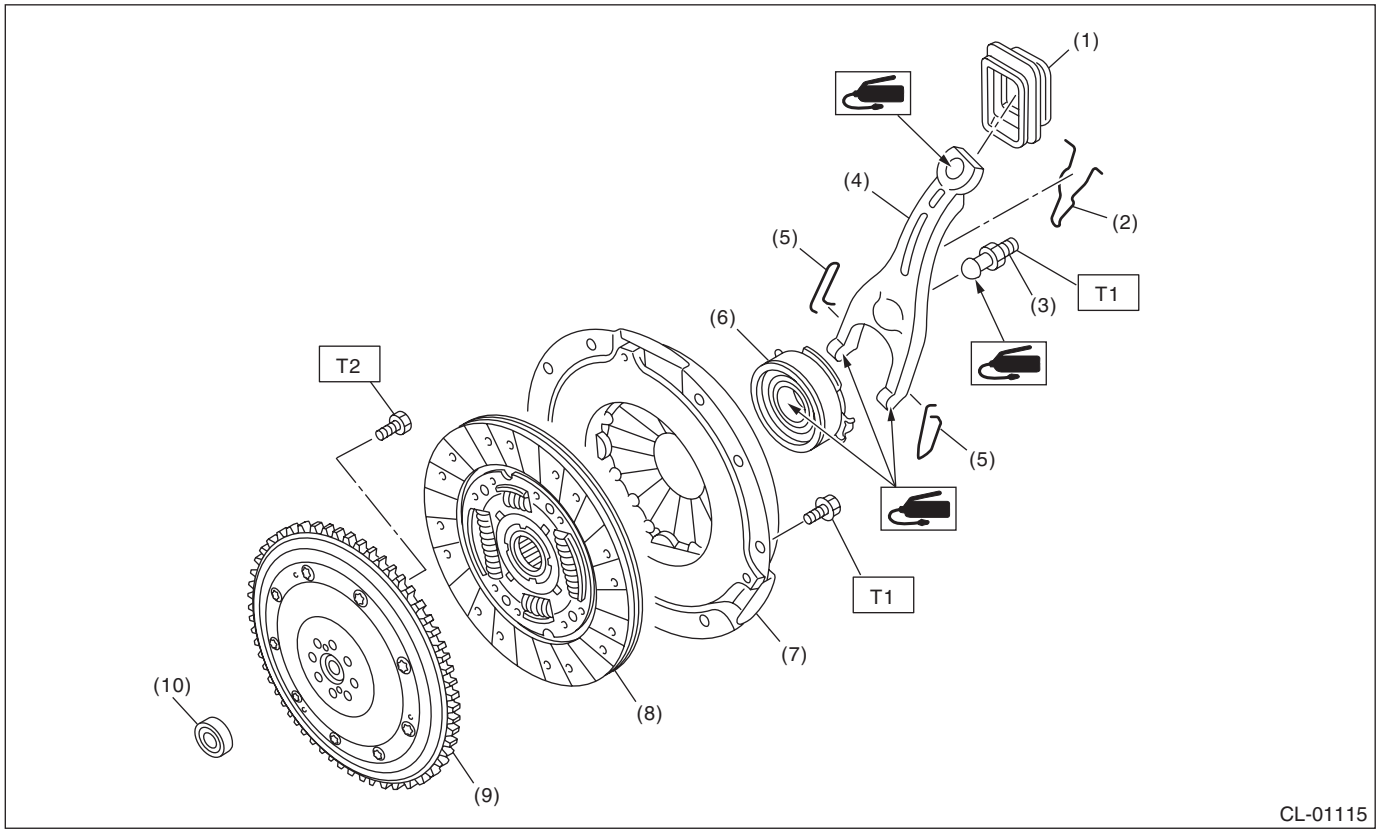
1. General Description

A: SPECIFICATION

Model			2.0 L
Transmission type			5MT
Clutch cover	Type		Push type
	Diaphragm set load N (kgf, lbf)		5,688 (580, 1,279)
Clutch disc	Facing material		Woven (non-asbestos)
	O.D. × I.D. × Thickness mm (in)	Flywheel side	225 × 150 × 3.2 (8.86 × 5.9 × 0.126)
		Clutch cover side	225 × 150 × 3.5 (8.86 × 5.9 × 0.138)
	Spline outer diameter mm (in)		25.2 (0.992), (number of teeth: 24)
	Depth of rivet head mm (in)	Flywheel side	1.35 — 1.95 (0.053 — 0.077)
		Clutch cover side	1.65 — 2.25 (0.065 — 0.089)
		Limit of sinking	0.8 (0.031)
	Deflection limit mm (in)		0.7 (0.028) at R = 110 (4.33)
Clutch release lever ratio			1.6
Release bearing			Grease-packed self-aligning
Clutch pedal	Full stroke mm (in)		130 — 135 (5.12 — 5.31)
	Free play mm (in)		4 — 11 (0.16 — 0.43)
Flywheel	Type		Flexible

B: COMPONENT

1. CLUTCH ASSEMBLY



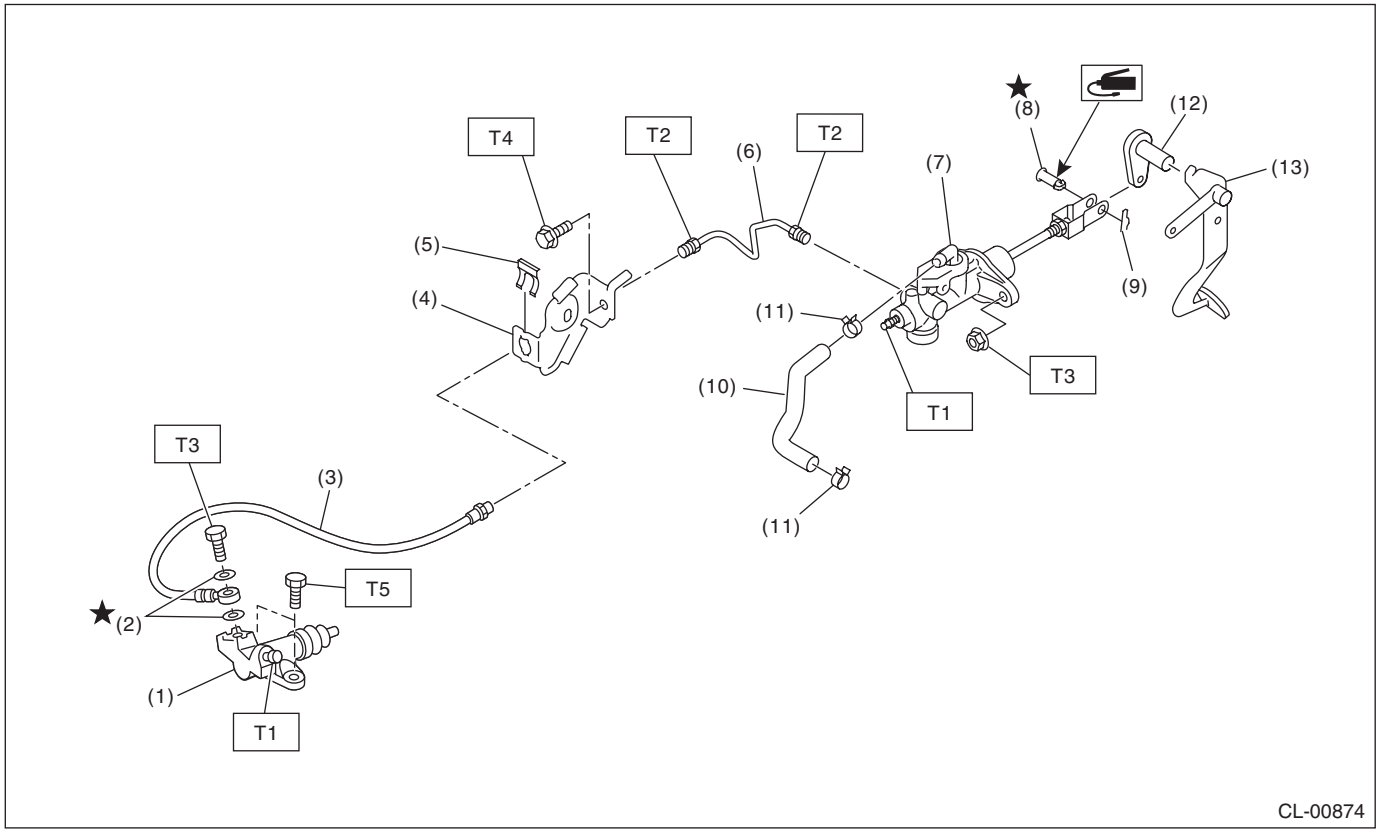
(1)	Dust cover	(6)	Release bearing
(2)	Lever spring	(7)	Clutch cover
(3)	Pivot	(8)	Clutch disc
(4)	Release lever	(9)	Flexible flywheel
(5)	Clip	(10)	Pilot bearing

Tightening torque: N·m (kgf-m, ft-lb)

T1: 16 (1.6, 11.8)

T2: <Ref. to CL-11, INSTALLATION, Flywheel.>

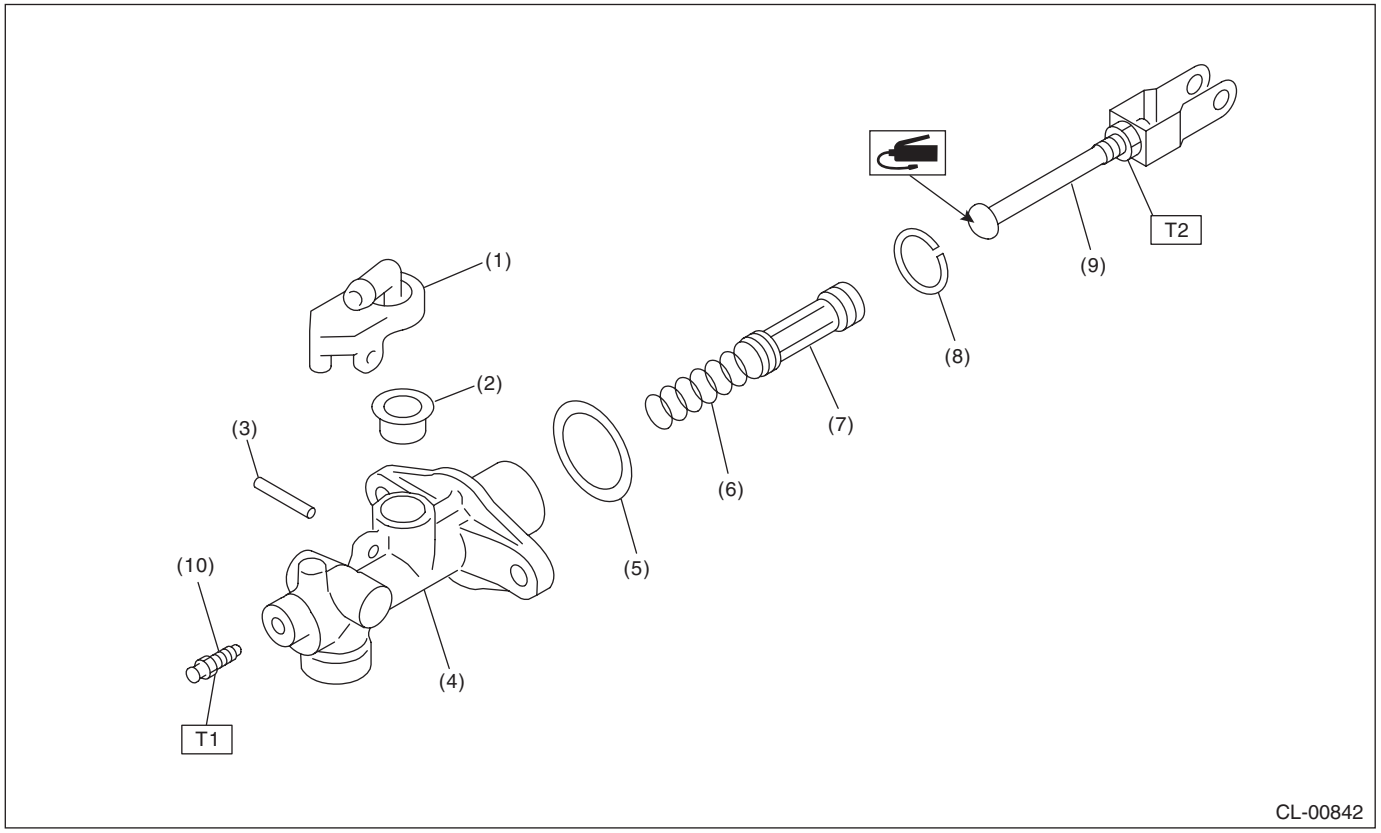
2. CLUTCH PIPE AND HOSE



(1)	Operating cylinder	(8)	Clevis pin
(2)	Gasket	(9)	Snap pin
(3)	Clutch hose	(10)	Tank hose
(4)	Bracket	(11)	Clamp
(5)	Clamp	(12)	Lever
(6)	Clutch pipe	(13)	Pedal
(7)	Master cylinder ASSY		

Tightening torque: N·m (kgf-m, ft-lb)
T1: 7.8 (0.8, 5.8)
T2: 15 (1.5, 11.1)
T3: 18 (1.8, 13.3)
T4: 25 (2.5, 18.4)
T5: 37 (3.8, 27.3)

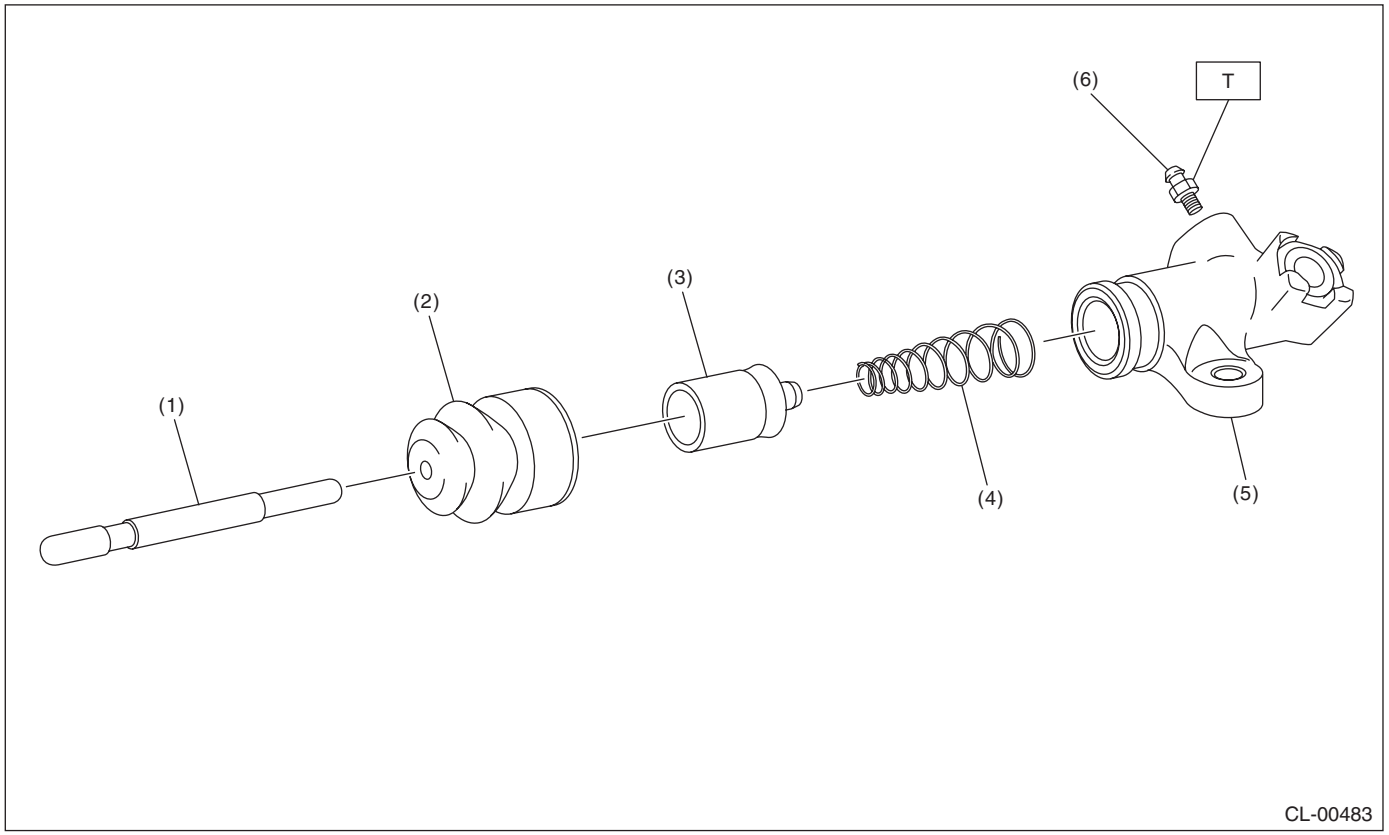
3. MASTER CYLINDER



(1)	Nipple	(6)	Return spring
(2)	Oil seal	(7)	Piston
(3)	Straight pin	(8)	Piston stop ring
(4)	Master cylinder	(9)	Push rod ASSY
(5)	Seat	(10)	Bleeder screw

Tightening torque: N·m (kgf-m, ft-lb)
T1: 7.8 (0.8, 5.8)
T2: 10 (1.0, 7.4)

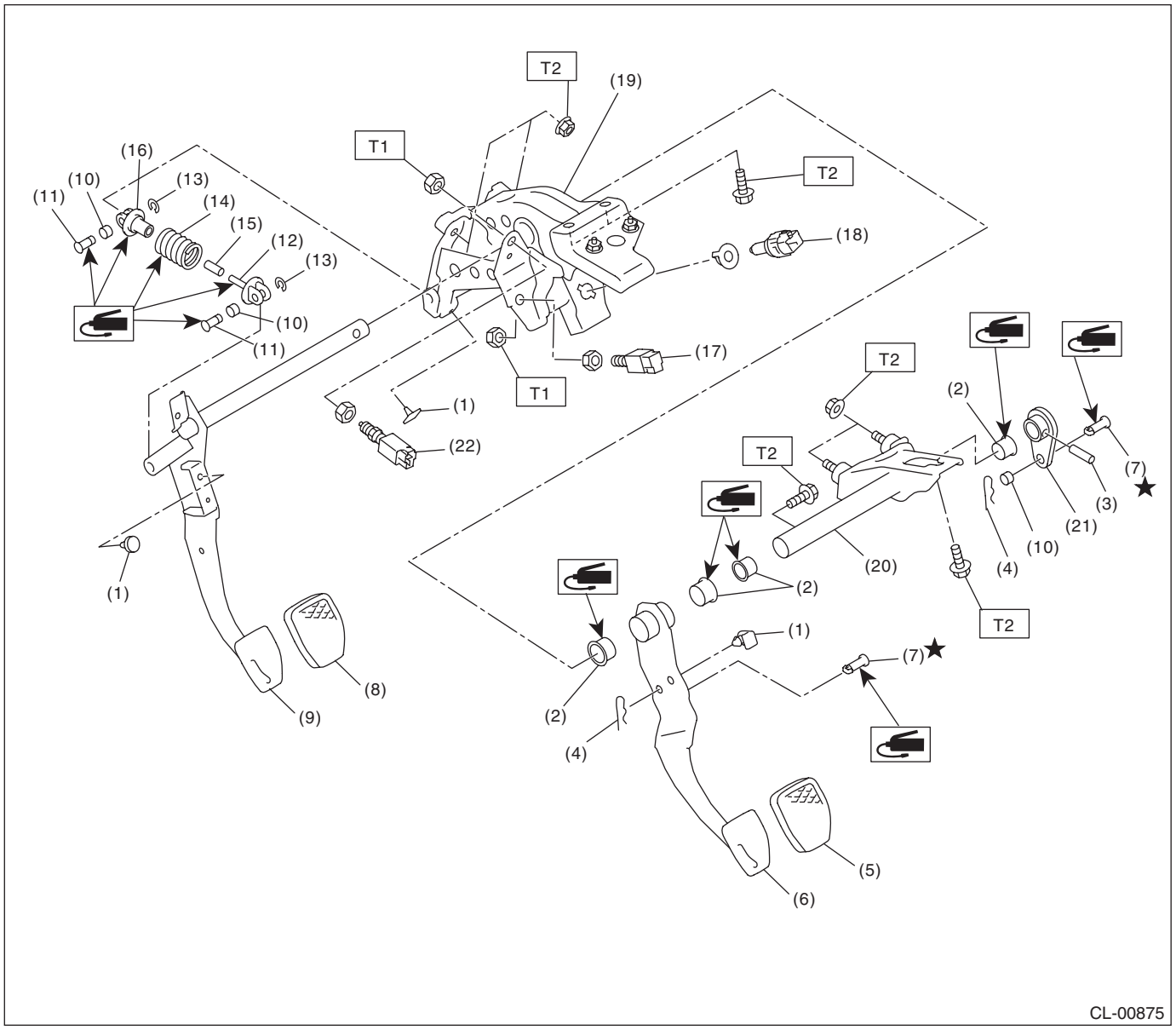
4. OPERATING CYLINDER



(1) Push rod
(2) Boot
(3) Piston
(4) Piston spring
(5) Operating cylinder
(6) Bleeder screw

Tightening torque: N·m (kgf-m, ft-lb)
T: 7.8 (0.8, 5.8)

5. CLUTCH PEDAL



(1) Stopper
(2) Bushing
(3) Spring pin
(4) Snap pin
(5) Brake pedal pad
(6) Brake pedal
(7) Clevis pin
(8) Clutch pedal pad
(9) Clutch pedal
(10) Bushing C
(11) Clutch clevis pin
(12) Assist rod A
(13) Clip
(14) Assist spring
(15) Assist bushing
(16) Assist rod B
(17) Clutch switch
(18) Stop light switch
(19) Pedal bracket
(20) Clutch master cylinder bracket
(21) Lever
(22) Clutch start switch

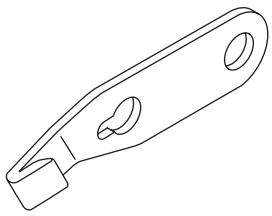
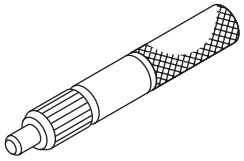
Tightening torque: N·m (kgf-m, ft-lb)
T1: 8 (0.8, 5.9)
T2: 18 (1.8, 13.3)

C: CAUTION

- Remove contamination including dirt and corrosion before removal, installation or disassembly.
- Keep the disassembled parts in order and protect them from dust and dirt.
- Before removal, installation or disassembly, be sure to clarify the failure. Avoid unnecessary removal, installation, disassembly and replacement.
- Vehicle components are extremely hot after driving. Be wary of receiving burns from heated parts.
- Use SUBARU genuine fluid, grease etc. or equivalent. Do not mix fluid, grease, etc. of different grades or manufacturers.
- Be sure to tighten fasteners including bolts and nuts to the specified torque.
- Apply grease onto sliding or revolving surfaces before installation.
- Before installing O-rings or snap rings, apply sufficient amount of fluid to avoid damage and deformation.
- Before securing a part in a vise, place cushioning material such as wood blocks, aluminum plate or cloth between the part and the vise.
- Keep fluid away from the vehicle body. If any fluid contacts the vehicle body, immediately flush the area with water.

D: PREPARATION TOOL

1. SPECIAL TOOL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-498497100	498497100	CRANKSHAFT STOPPER	Used for stopping rotation of the flywheel.
 ST-499747100	499747100	CLUTCH DISC GUIDE	Used for installing the clutch disc to the flywheel.

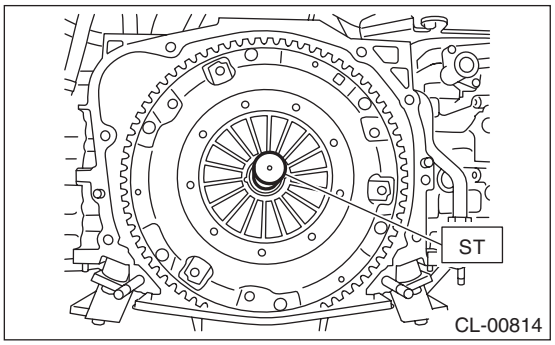
2. GENERAL TOOL

TOOL NAME	REMARKS
Circuit tester	Used for measuring resistance, voltage and current.
Dial gauge	Used for measuring clutch disc run-out.
Depth gauge	Used for measuring clutch disc wear.
Angle gauge	Used for tightening the flywheel.

2. Clutch Disc and Cover

A: REMOVAL

1) Remove the transmission assembly from the vehicle.
<Ref. to 5MT-22, REMOVAL, Manual Transmission Assembly.>
2) Attach the ST on the flywheel.
ST 499747100 CLUTCH DISC GUIDE



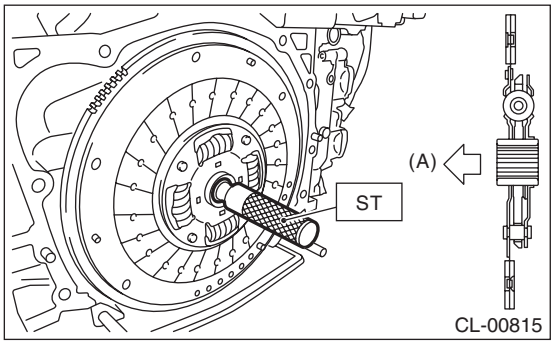
3) Remove the clutch cover and clutch disc.

NOTE:
• Take care not to allow oil to touch the clutch disc face.
• Do not disassemble the clutch cover or clutch disc.

B: INSTALLATION

1) Insert the ST into the clutch disc and the ST end into pilot bearing to install the clutch disc.

NOTE:
When installing the clutch disc, be careful to attach in the correct direction.
ST 499747100 CLUTCH DISC GUIDE

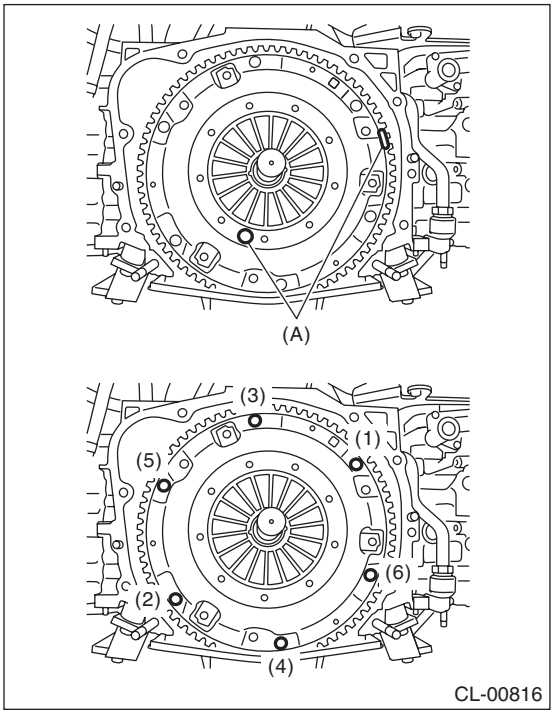


(A) Flywheel side

2) Install the clutch cover and tighten the bolts to the specified torque.

NOTE:
• When installing the clutch cover, position the clutch cover so that the spacing between the unbalance marks (paint mark) on the flywheel and clutch cover is 120° or more apart. (The unbalance mark indicates the direction of residual unbalance.)
• Temporarily tighten the bolts by hand. Each bolt should be tightened to the specified torque in a crisscross order.

Tightening torque:
16 N·m (1.6 kgf-m, 11.8 ft-lb)



(A) Unbalance mark (paint)

3) Remove the ST.
ST 499747100 CLUTCH DISC GUIDE
4) Install the transmission assembly. <Ref. to 5MT-25, INSTALLATION, Manual Transmission Assembly.>

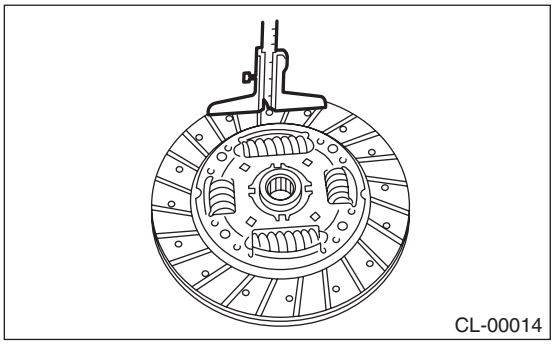
C: INSPECTION

1. CLUTCH DISC

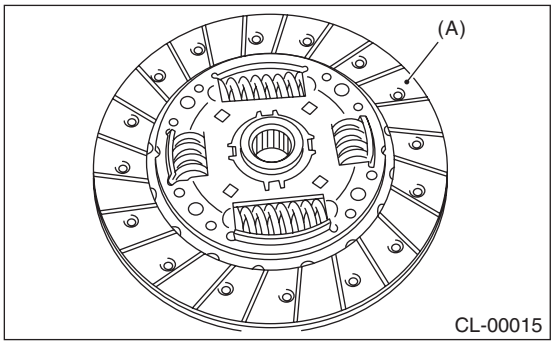
1) Facing wear
Measure the depth from the facing surface to the rivet head. Replace if the face is worn locally or worn down to less than the specified value.

Depth to rivet head:
Limit of sinking
0.8 mm (0.031 in)

NOTE:
Do not wash the clutch disc with any type of cleaning fluid.



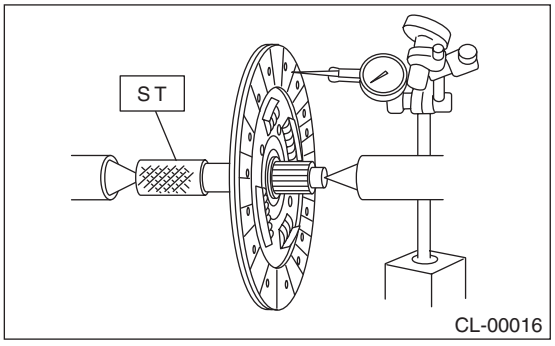
2) Hardened facing
Replace the clutch disc.
3) Oil soakage on facing
Replace the clutch disc and inspect the transmission front oil seal, transmission case mating surface, engine rear oil seal and other locations for oil leakage.



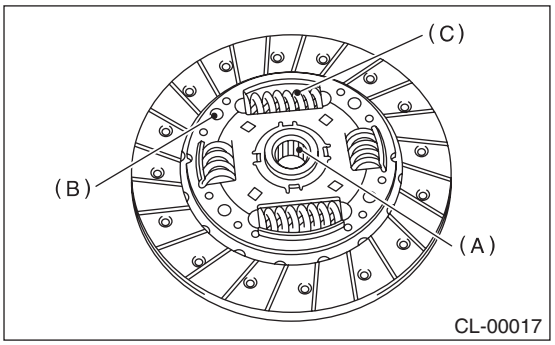
(A) Clutch facing

4) Deflection on facing
If deflection exceeds the specified value at the outer circumference of the facing, replace the clutch disc.
ST 499747100 CLUTCH DISC GUIDE

Limit for deflection:
0.7 mm (0.028 in) at R = 110 mm (4.33 in)



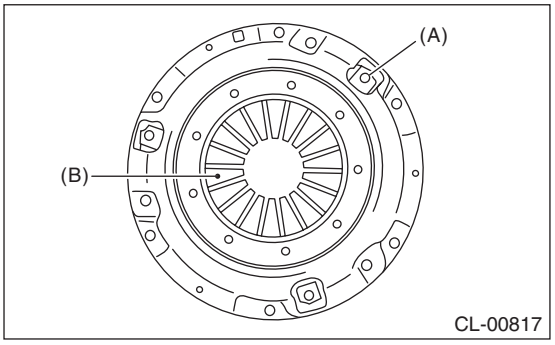
5) If there is spline wear, loose rivets, failed damper springs, etc., replace the clutch disc.



(A) Spline
(B) Rivet
(C) Damper spring

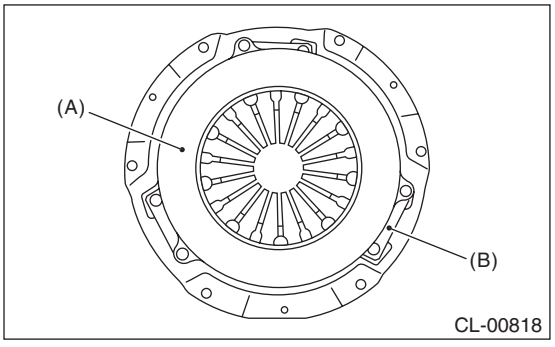
2. CLUTCH COVER

NOTE:
Visually check the following items without disassembling, and replace or repair if defective.
1) Loose thrust rivet
2) Damaged or worn bearing contact area at the center of diaphragm spring



(A) Thrust rivet
(B) Diaphragm spring

3) Damaged or worn disc contact surface of the pressure plate
4) Loose strap plate installation area
5) Worn diaphragm sliding area

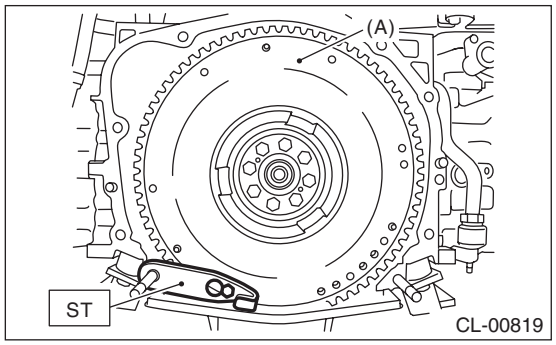


(A) Pressure plate
(B) Strap plate

3. Flywheel

A: REMOVAL

1) Remove the transmission assembly. <Ref. to 5MT-22, REMOVAL, Manual Transmission Assembly.>
2) Remove the clutch cover and clutch disc. <Ref. to CL-9, REMOVAL, Clutch Disc and Cover.>
3) Attach the ST.
ST 498497100 CRANKSHAFT STOPPER



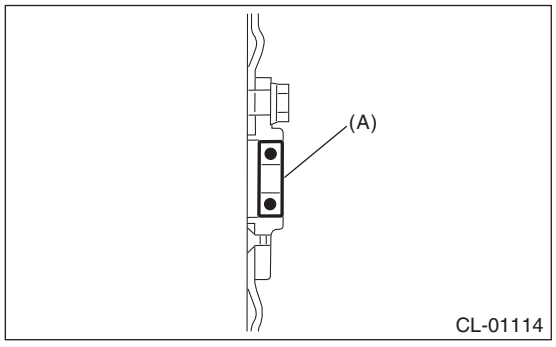
(A) Flywheel

4) Remove the flywheel and crankshaft position sensor plate.
5) Drive out the pilot bearing from flywheel.

B: INSTALLATION

1) Press-fit a new pilot bearing to a position between flush with the flywheel and 0.4 mm in depth from there.

CAUTION:
Do not press the bearing inner ring.

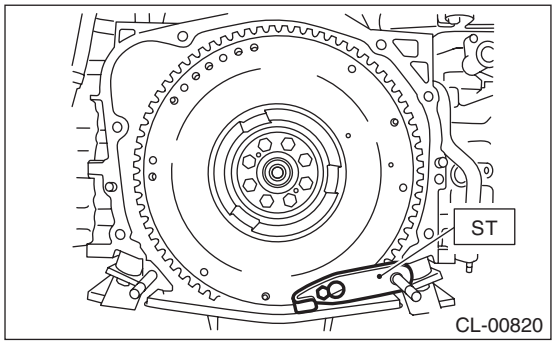


(A) Pilot bearing

2) Temporarily tighten the crankshaft position sensor plate and flywheel.

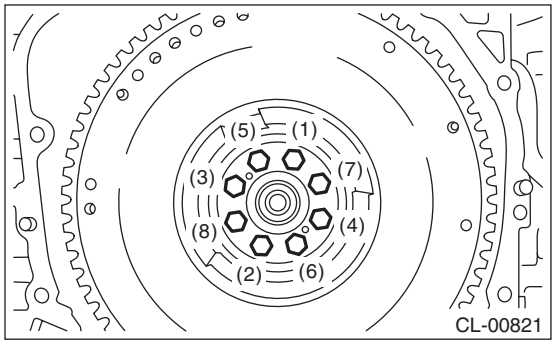
NOTE:
Align the knock pin hole of the crankshaft position sensor plate to the knock pin of the crankshaft to secure the knock pin.

3) Attach the ST.
ST 498497100 CRANKSHAFT STOPPER



4) Tighten the flywheel mounting bolts in two stages.
(1) Tighten the flywheel attachment bolts.

Tightening torque:
30 N·m (3.1 kgf-m, 22.1 ft-lb)



(2) While checking the tightening angle with the angle gauge, further tighten the flywheel mounting bolts.

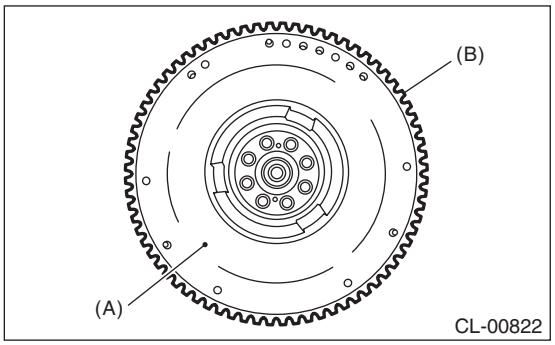
Tightening angle:
30° — 35°

5) Install the clutch disc and cover. <Ref. to CL-9, INSTALLATION, Clutch Disc and Cover.>
6) Install the transmission assembly. <Ref. to 5MT-25, INSTALLATION, Manual Transmission Assembly.>

C: INSPECTION

CAUTION:
Because the center pilot bearing is grease-sealed and is a non-lubrication type, do not wash with gasoline or solvents.

1) If there is damage or defectiveness in the facing sliding surface or ring gear, replace the flywheel.



(A) Flywheel
(B) Ring gear

2) Smoothness of rotation
Rotate the ball bearing while applying pressure in the thrust direction.

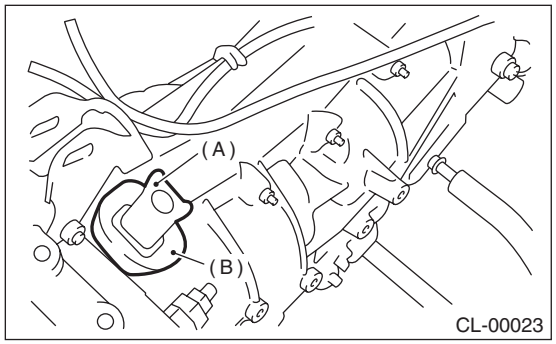
3) If noise or excessive play is noted, replace the pilot bearing.

4. Release Bearing and Lever

A: REMOVAL

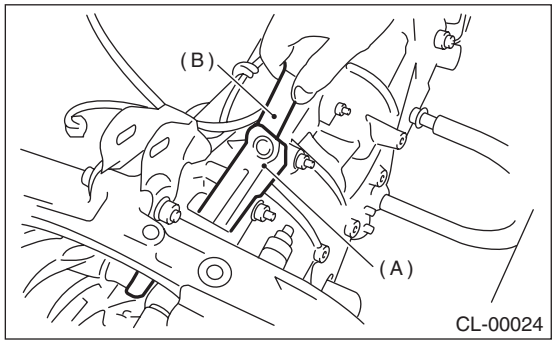
1) Remove the transmission assembly from the vehicle.
<Ref. to 5MT-22, REMOVAL, Manual Transmission Assembly.>
2) Remove the two clips from the release lever and remove the release bearing.

CAUTION:
Be careful not to deform the clips.
3) Remove the dust cover.



(A) Release lever
(B) Dust cover

4) Remove the lever spring with a screwdriver by accessing it through the clutch housing release lever hole. Then remove the release lever.



(A) Release lever
(B) Screwdriver

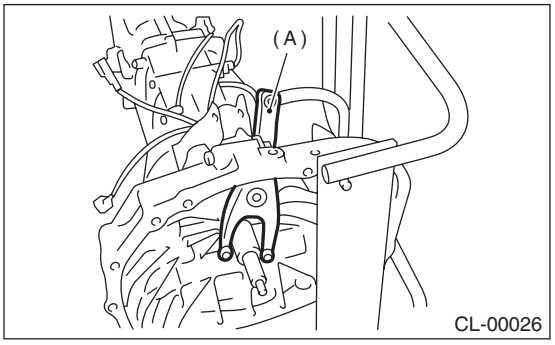
B: INSTALLATION

NOTE:
Apply the specified grease to lubricate to the following points before installation.
- Contact surface of lever and pivot
- Contact surface of lever and bearing
- Transmission main shaft spline
- Contact surface of bearing and transmission case

Grease
NICHIMOLY N-130 or equivalent

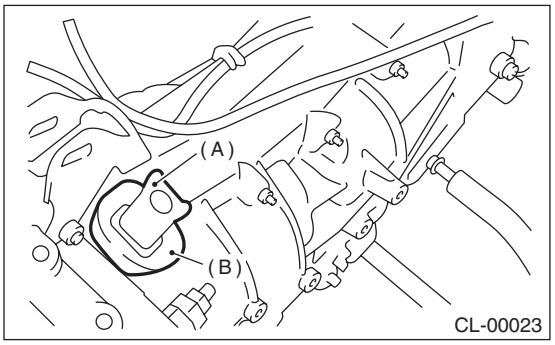
1) While pushing the release lever to the pivot and twisting it to both sides, fit the lever spring onto the raised portion of the pivot.

NOTE:
Observing from the main case hole, check that the lever spring is installed securely.



(A) Release lever

2) Install the release bearing and fasten it with two clips.
3) Install the dust cover.



(A) Release lever
(B) Dust cover

4) Check the release bearing for smooth movement by operating the release lever.
5) Apply grease to the contact point of the release lever and operating cylinder.

Grease
NICHIMOLY N-130 or equivalent
6) Install the transmission assembly. <Ref. to 5MT-25, INSTALLATION, Manual Transmission Assembly.>

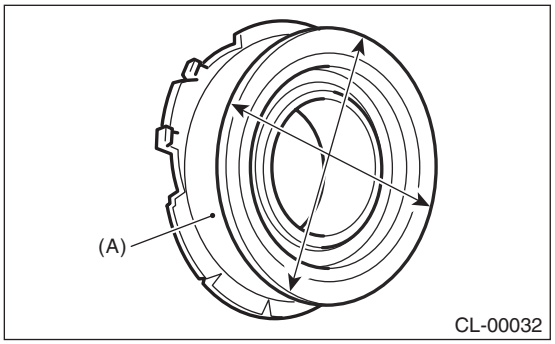
C: INSPECTION

1. RELEASE BEARING

CAUTION:
Since this bearing is grease-sealed and is a non-lubrication type, do not wash with gasoline or any other solvent when servicing the clutch.

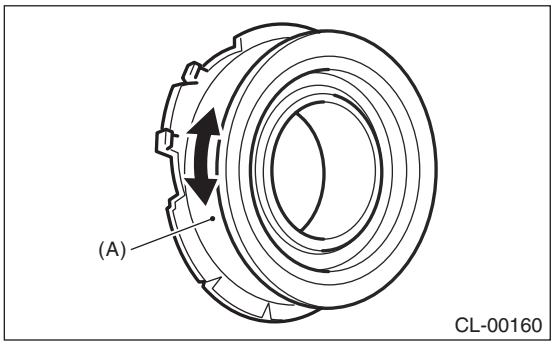
1) Check the bearing for smooth movement by applying force to the bearing in the radial direction.

Radial direction stroke:
1.6 mm (0.063 in)



(A) Bearing case

2) While applying force to the bearing in the rotational direction, check the bearing for smooth rotation.

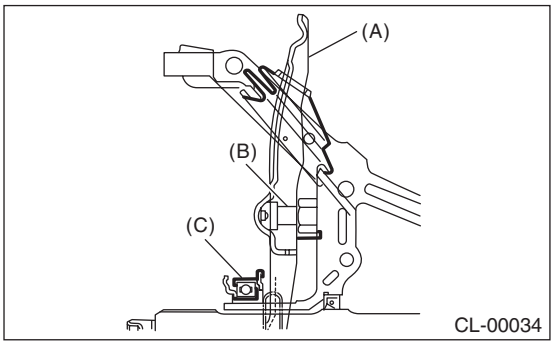


(A) Bearing case

3) Check for wear and damage at the bearing case surface in contact with the lever.

2. RELEASE LEVER

Check the pivot portion of the lever and the contact area with the release bearing case for wear.



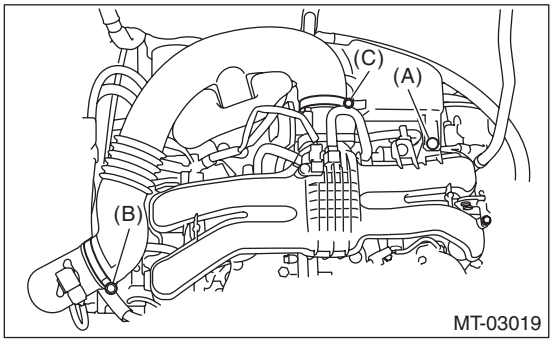
(A) Release lever
(B) Pivot
(C) Release bearing

5. Operating Cylinder

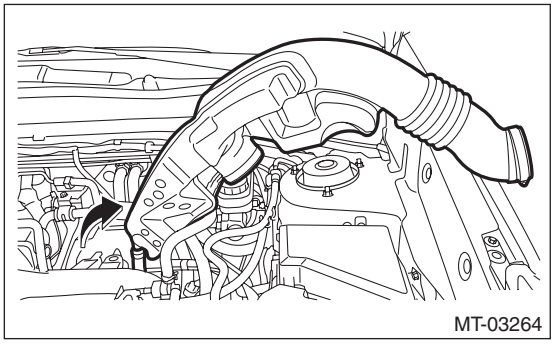
A: REMOVAL

CAUTION:
Clutch fluid spilled on the vehicle body will harm the paint surface; wash it off with water and wipe clean quickly if spilled.

1) Remove the clip (A) from the air intake boot.
2) Loosen the clamp (B) connecting the air intake boot and air cleaner case (rear).
3) Loosen the clamp (C) which connects the air intake boot and throttle body.

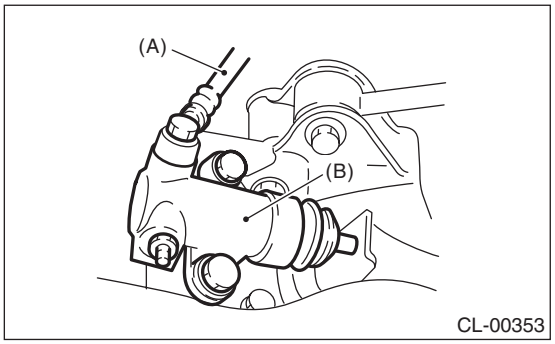


4) Remove the air intake boot from the throttle body, and move it to the left side wheel apron.



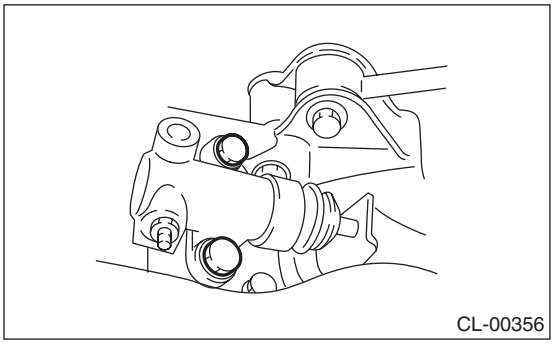
5) Disconnect the clutch hose.

CAUTION:
Cover the hose joint to prevent the clutch fluid from flowing out.



(A) Clutch hose
(B) Operating cylinder

6) Remove the operating cylinder.



B: INSTALLATION

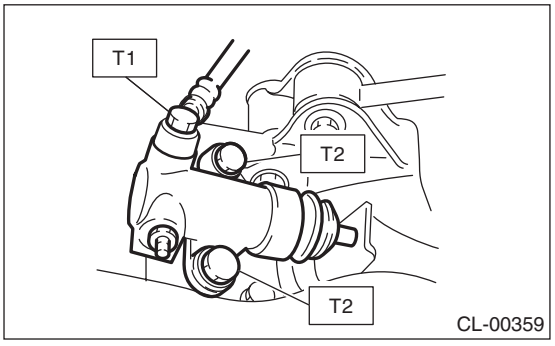
1) Install in the reverse order of removal.

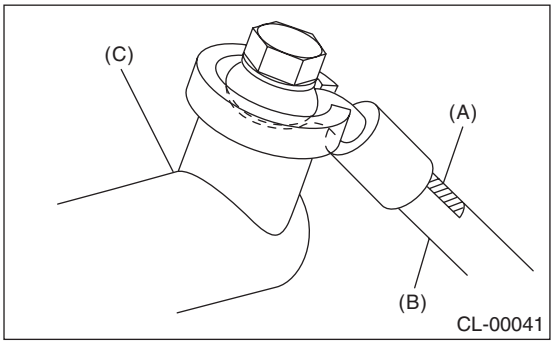
NOTE:
• Before installing the operating cylinder, apply grease to the contact point of the release lever and operating cylinder.

Grease:
NICHIMOLY N-130 or equivalent

• Be sure to install the clutch hose with the mark side facing upward.
• Be careful not to twist the clutch hose during installation.
• Use a new gasket.

Tightening torque:
T1: 18 N·m (1.8 kgf-m, 13.3 ft-lb)
T2: 37 N·m (3.8 kgf-m, 27.3 ft-lb)



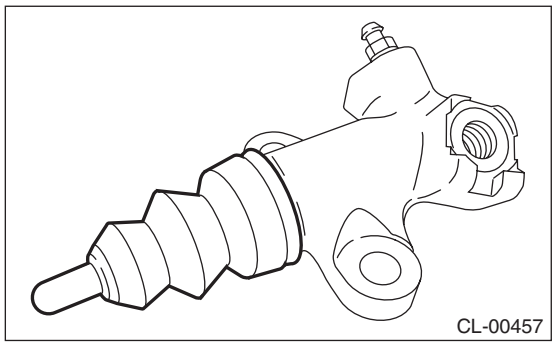


(A) Mark
(B) Clutch hose
(C) Operating cylinder

2) After bleeding air from the operating cylinder, ensure that the clutch operates properly. <Ref. to CL-23, Clutch Fluid Air Bleeding.>

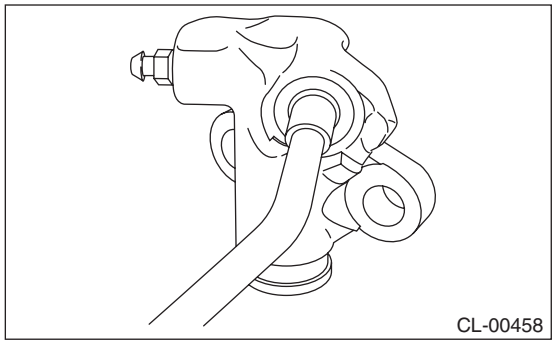
C: DISASSEMBLY

1) Remove the boot and push rod.

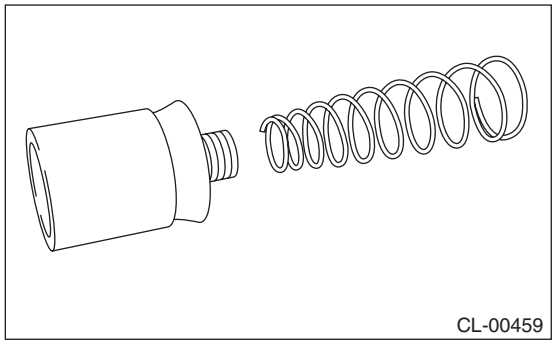


2) Apply compressed air through clutch hose attachment hole.

NOTE:
Face the piston hole down and place a piece of wood underneath to prevent the piston from popping out.



3) Separate the piston and piston spring.

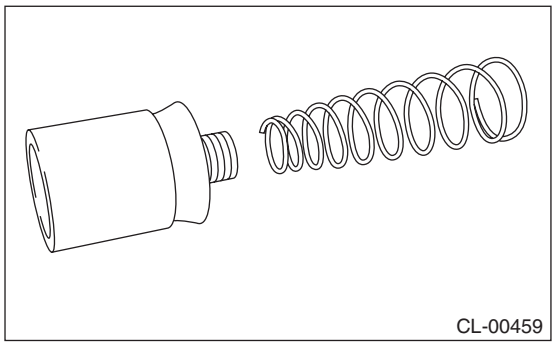


D: ASSEMBLY

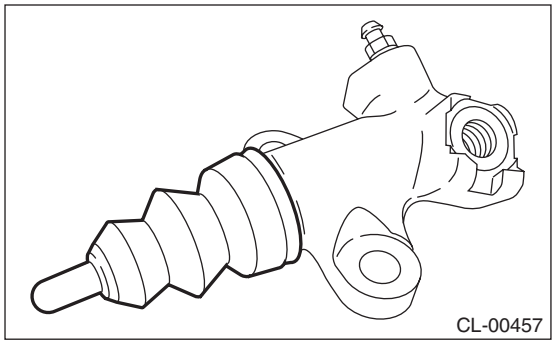
NOTE:
During assembly, apply hydraulic oil to all parts.

Recommended clutch fluid:
New FMVSS No. 116 DOT3 or DOT4

1) Install the piston spring.



2) Insert piston into the operating cylinder.
3) Install push rod to the boot.
4) Install the boot and push rod.



E: INSPECTION

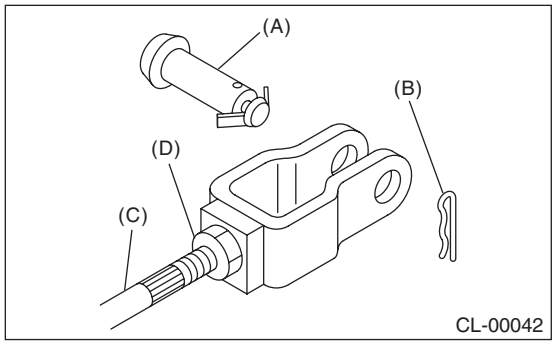
1) Check that the operating cylinder is not damaged. Replace the operating cylinder if it is damaged.
2) Check the clutch fluid leakage on the operating cylinder or the boot for damage. Replace the operating cylinder if clutch fluid leaks or boot damages are noted.

6. Master Cylinder

A: REMOVAL

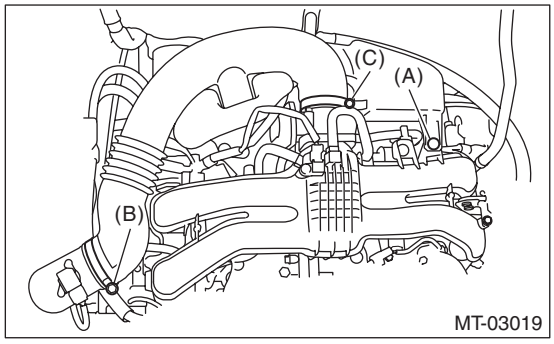
CAUTION:
Be careful not to spill the brake fluid. Brake fluid spilled on the vehicle body will harm the paint surface; wash it off with water and wipe clean quickly if spilled.

1) Drain the clutch fluid. <Ref. to CL-22, Clutch Fluid.>
2) Remove the cover assembly - instrument panel LWR driver. <Ref. to EI-76, REMOVAL, Instrument Panel Lower Cover.>
3) Remove the snap pin and clevis pin, and then separate the push rod of the master cylinder.

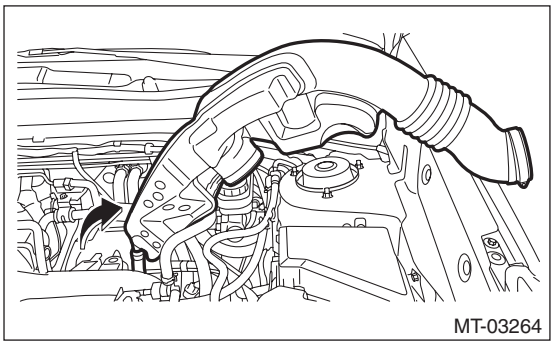


(A) Clevis pin
(B) Snap pin
(C) Push rod
(D) Lock nut

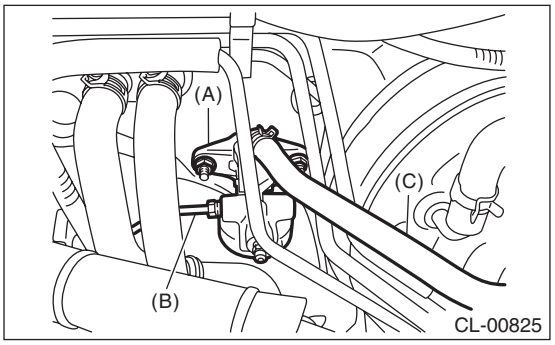
4) Remove the clip (A) from the air intake boot.
5) Loosen the clamp (B) connecting the air intake boot and air cleaner case (rear).
6) Loosen the clamp (C) which connects the air intake boot and throttle body.



7) Remove the air intake boot from the throttle body, and move it to the left side wheel apron.



8) Disconnect the clutch pipe and tank hose from the master cylinder.
9) Remove the master cylinder.

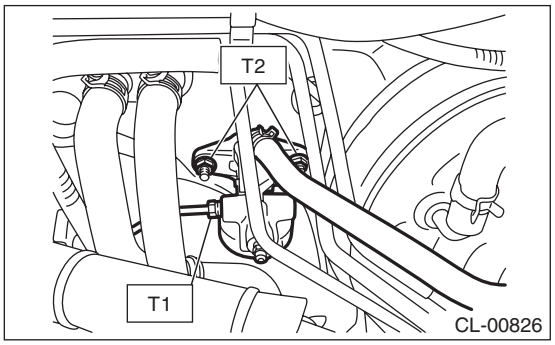


(A) Master cylinder
(B) Clutch pipe
(C) Tank hose

B: INSTALLATION

1) Install the master cylinder to the vehicle body, and connect the clutch pipe and tank hose.

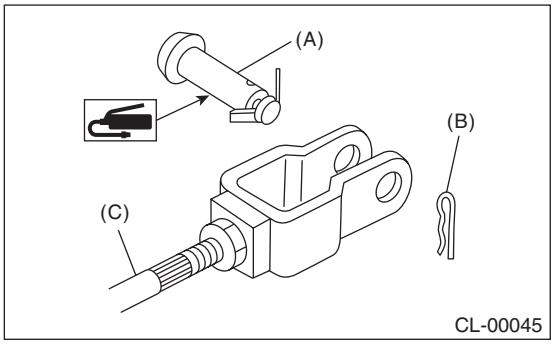
Tightening torque:
T1: 15 N·m (1.5 kgf-m, 11.1 ft-lb)
T2: 18 N·m (1.8 kgf-m, 13.3 ft-lb)



2) Connect the push rod of the master cylinder, and install the clevis pin and snap pin.

CAUTION:
Always use a new clevis pin.

NOTE:
Apply grease to the clevis pin.

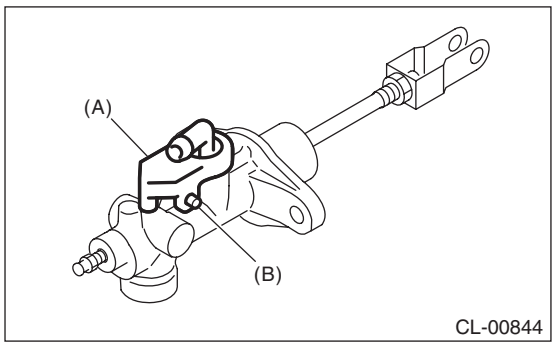


(A) Clevis pin
(B) Snap pin
(C) Push rod

3) Install the cover assembly - instrument panel LWR driver. <Ref. to EI-77, INSTALLATION, Instrument Panel Lower Cover.>
4) After bleeding air from the clutch system, ensure that the clutch operates properly. <Ref. to CL-23, Clutch Fluid Air Bleeding.>
5) Install the air intake boot assembly. <Ref. to IN(H4DO(w/o HEV))-12, INSTALLATION, Air Intake Boot.>

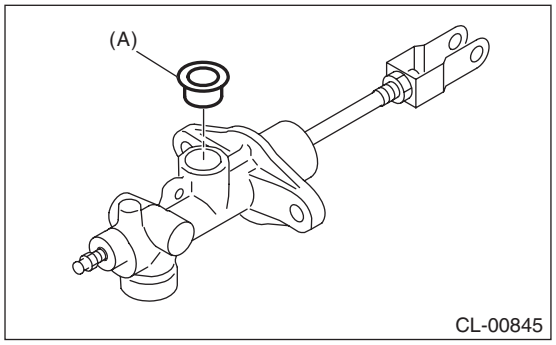
C: DISASSEMBLY

1) Remove the straight pin and nipple.



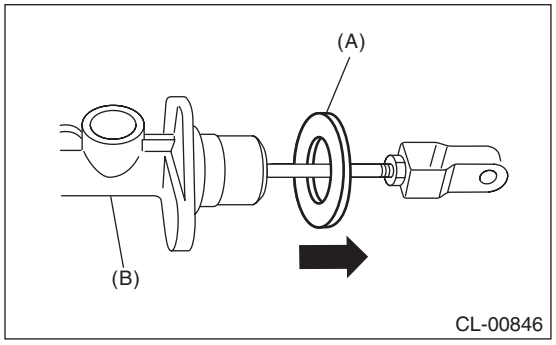
(A) Nipple
(B) Straight pin

2) Remove the oil seal.



(A) Oil seal

3) Move the seat towards the rear.



(A) Seat
(B) Master cylinder

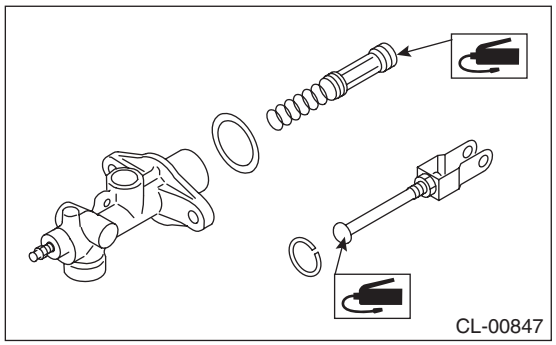
4) Remove the piston stop ring.

CAUTION:
When removing the piston stop ring, be careful to prevent the rod, washer, piston and return spring from popping out.

D: ASSEMBLY

1) Apply a coat of grease to the contact surfaces of the push rod and piston before installation.

Grease:
SILICONE GREASE G-40M or equivalent

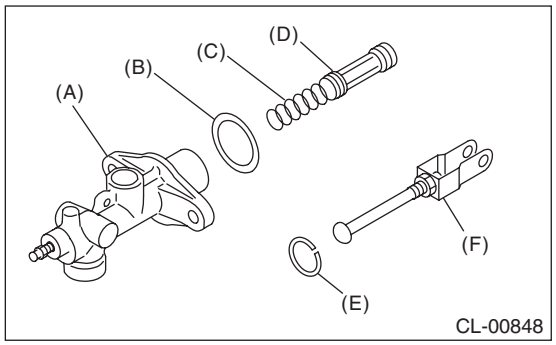


2) Assemble in the reverse order of disassembly.

Tightening torque:
10 N·m (1.0 kgf-m, 7.4 ft-lb)

E: INSPECTION

If any damage, deformation, wear, swelling, rust or other faults are found on the cylinder, piston, push rod, nipple, return spring, bleeder screw, seat or hose, replace the faulty part.

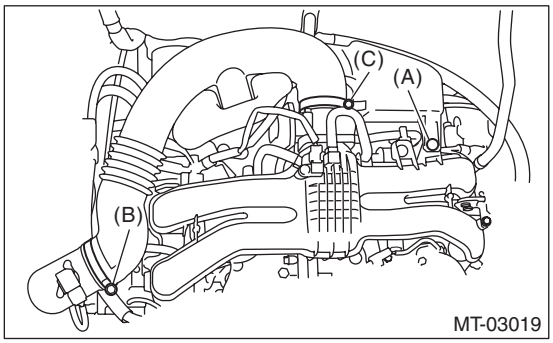


(A) Master cylinder body
(B) Seat
(C) Return spring
(D) Piston
(E) Piston stop ring
(F) Push rod ASSY

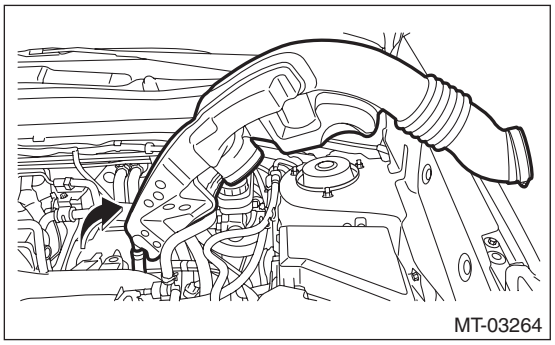
7. Clutch Pipe and Hose

A: REMOVAL

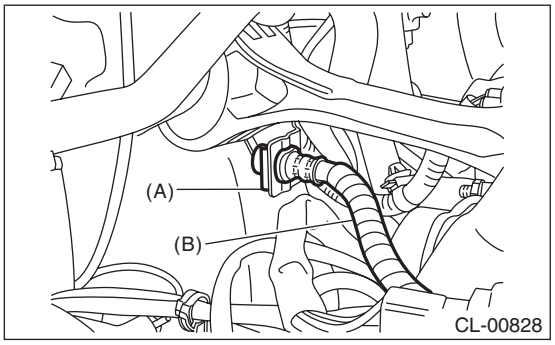
1) Remove the clip (A) from the air intake boot.
2) Loosen the clamp (B) connecting the air intake boot and air cleaner case (rear).
3) Loosen the clamp (C) which connects the air intake boot and throttle body.



4) Remove the air intake boot from the throttle body, and move it to the left side wheel apron.

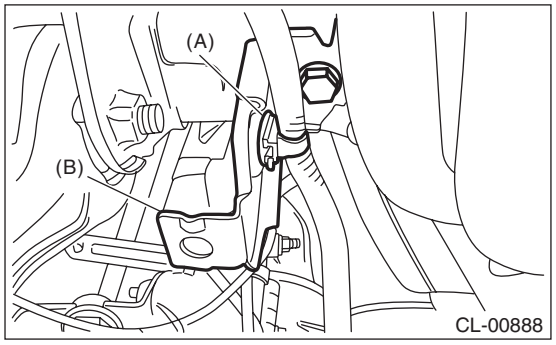


5) Drain the clutch fluid. <Ref. to CL-22, Clutch Fluid.>
6) Disconnect the clutch pipe from the clutch hose and master cylinder.
7) Remove the clamp and disconnect the clutch hose.



(A) Clamp
(B) Clutch hose

8) Remove the clutch hose from operating cylinder.
9) Remove the harness clip.



(A) Harness clip
(B) Bracket

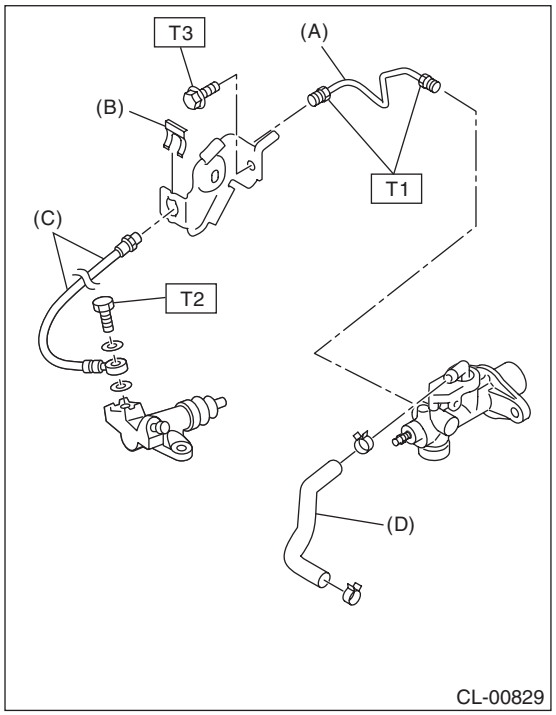
10) Remove the bracket.

B: INSTALLATION

Install in the reverse order of removal.

NOTE:
Bleed air from the clutch fluid. <Ref. to CL-23, Clutch Fluid Air Bleeding.>

Tightening torque:
T1: 15 N·m (1.5 kgf-m, 11.1 ft-lb)
T2: 18 N·m (1.8 kgf-m, 13.3 ft-lb)
T3: 25 N·m (2.5 kgf-m, 18.4 ft-lb)



(A) Clutch pipe
(B) Clamp
(C) Clutch hose
(D) Tank hose

C: INSPECTION

Check the pipes and hoses for breaks and damage. Check joints for fluid leakage. If crack, breakage or damage is found, repair or replace the faulty pipe or hose.

8. Clutch Fluid

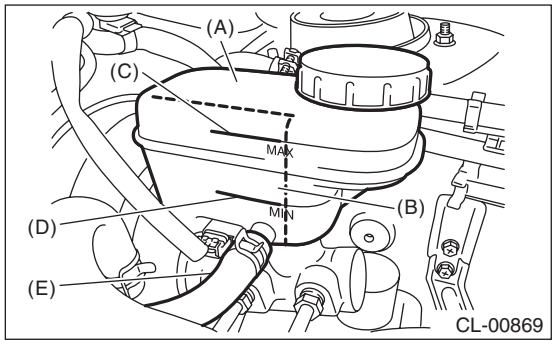
A: INSPECTION

CAUTION:
Be careful not to spill the brake fluid. Brake fluid spilled on the vehicle body will harm the paint surface; wash it off with water and wipe clean quickly if spilled.

1) Park the vehicle on a level surface.
2) Inspect the fluid level using the scale on the outside of the reservoir tank. If the level is below "MIN", add fluid to bring it up to "MAX", and also inspect for leakage.

CAUTION:
This reservoir tank has the brake fluid chamber and the clutch fluid chamber. When checking the fluid level, always check the fluid from the clutch fluid chamber side where the tank hose is connected.

Recommended brake fluid:
New FMVSS No. 116 DOT3 or DOT4



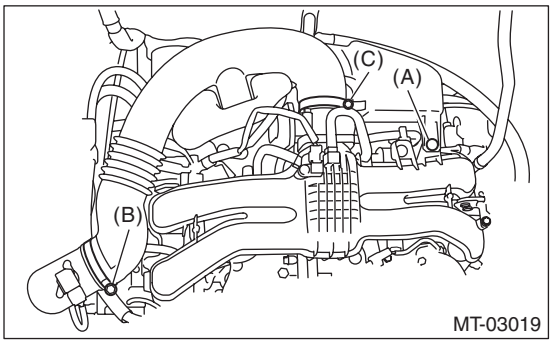
(A) Reservoir tank
(B) Clutch fluid chamber
(C) MAX. level
(D) MIN. level
(E) Tank hose

B: REPLACEMENT

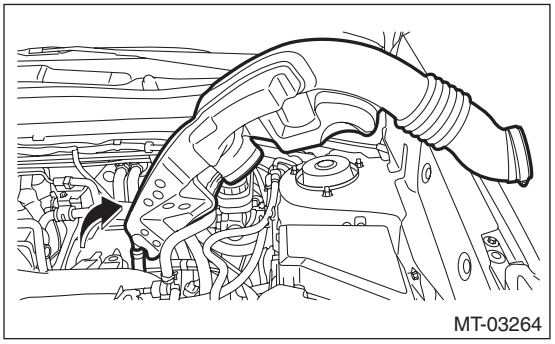
CAUTION:
• Be careful not to spill the brake fluid. Brake fluid spilled on the vehicle body will harm the paint surface; wash it off with water and wipe clean quickly if spilled.
• Use new FMVSS No. 116 DOT3 or DOT4.
• Cover the air bleeder with cloth to prevent brake fluid from being splashed on surrounding parts when loosening the bleeder.
• Avoid mixing brake fluid of different brands to prevent brake fluid performance from degrading.
• Be careful not to allow dirt or dust to enter the reservoir tank.

NOTE:
• During the bleeding operation, keep the reservoir tank filled with brake fluid to prevent entry of air.
• Clutch pedal must be operated very slowly.
• Bleed air from the oil line with help of a co-worker.
• The required amount of brake fluid is approximately 150 mL (5.1 US fl oz, 5.3 Imp fl oz) for total clutch system.

1) Remove the clip (A) from the air intake boot.
2) Loosen the clamp (B) connecting the air intake boot and air cleaner case (rear).
3) Loosen the clamp (C) which connects the air intake boot and throttle body.



4) Remove the air intake boot from the throttle body, and move it to the left side wheel apron.



5) Drain the brake fluid from the air bleeder of the operating cylinder.
6) Refill the reservoir tank with recommended brake fluid.

Recommended brake fluid:
New FMVSS No. 116 DOT3 or DOT4

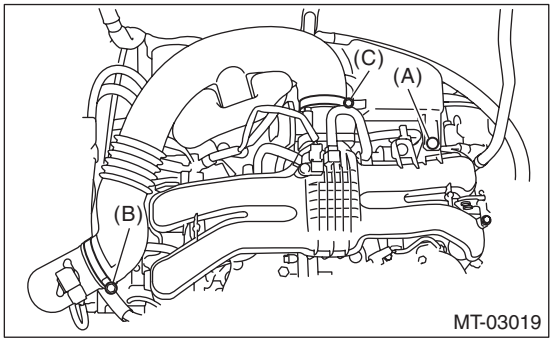
7) If necessary, bleed air from the clutch fluid. <Ref. to CL-23, Clutch Fluid Air Bleeding.>
8) Install the air intake boot assembly. <Ref. to IN(H4DO(w/o HEV))-12, INSTALLATION, Air Intake Boot.>

9. Clutch Fluid Air Bleeding

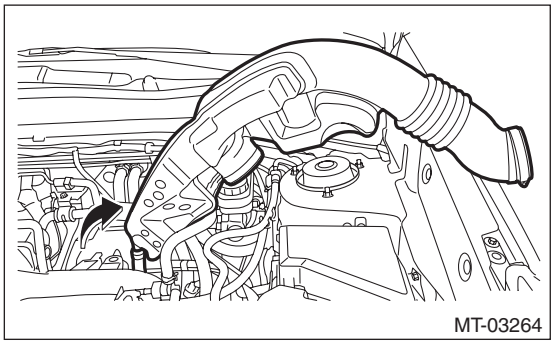
A: PROCEDURE

CAUTION:
Be careful not to spill the brake fluid. Brake fluid spilled on the vehicle body will harm the paint surface; wash it off with water and wipe clean quickly if spilled.

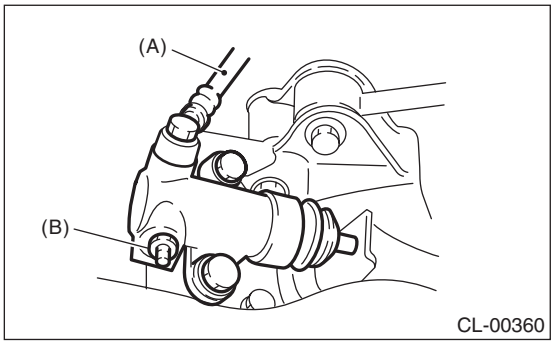
NOTE:
Bleed air from the oil line with help of a co-worker.
1) Remove the clip (A) from the air intake boot.
2) Loosen the clamp (B) connecting the air intake boot and air cleaner case (rear).
3) Loosen the clamp (C) which connects the air intake boot and throttle body.



4) Remove the air intake boot from the throttle body, and move it to the left side wheel apron.



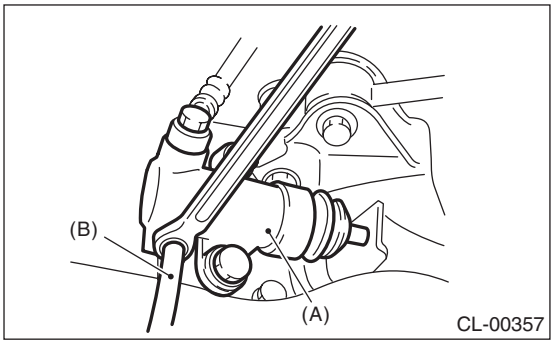
5) Fit one end of a vinyl tube into the air bleeder of the operating cylinder, and put the other end into a container.



(A) Clutch hose
(B) Air bleeder

6) Slowly depress the clutch pedal and keep it depressed. Then open the air bleeder to discharge air together with the brake fluid.
Release the air bleeder for 1 or 2 seconds. Next, with the bleeder closed, slowly release the clutch pedal.

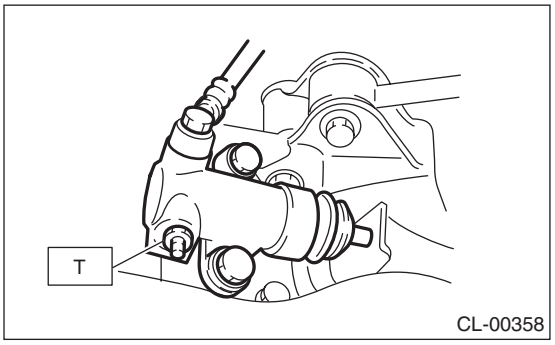
CAUTION:
Cover the bleeder with cloth to prevent brake fluid from being splashed on surrounding parts when loosening the bleeder.



(A) Operating cylinder
(B) Vinyl tube

7) Repeat procedure 6), until there are no more air bubbles appearing from the air bleeder.
8) Tighten the air bleeder.

Tightening torque:
T: 7.8 N·m (0.8 kgf-m, 5.8 ft-lb)

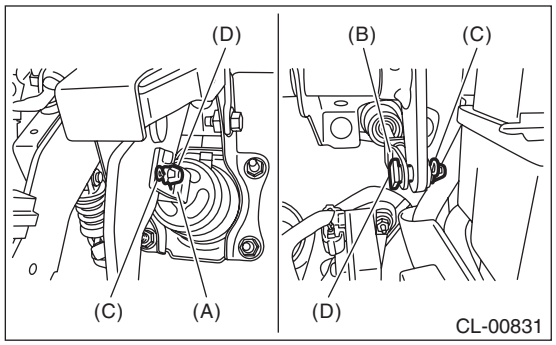


9) After stepping on the clutch pedal, make sure that there are no leaks evident in the entire clutch system.
10) After bleeding the air from clutch system, ensure that the clutch operates properly.
11) Install the air intake boot assembly. <Ref. to IN(H4DO(w/o HEV))-12, INSTALLATION, Air Intake Boot.>

10.Clutch Pedal

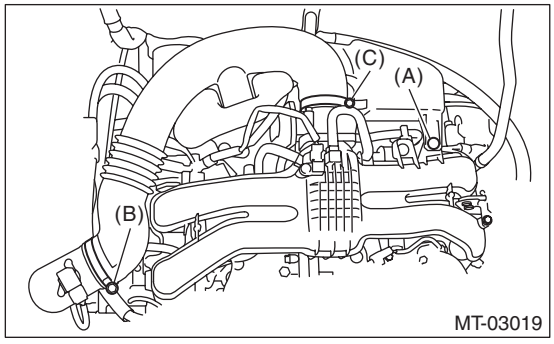
A: REMOVAL

1) Disconnect the ground cable from battery.
2) Remove the steering column. <Ref. to PS-19, REMOVAL, Steering Column.>
3) Disconnect the connector from the stop light switch and clutch switch.
4) Remove the snap pins from clevis pins which secure the lever to the push rod and operating rod.
5) Pull out the clevis pins which secures the lever to the push rod and operating rod.

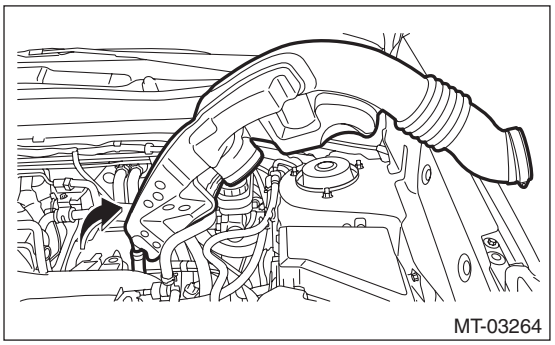


(A) Operating rod
(B) Push rod
(C) Snap pin
(D) Clevis pin

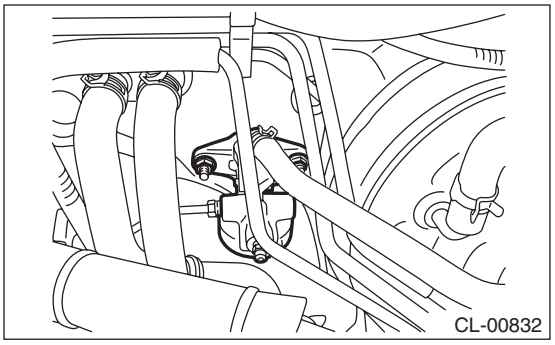
6) Remove the clip (A) from the air intake boot.
7) Loosen the clamp (B) connecting the air intake boot and air cleaner case (rear).
8) Loosen the clamp (C) which connects the air intake boot and throttle body.



9) Remove the air intake boot from the throttle body, and move it to the left side wheel apron.



10) Remove the nut which secures the clutch master cylinder.



11) Remove the bolts and nuts which secure the brake pedal and clutch pedal, and remove the pedal assembly.

NOTE:
Hold the clutch master cylinder with a wire or a string to avoid the clutch pipe from bending.

B: INSTALLATION

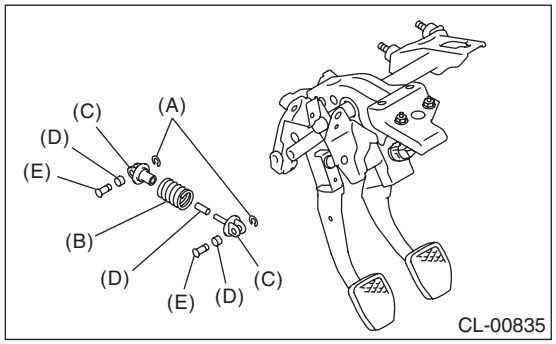
1) Install in the reverse order of removal.

Tightening torque:
18 N·m (1.8 kgf-m, 13.3 ft-lb)

CAUTION:
Always use a new clevis pin.
2) Adjust the clutch pedal after installation. <Ref. to CL-26, ADJUSTMENT, Clutch Pedal.>

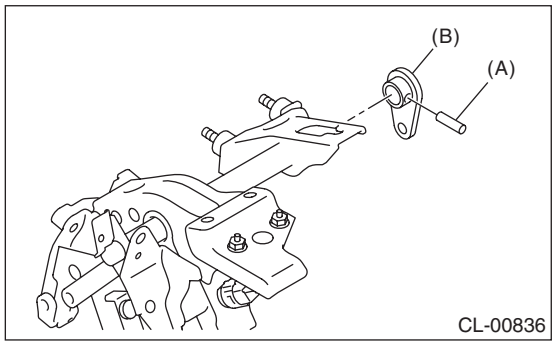
C: DISASSEMBLY

1) Remove the clutch switches.
2) Remove the clip, assist spring, rod and bushing.



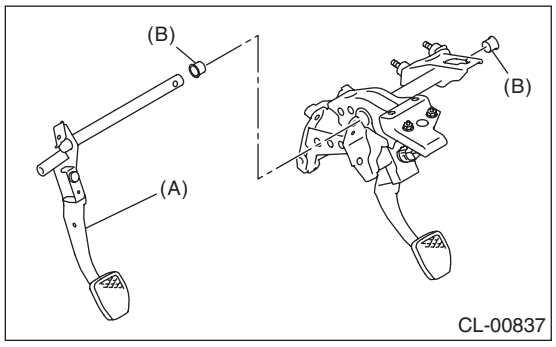
(A) Clip
(B) Assist spring
(C) Assist rod
(D) Bushing
(E) Clevis pin

3) Remove the spring pin and lever.



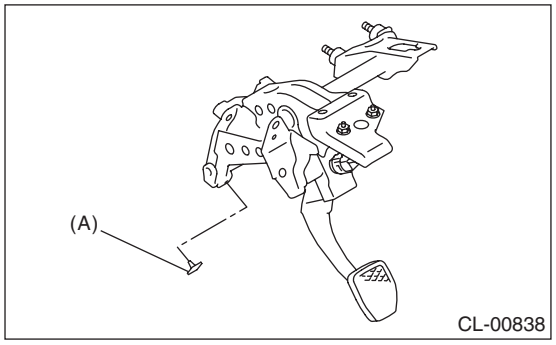
(A) Spring pin
(B) Lever

4) Remove the clutch pedal and bushings.



(A) Clutch pedal
(B) Bushing

5) Remove the stopper.



(A) Stopper

6) Remove the clutch pedal pad.

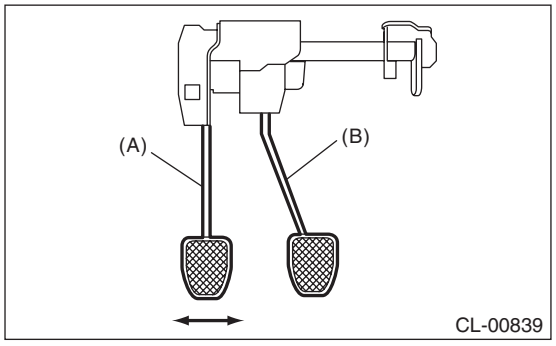
D: ASSEMBLY

1) Install the stopper and pedal pad to the clutch pedal.
2) Install the clutch switch to the pedal bracket.
3) Clean the pedal bushing holes of the clutch pedal and the brake pedal, apply grease, and install the pedal bushings.
4) Install the clutch pedal, brake pedal and lever to the pedal bracket, and fix with a spring pin.
5) Install the assist rod A, assist rod B, assist bushing and assist spring to the clutch pedal and pedal bracket.

E: INSPECTION

Move the clutch pedal pads in the lateral direction with a force of approximately 10 N (1 kgf, 2 lbf) to check that the clutch pedal deflection is within the service limit. If it exceeds the service limit, replace with new bushings.

Deflection of the clutch pedal:
Service limit
4.0 mm (0.157 in) or less



(A) Clutch pedal
(B) Brake pedal

F: ADJUSTMENT

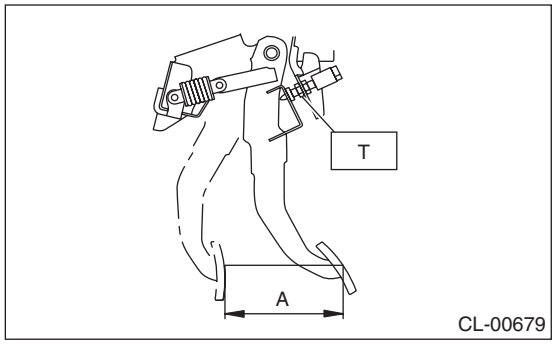
1) Turn the lock nut until the full stroke of clutch pedal becomes within the specification.

CAUTION:
When adjusting the full stroke of clutch pedal, do not turn the clutch switch.

NOTE:
If the lock nut cannot adjust the full stroke of clutch pedal to the specified value, adjust it by turning the master cylinder push rod.

Clutch pedal full stroke A:
130 — 135 mm (5.12 — 5.31 in)

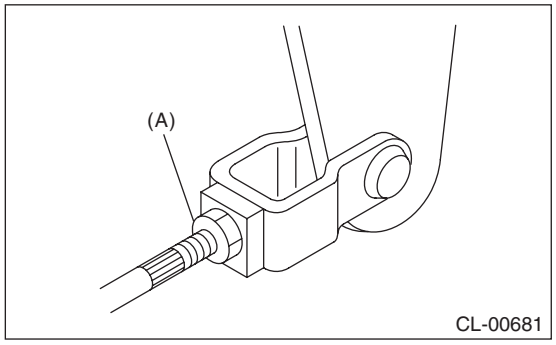
Tightening torque (Clutch switch lock nut):
T: 8 N·m (0.8 kgf-m, 5.9 ft-lb)



2) If the full stroke is not within the specified value, loosen the clutch switch lock nut to adjust.

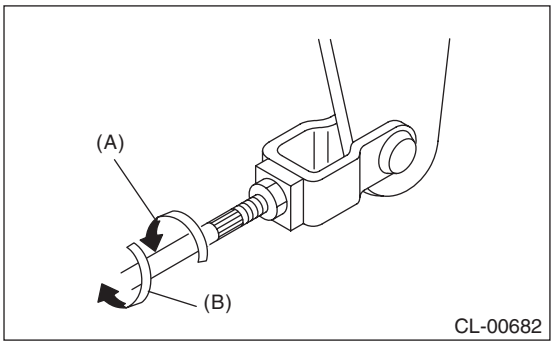
Tightening torque:
8 N·m (0.8 kgf-m, 5.9 ft-lb)

3) Loosen the push rod lock nuts.



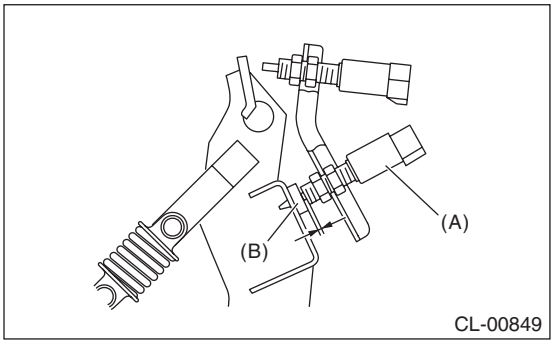
(A) Push rod lock nut

4) Make sure that the clutch pedal contacts the clutch pedal bracket stopper when the clutch pedal is at the maximum stroke position.



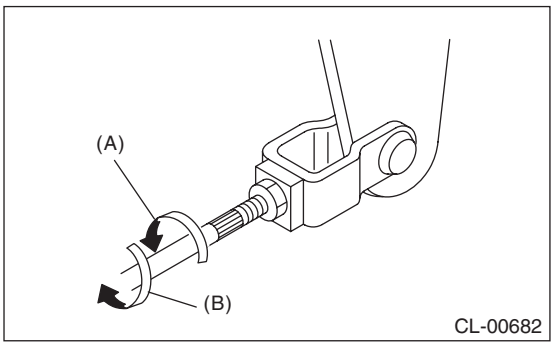
(A) In the longer direction
(B) In the shorter direction

5) Make sure that the clutch pedal contacts the clutch switch side when the pedal is released.
6) Turn the push rod to shorten until a clearance is gained on the clutch switch side.



(A) Clutch switch
(B) Stopper

7) Turn the push rod to lengthen until clutch pedal contacts the clutch switch.
8) Turn further in the direction that will shorten the push rod by 270°.

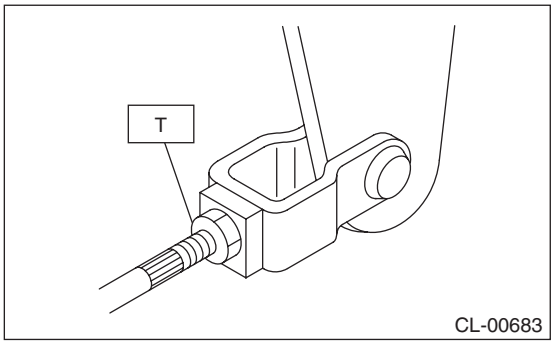


(A) In the longer direction
(B) In the shorter direction

9) Check that the clevis pin moves smoothly by moving it in the left and right directions.

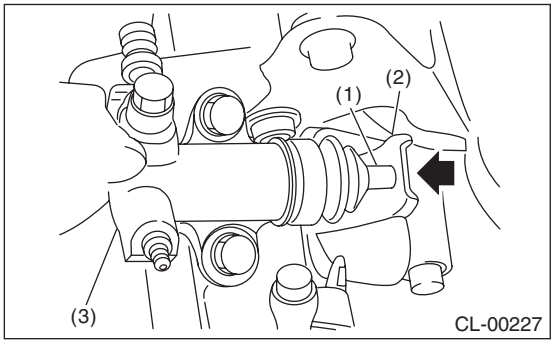
10) Tighten the push rod lock nut.

Tightening torque (Push rod lock nut):
T: 10 N·m (1.0 kgf-m, 7.4 ft-lb)



11) Depress and release the clutch pedal two or three times to ensure that the clutch pedal and release lever operate smoothly. If the clutch pedal and release lever do not operate smoothly, bleed air from the clutch hydraulic system. <Ref. to CL-23, Clutch Fluid Air Bleeding.>
12) Measure the clutch pedal full stroke length again to ensure that it is within specifications. If it is not within specifications, repeat adjustment procedures again from the beginning.

Clutch pedal full stroke:
130 — 135 mm (5.12 — 5.31 in)
13) Push the release lever until the operating cylinder push rod retracts. Check that the clutch fluid level in the reservoir tank increases.



(1) Push rod
(2) Release lever
(3) Operating cylinder

14) If the clutch fluid level increases, hydraulic clutch play is correct.
15) If the clutch fluid level does not increase or push rod does not retract, readjust the clutch pedal.
16) Check the fluid level using the scale on the reservoir tank. <Ref. to CL-22, INSPECTION, Clutch Fluid.>

11.Clutch Switch

A: REMOVAL

1) Disconnect the ground cable from battery.
2) Remove the cover assembly - instrument panel LWR driver. <Ref. to EI-76, REMOVAL, Instrument Panel Lower Cover.>
3) Disconnect the connector of clutch switch.
4) Remove the clutch switches.

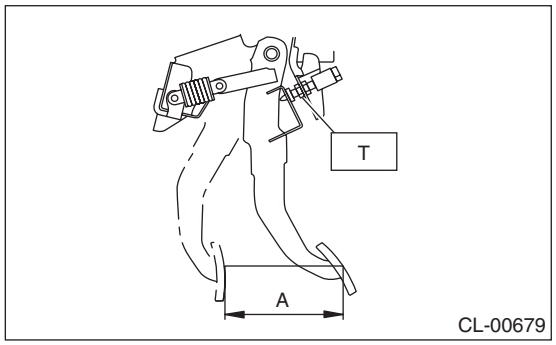
B: INSTALLATION

1. CLUTCH SWITCH

1) Move the clevis pin of push rod to left and right, retain it at the position where it moves smoothly, and measure the clutch pedal stroke.

Clutch pedal full stroke A:
130 — 135 mm (5.12 — 5.31 in)

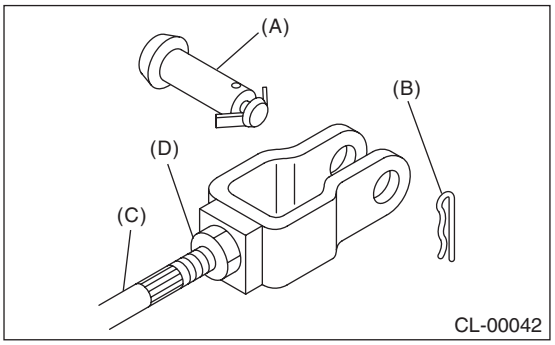
Tightening torque:
T: 8 N·m (0.8 kgf-m, 5.9 ft-lb)



2) If the clutch pedal stroke is out of specification, adjust the stroke. <Ref. to CL-26, ADJUSTMENT, Clutch Pedal.>
3) Connect the clutch switch connector.
4) Thereafter, install in the reverse order of removal.

2. CLUTCH START SWITCH

1) Remove the snap pin and clevis pin connecting the clutch pedal and operating rod.

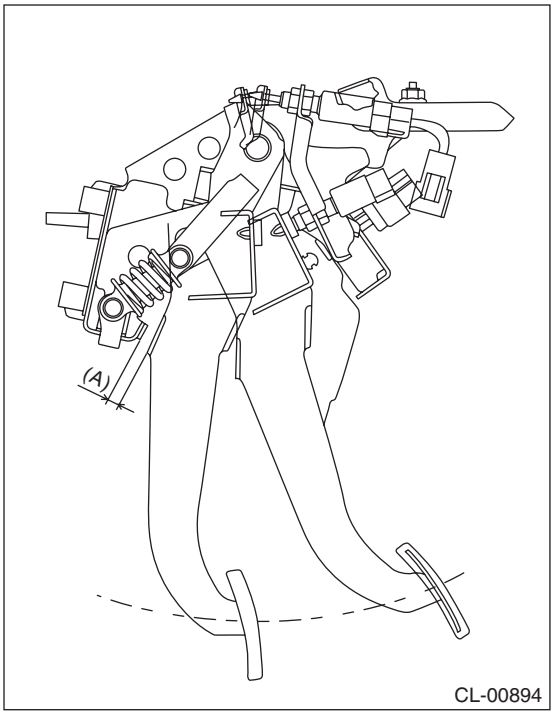


(A) Clevis pin
(B) Snap pin
(C) Push rod
(D) Lock nut

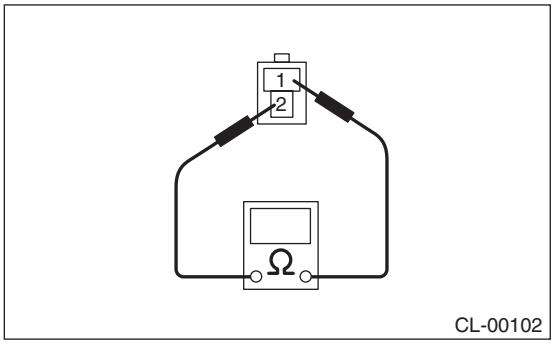
2) Install the clutch start switch so that the clutch switch turns on when the clearance between clutch pedal stopper and clutch pedal is within the specification described below.

Clearance A:
6.3 — 8.6 mm (0.25 — 0.34 in)

Tightening torque:
8 N·m (0.8 kgf-m, 5.9 ft-lb)

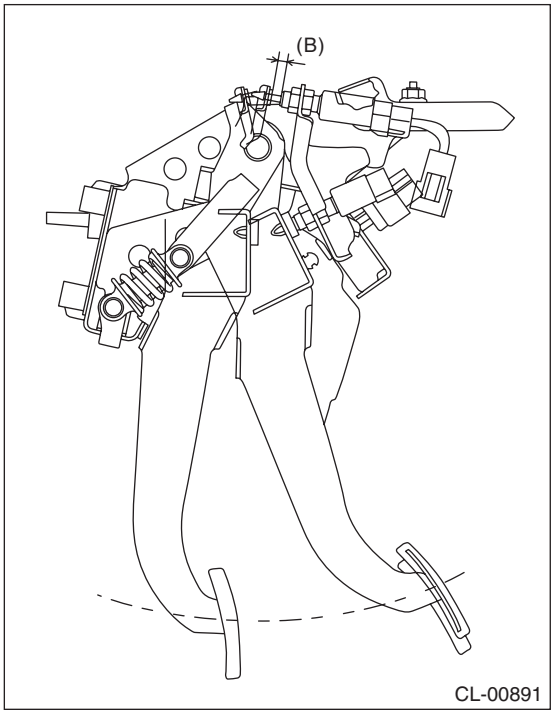


NOTE:
• Using a plate of the same thickness for the clearance facilitates the adjustment operation.
• Using the Subaru Select Monitor or a tester, check the position where the switch turns on.
Check the following figure for the terminal layout of the harness connector.



• When performing adjustment by the clearance between clutch start switch and clutch pedal plate, perform installation according to the following gap.

Clearance B:
8.6 — 9.0 mm (0.34 — 0.35 in)



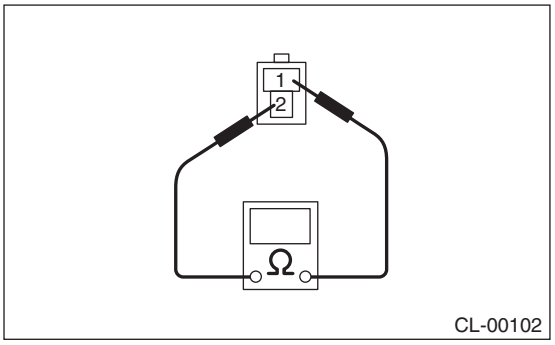
3) Connect the clutch start switch connector.
4) Make sure that engine does not start with clutch pedal not depressed.
5) Make sure that engine starts with clutch pedal depressed.
6) Thereafter, install in the reverse order of removal.

C: INSPECTION

1. CLUTCH START SWITCH

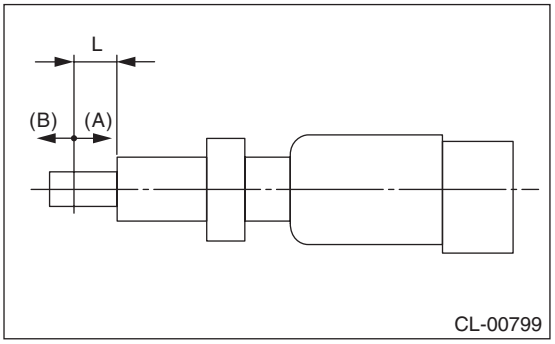
1) Perform the following inspections. If the clutch start switch does not operate normally, adjust the switch, and check it again. <Ref. to CL-30, ADJUSTMENT, Clutch Switch.>
• Make sure that engine does not start with clutch pedal not depressed.
• Make sure that engine starts with clutch pedal fully depressed.
2) When the clutch start switch does not operate normally even if it is adjusted, check the clutch start switch for continuity.
(1) Remove the clutch start switch. <Ref. to CL-28, REMOVAL, Clutch Switch.>
(2) Measure the resistance between terminal 1 and 2 of the switch. If the resistance is not at the standard value, replace the switch.

Condition	Terminal No.	Specified resistance
ON	No. 1 — No. 2	Less than 1 Ω
OFF	No. 1 — No. 2	1 MΩ or more



(3) Check that the switch is turned on and off in Dimension L.

Dimension L:
9 — 10 mm (0.35 — 0.39 in)

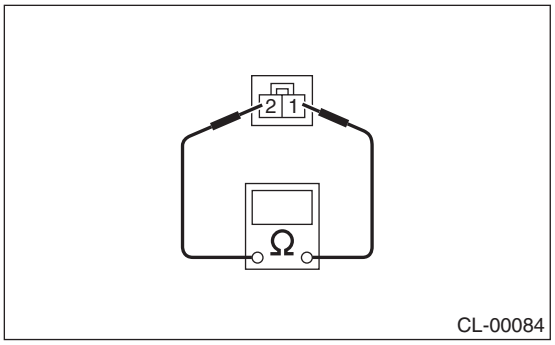


(A) ON
(B) OFF

2. CLUTCH SWITCH

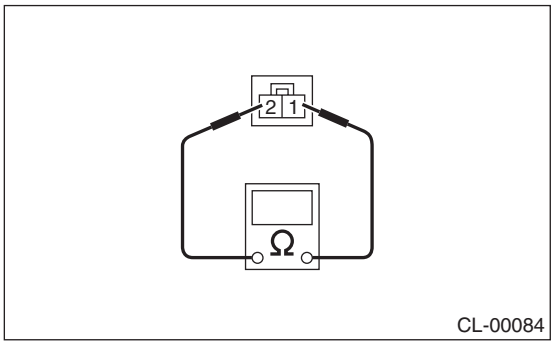
1) Check the clutch switch for continuity.
(1) Disconnect the connector of clutch switch.
(2) Measure the resistance between terminal 1 and 2 of the switch. If the resistance is not within the specification, inspect the clutch stroke and its installing condition, and check again.

Condition	Terminal No.	Specified resistance
When clutch pedal is depressed	No. 1 — No. 2	1 MΩ or more
When the clutch pedal is not depressed	No. 1 — No. 2	Less than 1 Ω



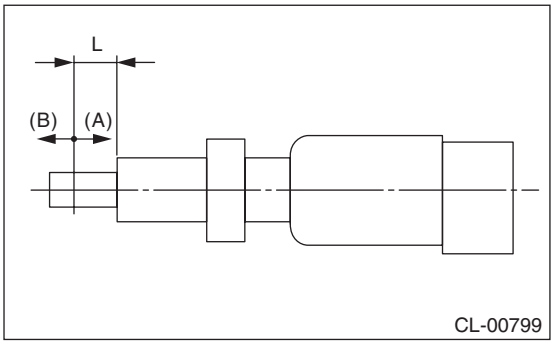
2) If the operation is not normal even when the clutch stroke and its installing condition is normal, check the continuity of the clutch switch.
(1) Remove the clutch switches. <Ref. to CL-28, REMOVAL, Clutch Switch.>
(2) Measure the resistance between terminal 1 and 2 of the switch. If the resistance is not at the standard value, replace the switch.

Condition	Terminal No.	Specified resistance
ON	No. 1 — No. 2	Less than 1 Ω
OFF	No. 1 — No. 2	1 MΩ or more



(3) Check that the switch changes between ON/OFF within L dimension.

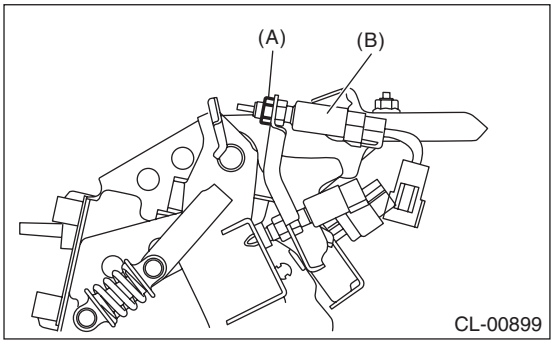
L dimension:
5 — 6.5 mm (0.2 — 0.26 in)



(A) ON
(B) OFF

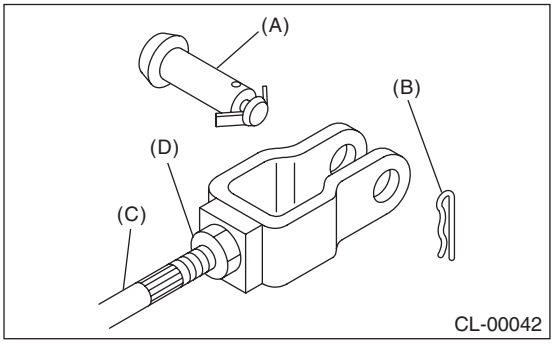
D: ADJUSTMENT

1) Loosen the lock nut of the clutch start switch.



(A) Lock nut
(B) Clutch start switch

2) Disconnect the harness connector of the clutch start switch.
3) Remove the snap pin and clevis pin connecting the clutch pedal and operating rod.

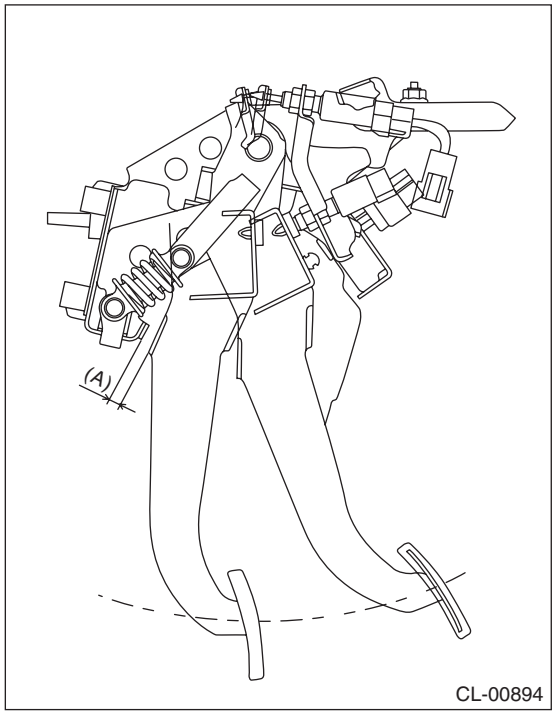


(A) Clevis pin
(B) Snap pin
(C) Push rod
(D) Lock nut

4) Adjust the clutch start switch so that the switch turns on when the clearance between clutch pedal stopper and clutch pedal is within the specification described below, and then tighten the lock nut.

Clearance A:
6.3 — 8.6 mm (0.25 — 0.34 in)

Tightening torque:
8 N·m (0.8 kgf-m, 5.9 ft-lb)



NOTE:
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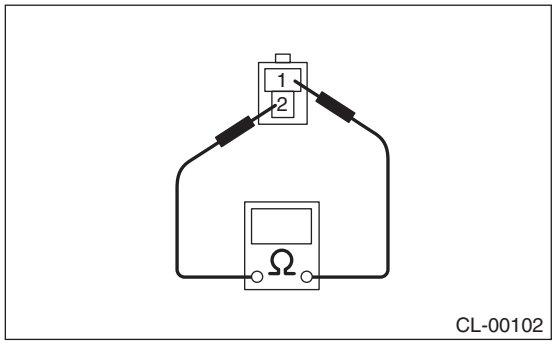
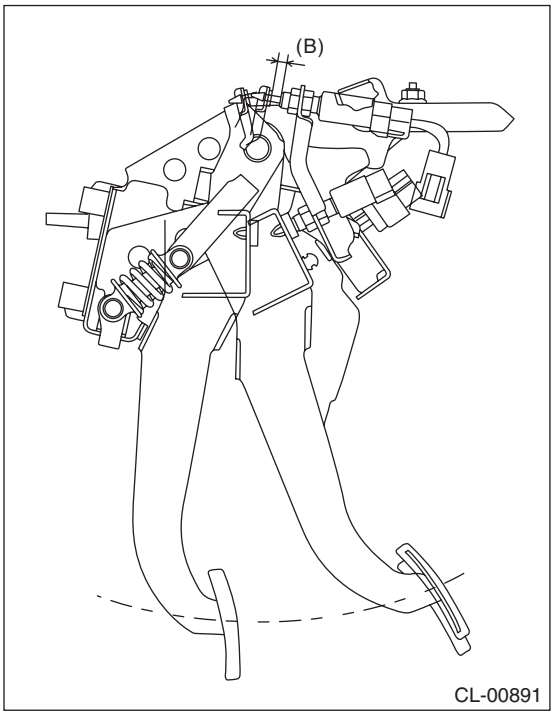
Check the following figure for the terminal layout of the harness connector.



• When performing adjustment by the clearance between clutch start switch and clutch pedal plate, perform installation according to the following gap.

Clearance B:
8.6 — 9.0 mm (0.34 — 0.35 in)



5) Connect the clutch start switch connector.

12.General Diagnostic Table

A: INSPECTION

1. CLUTCH

Symptoms	Possible cause	Corrective action
1. Clutch slippage. It is hard to perceive clutch slippage in the early stage, but pay attention to the following symptoms. • Engine speeds up when shifting. • High-speed driving is not possible; especially rapid acceleration is not possible and vehicle speed does not increase in proportion to the increase in engine speed. • Power drops particularly when ascending a slope, and there is a burning smell of the clutch plate. • Method of testing: Park the vehicle and fully apply the parking brake. Disengage the clutch and shift the transmission gear into the 1st. Gradually increase the engine speed while gradually allowing the clutch to engage. The clutch function is satisfactory if the engine stalls. However, the clutch is slipping if the vehicle does not move forward and the engine does not stall.	(a) Oil on the clutch face	Replace.
	(b) Worn clutch face	Replace.
	(c) Deteriorated diaphragm spring	Replace.
	(d) Warped pressure plate or flywheel	Repair or replace.
	(e) Defective release bearing holder	Repair or replace.
2. Clutch drags. As a symptom of this trouble, a harsh scratching noise occurs and control becomes difficult when shifting gears. The symptom becomes more apparent when shifting into the 1st gear. However, because most trouble of this sort is due to a defective synchronization mechanism, perform the following tests. • Method of testing: <Ref. to CL-33, DIAGNOSTIC DIAGRAM OF CLUTCH DRAG, INSPECTION, General Diagnostic Table.> The problem is caused by insufficient disengagement of the clutch if an abnormal noise occurs during this test.	(a) Worn or rusty clutch disc hub spline	Replace the clutch disc.
	(b) Excessive deflection of clutch disc face	Repair or replace.
	(c) Crankshaft pilot needle bearing sticking	Replace.
	(d) Cracked clutch disc face	Replace.
	(e) Stuck clutch disc (smeared by oil or water)	Replace.
3. Clutch chatters. Clutch chattering is an unpleasant vibration to the whole vehicle when the vehicle is just started with clutch partially engaged.	(a) Adhesion of oil on the clutch face	Replace the clutch disc.
	(b) Weak or broken damper spring	Replace the clutch disc.
	(c) Poor contact of the disc surface or excessively worn disc	Replace the faulty clutch disc.
	(d) Warped pressure plate or flywheel	Repair or replace.
	(e) Loose disc rivets	Replace the clutch disc.
	(f) Loose engine mounting	Retighten or replace mounting.
	(g) Loose pitching stopper	Retighten the pitching stopper. Or replace it.

Symptoms	Possible cause	Corrective action
4. Noisy clutch Noise occurs when the clutch is disengaged, engaged, or partially engaged.	(a) Broken, worn or insufficiently lubricated release bearing	Replace the release bearing.
	(b) Insufficient lubrication of the pilot bearing	Replace the pilot bearing.
	(c) Loose clutch disc hub	Replace the clutch disc.
	(d) Loose damper spring retainer	Replace the clutch disc.
	(e) Deteriorated or broken damper spring	Replace the clutch disc.
5. Clutch grabs suddenly. When starting the vehicle with the clutch partially engaged, the clutch engages suddenly and the vehicle jumps instead of making a smooth start.	(a) Grease or oil on facing	Replace the clutch disc.
	(b) Deteriorated cushioning spring	Replace the clutch disc.
	(c) Worn or rusted spline of clutch disc or main shaft	Take off rust, apply grease or replace clutch disc or main shaft.
	(d) Deteriorated or broken damper spring	Replace the clutch disc.
	(e) Loose engine mounting	Retighten or replace mounting.
	(f) Deteriorated diaphragm spring	Replace.

2. CLUTCH PEDAL

Symptoms	Corrective action
Insufficient clutch pedal free play	Adjust the free play of the pedal.
Excessively worn and damaged pedal shaft and/or bushing	Replace the bushing or shaft with a new part.

3. DIAGNOSTIC DIAGRAM OF CLUTCH DRAG

Step		Check	Yes	No
1	**CHECK GEAR NOISE.** 1) Start the engine. 2) Disengage the clutch and shift quickly from neutral to reverse in idling condition.	Is there any abnormal noise from the transmission gear?	Go to step **2**.	Clutch is normal.
2	**CHECK GEAR NOISE.** Disengage the clutch at idle and shift from neutral to reverse within 0.5 — 1.0 seconds.	Is there any abnormal noise from the transmission gear?	Go to step **3**.	Inspect defective transmission or excessive clutch drag torque, pilot bearing, clutch disc, transmission and clutch disc hub spline.
3	**CHECK GEAR NOISE.** 1) Disengage the clutch at idle and shift from neutral to reverse within 0.5 — 1.0 seconds. 2) With the clutch disengaged, shift from neutral to reverse, reverse to neutral several times.	Is there any abnormal noise from the transmission gear?	Inadequate clutch disengage. Inspect the clutch disc, clutch cover, clutch release, and clutch pedal free play.	Clutch and flywheel seizure. Inspect the clutch disc and the spline of the clutch disc hub.

CHASSIS SECTION

This service manual has been prepared to provide SUBARU service personnel with the necessary information and data for the correct maintenance and repair of SUBARU vehicles.
This manual includes the procedures for maintenance, disassembling, reassembling, inspection and adjustment of components and diagnostics for guidance of experienced mechanics.
Please peruse and utilize this manual fully to ensure complete repair work for satisfying our customers by keeping their vehicle in optimum condition. When replacement of parts during repair work is needed, be sure to use SUBARU genuine parts.

All information, illustration and specifications contained in this manual are based on the latest product information available at the time of publication approval.

FRONT SUSPENSION	FS
REAR SUSPENSION	RS
WHEEL AND TIRE SYSTEM	WT
TIRE PRESSURE MONITORING SYSTEM (DIAGNOSTICS)	TPM(diag)
DIFFERENTIALS	DI
TRANSFER CASE	TC
DRIVE SHAFT SYSTEM	DS
VEHICLE DYNAMICS CONTROL (VDC)	VDC
VEHICLE DYNAMICS CONTROL (VDC) (DIAGNOSTICS)	VDC(diag)
BRAKE	BR
PARKING BRAKE	PB
POWER ASSISTED SYSTEM (POWER STEERING)	PS
POWER ASSISTED SYSTEM (POWER STEERING) (DIAGNOSTICS)	PS(diag)

FRONT SUSPENSION

FS

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1. Basic Diagnostic Procedure

A: PROCEDURE

	Step	Check	Yes	No
1	**CHECK PRE-INSPECTION.** 1) Ask the customer when and how the trouble occurred using the interview check list. <Ref. to CVT(HEV)(diag)-4, Check List for Interview.> 2) Before performing diagnostics, check the following items which might affect CVT problems. • General inspection <Ref. to CVT(HEV)(diag)-5, INSPECTION, General Description.> • Disconnection of harness connector • Visual check for harness damage • Oil leakage • Stall test <Ref. to CVT(TH58A)-52, Stall Test.> • Secondary pressure test <Ref. to CVT(TH58A)-54, Secondary Pressure (Line Pressure) Test.> • Output clutch pressure test <Ref. to CVT(TH58A)-57, Output Clutch Pressure Test.> • Transfer clutch pressure test <Ref. to CVT(TH58A)-60, Transfer Clutch Pressure Test.> • Time lag test <Ref. to CVT(TH58A)-53, Time Lag Test.> • Road test <Ref. to CVT(TH58A)-50, Road Test.> • Inhibitor switch <Ref. to CVT(TH58A)-97, Inhibitor Switch.> • Electric oil pump inspection mode <Ref. to CVT(TH58A)-141, INSPECTION, Electric Fluid Pump.>	Is the item that is thought to influence the CVT problem working properly?	Go to step **2**.	Repair the items which may be affecting the CVT trouble.
2	**CHECK AT OIL TEMP LIGHT.** Turn the ignition switch to ON and wait for at least 2 seconds.	Does the AT OIL TEMP light illuminate?	Go to step **3**.	Check the AT OIL TEMP light.
3	**CHECK AT OIL TEMP LIGHT.** Start the engine and wait for 2 seconds or more.	Does the AT OIL TEMP light blink?	Go to step **4**.	Go to step **5**.
4	**CHECK DTC DISPLAY.** Read the DTC. NOTE: If the communication function of Subaru Select Monitor cannot be executed normally, check the communication circuit. <Ref. to CVT(HEV)(diag)-32, COMMUNICATION FOR INITIALIZING IMPOSSIBLE, Diagnostic Procedure for Subaru Select Monitor Communication.>	Is DTC displayed on Subaru Select Monitor?	Record the DTC, time stamp and freeze frame data. Go to step **6**. NOTE: • For the time stamp, refer to LAN section. <Ref. to LAN(HEV)(diag)-6, TIME STAMP, CAUTION, General Description.> • Depending on DTCs, time stamp may not be stored.	Go to step **5**.

	Step	Check	Yes	No
5	**PERFORM GENERAL DIAGNOSTICS.** 1) Inspect using “Diagnostic Procedure without Diagnostic Trouble Code (DTC)”. <Ref. to CVT(HEV)(diag)-165, Diagnostic Procedure without Diagnostic Trouble Code (DTC).> 2) Inspect using “Diagnostics with Phenomenon”. <Ref. to CVT(HEV)(diag)-166, Diagnostics with Phenomenon.> 3) Perform the Inspection Mode. <Ref. to CVT(HEV)(diag)-21, Inspection Mode.> 4) Read the DTC.	Is DTC displayed on Subaru Select Monitor?	Go to step **6**.	Finish the diagnosis.
6	**PERFORM DIAGNOSIS.** 1) Inspect by referring to “Diagnostic Procedure with Diagnostic Trouble Code (DTC)”. <Ref. to CVT(HEV)(diag)-42, Diagnostic Procedure with Diagnostic Trouble Code (DTC).> NOTE: For the DTC table, refer to “List of Diagnostic Trouble Code (DTC)”. <Ref. to CVT(HEV)(diag)-34, List of Diagnostic Trouble Code (DTC).> 2) Repair the trouble cause. 3) Perform the Clear Memory Mode. 4) Perform the Inspection Mode. <Ref. to CVT(HEV)(diag)-21, Inspection Mode.> 5) Read the DTC.	Is DTC displayed on Subaru Select Monitor?	Inspect by referring to “Diagnostic Procedure with Diagnostic Trouble Code (DTC)”. <Ref. to CVT(HEV)(diag)-42, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>	Finish the diagnosis.

1. General Description

A: SPECIFICATION

1. TORQUE CONVERTER

Model		HEV
Type		Symmetric, 3-element, single stage, 2-phase torque converter
Stall torque ratio		2.07
Nominal	mm (in)	236 (9.29)
Stall speed (at sea level)	r/min	2,000 — 2,750 (D range) 1,800 — 2,500 (R range)
One-way clutch		Sprag type one-way clutch

2. OIL PUMP

Type		Internal gear pump
Driving method		Driven by chain
Number of teeth	Inner rotor	8
	Outer rotor	9

3. TRANSMISSION CONTROL ELEMENT

Type	Forward continuously variable speed change, 1 reverse, planetary gear
Multi-plate clutch	1 set
Multi-plate brake	1 set

4. OUTPUT CLUTCH

Multi-plate clutch	1 set
Control method	Electronic hydraulic type

5. TRANSMISSION GEAR RATIO

Forward	3.420 — 0.544
Rev	3.502

6. PLATE

Number of forward clutch drive plates	3
Number of reverse brake drive plates	4
Number of output clutch drive plates	7

7. SELECTOR POSITION

P (Park)	Transmission neutral, output shaft locked, engine start enabled
R (Reverse)	Rev
N (Neutral)	Transmission neutral, engine start enabled
D (Drive)	Forward continuously variable speed change
M (Manual mode) (paddle shift +side)	Manual gear change 1st → 2nd → 3rd → 4th → 5th → 6th
M (Manual mode) (paddle shift –side)	Manual gear change 1st ← 2nd ← 3rd ← 4th ← 5th ← 6th

8. HYDRAULIC CONTROL AND LUBRICATION

Type	Electronic hydraulic control (gear ratio is changed by signals of vehicle speed and accelerator opening angle.)
Fluid	Specified fluid: SUBARU CVT FLUID LINEARTRONIC II **CAUTION:** **Always use specified CVTF. Using other fluid will cause malfunction.**
Fluid capacity L (US qt, Imp qt)	13.67 — 14.17 (14.4 — 15.0, 12.0 — 12.5)
Lubrication system	Forced feed lubrication with oil pump

9. COOLING AND HARNESS

Cooling system	CVTF cooler (with warmer feature)
Inhibitor switch harness	16 poles
Transmission harness	12 poles
Drive motor harness	20 poles

10.DRIVE MOTOR

Kind	Three-phase AC synchronous motor
Rated voltage V	100

11.TRANSFER

Transfer type	Multi-plate transfer (MP-T)
Number of transfer clutch drives & driven plates	5
Control method	Electronic hydraulic type
Reduction gear ratio	1.000 (43/43)

12.REDUCTION GEAR RATIO

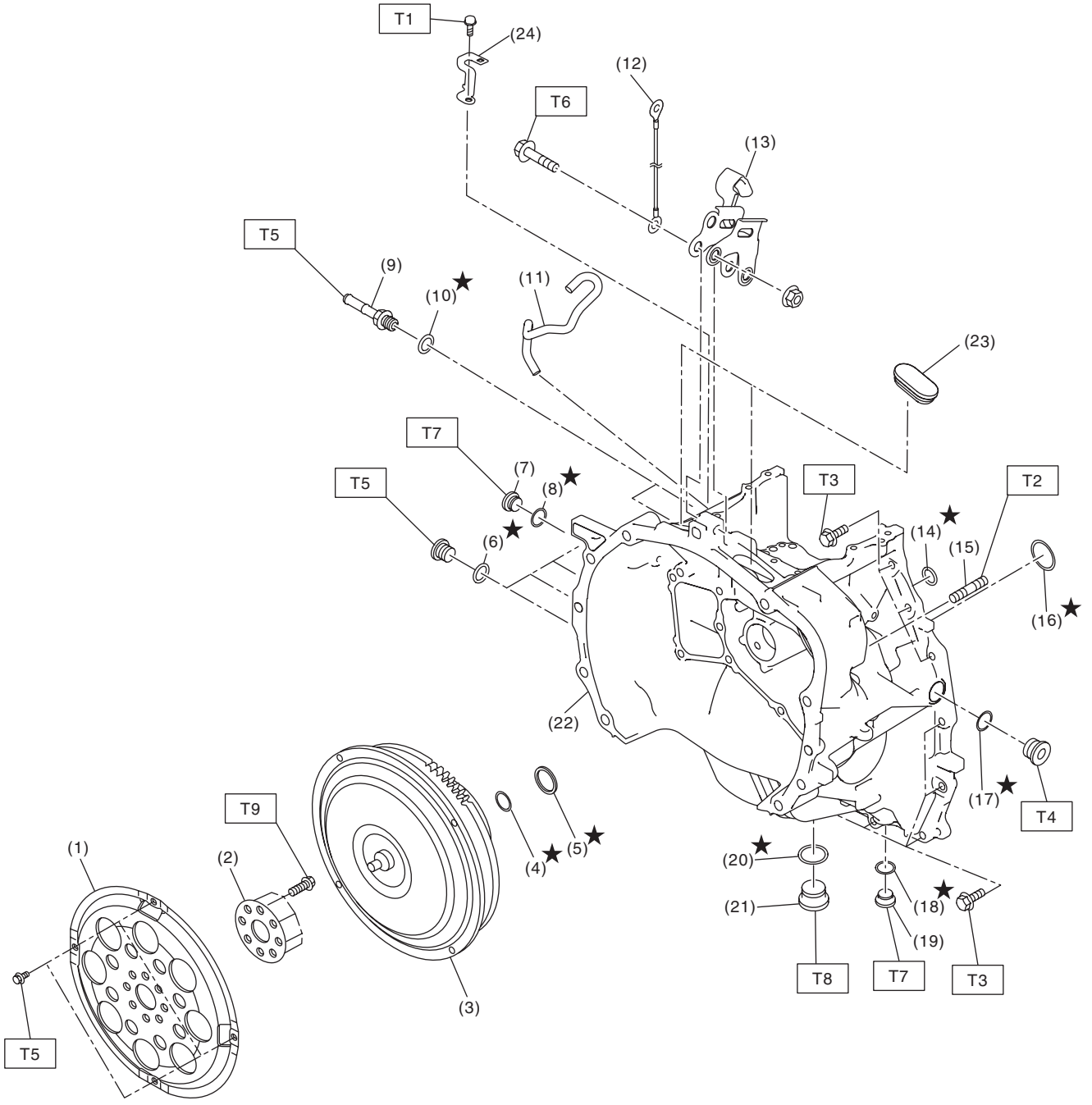
Front final reduction gear ratio	3.700

13.RECOMMENDED GEAR OIL

Lubrication oil	SUBARU GEAR OIL EXTRA MT or equivalent
Front differential oil capacity L (US qt, Imp qt)	1.3 — 1.4 (1.4 — 1.5, 1.1 — 1.2)

B: COMPONENT

1. TORQUE CONVERTER ASSEMBLY AND CONVERTER CASE



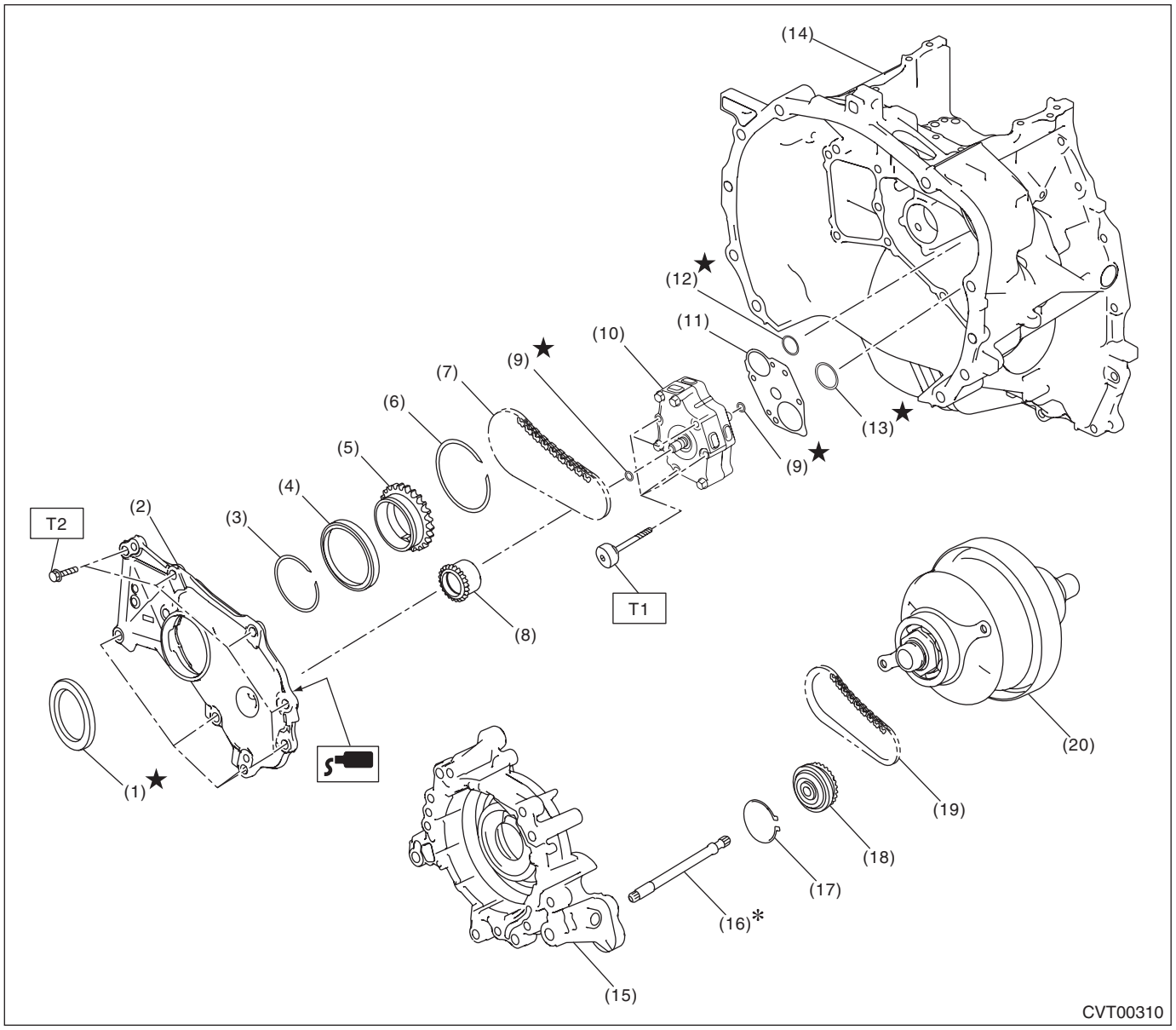
CVT00309

(1)	Drive plate	(13)	Pitching stopper bracket
(2)	Reinforcement drive plate	(14)	O-ring
(3)	Torque converter ASSY	(15)	Stud bolt
(4)	O-ring	(16)	O-ring
(5)	Seal ring	(17)	O-ring
(6)	O-ring	(18)	Gasket
(7)	Front differential gear oil filler plug	(19)	Overflow drain plug
(8)	O-ring	(20)	Gasket
(9)	Oil cooler pipe	(21)	Front differential gear oil drain plug
(10)	O-ring	(22)	Converter case
(11)	Air breather hose	(23)	Rubber cap
(12)	Transmission radio ground cord	(24)	Drive motor harness stay

Tightening torque: N·m (kgf-m, ft-lb)

- ***T1: 7 (0.7, 5.2)***
- ***T2: 18 (1.8, 13.3)***
- ***T3: 22 (2.2, 16.2)***
- ***T4: 22.5 (2.3, 16.6)***
- ***T5: 25 (2.5, 18.4)***
- ***T6: 41 (4.2, 30.2)***
- ***T7: 50 (5.1, 36.9)***
- ***T8: 70 (7.1, 51.6)***
- ***T9: <Ref. to CVT(TH58A)-176, INSTALLATION, Drive Plate.>***

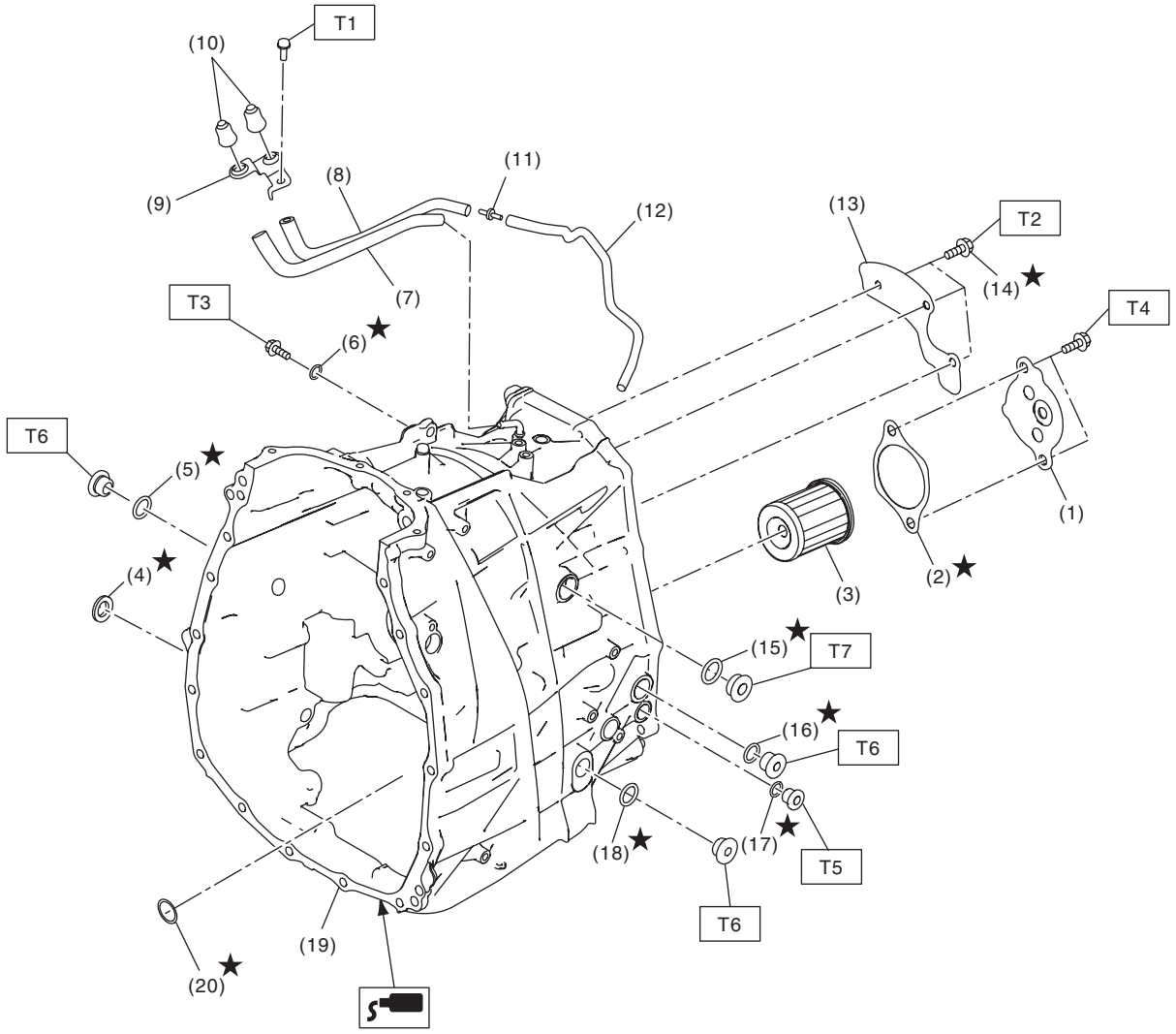
2. OIL PUMP ASSEMBLY



(1) Oil seal
(2) Oil pump chain cover
(3) Snap ring
(4) Ball bearing
(5) Drive sprocket
(6) Snap ring
(7) Oil pump chain front
(8) Oil pump sprocket front
(9) O-ring
(10) Oil pump ASSY
(11) Plate
(12) O-ring (small)
(13) O-ring (large)
(14) Converter case
(15) Reverse brake housing
(16) Oil pump shaft
(17) Snap ring
(18) Oil pump sprocket rear
(19) Oil pump chain rear
(20) Primary pulley ASSY

Tightening torque: N·m (kgf-m, ft-lb)
T1: 8.5 (0.9, 6.3)
T2: 21 (2.1, 15.5)

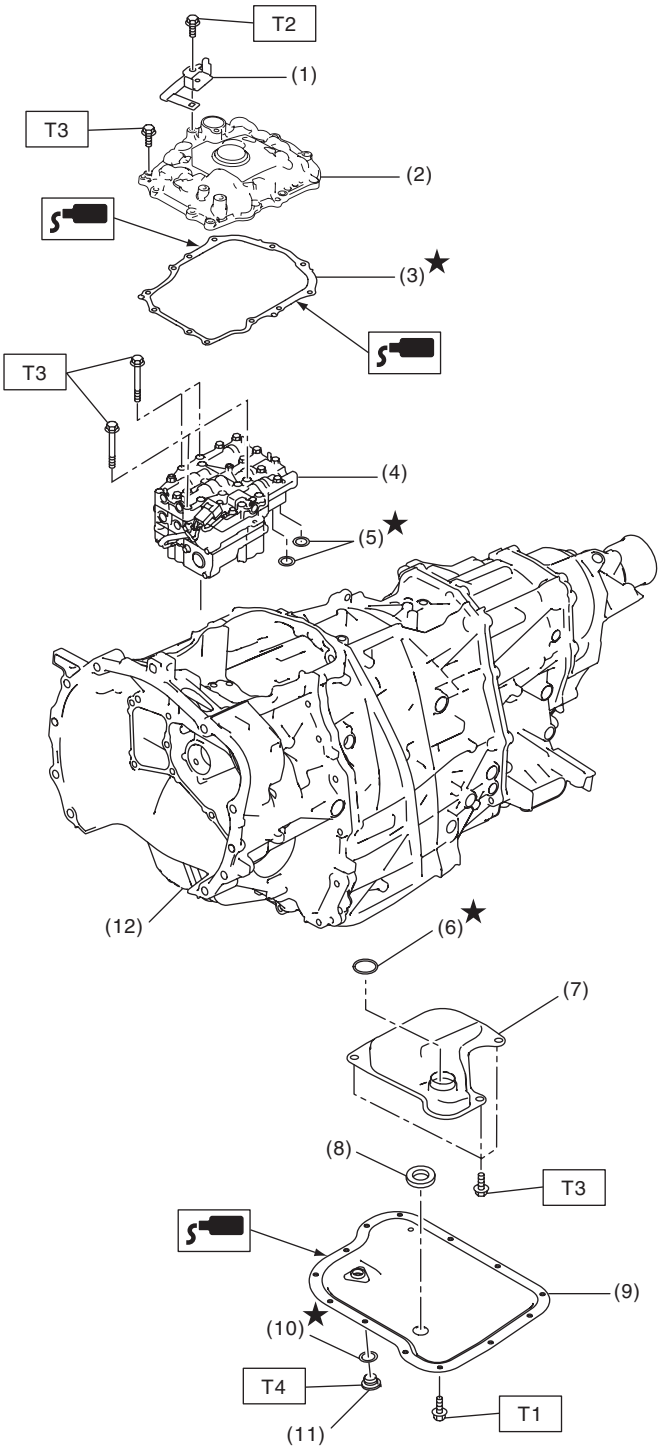
3. TRANSMISSION CASE



(1)	CVTF filter cover	(11)	Hose connector
(2)	Gasket	(12)	Air breather hose
(3)	CVTF filter	(13)	Oil stopper plate
(4)	Oil seal	(14)	Micro-encapsulated bolt
(5)	Gasket	(15)	Gasket
(6)	O-ring	(16)	O-ring
(7)	Air breather hose	(17)	O-ring
(8)	Air breather hose	(18)	Gasket
(9)	Bracket	(19)	Transmission case
(10)	Air breather cap	(20)	Seal ring

Tightening torque: N·m (kgf-m, ft-lb)
T1: 5 (0.5, 3.7)
T2: 9 (0.9, 6.6)
T3: 13 (1.3, 9.6)
T4: 17 (1.7, 12.5)
T5: 25 (2.5, 18.4)
T6: 50 (5.1, 36.9)
T7: 60 (6.1, 44.3)

4. CONTROL VALVE BODY

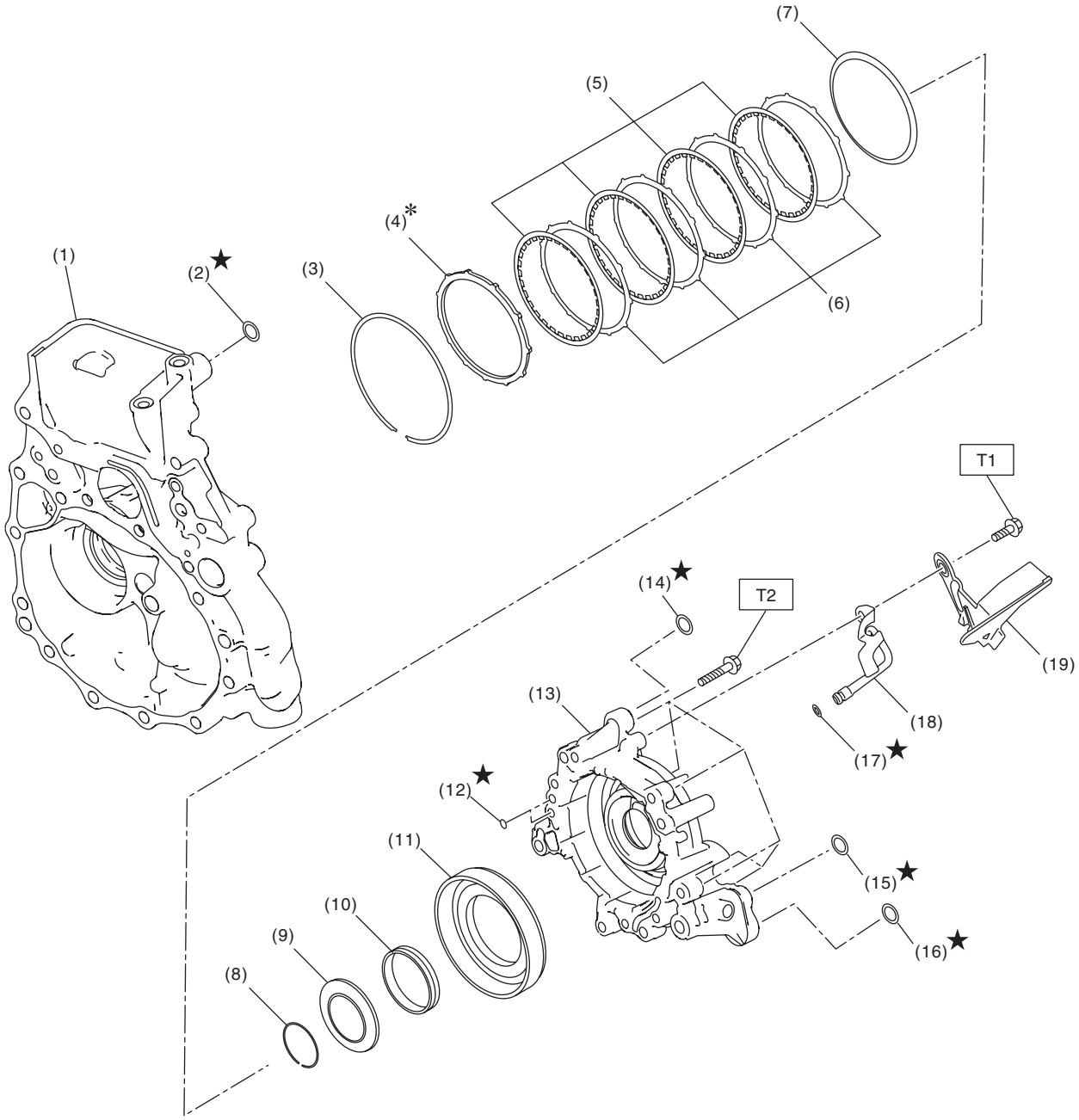


CVT00311

(1)	Transmission harness stay	(7)	Oil strainer	
(2)	Valve cover	(8)	Magnet	
(3)	Gasket	(9)	Oil pan	
(4)	Control valve body	(10)	Gasket	
(5)	O-ring	(11)	CVTF drain plug	
(6)	O-ring	(12)	Transmission ASSY	

Tightening torque: N·m (kgf-m, ft-lb)
T1: 5 (0.5, 3.7)
T2: 7 (0.7, 5.2)
T3: 9 (0.9, 6.6)
T4: 31 (3.2, 22.9)

5. REVERSE BRAKE ASSEMBLY

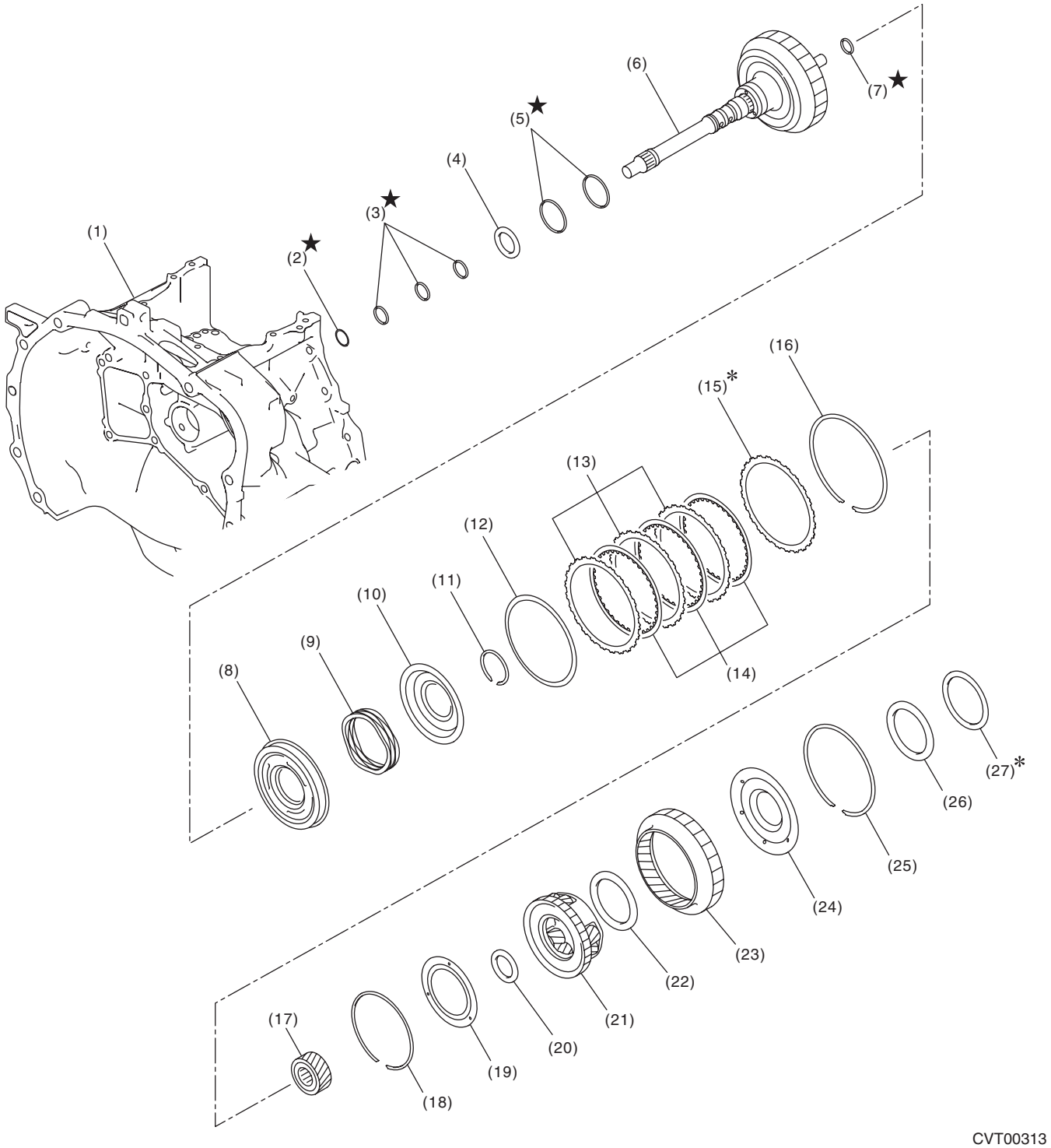


CVT00312

(1) Drive pinion retainer
(2) O-ring
(3) Snap ring
(4) Retaining plate
(5) Drive plate
(6) Driven plate
(7) Dish plate
(8) Snap ring
(9) Spring retainer
(10) Return spring
(11) Reverse brake piston
(12) O-ring
(13) Reverse brake housing
(14) O-ring
(15) O-ring
(16) O-ring
(17) O-ring
(18) Lubrication pipe
(19) Oil guide

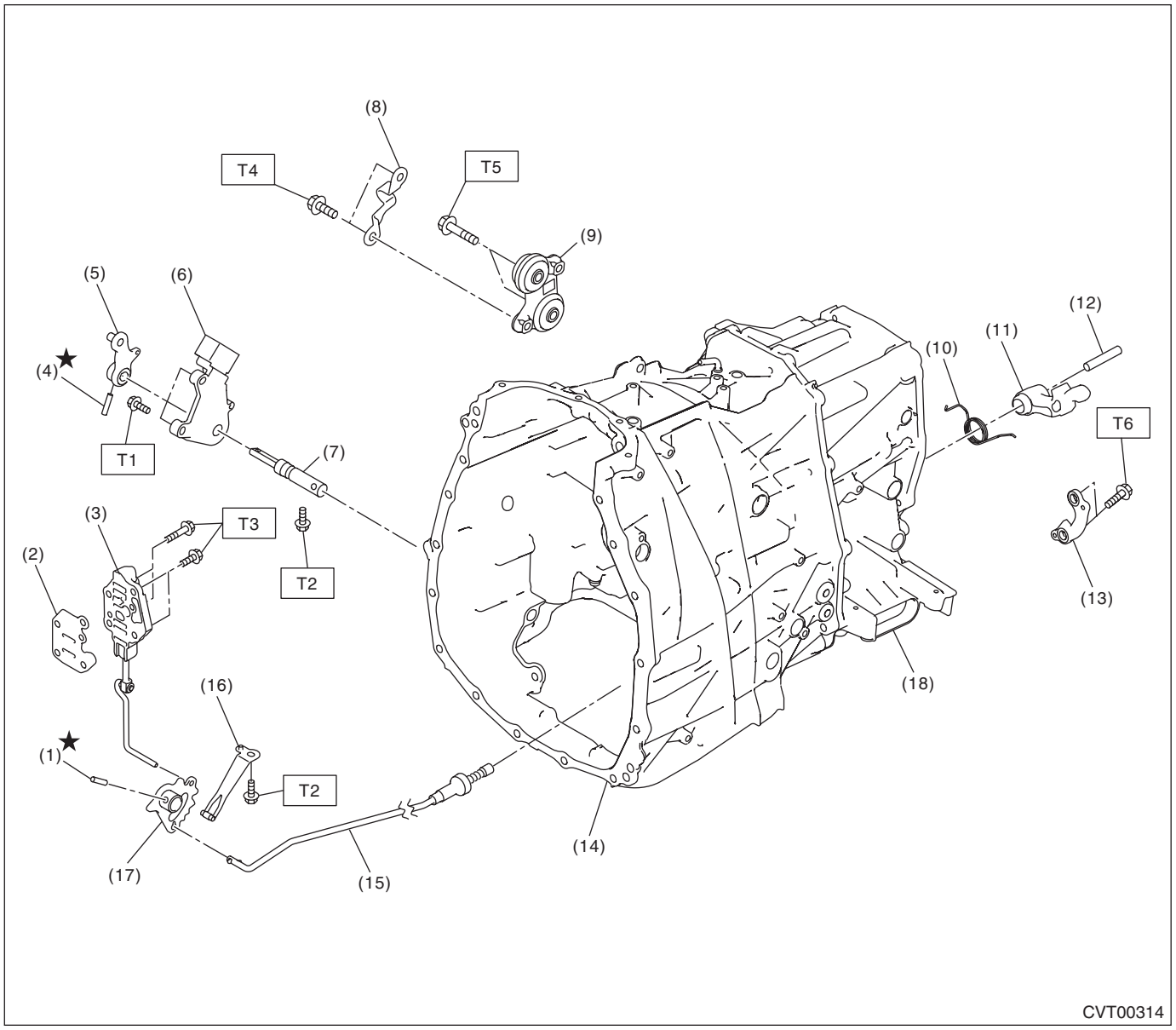
Tightening torque: N·m (kgf-m, ft-lb)
T1: 16 (1.6, 11.8)
T2: 37 (3.8, 27.3)

6. FORWARD CLUTCH ASSEMBLY



(1) Converter case
(2) O-ring
(3) Seal ring
(4) Thrust bearing
(5) Seal ring
(6) Forward clutch drum ASSY
(7) Seal ring
(8) Forward clutch piston
(9) Return spring
(10) Chamber COMPL
(11) Snap ring
(12) Dish plate
(13) Driven plate
(14) Drive plate
(15) Retaining plate
(16) Snap ring
(17) Sun gear
(18) Snap ring
(19) Balance oil guide
(20) Thrust bearing
(21) Planetary carrier ASSY
(22) Thrust bearing
(23) Internal gear
(24) Thrust gear plate
(25) Snap ring
(26) Thrust bearing
(27) Washer

7. TRANSMISSION CONTROL DEVICE

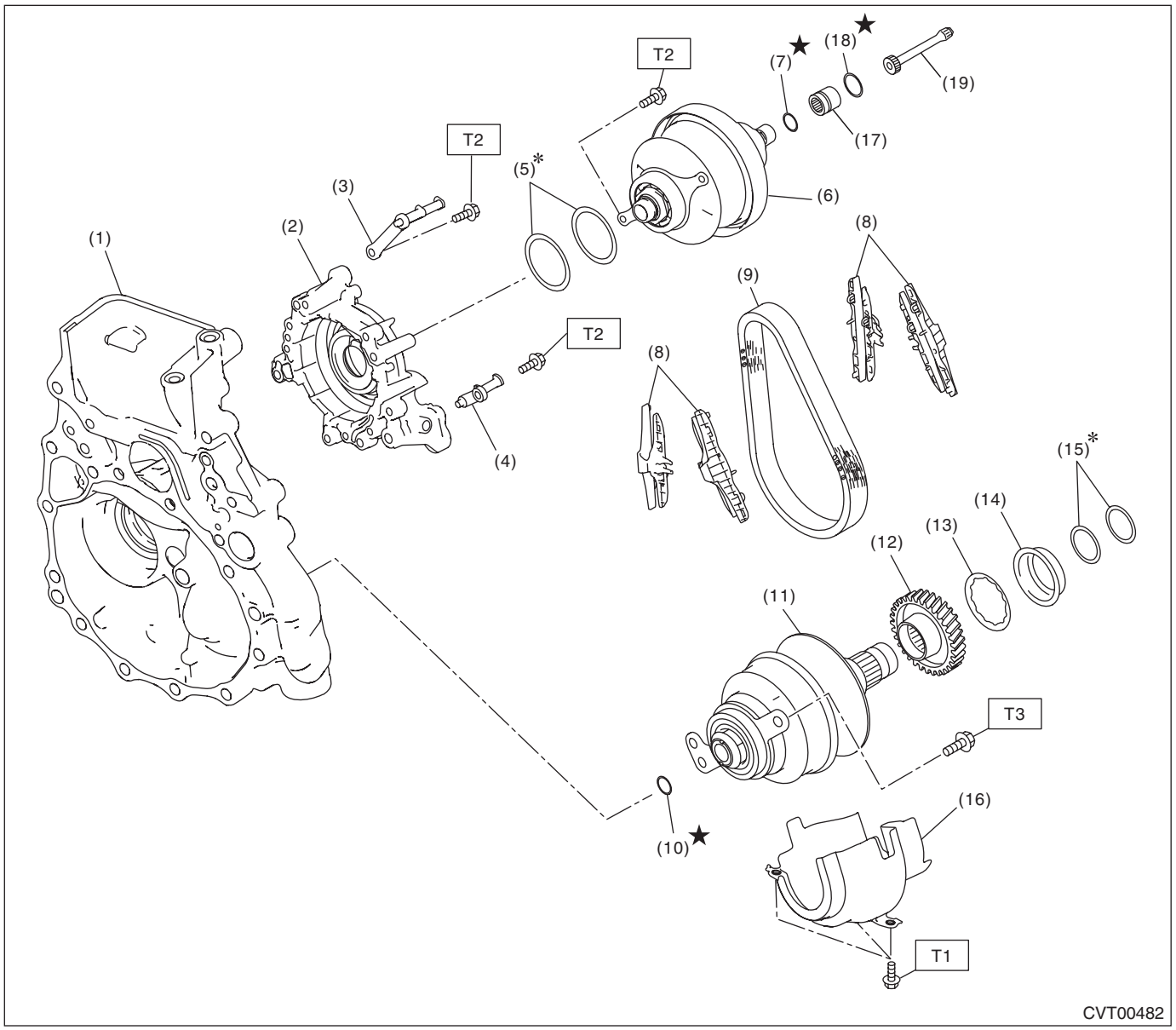


(1)	Spring pin	(10)	Return spring
(2)	Separator plate	(11)	Parking pawl
(3)	Manual valve ASSY	(12)	Shaft
(4)	Spring pin	(13)	Parking support
(5)	Shifter arm	(14)	Transmission case
(6)	Inhibitor switch	(15)	Parking rod
(7)	Shifter arm shaft	(16)	Detent spring
(8)	Cable bracket	(17)	Manual plate
(9)	Plate ASSY	(18)	Drive motor ASSY

Tightening torque: N·m (kgf-m, ft-lb)

- ***T1: 5 (0.5, 3.7)***
- ***T2: 7 (0.7, 5.2)***
- ***T3: 9 (0.9, 6.6)***
- ***T4: 18 (1.8, 13.3)***
- ***T5: 25 (2.5, 18.4)***
- ***T6: <Ref. to CVT(TH58A)-213, INSTALLATION, Transmission Control Device.>***

8. PRIMARY PULLEY, SECONDARY PULLEY & VARIATOR CHAIN AND REDUCTION DRIVE GEAR

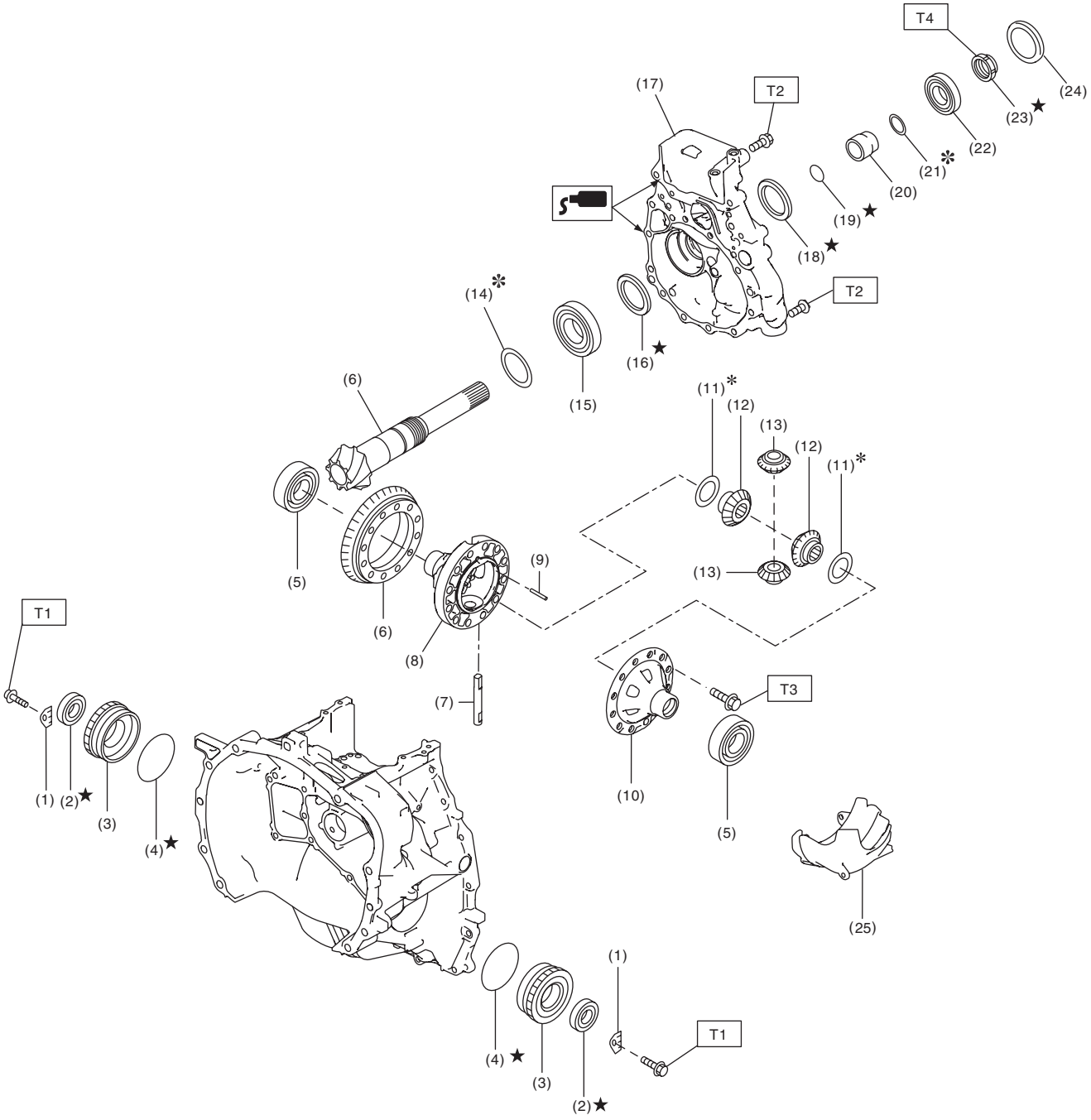


(1)	Drive pinion retainer	(9)	Variator chain	(17)	Sleeve
(2)	Reverse brake housing	(10)	Seal ring	(18)	O-ring
(3)	Support rod	(11)	Secondary pulley ASSY	(19)	Intermediate shaft
(4)	Lubrication pipe	(12)	Reduction drive gear		
(5)	Primary pulley shim	(13)	Dish plate		
(6)	Primary pulley ASSY	(14)	Spring retainer		
(7)	O-ring	(15)	Reduction gear shim		
(8)	Chain guide	(16)	Oil baffle		

Tightening torque: N·m (kgf-m, ft-lb)

T1: 16 (1.6, 11.8)
T2: 21 (2.1, 15.5)
T3: 67.5 (6.9, 49.8)

9. FRONT DIFFERENTIAL GEAR



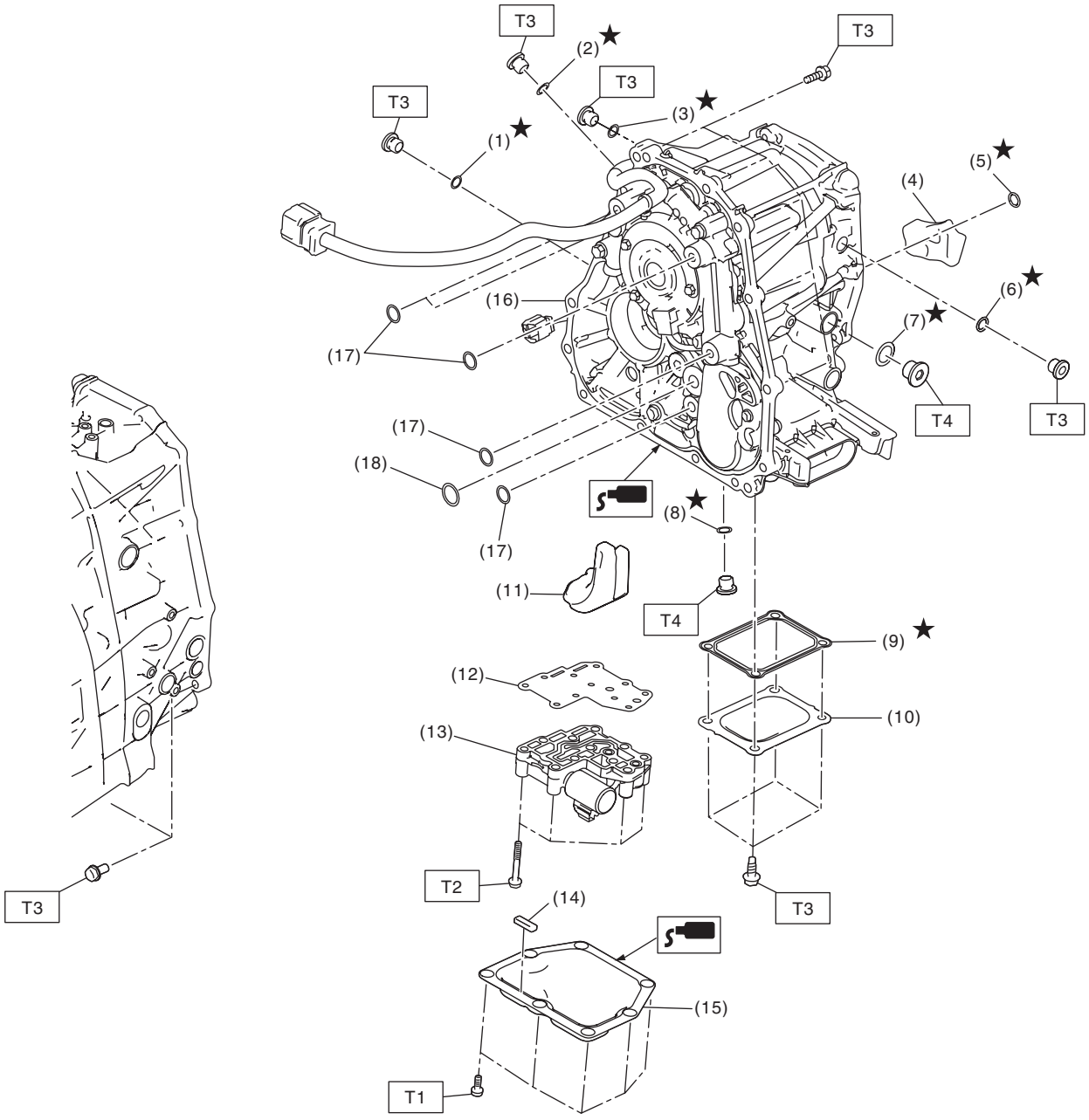
CVT00316

(1) Lock plate
(2) Oil seal
(3) Differential side retainer
(4) O-ring
(5) Taper roller bearing
(6) Drive pinion gear set
(7) Pinion shaft
(8) Differential case RH
(9) Straight pin
(10) Differential case LH
(11) Washer
(12) Differential bevel gear
(13) Differential bevel pinion
(14) Drive pinion shim
(15) Taper roller bearing
(16) Oil seal
(17) Drive pinion retainer
(18) Oil seal
(19) O-ring
(20) Drive pinion spacer
(21) Drive pinion washer
(22) Taper roller bearing
(23) Lock nut
(24) Plug
(25) Oil baffle

Tightening torque: N·m (kgf-m, ft-lb)

T1: 25 (2.5, 18.4)
T2: 43 (4.4, 31.7)
T3: 64 (6.5, 47.2)
T4: <Ref. to CVT(TH58A)-331, ASSEMBLY, Drive Pinion Shaft Assembly.>

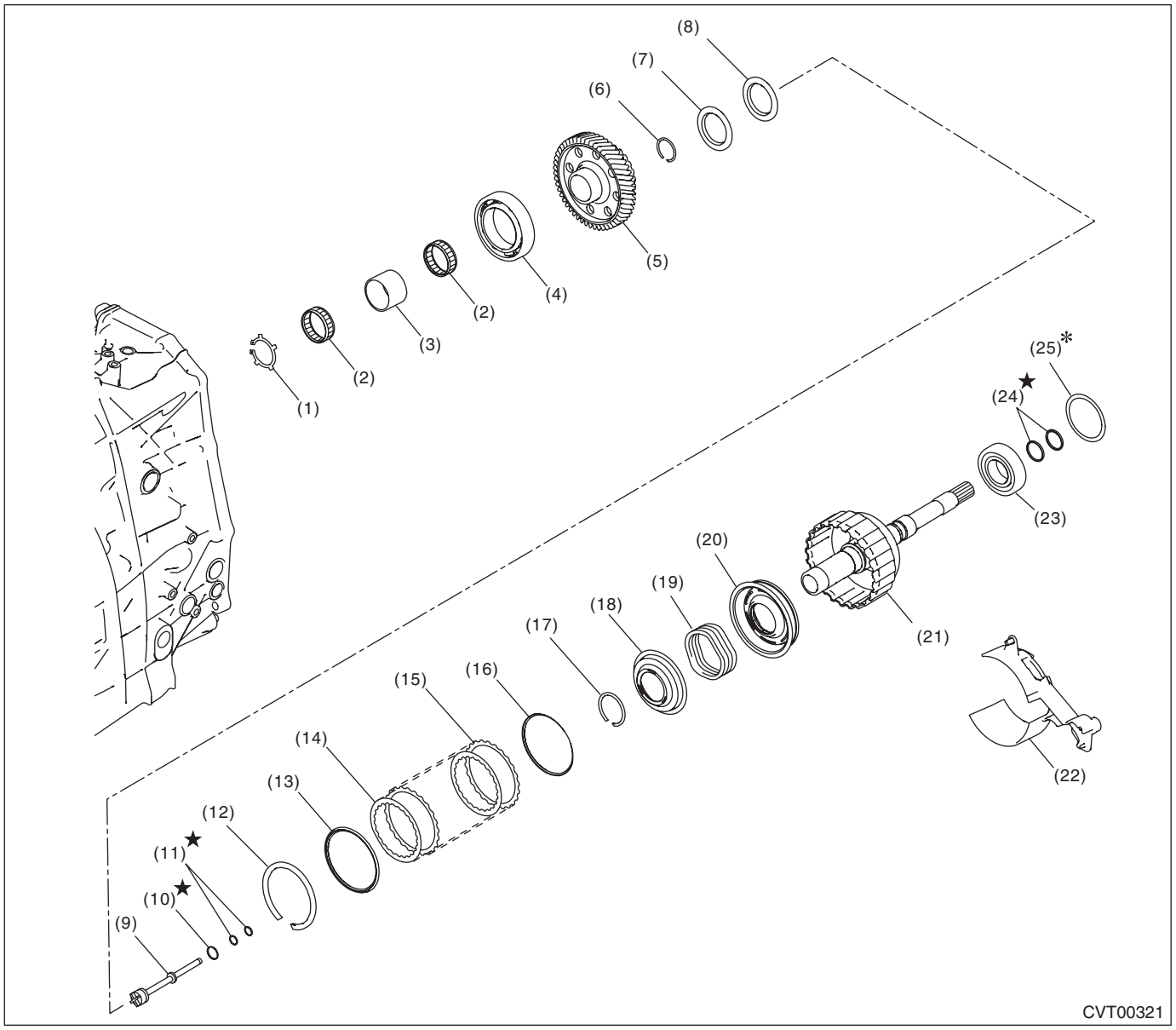
10.DRIVE MOTOR ASSY



(1) O-ring
(2) O-ring
(3) O-ring
(4) Oil spacer
(5) O-ring
(6) O-ring
(7) O-ring
(8) O-ring
(9) Gasket
(10) Power connect cover
(11) Oil spacer
(12) Separator plate
(13) Output clutch control valve body
(14) Magnet
(15) Oil pan
(16) Drive motor case ASSY
(17) O-ring
(18) O-ring

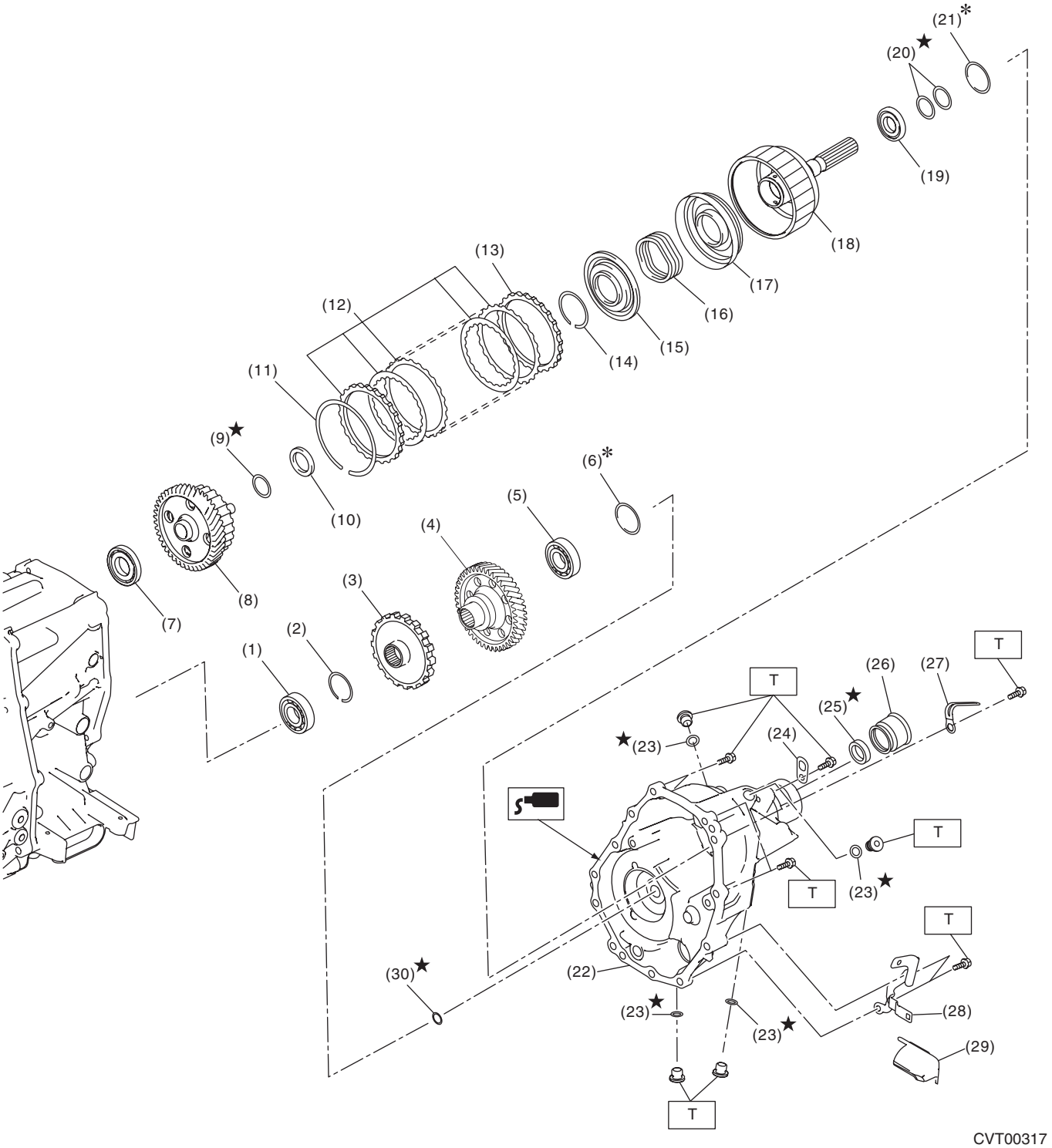
Tightening torque: N·m (kgf-m, ft-lb)
T1: 5 (0.5, 3.7)
T2: 9 (0.9, 6.6)
T3: 25 (2.5, 18.4)
T4: 50 (5.1, 36.9)

11.OUTPUT CLUTCH ASSEMBLY



(1) Snap ring
(2) Needle bearing
(3) Reduction driven gear bushing
(4) Ball bearing
(5) Reduction driven gear
(6) Snap ring
(7) Thrust bearing
(8) Thrust washer
(9) Oil pipe
(10) O-ring
(11) O-ring
(12) Snap ring
(13) Retaining plate
(14) Drive plate
(15) Driven plate
(16) Dish plate
(17) Snap ring
(18) Balance chamber
(19) Clutch piston return spring
(20) Clutch piston
(21) Driven shaft
(22) Oil baffle
(23) Ball bearing
(24) Seal ring
(25) Reduction driven gear shim

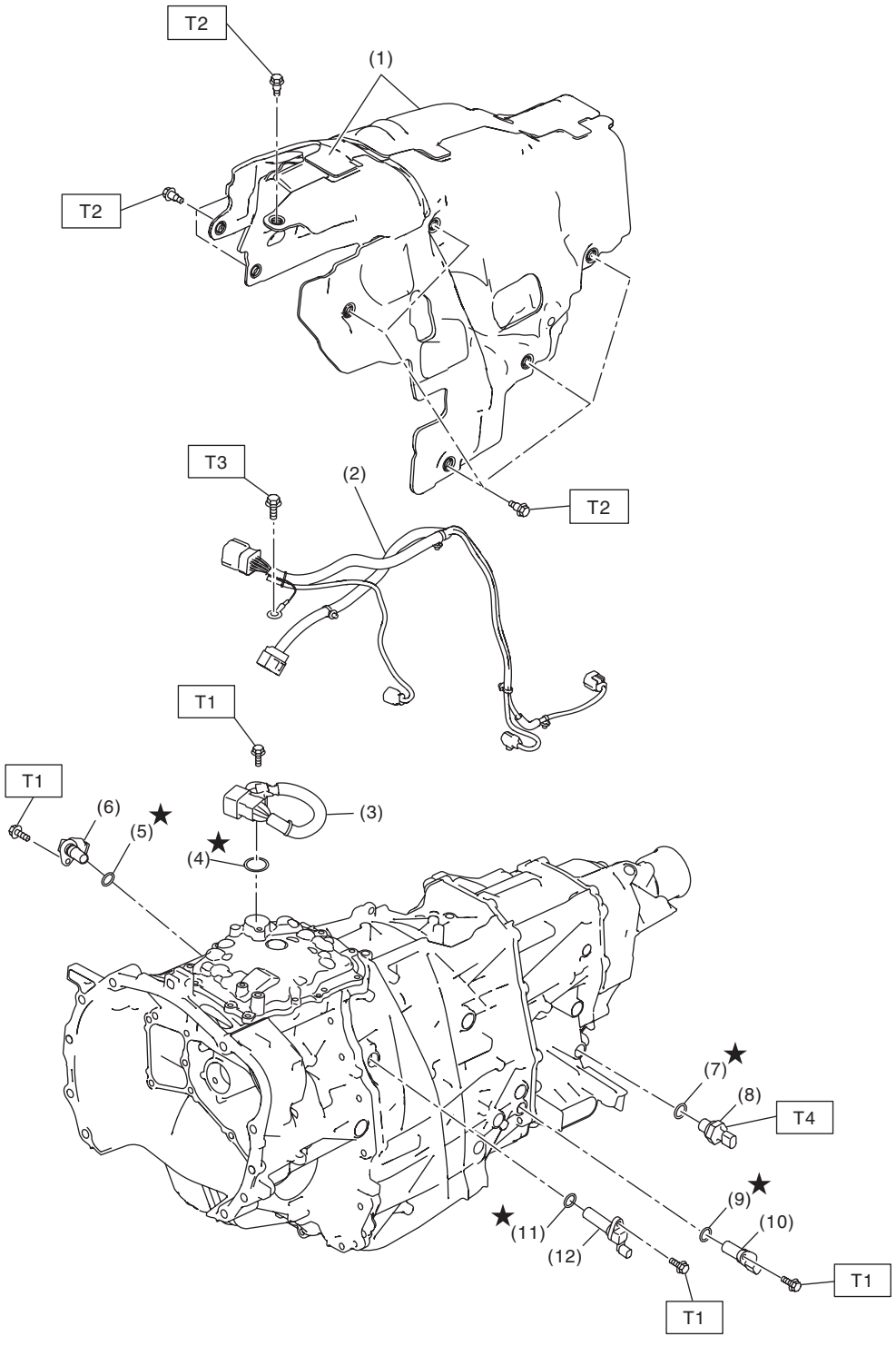
12.TRANSFER AND EXTENSION CASE



(1) Ball bearing
(2) Snap ring
(3) Parking gear
(4) Transfer drive gear
(5) Ball bearing
(6) Transfer drive gear shim
(7) Ball bearing
(8) Transfer driven gear
(9) Seal ring
(10) Thrust bearing
(11) Snap ring
(12) Transfer clutch plate set
(13) Pressure plate
(14) Snap ring
(15) Transfer clutch piston seal
(16) Transfer clutch piston return spring
(17) Transfer clutch piston
(18) Rear drive shaft
(19) Ball bearing
(20) Seal ring
(21) Transfer driven gear shim
(22) Extension case
(23) O-ring
(24) Transmission hanger
(25) Oil seal
(26) Dust cover
(27) Clip
(28) Harness bracket
(29) Sensor cover
(30) Seal ring

Tightening torque: N·m (kgf-m, ft-lb)
T: 25 (2.5, 18.4)

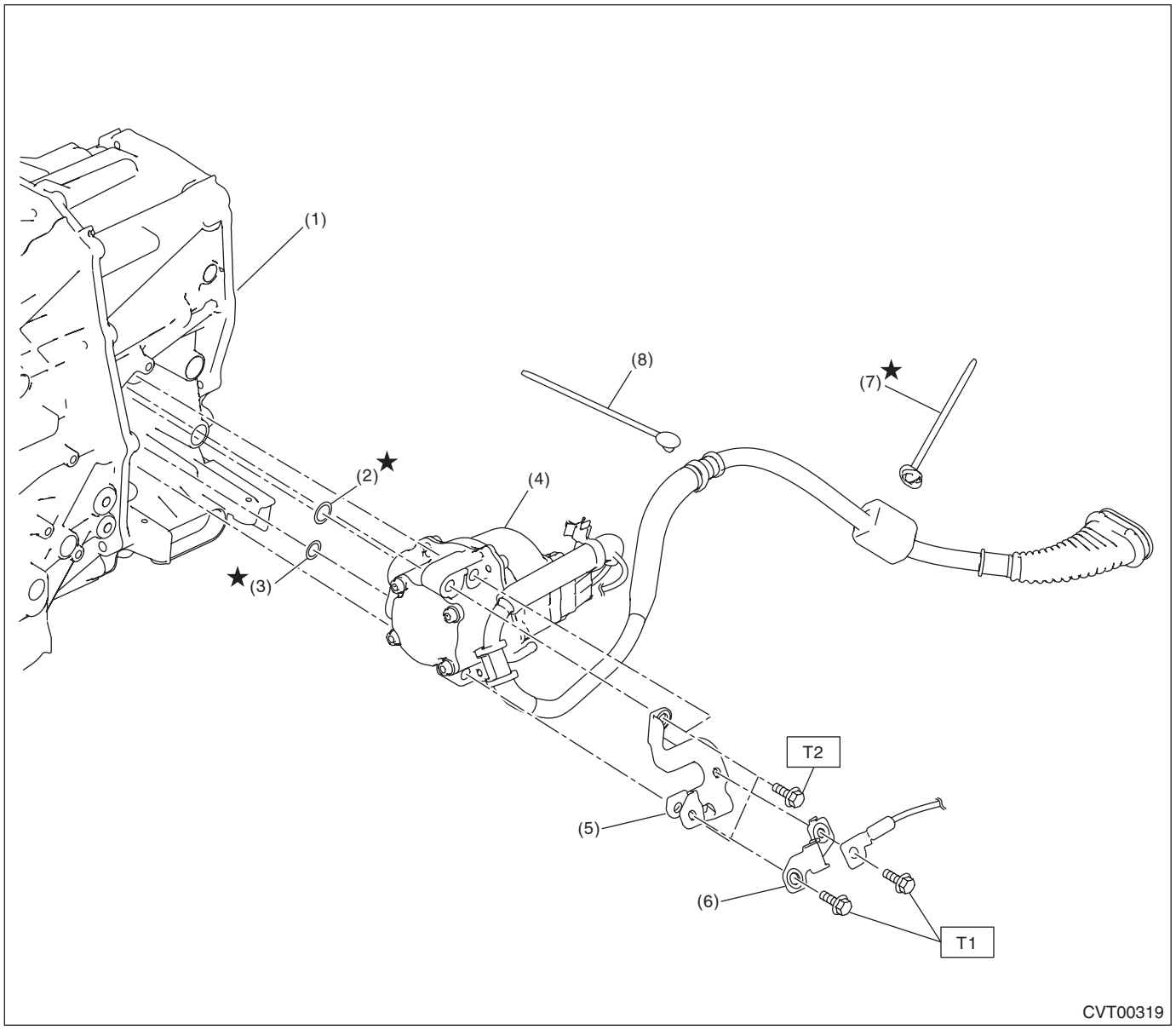
13.TRANSMISSION HARNESS AND SENSOR



(1)	Transmission case cover	(7)	O-ring
(2)	Inhibitor harness	(8)	Secondary pressure sensor
(3)	Transmission harness	(9)	O-ring
(4)	O-ring	(10)	Secondary speed sensor
(5)	O-ring	(11)	O-ring
(6)	Front wheel speed sensor	(12)	Turbine speed sensor

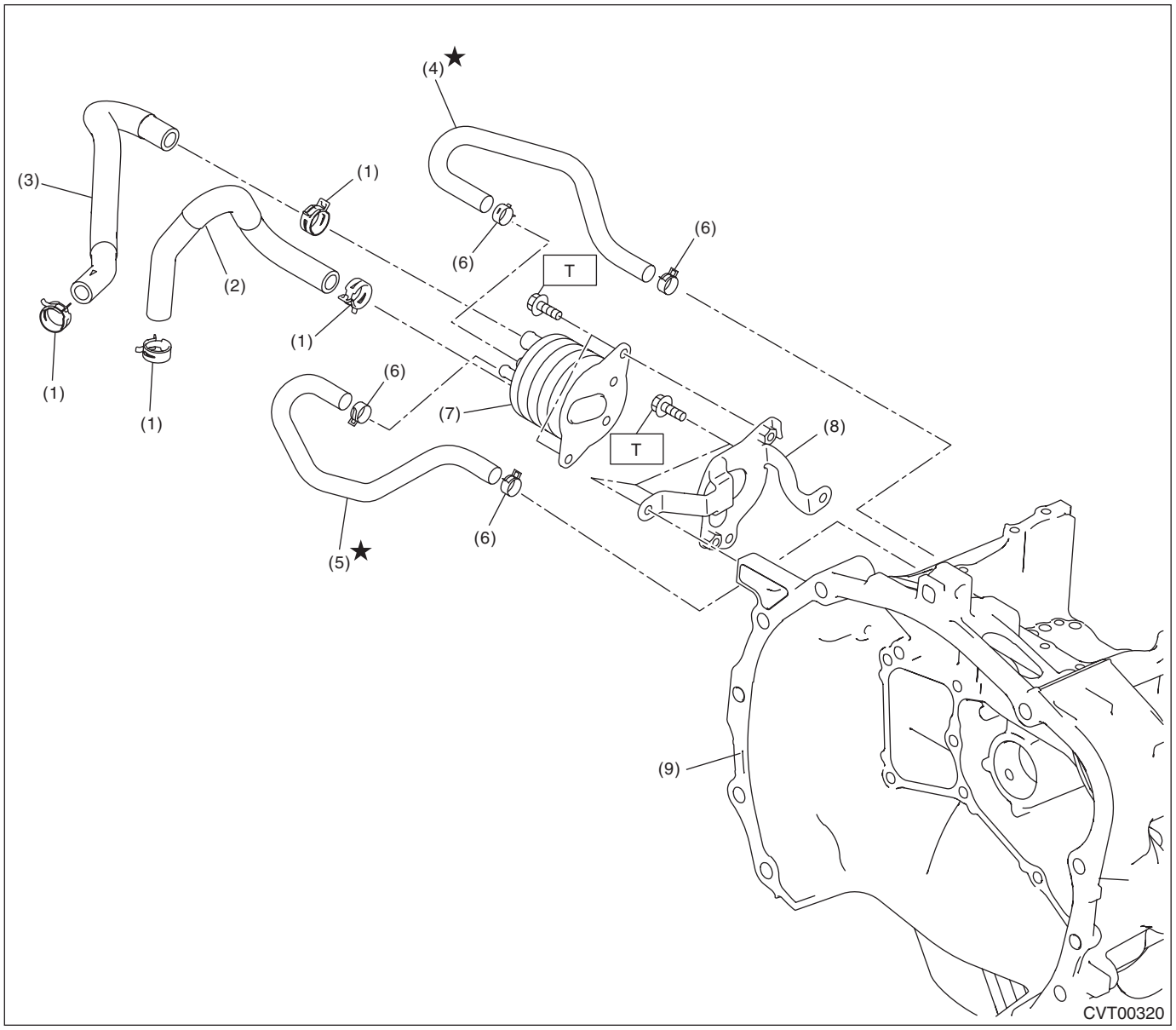
Tightening torque: N·m (kgf-m, ft-lb)
T1: 7 (0.7, 3.7)
T2: 8 (0.8, 5.9)
T3: 14 (1.4, 10.3)
T4: 39 (4.0, 28.8)

14.ELECTRIC OIL PUMP



(1)	Drive motor ASSY	(5)	Harness bracket	***Tightening torque: N·m (kgf-m, ft-lb)***
(2)	O-ring	(6)	Harness bracket COMP	***T1: 8 (0.8, 5.2)***
(3)	O-ring	(7)	Electric oil pump harness clip	***T2: 22 (2.2, 16.2)***
(4)	Electric oil pump ASSY	(8)	Electric oil pump harness clip	

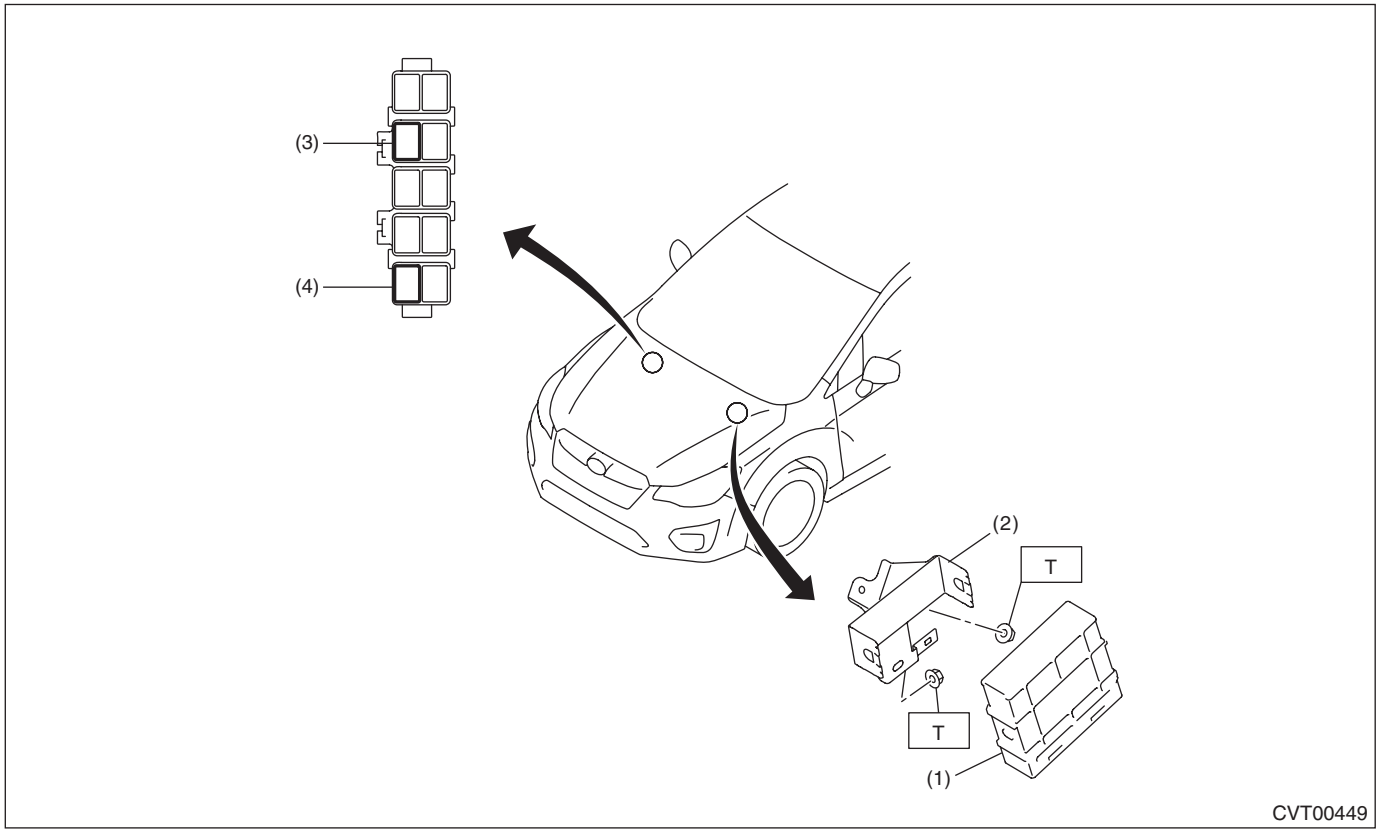
15.CVTF COOLER (WITH WARMER FEATURE)



(1) Hose clamp
(2) Engine coolant inlet hose
(3) Engine coolant outlet hose
(4) CVTF cooler outlet hose
(5) CVTF cooler inlet hose
(6) Hose clamp
(7) CVTF cooler (with warmer feature)
(8) CVTF cooler bracket
(9) Converter case

Tightening torque: N·m (kgf-m, ft-lb)
T: 23 (2.3, 17.0)

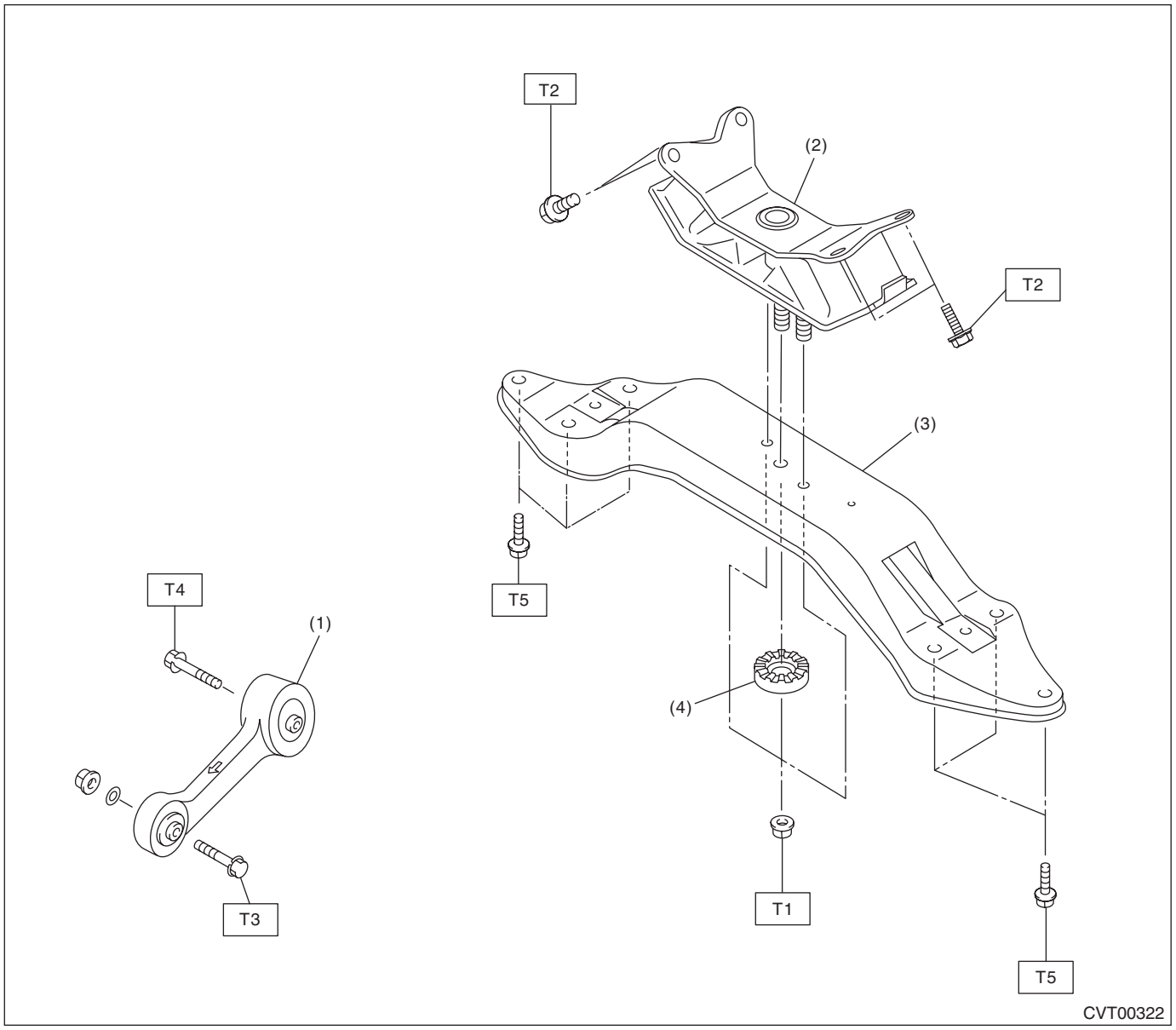
16.TRANSMISSION CONTROL MODULE



(1) Transmission control module (TCM)
(2) TCM bracket
(3) Self shut relay
(4) R range relay

Tightening torque: N·m (kgf-m, ft-lb)
T: 7.5 (0.8, 5.5)

17.TRANSMISSION MOUNTING



(1) Pitching stopper
(2) Rear cushion rubber
(3) Transmission rear crossmember
(4) Stopper

Tightening torque: N·m (kgf-m, ft-lb)
T1: 35 (3.6, 25.8)
T2: 40 (4.1, 29.5)
T3: 50 (5.1, 36.9)
T4: 58 (5.9, 42.8)
T5: 70 (7.1, 51.6)

C: CAUTION

• The hybrid system includes a high voltage circuit. Mishandling could cause accidents such as electric shock or leak. Always check "CAUTION (HYBRID SYSTEM)" and perform the proper operation. <Ref. to PC-7, CAUTION (HYBRID SYSTEM), Precaution.>

• Wear appropriate work clothing, including insulated gloves, a cap, protective goggles and protective shoes when performing any work.
• Remove contamination including dirt and corrosion before removal, installation or disassembly.
• Keep the disassembled parts in order and protect them from dust and dirt.
• Do not place the valve cover with its inner side facing up until it is installed, to prevent intrusion of foreign matter into the main control valve body.
• Do not place the oil pan with its inner side facing up until it is installed, to prevent intrusion of foreign matter into the output clutch control valve body.
• Before removal, installation or disassembly, be sure to clarify the failure. Avoid unnecessary removal, installation, disassembly and replacement.
• When disassembling the case and other light alloy parts, use a plastic hammer to force it apart. Do not pry apart with screwdrivers or other tools.
• Vehicle components are extremely hot after driving. Be wary of receiving burns from heated parts.
• Use SUBARU genuine CVTF and recommended grease. Do not mix CVTF, grease etc. of different grades or manufacturers.
• Be sure to tighten bolts and nuts to the specified torque.
• Apply CVTF onto sliding or revolving surfaces before installation.
• Replace deformed or damaged snap rings with new parts.
• Before installing O-rings or oil seals, apply sufficient amount of CVTF or gear oil to appropriate locations in order to avoid damage and deformation.
• Be careful not to incorrectly install or fail to install O-rings, snap rings and other such parts.
• Before securing a part on a vise, place cushioning material such as wood blocks, aluminum plate, or cloth between the part and the vise.
• Avoid damaging the mating surface of the case.
• Before applying liquid gasket, completely remove the old liquid gasket and clean the area.
• After removing the sensors, breather hose and plugs, plug the holes to avoid foreign materials intruding as necessary.
• During disassembly or assembly, be sure to use nylon gloves or paper towels. Do not use cloth gloves or waste cloth.
• Be careful of handling the oil seal, O-ring and gasket. If the contact surface of them is damaged, oil leakage may occur.
• When replacing the taper roller bearing, replace the outer race and inner race as a set.
• When replacing the hypoid gear, replace the hypoid gear and drive pinion shaft as a set.
• Replace the bolts if the seating surface or the thread surface is excessively rusted.

D: PREPARATION TOOL

1. SPECIAL TOOL

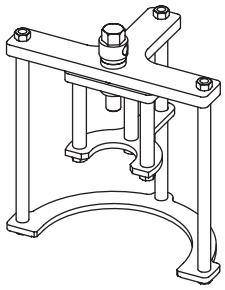
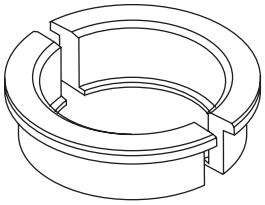
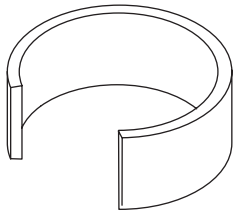
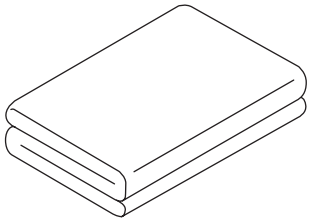
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST18769AA010	18769AA010	EXPANDER PULLEY	Used for removing and installing the secondary pulley assembly.
 ST18767AA020	18767AA020	BEARING REMOVER	Used for removing the ball bearing of transfer clutch assembly and the ball bearing of transfer driven gear.
 ST18762AA010	18762AA010	COMPRESSOR SPECIAL TOOL	Used for removing and installing snap ring of forward clutch assembly and output clutch assembly.
 ST18761AA010	18761AA010	SHEET SPECIAL TOOL	• Used for removing and installing control valve body. • Used for removing and installing valve cover. • Used for removing and installing transmission harness.

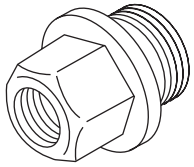
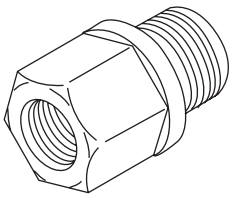
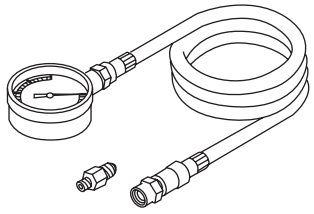
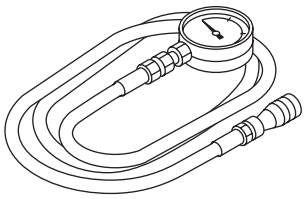
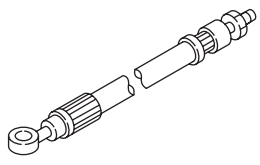
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST18681AA010	18681AA010	PRESSURE GAUGE ADAPTER	Used for measuring the secondary pressure (line pressure). NOTE: Used together with the genuine O-ring (part No. 806916050).
 ST18681AA000	18681AA000	PRESSURE GAUGE ADAPTER	Used for measuring the hydraulic pressure of transfer clutch and output clutch pressure. NOTE: Used together with the genuine O-ring (part No. 806911080).
 ST18801AA000	18801AA000	OIL PRESSURE GAUGE ASSY	Used for measuring the hydraulic pressure of secondary pressure (line pressure) and output clutch pressure.
 ST-498575400	498575400	OIL PRESSURE GAUGE ASSY	Used for measuring the transfer clutch hydraulic pressure.
 ST-498897800	498897800	OIL PRESSURE ADAPTER	Used for measuring the output clutch hydraulic pressure.

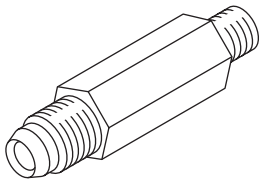
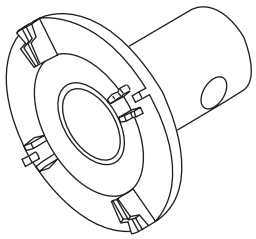
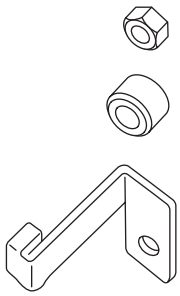
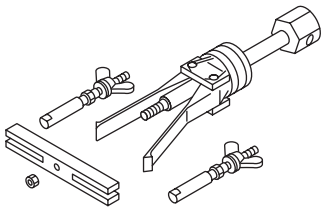
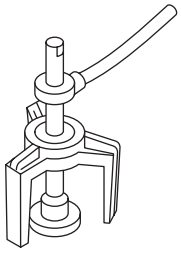
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-498897200	498897200	OIL PRESSURE GAUGE ASSY	Used for measuring the transfer clutch hydraulic pressure.
 ST18658AA020	18658AA020	WRENCH COMPL RETAINER	Used for removing and installing the differential side retainer.
 ST-498277200	498277200	STOPPER SET	• Used for removing and installing transmission assembly to engine. • Used for preventing the torque converter from dropping off.
 ST-398527700	398527700	PULLER ASSY	• Used for removing the extension case oil seal. • Used for removing the bearing outer race of the drive pinion shaft.
 ST-398673600	398673600	COMPRESSOR	Used for removing and installing snap ring of forward clutch assembly and output clutch.

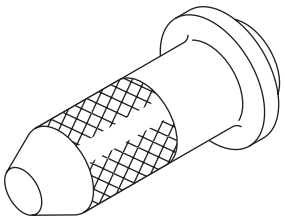
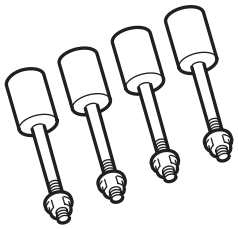
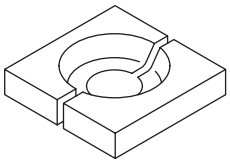
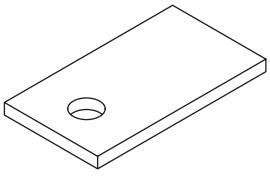
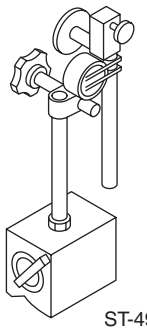
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-498057300	498057300	OIL SEAL INSTALLER	Used for installing the extension case oil seal.
 ST18632AA000	18632AA000	STAND ASSY	Used for disassembling and assembling the transmission.
 ST-498515500	498515500	REMOVER	Used for removing the bearing inner race of the drive pinion shaft.
 ST-498255400	498255400	PLATE	Used for measuring the backlash of hypoid gear.
 ST-498247001	498247001	MAGNET BASE	• Used for measuring the backlash of differential bevel pinion gear. • Used for measuring the backlash of hypoid gear. • Used together with DIAL GAUGE (498247100).

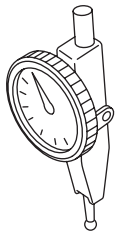
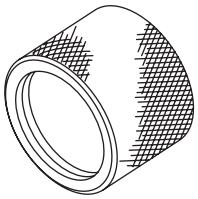
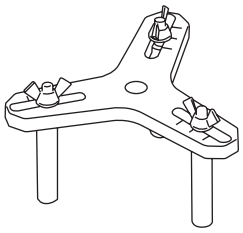
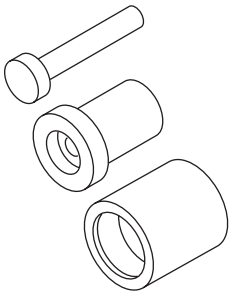
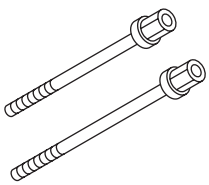
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-498247100	498247100	DIAL GAUGE	• Used for measuring the backlash of differential bevel pinion gear. • Used for measuring the backlash of hypoid gear. • Used together with DIAL GAUGE (498247101).
 ST18675AA000	18675AA000	DIFFERENTIAL SIDE OIL SEAL INSTALLER	Used for installing the differential side retainer oil seal.
 ST18762AA001	18762AA001	COMPRESSOR SPECIAL TOOL	• Used for disassembling and installing the multi-plate clutch piston. • COMPRESSOR SPECIAL TOOL (18762AA000) can also be used.
 ST-927720000	927720000	HOUSING BUSHING INSTALLER AND REMOVER	• Used for installing the oil seal. • Use BUSHING SHAFT (927880000).
 ST18763AA000	18763AA000	COMPRESSOR SHAFT	Used for measuring the backlash of hypoid gear.

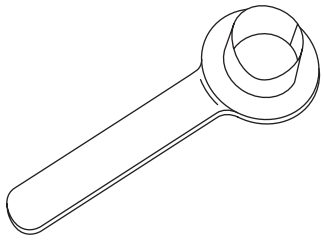
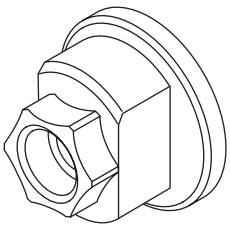
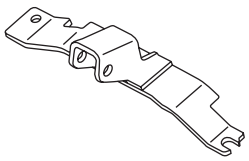
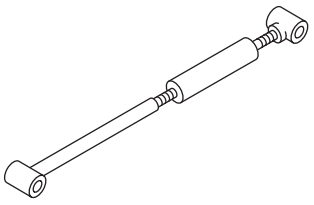
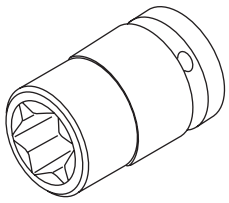
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST28399SA010	28399SA010	OIL SEAL PROTECTOR	Used for protecting oil seal when installing front drive shaft.
 ST-498937110	498937110	HOLDER	• Used for removing and installing the drive pinion lock nut. • Used as a holder to rotate gear when checking tooth contact.
 ST41099AA012	41099AA012 (Newly adopted tool)	ENGINE SUPPORT BRACKET	• Used for supporting the engine. • ENGINE SUPPORT BRACKET (41099AA011) can also be used.
 ST41099AA020	41099AA020	ENGINE SUPPORT	Used for supporting the engine.
 ST18270KA020	18270KA020	SOCKET (E20)	• Used for removing and installing the hypoid driven gear. • Used for removing and installing the drive pinion shaft retainer.

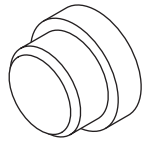
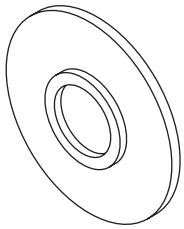
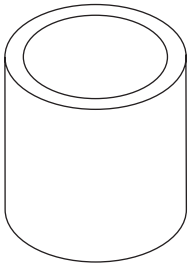
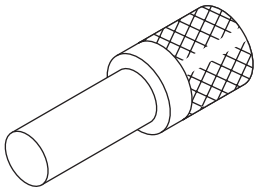
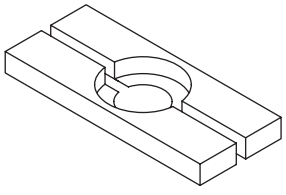
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-398497701	398497701	SEAT	Used for removing and installing the bearing.
 ST-398177700	398177700	INSTALLER	• Used for installing the ball bearing. • Used for installing the bearing outer race. • Used for installing the plug.
 ST28499TC010	28499TC010	PRESS SNAP RING	Used for installing the bearing outer race of drive pinion shaft.
 ST-899864100	899864100	REMOVER	• Used for removing and installing the ball bearing. • Used for removing the transfer drive gear. • Used for removing the bearing inner race of the front differential.
 ST-498077000	498077000	REMOVER	Used for removing the bearing inner race of the front differential.

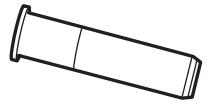
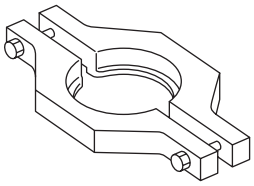
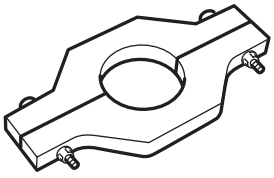
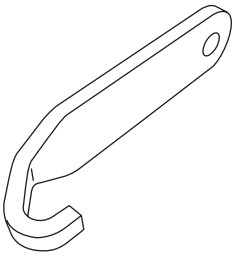
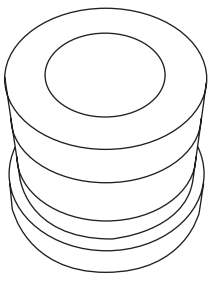
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST18657AA010	18657AA010	INSTALLER	Used for installing the oil seal at shifter arm shaft portion.
 ST-498077600	498077600	REMOVER	Used for removing the ball bearing of drive sprocket.
 ST18723AA000	18723AA000	REMOVER	Used for removing the ball bearings of transfer clutch assembly and transfer driven gear.
 ST-498497300	498497300	CRANKSHAFT STOPPER	Used for stopping the drive plate rotation when removing and installing the drive plate.
 ST-399513600	399513600	INSTALLER	Used for removing the ball bearing of drive sprocket.

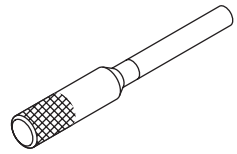
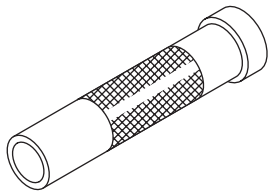
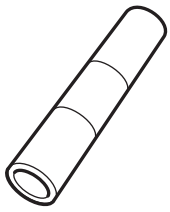
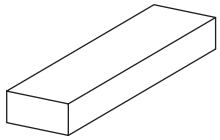
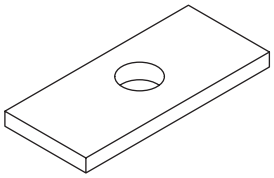
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-499267300	499267300	STOPPER PIN	Used for adjusting the inhibitor switch.
 ST-499277100	499277100	BUSHING 1-2 INSTALLER	• Used for installing the ball bearing. • Used for installing the bearing inner race.
 ST18651AA000	18651AA000	INSTALLER	Used for installing the ball bearing.
 ST-499575400	499575400	GAUGE	Used for measuring height of end play.
 ST-499575500	499575500	GAUGE	Used for measuring height of end play.

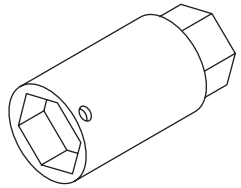
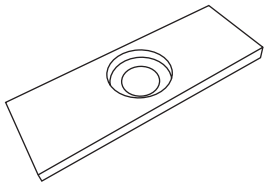
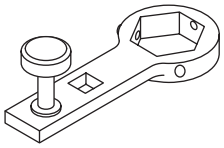
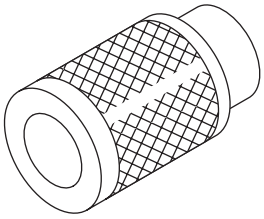
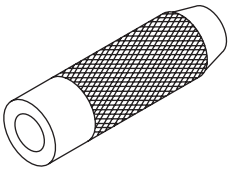
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-499787500	499787500	ADAPTER	• Used for removing and installing the drive pinion shaft lock nut. • Used for measuring the preload of the drive pinion shaft. • Used for measuring the backlash of hypoid gear.
 ST-499575600	499575600	GAUGE	Used for measuring height of end play.
 ST-499787700	499787700	WRENCH	• Used for removing and installing the drive pinion shaft lock nut. • Used for measuring the preload of the drive pinion shaft. • Used for measuring the backlash of hypoid gear.
 ST-499757002	499757002	INSTALLER	• Used for removing the bearing of reduction driven gear. • Used for installing the transfer drive gear.
 ST-899580100	899580100	INSTALLER	Used for installing the bearing inner race of drive pinion shaft.

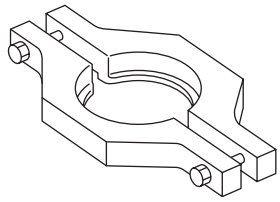
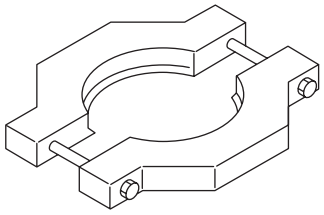
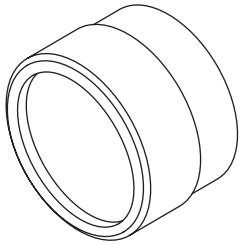
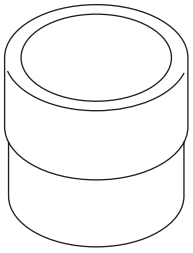
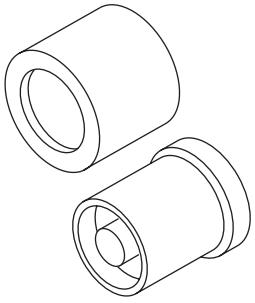
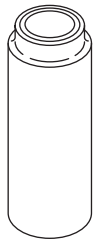
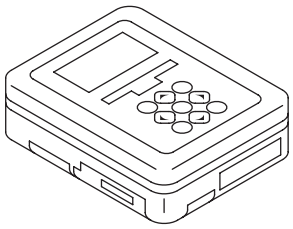
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-498077300	498077300	REMOVER	Used for removing the ball bearings of the reduction driven gear and output clutch assembly.
 ST18767AA000	18767AA000	REMOVER	Used for removing the parking gear.
 ST-499755502	499755502	PRESS SNAP RING	Used for installing the drive sprocket ball bearing.
 ST-499755602	499755602	PRESS SNAP RING	• Used for installing the oil seal. • Used for installing the ball bearing and roller bearing. • Used for installing the plug. • Used for installing the parking gear.
 ST20099AE020	20099AE020	INSTALLER	Used for installing the bearing outer race of drive pinion shaft.

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-927130000	927130000	EXTENSION DRIVE SHAFT	Used for installing the bearing inner race of drive pinion shaft.
 ST1B022XU0	1B022XU0	SUBARU SELECT MONITOR III KIT	Used for setting of each function and trouble-shooting for electrical system. NOTE: For detailed operation procedures of Subaru Select Monitor III, refer to “PC application help for Subaru Select Monitor”.

2. GENERAL TOOL

TOOL NAME	REMARKS
Circuit tester	Used for measuring resistance and voltage.
Thickness gauge	Used for measuring the clearance in reverse brake, forward clutch, output clutch and transfer clutch.
Oil pressure gauge	Used for measuring the electric oil pump hydraulic pressure.
Caliper	Used for measuring the dimension.
Spring scale	Used for measuring the starting torque of the drive pinion.
TORX® bit T70	Used for removing and installing differential gear oil drain plug.
Straight pin remover	Used for removing and installing the straight pin.
Push/pull gauge	Used for measuring clutch clearance.
Angle gauge	Used for installing the drive plate.
Insulated gloves	Used for high voltage system operation.
Insulated tools	Used for high voltage system operation.
Insulating tape	Used for insulation by wrapping high voltage system cable connectors and terminals with it.
Insulation multimeter	Used for measuring high voltage system resistance and voltage.

2. Check List for Interview

A: CHECK

Check the following items when a problem has occurred.

NOTE:
Use copies of this page for interviewing customers.

Customer's name			
Date of purchase			
Date of repair			
Transmission model	Transmission	V.I.N.	
Odometer reading	km (miles)		
Frequency	❑ Continuous ❑ Intermittent (times/day)		
Weather	❑ Fine ❑ Cloudy ❑ Rainy ❑ Snowy ❑ Other ( )		
Place	❑ Highland ❑ Suburbs ❑ Inner city ❑ Uphill ❑ Downhill ❑ Rough road ❑ Other ( )		
Ambient air temperature	❑ Hot ❑ Warm ❑ Cool ❑ Cold		
Vehicle speed	km/h (MPH)		
AT OIL TEMP light	❑ Blinks continuously	❑ Does not blink	
Select lever position	❑ P ❑ R ❑ N ❑ D ❑ Manual mode		
Driving condition	❑ Not affected ❑ At racing ❑ While decelerating ❑ While EV traveling	❑ At starting ❑ While accelerating ❑ While turning (❑ RH/❑ LH)	❑ While idling ❑ When cruising (Vehicle speed km/h) ❑ Immediately after starting the engine
Manual mode	❑ ON ❑ OFF		
Symptoms	❑ Vehicle does not move (❑ Any position ❑ Particular position)		
	❑ Vehicle does not move (no load racing condition as in N range)		
	❑ Vehicle does not move (engine speed does not increase, felt as stall condition)		
	❑ Noise or vibration (Describe concretely:)		
	❑ Shock felt at N → D selection (seconds after shifting, when engine cold or after warm-up)		
	❑ Shock felt at N → R selection (seconds after shifting, when engine cold or after warm-up)		
	❑ Shifting is wrong (Describe concretely:)		
	❑ Shock or judder during driving		
	❑ Fails to accelerate.		
	❑ Engine speed increases abruptly during driving		
	❑ Shock or judder during standing start		
	❑ Select lever does not move		
	❑ Other ( )		

2. CVTF

A: INSPECTION

Check for leakage of CVTF from transmission.

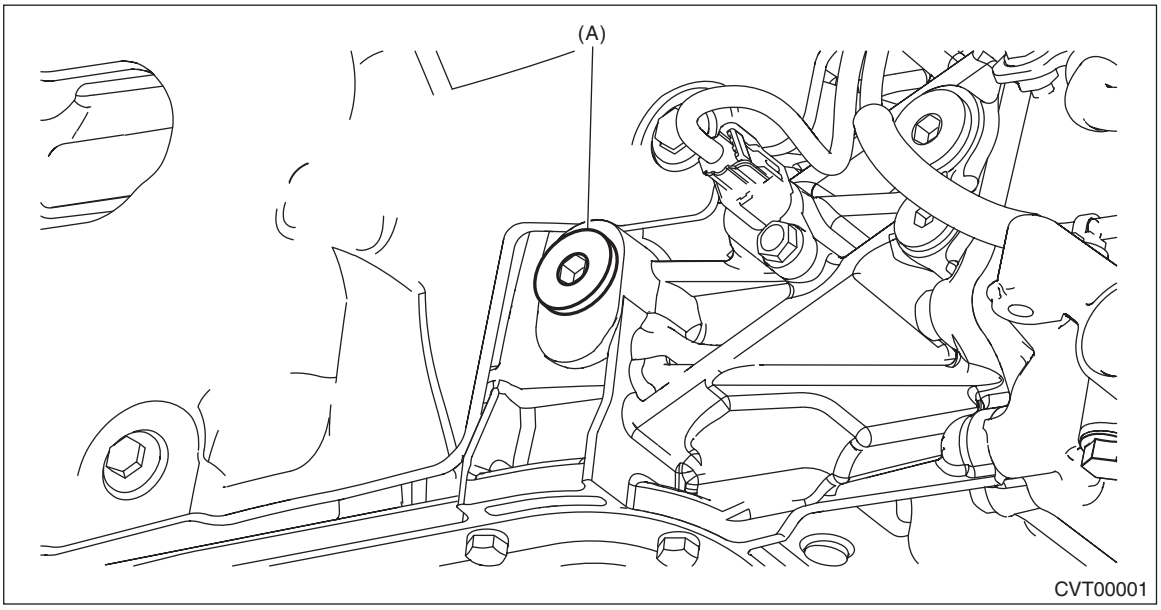
B: ADJUSTMENT

CAUTION:
• CVTF level changes along with CVTF temperature. When inspecting CVTF level, observe the specified CVTF temperature.
• Always use specified CVTF. Using other fluid will cause malfunction.

1) Perform “Engine only Drive Mode” using the Subaru Select Monitor. <Ref. to HEV(diag)-71, HYBRID POWERTRAIN CONTROL SYSTEM, OPERATION, System Operation Check Mode.>
2) Idle the engine to raise CVTF temperature to 35 — 45°C (95 — 113°F) on Subaru Select Monitor.
3) Operate the select lever in P → R → N → D and D → N → R → P to circulate CVTF with the engine idling.
4) While the select lever is in “P” range and the engine is running, lift up the vehicle and remove the filler plug.

CAUTION:
Pay special attention to the following operations as the engine is at idle.

NOTE:
CVTF is at the specified level when it is up to the filler plug hole lower section.

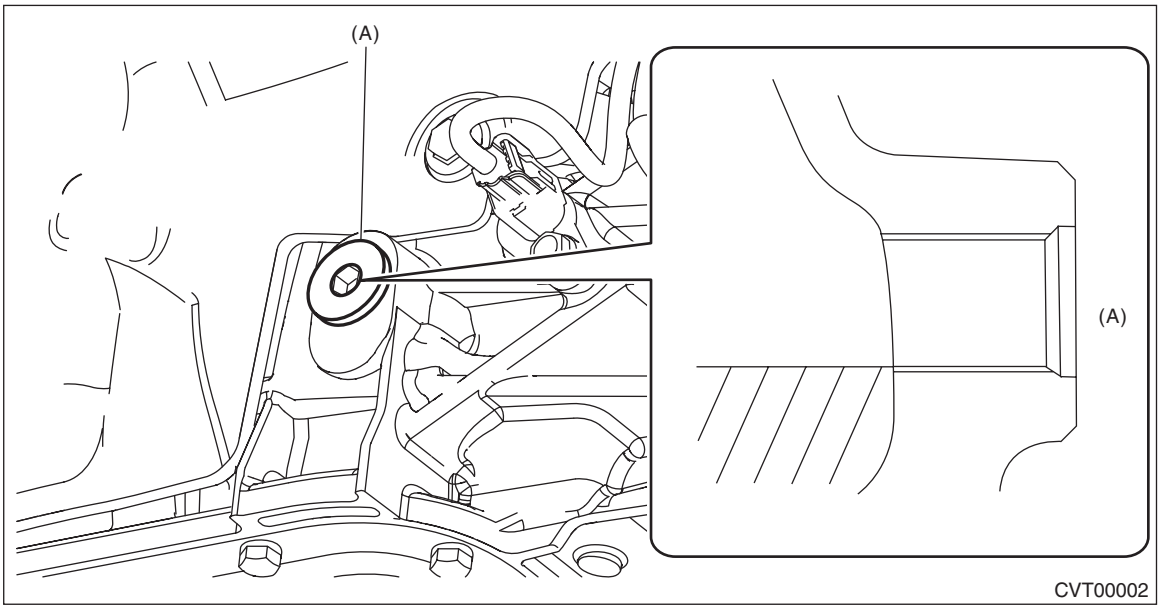


(A) Filler plug

5) When there is no CVTF leakage from the transmission, add the specified fluid up to the filler plug hole lower section.

Specified fluid:
<Ref. to CVT(TH58A)-4, HYDRAULIC CONTROL AND LUBRICATION, SPECIFICATION, General Description.>

CAUTION:
Note that when CVTF is added up to the lower section of filler plug while the transmission is in cold condition, overfilling of CVTF occurs, causing the oil to spill out.



(A) Filler plug hole

6) Install the filler plug.

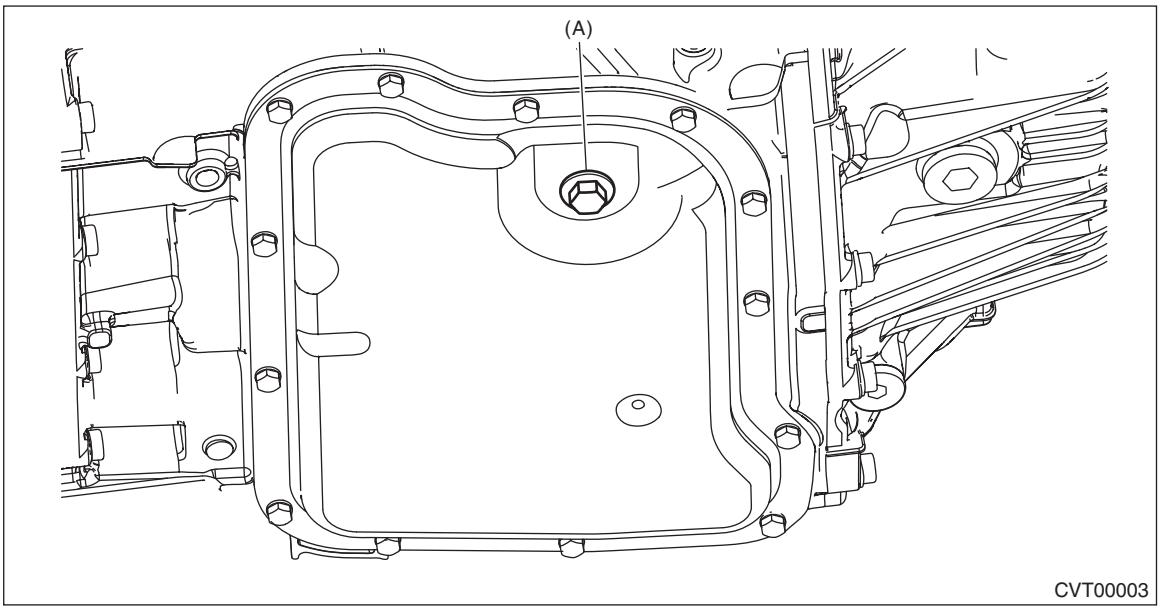
NOTE:
Use a new gasket.

Tightening torque:
50 N·m (5.1 kgf-m, 36.9 ft-lb)

C: REPLACEMENT

CAUTION:
• Directly after the vehicle has been running or the engine has been idling for a long time, the CVTF is hot. Be careful not to burn yourself.
• Be careful not to spill the CVTF on exhaust pipe to prevent it from emitting smoke or causing fires. If CVTF adheres, wipe it off completely.
• Always use specified CVTF. Using other fluid will cause malfunction.

1) Lift up the vehicle, and remove the CVTF drain plug.



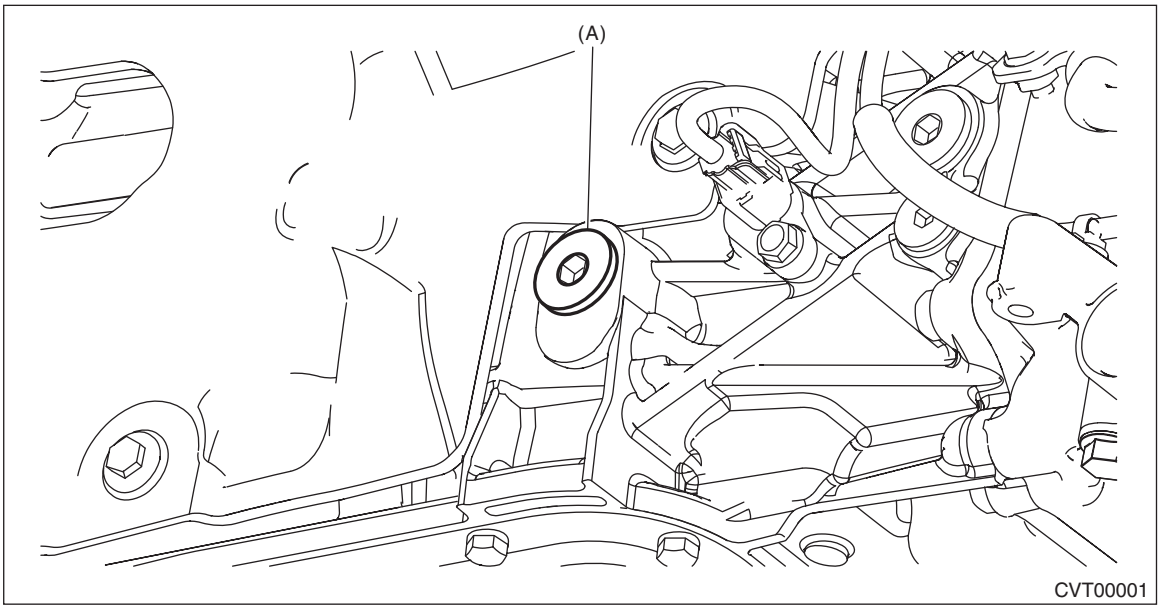
(A) CVTF drain plug

2) Check the CVTF condition. <Ref. to CVT(TH58A)-44, CONDITION CHECK, CVTF.>
3) Install the CVTF drain plug and gasket.

NOTE:
Use a new gasket.

Tightening torque:
31 N·m (3.2 kgf-m, 22.9 ft-lb)

4) Remove the filler plug.



(A) Filler plug

5) Add the specified fluid up to the filler plug hole lower section.

Specified fluid:
<Ref. to CVT(TH58A)-4, HYDRAULIC CONTROL AND LUBRICATION, SPECIFICATION, General Description.>

6) Temporarily tighten the filler plug.
7) Idle the engine to raise CVTF temperature to 35 — 45°C (95 — 113°F) on Subaru Select Monitor.
8) Operate the select lever in P → R → N → D and D → N → R → P to circulate CVTF with the engine idling.

CAUTION:
Pay special attention to the following operations as the engine is at idle.

9) With the select lever shifted to “P” range and the engine started, lift up the vehicle. Adjust the CVTF level and check for leakage. <Ref. to CVT(TH58A)-41, ADJUSTMENT, CVTF.>
10) Install the filler plug.

NOTE:
Use a new gasket.

Tightening torque:
50 N·m (5.1 kgf-m, 36.9 ft-lb)

D: CONDITION CHECK

NOTE:
When replacing CVTF, determine the condition inside the transmission body by inspecting the drained CVTF.

Fluid condition	Trouble and possible cause	Corrective action
Metal particles.	Excessive wear of the internal of the transmission body.	Replace CVTF and check if CVT operates correctly.
Thick and varnish-form fluid.	Burnt clutches	Replace CVTF and check the CVT body or vehicle for faulty.
Clouded CVTF or bubbles.	Water mixed in fluid.	Replace CVTF and check the water entering point.

3. Differential Gear Oil

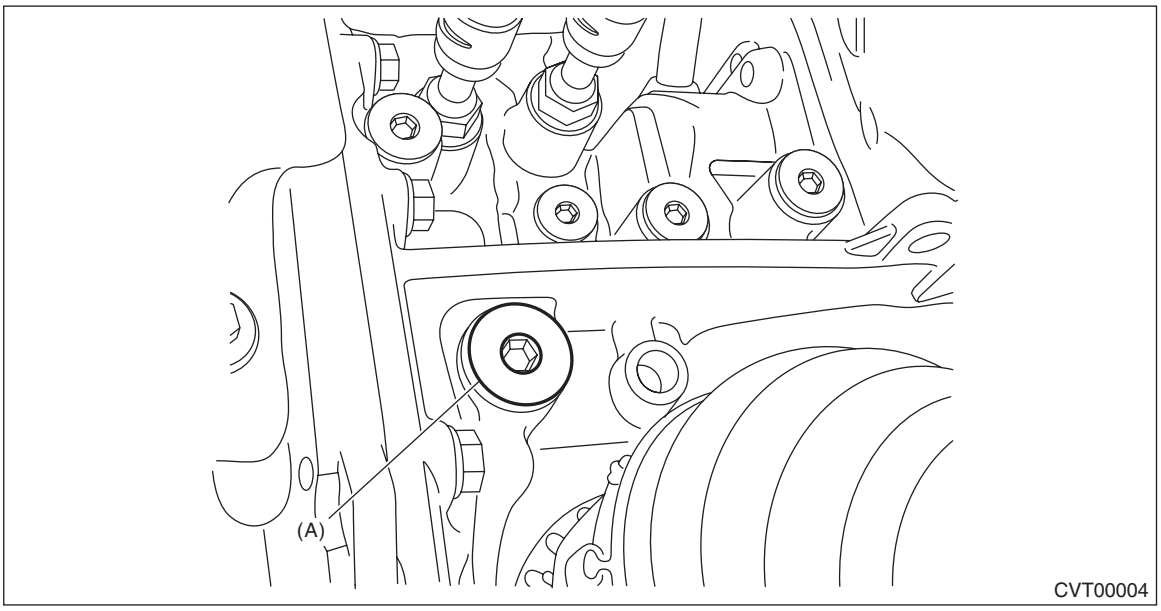
A: INSPECTION

Check that there is no leakage of differential gear oil from the converter case.

B: ADJUSTMENT

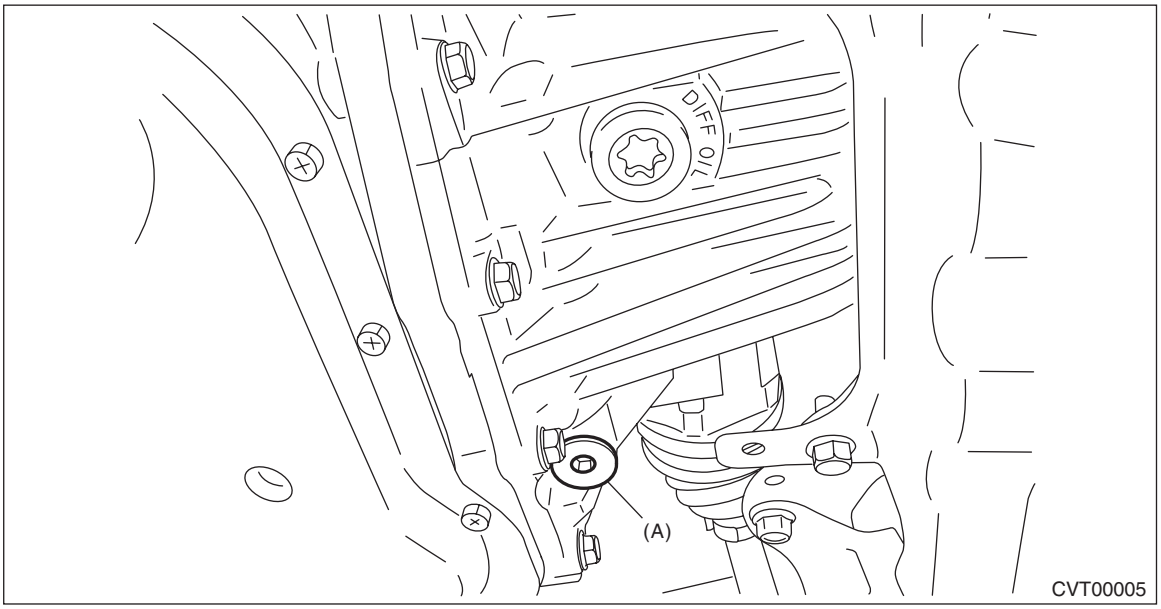
NOTE:
Immediately after removing the overflow drain plug, remaining gear oil (approx. 8 cc) may come out of the overflow pipe. This is not included in the specified amount. When removing the overflow drain plug, make sure the gear oil flows out of the overflow drain plug hole by filling with gear oil.

1) Turn the ignition switch to OFF.
2) Lift up the vehicle.
3) Remove the filler plug.



(A) Filler plug

4) Remove the overflow drain plug.



(A) Overflow drain plug

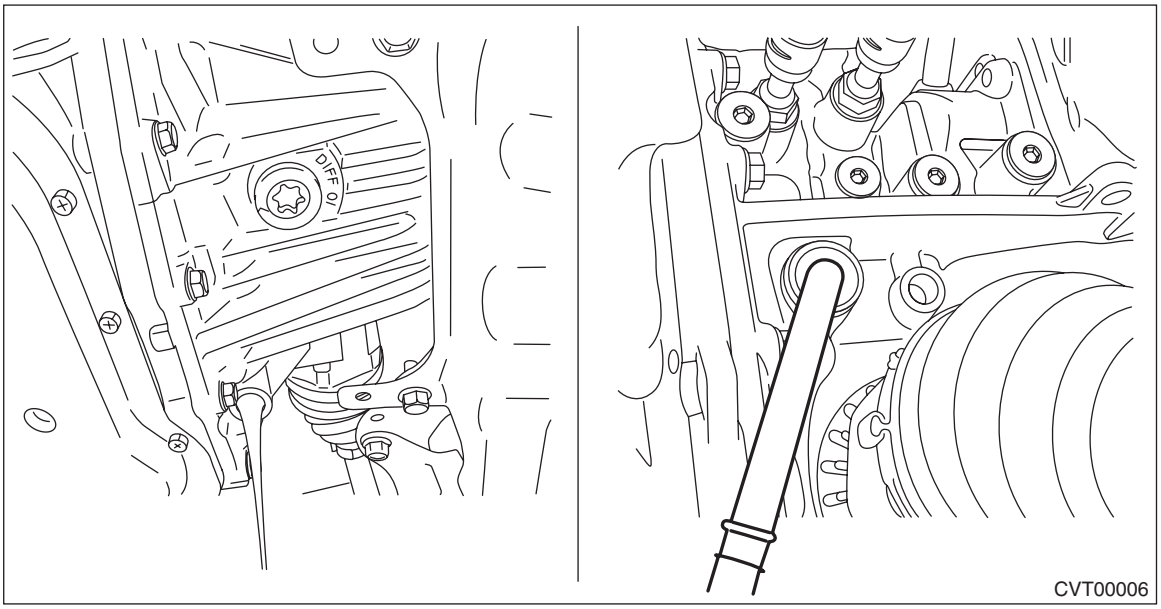
5) Fill in the differential gear oil through the filler plug hole up to where the oil flows out of the overflow drain plug.

Recommended gear oil:
<Ref. to CVT(TH58A)-4, RECOMMENDED GEAR OIL, SPECIFICATION, General Description.>

6) When the flow of the differential gear oil turns into a narrow stream, install the overflow drain plug.

NOTE:
Use a new gasket.

Tightening torque:
50 N·m (5.1 kgf-m, 36.9 ft-lb)



7) Install the filler plug.

NOTE:
Use a new gasket.

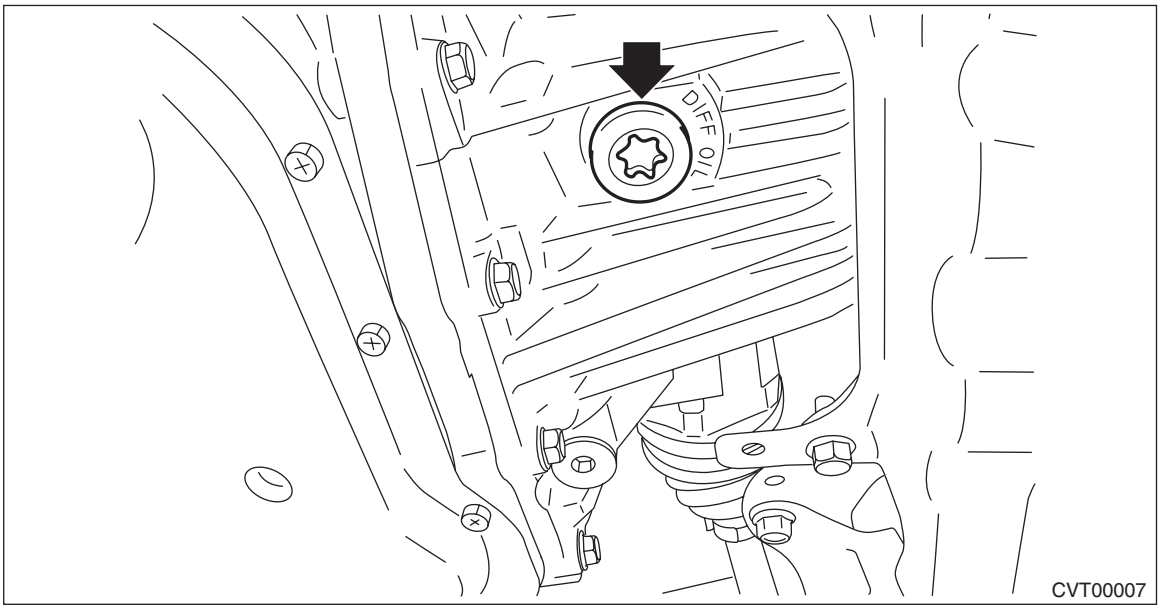
Tightening torque:
50 N·m (5.1 kgf-m, 36.9 ft-lb)

C: REPLACEMENT

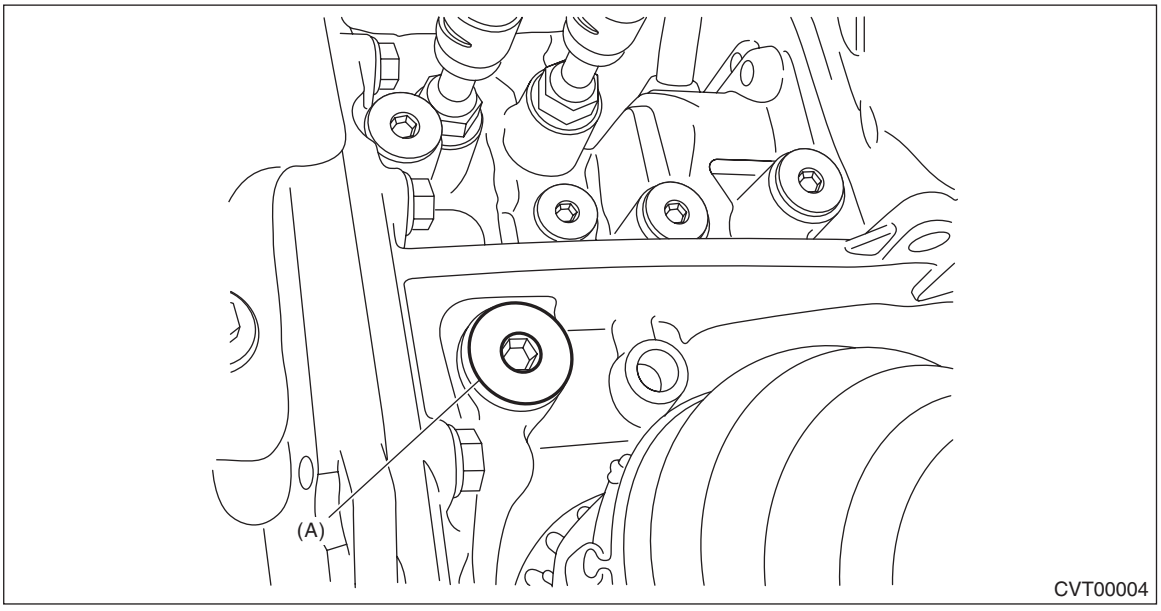
CAUTION:
• Immediately after the vehicle has been running or after idling for a long time, the differential gear oil will be hot. Be careful not to burn yourself.
• Be careful not to spill differential gear oil on the exhaust pipe to prevent it from emitting smoke or causing a fire. If gear oil adheres, wipe it off completely.
1) Lift up the vehicle.
2) Remove the differential gear oil drain plug using TORX® bit T70. Drain differential gear oil.
3) Install the differential gear oil drain plug using TORX® bit T70.

NOTE:
Use a new gasket.

Tightening torque:
70 N·m (7.1 kgf-m, 51.6 ft-lb)



4) Remove the filler plug.

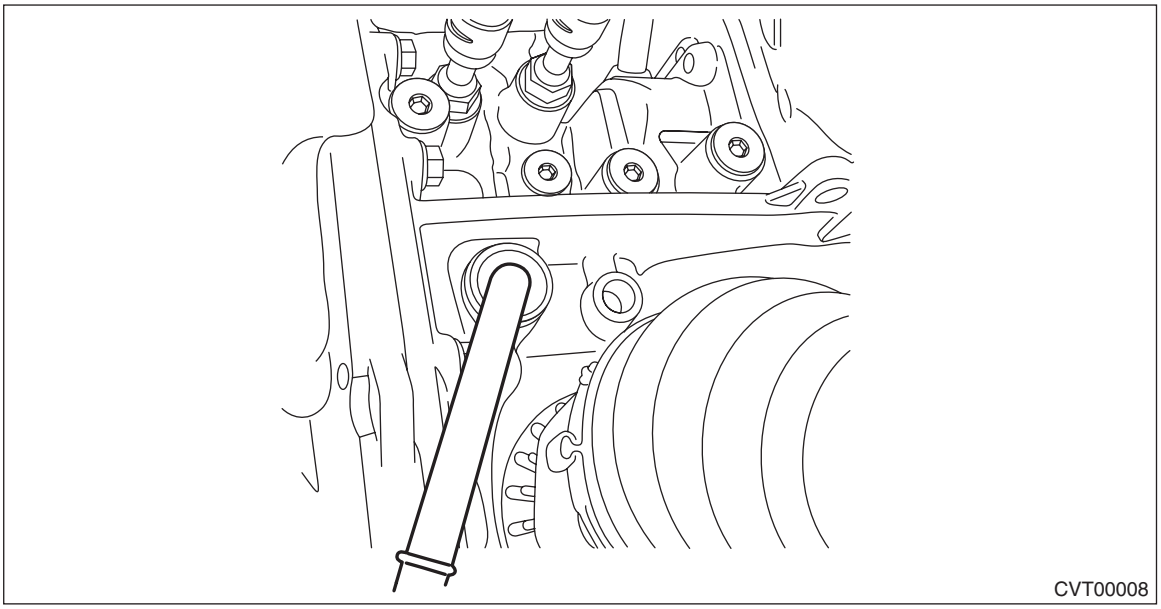


(A) Filler plug

5) Pour gear oil into the filler plug hole.

Recommended gear oil:
<Ref. to CVT(TH58A)-4, RECOMMENDED GEAR OIL, SPECIFICATION, General Description.>

Gear oil capacity:
<Ref. to CVT(TH58A)-4, RECOMMENDED GEAR OIL, SPECIFICATION, General Description.>



6) Adjust the level of differential gear oil. <Ref. to CVT(TH58A)-45, ADJUSTMENT, Differential Gear Oil.>

3. General Description

A: CAUTION

1. SRS AIRBAG SYSTEM

The airbag system wiring harness is routed near the TCM.

CAUTION:
• All the airbag system wiring harnesses and connectors are colored yellow. Do not use an electric test equipment to check these circuits.
• Be careful not to damage the airbag system wiring harness when performing diagnostics or servicing the TCM.

2. HYBRID SYSTEM

Refer to “CAUTION (HYBRID SYSTEM)” in “PRECAUTION section”. <Ref. to PC-7, CAUTION (HYBRID SYSTEM), Precaution.>

3. MEASUREMENT

When measuring the voltage and resistance of the ECM, TCM or each sensor, use a tapered pin with a diameter of less than 0.64 mm (0.025 in) in order to avoid poor contact. Do not insert a pin of more than 0.65 mm (0.026 in) diameter.

B: INSPECTION

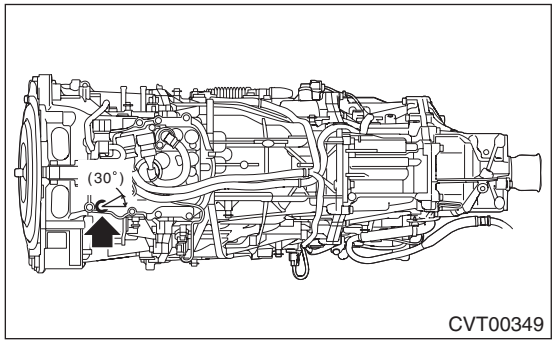
1. 12 VOLT AUXILIARY BATTERY

Check the battery. <Ref. to SC(H4DO(HEV))-43, INSPECTION, Battery.>

2. TRANSMISSION GROUND

Make sure that the ground terminal bolt is tightened securely.

Tightening torque:
14 N·m (1.4 kgf-m, 10.3 ft-lb)



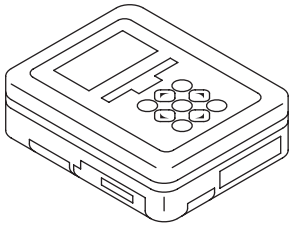
3. OPERATION OF SELECT LEVER

Make sure there is no noise, dragging or contact pattern in each select lever range.

WARNING:
Stop the engine while checking operation of the select lever.

C: PREPARATION TOOL

1. SPECIAL TOOL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST1B022XU0	1B022XU0	SUBARU SELECT MONITOR III KIT	Used for setting of each function and trouble-shooting for electrical system. NOTE: For detailed operation procedures of Subaru Select Monitor III, refer to “PC application help for Subaru Select Monitor”.

2. GENERAL TOOL

TOOL NAME	REMARKS
Circuit tester	Used for measuring resistance, voltage and current.
Oscilloscope	Used for measuring the sensor.

4. AWD ON/OFF Switching Mode

A: GENERAL DESCRIPTION

- Follow the messages displayed on the Subaru Select Monitor when working.
- Perform as necessary in FWD mode.
- When switched to FWD, AWD light illuminates.

B: PROCEDURE

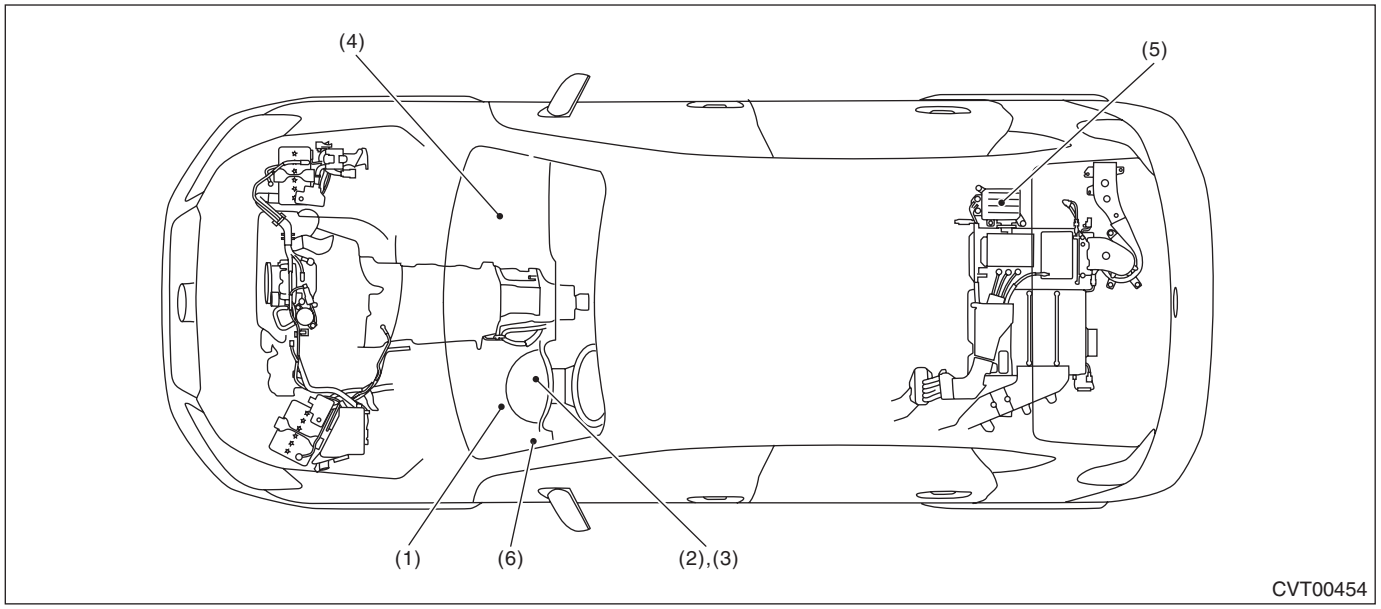
CAUTION:
• Do not turn the power of the Subaru Select Monitor OFF during work, and do not disconnect the data link connector.
• On completing the work in FWD, switch back in AWD.
• Perform the AWD ON/OFF changeover operation with the engine OFF.
1) Shift the select lever to “P” range.
2) Connect the Subaru Select Monitor to data link connector.
3) Press the push button ignition switch twice without depressing the brake pedal.
4) Turn off all switches causing an electrical load, such as headlights, A/C, seat heater and rear defogger.
5) Select {Work Support} in the «Transmission Diagnosis» display screen of the Subaru Select Monitor.
6) Select {Maintenance mode} in the «Work Support» screen of Subaru Select Monitor.
7) Select {AWD ON/OFF switching mode} in the «Maintenance mode» screen of the Subaru Select Monitor.
8) Follow the messages displayed on the Subaru Select Monitor screen when working.
Switching completes successfully if any of the following messages is displayed.
- When switching from AWD to FWD: {Switched to FF. To return to AWD, perform basic mode again.}
- When switching from FWD to AWD: {Switched to AWD. To return to FF, perform basic mode again.}

NOTE:
- If communication error occurs during switching mode, start in the “AWD ON/OFF switching mode” again.
- If operation is interrupted before the successful end message is displayed, perform the {AWD ON/OFF switching mode} from the beginning until confirming the operation is successfully ended. If this mode fails to complete successfully, the cause is as follows.
  - Select lever is not in “P” range.
  - Engine is running.
- For detailed operation procedures, refer to “PC application help for Subaru Select Monitor”.
- When performing the 2-wheel speed tester operation after FWD mode, place the vehicle on the speed tester, turn the ignition switch from OFF to ON, and then use the FWD mode. Failure to do so may cause a DTC on the hybrid system.

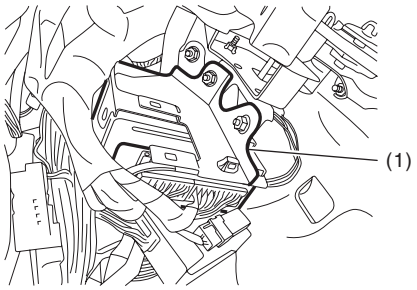
4. Electrical Component Location

A: LOCATION

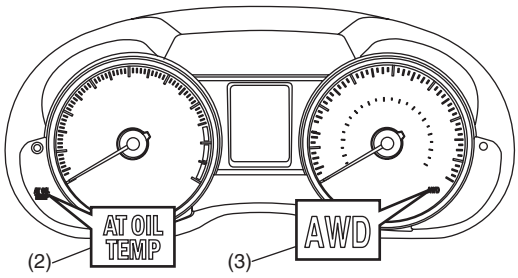
1. CONTROL MODULE



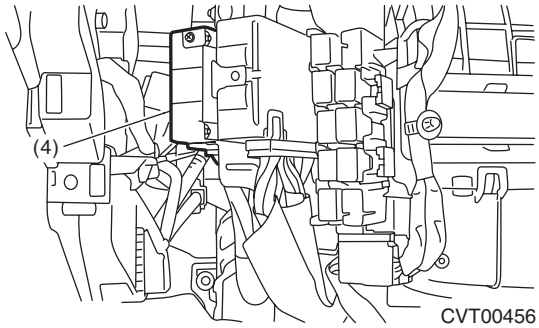
(1) Transmission control module (TCM)
(2) AT OIL TEMP light
(3) AWD light
(4) Hybrid powertrain control module (HPCM)
(5) Electric oil pump inverter
(6) Data link connector



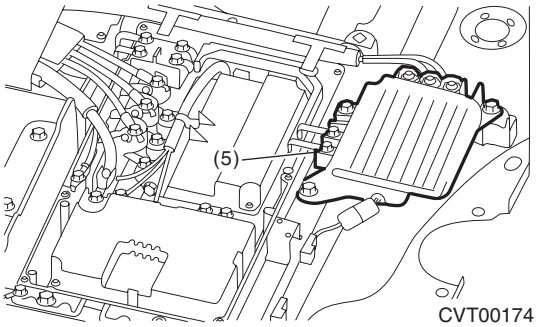
CVT00455



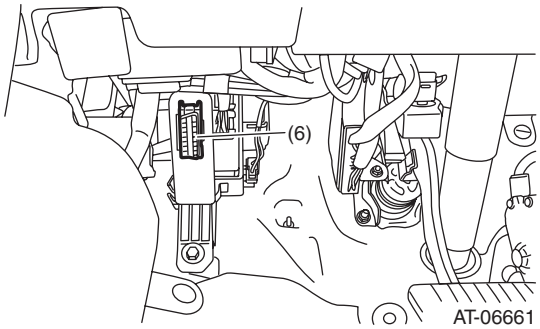
CVT00202



CVT00456

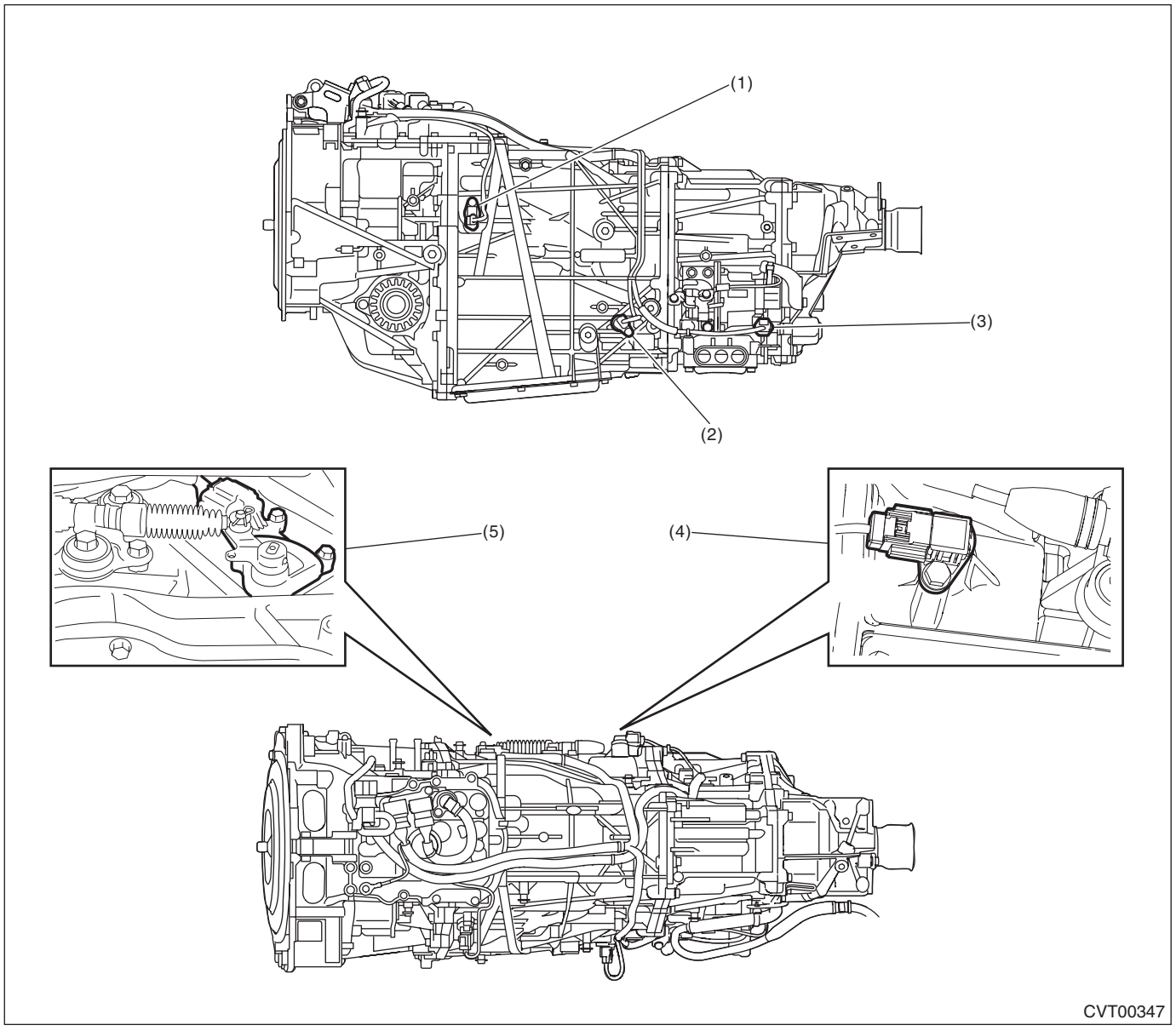


CVT00174



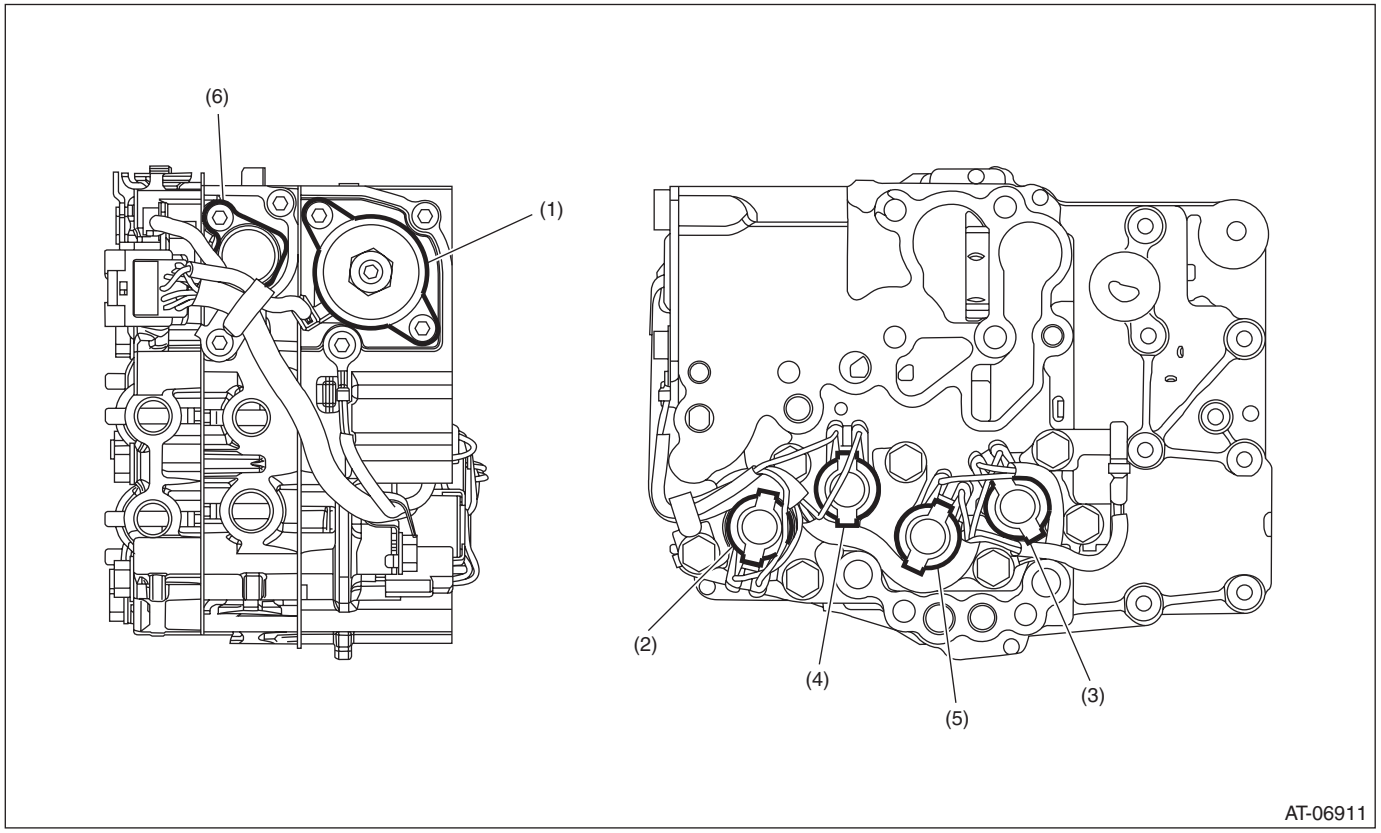
AT-06661

2. SENSOR

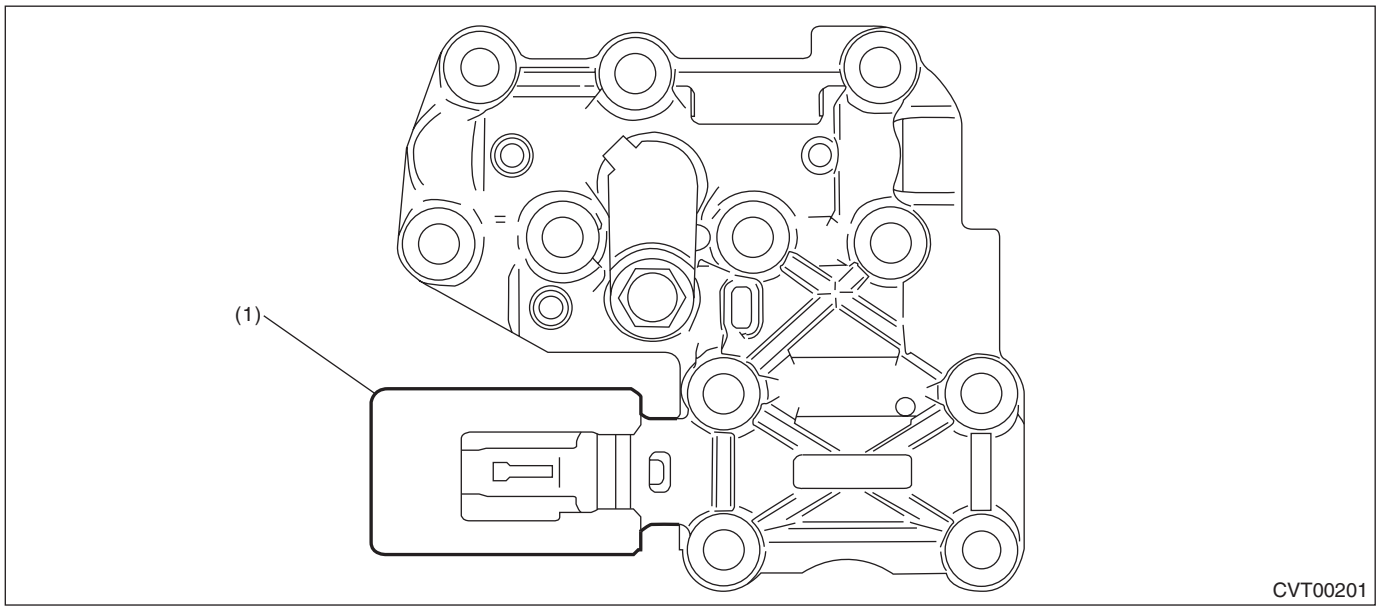


(1) Turbine speed sensor
(2) Secondary speed sensor
(3) Secondary pressure sensor
(4) Front wheel speed sensor
(5) Inhibitor switch

3. SOLENOID



(1) Secondary solenoid
(2) AWD solenoid
(3) Lock-up duty solenoid
(4) Primary DOWN solenoid
(5) Primary UP solenoid
(6) F&R solenoid



(1) Output clutch solenoid

5. Road Test

A: INSPECTION

1. GENERAL PRECAUTION

Road tests should be conducted to properly diagnose the condition of CVT.

CAUTION:
Always observe the local traffic laws when performing the test.

2. D RANGE SHIFT FUNCTION

Make sure that the engine speed is 950 — 1,400 r/min while driving on the level road at 50 km/h (31 MPH) after accelerating from halting up to 1/4 of accelerator opening angle. Then stop the vehicle. Check normal gear change has occurred while the vehicle speed changes from a constant speed to zero.

3. KICK-DOWN FUNCTION

Check if engine speed will rise by operating the accelerator opening angle to the full from a constant speed of 50 km/h (31 MPH) or more.

4. ENGINE BRAKE OPERATION

- Drive in “6th speed of manual mode” [70 — 80 km/h (43 — 50 MPH)], and shift down from 6th to 5th. Check if the indicator of combination meter switches “6” → “5”. At the same time, check the engine brake in 5th gear.
- Drive in “5th speed of manual mode” [60 — 70 km/h (37 — 43 MPH)], and shift down from 5th to 4th. Check if the indicator of combination meter switches “5” → “4”. At the same time, check the engine brake in 4th gear.
- Drive in “4th speed of manual mode” [50 — 60 km/h (31 — 37 MPH)], and shift down from 4th to 3rd. Check if the indicator of combination meter switches “4” → “3”. At the same time, check the engine brake in 3rd gear.
- Drive in “3rd speed of manual mode” [40 — 50 km/h (25 — 31 MPH)], and shift down from 3rd to 2nd. Check if the indicator of combination meter switches “3” → “2”. At the same time, check the engine brake in 2nd gear.
- Drive in “2nd speed of manual mode” [20 — 30 km/h (12 — 19 MPH)], and shift down from 2nd to 1st. Check if the indicator of combination meter switches “2” → “1”. At the same time, check the engine brake in 1st gear.

5. LOCK-UP FUNCTION

When the accelerator is lightly depressed while driving on a flat road in “D” range, check that rpm does not change abruptly.

6. P RANGE OPERATION

Stop the vehicle on an uphill grade of 5% or more and shift to the “P” range and apply the parking brake. Check that the vehicle does not move when the parking brake is released.

7. NOISE AND VIBRATION

Check for noise and vibration during driving at a constant speed, accelerating, decelerating and manual shift operation.

8. OIL LEAKAGE

After the driving test, inspect for leakage of CVTF and differential gear oil from the transmission body.

9. Auto Start Stop

NOTE:
- Perform inspection without using a lift and with the wheels in full contact with the ground.
- Measurement should be performed at CVTF temperature of 60°C (140°F) or more.

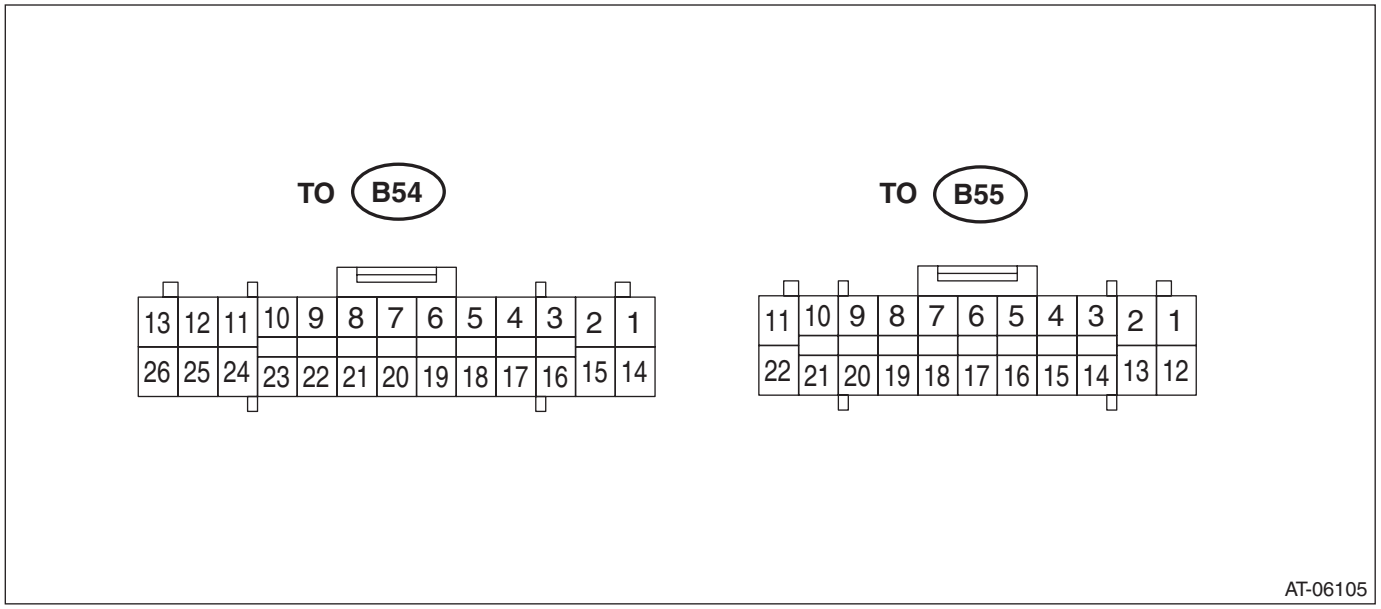
1) Start the engine.
2) Using the Subaru Select Monitor, check that Auto Start Stop cooperation prohibition demand is ON. <Ref. to CVT(HEV)(diag)-15, OPERATION, Subaru Select Monitor.>

NOTE:
If “Auto Start Stop cooperation prohibition demand” is “OFF”, turn it to “ON”.
   (1) Start the engine.
   (2) Check that no DTCs are recorded in TCM, ECM, VDCCM, BECM, DMCM and HPCM.
   (3) Check that ATF OIL TEMP or AWD light is not blinking or illuminating.
   (4) Check that the CVTF temperature reaches 60 — 90°C (140 — 194°F). <Ref. to CVT(HEV)(diag)-15, OPERATION, Subaru Select Monitor.>
   (5) Drive in D range at [20 — 30 km/h (12 — 19 MPH)], and slowly depress the brake pedal to decelerate the vehicle.
   (6) Check that «Auto Start Stop cooperation prohibition demand» is “ON”. <Ref. to CVT(HEV)(diag)-15, OPERATION, Subaru Select Monitor.>
   When the cooperation prohibition demand is “OFF”, repeat the procedure from step (1).
3) Shift the select lever to “D” range.
4) Set the vehicle to Auto Start Stop condition, and keep the condition for 5 seconds or more.
5) Release the brake pedal, depress the accelerator pedal firmly and start the engine to accelerate.
6) Stop the vehicle by depressing the brake pedal, and set the vehicle to Auto Start Stop condition.
7) Shift the select lever to “N” range.
8) Repeat steps from 3) to 7) five times.
9) Check that no shift shock occurs during engine starting.

If any shift shock occurred, repeat the steps five more times.

5. Transmission Control Module (TCM) I/O Signal

A: ELECTRICAL SPECIFICATION



NOTE:
Measure after warming up.

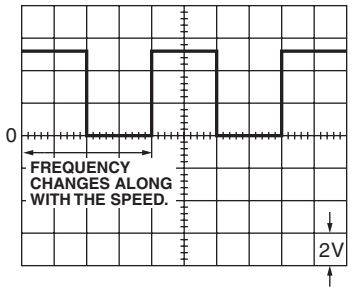
Item	Connector No.	Terminal No.	Measuring condition	Measurement value	Resistance between terminal and chassis ground	Remarks
Backup power supply	B55	1	—	10 — 13 V	—	
Ignition power supply	B55	21	—	10 — 13 V	—	
Main power supply	B55	11	—	10 — 13 V	—	
Main power supply	B55	2	—	10 — 13 V	—	
Main power supply	B55	22	—	10 — 13 V	—	
Manual mode switch	B55	4	Manual mode switch ON	Less than 1 V	—	
			Manual mode switch OFF	8 V or more	—	
Manual mode UP switch	B55	5	Manual mode UP switch ON	Less than 1 V	—	
			Manual mode UP switch OFF	8 V or more	—	
Manual mode DOWN switch	B55	16	Manual mode DOWN switch ON	Less than 1 V	—	
			Manual mode DOWN switch OFF	8 V or more	—	
Stop light switch	B55	13	Stop light switch ON	8 V or more	—	
			Stop light switch OFF	Less than 1 V	—	
P range switch	B54	5	P range	Less than 1 V	—	
			Except for P range	8 V or more	—	
R range switch	B54	18	R range	Less than 1 V	—	
			Except for R range	8 V or more	—	

Item	Connector No.	Terminal No.	Measuring condition	Measurement value	Resistance between terminal and chassis ground	Remarks
R range switch 2	B54	21	R range	Less than 1 V	—	
			Except for R range	8 V or more	—	
P N range switch	B55	15	At P, N range	Less than 1 V	—	
			Except for P, N range	8 V or more	—	
N range switch	B54	9	N range	Less than 1 V	—	
			Except for N range	8 V or more	—	
D range switch	B54	22	D range	Less than 1 V	—	
			Except for D range	8 V or more	—	
ATF temperature sensor	B54	3	ATF temperature at 20°C (68°F)	Approx. 2.5 V	Approx. 2.5 kΩ	
			ATF temperature at 80°C (176°F)	Approx. 0.7 V	Approx. 330 Ω	
ATF temperature sensor GND	B54	16	Always	Approx. 0 V	—	
Secondary pressure sensor power supply	B54	2	Ignition switch ON	5 V	—	
Secondary pressure sensor	B54	17	Ignition switch ON, engine OFF	Approx. 0.5 V (0 MPa)	—	Value increases with increase of engine load. (0.5 — 4.5 V)
			Ignition switch ON, engine ON	Approx. 1.0 V (1.0 MPa)	—	
Secondary pressure sensor GND	B54	15	Always	Approx. 0 V	—	
Secondary speed sensor	B54	7	While driving	0 or 5 V	—	Refer to the waveform (sensor)
Turbine speed sensor	B54	20	Engine ON, “P” or “N” range	0 or 5 V	—	Refer to the waveform (sensor)
Front wheel speed sensor	B54	19	While driving	0 or 5 V	—	Refer to the waveform (sensor)
Self-shut relay output	B55	20	For three seconds after ignition switch ON and OFF	Less than 1 V	—	
			Ignition switch OFF	8 V or more		
F&R solenoid	B54	11	Engine ON	Refer to the waveform (solenoid (1))	Approx. 4 — 6 Ω	Resistance value at 20°C (68°F). Value is higher as the temperature increase.
Secondary solenoid	B54	12	Engine ON	Refer to the waveform (solenoid (2))	Approx. 5 — 7 Ω	Resistance value at 20°C (68°F). Value is higher as the temperature increase.
Primary UP solenoid	B54	24	Engine ON, while UP shifting	Refer to the waveform (solenoid (3))	Approx. 10 — 13.5 Ω	Resistance value at 20°C (68°F). Value is higher as the temperature increase.
Primary DOWN solenoid	B54	25	Engine ON, while DOWN shifting	Refer to the waveform (solenoid (4))	Approx. 10 — 13.5 Ω	Resistance value at 20°C (68°F). Value is higher as the temperature increase.

Item	Connector No.	Terminal No.	Measuring condition	Measurement value	Resistance between terminal and chassis ground	Remarks
Lock-up duty solenoid	B54	26	Lock-up ON	Refer to the waveform (solenoid (5))	Approx. 10 — 13.5 Ω	Resistance value at 20°C (68°F). Value is higher as the temperature increase.
AWD solenoid	B54	13	Engine ON, “P” or “N” range	Refer to the waveform (solenoid (6))	Approx. 2 — 4.5 Ω	Resistance value at 20°C (68°F). Value is higher as the temperature increase.
			Engine ON, “D” range, brake ON	Refer to the waveform (solenoid (7))		
Output clutch solenoid	B54	10	Engine ON, “P” or “N” range	Refer to the waveform (solenoid (8))	Approx. 4 — 6 Ω	Resistance value at 20°C (68°F). Value is higher as the temperature increase.
CAN communication line (+)	B55	18	—	—	—	
CAN communication line (–)	B55	17	—	—	—	
CAN communication line 2 (+)	B55	10	—	—	—	
CAN communication line 2 (–)	B55	9	—	—	—	
GND	B54	1	Always	Approx. 0 V	—	
GND	B54	14	Always	Approx. 0 V	—	

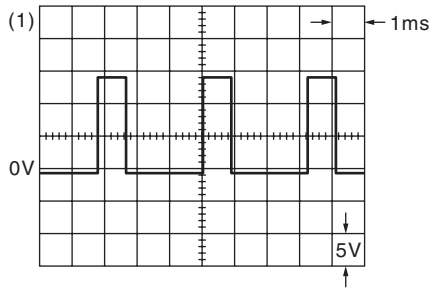
B: WAVEFORM

1. SENSOR

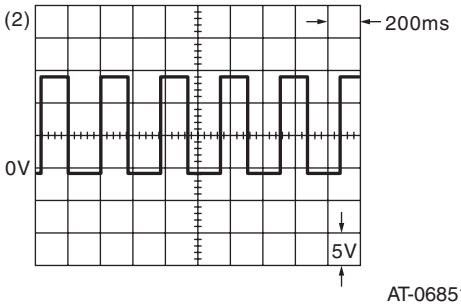


AT-04690

2. SOLENOID



AT-06855



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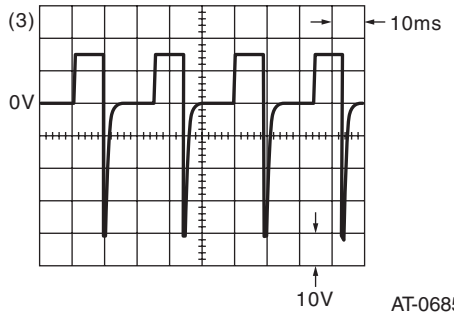

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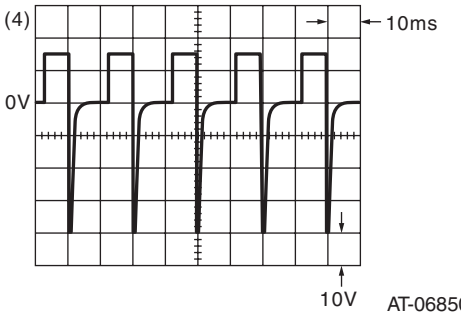

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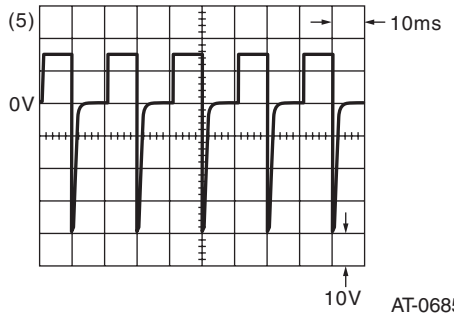

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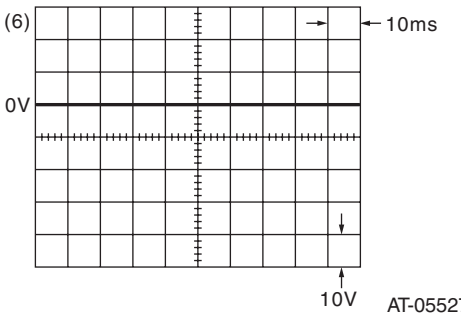
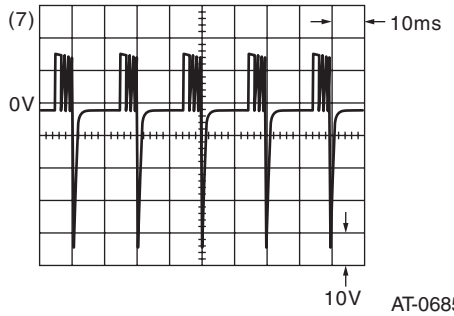


AT-05527



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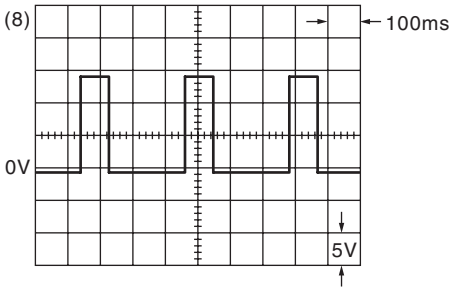


CVT00431

6. Stall Test

A: INSPECTION

CAUTION:
Make sure no other person is around the vehicle during stall test measurement.

NOTE:
Stall test is extremely important in diagnosing the condition of CVT and engine. The test is necessary to measure the engine stall speeds in “R” and “D” range.
Purposes of the stall test:
- Operational check of forward clutch, reverse brake and output clutch
- Operational check of the torque converter assembly
- Engine performance check

1) Place wheel chocks at the front and rear of all wheels and engage the parking brake.
2) Turn the A/C OFF.
3) Using the Subaru Select Monitor, check if the throttle valve operates when you depress the accelerator pedal. <Ref. to EN(H4DO HEV)(diag)-36, OPERATION, Subaru Select Monitor.>
4) Check the engine oil level. <Ref. to LU(H4DO(w/o HEV))-12, Engine Oil.>
5) Check the coolant level. <Ref. to CO(H4DO(w/o HEV))-16, Engine Coolant.>
6) Adjust the CVTF level. <Ref. to CVT(TH58A)-41, ADJUSTMENT, CVTF.>
7) Increase the CVTF temperature to 60 — 80°C (140 — 176°F) with the engine running and the select lever shifted to “N” or “P” range.
8) Shift the select lever to “D” range.
9) Depress the accelerator pedal to the full while fully depressing the foot brake pedal with your left foot.
10) When the engine speed stabilizes, quickly record the engine speed and release accelerator pedal. Shift the select lever to “N” range. Let the engine idle for one minute or more to cool it down.
11) Shift to “R” range and perform the same stall test.

NOTE:
- Do not perform a stall test for over 5 seconds at a time. (From closed throttle, fully open throttle to stall speed reading.) Failure to follow this instruction will cause the engine oil and CVTF to deteriorate and the clutch and brake to be adversely affected.
- Be sure to cool down the engine for at least one minute after each stall test with the select lever set in the “P” or “N” range and with the idle speed of 1,200 r/min or less.
- If the stall speed is higher than the specified range, attempt to finish the stall test in as short a time as possible, in order to prevent the CVT from sustaining damage.

Stall speed standard:
D range: 2,000 — 2,750 r/min
R range: 1,800 — 2,500 r/min

Stall test judgment

Stall speed (at sea level)	Range	Probable cause
Lower than standard value	D, R	• Insufficient engine output • Torque converter malfunction
Higher than standard value	D	• Forward clutch slippage • Secondary pressure (line pressure) is low. • Variator chain malfunction • Output clutch pressure is low. • Output clutch slippage
	R	• Reverse brake slippage • Secondary pressure (line pressure) is low. • Variator chain malfunction • Output clutch pressure is low. • Output clutch slippage
	D, R	• Torque converter malfunction • Control valve body malfunction • TCM malfunction • Damaged harness and harness connector

6. Subaru Select Monitor

A: OPERATION

1. HOW TO USE SUBARU SELECT MONITOR

For detailed operation procedures, refer to “PC application help for Subaru Select Monitor”.

2. READ CURRENT DATA

For detailed operation procedures, refer to “PC application help for Subaru Select Monitor”.

Display	Contents	Unit of measure
Engine Speed	Engine speed signal transmitted from the ECM. Calculated from crankshaft position sensor signal. TCM input value.	rpm
Turbine Speed	Turbine rotation speed calculated by the TCM using signals from the turbine speed sensor.	rpm
Accel opening angle	Accelerator pedal opening angle transmitted from the ECM. Value calculated from the accelerator pedal position sensor output. TCM input value.	%
Front Wheel Speed	Front wheel speed calculated from the output clutch output axis rotation speed.	km/h or MPH
ATF Temp.	Value calculated from the ATF temperature sensor output value. ATF temperature of the control valve section.	°C or °F
Lock Up Duty Ratio	Lock-up duty solenoid control duty ratio. TCM output value.	%
Transfer Duty Ratio	Transfer duty solenoid control duty ratio. TCM output value.	%
Actual Gear Ratio	Current gear ratio (rotation ratio of the pulley) calculated from the primary pulley axis rotation speed and the secondary pulley axis rotation speed.	—
Secondary Rev Speed	Secondary pulley rotation speed calculated by the TCM using signals from the secondary speed sensor.	rpm
Front Wheel Speed	Front wheel rotation speed calculated from the output clutch output axis rotation speed.	rpm
Stop light SW	Stop light SW signal. Set to ON when the brake pedal is depressed. TCM input value.	ON or OFF
Secondary Set Current	Value of the indicator current for controlling the secondary solenoid calculated by the TCM.	mA
Secondary Actual Current	Actual current value of the secondary solenoid. TCM output value.	mA
F&R Linear Solenoid Set Current	Value of the indicator current for controlling the F&R linear solenoid calculated by the TCM.	mA
F&R Linear Solenoid Actual Current	Actual current value of the F&R linear solenoid. TCM output value.	mA
ECU ACC	Battery voltage. TCM input value.	V
Primary UP Duty	Primary UP solenoid control duty ratio. TCM output value.	%
Primary DOWN Duty	Primary DOWN solenoid control duty ratio. TCM output value.	%
P Range	Inhibitor SW signal. Set to ON when the select lever is in P range. TCM input value.	ON or OFF
R Range	Inhibitor SW signal. Set to ON when the select lever is in R range. TCM input value.	ON or OFF
N Range	Inhibitor SW signal. Set to ON when the select lever is in N range. TCM input value.	ON or OFF
D Range	Inhibitor SW signal. Set to ON when the select lever is in D range. TCM input value.	ON or OFF
Tiptronic Mode Switch	Manual mode SW signal. Set to ON when the select lever is in the manual shift gate. TCM input value.	ON or OFF
Up Switch	Status of the paddle shift up SW. Set to ON when the plus (+) side of the steering wheel paddle shift is pulled. TCM input value.	ON or OFF
Down Switch	Status of the paddle shift down SW. Set to ON when the minus (–) side of the steering wheel paddle shift is pulled. TCM input value.	ON or OFF

Display	Contents	Unit of measure
Emphasized idle stop request	Permission status of EV traveling and Auto Start Stop are displayed as TCM requirement.	ON or OFF
secondary pressure sensor voltage.	Voltage value after an analog/digital conversion is done inside the TCM using the signal input from the secondary pressure sensor to the TCM. TCM input value.	V
ATF Temp sensor voltage.	Sensor voltage value input from the ATF temperature sensor to the TCM. TCM input value.	V
Diagnosis Lamp	Transmission failure detection status. Set to ON when a failure is detected. AT oil temperature warning light blinks at 2 Hz. TCM output value.	ON or OFF
ATF Temperature Lamp	ATF high temperature detection status. Set to ON when high temperature is detected. AT oil temperature warning light illuminates. TCM output value.	ON or OFF
AT learning	AT initial learning completion status. AT oil temperature warning light blinks at 4 Hz when the learning is not completed. TCM output value.	Completed or Not Completed
Ignition SW ON Count	Number of times the ignition switch is turned ON since the vehicle was manufactured.	times
Count	Shows whether the elapsed time counter after turning ON the ignition switch is synchronized with the integrated unit (master unit) or an original counter. “Common” means the integrated unit, and “Originally” means that the original counter is used.	—
Time Count	Shows the elapsed time after turning ON the ignition switch.	ms
Actual Secondary Pressure	Pressure value applied to the secondary pulley cylinder (line pressure) detected by the secondary pressure sensor.	MPa
N/P Range Signal	Inhibitor SW signal. Set to ON when the select lever is in P range or in N range. TCM input value.	ON or OFF
R Range Signal2	Inhibitor SW signal. Set to ON when the select lever is in R range. TCM input value.	ON or OFF
System Voltage	Power supply voltage supplied to the backup power supply (≈ battery voltage).	V
Electric Fluid Pump Target RPM	Rotation speed indication to the electric oil pump inverter calculated by the TCM. TCM output value.	rpm
Electric Fluid Pump Actual RPM	Actual rotation speed transmitted from the electric oil pump inverter. TCM input value.	rpm
Electric Fluid Pump Actual Current	Actual current value transmitted from the electric oil pump inverter. TCM input value.	A
Output Clutch Linear Solenoid Set Current	Value of the indicator current calculated by the TCM for controlling the output clutch linear solenoid.	mA
Output Clutch Linear Solenoid Actual Current	Actual current value of the output clutch linear solenoid. TCM output value.	mA
Primary Rev Speed	Rotation speed signal of the primary axis resolver transmitted from the drive motor. TCM input value.	rpm

3. READ FREEZE FRAME DATA

For detailed operation procedures, refer to “PC application help for Subaru Select Monitor”.

Display	Contents	Unit of measure
Engine Speed	Engine speed signal transmitted from the ECM. Calculated from crankshaft position sensor signal. TCM input value.	rpm
Turbine Speed	Turbine rotation speed calculated by the TCM using signals from the turbine speed sensor.	rpm
Accel opening angle	Accelerator pedal opening angle transmitted from the ECM. Value calculated from the accelerator pedal position sensor output. TCM input value.	%
Front Wheel Speed	Front wheel speed calculated from the output clutch output axis rotation speed.	km/h or MPH
ATF Temp.	Value calculated from the ATF temperature sensor output value. ATF temperature of the control valve section.	°C or °F
Lock Up Duty Ratio	Lock-up duty solenoid control duty ratio. TCM output value.	%
Transfer Duty Ratio	Transfer duty solenoid control duty ratio. TCM output value.	%
Actual Gear Ratio	Current gear ratio (rotation ratio of the pulley) calculated from the primary pulley axis rotation speed and the secondary pulley axis rotation speed.	—
Secondary Rev Speed	Secondary pulley rotation speed calculated by the TCM using signals from the secondary speed sensor.	rpm
Front Wheel Speed	Front wheel rotation speed calculated from the output clutch output axis rotation speed.	rpm
Stop light SW	Stop light SW signal. Set to ON when the brake pedal is depressed. TCM input value.	ON or OFF
Secondary Set Current	Value of the indicator current for controlling the secondary solenoid calculated by the TCM.	mA
Secondary Actual Current	Actual current value of the secondary solenoid. TCM output value.	mA
F&R Linear Solenoid Set Current	Value of the indicator current for controlling the F&R linear solenoid calculated by the TCM.	mA
F&R Linear Solenoid Actual Current	Actual current value of the F&R linear solenoid. TCM output value.	mA
ECU ACC	Battery voltage. TCM input value.	V
Primary UP Duty	Primary UP solenoid control duty ratio. TCM output value.	%
Primary DOWN Duty	Primary DOWN solenoid control duty ratio. TCM output value.	%
P Range	Inhibitor SW signal. Set to ON when the select lever is in P range. TCM input value.	ON or OFF
R Range	Inhibitor SW signal. Set to ON when the select lever is in R range. TCM input value.	ON or OFF
N Range	Inhibitor SW signal. Set to ON when the select lever is in N range. TCM input value.	ON or OFF
D Range	Inhibitor SW signal. Set to ON when the select lever is in D range. TCM input value.	ON or OFF
Tiptronic Mode Switch	Manual mode SW signal. Set to ON when the select lever is in the manual shift gate. TCM input value.	ON or OFF
Up Switch	Status of the paddle shift up SW. Set to ON when the plus (+) side of the steering wheel paddle shift is pulled. TCM input value.	ON or OFF
Down Switch	Status of the paddle shift down SW. Set to ON when the minus (–) side of the steering wheel paddle shift is pulled. TCM input value.	ON or OFF
Emphasized idle stop request	Permission status of EV traveling and Auto Start Stop are displayed as TCM requirement.	ON or OFF
secondary pressure sensor voltage.	Voltage value after an analog/digital conversion is done inside the TCM using the signal input from the secondary pressure sensor to the TCM. TCM input value.	V
ATF Temp sensor voltage.	Sensor voltage value input from the ATF temperature sensor to the TCM. TCM input value.	V

Display	Contents	Unit of measure
Diagnosis Lamp	Transmission failure detection status. Set to ON when a failure is detected. AT oil temperature warning light blinks at 2 Hz. TCM output value.	ON or OFF
ATF Temperature Lamp	ATF high temperature detection status. Set to ON when high temperature is detected. AT oil temperature warning light illuminates. TCM output value.	ON or OFF
Ignition SW ON Count	Number of times the ignition switch is turned ON since the vehicle was manufactured.	times
Count	Shows whether the elapsed time counter after turning ON the ignition switch is synchronized with the integrated unit (master unit) or an original counter. “Common” means the integrated unit, and “Originally” means that the original counter is used.	—
Time Count	Shows the elapsed time after turning ON the ignition switch.	ms
Actual Secondary Pressure	Pressure value applied to the secondary pulley cylinder (line pressure) detected by the secondary pressure sensor.	MPa
N/P Range Signal	Inhibitor SW signal. Set to ON when the select lever is in P range or in N range. TCM input value.	ON or OFF
R Range Signal2	Inhibitor SW signal. Set to ON when the select lever is in R range. TCM input value.	ON or OFF
System Voltage	Power supply voltage supplied to the backup power supply (≈ battery voltage).	V
Electric Fluid Pump Target RPM	Rotation speed indication to the electric oil pump inverter calculated by the TCM. TCM output value.	rpm
Electric Fluid Pump Actual RPM	Actual rotation speed transmitted from the electric oil pump inverter. TCM input value.	rpm
Electric Fluid Pump Actual Current	Actual current value transmitted from the electric oil pump inverter. TCM input value.	A
Output Clutch Linear Solenoid Set Current	Value of the indicator current calculated by the TCM for controlling the output clutch linear solenoid.	mA
Output Clutch Linear Solenoid Actual Current	Actual current value of the output clutch linear solenoid. TCM output value.	mA
Primary Rev Speed	Rotation speed signal of the primary axis resolver transmitted from the drive motor. TCM input value.	rpm

7. Read Diagnostic Trouble Code (DTC)

A: OPERATION

• For detailed operation procedures, refer to “PC application help for Subaru Select Monitor”.
• For details concerning DTC, refer to “List of Diagnostic Trouble Code (DTC)”. <Ref. to CVT(HEV)(diag)-34, List of Diagnostic Trouble Code (DTC).>

7. Time Lag Test

A: INSPECTION

NOTE:
When the select lever is shifted while the engine is idling, there will be a certain time elapse or lag before shock is felt. This symptom helps to check the condition of forward clutch and reverse brake.
- Perform the test at normal operation CVTF temperature of 60 — 80°C (140 — 176°F).
- Be sure to allow one minute or more interval between tests.
- Make three measurements and take the average value.

1) Apply the parking brake.
2) Start the engine. Check the idle speed. (A/C OFF)
3) Perform “Engine only Drive Mode” using the Subaru Select Monitor. <Ref. to HEV(diag)-71, HYBRID POWERTRAIN CONTROL SYSTEM, OPERATION, System Operation Check Mode.>
4) Shift the select lever from “N” to “D” range. Using a stop watch, measure the time elapsed from shifting the lever until the shock is felt.

Time lag standard:
1.5 seconds or less

If “N” → “D” time lag is longer than specified:
- Secondary pressure (line pressure) is too low.
- Forward clutch worn
- Forward clutch piston malfunction
- Control valve body malfunction
- Learning incomplete

5) In the same manner, measure the time lag when shifting from “N” range to “R” range.

Time lag standard:
1.5 seconds or less

If “N” → “R” time lag is longer than specified:
- Secondary pressure (line pressure) is too low.
- Reverse brake worn
- Reverse brake piston malfunction
- Control valve body malfunction
- Learning incomplete

8. Clear Memory Mode

A: OPERATION

For detailed operation procedures, refer to “PC application help for Subaru Select Monitor”.

CAUTION:
• If the AT learning value is cleared, learned control memory is cleared.
• If the AT learning value is cleared, perform learning. <Ref. to CVT(HEV)(diag)-26, Learning Control.>

8. Secondary Pressure (Line Pressure) Test

A: INSPECTION

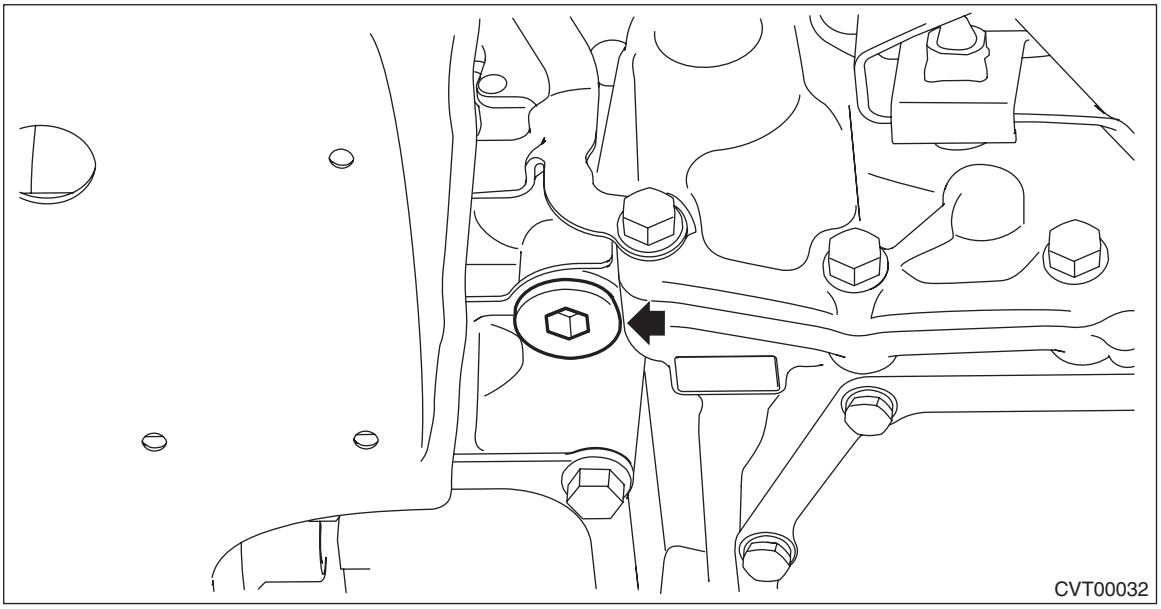
CAUTION:
• Directly after the vehicle has been running or the engine has been idling for a long time, the CVTF is hot. Be careful not to burn yourself.
• Make sure no other person is around the vehicle during secondary pressure (line pressure) test measurement.
• After performing the secondary pressure (line pressure) test measurement, adjust the CVTF level.

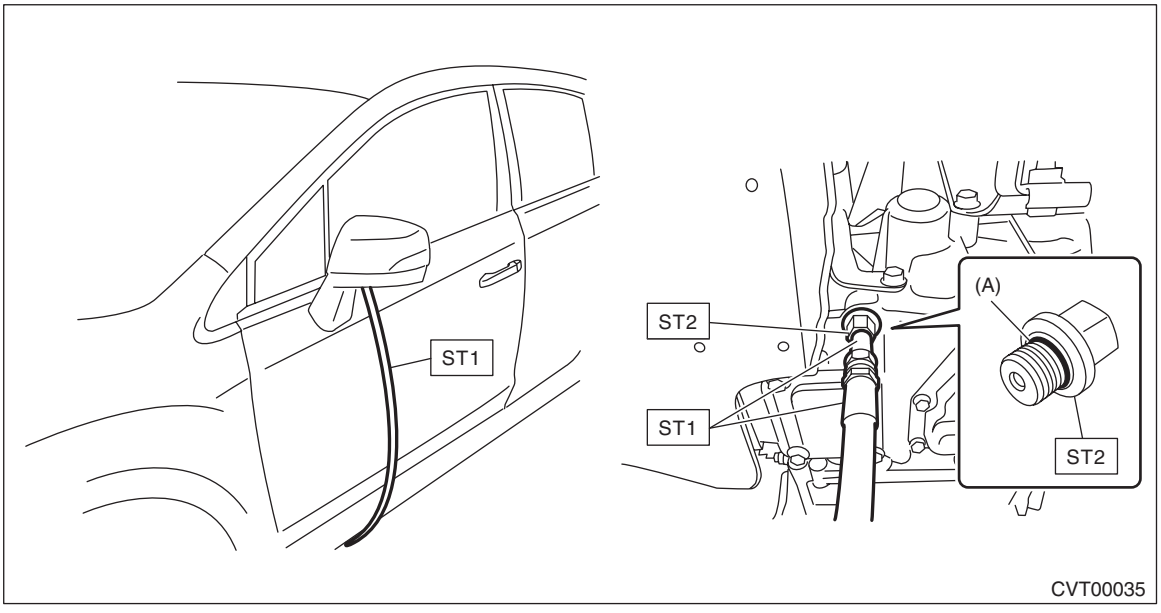
NOTE:
• If the pulley and variator chain, clutch or brake show signs of slipping or shift feel is not correct, check the secondary pressure (line pressure).
• Connect Subaru Select Monitor to vehicle so as to measure the engine speed and actual secondary pressure (secondary pressure (line pressure)).
• In many cases, slippage or inability to operate the vehicle may be due to insufficient oil pressure for the operation of clutch, brake or control valve body.

1) Lift up the vehicle.
2) Remove the secondary pressure (line pressure) test plug, and install ST1 and ST2.

CAUTION:
Removal of the test plug and installation of the ST shall be both performed quickly.

NOTE:
Use ST2 PRESSURE GAUGE ADAPTER with genuine O-ring (part No. 806916050) attached.
ST1 18801AA000 OIL PRESSURE GAUGE ASSY
ST2 18681AA010 PRESSURE GAUGE ADAPTER





(A) O-ring (genuine part)

3) Lower the vehicle.

4) Set the gauge so that it can be seen from the driver's seat.
5) Using the Subaru Select Monitor, check if the throttle valve operates when you depress the accelerator pedal. <Ref. to EN(H4DO HEV)(diag)-36, OPERATION, Subaru Select Monitor.>
6) Check the engine oil level. <Ref. to LU(H4DO(w/o HEV))-12, Engine Oil.>
7) Check the coolant level. <Ref. to CO(H4DO(w/o HEV))-16, Engine Coolant.>
8) Adjust the CVTF level. <Ref. to CVT(TH58A)-41, ADJUSTMENT, CVTF.>
9) Increase the CVTF temperature to 60 — 80°C (140 — 176°F) with the engine running and the select lever shifted to "N" or "P" range.
10) Shift the select lever to "D" range.
11) Depress the accelerator pedal to the full while fully depressing the foot brake pedal with your left foot.
12) Immediately after the engine speed becomes steady, record the reading of the secondary pressure (line pressure), engine speed and actual secondary pressure on Subaru Select Monitor. And then release the accelerator pedal. Shift the select lever to "N" range. Let the engine idle for one minute or more to cool it down.

NOTE:
• Do not continue the stall test for 5 seconds or more at a time (from fully closed throttle, fully open throttle to secondary pressure (line pressure) reading). Failure to follow this instruction will cause the engine oil and CVTF to deteriorate and the clutch and brake to be adversely affected.
• After performing the secondary pressure (line pressure) test, be sure to cool down the engine for at least one minute with the select lever set in "P" or "N" range and with the idle speed at 1,200 r/min or less.
• Under each condition, check that the measured pressure matches almost totally with actual secondary pressure.
• When both measured pressure and actual secondary pressure are out of specification, judge as control valve body malfunction.
• The value at stall is for reference because the pressure changes under different conditions or circumstances.
• The value at idling is steady because it is not affected by any condition or circumstance.
• After starting the engine with the select lever set in "P" range, when the secondary pressure is measured during idling without performing shift operation, the result may exceed the standard. Shift the select lever to "D" or "R" range before performing the measurement.

Secondary pressure (line pressure) standard				
	Range	Throttle	Brake	Secondary pressure (line pressure) (MPa (kgf/cm^2, psi))
Stall	D, R	Full open	ON	4.5 — 6.0 (45.9 — 61.2, 652 — 870)
Idling	P, N	Full closed	OFF	0.5 — 1.5 (5.1 — 15.3, 72 — 218)

13) Remove the ST and install the plug after measurement.

CAUTION:
Removal of the ST and installation of the test plug shall be both performed quickly.

NOTE:
• Use new O-rings.
• Apply CVTF to the O-ring.

Tightening torque:
50 N·m (5.1 kgf-m, 36.9 ft-lb)
14) Adjust the CVTF level. <Ref. to CVT(TH58A)-41, ADJUSTMENT, CVTF.>

9. Inspection Mode

A: PROCEDURE

<Ref. to CVT(TH58A)-50, Road Test.>

9. Output Clutch Pressure Test

A: INSPECTION

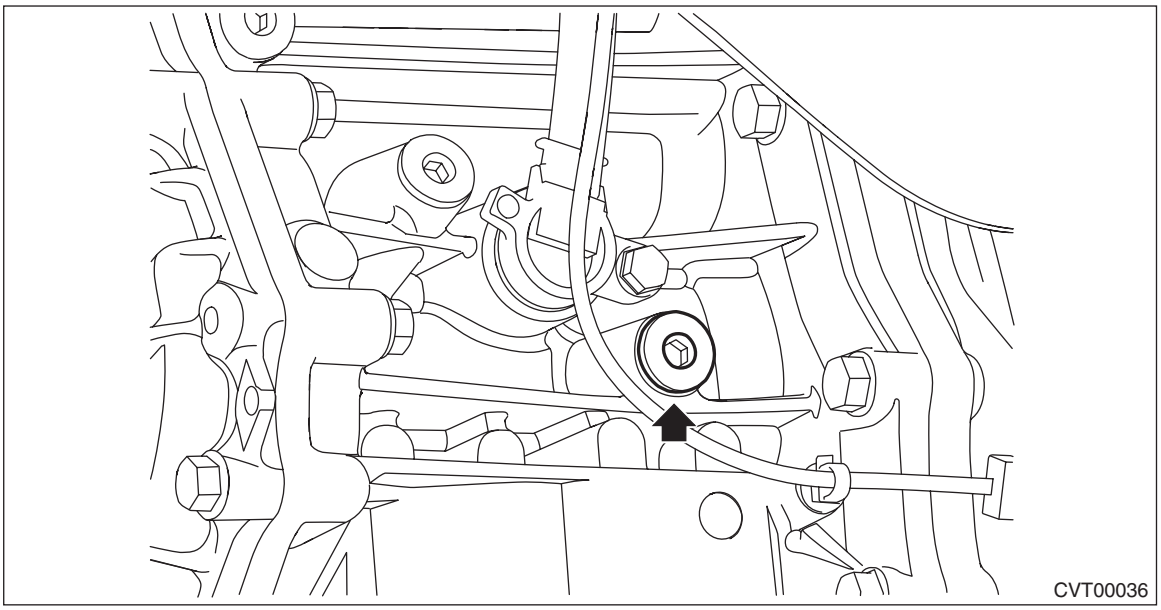
CAUTION:
• Directly after the vehicle has been running or the engine has been idling for a long time, the CVTF is hot. Be careful not to burn yourself.
• Make sure no other person is around the vehicle during output clutch pressure test measurement.
• After performing the output clutch pressure test measurement, adjust the CVTF level.

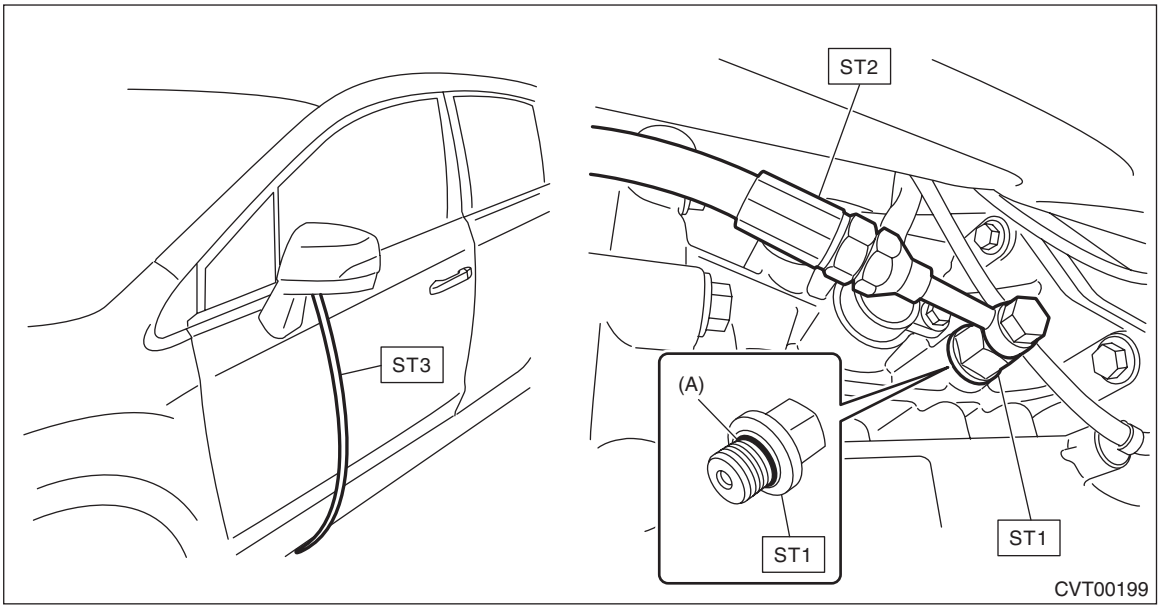
1) Lift up the vehicle.
2) Remove the output clutch pressure test plug, and install ST1, ST2 and ST3.

CAUTION:
• Be careful when setting tools so that the hoses do not touch the exhaust pipes.
• Be careful when setting tools so that the front wheel speed sensor harness does not touch ST1 and ST2.

NOTE:
Use ST1 (PRESSURE GAUGE ADAPTER) with genuine O-ring (part No. 806916050) attached.

ST1 18681AA000 PRESSURE GAUGE ADAPTER
ST2 498897800 OIL PRESSURE GAUGE ADAPTER SET
ST3 18801AA000 OIL PRESSURE GAUGE ASSY





(A) O-ring (genuine part)

3) Lower the vehicle.

4) Connect the Subaru Select Monitor to the data link connector and read the current data.
5) Check the output clutch pressure as in secondary pressure (line pressure) test. <Ref. to CVT(TH58A)-54, Secondary Pressure (Line Pressure) Test.>

Output clutch pressure standard value				
	Range	Throttle	Brake	MPa (kgf/cm^2, psi)
Stall	D	Full open	ON	1.5 — 4.0 (15.3 — 40.8, 217.5 — 580)
Idling (Engine speed: 1,000 r/min or less)	N	Full closed	OFF	0.5 — 1.3 (5.1 — 13.3, 72.5 — 188.5)

6) Lift up the vehicle.
7) Remove the ST and install the plug.

NOTE:
- Use new O-rings.
- Apply CVTF to the O-ring.

Tightening torque:
25 N·m (2.5 kgf-m, 18.4 ft-lb)
8) Adjust the CVTF level. <Ref. to CVT(TH58A)-41, ADJUSTMENT, CVTF.>

10.Drive Cycle

A: PROCEDURE

It is possible to complete diagnosis of the DTC by performing the indicated drive cycle. After the repair for the DTC, perform a necessary drive cycle and make sure the function recovers and the DTC is recorded.

1. PREPARATION FOR DRIVE CYCLE

1) Check that the battery voltage is 12 V or more and fuel remains approx. half [20 — 40 L (5.3 — 10.6 US gal, 4.4 — 8.8 Imp gal)].
2) After performing the diagnostics and Clear Memory Mode, check that no DTC remains. <Ref. to CVT(w/o HEV)(diag)-18, Clear Memory Mode.>

NOTE:
Perform the drive cycle after warming up the engine except when the ATF temperature at engine start is specified.

2. DRIVE CYCLE A

DTC	Item	Condition
P0560	System Voltage	—
P0601	Internal Control Module Memory Checksum Error	Perform the drive cycle A twice.
P0603	Internal Control Module Keep Alive Memory (KAM) Error	—
P0604	Internal Control Module Random Access Memory (RAM) Error	Perform the drive cycle A twice.
P062F	Internal Control Module EEPROM Error	Perform the drive cycle A twice.
P0705	Transmission Range Sensor Circuit (PRNDL Input)	—
P0712	Transmission Fluid Temperature Sensor Circuit Low Input	—
P0842	Secondary Oil Pressure Sensor Circuit (Low)	—
P0843	Secondary Oil Pressure Sensor Circuit (High)	—
P0890	AT Self-Shut Relay Diagnosis (Low)	—
P0962	Secondary Solenoid Circuit (Low)	—
P0963	Secondary Solenoid Circuit (High)	—
P0966	Forward & Reverse Solenoid Circuit (Low)	—
P0967	Forward & Reverse Linear Solenoid Circuit (High)	—
P0B0A	Auxiliary Transmission Fluid Pump Motor Supply Voltage Circuit Low	—
P0B0B	Auxiliary Transmission Fluid Pump Motor Supply Voltage Circuit High	—
P0B0D	Auxiliary Transmission Fluid Pump Motor Control Module	—
P0C21	Auxiliary Transmission Fluid Pump Phase U-V-W Circuit Low	—
P0C22	Auxiliary Transmission Fluid Pump Phase U-V-W Circuit High	—
P160A	Random Access Memory (RAM) Error	Perform the drive cycle A twice.
P172A	Auxiliary Transmission Fluid Pump Reverse Rotation	—
P2530	Ignition Switch Run Position Circuit	—
P2720	Pressure Control Solenoid D Control Circuit Low	—
P2721	Pressure Control Solenoid D Control Circuit High	—
P2763	Lock-Up Duty Solenoid Circuit (High)	Perform the drive cycle A, then perform the drive cycle C.

Diagnostic procedure:
1) Start the engine.
2) Depress the brake pedal and move the select lever to each range at an interval of five seconds.

NOTE:
Shift the select lever in the order of “P” → “R” → “N” → “D” → “N” → “R” → “P”.

3. DRIVE CYCLE B

DTC	Item	Condition
P0711	ATF Temp. Sensor Circuit Range/Performance	Perform drive cycle B twice or more.

Diagnostic procedure:
1) Start the engine while the ATF temperature is 20°C (68°F) or below.
2) Drive in any driving pattern for 20 minutes. (Include driving at a constant legal speed (for 20 seconds) at least once.)

4. DRIVE CYCLE C

DTC	Item	Condition
P0716	Torque Converter Turbine Speed	—
P0717	Input/Turbine Speed Sensor "A" Circuit No Signal	—
P0719	Brake Switch Circuit Low	Perform drive cycle C twelve times.
P0720	Output Speed Sensor Circuit	—
P0721	Output Shaft Speed Sensor Circuit Range/Performance	—
P0724	Brake Switch Circuit High	Perform drive cycle C twelve times.
P0973	Primary Solenoid System A Circuit (Low)	—
P0974	Primary Solenoid System A Circuit (High)	—
P0976	Primary Solenoid System B Circuit (Low)	—
P0977	Primary Solenoid System B Circuit (High)	—
P2750	Sec. Pulley Revolution Speed Sensor Circuit	—
P2751	Intermediate Shaft Speed Sensor "C" Circuit No Signal	—
P2763	Lock-Up Duty Solenoid Circuit (High)	Perform the drive cycle A, then perform the drive cycle C.
P2764	Lock-Up Duty Solenoid Circuit (Low)	—

Diagnostic procedure:
1) Start the engine.
2) Accelerate slowly to a legal speed, and then decelerate slowly to a stop.

5. DRIVE CYCLE D

DTC	Item	Condition
P0713	Transmission Fluid Temperature Sensor Circuit High Input	—
P0730	Gearshift Control Performance Abnormal	—
P0746	Pressure Control Solenoid "A" Performance/Stuck Off	Perform the drive cycle D twice.
P0747	Pressure Control Solenoid "A" Stuck On	Perform the drive cycle D twice.
P0751	Shift Solenoid "A" Performance/Stuck Off	Perform the drive cycle D twice.
P0752	Shift Solenoid "A" Stuck On	Perform the drive cycle D twice.
P0756	Shift Solenoid "B" Performance/Stuck Off	Perform the drive cycle D twice.
P0757	Shift Solenoid "B" Stuck On	Perform the drive cycle D twice.
P0776	Pressure Control Solenoid "B" Performance/Stuck Off	Perform the drive cycle D twice.
P0841	Secondary Oil Pressure Sensor Performance	—
P0961	Pressure Control Solenoid "A" Control Circuit Range/Performance	—
P0965	Forward & Reverse Solenoid Function	—
P2714	Pressure Control Solenoid "D" Performance/Stuck Off	—
P2719	Pressure Control Solenoid D Control Circuit Range/Performance	—
P2757	Torque Converter Clutch Pressure Control Solenoid Control Circuit Performance/Stuck Off	Perform the drive cycle D twice.
P2758	Torque Converter Clutch Pressure Control Solenoid Control Circuit Stuck On	Perform the drive cycle D twice.

Diagnostic procedure:
1) Start the engine.
2) Drive in any driving pattern for 20 minutes. (Include driving at a constant legal speed (for 20 seconds) at least once.)

6. DRIVE CYCLE E

DTC	Item	Condition
U0073	Control Module Communication Bus Off	—
U0075	Control Module Communication Bus "PU-CAN" Off	—
U0100	Lost Communication With ECM/PCM “A”	—
U0110	Lost Communication With Drive Motor Control Module "A"	—
U0122	Lost Communication With Vehicle Dynamics Control Module	—
U0287	Lost Communication With Transmission Fluid Pump Module	—
U0293	Lost Communication With Hybrid Powertrain Control Module	—
U0401	Invalid Data Received From ECM/PCM “A”	—
U0411	Invalid Data Received From Drive Motor Control Module "A"	—
U0416	Invalid Data Received From Vehicle Dynamics Control Module	—
U0588	Invalid Data Received From Transmission Fluid Pump Module	—
U0594	Invalid Data Received From Hybrid Powertrain Control Module	—
U1100	Lost Communication With ECM/PCM PU-CAN	—
U1293	Lost Communication With Hybrid Powertrain Control Module PU-CAN	—
U1401	Invalid Data Received From ECM/PCM PU-CAN	—
U1594	Invalid Data Received From Hybrid Powertrain Control Module PU-CAN	—

Diagnostic procedure:
1) Start the engine.

7. DRIVE CYCLE F

DTC	Item	Condition
P0708	Transmission Range Sensor Circuit (PRNDL Input)	—

Diagnostic procedure:
1) Start the engine.
2) Shift the select lever at intervals of 15 seconds for each range, while depressing the brake pedal.

NOTE:
Shift the select lever in the order of “P” → “R” → “N” → “D” → “N” → “R” → “P”.

8. DRIVE CYCLE G

DTC	Item	Condition
P0777	Pressure Control Solenoid "B" Stuck On	Perform the drive cycle G three times.
P0C29	Auxiliary Transmission Fluid Pump Driver Current Performance	Perform the drive cycle G three times.
P0C2A	Auxiliary Transmission Fluid Pump Motor Stalled	Perform the drive cycle G three times.
P2797	Auxiliary Transmission Fluid Pump	Perform the drive cycle G three times.

Diagnostic procedure:
1) Warm up the engine enough to drive in EV mode.
2) While driving at a legal speed, decelerate using EV coasting to a halt, and then stay in Auto Start Stop state for 10 seconds.
3) During EV creep driving, gently depress the accelerator pedal to enter motor drive mode.

9. DRIVE CYCLE H

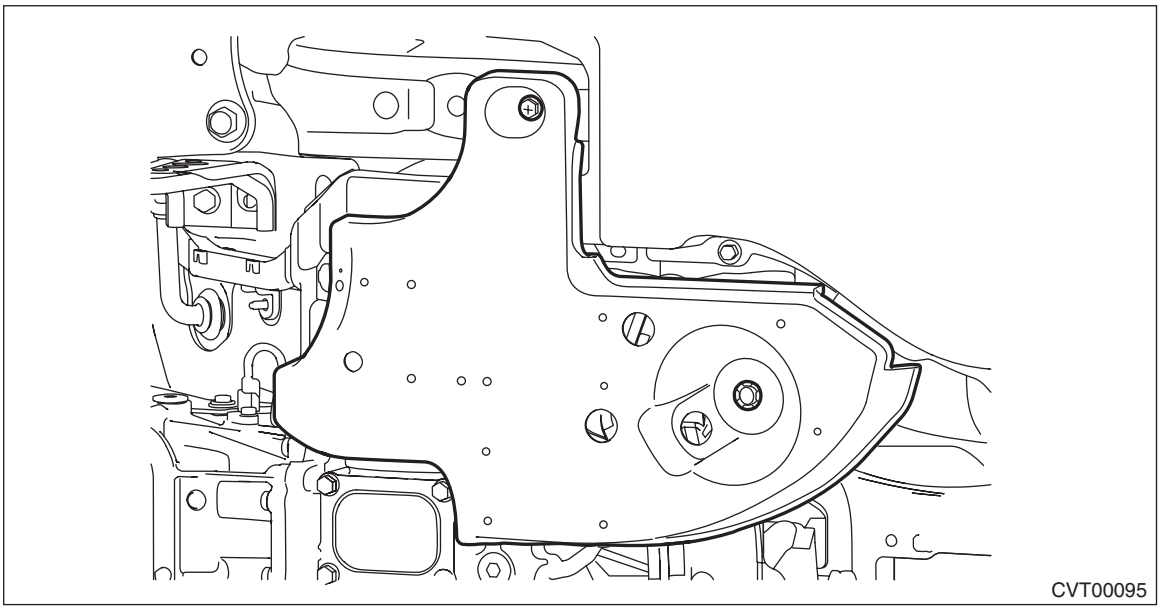
DTC	Item	Condition
P0500	Vehicle Speed Sensor “A”	—

Diagnostic procedure:
1) Drive at 10 km/h (6 MPH) or more.
2) Stop the vehicle and idle for ten minutes.

10.Transfer Clutch Pressure Test

A: INSPECTION

CAUTION:
• Directly after the vehicle has been running or the engine has been idling for a long time, the CVTF is hot. Be careful not to burn yourself.
• Make sure no other person is around the vehicle during transfer clutch pressure test measurement.
1) Lift up the vehicle.
2) Remove the under cover front - cable.

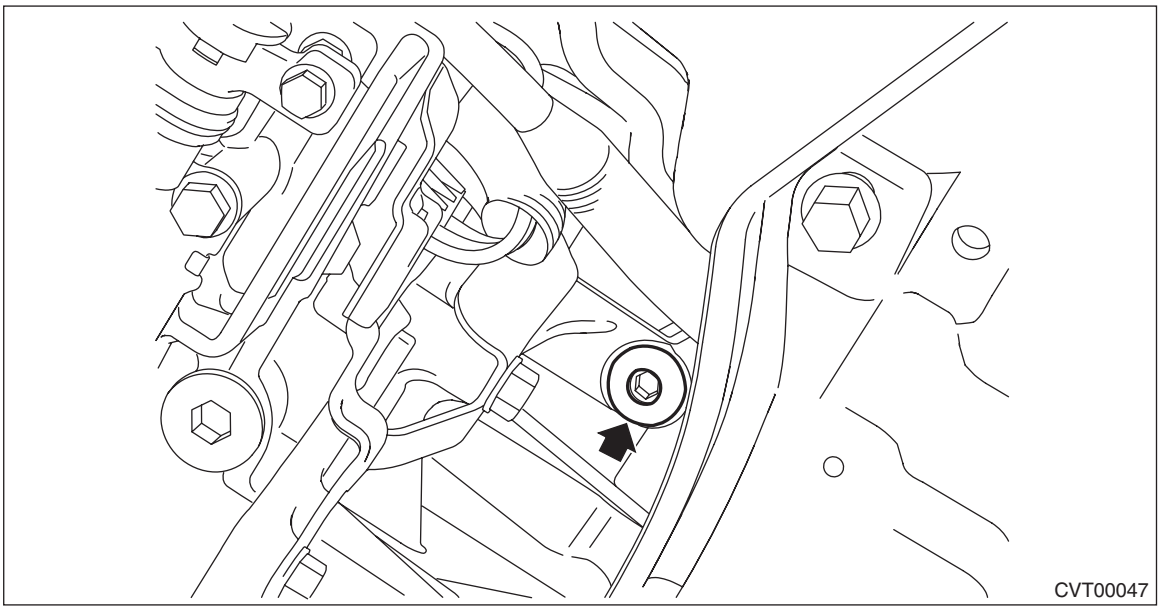


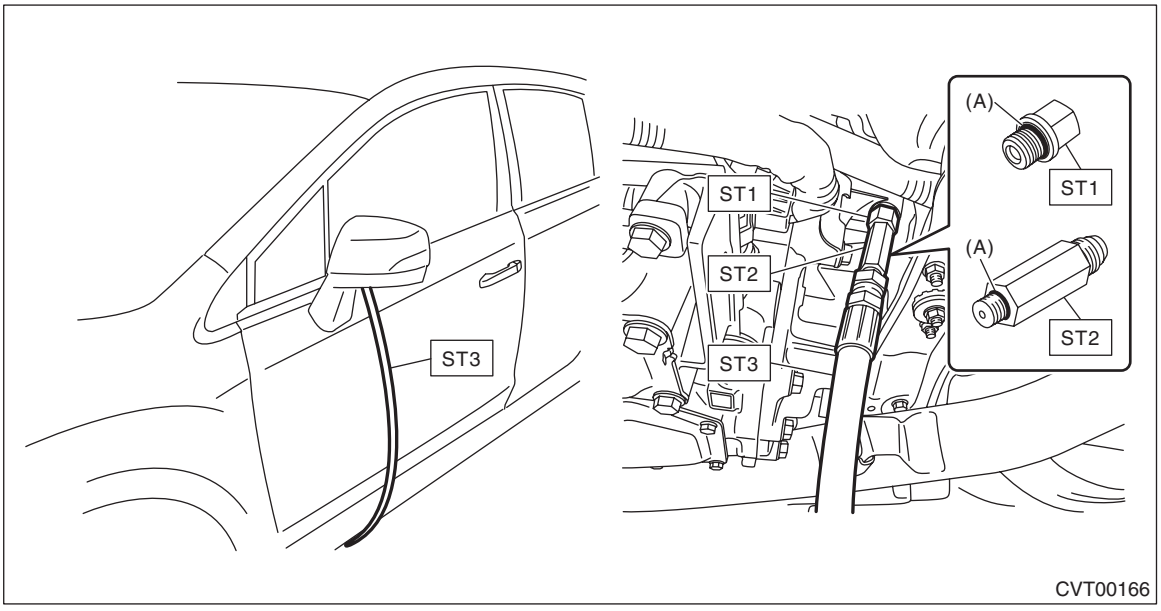
3) Remove the transfer clutch pressure test plug, and install ST1 and ST2.

CAUTION:
Removal of the test plug and installation of the ST shall be both performed quickly.

NOTE:
- Use ST1 (PRESSURE GAUGE ADAPTER) with genuine O-ring (part No. 806911080) attached.
- Use ST2 (OIL PRESSURE GAUGE ADAPTER) with genuine O-ring (part No. 806908070) attached.

ST1 18681AA000 PRESSURE GAUGE ADAPTER
ST2 498897200 OIL PRESSURE GAUGE ADAPTER
ST3 498575400 OIL PRESSURE GAUGE ASSY





(A) O-ring (genuine part)

4) Lower the vehicle.

5) Connect the Subaru Select Monitor to the data link connector and read the current data.
6) Check the transfer clutch pressure as in secondary pressure (line pressure) test. <Ref. to CVT(TH58A)-54, Secondary Pressure (Line Pressure) Test.>

NOTE:
• Use Subaru Select Monitor for switching to FWD mode. <Ref. to CVT(TH58A)-49, AWD ON/OFF Switching Mode.>
• If no oil pressure is produced, if it does not change in AWD mode or if oil pressure is produced in FWD mode, there may be a problem in the control valve body.

Range position	ON Duty ratio (%)	Accelerator pedal opening angle (%)	Standard transfer clutch pressure kPa (kgf/cm^2, psi)	
			AWD mode	FWD mode
D	85 — 100	Fully opened (100)	800 — 1,200 (8.2 — 12.2, 117 — 174)	—
	60	Adjust ON Duty ratio to 60%.	400 — 700 (4.1 — 7.1, 58 — 102)	—
	0	Fully closed (0)	—	0 (0, 0)
N or P	25 — 40	Fully closed (0)	30 — 300 (0.3 — 3.1, 4 — 43)	—

7) Lift up the vehicle.
8) Remove the ST and install the plug.

NOTE:
• Use new O-rings.
• Apply CVTF to the O-ring.

Tightening torque:
25 N·m (2.5 kgf-m, 18.4 ft-lb)
9) Install the under cover front - cable.

Tightening torque:
18 N·m (1.8 kgf-m, 13.3 ft-lb)
10) Adjust the CVTF level. <Ref. to CVT(TH58A)-41, ADJUSTMENT, CVTF.>

11.Automatic Transmission Assembly

A: REMOVAL

WARNING:
The hybrid system includes a high voltage circuit. Mishandling could cause accidents such as electric shock or leak. Always check "CAUTION (HYBRID SYSTEM)" and perform the proper operation. <Ref. to PC-7, CAUTION (HYBRID SYSTEM), Precaution.>

1) Disconnect the ground cable from battery. <Ref. to NT-5, BATTERY, NOTE, Note.>

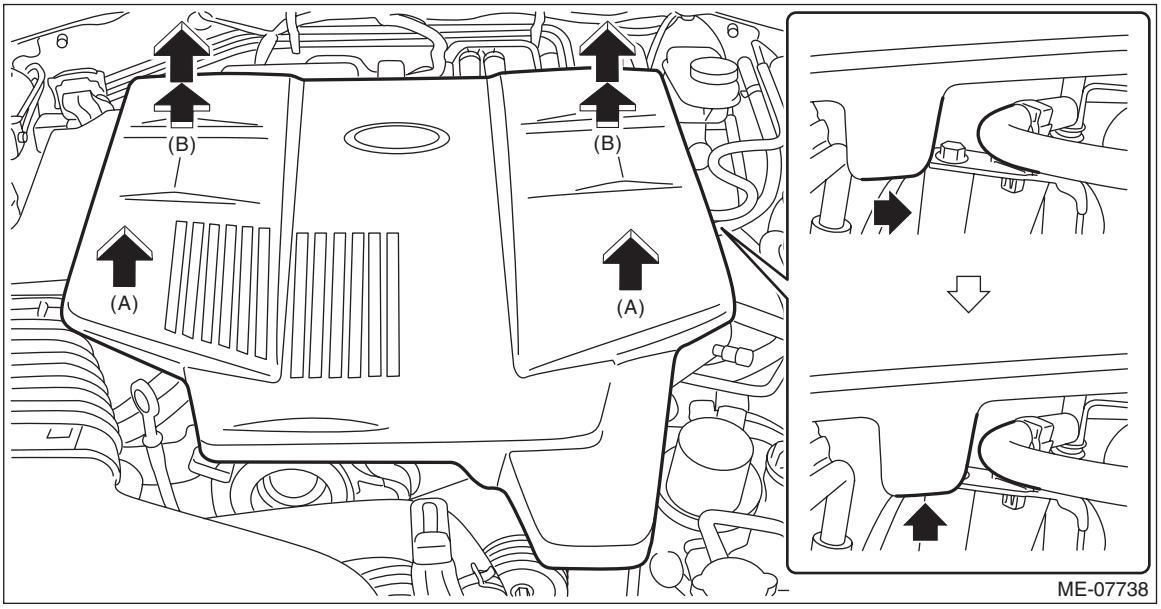
NOTE:
For the 12 volt engine restart battery, disconnect the ground terminal from 12V engine restart battery sensor.

2) Remove the service disconnect plug. <Ref. to HEV-15, REMOVAL, Service Plug.>

WARNING:
After pulling out the service disconnect plug, a high voltage is accumulated in the condenser inside the inverter. If touching the high voltage parts, wiring harness, terminals and connectors is required, wait for 10 minutes before starting the operation.

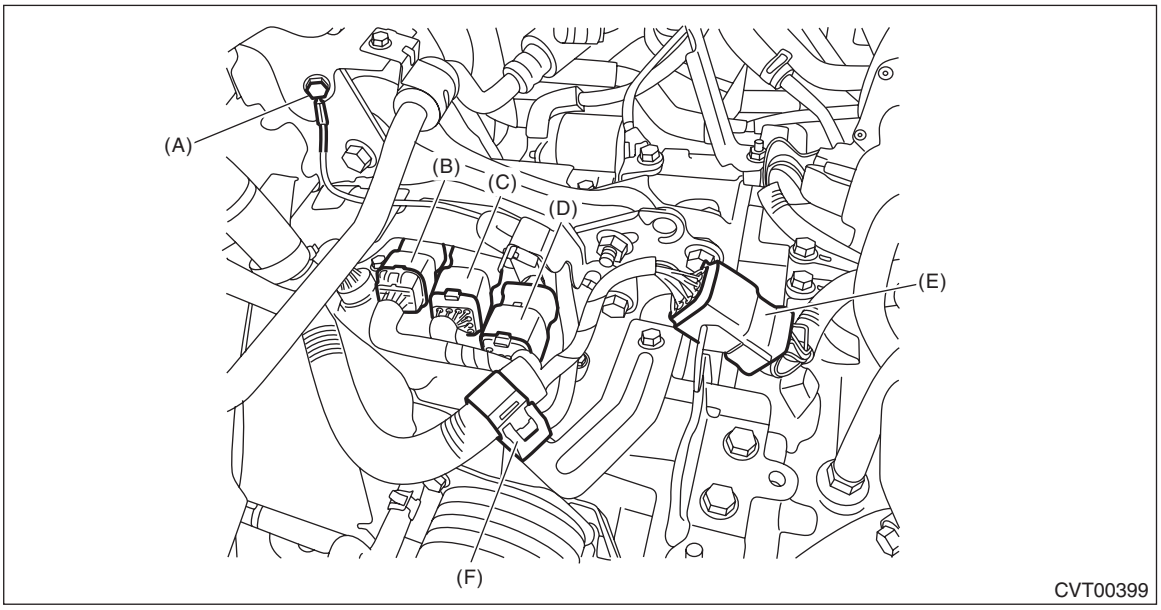
3) Remove the collector cover.
   (1) Carefully pull up the front of collector cover at two positions (A).
   (2) Carefully pull up the rear of collector cover at two positions (B) while moving it backward.

NOTE:
Be careful not to contact the fuel delivery tube when moving the collector cover rearward.



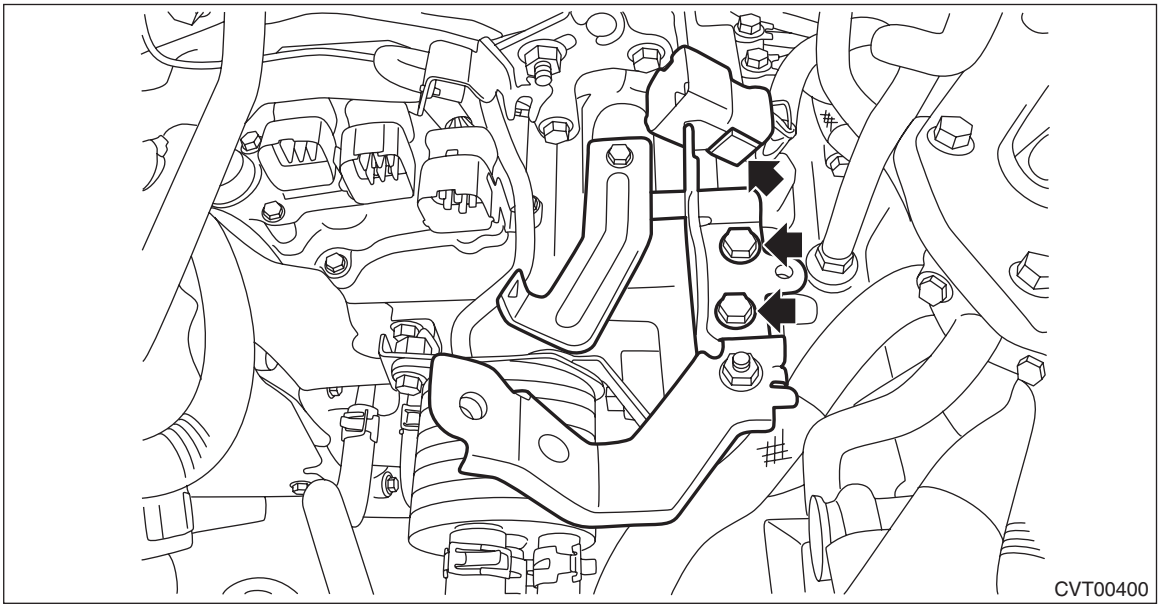
4) Remove the air cleaner case. <Ref. to IN(H4DO(HEV))-6, REMOVAL, Air Cleaner Case.>

5) Disconnect the following connectors and harness clips.
- Transmission radio ground terminal
- Transmission harness connectors
- Inhibitor harness connector
- Drive motor harness connector
- Engine harness connectors
- Harness clip

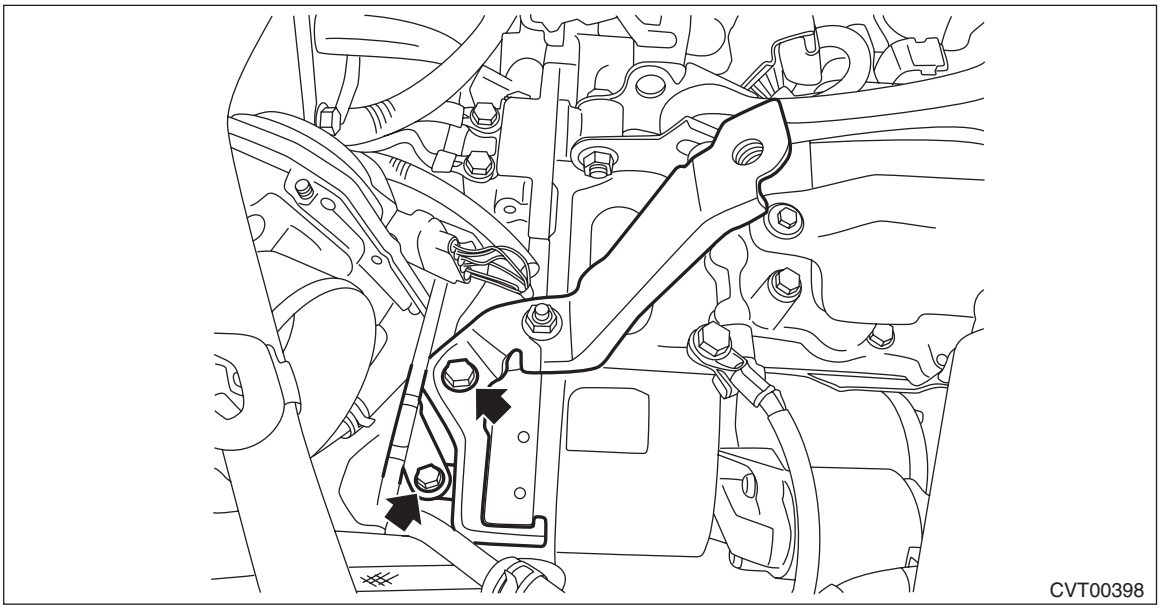


(A) Transmission radio ground terminal
(B) Transmission harness connectors
(C) Inhibitor harness connector
(D) Drive motor harness connector
(E) Engine harness connectors
(F) Harness clip

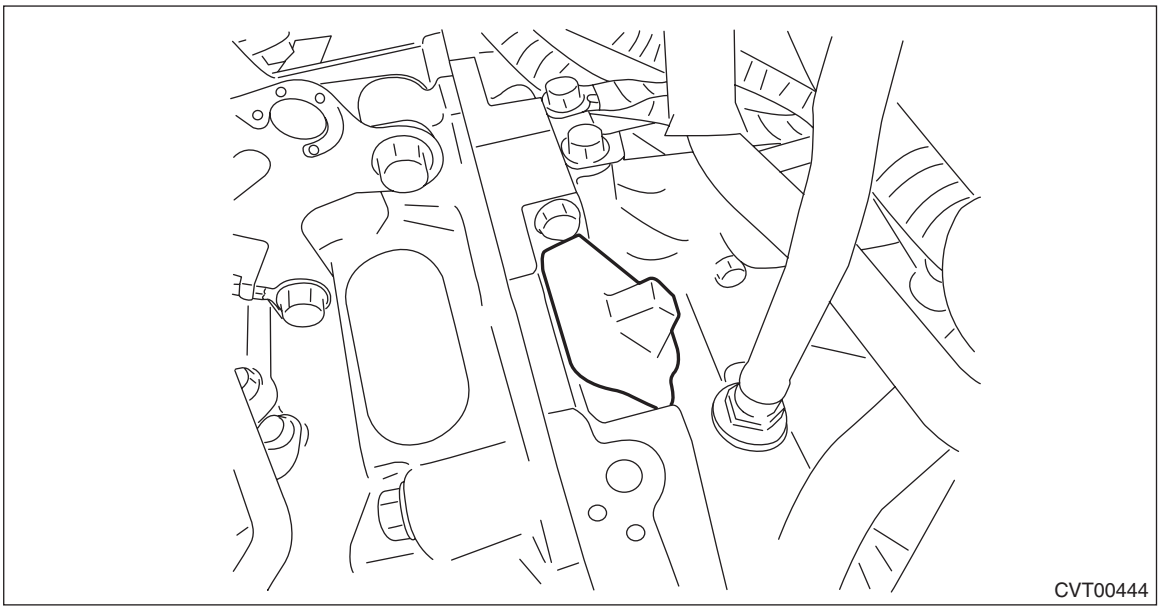
6) Remove the engine harness connector, and remove the engine hanger.



7) Remove the air cleaner case bracket LH.

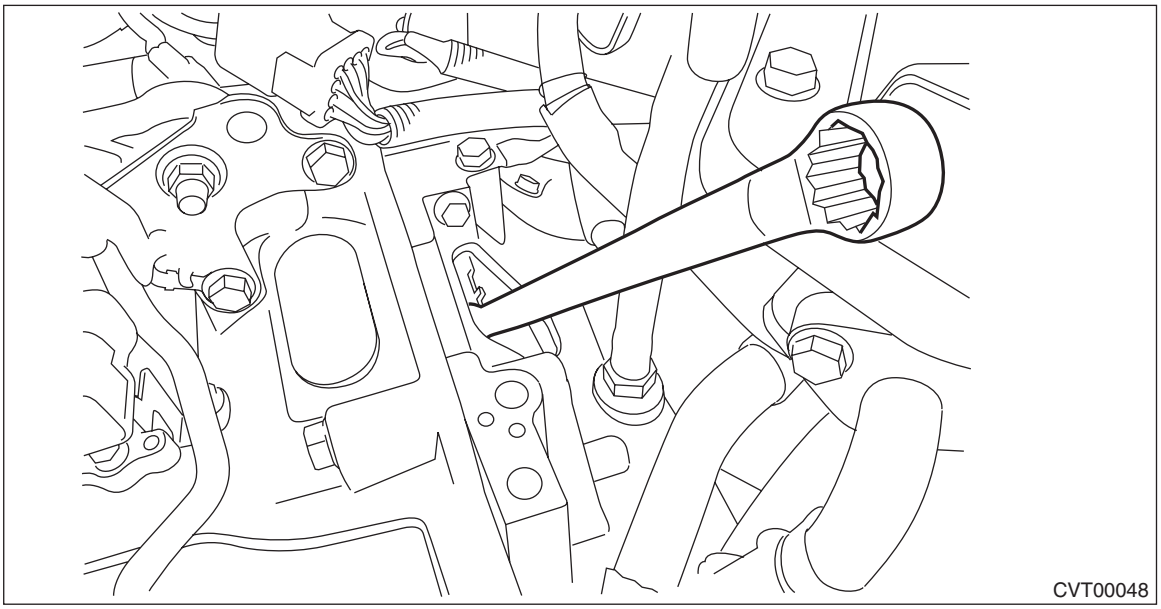


8) Remove the starter. <Ref. to SC(H4DO(HEV))-10, REMOVAL, Starter.>
9) Remove the pitching stopper. <Ref. to CVT(TH58A)-87, PITCHING STOPPER, REMOVAL, Transmission Mounting System.>
10) Disconnect the throttle position sensor harness connector.
11) Remove the service hole plug.

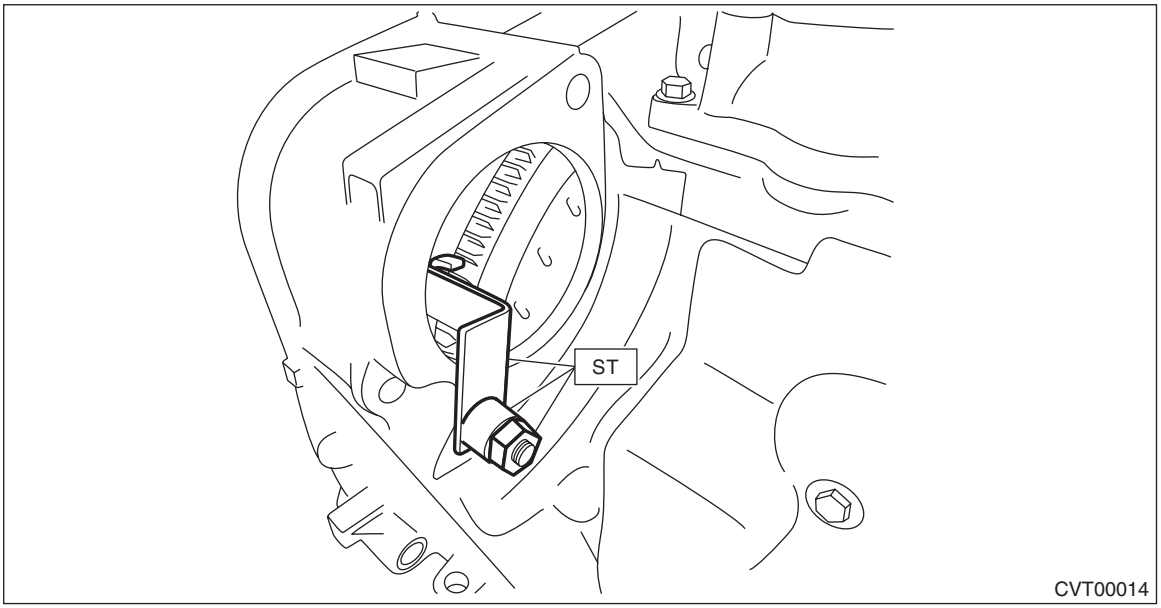


12) Remove the four bolts combining the torque converter and drive plate while rotating the crank pulley a little at a time in the same direction as engine revolution.

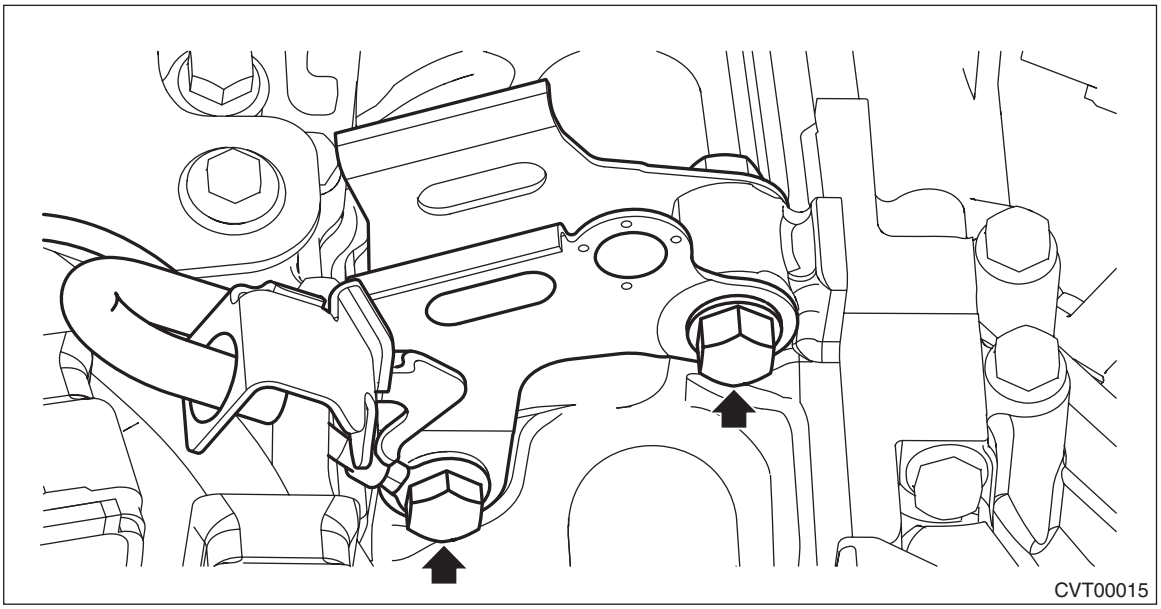
CAUTION:
- **Be careful not to drop bolts into the converter housing.**
- **Be careful not to damage the mounting bolts.**



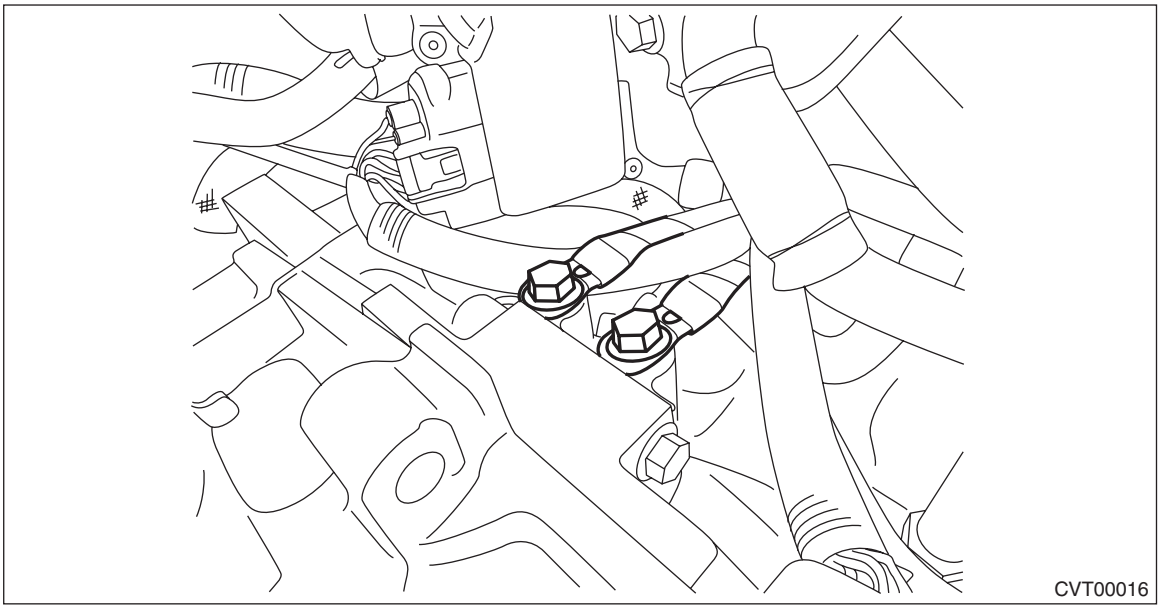
13) Make sure the torque converter moves freely by rotating with finger through the starter installation hole.
14) Attach the ST to the converter case.
ST 498277200 STOPPER SET



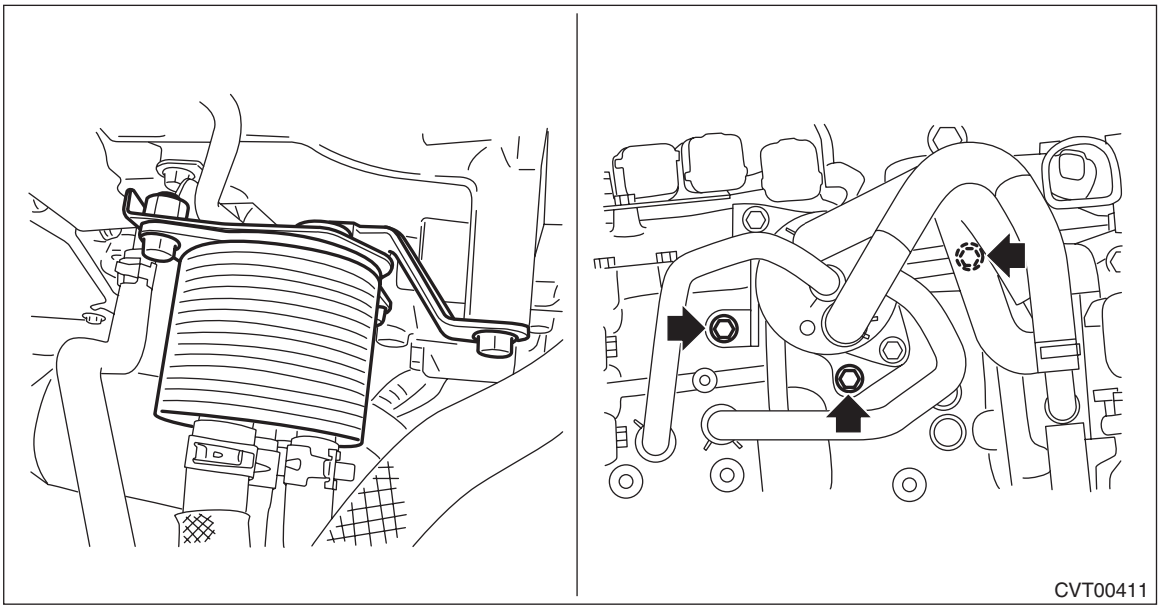
15) Remove the air breather hose from the pitching stopper bracket, and then remove the pitching stopper bracket and transmission radio ground cord.



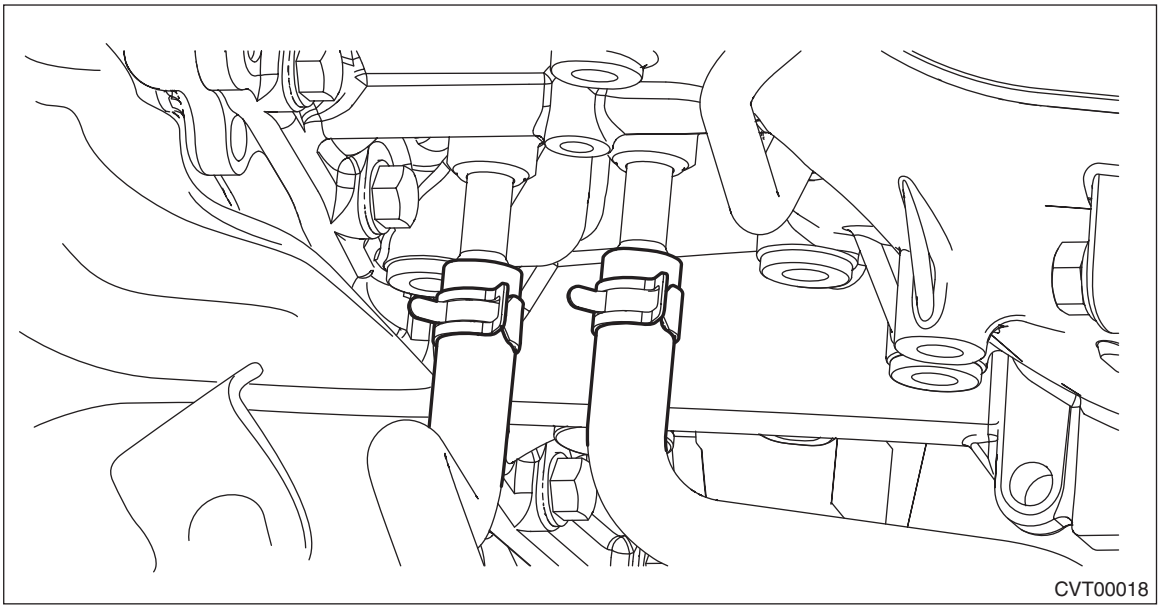
16) Disconnect the engine ground terminals.



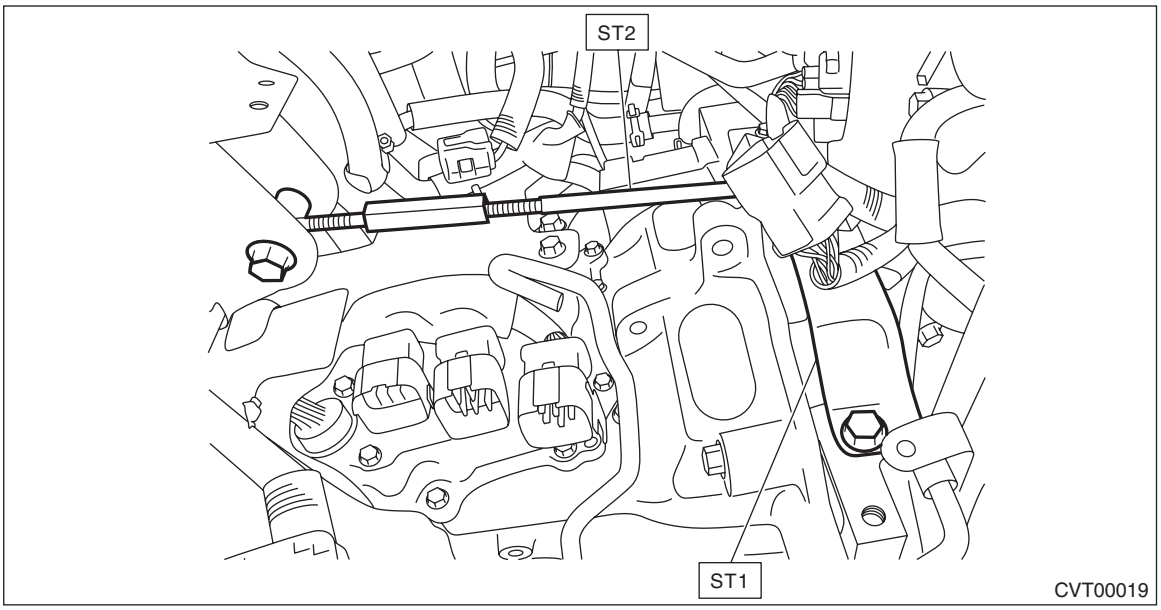
17) Remove the CVTF cooler (with warmer feature) from the transmission, and using a piece of wire, affix to a location of the body where it will not interfere with the removal of the transmission.



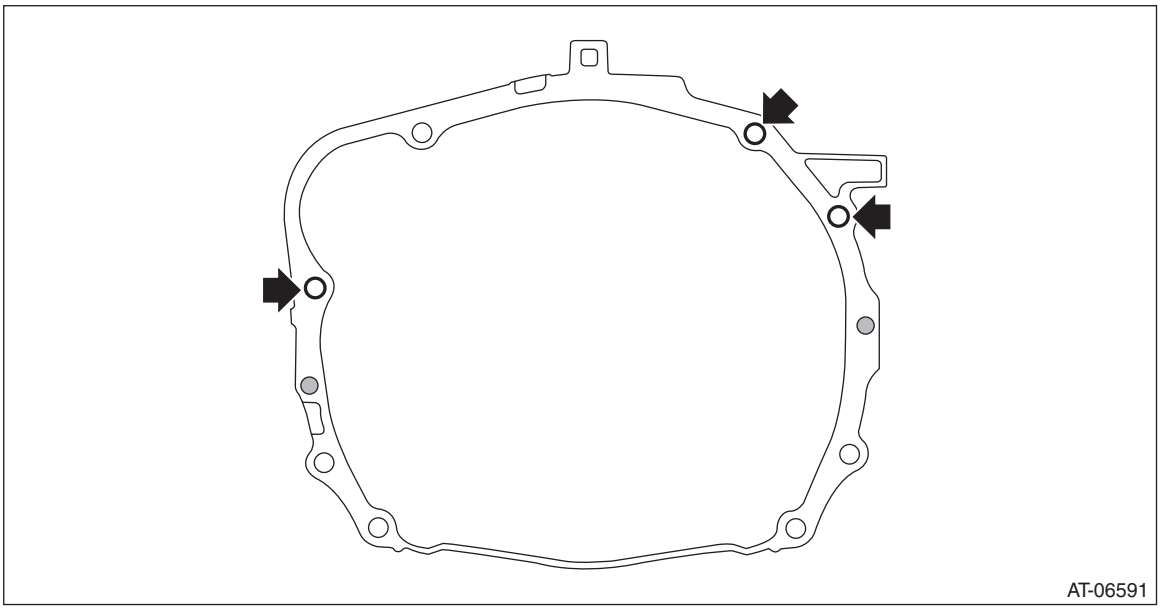
18) Remove the CVTF inlet hose and outlet hose from the pipe.



19) Set the ST.
ST1 41099AA012 ENGINE SUPPORT BRACKET
ST2 41099AA020 ENGINE SUPPORT

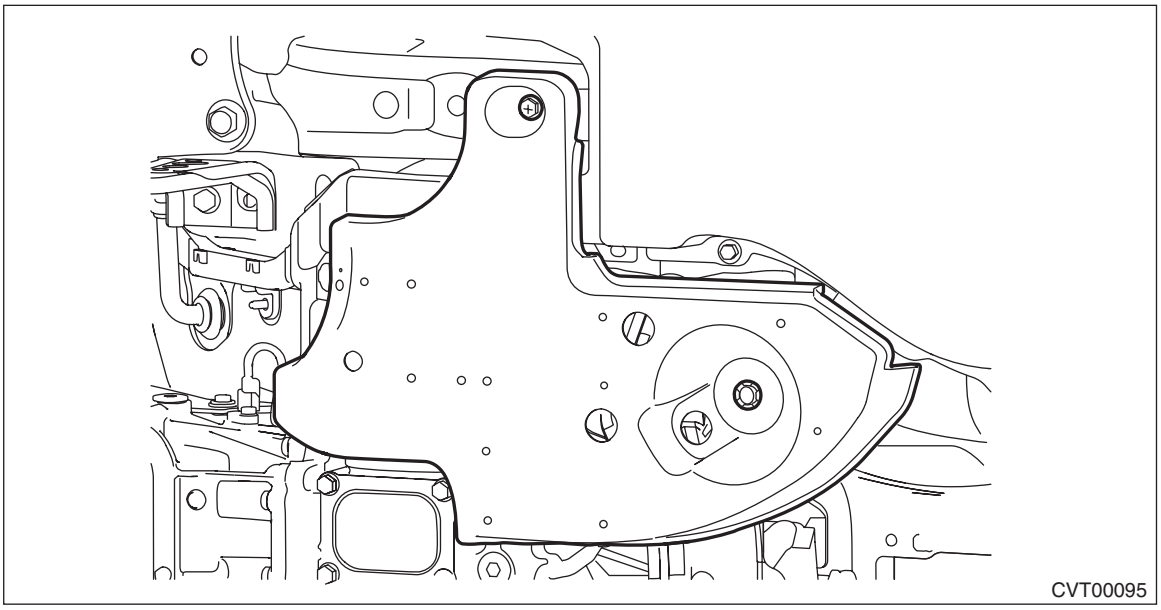


20) Remove the three transmission connecting bolts.

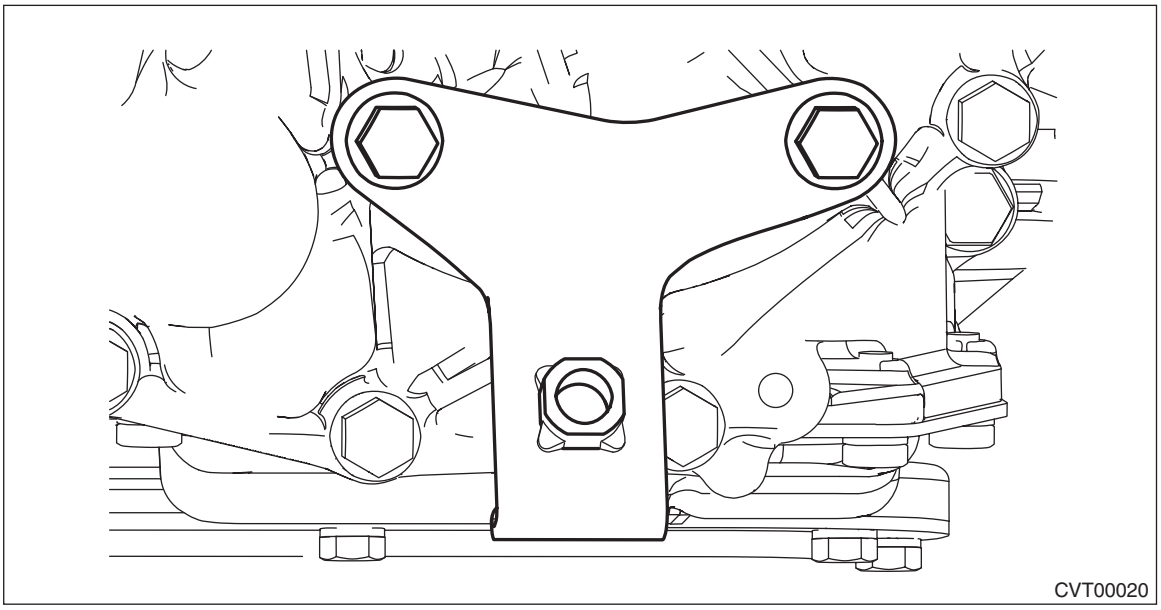


21) Lift up the vehicle.
22) Remove the front tires. <Ref. to WT-4, REMOVAL, Tire and Wheel.>
23) Remove the under cover - rear LH. <Ref. to EI-32, REMOVAL, Front Under Cover.>

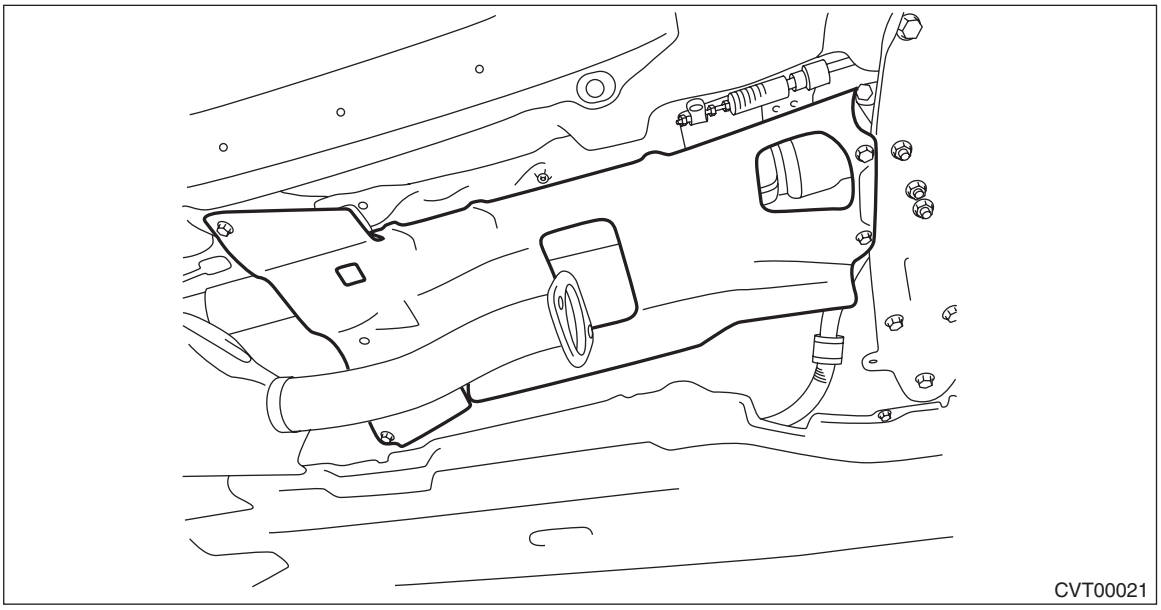
24) Remove the under cover front - cable.



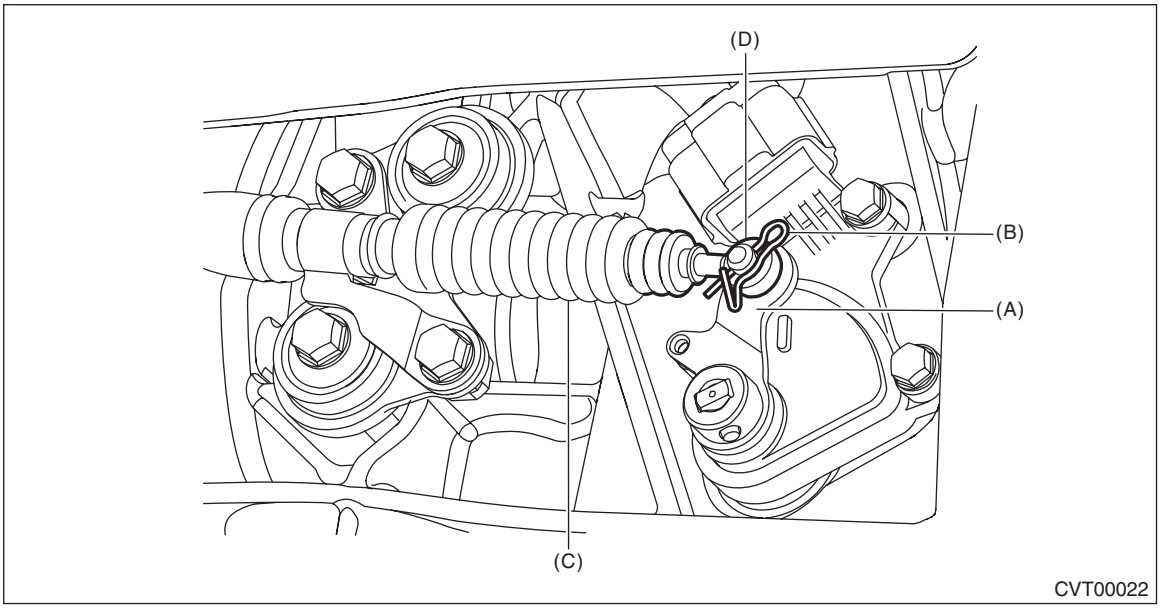
25) Remove the center exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-18, REMOVAL, Rear Exhaust Pipe.>
26) Remove the hanger bracket.



27) Remove the center exhaust cover.

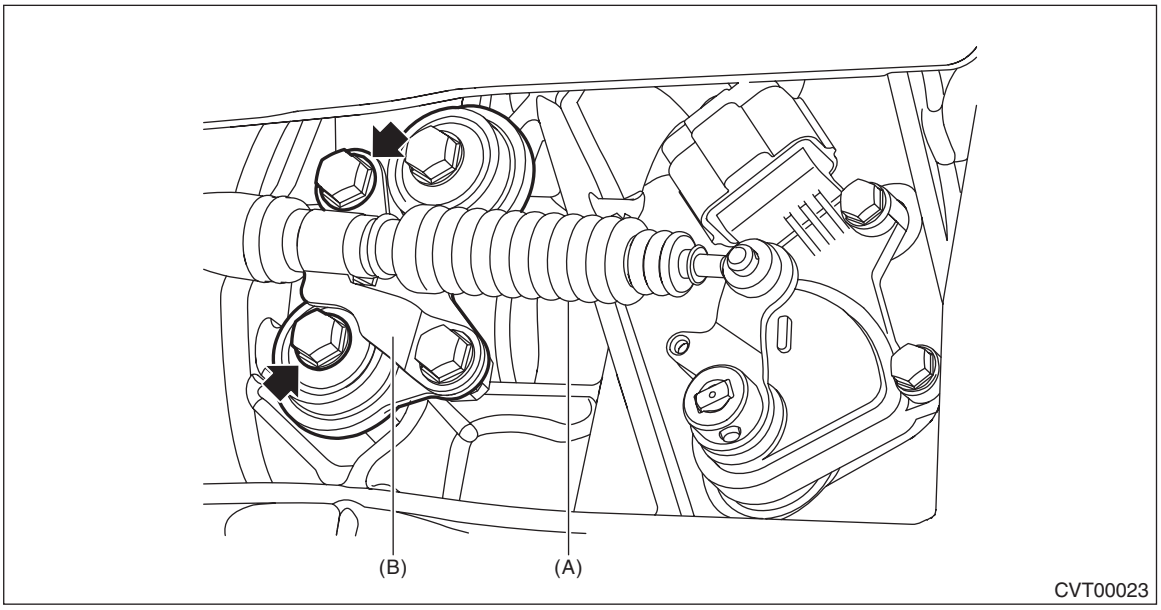


28) Remove the CVTF drain plug to drain CVTF. <Ref. to CVT(TH58A)-43, REPLACEMENT, CVTF.>
29) Drain differential gear oil. <Ref. to CVT(TH58A)-47, REPLACEMENT, Differential Gear Oil.>
30) Remove the snap pin and washer from shifter arm and remove the select cable from shifter arm.



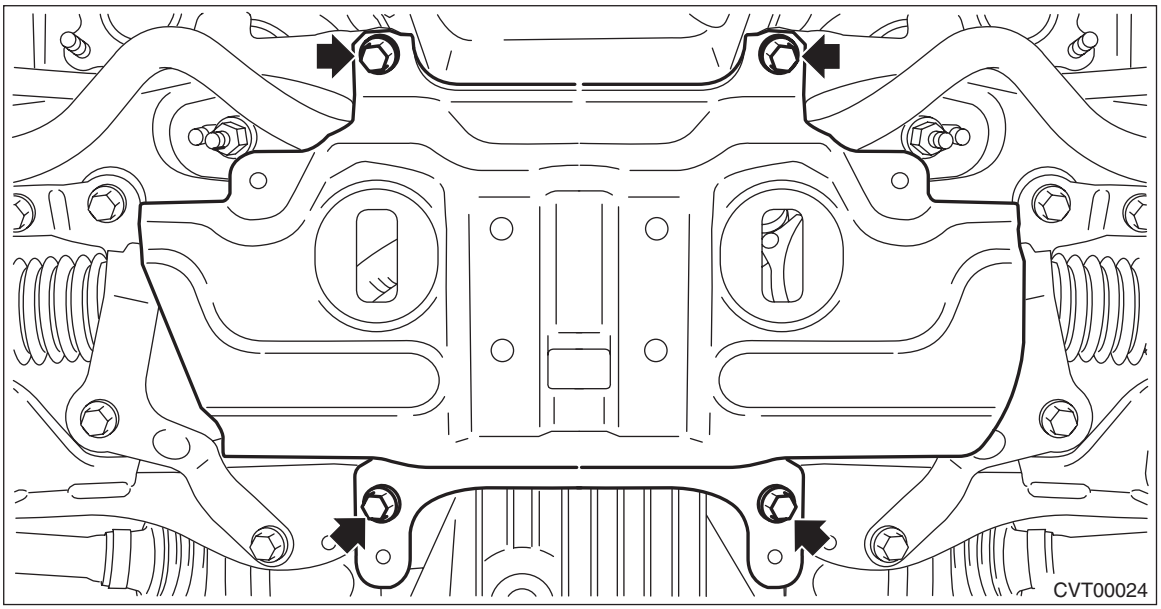
(A) Shifter arm
(B) Snap pin
(C) Select cable
(D) Washer

31) Remove the plate assembly from the transmission case.

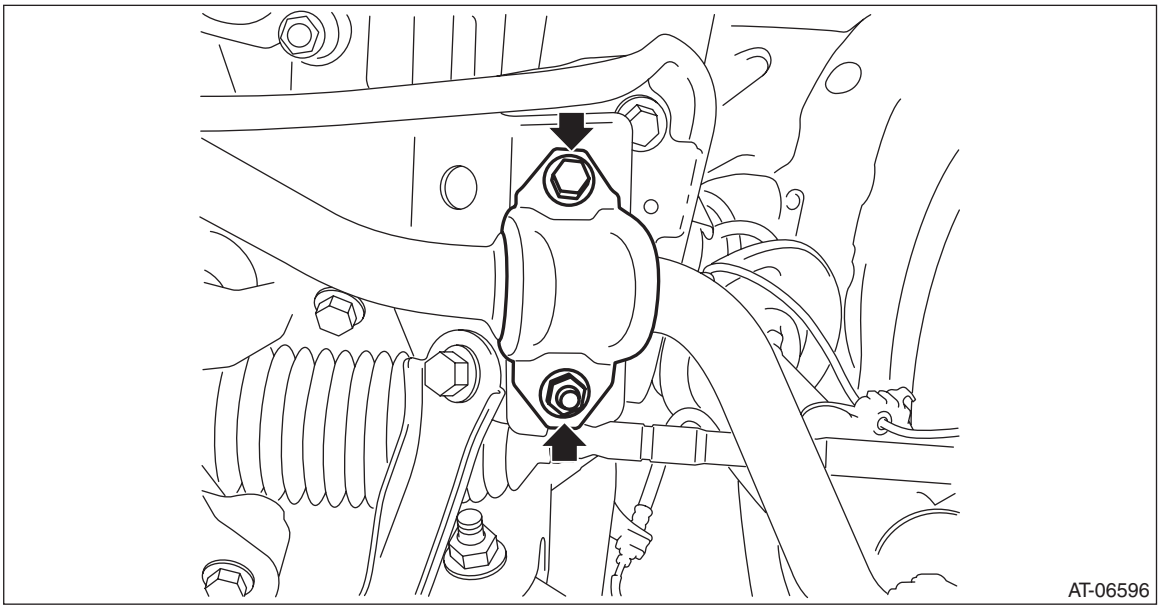


(A) Select cable
(B) Plate ASSY

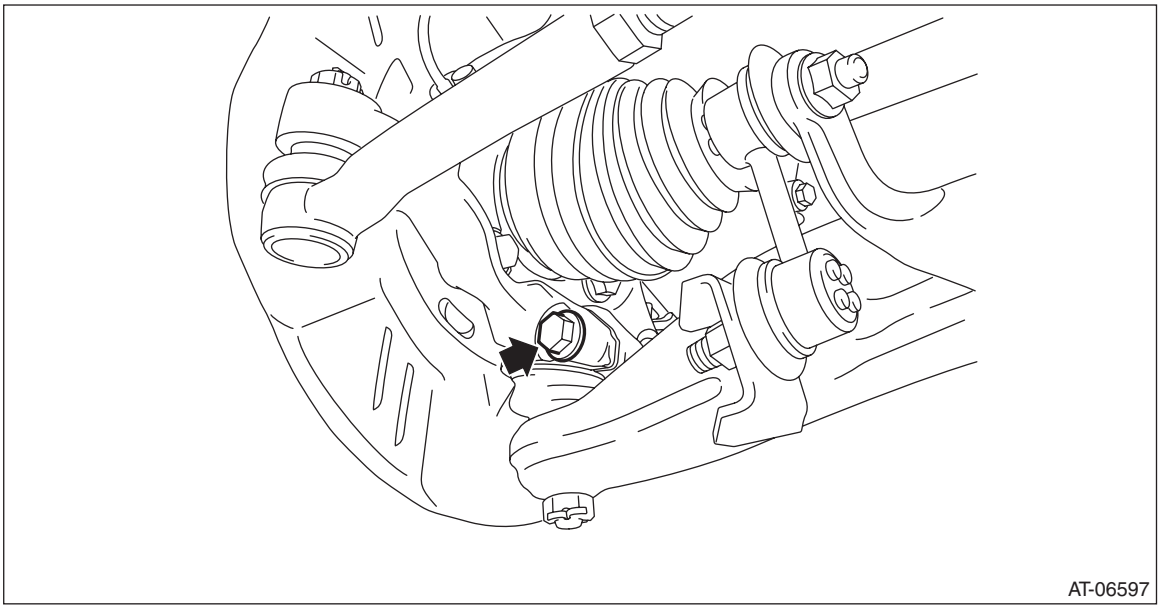
32) Remove the propeller shaft. <Ref. to DS-12, REMOVAL, Propeller Shaft.>
33) Remove the jack-up plate.



34) Remove the stabilizer bracket.



35) Remove the bolts which secure to the front housing, and separate the front arm and housing.



36) Using a tire lever or a crow bar, etc., pull out until the front drive shaft transmission side joint slides move smoothly.

NOTE:
Place cloth between the tire lever or bar and the transmission in order to avoid damaging the transmission side retainer.

37) Hold the transmission side joint of the front drive shaft by hand and extract the housing from the transmission while pressing the housing outward, so as not to stretch the boot.

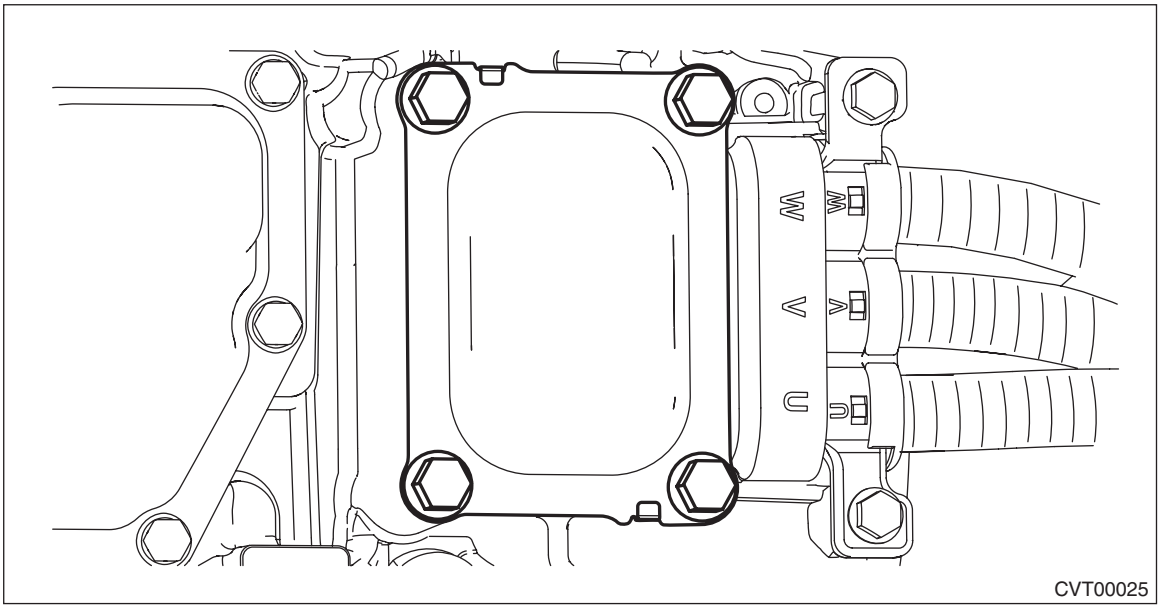
NOTE:
- Before pulling RH front drive shaft from transmission, turn the steering wheel to left hand full lock.
- Before pulling LH front drive shaft from transmission, turn the steering wheel to right hand full lock.

38) Remove the power cable.

WARNING:
Be sure to wear insulated gloves.

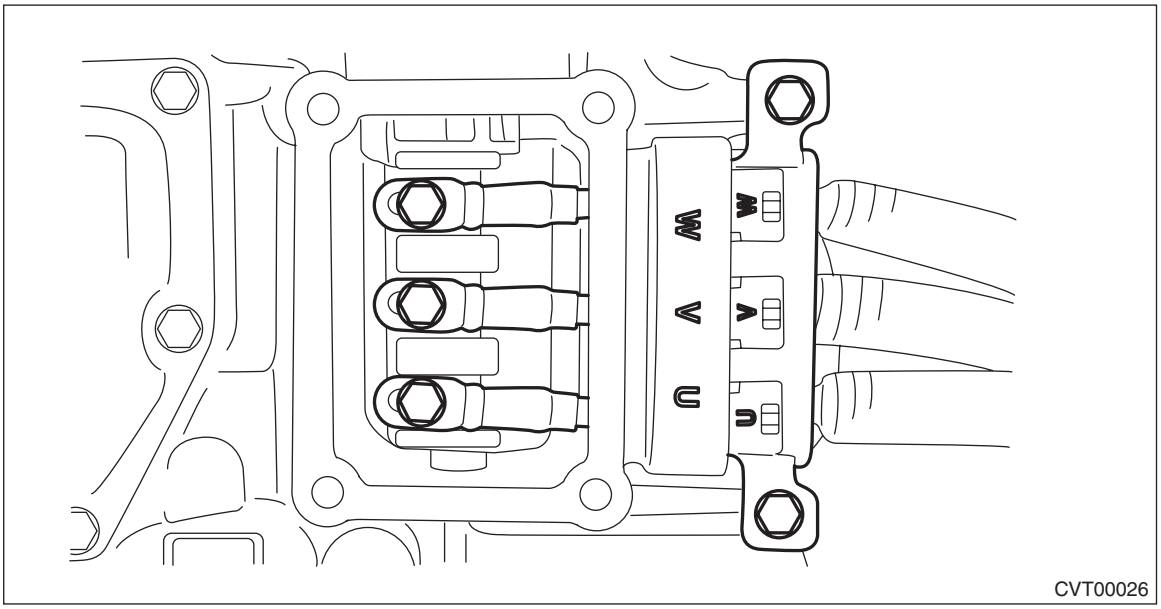
CAUTION:
- **Be sure to insulate the power cable terminal by wrapping it with insulating tape.**
- **When removing the power cable, do not apply excessive force or damage it.**

(1) Clean any water, dirt and sand thoroughly from the area around the power connect cover using air, etc.
(2) Remove the power connect cover and gasket.



(3) Remove the power cable terminal, and remove the terminal box assembly.

NOTE:
To prevent intrusion of foreign matter such as oil, water and dirt after removal, install the power connect cover and cover the terminal box assembly with tape.



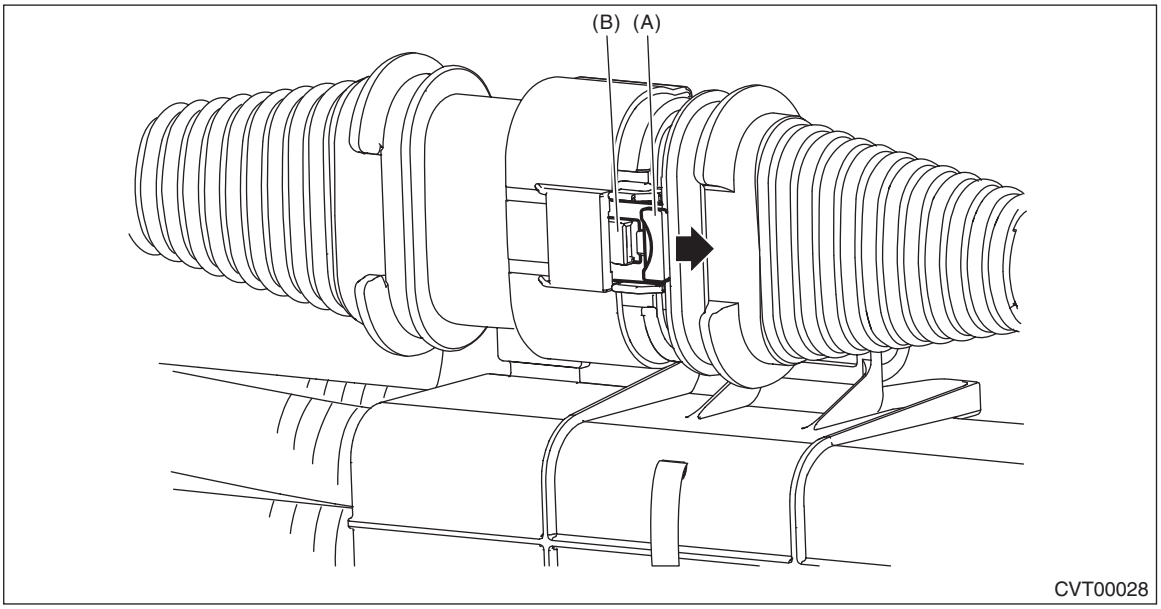
39) Remove the under cover - rear LH. <Ref. to EI-34, REMOVAL, Floor Under Protector.>

40) Remove the electric oil pump harness connector.

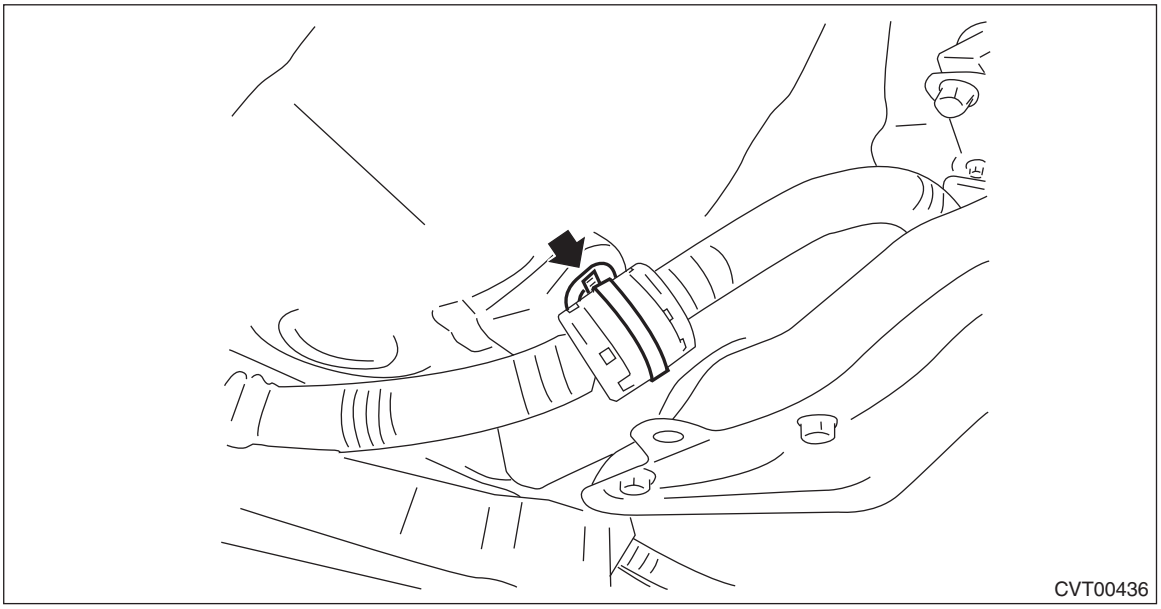
WARNING:
Be sure to wear insulated gloves.

CAUTION:
• To prevent intrusion of foreign matter such as oil, water and dirt after removal, cover the female side connector with a clean cloth or a plastic bag and cover the coupler portion of the male side connector with insulating tape.
• When foreign matter is found, remove it while paying attention not to damage the electrode inside. If water is attached, dry it completely.
• When disconnecting the electric oil pump harness connector, do not apply excessive force or damage it.

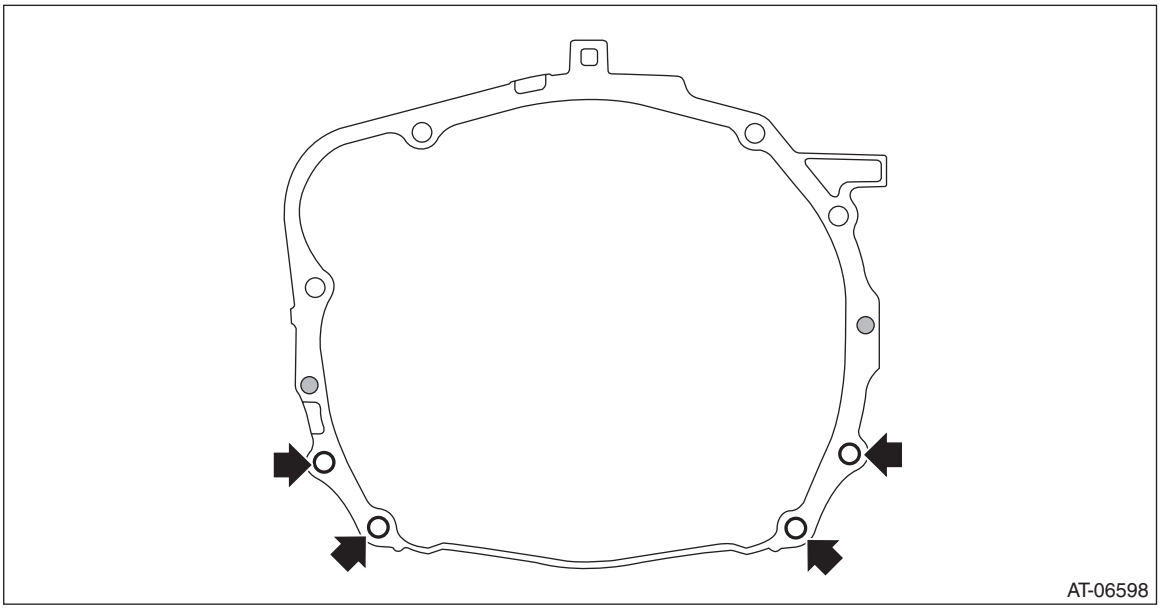
(1) Pull the slide lock (A) in the direction of arrow.
(2) Disconnect the harness connector by pushing the claw (B).



(3) Release the clip of the electric oil pump harness from the vehicle.



41) Remove the two transmission connecting bolts and two nuts (lower side).



42) Set the transmission jack under the transmission.

NOTE:
Make sure that the support plates of transmission jack do not touch the oil pan.

43) Release the clip of the electric oil pump harness from the transmission rear crossmember, and remove the transmission rear crossmember from the vehicle. <Ref. to CVT(TH58A)-88, TRANSMISSION REAR CROSSMEMBER AND REAR CUSHION RUBBER, REMOVAL, Transmission Mounting System.>

44) While lowering the transmission jack gradually, fully retract the engine support, and then tilt the engine rearward.

45) Remove the transmission assembly.

CAUTION:
Be careful not to damage the electric oil pump harness.

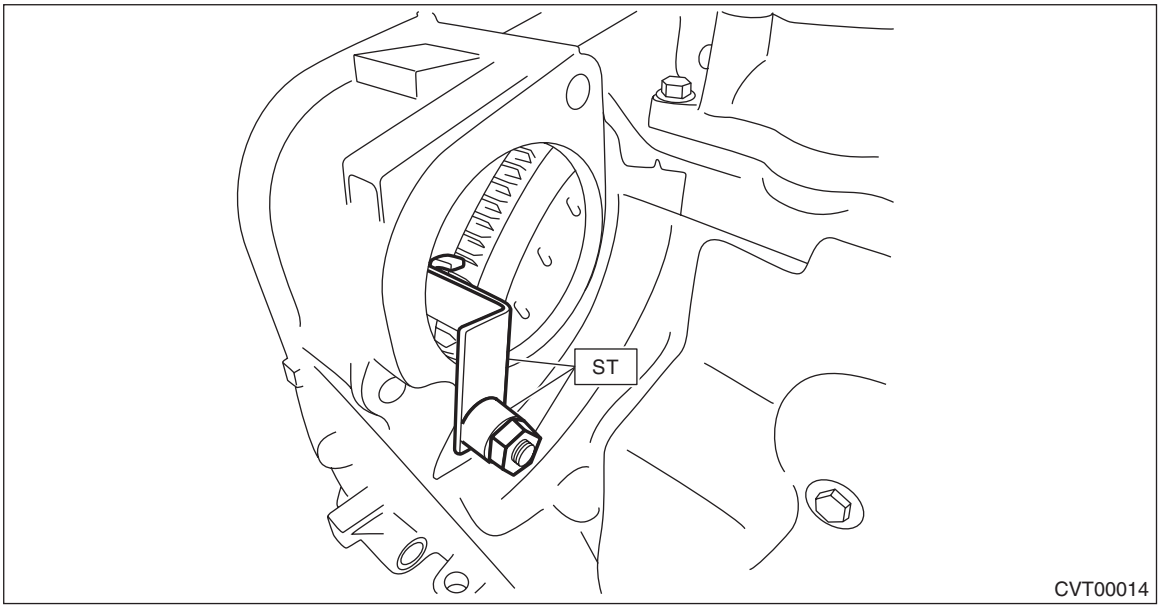
NOTE:
Remove it while moving the transmission jack up and down so that the engine and transmission remain directly aligned.

46) Remove the rear cushion rubber. <Ref. to CVT(TH58A)-88, TRANSMISSION REAR CROSSMEMBER AND REAR CUSHION RUBBER, REMOVAL, Transmission Mounting System.>

B: INSTALLATION

WARNING:
The hybrid system includes a high voltage circuit. Mishandling could cause accidents such as electric shock or leak. Always check "CAUTION (HYBRID SYSTEM)" and perform the proper operation. <Ref. to PC-7, CAUTION (HYBRID SYSTEM), Precaution.>

1) Attach the ST to converter case.
ST 498277200 STOPPER SET



2) When completely overhauling the transmission, refill CVTF through the transmission right side plug. <Ref. to CVT(TH58A)-180, Preparation for Overhaul.>
3) Replace the front differential side retainer oil seal. <Ref. to CVT(TH58A)-92, REPLACEMENT, Differential Side Retainer Oil Seal.>

NOTE:
- Be sure to replace the differential side retainer oil seal with a new part whenever the front drive shaft is removed from the transmission.
- When a new differential side retainer oil seal has been installed, replacement is not required.

4) Install the rear cushion rubber on the transmission. <Ref. to CVT(TH58A)-90, TRANSMISSION REAR CROSSMEMBER AND REAR CUSHION RUBBER, INSTALLATION, Transmission Mounting System.>
5) Mount the transmission onto the transmission jack.
6) Remove the pitching stopper bracket, if mounted.
7) Install the transmission assembly onto the engine.

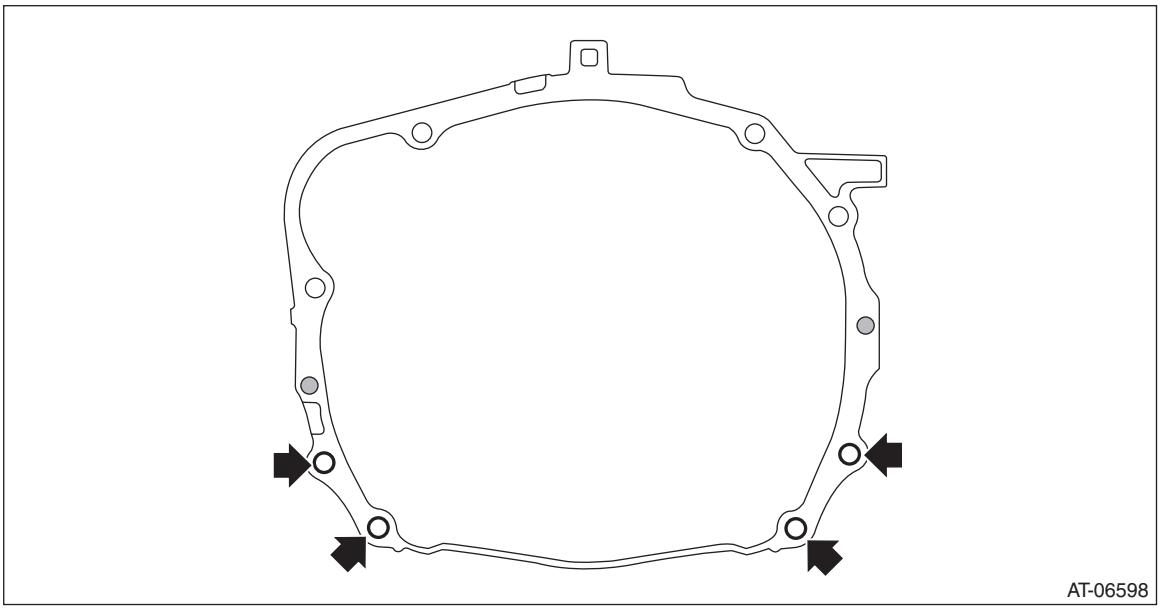
CAUTION:
Be careful not to damage the electric oil pump harness.

NOTE:
- While raising the transmission jack gradually, turn the screw of engine support, then tilt the engine forward.
- Temporarily attach the two engine connecting bolts and two nuts (lower side).

8) Attach the transmission rear crossmember, and install the clip of the electric oil pump cable to the transmission rear crossmember. <Ref. to CVT(TH58A)-90, TRANSMISSION REAR CROSSMEMBER AND REAR CUSHION RUBBER, INSTALLATION, Transmission Mounting System.>

9) Tighten the two engine connecting bolts and two nuts (lower side).

Tightening torque:
50 N·m (5.1 kgf-m, 36.9 ft-lb)



10) Remove the transmission jack.

11) Install the power cable.

WARNING:
Be sure to wear insulated gloves.

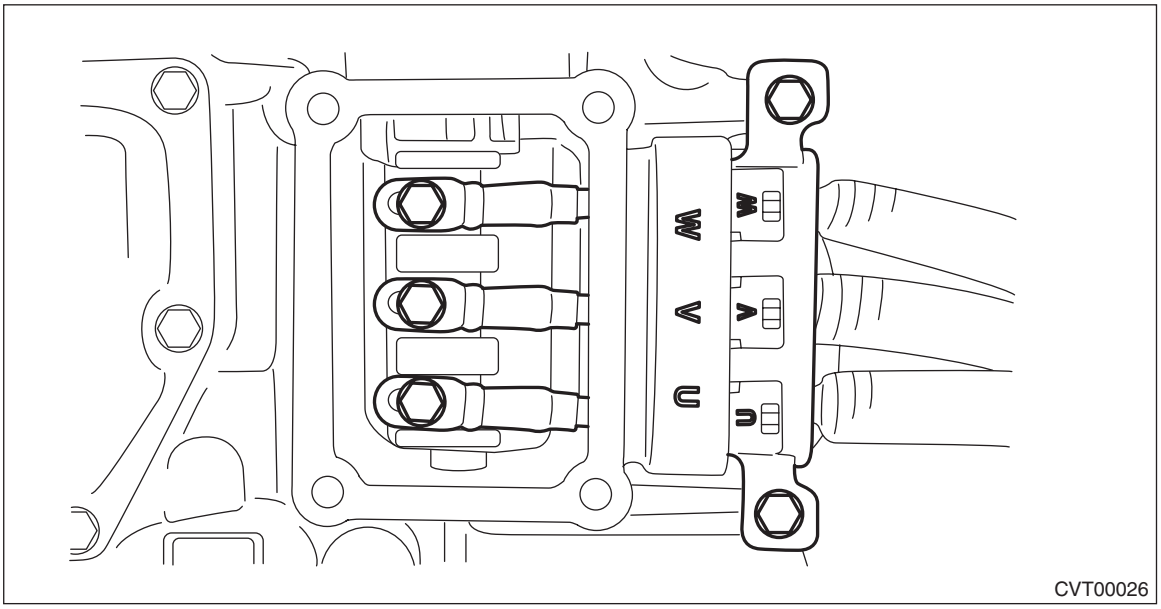
CAUTION:
• Do not allow foreign matter intrusion. If any foreign matter is found, remove them carefully so that the electrodes are not damaged.
• If water is attached, dry it completely before starting the operation.
• Do not apply excessive force to the terminals and watch to make sure the cable is not damaged or pinched.

(1) Match the letters (U, V, and W) imprinted on both the power cable and the transmission body, then insert the cable to the transmission and fix securely.

Tightening torque:
7.5 N·m (0.8 kgf-m, 5.5 ft-lb)

(2) Install the power cable terminal.

Tightening torque:
7.5 N·m (0.8 kgf-m, 5.5 ft-lb)



(3) Install the power connect cover.

NOTE:
Use a new gasket.

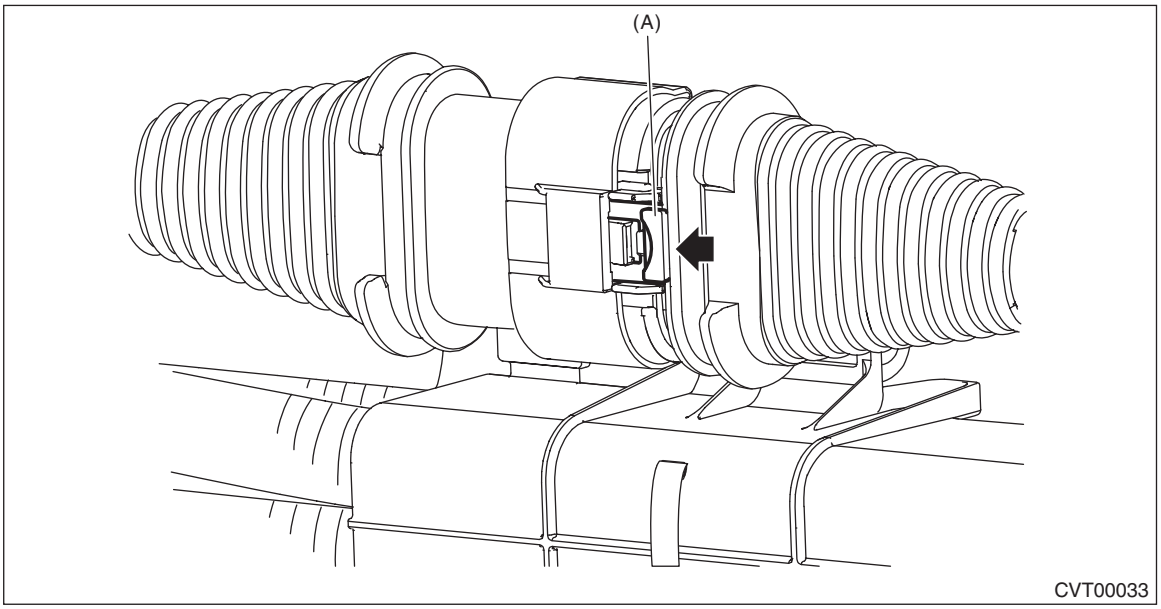
Tightening torque:
25 N·m (2.5 kgf-m, 18.4 ft-lb)

12) Install the electric oil pump harness connector.

WARNING:
Be sure to wear insulated gloves.

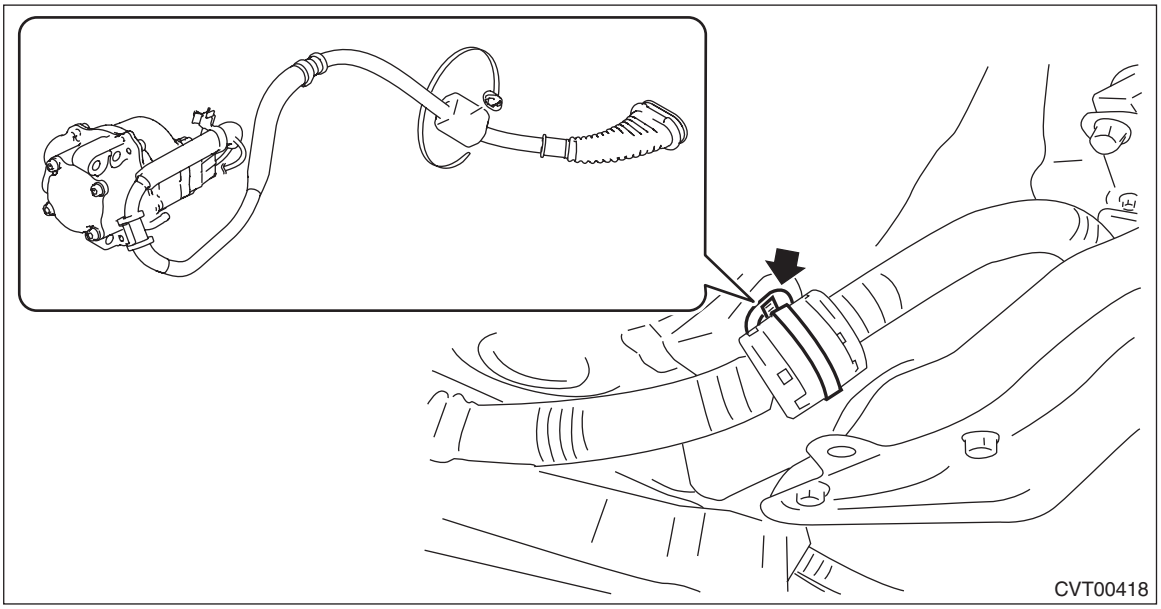
CAUTION:
• Do not allow foreign matter intrusion. When foreign matter is found inside, remove it while paying attention not to damage the electrode inside.
• If water is attached, dry it completely before starting the operation.

(1) Insert the harness connector until a click is heard, and move the slide lock (A) in the arrow direction to lock.



(2) Install the electric oil pump harness to the vehicle.

NOTE:
• Use a new electric oil pump harness clip.
• Install the electric oil pump harness clip as shown in the figure.

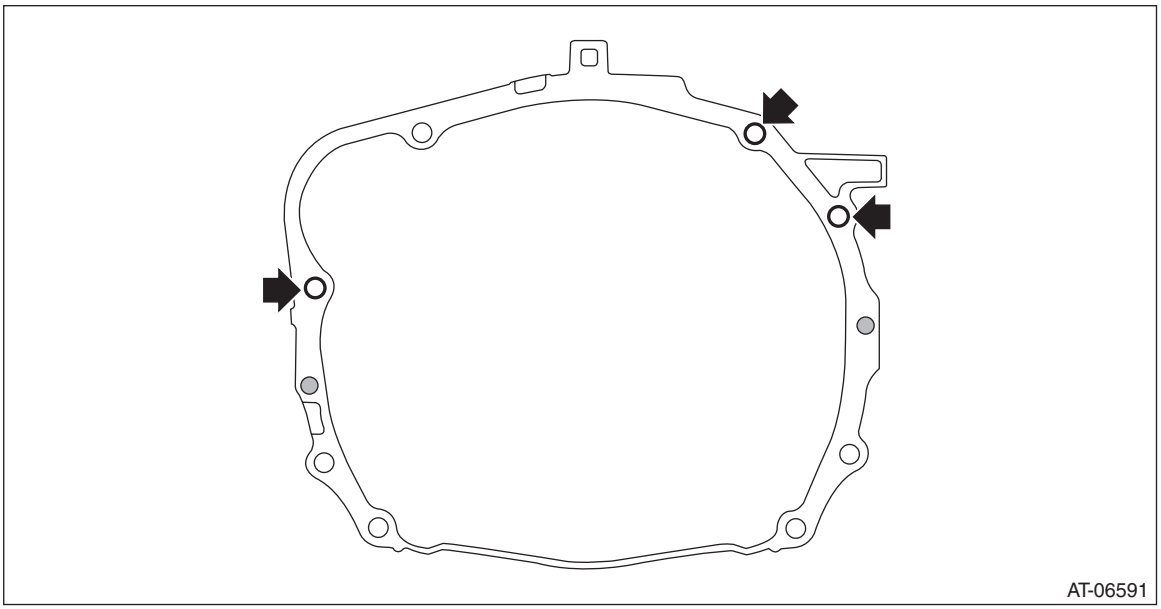


(3) Make sure that the electric oil pump harness does not interfere with other parts.

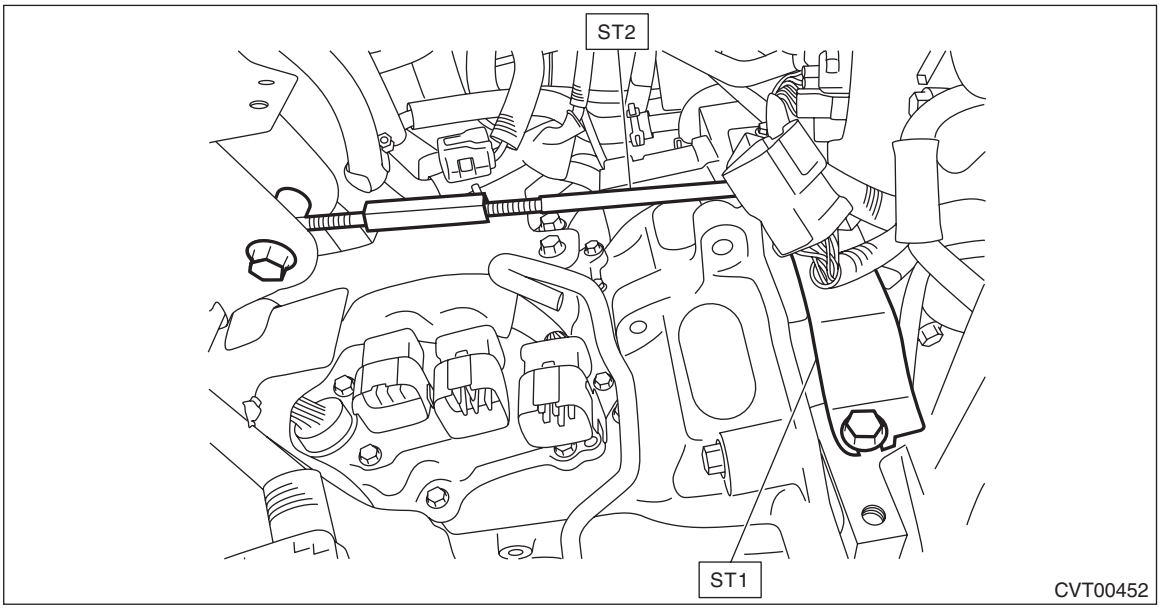
13) Install the under cover - rear LH. <Ref. to EI-35, INSTALLATION, Floor Under Protector.>
14) Lower the vehicle.

15) Install the three engine mounting bolts (upper side).

Tightening torque:
50 N·m (5.1 kgf-m, 36.9 ft-lb)



16) Remove the ST (STOPPER SET) from converter case.
17) Remove the ST (ENGINE SUPPORT BRACKET and ENGINE SUPPORT).
ST1 41099AA012 ENGINE SUPPORT BRACKET
ST2 41099AA020 ENGINE SUPPORT



18) Connect the throttle position sensor harness connector.
19) Match the torque converter screw hole with drive plate hole to install the bolt.

CAUTION:
- **Do not drop the mounting bolt in the converter housing.**
- **Do not damage the mounting bolt.**

Tightening torque:
25 N·m (2.5 kgf-m, 18.4 ft-lb)

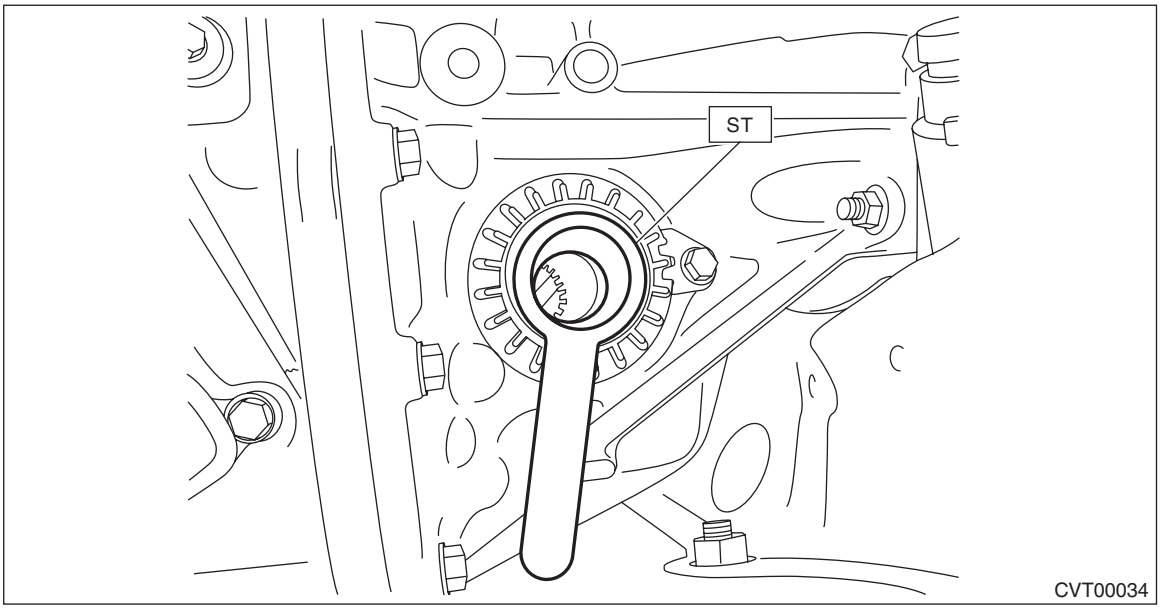
20) Install the remaining three bolts by rotating the crank pulley a little at a time in the same direction as engine revolution.

Tightening torque:
25 N·m (2.5 kgf-m, 18.4 ft-lb)
21) Install the service hole plug.
22) Install the engine ground terminals.

Tightening torque:
19 N·m (1.9 kgf-m, 14.0 ft-lb)
23) Replace the CVTF inlet hose and CVTF outlet hose. <Ref. to CVT(TH58A)-162, CVTF Cooler (With Warmer Function).>
24) Install the CVTF inlet hose and CVTF outlet hose to transmission.
25) Install the CVTF cooler (with warmer feature) to the transmission.

Tightening torque:
23 N·m (2.3 kgf-m, 17.0 ft-lb)
26) Install the starter. <Ref. to SC(H4DO(HEV))-11, INSTALLATION, Starter.>
27) Install the pitching stopper bracket and transmission radio ground cord.

Tightening torque:
41 N·m (4.2 kgf-m, 30.2 ft-lb)
28) Install the air breather hose to the pitching stopper bracket. <Ref. to CVT(TH58A)-173, FRONT DIFFERENTIAL SIDE, INSTALLATION, Air Breather Hose.>
29) Install the pitching stopper. <Ref. to CVT(TH58A)-89, PITCHING STOPPER, INSTALLATION, Transmission Mounting System.>
30) Lift up the vehicle.
31) Apply grease to the side retainer oil seal lip.
32) Set the ST to side retainer.
ST 28399SA010 OIL SEAL PROTECTOR



33) Replace the circlip of the drive shaft with a new part.
34) Insert the front drive shaft spline section into transmission and remove the ST (OIL SEAL PROTECTOR).

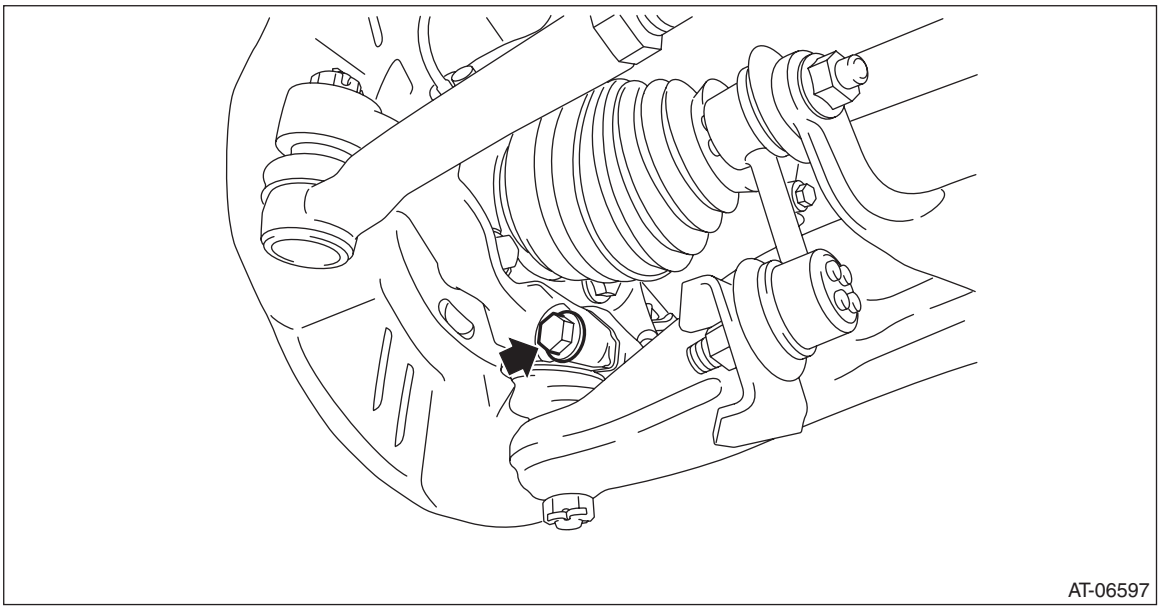
NOTE:
- Before inserting RH front drive shaft into transmission, turn the steering wheel to left hand full lock.
- Before inserting LH front drive shaft into transmission, turn the steering wheel to right hand full lock.

35) Insert the drive shaft into the transmission securely by pressing the housing from outside of the vehicle.

36) Insert the ball joint into housing and secure with bolt.

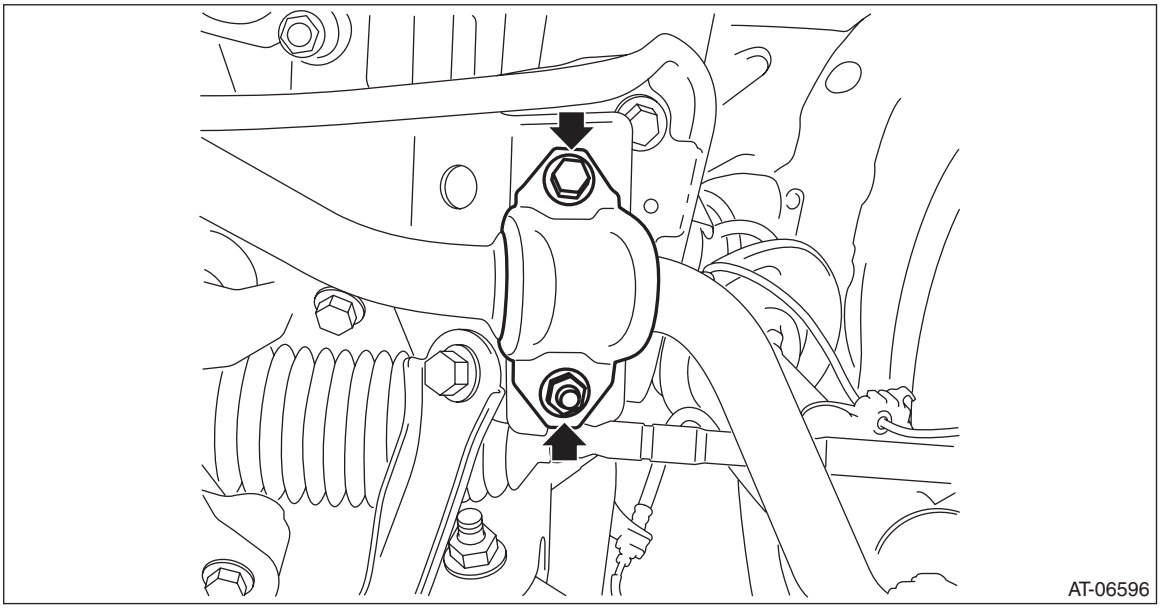
Tightening torque:
50 N·m (5.1 kgf-m, 36.9 ft-lb)

CAUTION:
- **Do not apply grease to the tapered portion of ball stud.**
- **Before tightening, make sure the lower side of housing and stepped section of ball joint are in contact.**


AT-06597

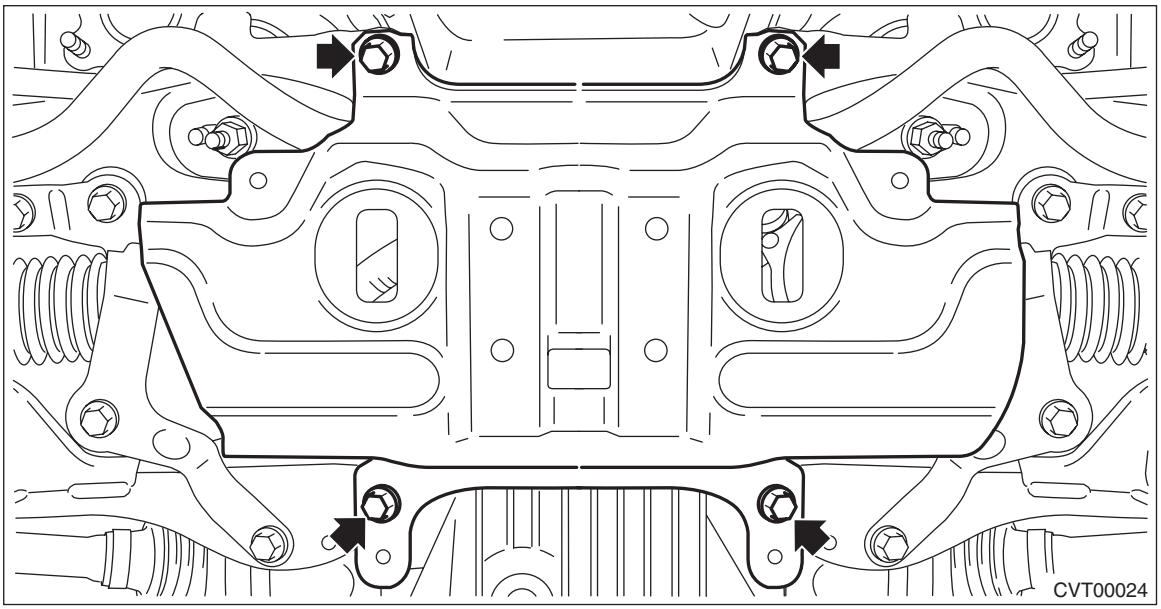
37) Install the stabilizer bracket.

Tightening torque:
25 N·m (2.5 kgf-m, 18.4 ft-lb)


AT-06596

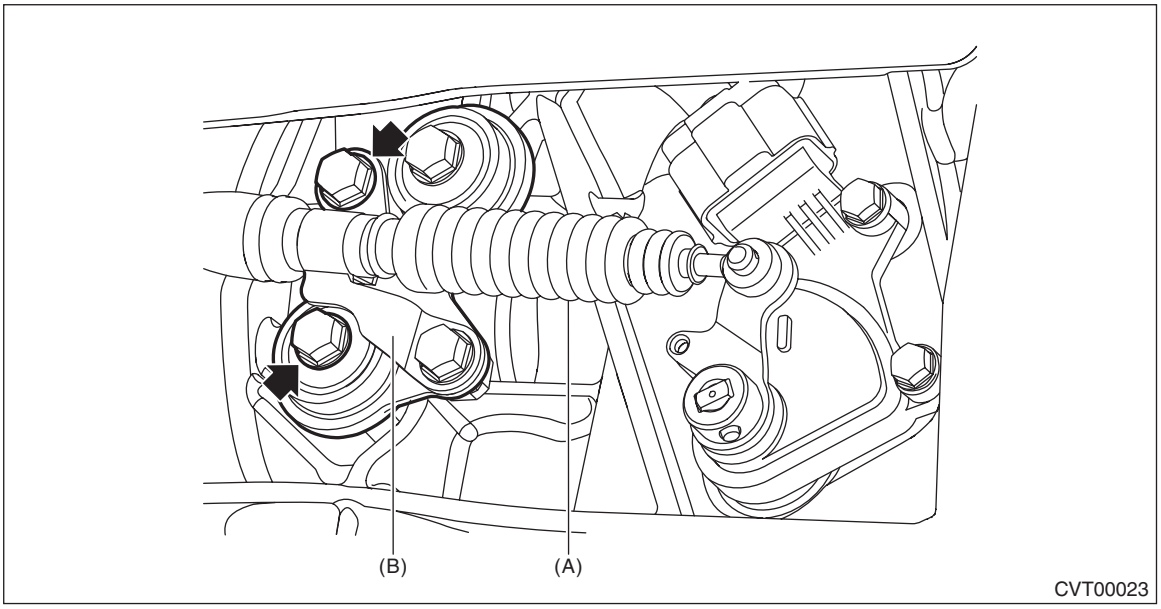
38) Install the jack-up plate.

Tightening torque:
60 N·m (6.1 kgf-m, 44.3 ft-lb)



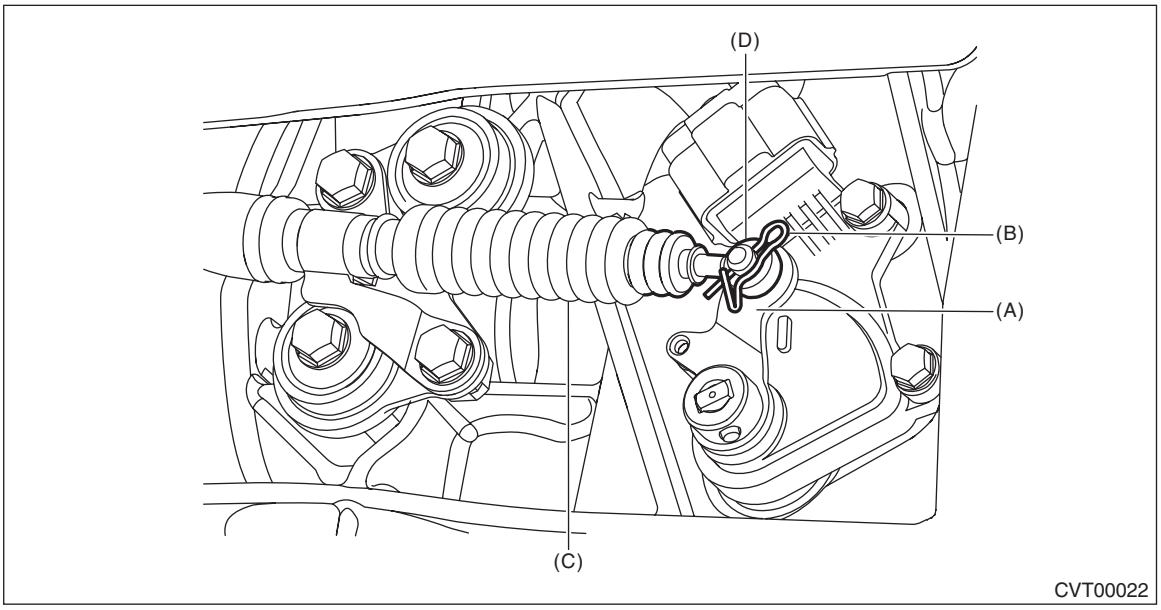
39) Install the plate assembly to transmission.

Tightening torque:
25 N·m (2.5 kgf-m, 18.4 ft-lb)



(A) Select cable
(B) Plate ASSY

40) Install the washer and snap pin to the shifter arm.



(A) Shifter arm
(B) Snap pin
(C) Select cable
(D) Washer

41) Install the propeller shaft. <Ref. to DS-13, INSTALLATION, Propeller Shaft.>
42) Install the center exhaust cover.

Tightening torque:
18 N·m (1.8 kgf-m, 13.3 ft-lb)
43) Install the hanger bracket.

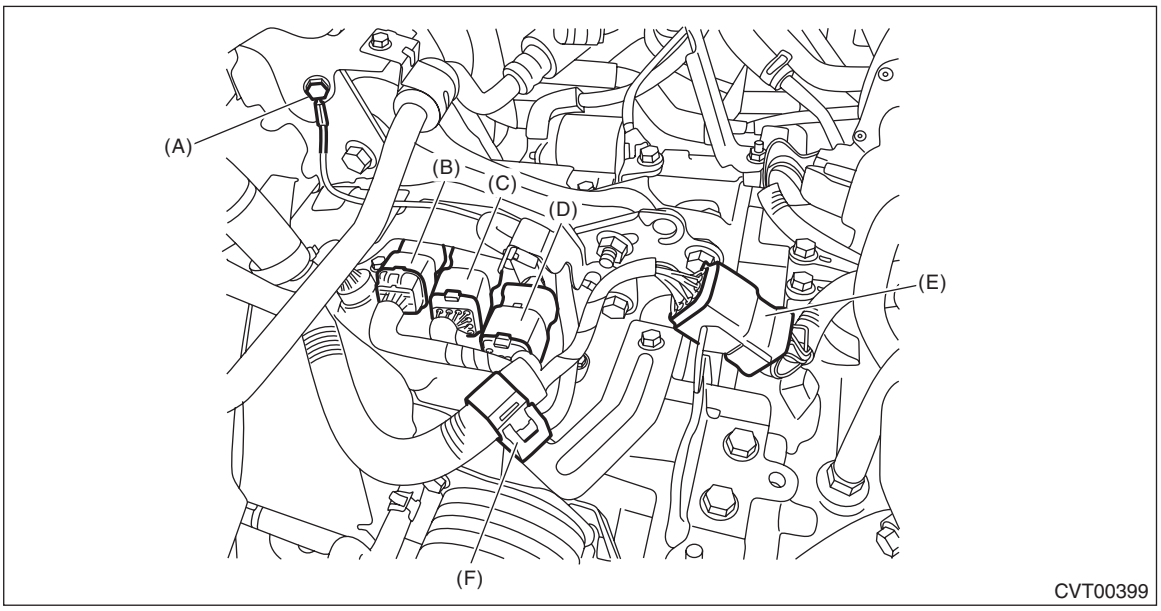
Tightening torque:
23 N·m (2.3 kgf-m, 17.0 ft-lb)
44) Install the center exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-8, INSTALLATION, Front Exhaust Pipe.>
45) Install the under cover - rear LH. <Ref. to EI-32, INSTALLATION, Front Under Cover.>
46) Install the under cover front - cable.

Tightening torque:
18 N·m (1.8 kgf-m, 13.3 ft-lb)
47) Lower the vehicle.
48) Install the engine hanger rear and the vacuum pipe.

Tightening torque:
Engine hanger rear
21 N·m (2.1 kgf-m, 15.5 ft-lb)
Vacuum pipe
6.4 N·m (0.7 kgf-m, 4.7 ft-lb)
49) Install the air cleaner case bracket LH.

Tightening torque:
18 N·m (1.8 kgf-m, 13.3 ft-lb)

50) Connect the following connectors and install the harness clip to the bracket.
- Transmission radio ground terminal
- Transmission harness connectors
- Inhibitor harness connector
- Drive motor harness connector
- Engine harness connectors
- Harness clip



(A) Transmission radio ground terminal
(B) Transmission harness connectors
(C) Inhibitor harness connector
(D) Drive motor harness connector
(E) Engine harness connectors
(F) Harness clip

51) Install the air cleaner case. <Ref. to IN(H4DO(HEV))-8, INSTALLATION, Air Cleaner Case.>
52) Install the front tires. <Ref. to WT-4, INSTALLATION, Tire and Wheel.>
53) Install the collector cover.
54) Install the service disconnect plug. <Ref. to HEV-16, INSTALLATION, Service Plug.>
55) Install the 12 volt auxiliary battery ground terminal and ground terminal to the 12V engine restart battery sensor of the 12 volt engine restart battery. <Ref. to NT-5, BATTERY, NOTE, Note.>
56) Refill differential gear oil to adjust the differential gear oil amount. <Ref. to CVT(TH58A)-45, Differential Gear Oil.>
57) Refill CVTF to adjust the CVTF level. <Ref. to CVT(TH58A)-41, CVTF.>
58) Perform the operation for clearing AT learning value. <Ref. to CVT(HEV)(diag)-20, Clear Memory Mode.>
59) Perform the learning again. <Ref. to CVT(HEV)(diag)-26, Learning Control.>
60) Execute the rear differential inspection mode. <Ref. to DI-63, Rear Differential Inspection Mode.>

CAUTION:
Always execute the rear differential inspection mode at the replacement of the following.
- **Replacement of transmission assembly**
- **Replacement of front differential hypoid gear set**

61) Perform the road test to make sure there is no fault. <Ref. to CVT(TH58A)-50, INSPECTION, Road Test.>

11.Learning Control

A: GENERAL DESCRIPTION

- Follow the messages displayed on the Subaru Select Monitor when working.
- When the following work is performed, perform learning work for the transmission.

Replacement of TCM/Replacement or disassembly of transmission assembly/Replacement of control valve body/Clearing AT leaning value is executed.

B: PROCEDURE

1. PREPARATION FOR LEARNING

1) Warm up or cool down until the ATF temperature displayed on the Subaru Select Monitor is 40 — 65°C (104 — 149°F).
2) After stopping the vehicle, shift the select lever to “P” range.
3) Fully apply the parking brake.
4) Lift up the vehicle.

CAUTION:
While working, be sure to keep the lower edge of the tires 30 cm or more above the ground as vehicle will vibrate.
5) Connect the Subaru Select Monitor to data link connector.
6) Turn the ignition switch to ON.
7) Turn off all switches causing an electrical load, such as headlights, A/C, seat heater and rear defogger, etc.

2. SIMPLE LEARNING

NOTE:
Simple learning is performed with the vehicle lifted, without actually running the vehicle.

CAUTION:
Do not turn the power of the Subaru Select Monitor OFF during work, and do not disconnect the data link connector.
1) Select {Work Support} in the «Transmission Diagnosis» display screen of the Subaru Select Monitor.
2) Select {Compulsory learning mode} in the «Work Support» display screen of the Subaru Select Monitor.
3) Follow the messages displayed on the Subaru Select Monitor screen when working.

NOTE:
During AT learning in progress, AT OIL TEMP light in the combination meter starts flashing at 2 Hz and the learning operation starts. The following message is displayed on the screen when the AT OIL TEMP light which was flashing at 2 Hz turns off.

4) When «AT learning normally ended.» is displayed, simple AT learning is completed.

NOTE:
- If communication error occurs during learning, retry the “AT learning mode” from the beginning.
- If the message «Execute AT learning again after fixing troubles of the vehicle» appears during learning, select [OK] and display the DTC list. After repairing the locations indicated by the DTC, start the “AT learning mode” over from the beginning.
- When communication error occurs during learning, select lever does not shift occasionally. If select lever does not shift, turn the ignition switch to OFF before operating the select lever.
- If the message «AT learning ended abnormally.» is displayed, start the “AT learning mode” over from the beginning.

Display	Main causes for abnormal termination
AT learning ended abnormally.	• Fault is detected during AT learning. • The accelerator pedal is depressed during AT learning. • An unspecified operation was performed during AT learning • ATF temperature becomes out of specification during AT learning. • Battery voltage is low. • Malfunction indicator light illuminates. • Hybrid fail lamp illuminates. • Parking brake not applied strongly enough. • Brake pedal is not fully depressed. • Abnormal idle speed increase, etc.

- For detailed operation procedures, refer to “PC application help for Subaru Select Monitor”.

12.AT OIL TEMP Warning Light Display

A: OPERATION

The AT OIL TEMP light illuminates or blinks, when the ATF temperature is high and malfunction occurs in CVT.

- At normal condition

AT OIL TEMP light always illuminates when the ignition switch is ON (engine OFF). Light goes off after two seconds from engine ON.

- When ATF temperature is high

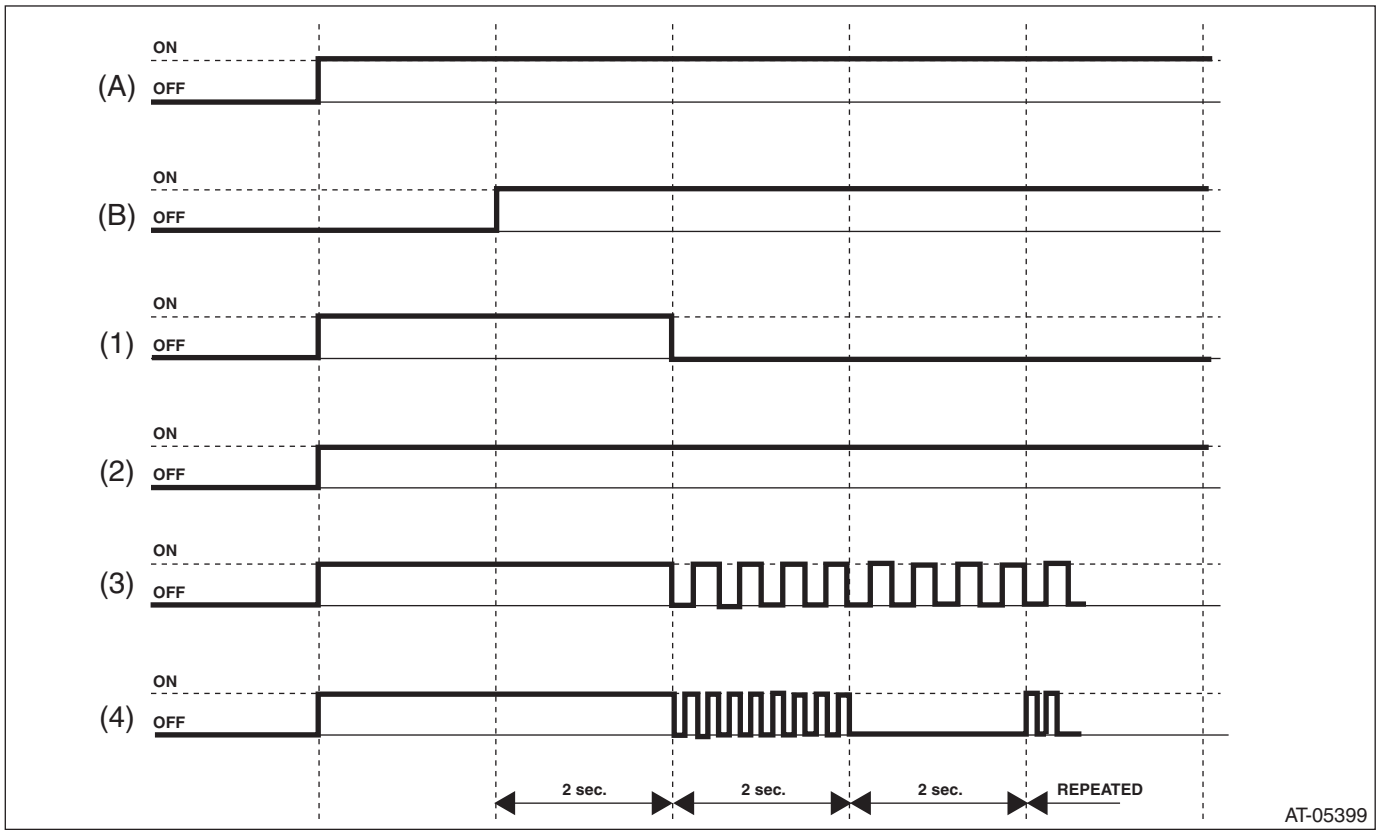
AT OIL TEMP light illuminates when the ATF temperature is abnormally high with engine ON.

- When malfunction is detected

AT OIL TEMP light blinks at 2 Hz when the TCM detects the malfunction of CVT with engine ON. In this case, inspect using “Diagnostic Procedure with Diagnostic Trouble Code (DTC)”. <Ref. to CVT(HEV)(diag)-42, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

- When AT learning is not finished

AT OIL TEMP light repeats “Blinking at 4 Hz → Turning OFF” every two seconds, when the AT learning is not finished with engine ON. In this case, perform the “Learning”. (During AT learning, the light blinks at 2 Hz or illuminates.) <Ref. to CVT(HEV)(diag)-26, Learning Control.>



(A) Ignition switch condition
(B) Engine condition
(1) At normal condition
(2) When ATF temperature is high
(3) When malfunction is detected
(4) When AT learning is not finished

If the AT OIL TEMP light does not illuminate, or illumination patterns are not as above, check the AT OIL TEMP light circuit. <Ref. to CVT(HEV)(diag)-29, INSPECTION, AT OIL TEMP Warning Light Display.>

B: INSPECTION

DIAGNOSIS:

- AT OIL TEMP light circuit is open or shorted.
- Combination meter malfunction
- TCM is in special control mode.
- AT learning is not finished.

TROUBLE SYMPTOM:

- When the ignition switch is turned to ON, the AT OIL TEMP light does not illuminate.
- AT OIL TEMP light remains lit after engine start.

	Step	Check	Yes	No
1	**CHECK AT OIL TEMP LIGHT.** Turn the ignition switch to ON.	Does the AT OIL TEMP light illuminate?	Go to step **2**.	Perform the self-diagnosis of combination meter. <Ref. to IDI-8, SELF-DIAGNOSIS DISPLAY MODE, OPERATION, Combination Meter System.>
2	**CHECK AT OIL TEMP LIGHT.** Start the engine.	Does AT OIL TEMP light go off after two seconds from engine start?	Current condition is normal. Go back to Basic Diagnostic Procedure. <Ref. to CVT(HEV)(diag)-2, Basic Diagnostic Procedure.>	Go to step **3**.
3	**CHECK DTC.** Read the DTC relating the TCM using the Subaru Select Monitor.	Is DTC displayed?	Perform the diagnosis according to DTC.	Go to step **4**.
4	**CHECK TCM.** Read the data of «ATF Temperature Lamp» using the Subaru Select Monitor.	Is “ON” displayed?	Go to step **5**.	Perform the self-diagnosis of combination meter. <Ref. to IDI-8, SELF-DIAGNOSIS DISPLAY MODE, OPERATION, Combination Meter System.>
5	**CHECK TCM.** Read the data of «ATF Temp.» using the Subaru Select Monitor.	Is the display 125°C or more?	Go to step **6**.	Replace the TCM. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>
6	**CHECK ATF TEMPERATURE.** Check the real fluid temperature from the transmission case surface temperature.	Does it clearly differ from the «ATF Temp.» displayed on Subaru Select Monitor?	Perform the diagnosis according to DTC P0711, P0712, P0713.	When ATF temperature can be judged as actually high, perform the diagnosis again after the ATF temperature lowers.

12.Transmission Mounting System

A: REMOVAL

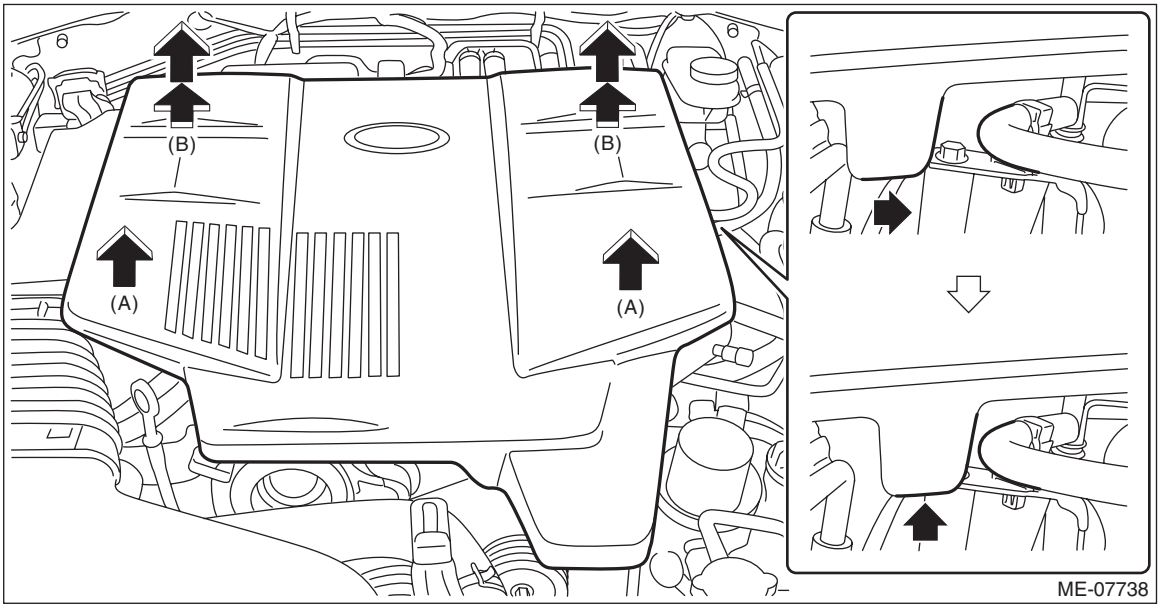
1. PITCHING STOPPER

1) Disconnect the ground cable from battery. <Ref. to NT-5, BATTERY, NOTE, Note.>

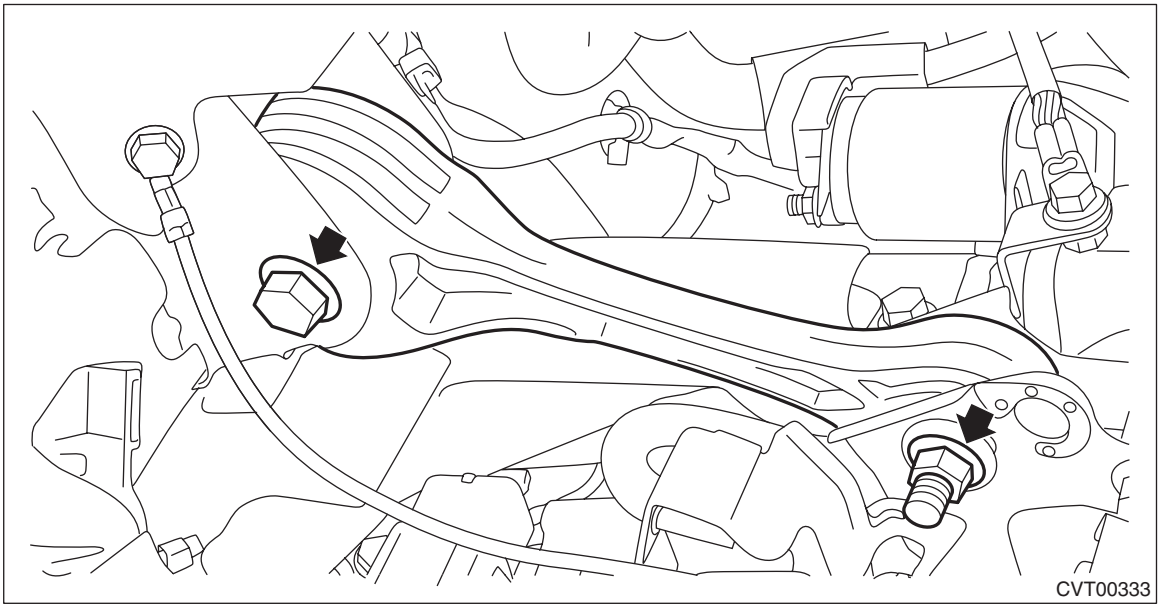
NOTE:
For the 12 volt engine restart battery, disconnect the ground terminal from 12V engine restart battery sensor.

2) Remove the collector cover.
   (1) Pull up the two points at the front of collector cover (A).
   (2) Pull up the two points at the rear of collector cover (B) while moving them rearward.

NOTE:
Be careful not to contact the fuel delivery tube when moving the collector cover rearward.



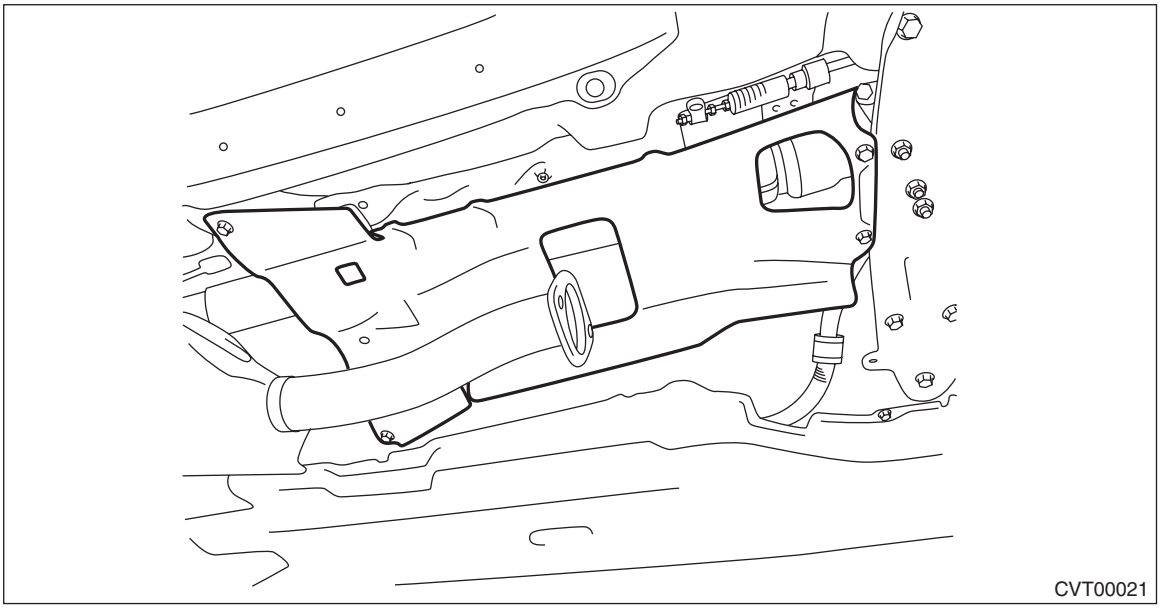
3) Remove the air cleaner case. <Ref. to IN(H4DO(HEV))-6, REMOVAL, Air Cleaner Case.>
4) Remove the pitching stopper.



2. TRANSMISSION REAR CROSSMEMBER AND REAR CUSHION RUBBER

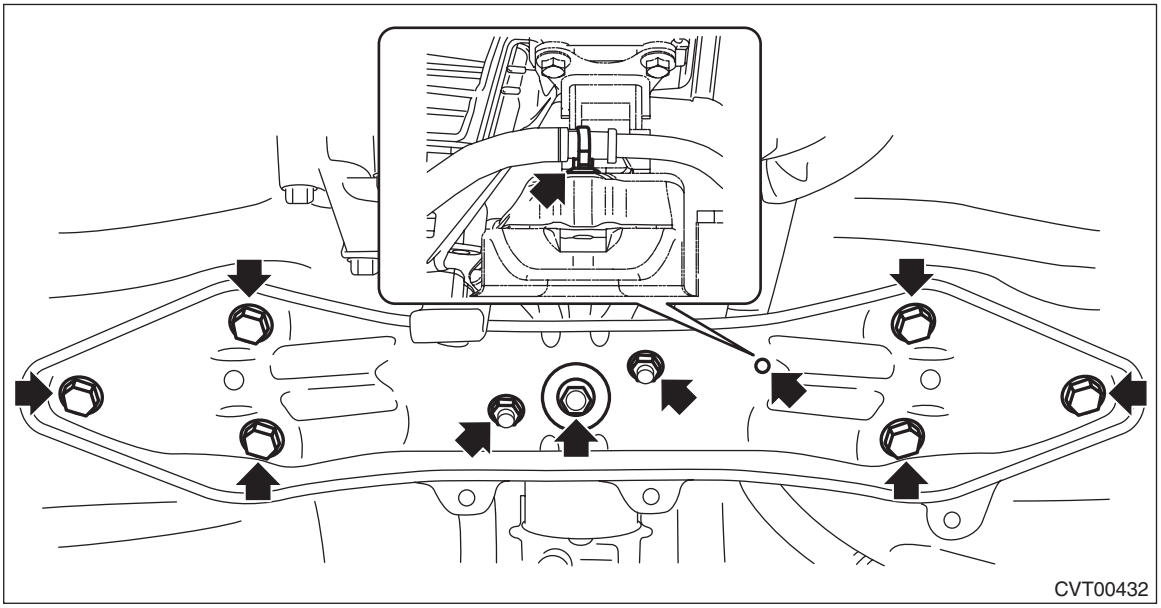
1) Disconnect the ground cable from battery. <Ref. to NT-5, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery, disconnect the ground terminal from 12V engine restart battery sensor.
2) Lift up the vehicle.
3) Remove the center exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-14, REMOVAL, Center Exhaust Pipe.>
4) Remove the center exhaust cover.

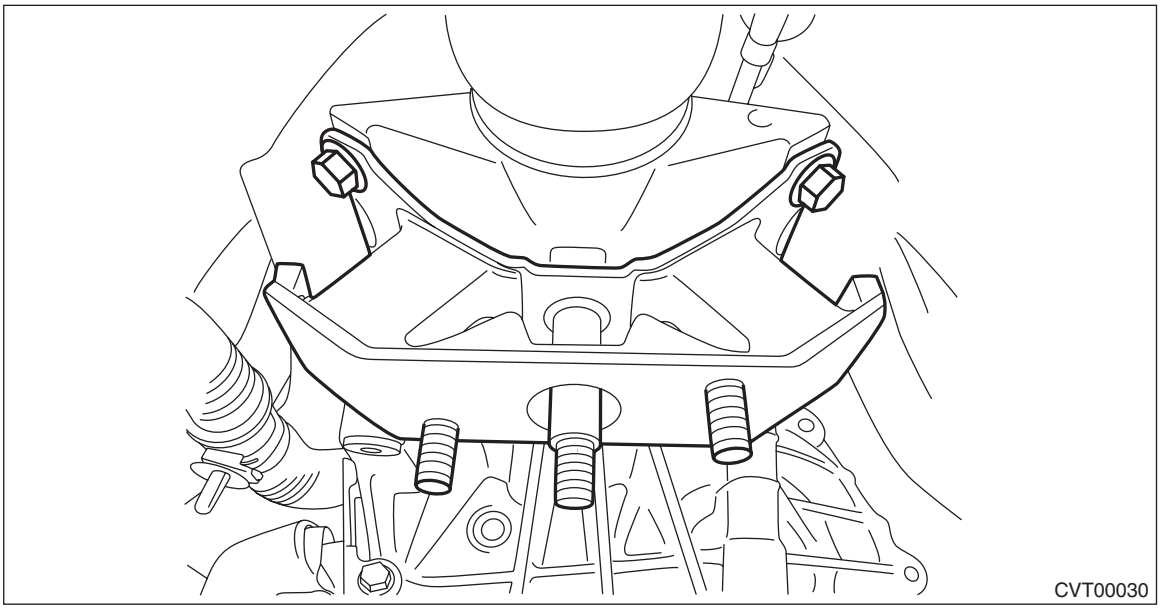

CVT00021

5) Set the transmission jack under the transmission.

NOTE:
Make sure that the support plate of transmission jack does not touch the oil pan.
6) Release the clip of the electric oil pump cable from the transmission rear crossmember, and remove the transmission rear crossmember.


CVT00432

7) Remove the rear cushion rubber.

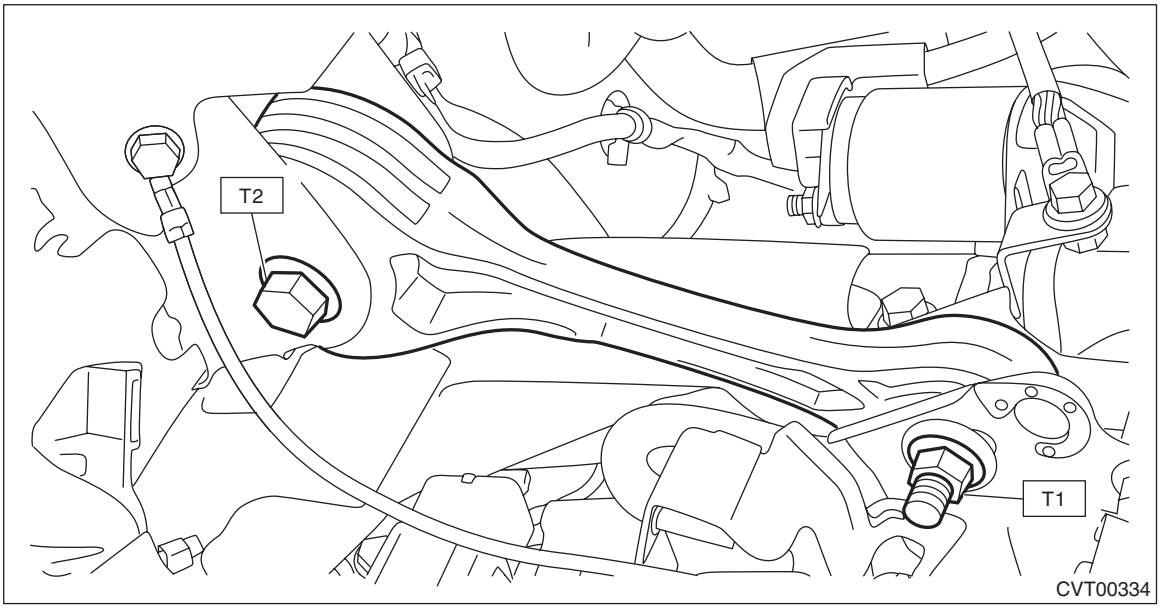


B: INSTALLATION

1. PITCHING STOPPER

1) Install the pitching stopper.

Tightening torque:
T1: 50 N·m (5.1 kgf-m, 36.9 ft-lb)
T2: 58 N·m (5.9 kgf-m, 42.8 ft-lb)



2) Install the air cleaner case. <Ref. to IN(H4DO(HEV))-8, INSTALLATION, Air Cleaner Case.>
3) Install the collector cover.
4) Install the 12 volt auxiliary battery ground terminal and ground terminal to the 12V engine restart battery sensor of the 12 volt engine restart battery. <Ref. to NT-5, BATTERY, NOTE, Note.>

2. TRANSMISSION REAR CROSSMEMBER AND REAR CUSHION RUBBER

1) Attach the rear cushion rubber to the transmission.

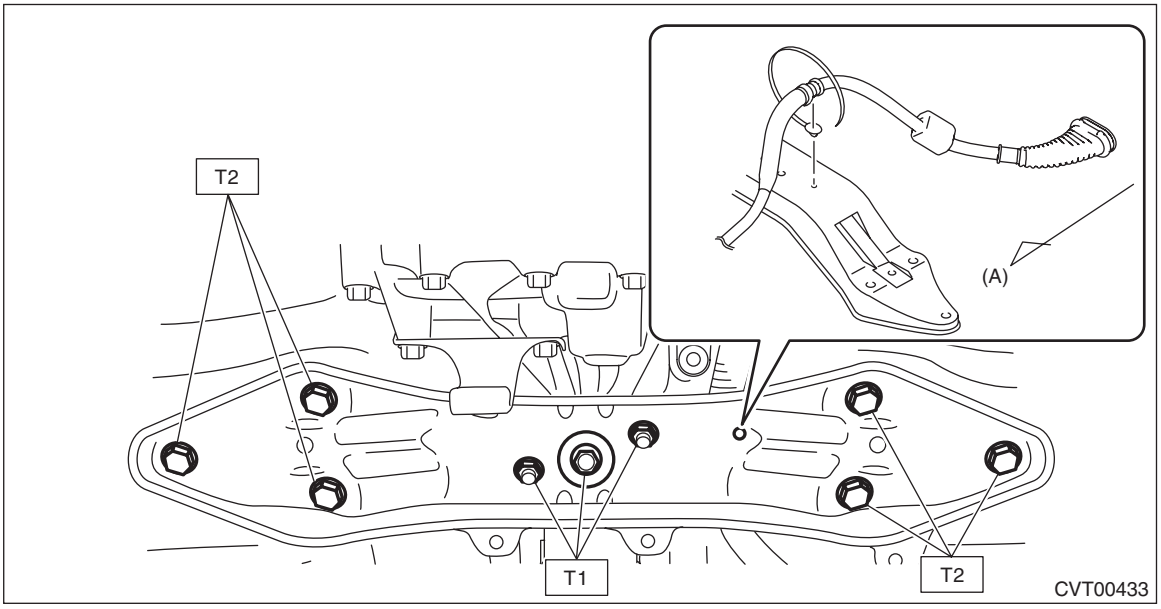
Tightening torque:
40 N·m (4.1 kgf-m, 29.5 ft-lb)

2) Attach the transmission rear crossmember, and install the electric oil pump harness clip to the transmission rear crossmember.

CAUTION:
- **Be careful not to damage the electric oil pump harness.**
- **Be careful not to pinch the harness.**

NOTE:
- If the electric oil pump harness clip is damaged, replace the harness clip.
- When replacing the electric oil pump harness clip, install the harness clip as shown in the figure.

Tightening torque:
T1: 35 N·m (3.6 kgf-m, 25.8 ft-lb)
T2: 70 N·m (7.1 kgf-m, 51.6 ft-lb)



(A) Front side of vehicle

3) Remove the transmission jack.
4) Install the center exhaust cover.

Tightening torque:
18 N·m (1.8 kgf-m, 13.3 ft-lb)

5) Install the center exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-15, INSTALLATION, Center Exhaust Pipe.>
6) Install the 12 volt auxiliary battery ground terminal and ground terminal to the 12V engine restart battery sensor of the 12 volt engine restart battery. <Ref. to NT-5, BATTERY, NOTE, Note.>

C: INSPECTION

- Check the crossmember for bends or damage.
- Check that the cushion rubber is not stiff, cracked or otherwise damaged.
- Check the pitching stopper for bends or damage.

13.AWD Warning Light Display

A: OPERATION

AWD light illuminates or blinks, when the AWD is in special control condition and AWD has malfunction.

- At normal condition

AWD light always illuminates when the ignition switch is ON (engine OFF). Light goes off after two seconds from engine ON.

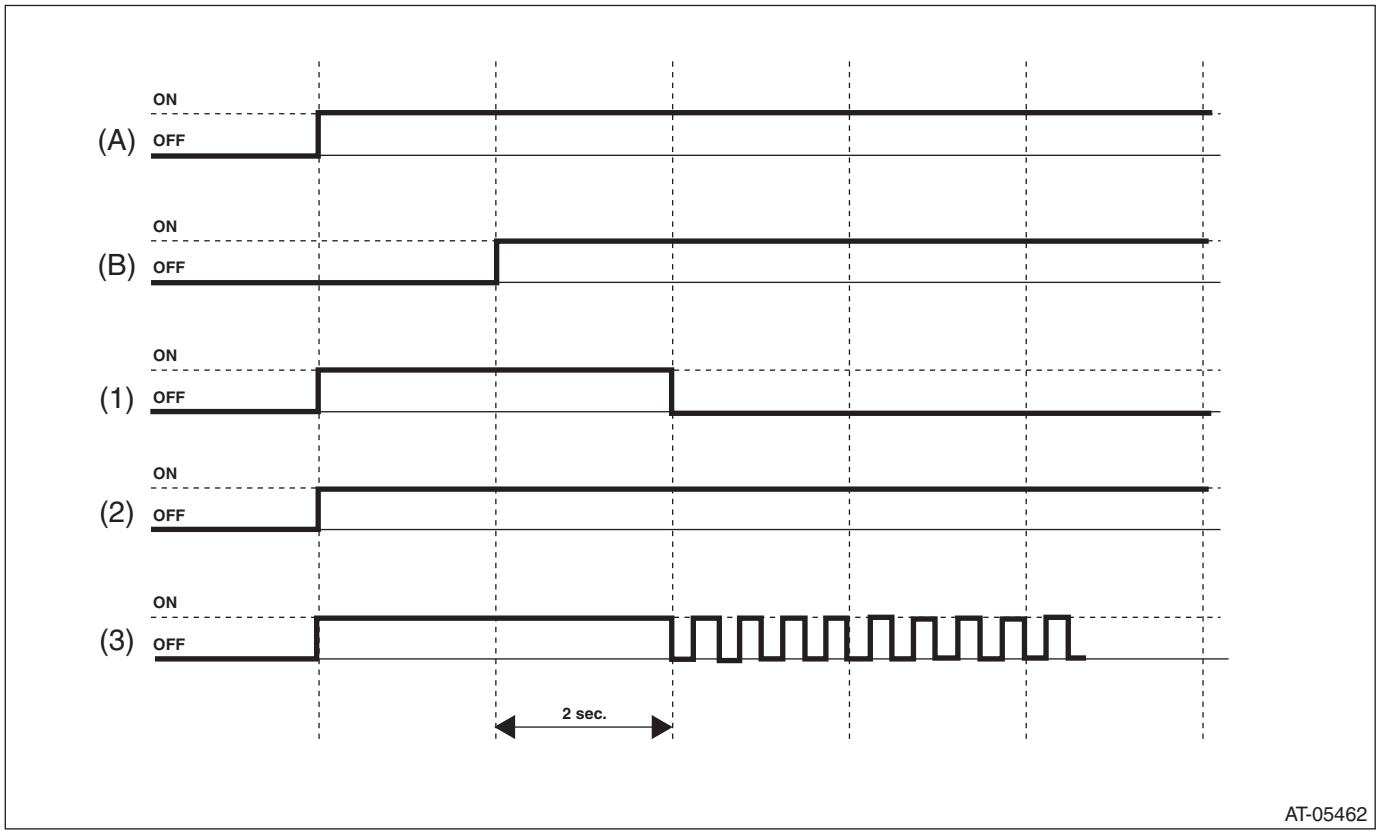
- When FF mode is selected

AWD light illuminates, when the AWD ON/OFF switching function is “FF mode” with engine ON.

- When malfunction is detected

AWD light blinks at 2 Hz when any of following malfunctions are detected.

1. When tire with different diameter is installed, or air pressure of any of four wheels is excessively low
2. When “Rear differential inspection mode” is judged as NG <Ref. to DI-63, Rear Differential Inspection Mode.>



(A) Ignition switch condition (B) Engine condition

(1) At normal condition (2) When FF mode is selected (3) When malfunction is detected

If the AWD light does not illuminate, or illumination patterns are not as above, check the AWD light circuit. <Ref. to CVT(HEV)(diag)-31, INSPECTION, AWD Warning Light Display.>

B: INSPECTION

DIAGNOSIS:

- AWD light circuit is open or shorted.
- Combination meter malfunction
- TCM is in AWD special control mode.

TROUBLE SYMPTOM:

- When the ignition switch is turned to ON, the AWD light does not illuminate.
- AWD light remains lit after engine start.
- AWD light is blinking immediately after engine start.

	Step	Check	Yes	No
1	**CHECK AWD LIGHT.** Turn the ignition switch to ON.	Does the AWD light illuminate?	Go to step **2**.	Perform the self-diagnosis of combination meter. <Ref. to IDI-8, SELF-DIAGNOSIS DISPLAY MODE, OPERATION, Combination Meter System.>
2	**CHECK AWD LIGHT.** Start the engine.	Does AWD light go off after two seconds from engine start?	Current condition is normal. Go back to Basic Diagnostic Procedure. <Ref. to CVT(HEV)(diag)-2, Basic Diagnostic Procedure.>	Go to step **3**.
3	**CHECK DTC.** Read the DTC relating the TCM using the Subaru Select Monitor.	Is DTC displayed?	Perform the diagnosis according to DTC.	Go to step **4**.
4	**CHECK AWD LIGHT.** Check the display of AWD light after engine start.	Is AWD light illuminating?	Go to step **6**.	Go to step **5**.
5	**CHECK AWD LIGHT.** Check the display of AWD light after engine start.	Is AWD light blinking at 2 Hz?	Go to step **7**.	Go to step **8**.
6	**CHECK AWD ON/OFF SWITCHING FUNCTION.** Using the Subaru Select Monitor, select the {AWD ON/OFF switching mode} in {Maintenance mode} from «Work Support», and check the current mode. <Ref. to CVT(TH58A)-49, AWD ON/OFF Switching Mode.>	Is the message «At present, the vehicle is in AWD. Switch to FF?» displayed?	Go to step **8**.	If the message «At present, the vehicle is in FF. Switch to AWD?» is displayed, select “OK”, and switch to AWD mode.
7	**CHECK REAR DIFFERENTIAL.** Using the Subaru Select Monitor, select {Rear differential inspection mode} in {Maintenance mode} from «Work Support», and check. <Ref. to DI-63, Rear Differential Inspection Mode.>	Does AWD light go off after inspection is finished normally?	Current condition is normal. Go back to Basic Diagnostic Procedure. <Ref. to CVT(HEV)(diag)-2, Basic Diagnostic Procedure.>	Go to step **8**.
8	**CHECK COMBINATION METER.** Perform the self-diagnosis of combination meter. <Ref. to IDI-8, SELF-DIAGNOSIS DISPLAY MODE, OPERATION, Combination Meter System.>	Is there any trouble with the combination meter?	Repair the combination meter.	Replace the TCM. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>

13.Extension Case Oil Seal

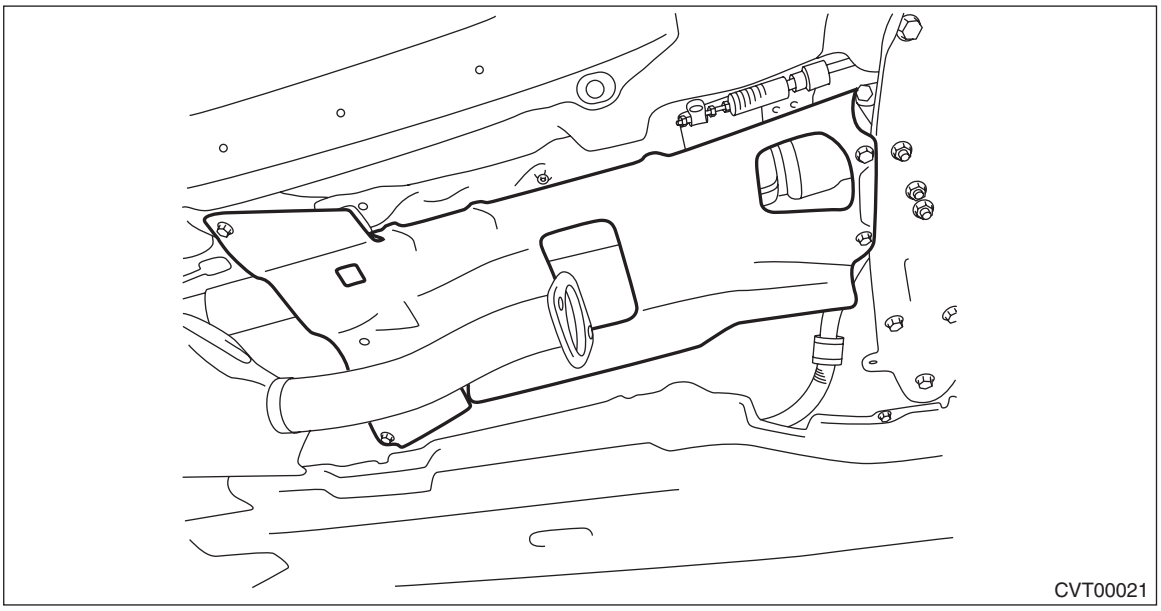
A: INSPECTION

Check for leakage of CVTF from the joint section of transmission and propeller shaft. If a leak is found, inspect the propeller shaft and replace the oil seal.

B: REPLACEMENT

CAUTION:
Immediately after the vehicle has been running or after idling for a long time, the CVTF will be hot. Be careful not to burn yourself.

1) Lift up the vehicle.
2) Remove the center exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-14, REMOVAL, Center Exhaust Pipe.>
3) Remove the center exhaust cover.



4) Clean the transmission exterior.
5) Remove the propeller shaft. <Ref. to DS-12, REMOVAL, Propeller Shaft.>
6) Using a screwdriver or ST, remove the oil seal trying not to damage the extension case.
ST 398527700 PULLER ASSY
7) Using the ST, install the oil seal.

NOTE:
- Use a new oil seal.
- Apply CVTF to the oil seal lip and press-fitting surface.

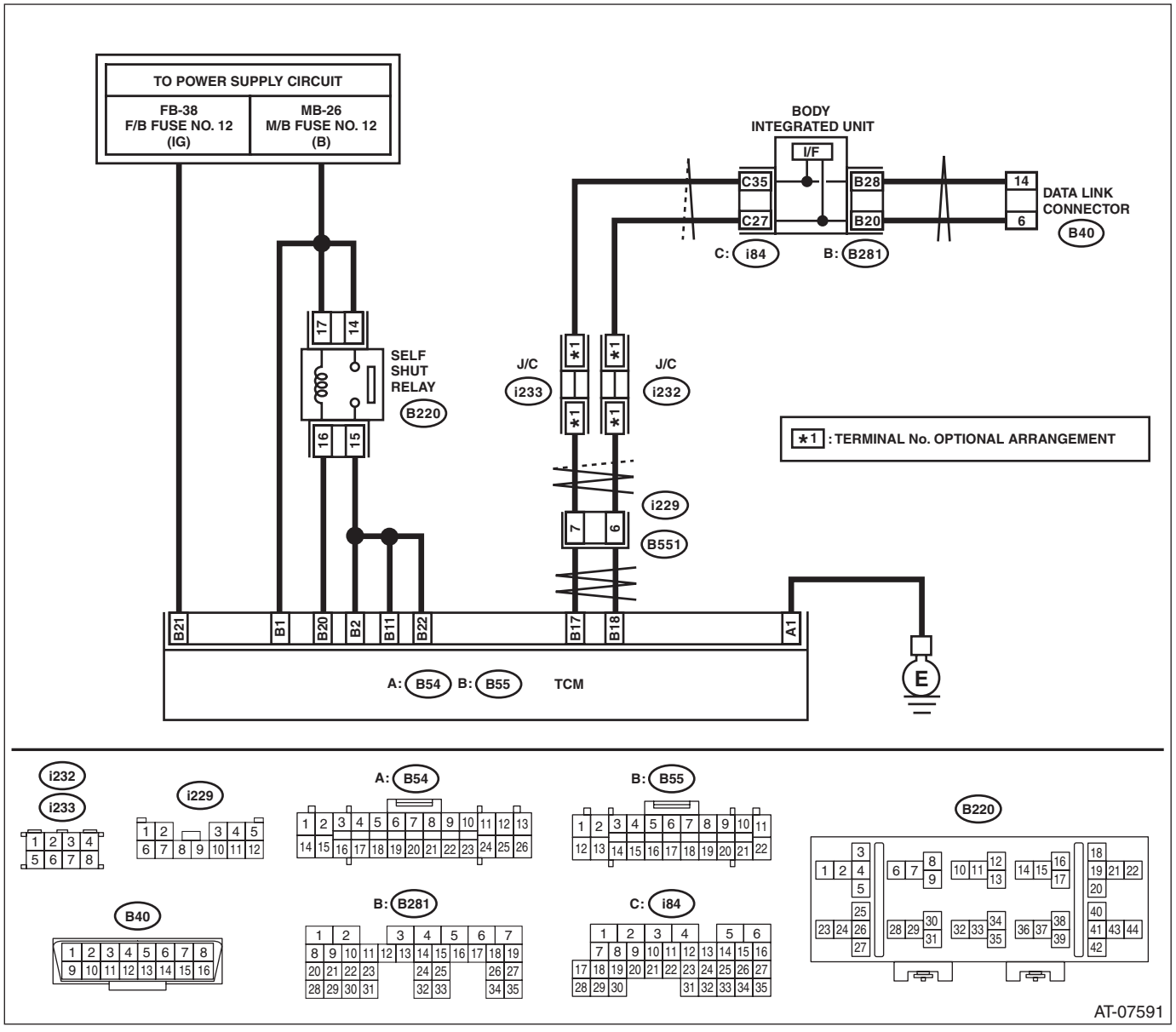
ST 498057300 OIL SEAL INSTALLER
8) Install the propeller shaft. <Ref. to DS-13, INSTALLATION, Propeller Shaft.>
9) Install the center exhaust cover.

Tightening torque:
18 N·m (1.8 kgf-m, 13.3 ft-lb)
10) Install the center exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-15, INSTALLATION, Center Exhaust Pipe.>
11) Adjust the CVTF level and check there is no leakage. <Ref. to CVT(TH58A)-41, ADJUSTMENT, CVTF.>

14.Diagnostic Procedure for Subaru Select Monitor Communication

A: COMMUNICATION FOR INITIALIZING IMPOSSIBLE

DIAGNOSIS:
Defective harness connector
TROUBLE SYMPTOM:
Subaru Select Monitor communication failure
WIRING DIAGRAM:
CVT control system <Ref. to WI(HEV)-86, CVT Control System.>



	Step	Check	Yes	No
1	**CHECK IGNITION SWITCH.**	Is the ignition switch ON?	Go to step **2**.	Turn the ignition switch to ON, and select the transmission mode using the Subaru Select Monitor.
2	**CHECK BATTERY.** 1) Turn the ignition switch to OFF. 2) Measure the battery voltage.	Is the voltage 11 V or more?	Go to step **3**.	Charge or replace the battery.
3	**CHECK BATTERY TERMINAL.**	Is there poor contact at battery terminal?	Repair or tighten the battery terminal.	Go to step **4**.
4	**CHECK INSTALLATION OF TCM CONNECTOR.** Turn the ignition switch to OFF.	Is the TCM connector inserted into the TCM until the clamp locks?	Go to step **5**.	Insert the TCM connector to TCM.
5	**CHECK LAN SYSTEM.** Perform the diagnosis for LAN system. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>	Is there any fault in LAN system?	Perform the diagnosis according to DTC for LAN system. <Ref. to LAN(HEV)(diag)-87, List of Diagnostic Trouble Code (DTC).>	Go to step **6**.
6	**CHECK SUBARU SELECT MONITOR COMMUNICATION.** 1) Turn the ignition switch to ON. 2) Check whether communication to transmission system can be executed normally.	Is the system name displayed on Subaru Select Monitor?	Check DTC of TCM. <Ref. to CVT(HEV)(diag)-19, Read Diagnostic Trouble Code (DTC).>	Go to step **7**.
7	**CHECK POWER SUPPLY CIRCUIT.** 1) Turn the ignition switch to ON. (engine OFF) 2) Measure the ignition power supply voltage between TCM connector and chassis ground. ***Connector & terminal*** ***(B55) No. 1 (+) — Chassis ground (–):*** ***(B55) No. 2 (+) — Chassis ground (–):*** ***(B55) No. 11 (+) — Chassis ground (–):*** ***(B55) No. 21 (+) — Chassis ground (–):*** ***(B55) No. 22 (+) — Chassis ground (–):***	Is the voltage 10 — 13 V?	Go to step **8**.	Repair the open circuit of harness between TCM and battery.
8	**CHECK HARNESS CONNECTOR BETWEEN TCM AND CHASSIS GROUND.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from TCM. 3) Measure the resistance of harness between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 1 — Chassis ground:***	Is the resistance less than 10 Ω?	Go to step **9**.	Repair the open circuit of the TCM ground circuit and poor contact of connector.
9	**CHECK POOR CONTACT OF CONNECTOR.**	Is there poor contact of control module power supply, ground circuit and data link connector?	Repair the connector.	Replace the TCM. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>

14.Differential Side Retainer Oil Seal

A: INSPECTION

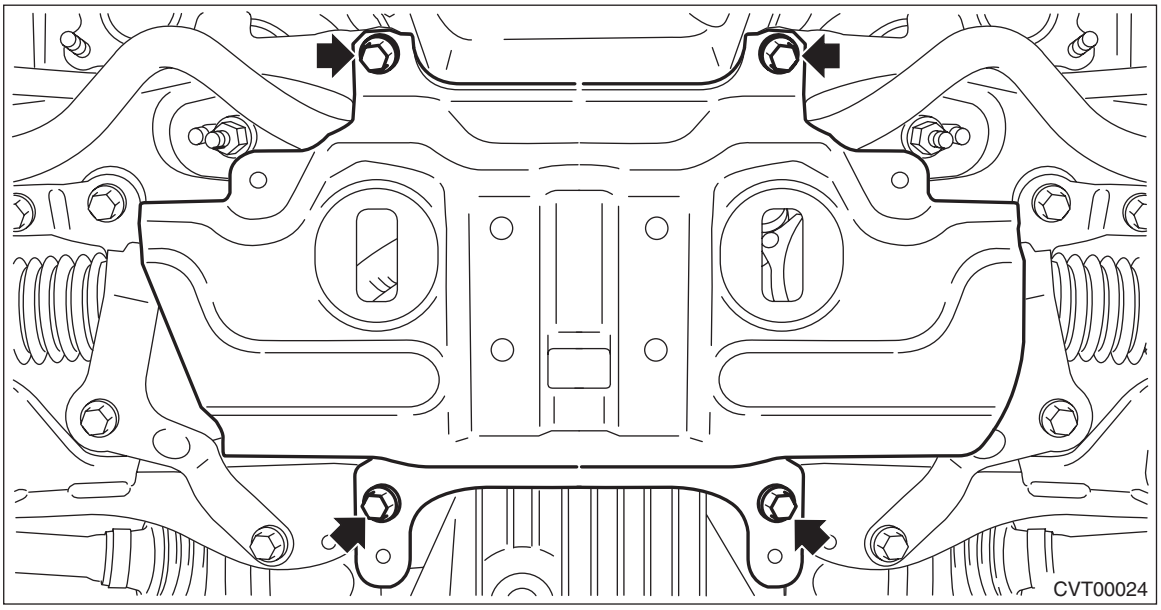
Check for leakage of gear oil from differential side retainer oil seal part. If there is an oil leak, inspect the front drive shaft and replace the oil seal.

B: REPLACEMENT

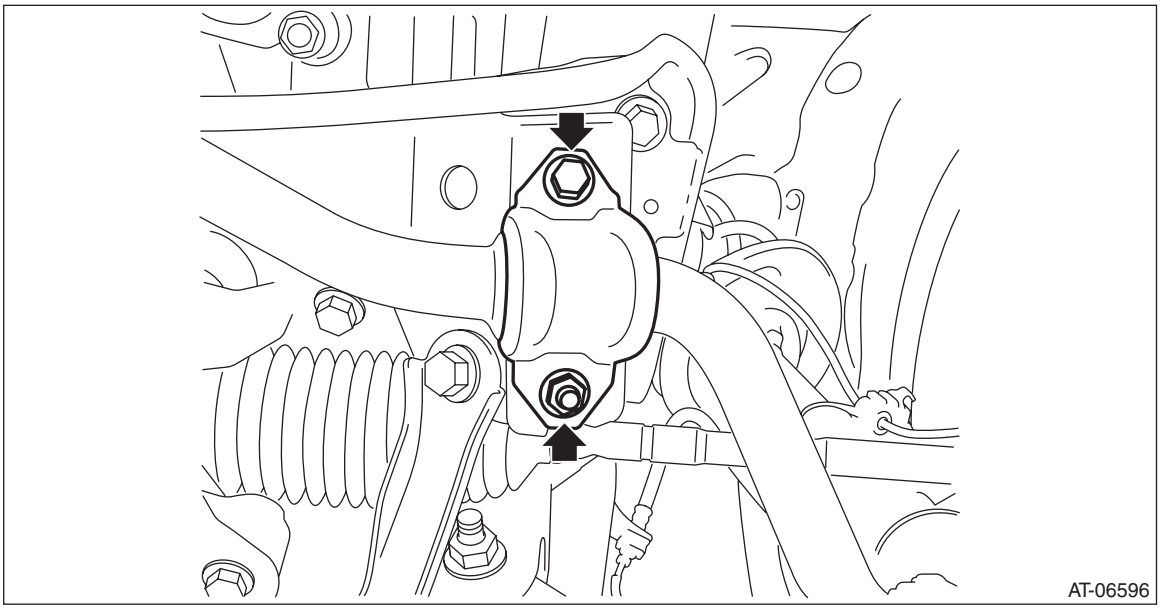
CAUTION:
• Immediately after the vehicle has been running or after idling for a long time, the differential gear oil will be hot. Be careful not to burn yourself.
• Be careful not to spill the differential gear oil on exhaust pipe to prevent it from emitting smoke or fire. If differential gear oil is spilled on the exhaust pipe, wipe it off completely.
1) Remove the front tires. <Ref. to WT-4, REMOVAL, Tire and Wheel.>
2) Remove the center exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-14, REMOVAL, Center Exhaust Pipe.>
3) Drain differential gear oil. <Ref. to CVT(TH58A)-47, REPLACEMENT, Differential Gear Oil.>
4) Tighten the differential gear oil drain plug.

NOTE:
Use a new gasket.

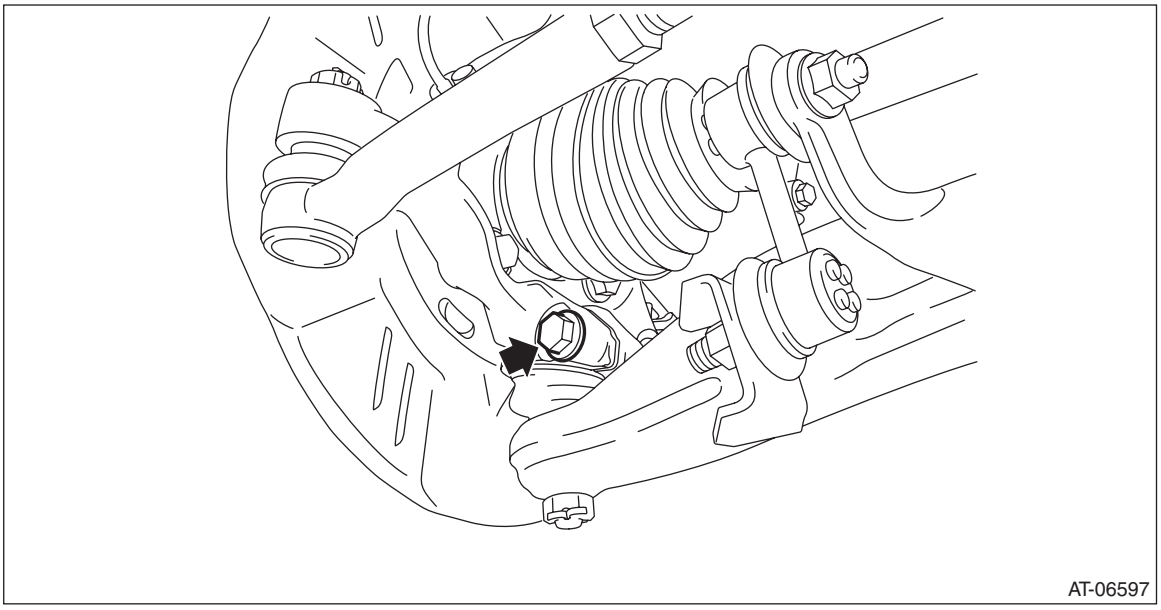
Tightening torque:
70 N·m (7.1 kgf-m, 51.6 ft-lb)
5) Remove the jack-up plate.



6) Remove the stabilizer bracket.



7) Remove the bolts which secure to the front housing, and separate the front arm and housing.



8) Using a crowbar, etc., pull out until the front drive shaft transmission side joint slides move smoothly.

NOTE:
Place cloth between the crowbar and the transmission in order to avoid damaging the transmission side retainer.

9) Hold the transmission side joint of the front drive shaft by hand and extract the housing from the transmission while pressing the housing outward, so as not to stretch the boot.

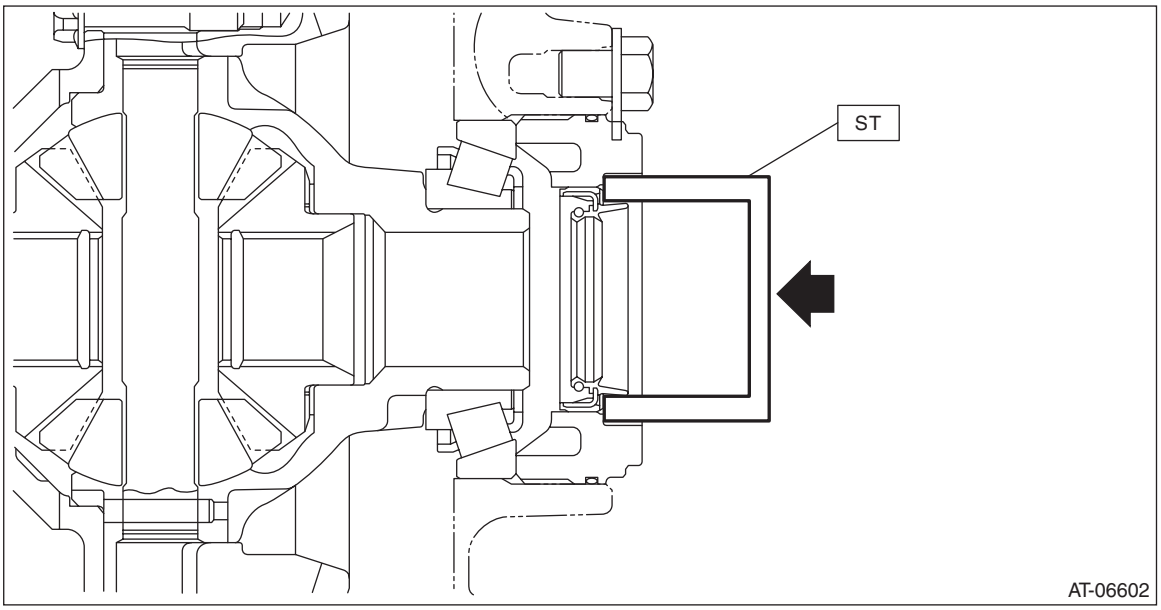
NOTE:
- Before pulling RH front drive shaft from transmission, turn the steering wheel to left hand full lock.
- Before pulling LH front drive shaft from transmission, turn the steering wheel to right hand full lock.

10) Remove the differential side retainer oil seal using driver wrapped with vinyl tape etc.

11) Using the ST, install the differential side retainer oil seal by lightly tapping with a hammer.

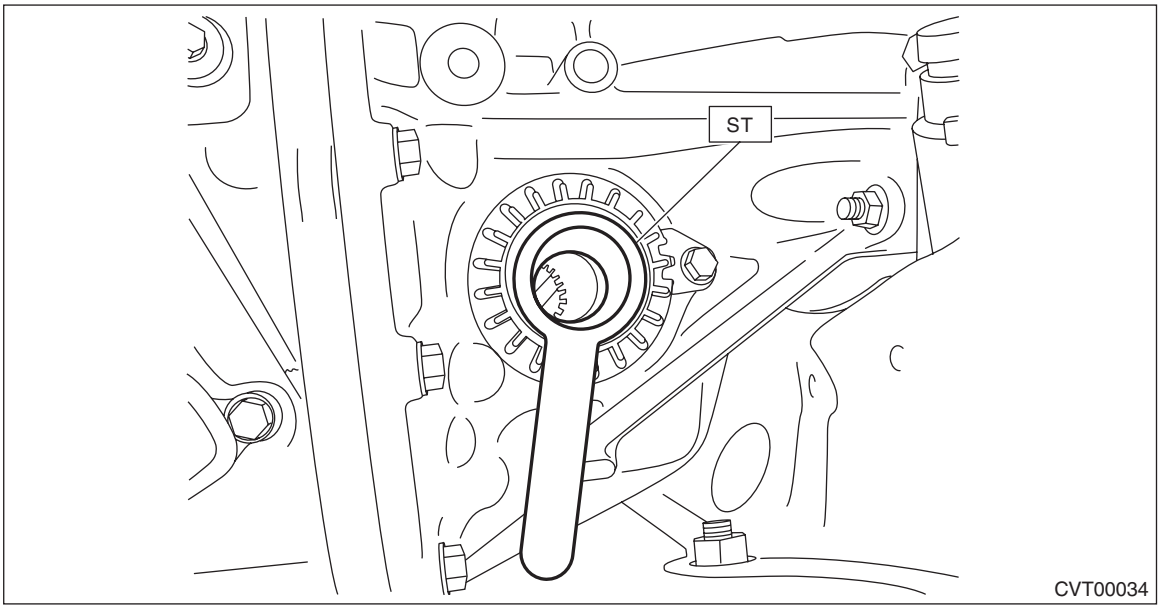
NOTE:
- Apply differential gear oil to the lip surface, so that the oil seal lip is not deformed.
- Apply differential gear oil to the press-fitting surface of oil seal and the differential side retainer.
- Oil seal has an identification mark (R, L). When installing oil seals, do not confuse the left and right.

ST 18675AA000 DIFFERENTIAL SIDE OIL SEAL INSTALLER



12) Set the ST to side retainer.

ST 28399SA010 OIL SEAL PROTECTOR



13) Replace the circlip of the drive shaft with a new part.
14) Apply grease to the side retainer oil seal lip.
15) Insert the front drive shaft spline section into transmission and remove the ST (DIFFERENTIAL SIDE OIL SEAL INSTALLER).

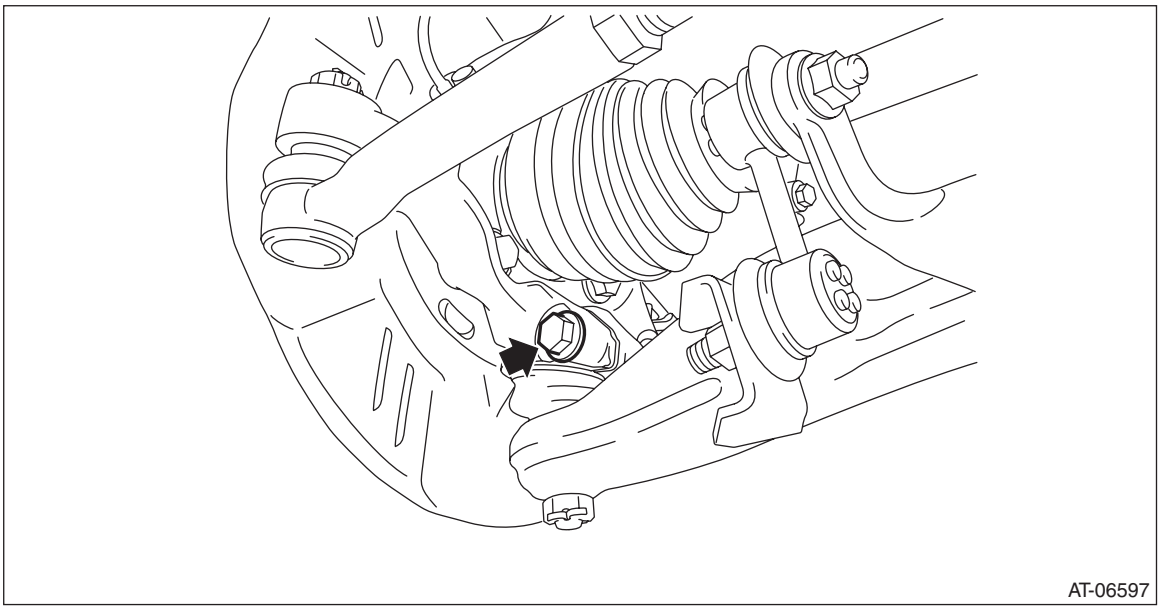
NOTE:
- Before inserting RH front drive shaft into transmission, turn the steering wheel to left hand full lock.
- Before inserting LH front drive shaft into transmission, turn the steering wheel to right hand full lock.

16) Insert the drive shaft into the transmission securely by pressing the housing from outside of the vehicle.

17) Insert the ball joint into housing and secure with bolt.

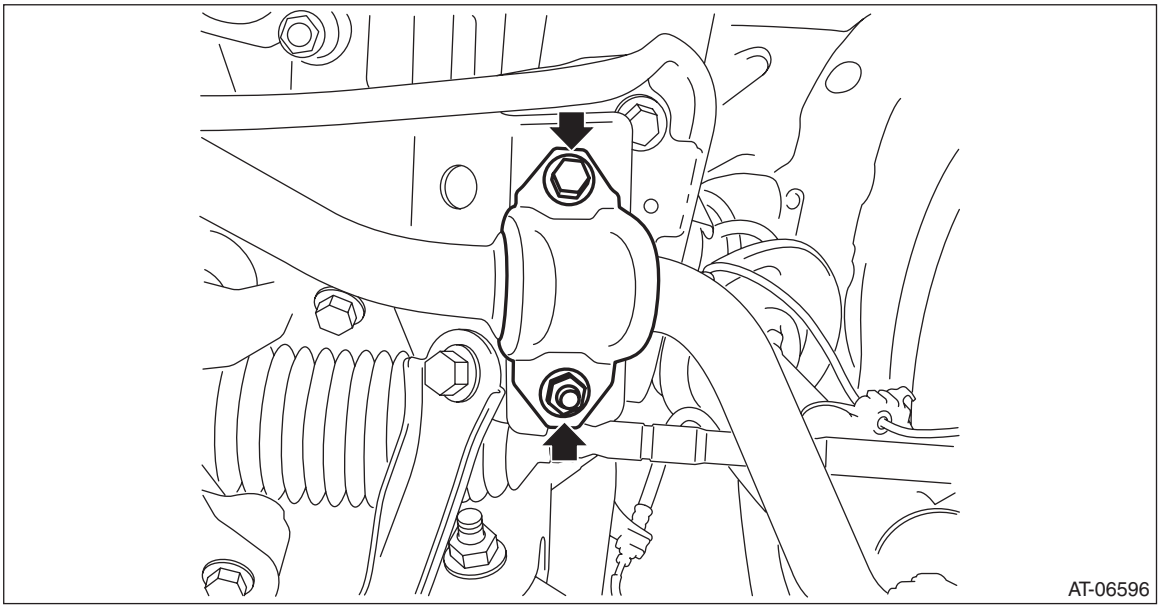
Tightening torque:
50 N·m (5.1 kgf-m, 36.9 ft-lb)

CAUTION:
- **Do not apply grease to the tapered portion of ball stud.**
- **Before tightening, make sure the lower side of housing and stepped section of ball joint are in contact.**



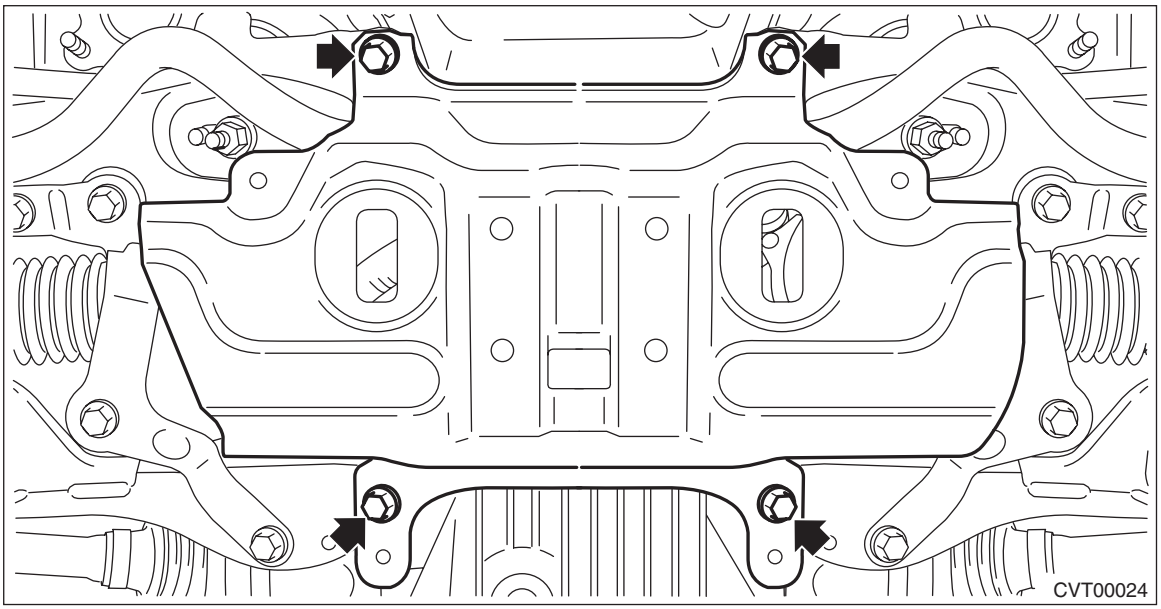
18) Install the stabilizer bracket.

Tightening torque:
25 N·m (2.5 kgf-m, 18.4 ft-lb)



19) Install the jack-up plate.

Tightening torque:
60 N·m (6.1 kgf-m, 44.3 ft-lb)



20) Install the center exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-15, INSTALLATION, Center Exhaust Pipe.>
21) Fill differential gear oil. <Ref. to CVT(TH58A)-45, Differential Gear Oil.>
22) Adjust the differential gear oil level, and check for leakage. <Ref. to CVT(TH58A)-45, ADJUSTMENT, Differential Gear Oil.>
23) Install the front tires. <Ref. to WT-4, INSTALLATION, Tire and Wheel.>

15.Inhibitor Switch

A: INSPECTION

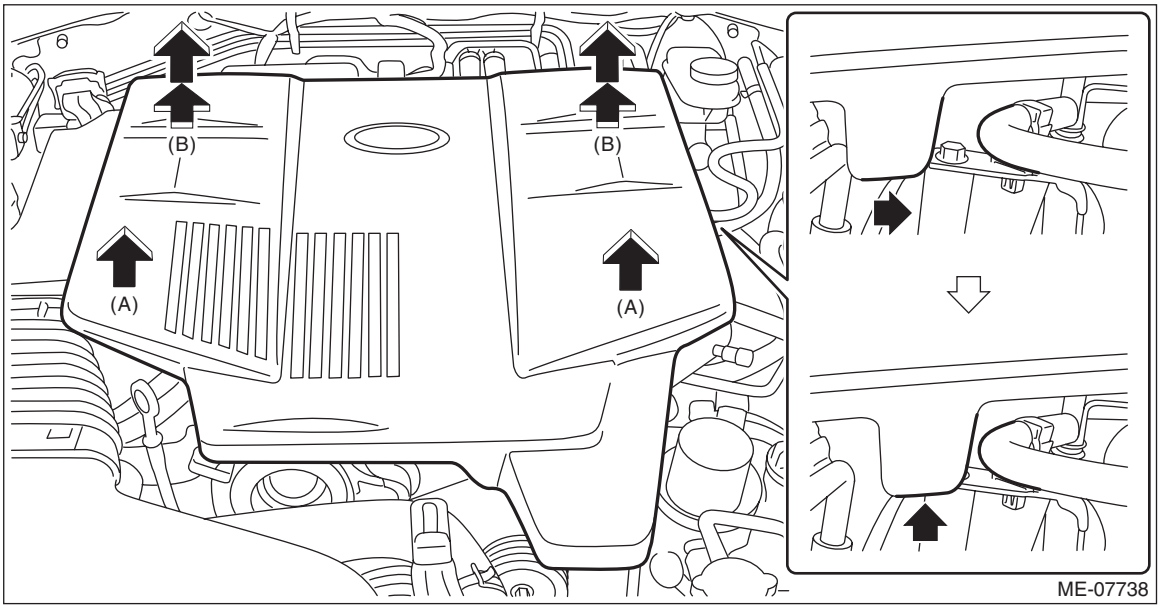
When the driving condition or starter motor operation is improper, first check the shift linkage for improper operation. If the shift linkage is functioning properly, check the inhibitor switch.

1) Disconnect the ground cable from battery. <Ref. to NT-5, BATTERY, NOTE, Note.>

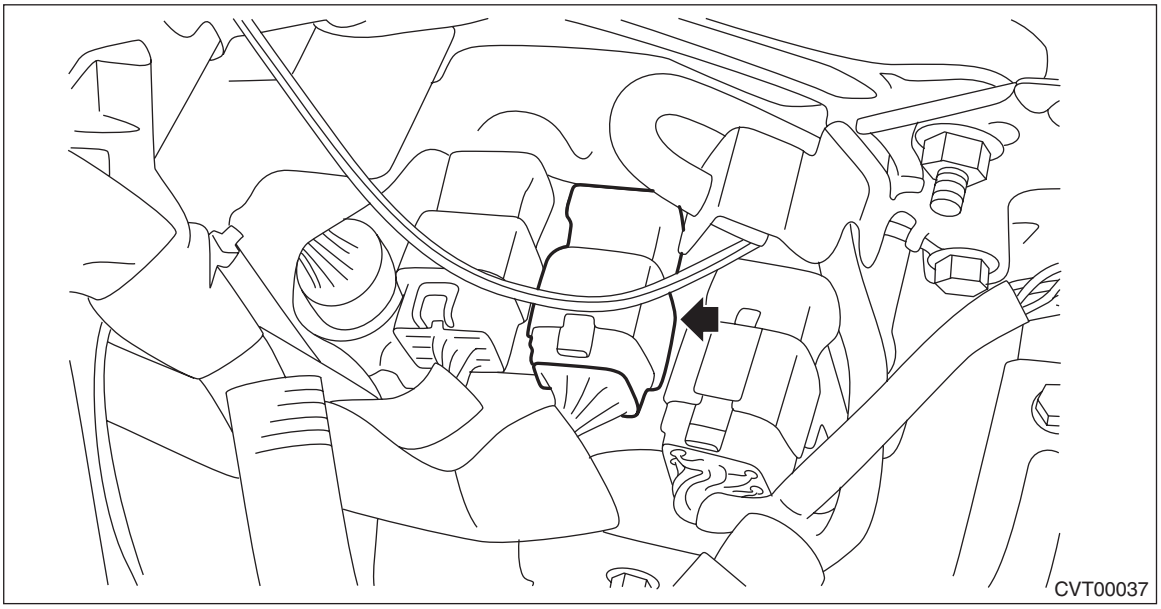
NOTE:
For the 12 volt engine restart battery, disconnect the ground terminal from 12V engine restart battery sensor.

2) Remove the collector cover.
   (1) Carefully pull up the front of collector cover at two positions (A).
   (2) Carefully pull up the rear of collector cover at two positions (B) while moving it backward.

NOTE:
Be careful not to contact the fuel delivery tube when moving the collector cover rearward.



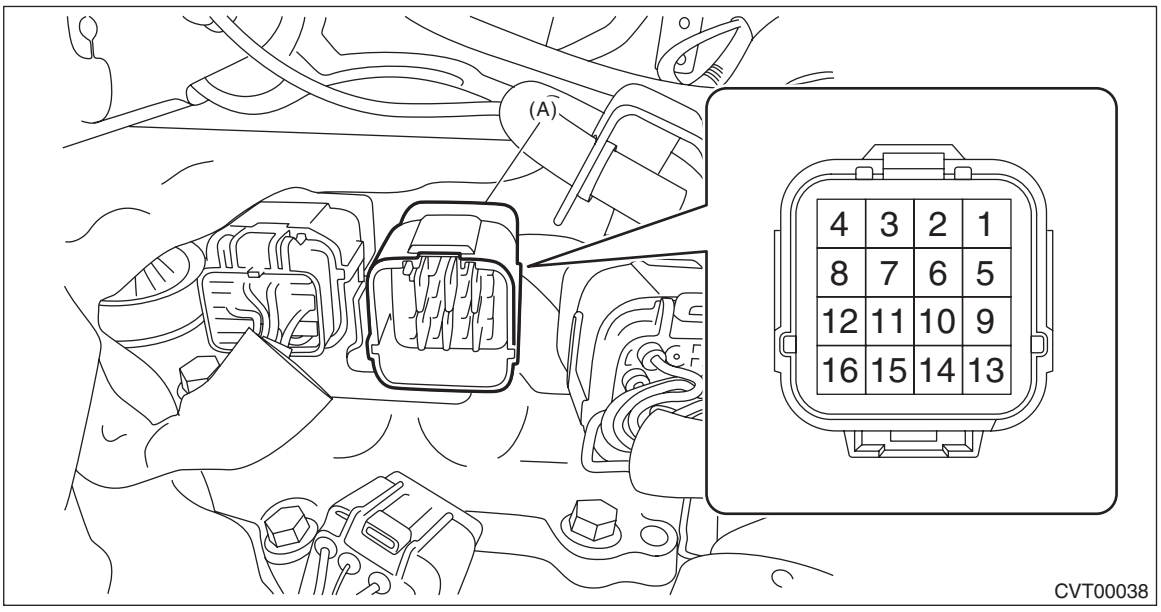
3) Remove the air cleaner case. <Ref. to IN(H4DO(HEV))-6, REMOVAL, Air Cleaner Case.>
4) Disconnect the inhibitor harness connector.



5) Check for continuity in inhibitor switch circuit by shifting the select lever in “P”, “R”, “N” and “D” respectively.

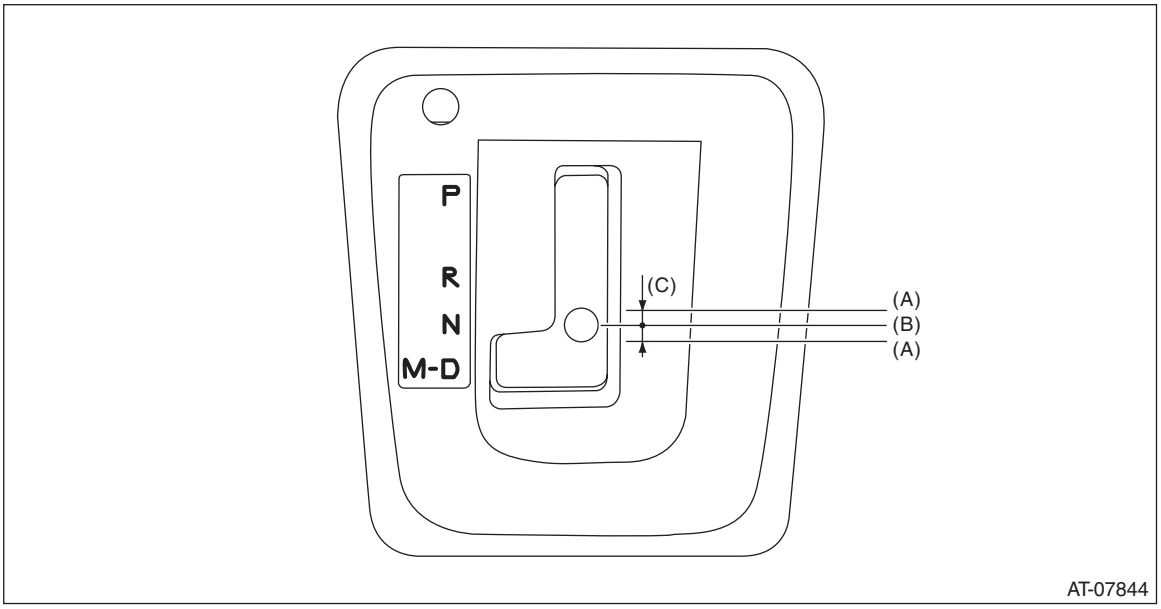
NOTE:
- Check that there is no continuity in the starter circuit when the select lever is in the “R” and “D” ranges.
- When inhibitor switch is normal, check there is no poor contact in vehicle side connector and no open circuit in harness.

	Range	Terminal No.
Signal sent to TCM	P	1 — 7
	R	2 — 7
	N	3 — 7
	D	4 — 7
Starter circuit	P/N	15 — 16
Back-up light circuit	R	13 — 14



(A) Inhibitor harness connector

6) Check that there is continuity at equal points when the select lever is moved 1.5° in both directions from the “N” range.
If there is continuity in only one direction or in other points, adjust the inhibitor switch. <Ref. to CVT(TH58A)-100, ADJUSTMENT, Inhibitor Switch.>

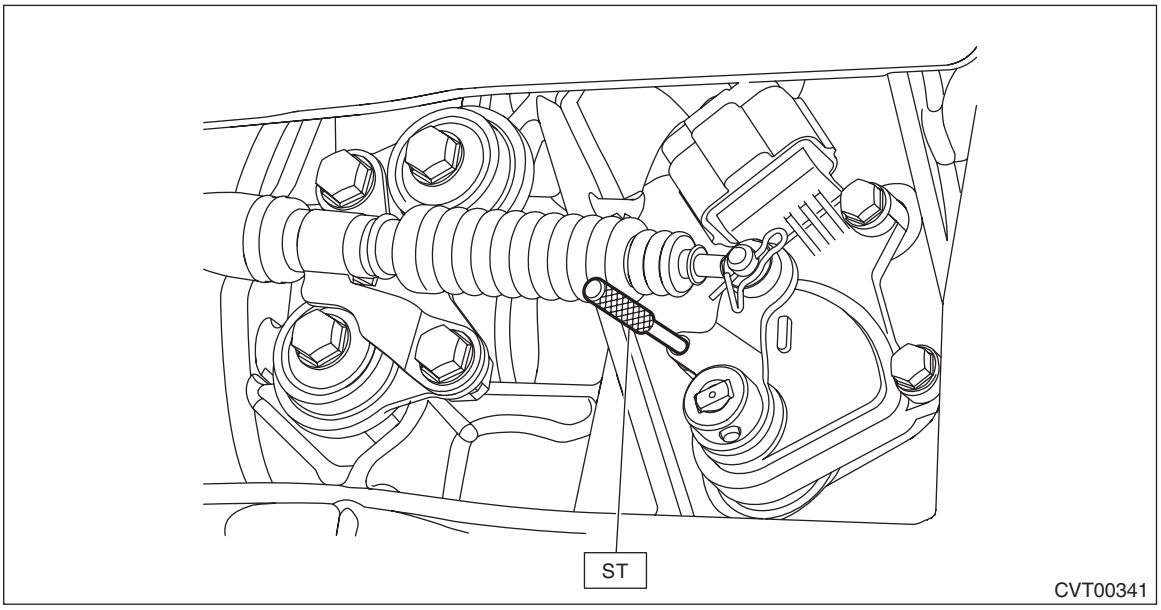


(A) Continuity does not exist.
(B) Continuity exists.
(C) 1.5°

7) Repeat the above inspection in other gear ranges. If there is fault, adjust the inhibitor switch and select cable. <Ref. to CVT(TH58A)-100, ADJUSTMENT, Inhibitor Switch.> <Ref. to CS-57, ADJUSTMENT, Select Cable.>

B: ADJUSTMENT

1) Shift the select lever to “N” range.
2) Loosen the two bolts holding the inhibitor switch.
3) Insert the ST vertically into the holes of the shifter arm and switch body.
ST 499267300 STOPPER PIN



4) Tighten the two bolts holding the inhibitor switch.

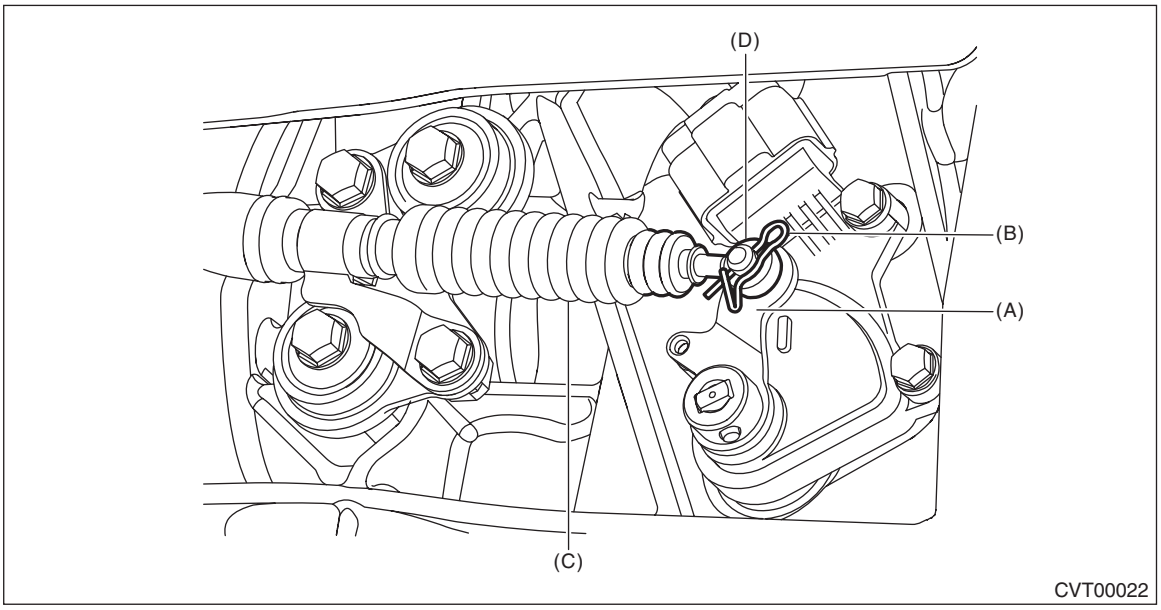
Tightening torque:
5 N·m (0.5 kgf-m, 3.7 ft-lb)

5) Repeat the inspection of the inhibitor switch. If the inhibitor switch is determined to be “faulty”, replace it.

C: REMOVAL

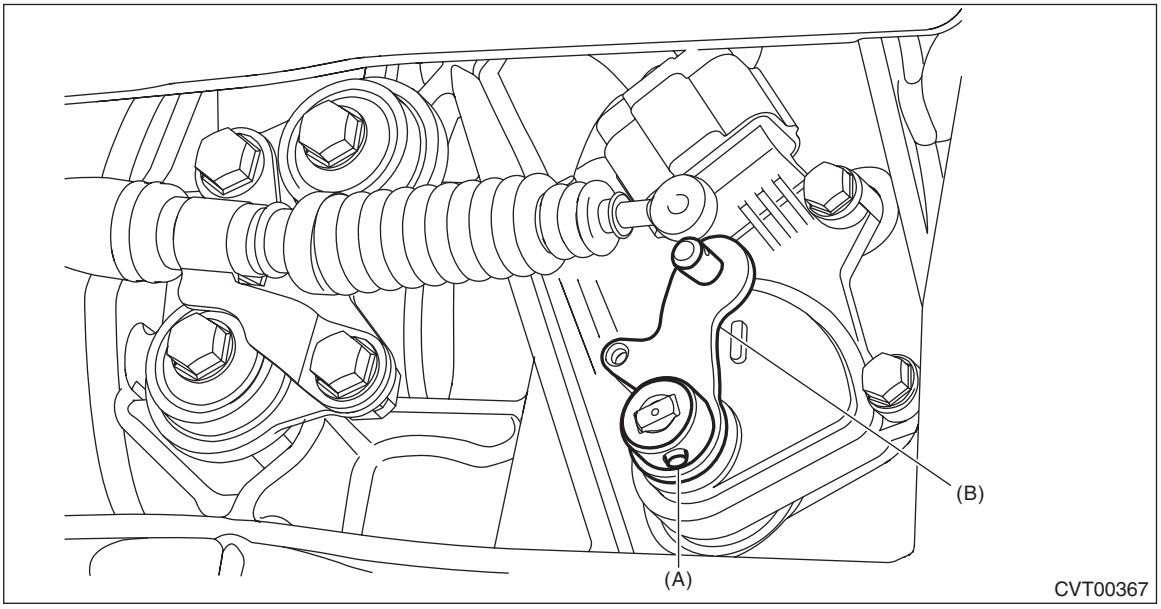
1) Disconnect the ground cable from battery. <Ref. to NT-5, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery, disconnect the ground terminal from 12V engine restart battery sensor.
2) Shift the select lever to “N” range.
3) Lift up the vehicle.
4) Remove the center exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-14, REMOVAL, Center Exhaust Pipe.>
5) Remove the snap pin and washer from the shifter arm.



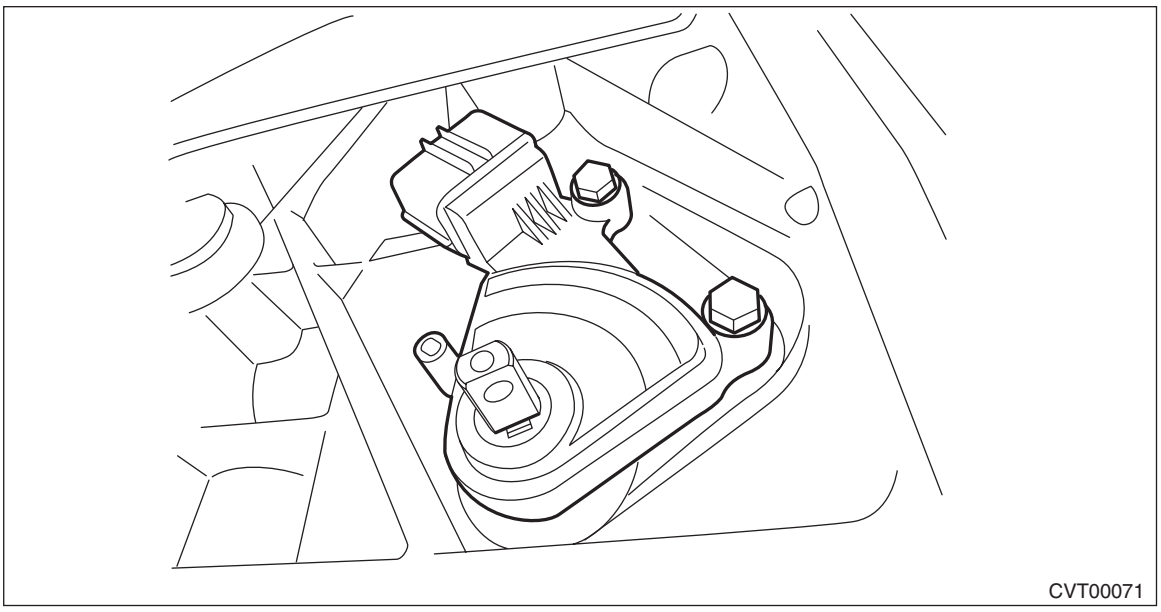
(A) Shifter arm
(B) Snap pin
(C) Select cable
(D) Washer

6) Remove the spring pin and shifter arm.



(A) Spring pin
(B) Shifter arm

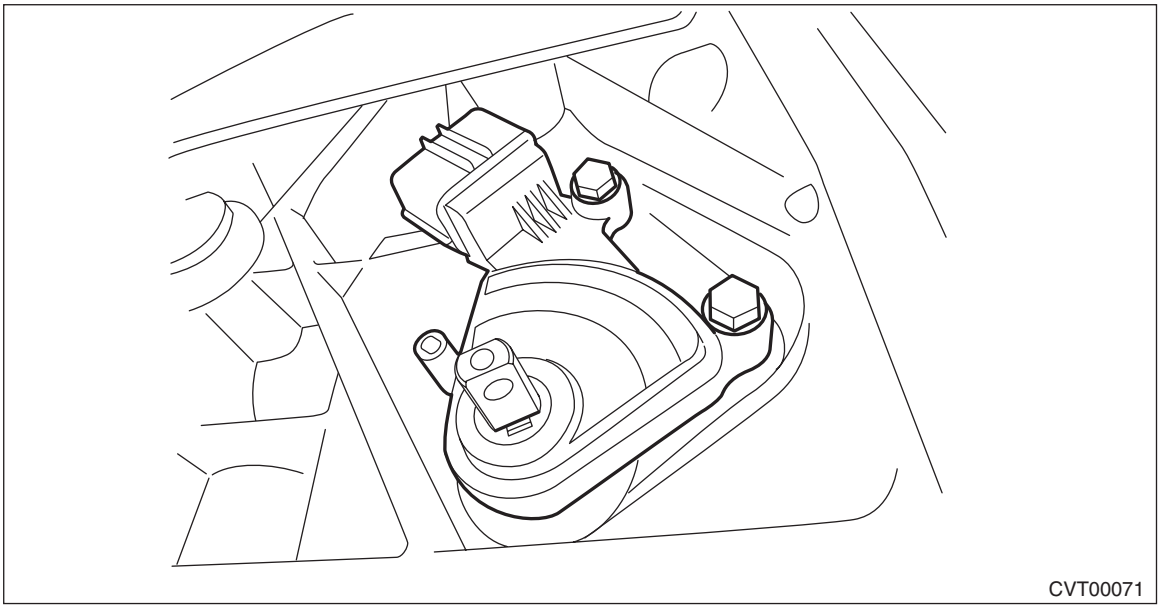
7) Remove the inhibitor harness connector from inhibitor switch.
8) Remove the two inhibitor switch securing bolts.



9) Remove the inhibitor switch from the transmission case.

D: INSTALLATION

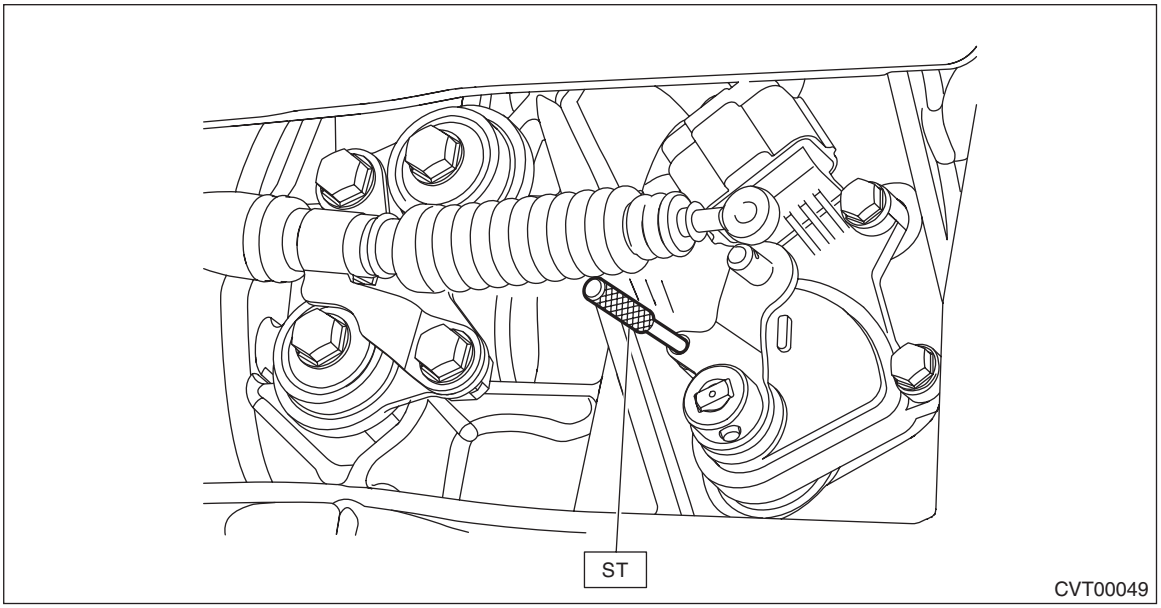
1) Install the inhibitor switch to the transmission case temporarily.



2) Connect the inhibitor harness connector to the inhibitor switch.
3) Install the shifter arm and fix with the spring pin.

NOTE:
Use new spring pin.
4) Shift the shifter arm to “N” range.

5) Install the ST vertically in the cutout of shifter arm and the hole of switch body.
ST 499267300 STOPPER PIN



6) Tighten the two bolts holding the inhibitor switch.

Tightening torque:
5 N·m (0.5 kgf-m, 3.7 ft-lb)

7) Install the select cable to the shifter arm.
8) Install the washer and snap pin to the shifter arm.
9) Install the center exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-15, INSTALLATION, Center Exhaust Pipe.>
10) Lower the vehicle.
11) Install the 12 volt auxiliary battery ground terminal and ground terminal to the 12V engine restart battery sensor of the 12 volt engine restart battery. <Ref. to NT-5, BATTERY, NOTE, Note.>
12) Check the inhibitor switch. <Ref. to CVT(TH58A)-97, INSPECTION, Inhibitor Switch.>

15.List of Diagnostic Trouble Code (DTC)

A: LIST

DTC	Item	Content of diagnosis	Reference
P0500	Vehicle Speed Sensor “A”	Data received from VDCCM&H/U is abnormal.	<Ref. to CVT(HEV)(diag)-42, DTC P0500 VEHICLE SPEED SENSOR “A”, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0560	System Voltage	Back-up voltage circuit is open or shorted.	<Ref. to CVT(HEV)(diag)-43, DTC P0560 SYSTEM VOLTAGE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0601	Internal Control Module Memory Checksum Error	TCM ROM is faulty.	<Ref. to CVT(HEV)(diag)-44, DTC P0601 INTERNAL CONTROL MODULE MEMORY CHECKSUM ERROR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0603	Internal Control Module Keep Alive Memory (KAM) Error	TCM backup RAM is faulty.	<Ref. to CVT(HEV)(diag)-44, DTC P0603 INTERNAL CONTROL MODULE KEEP ALIVE MEMORY (KAM) ERROR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0604	Internal Control Module Random Access Memory (RAM) Error	TCM RAM is faulty.	<Ref. to CVT(HEV)(diag)-45, DTC P0604 INTERNAL CONTROL MODULE RANDOM ACCESS MEMORY (RAM) ERROR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P062F	Internal Control Module EEPROM Error	TCM EEPROM is faulty.	<Ref. to CVT(HEV)(diag)-45, DTC P062F INTERNAL CONTROL MODULE EEPROM ERROR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0705	Transmission Range Sensor Circuit (PRNDL Input)	Inhibitor switch malfunction or short circuit	<Ref. to CVT(HEV)(diag)-46, DTC P0705 TRANSMISSION RANGE SENSOR CIRCUIT (PRNDL INPUT), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0708	AT Range Switch Not Inputted	Inhibitor switch malfunction or open circuit	<Ref. to CVT(HEV)(diag)-48, DTC P0708 AT RANGE SWITCH NOT INPUTTED, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0711	ATF Temp. Sensor Circuit Range/Performance	ATF temperature sensor is faulty or input signal circuit is faulty.	<Ref. to CVT(HEV)(diag)-50, DTC P0711 ATF TEMP. SENSOR CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0712	Transmission Fluid Temperature Sensor Circuit Low Input	ATF temperature sensor is faulty or input signal circuit is shorted.	<Ref. to CVT(HEV)(diag)-52, DTC P0712 TRANSMISSION FLUID TEMPERATURE SENSOR CIRCUIT LOW INPUT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0713	Transmission Fluid Temperature Sensor Circuit High Input	ATF temperature sensor is faulty or input signal circuit is open or shorted.	<Ref. to CVT(HEV)(diag)-54, DTC P0713 TRANSMISSION FLUID TEMPERATURE SENSOR CIRCUIT HIGH INPUT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0716	Torque Converter Turbine Speed	Turbine speed sensor characteristics is abnormal.	<Ref. to CVT(HEV)(diag)-56, DTC P0716 TORQUE CONVERTER TURBINE SPEED, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0717	Input/Turbine Speed Sensor "A" Circuit No Signal	Turbine speed sensor is faulty or input signal circuit is open or shorted.	<Ref. to CVT(HEV)(diag)-57, DTC P0717 INPUT/TURBINE SPEED SENSOR "A" CIRCUIT NO SIGNAL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

DTC	Item	Content of diagnosis	Reference
P0719	Brake Switch Circuit Low	Brake switch is faulty or input signal circuit is open or shorted.	<Ref. to CVT(HEV)(diag)-60, DTC P0719 BRAKE SWITCH CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0720	Output Speed Sensor Circuit	Front wheel speed sensor is faulty or input signal circuit is open or shorted.	<Ref. to CVT(HEV)(diag)-62, DTC P0720 OUTPUT SPEED SENSOR CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0721	Output Shaft Speed Sensor Circuit Range/Performance	Front wheel speed sensor characteristics is abnormal.	<Ref. to CVT(HEV)(diag)-65, DTC P0721 OUTPUT SHAFT SPEED SENSOR CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0724	Brake Switch Circuit High	Brake switch is faulty or input signal circuit is shorted.	<Ref. to CVT(HEV)(diag)-66, DTC P0724 BRAKE SWITCH CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0730	Gearshift Control Performance Abnormal	Secondary speed sensor etc. is faulty, control valve is faulty, or chain is faulty.	<Ref. to CVT(HEV)(diag)-68, DTC P0730 GEARSHIFT CONTROL PERFORMANCE ABNORMAL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0746	Pressure Control Solenoid "A" Performance/Stuck Off	Secondary solenoid is faulty, hydraulic circuit is stuck in low pressure side.	<Ref. to CVT(HEV)(diag)-69, DTC P0746 PRESSURE CONTROL SOLENOID "A" PERFORMANCE/STUCK OFF, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0747	Pressure Control Solenoid "A" Stuck On	Secondary solenoid is faulty, hydraulic circuit is stuck in high pressure side.	<Ref. to CVT(HEV)(diag)-71, DTC P0747 PRESSURE CONTROL SOLENOID "A" STUCK ON, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0751	Shift Solenoid "A" Performance/Stuck Off	Primary UP solenoid is faulty, hydraulic circuit is stuck in low pressure side.	<Ref. to CVT(HEV)(diag)-73, DTC P0751 SHIFT SOLENOID "A" PERFORMANCE/STUCK OFF, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0752	Shift Solenoid "A" Stuck On	Primary UP solenoid is faulty, hydraulic circuit is stuck in high pressure side.	<Ref. to CVT(HEV)(diag)-75, DTC P0752 SHIFT SOLENOID "A" STUCK ON, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0756	Shift Solenoid "B" Performance/Stuck Off	Primary DOWN solenoid is faulty, hydraulic circuit is stuck in low pressure side.	<Ref. to CVT(HEV)(diag)-77, DTC P0756 SHIFT SOLENOID "B" PERFORMANCE/STUCK OFF, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0757	Shift Solenoid "B" Stuck On	Primary DOWN solenoid is faulty, hydraulic circuit is stuck in high pressure side.	<Ref. to CVT(HEV)(diag)-79, DTC P0757 SHIFT SOLENOID "B" STUCK ON, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0776	Pressure Control Solenoid "B" Performance/Stuck Off	F&R solenoid, forward clutch or control valve is faulty.	<Ref. to CVT(HEV)(diag)-81, DTC P0776 PRESSURE CONTROL SOLENOID "B" PERFORMANCE/STUCK OFF, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0777	Pressure Control Solenoid "B" Stuck On	F&R solenoid is faulty, and hydraulic circuit is stuck in high pressure side.	<Ref. to CVT(HEV)(diag)-82, DTC P0777 PRESSURE CONTROL SOLENOID "B" STUCK ON, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0801	Reverse Inhibit Control Circuit	Shift lock solenoid is faulty or output signal circuit is open or shorted.	<Ref. to CVT(HEV)(diag)-83, DTC P0801 REVERSE INHIBIT CONTROL CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

DTC	Item	Content of diagnosis	Reference
P0812	Reverse Input Circuit	Inhibitor switch is faulty, or R range switch input signal circuit is open or shorted.	<Ref. to CVT(HEV)(diag)-84, DTC P0812 REVERSE INPUT CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0841	Secondary Oil Pressure Sensor Performance	Secondary pressure sensor is faulty, or control valve is faulty.	<Ref. to CVT(HEV)(diag)-86, DTC P0841 SECONDARY OIL PRESSURE SENSOR PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0842	Secondary Oil Pressure Sensor Circuit (Low)	Secondary pressure sensor is faulty, or input signal circuit is open or shorted.	<Ref. to CVT(HEV)(diag)-90, DTC P0842 SECONDARY OIL PRESSURE SENSOR CIRCUIT (LOW), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0843	Secondary Oil Pressure Sensor Circuit (High)	Secondary pressure sensor is faulty, or input signal circuit is shorted.	<Ref. to CVT(HEV)(diag)-92, DTC P0843 SECONDARY OIL PRESSURE SENSOR CIRCUIT (HIGH), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0851	Park/Neutral Switch Input Circuit Low	Inhibitor switch is faulty or P, N range switch input signal circuit is open or shorted.	<Ref. to CVT(HEV)(diag)-94, DTC P0851 PARK/NEUTRAL SWITCH INPUT CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P086C	Reverse Input Circuit 2	Inhibitor switch is faulty or R range switch 2 input signal circuit is open or shorted.	<Ref. to CVT(HEV)(diag)-96, DTC P086C REVERSE INPUT CIRCUIT 2, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0882	TCM Power Input Signal Low	TCM power supply voltage is low	<Ref. to CVT(HEV)(diag)-97, DTC P0882 TCM POWER INPUT SIGNAL LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0890	AT Self-Shut Relay Diagnosis (Low)	Self-shut relay is faulty or input signal circuit is open or shorted.	<Ref. to CVT(HEV)(diag)-98, DTC P0890 AT SELF-SHUT RELAY DIAGNOSIS (LOW), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0951	Manual Switch	Manual mode switch is faulty or input signal circuit is open or shorted.	<Ref. to CVT(HEV)(diag)-100, DTC P0951 MANUAL SWITCH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0961	Pressure Control Solenoid "A" Control Circuit Range/Performance	Characteristics of secondary solenoid current is abnormal.	<Ref. to CVT(HEV)(diag)-102, DTC P0961 PRESSURE CONTROL SOLENOID "A" CONTROL CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0962	Secondary Solenoid Circuit (Low)	Secondary solenoid is faulty, or output signal circuit is shorted.	<Ref. to CVT(HEV)(diag)-103, DTC P0962 SECONDARY SOLENOID CIRCUIT (LOW), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0963	Secondary Solenoid Circuit (High)	Secondary solenoid is faulty, or output signal circuit is open or shorted.	<Ref. to CVT(HEV)(diag)-105, DTC P0963 SECONDARY SOLENOID CIRCUIT (HIGH), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0965	Forward & Reverse Solenoid Function	Characteristics of F&R solenoid current is abnormal.	<Ref. to CVT(HEV)(diag)-107, DTC P0965 FORWARD & REVERSE SOLENOID FUNCTION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0966	Forward & Reverse Solenoid Circuit (Low)	F&R solenoid is faulty or output signal circuit is shorted.	<Ref. to CVT(HEV)(diag)-108, DTC P0966 FORWARD & REVERSE SOLENOID CIRCUIT (LOW), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0967	Forward & Reverse Linear Solenoid Circuit (High)	F&R solenoid is faulty or output signal circuit is open or shorted.	<Ref. to CVT(HEV)(diag)-110, DTC P0967 FORWARD & REVERSE LINEAR SOLENOID CIRCUIT (HIGH), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

DTC	Item	Content of diagnosis	Reference
P0970	Transfer Solenoid Circuit (Low)	AWD solenoid is faulty or output signal circuit is shorted.	<Ref. to CVT(HEV)(diag)-112, DTC P0970 TRANSFER SOLENOID CIRCUIT (LOW), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0971	Transfer Solenoid Circuit (High)	AWD solenoid is faulty or output signal circuit is open or shorted.	<Ref. to CVT(HEV)(diag)-113, DTC P0971 TRANSFER SOLENOID CIRCUIT (HIGH), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0973	Primary Solenoid System A Circuit (Low)	Primary UP solenoid is faulty, or output signal circuit is shorted.	<Ref. to CVT(HEV)(diag)-115, DTC P0973 PRIMARY SOLENOID SYSTEM A CIRCUIT (LOW), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0974	Primary Solenoid System A Circuit (High)	Primary UP solenoid is faulty, or output signal circuit is open or shorted.	<Ref. to CVT(HEV)(diag)-117, DTC P0974 PRIMARY SOLENOID SYSTEM A CIRCUIT (HIGH), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0976	Primary Solenoid System B Circuit (Low)	Primary DOWN solenoid is faulty, or output signal circuit is shorted.	<Ref. to CVT(HEV)(diag)-119, DTC P0976 PRIMARY SOLENOID SYSTEM B CIRCUIT (LOW), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0977	Primary Solenoid System B Circuit (High)	Primary DOWN solenoid is faulty, or output signal circuit is open or shorted.	<Ref. to CVT(HEV)(diag)-121, DTC P0977 PRIMARY SOLENOID SYSTEM B CIRCUIT (HIGH), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0B0A	Auxiliary Transmission Fluid Pump Motor Supply Voltage Circuit Low	100 V power supply for electric oil pump inverter has malfunction.	<Ref. to CVT(HEV)(diag)-123, DTC P0B0A AUXILIARY TRANSMISSION FLUID PUMP MOTOR SUPPLY VOLTAGE CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0B0B	Auxiliary Transmission Fluid Pump Motor Supply Voltage Circuit High	100 V power supply for electric oil pump inverter has malfunction.	<Ref. to CVT(HEV)(diag)-124, DTC P0B0B AUXILIARY TRANSMISSION FLUID PUMP MOTOR SUPPLY VOLTAGE CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0B0D	Auxiliary Transmission Fluid Pump Motor Control Module	Electric oil pump inverter is faulty.	<Ref. to CVT(HEV)(diag)-125, DTC P0B0D AUXILIARY TRANSMISSION FLUID PUMP MOTOR CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0C1D	Auxiliary Transmission Fluid Pump Control Module Internal Temperature Sensor Range/ Performance	Electric oil pump inverter circuit board is faulty.	<Ref. to CVT(HEV)(diag)-126, DTC P0C1D AUXILIARY TRANSMISSION FLUID PUMP CONTROL MODULE INTERNAL TEMPERATURE SENSOR RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0C21	Auxiliary Transmission Fluid Pump Phase U-V-W Circuit Low	Electric oil pump is faulty, electric oil pump inverter is faulty, or 3-phase circuit is open or shorted.	<Ref. to CVT(HEV)(diag)-127, DTC P0C21 AUXILIARY TRANSMISSION FLUID PUMP PHASE U-V-W CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0C22	Auxiliary Transmission Fluid Pump Phase U-V-W Circuit High	Electric oil pump is faulty, electric oil pump inverter is faulty, or 3-phase circuit is shorted.	<Ref. to CVT(HEV)(diag)-129, DTC P0C22 AUXILIARY TRANSMISSION FLUID PUMP PHASE U-V-W CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0C24	Auxiliary Transmission Fluid Pump Control Module Circuit Low	12V power supply for electric oil pump inverter has malfunction.	<Ref. to CVT(HEV)(diag)-131, DTC P0C24 AUXILIARY TRANSMISSION FLUID PUMP CONTROL MODULE CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

DTC	Item	Content of diagnosis	Reference
P0C25	Auxiliary Transmission Fluid Pump Control Module Circuit High	12V power supply for electric oil pump inverter has malfunction.	<Ref. to CVT(HEV)(diag)-132, DTC P0C25 AUXILIARY TRANSMISSION FLUID PUMP CONTROL MODULE CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0C27	Auxiliary Transmission Fluid Pump Motor Current Low	Electric oil pump inverter is faulty.	<Ref. to CVT(HEV)(diag)-133, DTC P0C27 AUXILIARY TRANSMISSION FLUID PUMP MOTOR CURRENT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0C28	Auxiliary Transmission Fluid Pump Motor Current High	Electric oil pump inverter is faulty.	<Ref. to CVT(HEV)(diag)-134, DTC P0C28 AUXILIARY TRANSMISSION FLUID PUMP MOTOR CURRENT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0C29	Auxiliary Transmission Fluid Pump Driver Current Performance	There is an overcurrent to electric oil pump inverter, or too much load is applied to electric oil pump motor.	<Ref. to CVT(HEV)(diag)-135, DTC P0C29 AUXILIARY TRANSMISSION FLUID PUMP DRIVER CURRENT PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0C2A	Auxiliary Transmission Fluid Pump Motor Stalled	Electric oil pump inverter control is abnormal.	<Ref. to CVT(HEV)(diag)-137, DTC P0C2A AUXILIARY TRANSMISSION FLUID PUMP MOTOR STALLED, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P160A	Random Access Memory (RAM) Error	TCM RAM is faulty.	<Ref. to CVT(HEV)(diag)-138, DTC P160A RANDOM ACCESS MEMORY (RAM) ERROR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P172A	Auxiliary Transmission Fluid Pump Reverse Rotation	Electric oil pump inverter control is abnormal.	<Ref. to CVT(HEV)(diag)-138, DTC P172A AUXILIARY TRANSMISSION FLUID PUMP REVERSE ROTATION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2530	Ignition Switch Run Position Circuit	Ignition SW circuit is faulty.	<Ref. to CVT(HEV)(diag)-139, DTC P2530 IGNITION SWITCH RUN POSITION CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2714	Pressure Control Solenoid "D" Performance/Stuck Off	Output clutch solenoid is faulty, output clutch is faulty, or output clutch valve is malfunctioning.	<Ref. to CVT(HEV)(diag)-141, DTC P2714 PRESSURE CONTROL SOLENOID "D" PERFORMANCE/STUCK OFF, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2715	Pressure Control Solenoid D Stuck On	Output clutch solenoid is faulty, and hydraulic circuit is stuck in high pressure side.	<Ref. to CVT(HEV)(diag)-142, DTC P2715 PRESSURE CONTROL SOLENOID D STUCK ON, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2719	Pressure Control Solenoid D Control Circuit Range/Performance	Characteristics of output clutch solenoid current is abnormal.	<Ref. to CVT(HEV)(diag)-143, DTC P2719 PRESSURE CONTROL SOLENOID D CONTROL CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2720	Pressure Control Solenoid D Control Circuit Low	Output clutch solenoid is faulty, or output signal circuit is shorted.	<Ref. to CVT(HEV)(diag)-145, DTC P2720 PRESSURE CONTROL SOLENOID D CONTROL CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2721	Pressure Control Solenoid D Control Circuit High	Output clutch solenoid is faulty, or output signal circuit is open or shorted.	<Ref. to CVT(HEV)(diag)-147, DTC P2721 PRESSURE CONTROL SOLENOID D CONTROL CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

DTC	Item	Content of diagnosis	Reference
P2750	Sec. Pulley Revolution Speed Sensor Circuit	Secondary speed sensor characteristics is abnormal.	<Ref. to CVT(HEV)(diag)-149, DTC P2750 SEC. PULLEY REVOLUTION SPEED SENSOR CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2751	Intermediate Shaft Speed Sensor "C" Circuit No Signal	Secondary speed sensor is faulty, or input signal circuit is open or shorted.	<Ref. to CVT(HEV)(diag)-150, DTC P2751 INTERMEDIATE SHAFT SPEED SENSOR "C" CIRCUIT NO SIGNAL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2757	Torque Converter Clutch Pressure Control Solenoid Control Circuit Performance/ Stuck Off	Lock-up duty solenoid is faulty, hydraulic circuit is stuck in low pressure side.	<Ref. to CVT(HEV)(diag)-153, DTC P2757 TORQUE CONVERTER CLUTCH PRESSURE CONTROL SOLENOID CONTROL CIRCUIT PERFORMANCE/STUCK OFF, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2758	Torque Converter Clutch Pressure Control Solenoid Control Circuit Stuck On	Lock-up duty solenoid is faulty, hydraulic circuit is stuck in high pressure side.	<Ref. to CVT(HEV)(diag)-155, DTC P2758 TORQUE CONVERTER CLUTCH PRESSURE CONTROL SOLENOID CONTROL CIRCUIT STUCK ON, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2763	Lock-Up Duty Solenoid Circuit (High)	Lock-up duty solenoid is faulty or output signal circuit is open or shorted.	<Ref. to CVT(HEV)(diag)-157, DTC P2763 LOCK-UP DUTY SOLENOID CIRCUIT (HIGH), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2764	Lock-Up Duty Solenoid Circuit (Low)	Lock-up duty solenoid is faulty or output signal circuit is shorted.	<Ref. to CVT(HEV)(diag)-159, DTC P2764 LOCK-UP DUTY SOLENOID CIRCUIT (LOW), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2797	Auxiliary Transmission Fluid Pump	Air entering, contamination clogging, or oil passage abnormality in the electric oil pump	<Ref. to CVT(HEV)(diag)-161, DTC P2797 AUXILIARY TRANSMISSION FLUID PUMP, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0073	Control Module Communication Bus Off	CAN bus is shorted or communication error.	<Ref. to CVT(HEV)(diag)-162, DTC U0073 CONTROL MODULE COMMUNICATION BUS OFF, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0075	Control Module Communication Bus "PU-CAN" Off	PU-CAN bus is shorted or communication system is faulty.	<Ref. to CVT(HEV)(diag)-162, DTC U0075 CONTROL MODULE COMMUNICATION BUS "PU-CAN" OFF, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0076	Control Module Communication Bus "HEV-CAN" Off	HEV-CAN bus is shorted or communication system is faulty.	<Ref. to CVT(HEV)(diag)-162, DTC U0076 CONTROL MODULE COMMUNICATION BUS "HEV-CAN" OFF, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0100	Lost Communication With ECM/PCM “A”	Detected that the engine data has not yet arrived.	<Ref. to CVT(HEV)(diag)-162, DTC U0100 LOST COMMUNICATION WITH ECM/PCM “A”, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0101	Lost Communication With TCM	Detected that the transmission data has not yet arrived.	<Ref. to CVT(HEV)(diag)-162, DTC U0101 LOST COMMUNICATION WITH TCM, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0110	Lost Communication With Drive Motor Control Module "A"	Detected that the motor control module data has not yet arrived.	<Ref. to CVT(HEV)(diag)-162, DTC U0110 LOST COMMUNICATION WITH DRIVE MOTOR CONTROL MODULE "A", Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

DTC	Item	Content of diagnosis	Reference
U0122	Lost Communication With Vehicle Dynamics Control Module	Detected that the VDC data has not yet arrived.	<Ref. to CVT(HEV)(diag)-162, DTC U0122 LOST COMMUNICATION WITH VEHICLE DYNAMICS CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0140	Lost Communication With Body Control Module	Detected that the body integrated unit data has not yet arrived.	<Ref. to CVT(HEV)(diag)-162, DTC U0140 LOST COMMUNICATION WITH BODY CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0155	Lost Communication With Instrument Panel Cluster (IPC) Control Module	Detected that the meter data has not yet arrived.	<Ref. to CVT(HEV)(diag)-162, DTC U0155 LOST COMMUNICATION WITH INSTRUMENT PANEL CLUSTER (IPC) CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0287	Lost Communication With Transmission Fluid Pump Module	Detected that the electric oil pump data has not yet arrived.	<Ref. to CVT(HEV)(diag)-163, DTC U0287 LOST COMMUNICATION WITH TRANSMISSION FLUID PUMP MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0293	Lost Communication With Hybrid Powertrain Control Module	Detected that the hybrid data has not yet arrived.	<Ref. to CVT(HEV)(diag)-163, DTC U0293 LOST COMMUNICATION WITH HYBRID POWERTRAIN CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0401	Invalid Data Received From ECM/PCM “A”	Detected abnormality of the engine data.	<Ref. to CVT(HEV)(diag)-163, DTC U0401 INVALID DATA RECEIVED FROM ECM/PCM “A”, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0402	Invalid Data Received From TCM	Detected abnormality of the transmission data.	<Ref. to CVT(HEV)(diag)-163, DTC U0402 INVALID DATA RECEIVED FROM TCM, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0411	Invalid Data Received From Drive Motor Control Module "A"	Detected abnormality of the motor control module data.	<Ref. to CVT(HEV)(diag)-163, DTC U0411 INVALID DATA RECEIVED FROM DRIVE MOTOR CONTROL MODULE "A", Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0416	Invalid Data Received From Vehicle Dynamics Control Module	Detected abnormality of the VDC data.	<Ref. to CVT(HEV)(diag)-163, DTC U0416 INVALID DATA RECEIVED FROM VEHICLE DYNAMICS CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0422	Invalid Data Received From Body Control Module	Detected abnormality of the body integrated unit data.	<Ref. to CVT(HEV)(diag)-163, DTC U0422 INVALID DATA RECEIVED FROM BODY CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0423	Invalid Data Received From Instrument Panel Cluster Control Module	Detected abnormality of the meter data.	<Ref. to CVT(HEV)(diag)-163, DTC U0423 INVALID DATA RECEIVED FROM INSTRUMENT PANEL CLUSTER CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0588	Invalid Data Received From Transmission Fluid Pump Module	Detected abnormality of the electric oil pump data.	<Ref. to CVT(HEV)(diag)-164, DTC U0588 INVALID DATA RECEIVED FROM TRANSMISSION FLUID PUMP MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

DTC	Item	Content of diagnosis	Reference
U0594	Invalid Data Received From Hybrid Powertrain Control Module	Detected abnormality of the hybrid data.	<Ref. to CVT(HEV)(diag)-164, DTC U0594 INVALID DATA RECEIVED FROM HYBRID POWERTRAIN CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U1100	Lost Communication With ECM/PCM PU-CAN	Detected that the engine PU-CAN data has not yet arrived.	<Ref. to CVT(HEV)(diag)-164, DTC U1100 LOST COMMUNICATION WITH ECM/PCM PU-CAN, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U1235	Lost Communication With EyeSight	Detected that the EyeSight data has not yet arrived.	<Ref. to CVT(HEV)(diag)-164, DTC U1235 LOST COMMUNICATION WITH EyeSight, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U1293	Lost Communication With Hybrid Powertrain Control Module PU-CAN	Detected that the hybrid powertrain control module PU-CAN data has not yet arrived.	<Ref. to CVT(HEV)(diag)-164, DTC U1293 LOST COMMUNICATION WITH HYBRID POWERTRAIN CONTROL MODULE PU-CAN, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U1401	Invalid Data Received From ECM/PCM PU-CAN	Detected abnormality of the engine·PU-CAN data.	<Ref. to CVT(HEV)(diag)-164, DTC U1401 INVALID DATA RECEIVED FROM ECM/PCM PU-CAN, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U1433	Invalid Data Received From EyeSight	Detected abnormality of the EyeSight data.	<Ref. to CVT(HEV)(diag)-164, DTC U1433 INVALID DATA RECEIVED FROM EyeSight, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U1594	Invalid Data Received From Hybrid Powertrain Control Module PU-CAN	Detected abnormality of the hybrid powertrain control module PU-CAN data.	<Ref. to CVT(HEV)(diag)-164, DTC U1594 INVALID DATA RECEIVED FROM HYBRID POWERTRAIN CONTROL MODULE PU-CAN, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

16.Diagnostic Procedure with Diagnostic Trouble Code (DTC)

A: DTC P0500 VEHICLE SPEED SENSOR “A”

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(CVT)(HEV)-6, DTC P0500 VEHICLE SPEED SENSOR “A”, Diagnostic Trouble Code (DTC) Detecting Criteria.>

NOTE:
Refer to the “ENGINE (DIAGNOSTICS)” for diagnostic procedure. <Ref. to EN(H4DO HEV)(diag)-254, DTC P0500 VEHICLE SPEED SENSOR “A”, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

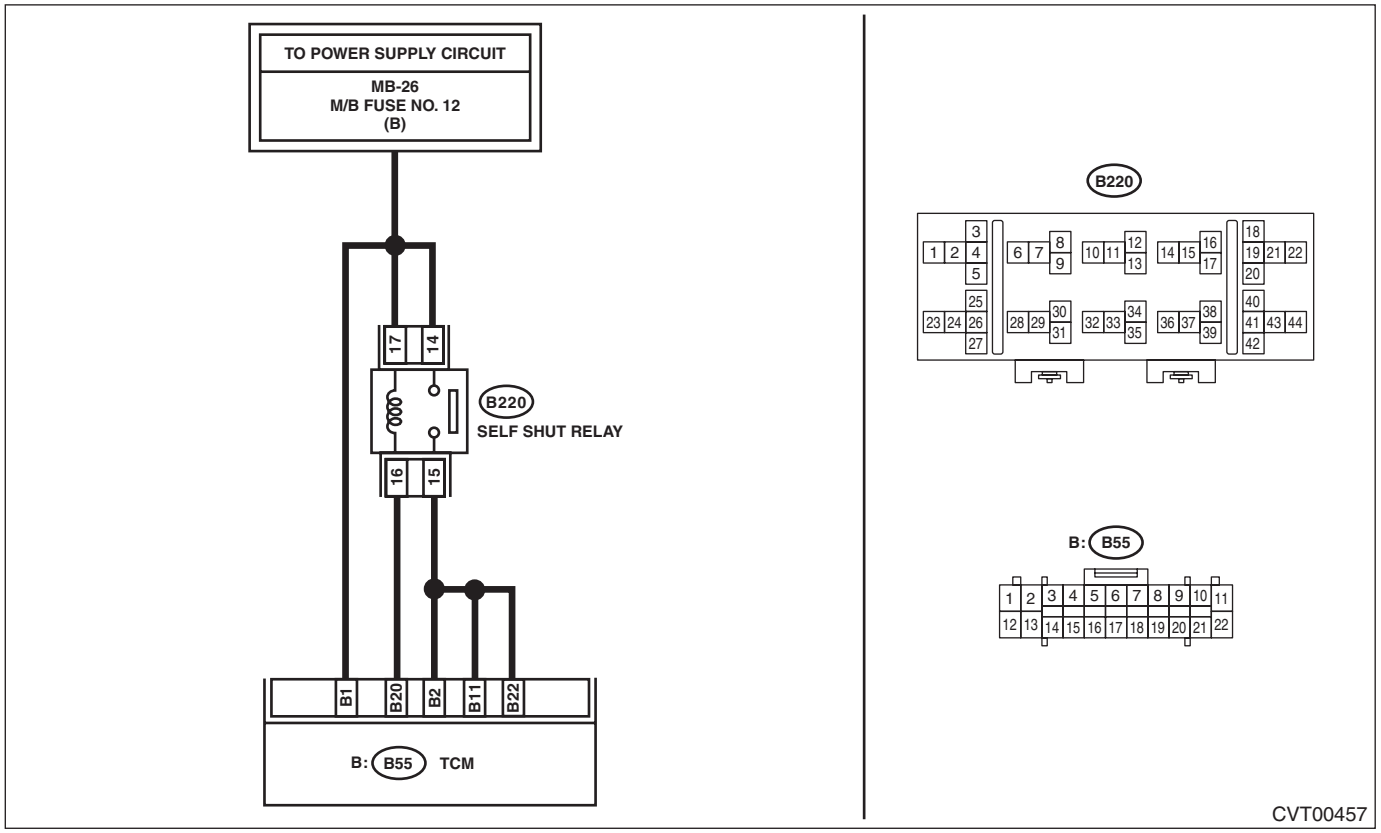
B: DTC P0560 SYSTEM VOLTAGE

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(CVT)(HEV)-7, DTC P0560 SYSTEM VOLTAGE, Diagnostic Trouble Code (DTC) Detecting Criteria.>

WIRING DIAGRAM:

CVT control system <Ref. to WI(HEV)-86, CVT Control System.>



Step		Check	Yes	No
1	**CHECK FUSE.** Remove the fuse (M/B No. 12).	Is the fuse blown out?	Replace the fuse. If the replaced fuse has blown out easily, repair short circuit of harness between fuse and TCM.	Go to step **2**.
2	**CHECK BACKUP POWER SUPPLY.** Read the data of «System Voltage» using the Subaru Select Monitor.	Is the voltage 10 — 13 V?	Current condition is normal.	Go to step **3**.
3	**CHECK HARNESS.** 1) Disconnect the TCM connector. 2) Measure the resistance of harness between TCM and fuse (M/B No. 12). ***Connector & terminal*** ***(B55) No. 1 — fuse (M/B No. 12):***	Is the resistance less than 1 Ω?	Replace the TCM. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>	Repair the open circuit of harness.

C: DTC P0601 INTERNAL CONTROL MODULE MEMORY CHECKSUM ERROR

DTC DETECTING CONDITION:

- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(CVT)(HEV)-8, DTC P0601 INTERNAL CONTROL MODULE MEMORY CHECKSUM ERROR, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

TCM ROM malfunction

	Step	Check	Yes	No
1	**CHECK DTC.** 1) Perform the Clear Memory Mode using the Subaru Select Monitor. <Ref. to CVT(HEV)(diag)-20, Clear Memory Mode.> 2) Read the DTC.	Is DTC P0601 displayed?	Replace the TCM. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>	Current condition is normal. Check for interference from noise, etc.

D: DTC P0603 INTERNAL CONTROL MODULE KEEP ALIVE MEMORY (KAM) ERROR

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(CVT)(HEV)-9, DTC P0603 INTERNAL CONTROL MODULE KEEP ALIVE MEMORY (KAM) ERROR, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

TCM back-up RAM malfunction

	Step	Check	Yes	No
1	**CHECK DTC.** 1) Perform the Clear Memory Mode using the Subaru Select Monitor. <Ref. to CVT(HEV)(diag)-20, Clear Memory Mode.> 2) Read the DTC.	Is DTC P0603 displayed?	Replace the TCM. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>	Current condition is normal. Check for interference from noise, etc.

E: DTC P0604 INTERNAL CONTROL MODULE RANDOM ACCESS MEMORY (RAM) ERROR

DTC DETECTING CONDITION:

- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(CVT)(HEV)-10, DTC P0604 INTERNAL CONTROL MODULE RANDOM ACCESS MEMORY (RAM) ERROR, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

TCM RAM malfunction

	Step	Check	Yes	No
1	**CHECK DTC.** 1) Perform the Clear Memory Mode using the Subaru Select Monitor. <Ref. to CVT(HEV)(diag)-20, Clear Memory Mode.> 2) Read the DTC.	Is DTC P0604 displayed?	Replace the TCM. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>	Current condition is normal. Check for interference from noise, etc.

F: DTC P062F INTERNAL CONTROL MODULE EEPROM ERROR

DTC DETECTING CONDITION:

- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(CVT)(HEV)-11, DTC P062F INTERNAL CONTROL MODULE EEPROM ERROR, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

- AT learning is not finished.
- Shock occurs when selecting N → D, N → R.
- Shock occurs when the vehicle starts to move after power generation at stand still.

	Step	Check	Yes	No
1	**CHECK TCM CONNECTOR.**	Is there improper connection of TCM connector?	Connect the TCM connector.	Go to step **2**.
2	**CHECK SELF SHUT RELAY.** Turn the ignition switch to ON.	Does the relay operates simultaneously?	Go to step **3**.	Perform the diagnosis according to DTC P0890.
3	**CHECK SELF SHUT RELAY.** Turn the ignition switch to OFF.	Does the relay operate after two or three seconds delay?	Go to step **4**.	Perform the diagnosis according to DTC P0890.
4	**PERFORM AT LEARNING.** 1) Perform {Clear AT learning value}. 2) Perform the AT learning. <Ref. to CVT(HEV)(diag)-26, Learning Control.> 3) Start the engine.	Does the AT OIL TEMP light blink after AT learning is finished correctly?	Replace the TCM. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>	Go to step **5**.
5	**CHECK DTC DISPLAY.** 1) Perform the Clear Memory Mode. 2) Turn the ignition switch to OFF. 3) Start the engine after 10 seconds. 4) Repeat steps 2) and 3).	Does the AT OIL TEMP light blink and is DTC P1724 detected?	Replace the TCM. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>	Current condition is normal. Check for poor contact of TCM connector or harness.

G: DTC P0705 TRANSMISSION RANGE SENSOR CIRCUIT (PRNDL INPUT)

DTC DETECTING CONDITION:

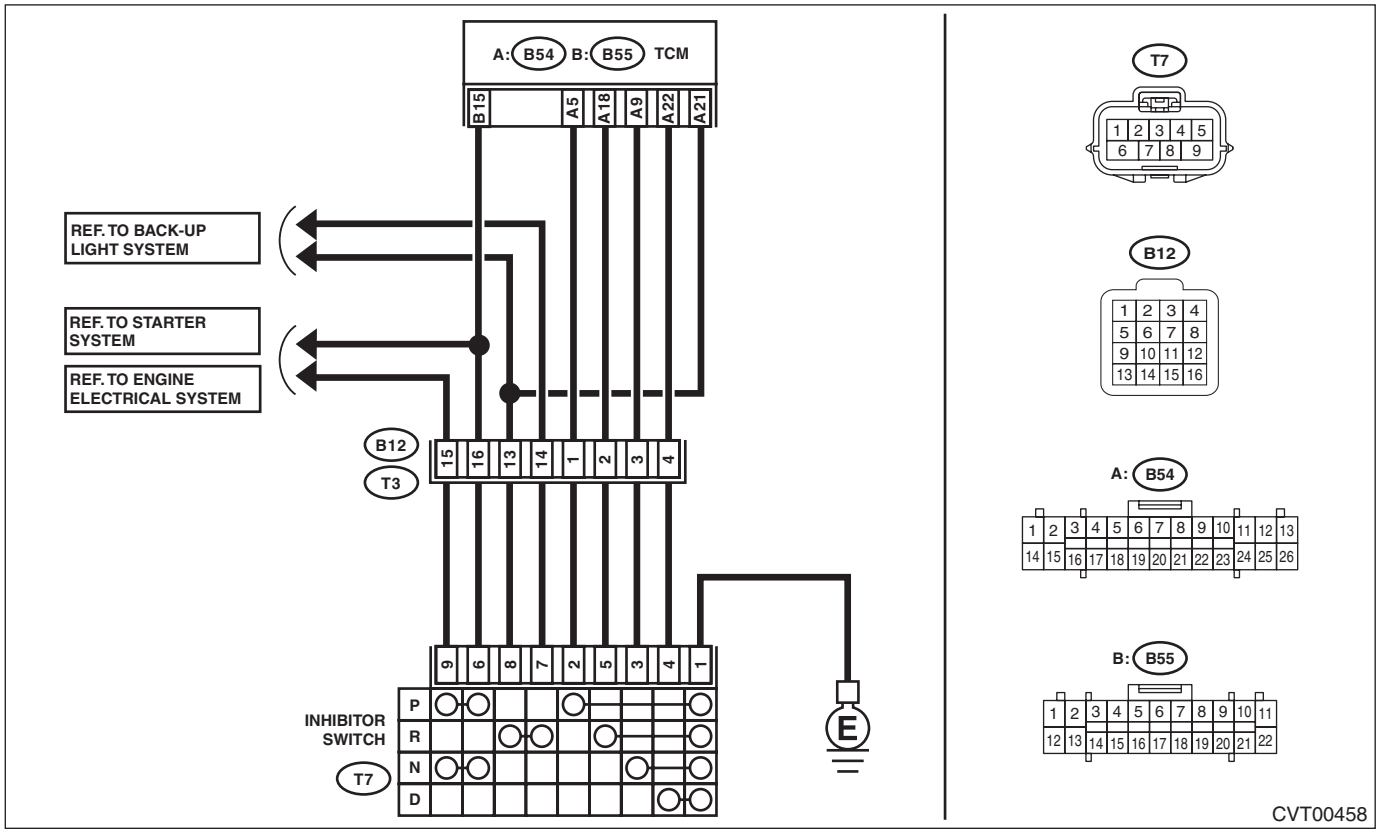
- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(CVT)(HEV)-12, DTC P0705 TRANSMISSION RANGE SENSOR CIRCUIT (PRNDL INPUT), Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

- Shift characteristics are erroneous.
- The range position of the select lever and the position of shift indicator display do not match.

WIRING DIAGRAM:

CVT control system <Ref. to WI(HEV)-86, CVT Control System.>



	Step	Check	Yes	No
1	**CHECK INPUT SIGNAL FOR TCM.** 1) Turn the ignition switch to ON. 2) Move the select lever to each range, and read the data of «P Range», «R Range», «N Range», «D Range», «N/P Range Signal», «R Range Signal2» using the Subaru Select Monitor.	Is display “OFF” for the range other than corresponding range?	Go to step **5**.	Go to step **2**.
2	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the TCM and transmission connectors. 3) Measure the resistance between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 5 — Chassis ground:*** ***(B54) No. 18 — Chassis ground:*** ***(B54) No. 9 — Chassis ground:*** ***(B54) No. 21 — Chassis ground:*** ***(B55) No. 15 — Chassis ground:*** ***(B54) No. 22 — Chassis ground:***	Is each resistance 1 MΩ or more?	Go to step **3**.	Repair the short circuit of body harness.

	Step	Check	Yes	No
3	**CHECK HARNESS.** 1) Disconnect the inhibitor switch connector. 2) Measure the resistance between transmission connector and chassis ground. ***Connector & terminal*** ***(T3) No. 1 — Chassis ground:*** ***(T3) No. 2 — Chassis ground:*** ***(T3) No. 3 — Chassis ground:*** ***(T3) No. 4 — Chassis ground:*** ***(T3) No. 13 — Chassis ground:*** ***(T3) No. 16 — Chassis ground:***	Is each resistance 1 MΩ or more?	Go to step **4**.	Repair the short circuit of transmission harness.
4	**CHECK INHIBITOR SWITCH.** Move the select lever to each range, and measure the resistance between inhibitor switch connector terminals. ***Terminals*** ***No. 2 — No. 1:*** ***No. 5 — No. 1:*** ***No. 3 — No. 1:*** ***No. 4 — No. 1:*** ***No. 6 — No. 1:*** ***No. 8 — No. 1:***	Is the resistance other than corresponding range 1 MΩ or more?	Go to step **5**.	Replace the inhibitor switch. <Ref. to CVT(TH58A)-97, Inhibitor Switch.>
5	**CHECK FOR POOR CONTACT.**	Is there poor contact between TCM, inhibitor switch, transmission ground?	Repair the poor contact.	Replace the TCM. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>

H: DTC P0708 AT RANGE SWITCH NOT INPUTTED

DTC DETECTING CONDITION:

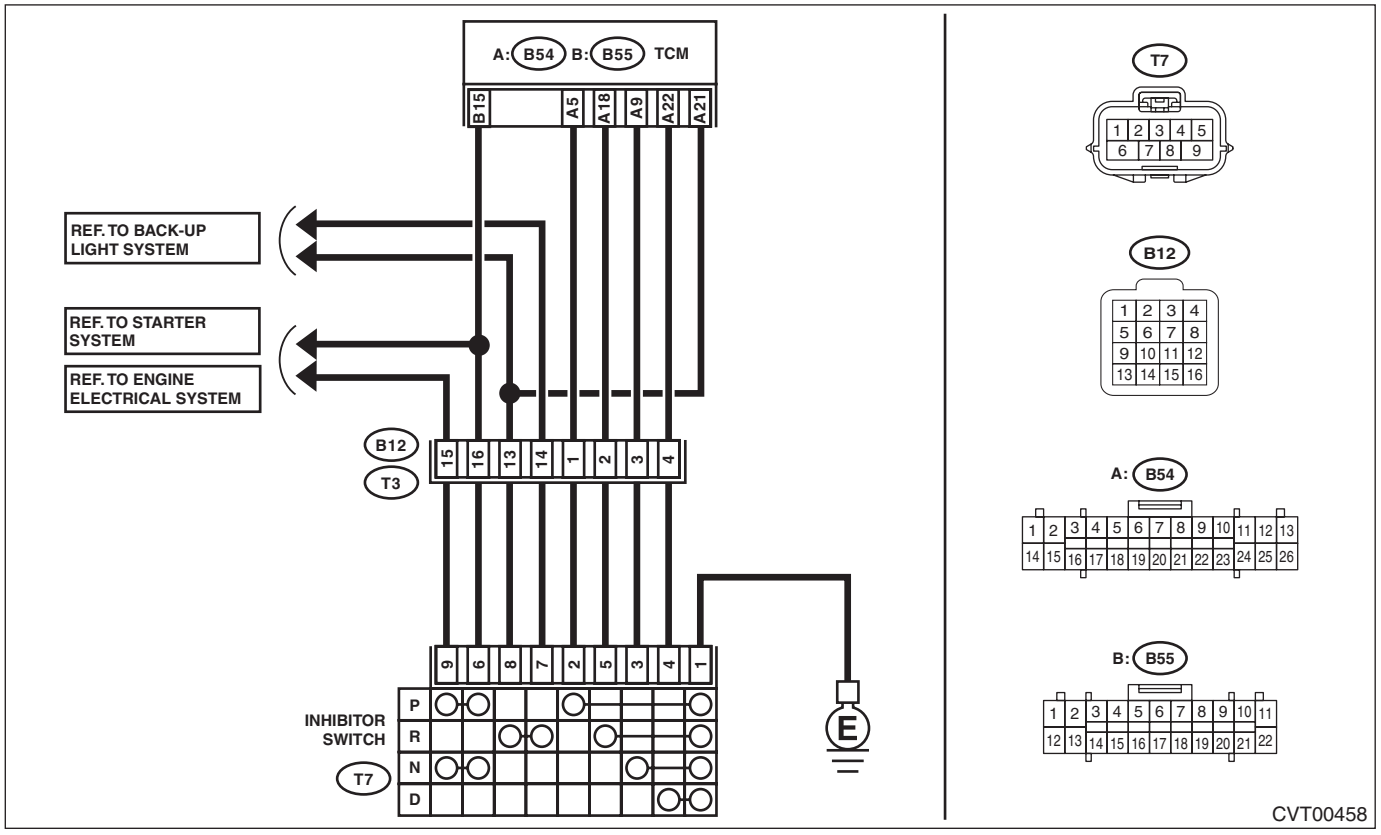
- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(CVT)(HEV)-13, DTC P0708 AT RANGE SWITCH NOT INPUTTED, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

- Shift characteristics are erroneous.
- The range position of the select lever and the position of shift indicator display do not match.

WIRING DIAGRAM:

CVT control system <Ref. to WI(HEV)-86, CVT Control System.>



Step		Check	Yes	No
1	**CHECK INPUT SIGNAL FOR TCM.** 1) Turn the ignition switch to ON. 2) Move the select lever to each range, and read the data of «P Range», «R Range», «N Range», «D Range», «N/P Range Signal», «R Range Signal2» using the Subaru Select Monitor.	Is the display of the corresponding range “ON”?	Go to step **7**.	Go to step **2**.
2	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the TCM and transmission connectors. 3) Measure the resistance of harness between TCM connector and transmission connector. ***Connector & terminal*** ***(B54) No. 5 — (B12) No. 1:*** ***(B54) No. 18 — (B12) No. 2:*** ***(B54) No. 9 — (B12) No. 3:*** ***(B54) No. 22 — (B12) No. 4:*** ***(B54) No. 21 — (B12) No. 13:*** ***(B55) No. 15 — (B12) No. 16:***	Is each resistance less than 1 Ω?	Go to step **3**.	Repair the open circuit of body harness.

	Step	Check	Yes	No
3	**CHECK HARNESS.** Measure the resistance of harness between inhibitor switch connector and transmission ground. ***Connector & terminal*** ***(T7) No. 1 — Transmission ground:***	Is the resistance less than 1 Ω?	Go to step **4**.	Repair the open circuit of harness.
4	**CHECK HARNESS.** 1) Disconnect the inhibitor switch connector. 2) Measure the resistance between transmission connector and inhibitor switch connector. ***Connector & terminal*** ***(T3) No. 1 — (T7) No. 2:*** ***(T3) No. 2 — (T7) No. 5:*** ***(T3) No. 3 — (T7) No. 3:*** ***(T3) No. 4 — (T7) No. 4:*** ***(T3) No. 13 — (T7) No. 8:*** ***(T3) No. 16 — (T7) No. 6:***	Is each resistance less than 1 Ω?	Go to step **5**.	Repair the open circuit of transmission harness.
5	**CHECK INHIBITOR SWITCH.** Move the select lever to each range, and measure the resistance between inhibitor switch connector terminals. ***Terminals*** ***No. 2 — No. 1:*** ***No. 5 — No. 1:*** ***No. 3 — No. 1:*** ***No. 4 — No. 1:*** ***No. 8 — No. 1:*** ***No. 6 — No. 1:***	Is the resistance of the corresponding range less than 1 MΩ?	Go to step **6**.	Replace the inhibitor switch. <Ref. to CVT(TH58A)-97, Inhibitor Switch.>
6	**CHECK HARNESS.** 1) Turn the ignition switch to ON. 2) Measure the voltage between each connector and chassis ground. ***Connector & terminal*** ***Transmission connector (B12 side)*** ***(B12) No. 1 (+) — Chassis ground (–):*** ***(B12) No. 2 (+) — Chassis ground (–):*** ***(B12) No. 3 (+) — Chassis ground (–):*** ***(B12) No. 4 (+) — Chassis ground (–):*** ***(B12) No. 13 (+) — Chassis ground (–):*** ***(B12) No. 16 (+) — Chassis ground (–):*** ***Transmission connector (T7 side)*** ***(T7) No. 2 (+) — Chassis ground (–):*** ***(T7) No. 5 (+) — Chassis ground (–):*** ***(T7) No. 3 (+) — Chassis ground (–):*** ***(T7) No. 4 (+) — Chassis ground (–):*** ***(T7) No. 8 (+) — Chassis ground (–):*** ***(T7) No. 6 (+) — Chassis ground (–):***	Is each voltage less than 1 V?	Go to step **7**.	Repair the harness which outputs 1 V or more.
7	**CHECK FOR POOR CONTACT.**	Is there poor contact between TCM, inhibitor switch, transmission ground?	Repair the poor contact.	Replace the TCM. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>

I: DTC P0711 ATF TEMP. SENSOR CIRCUIT RANGE/PERFORMANCE

DTC DETECTING CONDITION:

- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(CVT)(HEV)-14, DTC P0711 ATF TEMP. SENSOR CIRCUIT RANGE/PERFORMANCE, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

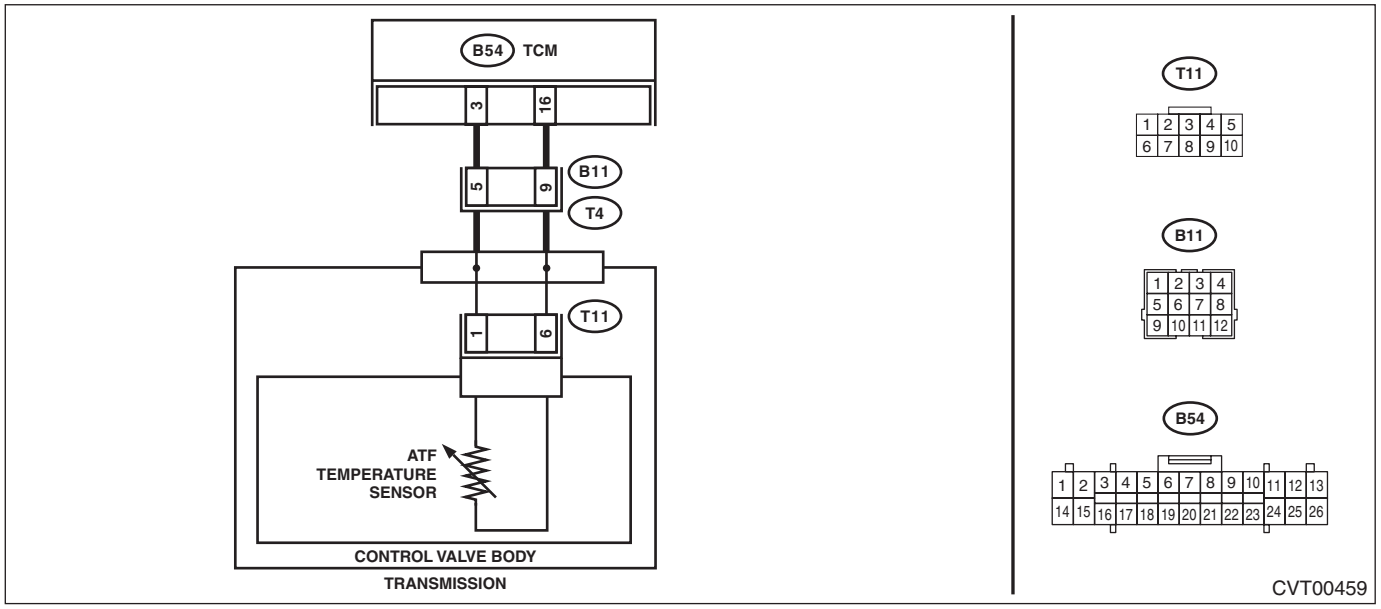
Excessive shift shock

CAUTION:

After diagnosis, perform Clear Memory Mode for each system.

WIRING DIAGRAM:

CVT control system <Ref. to WI(HEV)-86, CVT Control System.>



	Step	Check	Yes	No
1	**CHECK DTC.** Check the DTC using Subaru Select Monitor.	Is DTC P0712 or P0713 displayed?	Perform the diagnosis according to DTC.	Go to step **2**.
2	**CHECK TRANSMISSION FLUID.** Check the amount of ATF. <Ref. to CVT(TH58A)-41, ADJUSTMENT, CVTF.>	Is the ATF amount correct?	Go to step **3**.	Adjust the amount of ATF. <Ref. to CVT(TH58A)-41, ADJUSTMENT, CVTF.>
3	**CHECK INPUT SIGNAL FOR TCM.** Check «ATF Temp.» using the Subaru Select Monitor.	Is «ATF Temp.» less than 20°C (68°F)?	Go to step **4**.	Reconfirm after the ATF temperature drops below 20°C (68°F).
4	**CHECK INPUT SIGNAL FOR TCM.** 1) Lift up the vehicle. 2) Apply the electronic parking brake. 3) Start the engine. 4) Set the select lever to “D” range. 5) Warm up the engine until the ATF temperature reaches 20°C (68°F). 6) Read the data of «ATF Temp.» using the Subaru Select Monitor.	Does «ATF Temp.» increase by 1°C (1.8°F) within 10 minutes?	Current condition is normal.	Go to step **5**.

	Step	Check	Yes	No
5	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the TCM and transmission connectors. 3) Measure the resistance between TCM connector and transmission connectors. ***Connector & terminal*** ***(B54) No. 3 — (B11) No. 5:*** ***(B54) No. 16 — (B11) No. 9:***	Is the resistance less than 1 Ω?	Go to step **6**.	Check for poor contact of the ATF temperature sensor and transmission connector harness, and repair the defective part.
6	**CHECK INPUT SIGNAL FOR TCM.** 1) Connect the connector to TCM. (with the transmission connector disconnected) 2) Turn the ignition switch to ON. 3) Read the data of «ATF Temp.» using the Subaru Select Monitor.	Is –50°C (–58°F) displayed in «ATF Temp.»?	Replace the control valve body. <Ref. to CVT(TH58A)-115, Control Valve Body.>	Replace the TCM. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>

J: DTC P0712 TRANSMISSION FLUID TEMPERATURE SENSOR CIRCUIT LOW INPUT

DTC DETECTING CONDITION:

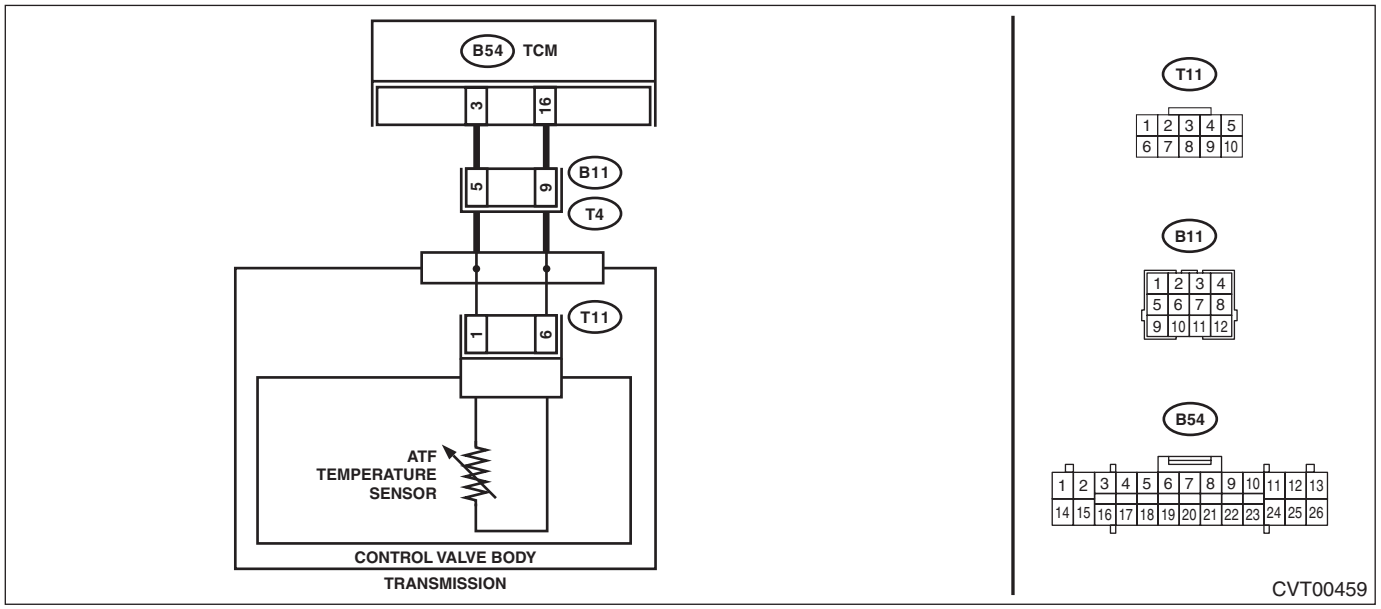
- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(CVT)(HEV)-15, DTC P0712 TRANSMISSION FLUID TEMPERATURE SENSOR CIRCUIT LOW INPUT, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

- Excessive shift shock
- Shift characteristics malfunction

WIRING DIAGRAM:

CVT control system <Ref. to WI(HEV)-86, CVT Control System.>



Step		Check	Yes	No
1	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the TCM connector. 3) Measure the resistance of harness between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 3 — Chassis ground:*** ***(B54) No. 16 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **4**.	Go to step **2**.
2	**CHECK HARNESS.** 1) Disconnect the transmission connector. 2) Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 5 — Transmission body:*** ***(T4) No. 9 — Transmission body:***	Is the resistance 1 MΩ or more?	Repair the short circuit of body harness.	Go to step **3**.
3	**CHECK HARNESS INSIDE TRANSMISSION.** **CAUTION:** **Start work after ATF cools down.** 1) Remove the transmission valve cover. 2) Check for the harness pinch, damage.	Is there any fault in the harness?	Replace the transmission harness.	Go to step **4**.

	Step	Check	Yes	No
4	**CHECK ATF TEMPERATURE SENSOR.** Measure the resistance between transmission connector terminals. ***Connector & terminal*** ***(T11) No. 1 — No. 6:*** NOTE: Perform the measurement under multiple oil temperatures.	Is resistance as follows? Fluid temperature 0°C → Approx. 6.0 kΩ Fluid temperature 20°C → Approx. 2.5 kΩ Fluid temperature 80°C → Approx. 330 Ω	Replace the TCM. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>	Replace the control valve body. <Ref. to CVT(TH58A)-115, Control Valve Body.>

K: DTC P0713 TRANSMISSION FLUID TEMPERATURE SENSOR CIRCUIT HIGH INPUT

DTC DETECTING CONDITION:

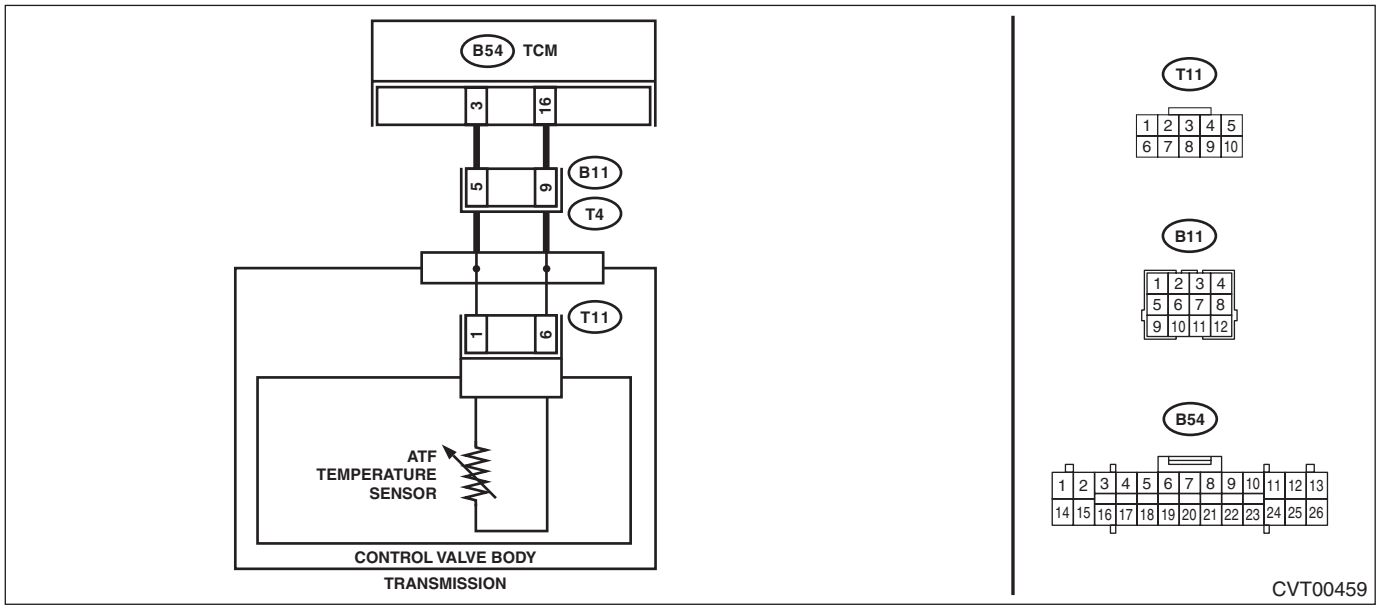
- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(CVT)(HEV)-16, DTC P0713 TRANSMISSION FLUID TEMPERATURE SENSOR CIRCUIT HIGH INPUT, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

- Excessive shift shock
- Shift characteristics malfunction

WIRING DIAGRAM:

CVT control system <Ref. to WI(HEV)-86, CVT Control System.>



Step		Check	Yes	No
1	**CHECK HARNESS.** 1) Turn the ignition switch to ON. 2) Measure the voltage between TCM connectors. ***Connector & terminal*** ***(B54) No. 3 (+) — (B54) No. 16 (–):***	Is the voltage 5 V or more?	Repair the short circuit of harness.	Go to step **2**.
2	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the TCM and transmission connectors. 3) Measure the resistance between TCM connector and transmission connectors. ***Connector & terminal*** ***(B54) No. 3 — (B11) No. 5:*** ***(B54) No. 16 — (B11) No. 9:***	Is the resistance less than 1 Ω?	Go to step **3**.	Repair the open circuit of body harness.
3	**CHECK ATF TEMPERATURE SENSOR.** Measure the resistance between transmission connector terminals. ***Connector & terminal*** ***(T4) No. 5 — No. 9:***	Is the resistance 1 MΩ or more?	Go to step **4**.	Go to step **5**.

	Step	Check	Yes	No
4	**CHECK HARNESS.** **CAUTION:** **Start work after ATF cools down.** 1) Remove the transmission valve cover. 2) Measure the resistance between transmission connector and control valve body connector. ***Connector & terminal*** ***(T4) No. 5 — (T11) No. 1:*** ***(T4) No. 9 — (T11) No. 6:***	Is the resistance less than 1 Ω?	Repair the open circuit of transmission harness on the control valve side.	Repair the open circuit of transmission harness on the outside of the transmission.
5	**CHECK ATF TEMPERATURE SENSOR.** 1) Connect the connectors to TCM and transmission. 2) Start the engine. 3) Warm up until the ATF temperature exceeds 50°C (122°F). 4) Turn the ignition switch to OFF. 5) Disconnect the transmission connector. 6) Measure the resistance between transmission connector terminals. ***Connector & terminal*** ***(T4) No. 5 — No. 9:***	Is the resistance 650 — 990 Ω?	Go to step **6**.	Go to step **8**.
6	**CHECK ATF TEMPERATURE SENSOR.** Measure the resistance between transmission connector terminals. ***Connector & terminal*** ***(T4) No. 5 — No. 9:***	Does the resistance value increase gradually while the ATF temperature decreases?	Go to step **7**.	Replace the control valve body. <Ref. to CVT(TH58A)-115, Control Valve Body.>
7	**CHECK INPUT SIGNAL FOR TCM.** 1) Connect the transmission connector. 2) Turn the ignition switch to ON. (Do not start engine.) 3) Read the data of «ATF Temp.» using the Subaru Select Monitor.	Does the ATF temperature gradually decrease?	Check for poor contact of the ATF temperature sensor and transmission connector harness, and repair the defective part.	Go to step **8**.
8	**CHECK FOR POOR CONTACT.**	Is there poor contact of ATF temperature sensor circuit?	Repair the poor contact.	Replace the TCM. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>

L: DTC P0716 TORQUE CONVERTER TURBINE SPEED

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(CVT)(HEV)-17, DTC P0716 TORQUE CONVERTER TURBINE SPEED, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

- Shock occurs when selecting shift position.
- Shift characteristics malfunction

	Step	Check	Yes	No
1	**CHECK DTC.** Read the DTC using Subaru Select Monitor.	Besides DTC P0716, is DTC U0100 or U0401 displayed?	Perform the diagnosis according to DTCs other than P0716.	Perform the diagnosis according to DTC P0717. <Ref. to CVT(HEV)(diag)-57, DTC P0717 INPUT/TURBINE SPEED SENSOR "A" CIRCUIT NO SIGNAL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

M: DTC P0717 INPUT/TURBINE SPEED SENSOR "A" CIRCUIT NO SIGNAL

DTC DETECTING CONDITION:

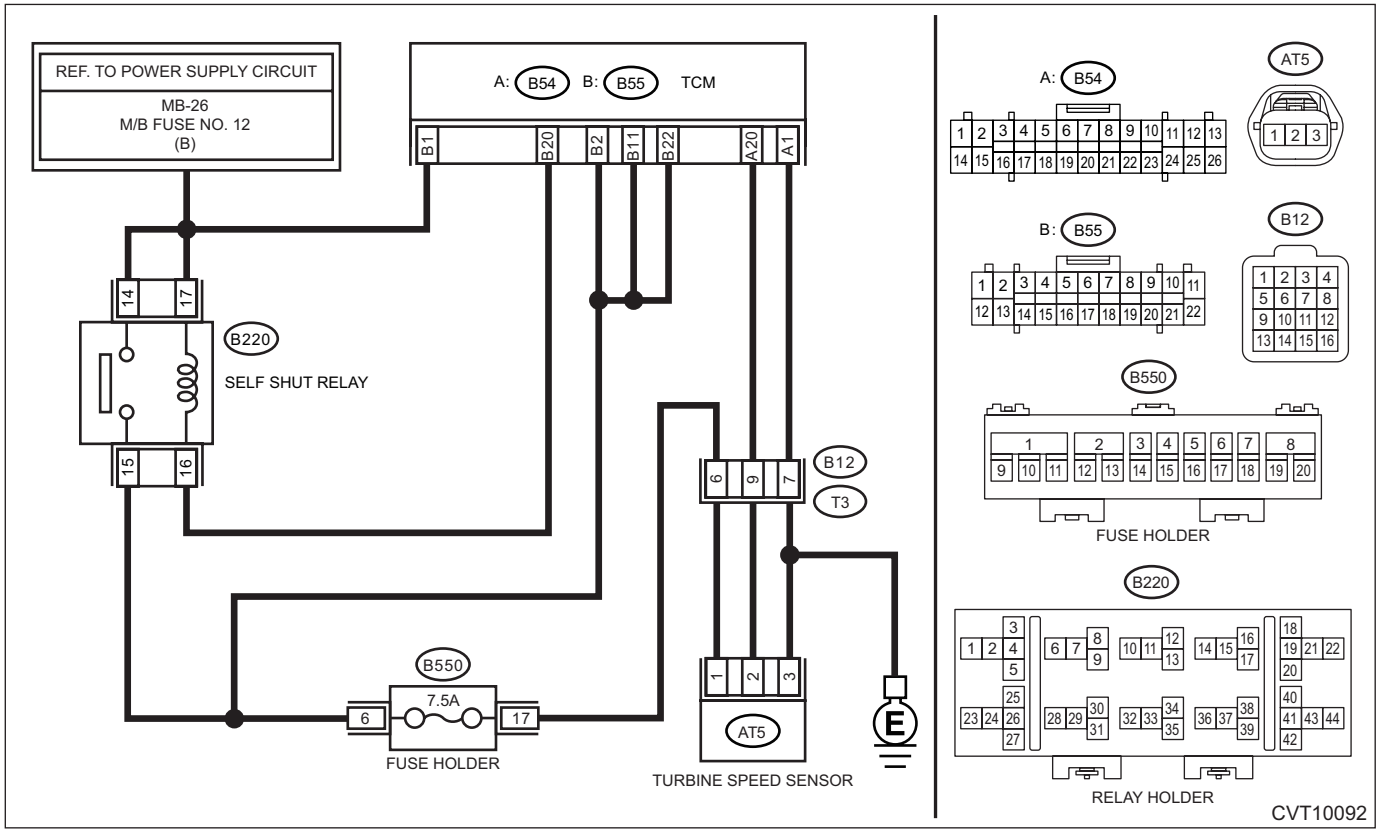
- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(CVT)(HEV)-18, DTC P0717 INPUT/TURBINE SPEED SENSOR "A" CIRCUIT NO SIGNAL, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

- Standing start problems
- Shock occurs when engaging the lockup clutch.
- Shock occurs when selecting shift position.
- Shock occurs when engine starts from EV traveling.

WIRING DIAGRAM:

CVT control system <Ref. to WI(HEV)-86, CVT Control System.>



Step		Check	Yes	No
1	**CHECK FUSE.** 1) Turn the ignition switch to OFF. 2) Remove the fuse (7.5 A) from the fuse holder.	Is the fuse blown out?	Replace the fuse. If the replaced fuse blows out easily, repair the short circuit of harness.	Go to step **2**.
2	**CHECK HARNESS.** 1) Disconnect the TCM and self shut relay connectors. 2) Measure the resistance between TCM connector and self shut relay connector. ***Connector & terminal*** ***(B55) No. 20 — (B220) No. 16:*** ***(B55) No. 2 — (B220) No. 15:*** ***(B55) No. 11 — (B220) No. 15:*** ***(B55) No. 22 — (B220) No. 15:***	Is the resistance less than 1 Ω?	Go to step **3**.	Repair the open circuit of harness.

	Step	Check	Yes	No
3	**CHECK HARNESS.** Measure the resistance between TCM connector and chassis ground. ***Connector & terminal*** ***(B55) No. 20 — Chassis ground:*** ***(B55) No. 2 — Chassis ground:*** ***(B55) No. 11 — Chassis ground:*** ***(B55) No. 22 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **4**.	Repair the short circuit of harness.
4	**CHECK RELAY POWER SUPPLY.** Measure the voltage between self shut relay connector and chassis ground. ***Connector & terminal*** ***(B220) No. 14 (+) — Chassis ground (–):*** ***(B220) No. 17 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **5**.	Repair the open or short circuit of harness.
5	**CHECK SELF SHUT RELAY.** Measure the resistance between self shut relay terminals. ***Terminals*** ***No. 16 — No. 17:***	Is the resistance 110 — 140 Ω?	Go to step **6**.	Replace the self shut relay.
6	**CHECK SELF SHUT RELAY.** Measure the resistance between self shut relay terminals. ***Terminals*** ***No. 14 — No. 15:***	Is the resistance 1 MΩ or more?	Go to step **7**.	Replace the self shut relay.
7	**CHECK INPUT SIGNAL FOR TCM.** 1) Connect the connectors of TCM and self shut relay. 2) Read the data of «Control module voltage» using Subaru Select Monitor.	Is the «Control module voltage» 10 V or more?	Current condition is normal. Check for poor contact in connectors or harnesses, and repair the defective part.	Go to step **8**.
8	**CHECK INPUT SIGNAL FOR TCM.** 1) Lift up the vehicle. 2) Start the engine. 3) Set the select lever to “D” range. 4) While the vehicle is at a standstill, read the data of «Turbine Revolution Speed» and «Primary Pulley Speed» using Subaru Select Monitor.	Is the value of «Turbine Revolution Speed» and «Primary Pulley Speed» 0 rpm?	Go to step **9**.	Check the turbine speed sensor circuit.
9	**CHECK INPUT SIGNAL FOR TCM.** Read the data of «Turbine Revolution Speed» and «Primary Pulley Speed» using Subaru Select Monitor.	Does the value of «Turbine Revolution Speed» and «Primary Pulley Speed» change according to the engine speed?	Current condition is normal.	Go to step **10**.
10	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the TCM and transmission connectors. 3) Measure the resistance between TCM connector and transmission connectors. ***Connector & terminal*** ***(B54) No. 1 — (B12) No. 7:*** ***(B54) No. 20 — (B12) No. 9:*** ***(B550) No. 17 — (B12) No. 6:***	Is the resistance less than 1 Ω?	Go to step **11**.	Repair the open circuit of harness.
11	**CHECK HARNESS.** Measure the resistance between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 20 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **12**.	Repair the short circuit of harness.

	Step	Check	Yes	No
12	**CHECK HARNESS.** Measure the resistance between self shut relay connector and fuse holder. ***Connector & terminal*** ***(B220) No. 15 — (B550) No. 6:***	Is the resistance less than 1 Ω?	Go to step **13**.	Repair the open circuit of harness.
13	**CHECK TRANSMISSION HARNESS.** 1) Install the fuse. 2) Connect the TCM connector. 3) Turn the ignition switch to ON. 4) Measure the voltage between transmission connector. ***Connector & terminal*** ***(B12) No. 6 (+) — Chassis ground (–):***	Is the voltage 10 — 13 V?	Go to step **14**.	Repair the open circuit of harness or poor contact of connector.
14	**CHECK TRANSMISSION HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the transmission connector. 3) Lift up the vehicle. 4) Disconnect the turbine speed sensor connector. 5) Measure the resistance between transmission connector and turbine speed sensor connector. ***Connector & terminal*** ***(T3) No. 6 — (AT5) No. 1:*** ***(T3) No. 7 — (AT5) No. 3:*** ***(T3) No. 9 — (AT5) No. 2:***	Is the resistance less than 1 Ω?	Go to step **15**.	Replace the transmission harness.
15	**CHECK TURBINE SPEED SENSOR HARNESS.** Measure the resistance between transmission connector and chassis ground. ***Connector & terminal*** ***(T3) No. 6 — Chassis ground:*** ***(T3) No. 9 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **16**.	Repair the short circuit of harness.
16	**CHECK TURBINE SPEED SENSOR.** 1) Turn the ignition switch to OFF. 2) Replace the turbine speed sensor. <Ref. to CVT(TH58A)-104, Turbine Speed Sensor.> 3) Perform the Clear Memory Mode. <Ref. to CVT(HEV)(diag)-20, Clear Memory Mode.> 4) Read the DTC.	Is DTC P0717 displayed?	Go to step **17**.	The original turbine speed sensor is defective.
17	**CHECK SELF SHUT RELAY.** 1) Turn the ignition switch to OFF. 2) Replace the self shut relay. 3) Perform the Clear Memory Mode. <Ref. to CVT(HEV)(diag)-20, Clear Memory Mode.> 4) Read the DTC.	Is DTC P0717 displayed?	Replace the TCM. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>	The original self shut relay is defective.

N: DTC P0719 BRAKE SWITCH CIRCUIT LOW

DTC DETECTING CONDITION:

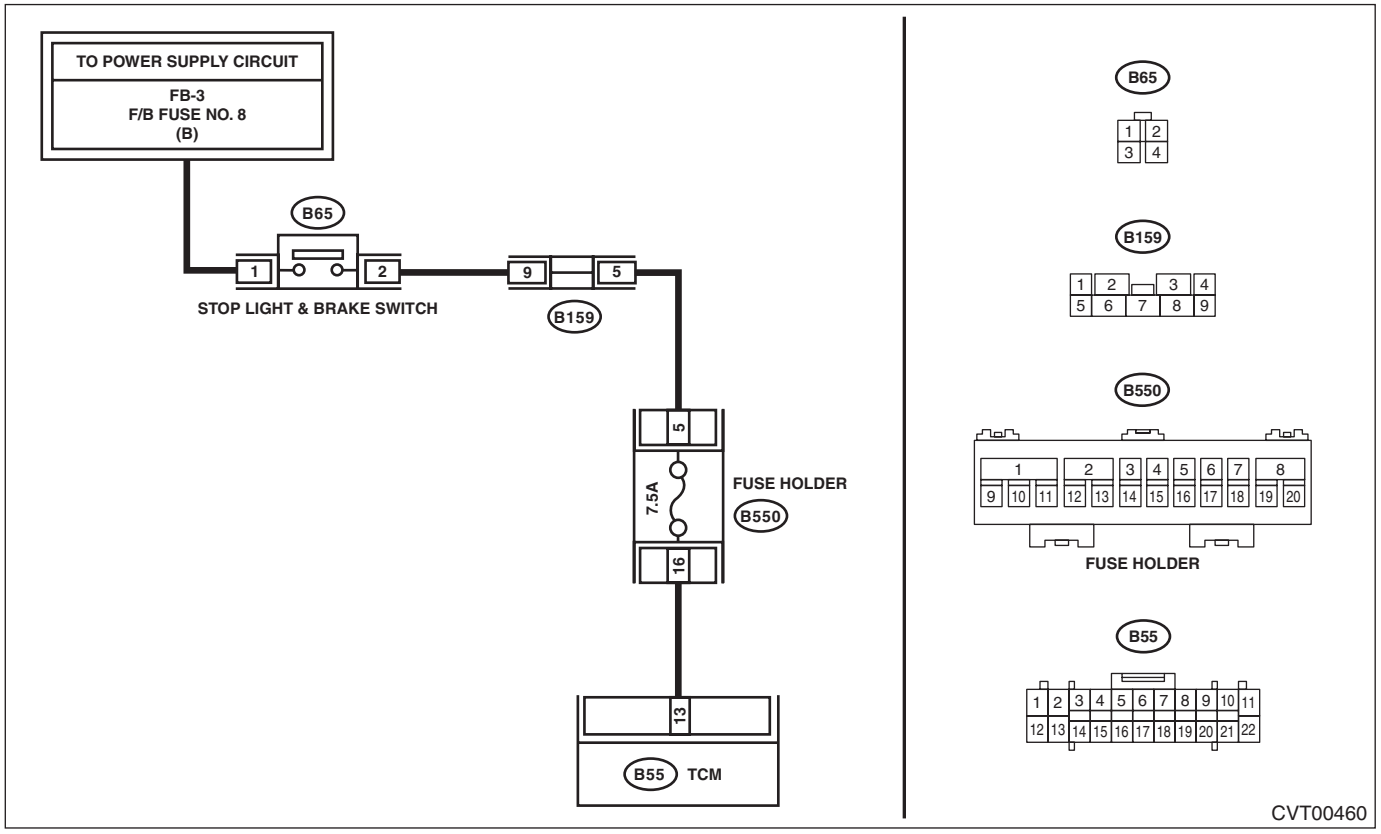
- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(CVT)(HEV)-19, DTC P0719 BRAKE SWITCH CIRCUIT LOW, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

Symptoms such as shift-down not operating may occur.

WIRING DIAGRAM:

Stop light system <Ref. to WI(HEV)-210, Stop Light System.>



Step		Check	Yes	No
1	**CHECK FUSE (NO. 8).** 1) Turn the ignition switch to OFF. 2) Remove the fuse (No. 8).	Is the fuse (No. 8) blown out?	Replace the fuse (No. 8). If the new fuse (No. 8) has blown out easily, repair the short circuit of harness between fuse (No. 8) and stop light switch.	Go to step **2**.
2	**CHECK FUSE.** Remove the fuse (7.5 A) from the fuse holder.	Is the fuse (7.5 A) blown out?	Replace the fuse (7.5 A). If the replaced fuse (7.5 A) blows out easily, repair the short circuit of harness between fuse (7.5 A) and TCM.	Go to step **3**.

	Step	Check	Yes	No
3	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the TCM and stop light switch connector. 3) Measure the resistance between TCM connector and stop light switch connector. ***Connector & terminal*** ***(B55) No. 13 — (B65) No. 2:***	Is the resistance less than 1 Ω?	Go to step **4**.	Repair the open circuit of harness.
4	**CHECK HARNESS.** Measure the resistance between the stop light switch connector and fuse (No. 8). ***Connector & terminal*** ***(B65) No. 1 — fuse (No. 8):***	Is the resistance less than 1 Ω?	Go to step **5**.	Repair the open circuit of harness.
5	**CHECK INPUT SIGNAL FOR TCM.** 1) Install the fuse (No. 8). 2) Connect the TCM and stop light switch connector. 3) Depress the brake pedal. 4) Measure the voltage between TCM connector and chassis ground. ***Connector & terminal*** ***(B55) No. 13 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **6**.	Replace the stop light switch. <Ref. to BR-74, Stop Light Switch.>
6	**CHECK INPUT SIGNAL FOR TCM.** With brake pedal depressed, read the data of «Stop Light Switch» using Subaru Select Monitor.	Is “ON” displayed?	Current condition is normal. Check for poor contact in connectors or harnesses, and repair the defective part.	Go to step **7**.
7	**CHECK FOR POOR CONTACT.**	Is there poor contact of input signal of stop light switch?	Repair the poor contact.	Replace the TCM. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>

O: DTC P0720 OUTPUT SPEED SENSOR CIRCUIT

DTC DETECTING CONDITION:

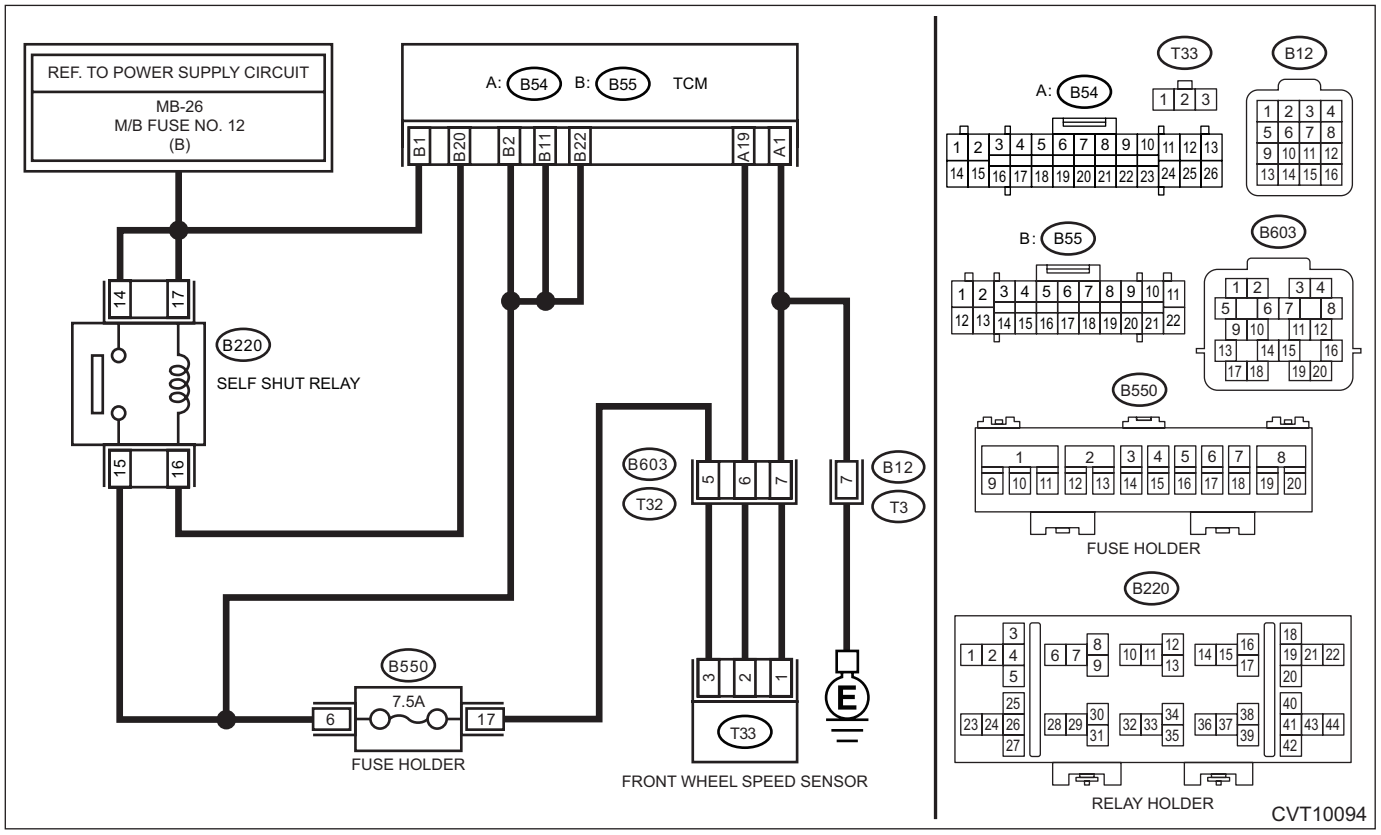
- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(CVT)(HEV)-20, DTC P0720 OUTPUT SPEED SENSOR CIRCUIT, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

Symptoms such as vehicle-vibration may occur.

WIRING DIAGRAM:

CVT control system <Ref. to WI(HEV)-86, CVT Control System.>



Step		Check	Yes	No
1	**CHECK FUSE.** 1) Turn the ignition switch to OFF. 2) Remove the fuse (7.5 A) from the fuse holder.	Is the fuse blown out?	Replace the fuse. If the replaced fuse blows out easily, repair the short circuit of harness.	Go to step **2**.
2	**CHECK HARNESS.** 1) Disconnect the TCM and self shut relay connectors. 2) Measure the resistance between TCM connector and self shut relay connector. ***Connector & terminal*** ***(B55) No. 20 — (B220) No. 16:*** ***(B55) No. 2 — (B220) No. 15:*** ***(B55) No. 11 — (B220) No. 15:*** ***(B55) No. 22 — (B220) No. 15:***	Is the resistance less than 1 Ω?	Go to step **3**.	Repair the open circuit of harness.

	Step	Check	Yes	No
3	**CHECK HARNESS.** Measure the resistance between TCM connector and chassis ground. ***Connector & terminal*** ***(B55) No. 20 — Chassis ground:*** ***(B55) No. 2 — Chassis ground:*** ***(B55) No. 11 — Chassis ground:*** ***(B55) No. 22 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **4**.	Repair the short circuit of harness.
4	**CHECK RELAY POWER SUPPLY.** Measure the voltage between self shut relay connector and chassis ground. ***Connector & terminal*** ***(B220) No. 14 (+) — Chassis ground (–):*** ***(B220) No. 17 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **5**.	Repair the open or short circuit of harness.
5	**CHECK SELF SHUT RELAY.** Measure the resistance between self shut relay terminals. ***Terminals*** ***No. 16 — No. 17:***	Is the resistance 110 — 140 Ω?	Go to step **6**.	Replace the self shut relay.
6	**CHECK SELF SHUT RELAY.** Measure the resistance between self shut relay terminals. ***Terminals*** ***No. 14 — No. 15:***	Is the resistance 1 MΩ or more?	Go to step **7**.	Replace the self shut relay.
7	**CHECK INPUT SIGNAL FOR TCM.** 1) Connect the connectors of TCM and self shut relay. 2) Read the data of «Control module voltage» using Subaru Select Monitor.	Is the «Control module voltage» 10 V or more?	Current condition is normal. Check for poor contact in connectors or harnesses, and repair the defective part.	Go to step **8**.
8	**CHECK INPUT SIGNAL FOR TCM.** 1) Lift up the vehicle. 2) Start the engine. 3) Slowly increase the speed to 30 km/h (18 MPH). 4) Read the data of «Front Wheel Speed» using Subaru Select Monitor.	Does the value of «Front Wheel Speed» change according to the engine speed?	Current condition is normal.	Go to step **9**.
9	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the TCM and transmission connectors. 3) Measure the resistance between TCM connector and transmission connectors. ***Connector & terminal*** ***(B54) No. 1 — (B12) No. 7:*** ***(B54) No. 1 — (B603) No. 7:*** ***(B54) No. 19 — (B603) No. 6:*** ***(B550) No. 17 — (B603) No. 5:***	Is the resistance less than 1 Ω?	Go to step **10**.	Repair the open circuit of harness.
10	**CHECK HARNESS.** Measure the resistance between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 19 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **11**.	Repair the short circuit of harness.
11	**CHECK HARNESS.** Measure the resistance between self shut relay connector and fuse holder. ***Connector & terminal*** ***(B220) No. 15 — (B550) No. 6:***	Is the resistance less than 1 Ω?	Go to step **12**.	Repair the open circuit of harness.

	Step	Check	Yes	No
12	**CHECK TRANSMISSION HARNESS.** 1) Install the fuse. 2) Connect the TCM connector. 3) Turn the ignition switch to ON. 4) Measure the voltage between transmission connector. ***Connector & terminal*** ***(B603) No. 5 (+) — Chassis ground (–):***	Is the voltage 10 — 13 V?	Go to step **13**.	Repair the open circuit of harness or poor contact of connector.
13	**CHECK TRANSMISSION HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the transmission connector. 3) Lift up the vehicle. 4) Disconnect the front wheel speed sensor connector. 5) Measure the resistance between transmission connector and front wheel speed sensor connector. ***Connector & terminal*** ***(T32) No. 5 — (T33) No. 3:*** ***(T32) No. 6 — (T33) No. 2:*** ***(T32) No. 7 — (T33) No. 1:***	Is the resistance less than 1 Ω?	Go to step **14**.	Replace the transmission harness.
14	**CHECK FRONT WHEEL SPEED SENSOR HARNESS.** Measure the resistance between transmission connector and chassis ground. ***Connector & terminal*** ***(T32) No. 5 — Chassis ground:*** ***(T32) No. 6 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **15**.	Repair the short circuit of harness.
15	**CHECK FRONT WHEEL SPEED SENSOR.** 1) Turn the ignition switch to OFF. 2) Replace the front wheel speed sensor. <Ref. to CVT(TH58A)-108, Front Wheel Speed Sensor.> 3) Perform the Clear Memory Mode. <Ref. to CVT(HEV)(diag)-20, Clear Memory Mode.> 4) Read the DTC.	Is DTC P0720 displayed?	Go to step **16**.	The original front wheel speed sensor is defective.
16	**CHECK SELF SHUT RELAY.** 1) Turn the ignition switch to OFF. 2) Replace the self shut relay. 3) Perform the Clear Memory Mode. <Ref. to CVT(HEV)(diag)-20, Clear Memory Mode.> 4) Read the DTC.	Is DTC P0720 displayed?	Replace the TCM. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>	The original self shut relay is defective.

P: DTC P0721 OUTPUT SHAFT SPEED SENSOR CIRCUIT RANGE/PERFORMANCE

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(CVT)(HEV)-21, DTC P0721 OUTPUT SHAFT SPEED SENSOR CIRCUIT RANGE/PERFORMANCE, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

- Acceleration is poor during standing start.
- No lock-up occurs.
- The engine stalls when the vehicle is stopped.
- Shift control malfunction

Step		Check	Yes	No
1	**CHECK DTC.** Read the DTC using Subaru Select Monitor.	Besides DTC P0721, is any of the DTC P0500, U0122 or U0416 displayed?	Perform the diagnosis according to DTCs other than P0721.	Perform the diagnosis according to DTC P0720. <Ref. to CVT(HEV)(diag)-62, DTC P0720 OUTPUT SPEED SENSOR CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

Q: DTC P0724 BRAKE SWITCH CIRCUIT HIGH

DTC DETECTING CONDITION:

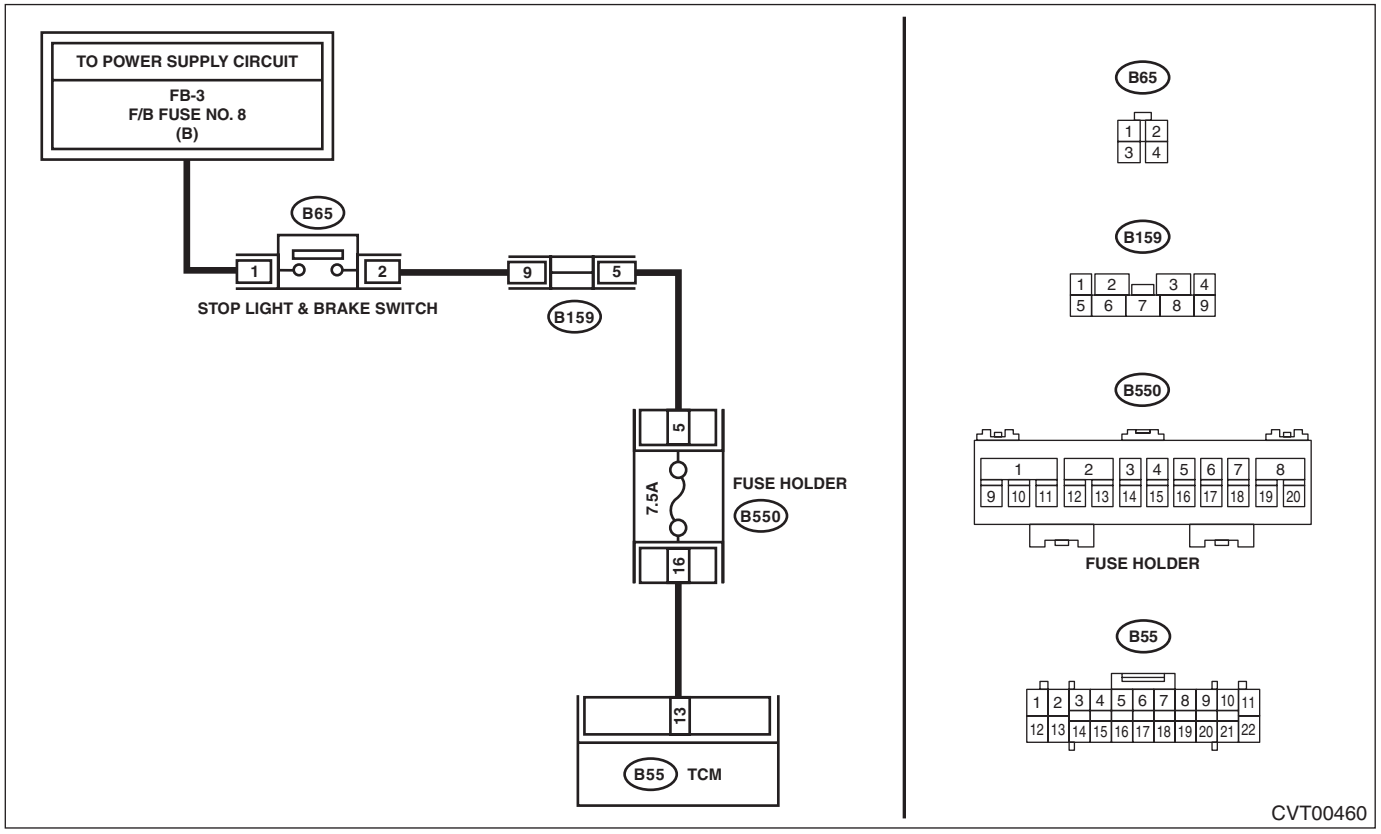
- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(CVT)(HEV)-22, DTC P0724 BRAKE SWITCH CIRCUIT HIGH, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

Symptoms such as shift-down not operating may occur.

WIRING DIAGRAM:

Stop light system <Ref. to WI(HEV)-210, Stop Light System.>



Step		Check	Yes	No
1	**CHECK STOP LIGHT SWITCH.** 1) Turn the ignition switch to OFF. 2) Disconnect the stop light switch connector. 3) Measure the resistance of harness between stop light switch connectors. ***Connector & terminal*** ***(B65) No. 1 — No. 2:***	Is the resistance 1 MΩ or more?	Go to step **2**.	Replace the stop light switch. <Ref. to BR-74, Stop Light Switch.>
2	**CHECK HARNESS.** 1) Disconnect the TCM connector. 2) Turn the ignition switch to ON. 3) Measure the voltage between TCM connector and chassis ground. ***Connector & terminal*** ***(B55) No. 13 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Repair the short circuit of harness.	Go to step **3**.
3	**CHECK INPUT SIGNAL FOR TCM.** 1) Connect the TCM and stop light switch connector. 2) Turn the ignition switch to ON. 3) Read the data of «Stop Light Switch» using Subaru Select Monitor.	Is “OFF” displayed?	Current condition is normal. Check for poor contact in connectors or harnesses, and repair the defective part.	Go to step **4**.

Step		Check	Yes	No
4	CHECK FOR POOR CONTACT.	Is there poor contact of input signal of stop light switch?	Repair the poor contact.	Replace the TCM. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>

R: DTC P0730 GEARSHIFT CONTROL PERFORMANCE ABNORMAL

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(CVT)(HEV)-23, DTC P0730 GEARSHIFT CONTROL PERFORMANCE ABNORMAL, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

- Acceleration is poor during standing start.
- Shift control malfunction
- Engine speed increases abruptly.

	Step	Check	Yes	No
1	**CHECK TRANSMISSION FLUID.** Check the amount of ATF. <Ref. to CVT(TH58A)-41, ADJUSTMENT, CVTF.>	Is the ATF amount correct?	Go to step **2**.	Adjust the amount of ATF. <Ref. to CVT(TH58A)-41, ADJUSTMENT, CVTF.>
2	**CHECK TRANSMISSION FLUID.** Check the condition of ATF. <Ref. to CVT(TH58A)-44, CONDITION CHECK, CVTF.>	Is the ATF OK?	Go to step **3**.	Check according to the “Corrective action” of ATF (CVTF) “CONDITION CHECK”. <Ref. to CVT(TH58A)-44, CONDITION CHECK, CVTF.>
3	**CHECK INPUT SIGNAL FOR TCM.** 1) Lift up the vehicle. 2) Start the engine. 3) Warm up until the ATF temperature reaches to 40 — 70°C (104 — 158°F). 4) Depress the brake pedal, and shift the select lever to “D” range. 5) Shift the select lever to “P” range. 6) Stabilize the engine speed at idle. 7) Read the data of «Actual secondary pressure» using Subaru Select Monitor.	Is the «Actual secondary pressure» 0.5 — 1.5 MPa?	Go to step **4**.	Perform the diagnosis according to DTC P0841. <Ref. to CVT(HEV)(diag)-86, DTC P0841 SECONDARY OIL PRESSURE SENSOR PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
4	**CHECK INPUT SIGNAL FOR TCM.** 1) Set the select lever to “D” range. 2) Release the brake pedal to stabilize the engine speed and front wheel speed. 3) Read the data of «Actual Gear Ratio» using Subaru Select Monitor.	Is the «Actual Gear Ratio» 1.5 — 2.6?	Go to step **5**.	Go to step **6**.
5	**CHECK INPUT SIGNAL FOR TCM.** 1) Set the select lever to “D” range. 2) Slowly increase the speed to 40 km/h (24 MPH) and keep the constant speed. 3) Read the data of «Actual Gear Ratio» using Subaru Select Monitor.	Is the «Actual Gear Ratio» 0.5 — 0.9?	Go to step **6**.	Replace the transmission assembly. <Ref. to CVT(TH58A)-63, Automatic Transmission Assembly.>
6	**DRIVING CHECK BY INSPECTION MODE.** 1) Turn the ignition switch to OFF. 2) Perform a drive check based on the “Inspection Mode”. <Ref. to CVT(HEV)(diag)-21, Inspection Mode.>	Does the AT OIL TEMP light blink and is DTC P0730 detected?	Replace the transmission assembly. <Ref. to CVT(TH58A)-63, Automatic Transmission Assembly.>	Current condition is normal. It is possible that temporary poor contact occurs.

S: DTC P0746 PRESSURE CONTROL SOLENOID "A" PERFORMANCE/STUCK OFF

DTC DETECTING CONDITION:

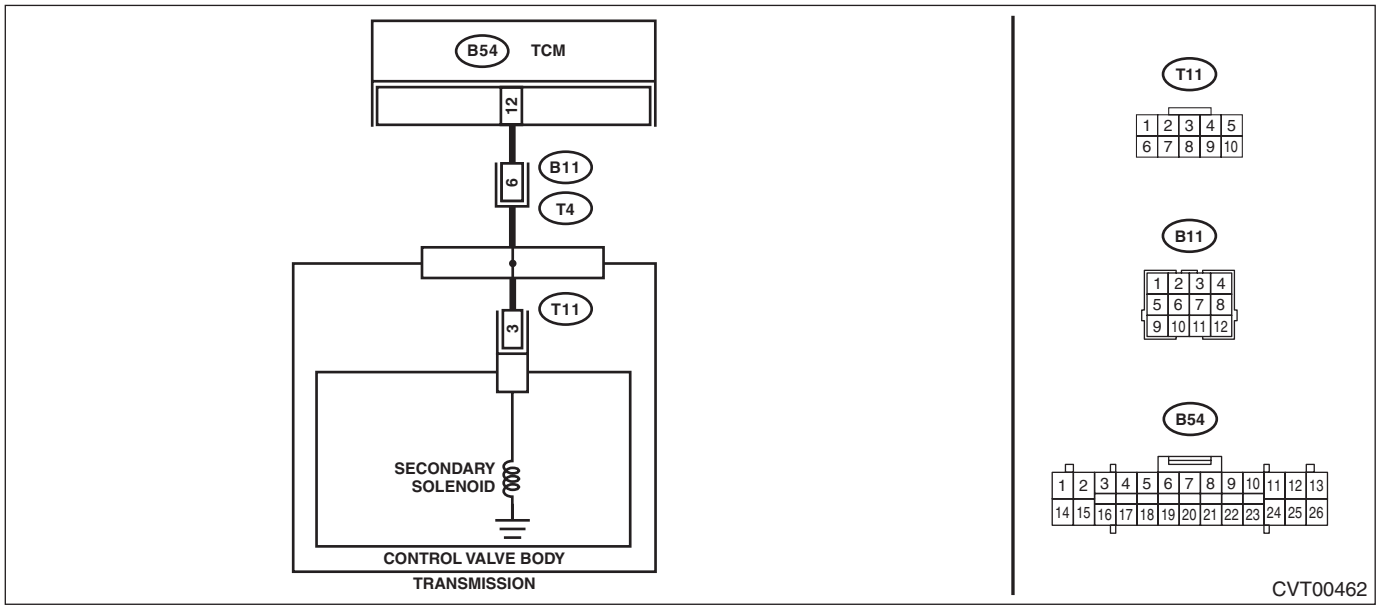
- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(CVT)(HEV)-24, DTC P0746 PRESSURE CONTROL SOLENOID "A" PERFORMANCE/STUCK OFF, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

- Shift control malfunction
- CVT chain slippage

WIRING DIAGRAM:

CVT control system <Ref. to WI(HEV)-86, CVT Control System.>



	Step	Check	Yes	No
1	**CHECK DTC.** Read the DTC using Subaru Select Monitor.	Besides DTC P0746, is any of the DTCs P0842, P0843, P0962 and P0963 displayed?	Perform the diagnosis according to DTCs other than P0746.	Go to step **2**.
2	**CHECK SECONDARY SOLENOID.** 1) Turn the ignition switch to OFF. 2) Disconnect the transmission connector. 3) Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 6 — Transmission body:***	Is the resistance approx. 5 — 7 Ω? (when cold)	Go to step **4**.	Go to step **3**.
3	**CHECK HARNESS.** Check the harness for continuity.	Is the harness normal? (Is it free from defects such as open circuit, power supply-output short or GND-output short circuit, or poor contact?)	Go to step **4**.	Repair the harness.
4	**CHECK TRANSMISSION FLUID.** 1) Connect the transmission connector. 2) Check the amount of ATF. <Ref. to CVT(TH58A)-41, ADJUSTMENT, CVTF.>	Is the ATF amount correct?	Go to step **5**.	Adjust the amount of ATF. <Ref. to CVT(TH58A)-41, ADJUSTMENT, CVTF.>

	Step	Check	Yes	No
5	**CHECK TRANSMISSION FLUID.** Check the condition of ATF. <Ref. to CVT(TH58A)-44, CONDITION CHECK, CVTF.>	Is the ATF OK?	Go to step **6**.	Check according to the "Corrective action" of ATF (CVTF) "CONDITION CHECK". <Ref. to CVT(TH58A)-44, CONDITION CHECK, CVTF.>
6	**CHECK INPUT SIGNAL FOR TCM.** 1) Lift up the vehicle. 2) Start the engine. 3) Warm up until the ATF temperature reaches to 40 — 70°C (104 — 158°F). 4) Depress the brake pedal, and shift the select lever to "D" range. 5) Shift the select lever to "P" range. 6) Stabilize the engine speed at idle. 7) Read the data of «Actual secondary pressure» using Subaru Select Monitor.	Is the «Actual secondary pressure» 0.5 — 1.5 MPa?	Go to step **7**.	Replace the control valve body. <Ref. to CVT(TH58A)-115, Control Valve Body.>
7	**CHECK INPUT SIGNAL FOR TCM.** 1) Keep the engine speed at 3,000 rpm. 2) Read the data of «Actual secondary pressure» using Subaru Select Monitor.	Is the «Actual secondary pressure» higher than step 6 value? Does the value change according to the engine speed?	Go to step **8**.	Replace the control valve body. <Ref. to CVT(TH58A)-115, Control Valve Body.>
8	**CHECK TCM INPUT SIGNAL (STALL TEST).** 1) Apply the parking brake. 2) Set the select lever to "D" range. 3) Depress the brake pedal firmly. 4) Slowly open the accelerator fully, and stabilize the engine speed. 5) Read the data of «Actual secondary pressure» using Subaru Select Monitor. **CAUTION:** **Do not perform a stall test for over 5 seconds at a time.**	Is the «Actual secondary pressure» higher than step 7 value? Does the value change according to the engine speed?	Go to step **9**.	Replace the control valve body. <Ref. to CVT(TH58A)-115, Control Valve Body.>
9	**DRIVING CHECK BY INSPECTION MODE.** 1) Turn the ignition switch to OFF. 2) Perform a drive check based on the "Inspection Mode". <Ref. to CVT(HEV)(diag)-21, Inspection Mode.>	Does the AT OIL TEMP light blink and is DTC P0746 displayed?	Perform the secondary pressure test. <Ref. to CVT(TH58A)-54, Secondary Pressure (Line Pressure) Test.>	Current condition is normal. It is possible that temporary poor contact occurs.

T: DTC P0747 PRESSURE CONTROL SOLENOID "A" STUCK ON

DTC DETECTING CONDITION:

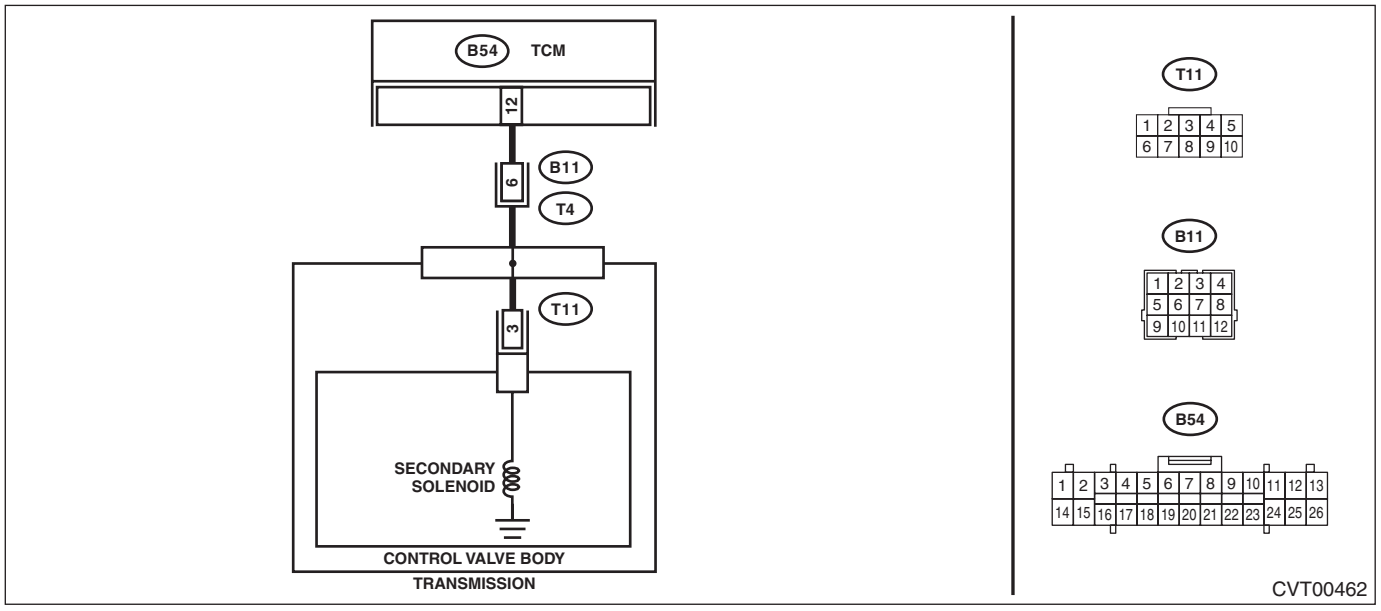
- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(CVT)(HEV)-25, DTC P0747 PRESSURE CONTROL SOLENOID "A" STUCK ON, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

- Acceleration is poor during standing start.
- Shift control malfunction

WIRING DIAGRAM:

CVT control system <Ref. to WI(HEV)-86, CVT Control System.>



	Step	Check	Yes	No
1	**CHECK DTC.** Read the DTC using Subaru Select Monitor.	Besides DTC P0747, is any of the DTCs P0842, P0843, P0962 and P0963 displayed?	Perform the diagnosis according to DTCs other than P0747.	Go to step **2**.
2	**CHECK SECONDARY SOLENOID.** 1) Turn the ignition switch to OFF. 2) Disconnect the transmission connector. 3) Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 6 — Transmission body:***	Is the resistance approx. 5 — 7 Ω? (when cold)	Go to step **4**.	Go to step **3**.
3	**CHECK HARNESS.** Check the harness for continuity.	Is the harness normal? (Is it free from defects such as open circuit, power supply-output short or GND-output short circuit, or poor contact?)	Go to step **4**.	Repair the harness.
4	**CHECK TRANSMISSION FLUID.** 1) Connect the transmission connector. 2) Check the amount of ATF. <Ref. to CVT(TH58A)-41, ADJUSTMENT, CVTF.>	Is the ATF amount correct?	Go to step **5**.	Adjust the amount of ATF. <Ref. to CVT(TH58A)-41, ADJUSTMENT, CVTF.>

	Step	Check	Yes	No
5	**CHECK TRANSMISSION FLUID.** Check the condition of ATF. <Ref. to CVT(TH58A)-44, CONDITION CHECK, CVTF.>	Is the ATF OK?	Go to step **6**.	Check according to the "Corrective action" of ATF (CVTF) "CONDITION CHECK". <Ref. to CVT(TH58A)-44, CONDITION CHECK, CVTF.>
6	**CHECK INPUT SIGNAL FOR TCM.** 1) Lift up the vehicle. 2) Start the engine. 3) Warm up until the ATF temperature reaches to 40 — 70°C (104 — 158°F). 4) Depress the brake pedal, and shift the select lever to "D" range. 5) Shift the select lever to "P" range. 6) Stabilize the engine speed at idle. 7) Read the data of «Actual secondary pressure» using Subaru Select Monitor.	Is the «Actual secondary pressure» 0.5 — 1.5 MPa?	Go to step **7**.	Replace the control valve body. <Ref. to CVT(TH58A)-115, Control Valve Body.>
7	**CHECK INPUT SIGNAL FOR TCM.** 1) Keep the engine speed at 3,000 rpm. 2) Read the data of «Actual secondary pressure» using Subaru Select Monitor.	Is the «Actual secondary pressure» higher than step 6 value? Does the value change according to the engine speed?	Go to step **8**.	Replace the control valve body. <Ref. to CVT(TH58A)-115, Control Valve Body.>
8	**CHECK TCM INPUT SIGNAL (STALL TEST).** 1) Apply the parking brake. 2) Set the select lever to "D" range. 3) Depress the brake pedal firmly. 4) Slowly open the accelerator fully, and stabilize the engine speed. 5) Read the data of «Actual secondary pressure» using Subaru Select Monitor. **CAUTION:** **Do not perform a stall test for over 5 seconds at a time.**	Is the «Actual secondary pressure» higher than step 7 value? Does the value change according to the engine speed?	Go to step **9**.	Replace the control valve body. <Ref. to CVT(TH58A)-115, Control Valve Body.>
9	**DRIVING CHECK BY INSPECTION MODE.** 1) Turn the ignition switch to OFF. 2) Perform a drive check based on the "Inspection Mode". <Ref. to CVT(HEV)(diag)-21, Inspection Mode.>	Does the AT OIL TEMP light blink and is DTC P0747 displayed?	Perform the secondary pressure test. <Ref. to CVT(TH58A)-54, Secondary Pressure (Line Pressure) Test.>	Current condition is normal. It is possible that temporary poor contact occurs.

U: DTC P0751 SHIFT SOLENOID "A" PERFORMANCE/STUCK OFF

DTC DETECTING CONDITION:

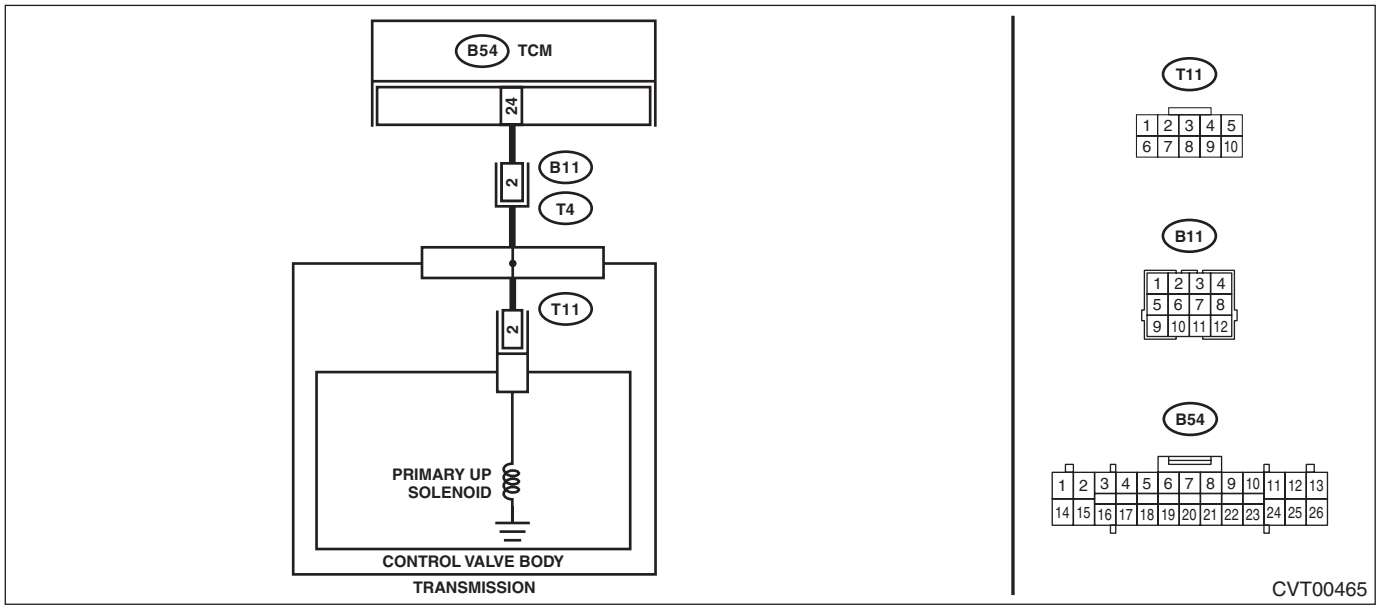
- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(CVT)(HEV)-26, DTC P0751 SHIFT SOLENOID "A" PERFORMANCE/STUCK OFF, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

- Shift control malfunction
- Engine speed increases abruptly.

WIRING DIAGRAM:

CVT control system <Ref. to WI(HEV)-86, CVT Control System.>



Step		Check	Yes	No
1	**CHECK DTC.** Read the DTC using Subaru Select Monitor.	Besides DTC P0751, is any of the DTC P0973, P0974, P0976, P0977, P2751, U0110 or U0411 displayed?	Perform the diagnosis according to DTCs other than P0751.	Go to step **2**.
2	**CHECK PRIMARY UP SOLENOID.** 1) Turn the ignition switch to OFF. 2) Disconnect the transmission connector. 3) Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 2 — Transmission body:***	Is the resistance approx. 10 — 13.5 Ω? (when cold)	Go to step **4**.	Go to step **3**.
3	**CHECK HARNESS.** Check the harness for continuity.	Is the harness normal? (Is it free from defects such as open circuit, power supply-output short or GND-output short circuit, or poor contact?)	Go to step **4**.	Repair the harness.
4	**CHECK TRANSMISSION FLUID.** 1) Connect the transmission connector. 2) Check the amount of ATF. <Ref. to CVT(TH58A)-41, ADJUSTMENT, CVTF.>	Is the ATF amount correct?	Go to step **5**.	Adjust the amount of ATF. <Ref. to CVT(TH58A)-41, ADJUSTMENT, CVTF.>

	Step	Check	Yes	No
5	**CHECK TRANSMISSION FLUID.** Check the condition of ATF. <Ref. to CVT(TH58A)-44, CONDITION CHECK, CVTF.>	Is the ATF OK?	Go to step **6**.	Check according to the "Corrective action" of ATF (CVTF) "CONDITION CHECK". <Ref. to CVT(TH58A)-44, CONDITION CHECK, CVTF.>
6	**CHECK INPUT SIGNAL FOR TCM.** 1) Lift up the vehicle. 2) Start the engine. 3) Warm up until the ATF temperature reaches to 40 — 70°C (104 — 158°F). 4) Depress the brake pedal, and shift the select lever to "D" range. 5) Shift the select lever to "P" range. 6) Stabilize the engine speed at idle. 7) Read the data of «Actual secondary pressure» using Subaru Select Monitor.	Is the «Actual secondary pressure» 0.5 — 1.5 MPa?	Go to step **7**.	Replace the transmission assembly. <Ref. to CVT(TH58A)-63, Automatic Transmission Assembly.>
7	**CHECK INPUT SIGNAL FOR TCM.** 1) Set the select lever to "D" range. 2) Release the brake pedal to stabilize the engine speed and front wheel speed. 3) Read the data of «Actual Gear Ratio» using Subaru Select Monitor.	Is the «Actual Gear Ratio» 1.5 — 2.6?	Go to step **8**.	Replace the transmission assembly. <Ref. to CVT(TH58A)-63, Automatic Transmission Assembly.>
8	**CHECK INPUT SIGNAL FOR TCM.** 1) Set the select lever to "D" range. 2) Slowly increase the speed to 40 km/h (25 MPH) and keep the constant speed. 3) Read the data of «Actual Gear Ratio» using Subaru Select Monitor.	Is the «Actual Gear Ratio» 0.5 — 0.9?	Go to step **9**.	Replace the transmission assembly. <Ref. to CVT(TH58A)-63, Automatic Transmission Assembly.>
9	**DRIVING CHECK BY INSPECTION MODE.** 1) Turn the ignition switch to OFF. 2) Perform a drive check based on the "Inspection Mode". <Ref. to CVT(HEV)(diag)-21, Inspection Mode.>	Does the AT OIL TEMP light blink and is DTC P0751 displayed?	Replace the transmission assembly. <Ref. to CVT(TH58A)-63, Automatic Transmission Assembly.>	Current condition is normal. It is possible that temporary poor contact occurs.

V: DTC P0752 SHIFT SOLENOID "A" STUCK ON

DTC DETECTING CONDITION:

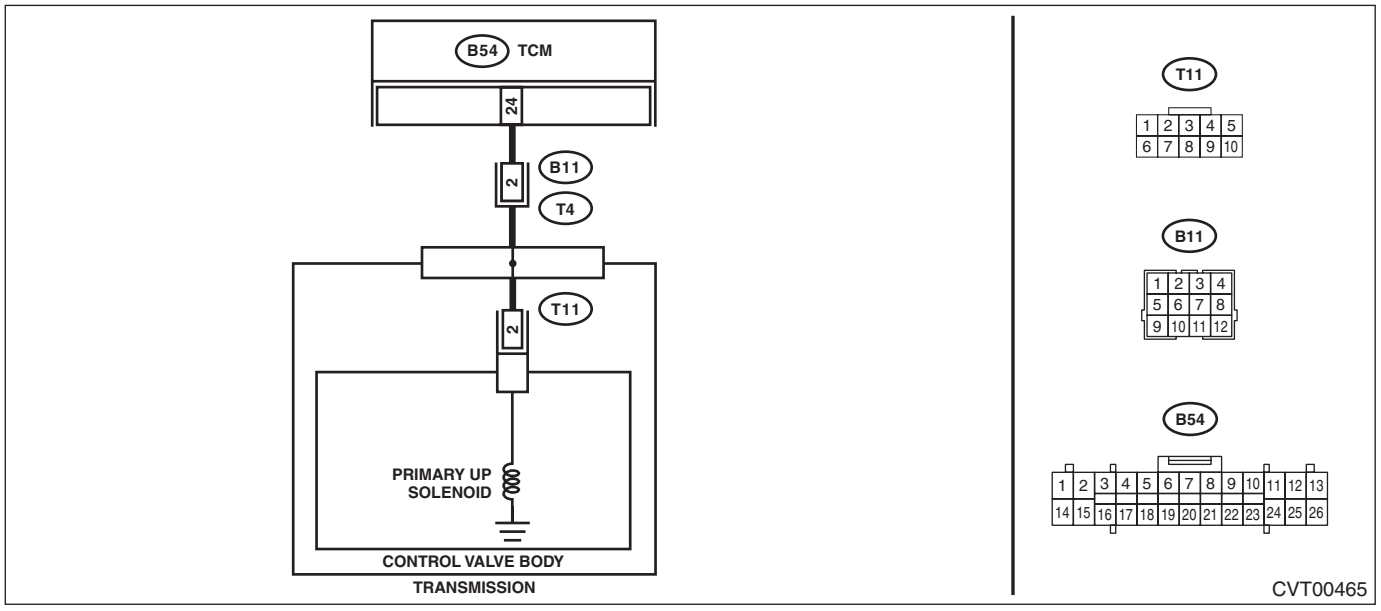
- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(CVT)(HEV)-27, DTC P0752 SHIFT SOLENOID "A" STUCK ON, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

- Acceleration is poor during standing start.
- Shift control malfunction

WIRING DIAGRAM:

CVT control system <Ref. to WI(HEV)-86, CVT Control System.>



Step		Check	Yes	No
1	**CHECK DTC.** Read the DTC using Subaru Select Monitor.	Besides DTC P0752, is any of the DTC P0973, P0974, P0976, P0977, P2751, U0110 or U0411 displayed?	Perform the diagnosis according to DTCs other than P0752.	Go to step **2**.
2	**CHECK PRIMARY UP SOLENOID.** 1) Turn the ignition switch to OFF. 2) Disconnect the transmission connector. 3) Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 2 — Transmission body:***	Is the resistance approx. 10 — 13.5 Ω? (when cold)	Go to step **4**.	Go to step **3**.
3	**CHECK HARNESS.** Check the harness for continuity.	Is the harness normal? (Is it free from defects such as open circuit, power supply-output short or GND-output short circuit, or poor contact?)	Go to step **4**.	Repair the harness.
4	**CHECK TRANSMISSION FLUID.** 1) Connect the transmission connector. 2) Check the amount of ATF. <Ref. to CVT(TH58A)-41, ADJUSTMENT, CVTF.>	Is the ATF amount correct?	Go to step **5**.	Adjust the amount of ATF. <Ref. to CVT(TH58A)-41, ADJUSTMENT, CVTF.>

	Step	Check	Yes	No
5	**CHECK TRANSMISSION FLUID.** Check the condition of ATF. <Ref. to CVT(TH58A)-44, CONDITION CHECK, CVTF.>	Is the ATF OK?	Go to step **6**.	Check according to the "Corrective action" of ATF (CVTF) "CONDITION CHECK". <Ref. to CVT(TH58A)-44, CONDITION CHECK, CVTF.>
6	**CHECK INPUT SIGNAL FOR TCM.** 1) Lift up the vehicle. 2) Start the engine. 3) Warm up until the ATF temperature reaches to 40 — 70°C (104 — 158°F). 4) Depress the brake pedal, and shift the select lever to "D" range. 5) Shift the select lever to "P" range. 6) Stabilize the engine speed at idle. 7) Read the data of «Actual secondary pressure» using Subaru Select Monitor.	Is the «Actual secondary pressure» 0.5 — 1.5 MPa?	Go to step **7**.	Replace the transmission assembly. <Ref. to CVT(TH58A)-63, Automatic Transmission Assembly.>
7	**CHECK INPUT SIGNAL FOR TCM.** 1) Set the select lever to "D" range. 2) Release the brake pedal to stabilize the engine speed and front wheel speed. 3) Read the data of «Actual Gear Ratio» using Subaru Select Monitor.	Is the «Actual Gear Ratio» 1.5 — 2.6?	Go to step **8**.	Replace the transmission assembly. <Ref. to CVT(TH58A)-63, Automatic Transmission Assembly.>
8	**CHECK INPUT SIGNAL FOR TCM.** 1) Set the select lever to "D" range. 2) Slowly increase the speed to 40 km/h (25 MPH) and keep the constant speed. 3) Read the data of «Actual Gear Ratio» using Subaru Select Monitor.	Is the «Actual Gear Ratio» 0.5 — 0.9?	Go to step **9**.	Replace the transmission assembly. <Ref. to CVT(TH58A)-63, Automatic Transmission Assembly.>
9	**DRIVING CHECK BY INSPECTION MODE.** 1) Turn the ignition switch to OFF. 2) Perform a drive check based on the "Inspection Mode". <Ref. to CVT(HEV)(diag)-21, Inspection Mode.>	Does the AT OIL TEMP light blink and is DTC P0752 displayed?	Replace the transmission assembly. <Ref. to CVT(TH58A)-63, Automatic Transmission Assembly.>	Current condition is normal. It is possible that temporary poor contact occurs.

W: DTC P0756 SHIFT SOLENOID "B" PERFORMANCE/STUCK OFF

DTC DETECTING CONDITION:

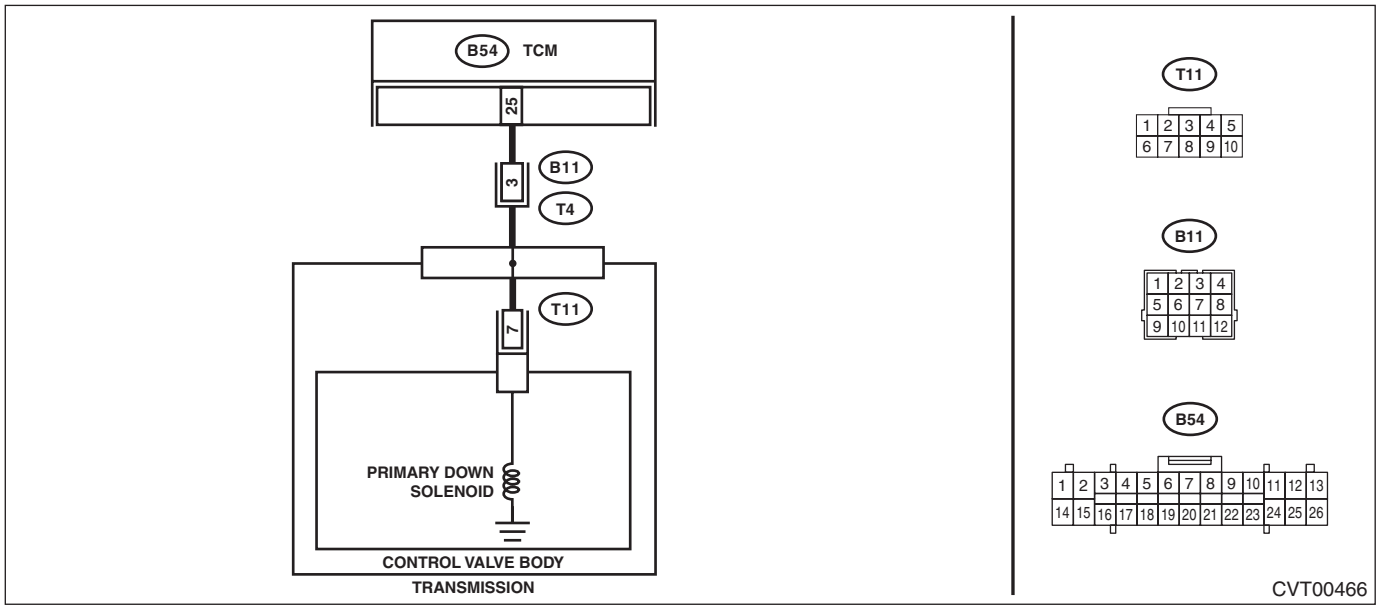
- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(CVT)(HEV)-28, DTC P0756 SHIFT SOLENOID "B" PERFORMANCE/STUCK OFF, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

- Acceleration is poor during standing start.
- Shift control malfunction

WIRING DIAGRAM:

CVT control system <Ref. to WI(HEV)-86, CVT Control System.>



	Step	Check	Yes	No
1	**CHECK DTC.** Read the DTC using Subaru Select Monitor.	Besides DTC P0756, is any of the DTC P0973, P0974, P0976, P0977, P2751, U0110 or U0411 displayed?	Perform the diagnosis according to DTCs other than P0756.	Go to step **2**.
2	**CHECK PRIMARY DOWN SOLENOID.** 1) Turn the ignition switch to OFF. 2) Disconnect the transmission connector. 3) Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 3 — Transmission body:***	Is the resistance approx. 10 — 13.5 Ω? (when cold)	Go to step **4**.	Go to step **3**.
3	**CHECK HARNESS.** Check the harness for continuity.	Is the harness normal? (Is it free from defects such as open circuit, power supply-output short or GND-output short circuit, or poor contact?)	Go to step **4**.	Repair the harness.
4	**CHECK TRANSMISSION FLUID.** 1) Connect the transmission connector. 2) Check the amount of ATF. <Ref. to CVT(TH58A)-41, ADJUSTMENT, CVTF.>	Is the ATF amount correct?	Go to step **5**.	Adjust the amount of ATF. <Ref. to CVT(TH58A)-41, ADJUSTMENT, CVTF.>

	Step	Check	Yes	No
5	**CHECK TRANSMISSION FLUID.** Check the condition of ATF. <Ref. to CVT(TH58A)-44, CONDITION CHECK, CVTF.>	Is the ATF OK?	Go to step **6**.	Check according to the "Corrective action" of ATF (CVTF) "CONDITION CHECK". <Ref. to CVT(TH58A)-44, CONDITION CHECK, CVTF.>
6	**CHECK INPUT SIGNAL FOR TCM.** 1) Lift up the vehicle. 2) Start the engine. 3) Warm up until the ATF temperature reaches to 40 — 70°C (104 — 158°F). 4) Depress the brake pedal, and shift the select lever to "D" range. 5) Shift the select lever to "P" range. 6) Stabilize the engine speed at idle. 7) Read the data of «Actual secondary pressure» using Subaru Select Monitor.	Is the «Actual secondary pressure» 0.5 — 1.5 MPa?	Go to step **7**.	Replace the transmission assembly. <Ref. to CVT(TH58A)-63, Automatic Transmission Assembly.>
7	**CHECK INPUT SIGNAL FOR TCM.** 1) Set the select lever to "D" range. 2) Release the brake pedal to stabilize the engine speed and front wheel speed. 3) Read the data of «Actual Gear Ratio» using Subaru Select Monitor.	Is the «Actual Gear Ratio» 1.5 — 2.6?	Go to step **8**.	Replace the transmission assembly. <Ref. to CVT(TH58A)-63, Automatic Transmission Assembly.>
8	**CHECK INPUT SIGNAL FOR TCM.** 1) Set the select lever to "D" range. 2) Slowly increase the speed to 40 km/h (25 MPH) and keep the constant speed. 3) Read the data of «Actual Gear Ratio» using Subaru Select Monitor.	Is the «Actual Gear Ratio» 0.5 — 0.9?	Go to step **9**.	Replace the transmission assembly. <Ref. to CVT(TH58A)-63, Automatic Transmission Assembly.>
9	**DRIVING CHECK BY INSPECTION MODE.** 1) Turn the ignition switch to OFF. 2) Perform a drive check based on the "Inspection Mode". <Ref. to CVT(HEV)(diag)-21, Inspection Mode.>	Does the AT OIL TEMP light blink and is DTC P0756 displayed?	Replace the transmission assembly. <Ref. to CVT(TH58A)-63, Automatic Transmission Assembly.>	Current condition is normal. It is possible that temporary poor contact occurs.

X: DTC P0757 SHIFT SOLENOID "B" STUCK ON

DTC DETECTING CONDITION:

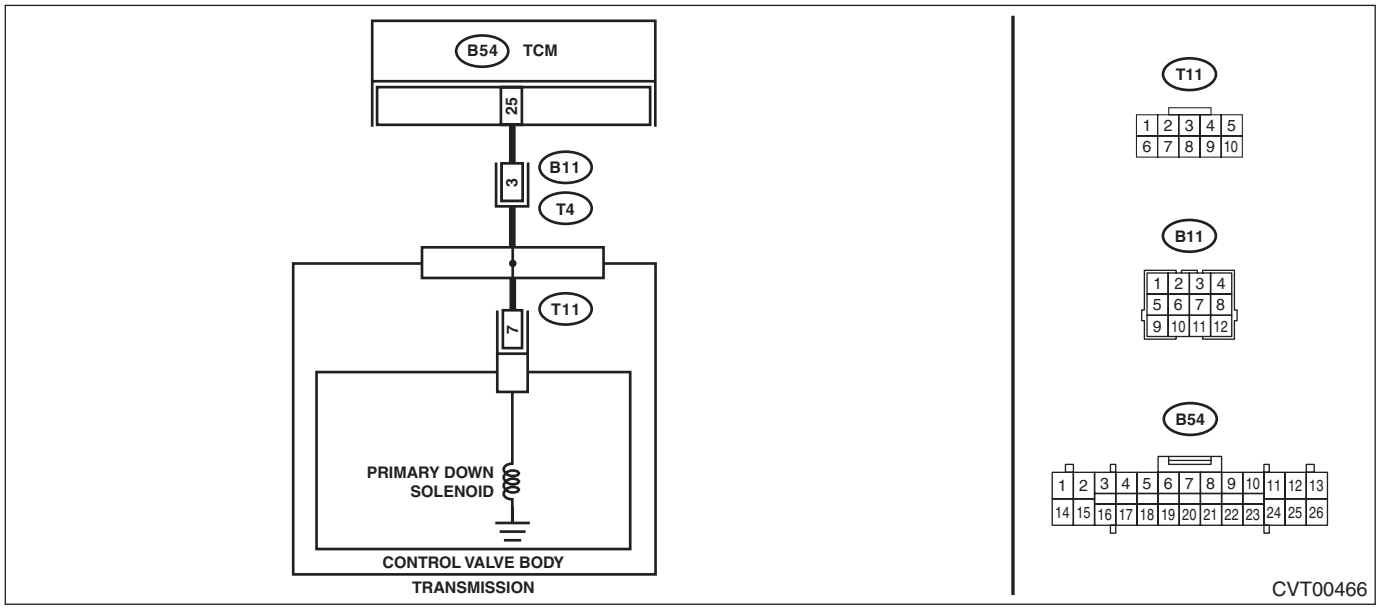
- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(CVT)(HEV)-29, DTC P0757 SHIFT SOLENOID "B" STUCK ON, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

- Vibration occurs at shift change.
- Shift control malfunction

WIRING DIAGRAM:

CVT control system <Ref. to WI(HEV)-86, CVT Control System.>



	Step	Check	Yes	No
1	**CHECK DTC.** Read the DTC using Subaru Select Monitor.	Besides DTC P0757, is any of the DTC P0973, P0974, P0976, P0977, P2751, U0110 or U0411 displayed?	Perform the diagnosis according to DTCs other than P0757.	Go to step **2**.
2	**CHECK PRIMARY DOWN SOLENOID.** 1) Turn the ignition switch to OFF. 2) Disconnect the transmission connector. 3) Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 3 — Transmission body:***	Is the resistance approx. 10 — 13.5 Ω? (when cold)	Go to step **4**.	Go to step **3**.
3	**CHECK HARNESS.** Check the harness for continuity.	Is the harness normal? (Is it free from defects such as open circuit, power supply-output short or GND-output short circuit, or poor contact?)	Go to step **4**.	Repair the harness.
4	**CHECK TRANSMISSION FLUID.** 1) Connect the transmission connector. 2) Check the amount of ATF. <Ref. to CVT(TH58A)-41, ADJUSTMENT, CVTF.>	Is the ATF amount correct?	Go to step **5**.	Adjust the amount of ATF. <Ref. to CVT(TH58A)-41, ADJUSTMENT, CVTF.>

	Step	Check	Yes	No
5	**CHECK TRANSMISSION FLUID.** Check the condition of ATF. <Ref. to CVT(TH58A)-44, CONDITION CHECK, CVTF.>	Is the ATF OK?	Go to step **6**.	Check according to the "Corrective action" of ATF (CVTF) "CONDITION CHECK". <Ref. to CVT(TH58A)-44, CONDITION CHECK, CVTF.>
6	**CHECK INPUT SIGNAL FOR TCM.** 1) Lift up the vehicle. 2) Start the engine. 3) Warm up until the ATF temperature reaches to 40 — 70°C (104 — 158°F). 4) Depress the brake pedal, and shift the select lever to "D" range. 5) Shift the select lever to "P" range. 6) Stabilize the engine speed at idle. 7) Read the data of «Actual secondary pressure» using Subaru Select Monitor.	Is the «Actual secondary pressure» 0.5 — 1.5 MPa?	Go to step **7**.	Replace the transmission assembly. <Ref. to CVT(TH58A)-63, Automatic Transmission Assembly.>
7	**CHECK INPUT SIGNAL FOR TCM.** 1) Set the select lever to "D" range. 2) Release the brake pedal to stabilize the engine speed and front wheel speed. 3) Read the data of «Actual Gear Ratio» using Subaru Select Monitor.	Is the «Actual Gear Ratio» 1.5 — 2.6?	Go to step **8**.	Replace the transmission assembly. <Ref. to CVT(TH58A)-63, Automatic Transmission Assembly.>
8	**CHECK INPUT SIGNAL FOR TCM.** 1) Set the select lever to "D" range. 2) Slowly increase the speed to 40 km/h (25 MPH) and keep the constant speed. 3) Read the data of «Actual Gear Ratio» using Subaru Select Monitor.	Is the «Actual Gear Ratio» 0.5 — 0.9?	Go to step **9**.	Replace the transmission assembly. <Ref. to CVT(TH58A)-63, Automatic Transmission Assembly.>
9	**DRIVING CHECK BY INSPECTION MODE.** 1) Turn the ignition switch to OFF. 2) Perform a drive check based on the "Inspection Mode". <Ref. to CVT(HEV)(diag)-21, Inspection Mode.>	Does the AT OIL TEMP light blink and is DTC P0757 displayed?	Replace the transmission assembly. <Ref. to CVT(TH58A)-63, Automatic Transmission Assembly.>	Current condition is normal. It is possible that temporary poor contact occurs.

Y: DTC P0776 PRESSURE CONTROL SOLENOID "B" PERFORMANCE/STUCK OFF

DTC DETECTING CONDITION:

- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(CVT)(HEV)-30, DTC P0776 PRESSURE CONTROL SOLENOID "B" PERFORMANCE/STUCK OFF, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

- Engine speed increases abruptly, and can not accelerate.
- Excessive slippage is felt.

	Step	Check	Yes	No
1	**CHECK DTC.** Read the DTC using Subaru Select Monitor.	Besides DTC P0776, is any of the DTC P0717, P0966, P0967, U0110 or U0411 displayed?	Perform the diagnosis according to DTCs other than P0776.	Go to step **2**.
2	**CHECK TRANSMISSION FLUID.** Check the amount of ATF. <Ref. to CVT(TH58A)-41, ADJUSTMENT, CVTF.>	Is the ATF amount correct?	Go to step **3**.	Adjust the amount of ATF. <Ref. to CVT(TH58A)-41, ADJUSTMENT, CVTF.>
3	**CHECK TRANSMISSION FLUID.** Check the condition of ATF. <Ref. to CVT(TH58A)-44, CONDITION CHECK, CVTF.>	Is the ATF OK?	Go to step **4**.	Check according to the “Corrective action” of ATF (CVTF) “CONDITION CHECK”. <Ref. to CVT(TH58A)-44, CONDITION CHECK, CVTF.>
4	**CHECK INPUT SIGNAL FOR TCM.** 1) Start the engine. 2) Warm up until the ATF temperature reaches to 40 — 70°C (104 — 158°F). 3) Depress the brake pedal, and shift the select lever to “D” range. 4) Shift the select lever to “P” range. 5) Stabilize the engine speed at idle. 6) Read the data of «Actual secondary pressure» using Subaru Select Monitor.	Is the «Actual secondary pressure» 0.5 — 1.5 MPa?	Go to step **5**.	Perform the diagnosis according to DTC P0841. <Ref. to CVT(HEV)(diag)-86, DTC P0841 SECONDARY OIL PRESSURE SENSOR PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
5	**STALL TEST.** Perform the stall test. <Ref. to CVT(TH58A)-52, Stall Test.>	Is the stall test normal?	Go to step **6**.	Replace the transmission assembly if the stall speed is higher than the standard value of the stall test. <Ref. to CVT(TH58A)-63, Automatic Transmission Assembly.>
6	**DRIVING CHECK BY INSPECTION MODE.** 1) Turn the ignition switch to OFF. 2) Perform a drive check based on the “Inspection Mode”. <Ref. to CVT(HEV)(diag)-21, Inspection Mode.>	Does the AT OIL TEMP light blink and is DTC P0776 detected?	Replace the transmission assembly. <Ref. to CVT(TH58A)-63, Automatic Transmission Assembly.>	Current condition is normal. It is possible that temporary poor contact occurs.

Z: DTC P0777 PRESSURE CONTROL SOLENOID "B" STUCK ON

DTC DETECTING CONDITION:

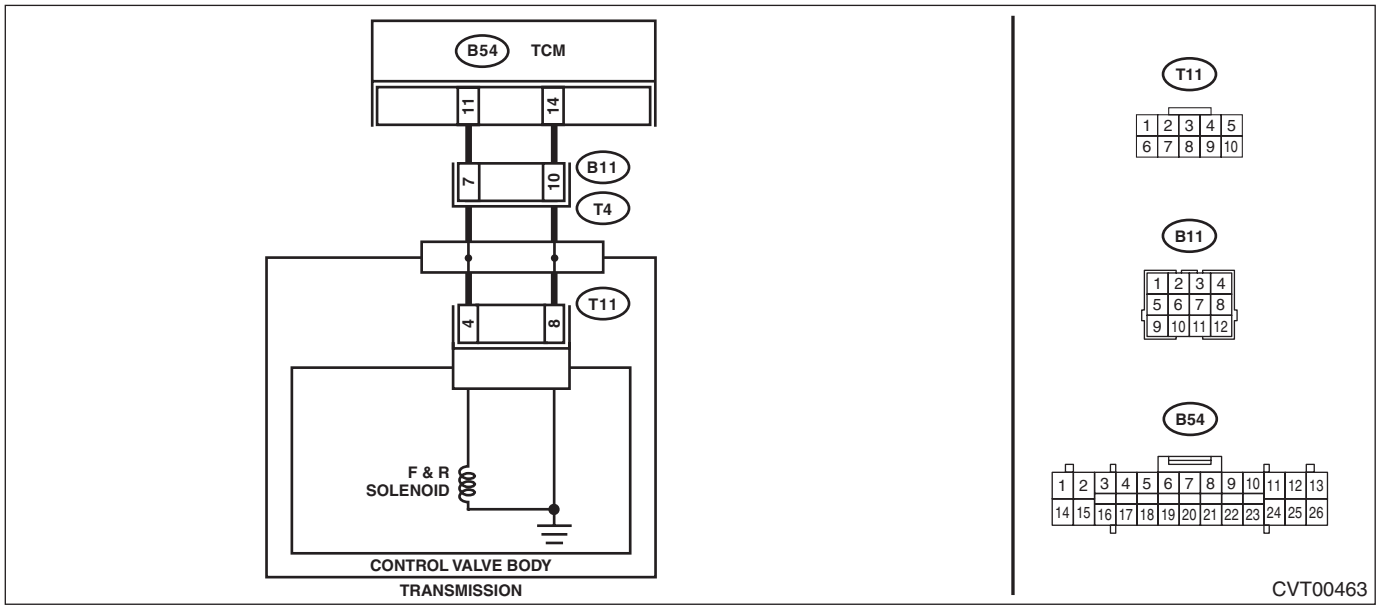
- F&R solenoid malfunction
- Hydraulic circuit malfunction (stuck to high pressure side)

TROUBLE SYMPTOM:

- Excessive shift shock.
- Decelerating speed in EV mode is higher than normal.

WIRING DIAGRAM:

CVT control system <Ref. to WI(HEV)-86, CVT Control System.>



	Step	Check	Yes	No
1	**CHECK DTC.** Read the DTC using Subaru Select Monitor.	Besides DTC P0777, is any of the DTC P0717, P0966, P0967, U0110 or U0411 displayed?	Perform the diagnosis according to DTCs other than P0777.	Go to step **2**.
2	**CHECK F&R SOLENOID.** 1) Turn the ignition switch to OFF. 2) Disconnect the transmission connector. 3) Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 7 — Transmission body:***	Is the resistance approx. 4 — 6 Ω? (when cold)	Go to step **4**.	Go to step **3**.
3	**CHECK HARNESS.** Check the harness for continuity.	Is the harness normal? (Is it free from defects such as open circuit, power supply-output short or GND-output short circuit, or poor contact?)	Go to step **4**.	Repair the harness.
4	**CHECK TRANSMISSION FLUID.** 1) Connect the transmission connector. 2) Check the amount of ATF. <Ref. to CVT(TH58A)-41, ADJUSTMENT, CVTF.>	Is the ATF amount correct?	Go to step **5**.	Adjust the amount of ATF. <Ref. to CVT(TH58A)-41, ADJUSTMENT, CVTF.>

	Step	Check	Yes	No
5	**CHECK TRANSMISSION FLUID.** Check the condition of ATF. <Ref. to CVT(TH58A)-44, CONDITION CHECK, CVTF.>	Is the ATF OK?	Go to step **6**.	Check according to the "Corrective action" of ATF (CVTF) "CONDITION CHECK". <Ref. to CVT(TH58A)-44, CONDITION CHECK, CVTF.>
6	**TEST DRIVE TO CHECK F&R CLUTCH CONDITION.** 1) Perform the Clear Memory Mode. <Ref. to CVT(HEV)(diag)-20, Clear Memory Mode.> 2) Turn the ignition switch to OFF. 3) Start the engine. 4) Warm up until the ATF temperature exceeds 60°C. 5) Place the vehicle on the ground. 6) While driving at a legal speed, gently depress the brake pedal to enter EV traveling mode. 7) After entering EV traveling mode, release the brake pedal and the accelerator pedal, and keep the coast driving until the vehicle speed drops to 10 km/h (6 MPH). 8) When the speed becomes 10 km/h (6 MPH) or less, stop the vehicle and place the select lever to "P" range. 9) Turn the ignition switch to OFF. 10) Start the engine. 11) Perform the procedure in step 6) again. 12) Read the DTC using Subaru Select Monitor.	Does the AT OIL TEMP light blink and is DTC P0777 displayed?	Replace the transmission assembly. <Ref. to CVT(TH58A)-63, Automatic Transmission Assembly.>	Go to step **7**.
7	**DRIVING CHECK BY INSPECTION MODE.** 1) Turn the ignition switch to OFF. 2) Perform a drive check based on the "Inspection Mode". <Ref. to CVT(HEV)(diag)-21, Inspection Mode.>	Does the AT OIL TEMP light blink and is DTC P0777 displayed?	Replace the transmission assembly. <Ref. to CVT(TH58A)-63, Automatic Transmission Assembly.>	Current condition is normal. It is possible that temporary poor contact occurs.

AA:DTC P0801 REVERSE INHIBIT CONTROL CIRCUIT

NOTE:
For diagnostic procedures, refer to "BODY CONTROL SYSTEM (DIAGNOSTICS)". <Ref. to BC(diag)-38, DTC B1016 SHIFT LOCK CIRCUIT FAILURE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

AB:DTC P0812 REVERSE INPUT CIRCUIT

DTC DETECTING CONDITION:

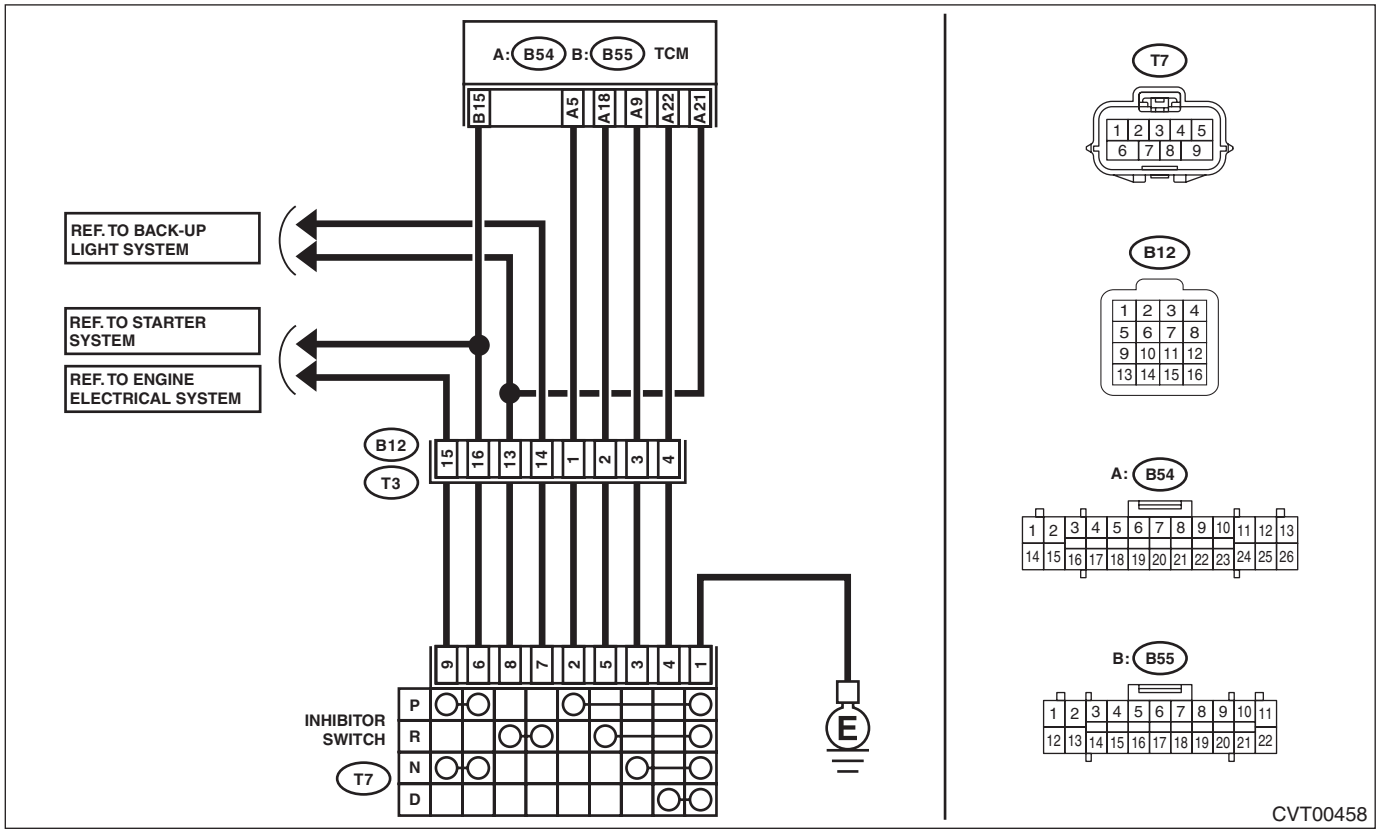
- Inhibitor switch is faulty.
- R range signal is not input.

TROUBLE SYMPTOM:

- Shift characteristics are erroneous.
- The range position of the select lever and the position of shift indicator display do not match.

WIRING DIAGRAM:

CVT control system <Ref. to WI(HEV)-86, CVT Control System.>



Step		Check	Yes	No
1	**CHECK INPUT SIGNAL FOR TCM.** 1) Turn the ignition switch to ON. 2) Move the select lever to “R” range, and read the data of «R Range» using the Subaru Select Monitor.	Is “ON” displayed?	Go to step **7**.	Go to step **2**.
2	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the TCM and transmission connectors. 3) Measure the resistance of harness between TCM connector and transmission connector. ***Connector & terminal*** ***(B54) No. 18 — (B12) No. 2:***	Is the resistance less than 1 Ω?	Go to step **3**.	Repair the open circuit of body harness.
3	**CHECK HARNESS.** Measure the resistance of harness between inhibitor switch connector and transmission ground. ***Connector & terminal*** ***(T7) No. 1 — Transmission ground:***	Is the resistance less than 1 Ω?	Go to step **4**.	Repair the open circuit of harness.

	Step	Check	Yes	No
4	**CHECK HARNESS.** 1) Disconnect the inhibitor switch connector. 2) Measure the resistance between transmission connector and inhibitor switch connector. ***Connector & terminal*** ***(T3) No. 2 — (T7) No. 5:***	Is the resistance less than 1 Ω?	Go to step **5**.	Repair the open circuit of transmission harness.
5	**CHECK INHIBITOR SWITCH.** Move the select lever to "R" range, and measure the resistance between inhibitor switch connector terminals. ***Terminals*** ***No. 5 — No. 1:***	Is the resistance less than 1 Ω?	Go to step **6**.	Replace the inhibitor switch. <Ref. to CVT(TH58A)-97, Inhibitor Switch.>
6	**CHECK HARNESS.** 1) Turn the ignition switch to ON. 2) Measure the voltage between each connector and chassis ground. ***Connector & terminal*** ***Transmission connector (B12 side)*** ***(B12) No. 2 (+) — Chassis ground (–):*** ***Transmission connector (T7 side)*** ***(T7) No. 5 (+) — Chassis ground (–):***	Is each voltage less than 1 V?	Go to step **7**.	Repair the harness which outputs 1 V or more.
7	**CHECK FOR POOR CONTACT.**	Is there poor contact between TCM, inhibitor switch, transmission ground?	Repair the poor contact.	Replace the TCM. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>

AC:DTC P0841 SECONDARY OIL PRESSURE SENSOR PERFORMANCE

DTC DETECTING CONDITION:

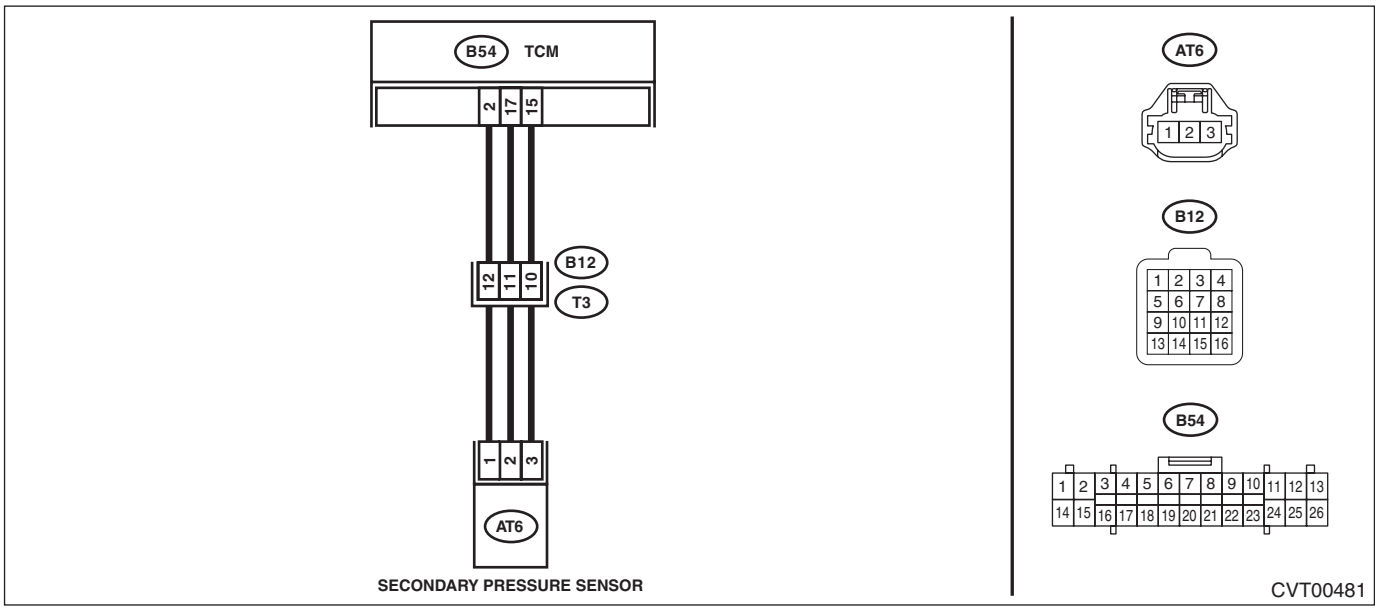
- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(CVT)(HEV)-31, DTC P0841 SECONDARY OIL PRESSURE SENSOR PERFORMANCE, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

- Acceleration is poor during standing start.
- Shift control malfunction
- Engine speed increases abruptly.

CAUTION:
Before performing diagnosis, record the freeze frame data.

WIRING DIAGRAM:
CVT control system <Ref. to WI(HEV)-86, CVT Control System.>



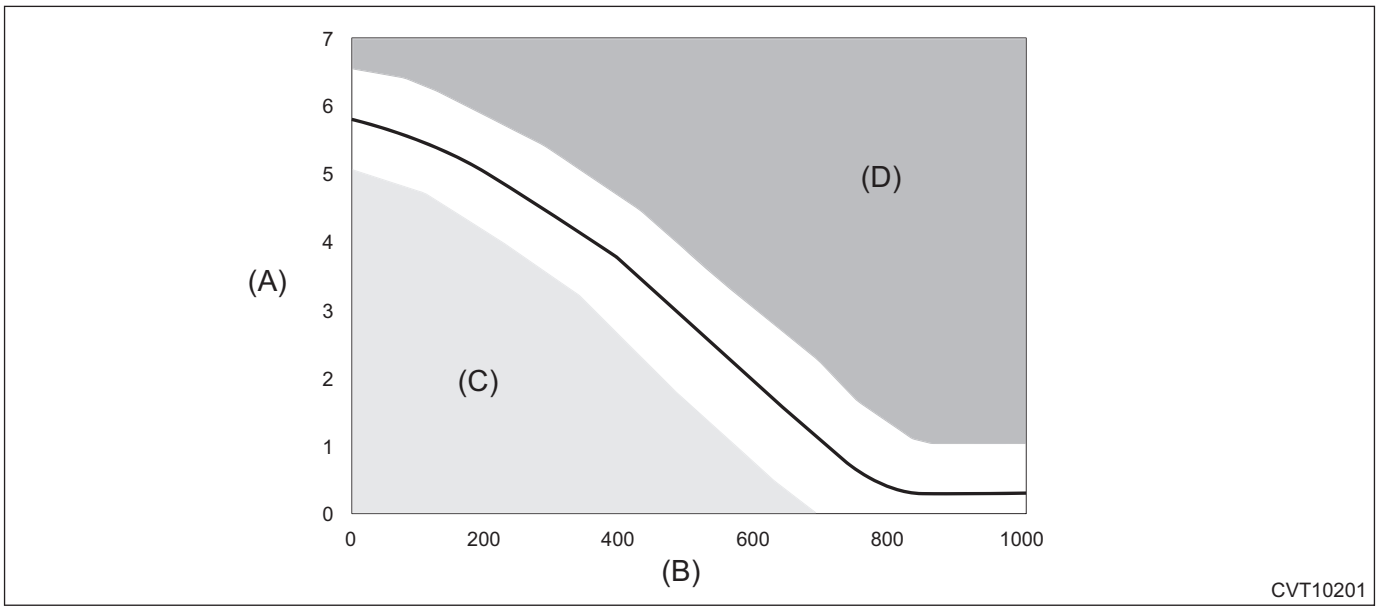
Step		Check	Yes	No
1	**CHECK DTC.** Read the DTC using Subaru Select Monitor.	Are DTCs other than P0841 displayed?	Perform the diagnosis according to DTC. After the diagnosis, start the engine, and drive for 20 minutes in any driving pattern. (Include driving at a constant legal speed (for 20 seconds) at least once.) Read the DTC, and if P0841 alone is detected, Go to step **2**.	Go to step **2**.
2	**CHECK INPUT SIGNAL FOR TCM.** 1) Turn the ignition switch to ON. 2) Read the data of «secondary pressure sensor voltage» using Subaru Select Monitor. (While shaking the secondary pressure sensor harness)	Is the value of «secondary pressure sensor voltage» 0.39 — 0.61 V?	Go to step **10**.	Go to step **3**.

	Step	Check	Yes	No
3	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector of TCM and secondary pressure sensor. 3) Measure the resistance between TCM connector and secondary pressure sensor connector. ***Connector & terminal*** ***(B54) No. 2 — (AT6) No. 1:*** ***(B54) No. 15 — (AT6) No. 3:*** ***(B54) No. 17 — (AT6) No. 2:***	Is the resistance less than 1 Ω?	Go to step **4**.	Repair the open circuit of harness.
4	**CHECK HARNESS.** Measure the resistance between TCM connectors. ***Connector & terminal*** ***(B54) No. 2 — (B54) No. 17:*** ***(B54) No. 15 — (B54) No. 2:*** ***(B54) No. 17 — (B54) No. 15:***	Is the resistance 1 MΩ or more?	Go to step **5**.	Repair the short circuit of harness.
5	**CHECK HARNESS.** Measure the resistance between TCM connector and transmission body. ***Connector & terminal*** ***(B54) No. 2 — Transmission body:*** ***(B54) No. 15 — Transmission body:*** ***(B54) No. 17 — Transmission body:***	Is the resistance 1 MΩ or more?	Go to step **6**.	Repair the short circuit of harness.
6	**CHECK POWER SUPPLY FOR SECONDARY PRESSURE SENSOR.** 1) Connect the TCM connector. 2) Turn the ignition switch to ON. 3) Measure the voltage between TCM connectors. ***Connector & terminal*** ***(B54) No. 2 (+) — (B54) No. 15 (–):***	Is the voltage 4.6 — 5.4 V?	Go to step **7**.	Check for poor contact of connector, and if no fault is found, replace the TCM. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>
7	**CHECK POWER SUPPLY FOR SECONDARY PRESSURE SENSOR.** 1) Turn the ignition switch to OFF. 2) Connect the secondary pressure sensor connector. 3) Turn the ignition switch to ON. 4) Measure the voltage between TCM connectors. ***Connector & terminal*** ***(B54) No. 2 (+) — (B54) No. 15 (–):***	Is the voltage 4.6 — 5.4 V?	Go to step **8**.	Replace the secondary pressure sensor. <Ref. to CVT(TH58A)-110, Secondary Pressure Sensor.>
8	**CHECK SECONDARY PRESSURE SENSOR OUTPUT.** Measure the voltage between TCM connectors. ***Connector & terminal*** ***(B54) No. 17 (+) — (B54) No. 15 (–):***	Is the voltage 0.39 — 0.61 V?	Check for poor contact of connector, and if no fault is found, replace the TCM. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>	Go to step **9**.
9	**CHECK CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector of TCM and secondary pressure sensor. 3) Check the TCM connector (B54) and the secondary pressure sensor connector (AT6).	Is there any fault in the TCM connector or the secondary pressure connector?	Repair the connector, or replace harness.	Go to step **10**.

	Step	Check	Yes	No
10	**CHECK TRANSMISSION FLUID.** 1) Connect all connectors. 2) Check the amount of ATF. <Ref. to CVT(TH58A)-41, ADJUSTMENT, CVTF.>	Is the ATF amount correct?	Go to step **11**.	Adjust the amount of ATF. <Ref. to CVT(TH58A)-41, ADJUSTMENT, CVTF.> Go to step **11**.
11	**CHECK INPUT SIGNAL FOR TCM.** 1) Perform the Clear Memory Mode. 2) Start the engine. 3) Warm up until the ATF temperature reaches to 40 — 70°C (104 — 158°F). 4) Depress the brake pedal and move the select lever to each range at an interval of five seconds. NOTE: Move the select lever in the following order: “P” → “R” → “N” → “D” → “N” → “R” → “P”. 5) Stabilize the engine speed at idle. 6) Read the data of «Actual secondary pressure» using Subaru Select Monitor.	Is the «Actual secondary pressure» 0.5 — 1.5 MPa?	Go to step **12**.	Replace the secondary pressure sensor. <Ref. to CVT(TH58A)-110, Secondary Pressure Sensor.>
12	**CHECK INPUT SIGNAL FOR TCM.** 1) Shift the select lever to “P” range. 2) Keep the engine speed at 3,000 rpm. 3) Read the data of «Actual secondary pressure» using Subaru Select Monitor.	Is the «Actual secondary pressure» 1.5 — 2.5 MPa? And is the difference of the actual oil pressure 0.2 MPa or more compared with the value measured in step 11?	Go to step **13**.	Replace the secondary pressure sensor. <Ref. to CVT(TH58A)-110, Secondary Pressure Sensor.>
13	**CHECK FREEZE FRAME DATA.** 1) Turn the ignition switch to OFF. 2) Check the recorded freeze frame data.	Was the detected symptom low-voltage malfunction? <Ref. to CVT(HEV)(diag)-89, CLASSIFICATION OF SYMPTOM USING FREEZE FRAME DATA, DTC P0841 SECONDARY OIL PRESSURE SENSOR PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>	Replace the transmission assembly. <Ref. to CVT(TH58A)-63, Automatic Transmission Assembly.>	Go to step **14**.
14	**CHECK TCM INPUT SIGNAL (STALL TEST).** 1) Lift up the vehicle. 2) Start the engine. 3) Apply the parking brake. 4) Set the select lever to “D” range. 5) Depress the brake pedal firmly. 6) Slowly open the accelerator fully, and stabilize the engine speed. 7) Read the data of «Actual secondary pressure» using Subaru Select Monitor.	Is the «Actual secondary pressure» 4.5 — 6.0 MPa?	Replace the transmission assembly. <Ref. to CVT(TH58A)-63, Automatic Transmission Assembly.>	Go to step **15**.
15	**CHECK TCM INPUT SIGNAL (STALL TEST).** Check the «Actual Secondary Pressure» in step 14.	Is the «Actual secondary pressure» 4.5 MPa or less?	Replace the transmission assembly. <Ref. to CVT(TH58A)-63, Automatic Transmission Assembly.>	Replace the control valve body. <Ref. to CVT(TH58A)-115, Control Valve Body.>

1. CLASSIFICATION OF SYMPTOM USING FREEZE FRAME DATA

Apply the values of «Actual Secondary Pressure» and «Secondary Actual Current» recorded in the freeze frame data onto the graph shown in the following figure, and judge if either low-voltage malfunction or high-voltage malfunction occurs.



(A) Actual secondary pressure (MPa)
(B) Secondary actual current (mA)
(C) Low-voltage malfunction
(D) High-voltage malfunction

NOTE:
Symptom that the DTC P0841 illuminates can be classified into 2 patterns.
- Low-voltage malfunction: detected due to insufficient oil pressure
- High-voltage malfunction: detected due to excessive oil pressure

AD:DTC P0842 SECONDARY OIL PRESSURE SENSOR CIRCUIT (LOW)

DTC DETECTING CONDITION:

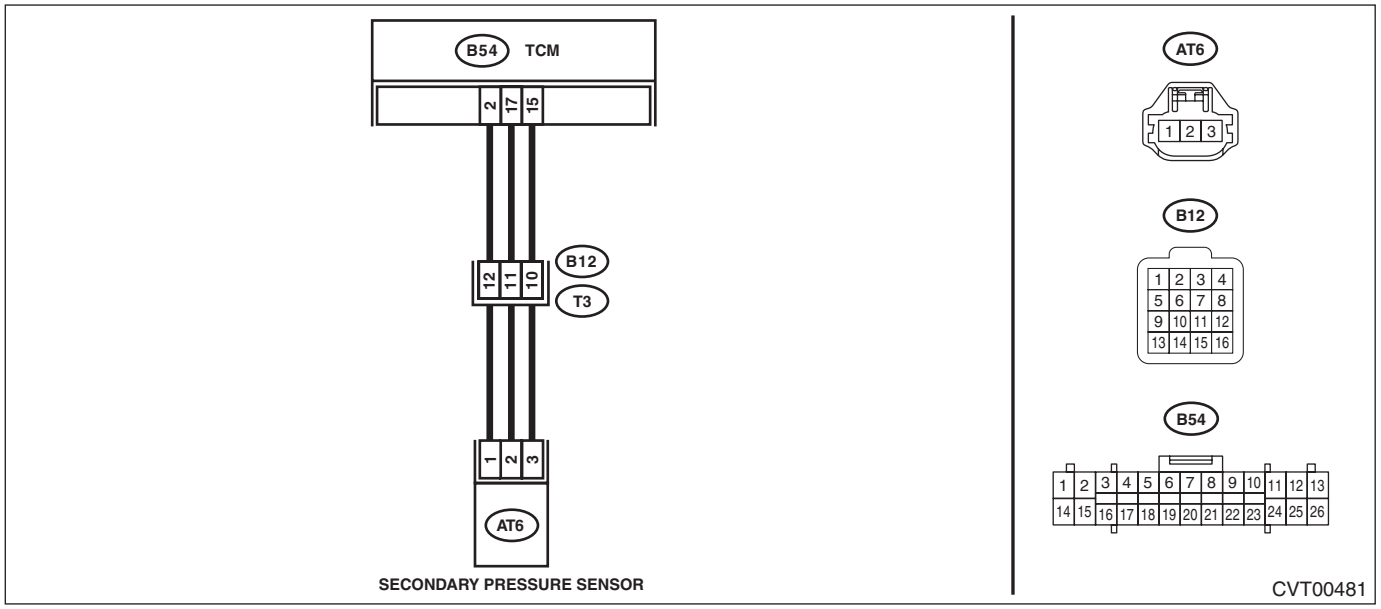
- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(CVT)(HEV)-32, DTC P0842 SECONDARY OIL PRESSURE SENSOR CIRCUIT (LOW), Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

Shift characteristics malfunction

WIRING DIAGRAM:

CVT control system <Ref. to WI(HEV)-86, CVT Control System.>



	Step	Check	Yes	No
1	**CHECK INPUT SIGNAL FOR TCM.** 1) Start the engine. 2) Warm up until the ATF temperature reaches to 40 — 70°C (104 — 158°F). 3) Depress the brake pedal, and shift the select lever to “D” range. 4) Shift the select lever to “P” range. 5) Stabilize the engine speed at idle. 6) Read the data of «Actual secondary pressure» using Subaru Select Monitor.	Is the «Actual secondary pressure» 0.5 — 1.5 MPa?	Check for poor contact of connector.	Go to step **2**.
2	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the TCM and transmission connectors. 3) Measure the resistance between TCM connector and transmission connectors. ***Connector & terminal*** ***(B54) No. 2 — (B12) No. 12:*** ***(B54) No. 15 — (B12) No. 10:*** ***(B54) No. 17 — (B12) No. 11:***	Is the resistance less than 1 Ω?	Go to step **3**.	Repair the open circuit of harness.
3	**CHECK HARNESS.** Measure the resistance between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 2 — Chassis ground:*** ***(B54) No. 17 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **4**.	Repair the short circuit of harness.

	Step	Check	Yes	No
4	**CHECK TRANSMISSION HARNESS.** 1) Disconnect the secondary pressure sensor connector. 2) Measure the resistance between transmission connector and secondary pressure sensor connector. ***Connector & terminal*** ***(T3) No. 10 — (AT6) No. 3:*** ***(T3) No. 11 — (AT6) No. 2:*** ***(T3) No. 12 — (AT6) No. 1:***	Is the resistance less than 1 Ω?	Go to step **5**.	Repair the open circuit of harness.
5	**CHECK TRANSMISSION HARNESS.** Measure the resistance between transmission connector and chassis ground. ***Connector & terminal*** ***(T3) No. 11 — Chassis ground:*** ***(T3) No. 12 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **6**.	Repair the short circuit of harness.
6	**CHECK SENSOR POWER SUPPLY.** 1) Connect the connectors of TCM and transmission. 2) Turn the ignition switch to ON. 3) Measure the voltage between secondary pressure sensor connector terminals. ***Connector & terminal*** ***(AT6) No. 1 (+) — (AT6) No. 3 (–):***	Is the voltage 4.5 V or more?	Replace the secondary pressure sensor. <Ref. to CVT(TH58A)-110, Secondary Pressure Sensor.>	Check for poor contact of connector, and if no fault is found, replace the TCM. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>

AE:DTC P0843 SECONDARY OIL PRESSURE SENSOR CIRCUIT (HIGH)

DTC DETECTING CONDITION:

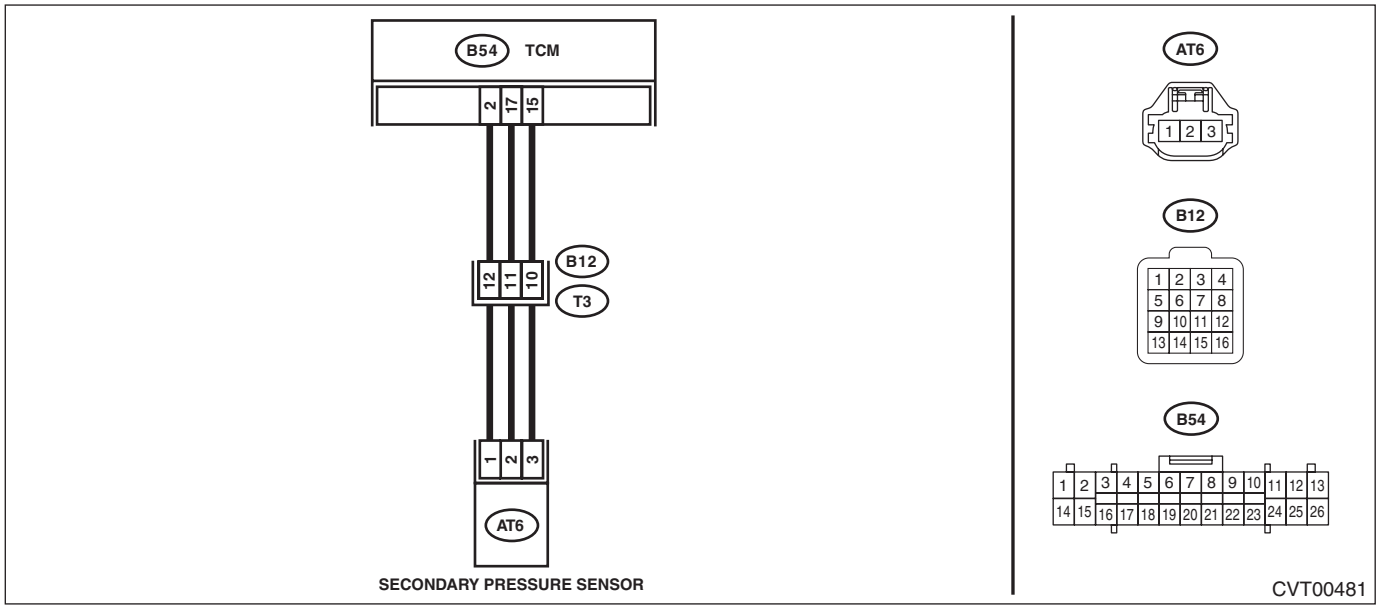
- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(CVT)(HEV)-33, DTC P0843 SECONDARY OIL PRESSURE SENSOR CIRCUIT (HIGH), Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

Shift characteristics malfunction

WIRING DIAGRAM:

CVT control system <Ref. to WI(HEV)-86, CVT Control System.>



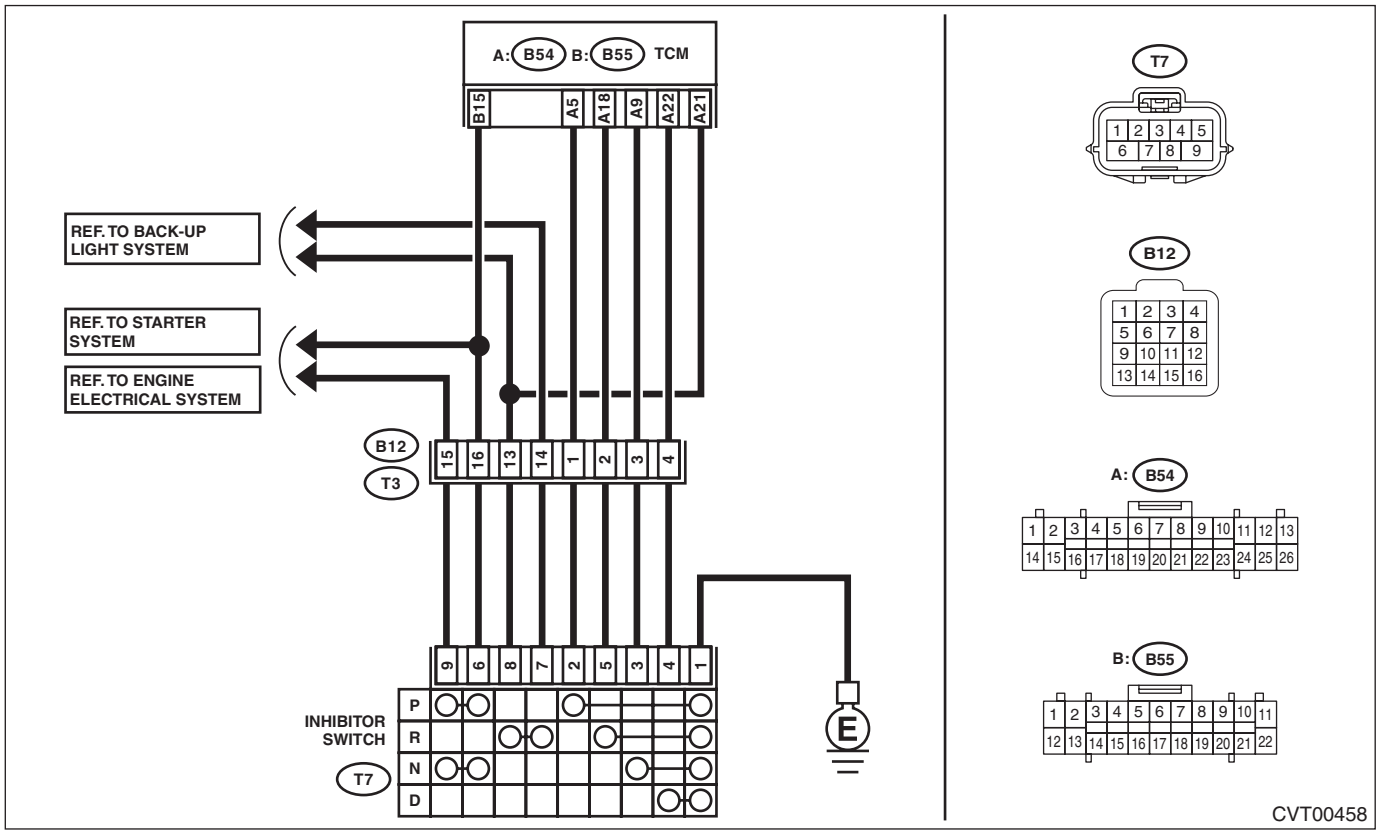
Step		Check	Yes	No
1	**CHECK INPUT SIGNAL FOR TCM.** 1) Start the engine. 2) Warm up until the ATF temperature reaches to 40 — 70°C (104 — 158°F). 3) Depress the brake pedal, and shift the select lever to “D” range. 4) Shift the select lever to “P” range. 5) Stabilize the engine speed at idle. 6) Read the data of «Actual secondary pressure» using Subaru Select Monitor.	Is the «Actual secondary pressure» 0.5 — 1.5 MPa?	Check for poor contact of connector.	Go to step **2**.
2	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the TCM and transmission connectors. 3) Turn the ignition switch to ON. 4) Measure the voltage between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 2 (+) — Chassis ground (–):*** ***(B54) No. 17 (+) — Chassis ground (–):***	Is the voltage approx. 0 V?	Go to step **3**.	Repair the short circuit of harness.
3	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Measure the resistance between TCM connector terminals. ***Connector & terminal*** ***(B54) No. 2 — (B54) No. 17:***	Is the resistance less than 1 Ω?	Repair the short circuit of harness.	Go to step **4**.

	Step	Check	Yes	No
4	**CHECK TRANSMISSION HARNESS.** 1) Disconnect the secondary pressure sensor connector. 2) Turn the ignition switch to ON. 3) Measure the voltage between transmission connector and chassis ground. ***Connector & terminal*** ***(T3) No. 11 (+) — Chassis ground (–):*** ***(T3) No. 12 (+) — Chassis ground (–):***	Is the voltage approx. 0 V?	Go to step **5**.	Repair the short circuit of harness.
5	**CHECK TRANSMISSION HARNESS.** 1) Turn the ignition switch to OFF. 2) Measure the resistance between transmission connector terminals. ***Connector & terminal*** ***(T3) No. 11 — (T3) No. 12:***	Is the resistance less than 1 Ω?	Repair the short circuit of harness.	Go to step **6**.
6	**CHECK SENSOR POWER SUPPLY.** 1) Connect the connectors of TCM and transmission. 2) Turn the ignition switch to ON. 3) Measure the voltage between secondary pressure sensor connector terminals. ***Connector & terminal*** ***(AT6) No. 1 (+) — (AT6) No. 3 (–):***	Is the voltage 4.5 V or more?	Replace the secondary pressure sensor. <Ref. to CVT(TH58A)-110, Secondary Pressure Sensor.>	Check for poor contact of connector, and if no fault is found, replace the TCM. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>

AF:DTC P0851 PARK/NEUTRAL SWITCH INPUT CIRCUIT LOW

DTC DETECTING CONDITION:
Inhibitor switch is faulty.
TROUBLE SYMPTOM:
- Shift characteristics are erroneous.
- The range position of the select lever and the position of shift indicator display do not match.

WIRING DIAGRAM:
CVT control system <Ref. to WI(HEV)-86, CVT Control System.>



Step		Check	Yes	No
1	**CHECK INPUT SIGNAL FOR TCM.** 1) Turn the ignition switch to ON. 2) Move the select lever to each range, and read the data of «P Range» and «N/P Range Signal» at P range, and the data of «N Range» and «N/P Range Signal» at N range using the Subaru Select Monitor.	Is the display of the corresponding range “ON”?	Go to step **7**.	Go to step **2**.
2	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the TCM and transmission connectors. 3) Measure the resistance of harness between TCM connector and transmission connector. ***Connector & terminal*** ***(B54) No. 5 — (B12) No. 1:*** ***(B54) No. 9 — (B12) No. 3:*** ***(B55) No. 15 — (B12) No. 16:***	Is each resistance less than 1 Ω?	Go to step **3**.	Repair the open circuit of body harness.

	Step	Check	Yes	No
3	**CHECK HARNESS.** Measure the resistance of harness between inhibitor switch connector and transmission ground. ***Connector & terminal*** ***(T7) No. 1 — Transmission ground:***	Is the resistance less than 1 Ω?	Go to step **4**.	Repair the open circuit of harness.
4	**CHECK HARNESS.** 1) Disconnect the inhibitor switch connector. 2) Measure the resistance between transmission connector and inhibitor switch connector. ***Connector & terminal*** ***(T3) No. 1 — (T7) No. 2:*** ***(T3) No. 3 — (T7) No. 3:*** ***(T3) No. 16 — (T7) No. 6:***	Is each resistance less than 1 Ω?	Go to step **5**.	Repair the open circuit of transmission harness.
5	**CHECK INHIBITOR SWITCH.** Move the select lever to each range, and measure the resistance between inhibitor switch connector terminals. ***Terminals*** ***No. 2 — No. 1:*** ***No. 3 — No. 1:*** ***No. 6 — No. 1:***	Is the resistance of the corresponding range less than 1 MΩ?	Go to step **6**.	Replace the inhibitor switch. <Ref. to CVT(TH58A)-97, Inhibitor Switch.>
6	**CHECK HARNESS.** 1) Turn the ignition switch to ON. 2) Measure the voltage between each connector and chassis ground. ***Connector & terminal*** ***Transmission connector (B12 side)*** ***(B12) No. 1 (+) — Chassis ground (–):*** ***(B12) No. 3 (+) — Chassis ground (–):*** ***(B12) No. 16 (+) — Chassis ground (–):*** ***Transmission connector (T7 side)*** ***(T7) No. 2 (+) — Chassis ground (–):*** ***(T7) No. 3 (+) — Chassis ground (–):*** ***(T7) No. 6 (+) — Chassis ground (–):***	Is each voltage less than 1 V?	Go to step **7**.	Repair the harness which outputs 1 V or more.
7	**CHECK FOR POOR CONTACT.**	Is there poor contact between TCM, inhibitor switch, transmission ground?	Repair the poor contact.	Replace the TCM. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>

AG:DTC P086C REVERSE INPUT CIRCUIT 2

DTC DETECTING CONDITION:

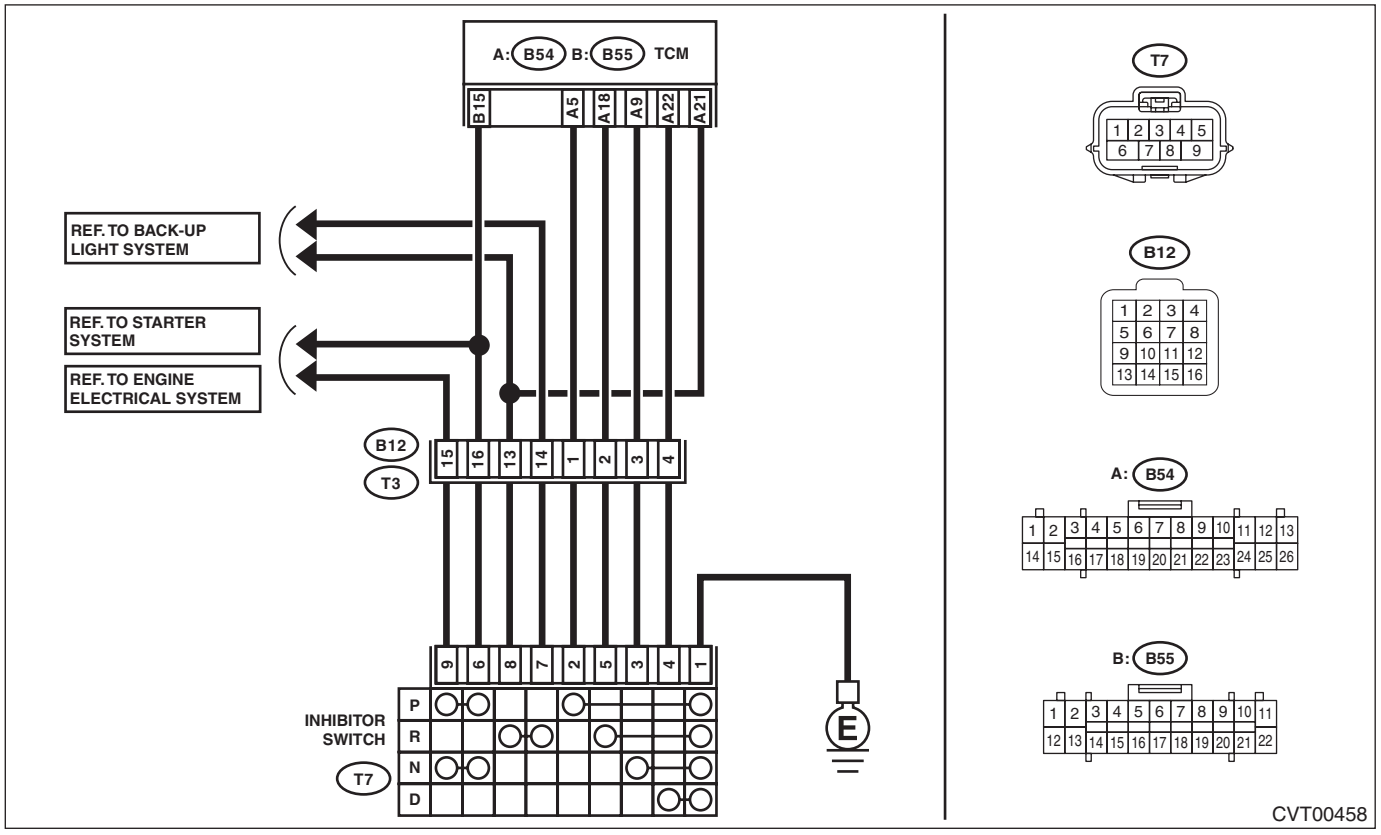
- Inhibitor switch is faulty.
- R range 2 signal is not input.

TROUBLE SYMPTOM:

- Shift characteristics are erroneous.
- The range position of the select lever and the position of shift indicator display do not match.

WIRING DIAGRAM:

CVT control system <Ref. to WI(HEV)-86, CVT Control System.>



Step		Check	Yes	No
1	**CHECK INPUT SIGNAL FOR TCM.** 1) Turn the ignition switch to ON. 2) Move the select lever to "R" range, and read the data of «R Range Signal2» using the Subaru Select Monitor.	Is "ON" displayed?	Go to step **7**.	Go to step **2**.
2	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the TCM and transmission connectors. 3) Measure the resistance of harness between TCM connector and transmission connector. ***Connector & terminal*** ***(B54) No. 21 — (B12) No. 13:***	Is the resistance less than 1 Ω?	Go to step **3**.	Repair the open circuit of body harness.
3	**CHECK HARNESS.** Measure the resistance of harness between inhibitor switch connector and transmission ground. ***Connector & terminal*** ***(T7) No. 1 — Transmission ground:***	Is the resistance less than 1 Ω?	Go to step **4**.	Repair the open circuit of harness.

	Step	Check	Yes	No
4	**CHECK HARNESS.** 1) Disconnect the inhibitor switch connector. 2) Measure the resistance between transmission connector and inhibitor switch connector. ***Connector & terminal*** ***(T3) No. 13 — (T7) No. 8:***	Is the resistance less than 1 Ω?	Go to step **5**.	Repair the open circuit of transmission harness.
5	**CHECK INHIBITOR SWITCH.** Move the select lever to "R" range, and measure the resistance between inhibitor switch connector terminals. ***Terminals*** ***No. 8 — No. 1:***	Is the resistance less than 1 Ω?	Go to step **6**.	Replace the inhibitor switch. <Ref. to CVT(TH58A)-97, Inhibitor Switch.>
6	**CHECK HARNESS.** 1) Turn the ignition switch to ON. 2) Measure the voltage between each connector and chassis ground. ***Connector & terminal*** ***Transmission connector (B12 side)*** ***(B12) No. 13 (+) — Chassis ground (–):*** ***Transmission connector (T7 side)*** ***(T7) No. 8 (+) — Chassis ground (–):***	Is each voltage less than 1 V?	Go to step **7**.	Repair the harness which outputs 1 V or more.
7	**CHECK FOR POOR CONTACT.**	Is there poor contact between TCM, inhibitor switch, transmission ground?	Repair the poor contact.	Replace the TCM. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>

AH:DTC P0882 TCM POWER INPUT SIGNAL LOW

NOTE:
Refer to "DTC P0890 AT SELF-SHUT RELAY DIAGNOSIS (LOW)" for diagnostic procedure. <Ref. to CVT(HEV)(diag)-98, DTC P0890 AT SELF-SHUT RELAY DIAGNOSIS (LOW), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

AI: DTC P0890 AT SELF-SHUT RELAY DIAGNOSIS (LOW)

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(CVT)(HEV)-34, DTC P0890 AT SELF-SHUT RELAY DIAGNOSIS (LOW), Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

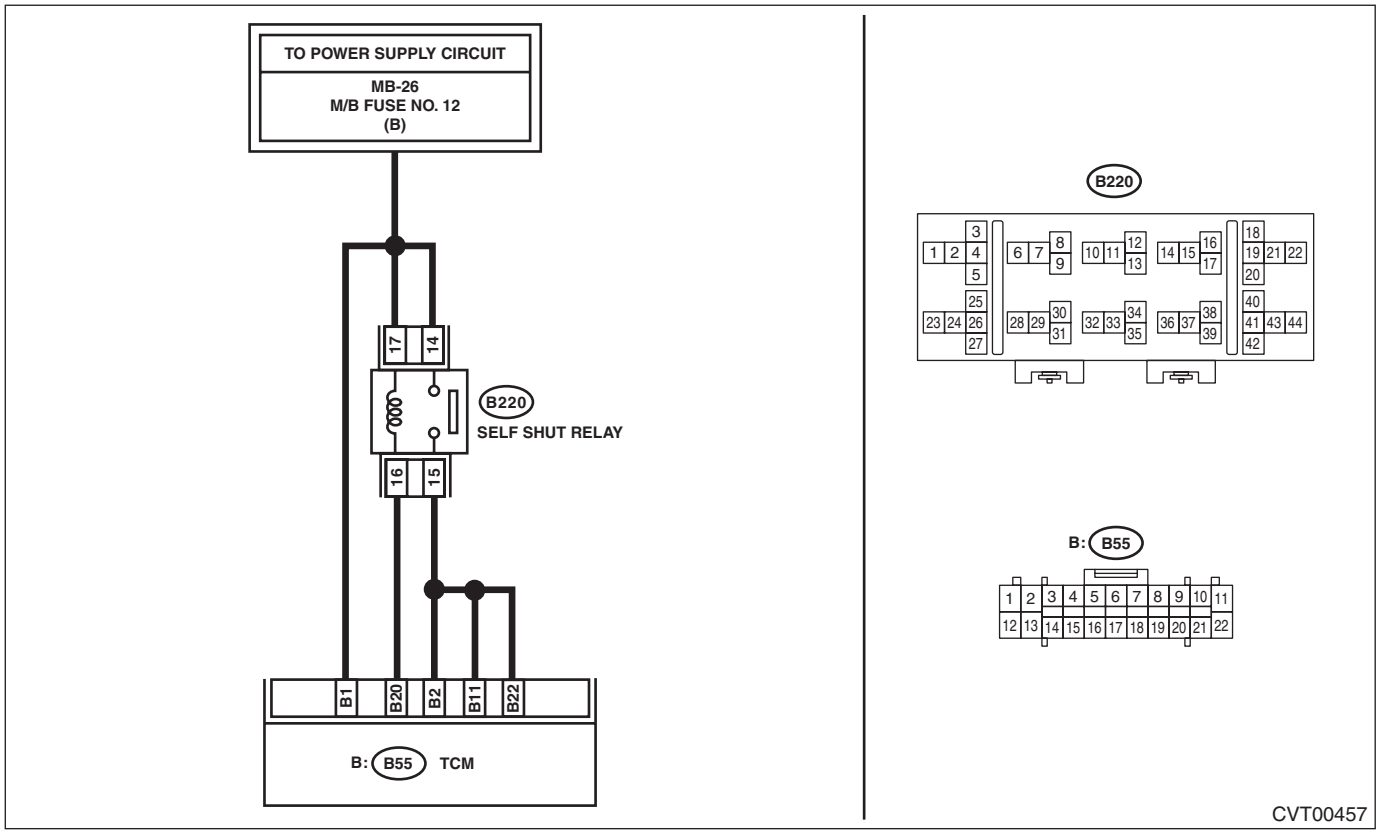
Gear is not changed.

CAUTION:

After diagnosis, perform Clear Memory Mode for ECM. <Ref. to EN(H4DO HEV)(diag)-66, Clear Memory Mode.>

WIRING DIAGRAM:

CVT control system <Ref. to WI(HEV)-86, CVT Control System.>

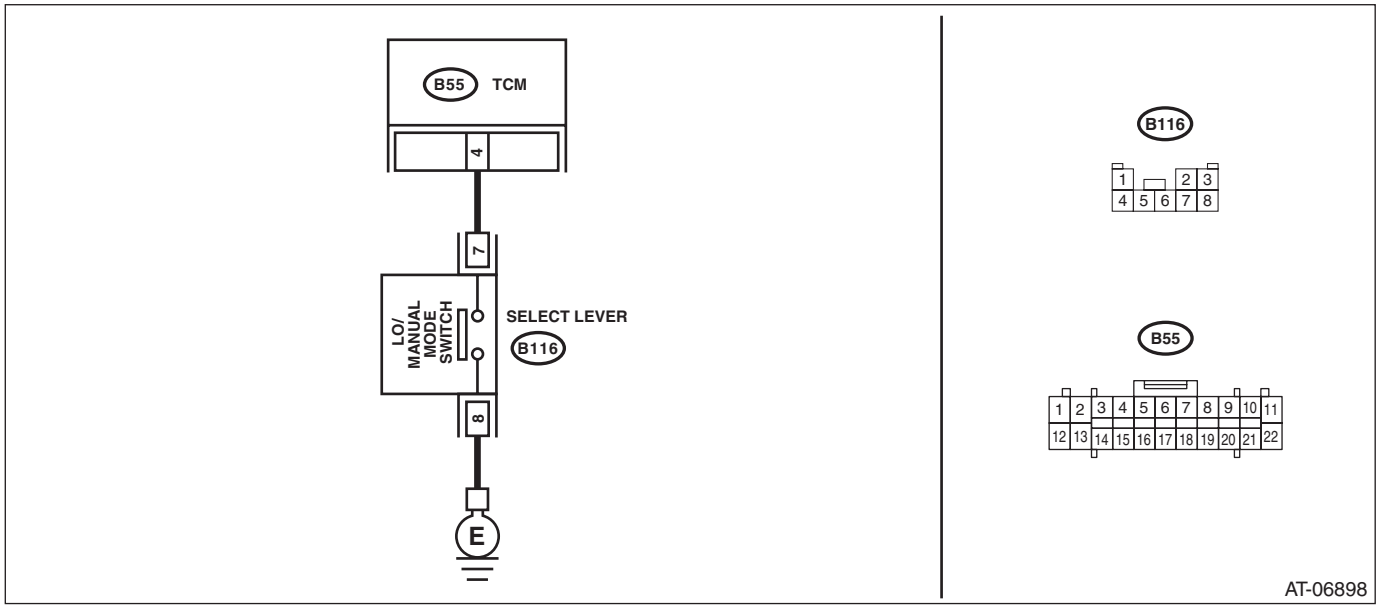


Step		Check	Yes	No
1	**CHECK HARNESS.** 1) Disconnect the TCM and self shut relay connectors. 2) Measure the resistance between TCM connector and self shut relay connector. ***Connector & terminal*** ***(B55) No. 20 — (B220) No. 16:*** ***(B55) No. 2 — (B220) No. 15:*** ***(B55) No. 11 — (B220) No. 15:*** ***(B55) No. 22 — (B220) No. 15:***	Is the resistance less than 1 Ω?	Go to step **2**.	Repair the open circuit of harness.

	Step	Check	Yes	No
2	**CHECK HARNESS.** Measure the resistance between TCM connector and chassis ground. ***Connector & terminal*** ***(B55) No. 20 — Chassis ground:*** ***(B55) No. 2 — Chassis ground:*** ***(B55) No. 11 — Chassis ground:*** ***(B55) No. 22 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **3**.	Repair the short circuit of harness.
3	**CHECK RELAY POWER SUPPLY.** Measure the voltage between self shut relay connector and chassis ground. ***Connector & terminal*** ***(B220) No. 14 (+) — Chassis ground (–):*** ***(B220) No. 17 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **4**.	Repair the open or short circuit of harness.
4	**CHECK SELF SHUT RELAY.** Measure the resistance between self shut relay terminals. ***Connector & terminal*** ***(B220) No. 16 — (B220) No. 17:***	Is the resistance 110 — 140 Ω?	Go to step **5**.	Replace the self shut relay.
5	**CHECK SELF SHUT RELAY.** Measure the resistance between self shut relay terminals. ***Connector & terminal*** ***(B220) No. 14 — (B220) No. 15:***	Is the resistance 1 MΩ or more?	Go to step **6**.	Replace the self shut relay.
6	**CHECK INPUT SIGNAL FOR TCM.** 1) Connect the connectors of TCM and self shut relay. 2) Read the data of «Control module voltage» using Subaru Select Monitor.	Is the «Control module voltage» 10 V or more?	Current condition is normal. Check for poor contact in connectors or harnesses, and repair the defective part.	Go to step **7**.
7	**CHECK FOR POOR CONTACT.**	Is there poor contact of the self shut relay circuit?	Repair the poor contact.	Replace the TCM. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>

AJ:DTC P0951 MANUAL SWITCH

DTC DETECTING CONDITION:
Input signal circuit of manual mode switch is open or shorted.
TROUBLE SYMPTOM:
Manual mode can not be set.
WIRING DIAGRAM:
CVT control system <Ref. to WI(HEV)-86, CVT Control System.>



Step		Check	Yes	No
1	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the manual mode switch connector. 3) Measure the resistance between manual mode switch connector and chassis ground. ***Connector & terminal*** ***(B116) No. 8 — Chassis ground:***	Is the resistance less than 1 Ω?	Go to step **2**.	Repair the open circuit of harness.
2	**CHECK MANUAL MODE SWITCH.** Measure the resistance between manual mode switch terminals. ***Connector & terminal*** ***(B116) No. 7 — No. 8:***	Is the resistance 1 MΩ or more?	Go to step **3**.	Replace the select lever assembly. <Ref. to CS-24, Select Lever.>
3	**CHECK MANUAL MODE SWITCH.** 1) Shift the select lever to manual mode. 2) Measure the resistance between manual mode switch terminals. ***Connector & terminal*** ***(B116) No. 7 — No. 8:***	Is the resistance less than 1 Ω?	Go to step **4**.	Replace the select lever assembly. <Ref. to CS-24, Select Lever.>
4	**CHECK HARNESS.** 1) Disconnect the TCM connector. 2) Measure the resistance between TCM connector and manual mode switch connector. ***Connector & terminal*** ***(B55) No. 4 — (B116) No. 7:***	Is the resistance less than 1 Ω?	Go to step **5**.	Repair the open circuit of harness or poor contact of connector.
5	**CHECK HARNESS.** Measure the resistance between manual mode switch connector and chassis ground. ***Connector & terminal*** ***(B116) No. 7 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **6**.	Repair the short circuit of harness.

	Step	Check	Yes	No
6	**CHECK INPUT SIGNAL FOR TCM.** 1) Connect the TCM and manual mode switch connector. 2) Turn the ignition switch to ON. 3) Set the select lever to “D” range. 4) Read the data of «Tiptronic Mode Switch» using Subaru Select Monitor.	Does the value of «Tiptronic Mode Switch» change to “ON” with select lever in manual mode, and “OFF” with select lever in other than manual mode?	Current condition is normal.	Go to step **7**.
7	**CHECK FOR POOR CONTACT.**	Is there poor contact of the manual mode switch circuit?	Repair the poor contact.	Replace the TCM. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>

AK:DTC P0961 PRESSURE CONTROL SOLENOID "A" CONTROL CIRCUIT RANGE/PERFORMANCE

DTC DETECTING CONDITION:

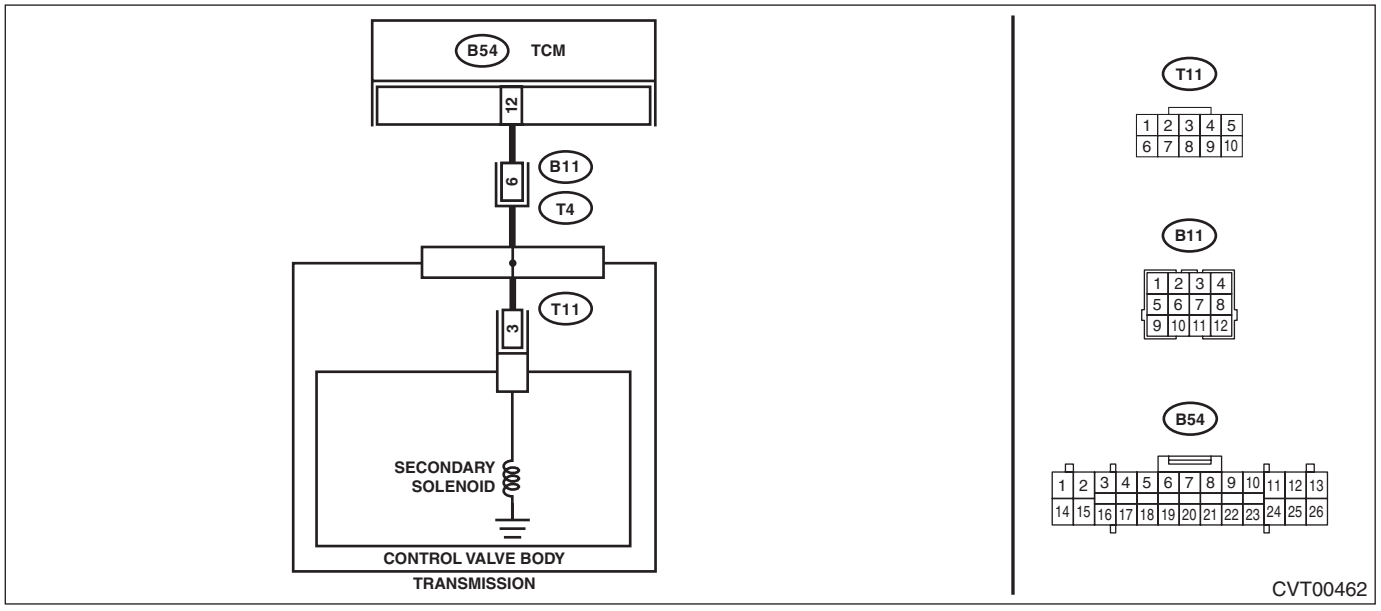
- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(CVT)(HEV)-35, DTC P0961 PRESSURE CONTROL SOLENOID "A" CONTROL CIRCUIT RANGE/PERFORMANCE, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

- Acceleration is poor during standing start.
- Shift control malfunction
- Engine speed increases abruptly.
- Excessive shift shock.

WIRING DIAGRAM:

CVT control system <Ref. to WI(HEV)-86, CVT Control System.>



	Step	Check	Yes	No
1	**CHECK DTC.** Read the DTC using Subaru Select Monitor.	Besides DTC P0961, is DTC P0962 or P0963 displayed?	Perform the diagnosis according to DTCs other than P0961.	Go to step **2**.
2	**CHECK FOR POOR CONTACT.** Check for poor contact of harness and connector between TCM and secondary solenoid.	Is there poor contact?	Repair the poor contact of harness and connector.	Go to step **3**.
3	**CHECK SECONDARY SOLENOID.** 1) Turn the ignition switch to OFF. 2) Disconnect the transmission connector. 3) Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 6 — Transmission body:***	Is the resistance approx. 5 — 7 Ω? (when cold)	Replace the control valve body. <Ref. to CVT(TH58A)-115, Control Valve Body.>	Recheck the poor contact of harness and connector. Replace the TCM if no fault is found. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>

AL:DTC P0962 SECONDARY SOLENOID CIRCUIT (LOW)

DTC DETECTING CONDITION:

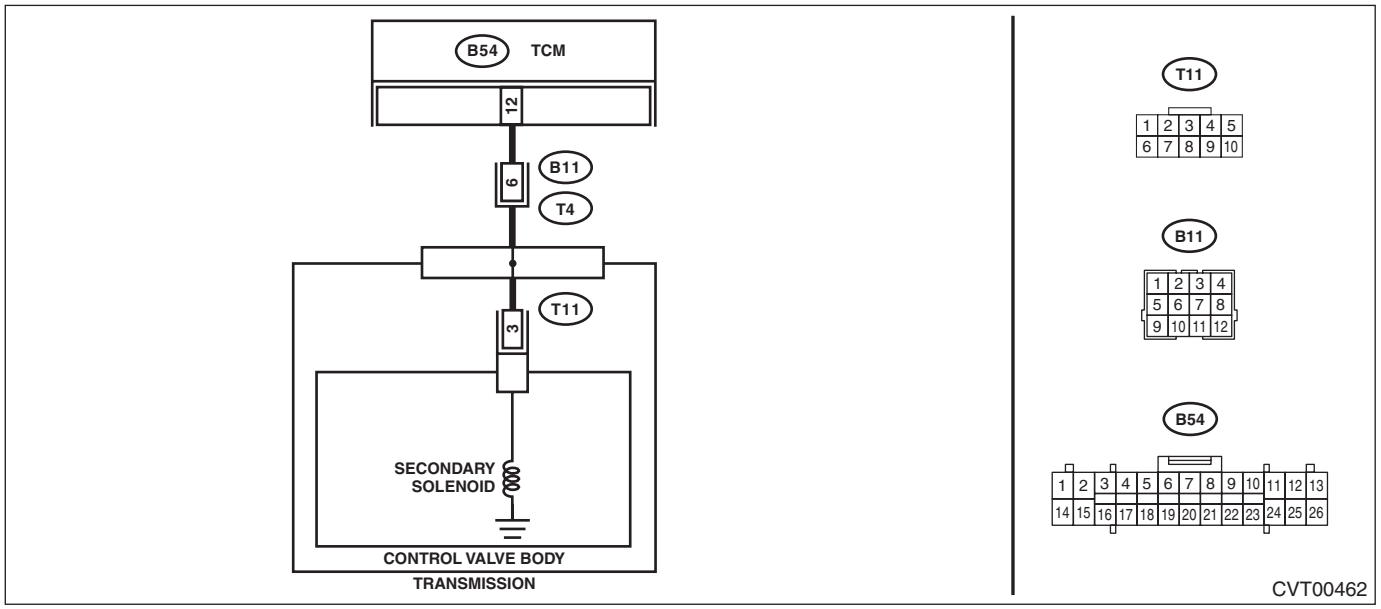
- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(CVT)(HEV)-36, DTC P0962 SECONDARY SOLENOID CIRCUIT (LOW), Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

- Engine speed increases abruptly, and can not start.
- Engine speed increases abruptly during driving.

WIRING DIAGRAM:

CVT control system <Ref. to WI(HEV)-86, CVT Control System.>



	Step	Check	Yes	No
1	**CHECK INPUT SIGNAL FOR TCM.** 1) After driving with warm up condition, park the vehicle while depressing the brake pedal at "N" range. 2) Read the data of «Sec. Sol. Set Current» and «Sec. Sol. Actual Current» using Subaru Select Monitor.	Does the value of «Sec. Sol. Set Current» and «Sec. Sol. Actual Current» almost correspond?	Check for poor contact of connector.	Go to step **2**.
2	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the TCM and transmission connectors. 3) Measure the resistance between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 12 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **3**.	Repair the short circuit of harness.
3	**CHECK SECONDARY SOLENOID.** Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 6 — Transmission body:***	Is the resistance approx. 5 — 7 Ω? (when cold)	Check for poor contact of connector, and if no fault is found, replace the TCM. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>	Go to step **4**.

	Step	Check	Yes	No
4	**CHECK HARNESS INSIDE TRANSMISSION.** **CAUTION:** **Start work after ATF cools down.** 1) Remove the transmission valve cover. 2) Check for the harness pinch, damage.	Is there any fault in the harness?	Replace the transmission harness.	Go to step **5**.
5	**CHECK HARNESS INSIDE TRANSMISSION.** 1) Disconnect the control valve body connector. 2) Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 6 — Transmission body:***	Is the resistance 1 MΩ or more?	Replace the control valve body. <Ref. to CVT(TH58A)-115, Control Valve Body.>	Replace the transmission harness.

AM:DTC P0963 SECONDARY SOLENOID CIRCUIT (HIGH)

DTC DETECTING CONDITION:

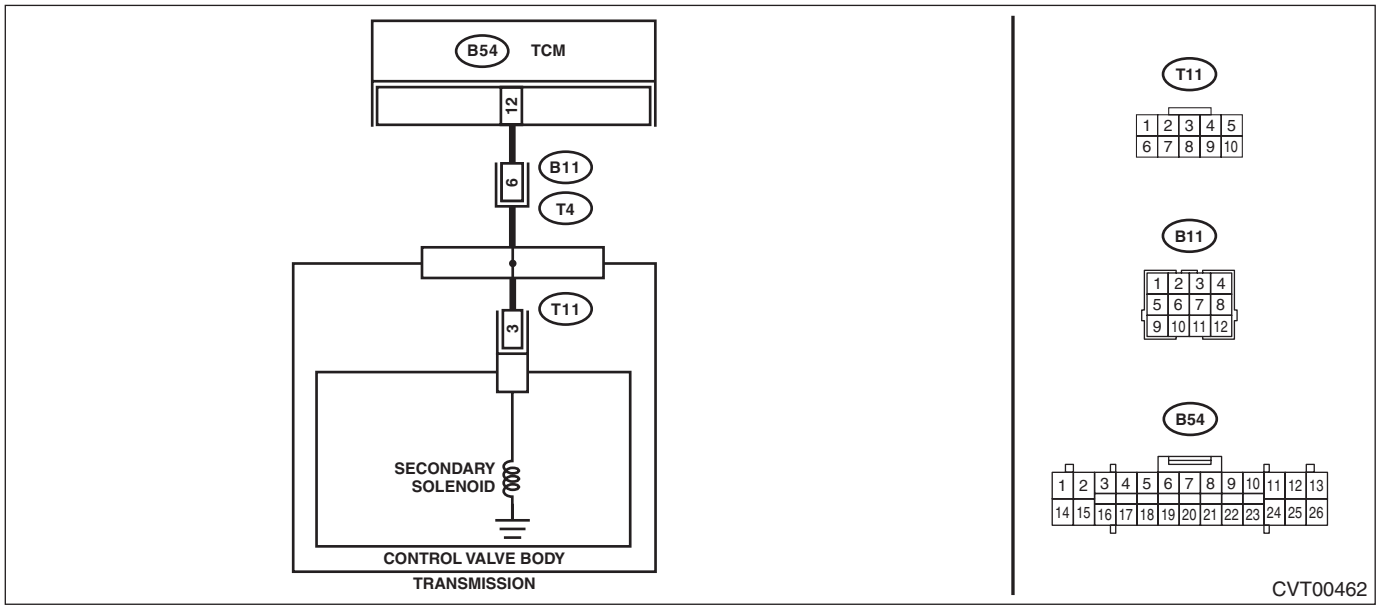
- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(CVT)(HEV)-37, DTC P0963 SECONDARY SOLENOID CIRCUIT (HIGH), Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

- Engine speed increases abruptly, and can not start.
- Engine speed increases abruptly during driving.

WIRING DIAGRAM:

CVT control system <Ref. to WI(HEV)-86, CVT Control System.>



	Step	Check	Yes	No
1	**CHECK INPUT SIGNAL FOR TCM.** 1) After driving with warm up condition, park the vehicle while depressing the brake pedal at "N" range. 2) Read the data of «Sec. Sol. Set Current» and «Sec. Sol. Actual Current» using Subaru Select Monitor.	Does the value of «Sec. Sol. Set Current» and «Sec. Sol. Actual Current» almost correspond?	Check for poor contact of connector.	Go to step **2**.
2	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the TCM and transmission connectors. 3) Measure the resistance between TCM connector and transmission connectors. ***Connector & terminal*** ***(B54) No. 12 — (B11) No. 6:***	Is the resistance less than 1 Ω?	Go to step **3**.	Repair the open circuit of harness.
3	**CHECK HARNESS.** 1) Turn the ignition switch to ON. 2) Measure the voltage between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 12 (+) — Chassis ground (–):***	Is the voltage approx. 0 V?	Go to step **4**.	Repair the short circuit of harness.

	Step	Check	Yes	No
4	**CHECK SECONDARY SOLENOID.** Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 6 — Transmission body:***	Is the resistance approx. 5 — 7 Ω? (when cold)	Check for poor contact of connector, and if no fault is found, replace the TCM. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>	Go to step **5**.
5	**CHECK HARNESS INSIDE TRANSMISSION.** **CAUTION:** **Start work after ATF cools down.** 1) Remove the transmission valve cover. 2) Check for the harness pinch, damage.	Is there any fault in the harness?	Replace the transmission harness.	Go to step **6**.
6	**CHECK HARNESS INSIDE TRANSMISSION.** 1) Disconnect the control valve body connector. 2) Turn the ignition switch to ON. 3) Measure the voltage between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 6 (+) — Transmission body (–):***	Is the voltage approx. 0 V?	Replace the control valve body. <Ref. to CVT(TH58A)-115, Control Valve Body.>	Replace the transmission harness.

AN:DTC P0965 FORWARD & REVERSE SOLENOID FUNCTION

DTC DETECTING CONDITION:

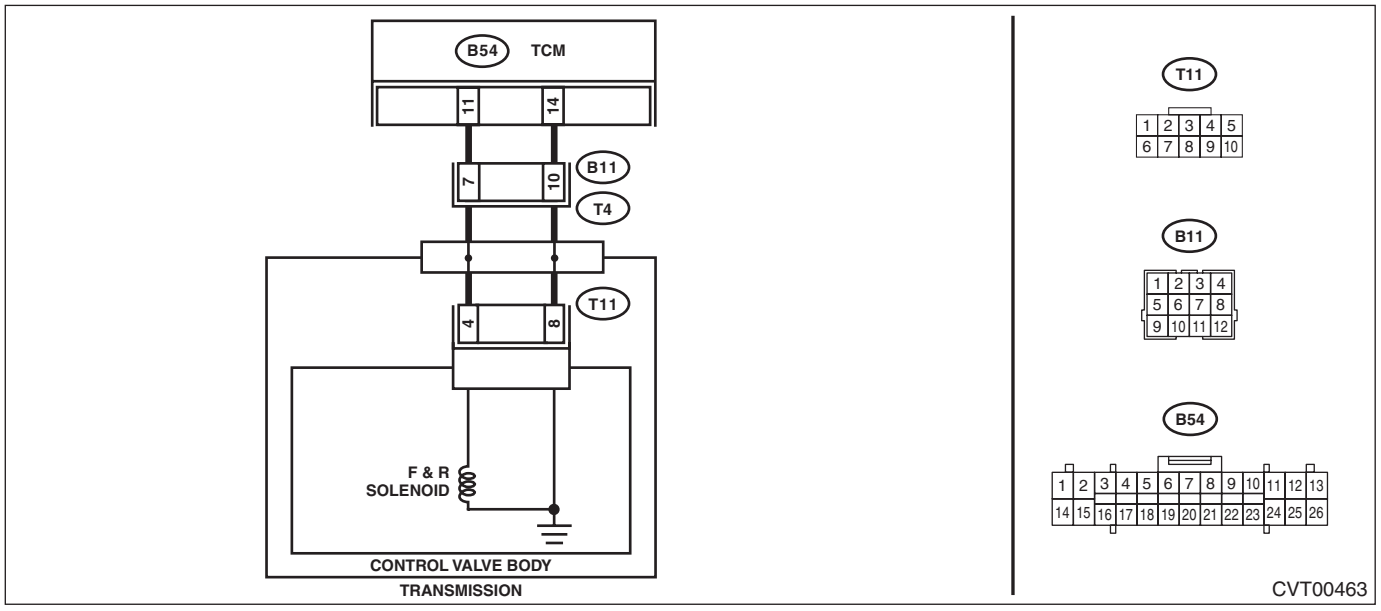
- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(CVT)(HEV)-38, DTC P0965 FORWARD & REVERSE SOLENOID FUNCTION, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

- Engine speed increases abruptly, and can not accelerate.
- Excessive slippage is felt.

WIRING DIAGRAM:

CVT control system <Ref. to WI(HEV)-86, CVT Control System.>



Step		Check	Yes	No
1	**CHECK DTC.** Read the DTC using Subaru Select Monitor.	Besides DTC P0965, is DTC P0966 or P0967 displayed?	Perform the diagnosis according to DTCs other than P0965.	Go to step **2**.
2	**CHECK FOR POOR CONTACT.** Check for poor contact of harness and connector between TCM and F&R solenoid.	Is there poor contact?	Repair the poor contact of harness and connector.	Go to step **3**.
3	**CHECK F&R SOLENOID.** 1) Turn the ignition switch to OFF. 2) Disconnect the transmission connector. 3) Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 7 — Transmission body:***	Is the resistance approx. 4 — 6 Ω? (when cold)	Replace the control valve body. <Ref. to CVT(TH58A)-115, Control Valve Body.>	Recheck the poor contact of harness and connector. Replace the TCM if no fault is found. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>

AO:DTC P0966 FORWARD & REVERSE SOLENOID CIRCUIT (LOW)

DTC DETECTING CONDITION:

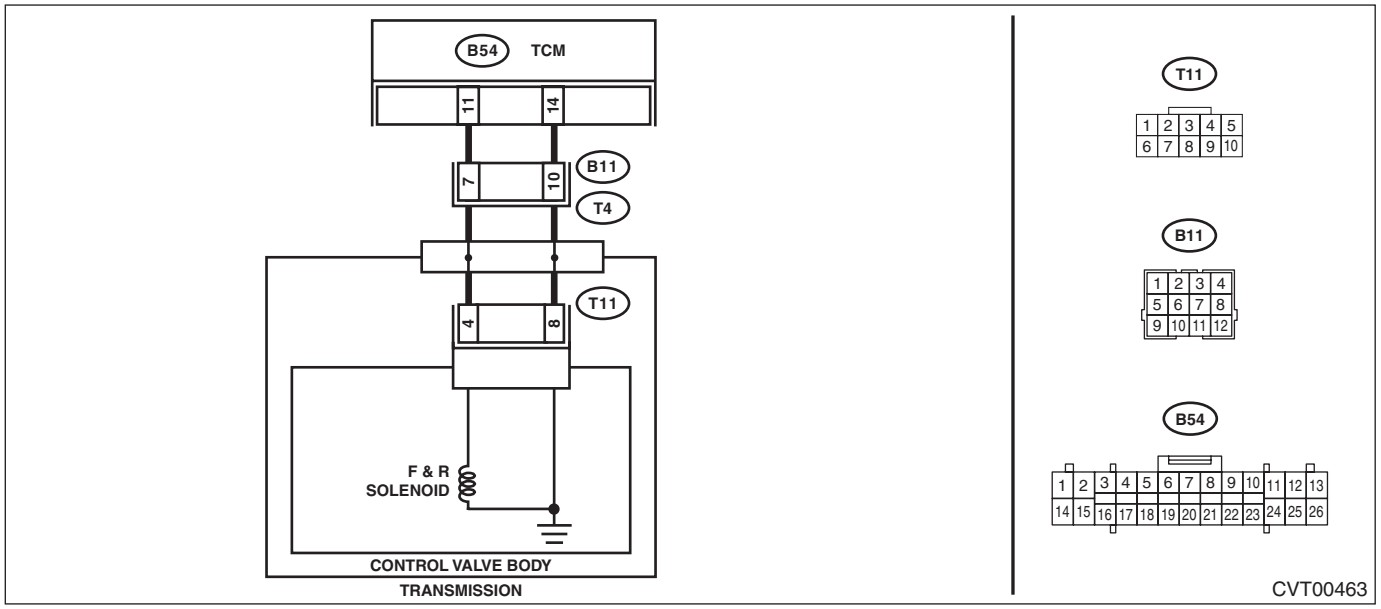
- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(CVT)(HEV)-39, DTC P0966 FORWARD & REVERSE SOLENOID CIRCUIT (LOW), Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

Excessive shift shock

WIRING DIAGRAM:

CVT control system <Ref. to WI(HEV)-86, CVT Control System.>



Step		Check	Yes	No
1	**CHECK INPUT SIGNAL FOR TCM.** 1) After driving with warm up condition, park the vehicle while depressing the brake pedal at "D" range. 2) Read the data of «F&R Linear Solenoid Set Current» and «F&R Linear Solenoid Actual Current» using Subaru Select Monitor.	Does the value of «F&R Linear Solenoid Set Current» and «F&R Linear Solenoid Actual Current» almost correspond?	Check for poor contact of connector.	Go to step **2**.
2	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the TCM and transmission connectors. 3) Measure the resistance between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 11 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **3**.	Repair the short circuit of harness.
3	**CHECK F&R SOLENOID.** Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 7 — Transmission body:***	Is the resistance approx. 4 — 6 Ω? (when cold)	Check for poor contact of connector, and if no fault is found, replace the TCM. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>	Go to step **4**.

	Step	Check	Yes	No
4	**CHECK HARNESS INSIDE TRANSMISSION.** **CAUTION:** **Start work after ATF cools down.** 1) Remove the transmission valve cover. 2) Check for the harness pinch, damage.	Is there any fault in the harness?	Replace the transmission harness.	Go to step **5**.
5	**CHECK HARNESS INSIDE TRANSMISSION.** 1) Disconnect the control valve body connector. 2) Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 7 — Transmission body:***	Is the resistance 1 MΩ or more?	Replace the control valve body. <Ref. to CVT(TH58A)-115, Control Valve Body.>	Replace the transmission harness.

AP:DTC P0967 FORWARD & REVERSE LINEAR SOLENOID CIRCUIT (HIGH)

DTC DETECTING CONDITION:

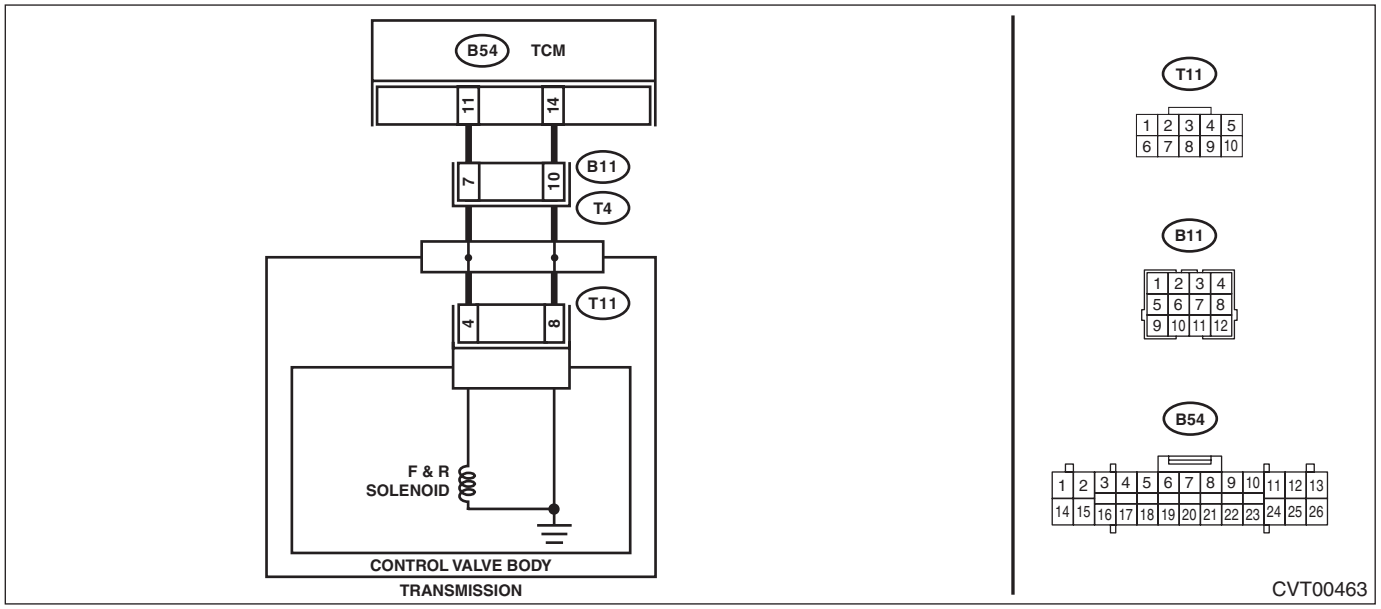
- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(CVT)(HEV)-40, DTC P0967 FORWARD & REVERSE LINEAR SOLENOID CIRCUIT (HIGH), Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

Engine speed increases abruptly, and can not start.

WIRING DIAGRAM:

CVT control system <Ref. to WI(HEV)-86, CVT Control System.>

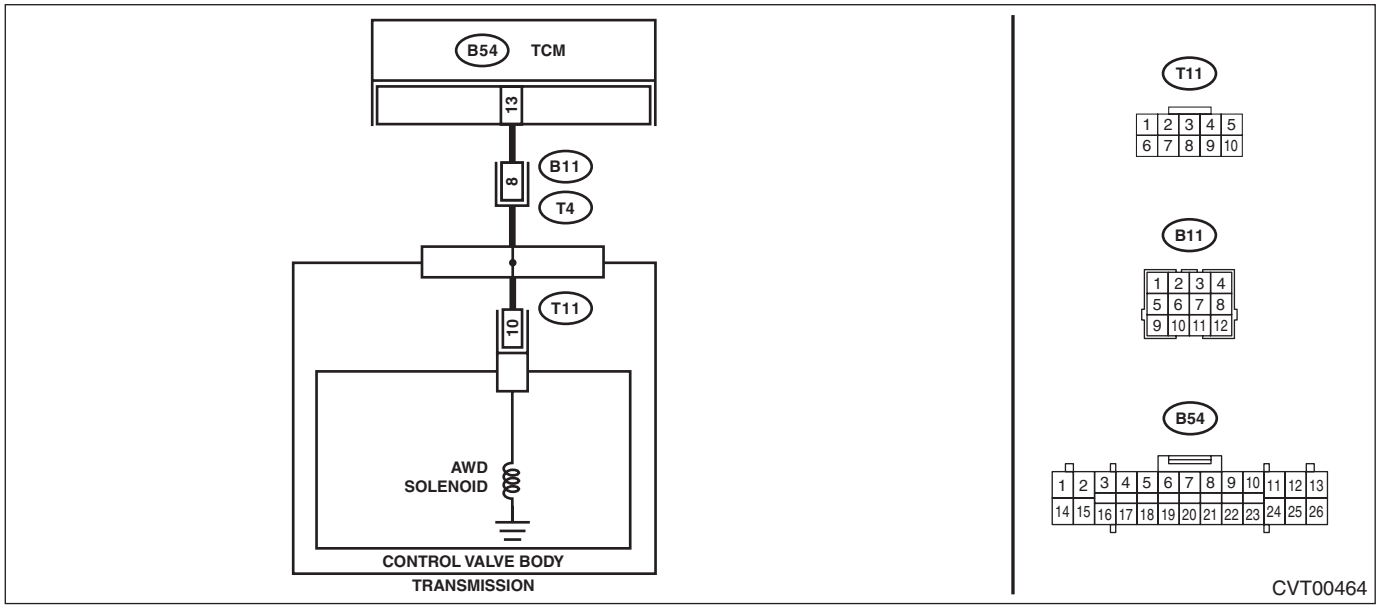


	Step	Check	Yes	No
1	**CHECK INPUT SIGNAL FOR TCM.** 1) After driving with warm up condition, park the vehicle while depressing the brake pedal at "D" range. 2) Read the data of «F&R Linear Solenoid Set Current» and «F&R Linear Solenoid Actual Current» using Subaru Select Monitor.	Does the value of «F&R Linear Solenoid Set Current» and «F&R Linear Solenoid Actual Current» almost correspond?	Check for poor contact of connector.	Go to step **2**.
2	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the TCM and transmission connectors. 3) Measure the resistance between TCM connector and transmission connectors. ***Connector & terminal*** ***(B54) No. 11 — (B11) No. 7:***	Is the resistance less than 1 Ω?	Go to step **3**.	Repair the open circuit of harness.
3	**CHECK HARNESS.** 1) Turn the ignition switch to ON. 2) Measure the voltage between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 11 (+) — Chassis ground (–):***	Is the voltage approx. 0 V?	Go to step **4**.	Repair the short circuit of harness.

	Step	Check	Yes	No
4	**CHECK F&R SOLENOID.** Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 7 — Transmission body:***	Is the resistance approx. 4 — 6 Ω? (when cold)	Check for poor contact of connector, and if no fault is found, replace the TCM. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>	Go to step **5**.
5	**CHECK HARNESS INSIDE TRANSMISSION.** **CAUTION:** **Start work after ATF cools down.** 1) Remove the transmission valve cover. 2) Check for the harness pinch, damage.	Is there any fault in the harness?	Replace the transmission harness.	Go to step **6**.
6	**CHECK HARNESS INSIDE TRANSMISSION.** 1) Disconnect the control valve body connector. 2) Turn the ignition switch to ON. 3) Measure the voltage between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 7 (+) — Transmission body (–):***	Is the voltage approx. 0 V?	Replace the control valve body. <Ref. to CVT(TH58A)-115, Control Valve Body.>	Replace the transmission harness.

AQ:DTC P0970 TRANSFER SOLENOID CIRCUIT (LOW)

DTC DETECTING CONDITION:
Output signal circuit of AWD solenoid is shorted.
TROUBLE SYMPTOM:
Drivability getting worse.
WIRING DIAGRAM:
CVT control system <Ref. to WI(HEV)-86, CVT Control System.>



	Step	Check	Yes	No
1	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the TCM and transmission connectors. 3) Measure the resistance between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 13 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **2**.	Repair the short circuit of harness.
2	**CHECK AWD SOLENOID.** Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 8 — Transmission body:***	Is the resistance approx. 2 — 4.5 Ω? (when cold)	Check for poor contact of connector, and if no fault is found, replace the TCM. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>	Go to step **3**.
3	**CHECK HARNESS INSIDE TRANSMISSION.** **CAUTION:** **Start work after ATF cools down.** 1) Remove the transmission valve cover. 2) Check for the harness pinch, damage.	Is there any fault in the harness?	Replace the transmission harness.	Go to step **4**.
4	**CHECK HARNESS INSIDE TRANSMISSION.** 1) Disconnect the control valve body connector. 2) Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 8 — Transmission body:***	Is the resistance 1 MΩ or more?	Replace the control valve body. <Ref. to CVT(TH58A)-115, Control Valve Body.>	Replace the transmission harness.

AR:DTC P0971 TRANSFER SOLENOID CIRCUIT (HIGH)

DTC DETECTING CONDITION:

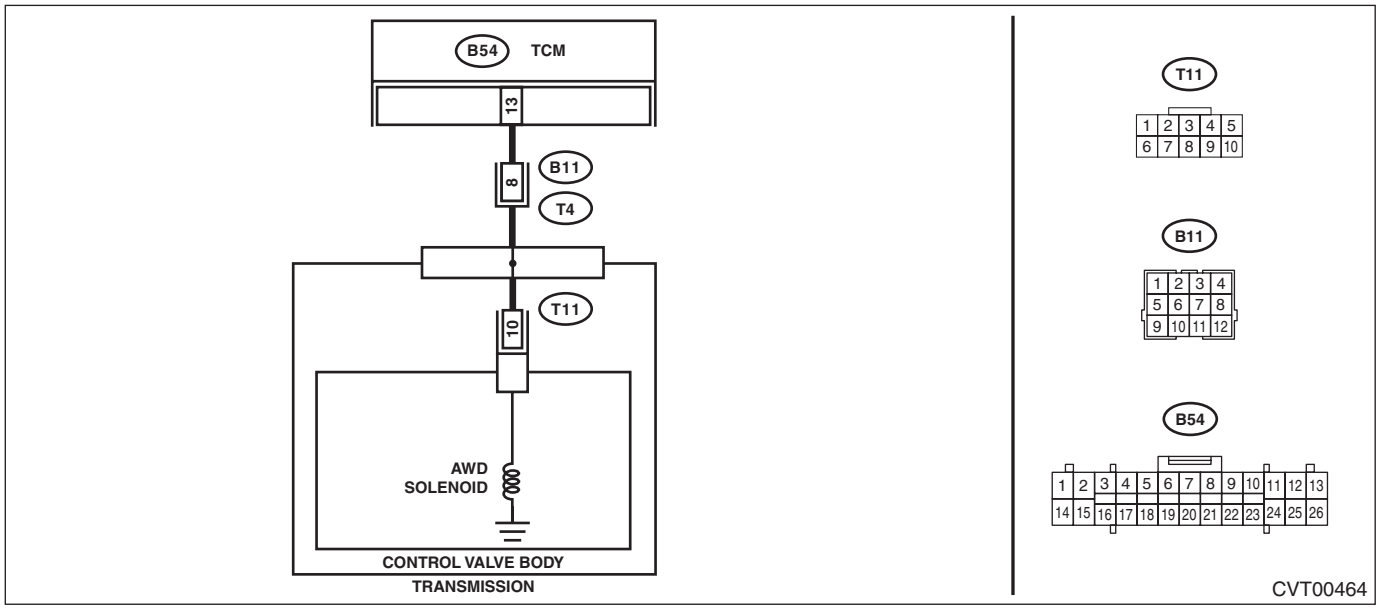
- Output signal circuit of AWD solenoid is open or shorted.
- AWD solenoid has open circuit inside.

TROUBLE SYMPTOM:

- Tight corner braking phenomenon occurs.
- Drivability getting worse.

WIRING DIAGRAM:

CVT control system <Ref. to WI(HEV)-86, CVT Control System.>



	Step	Check	Yes	No
1	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the TCM and transmission connectors. 3) Measure the resistance between TCM connector and transmission connectors. ***Connector & terminal*** ***(B54) No. 13 — (B11) No. 8:***	Is the resistance less than 1 Ω?	Go to step **2**.	Repair the open circuit of harness.
2	**CHECK HARNESS.** 1) Turn the ignition switch to ON. 2) Measure the voltage between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 13 (+) — Chassis ground (–):***	Is the voltage approx. 0 V?	Go to step **3**.	Repair the short circuit of harness.
3	**CHECK AWD SOLENOID.** Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 8 — Transmission body:***	Is the resistance approx. 2 — 4.5 Ω? (when cold)	Check for poor contact of connector, and if no fault is found, replace the TCM. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>	Go to step **4**.
4	**CHECK HARNESS INSIDE TRANSMISSION.** **CAUTION:** **Start work after ATF cools down.** 1) Remove the transmission valve cover. 2) Check for the harness pinch, damage.	Is there any fault in the harness?	Replace the transmission harness.	Go to step **5**.

Step		Check	Yes	No
5	**CHECK HARNESS INSIDE TRANSMISSION.** 1) Disconnect the control valve body connector. 2) Turn the ignition switch to ON. 3) Measure the voltage between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 8 (+) — Transmission body (–):***	Is the voltage approx. 0 V?	Replace the control valve body. <Ref. to CVT(TH58A)-115, Control Valve Body.>	Replace the transmission harness.

AS:DTC P0973 PRIMARY SOLENOID SYSTEM A CIRCUIT (LOW)

DTC DETECTING CONDITION:

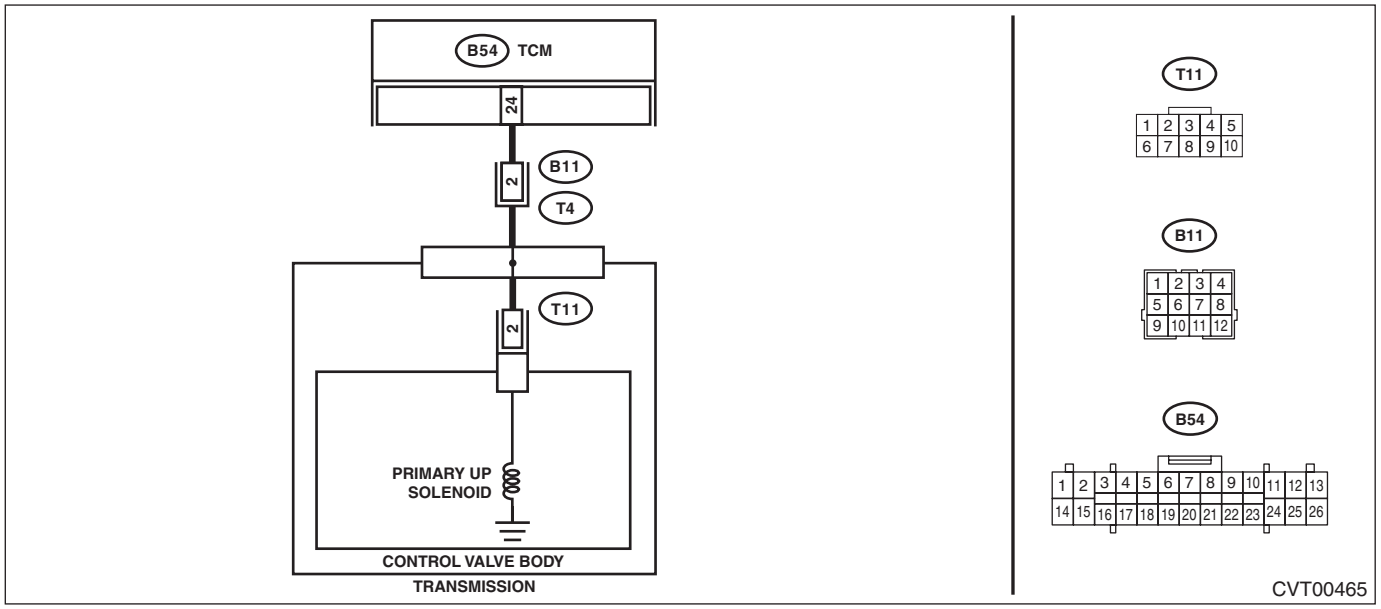
- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(CVT)(HEV)-41, DTC P0973 PRIMARY SOLENOID SYSTEM A CIRCUIT (LOW), Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

Gear is not changed. (No up-shift)

WIRING DIAGRAM:

CVT control system <Ref. to WI(HEV)-86, CVT Control System.>



	Step	Check	Yes	No
1	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the TCM and transmission connectors. 3) Measure the resistance between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 24 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **2**.	Repair the short circuit of harness.
2	**CHECK PRIMARY UP SOLENOID.** Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 2 — Transmission body:***	Is the resistance approx. 10 — 13.5 Ω? (when cold)	Check for poor contact of connector, and if no fault is found, replace the TCM. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>	Go to step **3**.
3	**CHECK HARNESS INSIDE TRANSMISSION.** **CAUTION:** **Start work after ATF cools down.** 1) Remove the transmission valve cover. 2) Check for the harness pinch, damage.	Is there any fault in the harness?	Replace the transmission harness.	Go to step **4**.

	Step	Check	Yes	No
4	**CHECK HARNESS INSIDE TRANSMISSION.** 1) Disconnect the control valve body connector. 2) Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 2 — Transmission body:***	Is the resistance 1 MΩ or more?	Replace the control valve body. <Ref. to CVT(TH58A)-115, Control Valve Body.>	Replace the transmission harness.

AT:DTC P0974 PRIMARY SOLENOID SYSTEM A CIRCUIT (HIGH)

DTC DETECTING CONDITION:

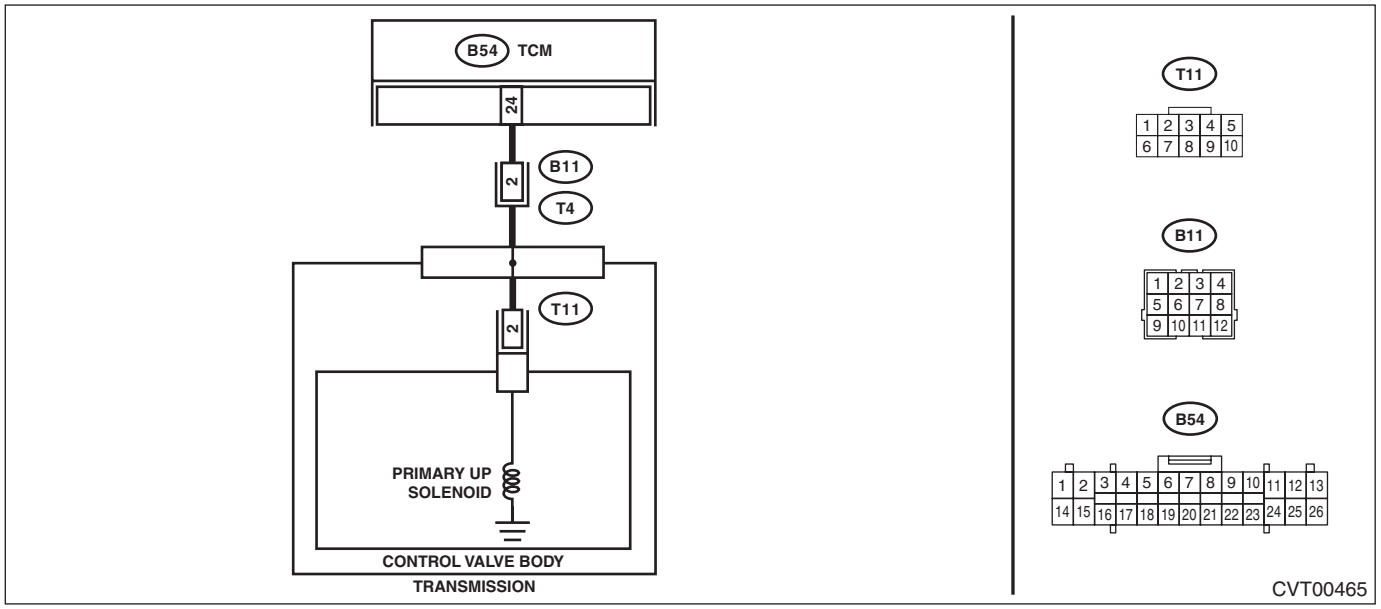
- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(CVT)(HEV)-42, DTC P0974 PRIMARY SOLENOID SYSTEM A CIRCUIT (HIGH), Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

Gear is not changed. (No up-shift)

WIRING DIAGRAM:

CVT control system <Ref. to WI(HEV)-86, CVT Control System.>



	Step	Check	Yes	No
1	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the TCM and transmission connectors. 3) Measure the resistance between TCM connector and transmission connectors. ***Connector & terminal*** ***(B54) No. 24 — (B11) No. 2:***	Is the resistance less than 1 Ω?	Go to step **2**.	Repair the open circuit of harness.
2	**CHECK HARNESS.** 1) Turn the ignition switch to ON. 2) Measure the voltage between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 24 (+) — Chassis ground (–):***	Is the voltage approx. 0 V?	Go to step **3**.	Repair the short circuit of harness.
3	**CHECK PRIMARY UP SOLENOID.** Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 2 — Transmission body:***	Is the resistance approx. 10 — 13.5 Ω? (when cold)	Check for poor contact of connector, and if no fault is found, replace the TCM. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>	Go to step **4**.
4	**CHECK HARNESS INSIDE TRANSMISSION.** **CAUTION:** **Start work after ATF cools down.** 1) Remove the transmission valve cover. 2) Check for the harness pinch, damage.	Is there any fault in the harness?	Replace the transmission harness.	Go to step **5**.

	Step	Check	Yes	No
5	**CHECK HARNESS INSIDE TRANSMISSION.** 1) Disconnect the control valve body connector. 2) Turn the ignition switch to ON. 3) Measure the voltage between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 2 (+) — Transmission body (–):***	Is the voltage approx. 0 V?	Replace the control valve body. <Ref. to CVT(TH58A)-115, Control Valve Body.>	Replace the transmission harness.

AU:DTC P0976 PRIMARY SOLENOID SYSTEM B CIRCUIT (LOW)

DTC DETECTING CONDITION:

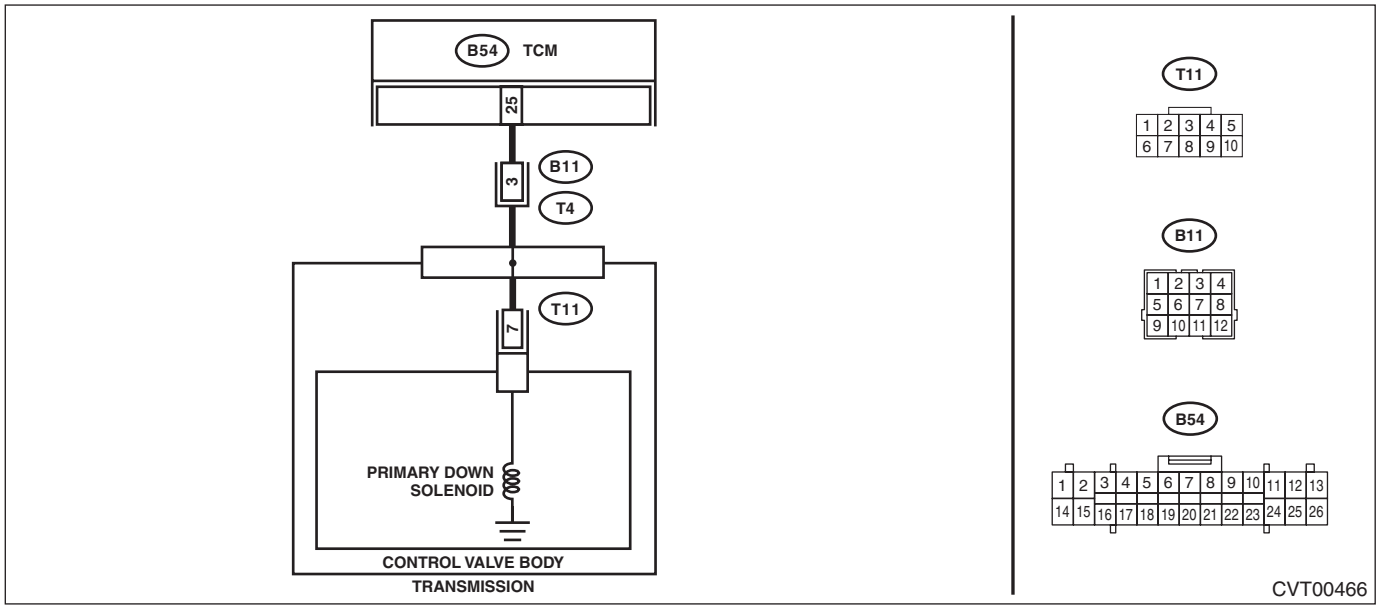
- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(CVT)(HEV)-43, DTC P0976 PRIMARY SOLENOID SYSTEM B CIRCUIT (LOW), Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

Gear is not changed. (No down-shift)

WIRING DIAGRAM:

CVT control system <Ref. to WI(HEV)-86, CVT Control System.>



	Step	Check	Yes	No
1	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the TCM and transmission connectors. 3) Measure the resistance between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 25 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **2**.	Repair the short circuit of harness.
2	**CHECK PRIMARY DOWN SOLENOID.** Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 3 — Transmission body:***	Is the resistance approx. 10 — 13.5 Ω? (when cold)	Check for poor contact of connector, and if no fault is found, replace the TCM. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>	Go to step **3**.
3	**CHECK HARNESS INSIDE TRANSMISSION.** **CAUTION:** **Start work after ATF cools down.** 1) Remove the transmission valve cover. 2) Check for the harness pinch, damage.	Is there any fault in the harness?	Replace the transmission harness.	Go to step **4**.

	Step	Check	Yes	No
4	**CHECK HARNESS INSIDE TRANSMISSION.** 1) Disconnect the control valve body connector. 2) Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 3 — Transmission body:***	Is the resistance 1 MΩ or more?	Replace the control valve body. <Ref. to CVT(TH58A)-115, Control Valve Body.>	Replace the transmission harness.

AV:DTC P0977 PRIMARY SOLENOID SYSTEM B CIRCUIT (HIGH)

DTC DETECTING CONDITION:

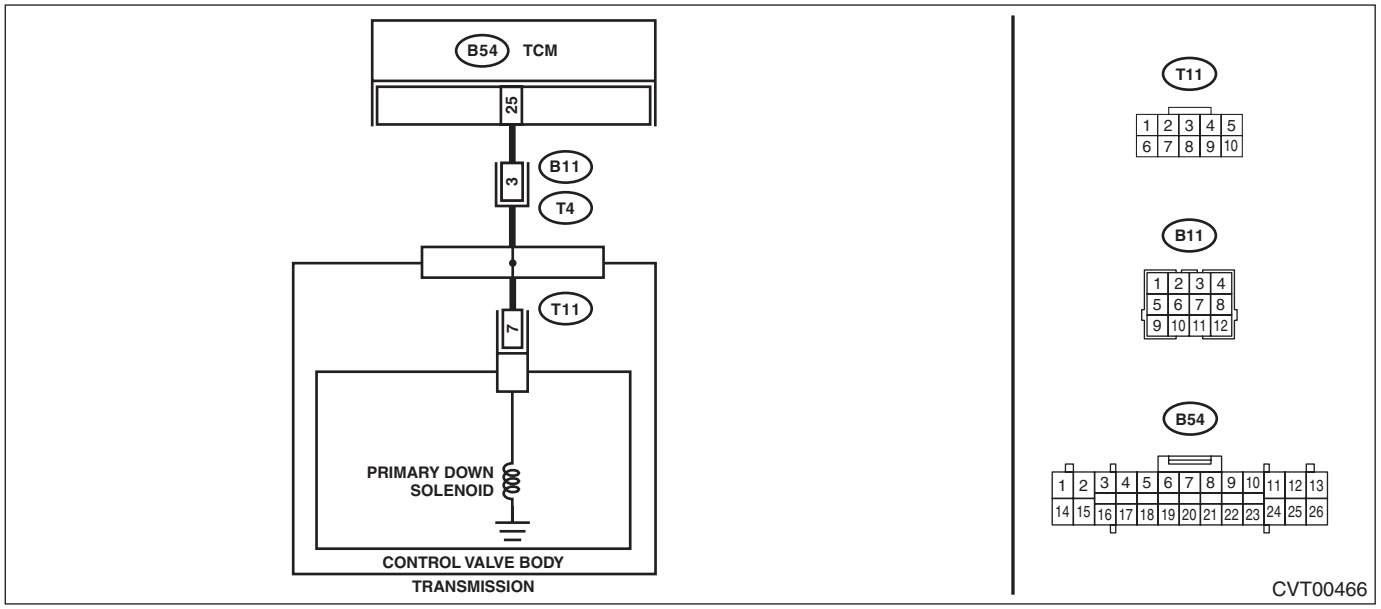
- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(CVT)(HEV)-44, DTC P0977 PRIMARY SOLENOID SYSTEM B CIRCUIT (HIGH), Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

Gear is not changed. (No down-shift)

WIRING DIAGRAM:

CVT control system <Ref. to WI(HEV)-86, CVT Control System.>



	Step	Check	Yes	No
1	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the TCM and transmission connectors. 3) Measure the resistance between TCM connector and transmission connectors. ***Connector & terminal*** ***(B54) No. 25 — (B11) No. 3:***	Is the resistance less than 1 Ω?	Go to step **2**.	Repair the open circuit of harness.
2	**CHECK HARNESS.** 1) Turn the ignition switch to ON. 2) Measure the voltage between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 25 (+) — Chassis ground (–):***	Is the voltage approx. 0 V?	Go to step **3**.	Repair the short circuit of harness.
3	**CHECK PRIMARY DOWN SOLENOID.** Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 3 — Transmission body:***	Is the resistance approx. 10 — 13.5 Ω? (when cold)	Check for poor contact of connector, and if no fault is found, replace the TCM. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>	Go to step **4**.
4	**CHECK HARNESS INSIDE TRANSMISSION.** **CAUTION:** **Start work after ATF cools down.** 1) Remove the transmission valve cover. 2) Check for the harness pinch, damage.	Is there any fault in the harness?	Replace the transmission harness.	Go to step **5**.

Step		Check	Yes	No
5	**CHECK HARNESS INSIDE TRANSMISSION.** 1) Disconnect the control valve body connector. 2) Turn the ignition switch to ON. 3) Measure the voltage between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 3 (+) — Transmission body (–):***	Is the voltage approx. 0 V?	Replace the control valve body. <Ref. to CVT(TH58A)-115, Control Valve Body.>	Replace the transmission harness.

AW:DTC P0B0A AUXILIARY TRANSMISSION FLUID PUMP MOTOR SUPPLY VOLTAGE CIRCUIT LOW

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(CVT)(HEV)-45, DTC P0B0A AUXILIARY TRANSMISSION FLUID PUMP MOTOR SUPPLY VOLTAGE CIRCUIT LOW, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

Electric oil pump does not operate.

CAUTION:

Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to CVT(HEV)(diag)-5, HYBRID SYSTEM, CAUTION, General Description.>

	Step	Check	Yes	No
1	**CHECK DTC.** Check the DTC relating the HPCM, BECM using the Subaru Select Monitor.	Is DTC detected?	Perform the diagnosis according to DTC.	Go to step **2**.
2	**CHECK BUS BAR.** 1) Turn the ignition switch to OFF. 2) Disconnect the ground cable of the 12 volt auxiliary battery, and as for the 12 volt engine restart battery, disconnect the ground cable from the 12V engine restart battery sensor. <Ref. to NT-5, BATTERY, NOTE, Note.> 3) Remove the service disconnect plug. <Ref. to HEV-15, Service Plug.> 4) Wait for 10 minutes. 5) Check the bus bar.	Is there any bend or looseness?	Reinstall or replace the bus bar.	Replace the electric oil pump inverter. <Ref. to HEV-45, ELECTRIC OIL PUMP INVERTER, REMOVAL, Inverter.>

AX:DTC P0B0B AUXILIARY TRANSMISSION FLUID PUMP MOTOR SUPPLY VOLTAGE CIRCUIT HIGH

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(CVT)(HEV)-46, DTC P0B0B AUXILIARY TRANSMISSION FLUID PUMP MOTOR SUPPLY VOLTAGE CIRCUIT HIGH, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

Electric oil pump does not operate.

CAUTION:

Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to CVT(HEV)(diag)-5, HYBRID SYSTEM, CAUTION, General Description.>

	Step	Check	Yes	No
1	**CHECK DTC.** Check the DTC relating the HPCM, BECM using the Subaru Select Monitor.	Is DTC detected?	Perform the diagnosis according to DTC.	Go to step **2**.
2	**CHECK DTC.** Check the displayed DTC using Subaru Select Monitor. (While the vehicle is stopped and idling)	Is the DTC P0B0B a current malfunction?	Replace the electric oil pump inverter. <Ref. to HEV-45, ELECTRIC OIL PUMP INVERTER, REMOVAL, Inverter.>	Go to step **3**.
3	**CHECK DTC.** Check other DTC using the Subaru Select Monitor.	Is a past malfunction DTC detected? (TCM, HPCM, BECM, DMCM)	Perform the diagnosis according to DTC.	Replace the electric oil pump inverter. <Ref. to HEV-45, ELECTRIC OIL PUMP INVERTER, REMOVAL, Inverter.>

AY:DTC P0B0D AUXILIARY TRANSMISSION FLUID PUMP MOTOR CONTROL MODULE

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(CVT)(HEV)-47, DTC P0B0D AUXILIARY TRANSMISSION FLUID PUMP MOTOR CONTROL MODULE, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

Electric oil pump does not operate.

CAUTION:

Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to CVT(HEV)(diag)-5, HYBRID SYSTEM, CAUTION, General Description.>

	Step	Check	Yes	No
1	**CHECK DTC.** Check the DTC using Subaru Select Monitor.	Is the DTC a current malfunction?	Replace the electric oil pump inverter. <Ref. to HEV-45, ELECTRIC OIL PUMP INVERTER, REMOVAL, Inverter.>	Go to step **2**.
2	**CHECK DTC.** 1) Perform the Clear Memory Mode. 2) Start the engine. 3) Check the DTC using Subaru Select Monitor.	Is DTC P0B0D detected?	Replace the electric oil pump inverter. <Ref. to HEV-45, ELECTRIC OIL PUMP INVERTER, REMOVAL, Inverter.>	Perform the Inspection Mode, and if there is no problem, finish the diagnosis. <Ref. to CVT(HEV)(diag)-21, Inspection Mode.>

AZ:DTC P0C1D AUXILIARY TRANSMISSION FLUID PUMP CONTROL MODULE INTERNAL TEMPERATURE SENSOR RANGE/PERFORMANCE

DTC DETECTING CONDITION:
Electric oil pump inverter circuit board failure
TROUBLE SYMPTOM:
Electric oil pump does not operate.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to CVT(HEV)(diag)-5, HYBRID SYSTEM, CAUTION, General Description.>

	Step	Check	Yes	No
1	**CHECK DTC.** Check the DTC using Subaru Select Monitor.	Is the DTC a current malfunction?	Replace the electric oil pump inverter. <Ref. to HEV-45, ELECTRIC OIL PUMP INVERTER, REMOVAL, Inverter.>	Go to step **2**.
2	**CHECK DTC.** 1) Perform the Clear Memory Mode. 2) Start the engine. 3) Warm up the engine until the ATF temperature reaches 40°C (104°F) or more. 4) Check the DTC using Subaru Select Monitor.	Is DTC P0C1D detected?	Replace the electric oil pump inverter. <Ref. to HEV-45, ELECTRIC OIL PUMP INVERTER, REMOVAL, Inverter.>	Perform the Inspection Mode, and if there is no problem, finish the diagnosis. <Ref. to CVT(HEV)(diag)-21, Inspection Mode.>

BA:DTC P0C21 AUXILIARY TRANSMISSION FLUID PUMP PHASE U-V-W CIRCUIT LOW

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(CVT)(HEV)-48, DTC P0C21 AUXILIARY TRANSMISSION FLUID PUMP PHASE U-V-W CIRCUIT LOW, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

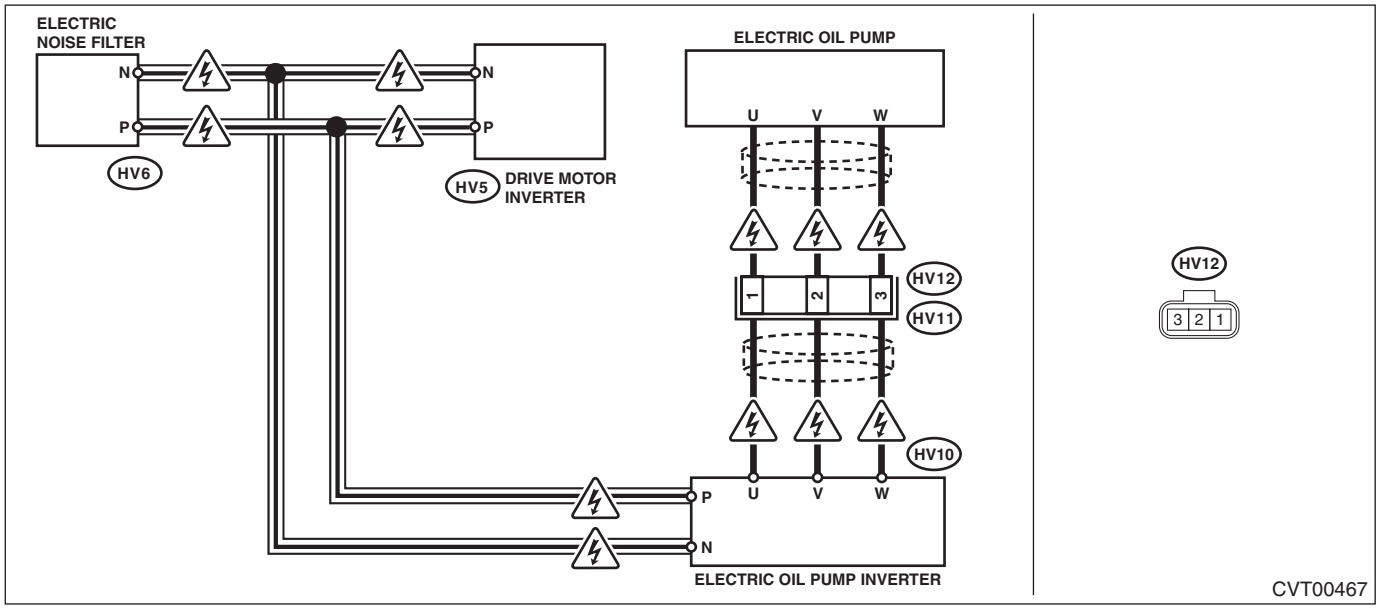
Electric oil pump does not operate.

CAUTION:

Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to CVT(HEV)(diag)-5, HYBRID SYSTEM, CAUTION, General Description.>

WIRING DIAGRAM:

CVT control system <Ref. to WI(HEV)-86, CVT Control System.>
Hybrid system <Ref. to WI(HEV)-140, Hybrid Electric Vehicle System.>



Step		Check	Yes	No
1	**CHECK POWER CABLE.** 1) Turn the ignition switch to OFF. 2) Disconnect the ground cable of the 12 volt auxiliary battery, and as for the 12 volt engine restart battery, disconnect the ground cable from the 12V engine restart battery sensor. <Ref. to NT-5, BATTERY, NOTE, Note.> 3) Remove the service disconnect plug. 4) Wait for 10 minutes. 5) Check the power cables of the electric oil pump and the electric oil pump inverter.	Is there any fault in the power cable? (looseness or rust)	Repair the power cable.	Go to step **2**.
2	**CHECK POWER CABLE.** 1) Disconnect the coupling connector of the electric oil pump and electric oil pump inverter. (HV11•HV12) 2) Disconnect the power cable from electric oil pump inverter. 3) Measure the resistance of power cable. ***Connector & terminal*** ***(HV10) U — (HV11) No. 1:*** ***(HV10) V — (HV11) No. 2:*** ***(HV10) W — (HV11) No. 3:***	Is the resistance less than 1 Ω?	Go to step **3**.	Replace the power cable. <Ref. to HEV-52, Power Cable.>

	Step	Check	Yes	No
3	**CHECK ELECTRIC OIL PUMP INVERTER.** Measure the resistance between the electric oil pump inverter terminals. ***Connector & terminal*** ***Electric oil pump inverter U terminal —*** ***Electric oil pump inverter N terminal:*** ***Electric oil pump inverter V terminal —*** ***Electric oil pump inverter N terminal:*** ***Electric oil pump inverter W terminal —*** ***Electric oil pump inverter N terminal:***	Is the resistance 1 kΩ or more?	Go to step **4**.	Replace the electric oil pump inverter. <Ref. to HEV-45, ELECTRIC OIL PUMP INVERTER, REMOVAL, Inverter.>
4	**CHECK ELECTRIC OIL PUMP SIDE POWER CABLE.** Measure the resistance of electric oil pump side power cable. ***Connector & terminal*** ***(HV12) No. 1 — (HV12) No. 2:*** ***(HV12) No. 1 — (HV12) No. 3:*** ***(HV12) No. 2 — (HV12) No. 3:***	Is the resistance 0.3 Ω or more?	Go to step **5**.	Replace the electric oil pump. <Ref. to CVT(TH58A)-134, Electric Fluid Pump.>
5	**CHECK ELECTRIC OIL PUMP.** 1) Replace the removed/disconnected parts back to the vehicle. 2) Perform the «Electric Fluid Pump inspection mode». <Ref. to CVT(TH58A)-141, INSPECTION, Electric Fluid Pump.>	Is P0C21 detected?	Replace the electric oil pump inverter. <Ref. to HEV-45, ELECTRIC OIL PUMP INVERTER, REMOVAL, Inverter.>	Go to step **6**.
6	**Auto Start Stop ROAD TEST.** Perform the Auto Start Stop road test. <Ref. to CVT(TH58A)-51, Auto Start Stop, INSPECTION, Road Test.>	Is P0C21 detected?	Replace the electric oil pump and the electric oil pump inverter. <Ref. to CVT(TH58A)-134, Electric Fluid Pump.> <Ref. to HEV-45, ELECTRIC OIL PUMP INVERTER, REMOVAL, Inverter.>	Current condition is normal.

BB:DTC P0C22 AUXILIARY TRANSMISSION FLUID PUMP PHASE U-V-W CIRCUIT HIGH

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(CVT)(HEV)-49, DTC P0C22 AUXILIARY TRANSMISSION FLUID PUMP PHASE U-V-W CIRCUIT HIGH, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

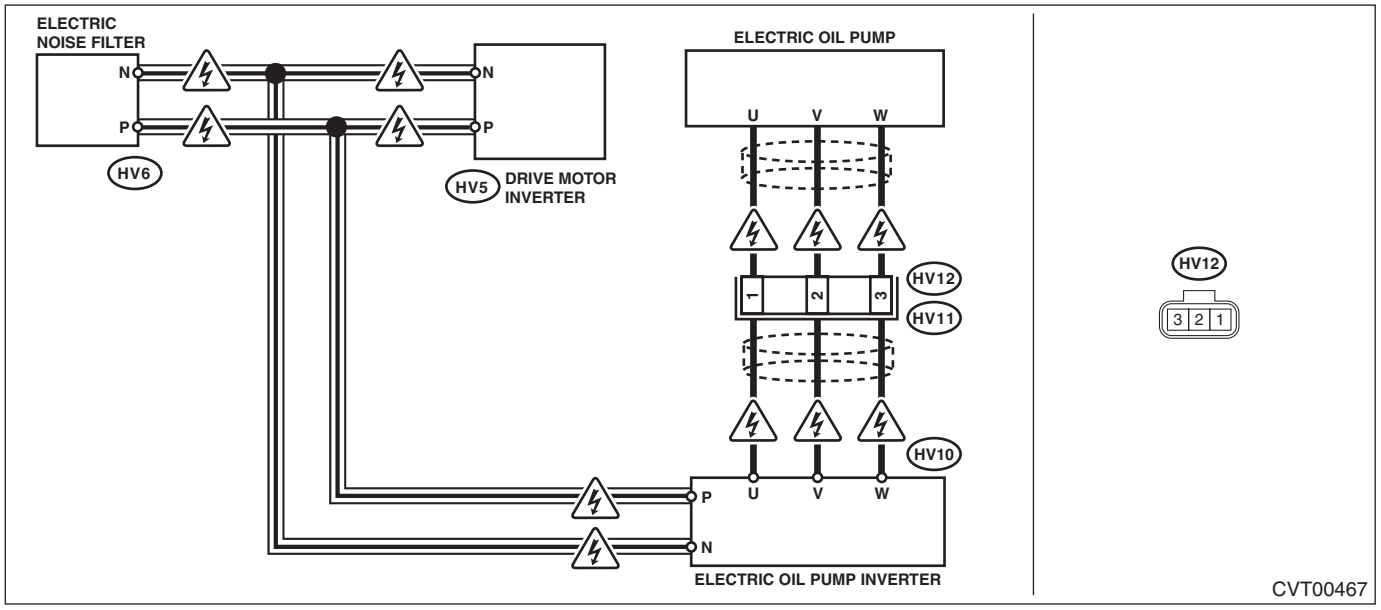
Electric oil pump does not operate.

CAUTION:

Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to CVT(HEV)(diag)-5, HYBRID SYSTEM, CAUTION, General Description.>

WIRING DIAGRAM:

CVT control system <Ref. to WI(HEV)-86, CVT Control System.>
Hybrid system <Ref. to WI(HEV)-140, Hybrid Electric Vehicle System.>



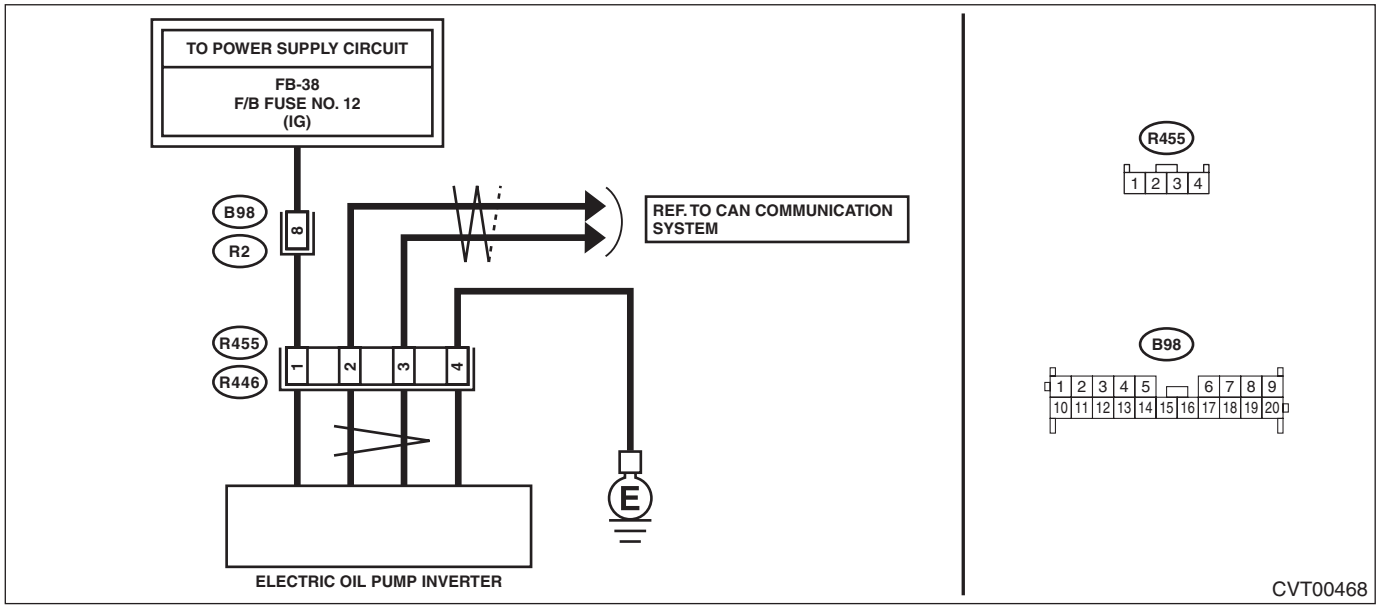
	Step	Check	Yes	No
1	**CHECK POWER CABLE.** 1) Turn the ignition switch to OFF. 2) Disconnect the ground cable of the 12 volt auxiliary battery, and as for the 12 volt engine restart battery, disconnect the ground cable from the 12V engine restart battery sensor. <Ref. to NT-5, BATTERY, NOTE, Note.> 3) Remove the service disconnect plug. 4) Wait for 10 minutes. 5) Check the power cables of the electric oil pump and the electric oil pump inverter.	Is there any fault in the power cable? (looseness or rust)	Repair the power cable.	Go to step **2**.
2	**CHECK POWER CABLE.** 1) Disconnect the coupling connector of the electric oil pump and electric oil pump inverter. (HV11•HV12) 2) Disconnect the power cable from electric oil pump inverter. 3) Measure the resistance of power cable. ***Connector & terminal*** ***(HV10) U — (HV11) No. 1:*** ***(HV10) V — (HV11) No. 2:*** ***(HV10) W — (HV11) No. 3:***	Is the resistance less than 1 Ω?	Go to step **3**.	Replace the power cable. <Ref. to HEV-52, Power Cable.>

	Step	Check	Yes	No
3	**CHECK ELECTRIC OIL PUMP INVERTER.** Measure the resistance between the electric oil pump inverter terminals. ***Connector & terminal*** ***Electric oil pump inverter U terminal —*** ***Electric oil pump inverter P terminal:*** ***Electric oil pump inverter V terminal —*** ***Electric oil pump inverter P terminal:*** ***Electric oil pump inverter W terminal —*** ***Electric oil pump inverter P terminal:***	Is the resistance 1 MΩ or more?	Go to step **4**.	Replace the electric oil pump inverter. <Ref. to HEV-45, ELECTRIC OIL PUMP INVERTER, REMOVAL, Inverter.>
4	**CHECK ELECTRIC OIL PUMP SIDE POWER CABLE.** Measure the resistance of electric oil pump side power cable. ***Connector & terminal*** ***(HV12) No. 1 — (HV12) No. 2:*** ***(HV12) No. 1 — (HV12) No. 3:*** ***(HV12) No. 2 — (HV12) No. 3:***	Is the resistance 0.3 Ω or more?	Go to step **5**.	Replace the electric oil pump. <Ref. to CVT(TH58A)-134, Electric Fluid Pump.>
5	**CHECK ELECTRIC OIL PUMP.** 1) Replace the removed/disconnected parts back to the vehicle. 2) Perform the «Electric Fluid Pump inspection mode». <Ref. to CVT(TH58A)-141, INSPECTION, Electric Fluid Pump.>	Is P0C22 detected?	Replace the electric oil pump inverter. <Ref. to HEV-45, ELECTRIC OIL PUMP INVERTER, REMOVAL, Inverter.>	Go to step **6**.
6	**Auto Start Stop ROAD TEST.** Perform the Auto Start Stop road test. <Ref. to CVT(TH58A)-51, Auto Start Stop, INSPECTION, Road Test.>	Is P0C22 detected?	Replace the electric oil pump and the electric oil pump inverter. <Ref. to CVT(TH58A)-134, Electric Fluid Pump.> <Ref. to HEV-45, ELECTRIC OIL PUMP INVERTER, REMOVAL, Inverter.>	Current condition is normal.

BC:DTC P0C24 AUXILIARY TRANSMISSION FLUID PUMP CONTROL MODULE CIRCUIT LOW

DTC DETECTING CONDITION:
Electric oil pump inverter 12 V supply voltage is shorted.
TROUBLE SYMPTOM:
Electric oil pump does not operate.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to CVT(HEV)(diag)-5, HYBRID SYSTEM, CAUTION, General Description.>
WIRING DIAGRAM:
CVT control system <Ref. to WI(HEV)-86, CVT Control System.>
Hybrid system <Ref. to WI(HEV)-140, Hybrid Electric Vehicle System.>

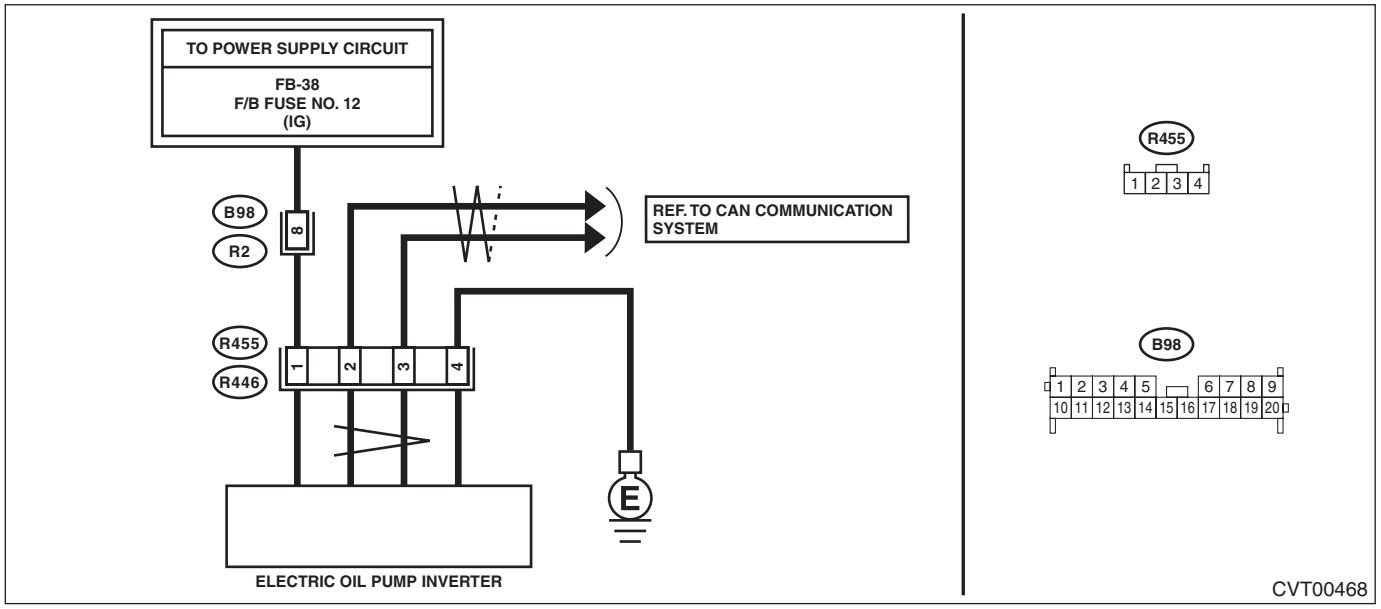


Step		Check	Yes	No
1	**CHECK DTC.** Using the Subaru Select Monitor, confirm all DTCs.	Is DTC detected?	Perform the diagnosis according to DTC.	Go to step **2**.
2	**CHECK INPUT SIGNAL FOR TCM.** Read the data of «Control module voltage» using Subaru Select Monitor.	Is the «Control Module Voltage» 10 V or more?	Go to step **3**.	Check the battery and TCM power supply circuit.
3	**CHECK HARNESS.** 1) Disconnect the connector from electric oil pump inverter. 2) Measure the voltage between the electric oil pump inverter connector and the ground bolt of inverter frame body. (ignition ON) ***Connector & terminal*** ***(R455) No. 1 (+) — Ground bolt of inverter frame body:***	Is the voltage 10 V or more?	Go to step **4**.	Check the power supply circuit between the fuse and the electric oil pump inverter connector (R455).
4	**CHECK HARNESS.** Measure the resistance between the electric oil pump inverter connector and the ground bolt of inverter frame body. ***Connector & terminal*** ***(R455) No. 4 — Ground bolt of inverter frame body:***	Is the resistance less than 1 Ω?	Replace the electric oil pump inverter. <Ref. to HEV-45, ELECTRIC OIL PUMP INVERTER, REMOVAL, Inverter.>	Repair the ground circuit.

BD:DTC P0C25 AUXILIARY TRANSMISSION FLUID PUMP CONTROL MODULE CIRCUIT HIGH

DTC DETECTING CONDITION:
Electric oil pump inverter 12 V supply voltage is shorted.
TROUBLE SYMPTOM:
Electric oil pump does not operate.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to CVT(HEV)(diag)-5, HYBRID SYSTEM, CAUTION, General Description.>
WIRING DIAGRAM:
CVT control system <Ref. to WI(HEV)-86, CVT Control System.>
Hybrid system <Ref. to WI(HEV)-140, Hybrid Electric Vehicle System.>



Step		Check	Yes	No
1	**CHECK DTC.** Using the Subaru Select Monitor, confirm all DTCs.	Is DTC detected?	Perform the diagnosis according to DTC.	Go to step **2**.
2	**CHECK INPUT SIGNAL FOR TCM.** Read the data of «Control module voltage» using Subaru Select Monitor.	Is the «Control Module Voltage» 16 V or more?	Go to step **3**.	Check the battery and TCM power supply circuit.
3	**CHECK HARNESS.** 1) Disconnect the connector from electric oil pump inverter. 2) Measure the voltage between the electric oil pump inverter connector terminals. (ignition ON) ***Connector & terminal*** ***(R455) No. 1 (+) — (B455) No. 4 (–):***	Is the voltage 16 V or more?	Check the power supply circuit between the fuse and the electric oil pump inverter connector (R455).	Go to step **4**.
4	**CHECK ELECTRIC OIL PUMP.** 1) Perform the Clear Memory Mode. 2) Perform the «Electric Fluid Pump inspection mode». <Ref. to CVT(TH58A)-141, INSPECTION, Electric Fluid Pump.>	Is P0C25 detected?	Replace the electric oil pump inverter. <Ref. to HEV-45, ELECTRIC OIL PUMP INVERTER, REMOVAL, Inverter.>	Current condition is normal.

BE:DTC P0C27 AUXILIARY TRANSMISSION FLUID PUMP MOTOR CURRENT LOW

DTC DETECTING CONDITION:
Electric oil pump inverter failure
TROUBLE SYMPTOM:
Electric oil pump does not operate.

	Step	Check	Yes	No
1	**CHECK DTC.** Using the Subaru Select Monitor, confirm all DTCs.	Is DTC detected?	Perform the diagnosis according to DTC.	Go to step **2**.
2	**CHECK ELECTRIC OIL PUMP.** 1) Perform the Clear Memory Mode. 2) Perform the «Electric Fluid Pump inspection mode». <Ref. to CVT(TH58A)-141, INSPECTION, Electric Fluid Pump.>	Is P0C27 detected?	Replace the electric oil pump inverter. <Ref. to HEV-45, ELECTRIC OIL PUMP INVERTER, REMOVAL, Inverter.>	Go to step **3**.
3	**Auto Start Stop ROAD TEST.** Perform the Auto Start Stop road test. <Ref. to CVT(TH58A)-51, Auto Start Stop, INSPECTION, Road Test.>	Is P0C27 detected?	Replace the electric oil pump and the electric oil pump inverter. <Ref. to CVT(TH58A)-134, Electric Fluid Pump.> <Ref. to HEV-45, ELECTRIC OIL PUMP INVERTER, REMOVAL, Inverter.>	Current condition is normal.

BF:DTC P0C28 AUXILIARY TRANSMISSION FLUID PUMP MOTOR CURRENT HIGH

DTC DETECTING CONDITION:
Electric oil pump inverter failure
TROUBLE SYMPTOM:
Electric oil pump does not operate.

CAUTION:
Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to CVT(HEV)(diag)-5, HYBRID SYSTEM, CAUTION, General Description.>

	Step	Check	Yes	No
1	**CHECK DTC.** Using the Subaru Select Monitor, confirm all DTCs.	Is DTC detected?	Perform the diagnosis according to DTC.	Go to step **2**.
2	**CHECK ELECTRIC OIL PUMP.** 1) Perform the Clear Memory Mode. 2) Perform the «Electric Fluid Pump inspection mode». <Ref. to CVT(TH58A)-141, INSPECTION, Electric Fluid Pump.>	Is P0C28 detected?	Replace the electric oil pump inverter. <Ref. to HEV-45, ELECTRIC OIL PUMP INVERTER, REMOVAL, Inverter.>	Go to step **3**.
3	**Auto Start Stop ROAD TEST.** Perform the Auto Start Stop road test. <Ref. to CVT(TH58A)-51, Auto Start Stop, INSPECTION, Road Test.>	Is P0C28 detected?	Replace the electric oil pump and the electric oil pump inverter. <Ref. to CVT(TH58A)-134, Electric Fluid Pump.> <Ref. to HEV-45, ELECTRIC OIL PUMP INVERTER, REMOVAL, Inverter.>	Current condition is normal.

BG:DTC P0C29 AUXILIARY TRANSMISSION FLUID PUMP DRIVER CURRENT PERFORMANCE

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(CVT)(HEV)-50, DTC P0C29 AUXILIARY TRANSMISSION FLUID PUMP DRIVER CURRENT PERFORMANCE, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

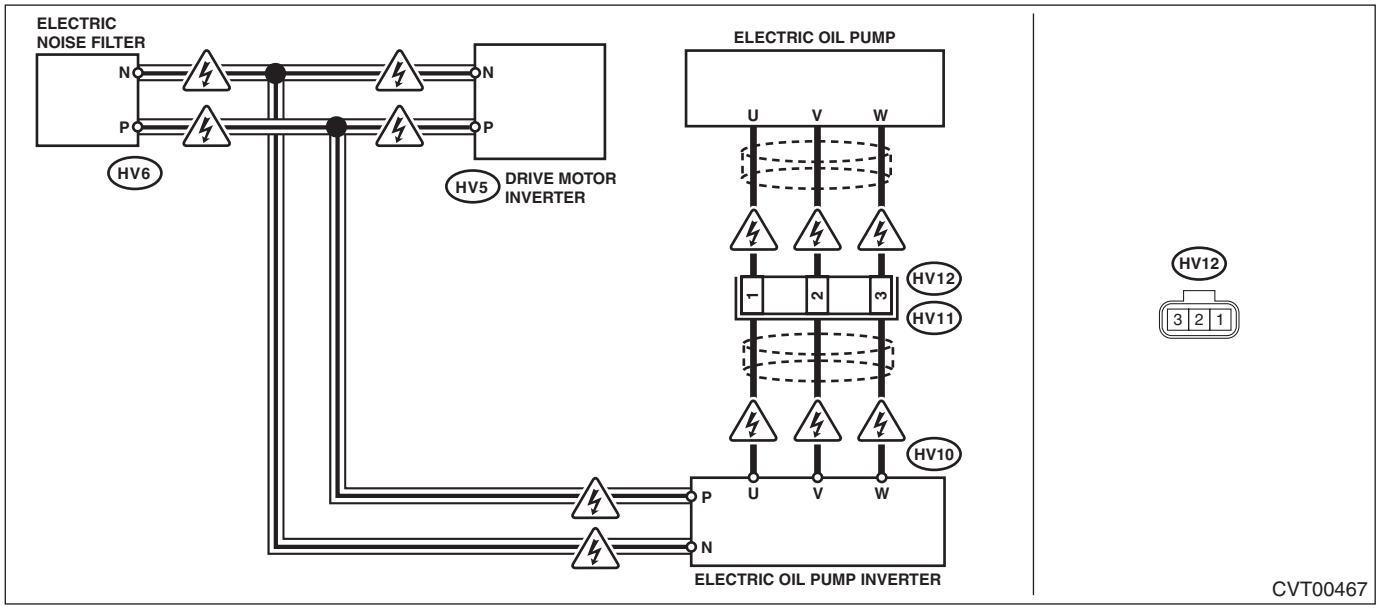
Electric oil pump does not operate.

CAUTION:

Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to CVT(HEV)(diag)-5, HYBRID SYSTEM, CAUTION, General Description.>

WIRING DIAGRAM:

CVT control system <Ref. to WI(HEV)-86, CVT Control System.>
Hybrid system <Ref. to WI(HEV)-140, Hybrid Electric Vehicle System.>



Step		Check	Yes	No
1	**CHECK ELECTRIC OIL PUMP.** 1) Perform the Clear Memory Mode. 2) Perform the «Electric Fluid Pump inspection mode». <Ref. to CVT(TH58A)-141, INSPECTION, Electric Fluid Pump.>	Is P0C29 detected?	Go to step **2**.	Current condition is normal.
2	**CHECK POWER CABLE.** 1) Turn the ignition switch to OFF. 2) Disconnect the ground cable of the 12 volt auxiliary battery, and as for the 12 volt engine restart battery, disconnect the ground cable from the 12V engine restart battery sensor. <Ref. to NT-5, BATTERY, NOTE, Note.> 3) Remove the service disconnect plug. 4) Wait for 10 minutes. 5) Remove the power cable from electric oil pump inverter. 6) Measure the resistance of power cable. ***Connector & terminal*** ***(HV10) U — (HV10) V:*** ***(HV10) U — (HV10) W:*** ***(HV10) V — (HV10) W:***	Is the resistance 0.3 Ω or more?	Go to step **3**.	Go to step **4**.

	Step	Check	Yes	No
3	**CHECK POWER CABLE.** 1) Disconnect the coupling connector of the electric oil pump and electric oil pump inverter. (HV11•HV12) 2) Measure the resistance of power cable. ***Connector & terminal*** ***(HV12) No. 1 — (HV12) No. 2:*** ***(HV12) No. 1 — (HV12) No. 3:*** ***(HV12) No. 2 — (HV12) No. 3:***	Is the resistance 0.3 Ω or more?	Replace the electric oil pump. <Ref. to CVT(TH58A)-134, Electric Fluid Pump.>	Replace the power cable. <Ref. to HEV-52, Power Cable.>
4	**CHECK ELECTRIC OIL PUMP INVERTER.** Measure the resistance between the electric oil pump inverter terminals. ***Terminals*** ***Electric oil pump inverter U terminal — Electric oil pump inverter V terminal:*** ***Electric oil pump inverter U terminal — Electric oil pump inverter W terminal:*** ***Electric oil pump inverter V terminal — Electric oil pump inverter W terminal:***	Is the resistance 1 kΩ or more?	Go to step **5**.	Replace the electric oil pump inverter. <Ref. to HEV-45, ELECTRIC OIL PUMP INVERTER, REMOVAL, Inverter.>
5	**CHECK INPUT SIGNAL FOR TCM.** 1) Connect the power cable and the battery. 2) Turn the ignition switch to ON. 3) Read the data of «Electric Fluid Pump Actual Current» using Subaru Select Monitor.	Is the «Electric Fluid Pump Actual Current» 0 A?	Go to step **6**.	Replace the electric oil pump inverter. <Ref. to HEV-45, ELECTRIC OIL PUMP INVERTER, REMOVAL, Inverter.>
6	**CHECK ELECTRIC OIL PUMP.** 1) Perform the Clear Memory Mode. 2) Perform the «Electric Fluid Pump inspection mode».	Is P0C29 detected?	Replace the electric oil pump. <Ref. to CVT(TH58A)-134, Electric Fluid Pump.>	Current condition is normal.

BH:DTC P0C2A AUXILIARY TRANSMISSION FLUID PUMP MOTOR STALLED

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(CVT)(HEV)-51, DTC P0C2A AUXILIARY TRANSMISSION FLUID PUMP MOTOR STALLED, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

Electric oil pump does not operate.

CAUTION:

Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to CVT(HEV)(diag)-5, HYBRID SYSTEM, CAUTION, General Description.>

	Step	Check	Yes	No
1	**CHECK ELECTRIC OIL PUMP.** 1) Turn the ignition switch to ON. 2) Perform the Clear Memory Mode. 3) Perform the «Electric Fluid Pump inspection mode». <Ref. to CVT(TH58A)-141, INSPECTION, Electric Fluid Pump.>	Is P0C2A detected?	Go to step **3**.	Go to step **2**.
2	**CHECK ELECTRIC OIL PUMP NOISE.** Perform the «Electric Fluid Pump inspection mode».	Does the electric oil pump emit noise while performing the «Electric Fluid Pump inspection mode»?	Go to step **3**.	Current condition is normal.
3	**CHECK SECONDARY PRESSURE.** 1) Perform the «Electric Fluid Pump inspection mode». 2) Read the data of «Actual secondary pressure» using Subaru Select Monitor.	Is the «Actual secondary pressure» 1.53 MPa or more? Or 0.3 MPa or less?	Replace the drive motor assembly. <Ref. to CVT(TH58A)-217, Drive Motor Assembly.>	Go to step **4**.
4	**CHECK ELECTRIC OIL PUMP.** 1) Perform the Clear Memory Mode. 2) Perform the «Electric Fluid Pump inspection mode».	Is P0C2A detected?	Replace the electric oil pump inverter. <Ref. to HEV-45, ELECTRIC OIL PUMP INVERTER, REMOVAL, Inverter.>	Go to step **5**.
5	**Auto Start Stop ROAD TEST.** Perform the Auto Start Stop road test. <Ref. to CVT(TH58A)-51, Auto Start Stop, INSPECTION, Road Test.>	Is P0C2A detected?	Replace the electric oil pump and the electric oil pump inverter. <Ref. to CVT(TH58A)-134, Electric Fluid Pump.> <Ref. to HEV-45, ELECTRIC OIL PUMP INVERTER, REMOVAL, Inverter.>	Current condition is normal.

BI: DTC P160A RANDOM ACCESS MEMORY (RAM) ERROR

DTC DETECTING CONDITION:

- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(CVT)(HEV)-52, DTC P160A RANDOM ACCESS MEMORY (RAM) ERROR, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

TCM RAM malfunction

	Step	Check	Yes	No
1	**CHECK DTC.** 1) Perform the Clear Memory Mode using the Subaru Select Monitor. <Ref. to CVT(HEV)(diag)-20, Clear Memory Mode.> 2) Read the DTC.	Is DTC P160A displayed?	Replace the TCM. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>	Current condition is normal. Check for interference from noise, etc.

BJ:DTC P172A AUXILIARY TRANSMISSION FLUID PUMP REVERSE ROTATION

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(CVT)(HEV)-53, DTC P172A AUXILIARY TRANSMISSION FLUID PUMP REVERSE ROTATION, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

Electric oil pump does not operate.

CAUTION:

Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to CVT(HEV)(diag)-5, HYBRID SYSTEM, CAUTION, General Description.>

	Step	Check	Yes	No
1	**CHECK DTC.** Check the DTC relating the HPCM, BECM using the Subaru Select Monitor.	Is DTC detected?	Perform the diagnosis according to DTC.	Go to step **2**.
2	**CHECK ELECTRIC OIL PUMP.** 1) Perform the Clear Memory Mode. 2) Perform the «Electric Fluid Pump inspection mode». <Ref. to CVT(TH58A)-141, INSPECTION, Electric Fluid Pump.>	Is DTC P172A detected?	Replace the electric oil pump inverter. <Ref. to HEV-45, ELECTRIC OIL PUMP INVERTER, REMOVAL, Inverter.>	Go to step **3**.
3	**STALL TEST.** Perform the stall test. <Ref. to CVT(TH58A)-52, Stall Test.>	Is DTC P172A detected?	Replace the drive motor assembly. <Ref. to CVT(TH58A)-217, Drive Motor Assembly.>	Go to step **4**.
4	**Auto Start Stop ROAD TEST.** Perform the Auto Start Stop road test. <Ref. to CVT(TH58A)-51, Auto Start Stop, INSPECTION, Road Test.>	Is DTC P172A detected?	Replace the drive motor assembly. <Ref. to CVT(TH58A)-217, Drive Motor Assembly.>	Current condition is normal.

BK:DTC P2530 IGNITION SWITCH RUN POSITION CIRCUIT

DTC DETECTING CONDITION:

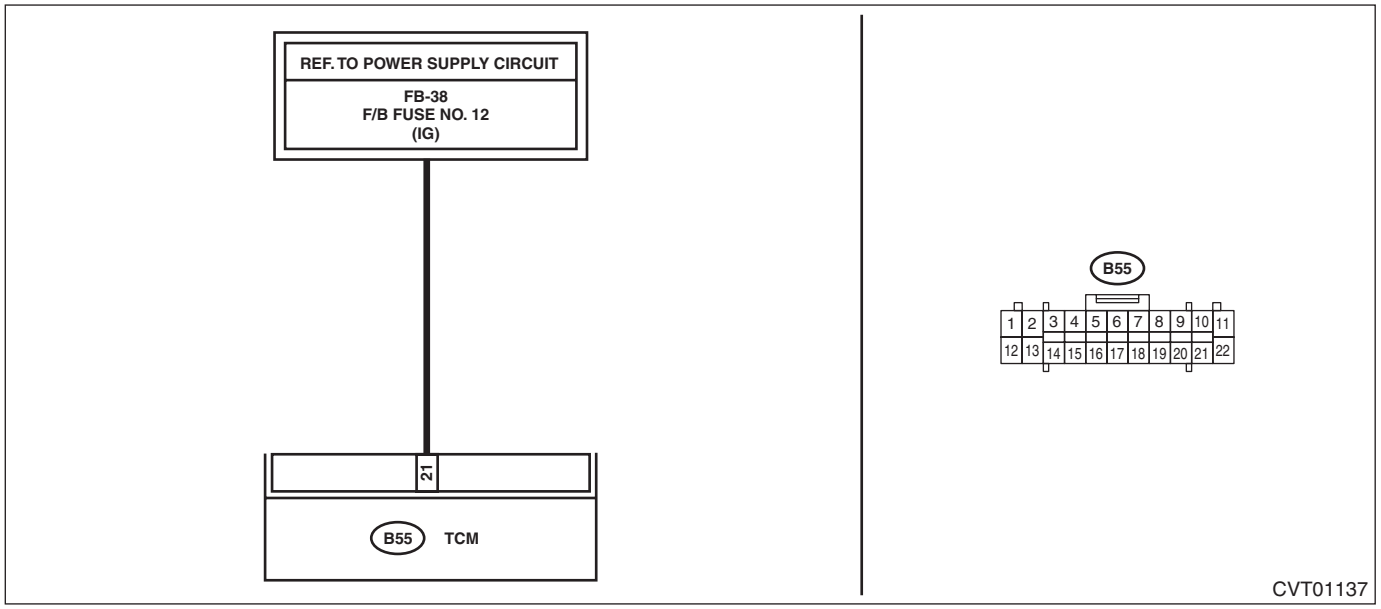
- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(CVT)(HEV)-54, DTC P2530 IGNITION SWITCH RUN POSITION CIRCUIT, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

Faulty TCM operation

WIRING DIAGRAM:

CVT control system <Ref. to WI(HEV)-86, CVT Control System.>



Step		Check	Yes	No
1	**CHECK CONNECTOR.** Check the installing condition of TCM connector.	Is the TCM connector installed properly?	Go to step **2**.	Install the TCM connector.

Step		Check	Yes	No
2	**CHECK INPUT VOLTAGE OF TCM.** 1) Turn the ignition switch to ON. 2) Measure the voltage between TCM connector and chassis ground. (While wiggling the harness) ***Connector & terminal*** ***(B55) No. 21 (+) — Chassis ground (–):***	Is the voltage 8 V or more?	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, the following items may be the cause of fault. • Open circuit or short circuit to ground of harness between TCM connector and ignition switch connector (IG relay 1 connector for model with push button start) • Poor contact of ignition switch connector (IG relay 1 connector for model with push button start) • Poor contact of ignition switch (IG relay 1 for model with push button start)	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit or short circuit to ground of harness between TCM connector and ignition switch connector (IG relay 1 connector for model with push button start) • Poor contact of ignition switch connector (IG relay 1 connector for model with push button start) • Poor contact of ignition switch (IG relay 1 for model with push button start)

BL:DTC P2714 PRESSURE CONTROL SOLENOID "D" PERFORMANCE/STUCK OFF

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(CVT)(HEV)-55, DTC P2714 PRESSURE CONTROL SOLENOID "D" PERFORMANCE/STUCK OFF, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

- Engine speed increases abruptly, and can not accelerate.
- Excessive slippage is felt.

CAUTION:

Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to CVT(HEV)(diag)-5, HYBRID SYSTEM, CAUTION, General Description.>

	Step	Check	Yes	No
1	**CHECK DTC.** Read the DTC using Subaru Select Monitor.	Besides DTC P2714, is any of the DTC P2751, P0720, P2720 or P2721 displayed?	Perform the diagnosis according to DTCs other than P2714.	Go to step **2**.
2	**CHECK TRANSMISSION FLUID.** Check the amount of ATF. <Ref. to CVT(TH58A)-41, ADJUSTMENT, CVTF.>	Is the ATF amount correct?	Go to step **3**.	Adjust the amount of ATF. <Ref. to CVT(TH58A)-41, ADJUSTMENT, CVTF.>
3	**CHECK TRANSMISSION FLUID.** Check the condition of ATF. <Ref. to CVT(TH58A)-44, CONDITION CHECK, CVTF.>	Is the ATF OK?	Go to step **4**.	Check according to the "Corrective action" of ATF (CVTF) "CONDITION CHECK". <Ref. to CVT(TH58A)-44, CONDITION CHECK, CVTF.>
4	**CHECK INPUT SIGNAL FOR TCM.** 1) Start the engine. 2) Warm up until the ATF temperature reaches to 40 — 70°C (104 — 158°F). 3) Depress the brake pedal, and shift the select lever to "D" range. 4) Shift the select lever to "P" range. 5) Stabilize the engine speed at idle. 6) Read the data of «Actual secondary pressure» using Subaru Select Monitor.	Is the «Actual secondary pressure» 0.5 — 1.5 MPa?	Go to step **5**.	Perform the diagnosis according to DTC P0841. <Ref. to CVT(HEV)(diag)-86, DTC P0841 SECONDARY OIL PRESSURE SENSOR PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
5	**STALL TEST.** Perform the stall test. <Ref. to CVT(TH58A)-52, Stall Test.>	Is the stall test normal?	Go to step **6**.	Replace the transmission assembly if the stall speed is higher than the standard value of the stall test. <Ref. to CVT(TH58A)-63, Automatic Transmission Assembly.>

	Step	Check	Yes	No
6	**DRIVING CHECK BY INSPECTION MODE.** 1) Turn the ignition switch to OFF. 2) Perform a drive check based on the “Inspection Mode”. <Ref. to CVT(HEV)(diag)-21, Inspection Mode.>	Does the AT OIL TEMP light blink and is DTC P2714 detected?	Replace the transmission assembly. <Ref. to CVT(TH58A)-63, Automatic Transmission Assembly.>	Current condition is normal. It is possible that temporary poor contact occurs.

BM:DTC P2715 PRESSURE CONTROL SOLENOID D STUCK ON

CAUTION:
Before performing diagnosis, refer to “CAUTION” in “General Description”. <Ref. to CVT(HEV)(diag)-5, HYBRID SYSTEM, CAUTION, General Description.>

NOTE:
Replace the drive motor assembly when this DTC is detected. <Ref. to CVT(TH58A)-217, Drive Motor Assembly.>

BN:DTC P2719 PRESSURE CONTROL SOLENOID D CONTROL CIRCUIT RANGE/PERFORMANCE

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(CVT)(HEV)-56, DTC P2719 PRESSURE CONTROL SOLENOID D CONTROL CIRCUIT RANGE/PERFORMANCE, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

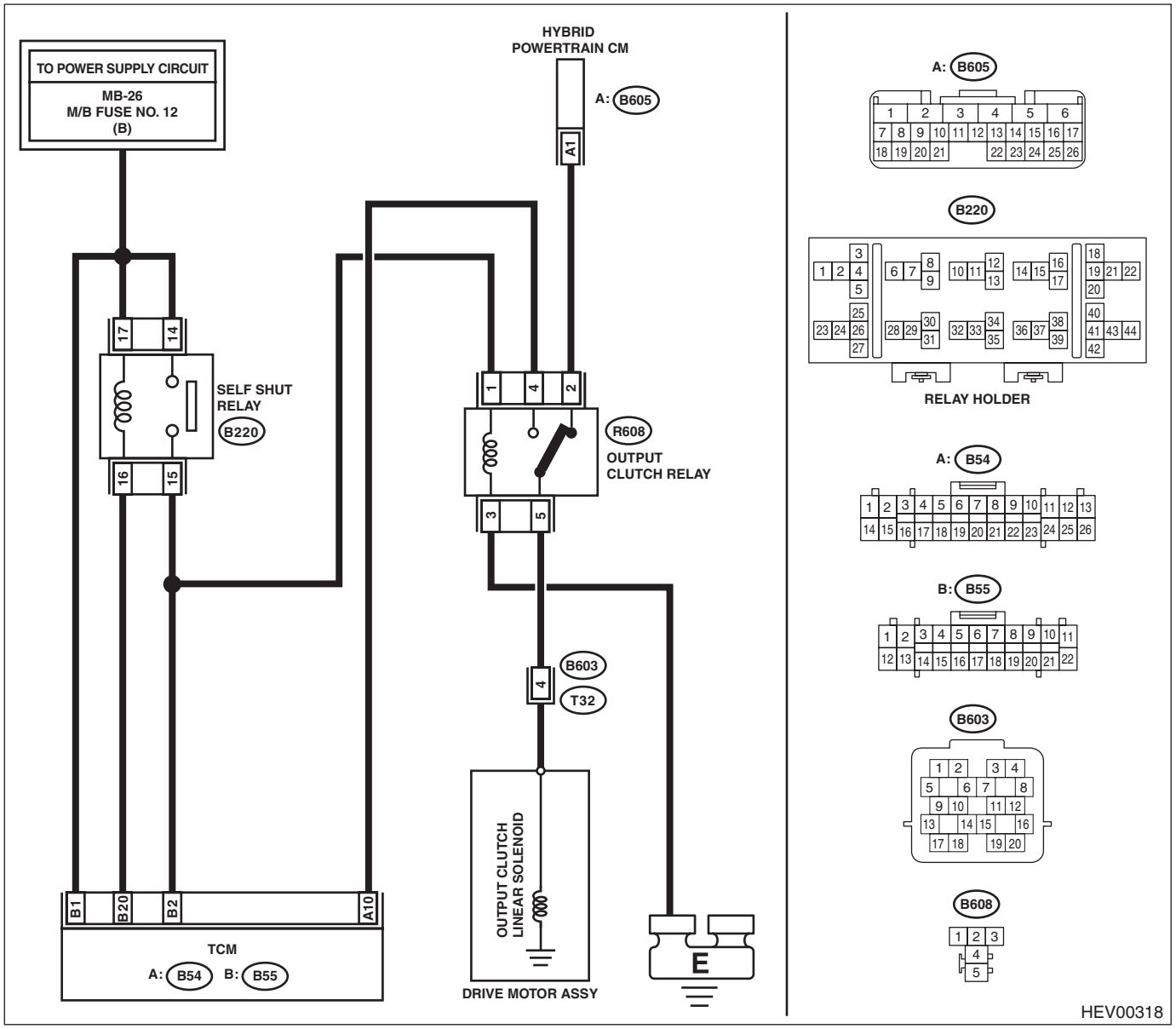
- Engine speed increases abruptly, and can not accelerate.
- Excessive slippage is felt.

CAUTION:

Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to CVT(HEV)(diag)-5, HYBRID SYSTEM, CAUTION, General Description.>

WIRING DIAGRAM:

CVT control system <Ref. to WI(HEV)-86, CVT Control System.>
Hybrid system <Ref. to WI(HEV)-140, Hybrid Electric Vehicle System.>



	Step	Check	Yes	No
1	**CHECK DTC.** Read the DTC using Subaru Select Monitor.	Besides DTC P2719, is DTC P2720 or P2721 displayed?	Perform the diagnosis according to DTCs other than P2719.	Go to step **2**.
2	**CHECK FOR POOR CONTACT.** Check for poor contact of harness and connector between TCM and output clutch linear solenoid.	Is there poor contact?	Repair the poor contact of harness and connector.	Go to step **3**.
3	**CHECK OUTPUT CLUTCH LINEAR SOLENOID.** 1) Turn the ignition switch to OFF. 2) Disconnect the drive motor assembly connector. 3) Measure the resistance between drive motor assembly connector and transmission body. ***Connector & terminal*** ***(T32) No. 4 — Transmission body:***	Is the resistance approx. 4 — 6 Ω? (when cold)	Recheck the poor contact of harness and connector. Replace the TCM if no fault is found. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>	Replace the output clutch control valve body. <Ref. to CVT(TH58A)-121, OUTPUT CLUTCH CONTROL VALVE BODY, REMOVAL, Control Valve Body.>

BO:DTC P2720 PRESSURE CONTROL SOLENOID D CONTROL CIRCUIT LOW

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(CVT)(HEV)-57, DTC P2720 PRESSURE CONTROL SOLENOID D CONTROL CIRCUIT LOW, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

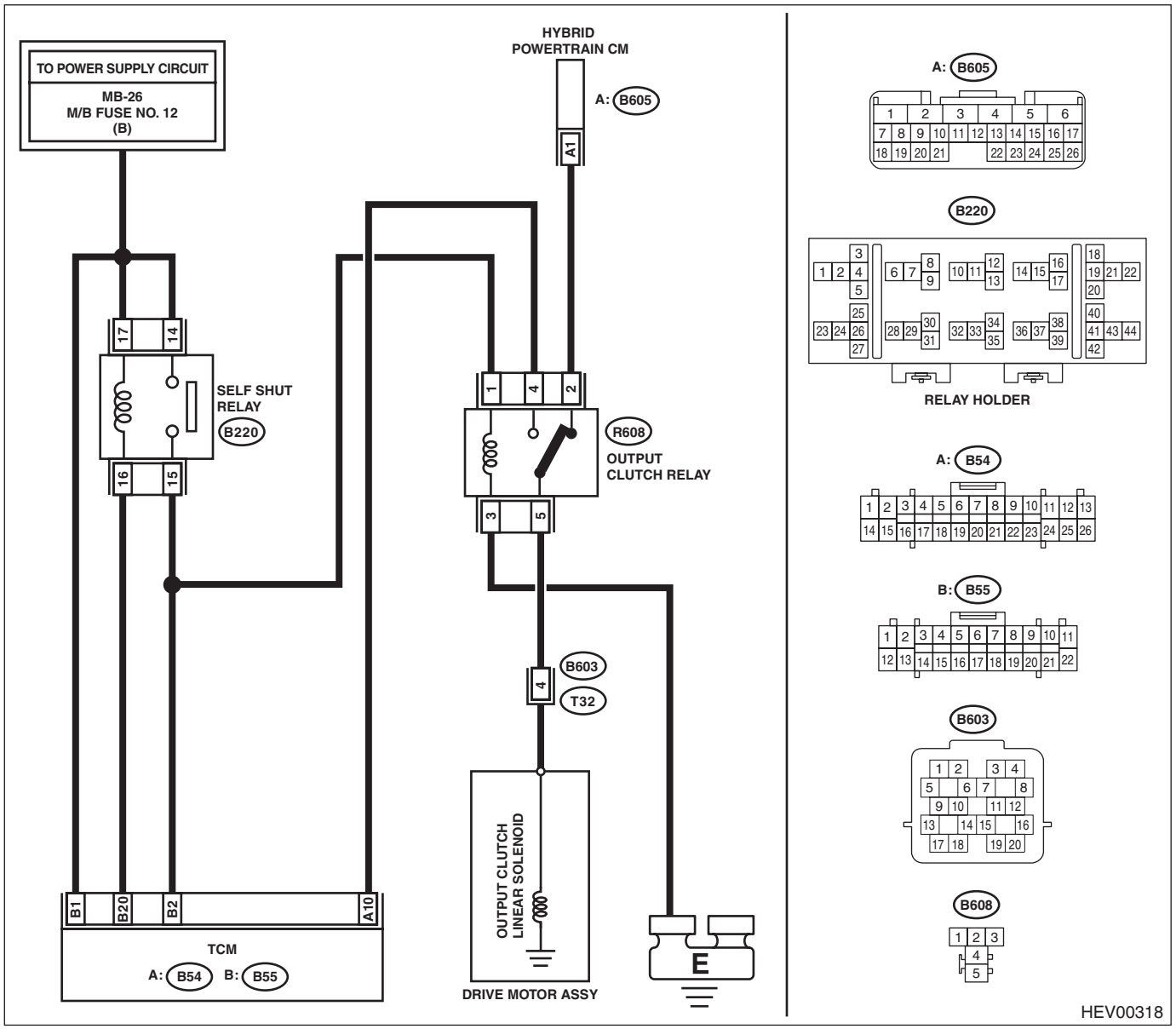
Unexpected vibration occurs.

CAUTION:

Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to CVT(HEV)(diag)-5, HYBRID SYSTEM, CAUTION, General Description.>

WIRING DIAGRAM:

CVT control system <Ref. to WI(HEV)-86, CVT Control System.>
Hybrid system <Ref. to WI(HEV)-140, Hybrid Electric Vehicle System.>



	Step	Check	Yes	No
1	**CHECK INPUT SIGNAL FOR TCM.** 1) After driving with warm up condition, park the vehicle while depressing the brake pedal at "D" range. 2) Read the data of «Output Clutch Linear Solenoid Set Current» and «Output Clutch Linear Solenoid Actual Current» using Subaru Select Monitor.	Does the value of «Output Clutch Linear Solenoid Set Current» and «Output Clutch Linear Solenoid Actual Current» almost correspond?	Check for poor contact of connector.	Go to step **2**.
2	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the TCM connector. 3) Remove the output clutch relay. 4) Measure the resistance between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 10 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **3**.	Repair the short circuit of harness.
3	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Measure the resistance between output clutch relay and chassis ground. ***Connector & terminal*** ***(B608) No. 5 — Transmission body:***	Is the resistance approximately 6 Ω?	Check for poor contact of connector, and if no fault is found, replace the TCM. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>	Go to step **4**.
4	**CHECK RELAY.** Check the output clutch relay. <Ref. to CVT(TH58A)-161, INSPECTION, Relay and Fuse.>	Is the output clutch relay OK?	Go to step **5**.	Replace the output clutch relay.
5	**CHECK HARNESS.** 1) Disconnect connector (B603) of the drive motor assembly. 2) Measure the resistance of drive motor assembly harness. ***Connector & terminal*** ***(B603) No. 4 — Chassis ground:***	Is the resistance 1 MΩ or more?	Replace the drive motor assembly. <Ref. to CVT(TH58A)-217, Drive Motor Assembly.>	Replace the transmission harness.

BP:DTC P2721 PRESSURE CONTROL SOLENOID D CONTROL CIRCUIT HIGH

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(CVT)(HEV)-58, DTC P2721 PRESSURE CONTROL SOLENOID D CONTROL CIRCUIT HIGH, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

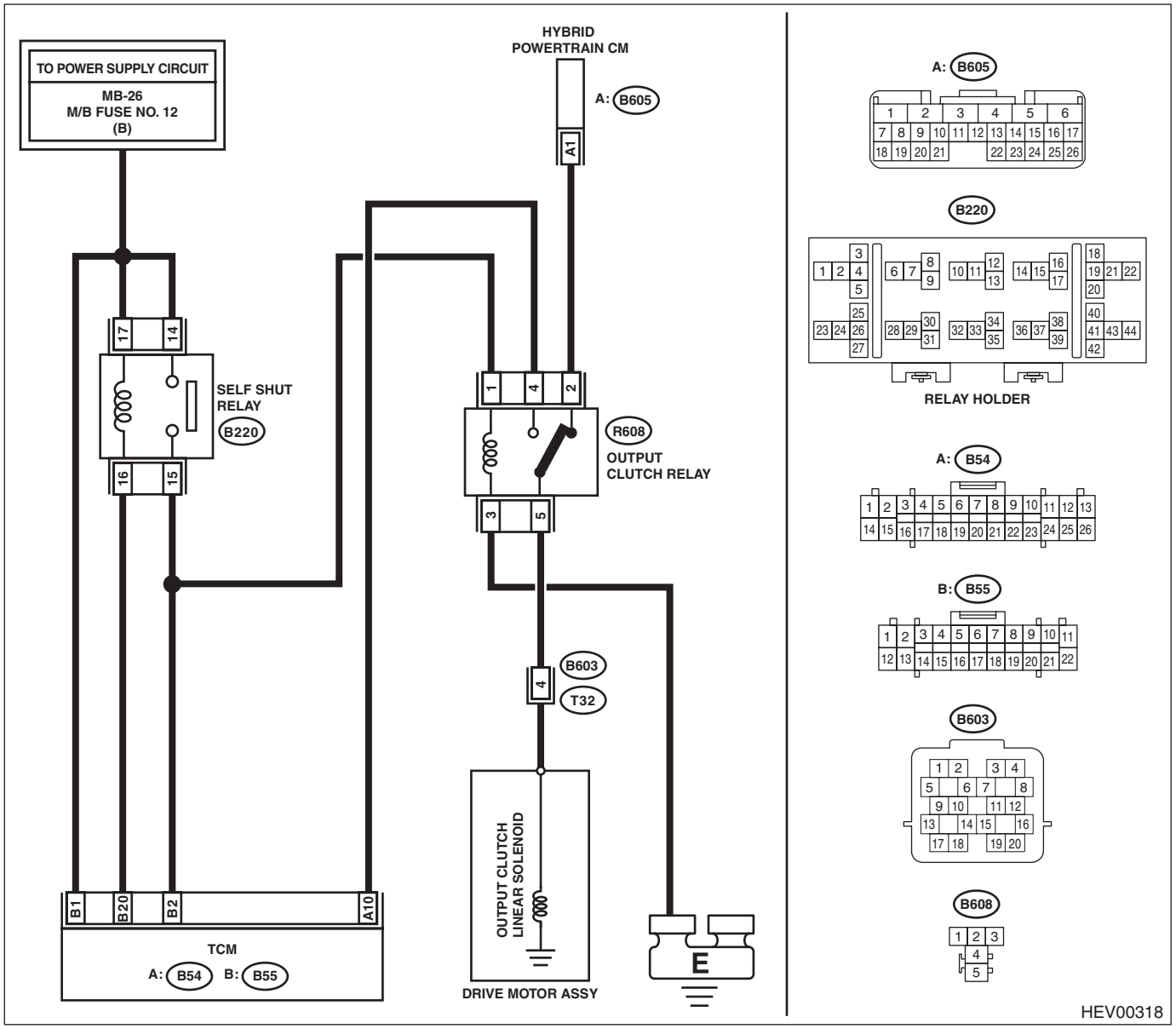
- Engine speed increases abruptly, and can not start.
- Unexpected vibration occurs.

CAUTION:

Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to CVT(HEV)(diag)-5, HYBRID SYSTEM, CAUTION, General Description.>

WIRING DIAGRAM:

CVT control system <Ref. to WI(HEV)-86, CVT Control System.>
Hybrid system <Ref. to WI(HEV)-140, Hybrid Electric Vehicle System.>



	Step	Check	Yes	No
1	**CHECK INPUT SIGNAL FOR TCM.** 1) After driving with warm up condition, park the vehicle while depressing the brake pedal at "D" range. 2) Read the data of «Output Clutch Linear Solenoid Set Current» and «Output Clutch Linear Solenoid Actual Current» using Subaru Select Monitor.	Does the value of «Output Clutch Linear Solenoid Set Current» and «Output Clutch Linear Solenoid Actual Current» almost correspond?	Check for poor contact of connector.	Go to step **2**.
2	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the TCM connector. 3) Measure the resistance between TCM connector and output clutch relay connector. ***Connector & terminal*** ***(B54) No. 10 — (B608) No. 4:***	Is the resistance less than 1 Ω?	Go to step **3**.	Repair the open circuit of harness.
3	**CHECK HARNESS.** 1) Turn the ignition switch to ON. 2) Measure the voltage between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 10 (+) — Chassis ground (–):***	Is the voltage approx. 0 V?	Go to step **4**.	Repair the short circuit of harness.
4	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Measure the resistance between output clutch relay and chassis ground. ***Connector & terminal*** ***(B608) No. 5 — Chassis ground:***	Is the resistance approximately 6 Ω?	Check for poor contact of connector, and if no fault is found, replace the TCM. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>	Go to step **5**.
5	**CHECK RELAY.** Check the output clutch relay. <Ref. to CVT(TH58A)-161, INSPECTION, Relay and Fuse.>	Is the output clutch relay OK?	Go to step **6**.	Replace the output clutch relay.
6	**CHECK HARNESS.** 1) Disconnect connector (B603) of the drive motor assembly. 2) Turn the ignition switch to ON. 3) Measure the voltage between drive motor assembly harness and transmission body. ***Connector & terminal*** ***(B603) No. 4 (+) — Transmission body (–):***	Is the voltage approx. 0 V?	Replace the drive motor assembly. <Ref. to CVT(TH58A)-217, Drive Motor Assembly.>	Replace the transmission harness.

BQ:DTC P2750 SEC. PULLEY REVOLUTION SPEED SENSOR CIRCUIT

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(CVT)(HEV)-59, DTC P2750 SEC. PULLEY REVOLUTION SPEED SENSOR CIRCUIT, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

- Shift control malfunction
- Shock felt when lock-up is engaged

	Step	Check	Yes	No
1	**CHECK DTC.** Read the DTC using Subaru Select Monitor.	Besides DTC P2750, is any of the DTC P2751, U0110 or U0411 displayed?	Perform the diagnosis according to DTCs other than P2750.	Perform the diagnosis according to DTC P2751. <Ref. to CVT(HEV)(diag)-150, DTC P2751 INTERMEDIATE SHAFT SPEED SENSOR "C" CIRCUIT NO SIGNAL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

BR:DTC P2751 INTERMEDIATE SHAFT SPEED SENSOR "C" CIRCUIT NO SIGNAL

DTC DETECTING CONDITION:

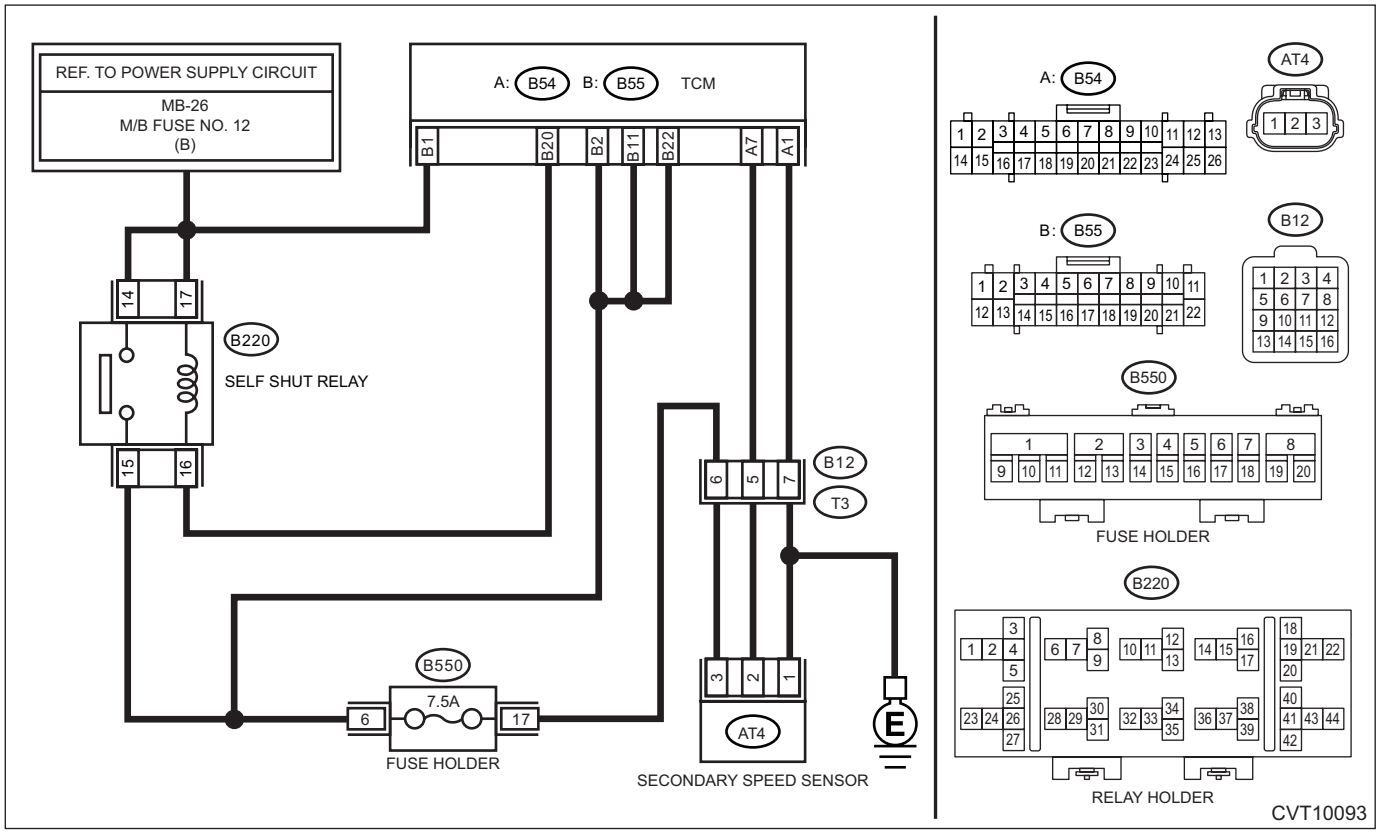
- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(CVT)(HEV)-60, DTC P2751 INTERMEDIATE SHAFT SPEED SENSOR "C" CIRCUIT NO SIGNAL, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

- Shifting shock is felt.
- Acceleration is poor during standing start.
- Shift control malfunction

WIRING DIAGRAM:

CVT control system <Ref. to WI(HEV)-86, CVT Control System.>



Step		Check	Yes	No
1	**CHECK FUSE.** 1) Turn the ignition switch to OFF. 2) Remove the fuse (7.5 A) from the fuse holder.	Is the fuse blown out?	Replace the fuse. If the replaced fuse blows out easily, repair the short circuit of harness.	Go to step **2**.
2	**CHECK HARNESS.** 1) Disconnect the TCM and self shut relay connectors. 2) Measure the resistance between TCM connector and self shut relay connector. ***Connector & terminal*** ***(B55) No. 20 — (B220) No. 16:*** ***(B55) No. 2 — (B220) No. 15:*** ***(B55) No. 11 — (B220) No. 15:*** ***(B55) No. 22 — (B220) No. 15:***	Is the resistance less than 1 Ω?	Go to step **3**.	Repair the open circuit of harness.

	Step	Check	Yes	No
3	**CHECK HARNESS.** Measure the resistance between TCM connector and chassis ground. ***Connector & terminal*** ***(B55) No. 20 — Chassis ground:*** ***(B55) No. 2 — Chassis ground:*** ***(B55) No. 11 — Chassis ground:*** ***(B55) No. 22 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **4**.	Repair the short circuit of harness.
4	**CHECK RELAY POWER SUPPLY.** Measure the voltage between self shut relay connector and chassis ground. ***Connector & terminal*** ***(B220) No. 14 (+) — Chassis ground (–):*** ***(B220) No. 17 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **5**.	Repair the open or short circuit of harness.
5	**CHECK SELF SHUT RELAY.** Measure the resistance between self shut relay terminals. ***Terminals*** ***No. 16 — No. 17:***	Is the resistance 110 — 140 Ω?	Go to step **6**.	Replace the self shut relay.
6	**CHECK SELF SHUT RELAY.** Measure the resistance between self shut relay terminals. ***Terminals*** ***No. 14 — No. 15:***	Is the resistance 1 MΩ or more?	Go to step **7**.	Replace the self shut relay.
7	**CHECK INPUT SIGNAL FOR TCM.** 1) Connect the connectors of TCM and self shut relay. 2) Read the data of «Control module voltage» using Subaru Select Monitor.	Is the «Control module voltage» 10 V or more?	Current condition is normal. Check for poor contact in connectors or harnesses, and repair the defective part.	Go to step **8**.
8	**CHECK INPUT SIGNAL FOR TCM.** 1) Lift up the vehicle. 2) Start the engine. 3) Set the select lever to “D” range. 4) Read the data of «Secondary Pulley Speed» and «Front Wheel Speed» using Subaru Select Monitor.	Does the value of «Secondary Pulley Speed» change according to those of «Front Wheel Speed»?	Current condition is normal.	Go to step **9**.
9	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the TCM and transmission connectors. 3) Measure the resistance between TCM connector and transmission connectors. ***Connector & terminal*** ***(B54) No. 1 — (B12) No. 7:*** ***(B54) No. 7 — (B12) No. 5:*** ***(B550) No. 17 — (B12) No. 6:***	Is the resistance less than 1 Ω?	Go to step **10**.	Repair the open circuit of harness.
10	**CHECK HARNESS.** Measure the resistance between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 7 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **11**.	Repair the short circuit of harness.
11	**CHECK HARNESS.** Measure the resistance between self shut relay connector and fuse holder. ***Connector & terminal*** ***(B220) No. 15 — (B550) No. 6:***	Is the resistance less than 1 Ω?	Go to step **12**.	Repair the open circuit of harness.

	Step	Check	Yes	No
12	**CHECK TRANSMISSION HARNESS.** 1) Install the fuse. 2) Connect the TCM connector. 3) Turn the ignition switch to ON. 4) Measure the voltage between transmission connector. ***Connector & terminal*** ***(B12) No. 6 (+) — Chassis ground (–):***	Is the voltage 10 — 13 V?	Go to step **13**.	Repair the open circuit of harness or poor contact of connector.
13	**CHECK TRANSMISSION HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the transmission connector. 3) Disconnect the secondary speed sensor connector. 4) Measure the resistance between transmission connector and secondary speed sensor connector. ***Connector & terminal*** ***(T3) No. 5 — (AT4) No. 2:*** ***(T3) No. 6 — (AT4) No. 3:*** ***(T3) No. 7 — (AT4) No. 1:***	Is the resistance less than 1 Ω?	Go to step **14**.	Replace the transmission harness.
14	**CHECK SECONDARY SPEED SENSOR HARNESS.** Measure the resistance between transmission connector and chassis ground. ***Connector & terminal*** ***(T3) No. 5 — Chassis ground:*** ***(T3) No. 6 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **15**.	Repair the short circuit of harness.
15	**CHECK SECONDARY SPEED SENSOR.** 1) Turn the ignition switch to OFF. 2) Replace the secondary speed sensor. <Ref. to CVT(TH58A)-106, Secondary Speed Sensor.> 3) Perform the Clear Memory Mode. <Ref. to CVT(HEV)(diag)-20, Clear Memory Mode.> 4) Read the DTC.	Is DTC P2751 displayed?	Go to step **16**.	The original secondary speed sensor is defective.
16	**CHECK SELF SHUT RELAY.** 1) Turn the ignition switch to OFF. 2) Replace the self shut relay. 3) Perform the Clear Memory Mode. <Ref. to CVT(HEV)(diag)-20, Clear Memory Mode.> 4) Read the DTC.	Is DTC P2751 displayed?	Replace the TCM. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>	The original self shut relay is defective.

BS:DTC P2757 TORQUE CONVERTER CLUTCH PRESSURE CONTROL SOLENOID CONTROL CIRCUIT PERFORMANCE/STUCK OFF

DTC DETECTING CONDITION:

- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(CVT)(HEV)-61, DTC P2757 TORQUE CONVERTER CLUTCH PRESSURE CONTROL SOLENOID CONTROL CIRCUIT PERFORMANCE/STUCK OFF, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

Lock-up malfunction

	Step	Check	Yes	No
1	**CHECK DTC.** Read the DTC using Subaru Select Monitor.	Besides DTC P2757, is any of the DTC P0717, P2763, P2764, U0100 or U0401 displayed?	Perform the diagnosis according to DTCs other than P2757.	Go to step **2**.
2	**CHECK DTC.** Read the DTC relating the ECM using the Subaru Select Monitor.	Is DTC detected?	Perform the diagnosis according to DTC.	Go to step **3**.
3	**CHECK DTC.** Read the DTC relating the TCM using the Subaru Select Monitor.	Are P0841, P0842, P0843 detected?	Perform the diagnosis according to DTC.	Go to step **4**.
4	**CHECK TRANSMISSION FLUID.** Check the amount of ATF. <Ref. to CVT(TH58A)-41, ADJUSTMENT, CVTF.>	Is the ATF amount correct?	Go to step **5**.	Adjust the amount of ATF. <Ref. to CVT(TH58A)-41, ADJUSTMENT, CVTF.>
5	**CHECK TRANSMISSION FLUID.** Check the condition of ATF. <Ref. to CVT(TH58A)-44, CONDITION CHECK, CVTF.>	Is the ATF OK?	Go to step **6**.	Check according to the “Corrective action” of ATF (CVTF) “CONDITION CHECK”. <Ref. to CVT(TH58A)-44, CONDITION CHECK, CVTF.>
6	**CHECK INPUT SIGNAL FOR TCM.** 1) Lift up the vehicle. 2) Start the engine. 3) Warm up until the ATF temperature reaches to 40 — 70°C (104 — 158°F). 4) Depress the brake pedal, and shift the select lever to “D” range. 5) Shift the select lever to “P” range. 6) Stabilize the engine speed at idle. 7) Read the data of «Actual secondary pressure» using Subaru Select Monitor.	Is the «Actual secondary pressure» 0.5 — 1.5 MPa?	Go to step **7**.	Perform the diagnosis according to DTC P0841. <Ref. to CVT(HEV)(diag)-86, DTC P0841 SECONDARY OIL PRESSURE SENSOR PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

	Step	Check	Yes	No
7	**DRIVING CHECK FOR LOCK-UP CONDITION.** 1) Perform the Clear Memory Mode. <Ref. to CVT(HEV)(diag)-20, Clear Memory Mode.> 2) Turn the ignition switch to OFF. 3) Start the engine. 4) Warm up until the ATF temperature exceeds 50°C. 5) Drive the vehicle for one minute or more while keeping the constant speed so that the display shown in the Subaru Select Monitor is as follows: «Lock Up Duty Ratio» is 70 % or more, and «Front Wheel Speed» is 40 km/h or more. 6) Turn the ignition switch to OFF. 7) Start the engine. 8) Perform the procedure in step 5) again. 9) Read the DTC using Subaru Select Monitor.	Does the AT OIL TEMP light blink and is DTC P2757 detected?	Perform the secondary pressure test. <Ref. to CVT(TH58A)-54, Secondary Pressure (Line Pressure) Test.> When DTC other than P2757 is displayed, perform the diagnosis corresponding to the DTC.	Current condition is normal. Temporary oil pressure malfunction.

BT:DTC P2758 TORQUE CONVERTER CLUTCH PRESSURE CONTROL SOLENOID CONTROL CIRCUIT STUCK ON

DTC DETECTING CONDITION:

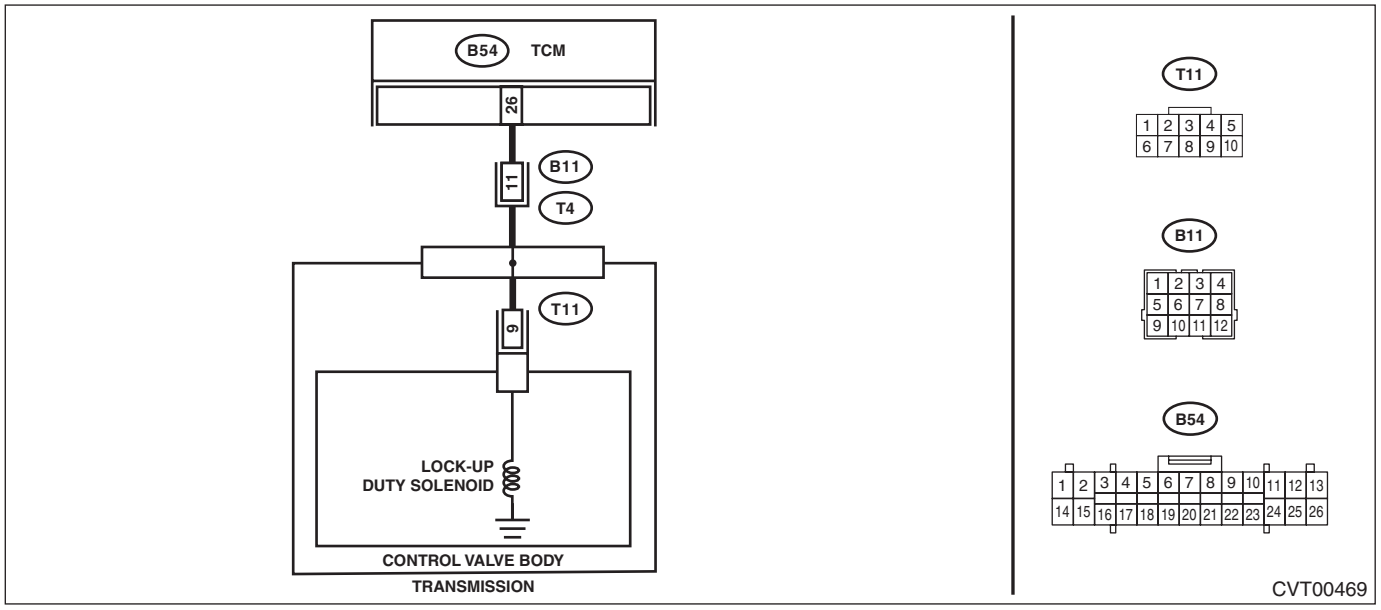
- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(CVT)(HEV)-62, DTC P2758 TORQUE CONVERTER CLUTCH PRESSURE CONTROL SOLENOID CONTROL CIRCUIT STUCK ON, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

The engine stalls when the vehicle is stopped.

WIRING DIAGRAM:

CVT control system <Ref. to WI(HEV)-86, CVT Control System.>



Step		Check	Yes	No
1	**CHECK DTC.** Read the DTC using Subaru Select Monitor.	Besides DTC P2758, is any of the DTC P0717, P2763, P2764, U0100 or U0401 displayed?	Perform the diagnosis according to DTCs other than P2758.	Go to step **2**.
2	**CHECK LOCK-UP DUTY SOLENOID.** 1) Turn the ignition switch to OFF. 2) Disconnect the transmission connector. 3) Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 11 — Transmission body:***	Is the resistance approx. 10 — 13.5 Ω? (when cold)	Go to step **4**.	Go to step **3**.
3	**CHECK HARNESS.** Check the harness for continuity.	Is the harness normal? (Is it free from defects such as open circuit, power supply-output short or GND-output short circuit, or poor contact?)	Go to step **4**.	Repair the harness.
4	**CHECK TRANSMISSION FLUID.** 1) Connect the transmission connector. 2) Check the amount of ATF. <Ref. to CVT(TH58A)-41, ADJUSTMENT, CVTF.>	Is the ATF amount correct?	Go to step **5**.	Adjust the amount of ATF. <Ref. to CVT(TH58A)-41, ADJUSTMENT, CVTF.>

	Step	Check	Yes	No
5	**CHECK TRANSMISSION FLUID.** Check the condition of ATF. <Ref. to CVT(TH58A)-44, CONDITION CHECK, CVTF.>	Is the ATF OK?	Go to step **6**.	Check according to the "Corrective action" of ATF (CVTF) "CONDITION CHECK". <Ref. to CVT(TH58A)-44, CONDITION CHECK, CVTF.>
6	**CHECK INPUT SIGNAL FOR TCM.** 1) Lift up the vehicle. 2) Start the engine. 3) Warm up until the ATF temperature reaches to 40 — 70°C (104 — 158°F). 4) Depress the brake pedal, and shift the select lever to "D" range. 5) Shift the select lever to "P" range. 6) Stabilize the engine speed at idle. 7) Read the data of «Actual secondary pressure» using Subaru Select Monitor.	Is the «Actual secondary pressure» 0.5 — 1.5 MPa?	Go to step **7**.	Perform the diagnosis according to DTC P0841. <Ref. to CVT(HEV)(diag)-86, DTC P0841 SECONDARY OIL PRESSURE SENSOR PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
7	**ACTUAL DRIVING CHECK FOR LOCK-UP CONDITION.** 1) Perform the Clear Memory Mode. <Ref. to CVT(HEV)(diag)-20, Clear Memory Mode.> 2) Turn the ignition switch to OFF. 3) Start the engine. 4) Warm up until the ATF temperature exceeds 50°C. 5) Drive the vehicle for one minute or more while keeping such constant speed that «Lock Up Duty Ratio» is 0%, and «Front Wheel Speed» is 5 km/h (3 MPH) or less, which are displayed on the Subaru Select Monitor. 6) Turn the ignition switch to OFF. 7) Start the engine. 8) Perform the procedure in step 5) again. 9) Read the DTC using Subaru Select Monitor.	Does the AT OIL TEMP light blink and is DTC P2758 displayed? Or does the engine stall?	Perform the secondary pressure test. <Ref. to CVT(TH58A)-54, Secondary Pressure (Line Pressure) Test.> When DTC other than P2758 is displayed, perform the diagnosis according to the DTC.	Current condition is normal. Check for poor contact of connector or harness.

BU:DTC P2763 LOCK-UP DUTY SOLENOID CIRCUIT (HIGH)

DTC DETECTING CONDITION:

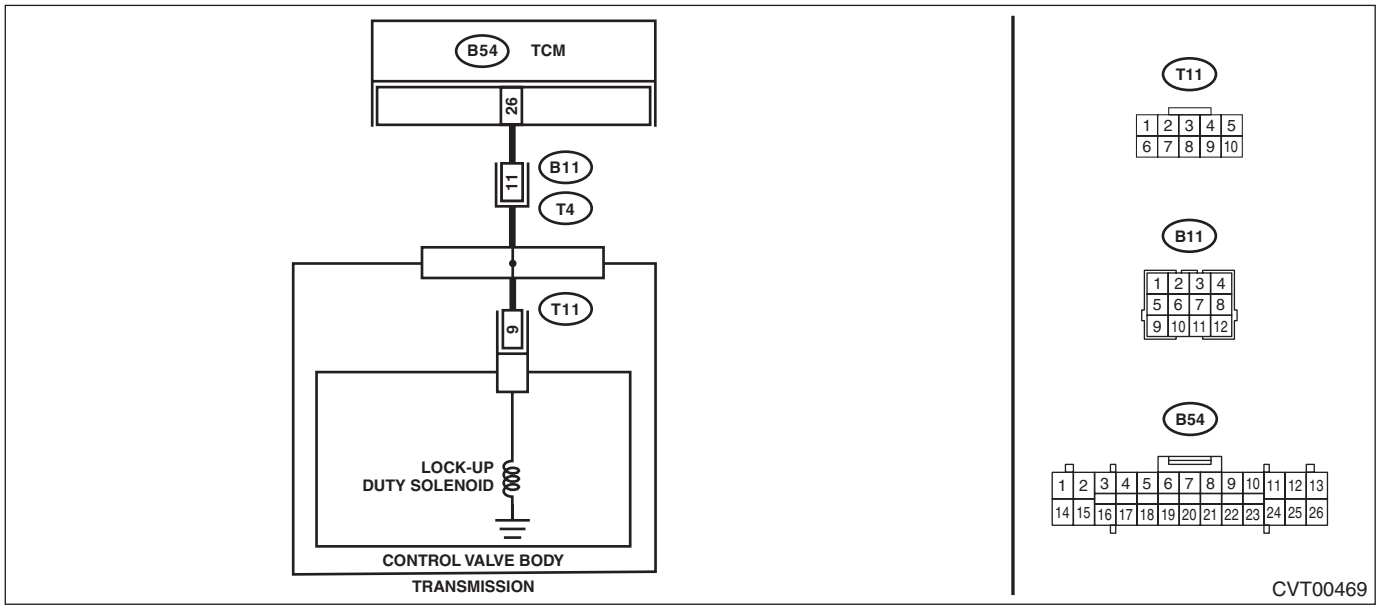
- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(CVT)(HEV)-63, DTC P2763 LOCK-UP DUTY SOLENOID CIRCUIT (HIGH), Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

- No lock-up occurs.
- Engine stalls.

WIRING DIAGRAM:

CVT control system <Ref. to WI(HEV)-86, CVT Control System.>



Step		Check	Yes	No
1	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the TCM and transmission connectors. 3) Measure the resistance between TCM connector and transmission connectors. ***Connector & terminal*** ***(B54) No. 26 — (B11) No. 11:***	Is the resistance less than 1 Ω?	Go to step **2**.	Repair the open circuit of harness.
2	**CHECK HARNESS.** 1) Turn the ignition switch to ON. 2) Measure the voltage between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 26 (+) — Chassis ground (–):***	Is the voltage approx. 0 V?	Go to step **3**.	Repair the short circuit of harness.
3	**CHECK LOCK-UP DUTY SOLENOID.** Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 11 — Transmission body:***	Is the resistance approx. 10 — 13.5 Ω? (when cold)	Check for poor contact of connector, and if no fault is found, replace the TCM. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>	Go to step **4**.

	Step	Check	Yes	No
4	**CHECK HARNESS INSIDE TRANSMISSION.** **CAUTION:** **Start work after ATF cools down.** 1) Remove the transmission valve cover. 2) Check for the harness pinch, damage.	Is there any fault in the harness?	Replace the transmission harness.	Go to step **5**.
5	**CHECK HARNESS INSIDE TRANSMISSION.** 1) Disconnect the control valve body connector. 2) Turn the ignition switch to ON. 3) Measure the voltage between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 11 (+) — Transmission body (–):***	Is the voltage approx. 0 V?	Replace the control valve body. <Ref. to CVT(TH58A)-115, Control Valve Body.>	Replace the transmission harness.

BV:DTC P2764 LOCK-UP DUTY SOLENOID CIRCUIT (LOW)

DTC DETECTING CONDITION:

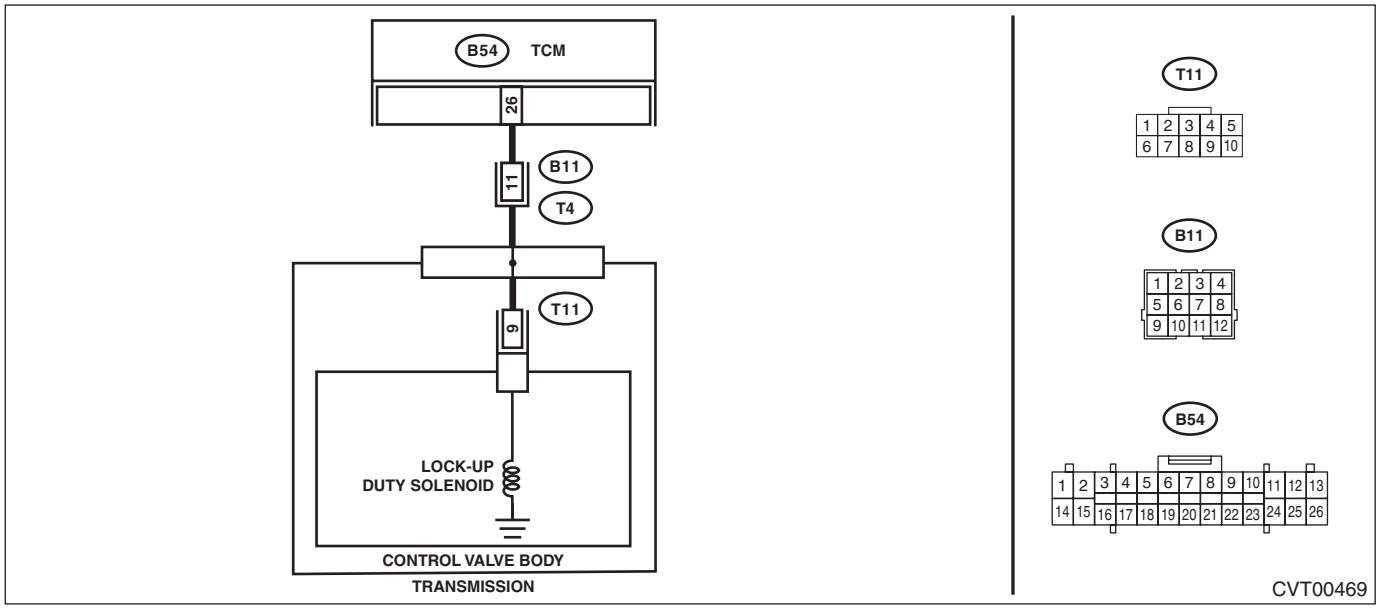
- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(CVT)(HEV)-64, DTC P2764 LOCK-UP DUTY SOLENOID CIRCUIT (LOW), Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

No lock-up occurs.

WIRING DIAGRAM:

CVT control system <Ref. to WI(HEV)-86, CVT Control System.>



	Step	Check	Yes	No
1	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the TCM and transmission connectors. 3) Measure the resistance between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 26 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **2**.	Repair the short circuit of harness.
2	**CHECK LOCK-UP DUTY SOLENOID.** Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 11 — Transmission body:***	Is the resistance approx. 10 — 13.5 Ω? (when cold)	Check for poor contact of connector, and if no fault is found, replace the TCM. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>	Go to step **3**.
3	**CHECK HARNESS INSIDE TRANSMISSION.** **CAUTION:** **Start work after ATF cools down.** 1) Remove the transmission valve cover. 2) Check for the harness pinch, damage.	Is there any fault in the harness?	Replace the transmission harness.	Go to step **4**.

	Step	Check	Yes	No
4	**CHECK HARNESS INSIDE TRANSMISSION.** 1) Disconnect the control valve body connector. 2) Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 11 — Transmission body:***	Is the resistance 1 MΩ or more?	Replace the control valve body. <Ref. to CVT(TH58A)-115, Control Valve Body.>	Replace the transmission harness.

BW:DTC P2797 AUXILIARY TRANSMISSION FLUID PUMP

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(CVT)(HEV)-65, DTC P2797 AUXILIARY TRANSMISSION FLUID PUMP, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

Electric oil pump does not operate.

CAUTION:

Before performing diagnosis, refer to "CAUTION" in "General Description". <Ref. to CVT(HEV)(diag)-5, HYBRID SYSTEM, CAUTION, General Description.>

	Step	Check	Yes	No
1	**CHECK TRANSMISSION FLUID.** Check the amount of ATF. <Ref. to CVT(TH58A)-41, ADJUSTMENT, CVTF.>	Is the ATF amount correct?	Go to step **2**.	Adjust the amount of ATF. <Ref. to CVT(TH58A)-41, ADJUSTMENT, CVTF.>
2	**CHECK DTC.** Check the DTC relating the TCM using the Subaru Select Monitor.	Is P0841 detected?	Perform the diagnosis according to DTC.	Go to step **3**.
3	**CHECK ELECTRIC OIL PUMP.** 1) Perform the Clear Memory Mode. 2) Perform the «Electric Fluid Pump inspection mode». <Ref. to CVT(TH58A)-141, INSPECTION, Electric Fluid Pump.>	Is a DTC other than DTC P2797 displayed?	Perform the diagnosis according to DTC.	Go to step **4**.
4	**CHECK ELECTRIC OIL PUMP.** 1) Perform the «Electric Fluid Pump inspection mode». 2) Read the data of «Electric Fluid Pump Target RPM» and «Electric Fluid Pump Actual RPM» using Subaru Select Monitor.	Is the difference between «Electric Fluid Pump Target RPM» and «Electric Fluid Pump Actual RPM» 200 rpm or more?	Go to step **6**.	Go to step **5**.
5	**CHECK ELECTRIC OIL PUMP.** 1) Perform the «Electric Fluid Pump inspection mode». 2) Read the data of «Actual secondary pressure» using Subaru Select Monitor.	Is the «Actual secondary pressure» 0.3 MPa or less?	Replace the drive motor assembly. <Ref. to CVT(TH58A)-217, Drive Motor Assembly.>	Current condition is normal.
6	**CHECK DTC HISTORY WHEN RECEIVING THE VEHICLE.**	Was DTC P0C21 recorded when receiving the vehicle?	Replace the electric oil pump inverter. <Ref. to HEV-45, ELECTRIC OIL PUMP INVERTER, REMOVAL, Inverter.>	Replace the electric oil pump. <Ref. to CVT(TH58A)-134, Electric Fluid Pump.>

BX:DTC U0073 CONTROL MODULE COMMUNICATION BUS OFF

NOTE:
Refer to “LAN SYSTEM (HEV) (DIAGNOSTICS)” for diagnostic procedure. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>

BY:DTC U0075 CONTROL MODULE COMMUNICATION BUS "PU-CAN" OFF

NOTE:
Refer to “LAN SYSTEM (HEV) (DIAGNOSTICS)” for diagnostic procedure. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>

BZ:DTC U0076 CONTROL MODULE COMMUNICATION BUS "HEV-CAN" OFF

NOTE:
Refer to “LAN SYSTEM (HEV) (DIAGNOSTICS)” for diagnostic procedure. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>

CA:DTC U0100 LOST COMMUNICATION WITH ECM/PCM “A”

NOTE:
Refer to “LAN SYSTEM (HEV) (DIAGNOSTICS)” for diagnostic procedure. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>

CB:DTC U0101 LOST COMMUNICATION WITH TCM

NOTE:
Refer to “LAN SYSTEM (HEV) (DIAGNOSTICS)” for diagnostic procedure. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>

CC:DTC U0110 LOST COMMUNICATION WITH DRIVE MOTOR CONTROL MODULE "A"

NOTE:
Refer to “LAN SYSTEM (HEV) (DIAGNOSTICS)” for diagnostic procedure. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>

CD:DTC U0122 LOST COMMUNICATION WITH VEHICLE DYNAMICS CONTROL MODULE

NOTE:
Refer to “LAN SYSTEM (HEV) (DIAGNOSTICS)” for diagnostic procedure. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>

CE:DTC U0140 LOST COMMUNICATION WITH BODY CONTROL MODULE

NOTE:
Refer to “LAN SYSTEM (HEV) (DIAGNOSTICS)” for diagnostic procedure. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>

CF:DTC U0155 LOST COMMUNICATION WITH INSTRUMENT PANEL CLUSTER (IPC) CONTROL MODULE

NOTE:
Refer to “LAN SYSTEM (HEV) (DIAGNOSTICS)” for diagnostic procedure. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>

CG:DTC U0287 LOST COMMUNICATION WITH TRANSMISSION FLUID PUMP MODULE

NOTE:
Refer to “LAN SYSTEM (HEV) (DIAGNOSTICS)” for diagnostic procedure. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>

CH:DTC U0293 LOST COMMUNICATION WITH HYBRID POWERTRAIN CONTROL MODULE

NOTE:
Refer to “LAN SYSTEM (HEV) (DIAGNOSTICS)” for diagnostic procedure. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>

CI: DTC U0401 INVALID DATA RECEIVED FROM ECM/PCM “A”

NOTE:
Refer to “LAN SYSTEM (HEV) (DIAGNOSTICS)” for diagnostic procedure. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>

CJ:DTC U0402 INVALID DATA RECEIVED FROM TCM

NOTE:
Refer to “LAN SYSTEM (HEV) (DIAGNOSTICS)” for diagnostic procedure. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>

CK:DTC U0411 INVALID DATA RECEIVED FROM DRIVE MOTOR CONTROL MODULE "A"

NOTE:
Refer to “LAN SYSTEM (HEV) (DIAGNOSTICS)” for diagnostic procedure. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>

CL:DTC U0416 INVALID DATA RECEIVED FROM VEHICLE DYNAMICS CONTROL MODULE

NOTE:
Refer to “LAN SYSTEM (HEV) (DIAGNOSTICS)” for diagnostic procedure. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>

CM:DTC U0422 INVALID DATA RECEIVED FROM BODY CONTROL MODULE

NOTE:
Refer to “LAN SYSTEM (HEV) (DIAGNOSTICS)” for diagnostic procedure. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>

CN:DTC U0423 INVALID DATA RECEIVED FROM INSTRUMENT PANEL CLUSTER CONTROL MODULE

NOTE:
Refer to “LAN SYSTEM (HEV) (DIAGNOSTICS)” for diagnostic procedure. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>

CO:DTC U0588 INVALID DATA RECEIVED FROM TRANSMISSION FLUID PUMP MODULE

NOTE:
Refer to “LAN SYSTEM (HEV) (DIAGNOSTICS)” for diagnostic procedure. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>

CP:DTC U0594 INVALID DATA RECEIVED FROM HYBRID POWERTRAIN CONTROL MODULE

NOTE:
Refer to “LAN SYSTEM (HEV) (DIAGNOSTICS)” for diagnostic procedure. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>

CQ:DTC U1100 LOST COMMUNICATION WITH ECM/PCM PU-CAN

NOTE:
Refer to “LAN SYSTEM (HEV) (DIAGNOSTICS)” for diagnostic procedure. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>

CR:DTC U1235 LOST COMMUNICATION WITH EyeSight

NOTE:
Refer to “LAN SYSTEM (HEV) (DIAGNOSTICS)” for diagnostic procedure. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>

CS:DTC U1293 LOST COMMUNICATION WITH HYBRID POWERTRAIN CONTROL MODULE PU-CAN

NOTE:
Refer to “LAN SYSTEM (HEV) (DIAGNOSTICS)” for diagnostic procedure. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>

CT:DTC U1401 INVALID DATA RECEIVED FROM ECM/PCM PU-CAN

NOTE:
Refer to “LAN SYSTEM (HEV) (DIAGNOSTICS)” for diagnostic procedure. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>

CU:DTC U1433 INVALID DATA RECEIVED FROM EyeSight

NOTE:
Refer to “LAN SYSTEM (HEV) (DIAGNOSTICS)” for diagnostic procedure. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>

CV:DTC U1594 INVALID DATA RECEIVED FROM HYBRID POWERTRAIN CONTROL MODULE PU-CAN

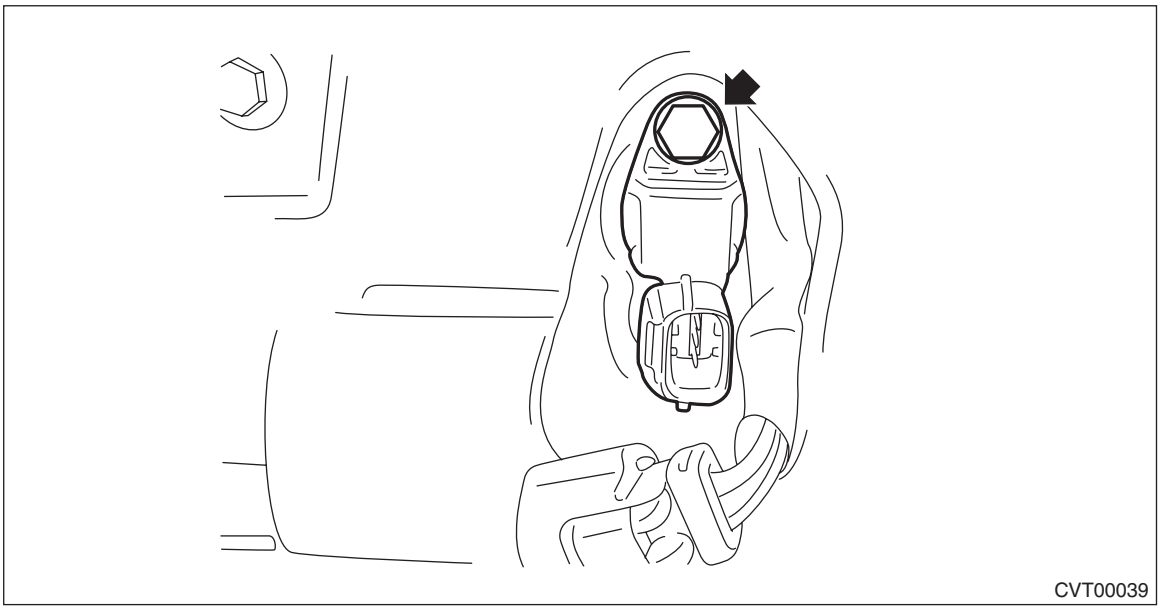
NOTE:
Refer to “LAN SYSTEM (HEV) (DIAGNOSTICS)” for diagnostic procedure. <Ref. to LAN(HEV)(diag)-2, Basic Diagnostic Procedure.>

16.Turbine Speed Sensor

A: REMOVAL

CAUTION:
Be sure to prevent water or oil from contacting the connector terminal of turbine speed sensor. If adhesion occurs, replace with a new part.
1) Disconnect the ground cable from battery. <Ref. to NT-5, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery, disconnect the ground terminal from 12V engine restart battery sensor.
2) Lift up the vehicle.
3) Remove the harness connector from turbine speed sensor.
4) Remove the turbine speed sensor.



B: INSTALLATION

CAUTION:
Be sure to prevent water or oil from contacting the connector terminal of turbine speed sensor. If adhesion occurs, replace with a new part.
Install in the reverse order of removal.

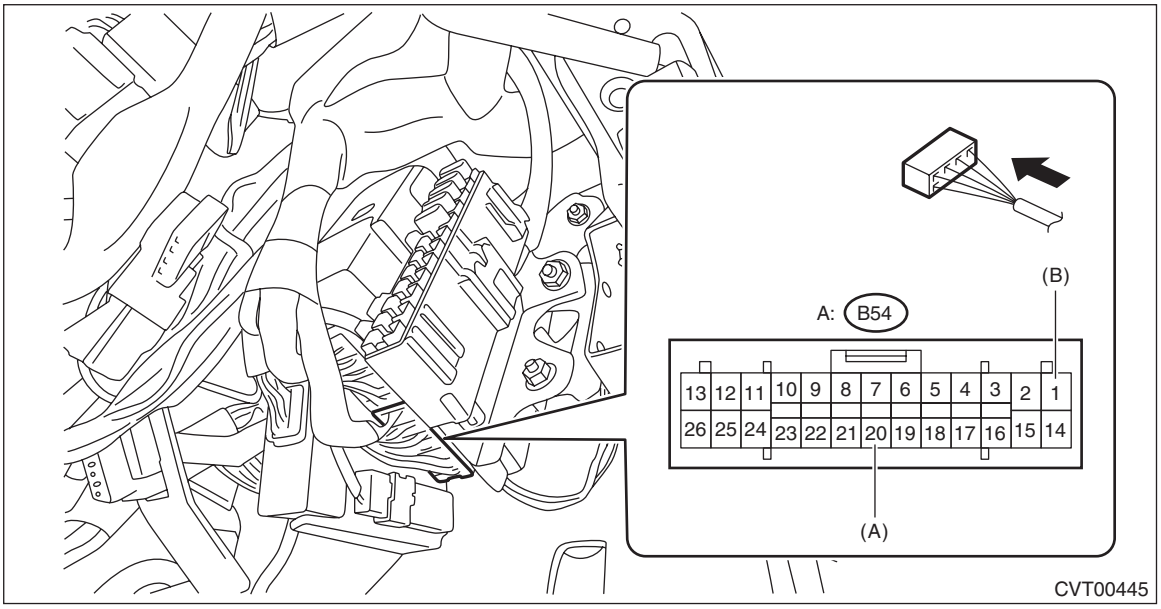
NOTE:
- Use new O-rings.
- Apply CVTF to the O-ring.

Tightening torque:
7 N·m (0.7 kgf-m, 5.2 ft-lb)

C: INSPECTION

1) Set the probe of oscilloscope to TCM harness connector.

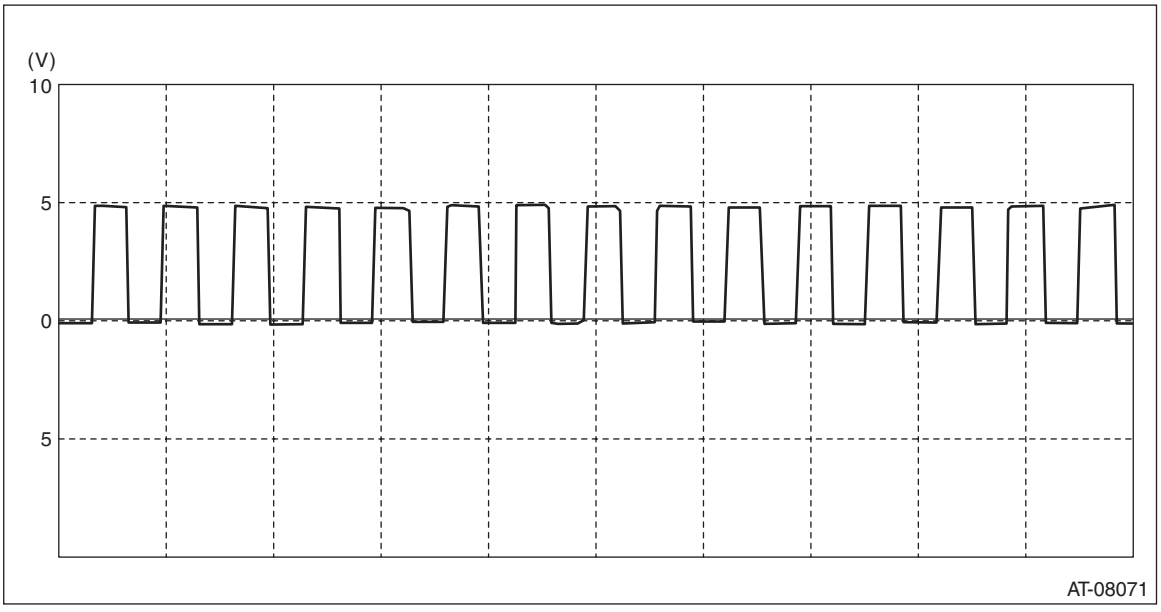
Connector & terminal
(B54) No. 20 (+) — No. 1 (–):



(A) + probe
(B) – probe

2) Start and warm up the engine.
3) Perform “Engine only Drive Mode” using the Subaru Select Monitor. <Ref. to HEV(diag)-71, HYBRID POWERTRAIN CONTROL SYSTEM, OPERATION, System Operation Check Mode.>
4) Check the waveform and output voltage of the turbine speed sensor with engine idling.

NOTE:
The waveform cycle changes as the speed changes.



17.Diagnostic Procedure without Diagnostic Trouble Code (DTC)

A: CHECK SHIFT INDICATOR

DIAGNOSIS:

- Output signal circuit of shift indicator is open or shorted.
- Combination meter malfunction

TROUBLE SYMPTOM:

- Shift indicator does not display or remains displayed.
- Shift indicator display does not change.

	Step	Check	Yes	No
1	**CHECK TCM.** Check the DTC relating the TCM using the Subaru Select Monitor.	Is DTC U0155 or U0423 detected?	Perform the self-diagnosis of combination meter.	Go to step **2**.
2	**CHECK TCM.** Check the DTC relating the TCM using the Subaru Select Monitor.	Are DTCs other than U0155 and U0423 detected?	Perform the diagnosis according to DTC.	Go to step **3**.
3	**CHECK COMBINATION METER.** Check the DTC of combination meter.	Is DTC detected?	Perform the diagnosis according to DTC.	Go to step **4**.
4	**CHECK TCM.** 1) Operate the + side of the paddle shift switch. 2) Read the data of «Up Switch» using the Subaru Select Monitor.	Does it change between ON and OFF according to the operation?	Go to step **5**.	Check for poor contact between TCM and paddle shift UP switch, and repair the defective part.
5	**CHECK TCM.** 1) Operate the – side of the paddle shift switch. 2) Read the data of «Down Switch» using the Subaru Select Monitor.	Does it change between ON and OFF according to the operation?	Go to step **6**.	Check for poor contact between TCM and paddle shift down switch, and repair the defective part.
6	**CHECK TCM.** 1) Turn the ignition switch OFF, then turn it ON again. 2) Shift the select lever to manual mode. 3) Read the data of «Tiptronic Mode Switch» using Subaru Select Monitor.	Does it change between ON and OFF according to the operation?	Current condition is normal.	Replace the TCM. <Ref. to CVT(TH58A)-158, Transmission Control Module (TCM).>

17.Secondary Speed Sensor

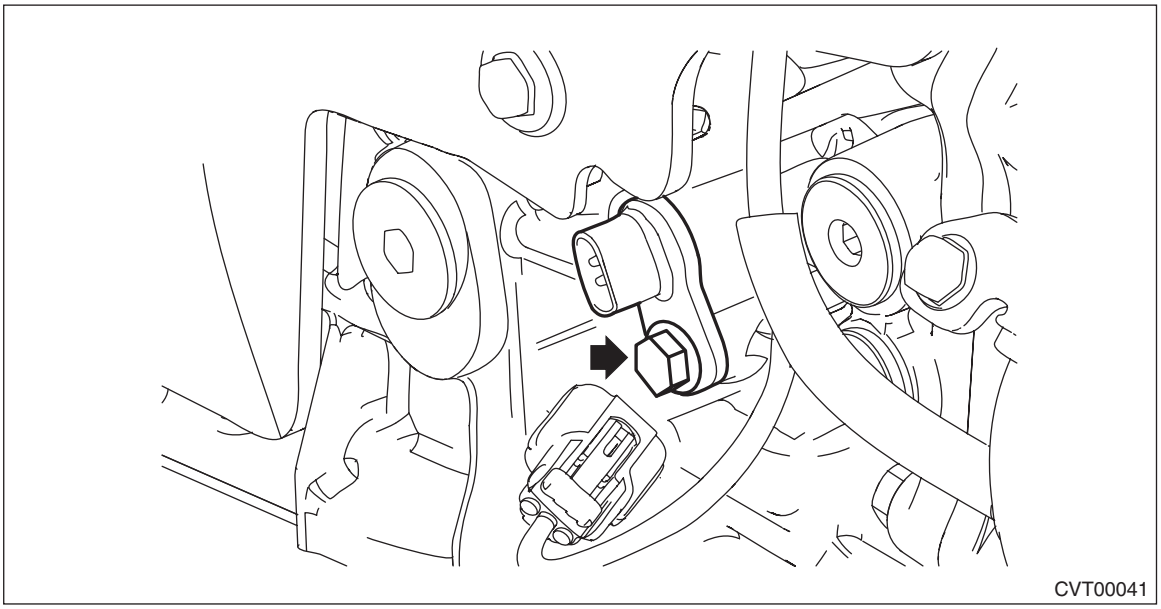
A: REMOVAL

CAUTION:
• Be sure to prevent water or oil from contacting the connector terminal of secondary speed sensor. If adhesion occurs, replace with a new part.
• When secondary speed sensor is removed, CVTF leaks. After installing the secondary speed sensor, adjust the CVTF level.

1) Disconnect the ground cable from battery. <Ref. to NT-5, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery, disconnect the ground terminal from 12V engine restart battery sensor.

2) Lift up the vehicle.
3) Remove the harness connector from secondary speed sensor.
4) Remove the secondary speed sensor.



B: INSTALLATION

CAUTION:
• Be sure to prevent water or oil from contacting the connector terminal of secondary speed sensor. If adhesion occurs, replace with a new part.
• After installing the secondary speed sensor, adjust the CVTF level.

Install in the reverse order of removal.

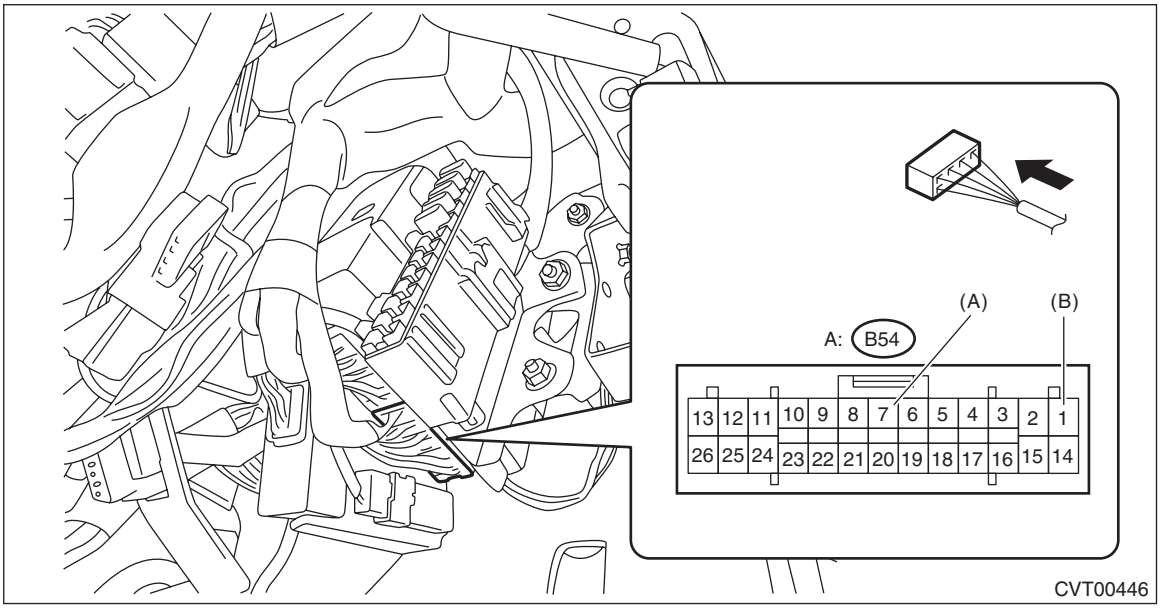
NOTE:
- Use new O-rings.
- Apply CVTF to the O-ring.

Tightening torque:
7 N·m (0.7 kgf-m, 5.2 ft-lb)

C: INSPECTION

1) Set the probe of oscilloscope to TCM harness connector.

Connector & terminal
(B54) No. 7 (+) — No. 1 (–):

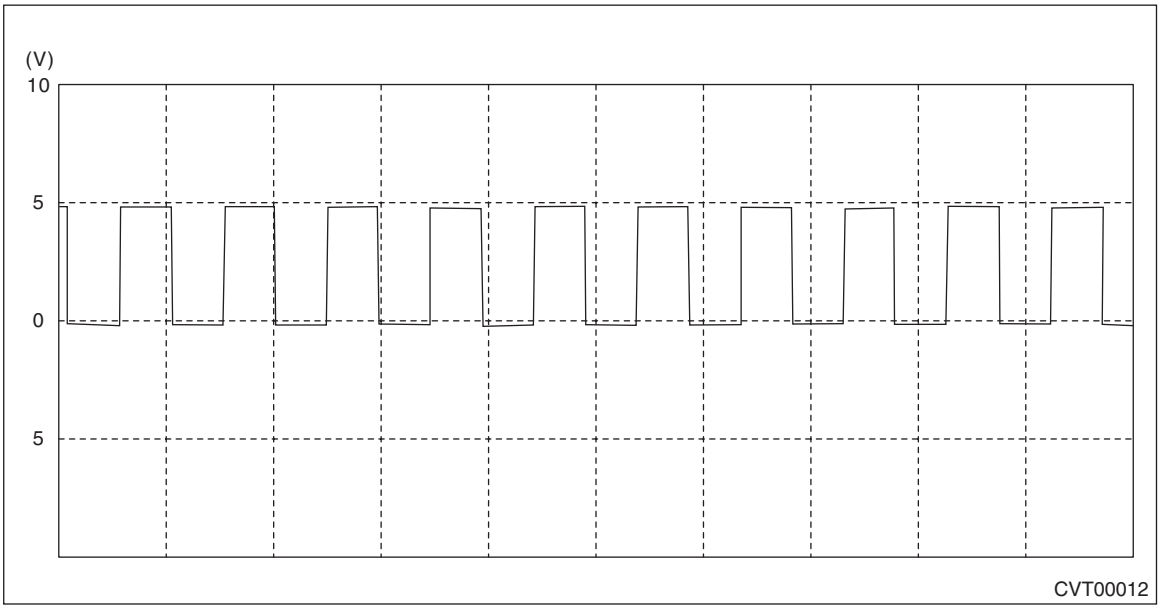


(A) + probe
(B) – probe

2) Start and warm up the engine.
3) Lift up the vehicle.

CAUTION:
Lift up the vehicle until the tire bottom is 0.3 m (0.98 ft) or more above the ground.
4) Shift the select lever to “D” range.
5) Check the waveform and output voltage of the secondary speed sensor with engine idling.

NOTE:
The waveform cycle changes as the speed changes.



18.Diagnostics with Phenomenon

A: INSPECTION

Symptoms	Faulty parts
The vehicle can not move unless the engine is started after ignition switch was turned off, when driving in “D” or “R” range, or selecting “N” → “D”, “N” → “R”.	• Control valve • Engine control system
While driving in “D” range, the vibration occurs immediately before the stopping. Or the vehicle can not move unless the engine is started after ignition switch was turned off.	• Control valve • Torque converter
Vehicle cannot shift while driving in “D” range.	• Control valve • TCM • Shift mechanism • Power supply system • HPCM
Excessive shock when selecting “N” → “D”, and “N” → “R”.	• Control valve • TCM • F&R clutch pack • ATF deterioration or lack
Excessive shock at standing start in “D” range.	• Control valve • TCM • F&R clutch pack • ATF deterioration or lack
Engine speed increases abruptly during driving in “D” or “R” range.	• Control valve • Secondary pressure sensor • F&R clutch pack • Output clutch pack • ATF deterioration or lack
Vehicle can not start when depressing the accelerator pedal in “D” or “R” range, or acceleration is very poor. (without abrupt engine increase)	• Control valve • F&R clutch pack • Output clutch pack • Shift mechanism • Parking mechanism • Engine control system • Power supply system • HPCM
Shift indicator in combination meter displays the position which differs from select lever position.	• Inhibitor switch • Select cable related • Combination meter
Manual mode enters even though the select lever and paddle shift switch is not operated.	• Manual mode switch • Paddle shift switch • Select lever • TCM • HPCM
Engine speed increases abruptly in “D” or “R” range, vehicle can not start.	• F&R clutch pack • Output clutch pack • Select cable related
Manual mode can not be set	• Select lever • TCM • HPCM

GENERAL DESCRIPTION (CVT)

GD(CVT)(HEV)

Page

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2. Diagnostic Trouble Code (DTC) Detecting Criteria 6

18.Front Wheel Speed Sensor

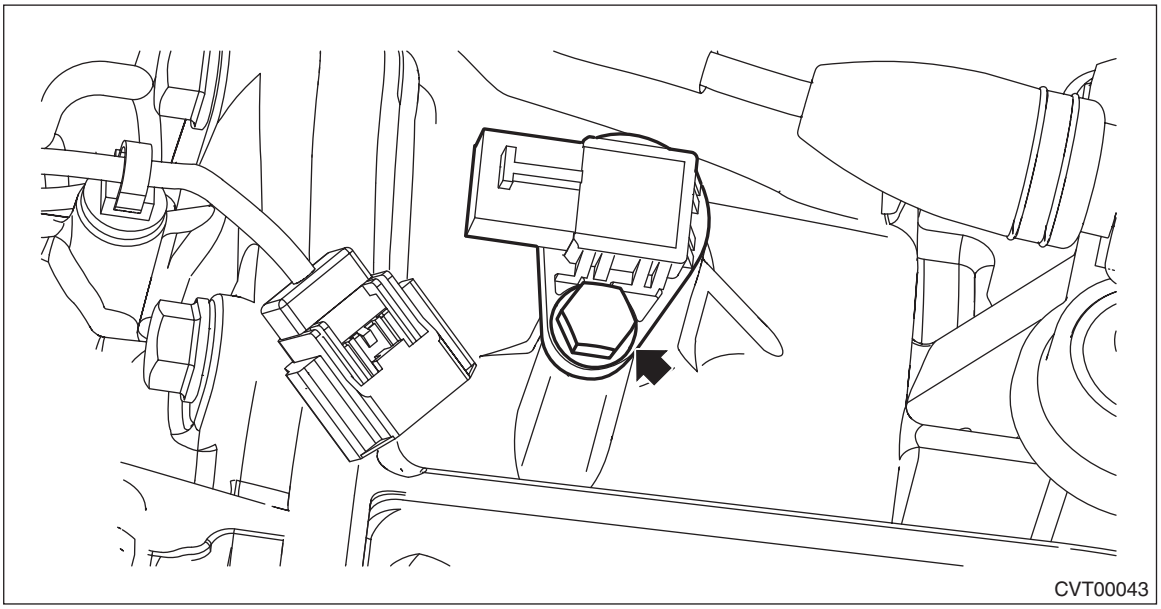
A: REMOVAL

CAUTION:
• Be sure to prevent water or oil from contacting the connector terminal of front wheel speed sensor. If adhesion occurs, replace with a new part.
• When the front wheel speed sensor is removed, CVTF leaks. After installing the front wheel speed sensor, adjust the CVTF level.

1) Disconnect the ground cable from battery. <Ref. to NT-5, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery, disconnect the ground terminal from 12V engine restart battery sensor.

2) Lift up the vehicle.
3) Remove the harness connector from front wheel speed sensor.
4) Remove the front wheel speed sensor.



B: INSTALLATION

CAUTION:
• Be sure to prevent water or oil from contacting the connector terminal of front wheel speed sensor. If adhesion occurs, replace with a new part.
• After installing the front wheel speed sensor, adjust the CVTF level.

Install in the reverse order of removal.

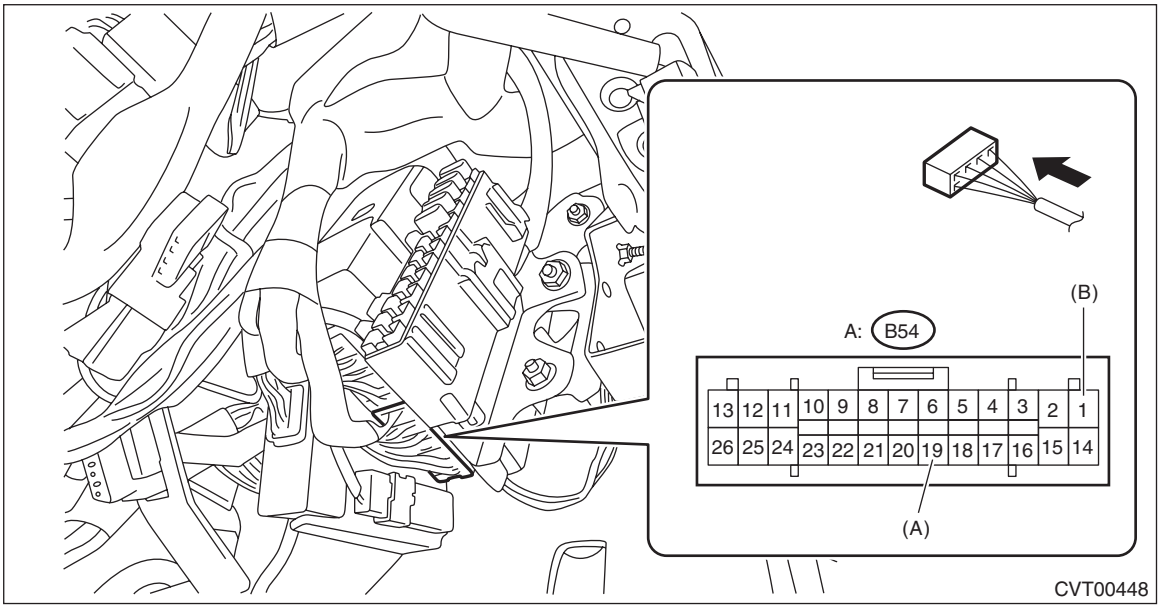
NOTE:
- Use new O-rings.
- Apply CVTF to the O-ring.

Tightening torque:
7 N·m (0.7 kgf-m, 5.2 ft-lb)

C: INSPECTION

1) Set the probe of oscilloscope to TCM harness connector.

Connector & terminal
(B54) No. 19 (+) — No. 1 (–):

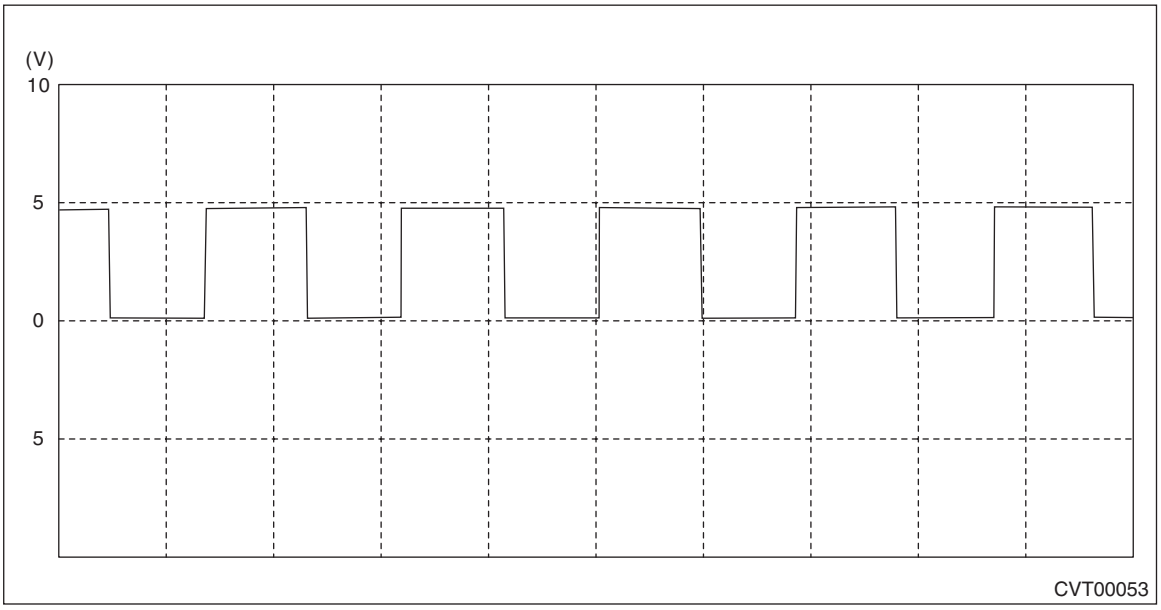


(A) + probe
(B) – probe

2) Start and warm up the engine.
3) Lift up the vehicle.

CAUTION:
Lift up the vehicle until the tire bottom is 0.3 m (0.98 ft) or more above the ground.
4) Shift the select lever to “D” range.
5) Check the waveform and output voltage of the front wheel speed sensor while driving with the engine idling.

NOTE:
The waveform cycle changes as the speed changes.



19.Secondary Pressure Sensor

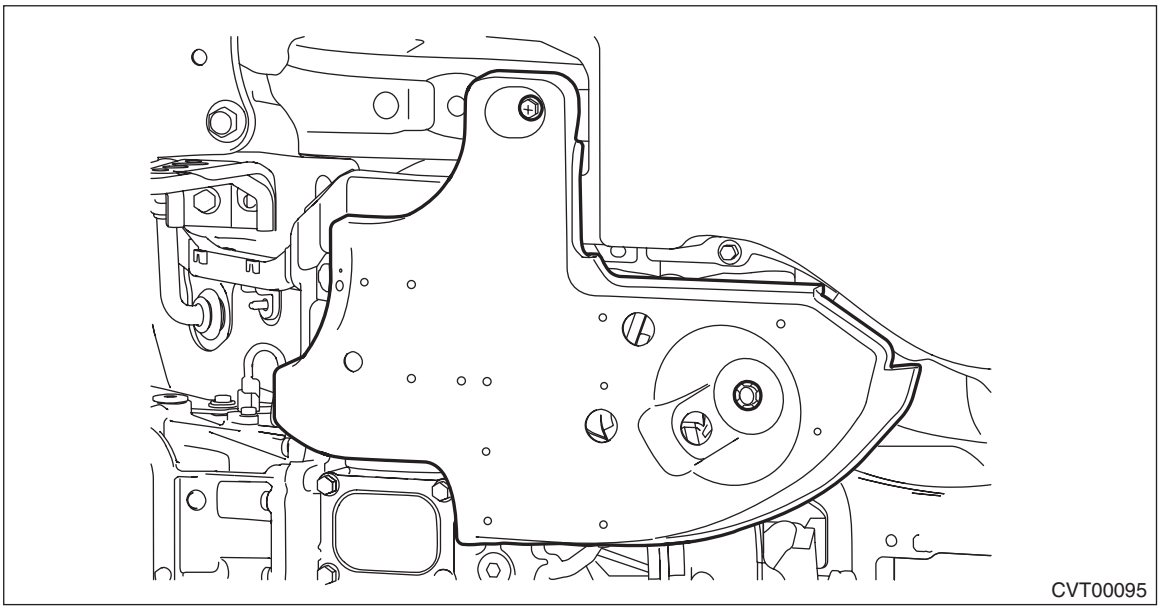
A: REMOVAL

CAUTION:
• Be sure to prevent water or oil from contacting the connector terminal of secondary pressure sensor. If adhesion occurs, replace with a new part.
• When secondary pressure sensor is removed, CVTF leaks. After installing the secondary pressure sensor, adjust the CVTF level.

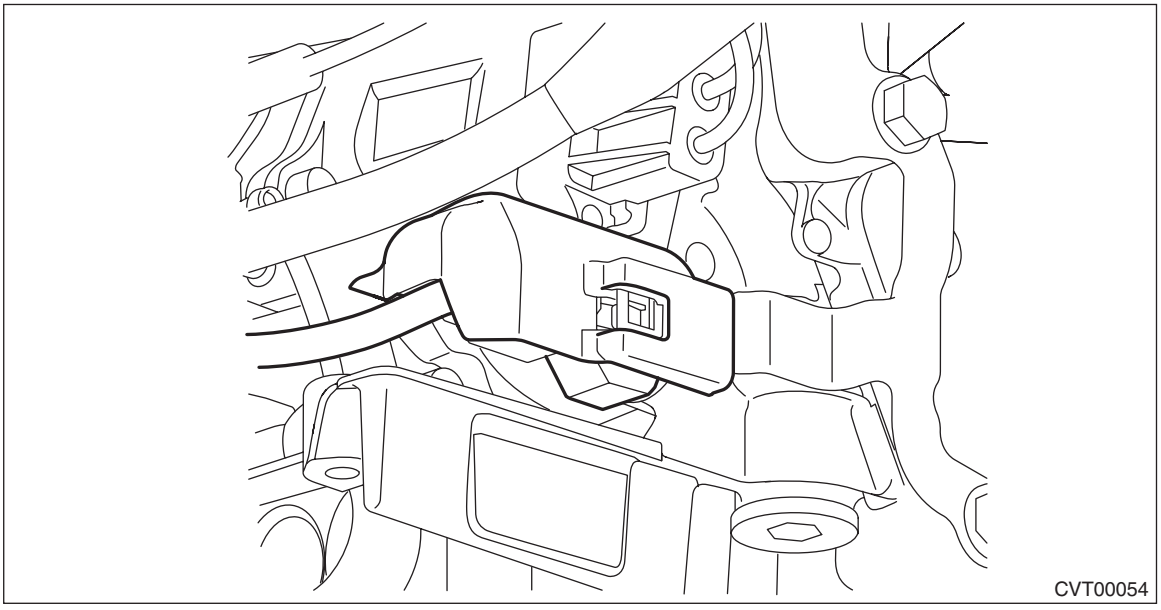
1) Disconnect the ground cable from battery. <Ref. to NT-5, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery, disconnect the ground terminal from 12V engine restart battery sensor.

2) Lift up the vehicle.
3) Remove the under cover front - cable.

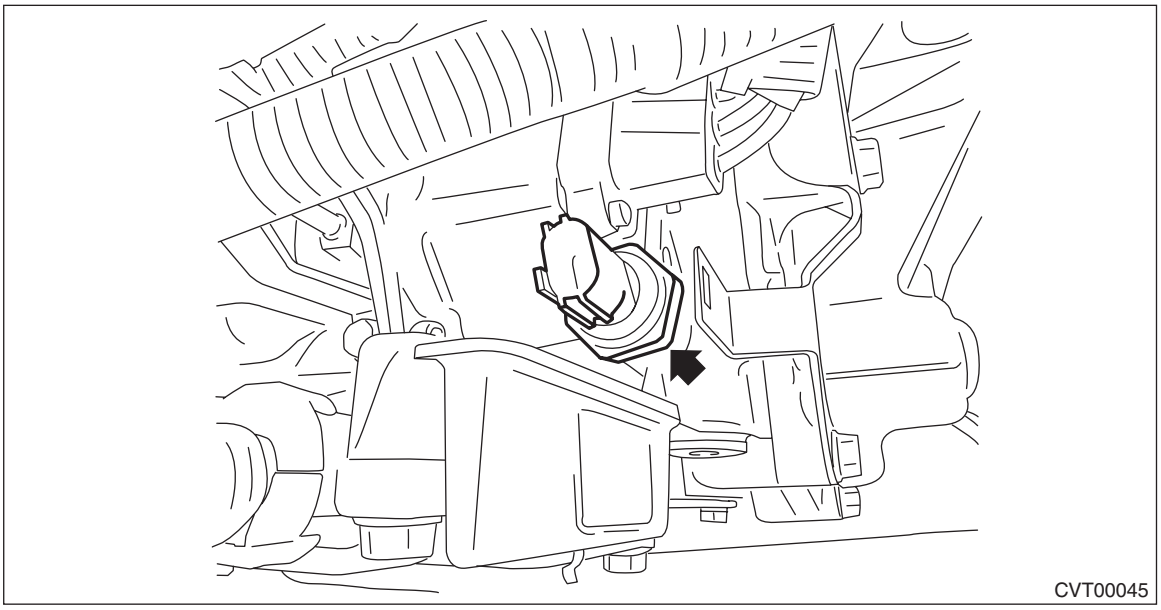

CVT00095

4) Remove the sensor cover.


CVT00054

5) Remove the secondary pressure sensor connector.

6) Remove the secondary pressure sensor.



B: INSTALLATION

CAUTION:
- **Be sure to prevent water or oil from contacting the connector terminal of secondary pressure sensor. If adhesion occurs, replace with a new part.**
- **After installing the secondary pressure sensor, adjust the CVTF level.**

Install in the reverse order of removal.

NOTE:
Use new O-rings.

Tightening torque:
Secondary pressure sensor
39 N·m (4.0 kgf-m, 28.8 ft-lb)
Under cover front - cable
18 N·m (1.8 kgf-m, 13.3 ft-lb)

C: INSPECTION

1) Start the engine in the “P” range, and warm up the engine.
2) Depress the brake pedal, and shift the select lever to “D” range.
3) Shift the select lever to “N” range.
4) Depress the brake pedal and hold it.
5) Check “secondary pressure sensor voltage” by using Subaru Select Monitor while the engine is idling. <Ref. to CVT(HEV)(diag)-15, OPERATION, Subaru Select Monitor.>

Specification:
Approx. 1.0 V

6) Check “secondary pressure sensor voltage” by using Subaru Select Monitor while the engine is stopped and the ignition switch is turned on. <Ref. to CVT(HEV)(diag)-15, OPERATION, Subaru Select Monitor.>

Specification:
Approx. 0.5 V

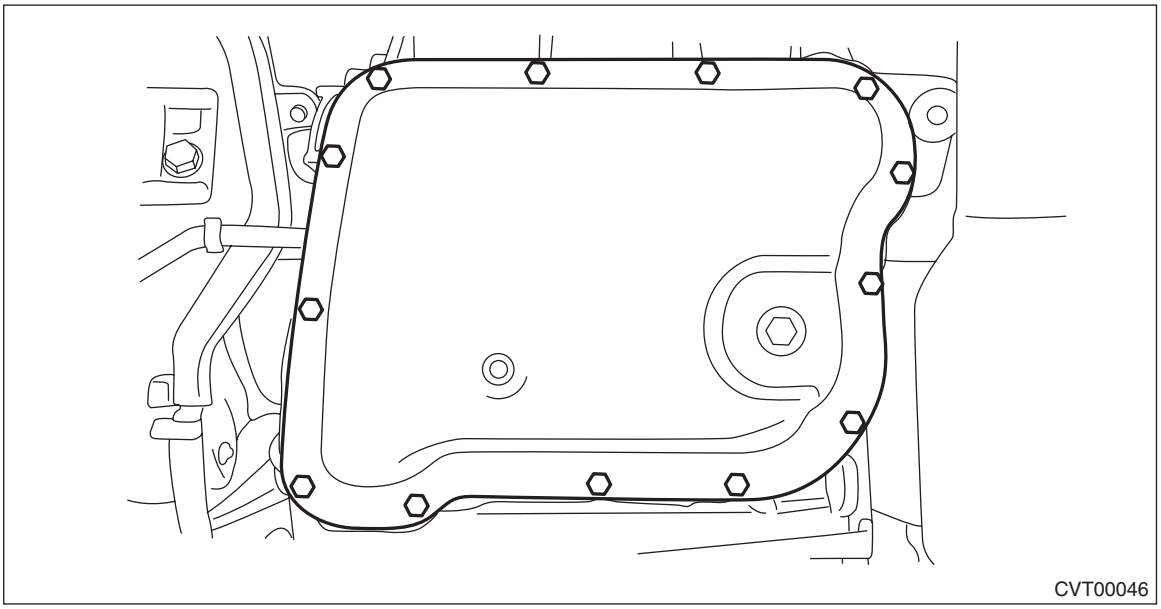
20.Oil Pan and Strainer

A: REMOVAL

CAUTION:
• Directly after the vehicle has been running or the engine has been idling for a long time, the CVTF is hot. Be careful not to burn yourself.
• Be careful not to spill CVTF on the exhaust pipe to prevent it from emitting smoke or causing a fire. If the CVTF adheres, wipe it off completely.

1) Lift up the vehicle.
2) Clean the transmission exterior.
3) Remove the CVTF drain plug to drain CVTF. <Ref. to CVT(TH58A)-41, CVTF.>
4) Remove the oil pan.

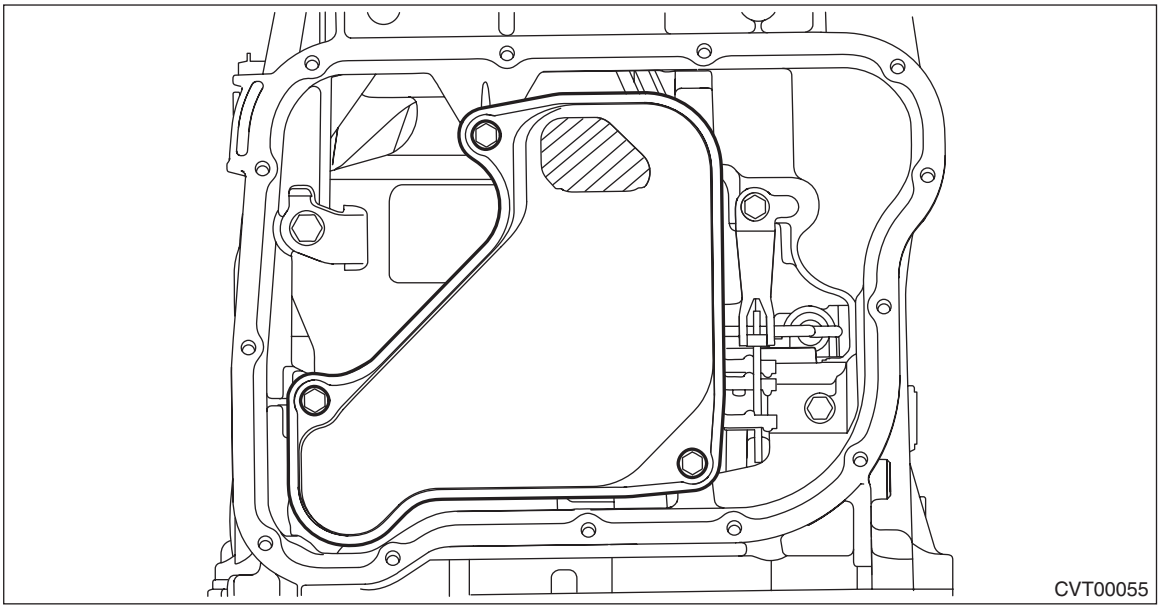
CAUTION:
Be careful not to allow foreign matter such as dust or dirt to enter the oil pan.



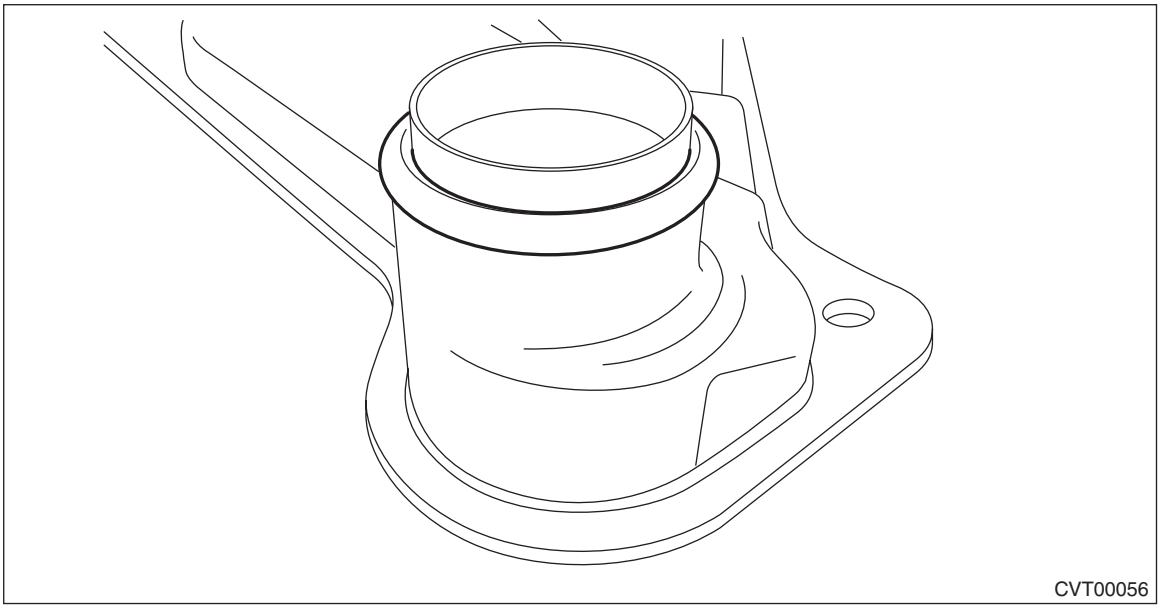
5) Remove the magnet.

6) Remove the oil strainer.

CAUTION:
Be careful not to touch the oil strainer filter.



7) Remove the O-ring from oil strainer.



B: INSTALLATION

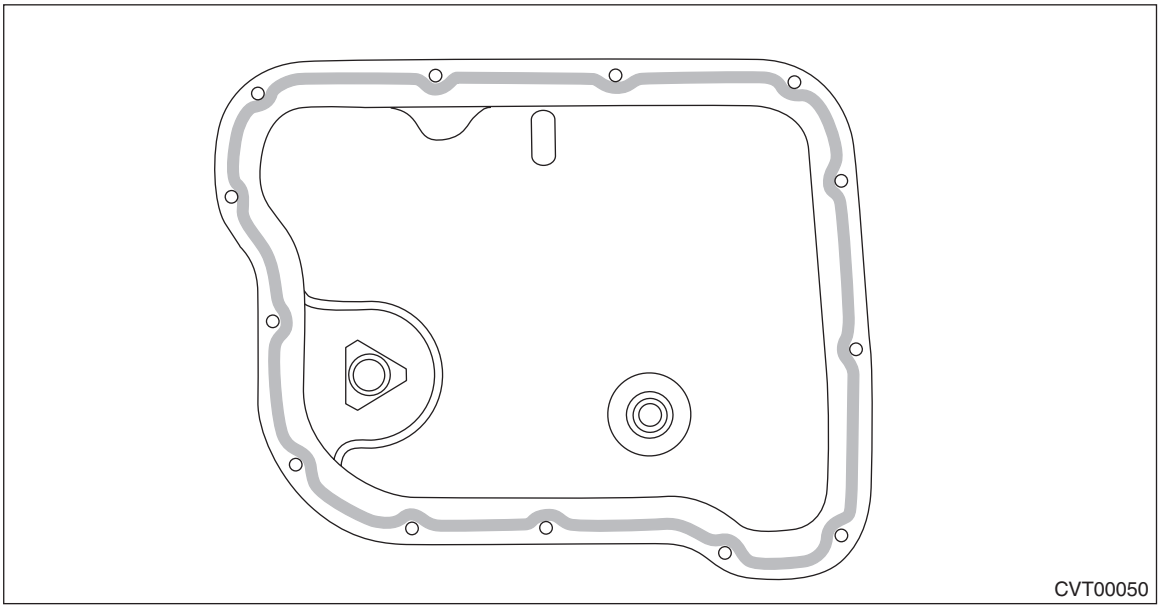
CAUTION:
Be careful not to touch the oil strainer filter.
1) Clean the mating surface of oil pan and transmission case.
2) Install the O-ring to the oil strainer.

NOTE:
- Use new O-rings.
- Apply CVTF to the O-ring.

3) Install the oil strainer.

Tightening torque:
9 N·m (0.9 kgf-m, 6.6 ft-lb)
4) Clean the magnet.
5) Attach the magnet at the specified position of the oil pan.
6) Apply liquid gasket all around the oil pan mating surface seamlessly.

Liquid gasket:
THREE BOND 1217B (Part No. K0877YA020) or equivalent



7) Install the oil pan by equally tightening the bolts.

Tightening torque:
5 N·m (0.5 kgf-m, 3.7 ft-lb)
8) Refill CVTF to adjust the CVTF level. <Ref. to CVT(TH58A)-41, CVTF.>

C: INSPECTION

- Check each part for damage or dust.
- Check oil strainer for clogging.

21.Control Valve Body

A: REMOVAL

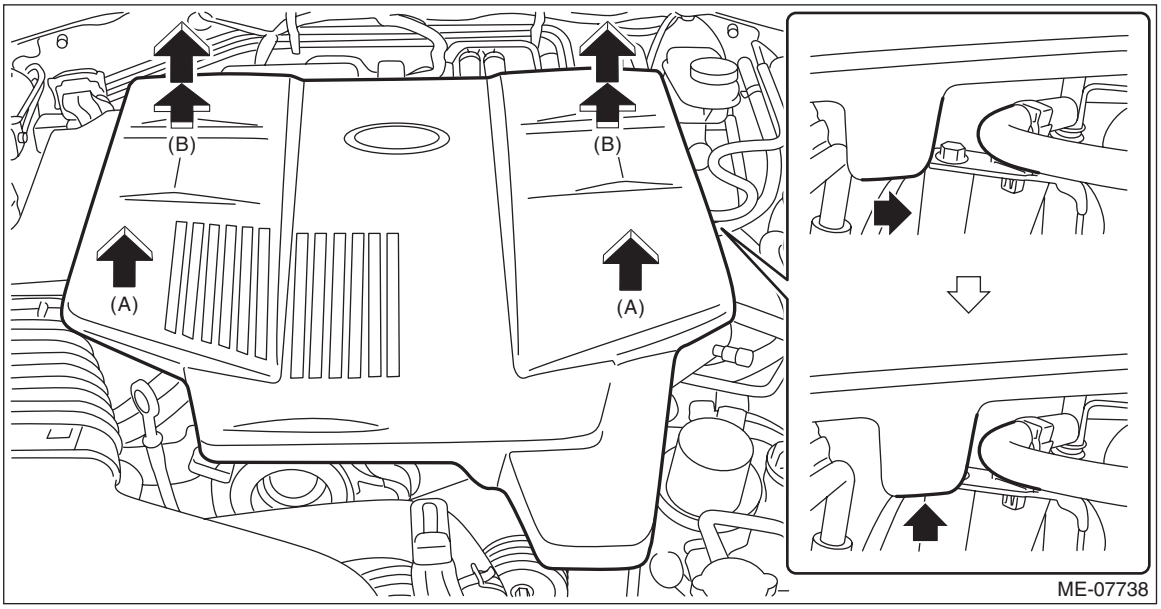
1. MAIN CONTROL VALVE BODY

CAUTION:
• Directly after the vehicle has been running or the engine has been idling for a long time, the CVTF is hot. Be careful not to burn yourself.
• Be careful not to spill CVTF on the exhaust pipe to prevent it from emitting smoke or causing a fire. If the CVTF adheres, wipe it off completely.
• Always clean the engine compartment before removal.

NOTE:
The control valve body is replaced as an assembly only, because it is a non-disassembly part.
1) Disconnect the ground cable from battery. <Ref. to NT-5, BATTERY, NOTE, Note.>

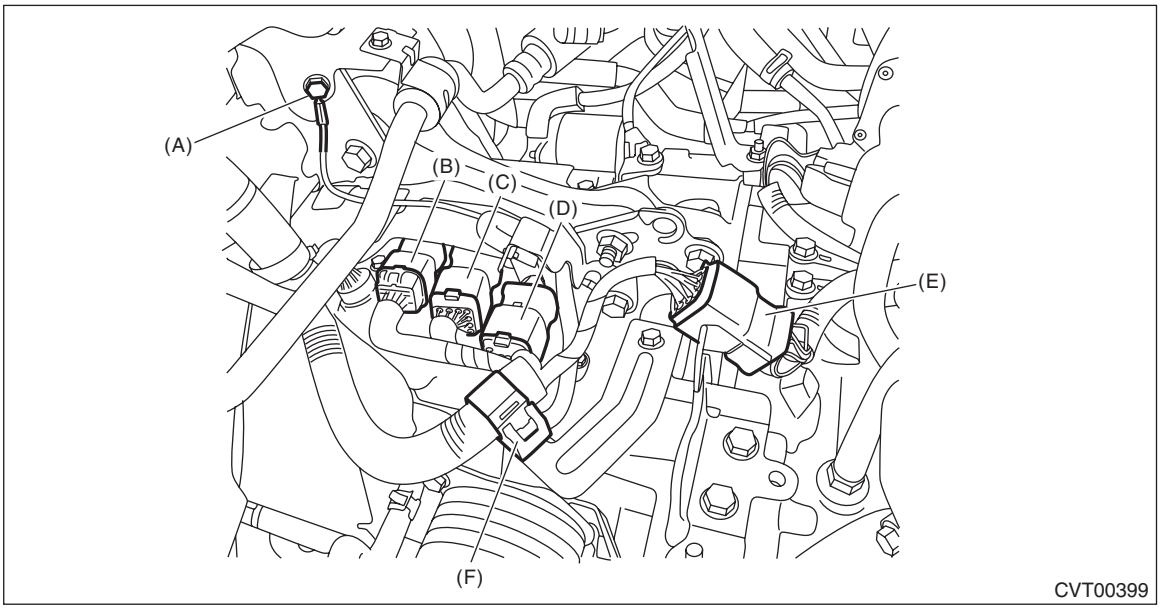
NOTE:
For the 12 volt engine restart battery, disconnect the ground terminal from 12V engine restart battery sensor.
2) Remove the collector cover.
(1) Carefully pull up the front of collector cover at two positions (A).
(2) Carefully pull up the rear of collector cover at two positions (B) while moving it backward.

NOTE:
Be careful not to contact the fuel delivery tube when moving the collector cover rearward.



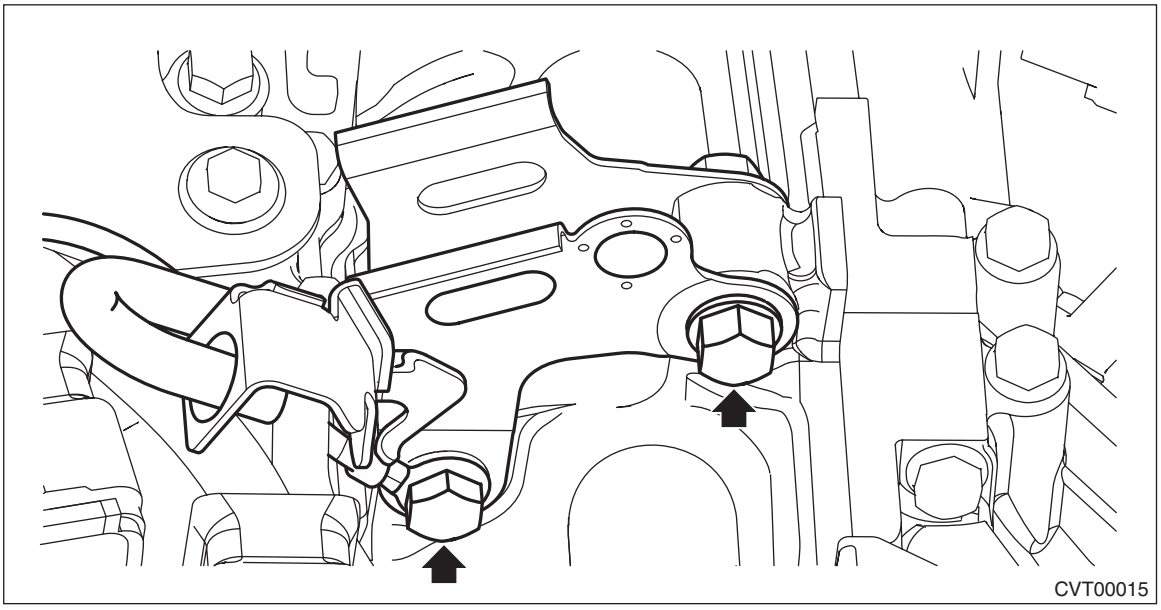
3) Remove the air cleaner case and bracket. <Ref. to IN(H4DO(HEV))-6, REMOVAL, Air Cleaner Case.>

4) Disconnect the following connectors and harness clips.
- Transmission radio ground terminal
- Transmission harness connectors
- Inhibitor harness connector
- Drive motor harness connector
- Engine harness connectors
- Harness clip

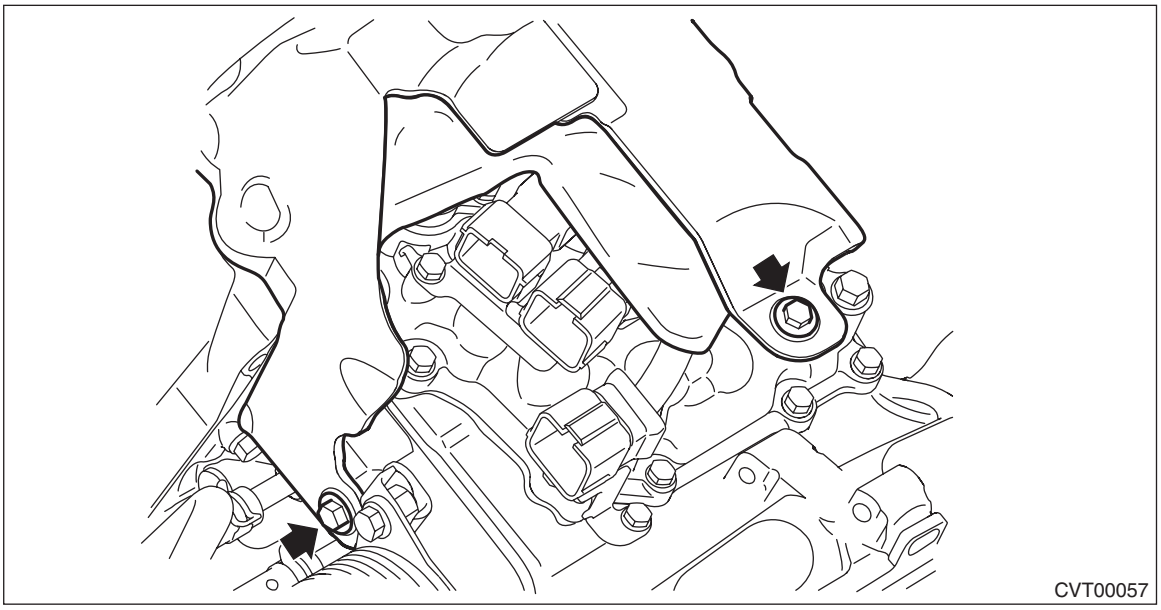


(A) Transmission radio ground terminal
(B) Transmission harness connectors
(C) Inhibitor harness connector
(D) Drive motor harness connector
(E) Engine harness connectors
(F) Harness clip

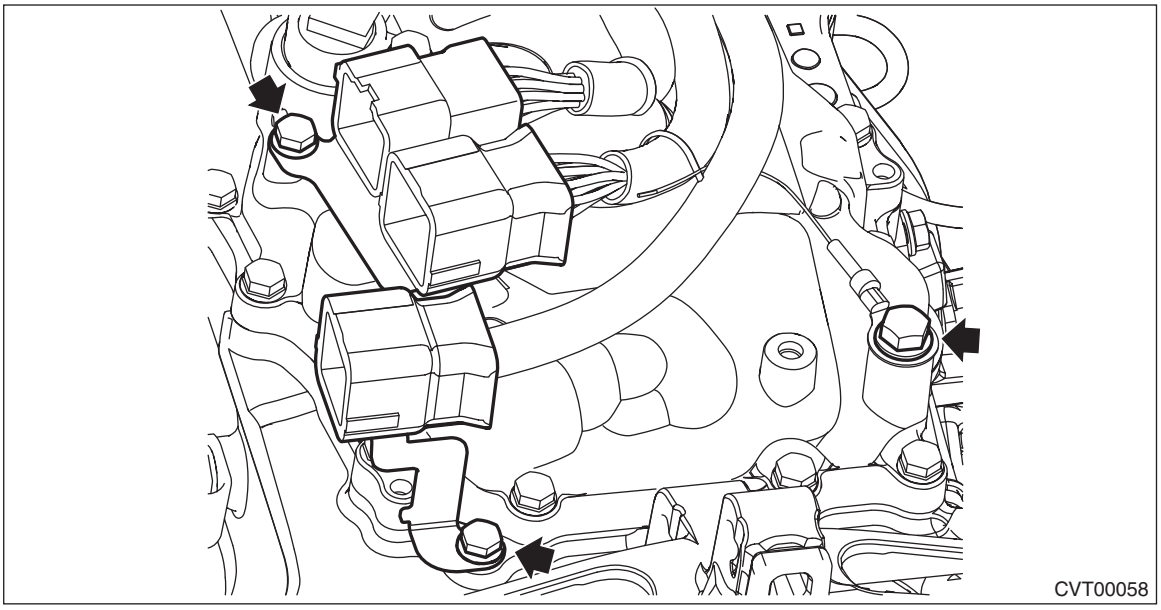
5) Remove the pitching stopper. <Ref. to CVT(TH58A)-87, PITCHING STOPPER, REMOVAL, Transmission Mounting System.>
6) Remove the air breather hose from the pitching stopper bracket, and then remove the pitching stopper bracket and transmission radio ground cord.



7) Remove the transmission case cover.



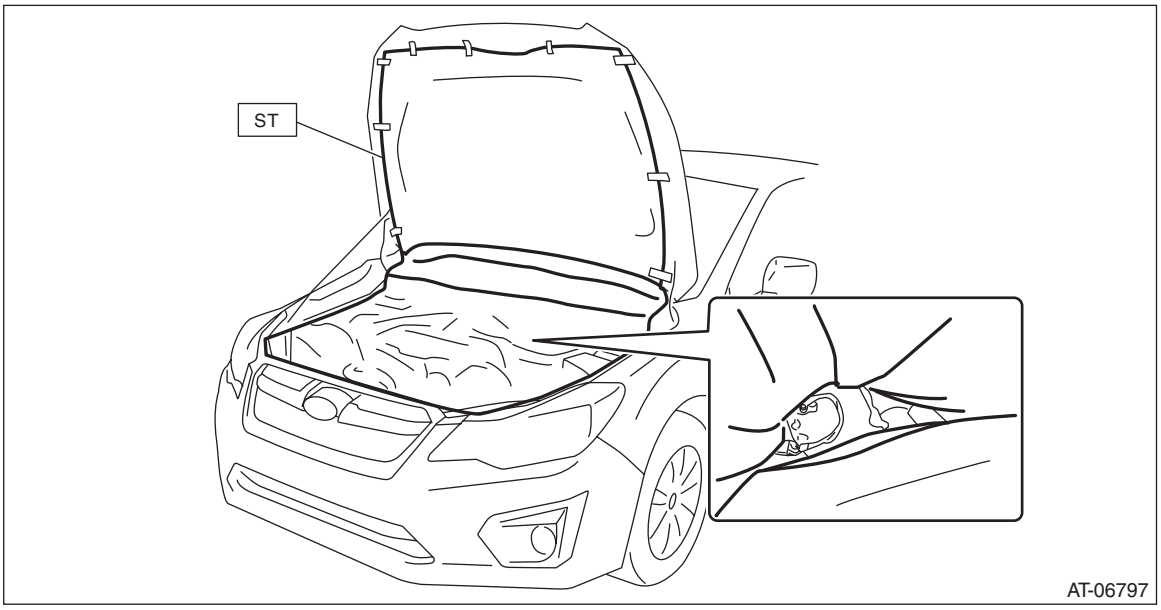
8) Remove the transmission harness stay, drive motor harness stay and transmission ground terminal.



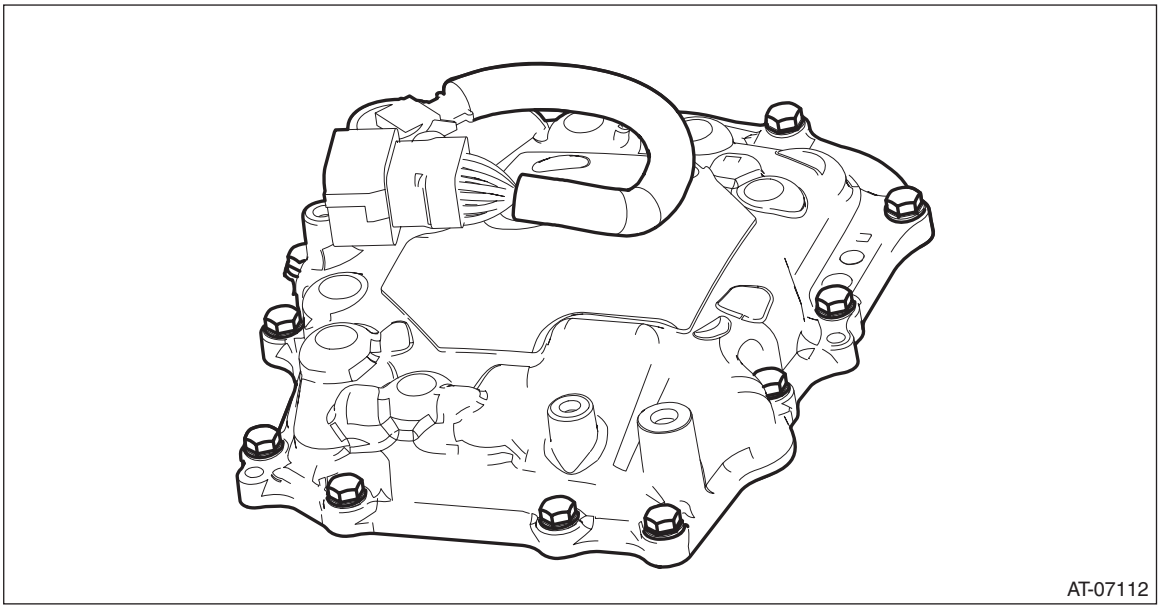
9) Remove the transmission harness connector from the harness stay.
10) Clean the transmission exterior.

11) Fix the ST with tape, and set the ST to the vehicle.

NOTE:
When replacing the control valve body, the sheet is included in the control valve body for repairs.
ST 18761AA010 SHEET SPECIAL TOOL

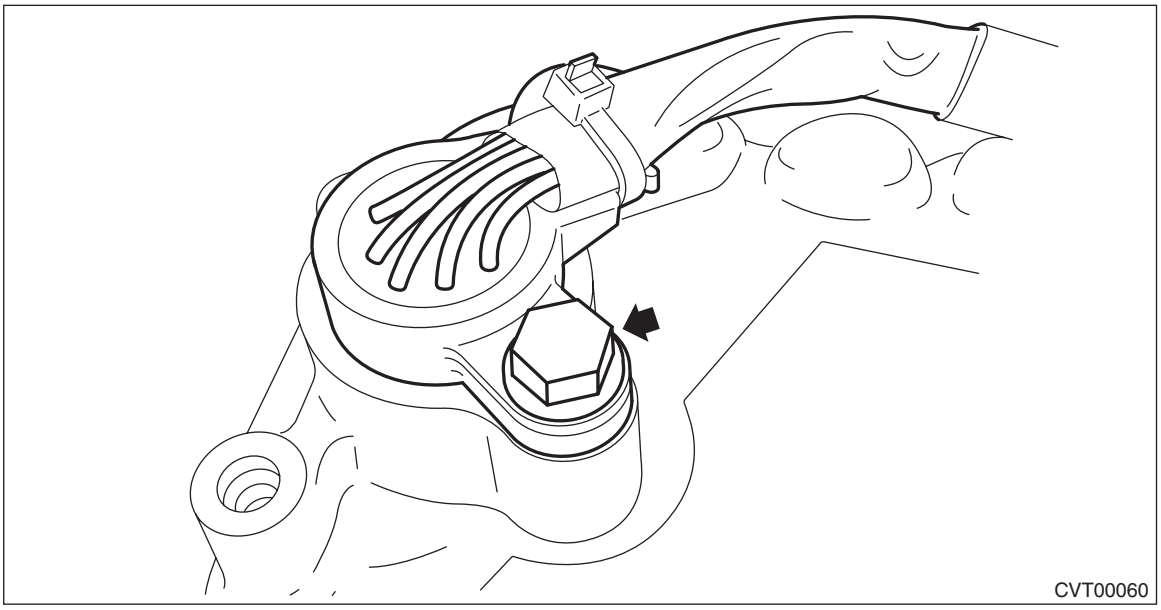


12) Remove the valve cover and gasket.

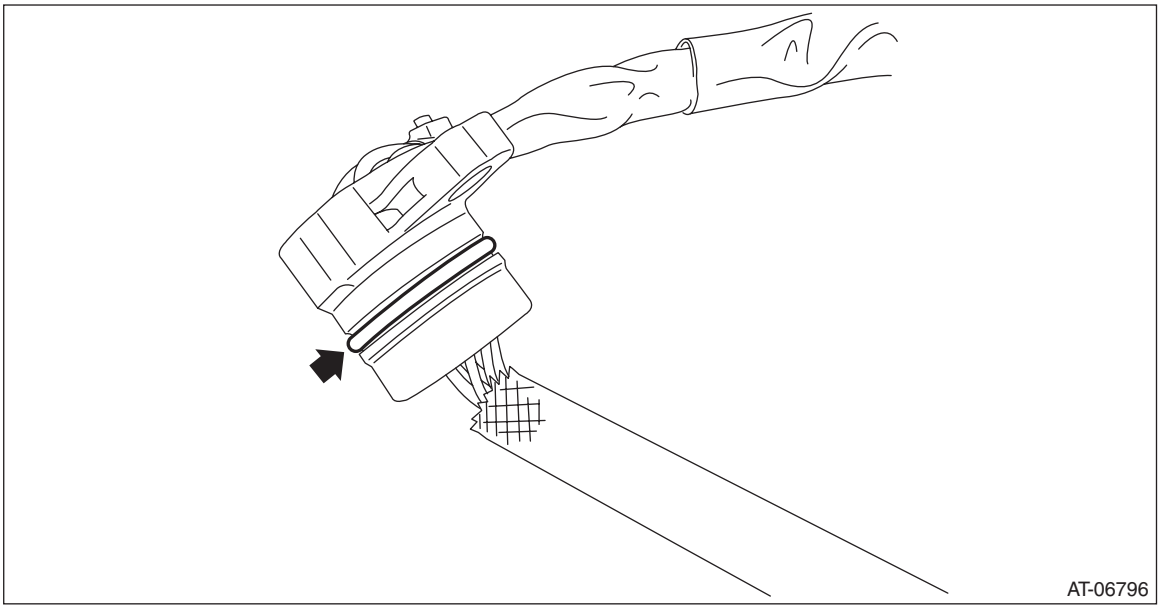


13) Disconnect the harness connector from the control valve body.

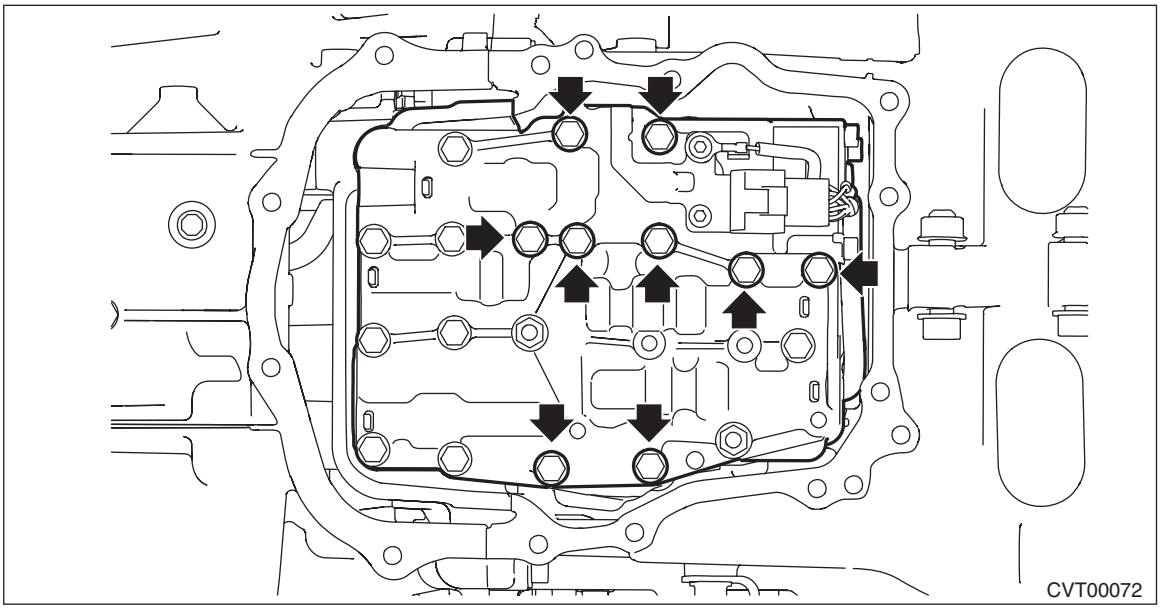
14) Remove the transmission harness from the valve cover.



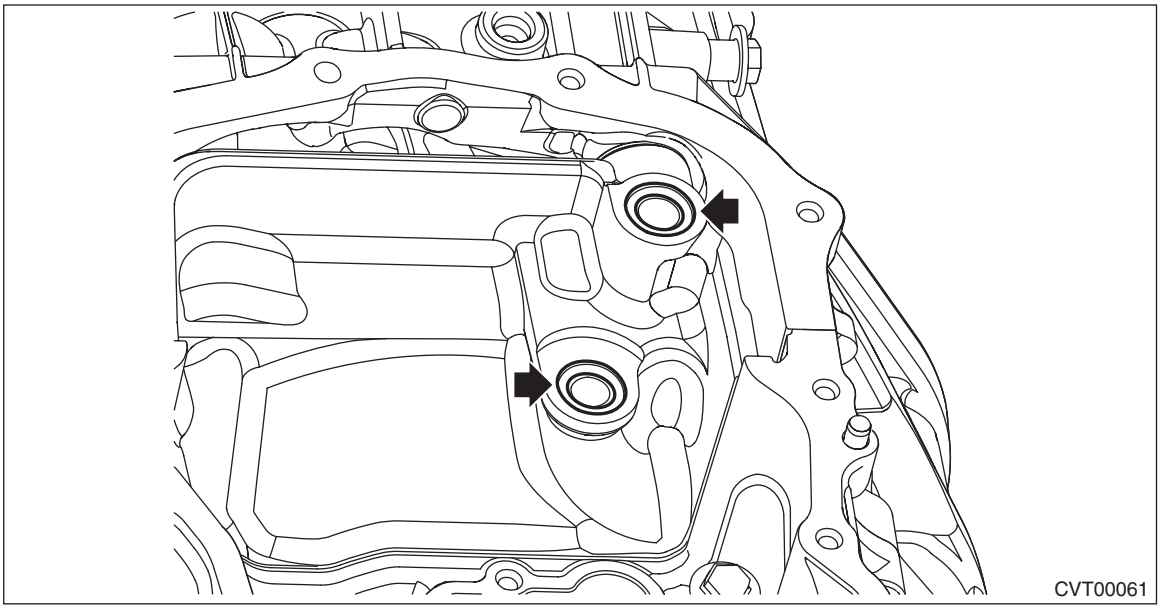
15) Remove the O-ring from the transmission harness.



16) Remove the control valve body.



17) Remove the O-ring from the transmission.



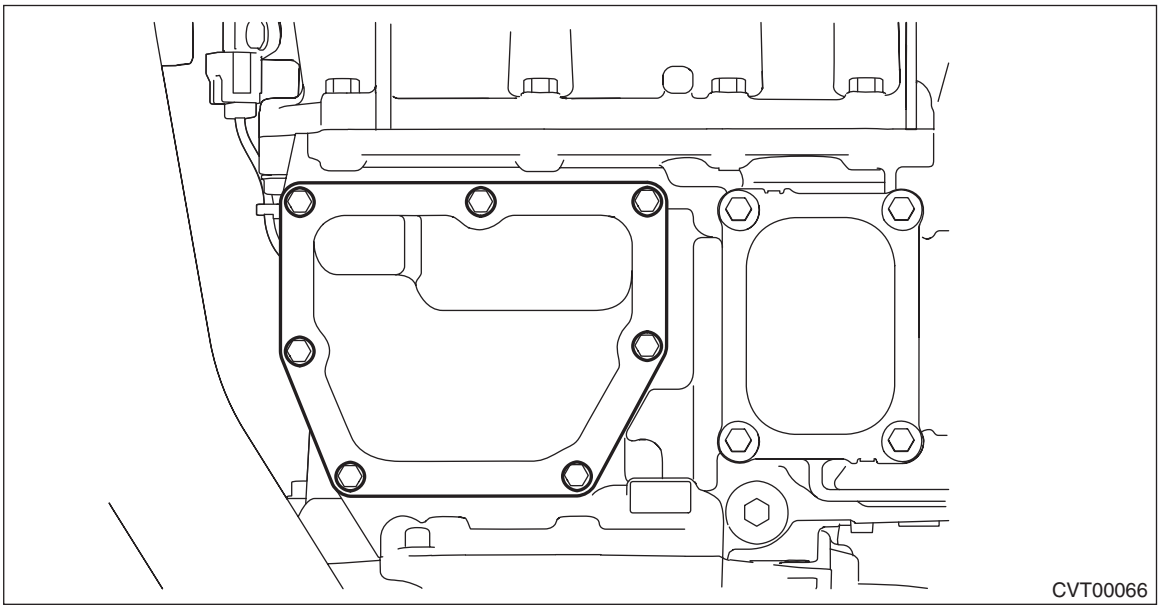
2. OUTPUT CLUTCH CONTROL VALVE BODY

CAUTION:
• Directly after the vehicle has been running or the engine has been idling for a long time, the CVTF is hot. Be careful not to burn yourself.
• Be careful not to spill CVTF on the exhaust pipe to prevent it from emitting smoke or causing a fire. If the CVTF adheres, wipe it off completely.
• Always clean the transmission before removal.

NOTE:
The output clutch control valve body is replaced as an assembly only, because it is a non-disassembly part.
1) Disconnect the ground cable from battery. <Ref. to NT-5, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery, disconnect the ground terminal from 12V engine restart battery sensor.
2) Lift up the vehicle.
3) Remove the oil pan.

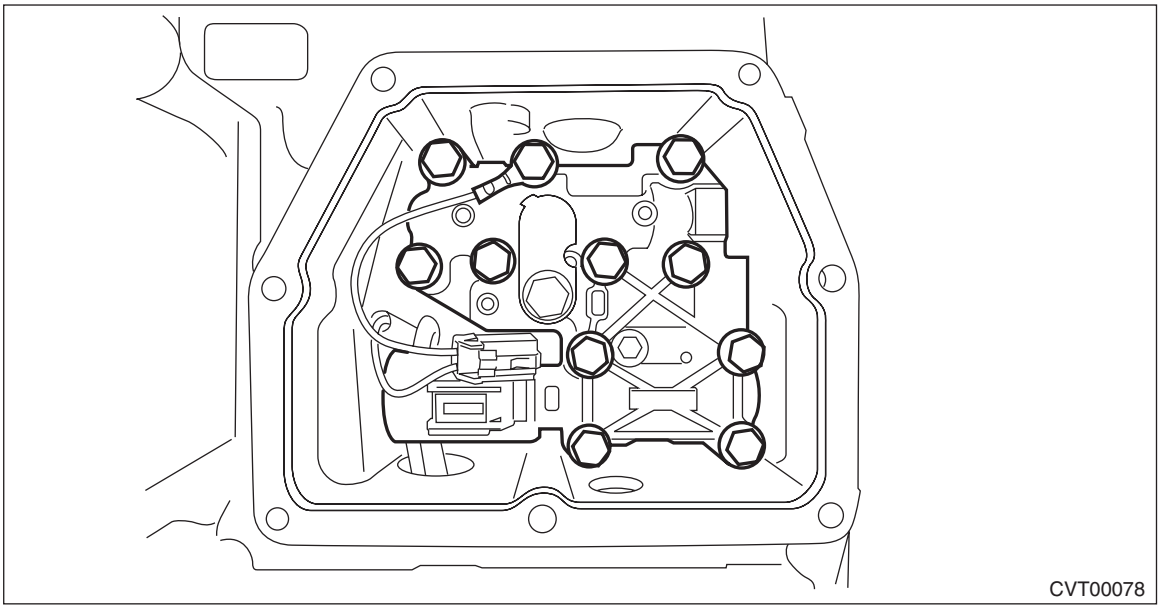
CAUTION:
Be careful not to allow foreign matter such as dust or dirt to enter the oil pan.



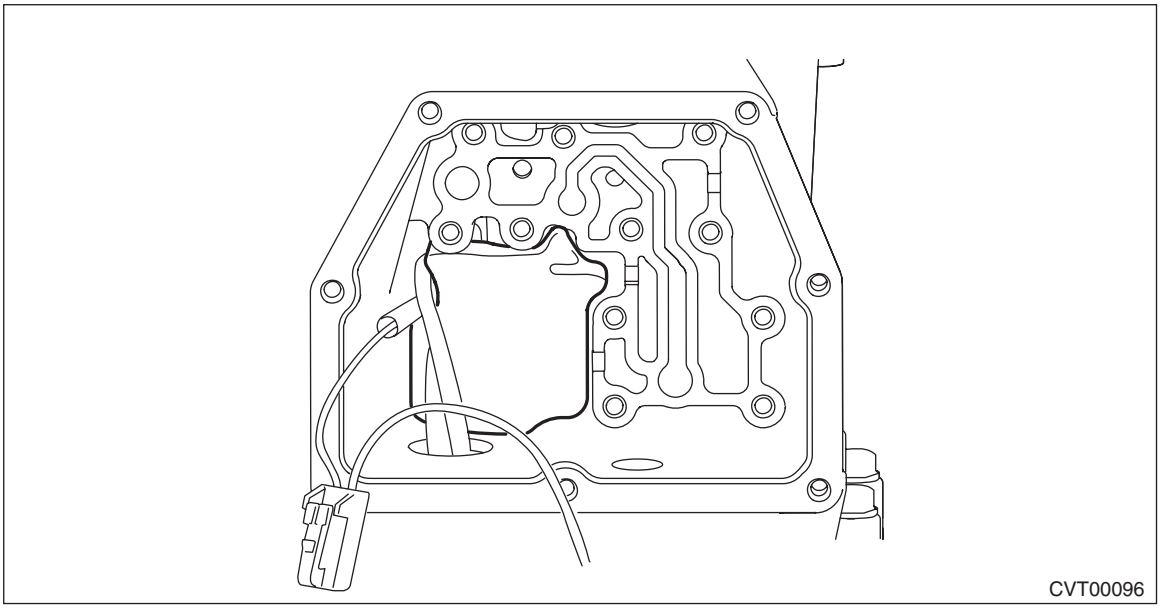
4) Remove the magnet.
5) Disconnect the harness connector from the solenoid.

6) Remove the control valve body and separate plate.

CAUTION:
Do not remove any bolts other than specified.



7) Remove the oil spacer.



B: INSTALLATION

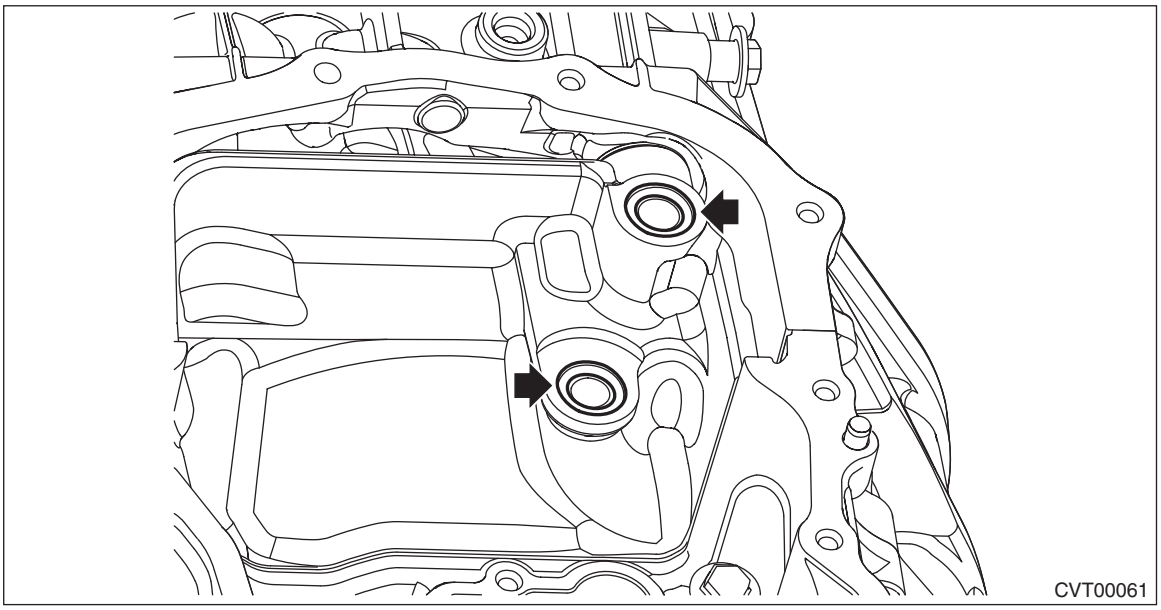
1. MAIN CONTROL VALVE BODY

1) Clean the mating surface of valve cover and transmission side.

CAUTION:
When cleaning the mating surface of the transmission side, be careful not to allow any dust, foreign matter and used liquid gasket to enter the transmission.

2) Check the control valve body for dust and other foreign matter.
3) Install the O-ring.

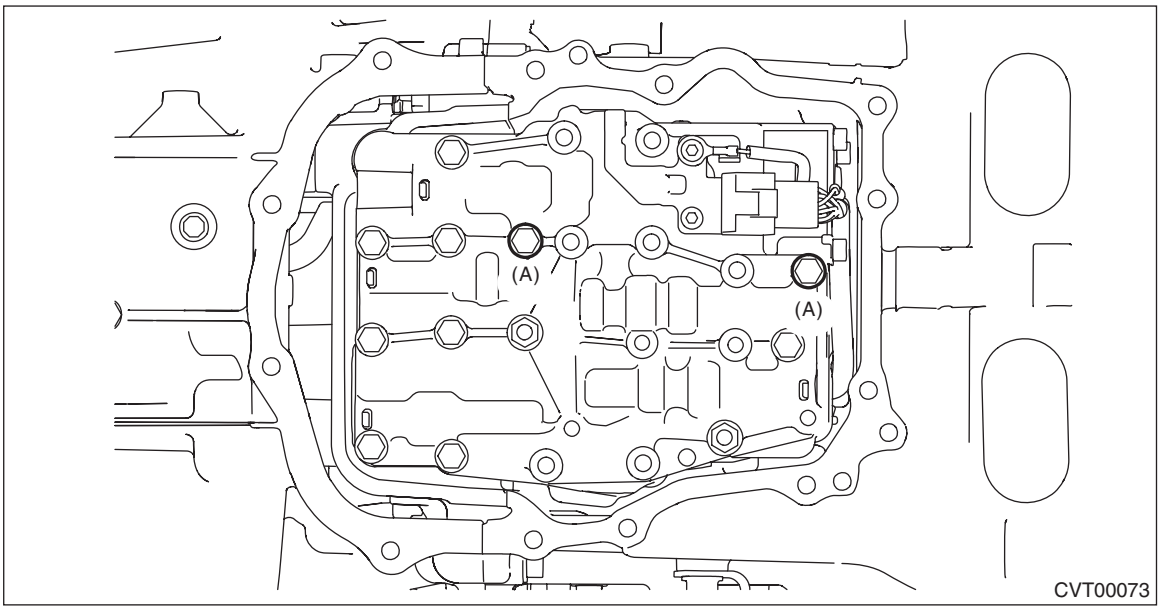
NOTE:
- Use new O-rings.
- Apply CVTF to the O-ring.



4) Install the control valve body.
(1) Install the control valve body to the transmission.

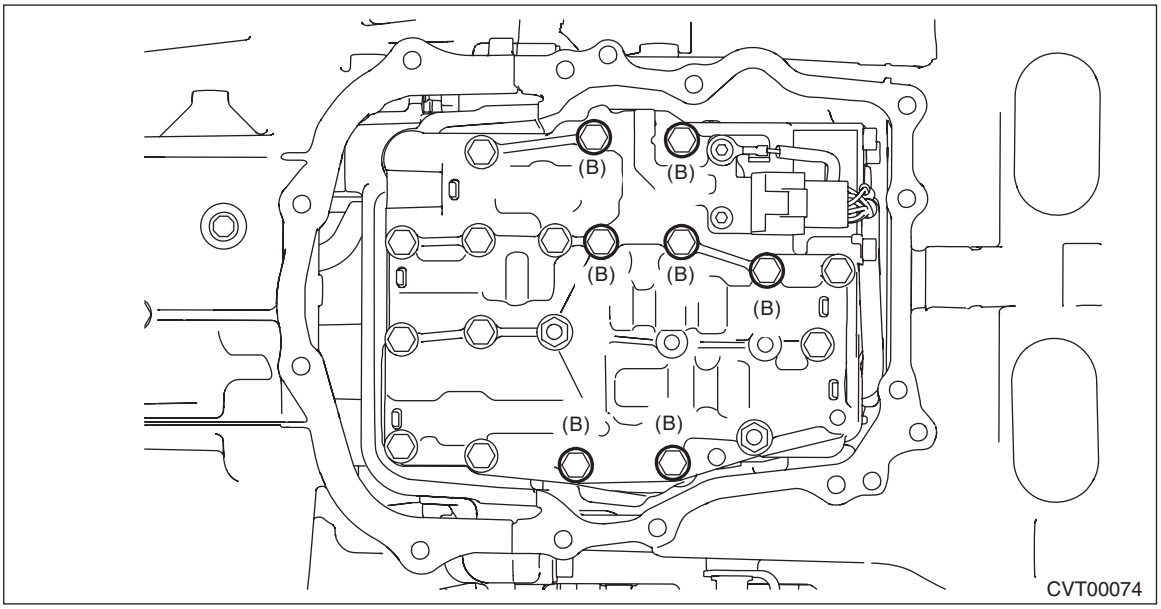
CAUTION:
- **Do not damage the O-ring.**
- **Perform installation so that the O-ring is not displaced.**

(2) Temporarily tighten the bolt (A: silver).



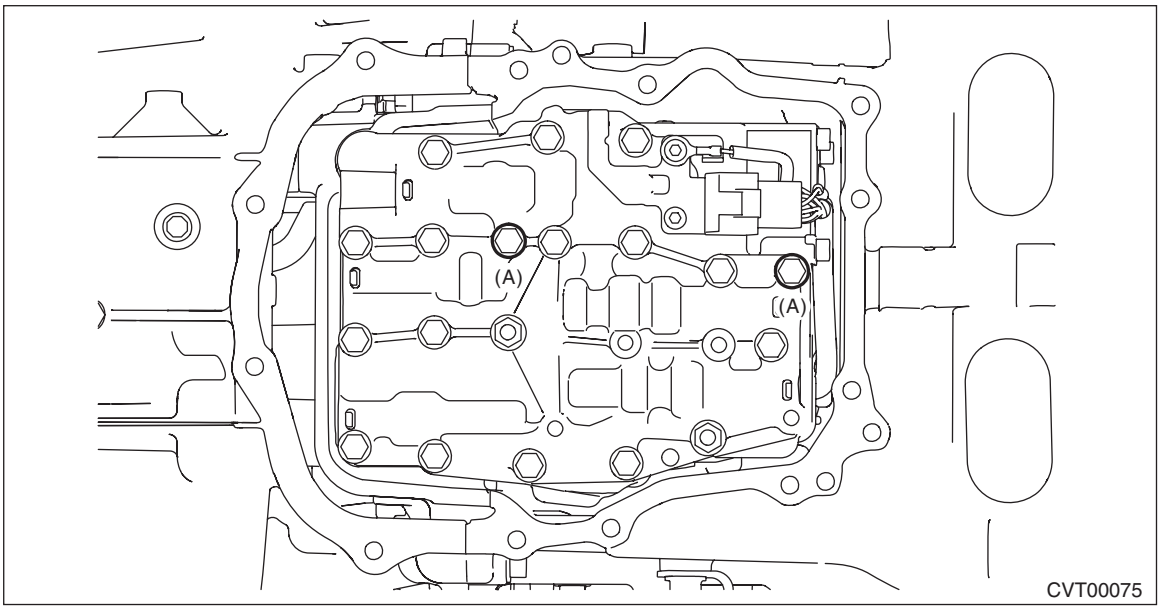
(3) Attach the bolt (B).

Tightening torque:
9 N·m (0.9 kgf-m, 6.6 ft-lb)



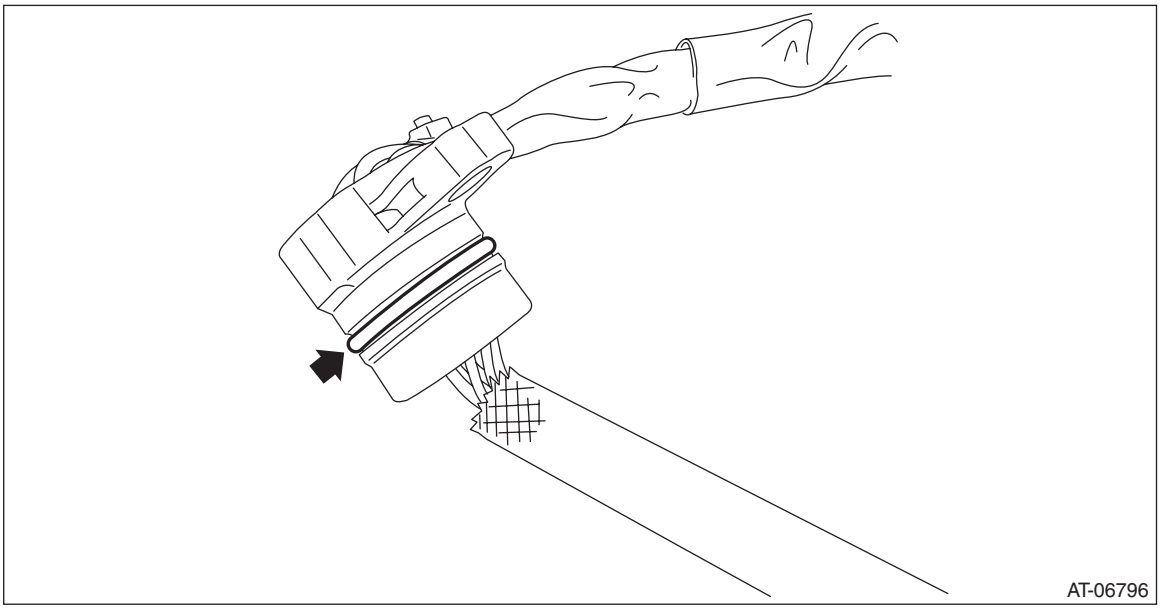
(4) Tighten the bolt (A: silver).

Tightening torque:
9 N·m (0.9 kgf-m, 6.6 ft-lb)



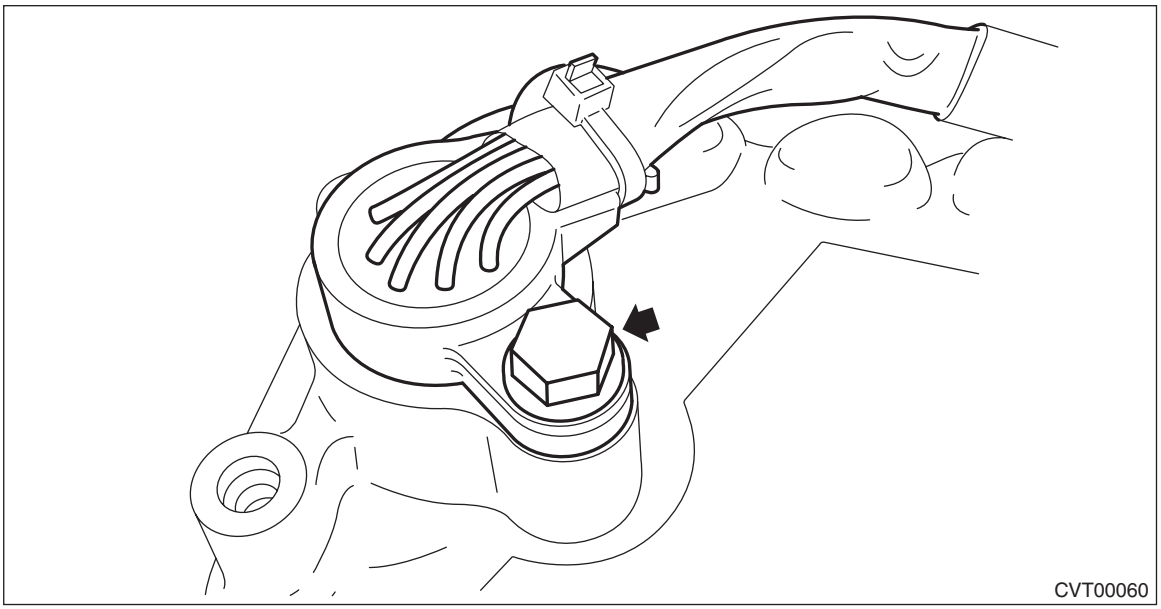
5) Install the O-ring to the transmission harness.

NOTE:
- Use new O-rings.
- Apply CVTF to the O-ring.



6) Install the transmission harness to the valve cover.

Tightening torque:
7 N·m (0.7 kgf-m, 5.2 ft-lb)

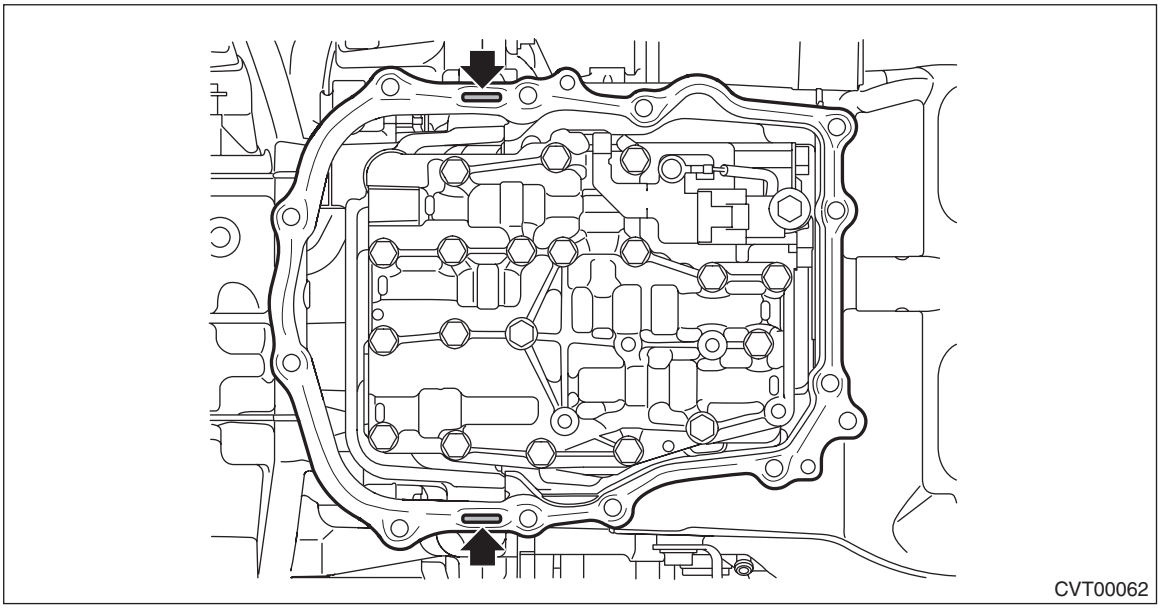


7) Install the gasket to the transmission.

NOTE:
Use a new gasket.

8) Apply liquid gasket to the oval hole of gasket.

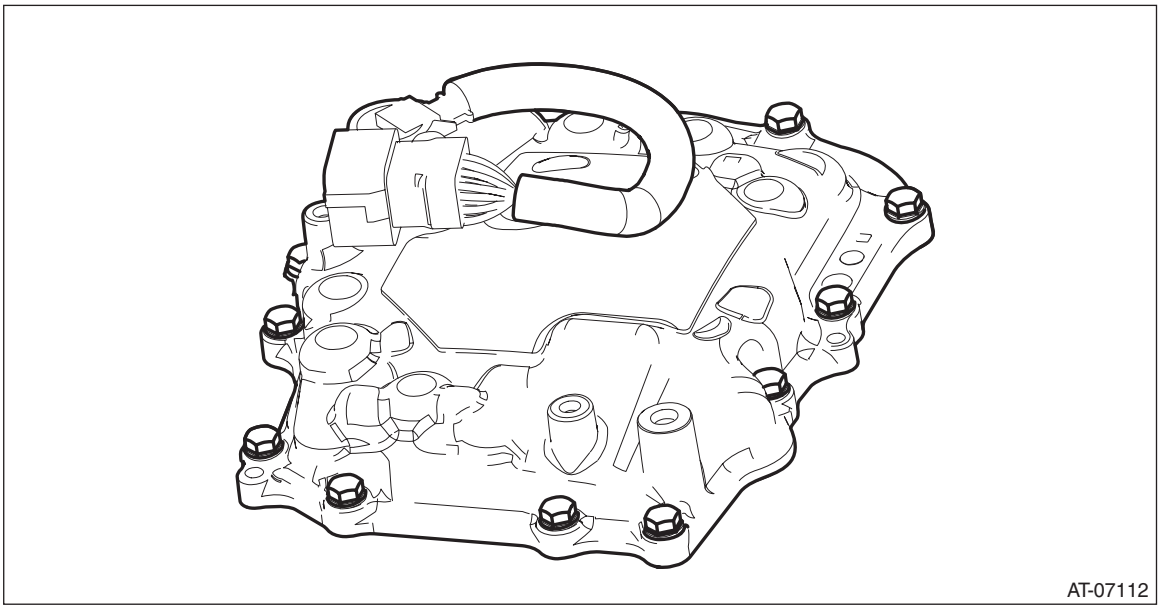
Liquid gasket:
THREE BOND 1215B or equivalent



9) Connect the transmission harness connector to the control valve body, and install the valve cover.

CAUTION:
Be careful not to catch the sheet of the ST.

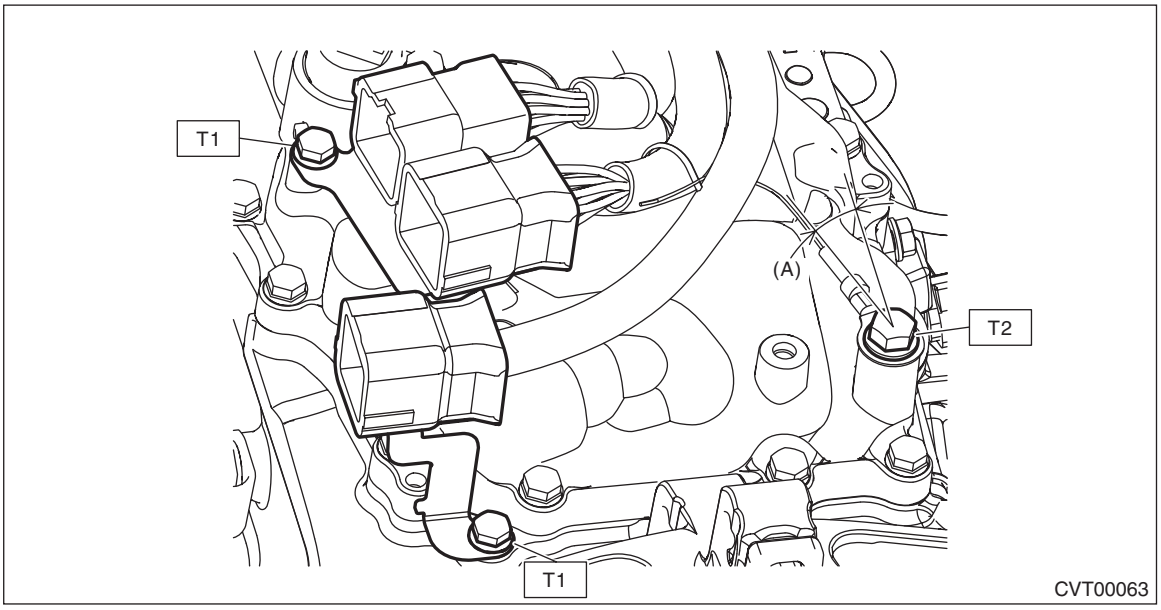
Tightening torque:
9 N·m (0.9 kgf-m, 6.6 ft-lb)



10) Remove the ST (SHEET SPECIAL TOOL).
11) Install the transmission harness connector to the harness stay.
12) Install the transmission harness stay, drive motor harness stay and transmission ground terminal.

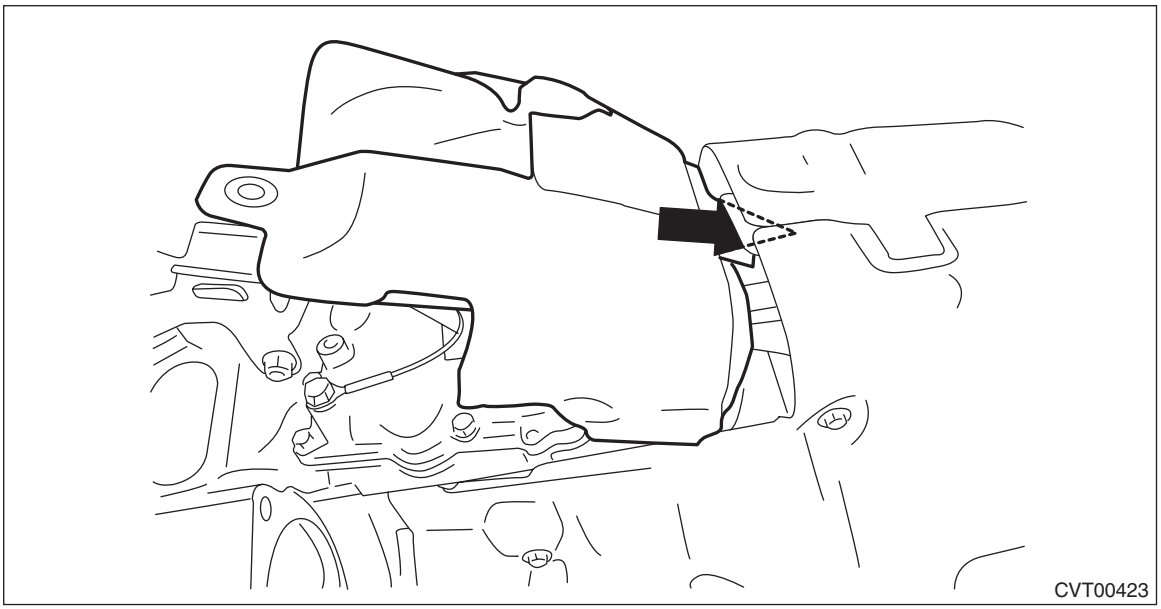
NOTE:
Install the transmission ground terminal in the direction within the range of approx. 30° (A).

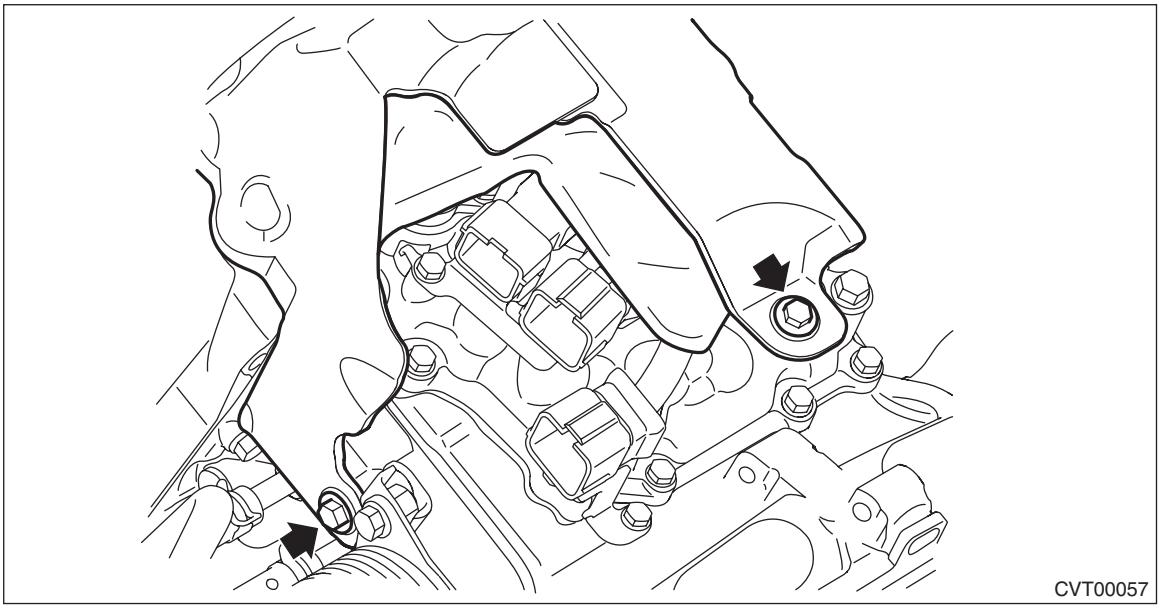
Tightening torque:
T1: 7 N·m (0.7 kgf-m, 5.2 ft-lb)
T2: 14 N·m (1.4 kgf-m, 10.3 ft-lb)



13) Insert the transmission case cover (small) between the transmission case cover (large) and the transmission to install.

Tightening torque:
8 N·m (0.8 kgf-m, 5.9 ft-lb)





14) Install the pitching stopper bracket and transmission radio ground cord.

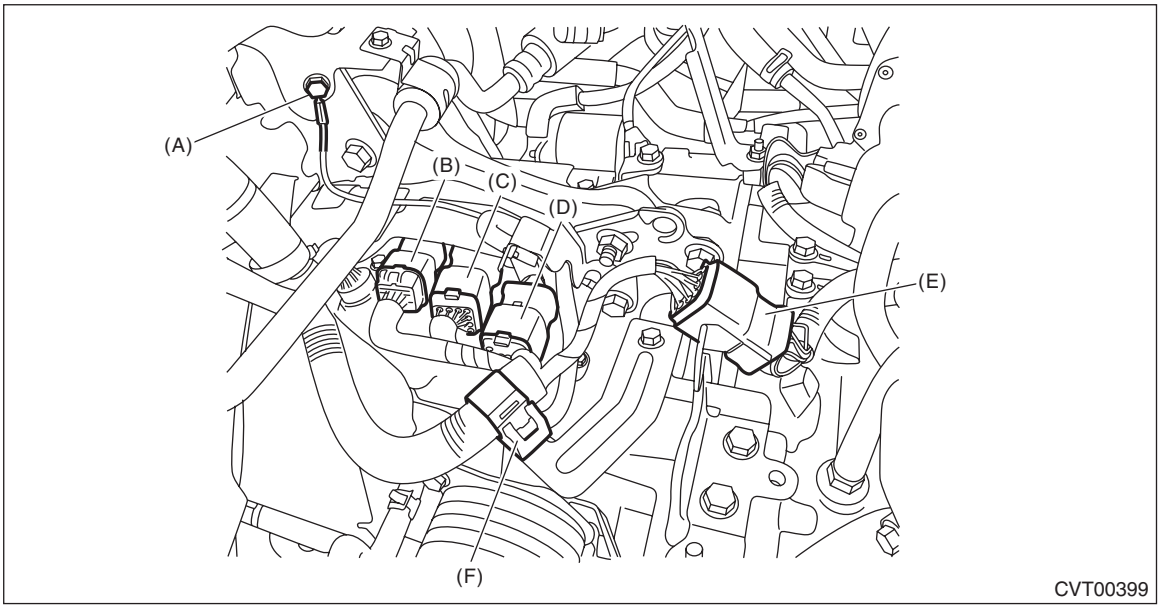
Tightening torque:
41 N·m (4.2 kgf-m, 30.2 ft-lb)

15) Install the air breather hose to the pitching stopper bracket. <Ref. to CVT(TH58A)-173, FRONT DIFFERENTIAL SIDE, INSTALLATION, Air Breather Hose.>

16) Install the pitching stopper. <Ref. to CVT(TH58A)-89, PITCHING STOPPER, INSTALLATION, Transmission Mounting System.>

17) Connect the following connectors and install the harness clip to the bracket.
- Transmission radio ground terminal
- Transmission harness connectors
- Inhibitor harness connector
- Drive motor harness connector
- Engine harness connectors
- Harness clip

Tightening torque:
13 N·m (1.3 kgf-m, 9.6 ft-lb)



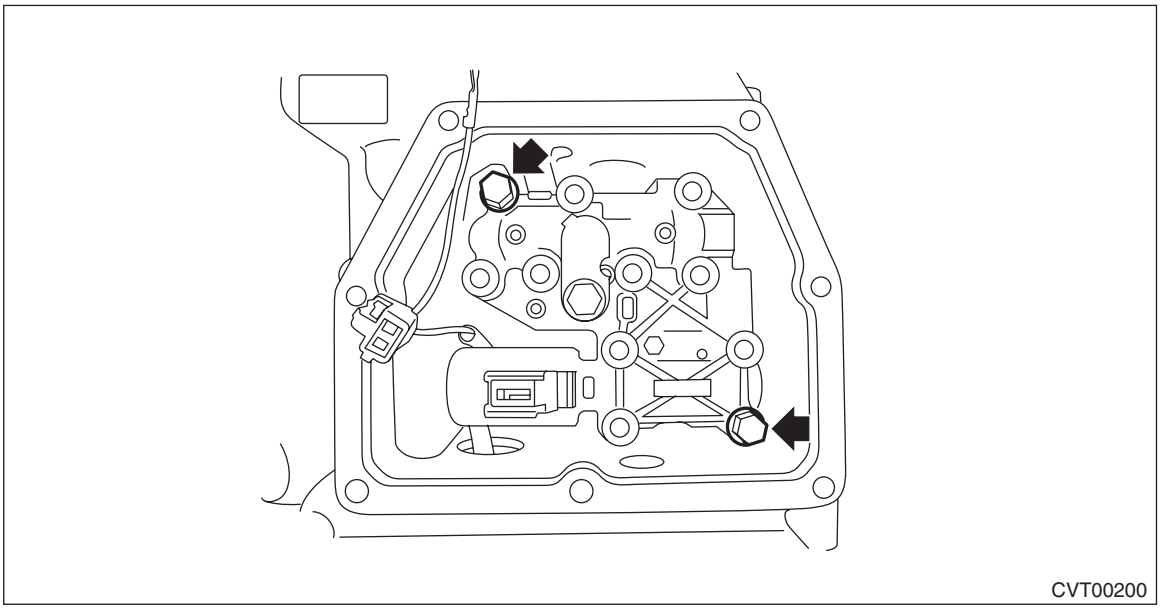
(A) Transmission radio ground terminal
(B) Transmission harness connectors
(C) Inhibitor harness connector
(D) Drive motor harness connector
(E) Engine harness connectors
(F) Harness clip

18) Install the air cleaner case and bracket. <Ref. to IN(H4DO(HEV))-8, INSTALLATION, Air Cleaner Case.>
19) Install the collector cover.
20) Install the 12 volt auxiliary battery ground terminal and ground terminal to the 12V engine restart battery sensor of the 12 volt engine restart battery. <Ref. to NT-5, BATTERY, NOTE, Note.>
21) Refill CVTF to adjust the CVTF level. <Ref. to CVT(TH58A)-41, ADJUSTMENT, CVTF.>
22) Perform the learning again. <Ref. to CVT(HEV)(diag)-26, Learning Control.>

2. OUTPUT CLUTCH CONTROL VALVE BODY

1) Clean the mating surface of oil pan and drive motor case.
2) Clean the magnet.
3) Attach the magnet at the specified position of the oil pan.
4) Install the oil spacer.
5) Install the control valve body.
   (1) Temporarily attach the separator plate and output clutch control valve with two bolts.

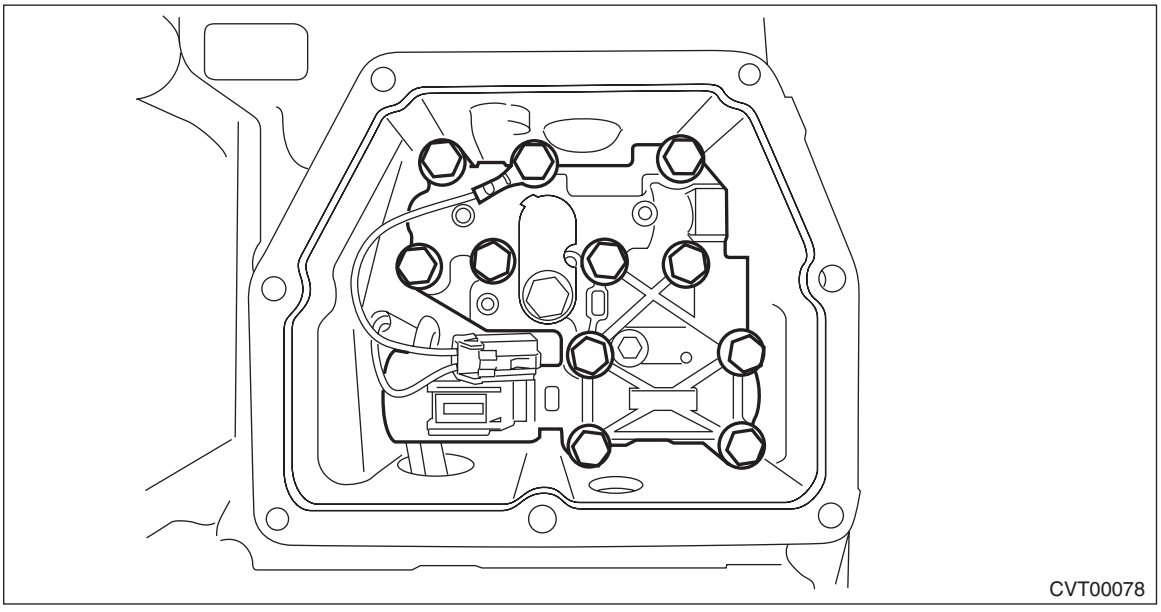
NOTE:
Apply CVTF to the bolt seating surface.



   (2) Install the bolt and the ground terminal.

NOTE:
Apply CVTF to the bolt seating surface.

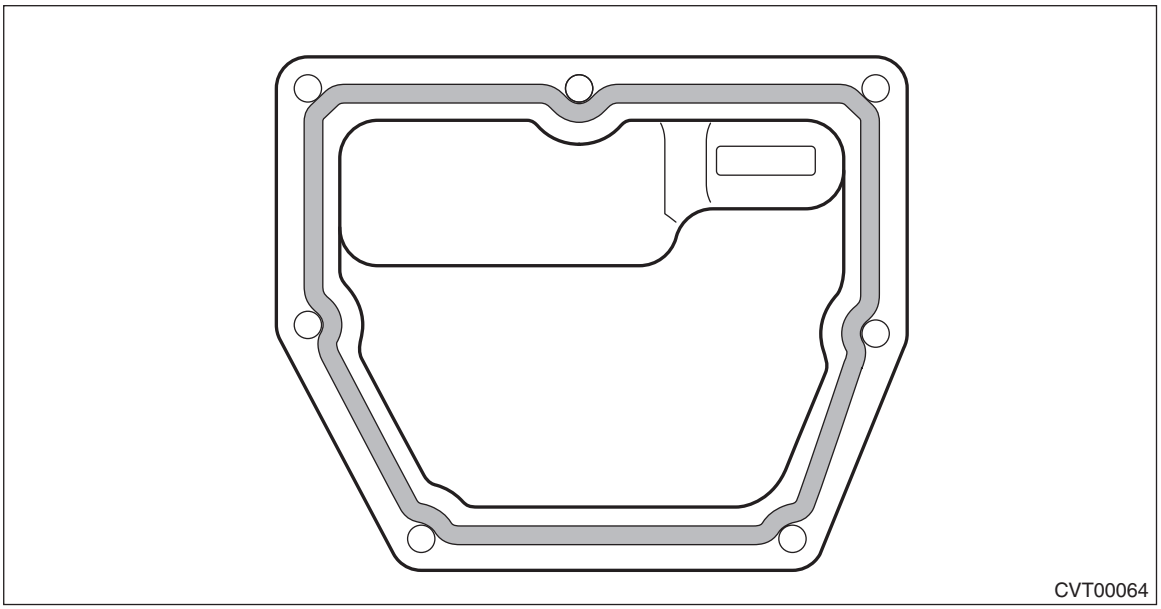
Tightening torque:
9 N·m (0.9 kgf-m, 6.6 ft-lb)



   (3) Install the harness connector to the solenoid.

6) Apply liquid gasket all around the oil pan mating surface seamlessly.

Liquid gasket:
THREE BOND 1217B (Part No. K0877YA020) or equivalent



7) Install the oil pan by equally tightening the bolts.

Tightening torque:
5 N·m (0.5 kgf-m, 3.7 ft-lb)

8) Install the 12 volt auxiliary battery ground terminal and ground terminal to the 12V engine restart battery sensor of the 12 volt engine restart battery. <Ref. to NT-5, BATTERY, NOTE, Note.>
9) Refill CVTF to adjust the CVTF level. <Ref. to CVT(TH58A)-41, ADJUSTMENT, CVTF.>
10) Perform the learning five times. <Ref. to CVT(HEV)(diag)-26, Learning Control.>

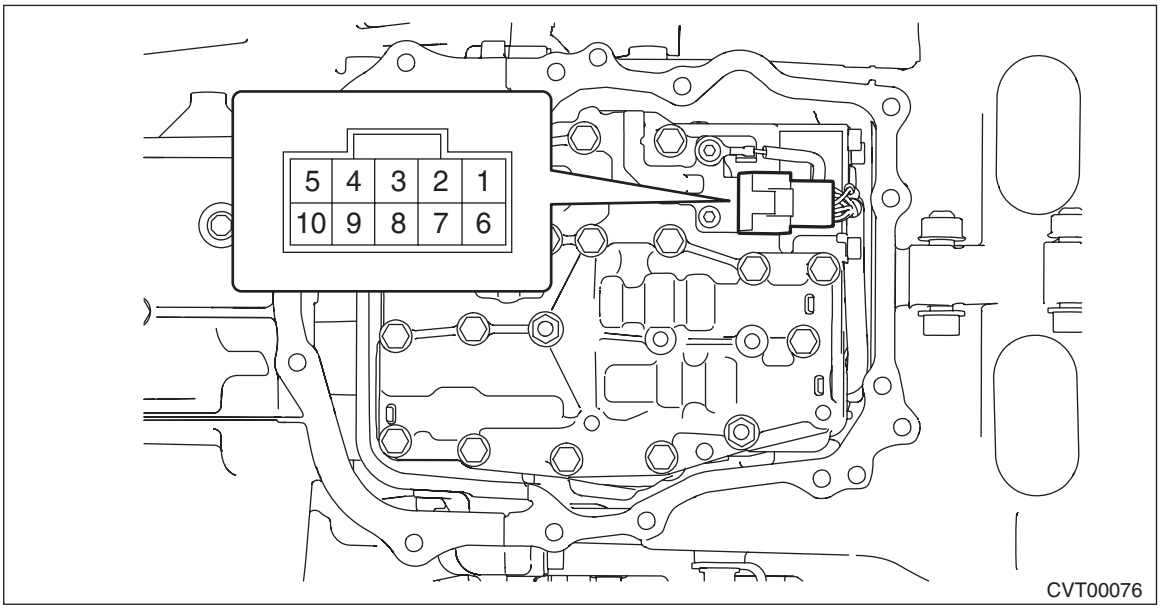
C: INSPECTION

- Check each part for damage or dust.
- Measure the resistance of each solenoid, sensor and ground wire.

NOTE:
Measurement should be performed at a temperature of 20°C (68°F).

1. MAIN CONTROL VALVE BODY

- **Solenoid**



Solenoid	Terminal No.	Standard (Ω)
Primary UP solenoid	No. 2 — control valve body	Approx. 10 — 13.5 Ω
Secondary solenoid	No. 3 — control valve body	Approx. 5 — 7 Ω
F&R clutch solenoid	No. 4 — control valve body	Approx. 4 — 6 Ω
Primary DOWN solenoid	No. 7 — control valve body	Approx. 10 — 13.5 Ω
Lock-up duty solenoid	No. 9 — control valve body	Approx. 10 — 13.5 Ω
AWD solenoid	No. 10 — control valve body	Approx. 2 — 4.5 Ω

- **Oil temperature sensor**

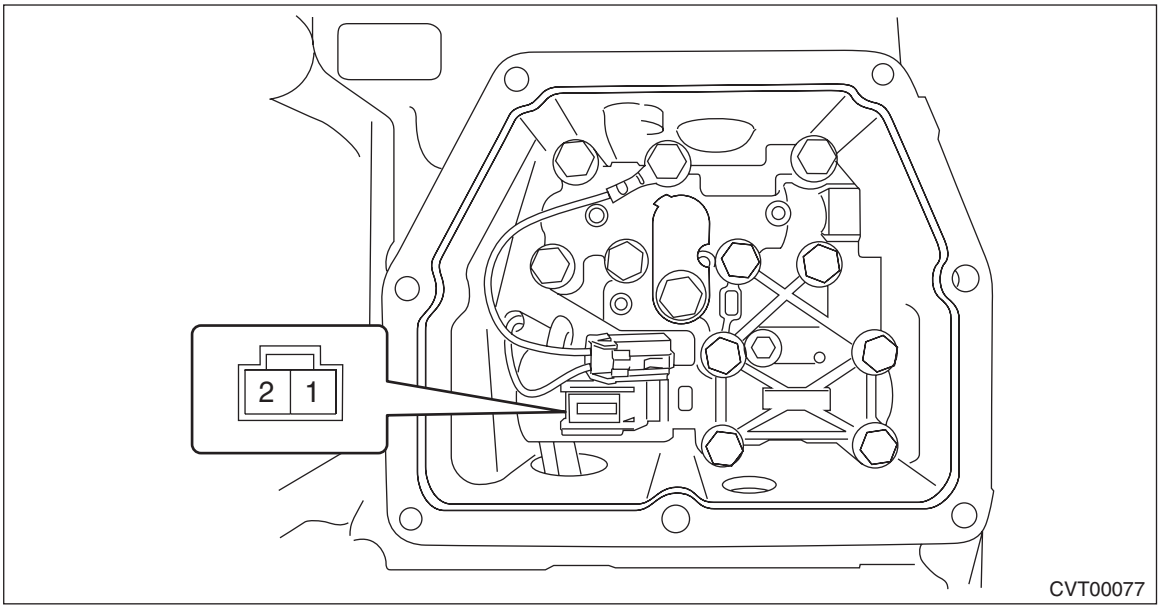
Sensor	Terminal No.	Standard (Ω) At 20°C (68°F)
Oil temperature sensor	No. 1 — No. 6	Approx. 2.5 kΩ

- **Transmission ground**

Terminal No.	Standard (Ω)
No. 8 — control valve body	Less than 1 Ω

2. OUTPUT CLUTCH CONTROL VALVE BODY

- **Solenoid**



Solenoid	Terminal No.	Standard (Ω)
Output clutch solenoid	No. 1 — No. 2	Approx. 4 — 6 Ω

22.Electric Fluid Pump

A: REMOVAL

WARNING:
The hybrid system includes a high voltage circuit. Mishandling could cause accidents such as electric shock or leak. Always check "CAUTION (HYBRID SYSTEM)" and perform the proper operation. <Ref. to PC-7, CAUTION (HYBRID SYSTEM), Precaution.>

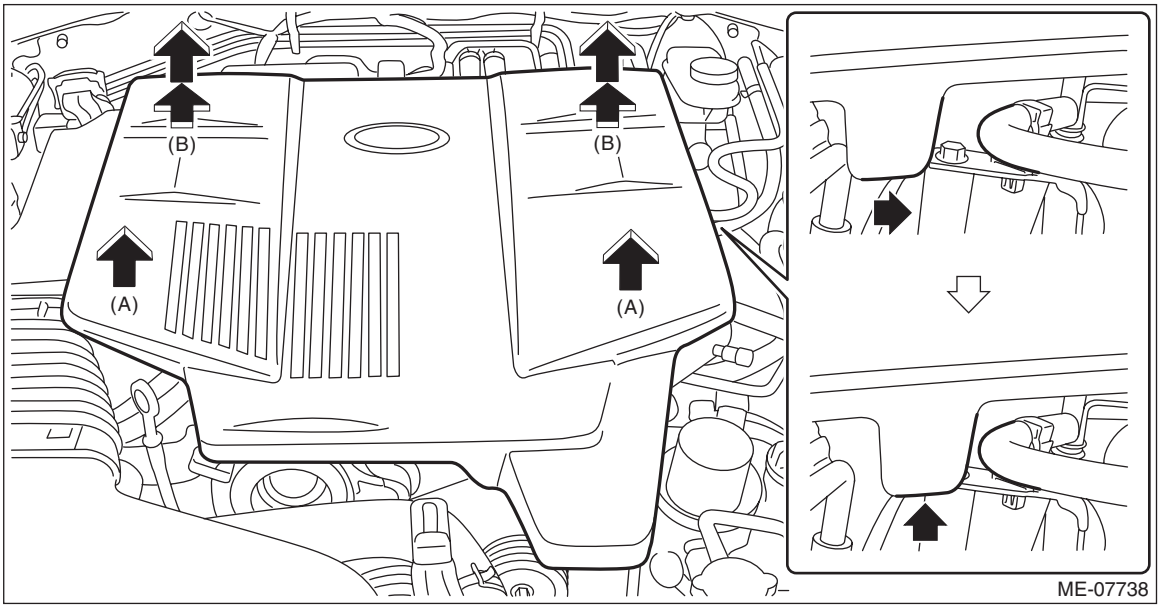
CAUTION:
• Directly after the vehicle has been running or the engine has been idling for a long time, the CVTF is hot. Be careful not to burn yourself.
• Be careful not to spill CVTF on the exhaust pipe to prevent it from emitting smoke or causing a fire. If the CVTF adheres, wipe it off completely.
• Always clean the transmission before removal.

NOTE:
The electric oil pump is replaced as an assembly only, because it is a non-disassembly part.
1) Disconnect the ground cable from battery. <Ref. to NT-5, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery, disconnect the ground terminal from 12V engine restart battery sensor.
2) Remove the service disconnect plug. <Ref. to HEV-15, REMOVAL, Service Plug.>

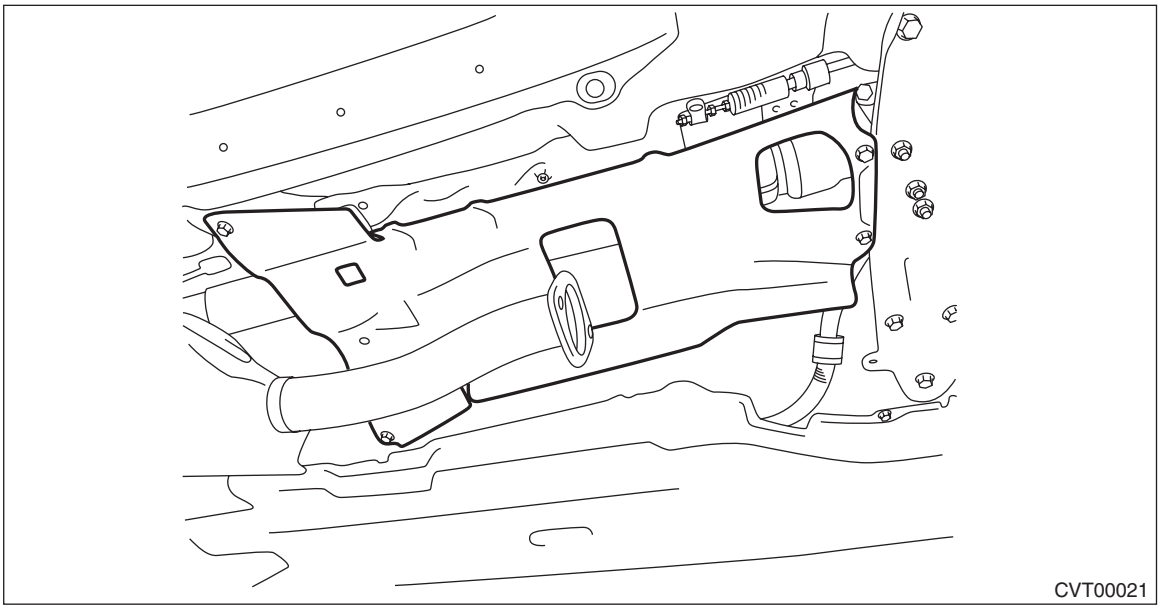
WARNING:
After pulling out the service disconnect plug, a high voltage is accumulated in the condenser inside the inverter. If touching the high voltage parts, wiring harness, terminals and connectors is required, wait for 10 minutes before starting the operation.
3) Remove the collector cover.
(1) Pull up the two points at the front of collector cover (A).
(2) Pull up the two points at the rear of collector cover (B) while moving them rearward.

NOTE:
Be careful not to contact the fuel delivery tube when moving the collector cover rearward.

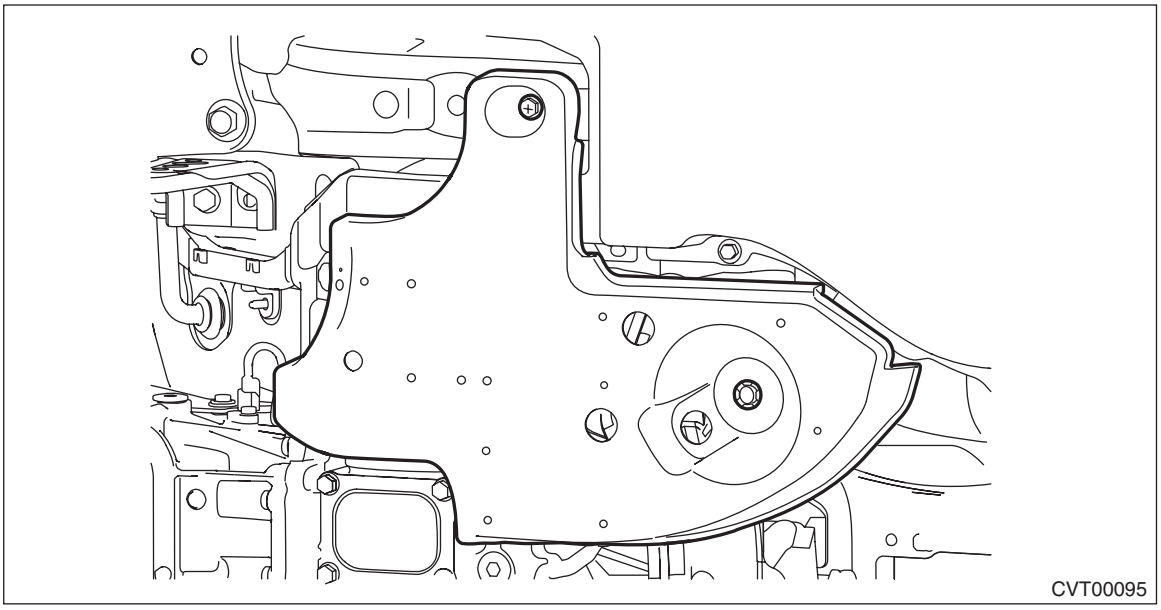


4) Remove the air cleaner case. <Ref. to IN(H4DO(HEV))-6, REMOVAL, Air Cleaner Case.>
5) Remove the pitching stopper. <Ref. to CVT(TH58A)-87, PITCHING STOPPER, REMOVAL, Transmission Mounting System.>
6) Lift up the vehicle.
7) Remove the center exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-18, REMOVAL, Rear Exhaust Pipe.>

8) Remove the center exhaust cover.



9) Remove the under cover - cable.



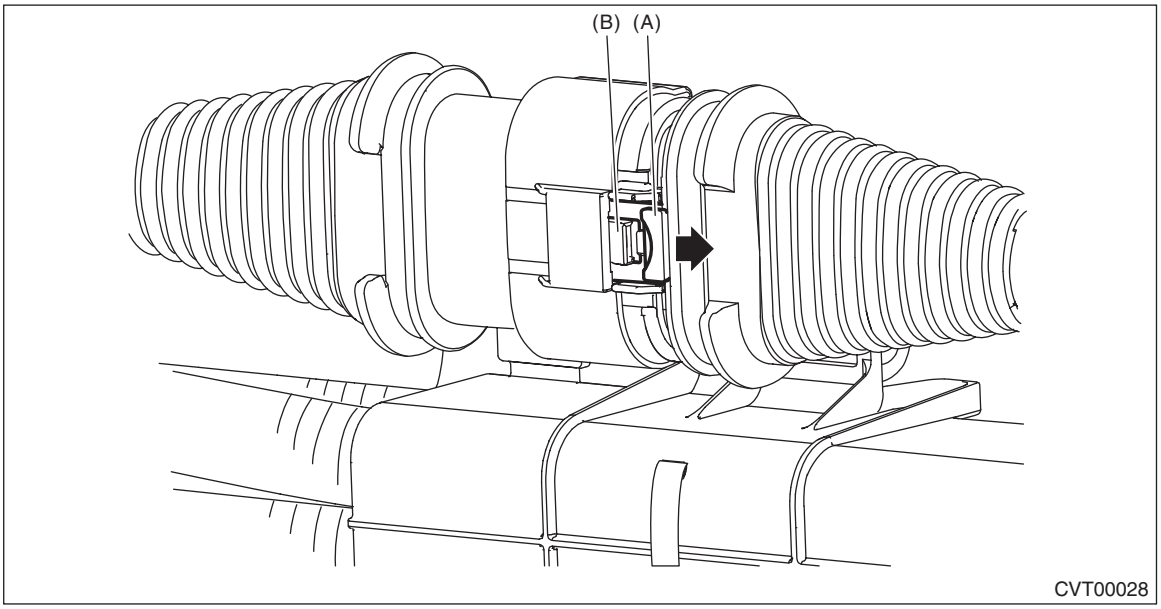
10) Remove the under cover - rear LH. <Ref. to EI-34, REMOVAL, Floor Under Protector.>

11) Remove the electric oil pump harness connector.

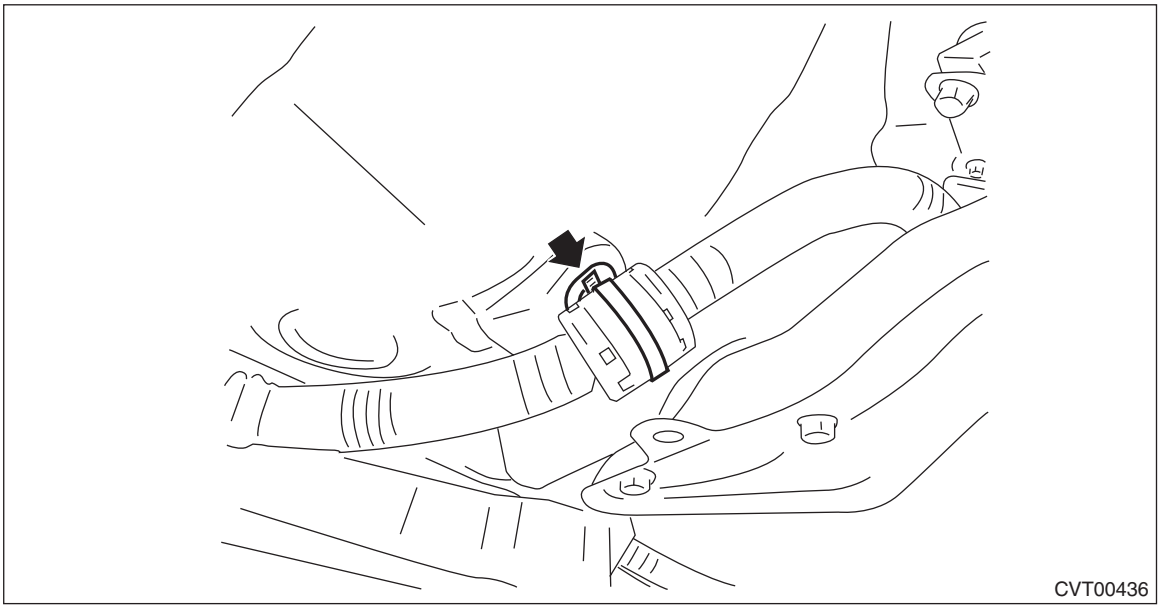
WARNING:
Be sure to wear insulated gloves.

CAUTION:
• To prevent intrusion of foreign matter such as oil, water and dirt after removal, cover the female side connector with a clean cloth or a plastic bag and cover the coupler portion of the male side connector with insulating tape.
• When foreign matter is found, remove it while paying attention not to damage the electrode inside. If water is attached, dry it completely.
• When disconnecting the electric oil pump harness connector, do not apply excessive force or damage it.

(1) Pull the slide lock (A) in the direction of arrow.
(2) Disconnect the harness connector by pushing the claw (B).

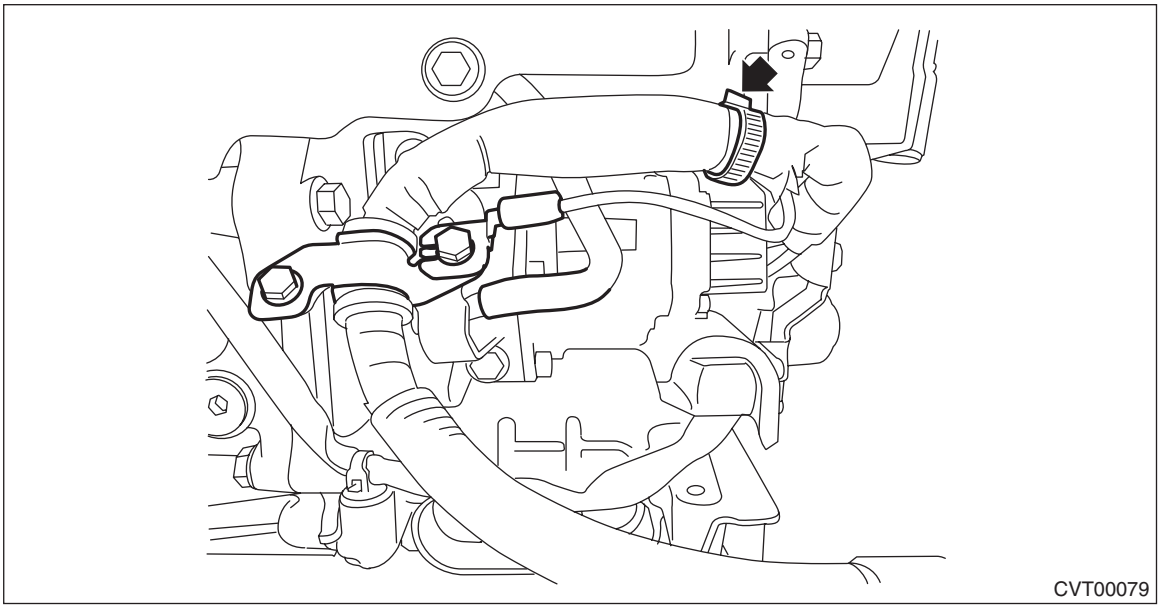


(3) Release the clip of the electric oil pump harness from the vehicle.

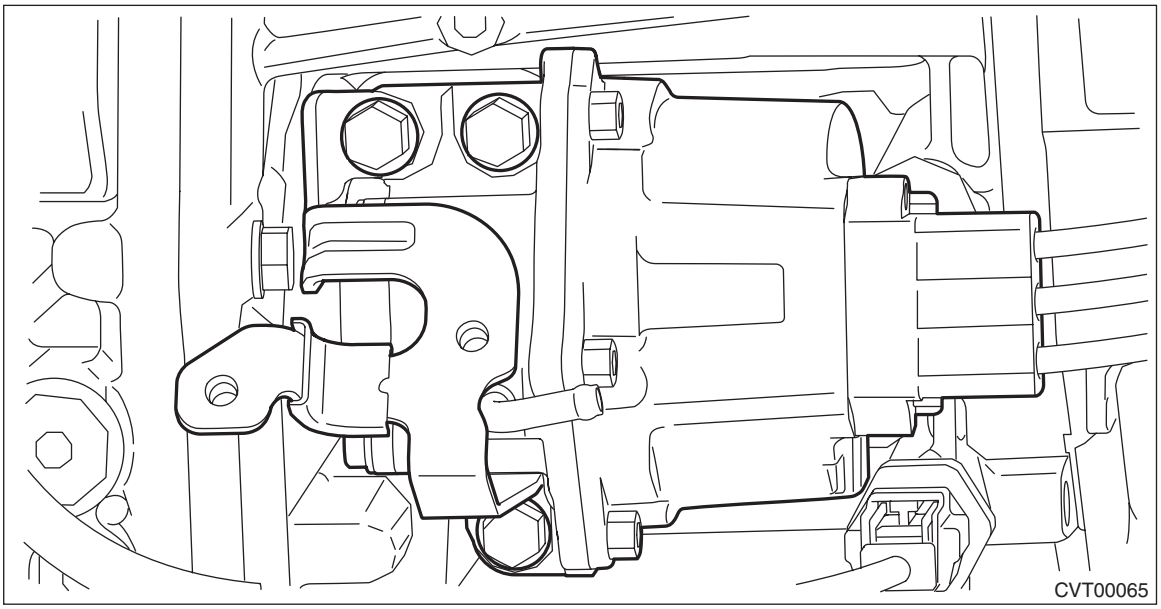


12) Set the transmission jack under the transmission.
13) Remove the rear crossmember. <Ref. to CVT(TH58A)-88, TRANSMISSION REAR CROSSMEMBER AND REAR CUSHION RUBBER, REMOVAL, Transmission Mounting System.>

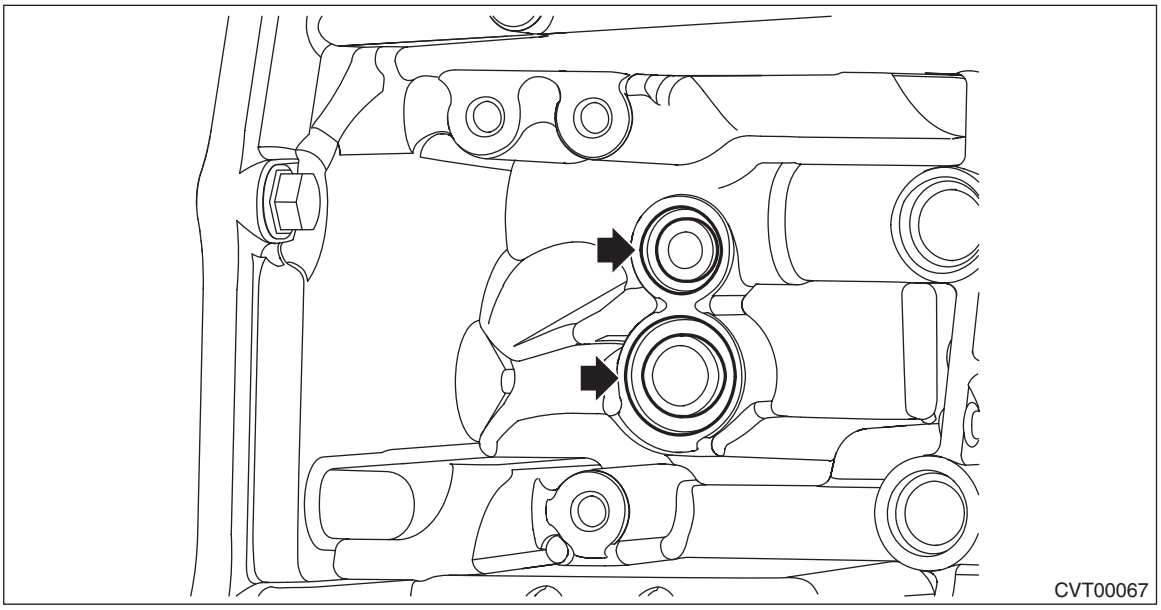
14) Lower the transmission.
15) Release the harness clips, then remove the air breather hose, harness bracket and ground terminal.



16) Remove the electric oil pump assembly and the harness bracket COMP.



17) Remove the O-ring.



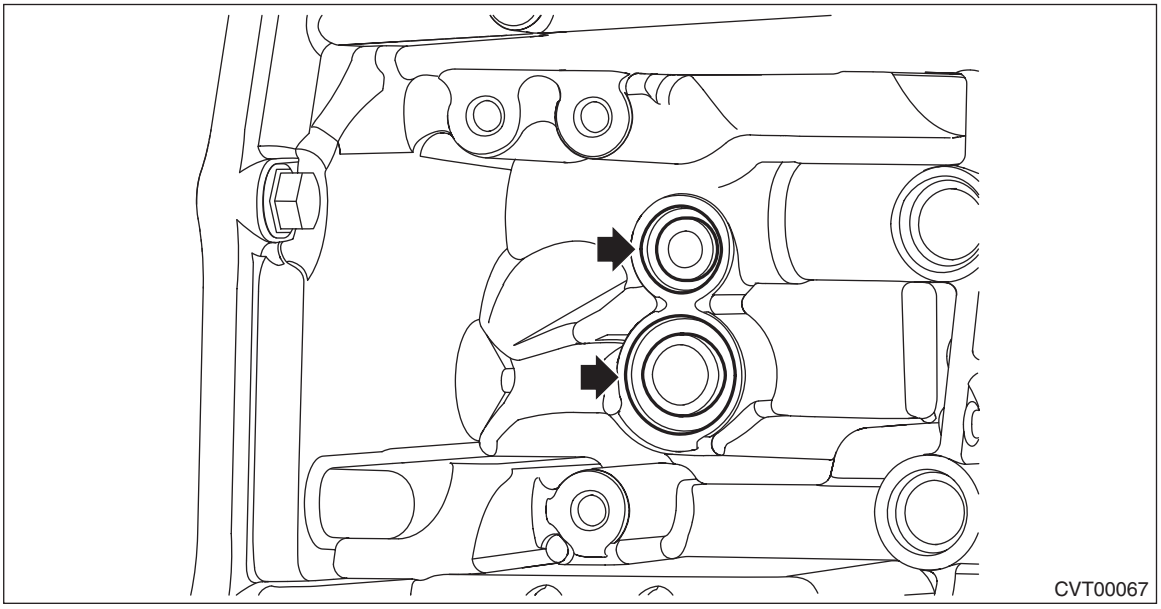
B: INSTALLATION

WARNING:
The hybrid system includes a high voltage circuit. Mishandling could cause accidents such as electric shock or leak. Always check "CAUTION (HYBRID SYSTEM)" and perform the proper operation. <Ref. to PC-7, CAUTION (HYBRID SYSTEM), Precaution.>

CAUTION:
- **Do not apply excessive force or damage the electric oil pump harness.**
- **Be careful not to twist the electric oil pump harness.**
- **When cleaning the mating surface of the transmission side, be careful not to allow any dust or dirt to enter the transmission.**

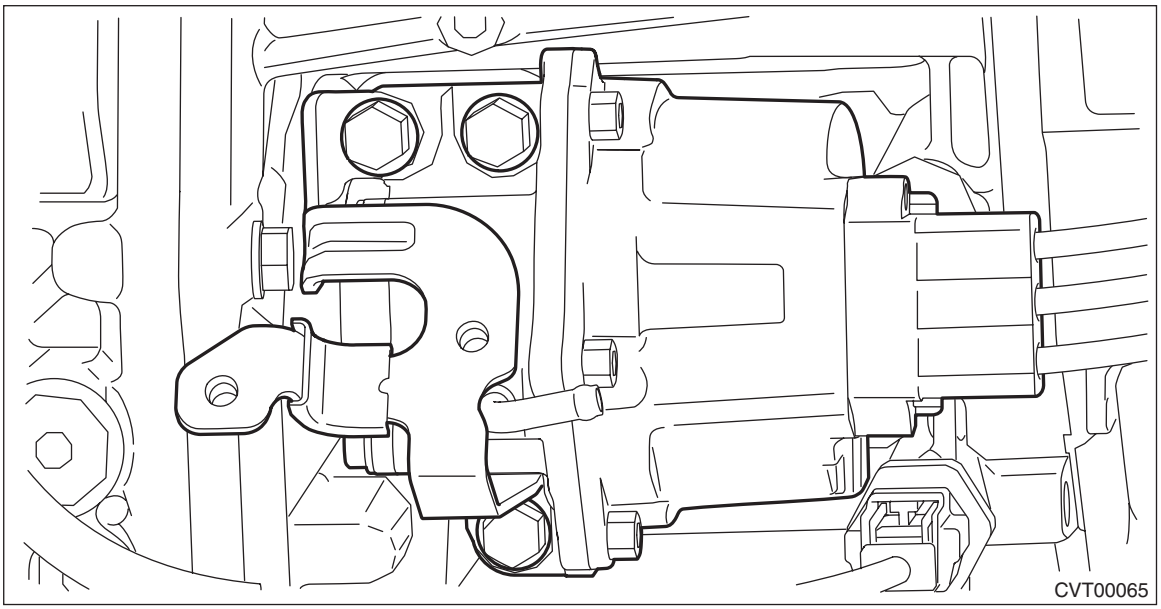
1) Install the O-ring to the transmission case.

NOTE:
- Use new O-rings.
- Apply CVTF to the O-ring.



2) Install the electric oil pump assembly and the harness bracket COMP.

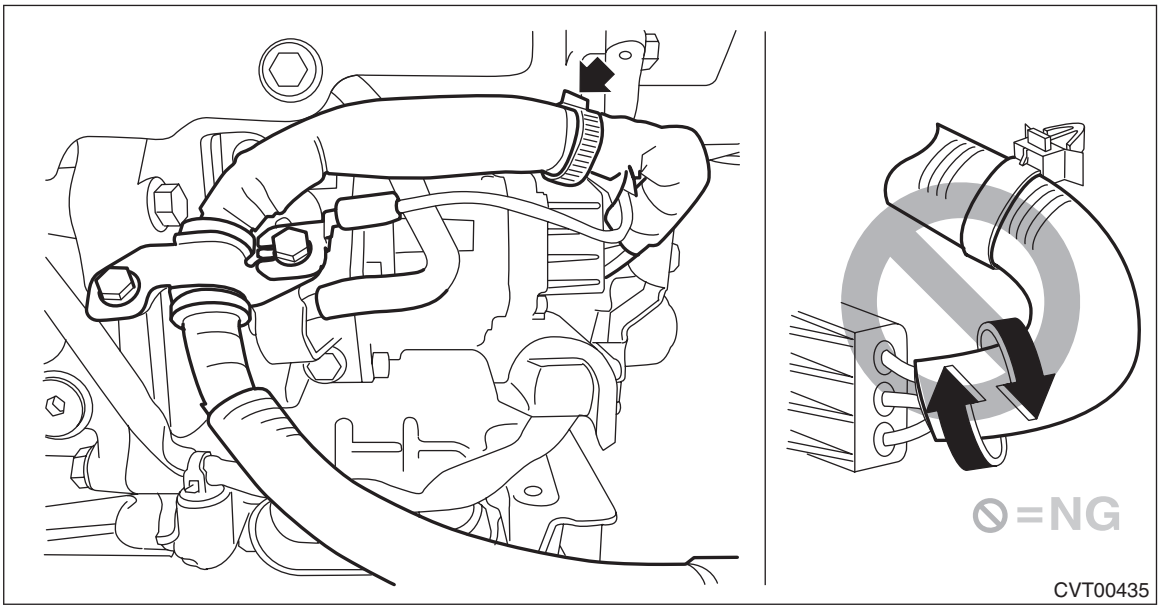
Tightening torque:
22 N·m (2.2 kgf-m, 16.2 ft-lb)



3) Install the harness clips to the bracket, then install the air breather hose, electric oil pump harness, harness bracket and ground terminal.

CAUTION:
When installing the electric oil pump harness clips, be careful not to twist the electric oil pump harness by 360°.

Tightening torque:
8 N·m (0.8 kgf-m, 13.3 ft-lb)



4) Raise the transmission, and install the rear crossmember. <Ref. to CVT(TH58A)-90, TRANSMISSION REAR CROSSMEMBER AND REAR CUSHION RUBBER, INSTALLATION, Transmission Mounting System.>
5) Install the exhaust cover.

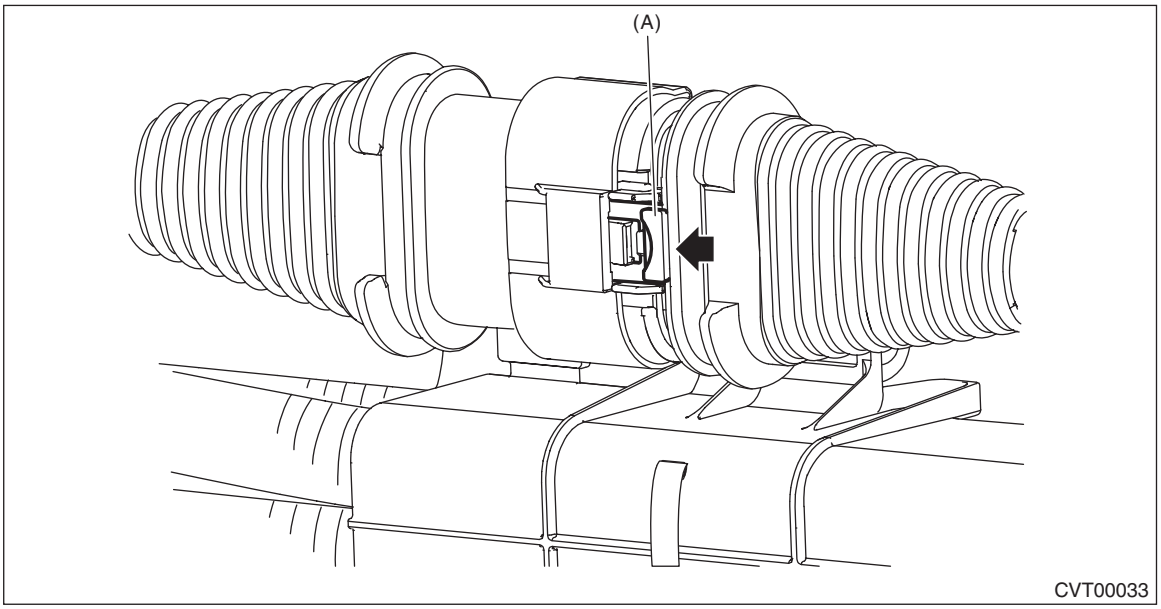
Tightening torque:
18 N·m (1.8 kgf-m, 13.3 ft-lb)

6) Install the electric oil pump harness connector.

WARNING:
Be sure to wear insulated gloves.

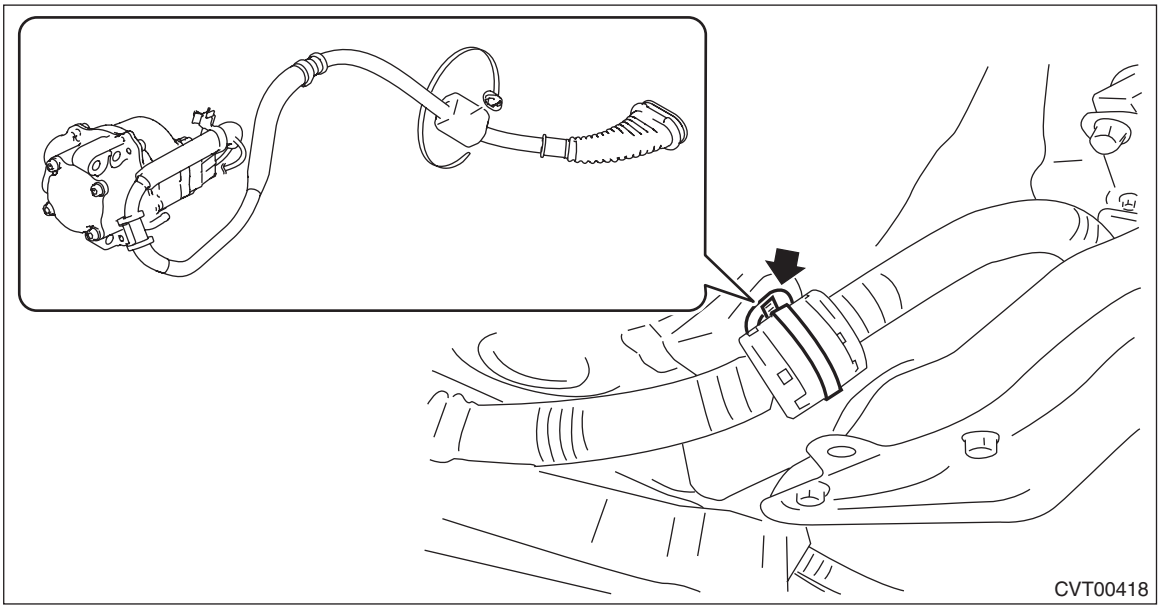
CAUTION:
• Do not allow foreign matter intrusion. When foreign matter is found inside, remove it while paying attention not to damage the electrode inside.
• If water is attached, dry it completely before starting the operation.

(1) Insert the harness connector until a click is heard, and move the slide lock (A) in the arrow direction to lock.



(2) Install the electric oil pump harness to the vehicle.

NOTE:
• Use a new electric oil pump harness clip.
• Install the electric oil pump harness clip as shown in the figure.



(3) Make sure that the electric oil pump harness does not interfere with other parts.

7) Install the under cover - rear LH. <Ref. to EI-35, INSTALLATION, Floor Under Protector.>
8) Install the under cover - cable.

Tightening torque:
18 N·m (1.8 kgf-m, 13.3 ft-lb)
9) Install the center exhaust cover.

Tightening torque:
18 N·m (1.8 kgf-m, 13.3 ft-lb)
10) Install the center exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-20, INSTALLATION, Rear Exhaust Pipe.>
11) Lower the vehicle.
12) Install the pitching stopper. <Ref. to CVT(TH58A)-89, PITCHING STOPPER, INSTALLATION, Transmission Mounting System.>
13) Install the air cleaner case. <Ref. to IN(H4DO(HEV))-8, INSTALLATION, Air Cleaner Case.>
14) Install the collector cover.
15) Install the service disconnect plug. <Ref. to HEV-16, INSTALLATION, Service Plug.>
16) Install the 12 volt auxiliary battery ground terminal and ground terminal to the 12V engine restart battery sensor of the 12 volt engine restart battery. <Ref. to NT-5, BATTERY, NOTE, Note.>
17) Refill CVTF to adjust the CVTF level. <Ref. to CVT(TH58A)-41, CVTF.>

C: INSPECTION

1. GENERAL DESCRIPTION

Perform this inspection as necessary when replacing or troubleshooting the electric oil pump to check that the electric oil pump works correctly.

2. PROCEDURE

CAUTION:
Do not turn the power of the Subaru Select Monitor OFF during work, and do not disconnect the data link connector.
1) Idle the engine until the CVTF temperature becomes 60 — 100°C (140 — 212°F) on Subaru Select Monitor.
2) Turn the ignition switch to OFF.
3) Apply the parking brake.
4) Connect the Subaru Select Monitor to data link connector.
5) Turn the ignition switch to ON.
6) Shift the select lever to “P” range.
7) Select {Work Support} in the «Transmission Diagnosis» display screen of the Subaru Select Monitor.
8) Select {Maintenance mode} in the «Work Support» screen of Subaru Select Monitor.
9) Select {Electric Fluid Pump inspection mode} in the «Maintenance mode» screen of the Subaru Select Monitor.
10) Follow the messages displayed on the Subaru Select Monitor screen when working.

NOTE:
If the operation does not follow the messages displayed on the Subaru Select Monitor screen, the inspection mode is finished.

11) The results of the electric oil pump inspection mode are displayed on the Subaru Select Monitor screen.
- Malfunction of TCM is detected or TCM is out of conditions: “Finished by abnormality of TCU.”
- The operation is ended normally: “Successful. Turn off the ignition switch.”
- Malfunction of hybrid system is detected or it is out of conditions: “Error finished.”
- Another malfunction is detected: “By high pressure abnormality of the secondary pressure, finished work.” or “Abnormal termination by Time out”

NOTE:
- For detailed operation procedures, refer to “PC application help for Subaru Select Monitor”.
- If the hybrid system is defective, perform the remedy displayed on the Subaru Select Monitor and inspect the electric oil pump again.
- When the inspection mode does not end normally, the following message is displayed.

Message	Main reasons for abnormal termination and actions to take
“By high pressure abnormality of the secondary pressure, finished work.”	• The secondary pressure is high. • The relief valve is damaged. Replace the drive motor assembly.
“Abnormal termination by Time out”	• The actual speed of electric oil pump does not follow the specified speed. Inspect the electric oil pump again. • The secondary pressure does not increase more than necessary. • Check the CVTF level. • Inspect the electric oil pump again. • Check for oil leaks in the secondary pressure oil passage. • If no malfunctions are found, the relief valve or the spring is damaged. Replace the drive motor assembly.
“Finished by abnormality of TCU”	• TCM detects a trouble code. Repair it according to the trouble code. • Other than P range is detected. Do not shift the select lever to other than P range during inspection. In addition, make sure the range SW is in the P range continuously using Subaru Select Monitor. • Engine speed is detected. • The CVTF temperature is out of 60 — 100°C (140 — 212°F). The CVTF temperature should be within 60 — 100°C (140 — 212°F). • Vehicle speed is detected. • 12 V battery voltage is low. • Malfunction of CAN communication with other than TCM is detected. Stop the inspection, and after starting the engine, check that no U codes exist in the current and past malfunctions of transmission using Subaru Select Monitor. • Electric oil pump temperature is high. Turn the ignition switch to OFF, stop the electric oil pump for approx. 60 seconds, and then perform the inspection mode again.
“Hybrid system is out of order”	• The hybrid system has a failure. Check the hybrid system.
“Safety plug has not been set”	• The safety plug is out of position or is not set properly. Inspect according to the troubleshooting for the battery energy control module.
“High voltage battery capacity is low”	• The battery remaining capacity of high voltage battery is low. Charge the high voltage battery.
“12V battery capacity is low”	• 12 V battery voltage is low. Charge the 12 V battery.
“Can not Test for a Hybrid system of other factors”	• High voltage start is inhibited by immobilizer. • A collision is detected. (P1C1E) Check the hybrid system.

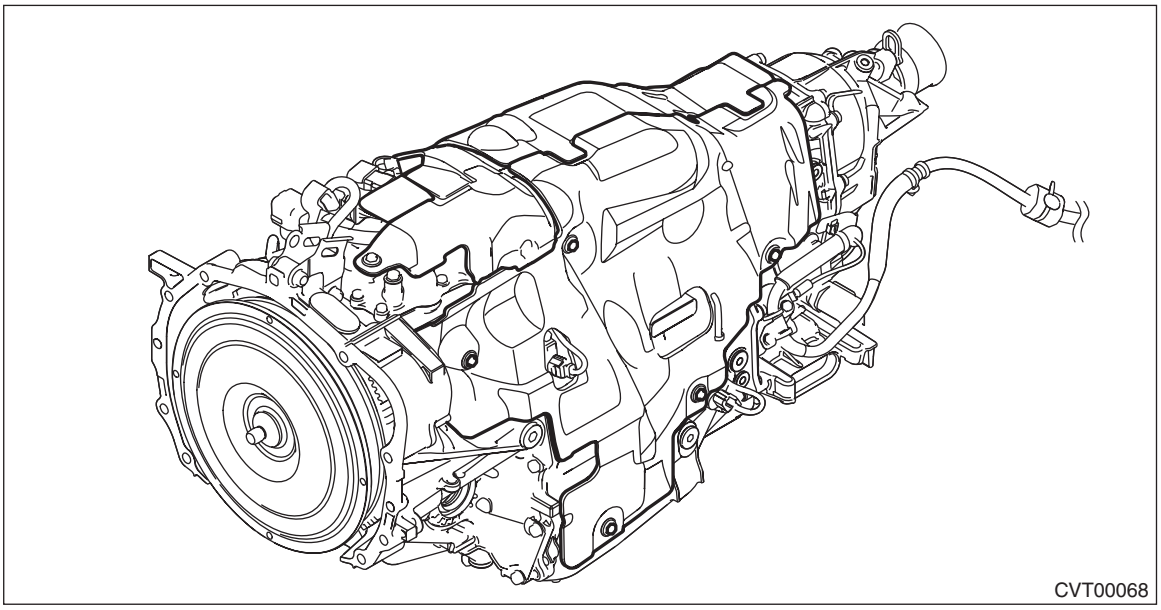
12) After the message “Successful. Turn off the ignition switch.” appears, turn the ignition switch to OFF and finish the electric oil pump inspection mode.

23.Transmission Harness

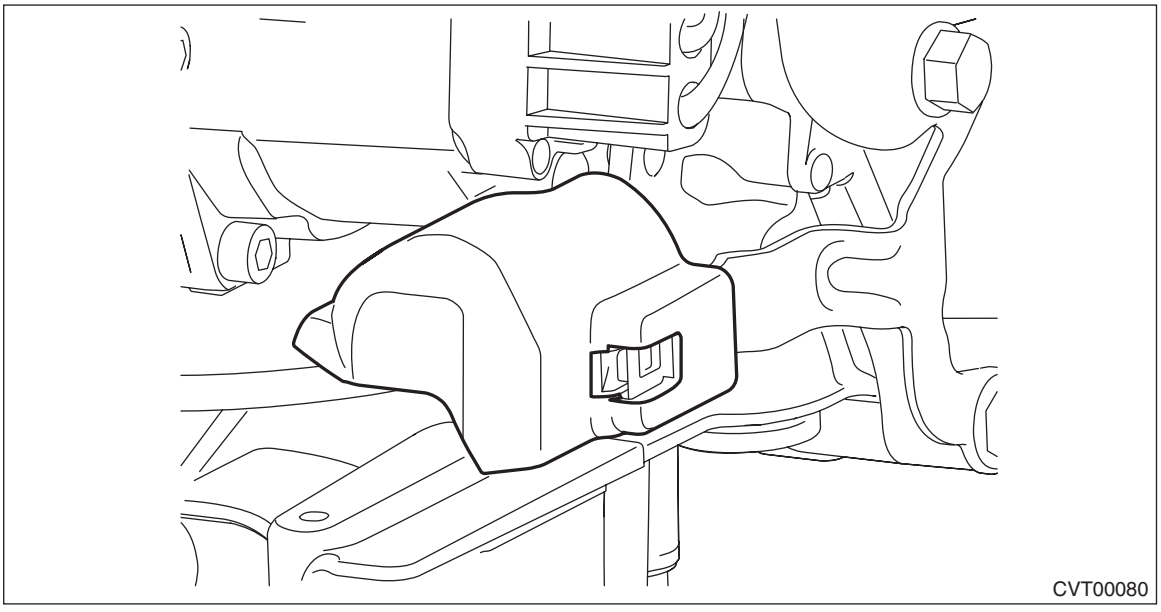
A: REMOVAL

1. INHIBITOR HARNESS

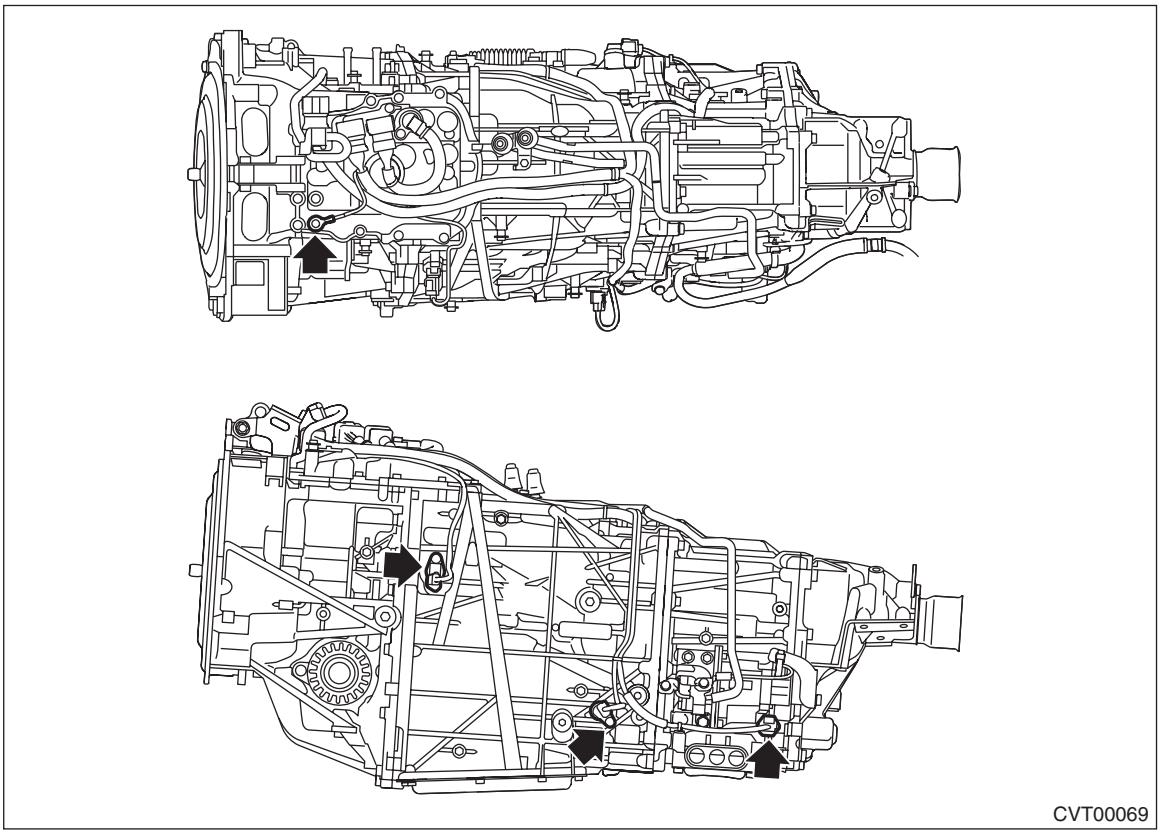
1) Remove the transmission from the vehicle. <Ref. to CVT(TH58A)-63, REMOVAL, Automatic Transmission Assembly.>
2) Remove the transmission case cover.



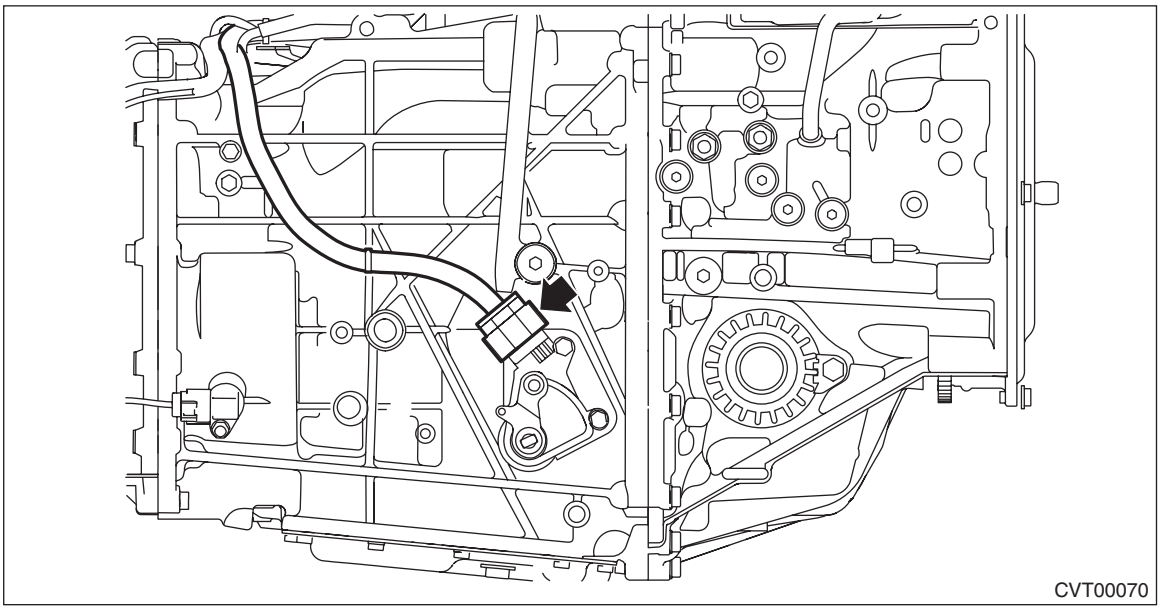
3) Remove the sensor cover.



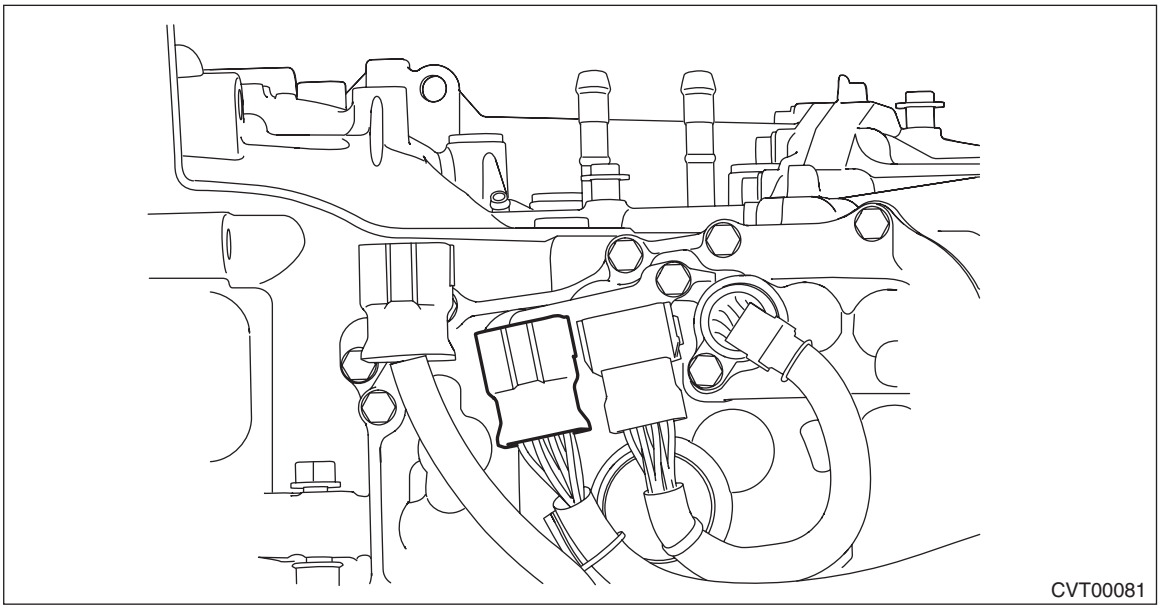
4) Remove the harness connector from the ground terminal, turbine speed sensor, secondary speed sensor and secondary pressure sensor.



5) Remove the harness connector from inhibitor switch.



6) Remove the inhibitor harness connector from the transmission harness stay.



7) Remove the harness clip from the transmission, and remove the inhibitor harness.

2. TRANSMISSION HARNESS

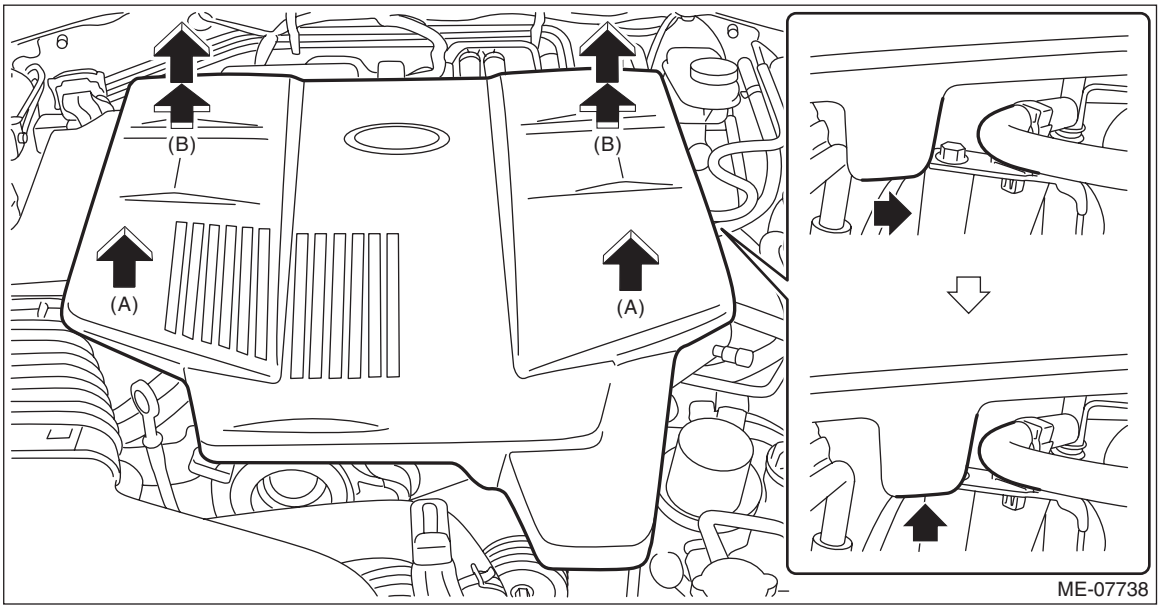
CAUTION:
• Directly after the vehicle has been running or the engine has been idling for a long time, the CVTF is hot. Be careful not to burn yourself.
• Be careful not to spill CVTF on the exhaust pipe to prevent it from emitting smoke or causing a fire. If the CVTF adheres, wipe it off completely.
• Always clean the engine compartment before removal.

1) Disconnect the ground cable from battery. <Ref. to NT-5, BATTERY, NOTE, Note.>

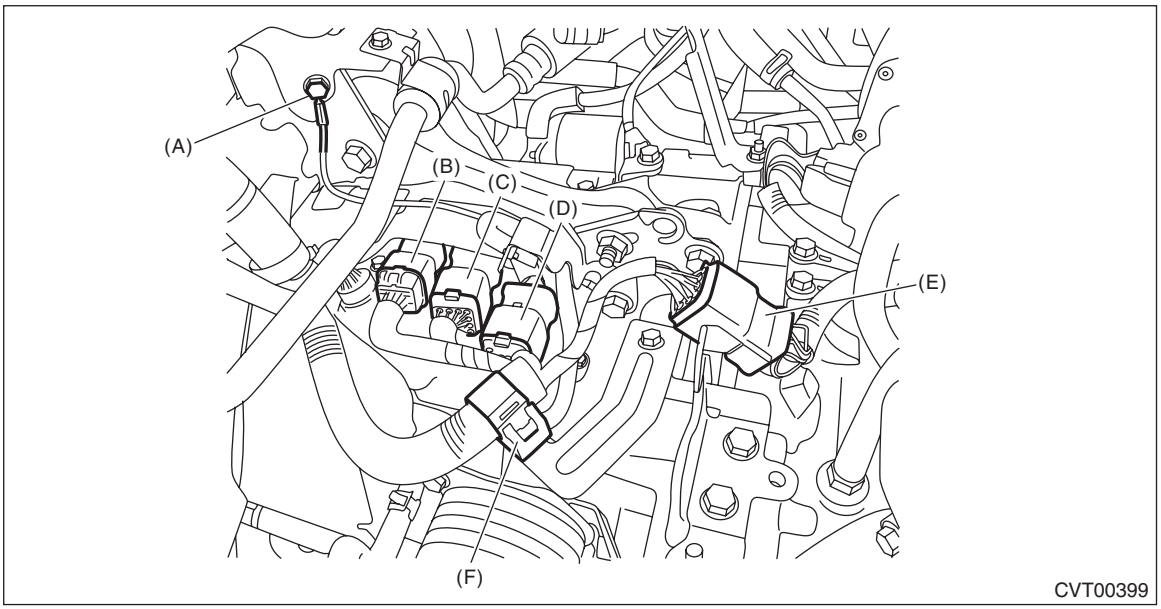
NOTE:
For the 12 volt engine restart battery, disconnect the ground terminal from 12V engine restart battery sensor.

2) Remove the collector cover.
(1) Carefully pull up the front of collector cover at two positions (A).
(2) Carefully pull up the rear of collector cover at two positions (B) while moving it backward.

NOTE:
Be careful not to contact the fuel delivery tube when moving the collector cover rearward.



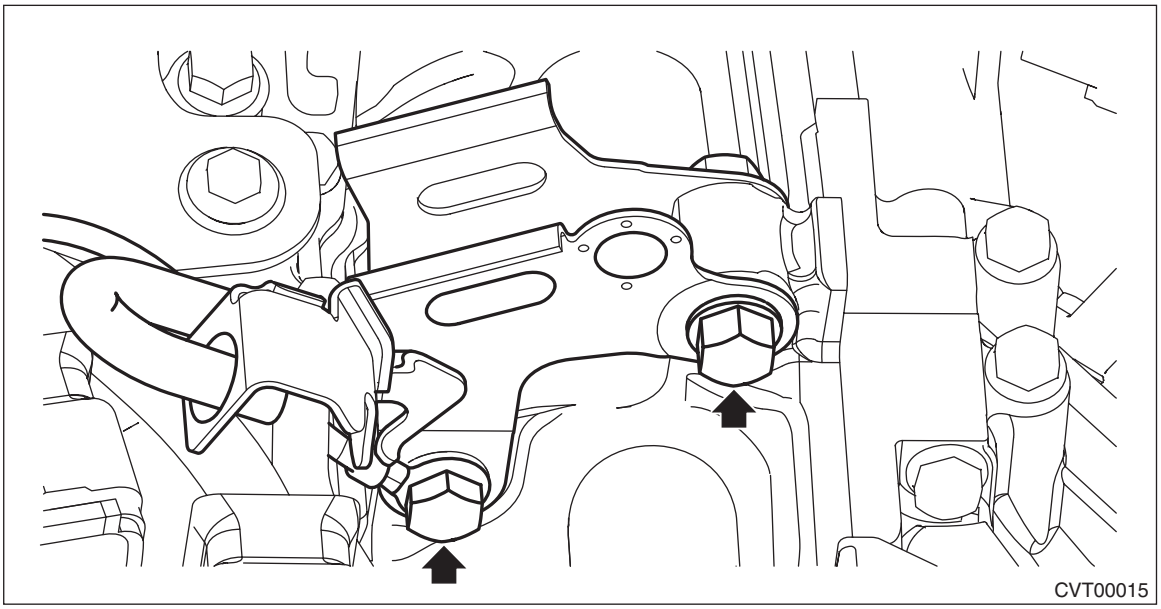
3) Remove the air cleaner case and bracket. <Ref. to IN(H4DO(HEV))-6, REMOVAL, Air Cleaner Case.>
4) Disconnect the following connectors and harness clips.
- Transmission radio ground terminal
- Transmission harness connectors
- Inhibitor harness connector
- Drive motor harness connector
- Engine harness connectors
- Harness clip



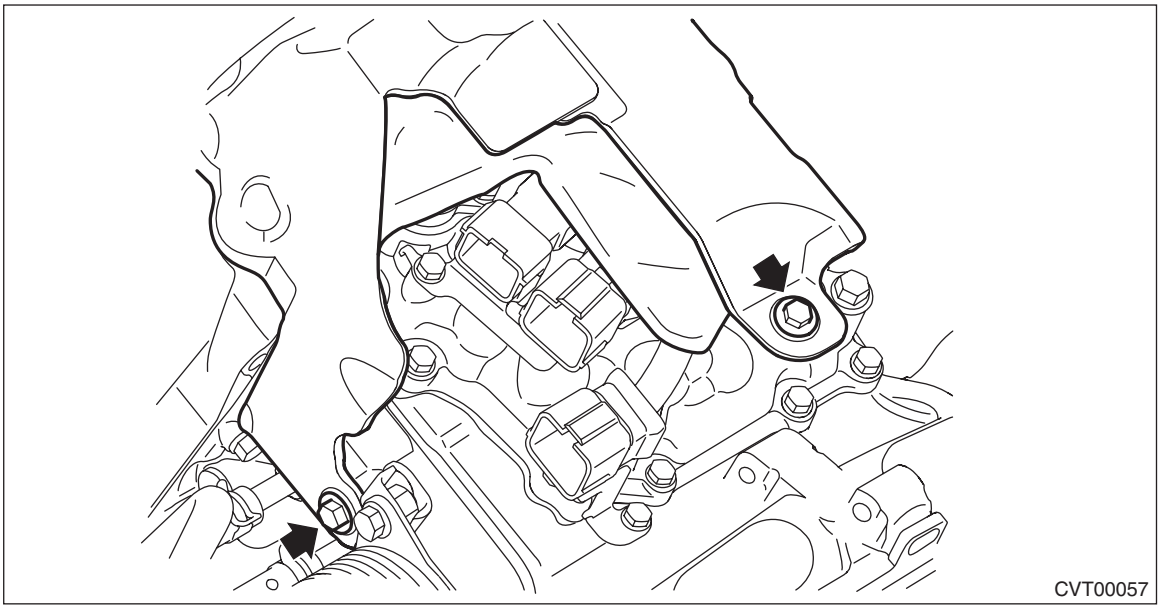
(A) Transmission radio ground terminal
(B) Transmission harness connectors
(C) Inhibitor harness connector
(D) Drive motor harness connector
(E) Engine harness connectors
(F) Harness clip

5) Remove the pitching stopper. <Ref. to CVT(TH58A)-87, PITCHING STOPPER, REMOVAL, Transmission Mounting System.>

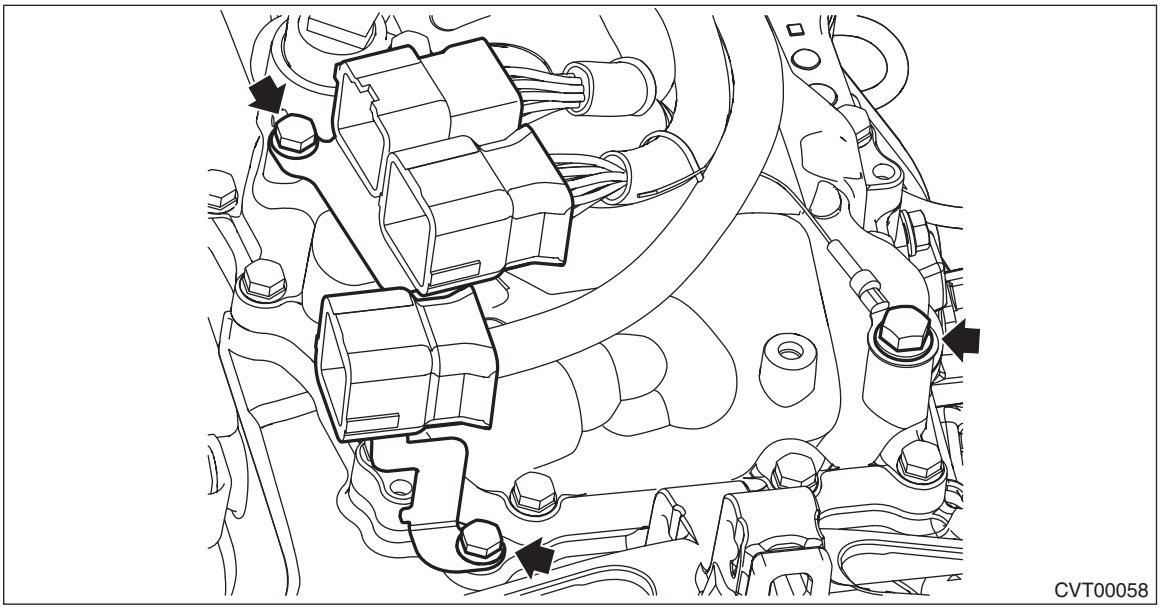
6) Remove the air breather hose from the pitching stopper bracket, and then remove the pitching stopper bracket and transmission radio ground cord.



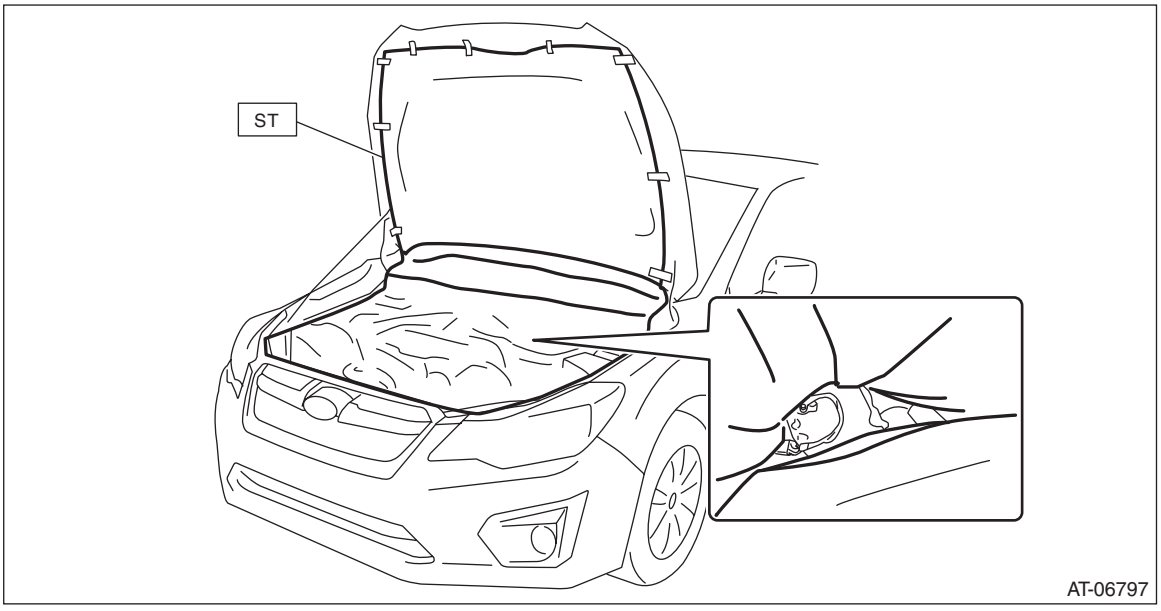
7) Remove the transmission case cover.



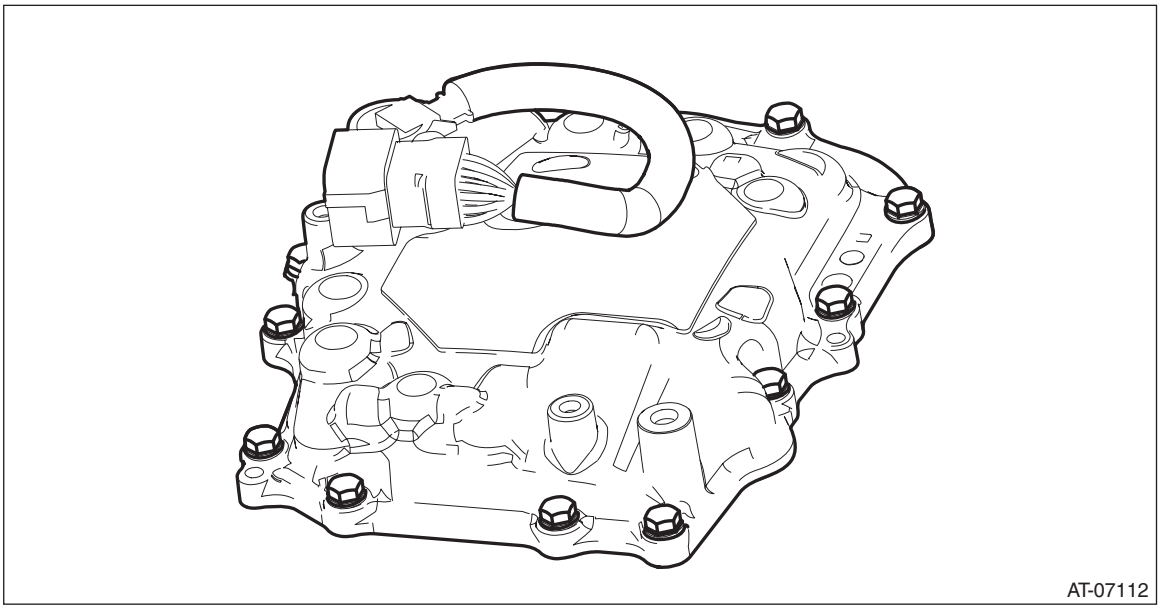
8) Remove the transmission harness stay, drive motor harness stay and transmission ground terminal.



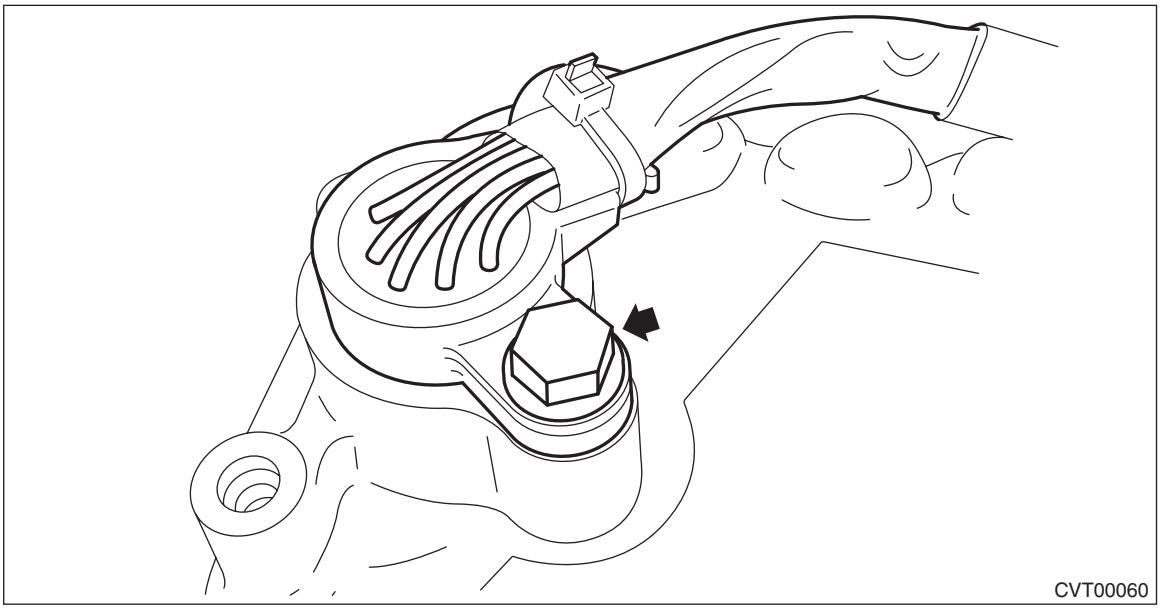
9) Remove the transmission harness connector from the harness stay.
10) Clean the transmission exterior.
11) Fix the ST with tape, and set the ST to the vehicle.
ST 18761AA010 SHEET SPECIAL TOOL



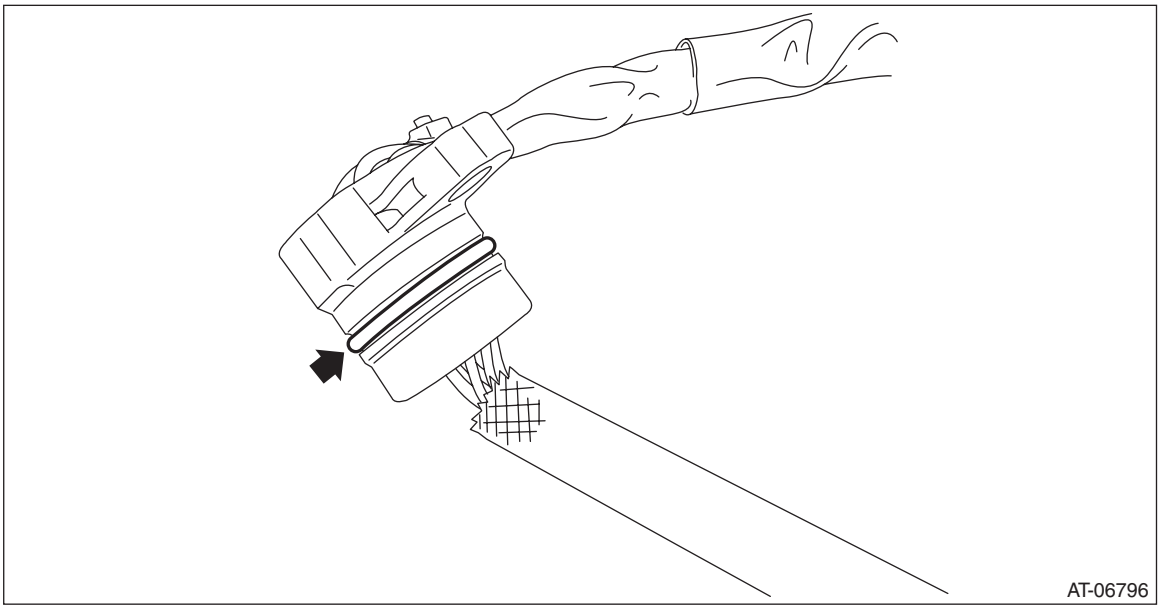
12) Remove the valve cover and gasket.



13) Disconnect the harness connector from the control valve body.
14) Remove the transmission harness from the valve cover.



15) Remove the O-ring from the transmission harness.



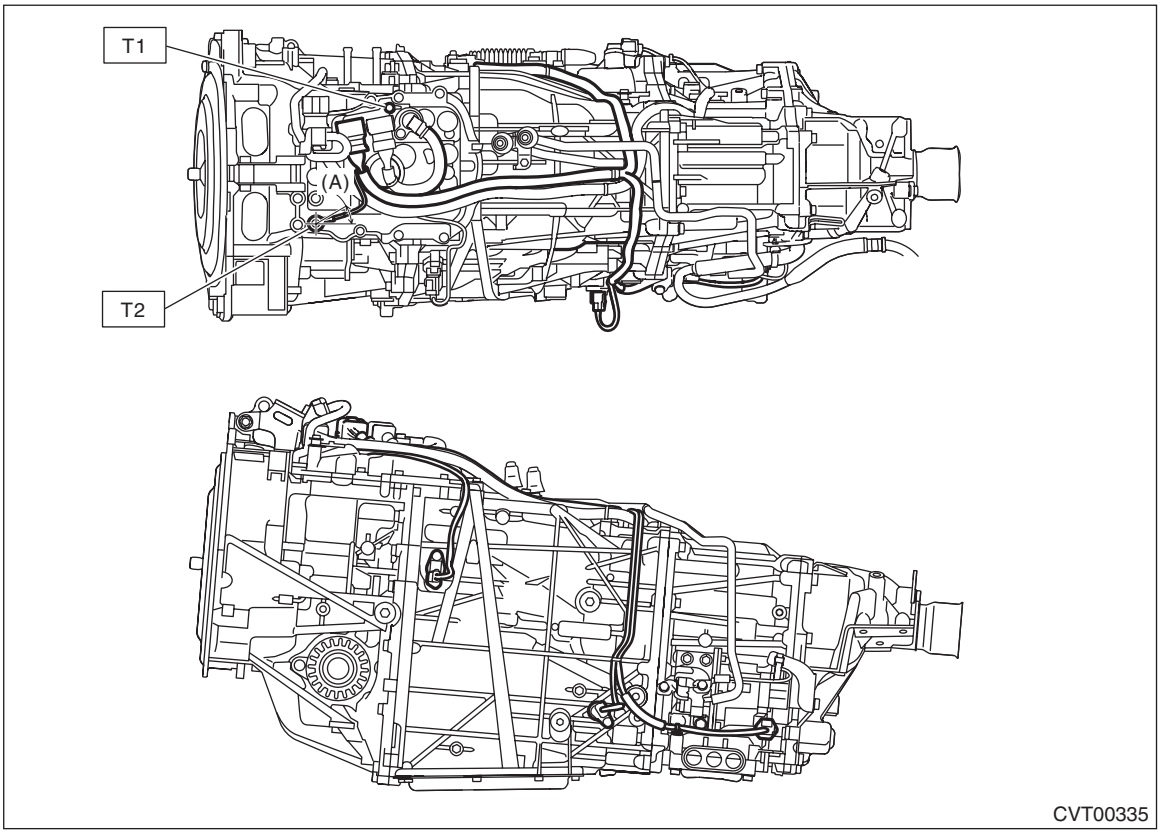
B: INSTALLATION

1. INHIBITOR HARNESS

Install in the reverse order of removal.

NOTE:
- Install the transmission ground terminal in the direction within the range of approx. 30° (A).
- Install the transmission harness through the lower side of air breather hose.

Tightening torque:
T1: 7 N·m (0.7 kgf-m, 3.7 ft-lb)
T2: 14 N·m (1.4 kgf-m, 10.3 ft-lb)



2. TRANSMISSION HARNESS

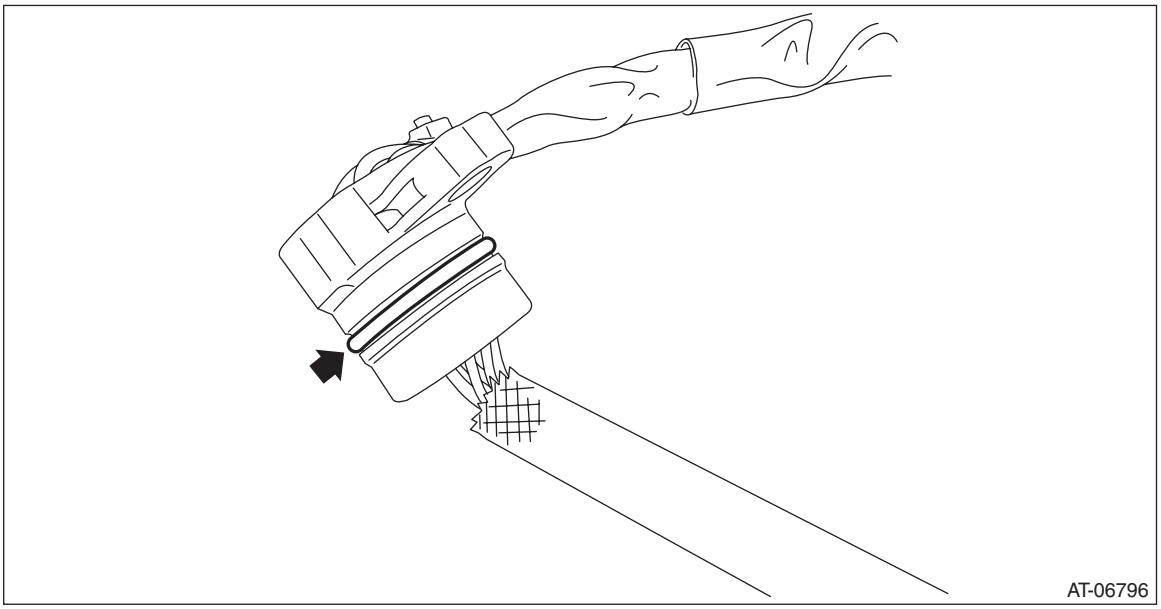
1) Clean the mating surface of valve cover and transmission side.

CAUTION:
When cleaning the mating surface of the transmission side, be careful not to allow any dust, foreign matter and used liquid gasket to enter the transmission.

2) Check the control valve body for dust and other foreign matter.

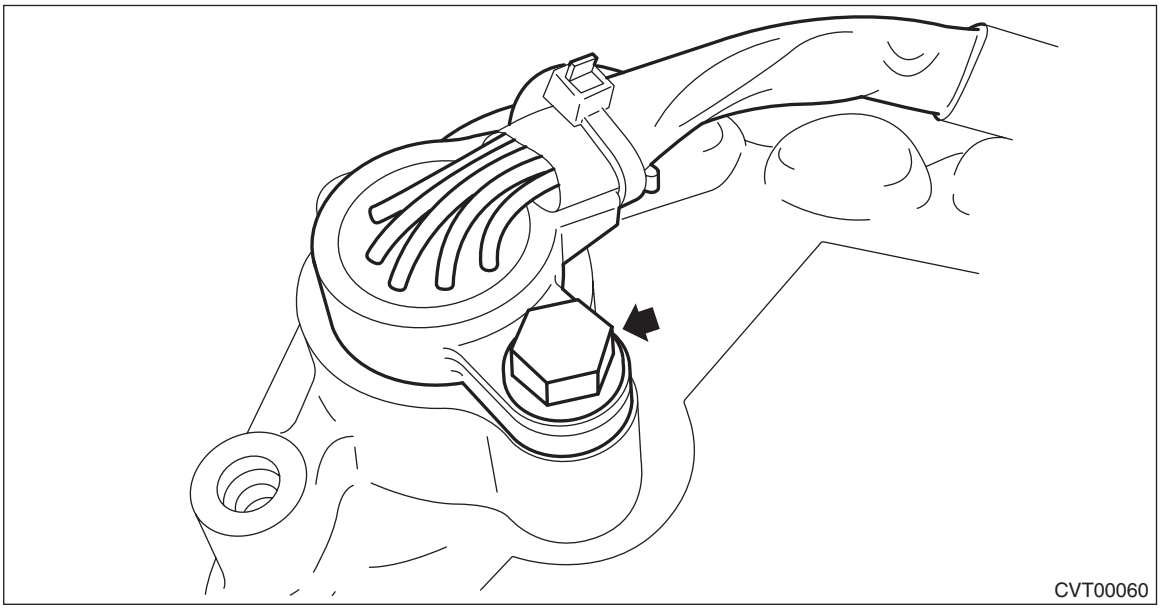
3) Install the O-ring to the transmission harness.

NOTE:
- Use new O-rings.
- Apply CVTF to the O-ring.



4) Install the transmission harness to the valve cover.

Tightening torque:
7 N·m (0.7 kgf-m, 5.2 ft-lb)

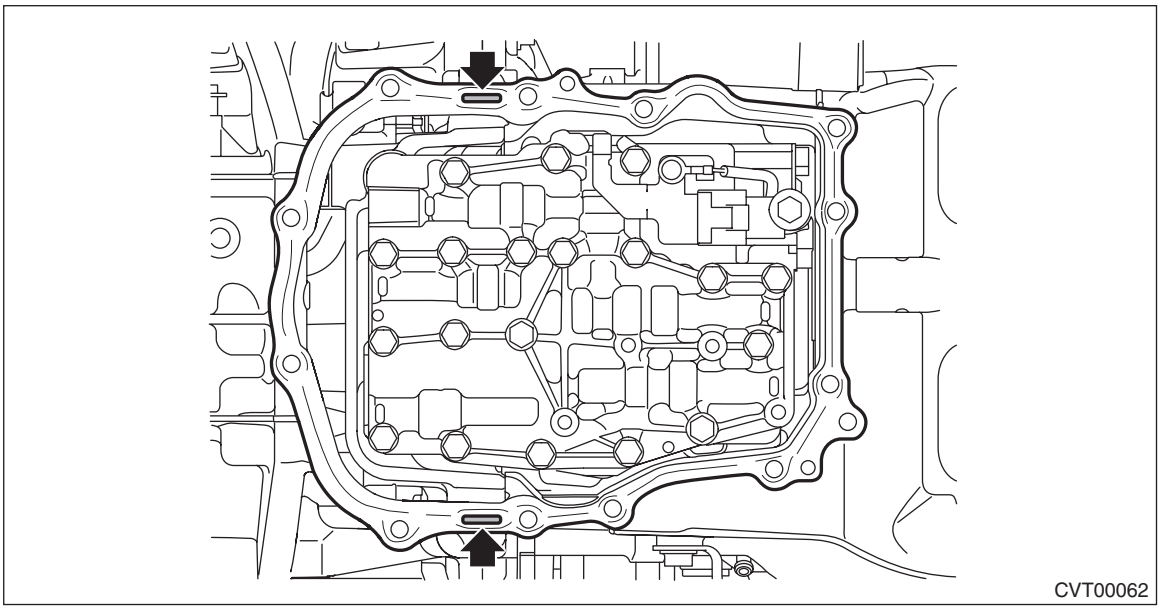


5) Install the gasket to the transmission.

NOTE:
Use a new gasket.

6) Apply liquid gasket to the oval hole of gasket.

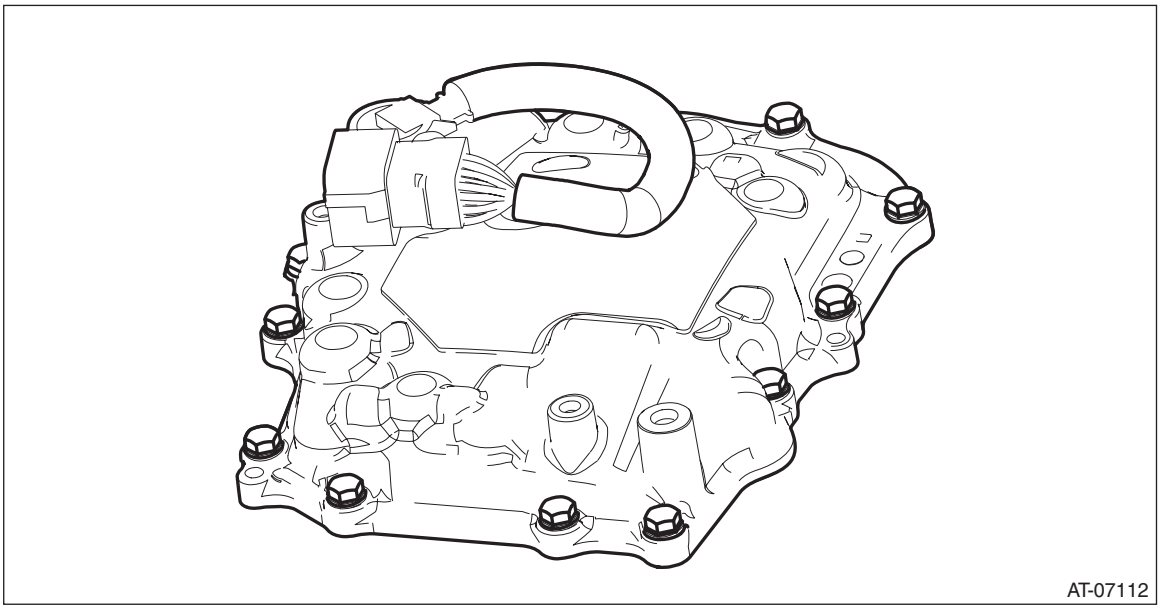
Liquid gasket:
THREE BOND 1215B or equivalent



7) Connect the transmission harness connector to the control valve body, and install the valve cover.

CAUTION:
Be careful not to catch the sheet of the ST.

Tightening torque:
9 N·m (0.9 kgf-m, 6.6 ft-lb)

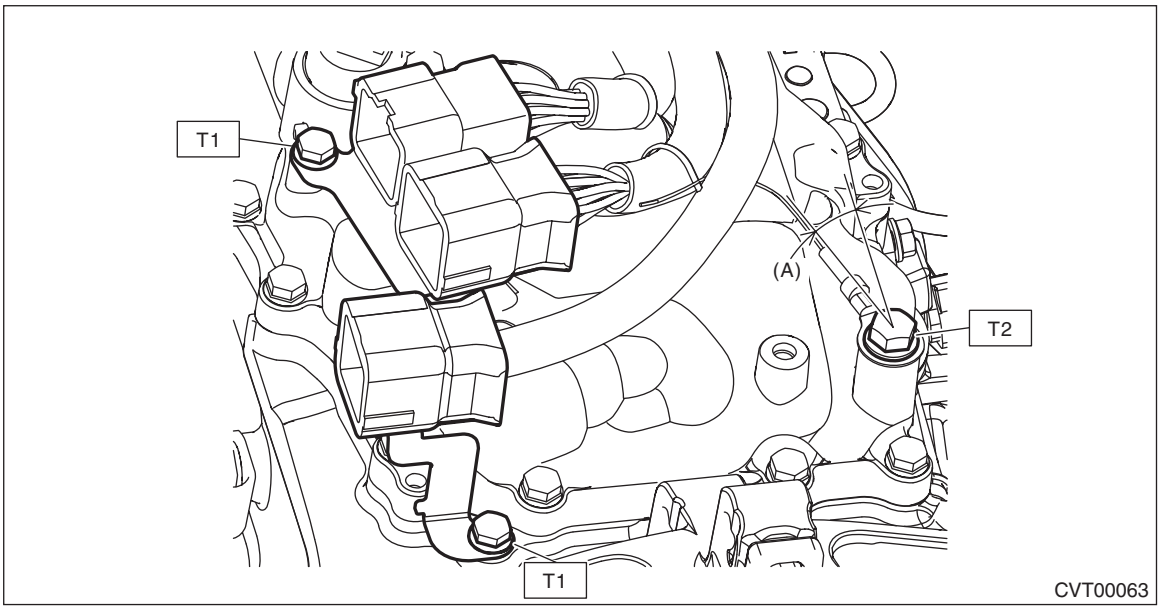


8) Remove the ST (SHEET SPECIAL TOOL).
9) Install the transmission harness connector to the harness stay.

10) Install the transmission harness stay, drive motor harness stay and transmission ground terminal.

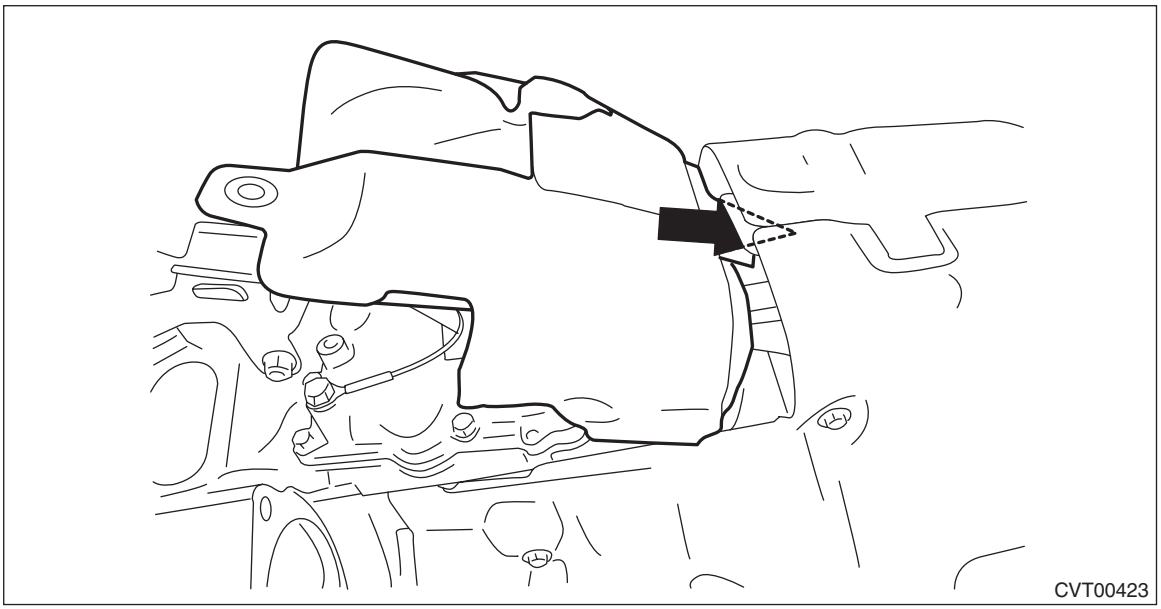
NOTE:
Install the transmission ground terminal in the direction within the range of approx. 30° (A).

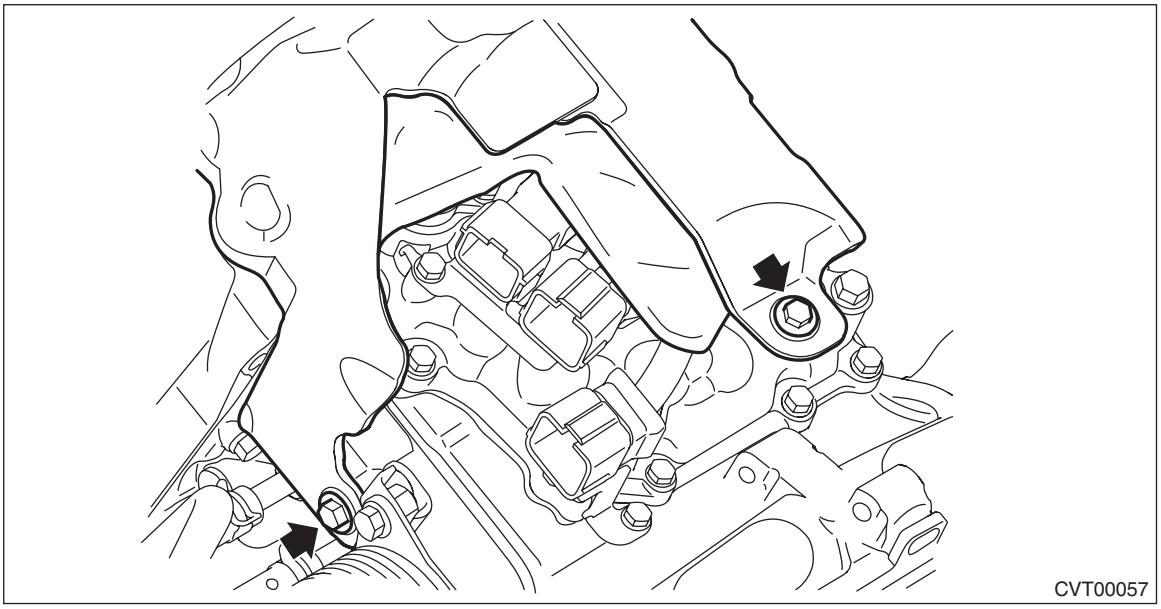
Tightening torque:
T1: 7 N·m (0.7 kgf-m, 5.2 ft-lb)
T2: 14 N·m (1.4 kgf-m, 10.3 ft-lb)



11) Insert the transmission case cover (small) between the transmission case cover (large) and the transmission to install.

Tightening torque:
8 N·m (0.8 kgf-m, 5.9 ft-lb)





12) Install the pitching stopper bracket and transmission radio ground cord.

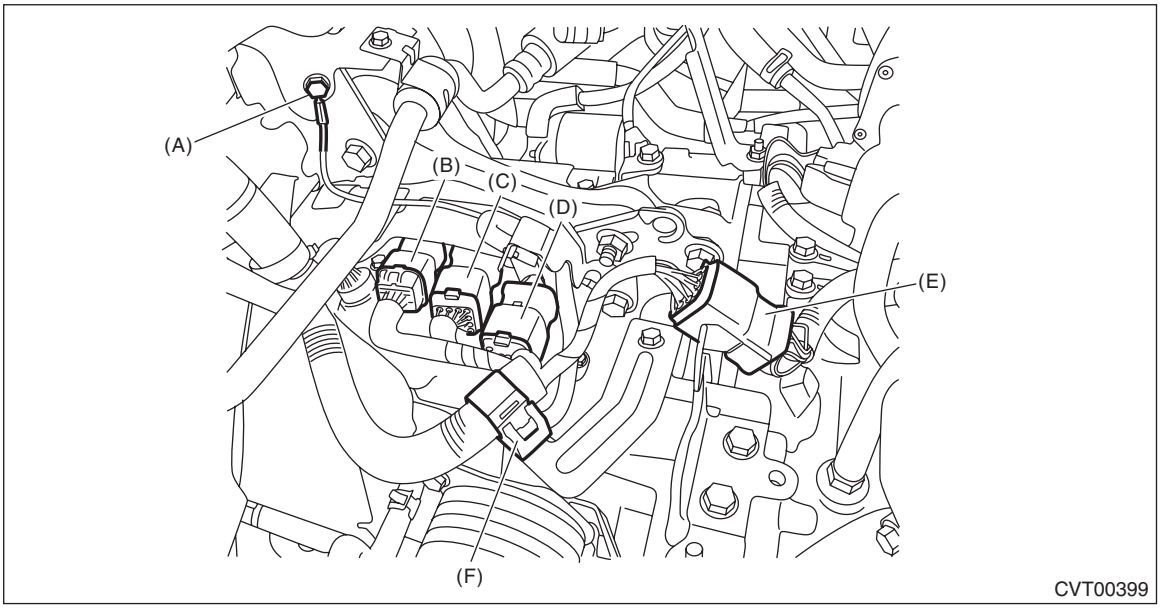
Tightening torque:
41 N·m (4.2 kgf-m, 30.2 ft-lb)

13) Install the air breather hose to the pitching stopper bracket. <Ref. to CVT(TH58A)-173, FRONT DIFFERENTIAL SIDE, INSTALLATION, Air Breather Hose.>

14) Install the pitching stopper. <Ref. to CVT(TH58A)-89, PITCHING STOPPER, INSTALLATION, Transmission Mounting System.>

15) Connect the following connectors and install the harness clip to the bracket.
- Transmission radio ground terminal
- Transmission harness connectors
- Inhibitor harness connector
- Drive motor harness connector
- Engine harness connectors
- Harness clip

Tightening torque:
13 N·m (1.3 kgf-m, 9.6 ft-lb)



(A) Transmission radio ground terminal
(B) Transmission harness connectors
(C) Inhibitor harness connector
(D) Drive motor harness connector
(E) Engine harness connectors
(F) Harness clip

16) Install the air cleaner case and bracket. <Ref. to IN(H4DO(HEV))-8, INSTALLATION, Air Cleaner Case.>
17) Install the collector cover.
18) Install the 12 volt auxiliary battery ground terminal and ground terminal to the 12V engine restart battery sensor of the 12 volt engine restart battery. <Ref. to NT-5, BATTERY, NOTE, Note.>

C: INSPECTION

1) Visually check the harness and connector for damage or crack.
2) Check the harness terminal for rust, disconnection or poor contact.
3) Check the continuity between harness terminals.

NOTE:
For details of transmission harness circuit, refer to wiring diagram. <Ref. to WI(w/o HEV)-90, WIRING DIAGRAM, CVT Control System.>

Harness continuity standard:
Less than 1 Ω

24.Drive Motor Control Module

A: REMOVAL

NOTE:
For removal of the drive motor control module, refer to “HEV” section. <Ref. to HEV-74, Drive Motor Control Module.>

B: INSTALLATION

NOTE:
For installation of the drive motor control module, refer to HEV section. <Ref. to HEV-74, Drive Motor Control Module.>

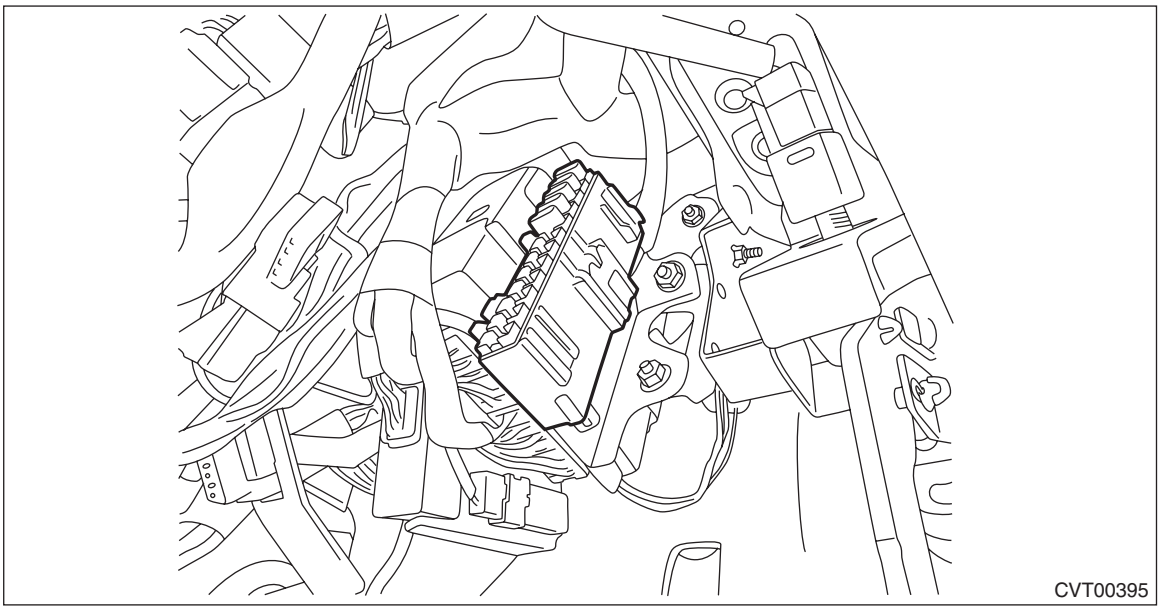
25.Transmission Control Module (TCM)

A: REMOVAL

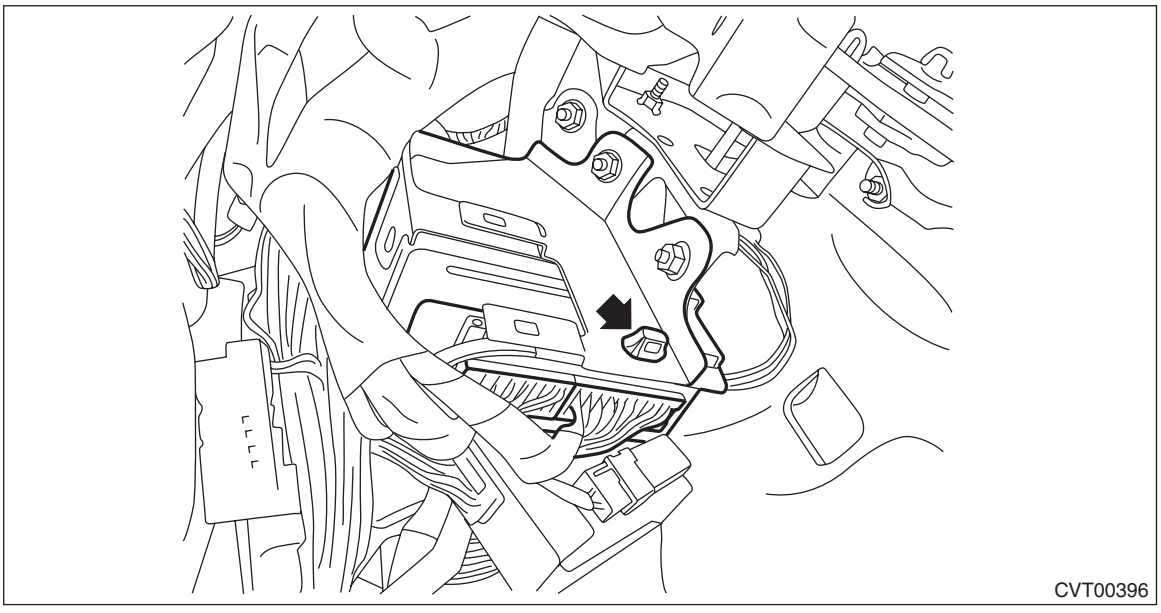
1) Disconnect the ground cable from battery. <Ref. to NT-5, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery, disconnect the ground terminal from 12V engine restart battery sensor.

2) Remove the fuse holder.



3) Release the harness clips, and disconnect the bulk head harness connector from TCM.



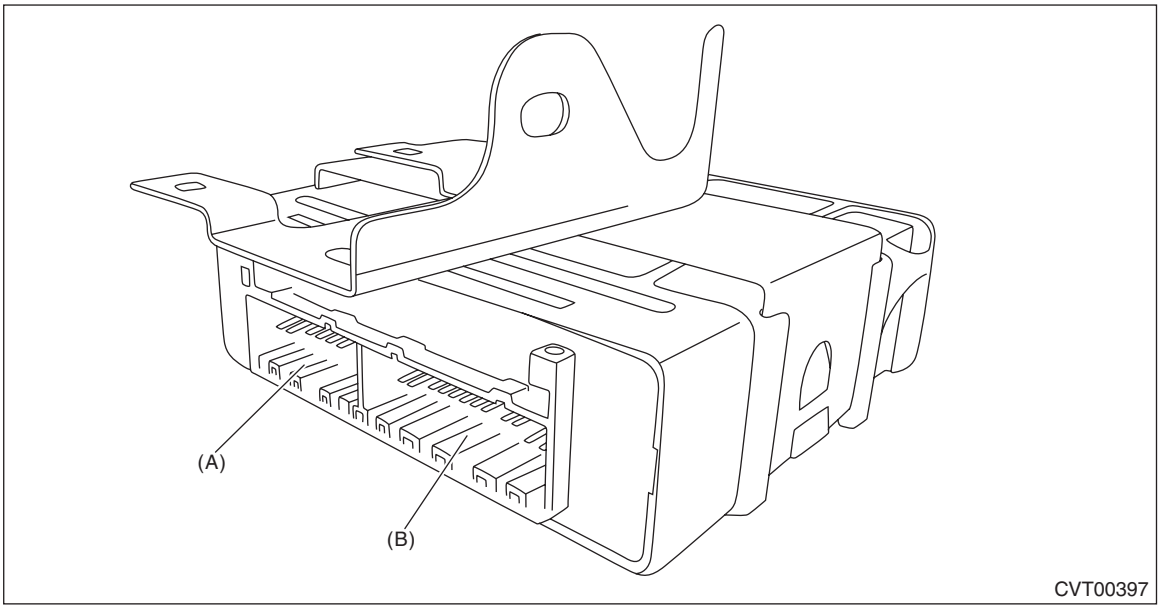
4) Remove the TCM.

NOTE:
Replace the TCM and bracket as a set.

B: INSTALLATION

1) Install the TCM to the bracket.

CAUTION:
To avoid the damage to bracket and TCM, do not remove after installing TCM to bracket. If installed by mistake, the part must be replaced with a new part.



(A) 22-pin connector side
(B) 26-pin connector side

2) Install the TCM.

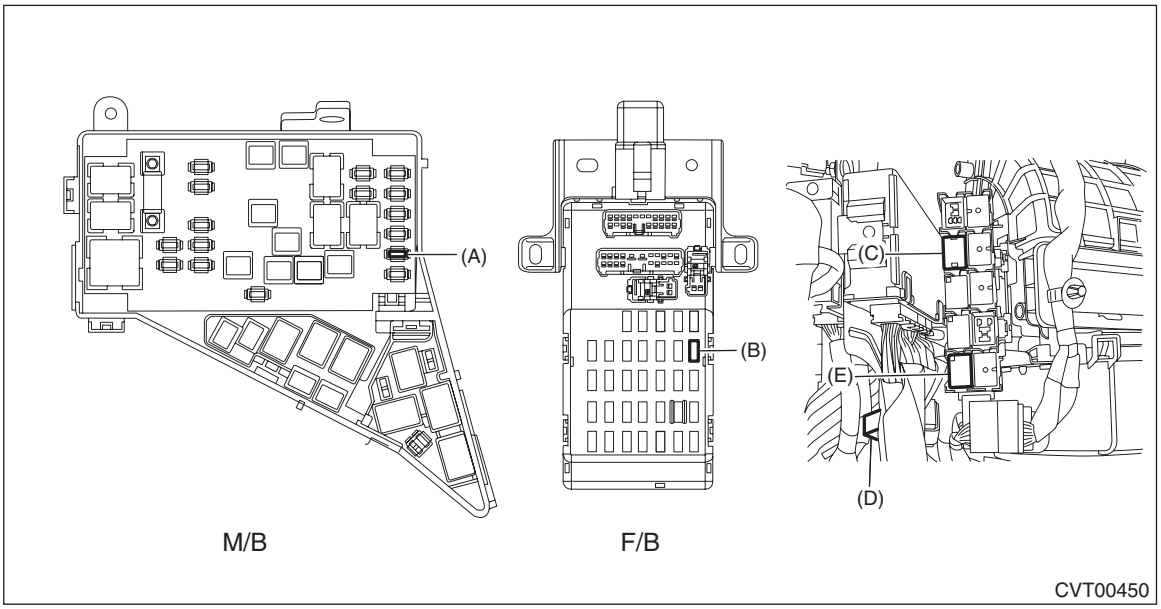
Tightening torque:
7.5 N·m (0.8 kgf-m, 5.5 ft-lb)

3) Install the harness connector and harness clip to TCM.
4) Install the fuse holder.
5) Install the 12 volt auxiliary battery ground terminal and ground terminal to the 12V engine restart battery sensor of the 12 volt engine restart battery. <Ref. to NT-5, BATTERY, NOTE, Note.>
6) Perform the learning again. <Ref. to CVT(HEV)(diag)-26, Learning Control.>

26.Relay and Fuse

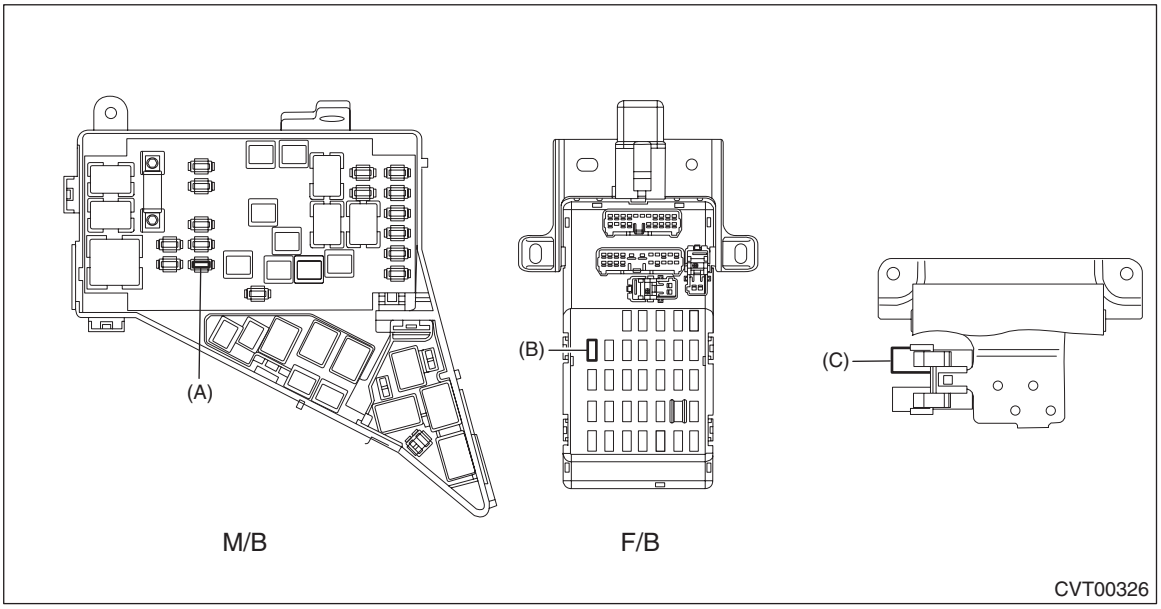
A: LOCATION

1. TRANSMISSION CONTROL MODULE (TCM)



Main fuse box	Fuse 20 A	(A)
Relay & fuse box	Fuse 15 A	(B)
Relay holder	Self shut relay	(C)
Relay holder	Linear solenoid relay	(D)
Relay holder	R range relay	(E)

2. DRIVE MOTOR CONTROL MODULE



Main fuse box	Fuse 25 A	(A)
Relay & fuse box	Fuse 7.5 A	(B)
Drive motor control module	Drive motor control module relay	(C)

B: INSPECTION

1. CHECK FUSE

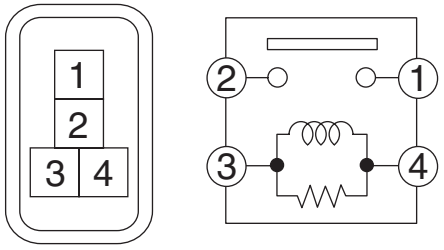
Remove the fuse and inspect visually. If the fuse is blown out, replace the fuse.

NOTE:
If the fuse is blown again, check the system.

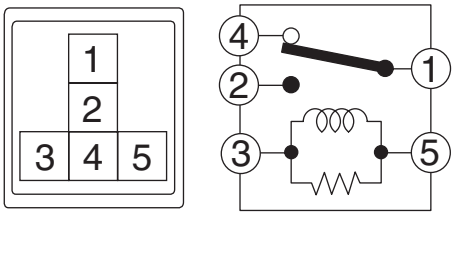
2. CHECK RELAY

Check the resistance between relay terminals. If it is not within the standard, replace the relay.

- Drive motor control module relay and self shut relay

Terminal No.	Inspection conditions	Standard	Circuit
1 — 2	Always	1 MΩ or more	 LI-01273
1 — 2	4 — Apply battery voltage between three terminals.	Less than 1 Ω	

- Linear solenoid relay and R range relay

Terminal No.	Inspection conditions	Standard	Circuit
1 — 2	Always	1 MΩ or more	 LI-01274
1 — 4	Always	Less than 1 Ω	
1 — 2	3 — Apply battery voltage between five terminals.	Less than 1 Ω	

27.CVTF Cooler (With Warmer Function)

A: REMOVAL

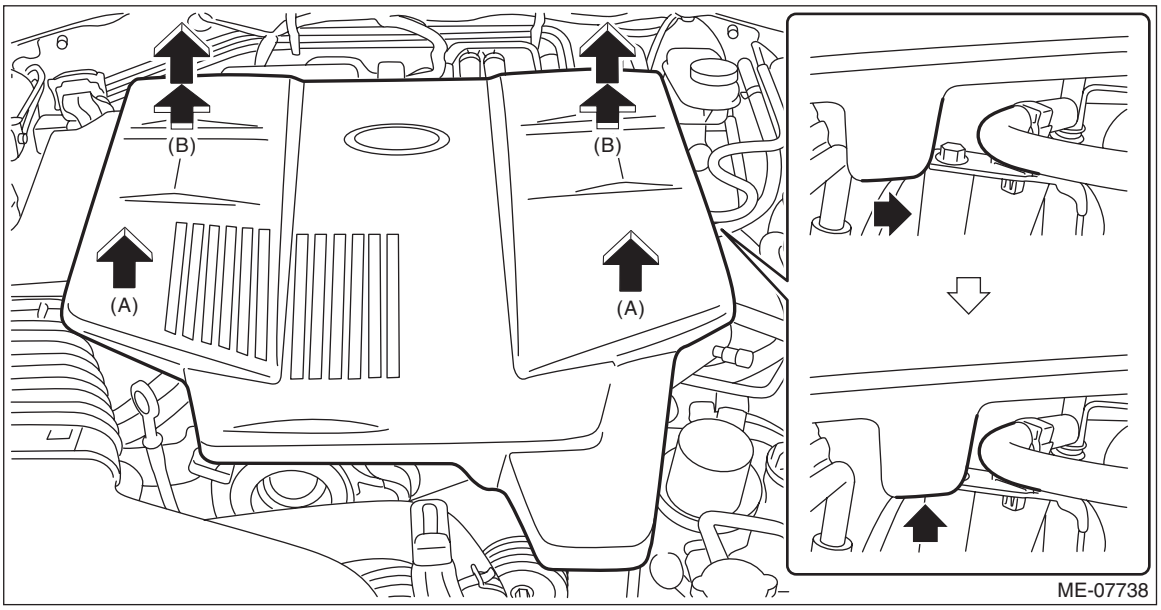
CAUTION:
If the CVTF and engine coolant is spilt over exhaust pipe, wipe it off with cloth to avoid emitting smoke or causing a fire.

1) Disconnect the ground cable from battery. <Ref. to NT-5, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery, disconnect the ground terminal from 12V engine restart battery sensor.

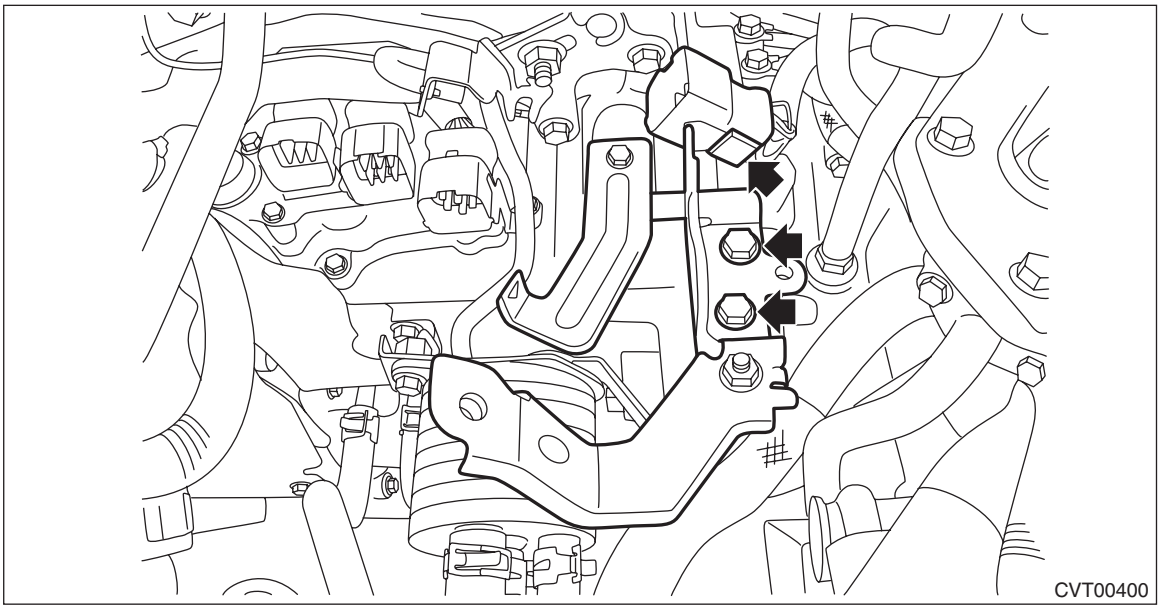
2) Drain engine coolant. <Ref. to CO(H4DO(w/o HEV))-16, REPLACEMENT, Engine Coolant.>
3) Remove the collector cover.
   (1) Carefully pull up the front of collector cover at two positions (A).
   (2) Carefully pull up the rear of collector cover at two positions (B) while moving it backward.

NOTE:
Be careful not to contact the fuel delivery tube when moving the collector cover rearward.

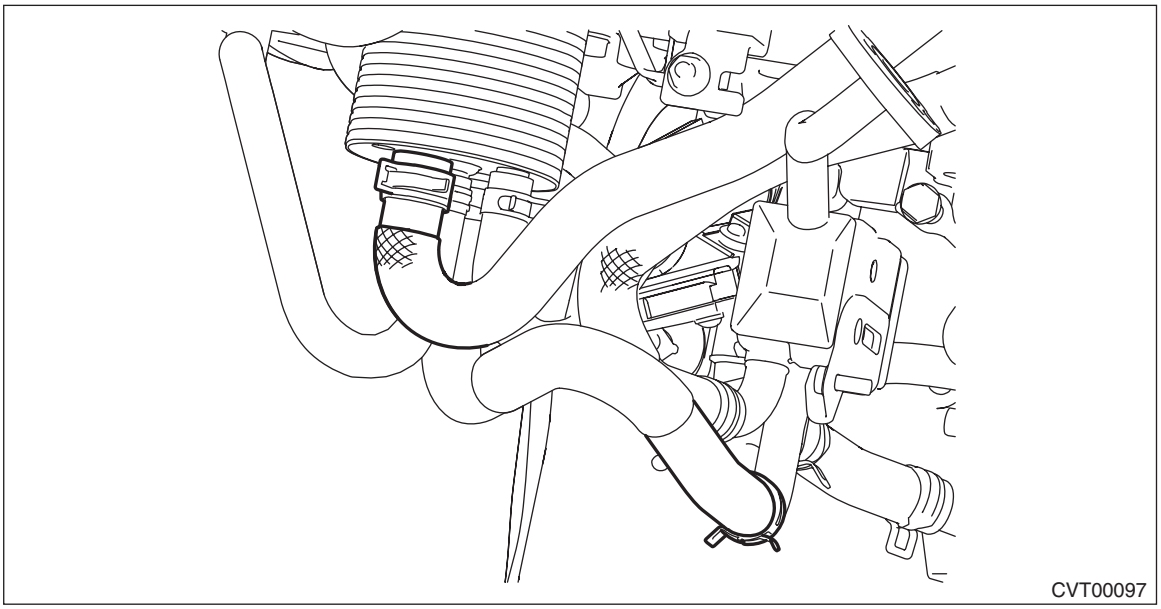


4) Remove the air cleaner case. <Ref. to IN(H4DO(HEV))-6, REMOVAL, Air Cleaner Case.>
5) Disconnect the drive motor harness connector, and detach the harness clip.

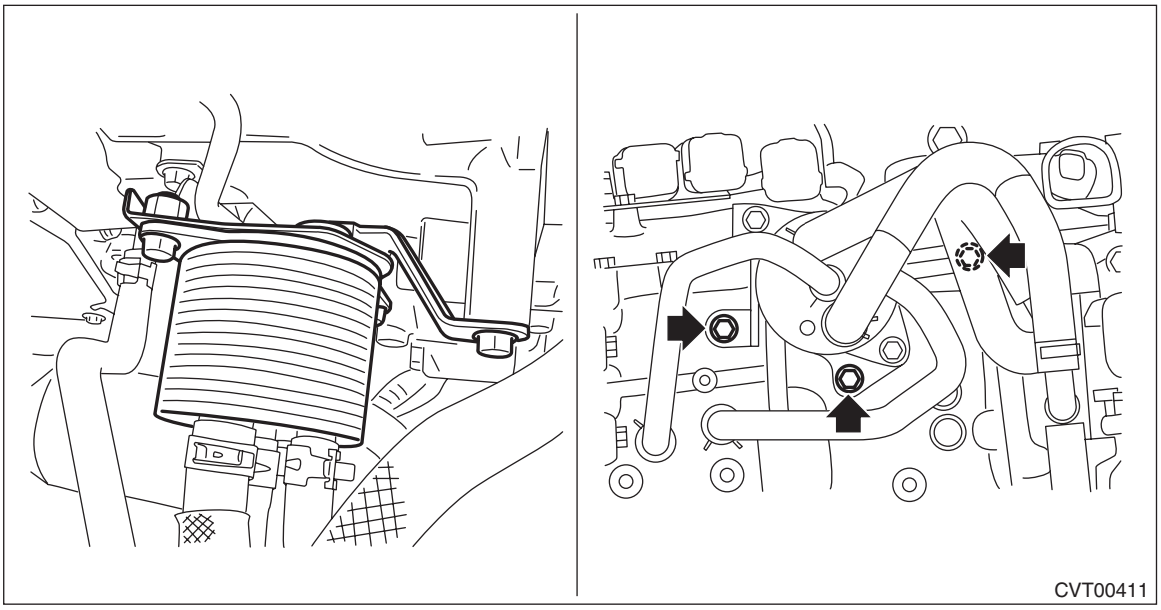
6) Remove the engine harness connector, and remove the engine hanger rear.



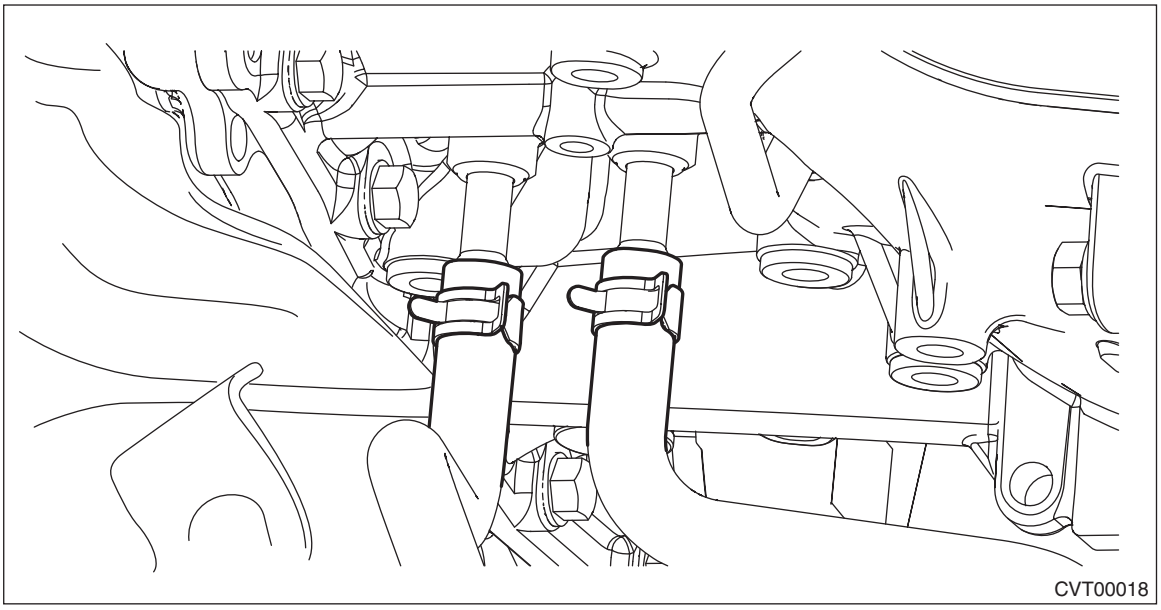
7) Remove the engine coolant inlet hose from the EGR cooler.
8) Remove the engine coolant outlet hose from the CVT cooler (with warmer feature).



9) Remove the CVTF cooler (with warmer feature) from the transmission.

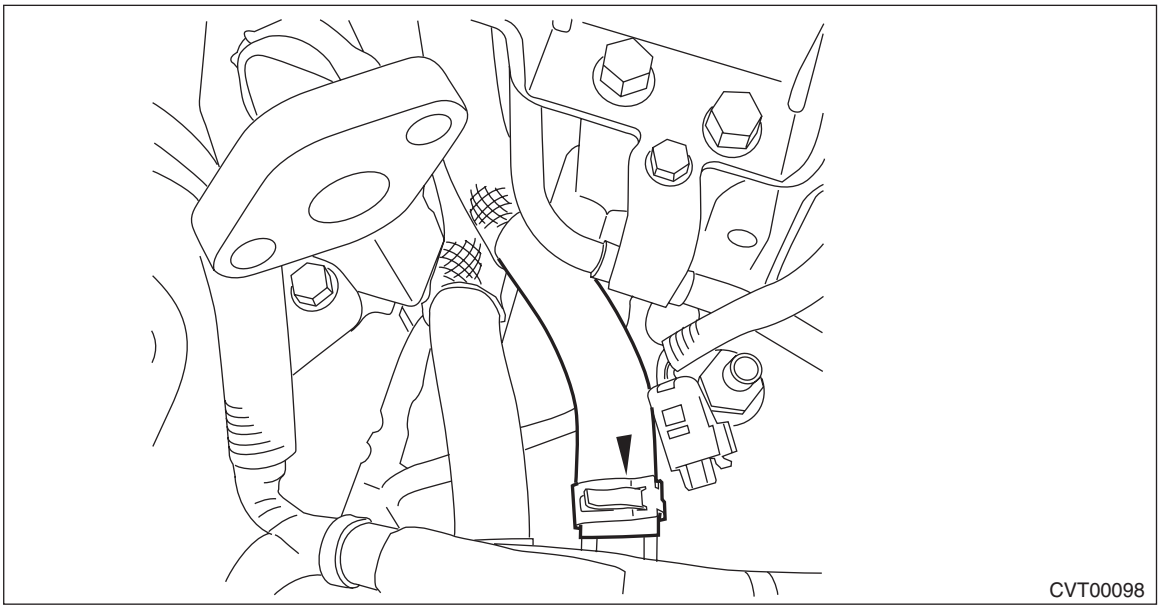


10) Remove the CVTF inlet hose and outlet hose from the pipe on the transmission side.



11) Remove the intake manifold. <Ref. to FU(H4DO(HEV))-19, REMOVAL, Intake Manifold.>

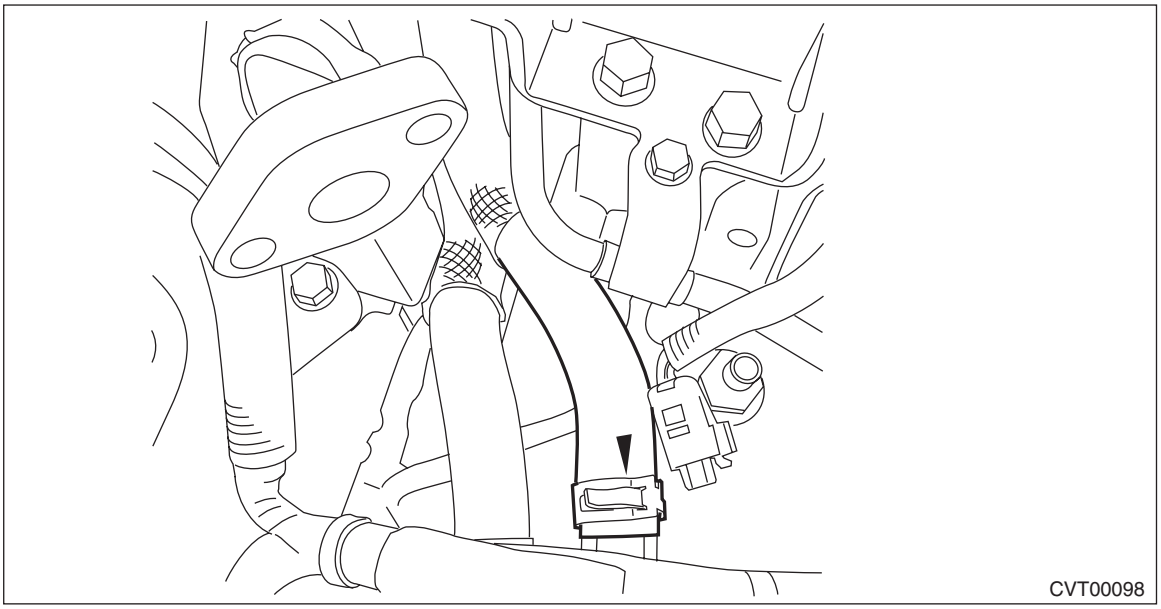
12) Remove the engine coolant outlet hose.



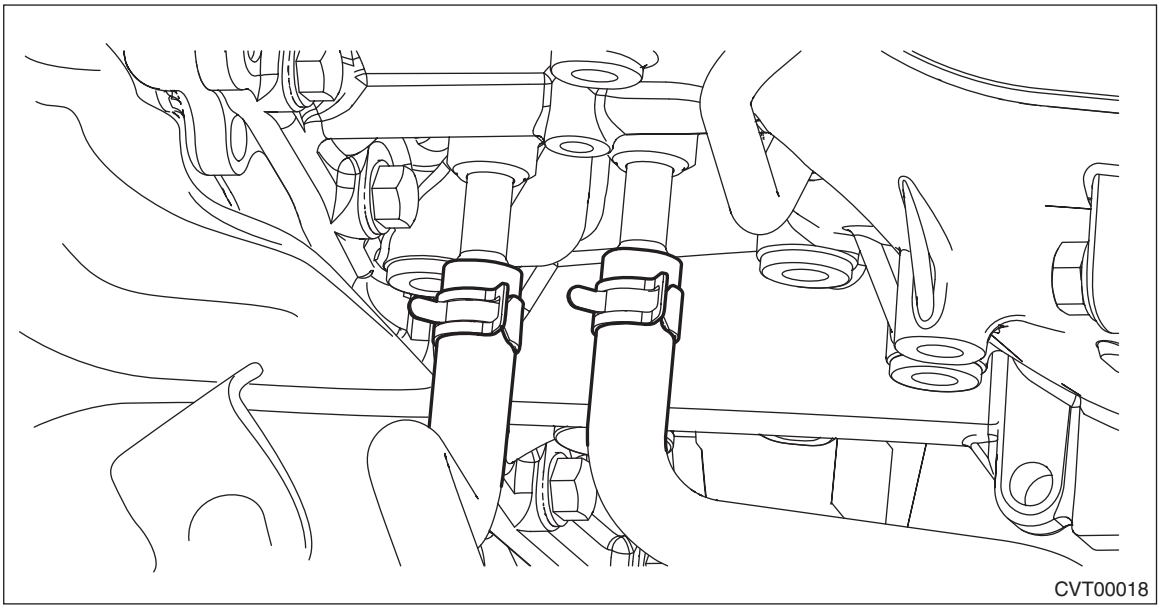
B: INSTALLATION

1) Connect the engine coolant outlet hose.

NOTE:
When installing the engine coolant outlet hose, the triangle marking should face upward.



2) Install the intake manifold. <Ref. to FU(H4DO(w/o HEV))-29, INSTALLATION, Intake Manifold.>
3) Install the CVTF inlet hose and CVTF outlet hose to transmission.

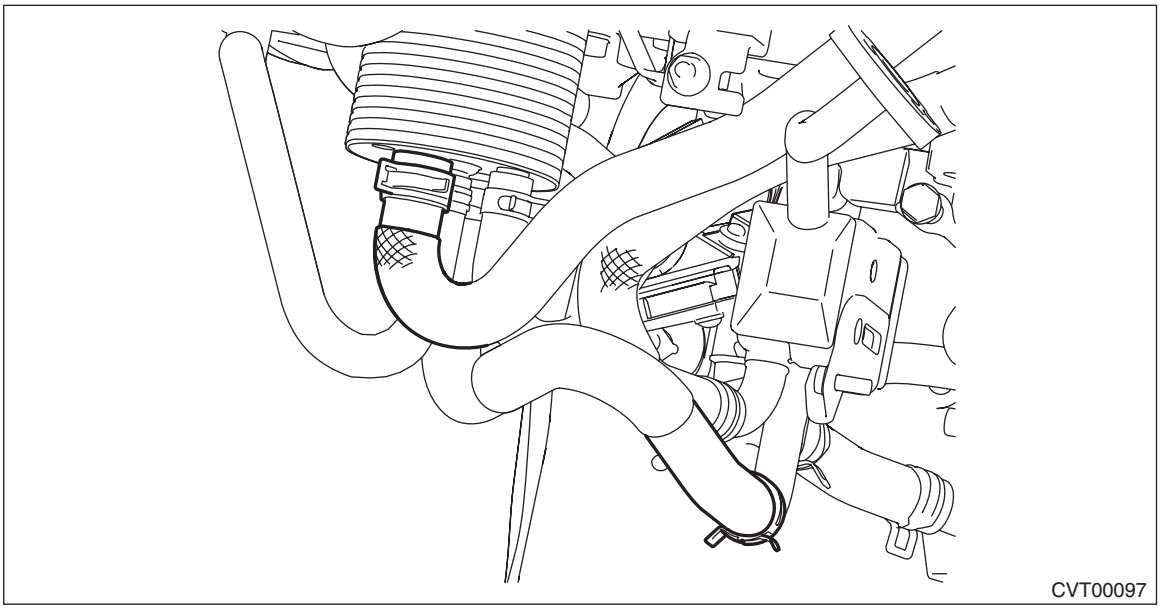


4) Install the CVTF cooler (with warmer feature) to the transmission.

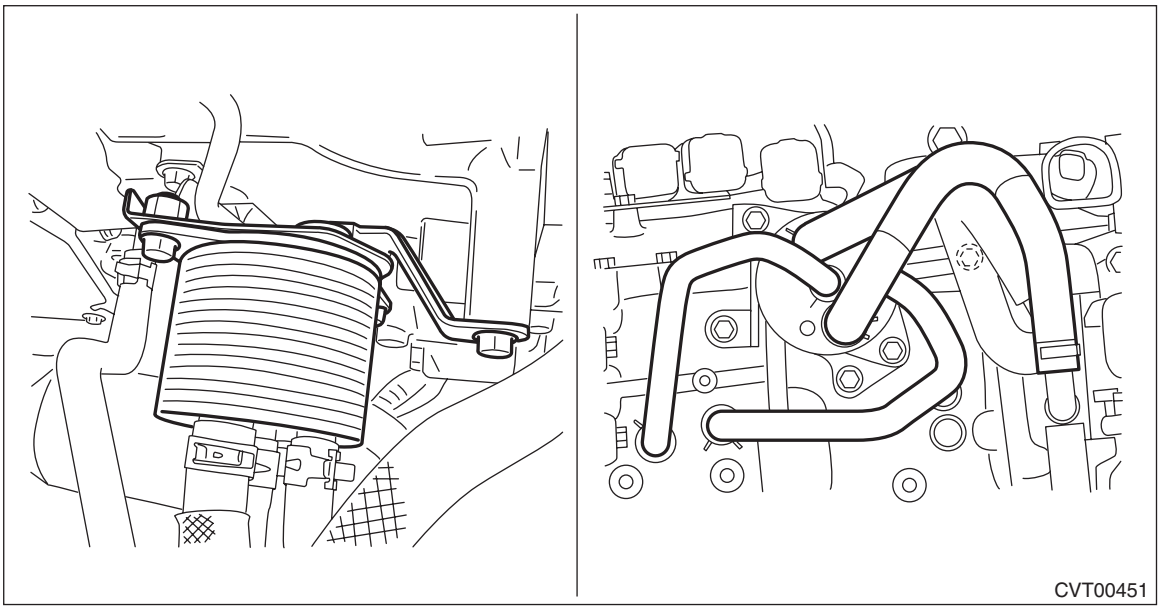
Tightening torque:
23 N·m (2.3 kgf-m, 17.0 ft-lb)

5) Install the engine coolant outlet hose to the CVT cooler (with warmer feature).

6) Install the engine coolant inlet hose to the EGR cooler.



7) Check installation condition of the hose.
- Make sure the hoses do not interfere with each other or with other components.
- Check each hose for bent, excess curve, and twisting conditions.



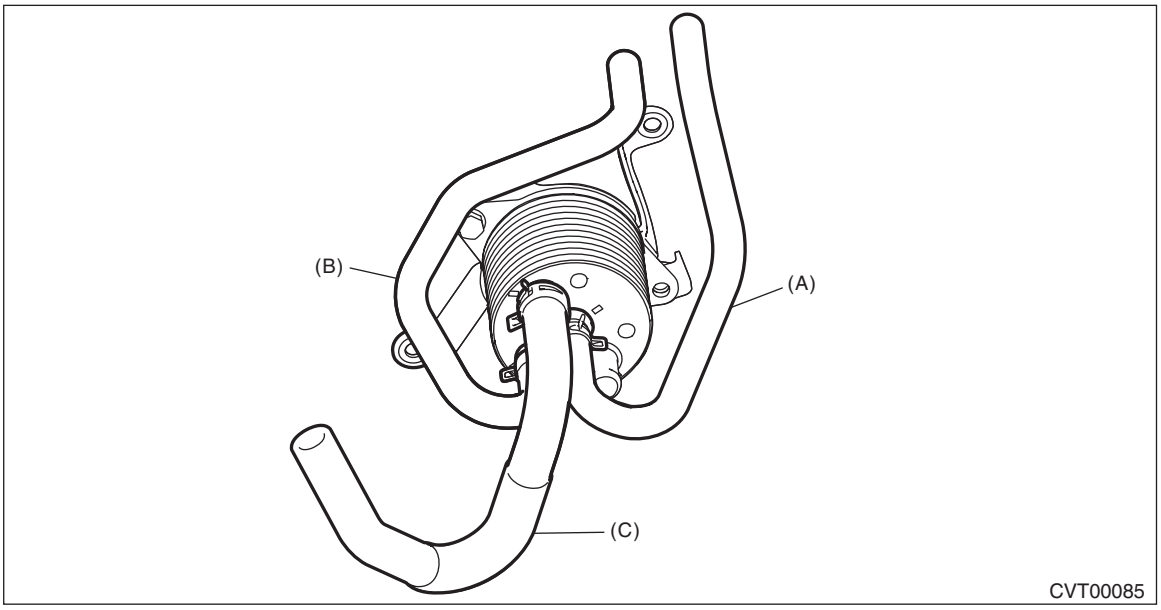
8) Install the engine hanger rear and the vacuum pipe.

Tightening torque:
Engine hanger rear
21 N·m (2.1 kgf-m, 15.5 ft-lb)
Vacuum pipe
6.4 N·m (0.7 kgf-m, 4.7 ft-lb)

9) Install the engine harness connector to the bracket, and then connect the engine harness.
10) Install the drive motor harness connector, and then install the harness clip.
11) Install the air cleaner case. <Ref. to IN(H4DO(HEV))-8, INSTALLATION, Air Cleaner Case.>
12) Install the 12 volt auxiliary battery ground terminal and ground terminal to the 12V engine restart battery sensor of the 12 volt engine restart battery. <Ref. to NT-5, BATTERY, NOTE, Note.>
13) Fill engine coolant. <Ref. to CO(H4DO(w/o HEV))-16, REPLACEMENT, Engine Coolant.>
14) Adjust the CVTF level. <Ref. to CVT(TH58A)-41, ADJUSTMENT, CVTF.>

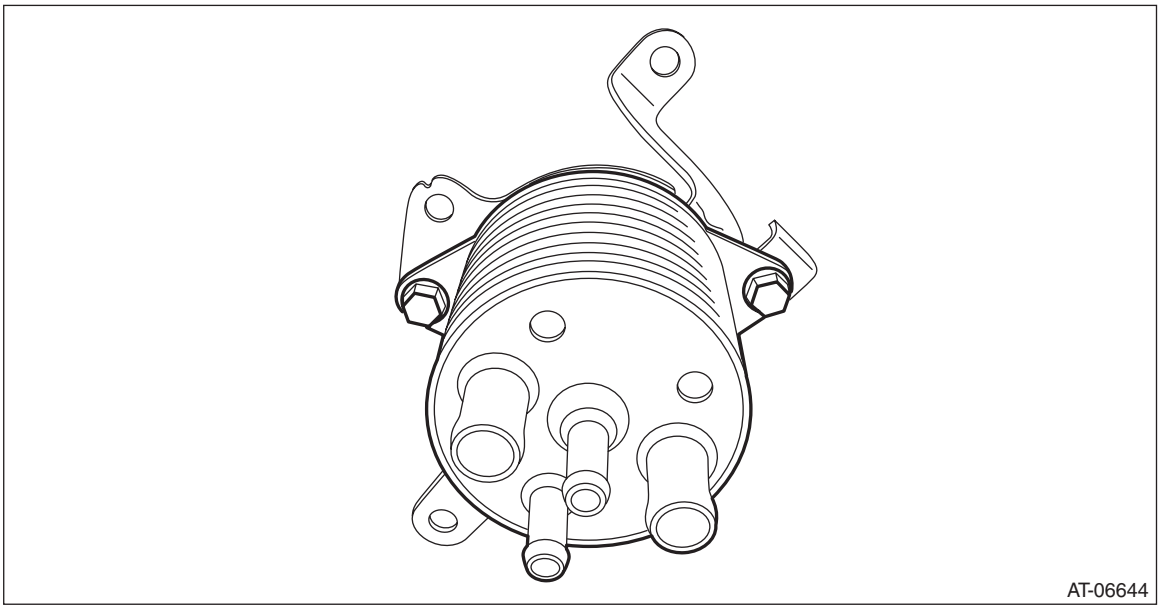
C: DISASSEMBLY

1) Remove the hoses from the CVTF cooler (with warmer feature).



(A) CVTF cooler outlet hose
(B) CVTF cooler inlet hose
(C) Engine coolant inlet hose

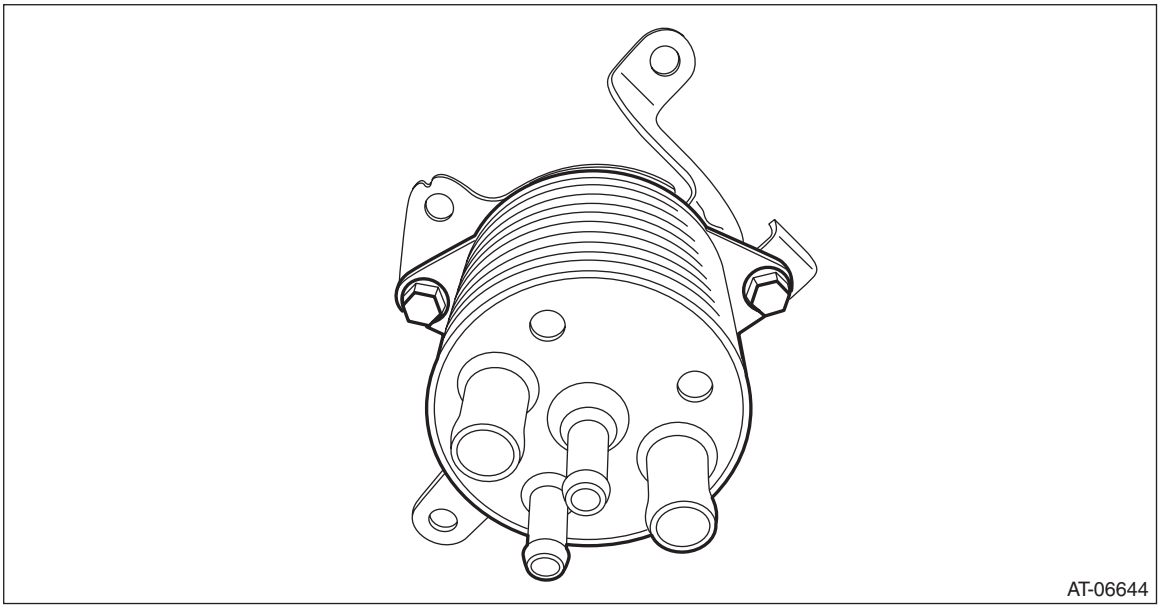
2) Remove the bracket from the CVTF cooler (with warmer feature).



D: ASSEMBLY

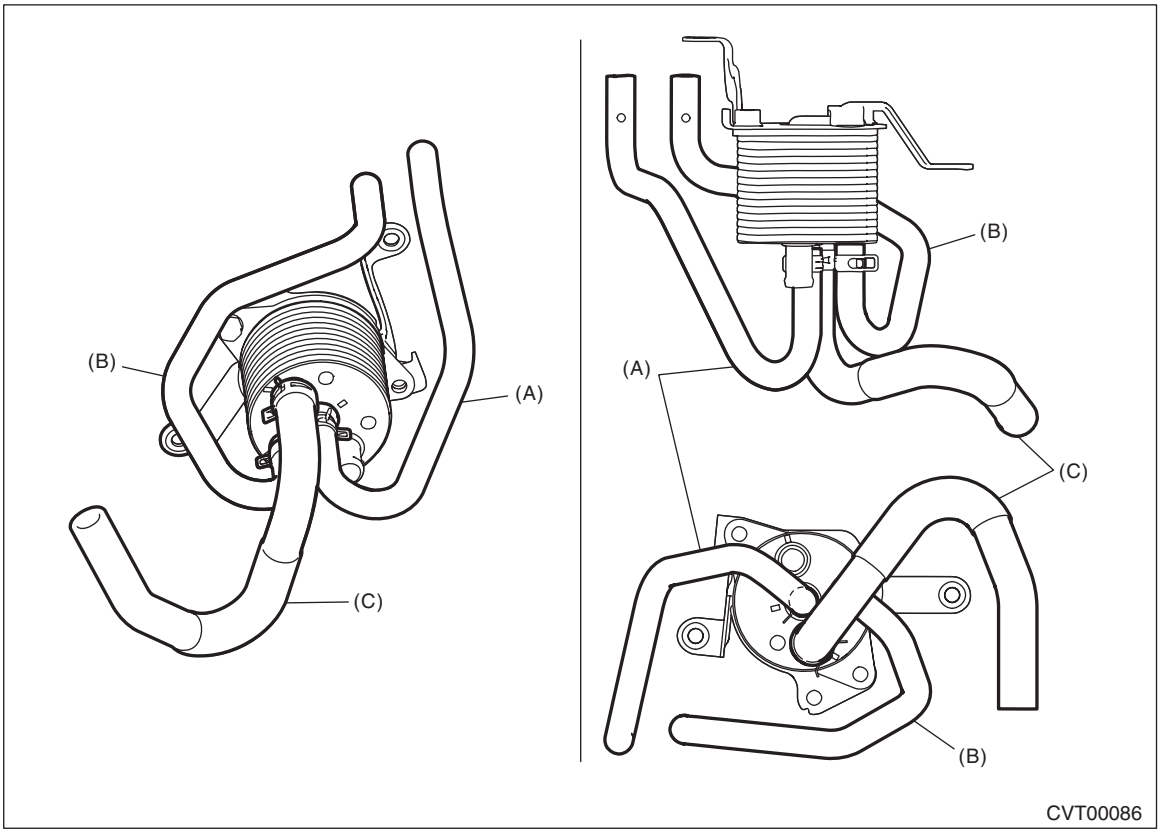
1) Attach the bracket.

Tightening torque:
23 N·m (2.3 kgf-m, 17.0 ft-lb)



2) Attach hoses to the CVTF cooler (with warmer feature).

NOTE:
- Use a new CVTF cooler hose.
- Install so that the CVTF cooler hose is not folded over, excessively bent or twisted.
- Insert the CVTF cooler hose to the specified position in the proper direction.



(A) CVTF cooler outlet hose
(B) CVTF cooler inlet hose
(C) Engine coolant inlet hose

E: INSPECTION

If any malfunction is found in hoses and clamps resulting from the following inspection, replace them.
1) Check that there are no CVTF or engine coolant leaks from the connections.
2) Check the clamp for deformation.
3) Lightly bend the CVTF cooler hose and check for cracks in the surface or other damages.
4) Pinch the CVTF cooler hose with your fingers and check for poor elasticity. Also check for poor elasticity in the parts where the clamp was installed by pressing with your fingernail.
5) Check for peeling, cracks, and deformation at the tip of the hose.
6) Check the CVTF cooler (with warmer feature) for any damage.

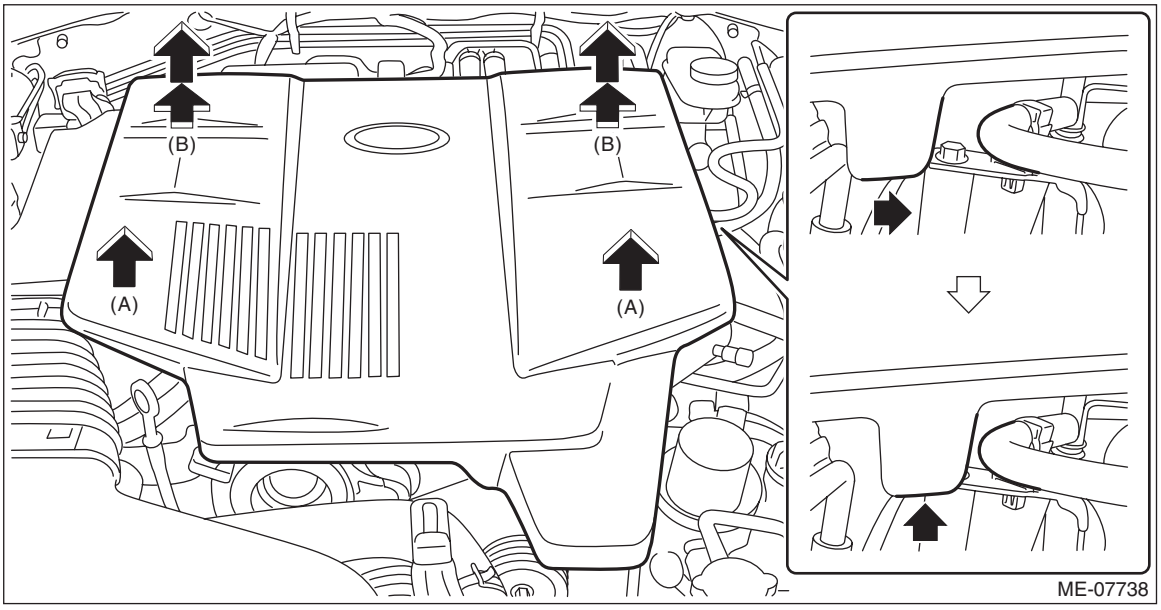
28.Air Breather Hose

A: REMOVAL

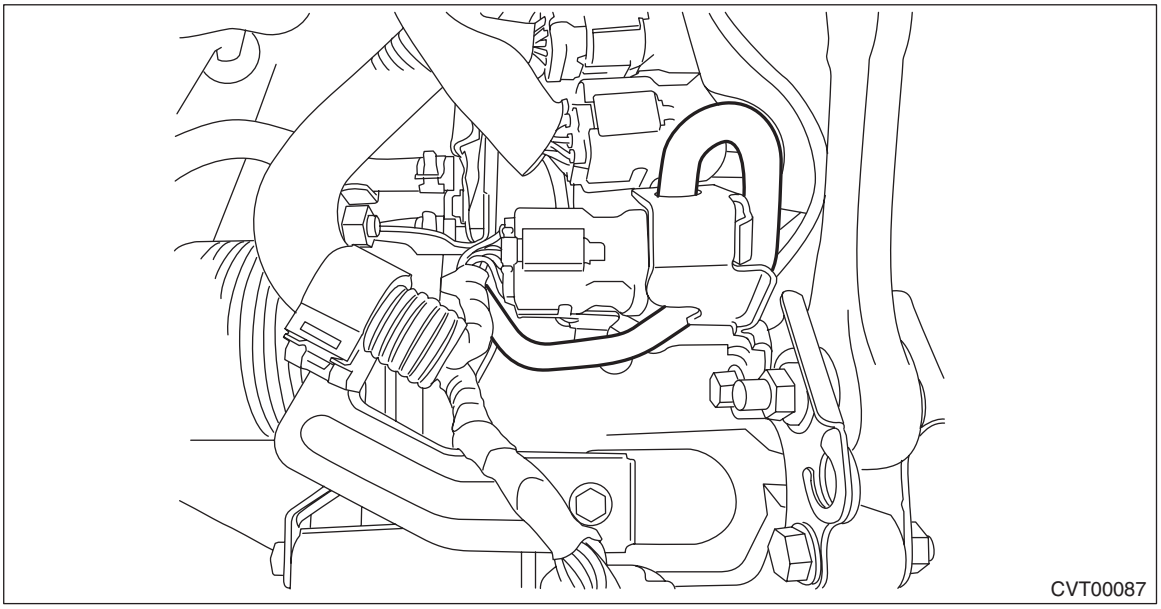
1. FRONT DIFFERENTIAL SIDE

1) Turn the ignition switch to OFF.
2) Remove the collector cover.
   (1) Carefully pull up the front of collector cover at two positions (A).
   (2) Carefully pull up the rear of collector cover at two positions (B) while moving it backward.

NOTE:
Be careful not to contact the fuel delivery tube when moving the collector cover rearward.

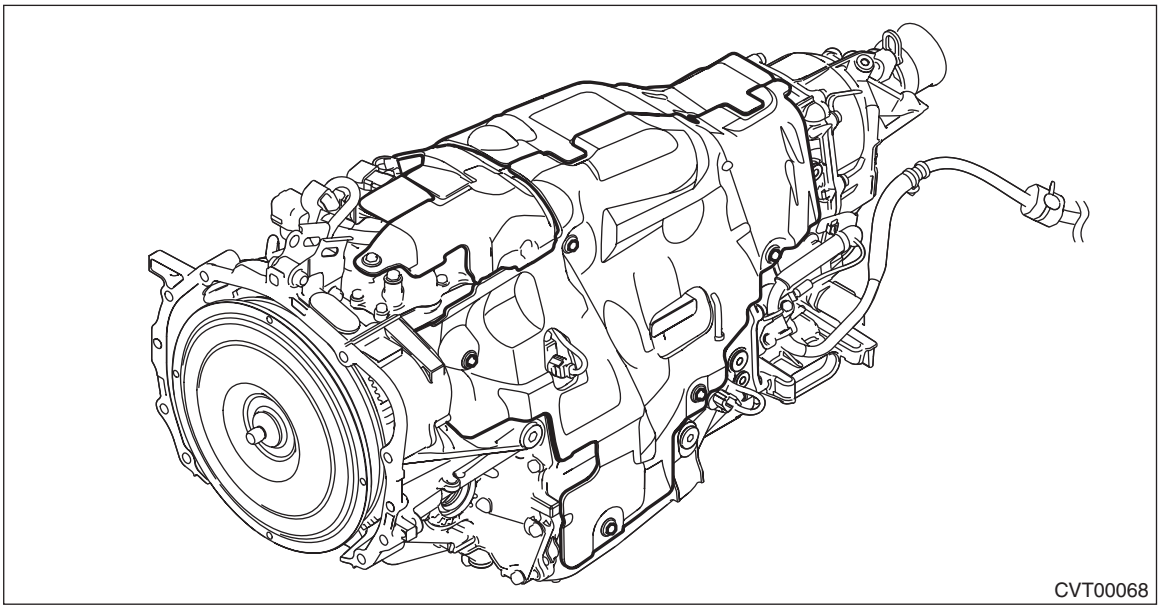


3) Remove the air cleaner case. <Ref. to IN(H4DO(HEV))-6, REMOVAL, Air Cleaner Case.>
4) Remove the air breather hose.

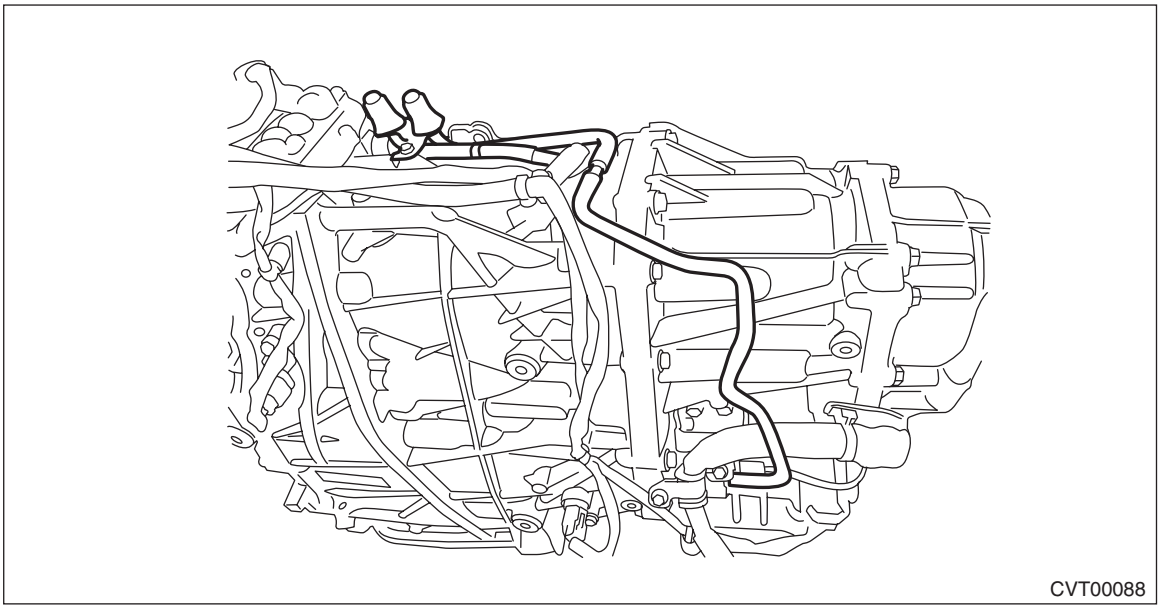


2. TRANSMISSION CASE SIDE

1) Remove the transmission assembly. <Ref. to CVT(TH58A)-63, REMOVAL, Automatic Transmission Assembly.>
2) Remove the transmission case cover.


CVT00068

3) Remove the two air breather hoses.


CVT00088

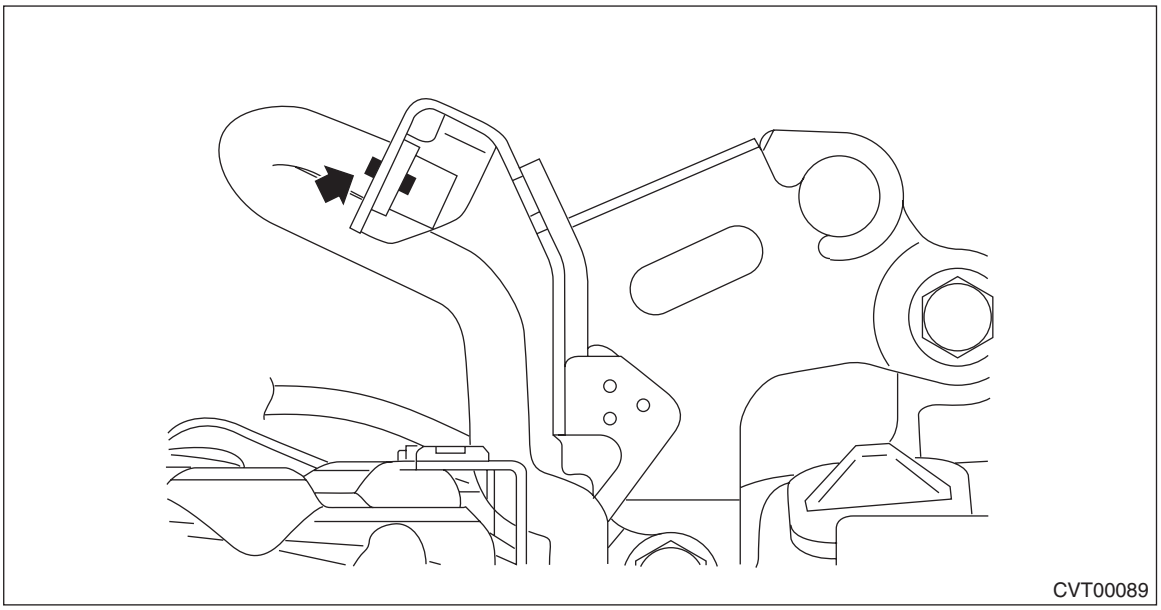
4) Remove the air breather cap, air breather hose and bracket.

B: INSTALLATION

1. FRONT DIFFERENTIAL SIDE

Install in the reverse order of removal.

NOTE:
Place the bracket between the markings of the hose during installation.

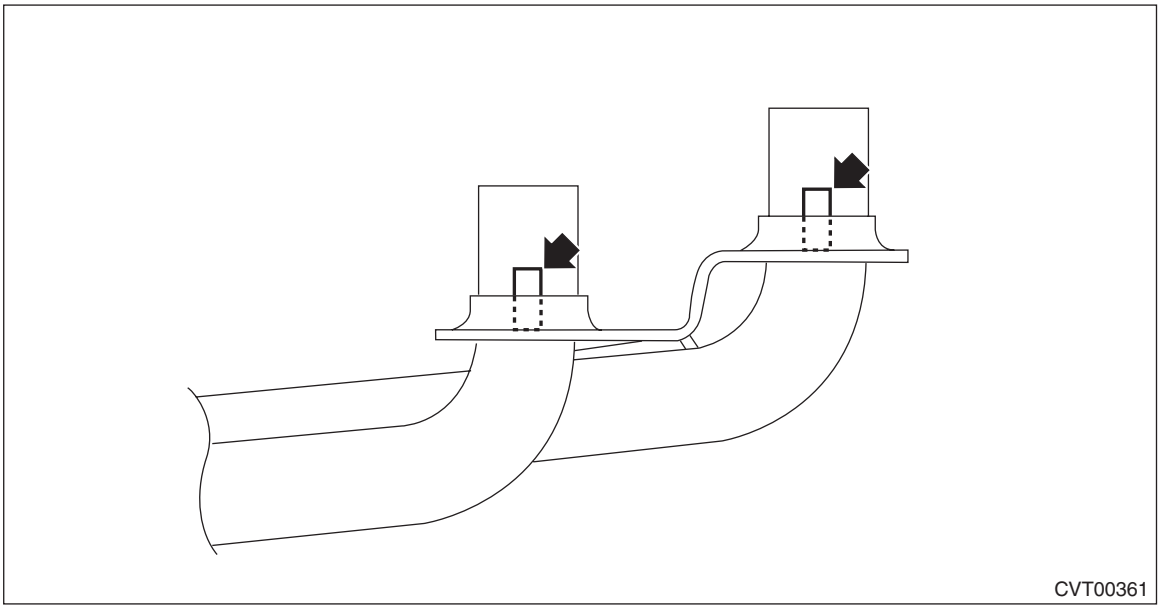


2. TRANSMISSION CASE SIDE

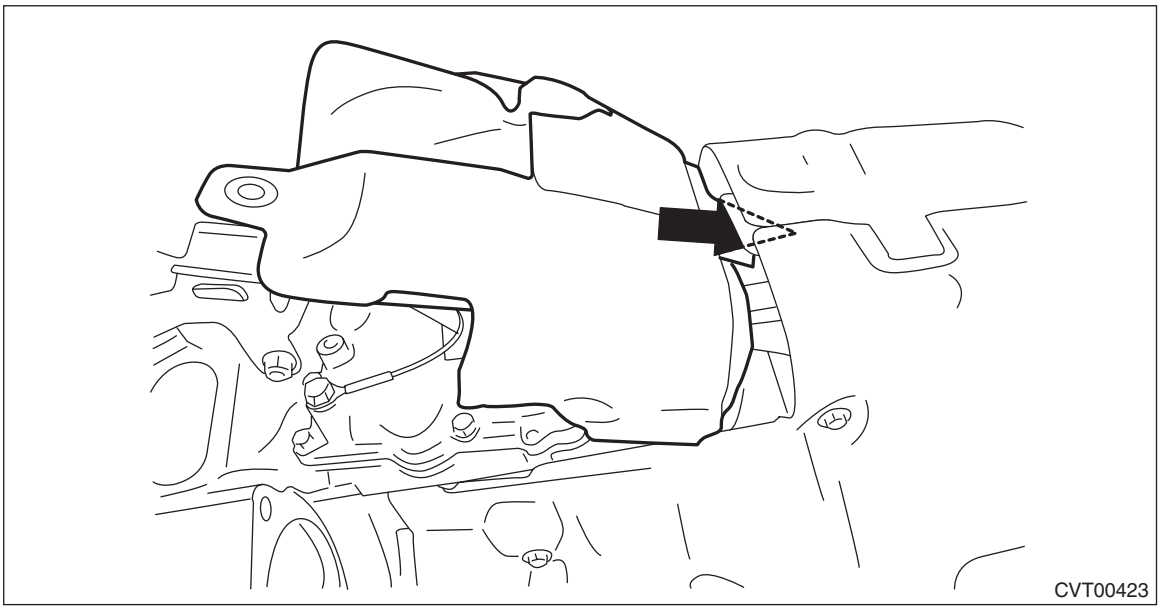
Install in the reverse order of removal.

Tightening torque:
Transmission case cover
8 N·m (0.8 kgf-m, 5.9 ft-lb)
Air breather
5 N·m (0.5 kgf-m, 3.7 ft-lb)

NOTE:
• Place the bracket between the markings of the hose during installation.



• After the transmission case cover (large) is installed, insert the transmission case cover (small) between the transmission case cover (large) and the transmission to install.



• Pass the air breather hose through the upper side of the transmission harness and inside of the electric oil pump harness.

C: INSPECTION

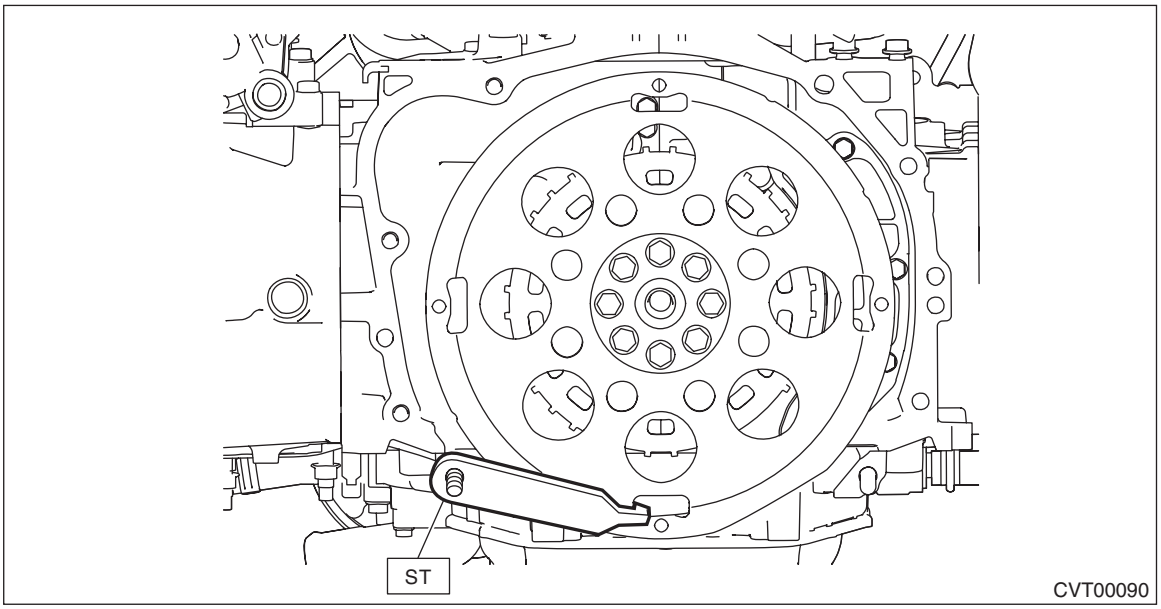
Check the hose for peeling, crack or clogging.

29.Drive Plate

A: REMOVAL

1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TH58A)-63, REMOVAL, Automatic Transmission Assembly.>
2) Set the ST.

NOTE:
Set the ST to the drive plate referring to the illustration.
ST 498497300 CRANKSHAFT STOPPER



3) Remove the drive plate and reinforcement drive plate.

B: INSTALLATION

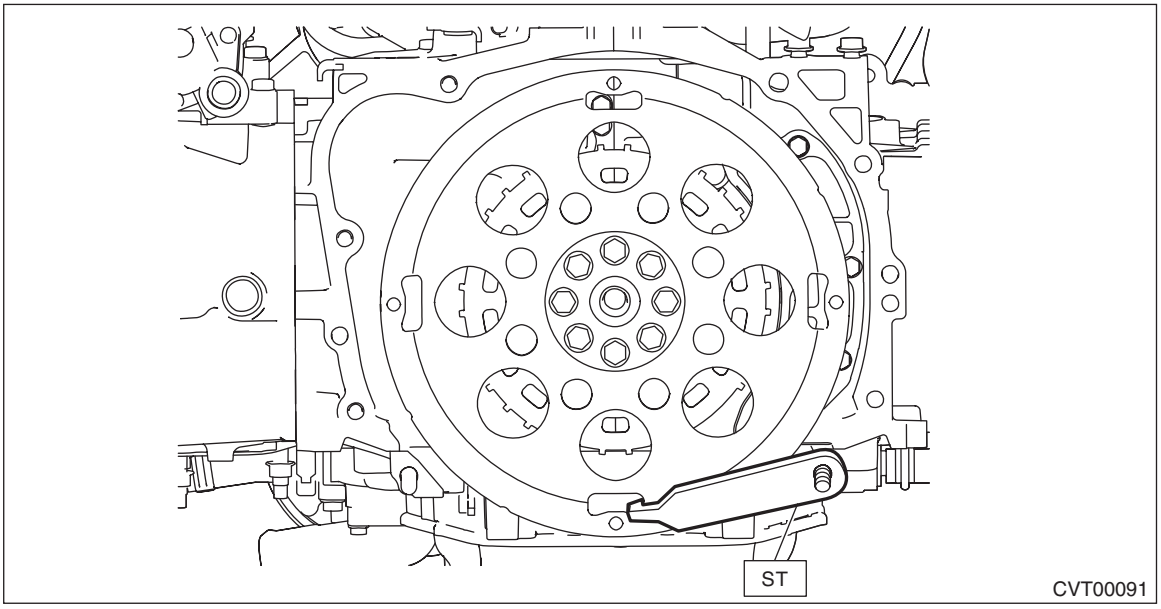
1) Temporarily install the drive plate and reinforcement drive plate.

NOTE:
Align the knock pin hole of the crankshaft position sensor plate to the knock pin of the crankshaft to secure the knock pin.

2) Set the ST.

NOTE:
Set the ST to the drive plate referring to the illustration.

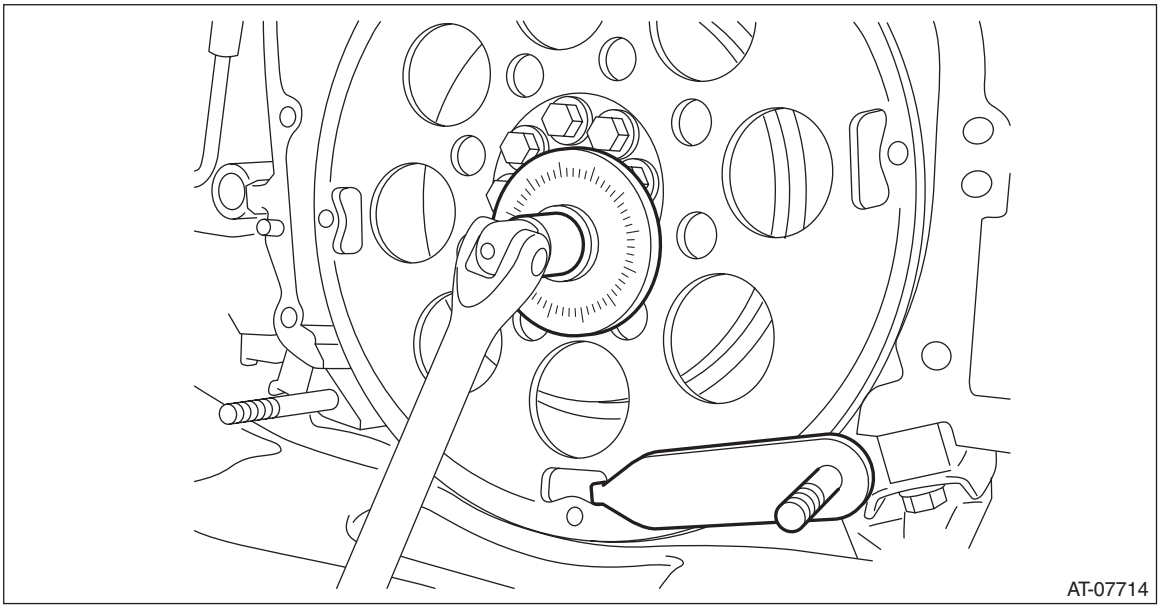
ST 498497300 CRANKSHAFT STOPPER



3) Tighten the drive plate mounting bolt in two stages.
(1) Tighten the drive plate mounting bolt.

Tightening torque:
30 N·m (3.1 kgf-m, 22.1 ft-lb)
(2) While checking the tightening angle with the angle gauge, tighten the drive plate mounting bolts to the specified angle.

Tightening angle:
30° — 35°



4) Install the transmission assembly to the vehicle. <Ref. to CVT(TH58A)-77, INSTALLATION, Automatic Transmission Assembly.>

C: INSPECTION

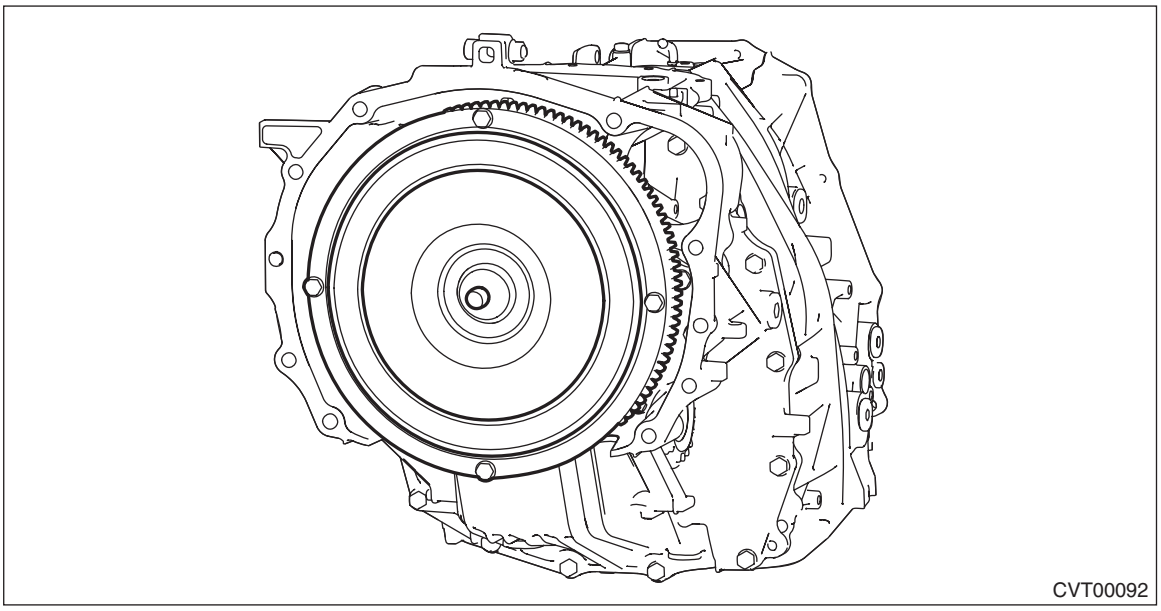
Check the drive cable for damage.

30.Torque Converter Assembly

A: REMOVAL

1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TH58A)-63, REMOVAL, Automatic Transmission Assembly.>
2) Pull out the torque converter assembly horizontally.

CAUTION:
Do not scratch the inside of engaging parts.



3) Remove the O-ring from the input shaft.

B: INSTALLATION

1) Install the O-ring to the input shaft.

NOTE:
- Use new O-rings.
- Apply CVTF to the O-ring.

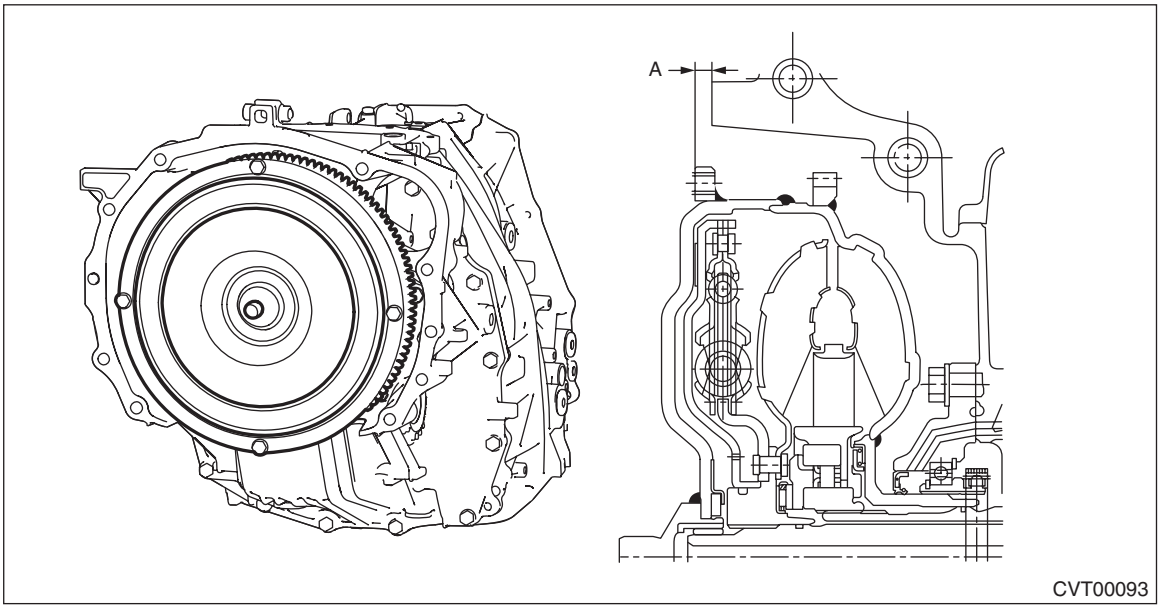
2) While holding the torque converter assembly by hand, carefully install it into the torque converter case.

NOTE:
- Apply CVTF to the oil seal lip.
- Do not damage the oil seal and O-ring.

3) Engage the splines while gently rotating the torque converter assembly by hand, and securely insert the assembly.

4) Measure depth “A”, from converter case end surface to drive plate contacting surface.

Standard (reference):
6.8 mm (0.268 in) or less



5) Install the transmission assembly to the vehicle. <Ref. to CVT(TH58A)-77, INSTALLATION, Automatic Transmission Assembly.>

C: INSPECTION

- Check the protrusion of torque converter center (front boss) is not deformed or damaged.
- Check the ring gear and exterior for break or damage.

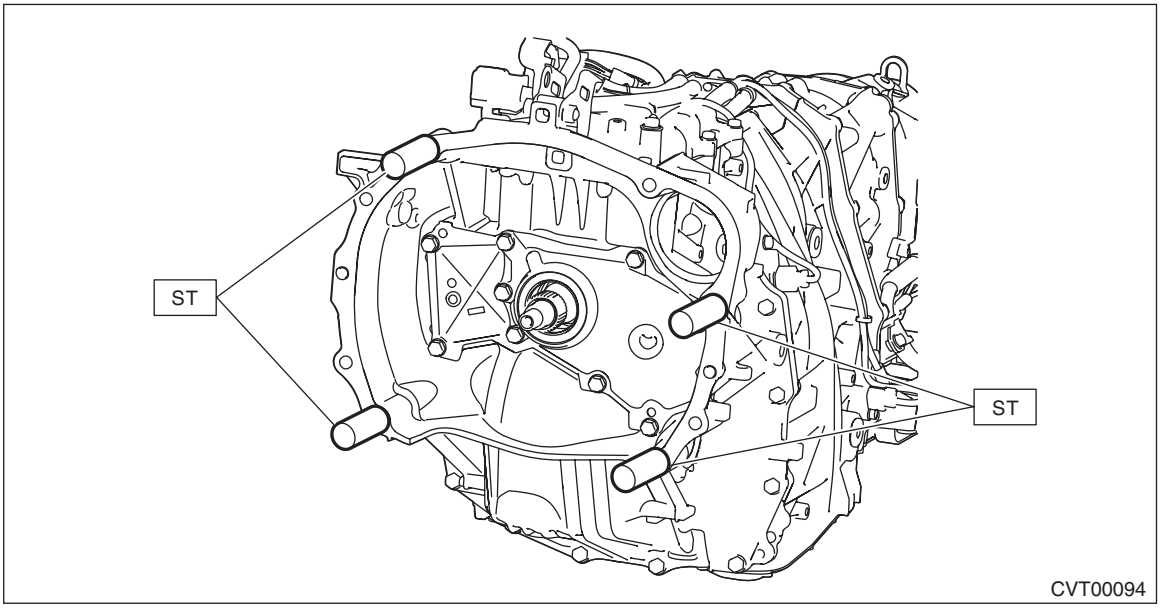
31.Preparation for Overhaul

A: GENERAL DESCRIPTION

Before disassembling and assembling the transmission, follow the following procedures to prepare.

B: PROCEDURE

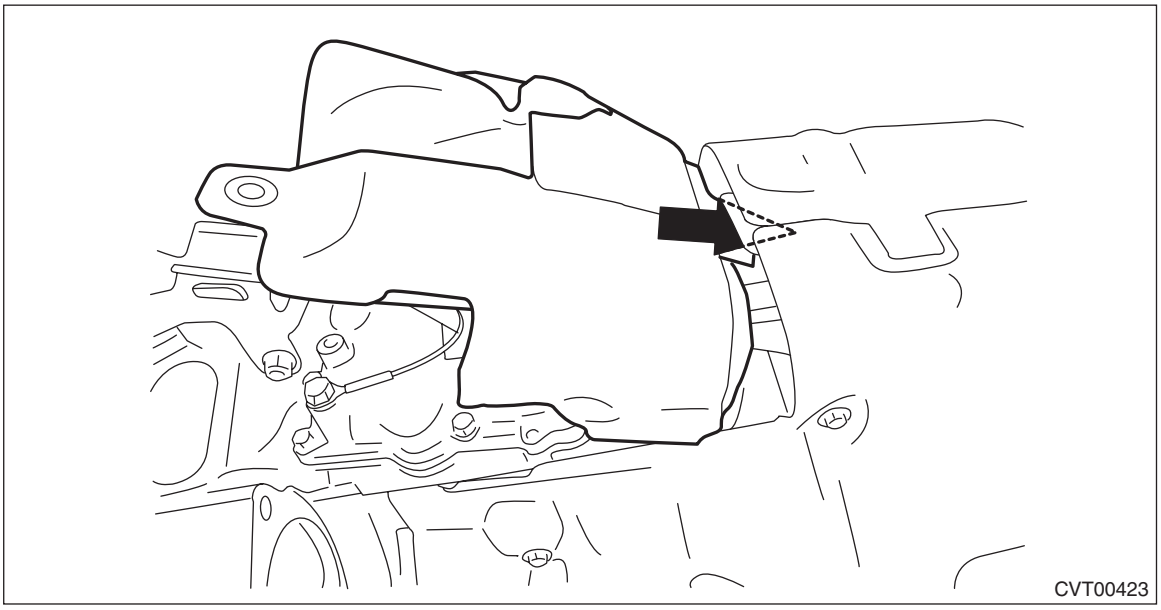
1) Clean the transmission exterior.
2) Remove the torque converter assembly. <Ref. to CVT(TH58A)-178, Torque Converter Assembly.>
3) Attach the ST on the transmission.
ST 18632AA000 STAND ASSY

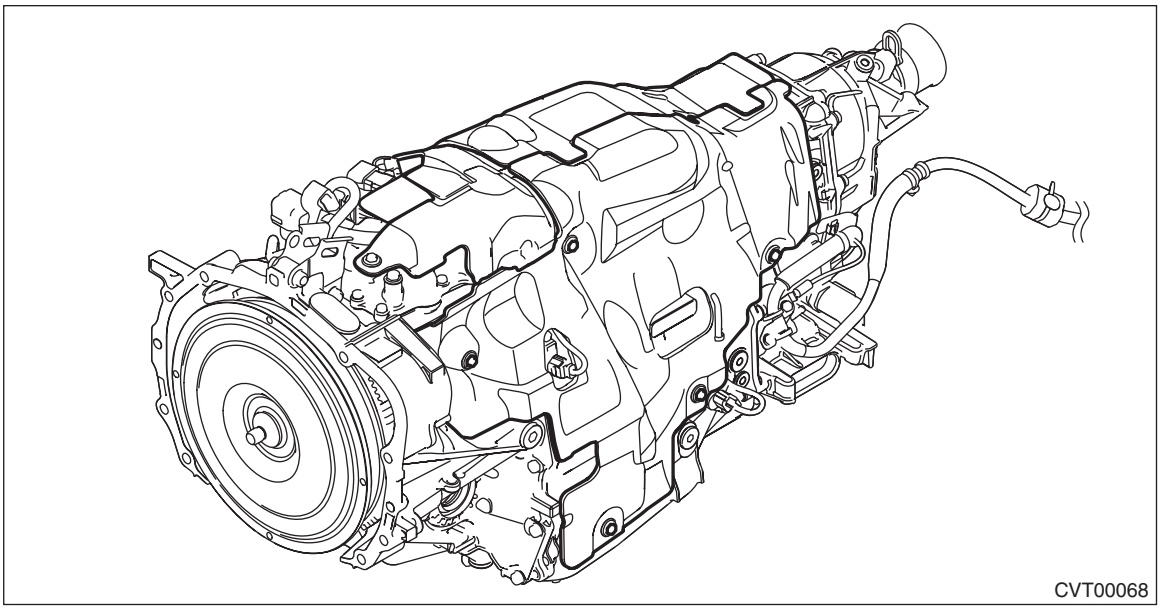


4) Remove the transmission case cover on the transmission upper side.

NOTE:
After the transmission case cover (large) is installed, insert the transmission case cover (small) between the transmission case cover (large) and the transmission to install.

Tightening torque:
8 N·m (0.8 kgf-m, 5.9 ft-lb)



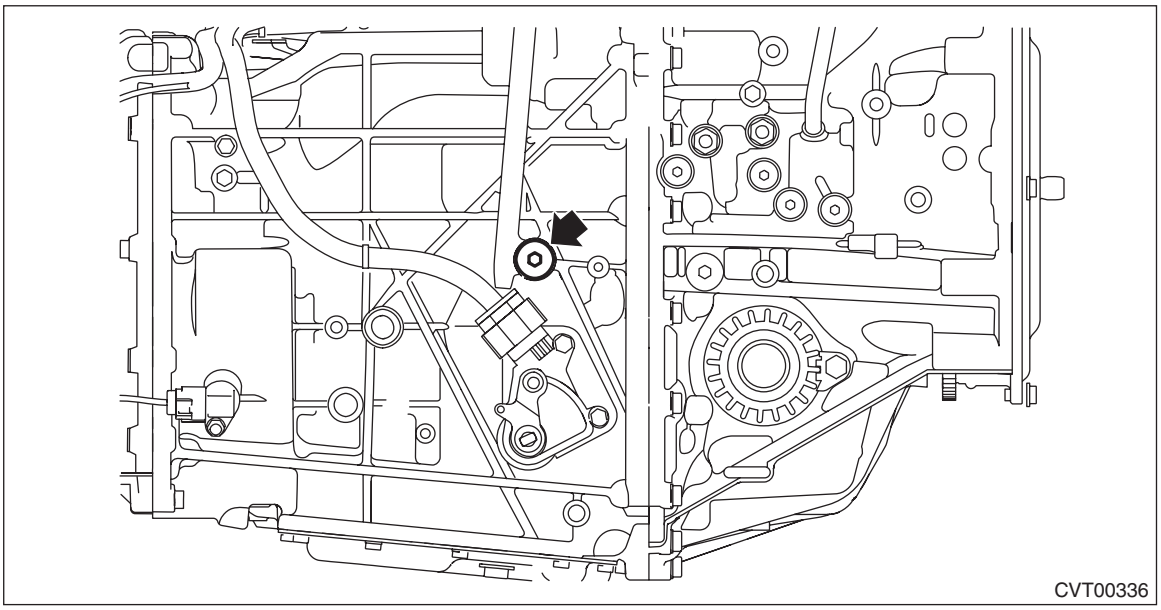

CVT00068

5) Place the transmission assembly on end.
6) When completely overhauling the transmission, refill it with CVTF through the transmission right side plug, and install the plug.

CAUTION:
• Always use specified CVTF. Using other fluid will cause malfunction. <Ref. to CVT(TH58A)-4, HYDRAULIC CONTROL AND LUBRICATION, SPECIFICATION, General Description.>
• After the transmission is installed to the engine, be sure to adjust the CVTF level.

NOTE:
Use a new gasket.

Tightening torque:
50 N·m (5.1 kgf-m, 36.9 ft-lb)

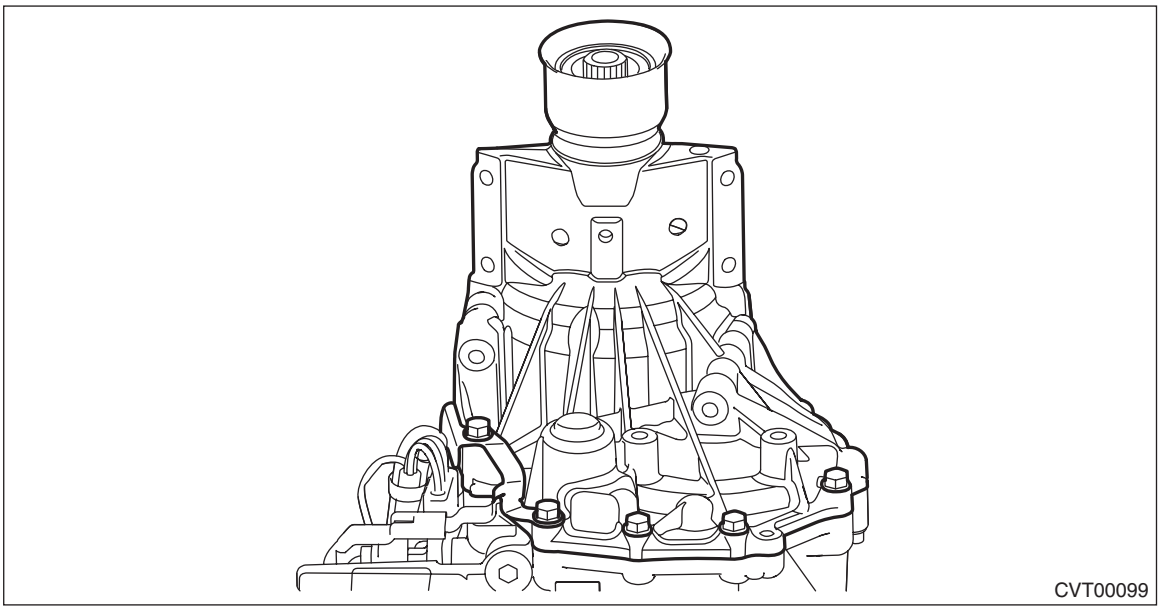

CVT00336

32.Extension Case

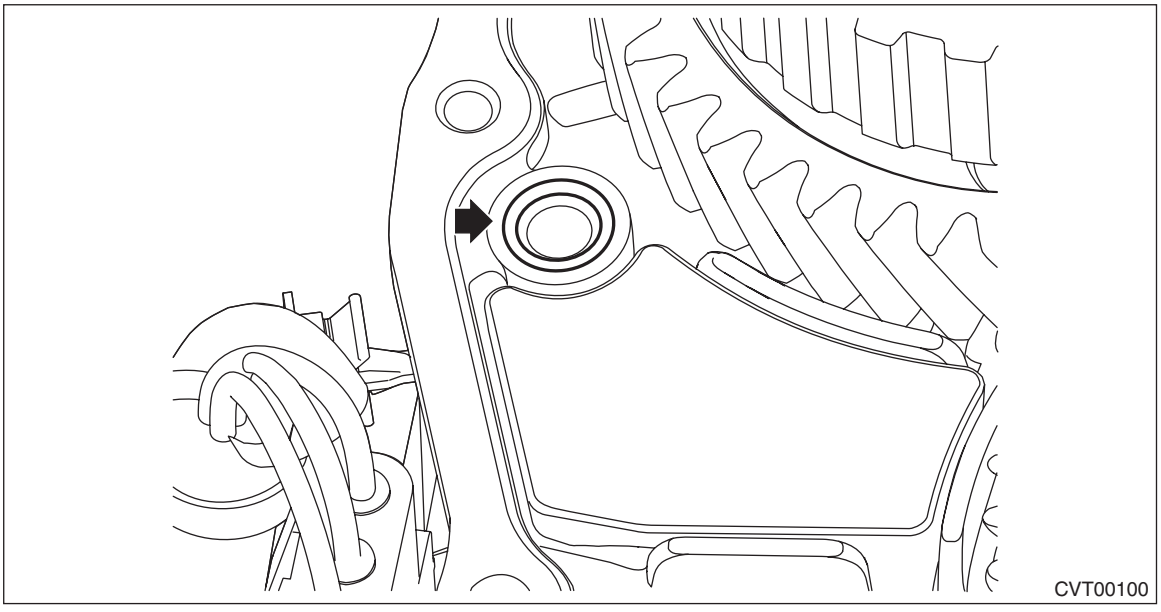
A: REMOVAL

1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TH58A)-63, REMOVAL, Automatic Transmission Assembly.>
2) Remove the extension case and the clip.

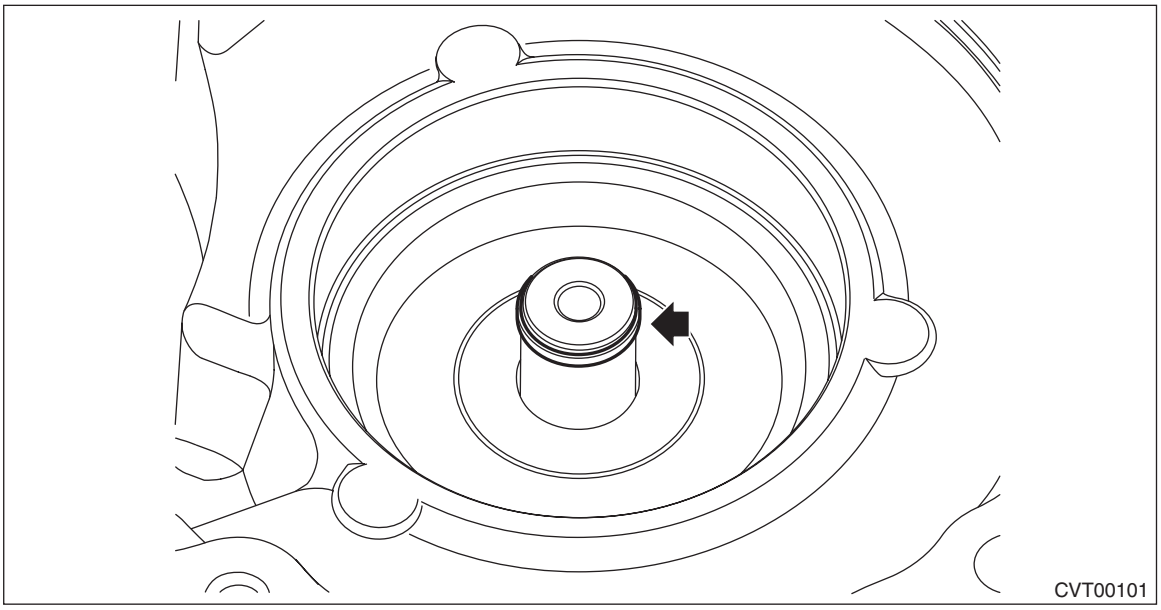
NOTE:
The total number of extension case mounting bolts is 12.



3) Remove the O-ring.



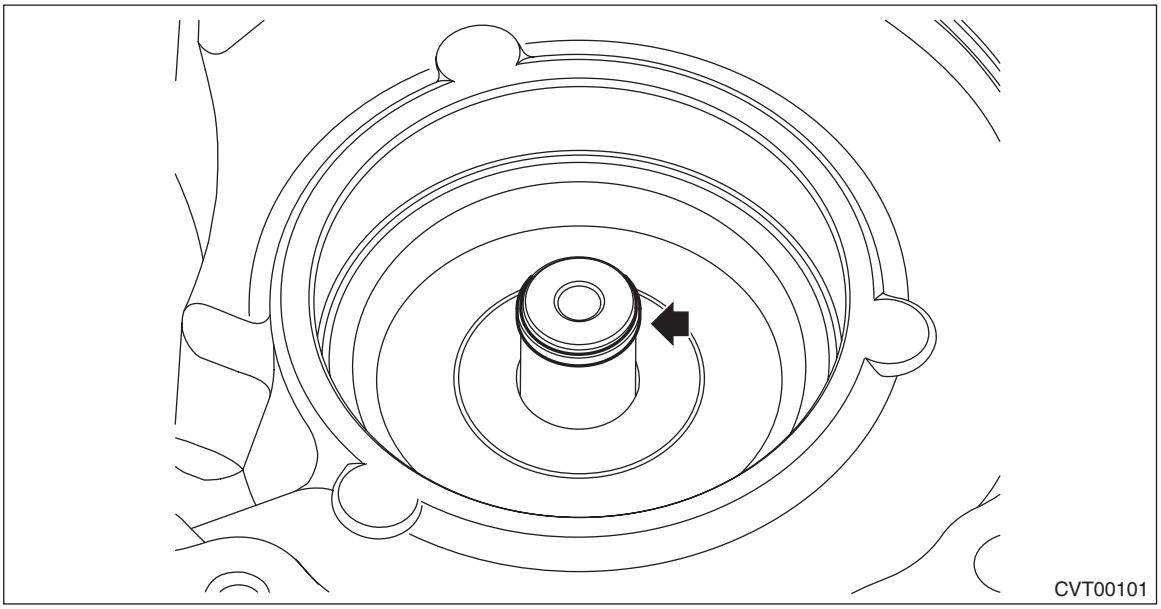
4) Remove the seal ring.



B: INSTALLATION

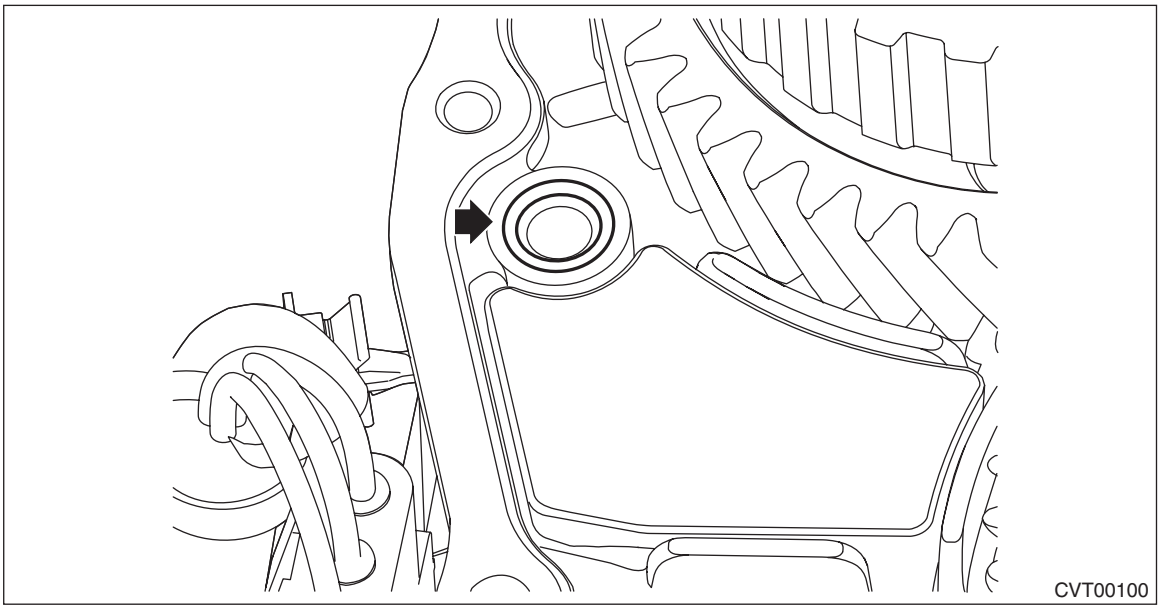
1) Clean the mating surface of extension case and transmission case.
2) Select the transfer drive gear shim. <Ref. to CVT(TH58A)-261, ADJUSTMENT, Reduction Drive Gear.>
3) Select the transfer driven gear shim. <Ref. to CVT(TH58A)-198, ADJUSTMENT, Transfer Clutch.>
4) Attach the selected transfer drive gear shim to extension case with vaseline.
5) Attach the selected transfer driven gear shim to extension case with vaseline.
6) Install the seal ring to the extension case.

NOTE:
- Use a new seal ring.
- When installing the seal ring, do not expand the seal ring too much.
- Apply CVTF to the seal rings.



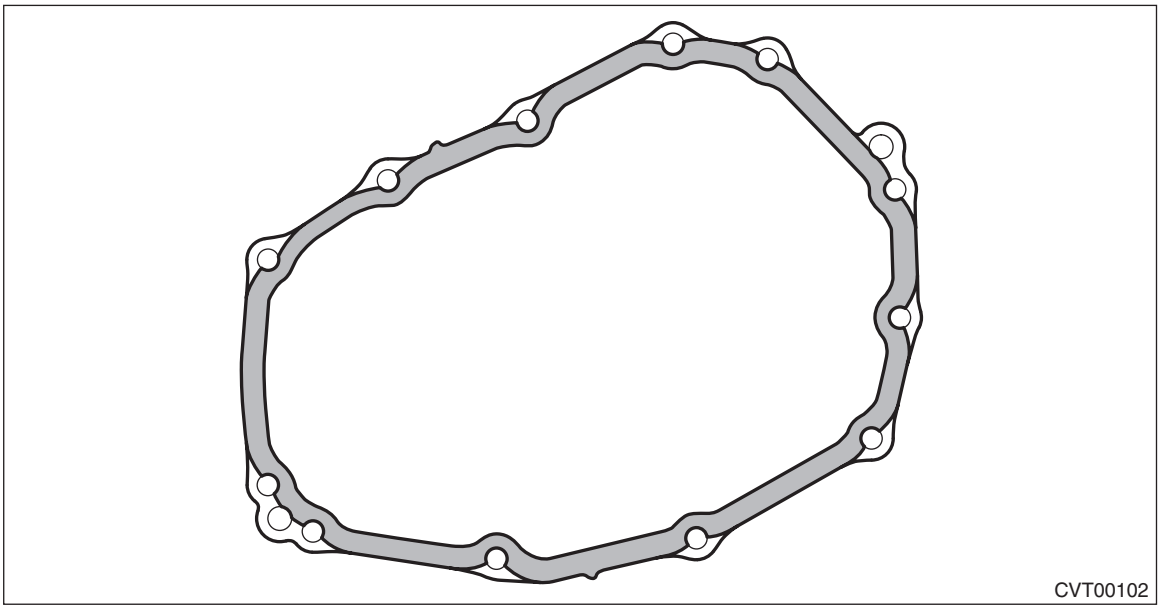
7) Install the O-ring to the transmission case.

NOTE:
- Use new O-rings.
- Apply CVTF to the O-ring.



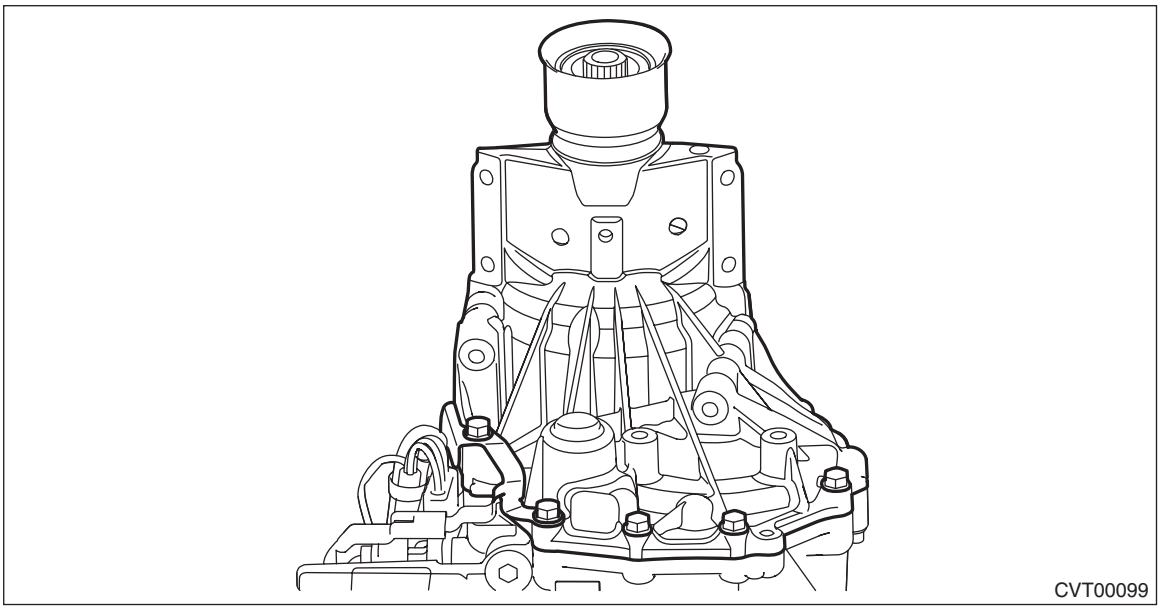
8) Apply liquid gasket to the drive motor assembly seamlessly.

Liquid gasket:
THREE BOND 1215B or equivalent



9) Install the extension case, clip and harness bracket.

Tightening torque:
25 N·m (2.5 kgf-m, 18.4 ft-lb)



10) Install the transmission assembly. <Ref. to CVT(TH58A)-77, INSTALLATION, Automatic Transmission Assembly.>

C: DISASSEMBLY

1) Remove the transmission hanger.
2) Remove the dust cover from extension case.
3) Remove the extension case oil seal from the extension case.
4) Remove all plugs.

D: ASSEMBLY

1) Press-fit the dust cover into extension case.
2) Install the extension case oil seal to extension case.
3) Install all plugs.

NOTE:
- Use a new O-ring or a gasket.
- Apply CVTF to the O-ring.

Tightening torque:
25 N·m (2.5 kgf-m, 18.4 ft-lb)

4) Install the transmission hanger.

Tightening torque:
25 N·m (2.5 kgf-m, 18.4 ft-lb)

E: INSPECTION

- Check there is no leak of CVTF from the joint between extension case and transmission case.
- Check there is no damage or cracks on the extension case and other parts.

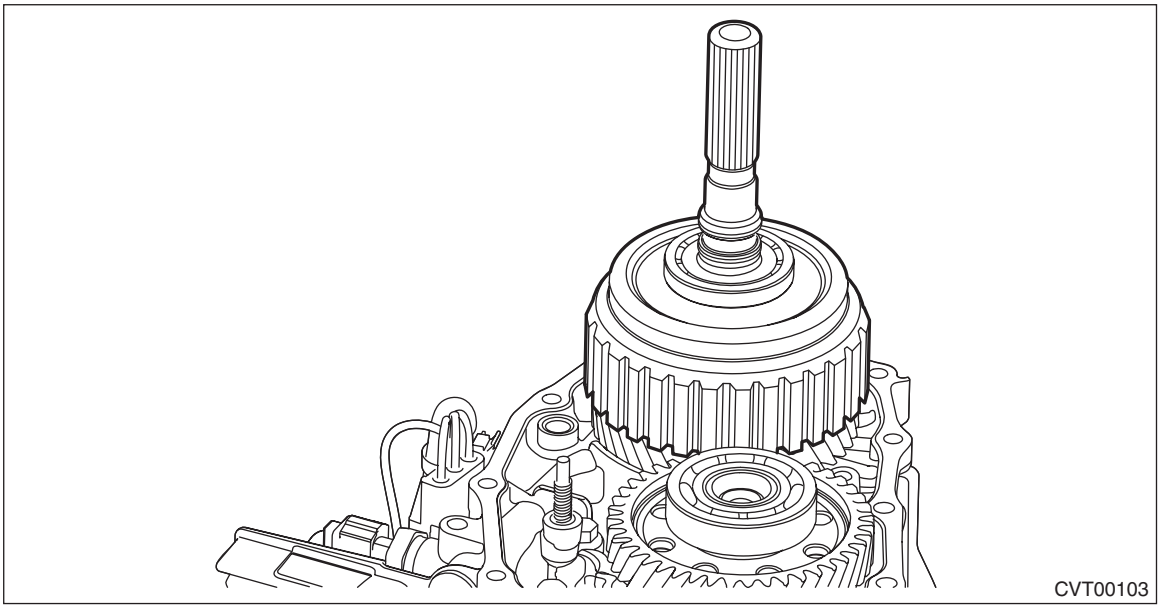
F: ADJUSTMENT

NOTE:
When replacing the extension case, select the transfer drive gear shim and transfer driven gear shim. <Ref. to CVT(TH58A)-207, ADJUSTMENT, Transfer Drive Gear.> <Ref. to CVT(TH58A)-198, ADJUSTMENT, Transfer Clutch.>

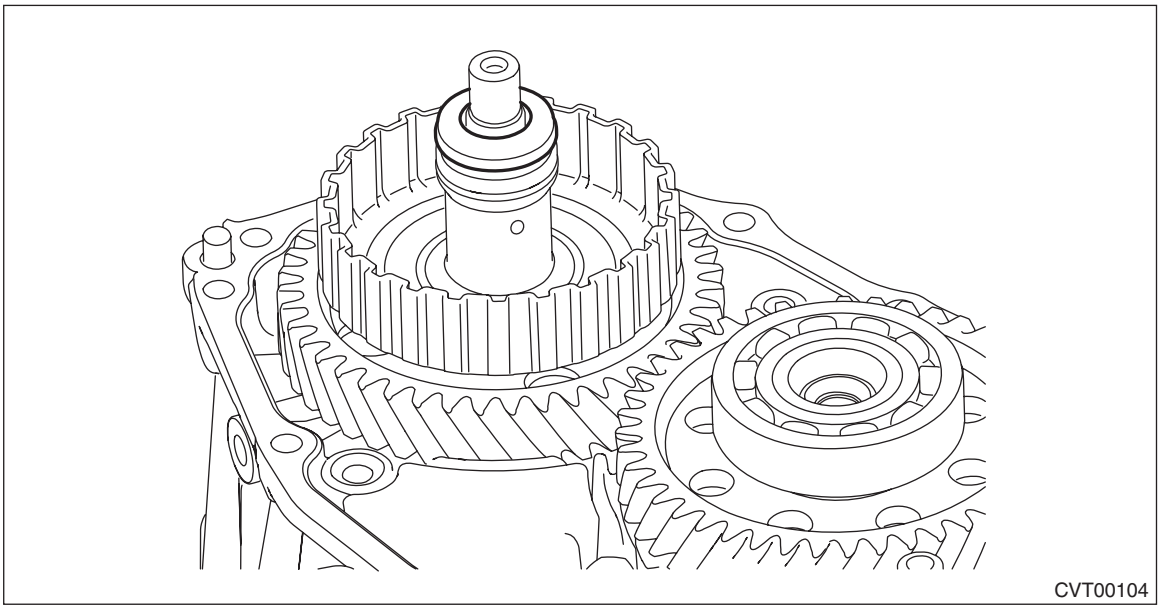
33.Transfer Clutch

A: REMOVAL

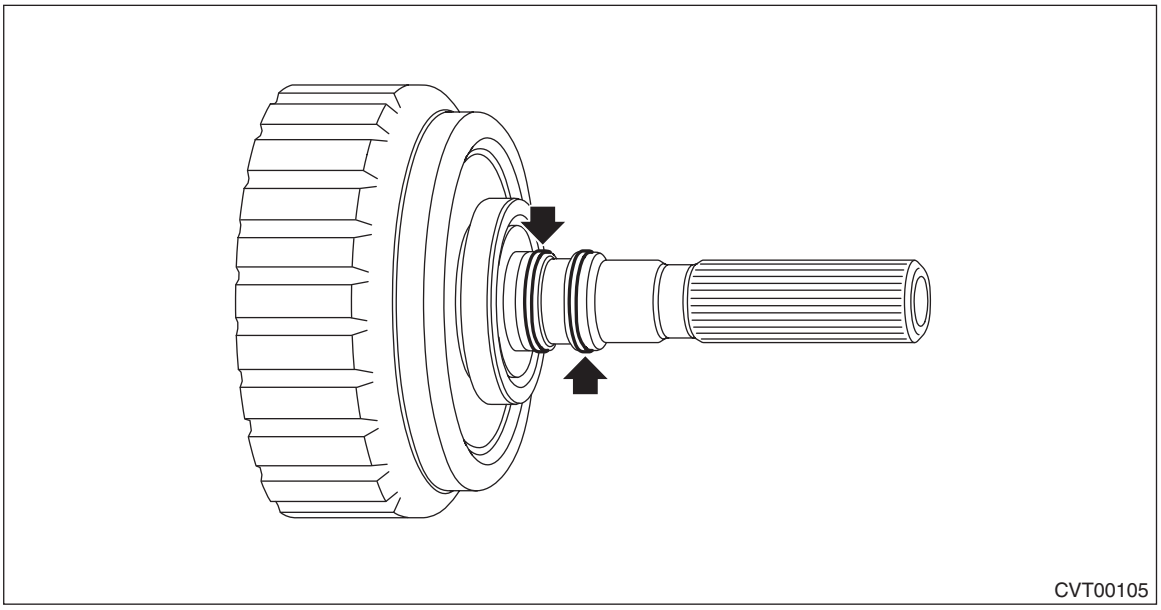
1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TH58A)-63, REMOVAL, Automatic Transmission Assembly.>
2) Remove the extension case. <Ref. to CVT(TH58A)-182, REMOVAL, Extension Case.>
3) Remove the transfer clutch assembly.


CVT00103

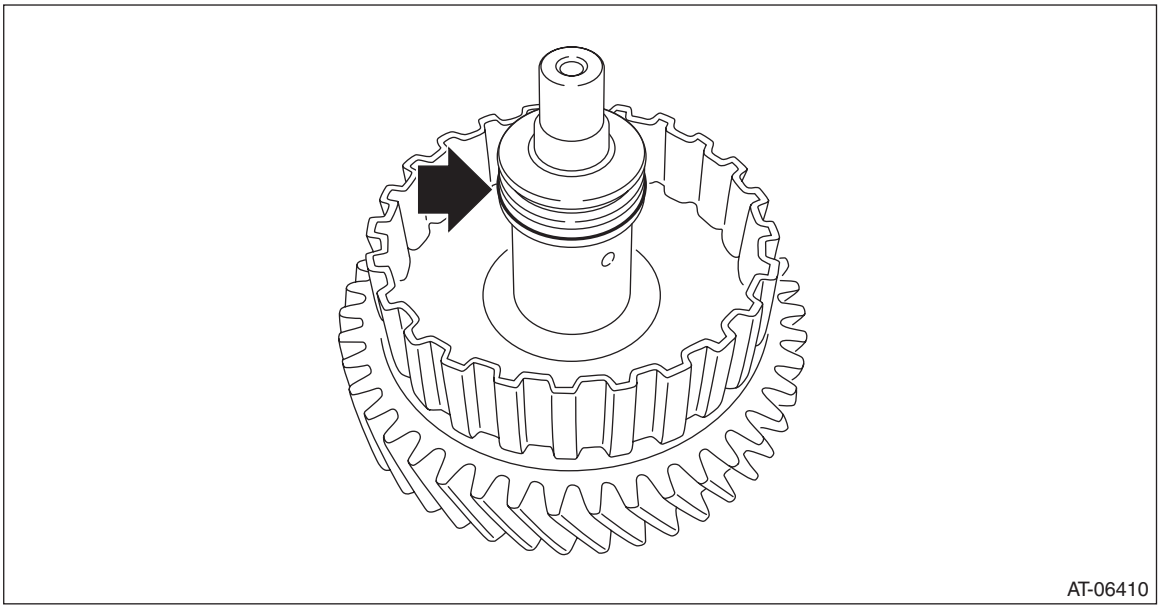
4) Remove the thrust bearing.


CVT00104

5) Remove the seal ring from transfer clutch assembly.



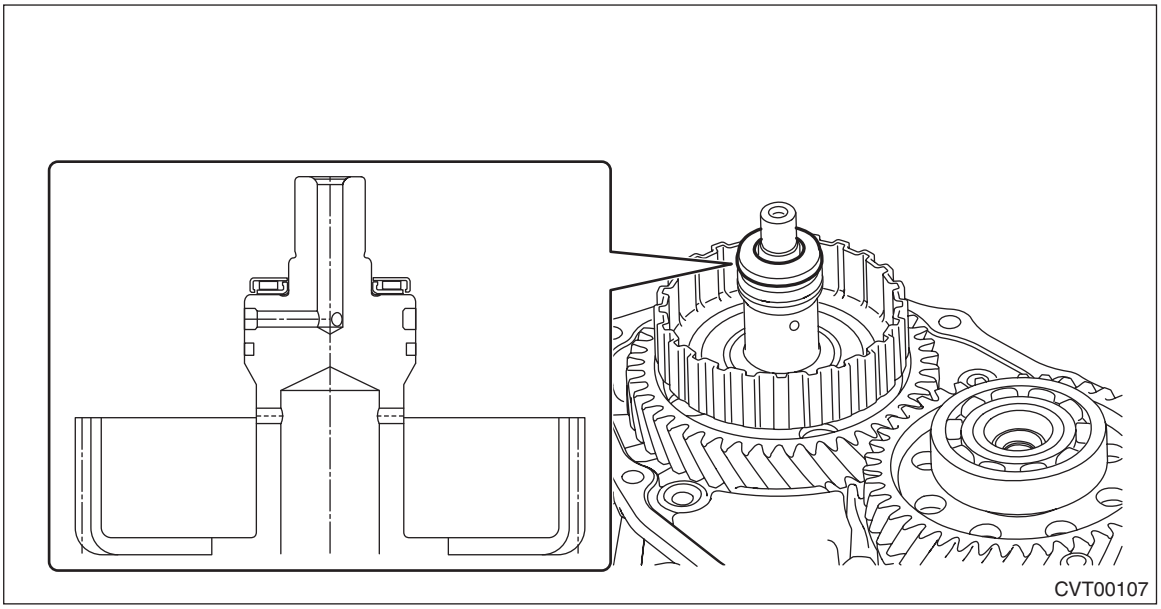
6) Remove the seal ring from the transfer driven gear assembly.



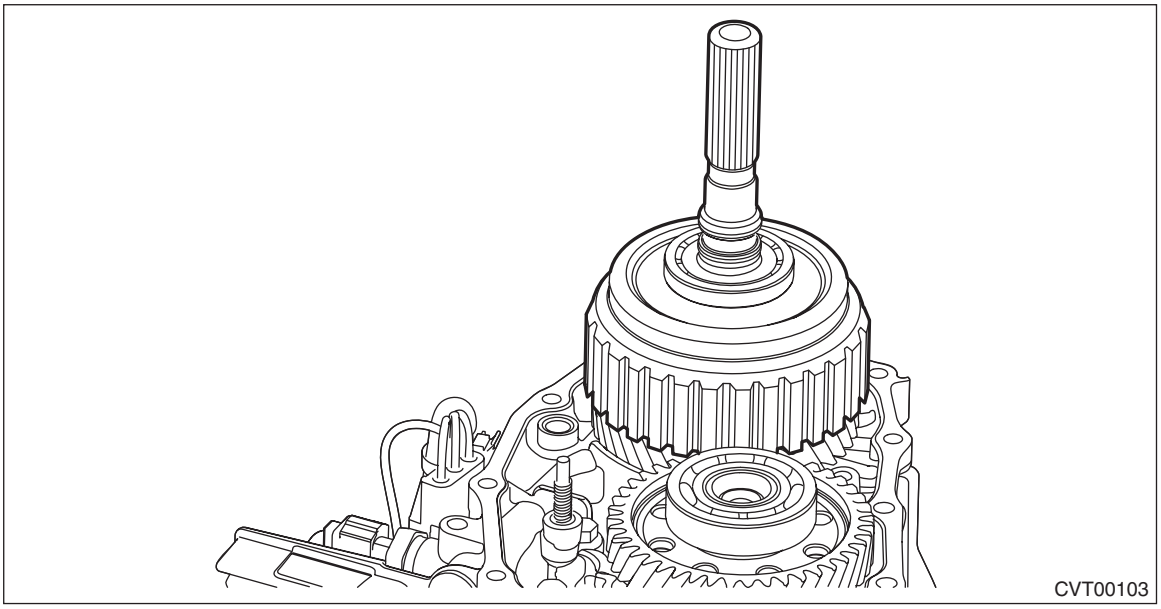
B: INSTALLATION

1) Install the thrust bearing.

NOTE:
Make sure to install in the right direction.



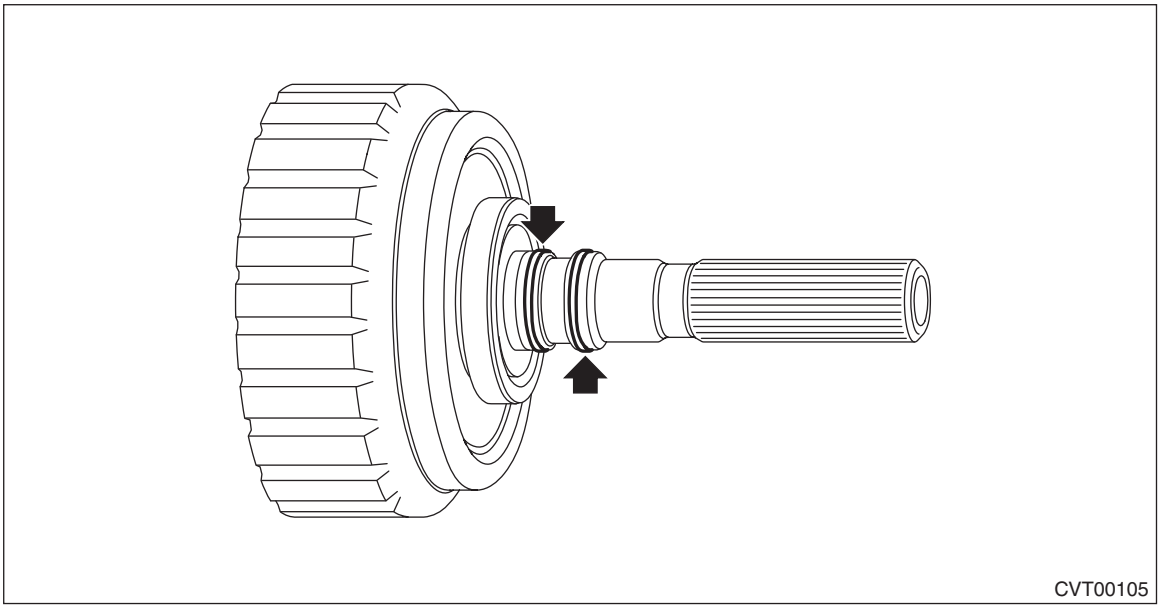
2) Install the transfer clutch assembly.



3) Select the transfer driven gear shim. <Ref. to CVT(TH58A)-198, ADJUSTMENT, Transfer Clutch.>
4) Attach the selected transfer driven gear shim to extension case with vaseline.
5) Remove the transfer clutch assembly.

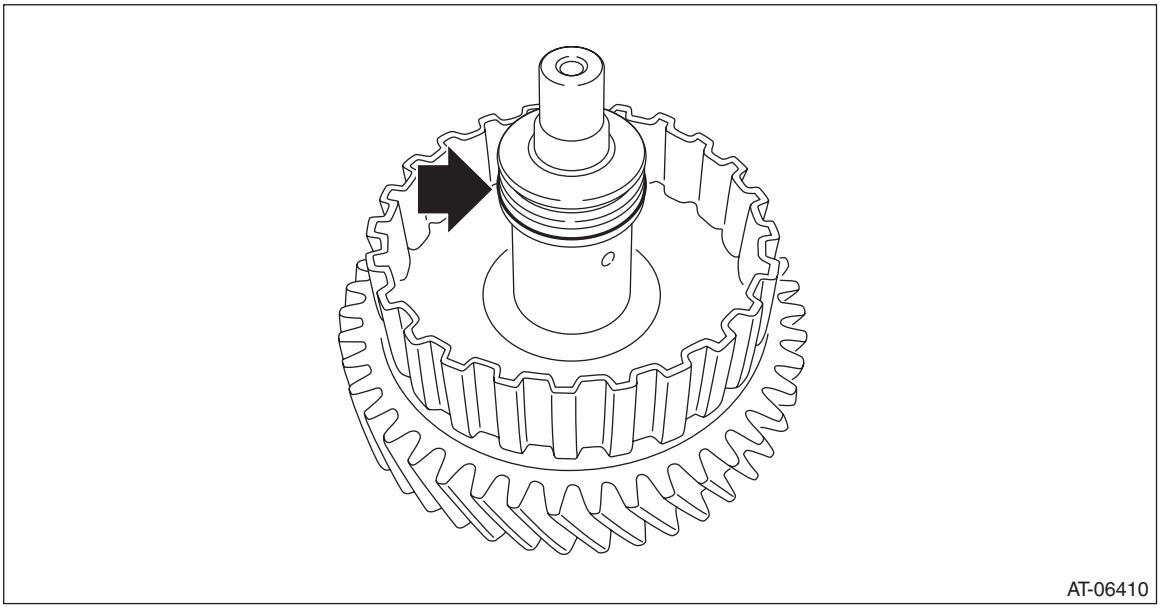
6) Install the seal ring to the transfer clutch assembly.

NOTE:
- Use a new seal ring.
- When installing the seal ring, do not expand the seal ring too much.
- Apply CVTF to the seal rings.



7) Install the seal ring to the transfer driven gear assembly.

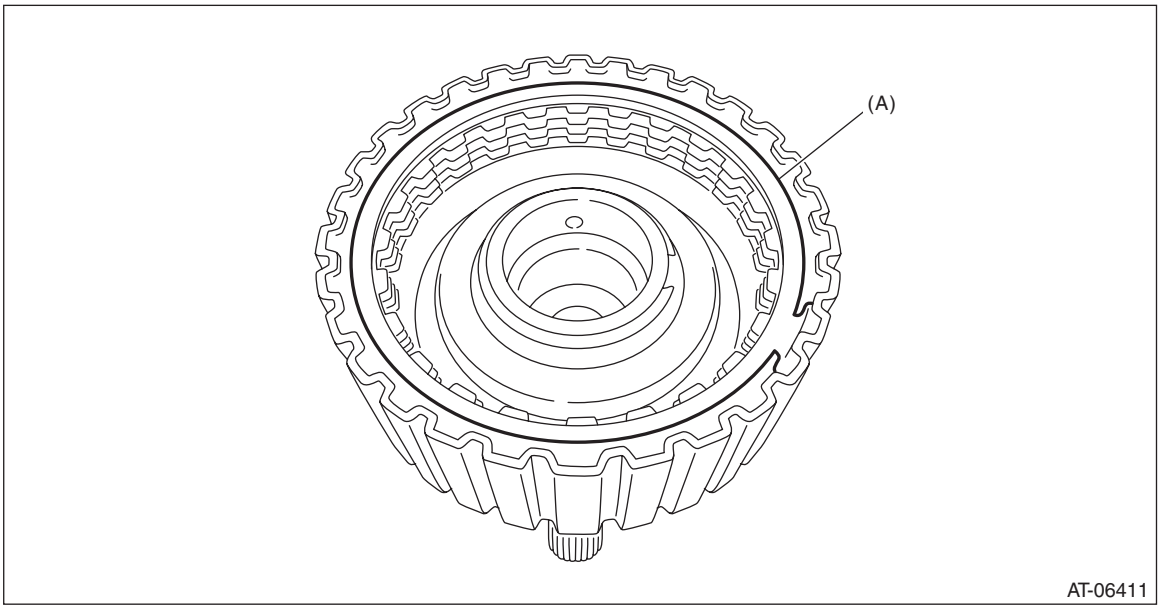
NOTE:
- Use a new seal ring.
- When installing the seal ring, do not expand the seal ring too much.
- Apply CVTF to the seal rings.



8) Install the transfer clutch assembly.
9) Install the extension case. <Ref. to CVT(TH58A)-183, INSTALLATION, Extension Case.>
10) Install the transmission assembly to the vehicle. <Ref. to CVT(TH58A)-77, INSTALLATION, Automatic Transmission Assembly.>

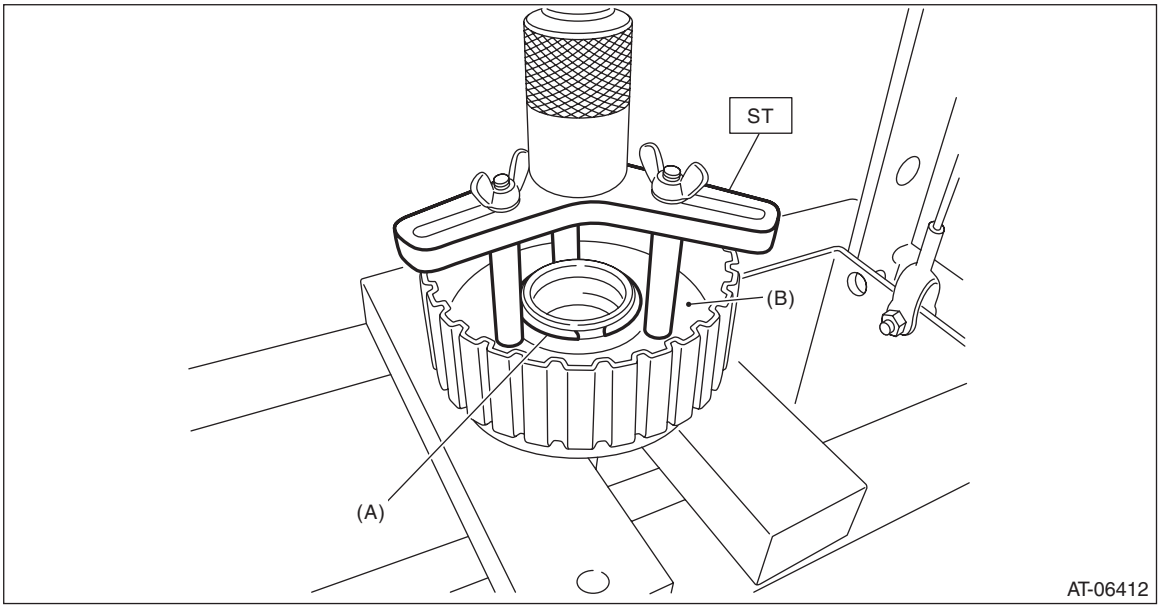
C: DISASSEMBLY

1) Remove the snap ring, and then remove the retaining plate, drive plate and driven plate.



(A) Snap ring

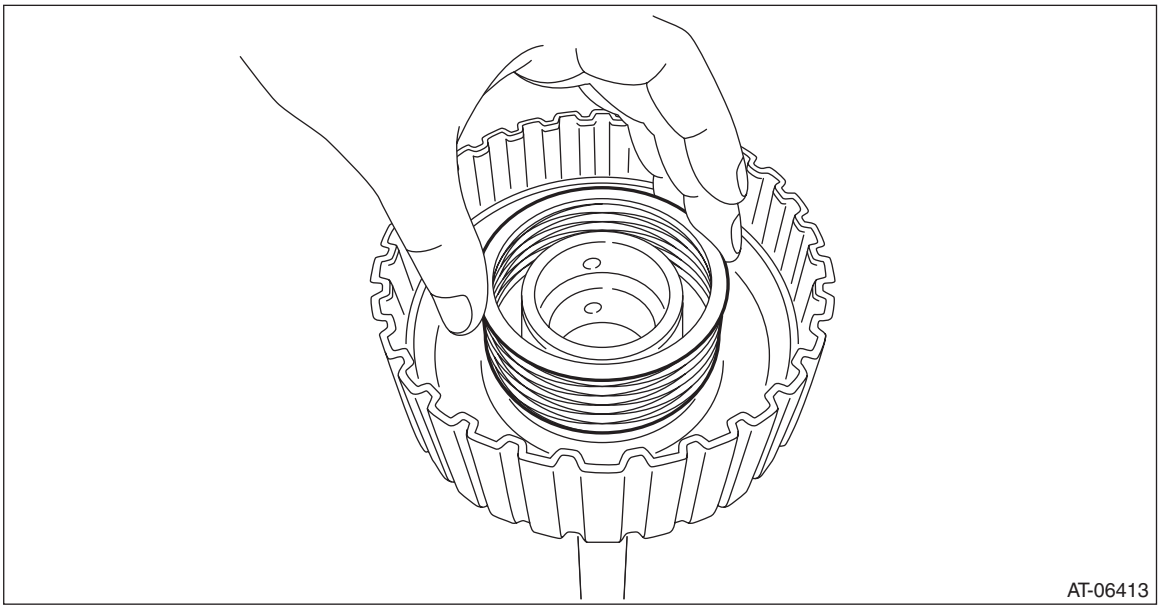
2) Compress the return spring using the ST to remove the snap ring.
ST 18762AA001 COMPRESSOR SPECIAL TOOL



(A) Snap ring
(B) Transfer clutch piston seal

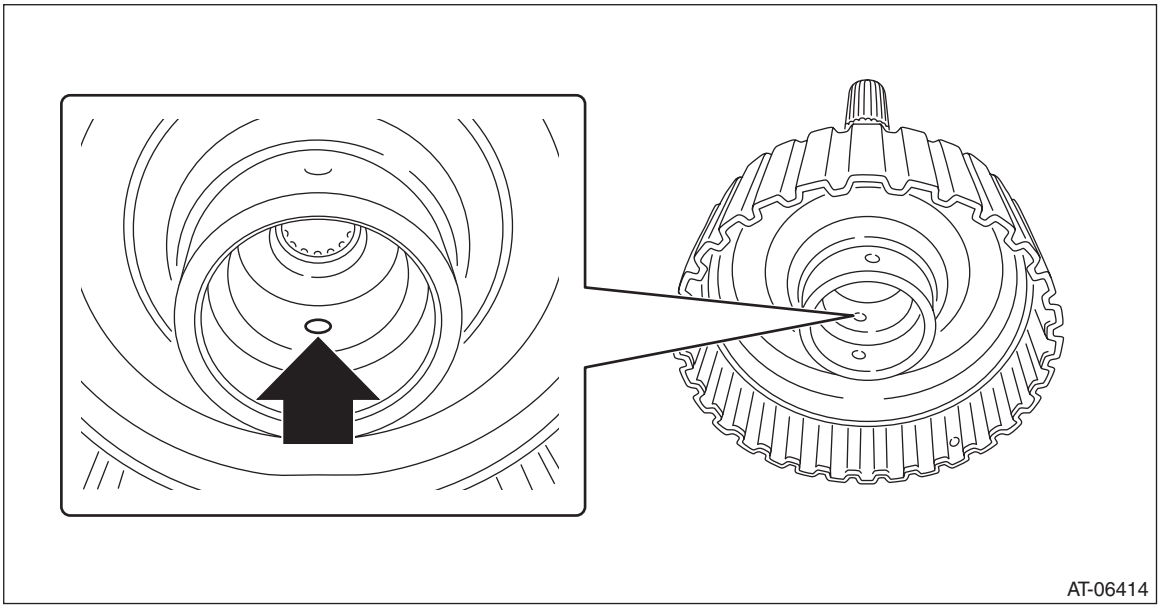
3) Remove the transfer clutch piston seal.

4) Remove the return spring.

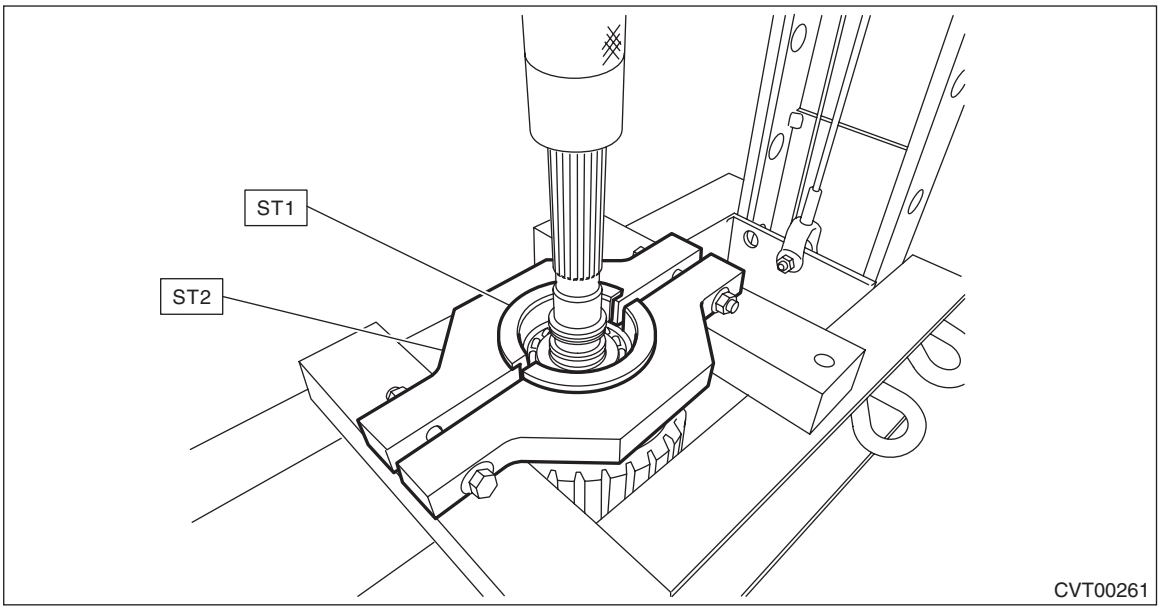


5) Remove the transfer clutch piston by blowing compressed air through transfer clutch assembly hole.

NOTE:
Plug the holes through which the compressed air is not blown.



6) Remove the ball bearing using ST.
ST1 18767AA020 BEARING REMOVER
ST2 18723AA000 REMOVER

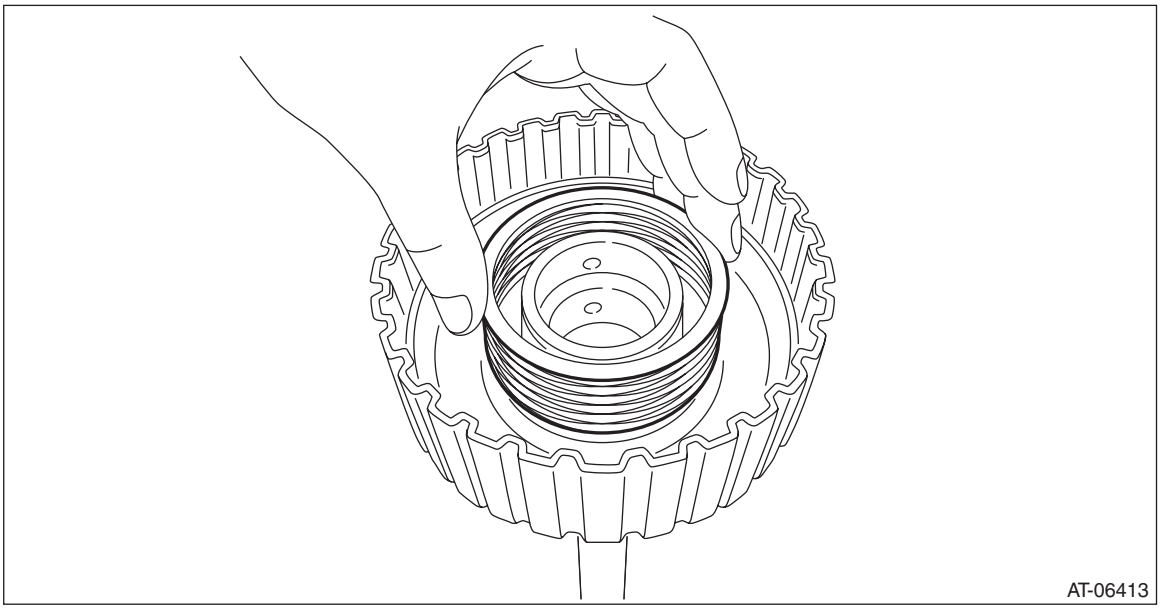


D: ASSEMBLY

1) Install the transfer clutch piston.

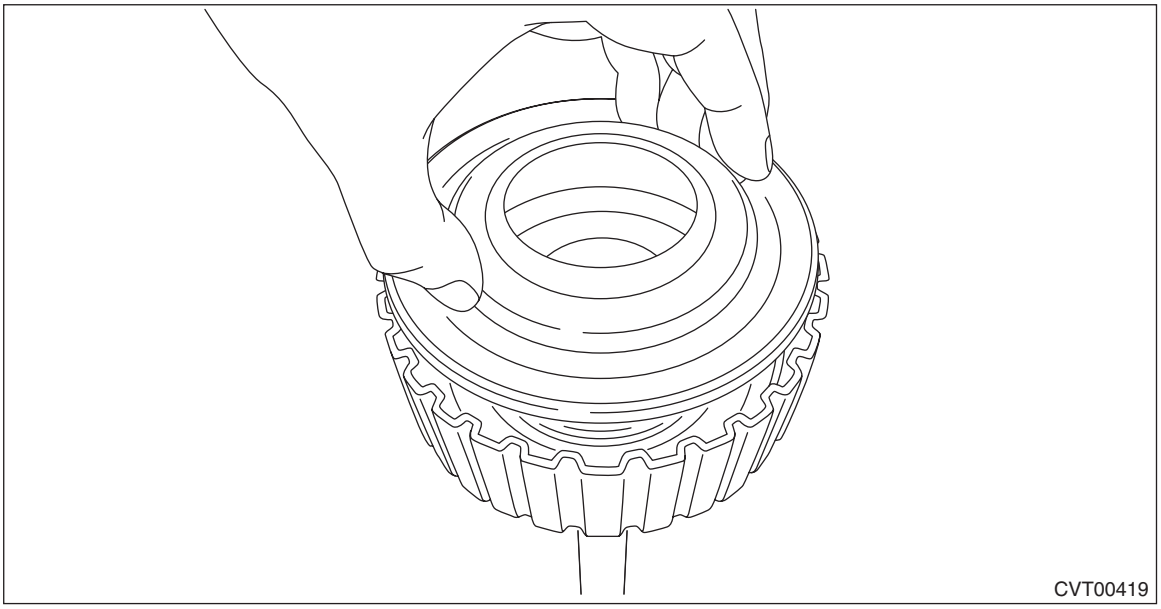
NOTE:
Apply CVTF to the transfer clutch piston lip.

2) Install the return spring.

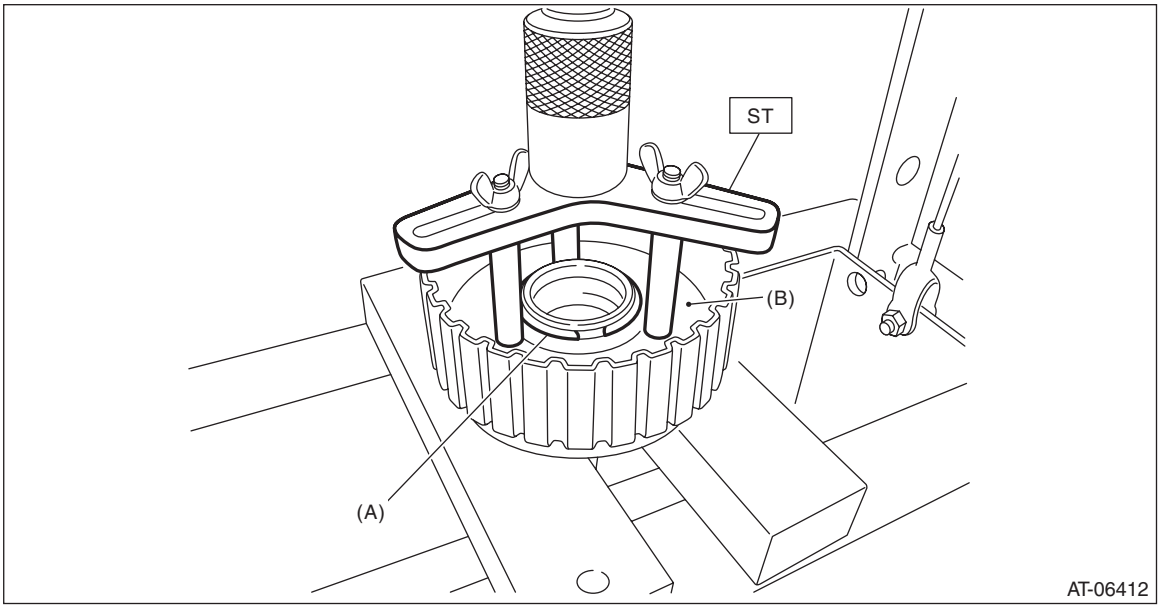


3) Install the transfer clutch piston seal.

NOTE:
Apply CVTF to the lip section of transfer clutch piston seal.

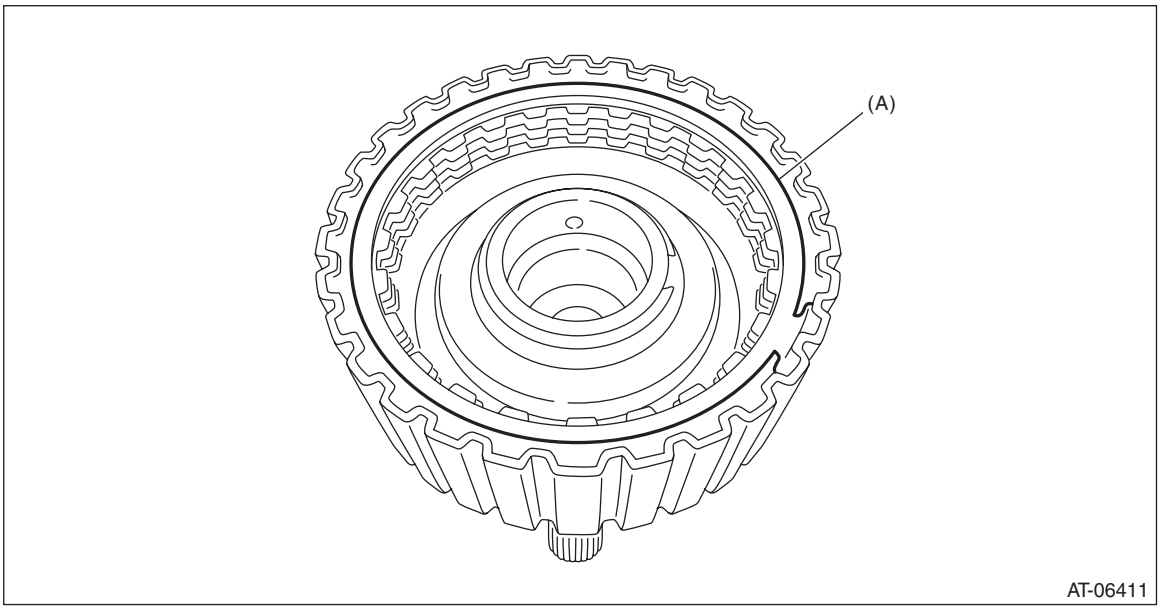


4) Compress the return spring using the ST to install the snap ring.
ST 18762AA001 COMPRESSOR SPECIAL TOOL



(A) Snap ring
(B) Transfer clutch piston seal

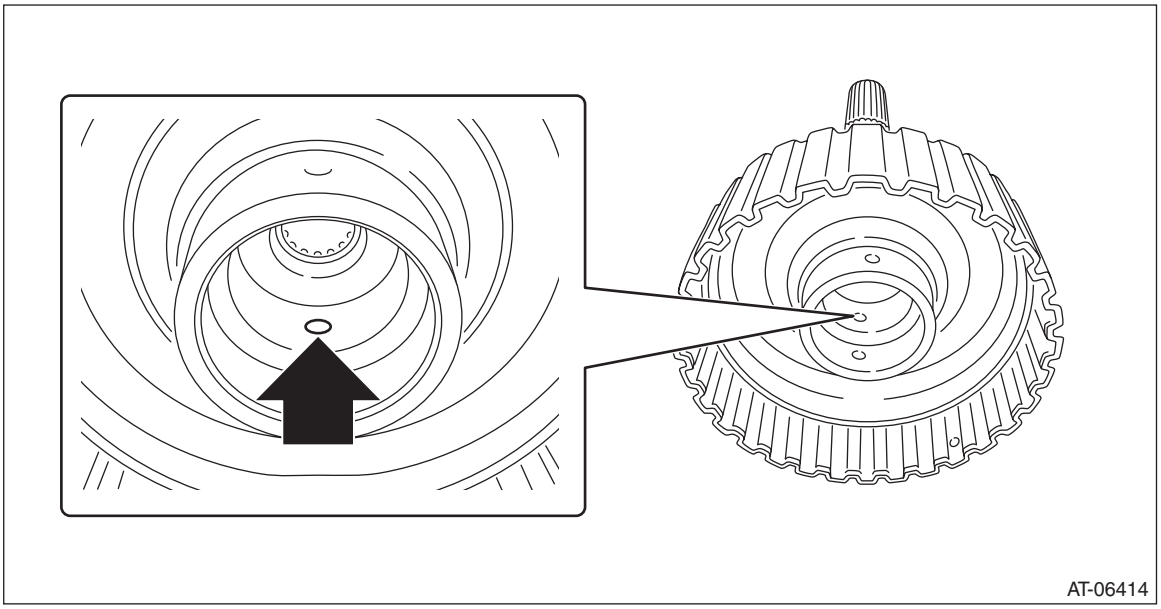
5) Install the pressure plate, driven plate, drive plate and snap ring.



(A) Snap ring

6) Blow compressed air through transfer clutch assembly hole, and check the transfer clutch piston operation.

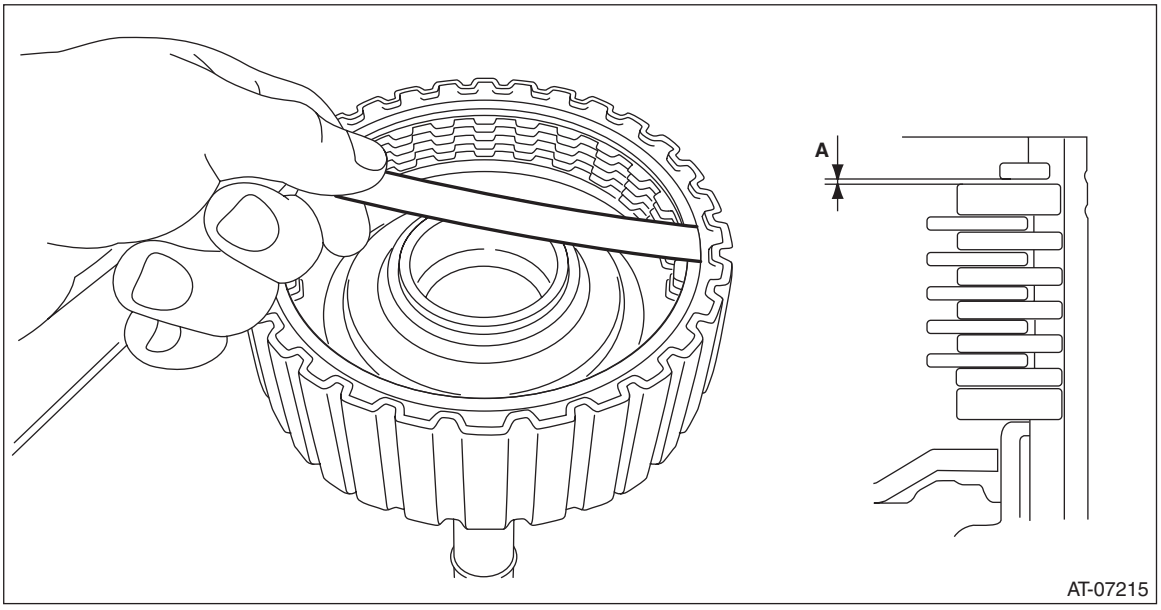
NOTE:
Plug the holes through which the compressed air is not blown.



7) Before measuring clearance “A”, place same thickness shims on both sides to prevent the plate from tilting.
8) When clearance “A” exceeds the limit for use, replace the drive plate and driven plate as a set, and select and adjust the pressure plate within the initial specified value.

Initial standard:
0.7 — 1.1 mm (0.028 — 0.043 in)

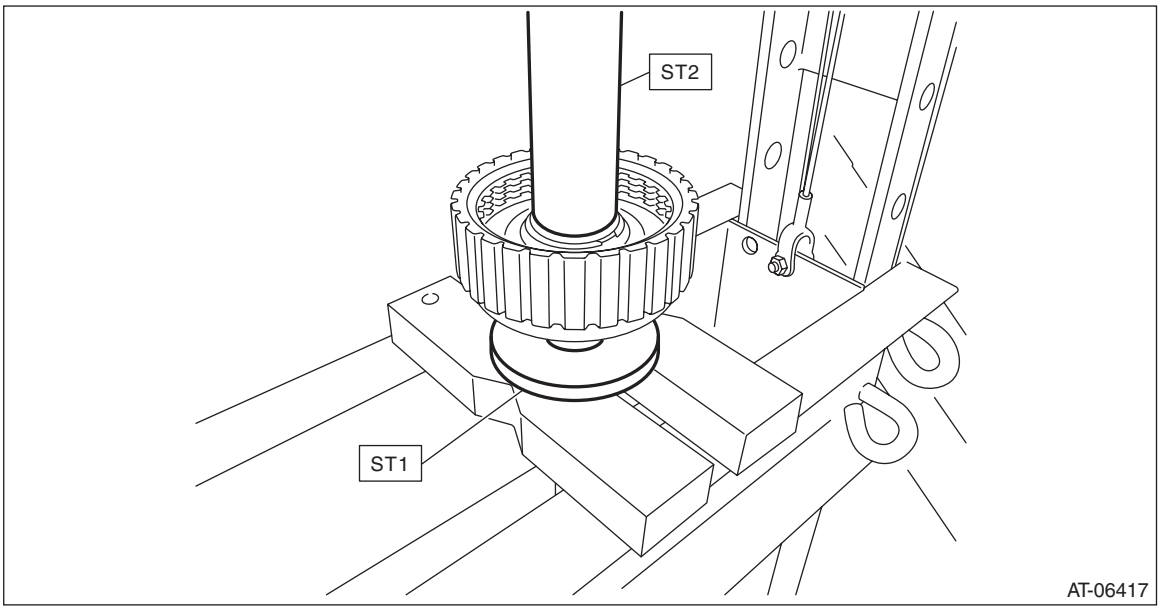
Limit thickness:
1.45 mm (0.057 in)



Pressure plate	
Part No.	Thickness mm (in)
31593AA151	3.3 (0.130)
31593AA161	3.7 (0.146)

9) Recheck the clearance. <Ref. to CVT(TH58A)-197, INSPECTION, Transfer Clutch.>
10) Using the ST, install the ball bearing.

NOTE:
Use a new ball bearing.
ST1 398177700 INSTALLER
ST2 499277100 INSTALLER



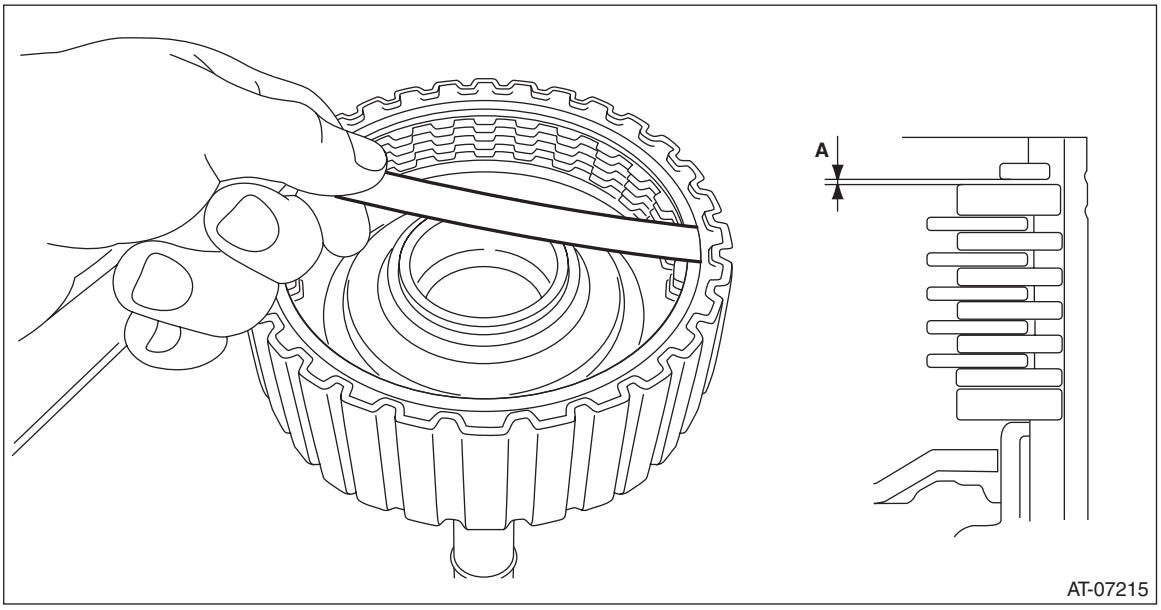
E: INSPECTION

- Inspect the drive plate facing for wear and damage.
- Driven plate for discoloration (burned color)
- Make sure the snap ring is not worn and the return spring has no permanent distortion, damage, or deformation.
- Check the lip seal for damage.
- Inspect the extension end play, and adjust it to within the standard value. <Ref. to CVT(TH58A)-198, ADJUSTMENT, Transfer Clutch.>

1) Before measuring clearance “A” between snap ring and driven plate, place same thickness shims on both sides to prevent the plate from tilting.
2) When clearance “A” exceeds the limit for use, replace the drive plate and driven plate as a set, and select the pressure plate within the initial specified value.

Initial standard:
0.7 — 1.1 mm (0.028 — 0.043 in)

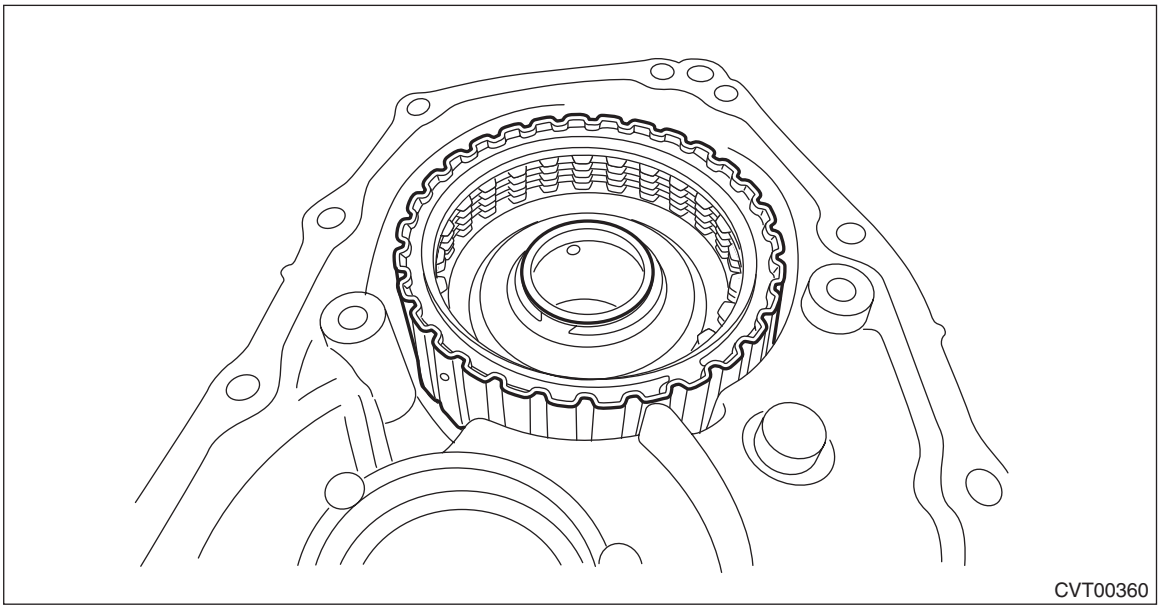
Limit thickness:
1.45 mm (0.057 in)



3) Check for tight corner braking phenomenon when the vehicle is moved forward with the steering fully turned. If tight corner braking occurs, perform the following procedures.
(1) With the steering wheel held at fully turned position, drive the vehicle in “D” range and with vehicle speed at approx. 5 km/h (3 MPH) in both clockwise and counterclockwise directions for approx. ten times each, while repeating acceleration and braking intermittently.
(2) If the tight corner braking phenomenon still persists, drive the vehicle again in a circle for several laps.

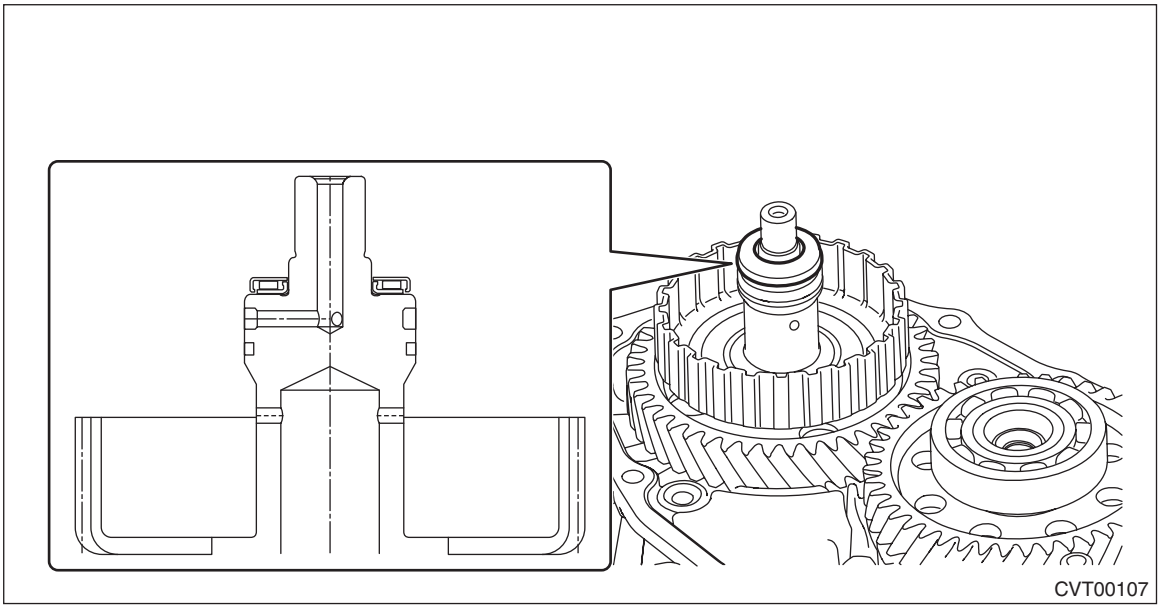
F: ADJUSTMENT

1) Install the transfer clutch assembly to the extension case with the transfer driven gear shims and thrust bearings removed.

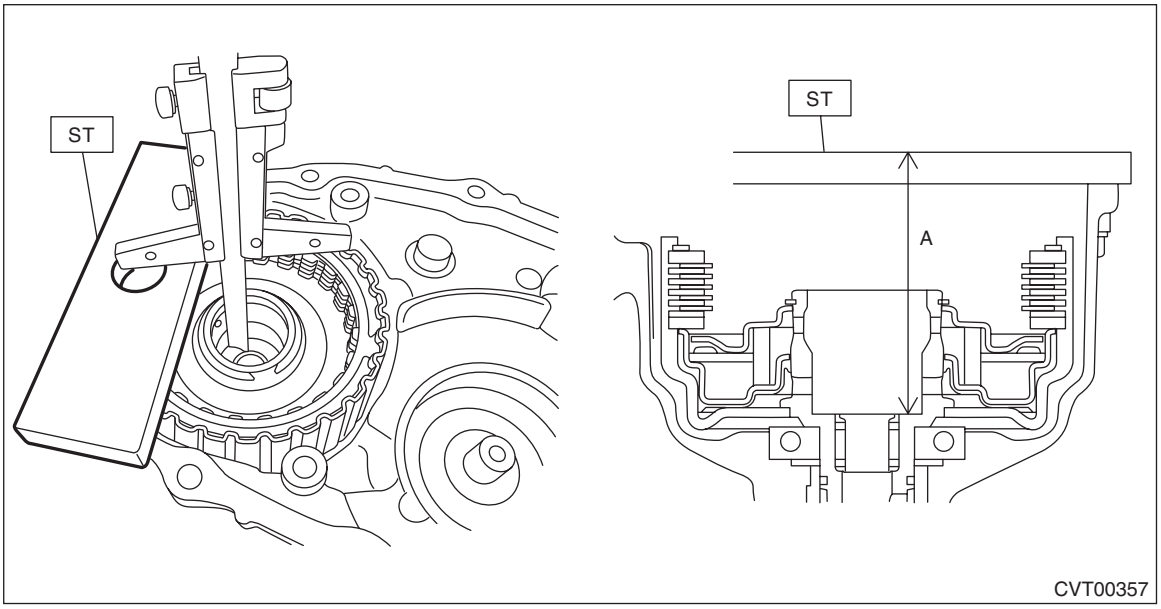


2) Install the thrust bearing to the transfer driven gear.

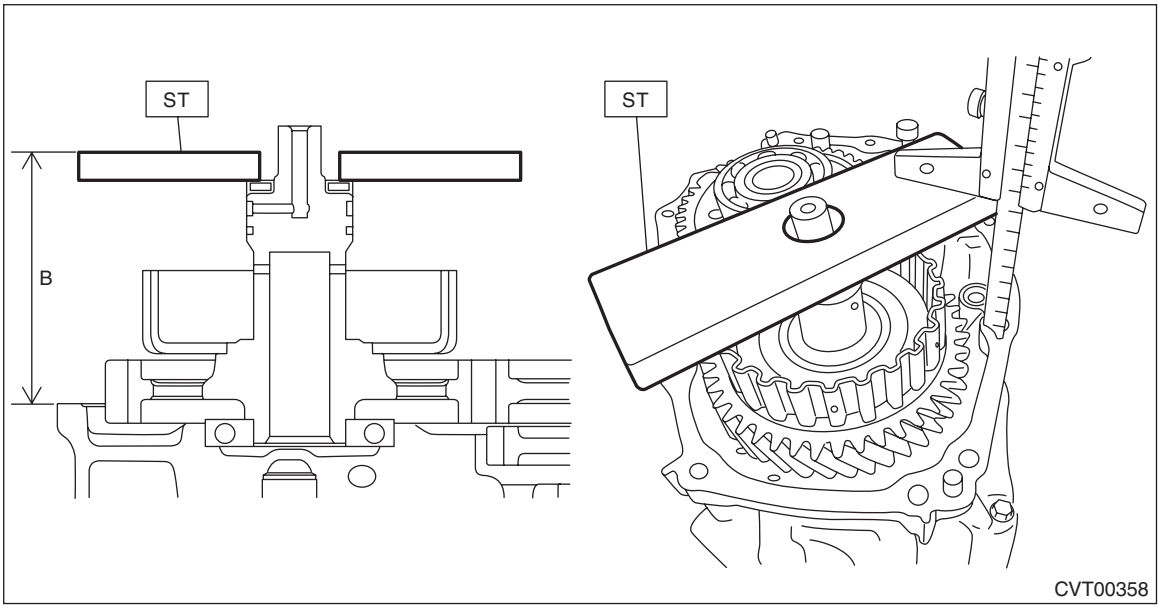
NOTE:
Make sure to install in the right direction.



3) Using the ST, measure the height “A” from the ST end face to the thrust bearing catch surface of the transfer clutch assembly.
ST 499575500 GAUGE



4) Using the ST, measure the height “B” from the transmission case mating surface to the end of ST.
ST 499575500 GAUGE



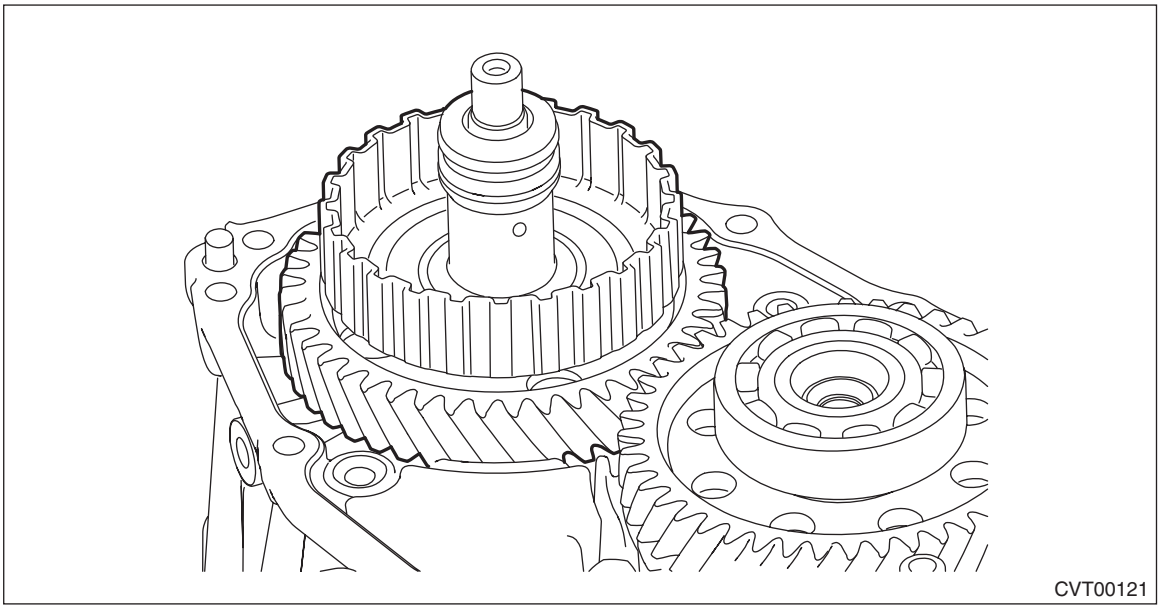
5) Obtain the thickness of transfer driven gear shim using the following formula to select zero to three transfer driven gear shims.
T (mm) = A – B – (0.05 — 0.25)
[T (in) = A – B – (0.002 — 0.01)]
T: Transfer driven gear shim thickness
A: Height from the ST end face to the transfer clutch assembly thrust bearing catch surface
B: Height from the mating surface of the transmission case to the end of the ST
0.05 — 0.25 mm (0.002 — 0.01 in): Clearance

Transfer driven gear shim	
Part No.	Thickness mm (in)
33280AA060	0.3 (0.012)
33280AA070	0.4 (0.016)
33280AA080	0.5 (0.020)

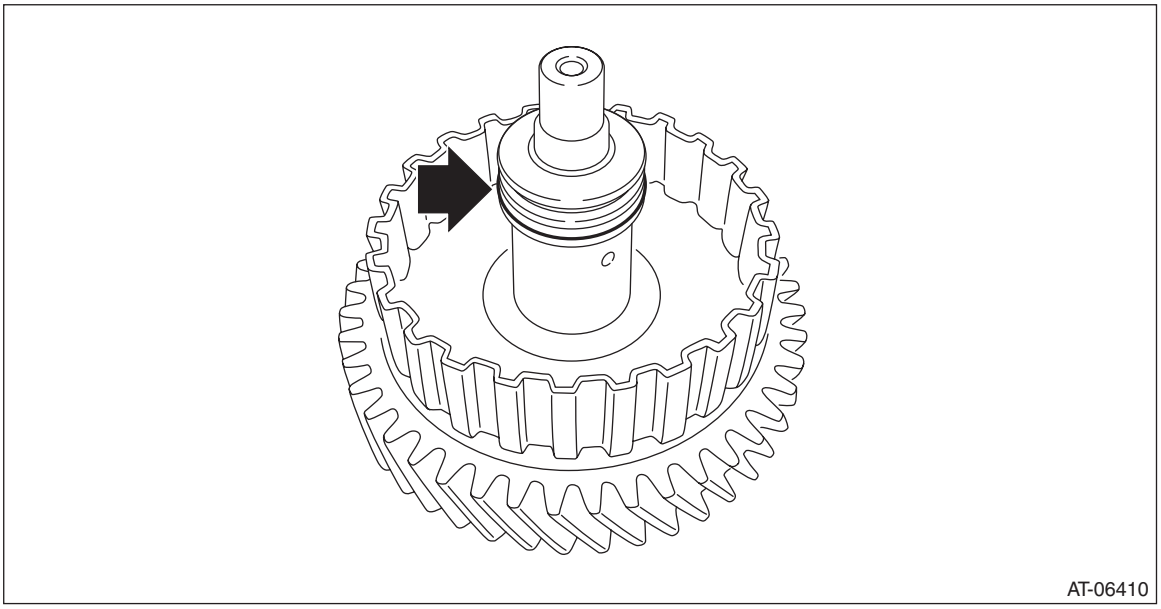
34.Transfer Driven Gear

A: REMOVAL

1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TH58A)-63, REMOVAL, Automatic Transmission Assembly.>
2) Remove the extension case. <Ref. to CVT(TH58A)-182, REMOVAL, Extension Case.>
3) Remove the transfer clutch assembly. <Ref. to CVT(TH58A)-186, REMOVAL, Transfer Clutch.>
4) Remove the transfer driven gear assembly.

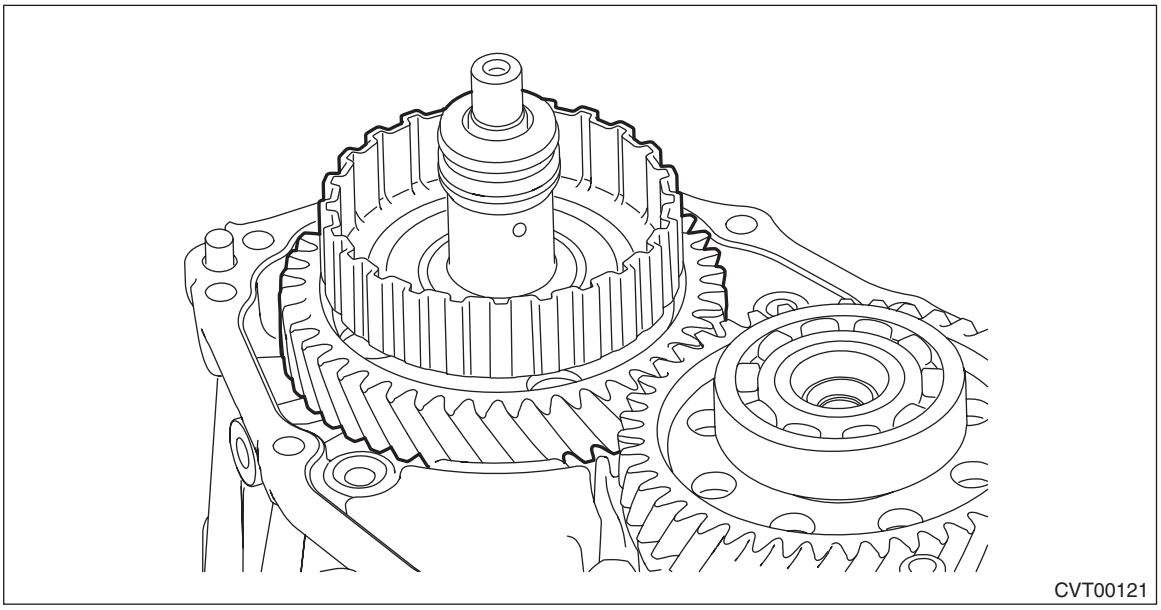

CVT00121

5) Remove the seal ring from the transfer driven gear assembly.


AT-06410

B: INSTALLATION

1) Install the transfer driven gear assembly.

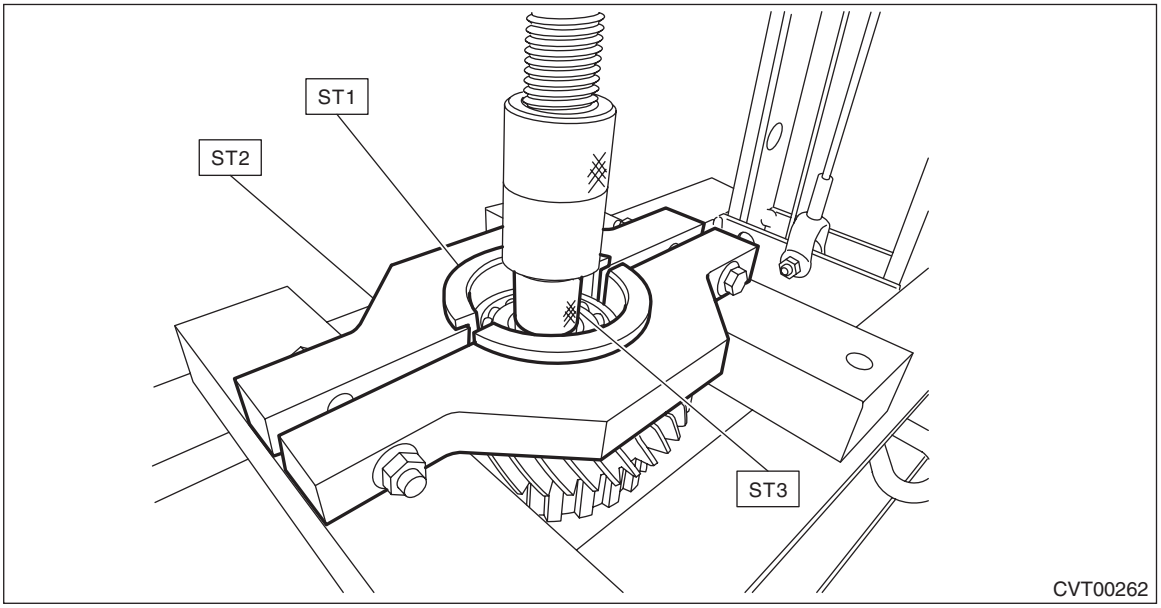


2) Install the transfer clutch assembly. <Ref. to CVT(TH58A)-188, INSTALLATION, Transfer Clutch.>
3) Select the transfer driven gear shim. <Ref. to CVT(TH58A)-198, ADJUSTMENT, Transfer Clutch.>
4) Install the extension case. <Ref. to CVT(TH58A)-183, INSTALLATION, Extension Case.>
5) Install the transmission assembly to the vehicle. <Ref. to CVT(TH58A)-77, INSTALLATION, Automatic Transmission Assembly.>

C: DISASSEMBLY

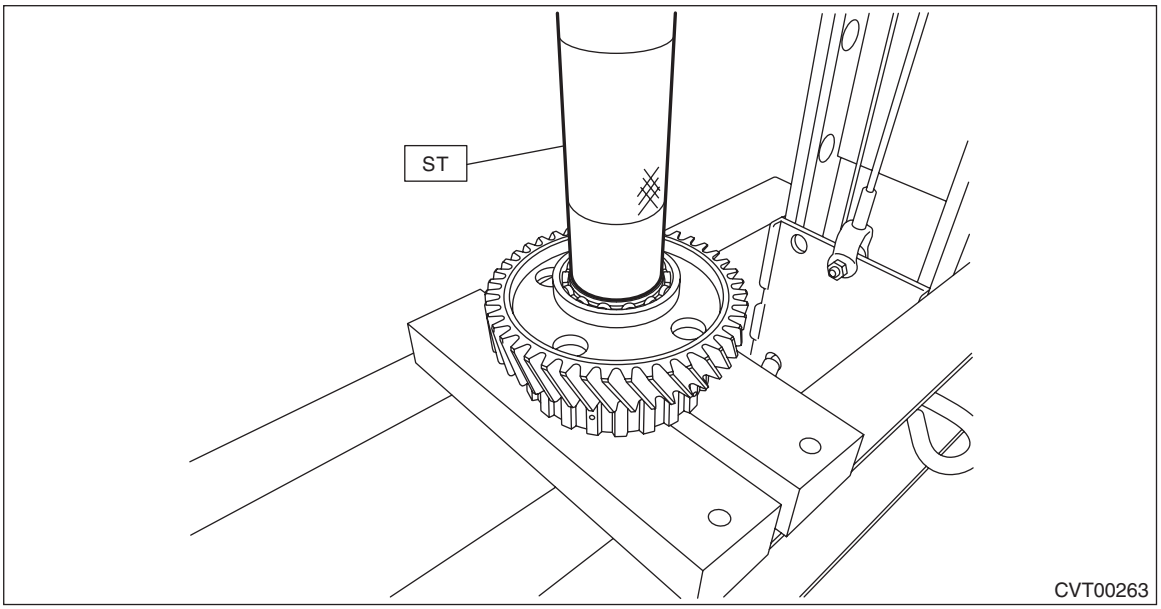
1) Remove the ball bearing using ST.

ST1	18767AA020	BEARING REMOVER
ST2	18723AA000	REMOVER
ST3	899864100	REMOVER



D: ASSEMBLY

1) Using the ST, install the ball bearing.
ST 18651AA000 INSTALLER



E: INSPECTION

- Check the ball bearing for smooth rotation.
- Check the ball bearing for excessive looseness.
- Check the transfer driven gear for breakage or damage.

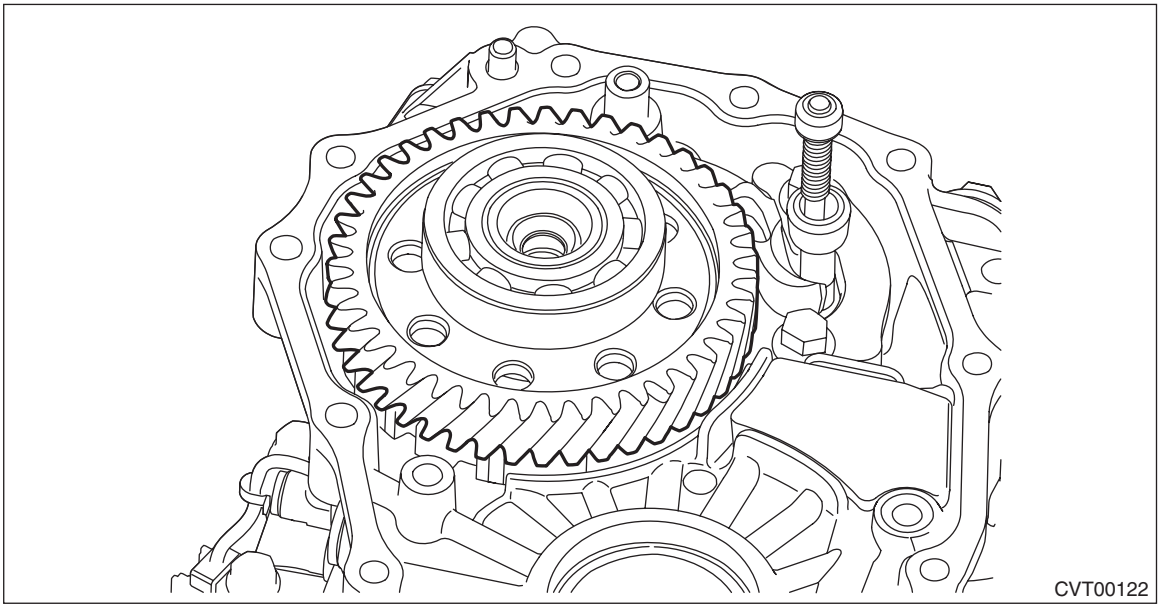
F: ADJUSTMENT

NOTE:
When the transfer driven gear or bearing is replaced, select the transfer driven gear shim. <Ref. to CVT(TH58A)-198, ADJUSTMENT, Transfer Clutch.>

35.Transfer Drive Gear

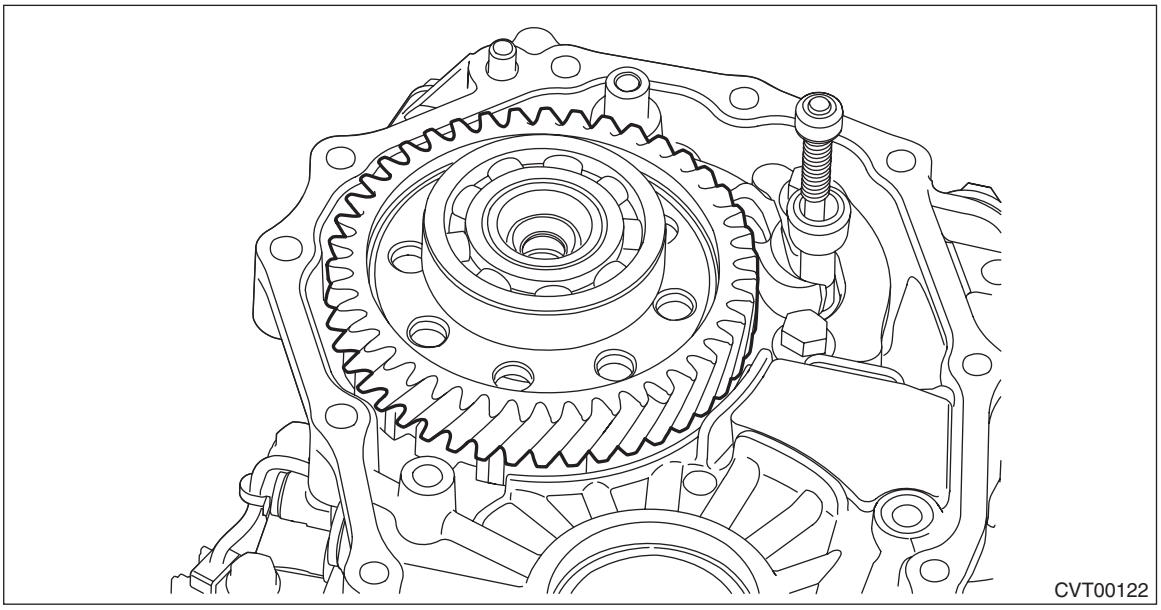
A: REMOVAL

1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TH58A)-63, REMOVAL, Automatic Transmission Assembly.>
2) Remove the extension case. <Ref. to CVT(TH58A)-182, REMOVAL, Extension Case.>
3) Remove the transfer clutch assembly. <Ref. to CVT(TH58A)-186, REMOVAL, Transfer Clutch.>
4) Remove the transfer driven gear assembly. <Ref. to CVT(TH58A)-200, REMOVAL, Transfer Driven Gear.>
5) Remove the transfer drive gear assembly.



B: INSTALLATION

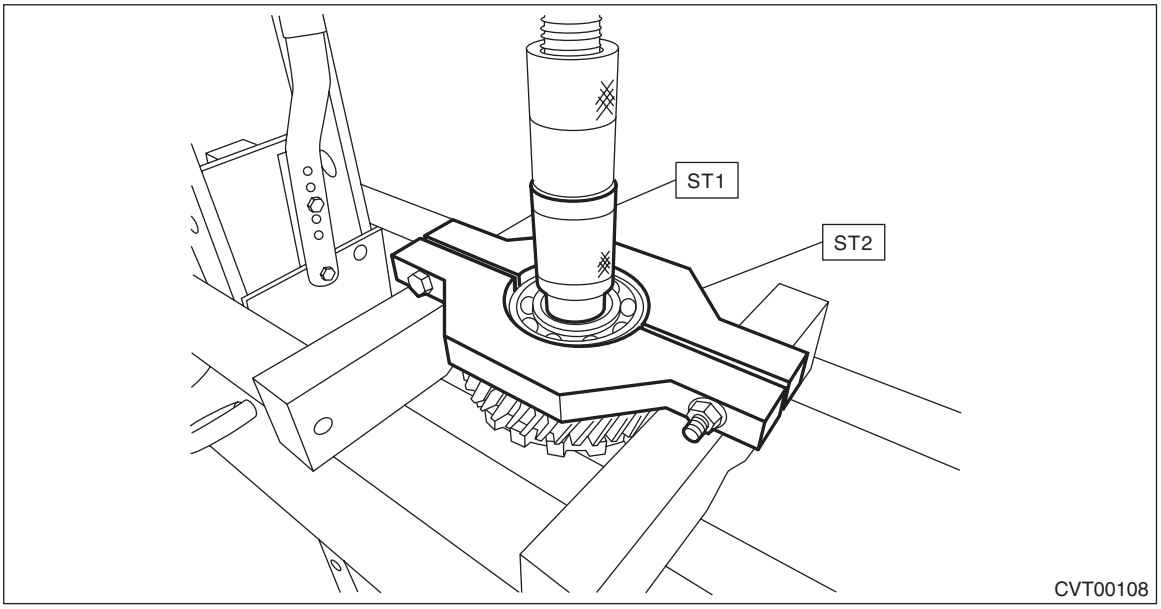
1) Install the transfer drive gear assembly.



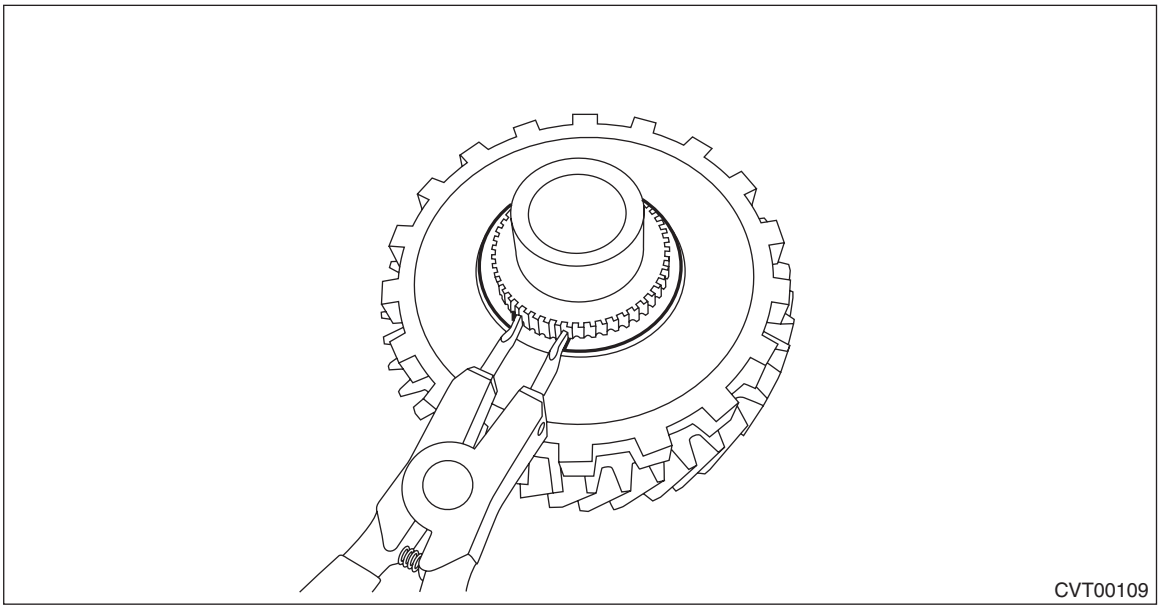
2) Select the transfer drive gear shim. <Ref. to CVT(TH58A)-207, ADJUSTMENT, Transfer Drive Gear.>
3) Attach the selected transfer drive gear shim to extension case with vaseline.
4) Install the transfer driven gear assembly. <Ref. to CVT(TH58A)-201, INSTALLATION, Transfer Driven Gear.>
5) Install the transfer clutch assembly. <Ref. to CVT(TH58A)-188, INSTALLATION, Transfer Clutch.>
6) Install the extension case. <Ref. to CVT(TH58A)-183, INSTALLATION, Extension Case.>
7) Install the transmission assembly to the vehicle. <Ref. to CVT(TH58A)-77, INSTALLATION, Automatic Transmission Assembly.>

C: DISASSEMBLY

1) Remove the ball bearing using ST.
ST1 499757002 INSTALLER
ST2 498077300 REMOVER

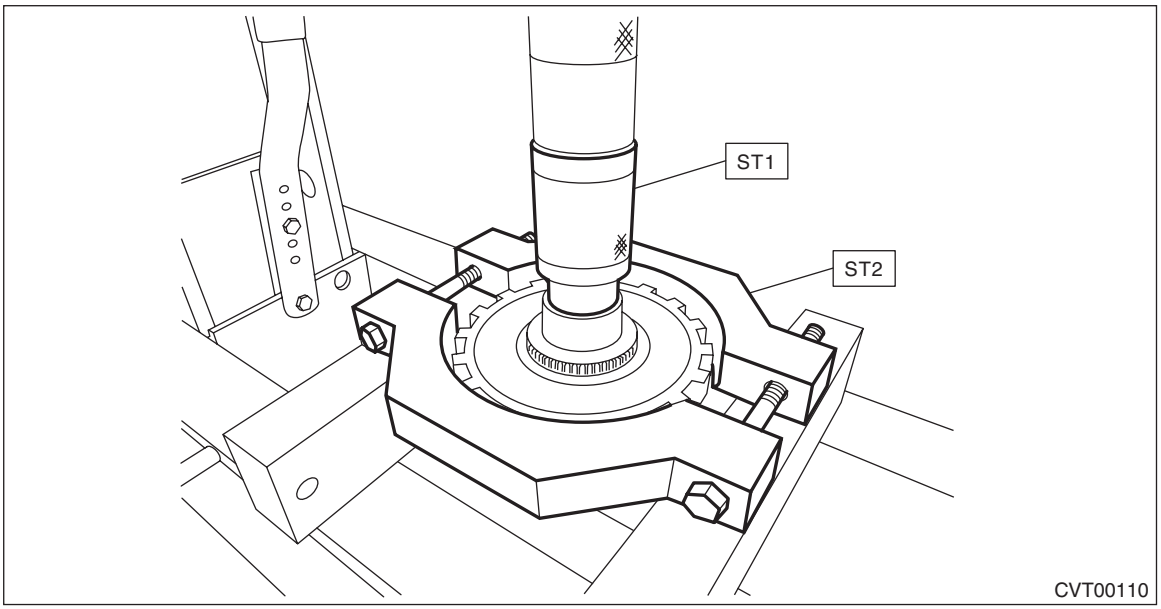


2) Remove the snap ring.



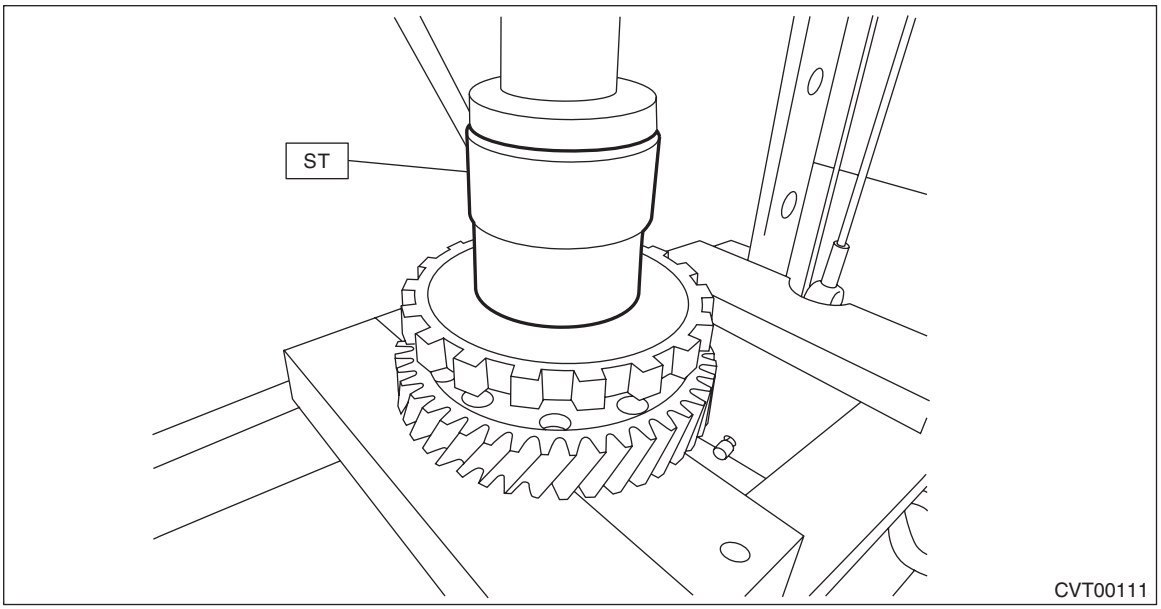
3) Using the ST, remove the parking gear from transfer reduction drive gear.

ST1 499757002 INSTALLER
ST2 18767AA000 BEARING REMOVER



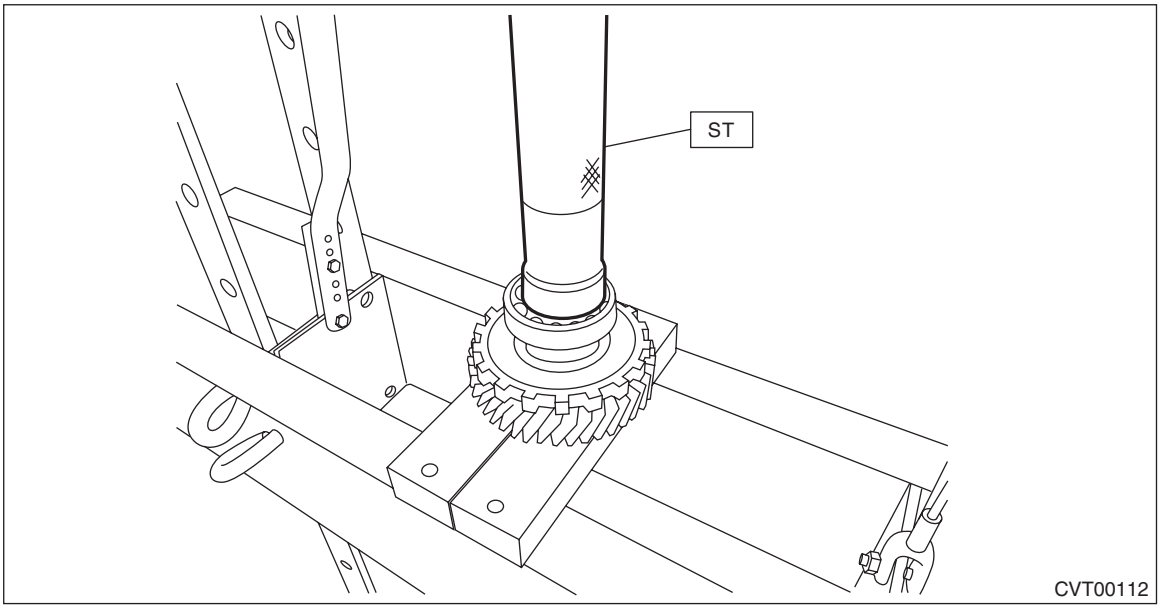
D: ASSEMBLY

1) Using the ST, install the transfer drive gear.
ST 499755602 INSTALLER



2) Install the snap ring.
3) Using the ST, install the ball bearing.

NOTE:
Use a new ball bearing.
ST 499277100 BUSHING 1-2 INSTALLER

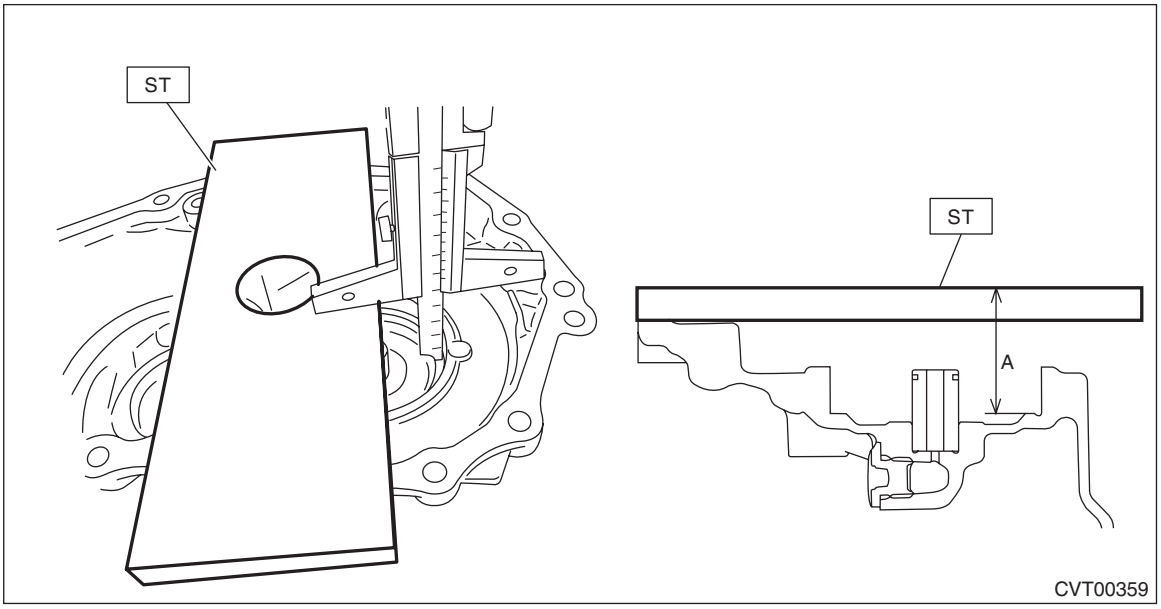


E: INSPECTION

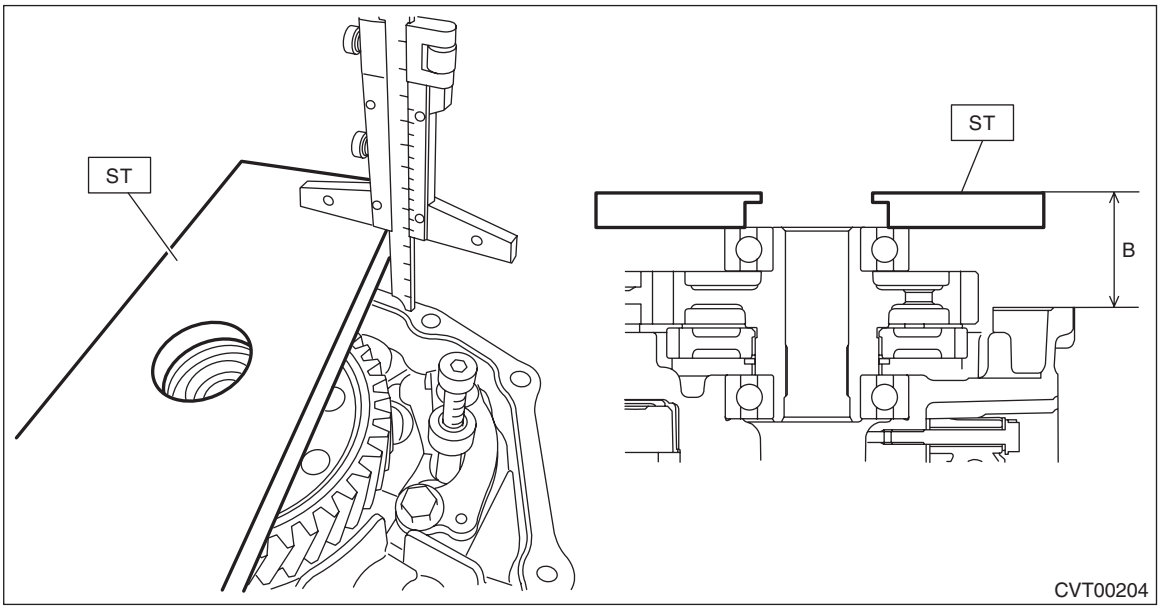
- Check the ball bearing for smooth rotation.
- Check the ball bearing for excessive looseness.
- Make sure each gear is not broken or damaged.

F: ADJUSTMENT

1) Measure the height “A” from the ST upper face to the ball bearing catch surface.
ST 499575600 GAUGE



2) Measure the height “B” from the ST to the mating surface of the transmission case.
ST 499575600 GAUGE



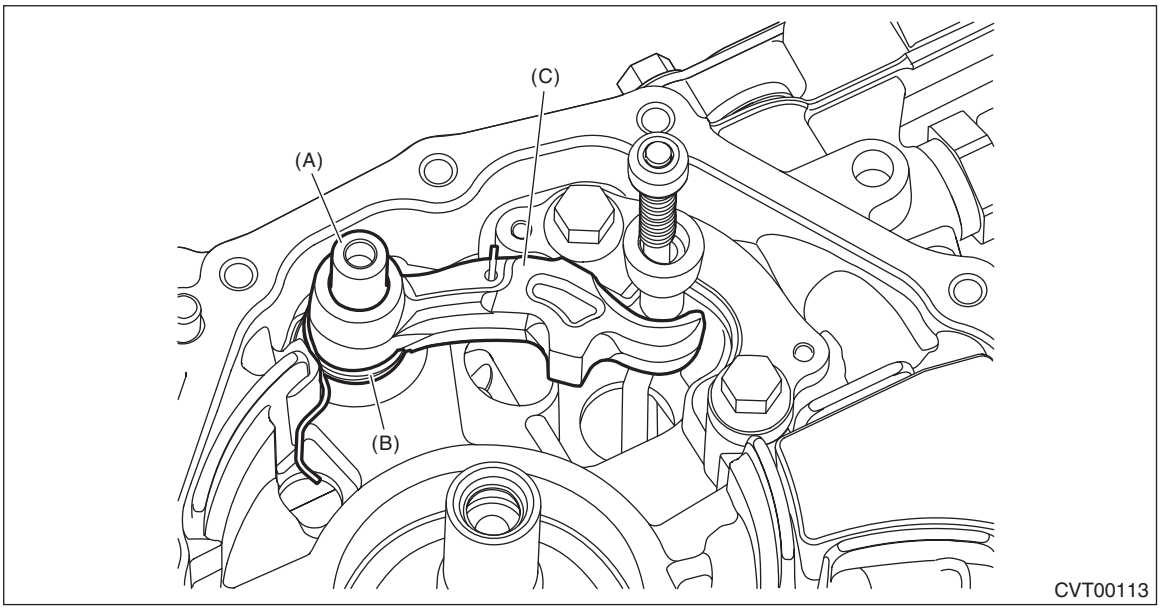
3) Obtain the thickness of transfer drive gear shim using the following formula to select zero to three transfer drive gear shims.
T (mm) = A – B – (0.05 — 0.25)
[T (in) = A – B – (0.002 — 0.01)]
T: Shim thickness
A: Height from the ST upper face to the ball bearing catch surface
B: Height from ST to transmission case mating surface
0.05 — 0.25 mm (0.002 — 0.01 in): Clearance

Transfer drive gear shim	
Part No.	Thickness mm (in)
33279AA090	0.3 (0.012)
33279AA100	0.4 (0.016)
33279AA110	0.5 (0.020)

36.Parking Pawl

A: REMOVAL

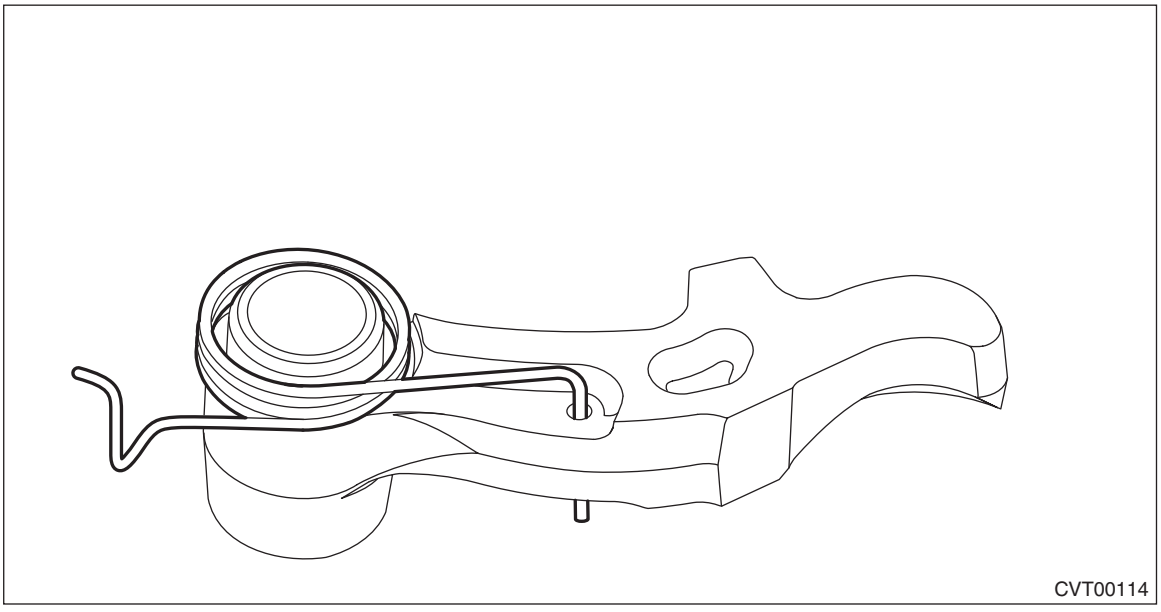
1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TH58A)-63, REMOVAL, Automatic Transmission Assembly.>
2) Remove the extension case. <Ref. to CVT(TH58A)-182, REMOVAL, Extension Case.>
3) Remove the transfer clutch assembly. <Ref. to CVT(TH58A)-186, REMOVAL, Transfer Clutch.>
4) Remove the transfer driven gear assembly. <Ref. to CVT(TH58A)-200, REMOVAL, Transfer Driven Gear.>
5) Remove the transfer drive gear assembly. <Ref. to CVT(TH58A)-203, REMOVAL, Transfer Drive Gear.>
6) Remove the parking pawl shaft, return spring and parking pawl.



(A) Parking pawl shaft
(B) Return spring
(C) Parking pawl

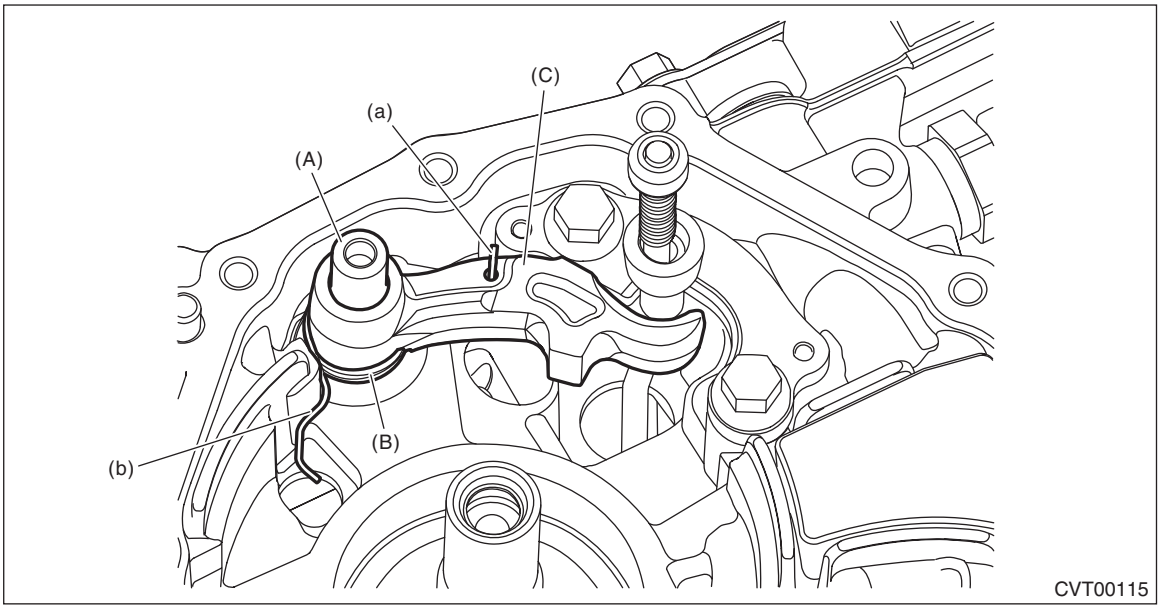
B: INSTALLATION

1) Set the range select lever to the “N” range.
2) Install the return spring to parking pawl.



3) Install the parking pawl and parking pawl shaft.

NOTE:
Make sure that the end of return spring sticks out of the hole of parking pawl as shown in (a). Make sure that the other end contacts the rib of transmission case as shown in (b).



(A) Parking pawl shaft
(B) Return spring
(C) Parking pawl

4) Install the transfer drive gear assembly. <Ref. to CVT(TH58A)-204, INSTALLATION, Transfer Drive Gear.>
5) Install the transfer driven gear assembly. <Ref. to CVT(TH58A)-201, INSTALLATION, Transfer Driven Gear.>
6) Install the transfer clutch assembly. <Ref. to CVT(TH58A)-188, INSTALLATION, Transfer Clutch.>
7) Install the extension case. <Ref. to CVT(TH58A)-183, INSTALLATION, Extension Case.>
8) Install the transmission assembly to the vehicle. <Ref. to CVT(TH58A)-77, INSTALLATION, Automatic Transmission Assembly.>

C: INSPECTION

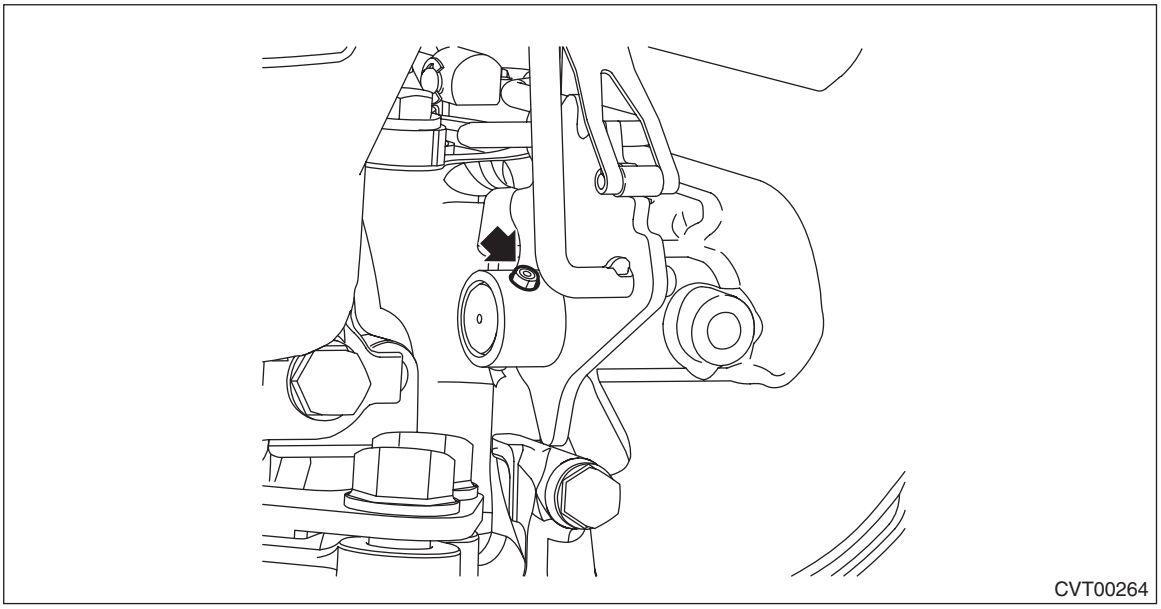
- Check the parking pawl for breakage or damage.
- Check for worn, broken and/or damaged return spring.

37.Transmission Control Device

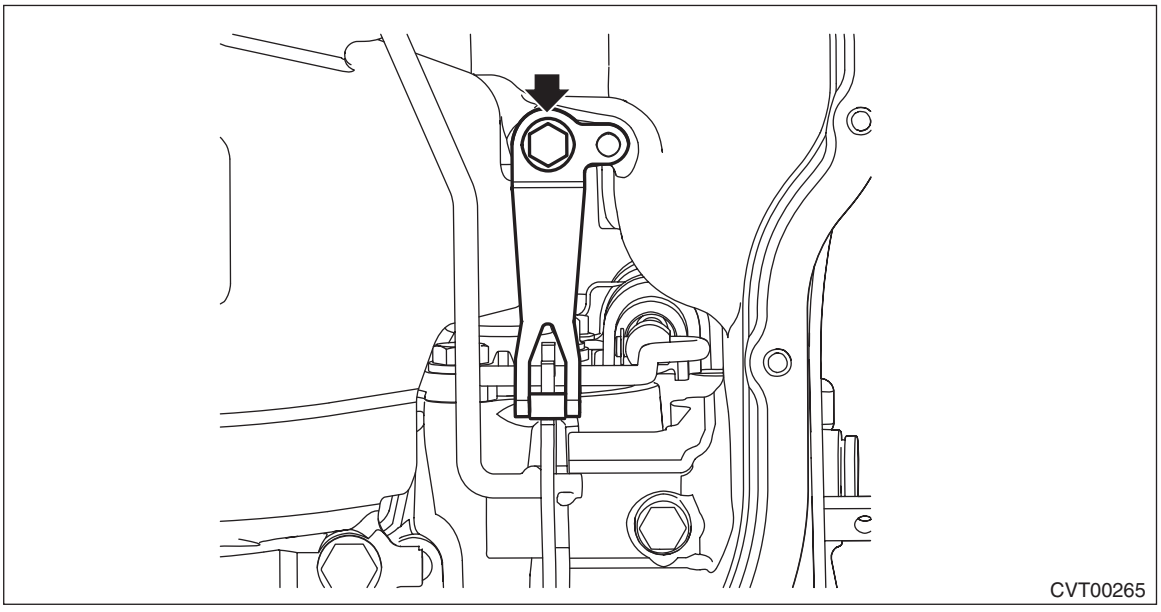
A: REMOVAL

1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TH58A)-63, REMOVAL, Automatic Transmission Assembly.>
2) Remove the inhibitor switch. <Ref. to CVT(TH58A)-101, REMOVAL, Inhibitor Switch.>
3) Remove the oil pan and oil strainer. <Ref. to CVT(TH58A)-112, REMOVAL, Oil Pan and Strainer.>
4) Shift the manual plate to “N” range, and remove the spring pin.

NOTE:
Prevent the spring pin from dropping in the transmission using paper towel etc.

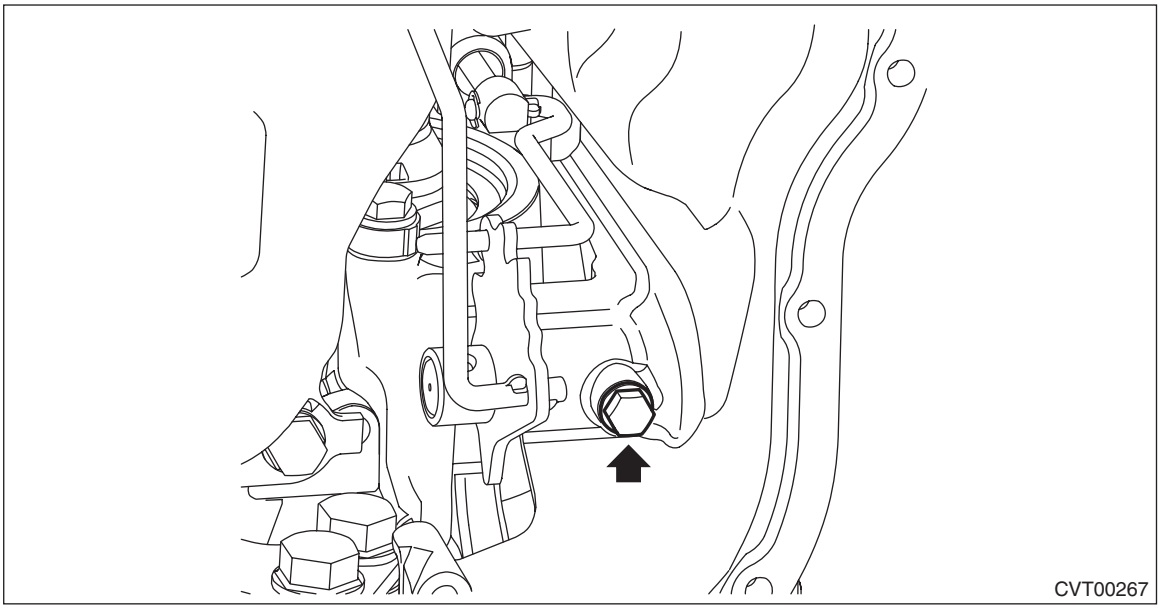

CVT00264

5) Remove the detent spring.

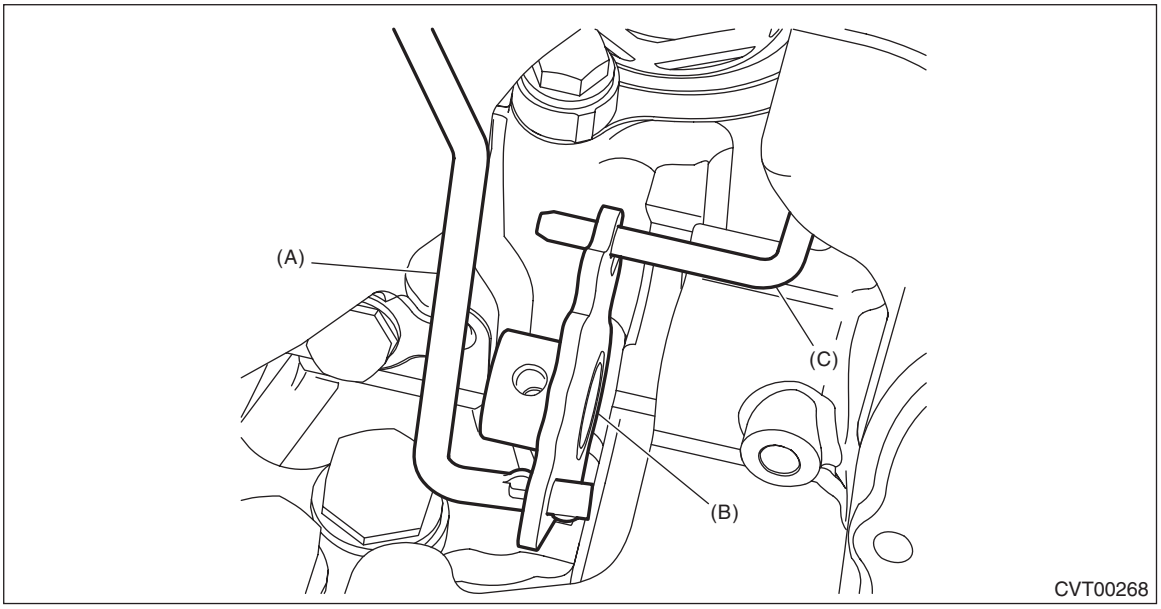

CVT00265

6) Remove the shifter arm shaft.

NOTE:
Do not damage the lip of oil seal press-fitted in the case.



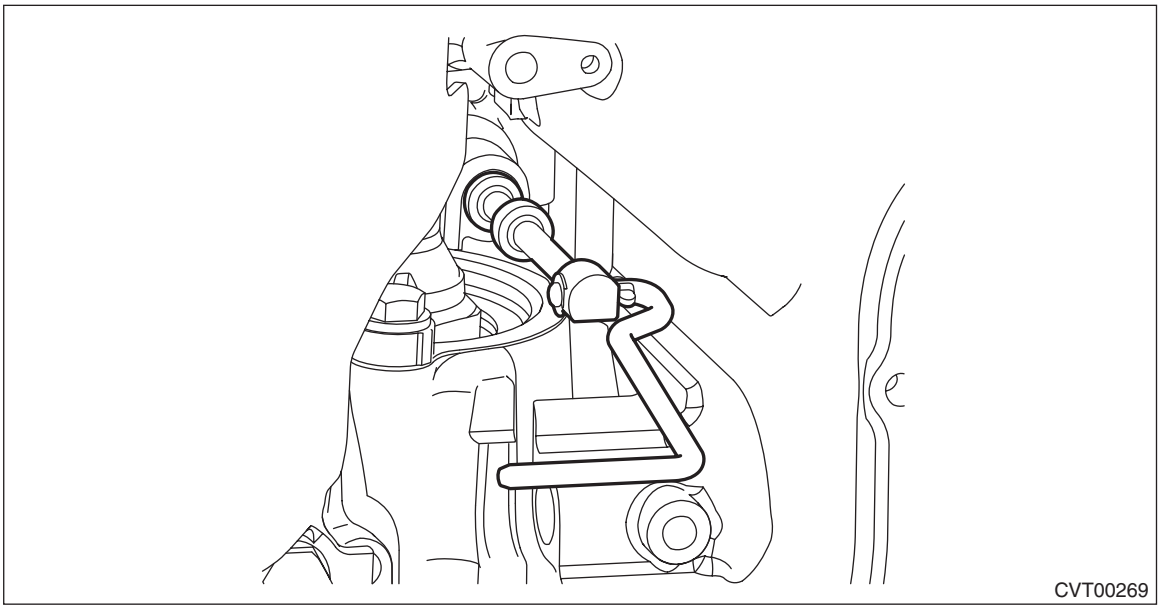
7) Remove the shift connecting rod of manual valve.



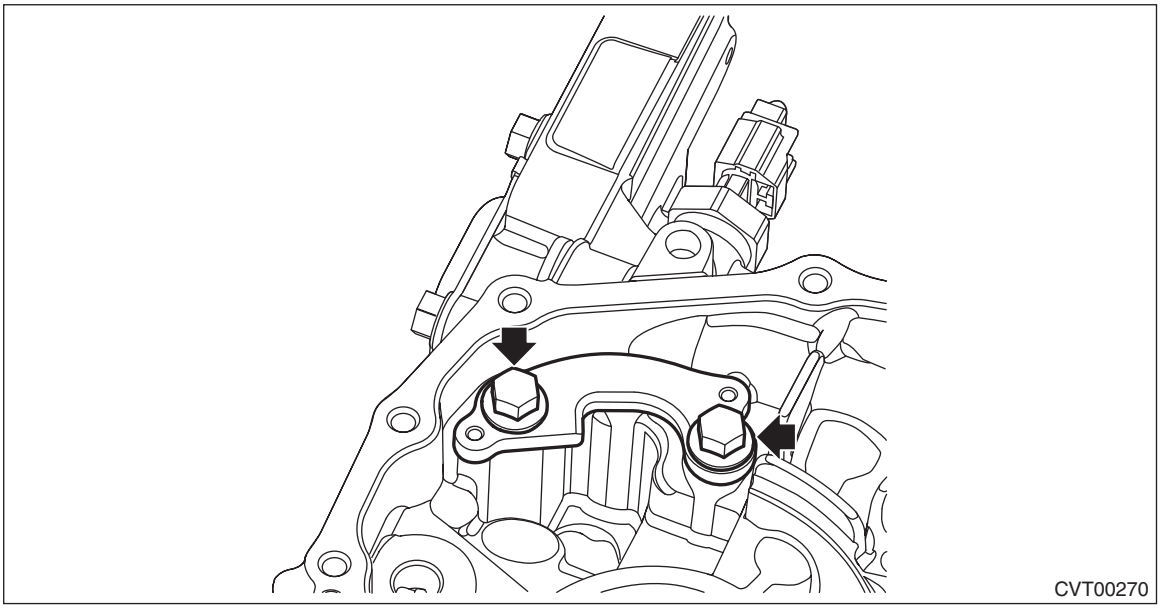
(A) Parking rod
(B) Manual plate
(C) Shift connecting rod

8) Remove the manual plate and parking rod.

9) Remove the manual valve.



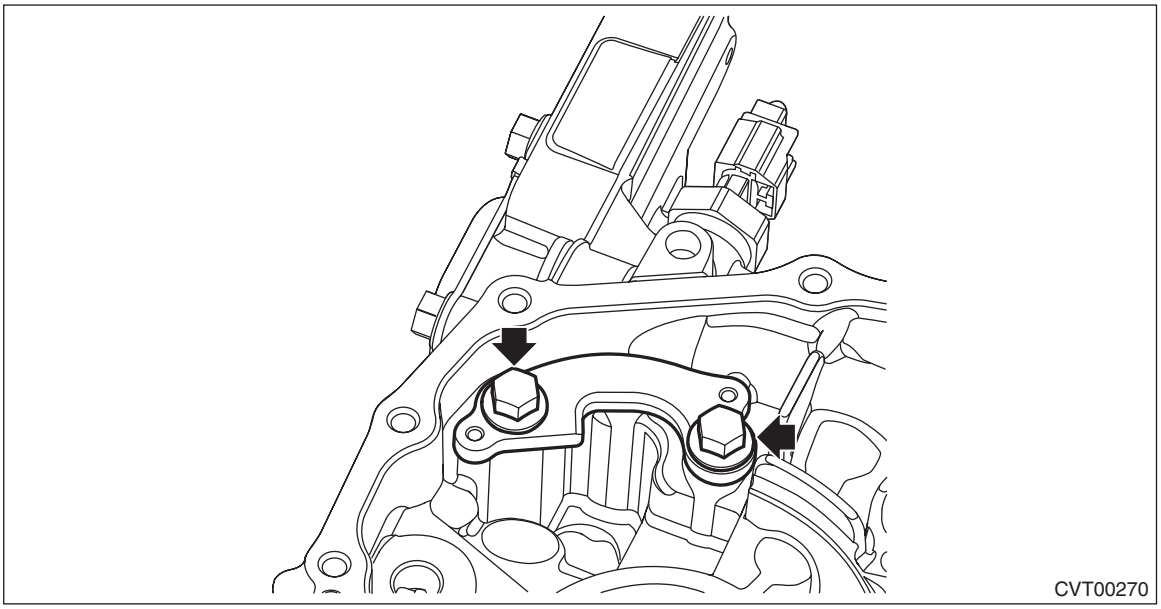
10) Remove the extension case. <Ref. to CVT(TH58A)-182, REMOVAL, Extension Case.>
11) Remove the transfer clutch assembly. <Ref. to CVT(TH58A)-186, REMOVAL, Transfer Clutch.>
12) Remove the transfer driven gear assembly. <Ref. to CVT(TH58A)-200, REMOVAL, Transfer Driven Gear.>
13) Remove the transfer drive gear assembly. <Ref. to CVT(TH58A)-203, REMOVAL, Transfer Drive Gear.>
14) Remove the parking pawl. <Ref. to CVT(TH58A)-208, REMOVAL, Parking Pawl.>
15) Remove the parking support.



B: INSTALLATION

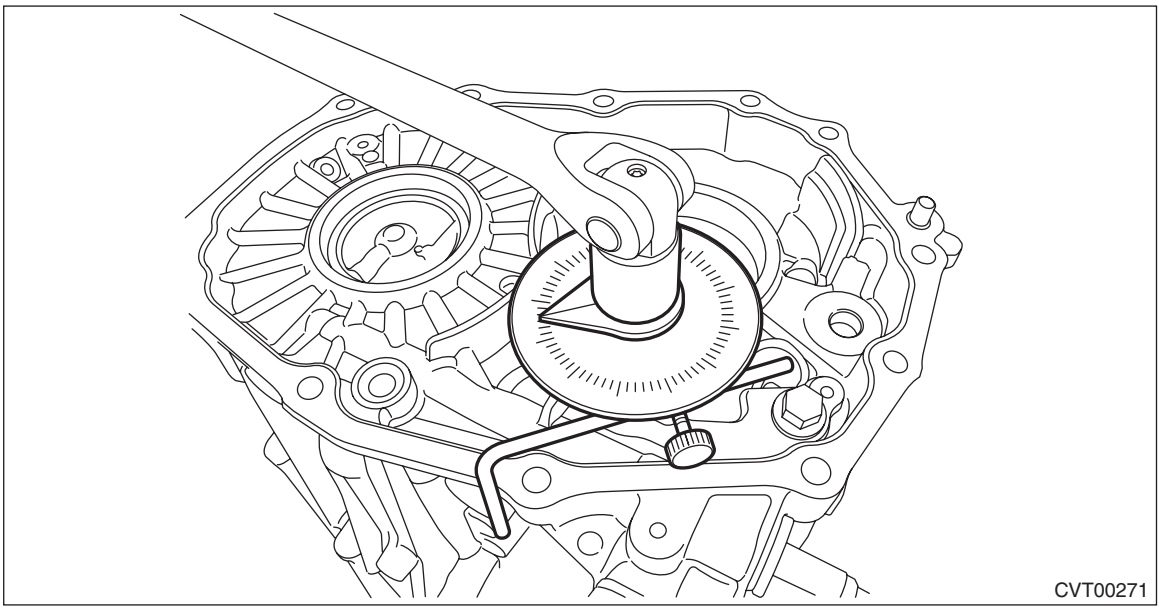
1) Install the parking support.
   (1) Install the parking support.

Tightening torque:
10 N·m (1.0 kgf-m, 7.4 ft-lb)

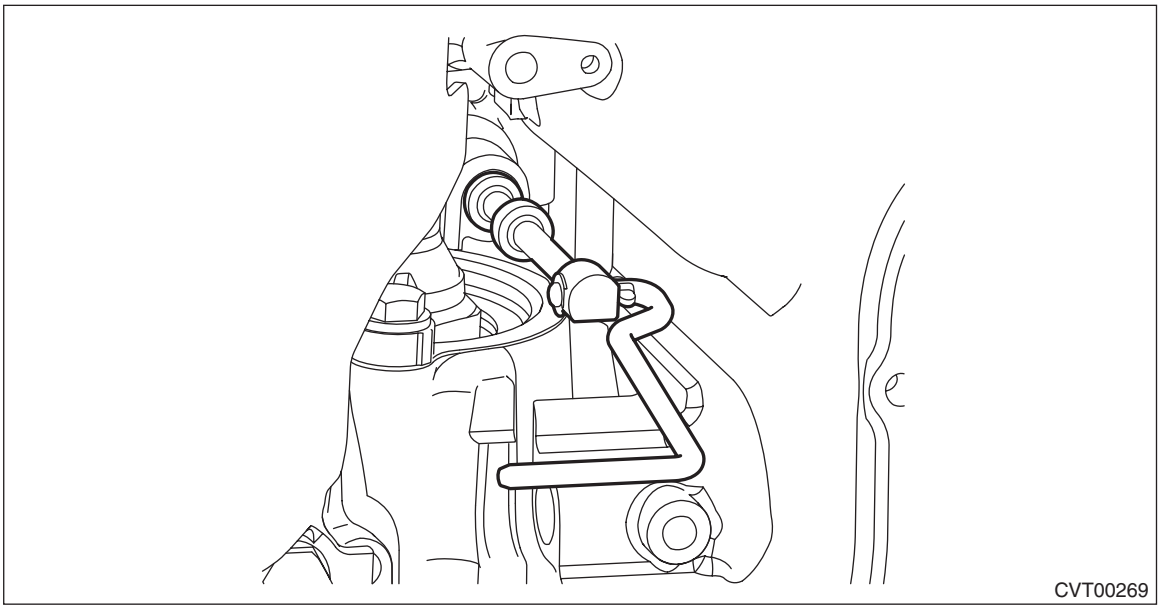


(2) While checking the tightening angle with the angle gauge, tighten the parking support mounting bolts to the specified angle.

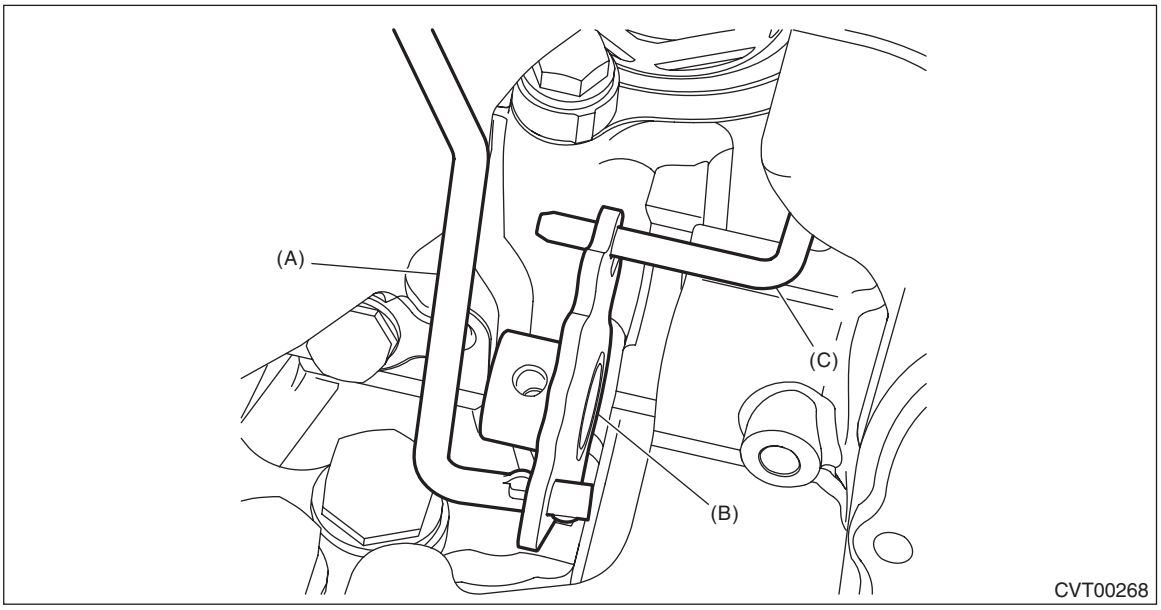
Tightening angle:
15° — 19°



2) Install the manual valve.



3) Install the parking rod to the manual plate.
4) Insert the parking rod into the transmission case, and install the shift connecting rod of the manual valve to the manual plate.

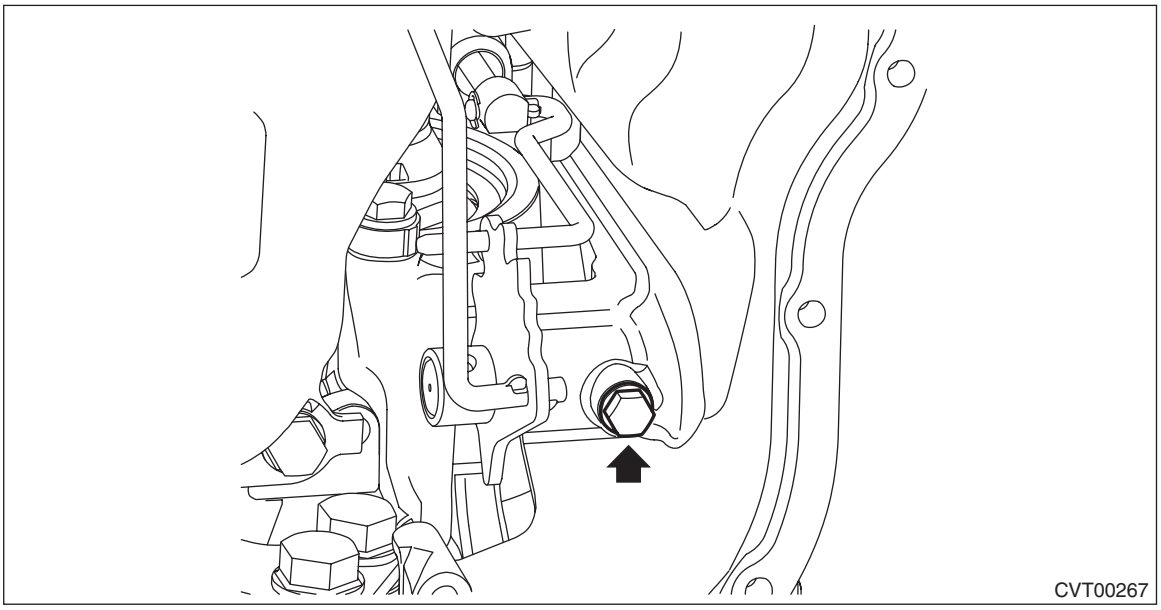


(A) Parking rod
(B) Manual plate
(C) Shift connecting rod

5) Insert the shifter arm shaft to the transmission, install the manual plate to the shifter arm shaft, and secure the shifter arm shaft with bolt.

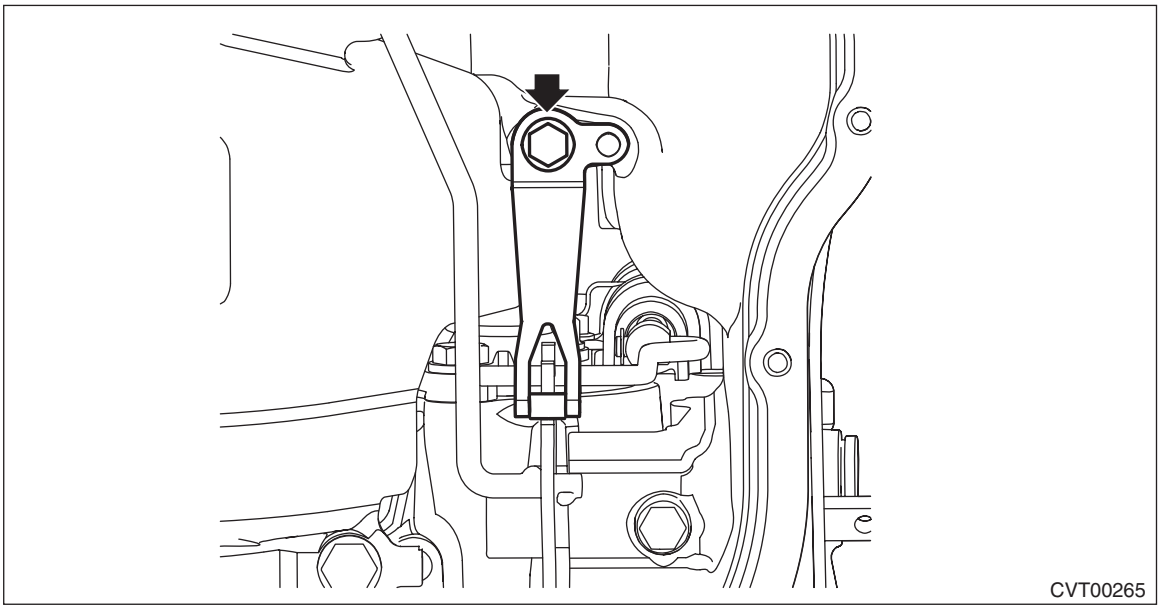
NOTE:
Do not damage the lip of oil seal press-fitted in the case.

Tightening torque:
7 N·m (0.7 kgf-m, 5.2 ft-lb)



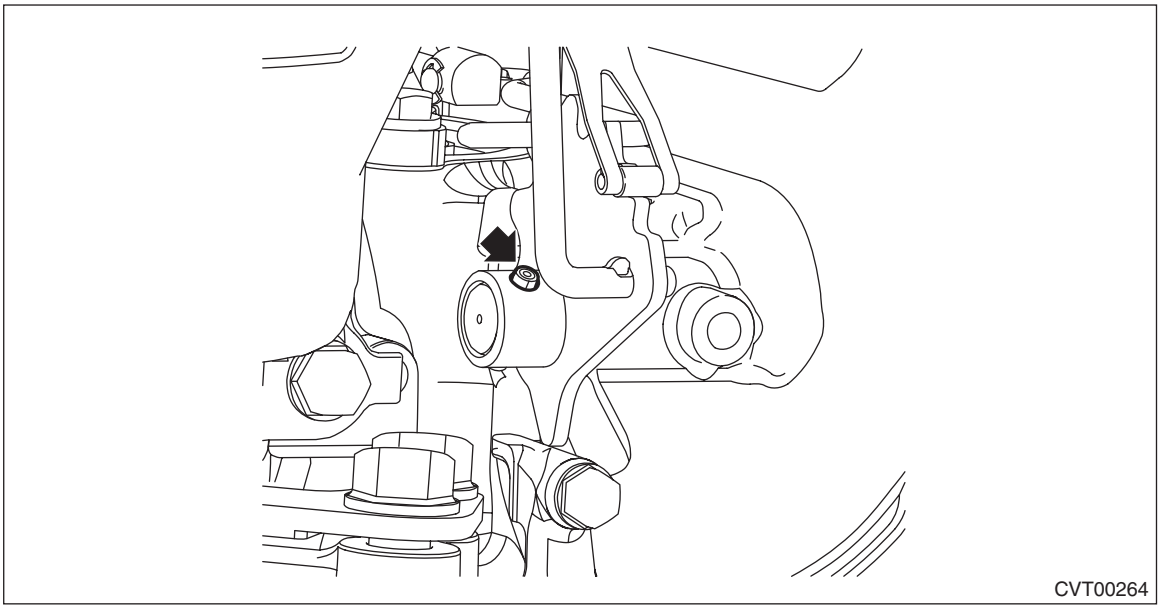
6) Install the detent spring to the transmission case.

Tightening torque:
7 N·m (0.7 kgf-m, 5.2 ft-lb)



7) Install the spring pin.

NOTE:
Use new spring pin.



8) Install the inhibitor switch. <Ref. to CVT(TH58A)-102, INSTALLATION, Inhibitor Switch.>
9) Adjust the inhibitor switch. <Ref. to CVT(TH58A)-100, ADJUSTMENT, Inhibitor Switch.>
10) Install the oil strainer and oil pan. <Ref. to CVT(TH58A)-114, INSTALLATION, Oil Pan and Strainer.>
11) Install the parking pawl. <Ref. to CVT(TH58A)-208, INSTALLATION, Parking Pawl.>
12) Install the transfer drive gear assembly. <Ref. to CVT(TH58A)-204, INSTALLATION, Transfer Drive Gear.>
13) Install the transfer driven gear assembly. <Ref. to CVT(TH58A)-201, INSTALLATION, Transfer Driven Gear.>
14) Install the transfer clutch assembly. <Ref. to CVT(TH58A)-188, INSTALLATION, Transfer Clutch.>
15) Install the extension case. <Ref. to CVT(TH58A)-183, INSTALLATION, Extension Case.>
16) Install the transmission assembly to the vehicle. <Ref. to CVT(TH58A)-77, INSTALLATION, Automatic Transmission Assembly.>

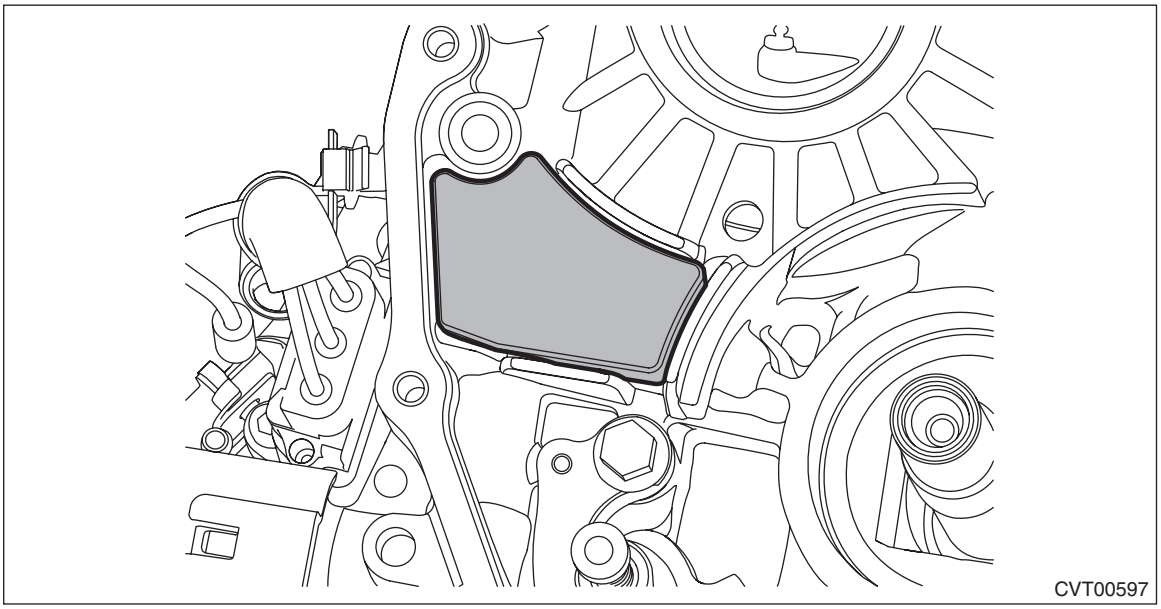
C: INSPECTION

Make sure that the manual plate and detent spring are not worn or otherwise damaged.

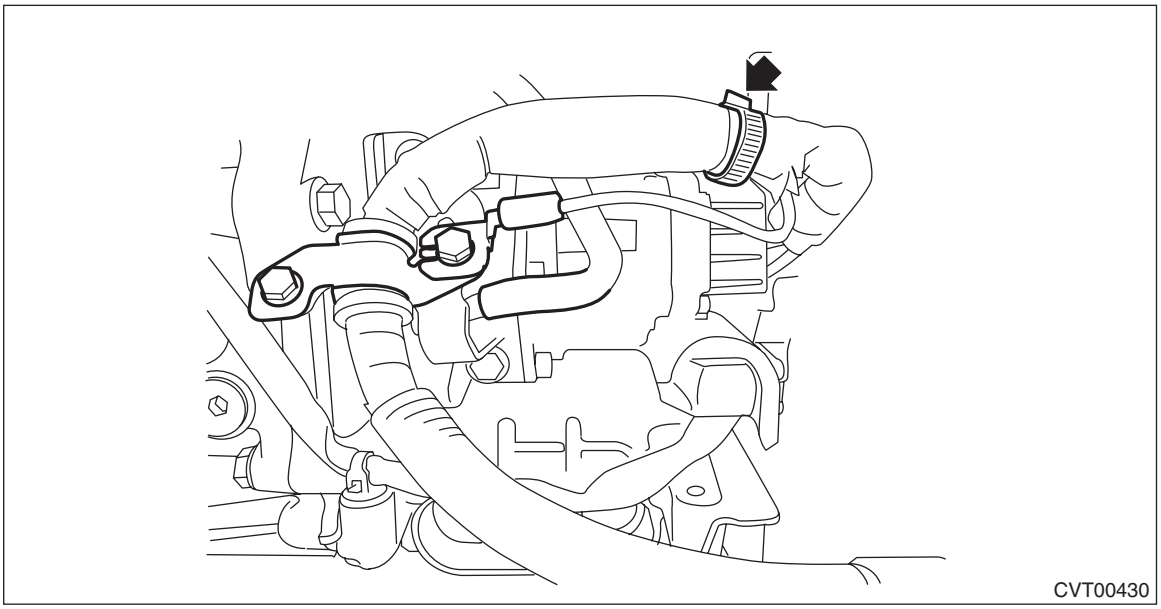
38.Drive Motor Assembly

A: REMOVAL

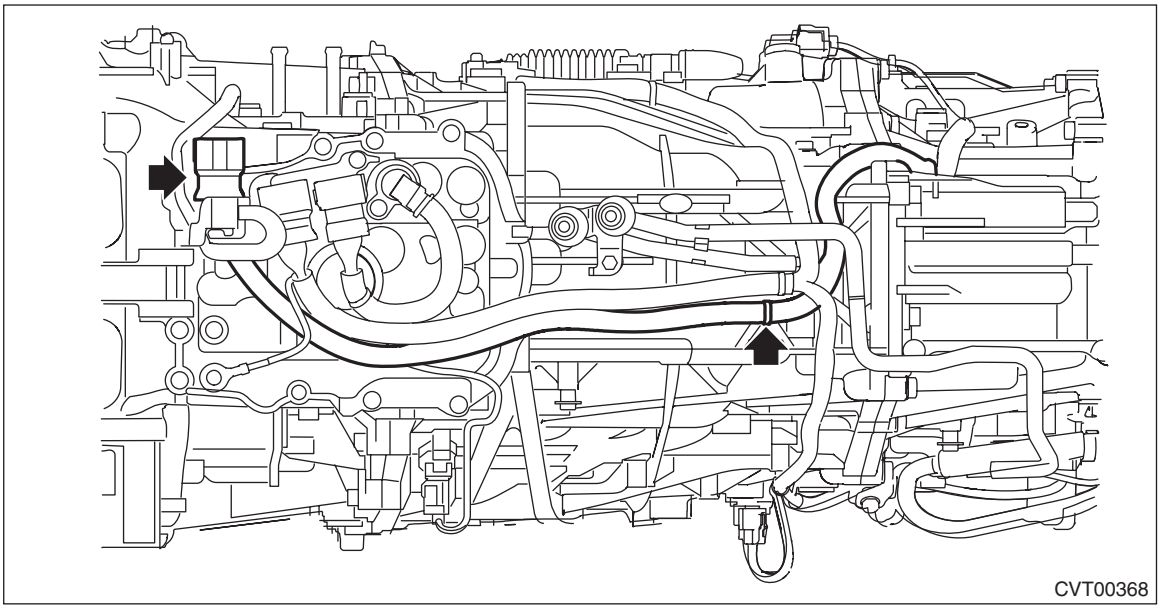
1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TH58A)-63, REMOVAL, Automatic Transmission Assembly.>
2) Remove the sensor cover. <Ref. to CVT(TH58A)-143, REMOVAL, Transmission Harness.>
3) Remove the secondary pressure sensor harness connector, and remove the harness clip. <Ref. to CVT(TH58A)-143, REMOVAL, Transmission Harness.>
4) Remove the extension case. <Ref. to CVT(TH58A)-182, REMOVAL, Extension Case.>
5) Remove the transfer clutch assembly. <Ref. to CVT(TH58A)-186, REMOVAL, Transfer Clutch.>
6) Remove the transfer driven gear assembly. <Ref. to CVT(TH58A)-200, REMOVAL, Transfer Driven Gear.>
7) Remove the transfer drive gear assembly. <Ref. to CVT(TH58A)-203, REMOVAL, Transfer Drive Gear.>
8) Remove the parking pawl. <Ref. to CVT(TH58A)-208, REMOVAL, Parking Pawl.>
9) Remove the transmission control device. <Ref. to CVT(TH58A)-210, REMOVAL, Transmission Control Device.>
10) Remove the oil spacer.



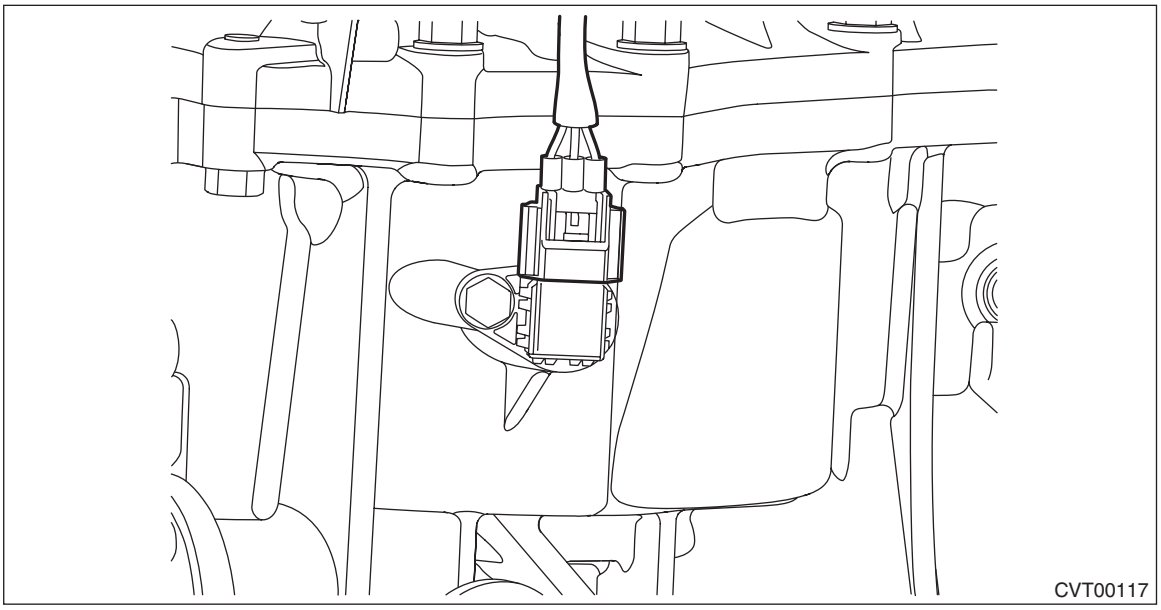
11) Release the harness clips from the harness bracket, then remove the air breather hose, harness bracket and ground terminal.



12) Remove the drive motor harness connector from the stay, and release the drive motor harness clips.



13) Remove the front wheel speed sensor harness connector.

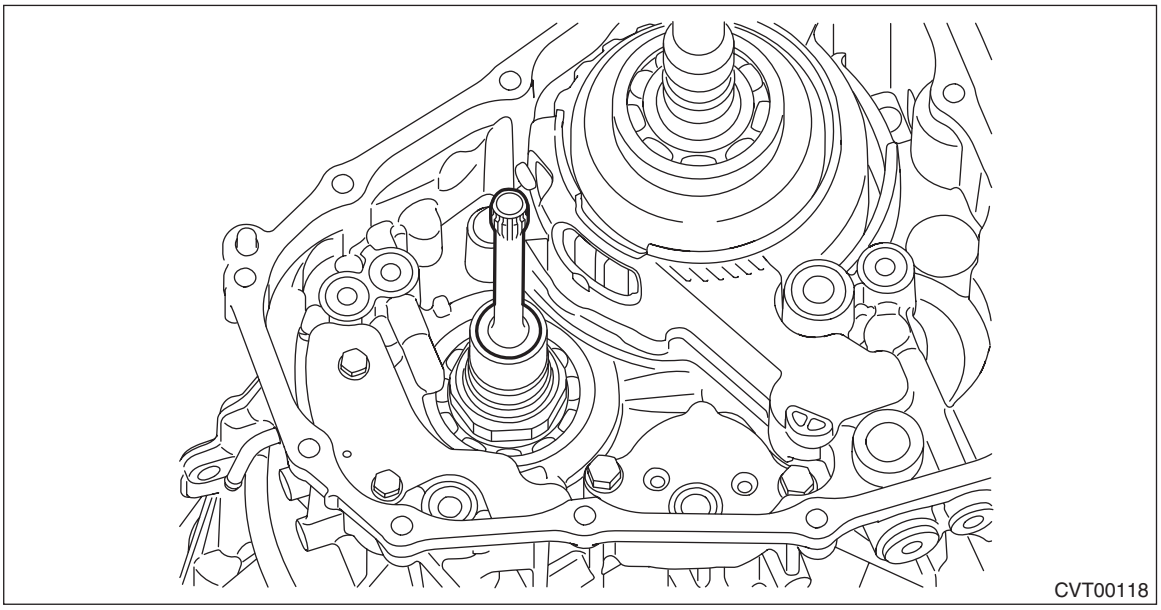


14) Remove the drive motor assembly.

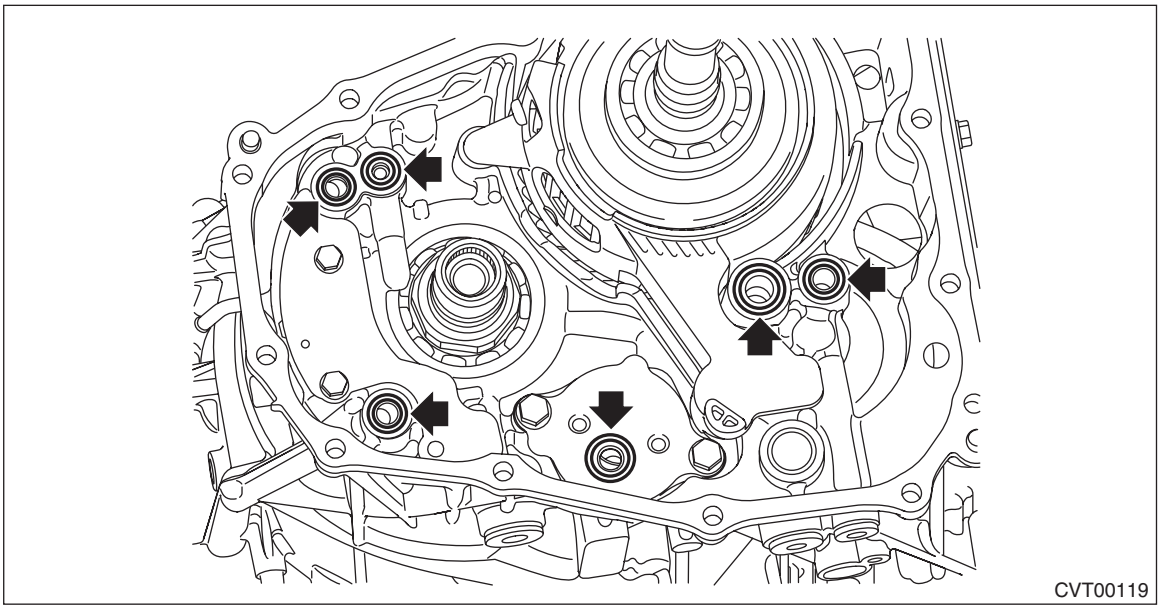
CAUTION:
Do not apply excessive force or damage the electric oil pump harness.

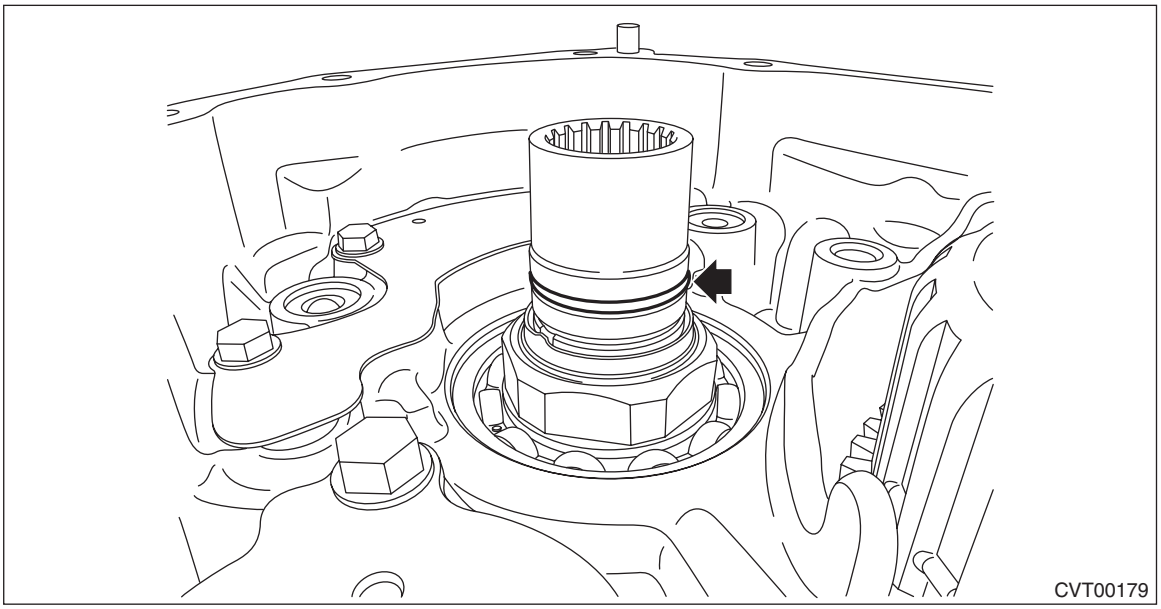
NOTE:
- The total number of drive motor assembly mounting bolts is 14.
- Perform this operation with two persons.
- After removal, do not place it with the drive motor side facing downward.

15) Remove the intermediate shaft.

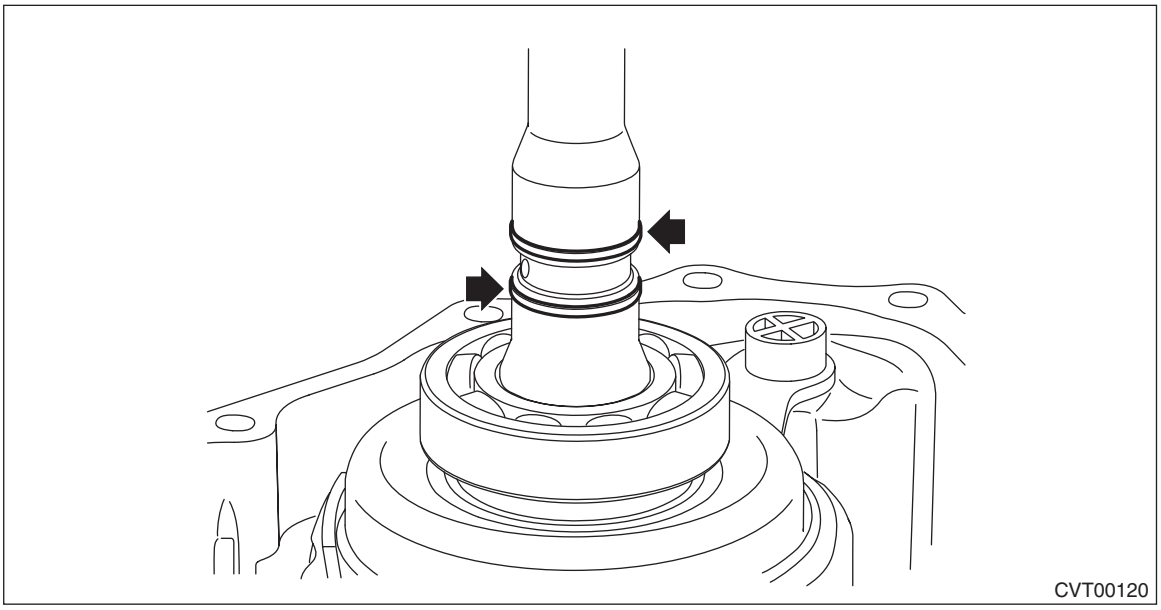


16) Remove the O-ring.


CVT00119


CVT00179

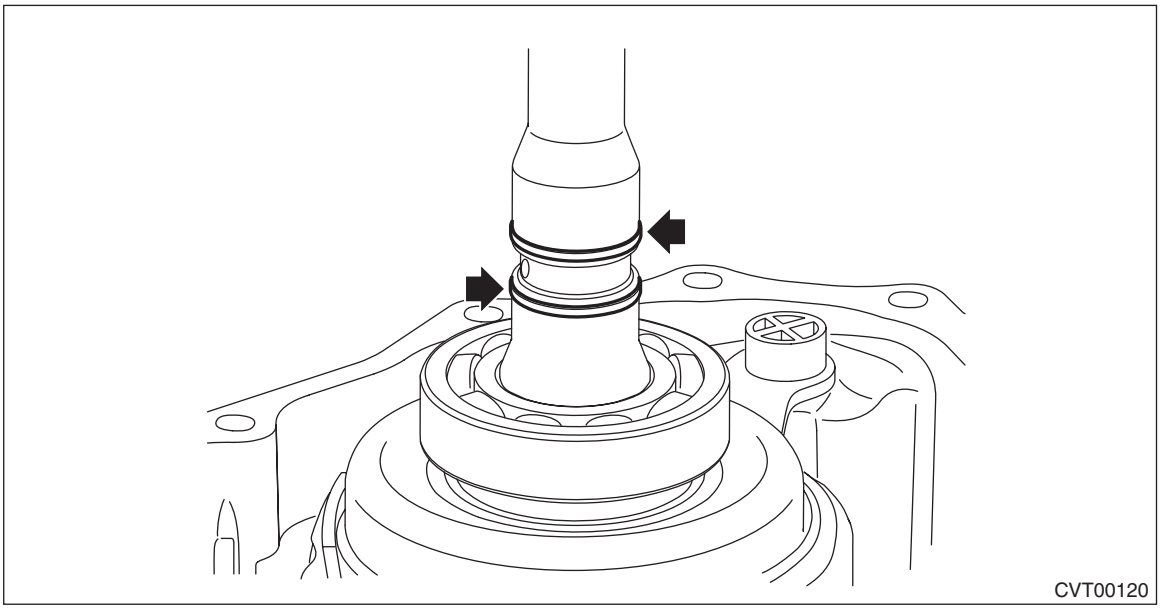
17) Remove the seal ring.



B: INSTALLATION

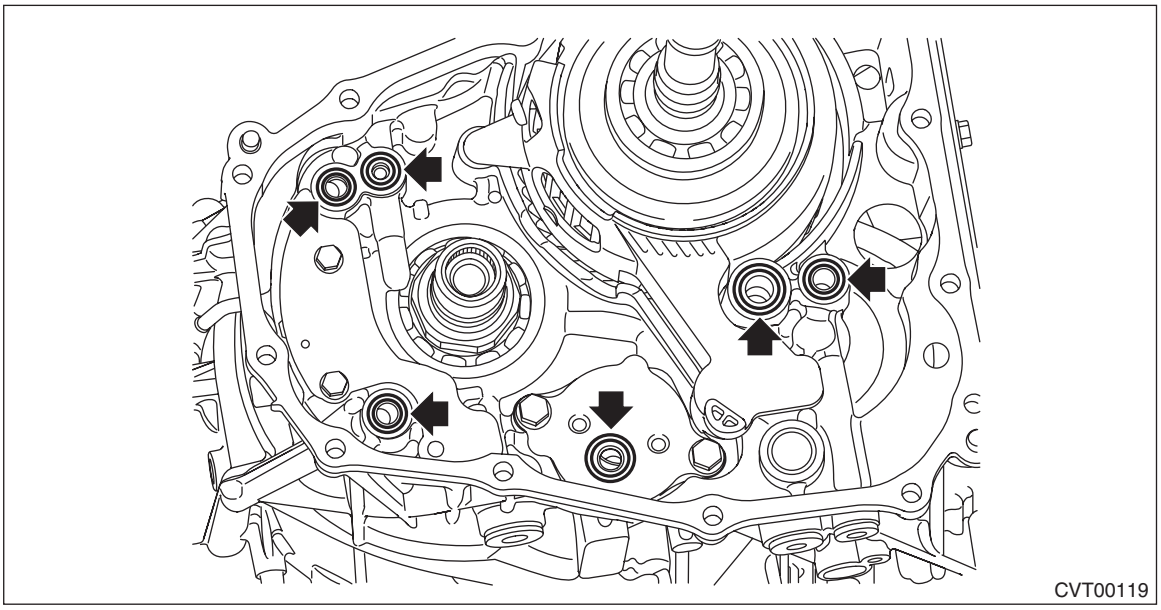
1) Install the seal ring.

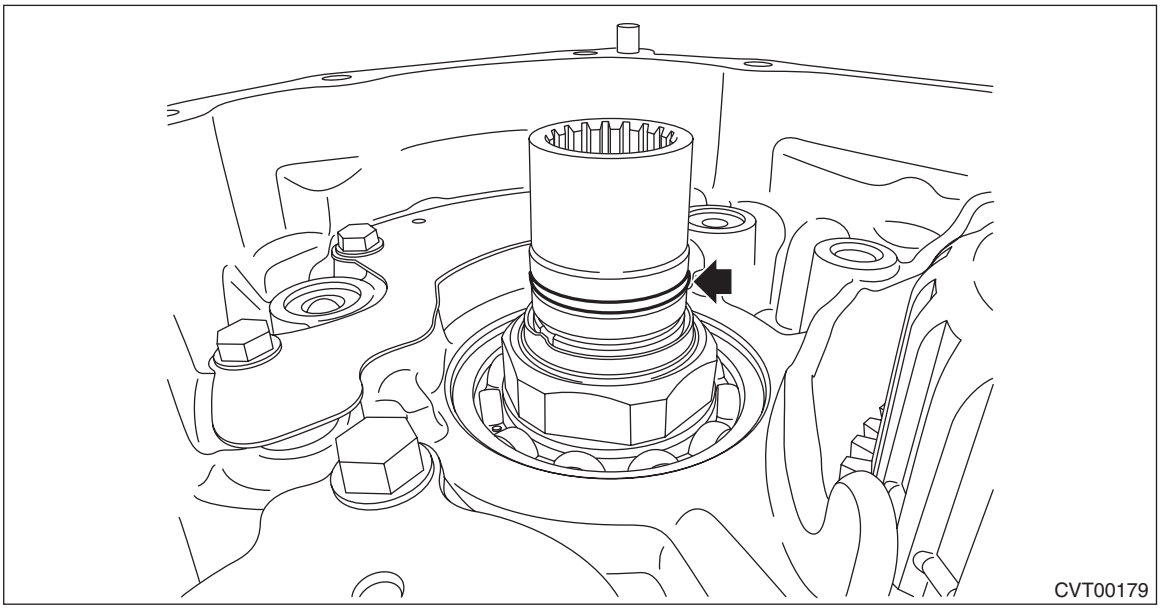
NOTE:
- Use a new seal ring.
- When installing the seal ring, do not expand the seal ring too much.
- Apply CVTF to the seal rings.



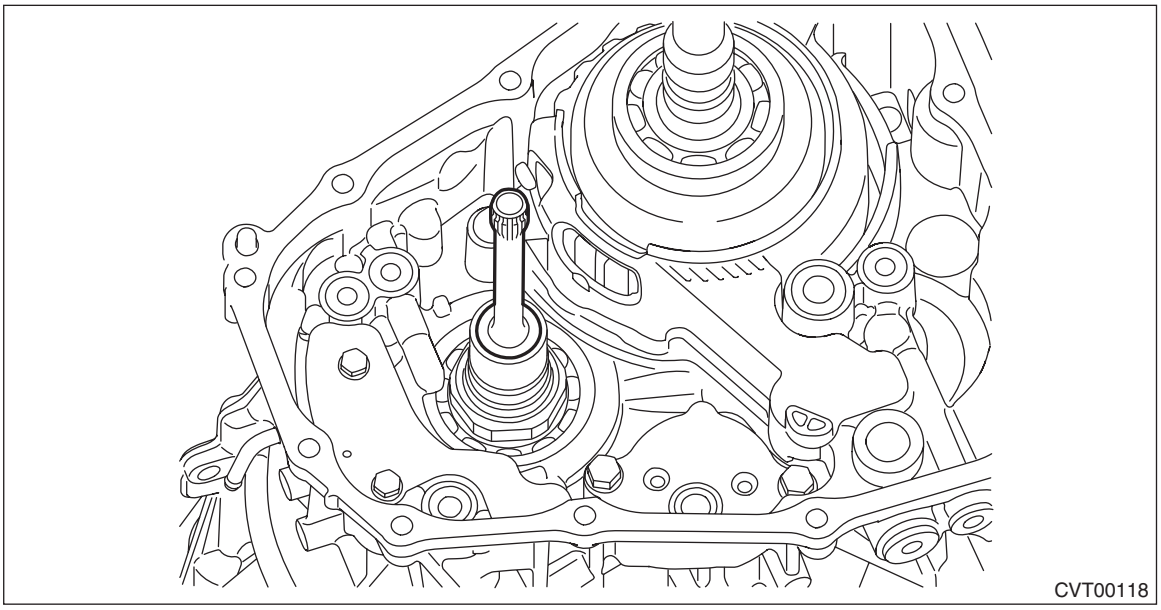
2) Install the O-ring.

NOTE:
- Use new O-rings.
- Apply CVTF to the O-ring.


CVT00119

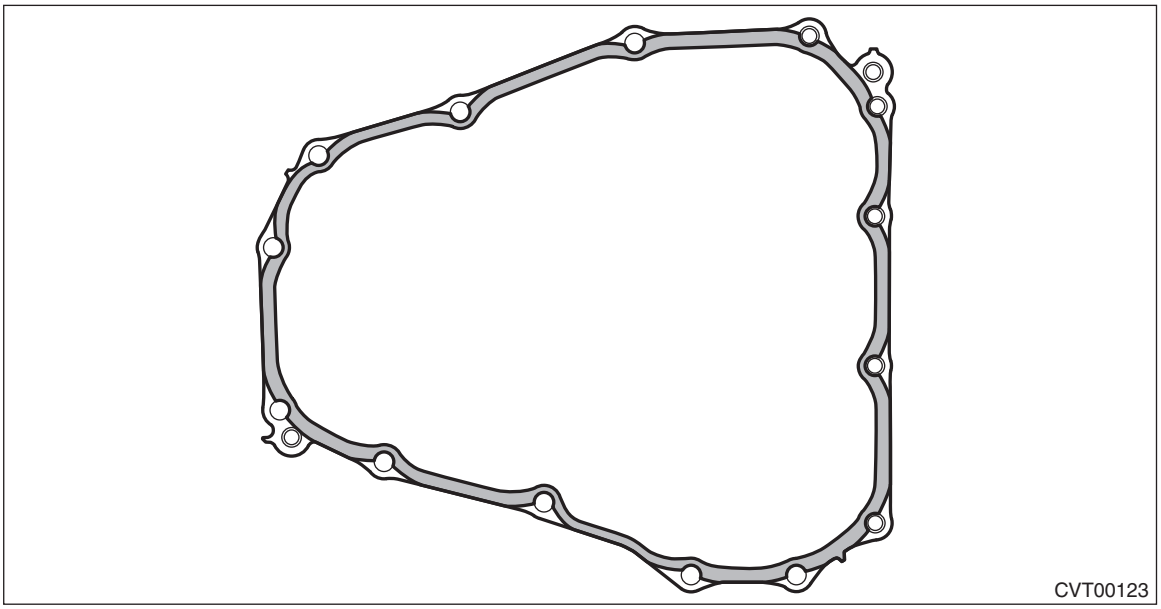

CVT00179

3) Install the intermediate shaft.



4) Apply liquid gasket to the transmission case seamlessly.

Liquid gasket:
THREE BOND 1215B or equivalent



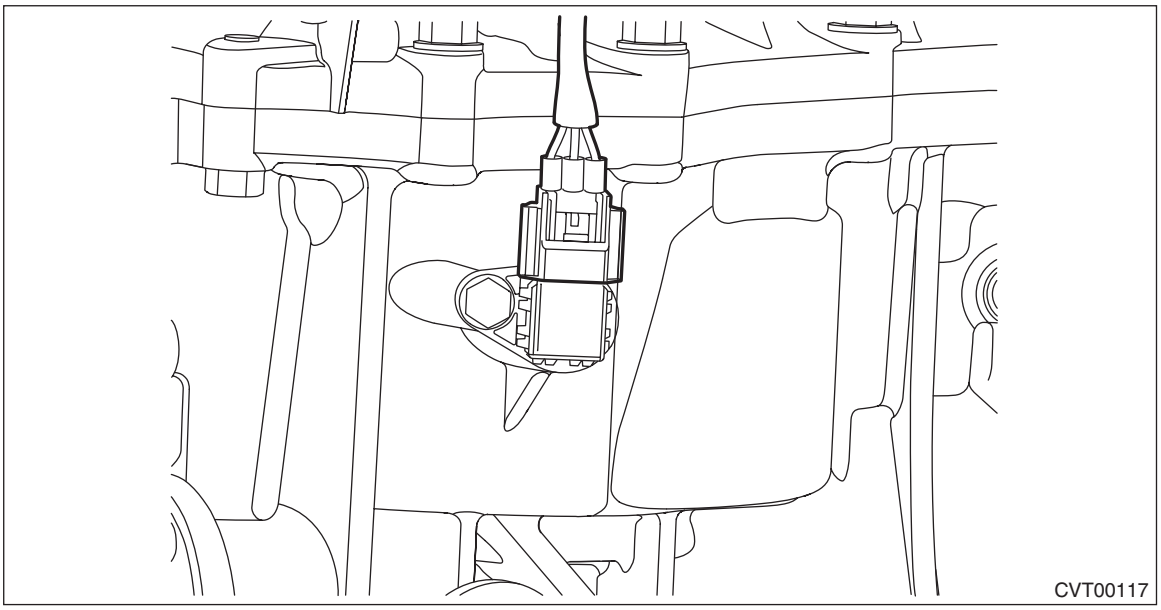
5) Install the drive motor assembly.

CAUTION:
Do not apply excessive force or damage the electric oil pump harness.

NOTE:
- The total number of drive motor assembly mounting bolts is 14.
- Perform this operation with two persons.

Tightening torque:
25 N·m (2.5 kgf-m, 18.4 ft-lb)

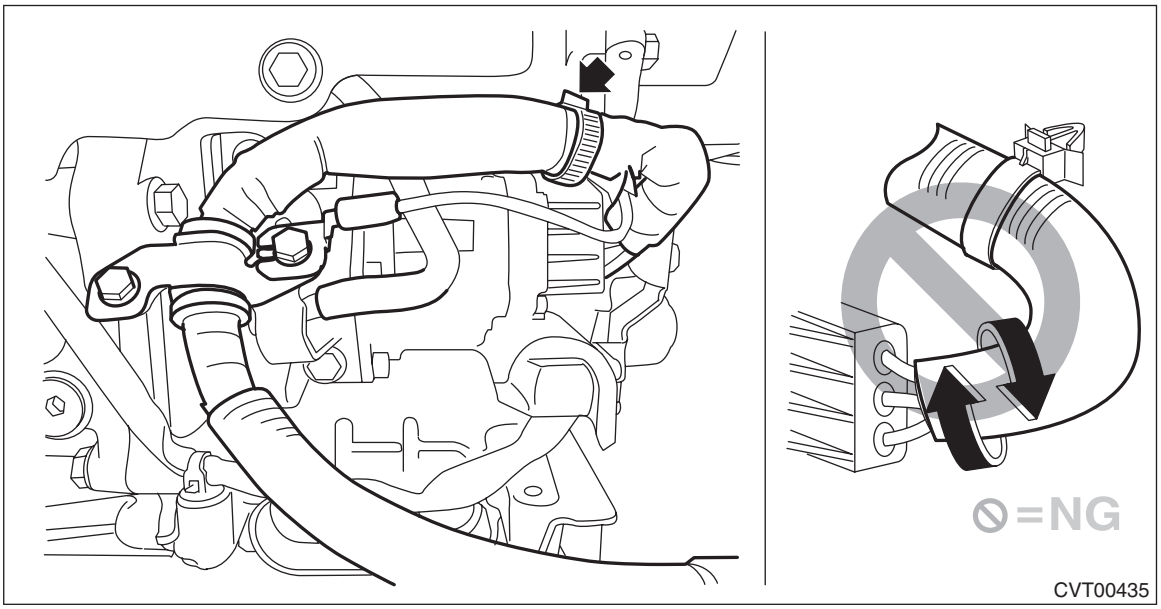
6) Install the front wheel speed sensor harness connector.



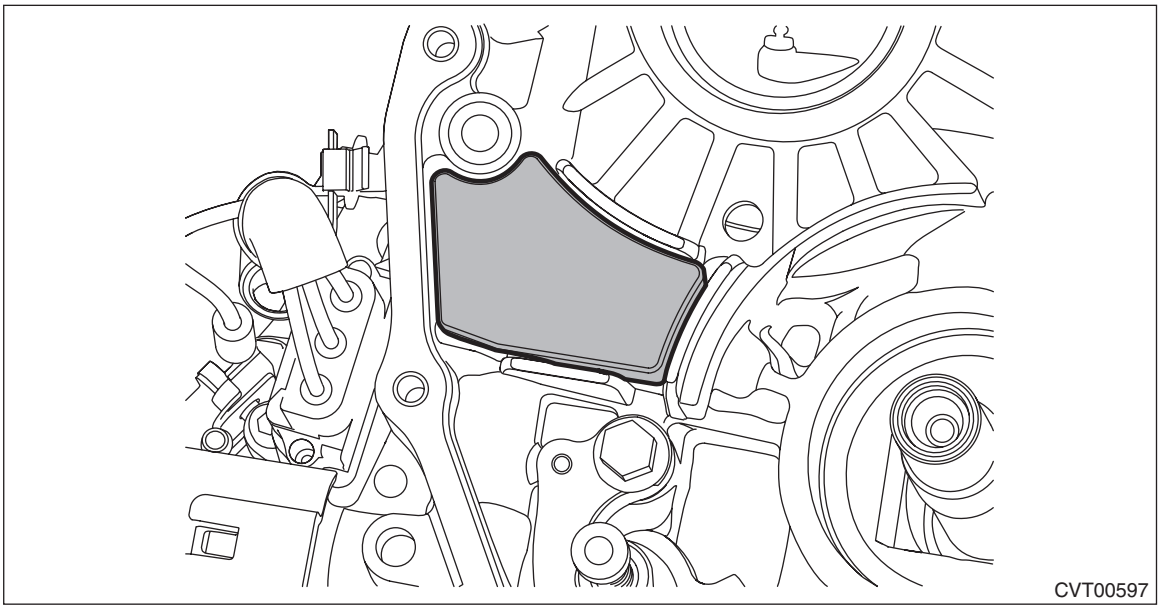
7) Install the harness bracket to the harness clip, then install the air breather hose, electric oil pump harness, harness bracket and ground terminal.

CAUTION:
When installing the electric oil pump harness, be careful not to twist the harness by 360°.

Tightening torque:
8 N·m (0.8 kgf-m, 13.3 ft-lb)

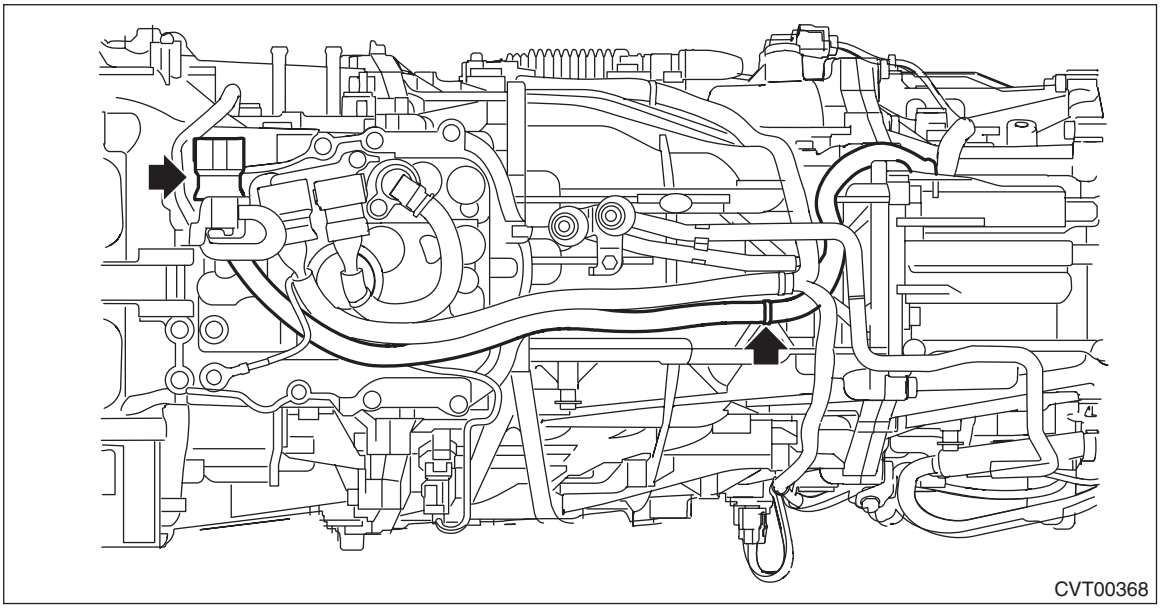


8) Install the oil spacer.



9) Install the drive motor harness clip, and then install the drive motor harness connector to the stay.

NOTE:
Install the drive motor harness through the lower side of air breather hose and the transmission harness.

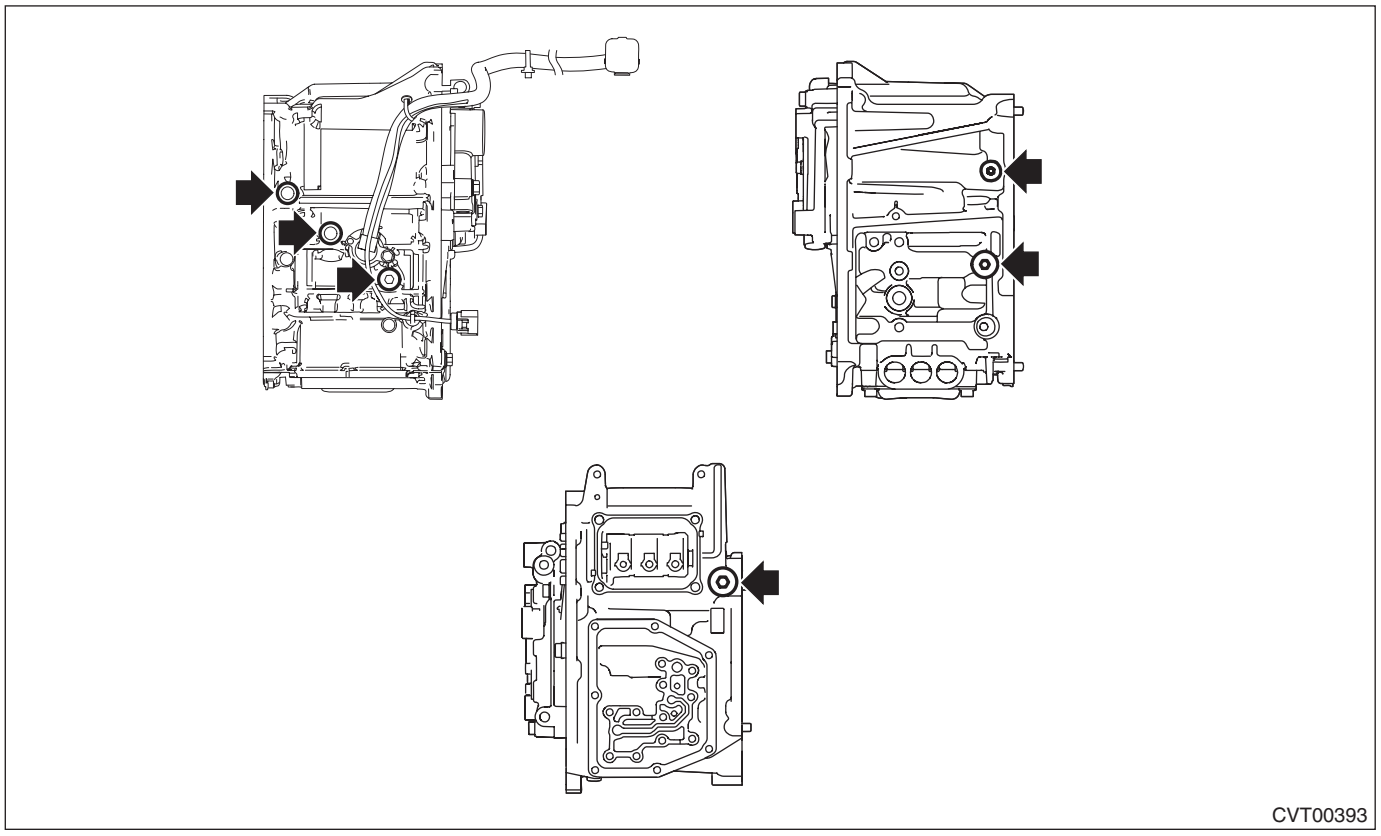


10) Install the transmission control device. <Ref. to CVT(TH58A)-213, INSTALLATION, Transmission Control Device.>
11) Install the parking pawl. <Ref. to CVT(TH58A)-208, INSTALLATION, Parking Pawl.>
12) Install the transfer drive gear assembly. <Ref. to CVT(TH58A)-204, INSTALLATION, Transfer Drive Gear.>
13) Install the transfer driven gear assembly. <Ref. to CVT(TH58A)-201, INSTALLATION, Transfer Driven Gear.>
14) Install the transfer clutch assembly. <Ref. to CVT(TH58A)-188, INSTALLATION, Transfer Clutch.>
15) Install the extension case. <Ref. to CVT(TH58A)-183, INSTALLATION, Extension Case.>
16) Install the secondary pressure sensor harness connector, and then install the harness clip. <Ref. to CVT(TH58A)-151, INSTALLATION, Transmission Harness.>
17) Install the sensor cover. <Ref. to CVT(TH58A)-151, INSTALLATION, Transmission Harness.>
18) Install the transmission assembly to the vehicle. <Ref. to CVT(TH58A)-77, INSTALLATION, Automatic Transmission Assembly.>

C: DISASSEMBLY

CAUTION:
For disassembly, follow the instructions in this manual. Do not disassemble other than the specified parts.

1) Remove the electric oil pump. <Ref. to CVT(TH58A)-134, REMOVAL, Electric Fluid Pump.>
2) Remove the output clutch control valve body. <Ref. to CVT(TH58A)-121, OUTPUT CLUTCH CONTROL VALVE BODY, REMOVAL, Control Valve Body.>
3) Remove the power connect cover, if mounted.
4) Remove the secondary pressure sensor. <Ref. to CVT(TH58A)-110, REMOVAL, Secondary Pressure Sensor.>
5) Remove all plugs.

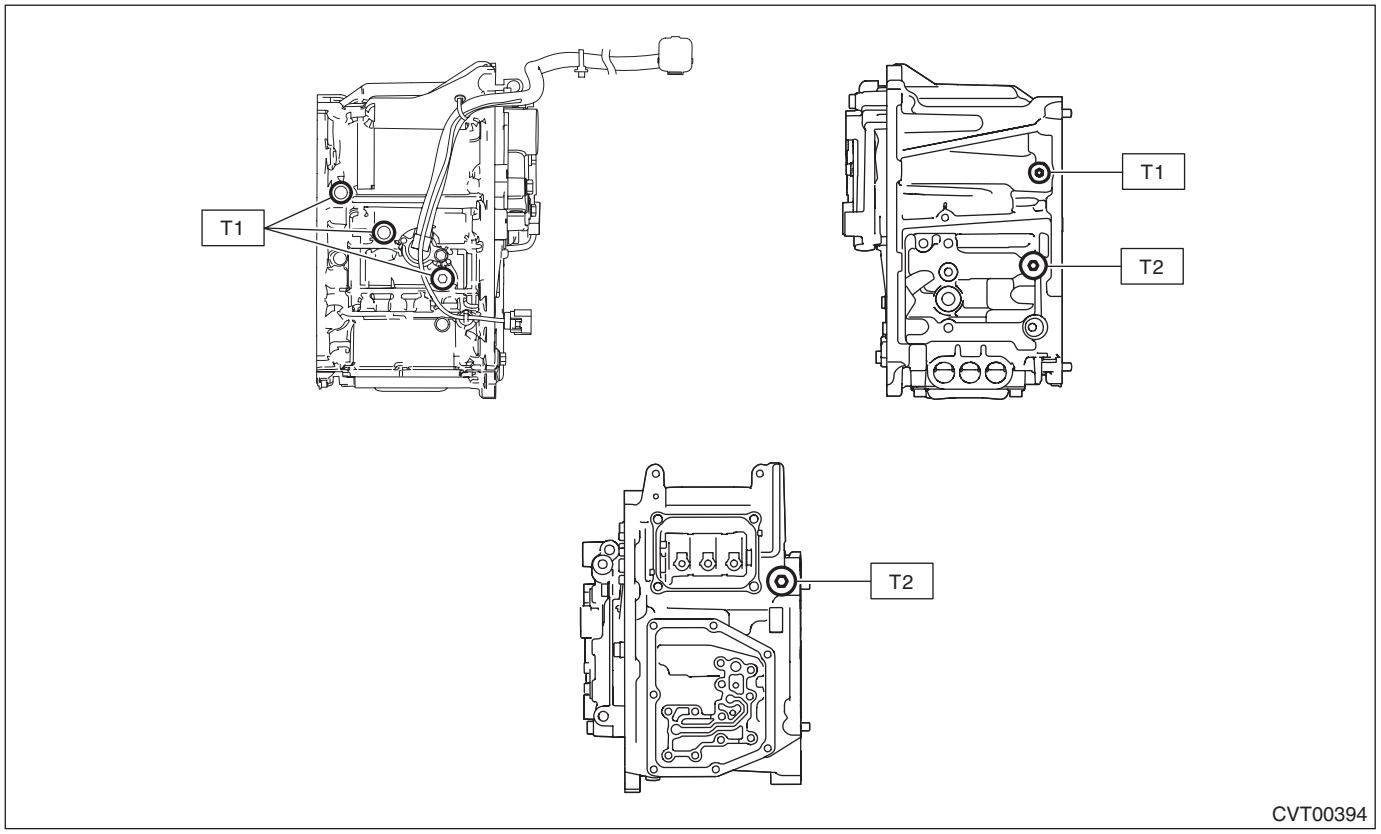


D: ASSEMBLY

1) Install all plugs.

NOTE:
- Use new O-rings.
- Apply CVTF to the O-rings.

Tightening torque:
T1: 25 N·m (2.5 kgf-m, 18.4 ft-lb)
T2: 50 N·m (5.1 kgf-m, 36.9 ft-lb)



2) Install the secondary pressure sensor. <Ref. to CVT(TH58A)-111, INSTALLATION, Secondary Pressure Sensor.>
3) Temporarily attach the power connect cover.
4) Install the output clutch control valve body. <Ref. to CVT(TH58A)-121, OUTPUT CLUTCH CONTROL VALVE BODY, REMOVAL, Control Valve Body.>
5) Install the electric oil pump. <Ref. to CVT(TH58A)-138, INSTALLATION, Electric Fluid Pump.>

E: INSPECTION

- Check there is no damage or cracks on the drive motor assembly case and other parts.
- Check there is no leak of CVTF from the joint between drive motor assembly case and transmission case.

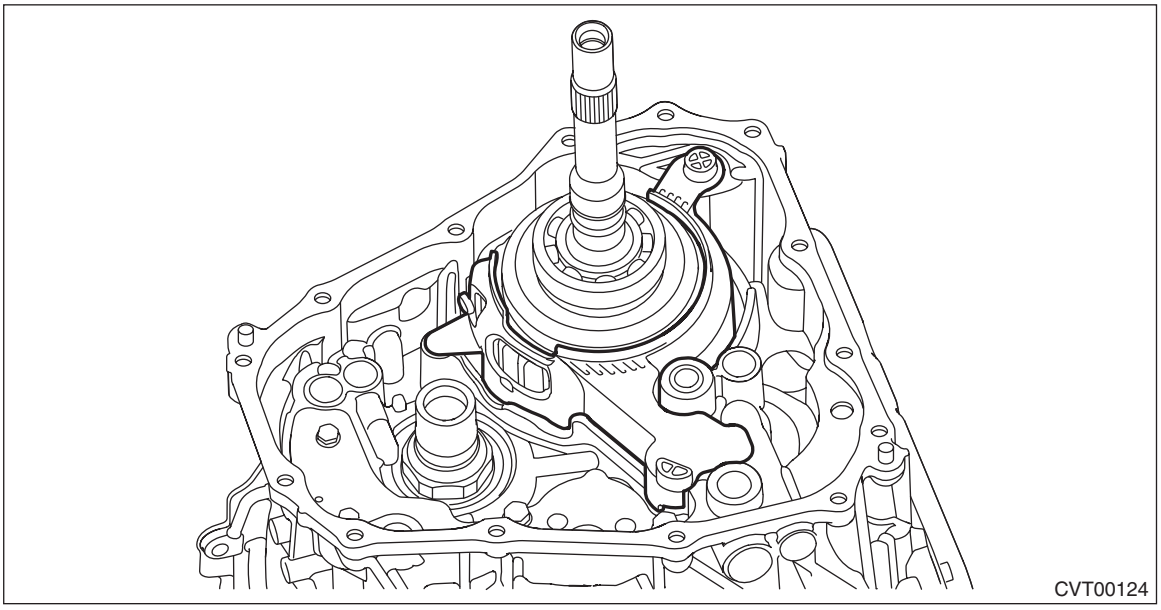
F: ADJUSTMENT

NOTE:
When replacing the drive motor assembly with a new part, perform the following check and adjustment for the selection.
- Select the transfer driven gear shim. <Ref. to CVT(TH58A)-198, ADJUSTMENT, Transfer Clutch.>
- Select the transfer drive gear shim. <Ref. to CVT(TH58A)-207, ADJUSTMENT, Transfer Drive Gear.>
- Select the reduction driven gear shim. <Ref. to CVT(TH58A)-243, ADJUSTMENT, Output Clutch Assembly.>

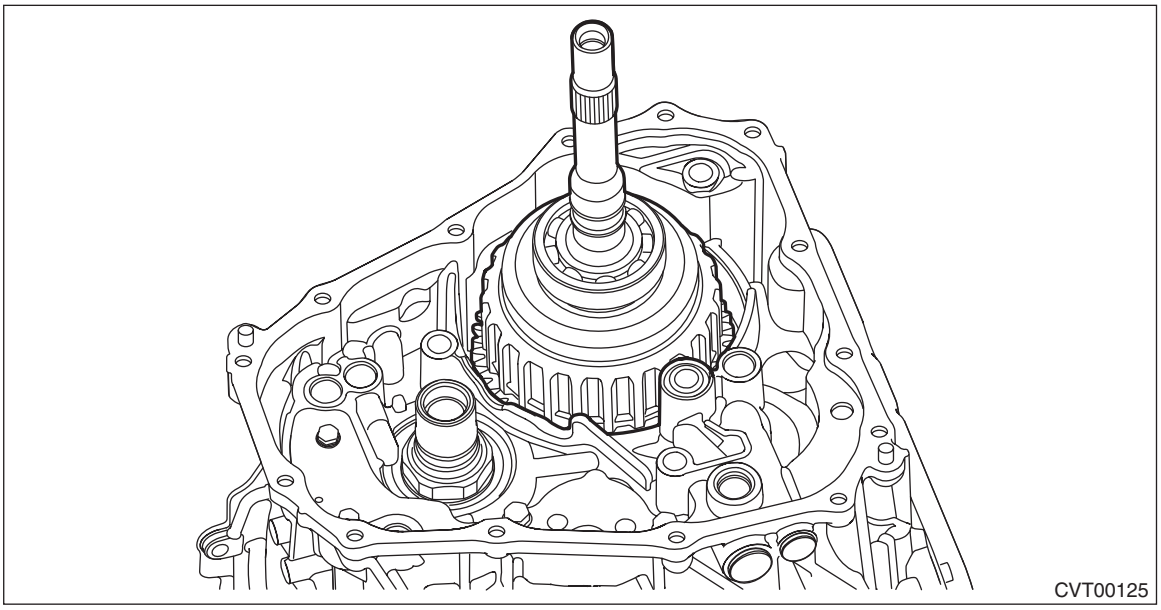
39.Output Clutch Assembly

A: REMOVAL

1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TH58A)-63, REMOVAL, Automatic Transmission Assembly.>
2) Remove the sensor cover. <Ref. to CVT(TH58A)-143, REMOVAL, Transmission Harness.>
3) Remove the secondary pressure sensor harness connector, and remove the harness clip. <Ref. to CVT(TH58A)-143, REMOVAL, Transmission Harness.>
4) Remove the extension case. <Ref. to CVT(TH58A)-182, REMOVAL, Extension Case.>
5) Remove the transfer clutch assembly. <Ref. to CVT(TH58A)-186, REMOVAL, Transfer Clutch.>
6) Remove the transfer driven gear assembly. <Ref. to CVT(TH58A)-200, REMOVAL, Transfer Driven Gear.>
7) Remove the transfer drive gear assembly. <Ref. to CVT(TH58A)-203, REMOVAL, Transfer Drive Gear.>
8) Remove the parking pawl. <Ref. to CVT(TH58A)-208, REMOVAL, Parking Pawl.>
9) Remove the transmission control device. <Ref. to CVT(TH58A)-210, REMOVAL, Transmission Control Device.>
10) Remove the drive motor assembly. <Ref. to CVT(TH58A)-217, REMOVAL, Drive Motor Assembly.>
11) Remove the front wheel speed sensor. <Ref. to CVT(TH58A)-108, REMOVAL, Front Wheel Speed Sensor.>
12) Remove the oil baffle.

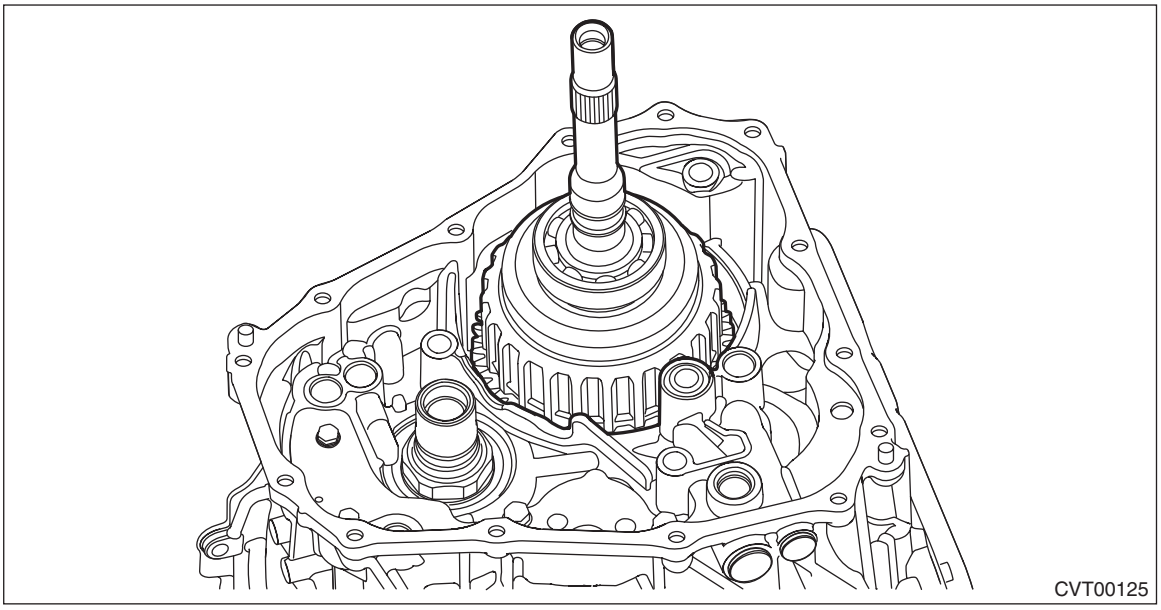


13) Remove the output clutch assembly.



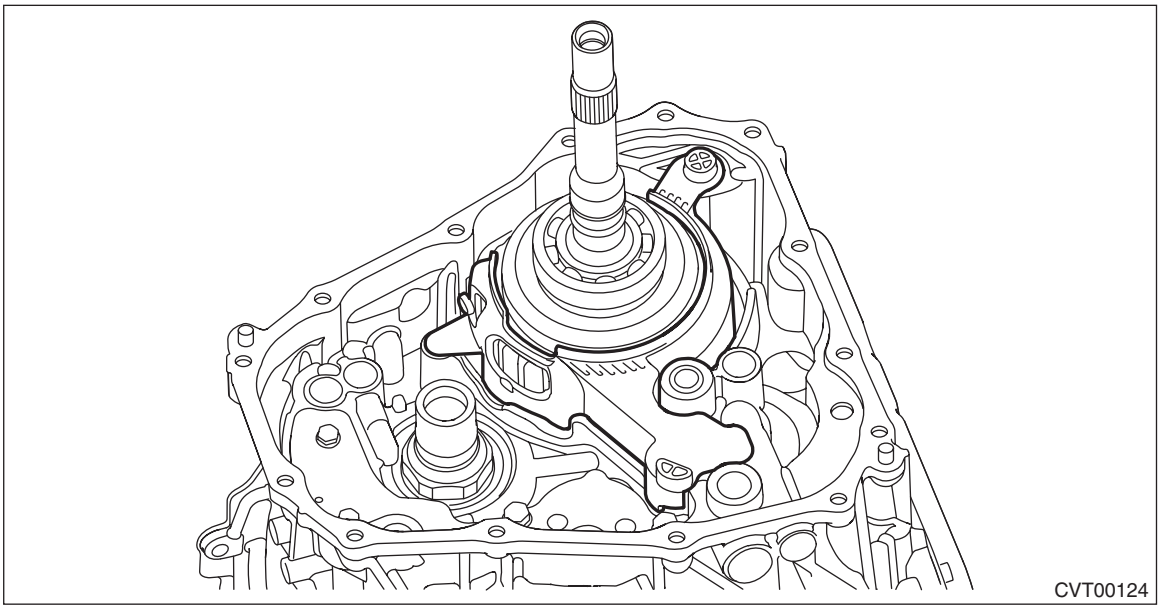
B: INSTALLATION

1) Install the output clutch assembly.



2) Select the reduction driven gear shim. <Ref. to CVT(TH58A)-243, ADJUSTMENT, Output Clutch Assembly.>
3) Attach the selected reduction driven gear shim to drive motor assembly with vaseline.

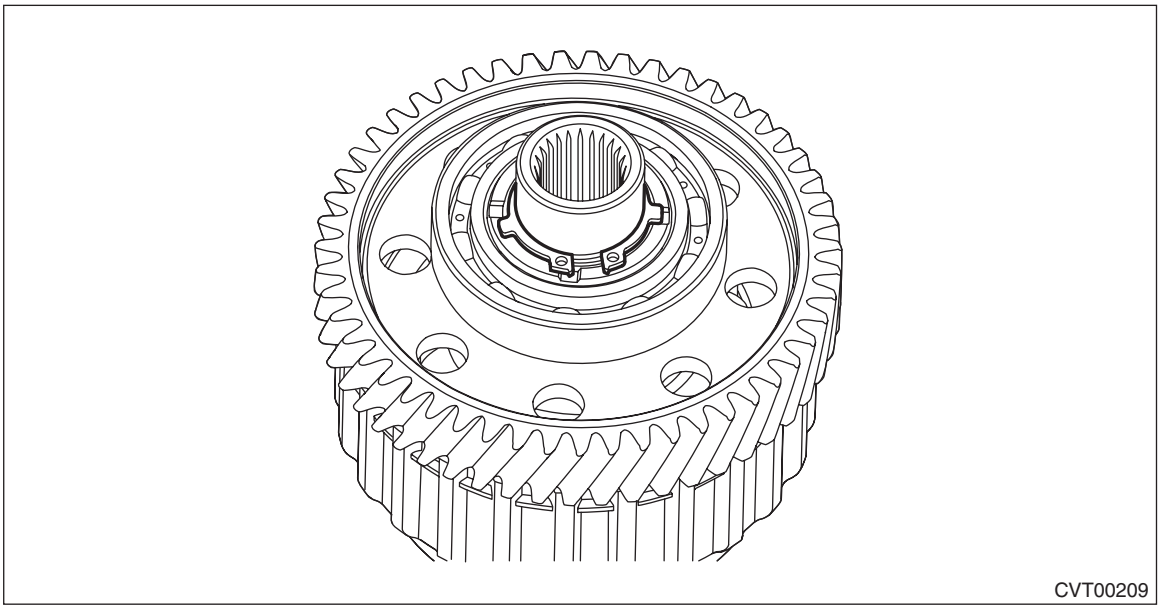
4) Install the oil baffle.



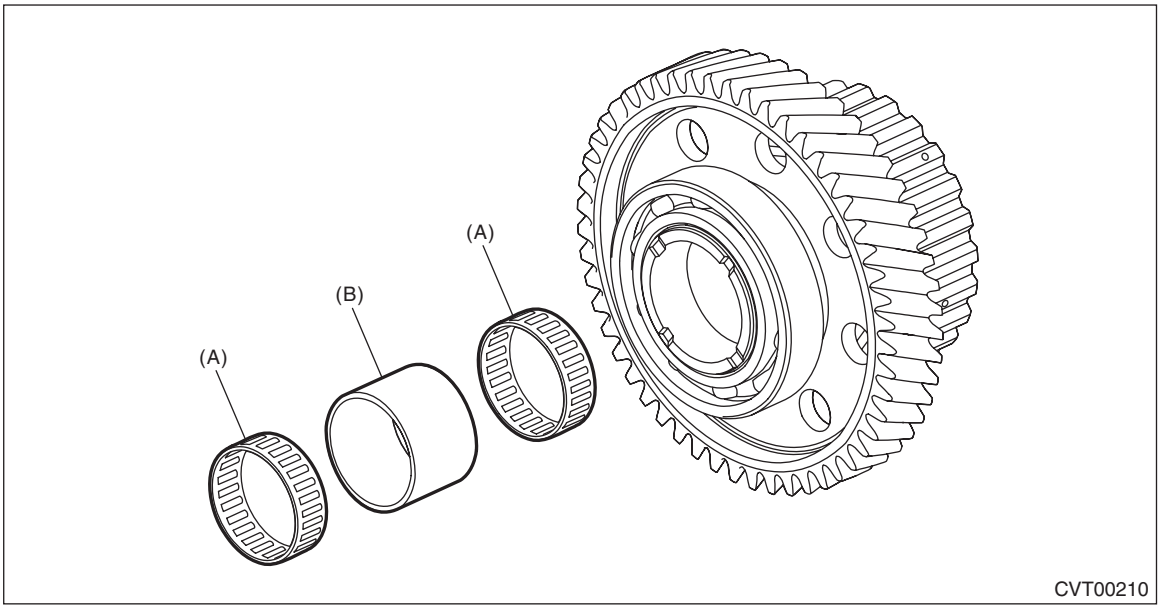
5) Install the front wheel speed sensor. <Ref. to CVT(TH58A)-108, REMOVAL, Front Wheel Speed Sensor.>
6) Install the drive motor assembly. <Ref. to CVT(TH58A)-221, INSTALLATION, Drive Motor Assembly.>
7) Install the transmission control device. <Ref. to CVT(TH58A)-213, INSTALLATION, Transmission Control Device.>
8) Install the parking pawl. <Ref. to CVT(TH58A)-208, INSTALLATION, Parking Pawl.>
9) Install the transfer drive gear. <Ref. to CVT(TH58A)-204, INSTALLATION, Transfer Drive Gear.>
10) Install the transfer driven gear assembly. <Ref. to CVT(TH58A)-201, INSTALLATION, Transfer Driven Gear.>
11) Install the extension case. <Ref. to CVT(TH58A)-183, INSTALLATION, Extension Case.>
12) Install the secondary pressure sensor harness connector, and then install the harness clip. <Ref. to CVT(TH58A)-151, INSTALLATION, Transmission Harness.>
13) Install the sensor cover. <Ref. to CVT(TH58A)-151, INSTALLATION, Transmission Harness.>
14) Install the transmission assembly to the vehicle. <Ref. to CVT(TH58A)-77, INSTALLATION, Automatic Transmission Assembly.>

C: DISASSEMBLY

1) Remove the snap ring.


CVT00209

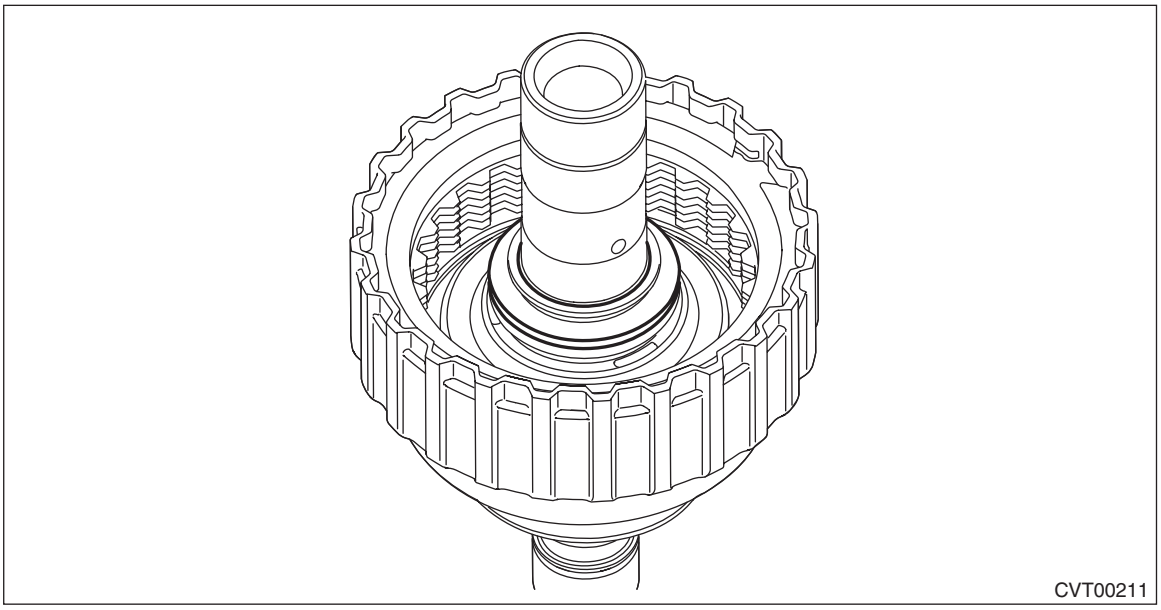
2) Remove the reduction driven gear assembly needle bearing and reduction driven gear bushing.



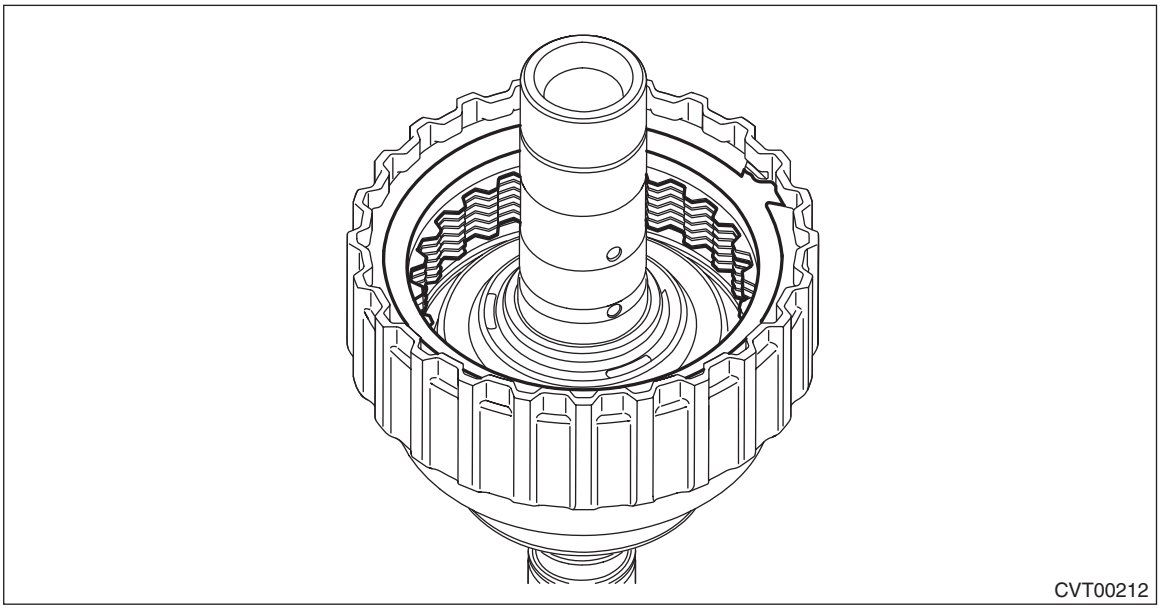
CVT00210

(A) Needle bearing
(B) Reduction driven gear bushing

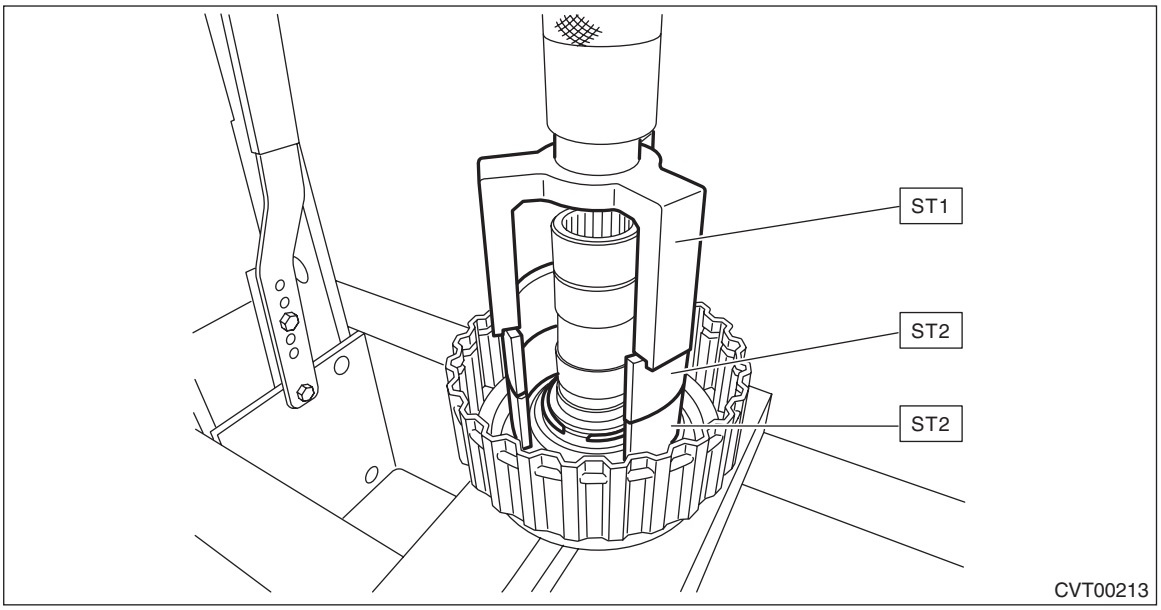
3) Remove the thrust bearing and thrust washer.


CVT00211

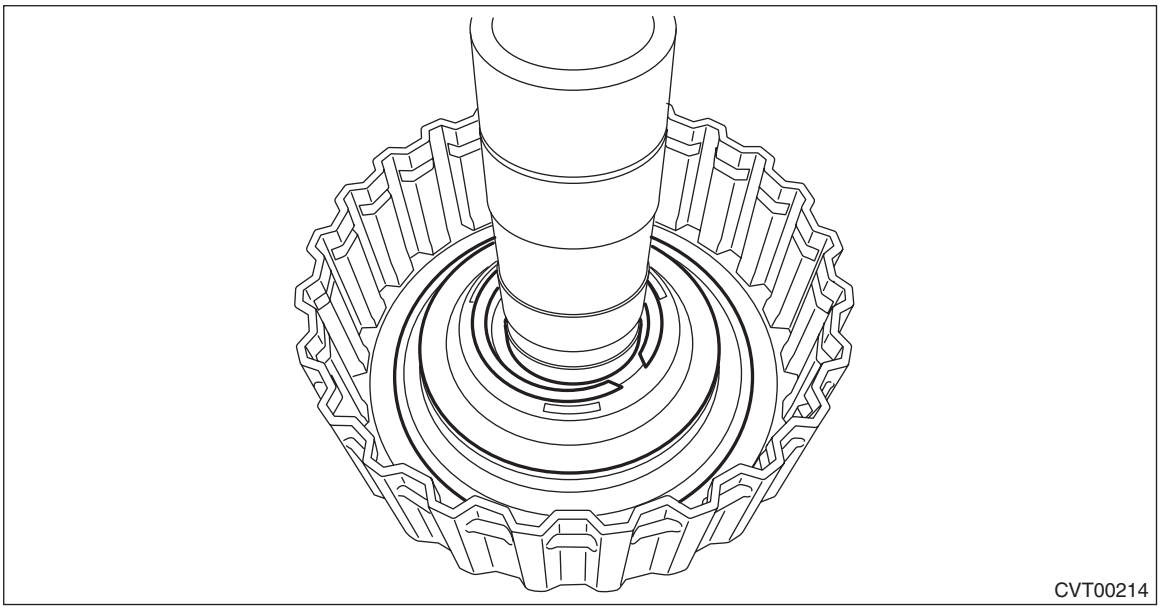
4) Remove the snap ring.
5) Remove the retaining plate, drive plate, driven plate and dish plate.


CVT00212

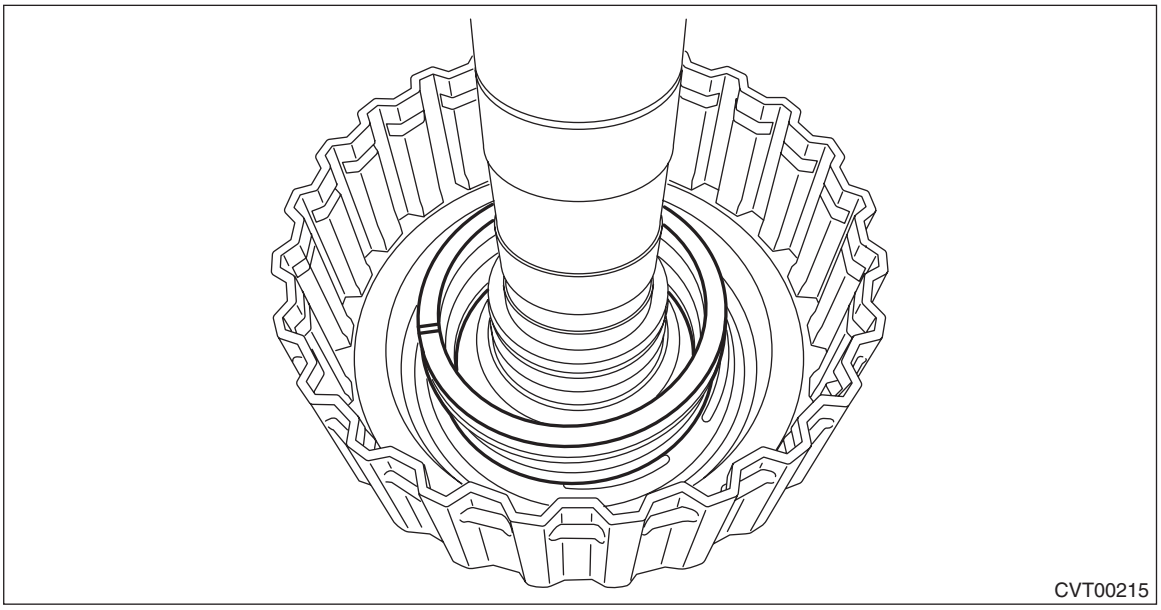
6) Compress the return spring using the ST to remove the snap ring.
ST1 18769AA010 COMPRESSOR SPECIAL TOOL
ST2 398673600 COMPRESSOR



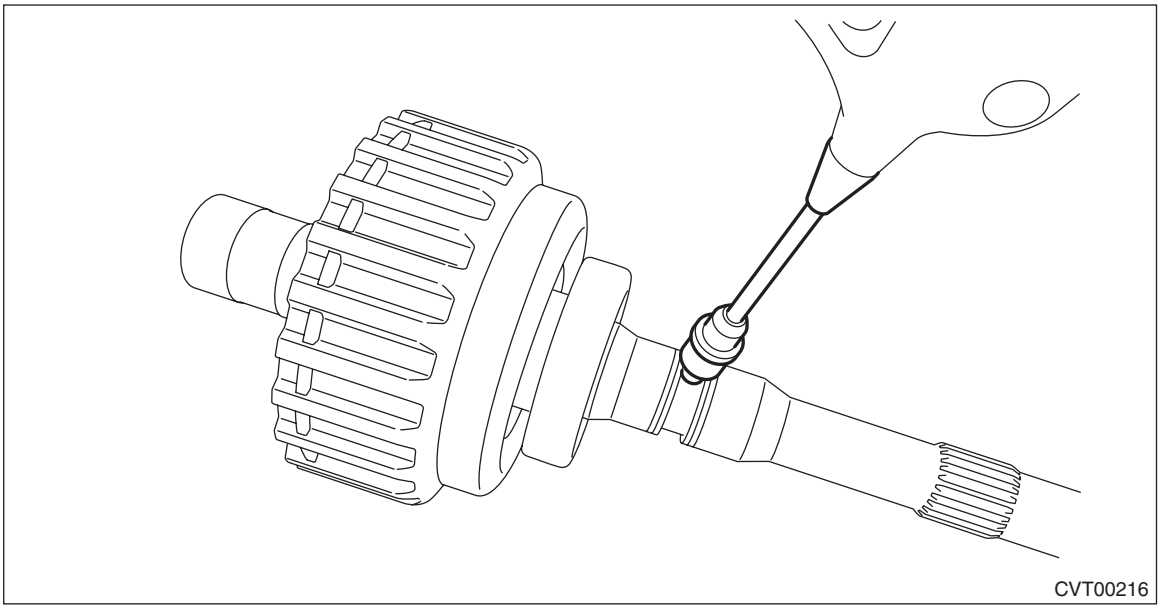
7) Remove the chamber COMPL and snap ring.



8) Remove the return spring.

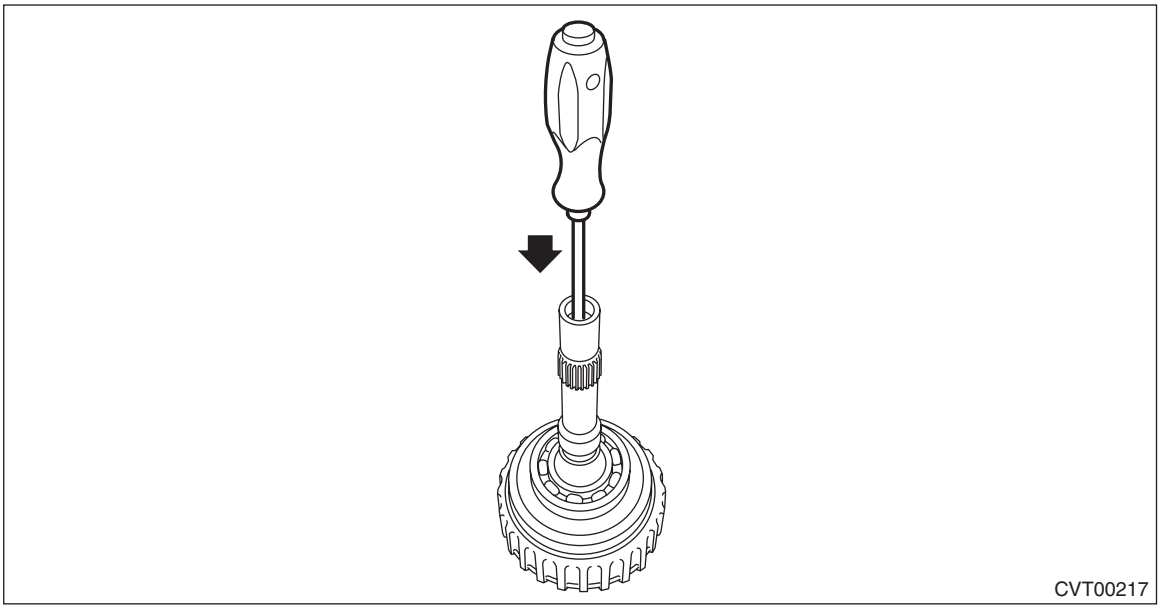


9) Remove the clutch piston by blowing compressed air intermittently from the shaft hole.

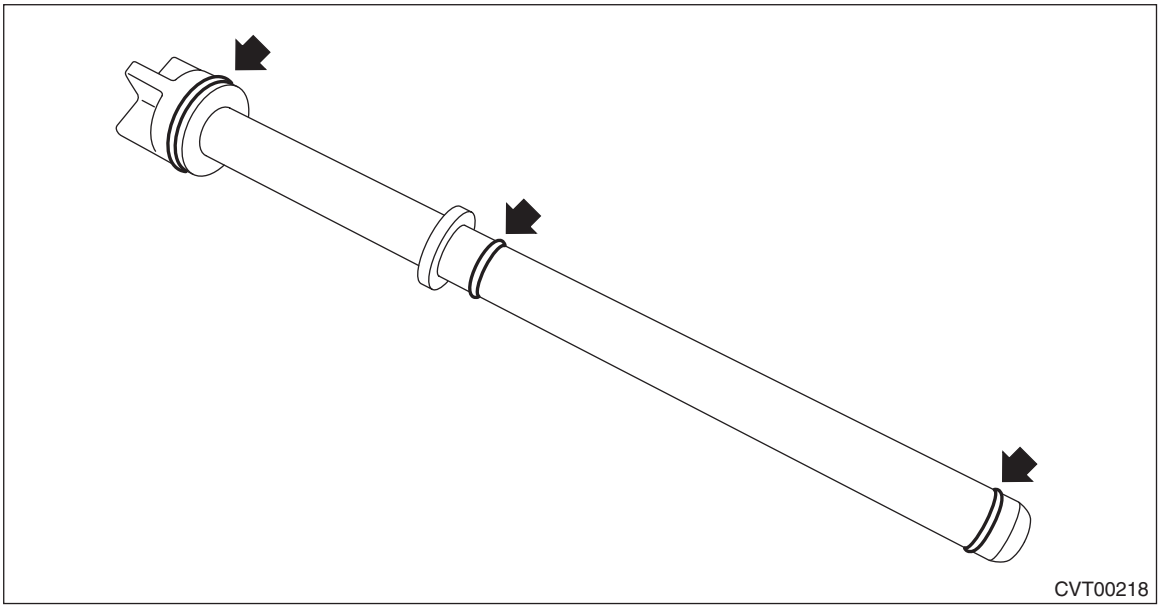


10) Using a round bar with diameter of 5 mm (0.2 in), remove the oil pipe assembly.

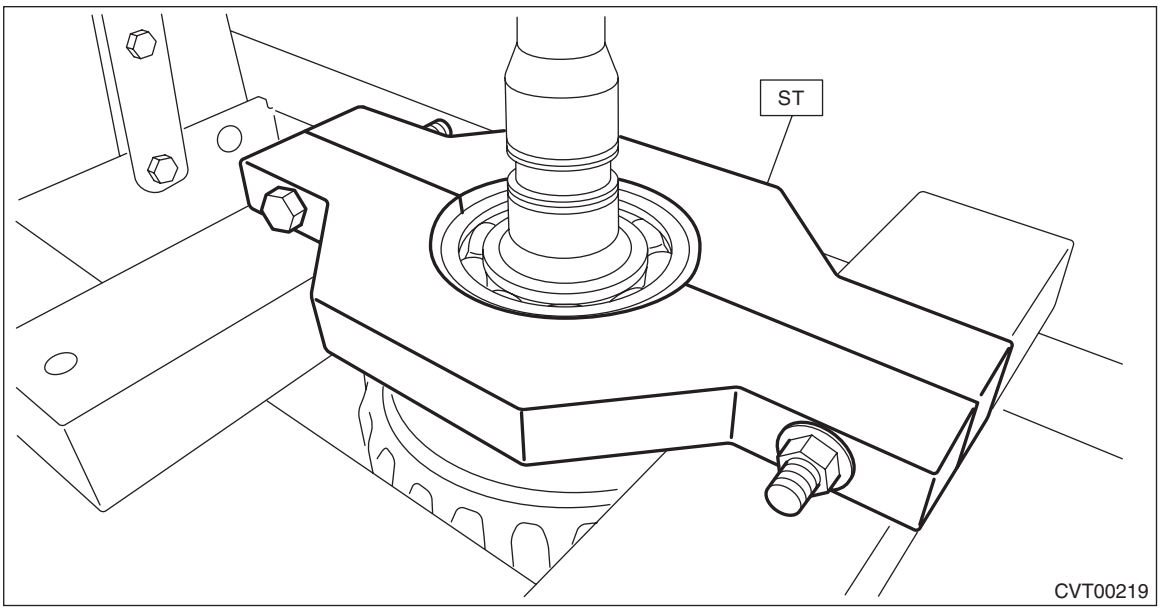
NOTE:
Apply vinyl tape to the tip of round bar.



11) Remove the O-ring from the oil pipe assembly.

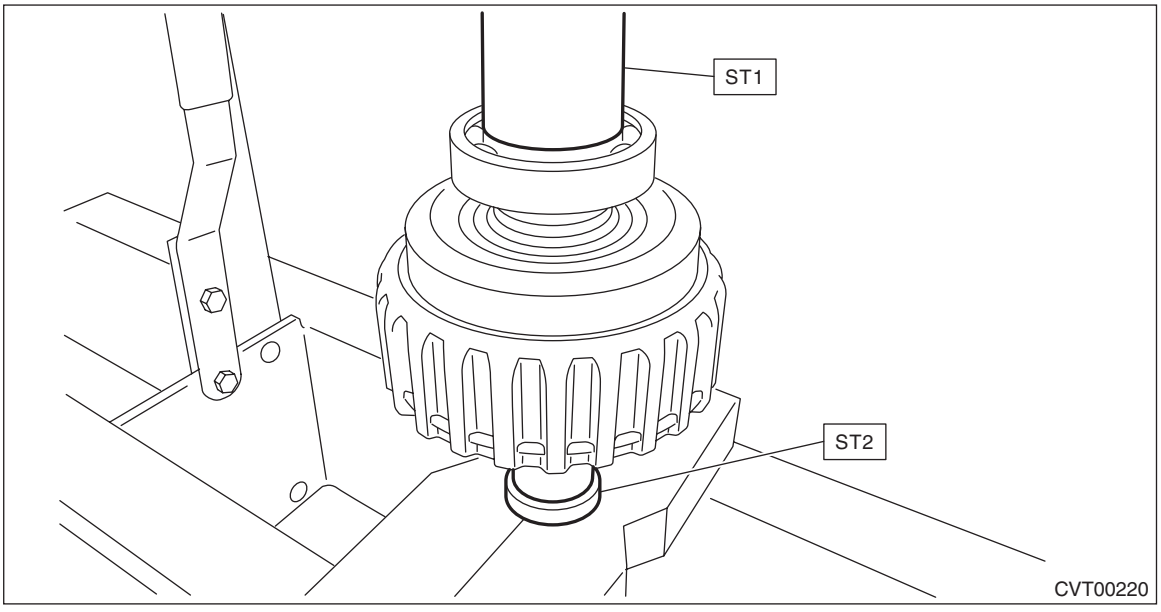


12) Remove the ball bearing using ST.
ST 498077300 REMOVER



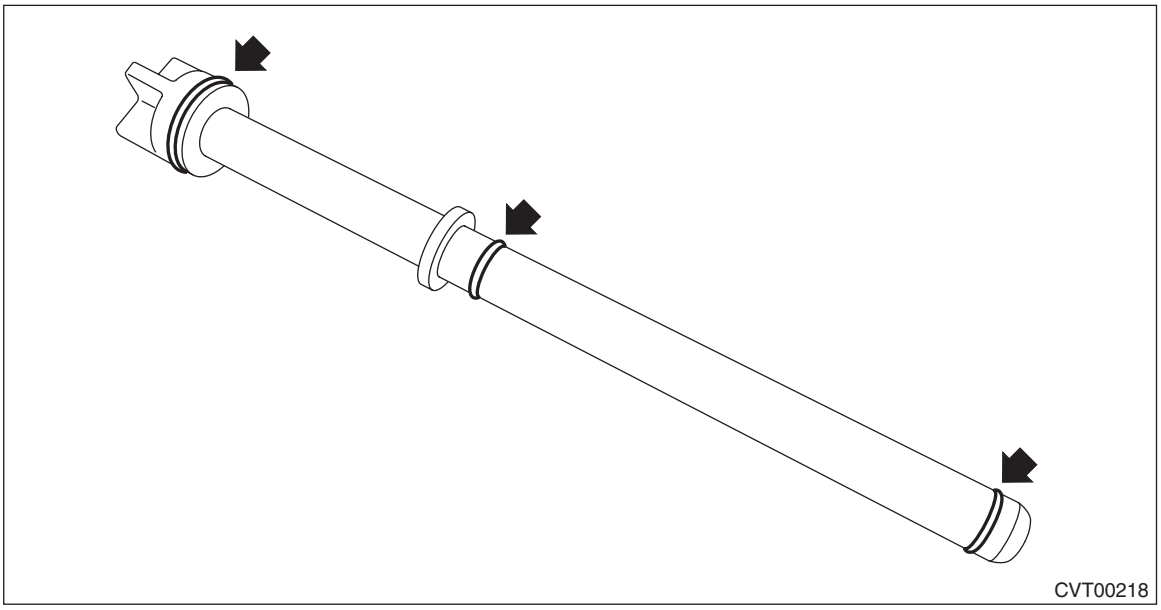
D: ASSEMBLY

1) Using the ST, install the ball bearing.
ST1 499277100 BUSHING 1-2 INSTALLER
ST2 398497701 SEAT

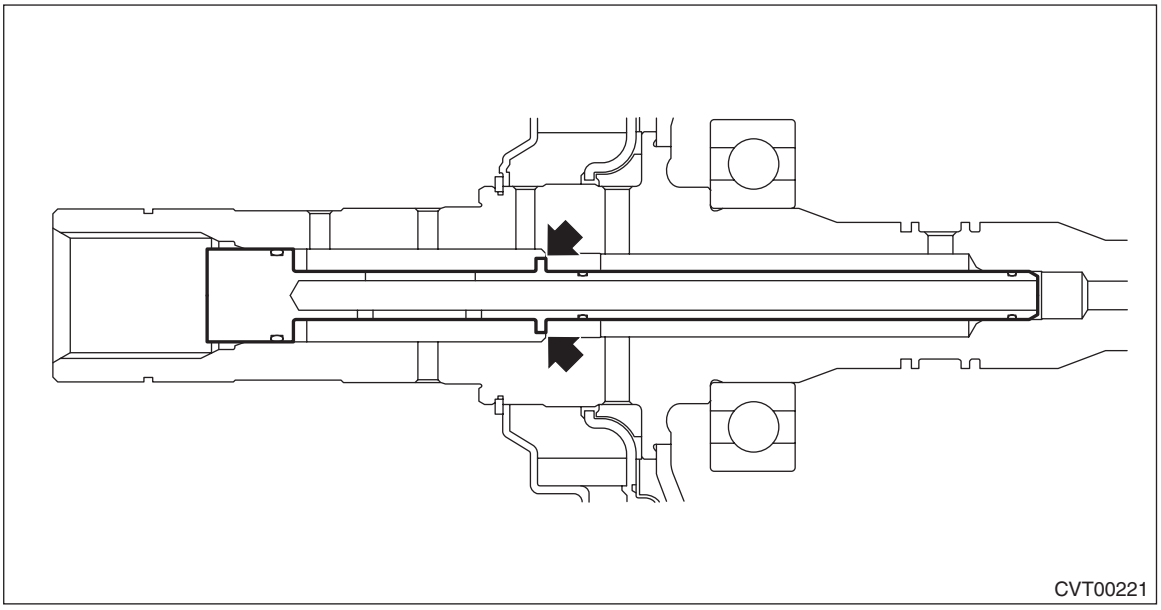


2) Install the O-ring to the oil pipe assembly.

NOTE:
- Use new O-rings.
- Apply CVTF to the O-ring.

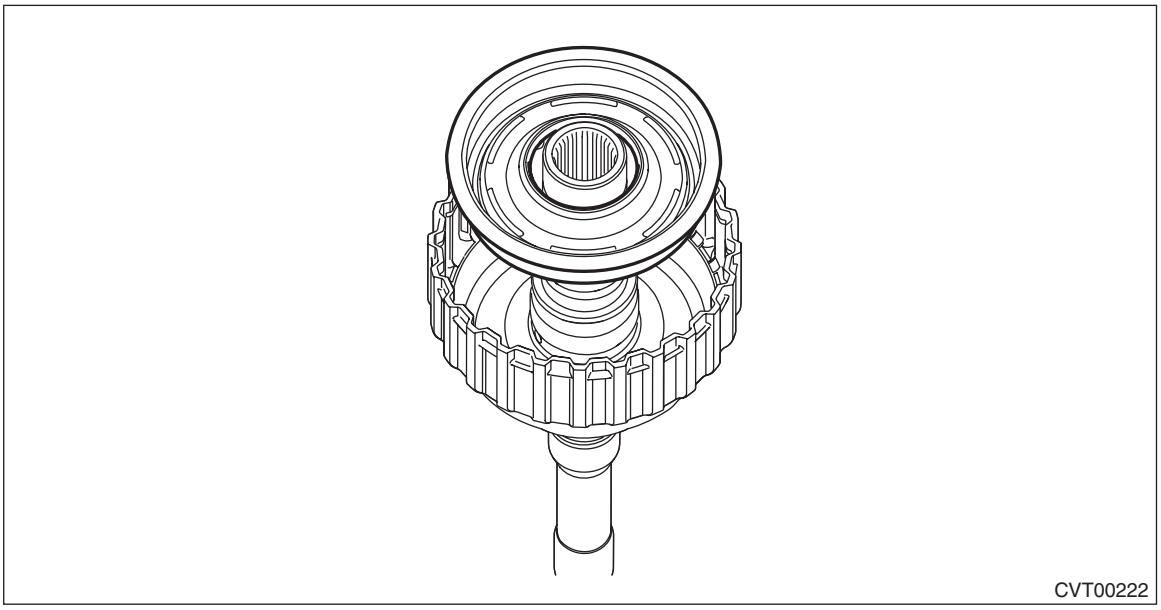


3) Insert the oil pipe assembly into the shaft, and press into the end.

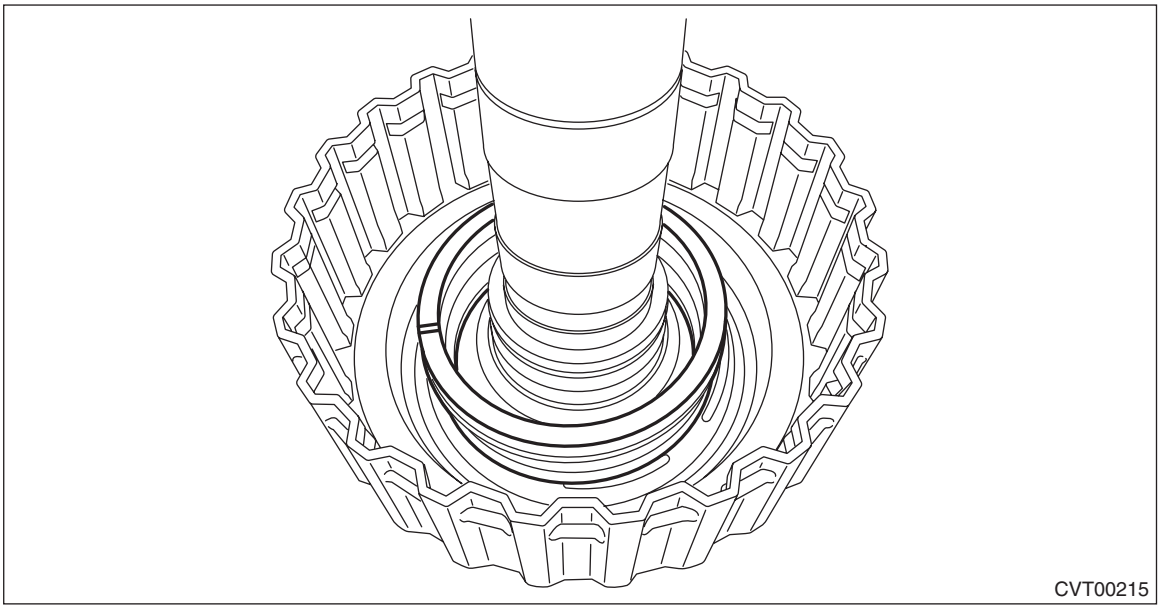


4) Install the output clutch piston to the clutch drum.

NOTE:
- Apply CVTF to the sealing area of the output clutch piston.
- Insert it all the way to the end.

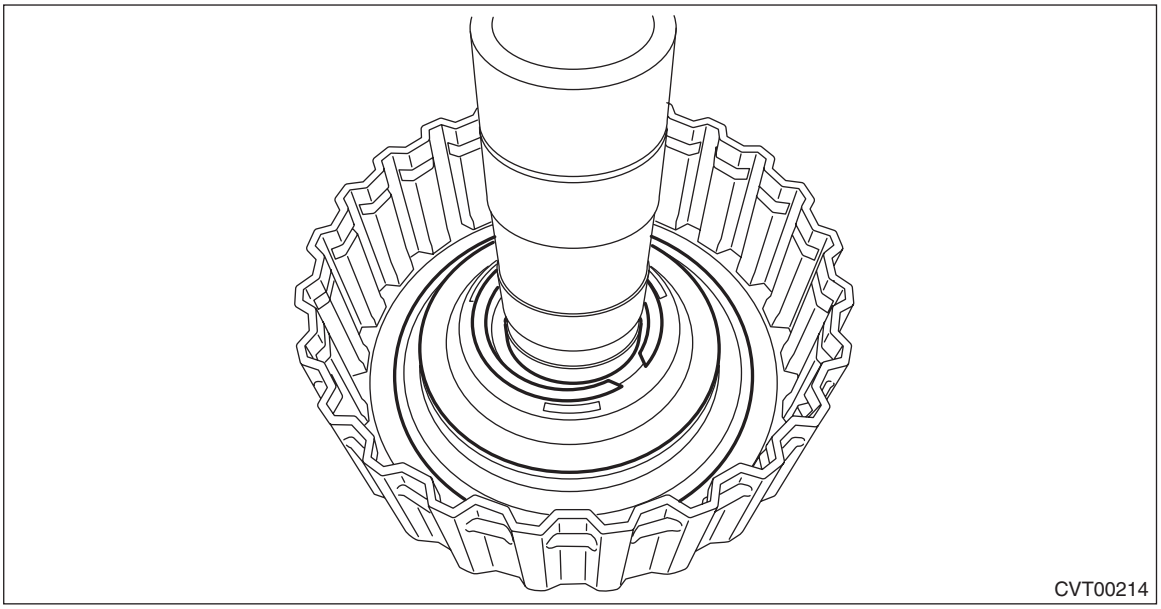

CVT00222

5) Install the return spring.


CVT00215

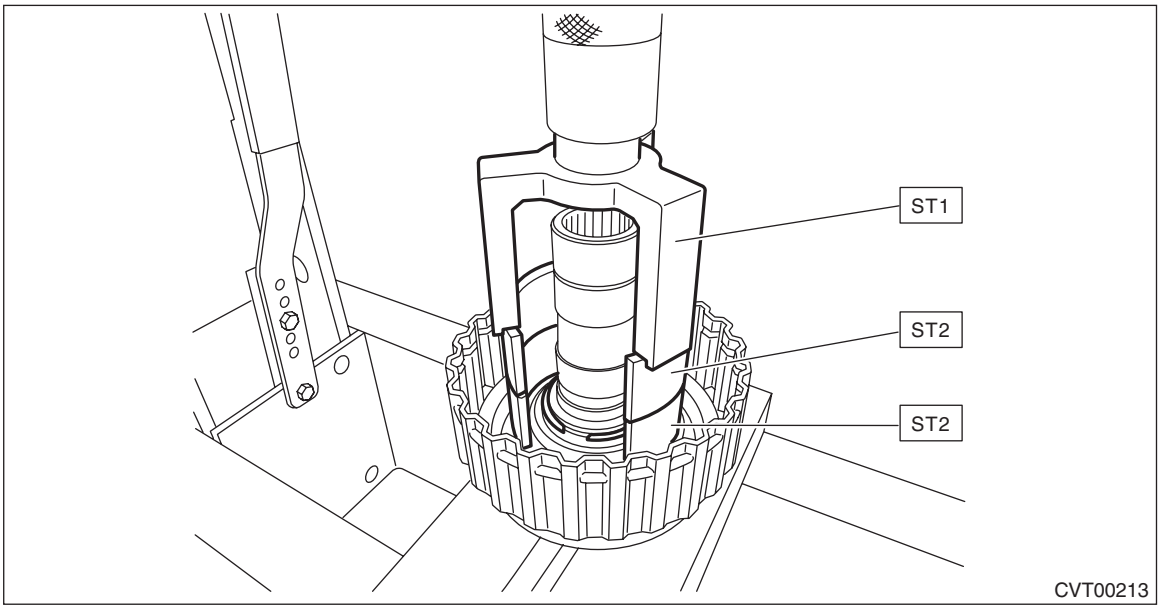
6) Install the chamber COMPL and snap ring.

NOTE:
Apply CVTF to the sealing area of chamber COMPL.

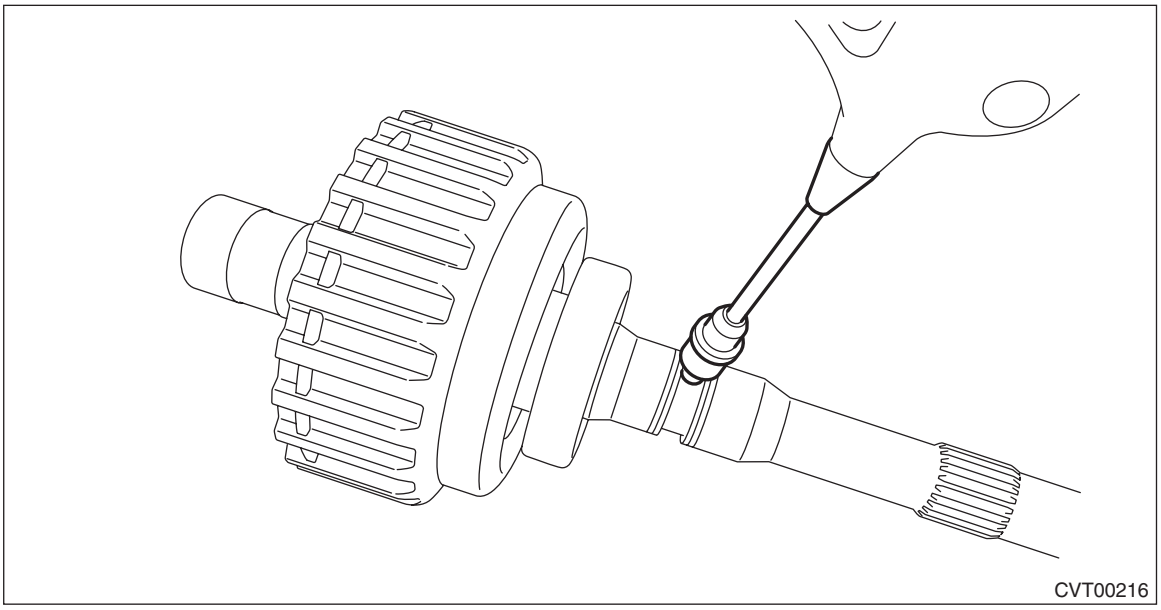


7) Compress the return spring using the ST to install the snap ring.

ST1 18769AA010 COMPRESSOR SPECIAL TOOL
ST2 398673600 COMPRESSOR



8) Check the operation of clutch piston by blowing compressed air intermittently from the shaft hole.

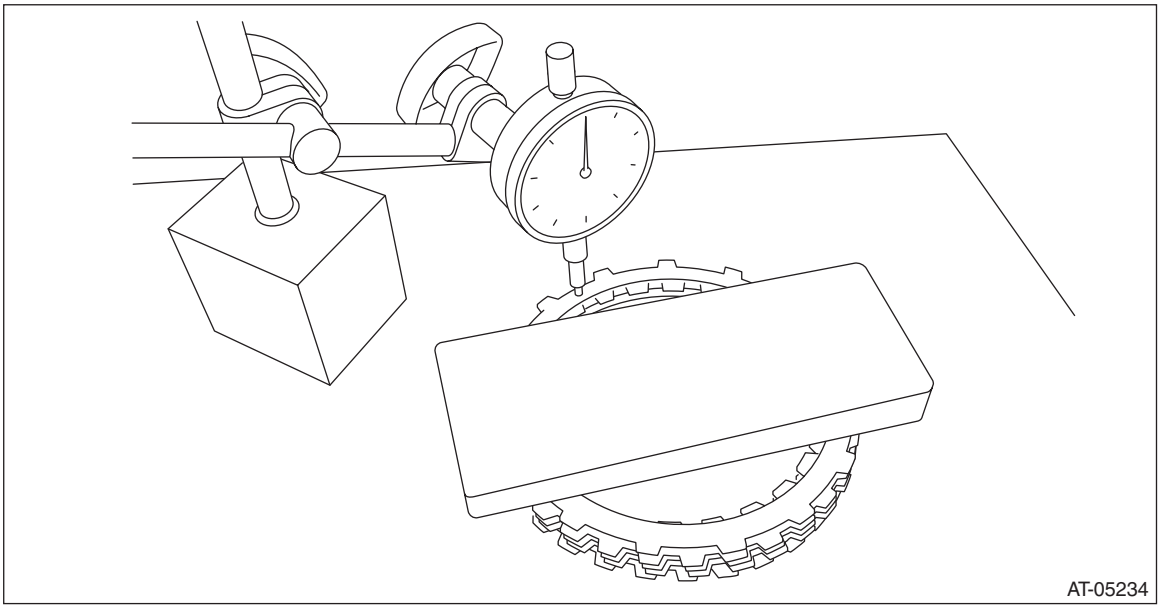


9) Place the driven plate, drive plate and retaining plate neatly in this order on surface table.
10) Set the dial gauge to retaining plate, and read its scale.

NOTE:
The value, which is read in the gauge at this time, is zero point.
11) Scale and record the weight “Z” of a flat board which will be put on retaining plate.

NOTE:
- Use a stiff board which does not bend against load as a flat board to be put on retaining plate.
- Use a flat board weighing less than 135 N (13.8 kgf, 30.4 lb).

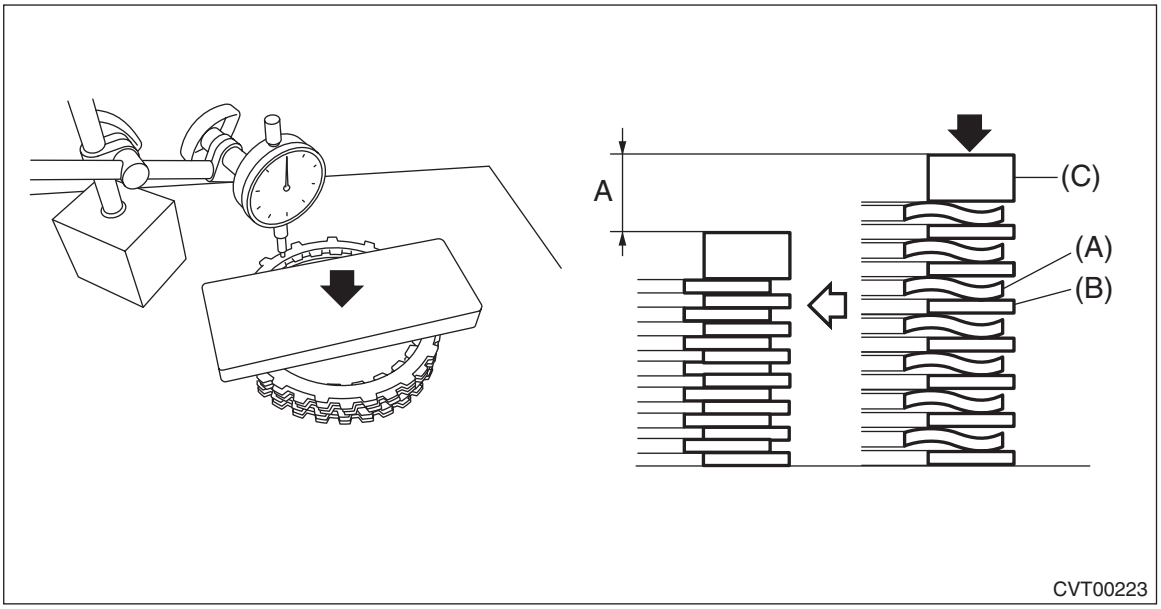
12) Put the flat board on retaining plate.



13) Using the following formula, read the push/pull gauge, and calculate “N”.
N = 135 — 162 N (13.8 — 16.5 kgf, 30.4 — 36.4 lb) – Z
135 — 162 N (13.8 — 16.5 kgf, 30.4 — 36.4 lb): Load on the clutch plate
Z: Flat board weight

14) Press the center of retaining plate by applying a force of “N” using push/pull gauge, and then measure and record the compression amount “A”.

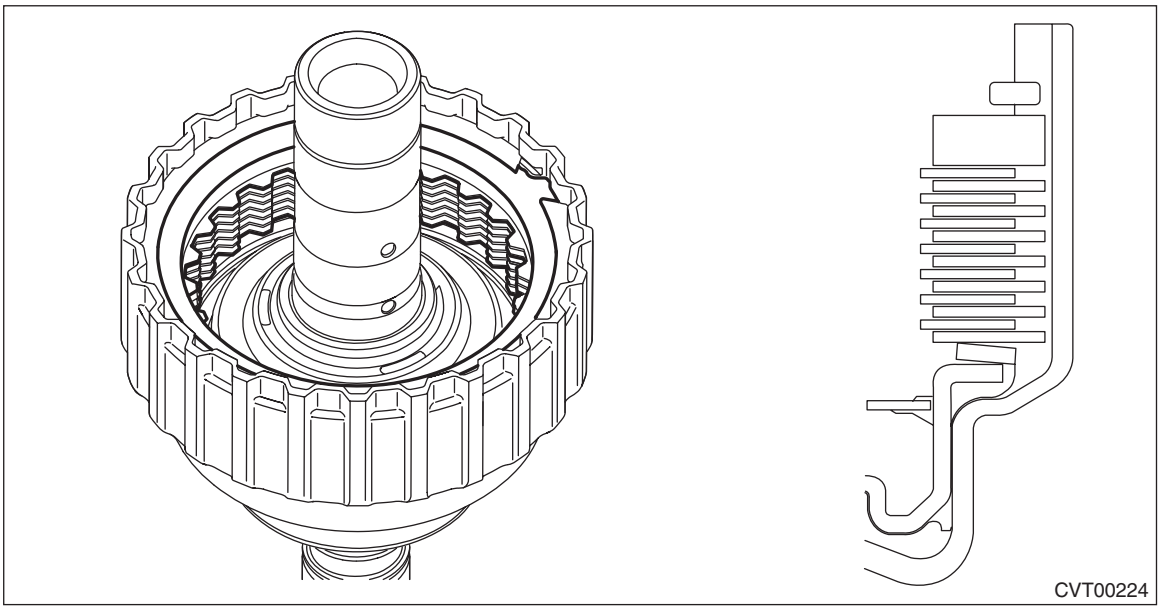
NOTE:
Measure at four points with a 90° interval and calculate the average.



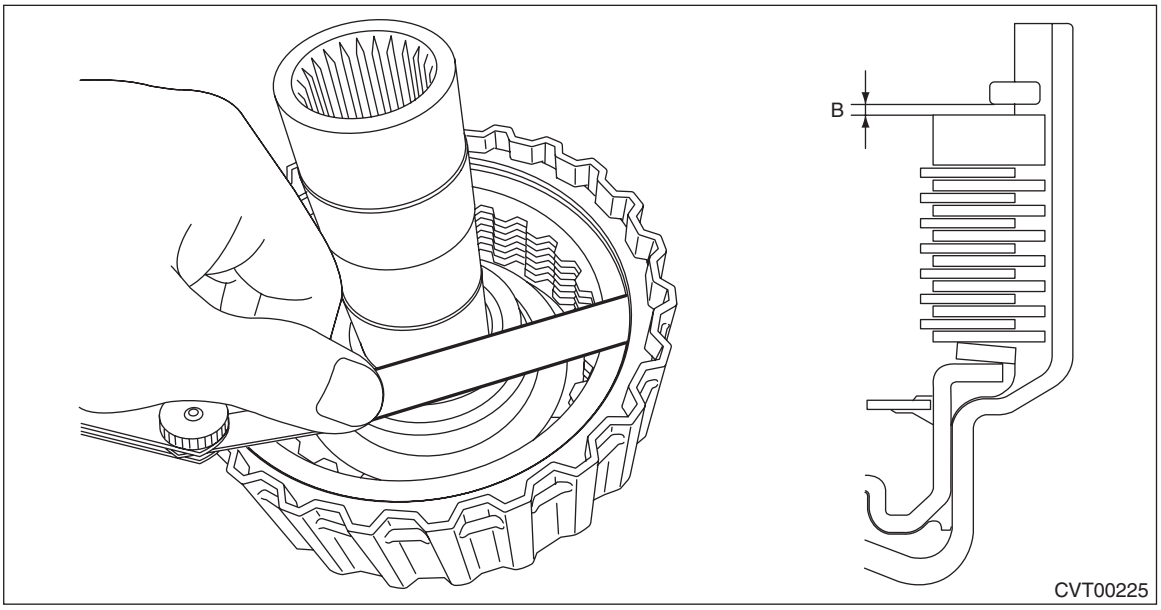
(A) Drive plate
(B) Driven plate
(C) Retaining plate

15) Install the dish plate, drive plate, driven plate, retaining plate and snap ring to the driven shaft.

NOTE:
Install the dish plate in the correct direction.



16) Measure and record the clearance “B” between the retaining plate and snap ring.



17) Piston stroke calculation
Calculate with A and B dimensions recorded before. If it exceeds the limit, replace with a new drive plate and adjust within the initial standard value.
S mm (in) = A + B
S: Piston stroke
A: Amount of drive plate compression
B: Clearance between retaining plate and snap ring

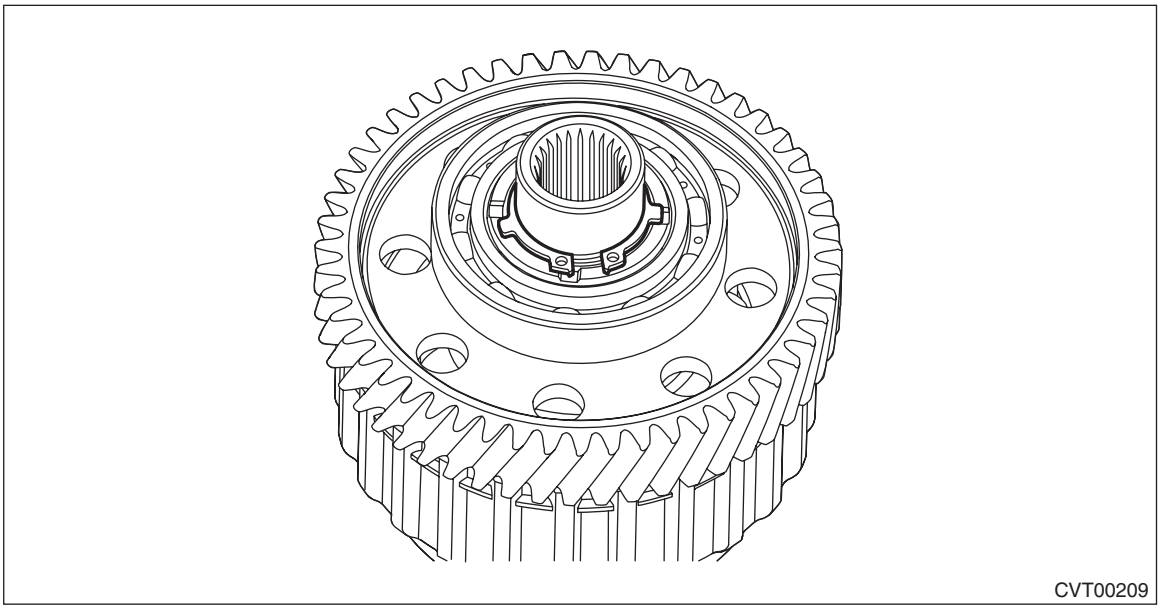
Initial standard:
2.65 — 3.05 mm (0.104 — 0.12 in)

Limit thickness:
4.05 mm (0.159 in)

Retaining plate	
Part No.	Thickness mm (in)
31567AB840	5.3 (0.209)
31567AB850	5.5 (0.217)
31567AB860	5.7 (0.224)
31567AB870	5.9 (0.232)
31567AB880	6.1 (0.240)

18) Install the snap ring to the reduction driven gear assembly.
19) Install the reduction driven gear assembly, needle bearing and reduction driven gear bushing to the output clutch assembly.

20) Install the snap ring.

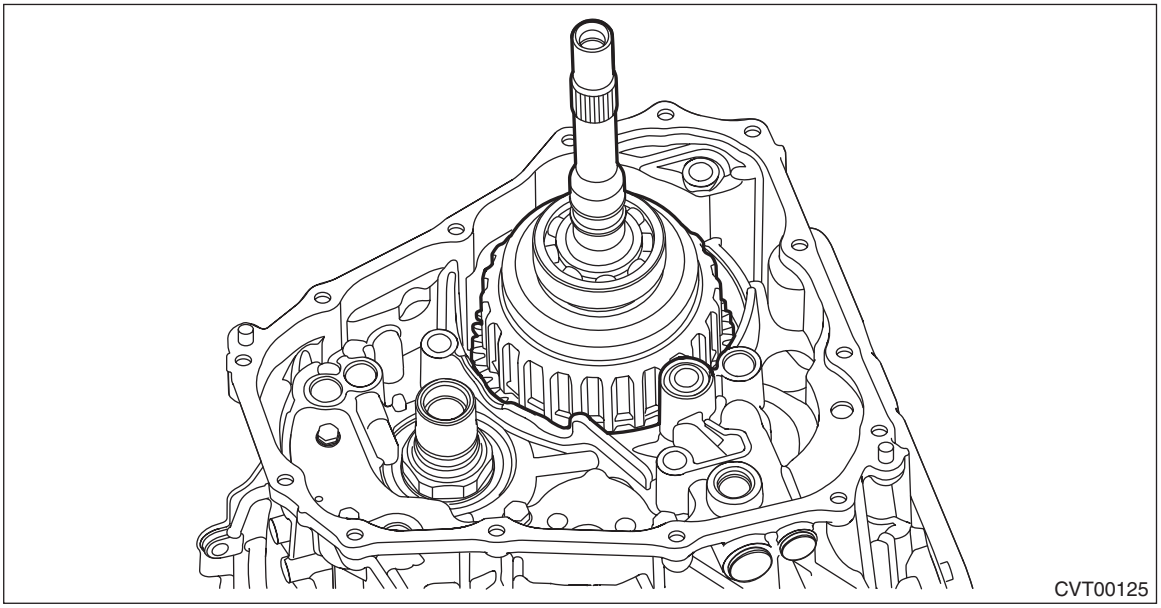

CVT00209

E: INSPECTION

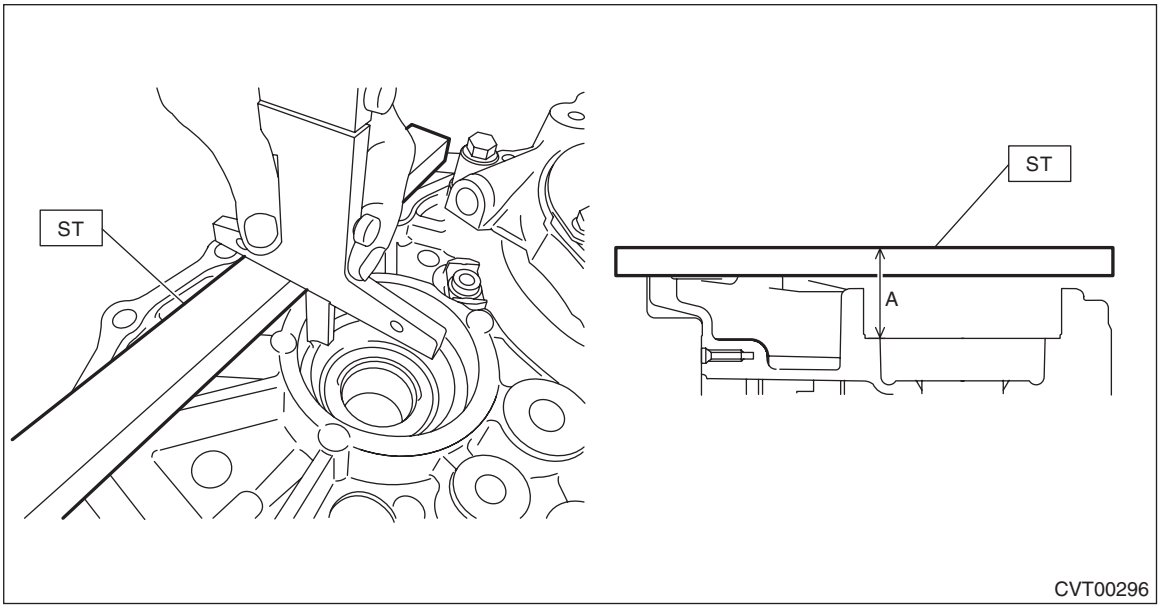
- Inspect the drive plate facing for wear and damage.
- Check the driven plate for discoloration (burnt color).
- Check for worn snap ring, fatigue or damaged return spring or deformed spring retainer.
- Make sure the clearance between retaining plate and snap ring of output clutch is within the limit. If it exceeds the limit, replace with a new drive plate and select and adjust the retaining plate within the initial standard value. <Ref. to CVT(TH58A)-236, ASSEMBLY, Output Clutch Assembly.>

F: ADJUSTMENT

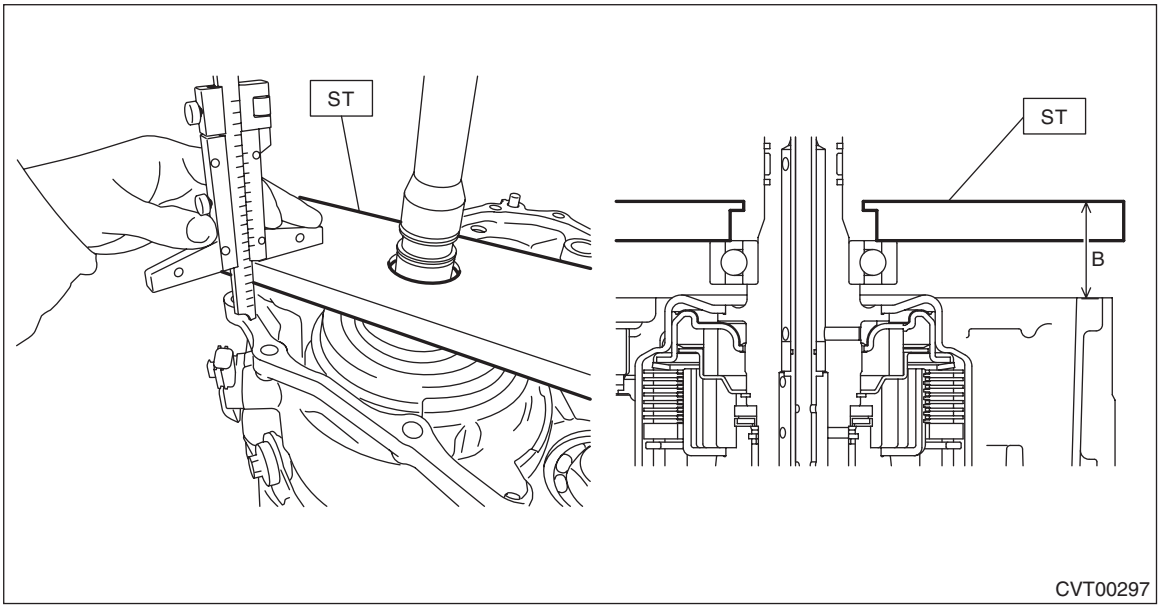
1) Install the output clutch assembly.


CVT00125

2) Measure the height “A” from the ST upper face to the ball bearing catch surface.
ST 499575400 GAUGE



3) Measure the height “B” from the ST to the mating surface of the transmission case.
ST 499575600 GAUGE



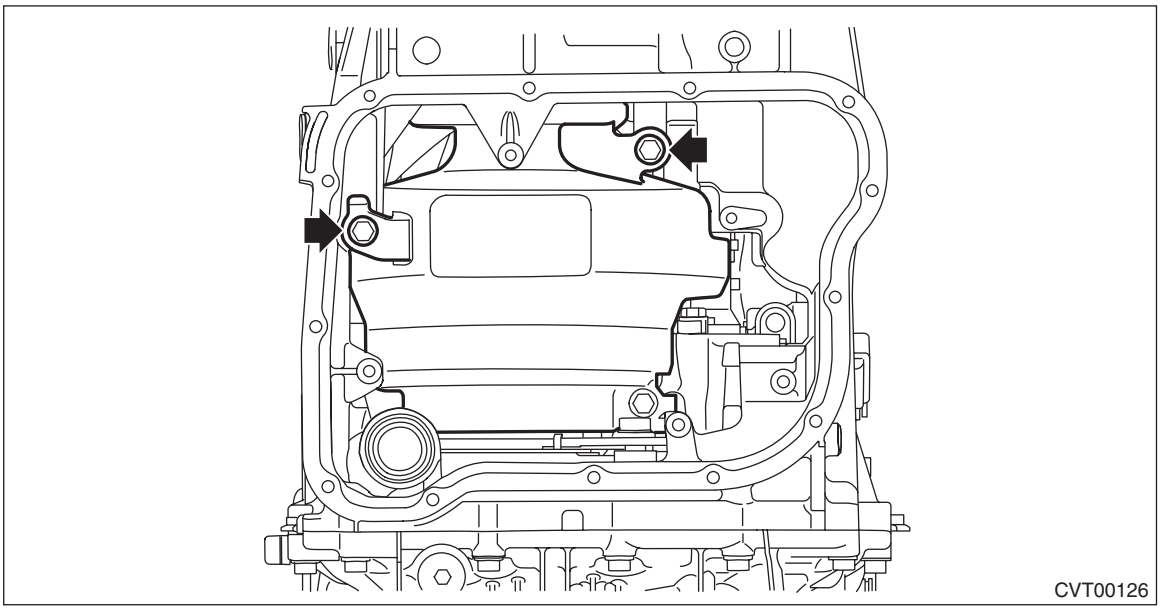
4) Obtain the thickness of reduction driven gear shim using the following formula to select zero to three reduction driven gear shims.
T (mm) = A – B – (0.05 — 0.25)
[T (in) = A – B – (0.002 — 0.01)]
T: Shim thickness
A: Height from the ST upper face to the ball bearing catch surface
B: Height from ST to transmission case mating surface
0.05 — 0.25 mm (0.002 — 0.01 in): Clearance

Reduction driven gear shim	
Part No.	Thickness mm (in)
33279AA090	0.3 (0.012)
33279AA100	0.4 (0.016)
33279AA110	0.5 (0.020)

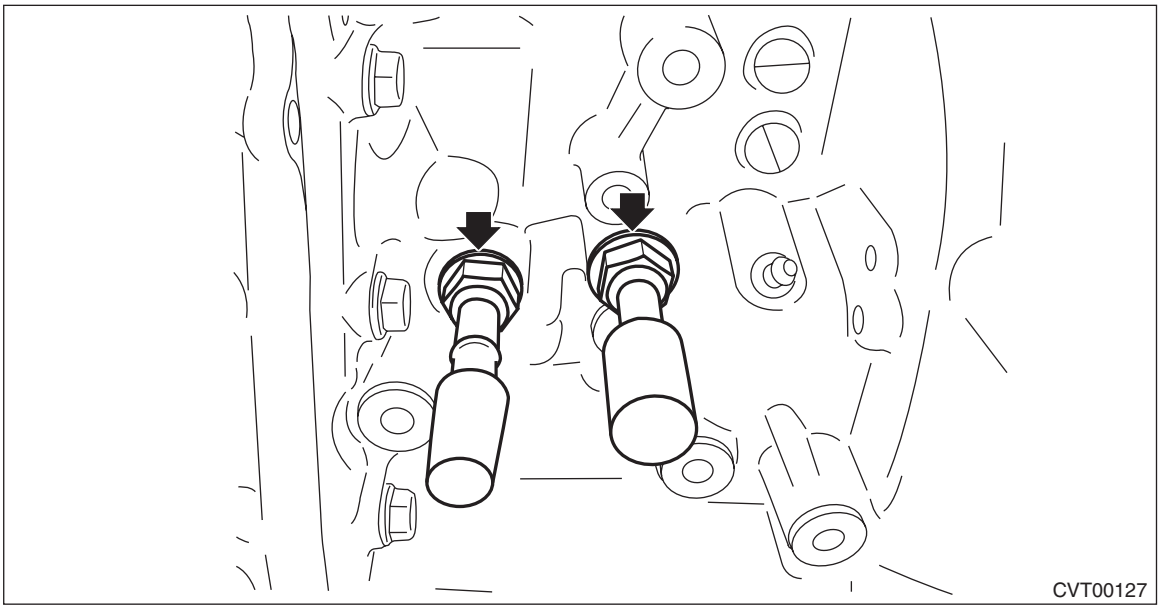
40.Transmission Case

A: REMOVAL

1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TH58A)-63, REMOVAL, Automatic Transmission Assembly.>
2) Remove the air breather hose. <Ref. to CVT(TH58A)-171, REMOVAL, Air Breather Hose.>
3) Remove the transmission harness. <Ref. to CVT(TH58A)-143, REMOVAL, Transmission Harness.>
4) Remove the main control valve body. <Ref. to CVT(TH58A)-115, REMOVAL, Control Valve Body.>
5) Remove the turbine speed sensor. <Ref. to CVT(TH58A)-104, REMOVAL, Turbine Speed Sensor.>
6) Remove the secondary speed sensor. <Ref. to CVT(TH58A)-106, REMOVAL, Secondary Speed Sensor.>
7) Remove the front wheel speed sensor. <Ref. to CVT(TH58A)-108, REMOVAL, Front Wheel Speed Sensor.>
8) Remove the inhibitor switch. <Ref. to CVT(TH58A)-101, REMOVAL, Inhibitor Switch.>
9) Remove the extension case. <Ref. to CVT(TH58A)-182, REMOVAL, Extension Case.>
10) Remove the transfer clutch assembly. <Ref. to CVT(TH58A)-186, REMOVAL, Transfer Clutch.>
11) Remove the transfer driven gear assembly. <Ref. to CVT(TH58A)-200, REMOVAL, Transfer Driven Gear.>
12) Remove the transfer drive gear assembly. <Ref. to CVT(TH58A)-203, REMOVAL, Transfer Drive Gear.>
13) Remove the parking pawl. <Ref. to CVT(TH58A)-208, REMOVAL, Parking Pawl.>
14) Remove the oil pan and oil strainer. <Ref. to CVT(TH58A)-112, REMOVAL, Oil Pan and Strainer.>
15) Remove the transmission control device. <Ref. to CVT(TH58A)-210, REMOVAL, Transmission Control Device.>
16) Remove the drive motor assembly. <Ref. to CVT(TH58A)-217, REMOVAL, Drive Motor Assembly.>
17) Remove the output clutch assembly. <Ref. to CVT(TH58A)-228, REMOVAL, Output Clutch Assembly.>
18) Remove the two oil baffle mounting bolts.



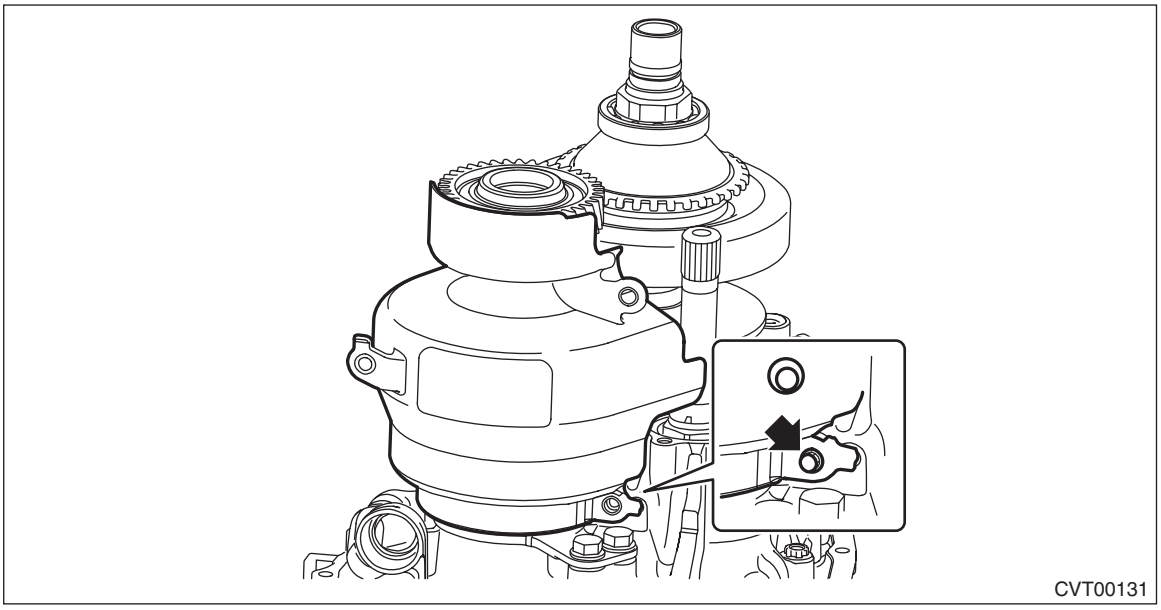
19) Remove the oil cooler pipe.



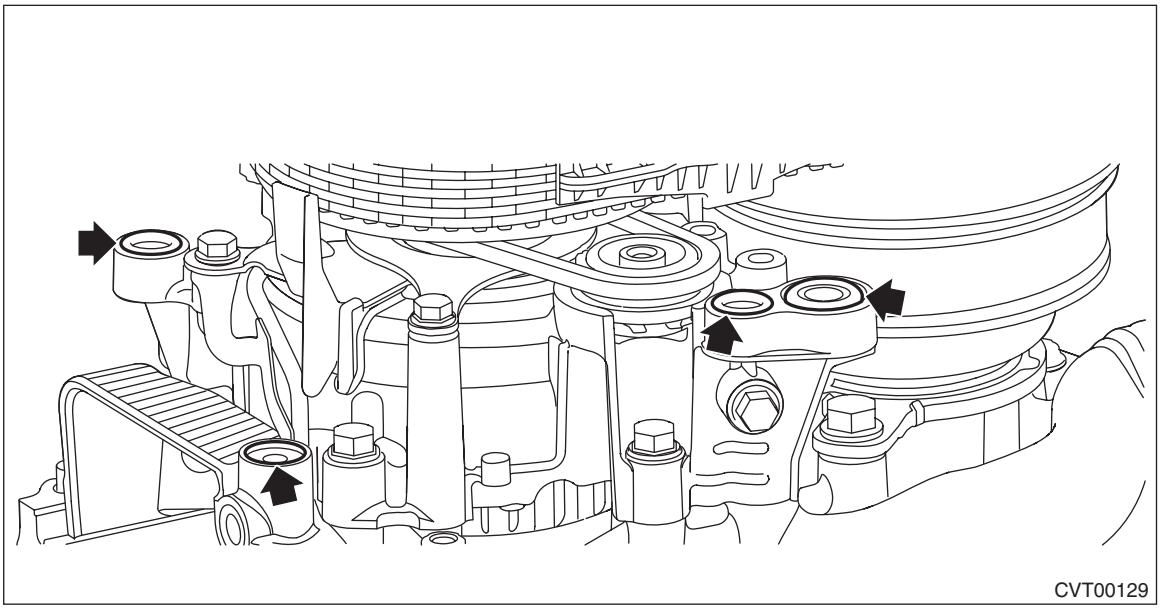
20) Remove the transmission case.

NOTE:
The total number of transmission case mounting bolts is 15.

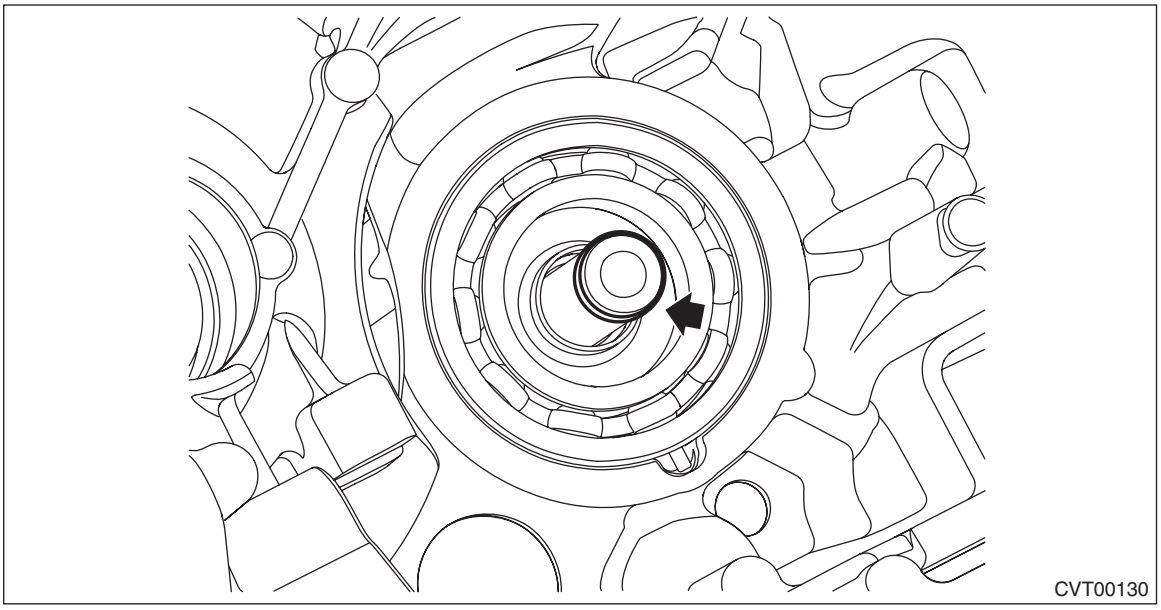
21) Remove the oil baffle.



22) Remove the O-ring.



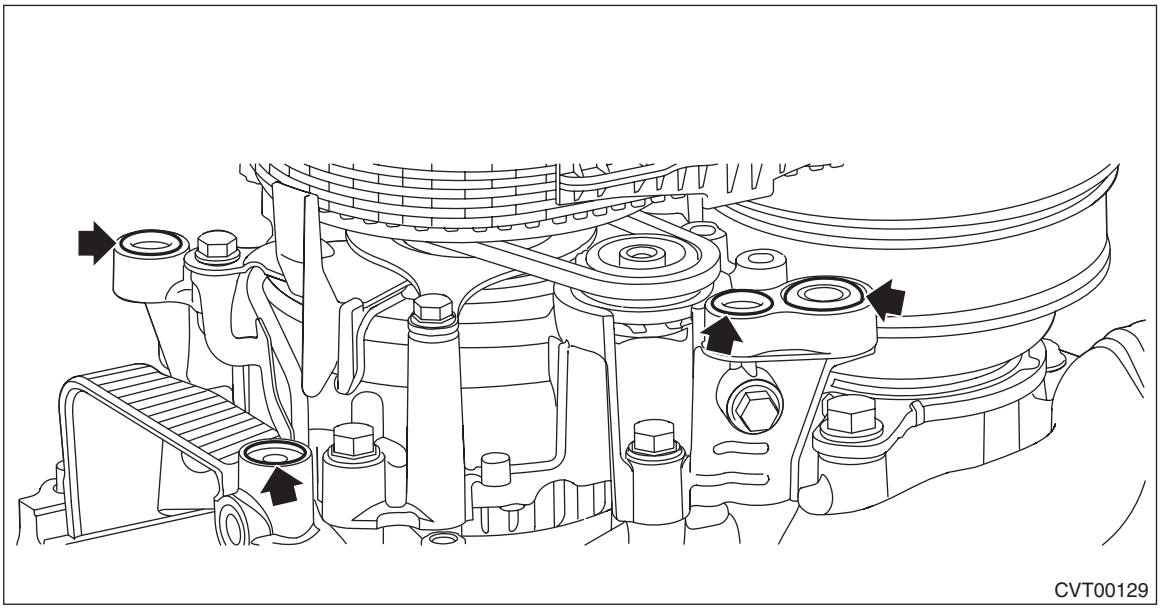
23) Remove the seal ring from the transmission case.



B: INSTALLATION

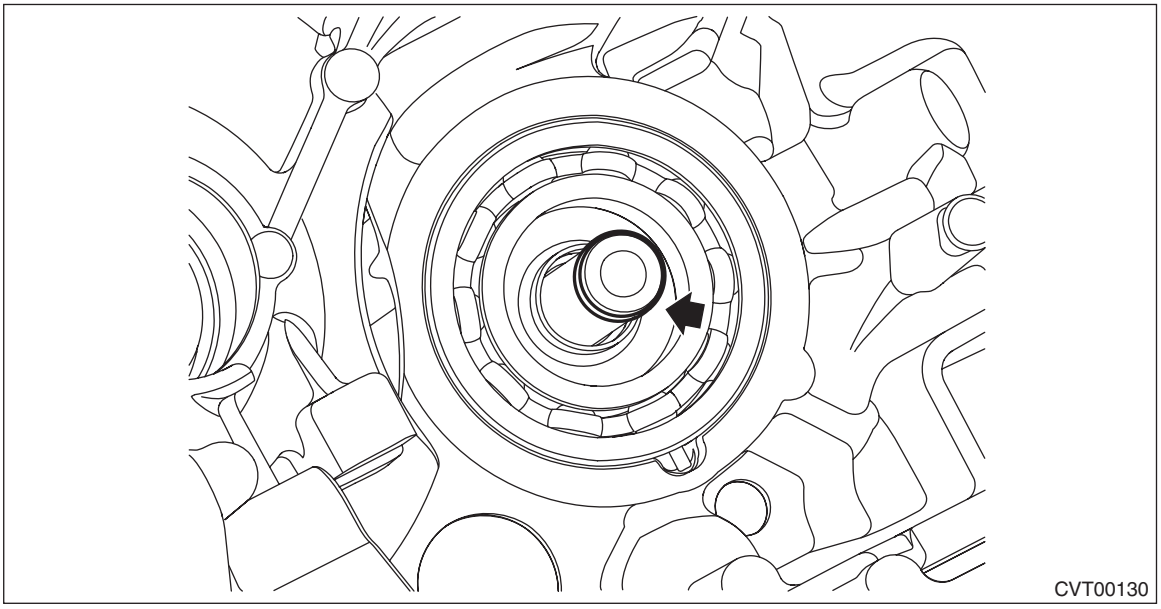
1) Clean the mating surface of transmission case and converter case.
2) Select the reduction gear shim. <Ref. to CVT(TH58A)-261, ADJUSTMENT, Reduction Drive Gear.>
3) Remove the transmission case, and install the selected reduction gear shim to the reduction drive gear.
4) Install the O-rings to the reverse clutch housing and drive pinion retainer.

NOTE:
- Use new O-rings.
- Apply CVTF to the O-ring.

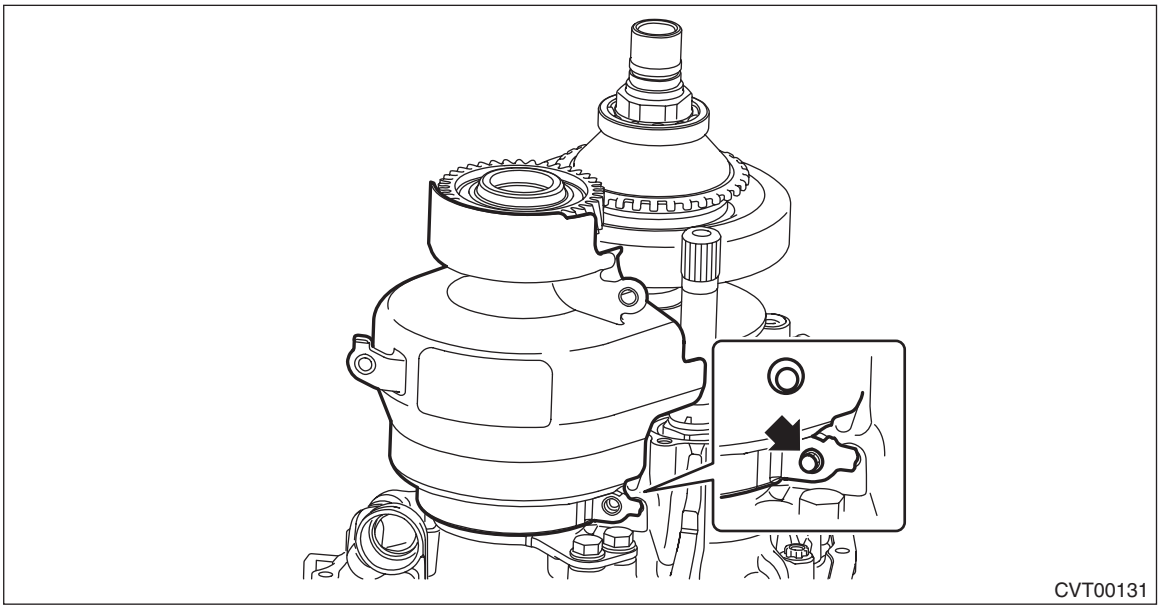

CVT00129

5) Install the seal ring to the transmission case.

NOTE:
- Use a new seal ring.
- When installing the seal ring, do not expand the seal ring too much.
- Apply CVTF to the seal rings.

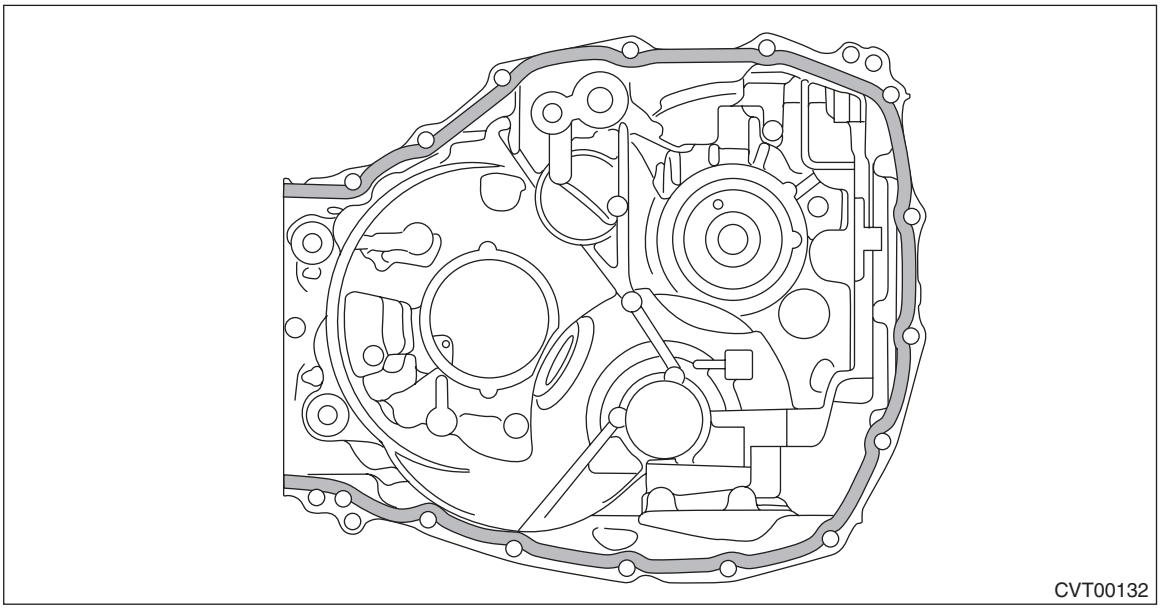

CVT00130

6) Cover the secondary pulley with the oil baffle, and temporarily install it with bolts.


CVT00131

7) Apply liquid gasket seamlessly to the mating surface of transmission case.

Liquid gasket:
THREE BOND 1215B or equivalent


CVT00132

8) Install the transmission case.

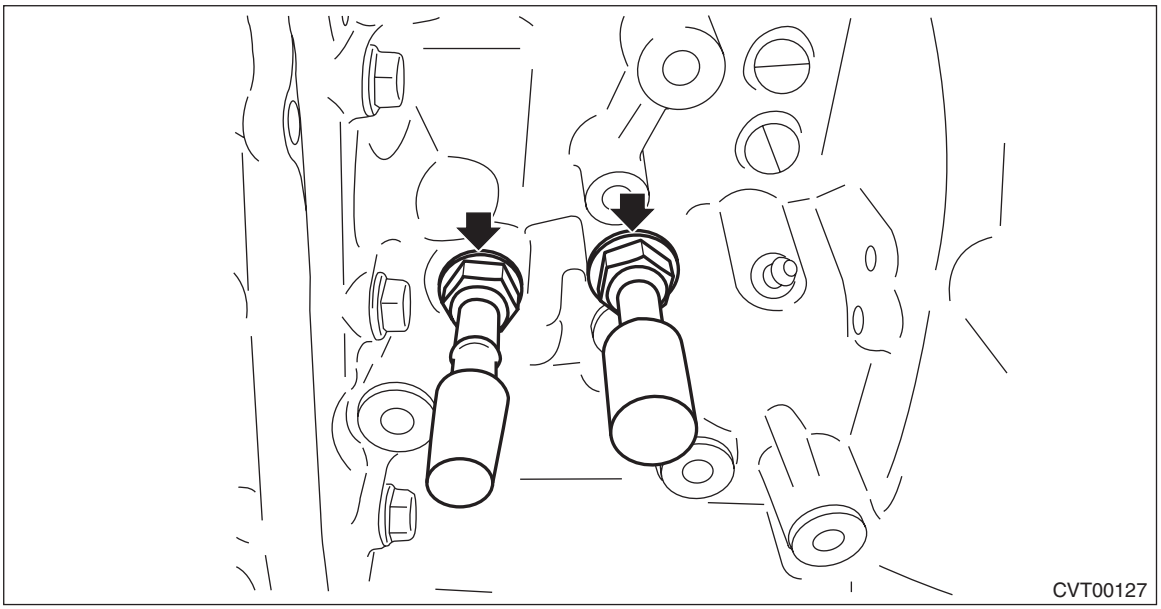
NOTE:
The total number of transmission case mounting bolts is 15.

Tightening torque:
22 N·m (2.2 kgf-m, 16.2 ft-lb)

9) Install the oil cooler pipe.

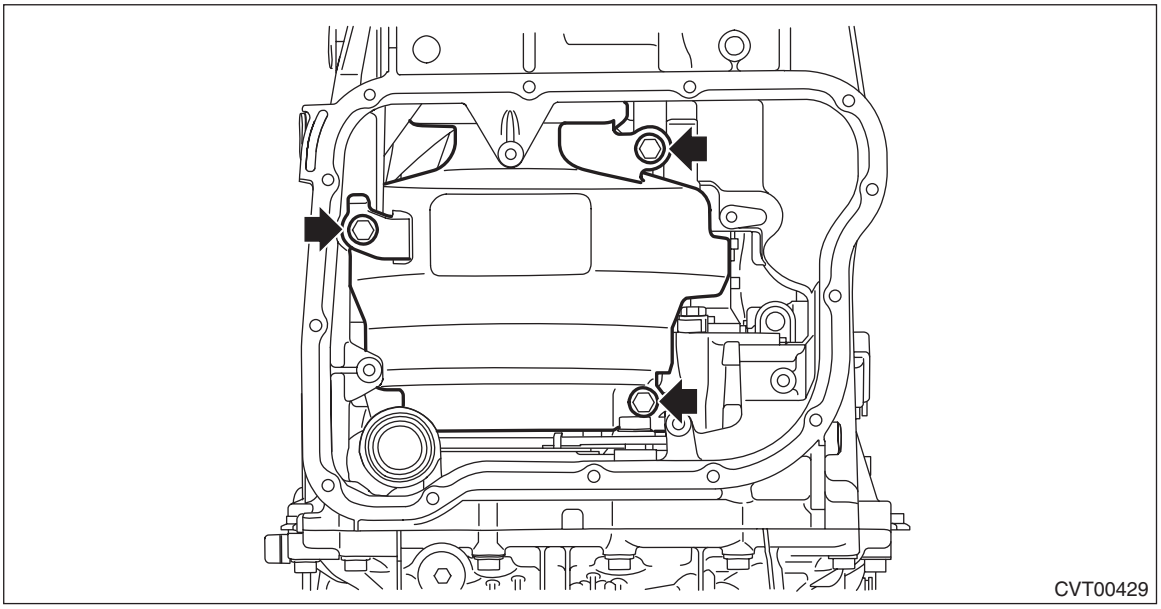
NOTE:
- Use new O-rings.
- Apply CVTF to the O-ring.

Tightening torque:
25 N·m (2.5 kgf-m, 18.4 ft-lb)



10) Install the oil baffle securing bolt.

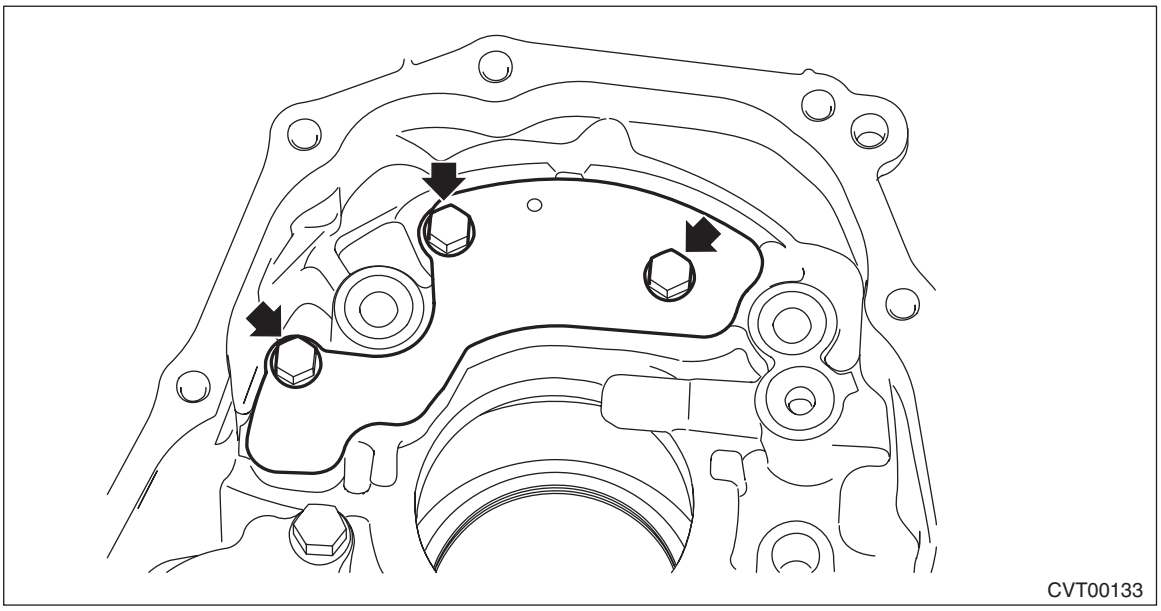
Tightening torque:
16 N·m (1.6 kgf-m, 11.8 ft-lb)



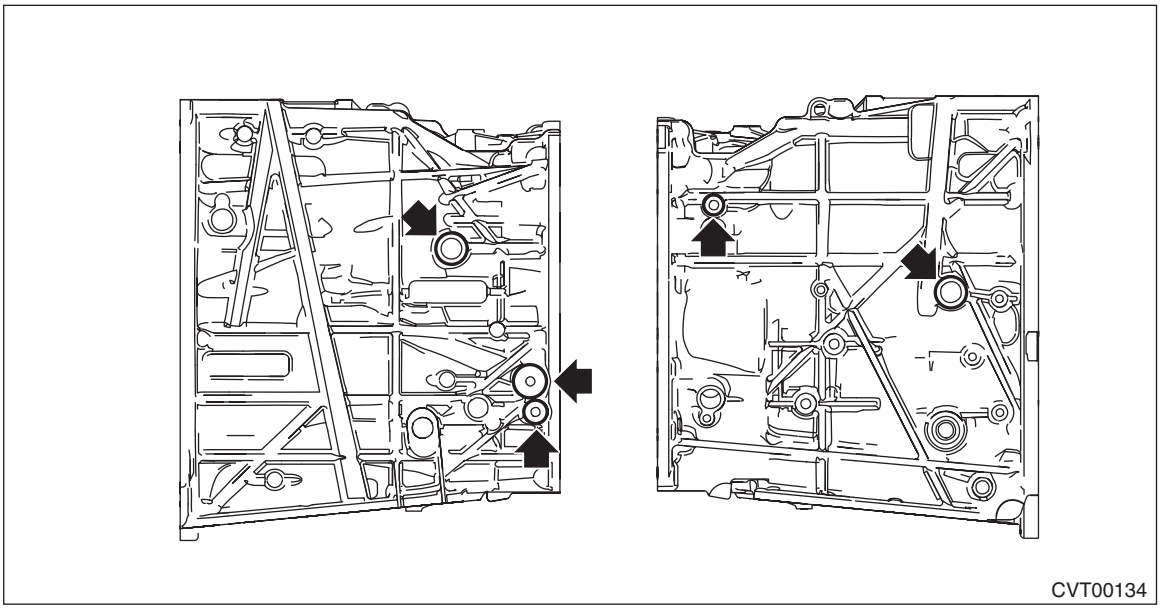
11) Install the output clutch assembly. <Ref. to CVT(TH58A)-229, INSTALLATION, Output Clutch Assembly.>
12) Install the drive motor assembly. <Ref. to CVT(TH58A)-221, INSTALLATION, Drive Motor Assembly.>
13) Install the transmission control device. <Ref. to CVT(TH58A)-213, INSTALLATION, Transmission Control Device.>
14) Install the oil strainer and oil pan. <Ref. to CVT(TH58A)-114, INSTALLATION, Oil Pan and Strainer.>
15) Install the parking pawl. <Ref. to CVT(TH58A)-208, INSTALLATION, Parking Pawl.>
16) Install the transfer drive gear assembly. <Ref. to CVT(TH58A)-204, INSTALLATION, Transfer Drive Gear.>
17) Install the transfer driven gear assembly. <Ref. to CVT(TH58A)-201, INSTALLATION, Transfer Driven Gear.>
18) Install the transfer clutch assembly. <Ref. to CVT(TH58A)-188, INSTALLATION, Transfer Clutch.>
19) Install the extension case. <Ref. to CVT(TH58A)-183, INSTALLATION, Extension Case.>
20) Install the inhibitor switch. <Ref. to CVT(TH58A)-102, INSTALLATION, Inhibitor Switch.>
21) Install the secondary speed sensor. <Ref. to CVT(TH58A)-106, INSTALLATION, Secondary Speed Sensor.>
22) Install the front wheel speed sensor. <Ref. to CVT(TH58A)-108, INSTALLATION, Front Wheel Speed Sensor.>
23) Install the turbine speed sensor. <Ref. to CVT(TH58A)-104, INSTALLATION, Turbine Speed Sensor.>
24) Install the main control valve body. <Ref. to CVT(TH58A)-123, INSTALLATION, Control Valve Body.>
25) Install the transmission harness. <Ref. to CVT(TH58A)-151, INSTALLATION, Transmission Harness.>
26) Install the air breather hose. <Ref. to CVT(TH58A)-173, INSTALLATION, Air Breather Hose.>
27) Install the transmission assembly to the vehicle. <Ref. to CVT(TH58A)-77, INSTALLATION, Automatic Transmission Assembly.>

C: DISASSEMBLY

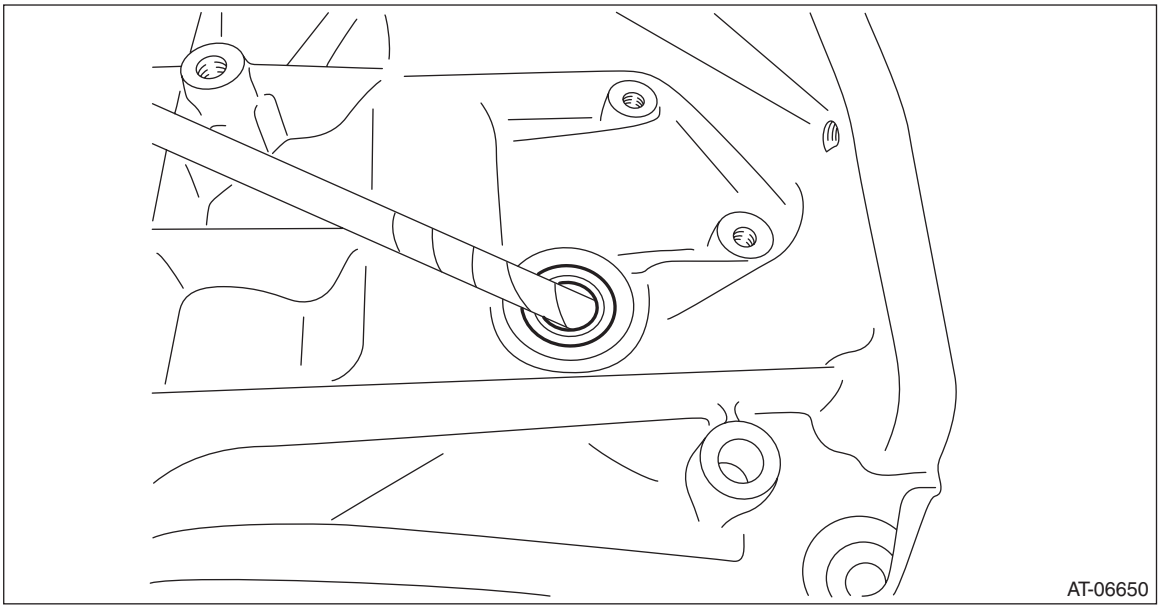
1) Remove the oil stopper plate.



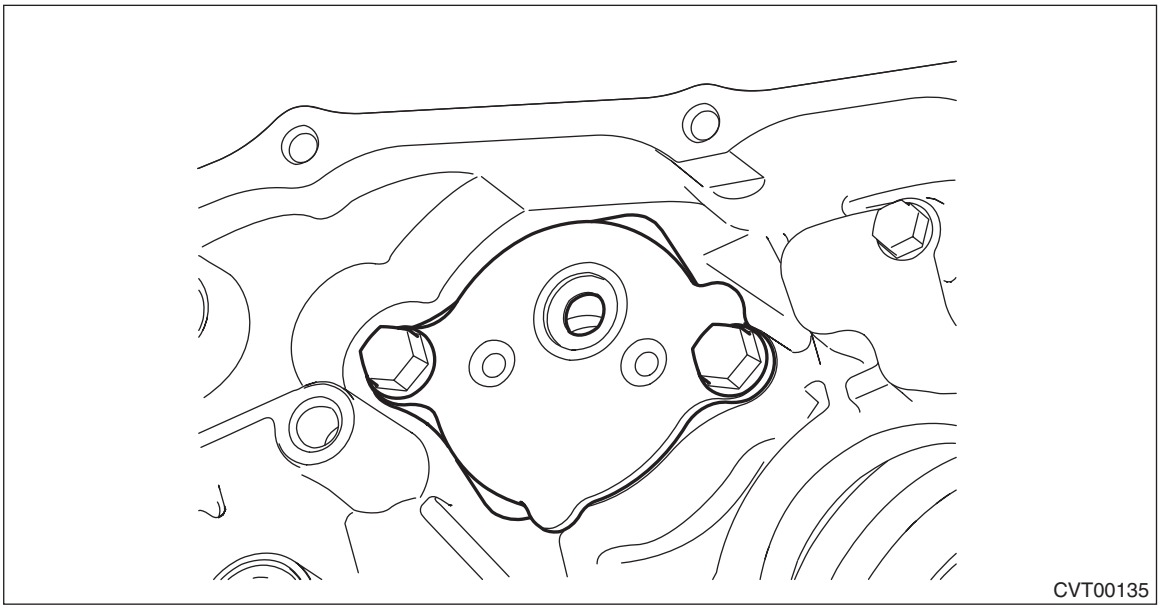
2) Remove all plugs from the transmission case.



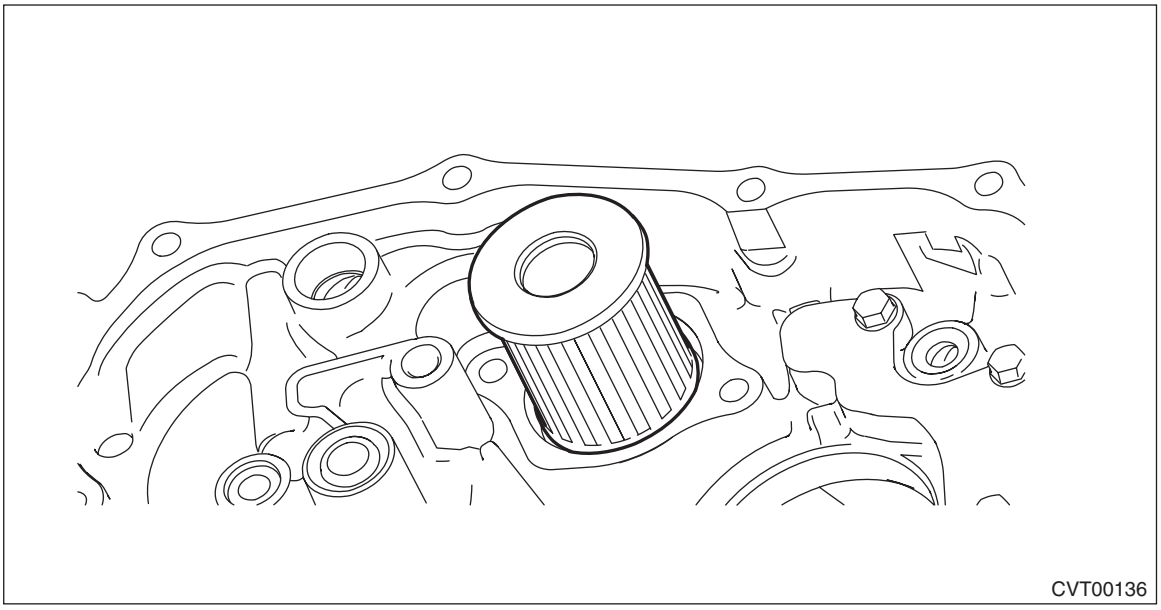
3) Remove the oil seal using a screwdriver wrapped with cloth etc.



4) Remove the CVTF filter cover and gasket.



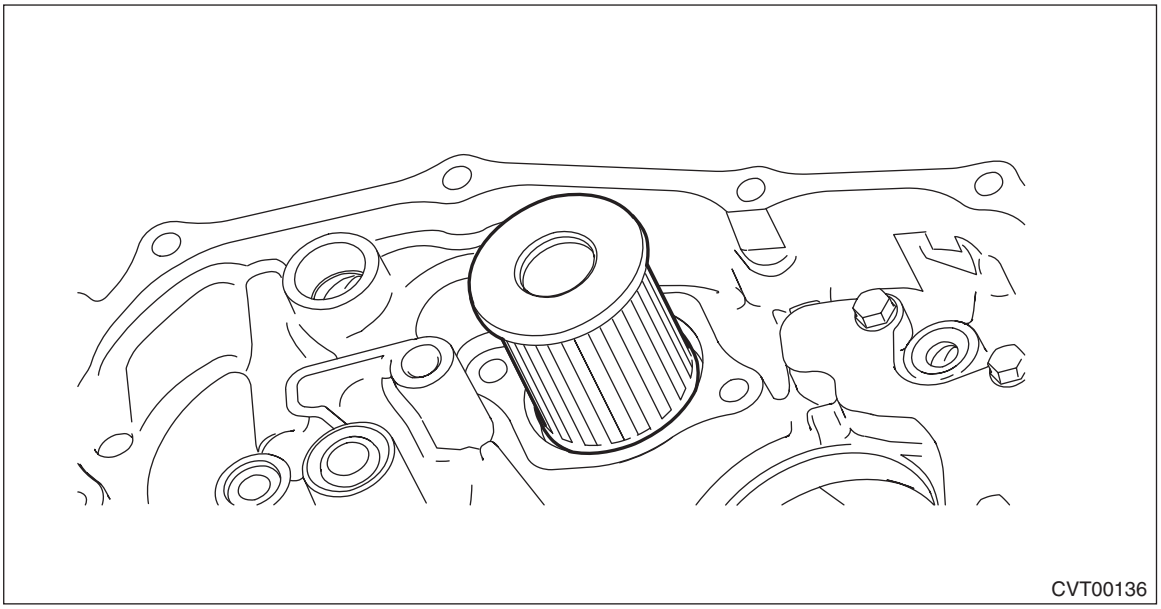
5) Remove the CVTF filter.



D: ASSEMBLY

1) Face the O-ring side of the CVTF filter to the CVTF filter cover side, and install the CVTF filter.

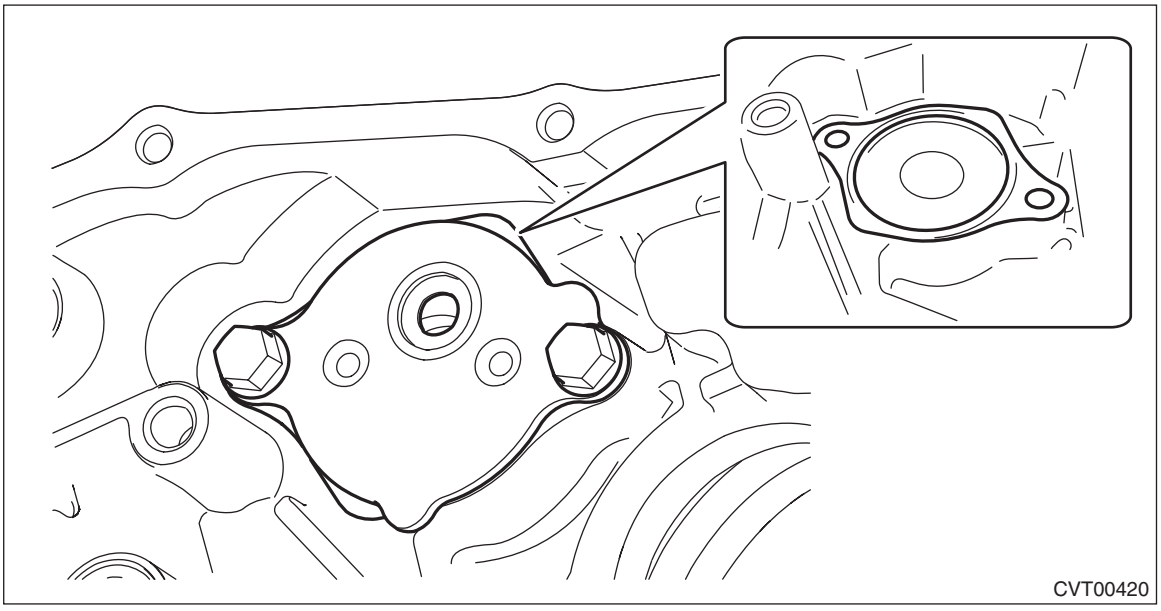
NOTE:
Apply CVTF to the O-ring of CVTF filter.



2) Install the CVTF filter cover and gasket.

NOTE:
- Use a new gasket.
- The gasket has the front side and back side. Install it as shown in the figure.

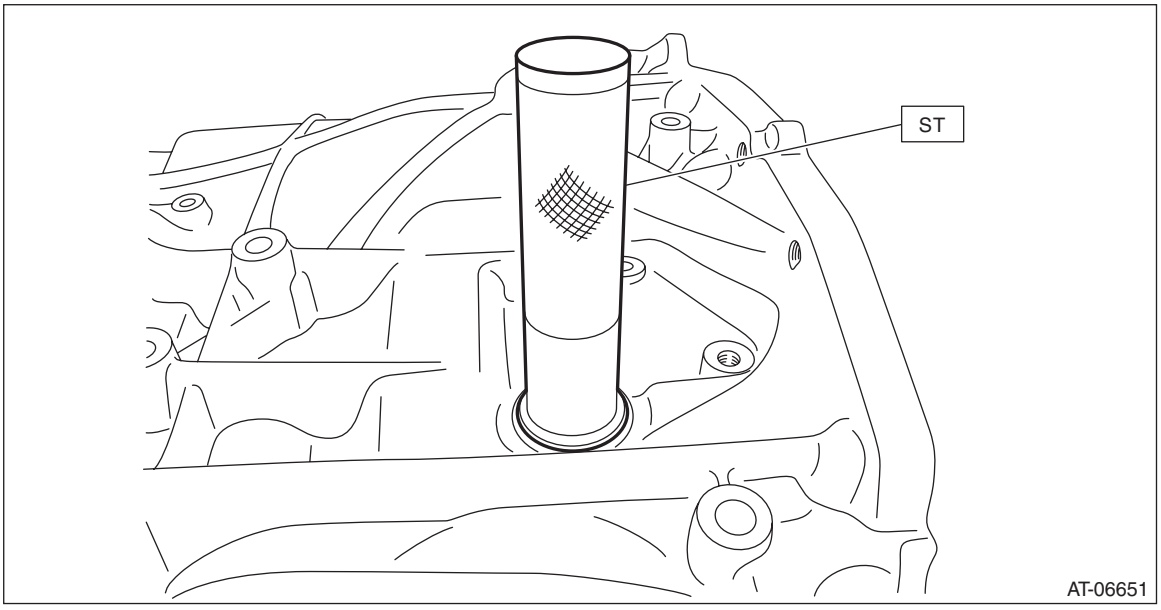
Tightening torque:
17 N·m (1.7 kgf-m, 12.5 ft-lb)



3) Using the ST, install the oil seal.

NOTE:
- Use a new oil seal.
- Apply CVTF to the oil seal lip and press-fitting surface.

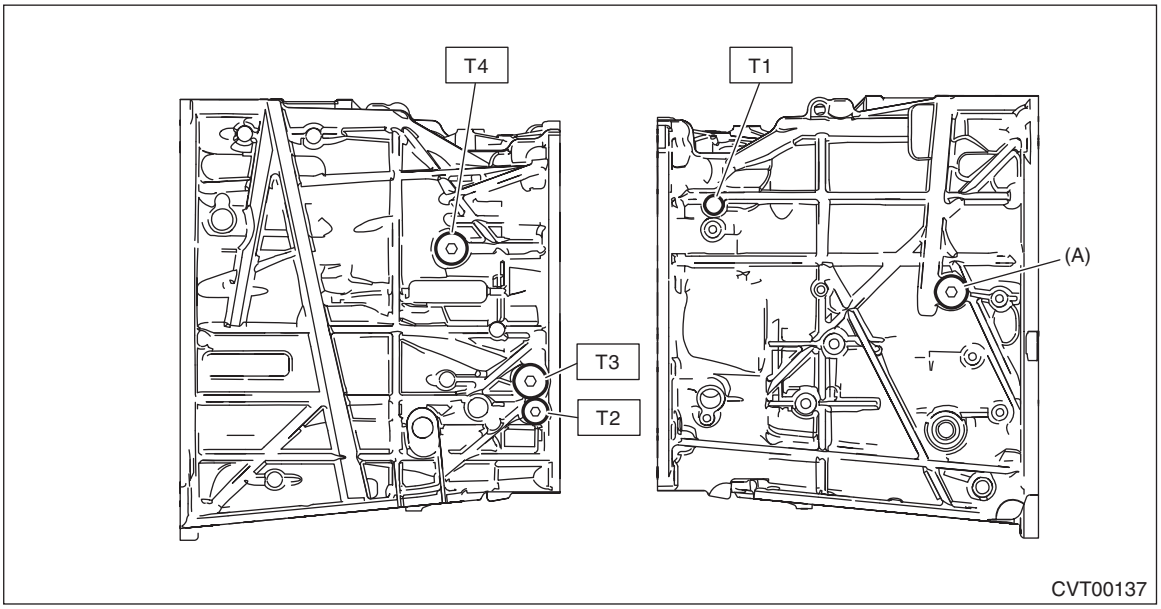
ST 18657AA000 INSTALLER



4) Install all plugs.

NOTE:
- Use new O-rings.
- Apply CVTF to the O-ring.
- For the plug (A), fill the CVTF, and then tighten the plug using a new gasket.

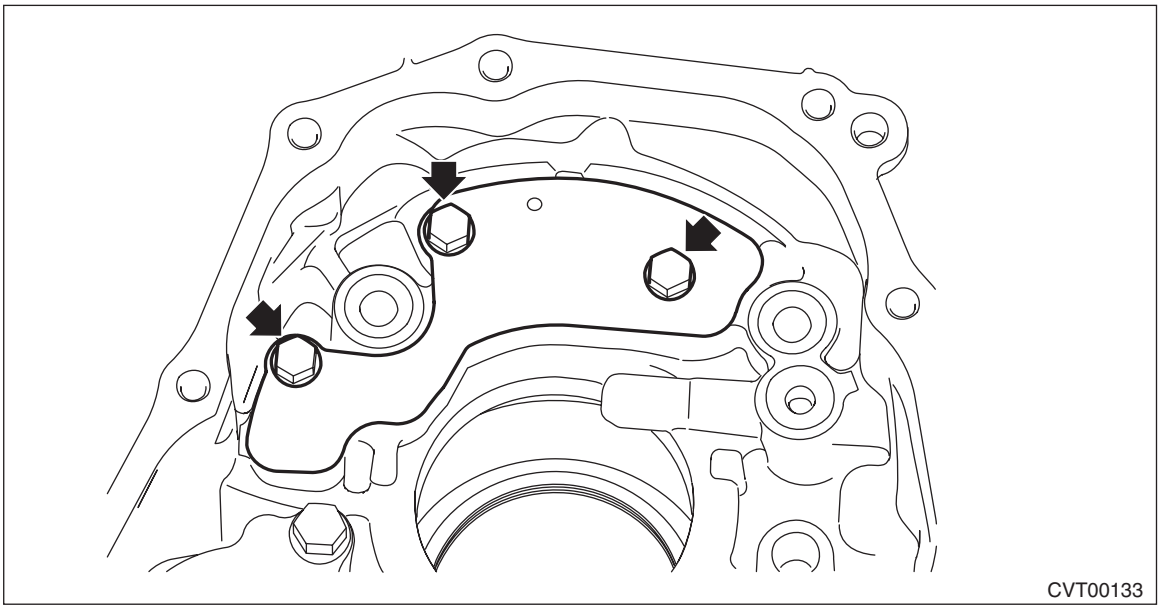
Tightening torque:
T1: 13 N·m (1.3 kgf-m, 9.6 ft-lb)
T2: 25 N·m (2.5 kgf-m, 18.4 ft-lb)
T3: 50 N·m (5.1 kgf-m, 36.9 ft-lb)
T4: 60 N·m (6.0 kgf-m, 44.3 ft-lb)



5) Install the oil stopper plate.

NOTE:
Use a new bolt.

Tightening torque:
9 N·m (0.9 kgf-m, 6.6 ft-lb)



E: INSPECTION

- Check the transmission case for damage.
- Check for leakage of CVTF from the connection between converter case and transmission case.
- Check the bearing for smooth operation.
- Check the bearing for seizure or wear.
- Check each part for damage.

F: ADJUSTMENT

NOTE:
When replacing the transmission case with a new part, perform the following check and adjustment for the selection.

- Select the reduction driven gear shim. <Ref. to CVT(TH58A)-243, ADJUSTMENT, Output Clutch Assembly.>
- Select the reduction drive gear shim. <Ref. to CVT(TH58A)-261, ADJUSTMENT, Reduction Drive Gear.>

41.CVTF Filter

A: REMOVAL

NOTE:
• Although CVTF filter is a maintenance-free part, replace it if a large quantity of wear debris and metal particles are found in CVTF and CVTF filter.
• For removal of CVTF filter, refer to “Transmission Case”. <Ref. to CVT(TH58A)-245, REMOVAL, Transmission Case.> <Ref. to CVT(TH58A)-251, DISASSEMBLY, Transmission Case.>

B: INSTALLATION

NOTE:
For installation of CVTF filter, refer to “Transmission Case”. <Ref. to CVT(TH58A)-254, ASSEMBLY, Transmission Case.> <Ref. to CVT(TH58A)-248, INSTALLATION, Transmission Case.>

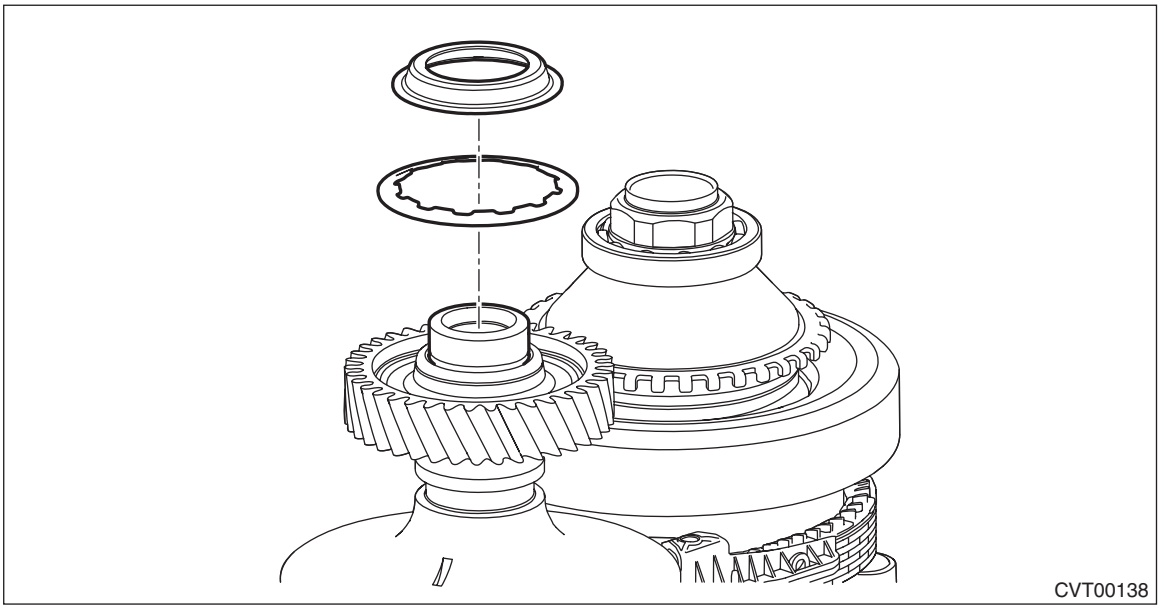
C: INSPECTION

- Check if a large quantity of wear debris or metal particles are in CVTF and CVTF filter.
- Check for broken part or damaged O-ring.

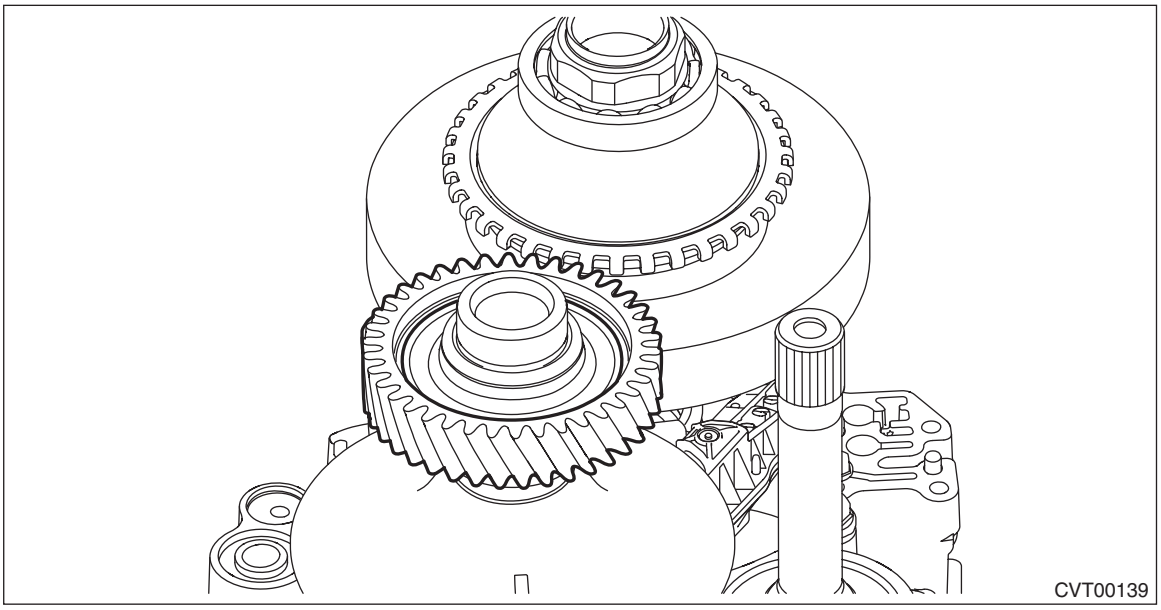
42.Reduction Drive Gear

A: REMOVAL

1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TH58A)-63, REMOVAL, Automatic Transmission Assembly.>
2) Remove the air breather hose. <Ref. to CVT(TH58A)-171, REMOVAL, Air Breather Hose.>
3) Remove the transmission harness. <Ref. to CVT(TH58A)-143, REMOVAL, Transmission Harness.>
4) Remove the main control valve body. <Ref. to CVT(TH58A)-115, REMOVAL, Control Valve Body.>
5) Remove the turbine speed sensor. <Ref. to CVT(TH58A)-104, REMOVAL, Turbine Speed Sensor.>
6) Remove the secondary speed sensor. <Ref. to CVT(TH58A)-106, REMOVAL, Secondary Speed Sensor.>
7) Remove the front wheel speed sensor. <Ref. to CVT(TH58A)-108, REMOVAL, Front Wheel Speed Sensor.>
8) Remove the inhibitor switch. <Ref. to CVT(TH58A)-101, REMOVAL, Inhibitor Switch.>
9) Remove the extension case. <Ref. to CVT(TH58A)-182, REMOVAL, Extension Case.>
10) Remove the transfer clutch assembly. <Ref. to CVT(TH58A)-186, REMOVAL, Transfer Clutch.>
11) Remove the transfer driven gear assembly. <Ref. to CVT(TH58A)-200, REMOVAL, Transfer Driven Gear.>
12) Remove the transfer drive gear assembly. <Ref. to CVT(TH58A)-203, REMOVAL, Transfer Drive Gear.>
13) Remove the parking pawl. <Ref. to CVT(TH58A)-208, REMOVAL, Parking Pawl.>
14) Remove the oil pan and oil strainer. <Ref. to CVT(TH58A)-112, REMOVAL, Oil Pan and Strainer.>
15) Remove the transmission control device. <Ref. to CVT(TH58A)-210, REMOVAL, Transmission Control Device.>
16) Remove the drive motor assembly. <Ref. to CVT(TH58A)-217, REMOVAL, Drive Motor Assembly.>
17) Remove the output clutch assembly. <Ref. to CVT(TH58A)-228, REMOVAL, Output Clutch Assembly.>
18) Remove the transmission case. <Ref. to CVT(TH58A)-245, REMOVAL, Transmission Case.>
19) Remove the reduction drive gear shims, spring retainers, and dish plates.

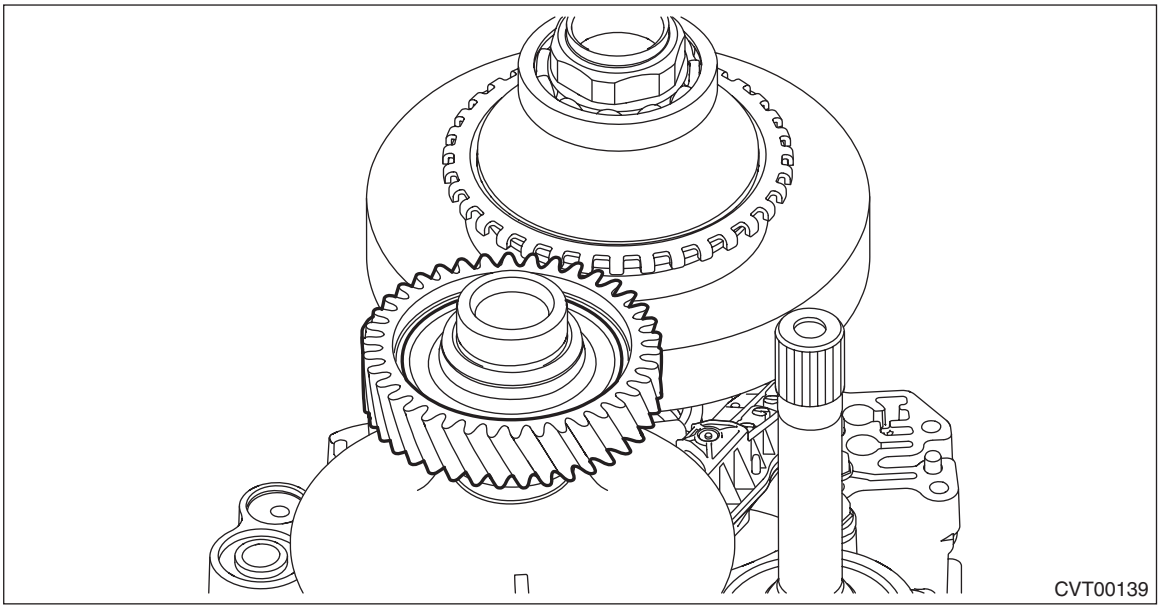


20) Remove the reduction drive gear.



B: INSTALLATION

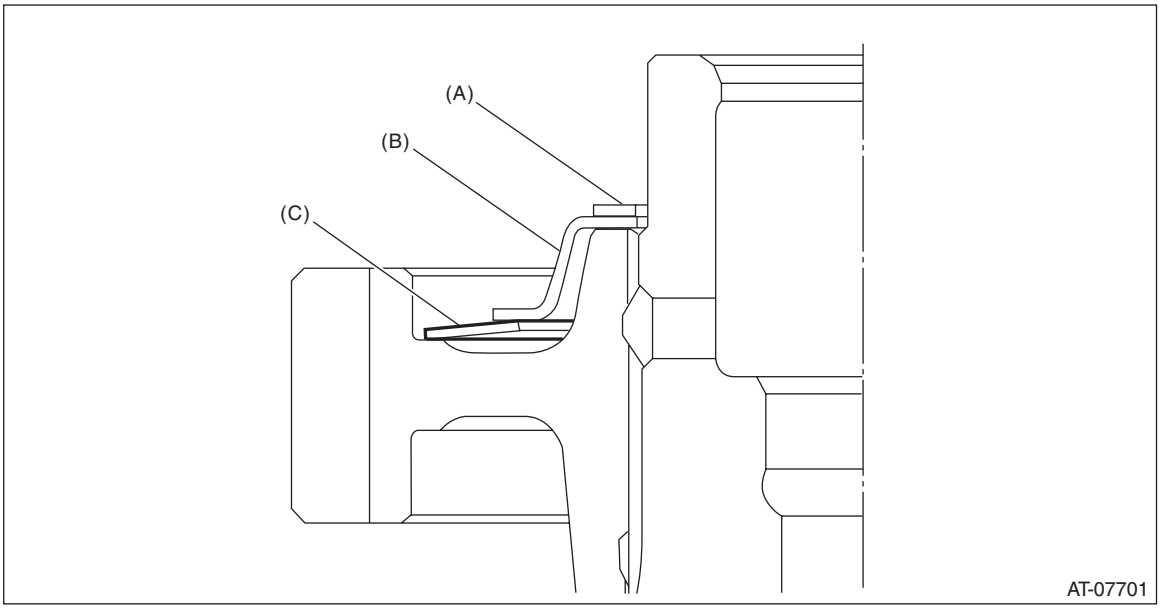
1) Install the reduction drive gear to secondary pulley.



2) Select the reduction drive gear shim. <Ref. to CVT(TH58A)-261, ADJUSTMENT, Reduction Drive Gear.>

3) Install the dish plates, spring retainers, and selected reduction drive gear shims.

NOTE:
Install the dish plate in the correct direction.



(A) Reduction drive gear shim
(B) Spring retainer
(C) Dish plate

4) Install the transmission case. <Ref. to CVT(TH58A)-248, INSTALLATION, Transmission Case.>
5) Install the output clutch assembly. <Ref. to CVT(TH58A)-229, INSTALLATION, Output Clutch Assembly.>
6) Install the drive motor assembly. <Ref. to CVT(TH58A)-221, INSTALLATION, Drive Motor Assembly.>
7) Install the transmission control device. <Ref. to CVT(TH58A)-213, INSTALLATION, Transmission Control Device.>
8) Install the oil strainer and oil pan. <Ref. to CVT(TH58A)-114, INSTALLATION, Oil Pan and Strainer.>
9) Install the parking pawl. <Ref. to CVT(TH58A)-208, INSTALLATION, Parking Pawl.>
10) Install the transfer drive gear assembly. <Ref. to CVT(TH58A)-204, INSTALLATION, Transfer Drive Gear.>
11) Install the transfer driven gear assembly. <Ref. to CVT(TH58A)-201, INSTALLATION, Transfer Driven Gear.>
12) Install the transfer clutch assembly. <Ref. to CVT(TH58A)-188, INSTALLATION, Transfer Clutch.>
13) Install the extension case. <Ref. to CVT(TH58A)-183, INSTALLATION, Extension Case.>
14) Install the inhibitor switch. <Ref. to CVT(TH58A)-102, INSTALLATION, Inhibitor Switch.>
15) Install the secondary speed sensor. <Ref. to CVT(TH58A)-106, INSTALLATION, Secondary Speed Sensor.>
16) Install the front wheel speed sensor. <Ref. to CVT(TH58A)-108, INSTALLATION, Front Wheel Speed Sensor.>
17) Install the turbine speed sensor. <Ref. to CVT(TH58A)-104, INSTALLATION, Turbine Speed Sensor.>
18) Install the main control valve body. <Ref. to CVT(TH58A)-123, INSTALLATION, Control Valve Body.>
19) Install the transmission harness. <Ref. to CVT(TH58A)-151, INSTALLATION, Transmission Harness.>
20) Install the air breather hose. <Ref. to CVT(TH58A)-173, INSTALLATION, Air Breather Hose.>
21) Install the transmission assembly to the vehicle. <Ref. to CVT(TH58A)-77, INSTALLATION, Automatic Transmission Assembly.>

C: INSPECTION

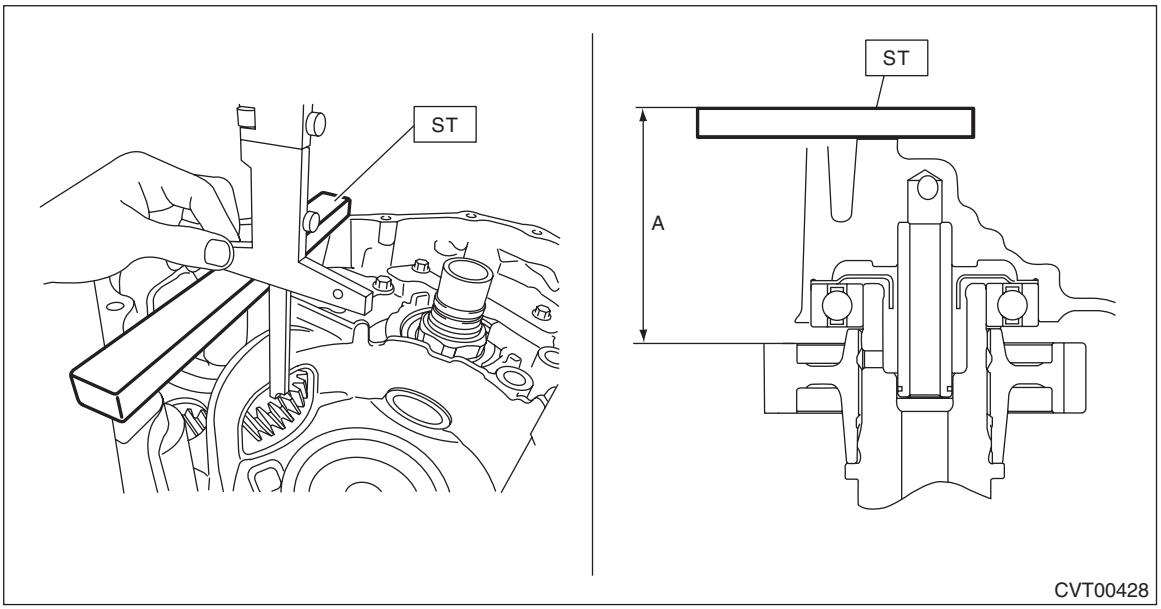
Check the reduction drive gear for breakage or damage.

D: ADJUSTMENT

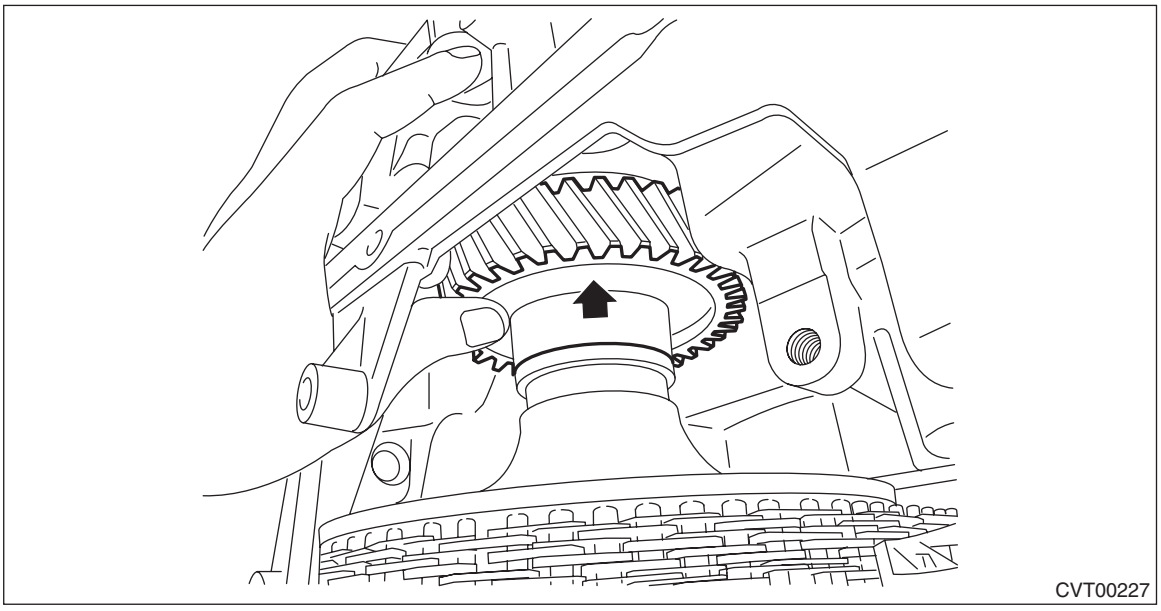
1) Remove the spring retainers and reduction drive gear shims.
2) Install the transmission case, and secure it with four or five bolts.

Tightening torque:
22 N·m (2.2 kgf-m, 16.2 ft-lb)

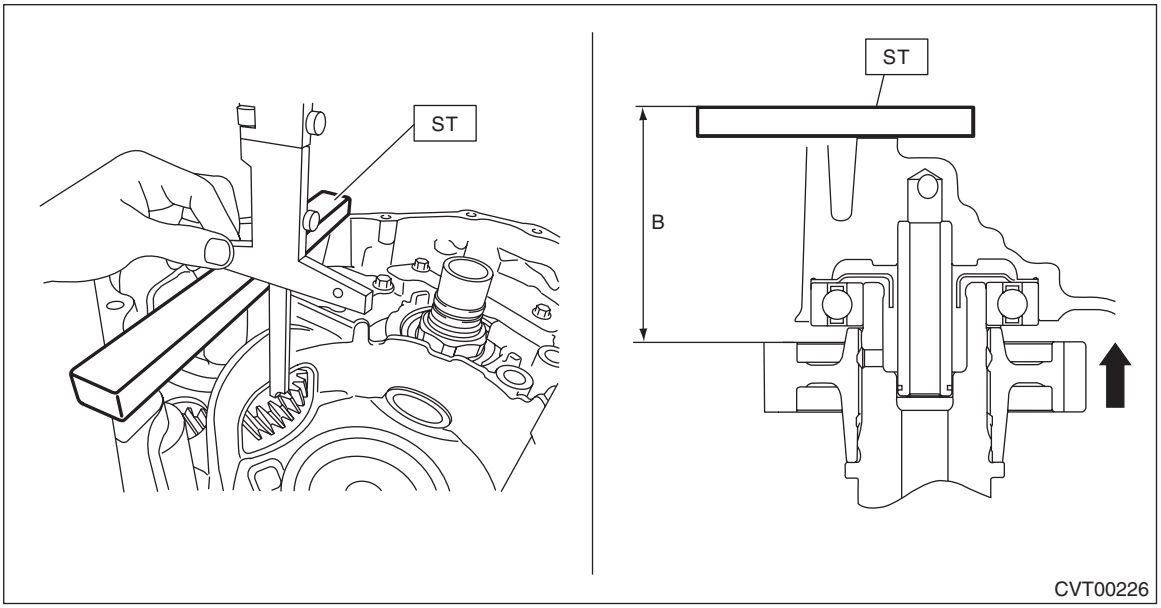
3) Measure depth “A” from the ST upper face to the reduction drive gear end face.
ST 499575400 GAUGE



4) Raise and hold the reduction drive gear.



5) Measure depth “B” from the ST upper face to the reduction drive gear end face.
ST 499575400 GAUGE



6) Calculate the following formula.
T mm = A – B – 1.0
[T in = A – B – 0.039]
T: Moving distance of reduction drive gear
A: Depth from the ST upper face to the reduction drive gear end surface
B: Depth from the ST upper face to the reduction drive gear end surface (with the gear raised)
1.0 mm (0.039 in): Thickness of spring retainer

Moving distance of transfer drive gear [T]	Total shim thickness mm (in)
0.420 — 0.519(0.0165 — 0.0204)	0.3 (0.012)
0.520 — 0.619(0.0205 — 0.0242)	0.4 (0.016)
0.620 — 0.719(0.0244 — 0.0283)	0.5 (0.020)
0.720 — 0.819(0.0283 — 0.0322)	0.6 (0.024)
0.820 — 0.919(0.0323 — 0.0362)	0.7 (0.028)
0.920 — 1.019(0.0362 — 0.0401)	0.8 (0.031)
1.020 — 1.119(0.0402 — 0.0441)	0.9 (0.035)
1.120 — 1.219(0.0441 — 0.0480)	1.0 (0.039)
1.220 — 1.319(0.0480 — 0.0519)	1.1 (0.043)
1.320 — 1.419(0.0520 — 0.0559)	1.2 (0.047)
1.420 — 1.519(0.0559 — 0.0598)	1.3 (0.051)
1.520 — 1.619(0.0598 — 0.0637)	1.4 (0.055)
1.620 — 1.719(0.0638 — 0.0677)	1.5 (0.059)
1.720 — 1.819(0.0677 — 0.0716)	1.6 (0.063)
1.820 — 1.920(0.0717 — 0.0756)	1.7 (0.067)

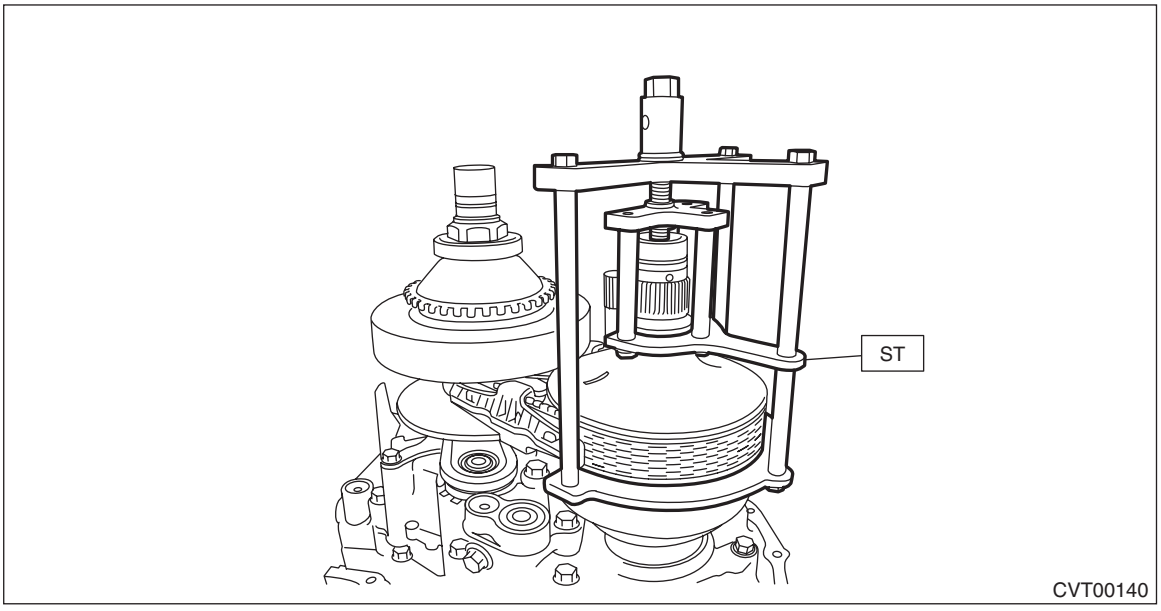
7) Select one to three reduction drive gear shims so that the total thickness meets the value obtained from step 6).

Part No.	Reduction drive gear shim thickness mm (in)
31288AA260	0.3 (0.012)
31288AA270	0.4 (0.016)
31288AA280	0.5 (0.020)
31288AA290	0.6 (0.024)

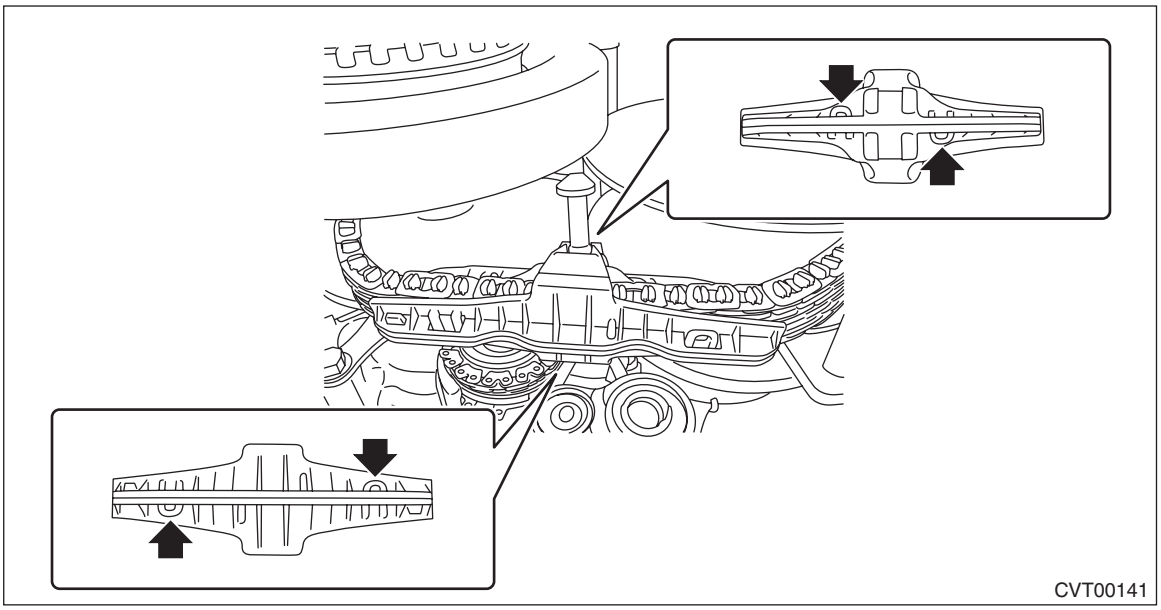
43.Primary Pulley and Secondary Pulley

A: REMOVAL

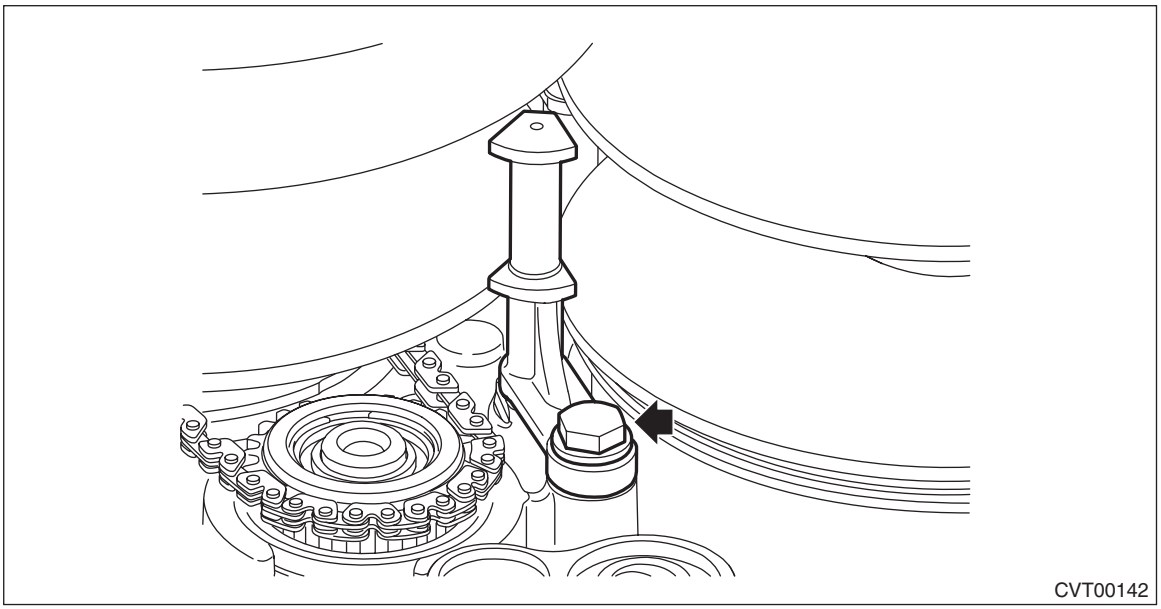
NOTE:
Always replace primary pulley and secondary pulley as an assembly because they are non-disassembled parts.
1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TH58A)-63, REMOVAL, Automatic Transmission Assembly.>
2) Remove the air breather hose. <Ref. to CVT(TH58A)-171, REMOVAL, Air Breather Hose.>
3) Remove the transmission harness. <Ref. to CVT(TH58A)-143, REMOVAL, Transmission Harness.>
4) Remove the main control valve body. <Ref. to CVT(TH58A)-115, REMOVAL, Control Valve Body.>
5) Remove the turbine speed sensor. <Ref. to CVT(TH58A)-104, REMOVAL, Turbine Speed Sensor.>
6) Remove the secondary speed sensor. <Ref. to CVT(TH58A)-106, REMOVAL, Secondary Speed Sensor.>
7) Remove the front wheel speed sensor. <Ref. to CVT(TH58A)-108, REMOVAL, Front Wheel Speed Sensor.>
8) Remove the inhibitor switch. <Ref. to CVT(TH58A)-101, REMOVAL, Inhibitor Switch.>
9) Remove the extension case. <Ref. to CVT(TH58A)-182, REMOVAL, Extension Case.>
10) Remove the transfer clutch assembly. <Ref. to CVT(TH58A)-186, REMOVAL, Transfer Clutch.>
11) Remove the transfer driven gear assembly. <Ref. to CVT(TH58A)-200, REMOVAL, Transfer Driven Gear.>
12) Remove the transfer drive gear assembly. <Ref. to CVT(TH58A)-203, REMOVAL, Transfer Drive Gear.>
13) Remove the parking pawl. <Ref. to CVT(TH58A)-208, REMOVAL, Parking Pawl.>
14) Remove the oil pan and oil strainer. <Ref. to CVT(TH58A)-112, REMOVAL, Oil Pan and Strainer.>
15) Remove the transmission control device. <Ref. to CVT(TH58A)-210, REMOVAL, Transmission Control Device.>
16) Remove the drive motor assembly. <Ref. to CVT(TH58A)-217, REMOVAL, Drive Motor Assembly.>
17) Remove the output clutch assembly. <Ref. to CVT(TH58A)-228, REMOVAL, Output Clutch Assembly.>
18) Remove the transmission case. <Ref. to CVT(TH58A)-245, REMOVAL, Transmission Case.>
19) Remove the reduction drive gear. <Ref. to CVT(TH58A)-258, REMOVAL, Reduction Drive Gear.>
20) Set the ST to secondary pulley, expand the V groove of pulley, and then completely loosen the variator chain.
ST 18769AA010 EXPANDER PULLEY



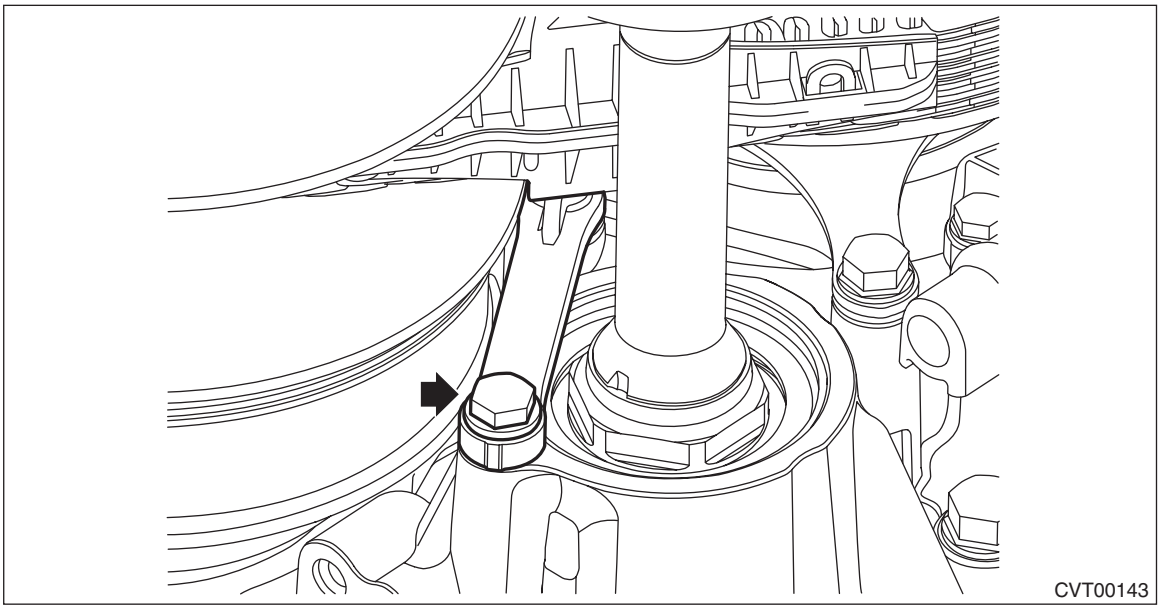
21) Remove the chain guide.
(1) Remove the chain guide from lubrication pipe.
(2) Detach the four claws to remove the chain guide.


CVT00141

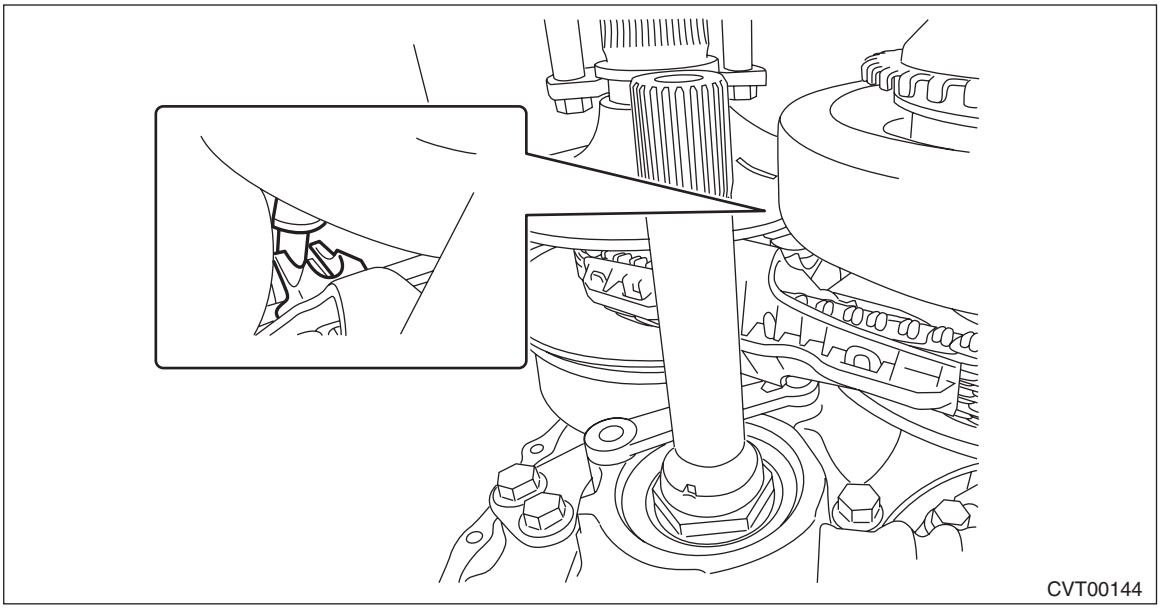
(3) Remove the lubrication pipe.


CVT00142

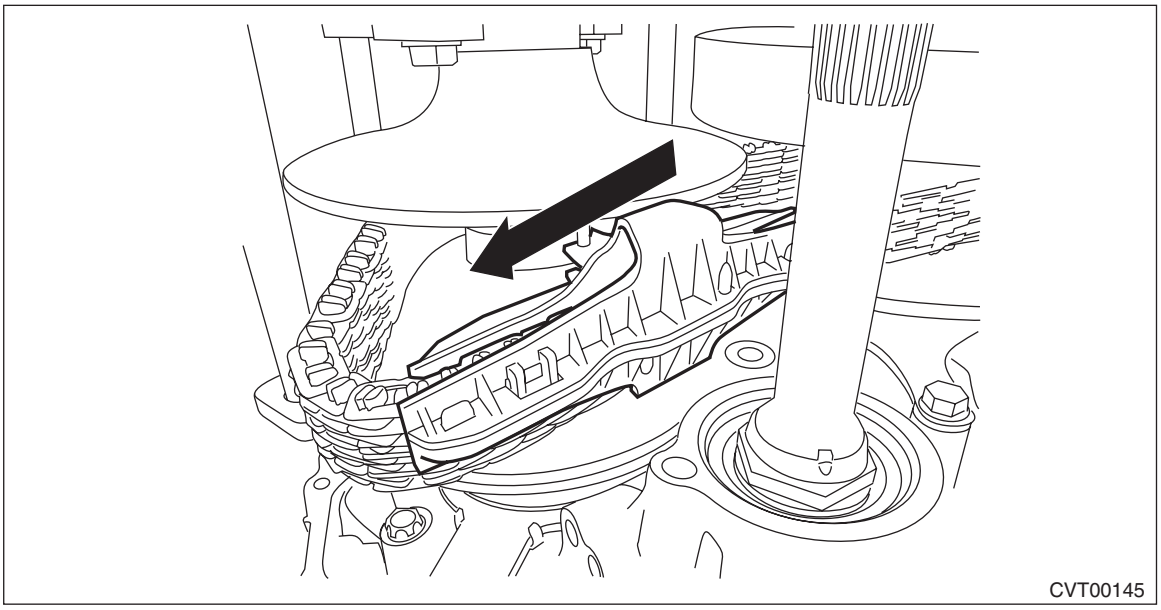
(4) Remove the support rod mounting bolts.



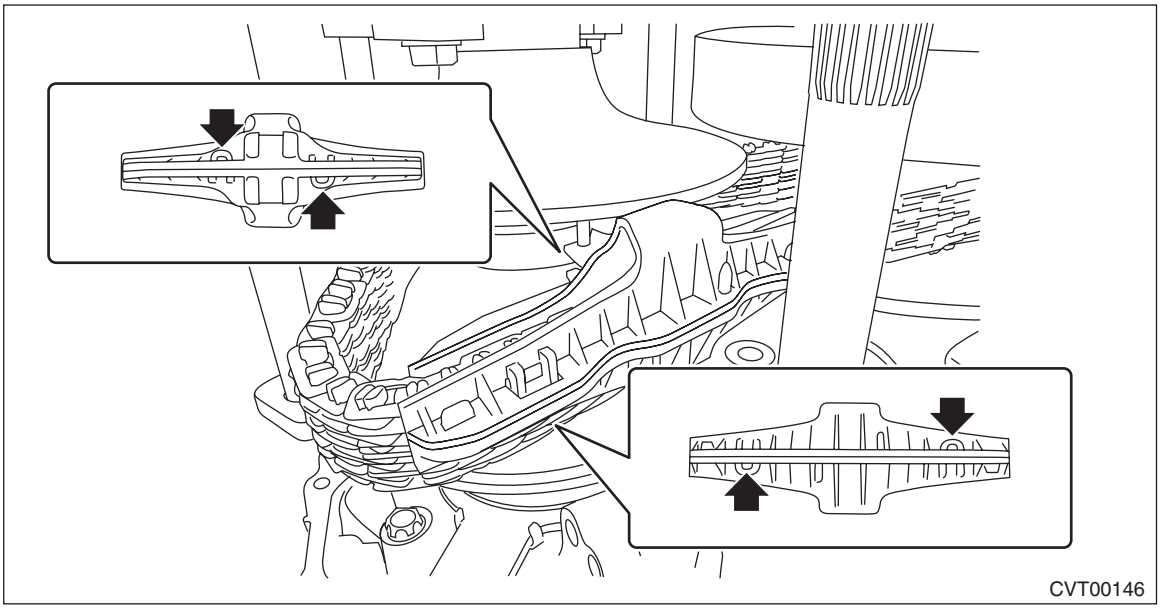
(5) Raise the support rod to remove the chain guide.



(6) Move the chain guide to the secondary pulley side.

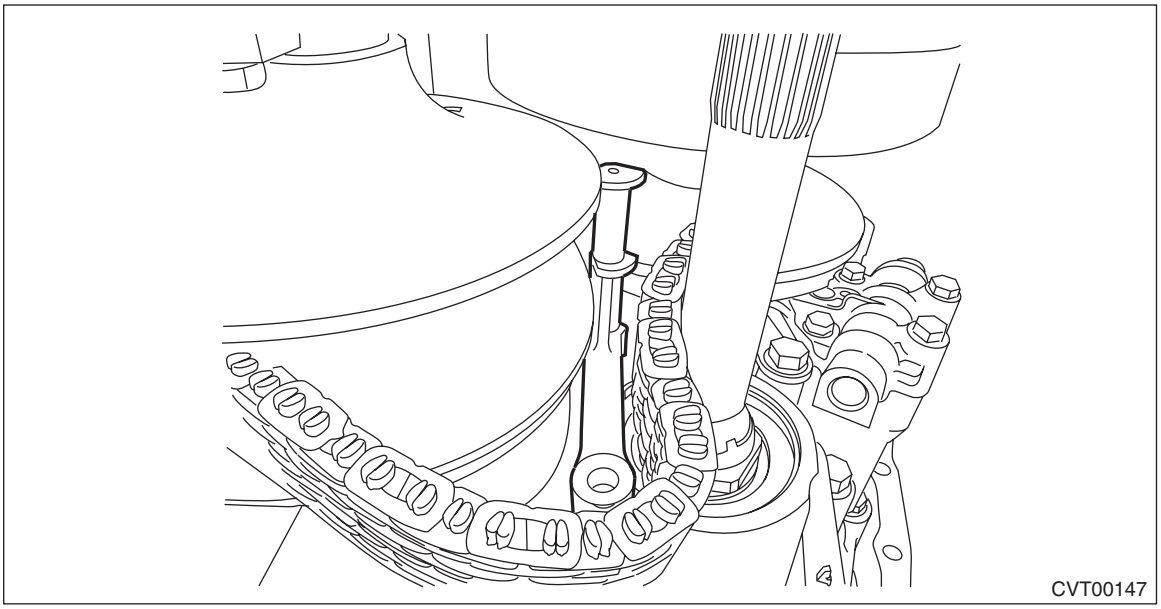


(7) Detach the four claws to remove the chain guide.

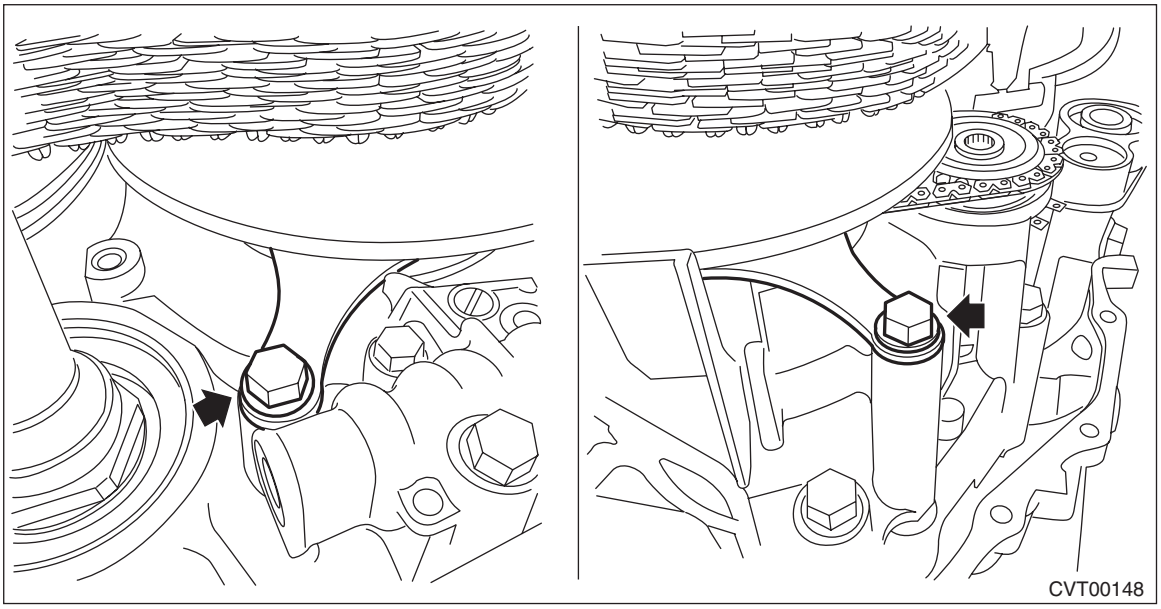


(8) Remove the support rod.

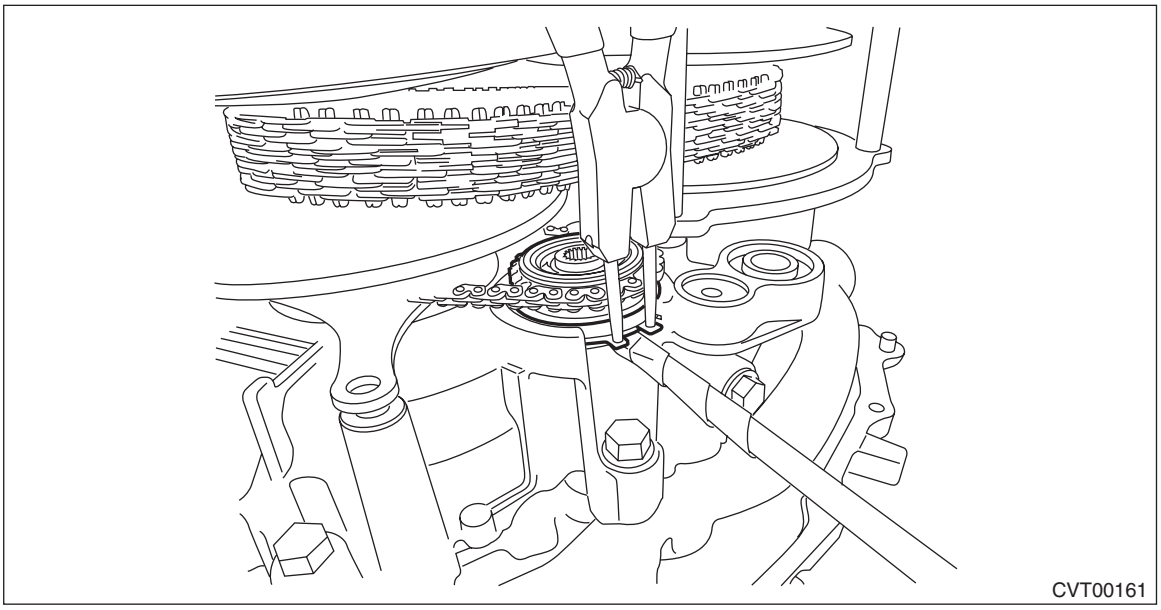
CAUTION:
Protect the both pulleys and variator chain from scratching.



22) Remove the primary pulley mounting bolt.



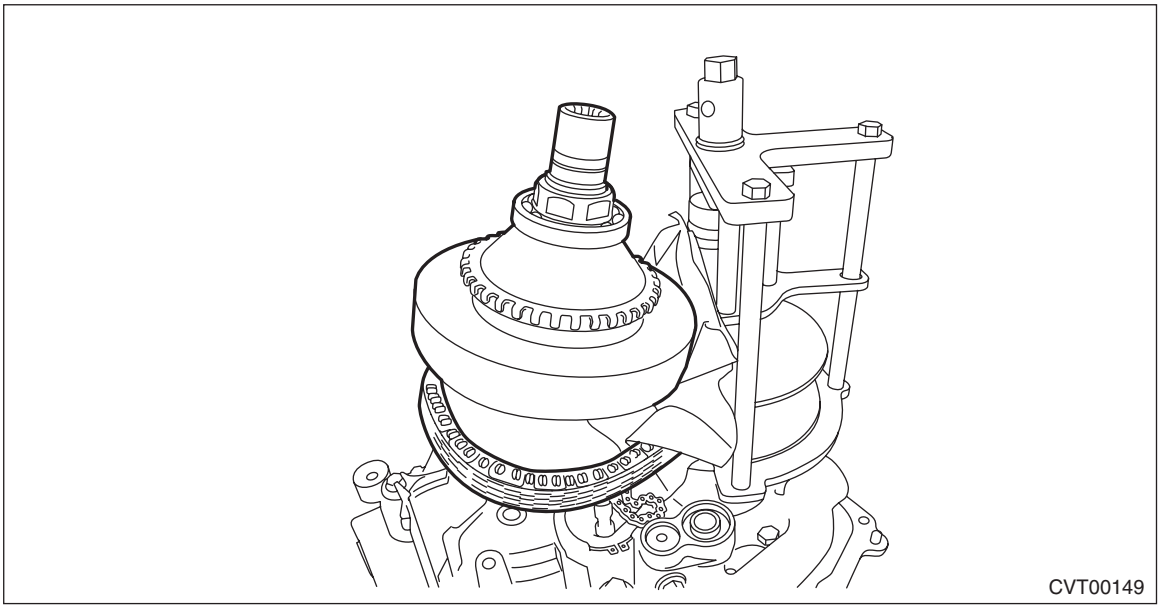
23) Spread the snap ring, and remove the snap ring from the oil pump sprocket (rear).


CVT00161

24) Remove the primary pulley.

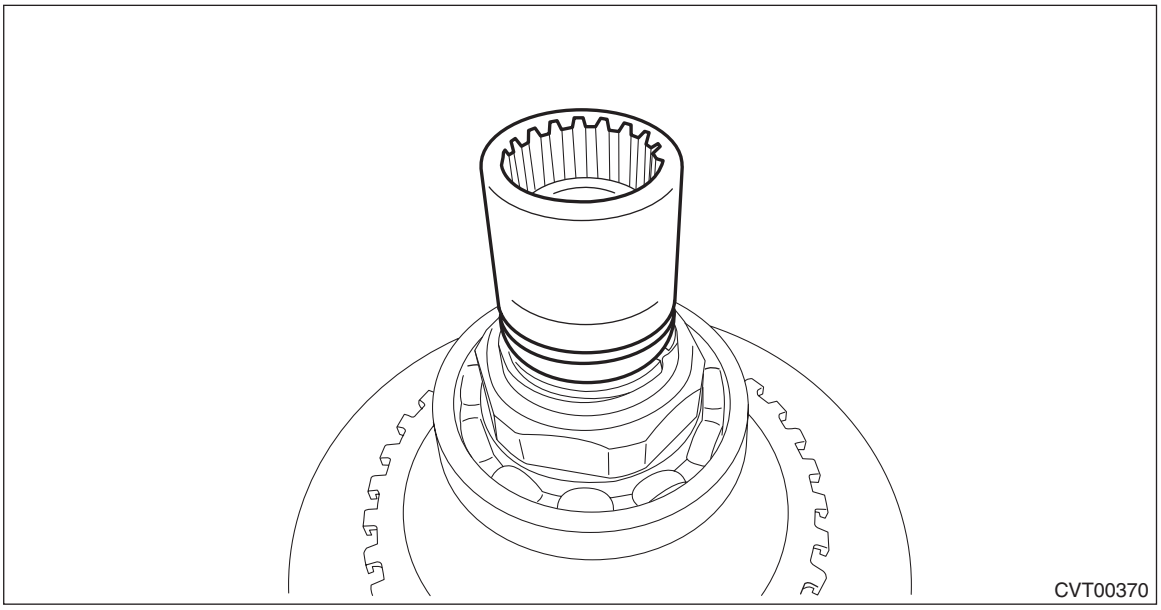
CAUTION:
Cover the V grooves of secondary pulley and primary pulley with cloth to protect the both pulleys and variator chain from scratching.

(1) Raise the primary pulley and the oil pump sprocket (rear) together, and remove the oil pump sprocket (rear).
(2) Remove the primary pulley from the reverse brake housing and intersect the V groove of secondary pulley and the V groove of primary pulley.
(3) Remove the variator chain from primary pulley, and remove the primary pulley.

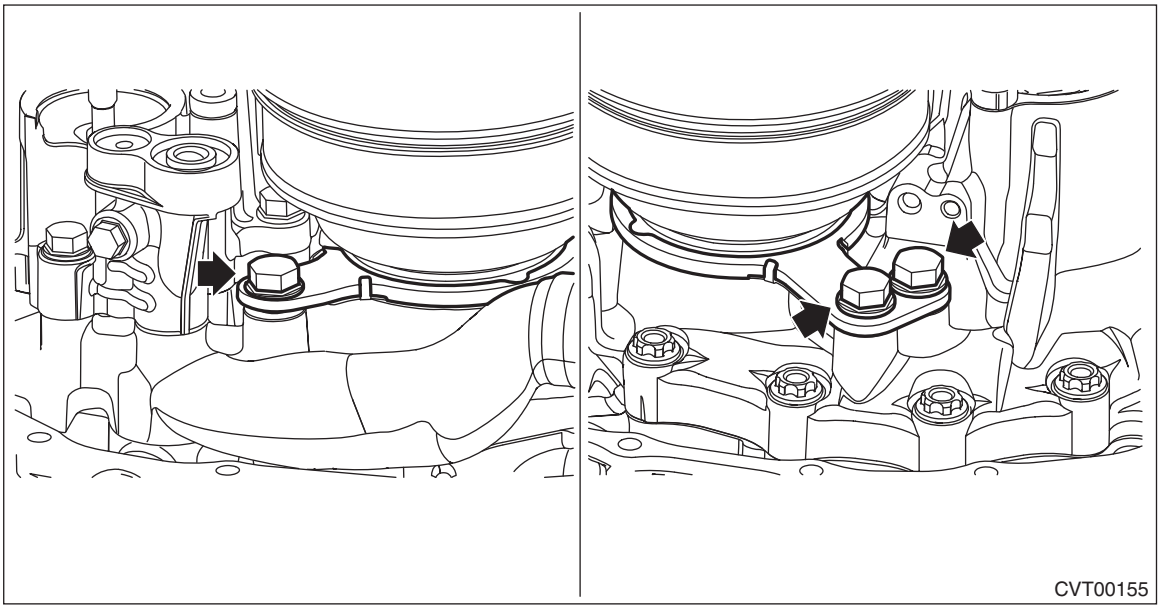

CVT00149

25) Remove the rear oil pump chain.

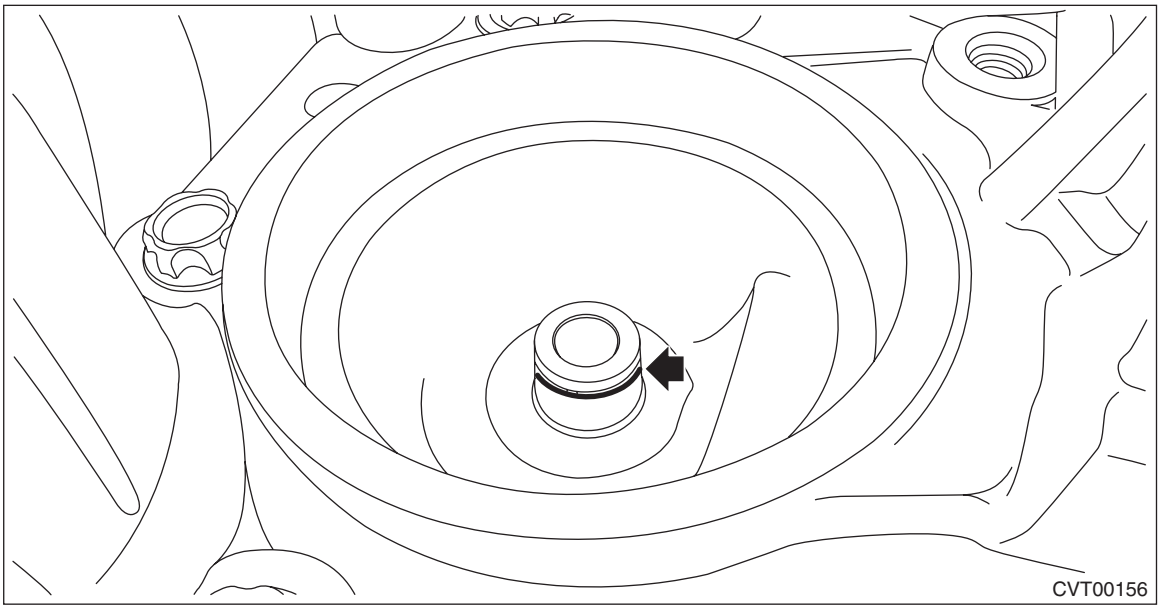
26) Remove the sleeve.



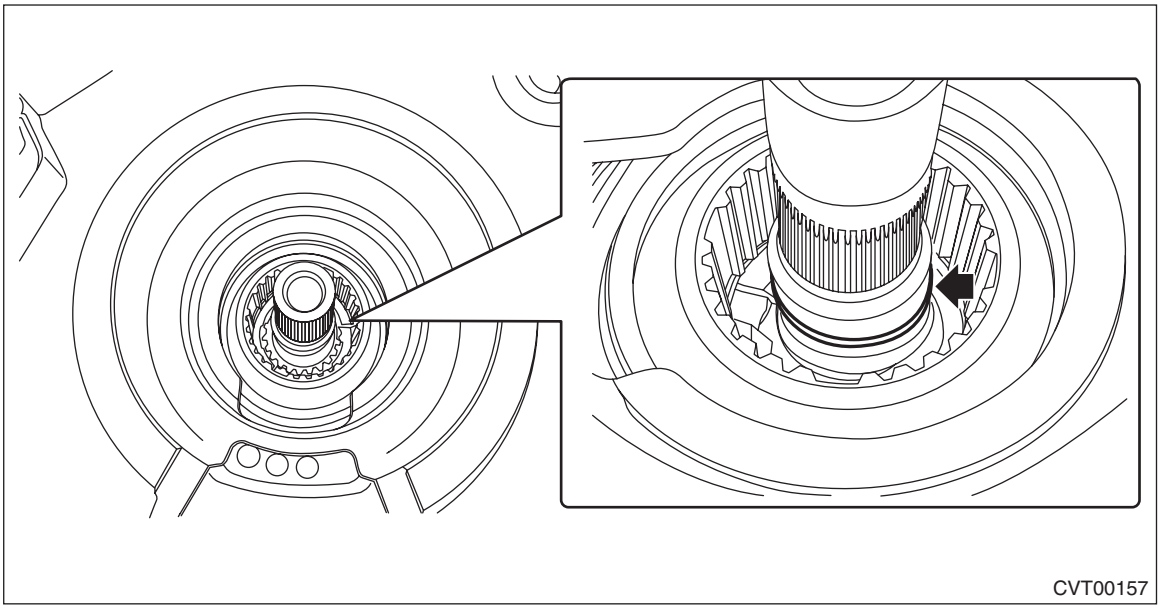
27) Remove the O-ring from the primary pulley assembly.
28) Remove the ST (EXPANDER PULLEY) from the secondary pulley.
29) Remove the variator chain from secondary pulley.
30) Remove the secondary pulley mounting bolts, and remove the secondary pulley.



31) Remove the seal ring from drive pinion retainer.



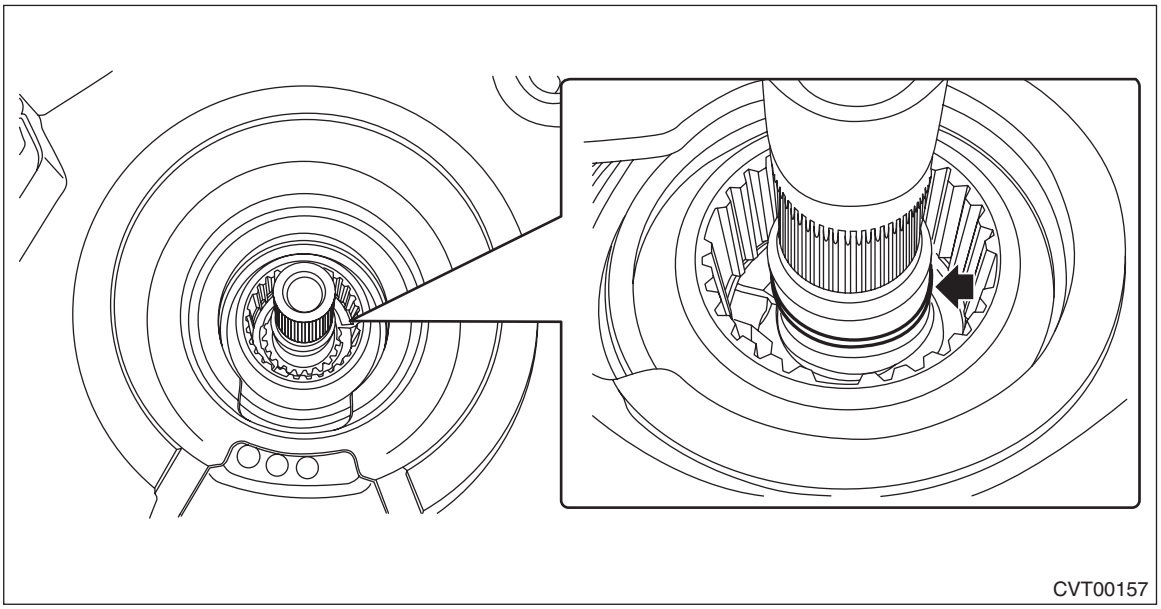
32) Remove the seal ring from the input shaft.



B: INSTALLATION

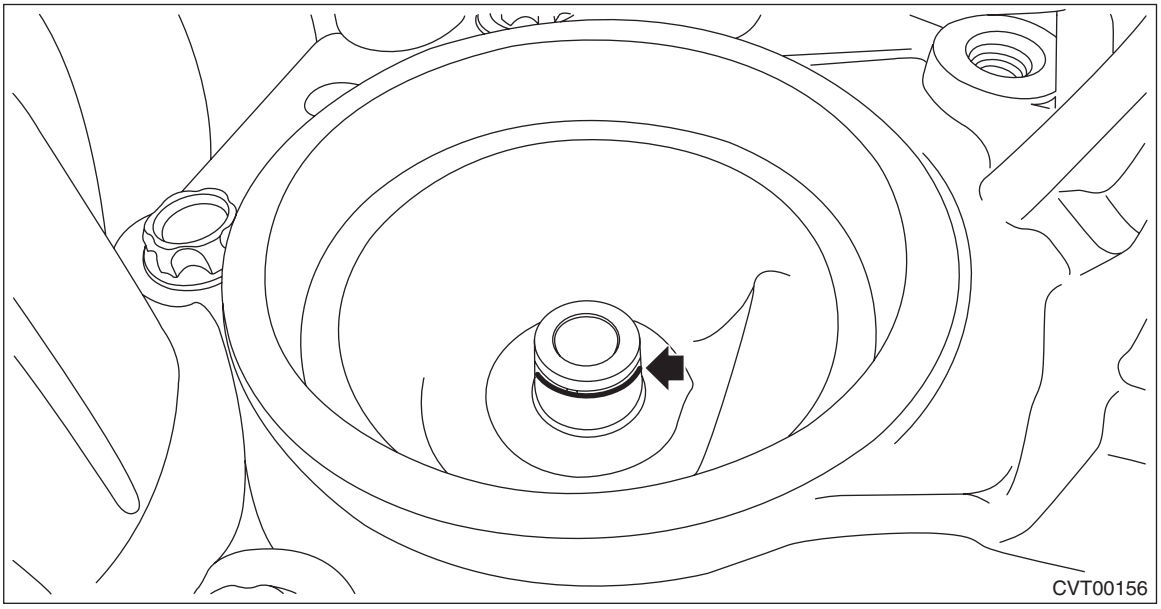
1) Select shims for pulley alignment. <Ref. to CVT(TH58A)-281, ADJUSTMENT, Primary Pulley and Secondary Pulley.>
2) When replacing the oil pump sprocket rear and the snap ring which secures the oil pump sprocket rear, select the oil pump shaft. <Ref. to CVT(TH58A)-387, ADJUSTMENT, Oil Pump.>
3) Install the seal ring to the input shaft.

NOTE:
- Use a new seal ring.
- When installing the seal ring, do not expand the seal ring too much.
- Apply CVTF to the seal rings.



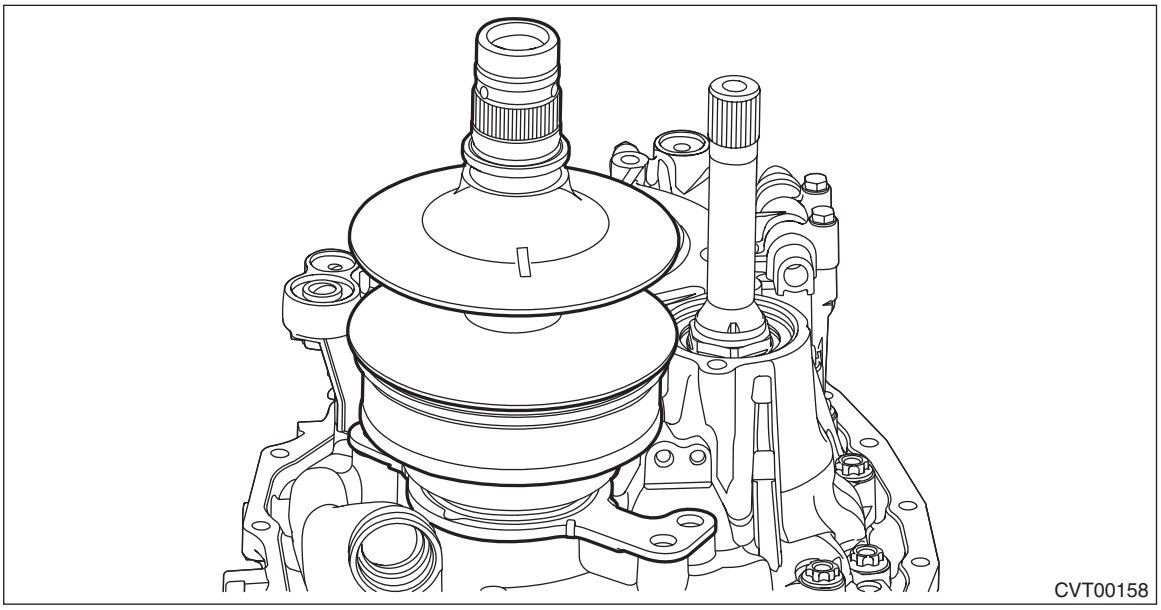
4) Install the seal ring to drive pinion retainer.

NOTE:
- Use a new seal ring.
- When installing the seal ring, do not expand the seal ring too much.
- Apply CVTF to the seal rings.



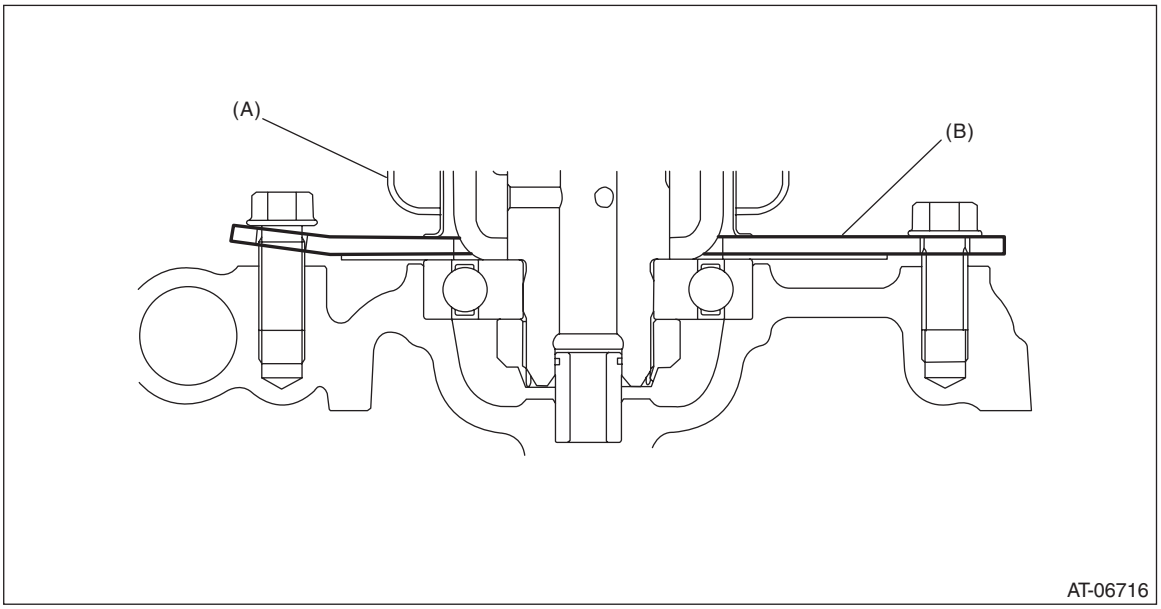
5) Install the selected shims to the primary pulley bearing catch surface.

6) Install the secondary pulley to the drive pinion retainer.



7) Install and tighten the secondary pulley securing bolts.
   (1) Tighten the three bolts until the seating surfaces contact the bearing retainer.

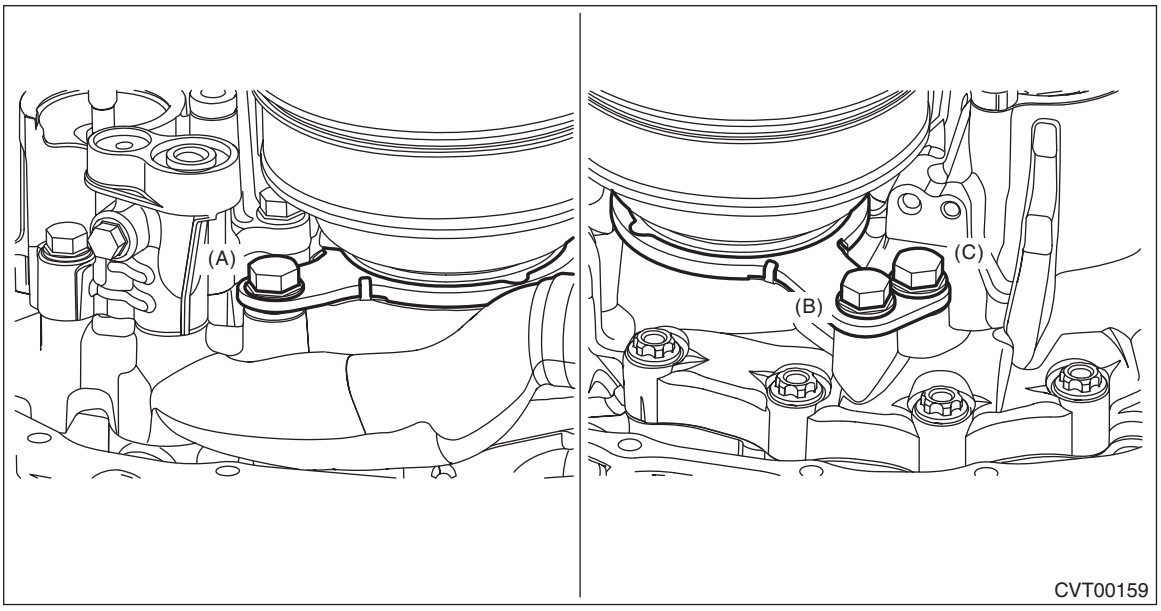
NOTE:
- Be careful not to tilt the bearing retainer of the secondary pulley.
- Apply CVTF to the bolt.



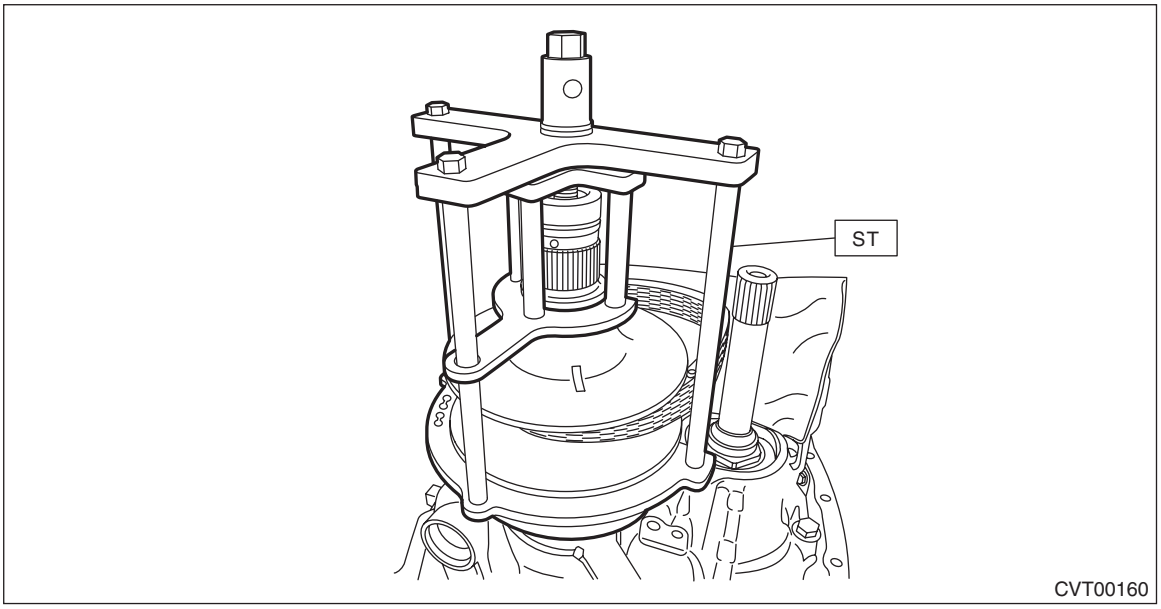
(A) Secondary pulley
(B) Bearing retainer

(2) Tighten the bolts in the order of (A) → (B) → (C) → (B).

Tightening torque:
67.5 N·m (6.9 kgf-m, 49.8 ft-lb)



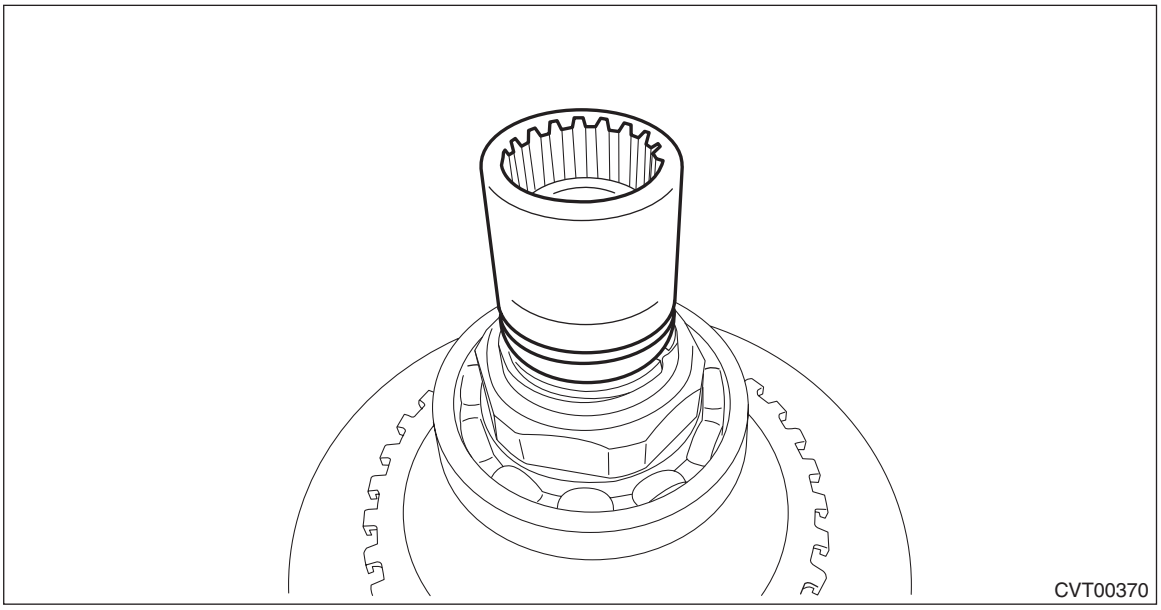
8) Place the variator chain on the V groove of the secondary pulley, and set the ST.
ST 18769AA010 EXPANDER PULLEY



9) Expand the V groove of the secondary pulley.
10) Install the O-ring to the primary pulley.

NOTE:
- Use new O-rings.
- Apply CVTF to the O-ring.

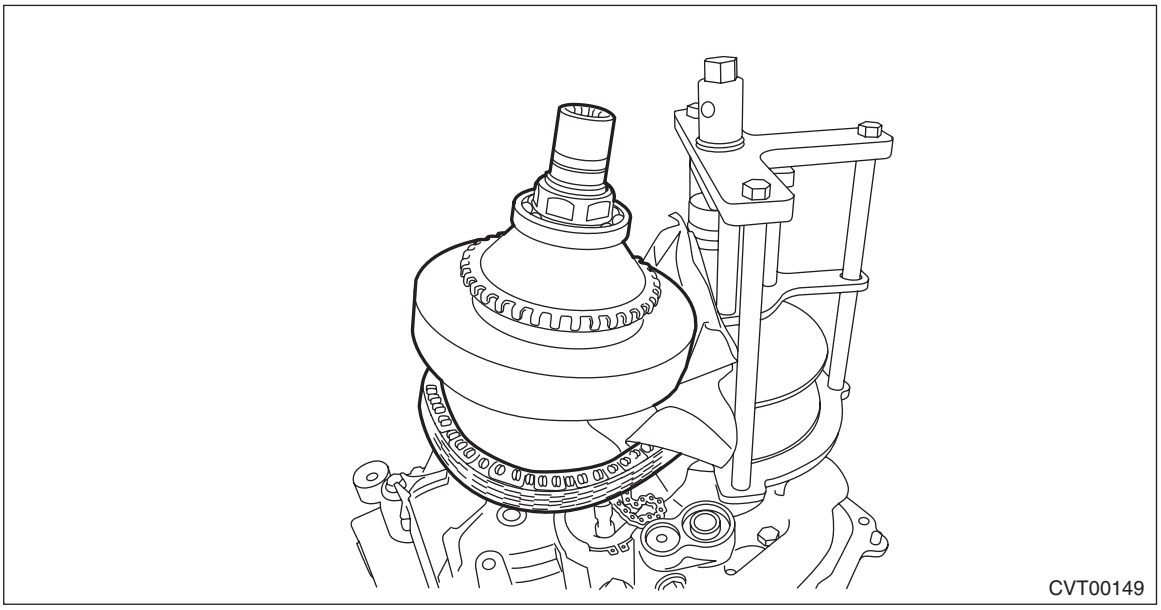
11) Install the sleeve.



12) Install the primary pulley.

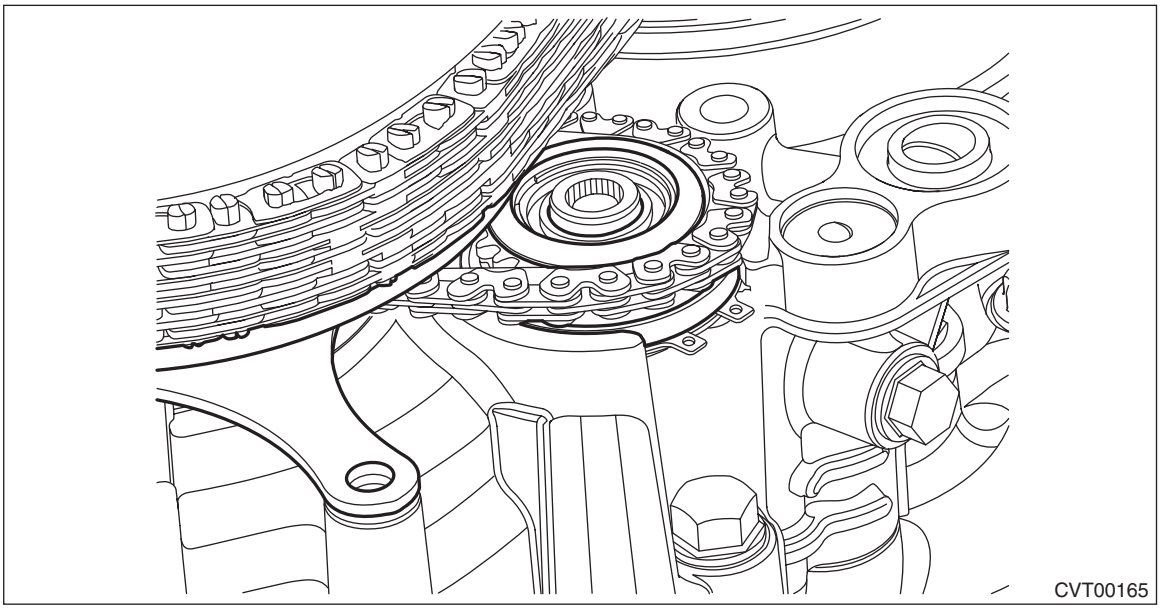
CAUTION:
Cover the V grooves of primary pulley and secondary pulley with cloth to protect the both pulleys and variator chain from scratching.

(1) Install the oil pump chain rear to the primary pulley.
(2) Intersect the V groove of primary pulley and the V groove of secondary pulley, and attach the variator chain to the primary pulley.

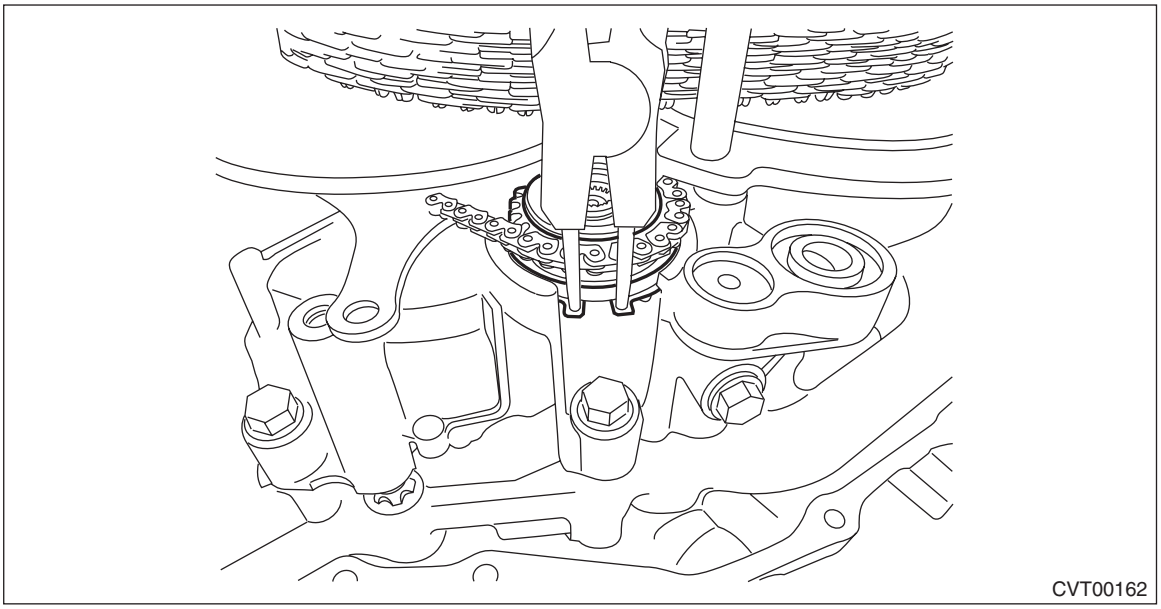


(3) Attach the oil pump chain rear to the primary pulley sprocket, and install the oil pump sprocket rear.

(4) Align the bolt hole of primary bearing retainer and the bolt hole of reverse brake housing, and install the primary pulley and the oil pump sprocket rear to the reverse brake housing.



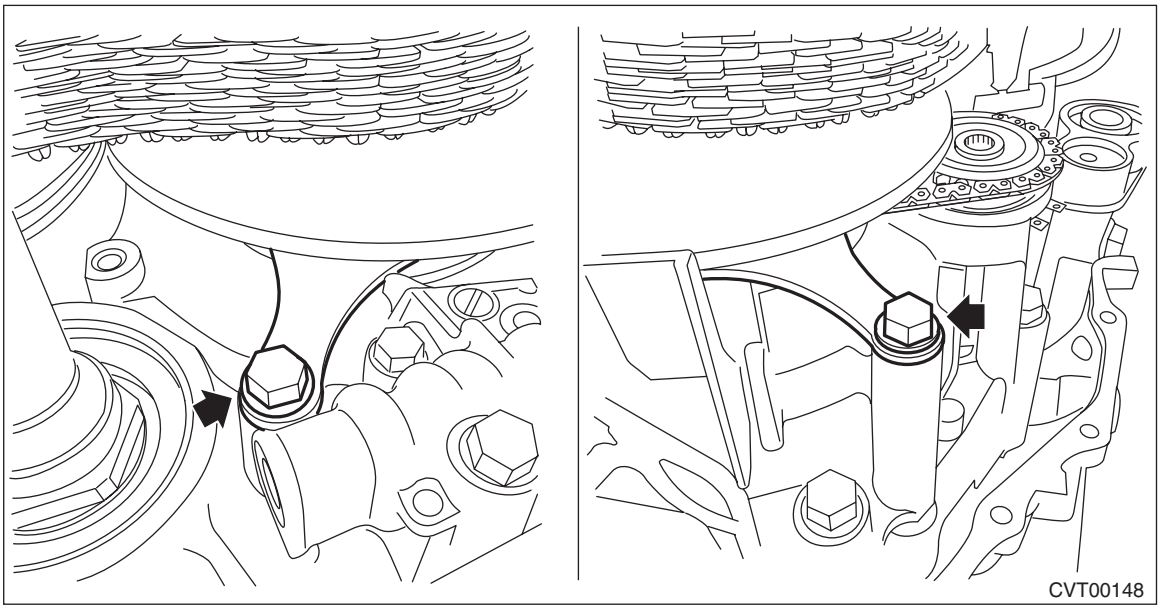
13) Spread the snap ring, align the snap ring with the bearing groove, and install the oil pump sprocket rear.



14) Install the primary pulley bolt.

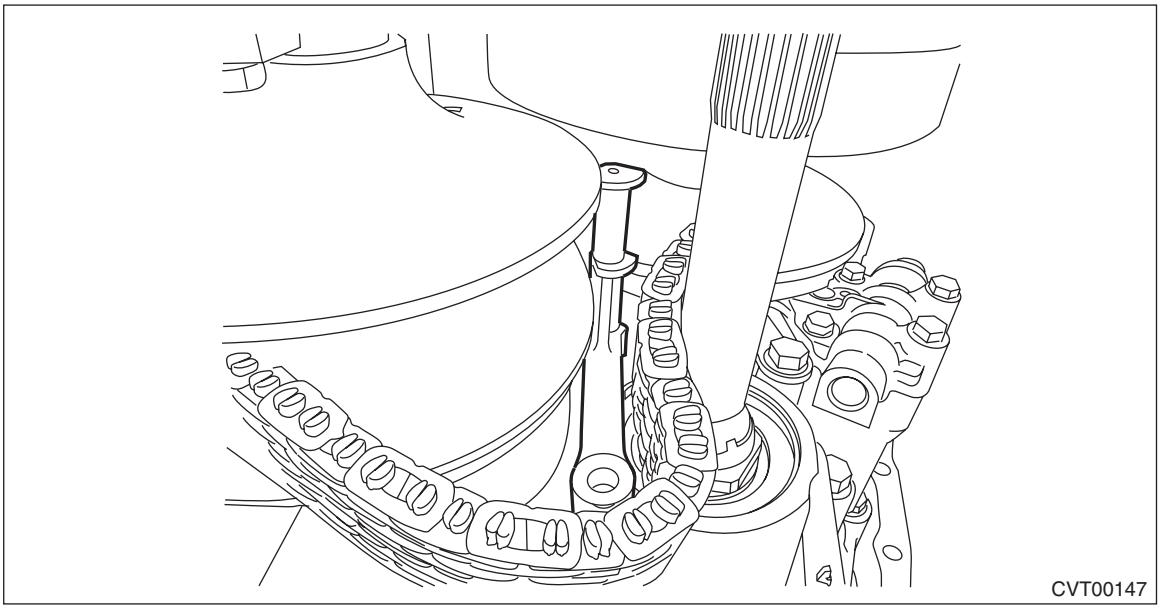
NOTE:
Apply CVTF to the bolt.

Tightening torque:
21 N·m (2.1 kgf-m, 15.5 ft-lb)

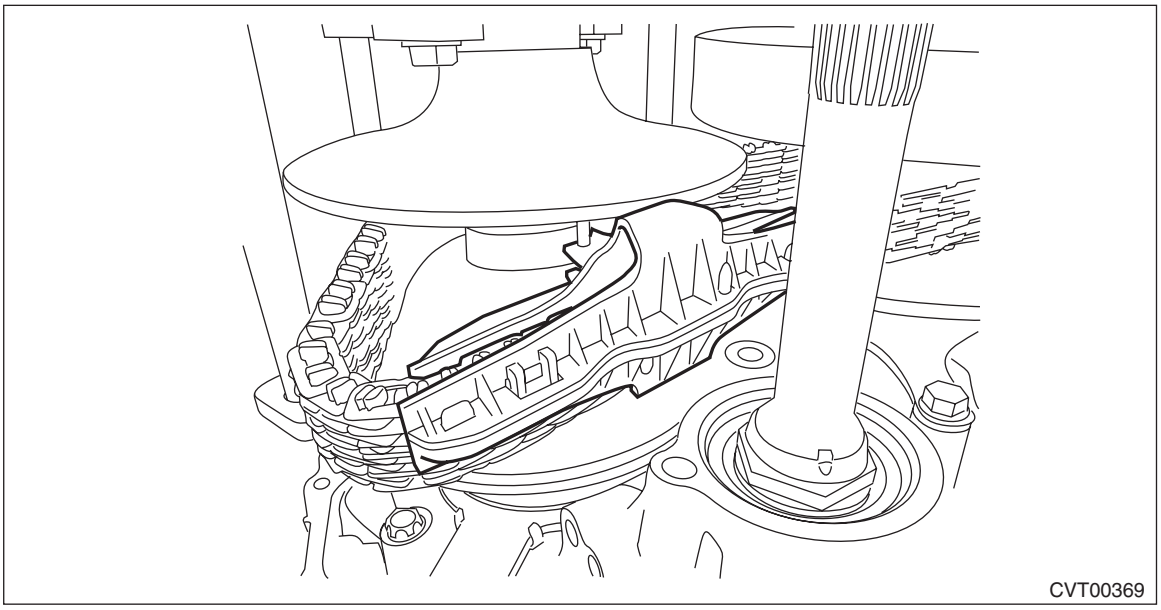


15) Install the chain guide.
(1) Place the support rod inside of the variator chain.

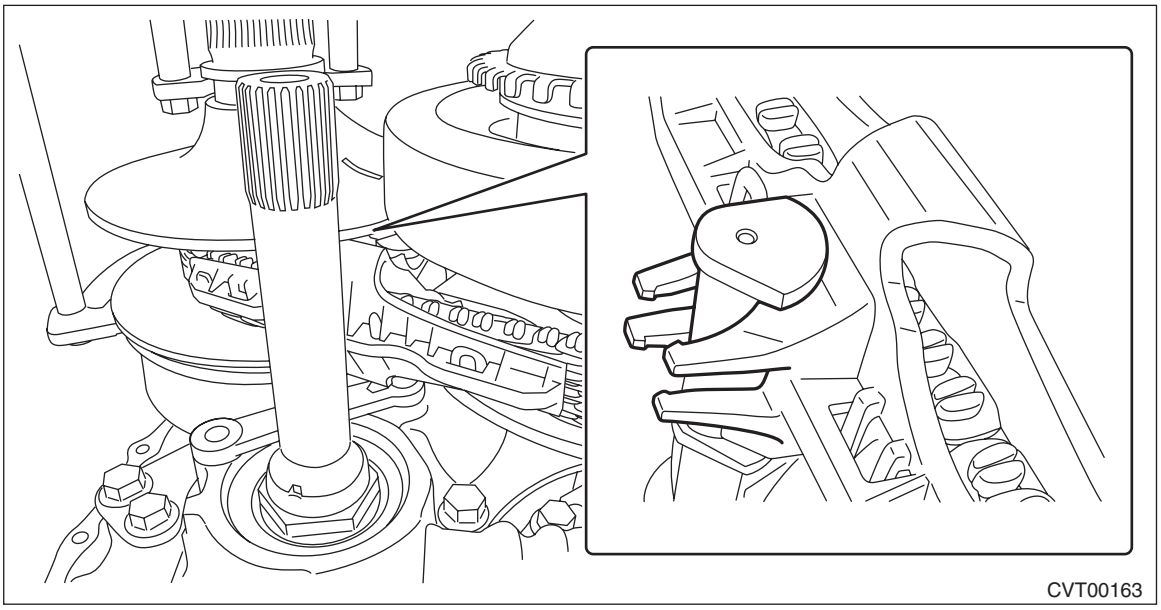
CAUTION:
Protect the both pulleys and variator chain from scratching.



(2) Install the chain guide to the variator chain.

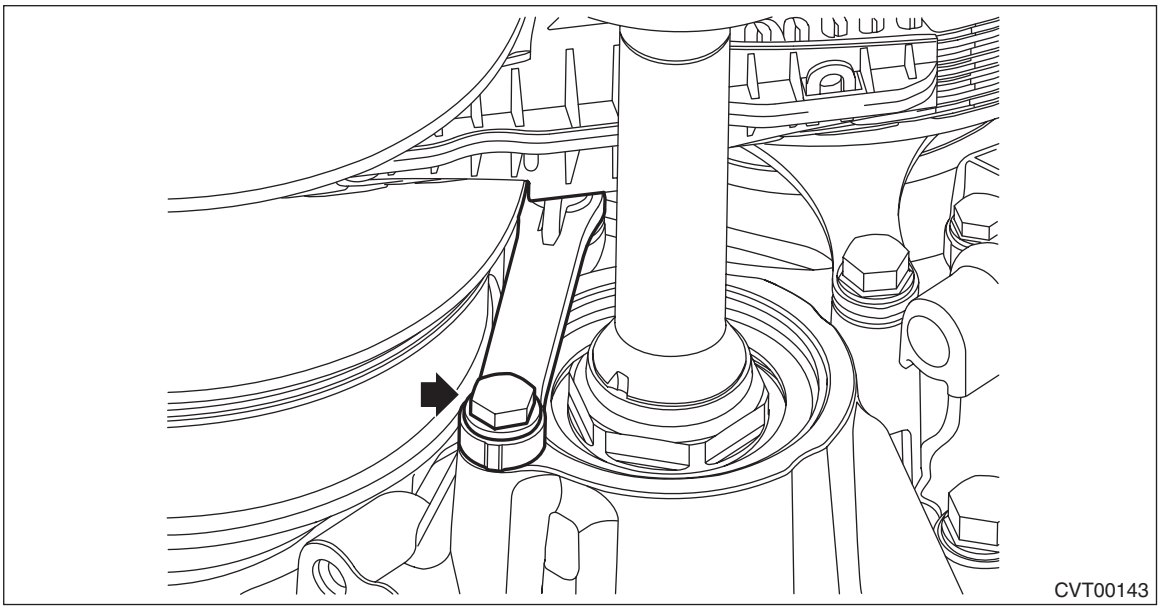


(3) Move the chain guide to the support rod side.
(4) While holding the support rod, press the chain guide so that the support rod runs through between the protrusions of chain guide and install the chain guide to the support rod.



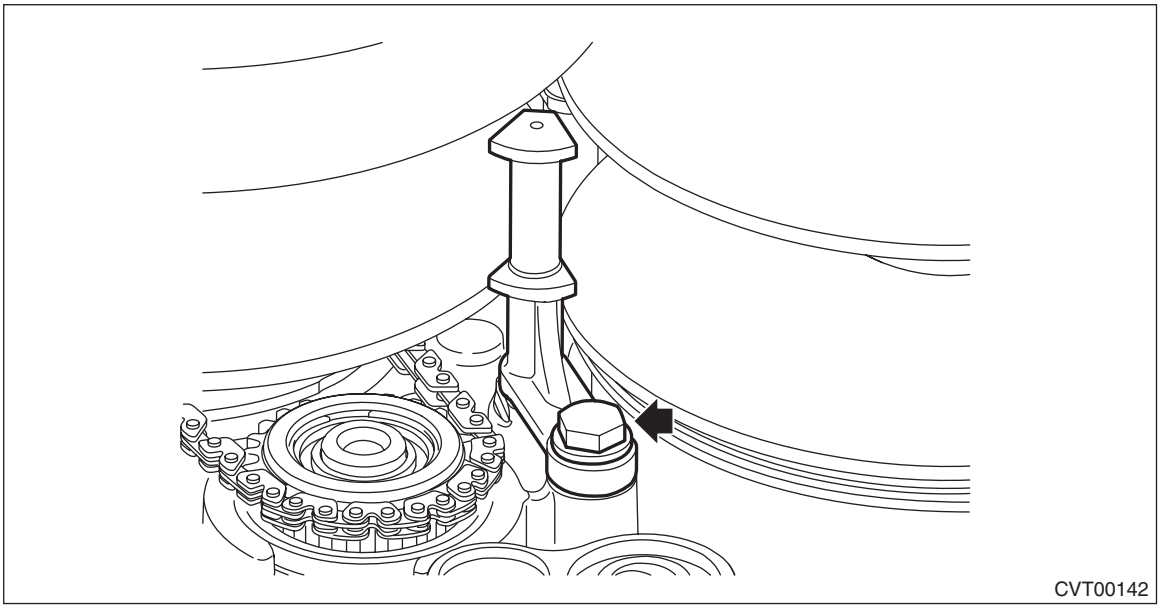
(5) Install the support rod.

Tightening torque:
21 N·m (2.1 kgf-m, 15.5 ft-lb)



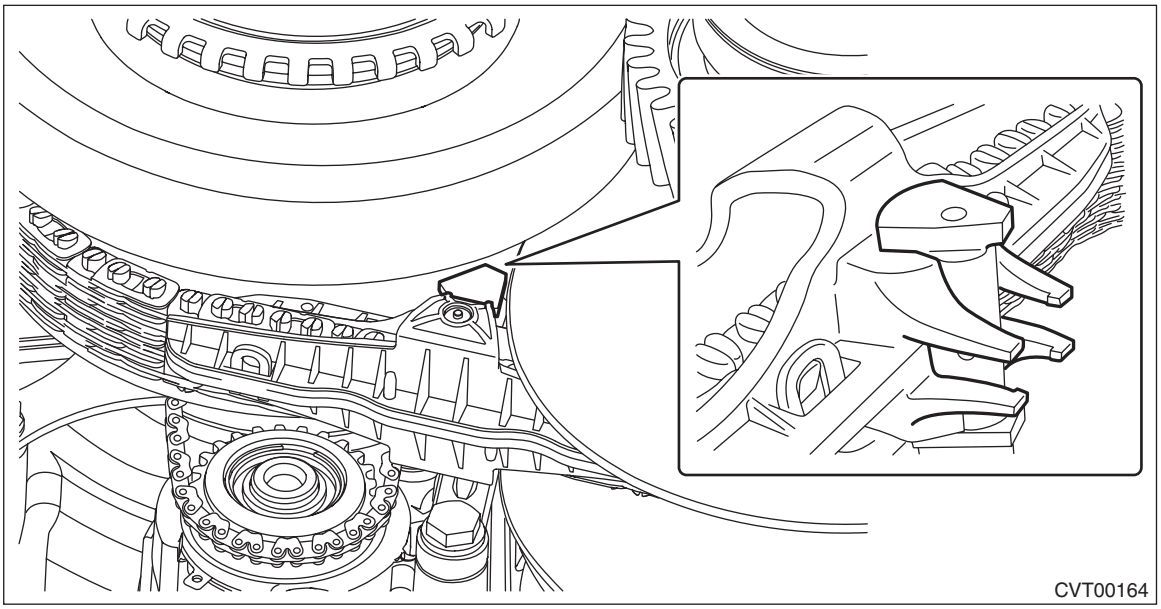
(6) Install the lubrication pipe.

Tightening torque:
21 N·m (2.1 kgf-m, 15.5 ft-lb)



(7) Install the chain guide to the variator chain.

(8) Install the chain guide so that the lubrication pipe runs through between the protrusions of each chain guide. Then remove the ST (PULLEY EXPANDER).

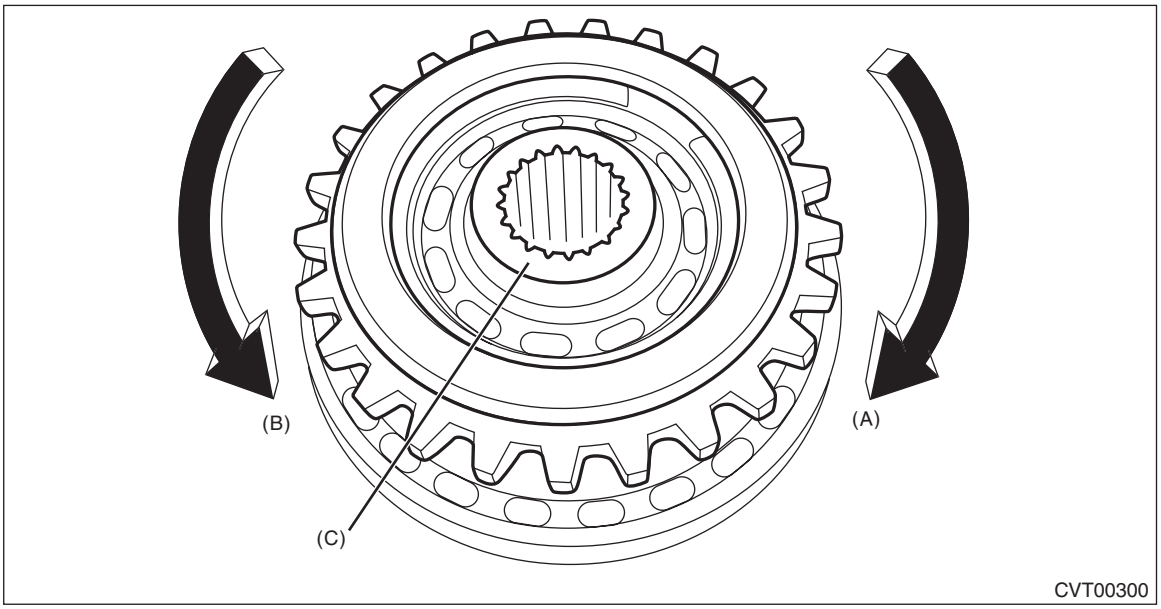


16) Install the reduction drive gear. <Ref. to CVT(TH58A)-259, INSTALLATION, Reduction Drive Gear.>
17) Install the transmission case. <Ref. to CVT(TH58A)-248, INSTALLATION, Transmission Case.>
18) Install the output clutch assembly. <Ref. to CVT(TH58A)-229, INSTALLATION, Output Clutch Assembly.>
19) Install the drive motor assembly. <Ref. to CVT(TH58A)-221, INSTALLATION, Drive Motor Assembly.>
20) Install the transmission control device. <Ref. to CVT(TH58A)-213, INSTALLATION, Transmission Control Device.>
21) Install the oil strainer and oil pan. <Ref. to CVT(TH58A)-114, INSTALLATION, Oil Pan and Strainer.>
22) Install the parking pawl. <Ref. to CVT(TH58A)-208, INSTALLATION, Parking Pawl.>
23) Install the transfer drive gear assembly. <Ref. to CVT(TH58A)-204, INSTALLATION, Transfer Drive Gear.>
24) Install the transfer driven gear assembly. <Ref. to CVT(TH58A)-201, INSTALLATION, Transfer Driven Gear.>
25) Install the transfer clutch assembly. <Ref. to CVT(TH58A)-188, INSTALLATION, Transfer Clutch.>
26) Install the extension case. <Ref. to CVT(TH58A)-183, INSTALLATION, Extension Case.>
27) Install the inhibitor switch. <Ref. to CVT(TH58A)-102, INSTALLATION, Inhibitor Switch.>
28) Install the secondary speed sensor. <Ref. to CVT(TH58A)-106, INSTALLATION, Secondary Speed Sensor.>
29) Install the front wheel speed sensor. <Ref. to CVT(TH58A)-108, INSTALLATION, Front Wheel Speed Sensor.>
30) Install the turbine speed sensor. <Ref. to CVT(TH58A)-104, INSTALLATION, Turbine Speed Sensor.>
31) Install the main control valve body. <Ref. to CVT(TH58A)-123, INSTALLATION, Control Valve Body.>
32) Install the transmission harness. <Ref. to CVT(TH58A)-151, INSTALLATION, Transmission Harness.>
33) Install the air breather hose. <Ref. to CVT(TH58A)-173, INSTALLATION, Air Breather Hose.>
34) Install the transmission assembly to the vehicle. <Ref. to CVT(TH58A)-77, INSTALLATION, Automatic Transmission Assembly.>

C: INSPECTION

- Check the surface of primary and secondary pulley cones for damage or wear.
- Check the primary and secondary pulley for damage.
- Check the bearing for seizure or wear.
- Apply CVTF to bearing and rotate the bearing to check for noise or dragging etc.
- Check the rear oil pump chain for damage.
- Check the one-way clutch of the oil pump sprocket (rear).

Secure the inner race, and check that the sprocket rotates clockwise and locks counterclockwise.

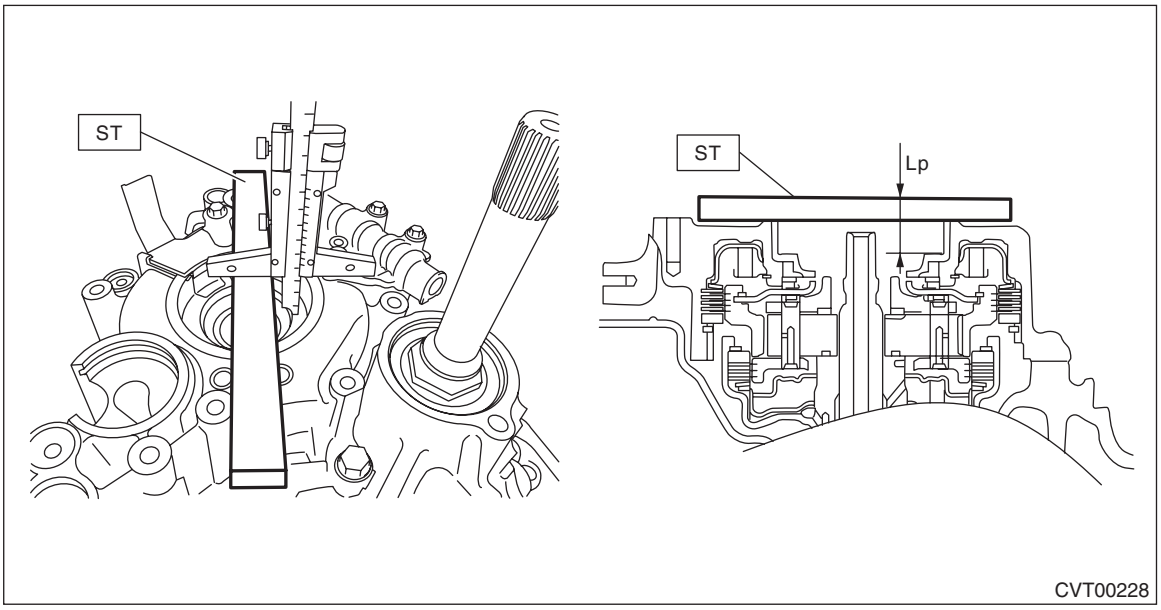


(A) Rotates freely
(B) Locked
(C) Inner race

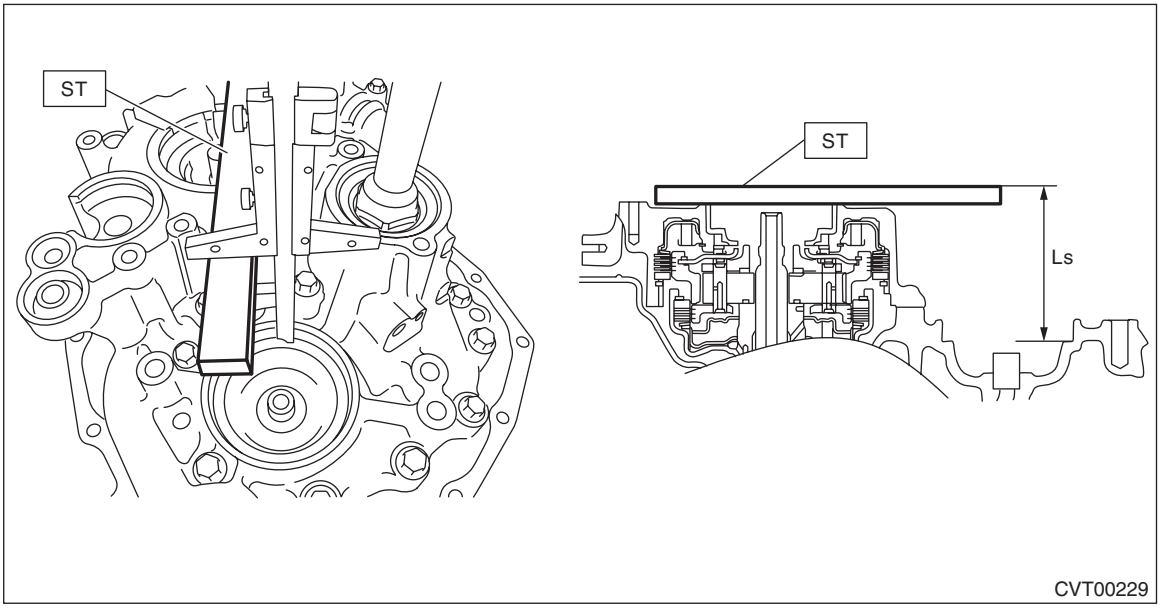
D: ADJUSTMENT

1. PROCEDURE IN REPLACEMENT OF PRIMARY AND SECONDARY PULLEY, OR IN REPLACEMENT OF PRIMARY PULLEY, SECONDARY PULLEY AND VARIATOR CHAIN

1) Measure depth “Lp” from the ST upper face to the primary pulley bearing catch surface at several points and calculate the average.
ST 499575400 GAUGE



2) Measure the depth “Ls” from the ST upper face to the secondary pulley bearing catch surface at several points and calculate the average.
ST 499575400 GAUGE



3) Calculate the following formula.
Calculation formula:
T (mm) = B – A + Lp – Ls – 28.602
[T (in) = B – A + Lp – Ls – 1.126]
T: Pulley alignment
A: Specified primary pulley dimension
B: Specified secondary pulley dimension
Lp: Depth from the ST upper face to the primary pulley bearing catch surface
Ls: Depth from the ST upper face to the secondary pulley bearing catch surface
28.602 mm (1.126 in): Constant

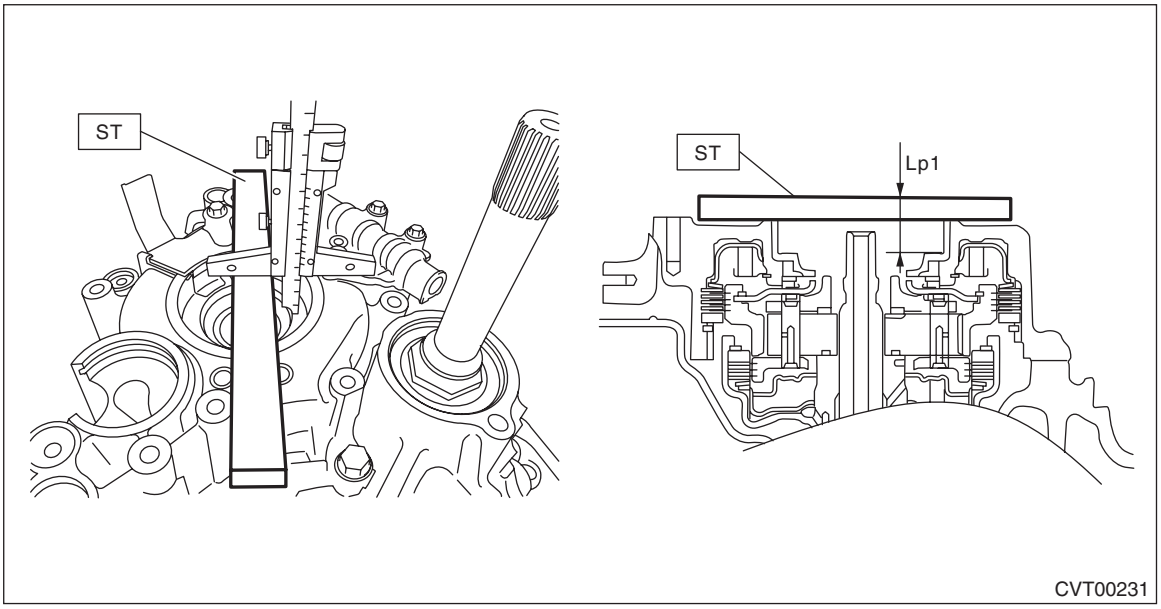
Pulley alignment T mm (in)	Thickness of shim mm (in)
-0.05 — 0.049(-0.002 — 0.002)	No shims
0.050 — 0.149(0.002 — 0.006)	0.1 (0.004)
0.150 — 0.249(0.006 — 0.010)	0.2 (0.008)
0.250 — 0.349(0.010 — 0.014)	0.3 (0.012)
0.350 — 0.449(0.014 — 0.018)	0.4 (0.016)
0.450 — 0.549(0.018 — 0.022)	0.5 (0.020)
0.550 — 0.649(0.022 — 0.026)	0.6 (0.024)
0.650 — 0.749(0.026 — 0.029)	0.7 (0.028)
0.750 — 0.849(0.029 — 0.033)	0.8 (0.031)
0.850 — 0.949(0.033 — 0.037)	0.9 (0.035)
0.950 — 1.049(0.037 — 0.041)	1.0 (0.039)
1.050 — 1.149(0.041 — 0.045)	1.1 (0.043)

4) Select one to two shims so that the total thickness meets the value obtained from step 3).

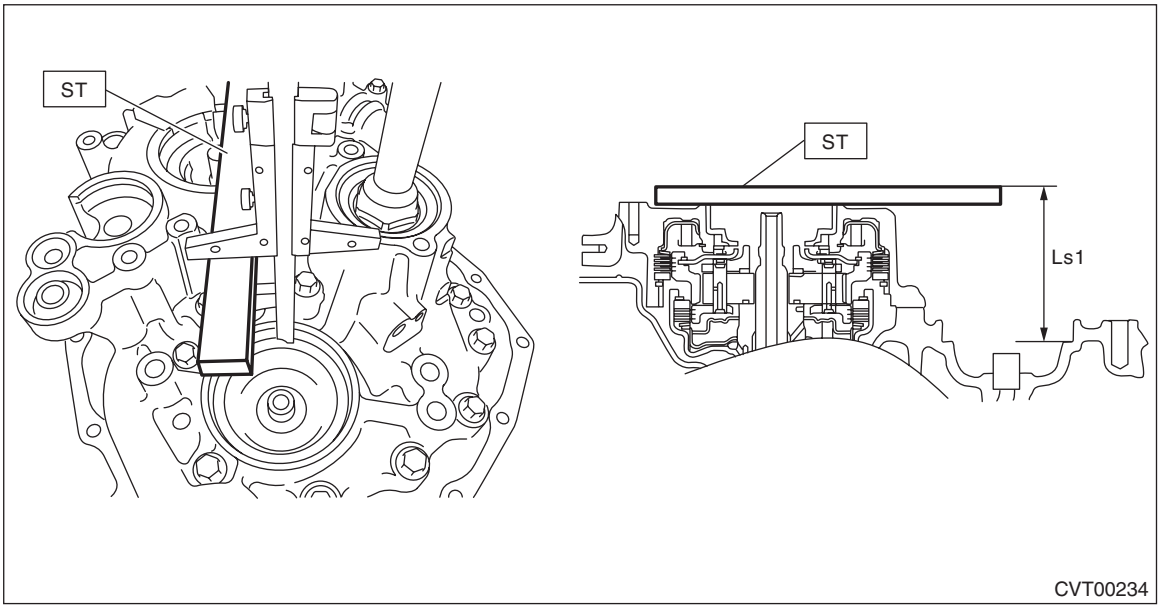
Part No.	Shim thickness mm (in)
32451AA050	0.1 (0.004)
32451AA060	0.2 (0.008)
32451AA070	0.3 (0.012)
32451AA080	0.4 (0.016)
32451AA090	0.5 (0.020)
32451AA100	0.6 (0.024)

2. PROCEDURE WHEN REPLACING ONLY DRIVE PINION RETAINER OR REVERSE BRAKE HOUSING

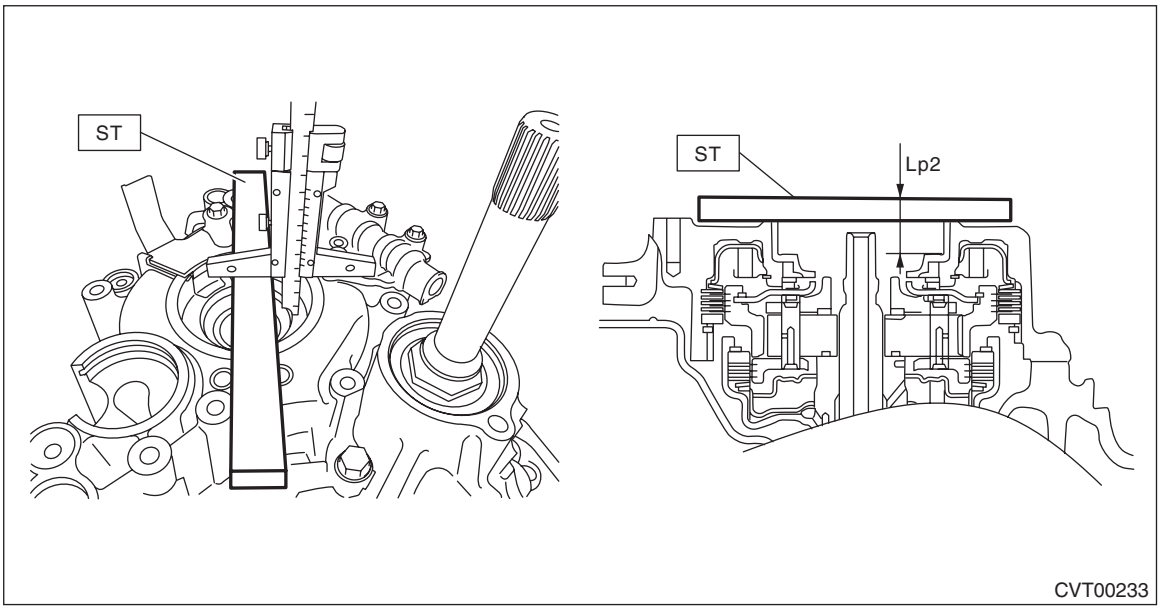
1) Clean the mating surface of current drive pinion retainer and converter case.
2) Measure and record the shim thickness that is attached on the current reverse brake housing.
3) Using the current drive pinion retainer, measure depth “Lp1” from the ST upper face to the primary pulley bearing catch surface at several points and calculate the average.
ST 499575400 GAUGE



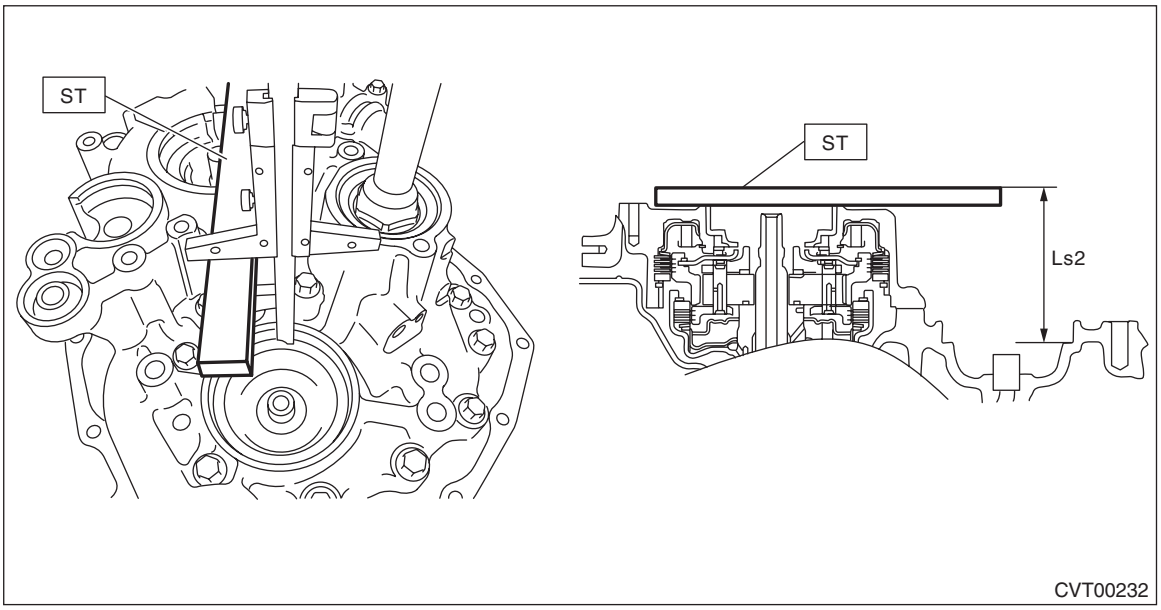
4) Using the current drive pinion retainer or current reverse brake housing, measure the depth “Ls1” from the ST upper face to the secondary pulley bearing catch surface at several points and calculate the average.
ST 499575400 GAUGE



5) Calculate the “LD1” using the following formula and record it.
Calculation formula:
LD1 mm (in) = Ls1 – Lp1
LD1: Height from the primary pulley bearing catch surface to the secondary pulley bearing catch surface
Lp1: Depth from the ST upper face to the primary pulley bearing catch surface
Ls1: Depth from the ST upper face to the secondary pulley bearing catch surface
6) Using the new drive pinion retainer or new reverse brake housing, measure the depth “Lp2” from the ST upper face to the primary pulley bearing catch surface at several points and calculate the average.
ST 499575400 GAUGE



7) Using the new drive pinion retainer or new reverse brake housing, measure depth “Ls2” from the ST upper face to the secondary pulley bearing catch surface at several points and calculate the average.
ST 499575400 GAUGE



8) Calculate the “LD2” using the following formula and record it.
Calculation formula:
LD2 mm (in) = Ls2 – Lp2
LD2: Height from the primary pulley bearing catch surface to the secondary pulley bearing catch surface
Lp2: Depth from the ST upper face to the primary pulley bearing catch surface
Ls2: Depth from the ST upper face to the secondary pulley bearing catch surface

9) Calculate the recorded values of “LD1” and “LD2” to obtain the positive number to select the shims.
Calculation formula: T1 mm (in) = LD1 – LD2 or T2 mm (in) = LD2 – LD1
T1, T2: Difference between new drive pinion retainer or new reverse brake housing and current drive pinion retainer or current reverse brake housing
LD1: Calculated value of current drive pinion retainer or current reverse brake housing
LD2: Calculated value of new drive pinion retainer or new reverse brake housing

Difference of the case (T1) mm (in)	Shim selection procedure
0 — 0.050 (0 — 0.00197)	Select a new shim of the same thickness with the shim that is used on the primary pulley side of the current reverse brake housing.
0.051 — 0.150 (0.00201 — 0.00591)	Select a shim which is 0.1 mm (0.004 in) thicker than the shim that is used on the primary pulley side of the current reverse brake housing.
0.151 — 0.250 (0.00594 — 0.00984)	Select a shim which is 0.2 mm (0.008 in) thicker than the shim that is used on the primary pulley side of the current reverse brake housing.
0.251 — 0.350 (0.00988 — 0.01378)	Select a shim which is 0.3 mm (0.012 in) thicker than the shim that is used on the primary pulley side of the current reverse brake housing.
0.351 — 0.450 (0.01382 — 0.01772)	Select a shim which is 0.4 mm (0.016 in) thicker than the shim that is used on the primary pulley side of the current reverse brake housing.
0.451 — 0.550 (0.01776 — 0.02165)	Select a shim which is 0.5 mm (0.020 in) thicker than the shim that is used on the primary pulley side of the current reverse brake housing.
0.551 — 0.600 (0.02169 — 0.02362)	Select a shim which is 0.6 mm (0.024 in) thicker than the shim that is used on the primary pulley side of the current reverse brake housing.

Difference of the case (T2) mm (in)	Shim selection procedure
0 — 0.050 (0 — 0.00197)	Select a new shim of the same thickness with the shim that is used on the primary pulley side of the current reverse brake housing.
0.051 — 0.150 (0.00201 — 0.00591)	Select a shim which is 0.1 mm (0.004 in) thinner than the shim that is used on the primary pulley side of the current reverse brake housing.
0.151 — 0.250 (0.00594 — 0.00984)	Select a shim which is 0.2 mm (0.008 in) thinner than the shim that is used on the primary pulley side of the current reverse brake housing.
0.251 — 0.350 (0.00988 — 0.01378)	Select a shim which is 0.3 mm (0.012 in) thinner than the shim that is used on the primary pulley side of the current reverse brake housing.
0.351 — 0.450 (0.01382 — 0.01772)	Select a shim which is 0.4 mm (0.016 in) thinner than the shim that is used on the primary pulley side of the current reverse brake housing.
0.451 — 0.550 (0.01776 — 0.02165)	Select a shim which is 0.5 mm (0.020 in) thinner than the shim that is used on the primary pulley side of the current reverse brake housing.
0.551 — 0.600 (0.02169 — 0.02362)	Select a shim which is 0.6 mm (0.024 in) thinner than the shim that is used on the primary pulley side of the current reverse brake housing.

Part No.	Shim thickness mm (in)
32451AA050	0.1 (0.004)
32451AA060	0.2 (0.008)
32451AA070	0.3 (0.012)
32451AA080	0.4 (0.016)
32451AA090	0.5 (0.020)
32451AA100	0.6 (0.024)

44.Variator Chain

A: REMOVAL

For removal of variator chain, refer to “Primary Pulley and Secondary Pulley”. <Ref. to CVT(TH58A)-263, REMOVAL, Primary Pulley and Secondary Pulley.>

B: INSTALLATION

For installation of variator chain, refer to “Primary Pulley and Secondary Pulley”. <Ref. to CVT(TH58A)-271, INSTALLATION, Primary Pulley and Secondary Pulley.>

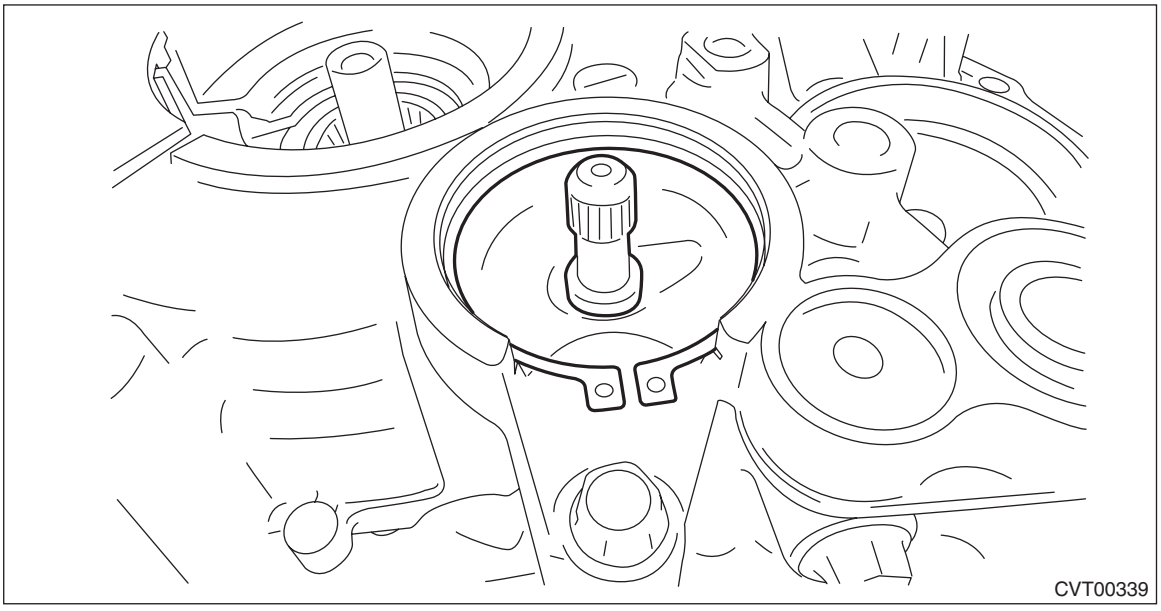
C: INSPECTION

Check the variator chain for damage and wear.

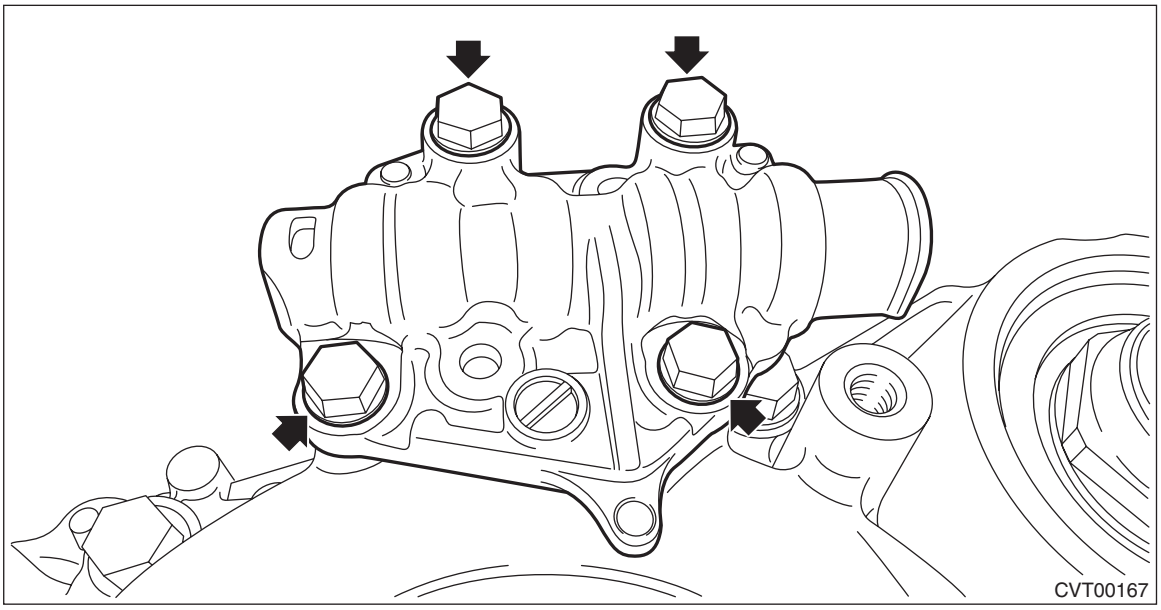
45.Reverse Brake Assembly

A: REMOVAL

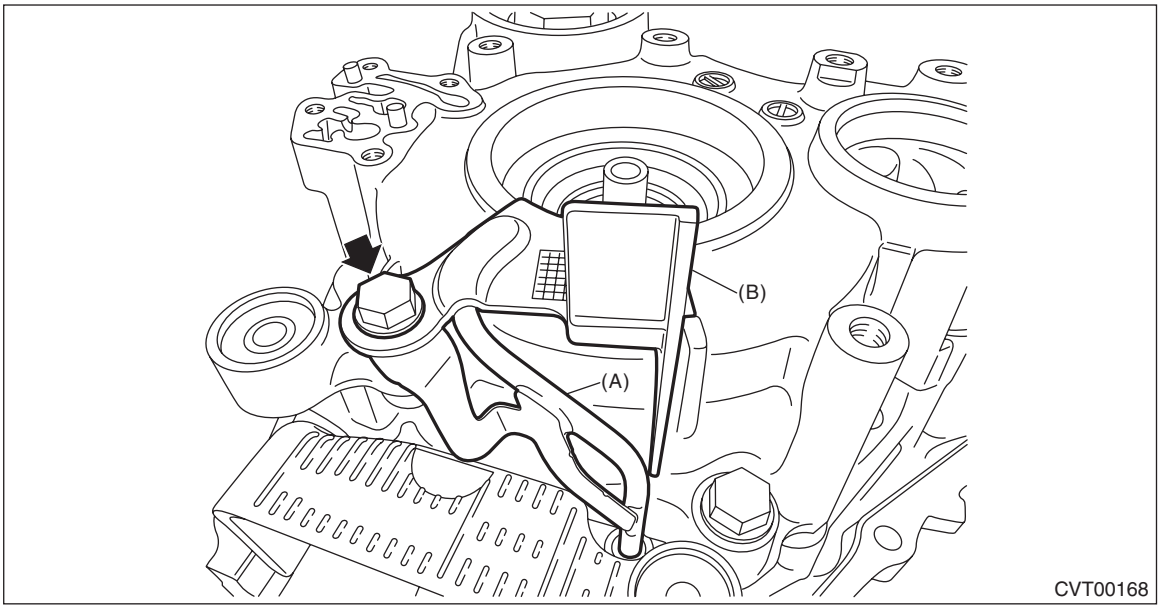
1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TH58A)-63, REMOVAL, Automatic Transmission Assembly.>
2) Remove the air breather hose. <Ref. to CVT(TH58A)-171, REMOVAL, Air Breather Hose.>
3) Remove the transmission harness. <Ref. to CVT(TH58A)-143, REMOVAL, Transmission Harness.>
4) Remove the main control valve body. <Ref. to CVT(TH58A)-115, REMOVAL, Control Valve Body.>
5) Remove the turbine speed sensor. <Ref. to CVT(TH58A)-104, REMOVAL, Turbine Speed Sensor.>
6) Remove the secondary speed sensor. <Ref. to CVT(TH58A)-106, REMOVAL, Secondary Speed Sensor.>
7) Remove the front wheel speed sensor. <Ref. to CVT(TH58A)-108, REMOVAL, Front Wheel Speed Sensor.>
8) Remove the inhibitor switch. <Ref. to CVT(TH58A)-101, REMOVAL, Inhibitor Switch.>
9) Remove the extension case. <Ref. to CVT(TH58A)-182, REMOVAL, Extension Case.>
10) Remove the transfer clutch assembly. <Ref. to CVT(TH58A)-186, REMOVAL, Transfer Clutch.>
11) Remove the transfer driven gear assembly. <Ref. to CVT(TH58A)-200, REMOVAL, Transfer Driven Gear.>
12) Remove the transfer drive gear assembly. <Ref. to CVT(TH58A)-203, REMOVAL, Transfer Drive Gear.>
13) Remove the parking pawl. <Ref. to CVT(TH58A)-208, REMOVAL, Parking Pawl.>
14) Remove the oil pan and oil strainer. <Ref. to CVT(TH58A)-112, REMOVAL, Oil Pan and Strainer.>
15) Remove the transmission control device. <Ref. to CVT(TH58A)-210, REMOVAL, Transmission Control Device.>
16) Remove the drive motor assembly. <Ref. to CVT(TH58A)-217, REMOVAL, Drive Motor Assembly.>
17) Remove the output clutch assembly. <Ref. to CVT(TH58A)-228, REMOVAL, Output Clutch Assembly.>
18) Remove the transmission case. <Ref. to CVT(TH58A)-245, REMOVAL, Transmission Case.>
19) Remove the reduction drive gear. <Ref. to CVT(TH58A)-258, REMOVAL, Reduction Drive Gear.>
20) Remove the primary pulley, secondary pulley and variator chain. <Ref. to CVT(TH58A)-263, REMOVAL, Primary Pulley and Secondary Pulley.>
21) Remove the oil pump shaft and the snap ring.



22) Remove the manual valve assembly.

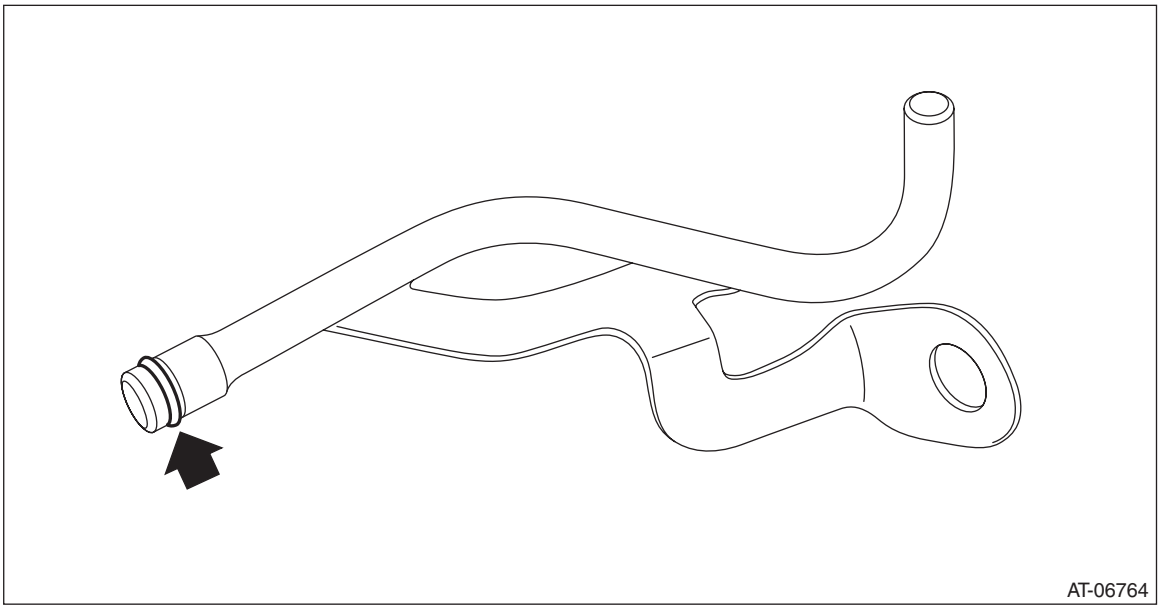


23) Remove the oil guide and lubrication pipe.

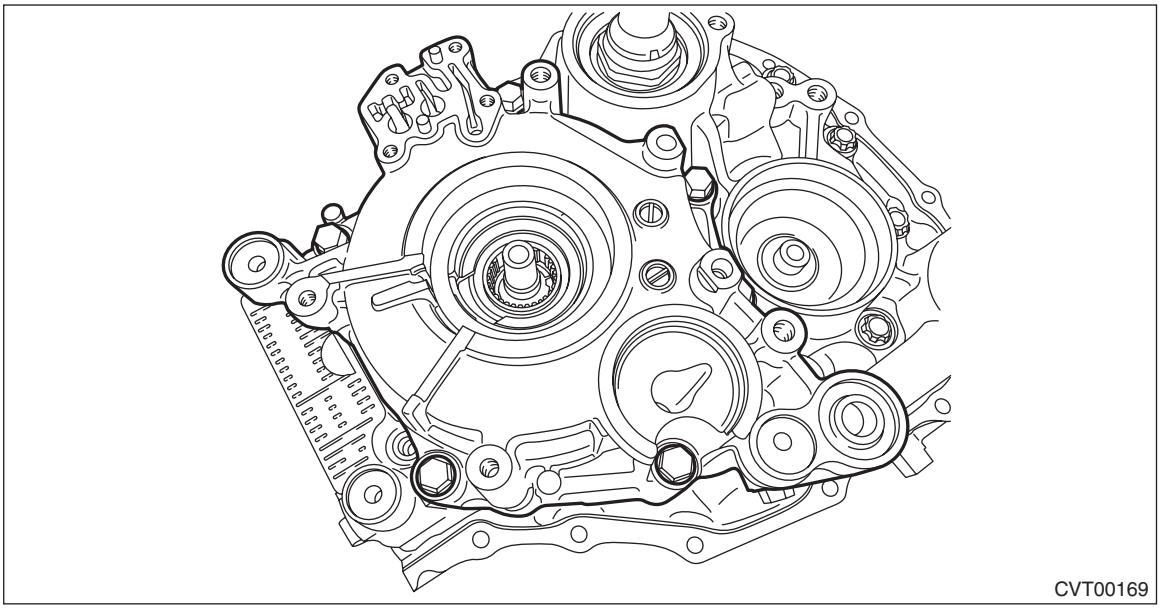


(A) Lubrication pipe
(B) Oil guide

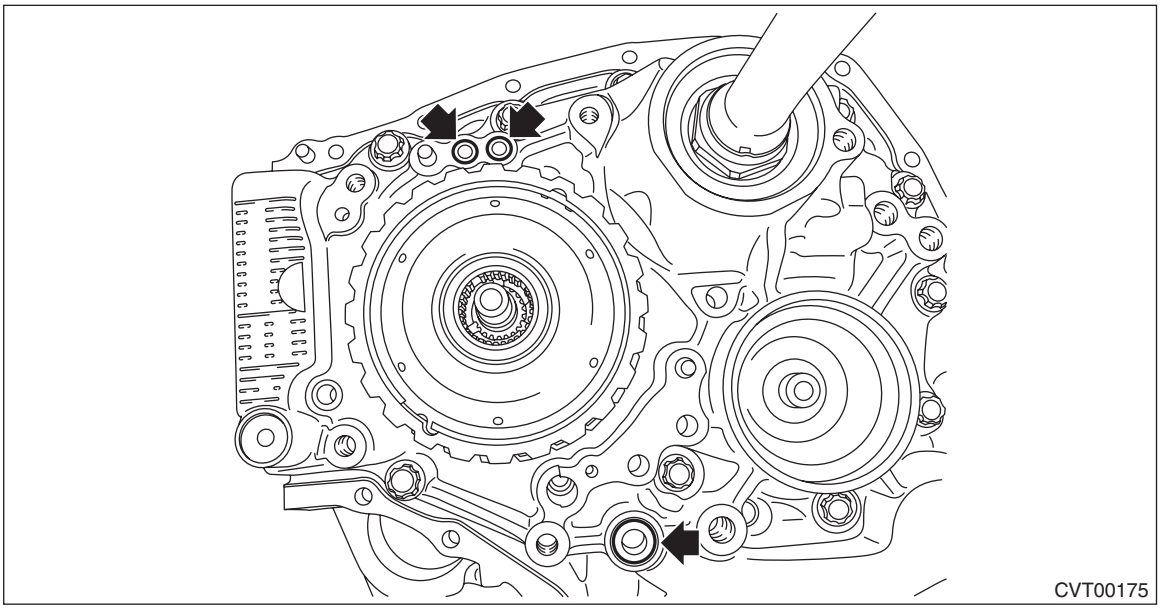
24) Remove the O-ring from lubrication pipe.



25) Remove the reverse brake assembly.

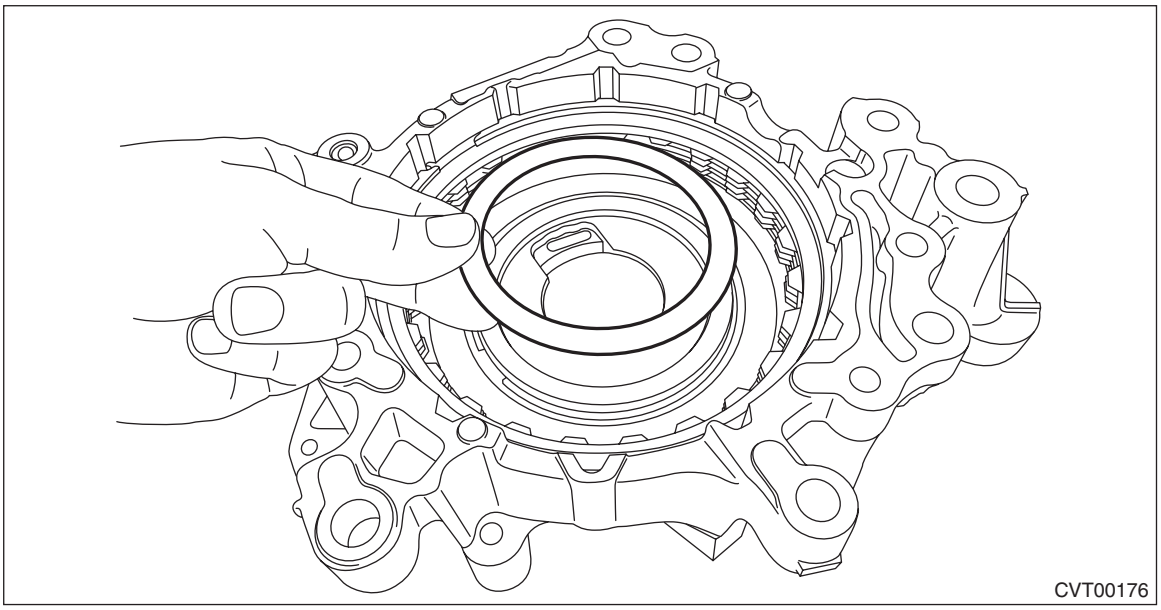


26) Remove the O-ring.



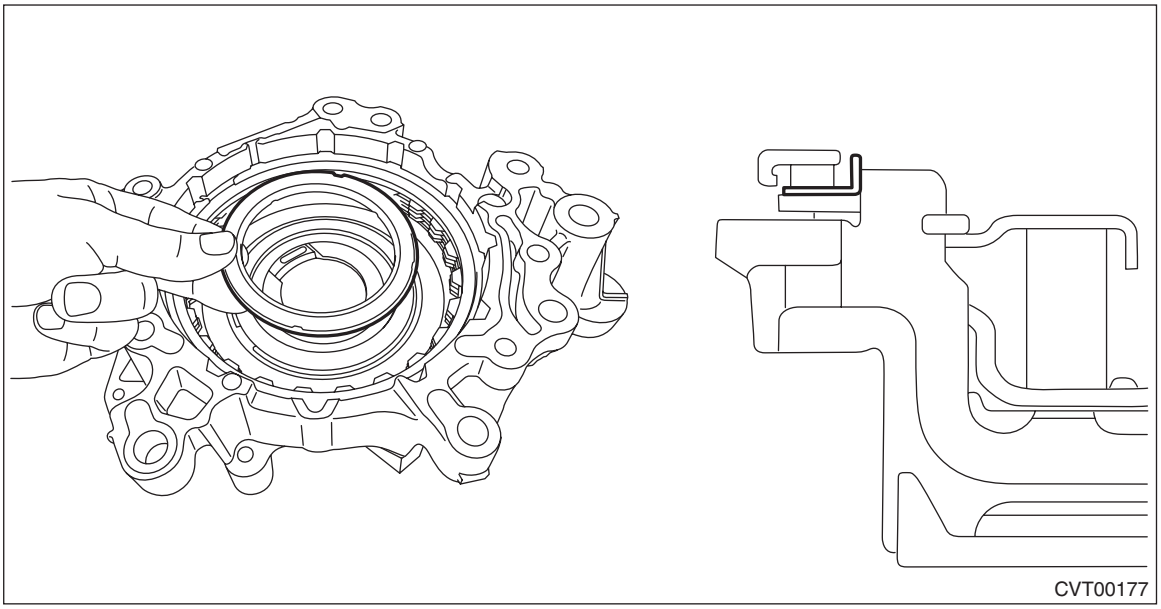
B: INSTALLATION

1) Select a washer. <Ref. to CVT(TH58A)-321, ADJUSTMENT, Forward Clutch Assembly.>
2) When replacing the reverse brake housing and the snap ring which secures the oil pump sprocket rear, select the oil pump shaft. <Ref. to CVT(TH58A)-387, ADJUSTMENT, Oil Pump.>
3) Install the selected washer to the reverse brake housing.

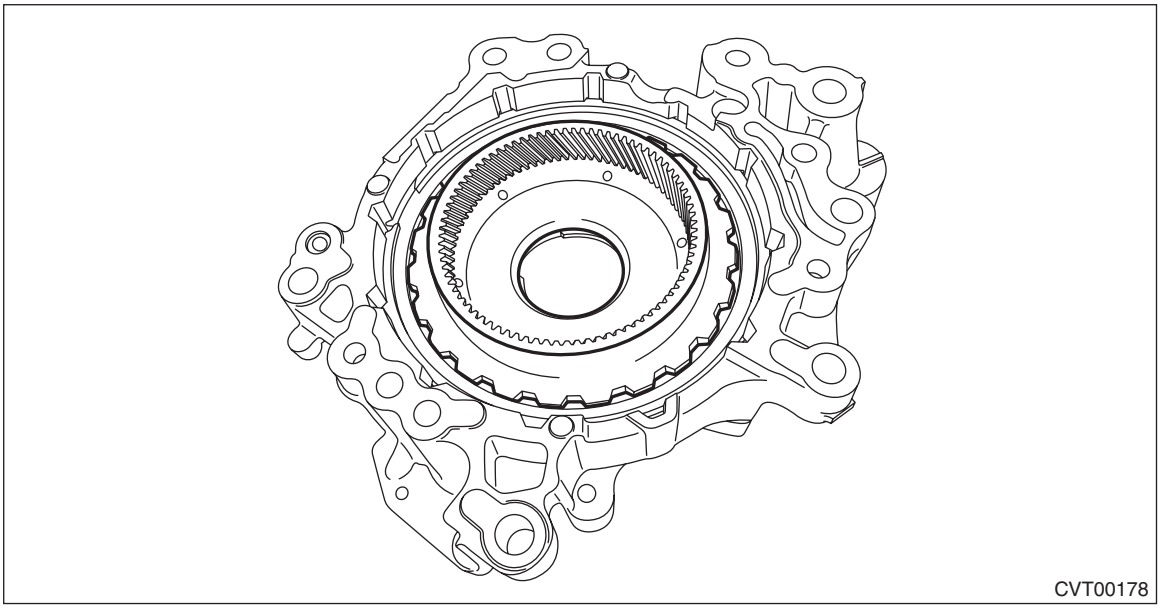


4) Install the thrust bearing to the reverse brake housing.

NOTE:
Face the temper color surface to the reverse brake side.

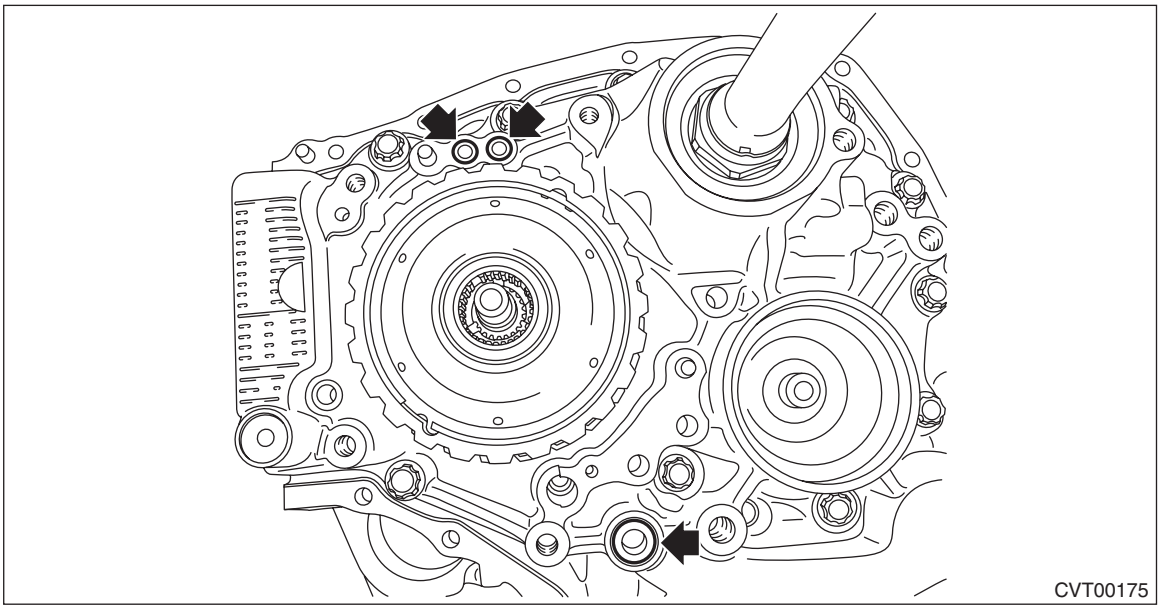


5) Remove the internal gear from the forward clutch assembly, and install it to the reverse brake housing.



6) Install the O-ring.

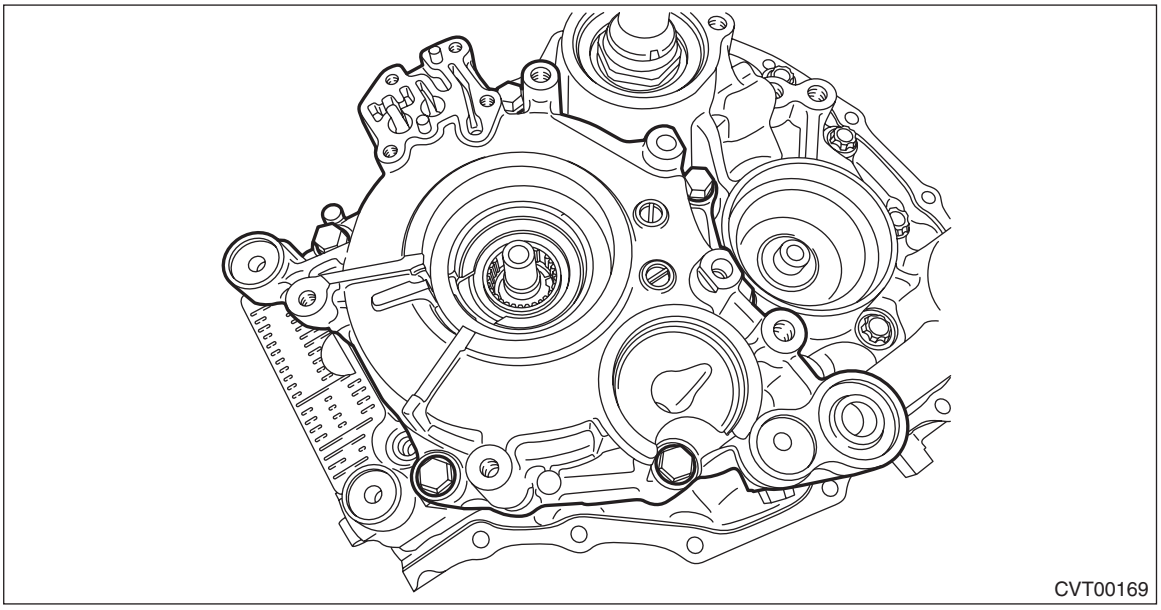
NOTE:
- Install a new O-ring.
- Apply CVTF to the O-ring.



7) Install the reverse brake assembly and internal gear as a unit to the drive pinion retainer.

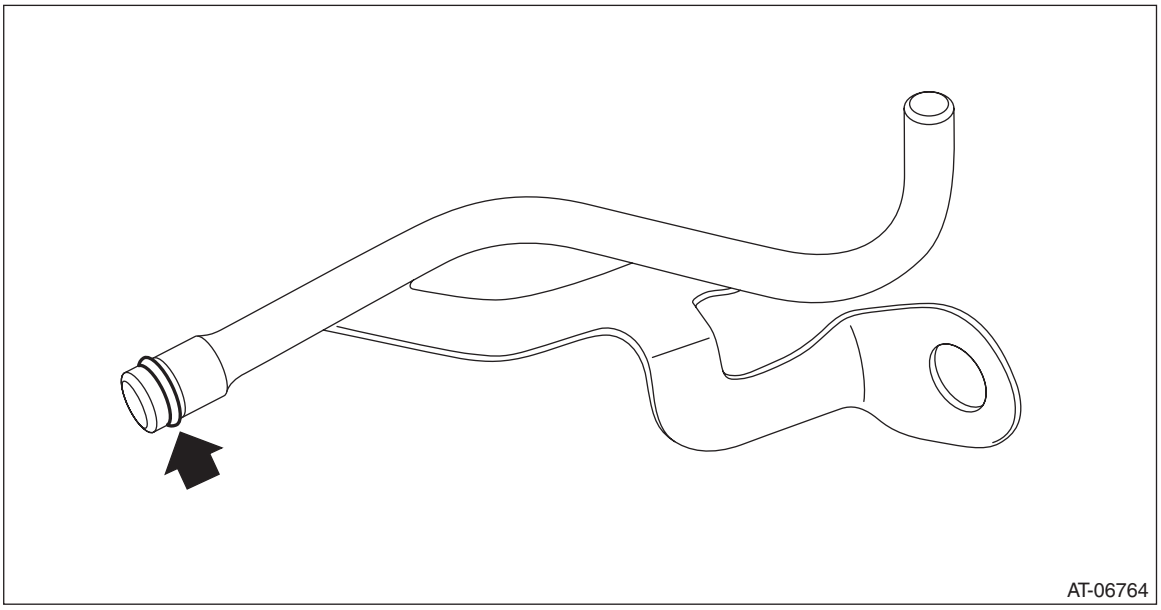
NOTE:
Slowly rotate the input shaft by hand to engage the internal gear and pinion gear of planetary carrier.

Tightening torque:
37 N·m (3.8 kgf-m, 27.3 ft-lb)



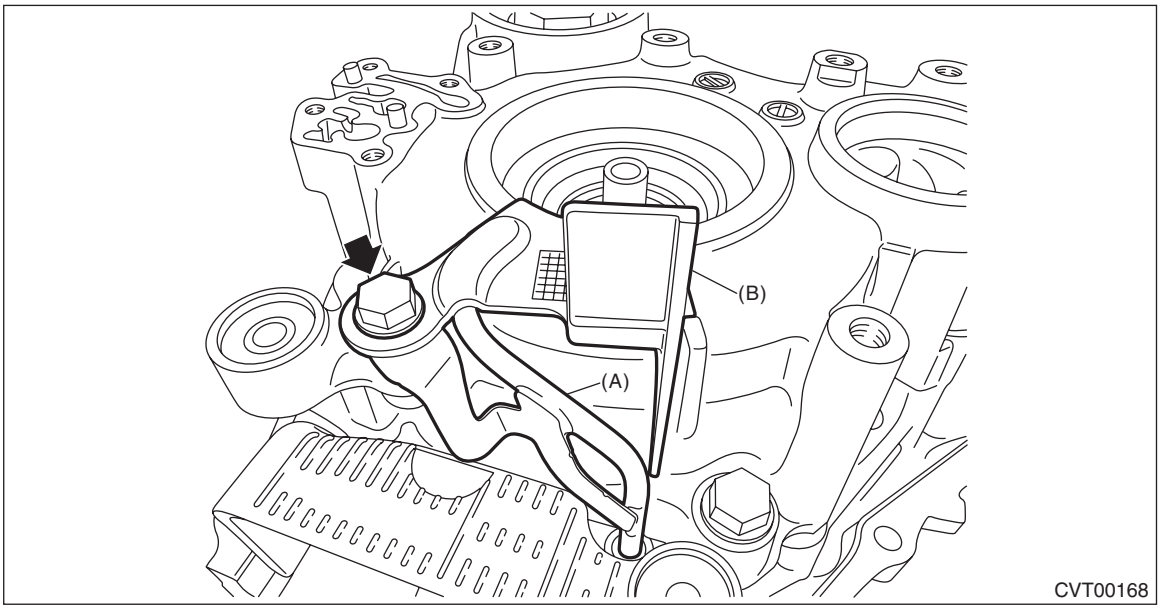
8) Install the O-ring to the lubrication pipe.

NOTE:
- Install a new O-ring.
- Apply CVTF to the O-ring.



9) Install the lubrication pipe and oil guide.

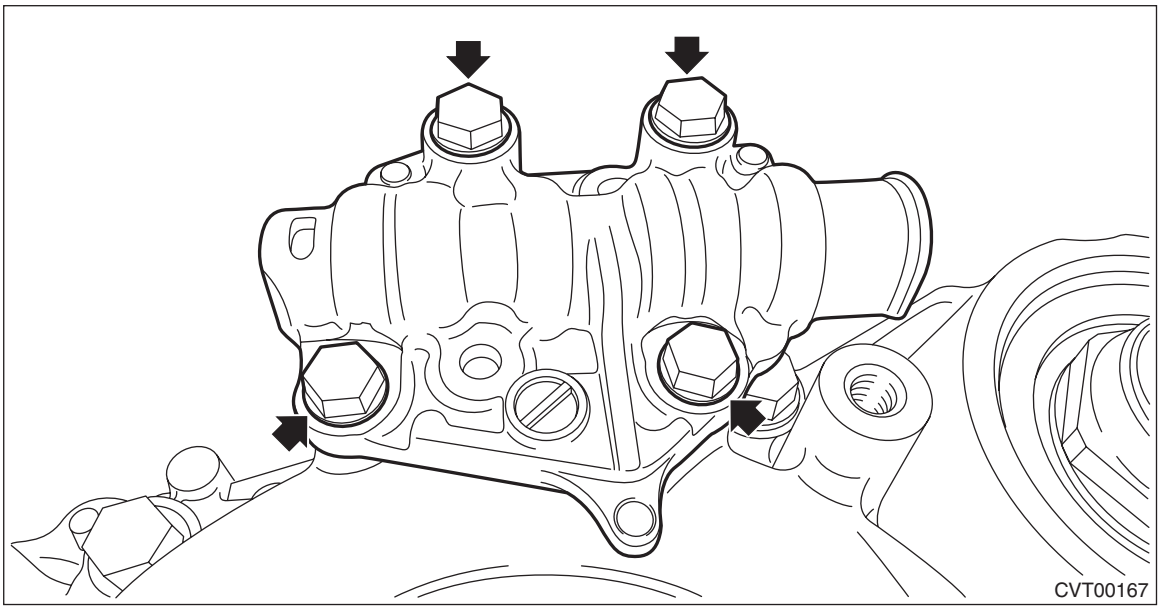
Tightening torque:
16 N·m (1.6 kgf-m, 11.8 ft-lb)



(A) Lubrication pipe
(B) Oil guide

10) Install the manual valve assembly and separator plate.

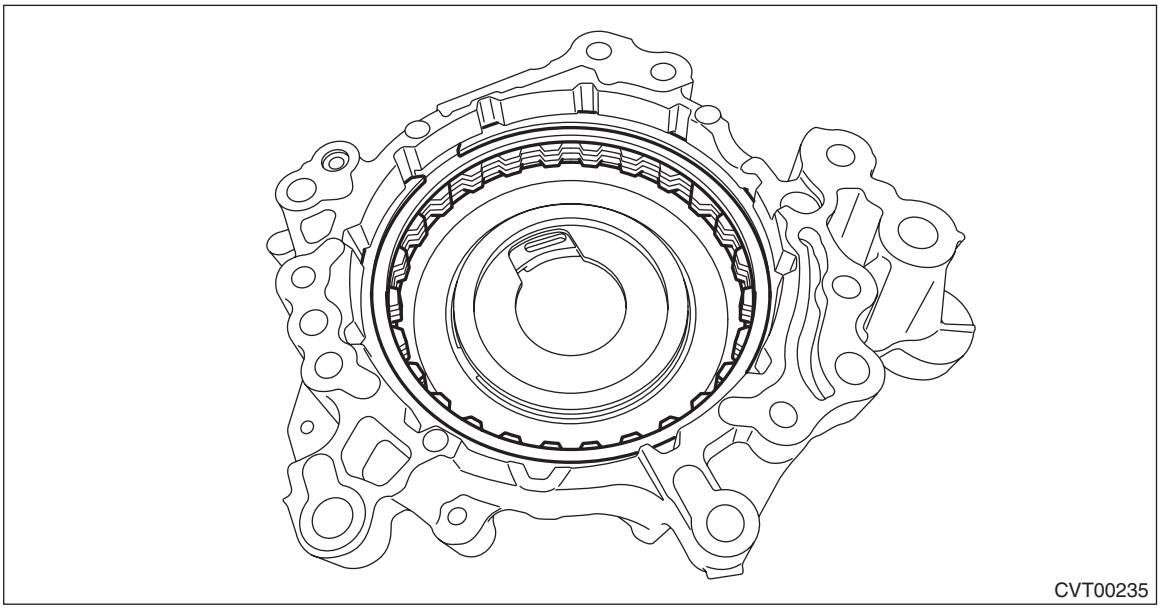
Tightening torque:
9 N·m (0.9 kgf-m, 6.6 ft-lb)



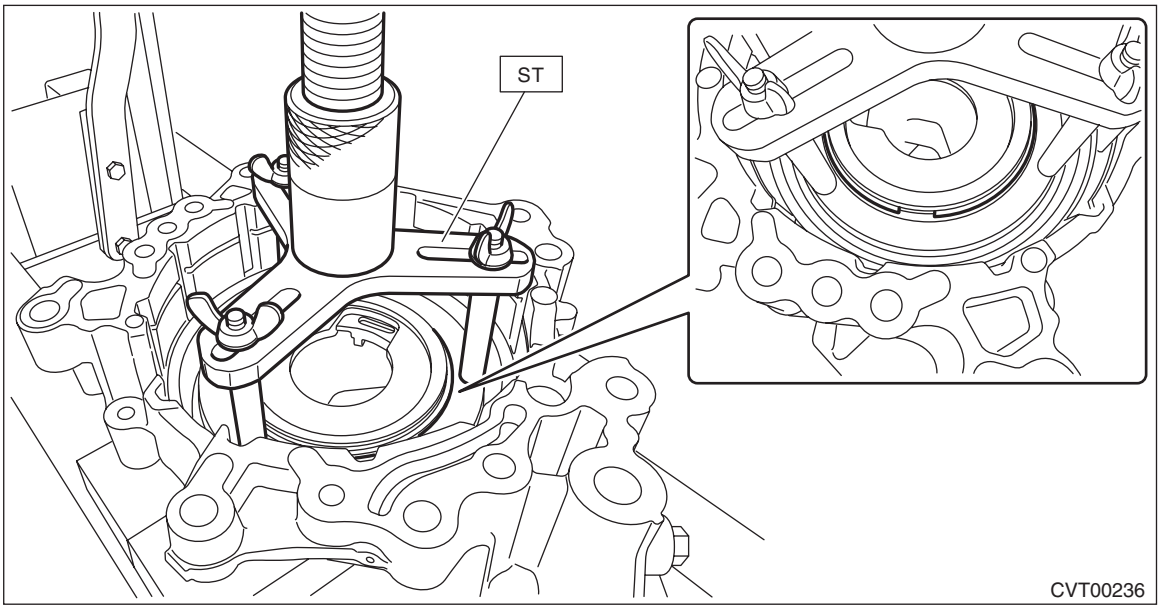
11) Install the primary pulley, secondary pulley and variator chain. <Ref. to CVT(TH58A)-271, INSTALLATION, Primary Pulley and Secondary Pulley.>
12) Install the reduction drive gear. <Ref. to CVT(TH58A)-259, INSTALLATION, Reduction Drive Gear.>
13) Install the transmission case. <Ref. to CVT(TH58A)-248, INSTALLATION, Transmission Case.>
14) Install the output clutch assembly. <Ref. to CVT(TH58A)-229, INSTALLATION, Output Clutch Assembly.>
15) Install the drive motor assembly. <Ref. to CVT(TH58A)-221, INSTALLATION, Drive Motor Assembly.>
16) Install the transmission control device. <Ref. to CVT(TH58A)-213, INSTALLATION, Transmission Control Device.>
17) Install the oil strainer and oil pan. <Ref. to CVT(TH58A)-114, INSTALLATION, Oil Pan and Strainer.>
18) Install the parking pawl. <Ref. to CVT(TH58A)-208, INSTALLATION, Parking Pawl.>
19) Install the transfer drive gear assembly. <Ref. to CVT(TH58A)-204, INSTALLATION, Transfer Drive Gear.>
20) Install the transfer driven gear assembly. <Ref. to CVT(TH58A)-201, INSTALLATION, Transfer Driven Gear.>
21) Install the transfer clutch assembly. <Ref. to CVT(TH58A)-188, INSTALLATION, Transfer Clutch.>
22) Install the extension case. <Ref. to CVT(TH58A)-183, INSTALLATION, Extension Case.>
23) Install the inhibitor switch. <Ref. to CVT(TH58A)-102, INSTALLATION, Inhibitor Switch.>
24) Install the secondary speed sensor. <Ref. to CVT(TH58A)-106, INSTALLATION, Secondary Speed Sensor.>
25) Install the front wheel speed sensor. <Ref. to CVT(TH58A)-108, INSTALLATION, Front Wheel Speed Sensor.>
26) Install the turbine speed sensor. <Ref. to CVT(TH58A)-104, INSTALLATION, Turbine Speed Sensor.>
27) Install the main control valve body. <Ref. to CVT(TH58A)-123, INSTALLATION, Control Valve Body.>
28) Install the transmission harness. <Ref. to CVT(TH58A)-151, INSTALLATION, Transmission Harness.>
29) Install the air breather hose. <Ref. to CVT(TH58A)-173, INSTALLATION, Air Breather Hose.>
30) Install the transmission assembly to the vehicle. <Ref. to CVT(TH58A)-77, INSTALLATION, Automatic Transmission Assembly.>

C: DISASSEMBLY

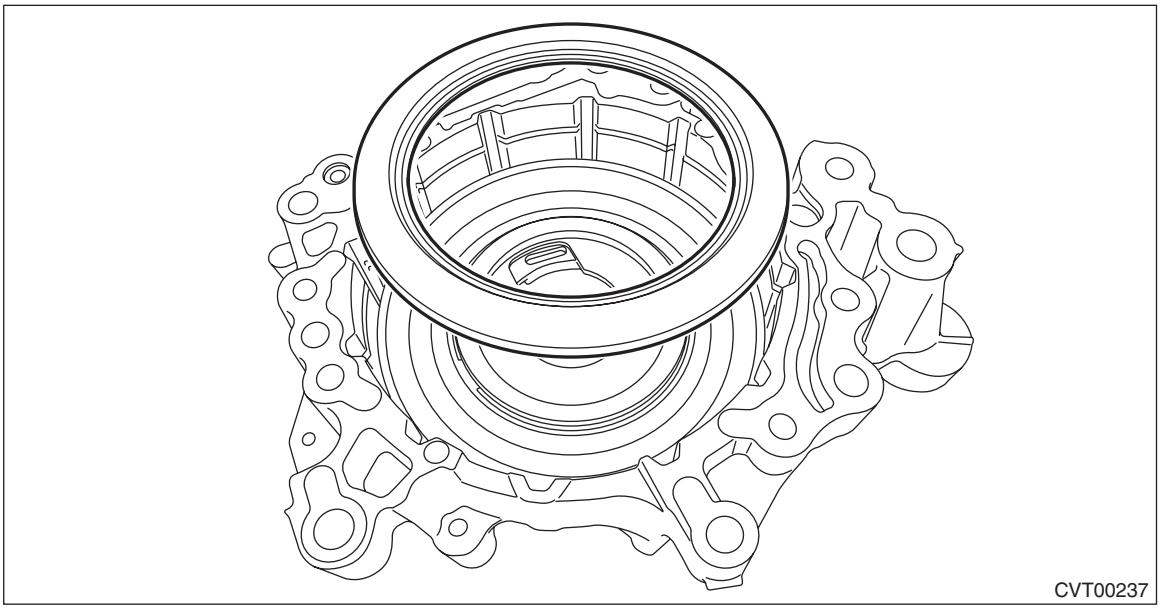
1) Remove the snap ring, retaining plate, drive plate, driven plate and dish plate.



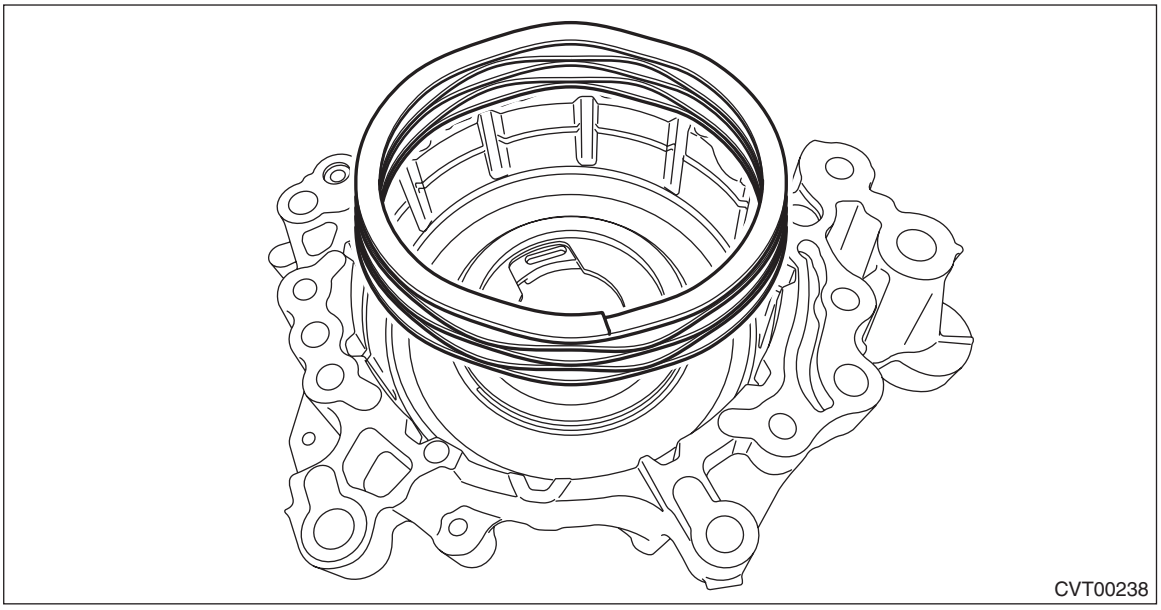
2) Compress the return spring using the ST to remove the snap ring.
ST 18762AA001 COMPRESSOR SPECIAL TOOL



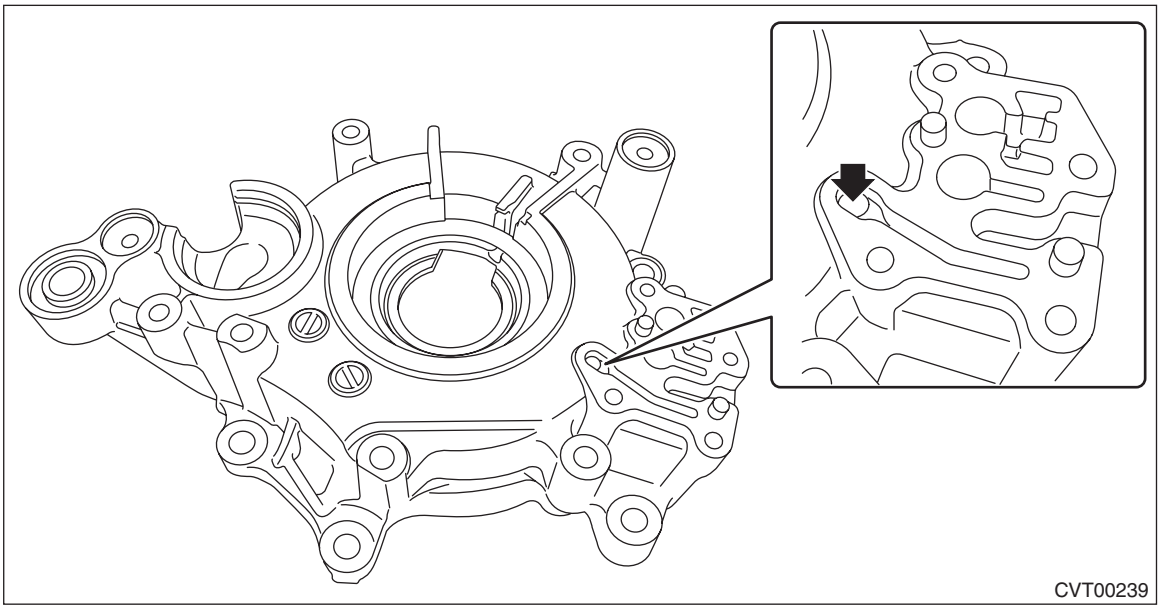
3) Using the ST, remove the snap ring and spring retainer.



4) Remove the return spring.



5) Remove the reverse brake piston by blowing compressed air intermittently from the reverse brake housing hole.



6) Remove the plug.

D: ASSEMBLY

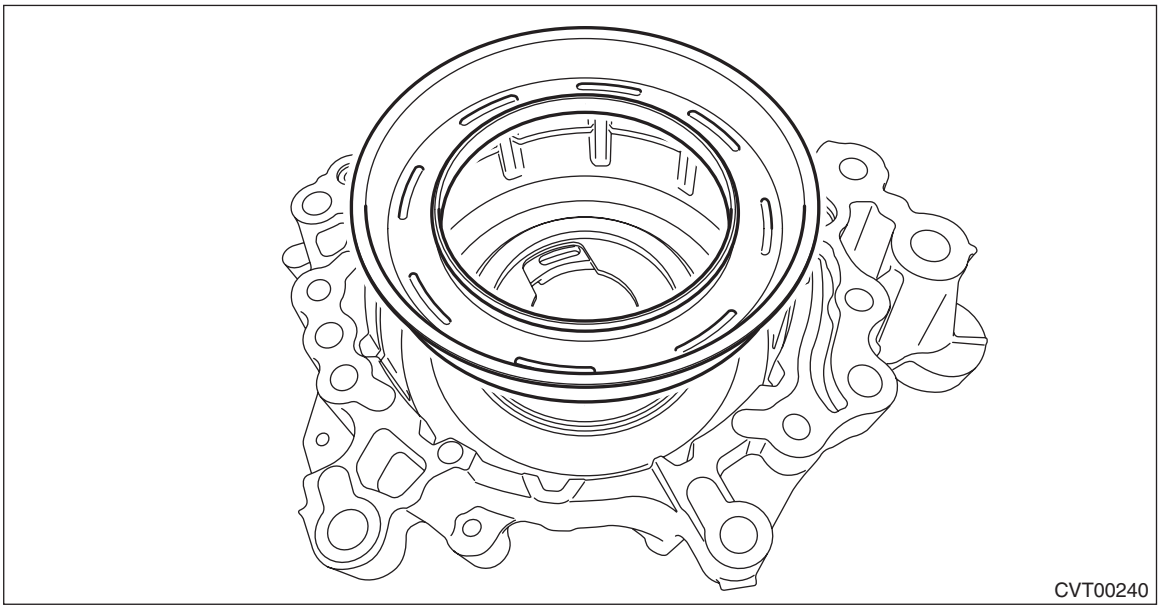
1) Install the plugs.

NOTE:
Use new O-rings.

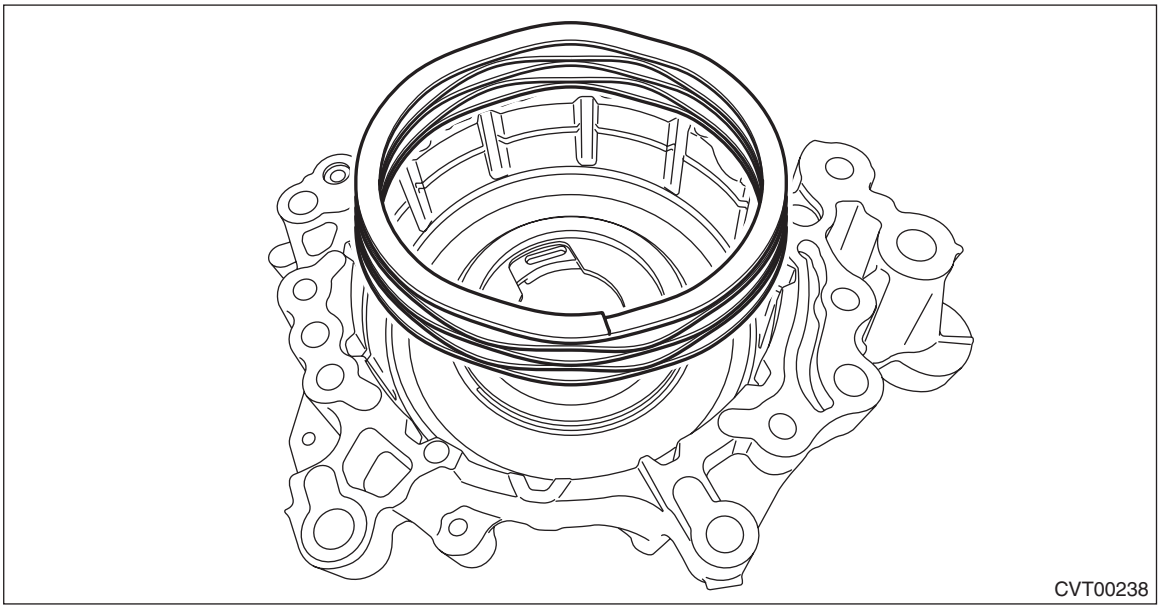
Tightening torque:
16 N·m (1.6 kgf-m, 11.8 ft-lb)

2) Install the reverse brake piston.

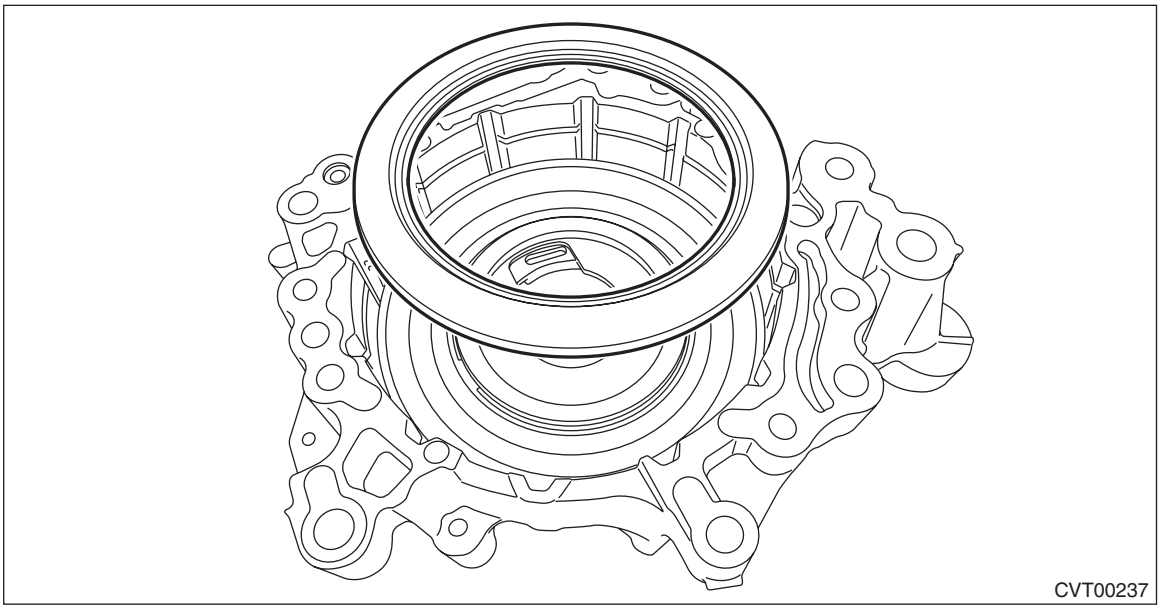
NOTE:
Apply CVTF to the sealing area of reverse brake piston.


CVT00240

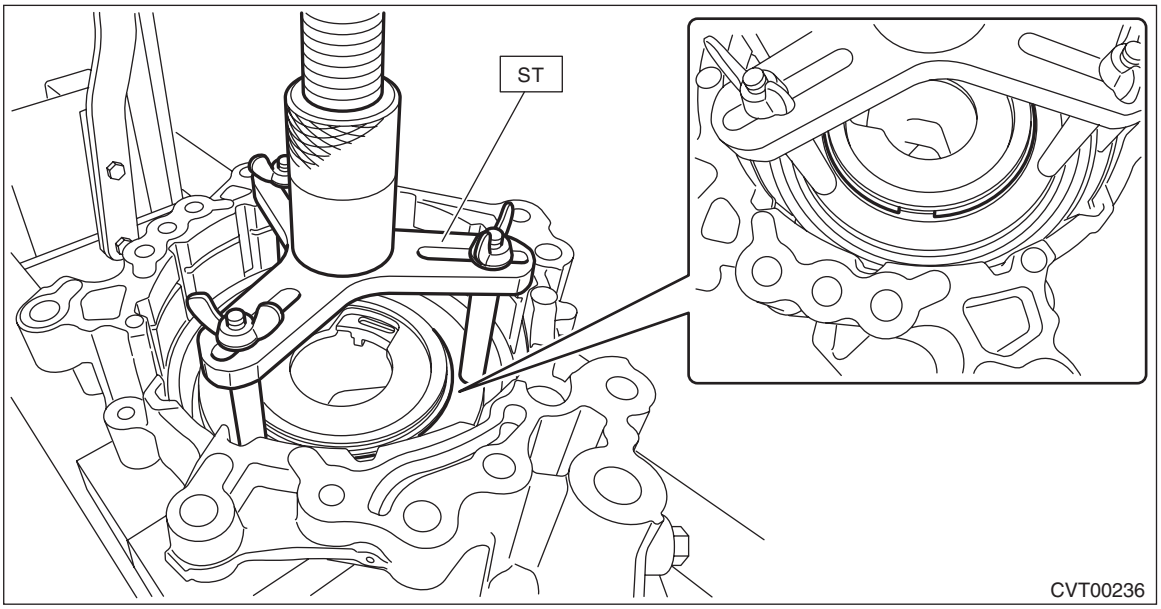
3) Install the return spring.


CVT00238

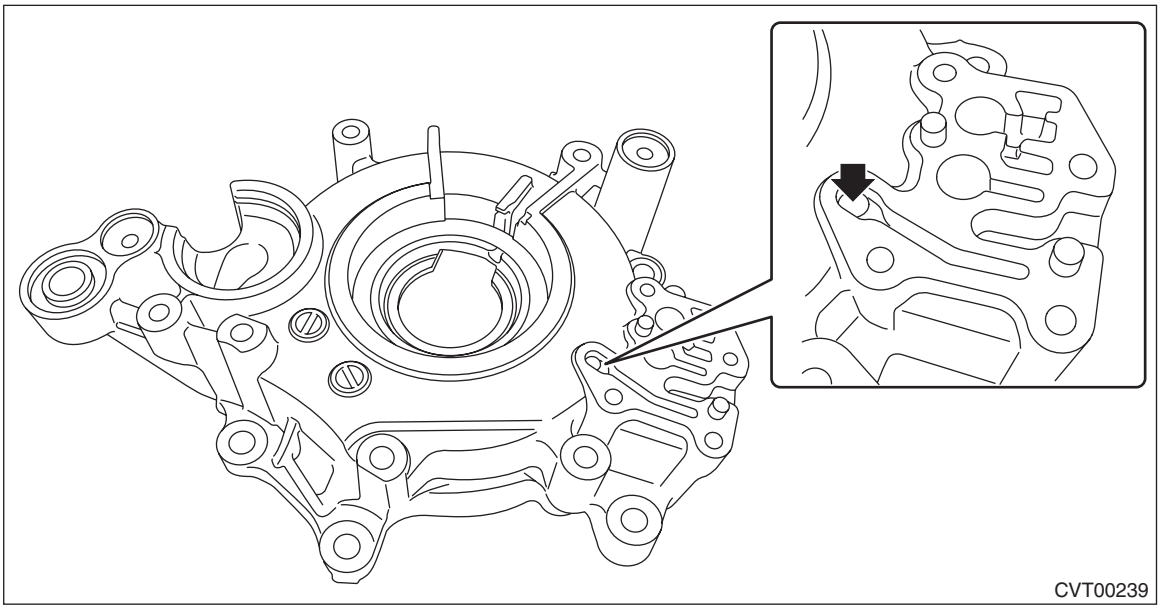
4) Install the spring retainer.



5) Compress the return spring using the ST to install the snap ring.
ST 18762AA001 COMPRESSOR SPECIAL TOOL



6) Check the operation of reverse brake piston by blowing compressed air intermittently from the reverse brake housing hole.

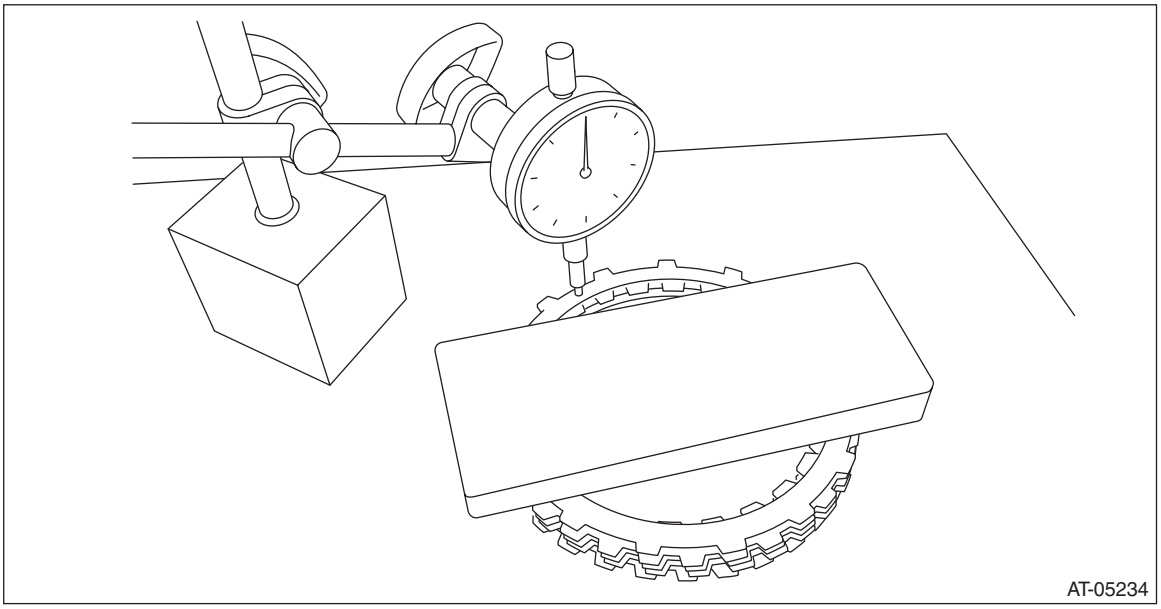

CVT00239

7) Place the driven plate, drive plate and retaining plate neatly in this order on surface table.
8) Set the dial gauge to retaining plate, and read its scale.

NOTE:
The value, which is read in the gauge at this time, is zero point.
9) Scale and record the weight “Z” of a flat board which will be put on retaining plate.

NOTE:
- Use a stiff board which does not bend against load as a flat board to be put on retaining plate.
- Use a flat board weighing less than 29 N (3.0 kgf, 6.5 lb).

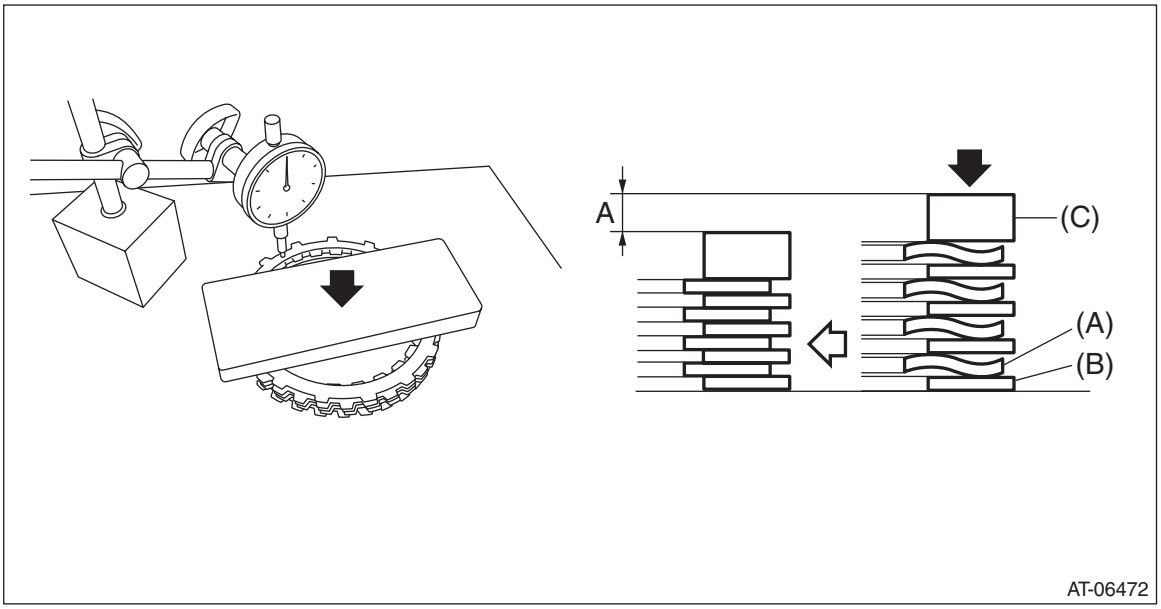
10) Put the flat board on retaining plate.


AT-05234

11) Using the following formula, read the push/pull gauge, and calculate “N”.
N = 29 N (3.0 kgf, 6.5 lb) – Z
29 N (3.0 kgf, 6.5 lb) : Load applied to clutch plate
Z: Flat board weight

12) Press the center of retaining plate by applying a force of “N” using push/pull gauge, and then measure and record the compression amount “A”.

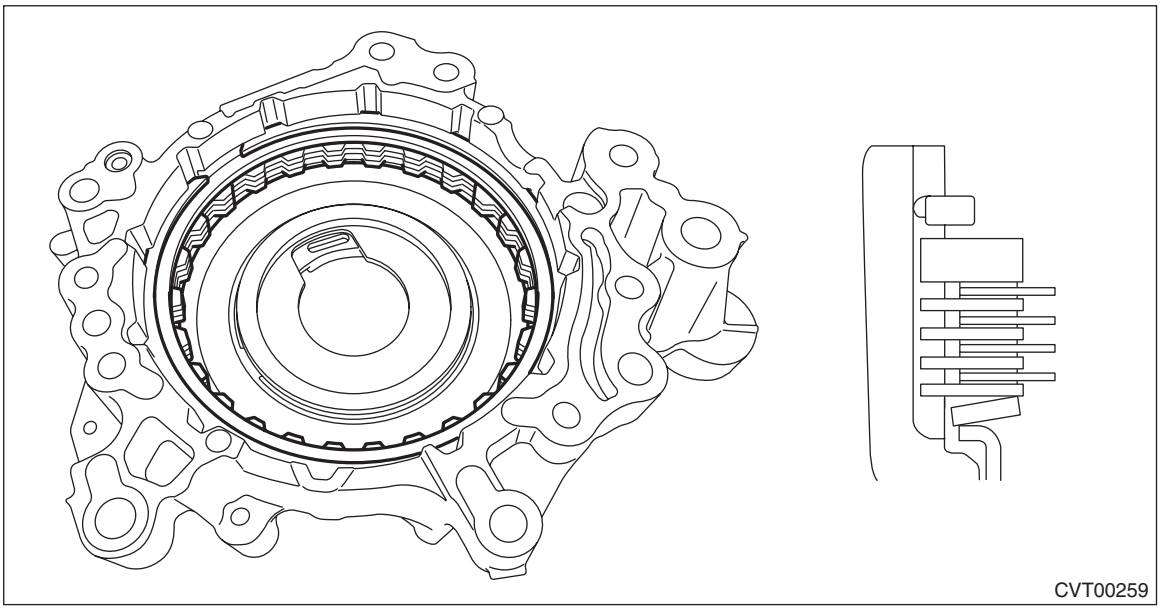
NOTE:
Measure at four points with a 90° interval and calculate the average.



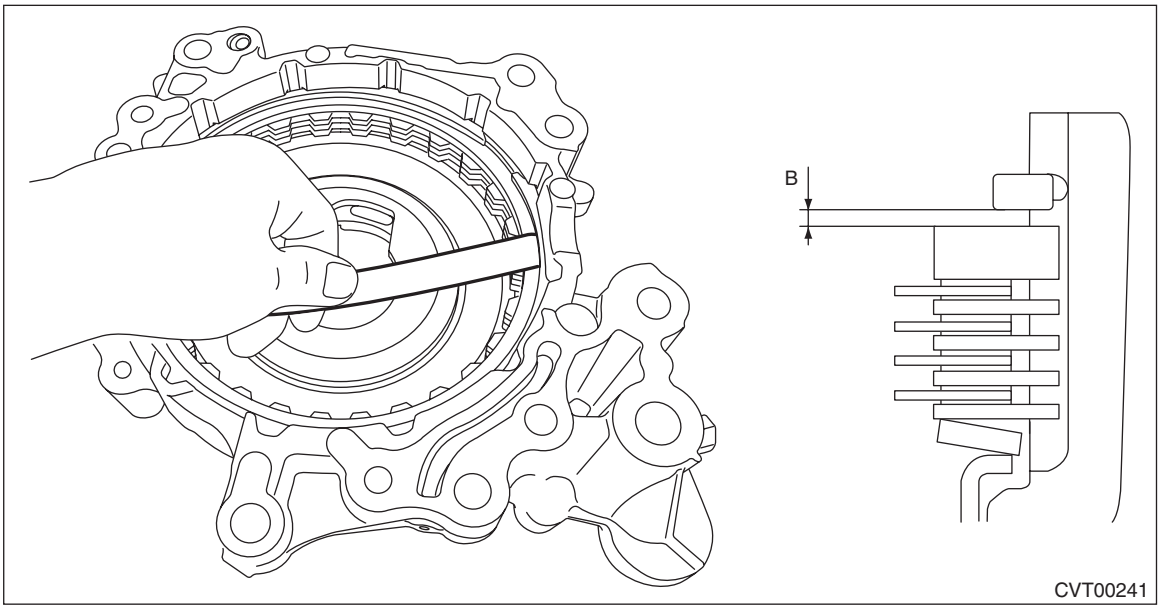
(A) Drive plate
(B) Driven plate
(C) Retaining plate

13) Install the dish plate, drive plate, driven plate, retaining plate and snap ring to the reverse brake housing.

NOTE:
Install the dish plate in the correct direction.



14) Measure and record the clearance “B” between the retaining plate and snap ring.



15) Piston stroke calculation
Calculate with A and B dimensions recorded before. If it exceeds the limit, replace with a new drive plate and adjust within the initial standard value.
S mm (in) = A + B
S: Piston stroke
A: Compression amount of drive plate and dish plate
B: Clearance between retaining plate and snap ring

Initial standard:
2.3 — 2.7 mm (0.091 — 0.106 in)

Limit thickness:
2.9 mm (0.114 in)

Retaining plate	
Part No.	Thickness mm (in)
31567AB750	4.2 (0.165)
31567AB800	4.4 (0.173)
31567AB810	4.6 (0.181)
31567AB820	4.8 (0.189)

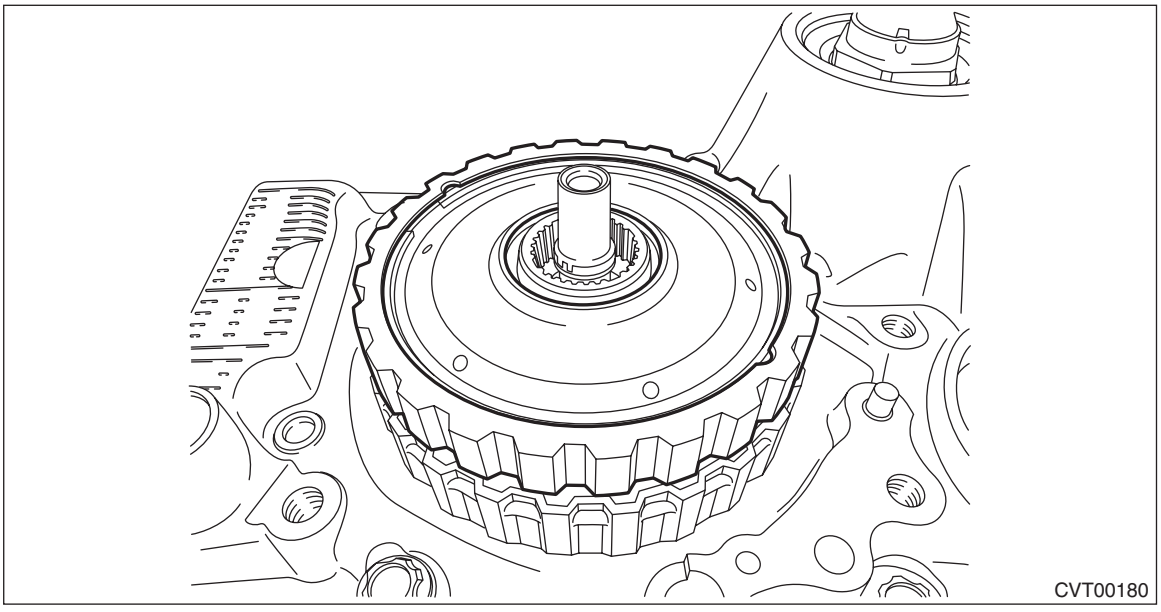
E: INSPECTION

- Inspect the drive plate facing for wear and damage.
- Check the driven plate for discoloration (burnt color).
- Check for worn snap ring, fatigue or damaged return spring or deformed spring retainer.
- Make sure the clearance between retaining plate and snap ring of reverse brake is within the limit. If it exceeds the limit, replace with a new drive plate and select and adjust the retaining plate within the initial standard value. <Ref. to CVT(TH58A)-298, ASSEMBLY, Reverse Brake Assembly.>
- Check the oil pump shaft for damage.

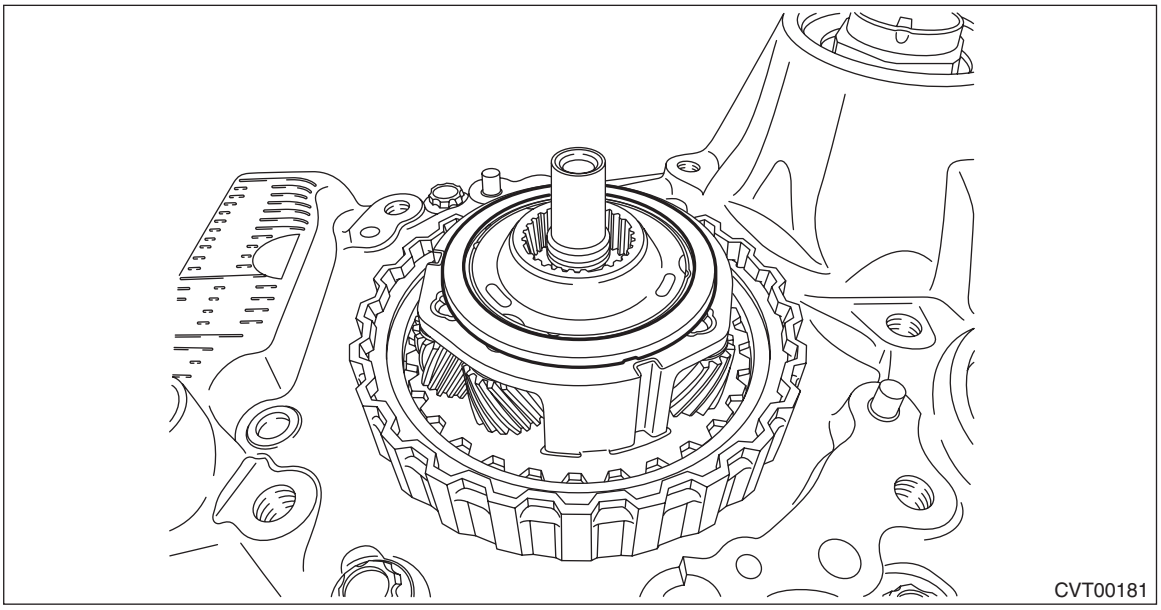
46.Forward Clutch Assembly

A: REMOVAL

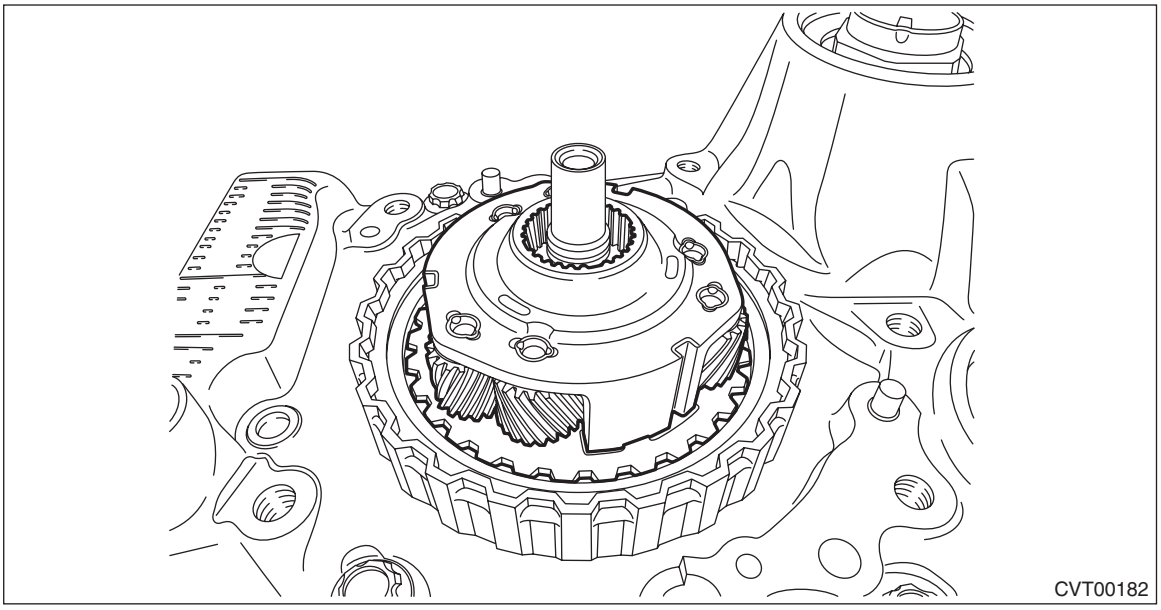
1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TH58A)-63, REMOVAL, Automatic Transmission Assembly.>
2) Remove the air breather hose. <Ref. to CVT(TH58A)-171, REMOVAL, Air Breather Hose.>
3) Remove the transmission harness. <Ref. to CVT(TH58A)-143, REMOVAL, Transmission Harness.>
4) Remove the main control valve body. <Ref. to CVT(TH58A)-115, REMOVAL, Control Valve Body.>
5) Remove the turbine speed sensor. <Ref. to CVT(TH58A)-104, REMOVAL, Turbine Speed Sensor.>
6) Remove the secondary speed sensor. <Ref. to CVT(TH58A)-106, REMOVAL, Secondary Speed Sensor.>
7) Remove the front wheel speed sensor. <Ref. to CVT(TH58A)-108, REMOVAL, Front Wheel Speed Sensor.>
8) Remove the inhibitor switch. <Ref. to CVT(TH58A)-101, REMOVAL, Inhibitor Switch.>
9) Remove the extension case. <Ref. to CVT(TH58A)-182, REMOVAL, Extension Case.>
10) Remove the transfer clutch assembly. <Ref. to CVT(TH58A)-186, REMOVAL, Transfer Clutch.>
11) Remove the transfer driven gear assembly. <Ref. to CVT(TH58A)-203, REMOVAL, Transfer Drive Gear.>
12) Remove the transfer drive gear assembly. <Ref. to CVT(TH58A)-203, REMOVAL, Transfer Drive Gear.>
13) Remove the parking pawl. <Ref. to CVT(TH58A)-208, REMOVAL, Parking Pawl.>
14) Remove the oil pan and oil strainer. <Ref. to CVT(TH58A)-112, REMOVAL, Oil Pan and Strainer.>
15) Remove the transmission control device. <Ref. to CVT(TH58A)-210, REMOVAL, Transmission Control Device.>
16) Remove the drive motor assembly. <Ref. to CVT(TH58A)-217, REMOVAL, Drive Motor Assembly.>
17) Remove the output clutch assembly. <Ref. to CVT(TH58A)-228, REMOVAL, Output Clutch Assembly.>
18) Remove the transmission case. <Ref. to CVT(TH58A)-245, REMOVAL, Transmission Case.>
19) Remove the reduction drive gear. <Ref. to CVT(TH58A)-258, REMOVAL, Reduction Drive Gear.>
20) Remove the primary pulley, secondary pulley and variator chain. <Ref. to CVT(TH58A)-263, REMOVAL, Primary Pulley and Secondary Pulley.>
21) Remove the reverse brake assembly. <Ref. to CVT(TH58A)-287, REMOVAL, Reverse Brake Assembly.>
22) Remove the internal gear.



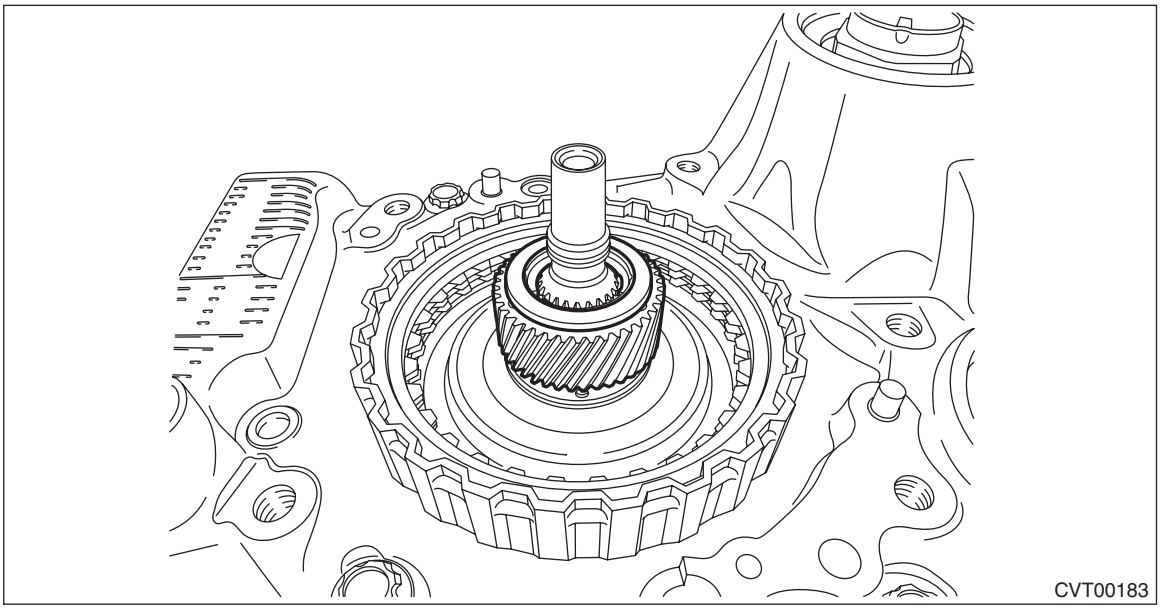
23) Remove the thrust bearing.



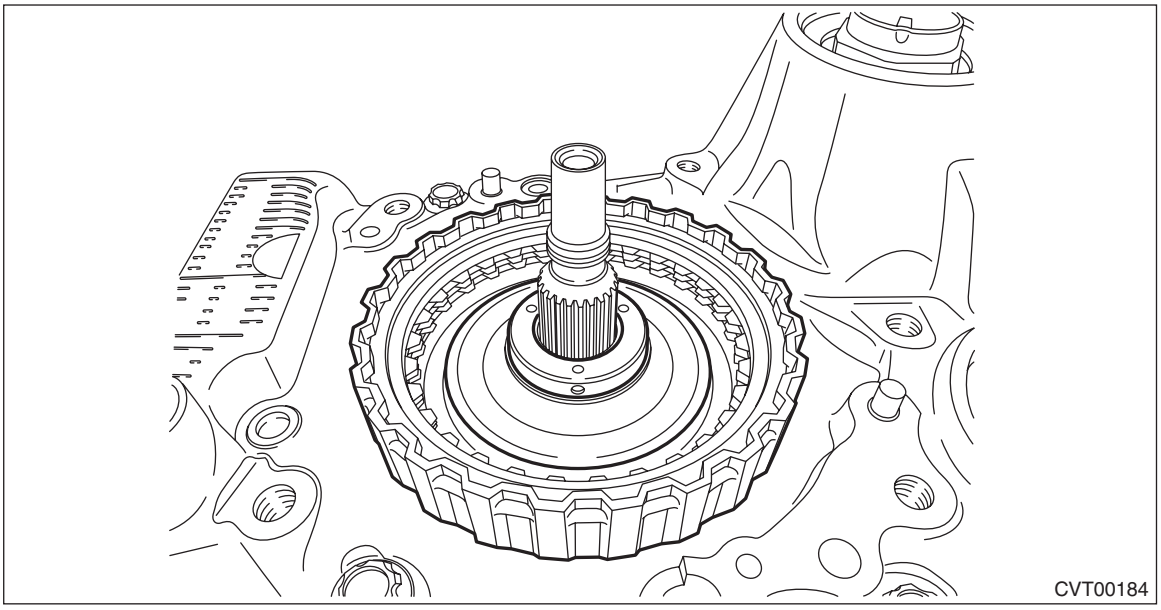
24) Remove the planetary carrier.



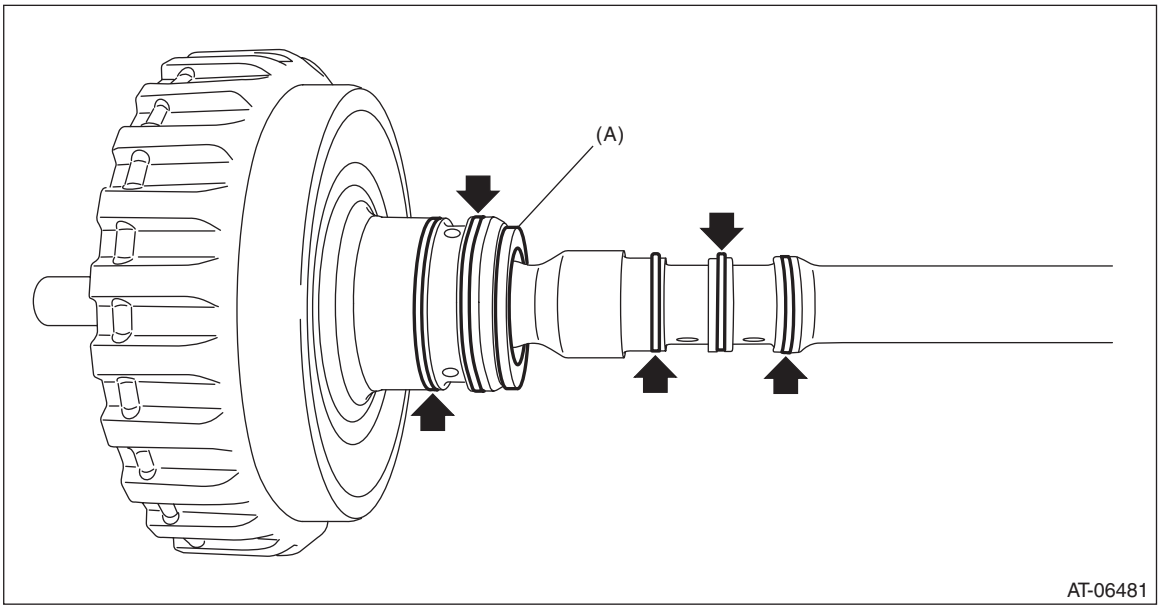
25) Remove the thrust bearing and sun gear.



26) Remove the forward clutch assembly.



27) Remove the thrust bearing and seal ring.

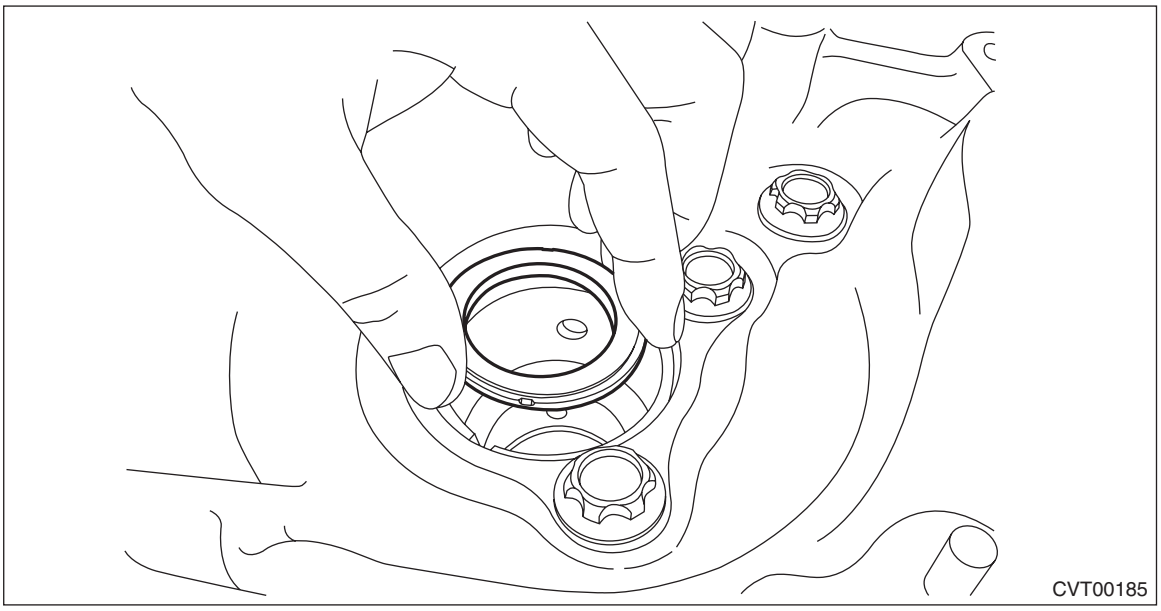


(A) Thrust bearing

B: INSTALLATION

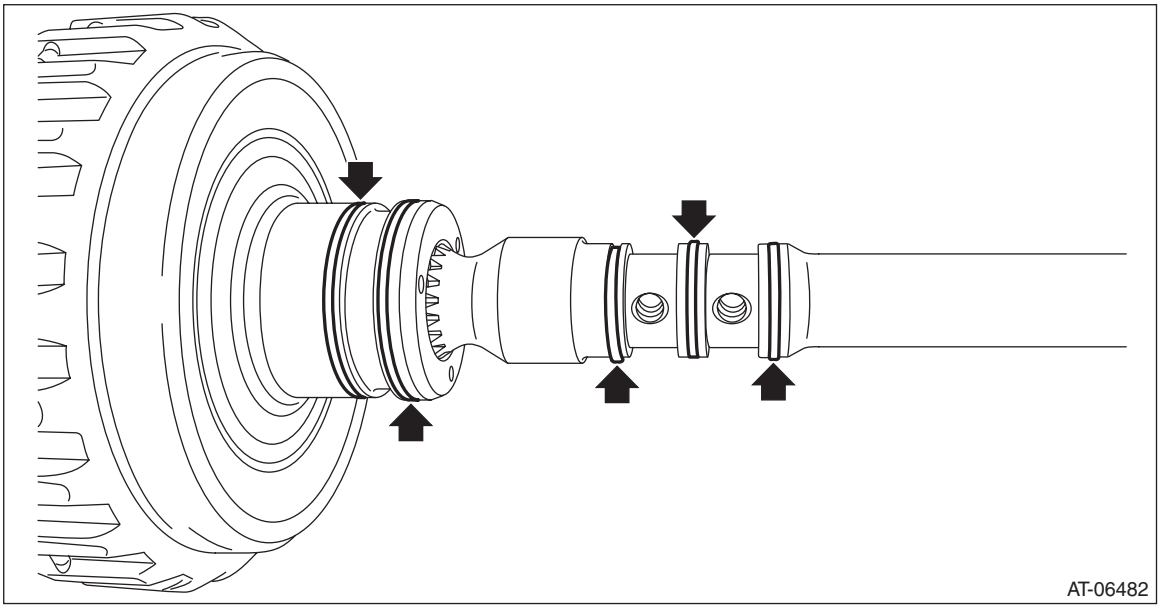
1) Install the thrust bearing to the converter case.

NOTE:
Face the temper color surface to the converter case side.

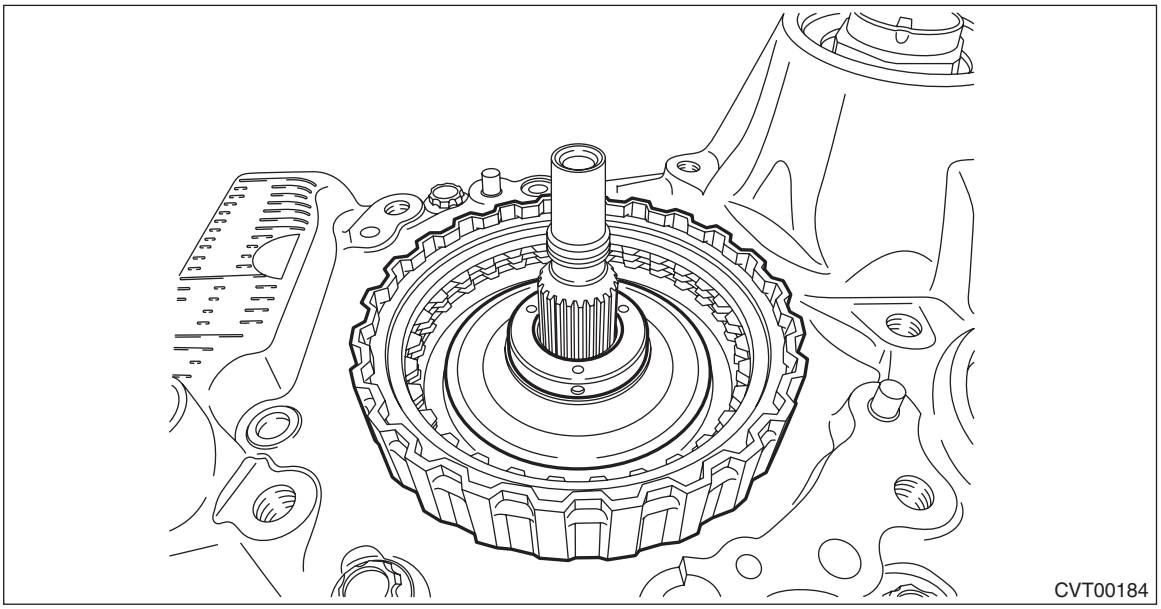


2) Install the seal ring to the input shaft.

NOTE:
- Use a new seal ring.
- When installing the seal ring, do not expand the seal ring too much.
- Apply CVTF to the seal rings.

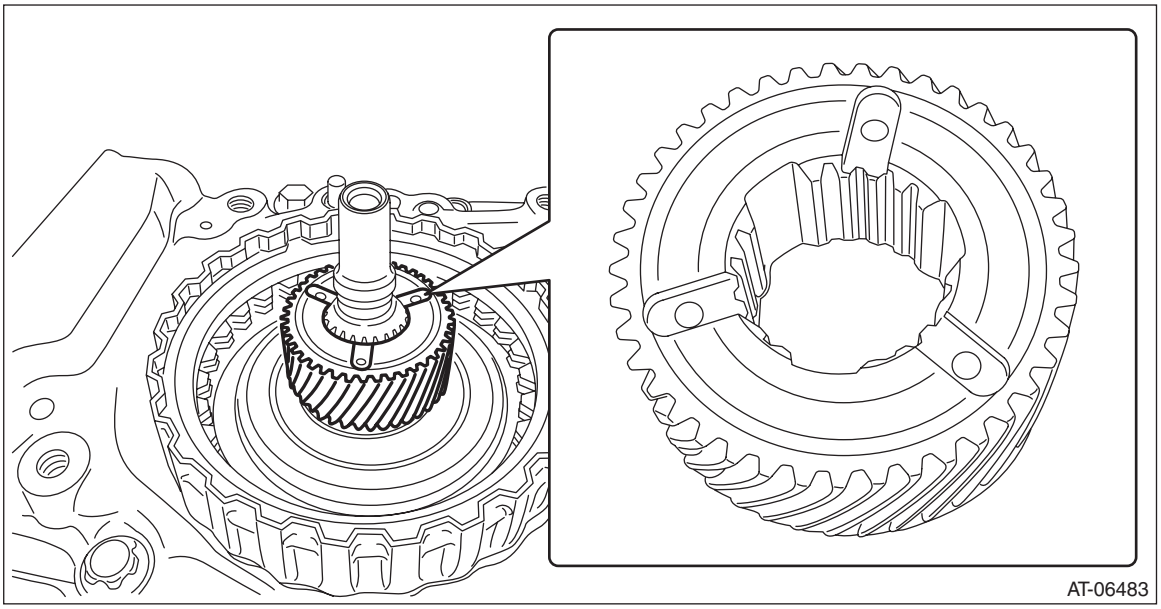


3) Install the forward clutch assembly to the converter case.



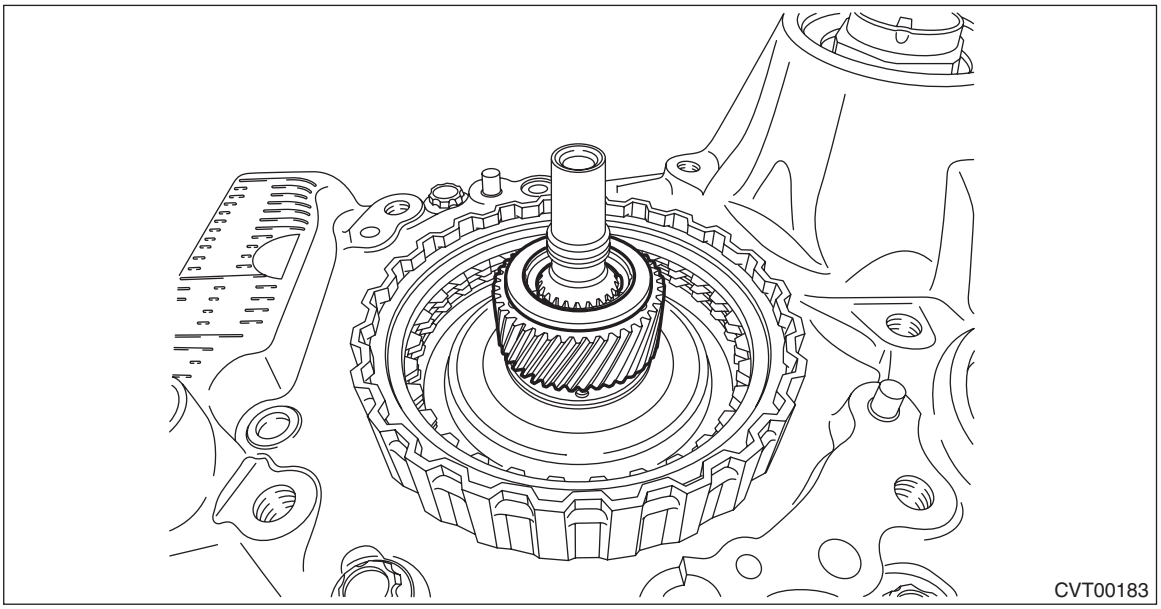
4) Install the sun gear.

NOTE:
Face the end face of the sun gear to the reverse brake side as shown in the figure.

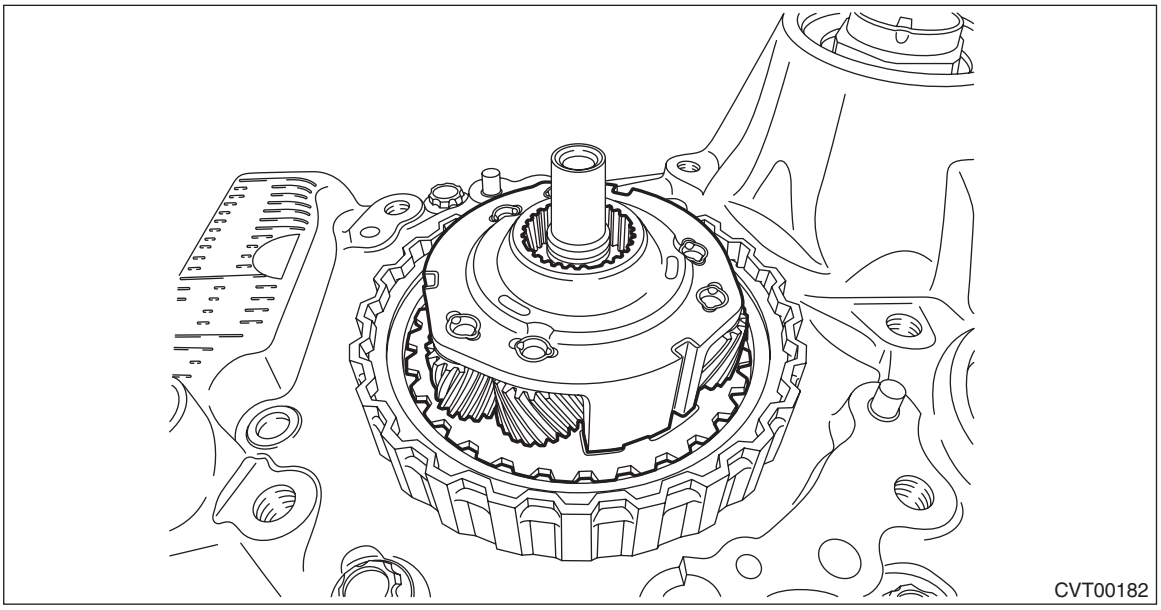


5) Install the thrust bearing to the sun gear.

NOTE:
Face the temper color surface to the reverse brake side.

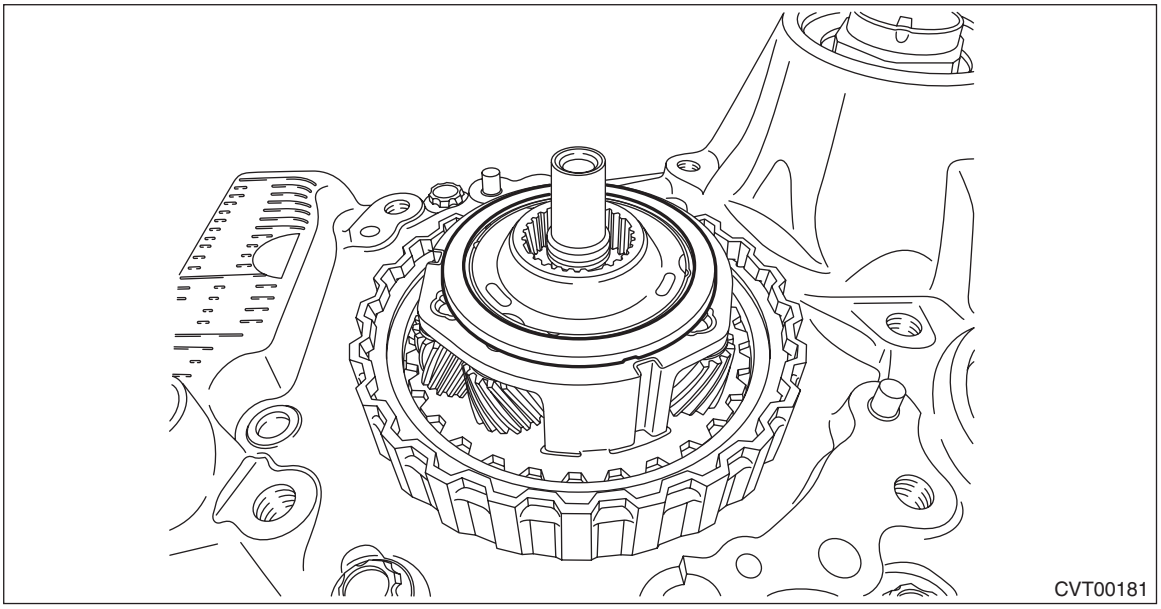


6) Install the planetary carrier.

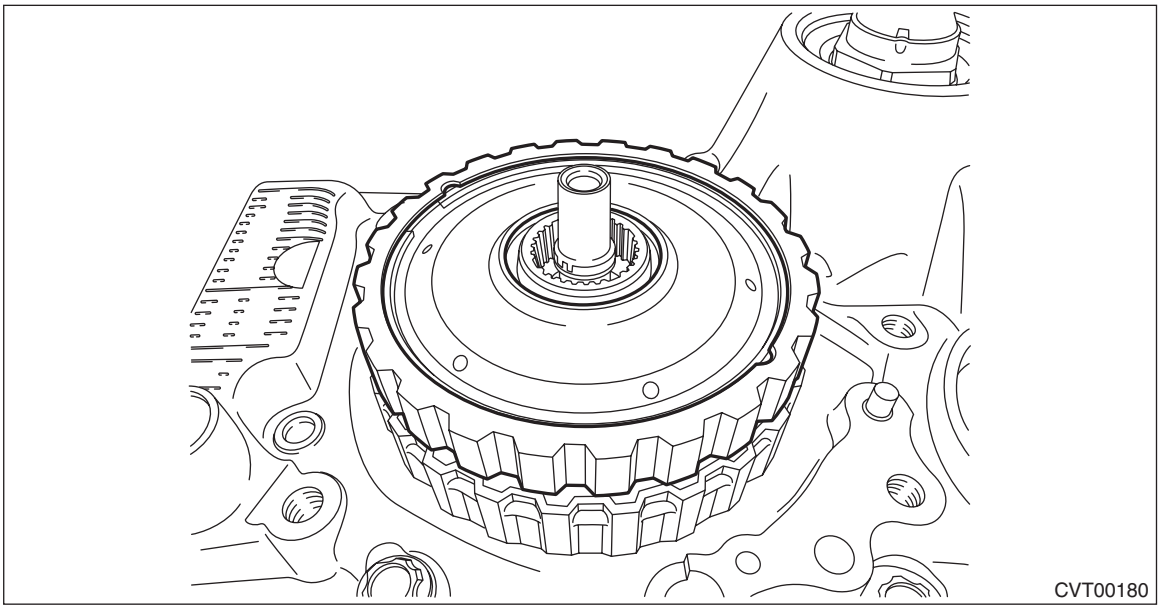


7) Install the thrust bearing.

NOTE:
Face the temper color surface to the reverse brake side.

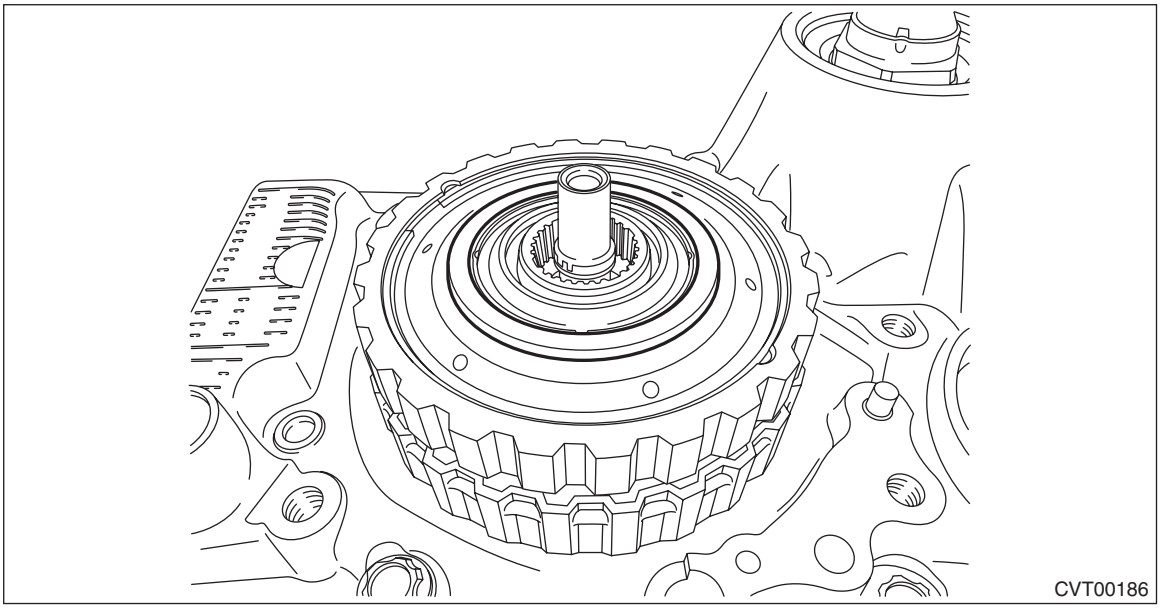


8) Install the internal gear.



9) Install the thrust bearing to the internal gear.

NOTE:
Face the temper color surface to the reverse brake side.



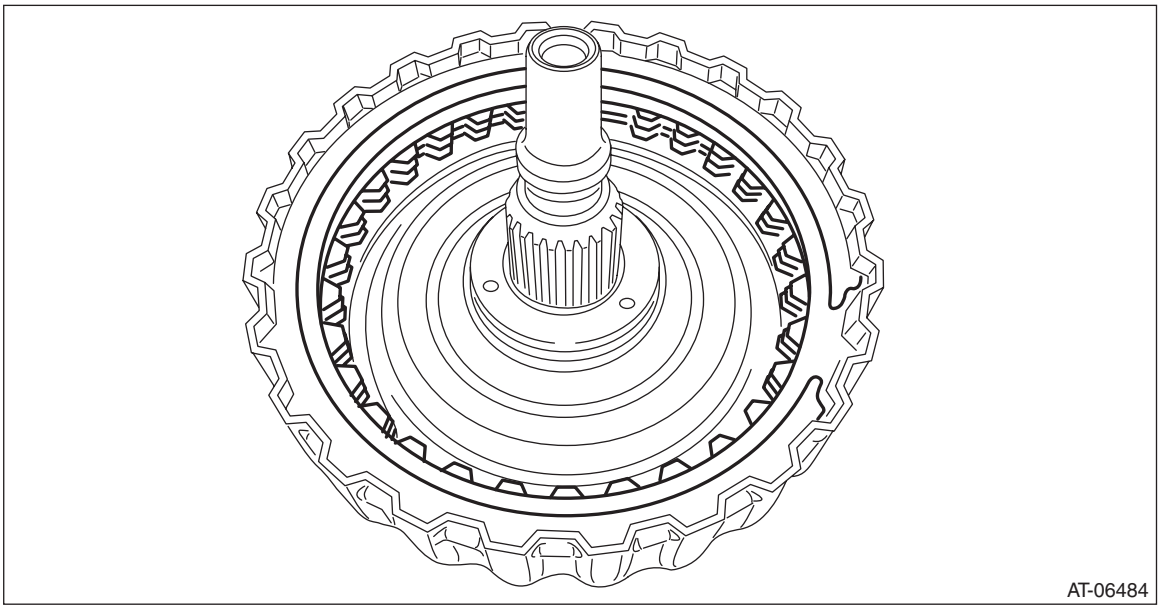
10) Select a washer. <Ref. to CVT(TH58A)-321, ADJUSTMENT, Forward Clutch Assembly.>

11) Install the reverse brake assembly. <Ref. to CVT(TH58A)-290, INSTALLATION, Reverse Brake Assembly.>
12) Install the primary pulley, secondary pulley and variator chain. <Ref. to CVT(TH58A)-271, INSTALLATION, Primary Pulley and Secondary Pulley.>
13) Install the reduction drive gear. <Ref. to CVT(TH58A)-259, INSTALLATION, Reduction Drive Gear.>
14) Install the transmission case. <Ref. to CVT(TH58A)-248, INSTALLATION, Transmission Case.>
15) Install the output clutch assembly. <Ref. to CVT(TH58A)-229, INSTALLATION, Output Clutch Assembly.>
16) Install the drive motor assembly. <Ref. to CVT(TH58A)-221, INSTALLATION, Drive Motor Assembly.>
17) Install the transmission control device. <Ref. to CVT(TH58A)-213, INSTALLATION, Transmission Control Device.>
18) Install the oil strainer and oil pan. <Ref. to CVT(TH58A)-114, INSTALLATION, Oil Pan and Strainer.>
19) Install the parking pawl. <Ref. to CVT(TH58A)-208, INSTALLATION, Parking Pawl.>
20) Install the transfer drive gear assembly. <Ref. to CVT(TH58A)-204, INSTALLATION, Transfer Drive Gear.>
21) Install the transfer driven gear assembly. <Ref. to CVT(TH58A)-201, INSTALLATION, Transfer Driven Gear.>
22) Install the transfer clutch assembly. <Ref. to CVT(TH58A)-188, INSTALLATION, Transfer Clutch.>
23) Install the extension case. <Ref. to CVT(TH58A)-183, INSTALLATION, Extension Case.>
24) Install the inhibitor switch. <Ref. to CVT(TH58A)-102, INSTALLATION, Inhibitor Switch.>
25) Install the secondary speed sensor. <Ref. to CVT(TH58A)-106, INSTALLATION, Secondary Speed Sensor.>
26) Install the front wheel speed sensor. <Ref. to CVT(TH58A)-108, INSTALLATION, Front Wheel Speed Sensor.>
27) Install the turbine speed sensor. <Ref. to CVT(TH58A)-104, INSTALLATION, Turbine Speed Sensor.>
28) Install the main control valve body. <Ref. to CVT(TH58A)-123, INSTALLATION, Control Valve Body.>
29) Install the transmission harness. <Ref. to CVT(TH58A)-151, INSTALLATION, Transmission Harness.>
30) Install the air breather hose. <Ref. to CVT(TH58A)-173, INSTALLATION, Air Breather Hose.>
31) Install the transmission assembly to the vehicle. <Ref. to CVT(TH58A)-77, INSTALLATION, Automatic Transmission Assembly.>

C: DISASSEMBLY

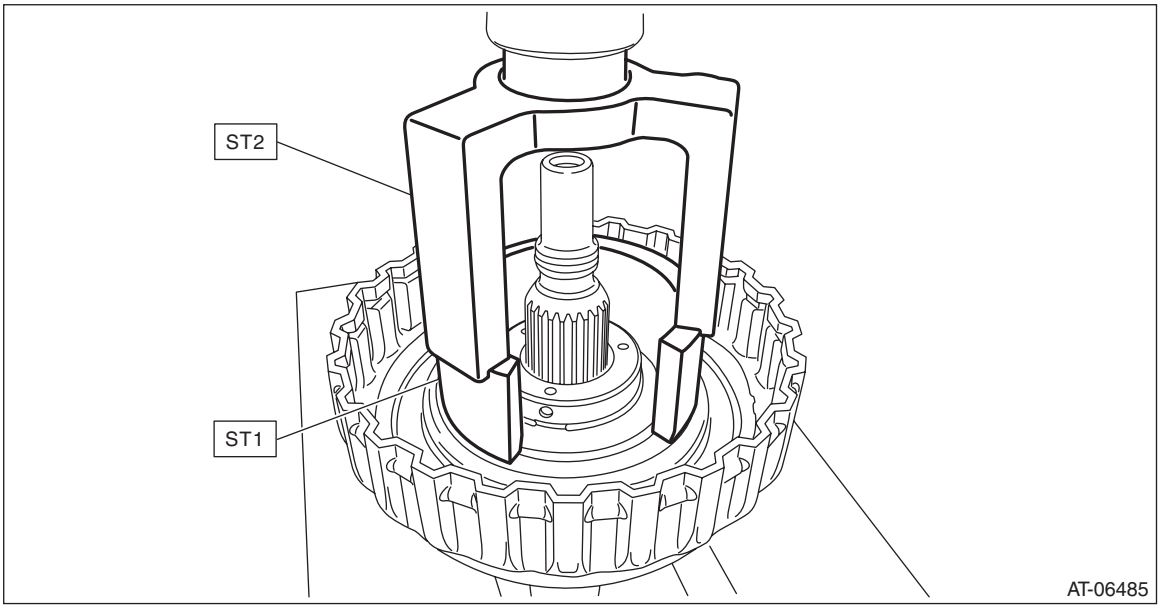
1. FORWARD CLUTCH ASSEMBLY

1) Remove the snap ring, retaining plate, drive plate, driven plate and dish plate.

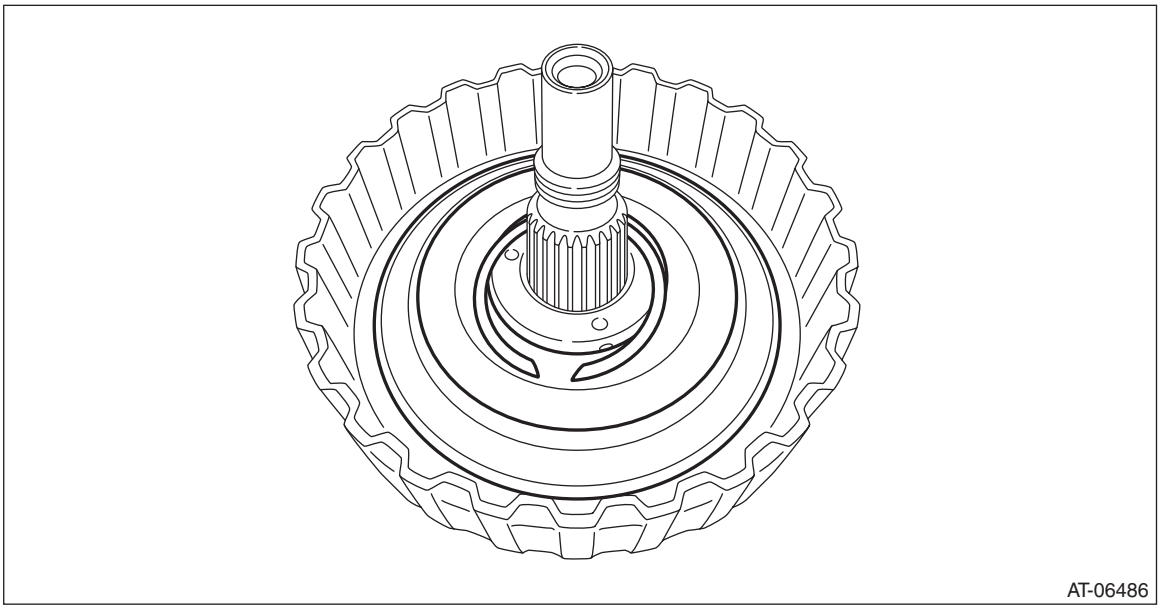


2) Compress the return spring using the ST to remove the snap ring.

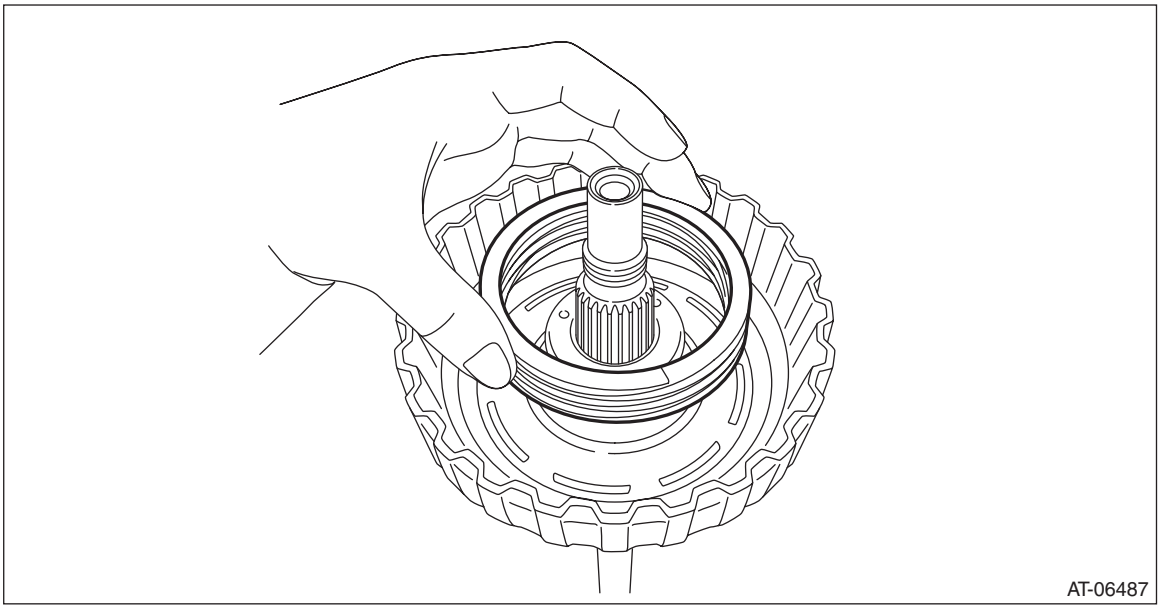
ST1 18762AA010 COMPRESSOR SPECIAL TOOL
ST2 398673600 COMPRESSOR



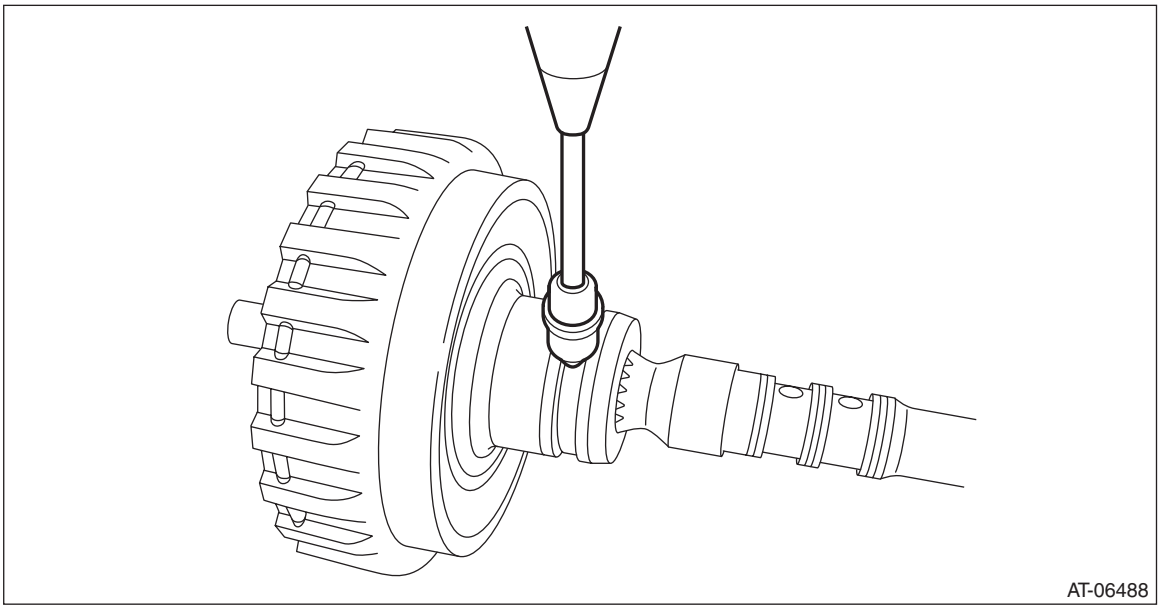
3) Remove the chamber COMPL and snap ring.



4) Remove the return spring.

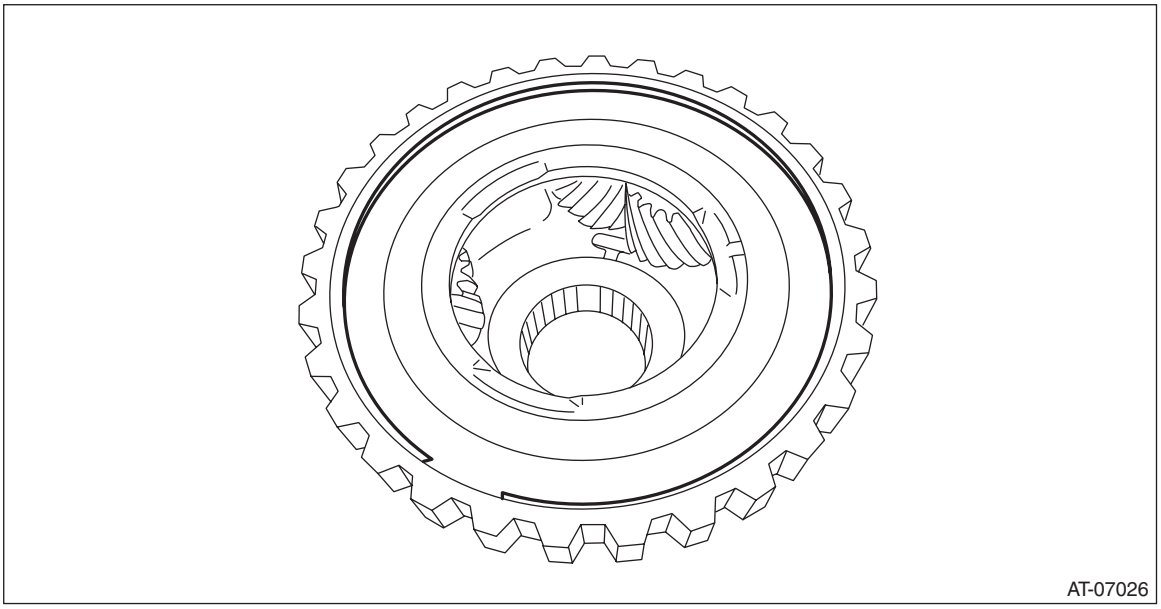


5) Remove the forward clutch piston by blowing compressed air intermittently from the forward clutch carrier hole.



2. PLANETARY CARRIER ASSEMBLY

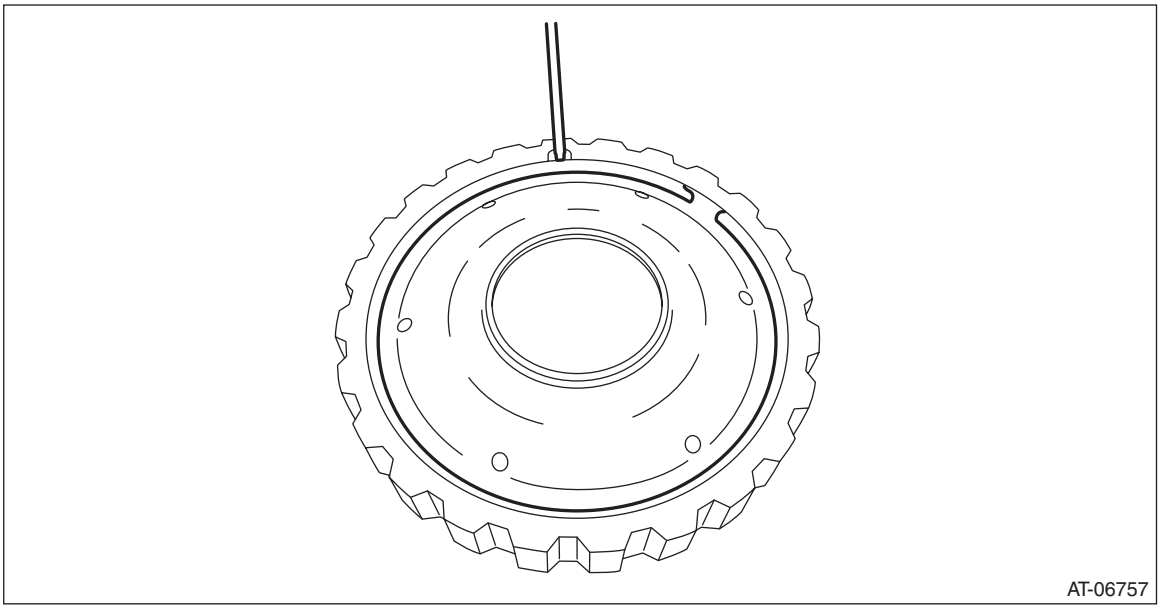
NOTE:
Disassemble the balance oil guide only.
1) Remove the snap ring.



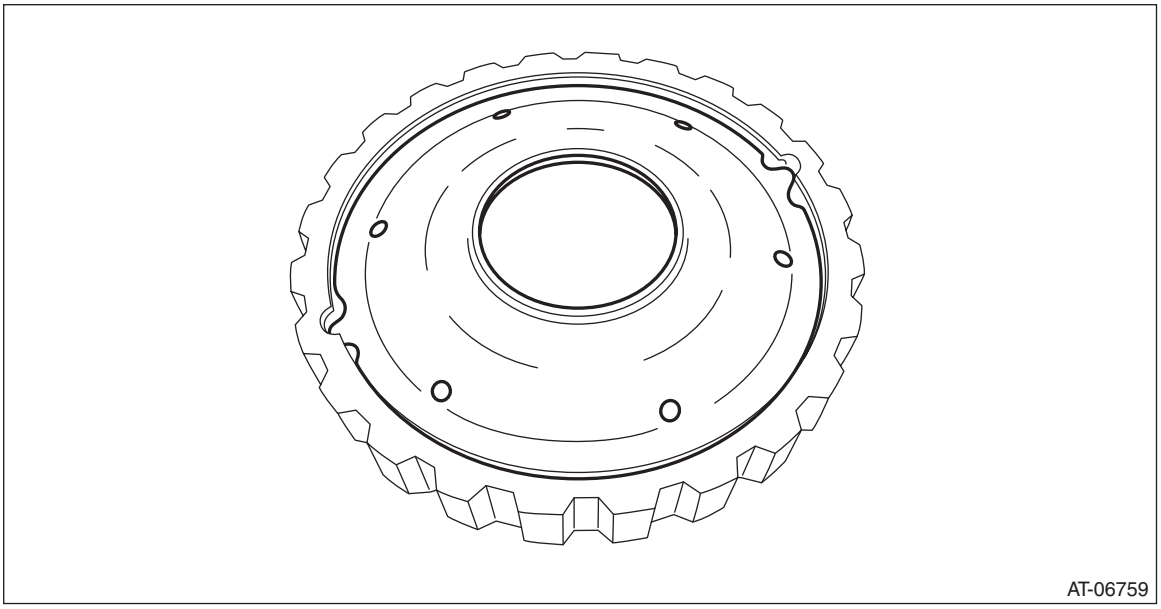
2) Remove the balance oil guide.

3. INTERNAL GEAR

1) Remove the snap ring.



2) Remove the thrust gear plate.

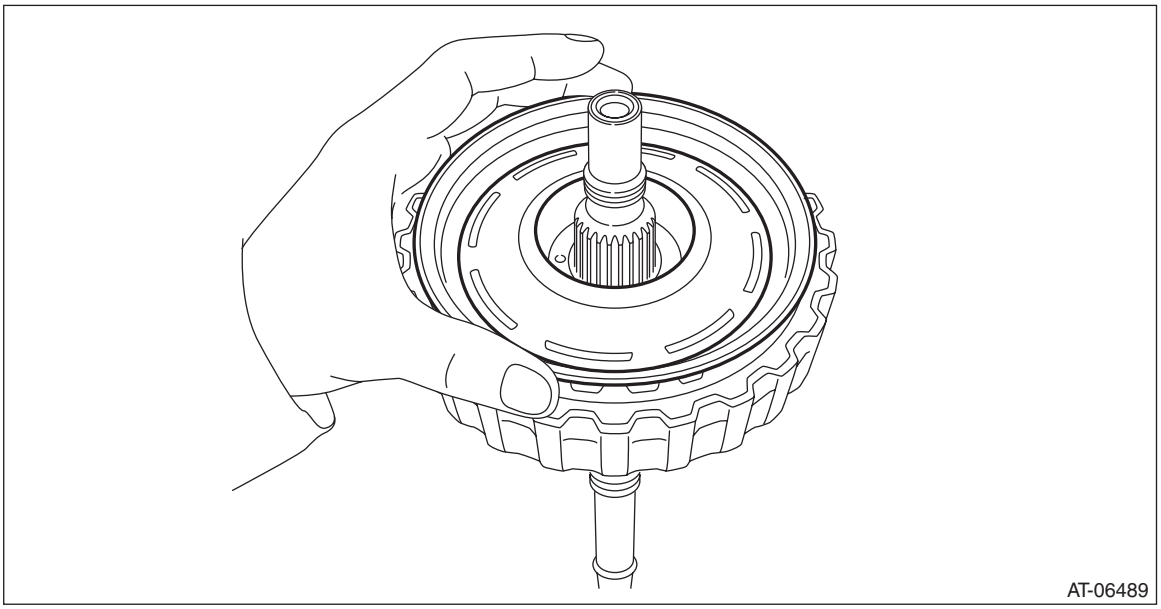


D: ASSEMBLY

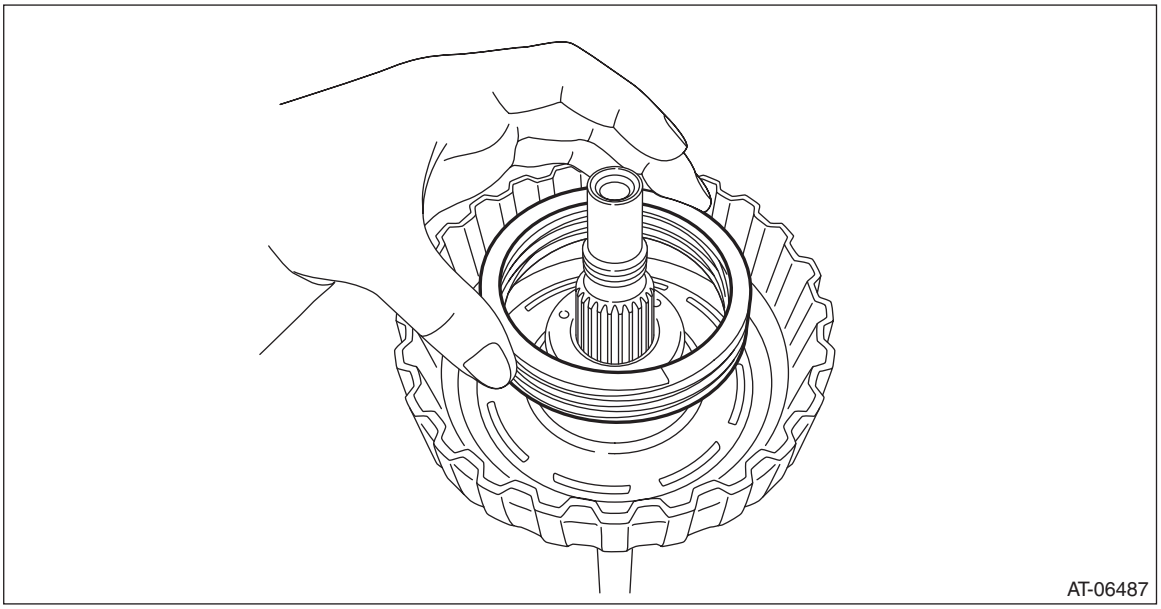
1. FORWARD CLUTCH ASSEMBLY

1) Install the forward clutch piston to forward clutch drum.

NOTE:
- Apply CVTF to the seal of forward clutch piston.
- Insert it all the way to the end.

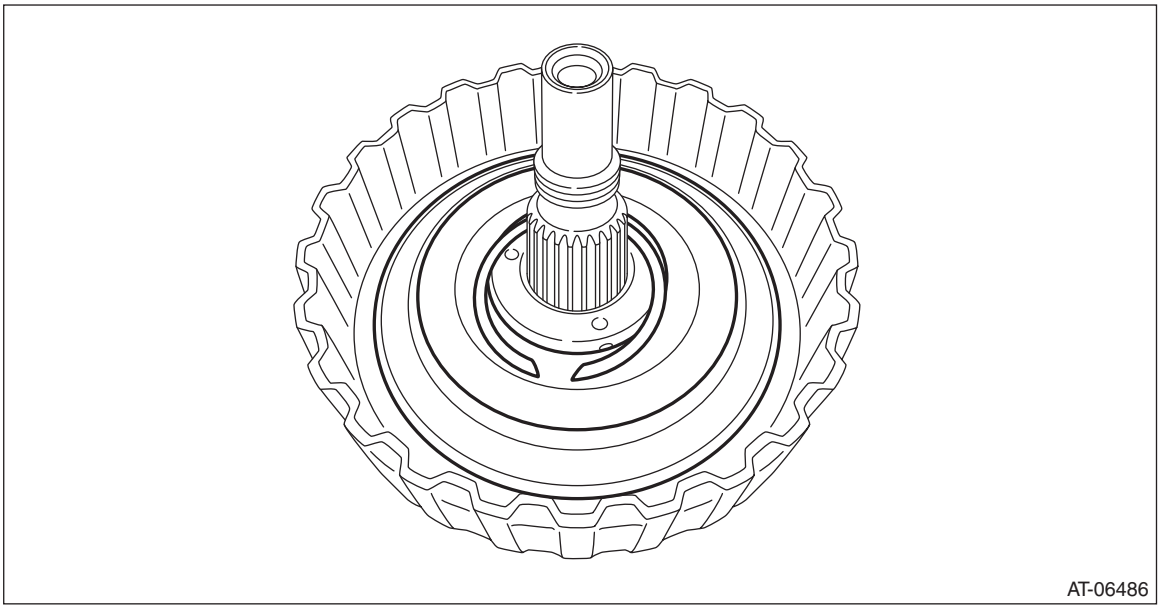


2) Install the return spring.



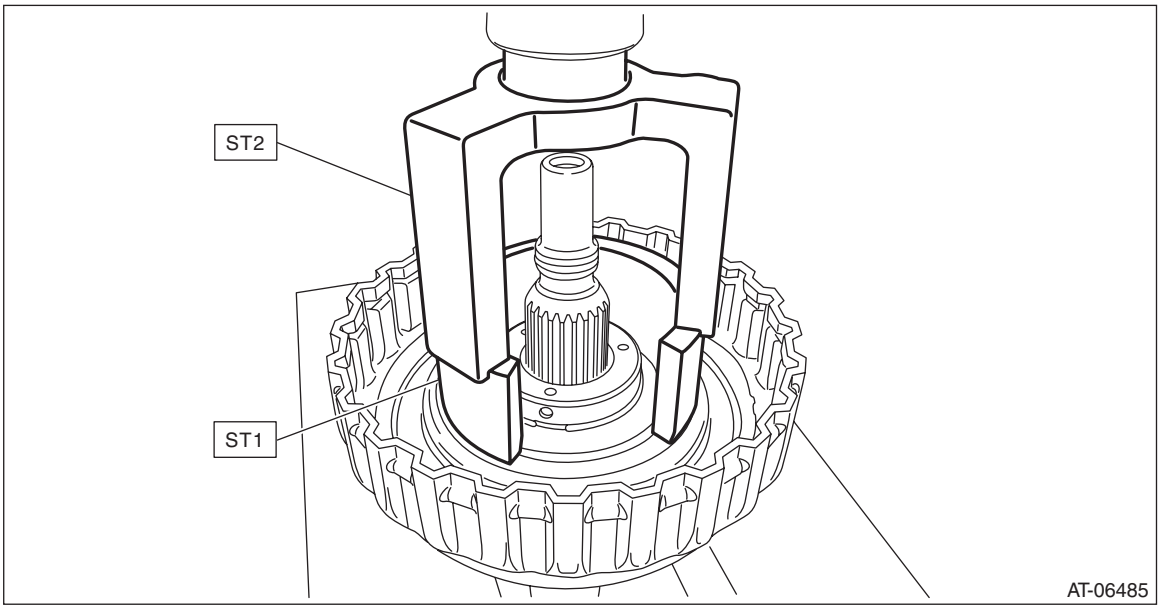
3) Install the chamber COMPL.

NOTE:
Apply CVTF to the sealing area of chamber COMPL.

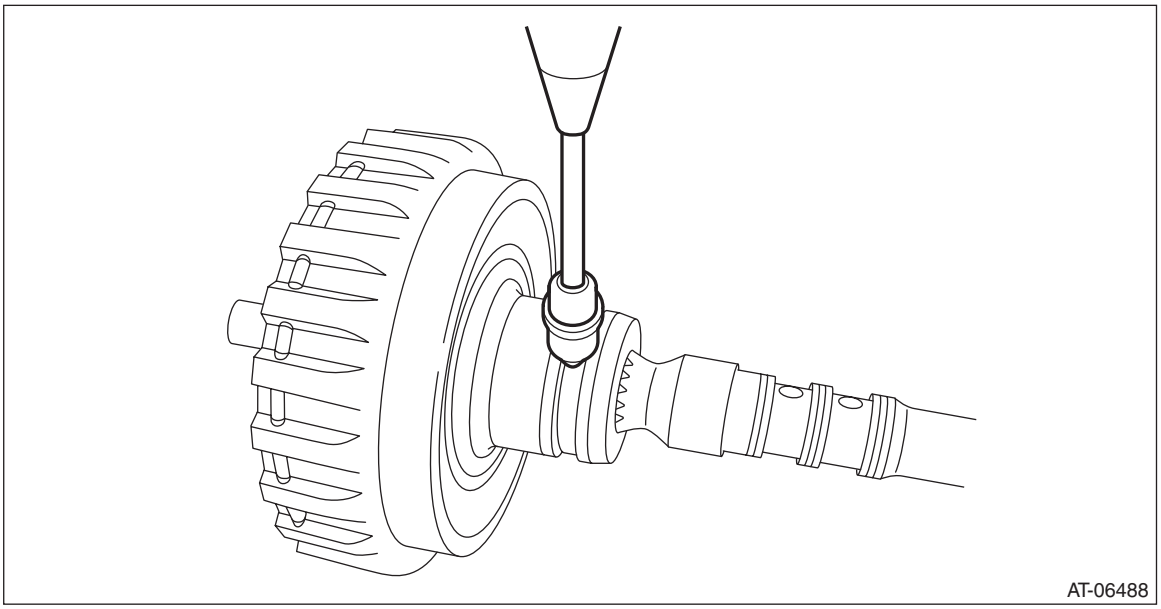


4) Compress the return spring using the ST to install the snap ring.

ST1 18762AA010 COMPRESSOR SPECIAL TOOL
ST2 398673600 COMPRESSOR



5) Check the operation of forward clutch piston by blowing compressed air intermittently from the forward clutch carrier hole.

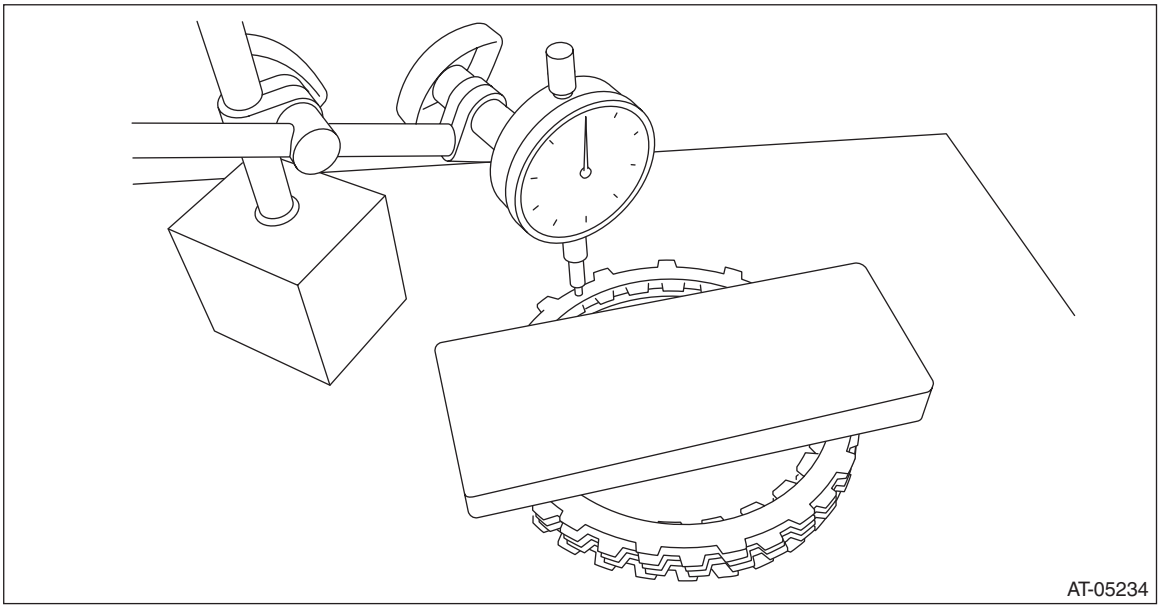


6) Place the driven plate, drive plate and retaining plate neatly in this order on surface table.
7) Set the dial gauge to retaining plate, and read its scale.

NOTE:
The value, which is read in the gauge at this time, is zero point.
8) Scale and record the weight "Z" of a flat board which will be put on retaining plate.

NOTE:
- Use a stiff board which does not bend against load as a flat board to be put on retaining plate.
- Use a flat board weighing less than 52 N (5.3 kgf, 11.7 lb).

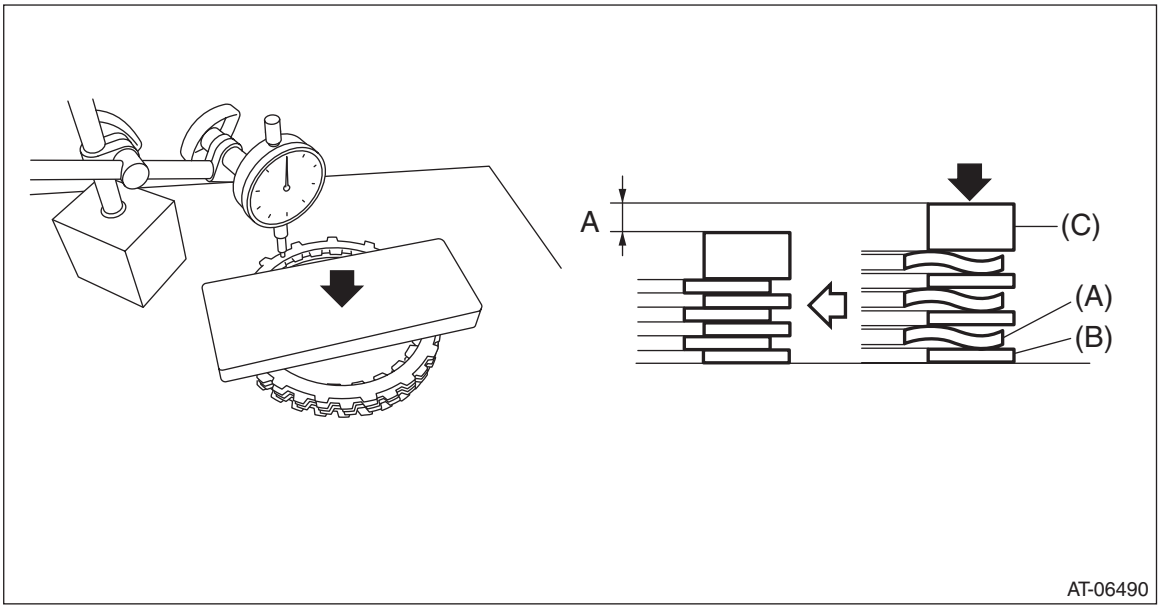
9) Put the flat board on retaining plate.



10) Using the following formula, read the push/pull gauge, and calculate "N".
N = 52 N (5.3 kgf, 11.7 lb) – Z
52 N (5.3 kgf, 11.7 lb) : Load applied to clutch plate
Z: Flat board weight

11) Press the center of retaining plate by applying a force of “N” using push/pull gauge, and then measure and record the compression amount “A”.

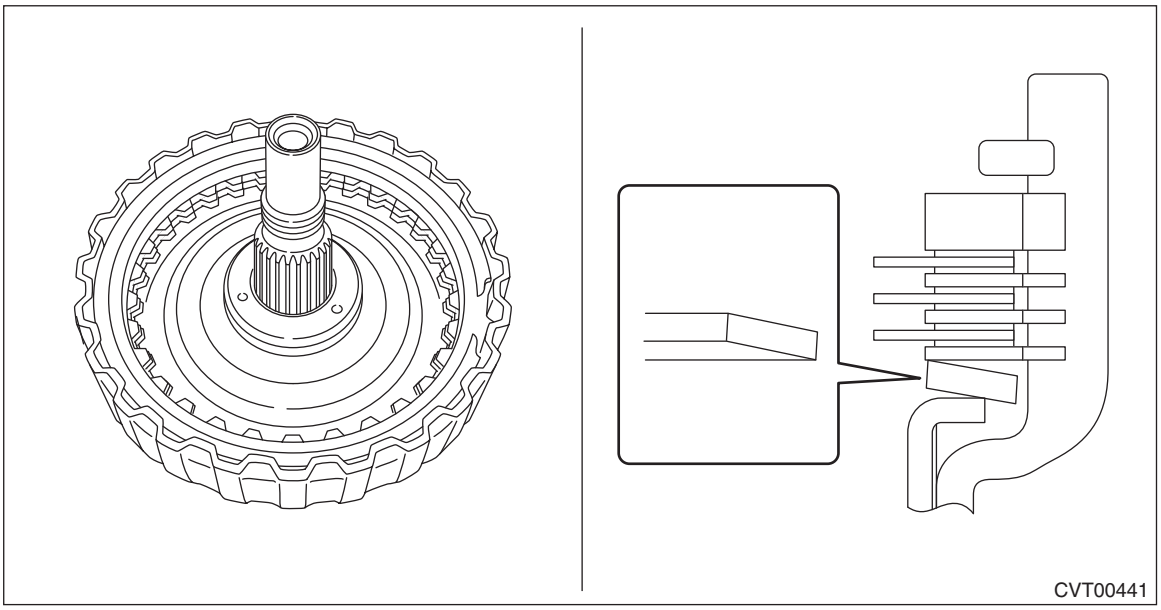
NOTE:
Measure at four points with a 90° interval and calculate the average.



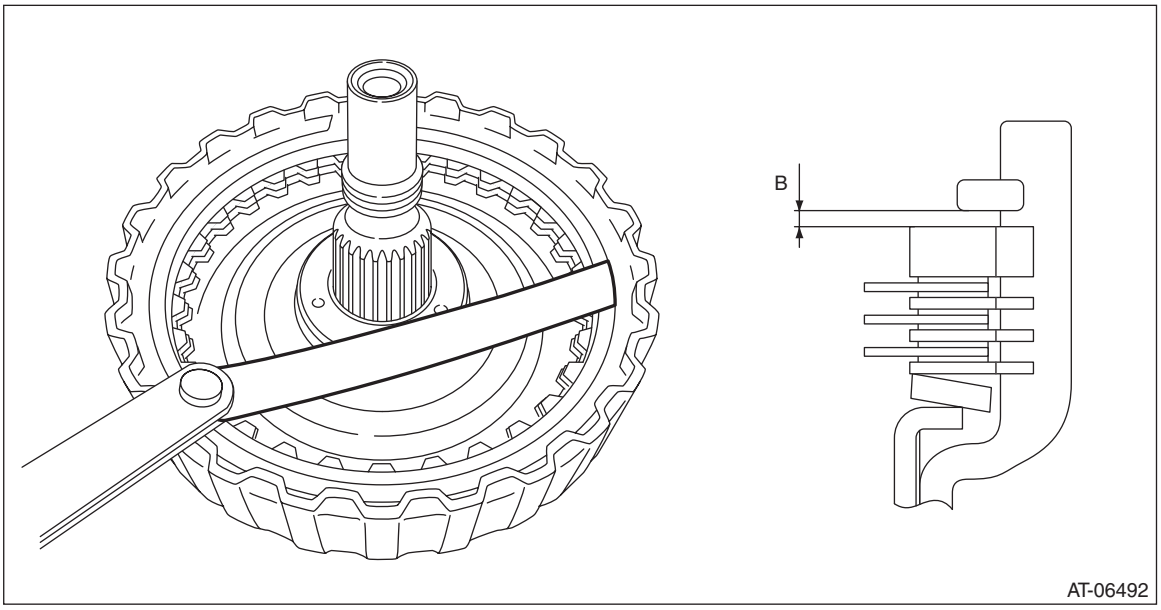
(A) Driven plate
(B) Drive plate
(C) Retaining plate

12) Install the dish plate, drive plate, driven plate, retaining plate and snap ring to the forward clutch carrier.

NOTE:
Install the dish plate in the correct direction.



13) Measure and record the clearance “B” between the retaining plate and snap ring.



14) Piston stroke calculation
Calculate with A and B dimensions recorded before.
If it exceeds the limit, replace with a new drive plate and adjust within the initial standard value.
S mm (in) = A + B
S: Piston stroke
A: Compression amount of drive plate and dish plate
B: Clearance between retaining plate and snap ring

Initial standard:
1.0 — 1.4 mm (0.040 — 0.055 in)

Limit thickness:
1.6 mm (0.063 in)

Retaining plate	
Part No.	Thickness mm (in)
31567AB760	4.2 (0.165)
31567AB770	4.4 (0.173)
31567AB780	4.6 (0.181)
31567AB790	4.8 (0.189)
31567AB830	5.0 (0.197)

2. PLANETARY CARRIER ASSEMBLY

NOTE:
Assemble in the reverse order of disassembly.

3. INTERNAL GEAR

NOTE:
Assemble in the reverse order of disassembly.

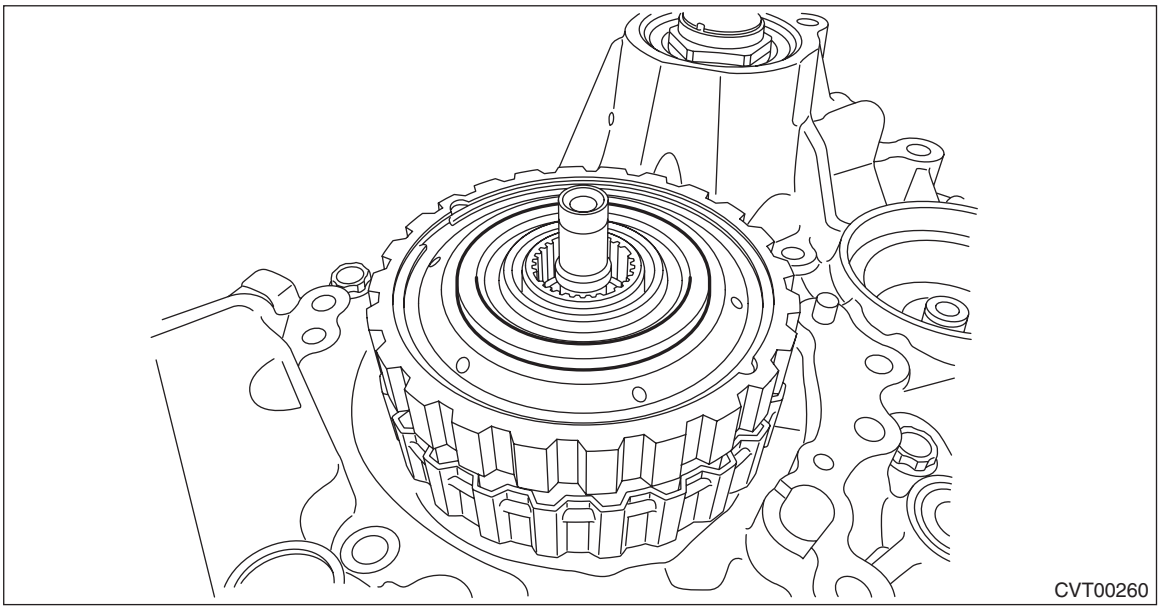
E: INSPECTION

- Check the forward clutch drum, internal gear, sun gear and forward clutch piston lip for wear or damage.
- Inspect the drive plate facing for wear and damage.
- Check the driven plate for discoloration (burnt color).
- Check for worn snap ring, fatigue or damaged return spring or deformed spring retainer.
- Make sure the clearance between retaining plate and internal gear of forward clutch is within the limit. If it exceeds the standard, replace the forward clutch. <Ref. to CVT(TH58A)-316, ASSEMBLY, Forward Clutch Assembly.>

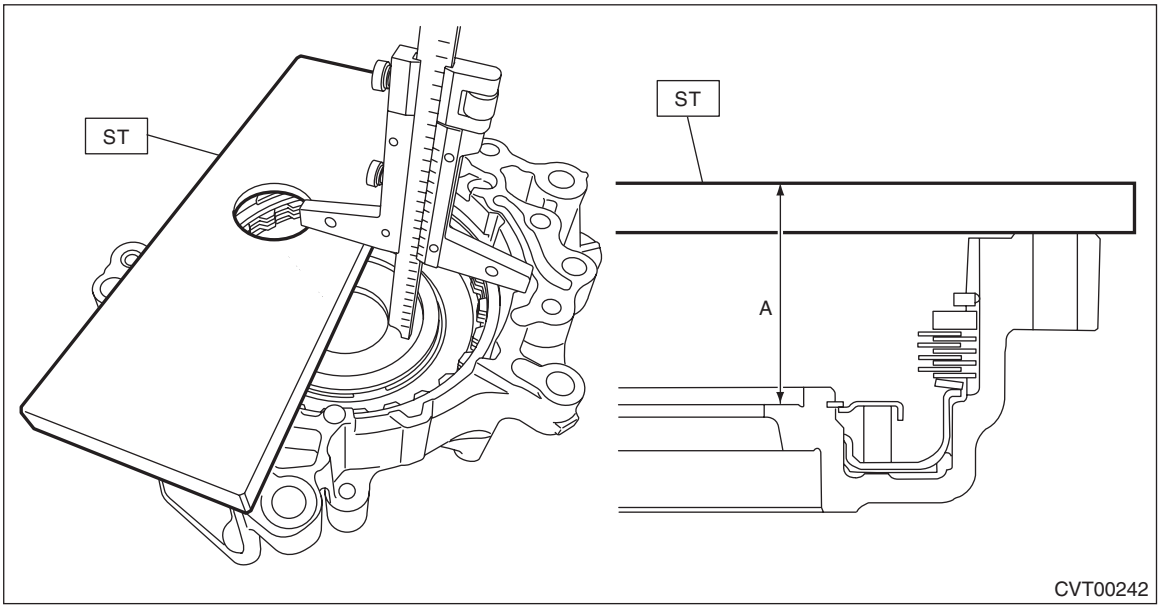
F: ADJUSTMENT

1) Install the thrust bearing to the internal gear.

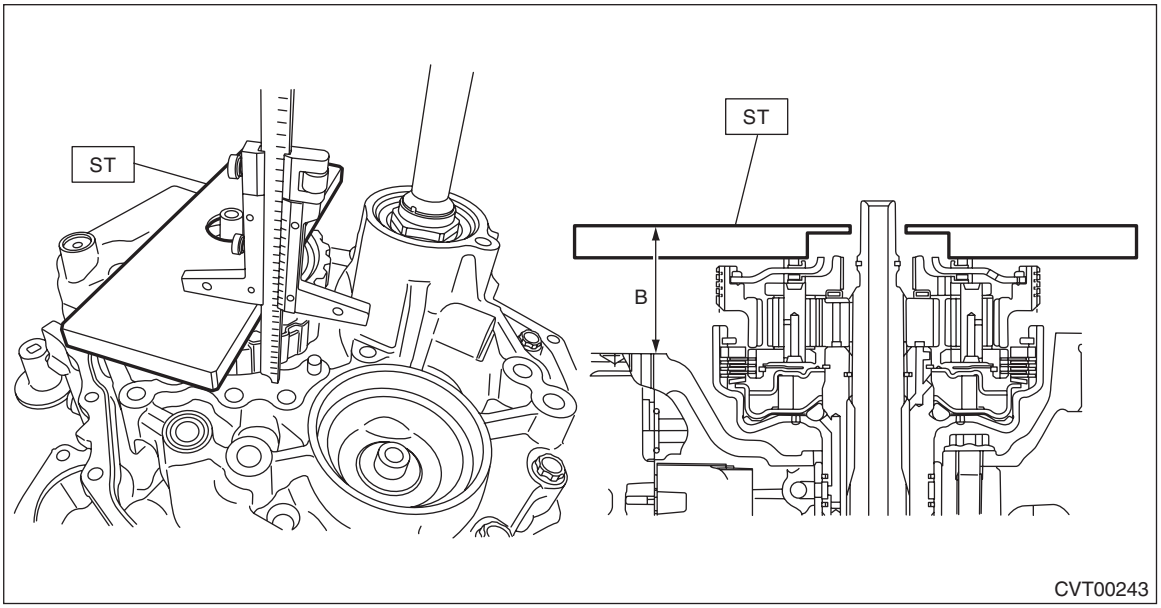
NOTE:
Face the temper color surface to the reverse brake side.



2) Measure depth “A” from the ST upper face to the washer mounting surface.
ST 499575600 GAUGE



3) Measure the height “B” from the ST upper face to the mating surface of the drive pinion retainer.
ST 499575600 GAUGE



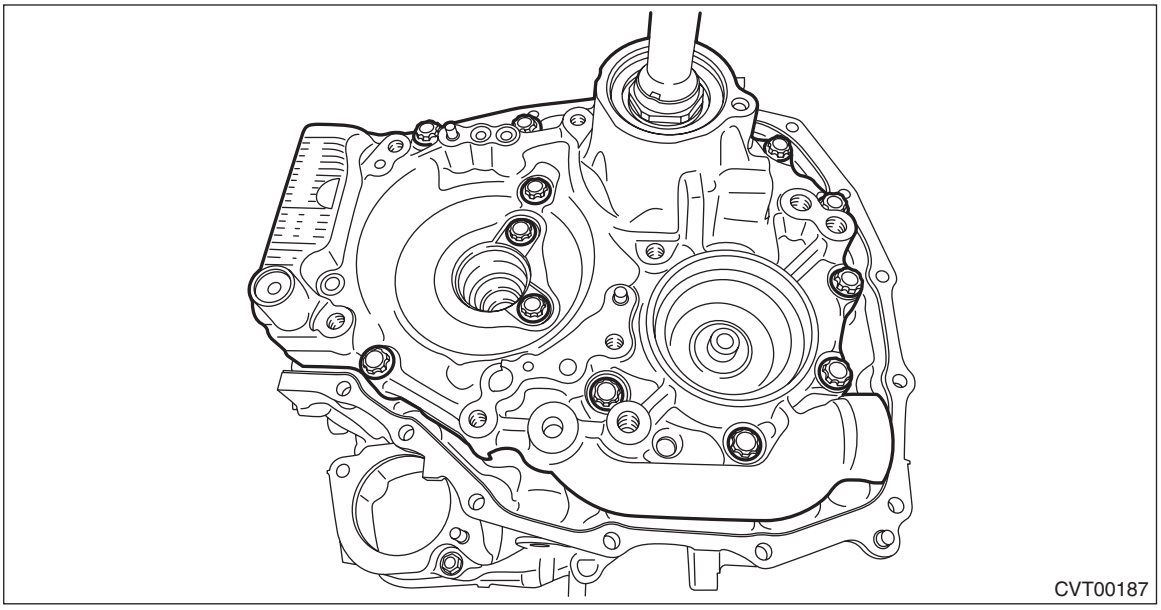
4) Obtain the thickness of washer using the following formula to select the washer.
T (mm) = A – B – (0.35 — 0.70)
[T (in) = A – B – (0.014 — 0.028)]
T: Shim thickness
A: Depth from the ST upper face to the washer mounting surface
B: Height from ST upper face to the drive pinion retainer mating surface
0.35 — 0.70 mm (0.014 — 0.028 in): Clearance

Washer	
Part No.	Thickness mm (in)
803064020	1.3 (0.051)
803064021	1.55 (0.061)
803064022	1.8 (0.071)
803064023	2.05 (0.081)
803064024	2.3 (0.091)
803064025	2.55 (0.100)

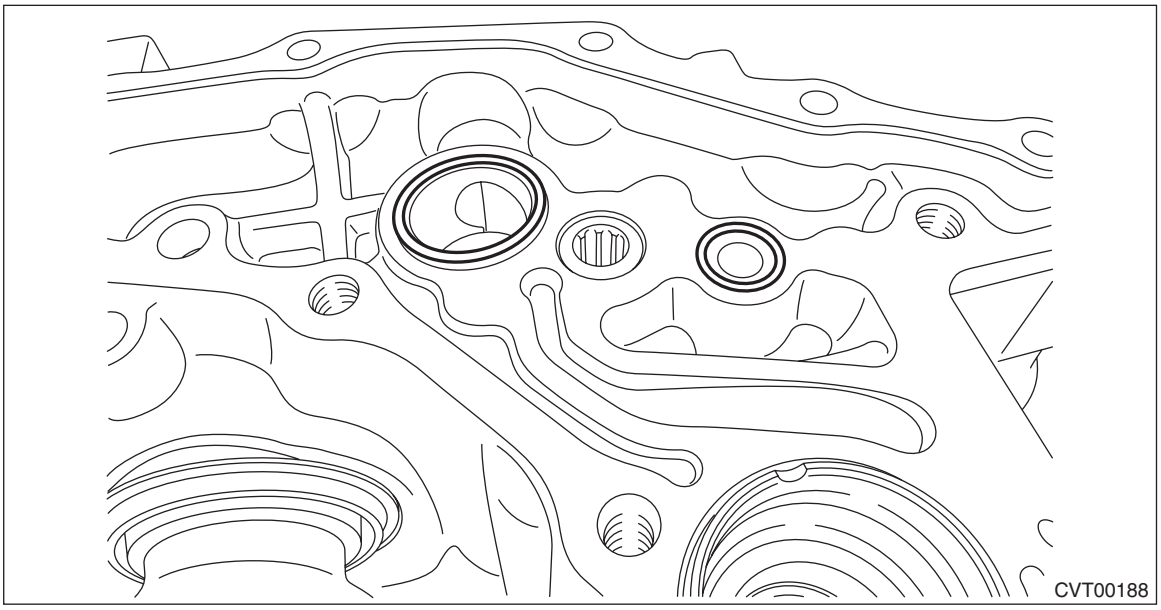
47.Drive Pinion Shaft Assembly

A: REMOVAL

1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TH58A)-63, REMOVAL, Automatic Transmission Assembly.>
2) Remove the air breather hose. <Ref. to CVT(TH58A)-171, REMOVAL, Air Breather Hose.>
3) Remove the transmission harness. <Ref. to CVT(TH58A)-143, REMOVAL, Transmission Harness.>
4) Remove the main control valve body. <Ref. to CVT(TH58A)-115, REMOVAL, Control Valve Body.>
5) Remove the turbine speed sensor. <Ref. to CVT(TH58A)-104, REMOVAL, Turbine Speed Sensor.>
6) Remove the secondary speed sensor. <Ref. to CVT(TH58A)-106, REMOVAL, Secondary Speed Sensor.>
7) Remove the front wheel speed sensor. <Ref. to CVT(TH58A)-108, REMOVAL, Front Wheel Speed Sensor.>
8) Remove the inhibitor switch. <Ref. to CVT(TH58A)-101, REMOVAL, Inhibitor Switch.>
9) Remove the extension case. <Ref. to CVT(TH58A)-182, REMOVAL, Extension Case.>
10) Remove the transfer clutch assembly. <Ref. to CVT(TH58A)-186, REMOVAL, Transfer Clutch.>
11) Remove the transfer driven gear assembly. <Ref. to CVT(TH58A)-200, REMOVAL, Transfer Driven Gear.>
12) Remove the transfer drive gear assembly. <Ref. to CVT(TH58A)-203, REMOVAL, Transfer Drive Gear.>
13) Remove the parking pawl. <Ref. to CVT(TH58A)-208, REMOVAL, Parking Pawl.>
14) Remove the oil pan and oil strainer. <Ref. to CVT(TH58A)-112, REMOVAL, Oil Pan and Strainer.>
15) Remove the transmission control device. <Ref. to CVT(TH58A)-210, REMOVAL, Transmission Control Device.>
16) Remove the drive motor assembly. <Ref. to CVT(TH58A)-217, REMOVAL, Drive Motor Assembly.>
17) Remove the output clutch assembly. <Ref. to CVT(TH58A)-228, REMOVAL, Output Clutch Assembly.>
18) Remove the transmission case. <Ref. to CVT(TH58A)-245, REMOVAL, Transmission Case.>
19) Remove the reduction drive gear. <Ref. to CVT(TH58A)-258, REMOVAL, Reduction Drive Gear.>
20) Remove the primary pulley, secondary pulley and variator chain. <Ref. to CVT(TH58A)-263, REMOVAL, Primary Pulley and Secondary Pulley.>
21) Remove the reverse brake assembly. <Ref. to CVT(TH58A)-287, REMOVAL, Reverse Brake Assembly.>
22) Remove the forward clutch assembly. <Ref. to CVT(TH58A)-303, REMOVAL, Forward Clutch Assembly.>
23) Using the ST, remove the drive pinion retainer.
ST 18270KA020 SOCKET (E20)


CVT00187

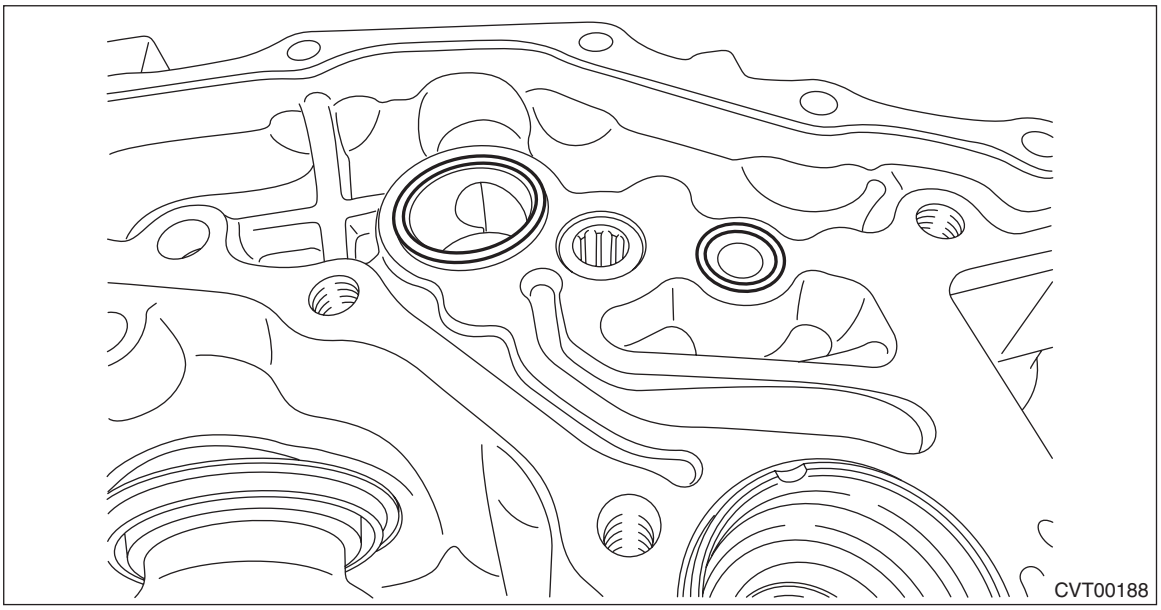
24) Remove the O-ring.



B: INSTALLATION

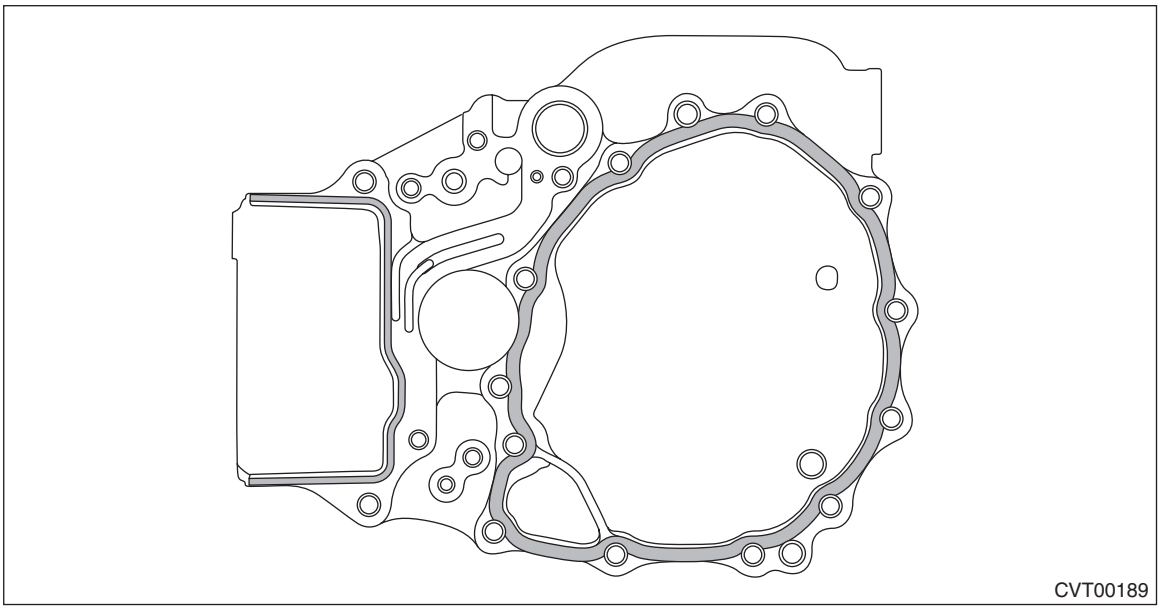
1) Clean the mating surface of drive pinion retainer and converter case.
2) Adjust the backlash and tooth contact between drive pinion shaft assembly and the front differential side gear. <Ref. to CVT(TH58A)-345, ADJUSTMENT, Drive Pinion Shaft Assembly.>
3) Install O-rings in two locations to the converter case.

NOTE:
- Use new O-rings.
- Apply CVTF to the O-ring.



4) Apply liquid gasket seamlessly to the mating surface of drive pinion retainer.

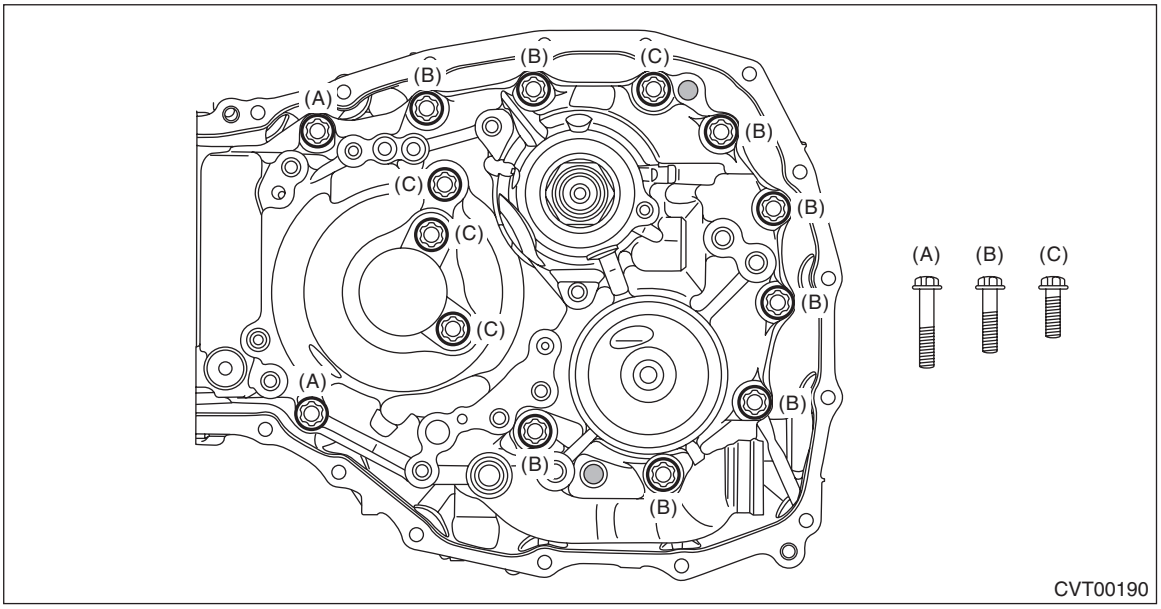
Liquid gasket:
THREE BOND 1215B or equivalent



5) Install the drive pinion retainer to converter case, and tighten the bolt using the ST.
ST 18270KA020 SOCKET (E20)

NOTE:
Do not confuse the three different-length bolts when installing.

Tightening torque:
43 N·m (4.4 kgf-m, 31.7 ft-lb)



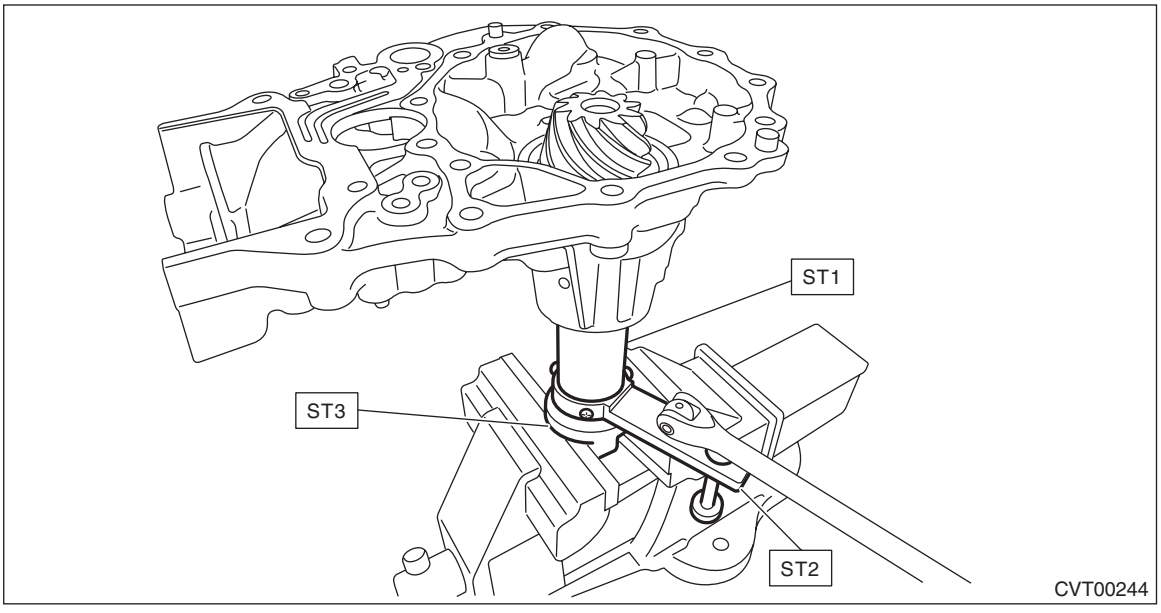
6) When replacing the drive pinion retainer, select the oil pump shaft. <Ref. to CVT(TH58A)-387, ADJUSTMENT, Oil Pump.>
7) Install the forward clutch assembly. <Ref. to CVT(TH58A)-306, INSTALLATION, Forward Clutch Assembly.>

8) Install the reverse brake assembly. <Ref. to CVT(TH58A)-290, INSTALLATION, Reverse Brake Assembly.>
9) Install the primary pulley, secondary pulley and variator chain. <Ref. to CVT(TH58A)-271, INSTALLATION, Primary Pulley and Secondary Pulley.>
10) Install the reduction drive gear. <Ref. to CVT(TH58A)-259, INSTALLATION, Reduction Drive Gear.>
11) Install the transmission case. <Ref. to CVT(TH58A)-248, INSTALLATION, Transmission Case.>
12) Install the output clutch assembly. <Ref. to CVT(TH58A)-229, INSTALLATION, Output Clutch Assembly.>
13) Install the drive motor assembly. <Ref. to CVT(TH58A)-221, INSTALLATION, Drive Motor Assembly.>
14) Install the transmission control device. <Ref. to CVT(TH58A)-213, INSTALLATION, Transmission Control Device.>
15) Install the oil strainer and oil pan. <Ref. to CVT(TH58A)-114, INSTALLATION, Oil Pan and Strainer.>
16) Install the parking pawl. <Ref. to CVT(TH58A)-208, INSTALLATION, Parking Pawl.>
17) Install the transfer drive gear assembly. <Ref. to CVT(TH58A)-204, INSTALLATION, Transfer Drive Gear.>
18) Install the transfer driven gear assembly. <Ref. to CVT(TH58A)-201, INSTALLATION, Transfer Driven Gear.>
19) Install the transfer clutch assembly. <Ref. to CVT(TH58A)-188, INSTALLATION, Transfer Clutch.>
20) Install the extension case. <Ref. to CVT(TH58A)-183, INSTALLATION, Extension Case.>
21) Install the inhibitor switch. <Ref. to CVT(TH58A)-102, INSTALLATION, Inhibitor Switch.>
22) Install the secondary speed sensor. <Ref. to CVT(TH58A)-106, INSTALLATION, Secondary Speed Sensor.>
23) Install the front wheel speed sensor. <Ref. to CVT(TH58A)-108, INSTALLATION, Front Wheel Speed Sensor.>
24) Install the turbine speed sensor. <Ref. to CVT(TH58A)-104, INSTALLATION, Turbine Speed Sensor.>
25) Install the main control valve body. <Ref. to CVT(TH58A)-123, INSTALLATION, Control Valve Body.>
26) Install the transmission harness. <Ref. to CVT(TH58A)-151, INSTALLATION, Transmission Harness.>
27) Install the air breather hose. <Ref. to CVT(TH58A)-173, INSTALLATION, Air Breather Hose.>
28) Install the transmission assembly to the vehicle. <Ref. to CVT(TH58A)-77, INSTALLATION, Automatic Transmission Assembly.>

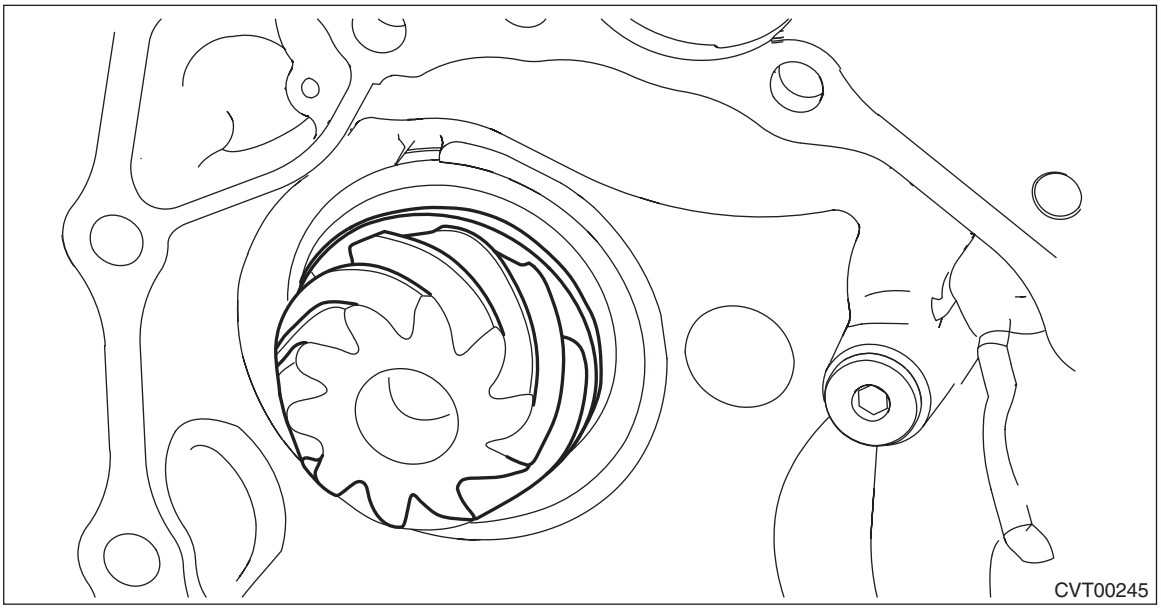
C: DISASSEMBLY

1) Flatten the tab of the lock nut.
2) Using ST1, ST2 and ST3, fix at the spline portion of drive pinion shaft to remove the lock nut.

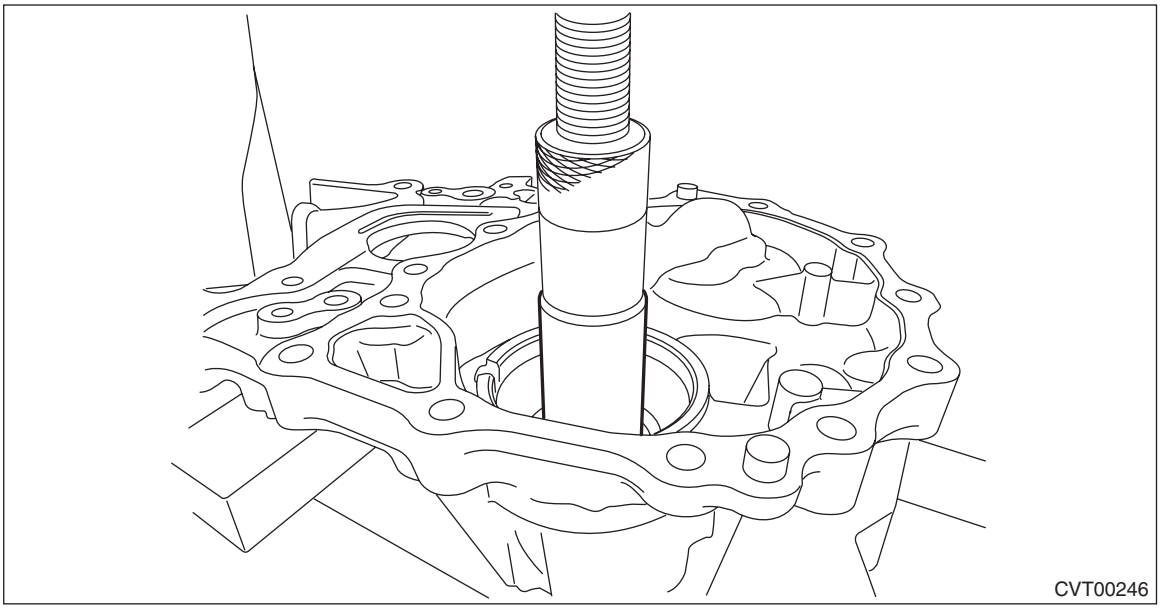
ST1	499787500	ADAPTER
ST2	499787700	WRENCH
ST3	498937110	HOLDER



3) Remove the drive pinion shaft from the drive pinion retainer.

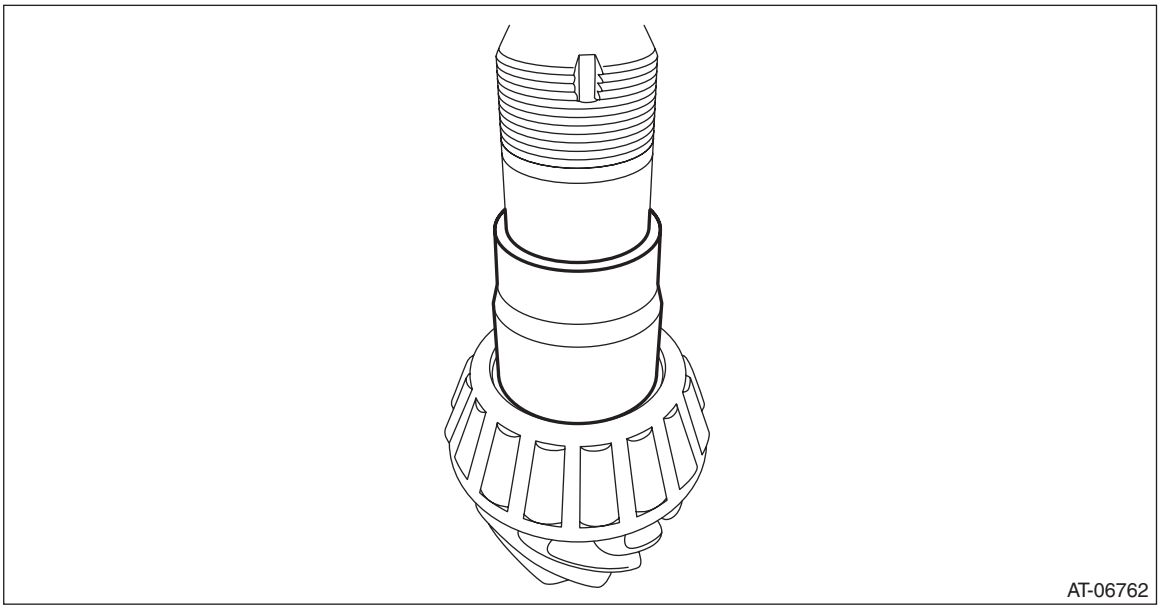


4) Using the round bar with diameter of 36 mm (1.42 in) or 37 mm (1.46 in), remove the bearing inner race and plug.

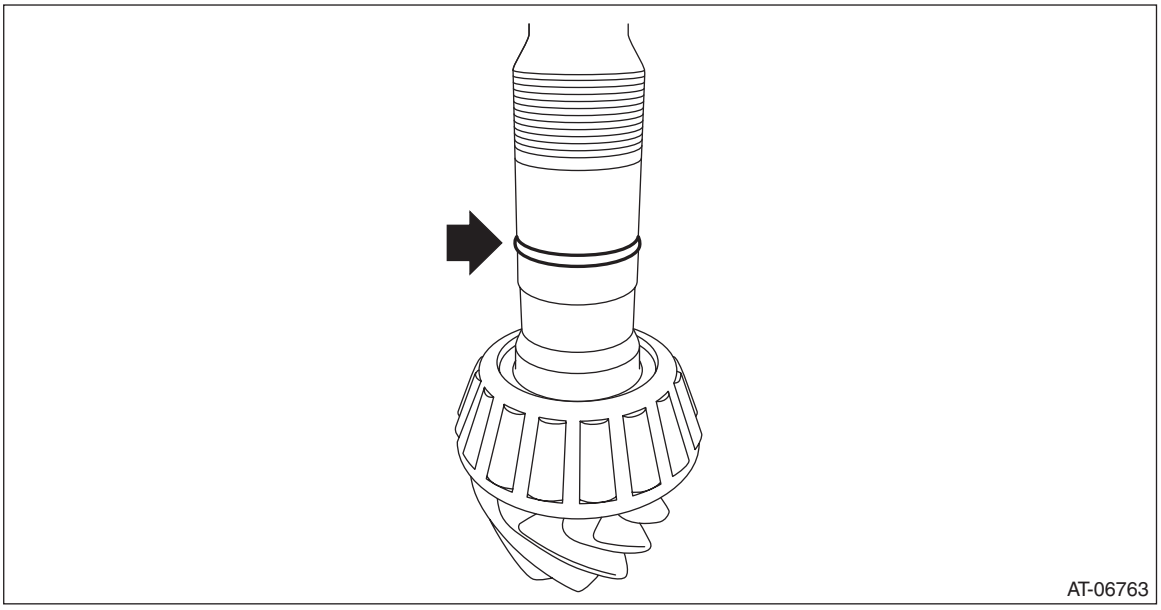


5) Remove the drive pinion washer.

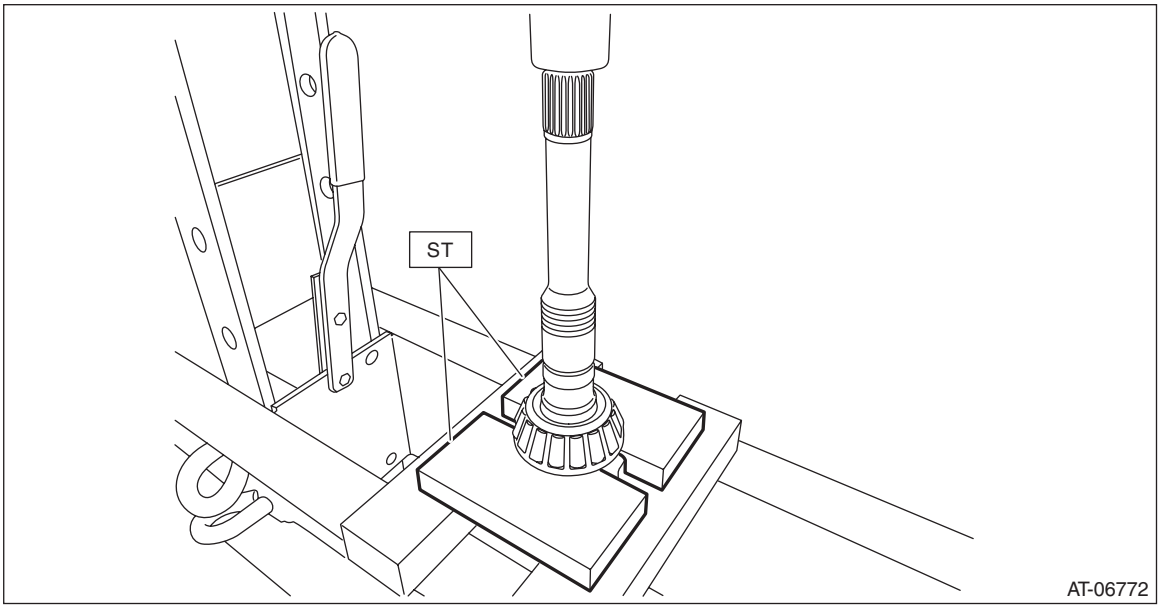
6) Remove the drive pinion spacer.



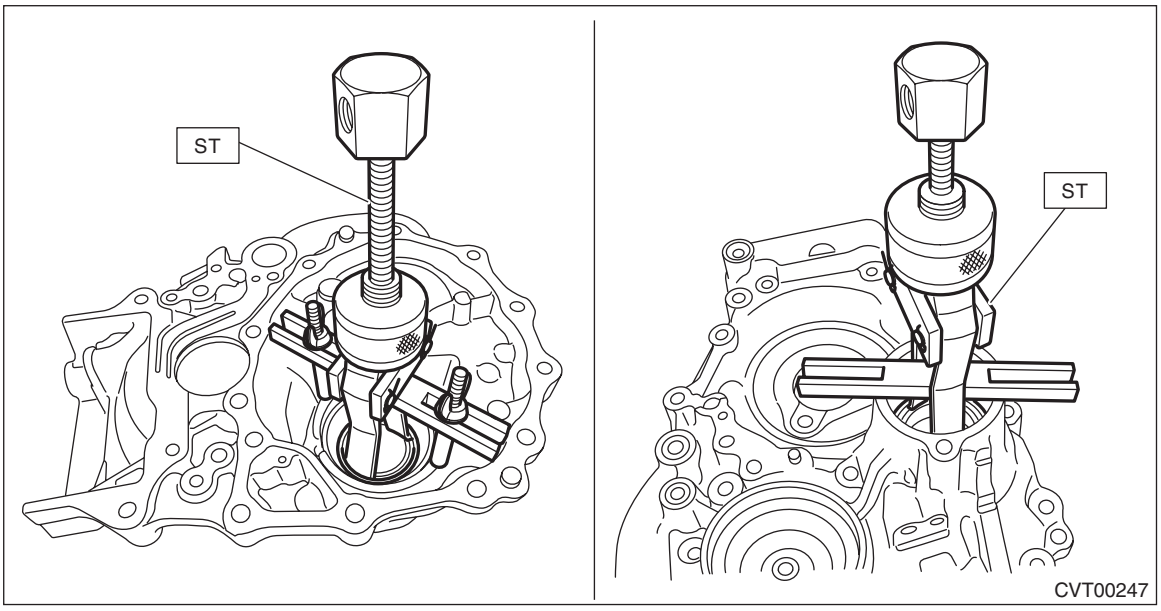
7) Remove the O-ring.



8) Remove the inner race and drive pinion shim from drive pinion shaft using ST.
ST 498515500 REMOVER

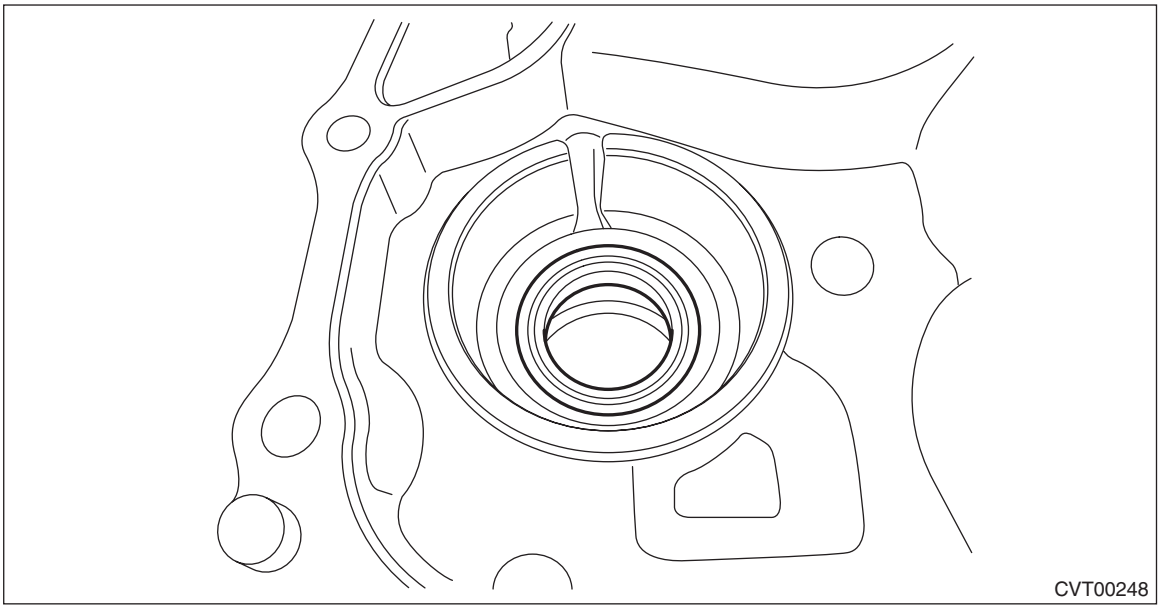


9) Using the ST, remove the outer race.
ST 398527700 PULLER ASSY

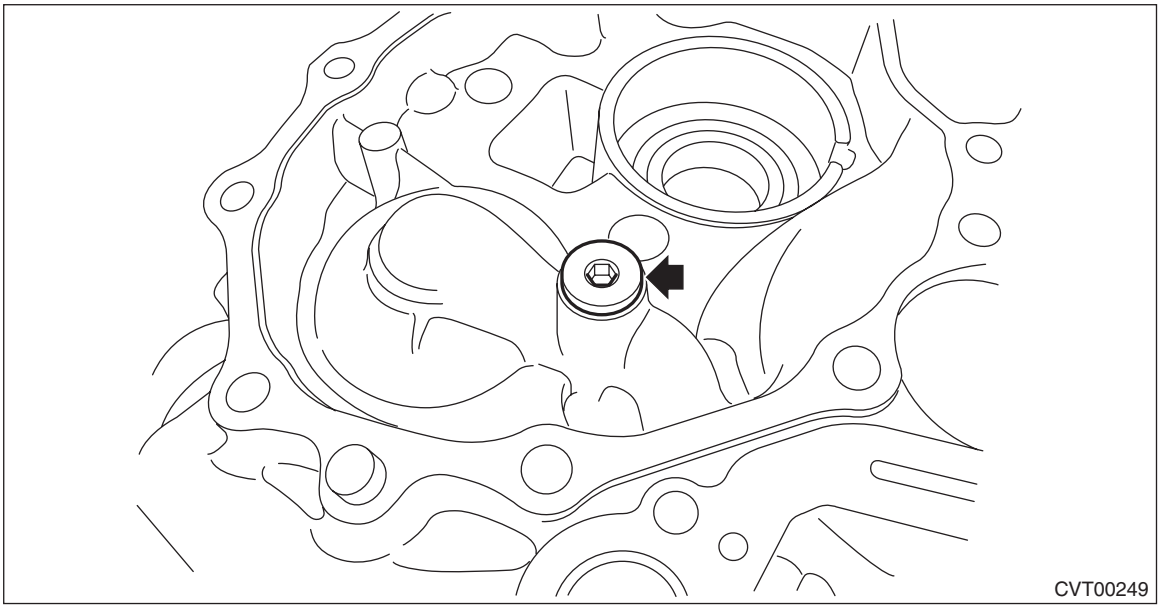


10) Remove the two oil seals using a screwdriver wrapped with cloth, etc.

CAUTION:
Do not damage the fitting surface of oil seal.



11) Remove the plug from drive pinion retainer.

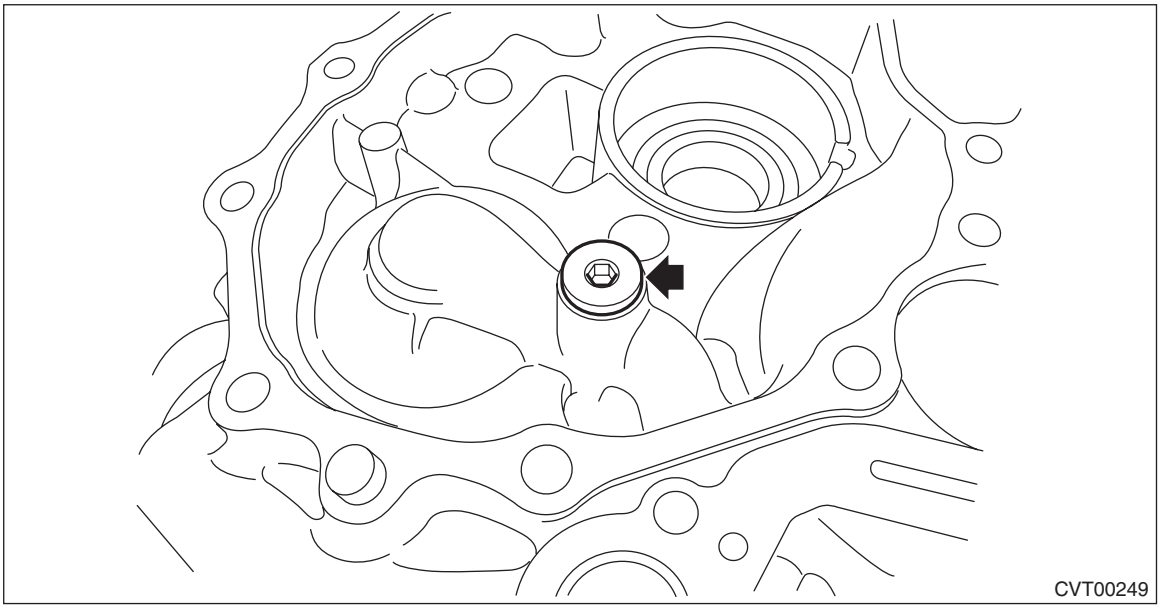


D: ASSEMBLY

1) Install the plug to drive pinion retainer.

NOTE:
- Use new O-rings.
- Apply CVTF to the O-ring.

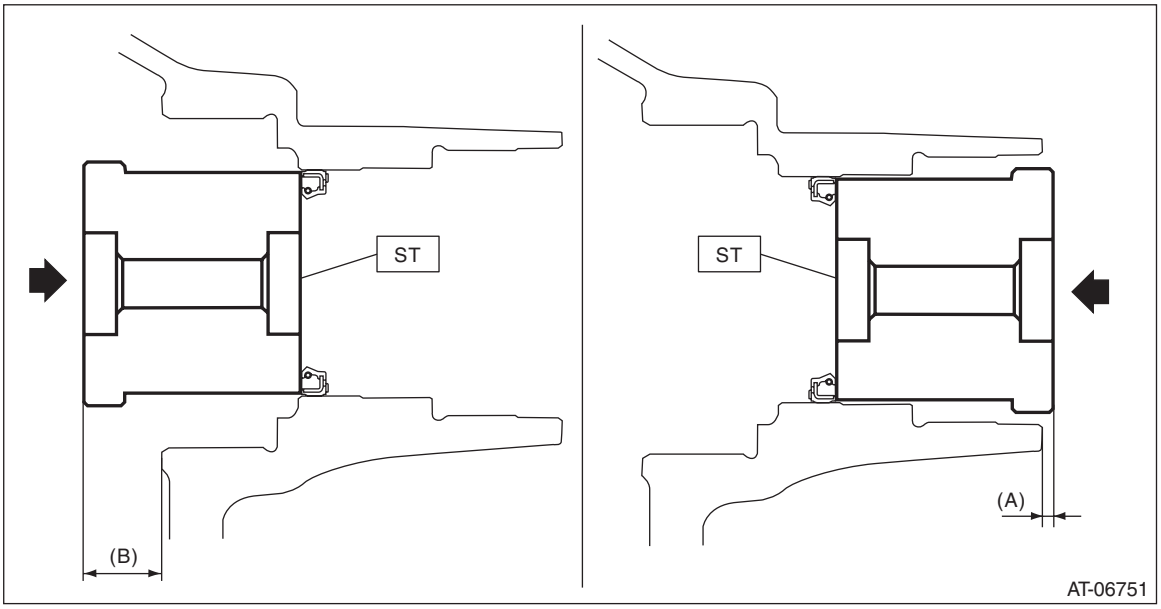
Tightening torque:
25 N·m (2.5 kgf-m, 18.4 ft-lb)



2) Using the ST, install the oil seal to drive pinion retainer.

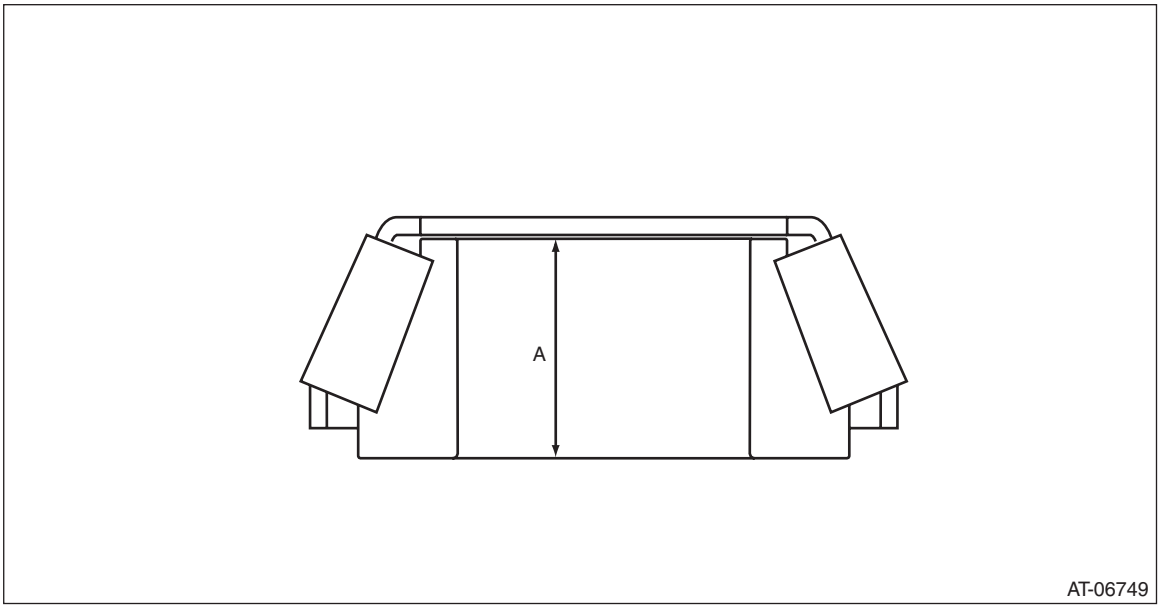
NOTE:
- Apply CVTF to the oil seal press-fitting surface and lip.
- Install the oil seal in the correct direction.

ST 927720000 HOUSING BUSHING INSTALLER AND REMOVER

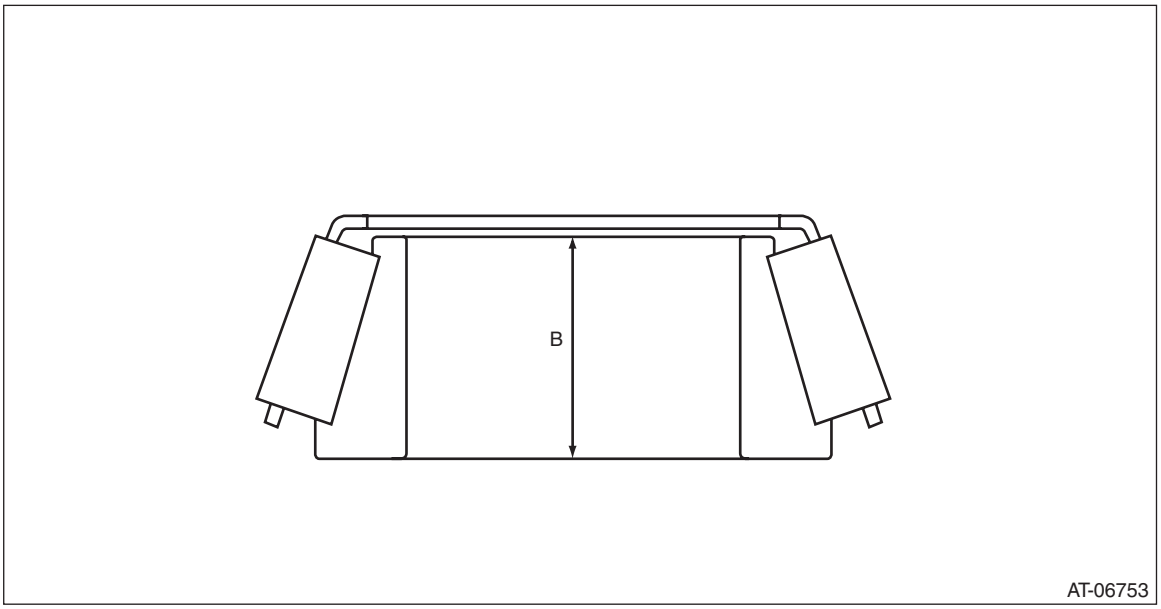


(A) 2.8 mm (0.11 in)
(B) 18.7 mm (0.74 in)

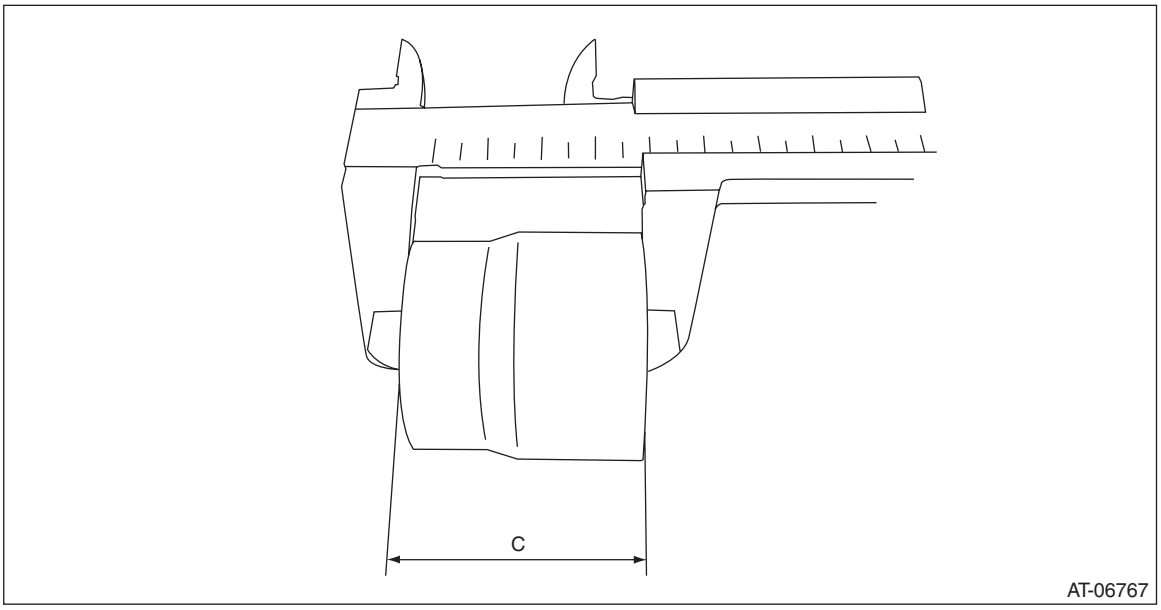
3) Select the drive pinion washer.
(1) Measure the roller bearing inner race width “A” on the front side.



(2) Measure the roller bearing inner race width “B” on the rear side.

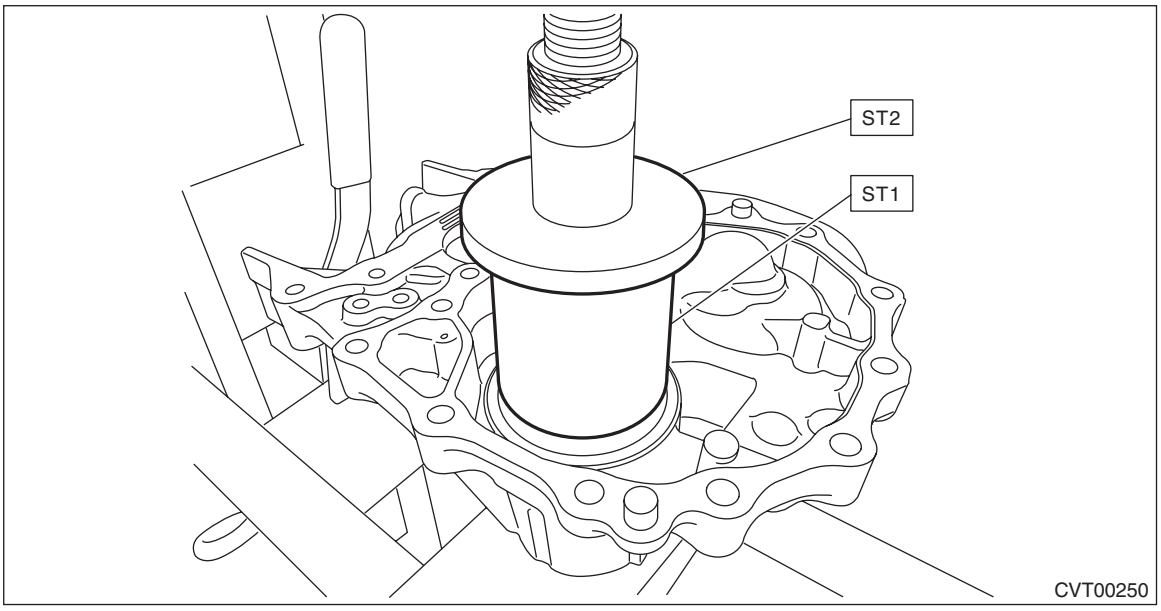


(3) Measure the spacer width “C”.



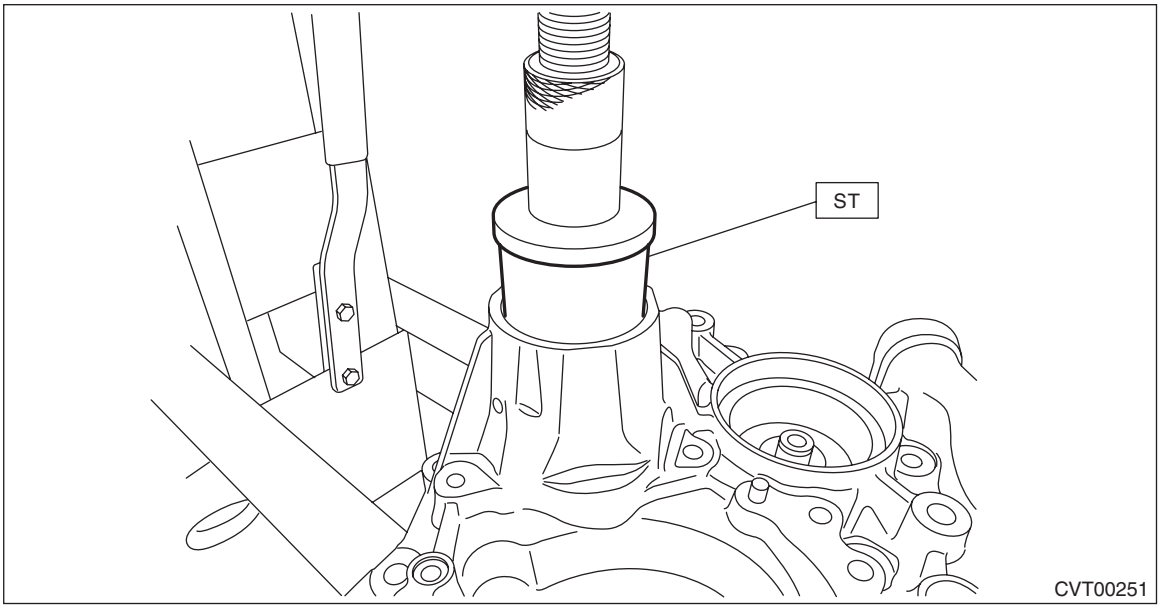
(4) Using the ST, install the front roller bearing outer race to the drive pinion retainer.

ST1 28499TC010 INSTALLER
ST2 398177700 INSTALLER



(5) Using the ST, install the rear roller bearing outer race to the drive pinion retainer.

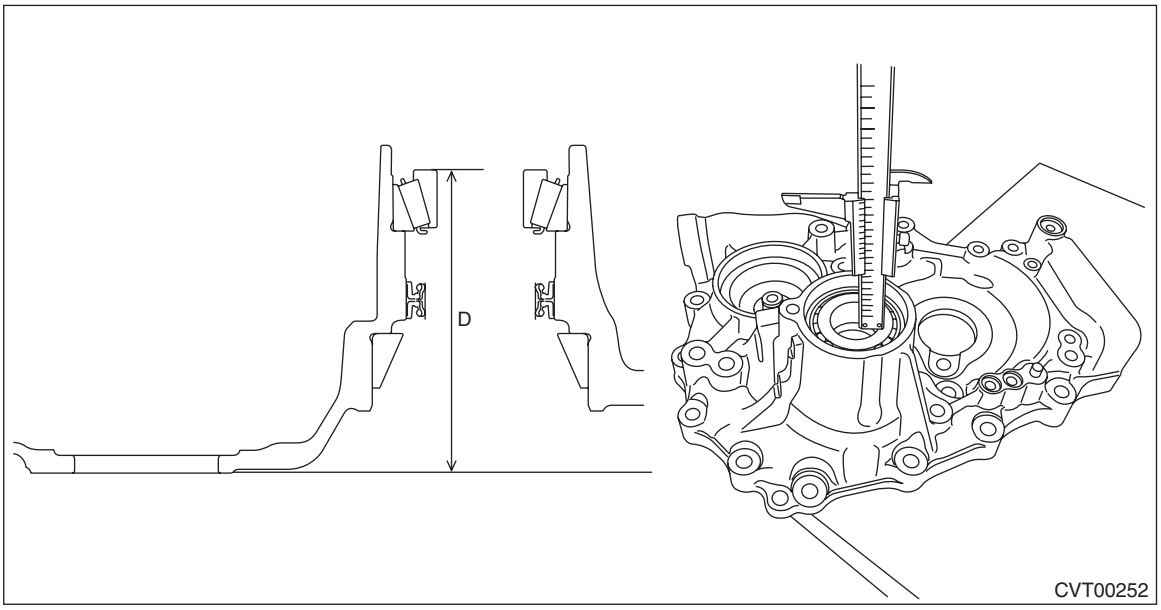
ST 20099AE020 INSTALLER



(6) Place the drive pinion retainer on the surface plate, and install the inner race to the rear roller bearing outer race.

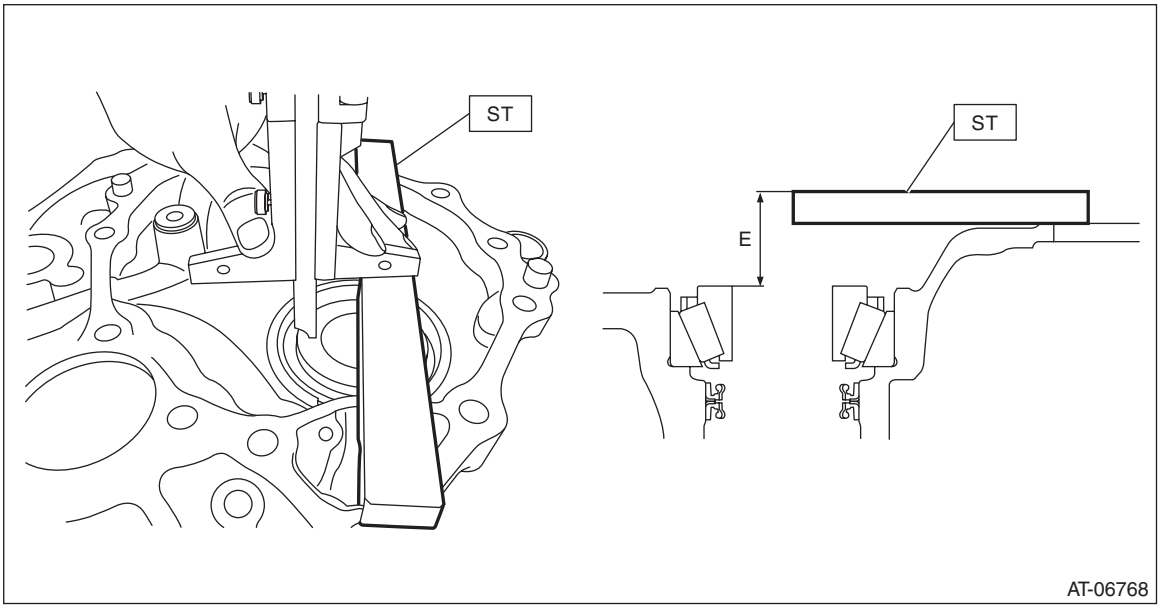
NOTE:
Place the drive pinion retainer so that the mating surface of the drive pinion retainer (mating surface with the converter case) contacts the surface plate.

(7) Measure the height “D” from the end face of the rear roller bearing inner race to the surface plate.



(8) Install the inner race to the front roller bearing outer race.

(9) Measure the depth “E” from the end face of the front roller bearing inner race to the end face of the ST.
ST 499575400 GAUGE

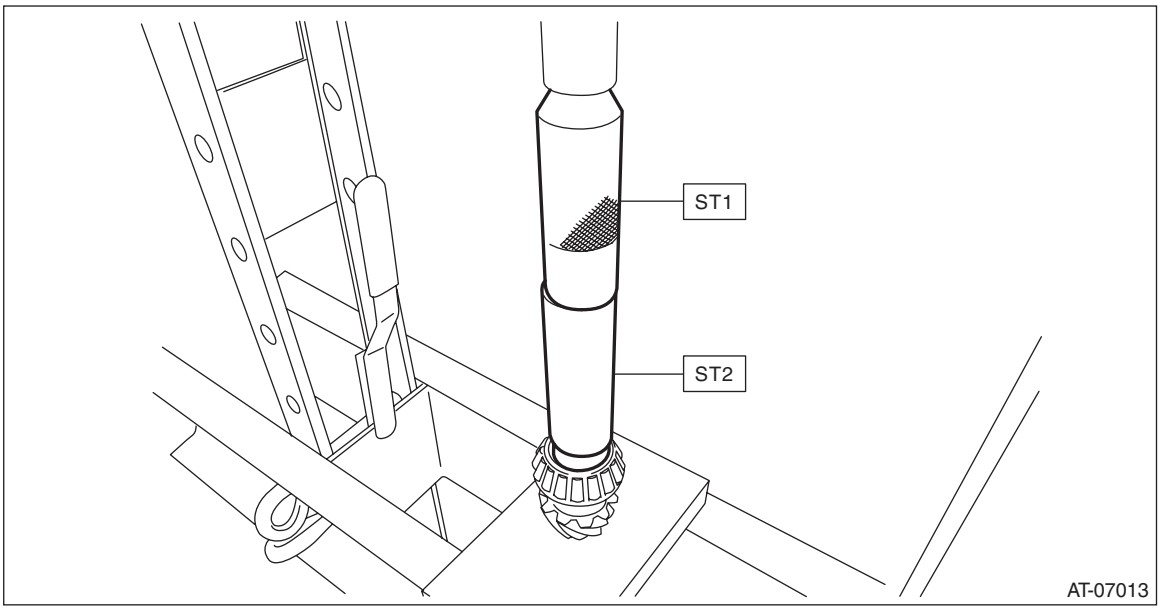


(10) Using following formula, select one to three drive pinion washers.
T (mm) = D – (A + B + C + E – 15) – (0±0.0125)
[T (in) = D – (A + B + C + E – 0.591) – (0±0.0005)]
A: Front roller bearing width
B: Rear roller bearing width
C: Spacer width
D: Height from end face of rear roller bearing inner race to surface plate
E: Depth from end face of front roller bearing inner race to end face of ST
15 mm (0.591 in): Thickness of ST
T: Drive pinion washer thickness
0±0.0125 mm (0±0.0005 in): Clearance

Drive pinion washer	
Part No.	Thickness mm (in)
38336AA750	0.150 (0.0059)
38336AA760	0.175 (0.0069)
38336AA770	0.200 (0.0079)
38336AA780	0.225 (0.0089)
38336AA790	0.250 (0.0098)
38336AA800	0.275 (0.0108)
38336AA810	0.300 (0.0118)
38336AA820	0.400 (0.0157)

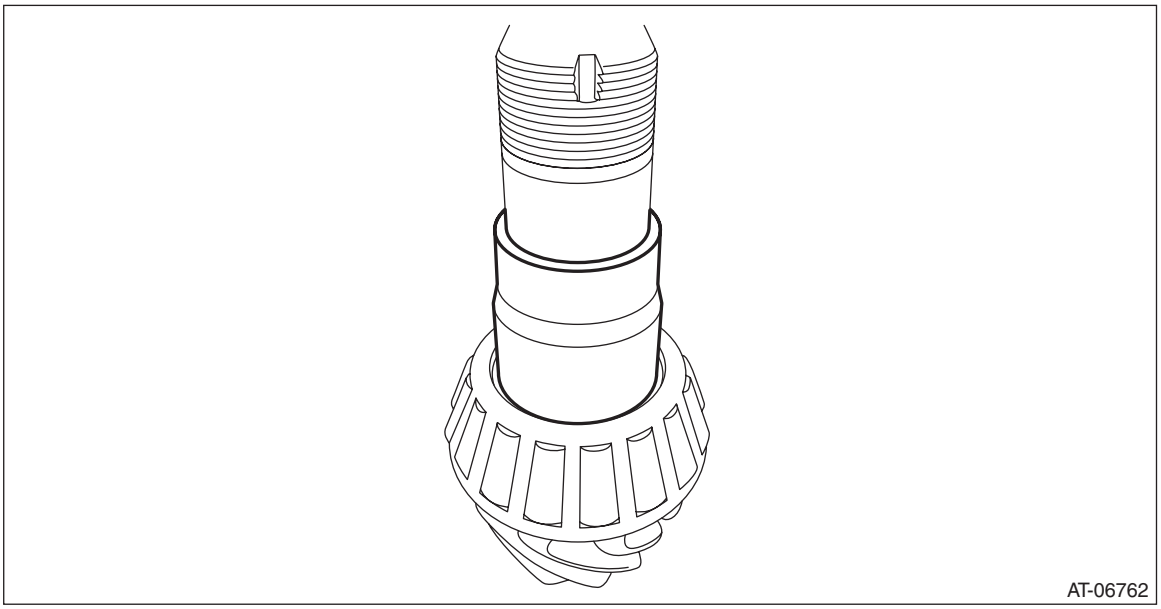
4) Measure and record the drive pinion shim thickness to be reused.
5) Install the drive pinion shim that is reused for the drive pinion shaft.

6) Using the ST1 and ST2, press-fit the inner race to the drive pinion shaft.
ST1 899580100 INSTALLER
ST2 927130000 EXTENSION DRIVE SHAFT

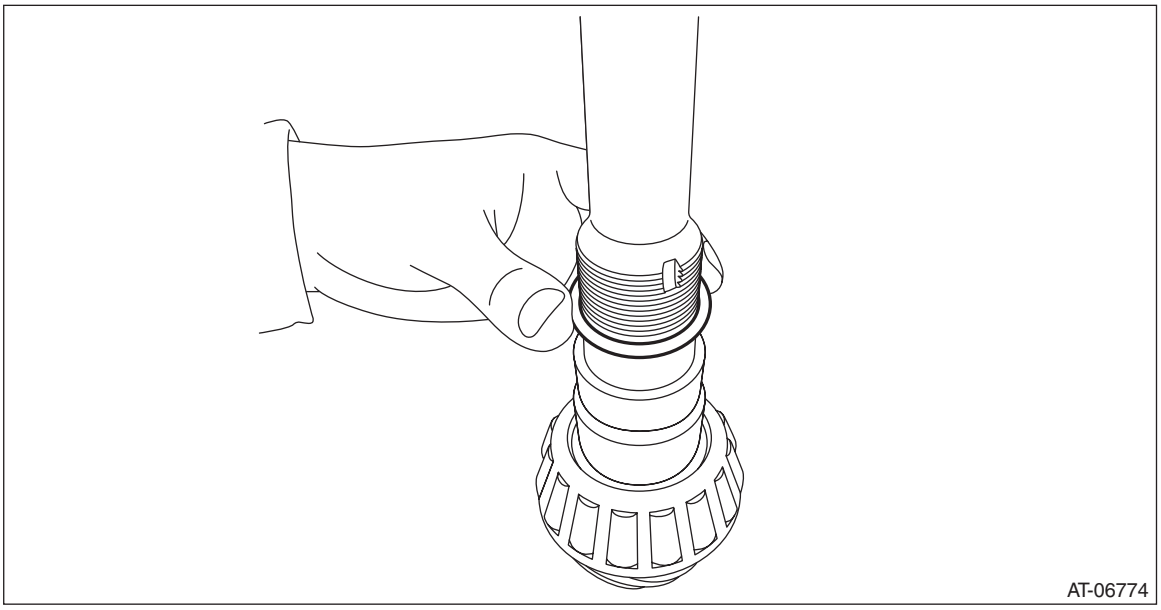


7) Install the drive pinion spacer.

NOTE:
Replace the O-ring with a new part after tooth contact inspection.



8) Install the selected drive pinion washer.

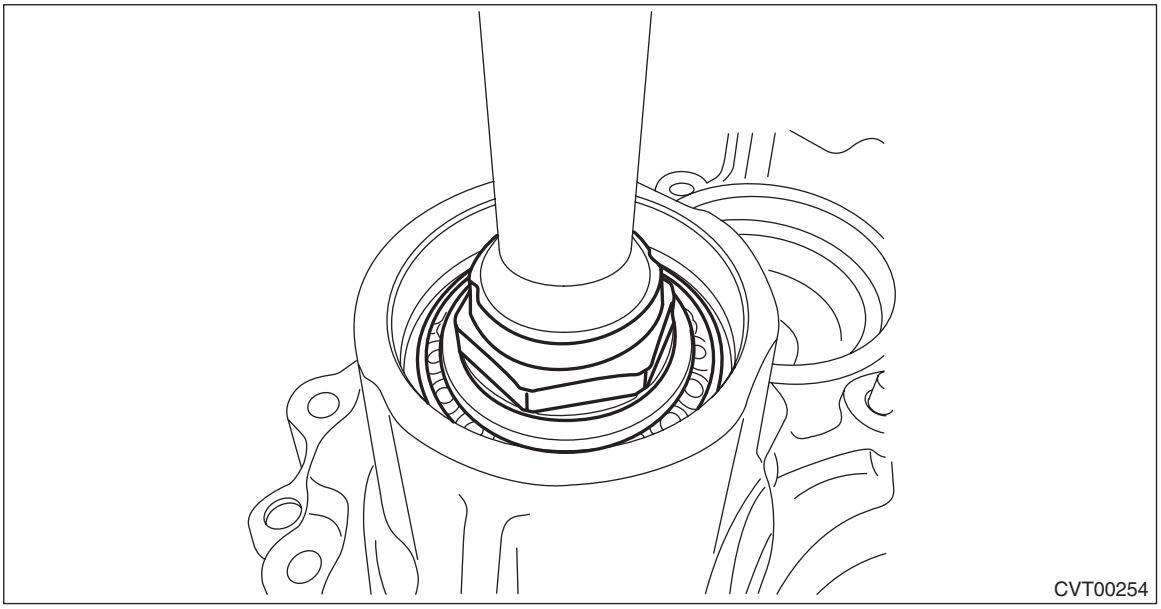


9) Insert the drive pinion shaft into the drive pinion retainer.

CAUTION:
Be careful not to damage the oil seal.

10) Install the inner bearing and lock nut.

NOTE:
Use a new lock nut.



11) Using the ST, tighten the lock nut to the specified torque so that the starting torque of the drive pinion shaft is within the specified range.

CAUTION:
Before inspecting the starting torque, apply differential gear oil to roller of bearing and rotate the bearing several times.

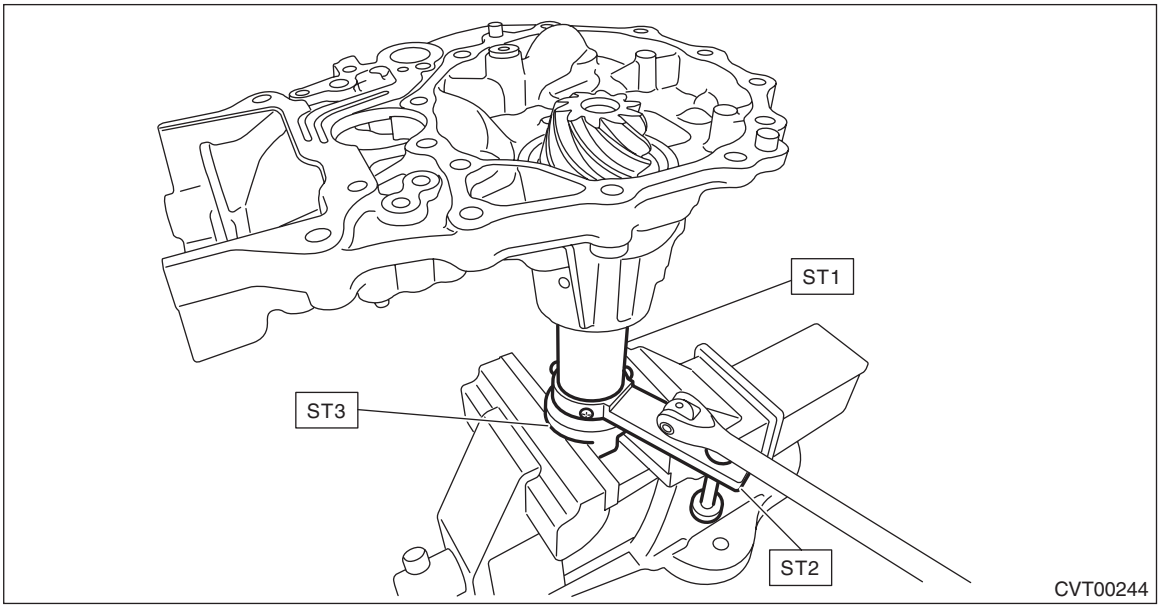
NOTE:
- Tighten the lock nut while directly aligning ST2 and torque wrench.
- If the starting torque is not within the specified range, select the drive pinion washer, and repeat the step until the starting torque is within the specified range.
- When a thicker drive pinion washer is selected, the starting torque decreases. When a thinner drive pinion washer is selected, the starting torque increases.

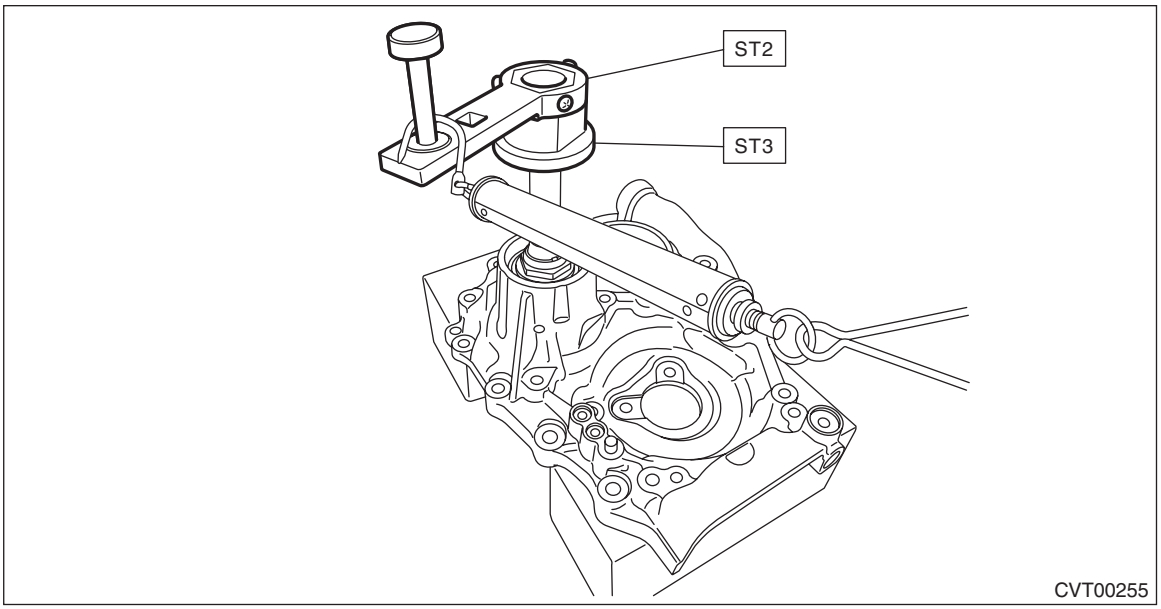
Starting torque:
5.1 — 17.1 N (0.5 — 1.7 kgf, 1.1 — 3.8 lbf)

ST1 499787500 ADAPTER
ST2 499787700 WRENCH
ST3 498937110 HOLDER

Using the following formula, calculate the tightening torque for a torque wrench.
$T2 = L2/(L1 + L2) \times T1$
T1: 170 — 250 N·m (17.3 — 25.5 kgf-m, 125.4 — 184.4 ft-lb) [Specified tightening torque range]
T2: Tightening torque
L1: ST1 length 0.072 m (2.83 in)
L2: Torque wrench length
Example:

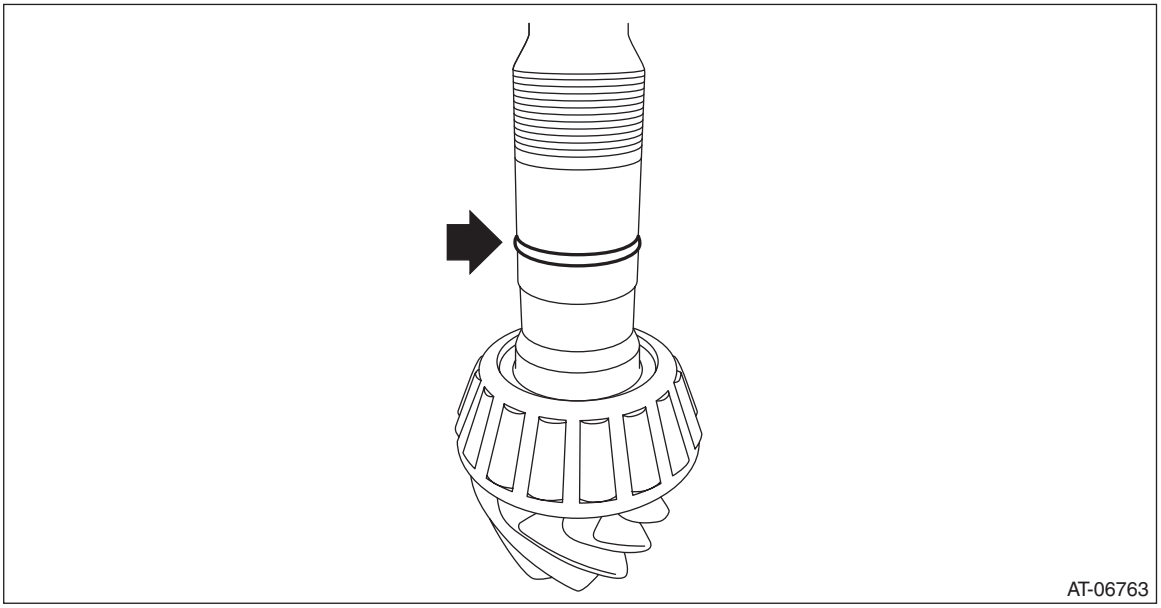
Torque wrench length m (in)	Tightening torque N·m (kgf-m, ft-lb)
0.4 (15.75)	144 — 211 (14.7 — 21.5, 106.2 — 155.6)
0.45 (17.72)	147 — 215 (15.0 — 21.9, 108.4 — 158.6)
0.5 (19.69)	149 — 218 (15.2 — 22.2, 109.9 — 160.8)
0.55 (21.65)	150 — 221 (15.3 — 22.5, 110.6 — 163.0)



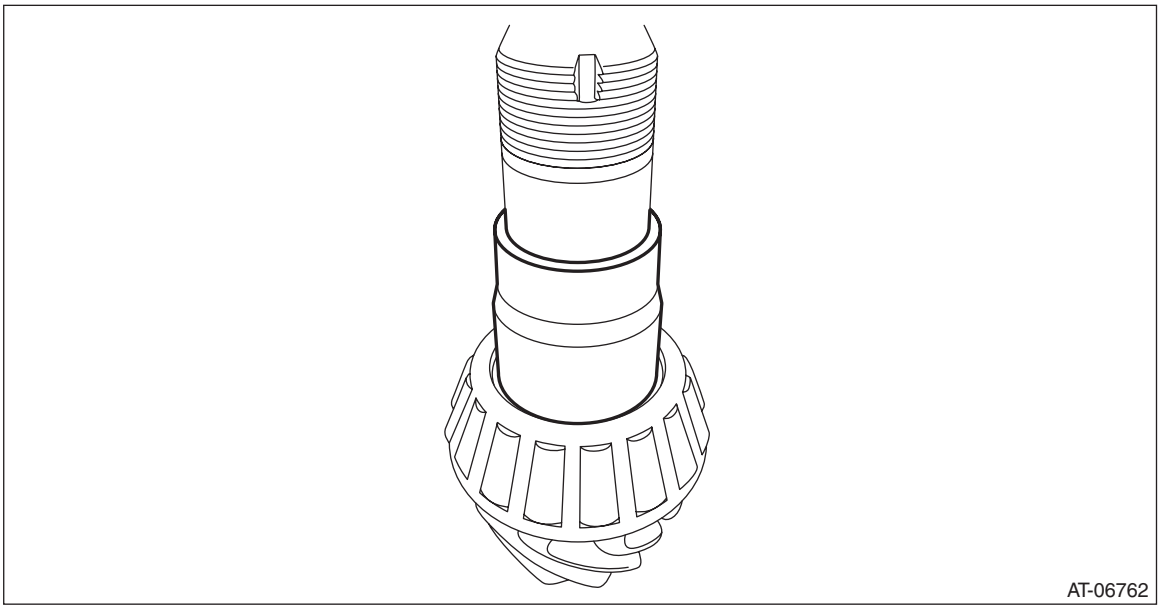


12) Install the drive pinion retainer to the converter case, and check the backlash and tooth contact. <Ref. to CVT(TH58A)-345, ADJUSTMENT, Drive Pinion Shaft Assembly.> <Ref. to CVT(TH58A)-368, ADJUSTMENT, Front Differential Assembly.>
13) Remove the drive pinion retainer from converter case. <Ref. to CVT(TH58A)-323, REMOVAL, Drive Pinion Shaft Assembly.>
14) Remove the drive pinion spacer from the drive pinion shaft. <Ref. to CVT(TH58A)-326, DISASSEMBLY, Drive Pinion Shaft Assembly.>
15) Install the O-ring to the drive pinion shaft.

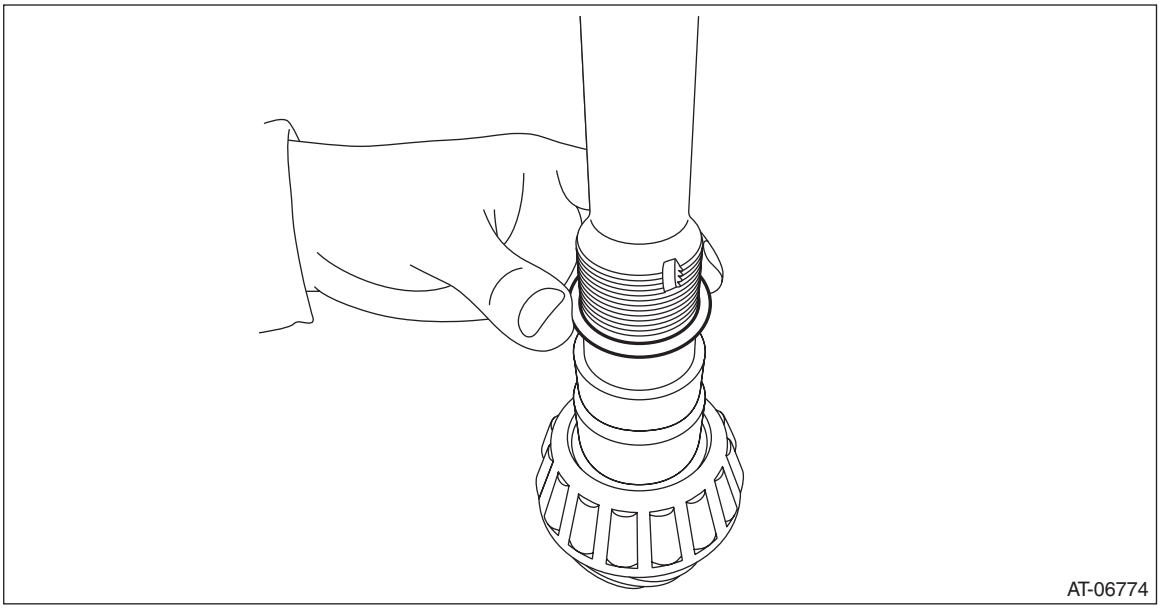
NOTE:
- Use new O-rings.
- Apply CVTF to the O-ring.



16) Install the drive pinion spacer to the drive pinion shaft.

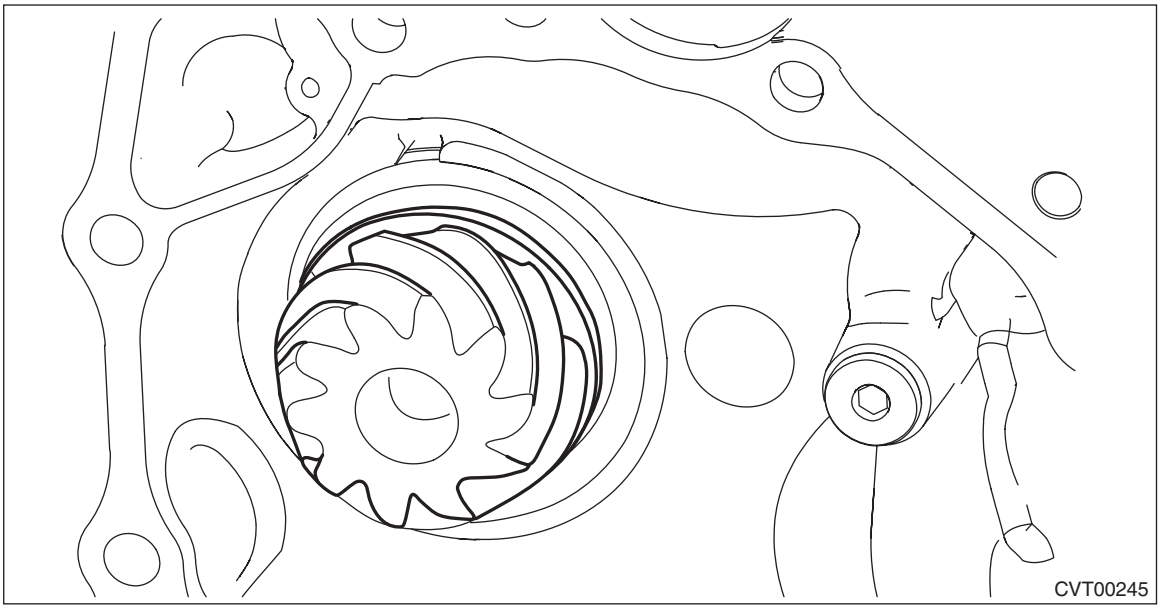


17) Install the drive pinion washer.

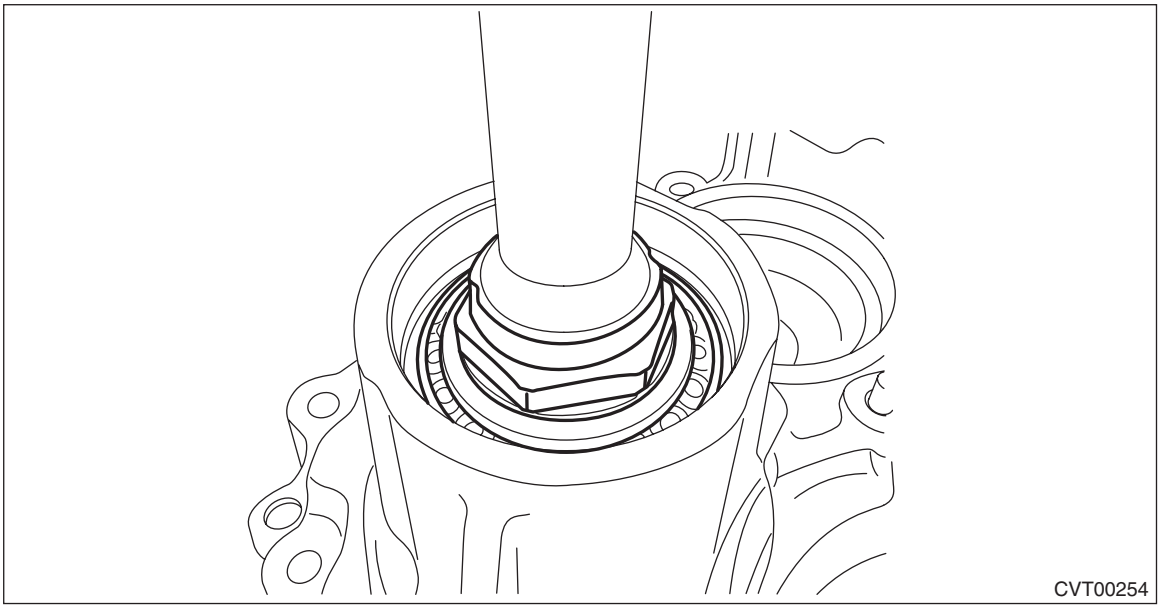


18) Insert the drive pinion shaft into the drive pinion retainer.

CAUTION:
Be careful not to damage the oil seal.



19) Install the inner bearing and lock nut.



20) Using the ST, tighten the lock nut to the specified torque so that the starting torque of the drive pinion shaft is within the specified range.

CAUTION:
Before inspecting the starting torque, apply differential gear oil to roller of bearing and rotate the bearing several times.

NOTE:
- Tighten the lock nut while directly aligning ST2 and torque wrench.
- If the starting torque is not within the specified range, select the drive pinion washer, and repeat the step until the starting torque is within the specified range.
- When a thicker drive pinion washer is selected, the starting torque decreases. When a thinner drive pinion washer is selected, the starting torque increases.

Starting torque:
5.1 — 17.1 N (0.5 — 1.7 kgf, 1.1 — 3.8 lbf)

ST1 499787500 ADAPTER
ST2 499787700 WRENCH
ST3 498937110 HOLDER

Using the following formula, calculate the tightening torque for a torque wrench.
T2 = L2/(L1 + L2) × T1
T1: 170 — 250 N·m (17.3 — 25.5 kgf-m, 125.4 — 184.4 ft-lb) [Specified tightening torque range]
T2: Tightening torque
L1: ST1 length 0.072 m (2.83 in)
L2: Torque wrench length
Example:

Torque wrench length m (in)	Tightening torque N·m (kgf-m, ft-lb)
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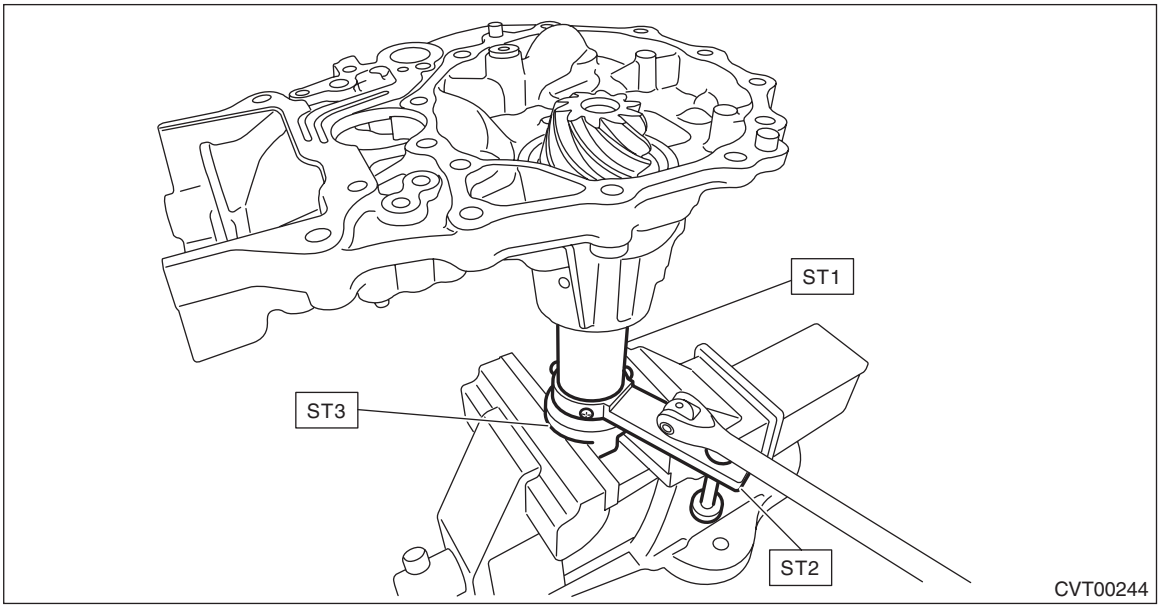
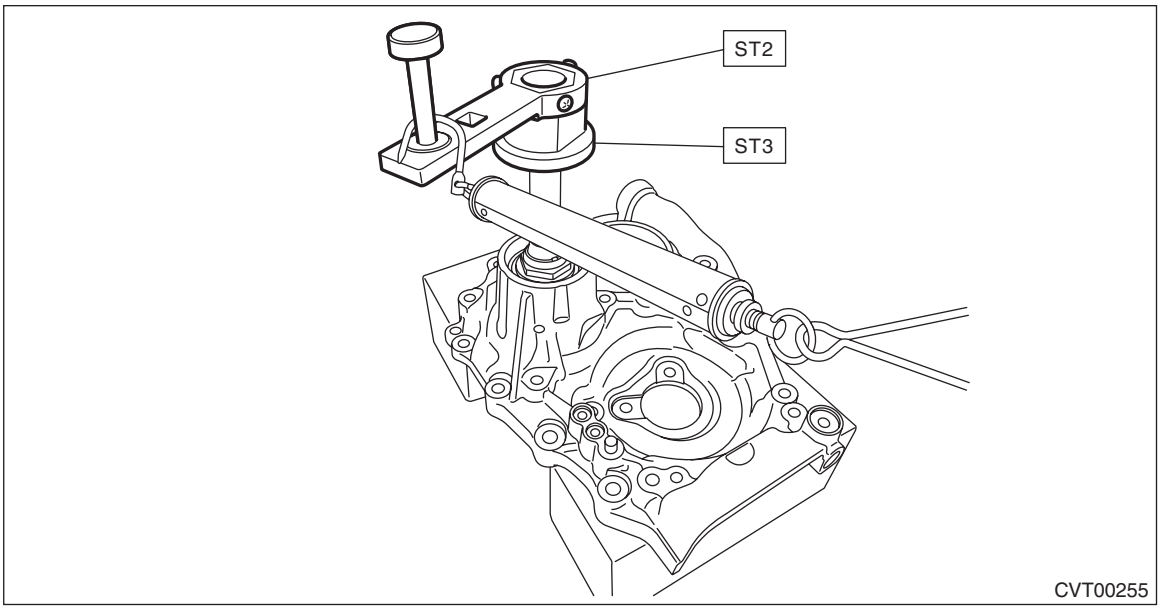
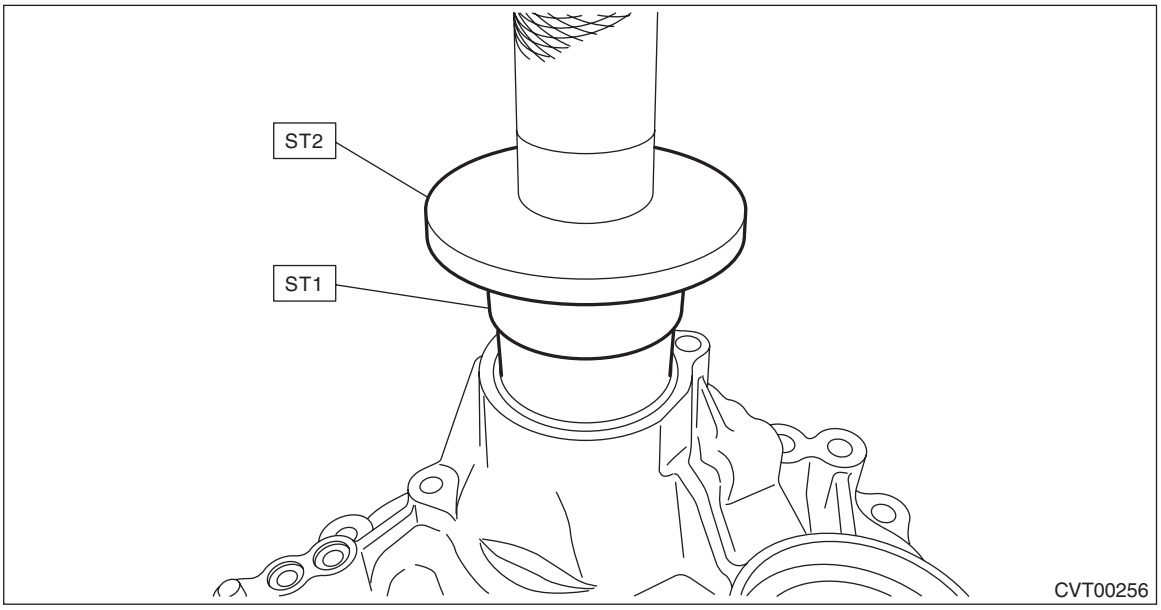
0.55 (21.65)	150 — 221 (15.3 — 22.5, 110.6 — 163.0)





21) Crimp the lock nut in 2 locations.
22) Using the ST, install the plug.

ST1	499755602	PRESS SNAP RING
ST2	398177700	INSTALLER

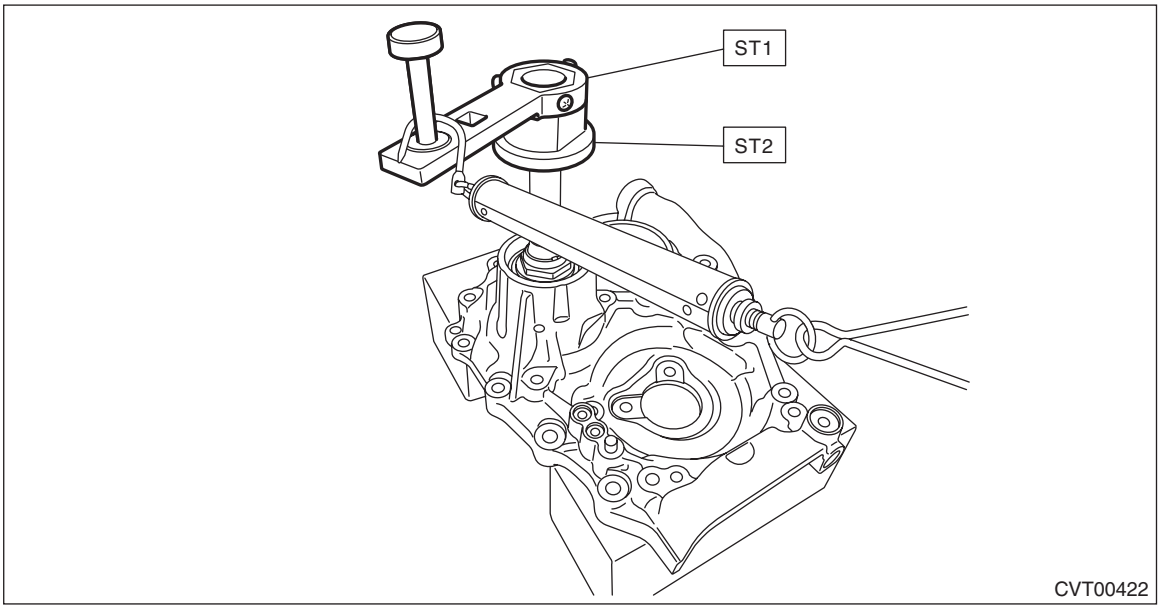


E: INSPECTION

- Make sure that all component parts are free of scratches, holes and other faults.
- Check the tooth contact. <Ref. to CVT(TH58A)-345, ADJUSTMENT, Drive Pinion Shaft Assembly.>
- Apply CVTF to bearing and rotate the bearing to check for noise or dragging etc.
- Check the starting torque of drive pinion shaft.

CAUTION:
Before measuring, apply differential gear oil to roller of bearing and rotate the bearing several times.
ST1 499787700 WRENCH
ST2 498937110 HOLDER

Starting torque:
5.1 — 17.1 N (0.5 — 1.7 kgf, 1.1 — 3.8 lbf)

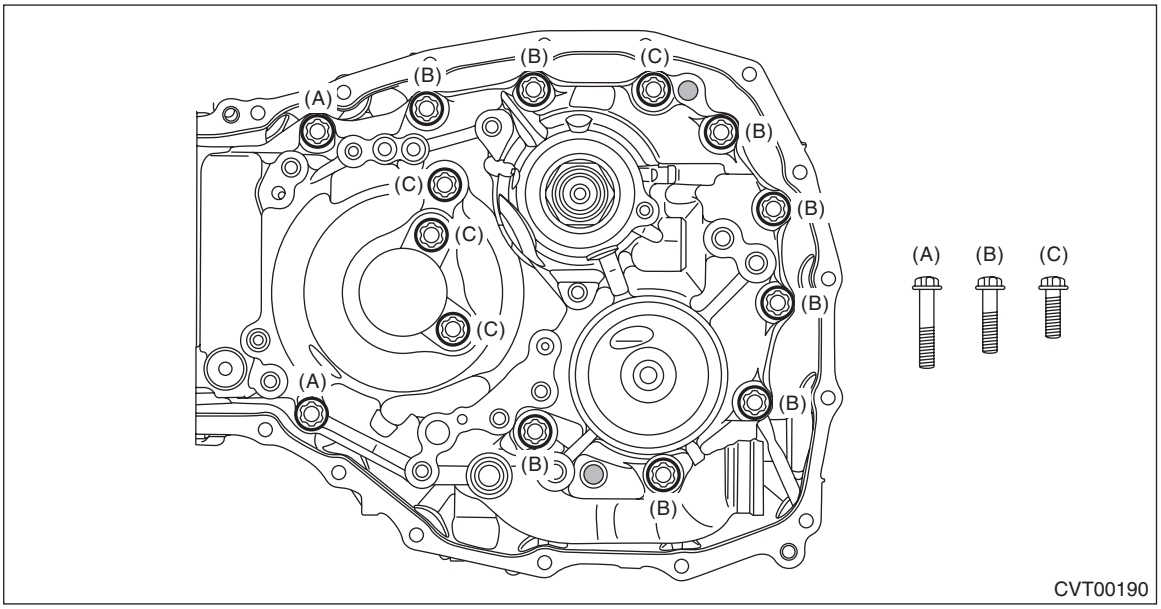


F: ADJUSTMENT

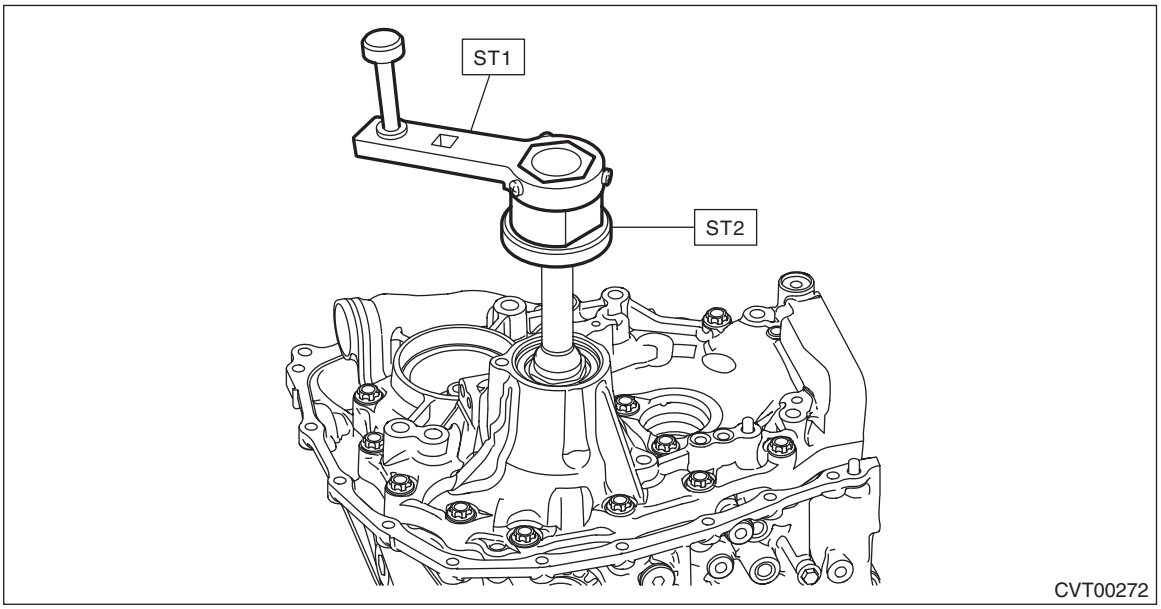
1) Remove the liquid gasket from the mating surface completely.
2) Using the ST, install the drive pinion retainer to converter case.
ST 18270KA020 SOCKET (E20)

NOTE:
Do not confuse the three different-length bolts when installing.

Tightening torque:
43 N·m (4.4 kgf-m, 31.7 ft-lb)



3) Rotate the drive pinion several times using ST1 and ST2.
ST1 499787700 WRENCH
ST2 498937110 HOLDER



4) Adjust the drive pinion and hypoid driven gear backlash. <Ref. to CVT(TH58A)-368, ADJUSTMENT, Front Differential Assembly.>
5) Using the ST, remove the drive pinion retainer from converter case.
ST 18270KA020 SOCKET (E20)

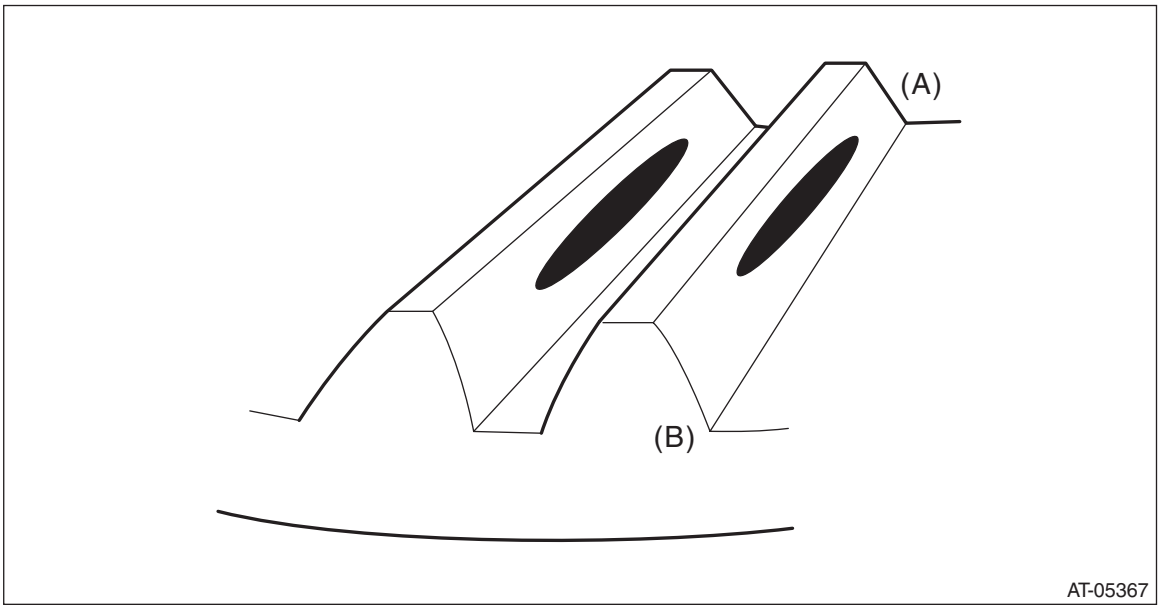
6) Apply lead-free red dye evenly on the both sides of three to four teeth of the hypoid driven gear. Then install the drive pinion retainer and rotate the drive pinion in both directions several times. Remove the drive pinion retainer and check the tooth contact pattern.
If the tooth contact is inappropriate, readjust the backlash and shim thickness (select 1 — 3 shims) until the correct tooth contact is obtained.

NOTE:
After correction, wipe off the lead-free red dye.

Drive pinion shim	
Part No.	Thickness mm (in)
31451AA320	0.150 (0.0059)
31451AA330	0.175 (0.0069)
31451AA340	0.200 (0.0079)
31451AA350	0.225 (0.0089)
31451AA360	0.250 (0.0098)
31451AA370	0.275 (0.0108)

- Correct tooth contact

Check item: Tooth contact surface is slightly shifted toward the toe side under a no-load condition. (When driving, it moves towards the heel side.)

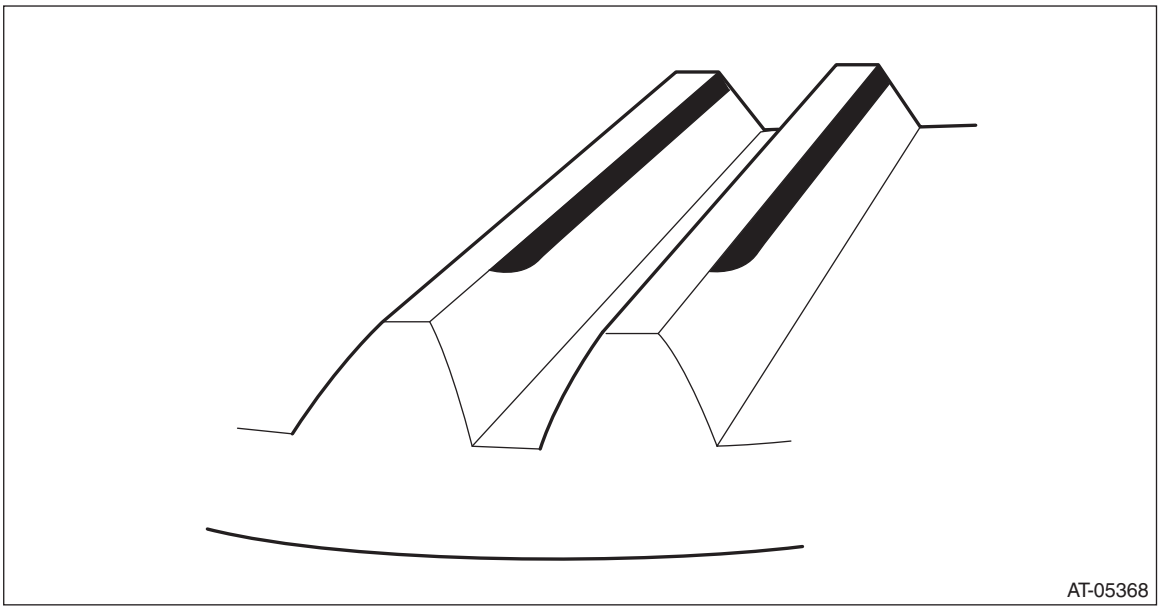


(A) Toe side
(B) Heel side

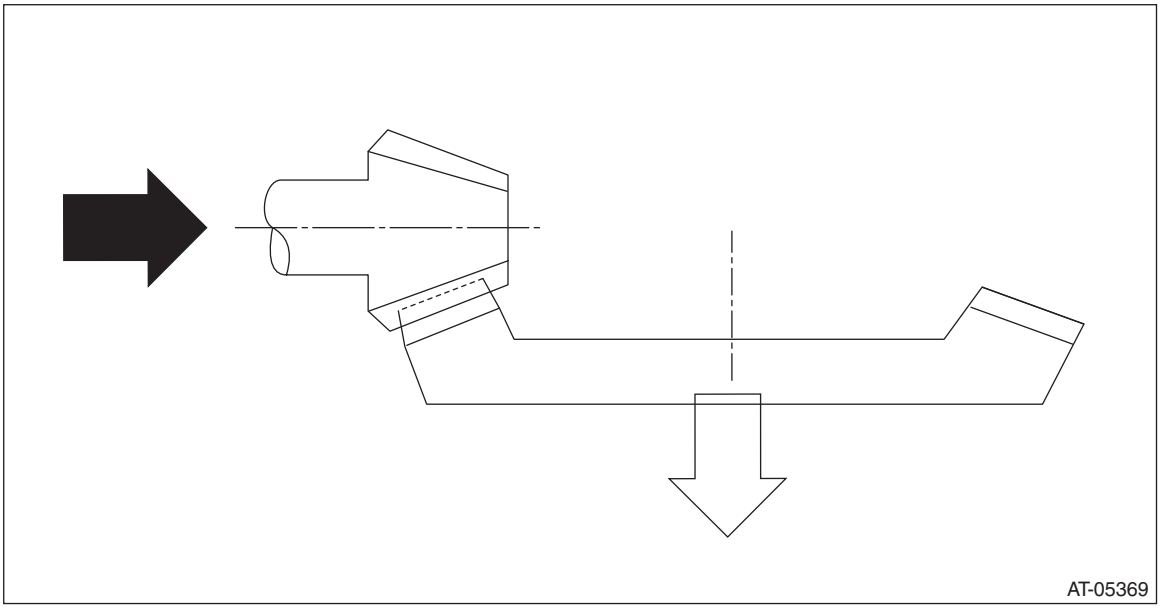
- Face contact

Check item: Backlash is too large.

Contact pattern



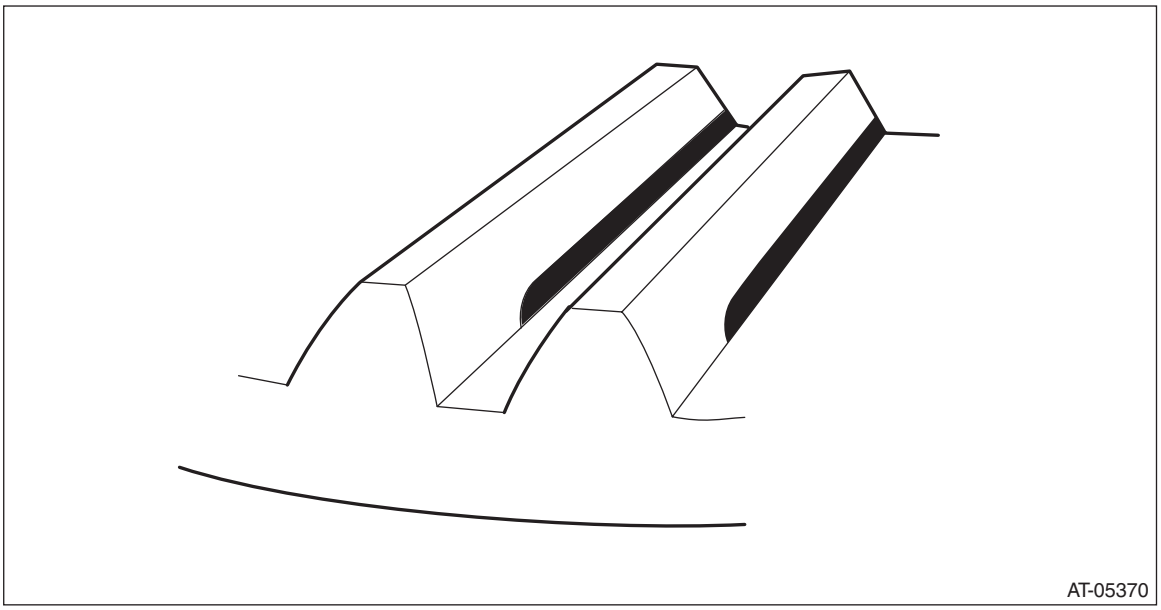
Corrective action: Increase thickness of drive pinion shim according to the procedures for moving the drive pinion close to hypoid driven gear.



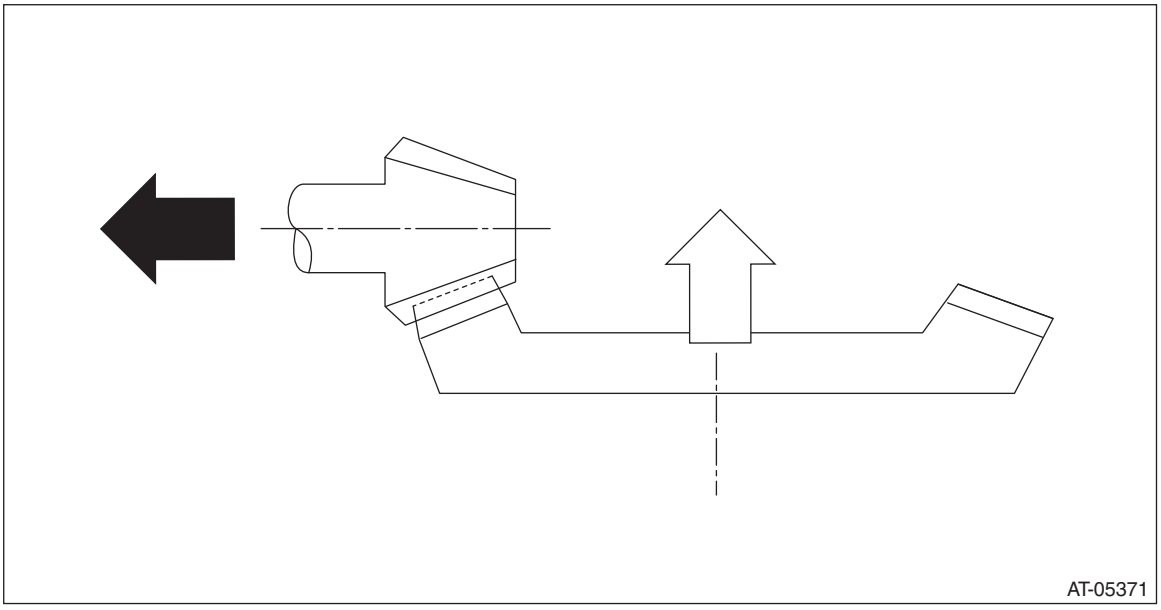
- Flank contact

Check item: Backlash is too small.

Contact pattern



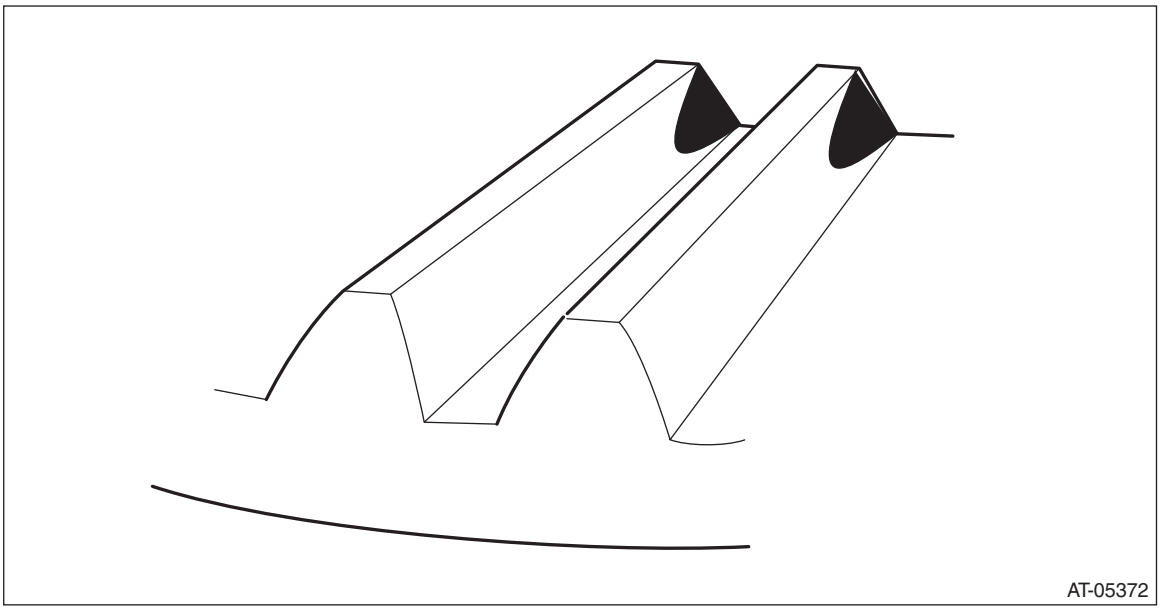
Corrective action: Reduce the thickness of the drive pinion shim according to the procedures for moving the drive pinion away from the hypoid driven gear.



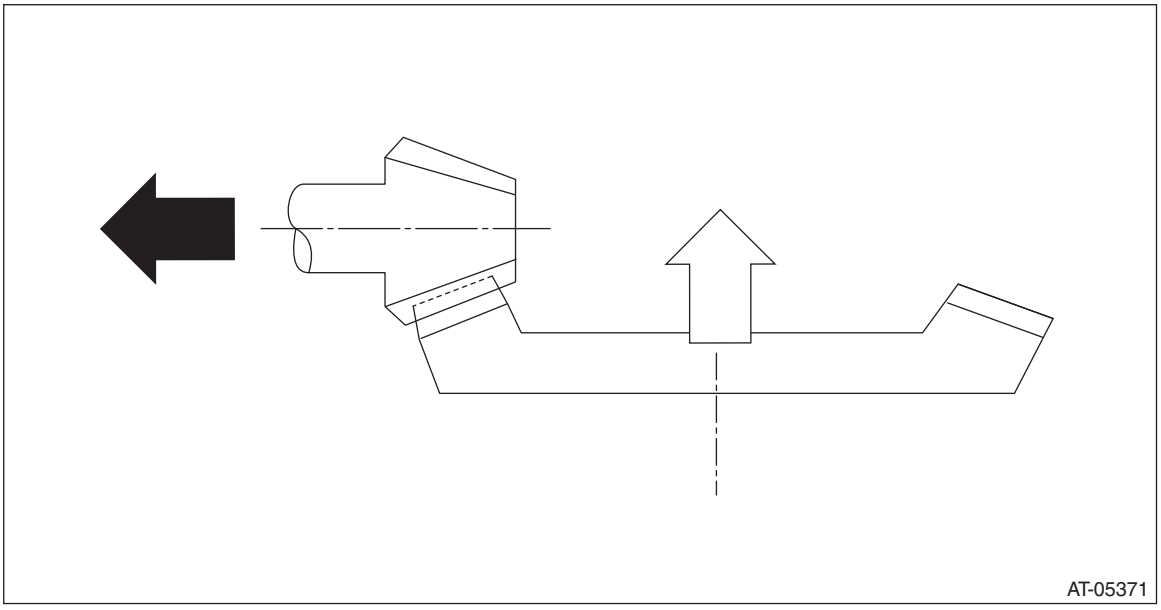
- Toe contact (inside contact)

Check item: Teeth contact area is too small.

Contact pattern



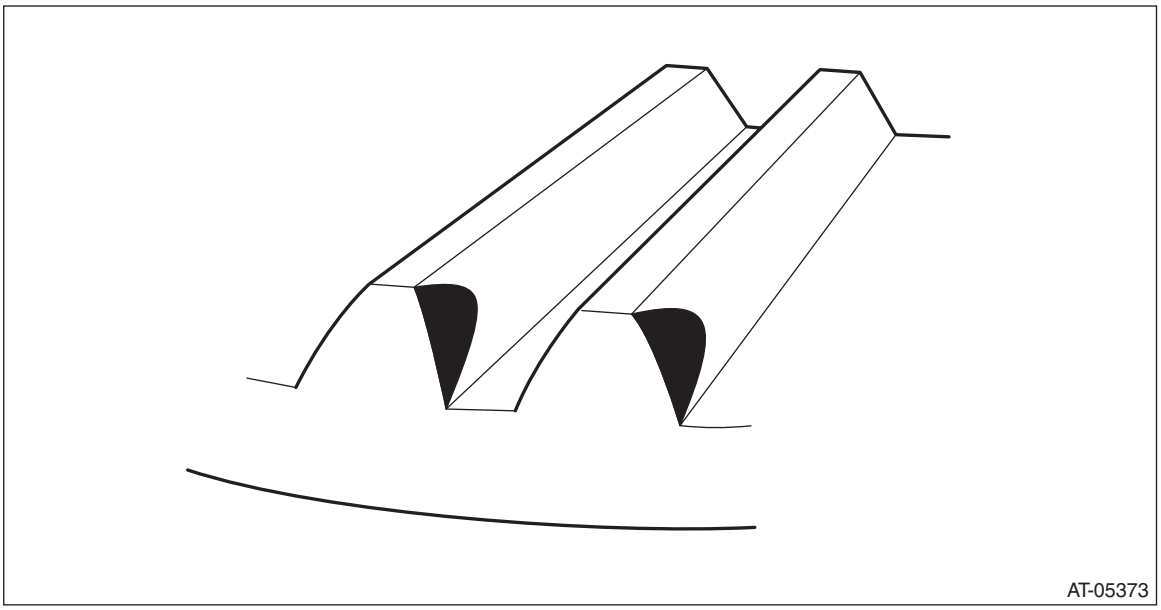
Corrective action: Reduce the thickness of the drive pinion shim according to the procedures for moving the drive pinion away from the hypoid driven gear side.



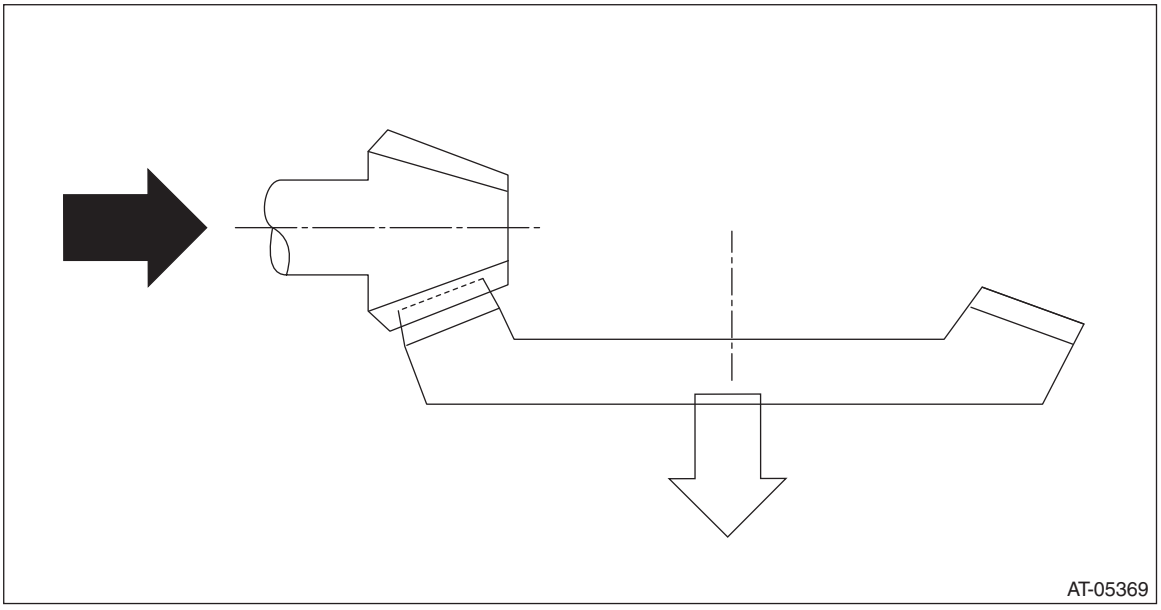
- Heel contact (outside end contact)

Check item: Teeth contact area is too small.

Contact pattern



Corrective action: Increase the thickness of the drive pinion shim according to the procedures for moving the drive pinion closer to the hypoid driven gear.



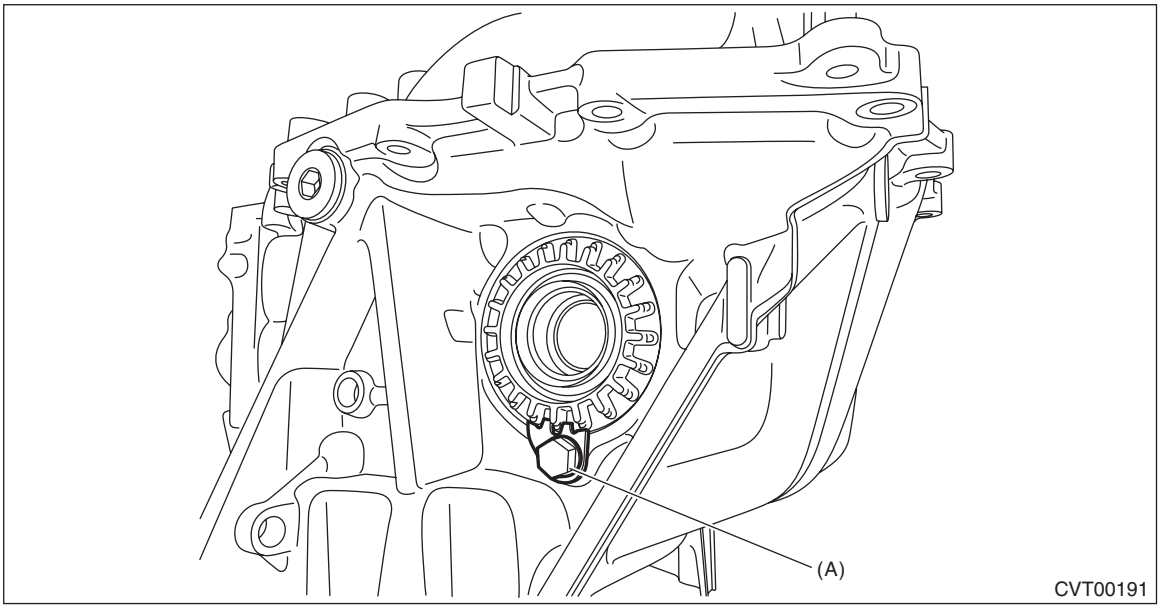
7) Using the ST, loosen the differential side retainer until the mounting groove of the O-ring appears, and then install the O-ring.

NOTE:
- When loosening the differential side retainer, record the number of the turns made.
- Perform this for both left and right differential side retainers.
- Use new O-rings.
- Apply the differential gear oil to O-ring.

ST 18658AA020 WRENCH COMPL RETAINER

8) Using the ST, tighten the retainer to the position before it is loosened.
ST 18658AA020 WRENCH COMPL RETAINER
9) Replace the differential side retainer oil seal with a new part. <Ref. to CVT(TH58A)-92, Differential Side Retainer Oil Seal.>
10) Install the lock plate.

Tightening torque:
25 N·m (2.5 kgf-m, 18.4 ft-lb)

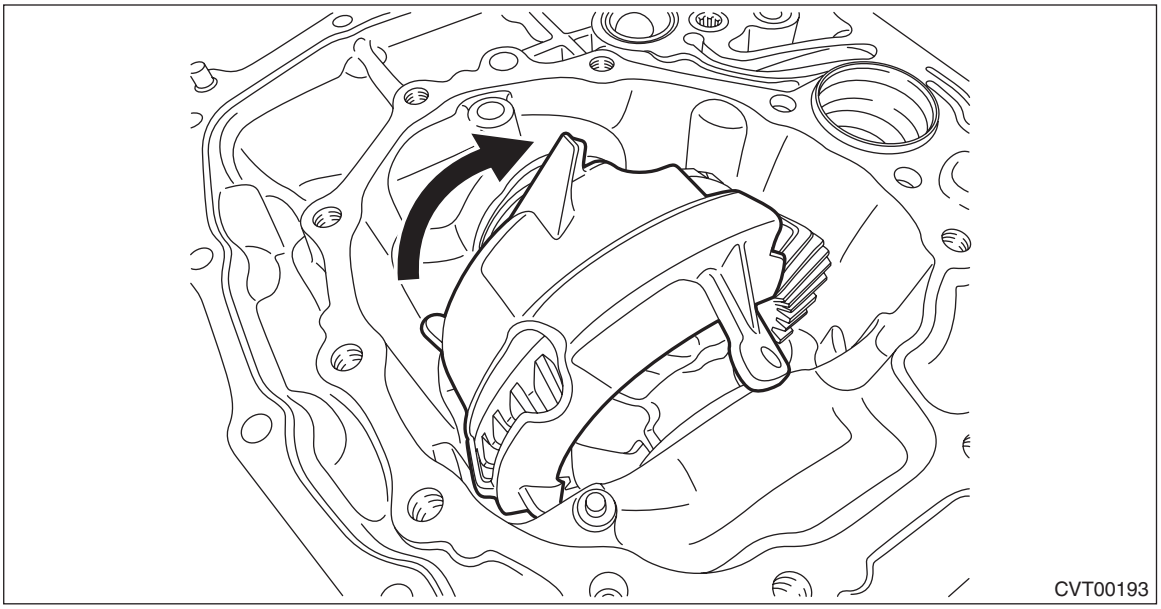


(A) Lock plate

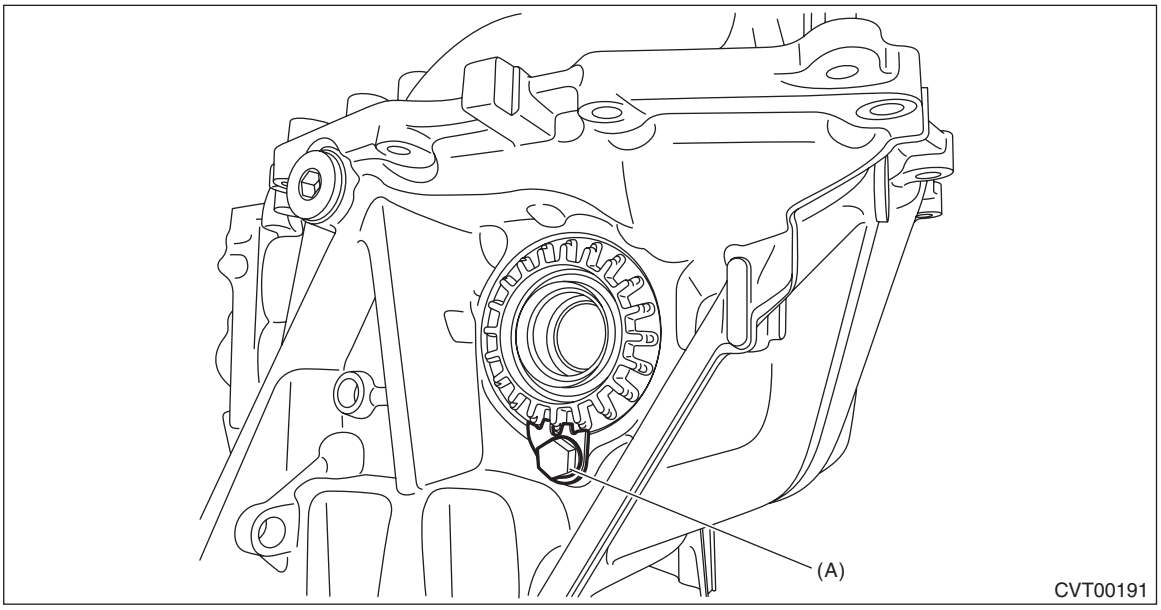
48.Front Differential Assembly

A: REMOVAL

1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TH58A)-63, REMOVAL, Automatic Transmission Assembly.>
2) Remove the air breather hose. <Ref. to CVT(TH58A)-171, REMOVAL, Air Breather Hose.>
3) Remove the transmission harness. <Ref. to CVT(TH58A)-143, REMOVAL, Transmission Harness.>
4) Remove the main control valve body. <Ref. to CVT(TH58A)-115, REMOVAL, Control Valve Body.>
5) Remove the turbine speed sensor. <Ref. to CVT(TH58A)-104, REMOVAL, Turbine Speed Sensor.>
6) Remove the secondary speed sensor. <Ref. to CVT(TH58A)-106, REMOVAL, Secondary Speed Sensor.>
7) Remove the front wheel speed sensor. <Ref. to CVT(TH58A)-108, REMOVAL, Front Wheel Speed Sensor.>
8) Remove the inhibitor switch. <Ref. to CVT(TH58A)-101, REMOVAL, Inhibitor Switch.>
9) Remove the extension case. <Ref. to CVT(TH58A)-182, REMOVAL, Extension Case.>
10) Remove the transfer clutch assembly. <Ref. to CVT(TH58A)-186, REMOVAL, Transfer Clutch.>
11) Remove the transfer driven gear assembly. <Ref. to CVT(TH58A)-200, REMOVAL, Transfer Driven Gear.>
12) Remove the transfer drive gear assembly. <Ref. to CVT(TH58A)-203, REMOVAL, Transfer Drive Gear.>
13) Remove the parking pawl. <Ref. to CVT(TH58A)-208, REMOVAL, Parking Pawl.>
14) Remove the oil pan and oil strainer. <Ref. to CVT(TH58A)-112, REMOVAL, Oil Pan and Strainer.>
15) Remove the transmission control device. <Ref. to CVT(TH58A)-210, REMOVAL, Transmission Control Device.>
16) Remove the drive motor assembly. <Ref. to CVT(TH58A)-217, REMOVAL, Drive Motor Assembly.>
17) Remove the output clutch assembly. <Ref. to CVT(TH58A)-228, REMOVAL, Output Clutch Assembly.>
18) Remove the transmission case. <Ref. to CVT(TH58A)-245, REMOVAL, Transmission Case.>
19) Remove the reduction drive gear. <Ref. to CVT(TH58A)-258, REMOVAL, Reduction Drive Gear.>
20) Remove the primary pulley, secondary pulley and variator chain. <Ref. to CVT(TH58A)-263, REMOVAL, Primary Pulley and Secondary Pulley.>
21) Remove the reverse brake assembly. <Ref. to CVT(TH58A)-287, REMOVAL, Reverse Brake Assembly.>
22) Remove the forward clutch assembly. <Ref. to CVT(TH58A)-303, REMOVAL, Forward Clutch Assembly.>
23) Remove the drive pinion shaft assembly. <Ref. to CVT(TH58A)-323, REMOVAL, Drive Pinion Shaft Assembly.>
24) Remove the oil baffle.



25) Remove the lock plates on both sides.

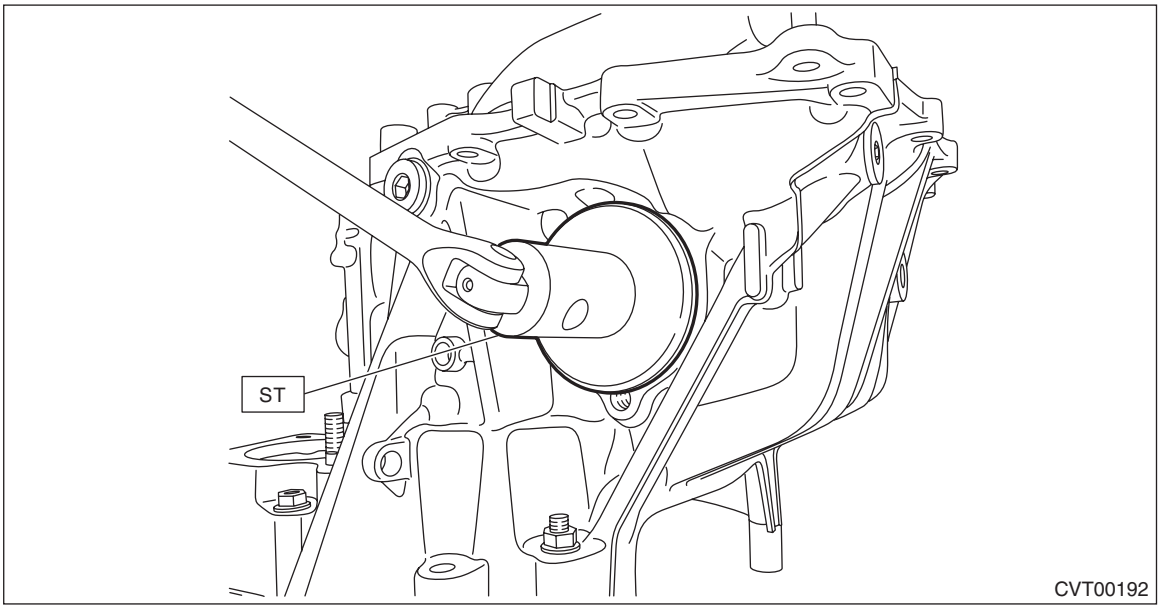


(A) Lock plate

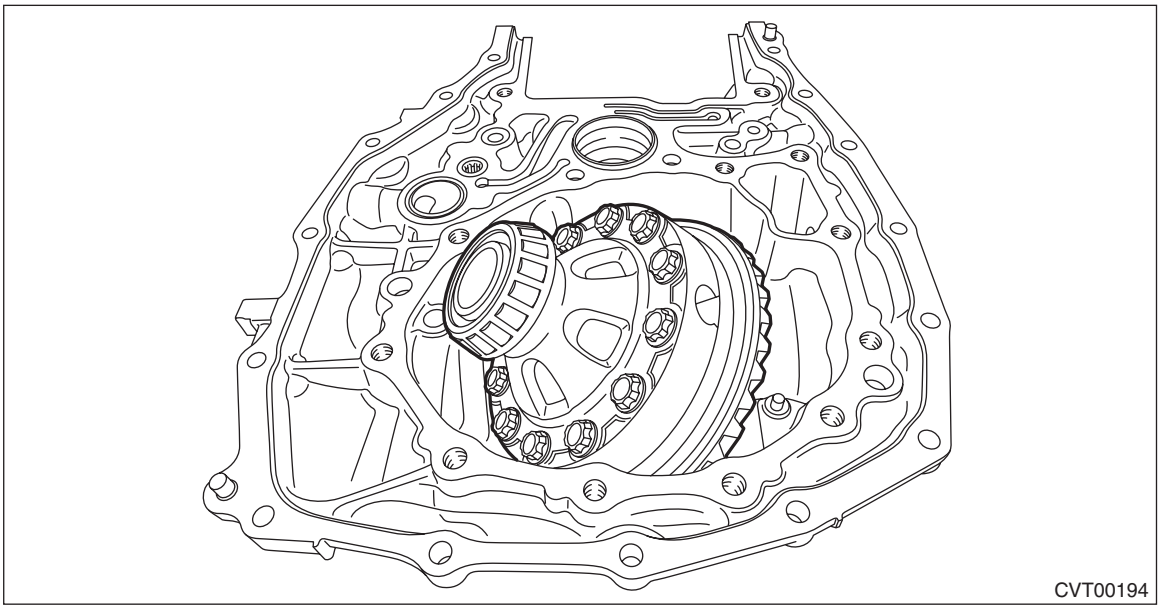
26) Remove the differential side retainers using ST.

NOTE:
• When the wrench COMPL retainer interferes with the converter case, align the cutout portion with the interference part.
• Support the differential case assembly by hand to avoid damaging the retainer mounting hole of the converter case.
• Keep the left and right differential side retainers and left and right bearing outer races by attaching tags or in similar ways to make it possible to identify RH and LH sides.

ST 18658AA020 WRENCH COMPL RETAINER



27) Remove the front differential assembly while being careful not to damage the attachment part of the retainer.

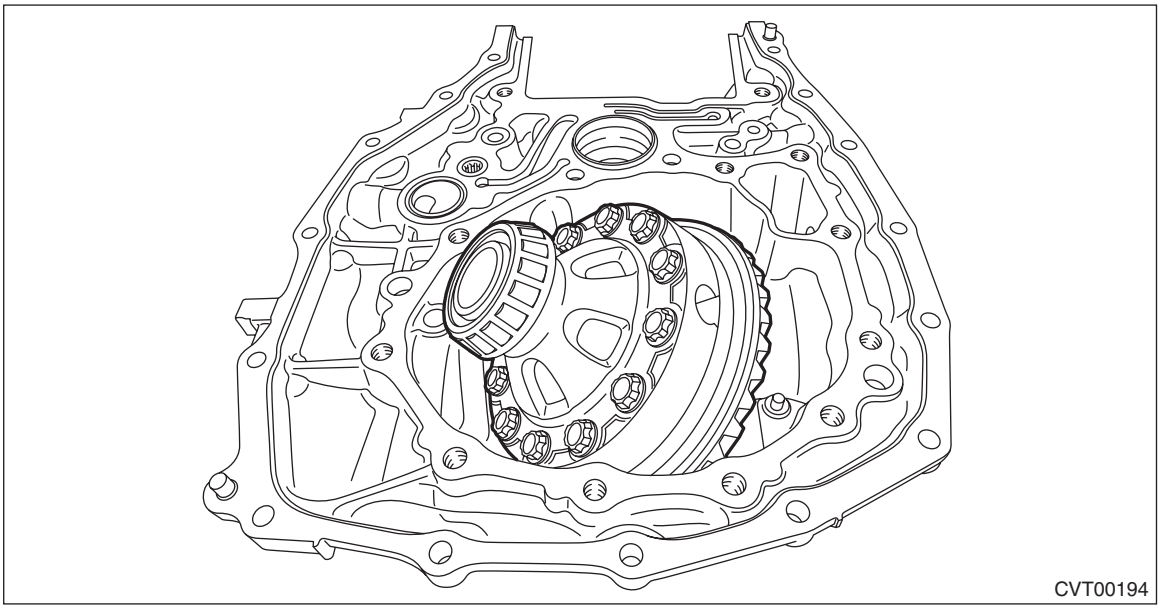


28) Remove the oil seals and O-rings from both differential side retainers. <Ref. to CVT(TH58A)-360, SIDE RETAINER, DISASSEMBLY, Front Differential Assembly.>

B: INSTALLATION

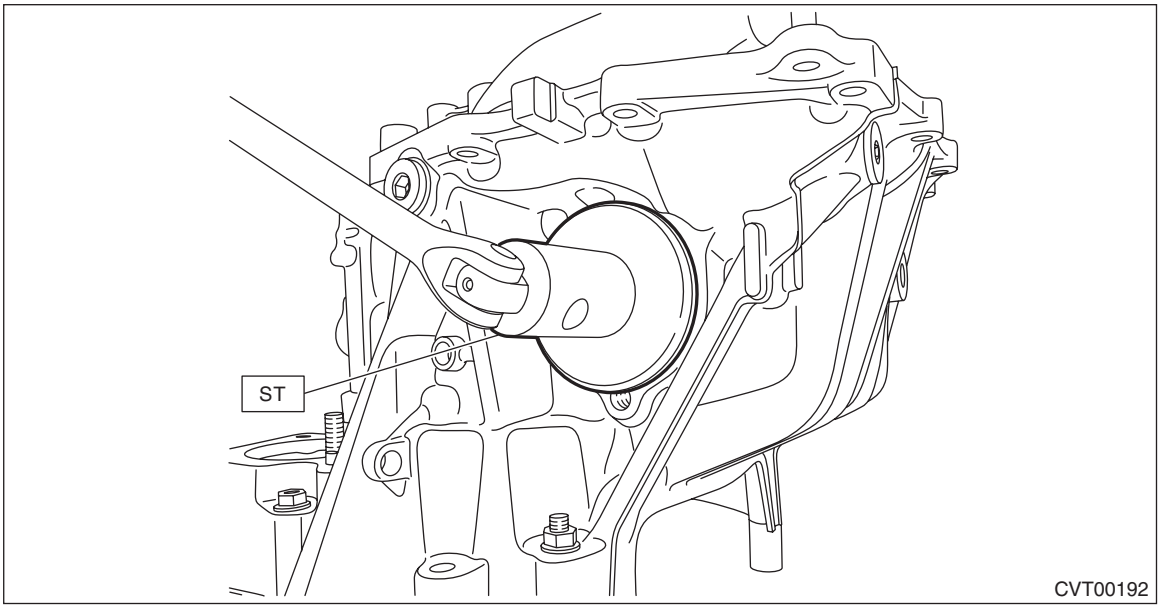
1) Install the front differential assembly to the converter case.

NOTE:
Be careful not to damage the inside of the case (especially the mounting surface of the differential side retainers).



2) Install the bearing outer race.

3) Temporarily install the differential side retainers using ST.
ST 18658AA020 WRENCH COMPL RETAINER



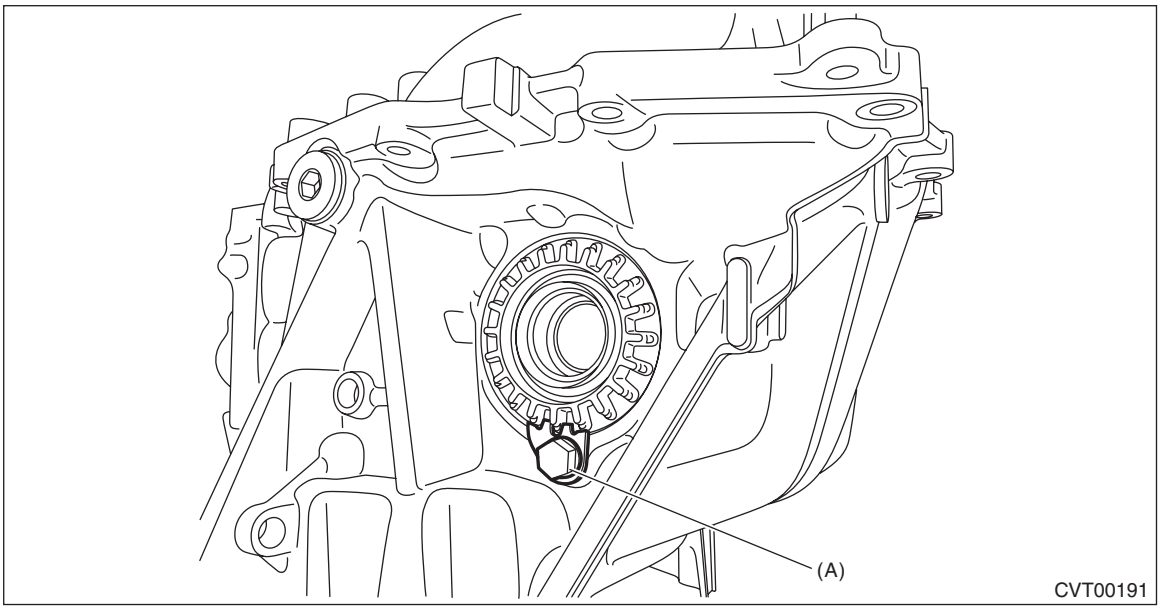
4) Adjust the backlash of the front differential. <Ref. to CVT(TH58A)-368, ADJUSTMENT, Front Differential Assembly.>
5) Inspect and adjust the tooth contact. <Ref. to CVT(TH58A)-345, ADJUSTMENT, Drive Pinion Shaft Assembly.>
6) Using the ST, loosen the differential side retainer until the mounting groove of the O-ring appears, and then install the O-ring.

NOTE:
- When loosening the differential side retainer, record the number of the turns made.
- Perform this for both left and right differential side retainers.
- Use new O-rings.
- Apply the differential gear oil to O-ring.

ST 18658AA020 WRENCH COMPL RETAINER
7) Using the ST, tighten the retainer to the position before it is loosened.
ST 18658AA020 WRENCH COMPL RETAINER
8) Install the oil seal to the differential side retainer. <Ref. to CVT(TH58A)-92, Differential Side Retainer Oil Seal.>

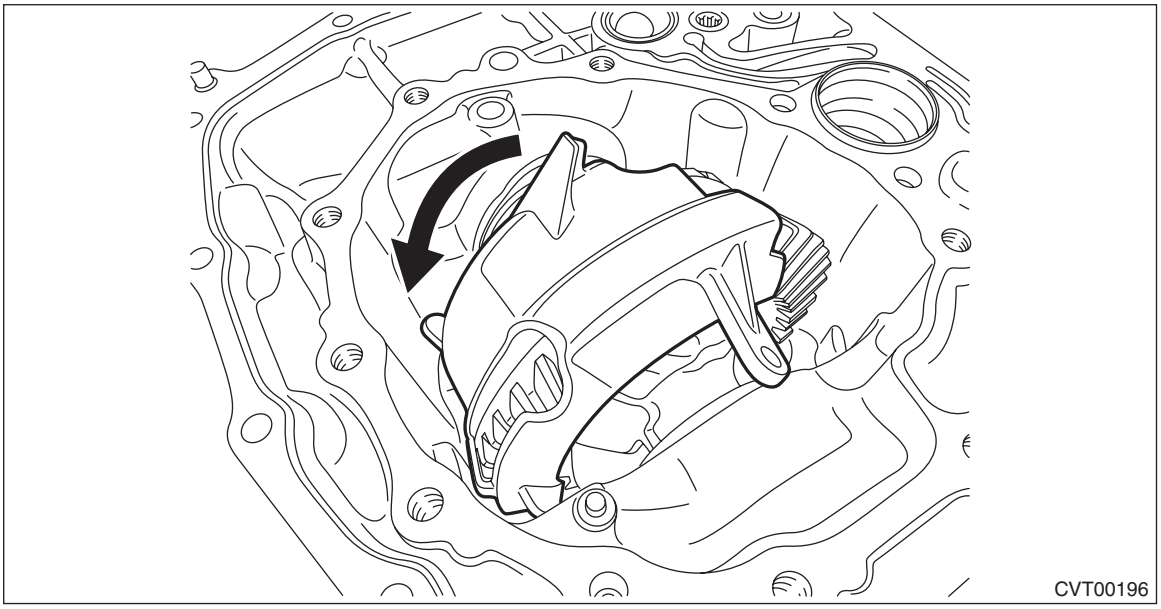
9) Install the lock plate.

Tightening torque:
25 N·m (2.5 kgf-m, 18.4 ft-lb)



(A) Lock plate

10) Install the oil baffle.



11) Install the drive pinion shaft assembly. <Ref. to CVT(TH58A)-324, INSTALLATION, Drive Pinion Shaft Assembly.>
12) Install the forward clutch assembly. <Ref. to CVT(TH58A)-306, INSTALLATION, Forward Clutch Assembly.>
13) Install the reverse brake assembly. <Ref. to CVT(TH58A)-290, INSTALLATION, Reverse Brake Assembly.>
14) Install the primary pulley, secondary pulley and variator chain. <Ref. to CVT(TH58A)-271, INSTALLATION, Primary Pulley and Secondary Pulley.>
15) Install the reduction drive gear. <Ref. to CVT(TH58A)-259, INSTALLATION, Reduction Drive Gear.>

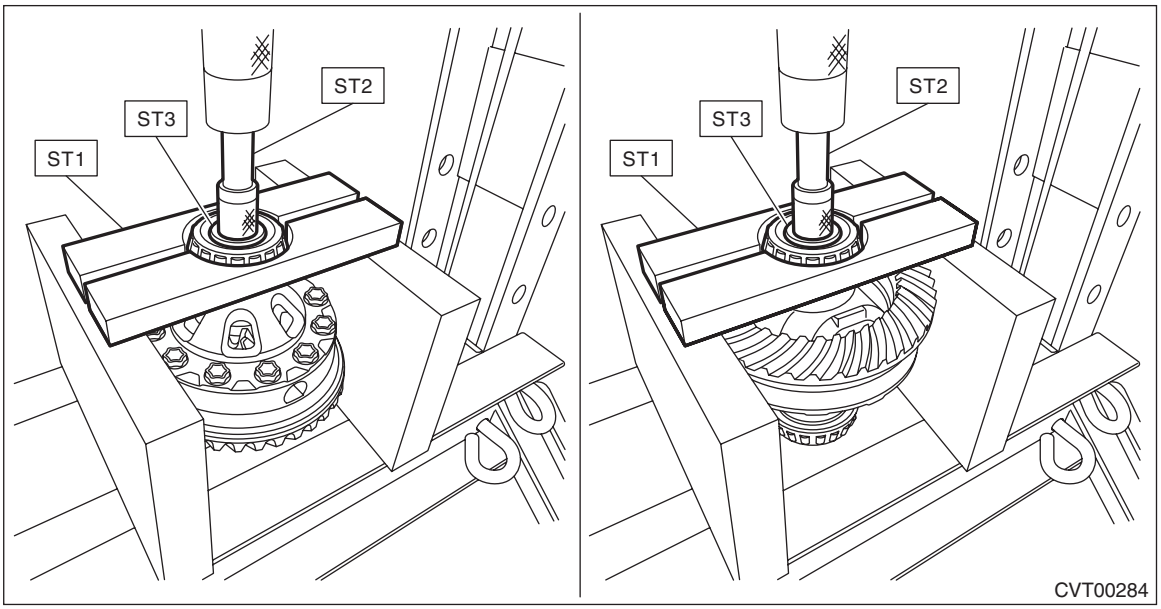
16) Install the transmission case. <Ref. to CVT(TH58A)-248, INSTALLATION, Transmission Case.>
17) Install the output clutch assembly. <Ref. to CVT(TH58A)-229, INSTALLATION, Output Clutch Assembly.>
18) Install the drive motor assembly. <Ref. to CVT(TH58A)-221, INSTALLATION, Drive Motor Assembly.>
19) Install the transmission control device. <Ref. to CVT(TH58A)-213, INSTALLATION, Transmission Control Device.>
20) Install the oil strainer and oil pan. <Ref. to CVT(TH58A)-114, INSTALLATION, Oil Pan and Strainer.>
21) Install the parking pawl. <Ref. to CVT(TH58A)-208, INSTALLATION, Parking Pawl.>
22) Install the transfer drive gear assembly. <Ref. to CVT(TH58A)-204, INSTALLATION, Transfer Drive Gear.>
23) Install the transfer driven gear assembly. <Ref. to CVT(TH58A)-201, INSTALLATION, Transfer Driven Gear.>
24) Install the transfer clutch assembly. <Ref. to CVT(TH58A)-188, INSTALLATION, Transfer Clutch.>
25) Install the extension case. <Ref. to CVT(TH58A)-183, INSTALLATION, Extension Case.>
26) Install the inhibitor switch. <Ref. to CVT(TH58A)-102, INSTALLATION, Inhibitor Switch.>
27) Install the secondary speed sensor. <Ref. to CVT(TH58A)-106, INSTALLATION, Secondary Speed Sensor.>
28) Install the front wheel speed sensor. <Ref. to CVT(TH58A)-108, INSTALLATION, Front Wheel Speed Sensor.>
29) Install the turbine speed sensor. <Ref. to CVT(TH58A)-104, INSTALLATION, Turbine Speed Sensor.>
30) Install the main control valve body. <Ref. to CVT(TH58A)-123, INSTALLATION, Control Valve Body.>
31) Install the transmission harness. <Ref. to CVT(TH58A)-151, INSTALLATION, Transmission Harness.>
32) Install the air breather hose. <Ref. to CVT(TH58A)-173, INSTALLATION, Air Breather Hose.>
33) Install the transmission assembly to the vehicle. <Ref. to CVT(TH58A)-77, INSTALLATION, Automatic Transmission Assembly.>

C: DISASSEMBLY

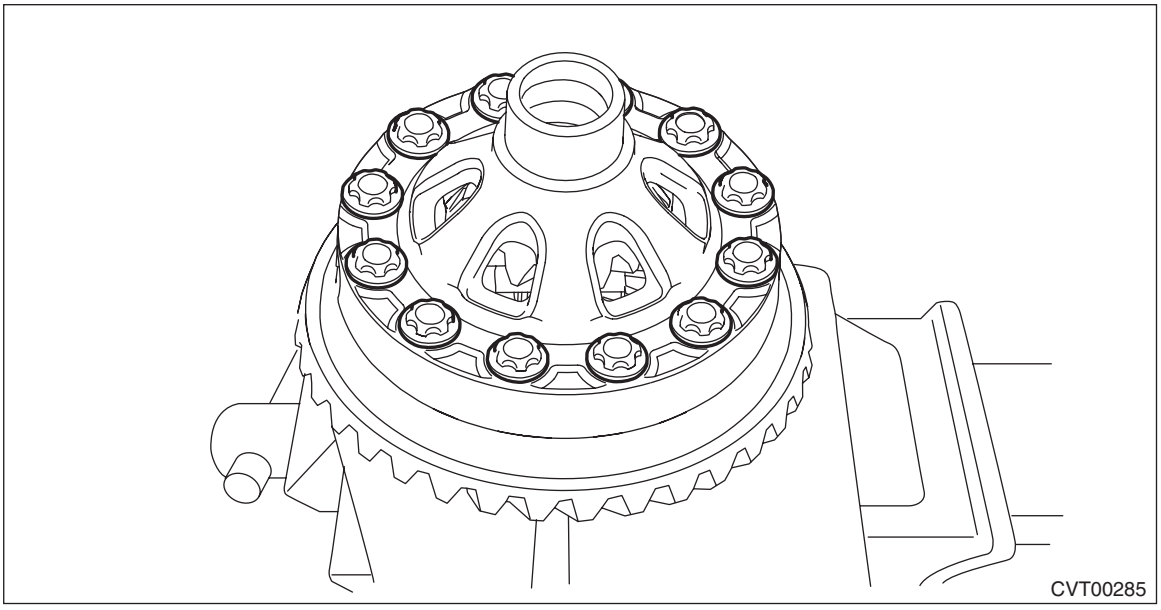
1. DIFFERENTIAL CASE ASSEMBLY

1) Remove the taper roller bearing using the ST.

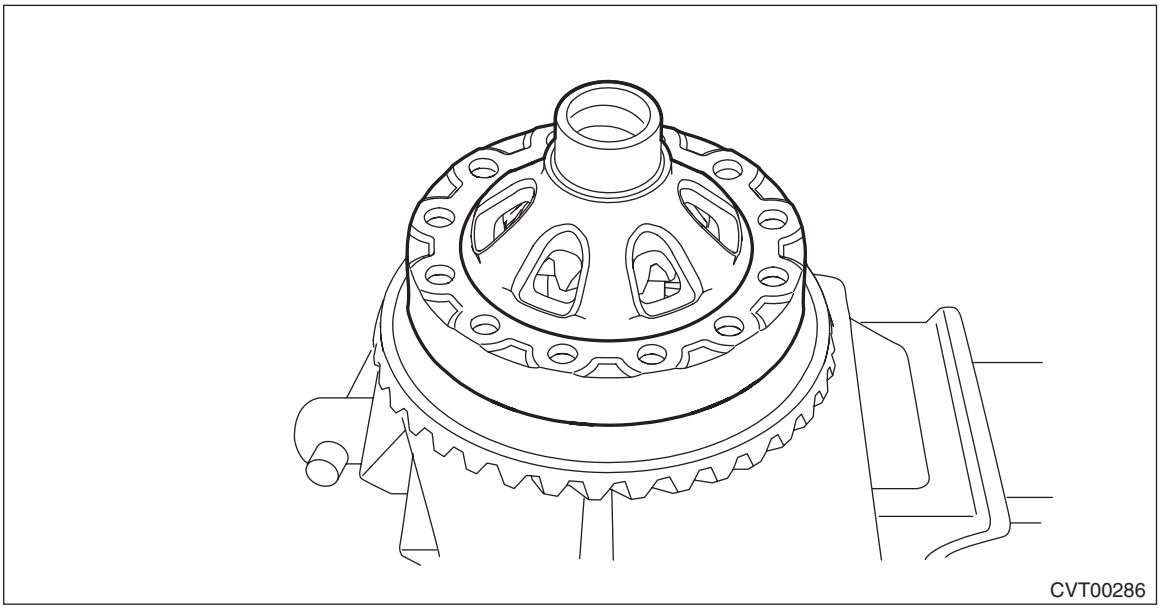
ST1	498077000	REMOVER
ST2	899864100	REMOVER
ST3	398497701	SEAT



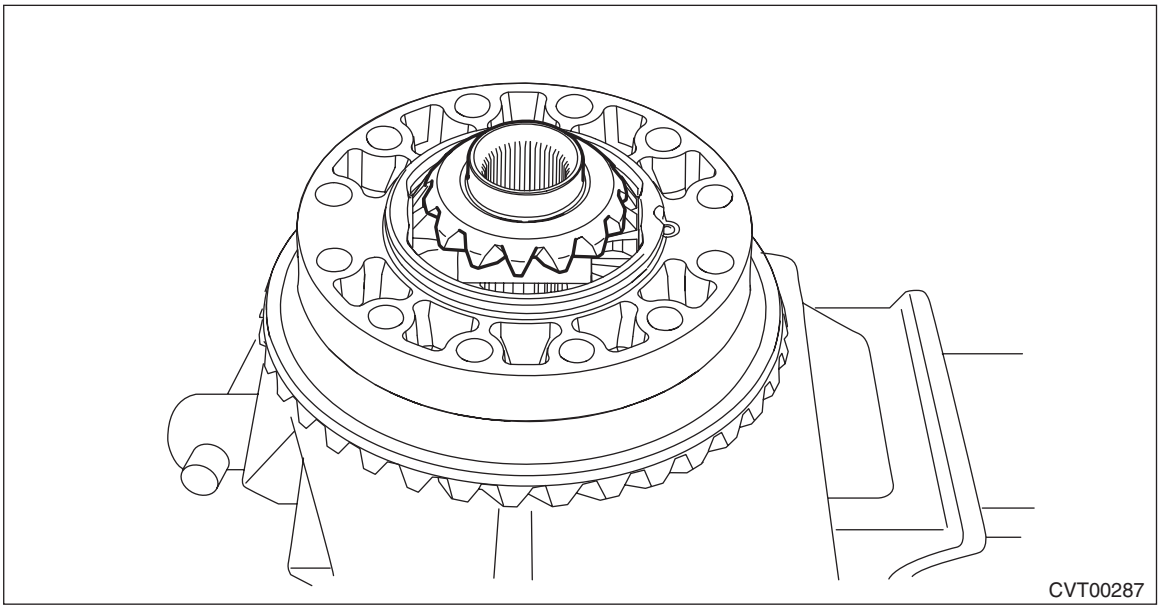
2) Remove the hypoid driven gear mounting bolt using the ST.
ST 18270KA020 SOCKET (E20)



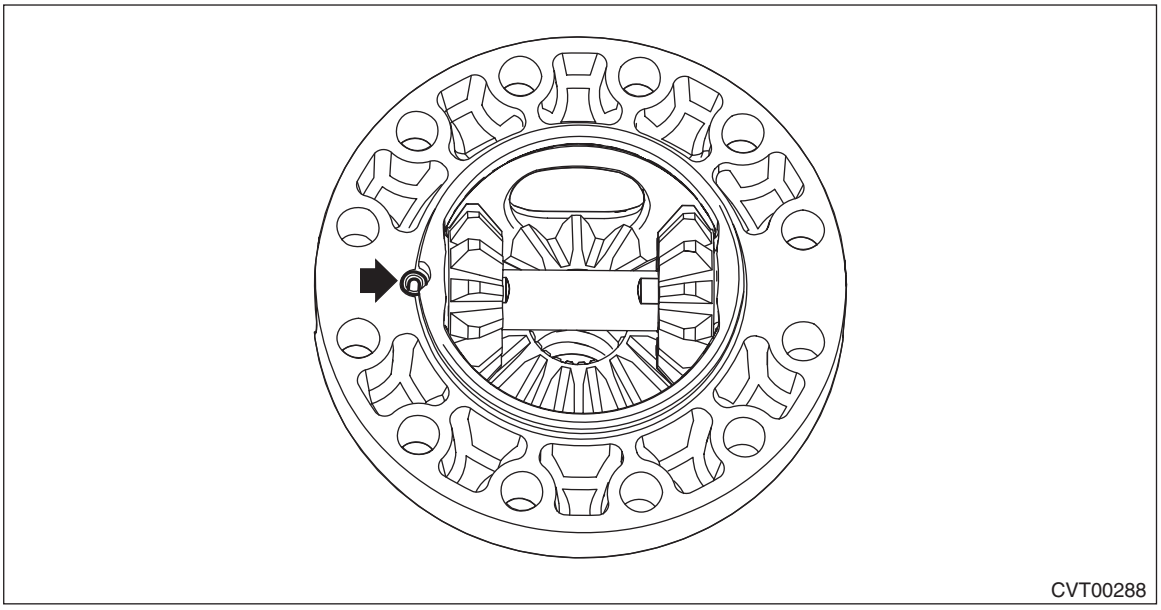
3) Remove the differential case (LH).



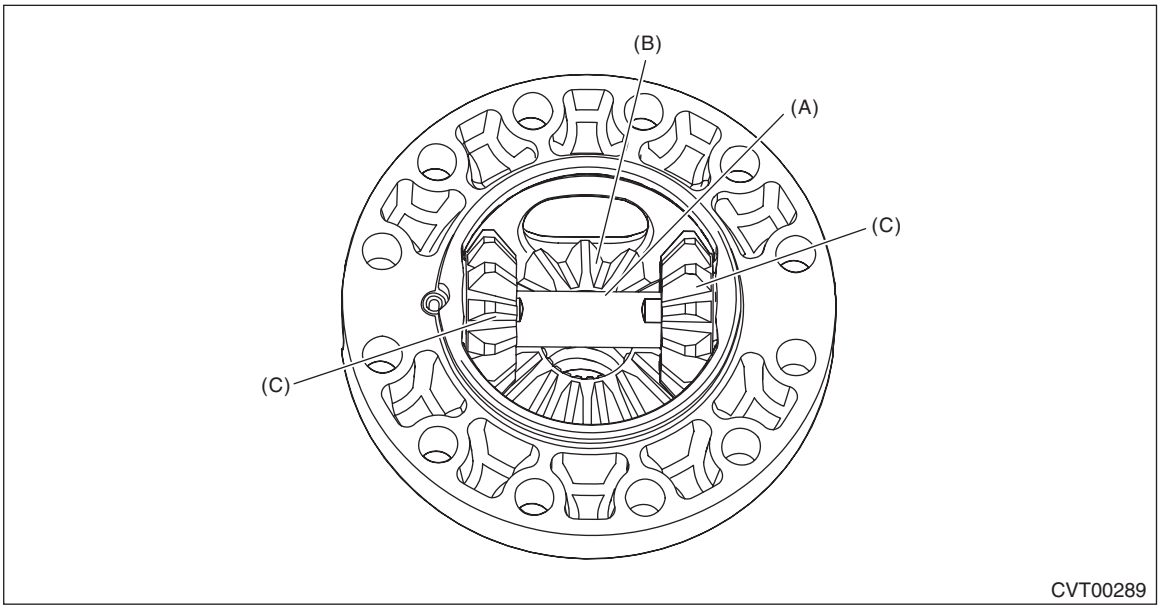
4) Remove the differential bevel gear and washer from differential case.



5) Remove the straight pin.



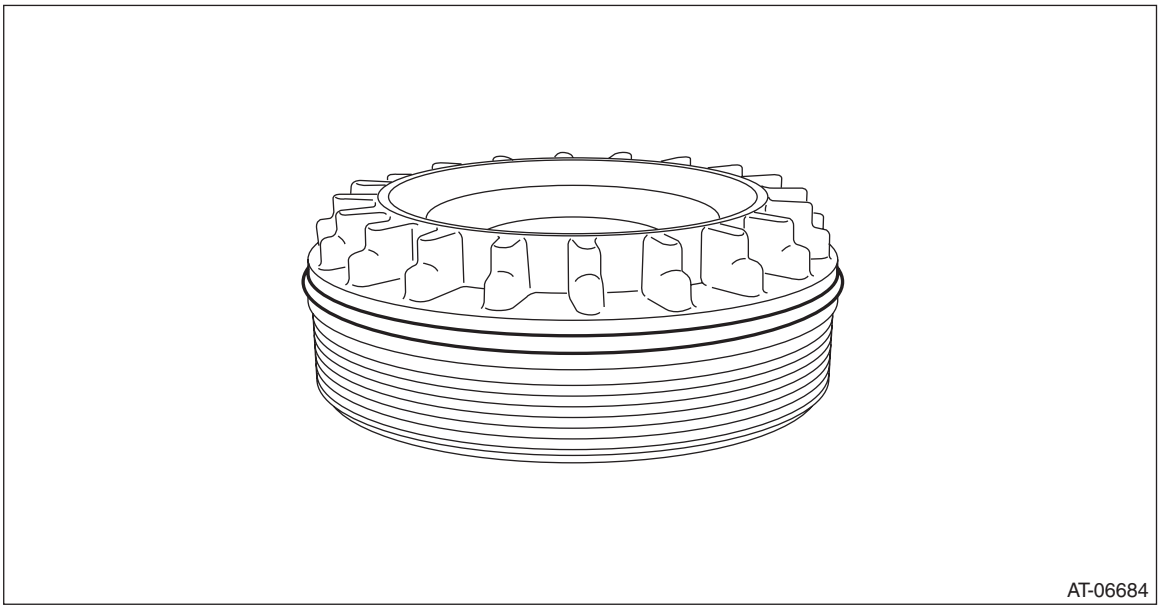
6) Remove the pinion shaft, then remove the differential bevel gear, washer and differential bevel pinion.



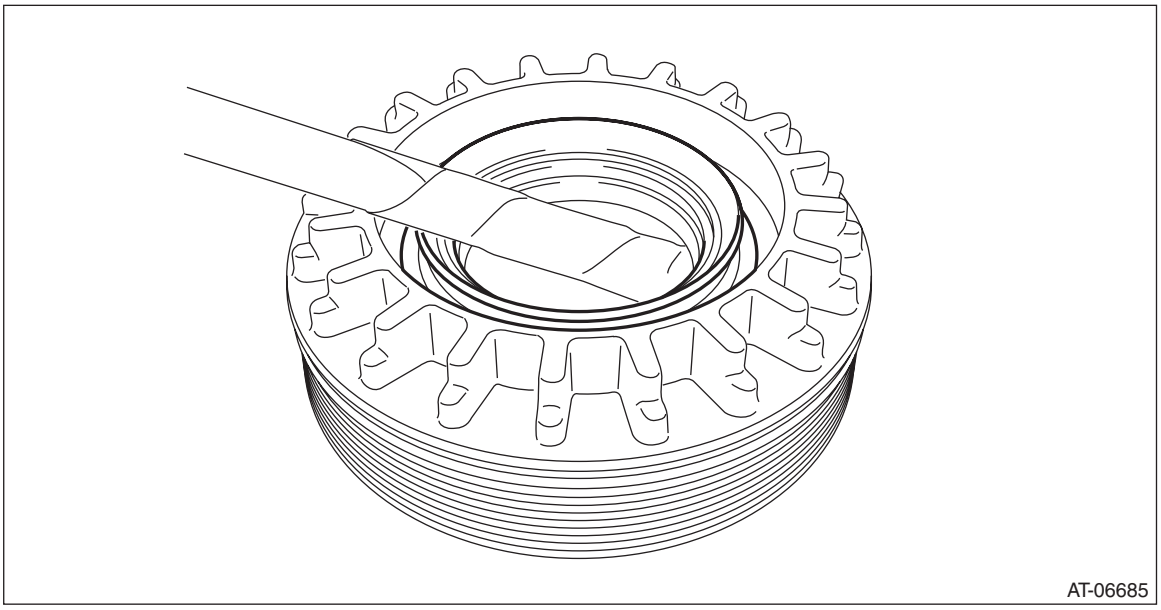
(A) Pinion shaft
(B) Differential bevel gear
(C) Differential bevel pinion

2. SIDE RETAINER

NOTE:
After adjusting the drive pinion backlash and tooth contact, replace the oil seal and O-ring with new parts.
1) Remove the O-ring.



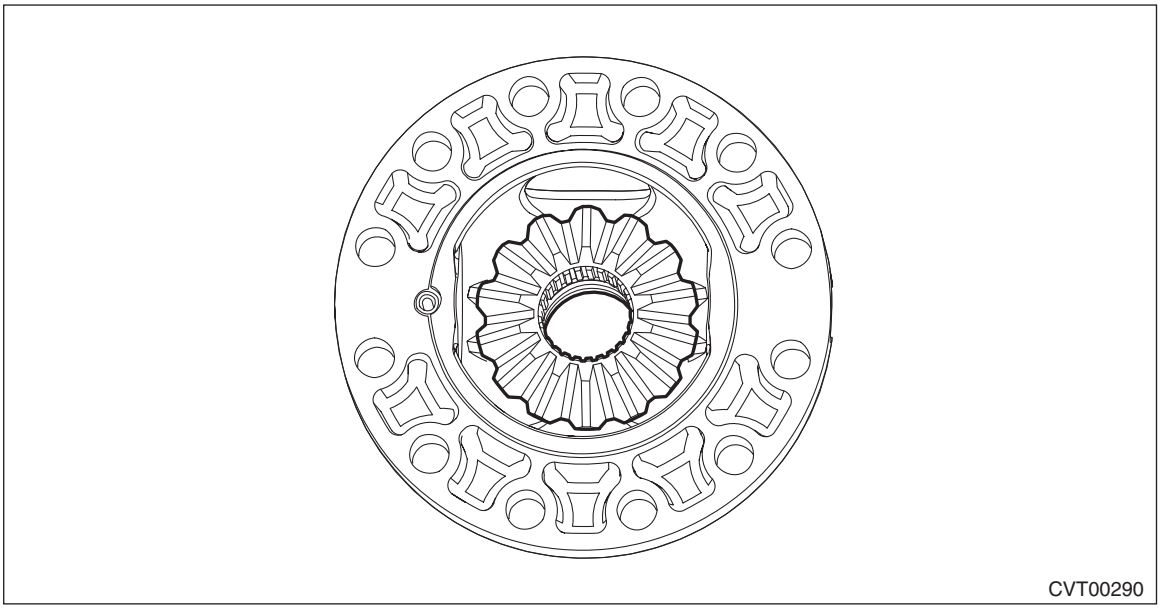
2) Remove the oil seal.



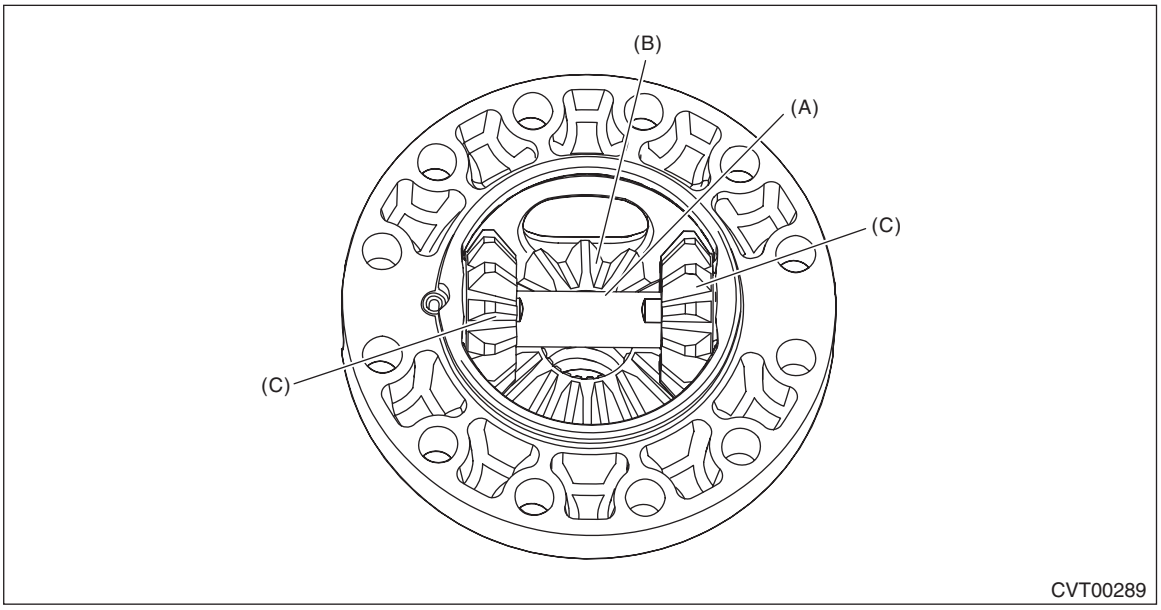
D: ASSEMBLY

1. DIFFERENTIAL CASE ASSEMBLY

1) Install the washer and differential bevel gear into the differential case (RH).

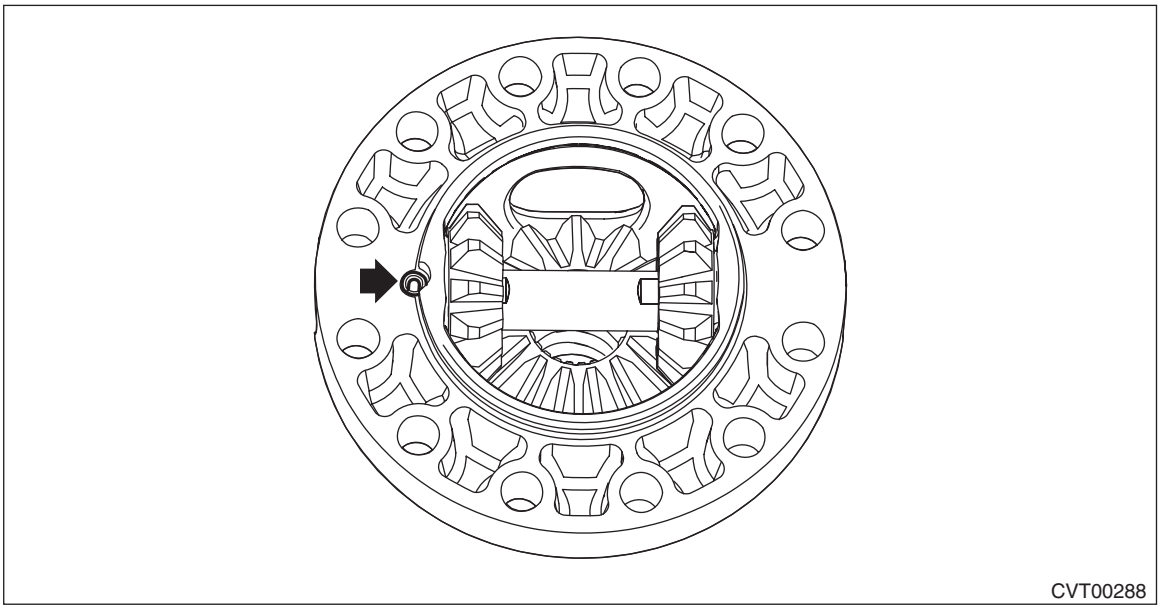


2) Install the differential bevel pinions into differential case (RH) and install the pinion shaft.

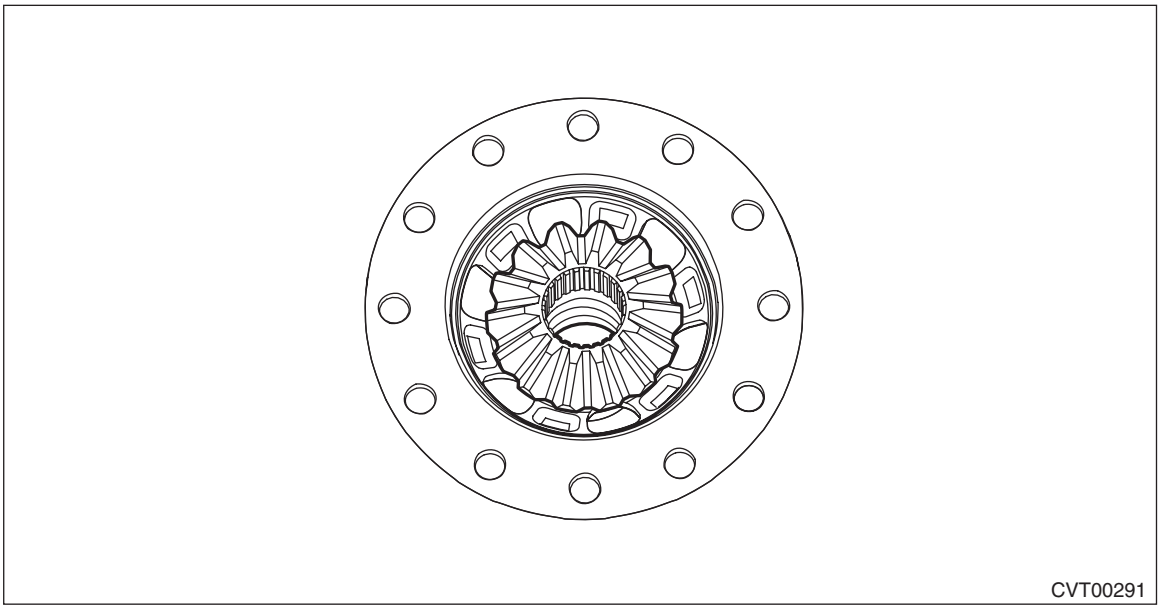


(A) Pinion shaft
(B) Differential bevel gear
(C) Differential bevel pinion

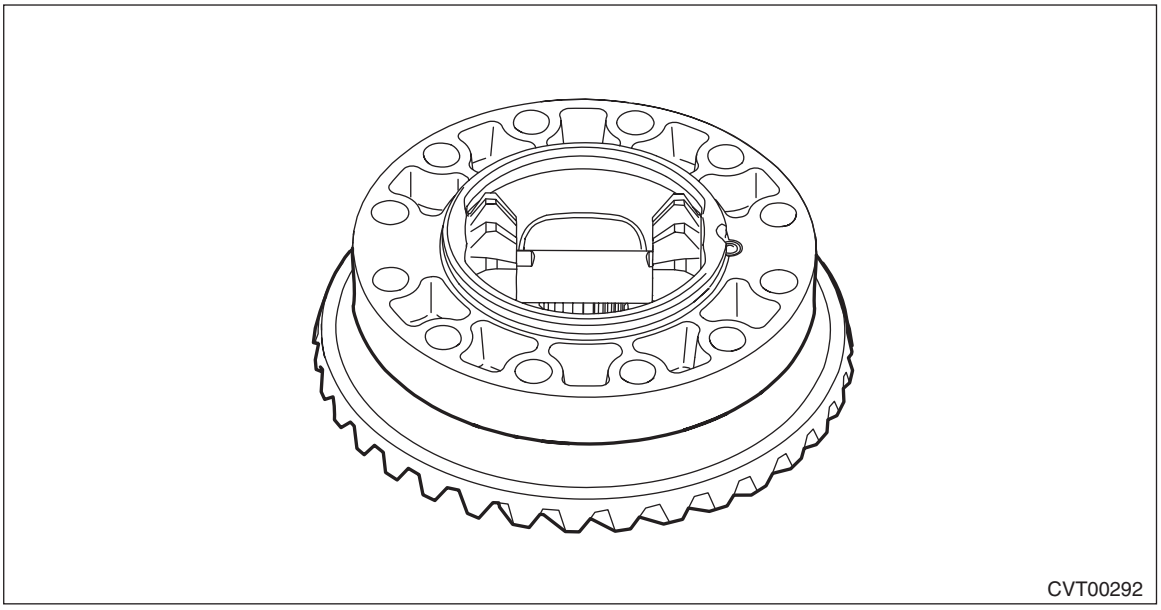
3) Install the straight pin.



4) Install the washer and differential bevel gear to the differential case (LH).


CVT00291

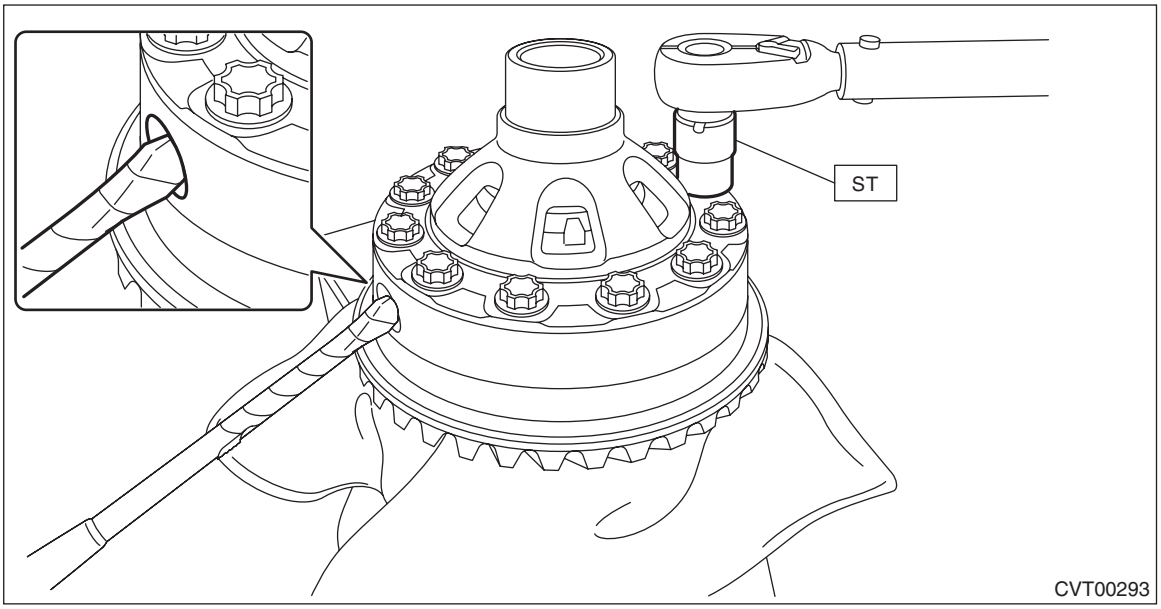
5) Install the differential case (RH) to the hypoid driven gear.


CVT00292

6) Install the differential case (LH) to the differential case (RH).

7) Using the ST, install the hypoid driven gear by tightening the installation bolt.
ST 18270KA020 SOCKET (E20)

Tightening torque:
64 N·m (6.5 kgf-m, 47.2 ft-lb)

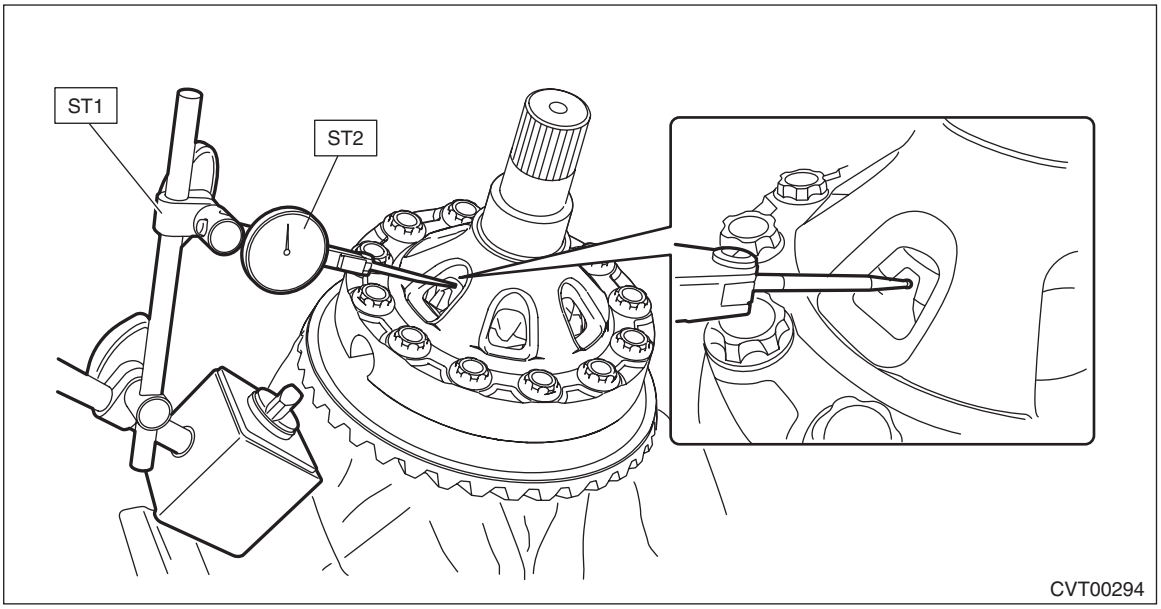


8) Measure the backlash, and select the washer.
(1) Install the SUBARU genuine axle shaft to differential case.
Part No. 38415AA070 Axle shaft
(2) Using ST1 and ST2, insert the ST2 through the window of differential case. Measure the backlash of the gear.

NOTE:
• Measure the backlash by applying a differential bevel pinion tooth between two differential bevel gear teeth.
• When measuring, fix the differential bevel pinion gear in place with a screwdriver covered with cloth, or a similar tool.

ST1 498247001 MAGNET BASE
ST2 498247100 DIAL GAUGE

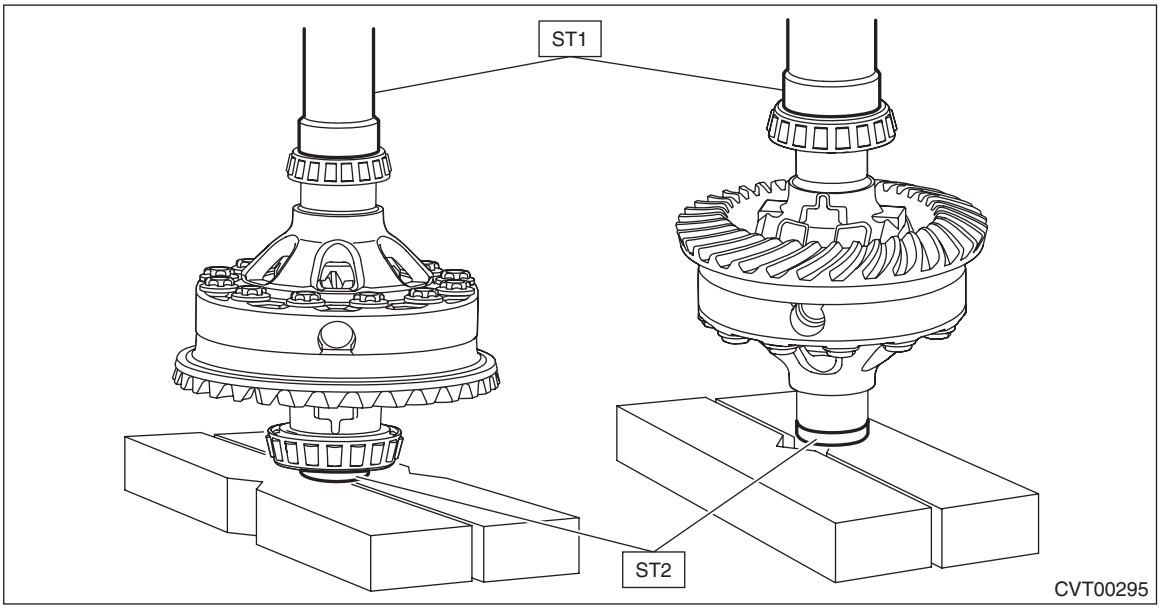
Specification:
0.13 — 0.18 mm (0.0051 — 0.0071 in)



(3) If the backlash is not within specification, select a washer from the table below and replace.

Washer	
Part No.	Thickness mm (in)
803038021	0.95 (0.037)
803038022	1.00 (0.039)
803038023	1.05 (0.041)

9) Using the ST, install the left and right taper roller bearings.
ST1 499277100 BUSHING 1-2 INSTALLER
ST2 398497701 SEAT

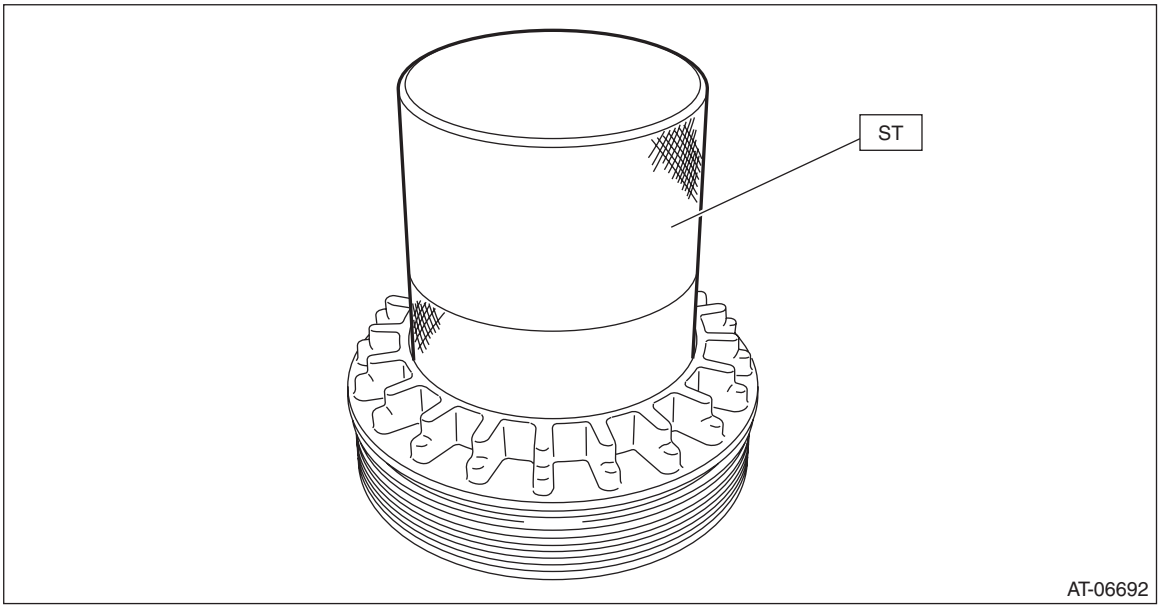


2. SIDE RETAINER

NOTE:
After adjusting the backlash and tooth contact, replace the oil seal and O-ring of side retainer with new parts.
1) Using the ST, install the oil seal.

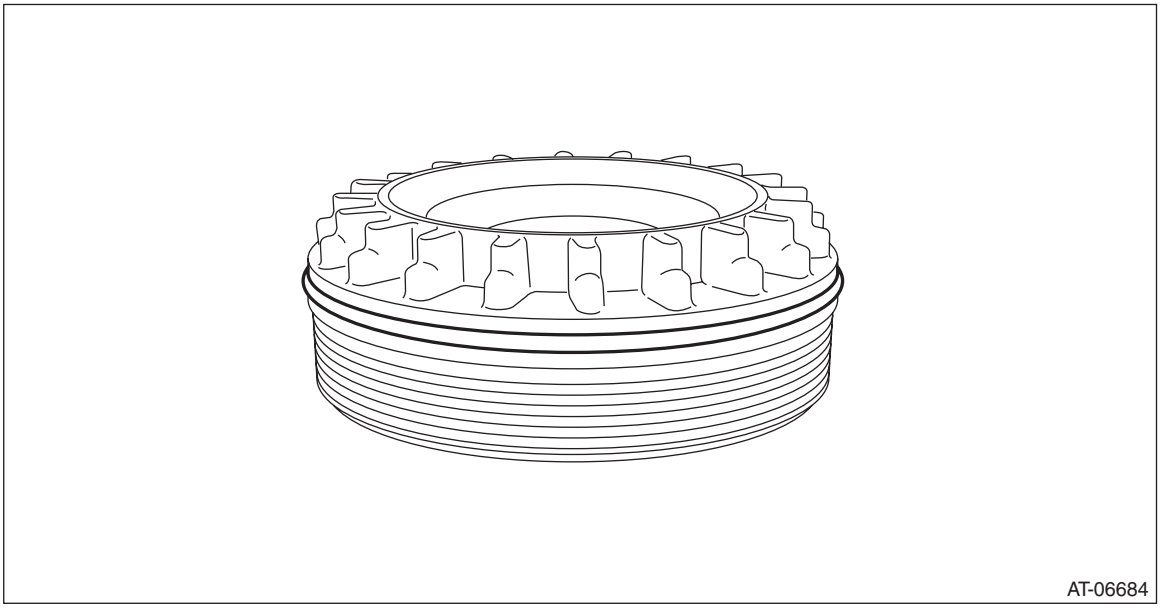
NOTE:
- Use a new oil seal.
- Apply differential gear oil to the oil seal lip and press-fitting surface.
- Oil seal has an identification mark (R, L). When installing oil seals, do not confuse the left and right.

ST 18675AA000 DIFFERENTIAL SIDE OIL SEAL INSTALLER



2) Install the O-ring.

NOTE:
- Use new O-rings.
- Apply the differential gear oil to O-ring.

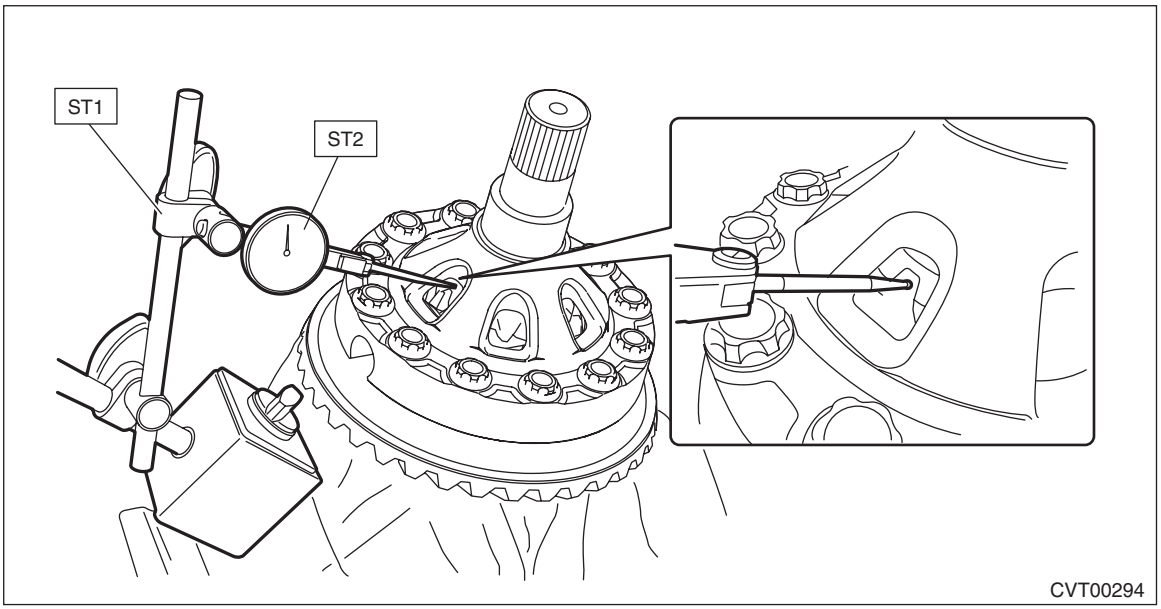


E: INSPECTION

- Check each component for scratches, damage or other faults.
- Using the ST, check the backlash of pinion gear.

ST1 498247001 MAGNET BASE
ST2 498247100 DIAL GAUGE

Specification:
0.13 — 0.18 mm (0.0051 — 0.0071 in)

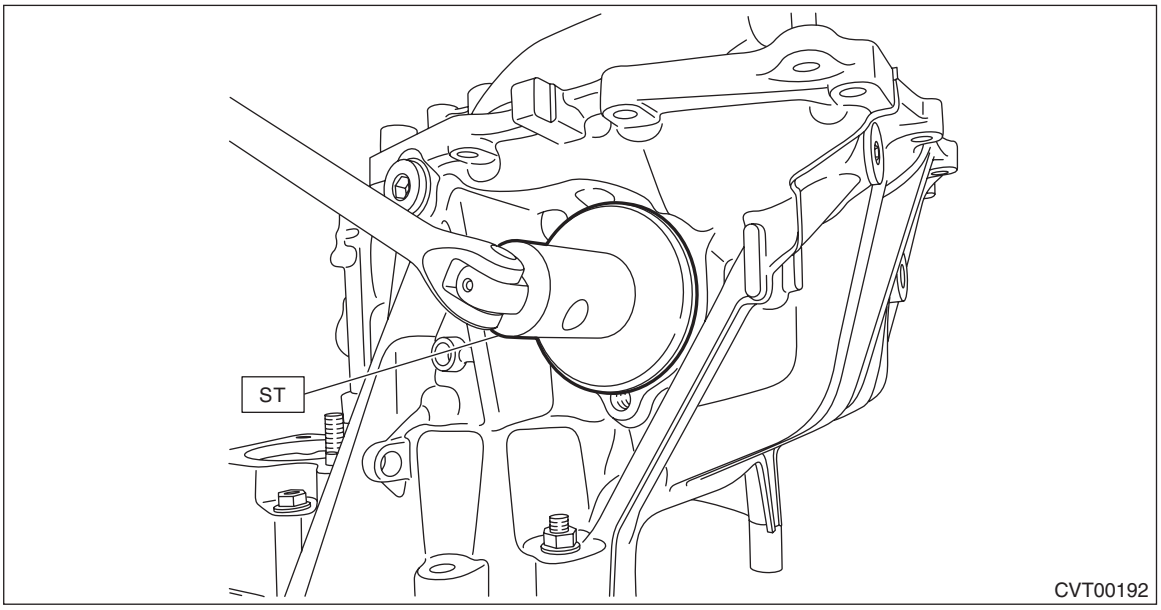


- Measure the hypoid gear backlash, and then adjust it to be within specification. <Ref. to CVT(TH58A)-368, ADJUSTMENT, Front Differential Assembly.>

F: ADJUSTMENT

1) Using the ST, screw-in the retainer until resistance is felt.

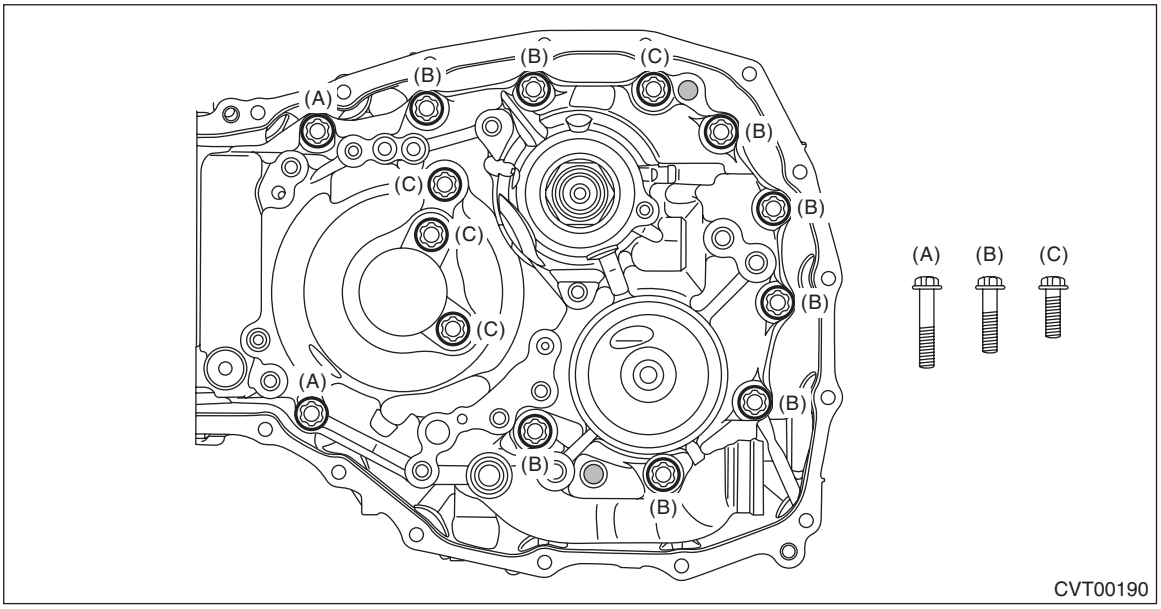
NOTE:
RH side should be screwed-in more than LH side.
ST 18658AA020 WRENCH COMPL RETAINER



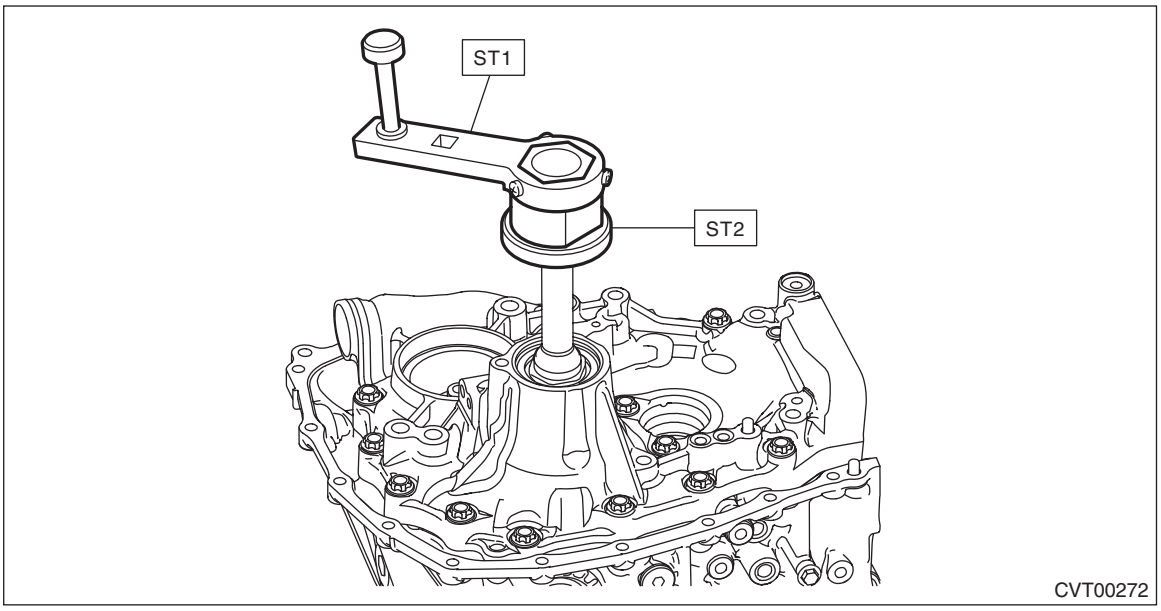
2) Remove the remaining liquid gasket from the mating surface completely.
3) Using the ST, install the drive pinion assembly to converter case.
ST 18270KA020 SOCKET (E20)

NOTE:
Do not confuse the three different-length bolts when installing.

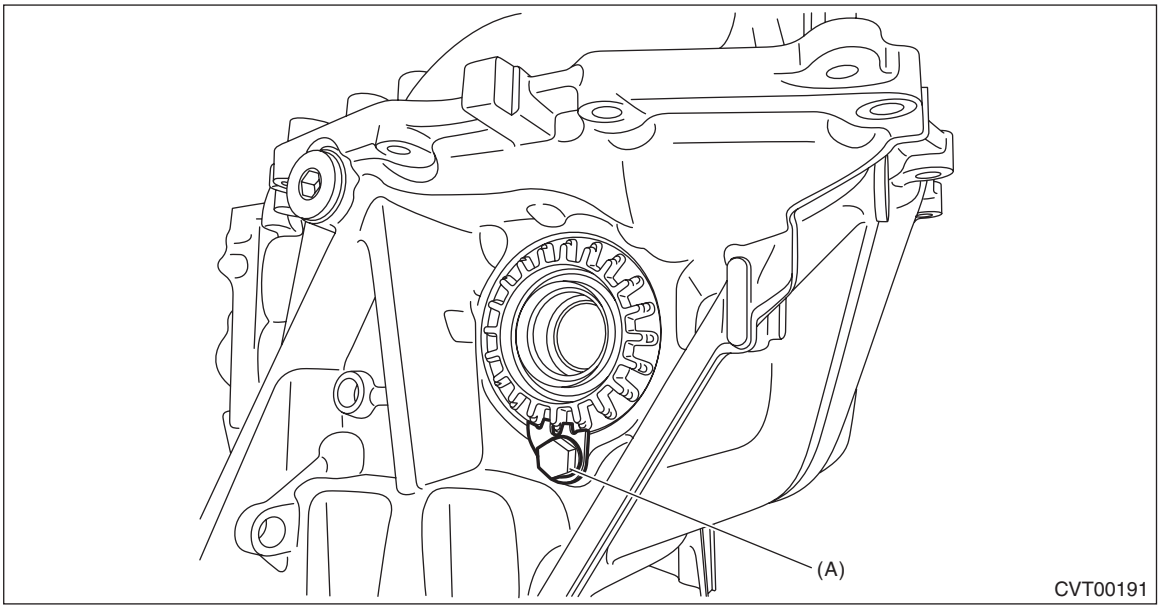
Tightening torque:
43 N·m (4.4 kgf-m, 31.7 ft-lb)



4) Rotate the drive pinion shaft ten times or more using ST1 and ST2.
ST1 499787700 WRENCH
ST2 498937110 HOLDER

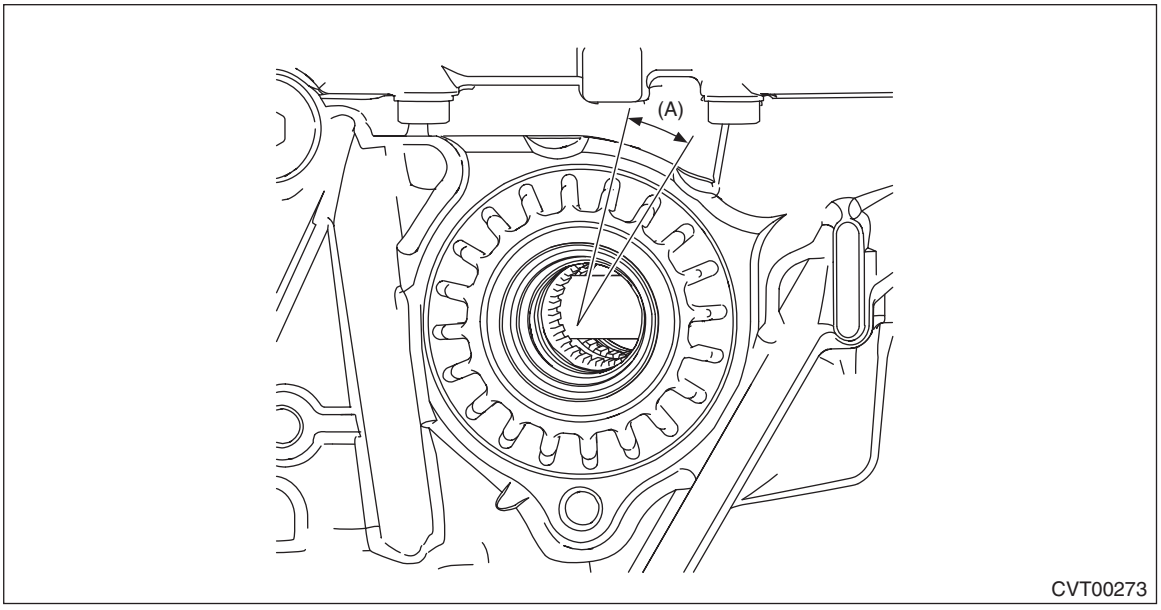


5) While rotating the pinion shaft, tighten the retainer LH and loosen the retainer RH until the shaft can't be turned anymore. The backlash is “zero” when the pinion shaft comes to the point where it doesn't rotate.
6) After the “zero” state is established, loosen the retainer LH by 3 notches and secure it with the lock plate. Retighten the retainer RH until it stops. Rotate the drive pinion 2 or 3 times. Tighten the retainer RH further 1-3/4 notches. This sets the preload. Finally, secure the retainer with its lock plate.



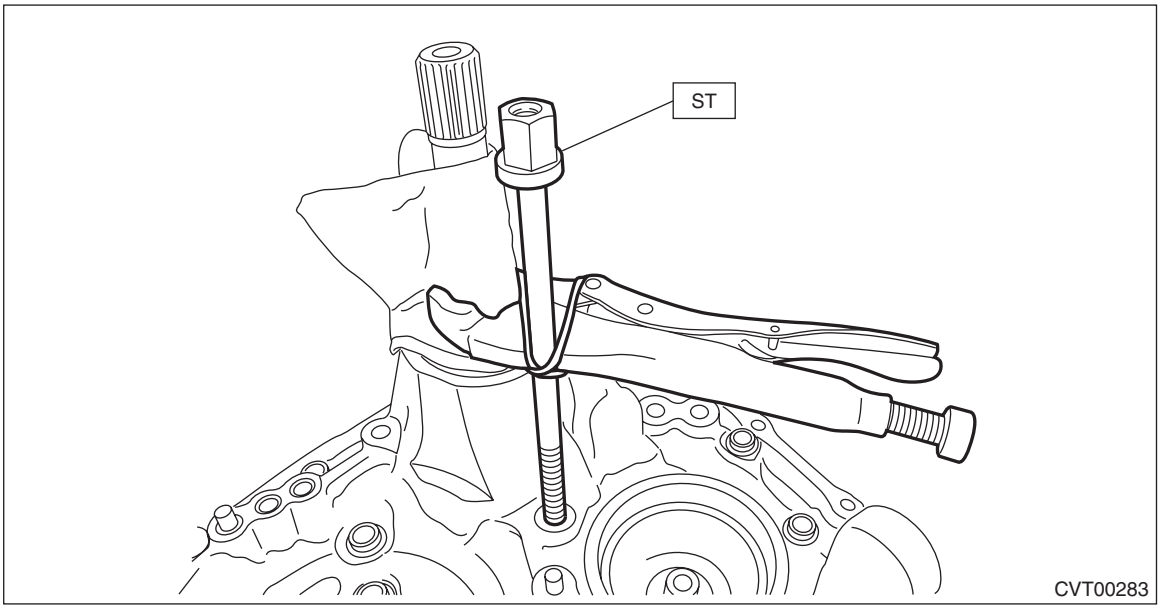
(A) Lock plate

NOTE:
Turning the retainer by every one tooth changes the backlash approx. 0.05 mm (0.0020 in).



(A) 1 tooth

7) Insert the two SUBARU genuine axle shafts into differential case.
Part No. 38415AA070 Axle shaft
8) Install the ST to the drive pinion retainer, and wrap the drive pinion shaft with cloth and pinch with vise pliers. Using a tie-wrap or a wire, fix the vise pliers to the ST.
Make sure the drive pinion shaft does not move.
ST 18763AA000 COMPRESSOR SHAFT

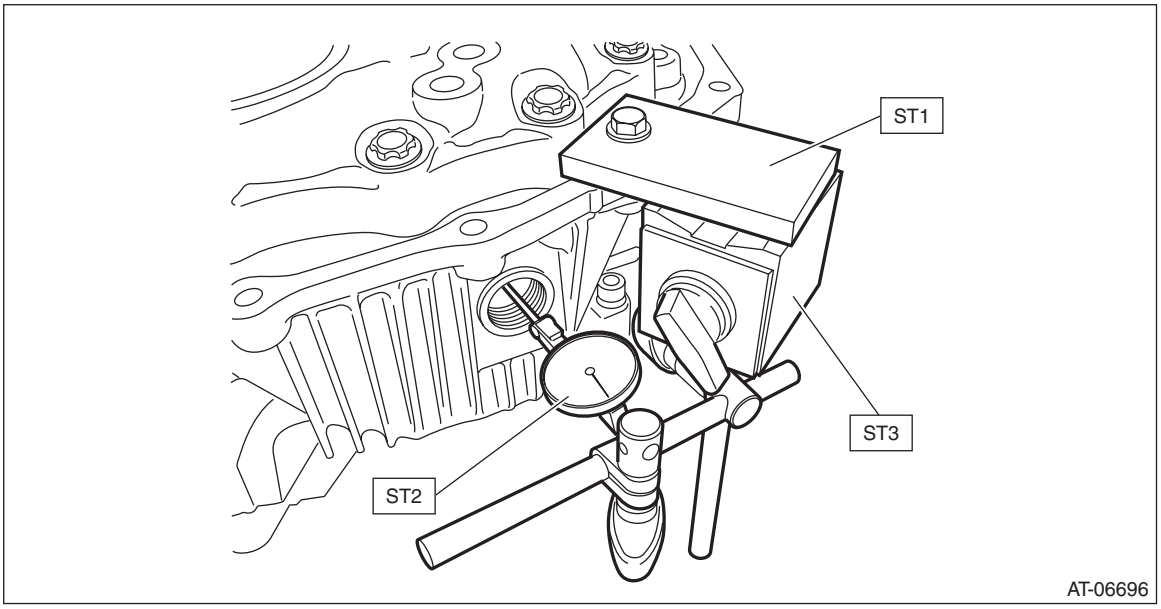


9) Check the backlash is within specification using ST1, ST2 and ST3.

ST1	498255400	PLATE
ST2	498247100	DIAL GAUGE
ST3	498247001	MAGNET BASE

Backlash:

0.13 — 0.18 mm (0.005 — 0.007 in)



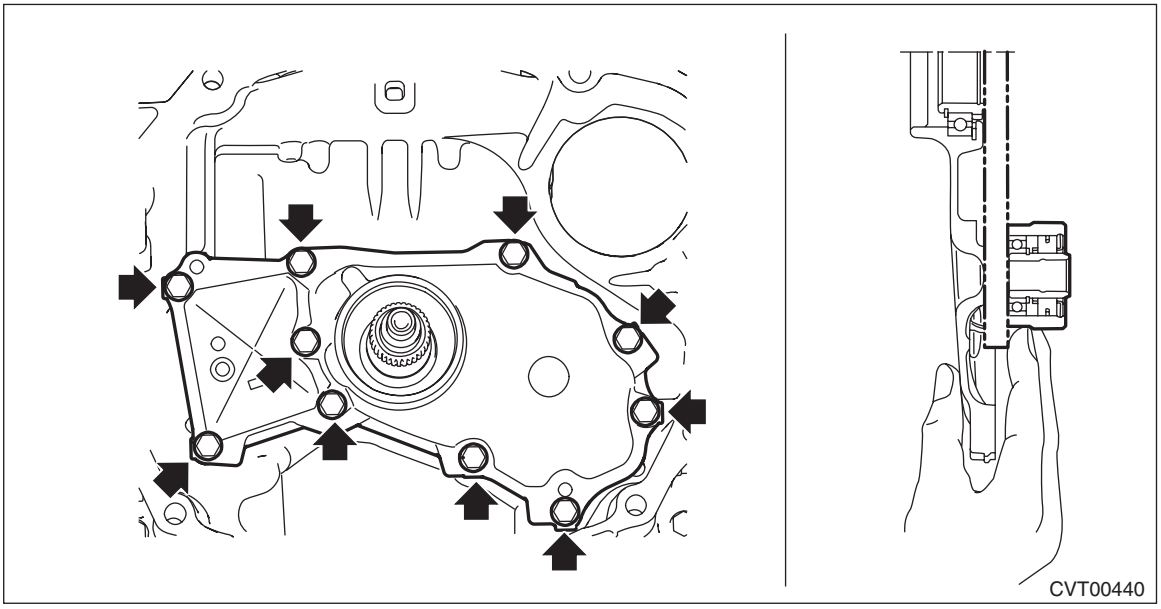
10) Adjust the teeth contact of the front differential and drive shaft. <Ref. to CVT(TH58A)-345, ADJUSTMENT, Drive Pinion Shaft Assembly.>

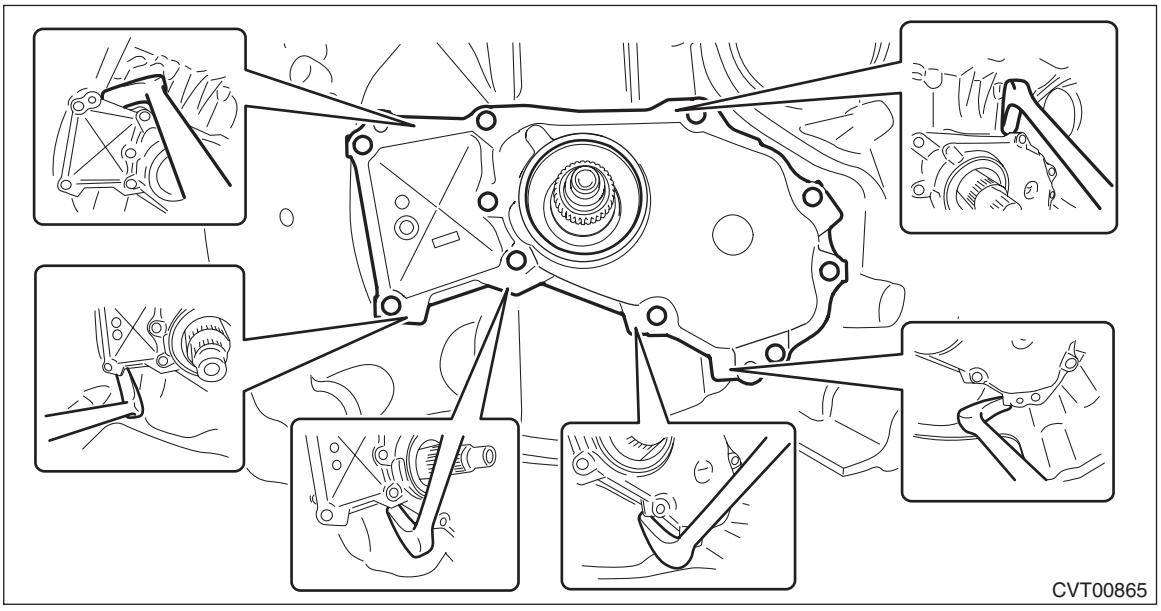
49.Oil Pump Chain

A: REMOVAL

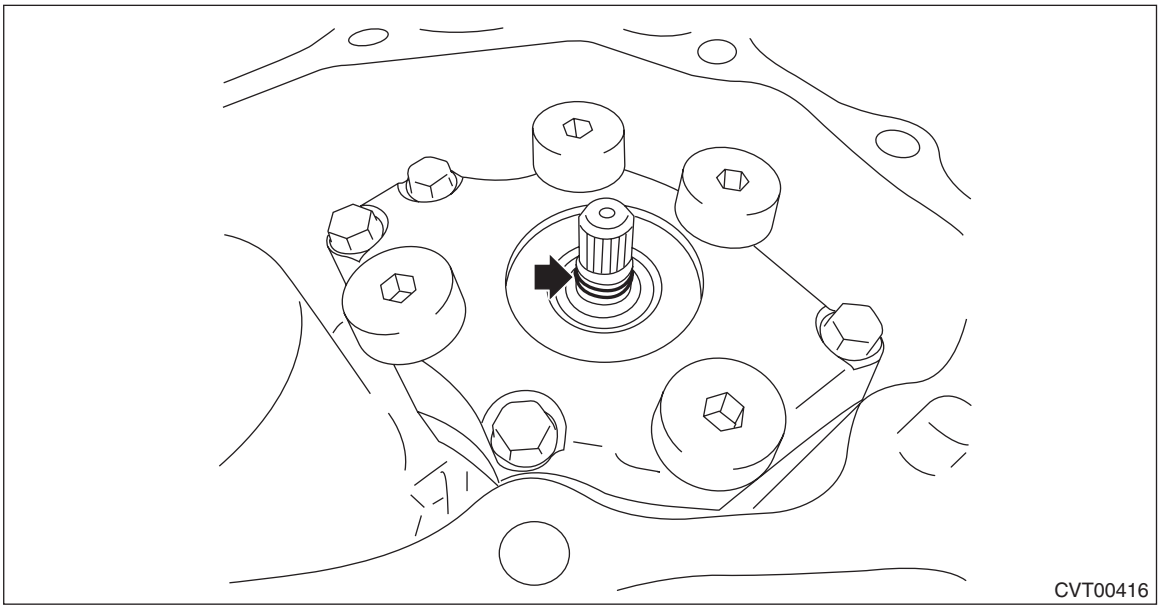
1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TH58A)-63, REMOVAL, Automatic Transmission Assembly.>
2) Remove the torque converter assembly. <Ref. to CVT(TH58A)-178, REMOVAL, Torque Converter Assembly.>
3) Remove the oil pump chain cover, oil pump sprocket (front) and front oil pump chain.

NOTE:
Oil pump chain cover may be hard to remove because the oil pump sprocket (front) is installed to the shaft side of the oil pump. Do not remove forcibly. Support the oil pump sprocket (front) by hand to remove.

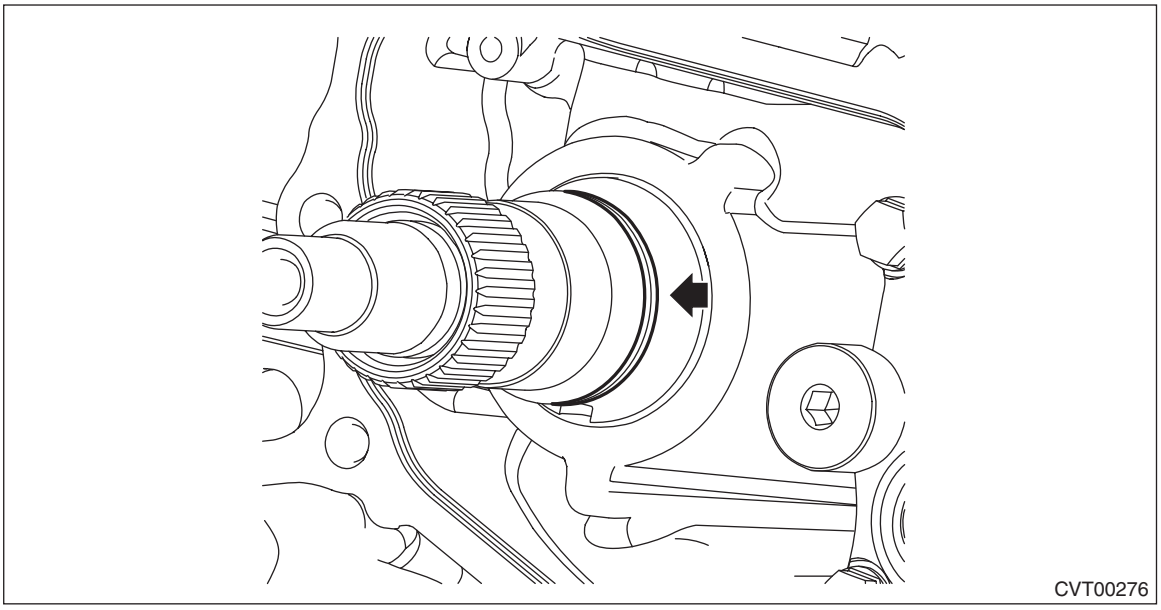

CVT00440


CVT00865

4) Remove the O-ring from the oil pump shaft.

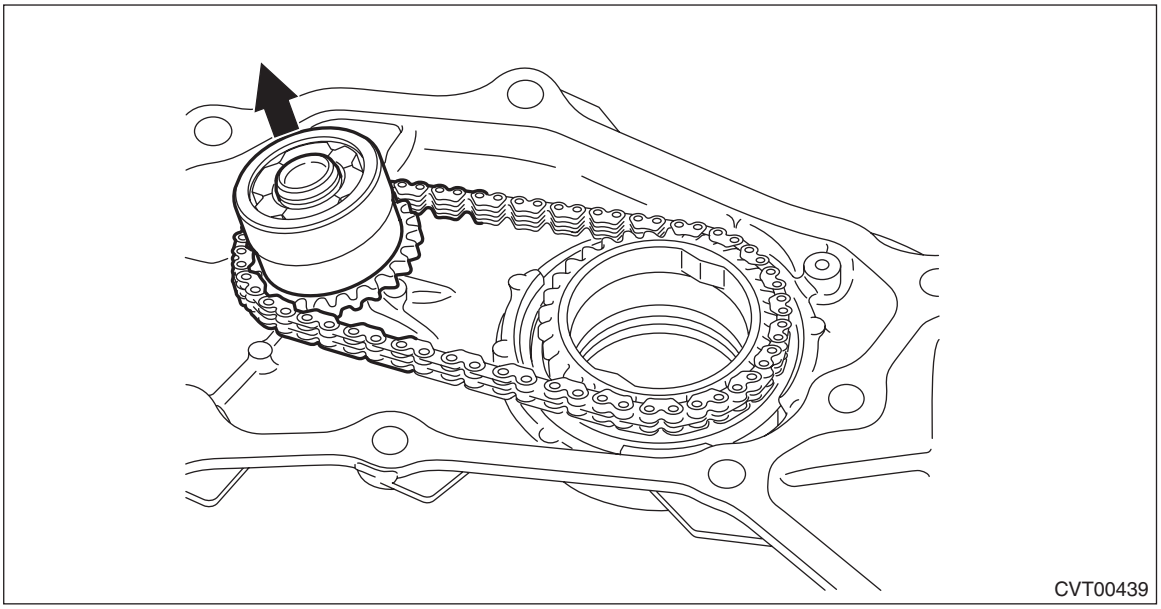


5) Remove the seal ring.

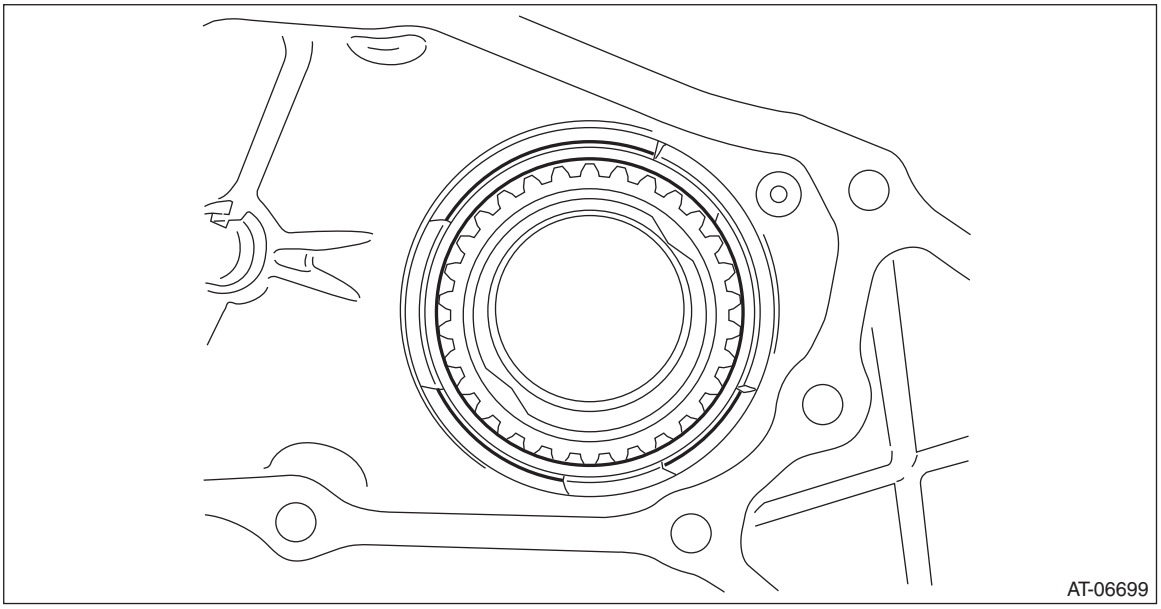


6) Remove the front oil pump chain and the oil pump sprocket (front) from the oil pump chain cover.

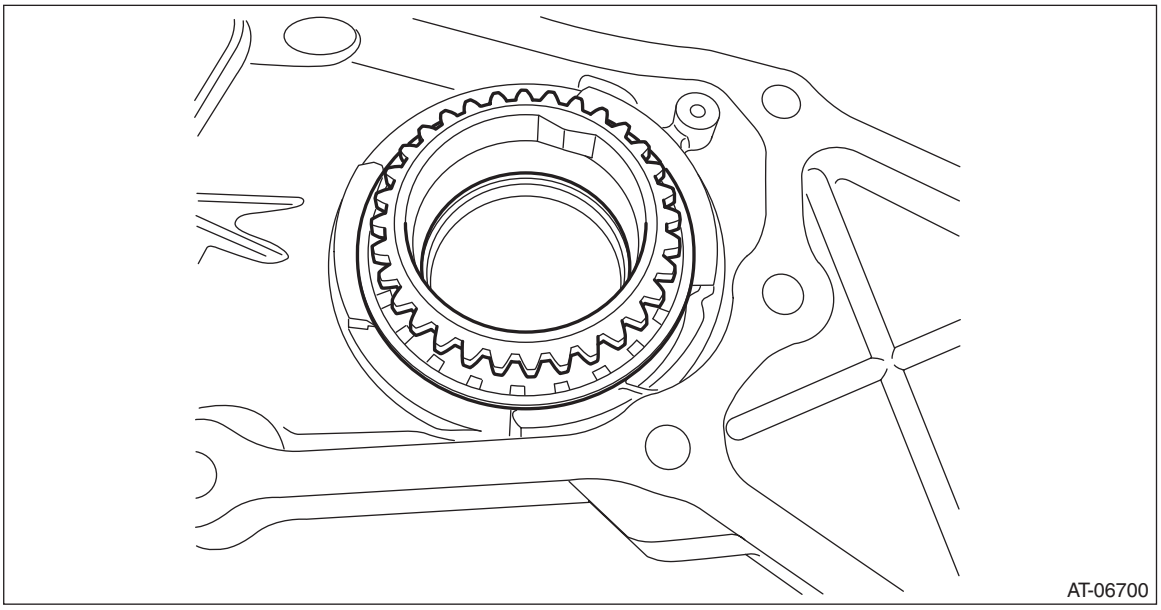
NOTE:
The oil pump sprocket (front) is replaced as an assembly only, because it is a non-disassembly part.



7) Remove the snap ring.

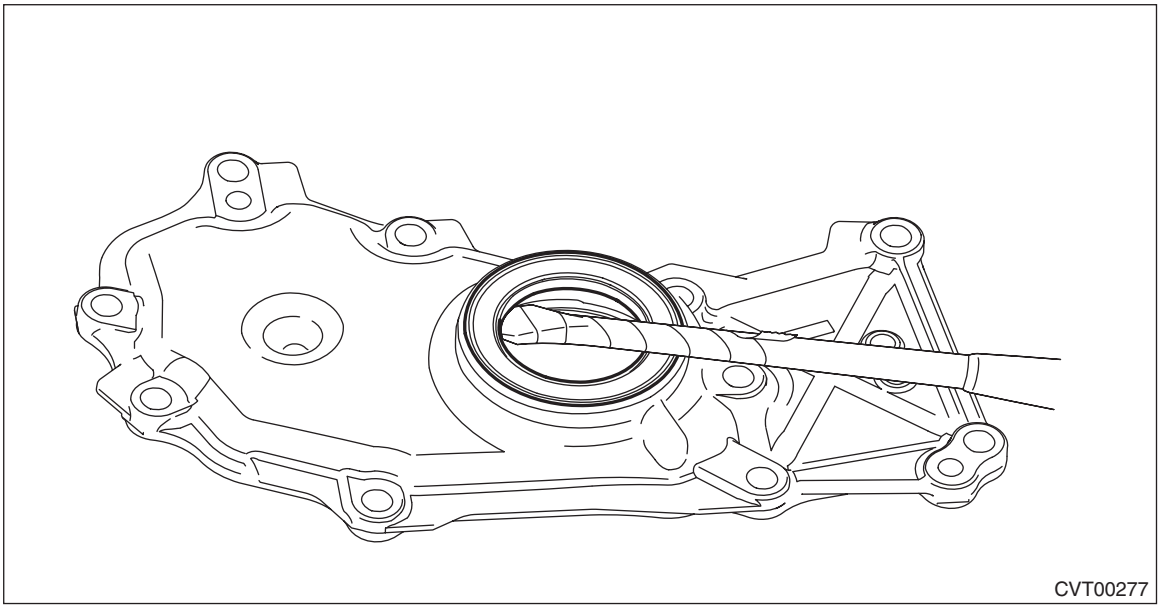


8) Remove the drive sprocket.



9) Remove the oil seal from the oil pump chain cover by using a screwdriver wrapped with vinyl tape, etc.

CAUTION:
Be careful not to damage the oil seal press-fitting surface.

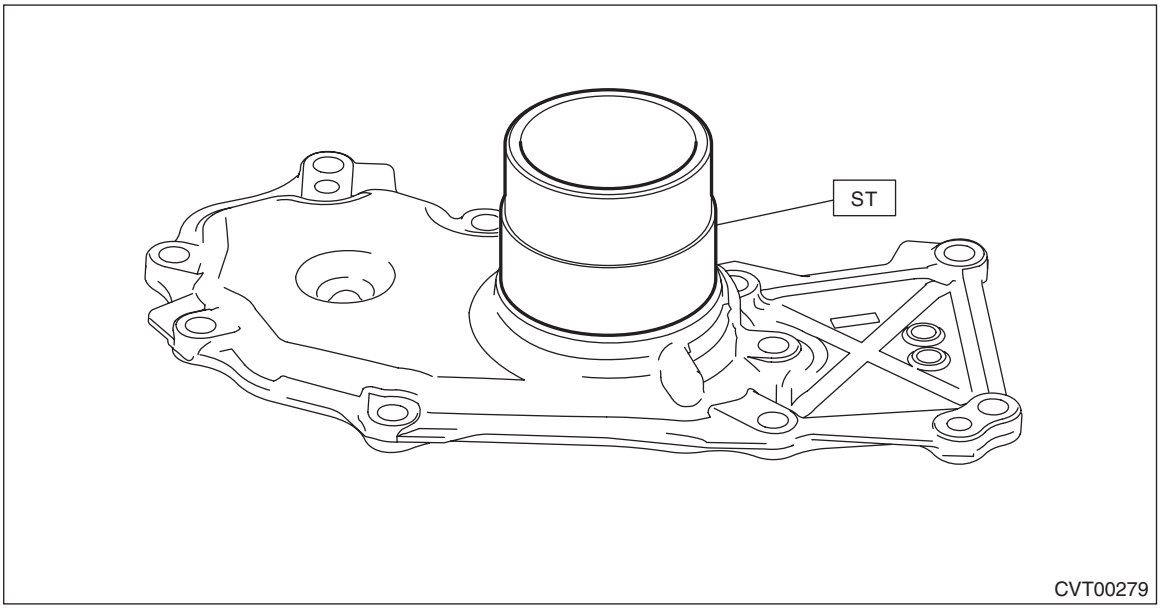


B: INSTALLATION

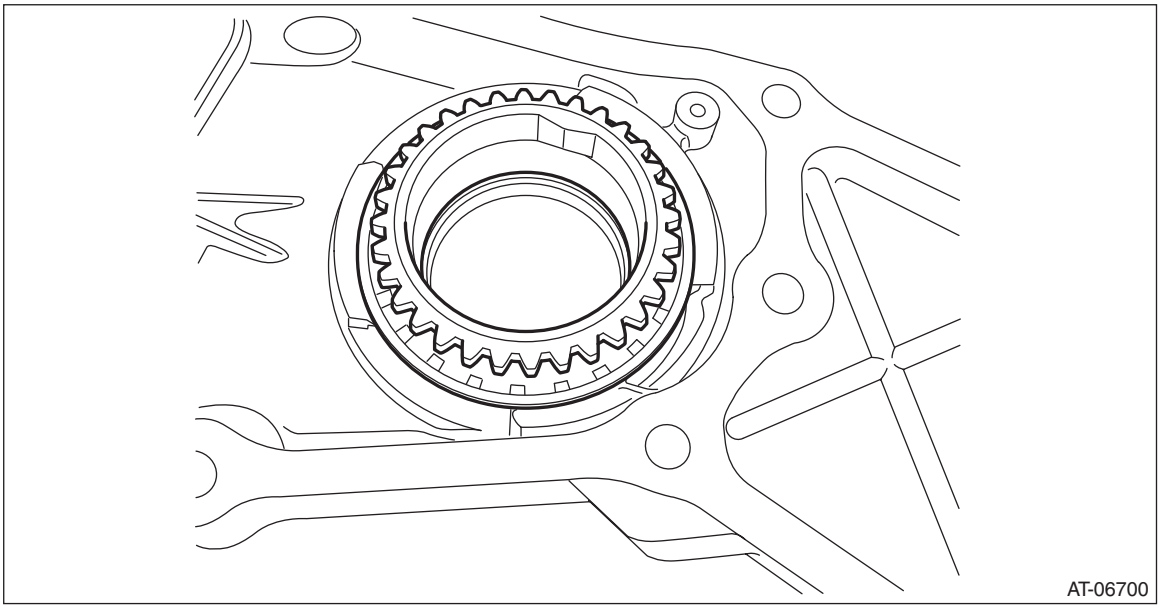
1) Clean the mating surface of oil pump chain cover and converter case.
2) Using the ST, install the oil seal.

NOTE:
- Use a new oil seal.
- Apply CVTF to the oil seal lip and press-fitting surface.

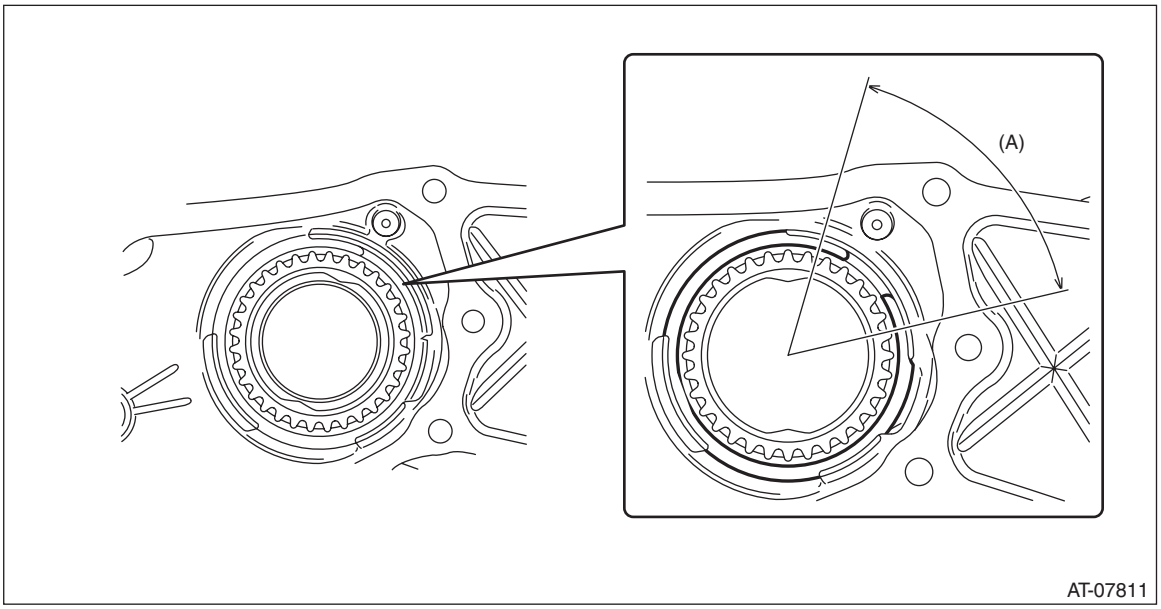
ST 499755602 PRESS SNAP RING



3) Install the drive sprocket.

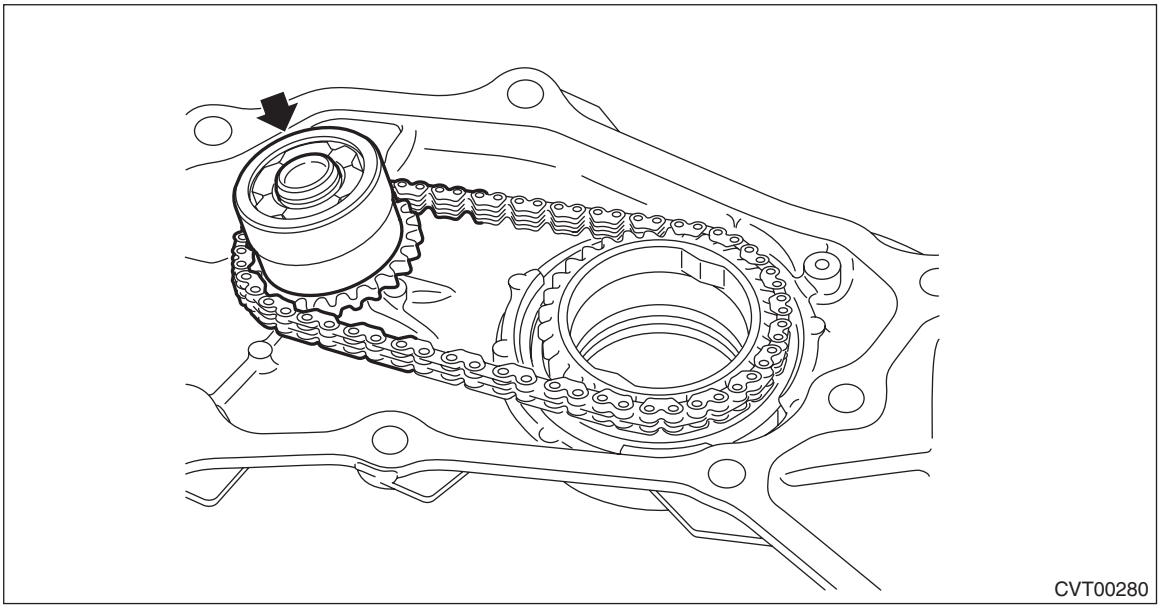


4) Install the snap ring so that its cutout portion is securely fitted into the snap ring groove of the oil pump chain cover.



(A) Installation range of cutout portion for snap ring

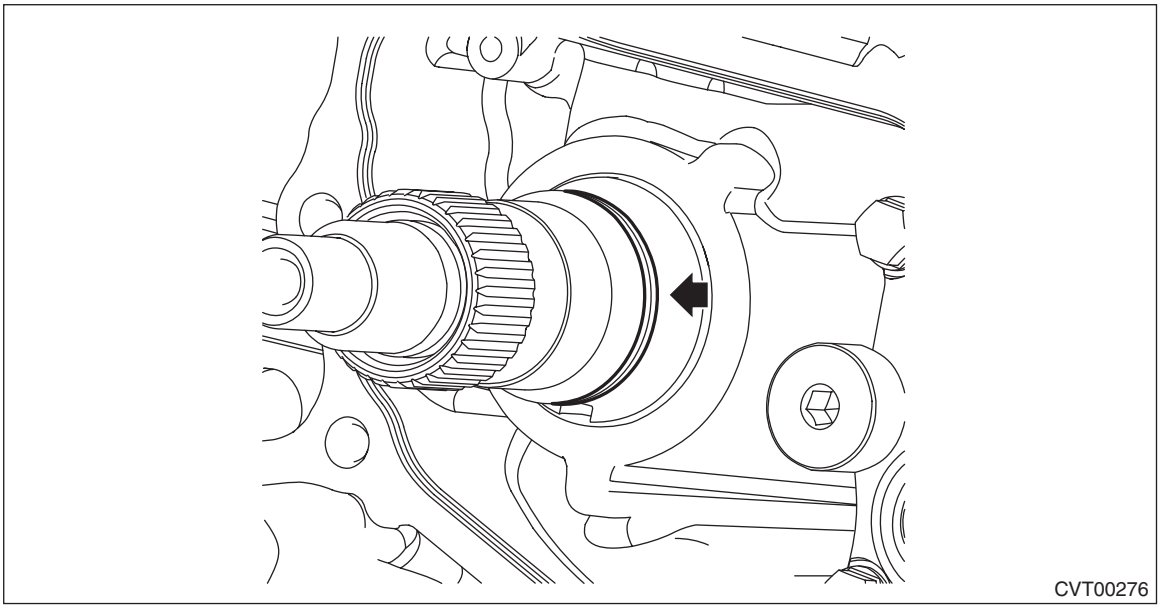
5) Place the oil pump chain on drive sprocket.
6) Place the front oil pump chain on the oil pump sprocket (front) and install the oil pump sprocket (front) to oil pump chain cover.



7) When replacing the oil pump sprocket (front) and the oil pump chain cover, select the oil pump shaft. <Ref. to CVT(TH58A)-387, ADJUSTMENT, Oil Pump.>

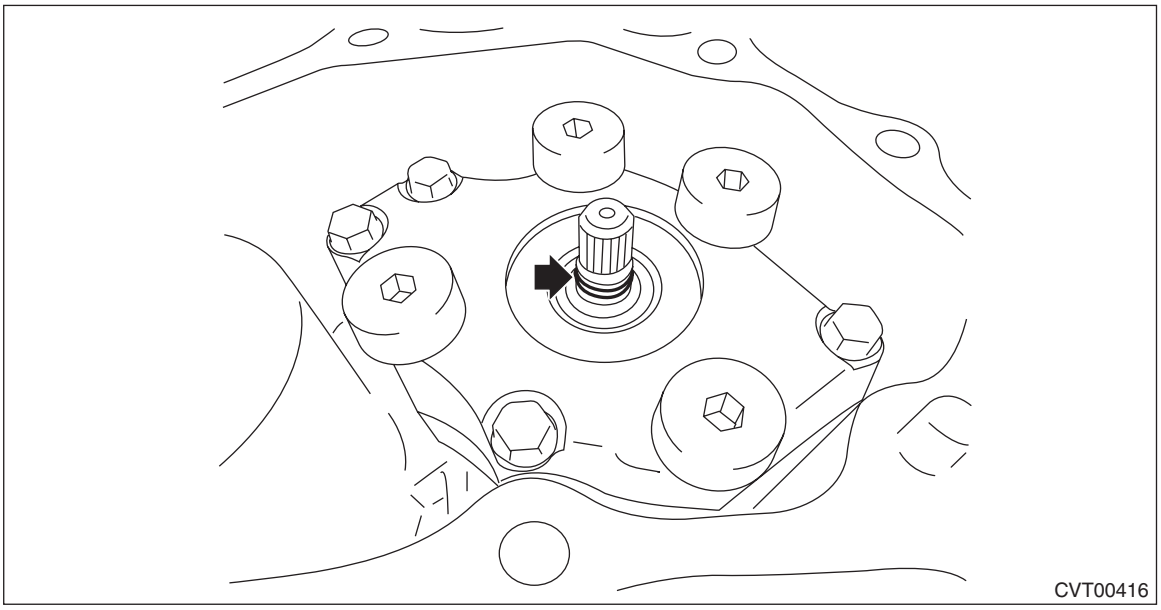
8) Install the seal ring.

NOTE:
- Use a new seal ring.
- Apply CVTF to the seal rings.
- When installing the seal ring, do not expand the seal ring too much.



9) Install the O-ring to the oil pump shaft.

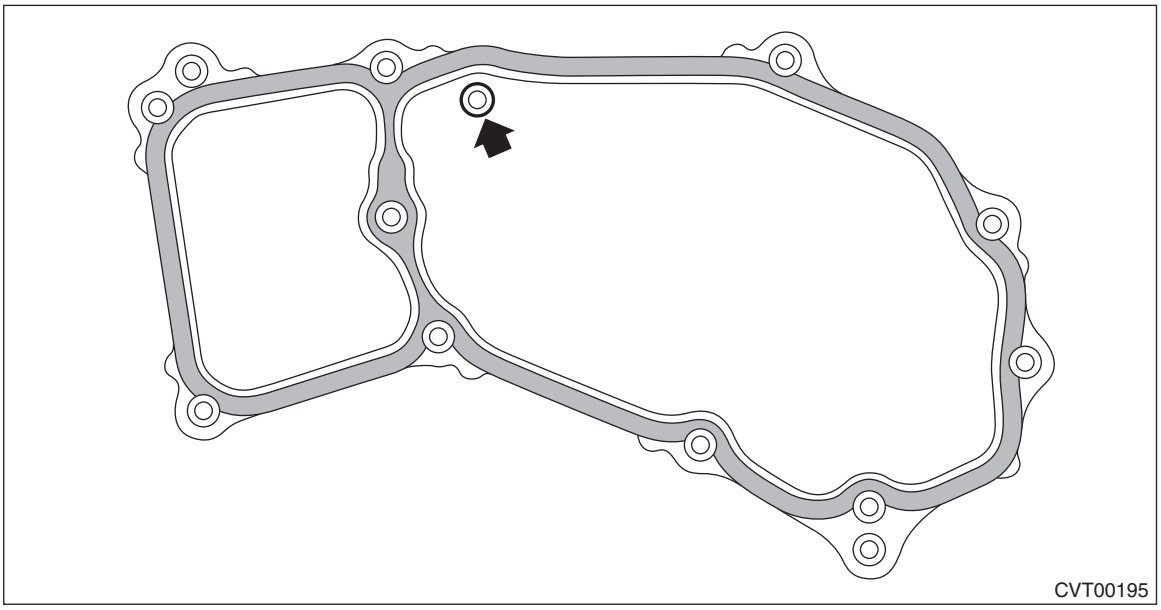
NOTE:
- Use new O-rings.
- Apply CVTF to the O-ring.



10) Apply liquid gasket seamlessly to the mating surface of oil pump chain cover.

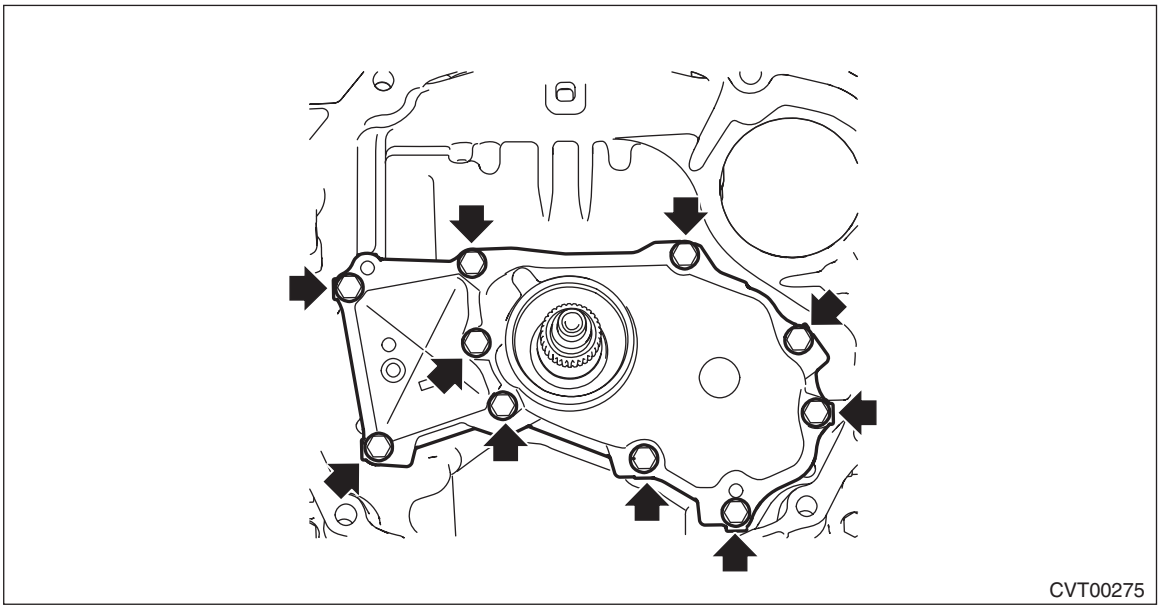
CAUTION:
Do not apply liquid gasket at the arrowed hole.

Liquid gasket:
THREE BOND 1215B or equivalent



11) Install the oil pump chain cover.

Tightening torque:
21 N·m (2.1 kgf-m, 15.5 ft-lb)

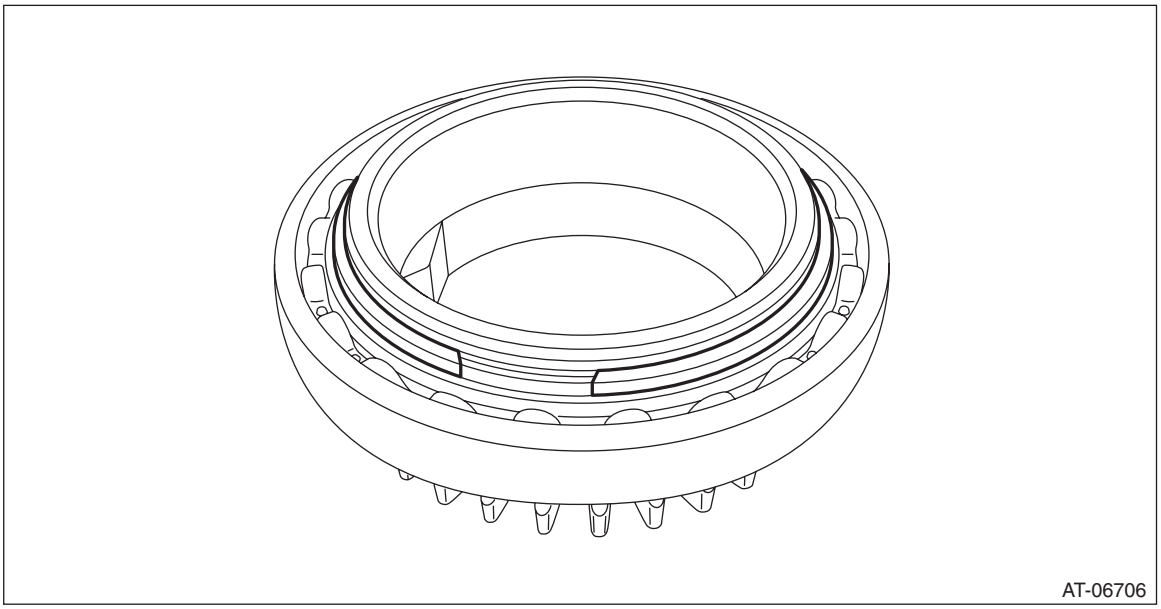


12) Install the torque converter assembly. <Ref. to CVT(TH58A)-179, INSTALLATION, Torque Converter Assembly.>
13) Install the transmission assembly to the vehicle. <Ref. to CVT(TH58A)-77, INSTALLATION, Automatic Transmission Assembly.>

C: DISASSEMBLY

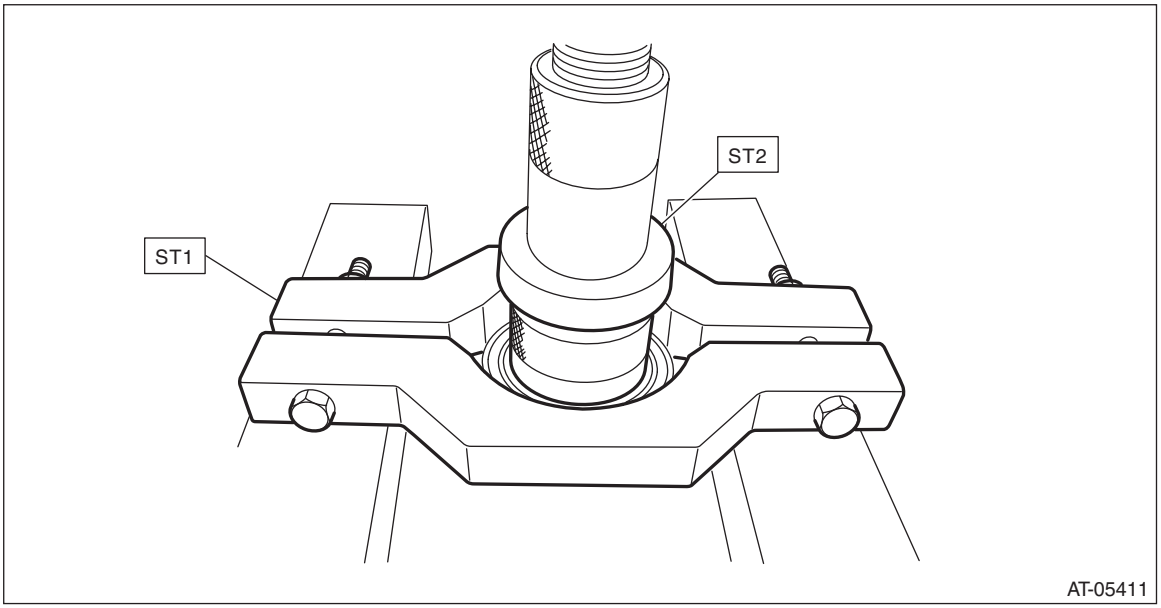
1. DRIVE SPROCKET

1) Remove the snap ring.



2) Remove the ball bearing using ST.

ST1 498077600 REMOVER
ST2 399513600 INSTALLER

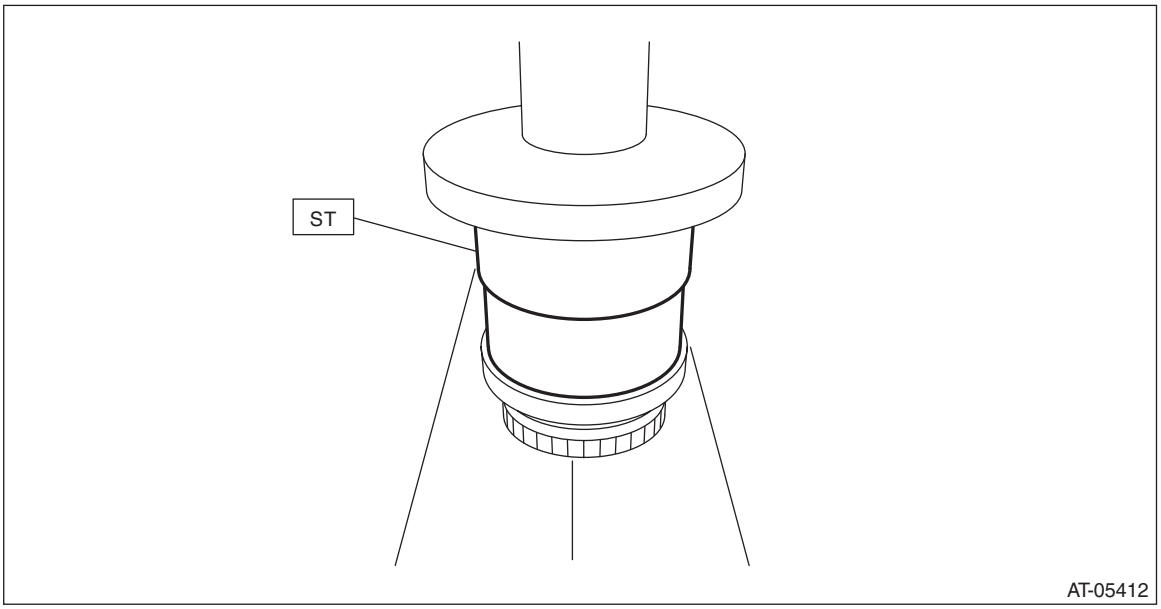


D: ASSEMBLY

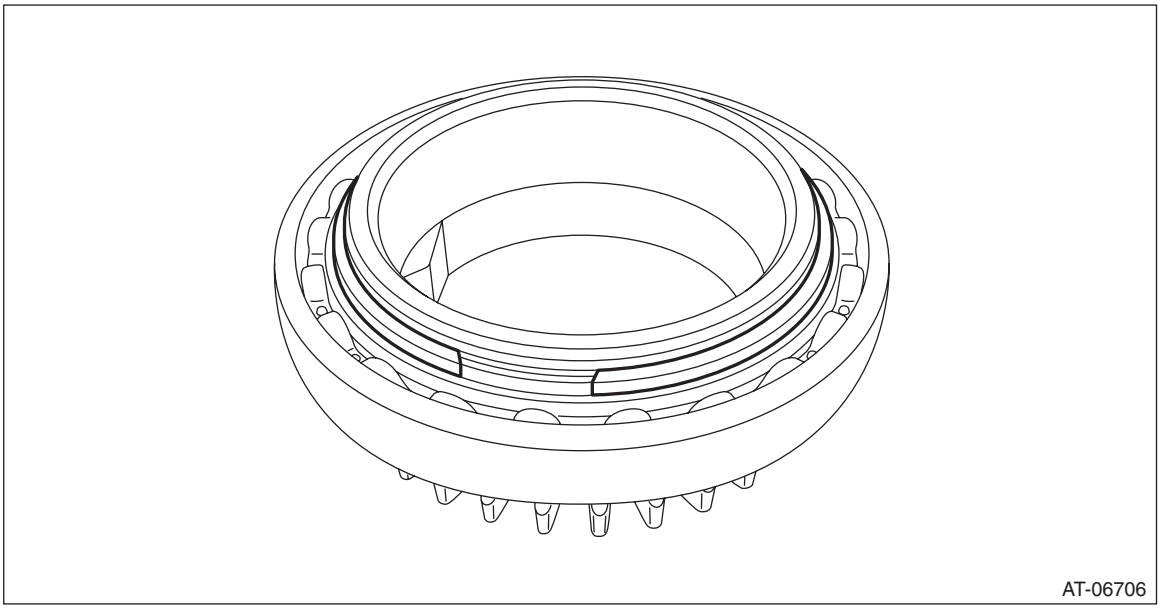
1. DRIVE SPROCKET

1) Using the ST, install the ball bearing.

NOTE:
Use a new ball bearing.
ST 499755502 PRESS SNAP RING



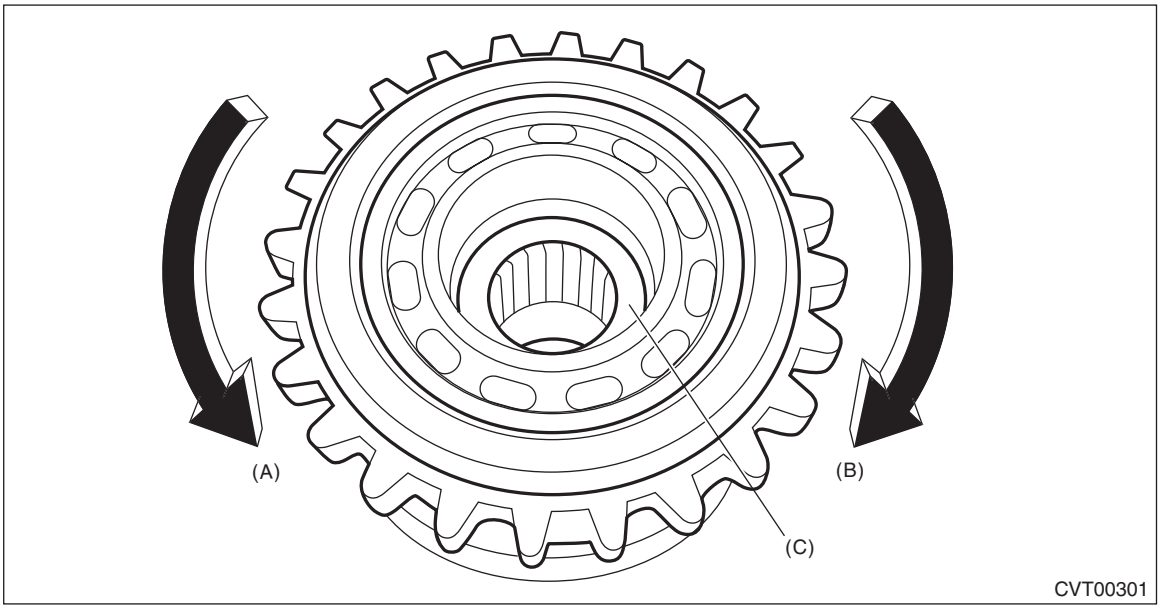
2) Install the snap ring.



E: INSPECTION

- Check the front oil pump chain for damage.
- Replace if gear teeth are broken, damaged, sharpen or excessively worn.
- Check the bearing for seizure or wear.
- Apply CVTF to bearing and rotate the bearing to check for noise or dragging etc.
- Check the oil pump chain cover for damage.
- Check for leakage of CVTF from the mating surface of oil pump chain cover.
- Check the oil seal for damage.
- Check the one-way clutch of the oil pump sprocket (front).

Secure the inner race, and check that the sprocket locks clockwise and rotates counterclockwise.

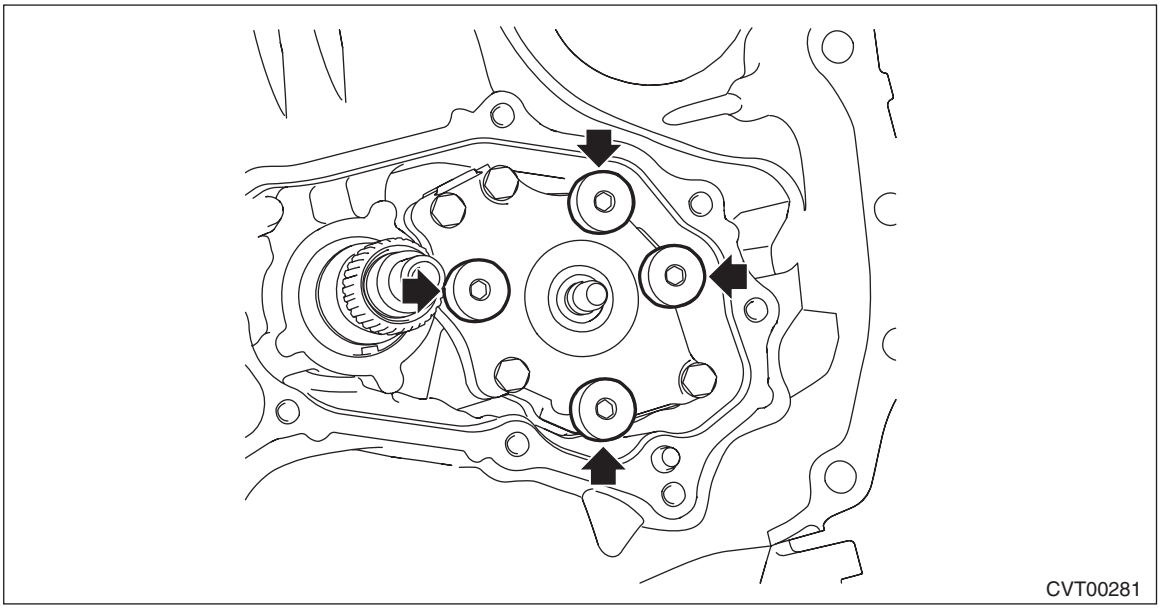


(A) Rotates freely
(B) Locked
(C) Inner race

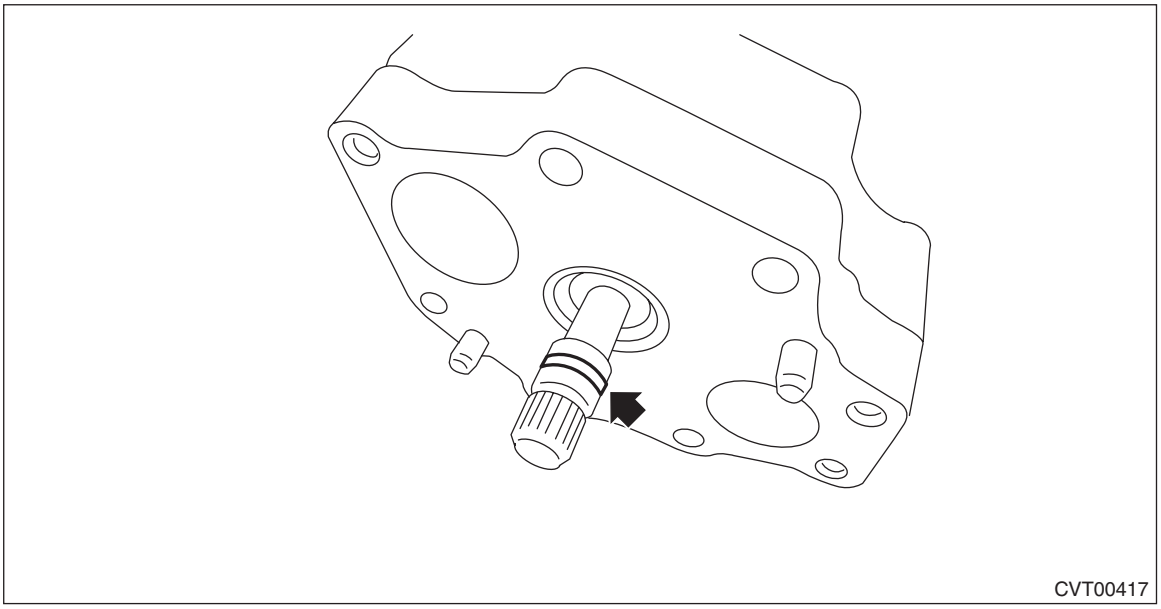
50.Oil Pump

A: REMOVAL

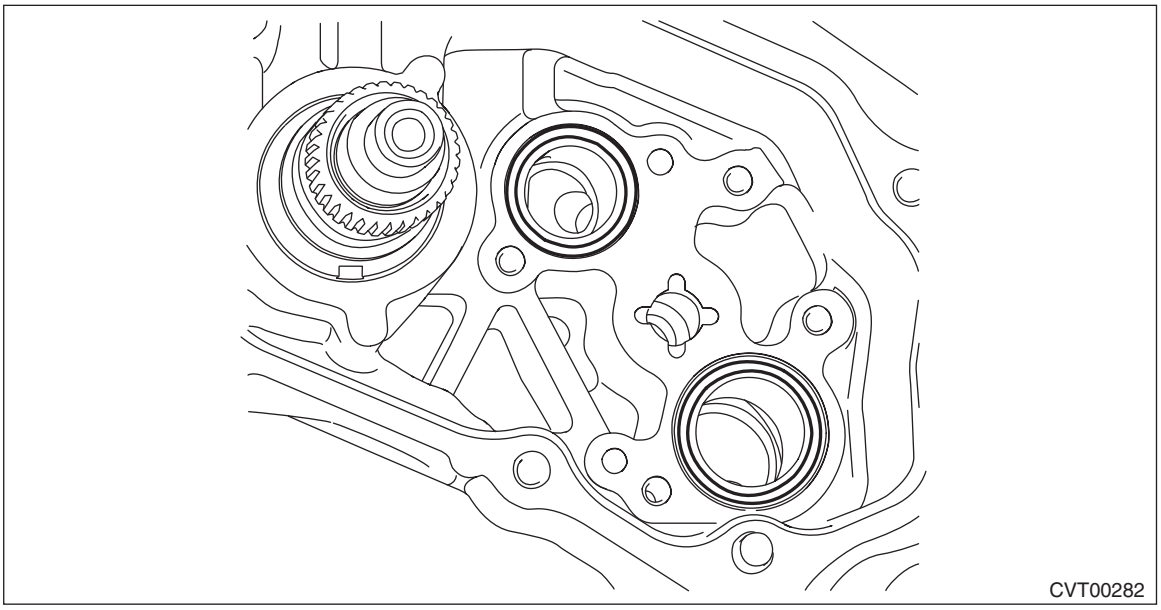
1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TH58A)-63, REMOVAL, Automatic Transmission Assembly.>
2) Remove the torque converter assembly. <Ref. to CVT(TH58A)-178, REMOVAL, Torque Converter Assembly.>
3) Remove the oil pump chain cover. <Ref. to CVT(TH58A)-372, REMOVAL, Oil Pump Chain.>
4) Remove the oil pump and the plate.


CVT00281

5) Remove the O-ring from the oil pump shaft.


CVT00417

6) Remove the O-ring.

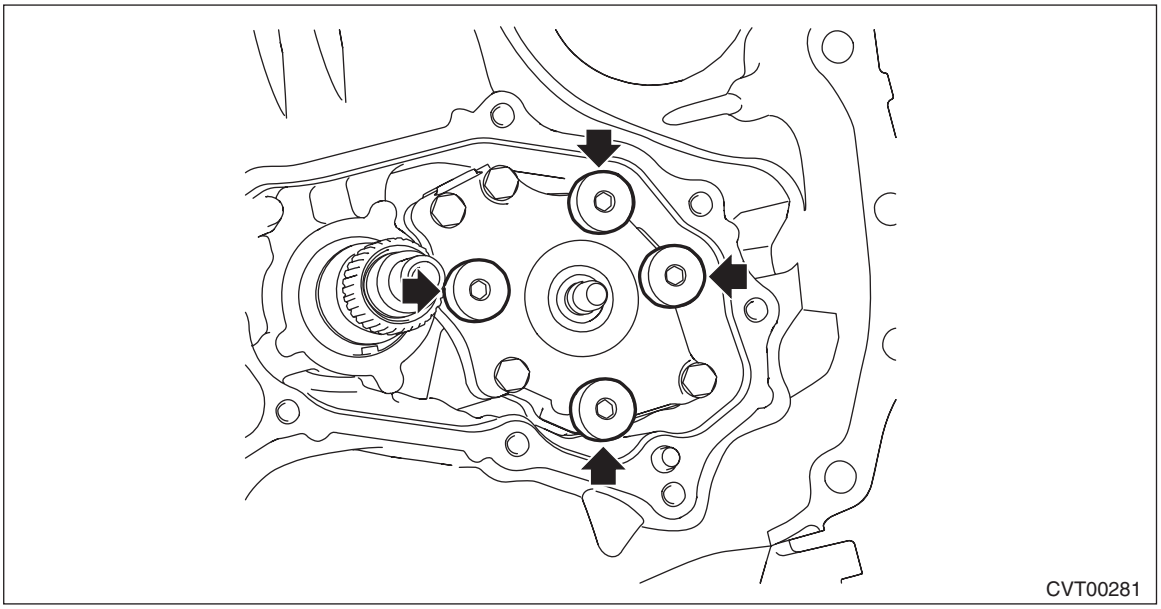


B: INSTALLATION

1) Install the plate and the oil pump.

NOTE:
Apply CVTF to the bolt.

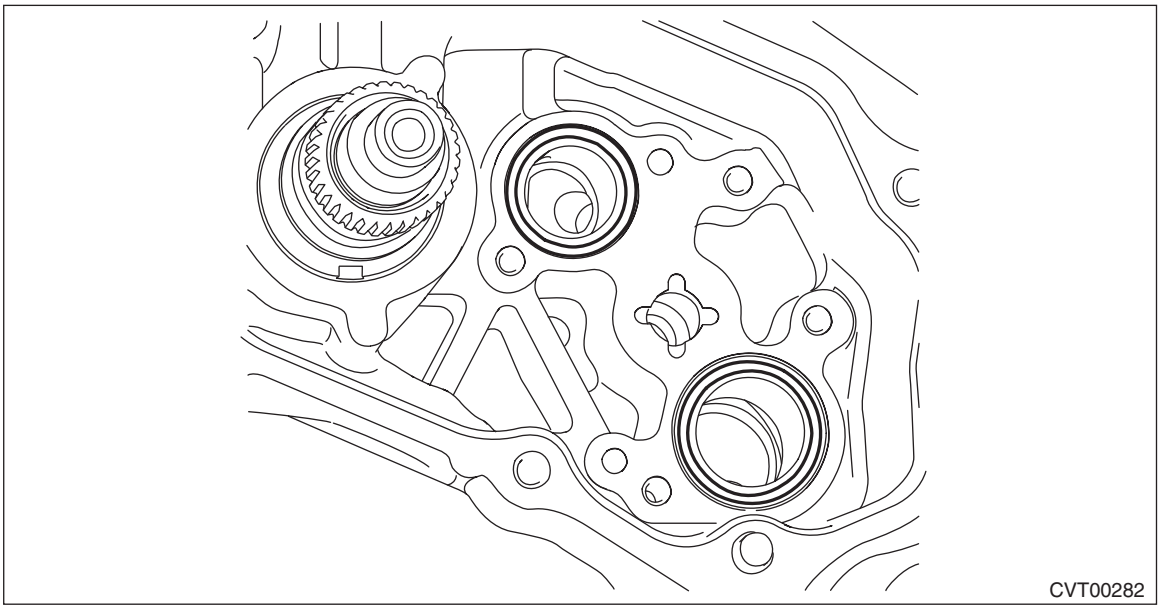
Tightening torque:
8.5 N·m (0.9 kgf-m, 6.3 ft-lb)



2) Select the oil pump shaft. <Ref. to CVT(TH58A)-387, ADJUSTMENT, Oil Pump.>
3) Remove the oil pump.

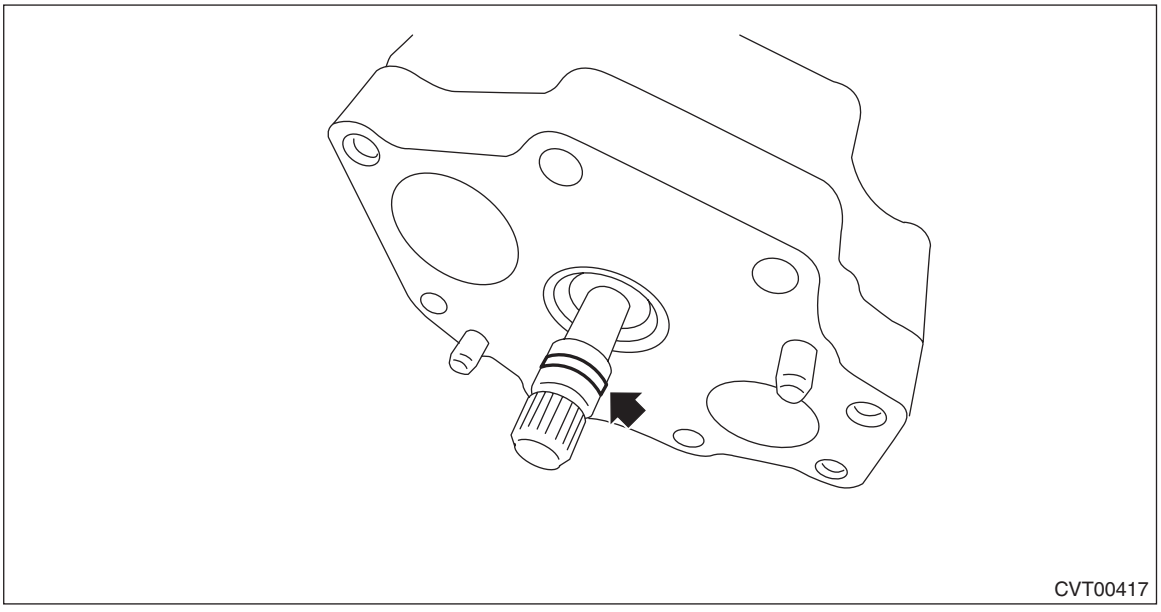
4) Install the O-ring.

NOTE:
- Use new O-rings.
- Apply CVTF to the O-ring.



5) Install the O-ring to the oil pump shaft.

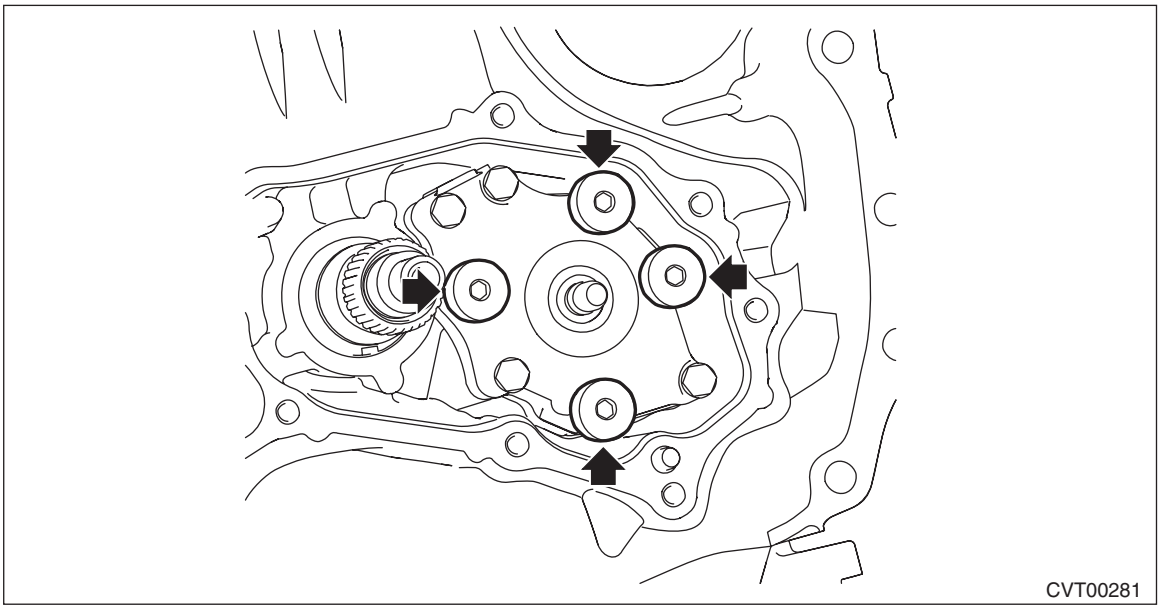
NOTE:
- Use new O-rings.
- Apply CVTF to the O-ring.



6) Install the plate and the oil pump.

NOTE:
Apply CVTF to the bolt.

Tightening torque:
8.5 N·m (0.9 kgf-m, 6.3 ft-lb)



7) Install the oil pump chain cover. <Ref. to CVT(TH58A)-376, INSTALLATION, Oil Pump Chain.>
8) Install the selected oil pump shaft, and assemble the transmission assembly. <Ref. to CVT(TH58A)-290, INSTALLATION, Reverse Brake Assembly.>
9) Install the torque converter assembly. <Ref. to CVT(TH58A)-179, INSTALLATION, Torque Converter Assembly.>
10) Install the transmission assembly to the vehicle. <Ref. to CVT(TH58A)-77, INSTALLATION, Automatic Transmission Assembly.>

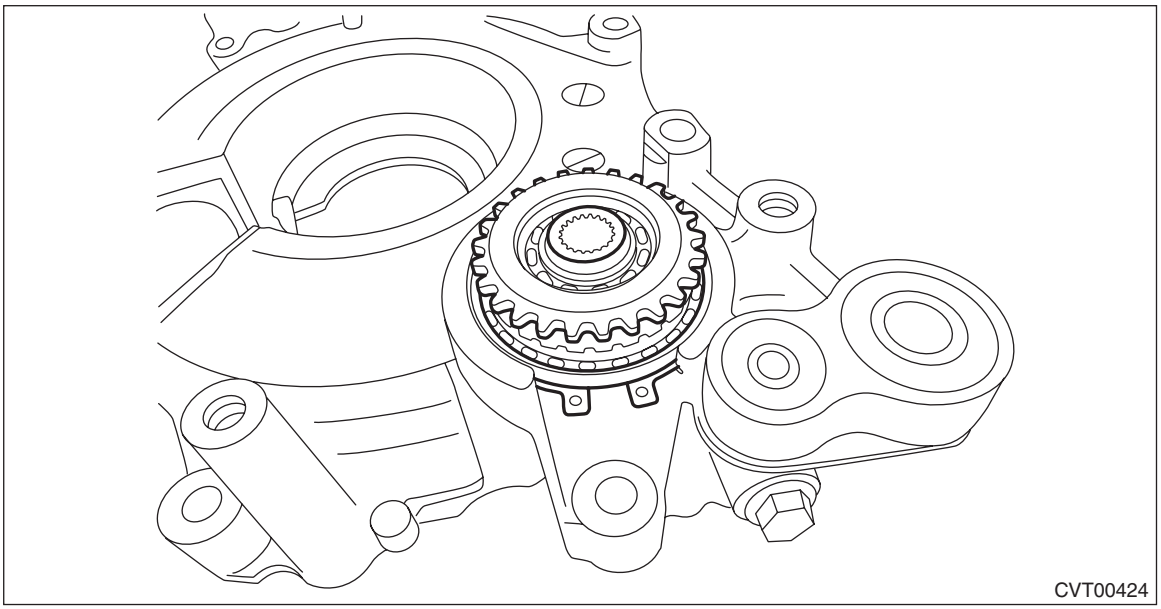
C: INSPECTION

Check the following items.
- Check the oil pump for damage and wear.
- Rotate the oil pump by hand, and check that it rotates smoothly.

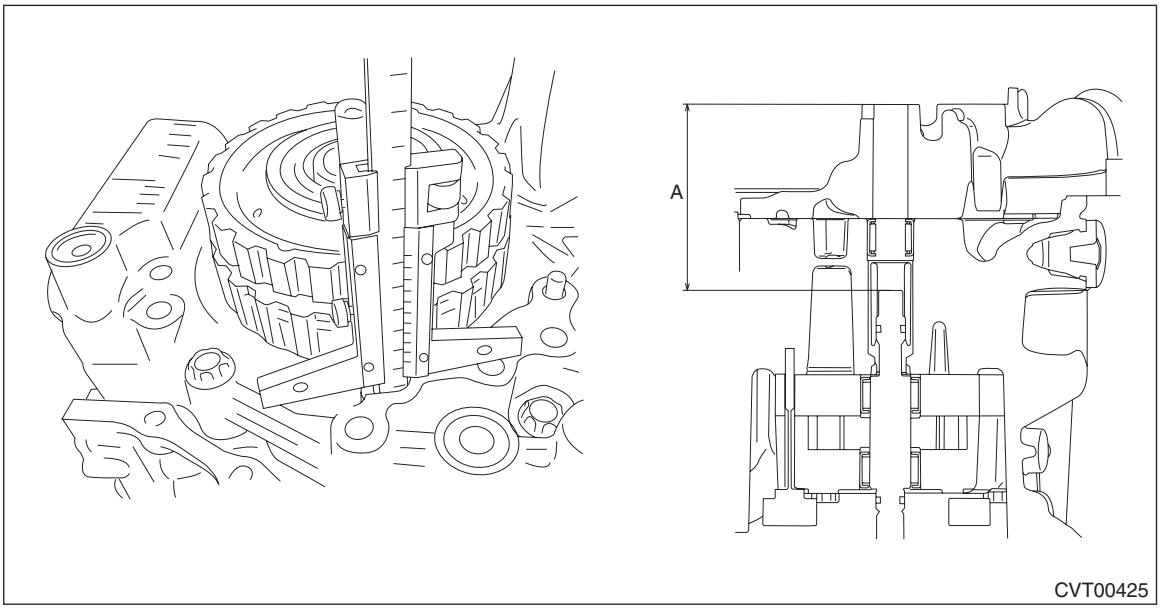
1) Measure the secondary pressure. <Ref. to CVT(TH58A)-54, INSPECTION, Secondary Pressure (Line Pressure) Test.>
2) Remove the oil pan and oil strainer. <Ref. to CVT(TH58A)-115, REMOVAL, Control Valve Body.>
3) Check oil strainer for clogging.
When oil strainer has no clogging, replace the oil pump.

D: ADJUSTMENT

1) Remove the reverse brake assembly. <Ref. to CVT(TH58A)-287, REMOVAL, Reverse Brake Assembly.>
2) Install the oil pump sprocket rear to the reverse brake housing.

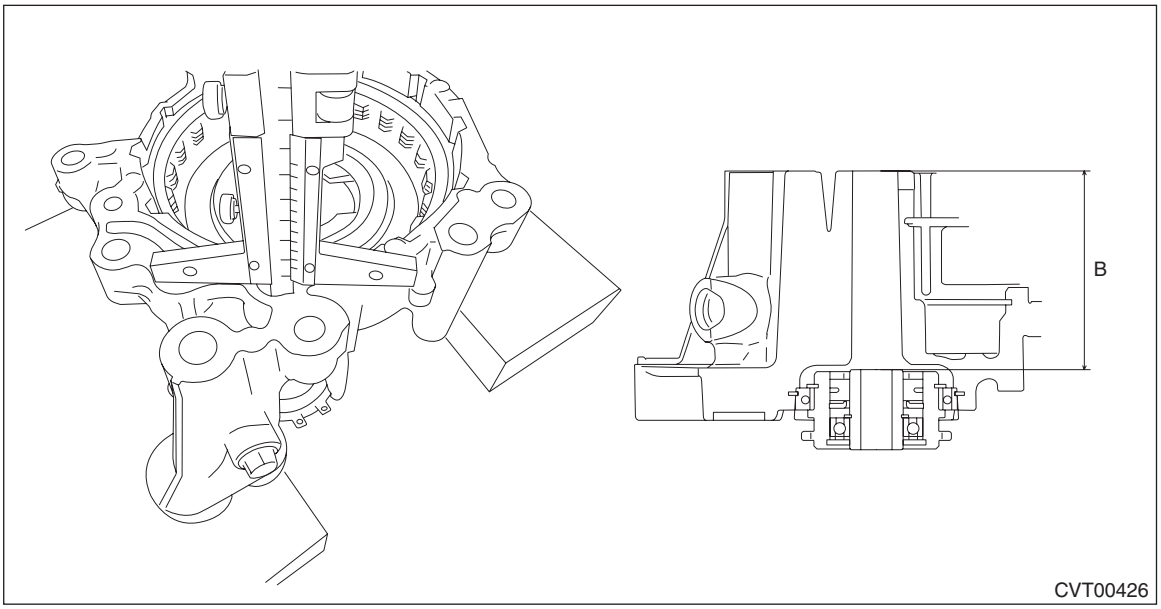

CVT00424

3) Measure the height “A” from the drive pinion retainer to the oil pump.



CVT00425

4) Measure the depth “B” from the mating surface of the reverse brake housing and the drive pinion retainer to the oil pump sprocket rear inner race.



5) Calculate the following formula and select the oil pump shaft.
T mm = A + B
[T in = A + B]
T: Distance from oil pump to oil pump sprocket rear inner race
A: Height from reverse brake housing mating surface to oil pump
B: Depth from drive pinion retainer mating surface to oil pump sprocket rear inner race

T mm (in)	Part No.
141.6 — 141.8(5.575 — 5.583)	31359AA220
141.8 — 142.0(5.583 — 5.591)	31359AA230
142.0 — 142.2(5.591 — 5.598)	31359AA240
142.2 — 142.4(5.598 — 5.606)	31359AA250
142.4 — 142.6(5.606 — 5.614)	31359AA260
142.6 — 142.8(5.614 — 5.622)	31359AA270
142.8 — 143.0(5.622 — 5.630)	31359AA280
143.0 — 143.2(5.630 — 5.638)	31359AA290

51.Converter Case

A: REMOVAL

1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TH58A)-63, REMOVAL, Automatic Transmission Assembly.>
2) Remove the air breather hose. <Ref. to CVT(TH58A)-171, REMOVAL, Air Breather Hose.>
3) Remove the transmission harness. <Ref. to CVT(TH58A)-143, REMOVAL, Transmission Harness.>
4) Remove the main control valve body. <Ref. to CVT(TH58A)-115, REMOVAL, Control Valve Body.>
5) Remove the turbine speed sensor. <Ref. to CVT(TH58A)-104, REMOVAL, Turbine Speed Sensor.>
6) Remove the secondary speed sensor. <Ref. to CVT(TH58A)-106, REMOVAL, Secondary Speed Sensor.>
7) Remove the front wheel speed sensor. <Ref. to CVT(TH58A)-108, REMOVAL, Front Wheel Speed Sensor.>
8) Remove the inhibitor switch. <Ref. to CVT(TH58A)-101, REMOVAL, Inhibitor Switch.>
9) Remove the extension case. <Ref. to CVT(TH58A)-182, REMOVAL, Extension Case.>
10) Remove the transfer clutch assembly. <Ref. to CVT(TH58A)-186, REMOVAL, Transfer Clutch.>
11) Remove the transfer driven gear assembly. <Ref. to CVT(TH58A)-200, REMOVAL, Transfer Driven Gear.>
12) Remove the transfer drive gear assembly. <Ref. to CVT(TH58A)-203, REMOVAL, Transfer Drive Gear.>
13) Remove the parking pawl. <Ref. to CVT(TH58A)-208, REMOVAL, Parking Pawl.>
14) Remove the oil pan and oil strainer. <Ref. to CVT(TH58A)-112, REMOVAL, Oil Pan and Strainer.>
15) Remove the transmission control device. <Ref. to CVT(TH58A)-210, REMOVAL, Transmission Control Device.>
16) Remove the drive motor assembly. <Ref. to CVT(TH58A)-210, REMOVAL, Transmission Control Device.>
17) Remove the output clutch assembly. <Ref. to CVT(TH58A)-228, Output Clutch Assembly.>
18) Remove the transmission case. <Ref. to CVT(TH58A)-245, REMOVAL, Transmission Case.>
19) Remove the reduction drive gear. <Ref. to CVT(TH58A)-258, REMOVAL, Reduction Drive Gear.>
20) Remove the primary pulley, secondary pulley and variator chain. <Ref. to CVT(TH58A)-263, REMOVAL, Primary Pulley and Secondary Pulley.>
21) Remove the reverse brake assembly. <Ref. to CVT(TH58A)-287, REMOVAL, Reverse Brake Assembly.>
22) Remove the forward clutch assembly. <Ref. to CVT(TH58A)-303, REMOVAL, Forward Clutch Assembly.>
23) Remove the drive pinion shaft assembly. <Ref. to CVT(TH58A)-323, REMOVAL, Drive Pinion Shaft Assembly.>
24) Remove the front differential assembly. <Ref. to CVT(TH58A)-352, REMOVAL, Front Differential Assembly.>
25) Remove the oil pump chain cover. <Ref. to CVT(TH58A)-372, REMOVAL, Oil Pump Chain.>
26) Remove the oil pump. <Ref. to CVT(TH58A)-383, REMOVAL, Oil Pump.>

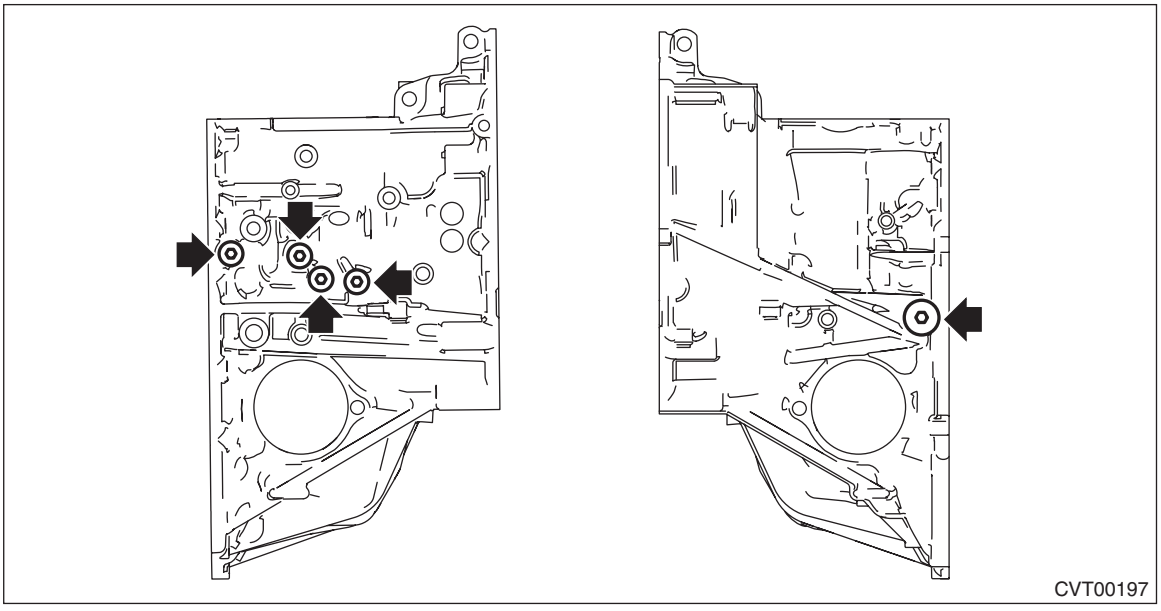
B: INSTALLATION

1) Install the oil pump. <Ref. to CVT(TH58A)-384, INSTALLATION, Oil Pump.>
2) Install the oil pump chain cover. <Ref. to CVT(TH58A)-376, INSTALLATION, Oil Pump Chain.>
3) Install the front differential assembly. <Ref. to CVT(TH58A)-354, INSTALLATION, Front Differential Assembly.>
4) Install the drive pinion shaft assembly. <Ref. to CVT(TH58A)-324, INSTALLATION, Drive Pinion Shaft Assembly.>
5) Select the oil pump shaft. <Ref. to CVT(TH58A)-387, ADJUSTMENT, Oil Pump.>
6) Install the forward clutch assembly. <Ref. to CVT(TH58A)-306, INSTALLATION, Forward Clutch Assembly.>
7) Install the reverse brake assembly. <Ref. to CVT(TH58A)-290, INSTALLATION, Reverse Brake Assembly.>

8) Install the primary pulley, secondary pulley and variator chain. <Ref. to CVT(TH58A)-271, INSTALLATION, Primary Pulley and Secondary Pulley.>
9) Install the transmission case. <Ref. to CVT(TH58A)-248, INSTALLATION, Transmission Case.>
10) Install the output clutch. <Ref. to CVT(TH58A)-229, INSTALLATION, Output Clutch Assembly.>
11) Install the drive motor assembly. <Ref. to CVT(TH58A)-221, INSTALLATION, Drive Motor Assembly.>
12) Install the transmission control device. <Ref. to CVT(TH58A)-213, INSTALLATION, Transmission Control Device.>
13) Install the oil strainer and oil pan. <Ref. to CVT(TH58A)-114, INSTALLATION, Oil Pan and Strainer.>
14) Install the parking pawl. <Ref. to CVT(TH58A)-208, INSTALLATION, Parking Pawl.>
15) Install the transfer drive gear assembly. <Ref. to CVT(TH58A)-204, INSTALLATION, Transfer Drive Gear.>
16) Install the transfer driven gear assembly. <Ref. to CVT(TH58A)-201, INSTALLATION, Transfer Driven Gear.>
17) Install the transfer clutch assembly. <Ref. to CVT(TH58A)-188, INSTALLATION, Transfer Clutch.>
18) Install the extension case. <Ref. to CVT(TH58A)-183, INSTALLATION, Extension Case.>
19) Install the inhibitor switch. <Ref. to CVT(TH58A)-102, INSTALLATION, Inhibitor Switch.>
20) Install the secondary speed sensor. <Ref. to CVT(TH58A)-106, INSTALLATION, Secondary Speed Sensor.>
21) Install the front wheel speed sensor. <Ref. to CVT(TH58A)-108, INSTALLATION, Front Wheel Speed Sensor.>
22) Install the turbine speed sensor. <Ref. to CVT(TH58A)-104, INSTALLATION, Turbine Speed Sensor.>
23) Install the control valve body. <Ref. to CVT(TH58A)-123, INSTALLATION, Control Valve Body.>
24) Install the transmission harness. <Ref. to CVT(TH58A)-151, INSTALLATION, Transmission Harness.>
25) Install the air breather hose. <Ref. to CVT(TH58A)-173, INSTALLATION, Air Breather Hose.>
26) Install the transmission assembly to the vehicle. <Ref. to CVT(TH58A)-77, INSTALLATION, Automatic Transmission Assembly.>

C: DISASSEMBLY

1) Remove the pitching stopper bracket and transmission radio ground cord, if mounted.
2) Remove the filler plug, oil drain plug and overflow drain plug. <Ref. to CVT(TH58A)-47, REPLACEMENT, Differential Gear Oil.>
3) Remove all plugs.



4) Remove the rubber cap.

D: ASSEMBLY

1) Install the rubber cap.
2) Install the oil drain plug.

NOTE:
Use a new gasket.

Tightening torque:
70 N·m (7.1 kgf-m, 51.6 ft-lb)

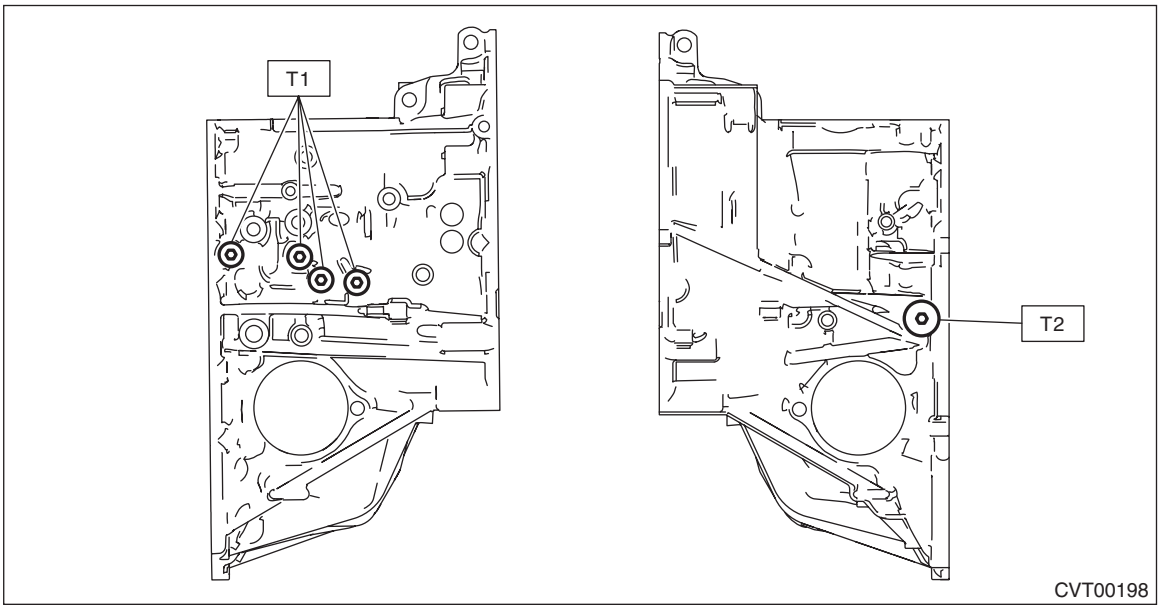
3) Install the overflow drain plug.

NOTE:
Overflow plug of differential gear oil is temporarily attached.

4) Install all plugs.

NOTE:
Use new O-rings.

Tightening torque:
T1: 25 N·m (2.5 kgf-m, 18.4 ft-lb)
T2: 22.5 N·m (2.3 kgf-m, 16.6 ft-lb)



5) Install the pitching stopper bracket and transmission radio ground cord.

Tightening torque:
41 N·m (4.2 kgf-m, 30.2 ft-lb)

E: INSPECTION

- Check for leakage of CVTF from the connection between converter case and transmission case.
- Check there is no damage or cracks on the converter case.

52.Diagnostics with Phenomenon

A: INSPECTION

Symptoms	Faulty parts
Stall speed is low after warming-up, with select lever in “D” or “R” range.	Engine control system
Vehicle does not move despite engine speed rising up, with select lever in “D” or “R” range.	• Engine control system • Select cable • CVTF • Secondary pressure circuit • Pulley, gear and variator chain • Forward/reverse changeover section • Output clutch • Torque converter assembly • TCM • Control valve body • Inhibitor switch
Vehicle does not move by engine stall, with select lever in “D” or “R” range.	• Parking mechanism • Select cable • Bearing • Forward/reverse changeover section • Output clutch
Excessive shock occurs at starting, with select lever in “D” or “R” range.	• Secondary pressure circuit • Control valve body • Pulley, gear and variator chain • Output clutch
Acceleration speed from standstill is insufficient, with select lever in “D” or “R” range.	• Control valve body • Forward/reverse changeover section • Output clutch • Torque converter assembly • Drive motor
Engine speed suddenly rises up during driving, with select lever in “D” or “R” range.	• Control valve body • Secondary pressure circuit • Primary pressure circuit
Vibration occurs during driving, with select lever in “D” or “R” range.	• Secondary pressure circuit • Primary pressure circuit • Forward/reverse changeover section • Pulley and variator chain • Torque converter assembly • Hydraulic pressure circuit to torque converter • Control valve body • Drive motor • Output clutch
Sudden braking occurs during driving, with select lever in “D” or “R” range.	• Secondary pressure circuit • Primary pressure circuit • Control valve body • Drive motor
During deceleration, lockup clutch does not disengage until just before halting, with select lever in “D” or “R” range.	• Control valve body • Torque converter assembly • CVTF
Engine stalls with vehicle at a standstill, with select lever in “D” or “R” range, except for Auto Start Stop.	• Engine control system • Control valve body • Torque converter assembly
Excessive lockup shock occurs during driving, with select lever in “D” range.	Control valve body
Slipping occurs at lockup, or lockup does not occur during driving, with select lever in “D” range.	• Control valve body • Lockup hydraulic line • Torque converter assembly

Symptoms	Faulty parts
Excessive shift shock occurs when shifting the select lever from “N” range to “D” range, or from “N” range to “R” range.	• Inhibitor switch • Control valve body • Forward/reverse changeover section
Vehicle does not keep at standstill with select lever in “P” range, or parking cannot be released when shifting from “P” range to another range.	• Select cable • Parking mechanism
Select lever does not shift smoothly.	• Select cable • Inhibitor switch • Detent spring • Manual plate
Clutch engagement shock occurs when engine is restarted from the Auto Start Stop condition and driving with motor.	• Electric oil pump • Relief valve • Electric oil pump hydraulic circuit • Forward clutch • CVTF
Large clutch engagement shock occurs with vehicle at a standstill.	• Output clutch • Forward clutch • CVTF • Torque converter assembly • Output clutch control valve body

CONTINUOUSLY VARIABLE TRANSMISSION (DIAGNOSTICS)

CVT(HEV)(diag)

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1. General Description

A: SPECIFICATION

1. TORQUE CONVERTER

Model	DOHC non-turbo
Type	Symmetric, 3-element, single stage, 2-phase torque converter
Stall torque ratio	2.62
Nominal mm (in)	236 (9.29)
Stall speed (at sea level) r/min	2,150 — 2,800 (D range) 1,950 — 2,550 (R range)
One-way clutch	Sprag type one-way clutch

2. OIL PUMP

Type		Internal gear pump
Driving method		Driven by chain
Number of teeth	Inner rotor	8
	Outer rotor	9

3. TRANSMISSION CONTROL ELEMENT

Type	Forward continuously variable speed change, 1 reverse, planetary gear
Multi-plate clutch	1 set
Multi-plate brake	1 set

4. TRANSMISSION GEAR RATIO

Forward	XV model	3.581 — 0.570
	Except for XV model	3.420 — 0.544
Rev	XV model	3.667
	Except for XV model	3.502

5. PLATE

Number of forward clutch drive plates	3
Number of reverse brake drive plates	4

6. SELECTOR POSITION

P (Park)	Transmission neutral, output shaft locked, engine start enabled
R (Reverse)	Rev
N (Neutral)	Transmission neutral, engine start enabled
D (Drive)	Forward continuously variable speed change
M (Manual mode) (paddle shift +side)	Manual gear change 1st → 2nd → 3rd → 4th → 5th → 6th
M (Manual mode) (paddle shift –side)	Manual gear change 1st ← 2nd ← 3rd ← 4th ← 5th ← 6th
L (Low)	Forward continuously variable speed change (engine brake)

7. HYDRAULIC CONTROL AND LUBRICATION

Type	Electronic hydraulic control (gear ratio is changed by signals of vehicle speed and accelerator opening angle.)
Fluid	Specified fluid: SUBARU CVT FLUID LINEARTRONIC II **CAUTION:** **Always use specified CVTF. Using other fluid will cause malfunction.**
Fluid capacity L (US qt, Imp qt)	11.68 — 12.18 (12.3 — 12.9, 10.3 — 10.7)
Lubrication system	Forced feed lubrication with oil pump

8. COOLING AND HARNESS

Cooling system	CVTF cooler (with warmer feature)
Inhibitor switch harness	16 poles
Transmission harness	12 poles

9. TRANSFER

Transfer type	Multi-plate transfer (MP-T)
Number of transfer clutch drives & driven plates	4
Control method	Electronic hydraulic type
Reduction gear ratio	1.000 (43/43)

10.REDUCTION GEAR RATIO

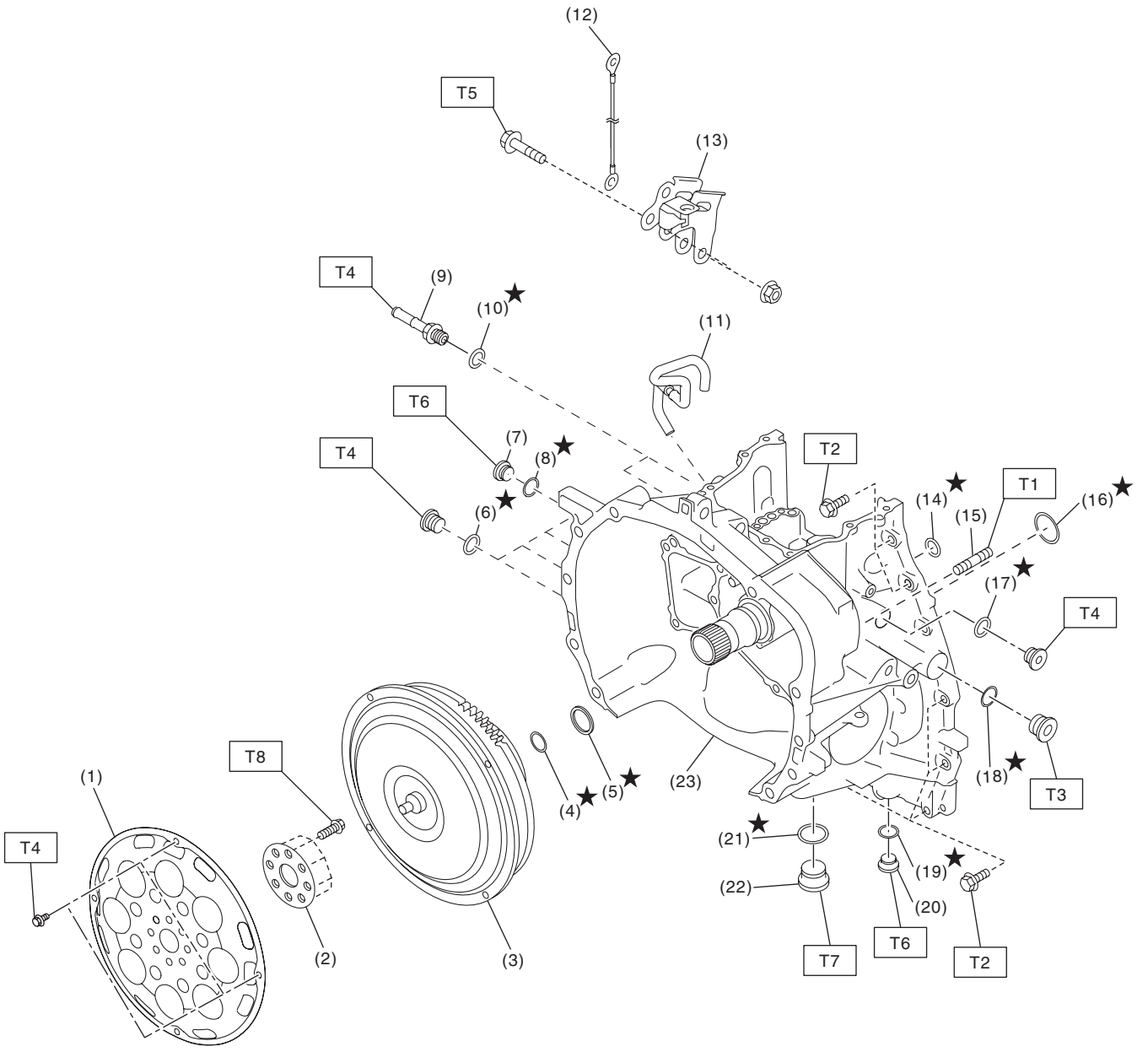
Front final reduction gear ratio	3.700

11.RECOMMENDED GEAR OIL

Lubrication oil	SUBARU GEAR OIL EXTRA MT or equivalent
Front differential oil capacity L (US qt, Imp qt)	1.14 — 1.24 (1.2 — 1.3, 1.0 — 1.1)

B: COMPONENT

1. TORQUE CONVERTER ASSEMBLY AND CONVERTER CASE

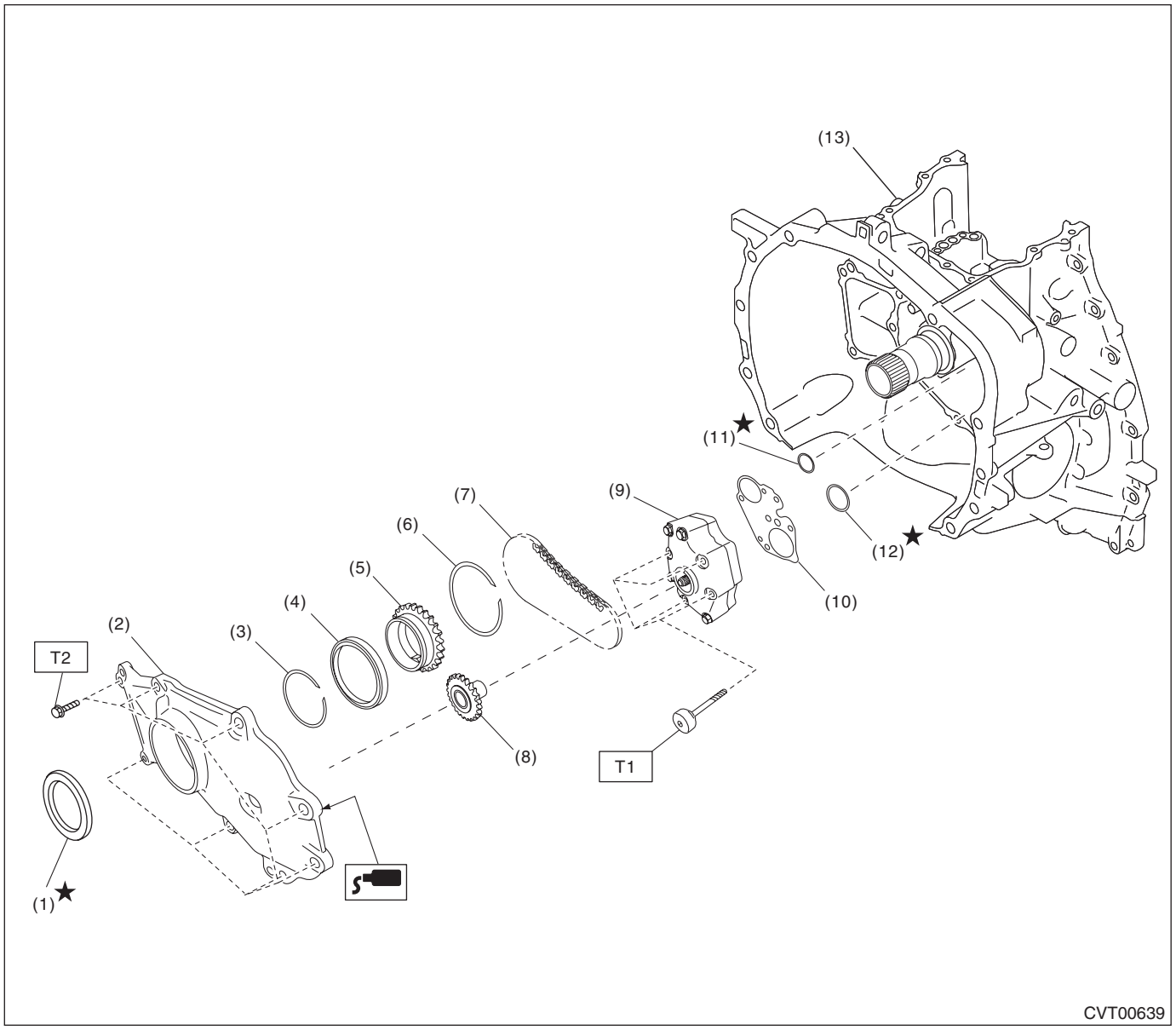


CVT00638

(1) Drive plate
(2) Reinforcement drive plate
(3) Torque converter ASSY
(4) O-ring
(5) Seal ring
(6) O-ring
(7) Front differential gear oil filler plug
(8) O-ring
(9) Oil cooler pipe
(10) O-ring
(11) Air breather hose
(12) Transmission radio ground cord
(13) Pitching stopper bracket
(14) O-ring
(15) Stud bolt
(16) O-ring
(17) O-ring
(18) O-ring
(19) Gasket
(20) Overflow drain plug
(21) Gasket
(22) Front differential gear oil drain plug
(23) Converter case

Tightening torque: N·m (kgf-m, ft-lb)	
T1:	***18 (1.8, 13.3)***
T2:	***22 (2.2, 16.2)***
T3:	***22.5 (2.3, 16.6)***
T4:	***25 (2.5, 18.4)***
T5:	***41 (4.2, 30.2)***
T6:	***50 (5.1, 36.9)***
T7:	***70 (7.1, 51.6)***
T8:	***<Ref. to CVT(TR580)-163, INSTALLATION, Drive Plate.>***

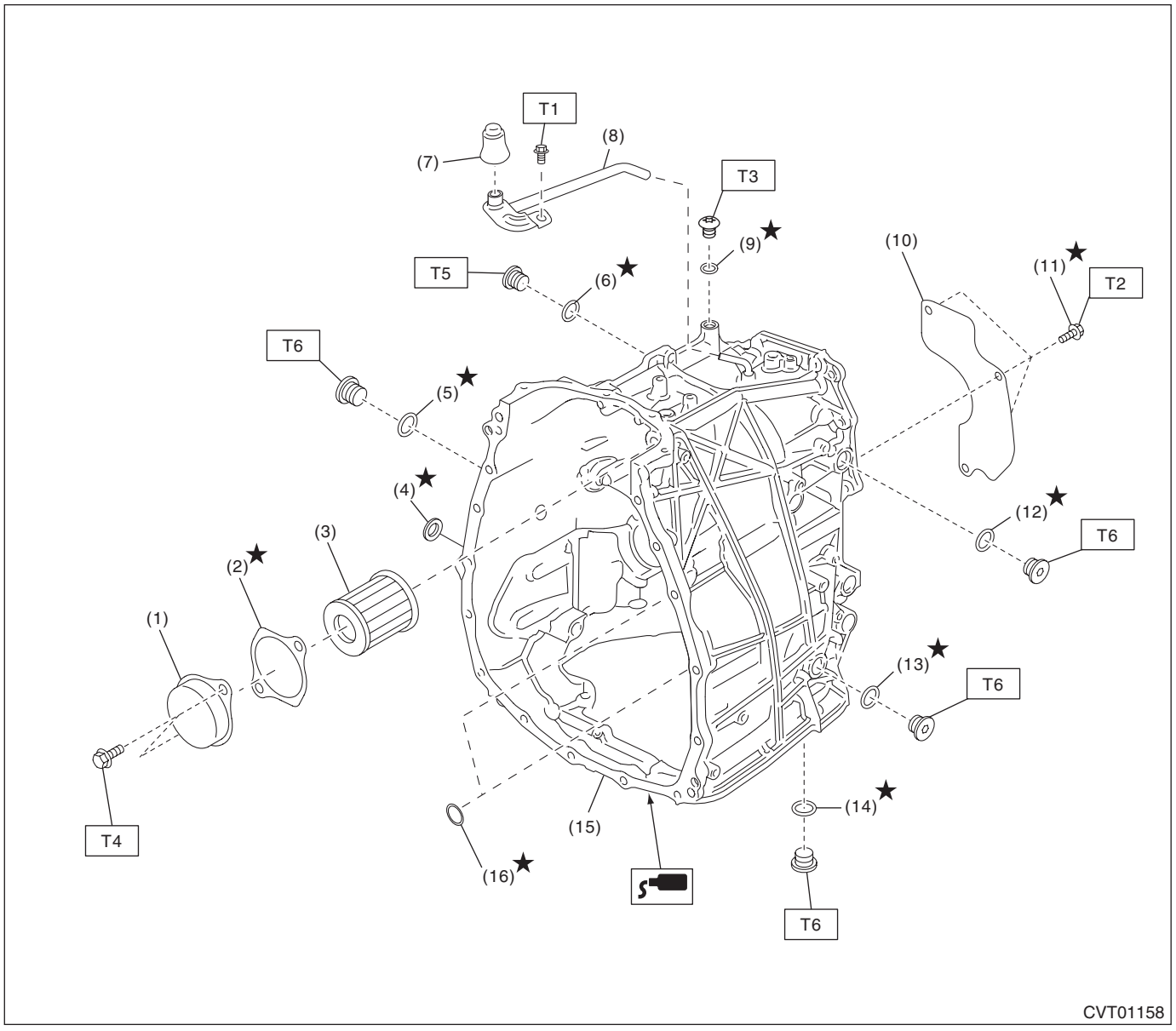
2. OIL PUMP ASSY



(1) Oil seal
(2) Oil pump chain cover
(3) Snap ring
(4) Ball bearing
(5) Drive sprocket
(6) Snap ring
(7) Oil pump chain
(8) Driven sprocket
(9) Oil pump ASSY
(10) Plate
(11) O-ring (small)
(12) O-ring (large)
(13) Converter case

Tightening torque: N·m (kgf-m, ft-lb)
T1: 8.5 (0.9, 6.3)
T2: 21 (2.1, 15.5)

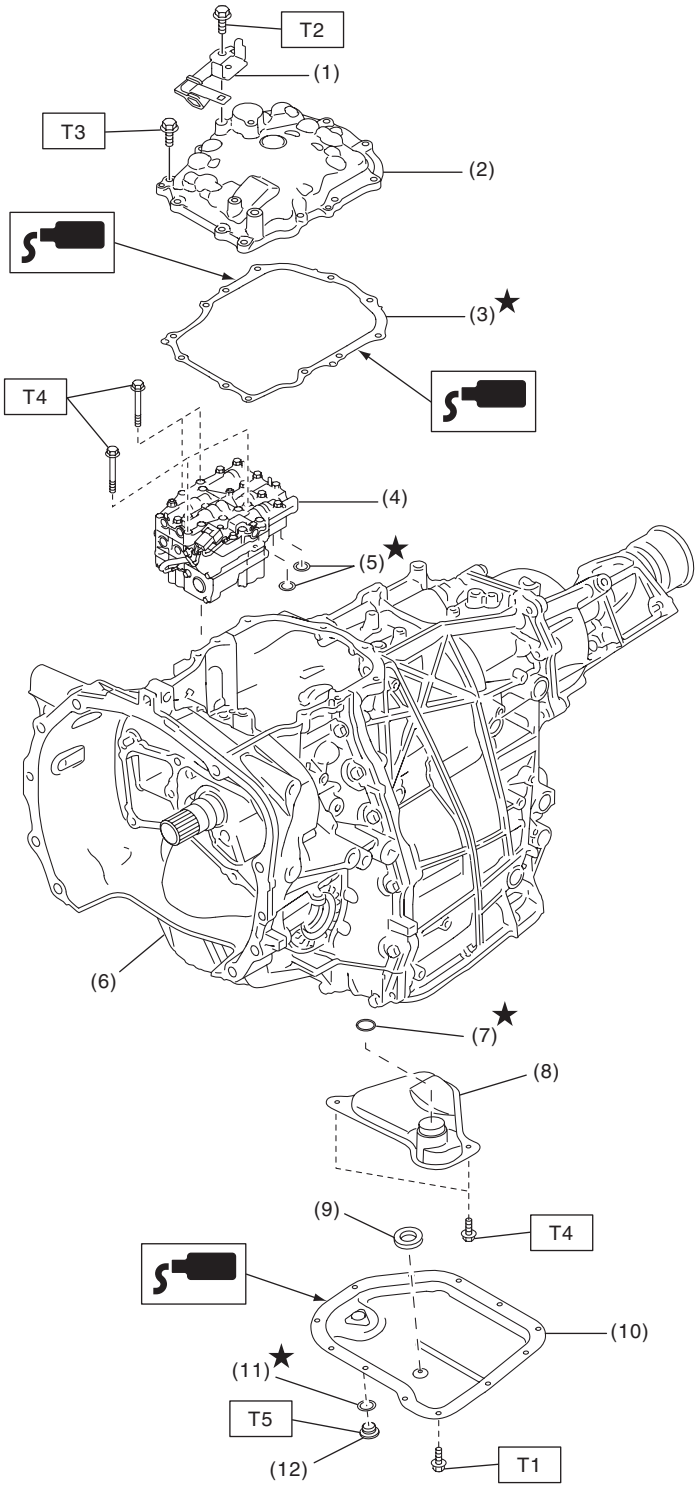
3. TRANSMISSION CASE



(1)	CVTF filter cover	(9)	O-ring
(2)	Gasket	(10)	Oil stopper plate
(3)	CVTF filter	(11)	Micro-encapsulated bolt
(4)	Oil seal	(12)	O-ring
(5)	Gasket	(13)	Gasket
(6)	O-ring	(14)	O-ring
(7)	Air breather cap	(15)	Transmission case
(8)	Air breather hose	(16)	Seal ring

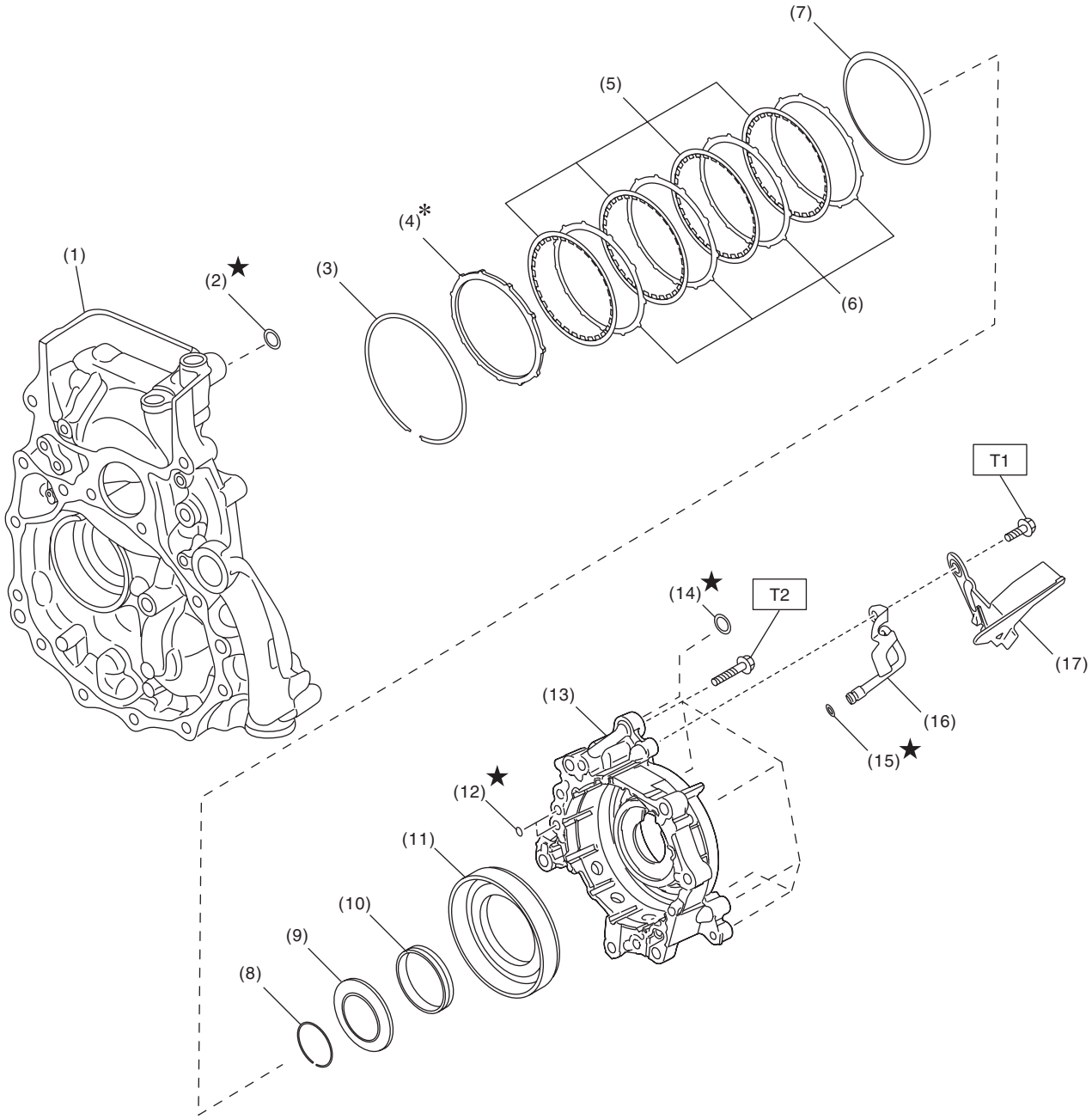
Tightening torque: N·m (kgf-m, ft-lb)
T1: 5 (0.5, 3.7)
T2: 9 (0.9, 6.6)
T3: 13 (1.3, 9.6)
T4: 17 (1.7, 12.5)
T5: 25 (2.5, 18.4)
T6: 50 (5.1, 25.8)

4. CONTROL VALVE BODY



(1)	Transmission harness stay	(7)	O-ring	***Tightening torque: N·m (kgf-m, ft-lb)***
(2)	Valve cover	(8)	Oil strainer	***T1: 5 (0.5, 3.7)***
(3)	Gasket	(9)	Magnet	***T2: 7 (0.7, 5.2)***
(4)	Control valve body	(10)	Oil pan	***T3: 8 (0.8, 5.9)***
(5)	O-ring	(11)	Gasket	***T4: 9 (0.9, 6.6)***
(6)	Transmission ASSY	(12)	CVTF drain plug	***T5: 31 (3.2, 22.9)***

5. REVERSE BRAKE ASSEMBLY

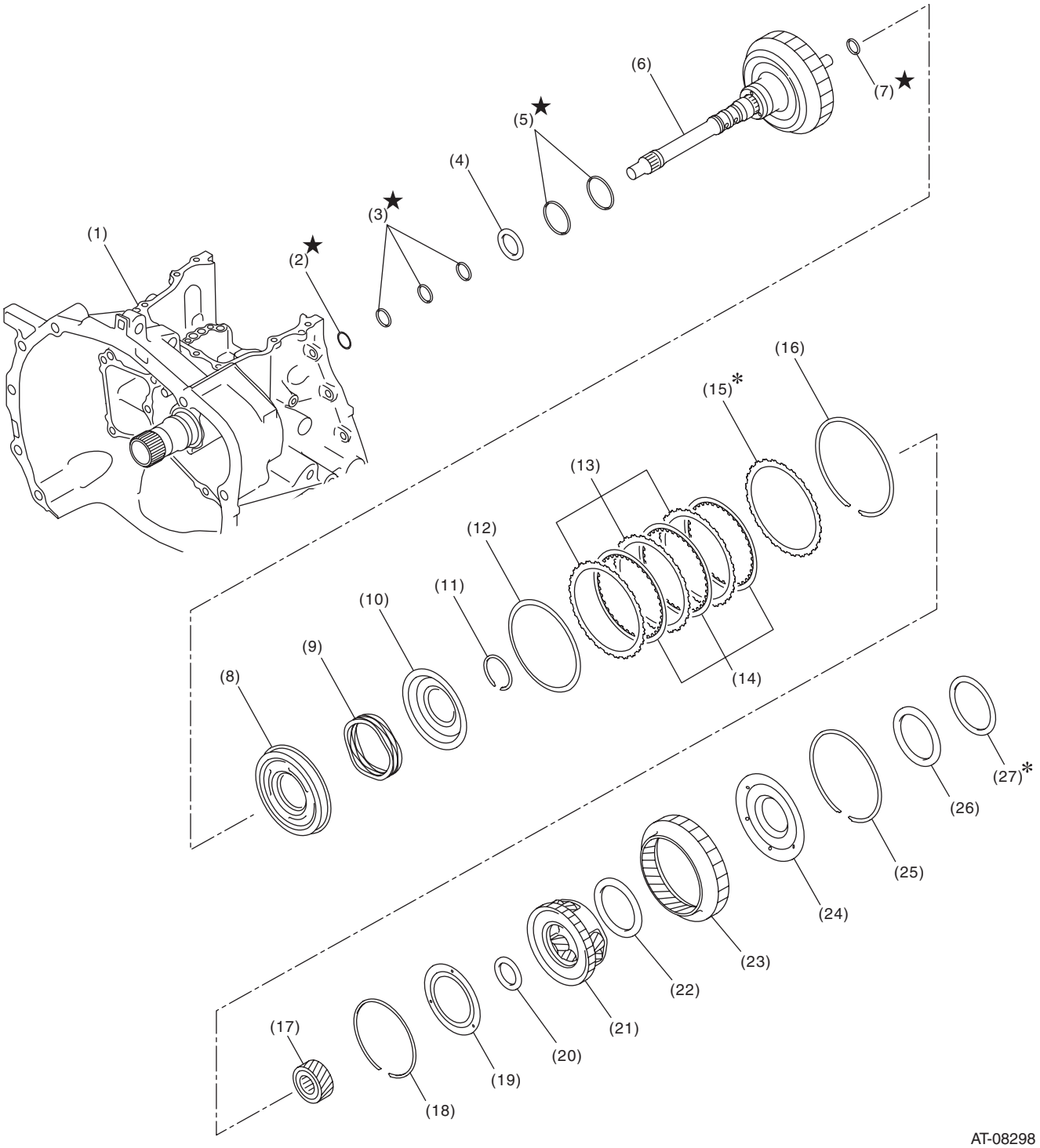


CVT00661

(1) Drive pinion retainer
(2) O-ring
(3) Snap ring
(4) Retaining plate
(5) Drive plate
(6) Driven plate
(7) Dish plate
(8) Snap ring
(9) Spring retainer
(10) Return spring
(11) Reverse brake piston
(12) O-ring
(13) Reverse brake housing
(14) O-ring
(15) O-ring
(16) Lubrication pipe
(17) Oil guide

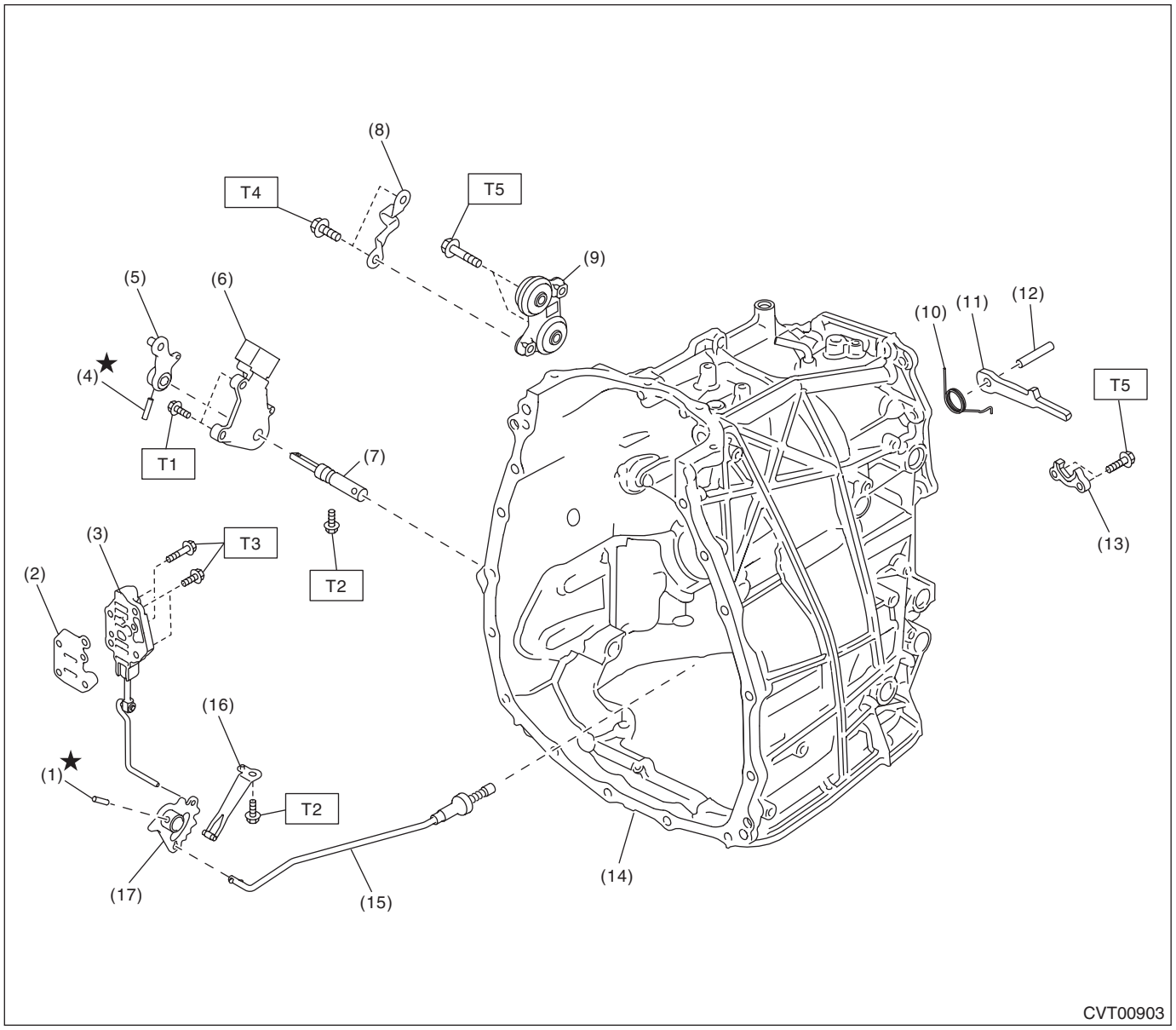
Tightening torque: N·m (kgf-m, ft-lb)
T1: 16 (1.6, 11.8)
T2: 37 (3.8, 27.3)

6. FORWARD CLUTCH ASSEMBLY



(1) Converter case
(2) O-ring
(3) Seal ring
(4) Thrust bearing
(5) Seal ring
(6) Forward clutch drum ASSY
(7) Seal ring
(8) Forward clutch piston
(9) Return spring
(10) Chamber COMPL
(11) Snap ring
(12) Dish plate
(13) Driven plate
(14) Drive plate
(15) Retaining plate
(16) Snap ring
(17) Sun gear
(18) Snap ring
(19) Balance oil guide
(20) Thrust bearing
(21) Planetary carrier ASSY
(22) Thrust bearing
(23) Internal gear
(24) Thrust gear plate
(25) Snap ring
(26) Thrust bearing
(27) Washer

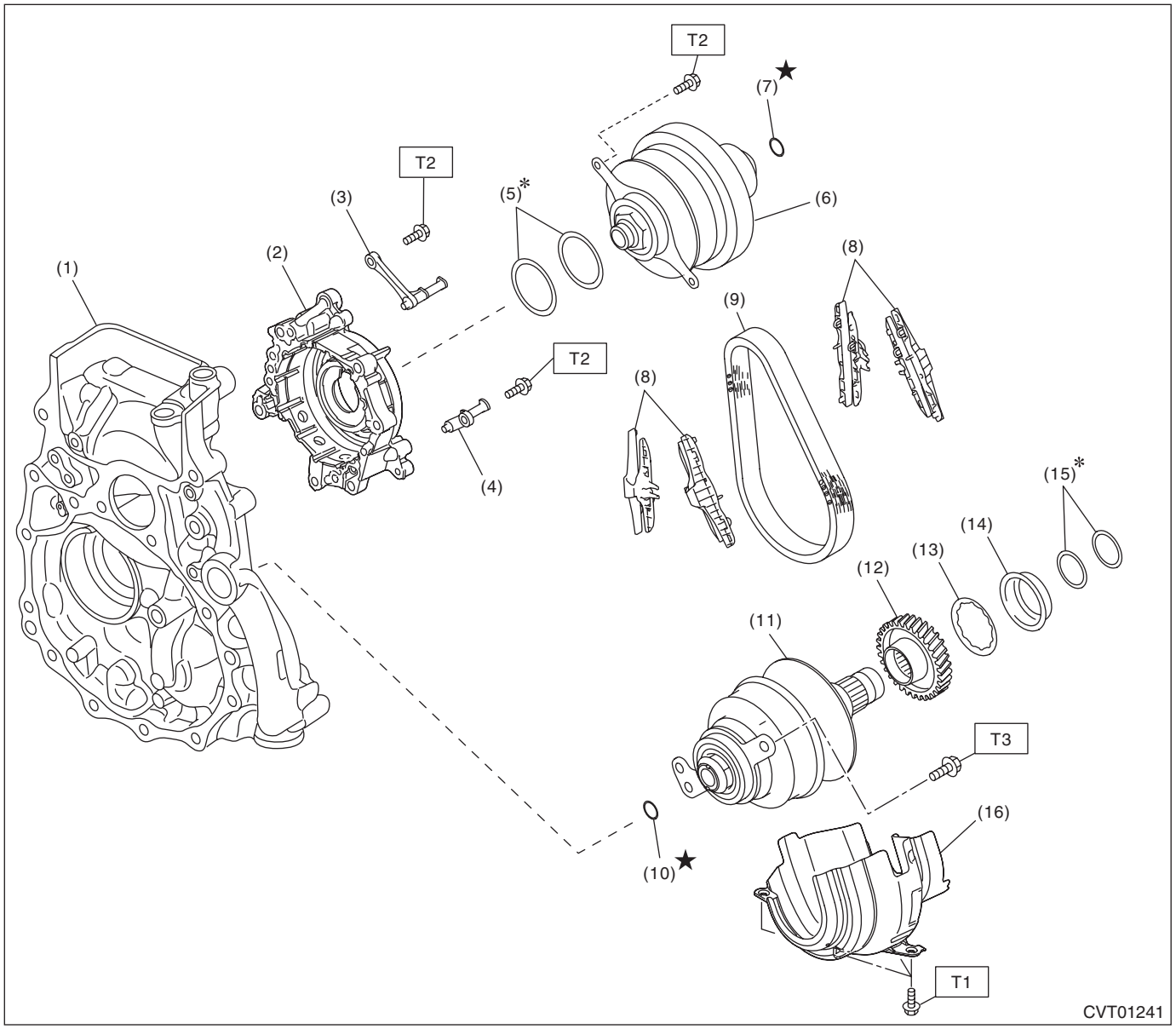
7. TRANSMISSION CONTROL DEVICE



(1) Spring pin
(2) Separator plate
(3) Manual valve ASSY
(4) Spring pin
(5) Shifter arm
(6) Inhibitor switch
(7) Shifter arm shaft
(8) Cable bracket
(9) Plate ASSY
(10) Return spring
(11) Parking pawl
(12) Shaft
(13) Parking support
(14) Transmission case
(15) Parking rod
(16) Detent spring
(17) Manual plate

Tightening torque: N·m (kgf-m, ft-lb)
T1: 5 (0.5, 3.7)
T2: 7 (0.7, 5.2)
T3: 9 (0.9, 6.6)
T4: 18 (1.8, 13.3)
T5: 25 (2.5, 18.4)

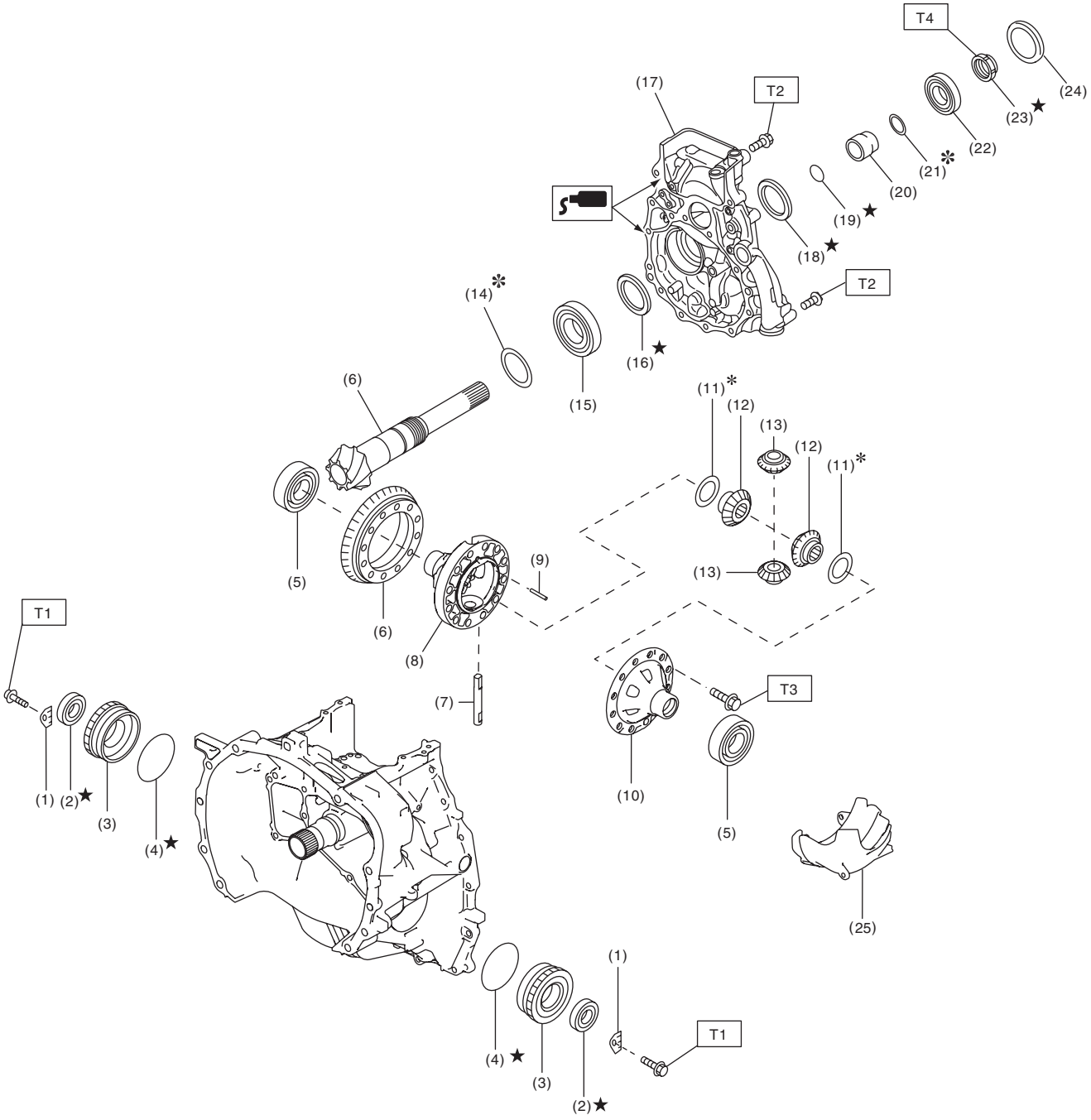
8. PRIMARY PULLEY, SECONDARY PULLEY & VARIATOR CHAIN AND REDUCTION DRIVE GEAR



(1) Drive pinion retainer
(2) Reverse brake housing
(3) Support rod
(4) Lubrication pipe
(5) Primary pulley shim
(6) Primary pulley ASSY
(7) Seal ring
(8) Chain guide
(9) Variator chain
(10) Seal ring
(11) Secondary pulley ASSY
(12) Reduction drive gear
(13) Dish plate
(14) Spring retainer
(15) Reduction gear shim
(16) Oil baffle

Tightening torque: N·m (kgf-m, ft-lb)
T1: 16 (1.6, 11.8)
T2: 21 (2.1, 15.5)
T3: 67.5 (6.9, 49.8)

9. FRONT DIFFERENTIAL GEAR

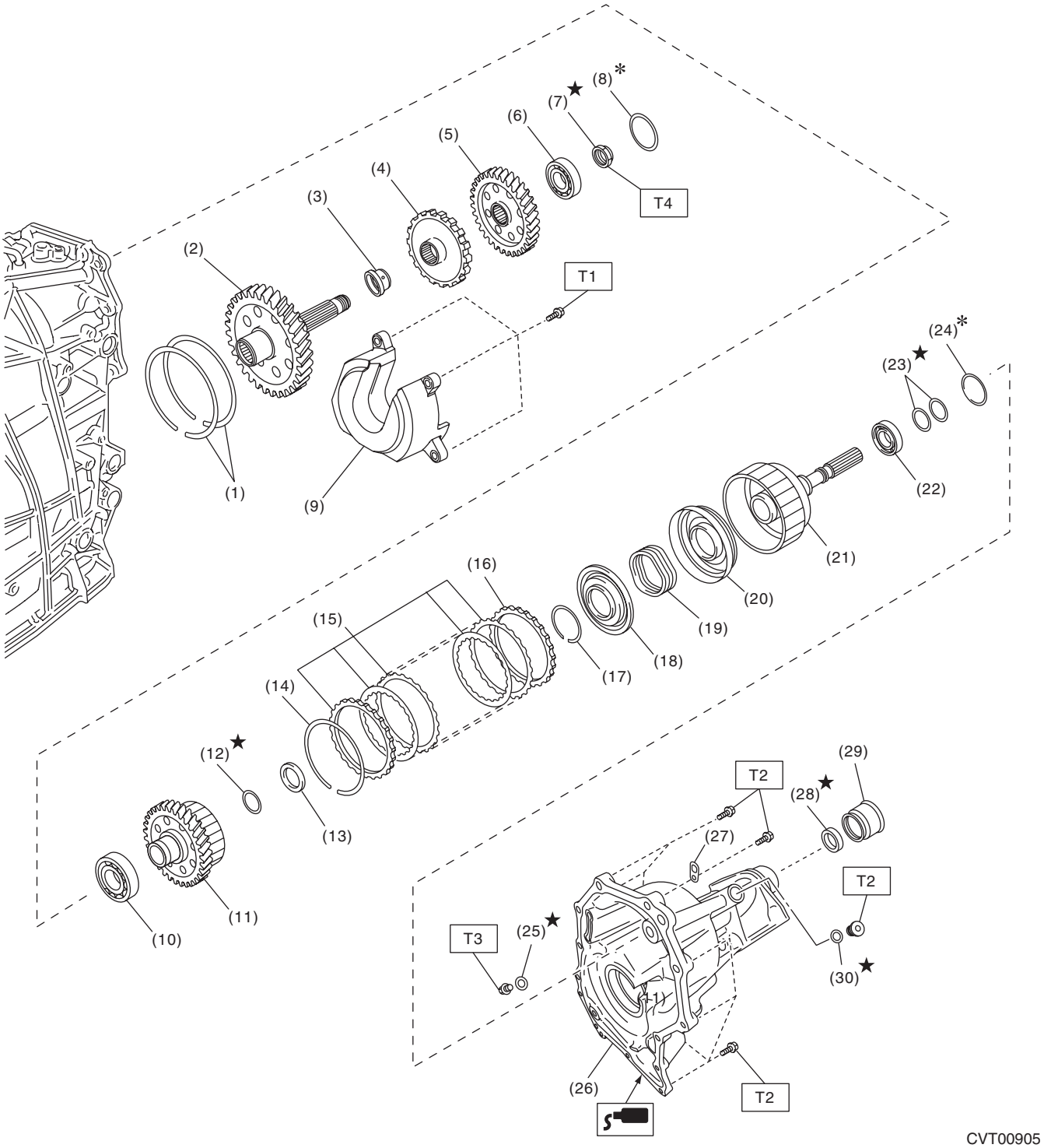


CVT00664

(1) Lock plate
(2) Oil seal
(3) Differential side retainer
(4) O-ring
(5) Taper roller bearing
(6) Drive pinion gear set
(7) Pinion shaft
(8) Differential case RH
(9) Straight pin
(10) Differential case LH
(11) Washer
(12) Differential bevel gear
(13) Differential bevel pinion
(14) Drive pinion shim
(15) Taper roller bearing
(16) Oil seal
(17) Drive pinion retainer
(18) Oil seal
(19) O-ring
(20) Drive pinion spacer
(21) Drive pinion washer
(22) Taper roller bearing
(23) Lock nut
(24) Plug
(25) Oil baffle

Tightening torque: N·m (kgf-m, ft-lb)
T1: 25 (2.5, 18.4)
T2: 43 (4.4, 31.7)
T3: 64 (6.5, 47.2)
T4: <Ref. to CVT(TR580)-287, ASSEMBLY, Drive Pinion Shaft Assembly.>

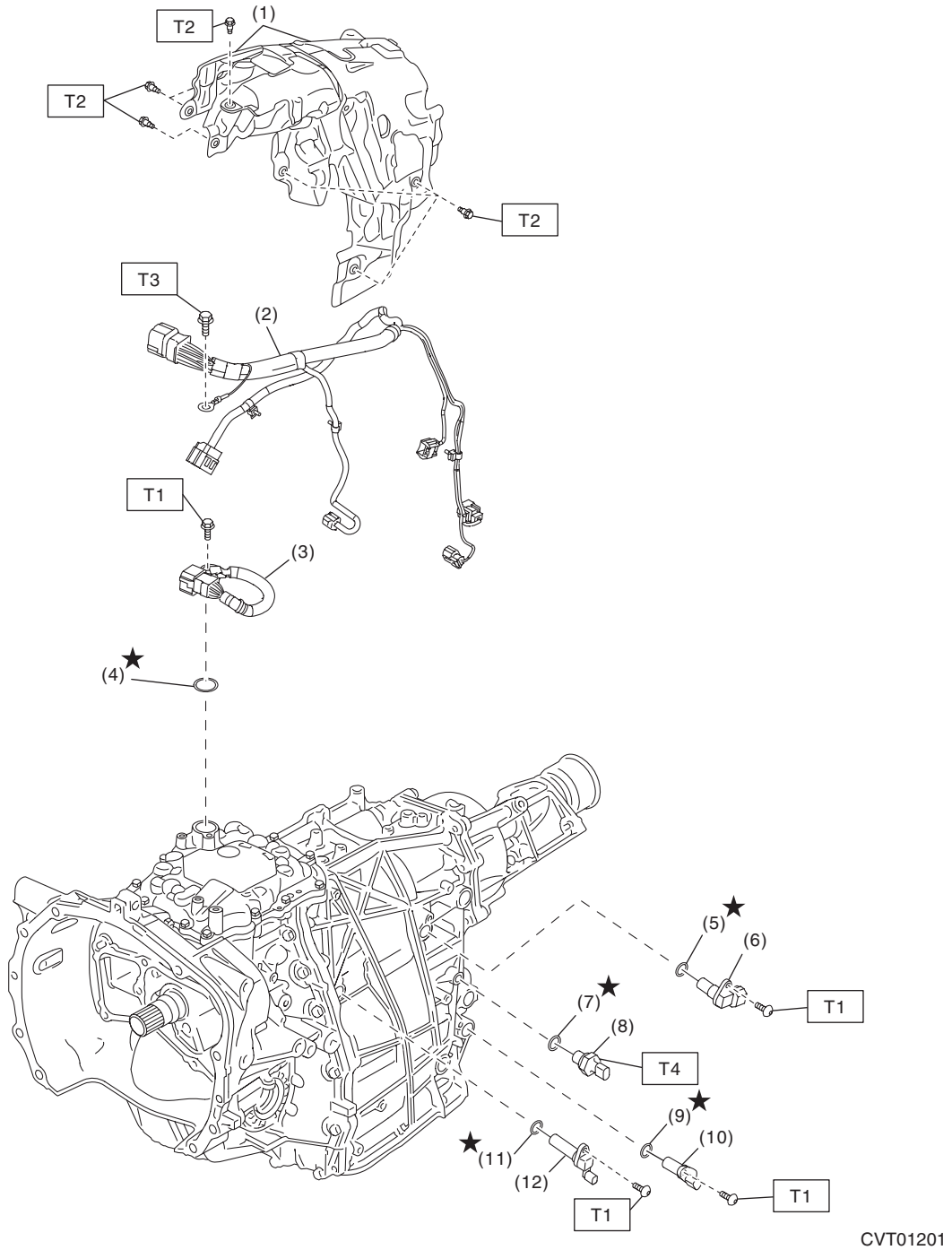
10.TRANSFER AND EXTENSION CASE



(1) Snap ring (XV model)
(2) Reduction driven gear COMPL
(3) Collar
(4) Parking gear
(5) Transfer drive gear
(6) Ball bearing
(7) Lock nut
(8) Transfer drive gear shim
(9) Spacer oil
(10) Ball bearing
(11) Transfer driven gear
(12) Seal ring
(13) Thrust bearing
(14) Snap ring
(15) Transfer clutch plate set
(16) Pressure plate
(17) Snap ring
(18) Transfer clutch piston seal
(19) Transfer clutch piston return spring
(20) Transfer clutch piston
(21) Rear drive shaft
(22) Ball bearing
(23) Seal ring
(24) Transfer driven gear shim
(25) Gasket
(26) Extension case
(27) Transmission hanger
(28) Oil seal
(29) Dust cover
(30) O-ring

Tightening torque: N·m (kgf-m, ft-lb)
T1: 17 (1.7, 12.5)
T2: 25 (2.5, 18.4)
T3: 35 (3.6, 25.8)
T4: 95 (9.7, 70.1)

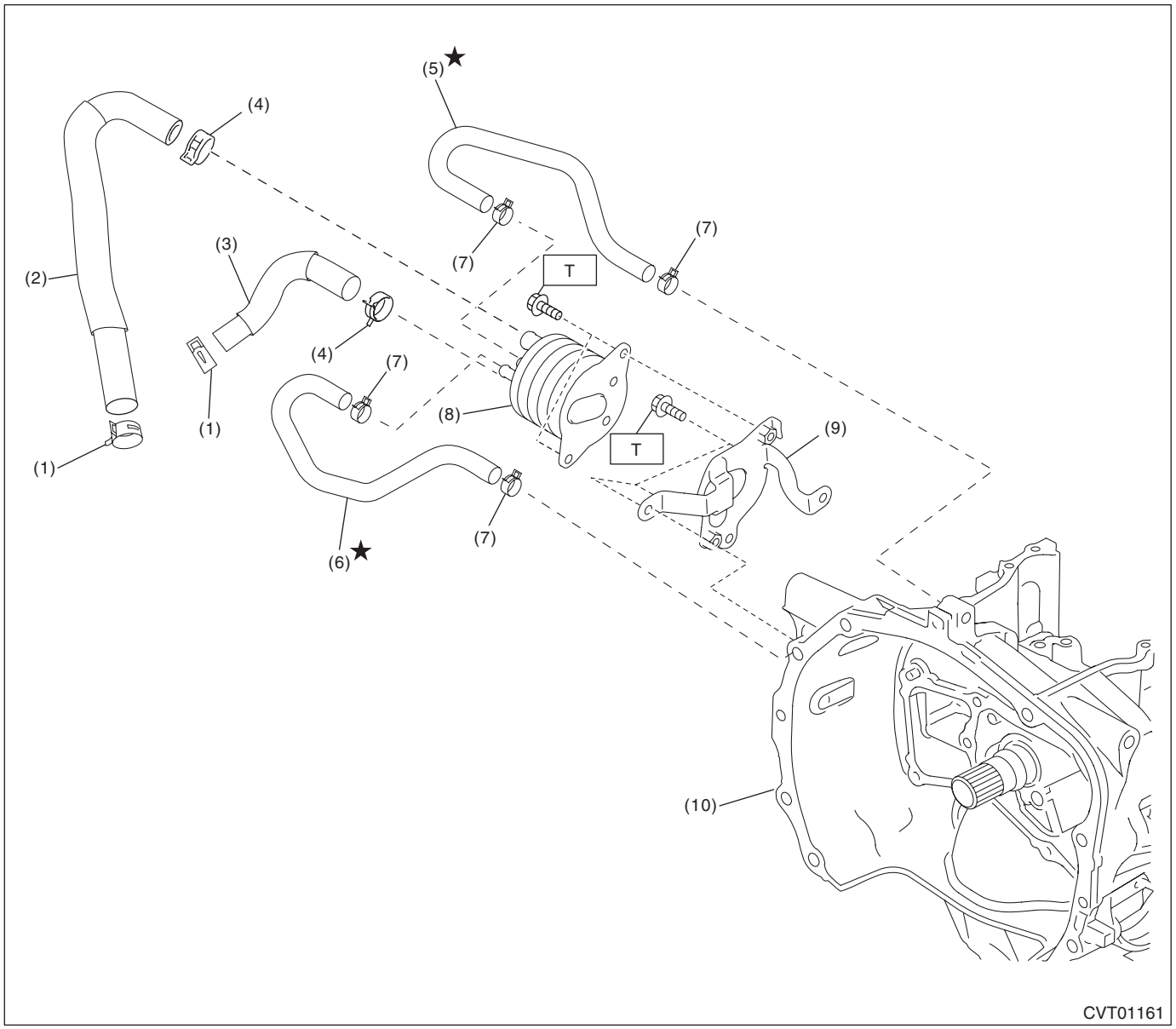
11.TRANSMISSION HARNESS AND SENSOR



(1)	Transmission case cover	(7)	O-ring	
(2)	Inhibitor harness	(8)	Secondary pressure sensor	
(3)	Transmission harness	(9)	O-ring	
(4)	O-ring	(10)	Secondary speed sensor	
(5)	O-ring	(11)	O-ring	
(6)	Primary speed sensor	(12)	Turbine speed sensor	

Tightening torque: N·m (kgf-m, ft-lb)
T1: 7 (0.7, 3.7)
T2: 8 (0.8, 5.9)
T3: 14 (1.4, 10.3)
T4: 39 (4.0, 28.8)

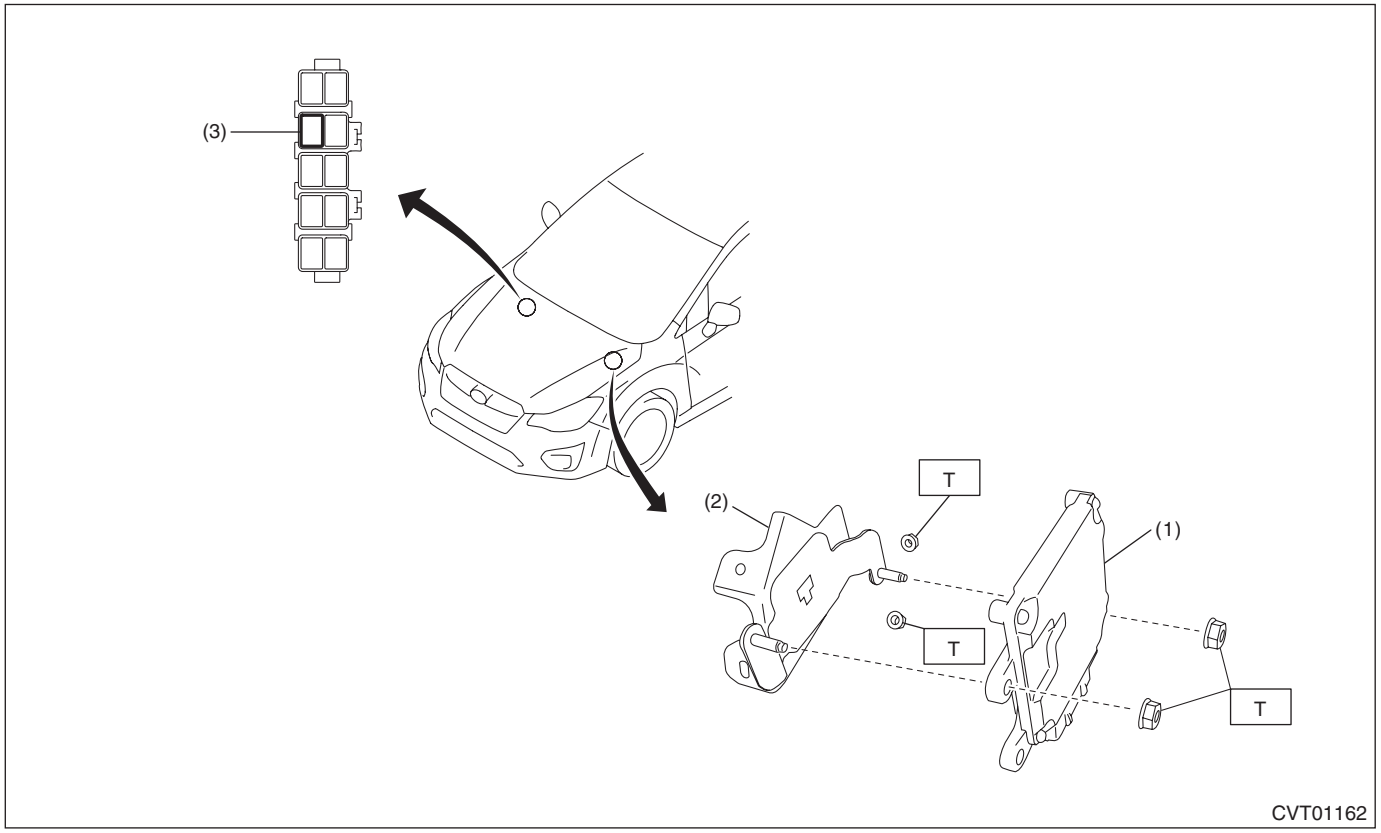
12.CVTF COOLER (WITH WARMER FEATURE)



(1) Hose clamp
(2) Engine coolant outlet hose
(3) Engine coolant inlet hose
(4) Hose clamp
(5) CVTF cooler inlet hose
(6) CVTF cooler outlet hose
(7) Hose clamp
(8) CVTF cooler (with warmer feature)
(9) CVTF cooler bracket
(10) Converter case

Tightening torque: N·m (kgf-m, ft-lb)
T: 23 (2.3, 17.0)

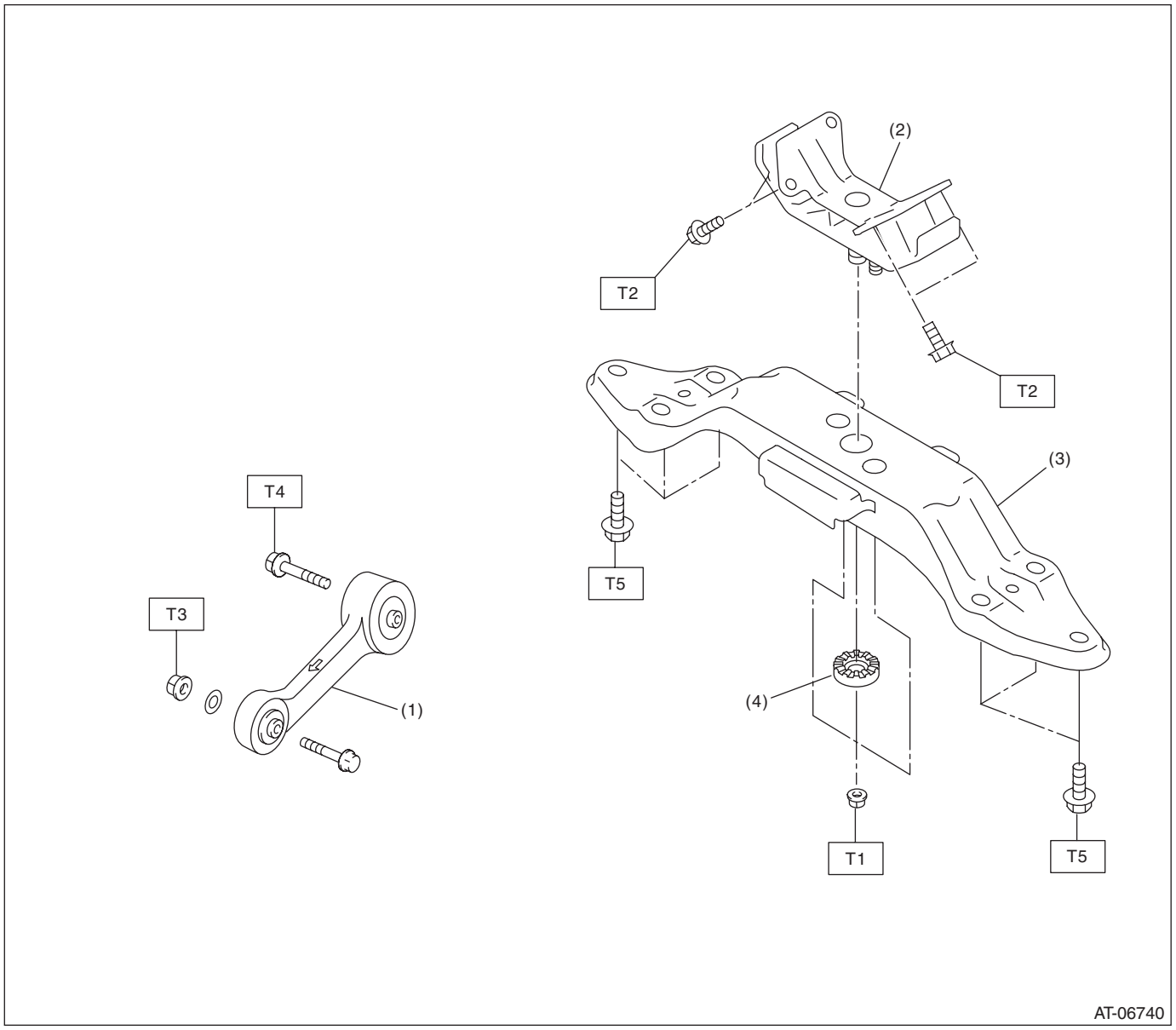
13.TRANSMISSION CONTROL MODULE



(1) Transmission control module (TCM)
(2) TCM bracket
(3) Relay

Tightening torque: N·m (kgf-m, ft-lb)
T: 7.5 (0.8, 5.5)

14.TRANSMISSION MOUNTING



(1) Pitching stopper
(2) Rear cushion rubber
(3) Transmission rear crossmember
(4) Stopper

Tightening torque: N·m (kgf-m, ft-lb)
T1: 35 (3.6, 25.8)
T2: 40 (4.1, 29.5)
T3: 50 (5.1, 36.9)
T4: 58 (5.9, 42.8)
T5: 70 (7.1, 51.6)

C: CAUTION

- Remove contamination including dirt and corrosion before removal, installation or disassembly.
- Keep the disassembled parts in order and protect them from dust and dirt.
- Do not place the valve cover with its inner side facing up until it is installed, to prevent intrusion of foreign matter into the control valve body.
- Before removal, installation or disassembly, be sure to clarify the failure. Avoid unnecessary removal, installation, disassembly and replacement.
- When disassembling the case and other light alloy parts, use a plastic hammer to force it apart. Do not pry apart with screwdrivers or other tools.
- Vehicle components are extremely hot after driving. Be wary of receiving burns from heated parts.
- Use SUBARU genuine CVTF and recommended grease. Do not mix CVTF, grease etc. of different grades or manufacturers.
- Be sure to tighten bolts and nuts to the specified torque.
- Apply CVTF onto sliding or revolving surfaces before installation.
- Replace deformed or damaged snap rings with new parts.
- Before installing O-rings or oil seals, apply sufficient amount of CVTF or gear oil to appropriate locations in order to avoid damage and deformation.
- Be careful not to incorrectly install or fail to install O-rings, snap rings and other such parts.
- Before securing a part on a vise, place cushioning material such as wood blocks, aluminum plate, or cloth between the part and the vise.
- Avoid damaging the mating surface of the case.
- Before applying liquid gasket, completely remove the old liquid gasket and clean the area.
- After removing the sensors, breather hose and plugs, plug the holes to avoid foreign materials intruding as necessary.
- During disassembly or assembly, be sure to use nylon gloves or paper towels. Do not use cloth gloves or waste cloth.
- Be careful of handling the oil seal, O-ring and gasket. If the contact surface of them is damaged, oil leakage may occur.
- When replacing the taper roller bearing, replace the outer race and inner race as a set.
- When replacing the hypoid gear, replace the hypoid gear and drive pinion shaft as a set.
- Replace the bolts if the seating surface or the thread surface is excessively rusted.

D: PREPARATION TOOL

1. SPECIAL TOOL

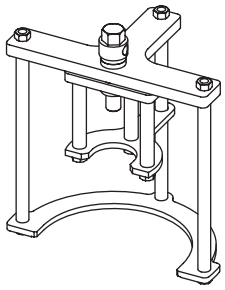
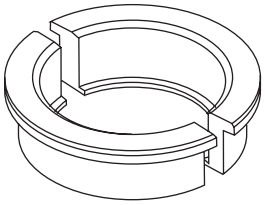
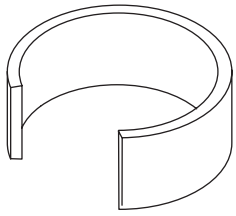
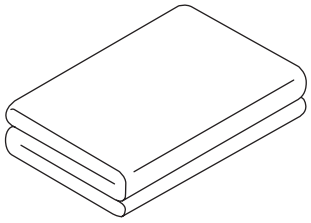
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST18769AA010	18769AA010	EXPANDER PULLEY	Used for removing and installing the secondary pulley assembly.
 ST18767AA010	18767AA010	BEARING REMOVER	Used for removing the ball bearing of transfer clutch assembly.
 ST18762AA010	18762AA010	COMPRESSOR SPECIAL TOOL	Used for removing and installing snap ring of forward clutch assembly.
 ST18761AA010	18761AA010	SHEET SPECIAL TOOL	• Used for removing and installing control valve body. • Used for removing and installing valve cover. • Used for removing and installing transmission harness.

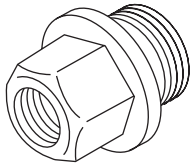
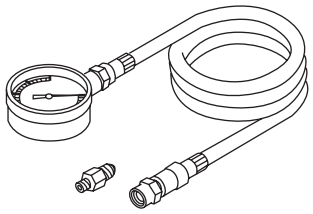
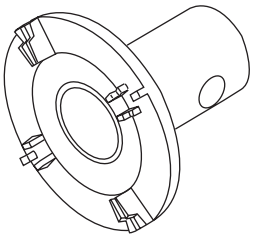
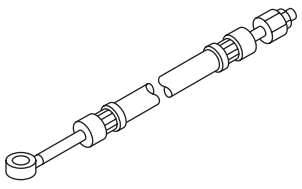
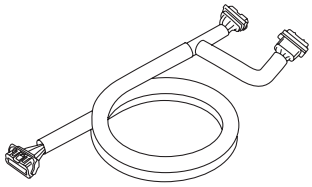
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST18681AA010	18681AA010	PRESSURE GAUGE ADAPTER	Used for measuring the secondary pressure (line pressure). NOTE: Used together with the genuine O-ring (part No. 806916050).
 ST18801AA000	18801AA000	OIL PRESSURE GAUGE ASSY	Used for measuring the secondary pressure (line pressure).
 ST18658AA020	18658AA020	WRENCH COMPL RETAINER	Used for removing and installing the differential side retainer.
 ST34099AC020	34099AC020	ADAPTER HOSE B	Used for measuring the transfer clutch hydraulic pressure. NOTE: Used with genuine union screw (Part No. 801914010) and gasket (Part No. 803914060).
 ST18460AA040	18460AA040 (Newly adopted tool)	CHECK BOARD	Used for measuring the check board TCM terminal voltage.

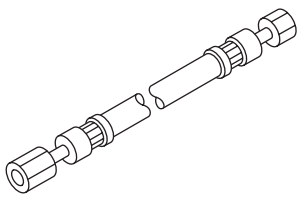
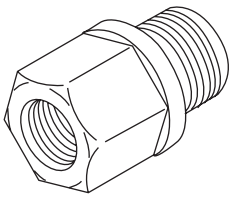
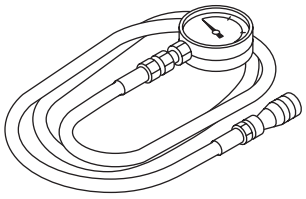
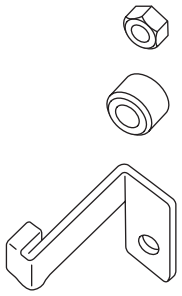
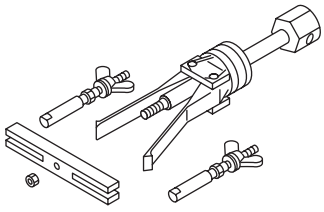
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST34099AC010	34099AC010	ADAPTER HOSE A	Used for measuring the transfer clutch hydraulic pressure.
 ST18681AA000	18681AA000	PRESSURE GAUGE ADAPTER	Used for measuring the transfer clutch hydraulic pressure. NOTE: Used together with the genuine O-ring (part No. 806911080).
 ST-498575400	498575400	OIL PRESSURE GAUGE ASSY	Used for measuring the transfer clutch hydraulic pressure.
 ST-498277200	498277200	STOPPER SET	• Used for removing and installing transmission assembly to engine. • Used for preventing the torque converter from dropping off.
 ST-398527700	398527700	PULLER ASSY	• Used for removing the extension case oil seal. • Used for removing the bearing outer race of the drive pinion shaft.

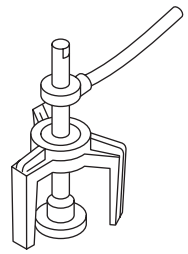
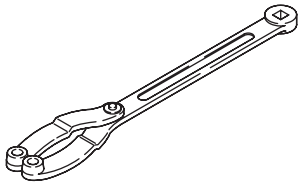
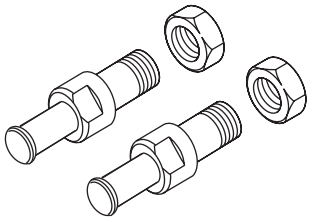
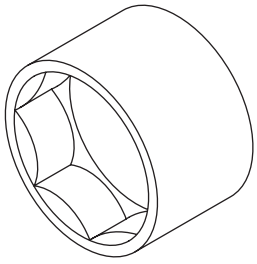
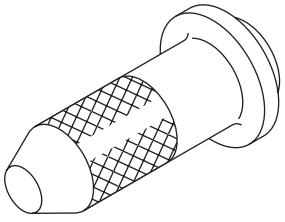
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-398673600	398673600	COMPRESSOR	Used for removing and installing snap ring of forward clutch assembly.
 ST18355AA000	18355AA000	PULLEY WRENCH	• Used for removing and installing the lock nut of reduction driven gear. • Used together with PIN SET (18334AA000).
 ST18334AA000	18334AA000	PIN SET	• Used for removing and installing the lock nut of reduction driven gear. • Used together with PULLEY WRENCH (18355AA000).
 ST-499987003	499987003	SOCKET WRENCH (35)	Used for removing and installing the lock nut of reduction driven gear.
 ST-498057300	498057300	OIL SEAL INSTALLER	Used for installing the extension case oil seal.

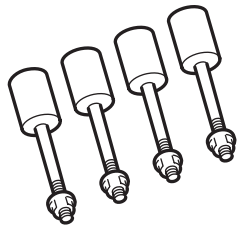
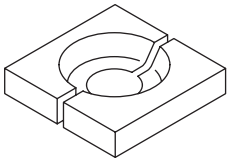
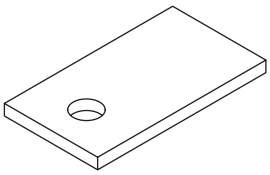
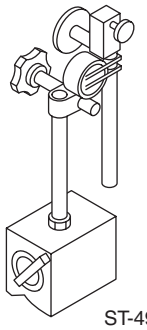
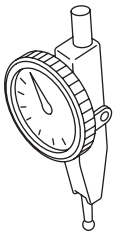
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST18632AA000	18632AA000	STAND ASSY	Used for disassembling and assembling the transmission.
 ST-498515500	498515500	REMOVER	Used for removing the bearing inner race of the drive pinion shaft.
 ST-498255400	498255400	PLATE	Used for measuring the backlash of hypoid gear.
 ST-498247001	498247001	MAGNET BASE	• Used for measuring the backlash of differential bevel pinion gear. • Used for measuring the backlash of hypoid gear. • Used together with DIAL GAUGE (498247100).
 ST-498247100	498247100	DIAL GAUGE	• Used for measuring the backlash of differential bevel pinion gear. • Used for measuring the backlash of hypoid gear. • Used together with DIAL GAUGE (498247101).

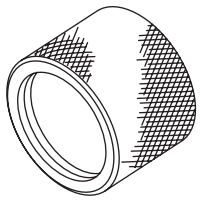
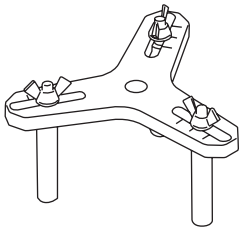
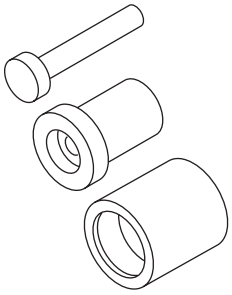
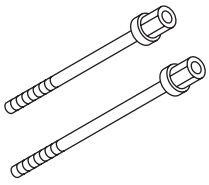
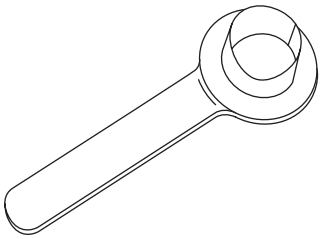
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST18675AA000	18675AA000	DIFFERENTIAL SIDE OIL SEAL INSTALLER	Used for installing the differential side retainer oil seal.
 ST18762AA001	18762AA001	COMPRESSOR SPECIAL TOOL	• Used for disassembling and installing the multi-plate clutch piston. • COMPRESSOR SPECIAL TOOL (18762AA000) can also be used.
 ST-927720000	927720000	HOUSING BUSHING INSTALLER AND REMOVER	• Used for installing the oil seal. • Use BUSHING SHAFT (927880000).
 ST18763AA000	18763AA000	COMPRESSOR SHAFT	Used for measuring the backlash of hypoid gear.
 ST28399SA010	28399SA010	OIL SEAL PROTECTOR	Used for protecting oil seal when installing front drive shaft.

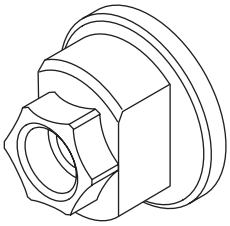
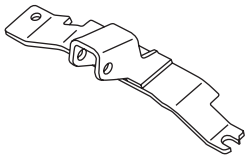
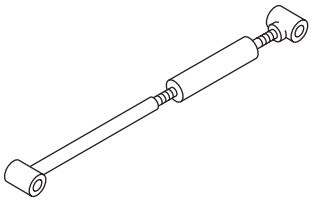
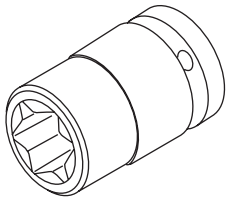
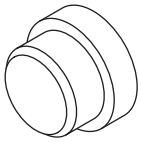
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-498937110	498937110	HOLDER	• Used for removing and installing the drive pinion lock nut. • Used as a holder to rotate gear when checking tooth contact.
 ST41099AA012	41099AA012 (Newly adopted tool)	ENGINE SUPPORT BRACKET	Used for supporting the engine.
 ST41099AA020	41099AA020	ENGINE SUPPORT	Used for supporting the engine.
 ST18270KA020	18270KA020	SOCKET (E20)	• Used for removing and installing the hypoid driven gear. • Used for removing and installing the drive pinion shaft retainer.
 ST-398497701	398497701	SEAT	Used for removing and installing the bearing.

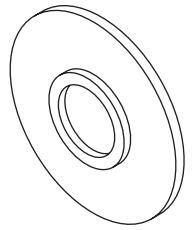
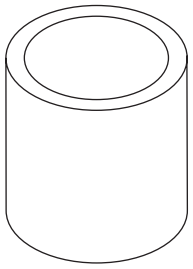
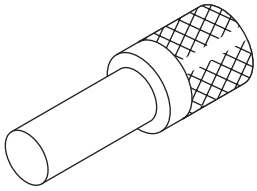
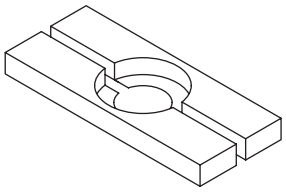
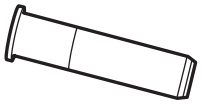
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-398177700	398177700	INSTALLER	• Used for installing the ball bearing. • Used for installing the parking gear. • Used for installing the bearing outer race. • Used for installing the plug.
 ST28499TC010	28499TC010	PRESS SNAP RING	Used for installing the bearing outer race of drive pinion shaft.
 ST-899864100	899864100	REMOVER	• Used for removing and installing the ball bearing. • Used for removing the parking gear and transfer drive gear. • Used for removing the bearing inner race of the front differential.
 ST-498077000	498077000	REMOVER	Used for removing the bearing inner race of the front differential.
 ST18657AA010	18657AA010	INSTALLER	Used for installing the oil seal at shifter arm shaft portion.

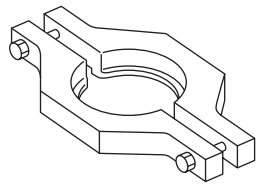
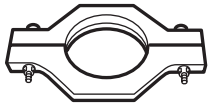
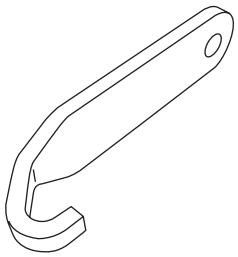
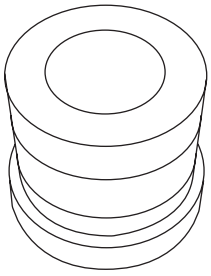
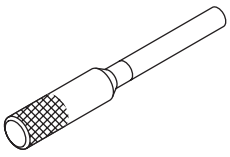
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-498077600	498077600	REMOVER	Used for removing the ball bearing of drive sprocket.
 ST18720AA000	18723AA000	REMOVER	Used for removing the ball bearing of transfer clutch assembly.
 ST-498497300	498497300	CRANKSHAFT STOPPER	Used for stopping the drive plate rotation when removing and installing the drive plate.
 ST-399513600	399513600	INSTALLER	Used for removing the ball bearing of drive sprocket.
 ST-499267300	499267300	STOPPER PIN	Used for adjusting the inhibitor switch.

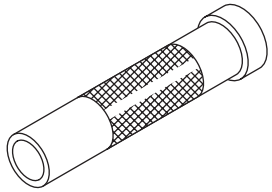
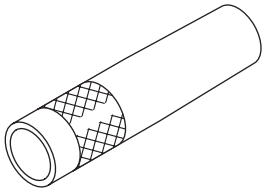
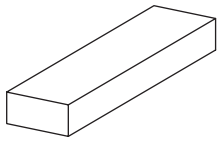
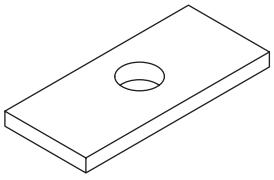
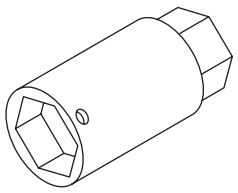
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-499277100	499277100	BUSHING 1-2 INSTALLER	• Used for installing the ball bearing. • Used for installing the bearing inner race.
 ST-499277200	499277200	INSTALLER	Used for installing the ball bearing of the transfer clutch assembly.
 ST-499575400	499575400	GAUGE	Used for measuring height of end play.
 ST-499575500	499575500	GAUGE	Used for measuring height of end play.
 ST-499787500	499787500	ADAPTER	• Used for removing and installing the drive pinion shaft lock nut. • Used for measuring the preload of the drive pinion shaft. • Used for measuring the backlash of hypoid gear.

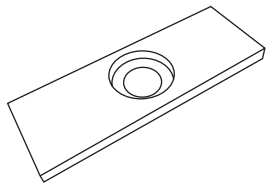
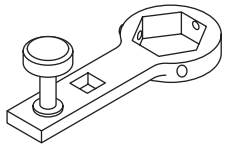
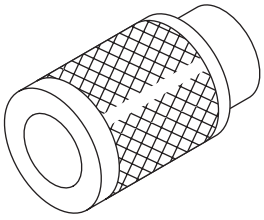
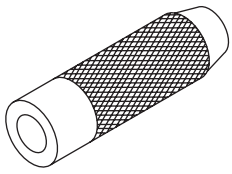
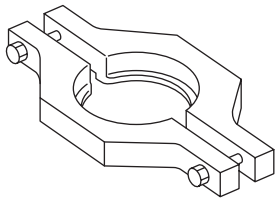
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-499575600	499575600	GAUGE	Used for measuring height of end play.
 ST-499787700	499787700	WRENCH	• Used for removing and installing the drive pinion shaft lock nut. • Used for measuring the preload of the drive pinion shaft. • Used for measuring the backlash of hypoid gear.
 ST-499757002	499757002	INSTALLER	• Used for removing the bearing of reduction driven gear. • Used for installing the parking gear. • Used for installing the transfer drive gear.
 ST-899580100	899580100	INSTALLER	• Used for installing the collar of reduction driven gear. • Used for installing the ball bearing of the transfer driven gear. • Used for installing the bearing inner race of drive pinion shaft.
 ST-498077300	498077300	REMOVER	Used for installing the ball bearing of reduction driven gear.

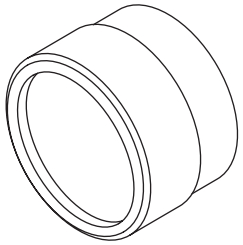
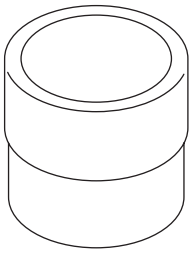
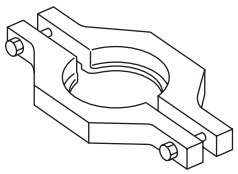
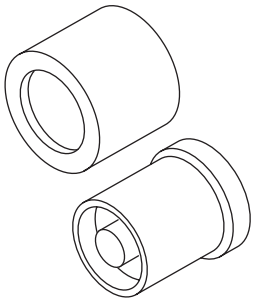
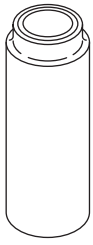
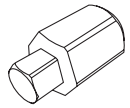
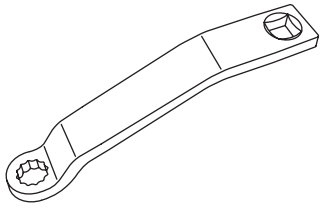
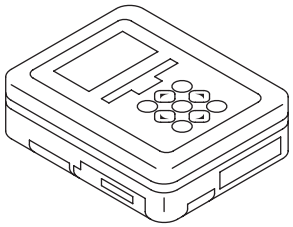
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-499755502	499755502	PRESS SNAP RING	Used for installing the drive sprocket ball bearing.
 ST-499755602	499755602	PRESS SNAP RING	• Used for installing the oil seal. • Used for installing the plug.
 ST-498077400	498077400	REMOVER	Used for removing the ball bearing of transfer driven gear.
 ST20099AE020	20099AE020	INSTALLER	Used for installing the bearing outer race of drive pinion shaft.
 ST-927130000	927130000	EXTENSION DRIVE SHAFT	Used for installing the bearing inner race of drive pinion shaft.

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST18270AA040	18270AA040	SOCKET	Used for removing and installing the transfer clutch pressure test plug.
 ST73099SG000	73099SG000	SPECIAL TOOL CONDENSER	Used for installing the transfer clutch pressure test plug.
 ST1B022XU0	1B022XU0	SUBARU SELECT MONITOR III KIT	Used for setting of each function and trouble-shooting for electrical system. NOTE: For detailed operation procedures of Subaru Select Monitor III, refer to “PC application help for Subaru Select Monitor”.

2. GENERAL TOOL

TOOL NAME	REMARKS
Circuit tester	Used for measuring resistance and voltage.
Thickness gauge	Used for measuring the clearance in reverse brake, forward clutch and transfer clutch.
Caliper	Used for measuring the dimension.
Spring scale	Used for measuring the starting torque of the drive pinion.
TORX® bit T70	Used for removing and installing differential gear oil drain plug.
Straight pin remover	Used for removing and installing the straight pin.
Push/pull gauge	Used for measuring clutch clearance.
Angle gauge	Used for installing the drive plate.

2. CVTF

A: INSPECTION

Check for leakage of CVTF from transmission.

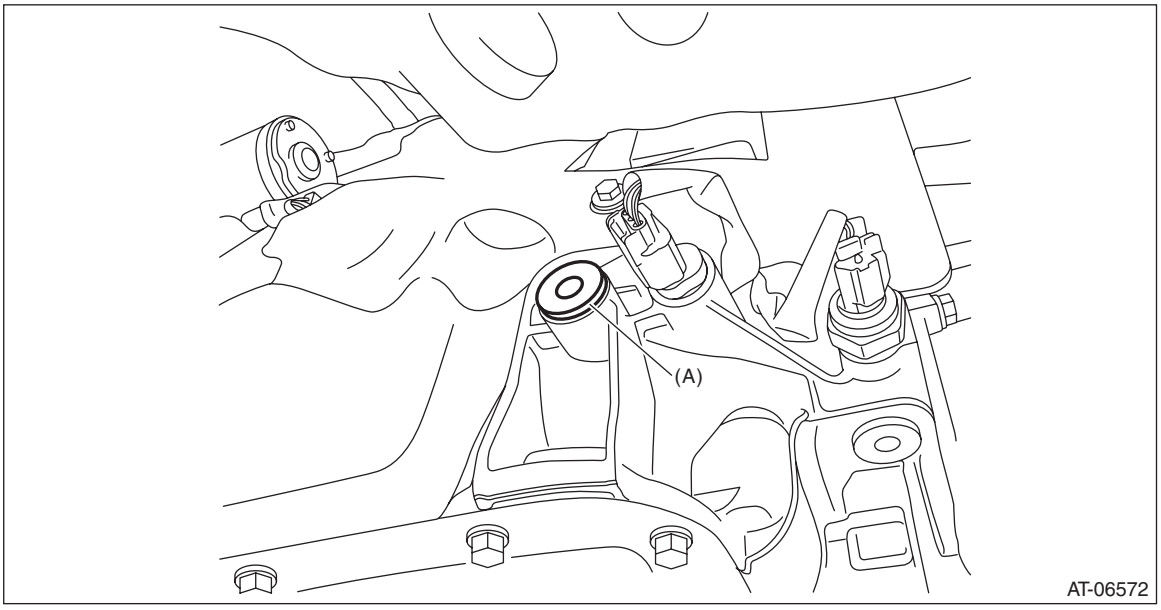
B: ADJUSTMENT

CAUTION:
• CVTF level changes along with CVTF temperature. When inspecting CVTF level, observe the specified CVTF temperature.
• Always use specified CVTF. Using other fluid will cause malfunction.

1) Idle the engine to raise CVTF temperature to 35 — 45°C (95 — 113°F) on Subaru Select Monitor.
2) Operate the select lever in P → R → N → D and D → N → R → P to circulate CVTF with the engine idling.
3) With the engine running, lift up the vehicle and remove the filler plug.

CAUTION:
Pay special attention to the following operations as the engine is at idle.

NOTE:
CVTF is at the specified level when it is up to the filler plug hole lower section.

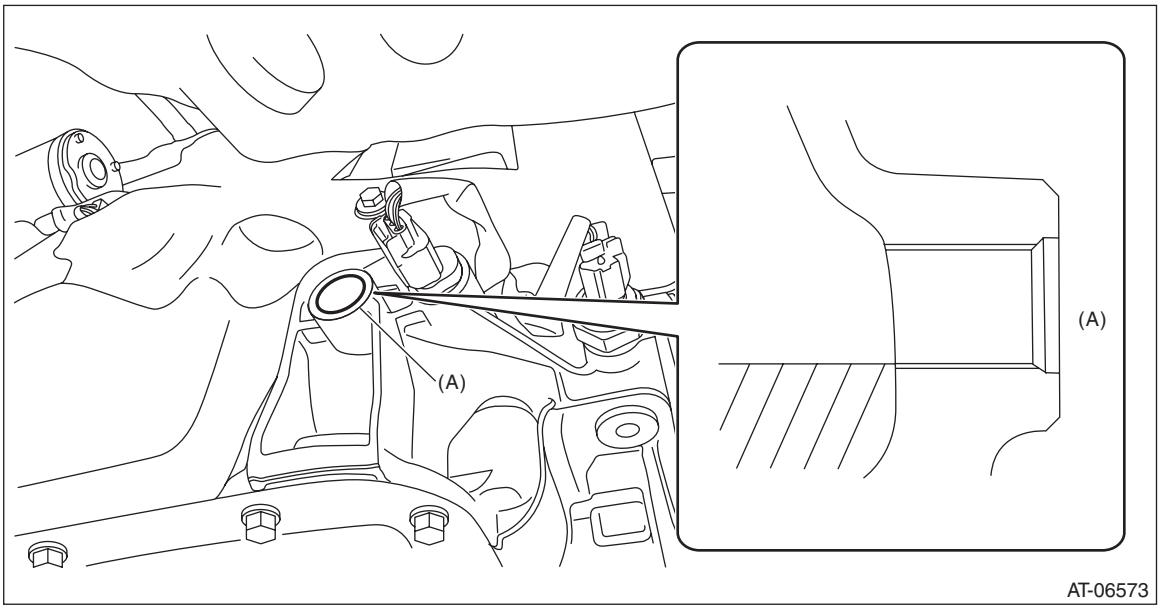


(A) Filler plug

4) When there is no CVTF leakage from the transmission, add the specified fluid up to the filler plug hole lower section.

Specified fluid:
<Ref. to CVT(TR580)-3, HYDRAULIC CONTROL AND LUBRICATION, SPECIFICATION, General Description.>

CAUTION:
Note that when CVTF is added up to the lower section of filler plug while the transmission is in cold condition, overfilling of CVTF occurs, causing the oil to spill out.



(A) Filler plug hole

5) Install the filler plug.

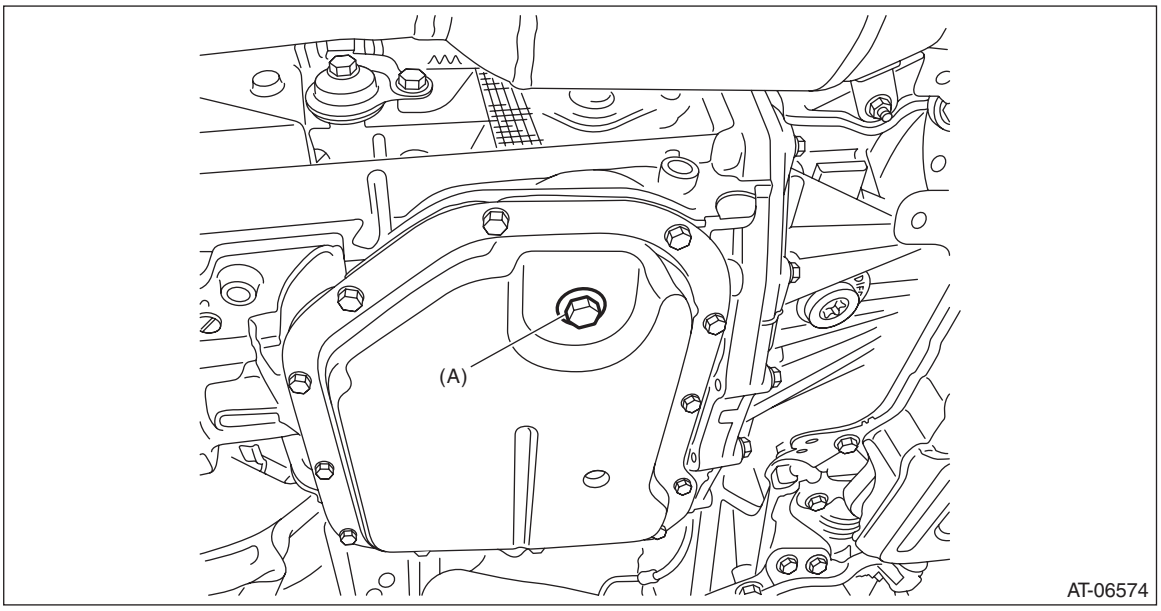
NOTE:
Use a new gasket.

Tightening torque:
50 N·m (5.1 kgf-m, 36.9 ft-lb)

C: REPLACEMENT

CAUTION:
• Directly after the vehicle has been running or the engine has been idling for a long time, the CVTF is hot. Be careful not to burn yourself.
• Be careful not to spill the CVTF on exhaust pipe to prevent it from emitting smoke or causing fires. If CVTF adheres, wipe it off completely.
• Always use specified CVTF. Using other fluid will cause malfunction.

1) Lift up the vehicle, and remove the CVTF drain plug.



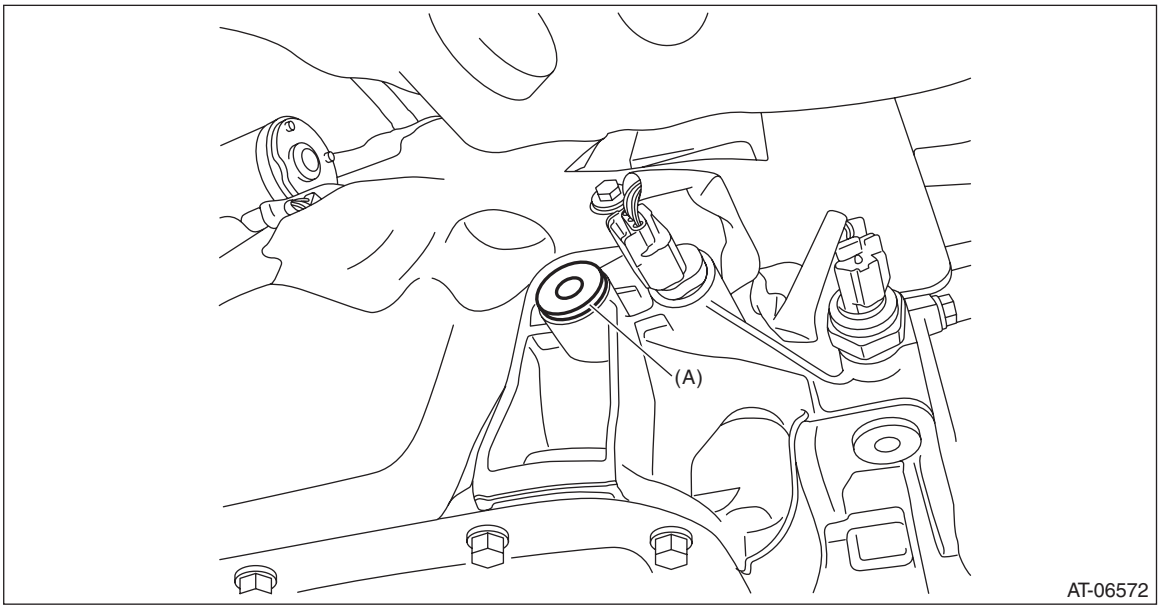
(A) CVTF drain plug

2) Check the CVTF condition. <Ref. to CVT(TR580)-40, CONDITION CHECK, CVTF.>
3) Install the CVTF drain plug and gasket.

NOTE:
• Use a new gasket.

Tightening torque:
31 N·m (3.2 kgf-m, 22.9 ft-lb)

4) Remove the filler plug.



(A) Filler plug

5) Add the specified fluid up to the filler plug hole lower section.

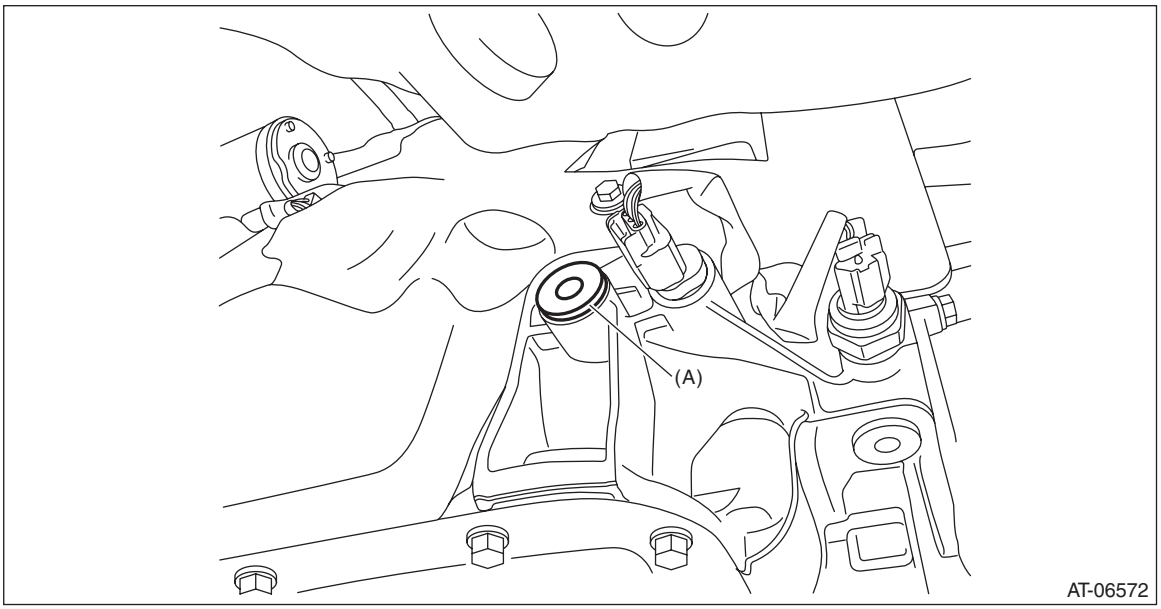
Specified fluid:
<Ref. to CVT(TR580)-3, HYDRAULIC CONTROL AND LUBRICATION, SPECIFICATION, General Description.>

6) Temporarily tighten the filler plug.
7) Idle the engine to raise CVTF temperature to 35 — 45°C (95 — 113°F) on Subaru Select Monitor.
8) Operate the select lever in P → R → N → D and D → N → R → P to circulate CVTF with the engine idling.

CAUTION:
Pay special attention to the following operations as the engine is at idle.
9) With the select lever shifted to “P” range and the engine started, lift up the vehicle. Adjust the CVTF level and check for leakage. <Ref. to CVT(TR580)-36, ADJUSTMENT, CVTF.>

10) Replace with a new gasket, and attach the filler plug.

Tightening torque:
50 N·m (5.1 kgf-m, 36.9 ft-lb)



(A) Filler plug

D: CONDITION CHECK

NOTE:
When replacing CVTF, determine the condition inside the transmission body by inspecting the drained CVTF.

Fluid condition	Trouble and possible cause	Corrective action
Metal particles.	Excessive wear of the internal of the transmission body.	Replace CVTF and check if CVT operates correctly.
Thick and varnish-form fluid.	Burnt clutches	Replace CVTF and check the CVT body or vehicle for faulty.
Clouded CVTF or bubbles.	Water mixed in fluid.	Replace CVTF and check the water entering point.

3. Differential Gear Oil

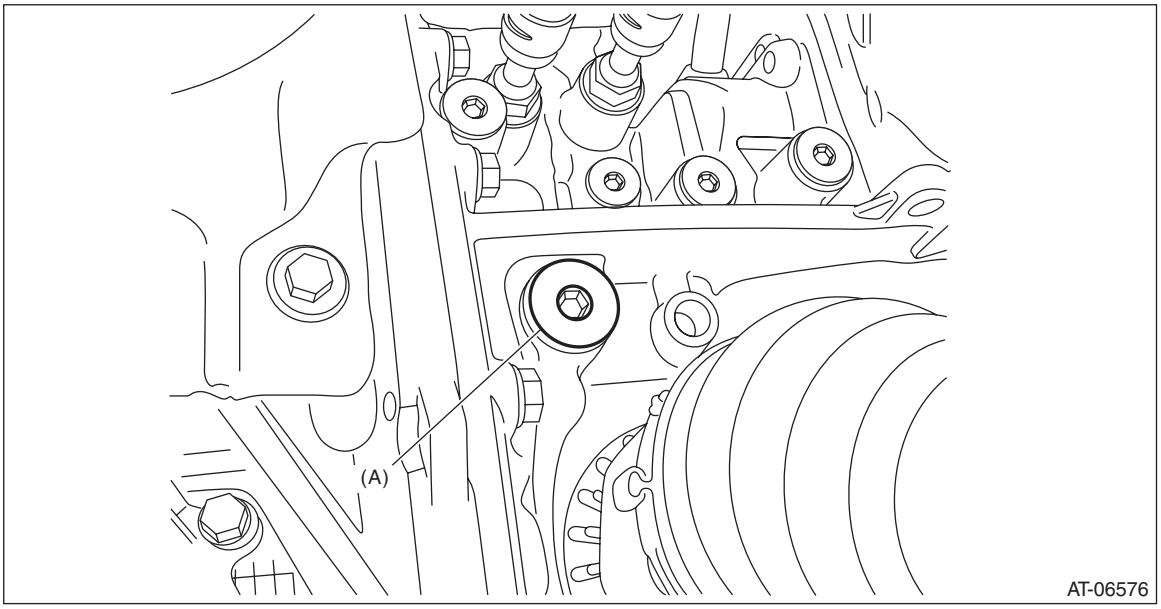
A: INSPECTION

Check that there is no leakage of differential gear oil from the converter case.

B: ADJUSTMENT

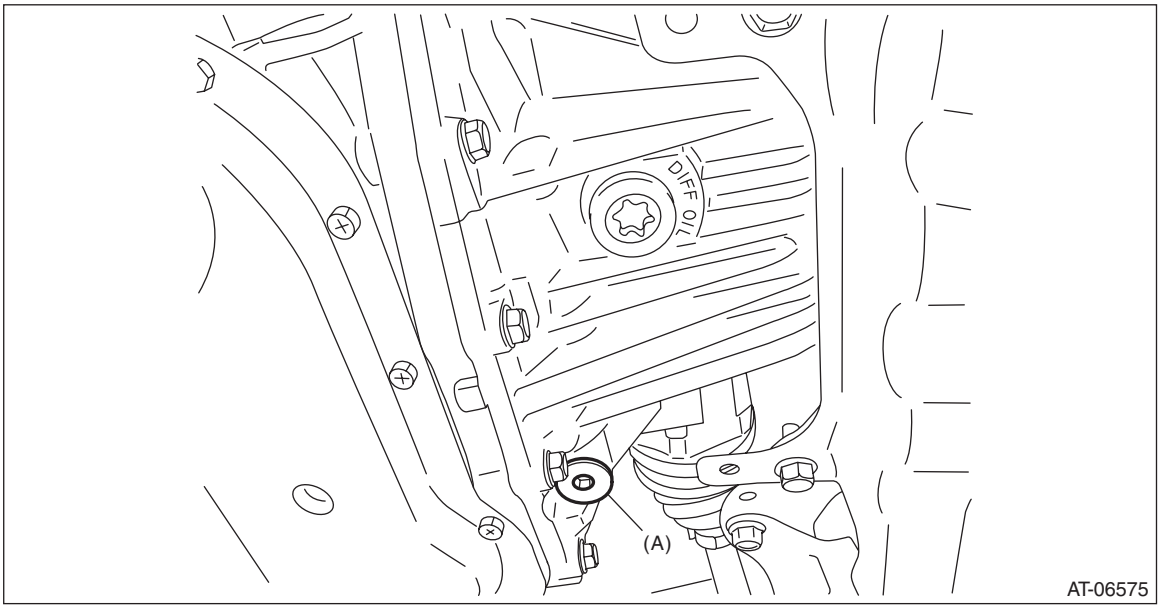
NOTE:
Immediately after removing the overflow drain plug, remaining gear oil (approx. 8 cc) may come out of the overflow pipe. This is not included in the specified amount. When removing the overflow drain plug, make sure the gear oil flows out of the overflow drain plug hole by filling with gear oil.

1) Lift up the vehicle.
2) Remove the filler plug.



(A) Filler plug

3) Remove the overflow drain plug.



(A) Overflow drain plug

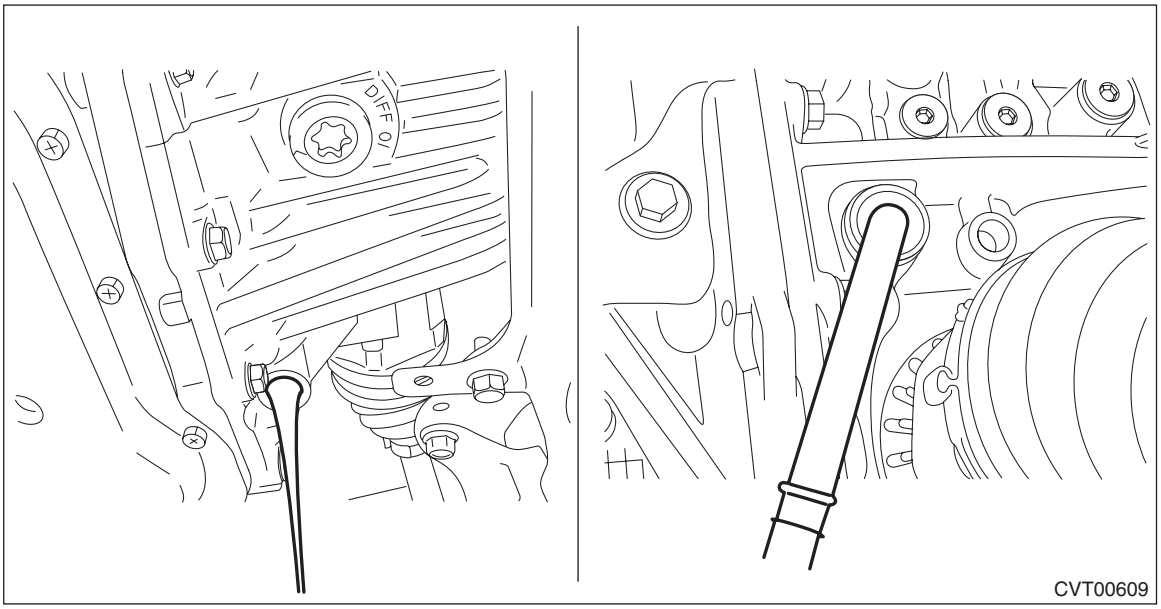
4) Fill in the differential gear oil through the filler plug hole up to where the oil flows out of the overflow drain plug.

Recommended gear oil:
<Ref. to CVT(TR580)-3, RECOMMENDED GEAR OIL, SPECIFICATION, General Description.>

5) When the flow of the differential gear oil turns into a narrow stream, install the overflow drain plug.

NOTE:
Use a new gasket.

Tightening torque:
50 N·m (5.1 kgf-m, 36.9 ft-lb)



6) Install the filler plug.

NOTE:
Use a new gasket.

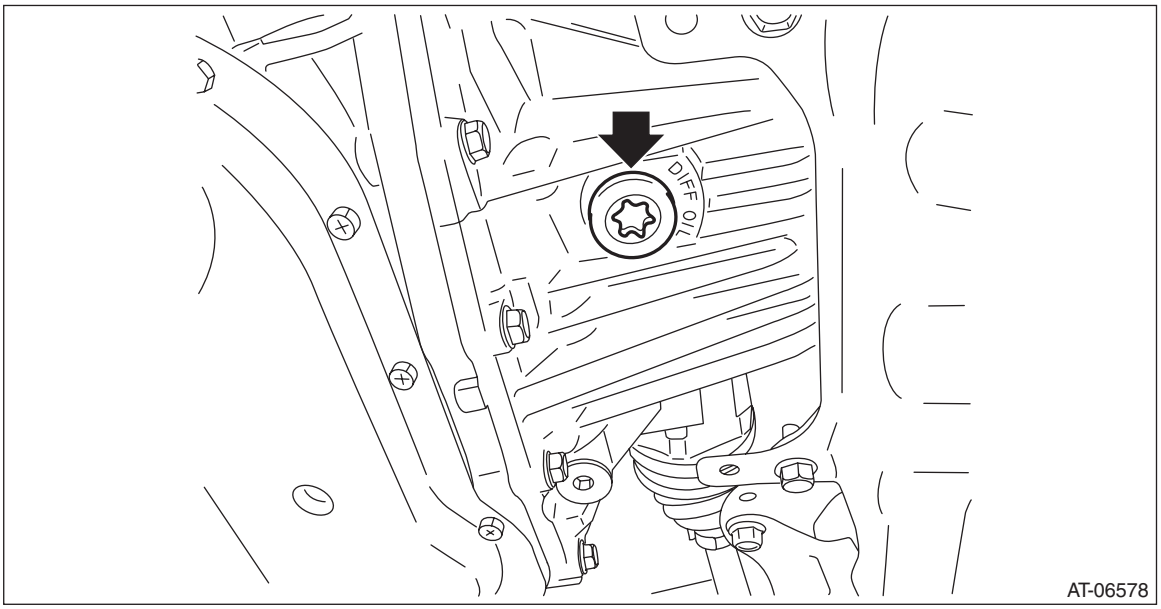
Tightening torque:
50 N·m (5.1 kgf-m, 36.9 ft-lb)

C: REPLACEMENT

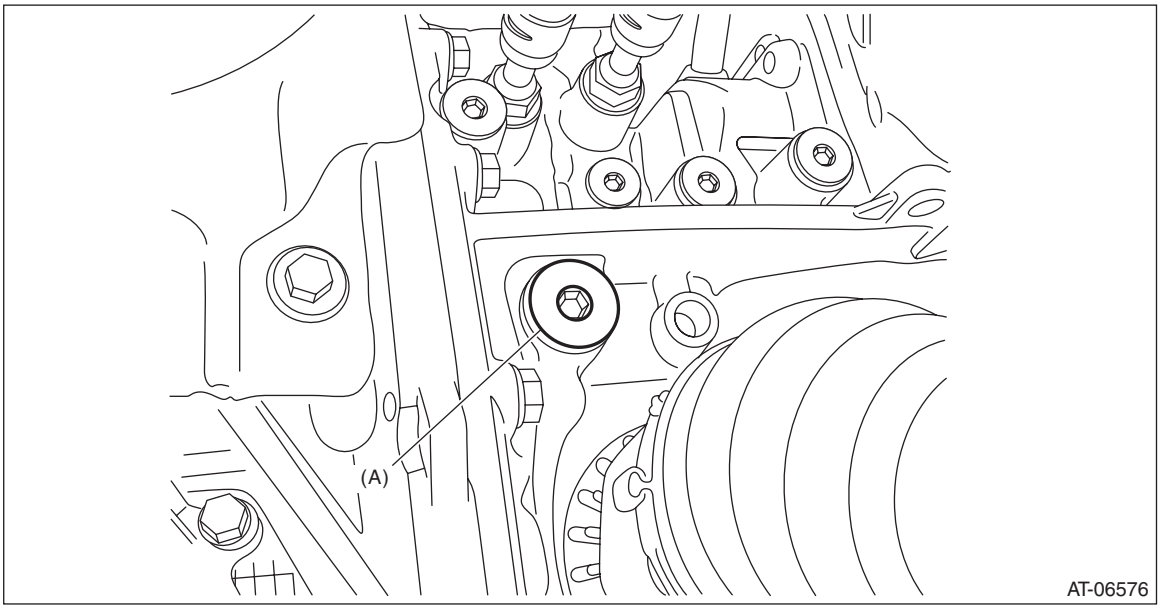
CAUTION:
• Immediately after the vehicle has been running or after idling for a long time, the differential gear oil will be hot. Be careful not to burn yourself.
• Be careful not to spill differential gear oil on the exhaust pipe to prevent it from emitting smoke or causing a fire. If gear oil adheres, wipe it off completely.
1) Lift up the vehicle.
2) Remove the differential gear oil drain plug using TORX® bit T70. Drain differential gear oil.
3) Install the differential gear oil drain plug using TORX® bit T70.

NOTE:
Use a new gasket.

Tightening torque:
70 N·m (7.1 kgf-m, 51.6 ft-lb)



4) Remove the filler plug.

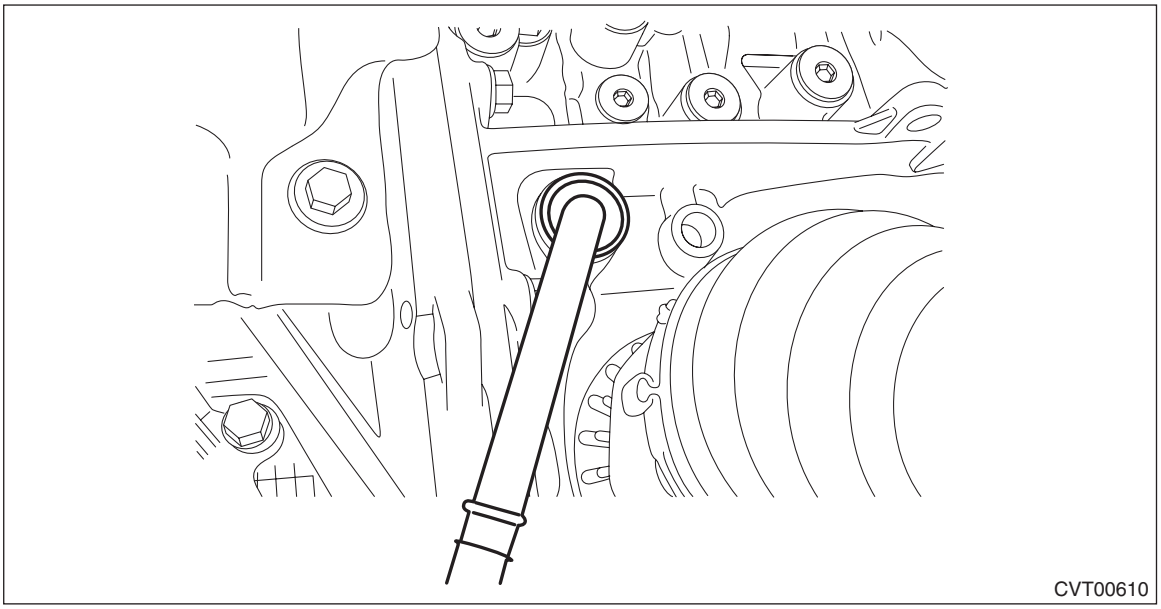


(A) Filler plug

5) Pour gear oil into the filler plug hole.

Recommended gear oil:
<Ref. to CVT(TR580)-3, RECOMMENDED GEAR OIL, SPECIFICATION, General Description.>

Gear oil capacity:
<Ref. to CVT(TR580)-3, RECOMMENDED GEAR OIL, SPECIFICATION, General Description.>



6) Adjust the level of differential gear oil. <Ref. to CVT(TR580)-41, ADJUSTMENT, Differential Gear Oil.>

4. AWD ON/OFF Switching Mode

A: GENERAL DESCRIPTION

- Follow the messages displayed on the Subaru Select Monitor when working.
- Perform as necessary in FWD mode.
- When switched to FWD, AWD light illuminates.

B: PROCEDURE

CAUTION:
• Do not turn the power of the Subaru Select Monitor OFF during work, and do not disconnect the data link connector.
• On completing the work in FWD, switch back in AWD.
1) Shift the select lever to “P” range.
2) Connect the Subaru Select Monitor to data link connector.
3) Turn the ignition switch to ON.
4) Turn off all switches causing an electrical load, such as headlights, A/C, seat heater and rear defogger.
5) Select {Work Support} in the «Transmission Diagnosis» display screen of the Subaru Select Monitor.
6) Select {Maintenance mode} in the «Work Support» screen of Subaru Select Monitor.
7) Select {AWD ON/OFF switching mode} in the «Maintenance mode» screen of the Subaru Select Monitor.
8) Follow the messages displayed on the Subaru Select Monitor screen when working.
Switching completes successfully if any of the following messages is displayed.
- When switching from AWD to FWD: {Switched to FF. To return to AWD, perform basic mode again.}
- When switching from FWD to AWD: {Switched to AWD. To return to FF, perform basic mode again.}

NOTE:
- If communication error occurs during switching mode, start in the “AWD ON/OFF switching mode” again.
- If operation is interrupted before the successful end message is displayed, perform the {AWD ON/OFF switching mode} from the beginning until confirming the operation is successfully ended. If this mode fails to complete successfully, the cause is as follows.
  - Select lever is not in “P” range.
  - Engine is running.
- For detailed operation procedures, refer to “PC application help for Subaru Select Monitor”.

5. Road Test

A: INSPECTION

1. GENERAL PRECAUTION

Road tests should be conducted to properly diagnose the condition of CVT.

CAUTION:
Always observe the local traffic laws when performing the test.

2. D RANGE SHIFT FUNCTION

Make sure that the engine speed is 1,100 — 1,300 r/min while driving on the level road at 50 km/h (31 MPH) after accelerating from halting up to 1/4 of accelerator opening angle. Then stop the vehicle. Check normal gear change has occurred while the vehicle speed changes from a constant speed to zero.

3. KICK-DOWN FUNCTION

Check if engine speed will rise by operating the accelerator opening angle to the full from a constant speed of 50 km/h (31 MPH) or more.

4. ENGINE BRAKE OPERATION

• Model with manual mode

• Drive in “6th speed of manual mode” [70 — 80 km/h (43 — 50 MPH)], and shift down from 6th to 5th. Check if the indicator of combination meter switches “6” → “5”. At the same time, check the engine brake in 5th gear.
• Drive in “5th speed of manual mode” [60 — 70 km/h (37 — 43 MPH)], and shift down from 5th to 4th. Check if the indicator of combination meter switches “5” → “4”. At the same time, check the engine brake in 4th gear.
• Drive in “4th speed of manual mode” [50 — 60 km/h (31 — 37 MPH)], and shift down from 4th to 3rd. Check if the indicator of combination meter switches “4” → “3”. At the same time, check the engine brake in 3rd gear.
• Drive in “3rd speed of manual mode” [40 — 50 km/h (25 — 31 MPH)], and shift down from 3rd to 2nd. Check if the indicator of combination meter switches “3” → “2”. At the same time, check the engine brake in 2nd gear.
• Drive in “2nd speed of manual mode” [20 — 30 km/h (12 — 19 MPH)], and shift down from 2nd to 1st. Check if the indicator of combination meter switches “2” → “1”. At the same time, check the engine brake in 1st gear.

• Model without manual mode

Drive in D range at [50 — 60 km/h (31 — 37 MPH)], and shift to “L” range. Check if the indicator of combination meter switches “D” → “L”. At the same time, check the engine brake in L range.

5. LOCK-UP FUNCTION

When the accelerator is lightly depressed while driving on a flat road in “D” range, check that rpm does not change abruptly.

6. P RANGE OPERATION

Stop the vehicle on an uphill grade of 5% or more and shift to the “P” range and apply the parking brake. Check that the vehicle does not move when the parking brake is released.

7. NOISE AND VIBRATION

Check for noise and vibration during a constant driving, accelerating, decelerating and manual shift operation.

8. OIL LEAKAGE

After the driving test, inspect for leakage of CVTF and differential gear oil from the transmission body.

6. Stall Test

A: INSPECTION

CAUTION:
Make sure no other person is around the vehicle during stall test measurement.

NOTE:
Stall test is extremely important in diagnosing the condition of CVT and engine. The test is necessary to measure the engine stall speeds in “R” and “D” range.
Purposes of the stall test:
- Operational check of forward clutch and reverse brake
- Operational check of the torque converter assembly
- Engine performance check

1) Place wheel chocks at the front and rear of all wheels and engage the parking brake.
2) Turn the A/C OFF.
3) Using the Subaru Select Monitor, check if the throttle valve operates when you depress the accelerator pedal. <Ref. to EN(H4DO w/o HEV)(diag)-37, DISPLAY ENGINE CURRENT DATA, OPERATION, Subaru Select Monitor.>
4) Check the engine oil level. <Ref. to LU(H4DO(w/o HEV))-12, Engine Oil.>
5) Check the coolant level. <Ref. to CO(H4DO(w/o HEV))-16, Engine Coolant.>
6) Adjust the CVTF level. <Ref. to CVT(TR580)-36, ADJUSTMENT, CVTF.>
7) Increase the CVTF temperature to 60 — 80°C (140 — 176°F) with the engine running and the select lever shifted to “N” or “P” range.
8) Hold down the pre-collision brake OFF switch to turn OFF the pre-collision brake function. (With EyeSight)
9) Shift the select lever to “D” range.
10) Depress the accelerator pedal to the full while fully depressing the foot brake pedal with your left foot.
11) When the engine speed stabilizes, quickly record the engine speed and release accelerator pedal. Shift the select lever to “N” range. Let the engine idle for one minute or more to cool it down.
12) Shift to “R” range and perform the same stall test.

NOTE:
- Do not perform a stall test for over 5 seconds at a time. (From closed throttle, fully open throttle to stall speed reading.) Failure to follow this instruction will cause the engine oil and CVTF to deteriorate and the clutch and brake to be adversely affected.
- Be sure to cool down the engine for at least one minute after each stall test with the select lever set in the “P” or “N” range and with the idle speed of 1,200 r/min or less.
- If the stall speed is higher than the specified range, attempt to finish the stall test in as short a time as possible, in order to prevent the CVT from sustaining damage.

Stall speed standard:
D range: 2,150 — 2,800 r/min
R range: 1,950 — 2,550 r/min

Stall test judgment

Stall speed (at sea level)	Range	Probable cause
Lower than standard value	D, R	• Insufficient engine output • Torque converter malfunction
Higher than standard value	D	• Forward clutch slippage • Secondary pressure (line pressure) is low. • Variator chain malfunction
	R	• Reverse brake slippage • Secondary pressure (line pressure) is low. • Variator chain malfunction
	D, R	• Torque converter malfunction • Control valve body malfunction • TCM malfunction • Damaged harness and harness connector

7. Time Lag Test

A: INSPECTION

NOTE:
When the select lever is shifted while the engine is idling, there will be a certain time elapse or lag before shock is felt. This symptom helps to check the condition of forward clutch and reverse brake.

- Perform the test at normal operation CVTF temperature of 60 — 80°C (140 — 176°F).
- Be sure to allow one minute or more interval between tests.
- Make three measurements and take the average value.

1) Apply the parking brake.
2) Start the engine. Check the idle speed. (A/C OFF)
3) Shift the select lever from “N” to “D” range. Using a stop watch, measure the time elapsed from shifting the lever until the shock is felt.

Time lag standard:
1.5 seconds or less

If “N” → “D” time lag is longer than specified:

- Secondary pressure (line pressure) is too low.
- Forward clutch worn
- Forward clutch piston malfunction
- Control valve body malfunction
- Learning incomplete

4) In the same manner, measure the time lag when shifting from “N” range to “R” range.

Time lag standard:
1.5 seconds or less

If “N” → “R” time lag is longer than specified:

- Secondary pressure (line pressure) is too low.
- Reverse brake worn
- Reverse brake piston malfunction
- Control valve body malfunction
- Learning incomplete

8. Secondary Pressure (Line Pressure) Test

A: INSPECTION

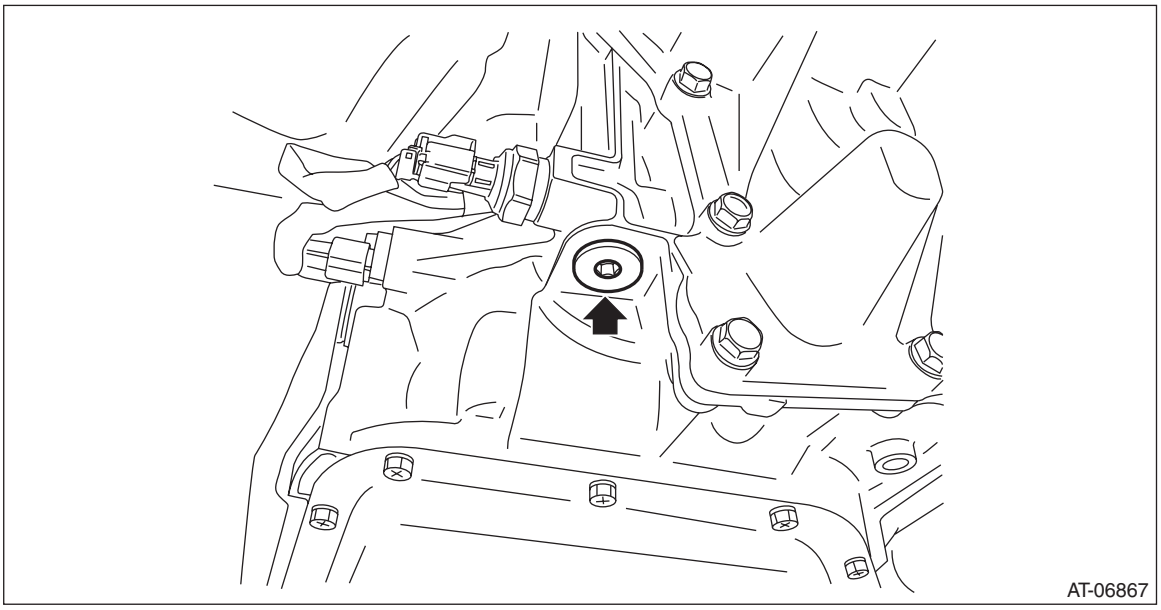
CAUTION:
• Directly after the vehicle has been running or the engine has been idling for a long time, the CVTF is hot. Be careful not to burn yourself.
• Make sure no other person is around the vehicle during secondary pressure (line pressure) test measurement.
• After performing the secondary pressure (line pressure) test measurement, adjust the CVTF level.

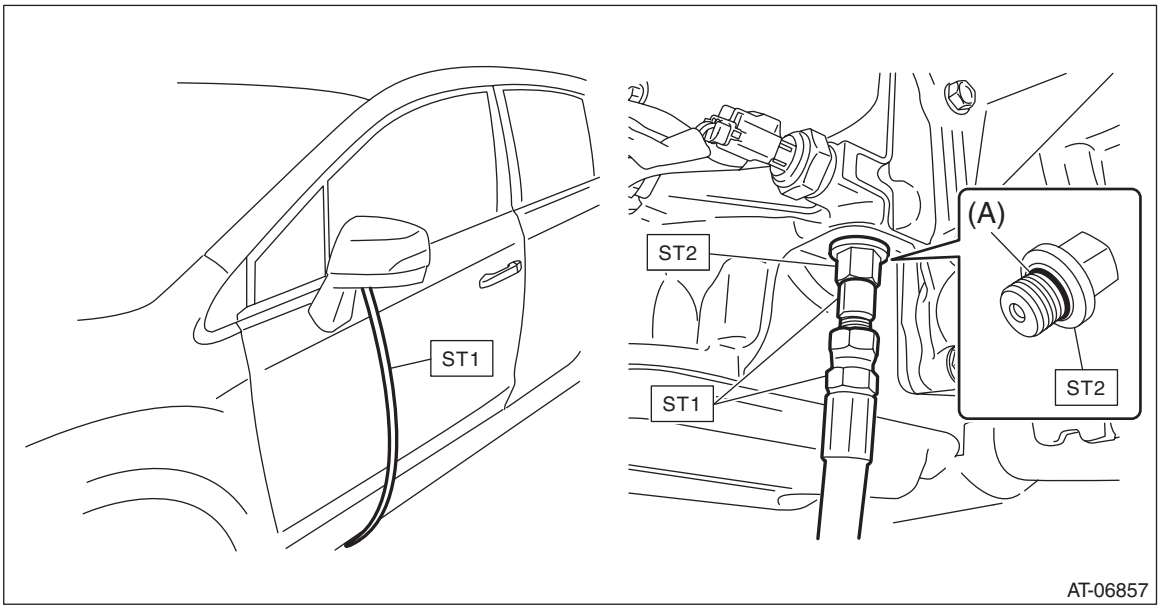
NOTE:
• If the pulley and variator chain, clutch or brake show signs of slipping or shift feel is not correct, check the secondary pressure (line pressure).
• Connect Subaru Select Monitor to vehicle so as to measure the engine speed and actual secondary pressure (secondary pressure (line pressure)).
• In many cases, slippage or inability to operate the vehicle may be due to insufficient oil pressure for the operation of clutch, brake or control valve.
1) Lift up the vehicle.

2) Remove the secondary pressure (line pressure) test plug, and install ST1 and ST2.

CAUTION:
Removal of the test plug and installation of the ST shall be both performed quickly.

NOTE:
Use ST2 PRESSURE GAUGE ADAPTER with genuine O-ring (part No. 806916050) attached.
ST1 18801AA000 OIL PRESSURE GAUGE ASSY
ST2 18681AA010 PRESSURE GAUGE ADAPTER





(A) O-ring (genuine part)

3) Lower the vehicle.

4) Set the gauge so that it can be seen from the driver's seat.
5) Using the Subaru Select Monitor, check if the throttle valve operates when you depress the accelerator pedal. <Ref. to EN(H4DO w/o HEV)(diag)-37, DISPLAY ENGINE CURRENT DATA, OPERATION, Subaru Select Monitor.>
6) Check the engine oil level. <Ref. to LU(H4DO(w/o HEV))-12, Engine Oil.>
7) Check the coolant level. <Ref. to CO(H4DO(w/o HEV))-16, Engine Coolant.>
8) Adjust the CVTF level. <Ref. to CVT(TR580)-36, ADJUSTMENT, CVTF.>
9) Increase the CVTF temperature to 60 — 80°C (140 — 176°F) with the engine running and the select lever shifted to "N" or "P" range.
10) Hold down the pre-collision brake OFF switch to turn OFF the pre-collision brake function. (With EyeSight)
11) Shift the select lever to "D" range.
12) Depress the accelerator pedal to the full while fully depressing the foot brake pedal with your left foot.
13) Immediately after the engine speed becomes steady, record the reading of the secondary pressure (line pressure), engine speed and actual secondary pressure on Subaru Select Monitor. And then release the accelerator pedal. Shift the select lever to "N" range. Let the engine idle for one minute or more to cool it down.

NOTE:
• Do not continue the stall test for 5 seconds or more at a time (from fully closed throttle, fully open throttle to secondary pressure (line pressure) reading). Failure to follow this instruction will cause the engine oil and CVTF to deteriorate and the clutch and brake to be adversely affected.
• After performing the secondary pressure (line pressure) test, be sure to cool down the engine for at least one minute with the select lever set in "P" or "N" range and with the idle speed at 1,200 r/min or less.
• Under each condition, check that the measured pressure matches almost totally with actual secondary pressure.
• When both measured pressure and actual secondary pressure are out of specification, judge as control valve malfunction.
• The value at stall is for reference because the pressure changes under different conditions or circumstances.
• The value at idling is steady because it is not affected by any condition or circumstance.
• After starting the engine with the select lever set in "P" range, when the secondary pressure is measured during idling without performing shift operation, the result may exceed the standard. Shift the select lever to "D" or "R" range before performing the measurement.

Secondary pressure (line pressure) standard				
	Range	Throttle	Brake	Secondary pressure (line pressure) (MPa (kgf/cm^2, psi))
Stall	D, R	Full open	ON	4.5 — 6.0 (45.9 — 61.2, 652 — 870)
Idling	P, N	Full closed	OFF	0.5 — 1.5 (5.1 — 15.3, 72 — 218)

14) Remove the ST and install the plug after measurement.

CAUTION:
Removal of the ST and installation of the test plug shall be both performed quickly.

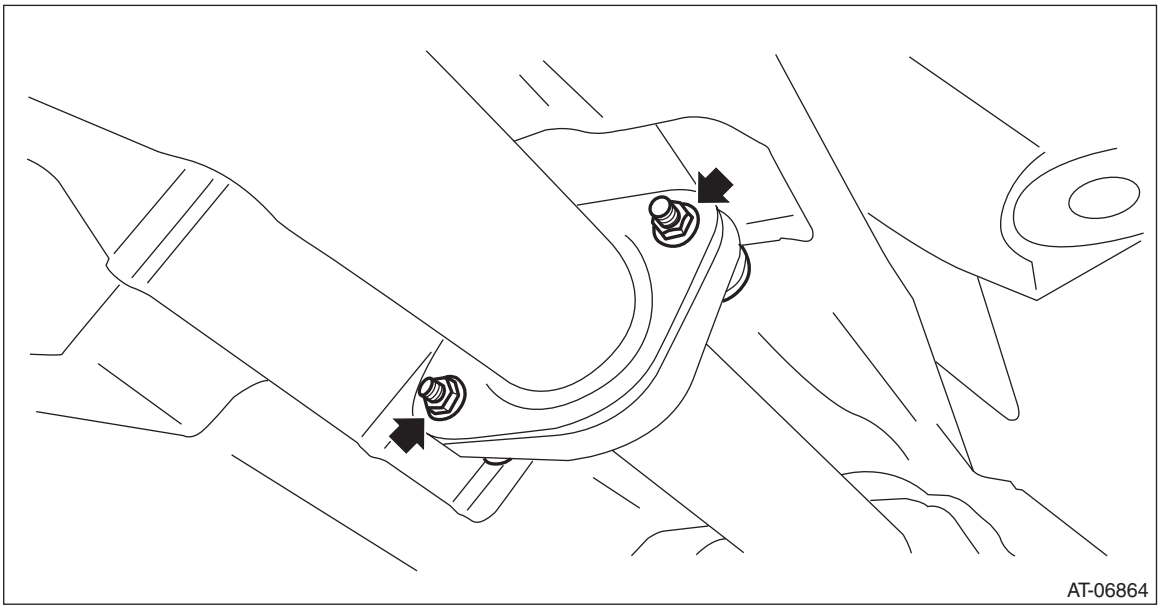
NOTE:
• Use new O-rings.
• Apply CVTF to the O-ring.

Tightening torque:
50 N·m (5.1 kgf-m, 36.9 ft-lb)
15) Adjust the CVTF level. <Ref. to CVT(TR580)-36, ADJUSTMENT, CVTF.>

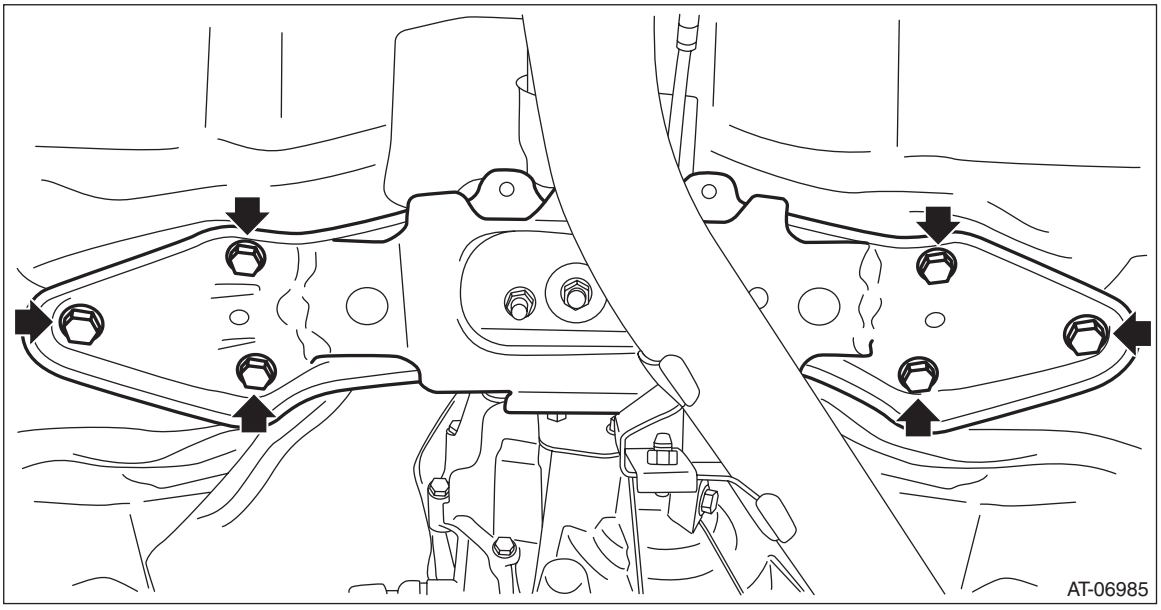
9. Transfer Clutch Pressure Test

A: INSPECTION

1) Lift up the vehicle.
2) Remove the rear exhaust pipe from center exhaust pipe.

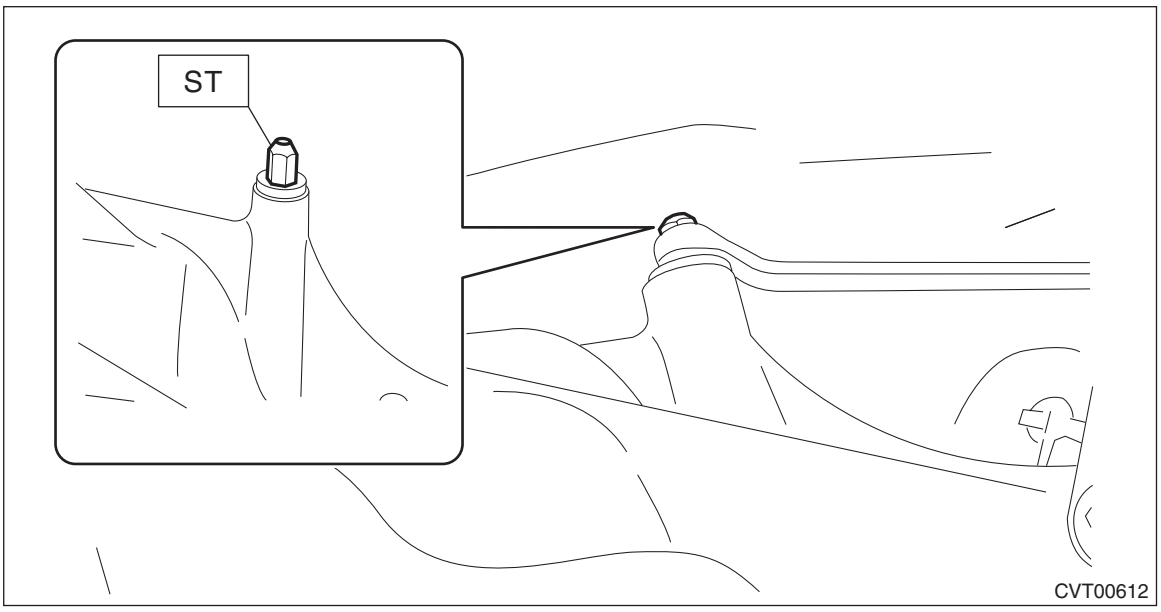


3) Remove the center exhaust cover.
4) Set the transmission jack under the transmission.
5) Remove the mounting bolt of rear crossmember.



6) Lower the rear side of transmission until the transfer clutch pressure test plug can be removed.

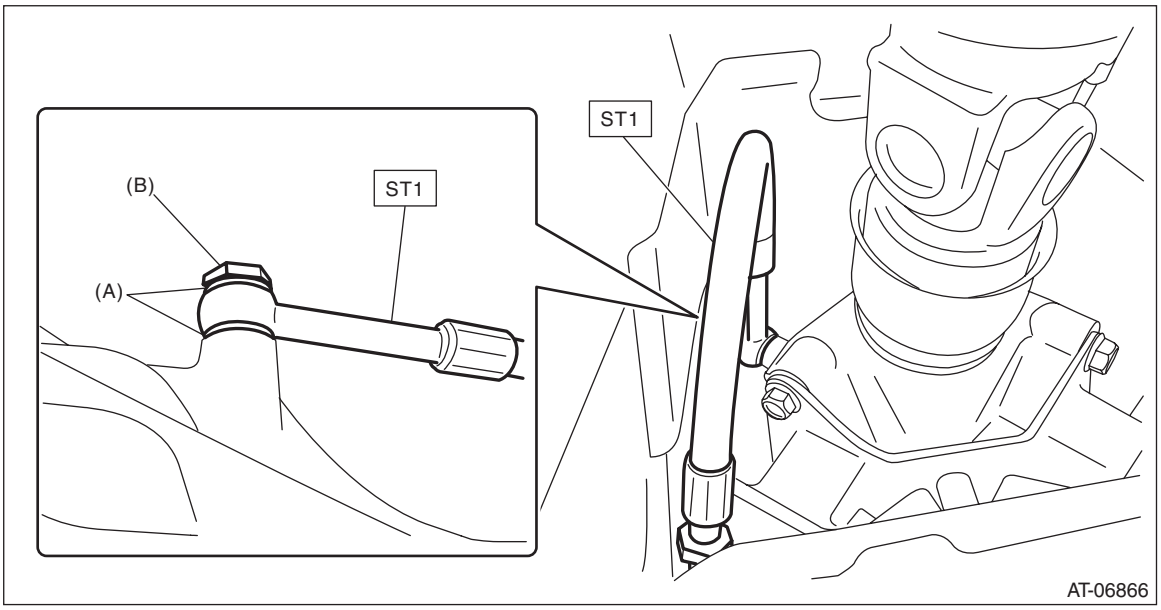
7) Using the ST, remove the transfer clutch pressure test plug.
ST 18270AA040 SOCKET



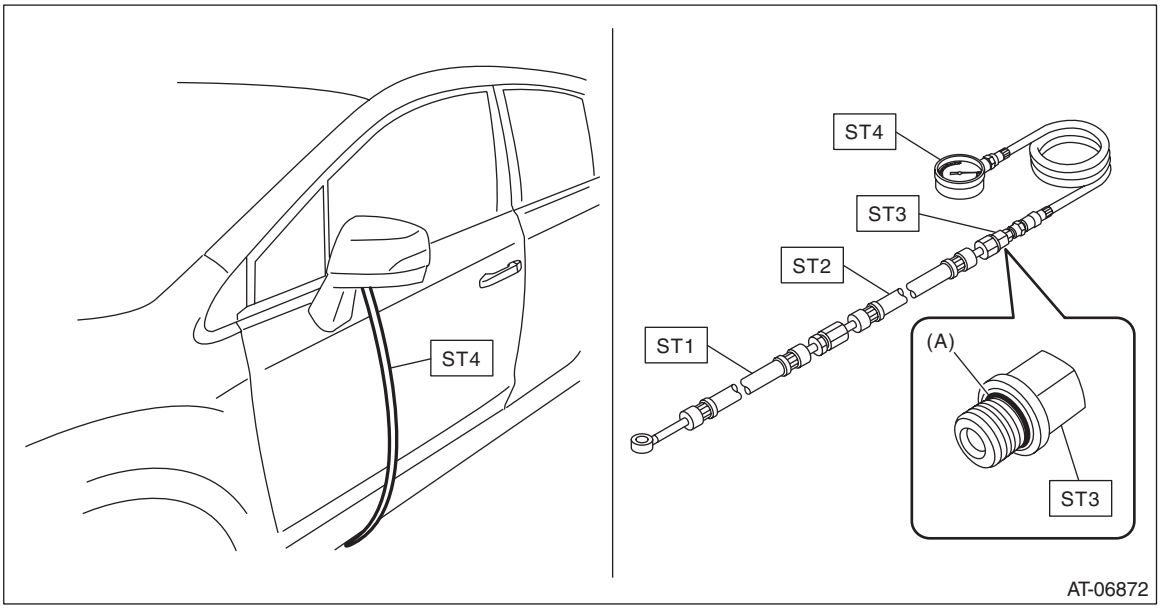
8) Set the ST1, ST2, ST3 and ST4 to the transmission.

NOTE:
• Use ST1 ADAPTER HOSE B with genuine union screw (part No. 801914010) and gasket (part No. 803914060) attached.
• Use ST3 PRESSURE GAUGE ADAPTER with genuine O-ring (part No. 806911080) attached.

ST1 34099AC020 ADAPTER HOSE B
ST2 34099AC010 ADAPTER HOSE A
ST3 18681AA000 PRESSURE GAUGE ADAPTER
ST4 498575400 OIL PRESSURE GAUGE ASSY



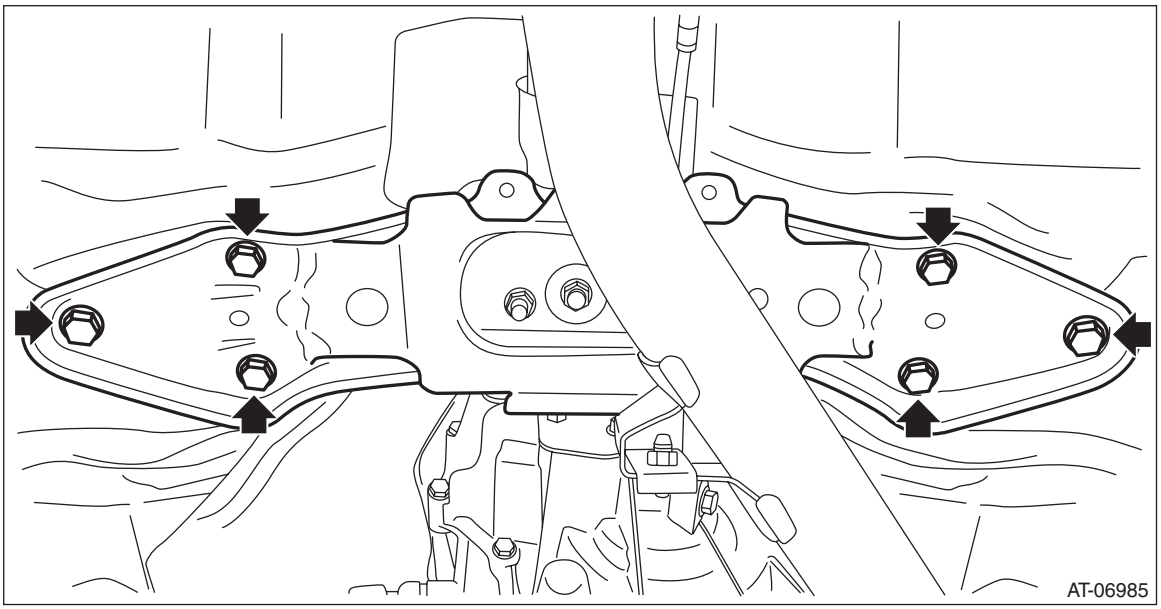
(A) Gasket (genuine part)
(B) Union screw (genuine part)



(A) O-ring (genuine part)

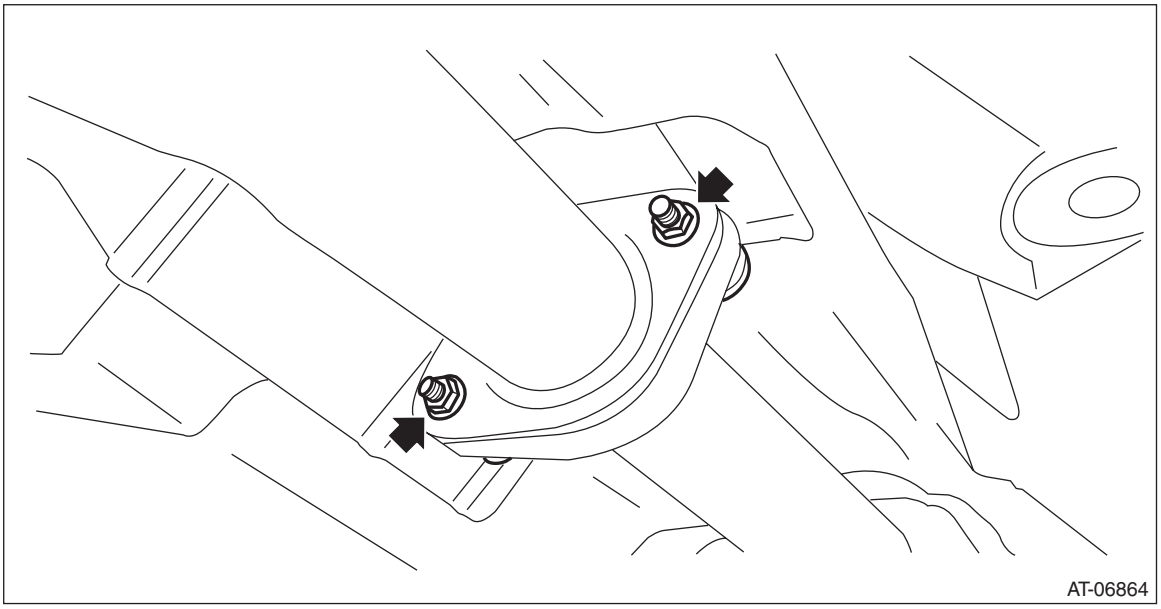
9) Raise the transmission, and install the rear crossmember.

Tightening torque:
70 N·m (7.1 kgf-m, 51.6 ft-lb)



10) Install the rear exhaust pipe to center exhaust pipe.

Tightening torque:
18 N·m (1.8 kgf-m, 13.3 ft-lb)



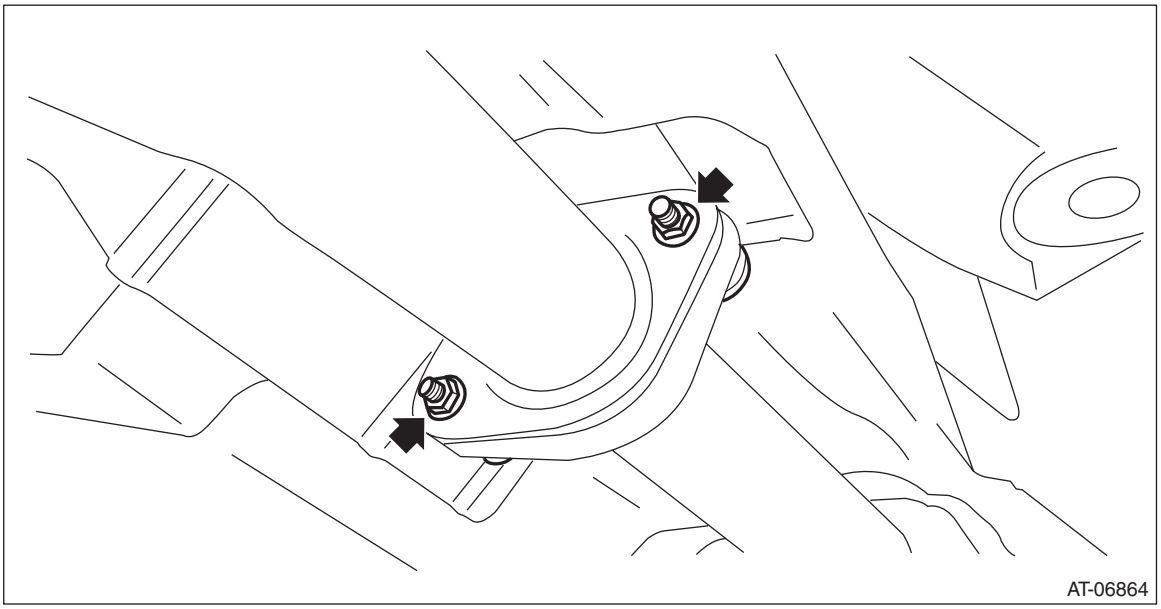
11) Lower the vehicle.
12) Connect the Subaru Select Monitor to the data link connector and read the current data.

13) Check the transfer clutch pressure as in secondary pressure (line pressure) test. <Ref. to CVT(TR580)-49, Secondary Pressure (Line Pressure) Test.>

NOTE:
• Use Subaru Select Monitor for switching to FWD mode. <Ref. to CVT(TR580)-45, AWD ON/OFF Switching Mode.>
• If no oil pressure is produced, if it does not change in AWD mode or if oil pressure is produced in FWD mode, there may be a problem in the control valve body.

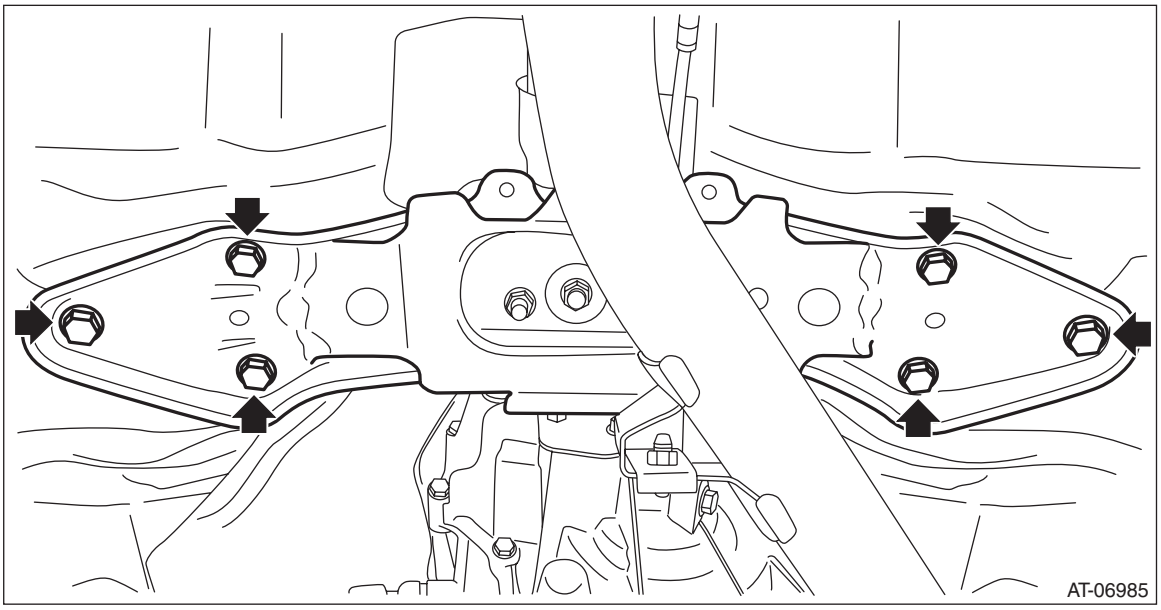
Range position	ON Duty ratio (%)	Accelerator pedal opening angle (%)	Standard transfer clutch pressure kPa (kgf/cm^2, psi)	
			AWD mode	FWD mode
D	95 — 100	Fully opened (100)	1,000 — 1,200 (10.2 — 12.2, 145 — 174)	—
	60	Adjust ON Duty ratio to 60%.	400 — 700 (4.1 — 7.1, 58 — 102)	—
	0	Fully closed (0)	—	0 (0, 0)
N or P	0	Fully closed (0)	0	—

14) Lift up the vehicle.
15) Remove the rear exhaust pipe from center exhaust pipe.



16) Set the transmission jack under the transmission.

17) Remove the mounting bolt of rear crossmember.



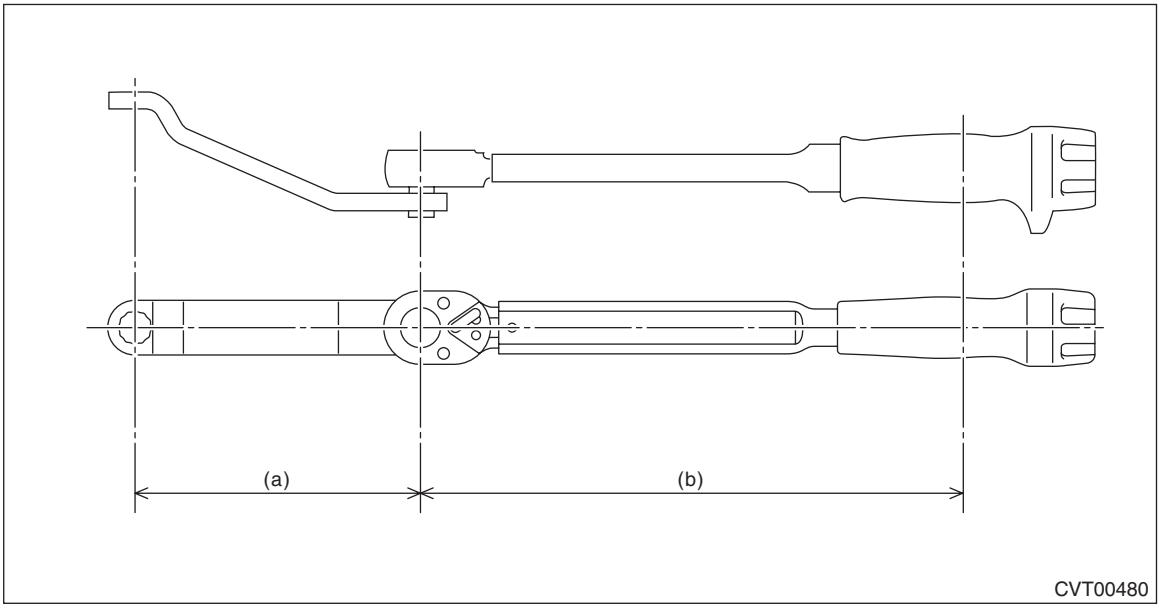
18) Lower the rear side of transmission until the ST can be removed.

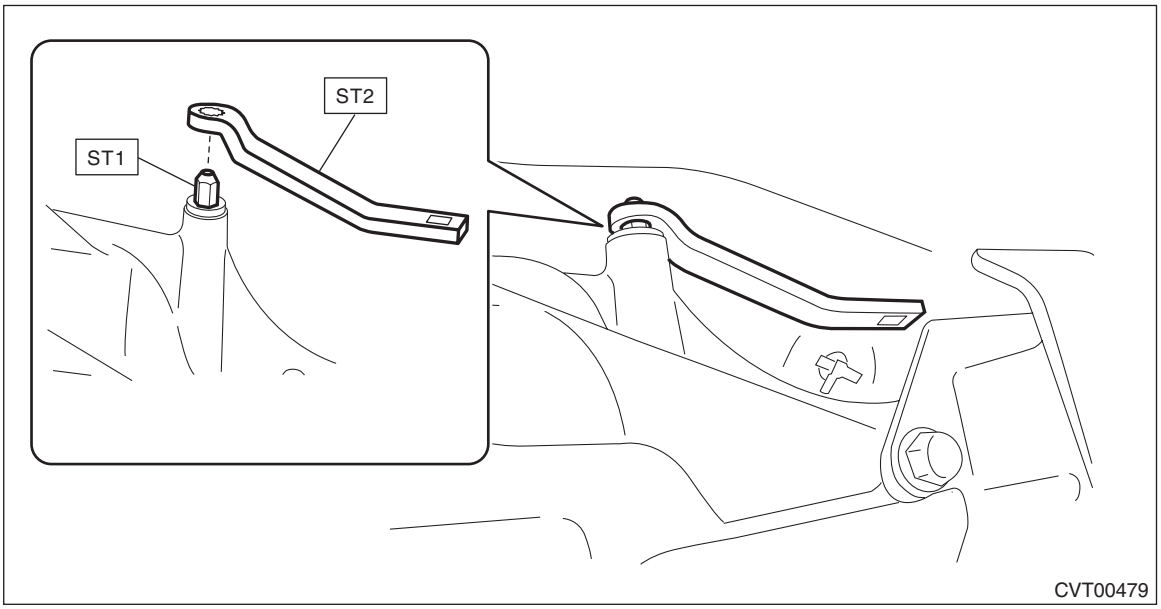
19) Install the test plug using ST1 and ST2.

NOTE:
- Use new O-rings.
- Apply CVTF to the O-ring.
- Tighten the test plug while directly aligning ST2 and torque wrench.

ST1 18270AA040 SOCKET
ST2 73099SG000 SPECIAL TOOL CONDENSER
Using the following formula, calculate the tightening torque for a torque wrench.
T2 = L2/(L1 + L2) × T1
T1: 25 N·m (2.5 kgf-m, 18.4 ft-lb)
L1: ST2 length 0.1 m (3.94 in) (a)
L2: Torque wrench length (b) m (in)

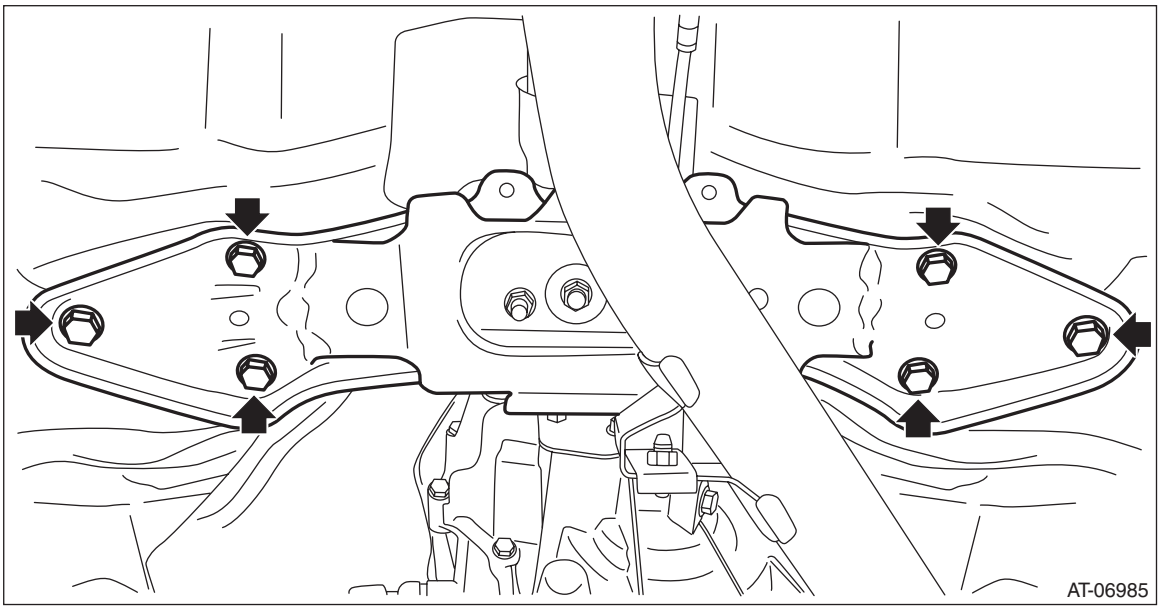
[Required torque setting]
T2: Tightening torque: N·m (kgf-m, ft-lb)





20) Raise the transmission, and install the rear crossmember.

Tightening torque:
70 N·m (7.1 kgf-m, 51.6 ft-lb)



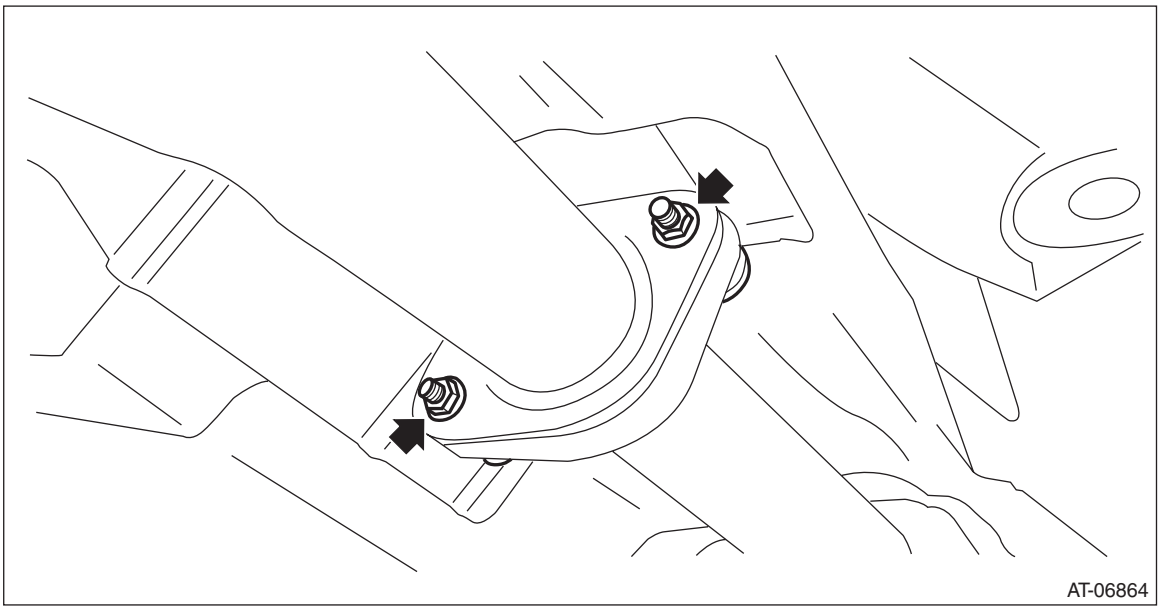
21) Install the center exhaust cover.

Tightening torque:
18 N·m (1.8 kgf-m, 13.3 ft-lb)

22) Install the rear exhaust pipe to center exhaust pipe.

NOTE:
Use a new gasket.

Tightening torque:
18 N·m (1.8 kgf-m, 13.3 ft-lb)

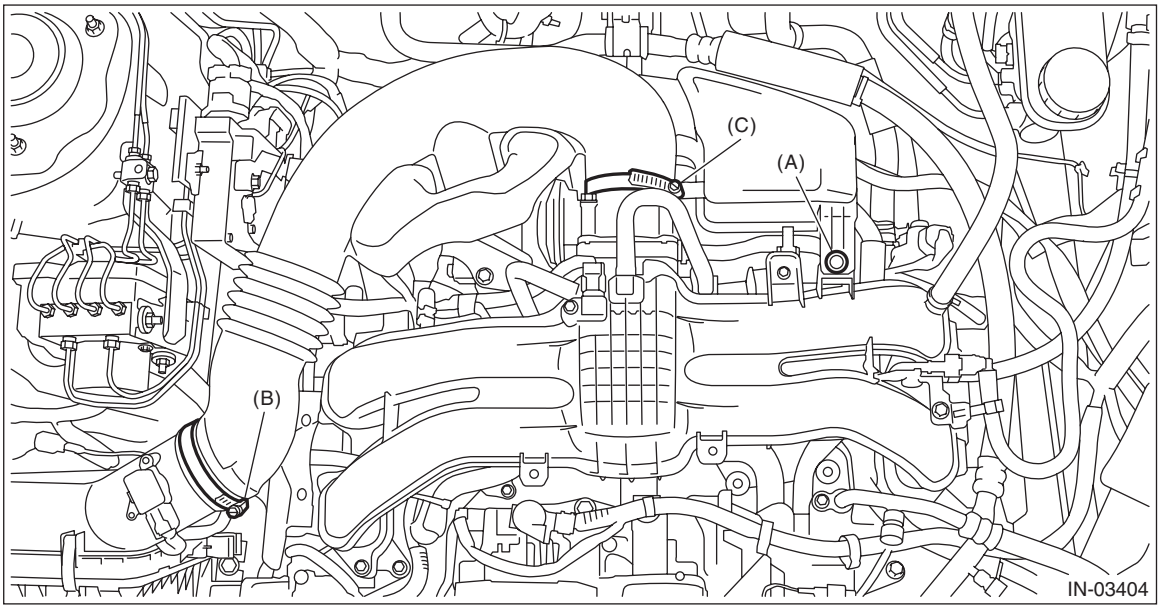


23) Lower the vehicle.

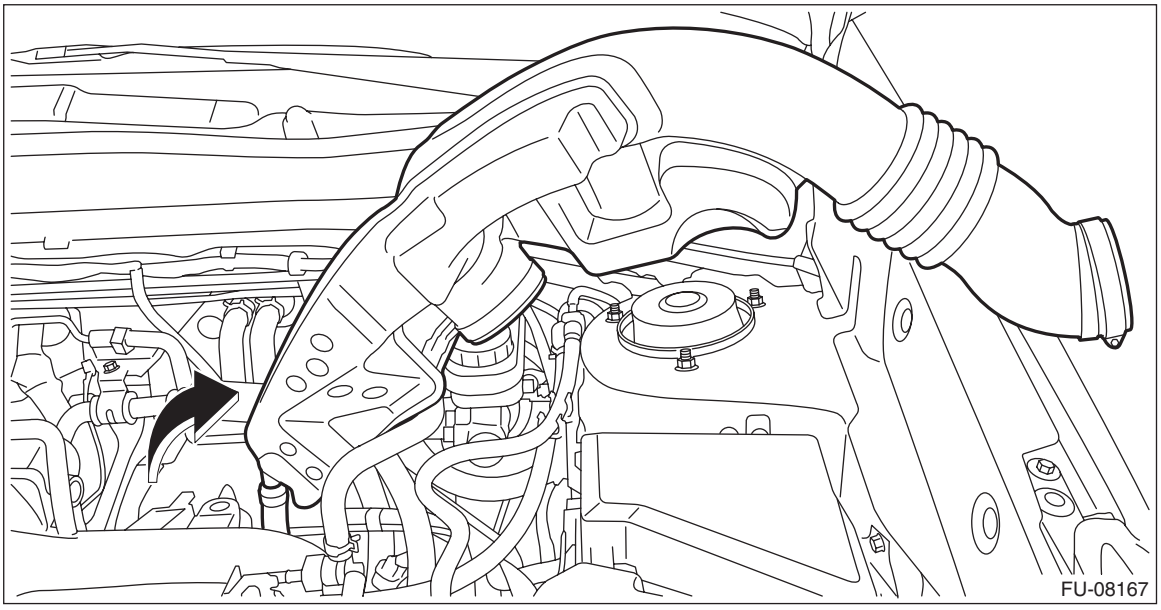
10.Automatic Transmission Assembly

A: REMOVAL

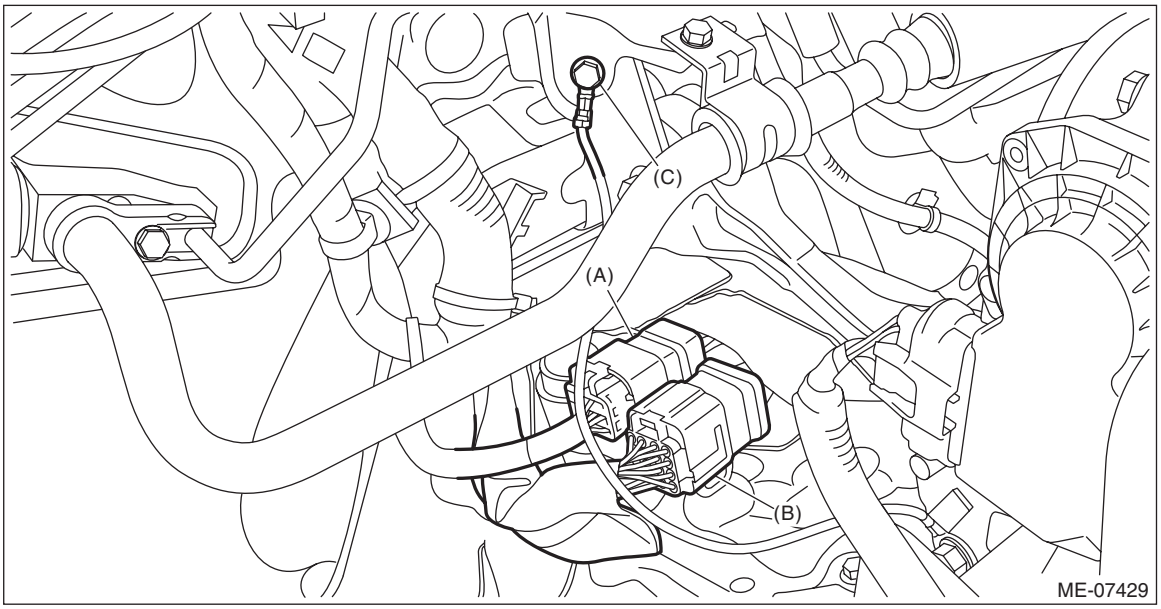
1) Disconnect the ground cable from battery.
2) Remove the clip (A) from the air intake boot.
3) Loosen the clamp (B) connecting the air intake boot and air cleaner case (rear).
4) Loosen the clamp (C) which connects the air intake boot and throttle body.



5) Remove the air intake boot from the throttle body, and move it to the left side wheel apron.

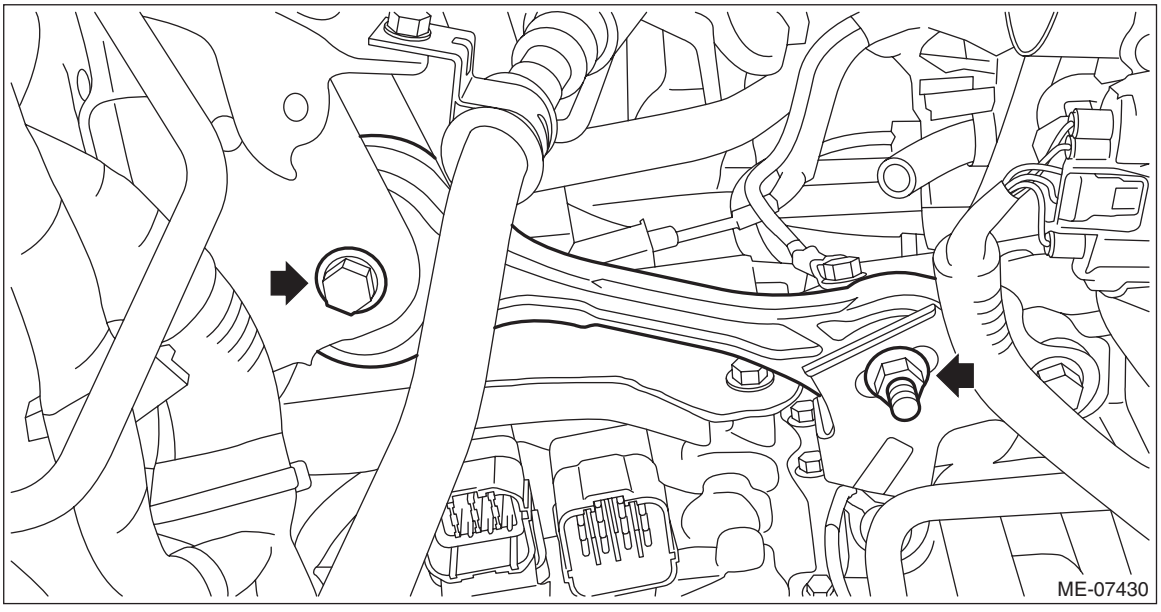


6) Disconnect the following connectors.
- Transmission harness connectors
- Inhibitor harness connector
- Transmission radio ground terminal

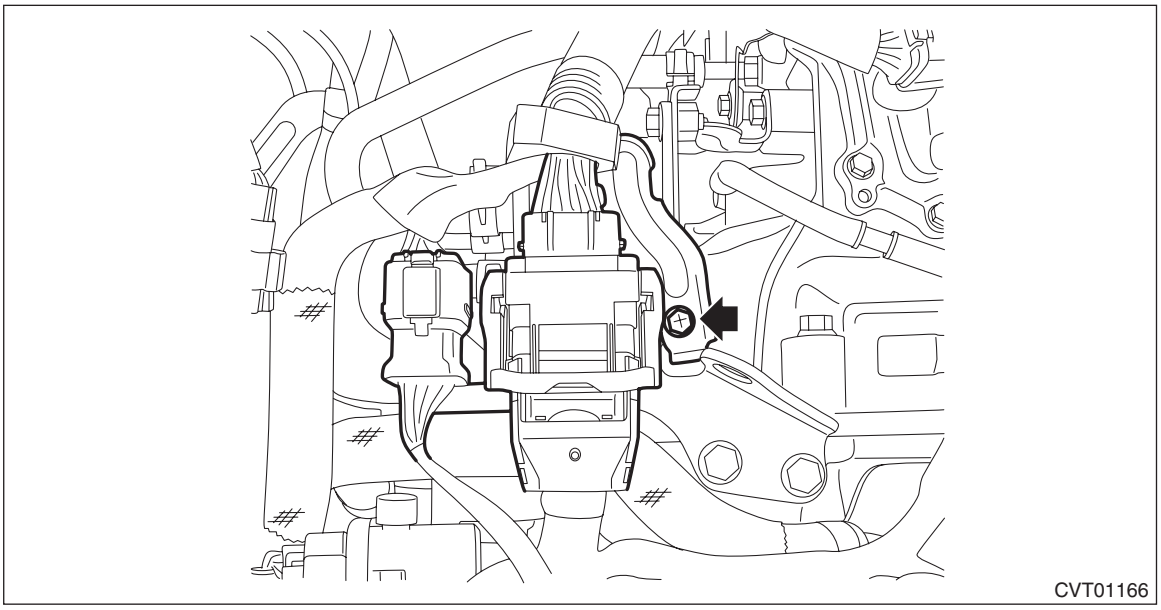


(A) Transmission harness connectors
(B) Inhibitor harness connector
(C) Transmission radio ground terminal

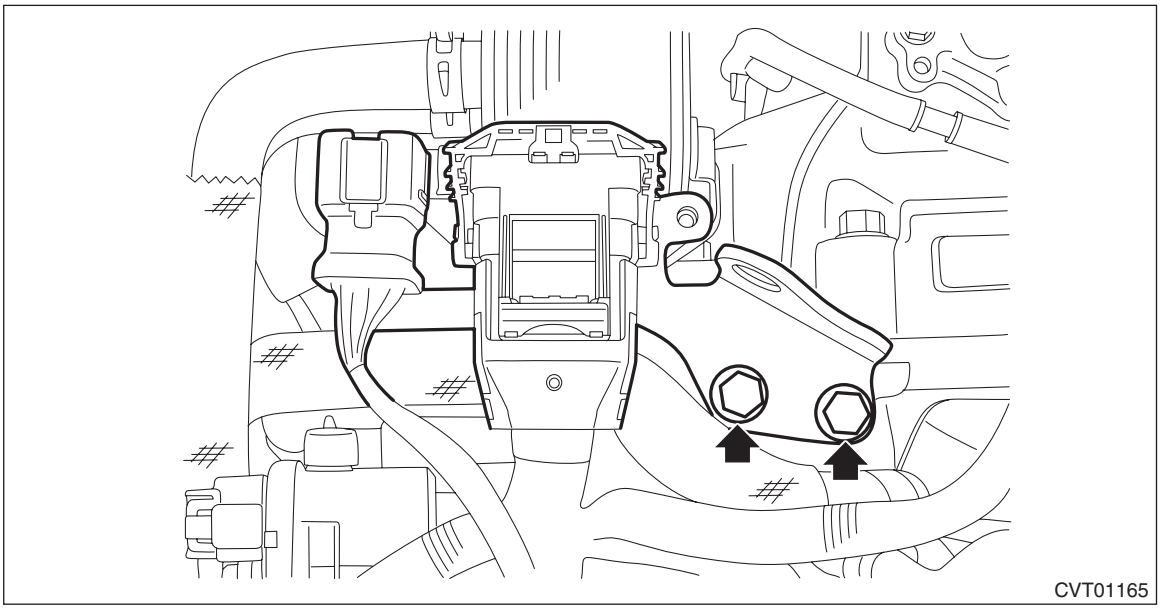
7) Remove the starter. <Ref. to SC(H4DO(w/o HEV))-8, REMOVAL, Starter.>
8) Remove the pitching stopper.



9) Remove the harness bracket, and then remove the engine harness.

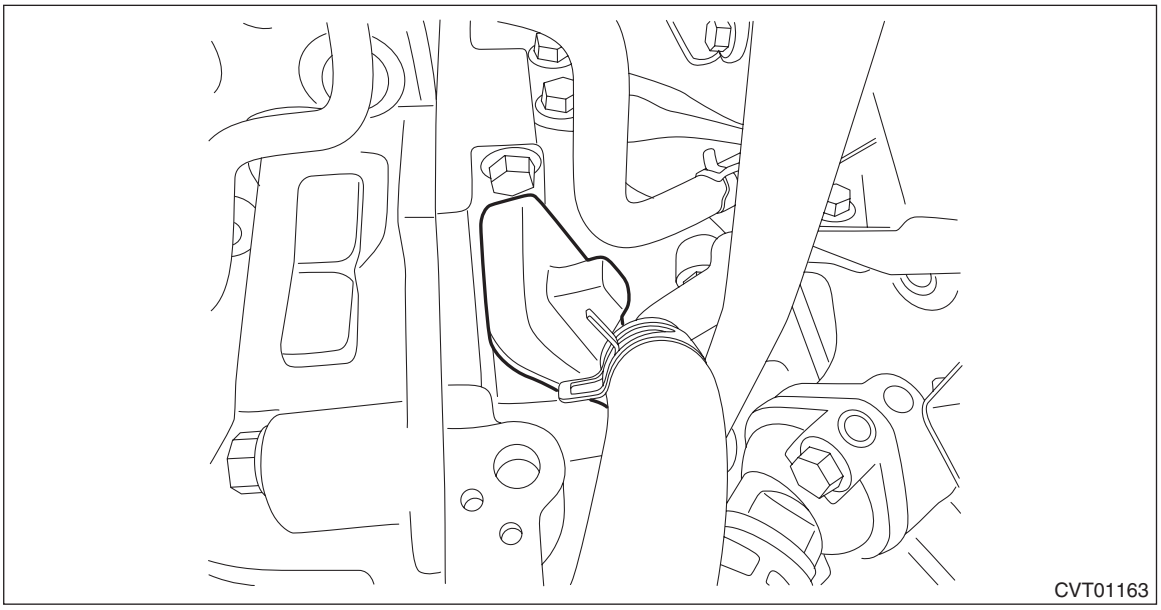


10) Disconnect the EGR control valve harness connector, throttle position sensor harness connector and manifold absolute pressure sensor harness connector.
11) Remove the engine hanger rear.



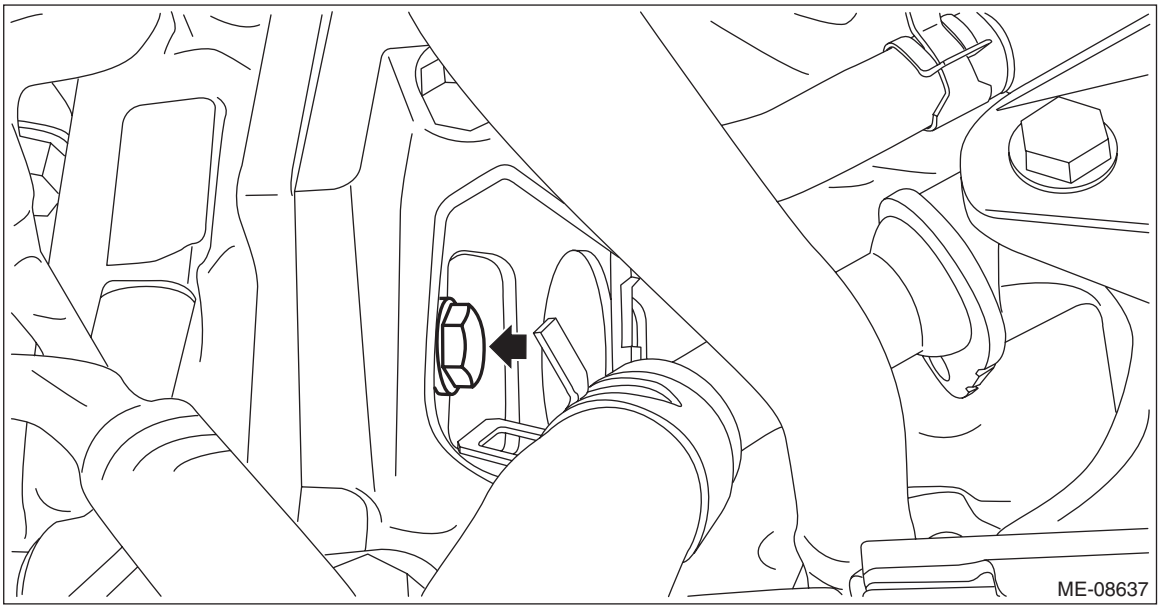
12) Remove the throttle valve body. <Ref. to FU(H4DO(w/o HEV))-14, REMOVAL, Throttle Body.>

13) Remove the service hole plug.



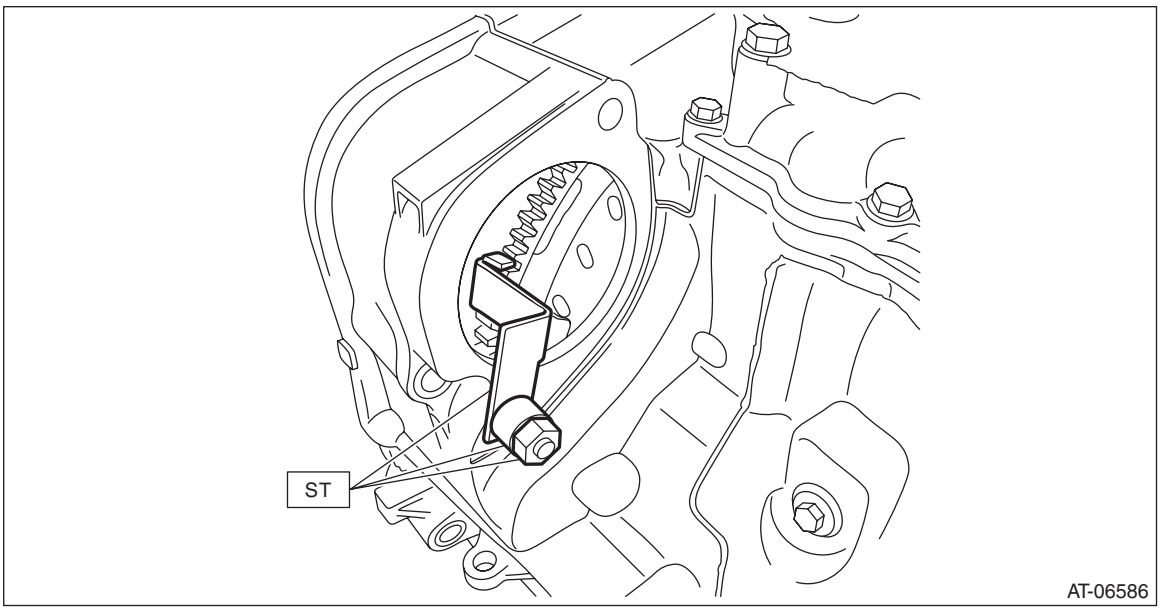
14) Remove the four bolts combining the torque converter and drive plate while rotating the crank pulley a little at a time in the same direction as engine revolution.

CAUTION:
- **Be careful not to drop bolts into the converter housing.**
- **Be careful not to damage the mounting bolts.**

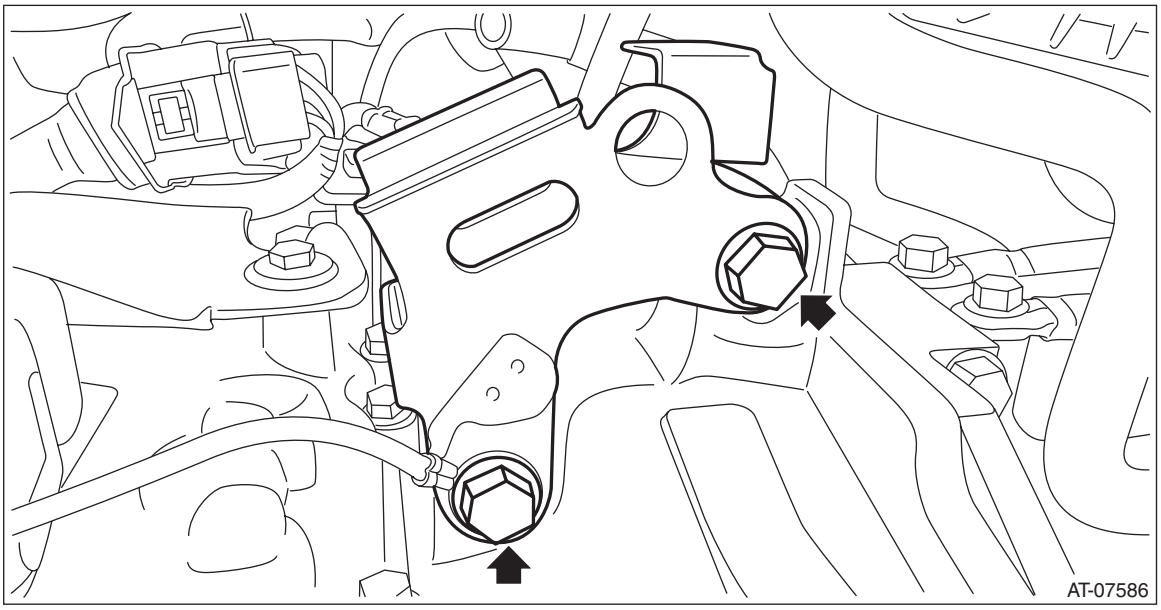


15) Make sure the torque converter moves freely by rotating with finger through the starter installation hole.

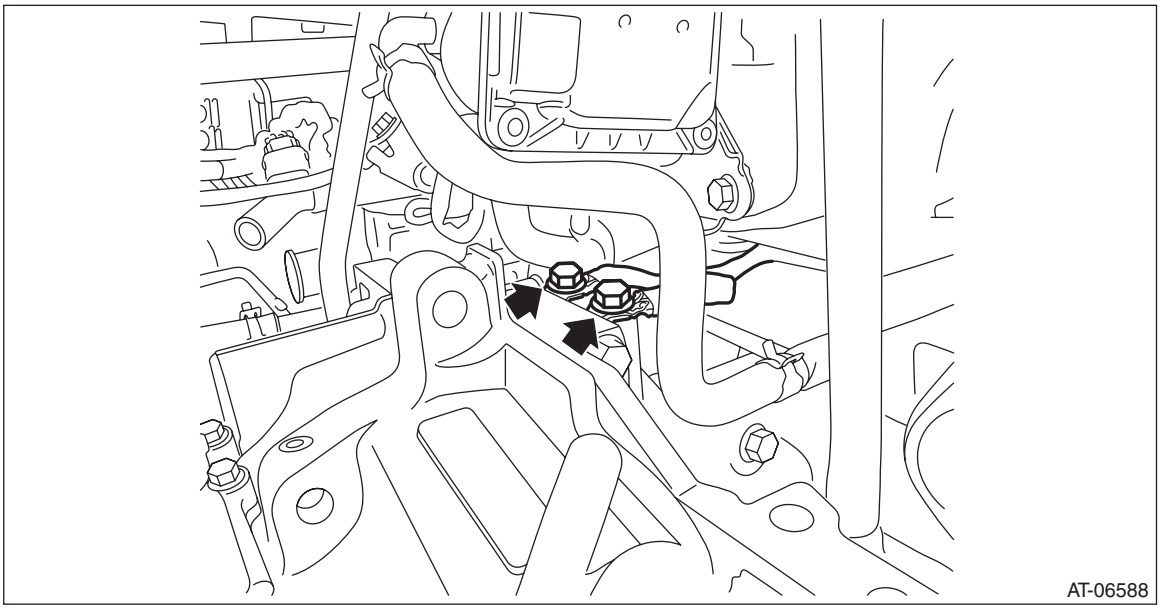
16) Attach the ST to the converter case.
ST 498277200 STOPPER SET



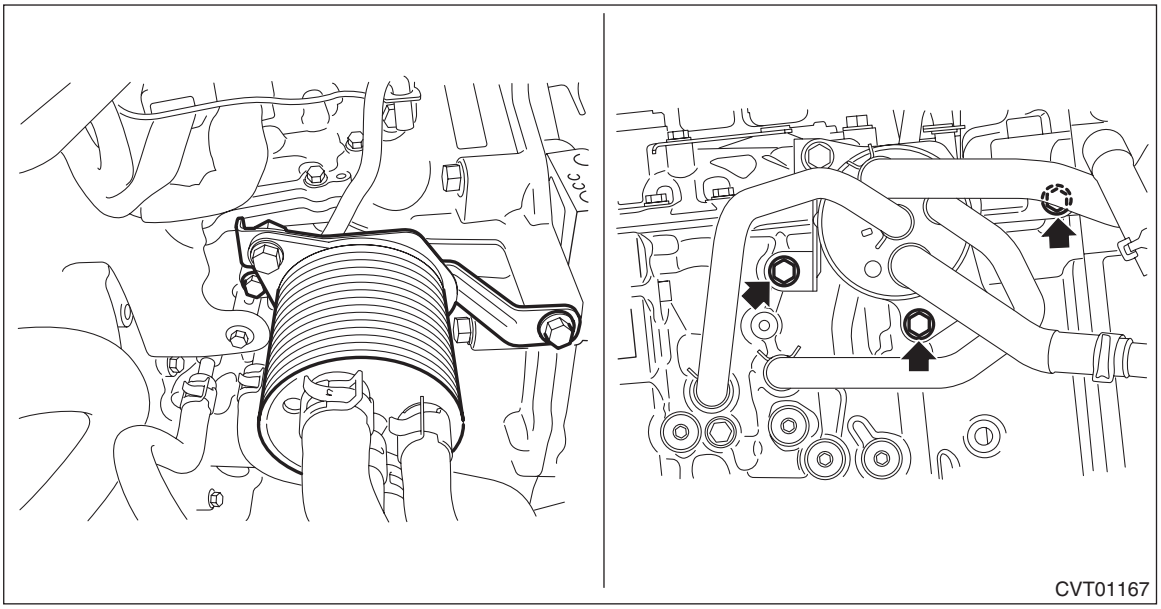
17) Remove the air breather hose from the pitching stopper bracket, and then remove the pitching stopper bracket and transmission radio ground cord.



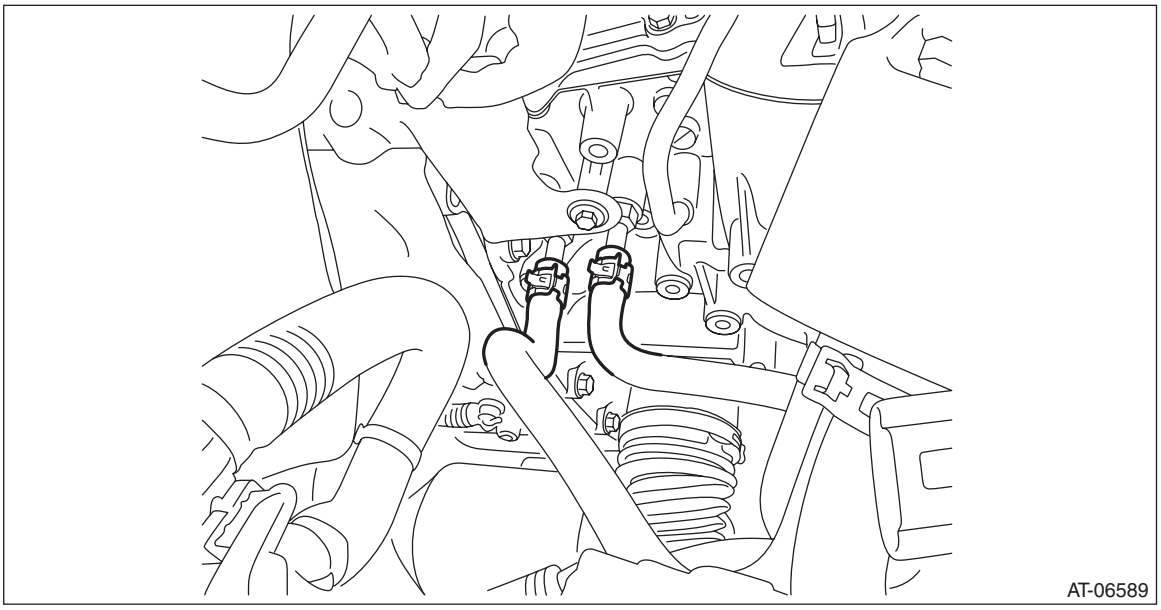
18) Remove the engine ground terminal.



19) Remove the CVTF cooler (with warmer feature) from the transmission, and using a piece of wire, affix to a location of the body where it will not interfere with the removal of the transmission.

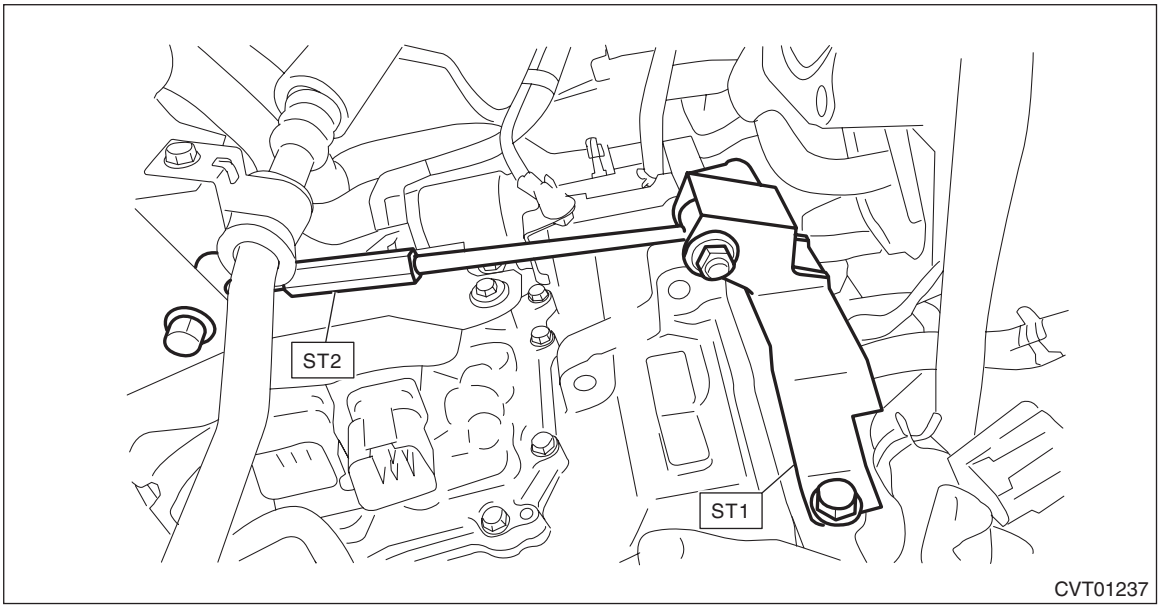


20) Remove the CVTF inlet hose and outlet hose from the pipe.

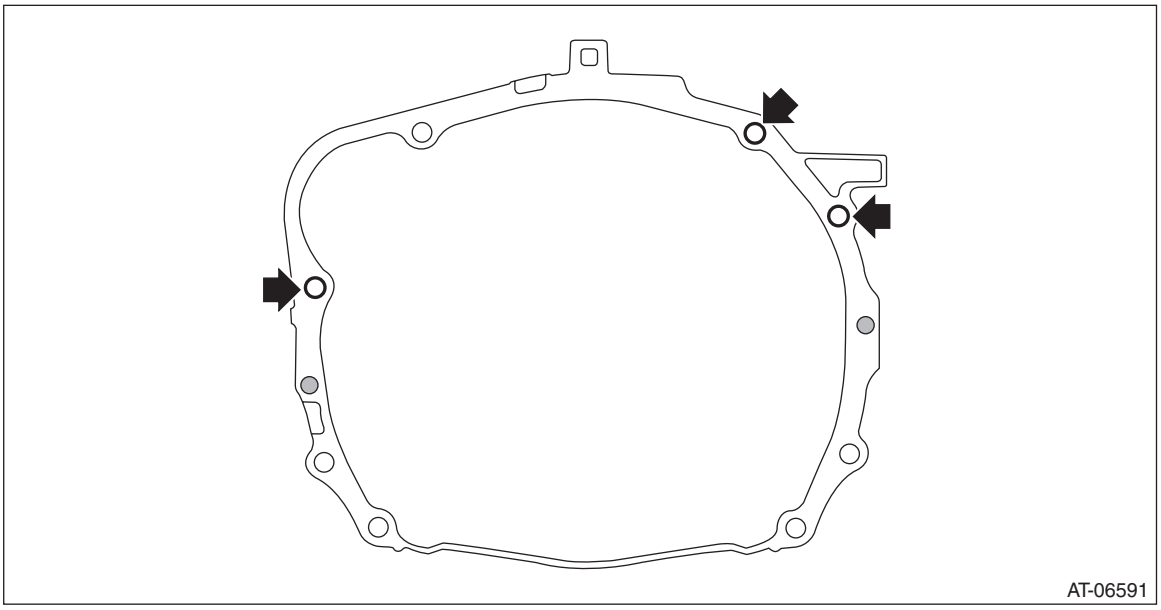


21) Set the ST.

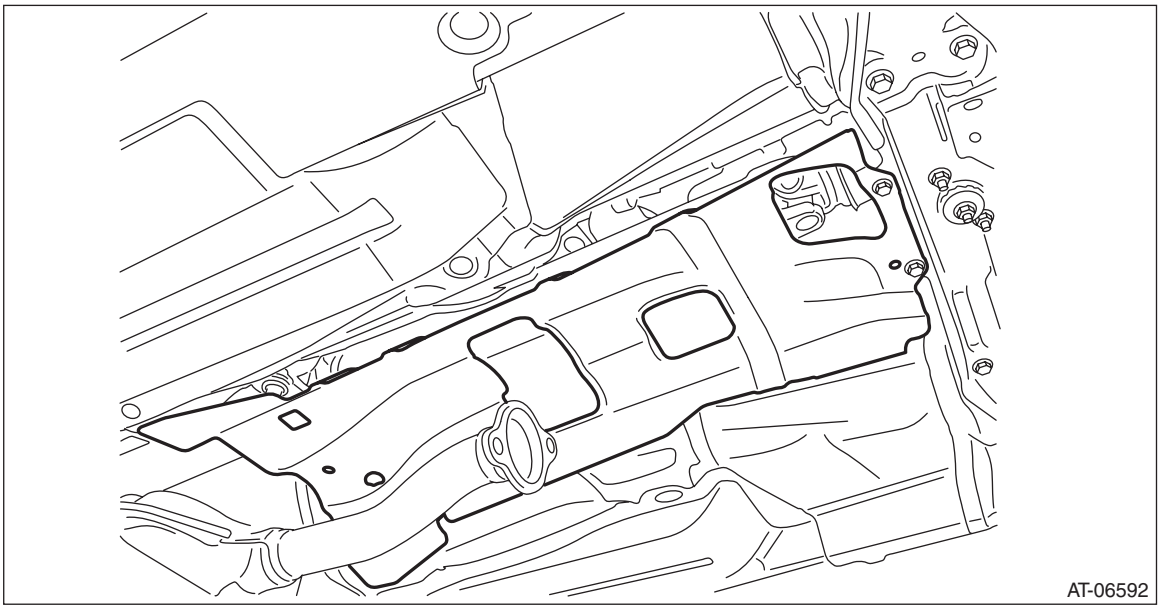
ST1 41099AA012 ENGINE SUPPORT BRACKET
ST2 41099AA020 ENGINE SUPPORT



22) Remove the three transmission connecting bolts.

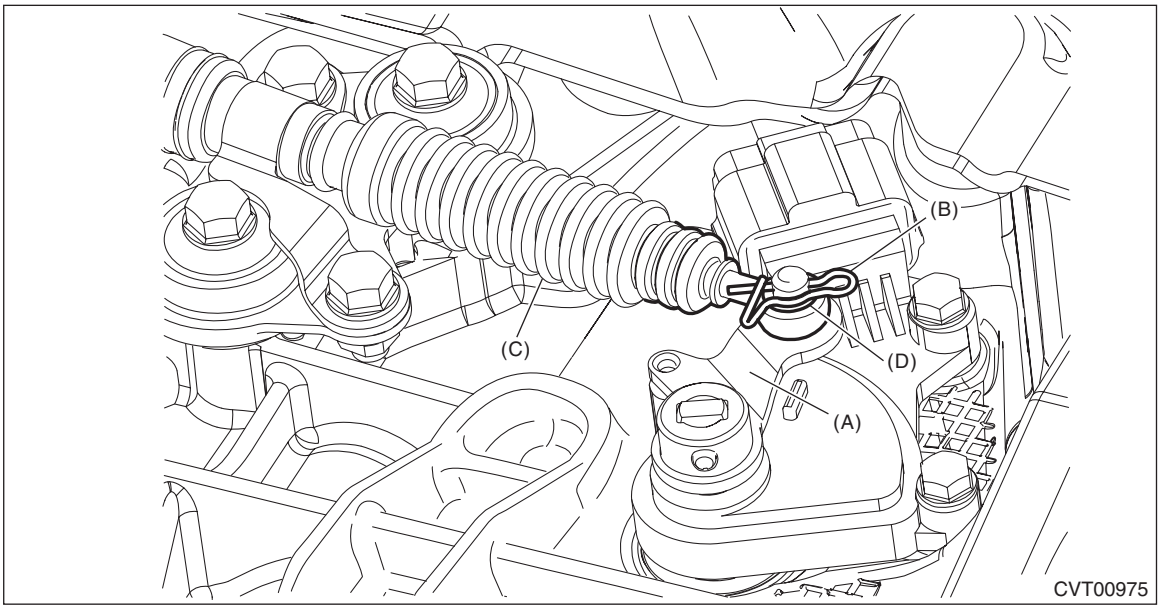


23) Lift up the vehicle.
24) Remove the front tires. <Ref. to WT-4, REMOVAL, Tire and Wheel.>
25) Remove the under cover.
26) Remove the center exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-18, REMOVAL, Rear Exhaust Pipe.>
27) Remove the center exhaust cover.



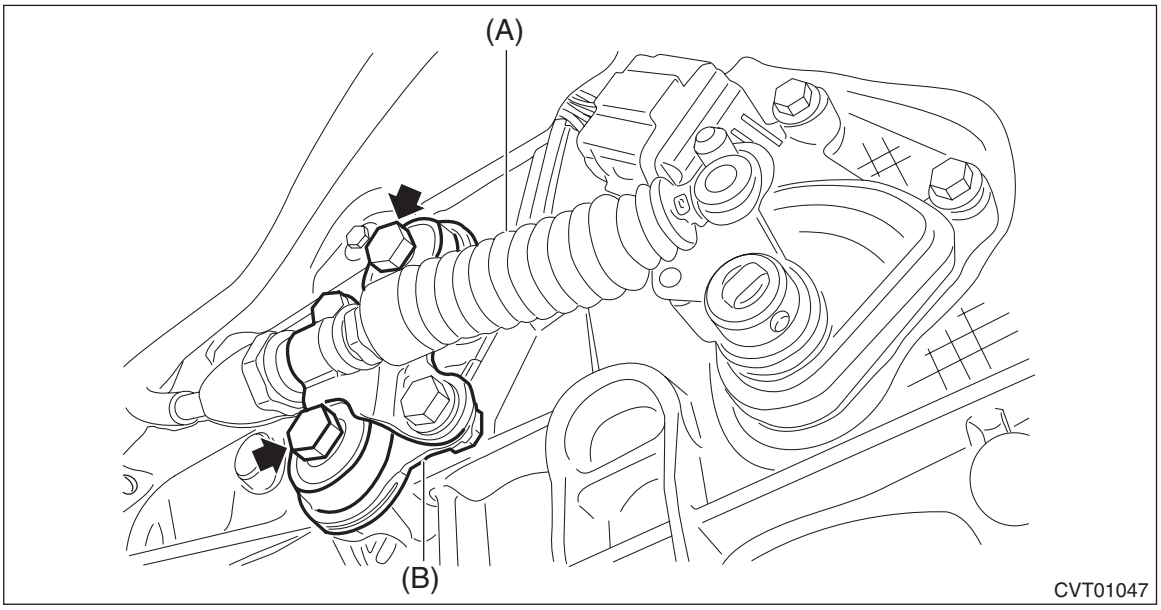
28) Remove the CVTF drain plug to drain CVTF. <Ref. to CVT(TR580)-38, REPLACEMENT, CVTF.>
29) Drain differential gear oil. <Ref. to CVT(TR580)-43, REPLACEMENT, Differential Gear Oil.>

30) Remove the snap pin and washer from shifter arm and remove the select cable from shifter arm.



(A) Shifter arm
(B) Snap pin
(C) Select cable
(D) Washer

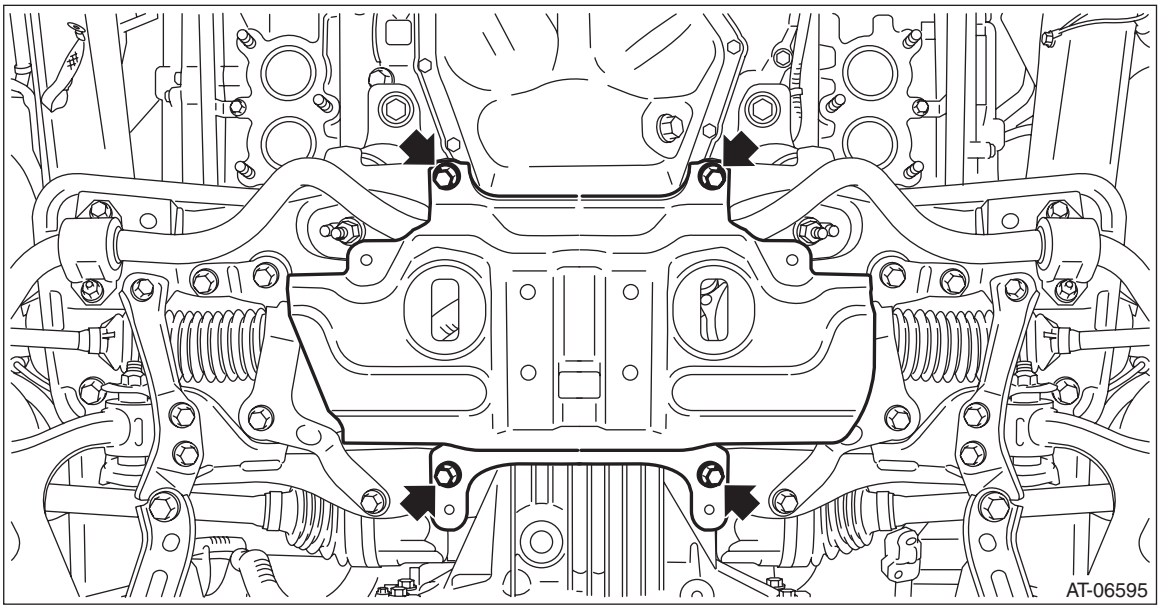
31) Remove the plate assembly from the transmission case.



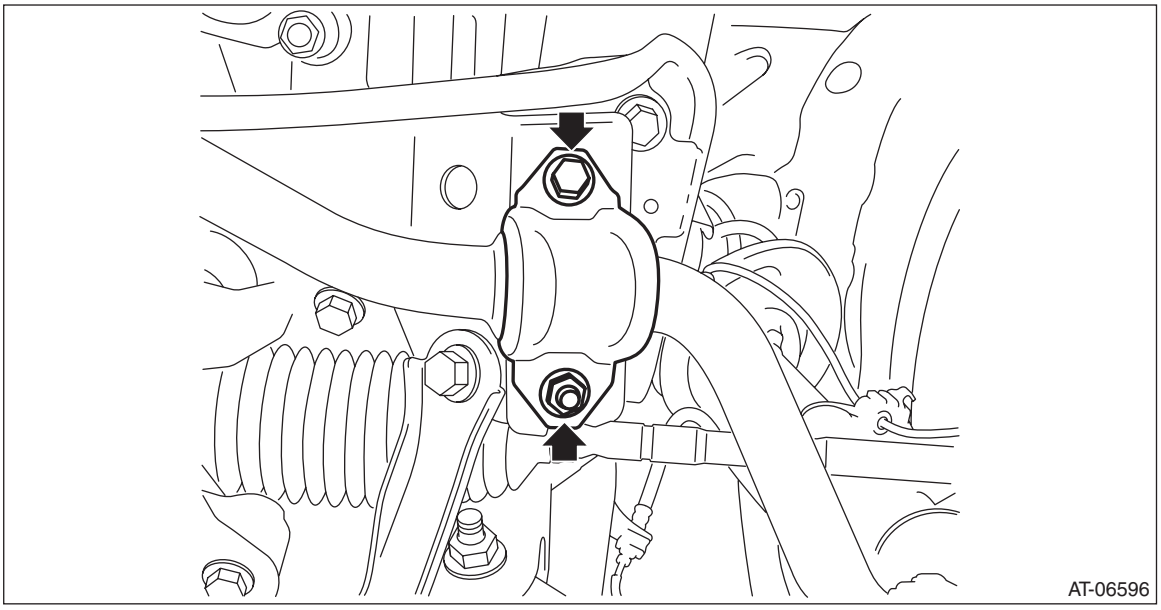
(A) Select cable
(B) Plate ASSY

32) Remove the propeller shaft. <Ref. to DS-12, REMOVAL, Propeller Shaft.>

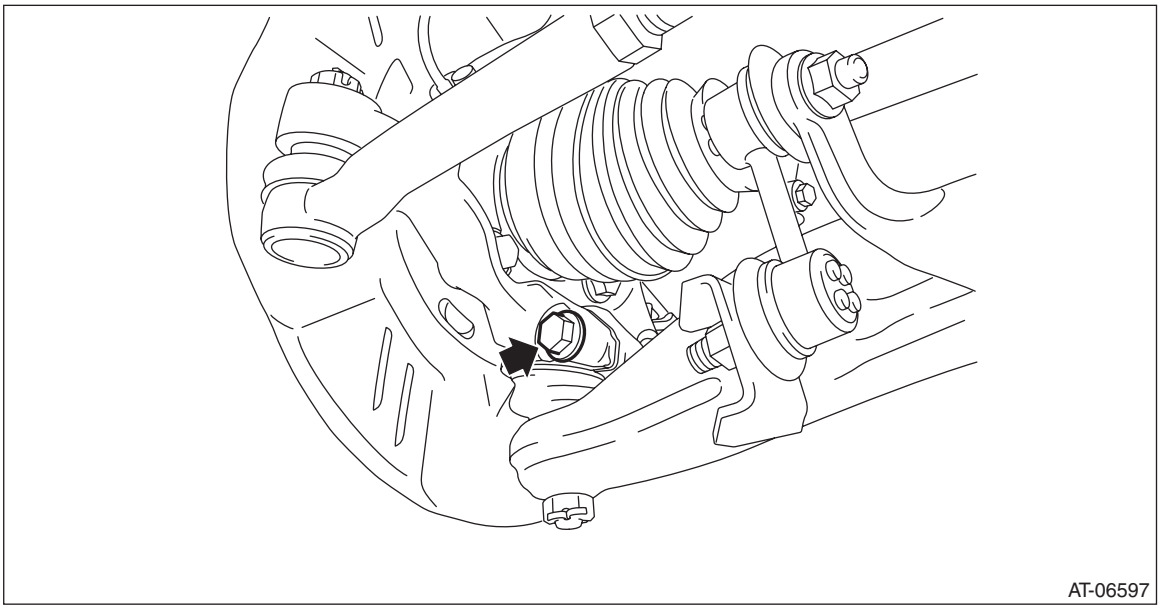
33) Remove the jack-up plate.



34) Remove the stabilizer bracket.



35) Remove the bolts which secure to the front housing, and separate the front arm and housing.



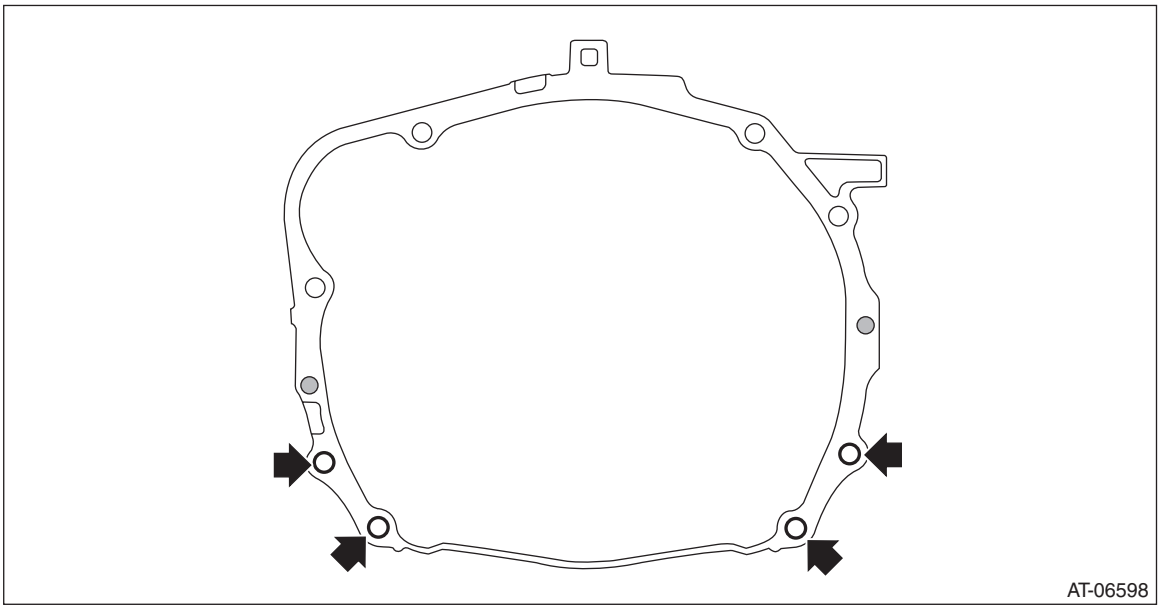
36) Using a tire lever or a crow bar, etc., pull out until the front drive shaft transmission side joint slides move smoothly.

NOTE:
Place cloth between the tire lever or bar and the transmission in order to avoid damaging the transmission side retainer.

37) Hold the transmission side joint of the front drive shaft by hand and extract the housing from the transmission while pressing the housing outward, so as not to stretch the boot.

NOTE:
- Before pulling RH front drive shaft from transmission, turn the steering wheel to left hand full lock.
- Before pulling LH front drive shaft from transmission, turn the steering wheel to right hand full lock.

38) Remove the two transmission connecting bolts and two nuts (lower side).

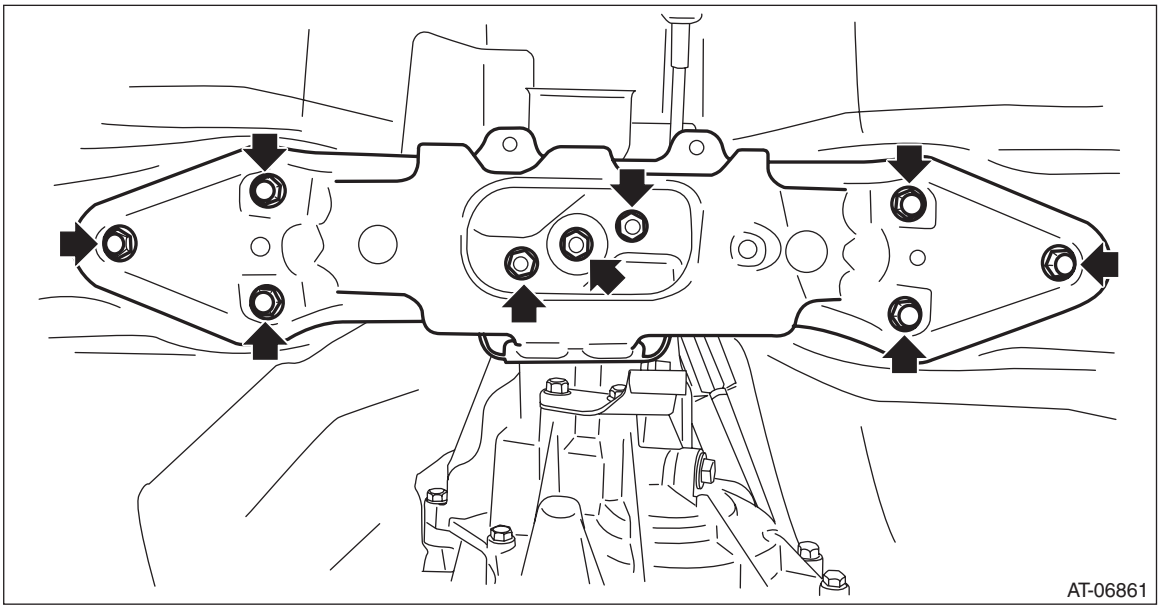


39) Set the transmission jack under the transmission.

NOTE:
Make sure that the support plates of transmission jack do not touch the oil pan.

40) Remove the hanger bracket.

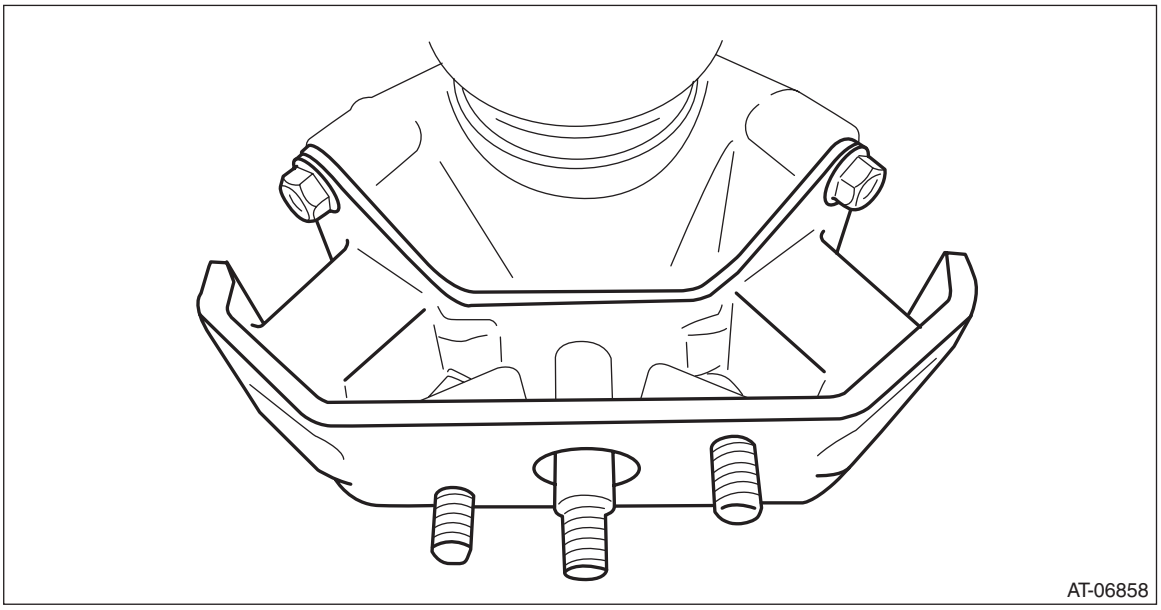
41) Remove the transmission rear crossmember from the vehicle.



42) While lowering the transmission jack gradually, fully retract the engine support, and then tilt the engine rearward.
43) Remove the transmission assembly.

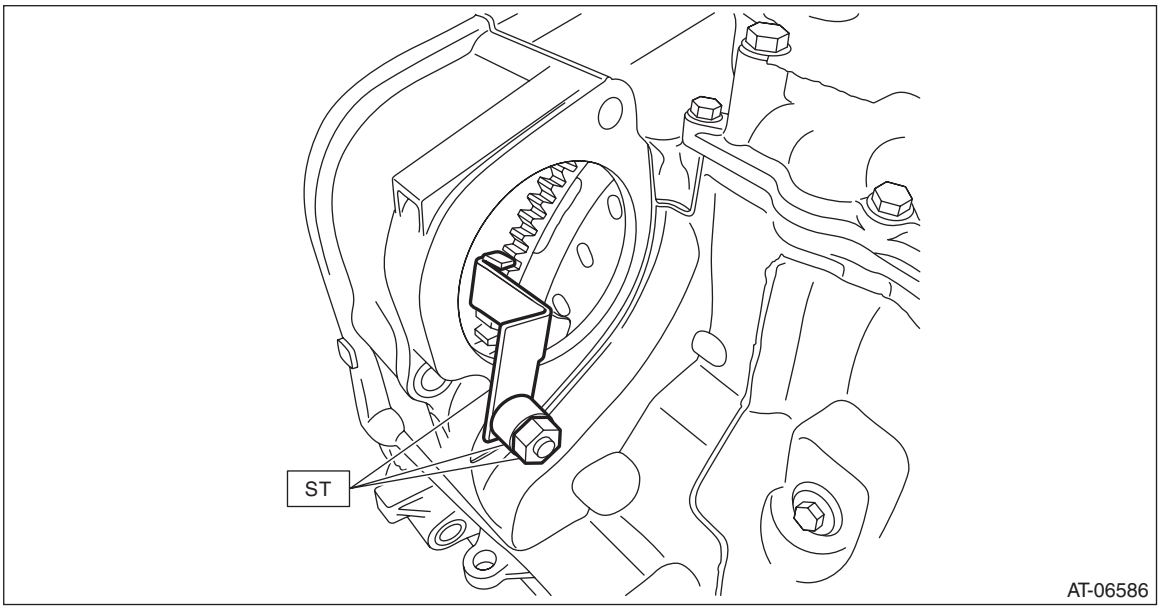
NOTE:
Remove it while moving the transmission jack up and down so that the engine and transmission remain directly aligned.

44) Remove the rear cushion rubber.



B: INSTALLATION

1) Attach the ST to converter case.
ST 498277200 STOPPER SET

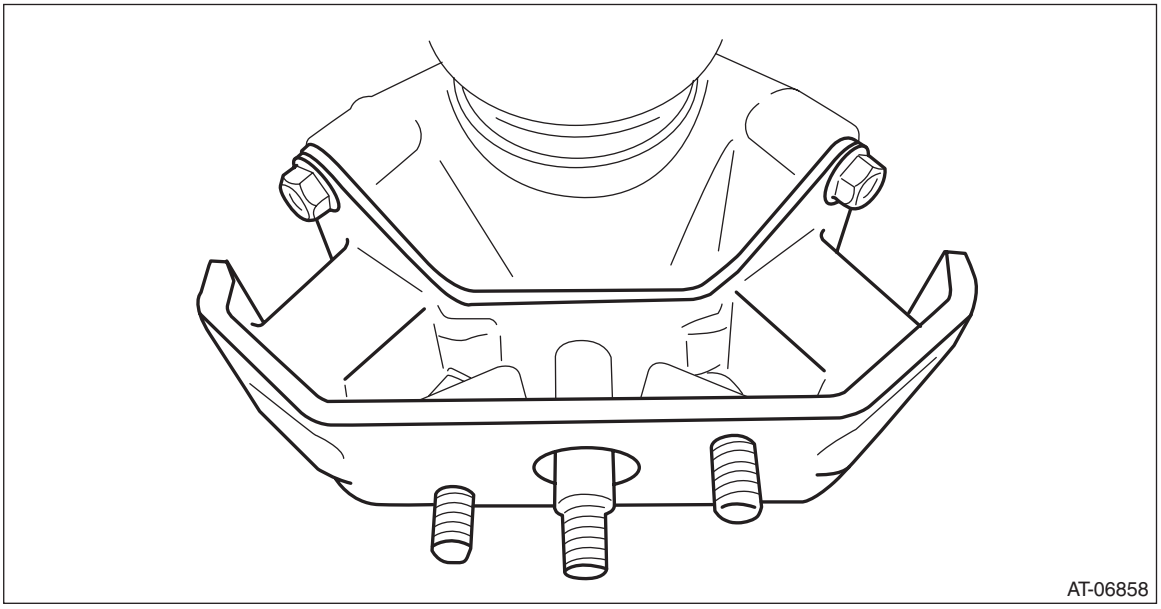


2) When completely overhauling the transmission, refill CVTF through the transmission right side plug. <Ref. to CVT(TR580)-166, Preparation for Overhaul.>
3) Replace the front differential side retainer oil seal. <Ref. to CVT(TR580)-91, REPLACEMENT, Differential Side Retainer Oil Seal.>

NOTE:
- Be sure to replace the differential side retainer oil seal with a new part whenever the front drive shaft is removed from the transmission.
- When a new differential side retainer oil seal has been installed, replacement is not required.

4) Install the rear cushion rubber on the transmission.

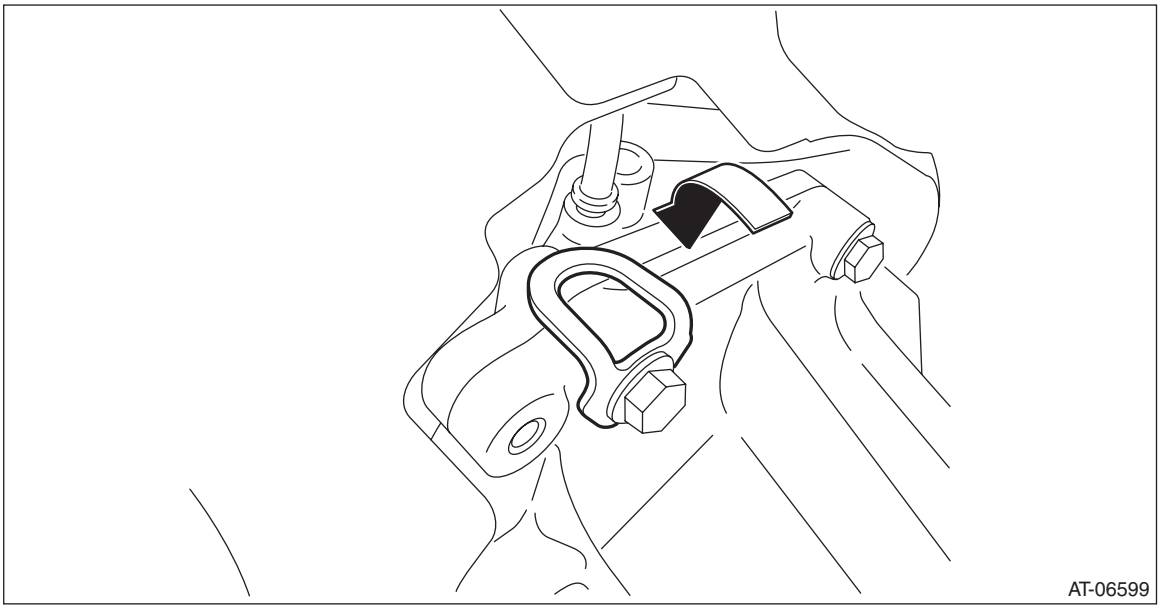
Tightening torque:
40 N·m (4.1 kgf-m, 29.5 ft-lb)



5) Mount the transmission onto the transmission jack.

6) Strike and bend the transmission hanger of transmission rear with a rubber hammer etc. so that it gets in contact with the transmission case.

CAUTION:
Do not apply extra overload or impact to the transmission case.

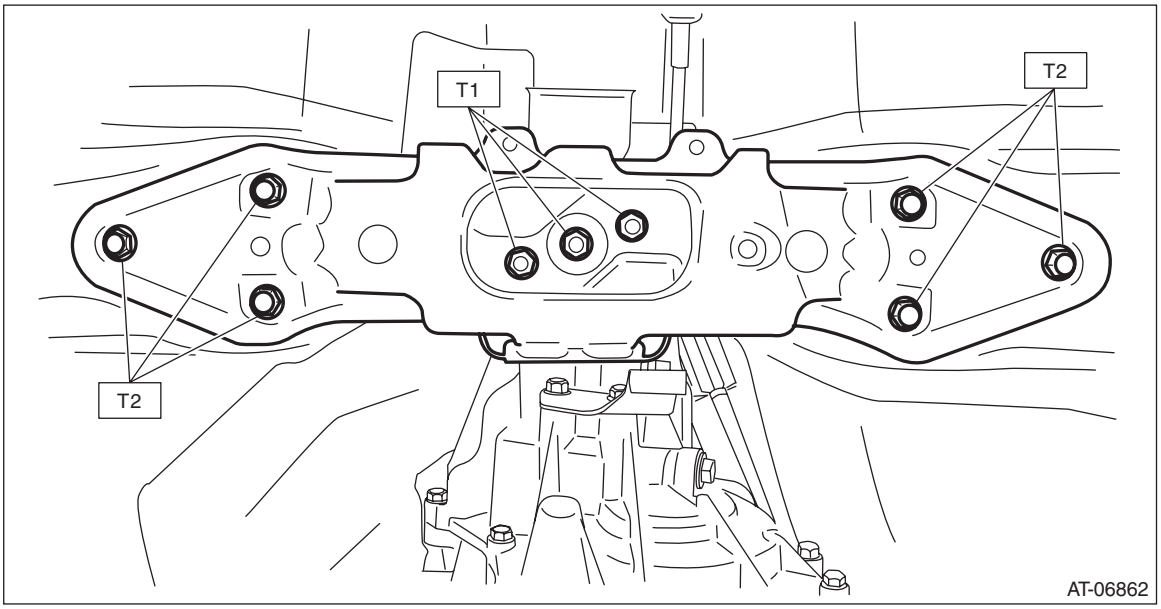


7) Remove the pitching stopper bracket, if mounted.
8) Install the transmission onto the engine.

NOTE:
- While raising the transmission jack gradually, turn the screw of engine support, then tilt the engine forward.
- Temporarily attach the two engine connecting bolts and two nuts (lower side).

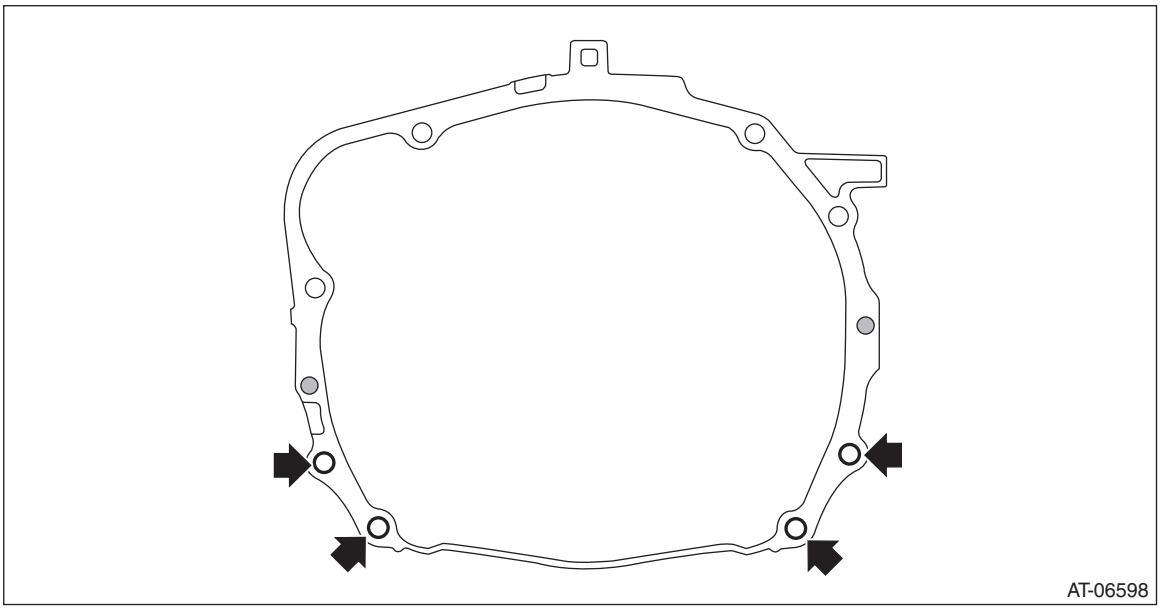
9) Install the transmission rear crossmember.

Tightening torque:
T1: 35 N·m (3.6 kgf-m, 25.8 ft-lb)
T2: 70 N·m (7.1 kgf-m, 51.6 ft-lb)



10) Tighten the two engine connecting bolts and two nuts (lower side).

Tightening torque:
50 N·m (5.1 kgf-m, 36.9 ft-lb)

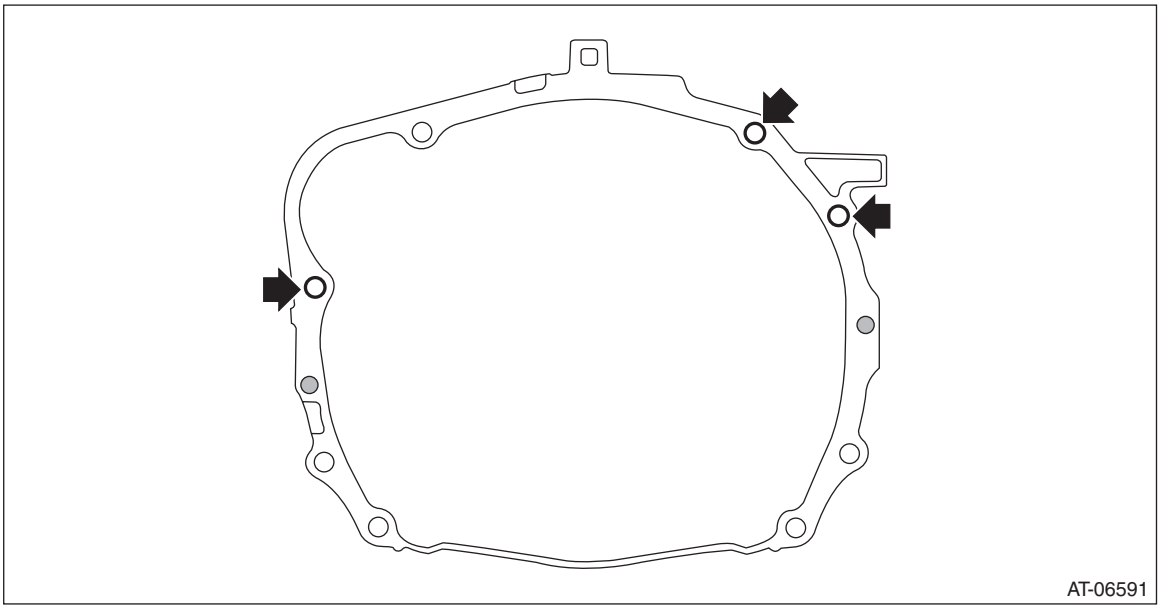


11) Tighten the hanger bracket.

Tightening torque:
23 N·m (2.3 kgf-m, 17.0 ft-lb)

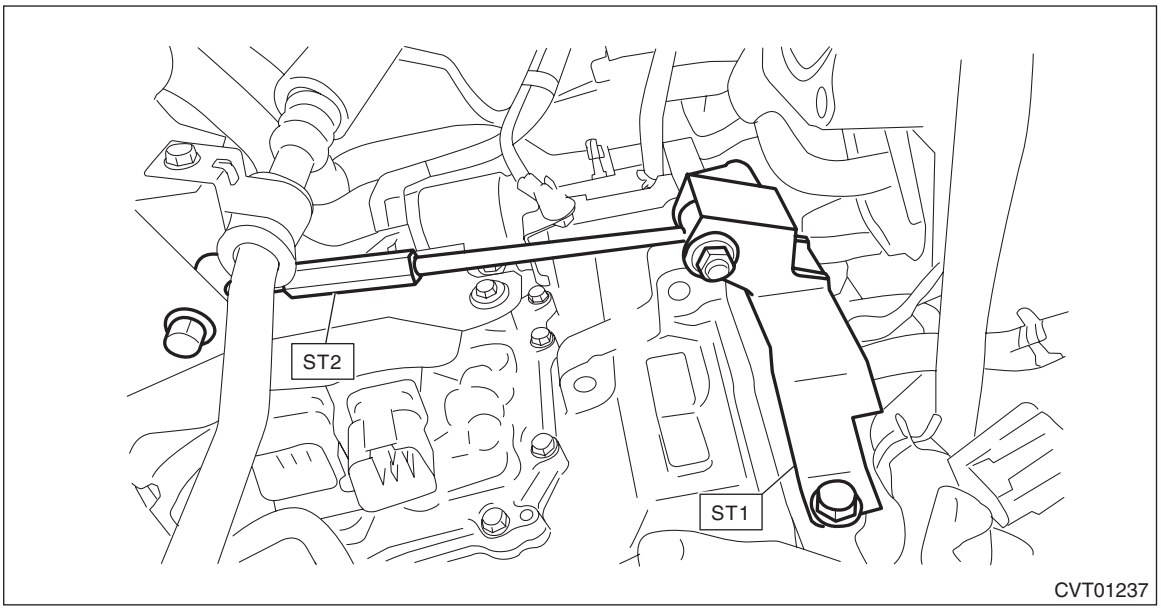
12) Remove the transmission jack.
13) Lower the vehicle.
14) Install the three engine mounting bolts (upper side).

Tightening torque:
50 N·m (5.1 kgf-m, 36.9 ft-lb)



15) Remove the ST (STOPPER SET) from converter case.

16) Remove the ST (ENGINE SUPPORT BRACKET and ENGINE SUPPORT).
ST1 41099AA012 ENGINE SUPPORT BRACKET
ST2 41099AA020 ENGINE SUPPORT



17) Match the torque converter screw hole with drive plate hole to install the bolt.

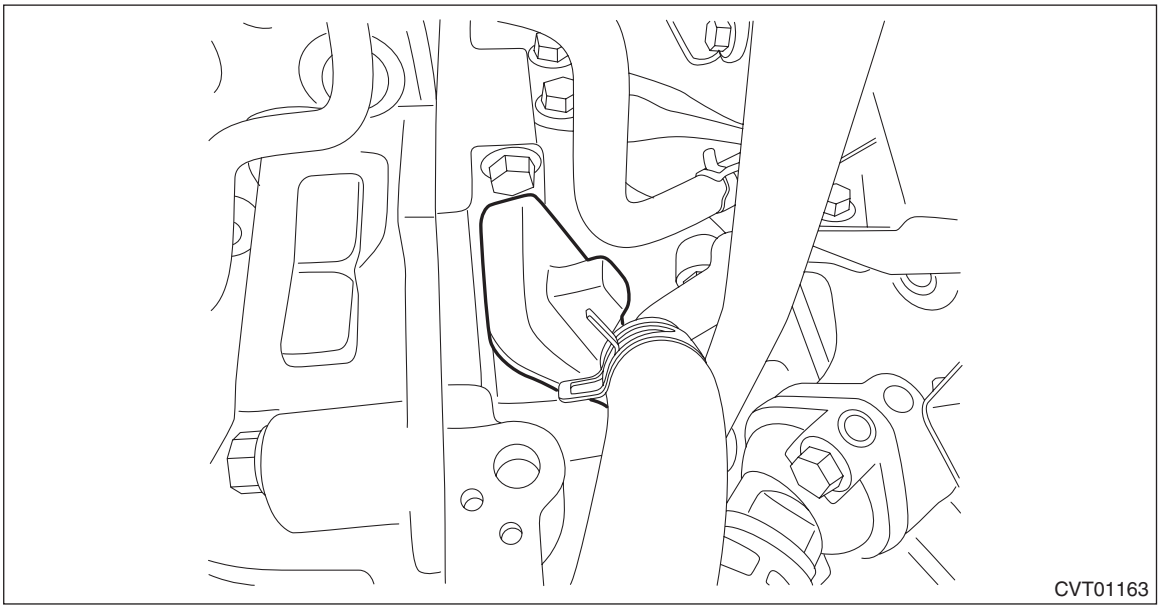
CAUTION:
- **Do not drop the mounting bolt in the converter housing.**
- **Do not damage the mounting bolt.**

Tightening torque:
25 N·m (2.5 kgf-m, 18.4 ft-lb)

18) Install the remaining three bolts by rotating the crank pulley a little at a time in the same direction as engine revolution.

Tightening torque:
25 N·m (2.5 kgf-m, 18.4 ft-lb)

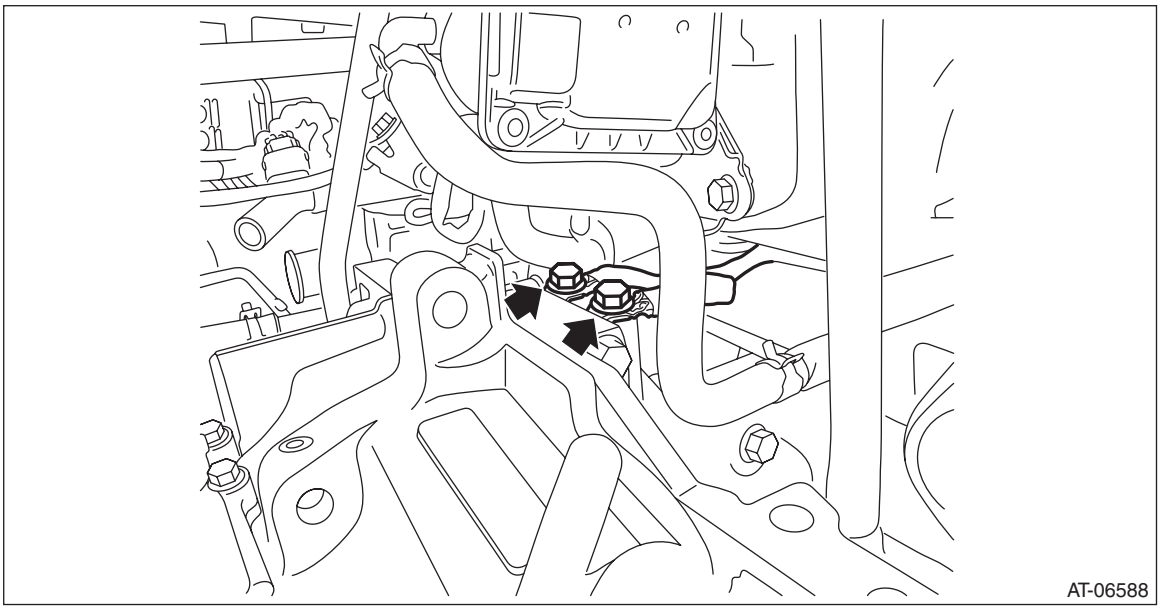
19) Install the service hole plug.



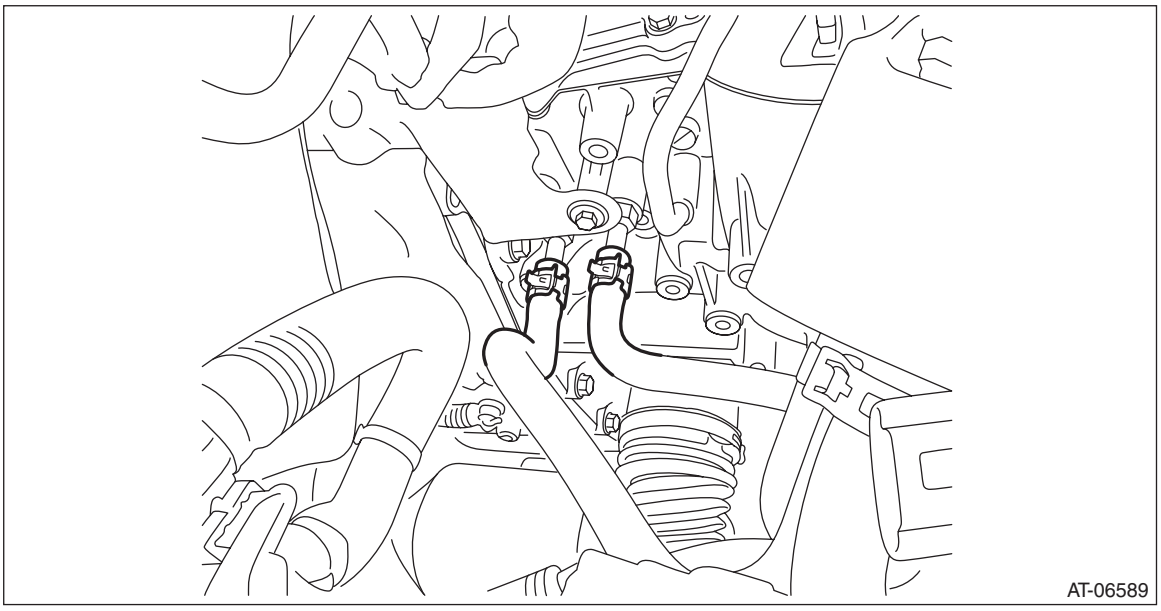
20) Install the throttle valve body. <Ref. to FU(H4DO(w/o HEV))-16, INSTALLATION, Throttle Body.>

21) Install the engine ground terminals.

Tightening torque:
19 N·m (1.9 kgf-m, 14.0 ft-lb)

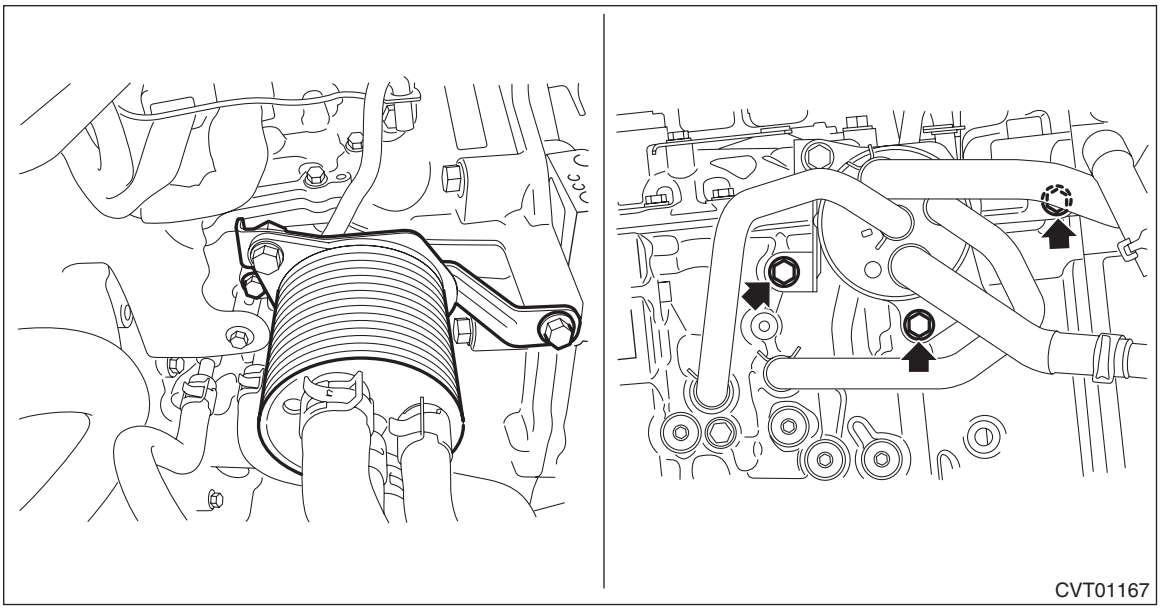


22) Replace the CVTF inlet hose and CVTF outlet hose. <Ref. to CVT(TR580)-155, DISASSEMBLY, CVTF Cooler (With Warmer Function).> <Ref. to CVT(TR580)-156, ASSEMBLY, CVTF Cooler (With Warmer Function).>
23) Install the CVTF inlet hose and CVTF outlet hose to transmission.



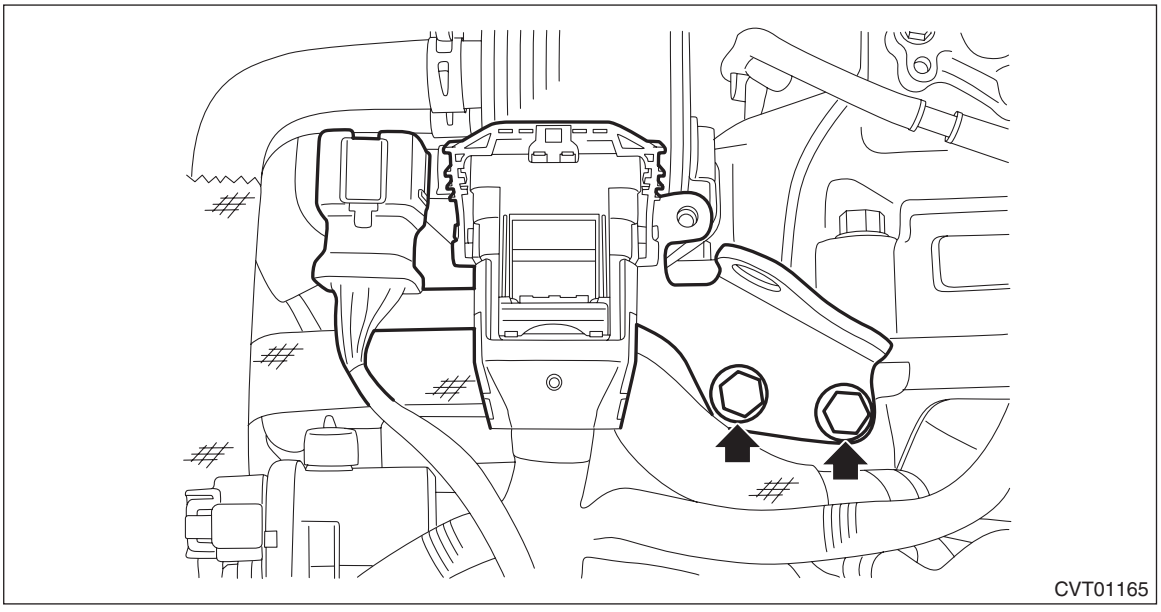
24) Install the CVTF cooler (with warmer feature) to the transmission.

Tightening torque:
23 N·m (2.3 kgf-m, 17.0 ft-lb)



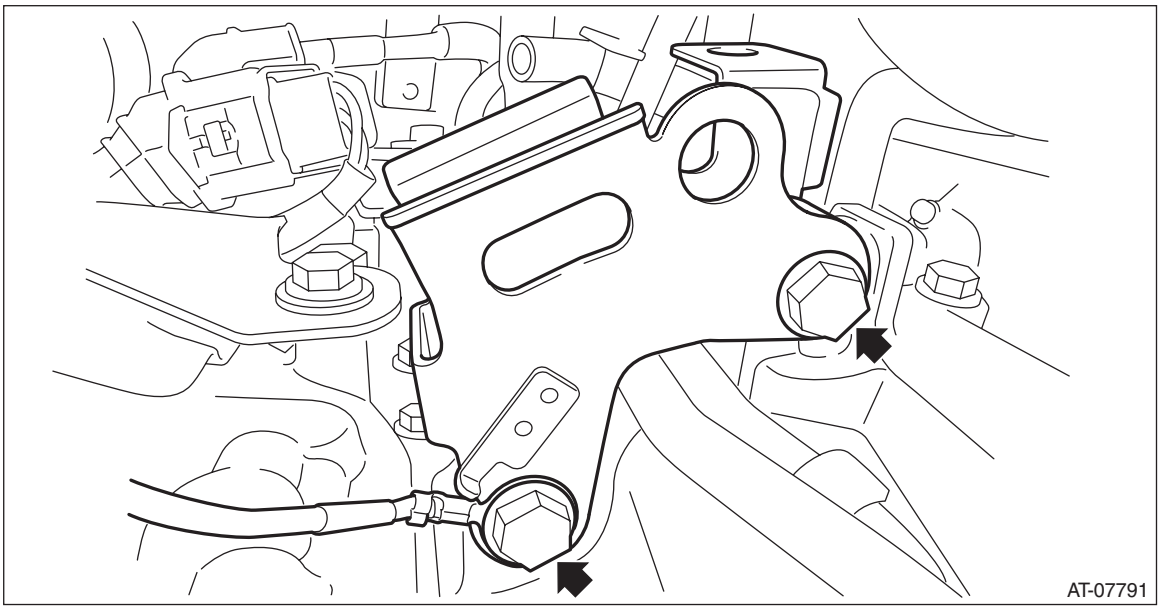
25) Install the starter. <Ref. to SC(H4DO(w/o HEV))-10, INSTALLATION, Starter.>
26) Install the engine hanger rear.

Tightening torque:
21 N·m (2.1 kgf-m, 15.5 ft-lb)



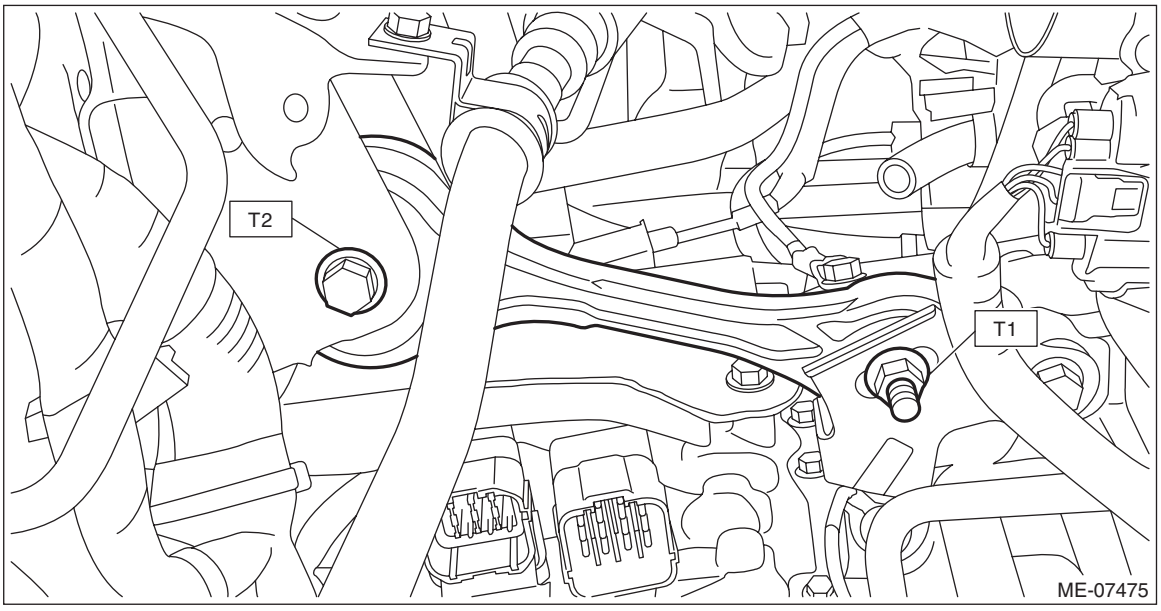
27) Install the pitching stopper bracket and transmission radio ground cord.

Tightening torque:
41 N·m (4.2 kgf-m, 30.2 ft-lb)



28) Install the air breather hose to the pitching stopper bracket.
29) Install the pitching stopper.

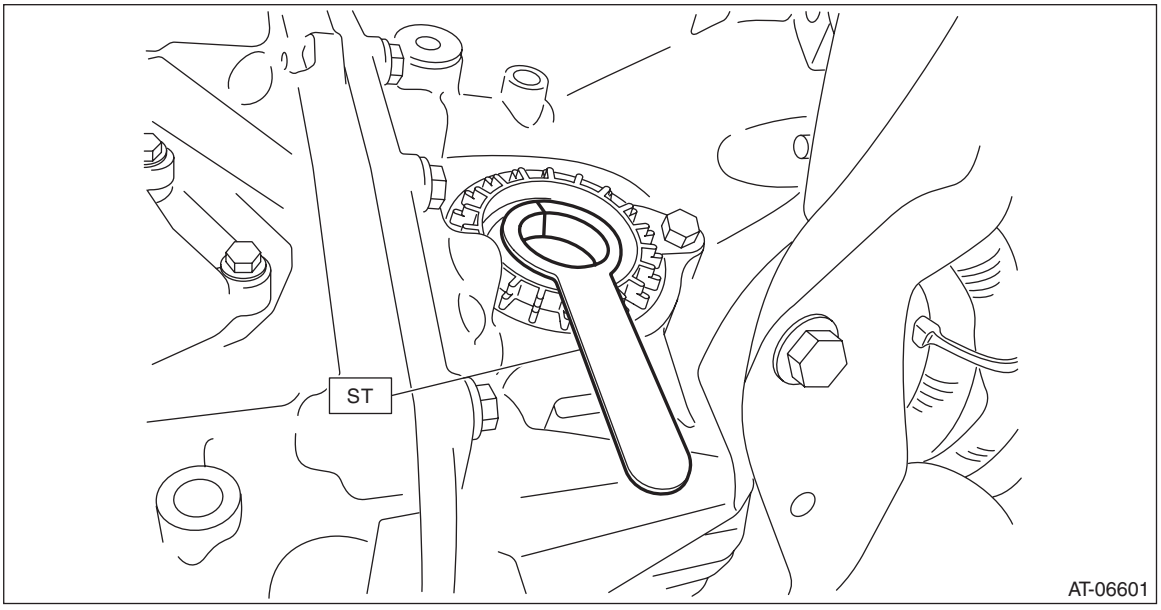
Tightening torque:
T1: 50 N·m (5.1 kgf-m, 36.9 ft-lb)
T2: 58 N·m (5.9 kgf-m, 42.8 ft-lb)



30) Connect the EGR control valve harness connector, throttle position sensor harness connector and manifold absolute pressure sensor harness connector.
31) Connect the engine harness connectors, then install the harness connector bracket.

Tightening torque:
7.5 N·m (0.8 kgf-m, 5.5 ft-lb)
32) Lift up the vehicle.
33) Apply grease to the side retainer oil seal lip.

34) Set the ST to side retainer.
ST 28399SA010 OIL SEAL PROTECTOR



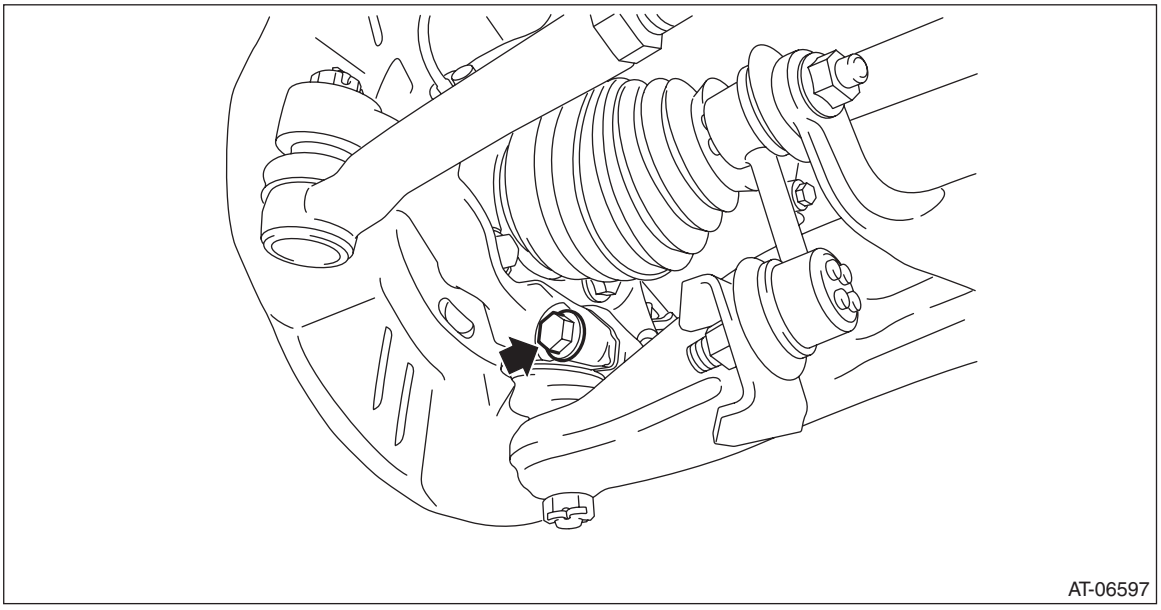
35) Replace the circlip of the drive shaft with a new part.
36) Insert the front drive shaft spline section into transmission and remove the ST (OIL SEAL PROTECTOR).

NOTE:
- Before inserting RH front drive shaft into transmission, turn the steering wheel to left hand full lock.
- Before inserting LH front drive shaft into transmission, turn the steering wheel to right hand full lock.

37) Insert the drive shaft into the transmission securely by pressing the housing from outside of the vehicle.
38) Insert the ball joint into housing and secure with bolt.

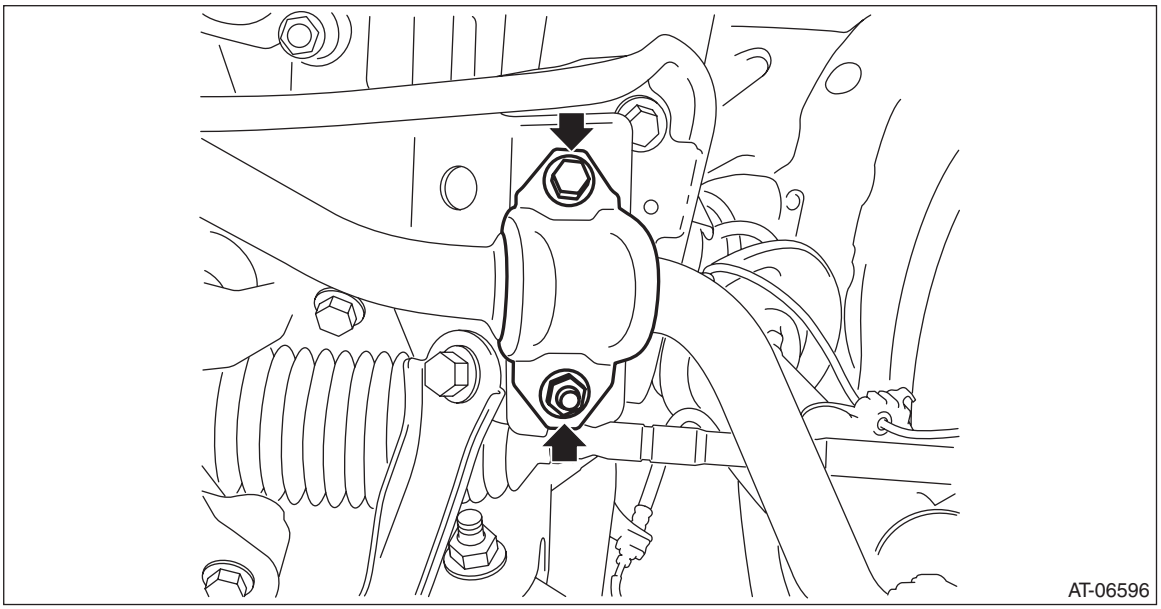
Tightening torque:
50 N·m (5.1 kgf-m, 36.9 ft-lb)

CAUTION:
- **Do not apply grease to the tapered portion of ball stud.**
- **Before tightening, make sure the lower side of housing and stepped section of ball joint are in contact.**



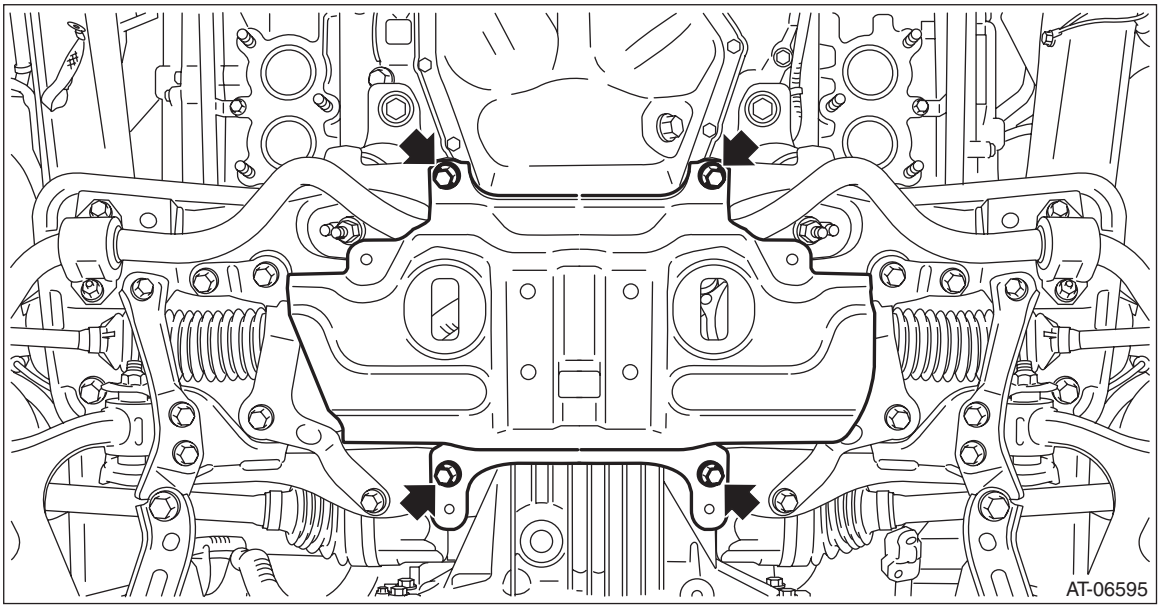
39) Install the stabilizer bracket.

Tightening torque:
25 N·m (2.5 kgf-m, 18.4 ft-lb)



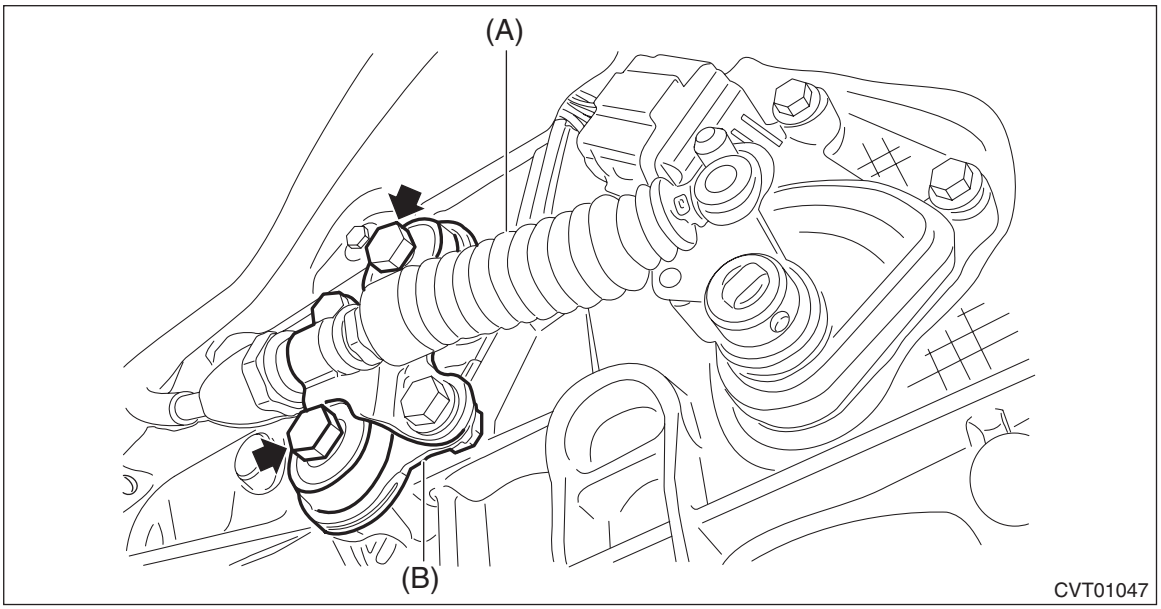
40) Install the jack-up plate.

Tightening torque:
60 N·m (6.1 kgf-m, 44.3 ft-lb)



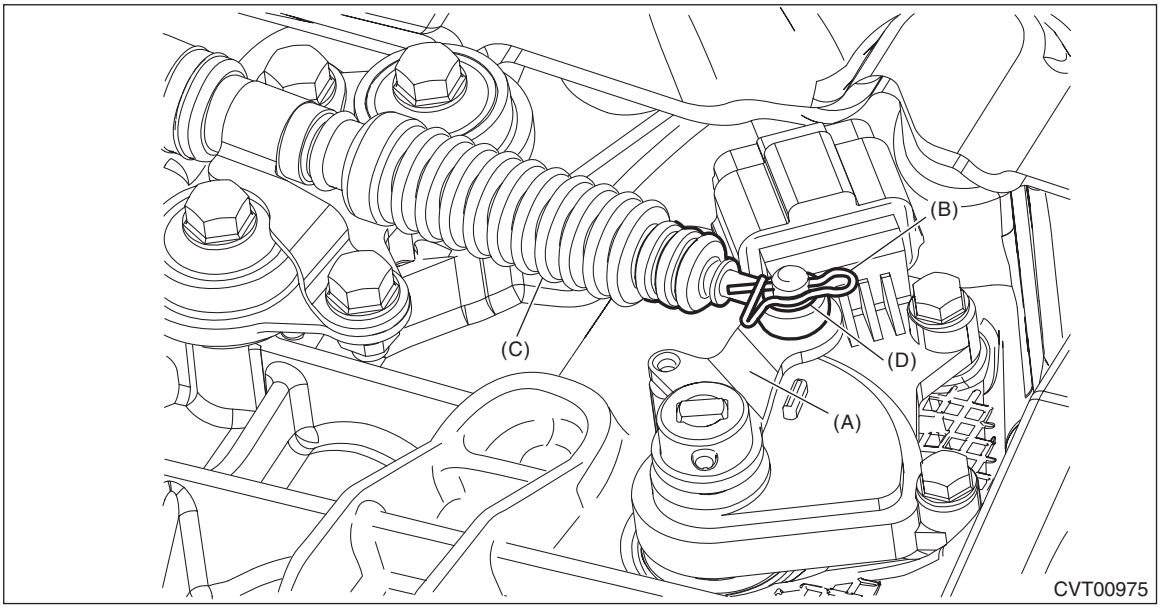
41) Install the plate assembly to transmission.

Tightening torque:
25 N·m (2.5 kgf-m, 18.4 ft-lb)



(A) Select cable
(B) Plate ASSY

42) Install the washer and snap pin to the shifter arm.

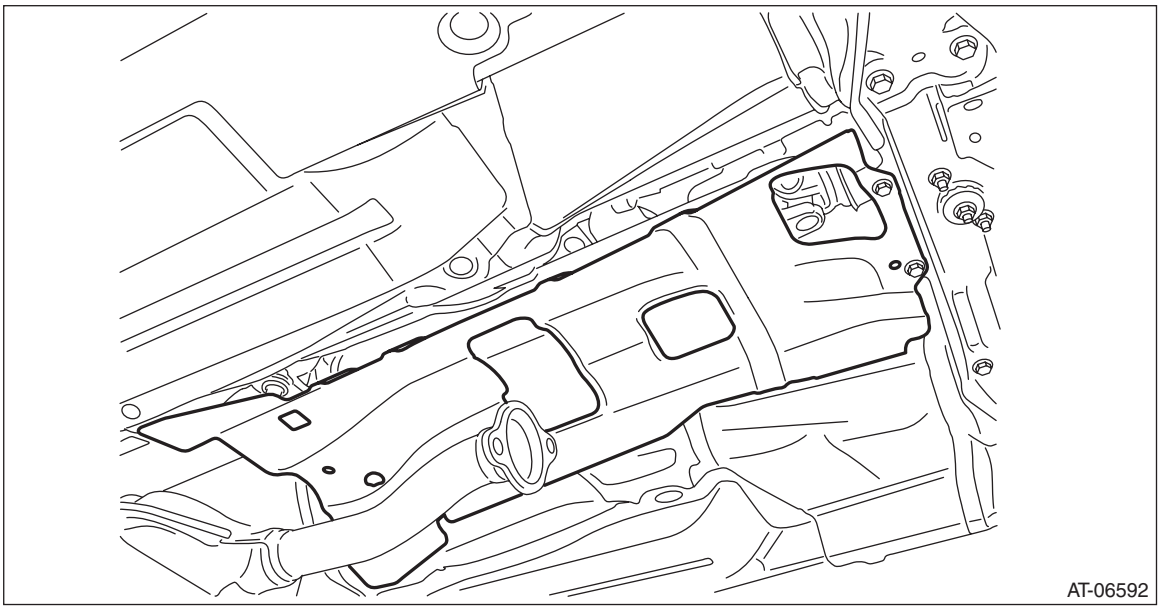


(A) Shifter arm
(B) Snap pin
(C) Select cable
(D) Washer

43) Install the propeller shaft. <Ref. to DS-13, INSTALLATION, Propeller Shaft.>

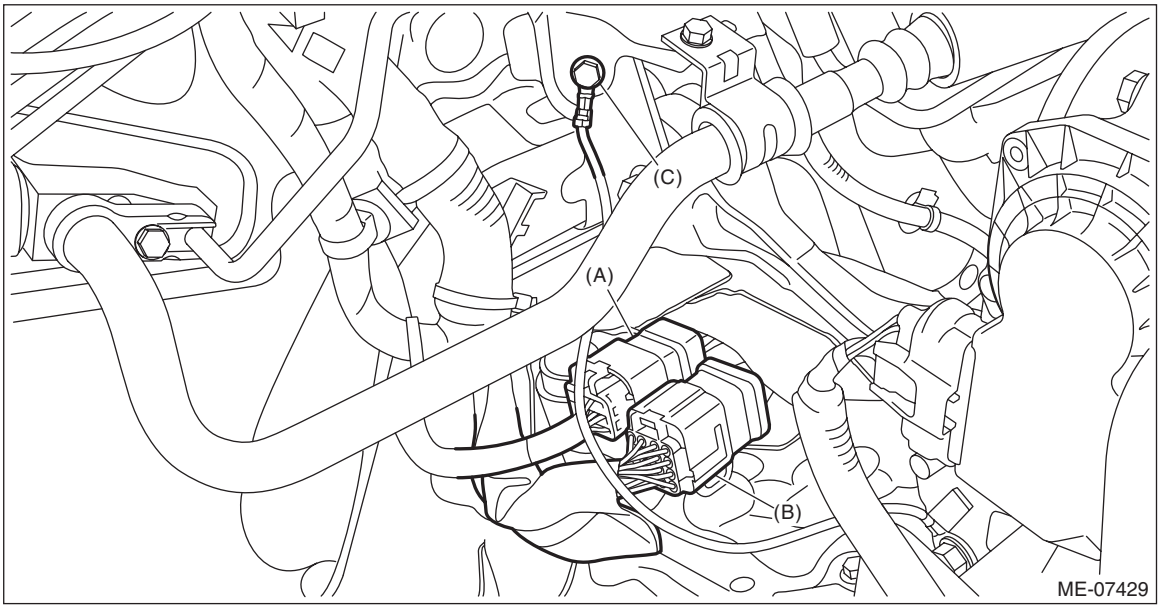
44) Install the center exhaust cover.

Tightening torque:
18 N·m (1.8 kgf-m, 13.3 ft-lb)



45) Install the center exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-8, INSTALLATION, Front Exhaust Pipe.>
46) Install the under cover.
47) Lower the vehicle.
48) Connect the following harness connectors.
- Transmission harness connectors
- Inhibitor harness connector
- Transmission radio ground terminal

Tightening torque:
13 N·m (1.3 kgf-m, 9.6 ft-lb)



(A) Transmission harness connectors
(B) Inhibitor harness connector
(C) Transmission radio ground terminal

49) Install the air intake boot assembly. <Ref. to IN(H4DO(w/o HEV))-12, INSTALLATION, Air Intake Boot.>

50) Install the front tires. <Ref. to WT-4, INSTALLATION, Tire and Wheel.>
51) Connect the battery ground terminal.
52) Refill differential gear oil to adjust the differential gear oil amount. <Ref. to CVT(TR580)-41, Differential Gear Oil.>
53) Refill CVTF to adjust the CVTF level. <Ref. to CVT(TR580)-36, CVTF.>
54) Perform the operation for clearing AT learning value. <Ref. to CVT(w/o HEV)(diag)-18, Clear Memory Mode.>
55) Perform the operation of AT learning mode. <Ref. to CVT(w/o HEV)(diag)-25, Learning Control.>
56) Execute the rear differential inspection mode. <Ref. to DI-63, Rear Differential Inspection Mode.>

CAUTION:
Always execute the rear differential inspection mode at the replacement of the following.

- **Replacement of transmission assembly**
- **Replacement of front differential hypoid gear set**

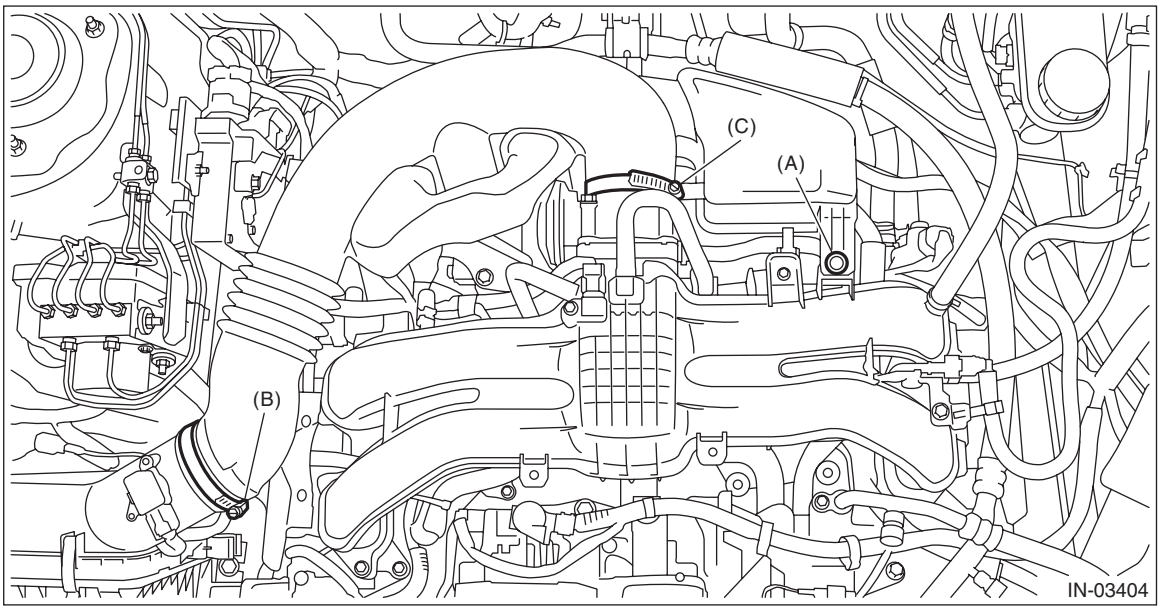
57) Perform the road test to make sure there is no fault. <Ref. to CVT(TR580)-46, INSPECTION, Road Test.>

11.Transmission Mounting System

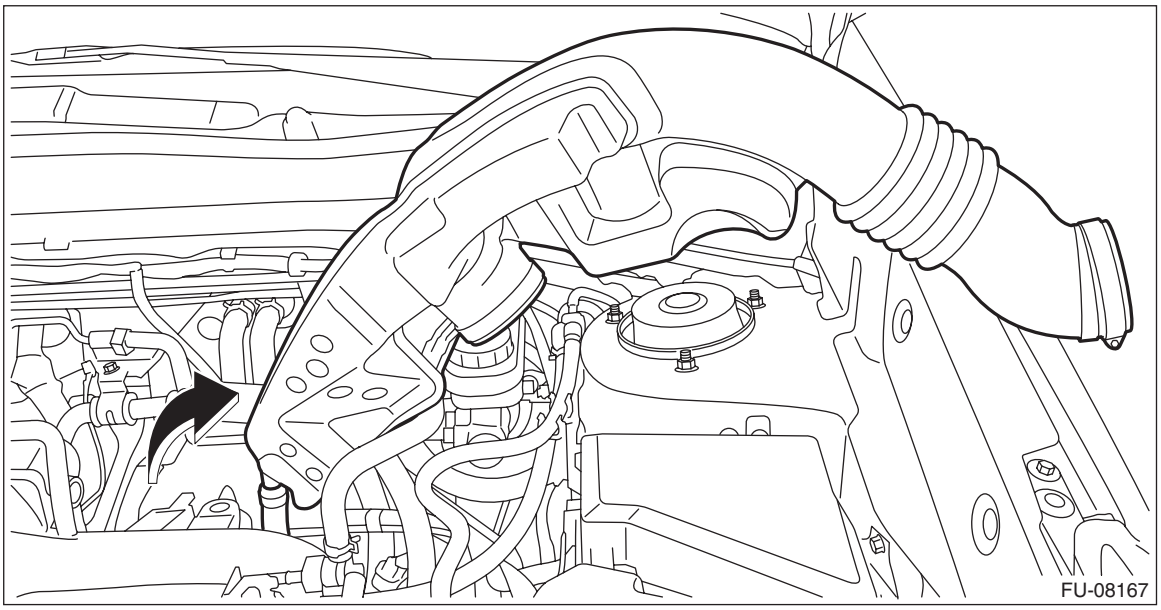
A: REMOVAL

1. PITCHING STOPPER

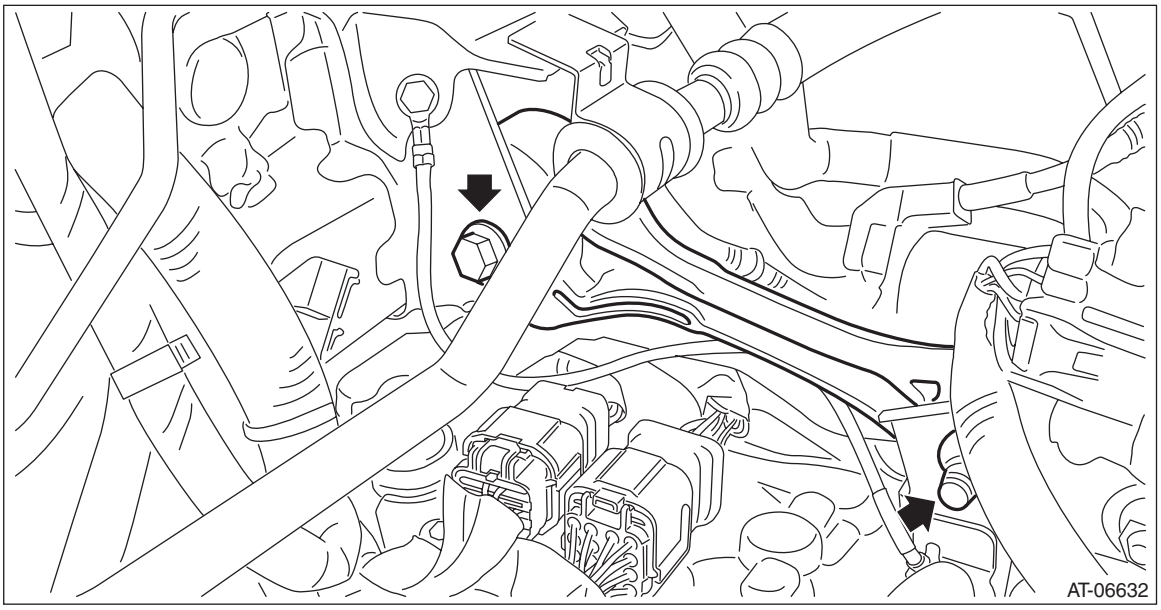
1) Disconnect the ground cable from battery.
2) Remove the clip (A) from the air intake boot.
3) Loosen the clamp (B) connecting the air intake boot and air cleaner case (rear).
4) Loosen the clamp (C) which connects the air intake boot and throttle body.



5) Remove the air intake boot from the throttle body, and move it to the left side wheel apron.

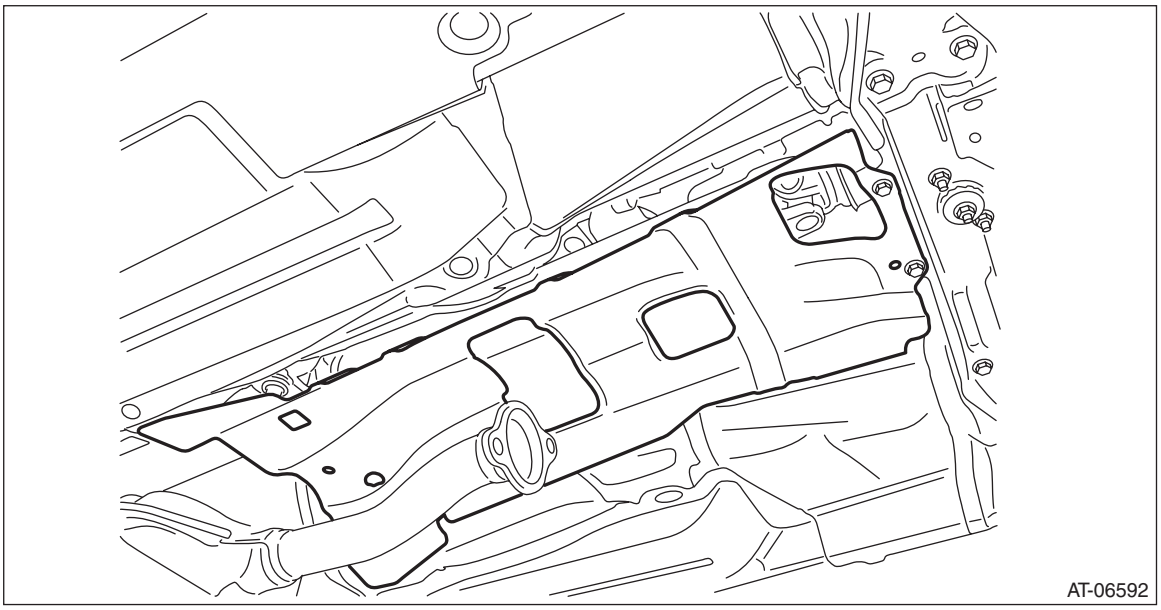


6) Remove the pitching stopper.



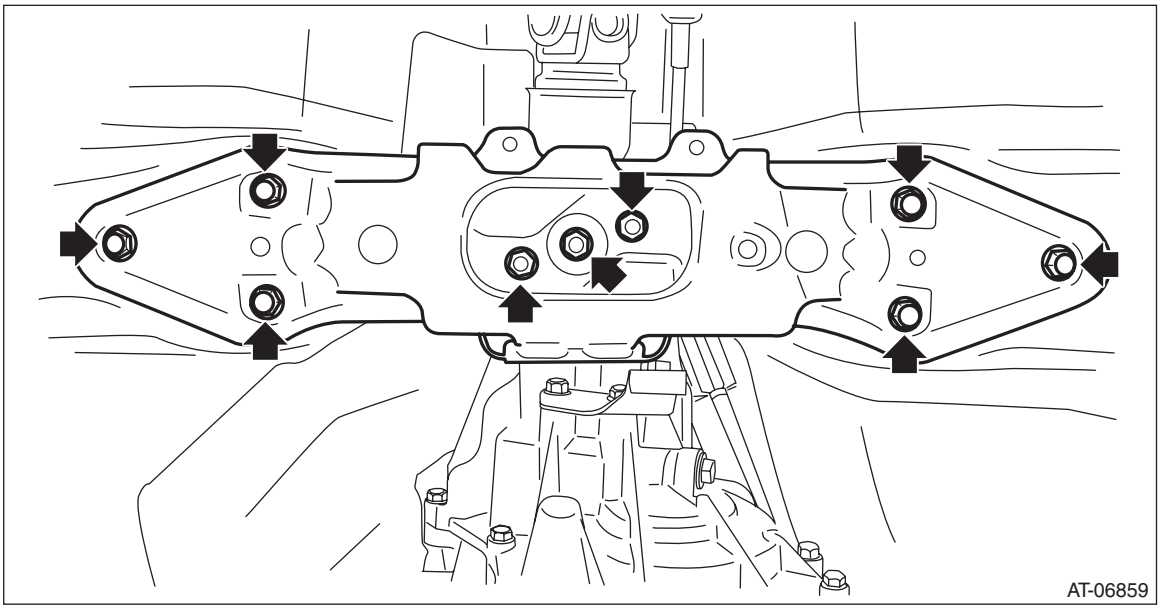
2. TRANSMISSION REAR CROSSMEMBER AND REAR CUSHION RUBBER

1) Disconnect the ground cable from battery.
2) Lift up the vehicle.
3) Remove the center exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-14, REMOVAL, Center Exhaust Pipe.>
4) Remove the center exhaust cover.

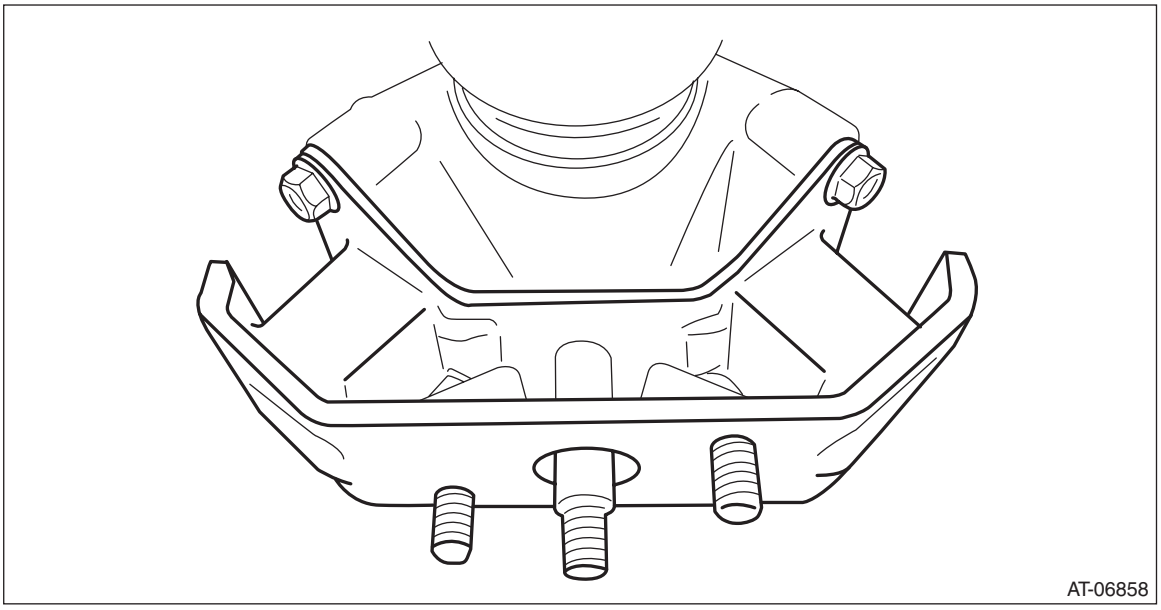


5) Set the transmission jack under the transmission. Make sure that the support plate of transmission jack does not touch the oil pan.

6) Remove the transmission rear crossmember.



7) Remove the rear cushion rubber.

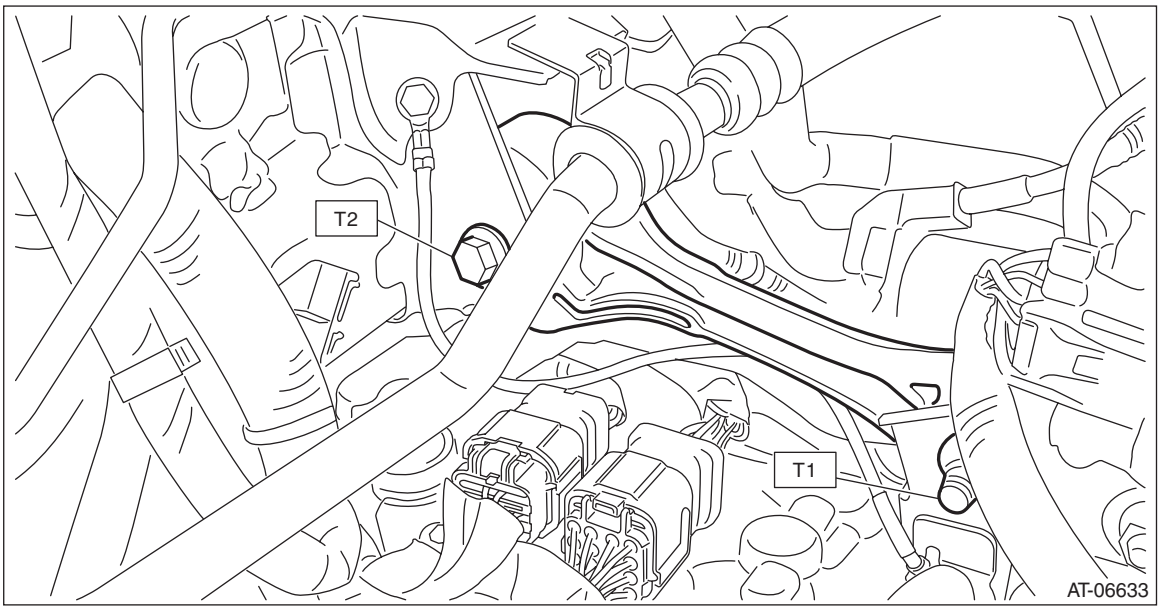


B: INSTALLATION

1. PITCHING STOPPER

1) Install the pitching stopper.

Tightening torque:
T1: 50 N·m (5.1 kgf-m, 36.9 ft-lb)
T2: 58 N·m (5.9 kgf-m, 42.8 ft-lb)

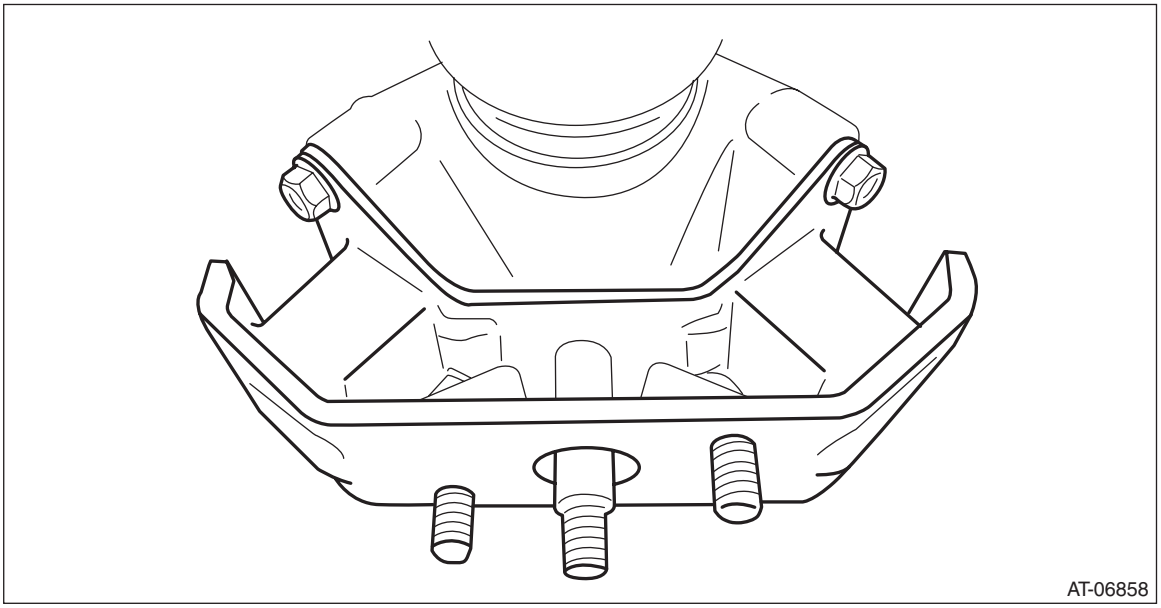


2) Install the air intake boot assembly. <Ref. to IN(H4DO(w/o HEV))-12, INSTALLATION, Air Intake Boot.>
3) Connect the battery ground terminal.

2. TRANSMISSION REAR CROSSMEMBER AND REAR CUSHION RUBBER

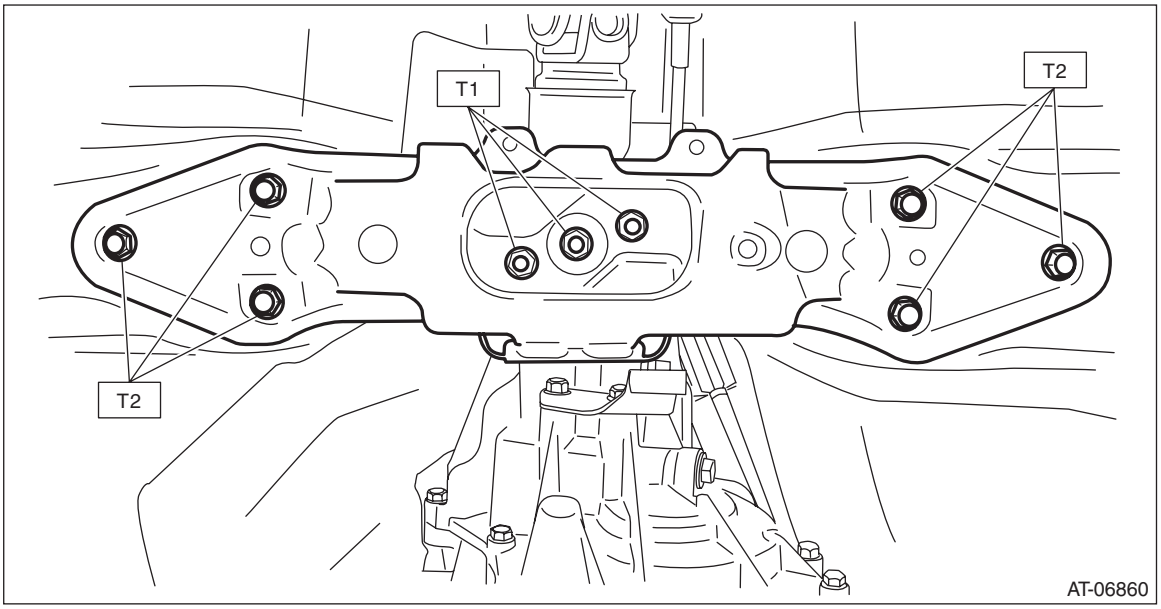
1) Attach the rear cushion rubber to the transmission.

Tightening torque:
40 N·m (4.1 kgf-m, 29.5 ft-lb)



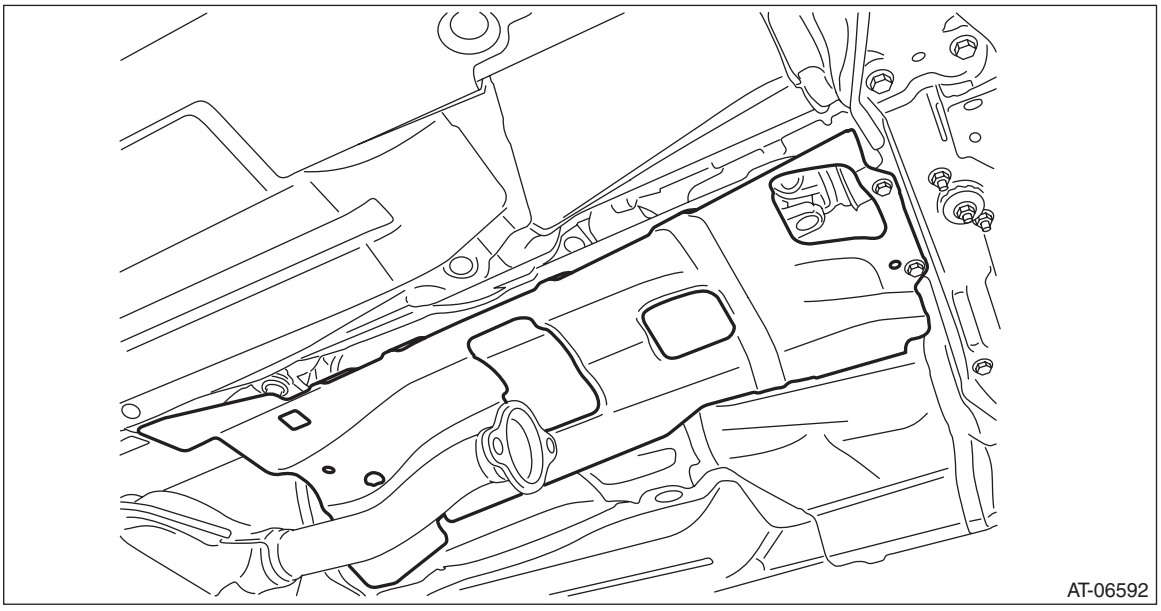
2) Install the crossmember.

Tightening torque:
T1: 35 N·m (3.6 kgf-m, 25.8 ft-lb)
T2: 70 N·m (7.1 kgf-m, 51.6 ft-lb)



3) Remove the transmission jack.
4) Install the center exhaust cover.

Tightening torque:
18 N·m (1.8 kgf-m, 13.3 ft-lb)



5) Install the center exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-15, INSTALLATION, Center Exhaust Pipe.>
6) Connect the battery ground terminal.

C: INSPECTION

- Check the crossmember for bends or damage.
- Check that the cushion rubber is not stiff, cracked or otherwise damaged.
- Check the pitching stopper for bends or damage.

12.Extension Case Oil Seal

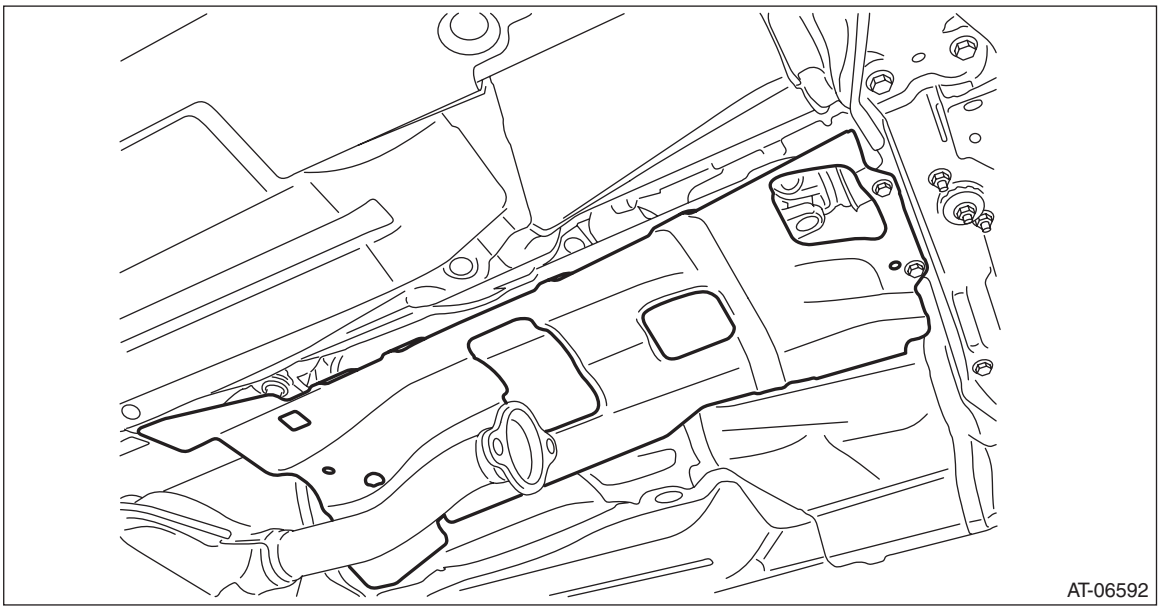
A: INSPECTION

Check for leakage of CVTF from the joint section of transmission and propeller shaft. If a leak is found, inspect the propeller shaft and replace the oil seal.

B: REPLACEMENT

CAUTION:
Immediately after the vehicle has been running or after idling for a long time, the CVTF will be hot. Be careful not to burn yourself.

1) Lift up the vehicle.
2) Remove the center exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-14, REMOVAL, Center Exhaust Pipe.>
3) Remove the center exhaust cover.



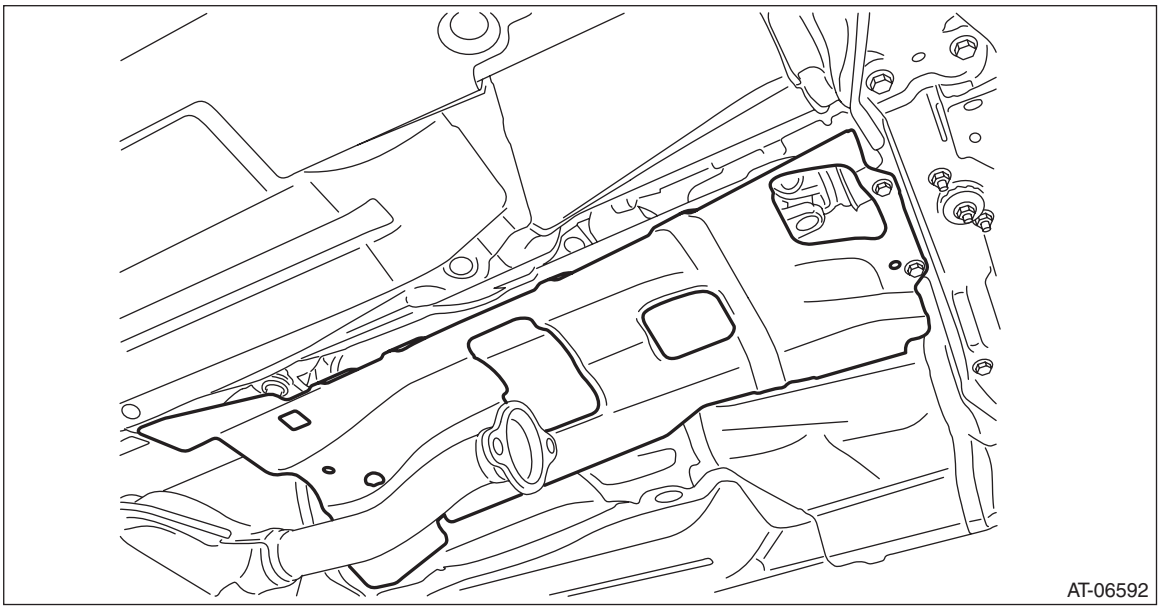
4) Clean the transmission exterior.
5) Remove the propeller shaft. <Ref. to DS-12, REMOVAL, Propeller Shaft.>
6) Using a screwdriver or ST, remove the oil seal trying not to damage the extension case.
ST 398527700 PULLER ASSY
7) Using the ST, install the oil seal.

NOTE:
- Use a new oil seal.
- Apply CVTF to the oil seal lip and press-fitting surface.

ST 498057300 OIL SEAL INSTALLER
8) Install the propeller shaft. <Ref. to DS-13, INSTALLATION, Propeller Shaft.>

9) Install the center exhaust cover.

Tightening torque:
18 N·m (1.8 kgf-m, 13.3 ft-lb)



10) Install the center exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-15, INSTALLATION, Center Exhaust Pipe.>
11) Adjust the CVTF level and check there is no leakage. <Ref. to CVT(TR580)-36, ADJUSTMENT, CVTF.>

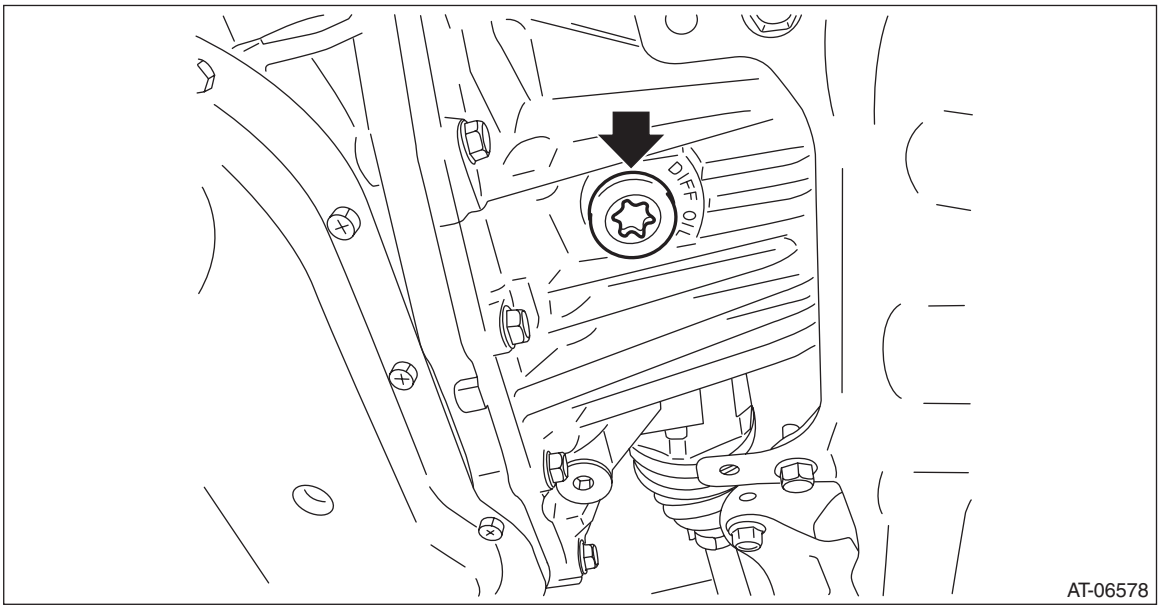
13.Differential Side Retainer Oil Seal

A: INSPECTION

Check for leakage of gear oil from differential side retainer oil seal part. If there is an oil leak, inspect the front drive shaft and replace the oil seal.

B: REPLACEMENT

CAUTION:
• Immediately after the vehicle has been running or after idling for a long time, the differential gear oil will be hot. Be careful not to burn yourself.
• Be careful not to spill the differential gear oil on exhaust pipe to prevent it from emitting smoke or fire. If differential gear oil is spilled on the exhaust pipe, wipe it off completely.
1) Remove the front tires. <Ref. to WT-4, REMOVAL, Tire and Wheel.>
2) Remove the center exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-14, REMOVAL, Center Exhaust Pipe.>
3) Remove the differential gear oil drain plug using TORX® bit T70, and then drain differential gear oil.

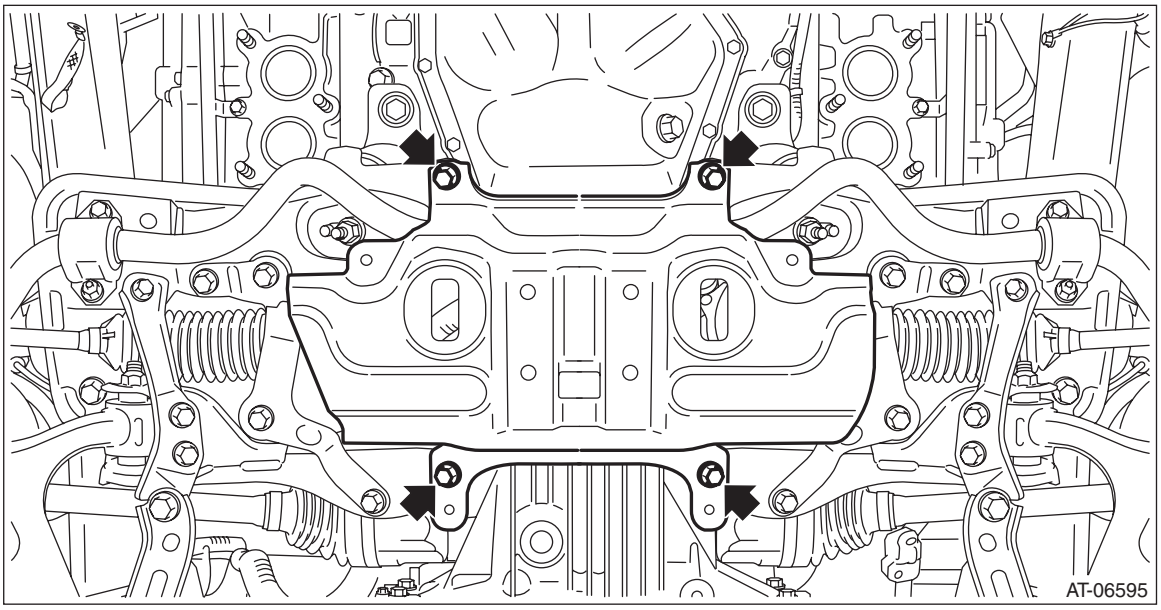


4) Tighten the differential gear oil drain plug.

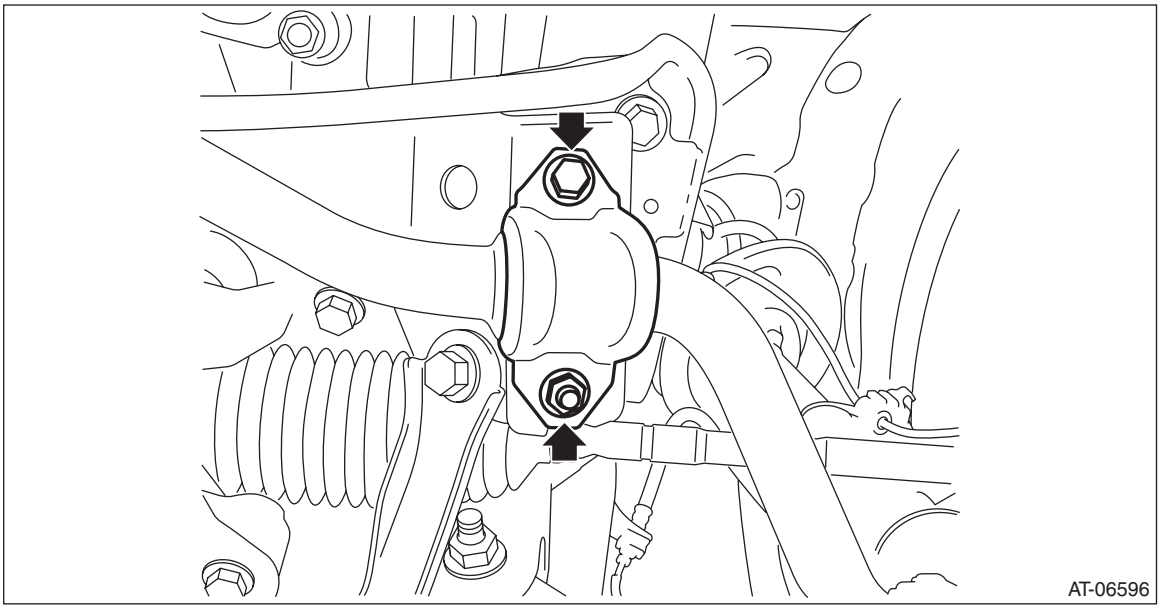
NOTE:
Use a new gasket.

Tightening torque:
70 N·m (7.1 kgf-m, 51.6 ft-lb)

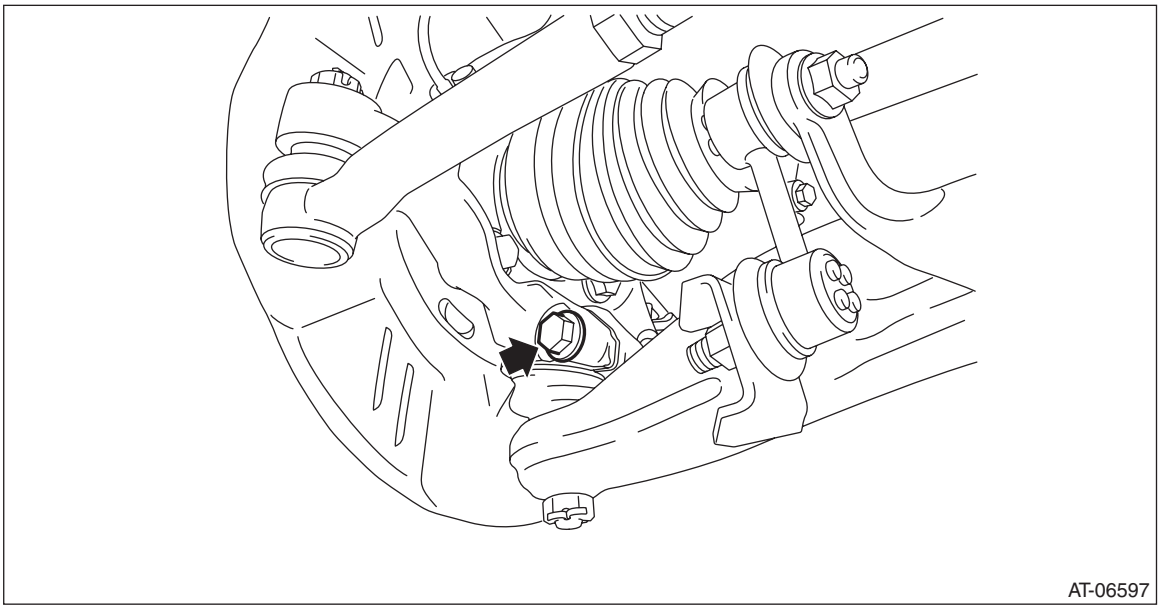
5) Remove the jack-up plate.



6) Remove the stabilizer bracket.



7) Remove the bolts which secure to the front housing, and separate the front arm and housing.



8) Using a crowbar, etc., pull out until the front drive shaft transmission side joint slides move smoothly.

NOTE:
Place cloth between the crowbar and the transmission in order to avoid damaging the transmission side retainer.

9) Hold the transmission side joint of the front drive shaft by hand and extract the housing from the transmission while pressing the housing outward, so as not to stretch the boot.

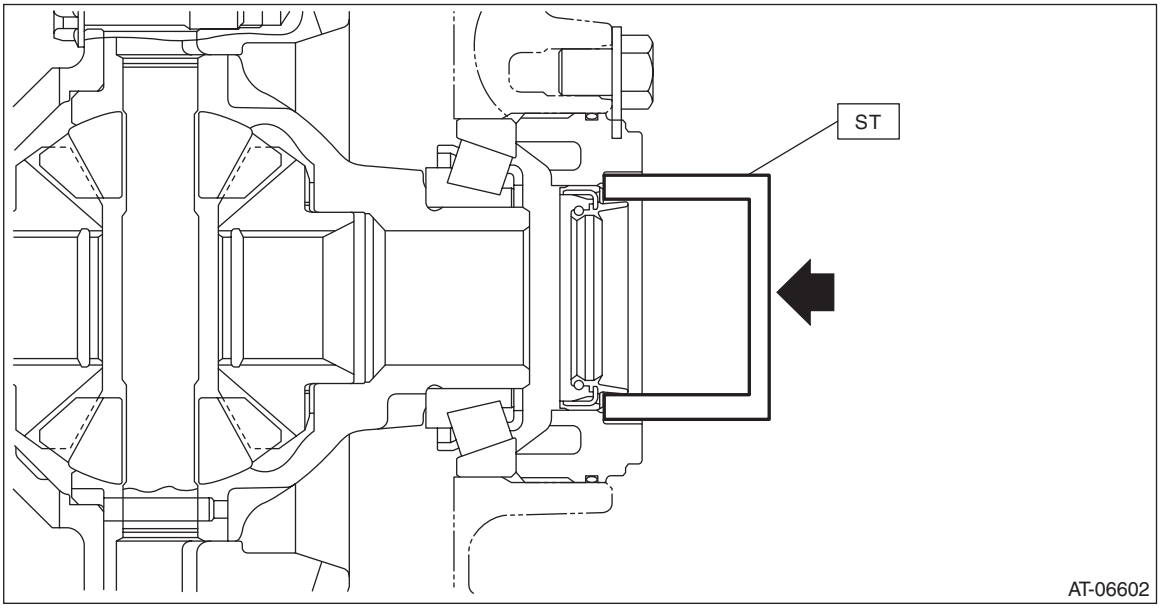
NOTE:
- Before pulling RH front drive shaft from transmission, turn the steering wheel to left hand full lock.
- Before pulling LH front drive shaft from transmission, turn the steering wheel to right hand full lock.

10) Remove the differential side retainer oil seal using driver wrapped with vinyl tape etc.

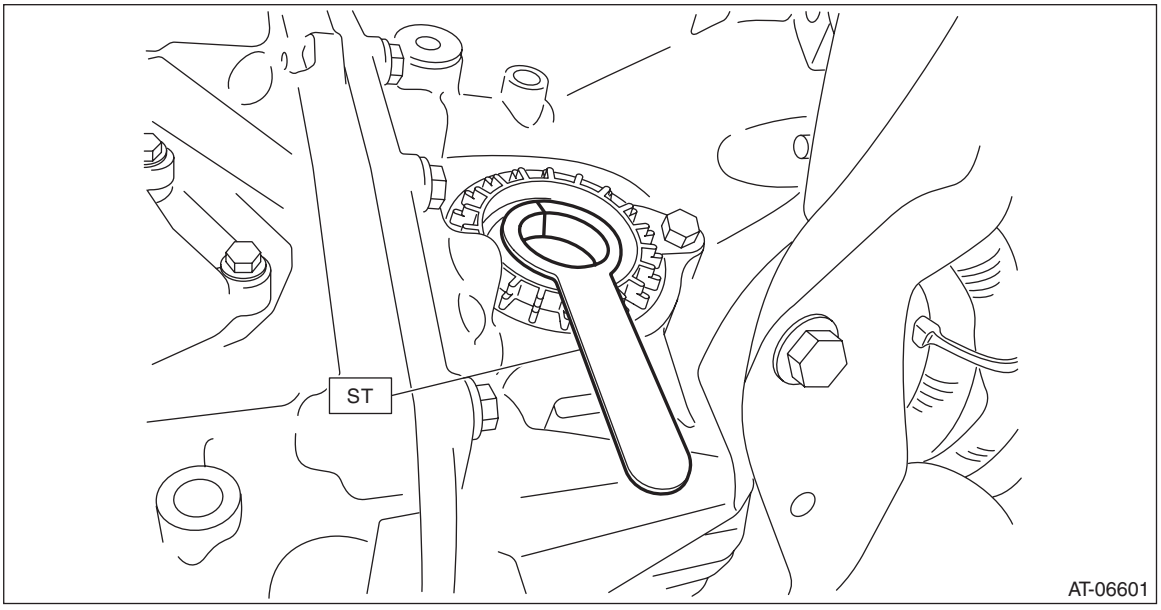
11) Using the ST, install the differential side retainer oil seal by lightly tapping with a hammer.

NOTE:
- Apply differential gear oil to the lip surface, so that the oil seal lip is not deformed.
- Apply differential gear oil to the press-fitting surface of oil seal and the differential side retainer.
- Oil seal has an identification mark (R, L). When installing oil seals, do not confuse the left and right.

ST 18675AA000 DIFFERENTIAL SIDE OIL SEAL INSTALLER



12) Set the ST to side retainer.
ST 28399SA010 OIL SEAL PROTECTOR



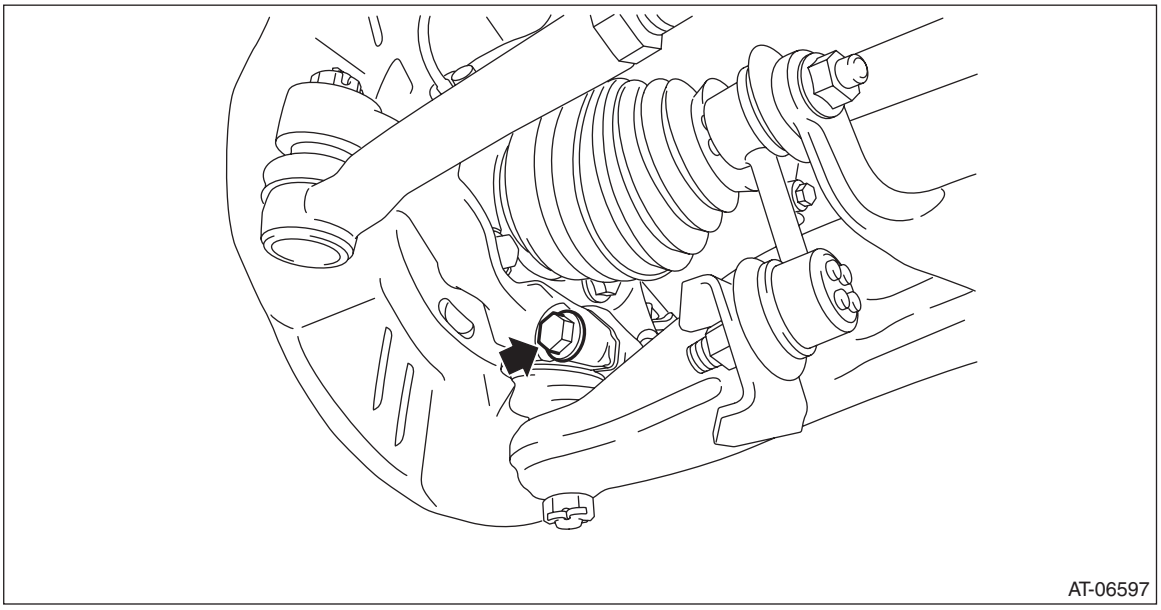
13) Replace the circlip of the drive shaft with a new part.
14) Insert the front drive shaft spline section into transmission and remove the ST (DIFFERENTIAL SIDE OIL SEAL INSTALLER).

NOTE:
- Apply grease to the side retainer oil seal lip.
- Before inserting RH front drive shaft into transmission, turn the steering wheel to left hand full lock.
- Before inserting LH front drive shaft into transmission, turn the steering wheel to right hand full lock.

15) Insert the drive shaft into the transmission securely by pressing the housing from outside of the vehicle.
16) Insert the ball joint into housing and secure with bolt.

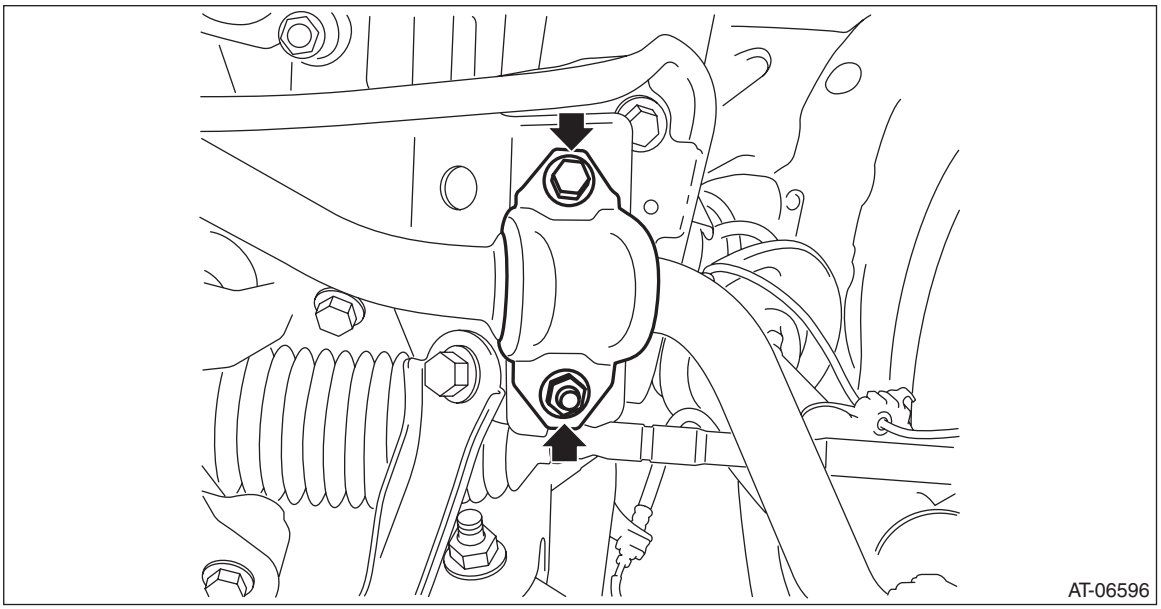
Tightening torque:
50 N·m (5.1 kgf-m, 36.9 ft-lb)

CAUTION:
- **Do not apply grease to the tapered portion of ball stud.**
- **Before tightening, make sure the lower side of housing and stepped section of ball joint are in contact.**



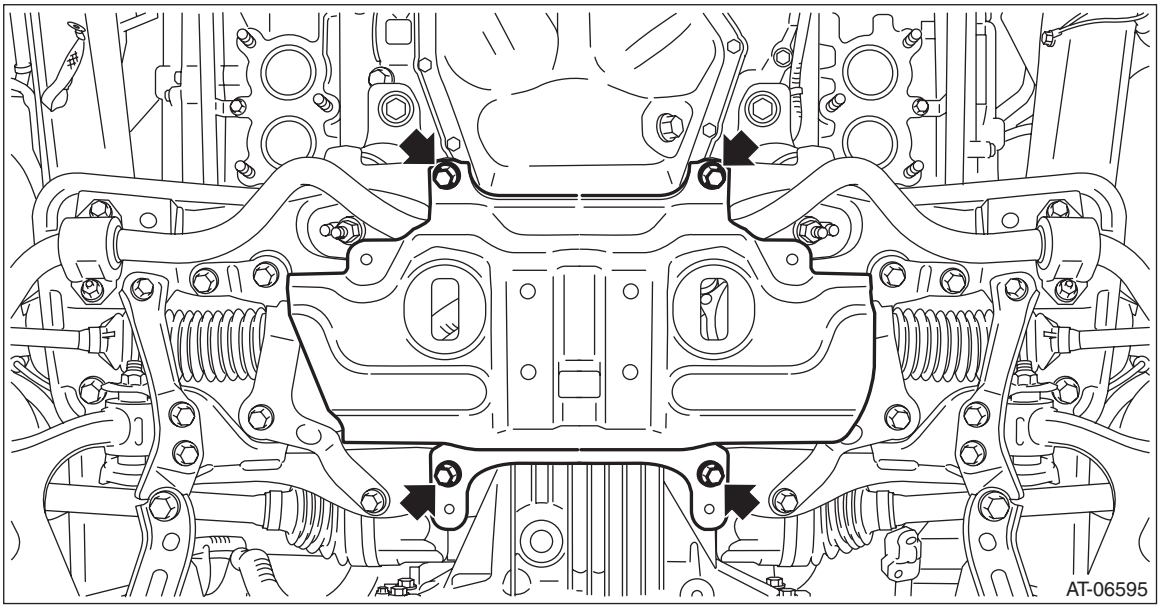
17) Install the stabilizer bracket.

Tightening torque:
25 N·m (2.5 kgf-m, 18.4 ft-lb)



18) Install the jack-up plate.

Tightening torque:
60 N·m (6.1 kgf-m, 44.3 ft-lb)



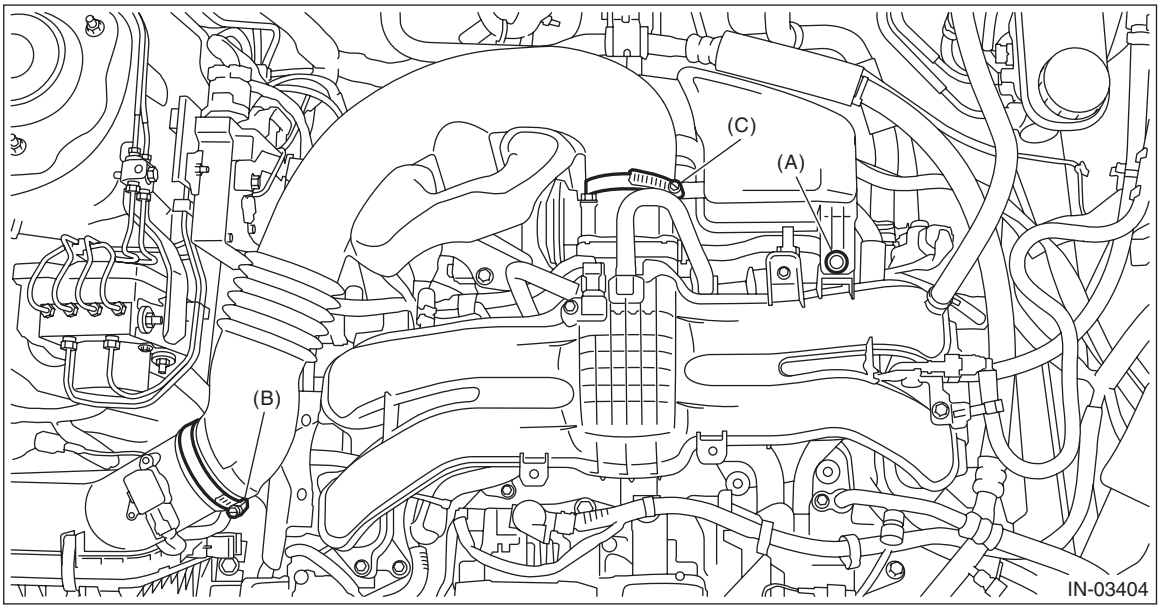
19) Install the center exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-15, INSTALLATION, Center Exhaust Pipe.>
20) Fill differential gear oil. <Ref. to CVT(TR580)-41, Differential Gear Oil.>
21) Adjust the differential gear oil level, and check for leakage. <Ref. to CVT(TR580)-41, ADJUSTMENT, Differential Gear Oil.>
22) Install the front tires. <Ref. to WT-4, INSTALLATION, Tire and Wheel.>

14.Inhibitor Switch

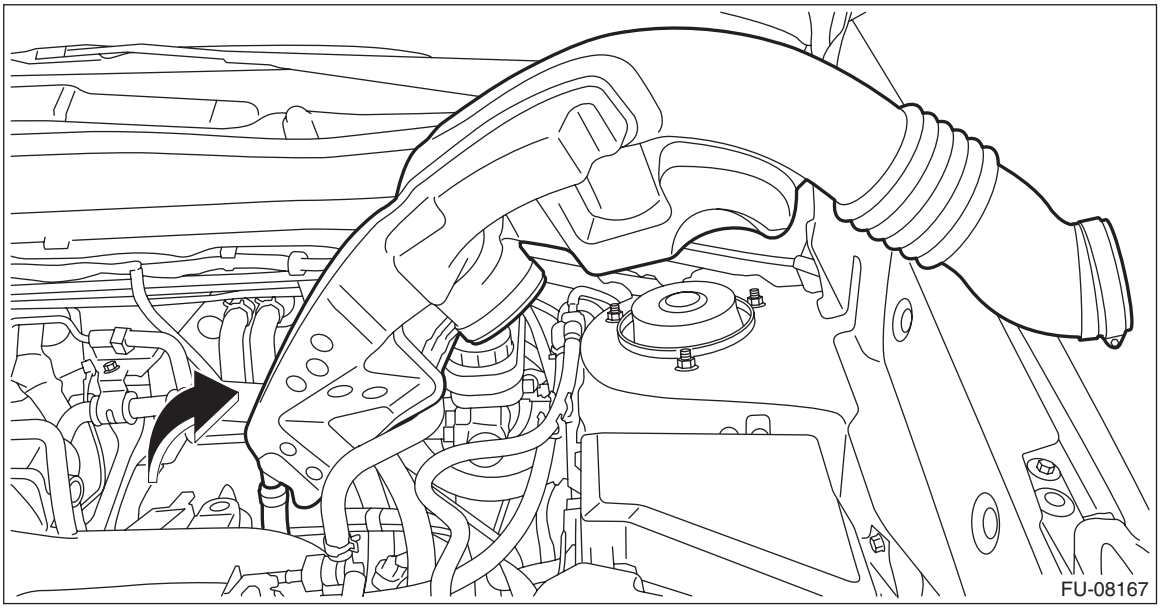
A: INSPECTION

When the driving condition or starter motor operation is improper, first check the shift linkage for improper operation. If the shift linkage is functioning properly, check the inhibitor switch.

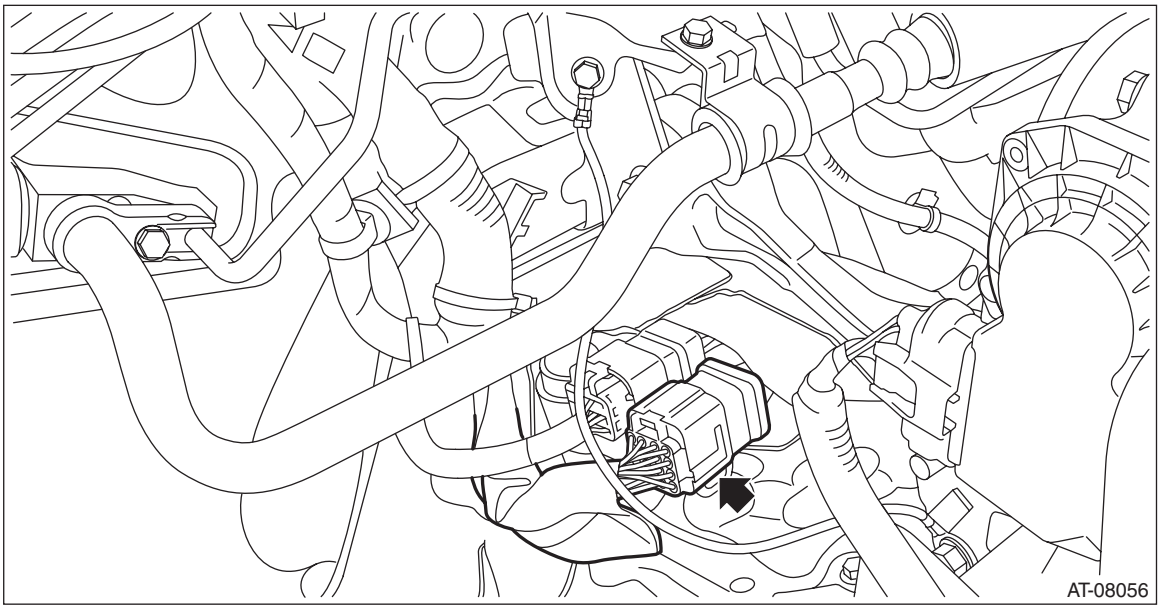
1) Remove the clip (A) from the air intake boot.
2) Loosen the clamp (B) connecting the air intake boot and air cleaner case (rear).
3) Loosen the clamp (C) which connects the air intake boot and throttle body.



4) Remove the air intake boot from the throttle body, and move it to the left side wheel apron.



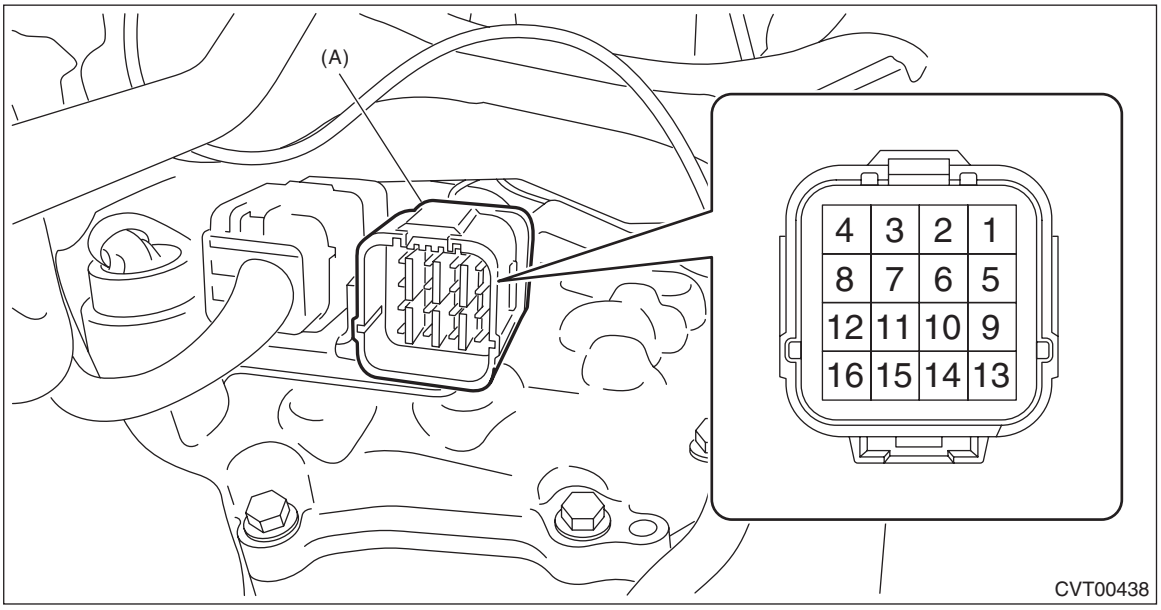
5) Disconnect the inhibitor harness connector.



6) Check for continuity in inhibitor switch circuit by shifting the select lever in “P”, “R”, “N” and “D” respectively.

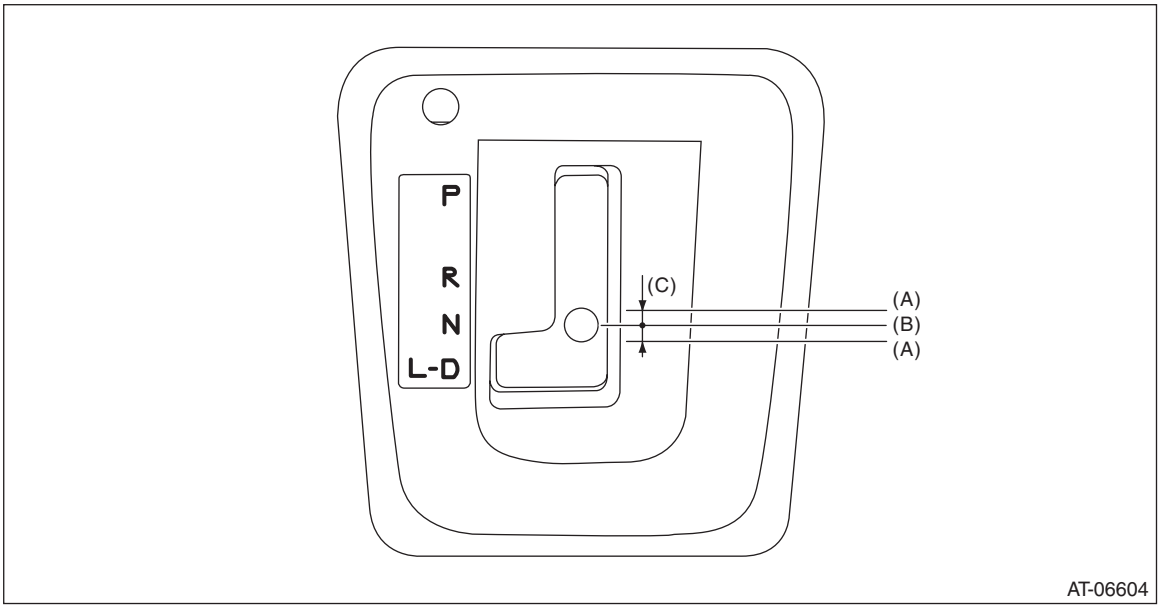
NOTE:
- Check that there is no continuity in the starter circuit when the select lever is in the “R” and “D” ranges.
- When inhibitor switch is normal, check there is no poor contact in vehicle side connector and no open circuit in harness.

	Range	Terminal No.
Signal sent to TCM	P	1 — 7
	R	2 — 7
	N	3 — 7
	D	4 — 7
Starter circuit	P/N	15 — 16
Back-up light circuit	R	13 — 14



(A) Inhibitor harness connector

7) Check that there is continuity at equal points when the select lever is moved 1.5° in both directions from the “N” range.
If there is continuity in only one direction or in other points, adjust the inhibitor switch. <Ref. to CVT(TR580)-98, ADJUSTMENT, Inhibitor Switch.>

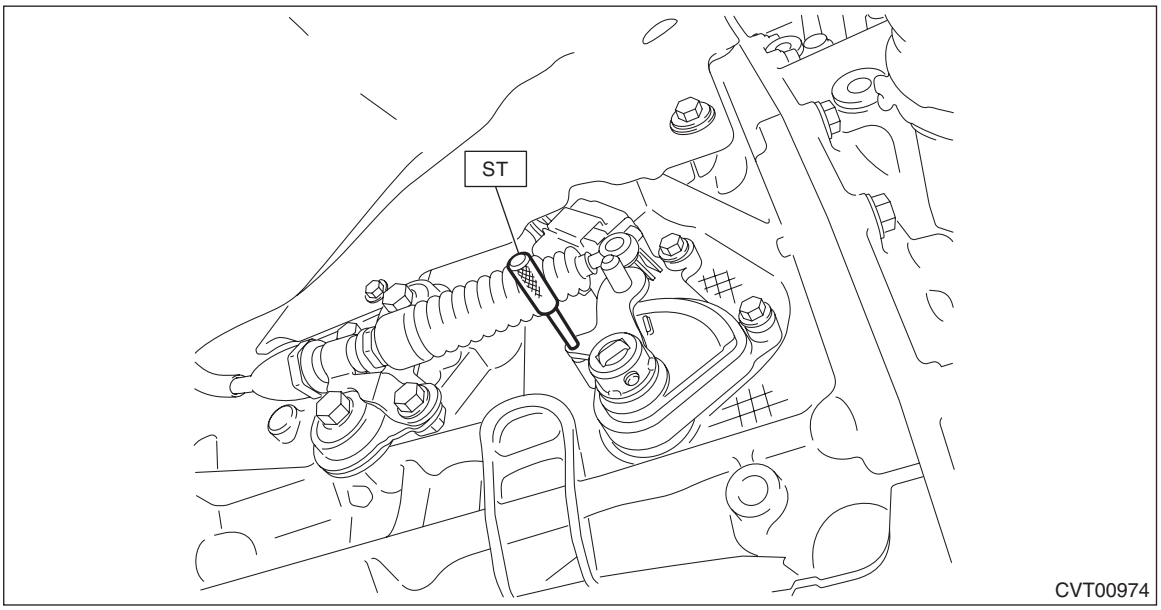


(A) Continuity does not exist.
(B) Continuity exists.
(C) 1.5°

8) Repeat the above inspection in other gear ranges. If there is fault, adjust the inhibitor switch and select cable. <Ref. to CVT(TR580)-98, ADJUSTMENT, Inhibitor Switch.> <Ref. to CS-57, ADJUSTMENT, Select Cable.>

B: ADJUSTMENT

1) Shift the select lever to “N” range.
2) Loosen the two bolts holding the inhibitor switch.
3) Insert the ST vertically into the holes of the shifter arm and switch body.
ST 499267300 STOPPER PIN



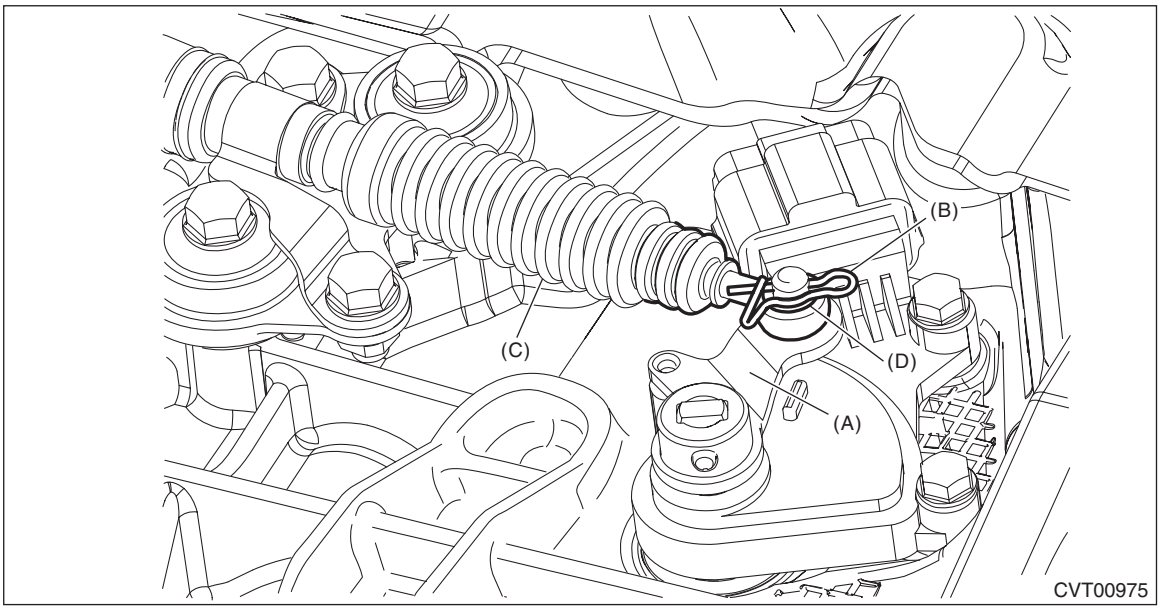
4) Tighten the two bolts holding the inhibitor switch.

Tightening torque:
5 N·m (0.5 kgf-m, 3.7 ft-lb)

5) Repeat the inspection of the inhibitor switch. If the inhibitor switch is determined to be “faulty”, replace it.

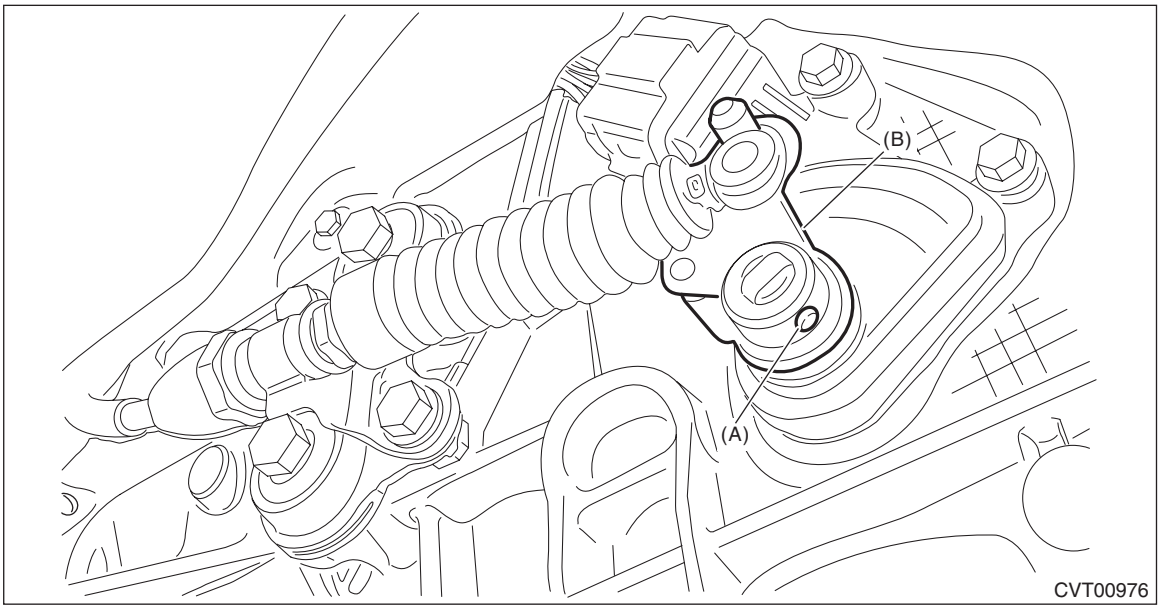
C: REMOVAL

1) Shift the select lever to “N” range.
2) Disconnect the ground cable from battery.
3) Lift up the vehicle.
4) Remove the center exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-14, REMOVAL, Center Exhaust Pipe.>
5) Remove the snap pin and washer from the shifter arm.



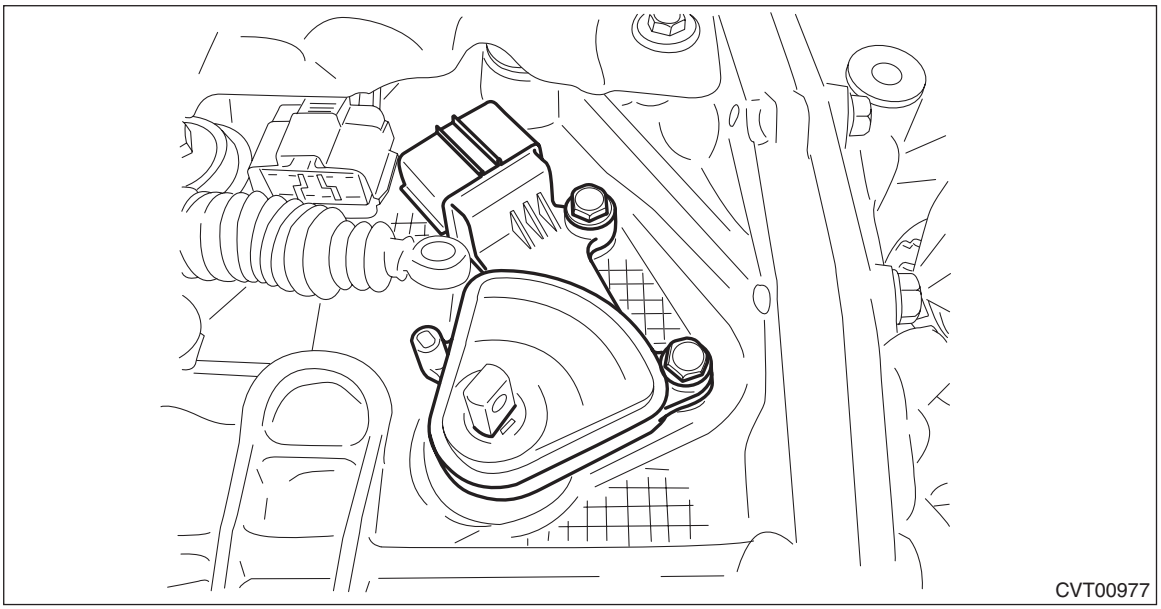
(A) Shifter arm
(B) Snap pin
(C) Select cable
(D) Washer

6) Remove the spring pin and shifter arm.



(A) Spring pin
(B) Shifter arm

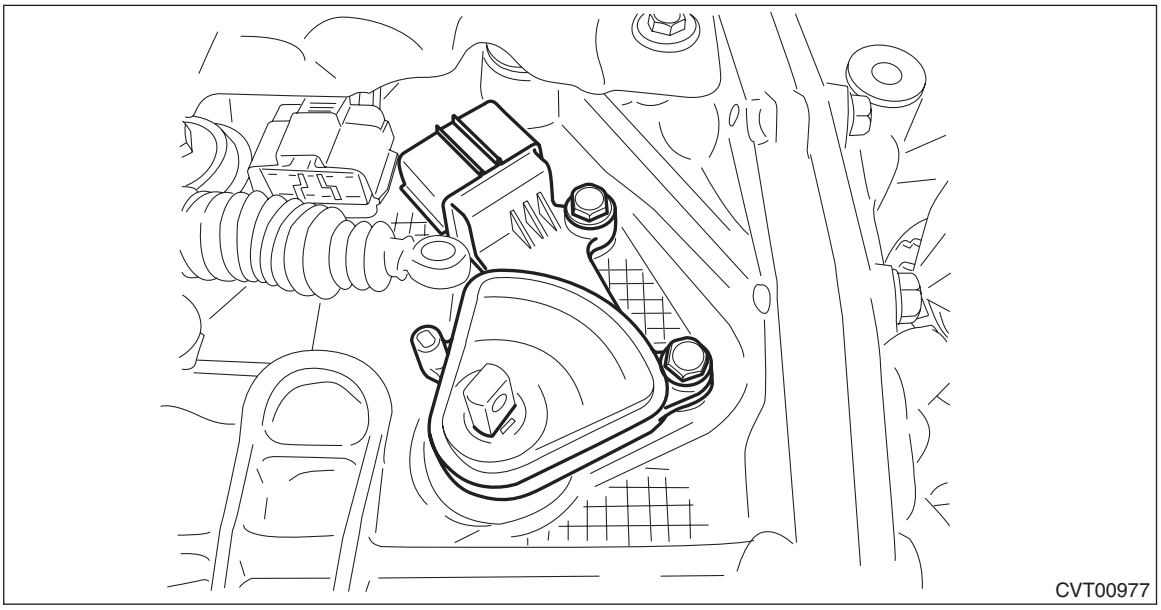
7) Remove the inhibitor harness connector from inhibitor switch.
8) Remove the two inhibitor switch securing bolts.



9) Remove the inhibitor switch from the transmission case.

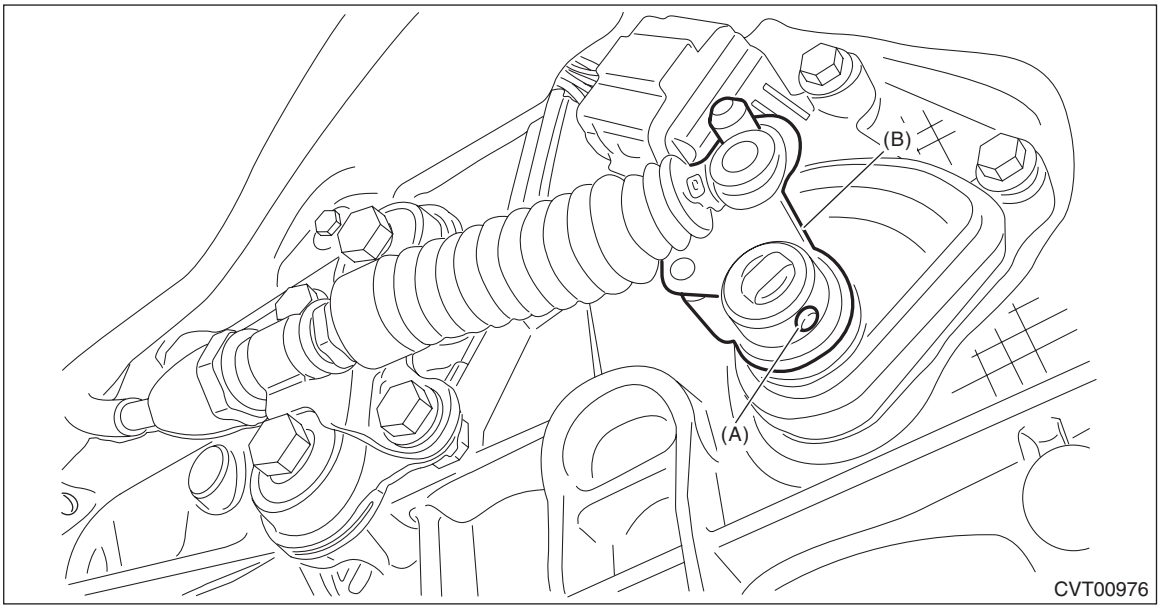
D: INSTALLATION

1) Install the inhibitor switch to the transmission case temporarily.



2) Connect the inhibitor harness connector to the inhibitor switch.
3) Install the shifter arm and fix with the spring pin.

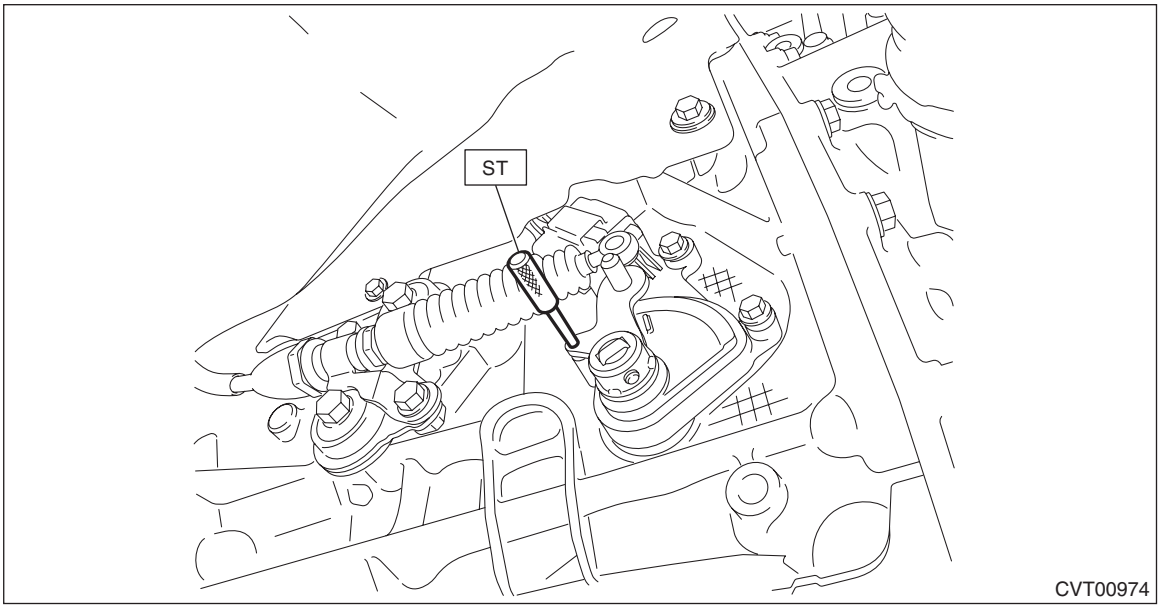
NOTE:
Use new spring pin.



(A) Spring pin
(B) Shifter arm

4) Shift the shifter arm to “N” range.

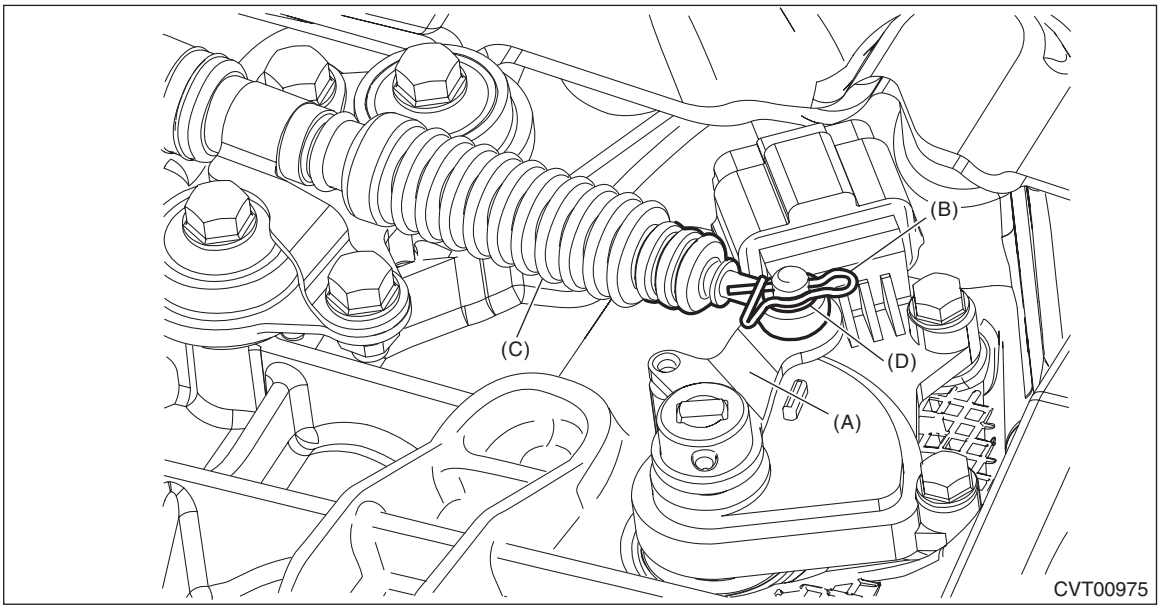
5) Install the ST vertically in the cutout of shifter arm and the hole of switch body.
ST 499267300 STOPPER PIN



6) Tighten the two bolts holding the inhibitor switch.

Tightening torque:
5 N·m (0.5 kgf-m, 3.7 ft-lb)

7) Install the select cable to the shifter arm.
8) Install the washer and snap pin to the shifter arm.



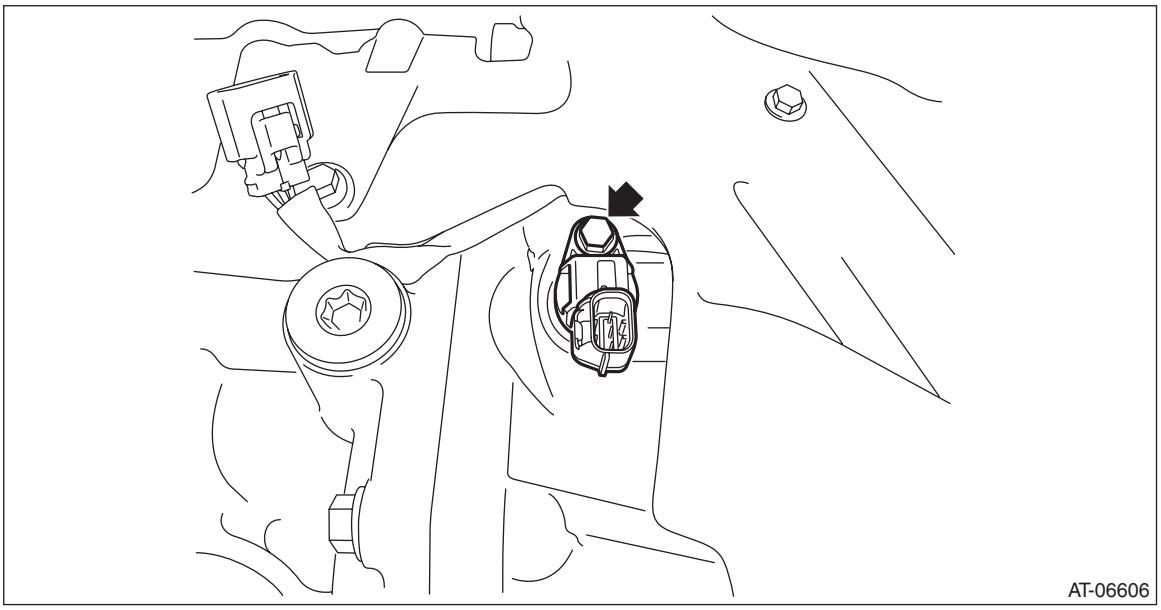
(A) Shifter arm
(B) Snap pin
(C) Select cable
(D) Washer

9) Install the center exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-15, INSTALLATION, Center Exhaust Pipe.>
10) Lower the vehicle.
11) Connect the battery ground terminal.
12) Check the inhibitor switch. <Ref. to CVT(TR580)-96, INSPECTION, Inhibitor Switch.>

15.Turbine Speed Sensor

A: REMOVAL

CAUTION:
Be sure to prevent water or oil from contacting the connector terminal of turbine speed sensor. If adhesion occurs, replace with a new part.
1) Lift up the vehicle.
2) Remove the harness connector from turbine speed sensor.
3) Remove the turbine speed sensor.



B: INSTALLATION

CAUTION:
Be sure to prevent water or oil from contacting the connector terminal of turbine speed sensor. If adhesion occurs, replace with a new part.
Install in the reverse order of removal.

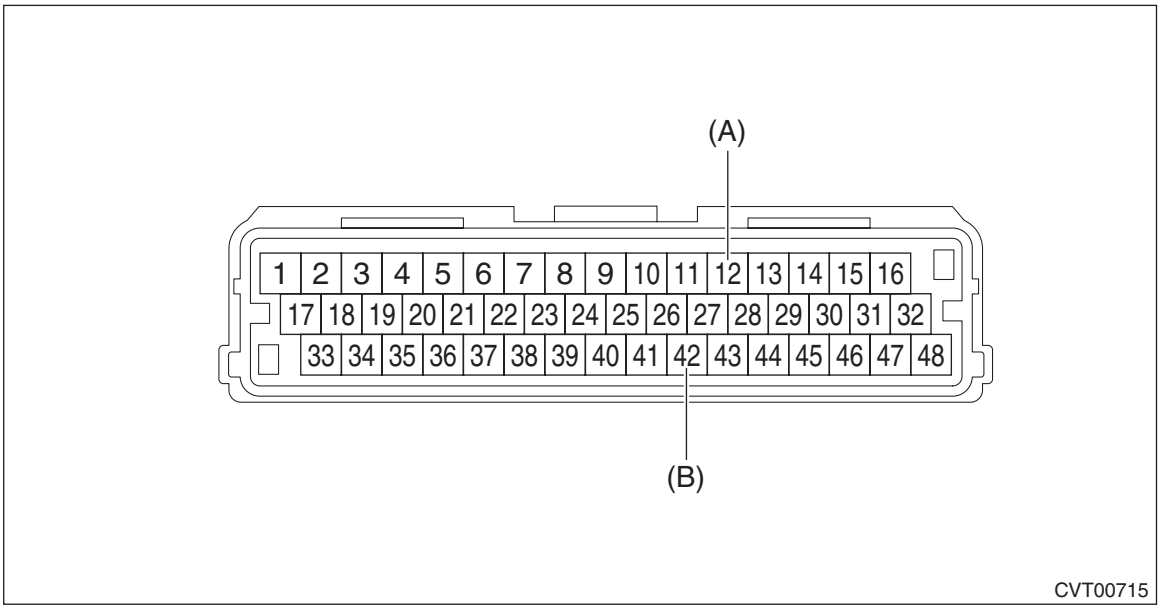
NOTE:
- Use new O-rings.
- Apply CVTF to the O-ring.

Tightening torque:
7 N·m (0.7 kgf-m, 5.2 ft-lb)

C: INSPECTION

1) Set the ST between the TCM and bulkhead harness.
ST 18460AA040 CHECK BOARD
2) Set the probe of oscilloscope to the check board connector.

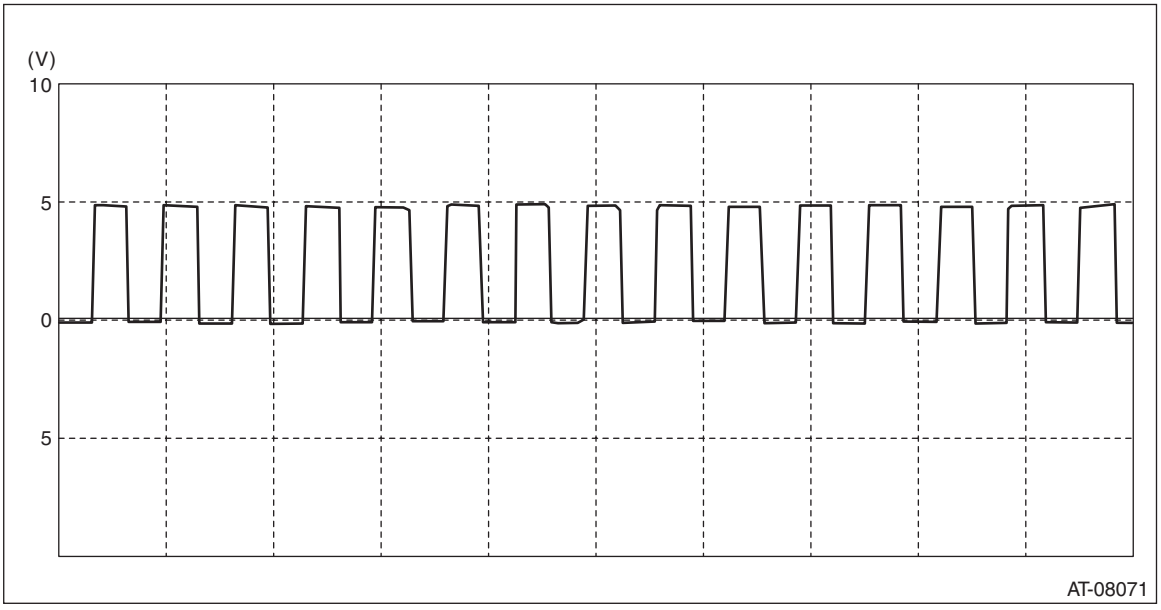
Connector & terminal
No. 12 (+) — No. 42 (–):



(A) + probe
(B) – probe

3) Start and warm up the engine.
4) Check the waveform and output voltage of the turbine speed sensor with engine idling.

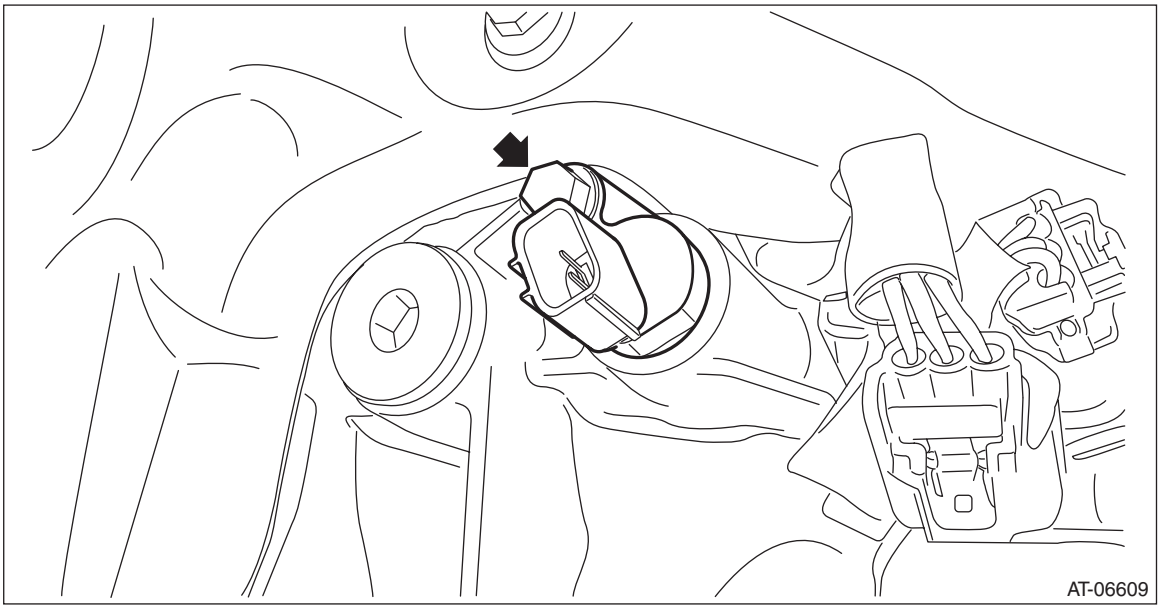
NOTE:
The waveform cycle changes as the speed changes.



16.Secondary Speed Sensor

A: REMOVAL

CAUTION:
• Be sure to prevent water or oil from contacting the connector terminal of secondary speed sensor. If adhesion occurs, replace with a new part.
• When secondary speed sensor is removed, CVTF leaks. After installing the secondary speed sensor, adjust the CVTF level.
1) Lift up the vehicle.
2) Remove the harness connector from secondary speed sensor.
3) Remove the secondary speed sensor.



B: INSTALLATION

CAUTION:
• Be sure to prevent water or oil from contacting the connector terminal of secondary speed sensor. If adhesion occurs, replace with a new part.
• After installing the secondary speed sensor, adjust the CVTF level.
Install in the reverse order of removal.

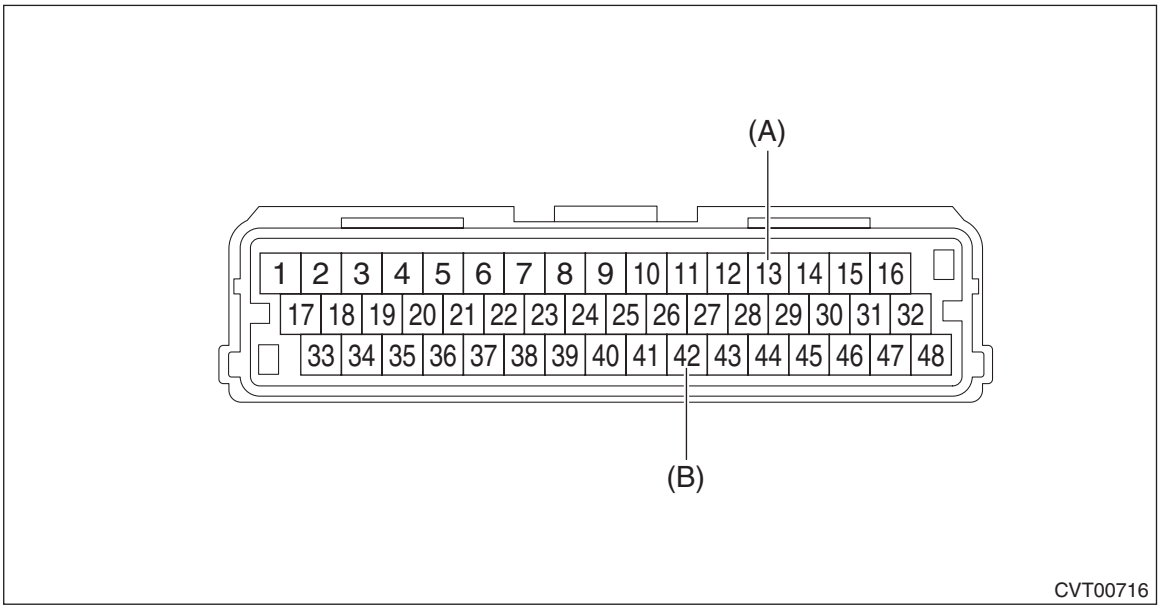
NOTE:
• Use new O-rings.
• Apply CVTF to the O-ring.

Tightening torque:
7 N·m (0.7 kgf-m, 5.2 ft-lb)

C: INSPECTION

1) Set the ST between the TCM and bulkhead harness.
ST 18460AA040 CHECK BOARD
2) Set the probe of oscilloscope to the check board connector.

Connector & terminal
No. 13 (+) — No. 42 (–):



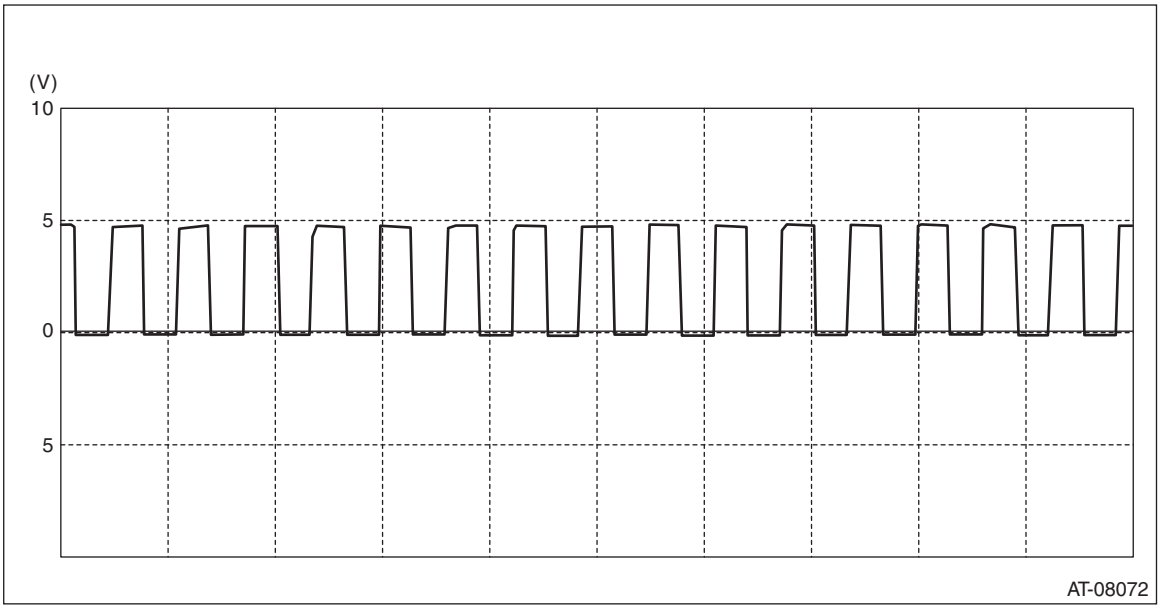
(A) + probe
(B) – probe

3) Start and warm up the engine.
4) Lift up the vehicle.

CAUTION:
Lift up the vehicle until the tire bottom is 0.3 m (0.98 ft) or more above the ground.
5) Shift the select lever to “D” range.

6) Check the waveform and output voltage of the secondary speed sensor with engine idling.

NOTE:
The waveform cycle changes as the speed changes.

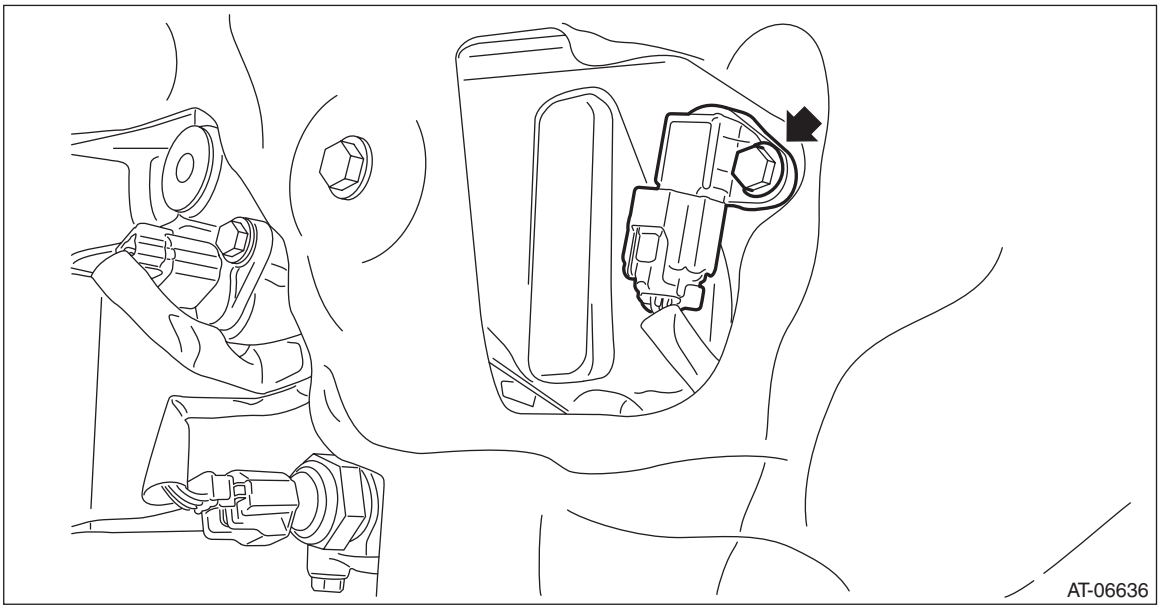


17.Primary Speed Sensor

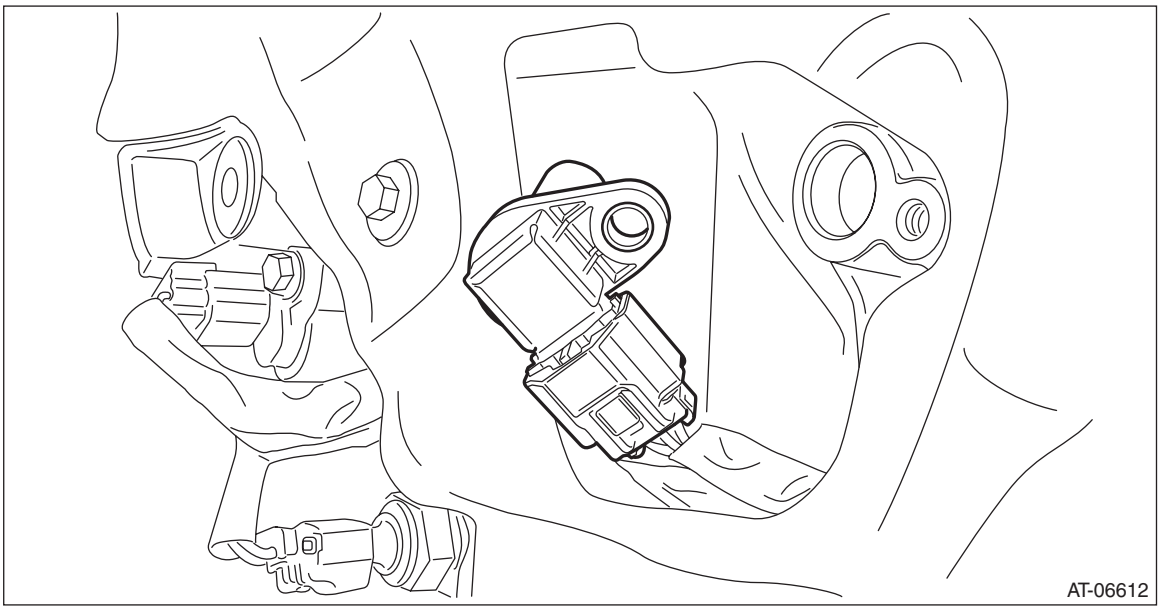
A: REMOVAL

CAUTION:
Be sure to prevent water or oil from contacting the connector terminal of primary speed sensor. If adhesion occurs, replace with a new part.

1) Remove the transmission assembly. <Ref. to CVT(TR580)-60, REMOVAL, Automatic Transmission Assembly.>
2) Remove the primary speed sensor.



3) Remove the harness connector from primary speed sensor.



B: INSTALLATION

CAUTION:
Be sure to prevent water or oil from contacting the connector terminal of primary speed sensor. If adhesion occurs, replace with a new part.
Install in the reverse order of removal.

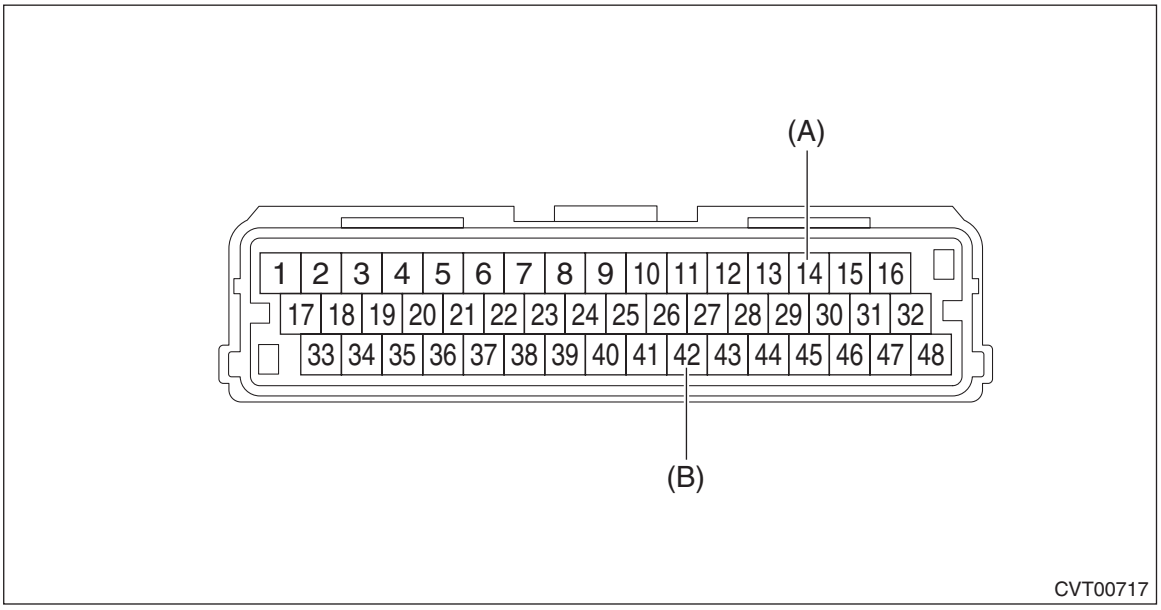
NOTE:
- Use new O-rings.
- Apply CVTF to the O-ring.

Tightening torque:
7 N·m (0.7 kgf-m, 5.2 ft-lb)

C: INSPECTION

1) Set the ST between the TCM and bulkhead harness.
ST 18460AA040 CHECK BOARD
2) Set the probe of oscilloscope to the check board connector.

Connector & terminal
No. 14 (+) — No. 42 (–):



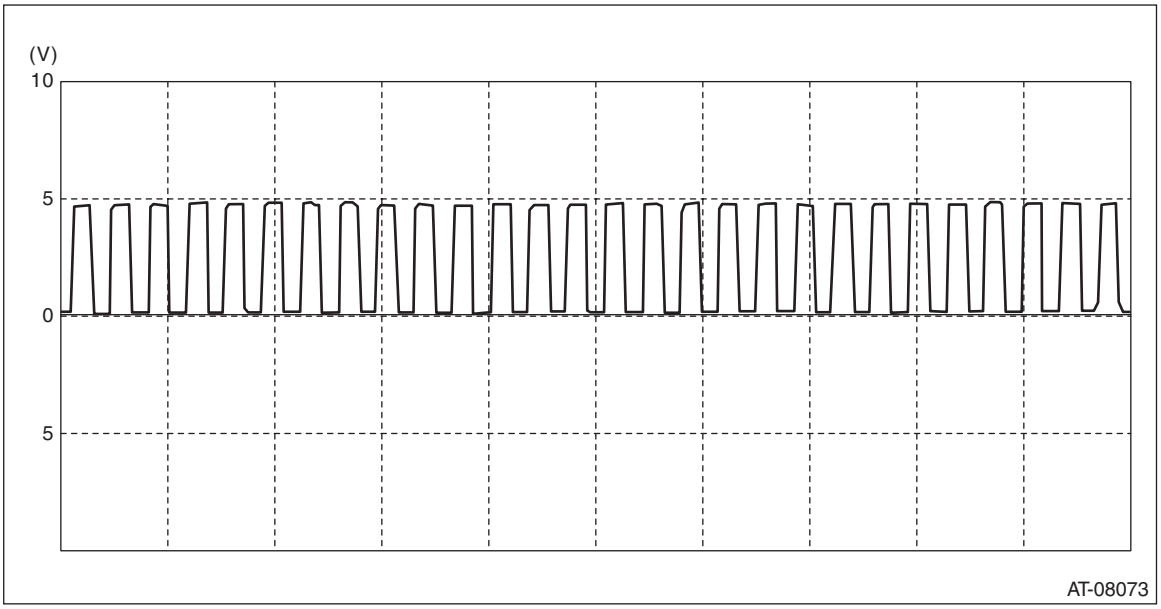
(A) + probe
(B) – probe

3) Start and warm up the engine.
4) Lift up the vehicle.

CAUTION:
Lift up the vehicle until the tire bottom is 0.3 m (0.98 ft) or more above the ground.
5) Shift the select lever to “D” range.

6) Check the waveform of primary speed sensor with engine idling running.

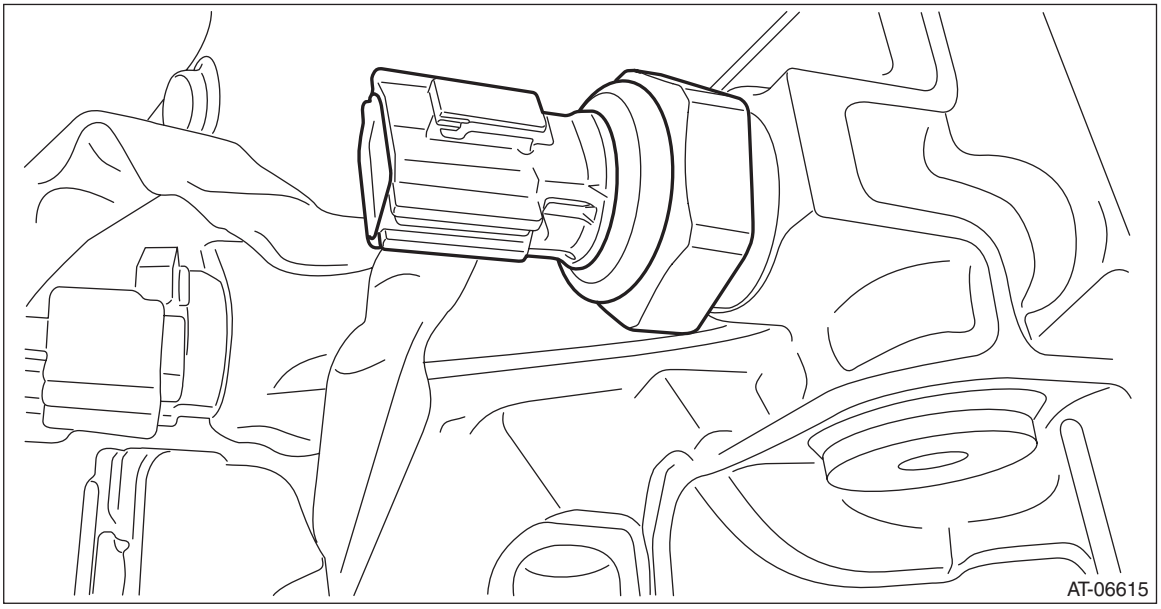
NOTE:
The waveform cycle changes as the speed changes.



18.Secondary Pressure Sensor

A: REMOVAL

CAUTION:
• Be sure to prevent water or oil from contacting the connector terminal of secondary pressure sensor. If adhesion occurs, replace with a new part.
• When secondary pressure sensor is removed, CVTF leaks. After installing the secondary pressure sensor, adjust the CVTF level.
1) Disconnect the ground cable from battery.
2) Lift up the vehicle.
3) Remove the secondary pressure sensor connector.
4) Remove the secondary pressure sensor.



B: INSTALLATION

CAUTION:
• Be sure to prevent water or oil from contacting the connector terminal of secondary pressure sensor. If adhesion occurs, replace with a new part.
• After installing the secondary pressure sensor, adjust the CVTF level.
Install in the reverse order of removal.

NOTE:
Use new O-rings.

Tightening torque:
39 N·m (4.0 kgf-m, 28.8 ft-lb)

C: INSPECTION

1) Start and warm up the engine.
2) Depress the brake pedal, and shift the select lever to “D” range.
3) Shift the select lever to “P” or “N” range.
4) Depress the brake pedal and hold it.
5) Check “secondary pressure sensor voltage” by using Subaru Select Monitor while the engine is idling. <Ref. to CVT(w/o HEV)(diag)-14, OPERATION, Subaru Select Monitor.>

Standard
Approx. 0.8 V

6) Check “secondary pressure sensor voltage” by using Subaru Select Monitor while the engine is stopped and the ignition switch is turned on. <Ref. to CVT(w/o HEV)(diag)-14, OPERATION, Subaru Select Monitor.>

Specification:
Approx. 0.5 V

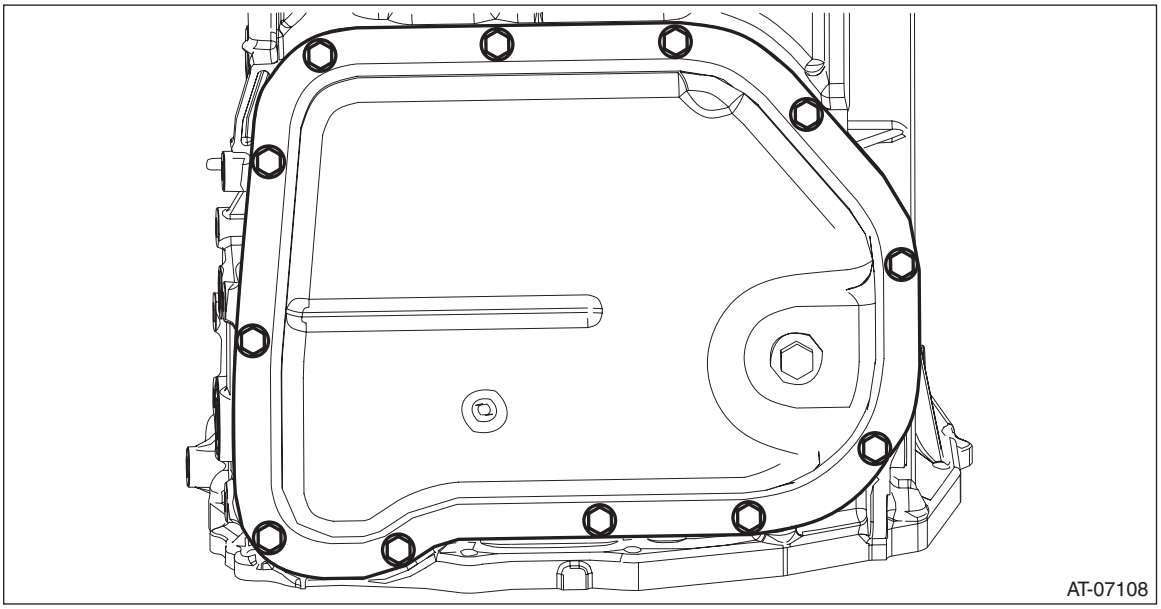
19.Oil Pan and Strainer

A: REMOVAL

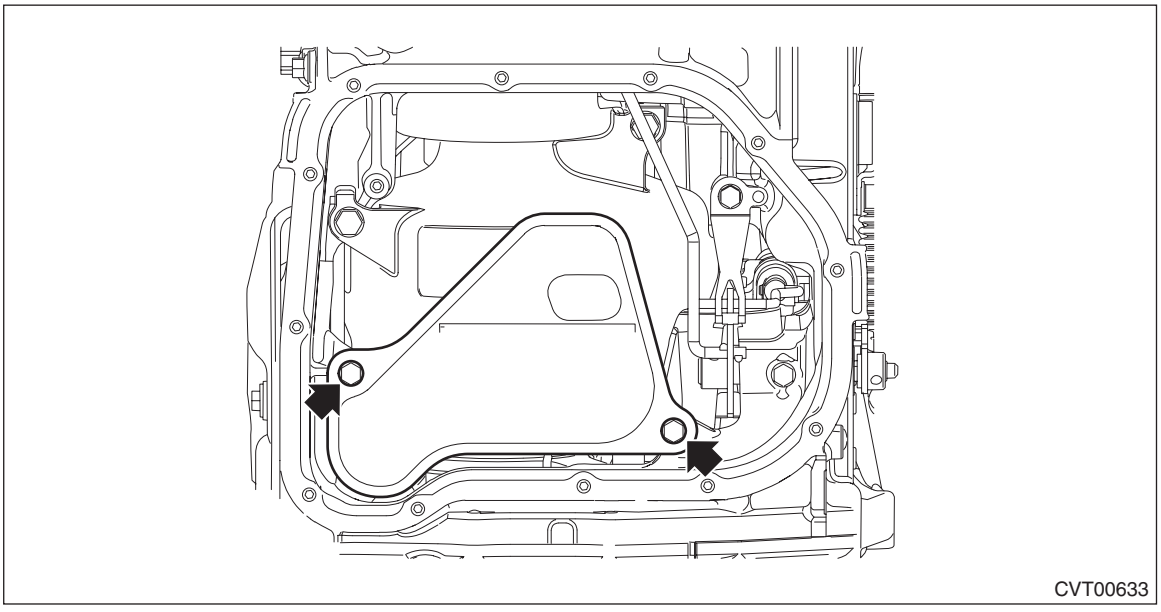
CAUTION:
• Directly after the vehicle has been running or the engine has been idling for a long time, the CVTF is hot. Be careful not to burn yourself.
• Be careful not to spill CVTF on the exhaust pipe to prevent it from emitting smoke or causing a fire. If the CVTF adheres, wipe it off completely.

1) Lift up the vehicle.
2) Clean the transmission exterior.
3) Remove the CVTF drain plug to drain CVTF.
4) Remove the oil pan.

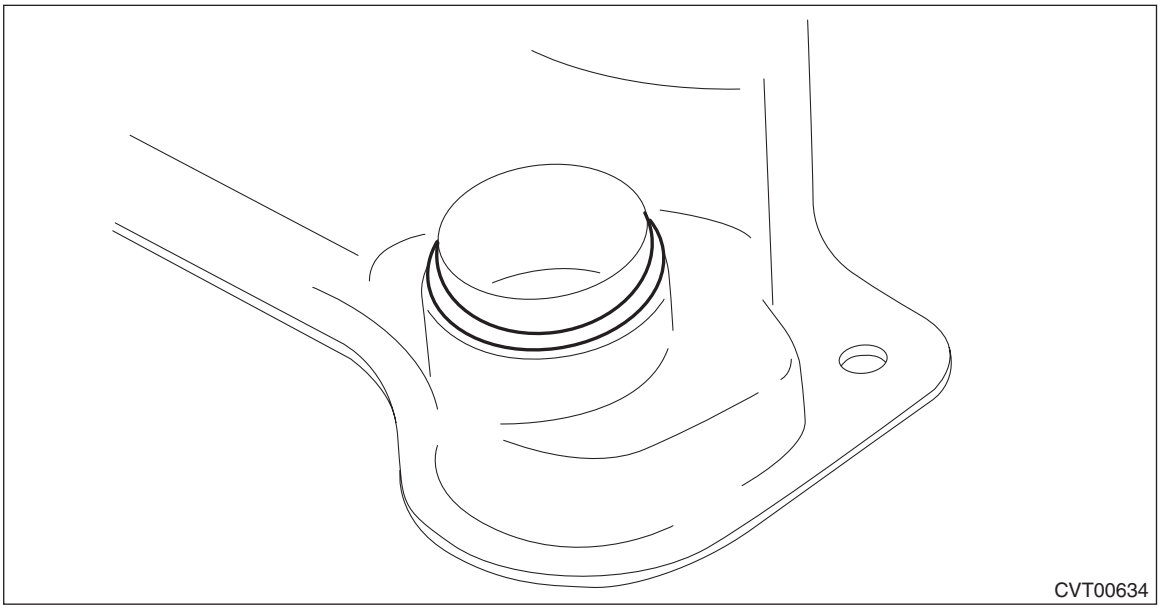
CAUTION:
Be careful not to allow foreign matter such as dust or dirt to enter the oil pan.


AT-07108

5) Remove the magnet.
6) Remove the oil strainer.


CVT00633

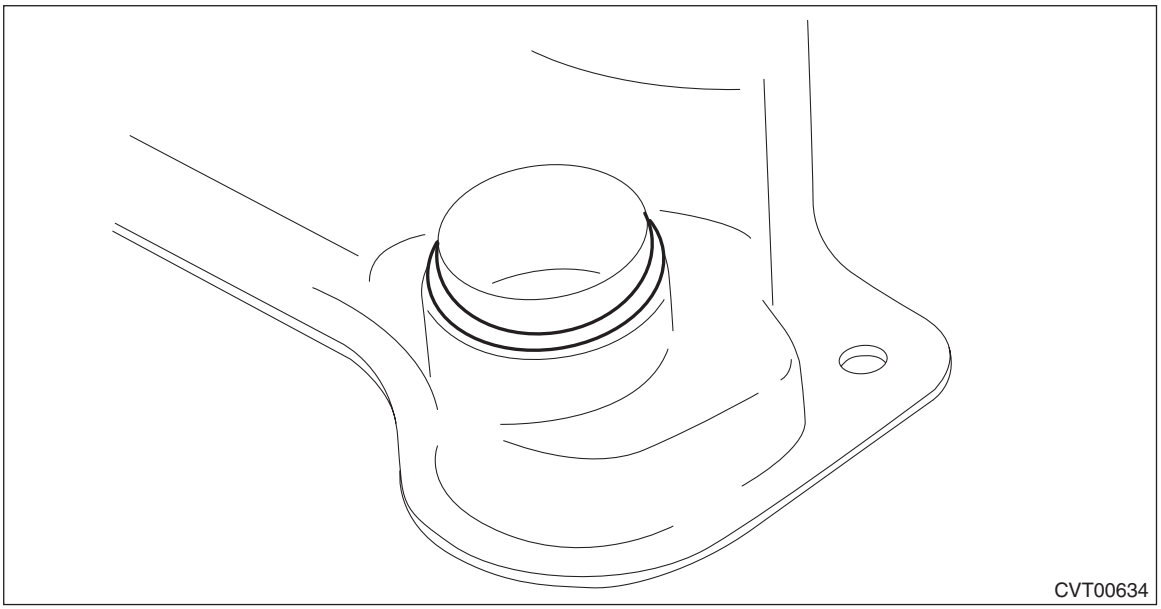
7) Remove the O-ring from oil strainer.



B: INSTALLATION

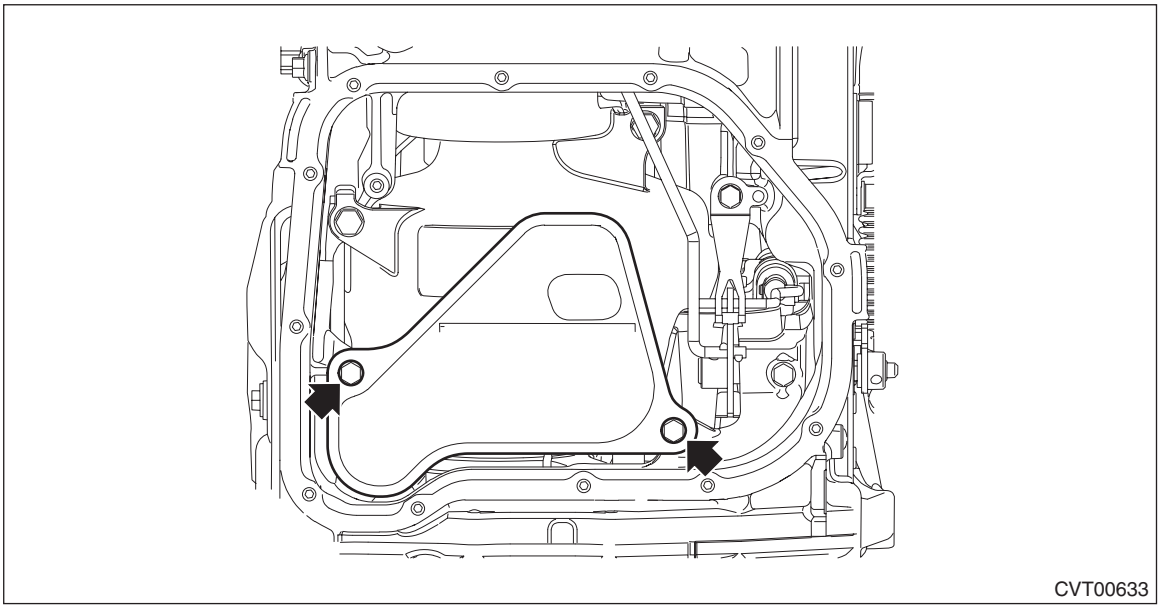
1) Clean the mating surface of oil pan and transmission case.
2) Install the O-ring to the oil strainer.

NOTE:
- Use new O-rings.
- Apply CVTF to the O-ring.



3) Install the oil strainer.

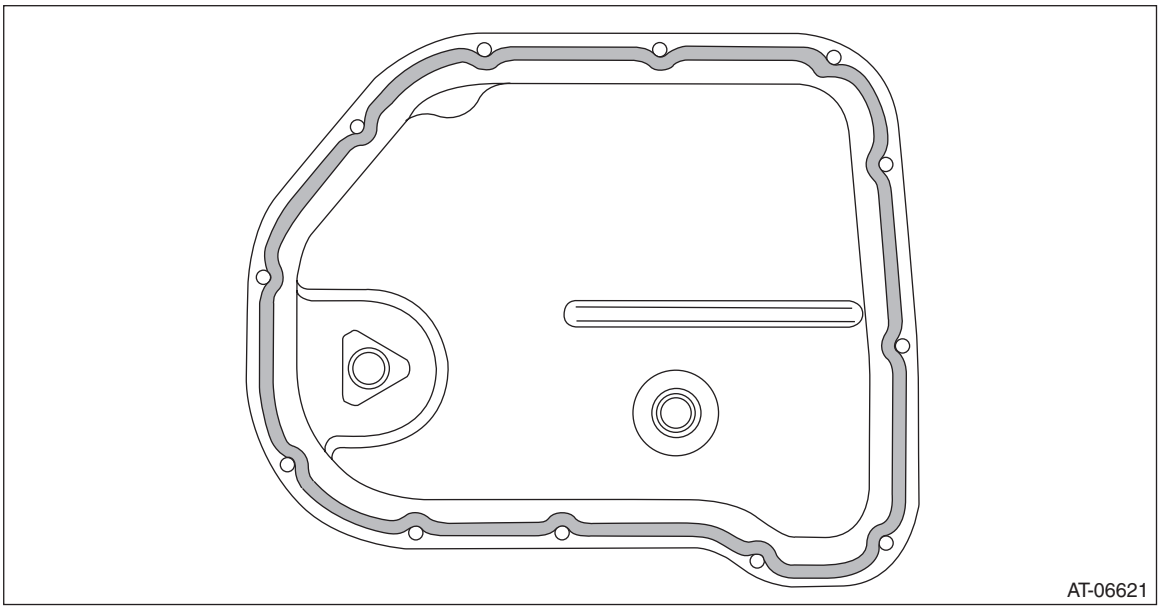
Tightening torque:
9 N·m (0.9 kgf-m, 6.6 ft-lb)



4) Clean the magnet.
5) Attach the magnet at the specified position of the oil pan.

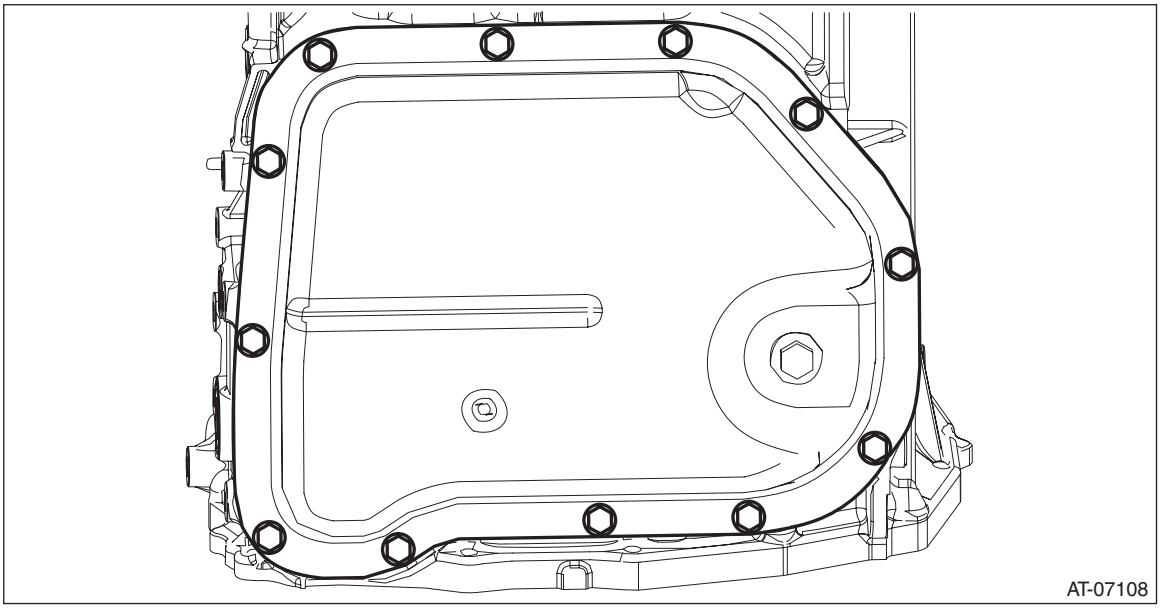
6) Apply liquid gasket all around the oil pan mating surface seamlessly.

Liquid gasket:
THREE BOND 1217B (Part No. K0877YA020) or equivalent



7) Install the oil pan by equally tightening the bolts.

Tightening torque:
5 N·m (0.5 kgf-m, 3.7 ft-lb)



8) Refill CVTF and adjust the level. <Ref. to CVT(TR580)-38, REPLACEMENT, CVTF.>

C: INSPECTION

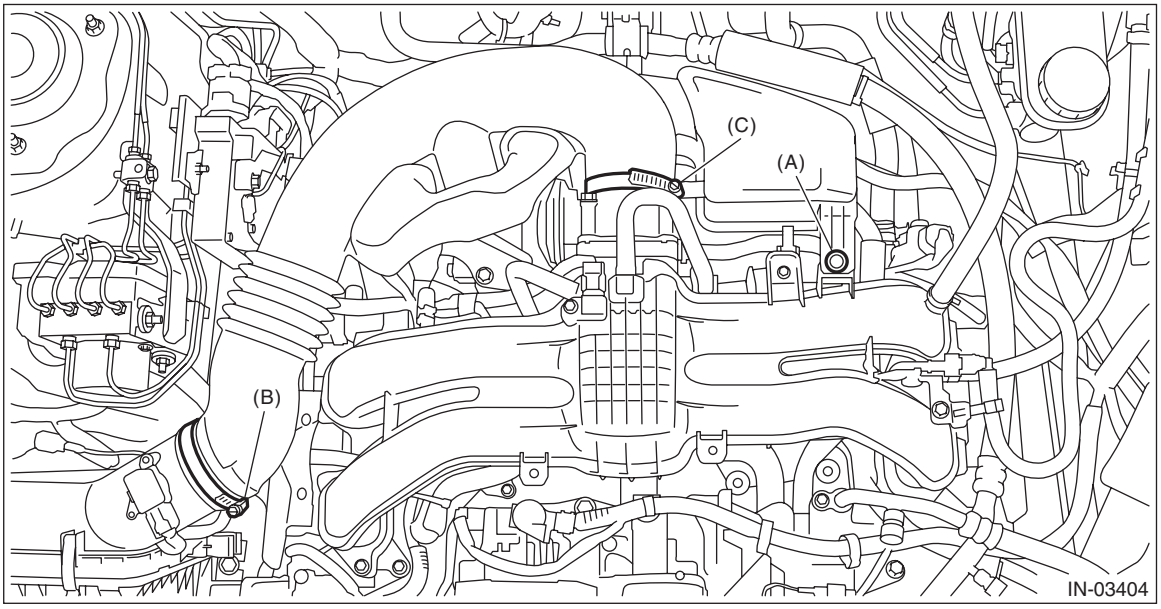
- Check each part for damage or dust.
- Check oil strainer for clogging.

20.Control Valve Body

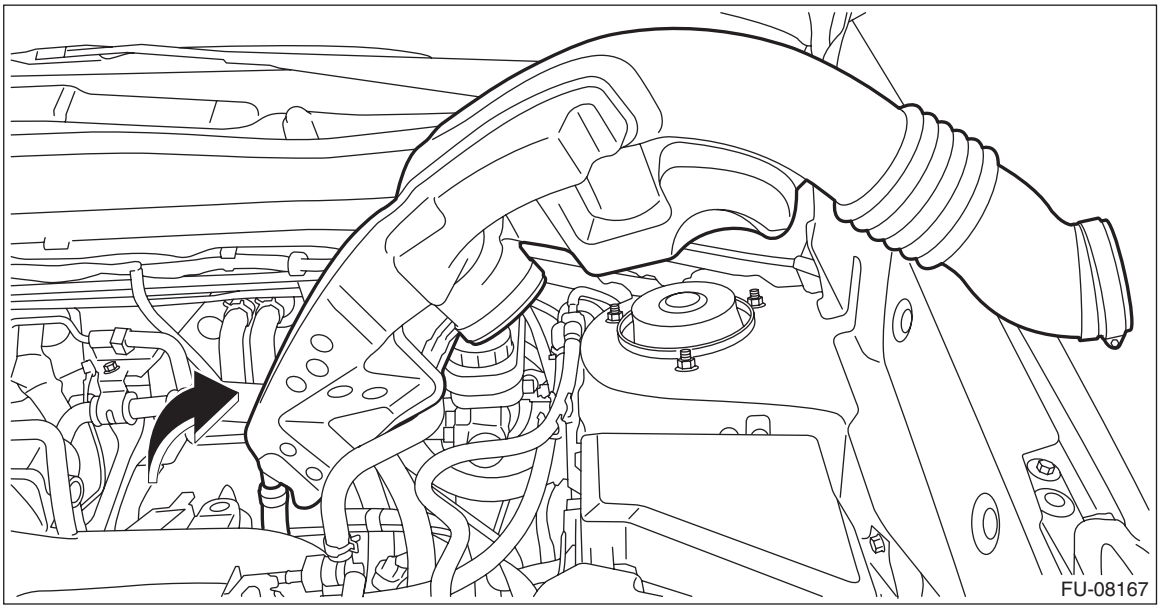
A: REMOVAL

CAUTION:
• Directly after the vehicle has been running or the engine has been idling for a long time, the CVTF is hot. Be careful not to burn yourself.
• Be careful not to spill CVTF on the exhaust pipe to prevent it from emitting smoke or causing a fire. If the CVTF adheres, wipe it off completely.
• Always clean the engine compartment before removal.

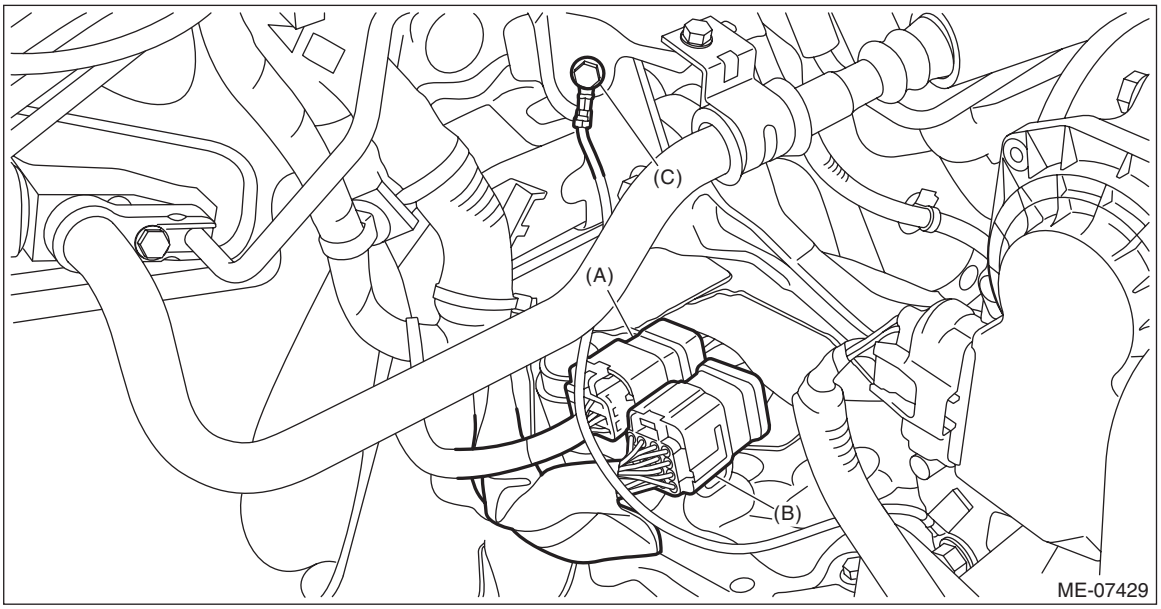
NOTE:
The control valve body is replaced as an assembly only, because it is a non-disassembly part.
1) Disconnect the ground cable from battery.
2) Remove the clip (A) from the air intake boot.
3) Loosen the clamp (B) connecting the air intake boot and air cleaner case (rear).
4) Loosen the clamp (C) which connects the air intake boot and throttle body.



5) Remove the air intake boot from the throttle body, and move it to the left side wheel apron.

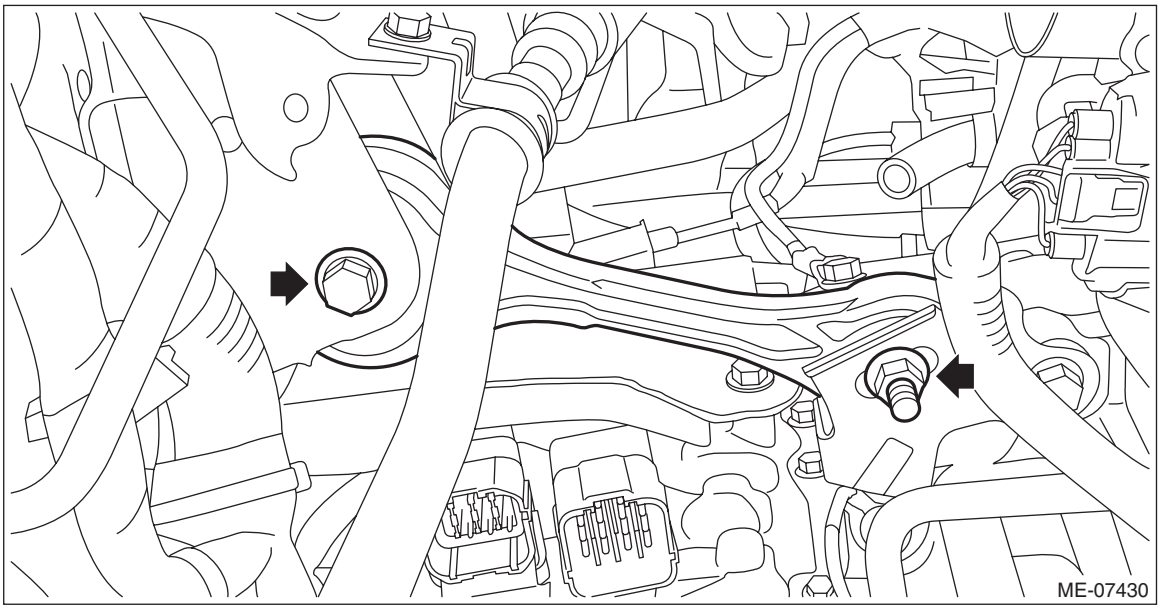


6) Disconnect the following connectors.
- Transmission harness connectors
- Inhibitor harness connector
- Transmission radio ground terminal

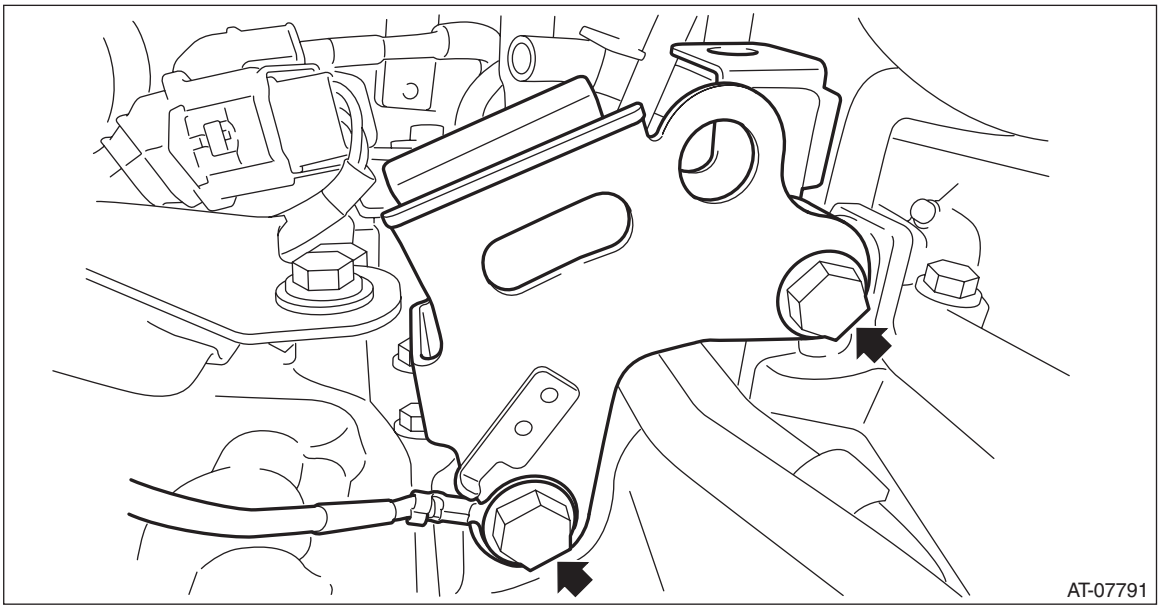


(A) Transmission harness connectors
(B) Inhibitor harness connector
(C) Transmission radio ground terminal

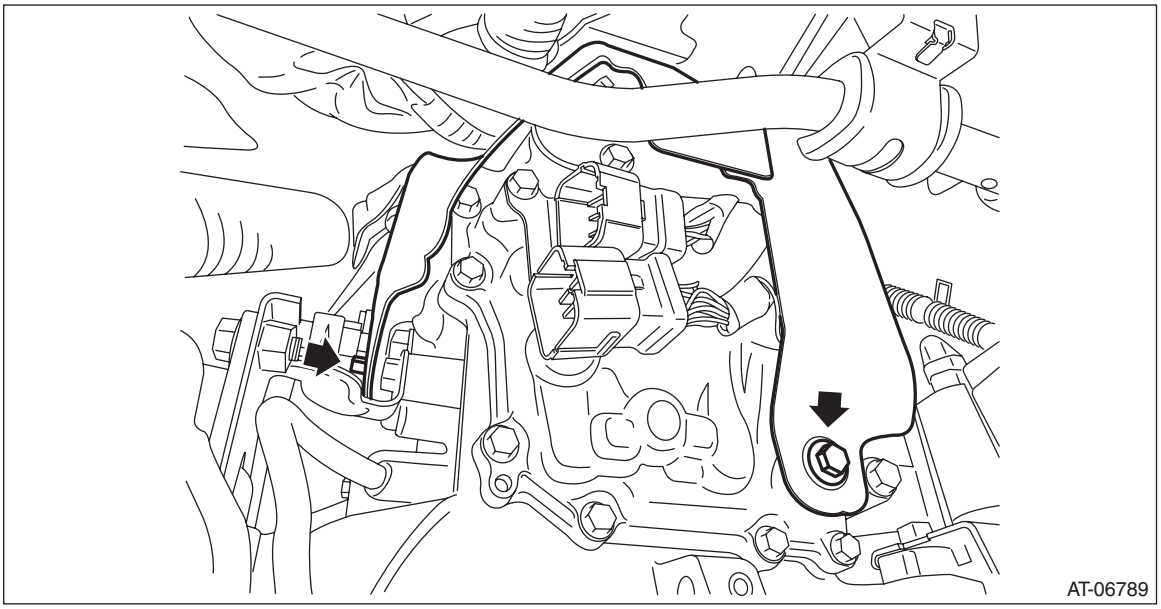
7) Remove the pitching stopper.



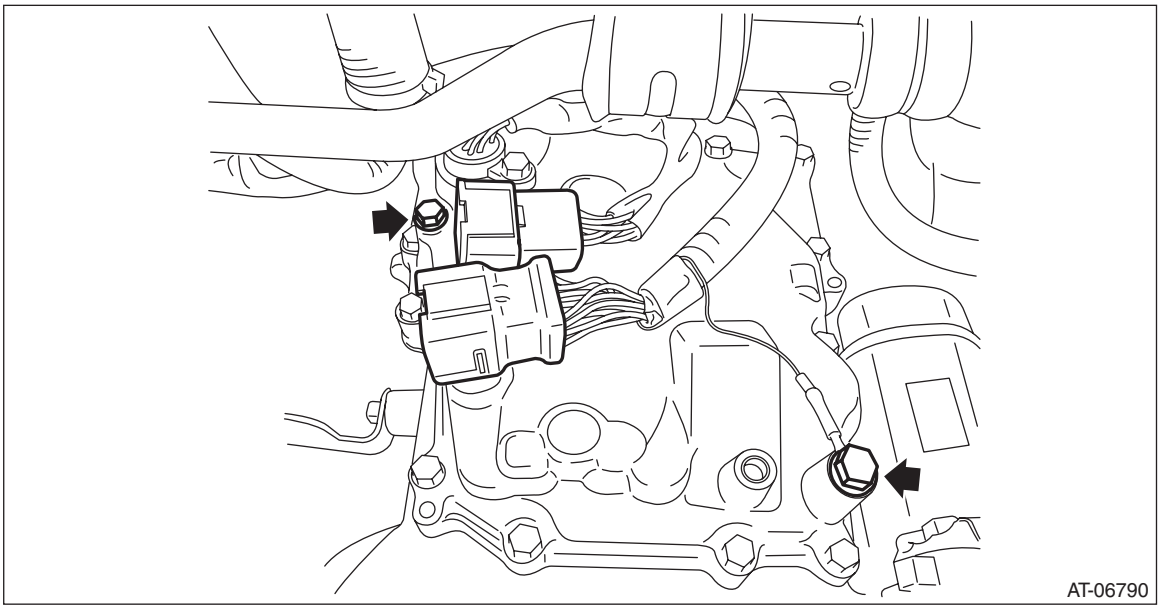
8) Remove the air breather hose from the pitching stopper bracket, and then remove the pitching stopper bracket and transmission radio ground cord.



9) Remove the transmission case cover.



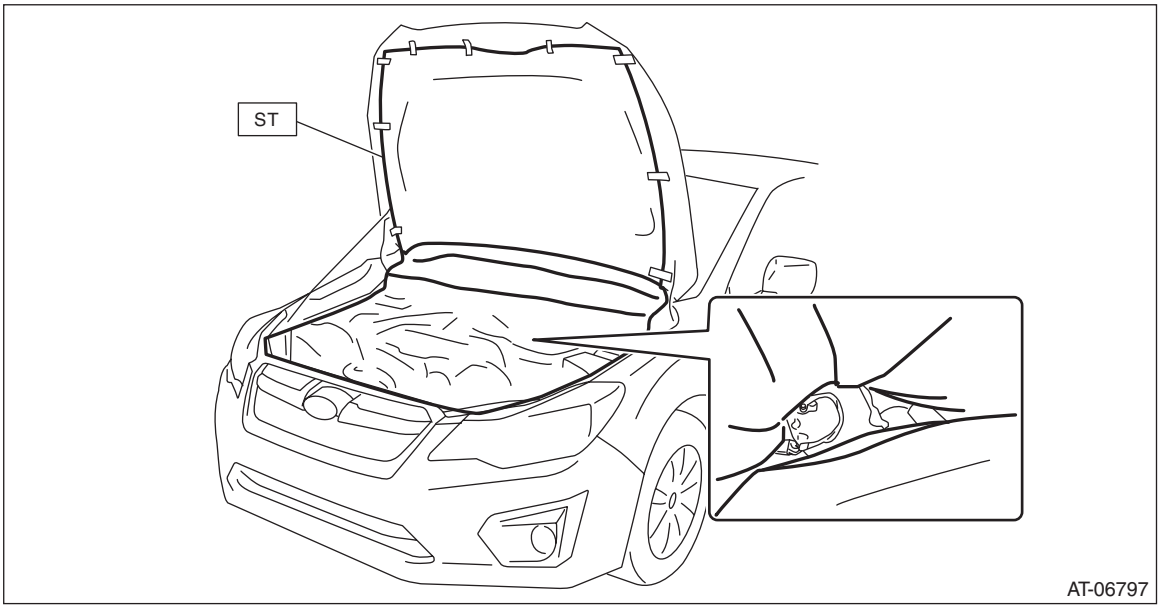
10) Remove the transmission harness stay and ground terminal.



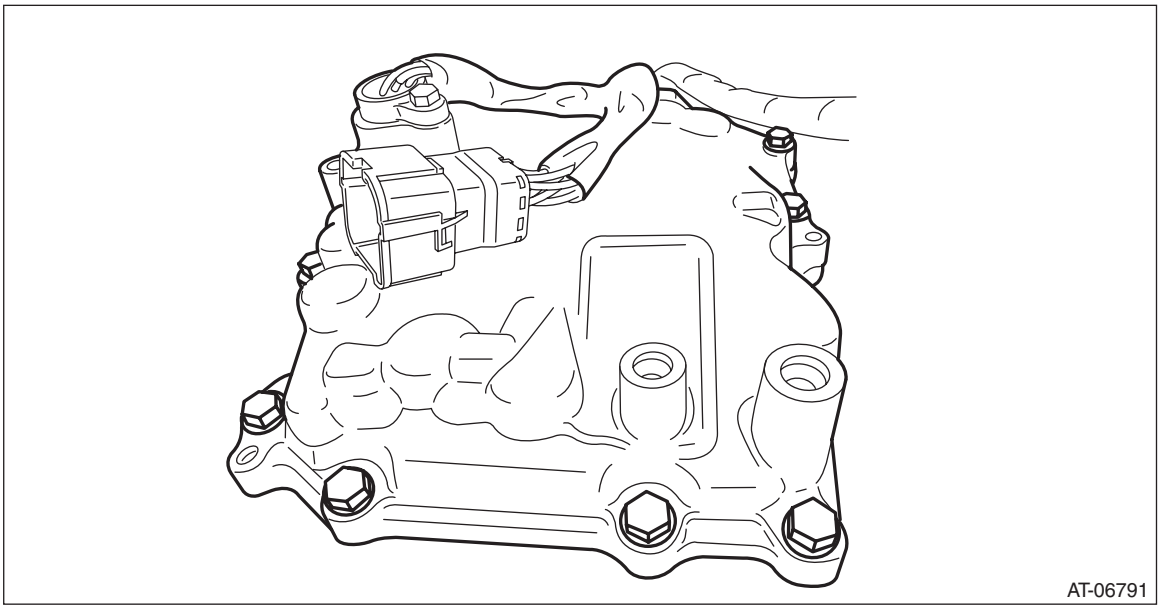
11) Remove the transmission harness connector from the harness stay.
12) Remove the throttle body, and move it aside so that it will not interfere with the removal of the control valve. <Ref. to FU(H4DO(w/o HEV))-14, REMOVAL, Throttle Body.>

NOTE:
Do not remove the preheater hose.
13) Clean the transmission exterior.
14) Fix the ST with tape, and set the ST to the vehicle.

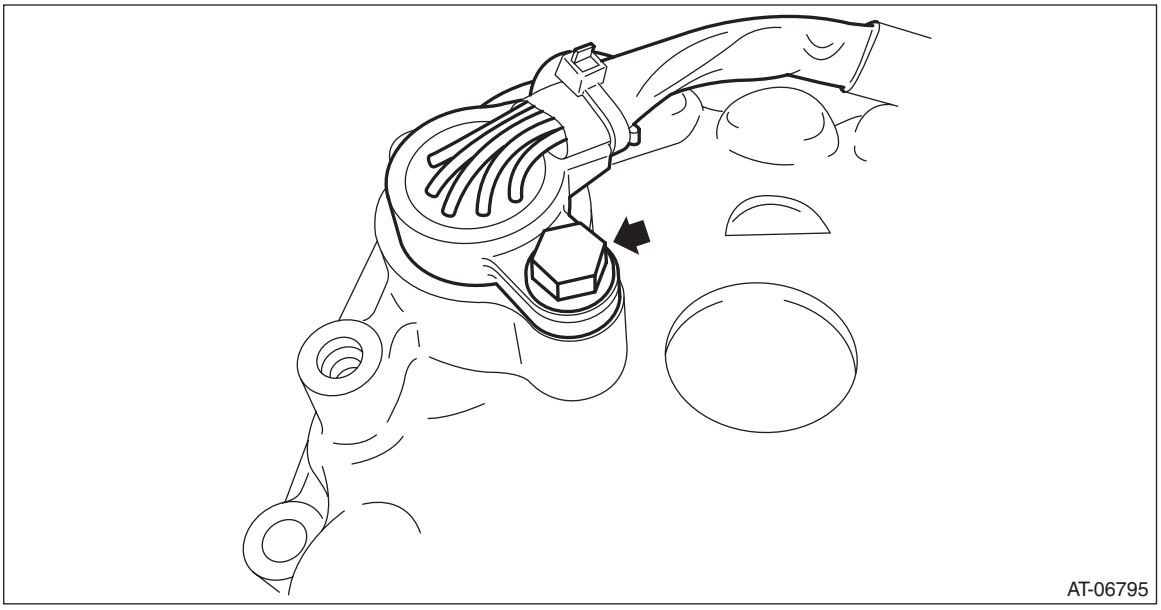
NOTE:
When replacing the control valve body, the sheet is included in the control valve body for repairs.
ST 18761AA010 SHEET SPECIAL TOOL



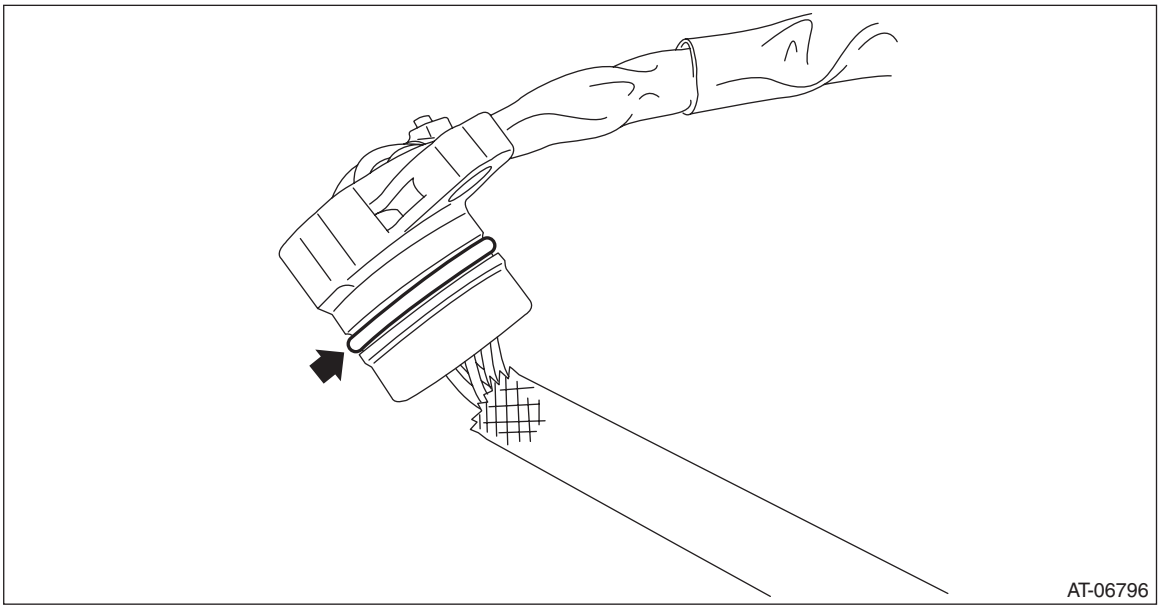
15) Remove the valve cover and gasket.



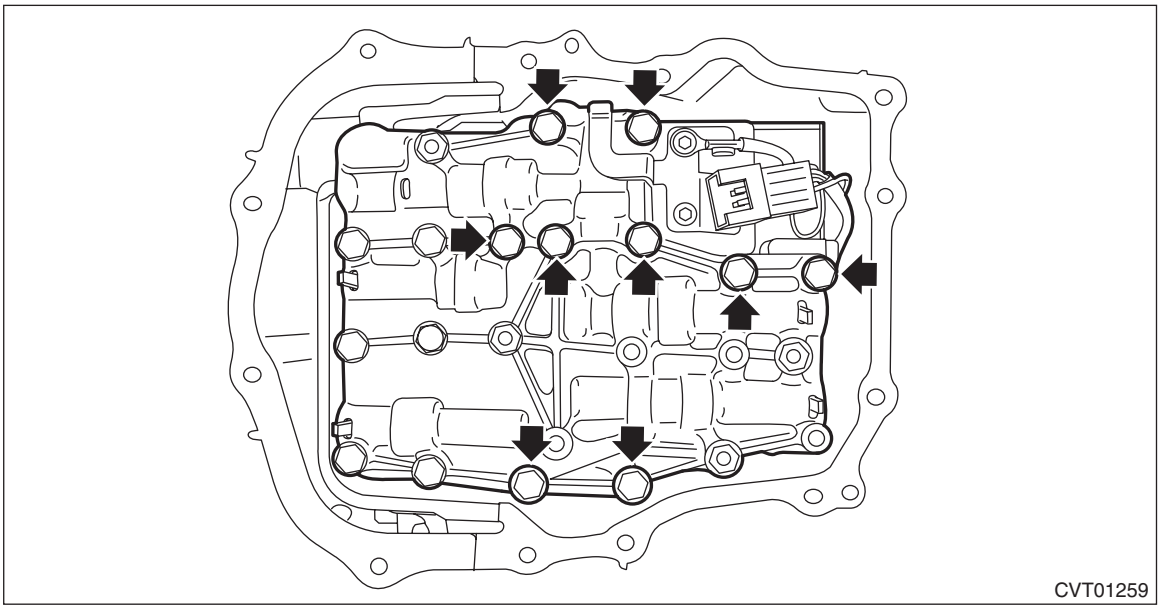
16) Remove the transmission harness from the valve cover.



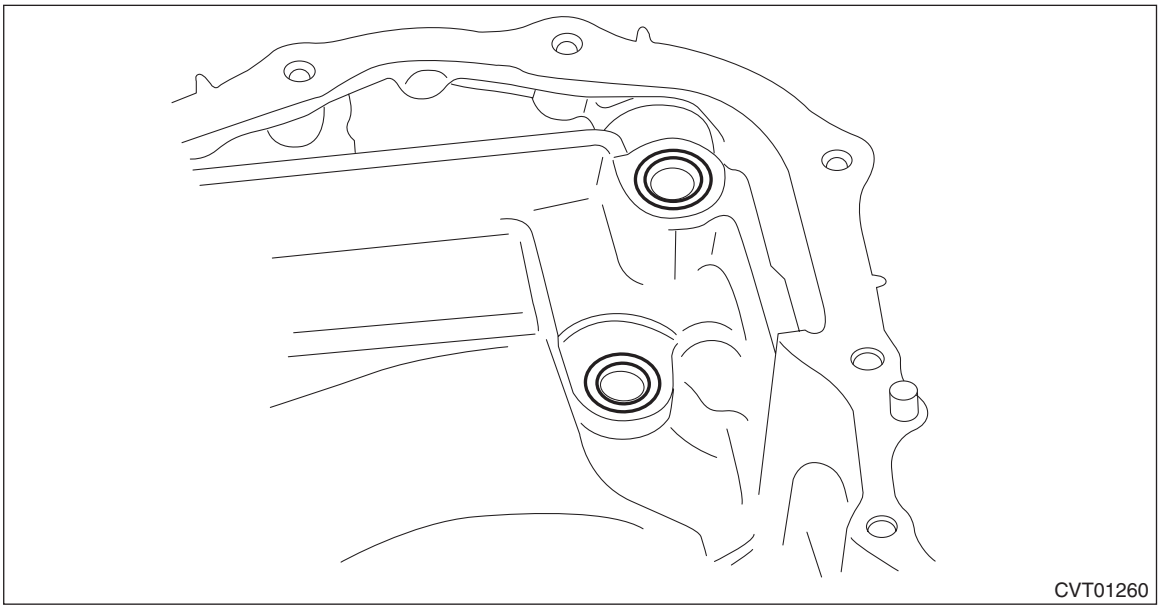
17) Remove the O-ring from the transmission harness.



18) Disconnect the harness connector from the control valve body.
19) Remove the control valve body.



20) Remove the O-ring from the transmission.



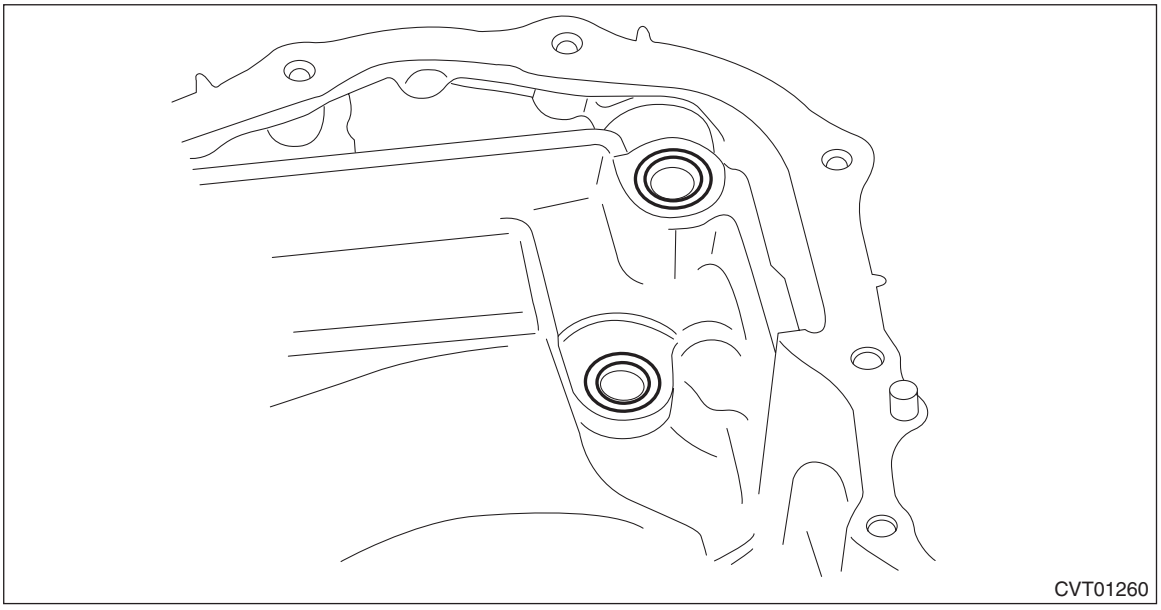
B: INSTALLATION

1) Clean the mating surface of valve cover and transmission side.

CAUTION:
When cleaning the mating surface of the transmission side, be careful not to allow any dust, foreign matter and used liquid gasket to enter the transmission.

2) Check the control valve body for dust and other foreign matter.
3) Install the O-ring.

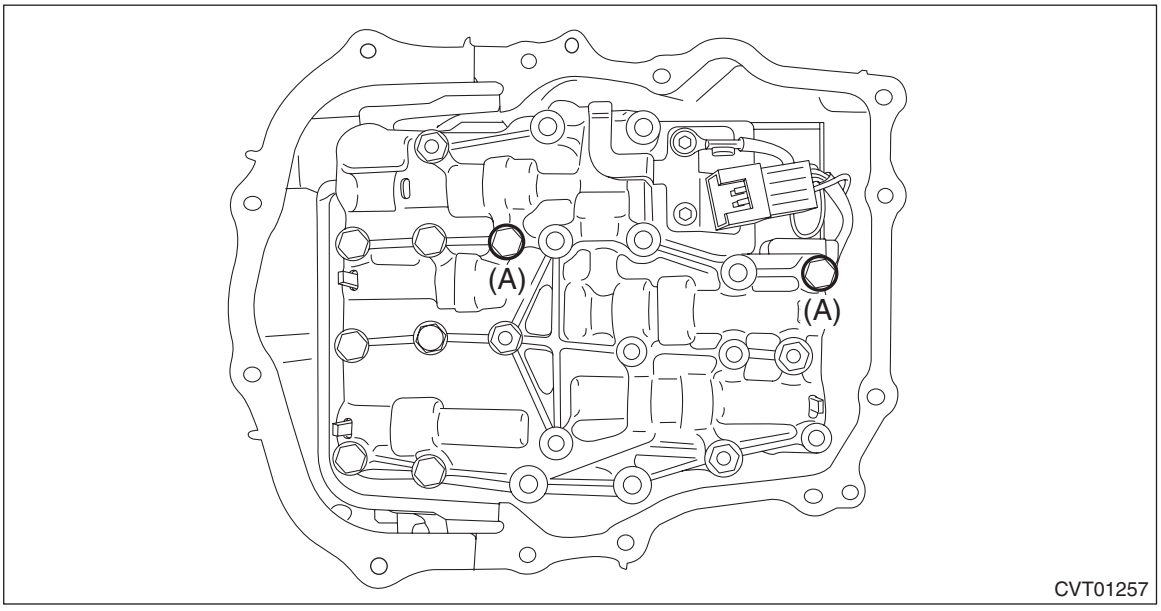
NOTE:
- Use new O-rings.
- Apply CVTF to the O-ring.


CVT01260

4) Install the control valve body.
   (1) Install the control valve body to the transmission.

CAUTION:
- **Do not damage the O-ring.**
- **Perform installation so that the O-ring is not displaced.**

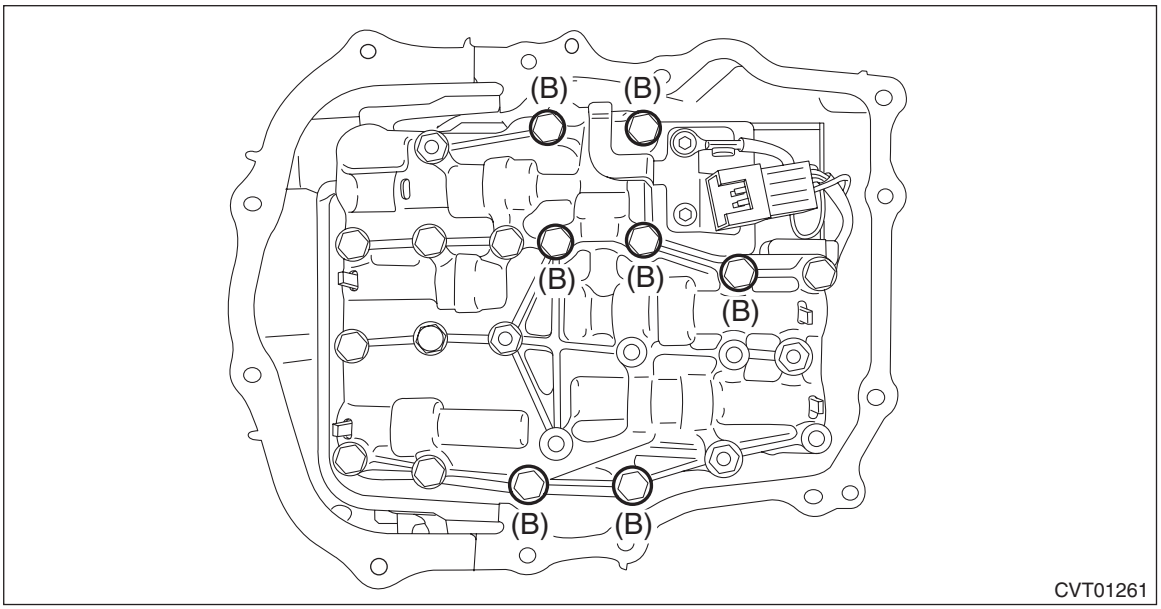
   (2) Temporarily tighten the bolt (A: silver).



CVT01257

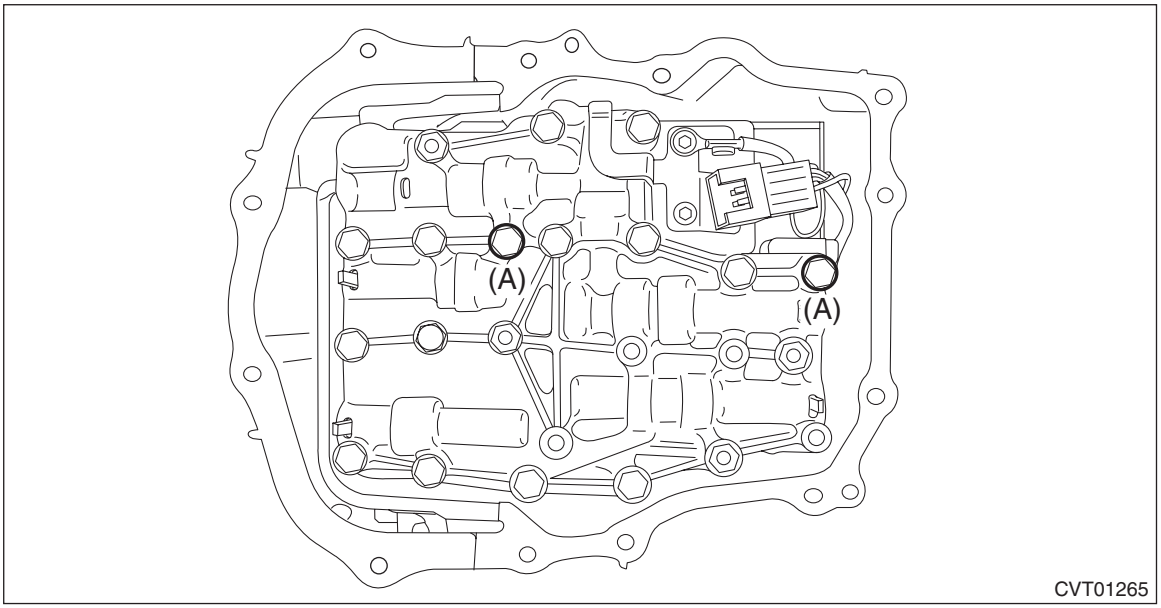
(3) Attach the bolt (B).

Tightening torque:
9 N·m (0.9 kgf-m, 6.6 ft-lb)



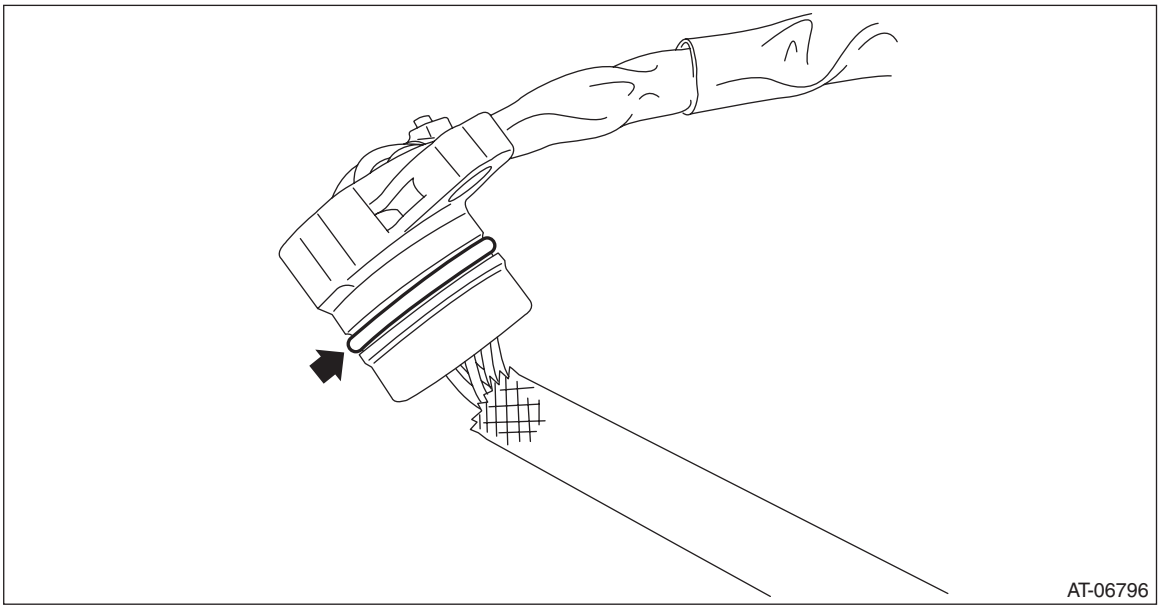
(4) Tighten the bolt (A: silver).

Tightening torque:
9 N·m (0.9 kgf-m, 6.6 ft-lb)



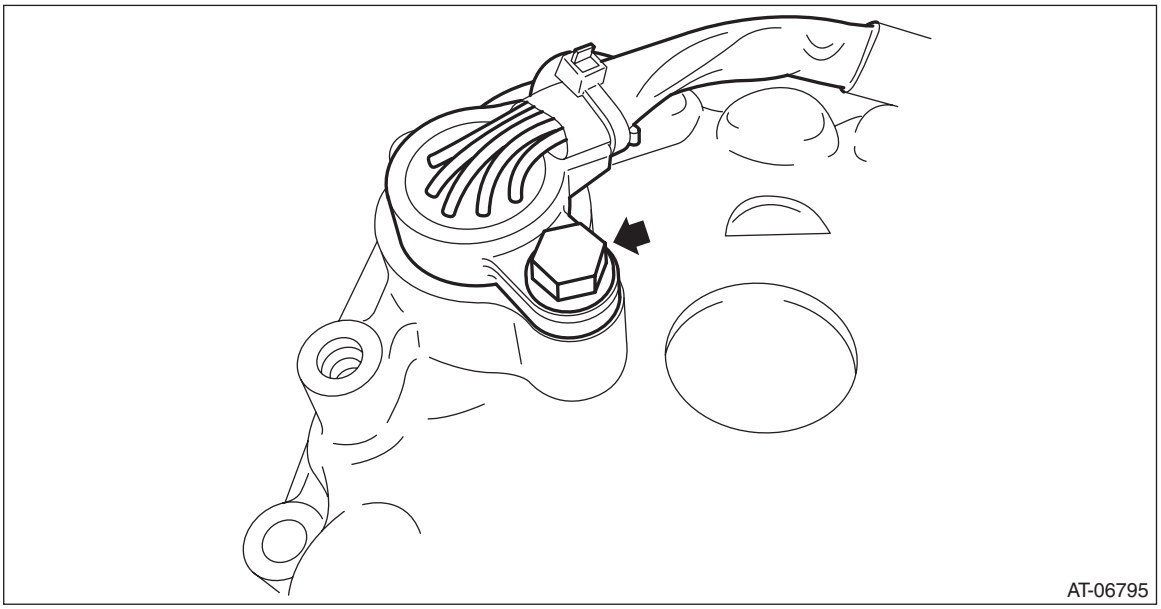
5) Install the O-ring to the transmission harness.

NOTE:
- Use new O-rings.
- Apply CVTF to the O-ring.



6) Install the transmission harness to the valve cover.

Tightening torque:
7 N·m (0.7 kgf-m, 5.2 ft-lb)

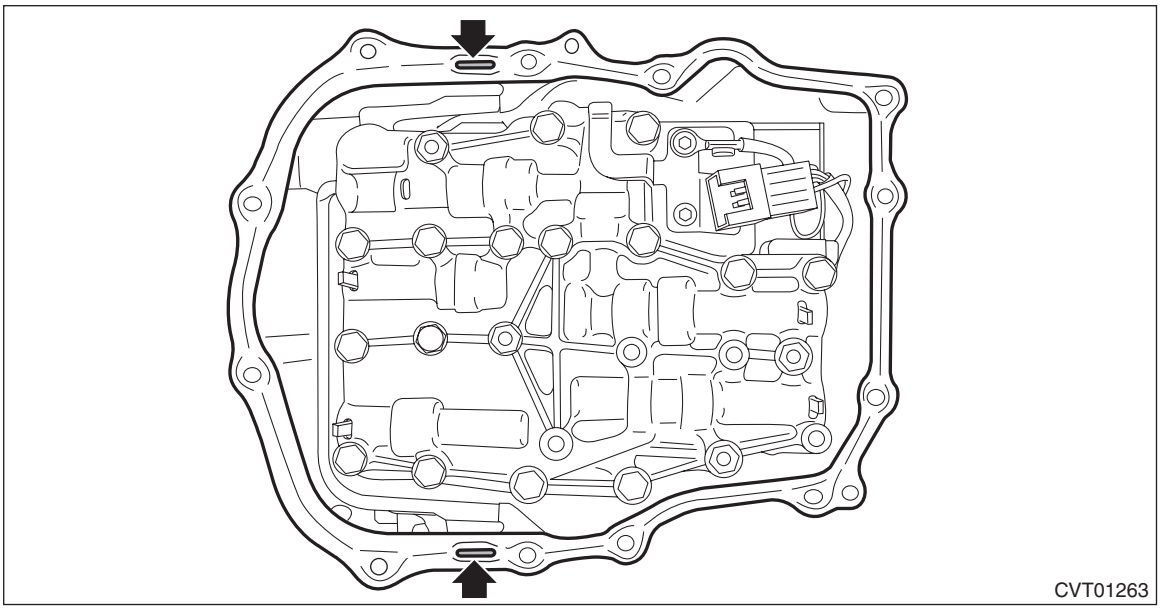


7) Install the gasket to the transmission.

NOTE:
Use a new gasket.

8) Apply liquid gasket to the oval hole of gasket.

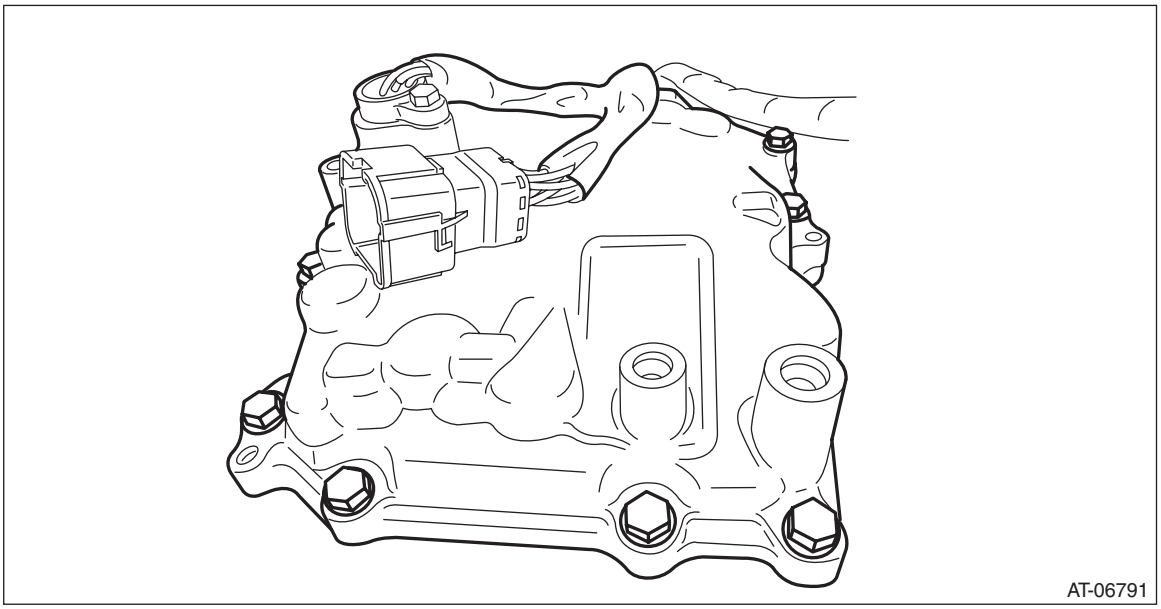
Liquid gasket:
THREE BOND 1215B or equivalent



9) Connect the transmission harness connector to the control valve body, and install the valve cover.

CAUTION:
Be careful not to catch the sheet of the ST.

Tightening torque:
8 N·m (0.8 kgf-m, 5.9 ft-lb)

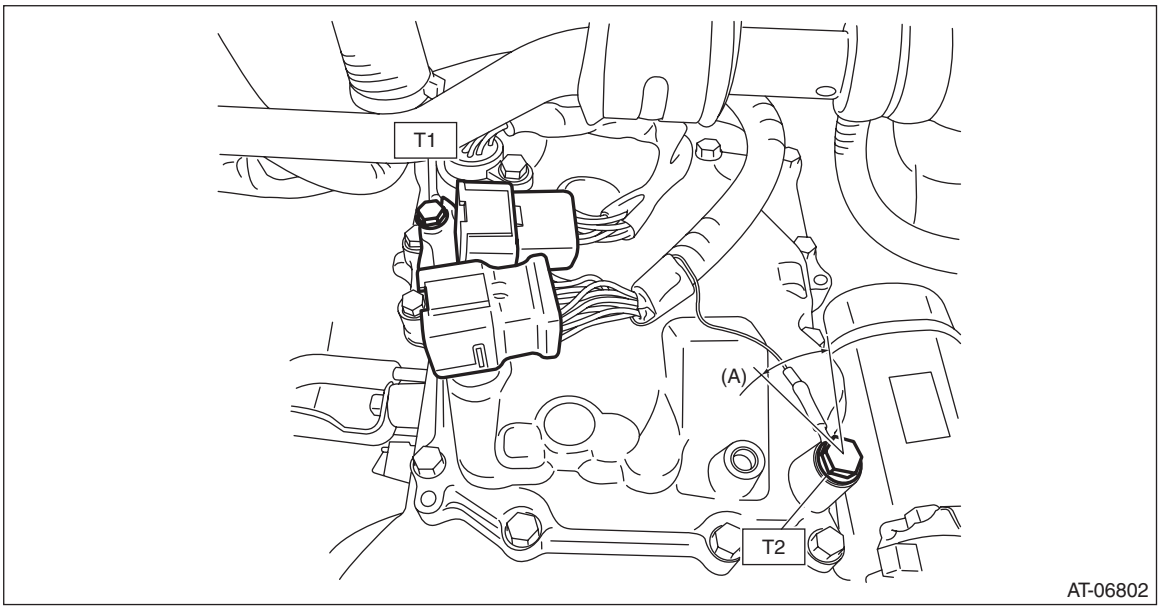


10) Remove the ST (SHEET SPECIAL TOOL).
11) Install the throttle body. <Ref. to FU(H4DO(w/o HEV))-16, INSTALLATION, Throttle Body.>
12) Install the transmission harness connector to the harness stay.

13) Install the transmission harness stay and transmission ground terminal.

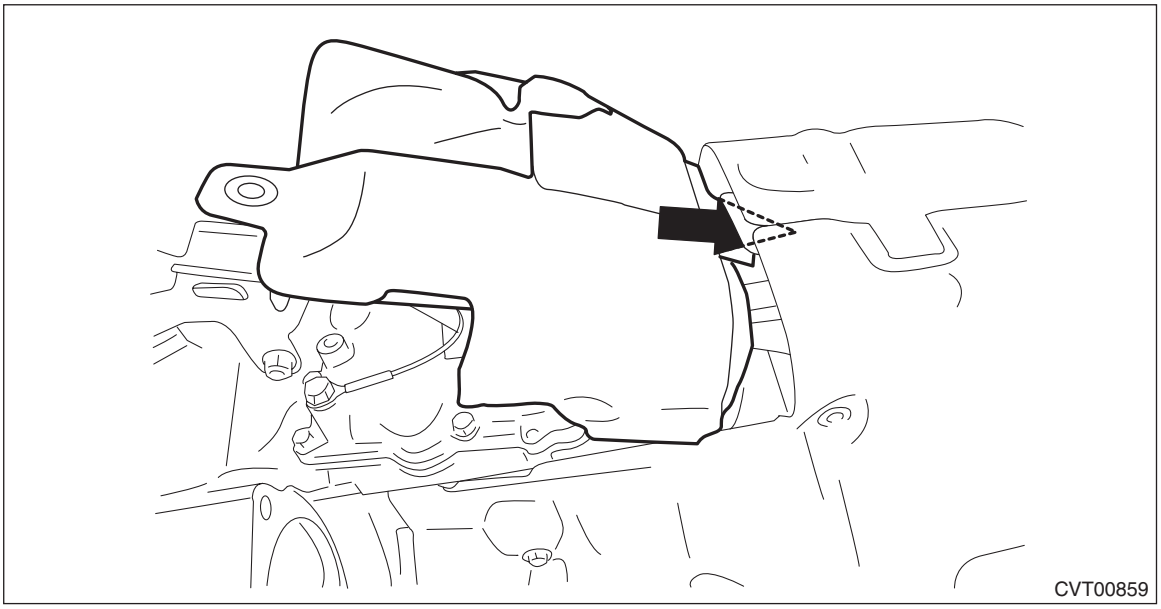
NOTE:
Install the transmission ground terminal in the direction within the range of approx. 30° (A).

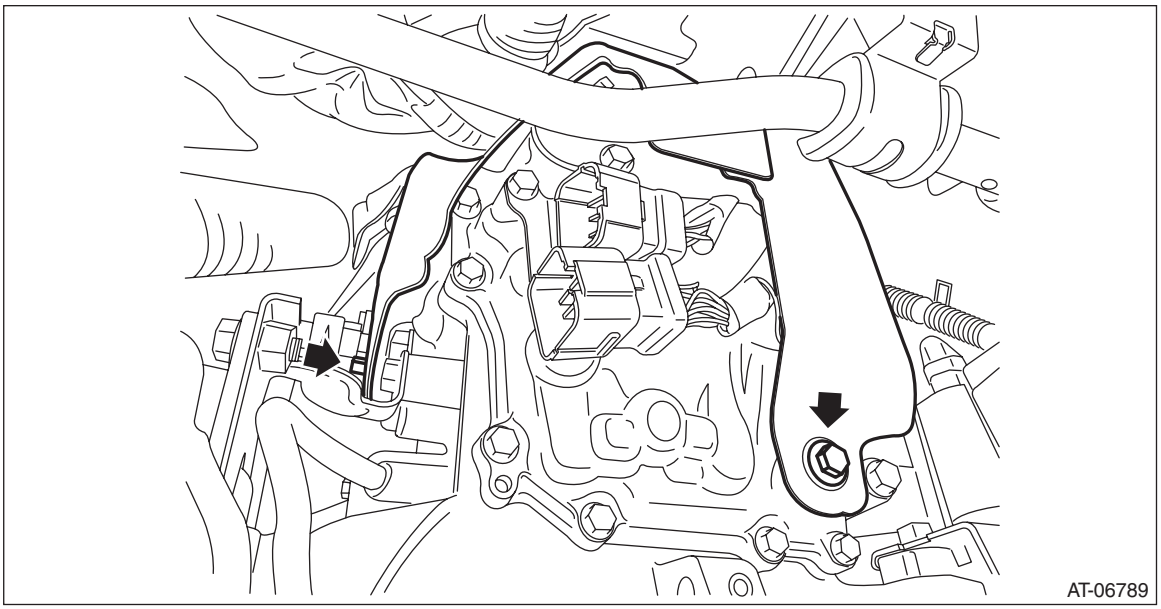
Tightening torque:
T1: 7 N·m (0.7 kgf-m, 5.2 ft-lb)
T2: 14 N·m (1.4 kgf-m, 10.3 ft-lb)



14) Insert the transmission case cover (small) between the transmission case cover (large) and the transmission to install.

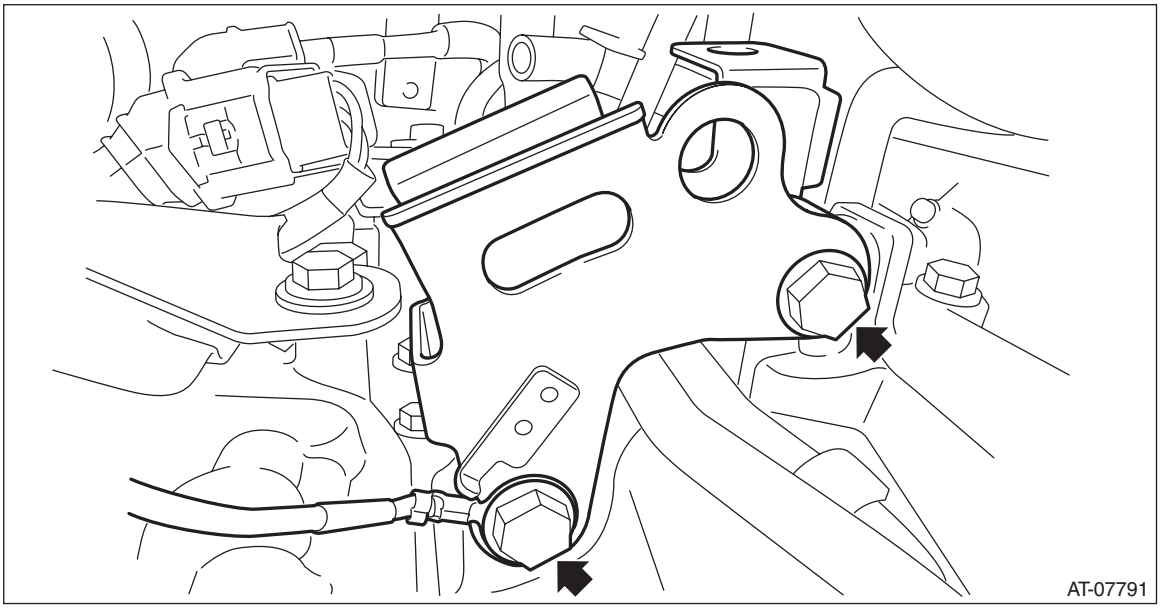
Tightening torque:
8 N·m (0.8 kgf-m, 5.9 ft-lb)





15) Install the pitching stopper bracket and transmission radio ground cord.

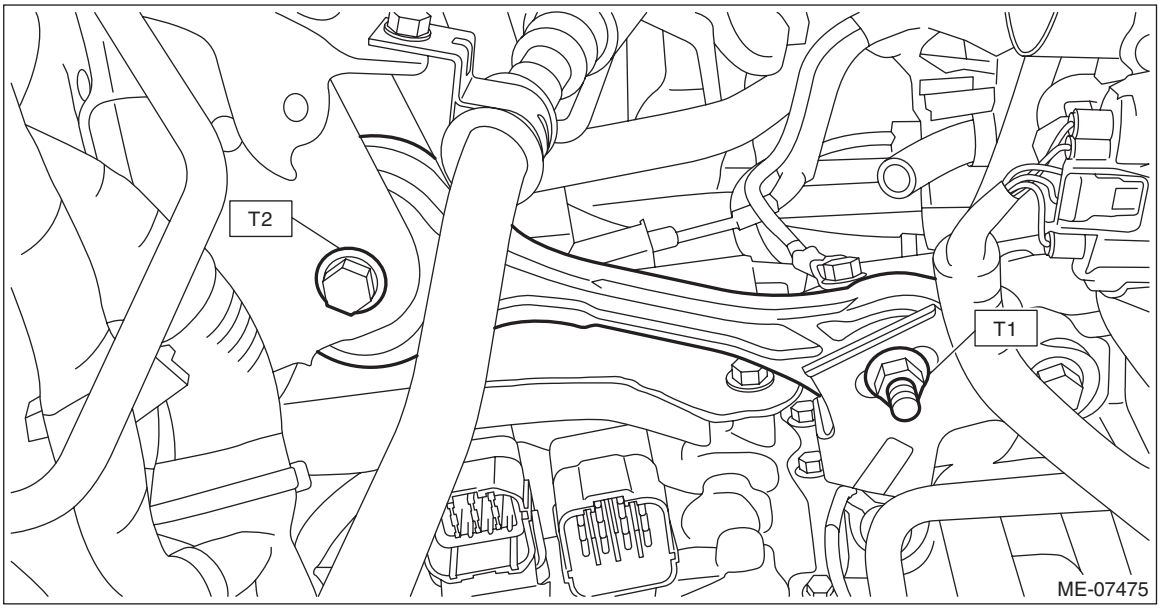
Tightening torque:
41 N·m (4.2 kgf-m, 30.2 ft-lb)



16) Install the air breather hose to the pitching stopper bracket.

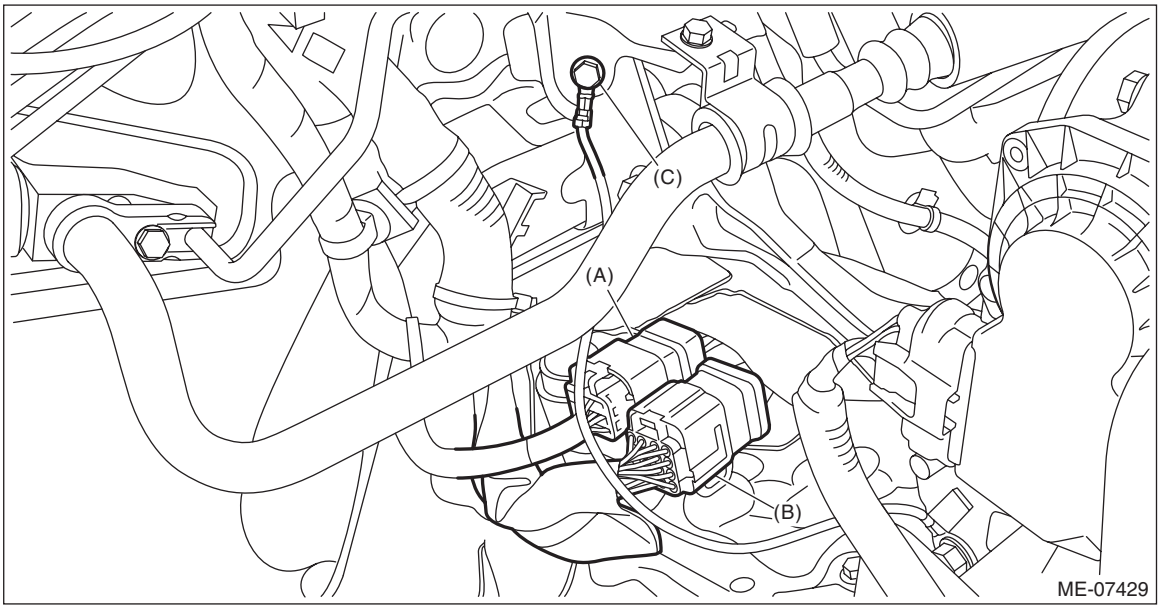
17) Install the pitching stopper.

Tightening torque:
T1: 50 N·m (5.1 kgf-m, 36.9 ft-lb)
T2: 58 N·m (5.9 kgf-m, 42.8 ft-lb)



18) Connect the following harness connectors.
- Transmission harness connectors
- Inhibitor harness connector
- Transmission radio ground terminal

Tightening torque:
13 N·m (1.3 kgf-m, 9.6 ft-lb)



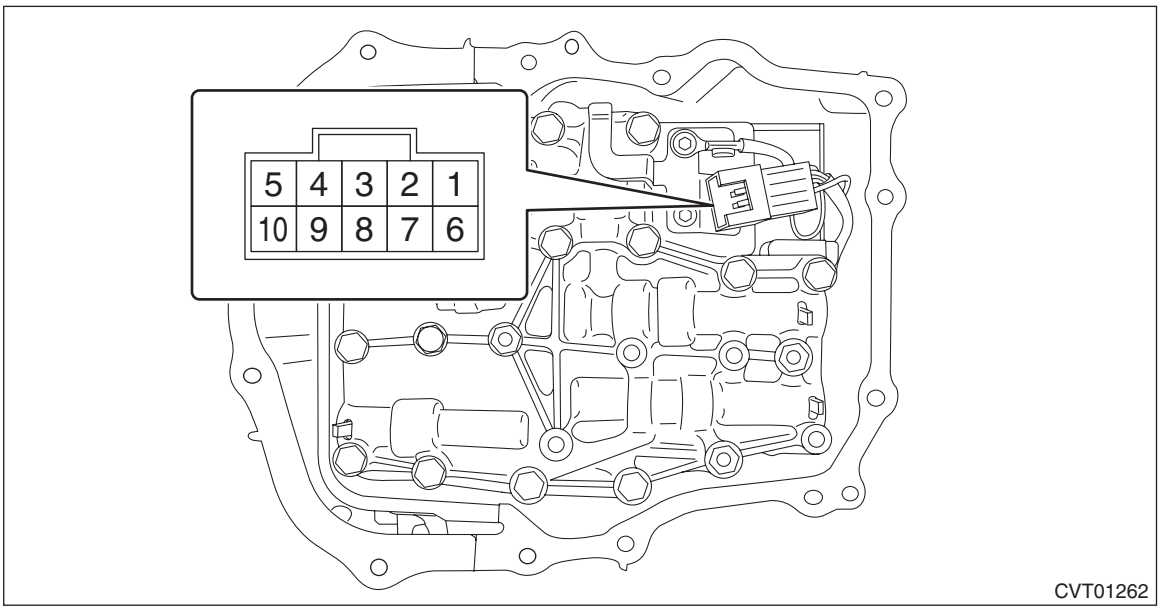
(A) Transmission harness connectors
(B) Inhibitor harness connector
(C) Transmission radio ground terminal

19) Install the air intake boot assembly. <Ref. to IN(H4DO(w/o HEV))-12, INSTALLATION, Air Intake Boot.>
20) Adjust the CVTF level. <Ref. to CVT(TR580)-36, ADJUSTMENT, CVTF.>
21) Perform the learning again. <Ref. to CVT(w/o HEV)(diag)-25, Learning Control.>

C: INSPECTION

- Check each part for damage or dust.
- Measure the resistance of each solenoid, sensor and ground wire.

NOTE:
Measurement should be performed at a temperature of 20°C (68°F).



- **Solenoid**

Solenoid	Terminal No.	Standard
Primary UP solenoid	No. 2 — control valve body	Approx. 10 — 13.5 Ω
Secondary solenoid	No. 3 — control valve body	Approx. 5 — 7 Ω
F&R clutch solenoid	No. 4 — control valve body	Approx. 4 — 6 Ω
Primary DOWN solenoid	No. 7 — control valve body	Approx. 10 — 13.5 Ω
Lock-up duty solenoid	No. 9 — control valve body	Approx. 10 — 13.5 Ω
AWD solenoid	No. 10 — control valve body	Approx. 2 — 4.5 Ω

- **Oil temperature sensor**

Sensor	Terminal No.	Standard At 20°C (68°F)
Oil temperature sensor	No. 1 — No. 6	Approx. 2.5 kΩ

- **Transmission ground**

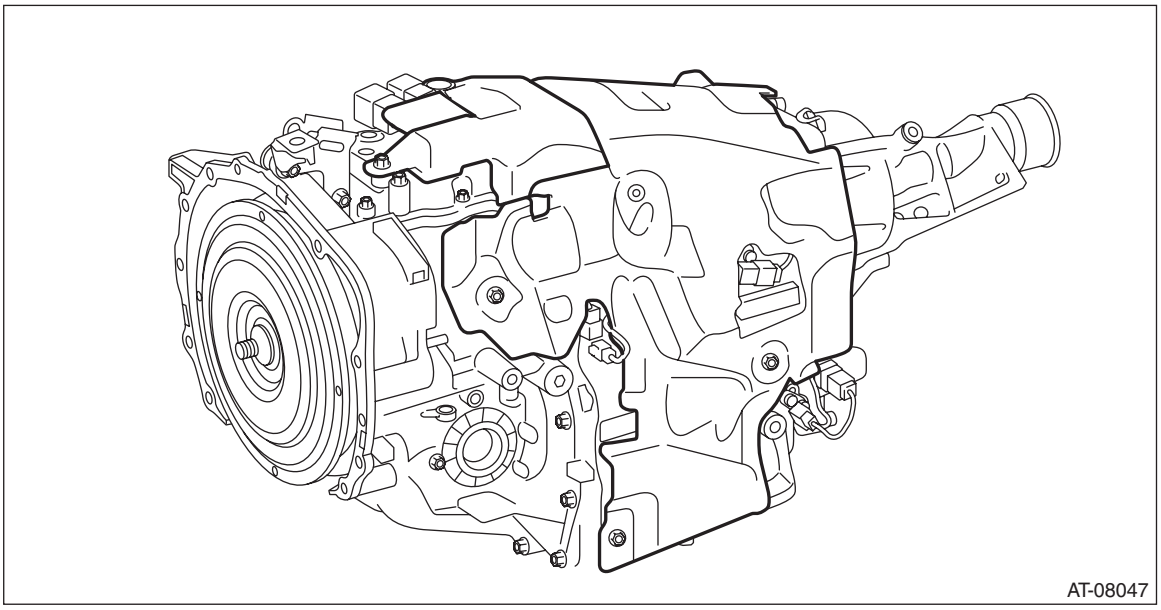
Terminal No.	Standard
No. 8 — control valve body	Less than 1 Ω

21.Transmission Harness

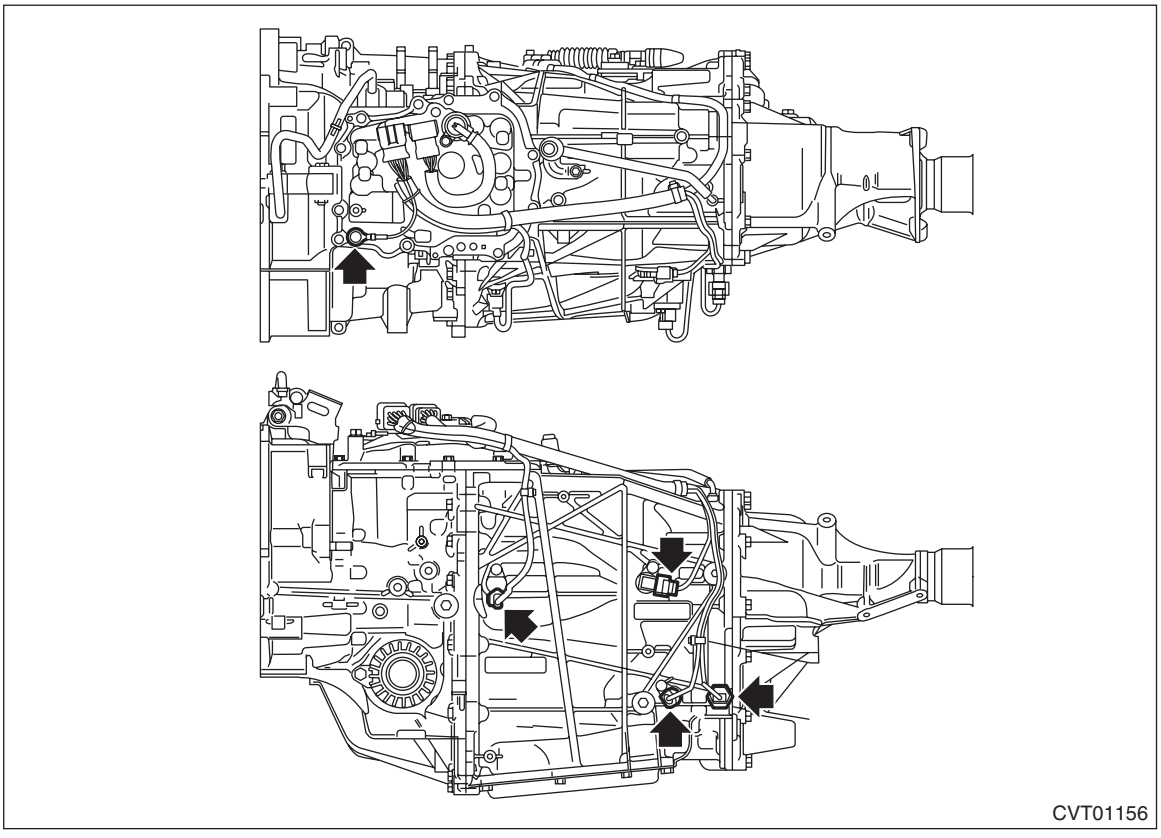
A: REMOVAL

1. INHIBITOR HARNESS

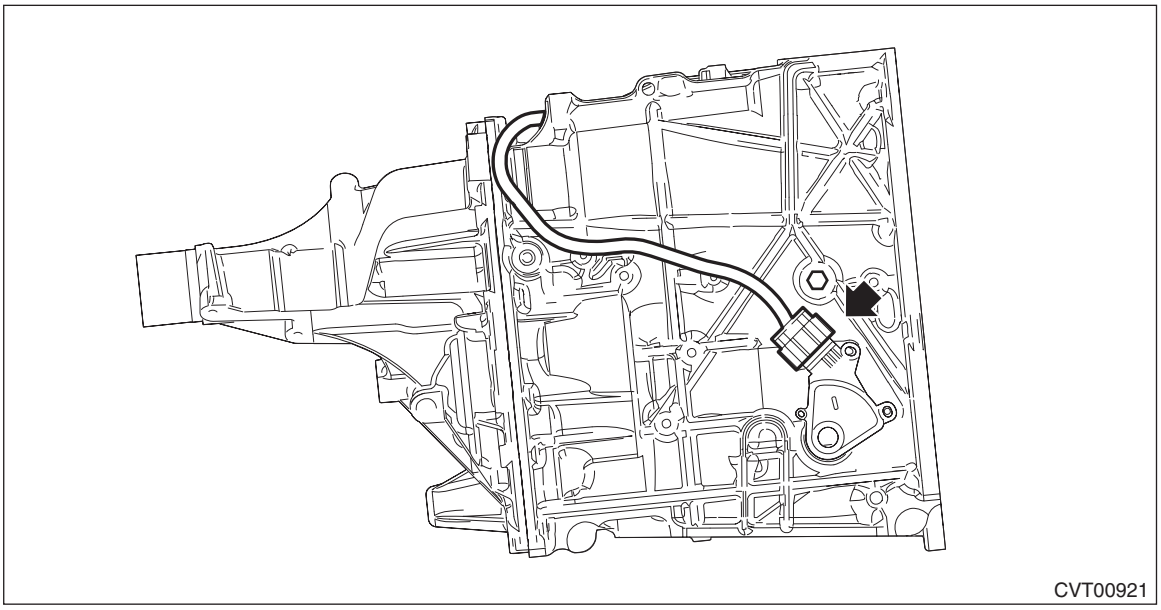
1) Remove the transmission from the vehicle. <Ref. to CVT(TR580)-60, REMOVAL, Automatic Transmission Assembly.>
2) Remove the transmission case cover.



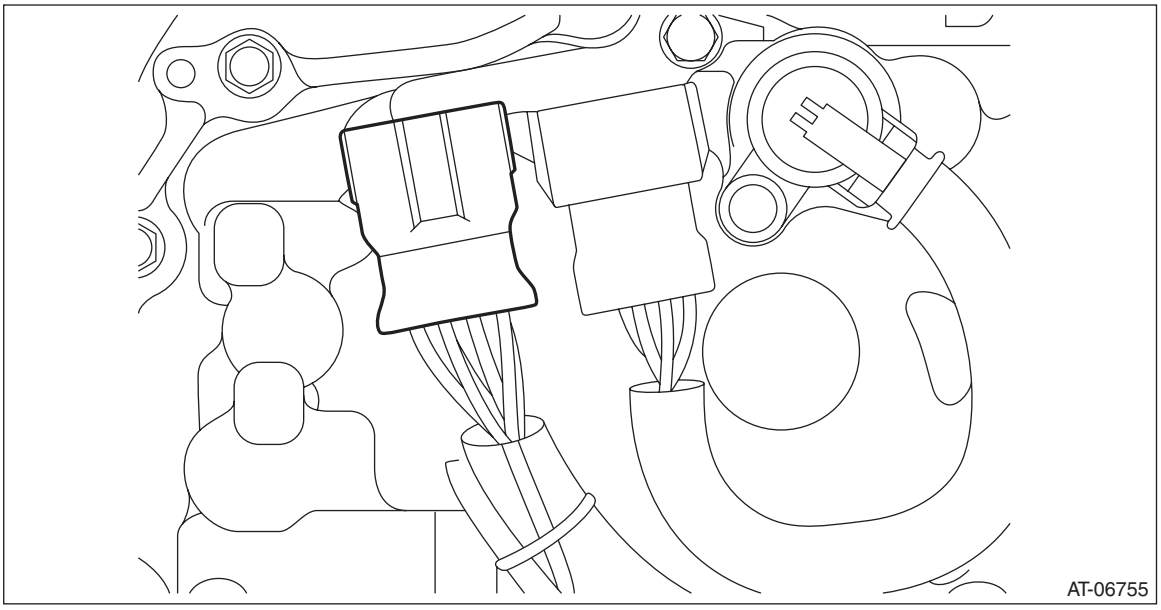
3) Remove the harness connector from the ground terminal, turbine speed sensor, primary speed sensor, secondary speed sensor and secondary pressure sensor.



4) Remove the harness connector from inhibitor switch.



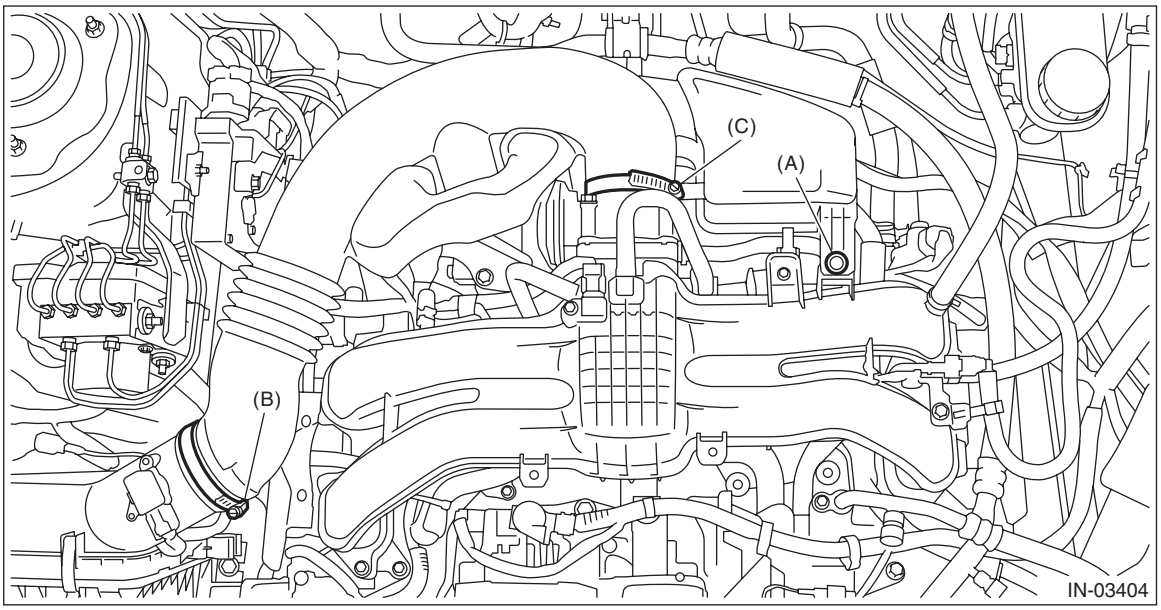
5) Remove the inhibitor harness connector from the transmission harness stay.



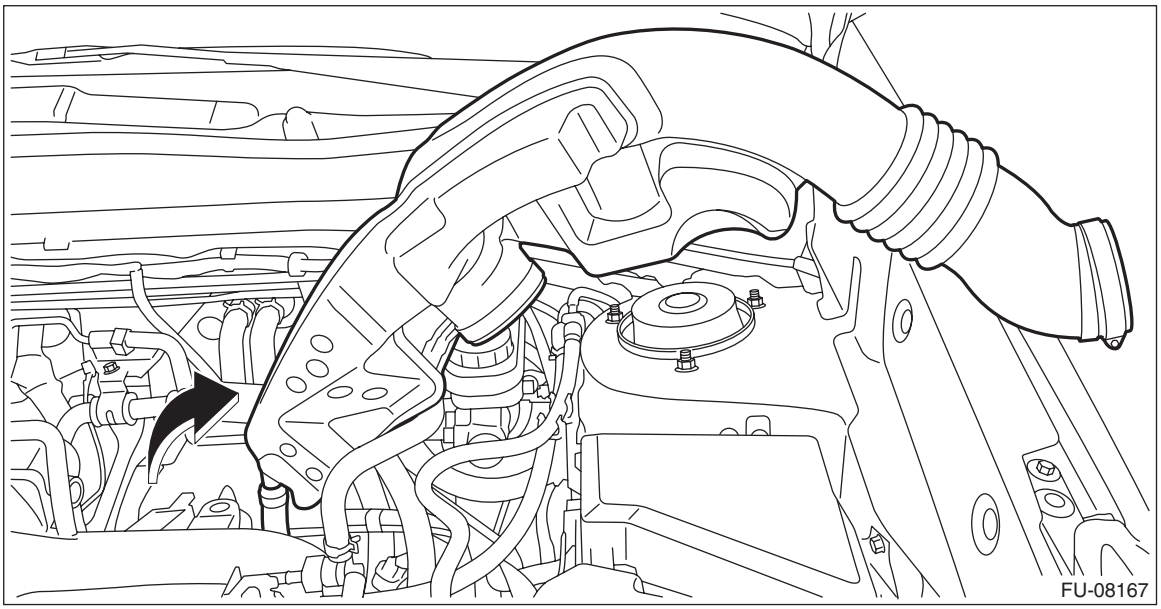
6) Remove the harness clip from the transmission, and remove the inhibitor harness.

2. TRANSMISSION HARNESS

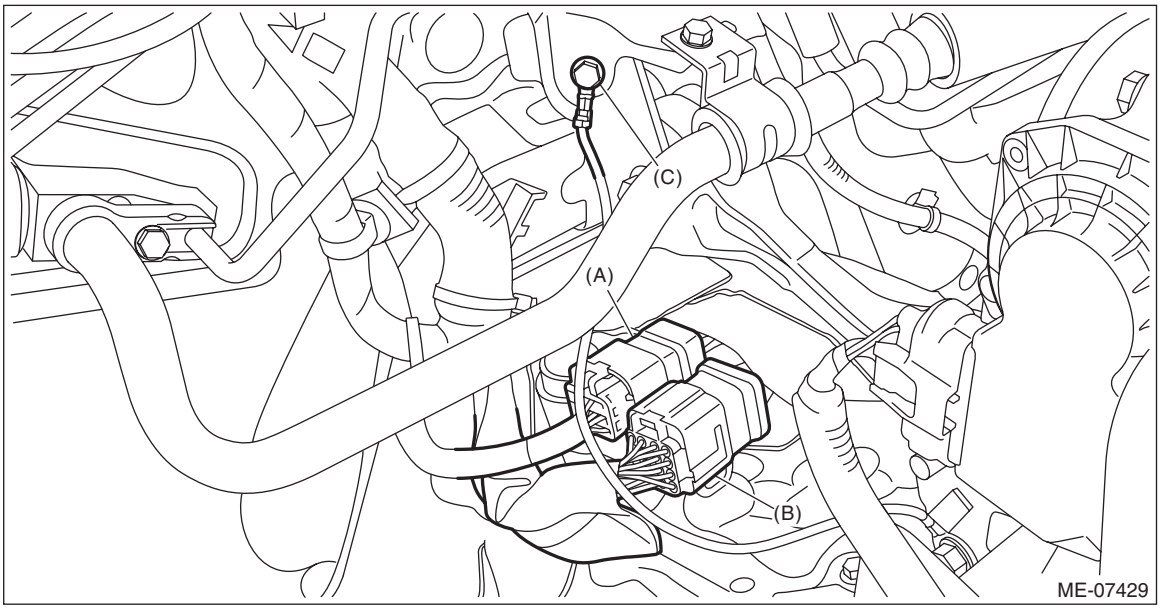
1) Disconnect the ground cable from battery.
2) Remove the clip (A) from the air intake boot.
3) Loosen the clamp (B) connecting the air intake boot and air cleaner case (rear).
4) Loosen the clamp (C) which connects the air intake boot and throttle body.



5) Remove the air intake boot from the throttle body, and move it to the left side wheel apron.

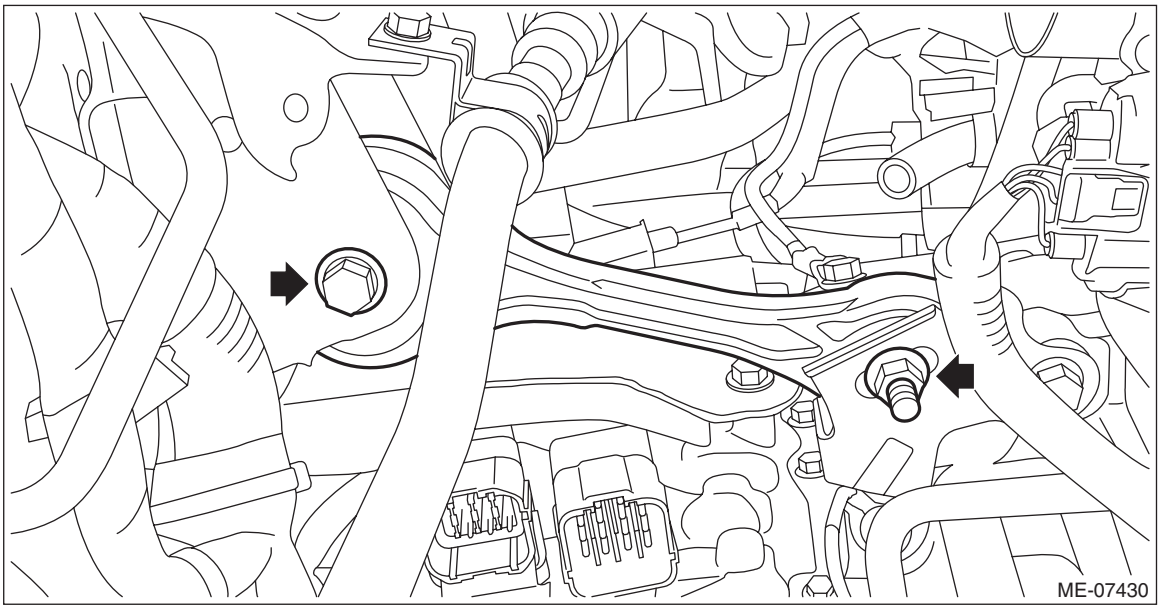


6) Disconnect the following connectors.
- Transmission harness connectors
- Inhibitor harness connector
- Transmission radio ground terminal

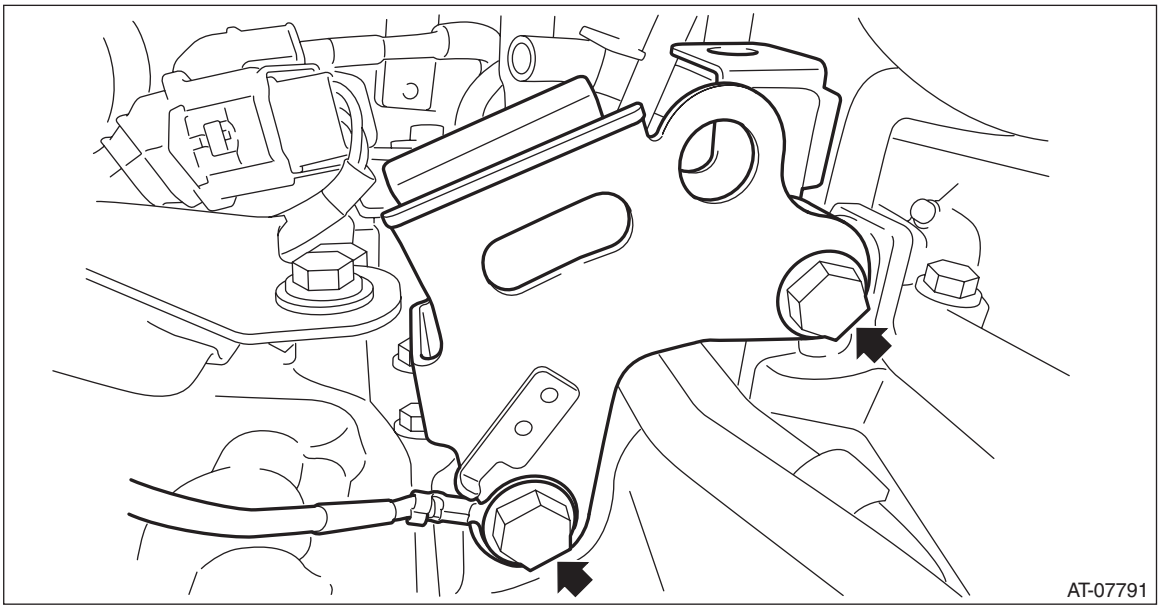


(A) Transmission harness connectors
(B) Inhibitor harness connector
(C) Transmission radio ground terminal

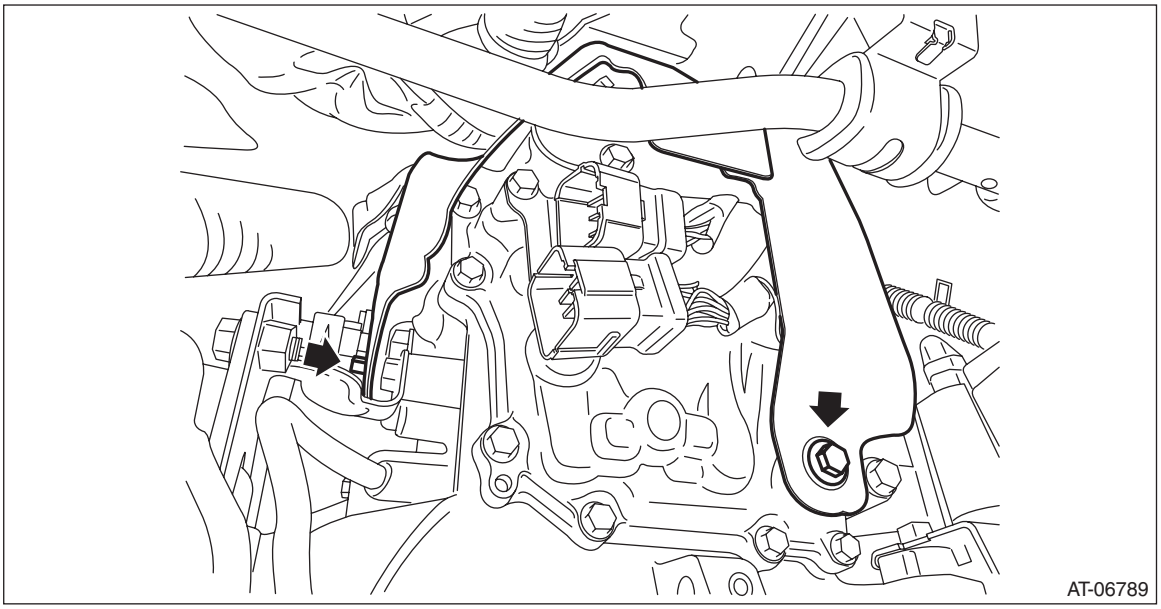
7) Remove the pitching stopper.



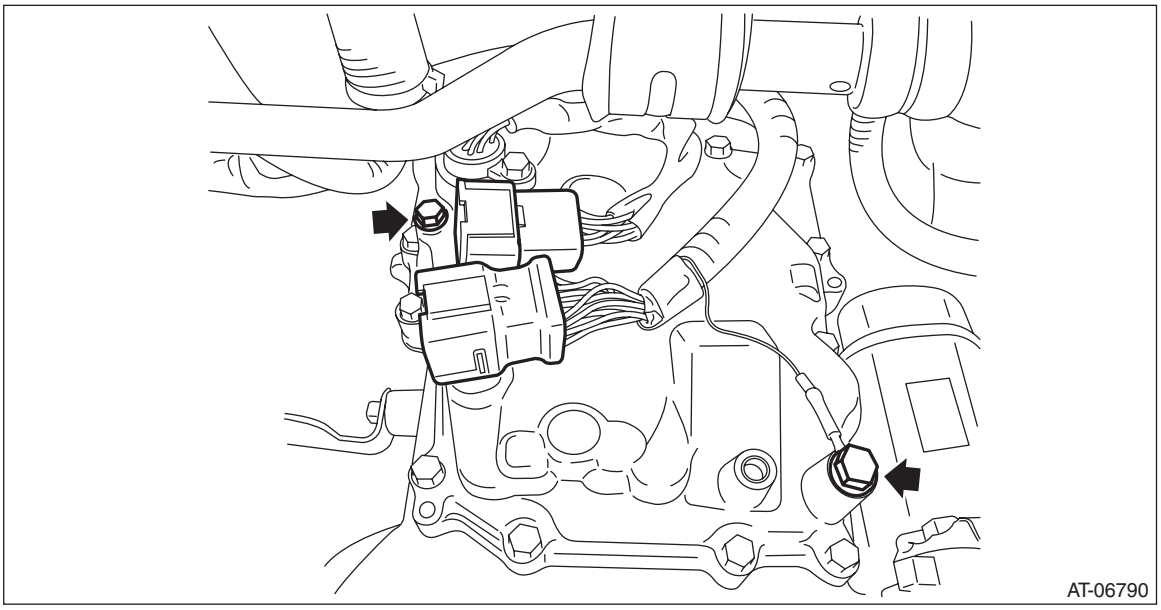
8) Remove the air breather hose from the pitching stopper bracket, and then remove the pitching stopper bracket and transmission radio ground cord.



9) Remove the transmission case cover.

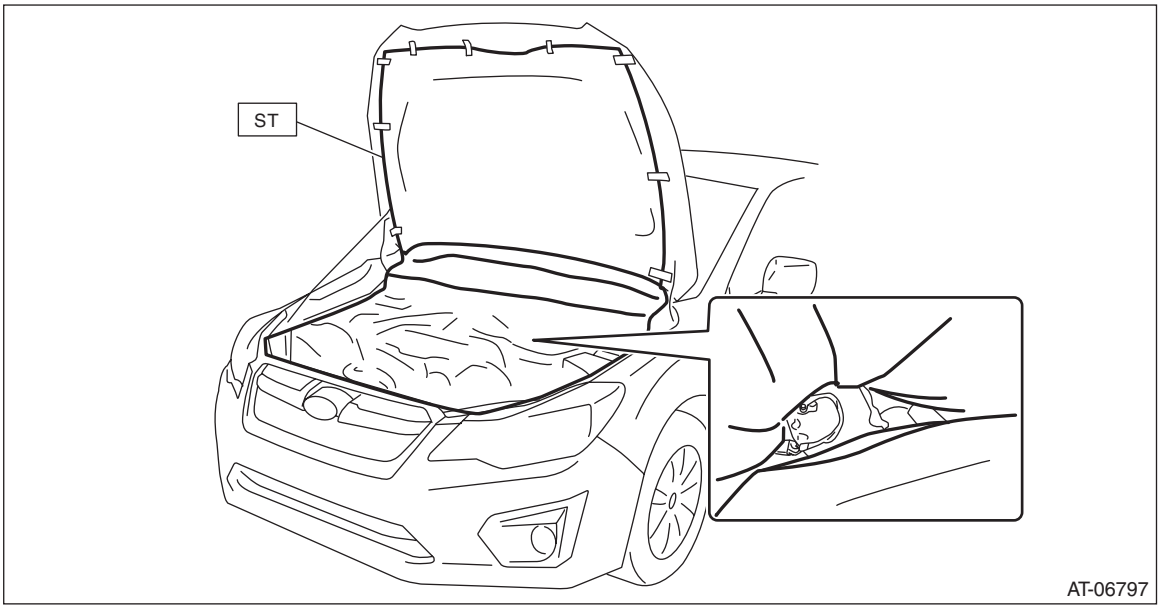


10) Remove the transmission harness stay and ground terminal.

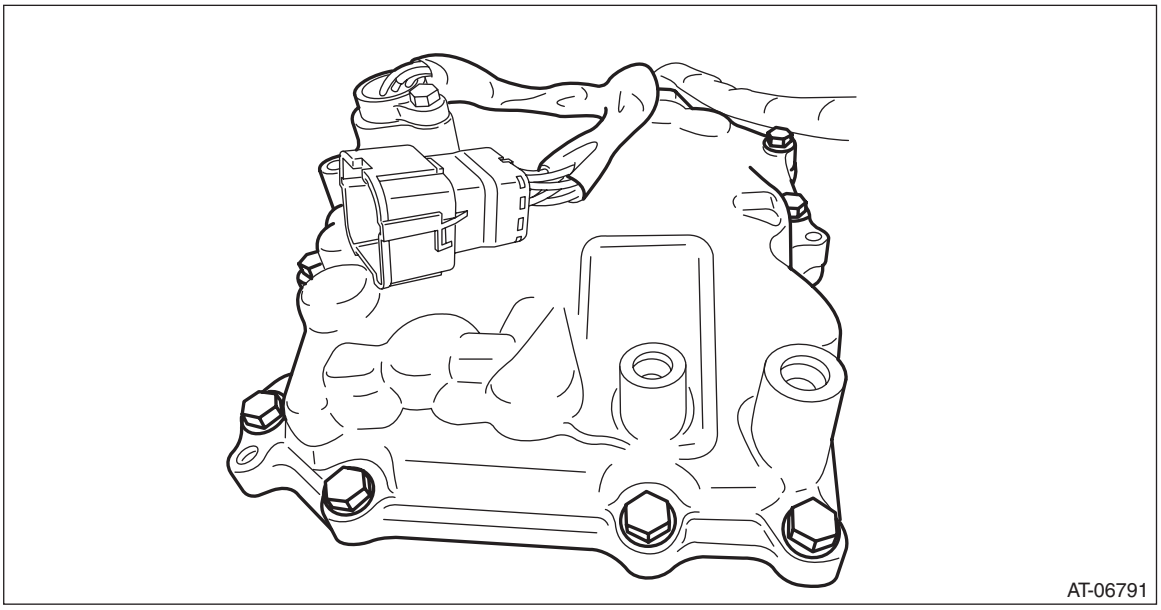


11) Remove the transmission harness connector from the harness stay.
12) Clean the transmission exterior.
13) Set the ST on the vehicle.

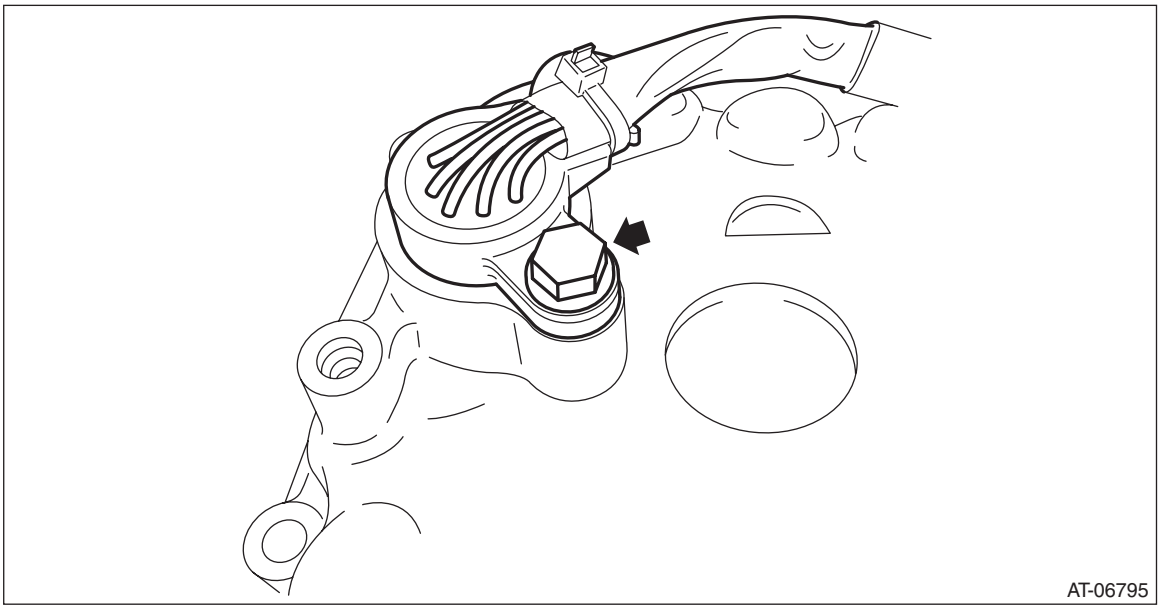
ST 18761AA010 SHEET SPECIAL TOOL



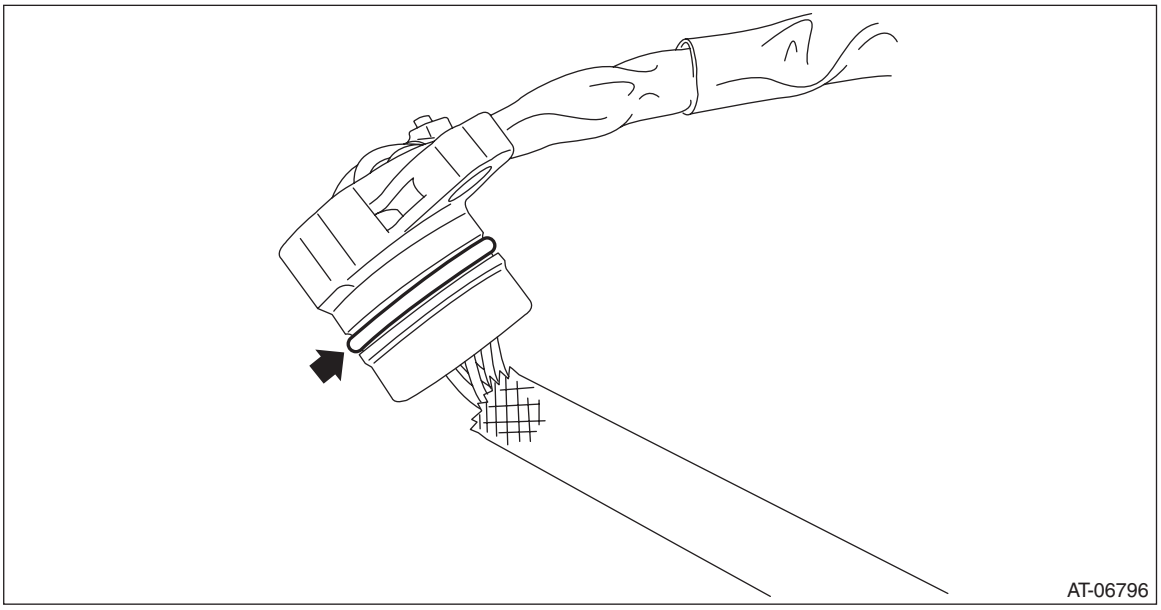
14) Remove the valve cover and gasket.



15) Remove the transmission harness connector from the control valve body.
16) Remove the transmission harness from the valve cover.



17) Remove the O-ring from the transmission harness.



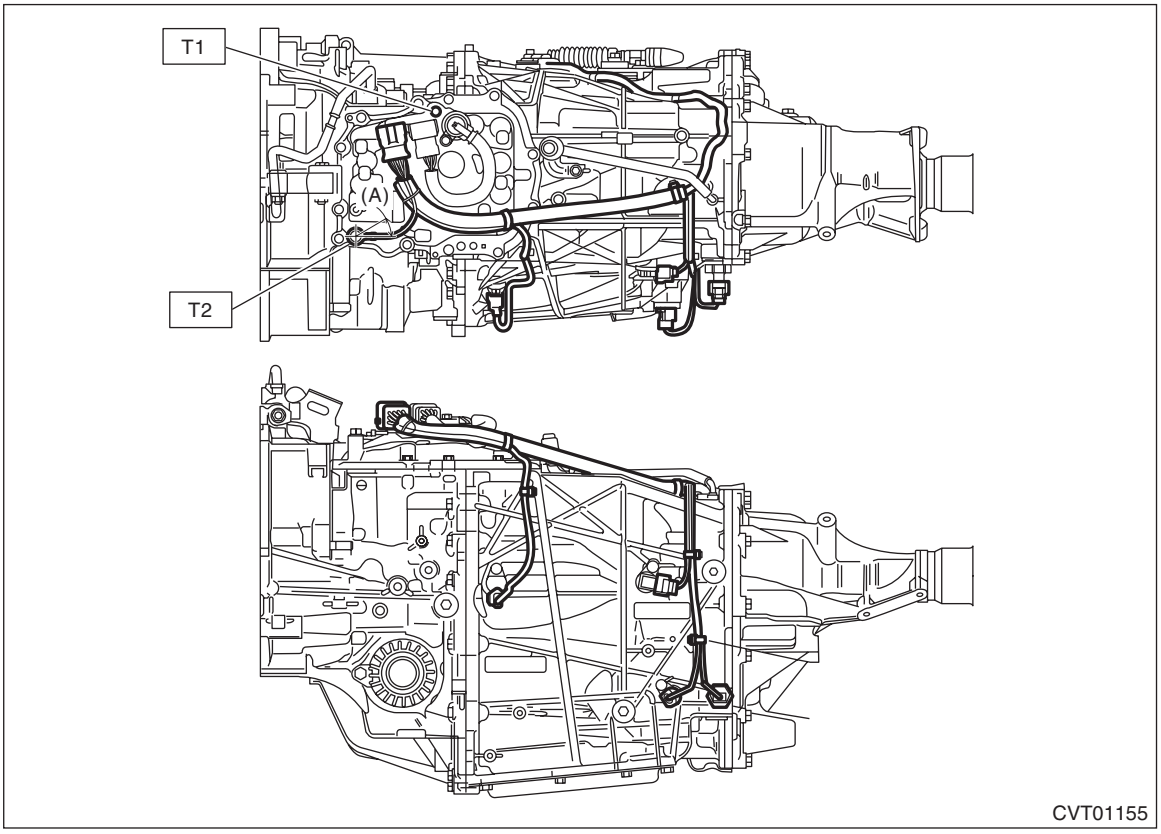
B: INSTALLATION

1. INHIBITOR HARNESS

Install in the reverse order of removal.

NOTE:
Install the transmission ground terminal in the direction within the range of approx. 30° (A).

Tightening torque:
T1: 7 N·m (0.7 kgf-m, 3.7 ft-lb)
T2: 14 N·m (1.4 kgf-m, 10.3 ft-lb)



2. TRANSMISSION HARNESS

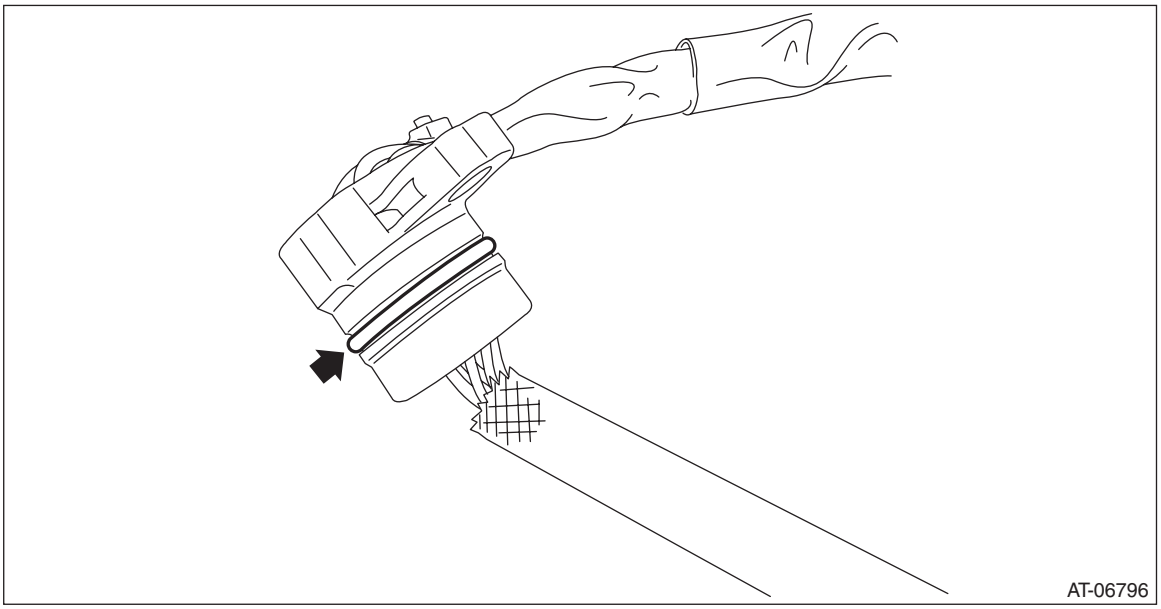
1) Clean the mating surface of valve cover and transmission side.

CAUTION:
When cleaning the mating surface of the transmission side, be careful not to allow any dust, foreign matter and used liquid gasket to enter the transmission.

2) Check the control valve body for dust and other foreign matter.

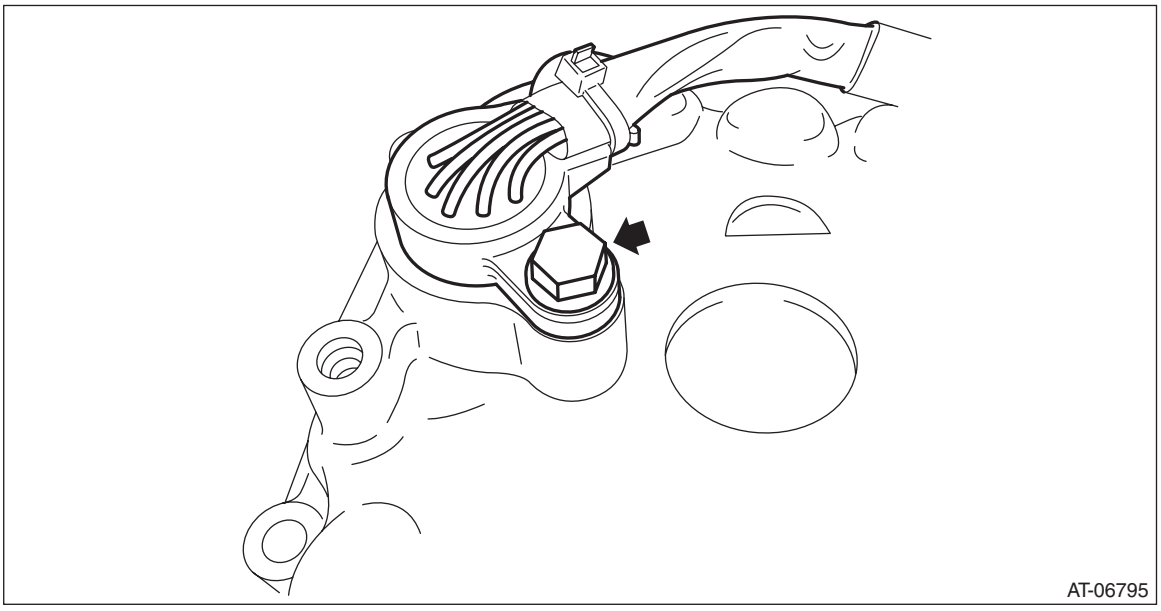
3) Install the O-ring to the transmission harness.

NOTE:
- Use new O-rings.
- Apply CVTF to the O-ring.



4) Install the transmission harness to the valve cover.

Tightening torque:
7 N·m (0.7 kgf-m, 5.2 ft-lb)

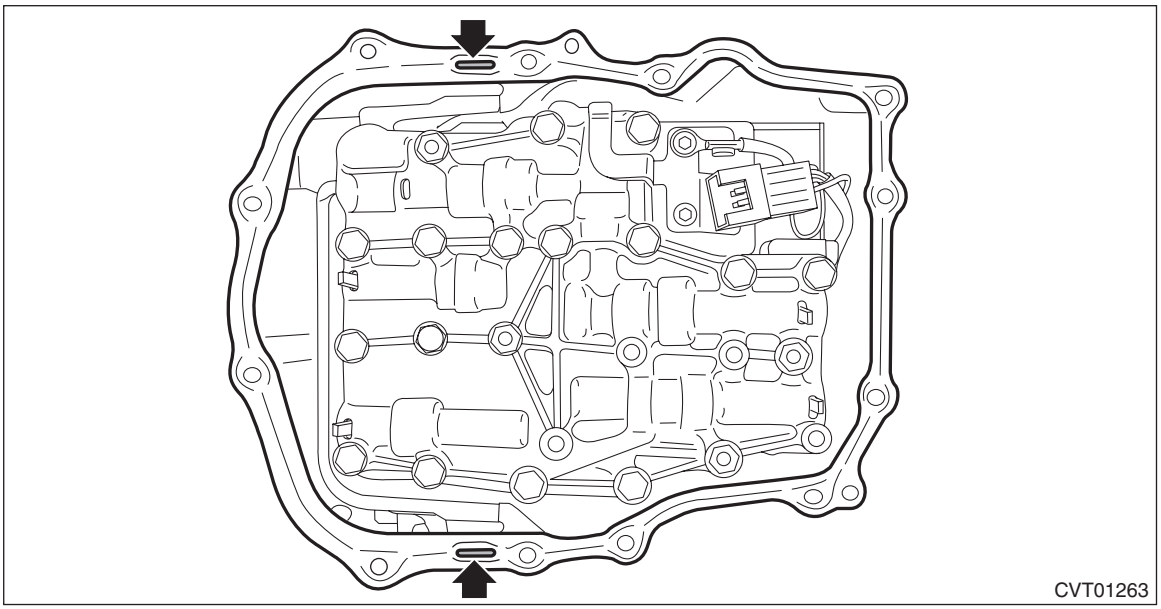


5) Install the gasket to the transmission.

NOTE:
Use a new gasket.

6) Apply liquid gasket to the oval hole of gasket.

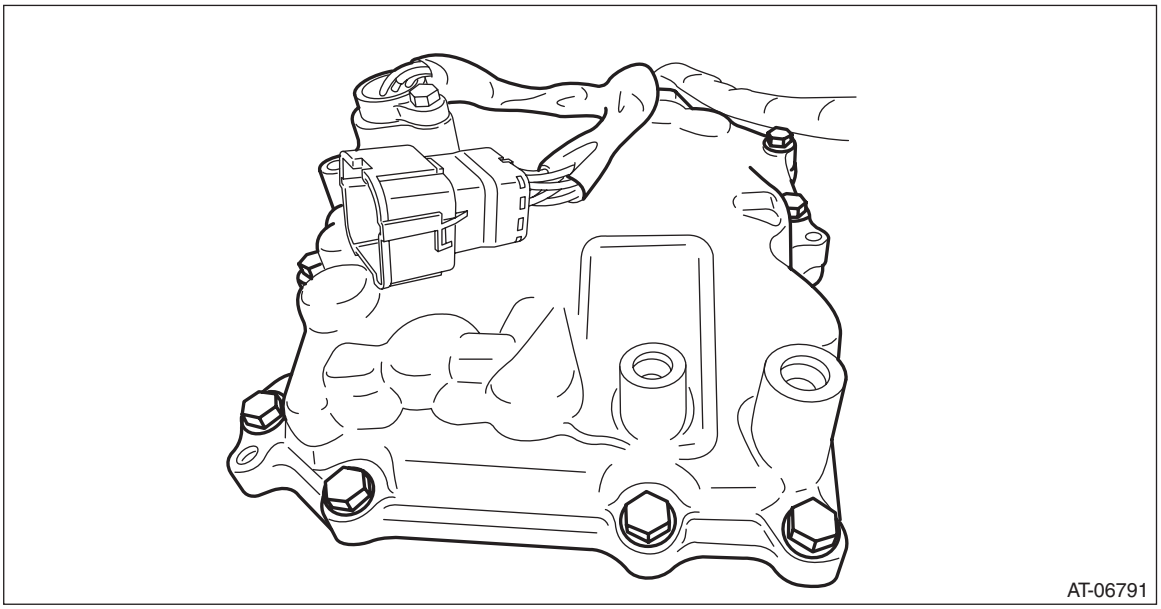
Liquid gasket:
THREE BOND 1215B or equivalent



7) Connect the transmission harness connector to the control valve body, and install the valve cover.

CAUTION:
Be careful not to catch the sheet of the ST.

Tightening torque:
8 N·m (0.8 kgf-m, 5.9 ft-lb)

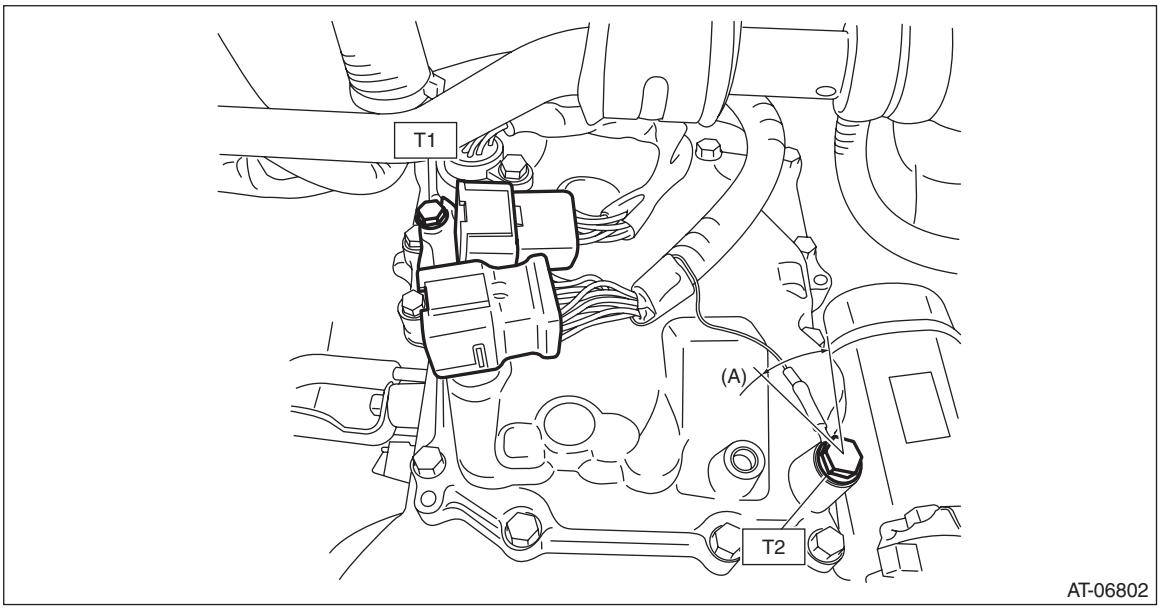


8) Remove the ST (SHEET SPECIAL TOOL).
9) Install the transmission harness connector to the harness stay.

10) Install the transmission harness stay and transmission ground terminal.

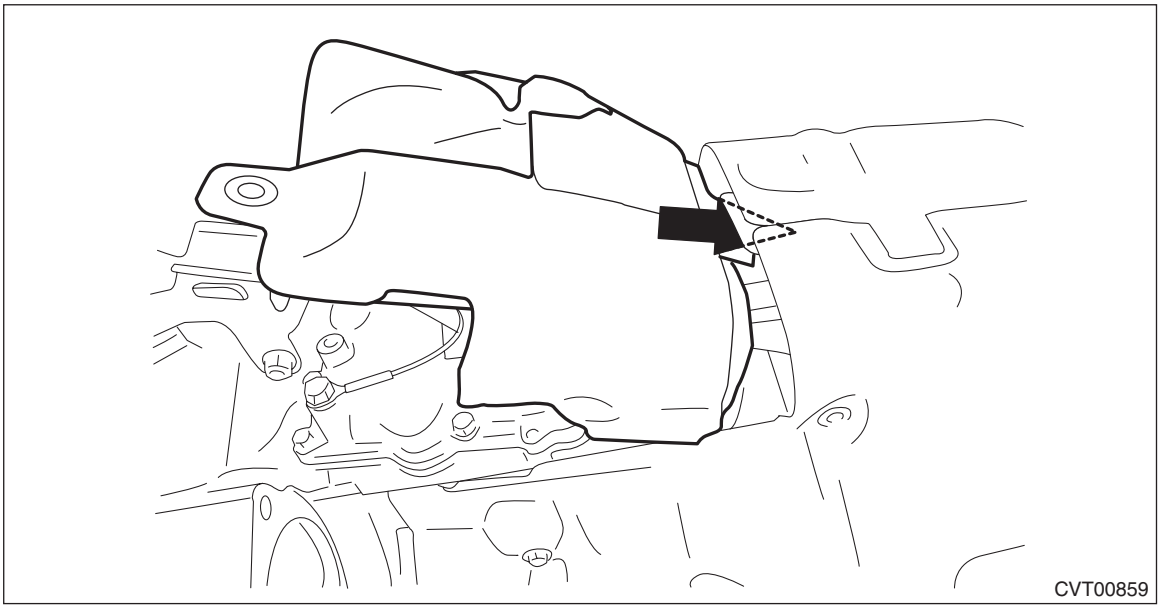
NOTE:
Install the transmission ground terminal in the direction within the range of approx. 30° (A).

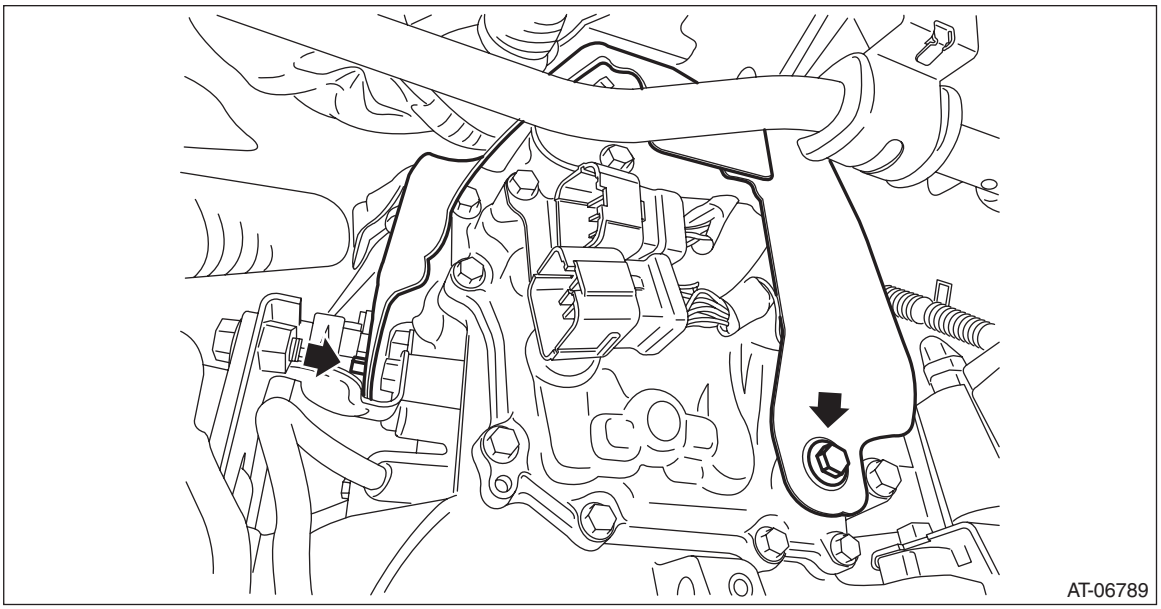
Tightening torque:
T1: 7 N·m (0.7 kgf-m, 5.2 ft-lb)
T2: 14 N·m (1.4 kgf-m, 10.3 ft-lb)



11) Insert the transmission case cover (small) between the transmission case cover (large) and the transmission to install.

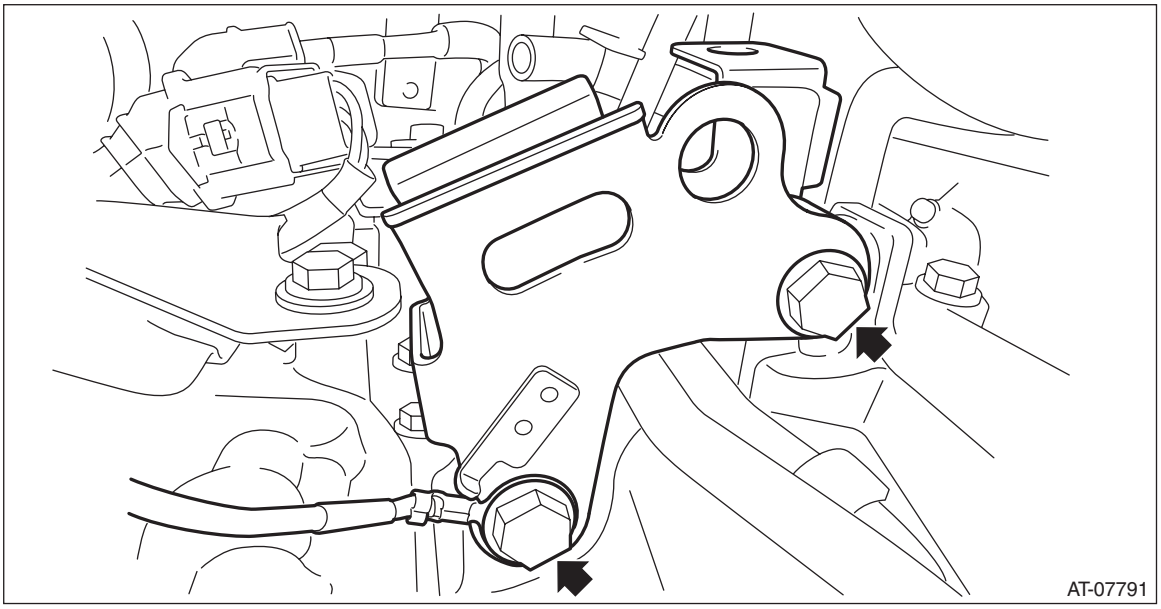
Tightening torque:
8 N·m (0.8 kgf-m, 5.9 ft-lb)





12) Install the pitching stopper bracket and transmission radio ground cord.

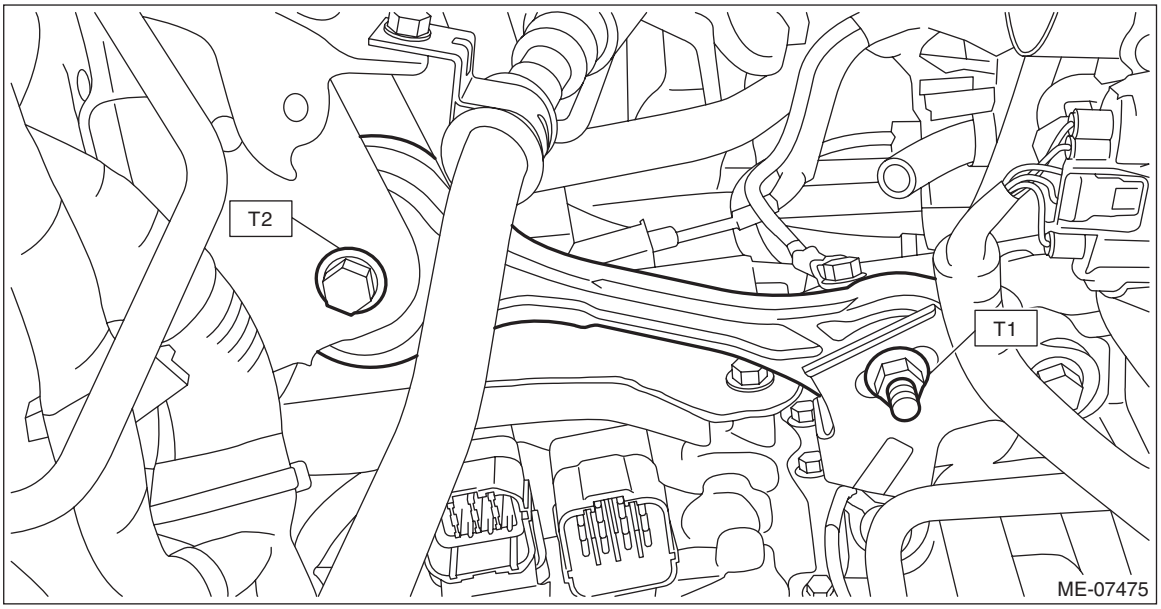
Tightening torque:
41 N·m (4.2 kgf-m, 30.2 ft-lb)



13) Install the air breather hose to the pitching stopper bracket.

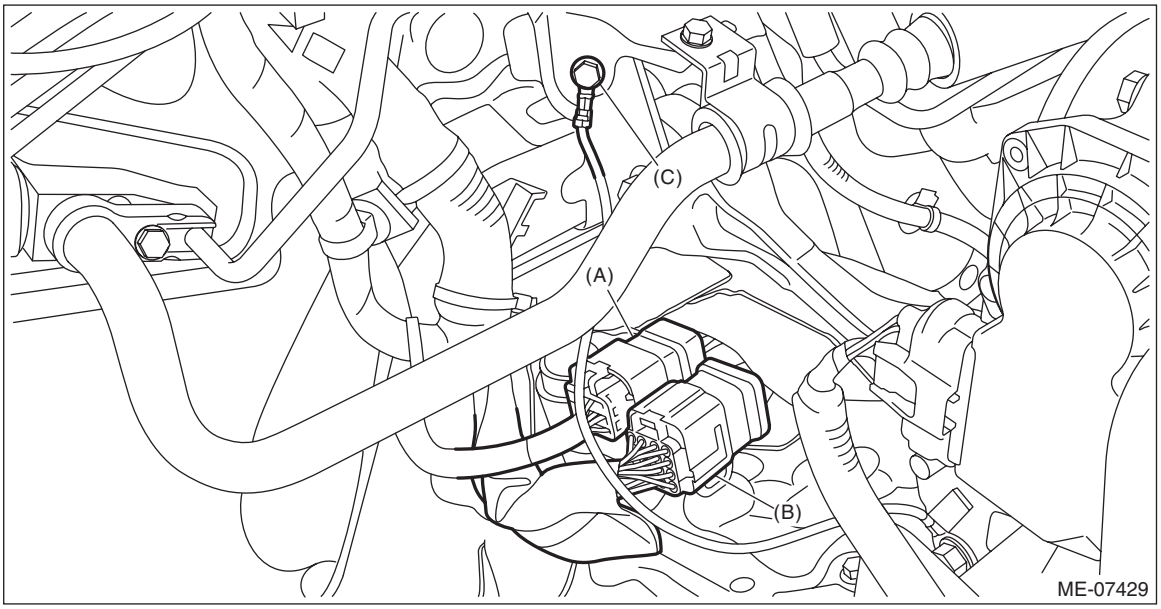
14) Install the pitching stopper.

Tightening torque:
T1: 50 N·m (5.1 kgf-m, 36.9 ft-lb)
T2: 58 N·m (5.9 kgf-m, 42.8 ft-lb)



15) Connect the following harness connectors.
- Transmission harness connectors
- Inhibitor harness connector
- Transmission radio ground terminal

Tightening torque:
13 N·m (1.3 kgf-m, 9.6 ft-lb)



(A) Transmission harness connectors
(B) Inhibitor harness connector
(C) Transmission radio ground terminal

16) Install the air intake boot assembly. <Ref. to IN(H4DO(w/o HEV))-12, INSTALLATION, Air Intake Boot.>
17) Adjust the CVTF level. <Ref. to CVT(TR580)-36, ADJUSTMENT, CVTF.>

C: INSPECTION

1) Visually check the harness and connector for damage or crack.
2) Check the harness terminal for rust, disconnection or poor contact.
3) Check the continuity between harness terminals.

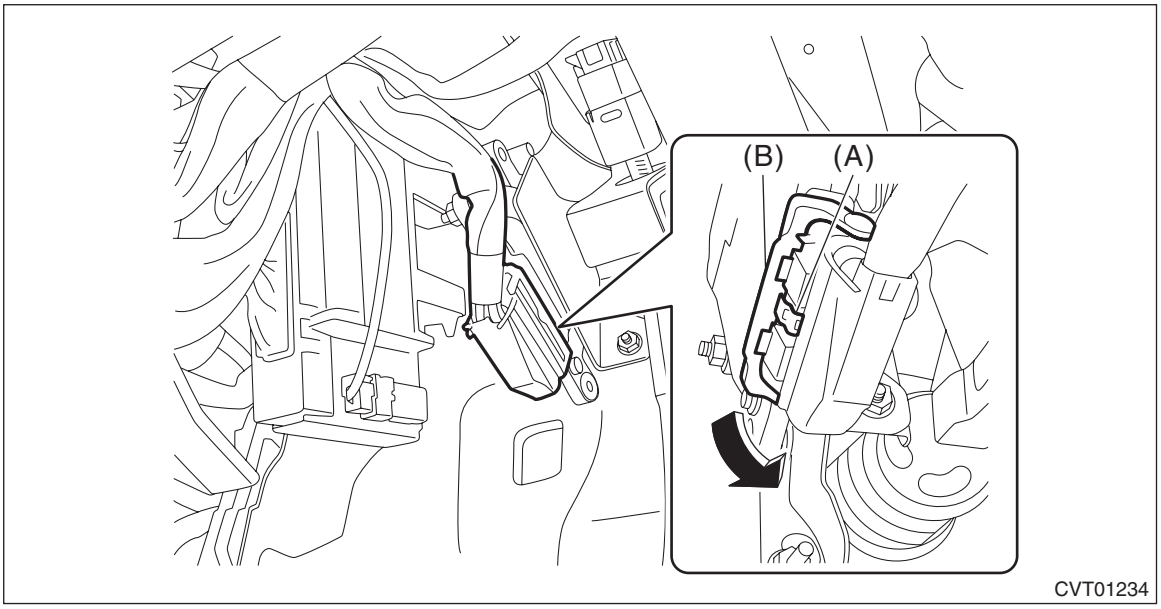
NOTE:
For details of transmission harness circuit, refer to wiring diagram. <Ref. to WI(w/o HEV)-90, WIRING DIAGRAM, CVT Control System.>

Harness continuity standard
Less than 1 Ω

22.Transmission Control Module (TCM)

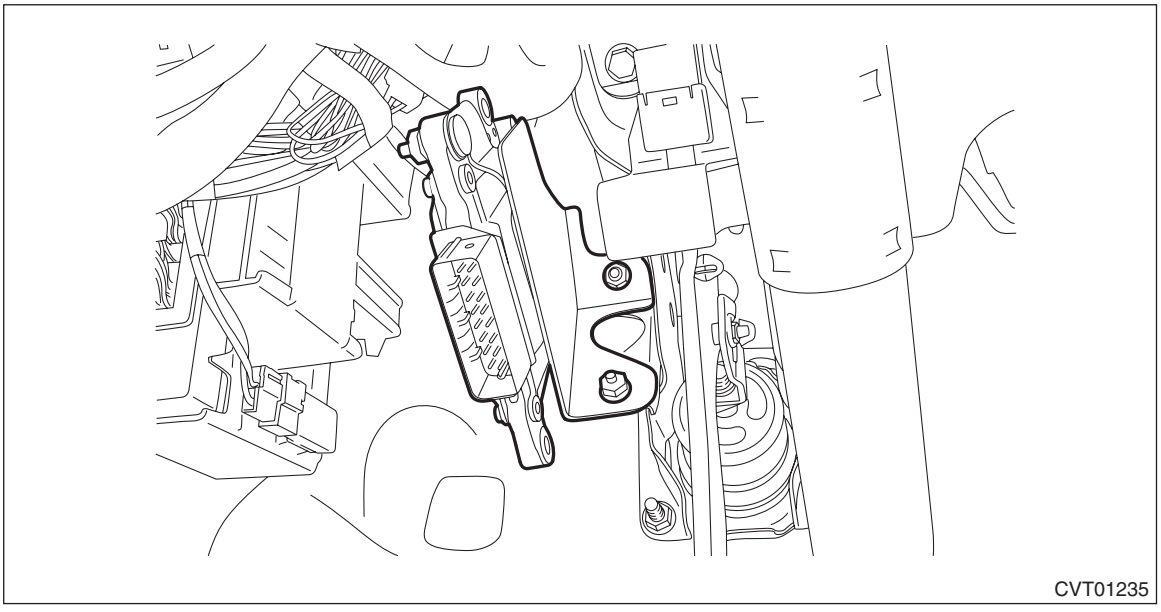
A: REMOVAL

1) Disconnect the ground cable from battery.
2) Remove the instrument panel lower cover. <Ref. to EI-76, REMOVAL, Instrument Panel Lower Cover.>
3) Move the lock lever in the arrow direction while pressing the lock button, and disconnect the connector.

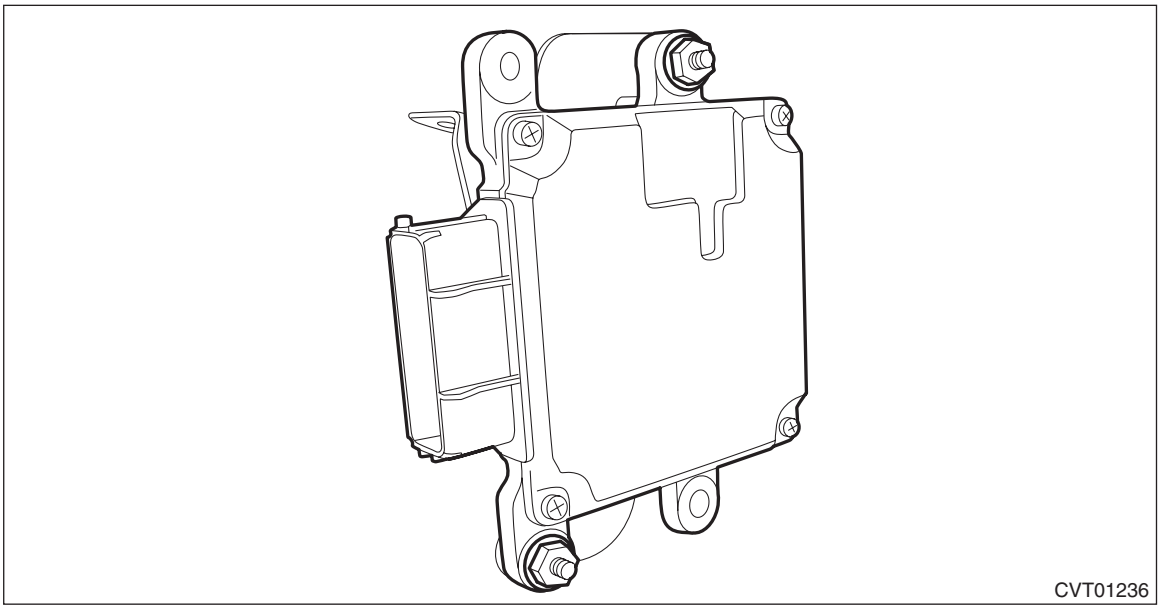


(A) Lock button
(B) Lock lever

4) Remove the TCM.



5) Remove the TCM from the bracket.



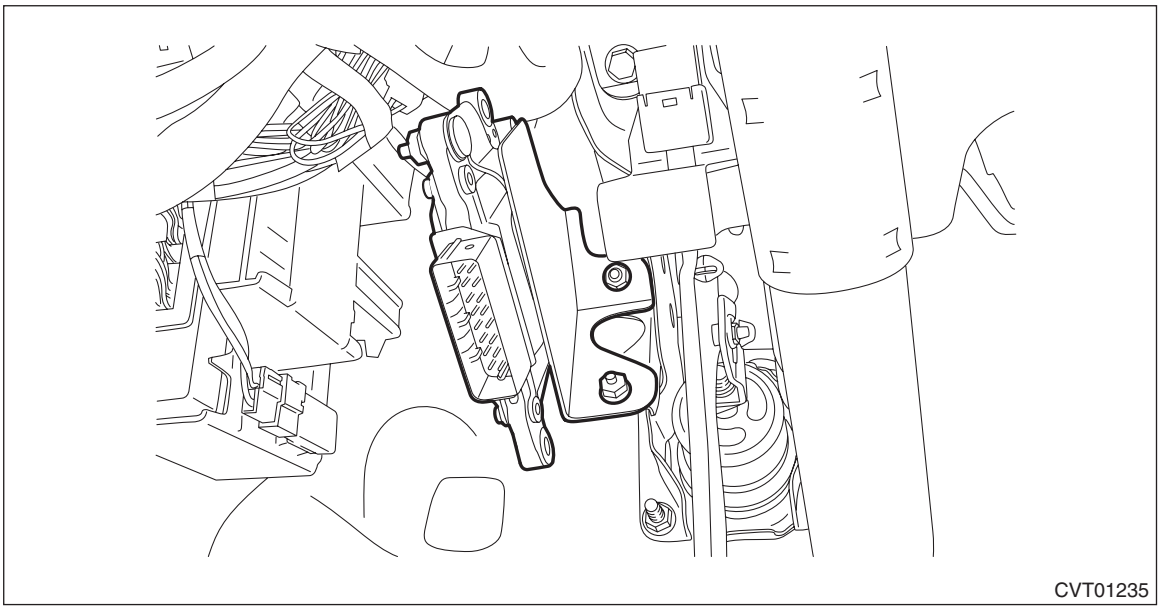
B: INSTALLATION

1) Install the bracket to the TCM.
2) Install the TCM to the bracket.

Tightening torque:
7.5 N·m (0.8 kgf-m, 5.5 ft-lb)

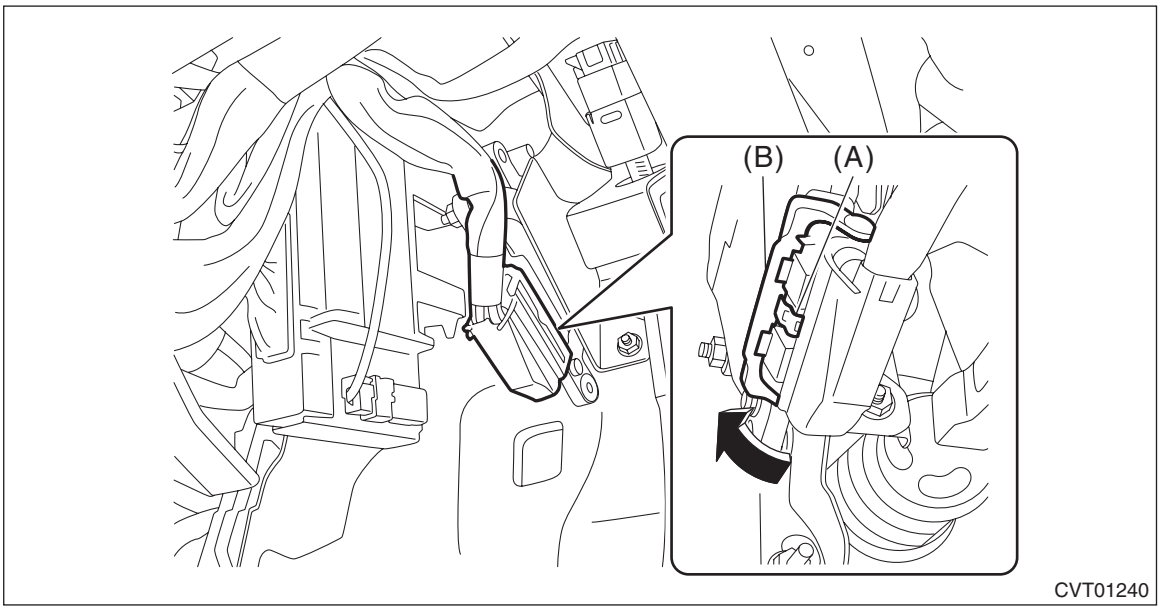
3) Install the TCM.

Tightening torque:
7.5 N·m (0.8 kgf-m, 5.5 ft-lb)



4) Install the harness connector to TCM.

NOTE:
Move the lock lever in the arrow direction, and confirm that a clicking sound is heard.



(A) Lock button
(B) Lock lever

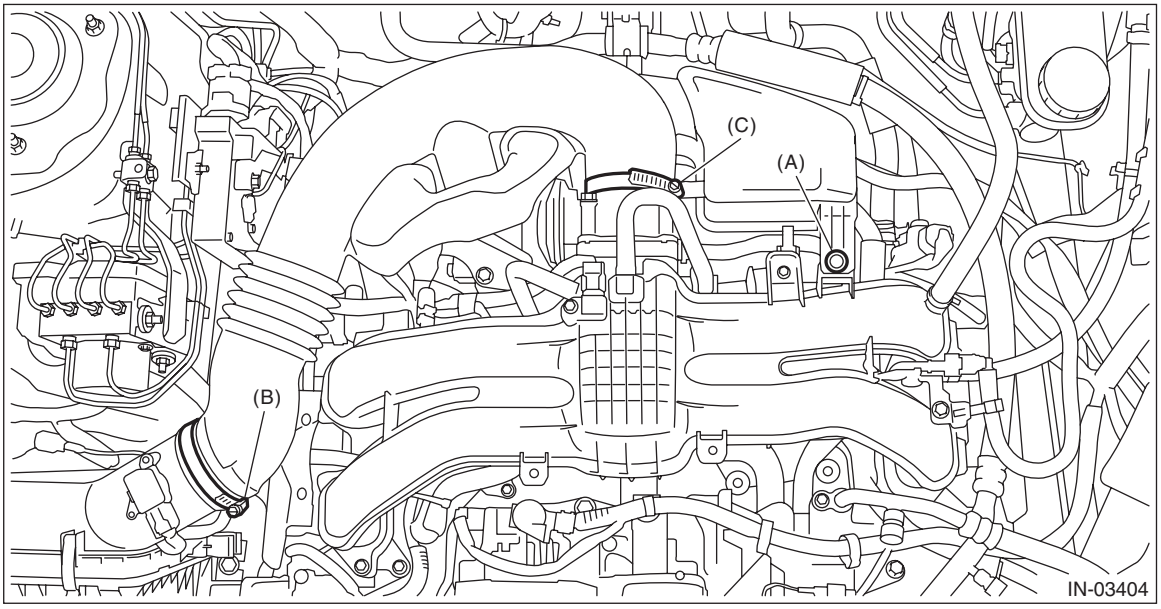
5) Install the instrument panel lower cover. <Ref. to EI-77, INSTALLATION, Instrument Panel Lower Cover.>
6) Perform the learning again. <Ref. to CVT(w/o HEV)(diag)-25, Learning Control.>

23.CVTF Cooler (With Warmer Function)

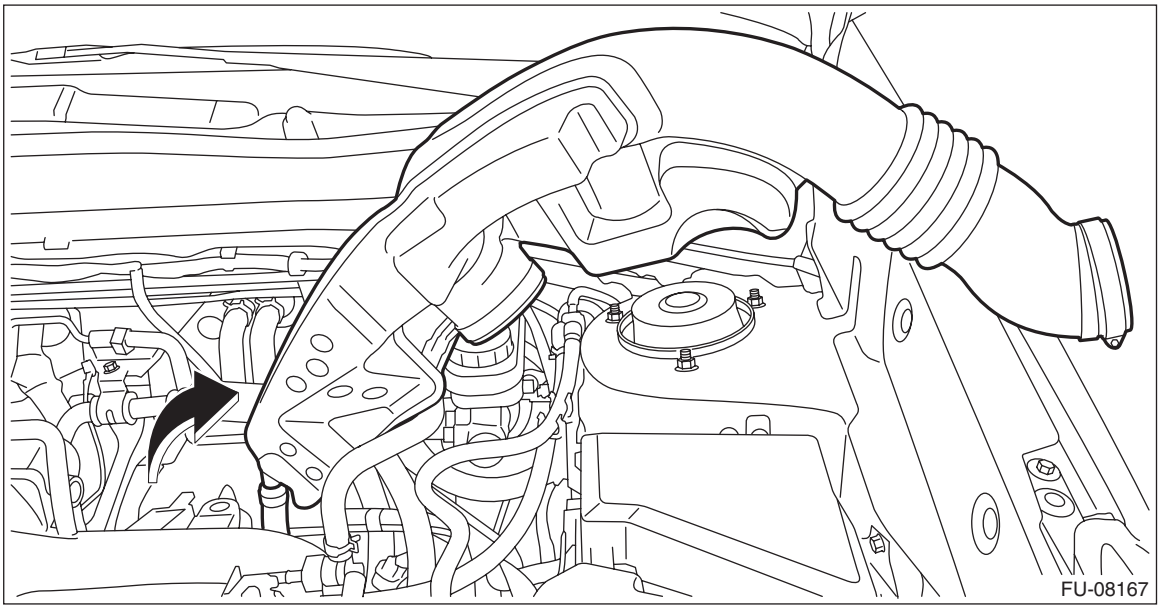
A: REMOVAL

CAUTION:
If the CVTF and engine coolant is spilt over exhaust pipe, wipe it off with cloth to avoid emitting smoke or causing a fire.

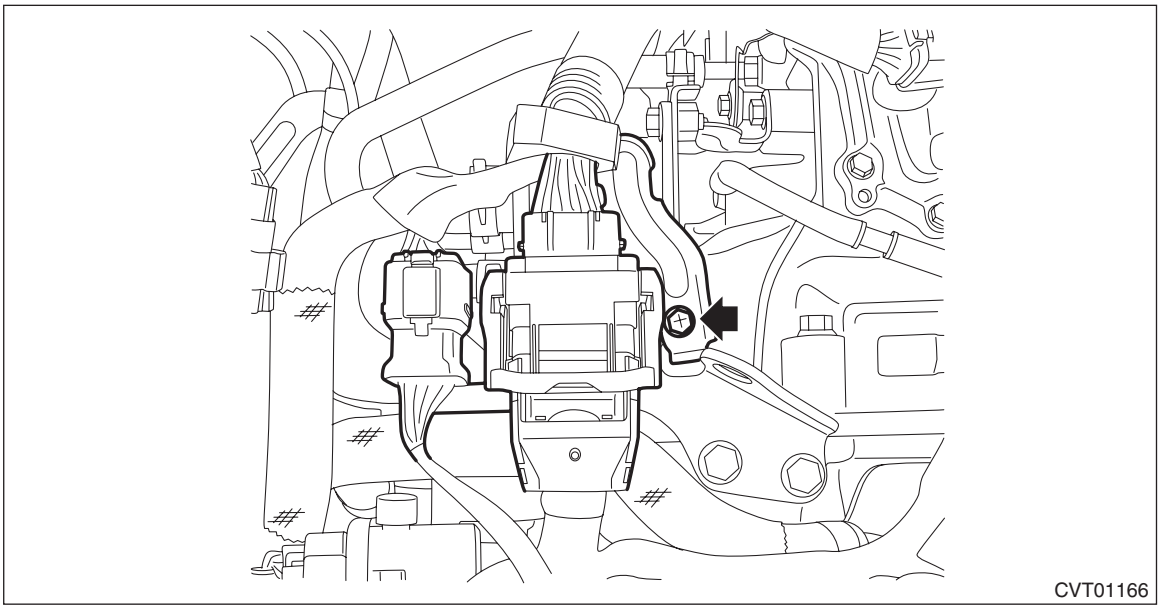
1) Disconnect the ground cable from battery.
2) Drain engine coolant. <Ref. to CO(H4DO(w/o HEV))-16, REPLACEMENT, Engine Coolant.>
3) Remove the clip (A) from the air intake boot.
4) Loosen the clamp (B) connecting the air intake boot and air cleaner case (rear).
5) Loosen the clamp (C) which connects the air intake boot and throttle body.



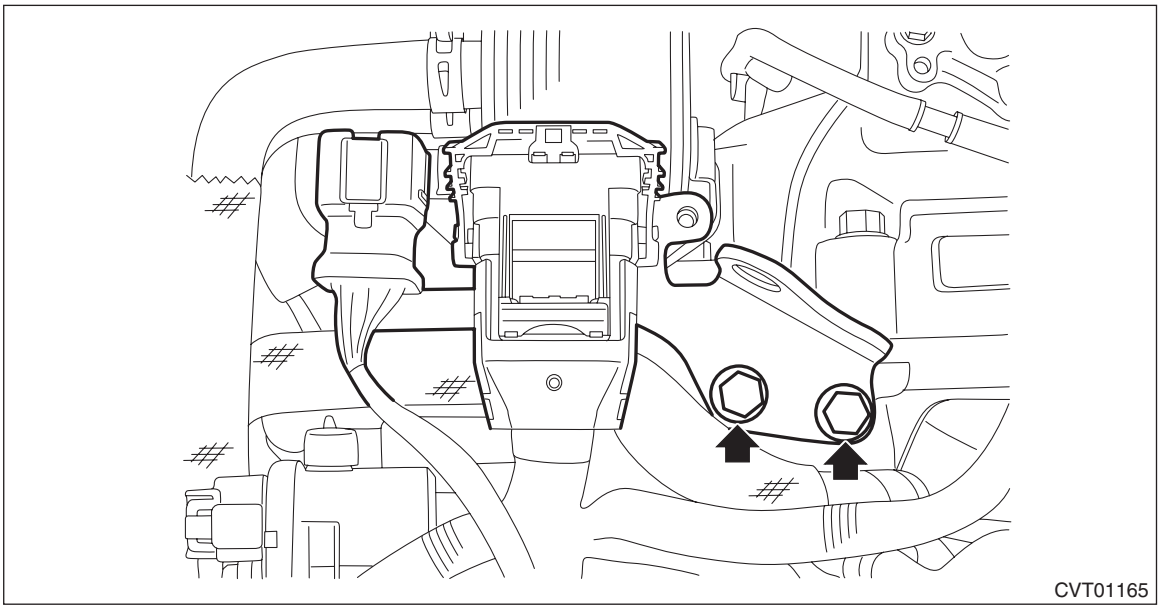
6) Remove the air intake boot from the throttle body, and move it to the left side wheel apron.



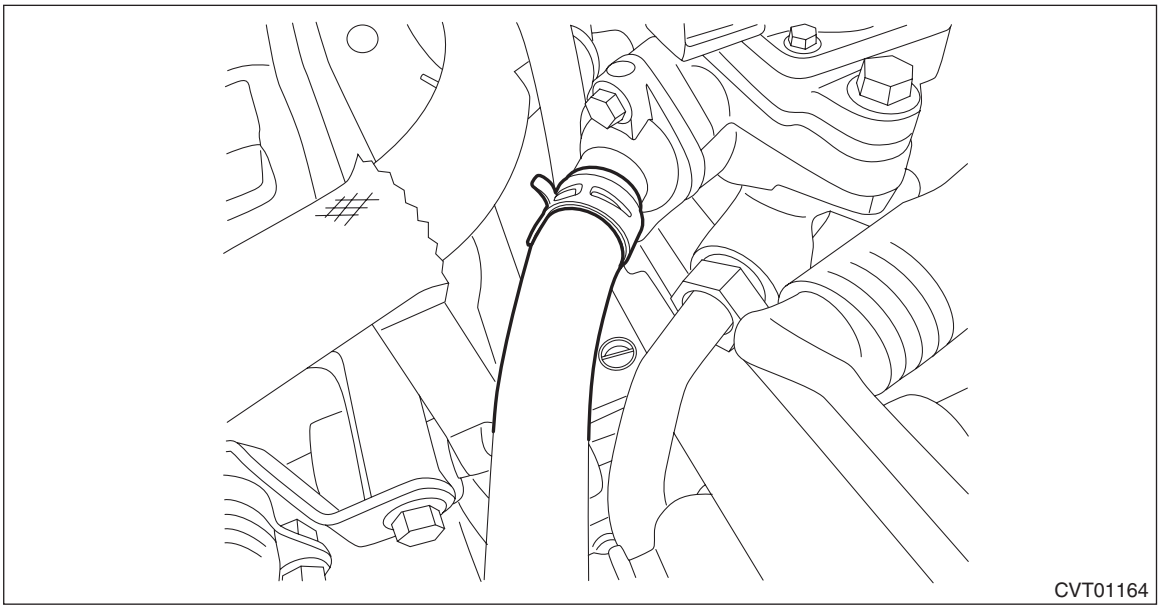
7) Remove the harness bracket, and then remove the engine harness.



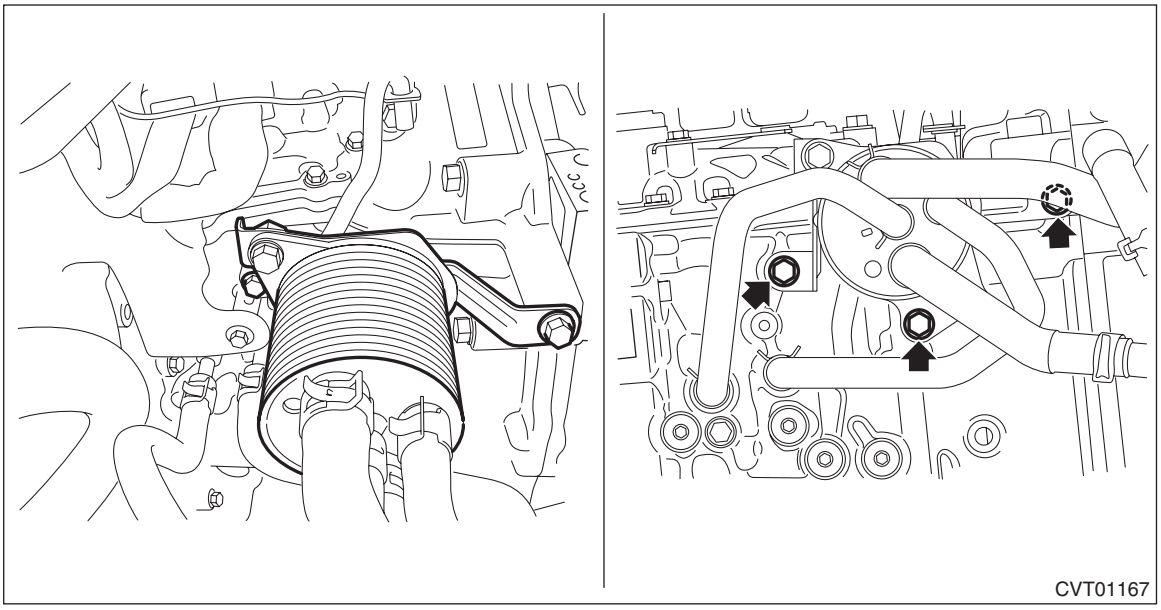
8) Disconnect the EGR control valve harness connector, throttle position sensor harness connector and manifold absolute pressure sensor harness connector.
9) Remove the engine hanger rear.



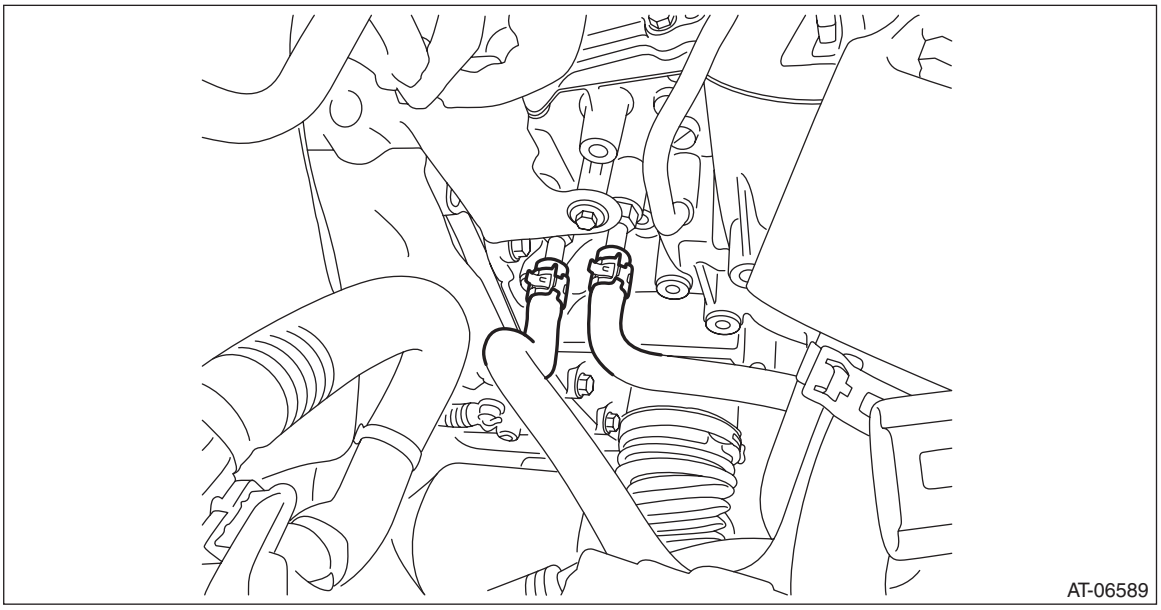
10) Disconnect the engine coolant outlet hose.



11) Remove the CVTF cooler (with warmer feature) from the transmission.



12) Remove the CVTF inlet hose and outlet hose from the pipe on the transmission side.



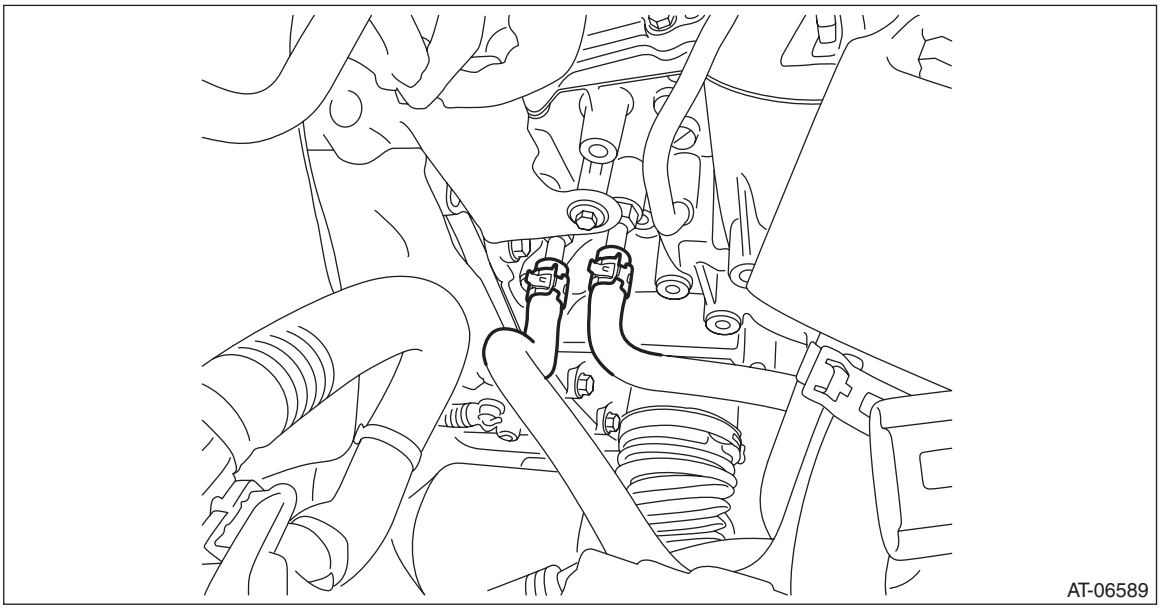
13) Remove the engine coolant inlet hose from the EGR cooler.

B: INSTALLATION

1) Install the engine coolant inlet hose to the EGR cooler.

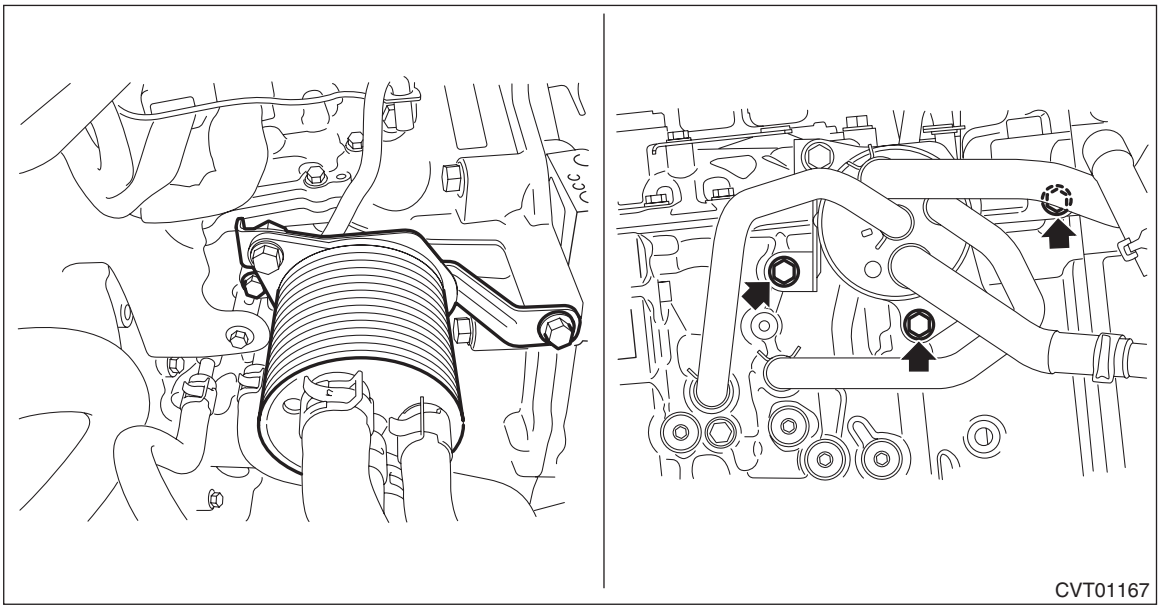
NOTE:
With the triangle mark on the engine coolant inlet hose facing the vehicle outside, install the hose to the EGR cooler.

2) Install the CVTF inlet hose and CVTF outlet hose to transmission.

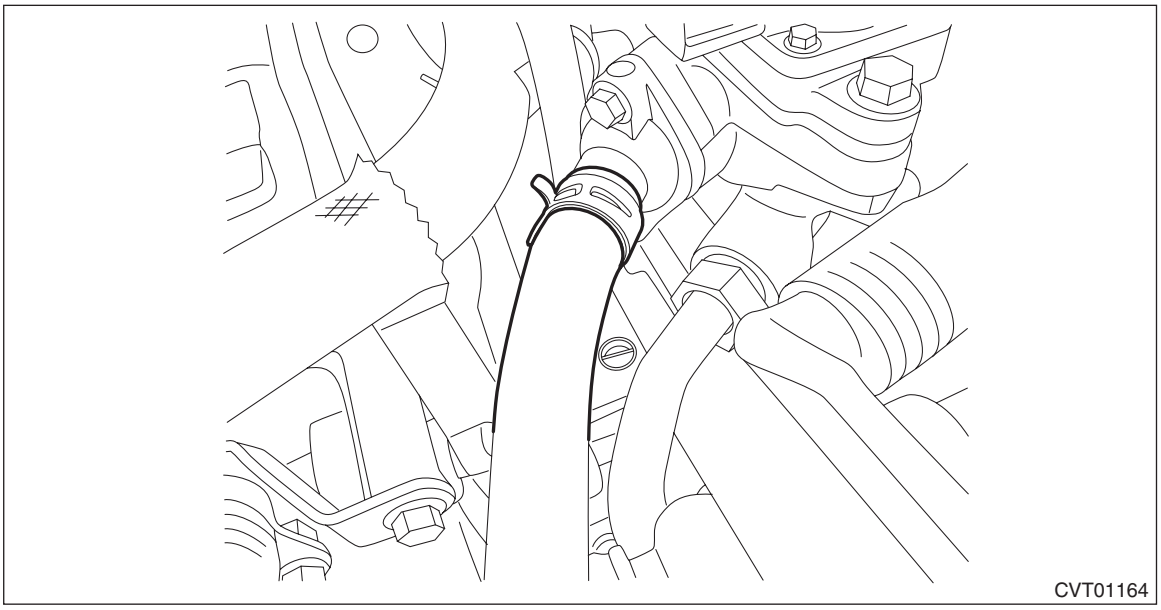


3) Install the CVTF cooler (with warmer feature) to the transmission.

Tightening torque:
23 N·m (2.3 kgf-m, 17.0 ft-lb)



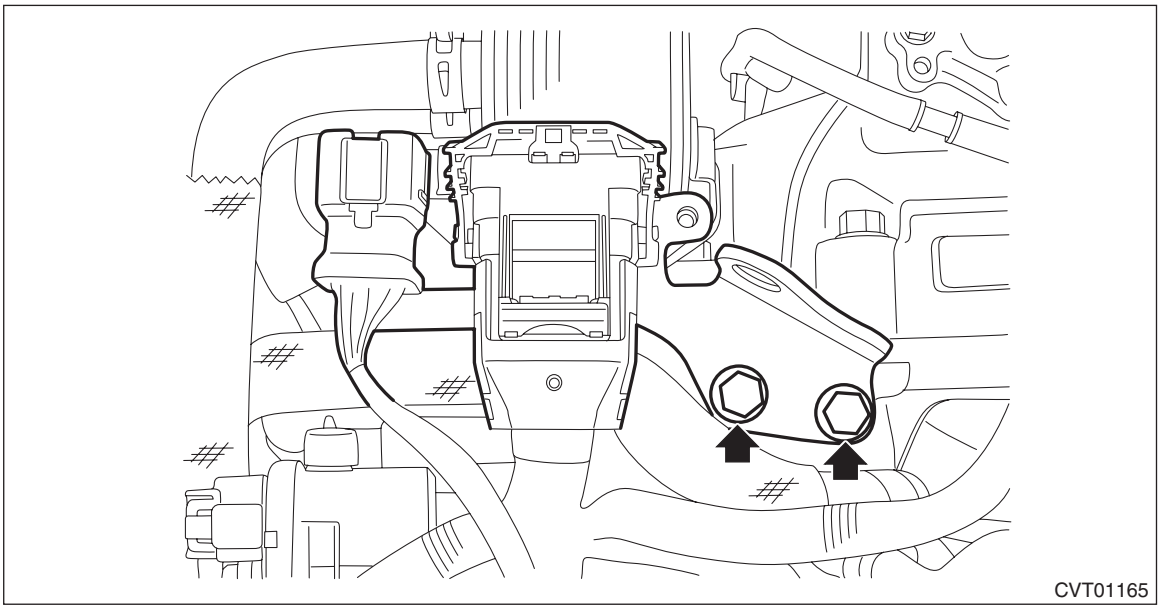
4) Connect the engine coolant outlet hose.



5) Check installation condition of each hose.
- Make sure the hoses do not interfere with each other or with other components.
- Check each hose for bent, excess curve, and twisting conditions.

6) Install the engine hanger rear.

Tightening torque:
21 N·m (2.1 kgf-m, 15.5 ft-lb)



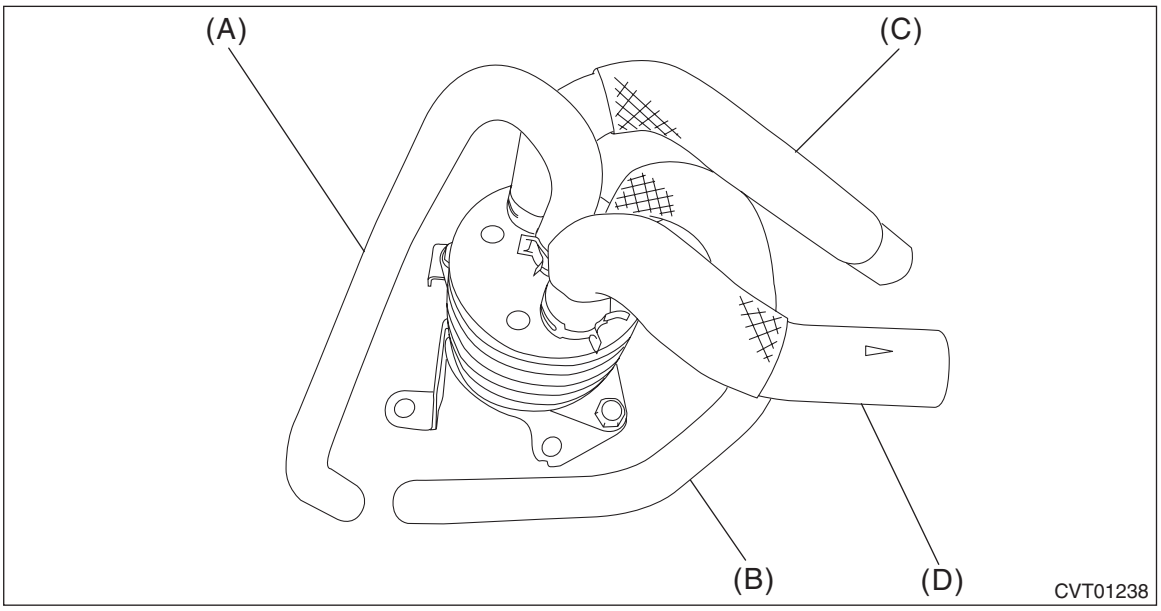
7) Connect the EGR control valve harness connector, throttle position sensor harness connector and manifold absolute pressure sensor harness connector.
8) Connect the engine harness connectors, then install the harness connector bracket.

Tightening torque:
7.5 N·m (0.8 kgf-m, 5.5 ft-lb)

9) Install the air intake boot assembly. <Ref. to IN(H4DO(w/o HEV))-12, INSTALLATION, Air Intake Boot.>
10) Connect the battery ground terminal.
11) Fill engine coolant. <Ref. to CO(H4DO(w/o HEV))-16, REPLACEMENT, Engine Coolant.>
12) Adjust the CVTF level. <Ref. to CVT(TR580)-36, ADJUSTMENT, CVTF.>

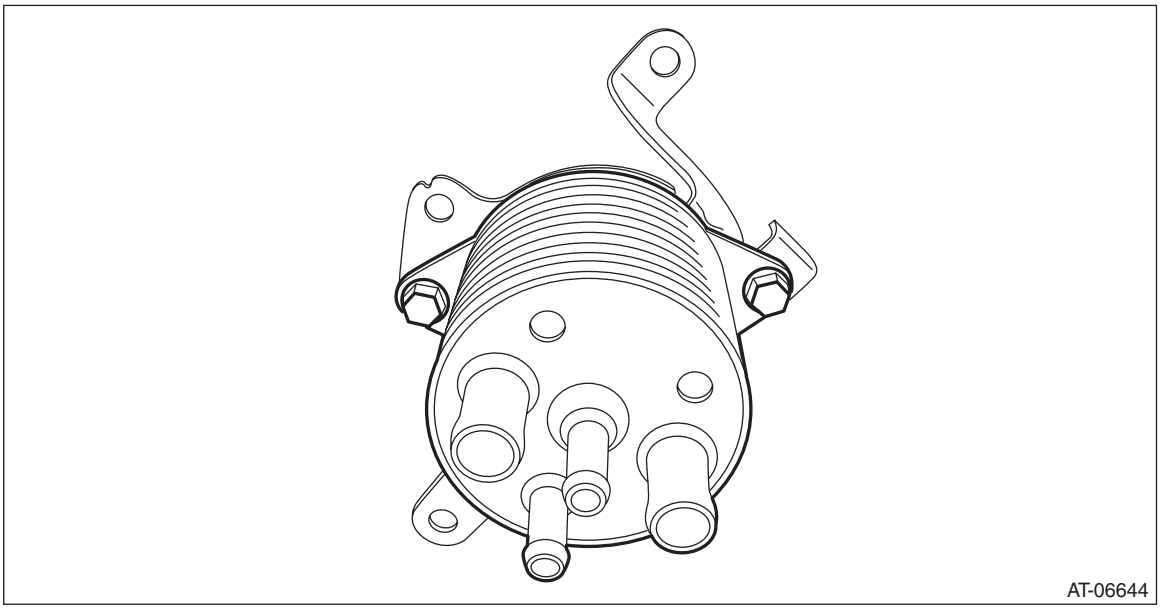
C: DISASSEMBLY

1) Remove the hoses from the CVTF cooler (with warmer feature).



(A) CVTF cooler inlet hose
(B) CVTF cooler outlet hose
(C) Engine coolant outlet hose
(D) Engine coolant inlet hose

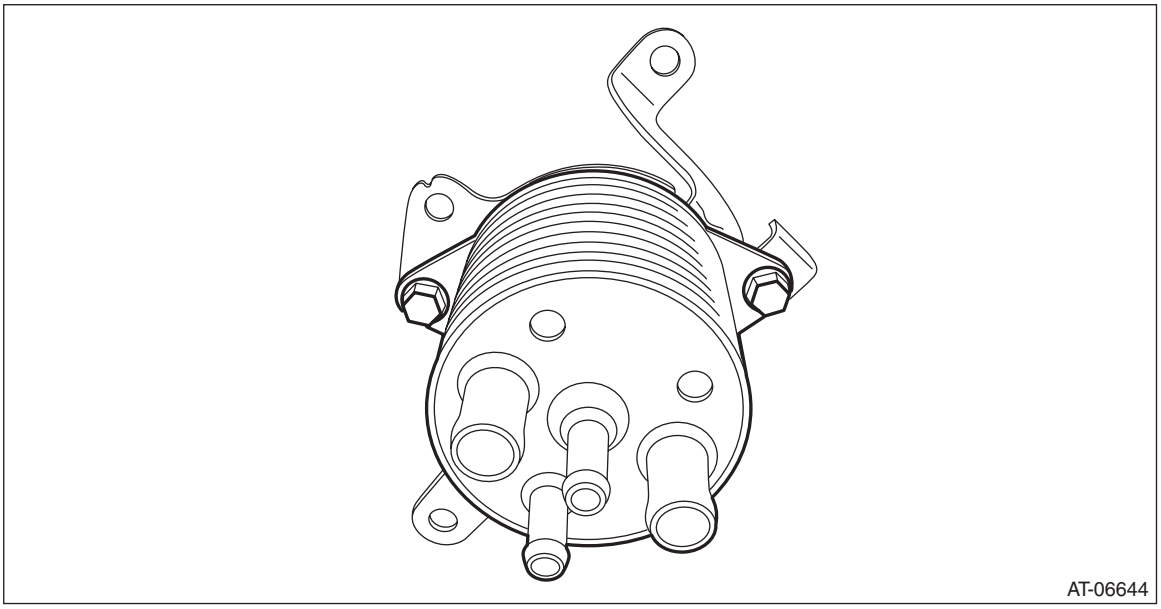
2) Remove the bracket from the CVTF cooler (with warmer feature).



D: ASSEMBLY

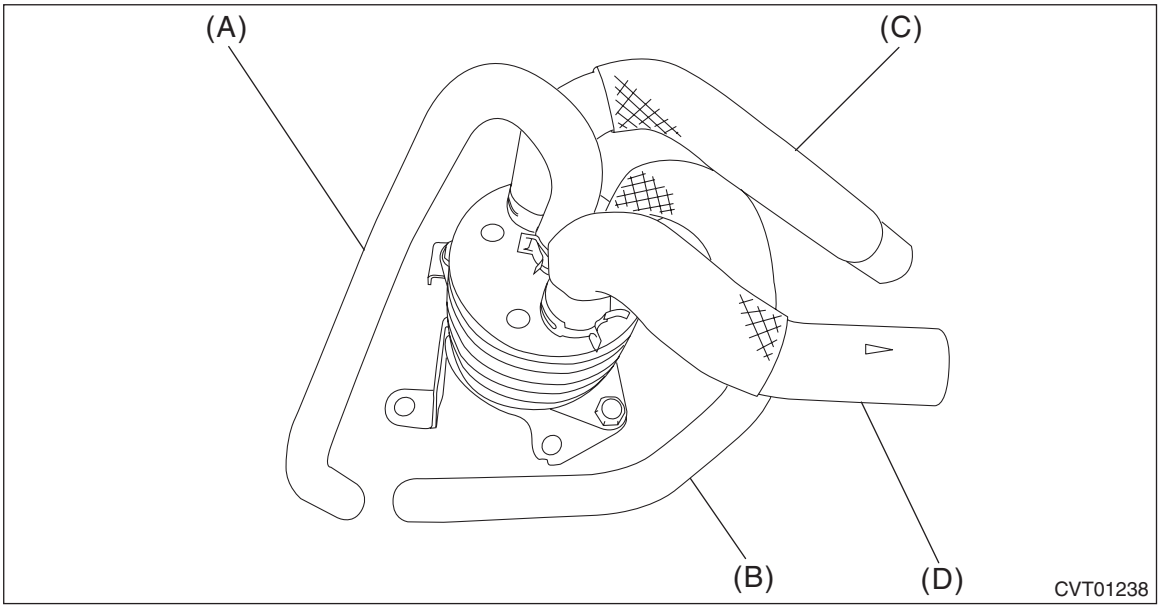
1) Attach the bracket.

Tightening torque:
23 N·m (2.3 kgf-m, 17.0 ft-lb)



2) Attach hoses to the CVTF cooler (with warmer feature).

NOTE:
- Use a new CVTF cooler hose.
- Install so that the CVTF cooler hose is not folded over, excessively bent or twisted.
- Insert the CVTF cooler hose to the specified position in the proper direction.



(A) CVTF cooler inlet hose
(B) CVTF cooler outlet hose
(C) Engine coolant outlet hose
(D) Engine coolant inlet hose

E: INSPECTION

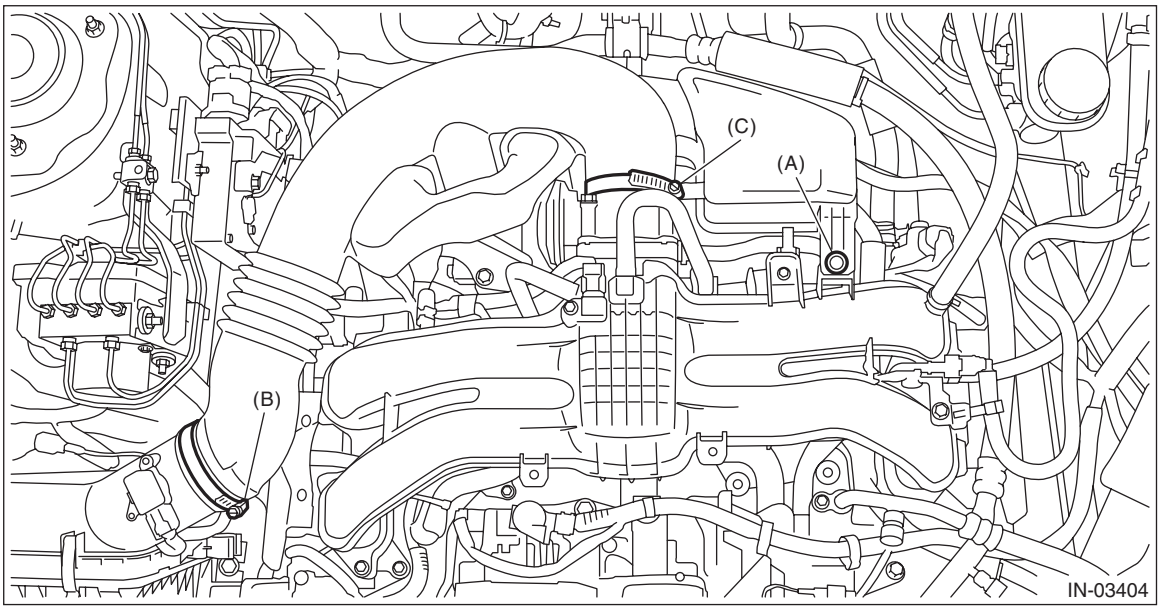
Replace any faulty CVTF cooler hoses, CVTF cooler pipes and clamps found in the inspection below.
1) Check that there are no CVTF or engine coolant leaks from the connections.
2) Check the clamp for deformation.
3) Lightly bend the CVTF cooler hose and check for cracks in the surface or other damages.
4) Pinch the CVTF cooler hose with your fingers and check for poor elasticity. Also check for poor elasticity in the parts where the clamp was installed by pressing with your fingernail.
5) Check for peeling, cracks, and deformation at the tip of the hose.
6) Check the CVTF cooler (with warmer feature) for any damage.

24.Air Breather Hose

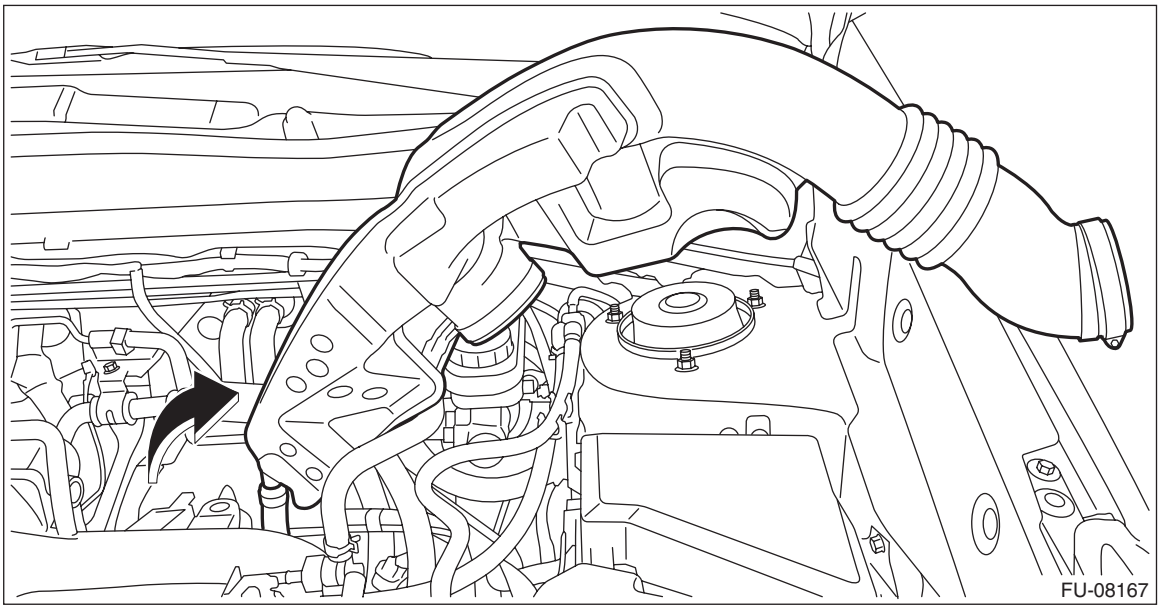
A: REMOVAL

1. FRONT DIFFERENTIAL SIDE

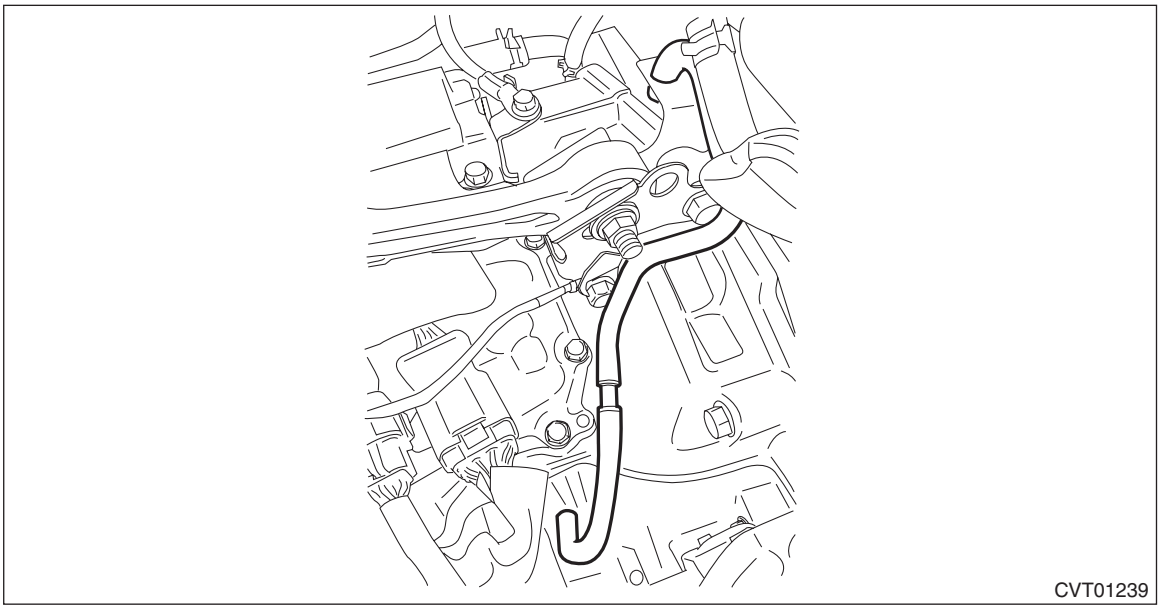
1) Remove the clip (A) from the air intake boot.
2) Loosen the clamp (B) connecting the air intake boot and air cleaner case (rear).
3) Loosen the clamp (C) which connects the air intake boot and throttle body.



4) Remove the air intake boot from the throttle body, and move it to the left side wheel apron.

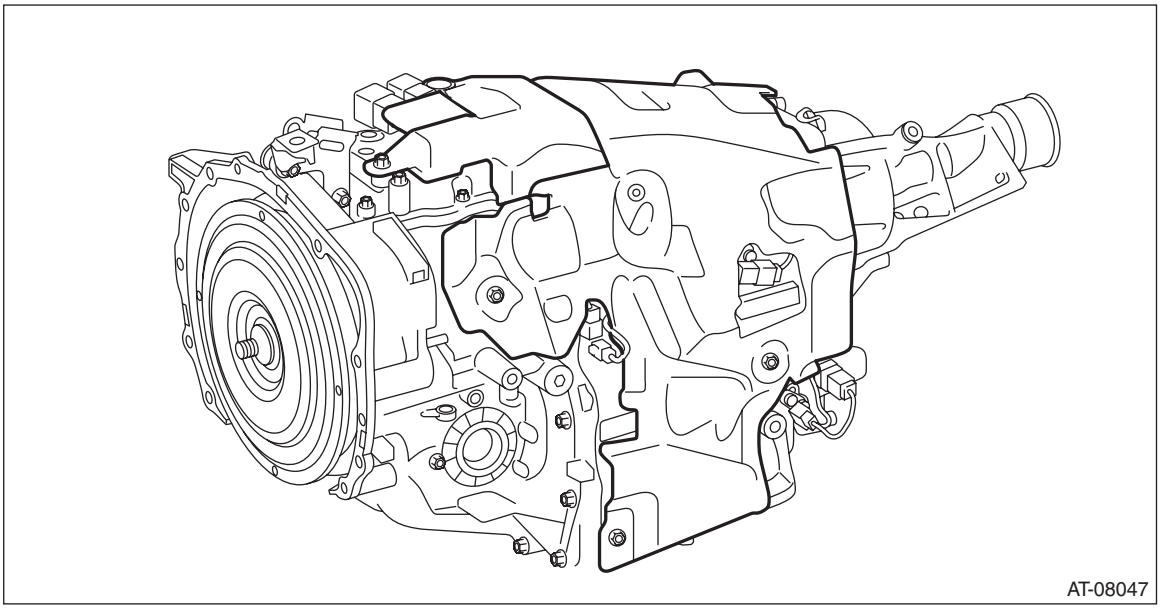


5) Remove the air breather hose.

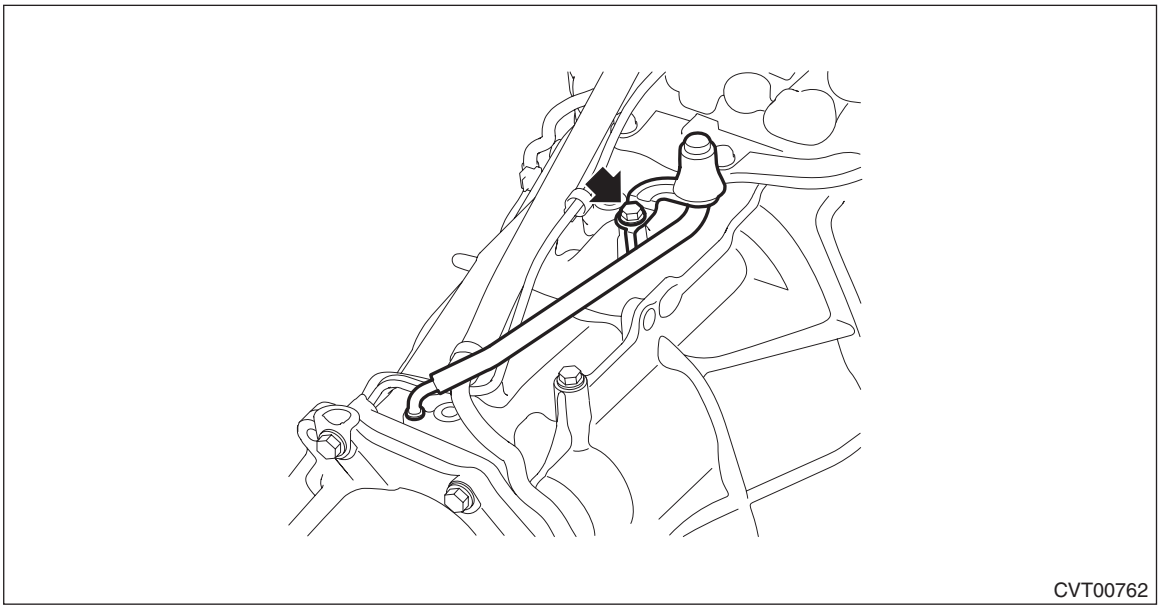


2. TRANSMISSION CASE SIDE

1) Remove the transmission assembly. <Ref. to CVT(TR580)-60, REMOVAL, Automatic Transmission Assembly.>
2) Remove the transmission case cover.



3) Remove the air breather hose.



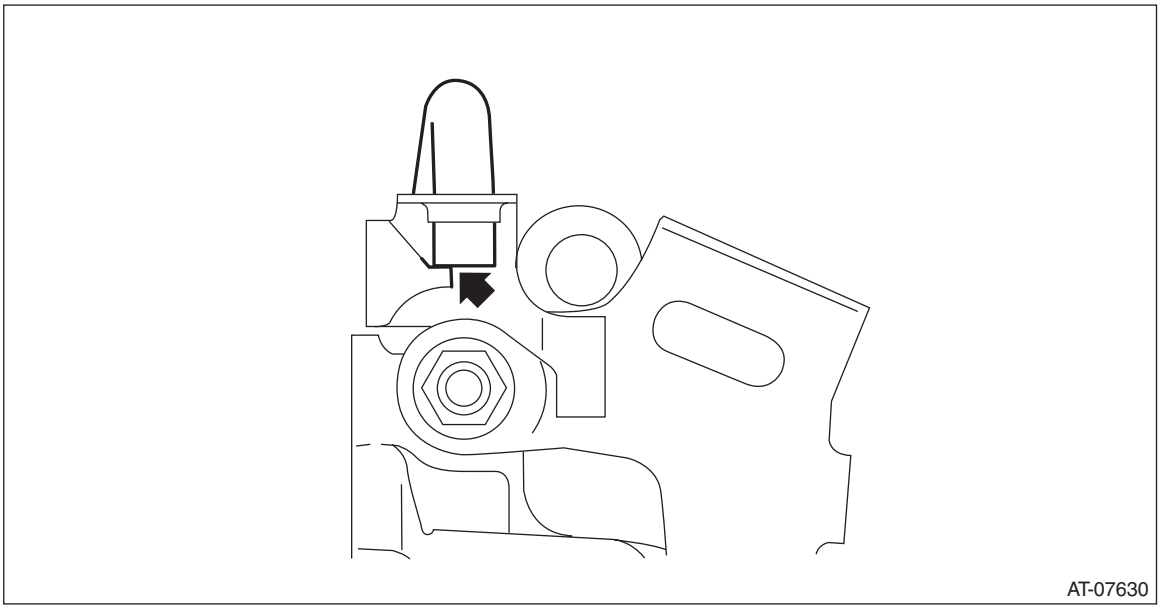
4) Remove the air breather cap.

B: INSTALLATION

1. FRONT DIFFERENTIAL SIDE

Install in the reverse order of removal.

NOTE:
Securely insert the air breather hose until the hose end contacts the catch of the pitching stopper bracket.

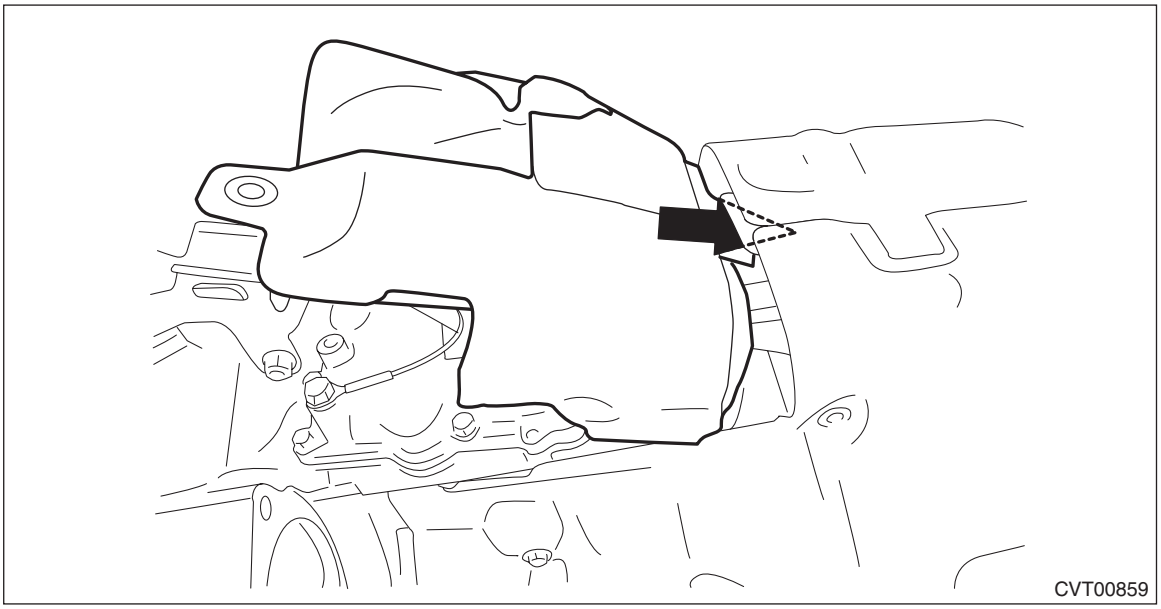


2. TRANSMISSION CASE SIDE

Install in the reverse order of removal.

Tightening torque:
Transmission case cover:
8 N·m (0.8 kgf-m, 5.9 ft-lb)
Air breather hose:
5 N·m (0.5 kgf-m, 3.7 ft-lb)

NOTE:
After the transmission case cover (large) is installed, insert the transmission case cover (small) between the transmission case cover (large) and the transmission to install.



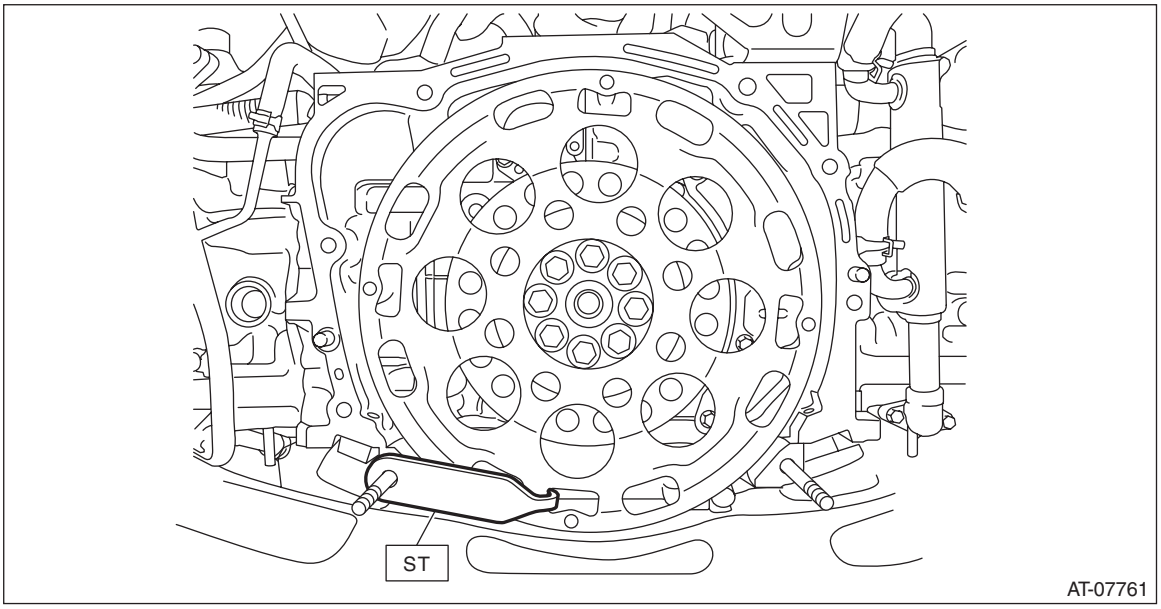
C: INSPECTION

Check the hose for peeling, crack or clogging.

25.Drive Plate

A: REMOVAL

1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TR580)-60, REMOVAL, Automatic Transmission Assembly.>
2) Set the ST.
ST 498497300 CRANKSHAFT STOPPER



3) Remove the drive plate and reinforcement drive plate.

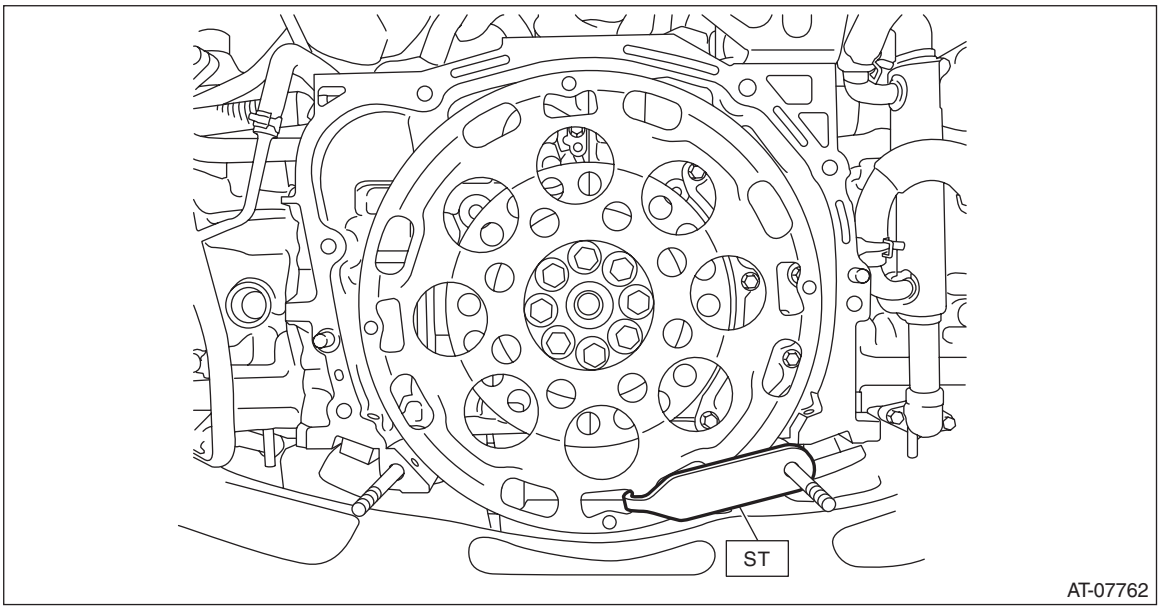
B: INSTALLATION

1) Temporarily install the drive plate and reinforcement drive plate.

NOTE:
Align the knock pin hole of the crankshaft position sensor plate to the knock pin of the crankshaft to secure the knock pin.

2) Set the ST.

ST 498497300 CRANKSHAFT STOPPER



3) Tighten the drive plate mounting bolt in two stages.
(1) Tighten the drive plate mounting bolt.

Tightening torque:
30 N·m (3.1 kgf-m, 22.1 ft-lb)

(2) While checking the tightening angle with the angle gauge, tighten the drive plate mounting bolts to the specified angle.

Tightening angle:
30° — 35°

4) Install the transmission assembly to the vehicle. <Ref. to CVT(TR580)-72, INSTALLATION, Automatic Transmission Assembly.>

C: INSPECTION

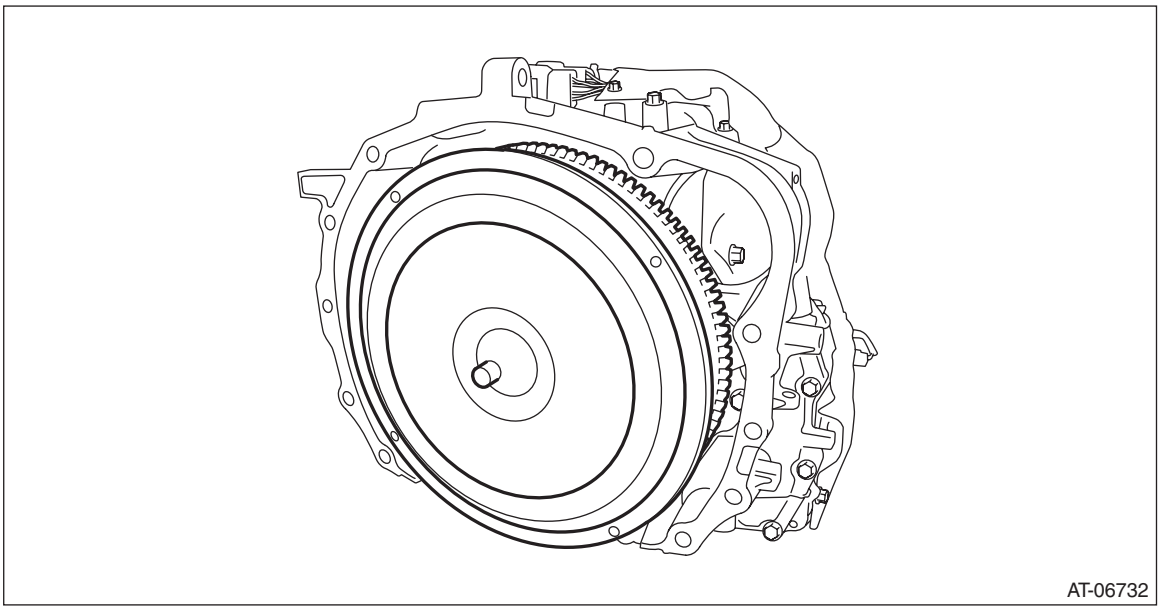
Check the drive cable for damage.

26.Torque Converter Assembly

A: REMOVAL

1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TR580)-60, REMOVAL, Automatic Transmission Assembly.>
2) Pull out the torque converter assembly horizontally.

CAUTION:
Do not scratch the inside of engaging parts.



3) Remove the O-ring from the input shaft.

B: INSTALLATION

1) Install the O-ring to the input shaft.

NOTE:
- Use new O-rings.
- Apply CVTF to the O-ring.

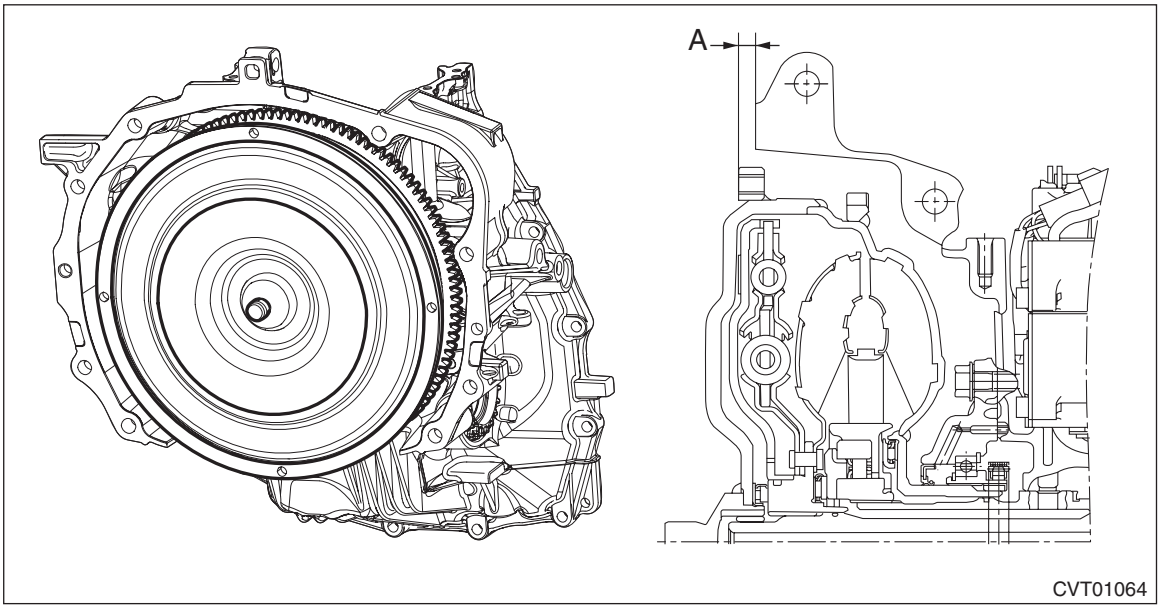
2) While holding the torque converter assembly by hand, carefully install it into the torque converter case.

NOTE:
- Apply CVTF to the oil seal lip.
- Do not damage the oil seal and O-ring.

3) Engage the splines while gently rotating the torque converter assembly by hand, and securely insert the assembly.

4) Measure depth “A”, from converter case end surface to drive plate contacting surface.

Standard (reference):
6.8 mm (0.268 in) or less



5) Install the transmission assembly to the vehicle. <Ref. to CVT(TR580)-72, INSTALLATION, Automatic Transmission Assembly.>

C: INSPECTION

- Check the protrusion of torque converter center (front boss) is not deformed or damaged.
- Check the ring gear and exterior for break or damage.

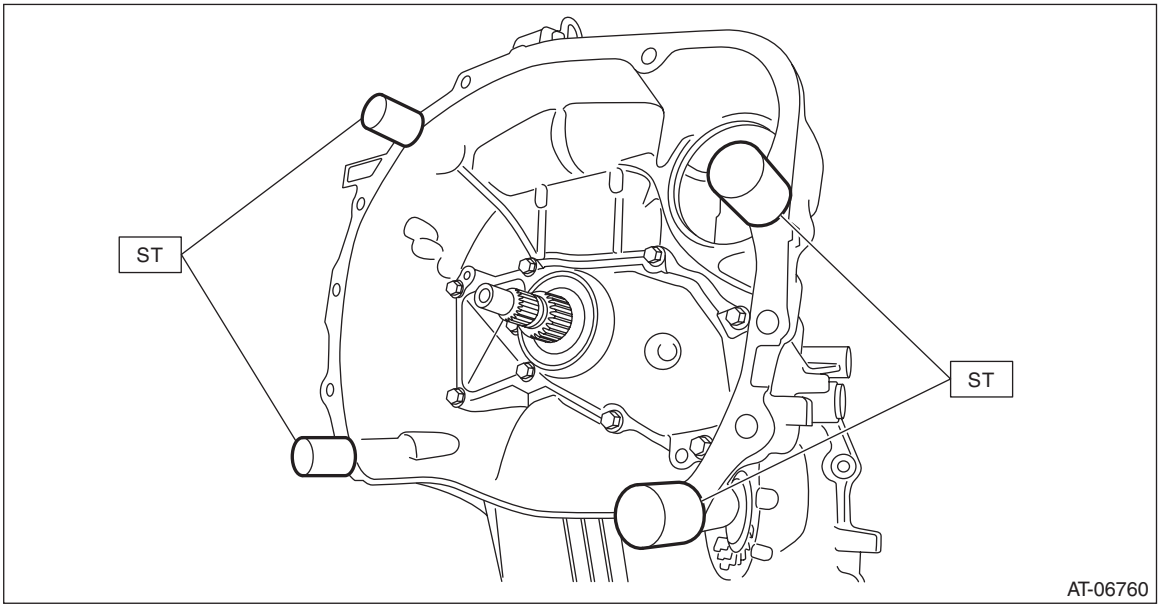
27.Preparation for Overhaul

A: GENERAL DESCRIPTION

Before disassembling and assembling the transmission, follow the following procedures to prepare.

B: PROCEDURE

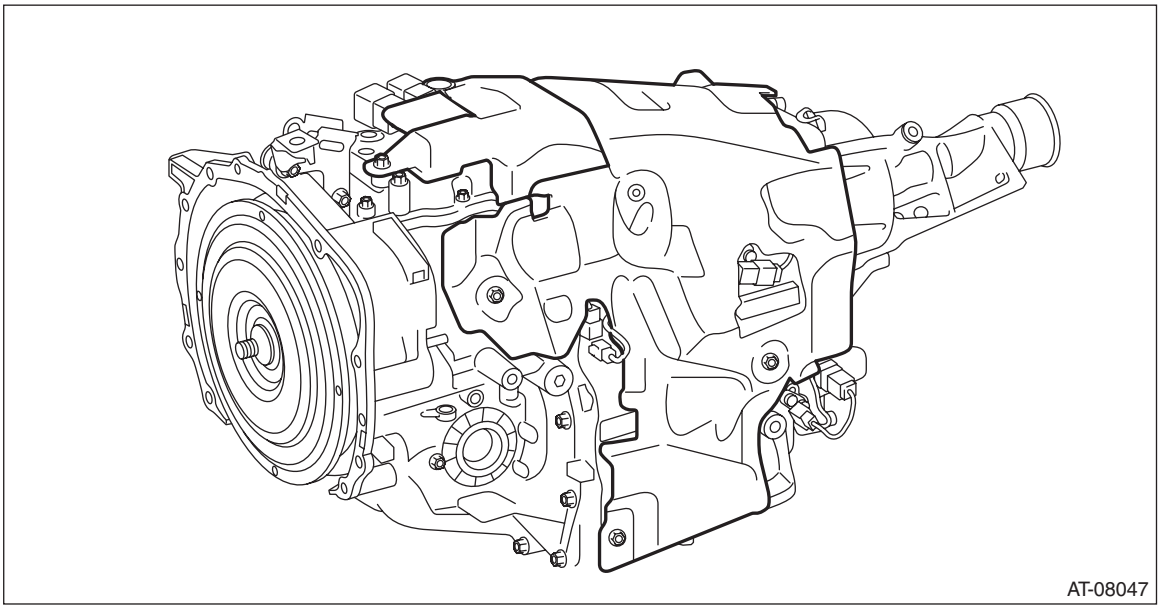
1) Clean the transmission exterior.
2) Remove the torque converter assembly. <Ref. to CVT(TR580)-164, Torque Converter Assembly.>
3) Attach the ST on the transmission.
ST 18632AA000 STAND ASSY

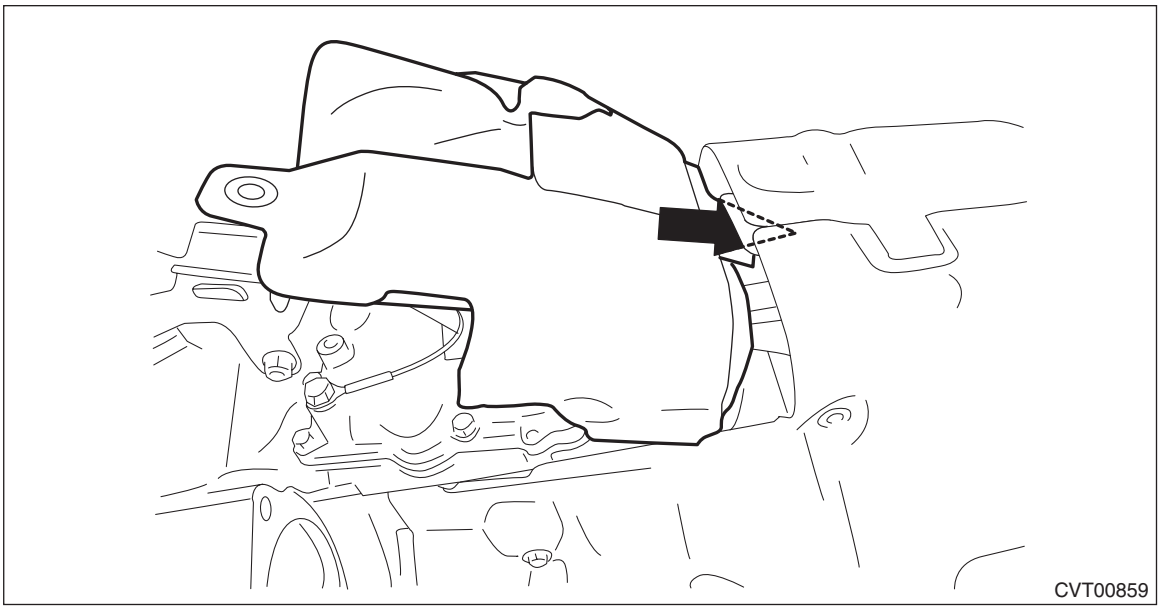


4) Remove the transmission case cover on the transmission upper side.

NOTE:
After the transmission case cover (large) is installed, insert the transmission case cover (small) between the transmission case cover (large) and the transmission to install.

Tightening torque:
8 N·m (0.8 kgf-m, 5.9 ft-lb)



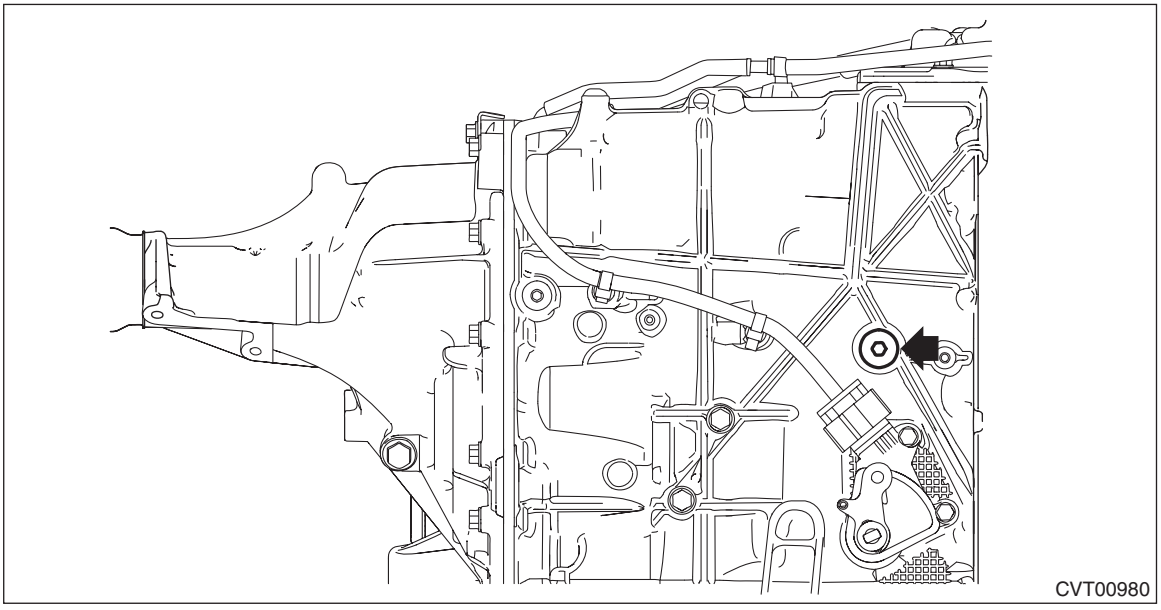


5) Place the transmission assembly on end.
6) When completely overhauling the transmission, refill approx. 10 L (2.6 US qt, 8.8 Imp qt) of CVTF through the transmission right side plug, and install the plug. Finally, install the transmission case cover.

CAUTION:
Always use specified CVTF. Using other fluid will cause malfunction. <Ref. to CVT(TR580)-3, HYDRAULIC CONTROL AND LUBRICATION, SPECIFICATION, General Description.>

NOTE:
Use a new gasket.

Tightening torque:
50 N·m (5.1 kgf-m, 36.9 ft-lb)

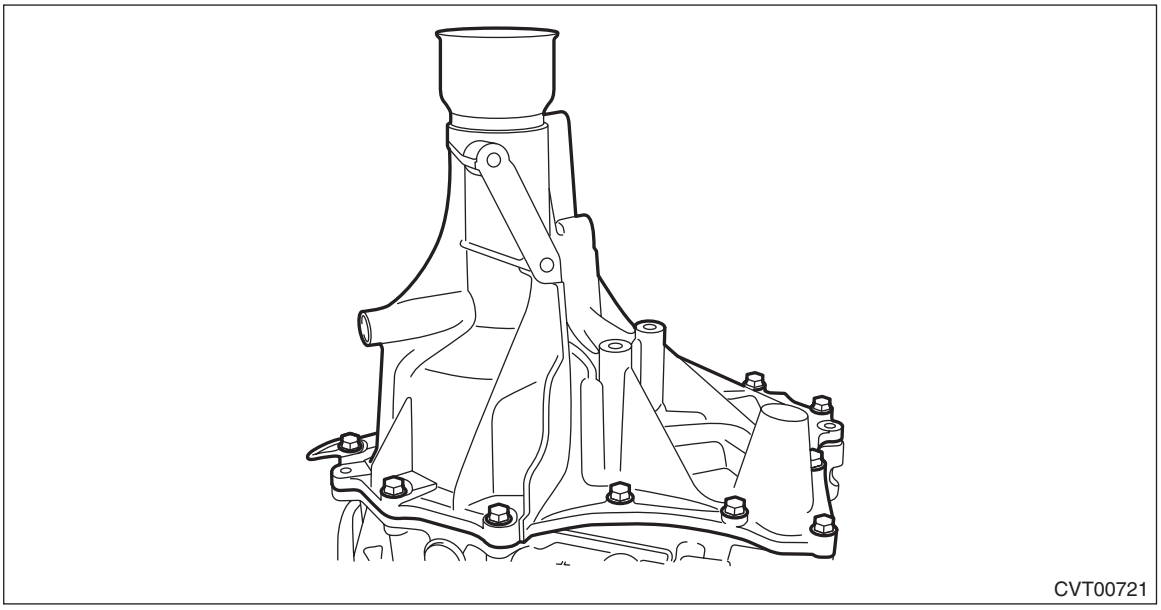


28.Extension Case

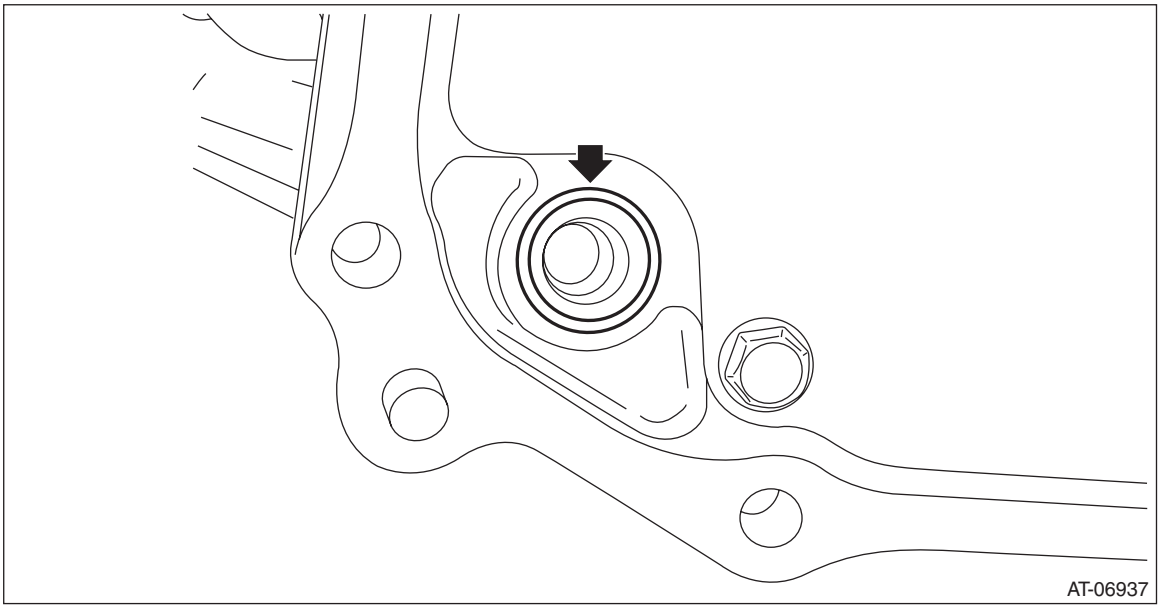
A: REMOVAL

1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TR580)-60, REMOVAL, Automatic Transmission Assembly.>
2) Remove the extension case and transmission hanger.

NOTE:
The total number of extension case mounting bolts is 13.



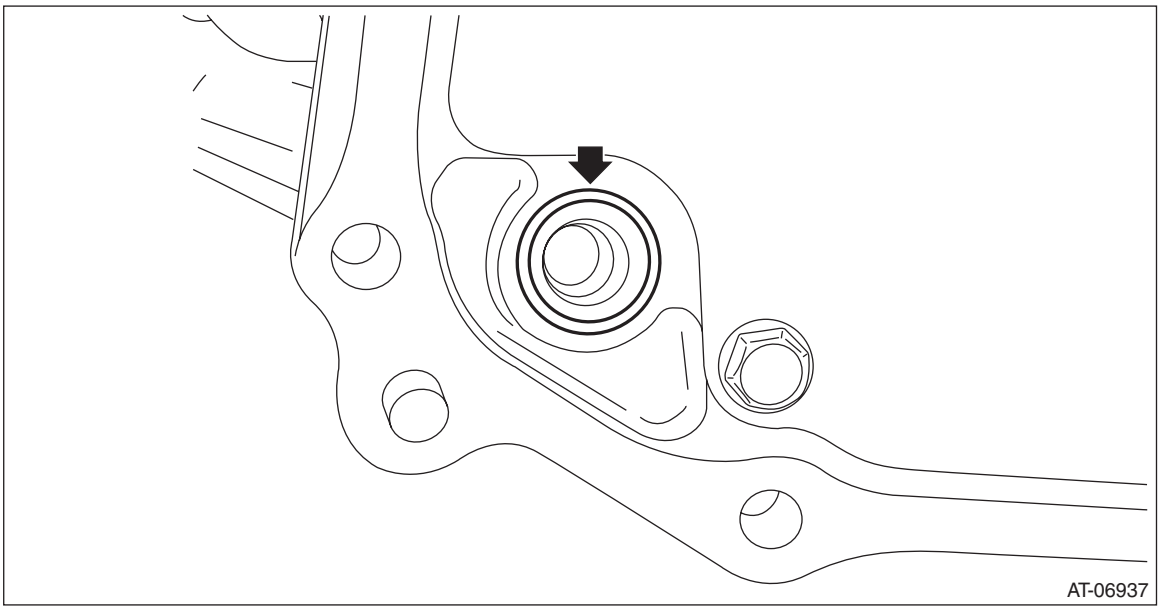
3) Remove the O-ring.



B: INSTALLATION

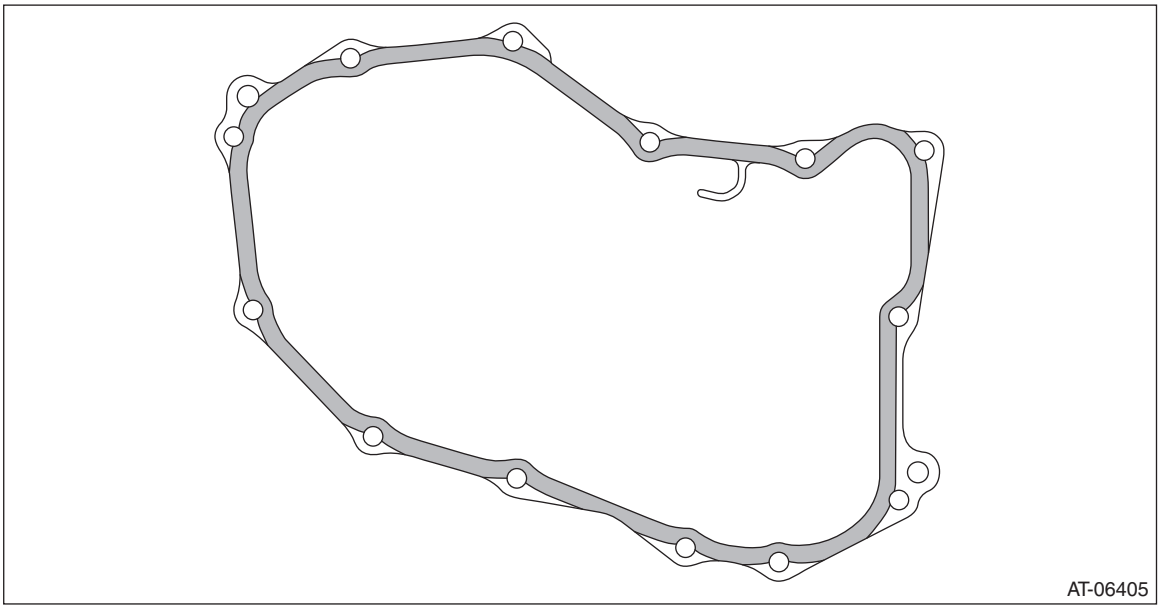
1) Clean the mating surface of extension case and transmission case.
2) Select the transfer drive gear shim. <Ref. to CVT(TR580)-221, ADJUSTMENT, Reduction Drive Gear.>
3) Select the transfer driven gear shim. <Ref. to CVT(TR580)-184, ADJUSTMENT, Transfer Clutch.>
4) Attach the selected transfer drive gear shim to extension case with vaseline.
5) Attach the selected transfer driven gear shim to extension case with vaseline.
6) Install the O-ring to the transmission case.

NOTE:
- Use new O-rings.
- Apply CVTF to the O-ring.



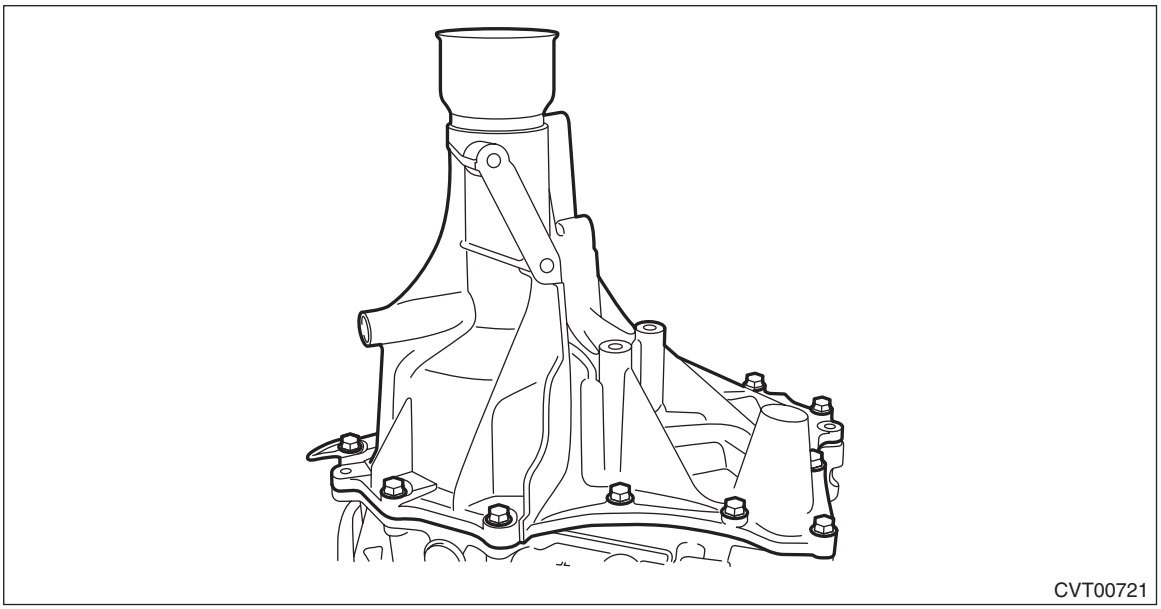
7) Apply liquid gasket to extension case seamlessly.

Liquid gasket:
THREE BOND 1215B or equivalent



8) Install the extension case to transmission hanger.

Tightening torque:
25 N·m (2.5 kgf-m, 18.4 ft-lb)



9) Install the transmission assembly. <Ref. to CVT(TR580)-72, INSTALLATION, Automatic Transmission Assembly.>

C: DISASSEMBLY

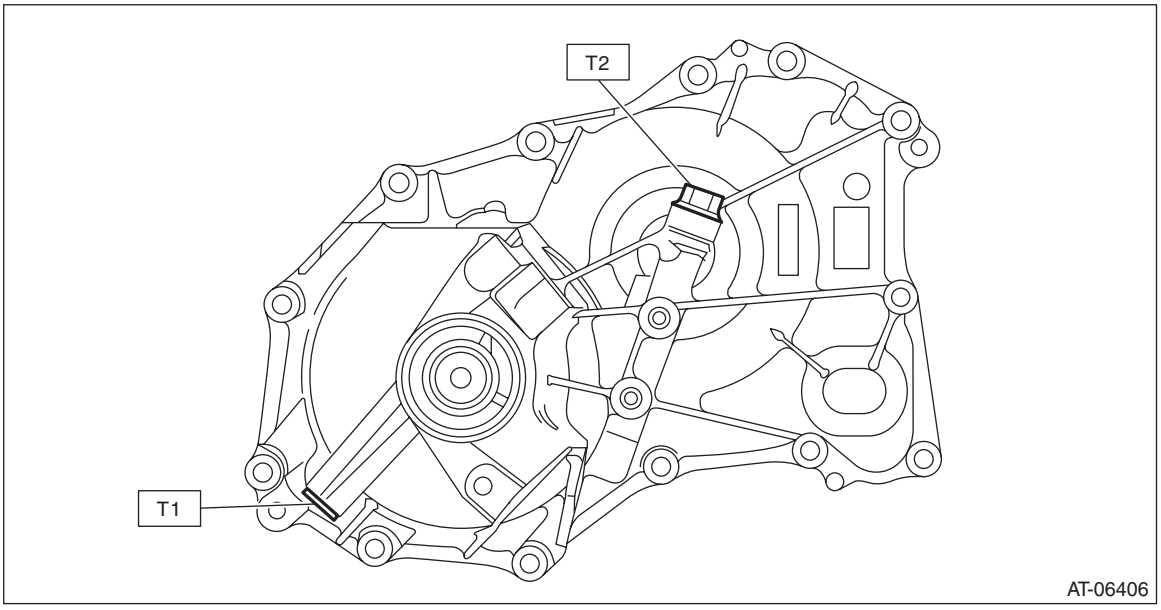
1) Remove the dust cover from extension case.
2) Remove the extension case oil seal from the extension case. <Ref. to CVT(TR580)-91, REPLACEMENT, Differential Side Retainer Oil Seal.>
3) Remove all plugs.

D: ASSEMBLY

1) Press-fit the dust cover into extension case.
2) Install the extension case oil seal to extension case. <Ref. to CVT(TR580)-91, REPLACEMENT, Differential Side Retainer Oil Seal.>
3) Install all plugs.

NOTE:
- Use a new O-ring or a gasket.
- Apply CVTF to the O-ring.

Tightening torque:
T1: 25 N·m (2.5 kgf-m, 18.4 ft-lb)
T2: 35 N·m (3.6 kgf-m, 25.8 ft-lb)



E: INSPECTION

- Check there is no leak of CVTF from the joint between extension case and transmission case.
- Check there is no damage or cracks on the extension case and other parts.

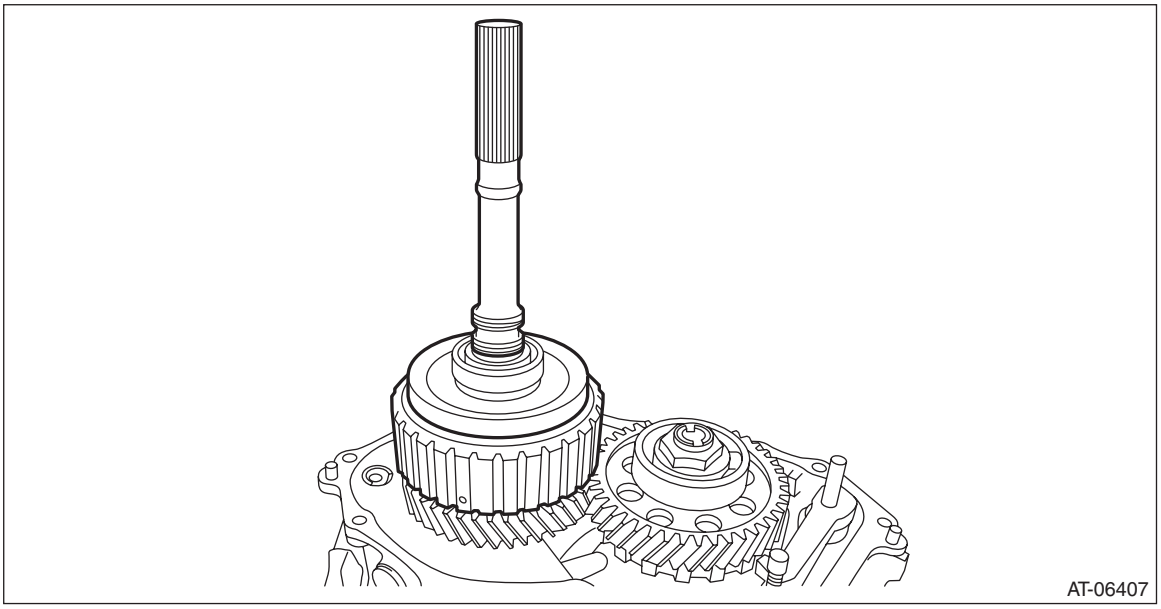
F: ADJUSTMENT

NOTE:
When replacing the extension case, select the transfer drive gear shim and transfer driven gear shim. <Ref. to CVT(TR580)-221, ADJUSTMENT, Reduction Drive Gear.> <Ref. to CVT(TR580)-184, ADJUSTMENT, Transfer Clutch.>

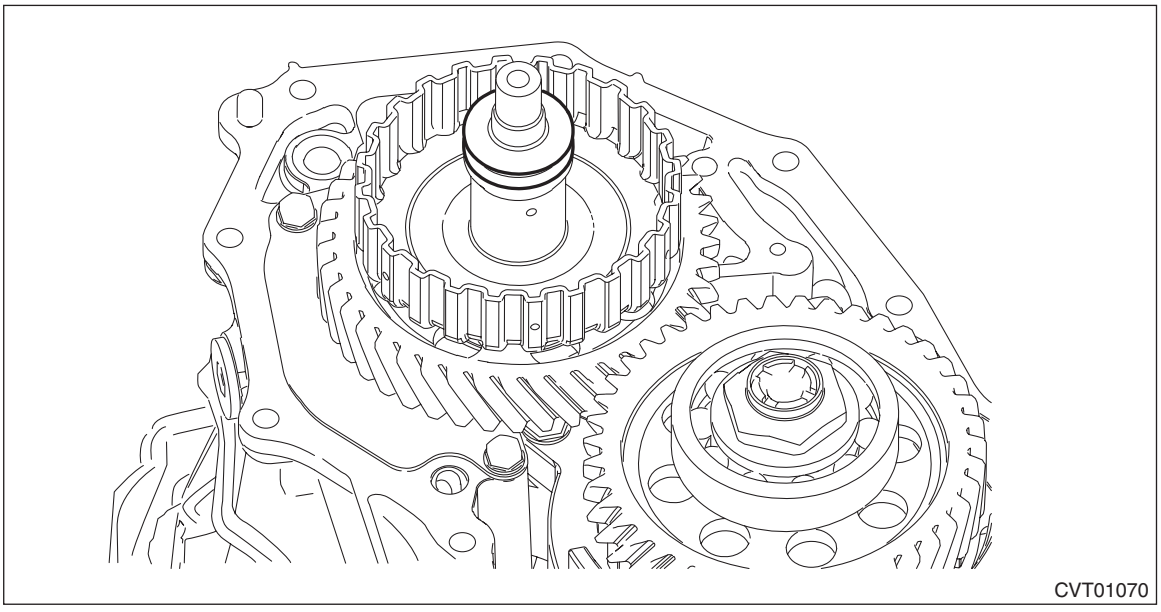
29.Transfer Clutch

A: REMOVAL

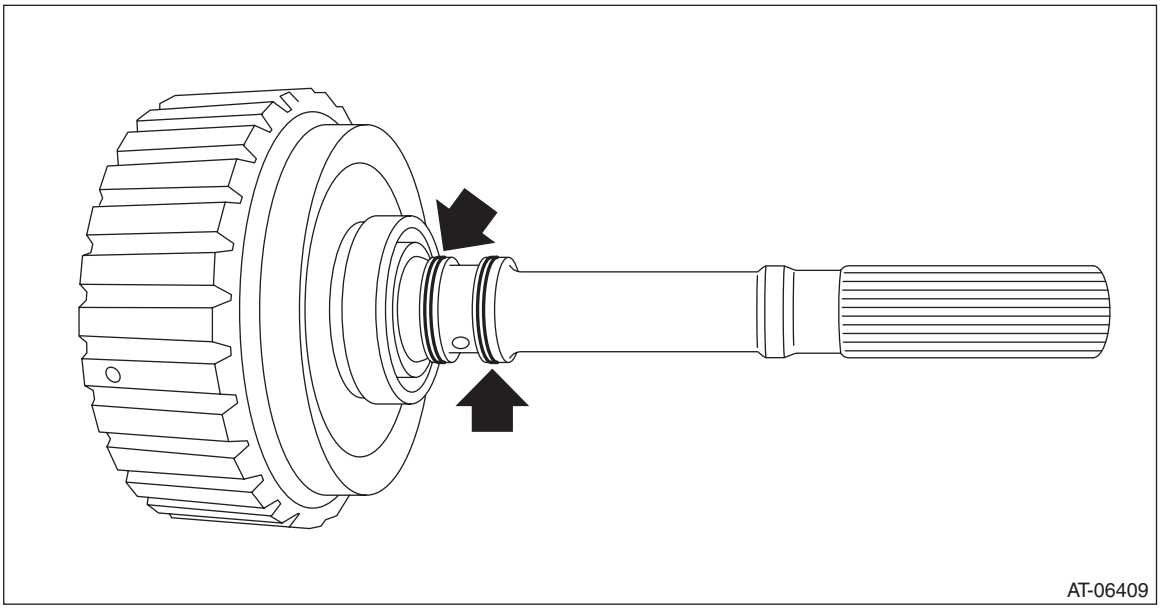
1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TR580)-60, REMOVAL, Automatic Transmission Assembly.>
2) Remove the extension case. <Ref. to CVT(TR580)-168, REMOVAL, Extension Case.>
3) Remove the transfer clutch assembly.



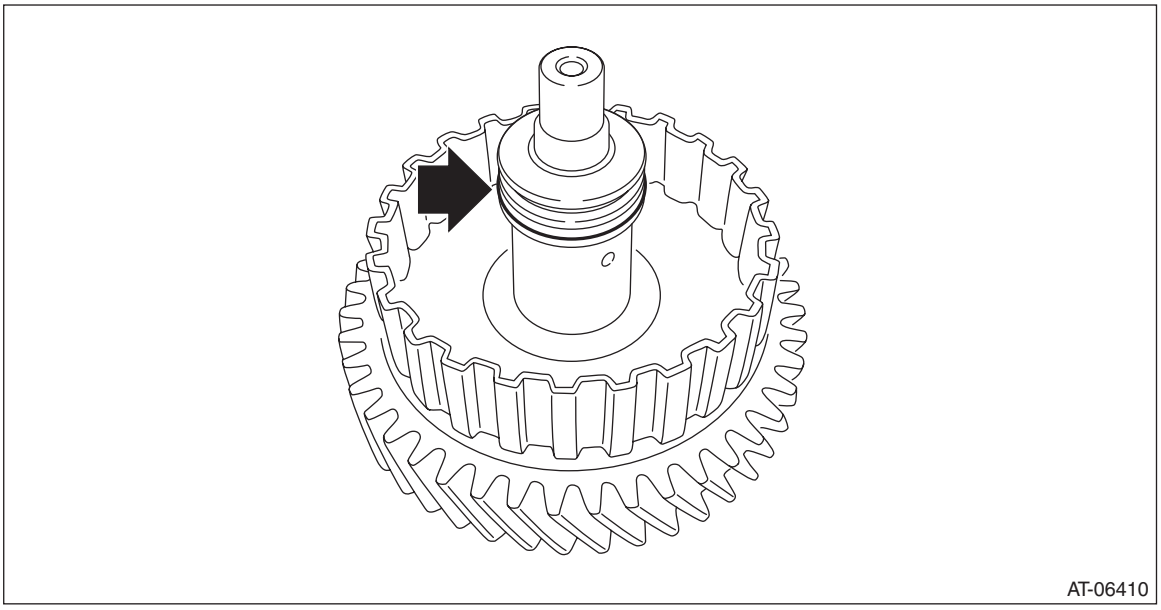
4) Remove the thrust bearing.



5) Remove the seal ring from transfer clutch assembly.



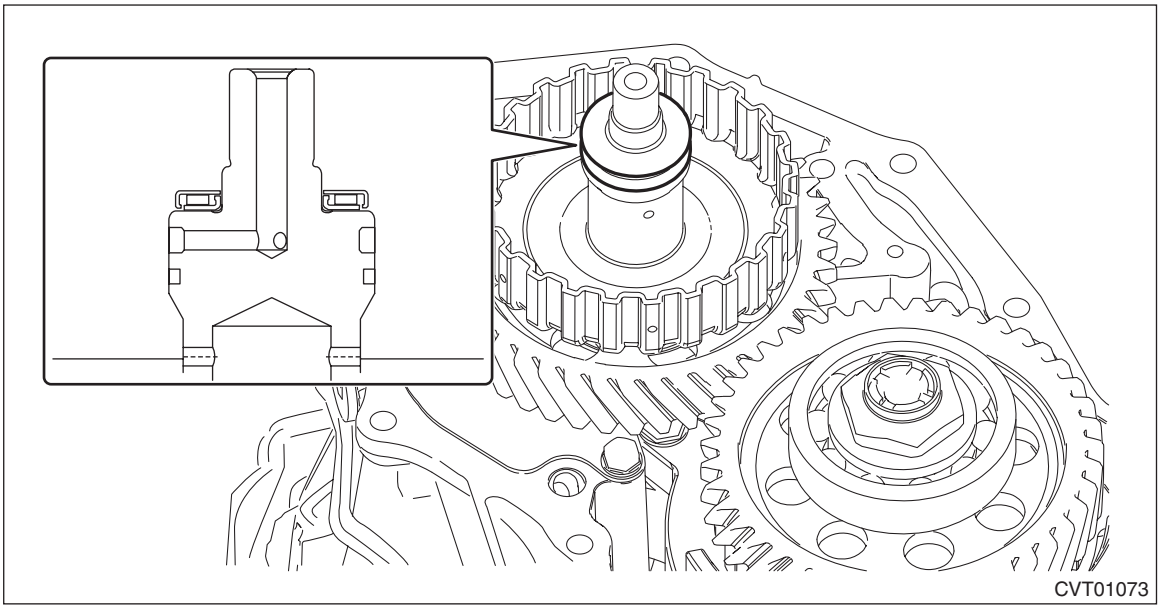
6) Remove the seal ring from the transfer driven gear assembly.



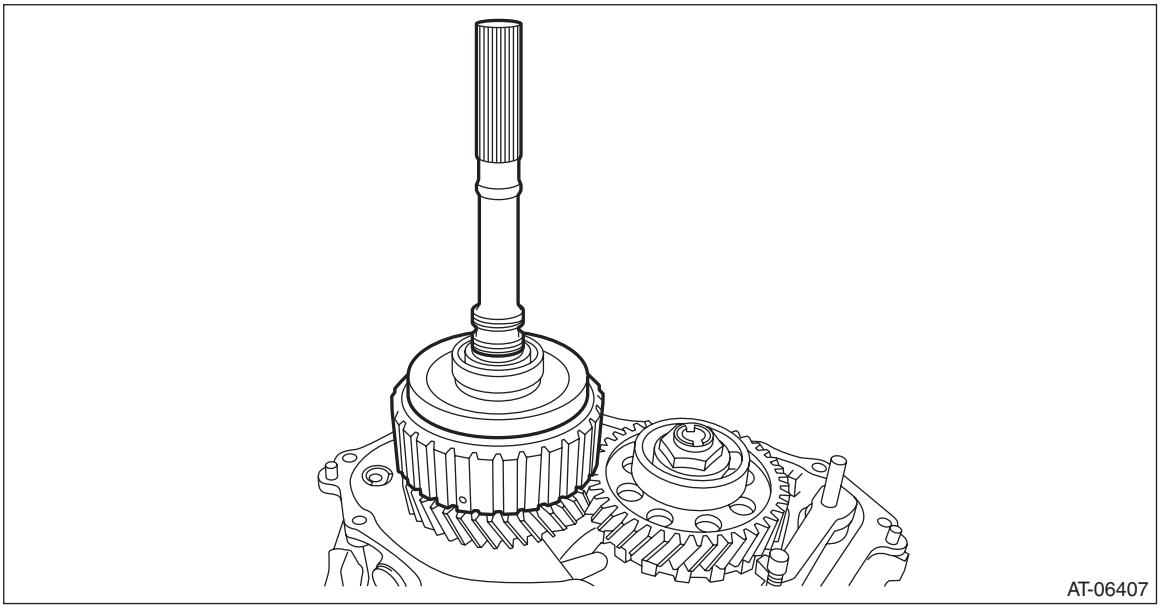
B: INSTALLATION

1) Install the thrust bearing.

NOTE:
Make sure to install in the right direction.



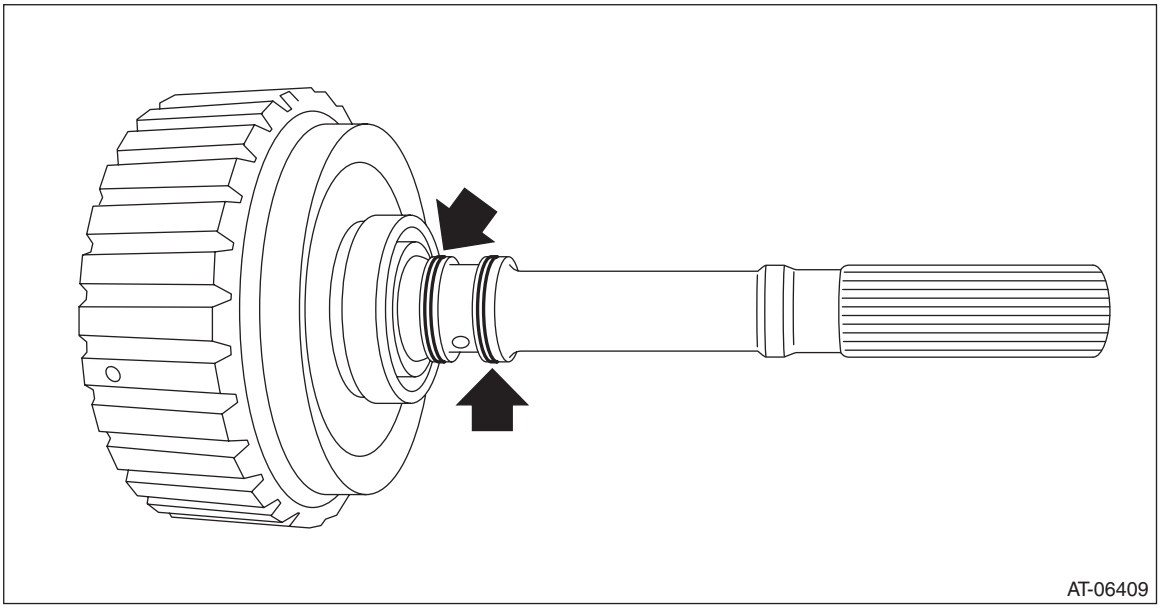
2) Install the transfer clutch assembly.



3) Select the transfer driven gear shim. <Ref. to CVT(TR580)-184, ADJUSTMENT, Transfer Clutch.>
4) Attach the selected transfer driven gear shim to extension case with vaseline.
5) Remove the transfer clutch assembly.

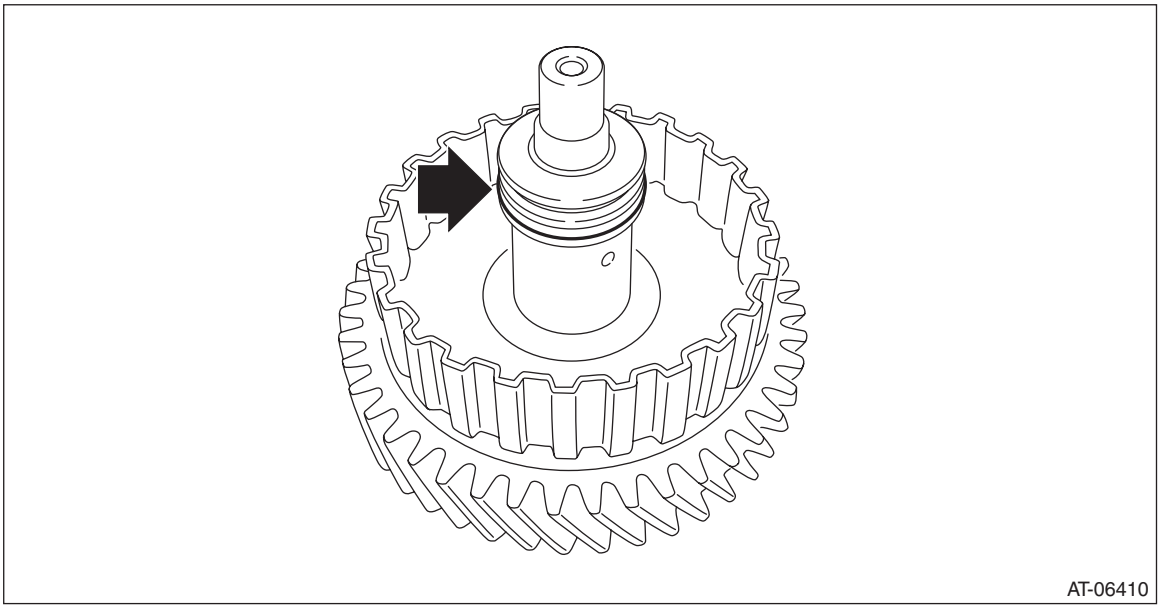
6) Install the seal ring to the transfer clutch assembly.

NOTE:
- Use a new seal ring.
- When installing the seal ring, do not expand the seal ring too much.
- Apply CVTF to the seal rings.



7) Install the seal ring to the transfer driven gear assembly.

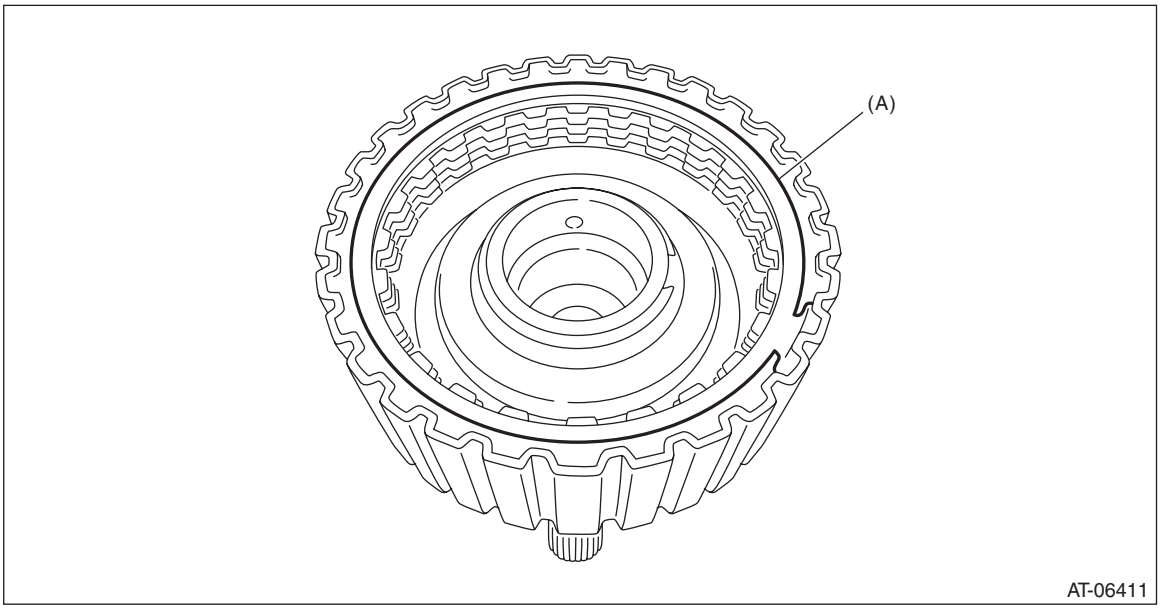
NOTE:
- Use a new seal ring.
- When installing the seal ring, do not expand the seal ring too much.
- Apply CVTF to the seal rings.



8) Install the transfer clutch assembly.
9) Install the extension case. <Ref. to CVT(TR580)-169, INSTALLATION, Extension Case.>
10) Install the transmission assembly to the vehicle. <Ref. to CVT(TR580)-72, INSTALLATION, Automatic Transmission Assembly.>

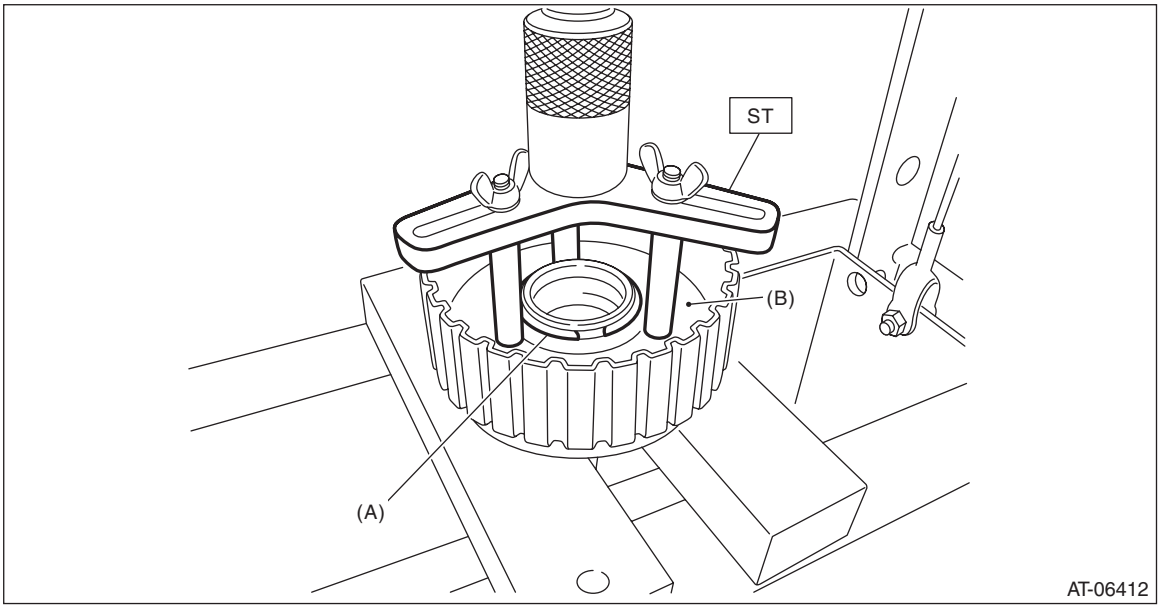
C: DISASSEMBLY

1) Remove the snap ring, and then remove the retaining plate, drive plate and driven plate.



(A) Snap ring

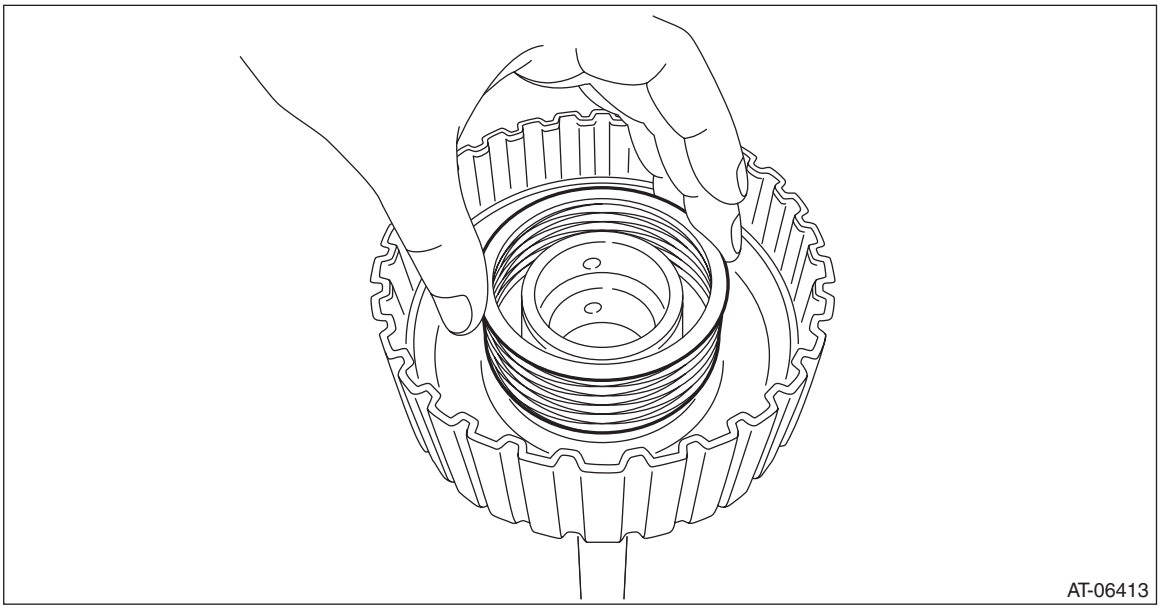
2) Compress the return spring using the ST to remove the snap ring.
ST 18762AA001 COMPRESSOR SPECIAL TOOL



(A) Snap ring
(B) Transfer clutch piston seal

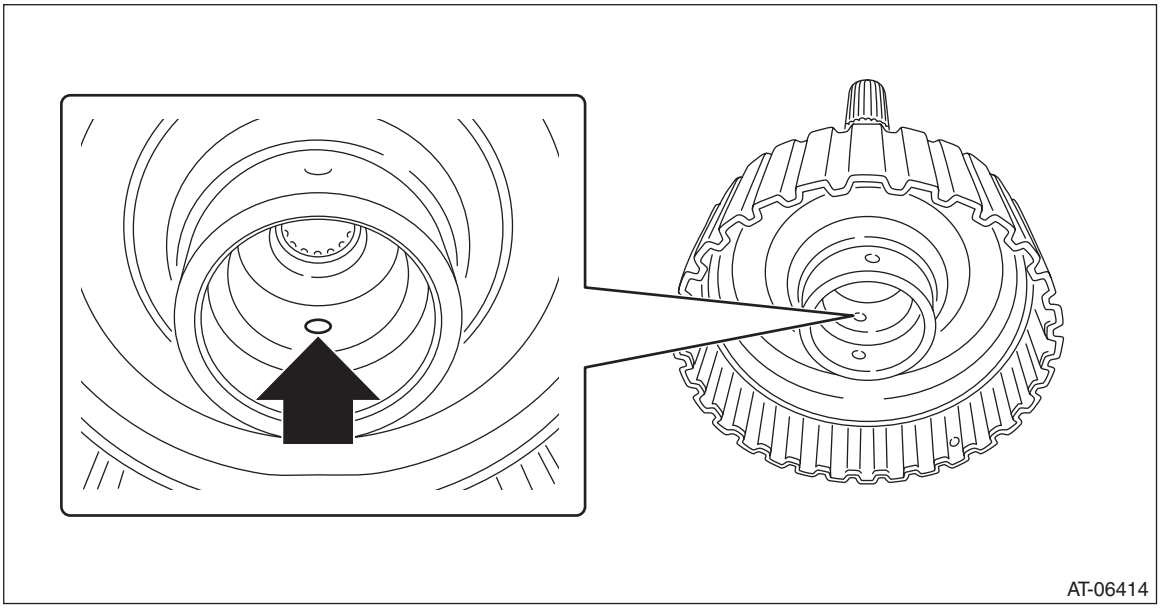
3) Remove the transfer clutch piston seal.

4) Remove the return spring.

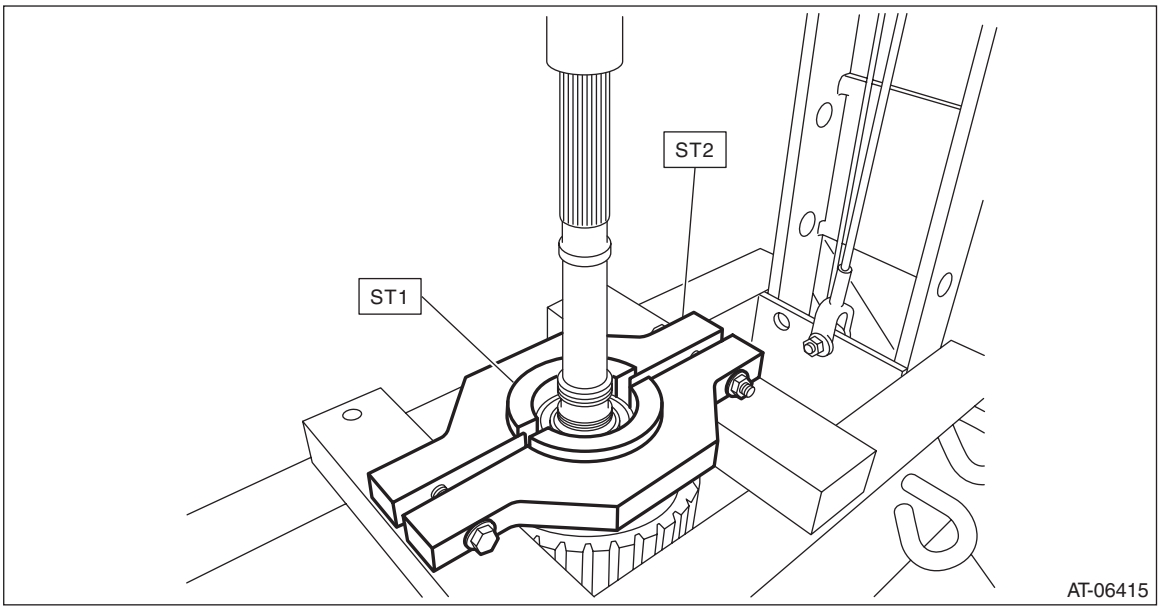


5) Remove the transfer clutch piston by blowing compressed air through transfer clutch assembly hole.

NOTE:
Plug the holes through which the compressed air is not blown.



6) Remove the ball bearing using ST.
ST1 18767AA010 BEARING REMOVER
ST2 18723AA000 REMOVER

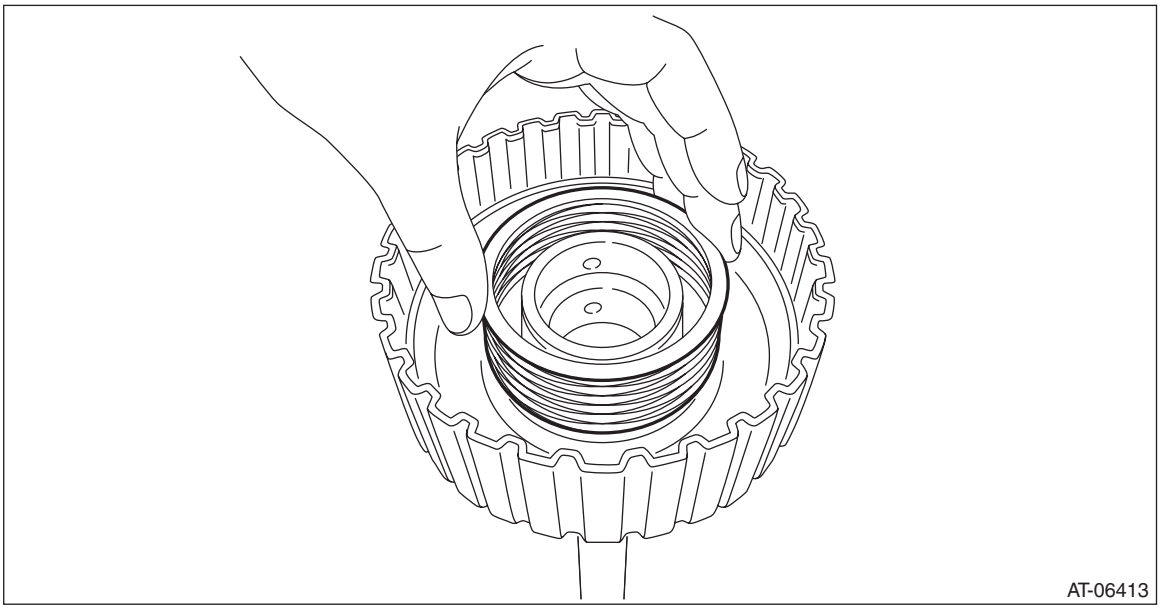


D: ASSEMBLY

1) Install the transfer clutch piston.

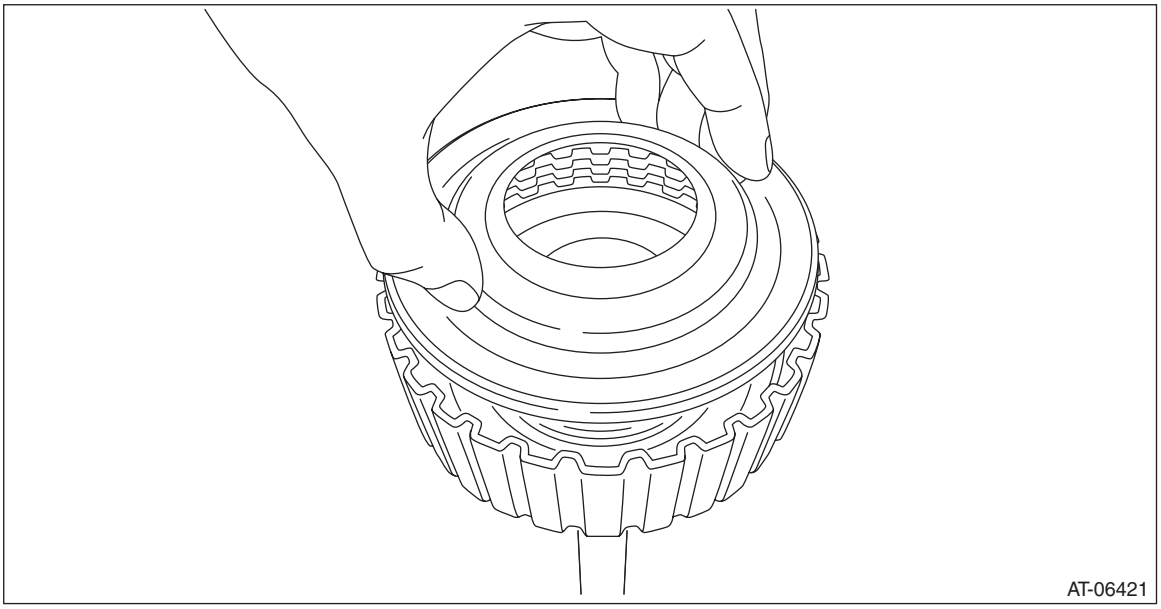
NOTE:
Apply CVTF to the transfer clutch piston lip.

2) Install the return spring.

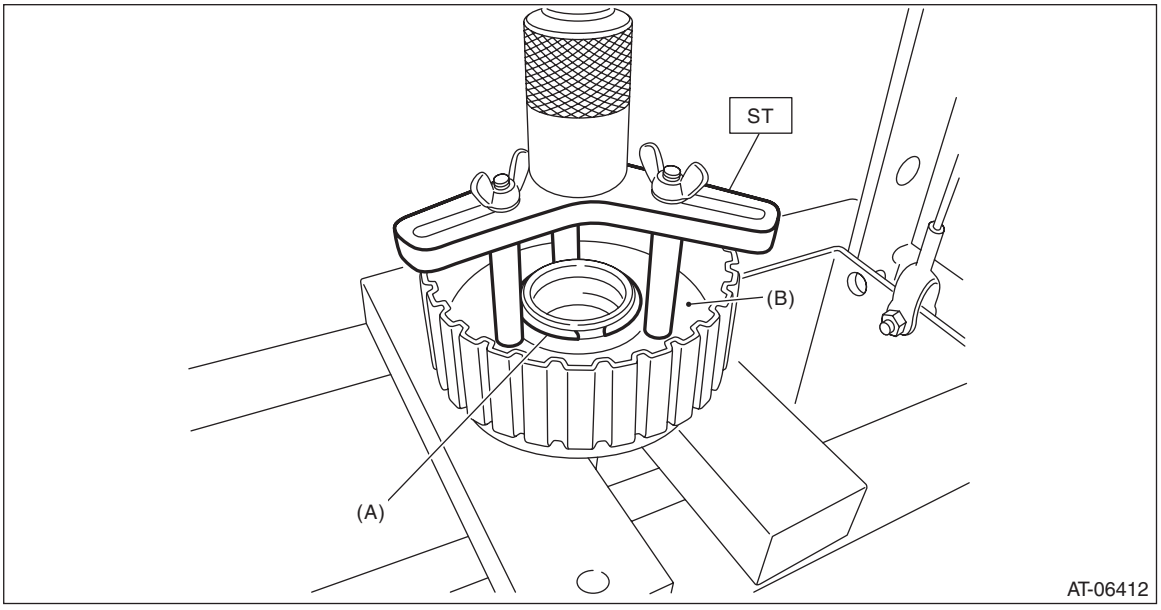


3) Install the transfer clutch piston seal.

NOTE:
Apply CVTF to the lip section of transfer clutch piston seal.

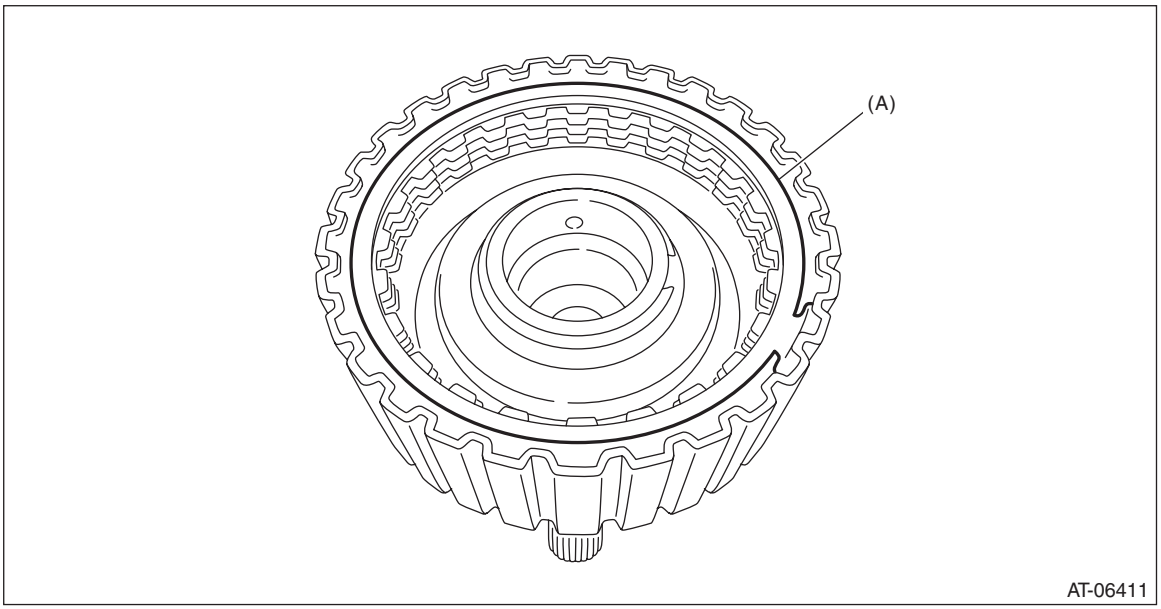


4) Compress the return spring using the ST to install the snap ring.
ST 18762AA001 COMPRESSOR SPECIAL TOOL



(A) Snap ring
(B) Transfer clutch piston seal

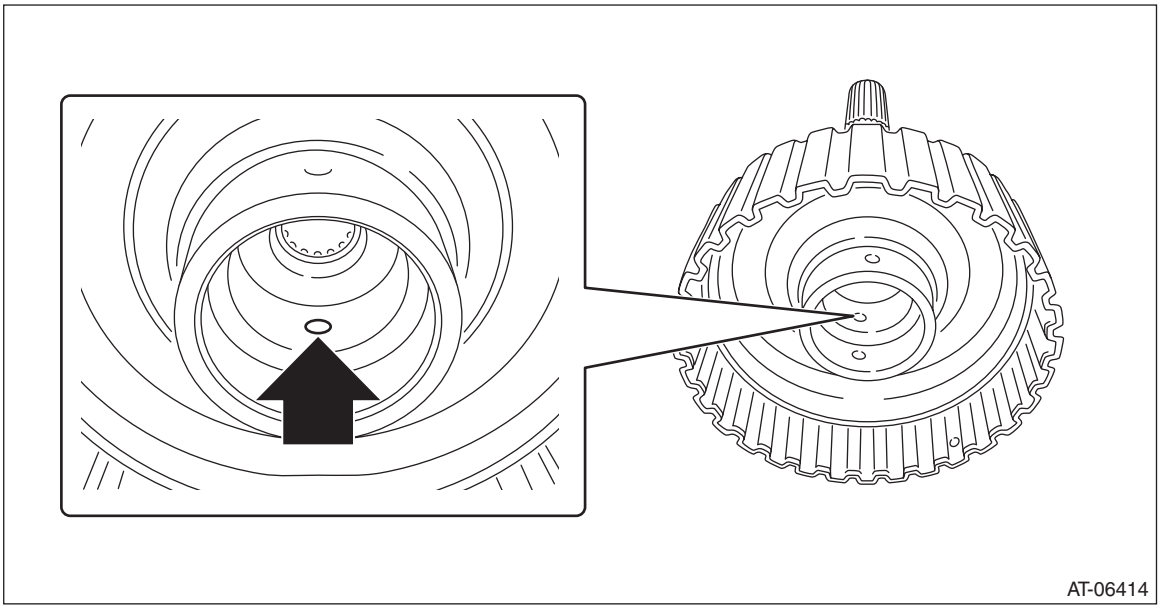
5) Install the pressure plate, driven plate, drive plate and snap ring.



(A) Snap ring

6) Blow compressed air through transfer clutch assembly hole, and check the transfer clutch piston operation.

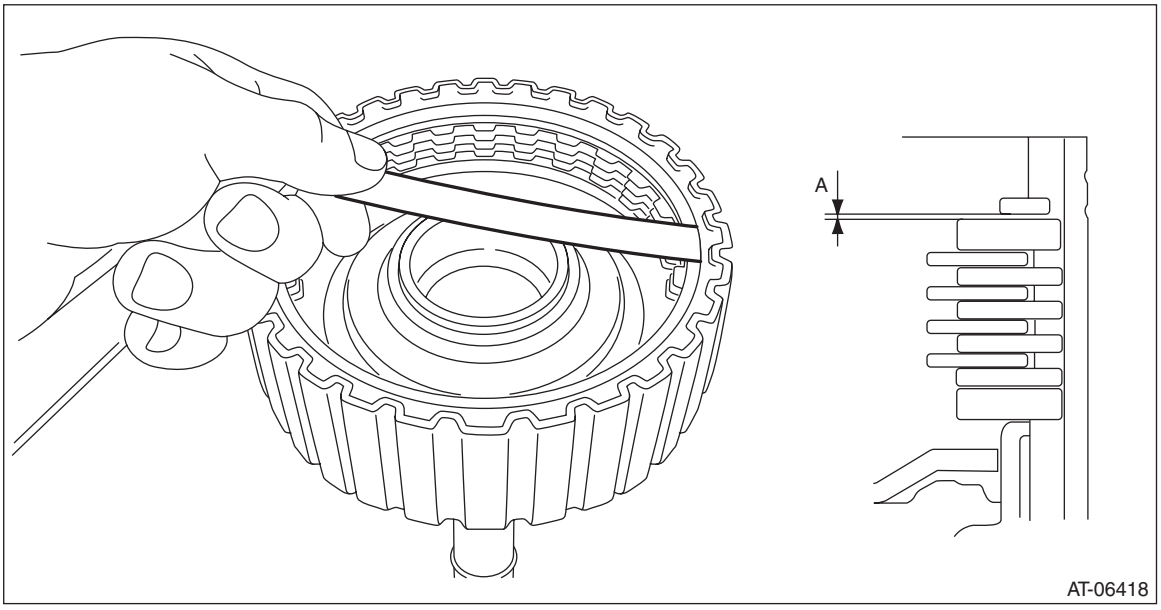
NOTE:
Plug the holes through which the compressed air is not blown.



7) Before measuring clearance “A”, place same thickness shims on both sides to prevent the plate from tilting.
8) When clearance “A” exceeds the limit for use, replace the drive plate and driven plate as a set, and select and adjust the pressure plate within the initial specified value.

Initial standard:
0.7 — 1.1 mm (0.028 — 0.043 in)

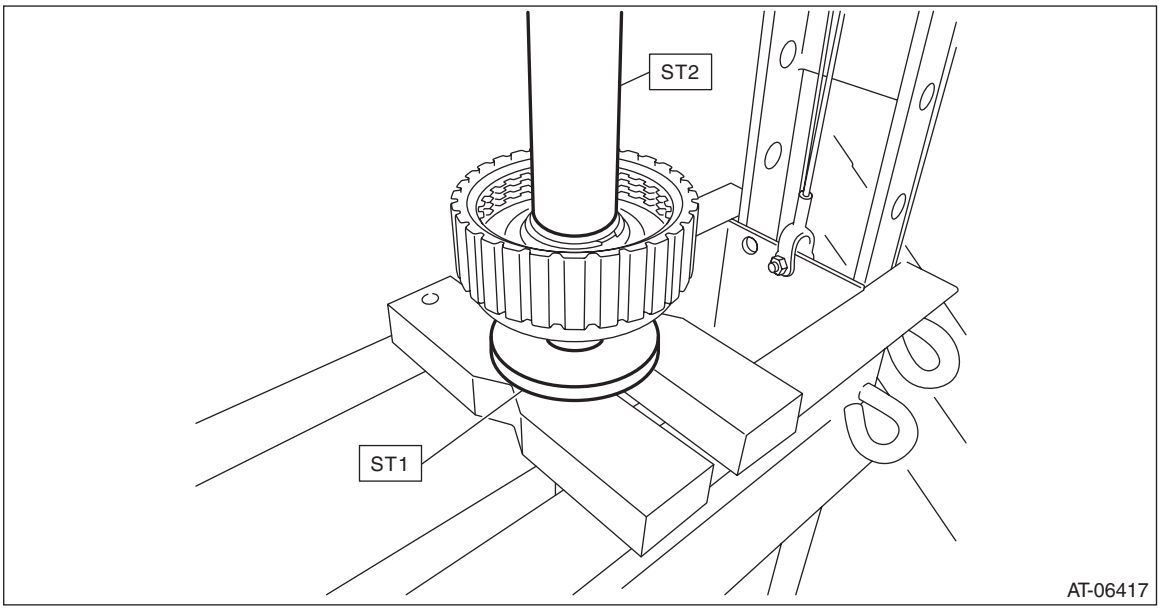
Limit thickness:
1.3 mm (0.051 in)



Pressure plate	
Part No.	Thickness mm (in)
31593AA151	3.3 (0.130)
31593AA161	3.7 (0.146)

9) Recheck the clearance. <Ref. to CVT(TR580)-183, INSPECTION, Transfer Clutch.>
10) Using the ST, install the ball bearing.

NOTE:
Use a new ball bearing.
ST1 398177700 INSTALLER
ST2 499277000 INSTALLER



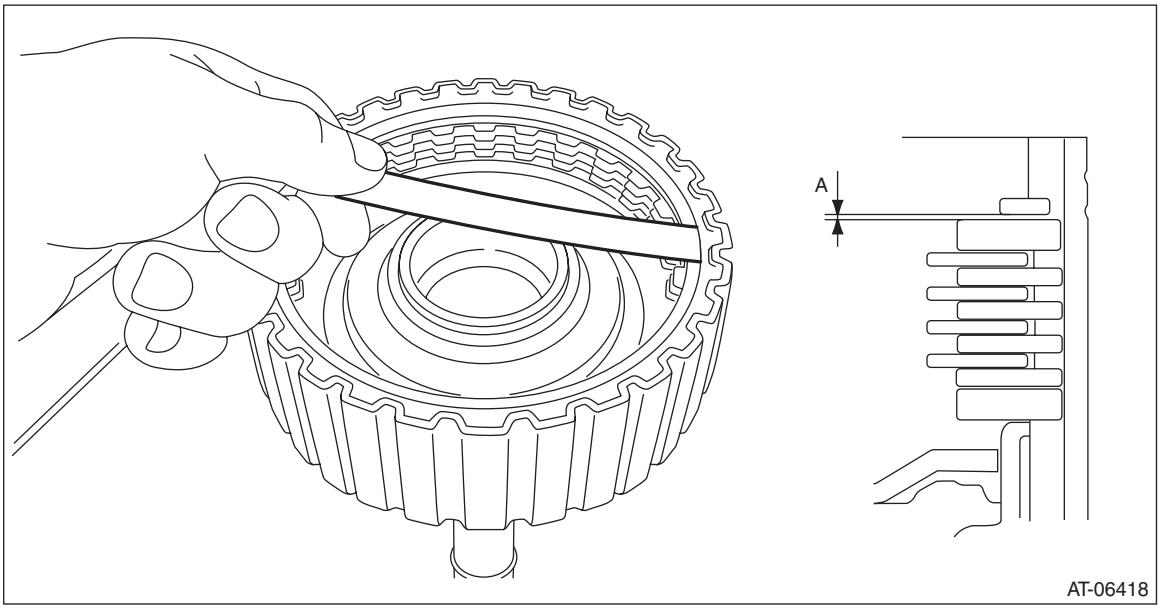
E: INSPECTION

- Inspect the drive plate facing for wear and damage.
- Driven plate for discoloration (burned color)
- Make sure the snap ring is not worn and the return spring has no permanent distortion, damage, or deformation.
- Check the lip seal for damage.
- Inspect the extension end play, and adjust it to within the standard value. <Ref. to CVT(TR580)-184, ADJUSTMENT, Transfer Clutch.>

1) Before measuring clearance “A” between snap ring and driven plate, place same thickness shims on both sides to prevent the plate from tilting.
2) When clearance “A” exceeds the limit for use, replace the drive plate and driven plate as a set, and select the pressure plate within the initial specified value.

Initial standard:
0.7 — 1.1 mm (0.028 — 0.043 in)

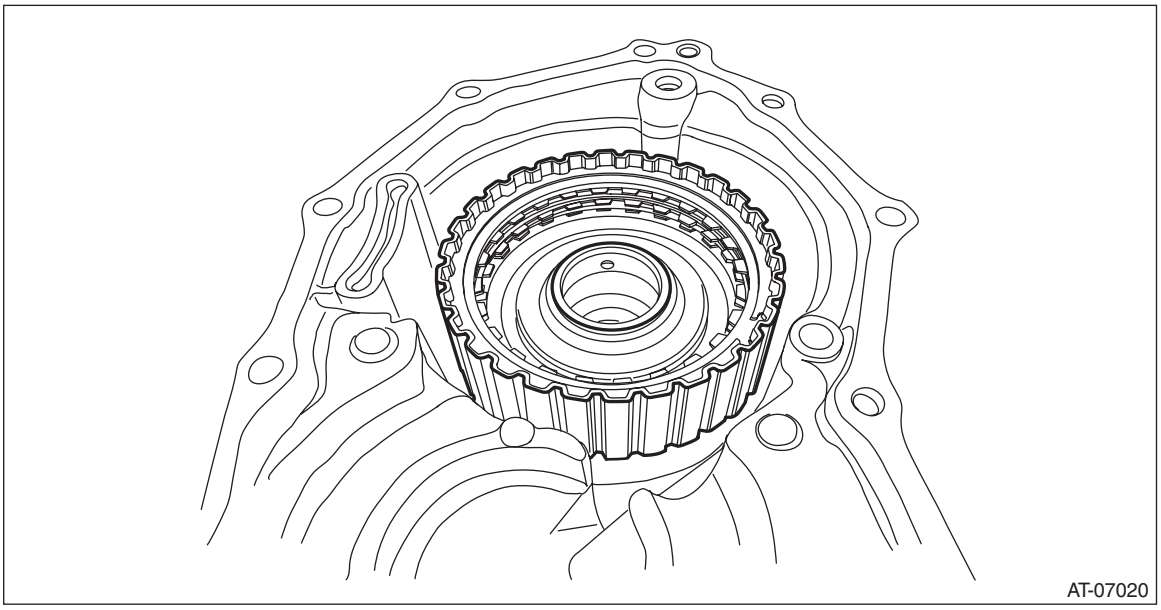
Limit thickness:
1.3 mm (0.051 in)



3) Check for tight corner braking phenomenon when the vehicle is moved forward with the steering fully turned. If tight corner braking occurs, perform the following procedures.
(1) With the steering wheel held at fully turned position, drive the vehicle in “D” range and with vehicle speed at approx. 5 km/h (3 MPH) in both clockwise and counterclockwise directions for approx. ten times each, while repeating acceleration and braking intermittently.
(2) If the tight corner braking phenomenon still persists, drive the vehicle again in a circle for several laps.

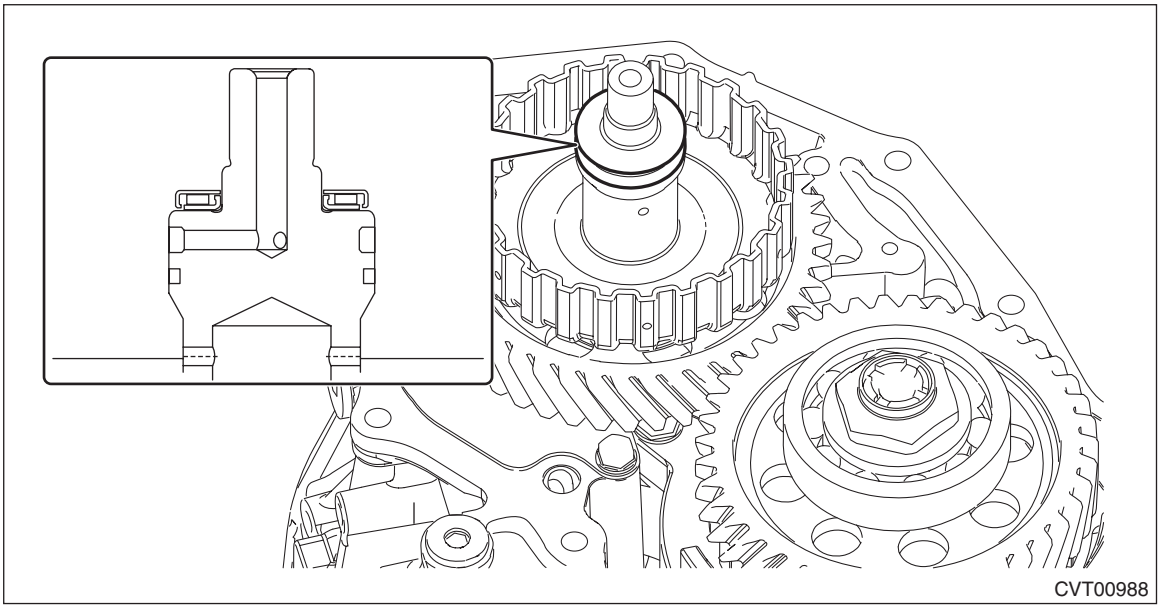
F: ADJUSTMENT

1) Install the transfer clutch assembly to the extension case with the transfer driven gear shims and thrust bearings removed.

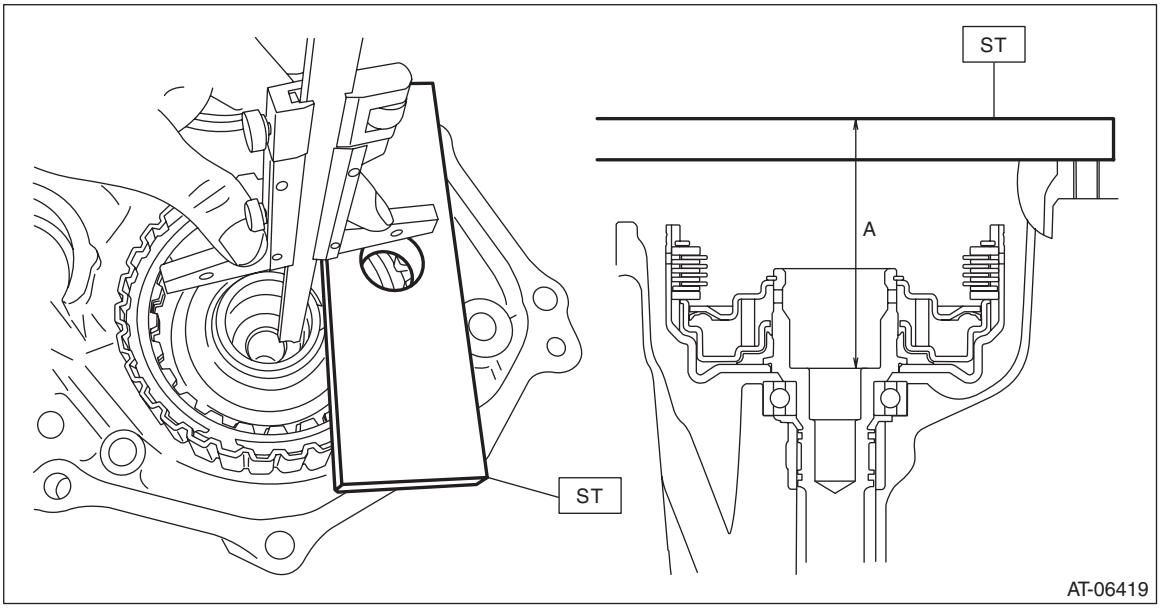


2) Install the thrust bearing to the transfer driven gear.

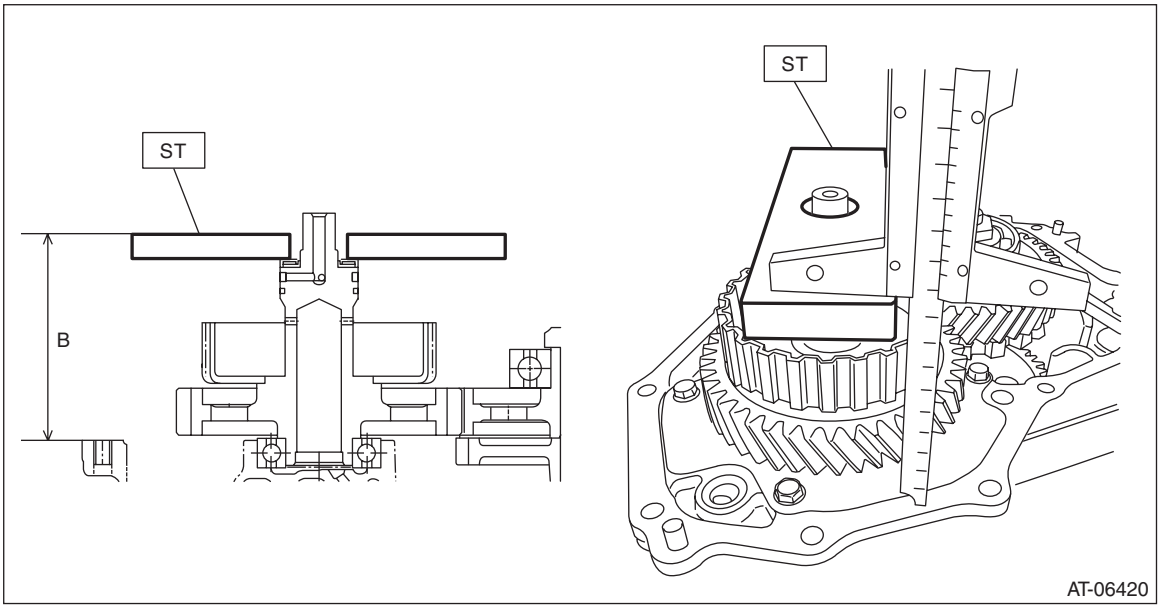
NOTE:
Make sure to install in the right direction.



3) Using the ST, measure the height “A” from the ST end face to the thrust bearing catch surface of the transfer clutch assembly.
ST 499575500 GAUGE



4) Using the ST, measure the height “B” from the transmission case mating surface to the end of ST.
ST 499575500 GAUGE



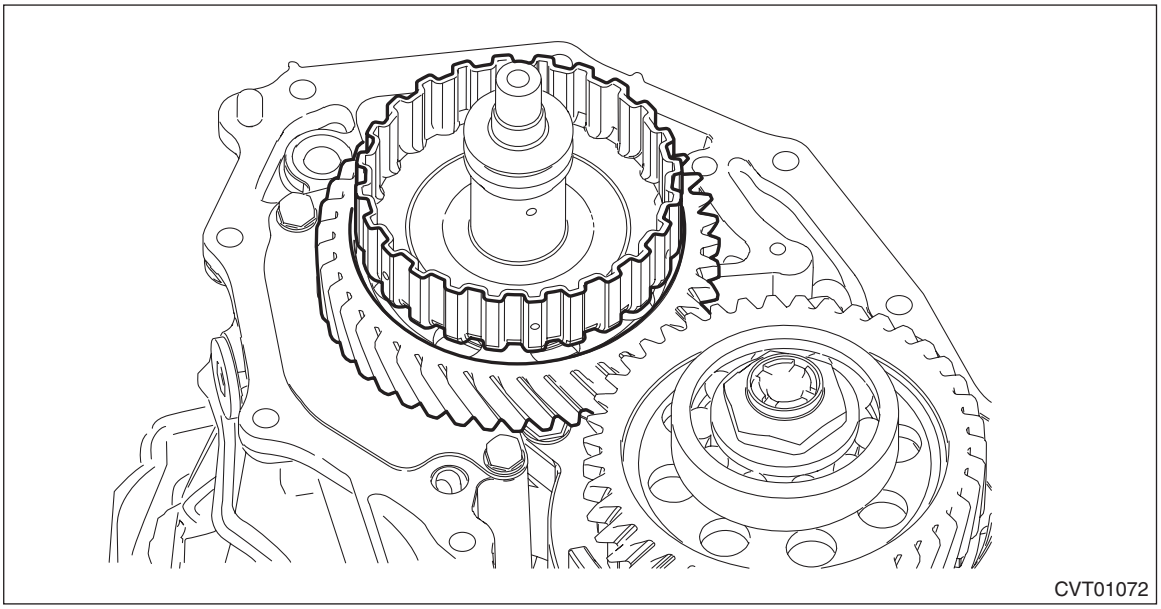
5) Obtain the thickness of transfer driven gear shim using the following formula to select one to three transfer driven gear shims.
T (mm) = A – B – (0.05 — 0.25)
[T (in) = A – B – (0.002 — 0.01)]
T: Transfer driven gear shim thickness
A: Height from the ST end face to the transfer clutch assembly thrust bearing catch surface
B: Height from the mating surface of the transmission case to the end of the ST
0.05 — 0.25 mm (0.002 — 0.01 in): Clearance

Transfer driven gear shim	
Part No.	Thickness mm (in)
33280AA030	0.3 (0.012)
33280AA040	0.4 (0.016)
33280AA050	0.5 (0.020)

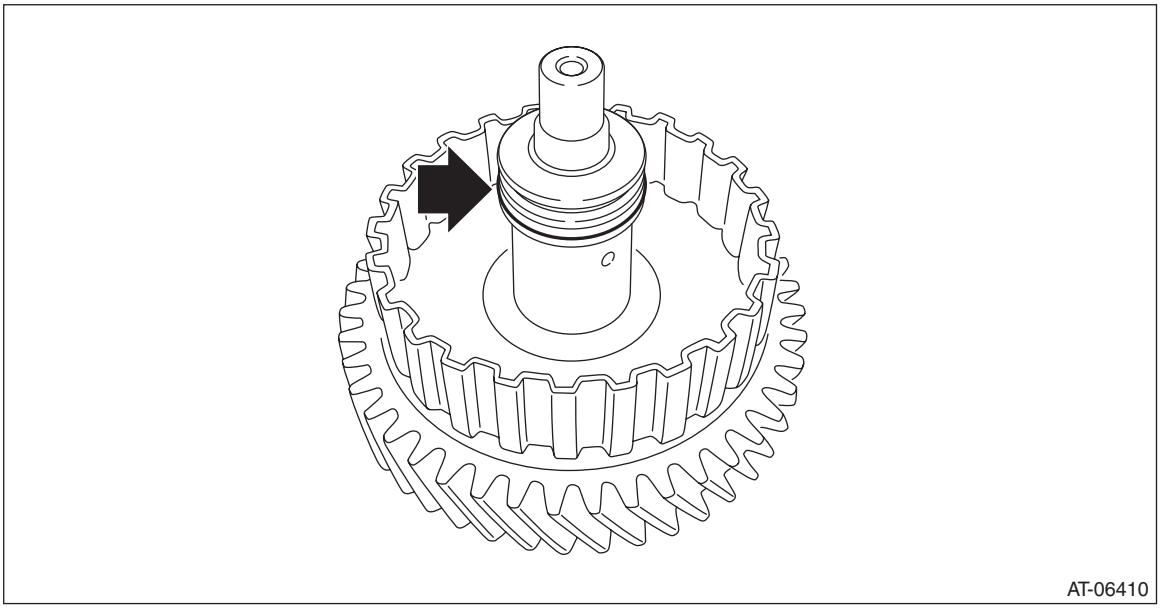
30.Transfer Driven Gear

A: REMOVAL

1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TR580)-60, REMOVAL, Automatic Transmission Assembly.>
2) Remove the extension case. <Ref. to CVT(TR580)-168, REMOVAL, Extension Case.>
3) Remove the transfer clutch assembly. <Ref. to CVT(TR580)-172, REMOVAL, Transfer Clutch.>
4) Remove the transfer driven gear assembly.

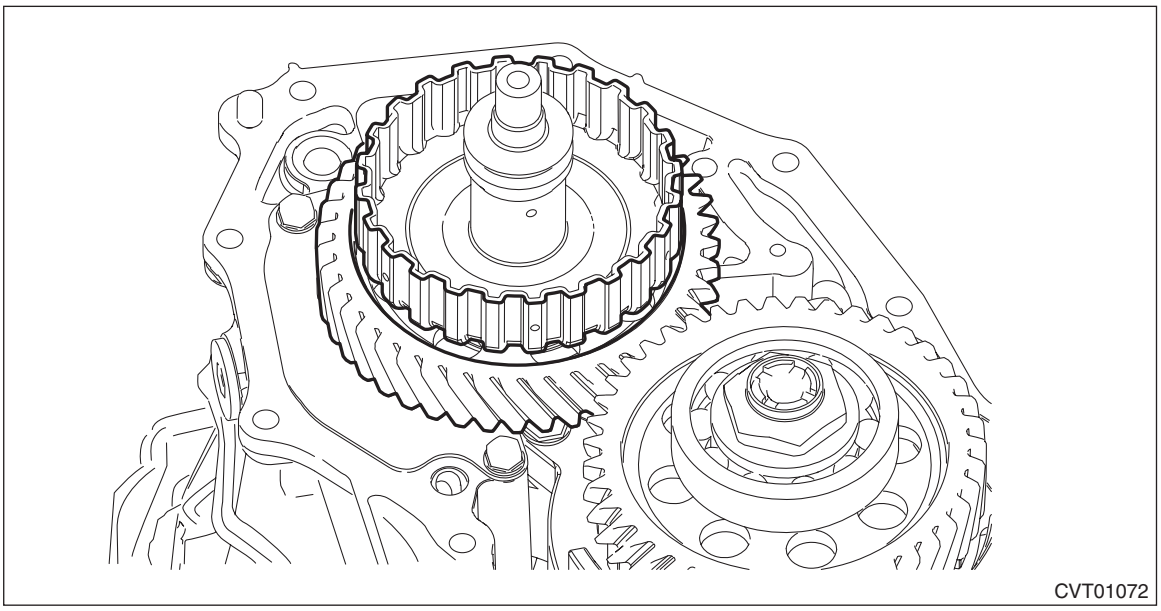

CVT01072

5) Remove the seal ring from the transfer driven gear assembly.


AT-06410

B: INSTALLATION

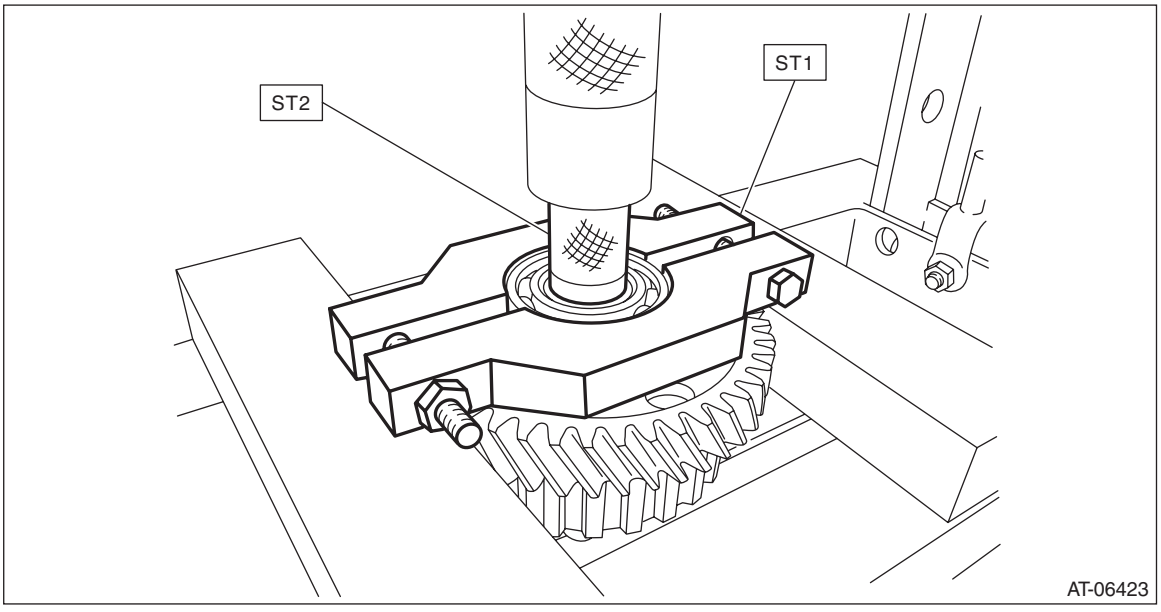
1) Install the transfer driven gear assembly.



2) Install the transfer clutch assembly. <Ref. to CVT(TR580)-174, INSTALLATION, Transfer Clutch.>
3) Select the transfer driven gear shim. <Ref. to CVT(TR580)-184, ADJUSTMENT, Transfer Clutch.>
4) Install the extension case. <Ref. to CVT(TR580)-169, INSTALLATION, Extension Case.>
5) Install the transmission assembly to the vehicle. <Ref. to CVT(TR580)-72, INSTALLATION, Automatic Transmission Assembly.>

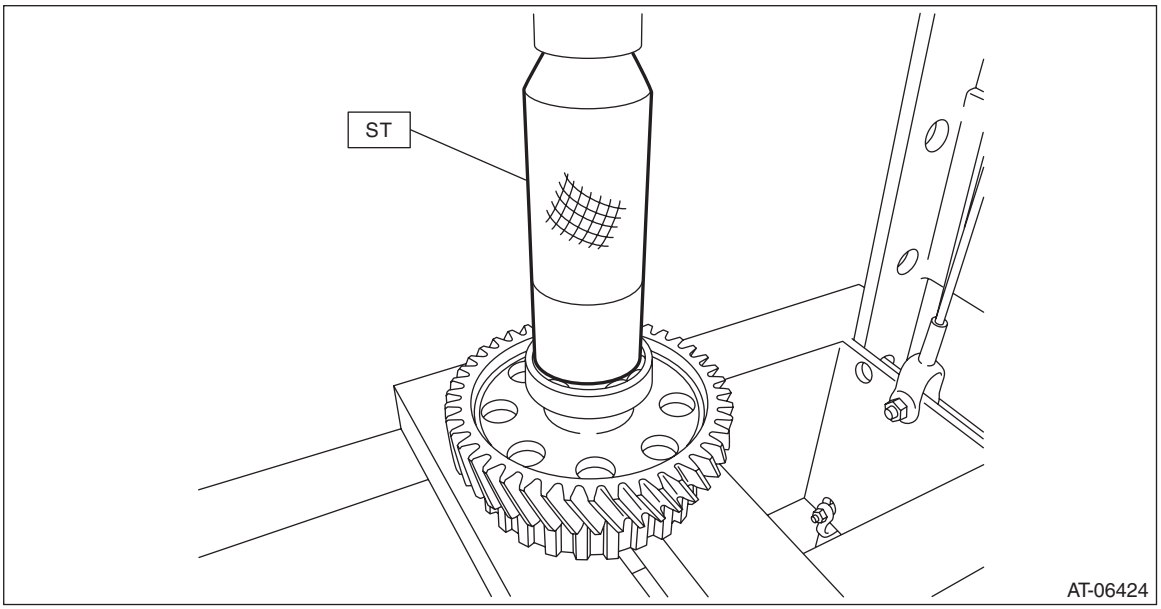
C: DISASSEMBLY

1) Remove the ball bearing using ST.
ST1 498077400 BEARING REMOVER
ST2 899864100 REMOVER



D: ASSEMBLY

1) Using the ST, install the ball bearing.
ST 899580100 INSTALLER



E: INSPECTION

- Check the ball bearing for smooth rotation.
- Check the ball bearing for excessive looseness.
- Check the transfer driven gear for breakage or damage.

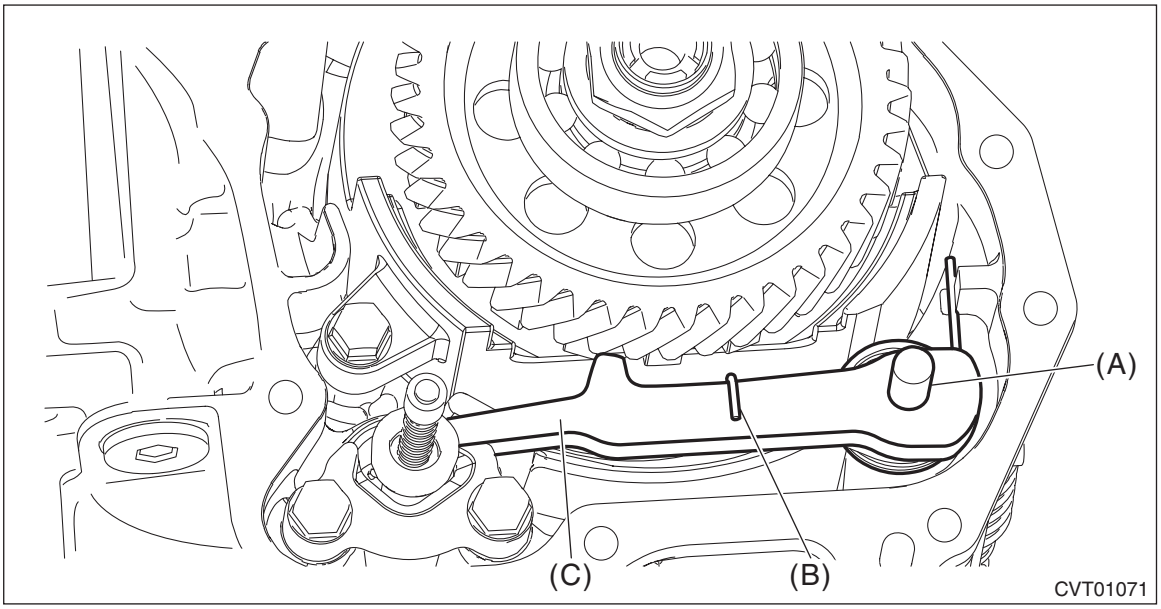
F: ADJUSTMENT

NOTE:
When the transfer driven gear or bearing is replaced, select the transfer driven gear shim. <Ref. to CVT(TR580)-184, ADJUSTMENT, Transfer Clutch.>

31.Parking Pawl

A: REMOVAL

1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TR580)-60, REMOVAL, Automatic Transmission Assembly.>
2) Shift the range select lever to “N” range.
3) Remove the extension case. <Ref. to CVT(TR580)-168, REMOVAL, Extension Case.>
4) Remove the parking pawl shaft, return spring and parking pawl.

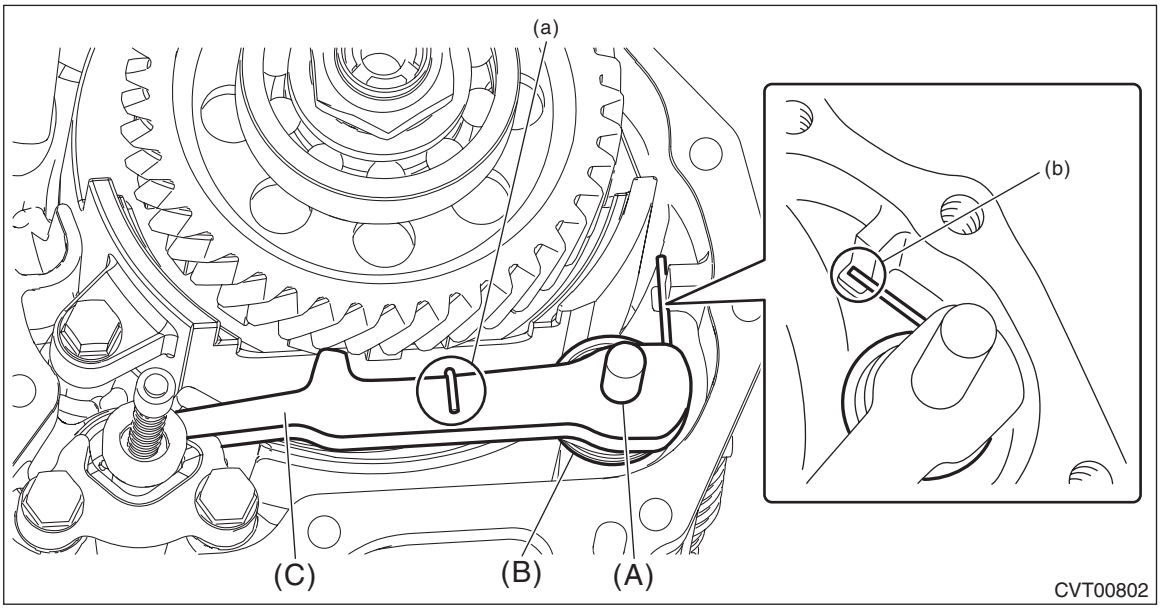


(A) Parking pawl shaft
(B) Return spring
(C) Parking pawl

B: INSTALLATION

1) Set the range select lever to the “N” range.
2) Install the parking pawl shaft, return spring and parking pawl.

NOTE:
Make sure that the end of return spring sticks out of parking pawl as shown in (a). Make sure that the other end contacts the rib of transmission case as shown in (b).



(A) Parking pawl shaft
(B) Return spring
(C) Parking pawl

3) Install the extension case. <Ref. to CVT(TR580)-169, INSTALLATION, Extension Case.>
4) Install the transmission assembly to the vehicle. <Ref. to CVT(TR580)-72, INSTALLATION, Automatic Transmission Assembly.>

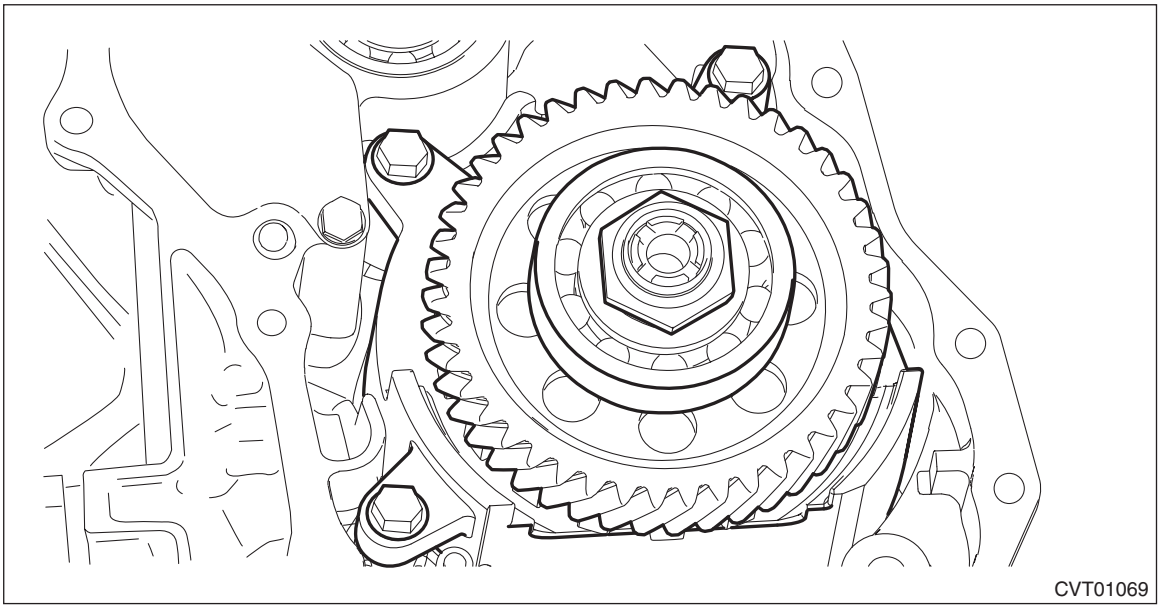
C: INSPECTION

- Check the parking pawl for breakage or damage.
- Check for worn, broken and/or damaged return spring.

32.Reduction Driven Gear

A: REMOVAL

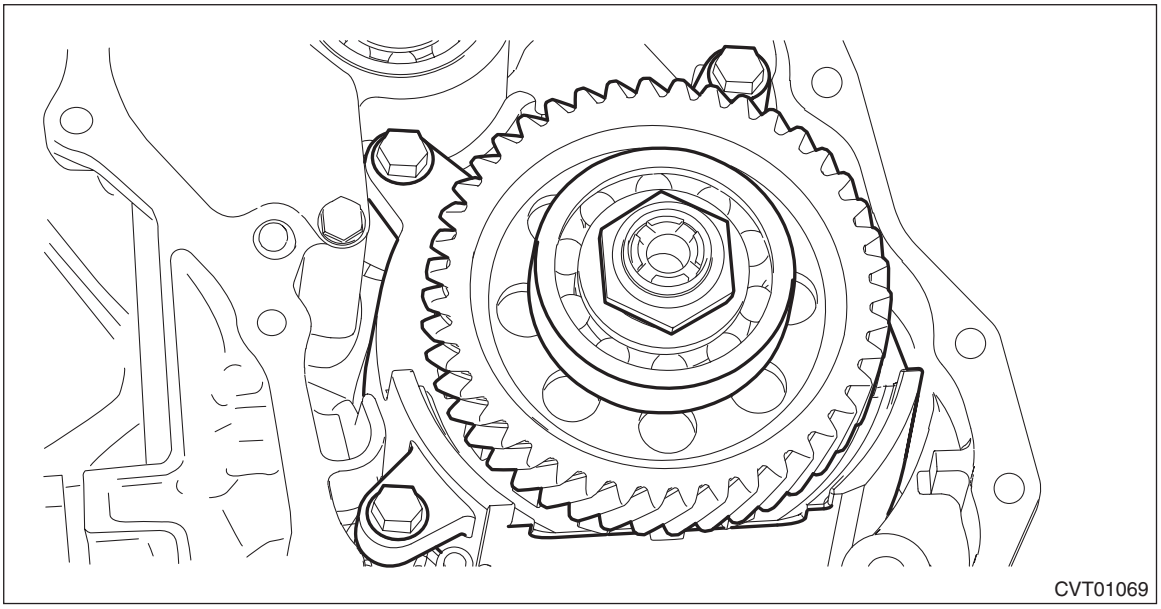
1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TR580)-60, REMOVAL, Automatic Transmission Assembly.>
2) Remove the extension case. <Ref. to CVT(TR580)-168, REMOVAL, Extension Case.>
3) Remove the transfer clutch assembly. <Ref. to CVT(TR580)-172, REMOVAL, Transfer Clutch.>
4) Remove the transfer driven gear assembly. <Ref. to CVT(TR580)-186, REMOVAL, Transfer Driven Gear.>
5) Remove the parking pawl. <Ref. to CVT(TR580)-189, REMOVAL, Parking Pawl.>
6) Remove the reduction driven gear assembly and spacer oil.



B: INSTALLATION

1) Install the reduction driven gear assembly and spacer oil.

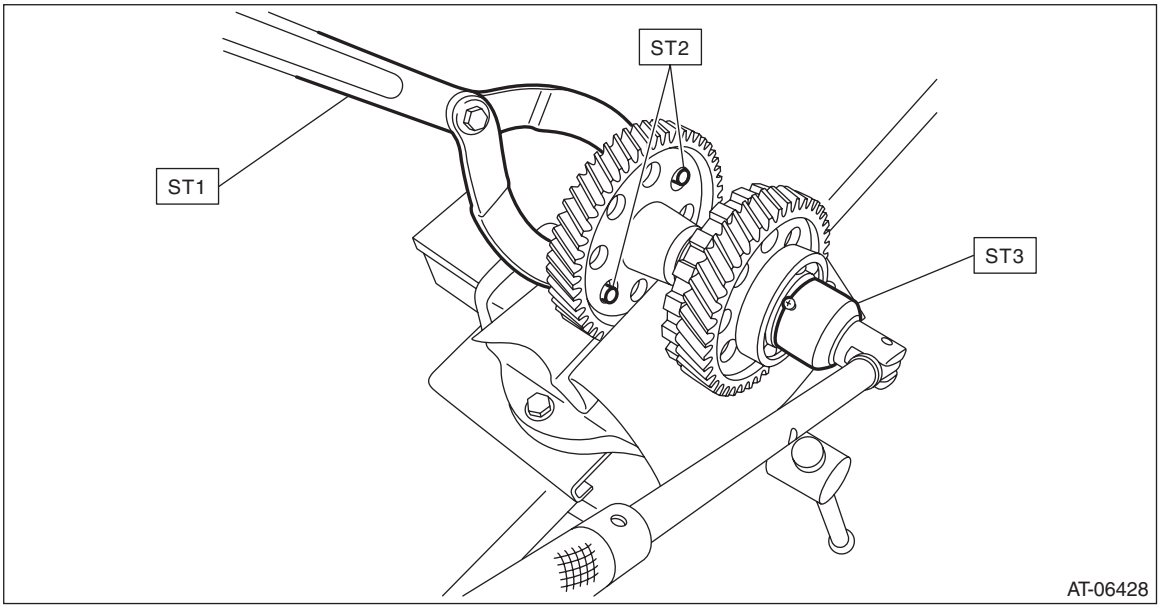
Tightening torque:
17 N·m (1.7 kgf-m, 12.5 ft-lb)



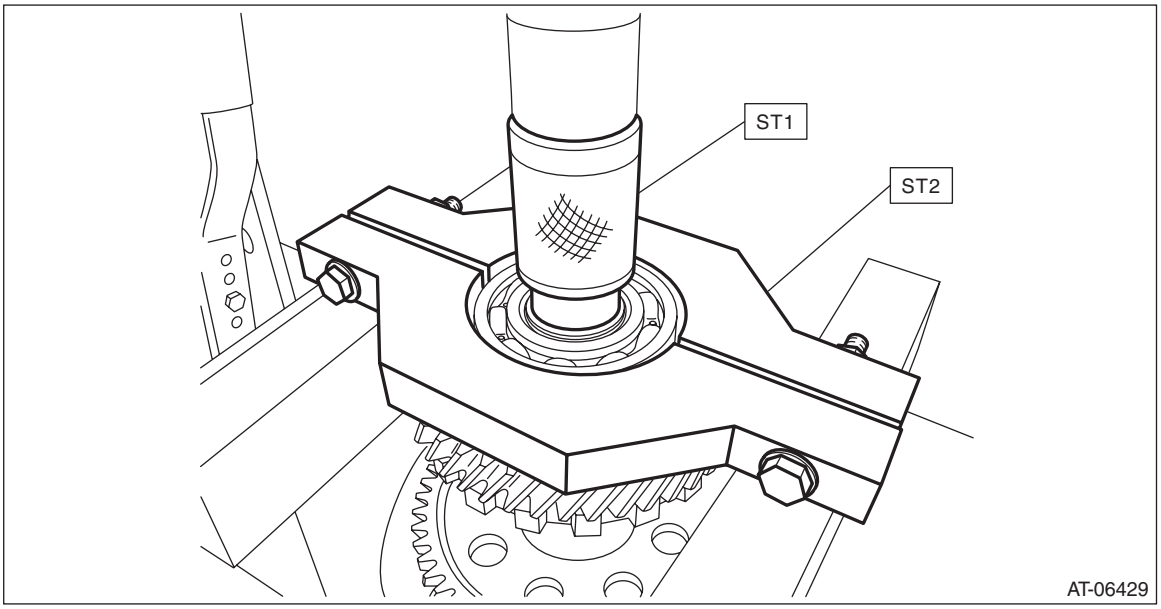
2) Select the transfer drive gear shim. <Ref. to CVT(TR580)-221, ADJUSTMENT, Reduction Drive Gear.>
3) Install the parking pawl. <Ref. to CVT(TR580)-190, INSTALLATION, Parking Pawl.>
4) Attach the selected transfer drive gear shim to extension case with vaseline.
5) Install the transfer driven gear assembly. <Ref. to CVT(TR580)-187, INSTALLATION, Transfer Driven Gear.>
6) Install the transfer clutch assembly. <Ref. to CVT(TR580)-174, INSTALLATION, Transfer Clutch.>
7) Install the extension case. <Ref. to CVT(TR580)-169, INSTALLATION, Extension Case.>
8) Install the transmission assembly to the vehicle. <Ref. to CVT(TR580)-72, INSTALLATION, Automatic Transmission Assembly.>

C: DISASSEMBLY

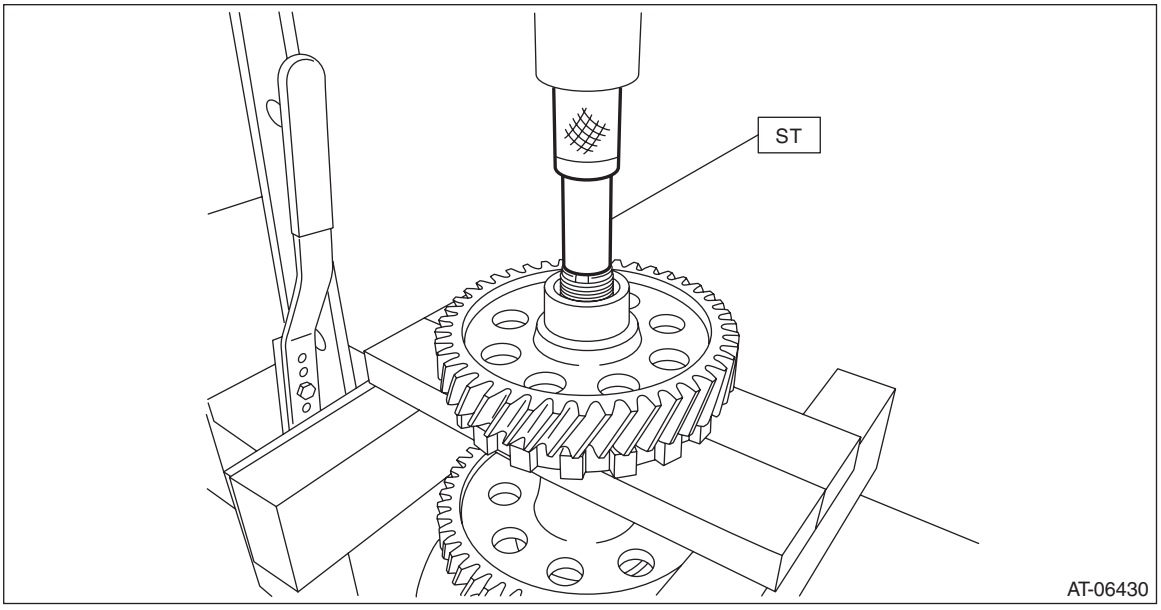
1) Flatten the tab of the lock nut.
2) Using the ST, counter the rotation of the reduction driven gear assembly, and remove the lock nut.
ST1 18355AA000 PULLEY WRENCH
ST2 18334AA000 PIN SET
ST3 499987003 SOCKET WRENCH (35)



3) Remove the ball bearing using ST.
ST1 499757002 INSTALLER
ST2 498077300 REMOVER

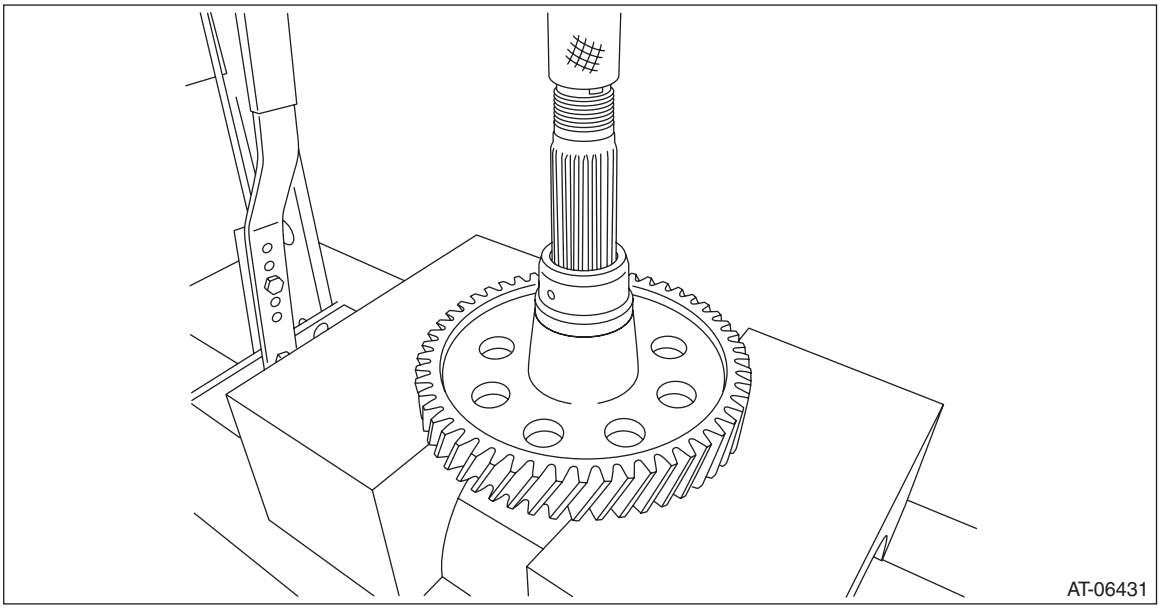


4) Using the ST, remove the parking gear and transfer drive gear.
ST 899864100 REMOVER



5) Remove the collar.

NOTE:
When collar has been removed, do not reuse the reduction driven gear and/or shaft, and replace it with reduction driven gear COMPL.

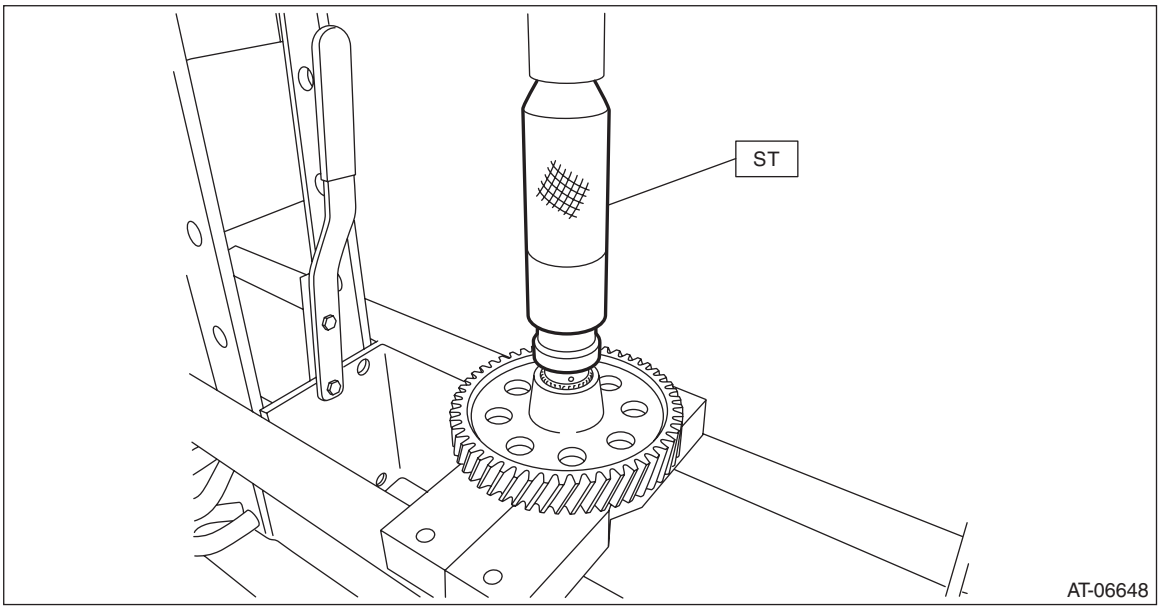


D: ASSEMBLY

1) Using the ST, attach the collar.

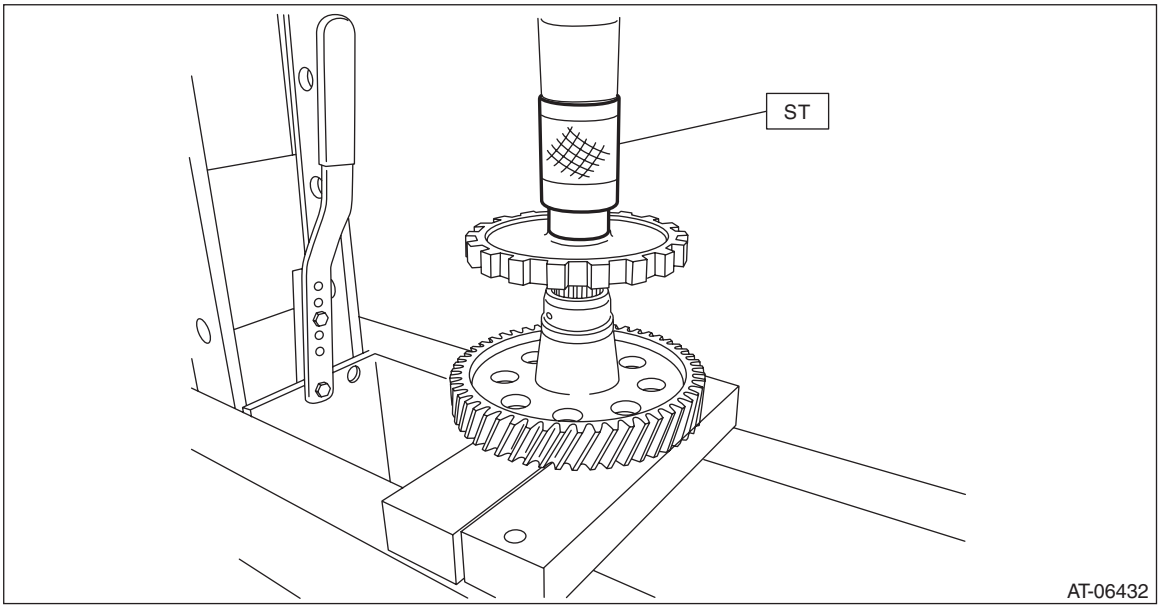
NOTE:
- Attach the collar in the correct direction.
- Use a new reduction driven gear COMPL.

ST 899580100 INSTALLER

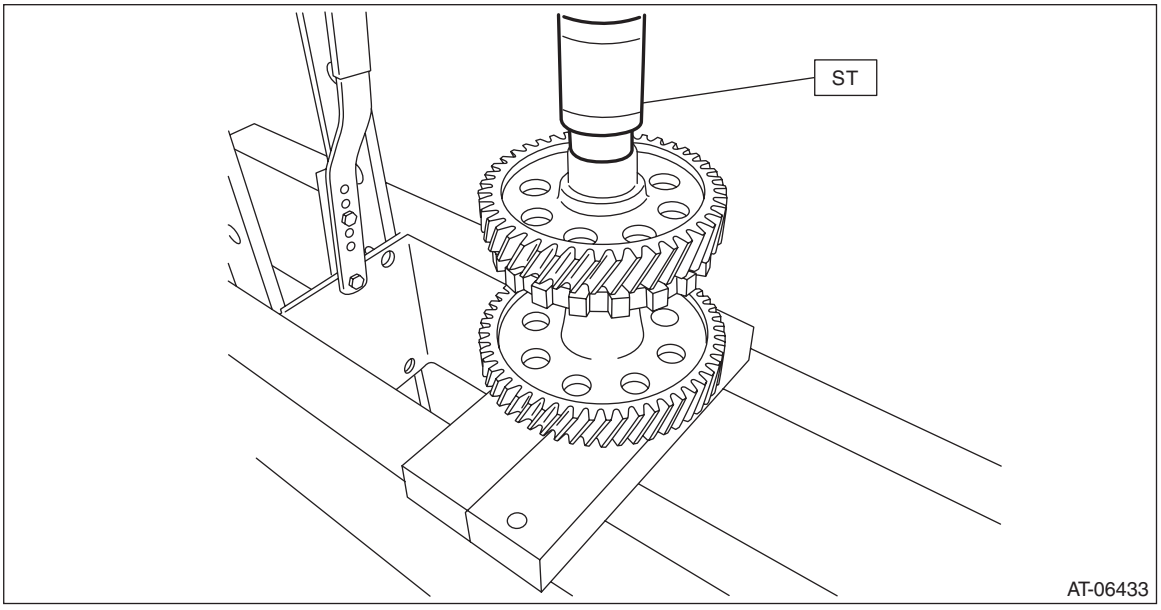


2) Using the ST, install the parking gear.

ST 499757002 INSTALLER

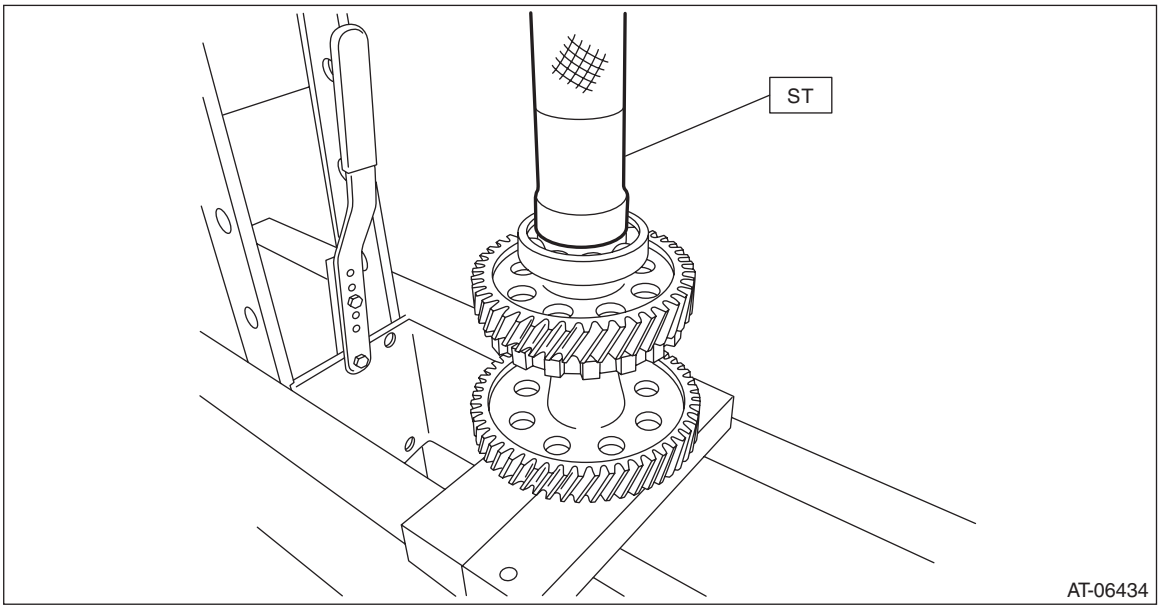


3) Using the ST, install the transfer drive gear.
ST 499757002 INSTALLER



4) Using the ST, install the ball bearing.

NOTE:
Use a new ball bearing.
ST 499277100 BUSHING 1-2 INSTALLER

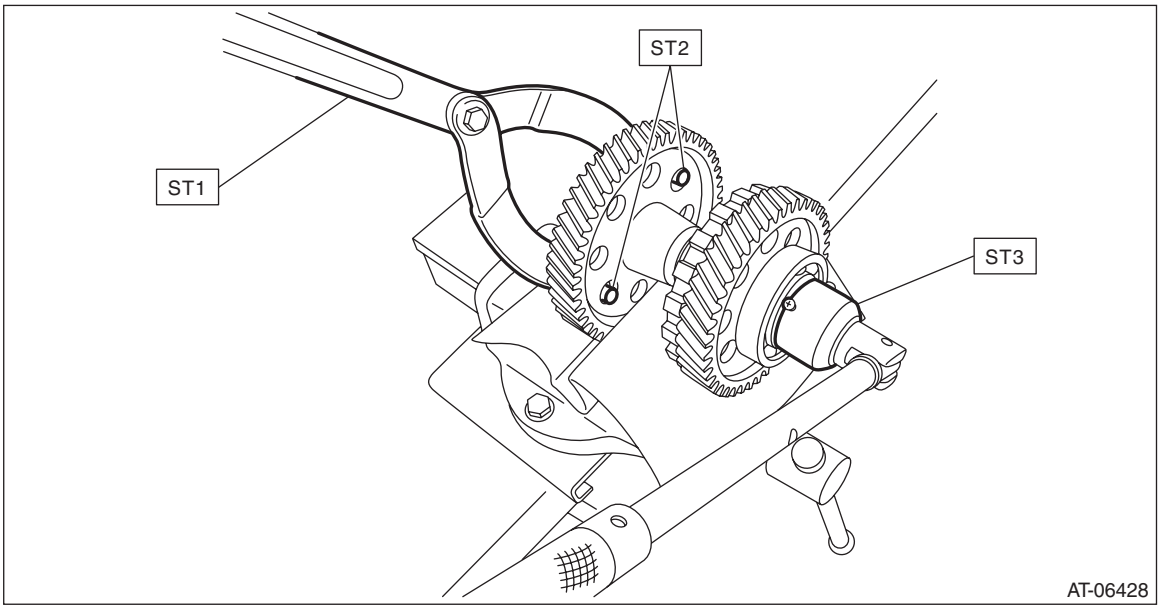


5) Using the ST, counter the rotation of the reduction drive gear assembly, and install the lock nut.

NOTE:
Use a new lock nut.

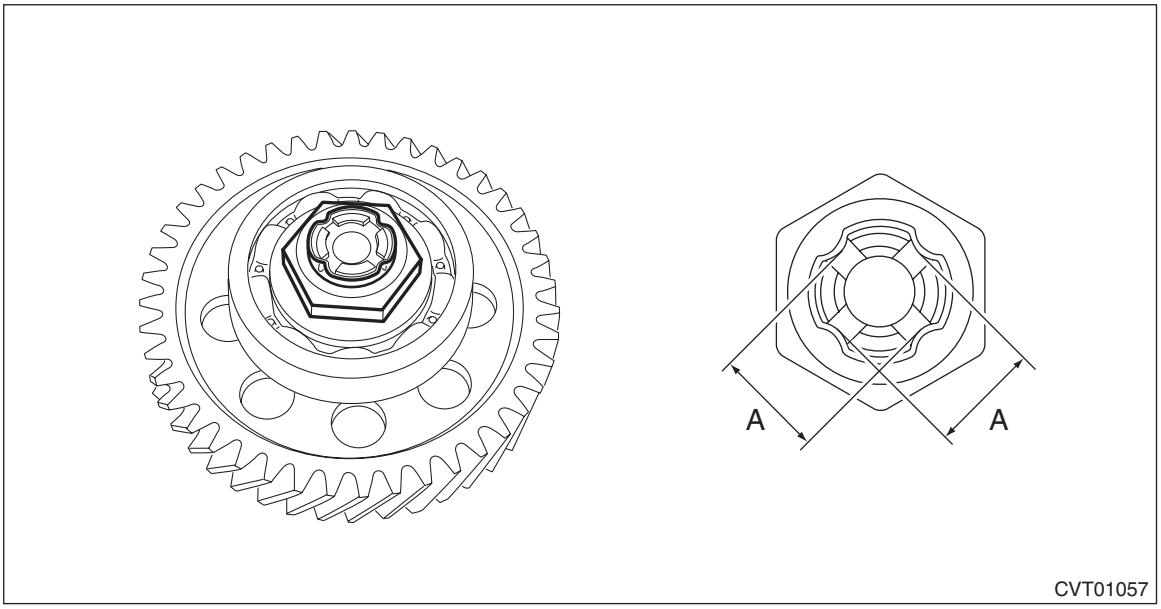
ST1	18355AA000	PULLEY WRENCH
ST2	18334AA000	PIN SET
ST3	499987003	SOCKET WRENCH (35)

Tightening torque:
95 N·m (9.7 kgf-m, 70.1 ft-lb)



6) Crimp the lock nut at four locations so that the dimension of A becomes 18.9 mm (0.74 in) or less.

CAUTION:
Do not allow the lock nut to be cracked during crimping operation.

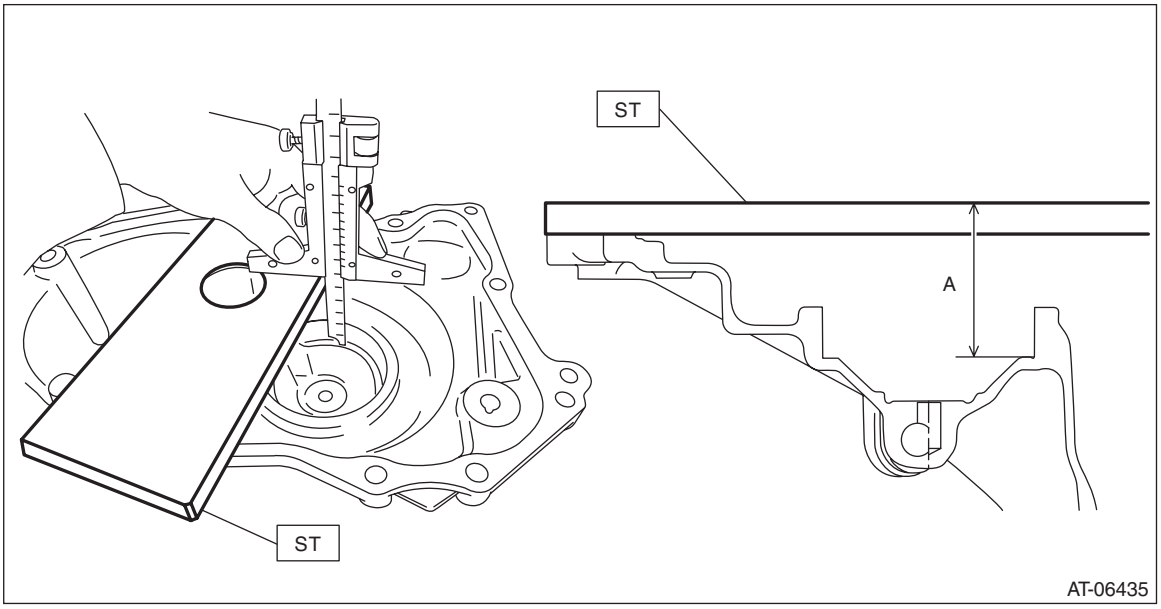


E: INSPECTION

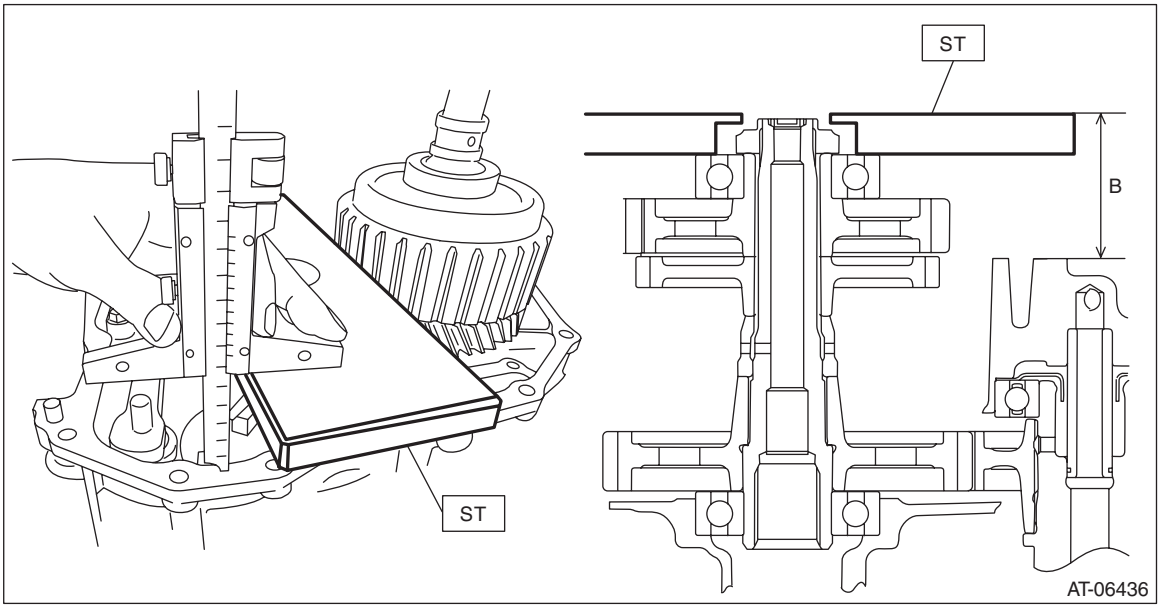
- Check the ball bearing for smooth rotation.
- Check the ball bearing for excessive looseness.
- Make sure each gear is not broken or damaged.

F: ADJUSTMENT

1) Measure the height “A” from the ST upper face to the ball bearing catch surface.
ST 499575600 GAUGE



2) Measure the height “B” from the ST to the mating surface of the transmission case.
ST 499575600 GAUGE



3) Obtain the thickness of transfer drive gear shim using the following formula to select one to three transfer drive gear shims.
T (mm) = A – B – (0.05 — 0.25)
[T (in) = A – B – (0.002 — 0.01)]
T: Shim thickness
A: Height from the ST upper face to the ball bearing catch surface
B: Height from ST to transmission case mating surface
0.05 — 0.25 mm (0.002 — 0.01 in): Clearance

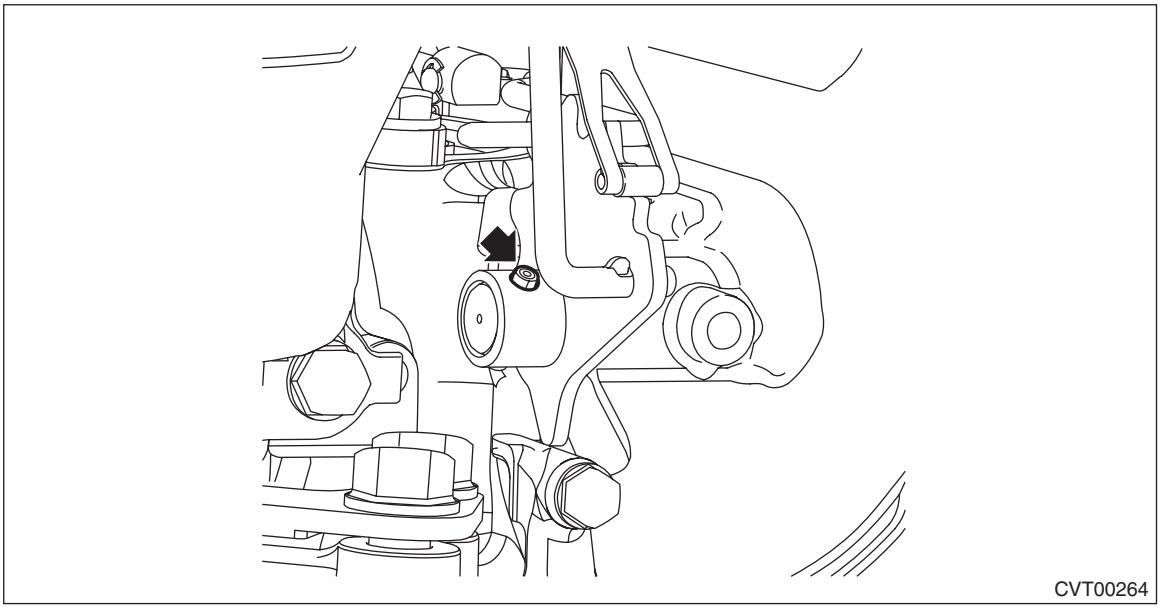
Transfer drive gear shim	
Part No.	Thickness mm (in)
33279AA090	0.3 (0.012)
33279AA100	0.4 (0.016)
33279AA110	0.5 (0.020)

33.Transmission Control Device

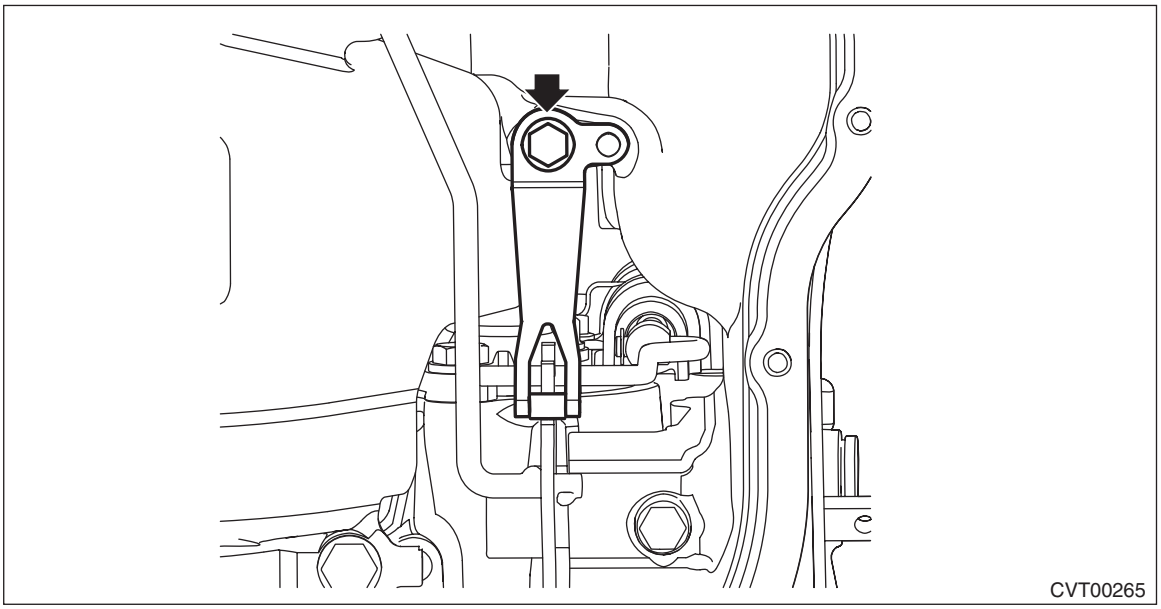
A: REMOVAL

1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TR580)-60, REMOVAL, Automatic Transmission Assembly.>
2) Remove the inhibitor switch. <Ref. to CVT(TR580)-99, REMOVAL, Inhibitor Switch.>
3) Remove the oil pan and oil strainer. <Ref. to CVT(TR580)-113, REMOVAL, Oil Pan and Strainer.>
4) Shift the manual plate to “N” range, and remove the spring pin.

NOTE:
Prevent the spring pin from dropping in the transmission using paper towel etc.

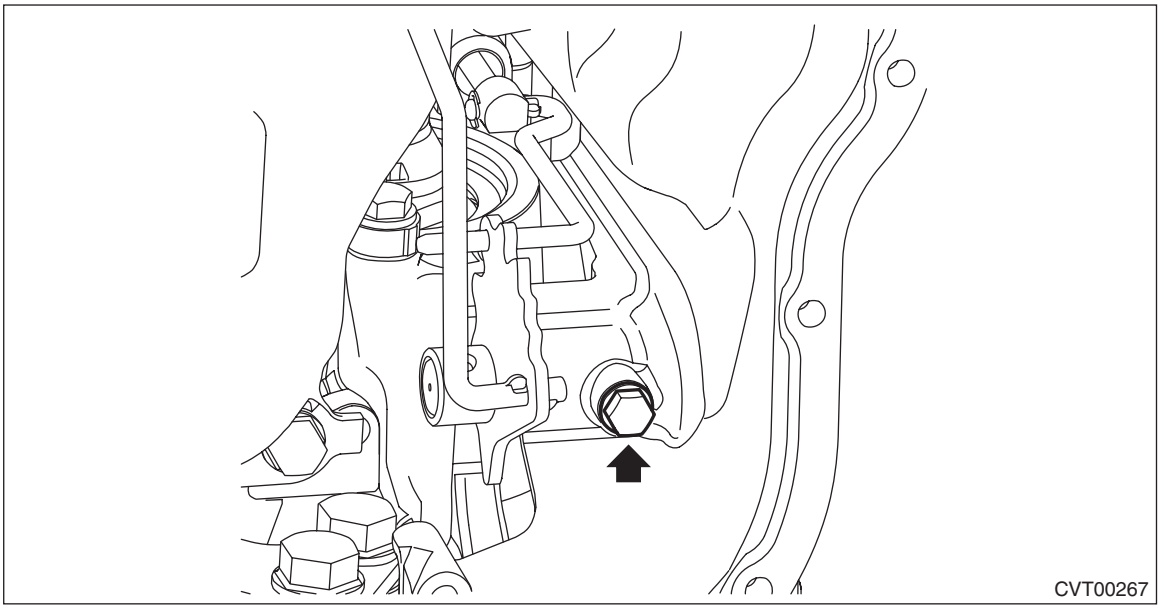

CVT00264

5) Remove the detent spring.

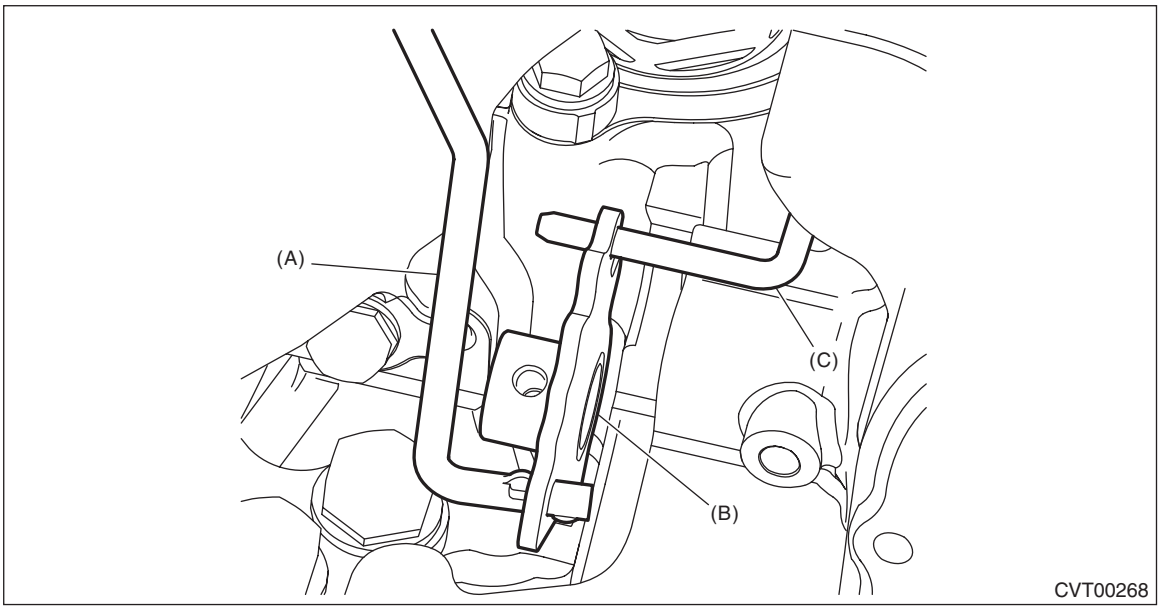

CVT00265

6) Remove the bolt, and remove the shifter arm shaft.

NOTE:
Do not damage the lip of oil seal press-fitted in the case.



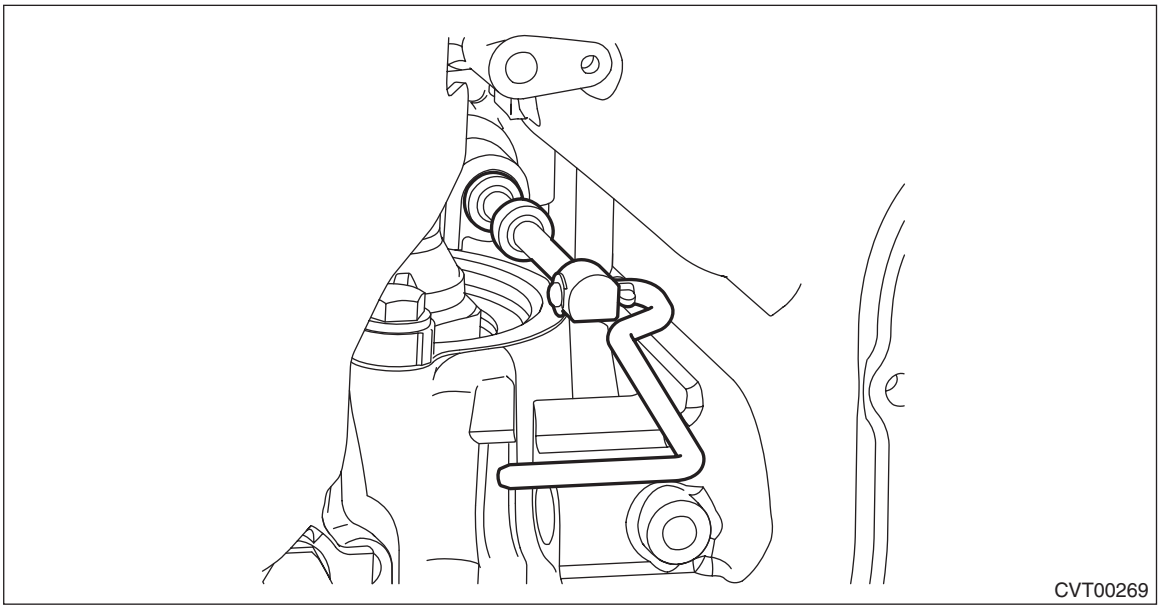
7) Remove the manual plate from the shifter arm shaft, and remove the shift connecting rod of the manual valve.



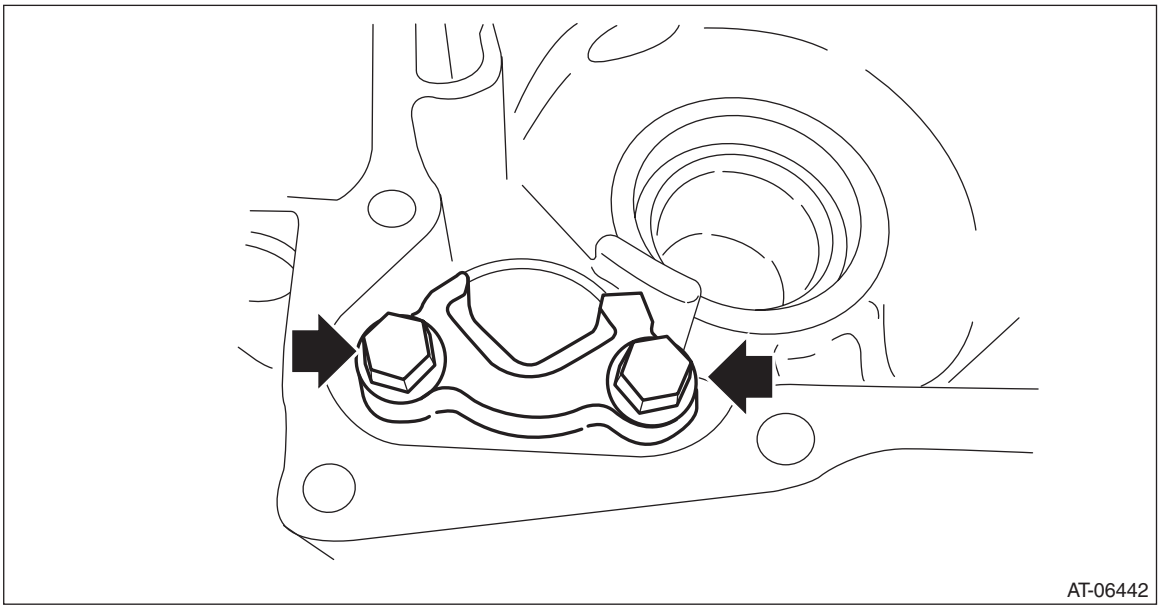
(A) Parking rod
(B) Manual plate
(C) Shift connecting rod

8) Remove the manual plate and parking rod.

9) Remove the manual valve.



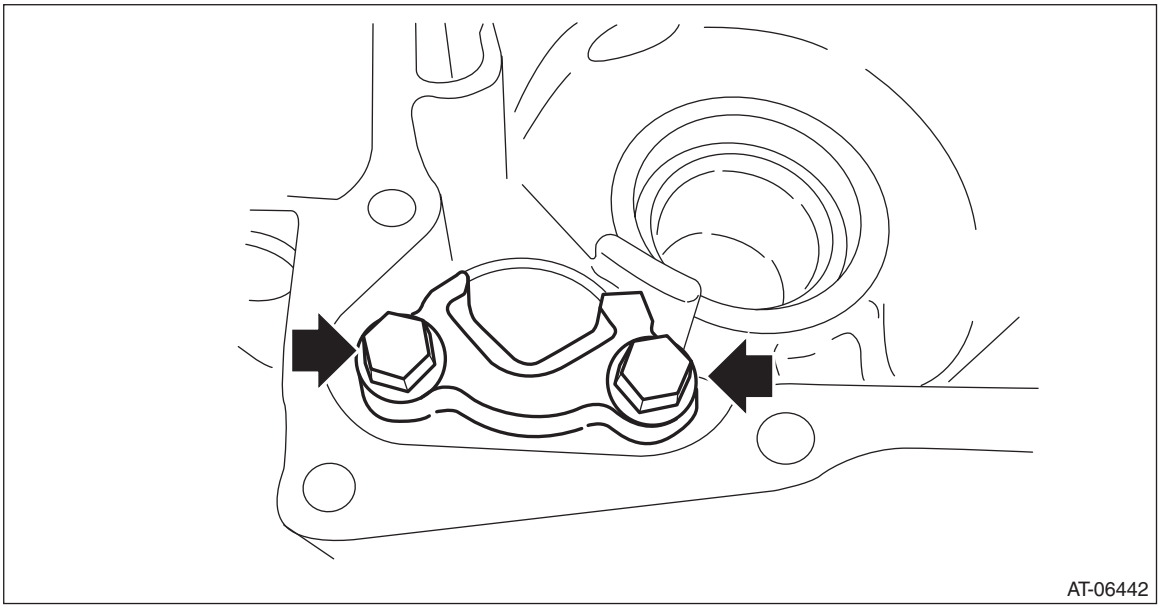
10) Remove the extension case. <Ref. to CVT(TR580)-168, REMOVAL, Extension Case.>
11) Remove the parking support.



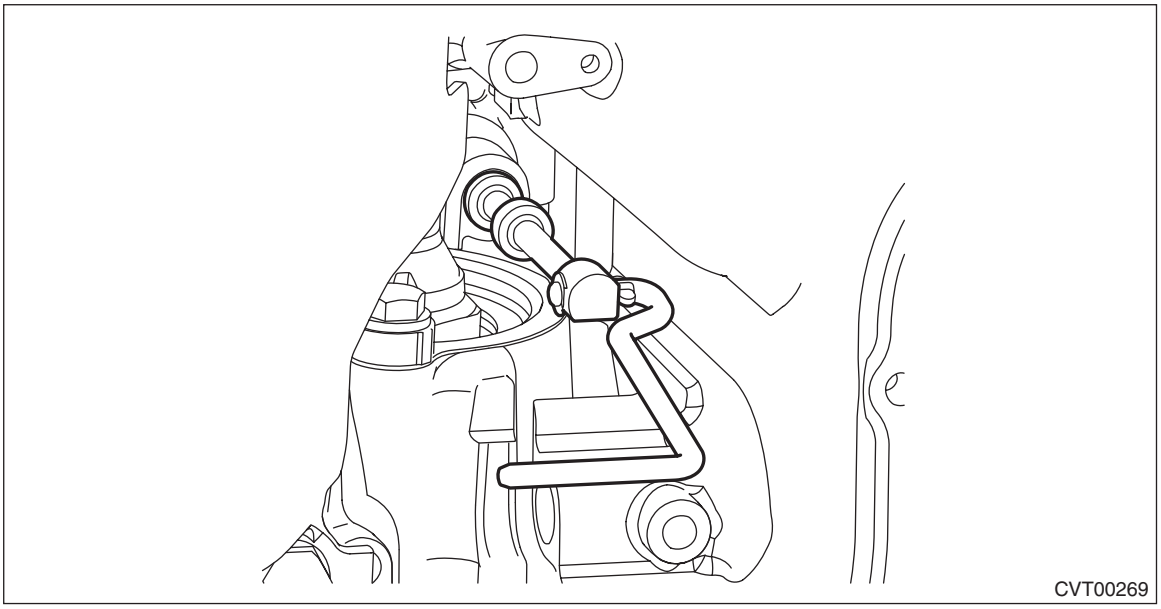
B: INSTALLATION

1) Install the parking support.

Tightening torque:
25 N·m (2.5 kgf-m, 18.4 ft-lb)

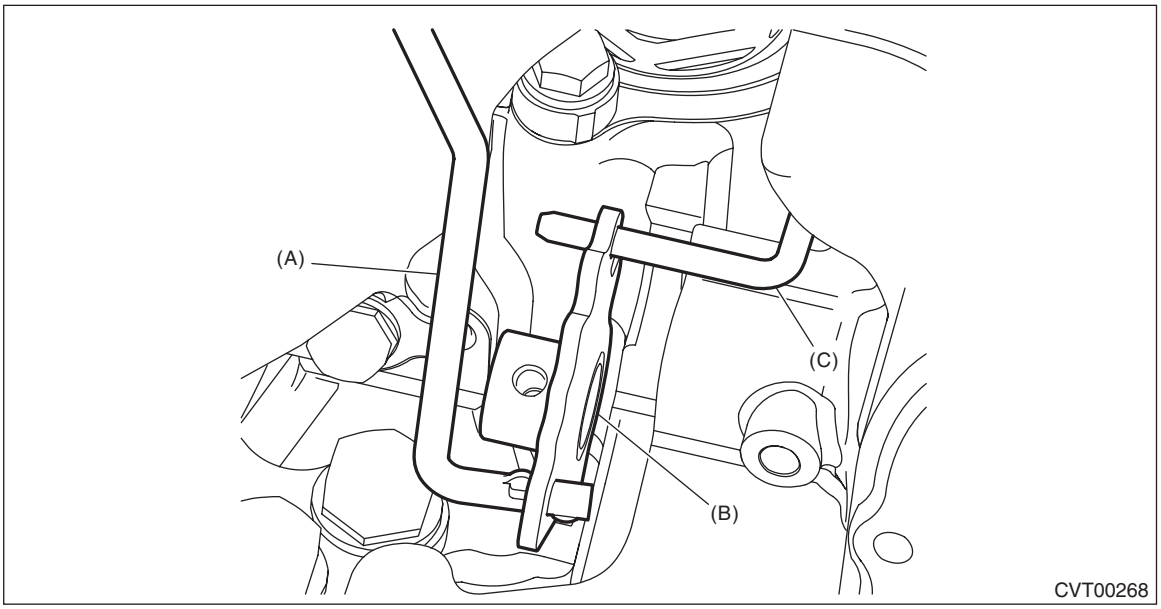


2) Install the extension case. <Ref. to CVT(TR580)-169, INSTALLATION, Extension Case.>
3) Install the manual valve.



4) Install the parking rod to the manual plate.

5) Insert the parking rod into the transmission case, and install the shift connecting rod of the manual valve to the manual plate.

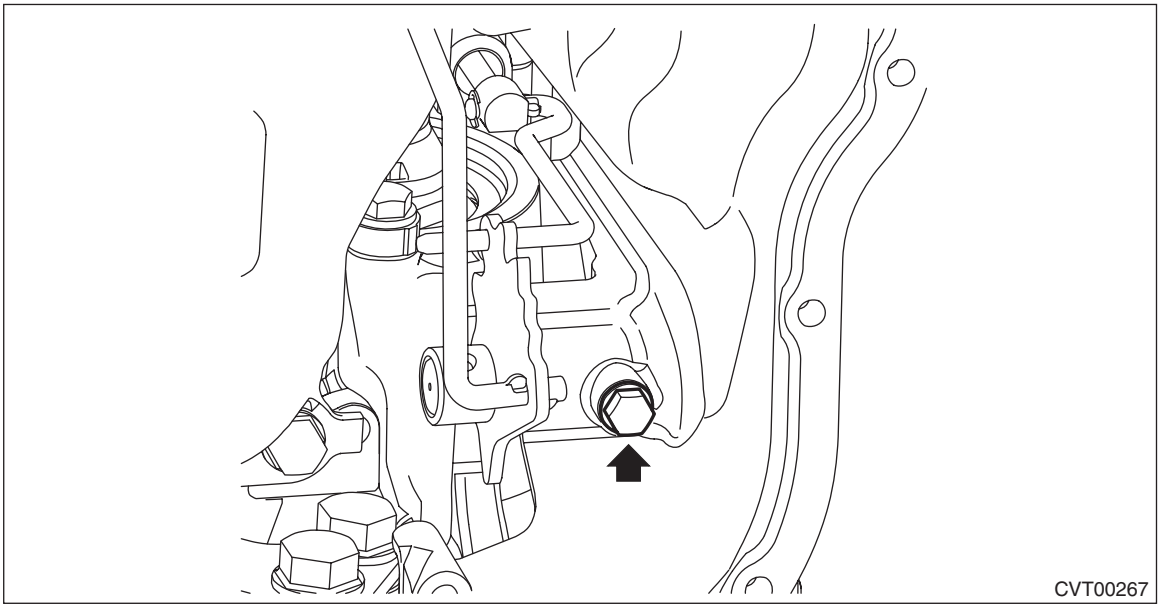


(A) Parking rod
(B) Manual plate
(C) Shift connecting rod

6) Insert the shifter arm shaft to the transmission assembly, install the manual plate to the shifter arm shaft, and secure the shifter arm shaft with a bolt.

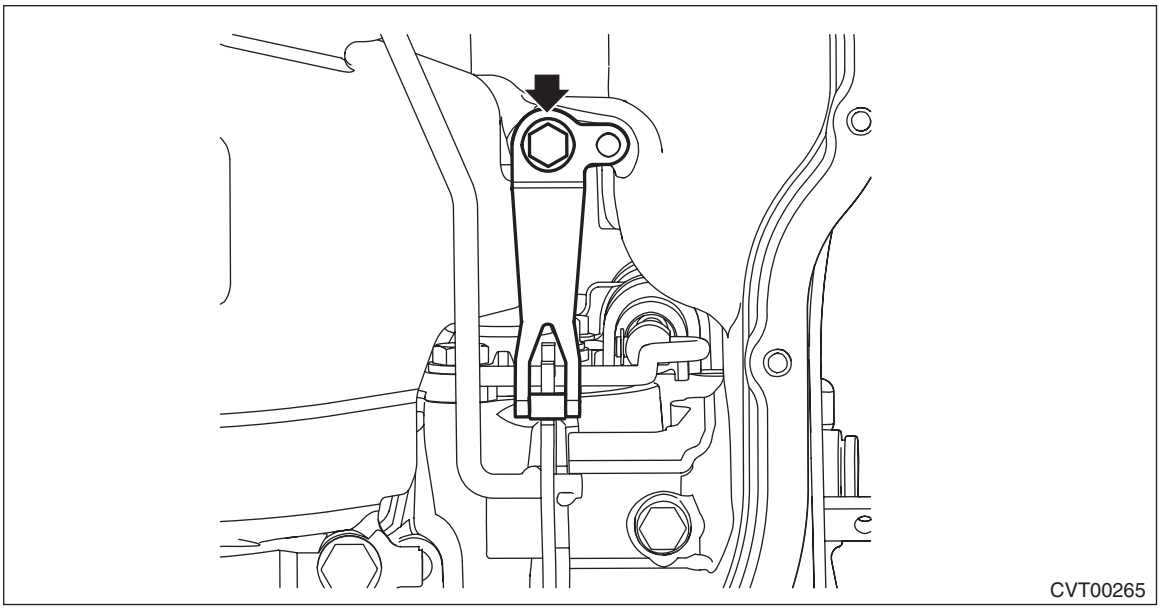
NOTE:
Do not damage the lip of oil seal press-fitted in the case.

Tightening torque:
7 N·m (0.7 kgf-m, 5.2 ft-lb)



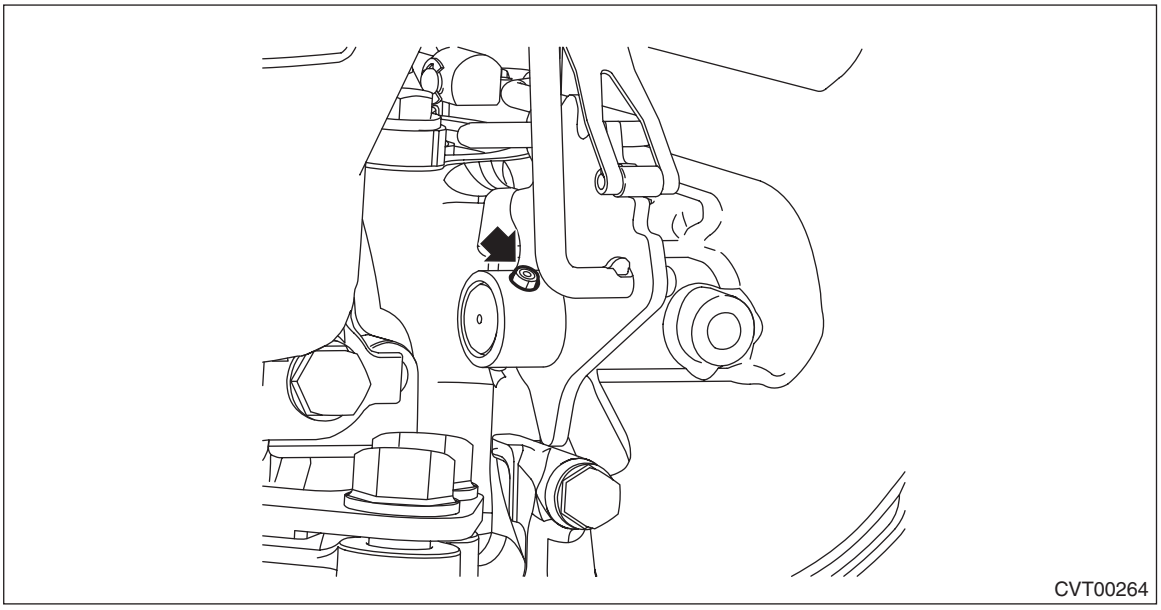
7) Install the detent spring.

Tightening torque:
7 N·m (0.7 kgf-m, 5.2 ft-lb)



8) Install the spring pin.

NOTE:
Use new spring pin.



9) Install the inhibitor switch. <Ref. to CVT(TR580)-101, INSTALLATION, Inhibitor Switch.>
10) Adjust the inhibitor switch. <Ref. to CVT(TR580)-98, ADJUSTMENT, Inhibitor Switch.>
11) Install the oil strainer and oil pan. <Ref. to CVT(TR580)-115, INSTALLATION, Oil Pan and Strainer.>
12) Install the transmission assembly to the vehicle. <Ref. to CVT(TR580)-72, INSTALLATION, Automatic Transmission Assembly.>

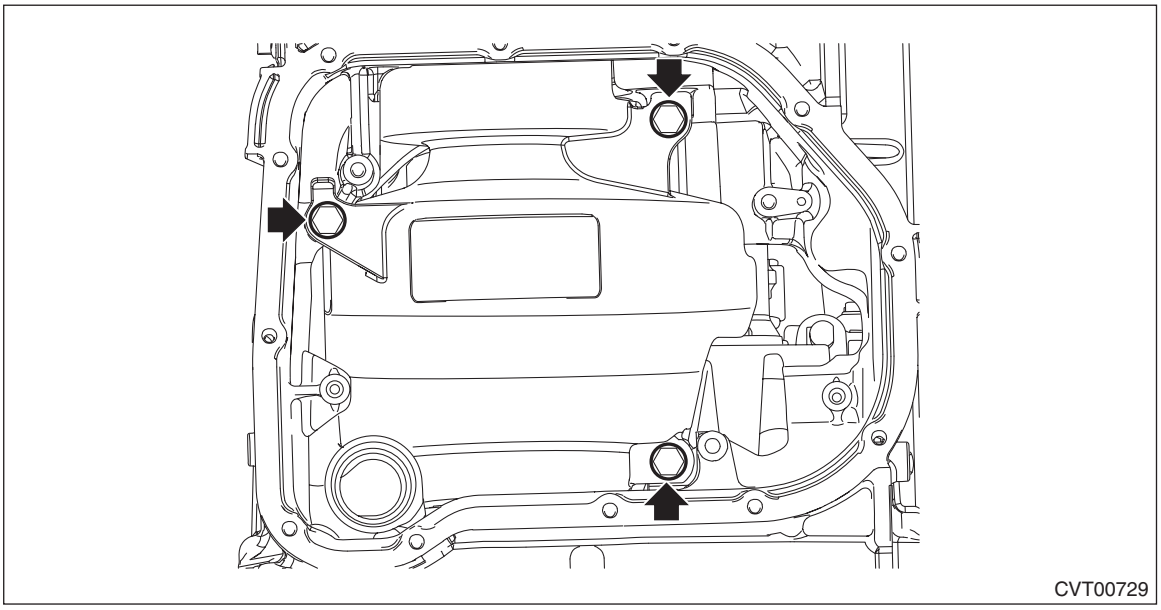
C: INSPECTION

Make sure that the manual plate and detent spring are not worn or otherwise damaged.

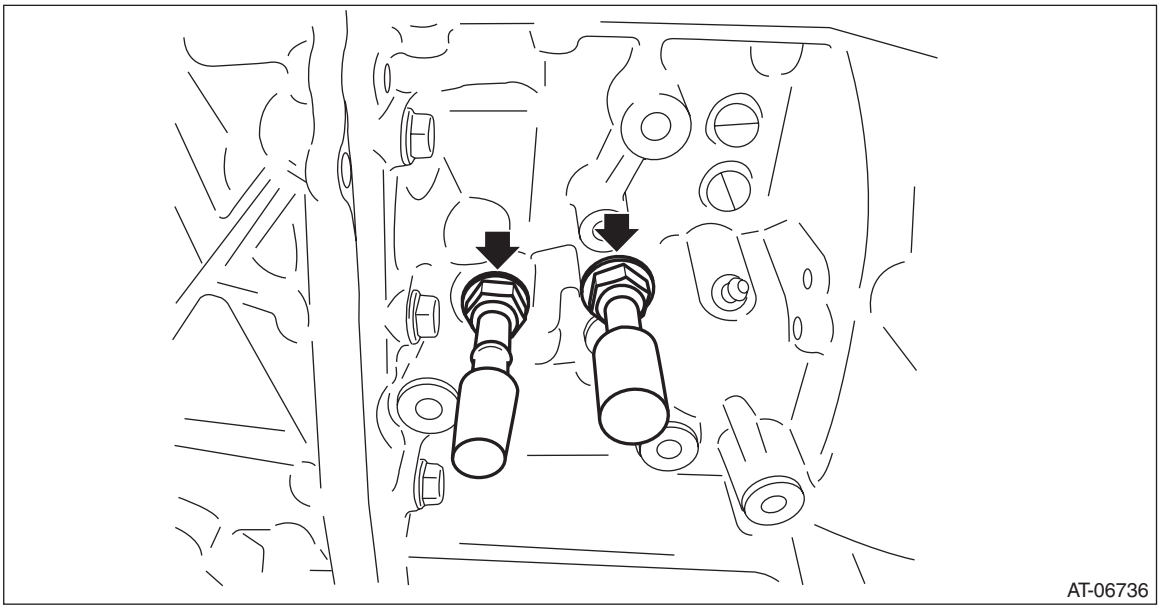
34.Transmission Case

A: REMOVAL

1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TR580)-60, REMOVAL, Automatic Transmission Assembly.>
2) Remove the air breather hose. <Ref. to CVT(TR580)-158, REMOVAL, Air Breather Hose.>
3) Remove the control valve body. <Ref. to CVT(TR580)-117, REMOVAL, Control Valve Body.>
4) Remove the transmission harness. <Ref. to CVT(TR580)-132, REMOVAL, Transmission Harness.>
5) Remove the turbine speed sensor. <Ref. to CVT(TR580)-103, REMOVAL, Turbine Speed Sensor.>
6) Remove the secondary speed sensor. <Ref. to CVT(TR580)-105, REMOVAL, Secondary Speed Sensor.>
7) Remove the primary speed sensor. <Ref. to CVT(TR580)-108, REMOVAL, Primary Speed Sensor.>
8) Remove the inhibitor switch. <Ref. to CVT(TR580)-99, REMOVAL, Inhibitor Switch.>
9) Remove the extension case. <Ref. to CVT(TR580)-168, REMOVAL, Extension Case.>
10) Remove the transfer clutch assembly. <Ref. to CVT(TR580)-172, REMOVAL, Transfer Clutch.>
11) Remove the transfer driven gear assembly. <Ref. to CVT(TR580)-186, REMOVAL, Transfer Driven Gear.>
12) Remove the parking pawl. <Ref. to CVT(TR580)-189, REMOVAL, Parking Pawl.>
13) Remove the reduction driven gear assembly. <Ref. to CVT(TR580)-191, REMOVAL, Reduction Driven Gear.>
14) Remove the oil pan and oil strainer. <Ref. to CVT(TR580)-113, REMOVAL, Oil Pan and Strainer.>
15) Remove the transmission control device. <Ref. to CVT(TR580)-199, REMOVAL, Transmission Control Device.>
16) Remove the oil baffle securing bolt.


CVT00729

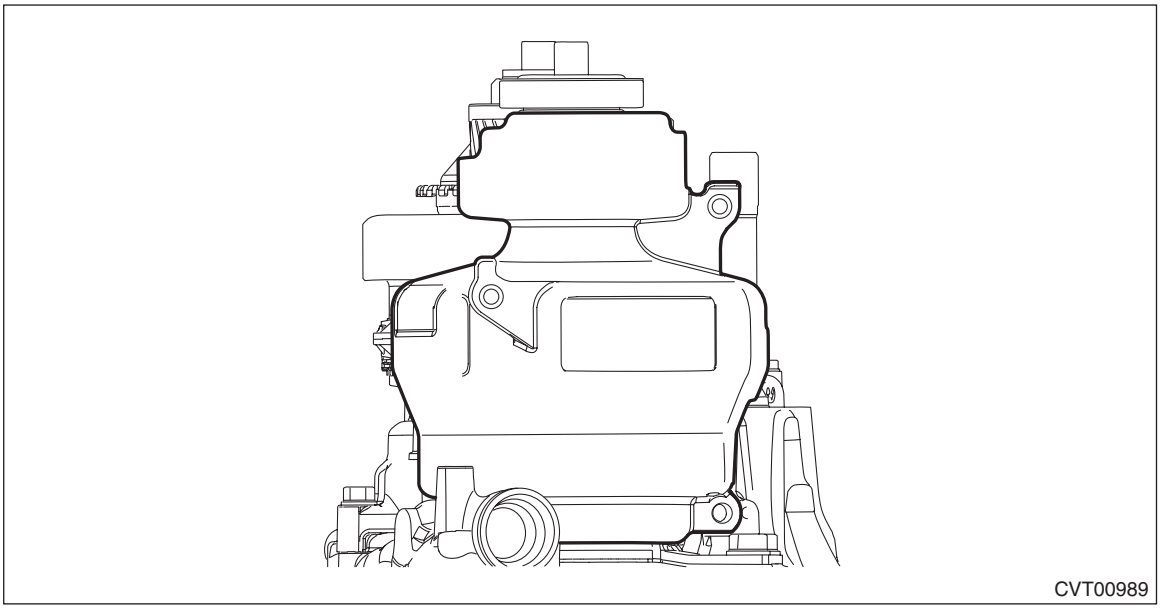
17) Remove the oil cooler pipe.



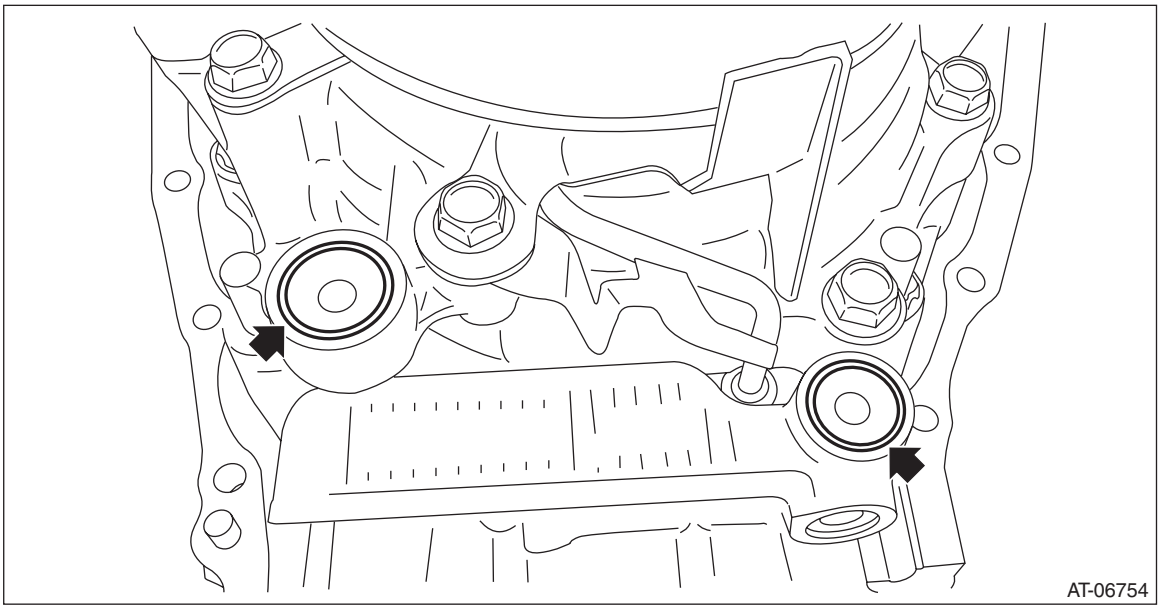
18) Remove the transmission case.

NOTE:
The total number of transmission case mounting bolts is 15.

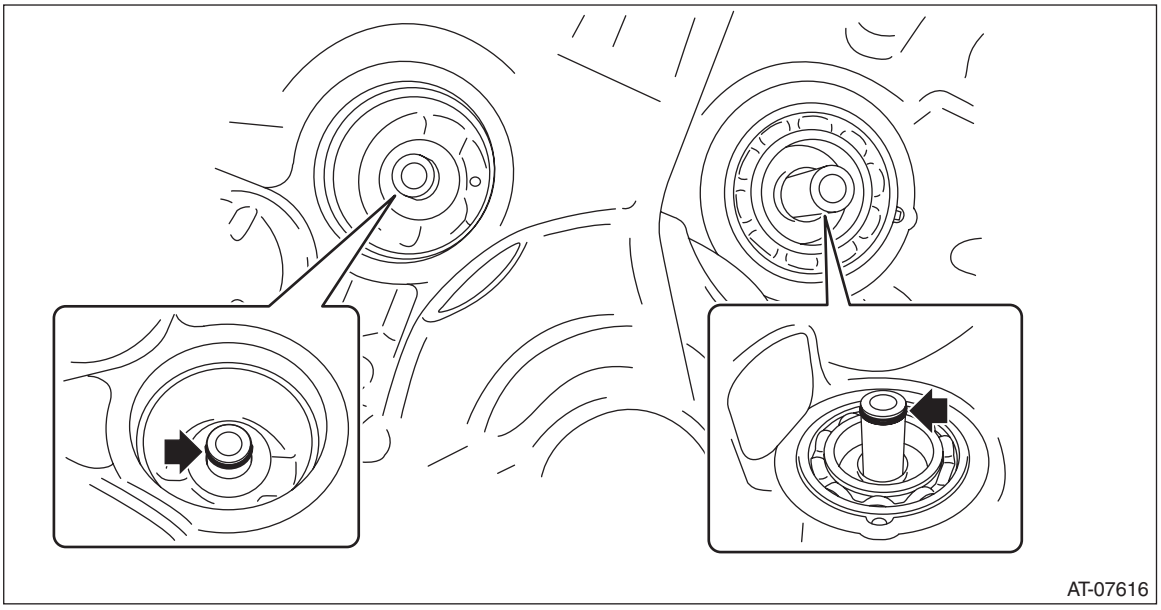
19) Remove the oil baffle.



20) Remove the O-ring.



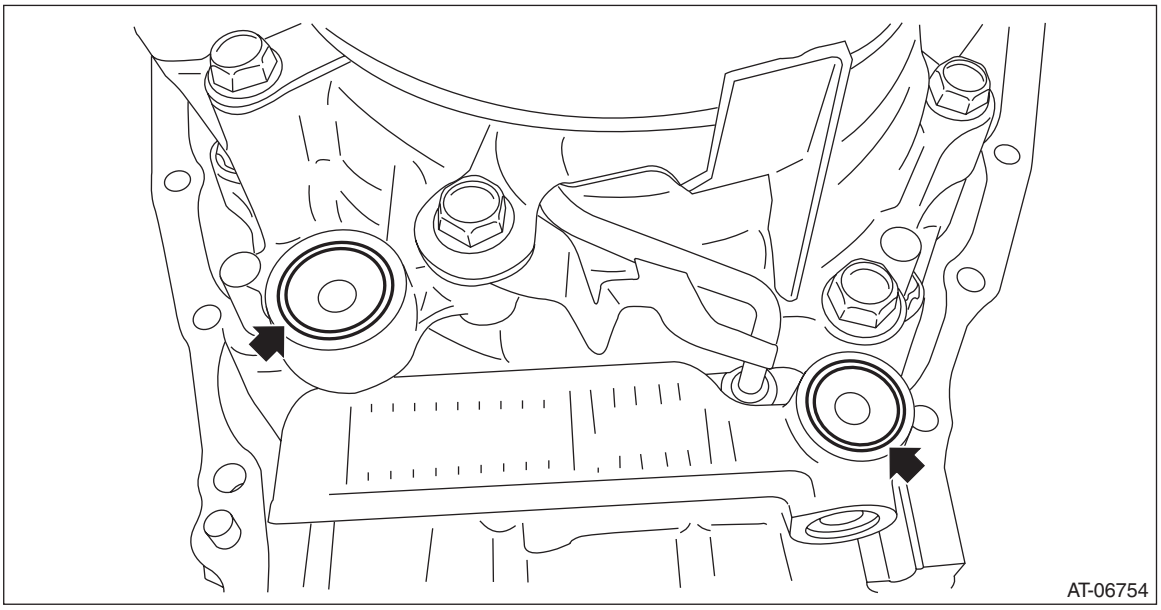
21) Remove the seal ring from the transmission case.



B: INSTALLATION

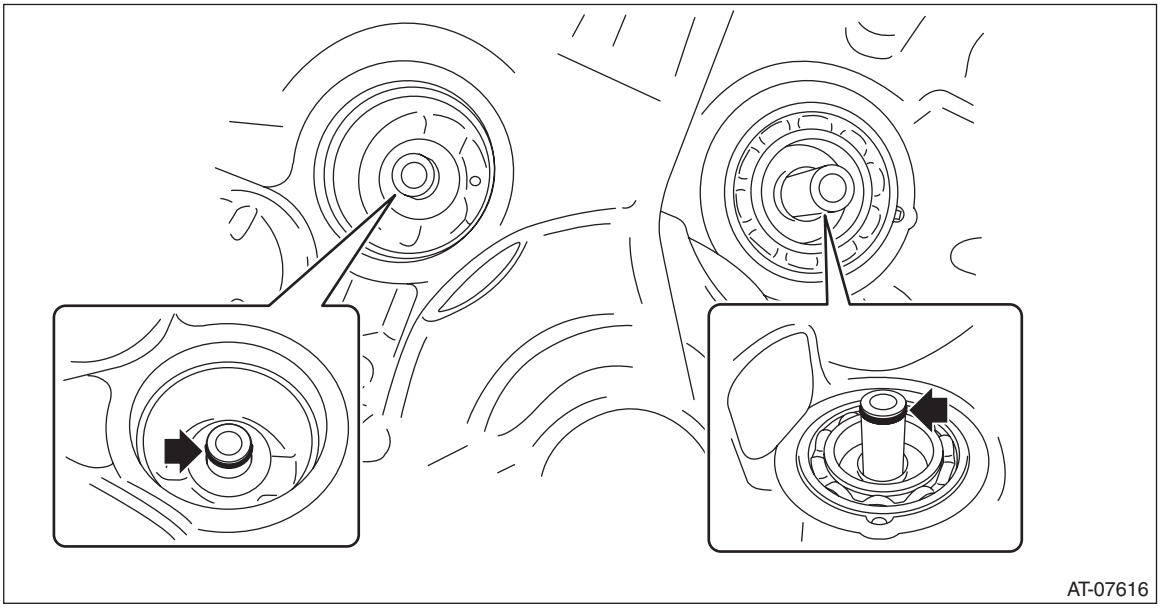
1) Clean the mating surface of transmission case and converter case.
2) Select the reduction gear shim. <Ref. to CVT(TR580)-221, ADJUSTMENT, Reduction Drive Gear.>
3) Remove the transmission case, and install the selected reduction gear shim to the reduction drive gear.
4) Install the O-rings to the reverse clutch housing and drive pinion retainer.

NOTE:
- Use new O-rings.
- Apply CVTF to the O-ring.

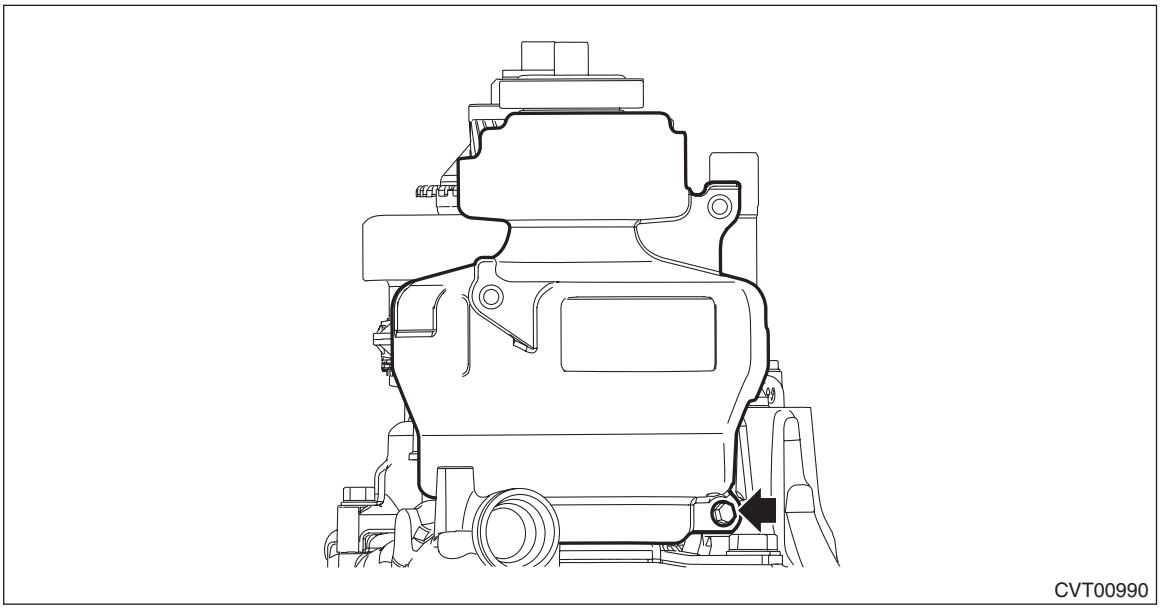


5) Install the seal ring to the transmission case.

NOTE:
- Use a new seal ring.
- When installing the seal ring, do not expand the seal ring too much.
- Apply CVTF to the seal rings.

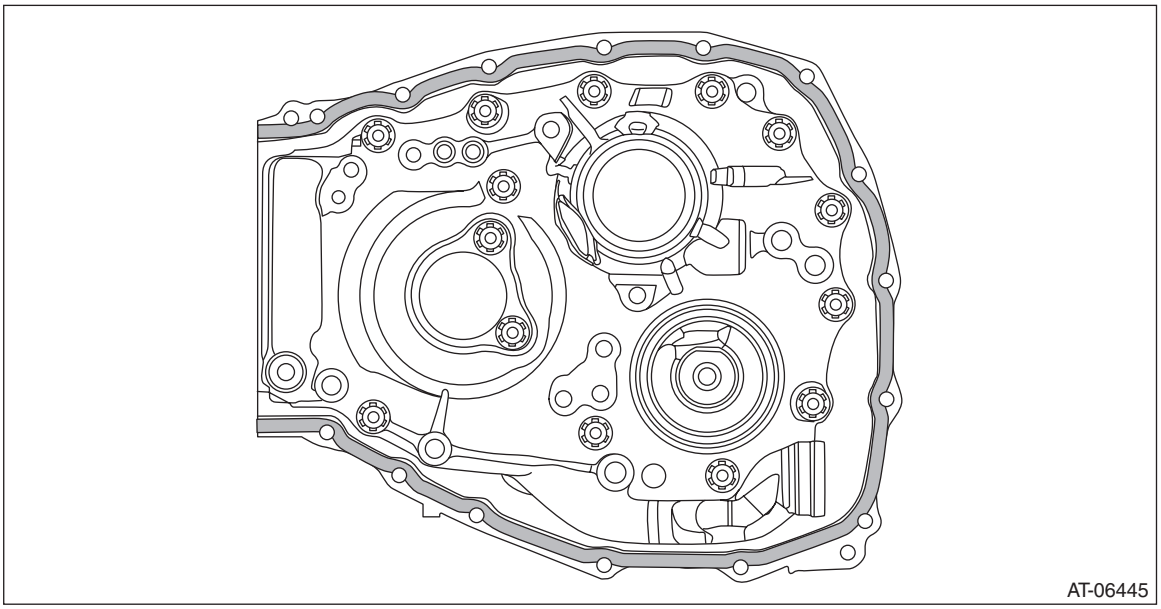


6) Cover the secondary pulley with the oil baffle, and temporarily install it with bolts.



7) Apply liquid gasket seamlessly to the mating surface of transmission case.

Liquid gasket:
THREE BOND 1215B or equivalent



8) Install the transmission case.

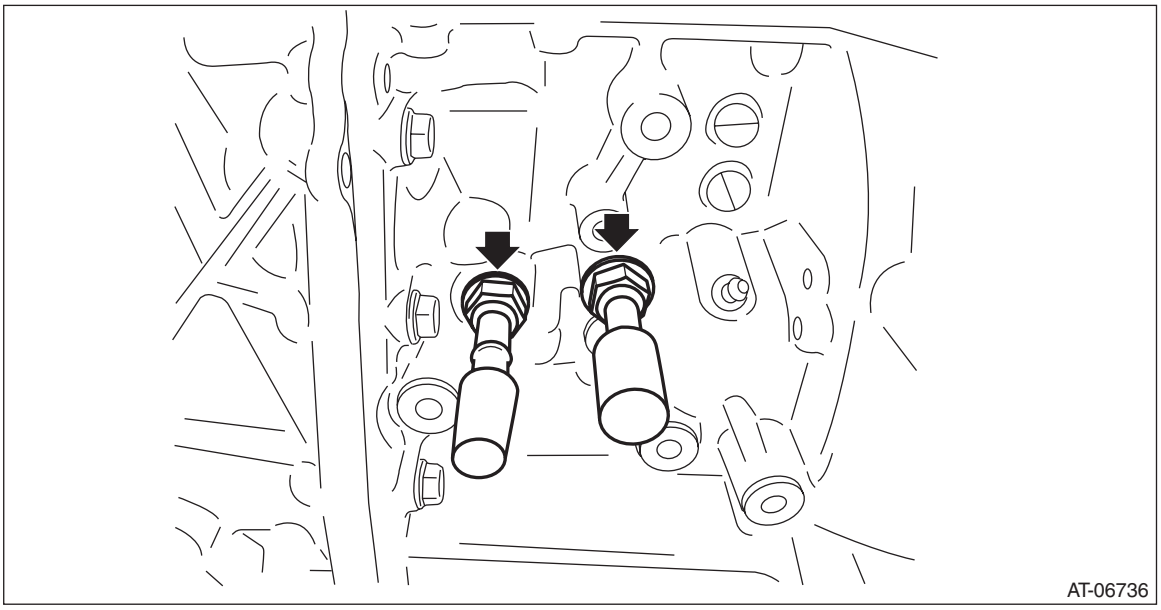
NOTE:
The total number of transmission case mounting bolts is 15.

Tightening torque:
22 N·m (2.2 kgf-m, 16.2 ft-lb)

9) Install the oil cooler pipe.

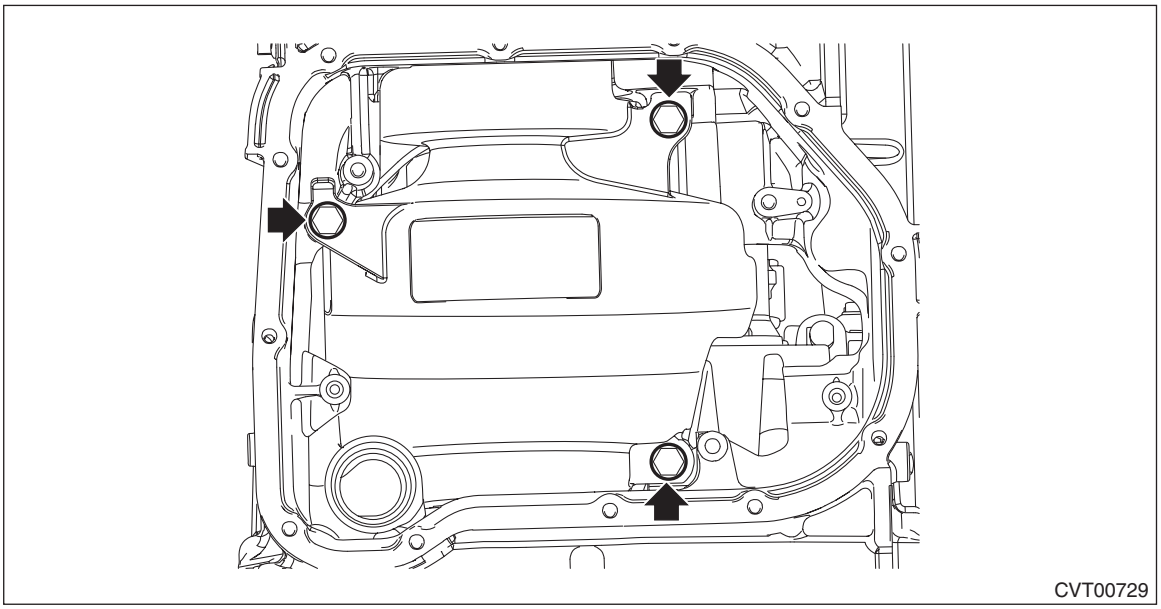
NOTE:
Use new O-rings.

Tightening torque:
25 N·m (2.5 kgf-m, 18.4 ft-lb)



10) Install the oil baffle securing bolt.

Tightening torque:
16 N·m (1.6 kgf-m, 11.8 ft-lb)

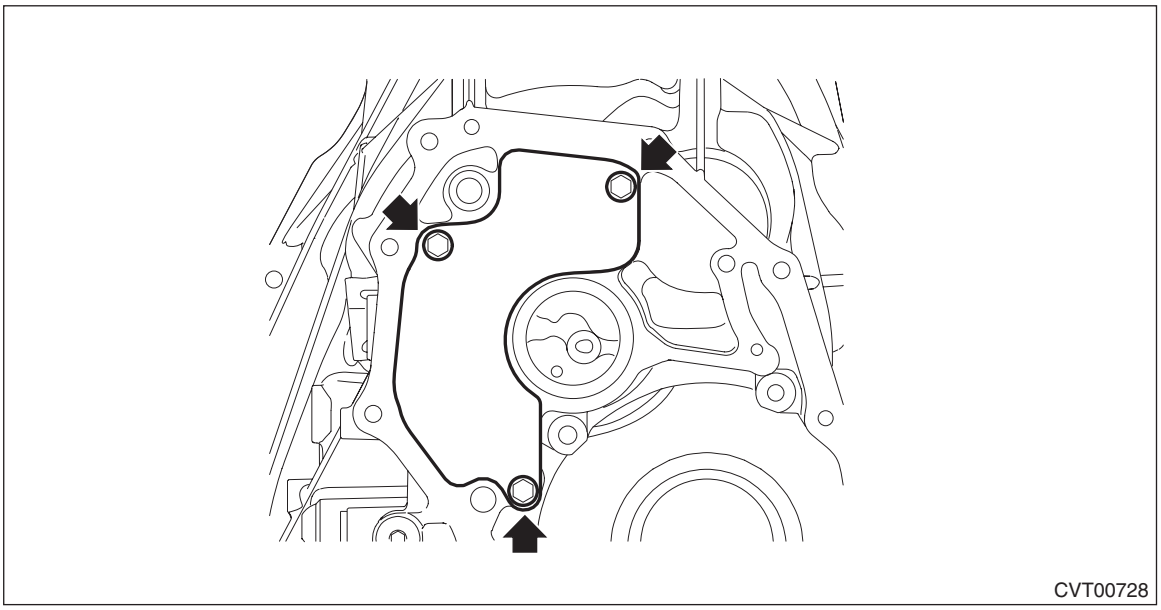


11) Install the transmission control device. <Ref. to CVT(TR580)-202, INSTALLATION, Transmission Control Device.>
12) Install the oil pan and oil strainer. <Ref. to CVT(TR580)-115, INSTALLATION, Oil Pan and Strainer.>
13) Install the reduction driven gear assembly. <Ref. to CVT(TR580)-192, INSTALLATION, Reduction Driven Gear.>
14) Install the parking pawl. <Ref. to CVT(TR580)-190, INSTALLATION, Parking Pawl.>
15) Install the transfer driven gear assembly. <Ref. to CVT(TR580)-187, INSTALLATION, Transfer Driven Gear.>

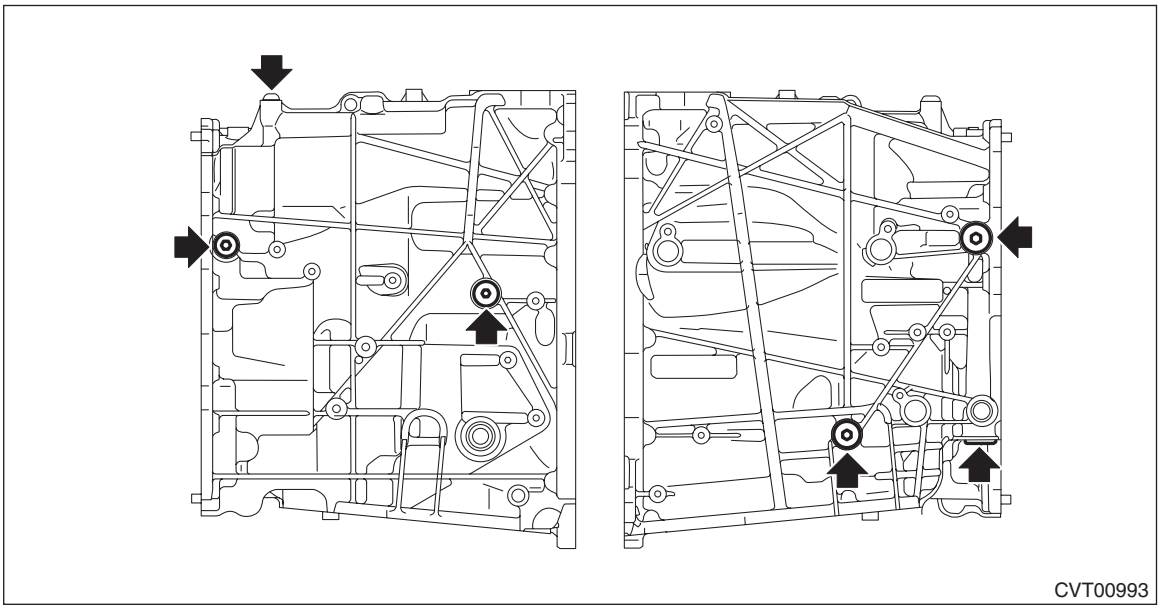
16) Install the transfer clutch assembly. <Ref. to CVT(TR580)-174, INSTALLATION, Transfer Clutch.>
17) Install the extension case. <Ref. to CVT(TR580)-169, INSTALLATION, Extension Case.>
18) Install the inhibitor switch. <Ref. to CVT(TR580)-101, INSTALLATION, Inhibitor Switch.>
19) Install the secondary speed sensor. <Ref. to CVT(TR580)-105, INSTALLATION, Secondary Speed Sensor.>
20) Install the primary speed sensor. <Ref. to CVT(TR580)-109, INSTALLATION, Primary Speed Sensor.>
21) Install the turbine speed sensor. <Ref. to CVT(TR580)-103, INSTALLATION, Turbine Speed Sensor.>
22) Install the transmission harness. <Ref. to CVT(TR580)-139, INSTALLATION, Transmission Harness.>
23) Install the control valve body. <Ref. to CVT(TR580)-124, INSTALLATION, Control Valve Body.>
24) Install the air breather hose. <Ref. to CVT(TR580)-160, INSTALLATION, Air Breather Hose.>
25) Install the transmission assembly to the vehicle. <Ref. to CVT(TR580)-72, INSTALLATION, Automatic Transmission Assembly.>

C: DISASSEMBLY

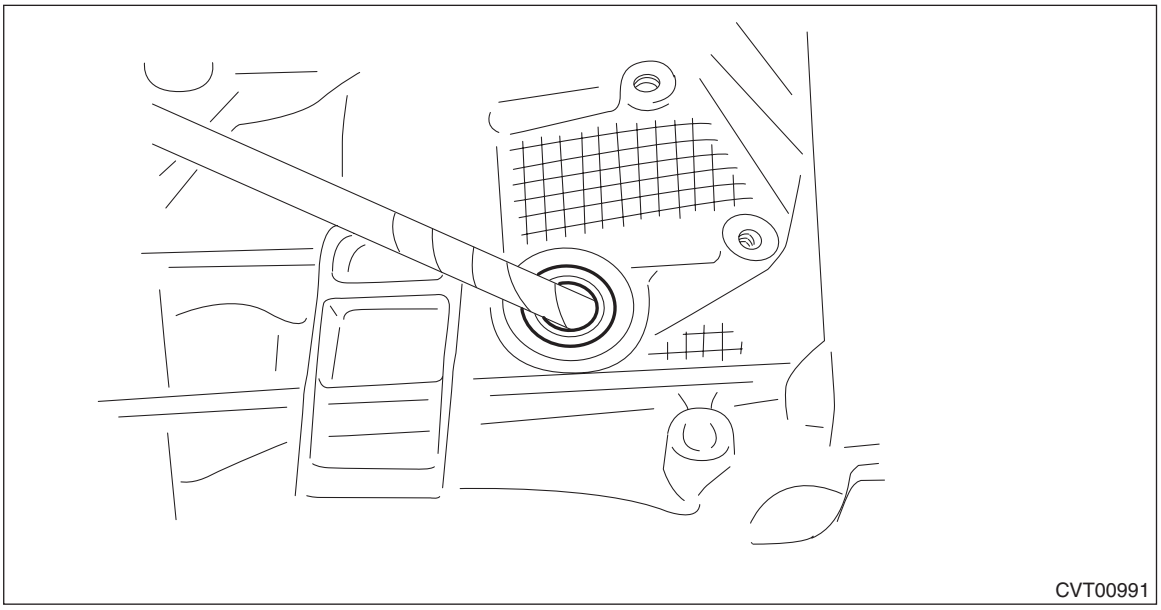
1) Remove the oil stopper plate.


CVT00728

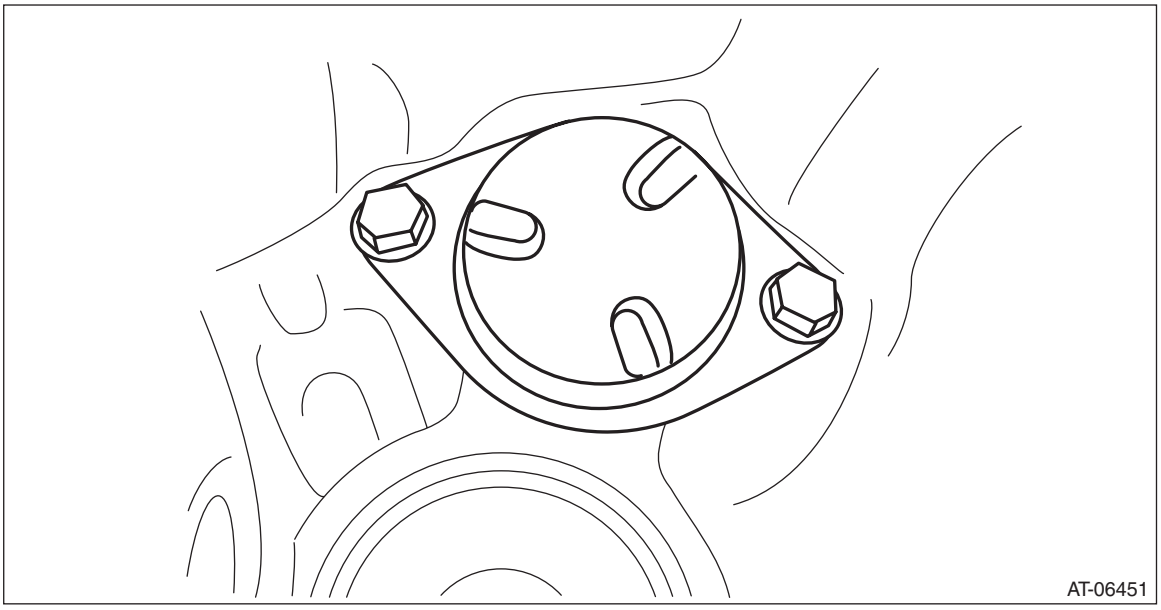
2) Remove all plugs from the transmission case.


CVT00993

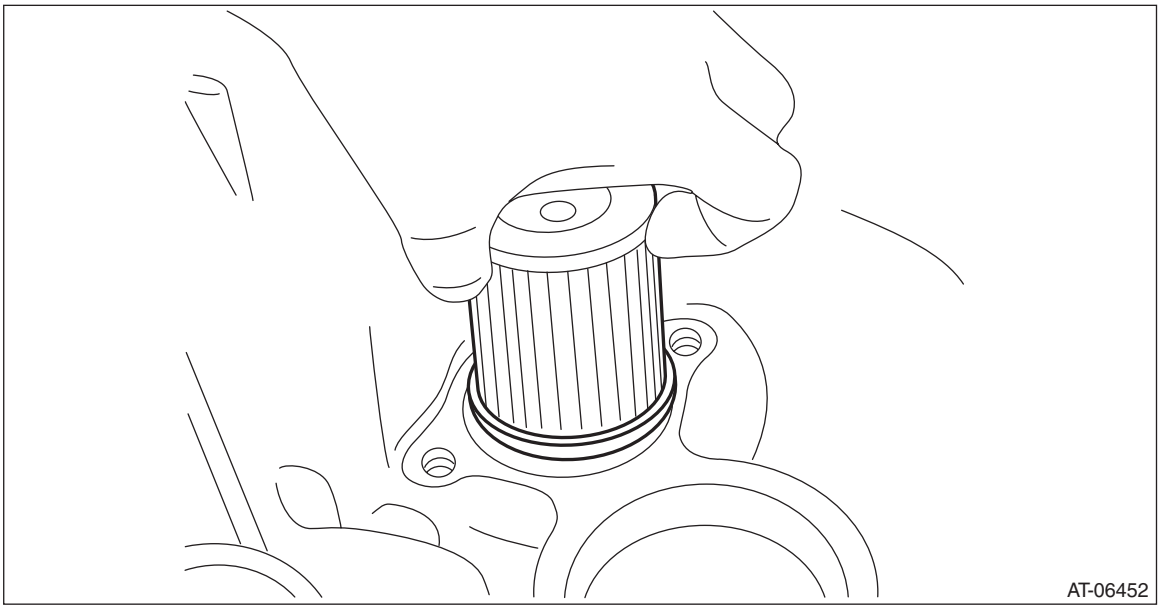
3) Remove the oil seal using a screwdriver wrapped with cloth etc.



4) Remove the CVTF filter cover and gasket.



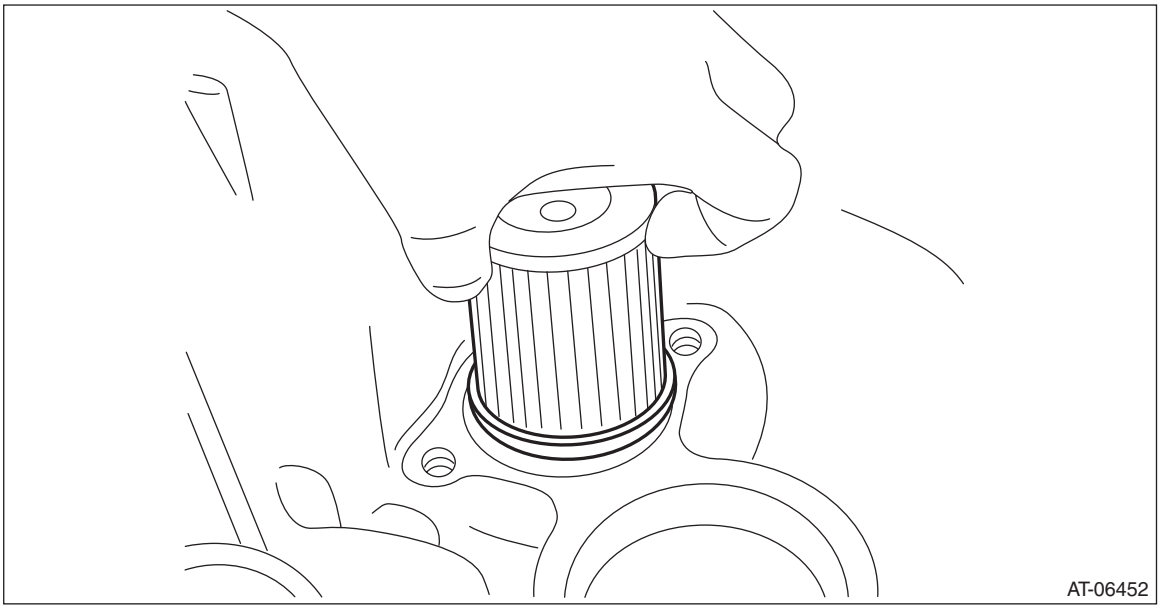
5) Remove the CVTF filter.



D: ASSEMBLY

1) Face the O-ring side of the CVTF filter to the transmission case side, and install the CVTF filter.

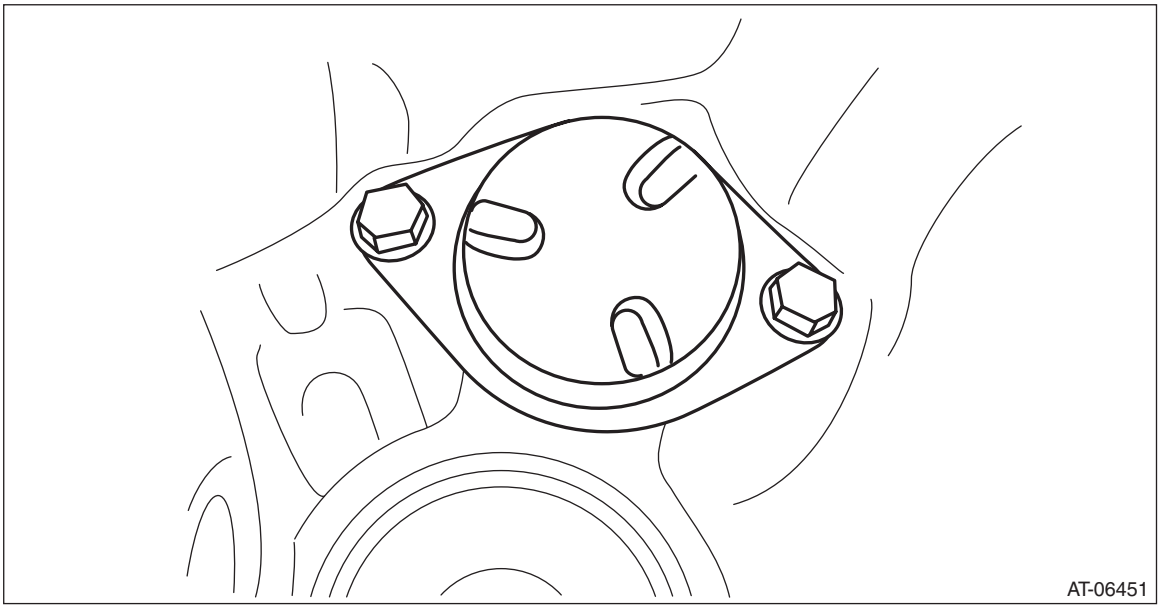
NOTE:
Apply CVTF to the O-ring of CVTF filter.



2) Install the CVTF filter cover and gasket.

NOTE:
Use a new gasket.

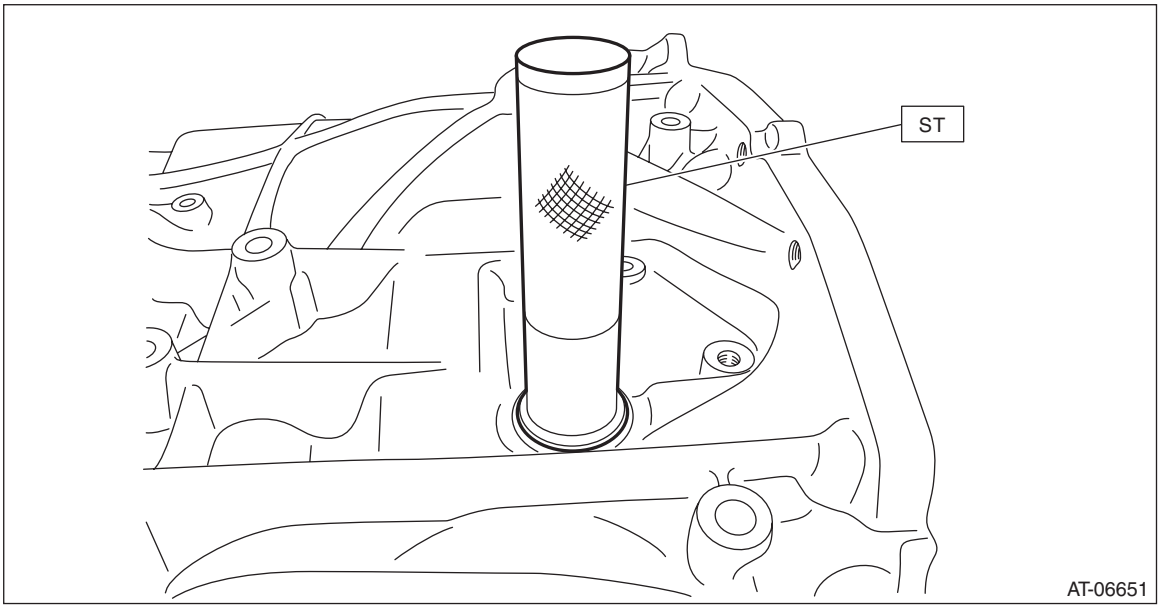
Tightening torque:
17 N·m (1.7 kgf-m, 12.5 ft-lb)



3) Using the ST, install the oil seal.

NOTE:
- Use a new oil seal.
- Apply CVTF to the oil seal lip and press-fitting surface.

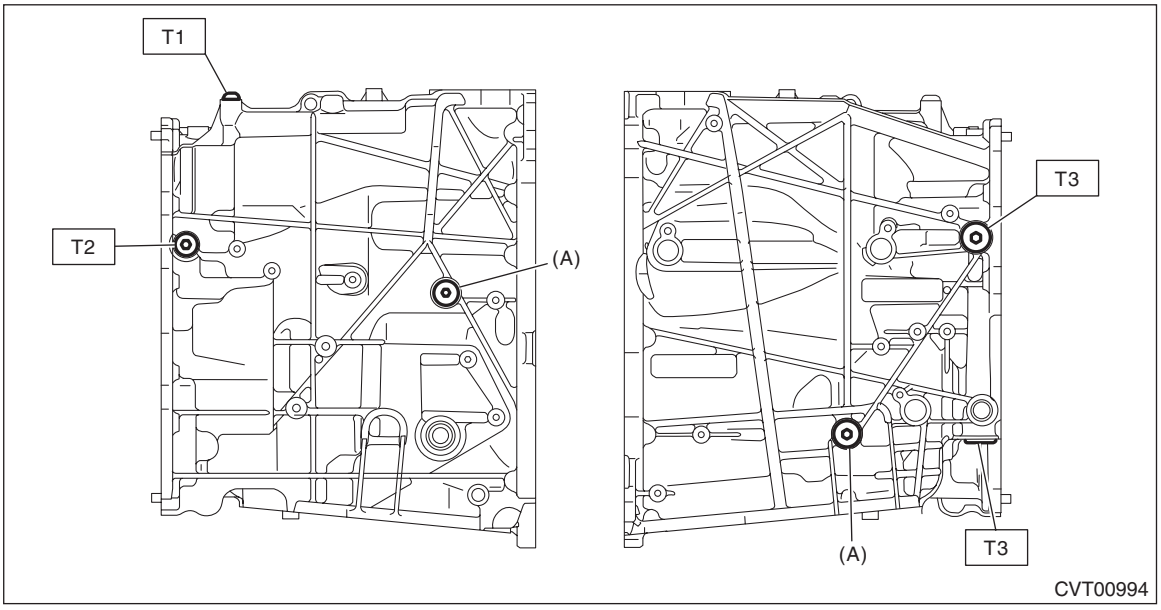
ST 18657AA000 INSTALLER



4) Install all plugs.

NOTE:
- Use new O-rings.
- Apply CVTF to the O-ring.
- For the plug (A), fill the CVTF, and then tighten the plug using a new O-ring.

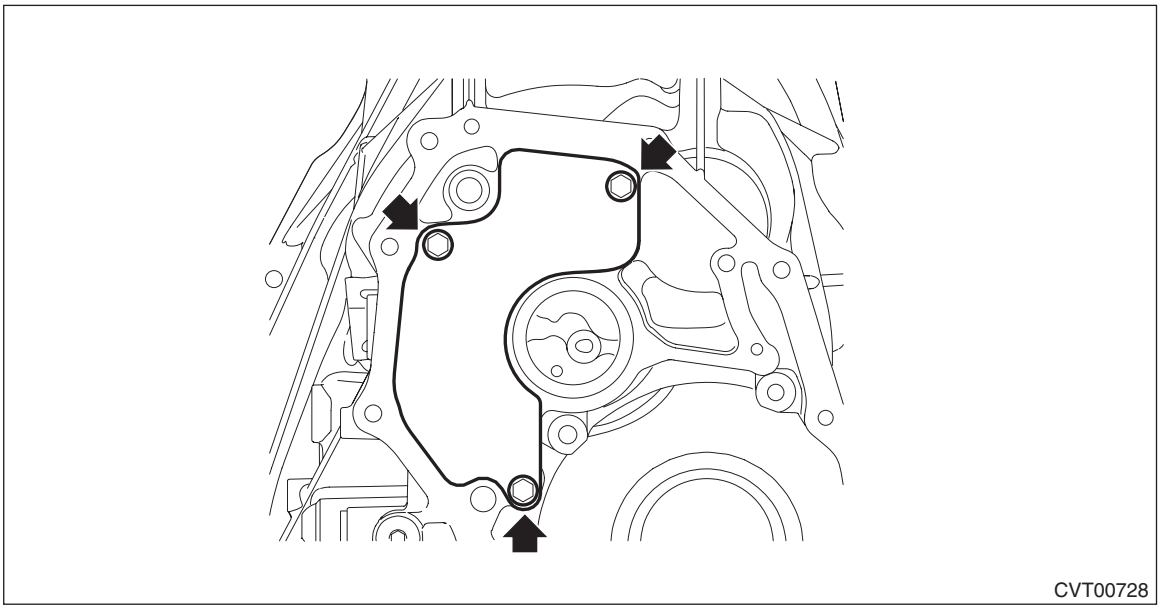
Tightening torque:
T1: 13 N·m (1.3 kgf-m, 9.6 ft-lb)
T2: 25 N·m (2.5 kgf-m, 18.4 ft-lb)
T3: 50 N·m (5.1 kgf-m, 36.9 ft-lb)



5) Install the oil stopper plate.

NOTE:
Use a new bolt.

Tightening torque:
9 N·m (0.9 kgf-m, 6.6 ft-lb)



E: INSPECTION

- Check the transmission case for damage.
- Check for leakage of CVTF from the connection between converter case and transmission case.
- Check the bearing for smooth operation.
- Check the bearing for seizure or wear.

F: ADJUSTMENT

NOTE:
When replacing the transmission case with a new part, perform the following check and adjustment for the selection.

- Select the transfer driven gear shim. <Ref. to CVT(TR580)-184, ADJUSTMENT, Transfer Clutch.>
- Select the transfer drive gear shim. <Ref. to CVT(TR580)-198, ADJUSTMENT, Reduction Driven Gear.>
- Select the reduction drive gear shim. <Ref. to CVT(TR580)-221, ADJUSTMENT, Reduction Drive Gear.>

35.CVTF Filter

A: REMOVAL

NOTE:
• Although CVTF filter is a maintenance-free part, replace it if a large quantity of wear debris and metal particles are found in CVTF and CVTF filter.
• For removal of CVTF filter, refer to “Transmission Case”. <Ref. to CVT(TR580)-205, REMOVAL, Transmission Case.> <Ref. to CVT(TR580)-211, DISASSEMBLY, Transmission Case.>

B: INSTALLATION

NOTE:
For installation of CVTF filter, refer to “Transmission Case”. <Ref. to CVT(TR580)-214, ASSEMBLY, Transmission Case.> <Ref. to CVT(TR580)-208, INSTALLATION, Transmission Case.>

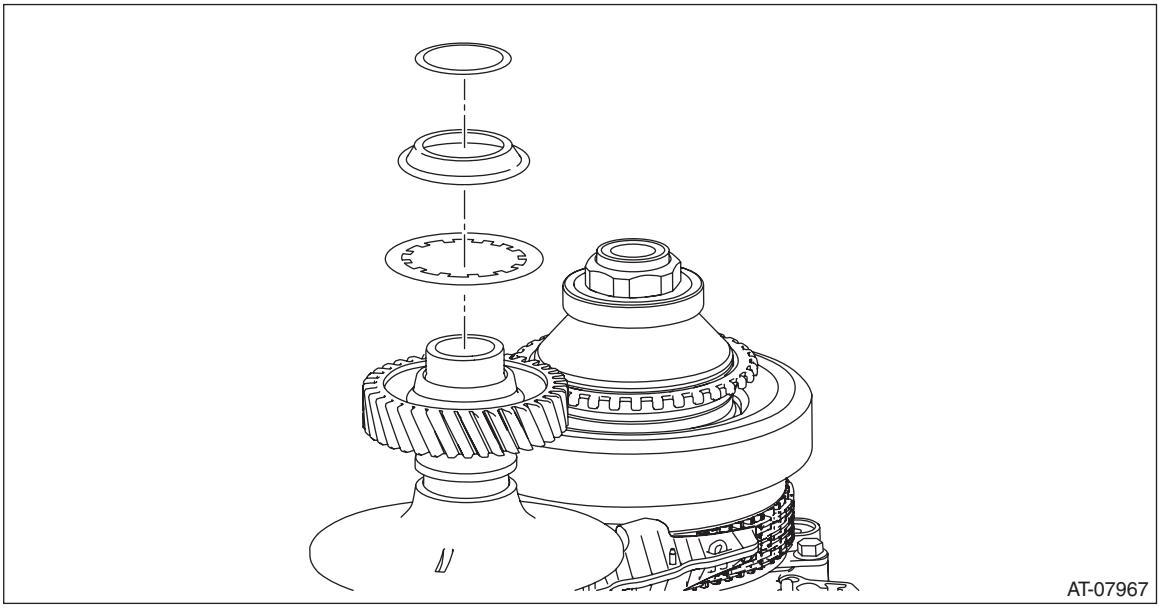
C: INSPECTION

- Check if a large quantity of wear debris or metal particles are in CVTF and CVTF filter.
- Check for broken part or damaged O-ring.

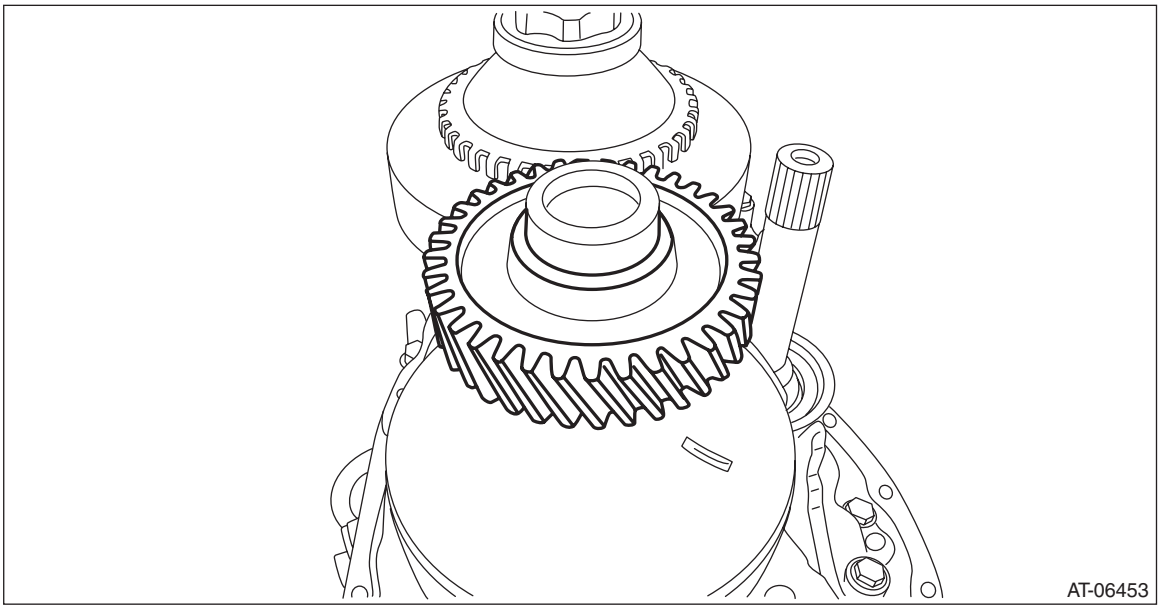
36.Reduction Drive Gear

A: REMOVAL

1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TR580)-60, REMOVAL, Automatic Transmission Assembly.>
2) Remove the air breather hose. <Ref. to CVT(TR580)-158, REMOVAL, Air Breather Hose.>
3) Remove the control valve body. <Ref. to CVT(TR580)-117, REMOVAL, Control Valve Body.>
4) Remove the transmission harness. <Ref. to CVT(TR580)-132, REMOVAL, Transmission Harness.>
5) Remove the turbine speed sensor. <Ref. to CVT(TR580)-103, REMOVAL, Turbine Speed Sensor.>
6) Remove the secondary speed sensor. <Ref. to CVT(TR580)-105, REMOVAL, Secondary Speed Sensor.>
7) Remove the primary speed sensor. <Ref. to CVT(TR580)-108, REMOVAL, Primary Speed Sensor.>
8) Remove the inhibitor switch. <Ref. to CVT(TR580)-99, REMOVAL, Inhibitor Switch.>
9) Remove the extension case. <Ref. to CVT(TR580)-168, REMOVAL, Extension Case.>
10) Remove the transfer clutch assembly. <Ref. to CVT(TR580)-172, REMOVAL, Transfer Clutch.>
11) Remove the transfer driven gear assembly. <Ref. to CVT(TR580)-186, REMOVAL, Transfer Driven Gear.>
12) Remove the parking pawl. <Ref. to CVT(TR580)-189, REMOVAL, Parking Pawl.>
13) Remove the reduction driven gear assembly. <Ref. to CVT(TR580)-191, REMOVAL, Reduction Driven Gear.>
14) Remove the oil pan and oil strainer. <Ref. to CVT(TR580)-113, REMOVAL, Oil Pan and Strainer.>
15) Remove the transmission control device. <Ref. to CVT(TR580)-199, REMOVAL, Transmission Control Device.>
16) Remove the transmission case. <Ref. to CVT(TR580)-205, REMOVAL, Transmission Case.>
17) Remove the reduction drive gear shims, spring retainers, and dish plates.

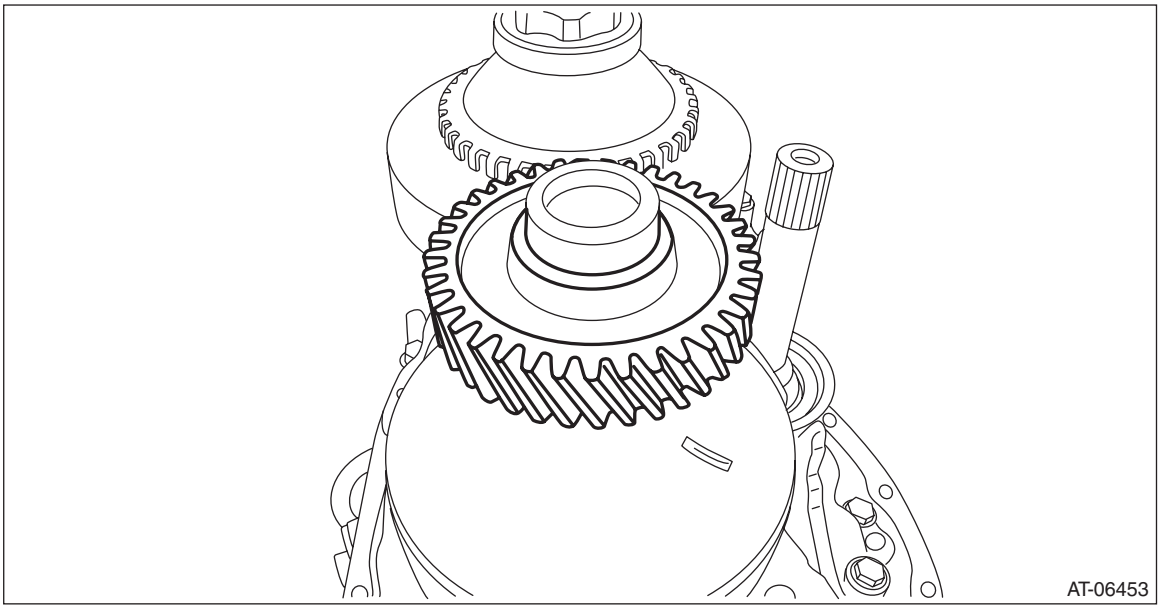


18) Remove the reduction drive gear.



B: INSTALLATION

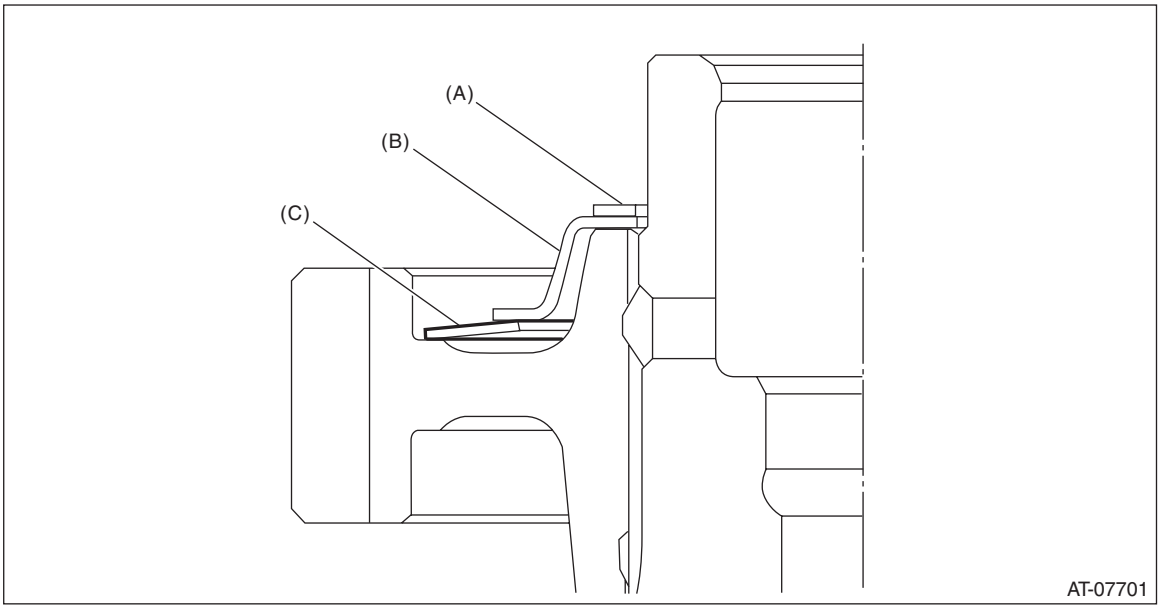
1) Install the reduction drive gear to secondary pulley.



2) Select the reduction drive gear shim. <Ref. to CVT(TR580)-221, ADJUSTMENT, Reduction Drive Gear.>

3) Install the dish plates, spring retainers, and selected reduction drive gear shims.

NOTE:
Install the dish plate in the correct direction.



(A) Reduction drive gear shim
(B) Spring retainer
(C) Dish plate

4) Install the transmission case. <Ref. to CVT(TR580)-208, INSTALLATION, Transmission Case.>
5) Install the transmission control device. <Ref. to CVT(TR580)-202, INSTALLATION, Transmission Control Device.>
6) Install the oil strainer and oil pan. <Ref. to CVT(TR580)-115, INSTALLATION, Oil Pan and Strainer.>
7) Install the reduction driven gear assembly. <Ref. to CVT(TR580)-192, INSTALLATION, Reduction Driven Gear.>
8) Install the parking pawl. <Ref. to CVT(TR580)-190, INSTALLATION, Parking Pawl.>
9) Install the transfer driven gear assembly. <Ref. to CVT(TR580)-187, INSTALLATION, Transfer Driven Gear.>
10) Install the transfer clutch assembly. <Ref. to CVT(TR580)-174, INSTALLATION, Transfer Clutch.>
11) Install the extension case. <Ref. to CVT(TR580)-169, INSTALLATION, Extension Case.>
12) Install the inhibitor switch. <Ref. to CVT(TR580)-101, INSTALLATION, Inhibitor Switch.>
13) Install the secondary speed sensor. <Ref. to CVT(TR580)-105, INSTALLATION, Secondary Speed Sensor.>
14) Install the primary speed sensor. <Ref. to CVT(TR580)-109, INSTALLATION, Primary Speed Sensor.>
15) Install the turbine speed sensor. <Ref. to CVT(TR580)-103, INSTALLATION, Turbine Speed Sensor.>
16) Install the transmission harness. <Ref. to CVT(TR580)-139, INSTALLATION, Transmission Harness.>
17) Install the control valve body. <Ref. to CVT(TR580)-124, INSTALLATION, Control Valve Body.>
18) Install the air breather hose. <Ref. to CVT(TR580)-160, INSTALLATION, Air Breather Hose.>
19) Install the transmission assembly to the vehicle. <Ref. to CVT(TR580)-72, INSTALLATION, Automatic Transmission Assembly.>

C: INSPECTION

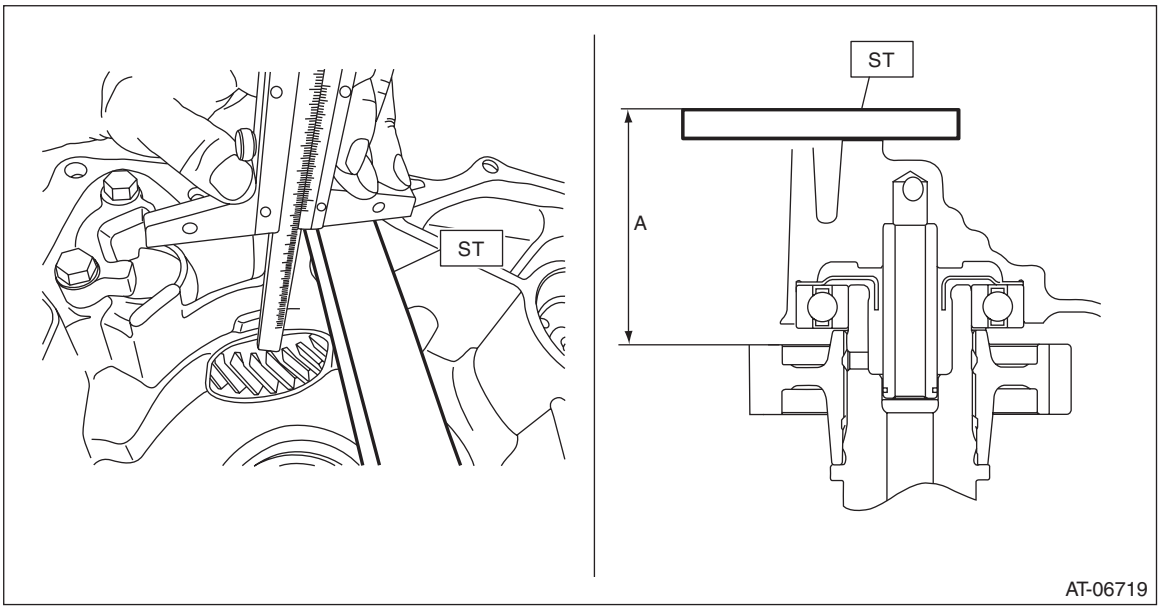
Check the reduction drive gear for breakage or damage.

D: ADJUSTMENT

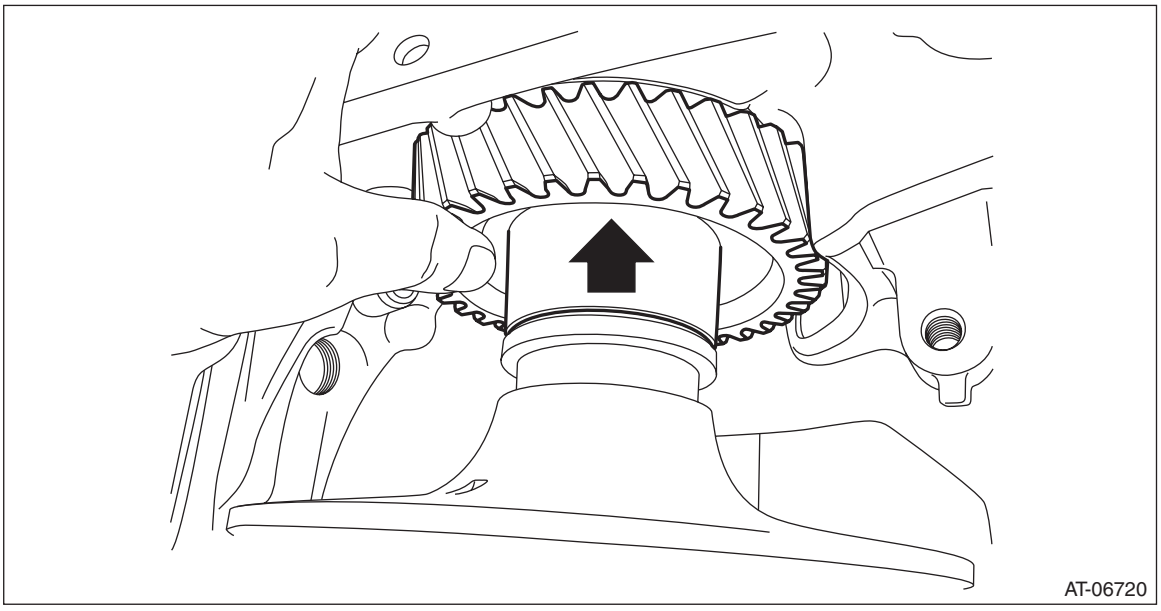
1) Remove the retaining springs and reduction drive gear shims.
2) Install the transmission case, and secure it with four or five bolts.

Tightening torque:
22 N·m (2.2 kgf-m, 16.2 ft-lb)

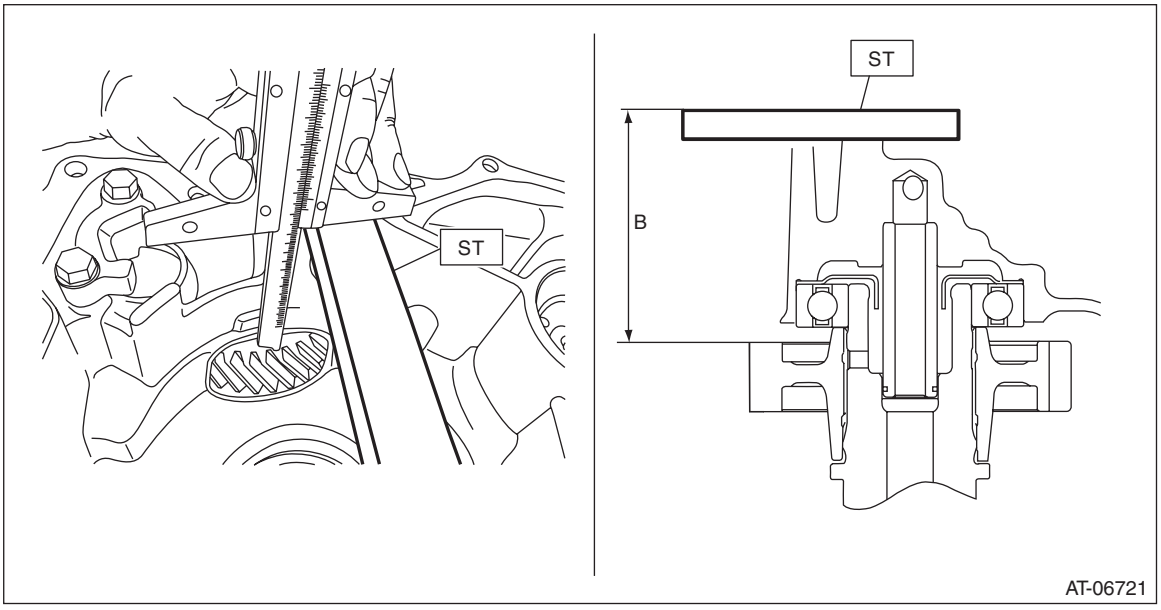
3) Measure depth “A” from the ST upper face to the reduction drive gear end face.
ST 499575400 GAUGE



4) Raise and hold the reduction drive gear.



5) Measure depth “B” from the ST upper face to the reduction drive gear end face.
ST 499575400 GAUGE



6) Calculate the following formula.
T mm = A – B – 1.0
[T in = A – B – 0.039]
T: Moving distance of reduction drive gear shim
A: Depth from the ST upper face to the reduction drive gear end surface
B: Depth from the ST upper face to the reduction drive gear end surface
1.0 mm (0.039 in): Thickness of spring retainer

Moving distance of transfer drive gear [T]	Total shim thickness mm (in)
0.420 — 0.519(0.0165 — 0.0204)	0.3 (0.012)
0.520 — 0.619(0.0205 — 0.0242)	0.4 (0.016)
0.620 — 0.719(0.0244 — 0.0283)	0.5 (0.020)
0.720 — 0.819(0.0283 — 0.0322)	0.6 (0.024)
0.820 — 0.919(0.0323 — 0.0362)	0.7 (0.028)
0.920 — 1.019(0.0362 — 0.0401)	0.8 (0.031)
1.020 — 1.119(0.0402 — 0.0441)	0.9 (0.035)
1.120 — 1.219(0.0441 — 0.0480)	1.0 (0.039)
1.220 — 1.319(0.0480 — 0.0519)	1.1 (0.043)
1.320 — 1.419(0.0520 — 0.0559)	1.2 (0.047)
1.420 — 1.519(0.0559 — 0.0598)	1.3 (0.051)
1.520 — 1.619(0.0598 — 0.0637)	1.4 (0.055)
1.620 — 1.719(0.0638 — 0.0677)	1.5 (0.059)
1.720 — 1.819(0.0677 — 0.0716)	1.6 (0.063)
1.820 — 1.920(0.0717 — 0.0756)	1.7 (0.067)

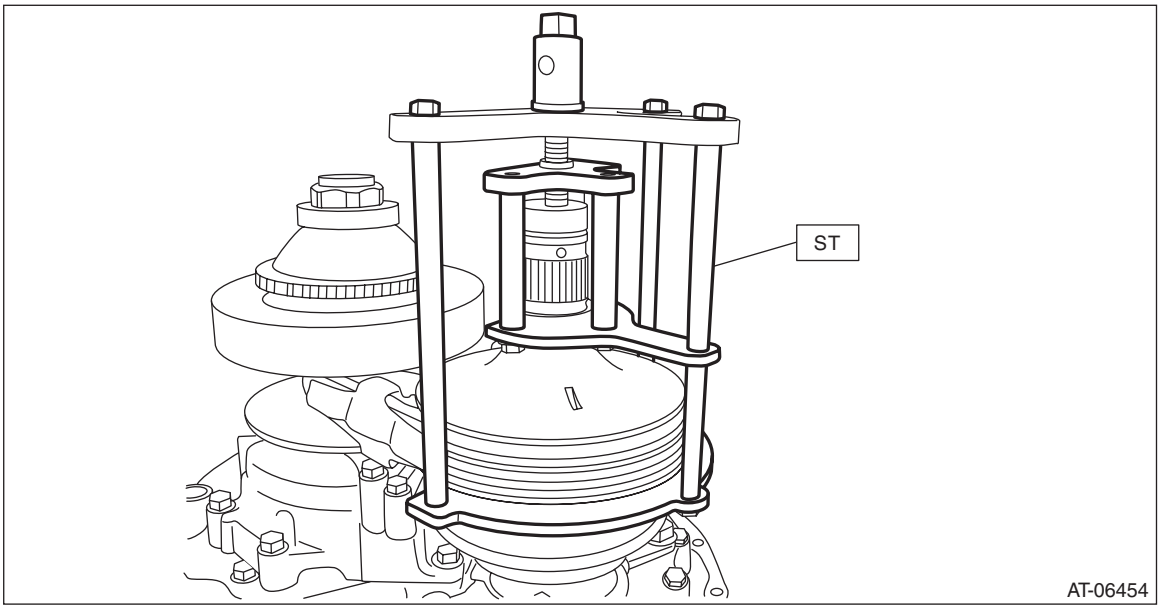
7) Select one to three reduction drive gear shims so that the total thickness meets the value obtained from step 6).

Part No.	Reduction drive gear shim thickness mm (in)
31288AA260	0.3 (0.012)
31288AA270	0.4 (0.016)
31288AA280	0.5 (0.020)
31288AA290	0.6 (0.024)

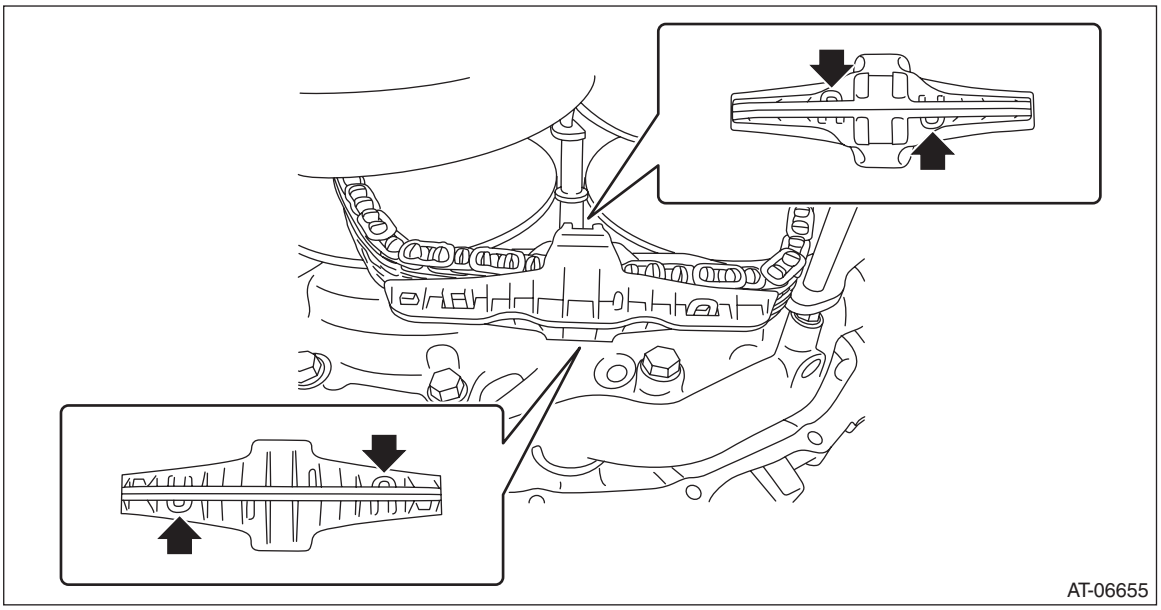
37.Primary Pulley and Secondary Pulley

A: REMOVAL

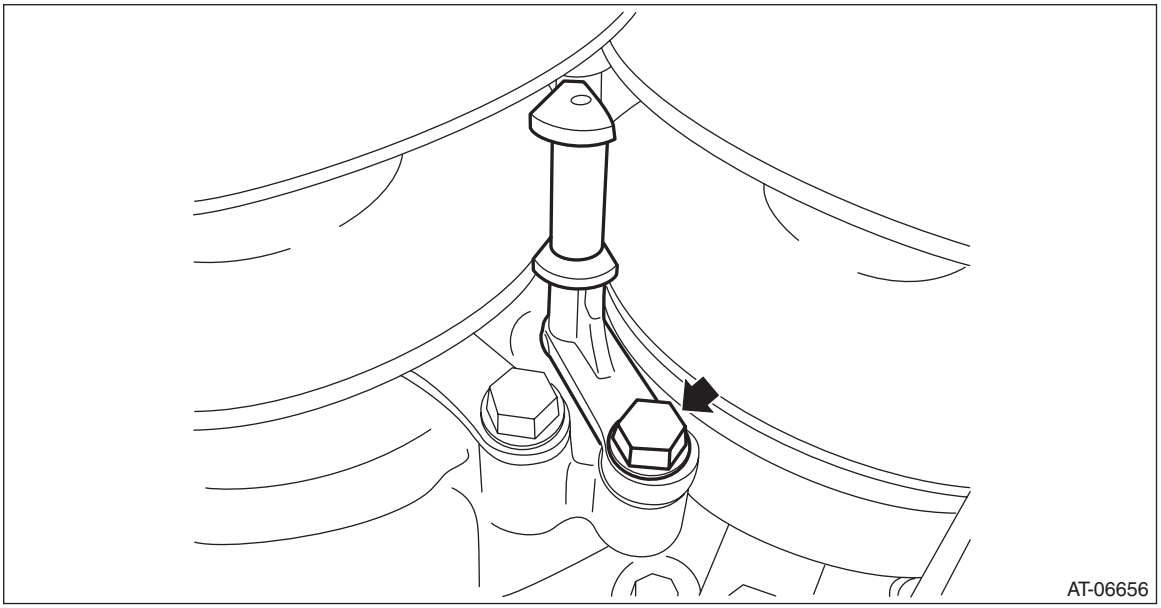
NOTE:
Always replace primary pulley and secondary pulley as an assembly because they are non-disassembled parts.
1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TR580)-60, REMOVAL, Automatic Transmission Assembly.>
2) Remove the air breather hose. <Ref. to CVT(TR580)-158, REMOVAL, Air Breather Hose.>
3) Remove the control valve body. <Ref. to CVT(TR580)-117, REMOVAL, Control Valve Body.>
4) Remove the transmission harness. <Ref. to CVT(TR580)-132, REMOVAL, Transmission Harness.>
5) Remove the turbine speed sensor. <Ref. to CVT(TR580)-103, REMOVAL, Turbine Speed Sensor.>
6) Remove the secondary speed sensor. <Ref. to CVT(TR580)-105, REMOVAL, Secondary Speed Sensor.>
7) Remove the primary speed sensor. <Ref. to CVT(TR580)-108, REMOVAL, Primary Speed Sensor.>
8) Remove the inhibitor switch. <Ref. to CVT(TR580)-99, REMOVAL, Inhibitor Switch.>
9) Remove the extension case. <Ref. to CVT(TR580)-168, REMOVAL, Extension Case.>
10) Remove the transfer clutch assembly. <Ref. to CVT(TR580)-172, REMOVAL, Transfer Clutch.>
11) Remove the transfer driven gear assembly. <Ref. to CVT(TR580)-186, REMOVAL, Transfer Driven Gear.>
12) Remove the parking pawl. <Ref. to CVT(TR580)-189, REMOVAL, Parking Pawl.>
13) Remove the reduction driven gear assembly. <Ref. to CVT(TR580)-191, REMOVAL, Reduction Driven Gear.>
14) Remove the oil pan and oil strainer. <Ref. to CVT(TR580)-113, REMOVAL, Oil Pan and Strainer.>
15) Remove the transmission control device. <Ref. to CVT(TR580)-199, REMOVAL, Transmission Control Device.>
16) Remove the transmission case. <Ref. to CVT(TR580)-205, REMOVAL, Transmission Case.>
17) Remove the reduction drive gear. <Ref. to CVT(TR580)-218, REMOVAL, Reduction Drive Gear.>
18) Set the ST to secondary pulley, expand the V groove of pulley, and then completely loosen the variator chain.
ST 18769AA010 EXPANDER PULLEY



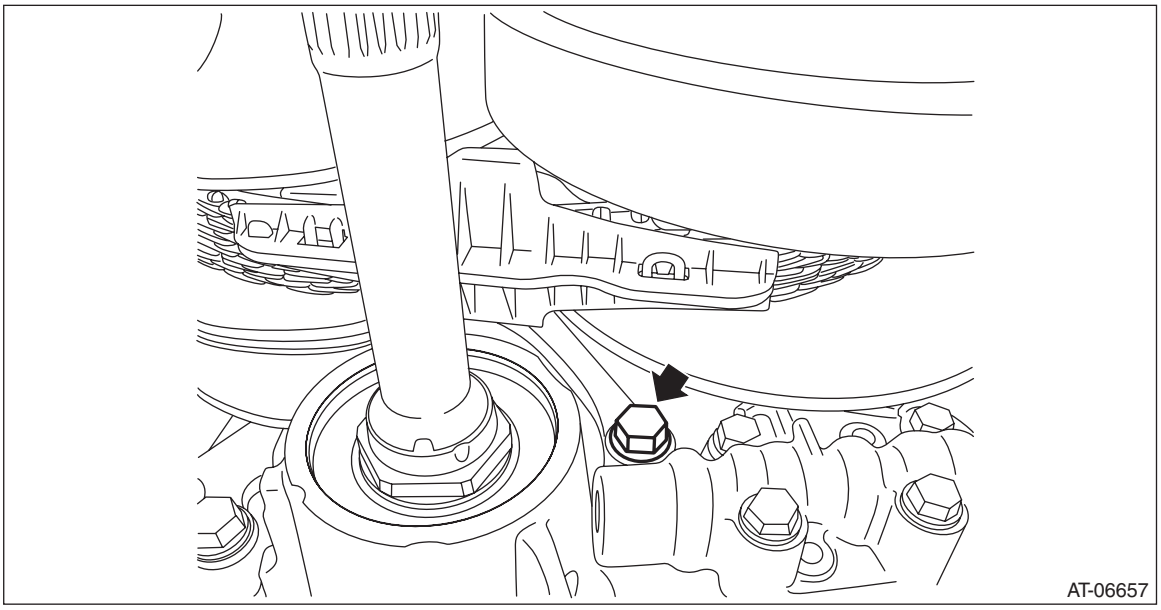
19) Remove the chain guide.
(1) Remove the chain guide from lubrication pipe.
(2) Detach the four claws to remove the chain guide.



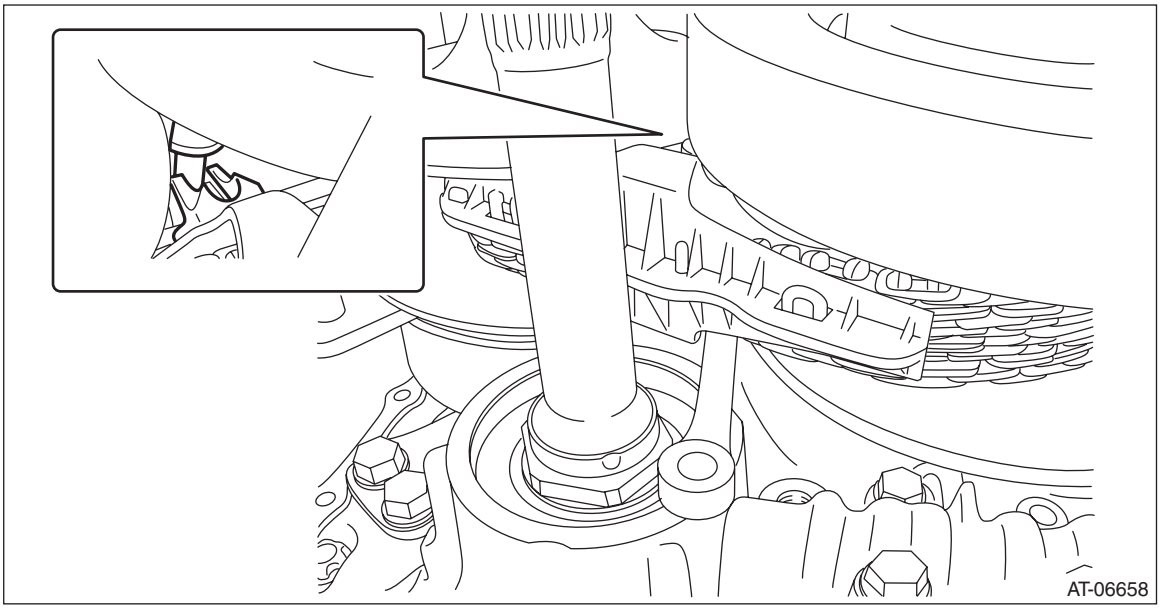
(3) Remove the lubrication pipe.



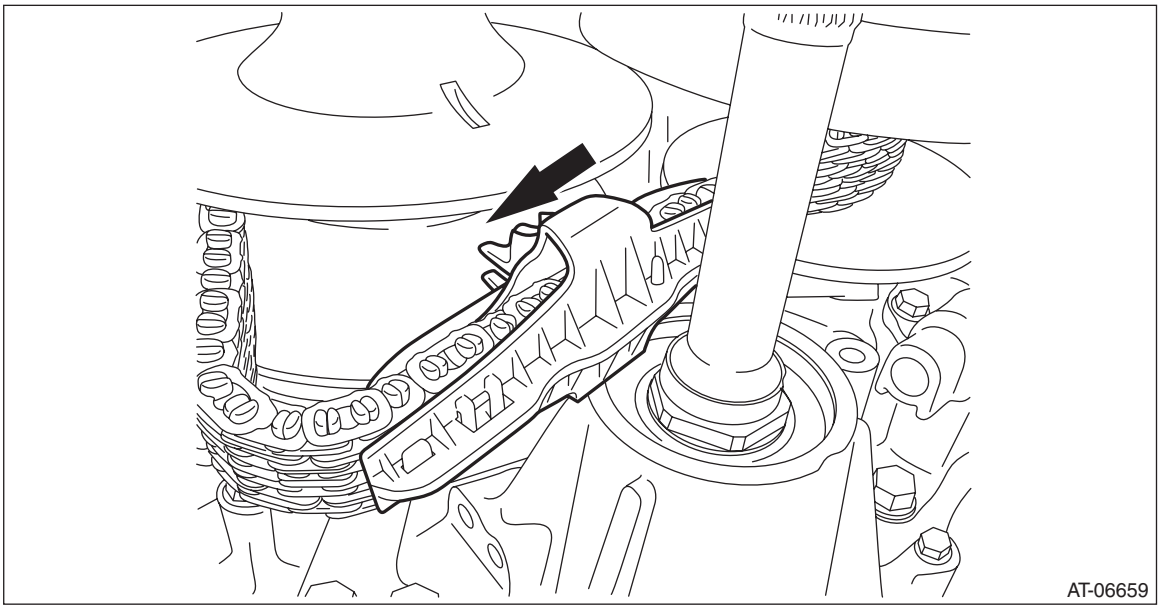
(4) Remove the support rod mounting bolts.



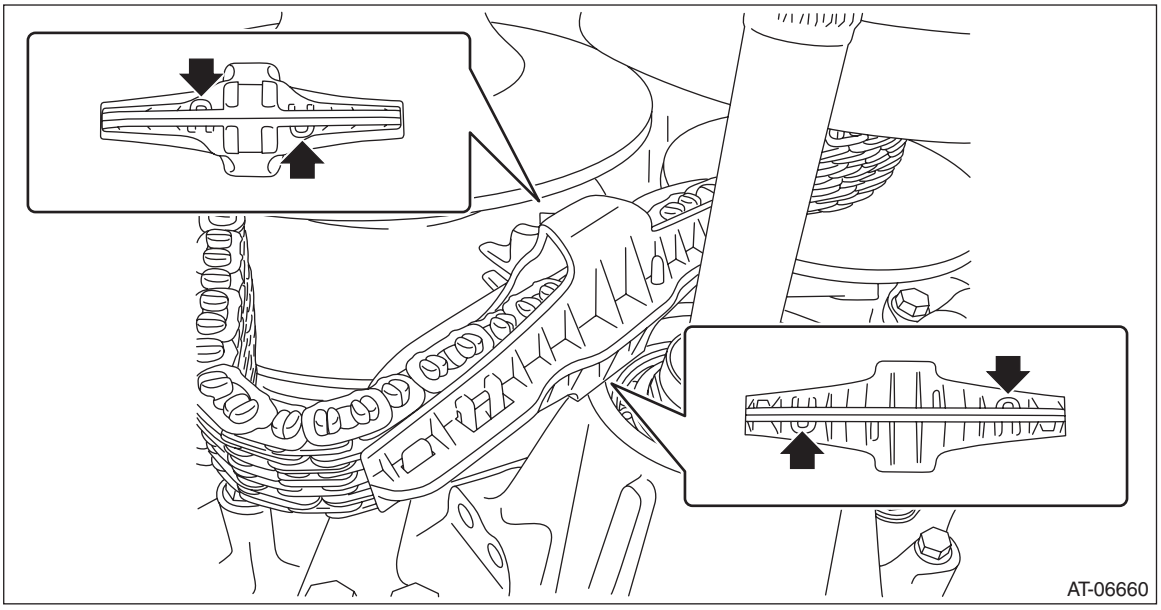
(5) Raise the support rod to remove the chain guide.



(6) Move the chain guide to the secondary pulley side.

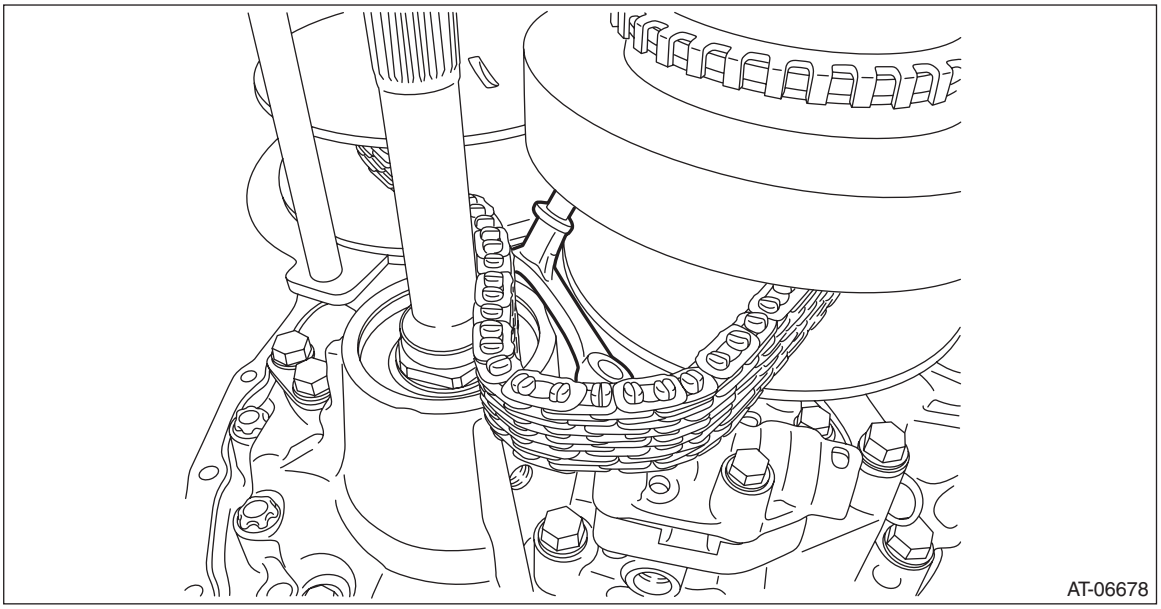


(7) Detach the four claws to remove the chain guide.

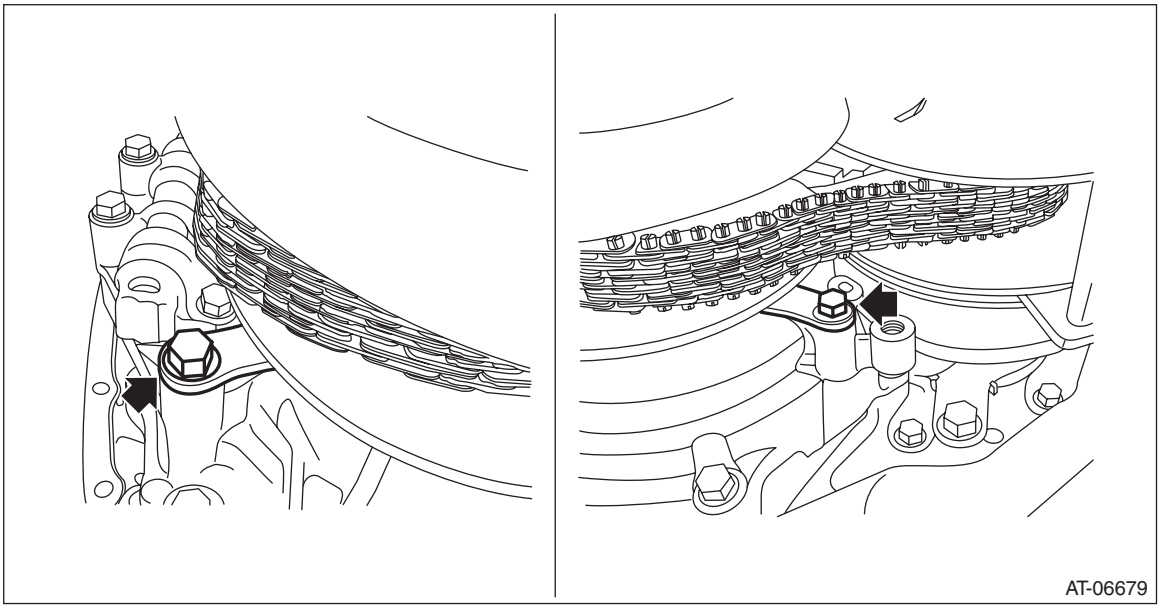


(8) Remove the support rod.

CAUTION:
Protect the both pulleys and variator chain from scratching.

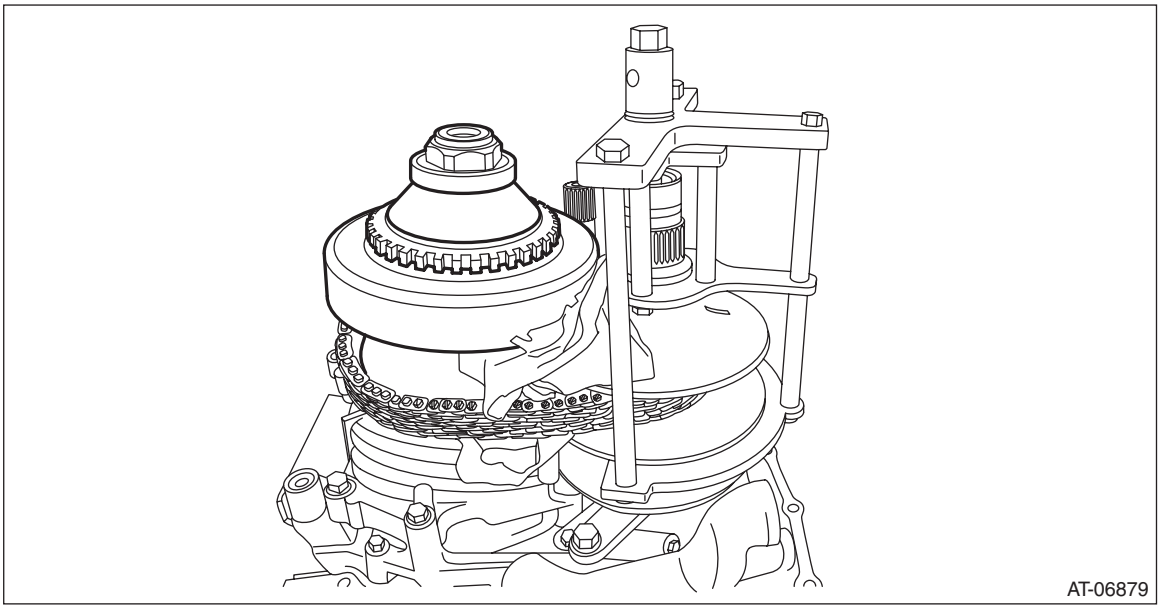


20) Remove the primary pulley mounting bolt.

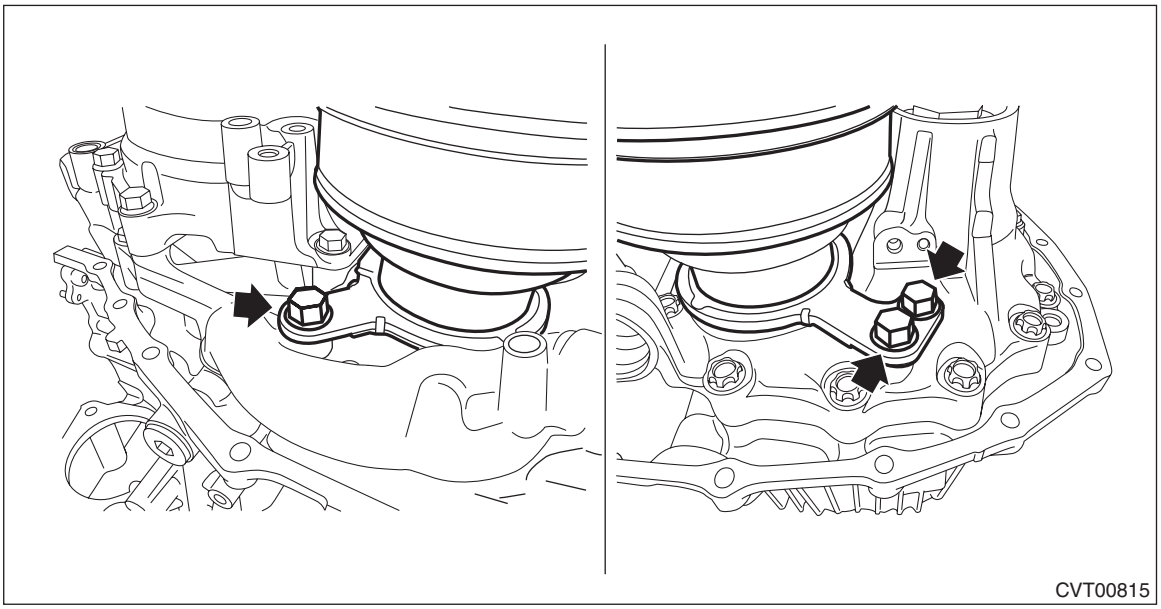


21) Remove the primary pulley from the reverse brake housing and intersect the V groove of secondary pulley and the V groove of primary pulley. Remove the variator chain from primary pulley, and remove the primary pulley.

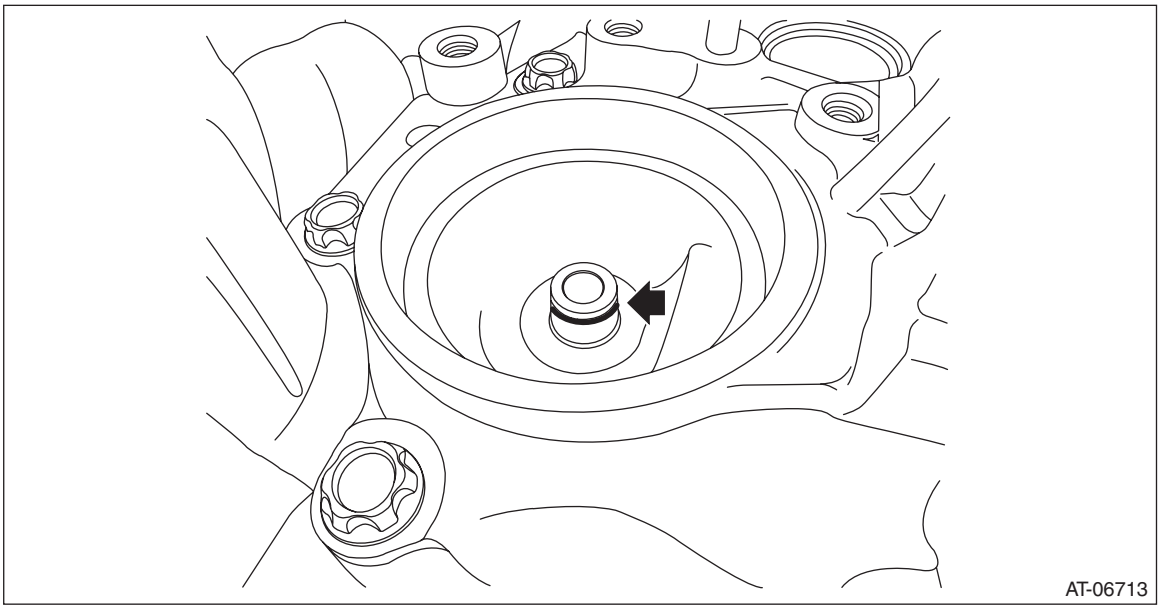
CAUTION:
Cover the V grooves of secondary pulley and primary pulley with cloth to protect the both pulleys and variator chain from scratching.



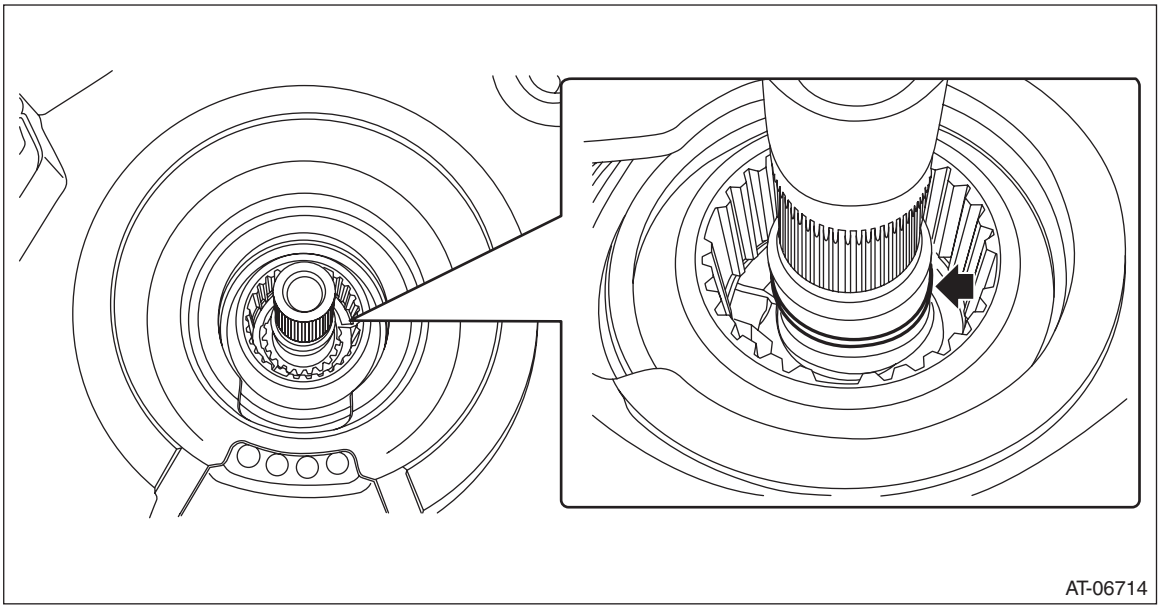
22) Remove the ST (EXPANDER PULLEY) from the secondary pulley.
23) Remove the variator chain from secondary pulley.
24) Remove the secondary pulley mounting bolts, and remove the secondary pulley.



25) Remove the seal ring from drive pinion retainer.



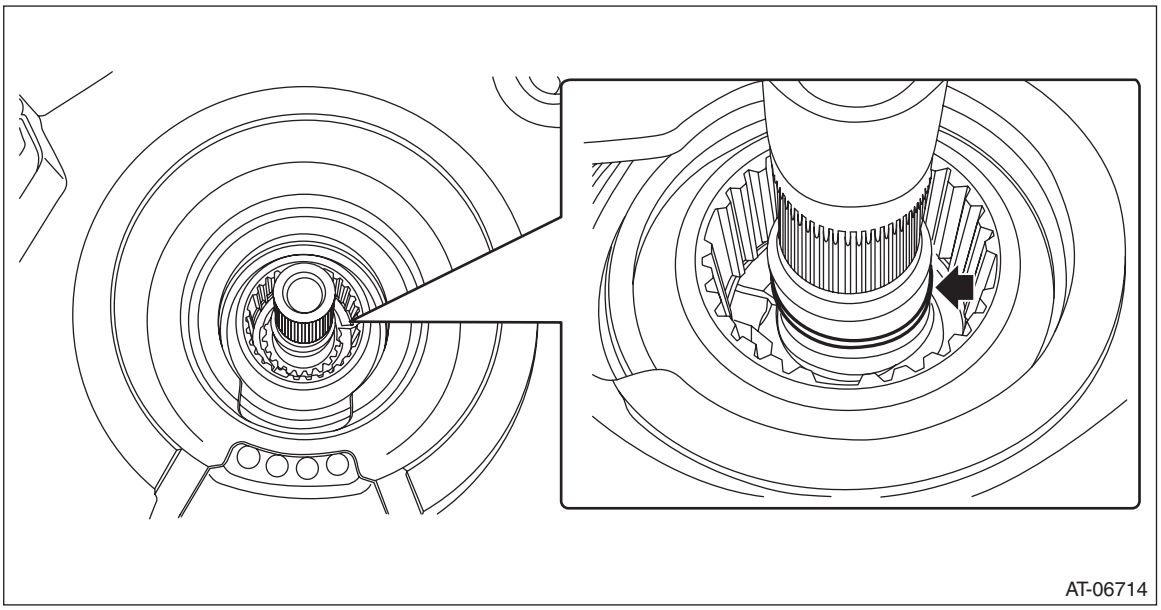
26) Remove the seal ring from the input shaft.



B: INSTALLATION

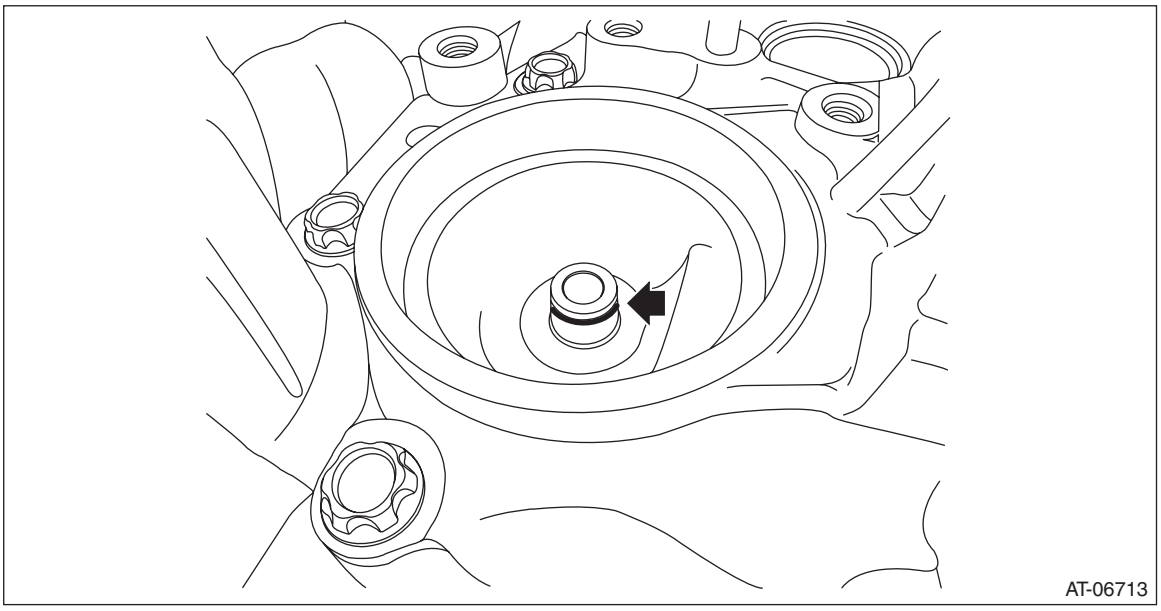
1) Select shims for pulley alignment. <Ref. to CVT(TR580)-237, ADJUSTMENT, Primary Pulley and Secondary Pulley.>
2) Install the seal ring to the input shaft.

NOTE:
- Use a new seal ring.
- When installing the seal ring, do not expand the seal ring too much.
- Apply CVTF to the seal rings.



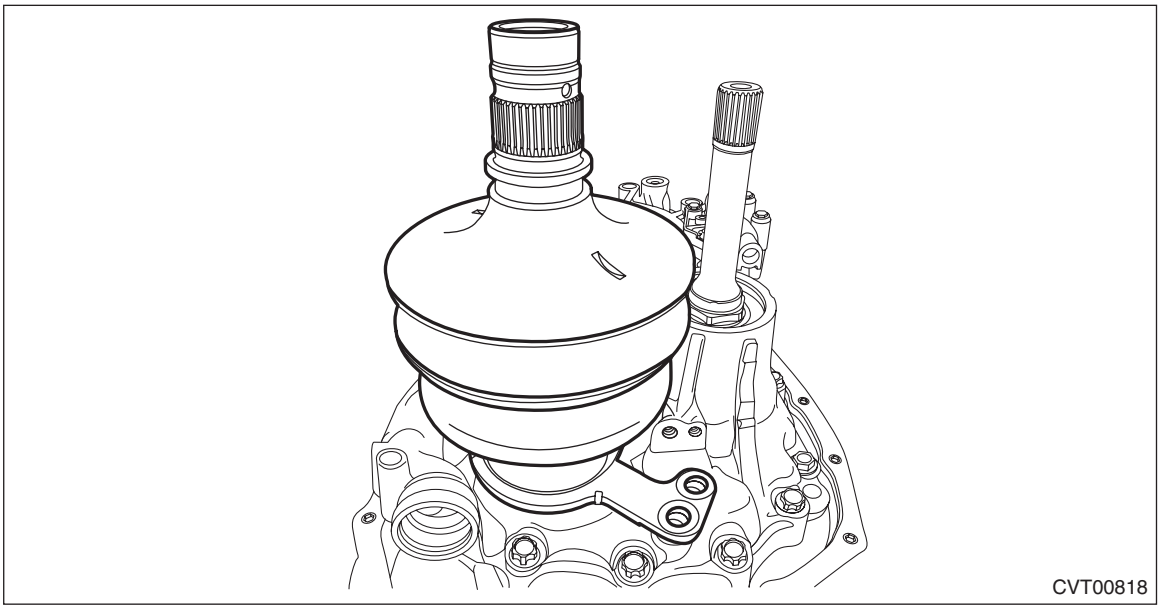
3) Install the seal ring to drive pinion retainer.

NOTE:
- Use a new seal ring.
- Apply CVTF to the seal rings.



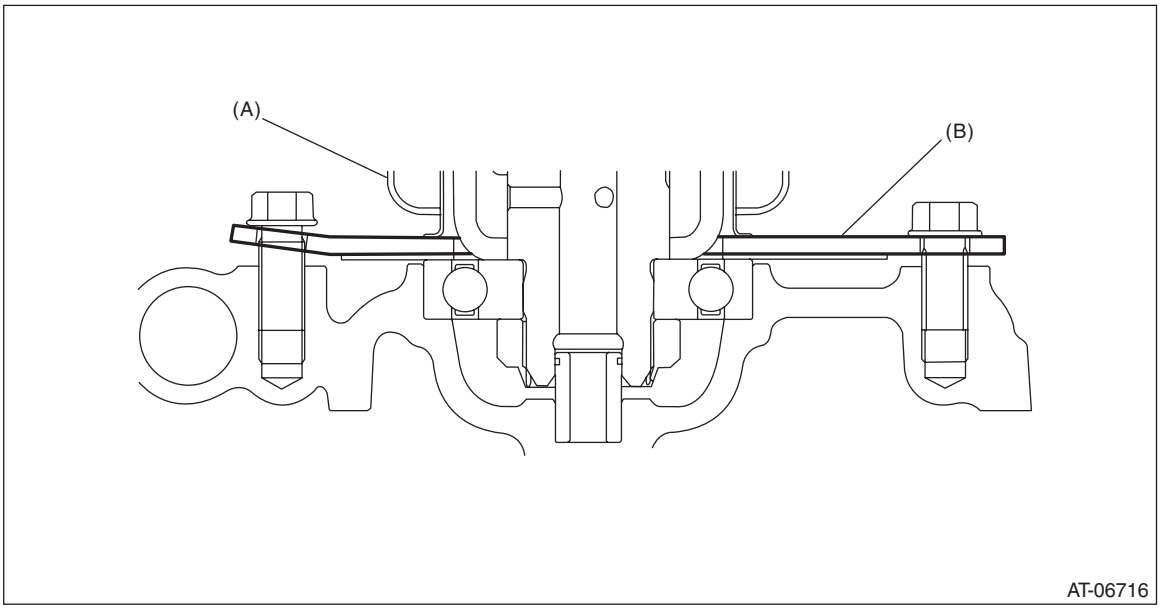
4) Install the selected shims to the primary pulley bearing catch surface.

5) Install the secondary pulley to the drive pinion retainer.



6) Install and tighten the secondary pulley securing bolts.
   (1) Tighten the three bolts until the seating surfaces contact the bearing retainer.

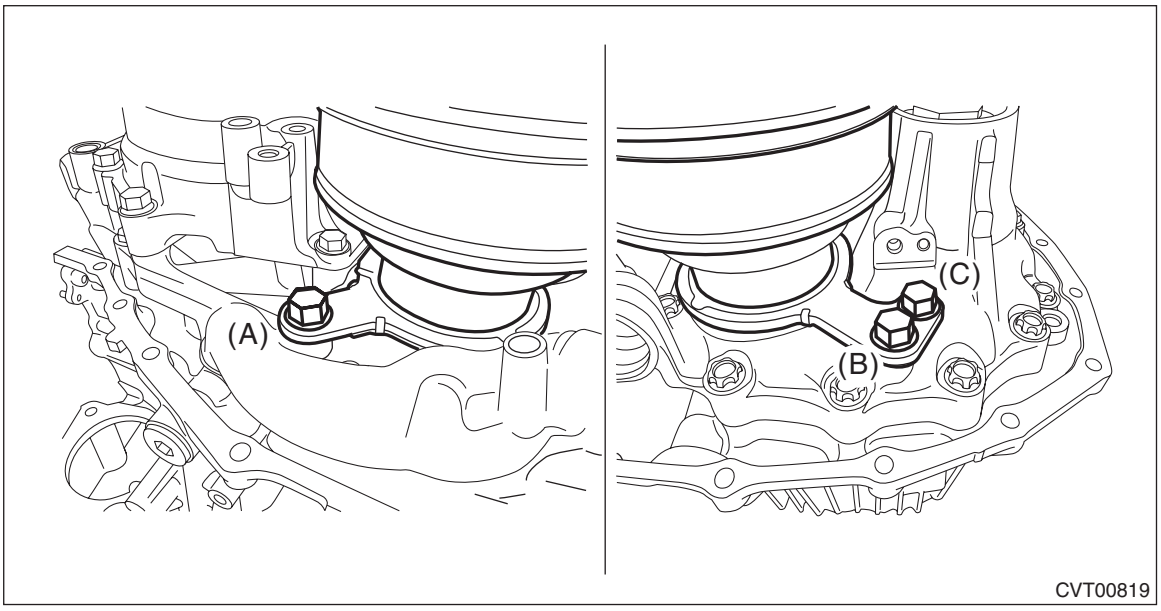
NOTE:
- Be careful not to tilt the bearing retainer of the secondary pulley.
- Apply CVTF to the bolt.



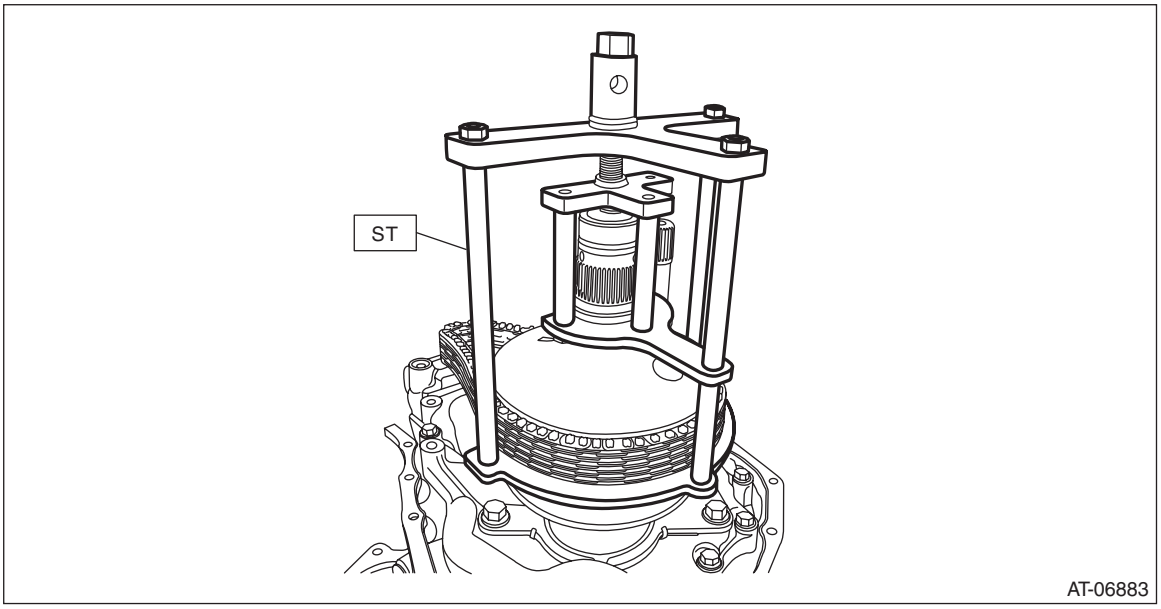
(A) Secondary pulley
(B) Bearing retainer

(2) Tighten the bolts in the order of (A) → (B) → (C) → (B).

Tightening torque:
67.5 N·m (6.9 kgf-m, 49.8 ft-lb)



7) Place the variator chain on the V groove of the secondary pulley, and set the ST.
ST 18769AA010 EXPANDER PULLEY

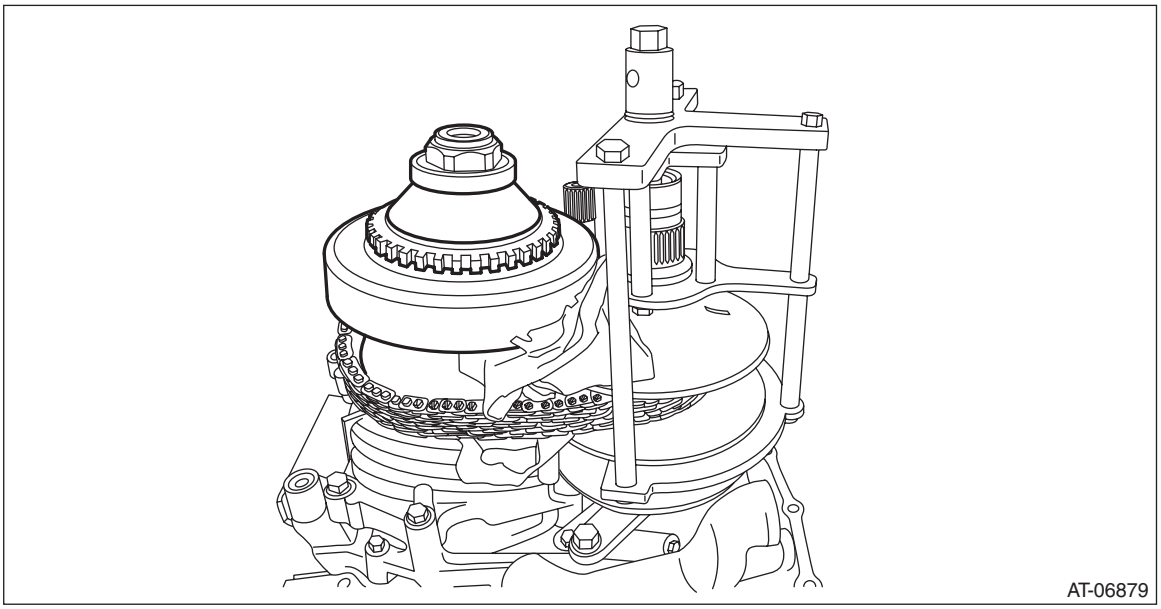


8) Expand the V groove of the secondary pulley.

9) Install the primary pulley to the reverse brake housing together with the variator chain.

CAUTION:
Cover the V grooves of primary pulley and secondary pulley with cloth to protect the both pulleys and variator chain from scratching.

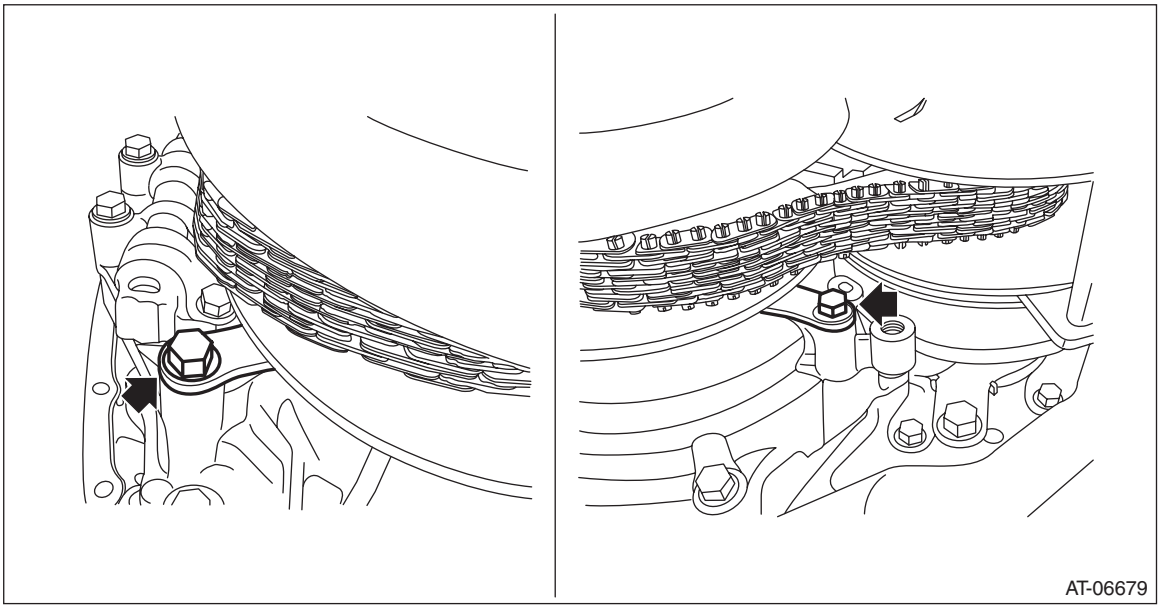
(1) Intersect the V groove of primary pulley and the V groove of secondary pulley and install the secondary pulley while placing the variator chain on secondary pulley.



(2) Install the primary pulley to the reverse brake housing so that the bolt hole of primary bearing retainer and the bolt hole of reverse brake housing are aligned.

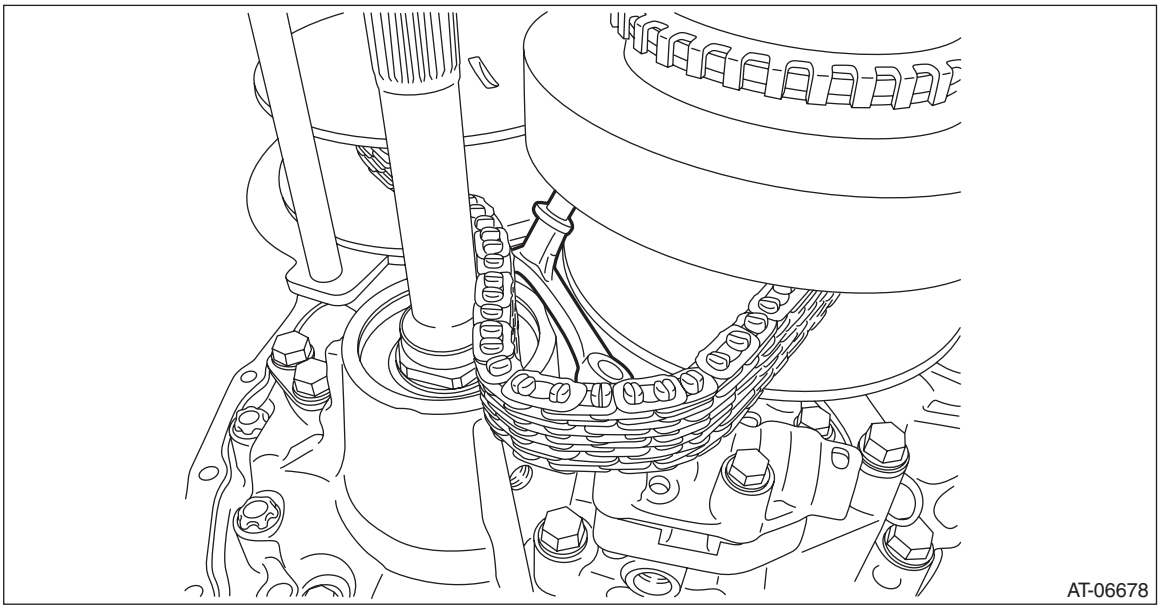
10) Install the primary pulley bolt.

Tightening torque:
21 N·m (2.1 kgf-m, 15.5 ft-lb)

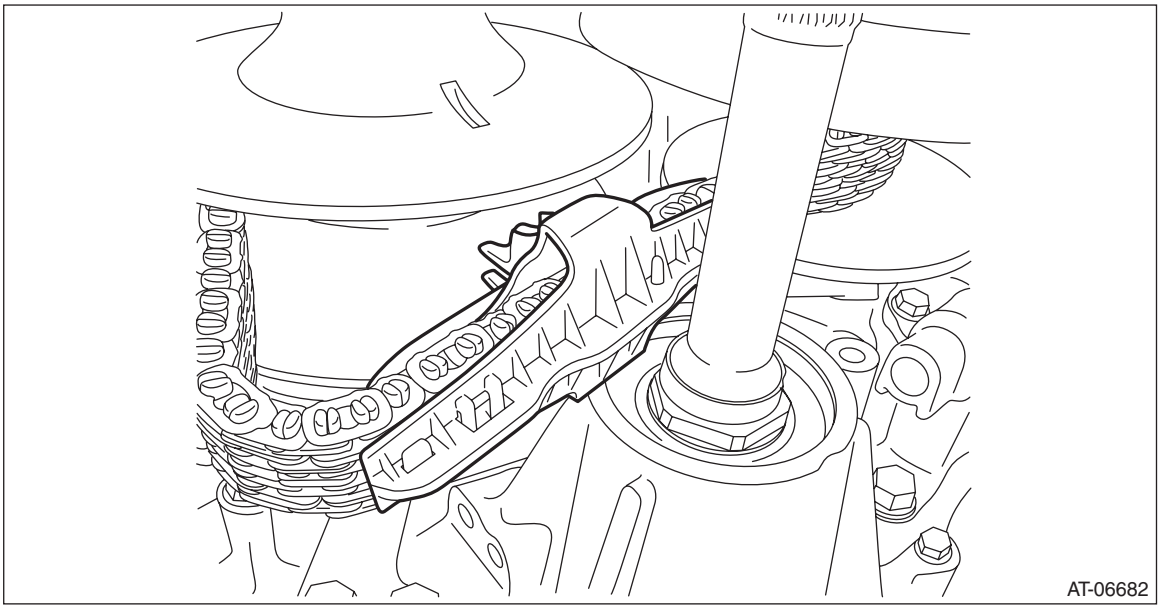


11) Install the chain guide.
(1) Place the support rod inside of the variator chain.

CAUTION:
Protect the both pulleys and variator chain from scratching.

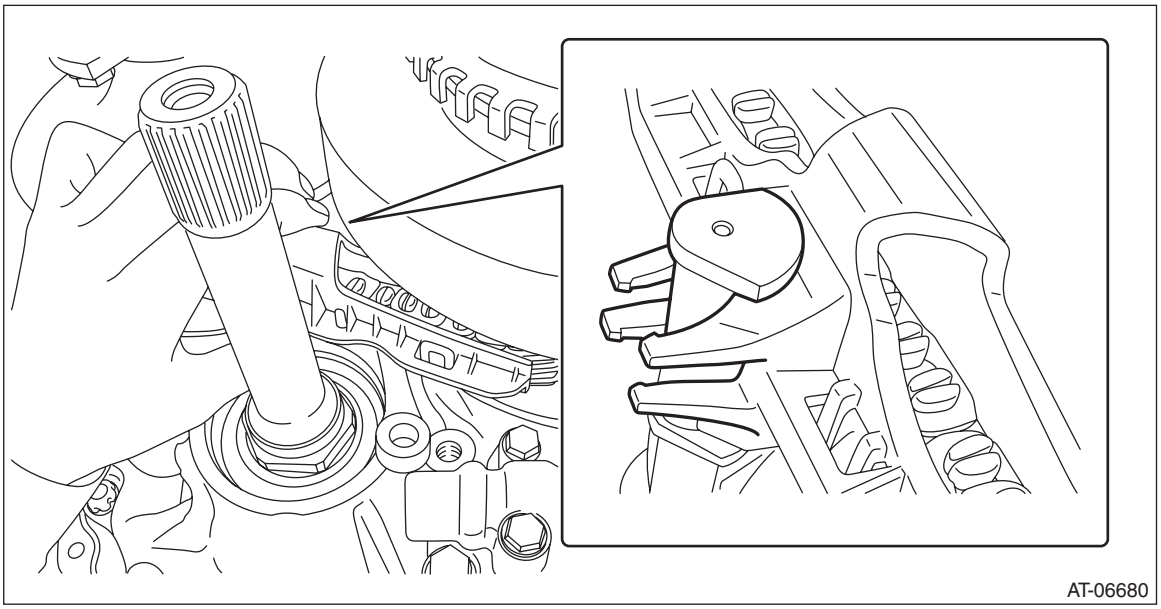

AT-06678

(2) Install the chain guide to the variator chain.


AT-06682

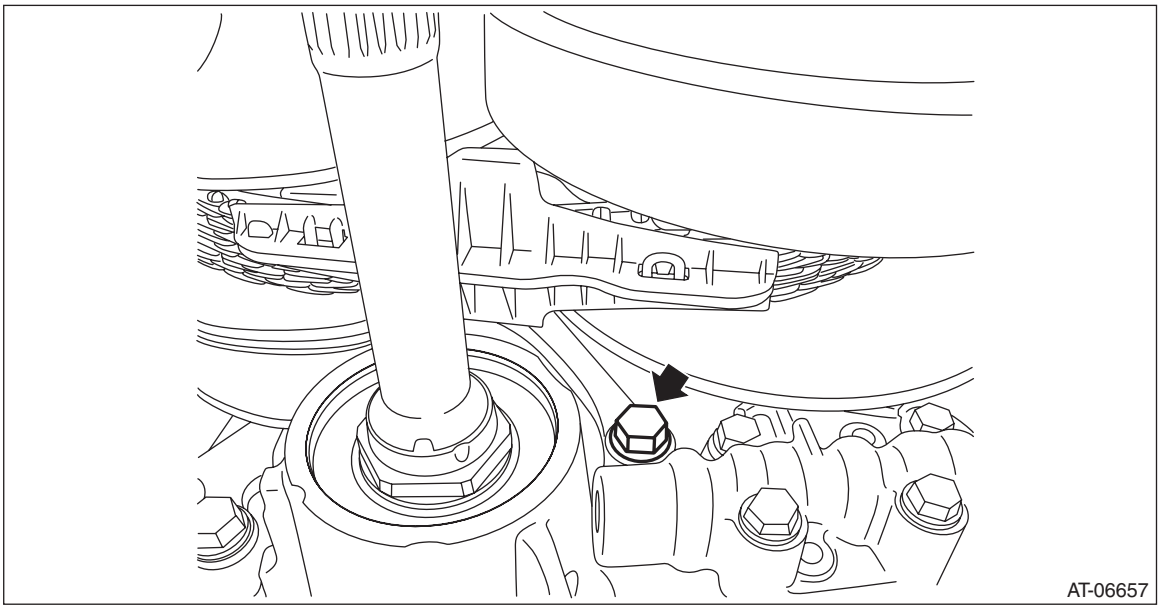
(3) Move the chain guide to the support rod side.

(4) While holding the support rod, press the chain guide so that the support rod runs through between the protrusions of chain guide and install the chain guide to the support rod.



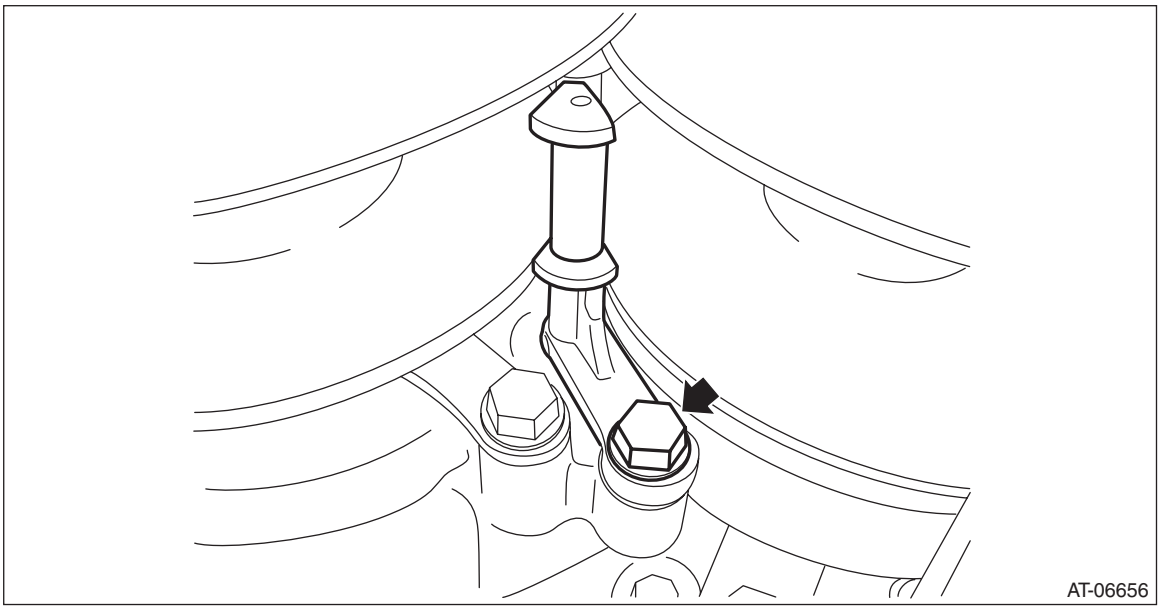
(5) Install the support rod.

Tightening torque:
21 N·m (2.1 kgf-m, 15.5 ft-lb)

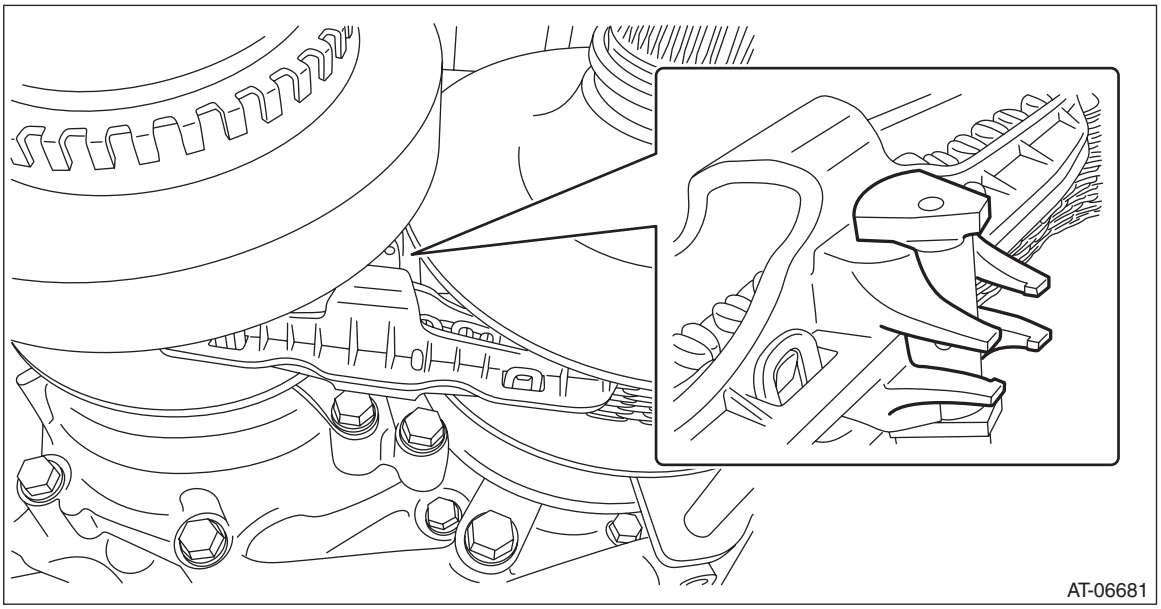


(6) Install the lubrication pipe.

Tightening torque:
21 N·m (2.1 kgf-m, 15.5 ft-lb)



(7) Install the chain guide so that the lubrication pipe runs through between the protrusions of each chain guide. Then remove the ST (PULLEY EXPANDER).



12) Install the reduction drive gear. <Ref. to CVT(TR580)-219, INSTALLATION, Reduction Drive Gear.>
13) Select the reduction drive gear shim. <Ref. to CVT(TR580)-221, ADJUSTMENT, Reduction Drive Gear.>
14) Install the transmission case. <Ref. to CVT(TR580)-208, INSTALLATION, Transmission Case.>
15) Install the transmission control device. <Ref. to CVT(TR580)-202, INSTALLATION, Transmission Control Device.>
16) Install the oil strainer and oil pan. <Ref. to CVT(TR580)-115, INSTALLATION, Oil Pan and Strainer.>

17) Install the reduction driven gear assembly. <Ref. to CVT(TR580)-192, INSTALLATION, Reduction Driven Gear.>
18) Install the transfer driven gear assembly. <Ref. to CVT(TR580)-187, INSTALLATION, Transfer Driven Gear.>
19) Install the transfer clutch assembly. <Ref. to CVT(TR580)-174, INSTALLATION, Transfer Clutch.>
20) Install the parking pawl. <Ref. to CVT(TR580)-190, INSTALLATION, Parking Pawl.>
21) Install the extension case. <Ref. to CVT(TR580)-169, INSTALLATION, Extension Case.>
22) Install the inhibitor switch. <Ref. to CVT(TR580)-101, INSTALLATION, Inhibitor Switch.>
23) Install the secondary speed sensor. <Ref. to CVT(TR580)-105, INSTALLATION, Secondary Speed Sensor.>
24) Install the primary speed sensor. <Ref. to CVT(TR580)-109, INSTALLATION, Primary Speed Sensor.>
25) Install the turbine speed sensor. <Ref. to CVT(TR580)-103, INSTALLATION, Turbine Speed Sensor.>
26) Install the transmission harness. <Ref. to CVT(TR580)-139, INSTALLATION, Transmission Harness.>
27) Install the control valve body. <Ref. to CVT(TR580)-124, INSTALLATION, Control Valve Body.>
28) Install the air breather hose. <Ref. to CVT(TR580)-160, INSTALLATION, Air Breather Hose.>
29) Install the transmission assembly to the vehicle. <Ref. to CVT(TR580)-72, INSTALLATION, Automatic Transmission Assembly.>

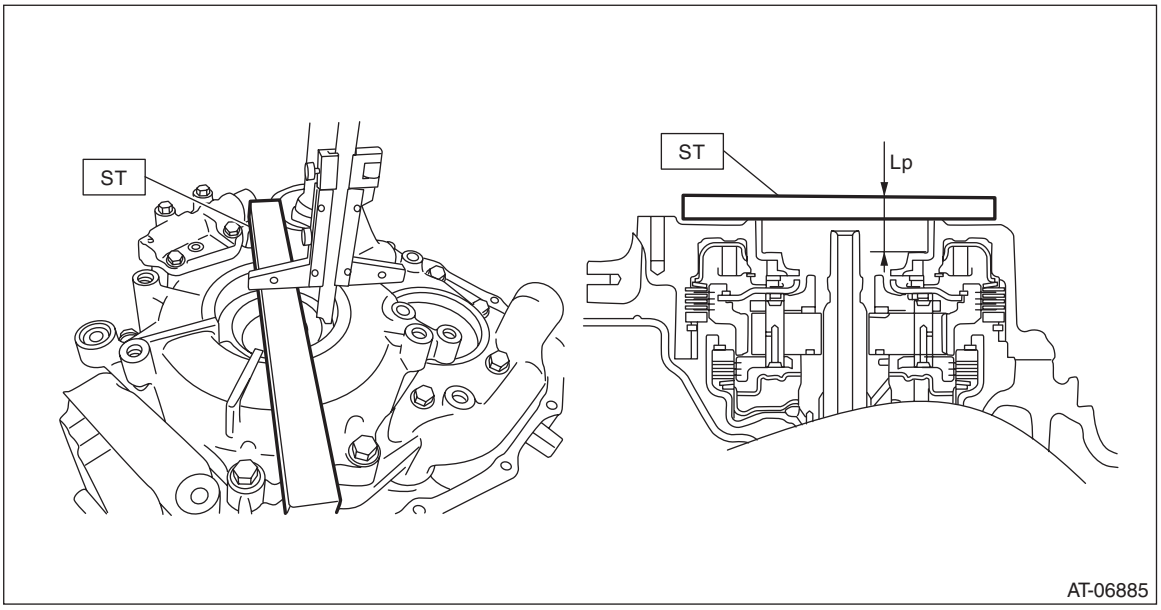
C: INSPECTION

- Check the surface of primary and secondary pulley cones for damage or wear.
- Check the primary and secondary pulley for damage.
- Check the bearing for seizure or wear.
- Apply CVTF to bearing and rotate the bearing to check for noise or dragging etc.

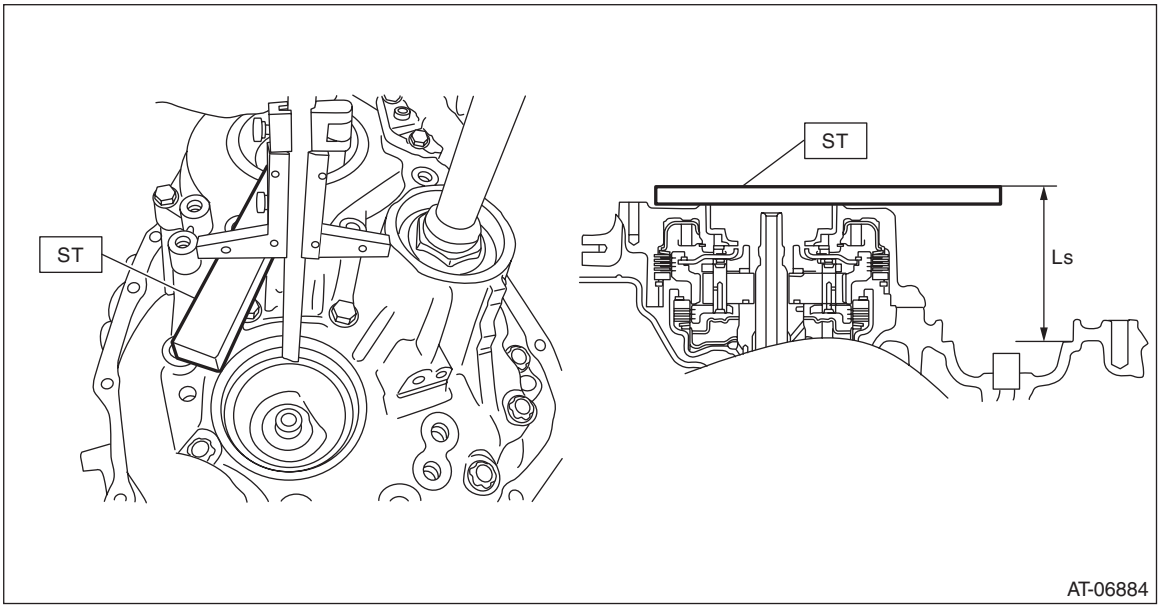
D: ADJUSTMENT

1. PROCEDURE IN REPLACEMENT OF PRIMARY AND SECONDARY PULLEY, OR IN REPLACEMENT OF PRIMARY PULLEY, SECONDARY PULLEY AND VARIATOR CHAIN

1) Measure depth “Lp” from the ST upper face to the primary pulley bearing catch surface at several points and calculate the average.
ST 499575400 GAUGE



2) Measure the depth “Ls” from the ST upper face to the secondary pulley bearing catch surface at several points and calculate the average.
ST 499575400 GAUGE



3) Calculate the following formula.
Calculation formula:
T (mm) = B – A + Lp – Ls – 28.602
[T (in) = B – A + Lp – Ls – 1.126]
T: Pulley alignment
A: Specified primary pulley dimension
B: Specified secondary pulley dimension
Lp: Depth from the ST upper face to the primary pulley bearing catch surface
Ls: Depth from the ST upper face to the secondary pulley bearing catch surface
28.602 mm (1.126 in): Constant

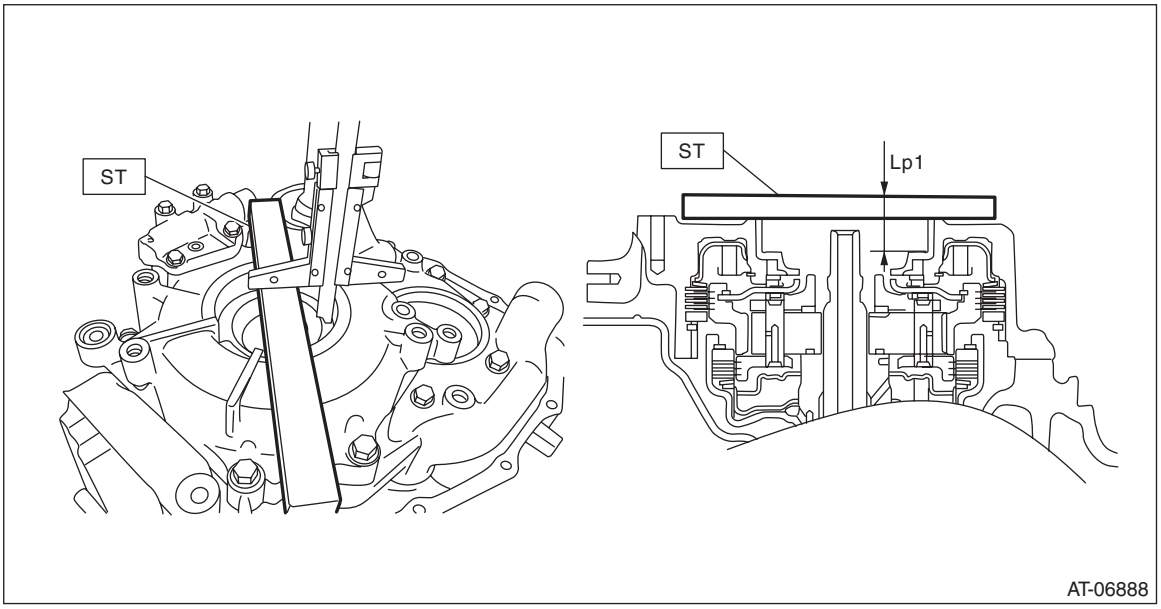
Pulley alignment T mm (in)	Thickness of shim mm (in)
-0.05 — 0.049 (-0.002 — 0.002)	No shims
0.050 — 0.149 (0.002 — 0.006)	0.1 (0.004)
0.150 — 0.249 (0.006 — 0.010)	0.2 (0.008)
0.250 — 0.349 (0.010 — 0.014)	0.3 (0.012)
0.350 — 0.449 (0.014 — 0.018)	0.4 (0.016)
0.450 — 0.549 (0.018 — 0.022)	0.5 (0.020)
0.550 — 0.649 (0.022 — 0.026)	0.6 (0.024)
0.650 — 0.749 (0.026 — 0.029)	0.7 (0.028)
0.750 — 0.849 (0.029 — 0.033)	0.8 (0.031)
0.850 — 0.949 (0.033 — 0.037)	0.9 (0.035)
0.950 — 1.049 (0.037 — 0.041)	1.0 (0.039)
1.050 — 1.149 (0.041 — 0.045)	1.1 (0.043)

4) Select one to two shims so that the total thickness meets the value obtained from step 3).

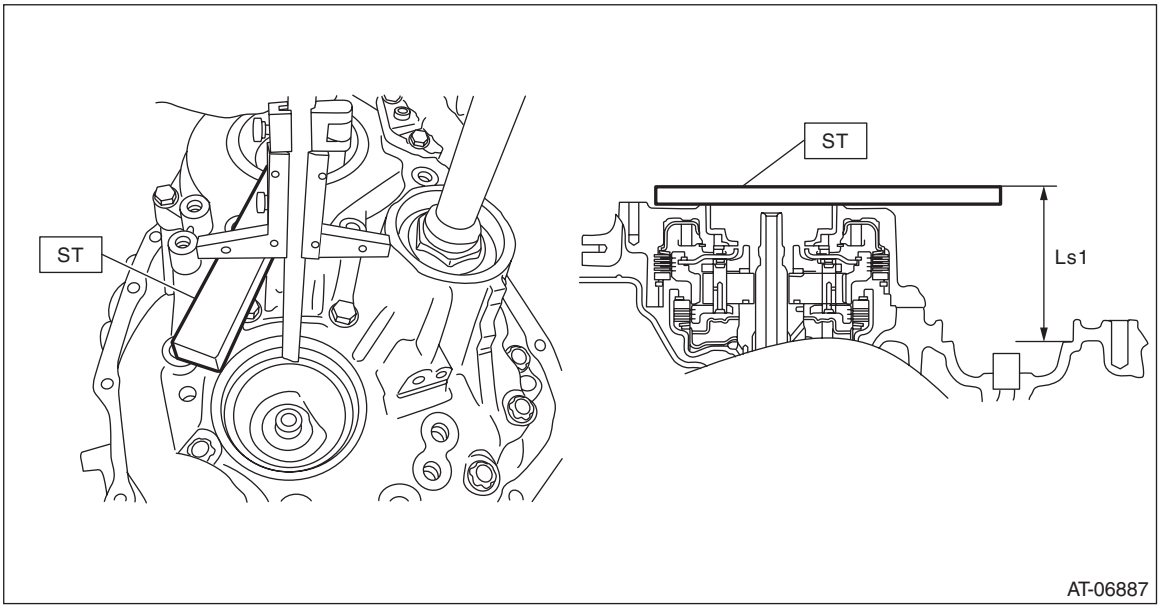
Part No.	Shim thickness mm (in)
32451AA050	0.1 (0.004)
32451AA060	0.2 (0.008)
32451AA070	0.3 (0.012)
32451AA080	0.4 (0.016)
32451AA090	0.5 (0.020)
32451AA100	0.6 (0.024)

2. PROCEDURE WHEN REPLACING ONLY DRIVE PINION RETAINER OR REVERSE BRAKE HOUSING

1) Clean the mating surface of current drive pinion retainer and converter case.
2) Measure and record the shim thickness that is attached on the current reverse brake housing.
3) Using the current drive pinion retainer, measure depth “Lp1” from the ST upper face to the primary pulley bearing catch surface at several points and calculate the average.
ST 499575400 GAUGE

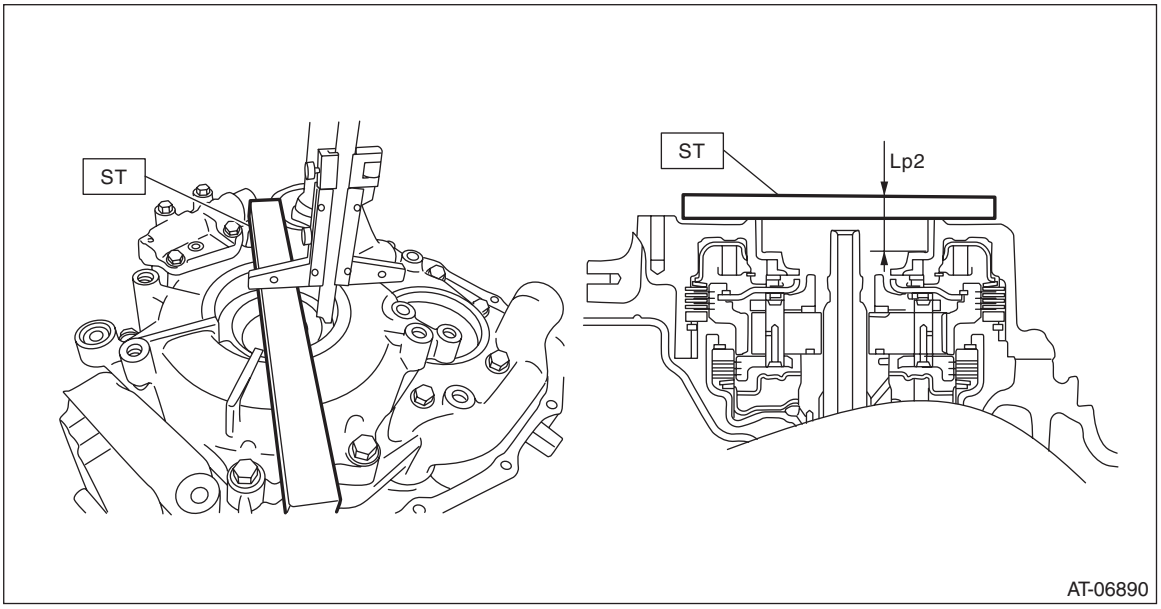


4) Using the current drive pinion retainer or current reverse brake housing, measure the depth “Ls1” from the ST upper face to the secondary pulley bearing catch surface at several points and calculate the average.
ST 499575400 GAUGE

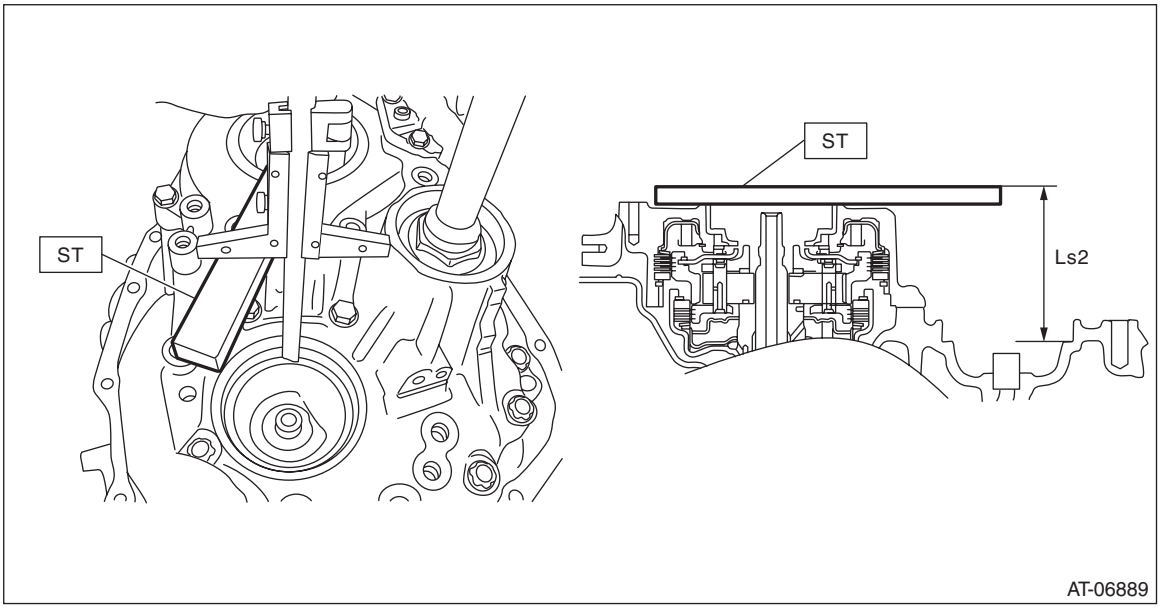


5) Calculate the “LD1” using the following formula and record it.
Calculation formula:
LD1 mm (in) = Ls1 – Lp1
LD1: Height from the primary pulley bearing catch surface to the secondary pulley bearing catch surface
Lp1: Depth from the ST upper face to the primary pulley bearing catch surface
Ls1: Depth from the ST upper face to the secondary pulley bearing catch surface

6) Using the new drive pinion retainer or new reverse brake housing, measure the depth “Lp2” from the ST upper face to the primary pulley bearing catch surface at several points and calculate the average.
ST 499575400 GAUGE



7) Using the new drive pinion retainer or new reverse brake housing, measure the depth “Ls2” from the ST upper face to the secondary pulley bearing catch surface at several points and calculate the average.
ST 499575400 GAUGE



8) Calculate the “LD2” using the following formula and record it.
Calculation formula:
LD2 mm (in) = Ls2 – Lp2
LD2: Height from the primary pulley bearing catch surface to the secondary pulley bearing catch surface
Lp2: Depth from the ST upper face to the primary pulley bearing catch surface
Ls2: Depth from the ST upper face to the secondary pulley bearing catch surface

9) Calculate the recorded values of “LD1” and “LD2” to obtain the positive number to select the shims.
Calculation formula: T1 mm (in) = LD1 – LD2 or T2 mm (in) = LD2 – LD1
T1, T2: Difference between new drive pinion retainer or new reverse brake housing and current drive pinion retainer or current reverse brake housing
LD1: Calculated value of current drive pinion retainer or current reverse brake housing
LD2: Calculated value of new drive pinion retainer or new reverse brake housing

Difference of the case (T1) mm (in)	Shim selection procedure
0 — 0.050 (0 — 0.00197)	Select a new shim of the same thickness with the shim that is used on the primary pulley side of the current reverse brake housing.
0.051 — 0.150 (0.00201 — 0.00591)	Select a shim which is 0.1 mm (0.004 in) thicker than the shim that is used on the primary pulley side of the current reverse brake housing.
0.151 — 0.250 (0.00594 — 0.00984)	Select a shim which is 0.2 mm (0.008 in) thicker than the shim that is used on the primary pulley side of the current reverse brake housing.
0.251 — 0.350 (0.00988 — 0.01378)	Select a shim which is 0.3 mm (0.012 in) thicker than the shim that is used on the primary pulley side of the current reverse brake housing.
0.351 — 0.450 (0.01382 — 0.01772)	Select a shim which is 0.4 mm (0.016 in) thicker than the shim that is used on the primary pulley side of the current reverse brake housing.
0.451 — 0.550 (0.01776 — 0.02165)	Select a shim which is 0.5 mm (0.020 in) thicker than the shim that is used on the primary pulley side of the current reverse brake housing.
0.551 — 0.600 (0.02169 — 0.02362)	Select a shim which is 0.6 mm (0.024 in) thicker than the shim that is used on the primary pulley side of the current reverse brake housing.

Difference of the case (T2) mm (in)	Shim selection procedure
0 — 0.050 (0 — 0.00197)	Select a new shim of the same thickness with the shim that is used on the primary pulley side of the current reverse brake housing.
0.051 — 0.150 (0.00201 — 0.00591)	Select a shim which is 0.1 mm (0.004 in) thinner than the shim that is used on the primary pulley side of the current reverse brake housing.
0.151 — 0.250 (0.00594 — 0.00984)	Select a shim which is 0.2 mm (0.008 in) thinner than the shim that is used on the primary pulley side of the current reverse brake housing.
0.251 — 0.350 (0.00988 — 0.01378)	Select a shim which is 0.3 mm (0.012 in) thinner than the shim that is used on the primary pulley side of the current reverse brake housing.
0.351 — 0.450 (0.01382 — 0.01772)	Select a shim which is 0.4 mm (0.016 in) thinner than the shim that is used on the primary pulley side of the current reverse brake housing.
0.451 — 0.550 (0.01776 — 0.02165)	Select a shim which is 0.5 mm (0.020 in) thinner than the shim that is used on the primary pulley side of the current reverse brake housing.
0.551 — 0.600 (0.02169 — 0.02362)	Select a shim which is 0.6 mm (0.024 in) thinner than the shim that is used on the primary pulley side of the current reverse brake housing.

Part No.	Shim thickness mm (in)
32451AA050	0.1 (0.004)
32451AA060	0.2 (0.008)
32451AA070	0.3 (0.012)
32451AA080	0.4 (0.016)
32451AA090	0.5 (0.020)
32451AA100	0.6 (0.024)

38.Variator Chain

A: REMOVAL

For removal of variator chain, refer to “Primary Pulley and Secondary Pulley”. <Ref. to CVT(TR580)-223, REMOVAL, Primary Pulley and Secondary Pulley.>

B: INSTALLATION

For installation of variator chain, refer to “Primary Pulley and Secondary Pulley”. <Ref. to CVT(TR580)-230, INSTALLATION, Primary Pulley and Secondary Pulley.>

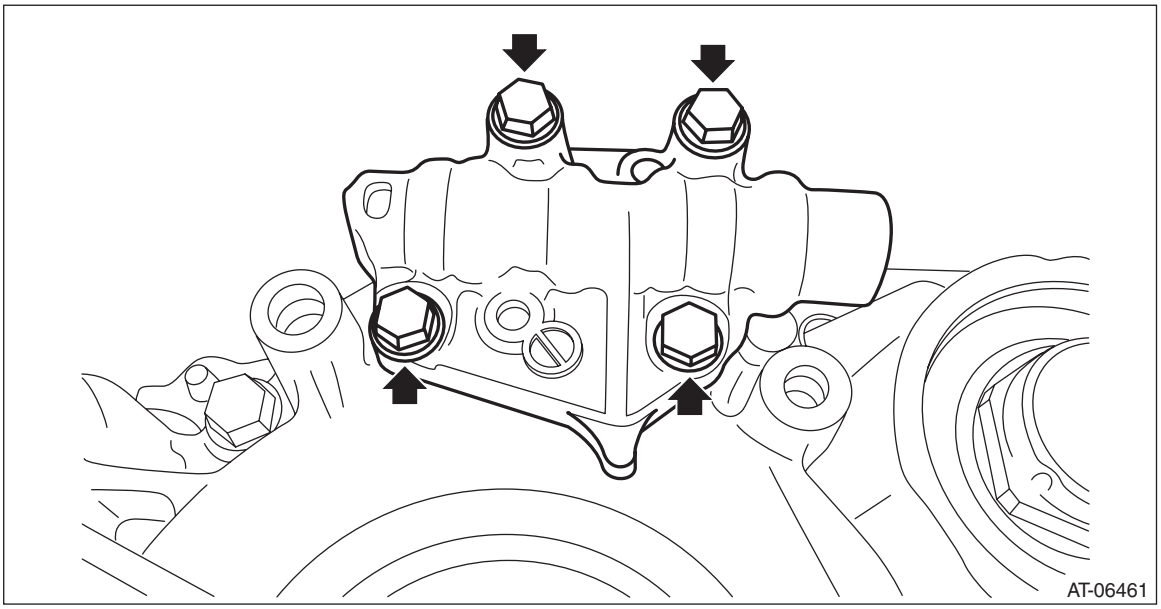
C: INSPECTION

Check the variator chain for damage and wear.

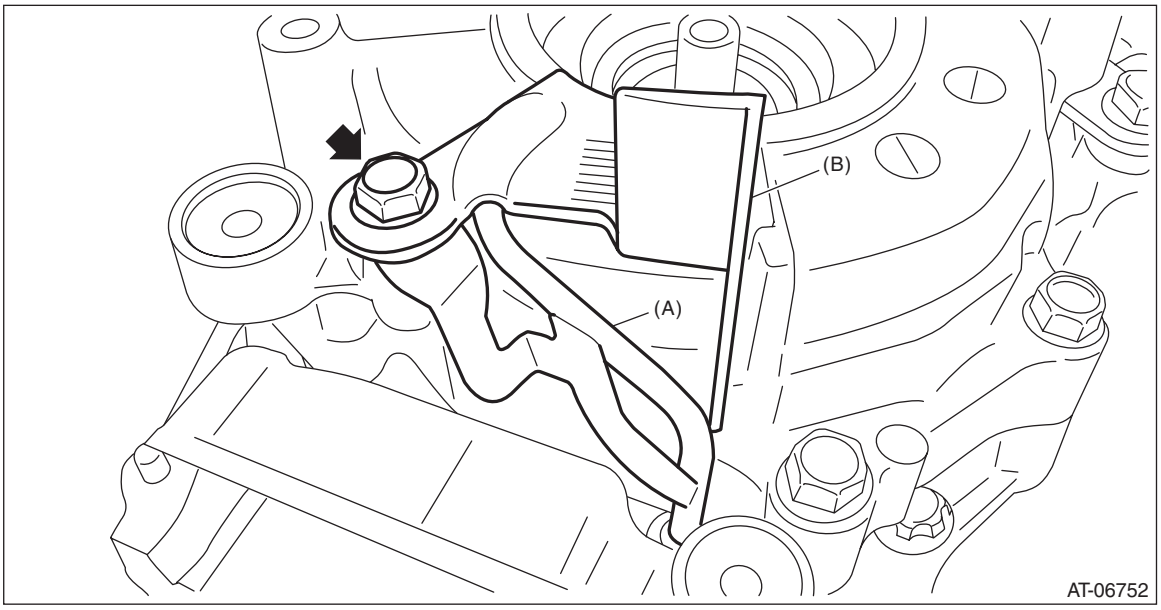
39.Reverse Brake Assembly

A: REMOVAL

1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TR580)-60, REMOVAL, Automatic Transmission Assembly.>
2) Remove the air breather hose. <Ref. to CVT(TR580)-158, REMOVAL, Air Breather Hose.>
3) Remove the control valve body. <Ref. to CVT(TR580)-117, REMOVAL, Control Valve Body.>
4) Remove the transmission harness. <Ref. to CVT(TR580)-132, REMOVAL, Transmission Harness.>
5) Remove the turbine speed sensor. <Ref. to CVT(TR580)-103, REMOVAL, Turbine Speed Sensor.>
6) Remove the secondary speed sensor. <Ref. to CVT(TR580)-105, REMOVAL, Secondary Speed Sensor.>
7) Remove the primary speed sensor. <Ref. to CVT(TR580)-108, REMOVAL, Primary Speed Sensor.>
8) Remove the inhibitor switch. <Ref. to CVT(TR580)-99, REMOVAL, Inhibitor Switch.>
9) Remove the extension case. <Ref. to CVT(TR580)-168, REMOVAL, Extension Case.>
10) Remove the transfer clutch assembly. <Ref. to CVT(TR580)-172, REMOVAL, Transfer Clutch.>
11) Remove the transfer driven gear assembly. <Ref. to CVT(TR580)-186, REMOVAL, Transfer Driven Gear.>
12) Remove the parking pawl. <Ref. to CVT(TR580)-189, REMOVAL, Parking Pawl.>
13) Remove the reduction driven gear assembly. <Ref. to CVT(TR580)-191, REMOVAL, Reduction Driven Gear.>
14) Remove the oil pan and oil strainer. <Ref. to CVT(TR580)-113, REMOVAL, Oil Pan and Strainer.>
15) Remove the transmission control device. <Ref. to CVT(TR580)-199, REMOVAL, Transmission Control Device.>
16) Remove the transmission case. <Ref. to CVT(TR580)-205, REMOVAL, Transmission Case.>
17) Remove the reduction drive gear. <Ref. to CVT(TR580)-218, REMOVAL, Reduction Drive Gear.>
18) Remove the primary pulley, secondary pulley and variator chain. <Ref. to CVT(TR580)-223, REMOVAL, Primary Pulley and Secondary Pulley.>
19) Remove the manual valve assembly.

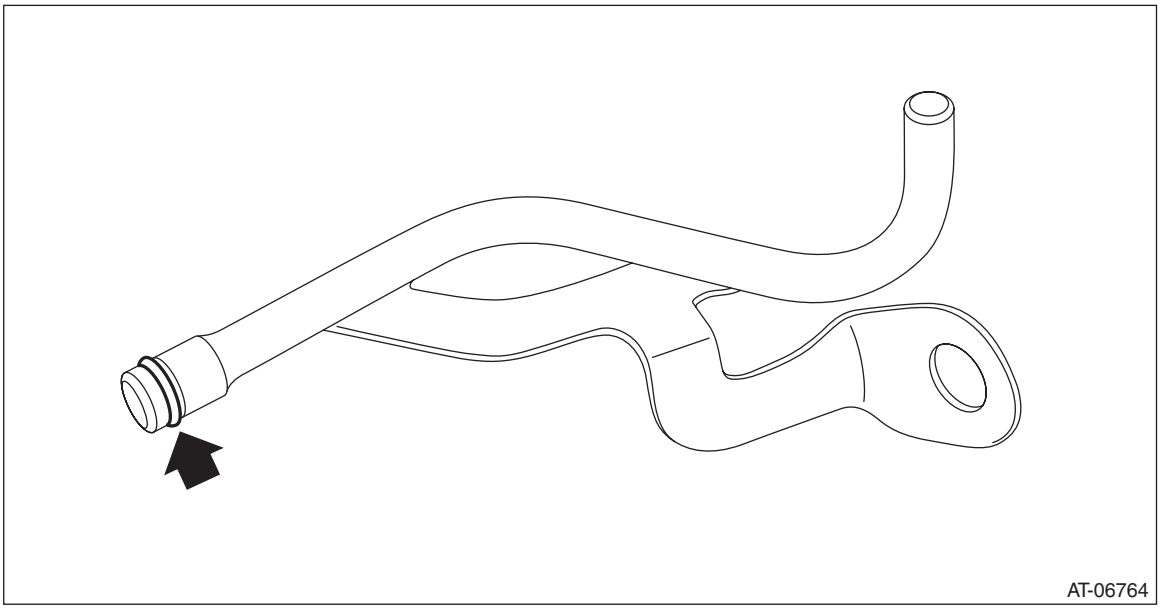


20) Remove the oil guide and lubrication pipe.

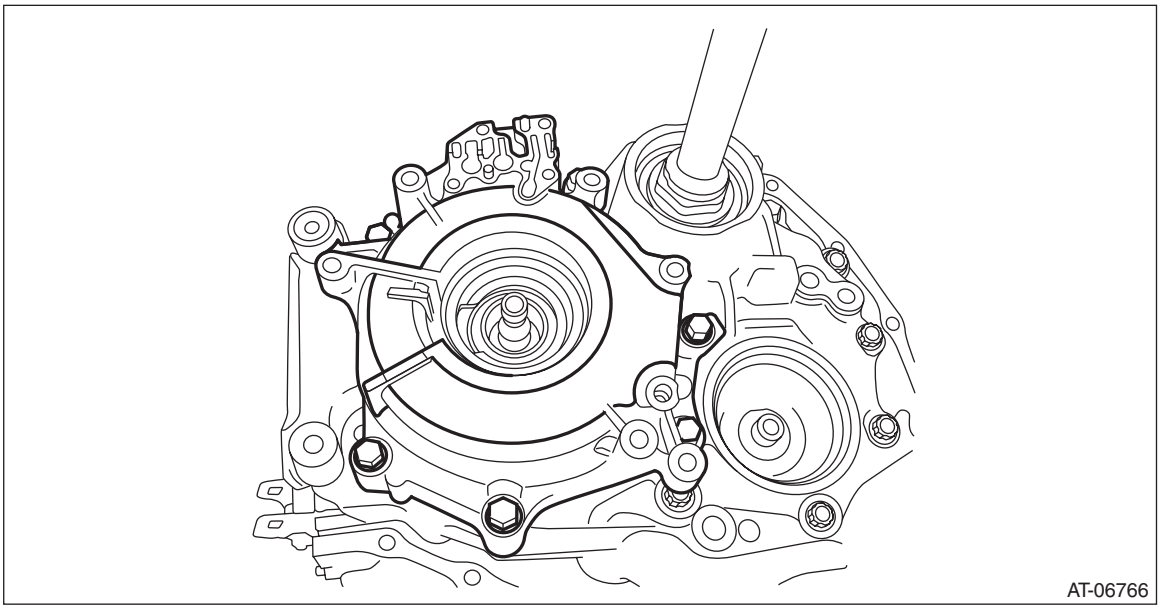


(A) Lubrication pipe
(B) Oil guide

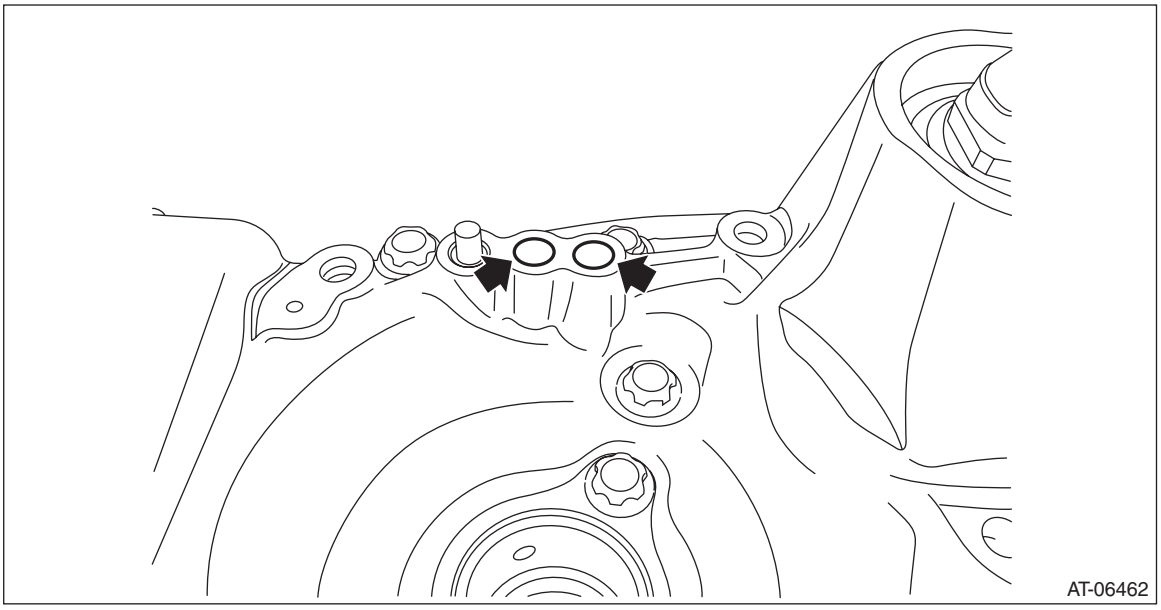
21) Remove the O-ring from lubrication pipe.



22) Remove the reverse brake assembly.

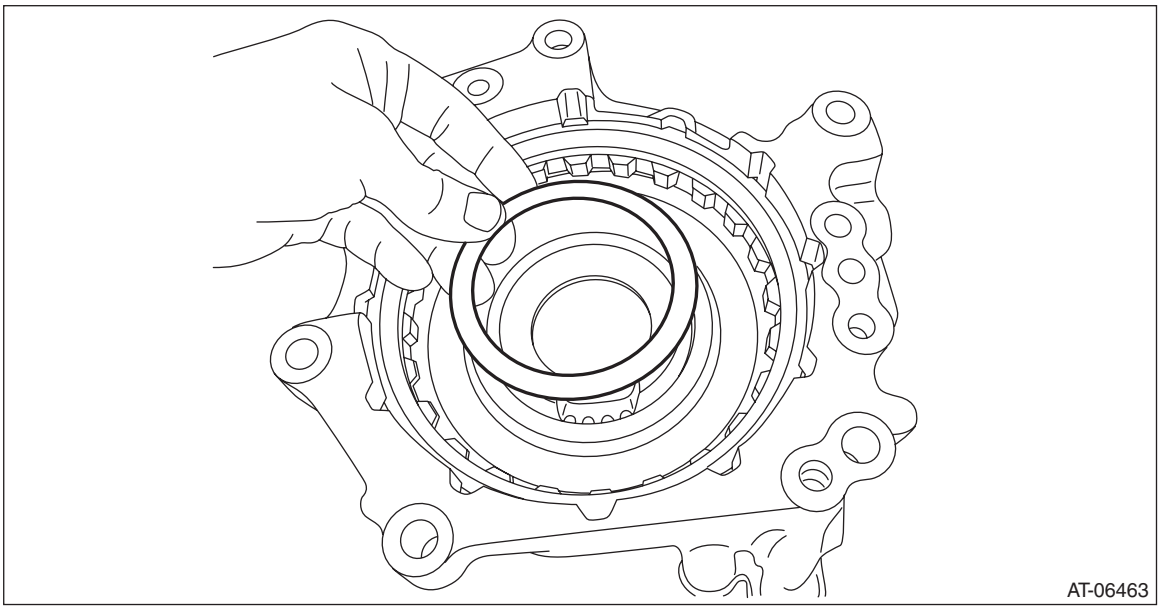


23) Remove the O-ring.



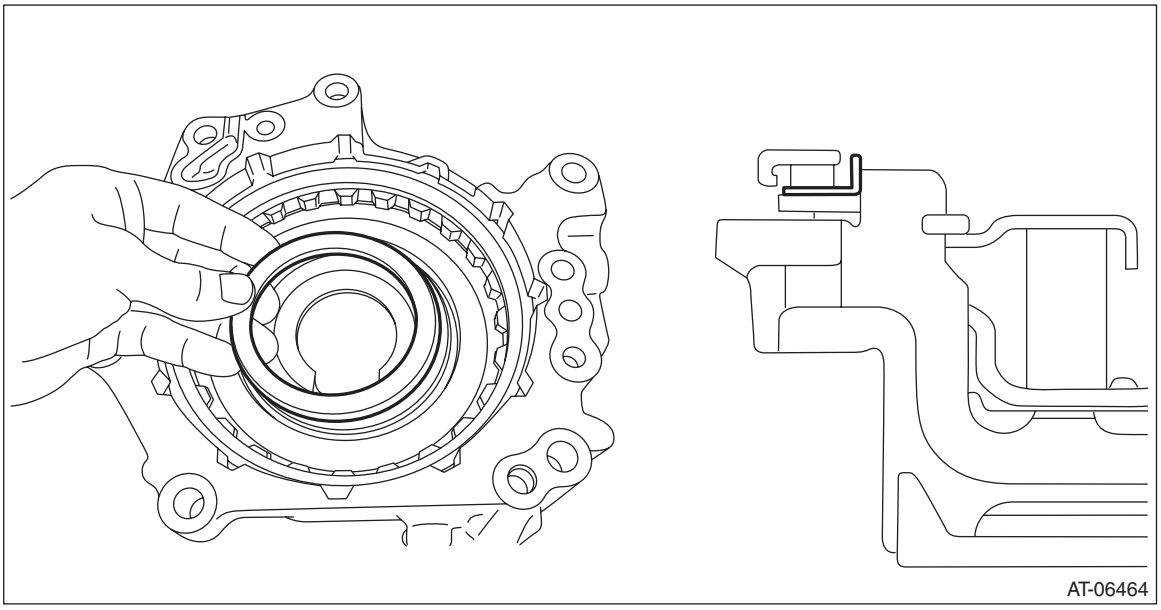
B: INSTALLATION

1) Select a washer. <Ref. to CVT(TR580)-276, ADJUSTMENT, Forward Clutch Assembly.>
2) Install the selected washer to the reverse brake housing.

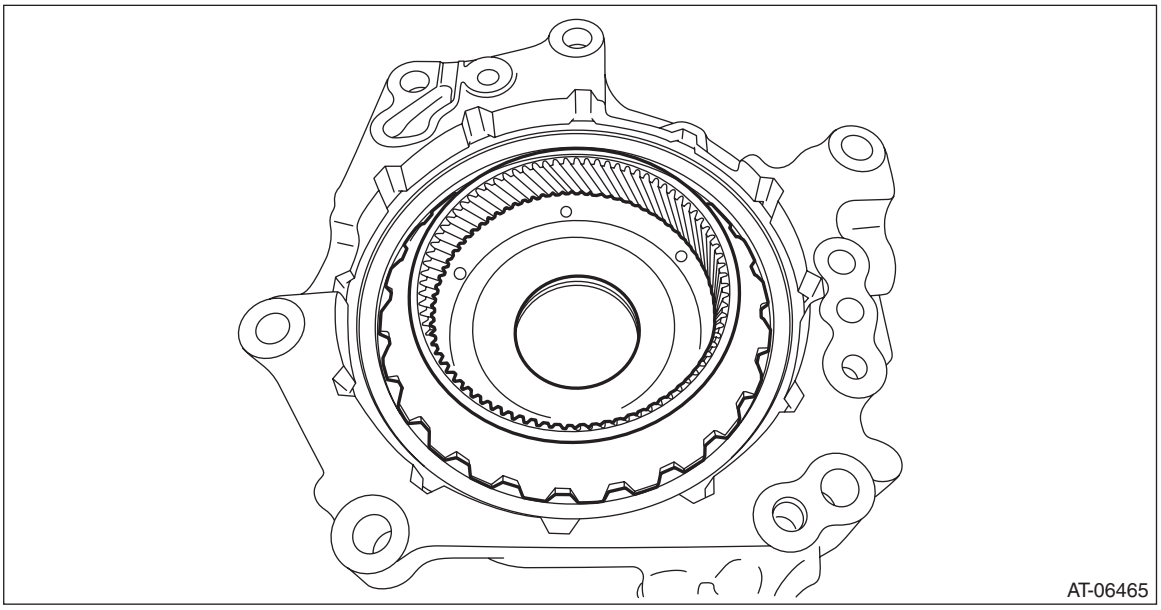


3) Install the thrust bearing to the reverse brake housing.

NOTE:
Face the temper color surface to the reverse brake side.

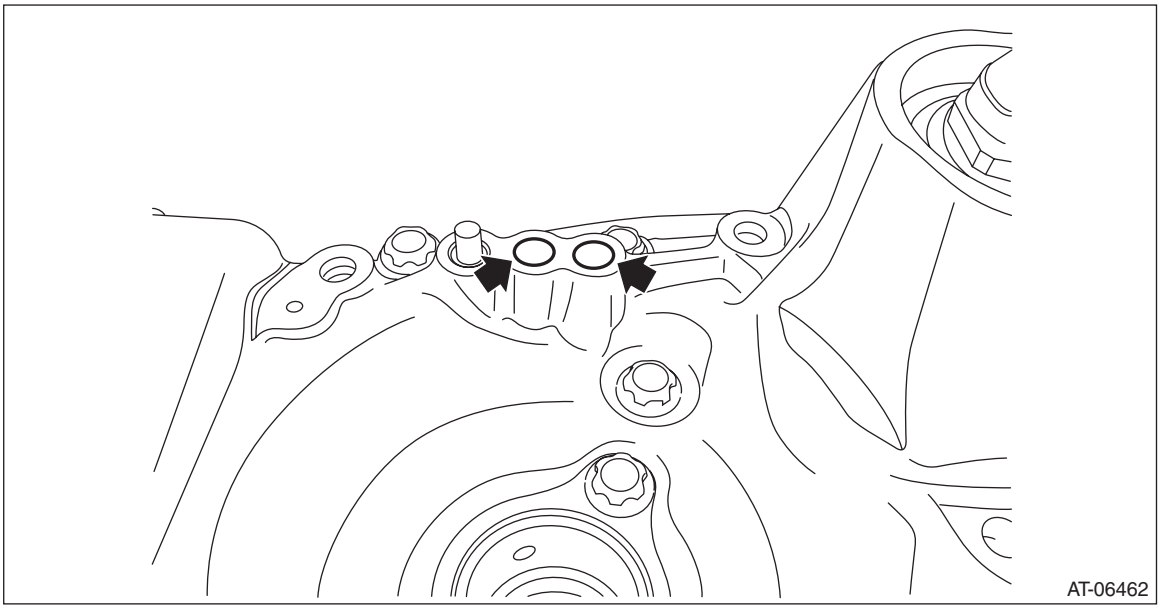


4) Remove the internal gear from the forward clutch assembly, and install it to the reverse brake housing.



5) Install the O-ring.

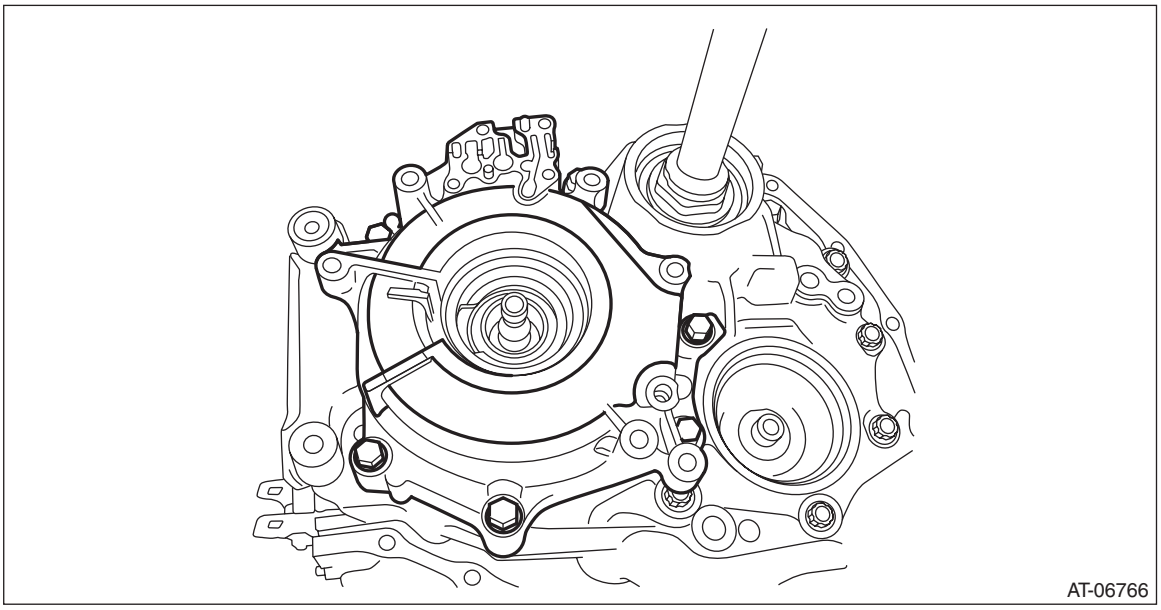
NOTE:
- Install a new O-ring.
- Apply CVTF to the O-ring.



6) Install the reverse brake assembly and internal gear as a unit to the drive pinion retainer.

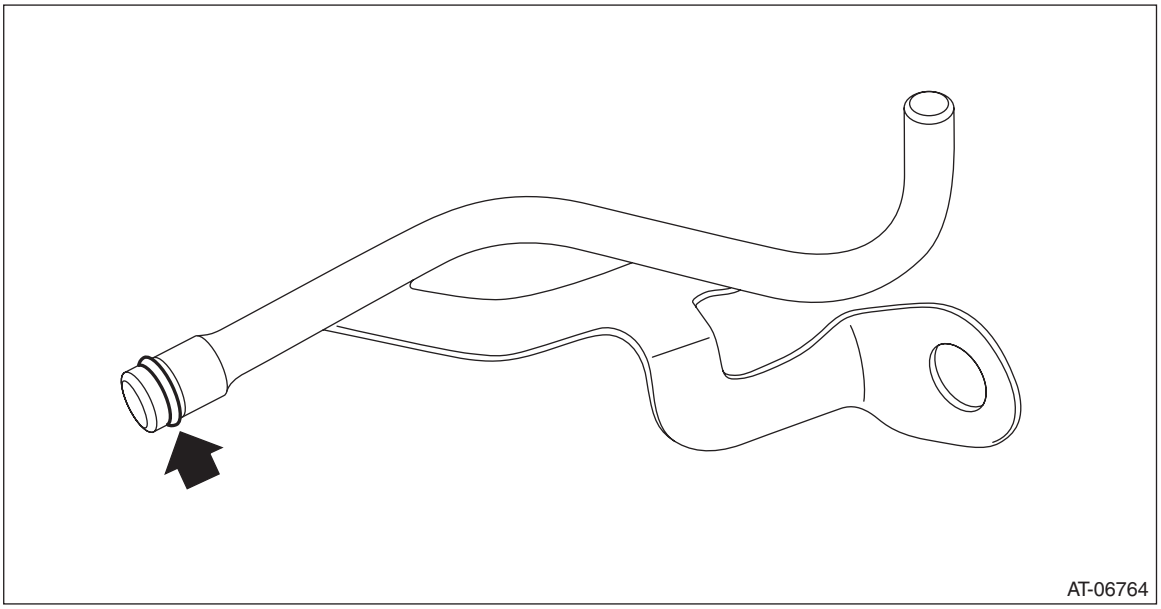
NOTE:
Slowly rotate the input shaft by hand to engage the internal gear and pinion gear of planetary carrier.

Tightening torque:
37 N·m (3.8 kgf-m, 27.3 ft-lb)



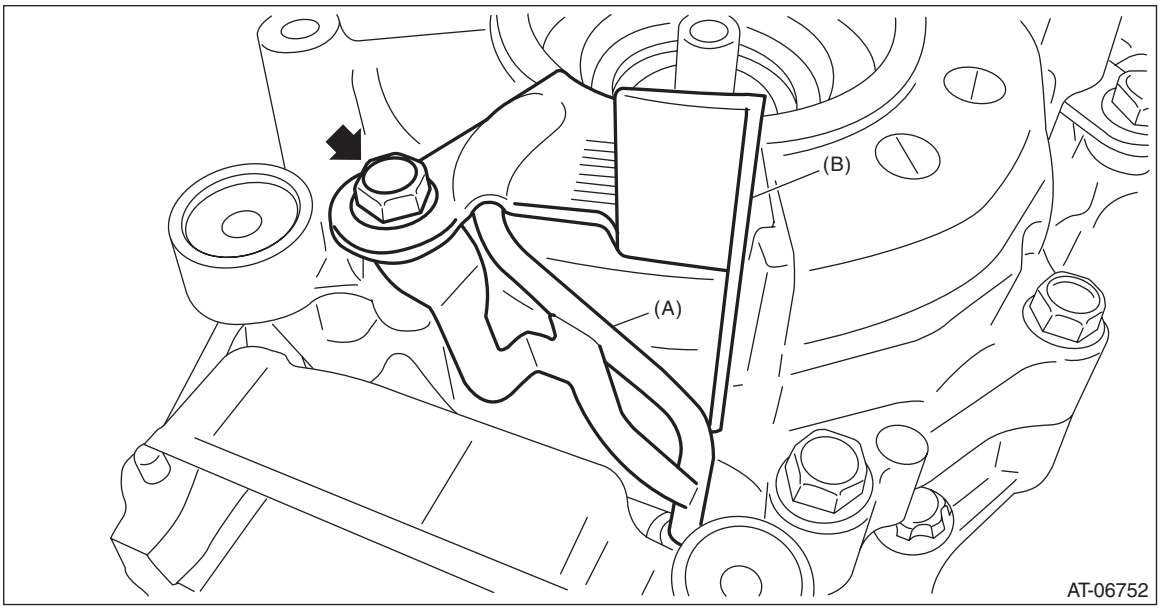
7) Install the O-ring to the lubrication pipe.

NOTE:
- Install a new O-ring.
- Apply CVTF to the O-ring.



8) Install the lubrication pipe and oil guide.

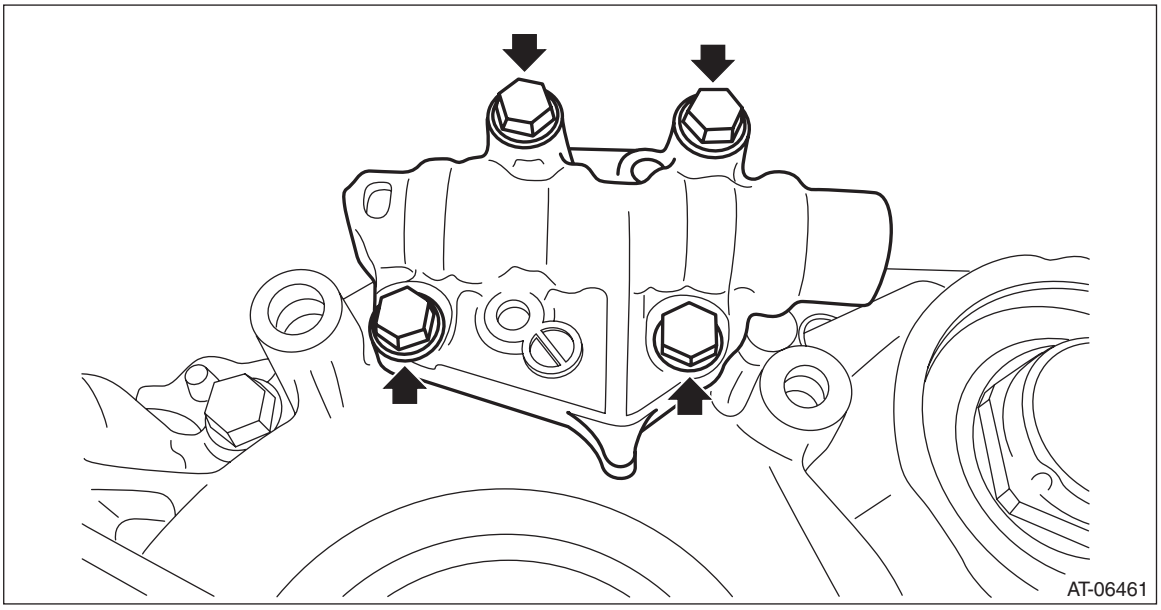
Tightening torque:
16 N·m (1.6 kgf-m, 11.8 ft-lb)



(A) Lubrication pipe
(B) Oil guide

9) Install the manual valve assembly and separator plate.

Tightening torque:
9 N·m (0.9 kgf-m, 6.6 ft-lb)

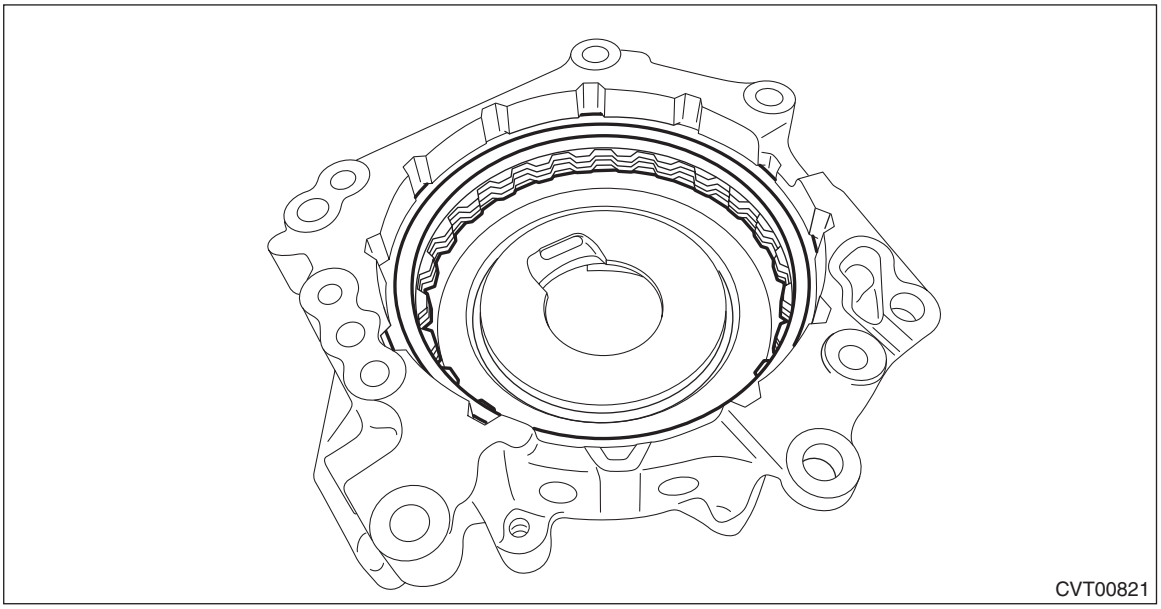


10) Install the primary pulley, secondary pulley and variator chain. <Ref. to CVT(TR580)-230, INSTALLATION, Primary Pulley and Secondary Pulley.>

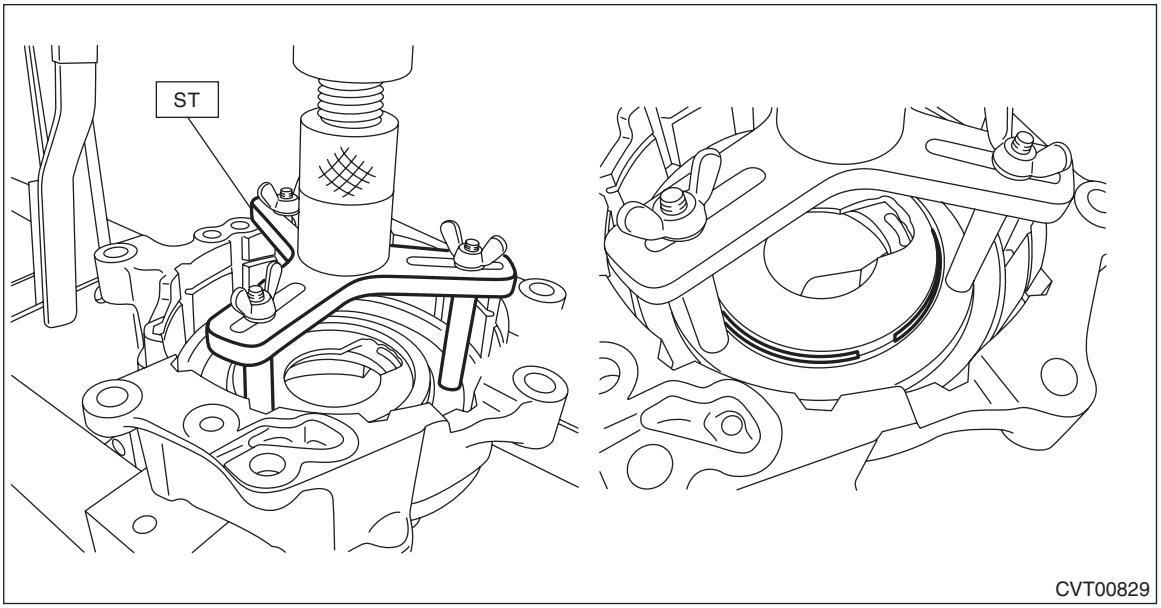
11) Select shims for pulley alignment. <Ref. to CVT(TR580)-237, ADJUSTMENT, Primary Pulley and Secondary Pulley.>
12) Install the reduction drive gear. <Ref. to CVT(TR580)-219, INSTALLATION, Reduction Drive Gear.>
13) Install the transmission case. <Ref. to CVT(TR580)-208, INSTALLATION, Transmission Case.>
14) Install the transmission control device. <Ref. to CVT(TR580)-202, INSTALLATION, Transmission Control Device.>
15) Install the oil strainer and oil pan. <Ref. to CVT(TR580)-115, INSTALLATION, Oil Pan and Strainer.>
16) Install the reduction driven gear assembly. <Ref. to CVT(TR580)-192, INSTALLATION, Reduction Driven Gear.>
17) Install the transfer driven gear assembly. <Ref. to CVT(TR580)-187, INSTALLATION, Transfer Driven Gear.>
18) Install the transfer clutch assembly. <Ref. to CVT(TR580)-174, INSTALLATION, Transfer Clutch.>
19) Install the parking pawl. <Ref. to CVT(TR580)-190, INSTALLATION, Parking Pawl.>
20) Install the extension case. <Ref. to CVT(TR580)-169, INSTALLATION, Extension Case.>
21) Install the inhibitor switch. <Ref. to CVT(TR580)-101, INSTALLATION, Inhibitor Switch.>
22) Install the secondary speed sensor. <Ref. to CVT(TR580)-105, INSTALLATION, Secondary Speed Sensor.>
23) Install the primary speed sensor. <Ref. to CVT(TR580)-109, INSTALLATION, Primary Speed Sensor.>
24) Install the turbine speed sensor. <Ref. to CVT(TR580)-103, INSTALLATION, Turbine Speed Sensor.>
25) Install the transmission harness. <Ref. to CVT(TR580)-139, INSTALLATION, Transmission Harness.>
26) Install the control valve body. <Ref. to CVT(TR580)-124, INSTALLATION, Control Valve Body.>
27) Install the air breather hose. <Ref. to CVT(TR580)-160, INSTALLATION, Air Breather Hose.>
28) Install the transmission assembly to the vehicle. <Ref. to CVT(TR580)-72, INSTALLATION, Automatic Transmission Assembly.>

C: DISASSEMBLY

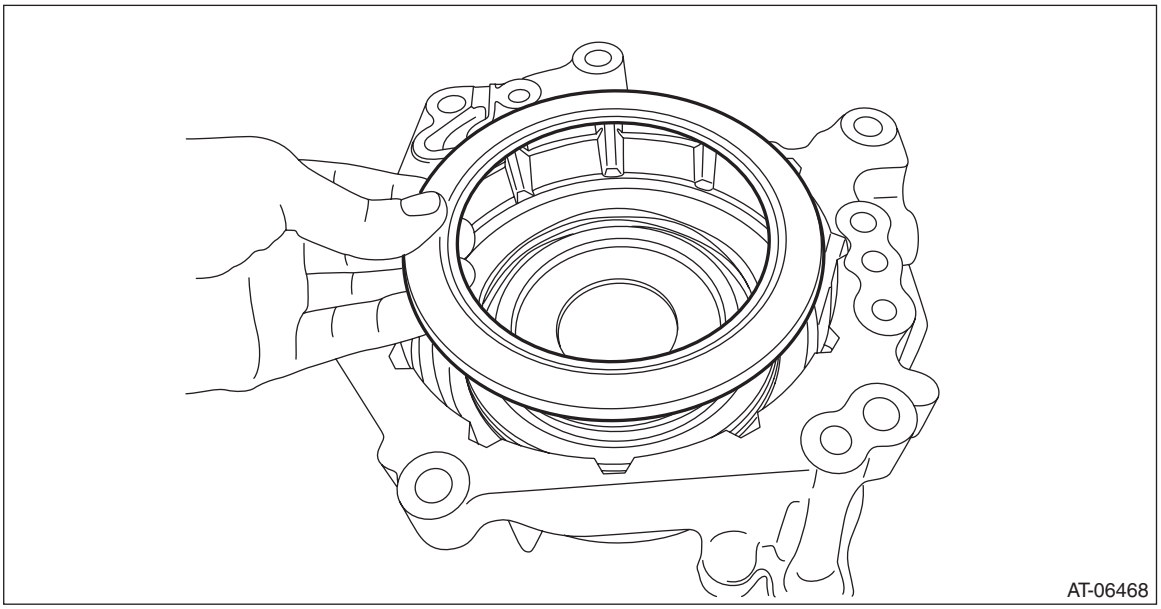
1) Remove the snap ring.
2) Remove the retaining plate, drive plate, driven plate and dish plate.



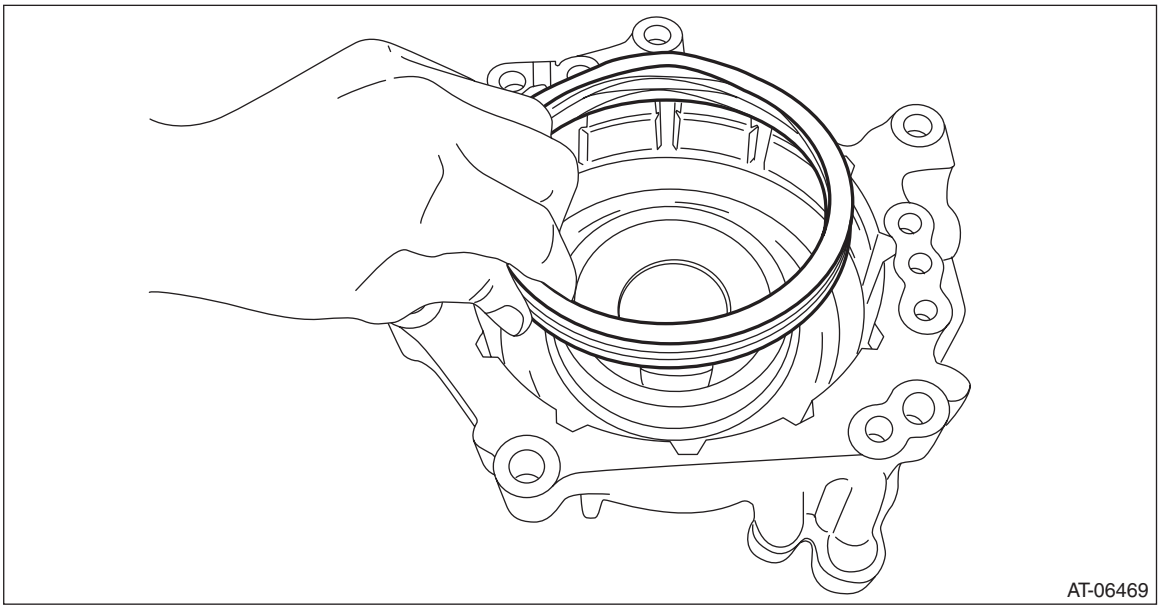
3) Compress the return spring using the ST to remove the snap ring.
ST 18762AA001 COMPRESSOR SPECIAL TOOL



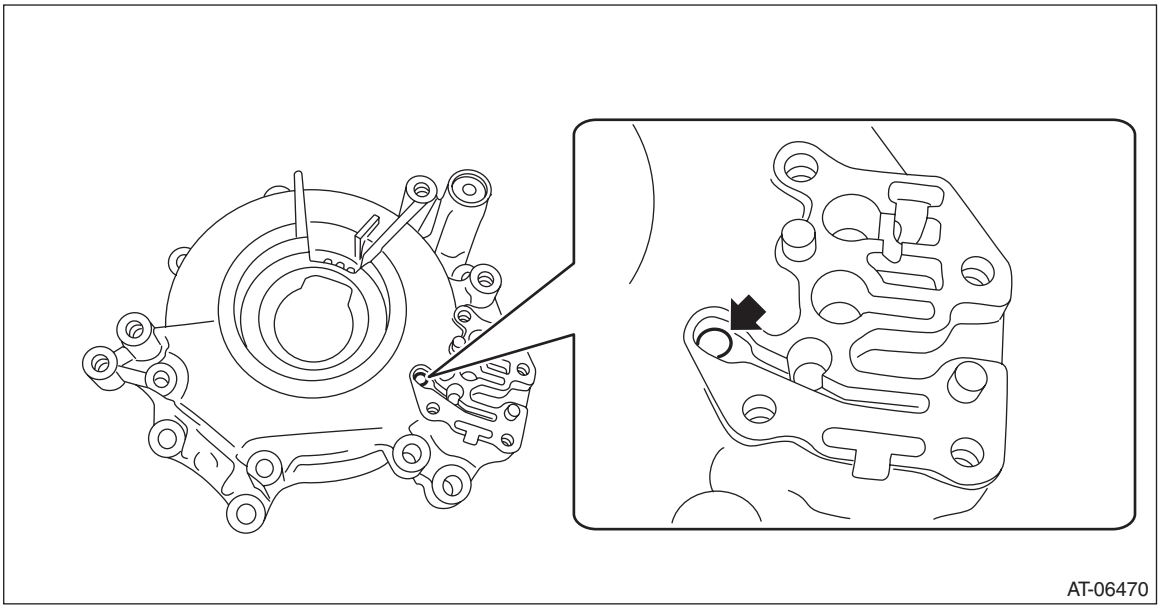
4) Using the ST, remove the snap ring and spring retainer.



5) Remove the return spring.



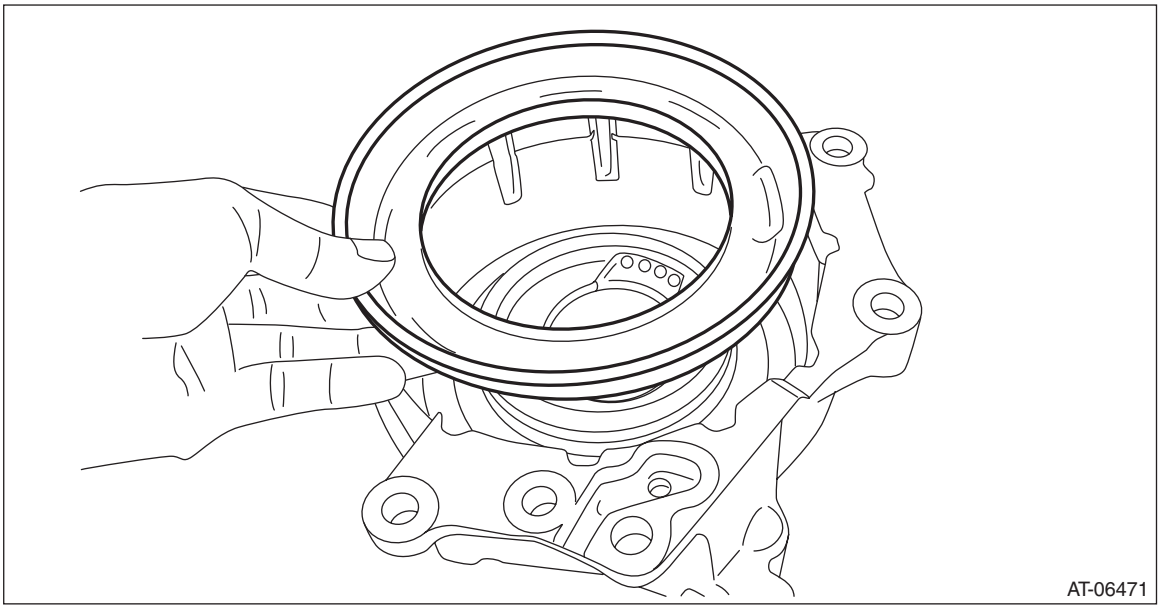
6) Remove the reverse brake piston by blowing compressed air intermittently from reverse brake housing hole.



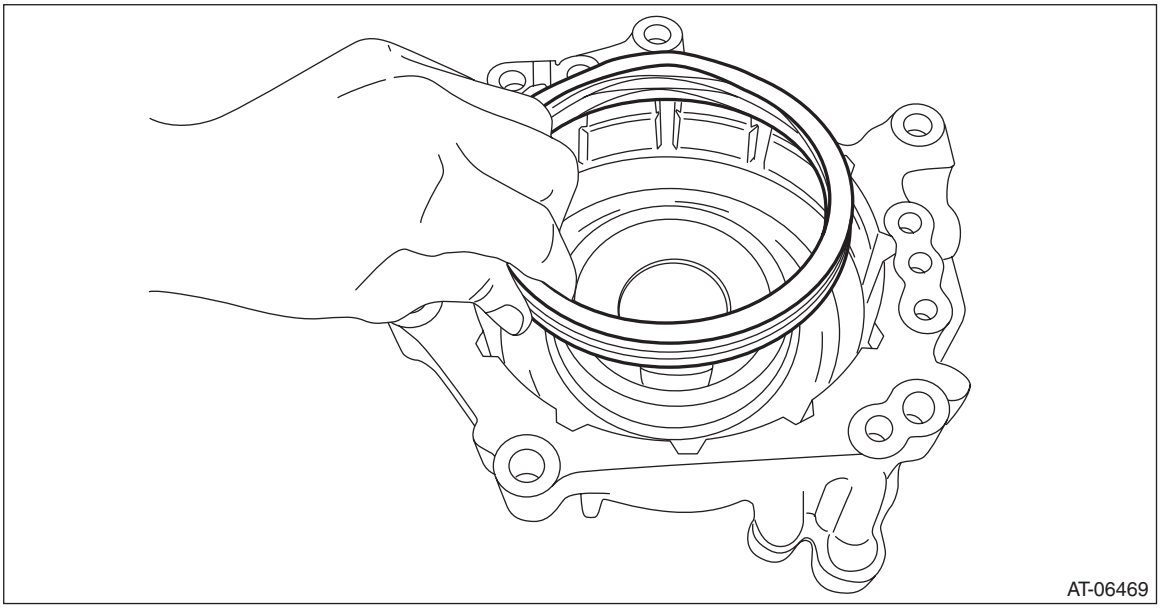
D: ASSEMBLY

1) Install the reverse brake piston.

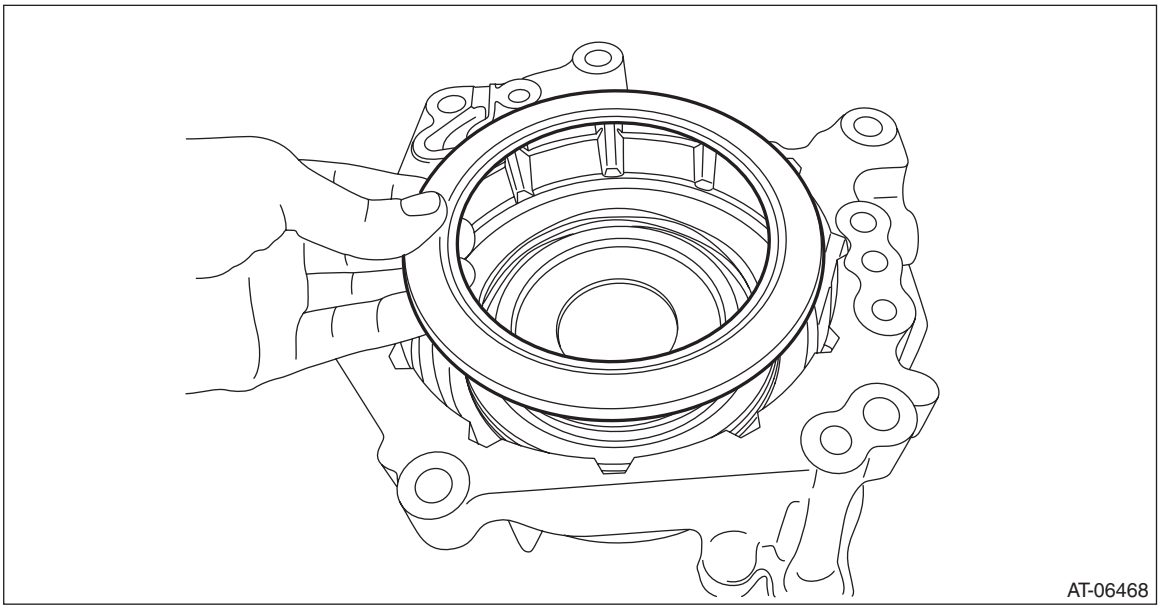
NOTE:
Apply CVTF to the sealing area of reverse brake piston.



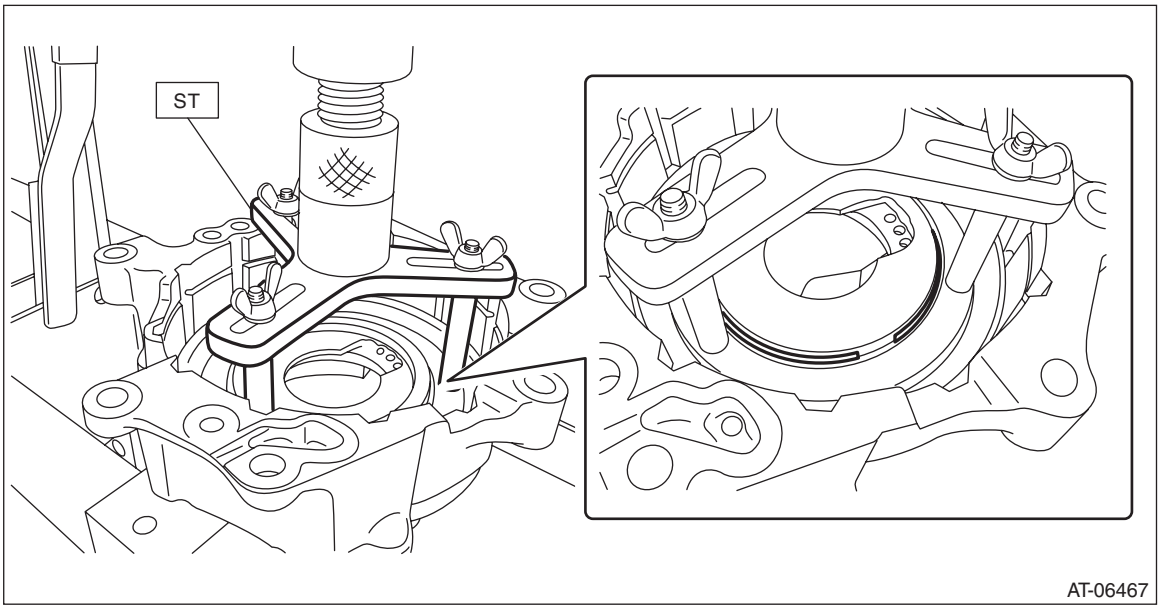
2) Install the return spring.



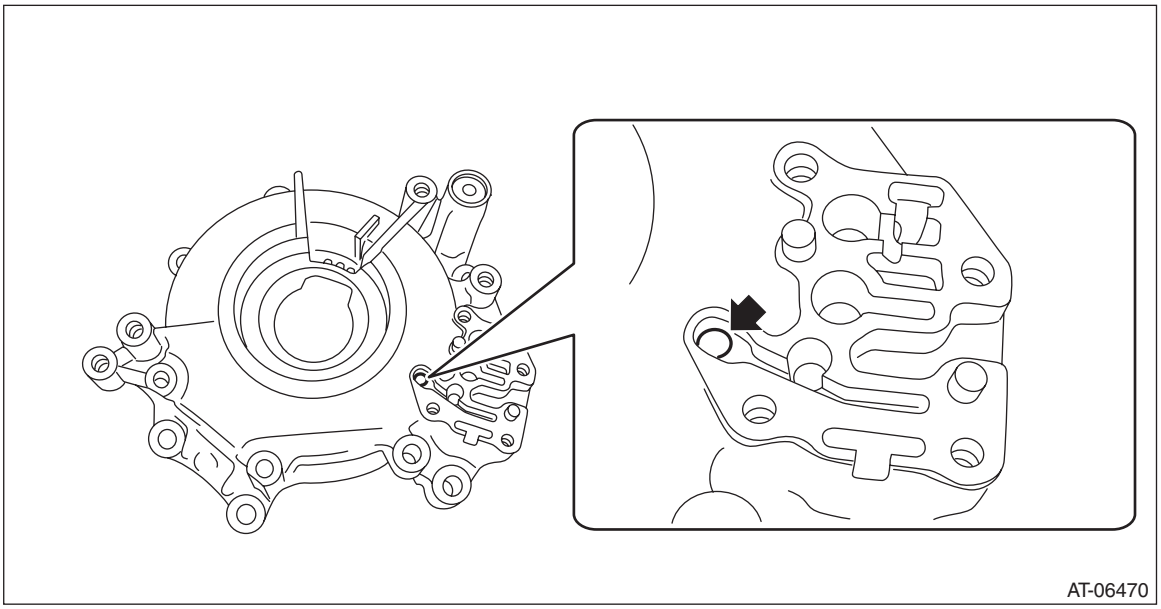
3) Install the spring retainer.



4) Compress the return spring using the ST to install the snap ring.
ST1 18762AA001 COMPRESSOR SPECIAL TOOL



5) Check the operation of reverse brake piston by blowing compressed air intermittently from reverse brake housing hole.



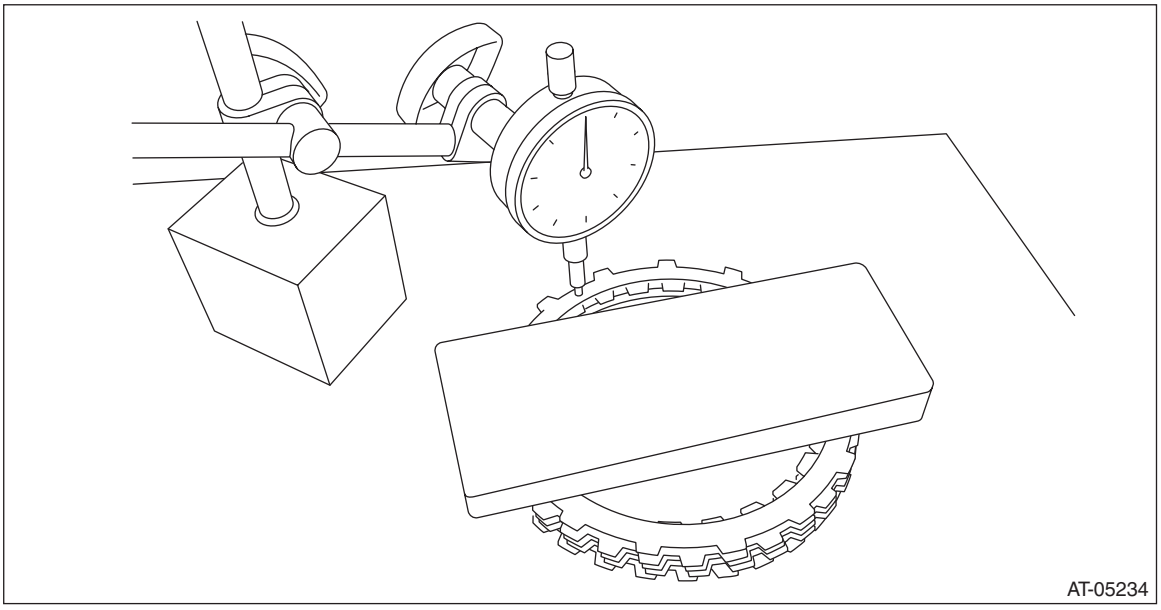
6) Place the driven plate, drive plate and retaining plate neatly in this order on surface table.
7) Set the dial gauge to retaining plate, and read its scale.

NOTE:
The value, which is read in the gauge at this time, is zero point.

8) Scale and record the weight “Z” of a flat board which will be put on retaining plate.

NOTE:
- Use a stiff board which does not bend against load as a flat board to be put on retaining plate.
- Use a flat board weighing less than 29 N (3.0 kgf, 6.5 lb).

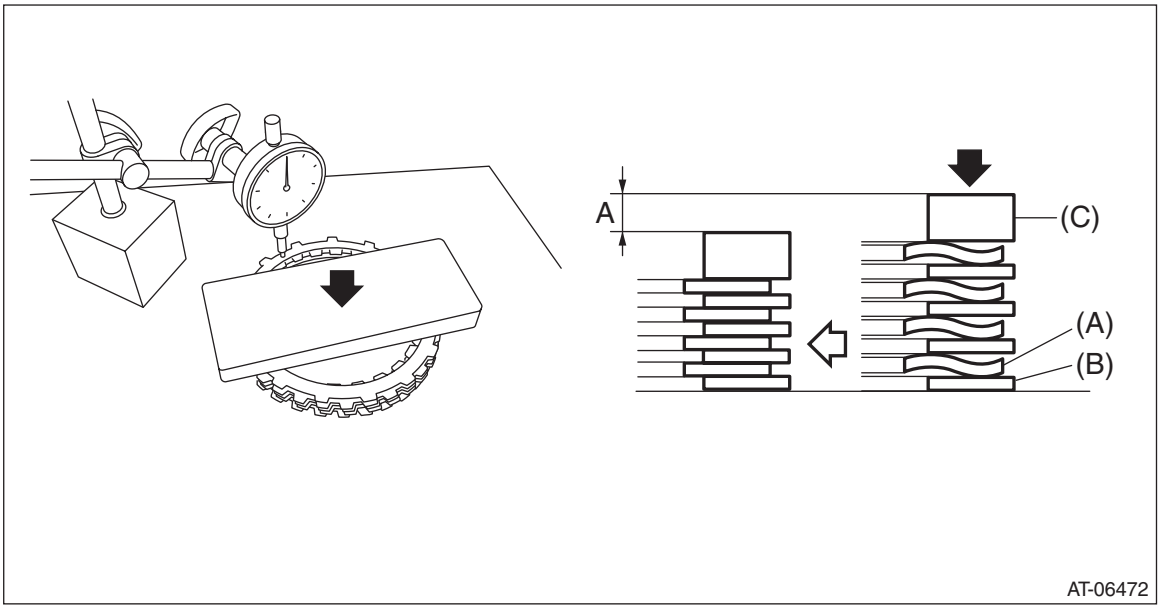
9) Put the flat board on retaining plate.



10) Using the following formula, read the push/pull gauge and calculate “N”.
N = 29 N (3.0 kgf, 6.5 lb) – Z
29 N (3.0 kgf, 6.5 lb) : Load applied to clutch plate
Z: Flat board weight

11) Press the center of retaining plate by applying a force of “N” using push/pull gauge, and then measure and record the compression amount “A”.

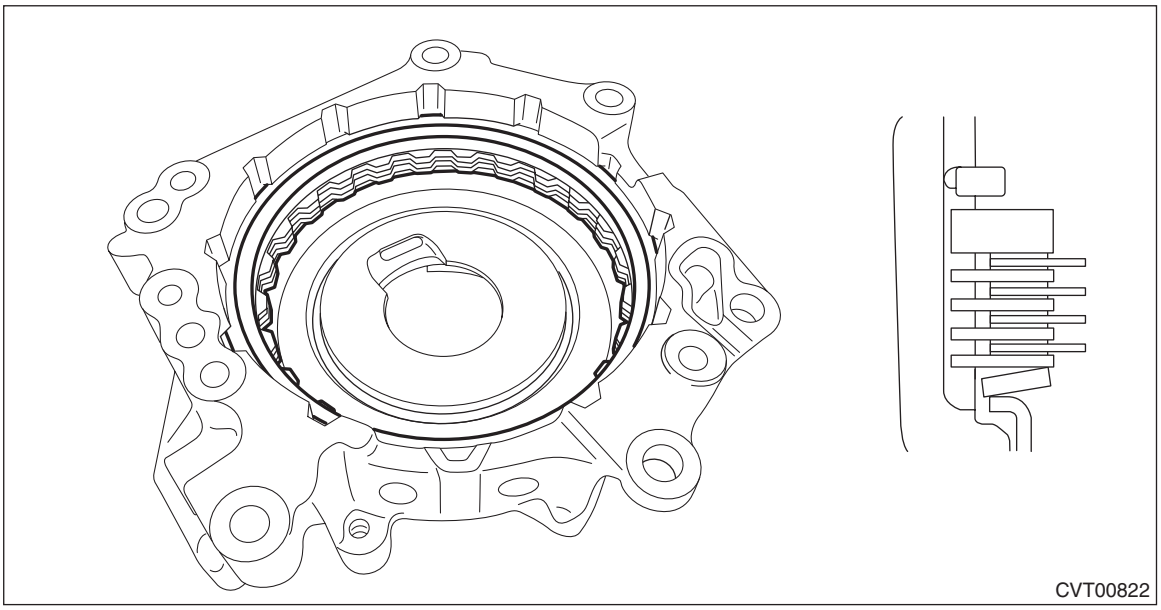
NOTE:
Measure at four points with a 90° interval and calculate the average.



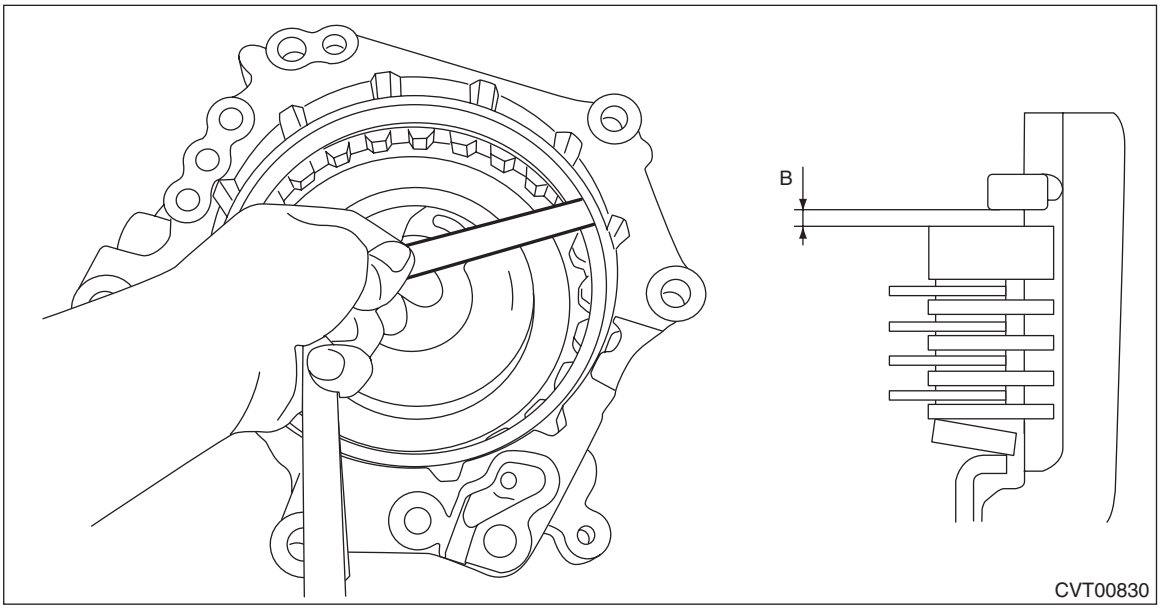
(A) Drive plate
(B) Driven plate
(C) Retaining plate

12) Install the dish plate, drive plate, driven plate, retaining plate and snap ring to the reverse brake housing.

NOTE:
Install the dish plate in the correct direction.



13) Measure and record the clearance “B” between the retaining plate and snap ring.



14) Piston stroke calculation

Calculate with A and B dimensions recorded before. If it exceeds the limit, replace with a new drive plate and adjust within the initial standard value.

S mm (in) = A + B

S: Piston stroke

A: Compression amount of drive plate and dish plate

B: Clearance between retaining plate and snap ring

Initial standard:

2.3 — 2.7 mm (0.091 — 0.106 in)

Limit thickness:

2.9 mm (0.114 in)

Retaining plate	
Part No.	Thickness mm (in)
31567AB750	4.2 (0.165)
31567AB800	4.4 (0.173)
31567AB810	4.6 (0.181)
31567AB820	4.8 (0.189)

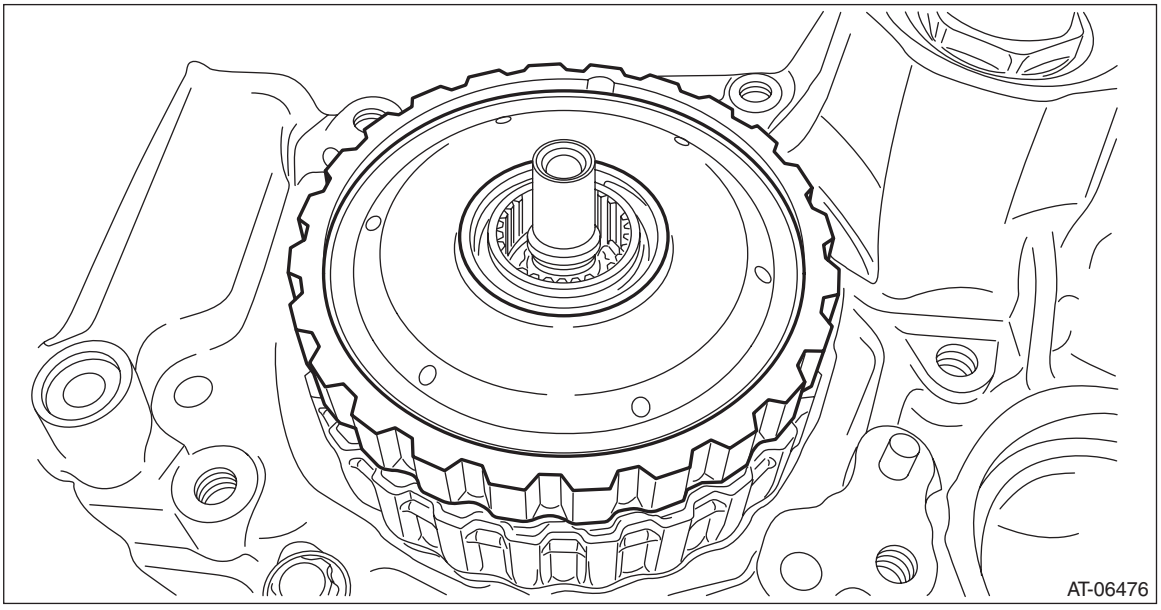
E: INSPECTION

- Inspect the drive plate facing for wear and damage.
- Check the driven plate for discoloration (burnt color).
- Check for worn snap ring, fatigue or damaged return spring or deformed spring retainer.
- Make sure the clearance between retaining plate and snap ring of reverse brake is within the limit. If it exceeds the limit, replace with a new drive plate and select and adjust the retaining plate within the initial standard value. <Ref. to CVT(TR580)-253, ASSEMBLY, Reverse Brake Assembly.>

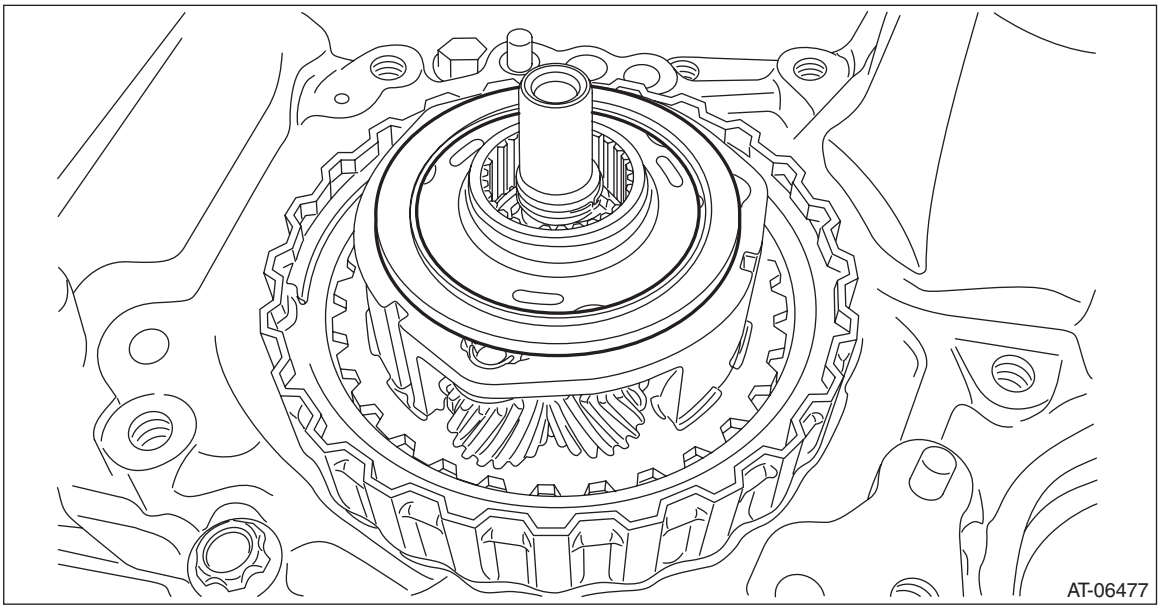
40.Forward Clutch Assembly

A: REMOVAL

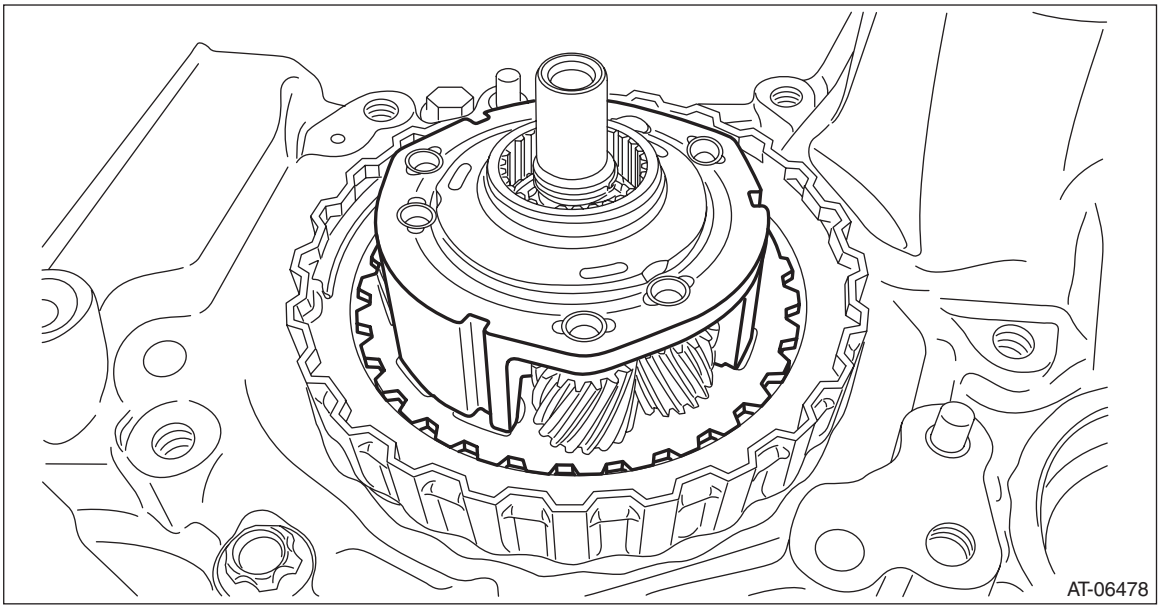
1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TR580)-60, REMOVAL, Automatic Transmission Assembly.>
2) Remove the air breather hose. <Ref. to CVT(TR580)-158, REMOVAL, Air Breather Hose.>
3) Remove the control valve body. <Ref. to CVT(TR580)-117, REMOVAL, Control Valve Body.>
4) Remove the transmission harness. <Ref. to CVT(TR580)-132, REMOVAL, Transmission Harness.>
5) Remove the turbine speed sensor. <Ref. to CVT(TR580)-103, REMOVAL, Turbine Speed Sensor.>
6) Remove the secondary speed sensor. <Ref. to CVT(TR580)-105, REMOVAL, Secondary Speed Sensor.>
7) Remove the primary speed sensor. <Ref. to CVT(TR580)-108, REMOVAL, Primary Speed Sensor.>
8) Remove the inhibitor switch. <Ref. to CVT(TR580)-99, REMOVAL, Inhibitor Switch.>
9) Remove the extension case. <Ref. to CVT(TR580)-168, REMOVAL, Extension Case.>
10) Remove the transfer clutch assembly. <Ref. to CVT(TR580)-172, REMOVAL, Transfer Clutch.>
11) Remove the transfer driven gear assembly. <Ref. to CVT(TR580)-186, REMOVAL, Transfer Driven Gear.>
12) Remove the parking pawl. <Ref. to CVT(TR580)-189, REMOVAL, Parking Pawl.>
13) Remove the reduction driven gear assembly. <Ref. to CVT(TR580)-191, REMOVAL, Reduction Driven Gear.>
14) Remove the oil pan and oil strainer. <Ref. to CVT(TR580)-113, REMOVAL, Oil Pan and Strainer.>
15) Remove the transmission control device. <Ref. to CVT(TR580)-199, REMOVAL, Transmission Control Device.>
16) Remove the transmission case. <Ref. to CVT(TR580)-205, REMOVAL, Transmission Case.>
17) Remove the reduction drive gear. <Ref. to CVT(TR580)-218, REMOVAL, Reduction Drive Gear.>
18) Remove the primary pulley, secondary pulley and variator chain. <Ref. to CVT(TR580)-223, REMOVAL, Primary Pulley and Secondary Pulley.>
19) Remove the reverse brake assembly. <Ref. to CVT(TR580)-243, REMOVAL, Reverse Brake Assembly.>
20) Remove the internal gear.



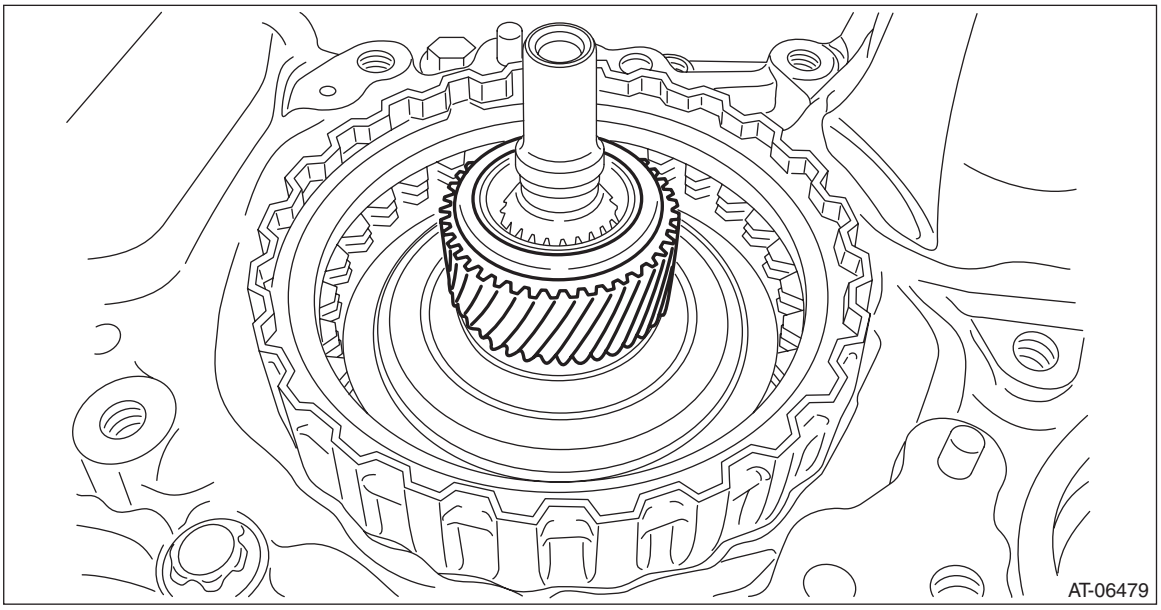
21) Remove the thrust bearing.



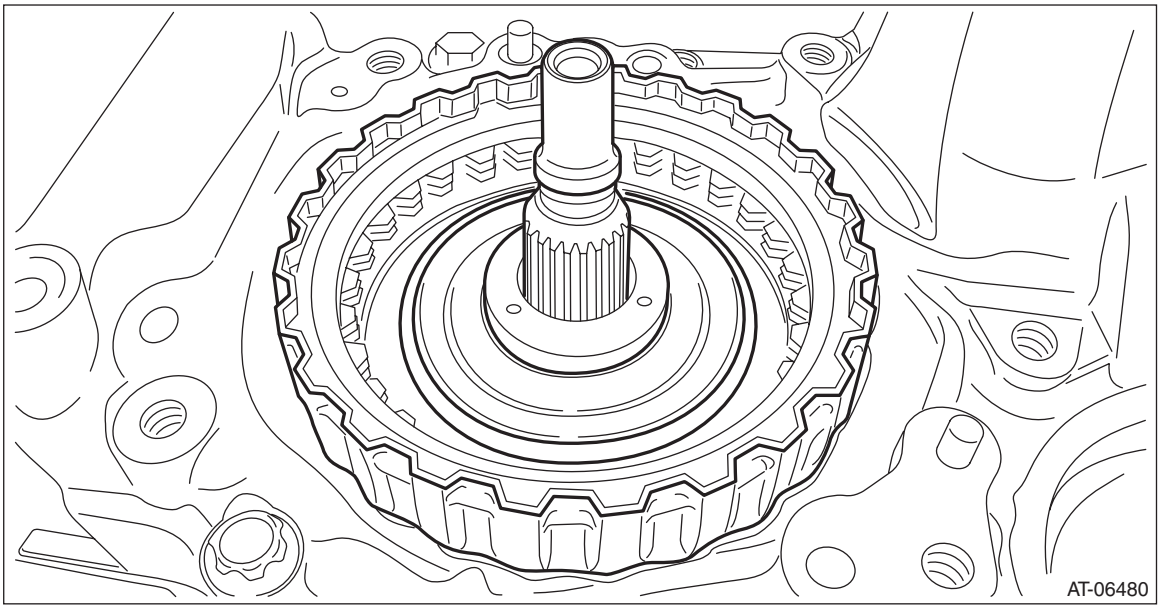
22) Remove the planetary carrier.



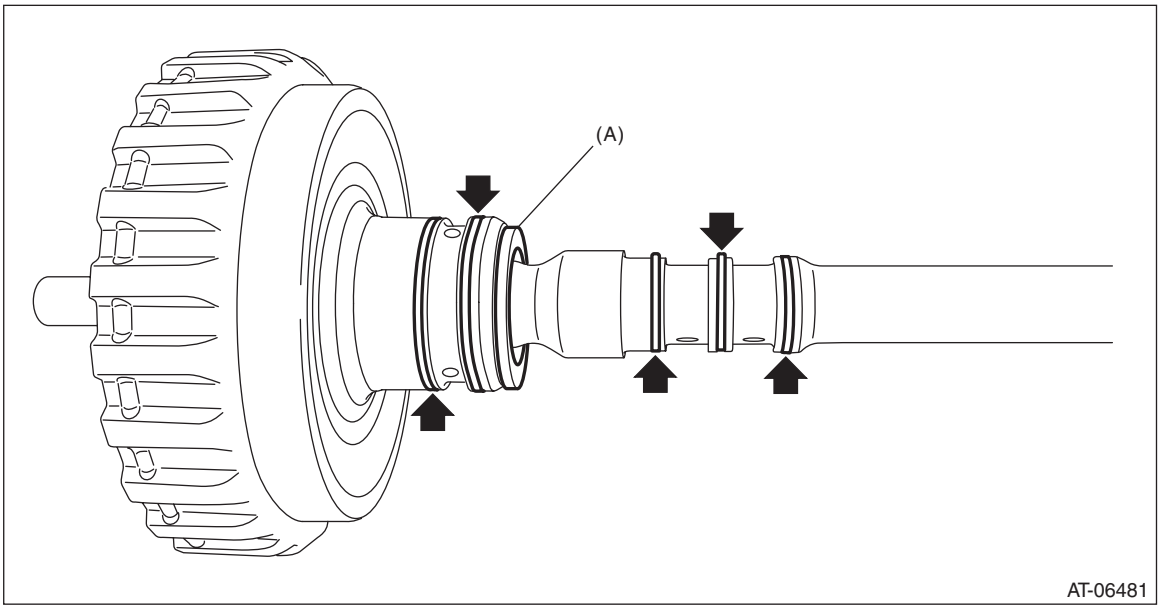
23) Remove the thrust bearing and sun gear.



24) Remove the forward clutch assembly.



25) Remove the thrust bearing and seal ring.

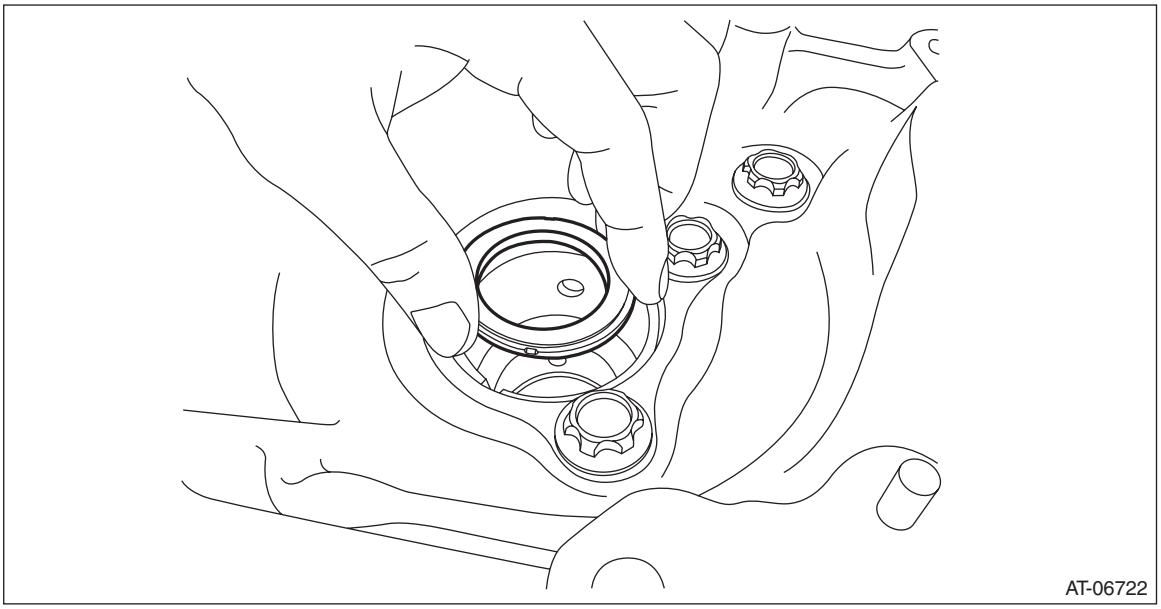


(A) Thrust bearing

B: INSTALLATION

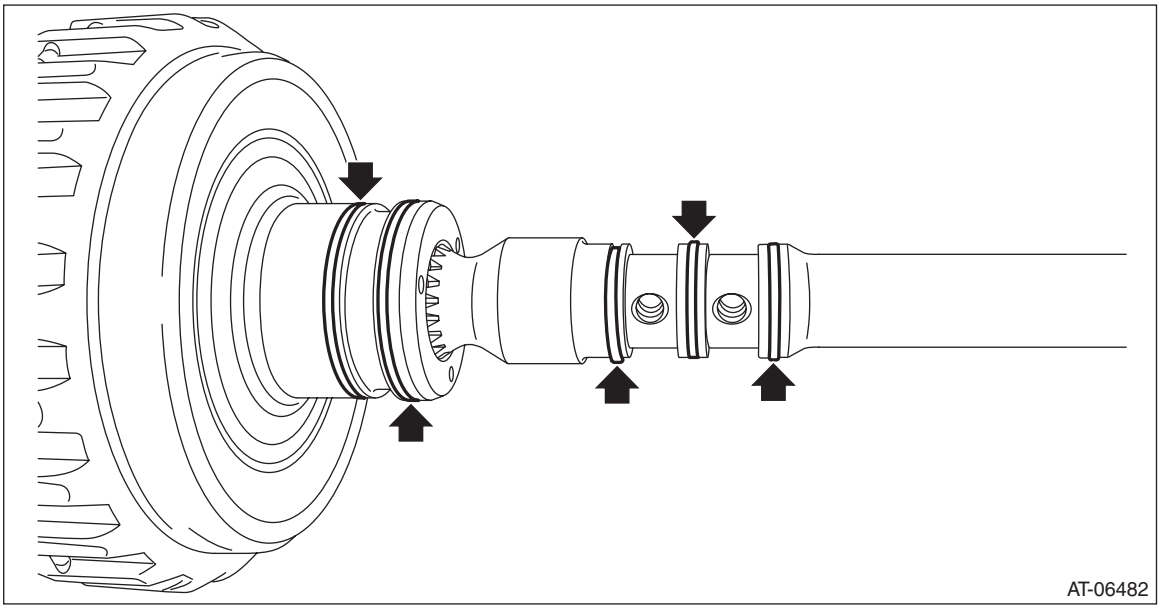
1) Install the thrust bearing to the converter case.

NOTE:
Face the temper color surface to the converter case side.

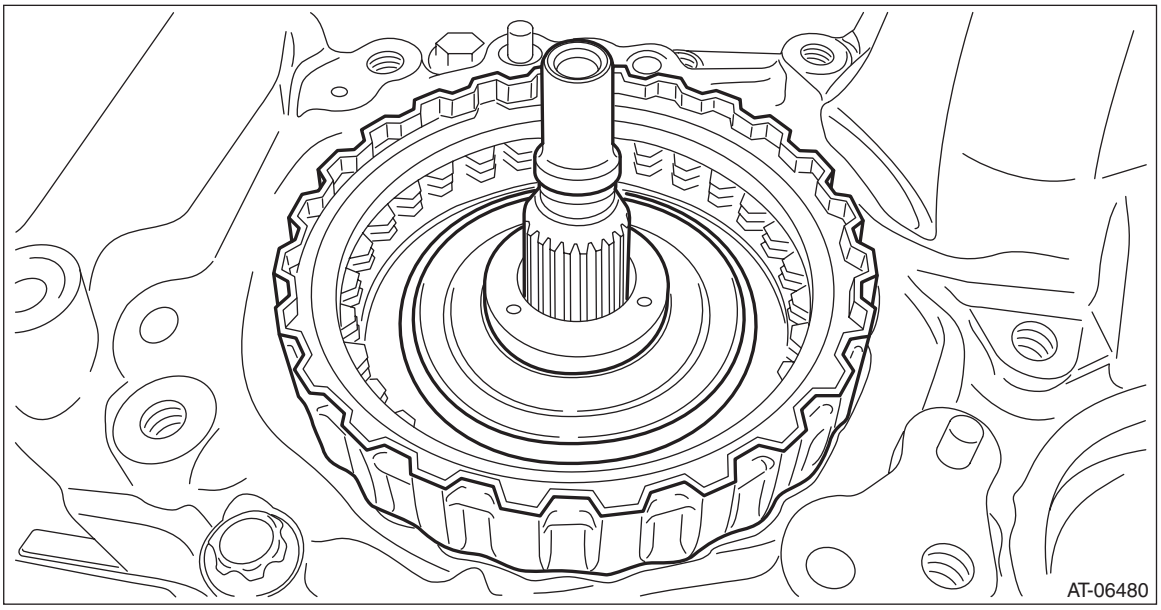


2) Install the seal ring to the input shaft.

NOTE:
- Use a new seal ring.
- When installing the seal ring, do not expand the seal ring too much.
- Apply CVTF to the seal rings.

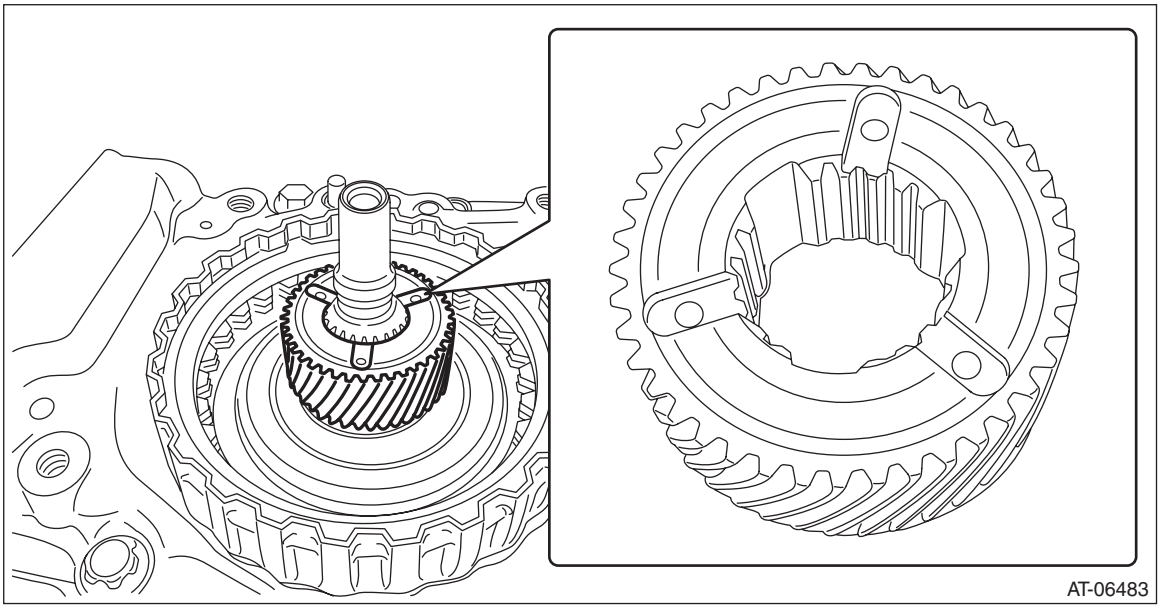


3) Install the forward clutch assembly to the converter case.



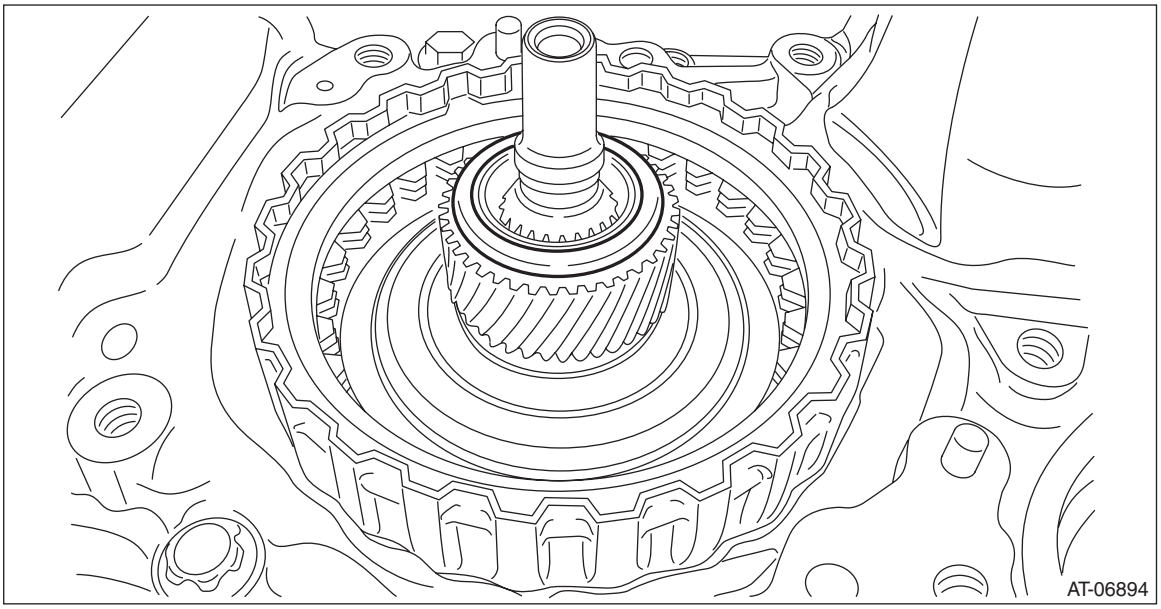
4) Install the sun gear.

NOTE:
Face the end face of the sun gear to the reverse brake side as shown in the figure.

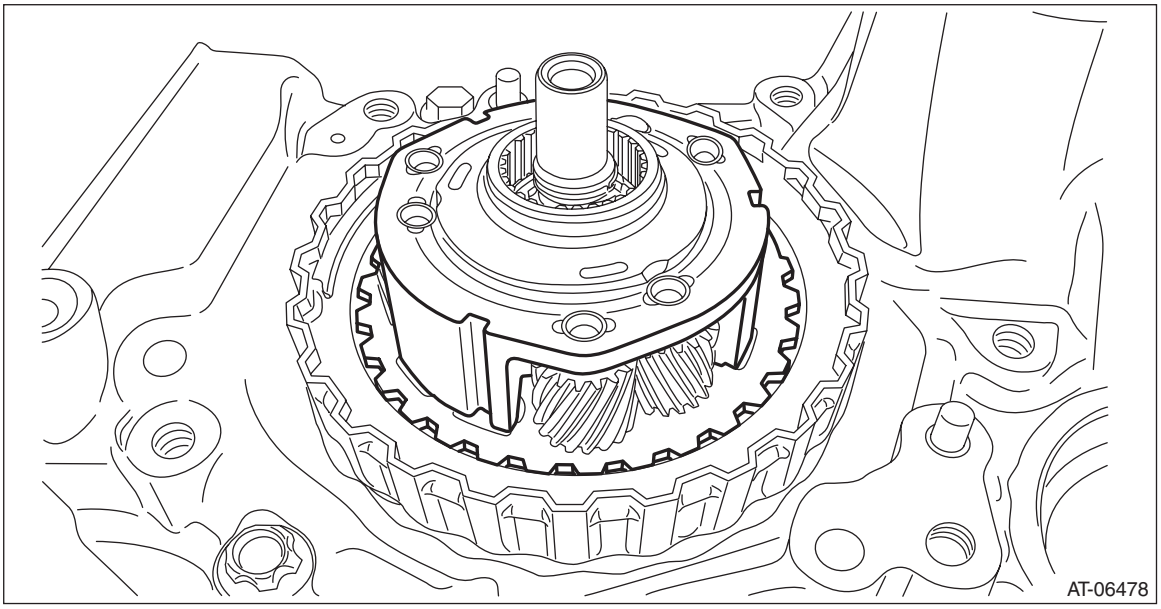


5) Install the thrust bearing to the sun gear.

NOTE:
Face the temper color surface to the reverse brake side.

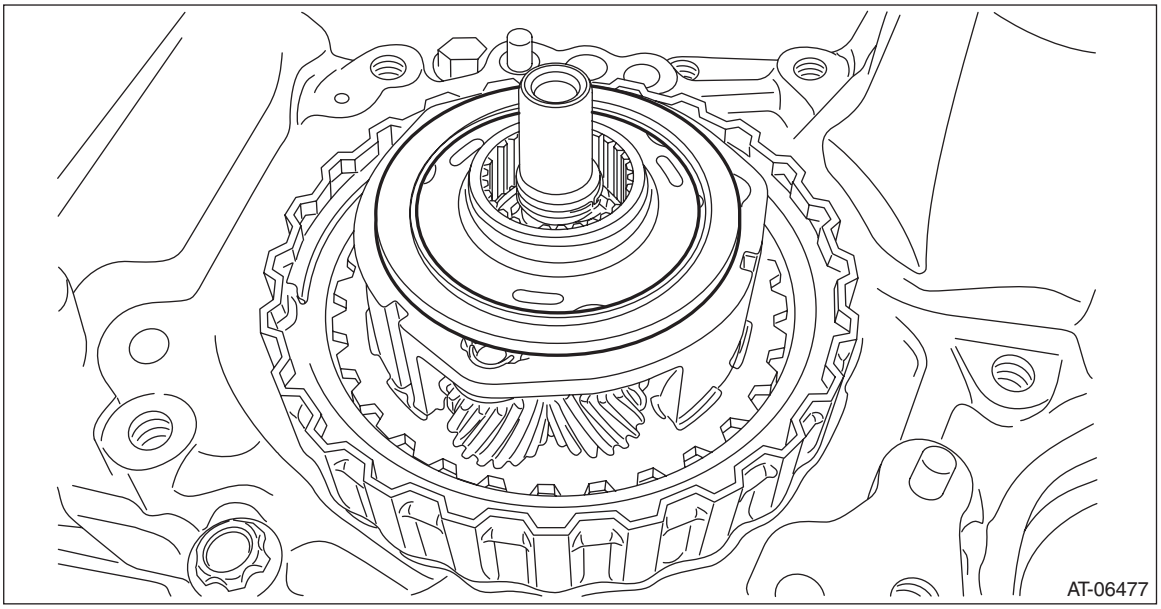


6) Install the planetary carrier.

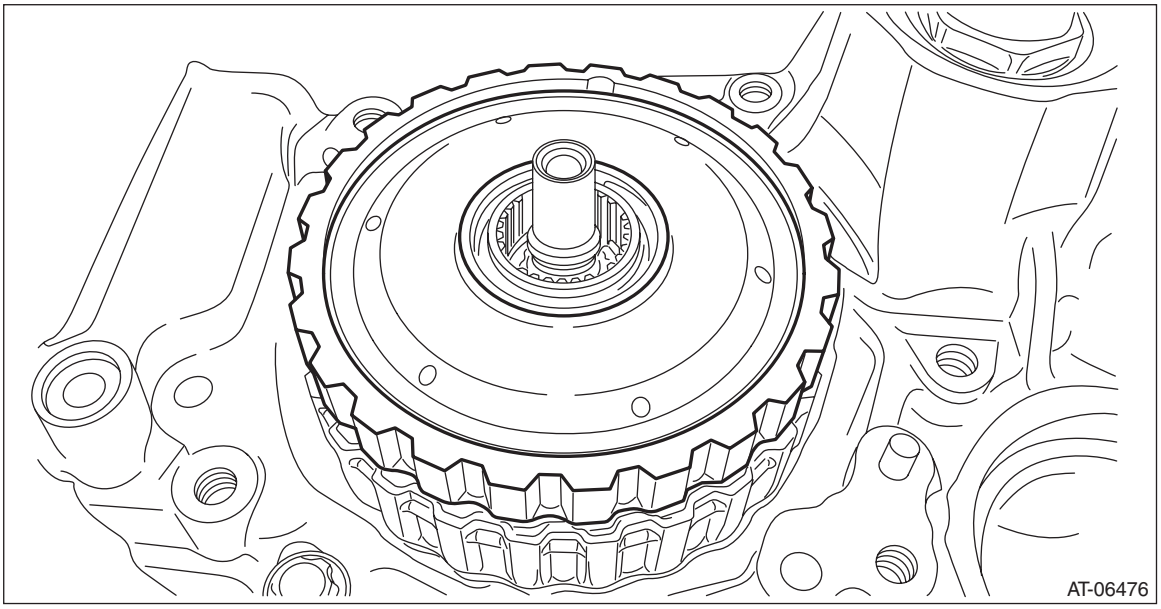


7) Install the thrust bearing.

NOTE:
Face the temper color surface to the reverse brake side.

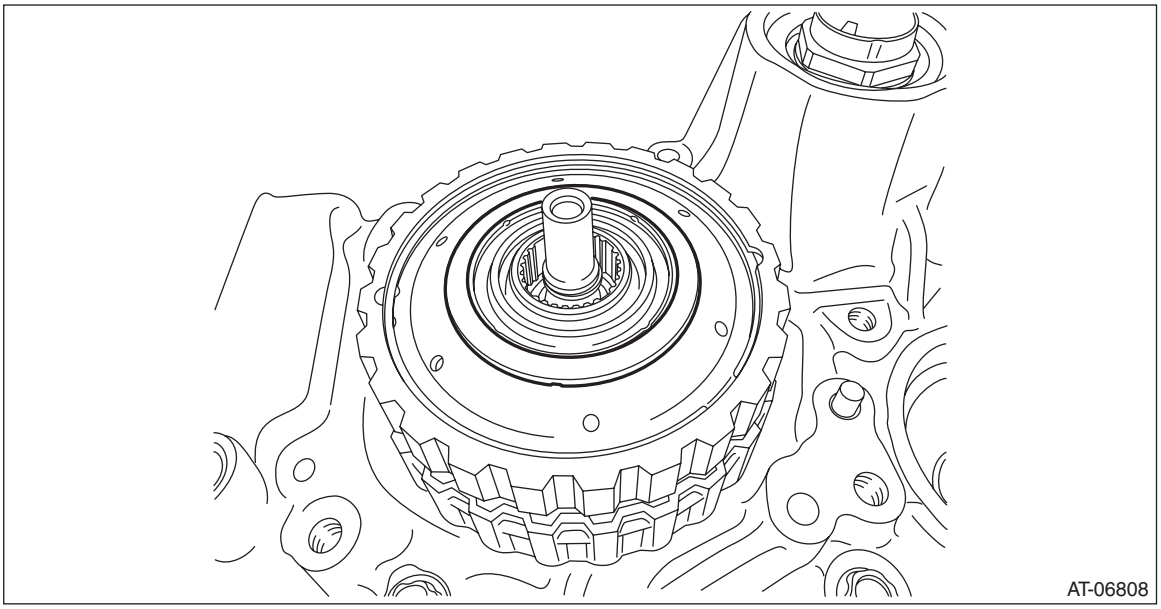


8) Install the internal gear.



9) Install the thrust bearing to the internal gear.

NOTE:
Face the temper color surface to the reverse brake side.

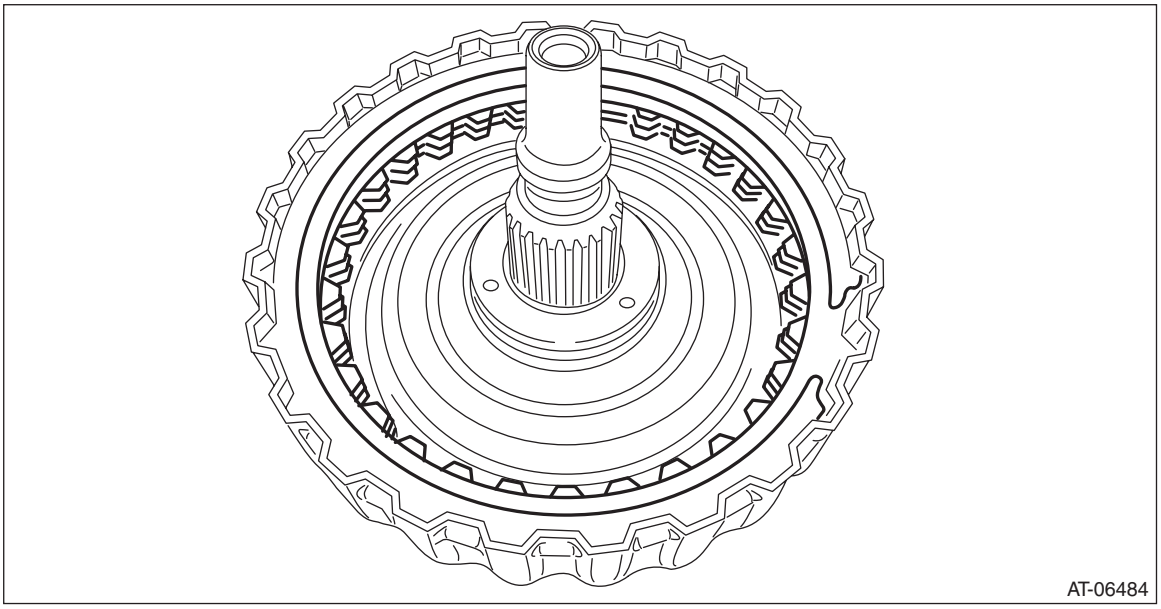


10) Select a washer. <Ref. to CVT(TR580)-276, ADJUSTMENT, Forward Clutch Assembly.>
11) Install the reverse brake assembly. <Ref. to CVT(TR580)-246, INSTALLATION, Reverse Brake Assembly.>
12) Install the primary pulley, secondary pulley and variator chain. <Ref. to CVT(TR580)-230, INSTALLATION, Primary Pulley and Secondary Pulley.>
13) Install the reduction drive gear. <Ref. to CVT(TR580)-219, INSTALLATION, Reduction Drive Gear.>
14) Install the transmission case. <Ref. to CVT(TR580)-208, INSTALLATION, Transmission Case.>
15) Install the transmission control device. <Ref. to CVT(TR580)-202, INSTALLATION, Transmission Control Device.>
16) Install the oil strainer and oil pan. <Ref. to CVT(TR580)-115, INSTALLATION, Oil Pan and Strainer.>
17) Install the reduction driven gear assembly. <Ref. to CVT(TR580)-192, INSTALLATION, Reduction Driven Gear.>
18) Install the transfer driven gear assembly. <Ref. to CVT(TR580)-187, INSTALLATION, Transfer Driven Gear.>
19) Install the transfer clutch assembly. <Ref. to CVT(TR580)-174, INSTALLATION, Transfer Clutch.>
20) Install the parking pawl. <Ref. to CVT(TR580)-190, INSTALLATION, Parking Pawl.>
21) Install the extension case. <Ref. to CVT(TR580)-169, INSTALLATION, Extension Case.>
22) Install the inhibitor switch. <Ref. to CVT(TR580)-101, INSTALLATION, Inhibitor Switch.>
23) Install the secondary speed sensor. <Ref. to CVT(TR580)-105, INSTALLATION, Secondary Speed Sensor.>
24) Install the primary speed sensor. <Ref. to CVT(TR580)-109, INSTALLATION, Primary Speed Sensor.>
25) Install the turbine speed sensor. <Ref. to CVT(TR580)-103, INSTALLATION, Turbine Speed Sensor.>
26) Install the transmission harness. <Ref. to CVT(TR580)-139, INSTALLATION, Transmission Harness.>
27) Install the control valve body. <Ref. to CVT(TR580)-124, INSTALLATION, Control Valve Body.>
28) Install the air breather hose. <Ref. to CVT(TR580)-160, INSTALLATION, Air Breather Hose.>
29) Install the transmission assembly to the vehicle. <Ref. to CVT(TR580)-72, INSTALLATION, Automatic Transmission Assembly.>

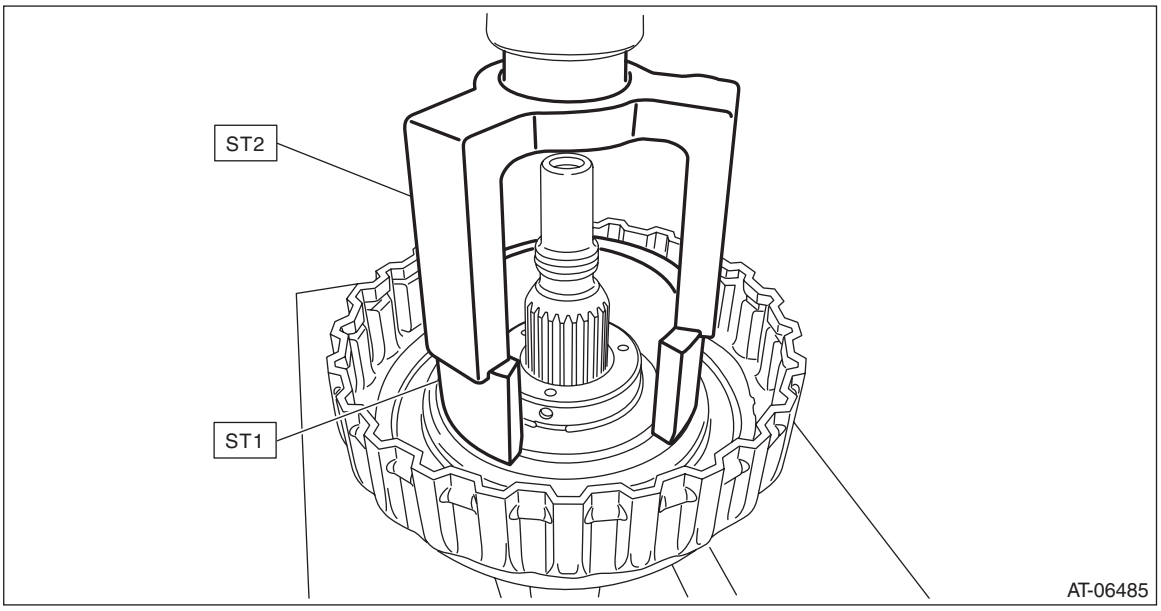
C: DISASSEMBLY

1. FORWARD CLUTCH ASSEMBLY

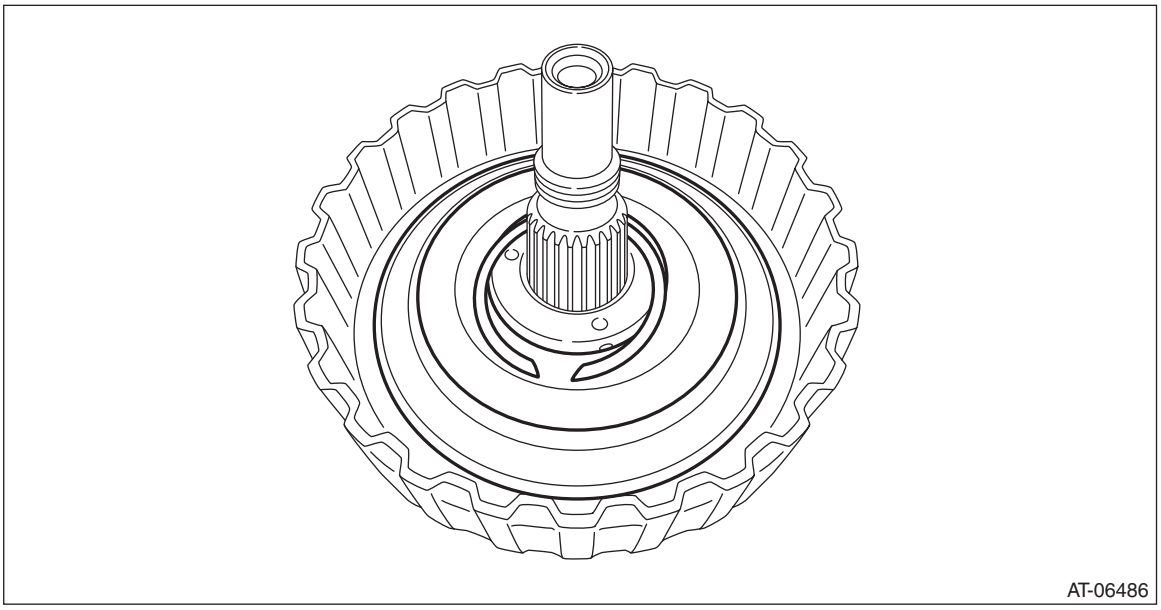
1) Remove the snap ring.
2) Remove the retaining plate, drive plate, driven plate and dish plate.



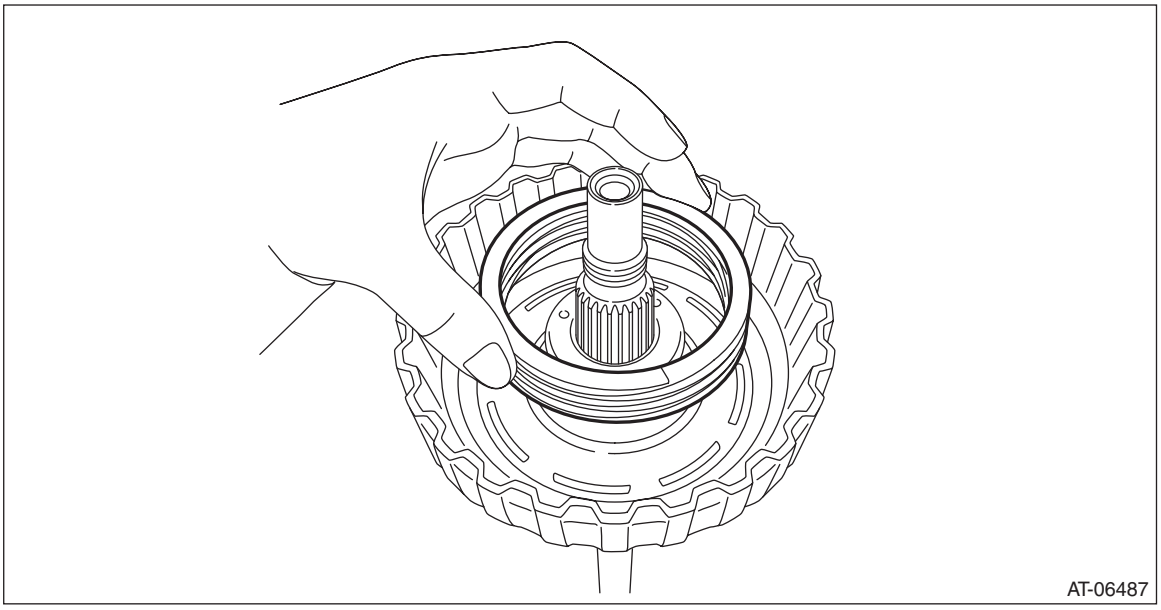
3) Compress the return spring using the ST to remove the snap ring.
ST1 18762AA010 COMPRESSOR SPECIAL TOOL
ST2 398673600 COMPRESSOR



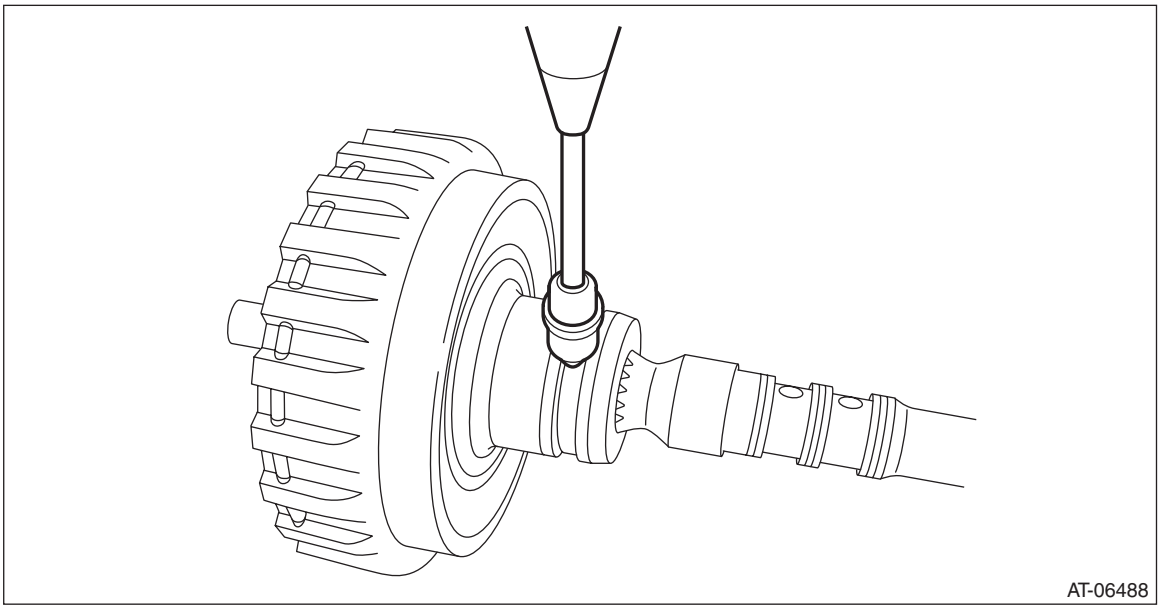
4) Remove the chamber COMPL and snap ring.



5) Remove the return spring.

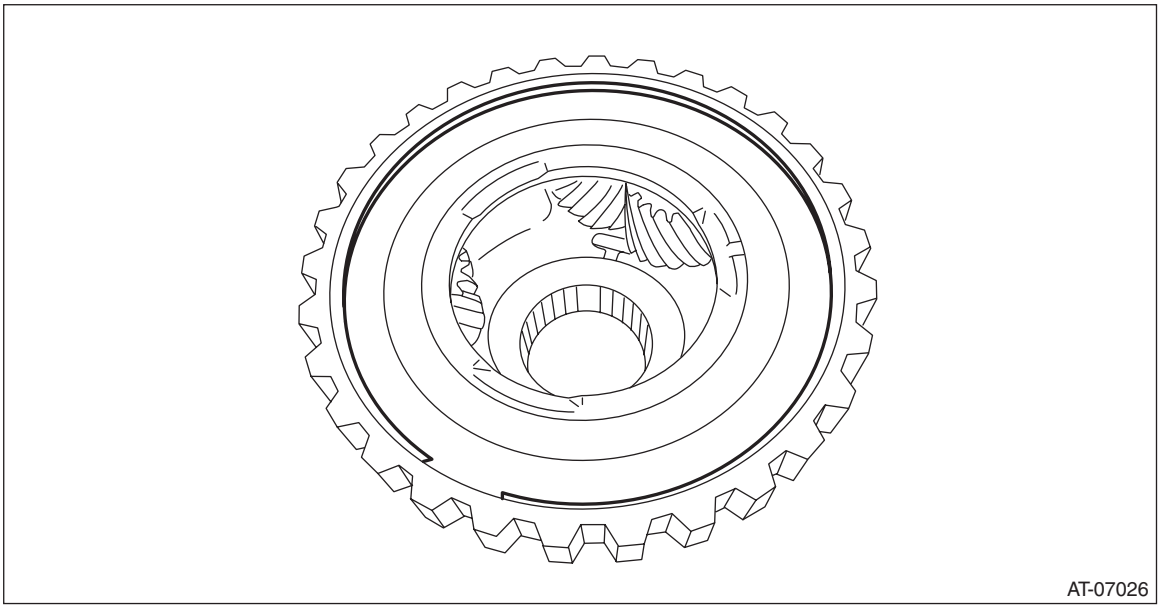


6) Remove the forward clutch piston by blowing compressed air intermittently from the forward clutch carrier hole.



2. PLANETARY CARRIER ASSY

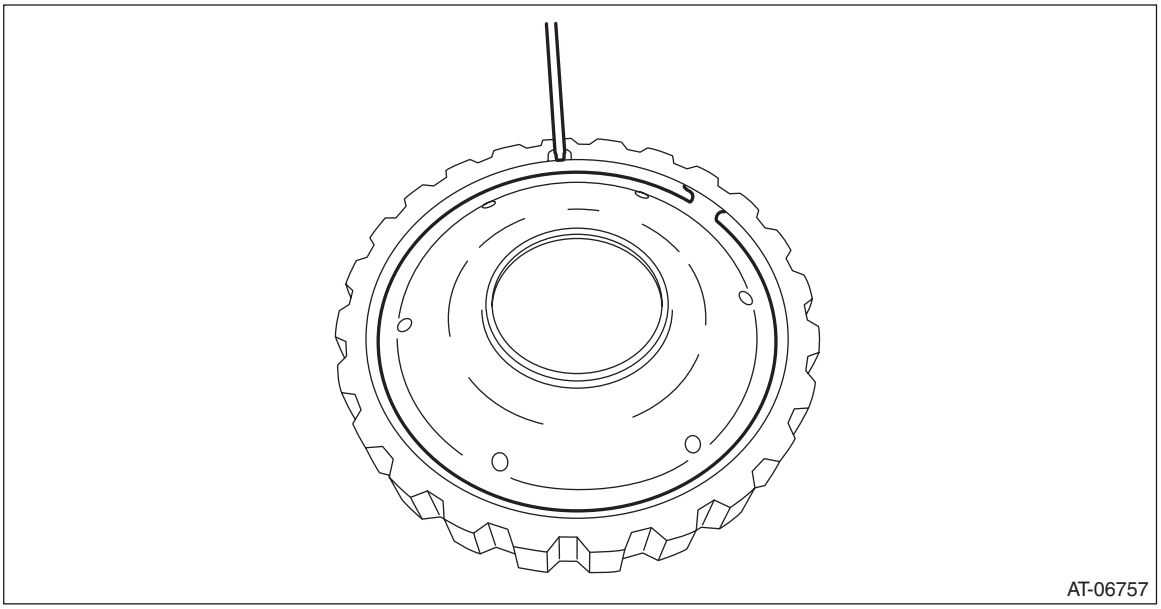
NOTE:
Disassemble the balance oil guide only.
1) Remove the snap ring.



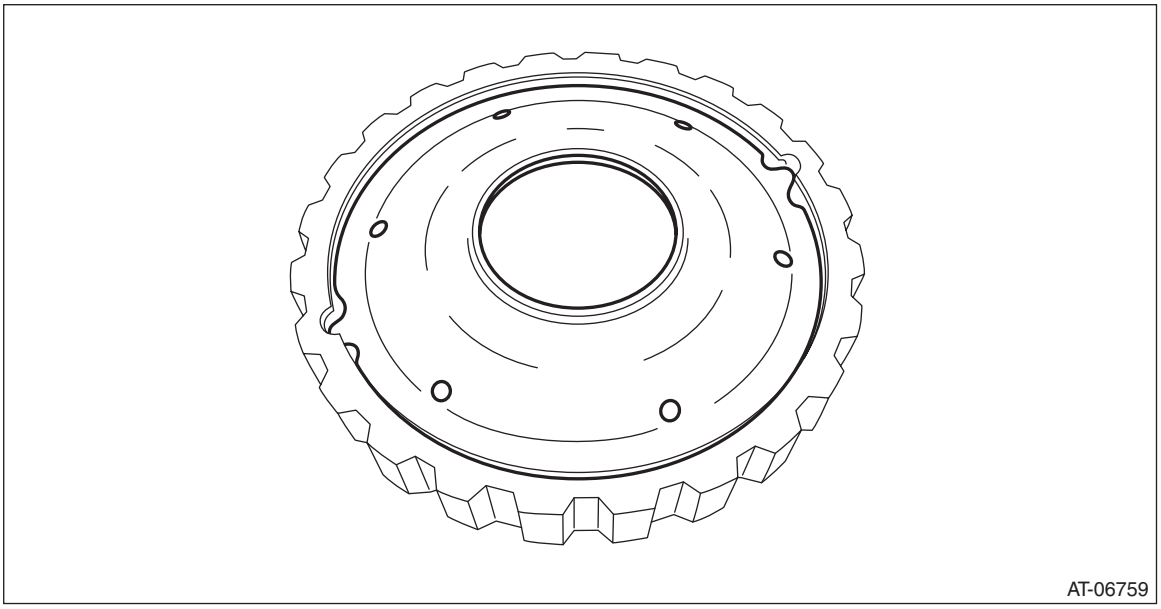
2) Remove the balance oil guide.

3. INTERNAL GEAR

1) Remove the snap ring.



2) Remove the thrust gear plate.

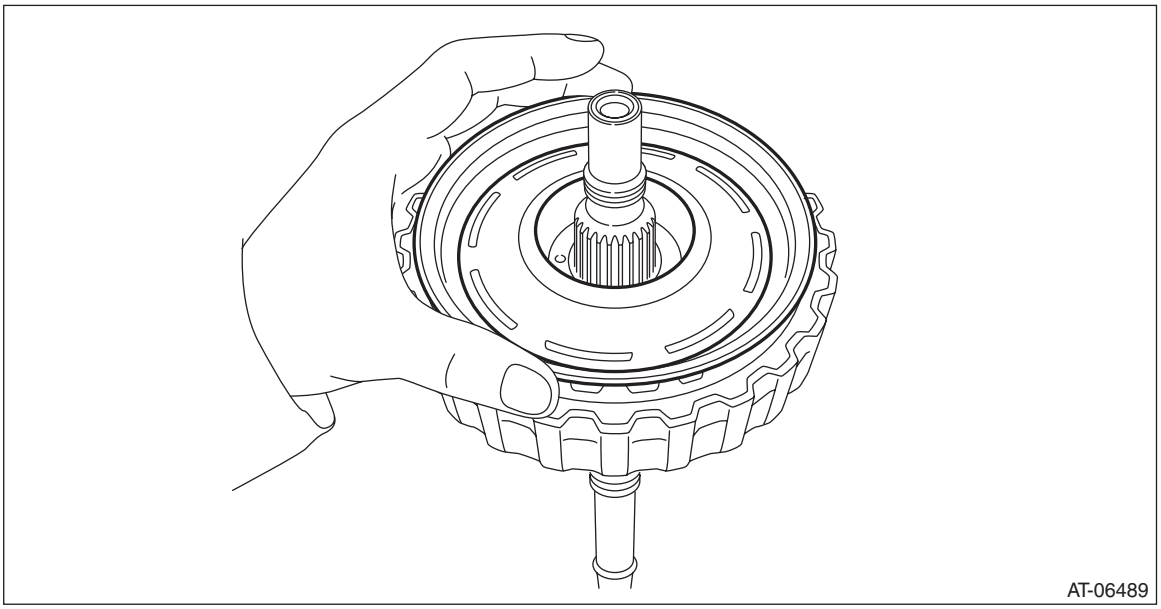


D: ASSEMBLY

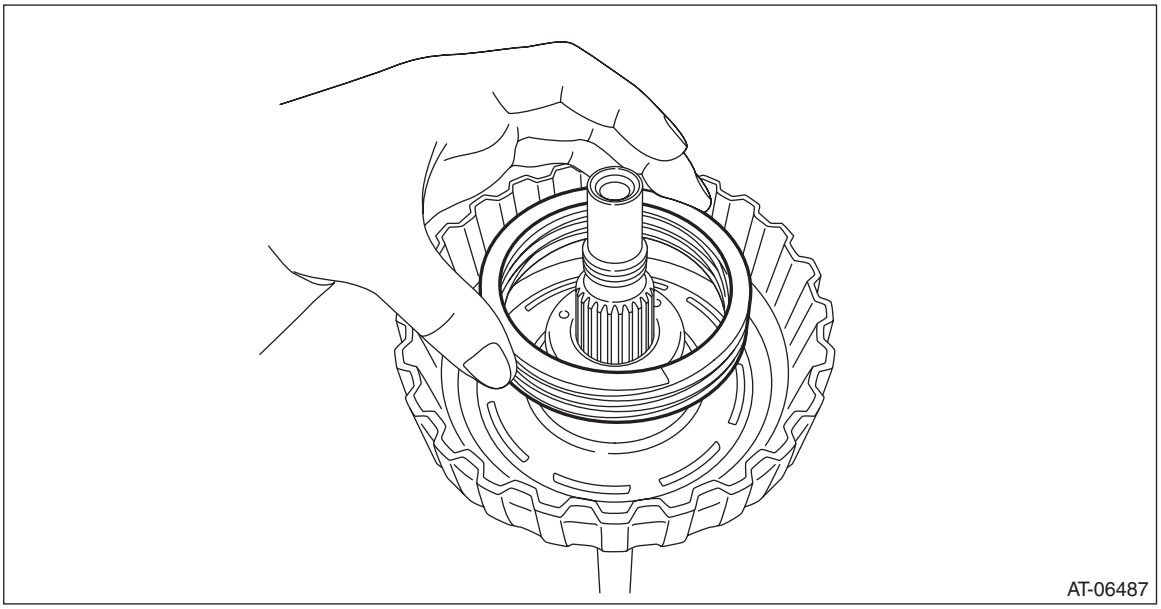
1. FORWARD CLUTCH ASSEMBLY

1) Install the forward clutch piston to forward clutch drum.

NOTE:
- Apply CVTF to the seal of forward clutch piston.
- Insert it all the way to the end.

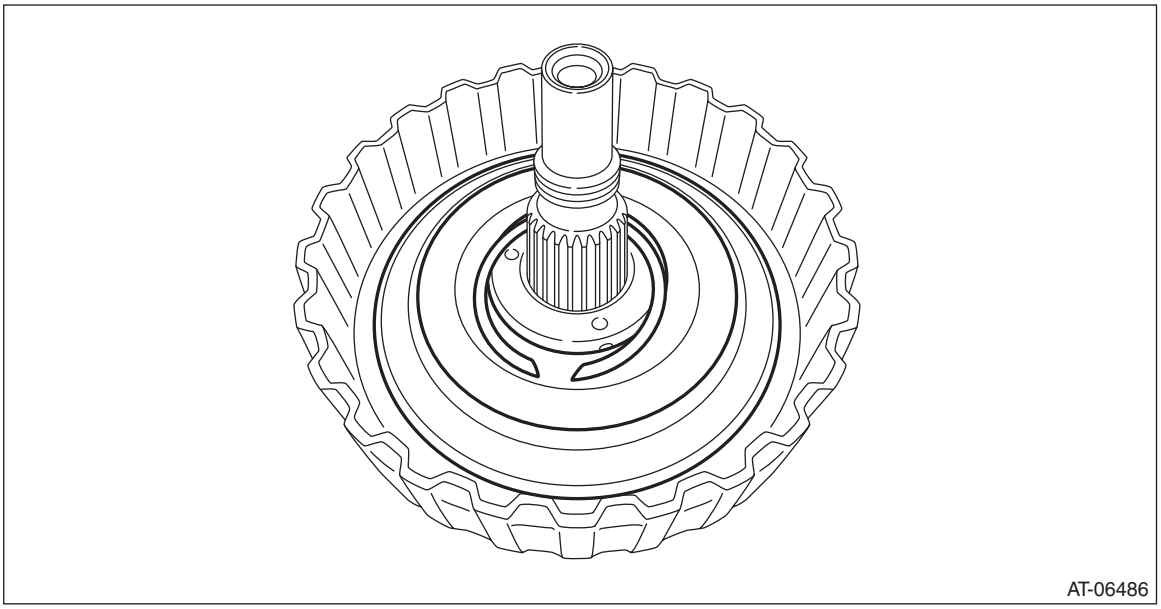


2) Install the return spring.



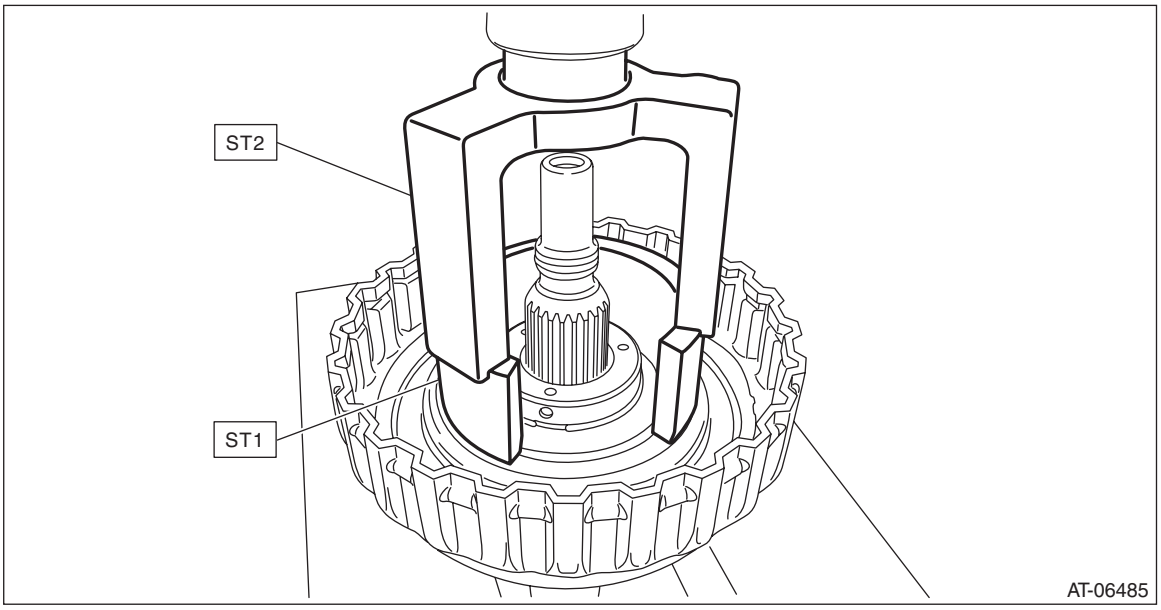
3) Install the chamber COMPL.

NOTE:
Apply CVTF to the sealing area of chamber COMPL.

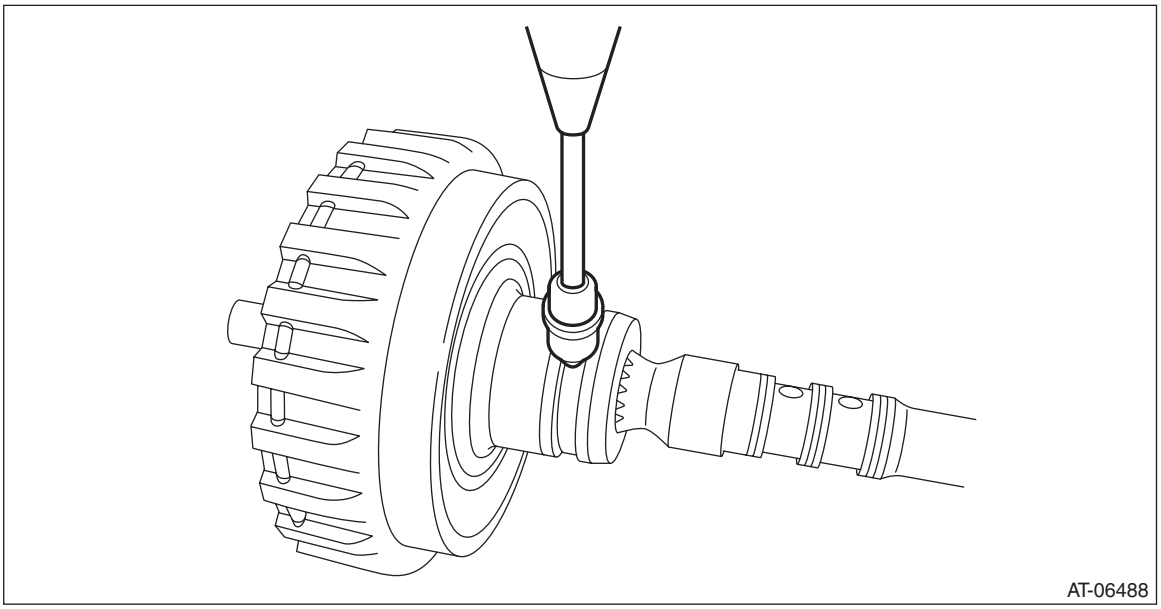


4) Compress the return spring using the ST to install the snap ring.

ST1 18762AA010 COMPRESSOR SPECIAL TOOL
ST2 398673600 COMPRESSOR



5) Check the operation of forward clutch piston by blowing compressed air intermittently from forward clutch carrier hole.



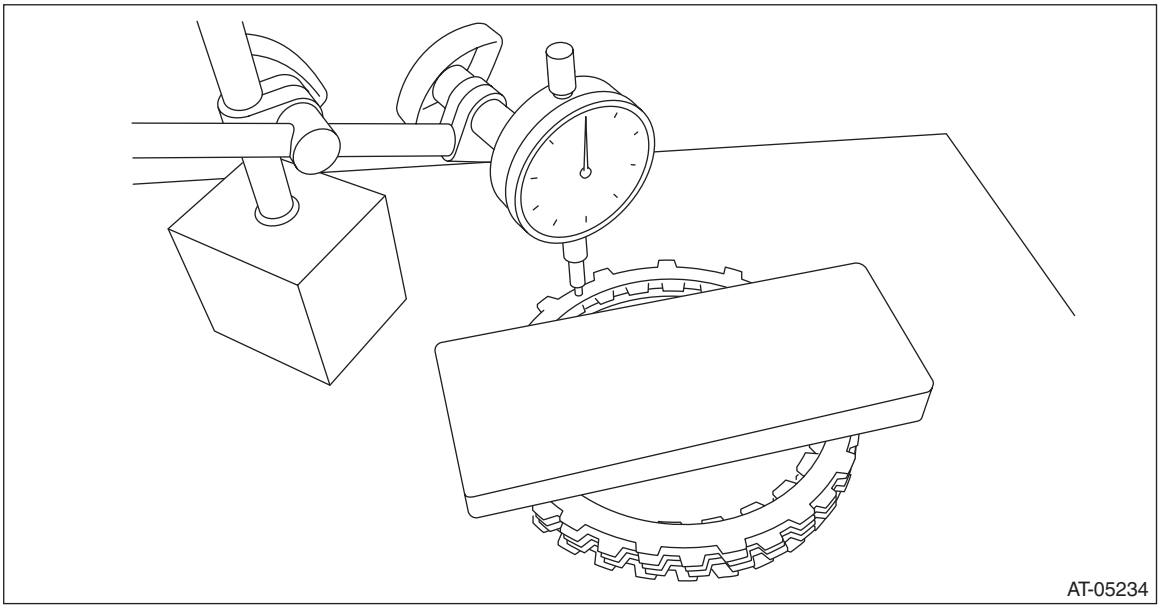
6) Place the driven plate, drive plate and retaining plate neatly in this order on surface table.
7) Set the dial gauge to retaining plate, and read its scale.

NOTE:
The value, which is read in the gauge at this time, is zero point.

8) Scale and record the weight "Z" of a flat board which will be put on retaining plate.

NOTE:
- Use a stiff board which does not bend against load as a flat board to be put on retaining plate.
- Use a flat board weighing less than 52 N (5.3 kgf, 11.7 lb).

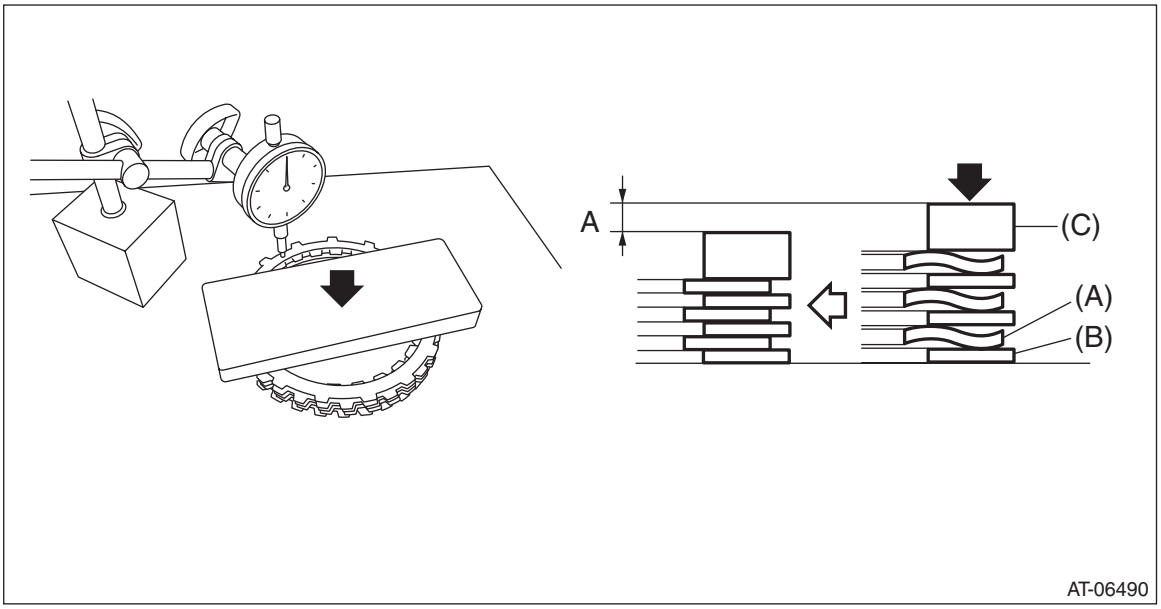
9) Put the flat board on retaining plate.



10) Using the following formula, read the push/pull gauge and calculate "N".
N = 52 N (5.3 kgf, 11.7 lb) – Z
52 N (5.3 kgf, 11.7 lb) : Load applied to clutch plate
Z: Flat board weight

11) Press the center of retaining plate by applying a force of “N” using push/pull gauge, and then measure and record the compression amount “A”.

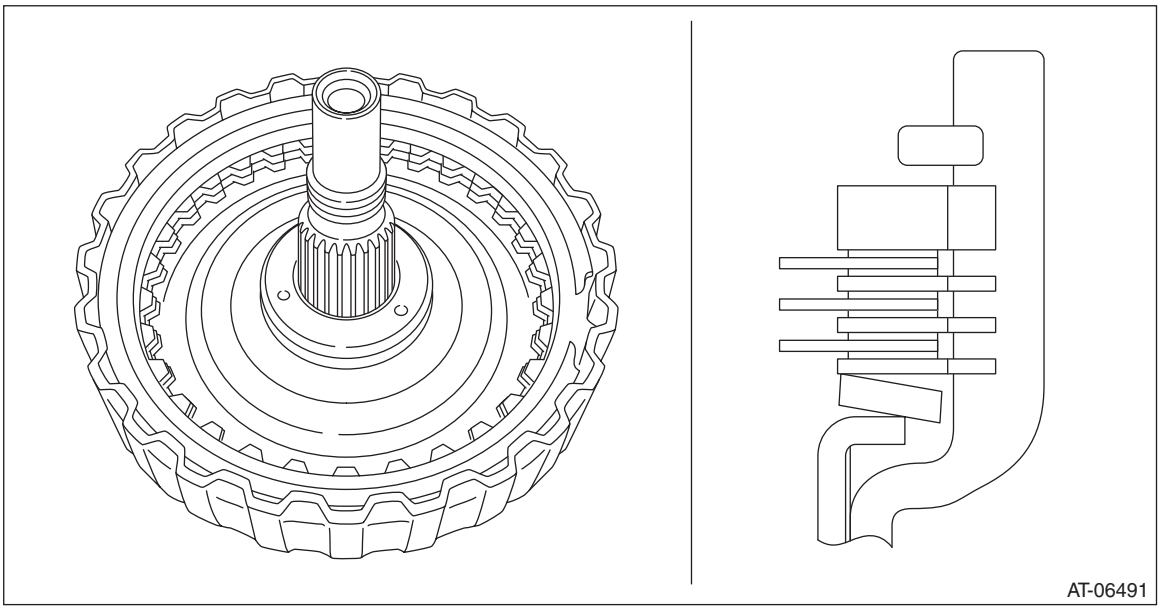
NOTE:
Measure at four points with a 90° interval and calculate the average.



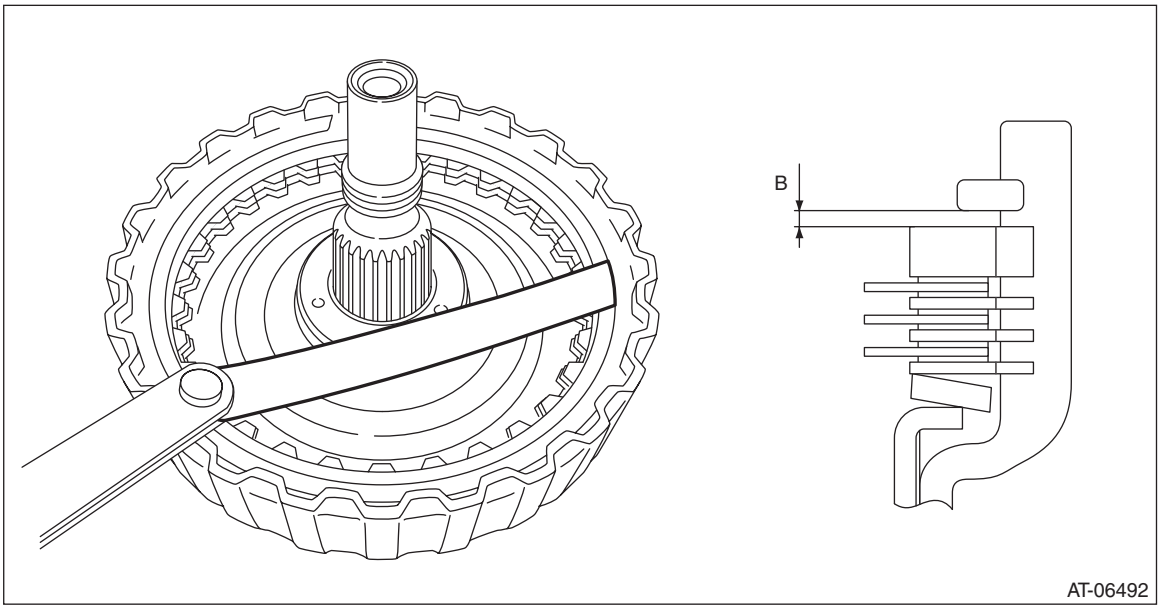
(A) Driven plate
(B) Drive plate
(C) Retaining plate

12) Install the dish plate, drive plate, driven plate, retaining plate and snap ring to the forward clutch carrier.

NOTE:
Install the dish plate in the correct direction.



13) Measure and record the clearance “B” between the retaining plate and snap ring.



14) Piston stroke calculation
Calculate with A and B dimensions recorded before.
If it exceeds the limit, replace with a new drive plate and adjust within the initial standard value.
S mm (in) = A + B
S: Piston stroke
A: Compression amount of drive plate and dish plate
B: Clearance between retaining plate and snap ring

Initial standard:
1.0 — 1.4 mm (0.040 — 0.055 in)

Limit thickness:
1.6 mm (0.063 in)

Retaining plate	
Part No.	Thickness mm (in)
31567AB760	4.2 (0.165)
31567AB770	4.4 (0.173)
31567AB780	4.6 (0.181)
31567AB790	4.8 (0.189)
31567AB830	5.0 (0.197)

2. PLANETARY CARRIER ASSY

NOTE:
Assemble in the reverse order of disassembly.

3. INTERNAL GEAR

NOTE:
Assemble in the reverse order of disassembly.

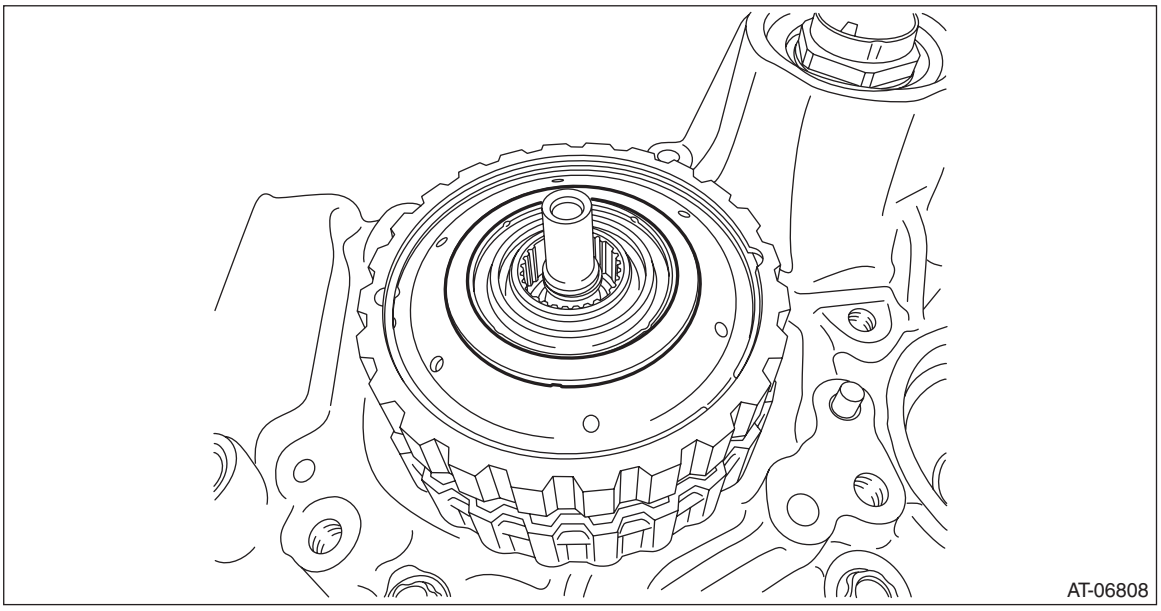
E: INSPECTION

- Check the forward clutch drum, internal gear, sun gear and forward clutch piston lip for wear or damage.
- Inspect the drive plate facing for wear and damage.
- Check the driven plate for discoloration (burnt color).
- Check for worn snap ring, fatigue or damaged return spring or deformed spring retainer.
- Make sure the clearance between retaining plate and internal gear of forward clutch is within the limit. If it exceeds the standard, replace the forward clutch. <Ref. to CVT(TR580)-271, ASSEMBLY, Forward Clutch Assembly.>

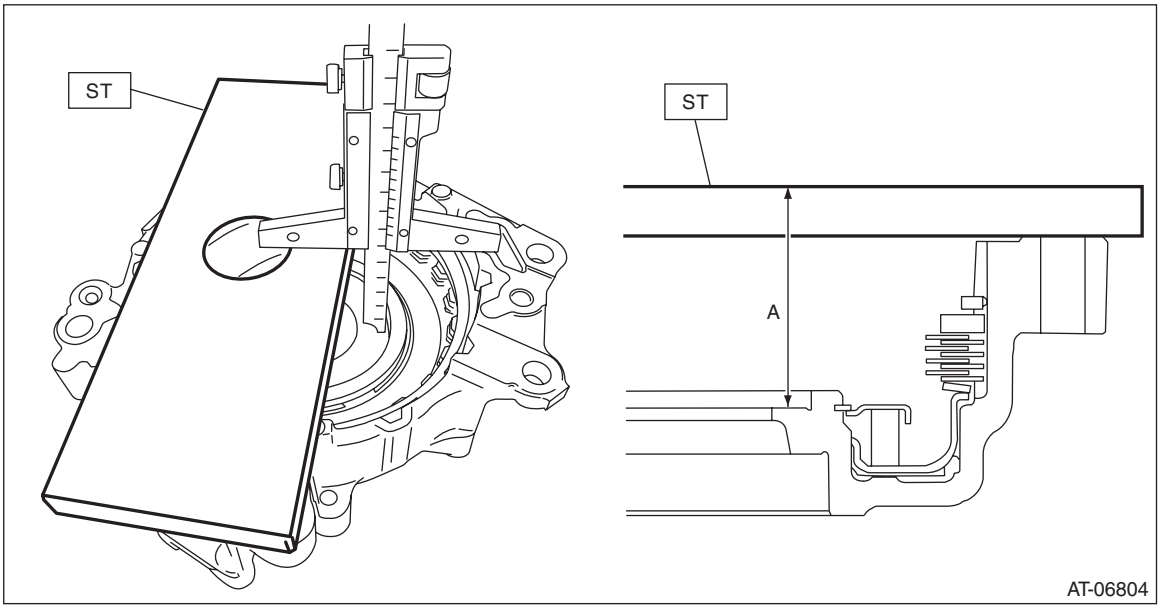
F: ADJUSTMENT

1) Install the thrust bearing to the internal gear.

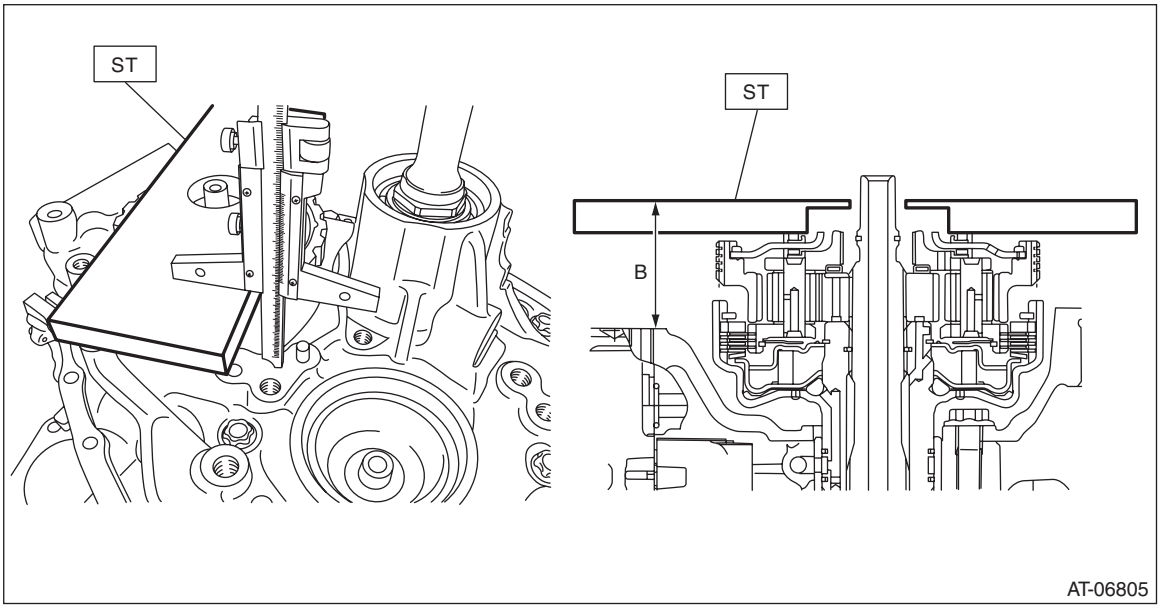
NOTE:
Face the temper color surface to the reverse brake side.



2) Measure depth “A” from the ST upper face to the washer mounting surface.
ST 499575600 GAUGE



3) Measure the height “B” from the ST upper face to the mating surface of the drive pinion retainer.
ST 499575600 GAUGE



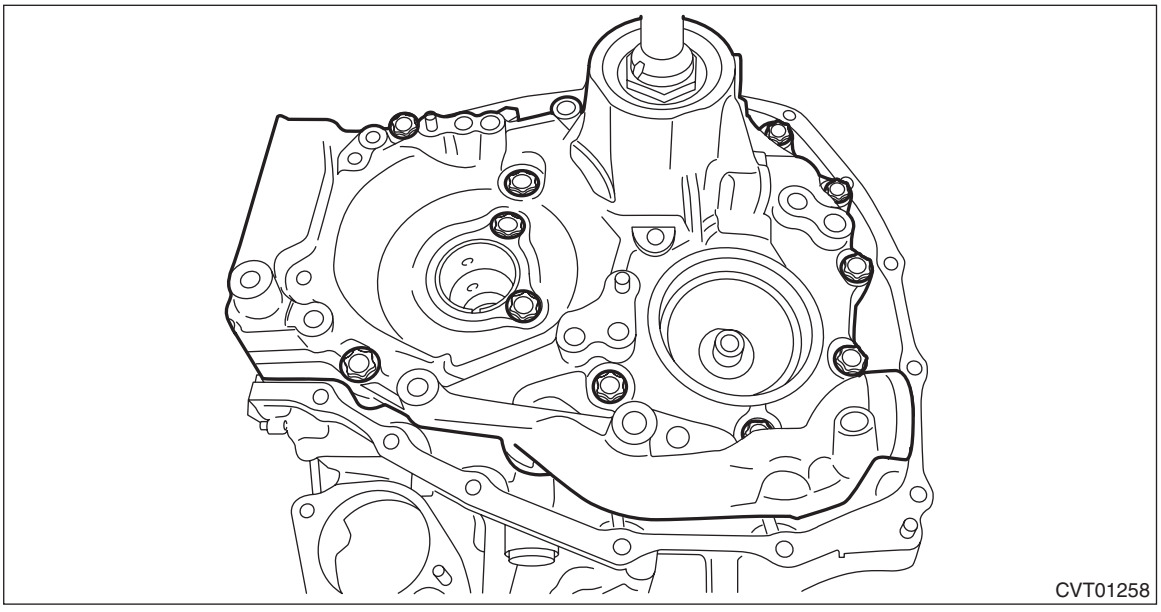
4) Obtain the thickness of washer using the following formula to select the washer.
T (mm) = A – B – (0.35 — 0.70)
[T (in) = A – B – (0.014 — 0.028)]
T: Shim thickness
A: Depth from the ST upper face to the washer mounting surface
B: Height from ST upper face to the drive pinion retainer mating surface
0.35 — 0.70 mm (0.014 — 0.028 in): Clearance

Washer	
Part No.	Thickness mm (in)
803064020	1.3 (0.051)
803064021	1.55 (0.061)
803064022	1.8 (0.071)
803064023	2.05 (0.081)
803064024	2.3 (0.091)
803064025	2.55 (0.100)

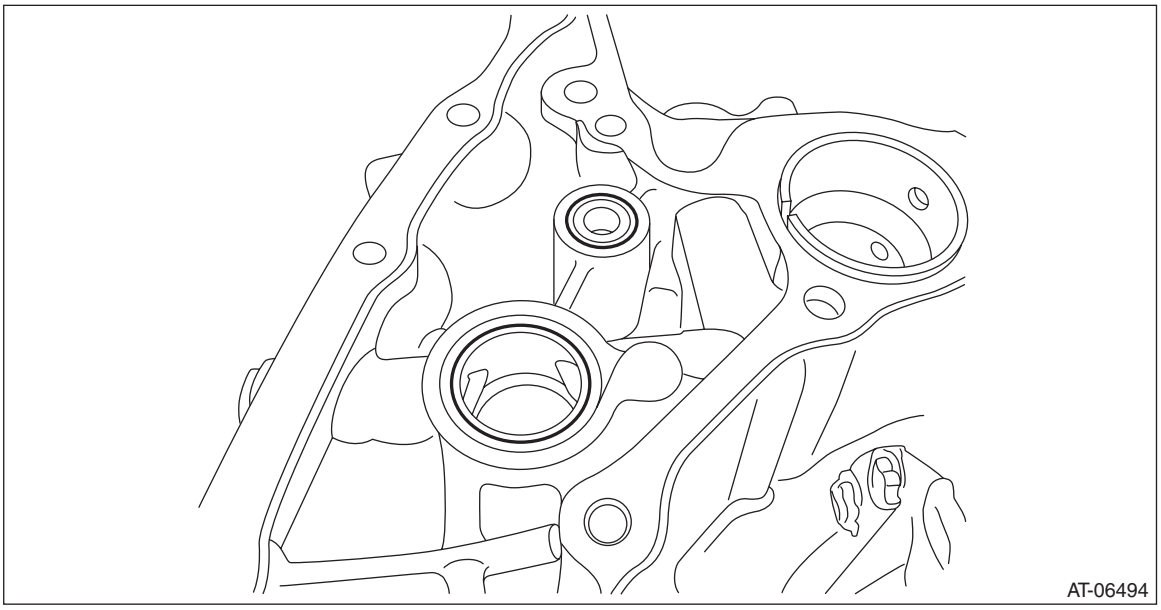
41.Drive Pinion Shaft Assembly

A: REMOVAL

1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TR580)-60, REMOVAL, Automatic Transmission Assembly.>
2) Remove the air breather hose. <Ref. to CVT(TR580)-158, REMOVAL, Air Breather Hose.>
3) Remove the control valve body. <Ref. to CVT(TR580)-117, REMOVAL, Control Valve Body.>
4) Remove the transmission harness. <Ref. to CVT(TR580)-132, REMOVAL, Transmission Harness.>
5) Remove the turbine speed sensor. <Ref. to CVT(TR580)-103, REMOVAL, Turbine Speed Sensor.>
6) Remove the secondary speed sensor. <Ref. to CVT(TR580)-105, REMOVAL, Secondary Speed Sensor.>
7) Remove the primary speed sensor. <Ref. to CVT(TR580)-108, REMOVAL, Primary Speed Sensor.>
8) Remove the inhibitor switch. <Ref. to CVT(TR580)-99, REMOVAL, Inhibitor Switch.>
9) Remove the extension case. <Ref. to CVT(TR580)-168, REMOVAL, Extension Case.>
10) Remove the transfer clutch assembly. <Ref. to CVT(TR580)-172, REMOVAL, Transfer Clutch.>
11) Remove the transfer driven gear assembly. <Ref. to CVT(TR580)-186, REMOVAL, Transfer Driven Gear.>
12) Remove the parking pawl. <Ref. to CVT(TR580)-189, REMOVAL, Parking Pawl.>
13) Remove the reduction driven gear assembly. <Ref. to CVT(TR580)-191, REMOVAL, Reduction Driven Gear.>
14) Remove the oil pan and oil strainer. <Ref. to CVT(TR580)-113, REMOVAL, Oil Pan and Strainer.>
15) Remove the transmission control device. <Ref. to CVT(TR580)-199, REMOVAL, Transmission Control Device.>
16) Remove the transmission case. <Ref. to CVT(TR580)-205, REMOVAL, Transmission Case.>
17) Remove the reduction drive gear. <Ref. to CVT(TR580)-218, REMOVAL, Reduction Drive Gear.>
18) Remove the primary pulley, secondary pulley and variator chain. <Ref. to CVT(TR580)-223, REMOVAL, Primary Pulley and Secondary Pulley.>
19) Remove the reverse brake assembly. <Ref. to CVT(TR580)-243, REMOVAL, Reverse Brake Assembly.>
20) Remove the forward clutch assembly. <Ref. to CVT(TR580)-258, REMOVAL, Forward Clutch Assembly.>
21) Using the ST, remove the drive pinion retainer.
ST 18270KA020 SOCKET (E20)


CVT01258

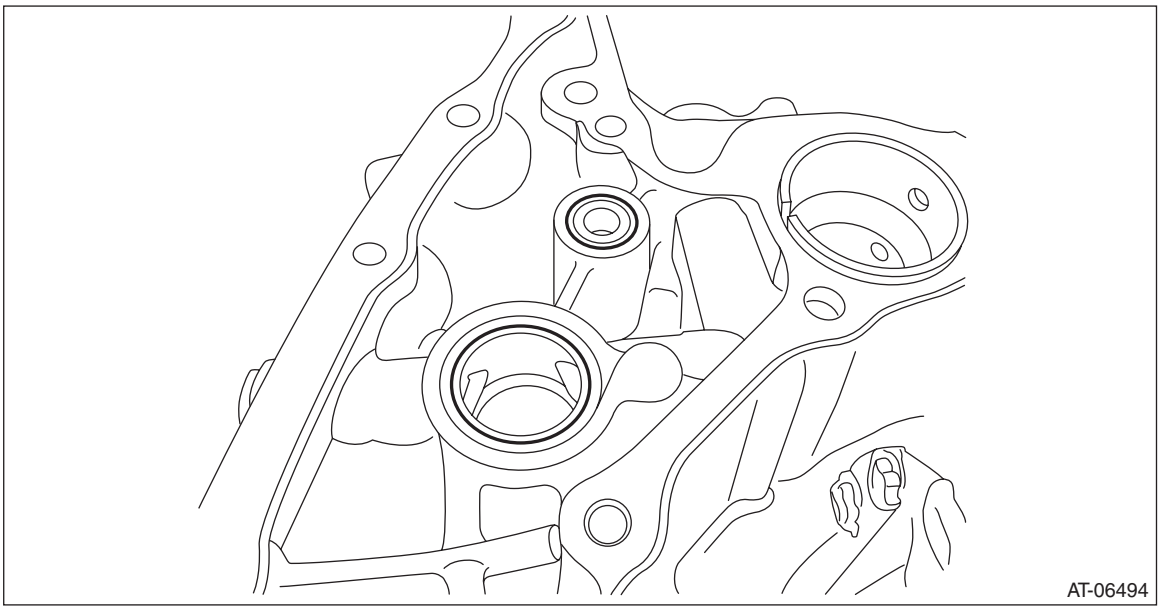
22) Remove the O-ring.



B: INSTALLATION

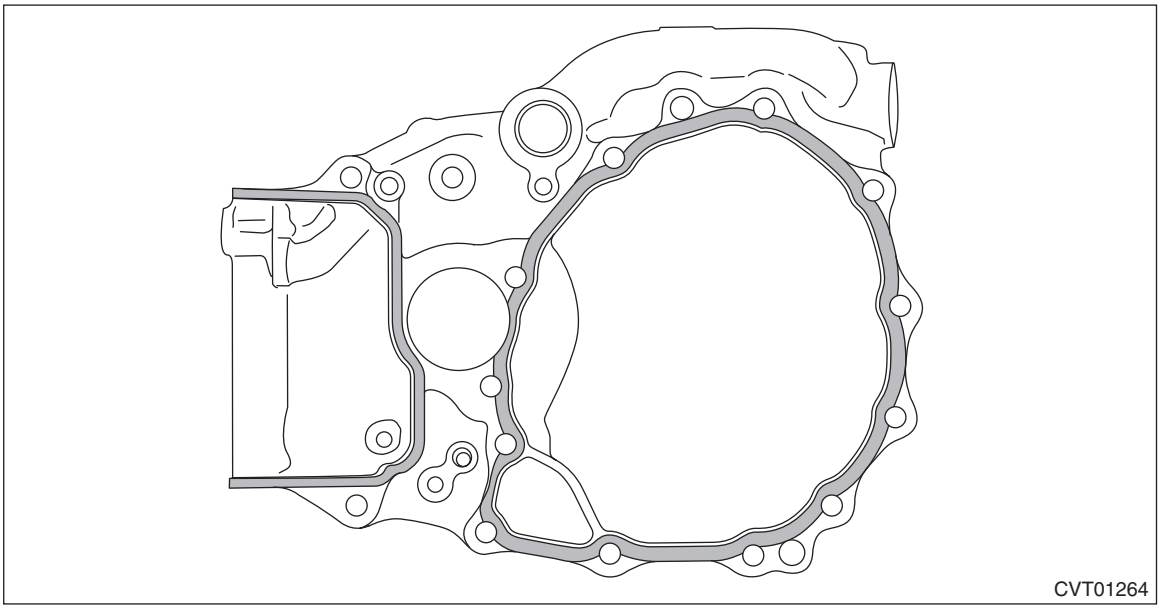
1) Clean the mating surface of drive pinion retainer and converter case.
2) Adjust the backlash and tooth contact between drive pinion shaft assembly and the front differential side gear. <Ref. to CVT(TR580)-301, ADJUSTMENT, Drive Pinion Shaft Assembly.>
3) Install O-rings in two locations to the converter case.

NOTE:
- Use new O-rings.
- Apply CVTF to the O-ring.



4) Apply liquid gasket seamlessly to the mating surface of drive pinion retainer.

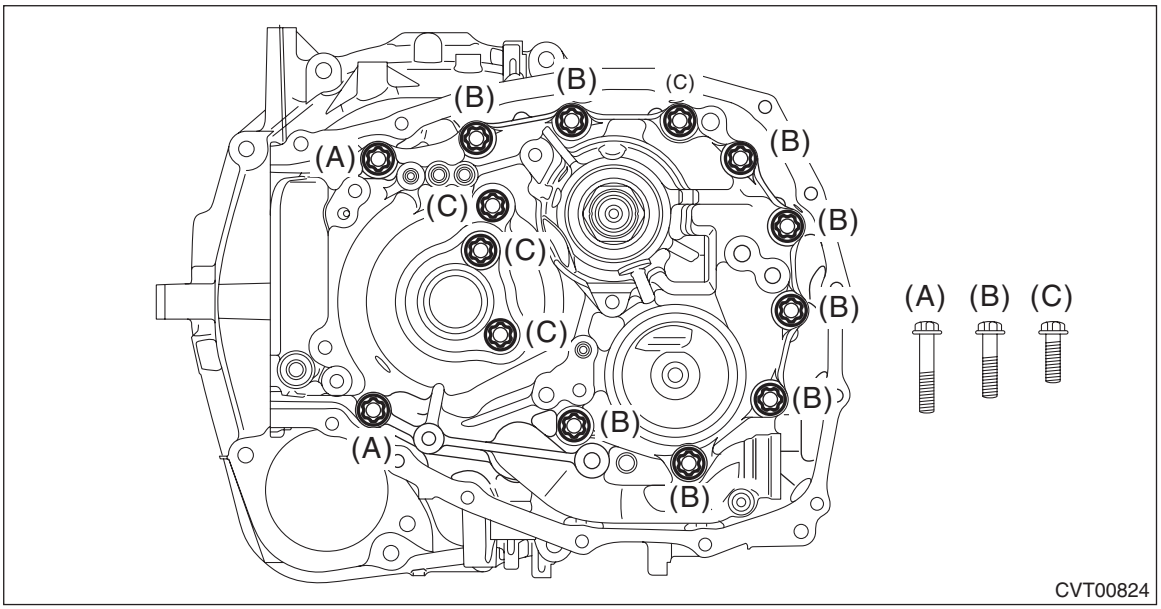
Liquid gasket:
THREE BOND 1215B or equivalent



5) Install the drive pinion retainer to converter case, and tighten the bolt using the ST.
ST 18270KA020 SOCKET (E20)

NOTE:
Do not confuse the three different-length bolts when installing.

Tightening torque:
43 N·m (4.4 kgf-m, 31.7 ft-lb)

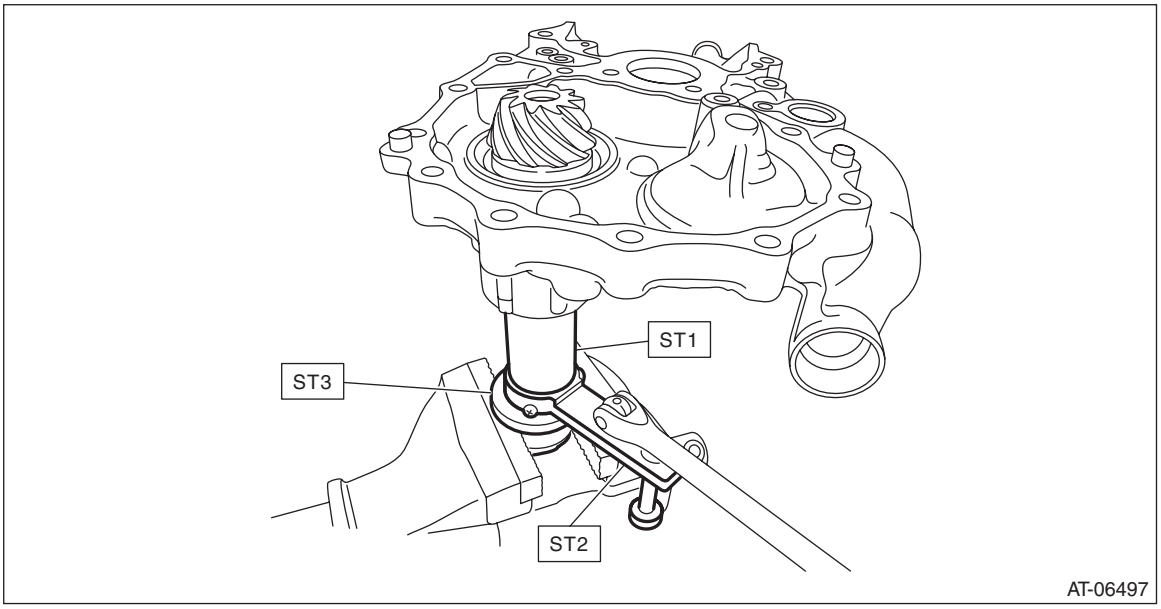


6) Install the forward clutch assembly. <Ref. to CVT(TR580)-262, INSTALLATION, Forward Clutch Assembly.>
7) Install the reverse brake assembly. <Ref. to CVT(TR580)-246, INSTALLATION, Reverse Brake Assembly.>
8) Install the primary pulley, secondary pulley and variator chain. <Ref. to CVT(TR580)-230, INSTALLATION, Primary Pulley and Secondary Pulley.>
9) Install the reduction drive gear. <Ref. to CVT(TR580)-219, INSTALLATION, Reduction Drive Gear.>
10) Install the transmission case. <Ref. to CVT(TR580)-208, INSTALLATION, Transmission Case.>
11) Install the transmission control device. <Ref. to CVT(TR580)-202, INSTALLATION, Transmission Control Device.>
12) Install the oil strainer and oil pan. <Ref. to CVT(TR580)-115, INSTALLATION, Oil Pan and Strainer.>
13) Install the reduction driven gear assembly. <Ref. to CVT(TR580)-192, INSTALLATION, Reduction Driven Gear.>
14) Install the transfer driven gear assembly. <Ref. to CVT(TR580)-187, INSTALLATION, Transfer Driven Gear.>
15) Install the transfer clutch assembly. <Ref. to CVT(TR580)-174, INSTALLATION, Transfer Clutch.>
16) Install the parking pawl. <Ref. to CVT(TR580)-190, INSTALLATION, Parking Pawl.>
17) Install the extension case. <Ref. to CVT(TR580)-169, INSTALLATION, Extension Case.>
18) Install the inhibitor switch. <Ref. to CVT(TR580)-101, INSTALLATION, Inhibitor Switch.>
19) Install the secondary speed sensor. <Ref. to CVT(TR580)-105, INSTALLATION, Secondary Speed Sensor.>
20) Install the primary speed sensor. <Ref. to CVT(TR580)-109, INSTALLATION, Primary Speed Sensor.>
21) Install the turbine speed sensor. <Ref. to CVT(TR580)-103, INSTALLATION, Turbine Speed Sensor.>
22) Install the transmission harness. <Ref. to CVT(TR580)-139, INSTALLATION, Transmission Harness.>
23) Install the control valve body. <Ref. to CVT(TR580)-124, INSTALLATION, Control Valve Body.>
24) Install the air breather hose. <Ref. to CVT(TR580)-160, INSTALLATION, Air Breather Hose.>
25) Install the transmission assembly to the vehicle. <Ref. to CVT(TR580)-72, INSTALLATION, Automatic Transmission Assembly.>

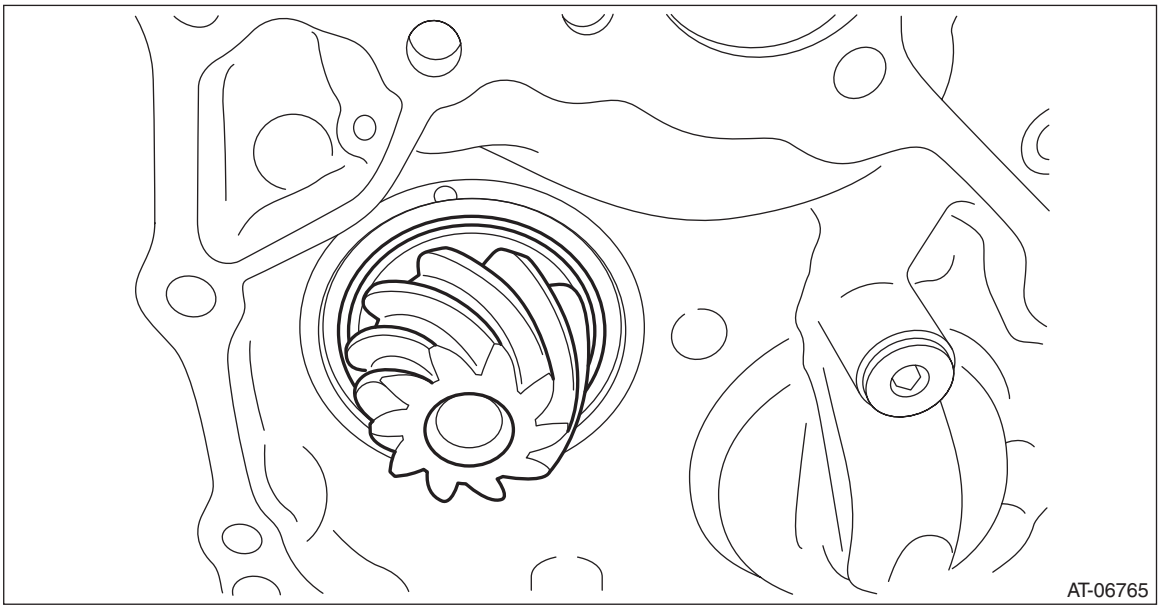
C: DISASSEMBLY

1) Flatten the tab of the lock nut.
2) Using ST1, ST2 and ST3, fix at the spline portion of drive pinion shaft to remove the lock nut.

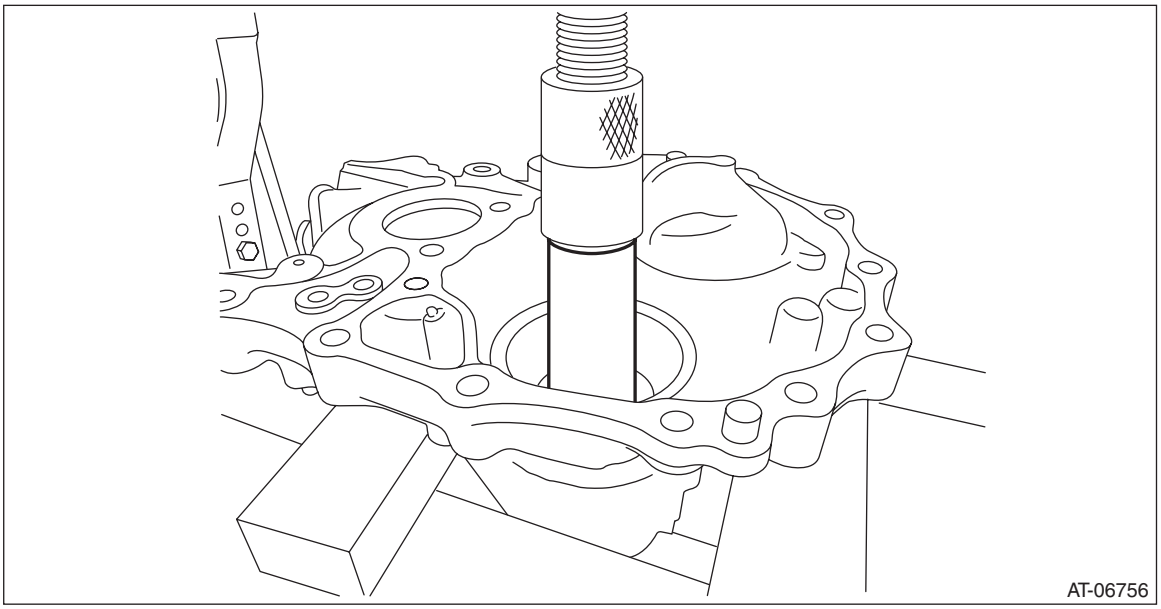
ST1 499787500 ADAPTER
ST2 499787700 WRENCH
ST3 498937110 HOLDER



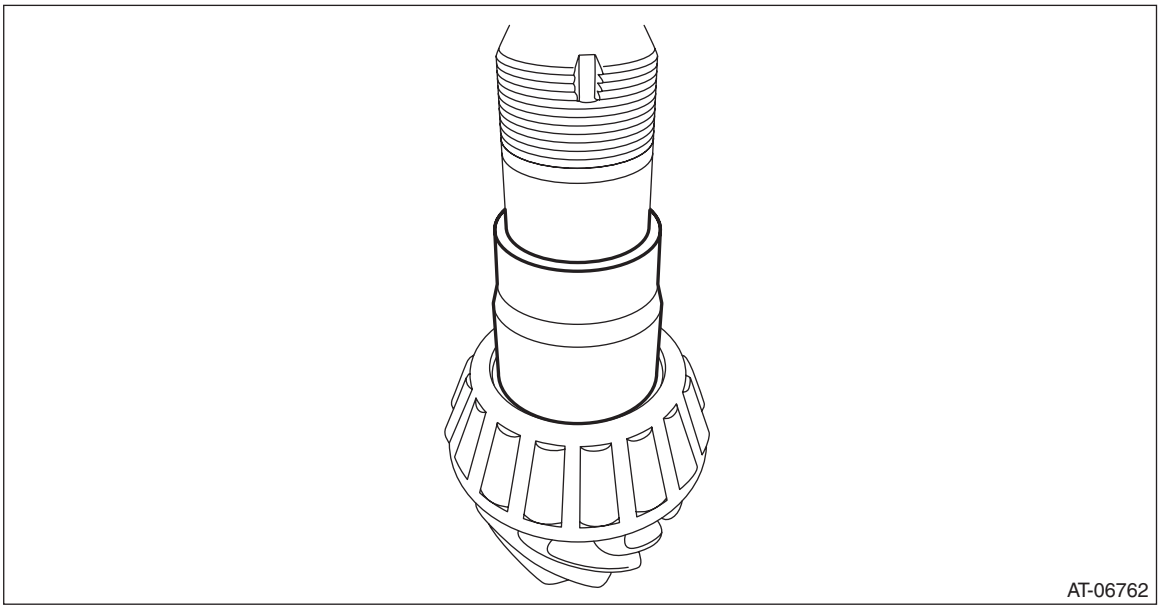
3) Remove the drive pinion shaft from the drive pinion retainer.



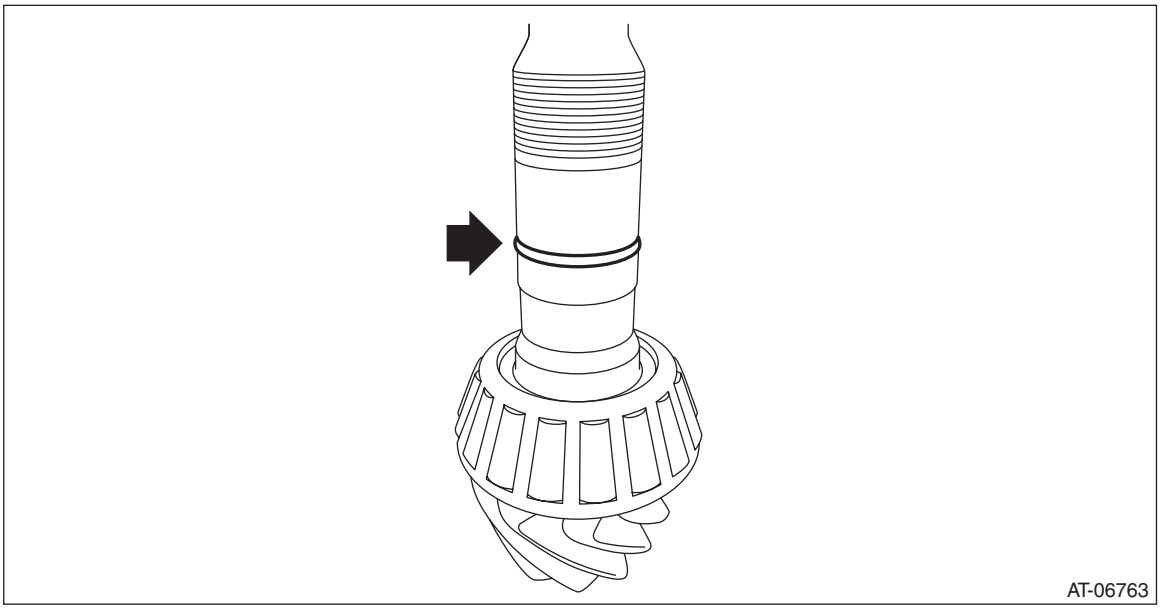
4) Using the round bar with diameter of 36 mm (1.42 in) or 37 mm (1.46 in), remove the bearing inner race and plug.



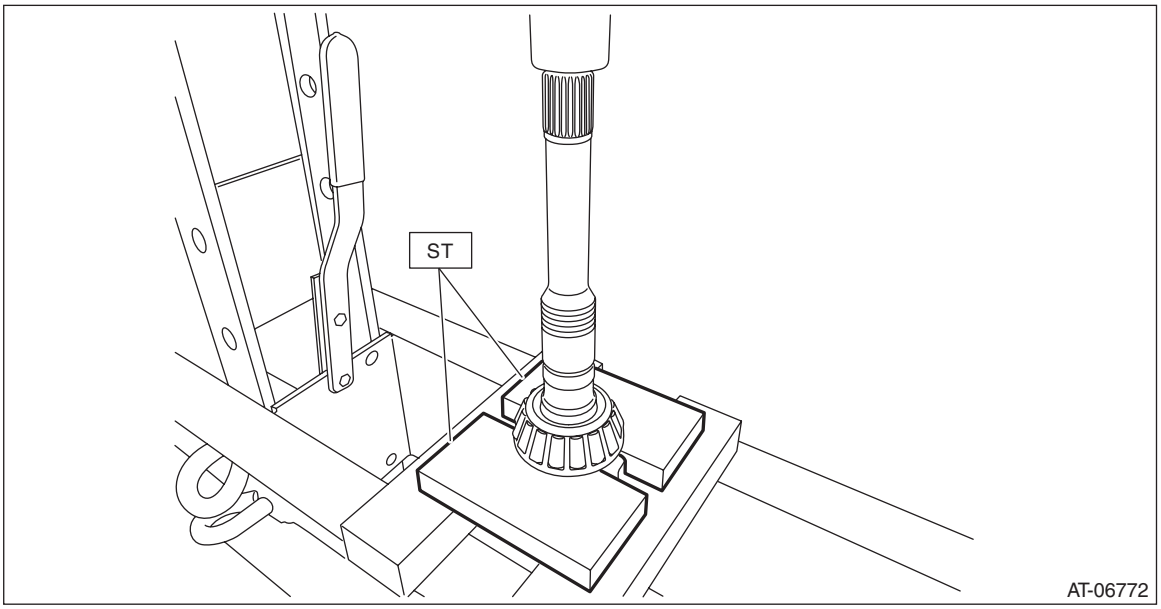
5) Remove the drive pinion washer.
6) Remove the drive pinion spacer.



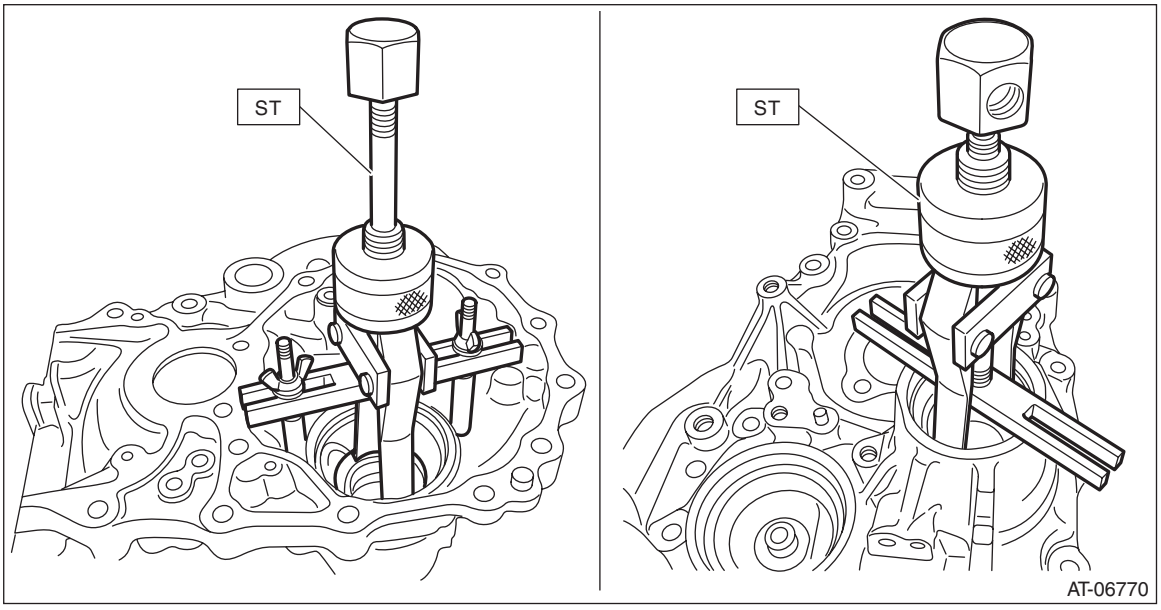
7) Remove the O-ring.



8) Remove the inner race and drive pinion shim from drive pinion shaft using ST.
ST 498515500 REMOVER

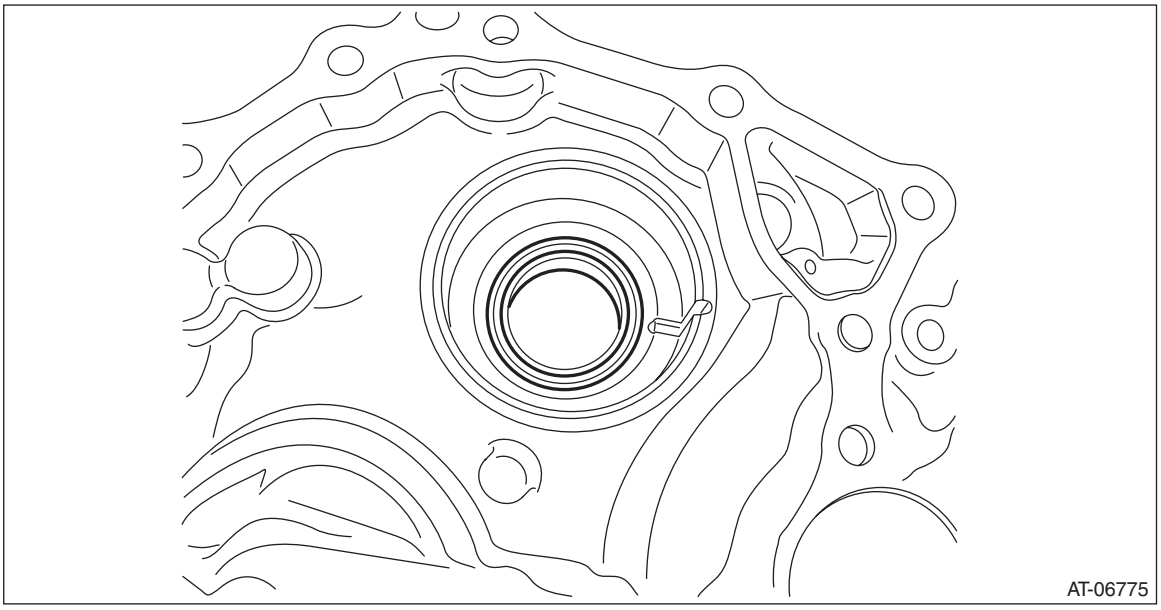


9) Using the ST, remove the outer race.
ST 398527700 PULLER ASSY

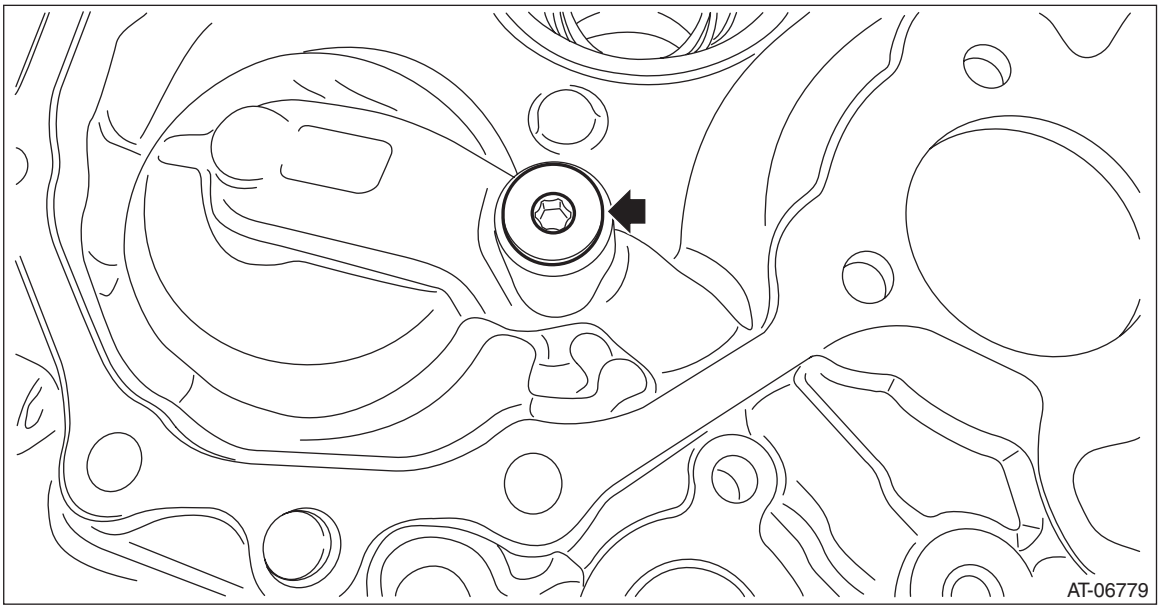


10) Remove the two oil seals using a screwdriver wrapped with cloth etc.

CAUTION:
Do not damage the fitting surface of oil seal.



11) Remove the plug from drive pinion retainer.

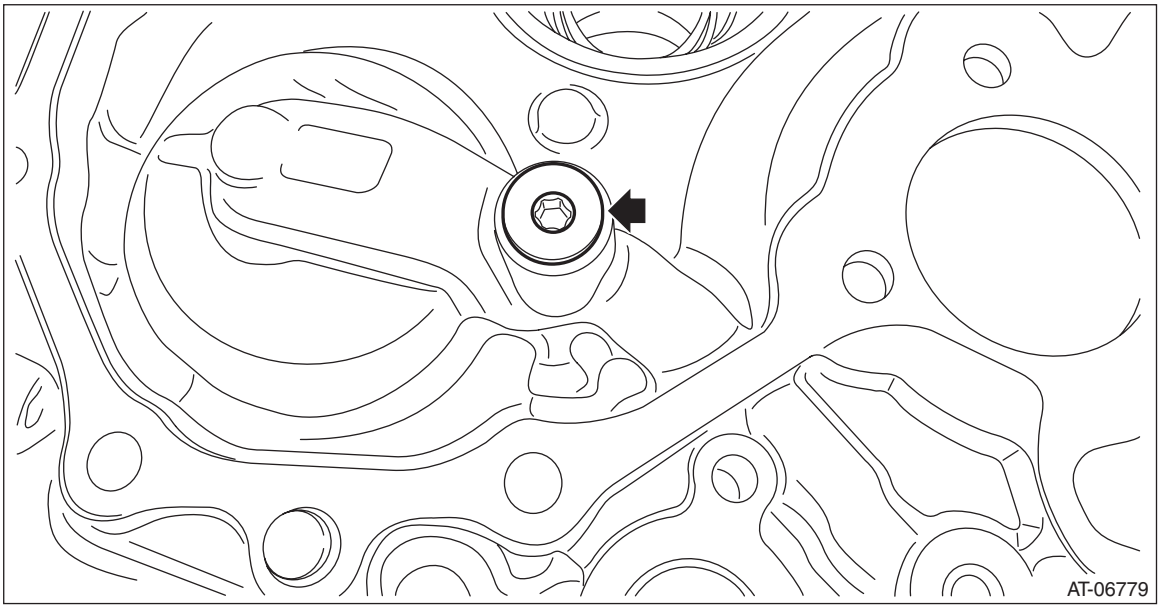


D: ASSEMBLY

1) Install the plug to drive pinion retainer.

NOTE:
- Use new O-rings.
- Apply CVTF to the O-ring.

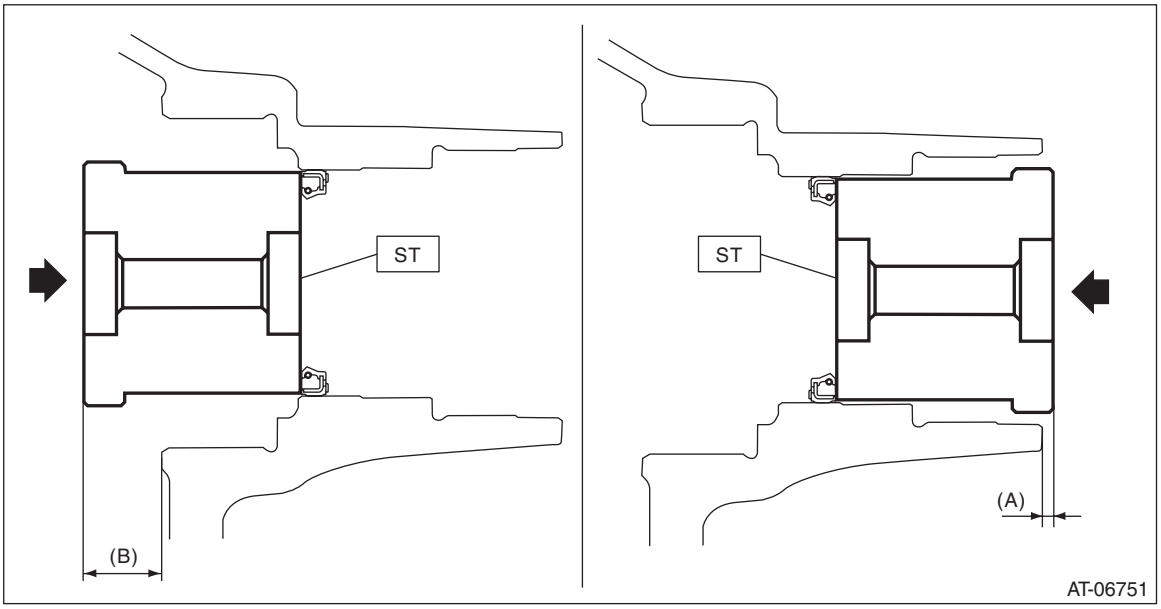
Tightening torque:
25 N·m (2.5 kgf-m, 18.4 ft-lb)



2) Using the ST, install the oil seal to drive pinion retainer.

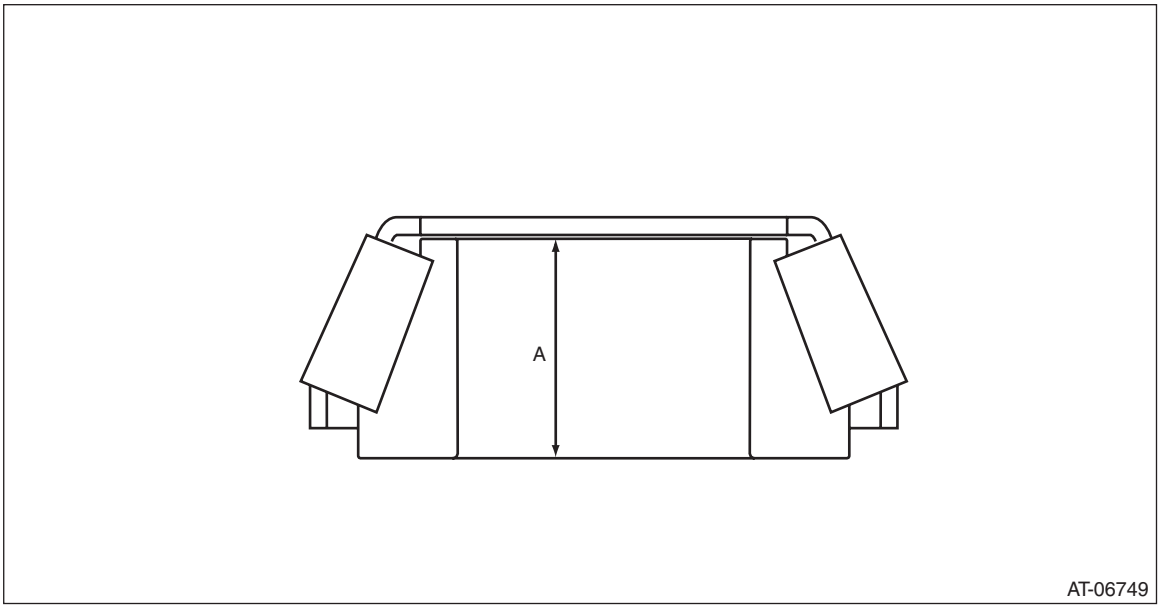
NOTE:
- Apply CVTF to the oil seal press-fitting surface and lip.
- Install the oil seal in the correct direction.

ST 927720000 HOUSING BUSHING INSTALLER AND REMOVER

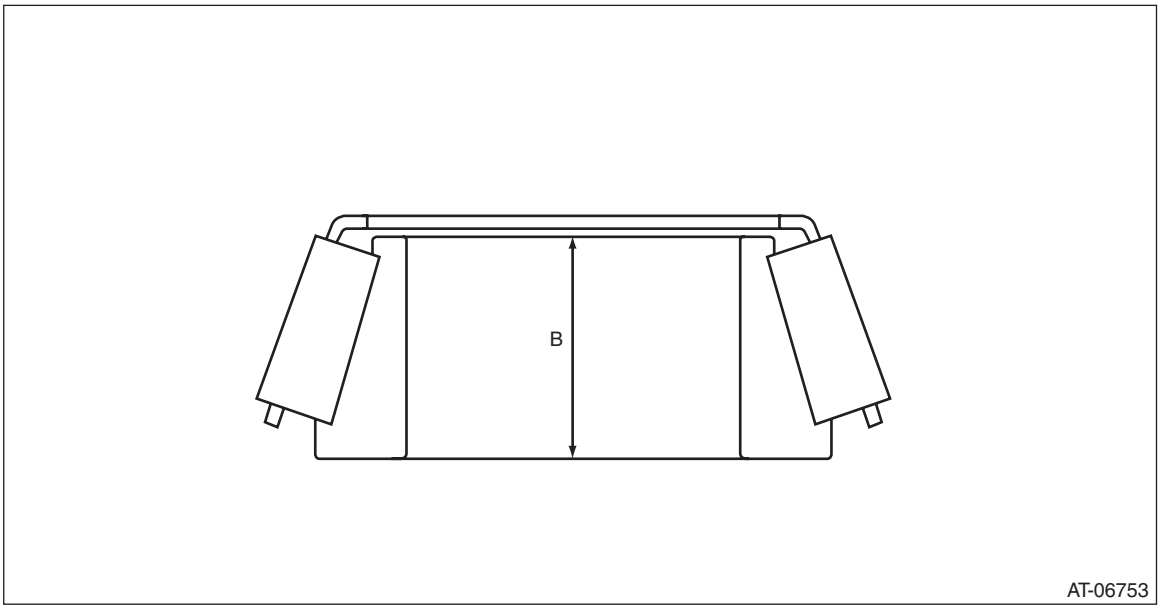


(A) 2.8 mm (0.11 in)
(B) 18.7 mm (0.74 in)

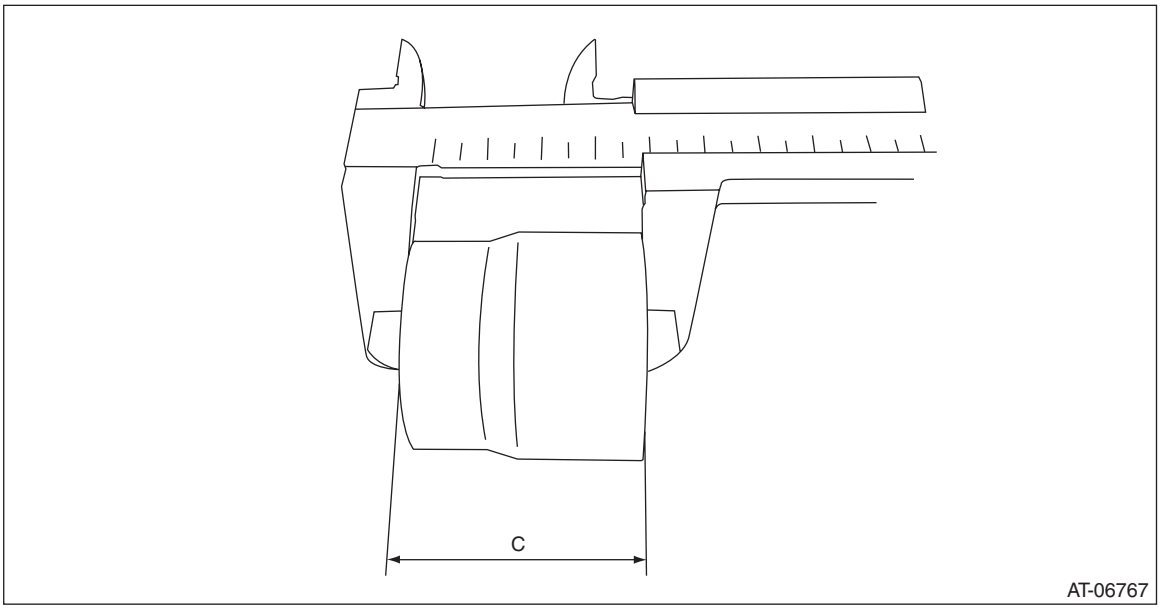
3) Select the drive pinion washer.
(1) Measure the roller bearing inner race width “A” on the front side.



(2) Measure the roller bearing inner race width “B” on the rear side.

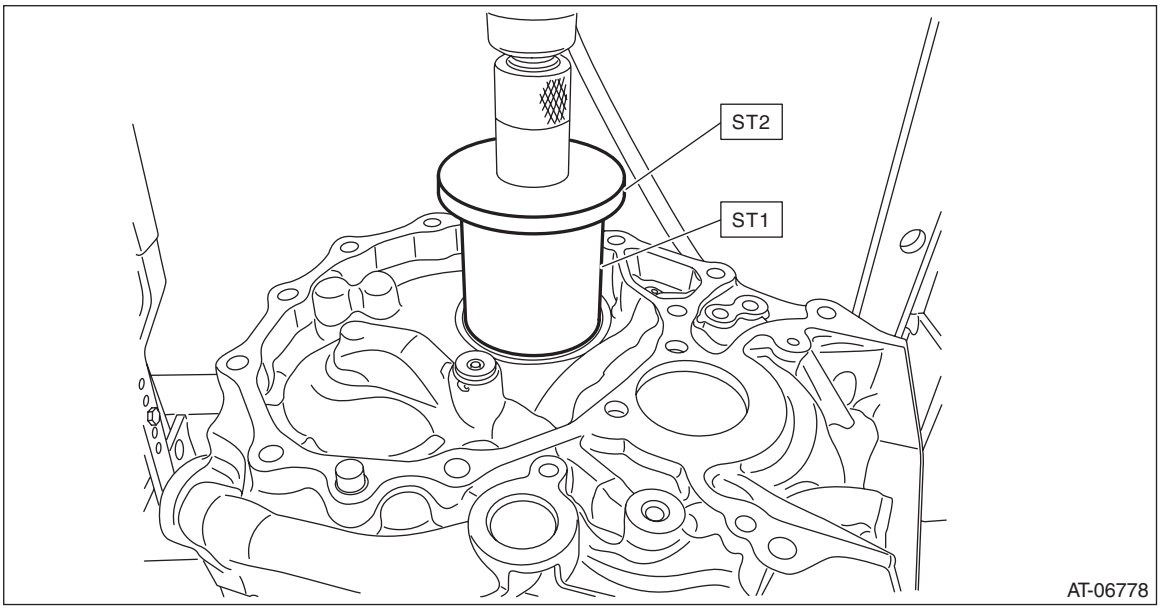


(3) Measure the spacer width “C”.

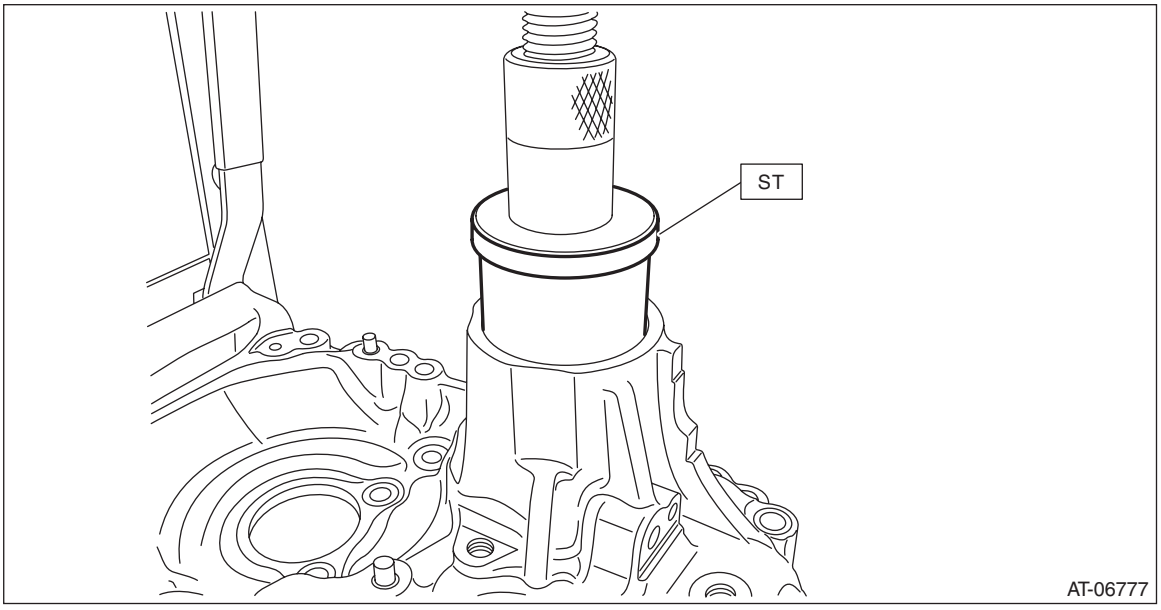


(4) Using the ST, install the front roller bearing outer race to the drive pinion retainer.

ST1 28499TC010 INSTALLER
ST2 398177700 INSTALLER



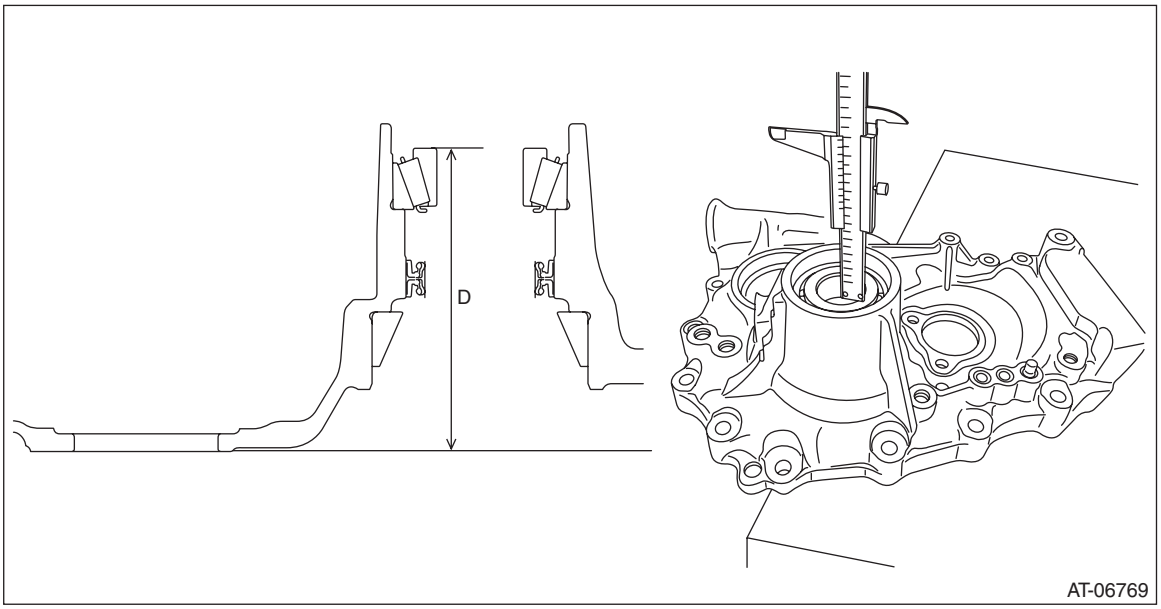
(5) Using the ST, install the rear roller bearing outer race to the drive pinion retainer.
ST 20099AE020 INSTALLER



(6) Place the drive pinion retainer on the surface plate, and install the inner race to the rear roller bearing outer race.

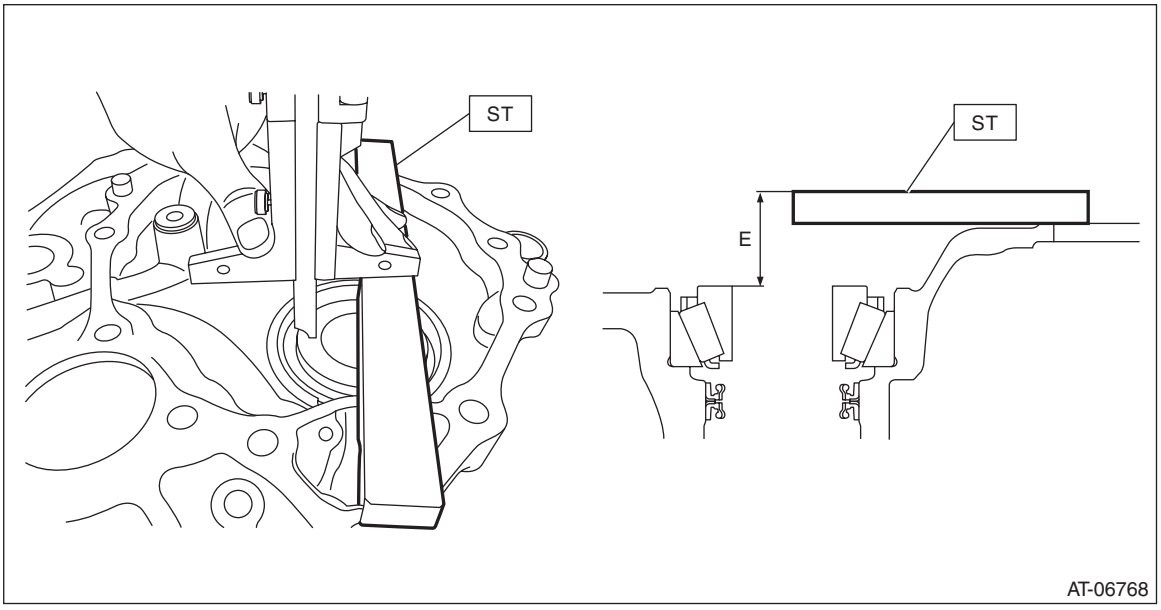
NOTE:
Place the drive pinion retainer so that the mating surface of the drive pinion retainer (mating surface with the converter case) contacts the surface plate.

(7) Measure the height “D” from the end face of the rear roller bearing inner race to the surface plate.



(8) Install the inner race to the front roller bearing outer race.

(9) Measure the depth “E” from the end face of the front roller bearing inner race to the end face of the ST.
ST 499575400 GAUGE

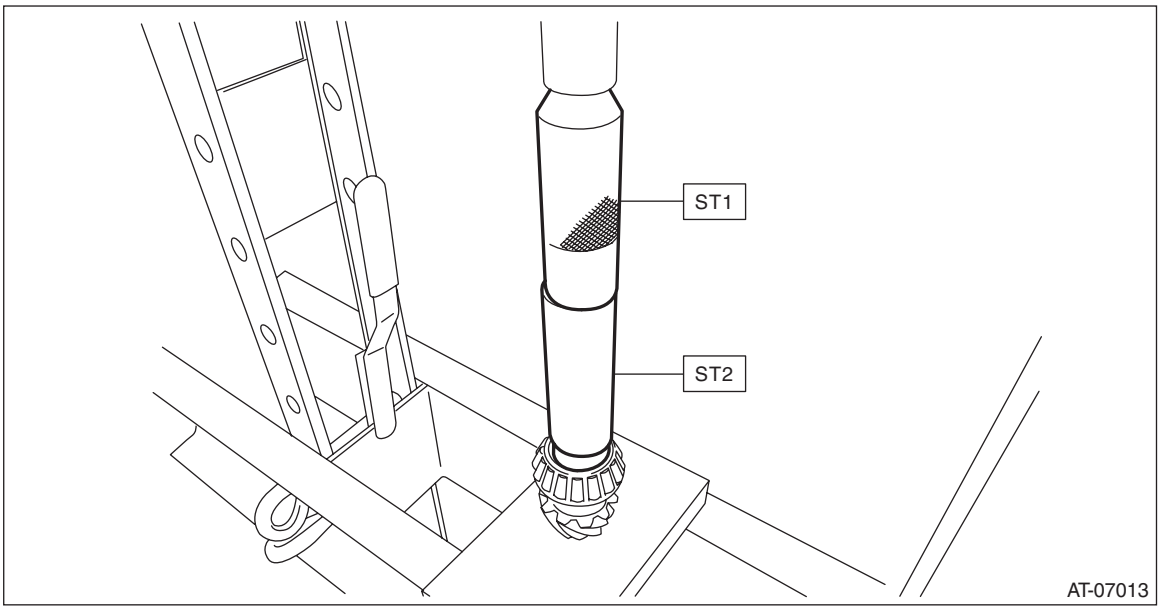


(10) Using following formula, select one to three drive pinion washers.
T (mm) = D – (A + B + C + E – 15) – (0±0.0125)
[T (in) = D – (A + B + C + E – 0.591) – (0±0.0005)]
A: Front roller bearing width
B: Rear roller bearing width
C: Spacer width
D: Height from end face of rear roller bearing inner race to surface plate
E: Depth from end face of front roller bearing inner race to end face of ST
15 mm (0.591 in): Thickness of ST
T: Drive pinion washer thickness
0±0.0125 mm (0±0.0005 in): Clearance

Drive pinion washer	
Part No.	Thickness mm (in)
38336AA750	0.150 (0.0059)
38336AA760	0.175 (0.0069)
38336AA770	0.200 (0.0079)
38336AA780	0.225 (0.0089)
38336AA790	0.250 (0.0098)
38336AA800	0.275 (0.0108)
38336AA810	0.300 (0.0118)
38336AA820	0.400 (0.0157)

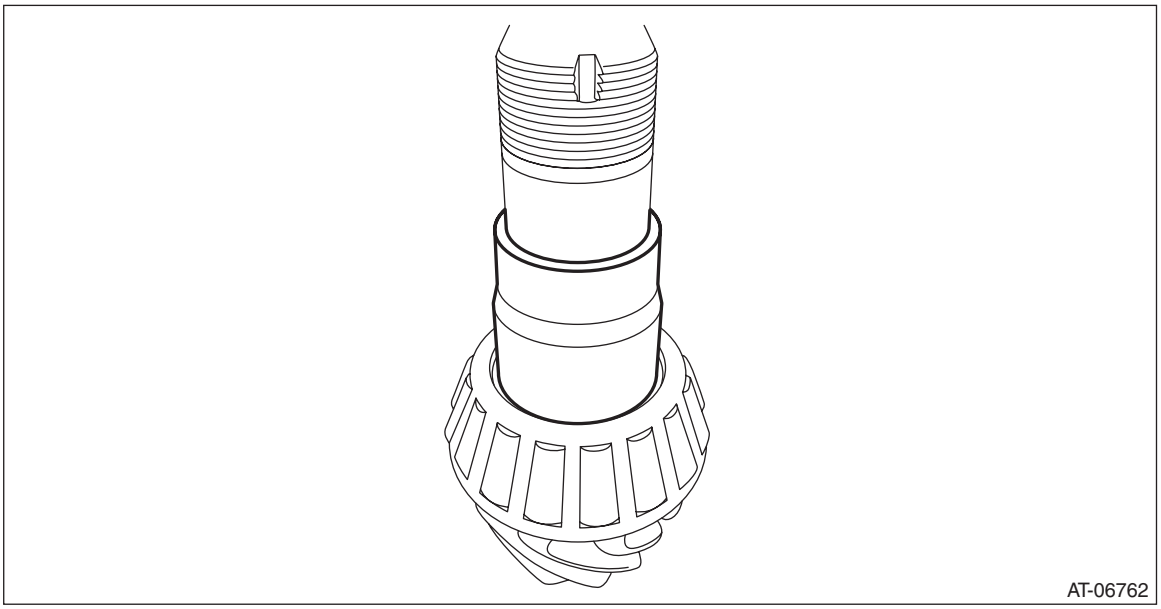
4) Measure and record the drive pinion shim thickness to be reused.
5) Install the drive pinion shim that is reused for the drive pinion shaft.

6) Using the ST1 and ST2, press-fit the inner race to the drive pinion shaft.
ST1 899580100 INSTALLER
ST2 927130000 EXTENSION DRIVE SHAFT

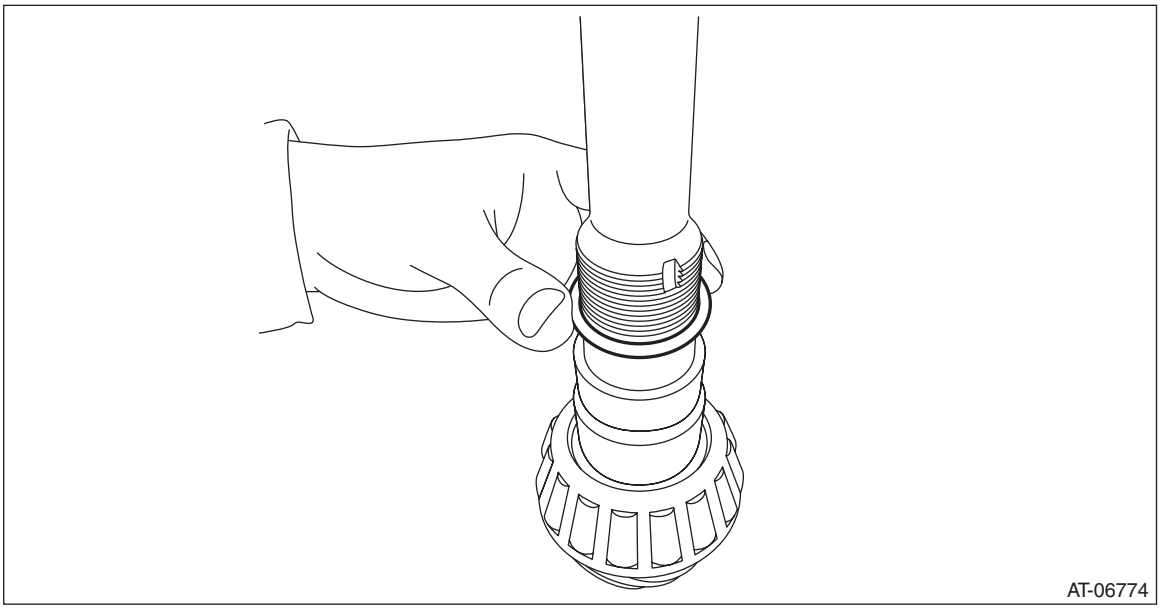


7) Install the drive pinion spacer.

NOTE:
Replace the O-ring with a new part after tooth contact inspection.



8) Install the selected drive pinion washer.

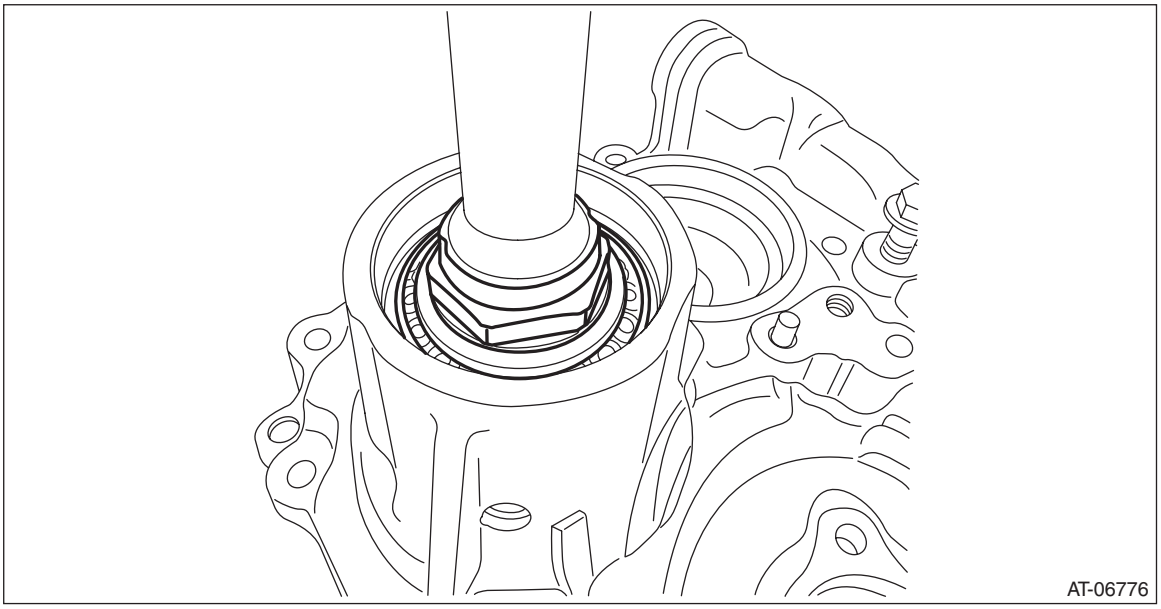


9) Insert the drive pinion shaft into the drive pinion retainer.

CAUTION:
Be careful not to damage the oil seal.

10) Install the inner bearing and lock nut.

NOTE:
Use a new lock nut.



11) Using the ST, tighten the lock nut to the specified torque so that the starting torque of the drive pinion shaft is within the specified range.

CAUTION:
Before inspecting the starting torque, apply differential gear oil to roller of bearing and rotate the bearing several times.

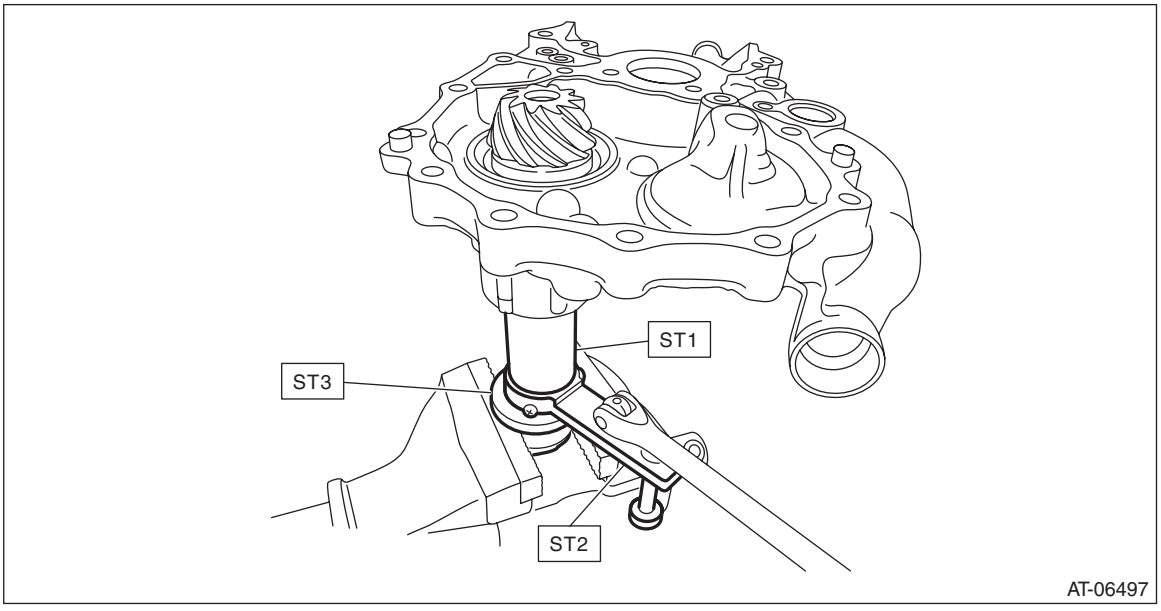
NOTE:
- Tighten the lock nut while directly aligning ST2 and torque wrench.
- If the starting torque is not within the specified range, select the drive pinion washer, and repeat the step until the starting torque is within the specified range.
- When a thicker drive pinion washer is selected, the starting torque decreases. When a thinner drive pinion washer is selected, the starting torque increases.

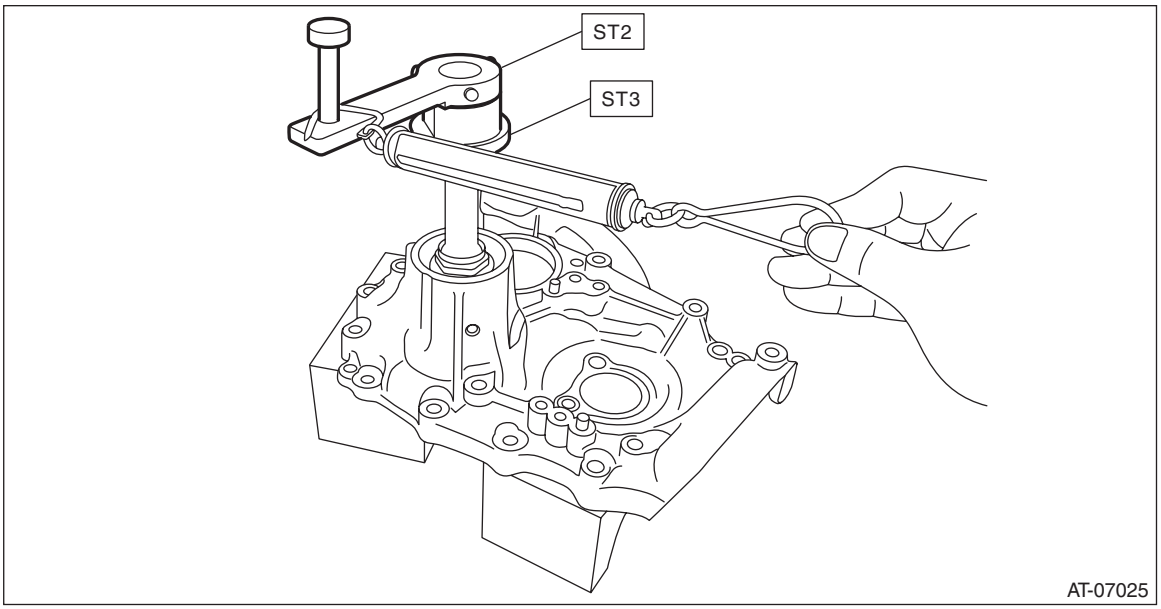
Starting torque:
5.1 — 17.1 N (0.5 — 1.7 kgf, 1.1 — 3.8 lbf)

ST1 499787500 ADAPTER
ST2 499787700 WRENCH
ST3 498937110 HOLDER

Using the following formula, calculate the tightening torque for a torque wrench.
$T2 = L2/(L1 + L2) \times T1$
T1: 170 — 250 N·m (17.3 — 25.5 kgf-m, 125.4 — 184.4 ft-lb) [Specified tightening torque range]
T2: Tightening torque
L1: ST1 length 0.072 m (2.83 in)
L2: Torque wrench length
Example:

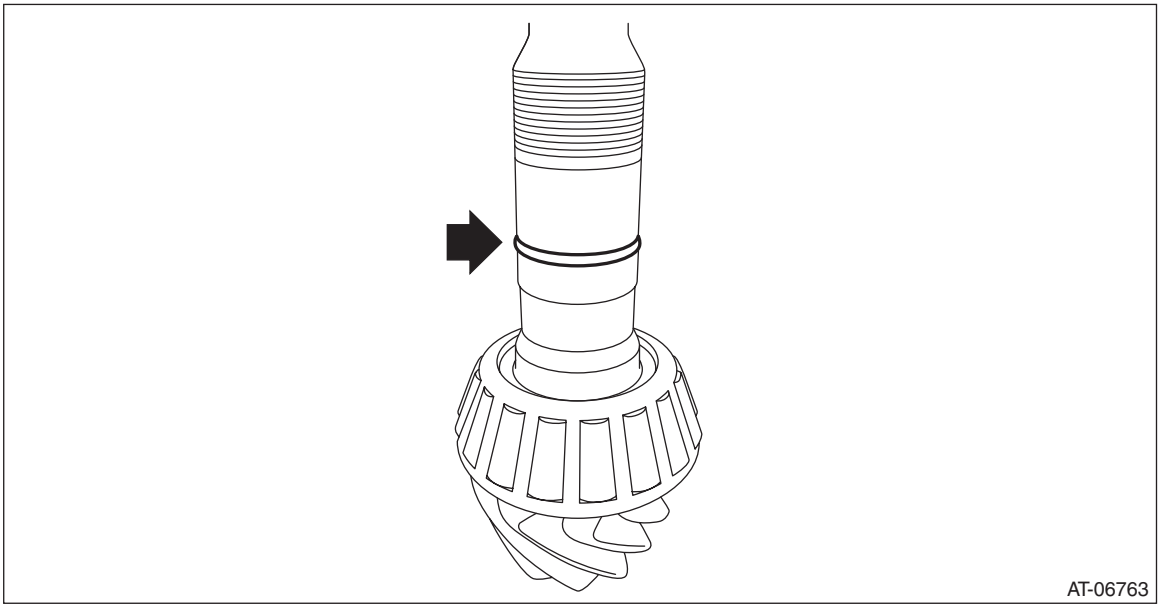
Torque wrench length m (in)	Tightening torque N·m (kgf-m, ft-lb)
0.4 (15.75)	144 — 211 (14.7 — 21.5, 106.2 — 155.6)
0.45 (17.72)	147 — 215 (15.0 — 21.9, 108.4 — 158.6)
0.5 (19.69)	149 — 218 (15.2 — 22.2, 109.9 — 160.8)
0.55 (21.65)	150 — 221 (15.3 — 22.5, 110.6 — 163.0)



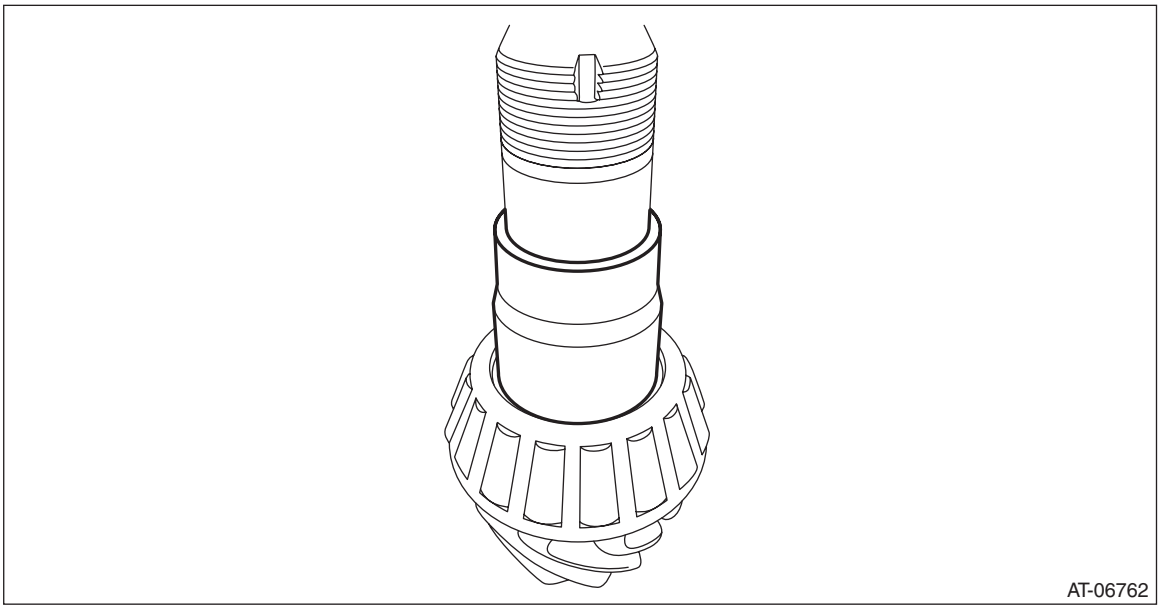


12) Install the drive pinion retainer to the converter case, and check the backlash and tooth contact. <Ref. to CVT(TR580)-301, ADJUSTMENT, Drive Pinion Shaft Assembly.> <Ref. to CVT(TR580)-323, ADJUSTMENT, Front Differential Assembly.>
13) Remove the drive pinion retainer from converter case. <Ref. to CVT(TR580)-278, REMOVAL, Drive Pinion Shaft Assembly.>
14) Remove the drive pinion spacer from the drive pinion shaft. <Ref. to CVT(TR580)-282, DISASSEMBLY, Drive Pinion Shaft Assembly.>
15) Install the O-ring to the drive pinion shaft.

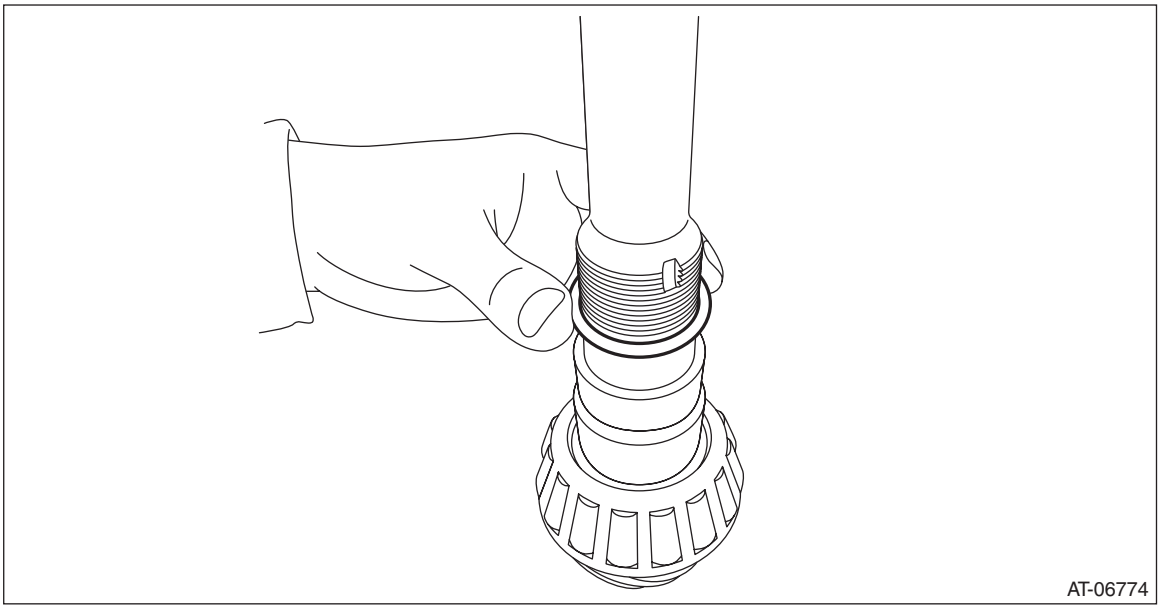
NOTE:
- Use new O-rings.
- Apply CVTF to the O-ring.



16) Install the drive pinion spacer to the drive pinion shaft.

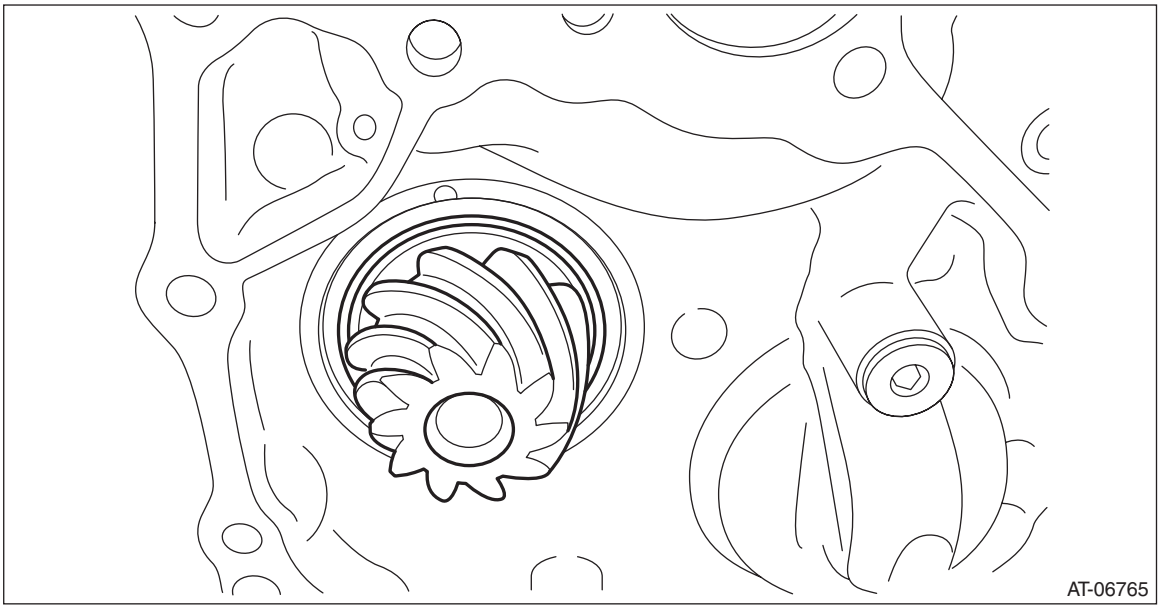


17) Install the drive pinion washer.

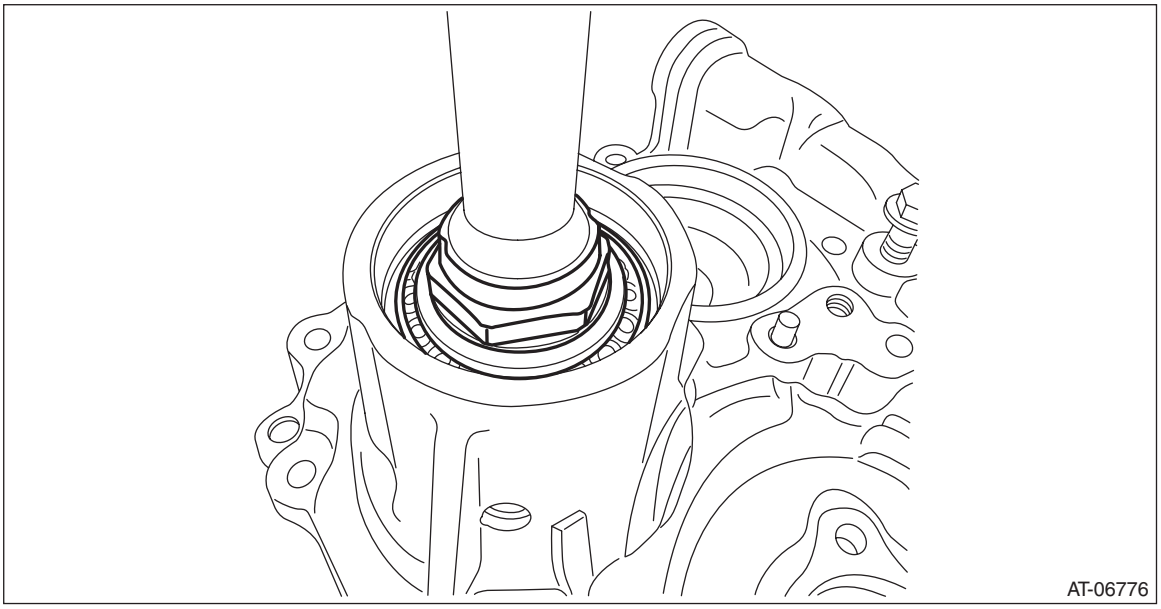


18) Insert the drive pinion shaft into the drive pinion retainer.

CAUTION:
Be careful not to damage the oil seal.



19) Install the inner bearing and lock nut.



20) Using the ST, tighten the lock nut to the specified torque so that the starting torque of the drive pinion shaft is within the specified range.

CAUTION:
Before inspecting the starting torque, apply differential gear oil to roller of bearing and rotate the bearing several times.

NOTE:
- Tighten the lock nut while directly aligning ST2 and torque wrench.
- If the starting torque is not within the specified range, select the drive pinion washer, and repeat the step until the starting torque is within the specified range.
- When a thicker drive pinion washer is selected, the starting torque decreases. When a thinner drive pinion washer is selected, the starting torque increases.

Starting torque:
5.1 — 17.1 N (0.5 — 1.7 kgf, 1.1 — 3.8 lbf)

ST1 499787500 ADAPTER
ST2 499787700 WRENCH
ST3 498937110 HOLDER

Using the following formula, calculate the tightening torque for a torque wrench.
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T1: 170 — 250 N·m (17.3 — 25.5 kgf-m, 125.4 — 184.4 ft-lb) [Specified tightening torque range]
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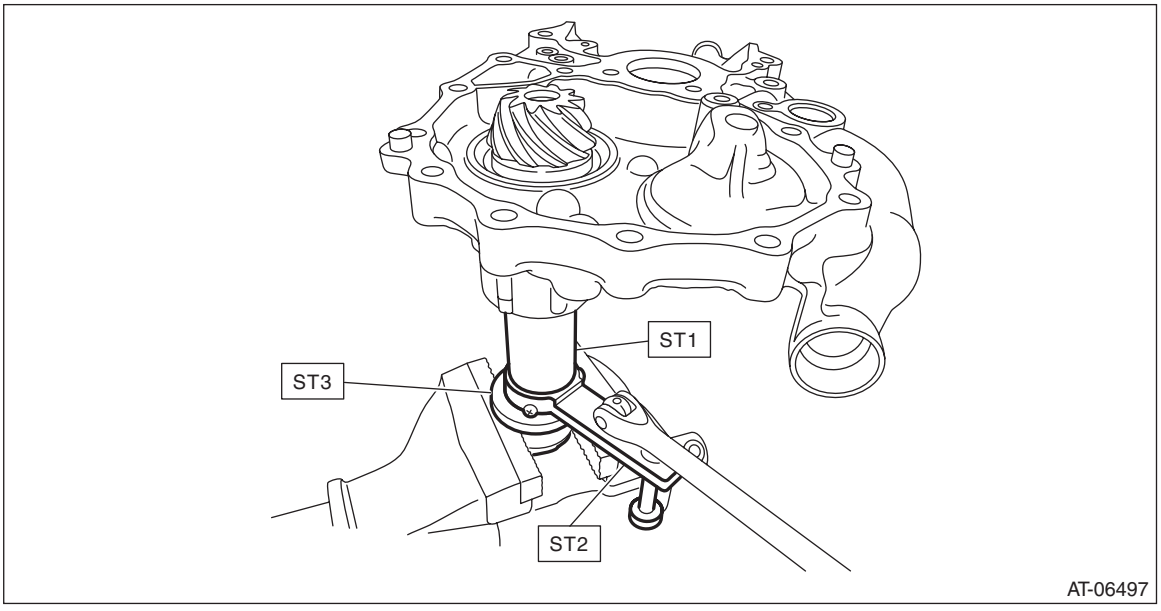
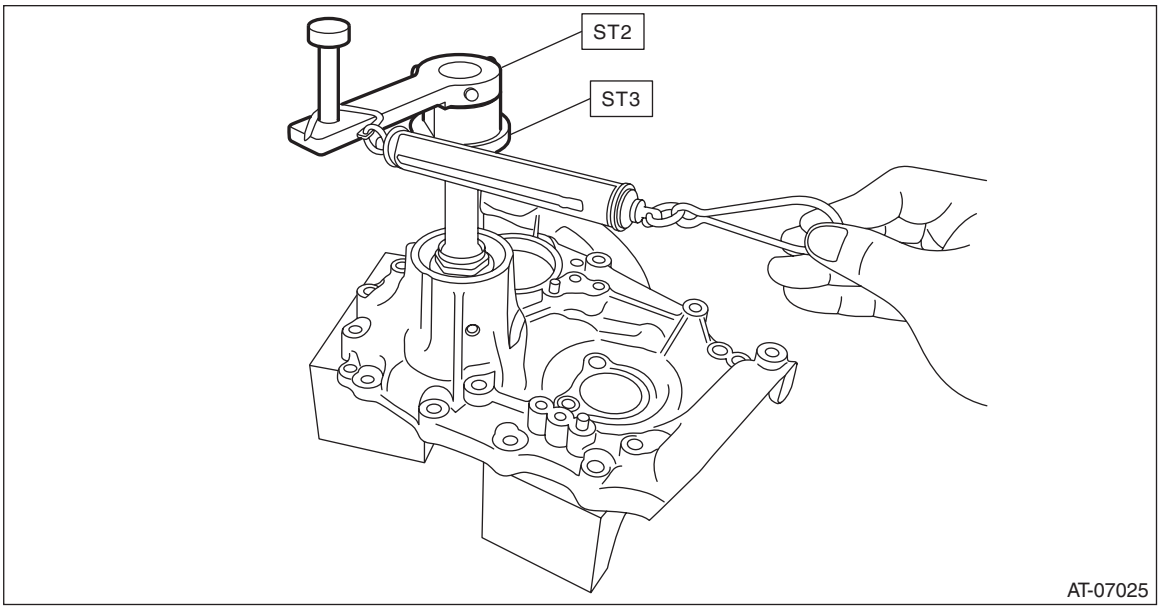
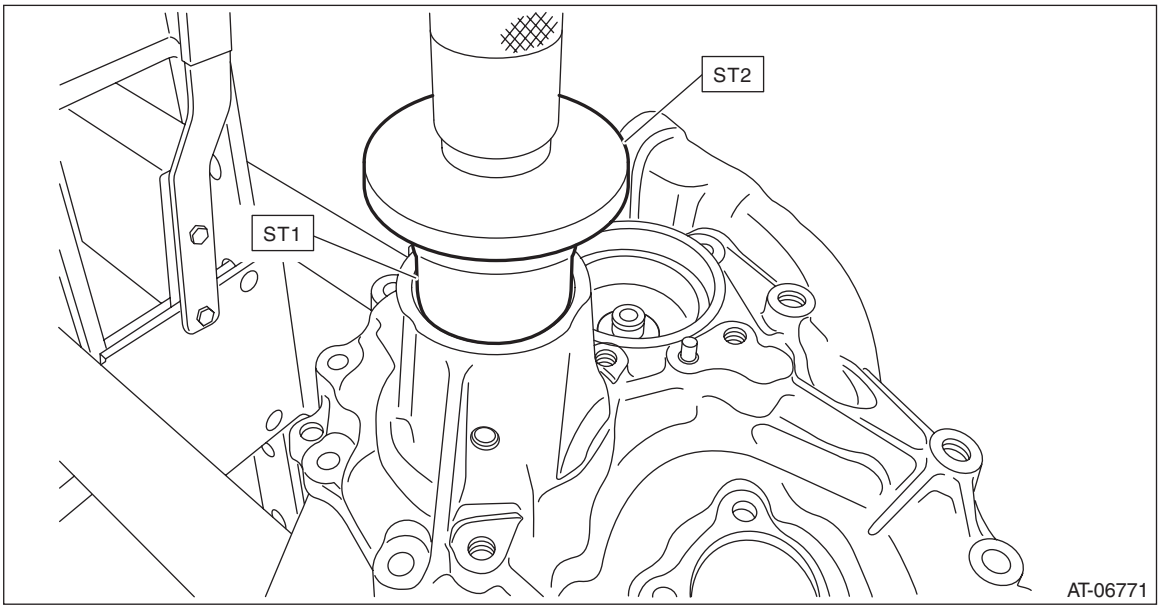
0.5 (19.69)	149 — 218 (15.2 — 22.2, 109.9 — 160.8)
0.55 (21.65)	150 — 221 (15.3 — 22.5, 110.6 — 163.0)





21) Crimp the lock nut in 2 locations.
22) Using the ST, install the plug.

ST1 499755602 PRESS SNAP RING
ST2 398177700 INSTALLER

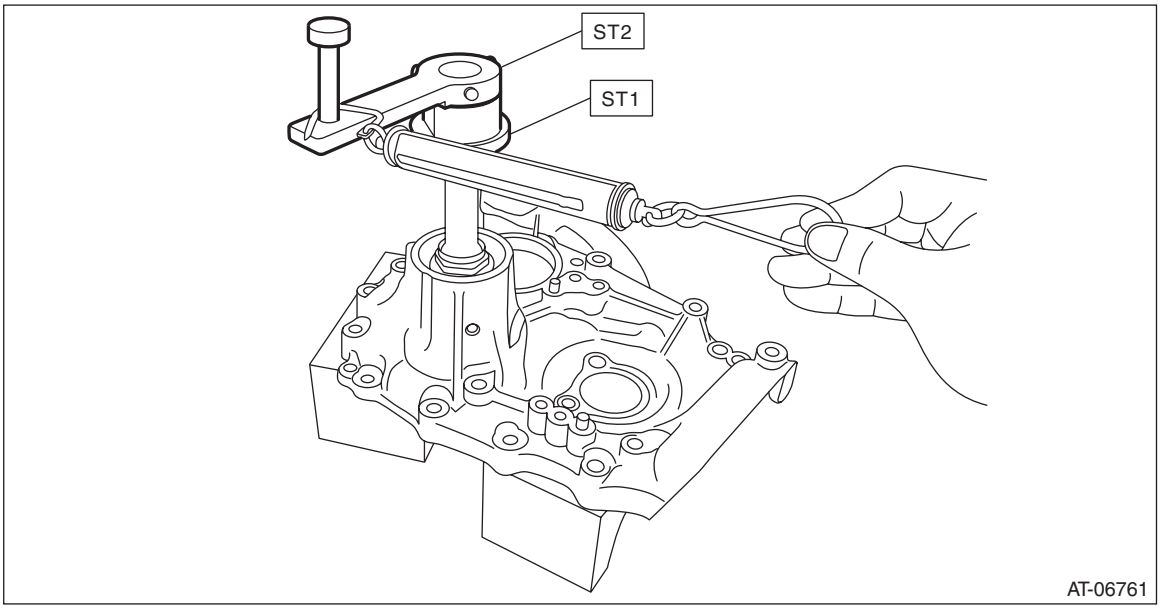


E: INSPECTION

- Make sure that all component parts are free of scratches, holes and other faults.
- Check the tooth contact. <Ref. to CVT(TR580)-301, ADJUSTMENT, Drive Pinion Shaft Assembly.>
- Apply CVTF to bearing and rotate the bearing to check for noise or dragging etc.
- Check the starting torque of drive pinion shaft.

CAUTION:
Before measuring, apply differential gear oil to roller of bearing and rotate the bearing several times.
ST1 498937110 HOLDER
ST2 499787700 WRENCH

Starting torque:
5.1 — 17.1 N (0.5 — 1.7 kgf, 1.1 — 3.8 lbf)

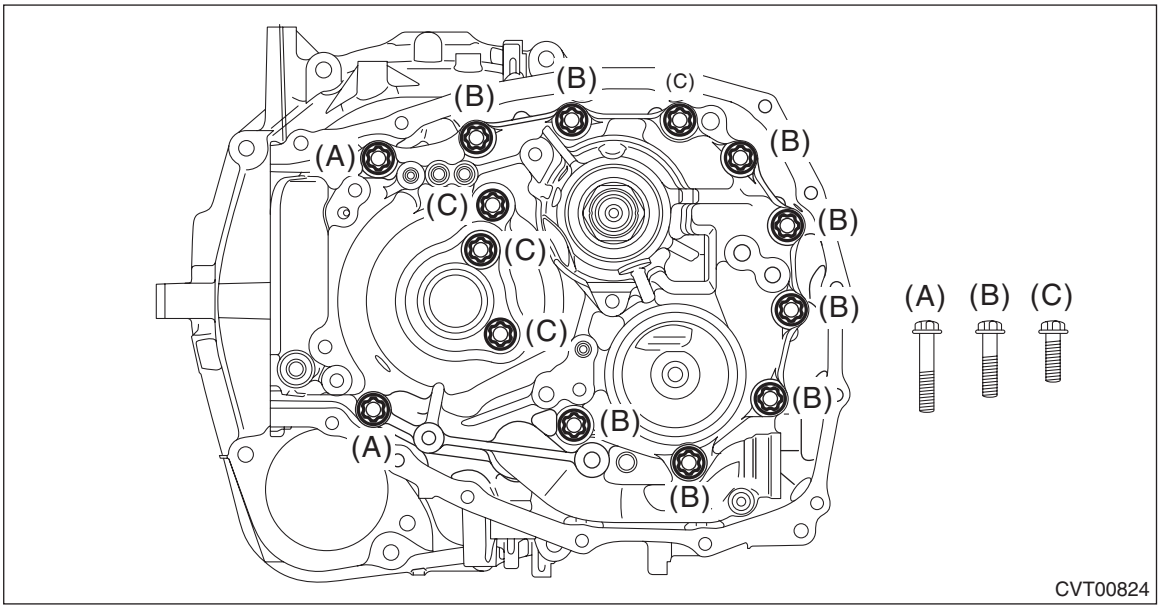


F: ADJUSTMENT

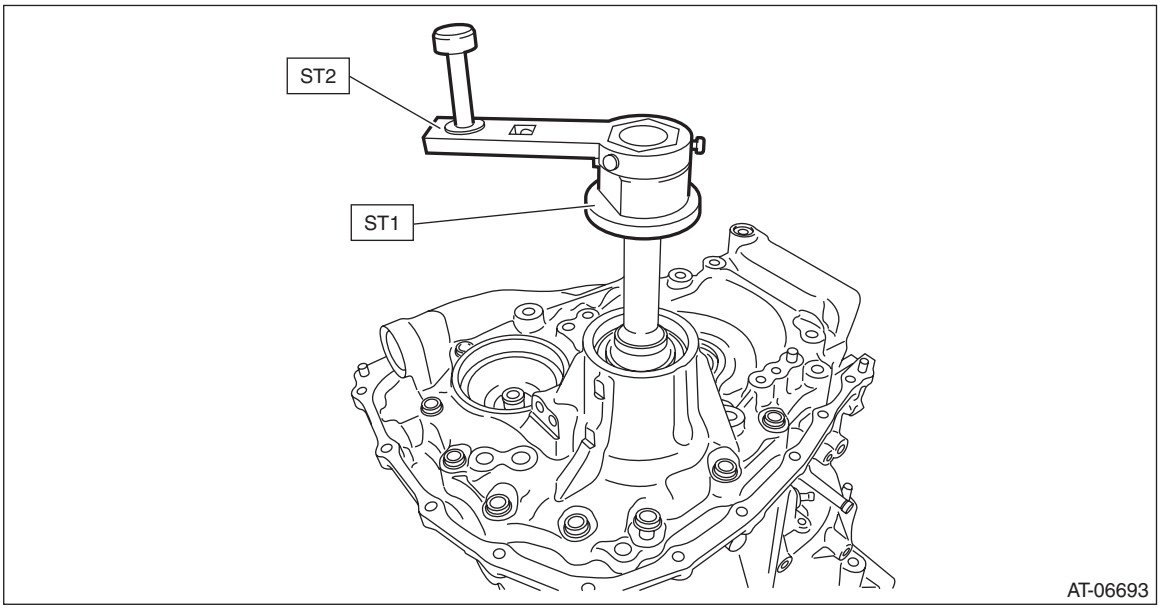
1) Remove the liquid gasket from the mating surface completely.
2) Using the ST, install the drive pinion retainer to converter case.
ST 18270KA020 SOCKET (E20)

NOTE:
Do not confuse the three different-length bolts when installing.

Tightening torque:
43 N·m (4.4 kgf-m, 31.7 ft-lb)



3) Rotate the drive pinion several times using ST1 and ST2.
ST1 498937110 HOLDER
ST2 499787700 WRENCH



4) Adjust the drive pinion and hypoid driven gear backlash. <Ref. to CVT(TR580)-323, ADJUSTMENT, Front Differential Assembly.>
5) Using the ST, remove the drive pinion retainer from converter case.
ST 18270KA020 SOCKET (E20)

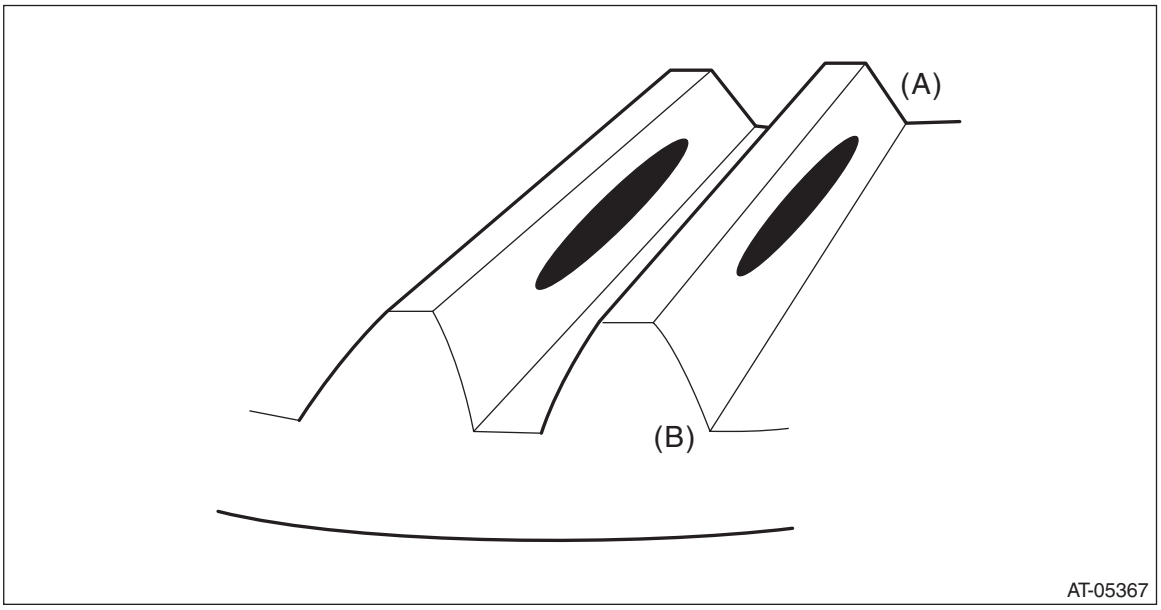
6) Apply lead-free red dye evenly on the both sides of three to four teeth of the hypoid driven gear. Then install the drive pinion retainer and rotate the drive pinion in both directions several times. Remove the drive pinion retainer and check the tooth contact pattern.
If the teeth contact is inappropriate, adjust the backlash or thickness of the shim. <Ref. to CVT(TR580)-323, ADJUSTMENT, Front Differential Assembly.>

NOTE:
After correction, wipe off the lead-free red dye.

Drive pinion shim	
Part No.	Thickness mm (in)
31451AA320	0.150 (0.0059)
31451AA330	0.175 (0.0069)
31451AA340	0.200 (0.0079)
31451AA350	0.225 (0.0089)
31451AA360	0.250 (0.0098)
31451AA370	0.275 (0.0108)

- Correct tooth contact

Check item: Tooth contact surface is slightly shifted toward the toe side under a no-load condition. (When driving, it moves towards the heel side.)

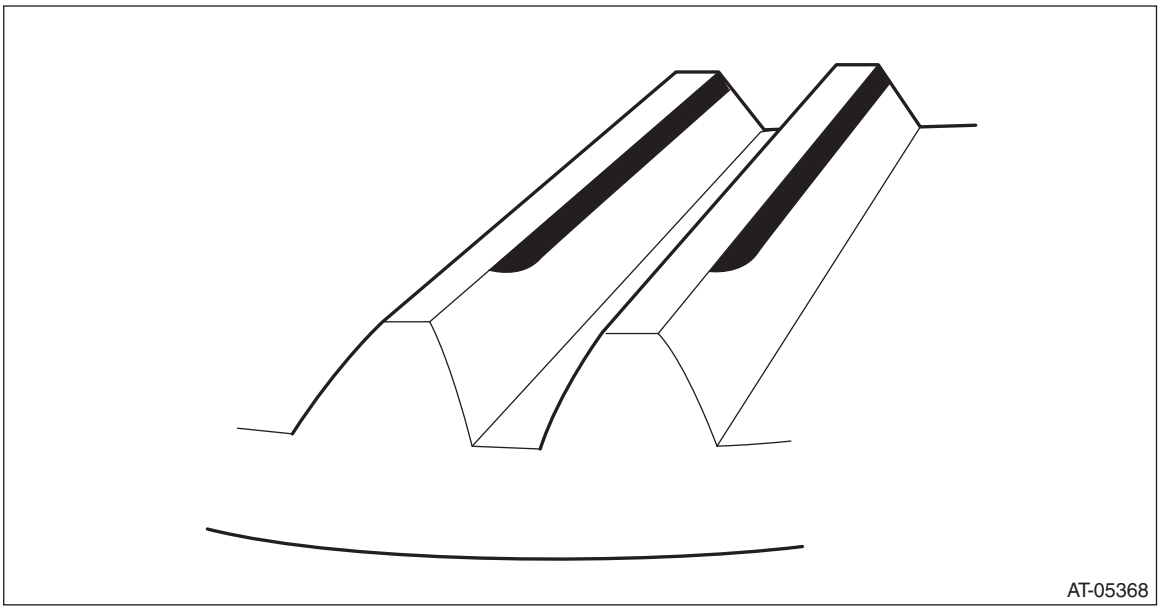


(A) Toe side
(B) Heel side

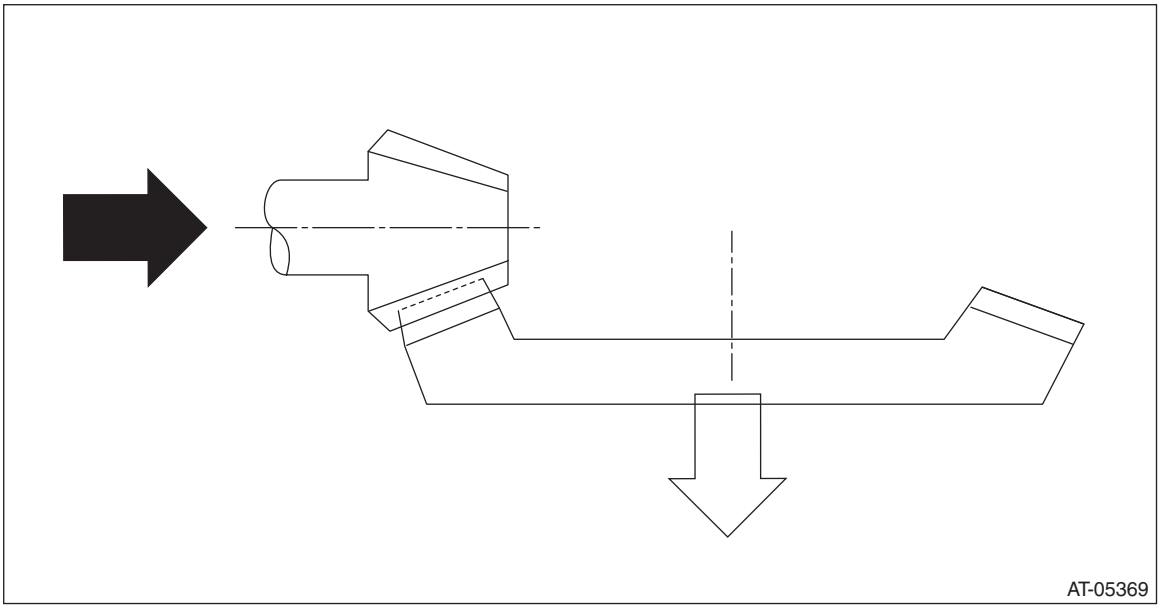
- Face contact

Check item: Backlash is too large.

Contact pattern



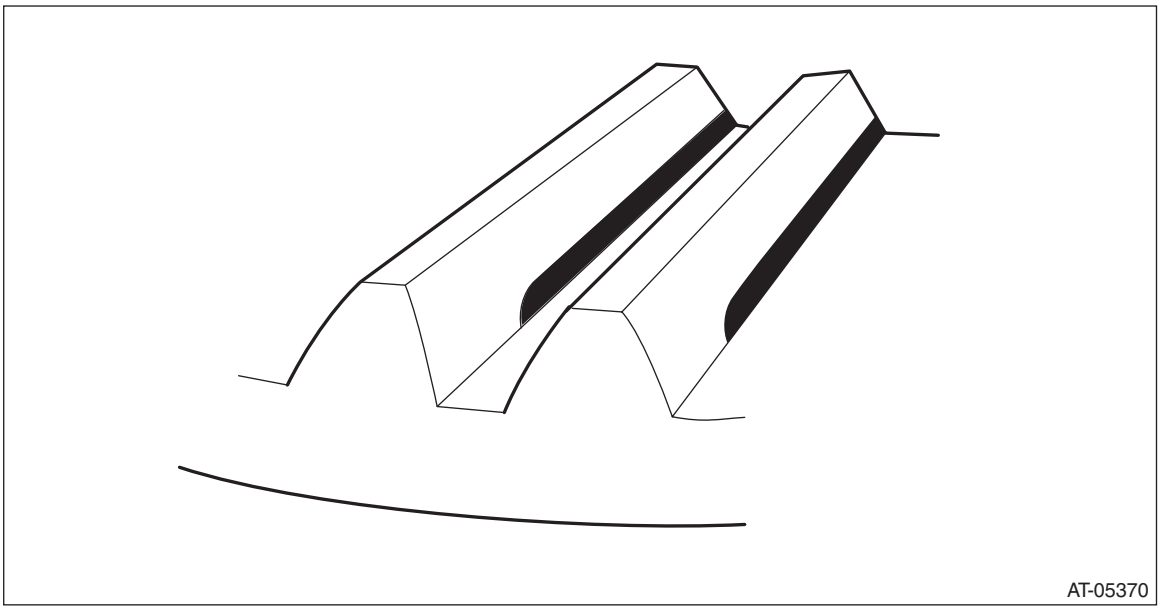
Corrective action: Increase thickness of drive pinion shim according to the procedures for moving the drive pinion close to hypoid driven gear.



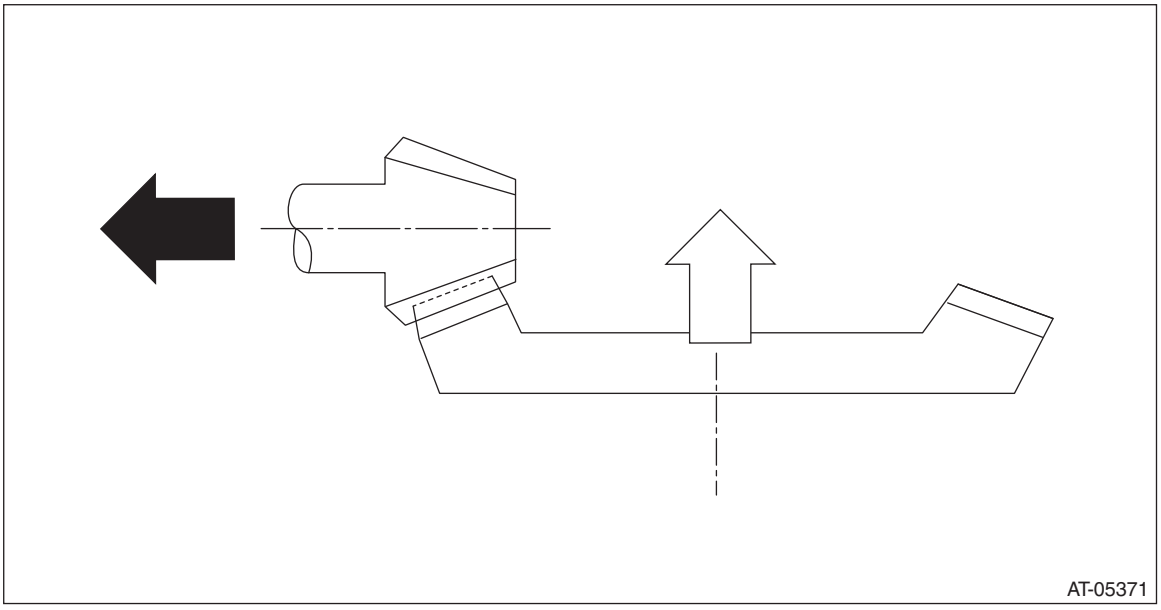
- Flank contact

Check item: Backlash is too small.

Contact pattern



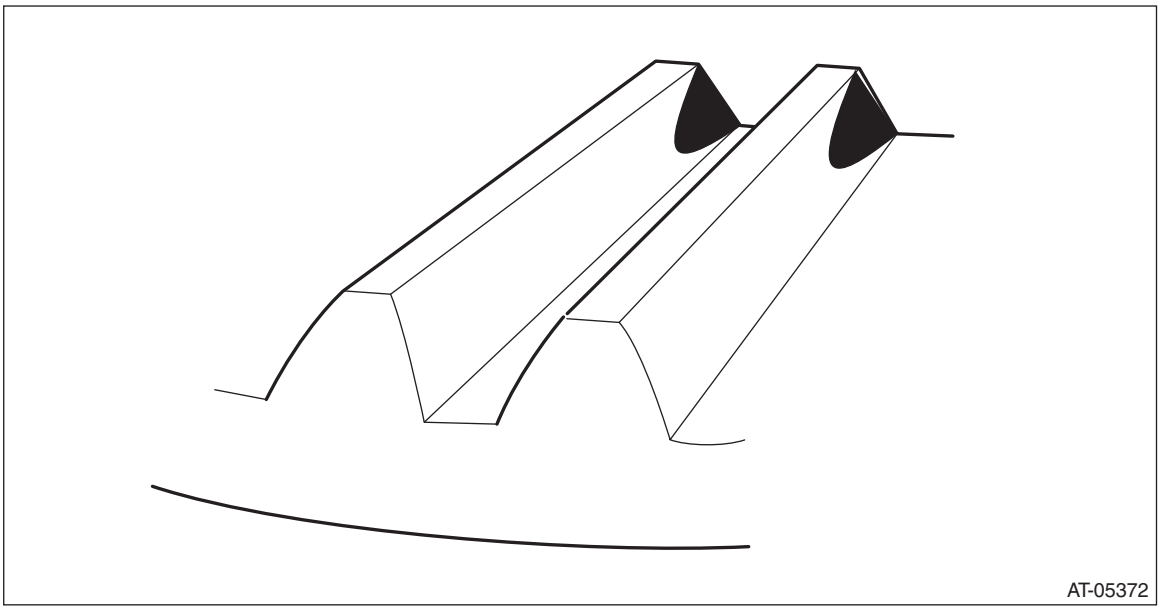
Corrective action: Reduce the thickness of the drive pinion shim according to the procedures for moving the drive pinion away from the hypoid driven gear.



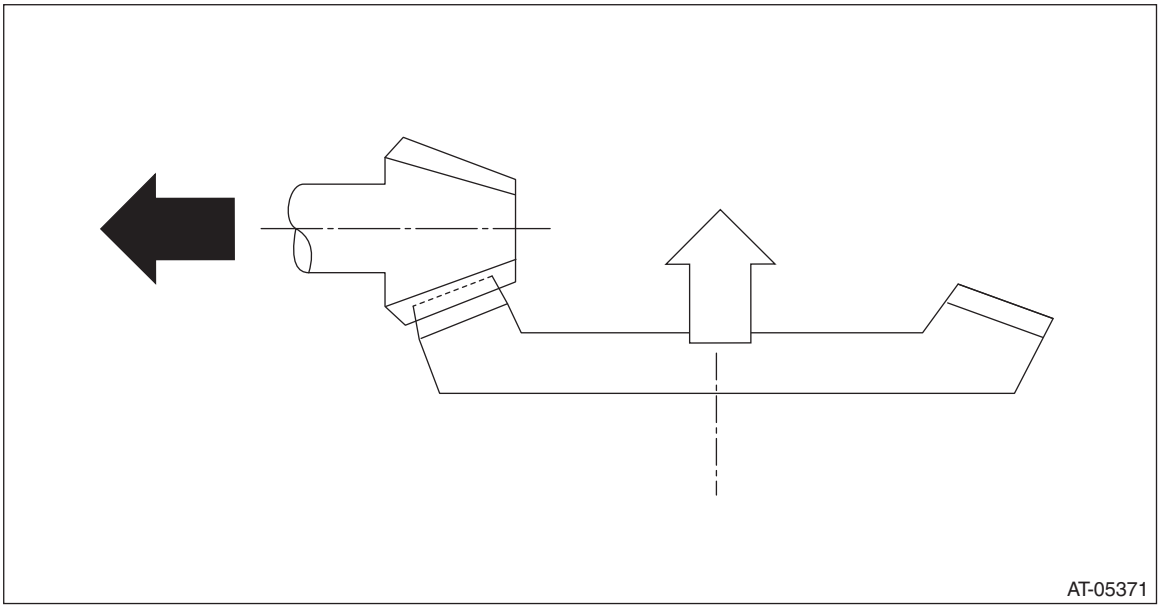
- Toe contact (inside contact)

Check item: Teeth contact area is too small.

Contact pattern



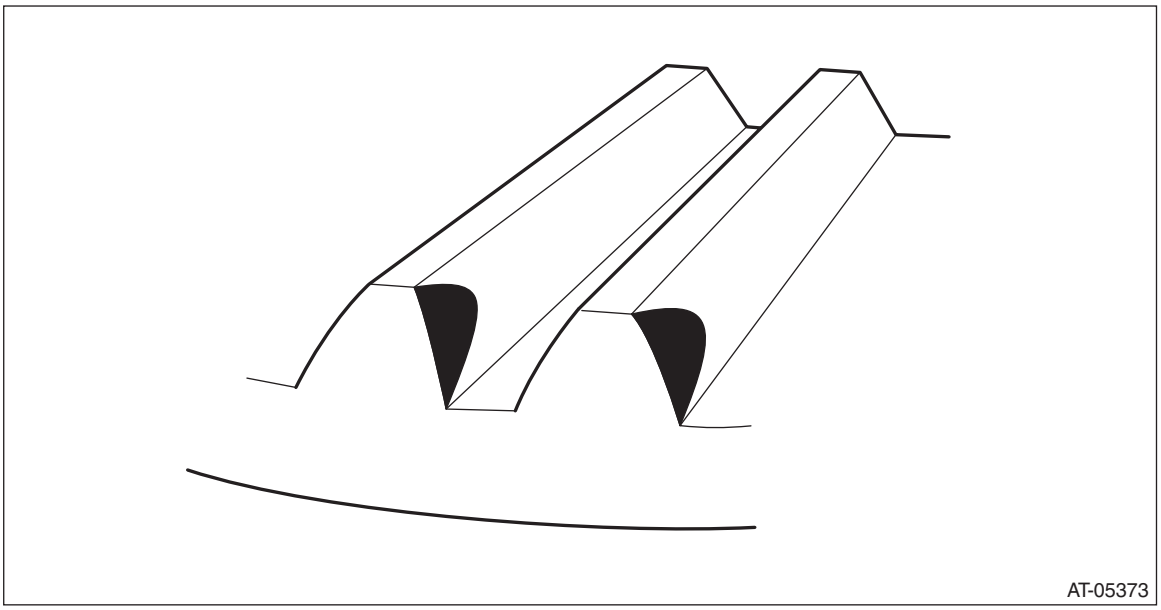
Corrective action: Reduce the thickness of the drive pinion shim according to the procedures for moving the drive pinion away from the hypoid driven gear side.



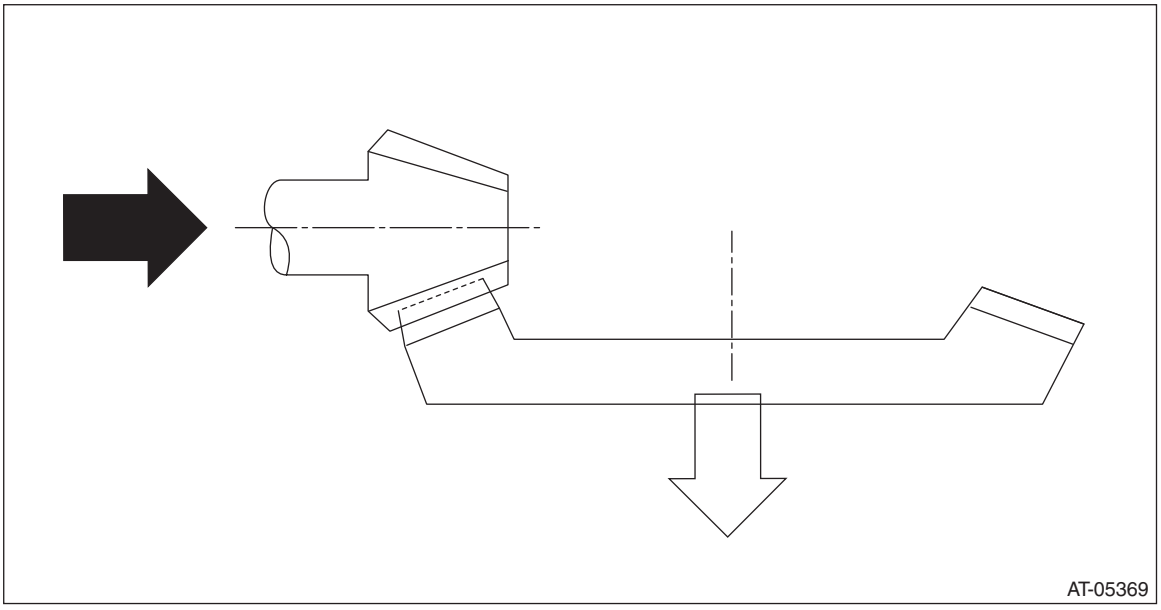
- Heel contact (outside end contact)

Check item: Teeth contact area is too small.

Contact pattern



Corrective action: Increase the thickness of the drive pinion shim according to the procedures for moving the drive pinion closer to the hypoid driven gear.



7) Using the ST, loosen the differential side retainer until the mounting groove of the O-ring appears, and then install the O-ring.

NOTE:
- When loosening the differential side retainer, record the number of the turns made.
- Perform this for both left and right differential side retainers.
- Use new O-rings.
- Apply the differential gear oil to O-ring.

ST 18658AA020 WRENCH COMPL RETAINER

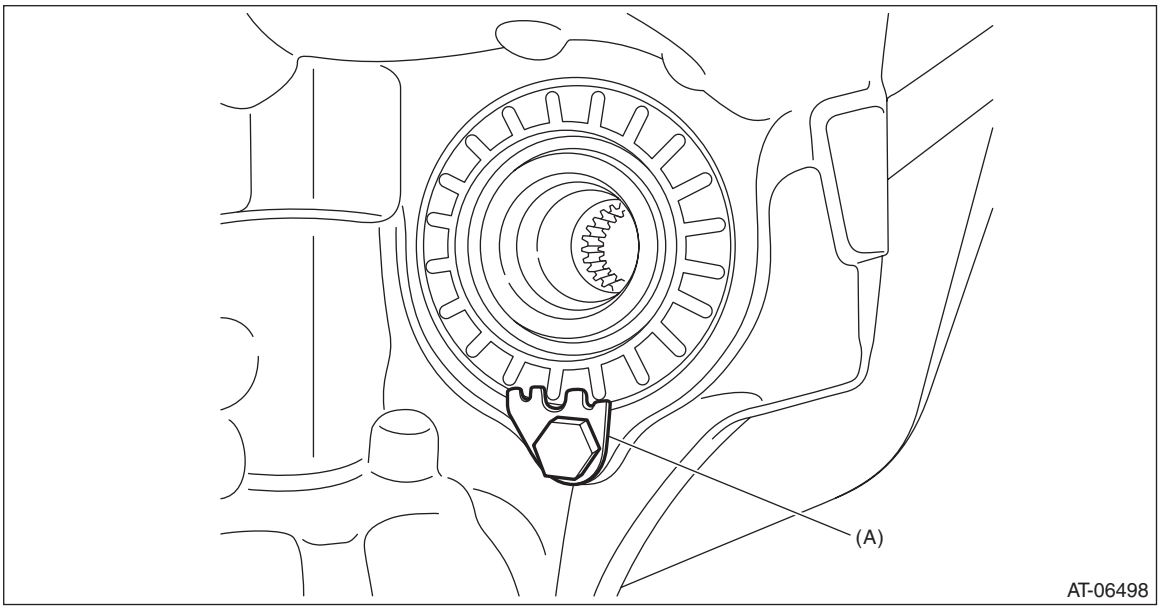
8) Using the ST, tighten the retainer to the position before it is loosened.

ST 18658AA020 WRENCH COMPL RETAINER

9) Replace the differential side retainer oil seal with a new part. <Ref. to CVT(TR580)-91, Differential Side Retainer Oil Seal.>

10) Install the lock plate.

Tightening torque:
25 N·m (2.5 kgf-m, 18.4 ft-lb)

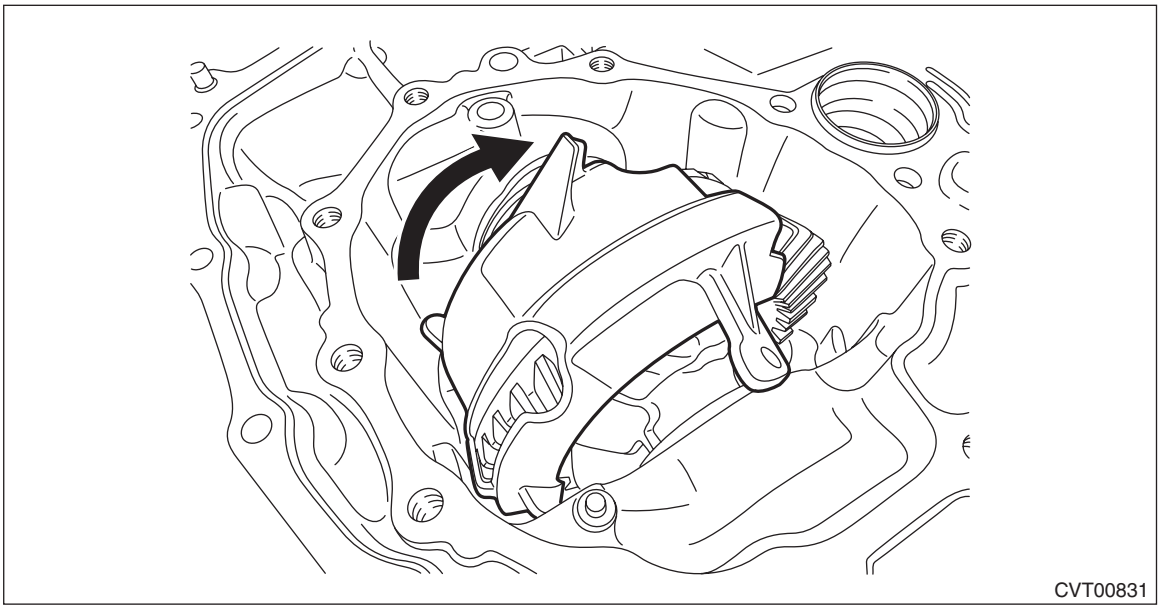


(A) Lock plate

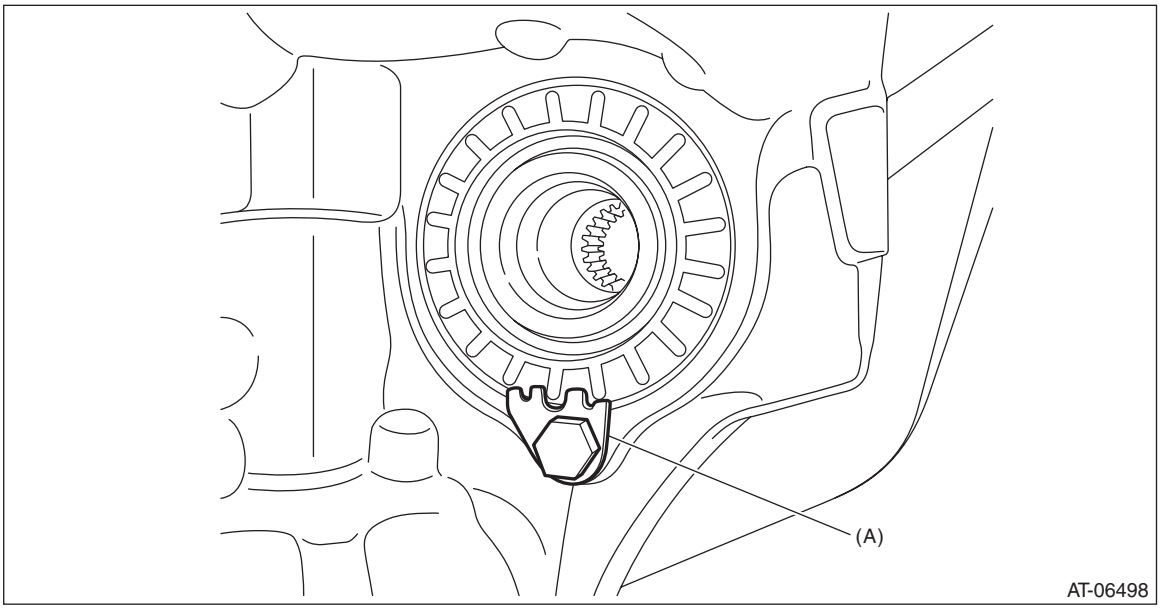
42.Front Differential Assembly

A: REMOVAL

1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TR580)-60, REMOVAL, Automatic Transmission Assembly.>
2) Remove the air breather hose. <Ref. to CVT(TR580)-158, REMOVAL, Air Breather Hose.>
3) Remove the control valve body. <Ref. to CVT(TR580)-117, REMOVAL, Control Valve Body.>
4) Remove the transmission harness. <Ref. to CVT(TR580)-132, REMOVAL, Transmission Harness.>
5) Remove the turbine speed sensor. <Ref. to CVT(TR580)-103, REMOVAL, Turbine Speed Sensor.>
6) Remove the secondary speed sensor. <Ref. to CVT(TR580)-105, REMOVAL, Secondary Speed Sensor.>
7) Remove the primary speed sensor. <Ref. to CVT(TR580)-108, REMOVAL, Primary Speed Sensor.>
8) Remove the inhibitor switch. <Ref. to CVT(TR580)-99, REMOVAL, Inhibitor Switch.>
9) Remove the extension case. <Ref. to CVT(TR580)-168, REMOVAL, Extension Case.>
10) Remove the transfer clutch assembly. <Ref. to CVT(TR580)-172, REMOVAL, Transfer Clutch.>
11) Remove the transfer driven gear assembly. <Ref. to CVT(TR580)-186, REMOVAL, Transfer Driven Gear.>
12) Remove the parking pawl. <Ref. to CVT(TR580)-189, REMOVAL, Parking Pawl.>
13) Remove the reduction driven gear assembly. <Ref. to CVT(TR580)-191, REMOVAL, Reduction Driven Gear.>
14) Remove the oil pan and oil strainer. <Ref. to CVT(TR580)-113, REMOVAL, Oil Pan and Strainer.>
15) Remove the transmission control device. <Ref. to CVT(TR580)-199, REMOVAL, Transmission Control Device.>
16) Remove the transmission case. <Ref. to CVT(TR580)-205, REMOVAL, Transmission Case.>
17) Remove the reduction drive gear. <Ref. to CVT(TR580)-218, REMOVAL, Reduction Drive Gear.>
18) Remove the primary pulley, secondary pulley and variator chain. <Ref. to CVT(TR580)-223, REMOVAL, Primary Pulley and Secondary Pulley.>
19) Remove the reverse brake assembly. <Ref. to CVT(TR580)-243, REMOVAL, Reverse Brake Assembly.>
20) Remove the forward clutch assembly. <Ref. to CVT(TR580)-258, REMOVAL, Forward Clutch Assembly.>
21) Remove the drive pinion shaft assembly. <Ref. to CVT(TR580)-278, REMOVAL, Drive Pinion Shaft Assembly.>
22) Remove the oil baffle.


CVT00831

23) Remove the lock plates on both sides.

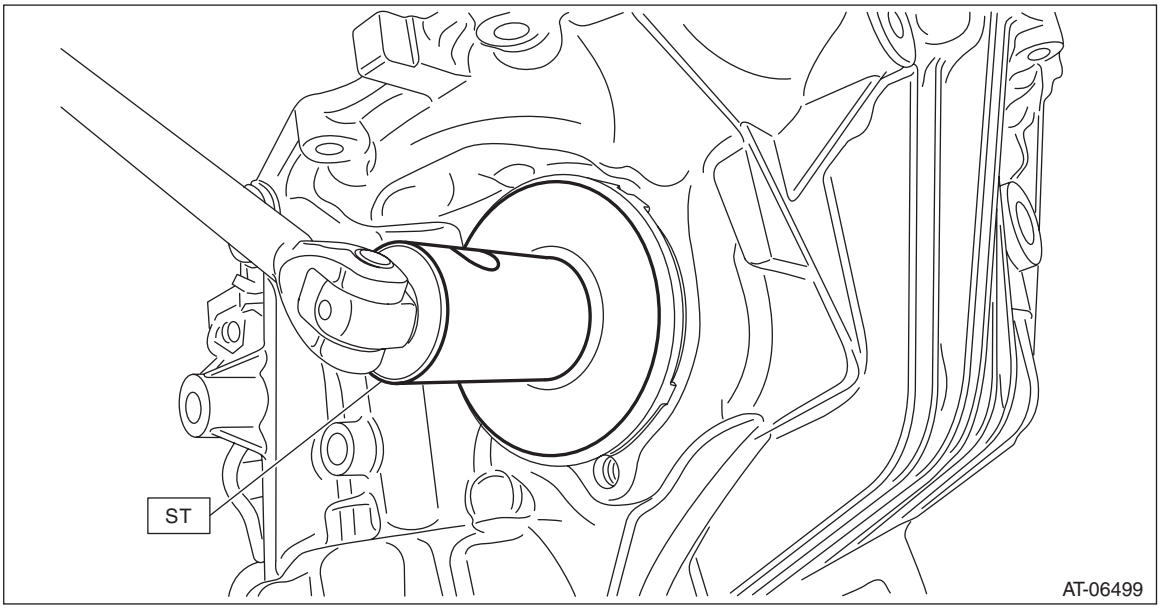


(A) Lock plate

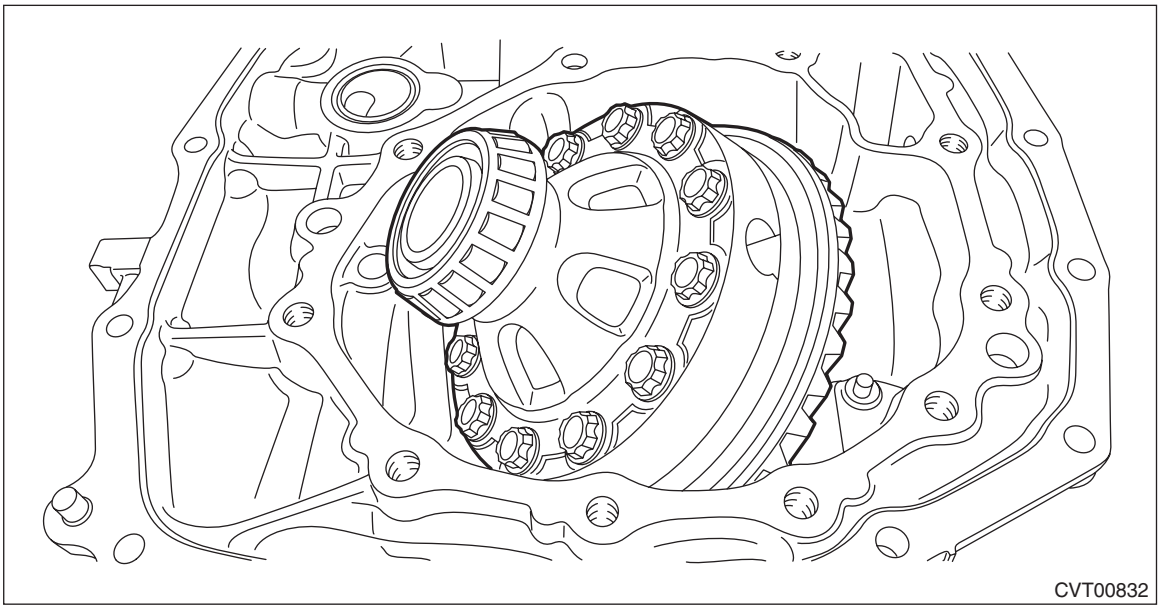
24) Remove the differential side retainers using ST.

NOTE:
• When the wrench COMPL retainer interferes with the converter case, align the cutout portion with the interference part.
• Support the differential case assembly by hand to avoid damaging the retainer mounting hole of the converter case.
• Keep the left and right differential side retainers and left and right bearing outer races by attaching tags or in similar ways to make it possible to identify RH and LH sides.

ST 18658AA020 WRENCH COMPL RETAINER



25) Remove the front differential assembly while being careful not to damage the attachment part of the retainer.

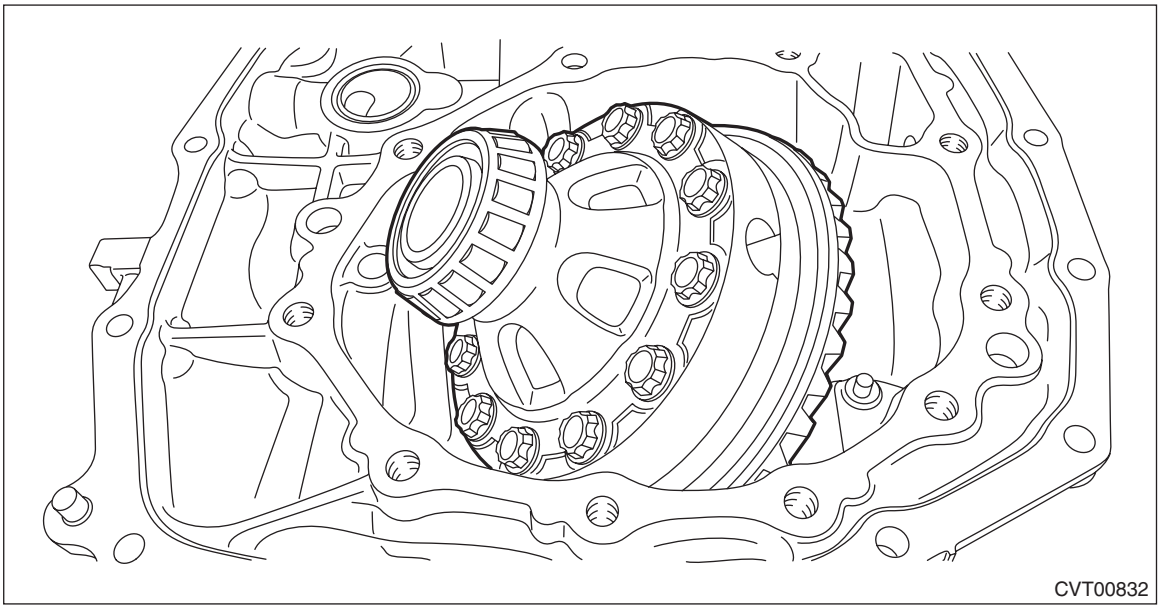


26) Remove the oil seals and O-rings from both differential side retainers. <Ref. to CVT(TR580)-316, SIDE RETAINER, DISASSEMBLY, Front Differential Assembly.>

B: INSTALLATION

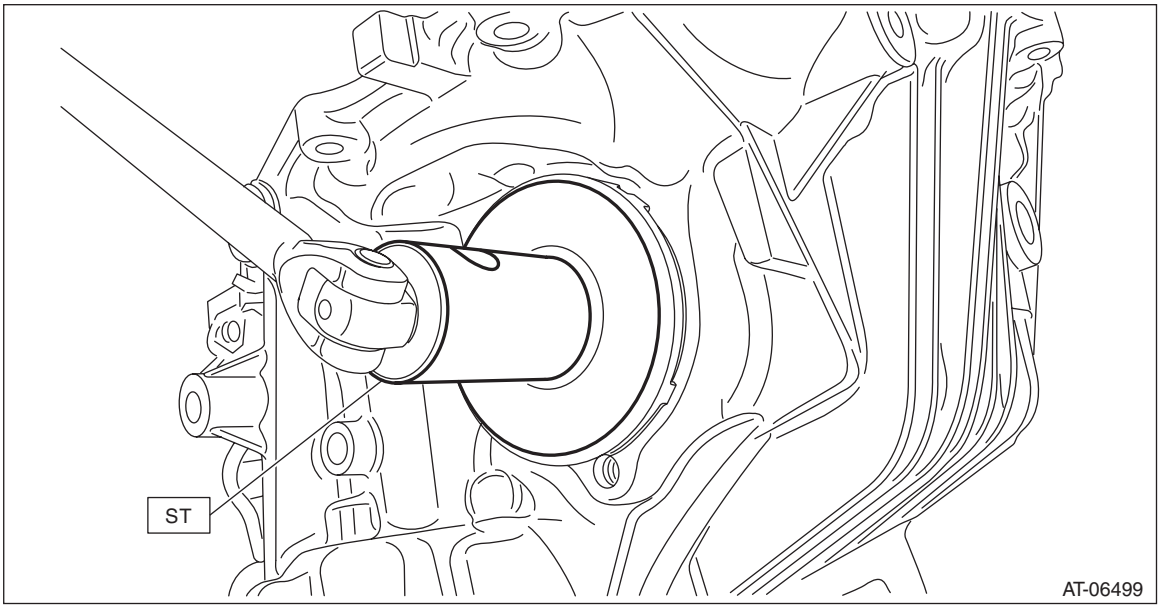
1) Install the front differential assembly to the converter case.

NOTE:
Be careful not to damage the inside of the case (especially the mounting surface of the differential side retainers).



2) Install the bearing outer race.

3) Temporarily install the differential side retainers using ST.
ST 18658AA020 WRENCH COMPL RETAINER



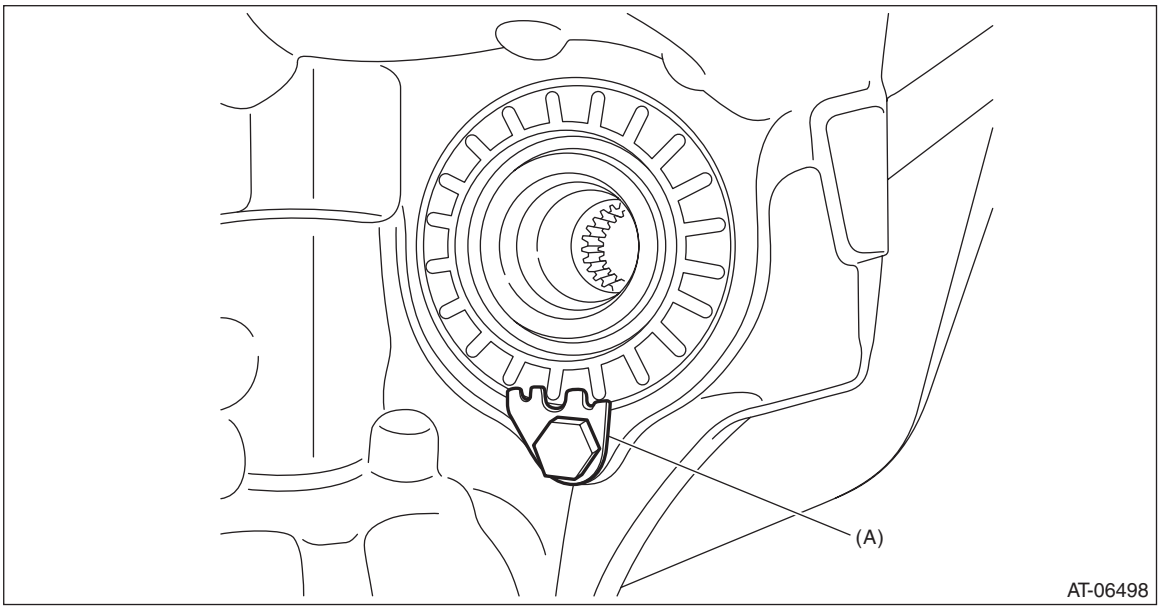
4) Adjust the backlash of the front differential. <Ref. to CVT(TR580)-323, ADJUSTMENT, Front Differential Assembly.>
5) Inspect and adjust the tooth contact. <Ref. to CVT(TR580)-301, ADJUSTMENT, Drive Pinion Shaft Assembly.>
6) Using the ST, loosen the differential side retainer until the mounting groove of the O-ring appears, and then install the O-ring.

NOTE:
- When loosening the differential side retainer, record the number of the turns made.
- Perform this for both left and right differential side retainers.
- Use new O-rings.
- Apply the differential gear oil to O-ring.

ST 18658AA020 WRENCH COMPL RETAINER
7) Using the ST, tighten the retainer to the position before it is loosened.
ST 18658AA020 WRENCH COMPL RETAINER
8) Install the oil seal to the differential side retainer. <Ref. to CVT(TR580)-91, Differential Side Retainer Oil Seal.>

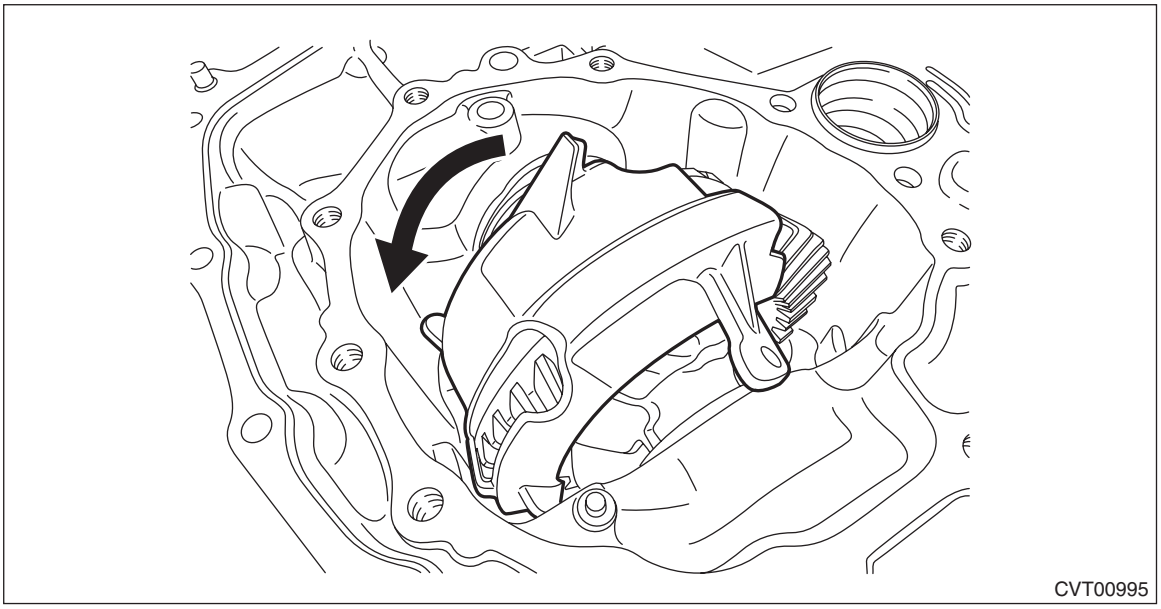
9) Install the lock plate.

Tightening torque:
25 N·m (2.5 kgf-m, 18.4 ft-lb)



(A) Lock plate

10) Install the oil baffle.



11) Install the drive pinion shaft assembly. <Ref. to CVT(TR580)-280, INSTALLATION, Drive Pinion Shaft Assembly.>
12) Install the forward clutch assembly. <Ref. to CVT(TR580)-262, INSTALLATION, Forward Clutch Assembly.>
13) Install the reverse brake assembly. <Ref. to CVT(TR580)-246, INSTALLATION, Reverse Brake Assembly.>
14) Install the primary pulley, secondary pulley and variator chain. <Ref. to CVT(TR580)-230, INSTALLATION, Primary Pulley and Secondary Pulley.>

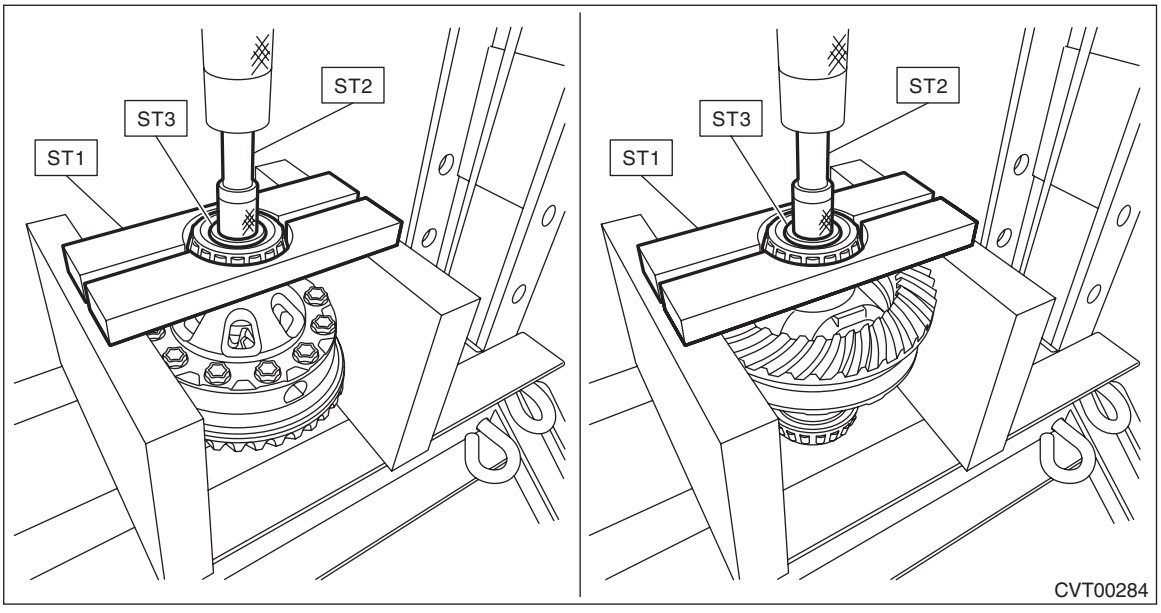
15) Install the reduction drive gear. <Ref. to CVT(TR580)-219, INSTALLATION, Reduction Drive Gear.>
16) Install the transmission case. <Ref. to CVT(TR580)-208, INSTALLATION, Transmission Case.>
17) Install the oil strainer and oil pan. <Ref. to CVT(TR580)-115, INSTALLATION, Oil Pan and Strainer.>
18) Install the transmission control device. <Ref. to CVT(TR580)-202, INSTALLATION, Transmission Control Device.>
19) Install the reduction driven gear assembly. <Ref. to CVT(TR580)-192, INSTALLATION, Reduction Driven Gear.>
20) Install the transfer driven gear assembly. <Ref. to CVT(TR580)-187, INSTALLATION, Transfer Driven Gear.>
21) Install the transfer clutch assembly. <Ref. to CVT(TR580)-174, INSTALLATION, Transfer Clutch.>
22) Install the parking pawl. <Ref. to CVT(TR580)-190, INSTALLATION, Parking Pawl.>
23) Install the extension case. <Ref. to CVT(TR580)-169, INSTALLATION, Extension Case.>
24) Install the inhibitor switch. <Ref. to CVT(TR580)-101, INSTALLATION, Inhibitor Switch.>
25) Install the secondary speed sensor. <Ref. to CVT(TR580)-105, INSTALLATION, Secondary Speed Sensor.>
26) Install the primary speed sensor. <Ref. to CVT(TR580)-109, INSTALLATION, Primary Speed Sensor.>
27) Install the turbine speed sensor. <Ref. to CVT(TR580)-103, INSTALLATION, Turbine Speed Sensor.>
28) Install the transmission harness. <Ref. to CVT(TR580)-139, INSTALLATION, Transmission Harness.>
29) Install the control valve body. <Ref. to CVT(TR580)-124, INSTALLATION, Control Valve Body.>
30) Install the air breather hose. <Ref. to CVT(TR580)-160, INSTALLATION, Air Breather Hose.>
31) Install the transmission assembly to the vehicle. <Ref. to CVT(TR580)-72, INSTALLATION, Automatic Transmission Assembly.>

C: DISASSEMBLY

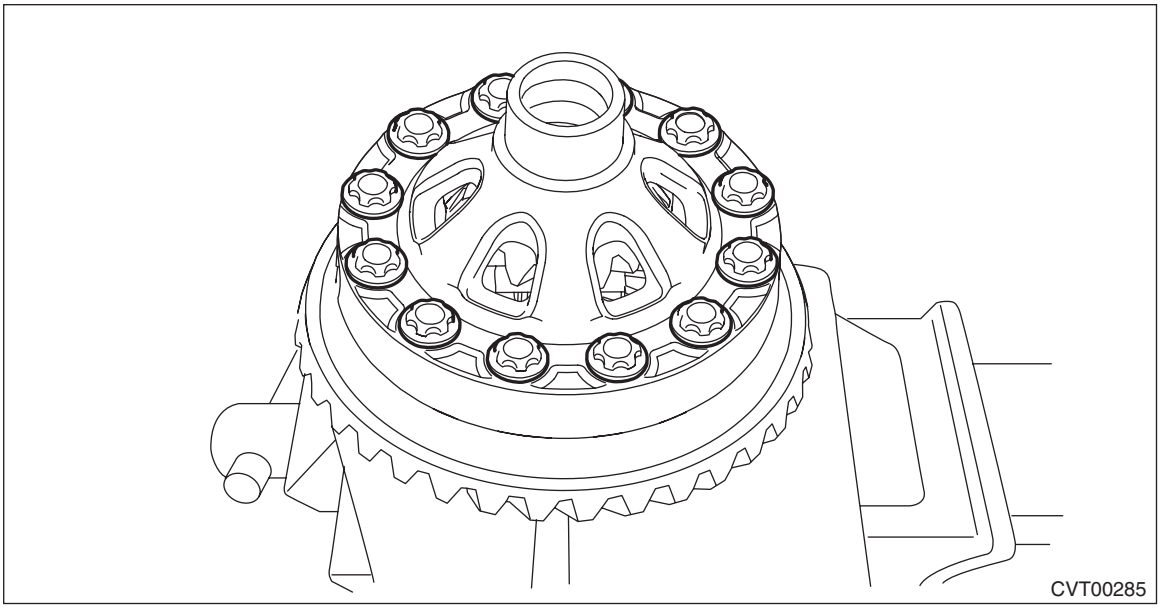
1. DIFFERENTIAL CASE ASSEMBLY

1) Remove the taper roller bearing using the ST.

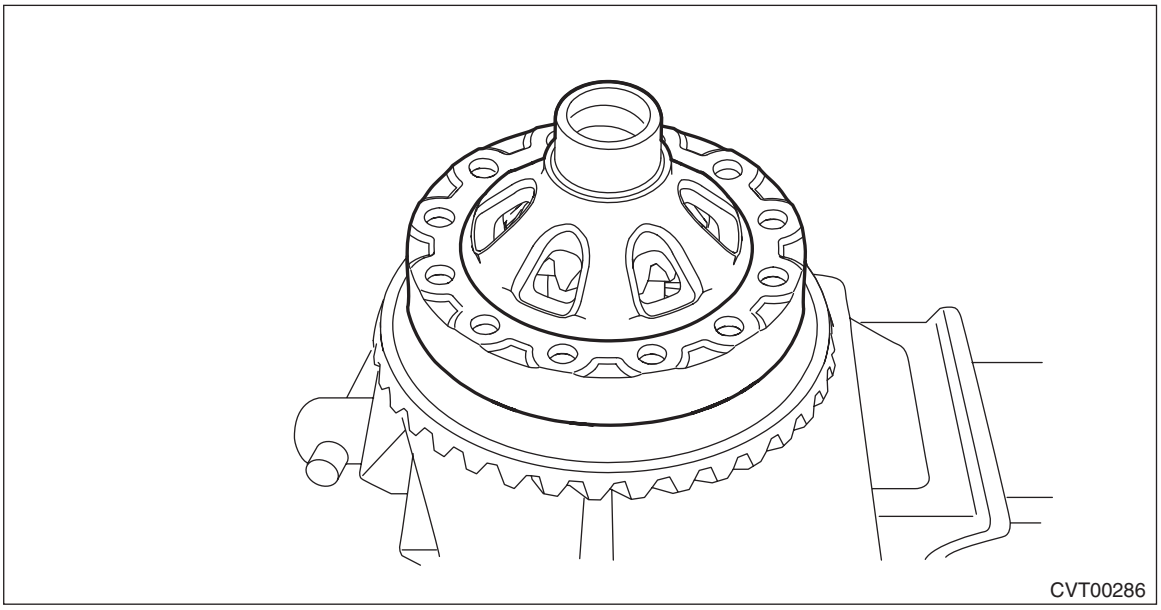
ST1	498077000	REMOVER
ST2	899864100	REMOVER
ST3	398497701	SEAT



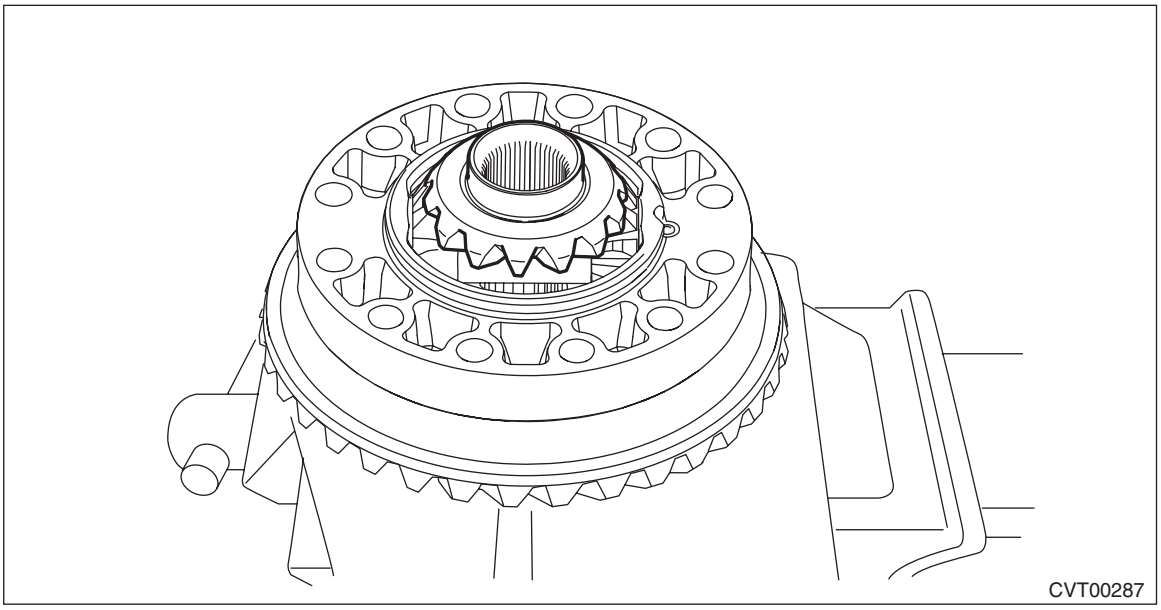
2) Remove the hypoid driven gear mounting bolt using the ST.
ST 18270KA020 SOCKET (E20)



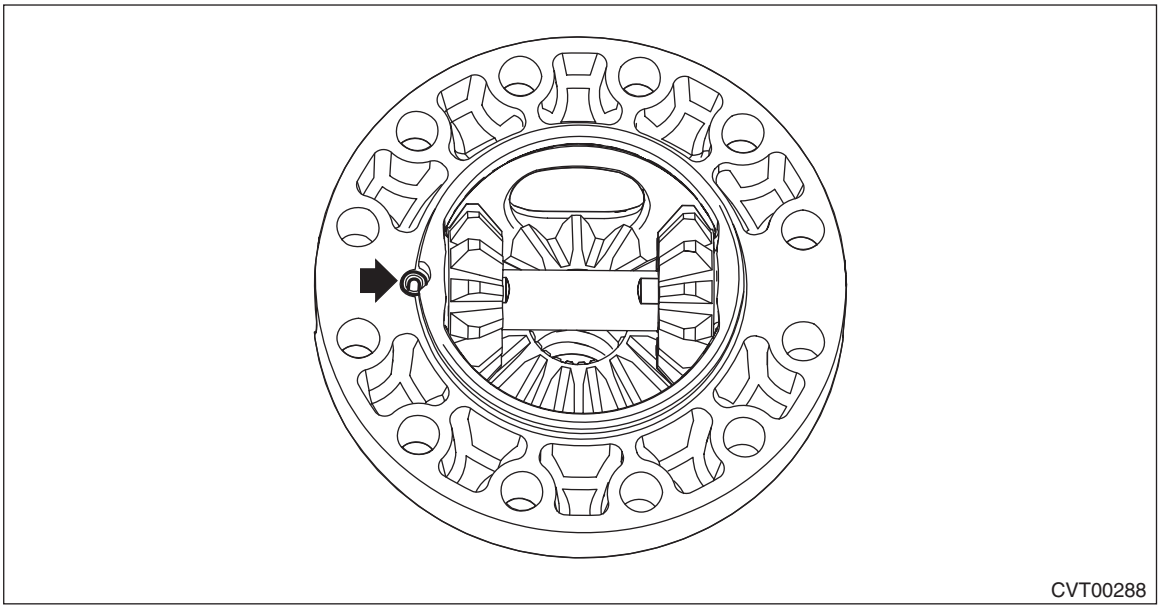
3) Remove the differential case (LH).



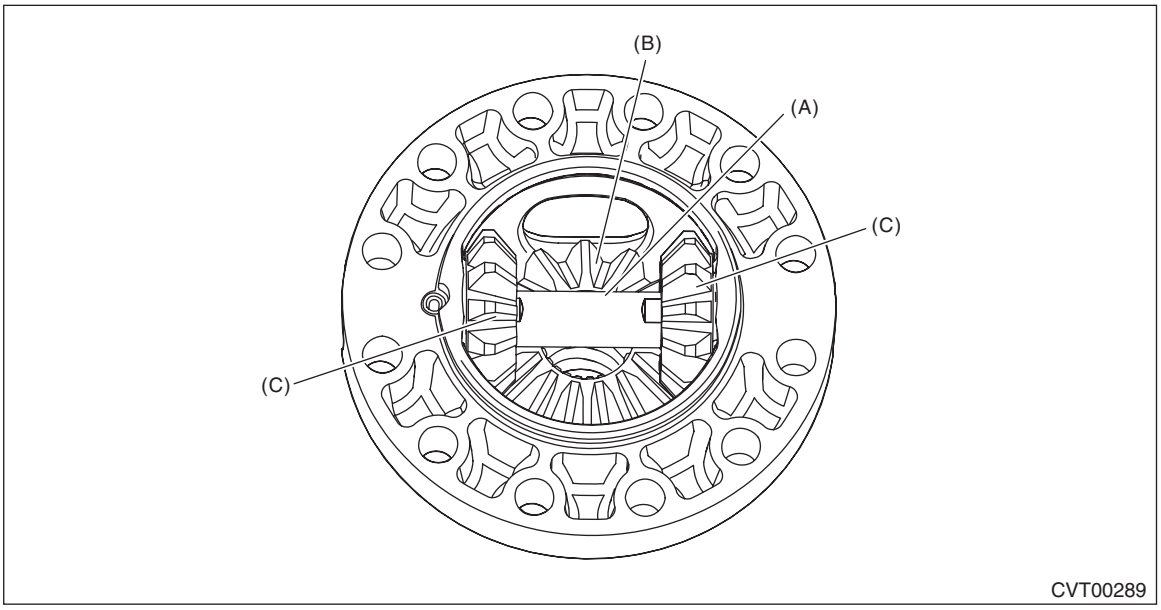
4) Remove the differential bevel gear and washer from differential case.



5) Remove the straight pin.



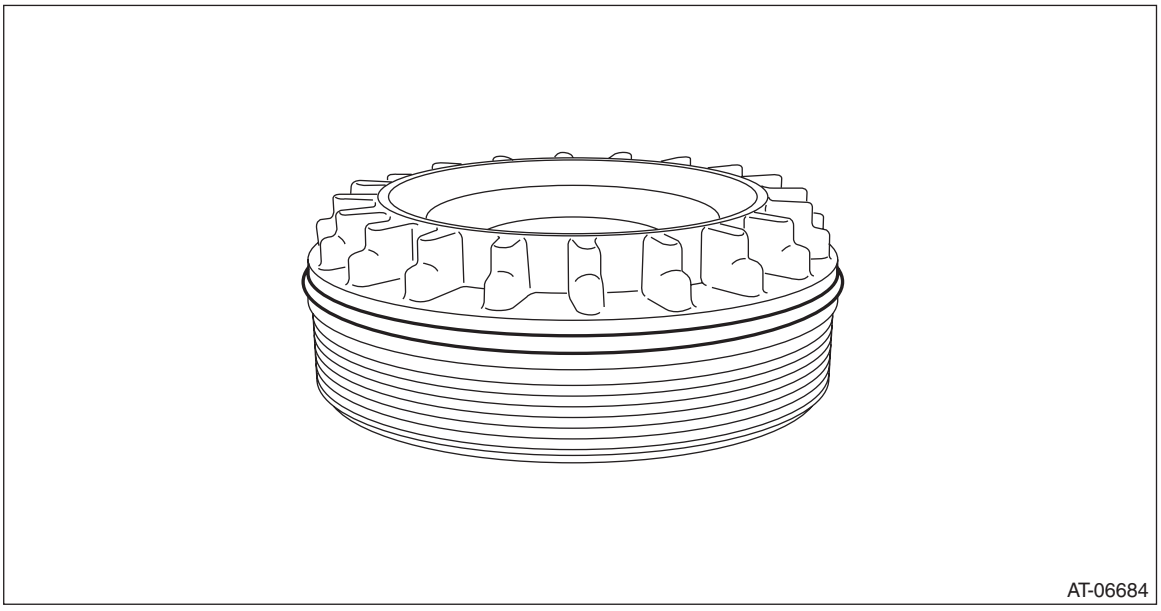
6) Remove the pinion shaft, then remove the differential bevel gear, washer and differential bevel pinion.



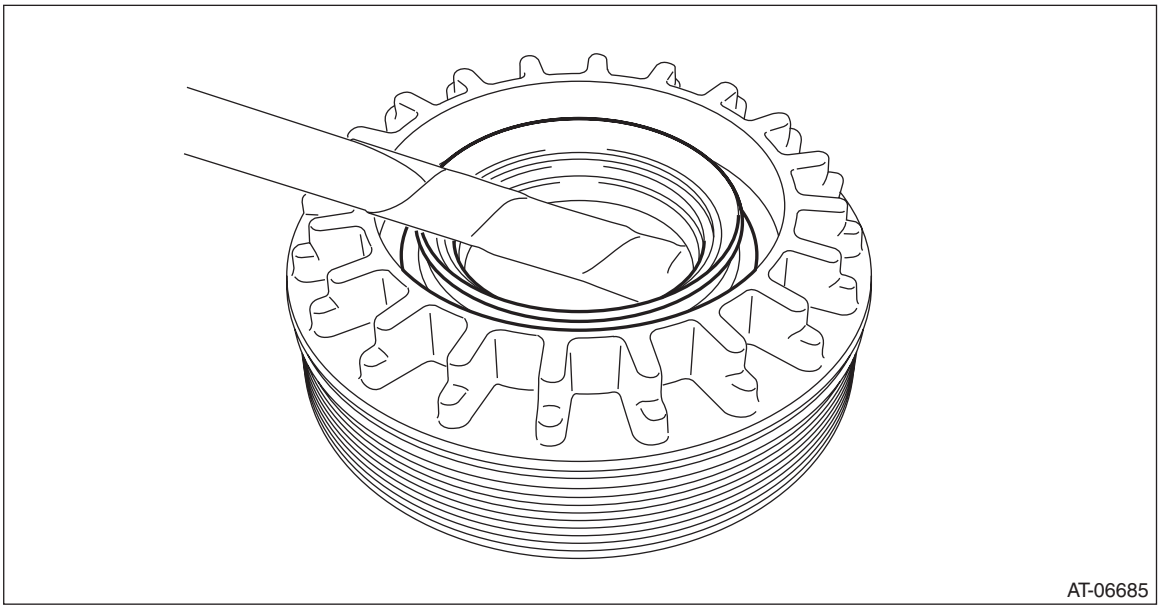
(A) Pinion shaft
(B) Differential bevel gear
(C) Differential bevel pinion

2. SIDE RETAINER

NOTE:
After adjusting the drive pinion backlash and tooth contact, replace the oil seal and O-ring with new parts.
1) Remove the O-ring.



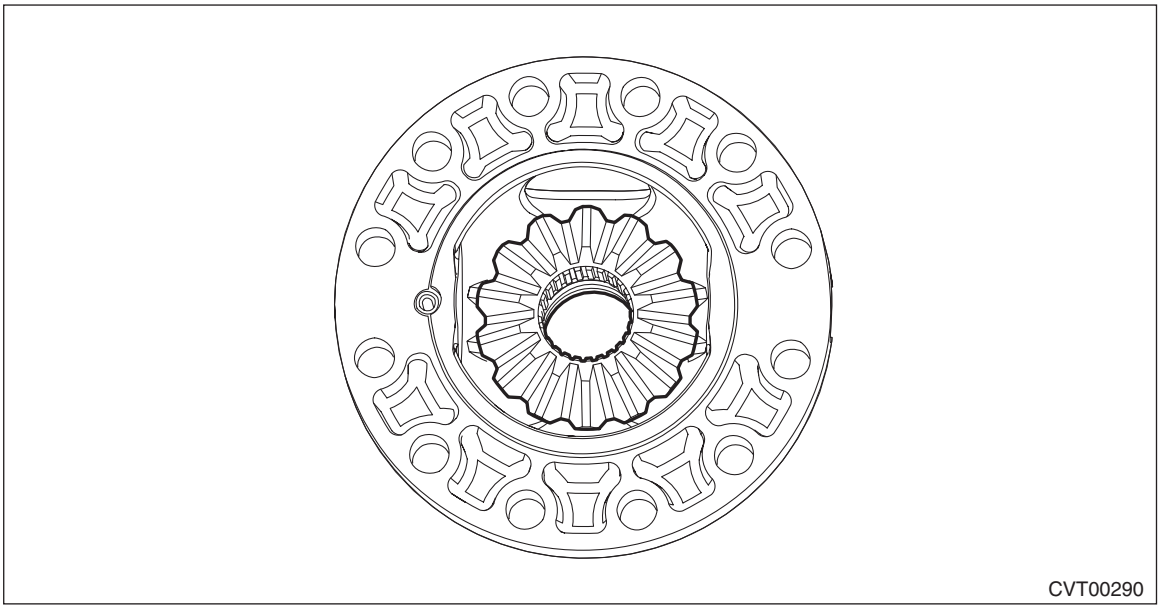
2) Remove the oil seal.



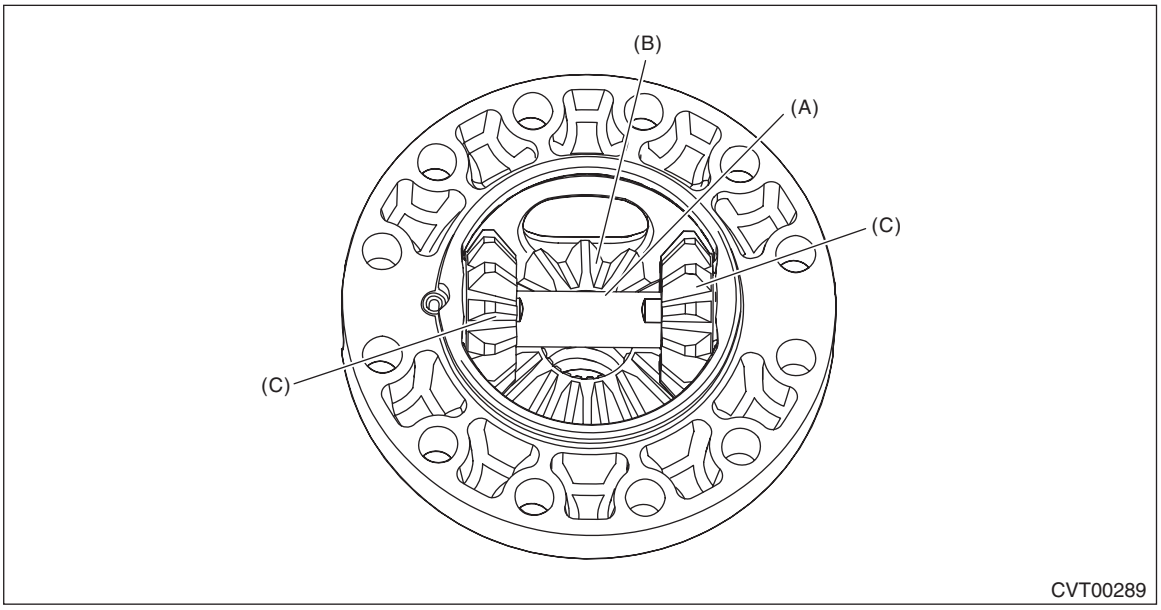
D: ASSEMBLY

1. DIFFERENTIAL CASE ASSEMBLY

1) Install the washer and differential bevel gear into the differential case (RH).

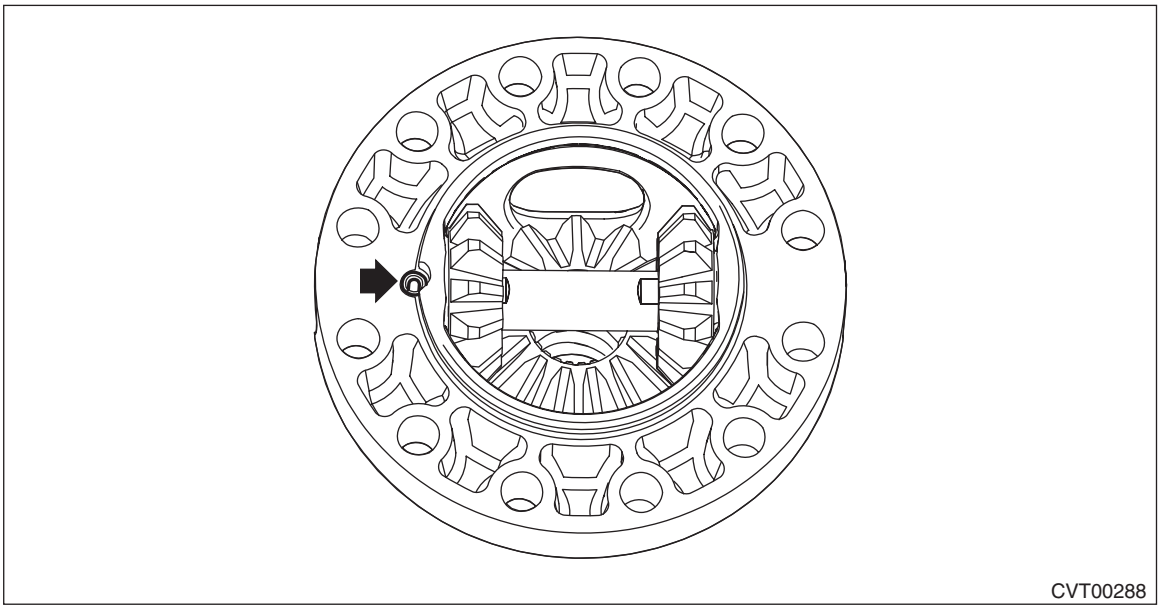


2) Install the differential bevel pinions into differential case (RH) and install the pinion shaft.

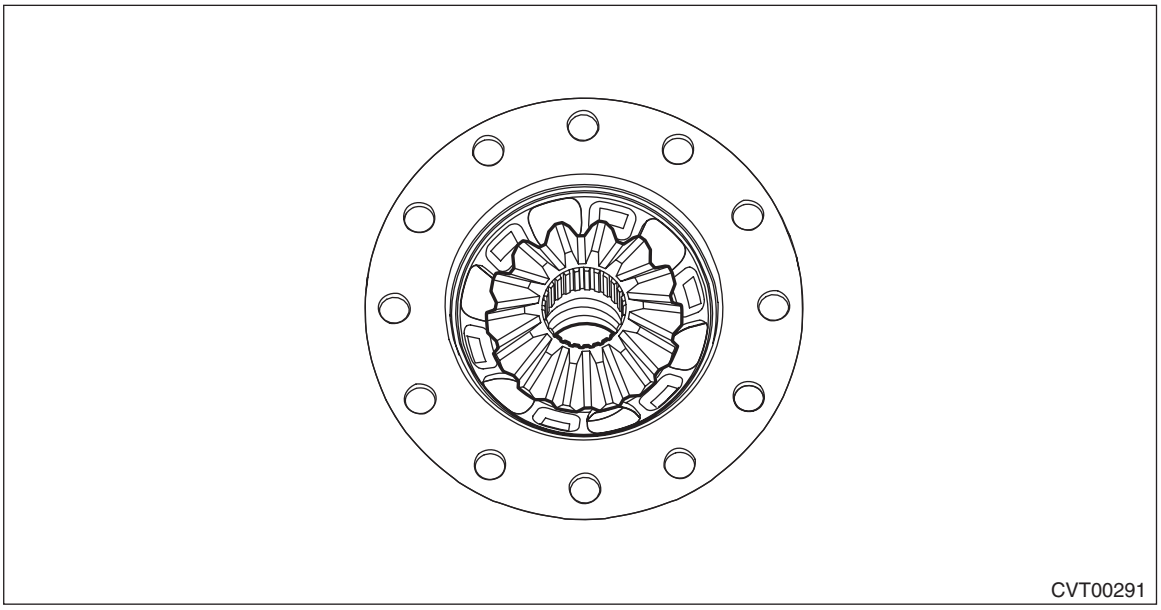


(A) Pinion shaft
(B) Differential bevel gear
(C) Differential bevel pinion

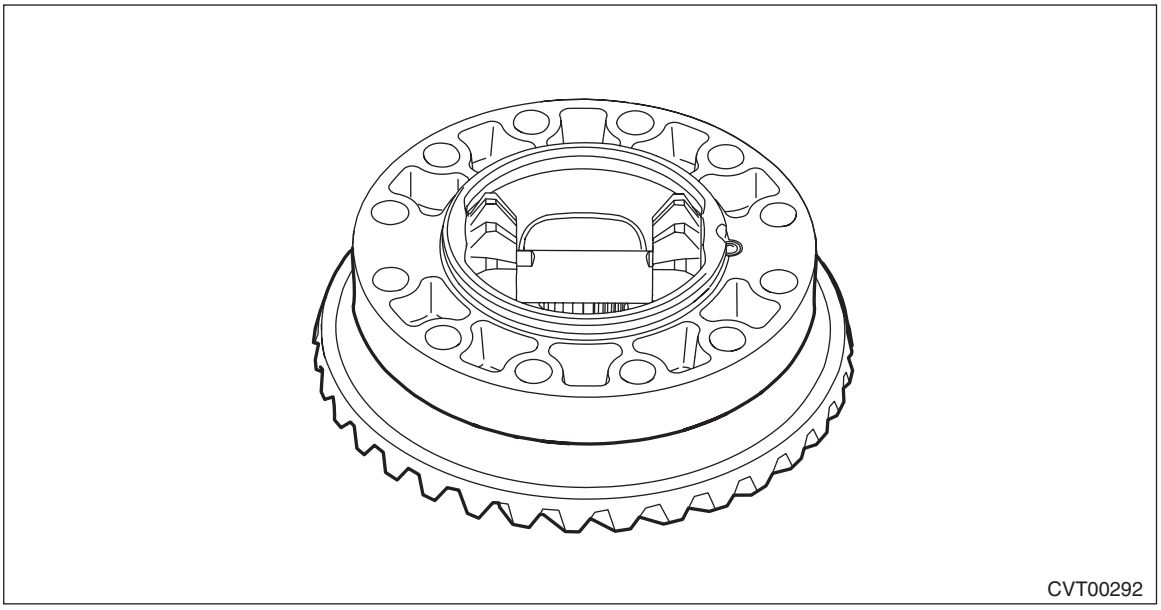
3) Install the straight pin.



4) Install the washer and differential bevel gear to the differential case (LH).


CVT00291

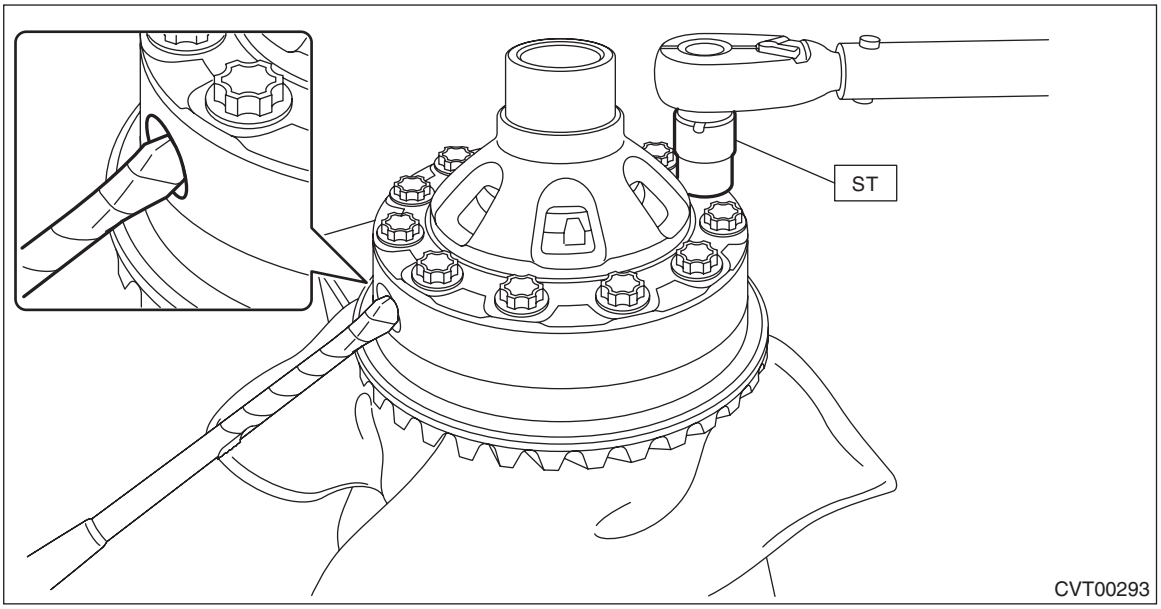
5) Install the differential case (RH) to the hypoid driven gear.


CVT00292

6) Install the differential case (LH) to the differential case (RH).

7) Using the ST, install the hypoid driven gear by tightening the installation bolt.
ST 18270KA020 SOCKET (E20)

Tightening torque:
64 N·m (6.5 kgf-m, 47.2 ft-lb)

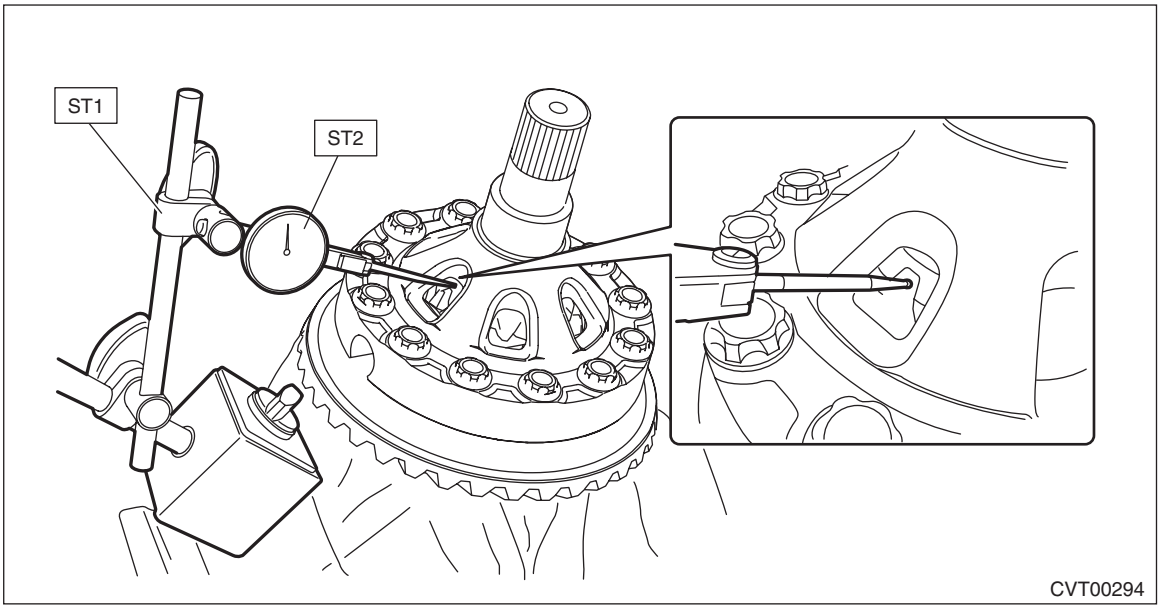


8) Measure the backlash, and select the washer.
(1) Install the SUBARU genuine axle shaft to differential case.
Part No. 38415AA070 Axle shaft
(2) Using ST1 and ST2, insert the ST2 through the window of differential case. Measure the backlash of the gear.

NOTE:
• Measure the backlash by applying a differential bevel pinion tooth between two differential bevel gear teeth.
• When measuring, fix the differential bevel pinion in place with a screwdriver covered with cloth, or a similar tool.

ST1 498247001 MAGNET BASE
ST2 498247100 DIAL GAUGE

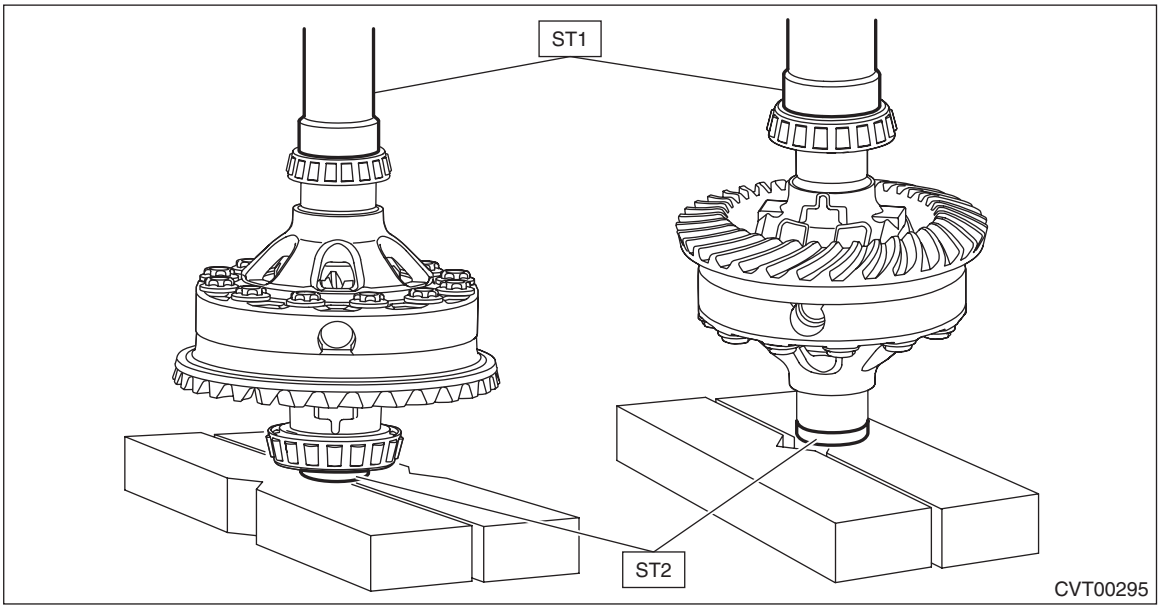
Specification:
0.13 — 0.18 mm (0.0051 — 0.0071 in)



(3) If the backlash is not within specification, select a washer from the table below and replace.

Washer	
Part No.	Thickness mm (in)
803038021	0.95 (0.037)
803038022	1.00 (0.039)
803038023	1.05 (0.041)

9) Using the ST, install the left and right taper roller bearings.
ST1 499277100 BUSHING 1-2 INSTALLER
ST2 398497701 SEAT

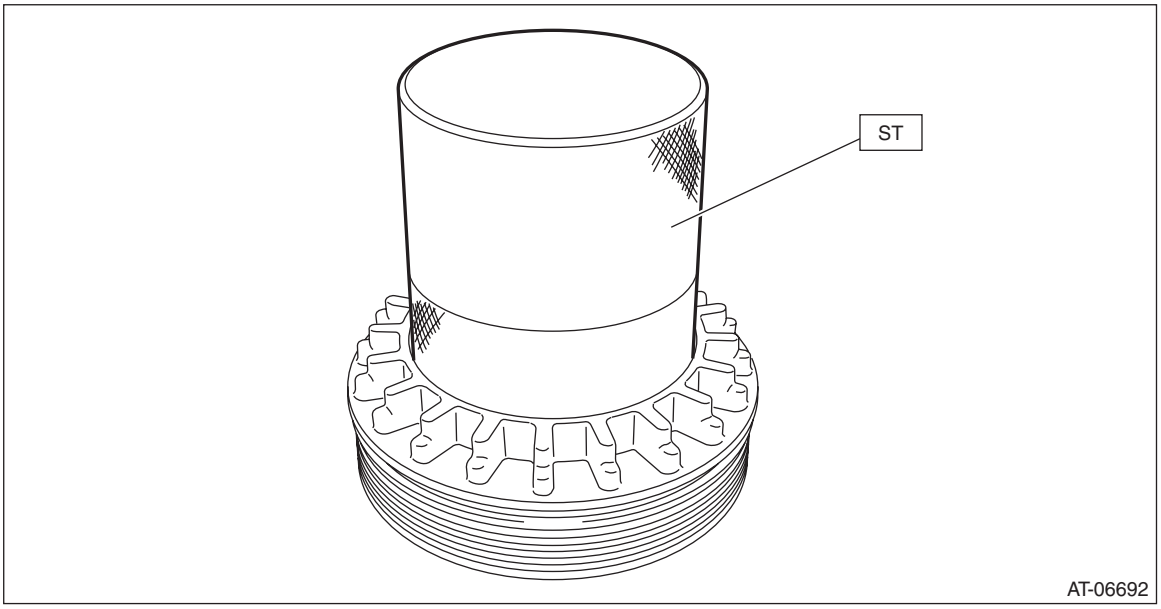


2. SIDE RETAINER

NOTE:
After adjusting the backlash and tooth contact, replace the oil seal and O-ring of side retainer with new parts.
1) Using the ST, install the oil seal.

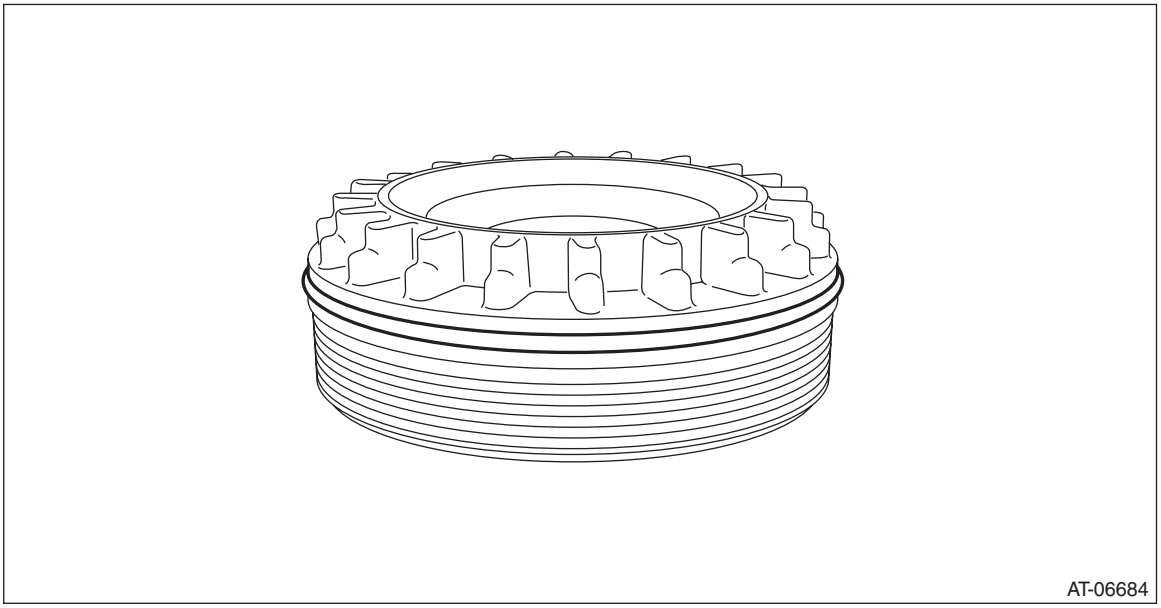
NOTE:
- Use a new oil seal.
- Apply differential gear oil to the oil seal lip and press-fitting surface.
- Oil seal has an identification mark (R, L). When installing oil seals, do not confuse the left and right.

ST 18675AA000 DIFFERENTIAL SIDE OIL SEAL INSTALLER



2) Install the O-ring.

NOTE:
- Use new O-rings.
- Apply the differential gear oil to O-ring.

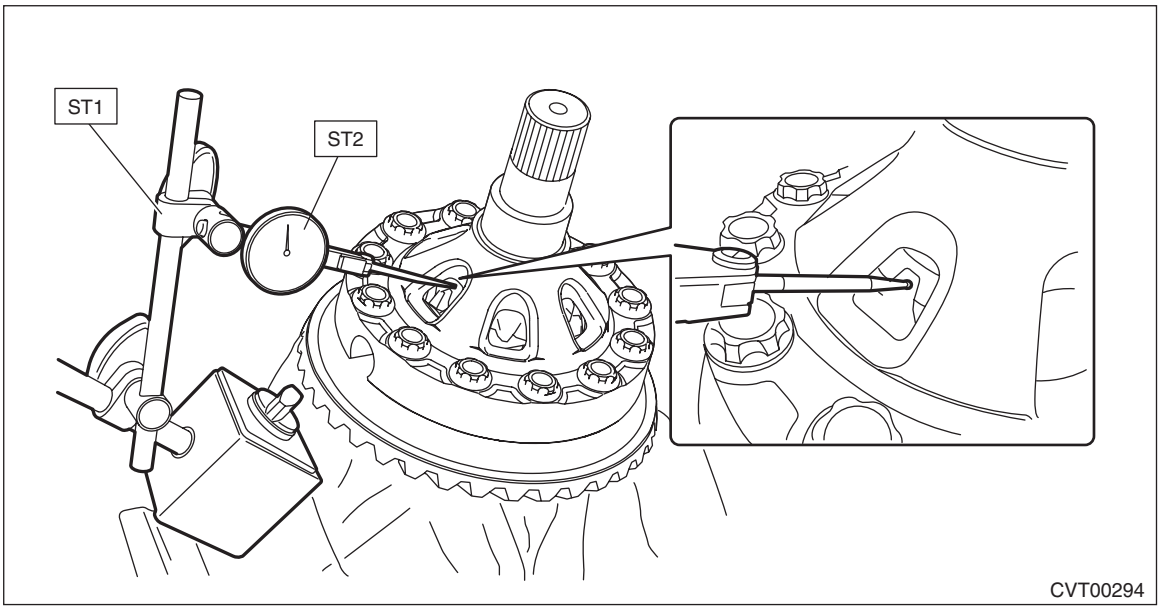


E: INSPECTION

- Check each component for scratches, damage or other faults.
- Using the ST, check the backlash of pinion gear.

ST1 498247001 MAGNET BASE
ST2 498247100 DIAL GAUGE

Specification:
0.13 — 0.18 mm (0.0051 — 0.0071 in)

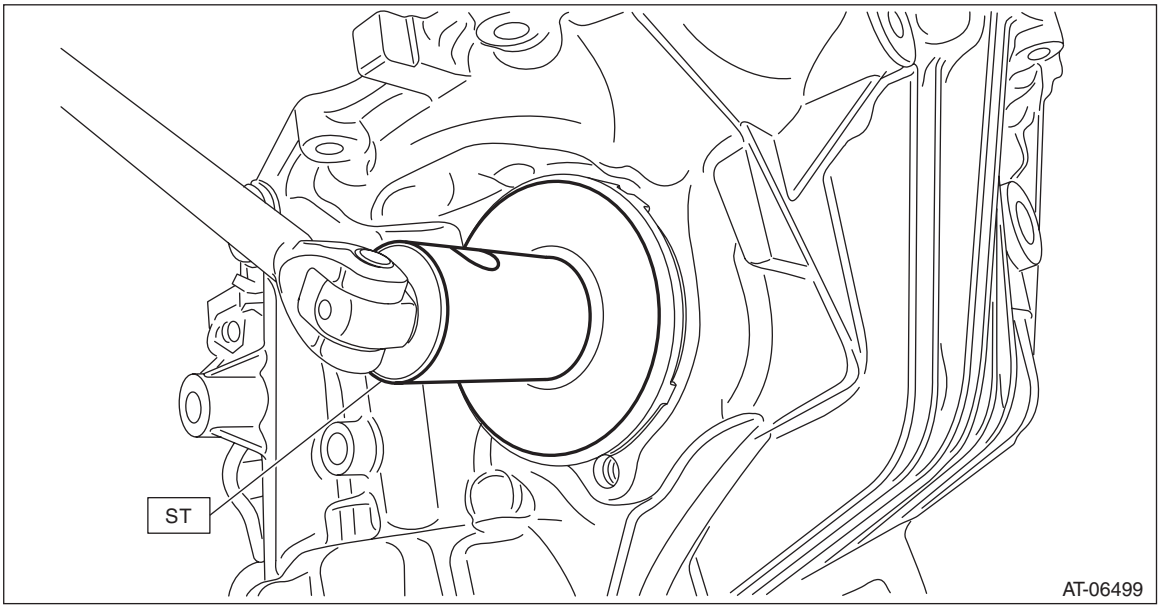


- Measure the hypoid gear backlash, and then adjust it to be within specification. <Ref. to CVT(TR580)-323, ADJUSTMENT, Front Differential Assembly.>

F: ADJUSTMENT

1) Using the ST, screw-in the retainer until resistance is felt.

NOTE:
RH side should be screwed-in more than LH side.
ST 18658AA020 WRENCH COMPL RETAINER

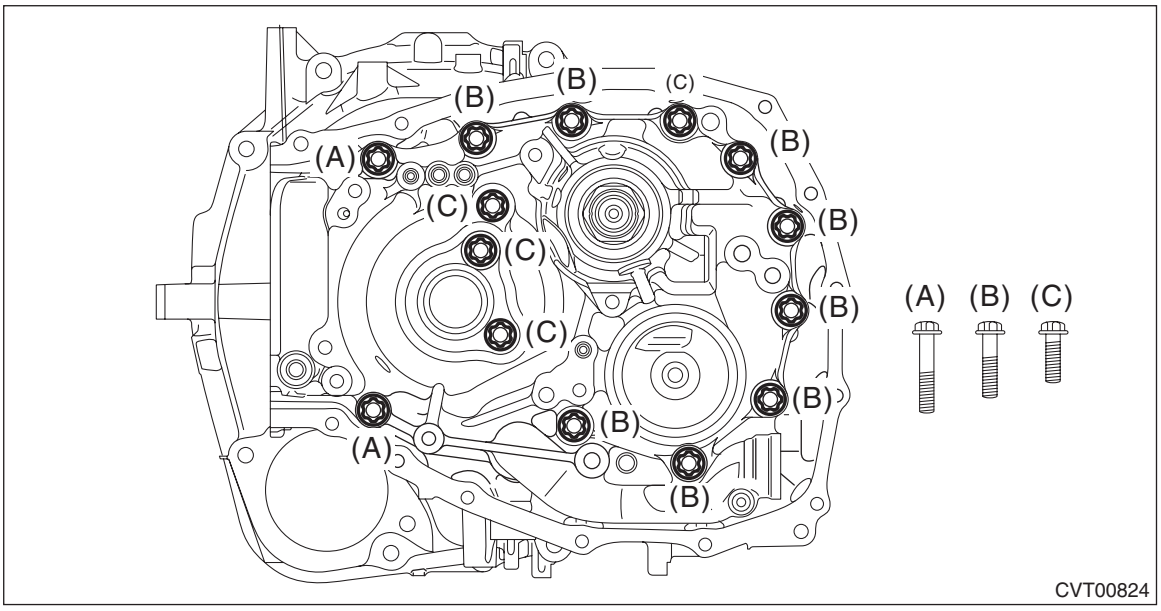


2) Remove the remaining liquid gasket from the mating surface completely.

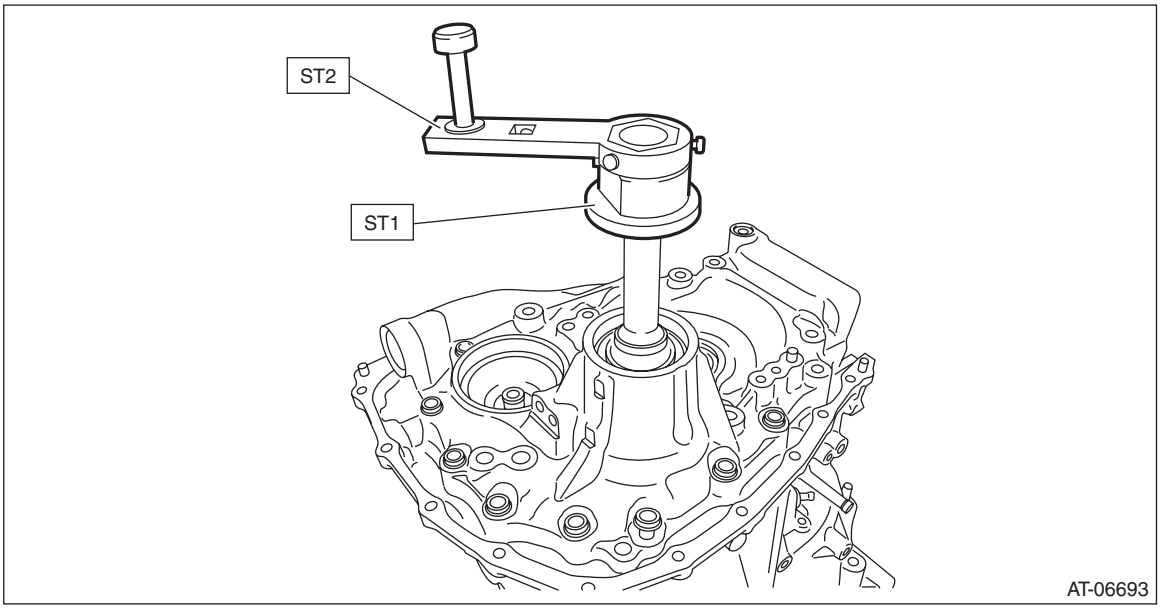
3) Using the ST, install the drive pinion assembly to converter case.
ST 18270KA020 SOCKET (E20)

NOTE:
Do not confuse the three different-length bolts when installing.

Tightening torque:
43 N·m (4.4 kgf-m, 31.7 ft-lb)

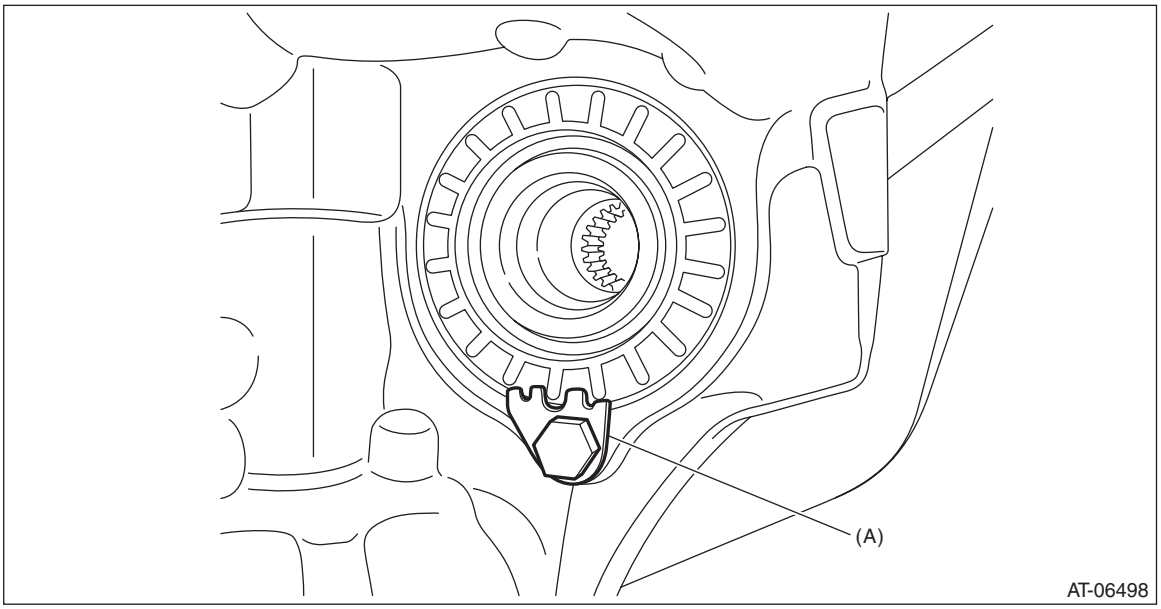


4) Rotate the drive pinion shaft ten times or more using ST1 and ST2.
ST1 18667AA010 HOLDER
ST2 499787700 WRENCH



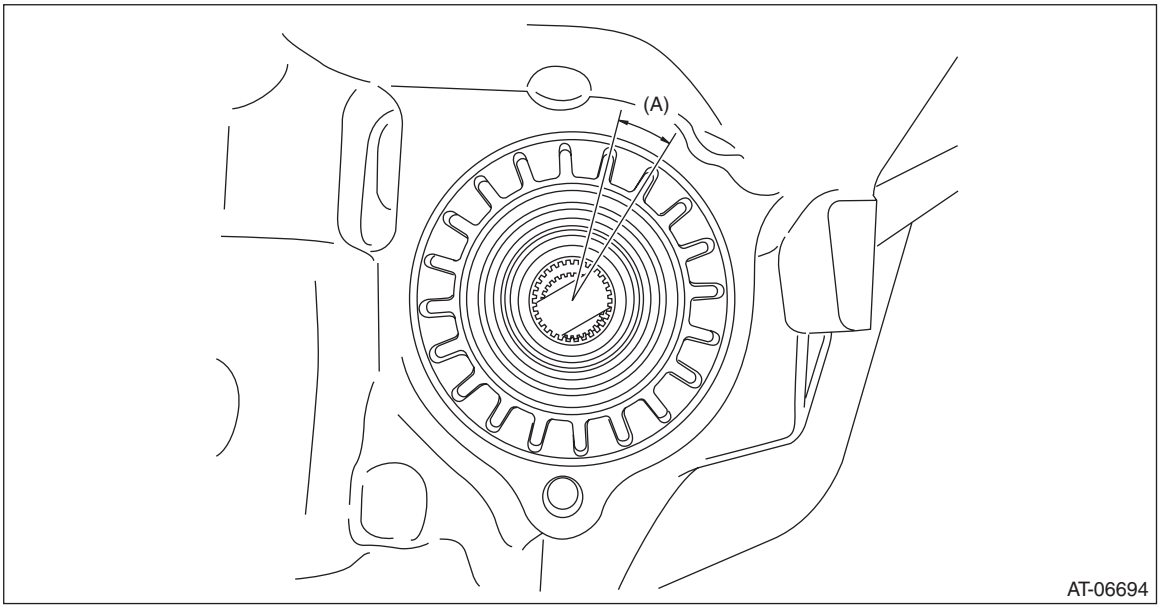
5) While rotating the pinion shaft, tighten the retainer LH and loosen the retainer RH until the shaft can't be turned anymore. The backlash is “zero” when the pinion shaft comes to the point where it doesn't rotate.

6) After the “zero” state is established, loosen the retainer LH by 3 notches and secure it with the lock plate. Retighten the retainer RH until it stops. Rotate the drive pinion 2 or 3 times. Tighten the retainer RH further 1-3/4 notches. This sets the preload. Finally, secure the retainer with its lock plate.



(A) Lock plate

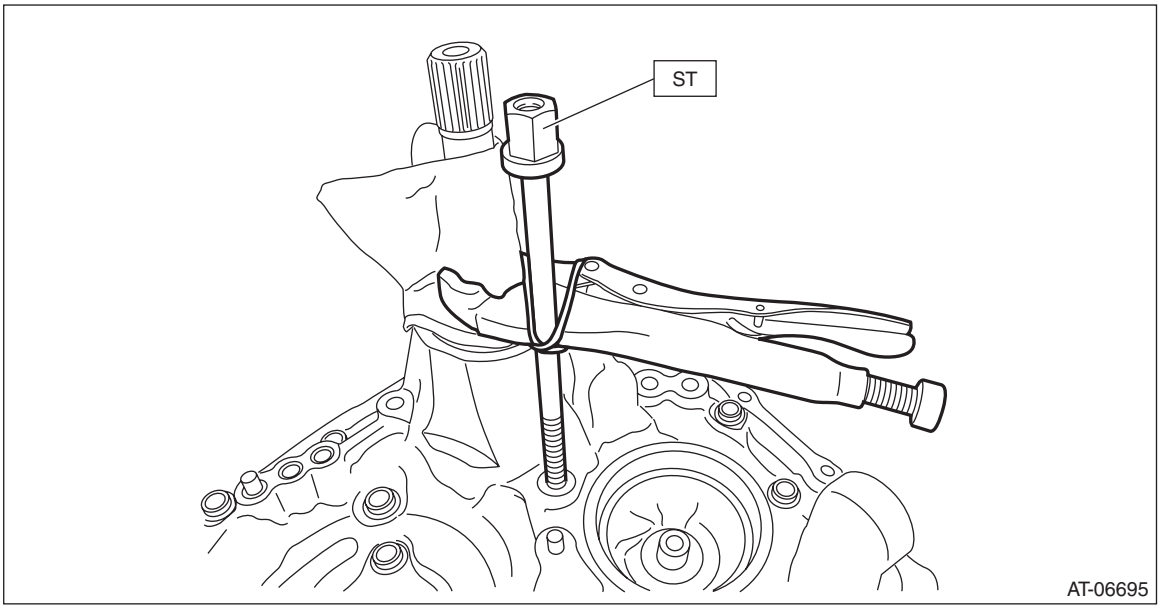
NOTE:
Turning the retainer by every one tooth changes the backlash approx. 0.05 mm (0.0020 in).



(A) 1 tooth

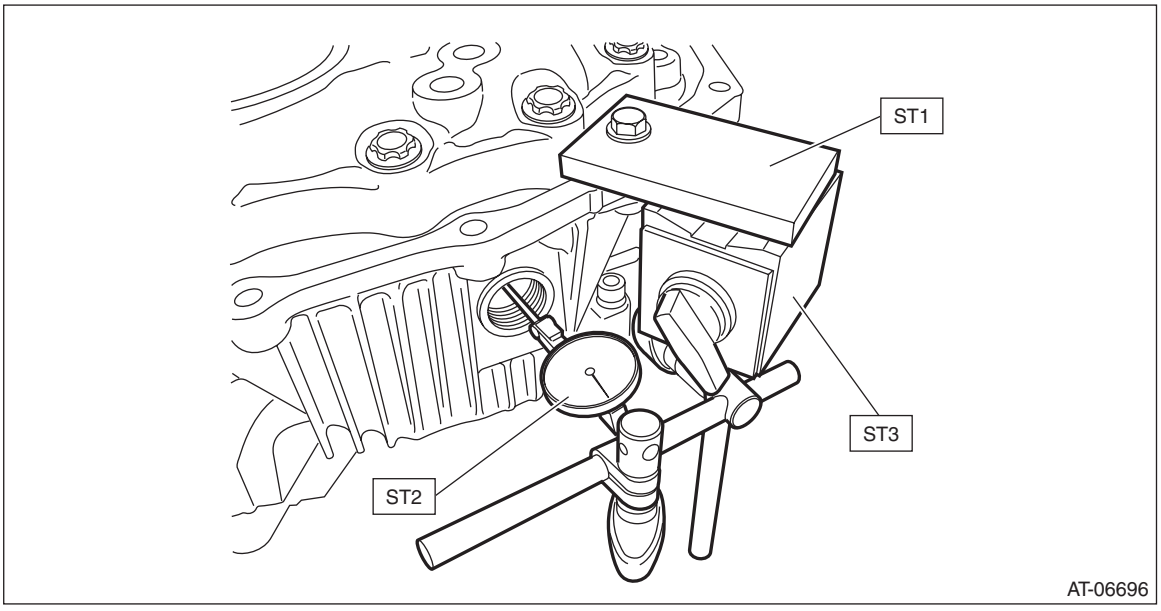
7) Insert the two SUBARU genuine axle shafts into differential case.
Part No. 38415AA070 Axle shaft

8) Install the ST to the drive pinion retainer, and wrap the drive pinion shaft with cloth and pinch with vise pliers. Using a tie-wrap or a wire, fix the vise pliers to the ST.
Make sure the drive pinion shaft does not move.
ST 18763AA000 COMPRESSOR SHAFT



9) Check the backlash is within specification using ST1, ST2 and ST3.
ST1 498255400 PLATE
ST2 498247100 DIAL GAUGE
ST3 498247001 MAGNET BASE

Backlash:
0.13 — 0.18 mm (0.005 — 0.007 in)



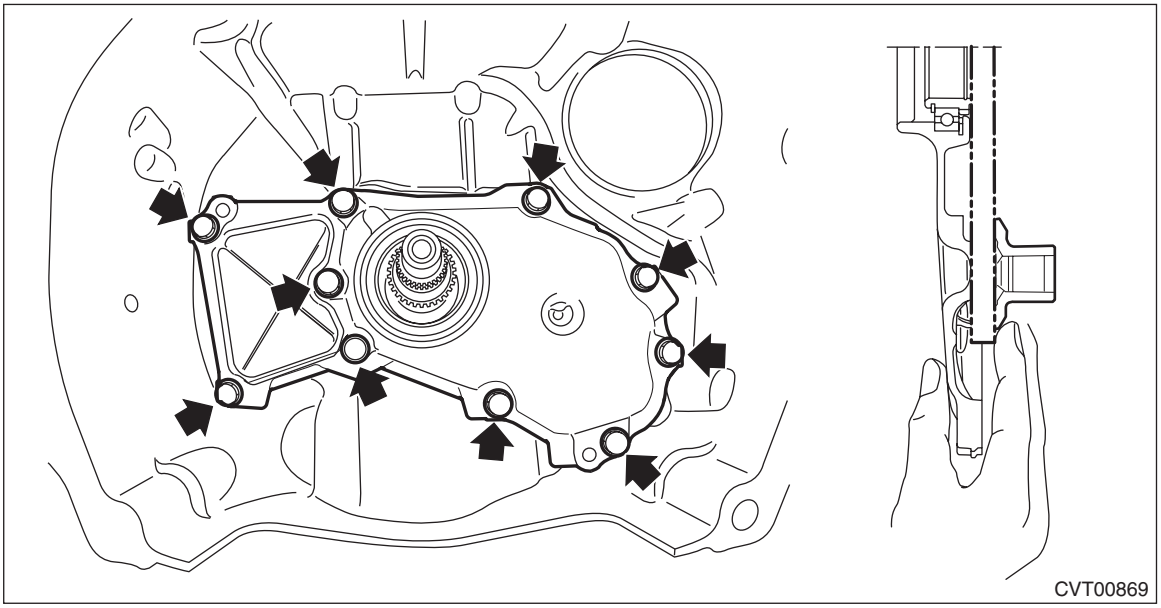
10) Adjust the teeth contact of the front differential and drive shaft. <Ref. to CVT(TR580)-301, ADJUSTMENT, Drive Pinion Shaft Assembly.>

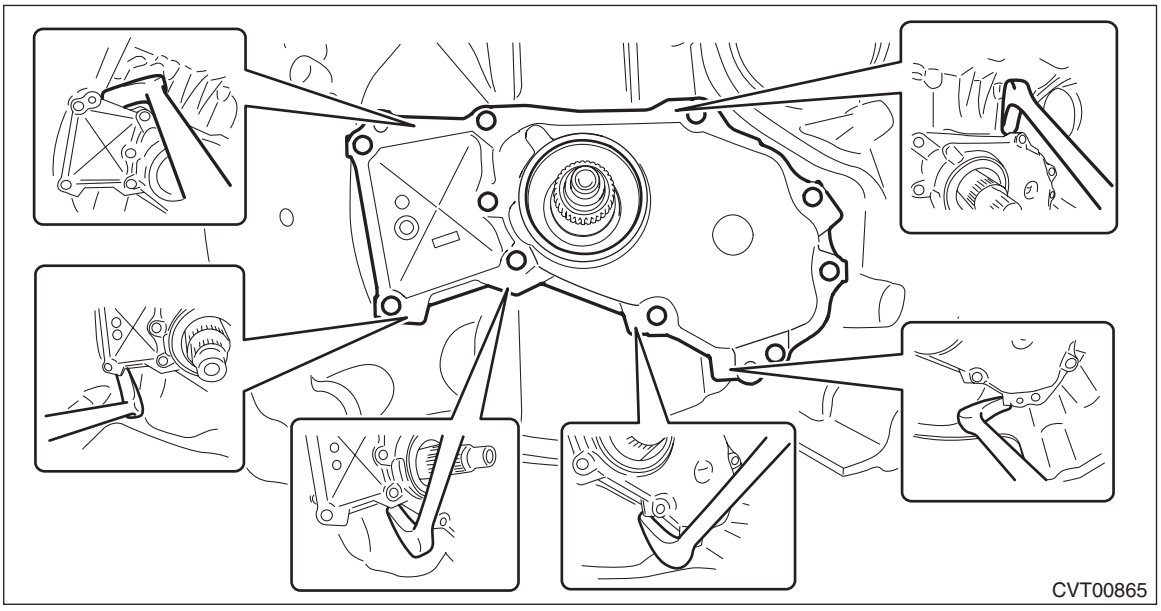
43.Oil Pump Chain

A: REMOVAL

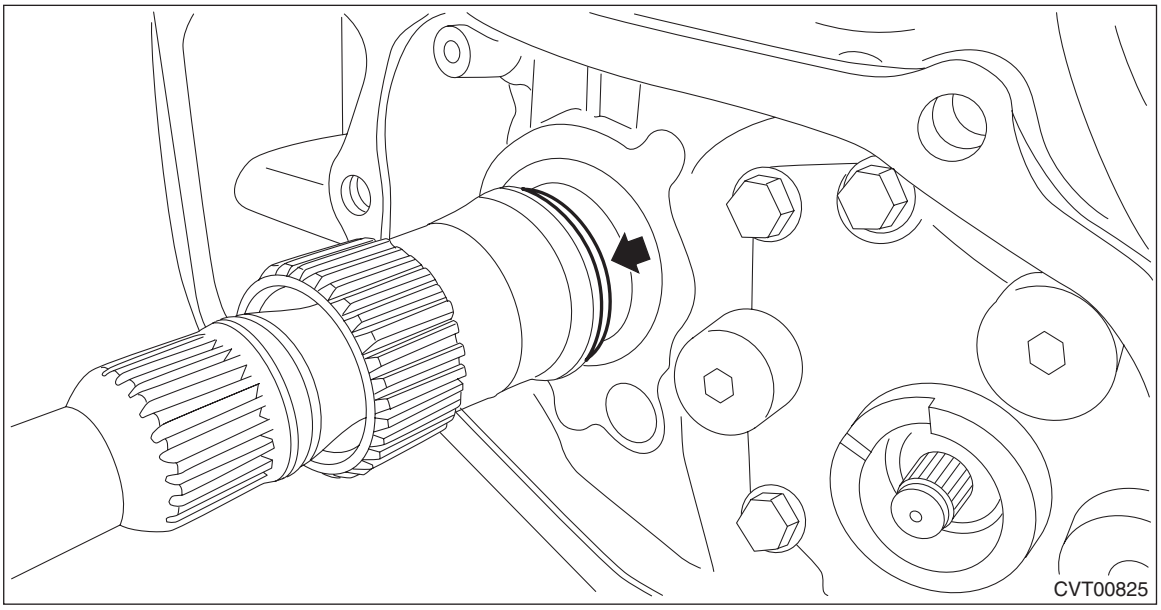
1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TR580)-60, REMOVAL, Automatic Transmission Assembly.>
2) Remove the torque converter assembly. <Ref. to CVT(TR580)-164, REMOVAL, Torque Converter Assembly.>
3) Remove the oil pump chain cover.

NOTE:
Oil pump chain cover may be hard to remove because the driven sprocket is installed to the shaft side of the oil pump. Do not remove it forcibly. Remove it while holding the driven sprocket by hand.



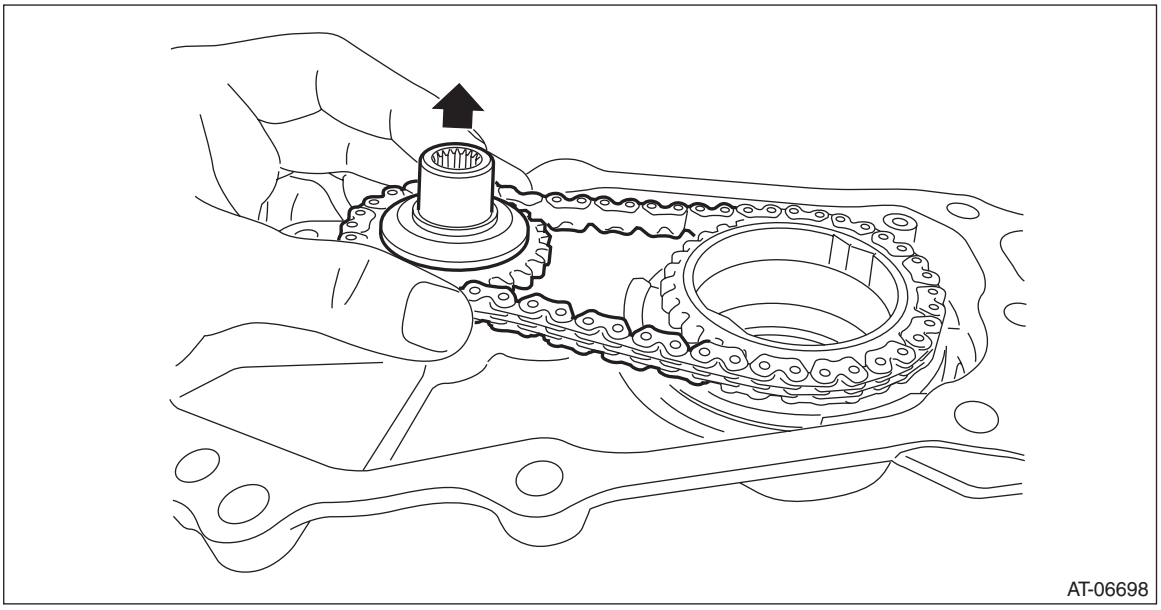


4) Remove the seal ring.

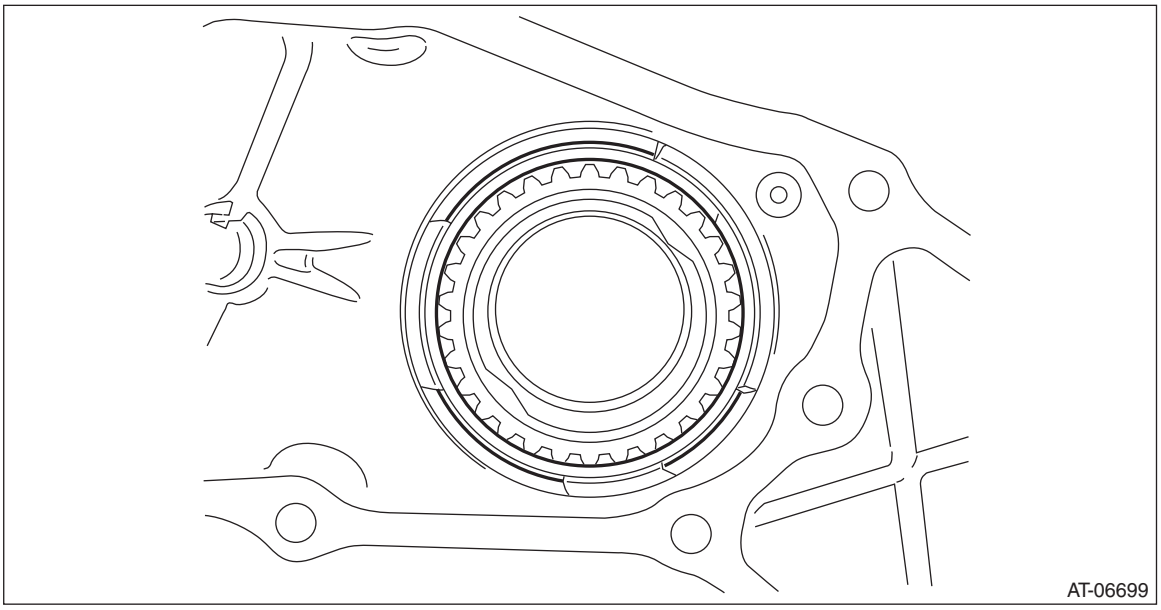


5) Remove the driven sprocket from oil pump chain cover to remove the oil pump chain.

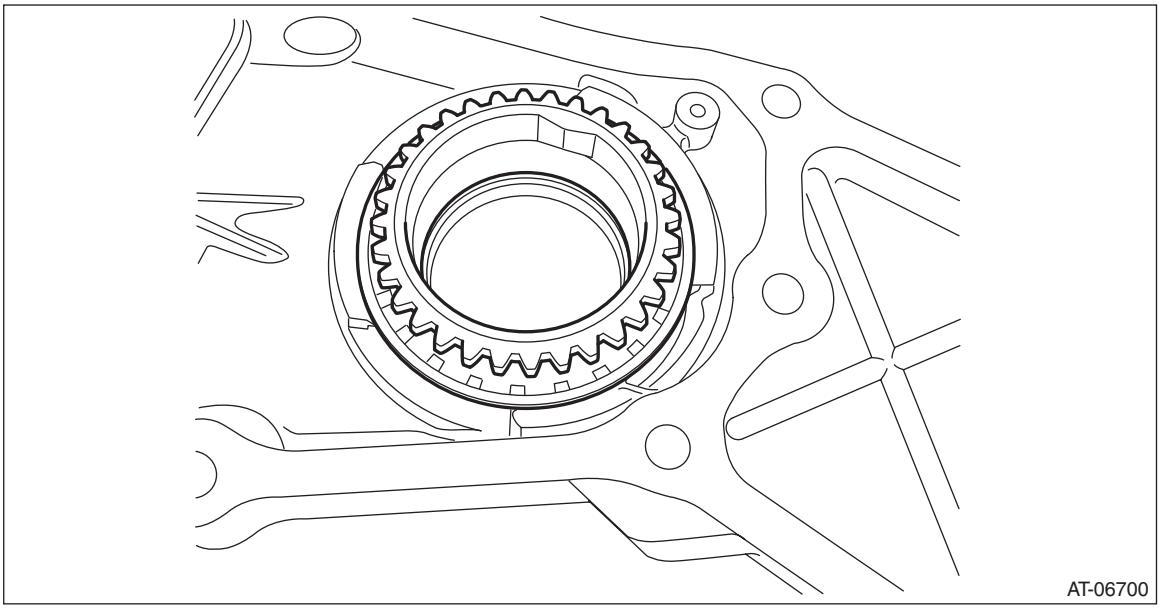
NOTE:
- The driven sprocket is replaced as an assembly only, because it is a non-disassembly part.
- If the ball bearing is removed from the driven sprocket, replace with a new part.



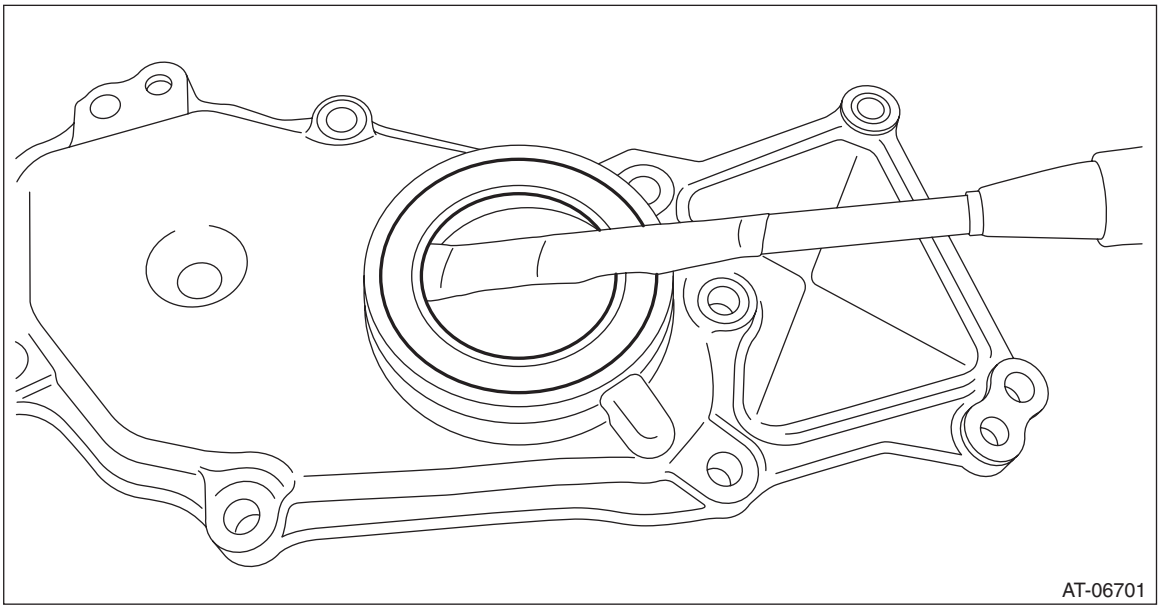
6) Remove the snap ring.



7) Remove the drive sprocket.



8) Remove the oil seal from the oil pump chain cover.

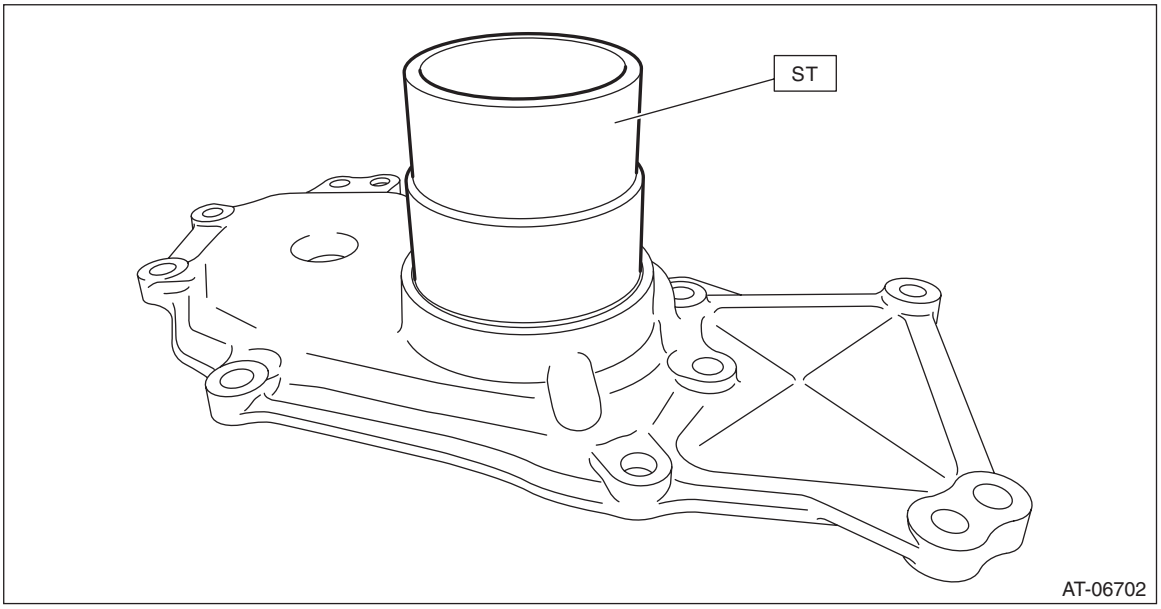


B: INSTALLATION

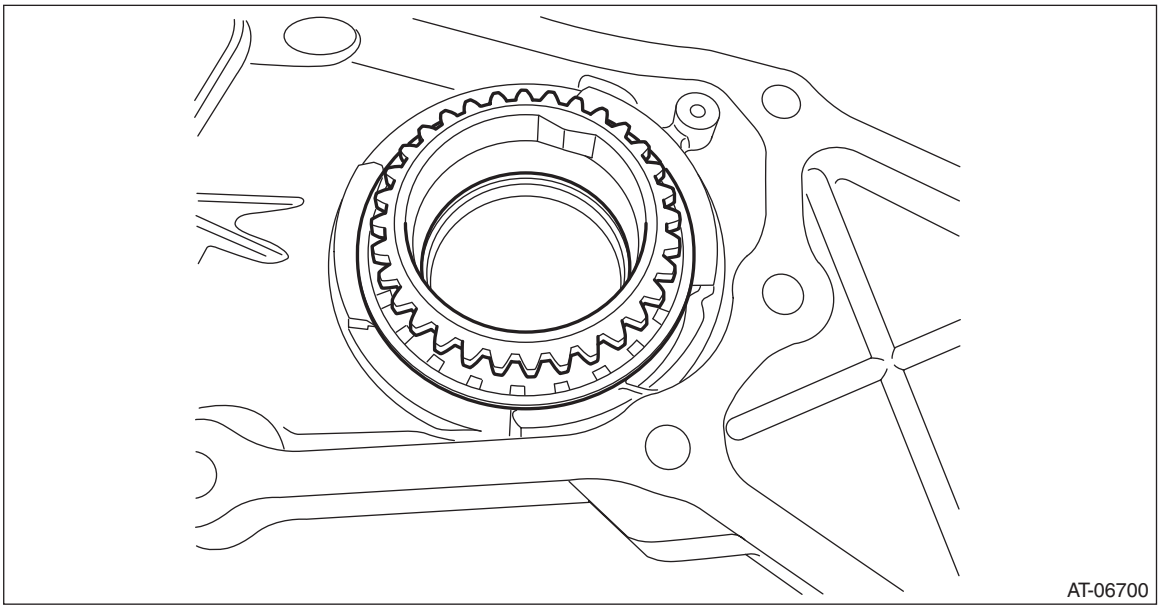
1) Clean the mating surface of oil pump chain cover and converter case.
2) Using the ST, install the oil seal.

NOTE:
- Use a new oil seal.
- Apply CVTF to the oil seal lip and press-fitting surface.

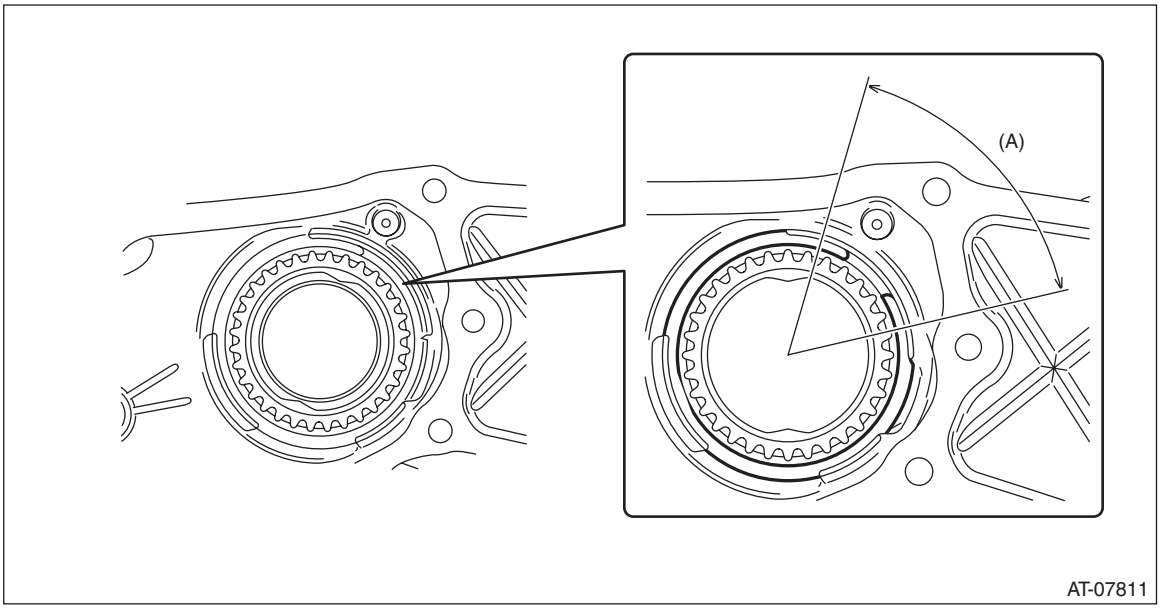
ST 499755602 PRESS SNAP RING



3) Install the drive sprocket.



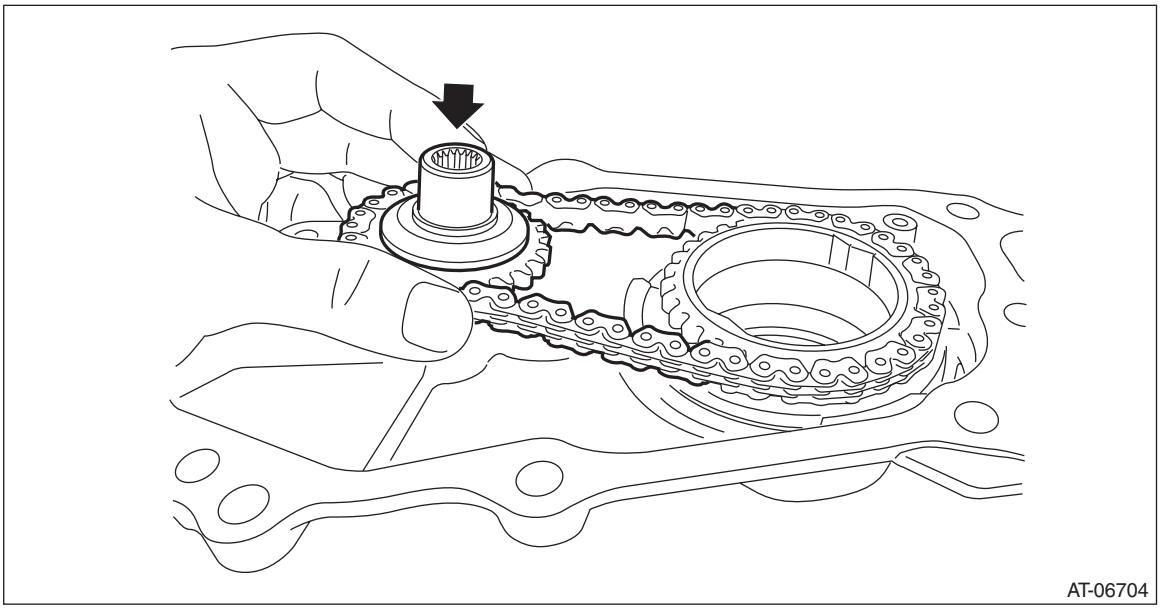
4) Install the snap ring so that its cutout portion is securely fitted into the snap ring groove of the oil pump chain cover.



(A) Installation range of cutout portion for snap ring

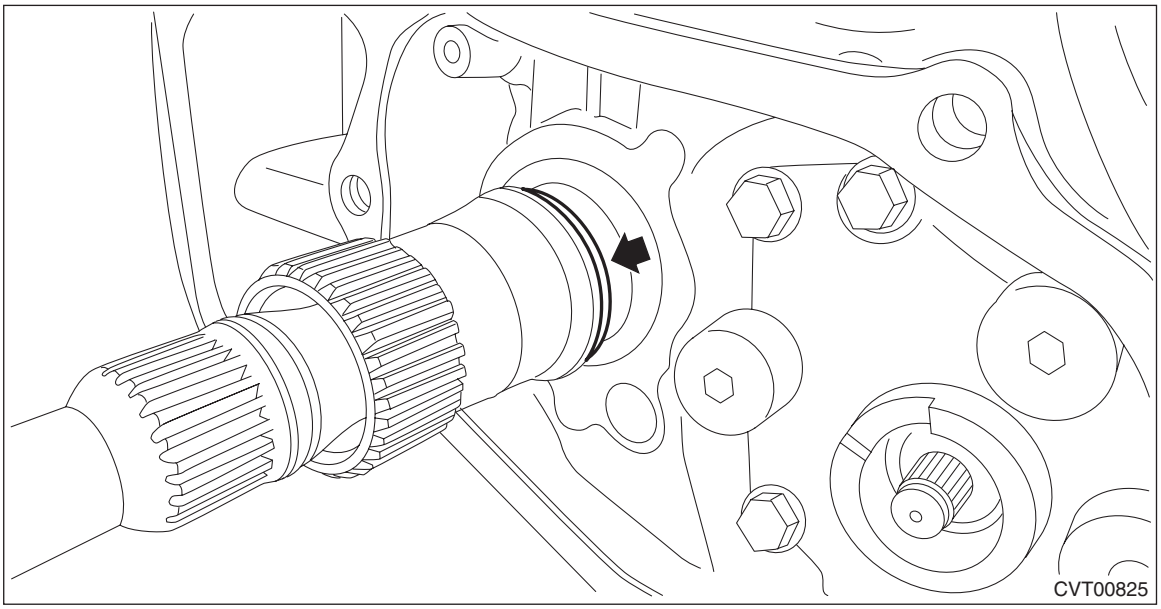
5) Place the oil pump chain on drive sprocket.

6) Place the oil pump chain on driven sprocket and install the driven sprocket to oil pump chain cover.



7) Install the seal ring.

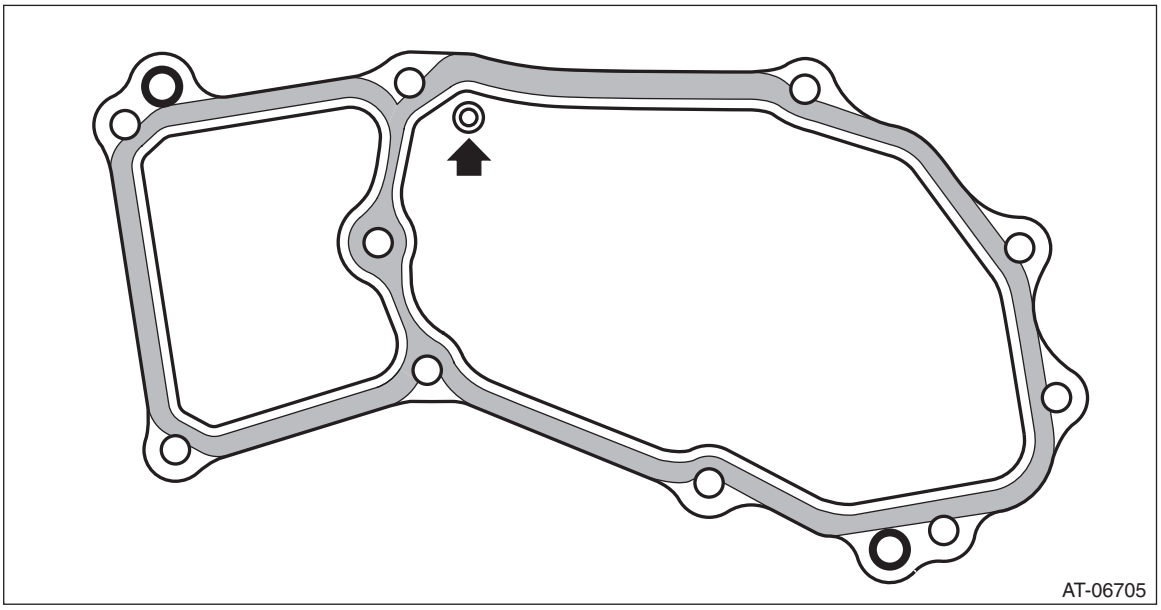
NOTE:
- Use a new seal ring.
- Apply CVTF to the seal rings.
- When installing the seal ring, do not expand the seal ring too much.



8) Apply liquid gasket seamlessly to the mating surface of oil pump chain cover.

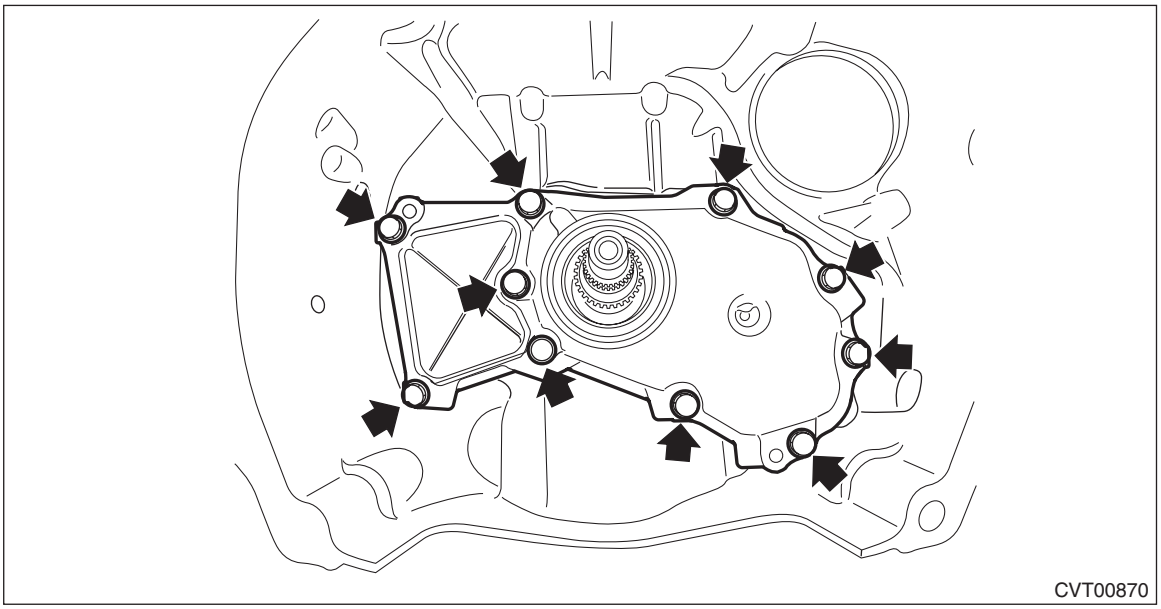
CAUTION:
Do not apply liquid gasket at the arrowed hole.

Liquid gasket:
THREE BOND 1215B or equivalent



9) Install the oil pump chain cover.

Tightening torque:
21 N·m (2.1 kgf-m, 15.5 ft-lb)

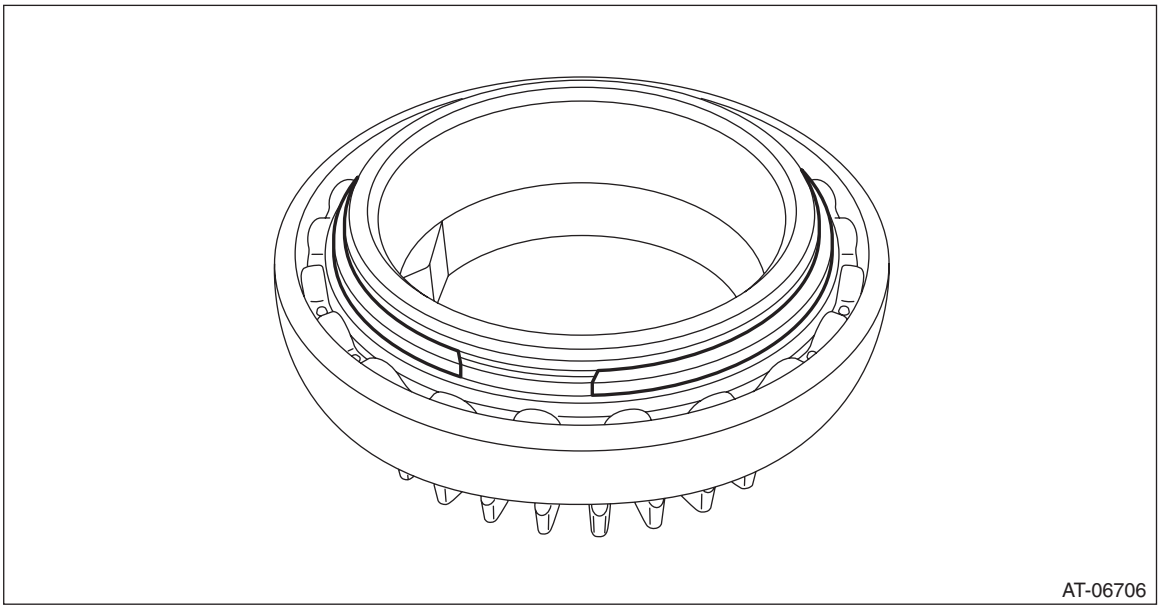


10) Install the torque converter assembly. <Ref. to CVT(TR580)-165, INSTALLATION, Torque Converter Assembly.>
11) Install the transmission assembly to the vehicle. <Ref. to CVT(TR580)-72, INSTALLATION, Automatic Transmission Assembly.>

C: DISASSEMBLY

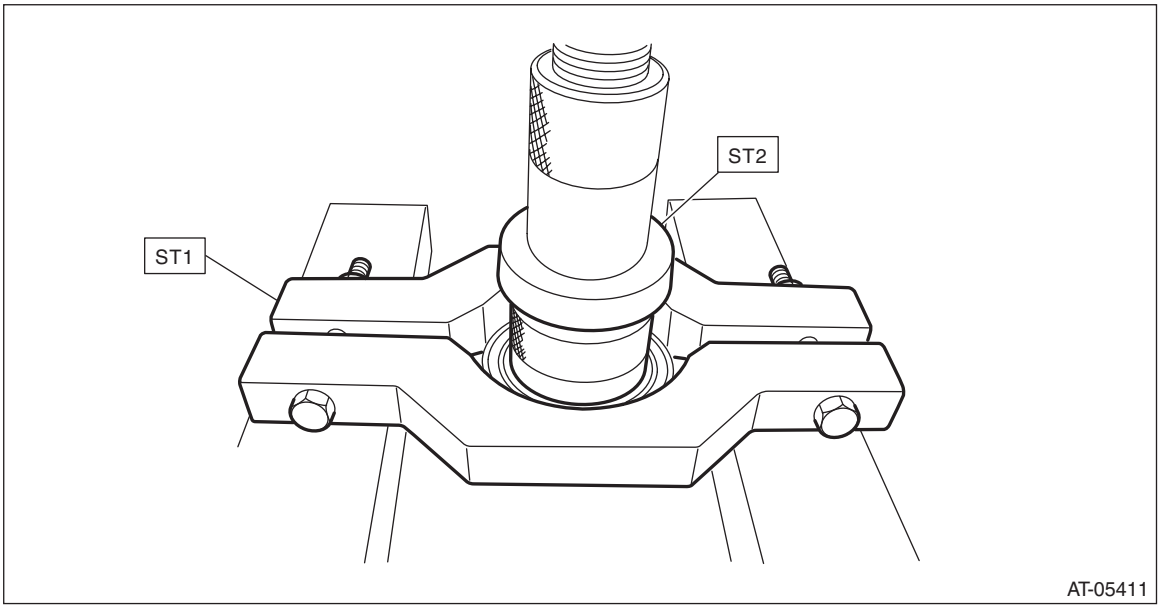
1. DRIVE SPROCKET

1) Remove the snap ring.



2) Remove the ball bearing using ST.

ST1 498077600 REMOVER
ST2 399513600 INSTALLER

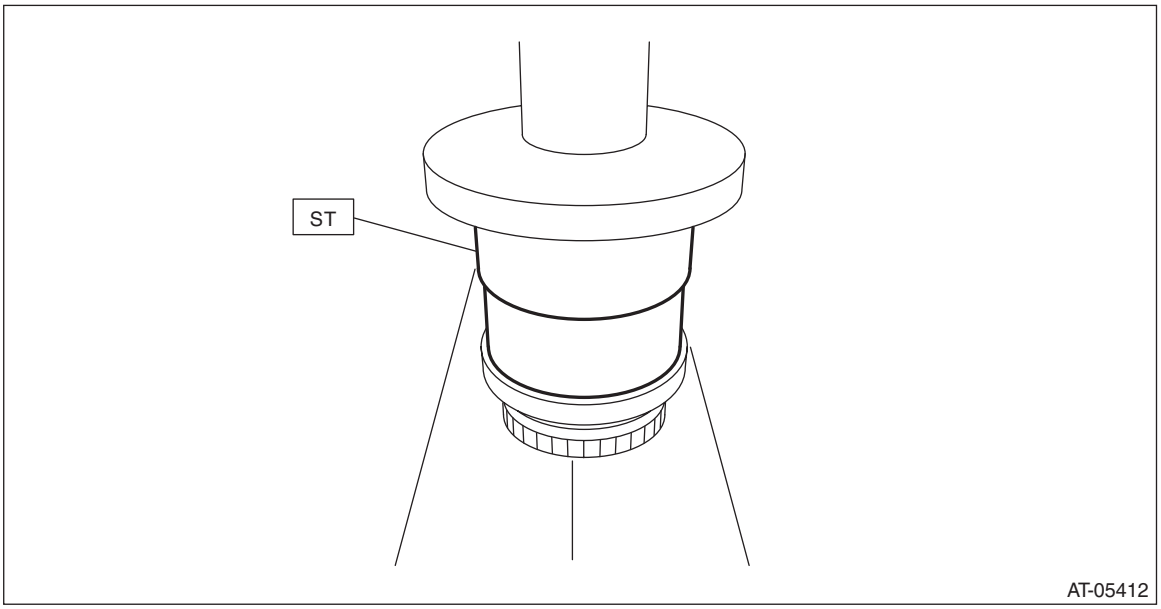


D: ASSEMBLY

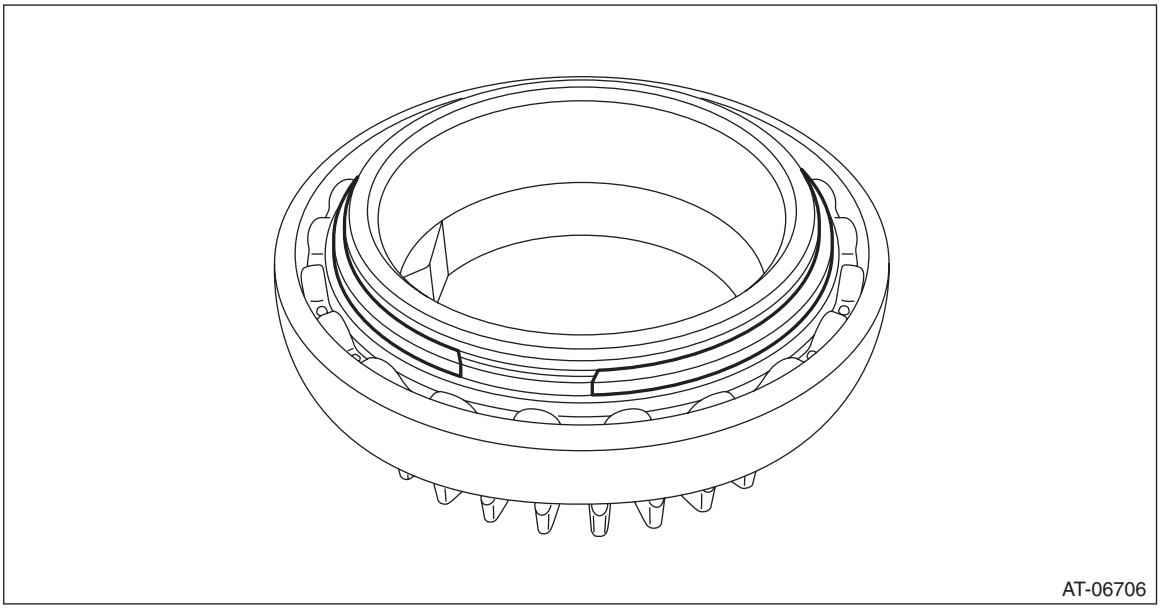
1. DRIVE SPROCKET

1) Using the ST, install the ball bearing.

NOTE:
Use a new ball bearing.
ST 499755502 PRESS SNAP RING



2) Install the snap ring.



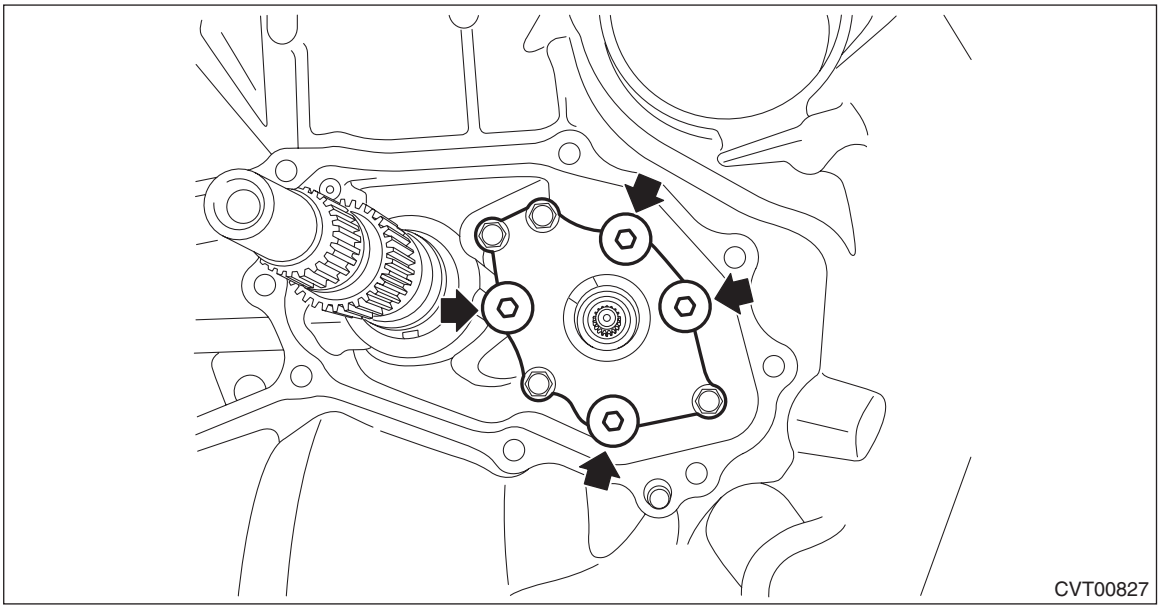
E: INSPECTION

- Check the oil pump chain for damage.
- Replace if gear teeth are broken, damaged, sharpen or excessively worn.
- Check the bearing for seizure or wear.
- Apply CVTF to bearing and rotate the bearing to check for noise or dragging etc.
- Check the oil pump chain cover for damage.
- Check for leakage of CVTF from the mating surface of oil pump chain cover.
- Check the oil seal for damage.

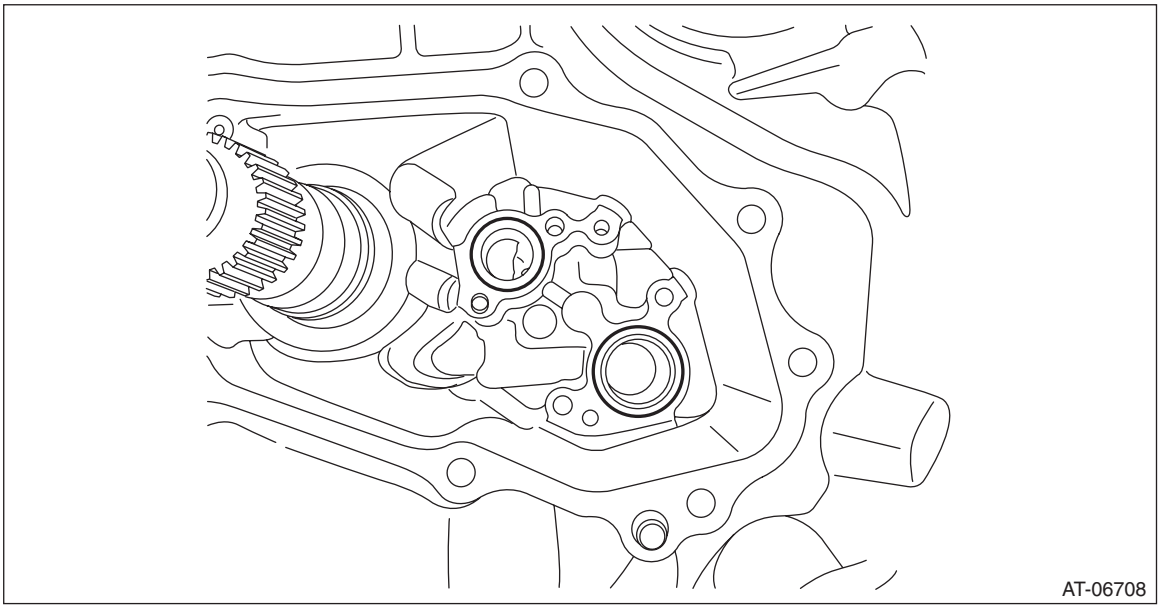
44.Oil Pump

A: REMOVAL

1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TR580)-60, REMOVAL, Automatic Transmission Assembly.>
2) Remove the torque converter assembly. <Ref. to CVT(TR580)-164, REMOVAL, Torque Converter Assembly.>
3) Remove the oil pump chain cover. <Ref. to CVT(TR580)-327, REMOVAL, Oil Pump Chain.>
4) Remove the oil pump and the plate.



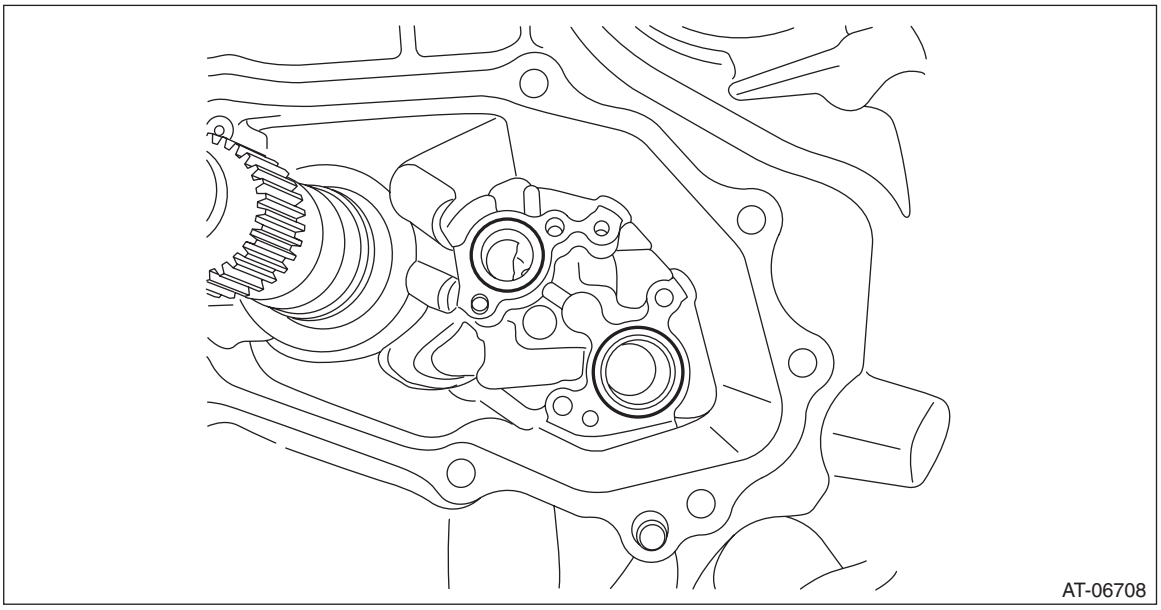
5) Remove the O-ring.



B: INSTALLATION

1) Install the O-ring.

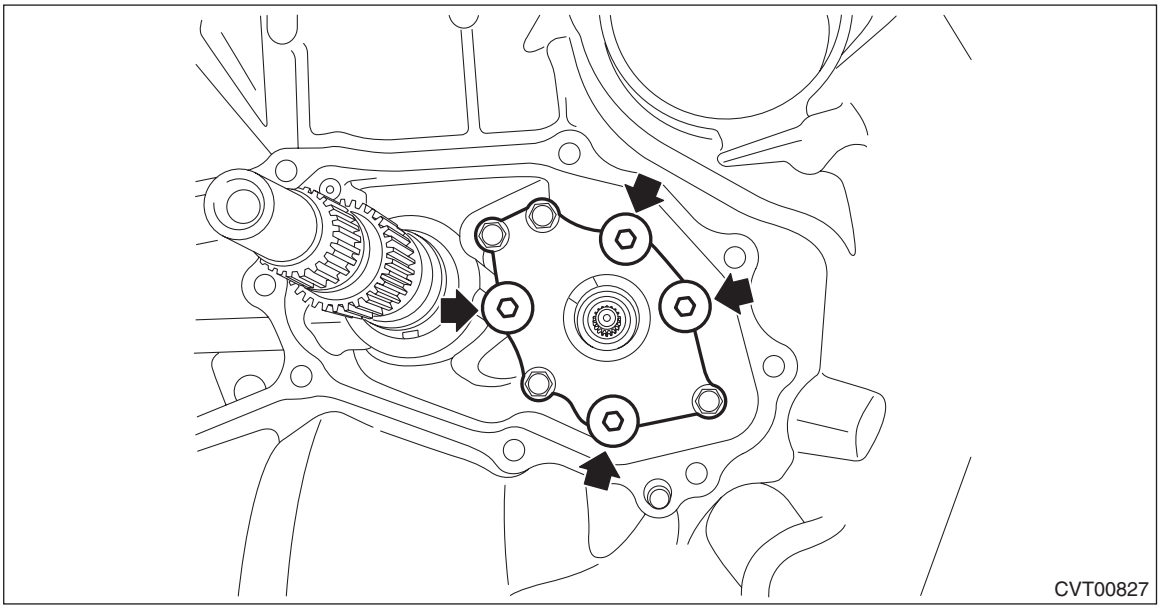
NOTE:
- Use new O-rings.
- Apply CVTF to the O-ring.



2) Install the plate and the oil pump.

NOTE:
Apply CVTF to the bolt.

Tightening torque:
8.5 N·m (0.9 kgf-m, 6.3 ft-lb)



3) Install the oil pump chain cover. <Ref. to CVT(TR580)-330, INSTALLATION, Oil Pump Chain.>
4) Install the torque converter assembly. <Ref. to CVT(TR580)-165, INSTALLATION, Torque Converter Assembly.>
5) Install the transmission assembly to the vehicle. <Ref. to CVT(TR580)-72, INSTALLATION, Automatic Transmission Assembly.>

C: INSPECTION

Check the following items.
- Check the oil pump for damage and wear.
- Rotate the oil pump by hand, and check that it rotates smoothly.

1) Measure the secondary pressure. <Ref. to CVT(TR580)-49, INSPECTION, Secondary Pressure (Line Pressure) Test.>
2) Remove the oil pan and oil strainer. <Ref. to CVT(TR580)-117, REMOVAL, Control Valve Body.>
3) Check oil strainer for clogging.
When oil strainer has no clogging, replace the oil pump.

45.Converter Case

A: REMOVAL

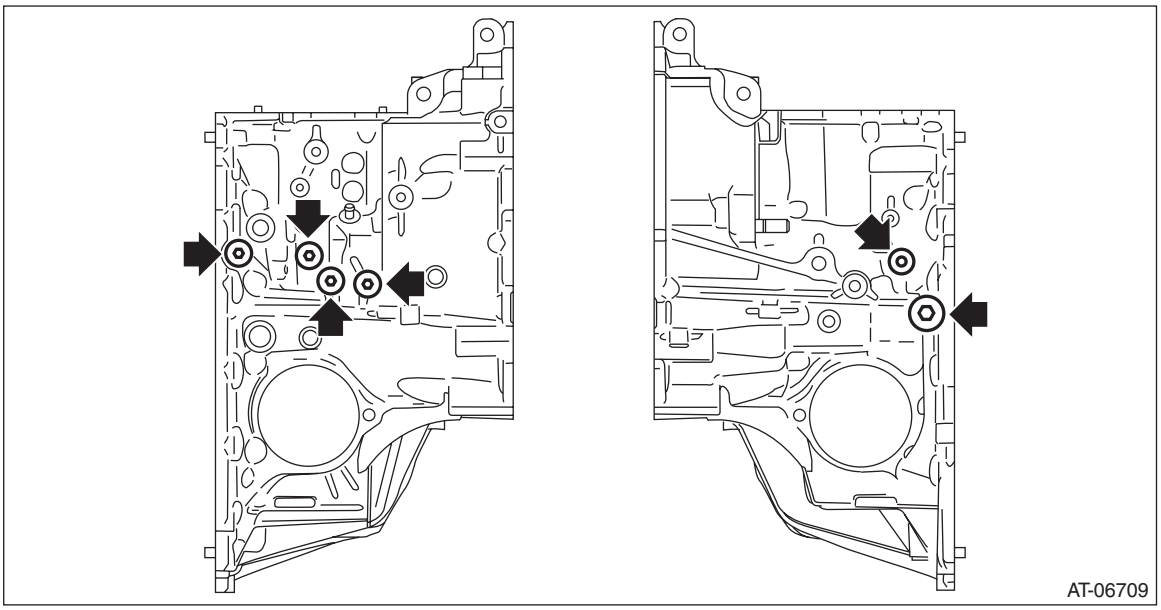
1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TR580)-60, REMOVAL, Automatic Transmission Assembly.>
2) Remove the air breather hose. <Ref. to CVT(TR580)-158, REMOVAL, Air Breather Hose.>
3) Remove the control valve body. <Ref. to CVT(TR580)-117, REMOVAL, Control Valve Body.>
4) Remove the transmission harness. <Ref. to CVT(TR580)-132, REMOVAL, Transmission Harness.>
5) Remove the turbine speed sensor. <Ref. to CVT(TR580)-103, REMOVAL, Turbine Speed Sensor.>
6) Remove the secondary speed sensor. <Ref. to CVT(TR580)-105, REMOVAL, Secondary Speed Sensor.>
7) Remove the primary speed sensor. <Ref. to CVT(TR580)-108, REMOVAL, Primary Speed Sensor.>
8) Remove the inhibitor switch. <Ref. to CVT(TR580)-99, REMOVAL, Inhibitor Switch.>
9) Remove the extension case. <Ref. to CVT(TR580)-168, REMOVAL, Extension Case.>
10) Remove the transfer clutch assembly. <Ref. to CVT(TR580)-172, REMOVAL, Transfer Clutch.>
11) Remove the transfer driven gear assembly. <Ref. to CVT(TR580)-186, REMOVAL, Transfer Driven Gear.>
12) Remove the parking pawl. <Ref. to CVT(TR580)-189, REMOVAL, Parking Pawl.>
13) Remove the reduction driven gear assembly. <Ref. to CVT(TR580)-191, REMOVAL, Reduction Driven Gear.>
14) Remove the oil pan and oil strainer. <Ref. to CVT(TR580)-113, REMOVAL, Oil Pan and Strainer.>
15) Remove the transmission control device. <Ref. to CVT(TR580)-199, REMOVAL, Transmission Control Device.>
16) Remove the transmission case. <Ref. to CVT(TR580)-205, REMOVAL, Transmission Case.>
17) Remove the reduction drive gear. <Ref. to CVT(TR580)-218, REMOVAL, Reduction Drive Gear.>
18) Remove the primary pulley, secondary pulley and variator chain. <Ref. to CVT(TR580)-223, REMOVAL, Primary Pulley and Secondary Pulley.>
19) Remove the reverse brake assembly. <Ref. to CVT(TR580)-243, REMOVAL, Reverse Brake Assembly.>
20) Remove the forward clutch assembly. <Ref. to CVT(TR580)-258, REMOVAL, Forward Clutch Assembly.>
21) Remove the drive pinion shaft assembly. <Ref. to CVT(TR580)-278, REMOVAL, Drive Pinion Shaft Assembly.>
22) Remove the front differential assembly. <Ref. to CVT(TR580)-308, REMOVAL, Front Differential Assembly.>
23) Remove the oil pump chain cover. <Ref. to CVT(TR580)-327, REMOVAL, Oil Pump Chain.>
24) Remove the oil pump. <Ref. to CVT(TR580)-336, REMOVAL, Oil Pump.>

B: INSTALLATION

1) Install the oil pump. <Ref. to CVT(TR580)-337, INSTALLATION, Oil Pump.>
2) Install the oil pump chain cover. <Ref. to CVT(TR580)-330, INSTALLATION, Oil Pump Chain.>
3) Install the front differential assembly. <Ref. to CVT(TR580)-310, INSTALLATION, Front Differential Assembly.>
4) Install the drive pinion shaft assembly. <Ref. to CVT(TR580)-280, INSTALLATION, Drive Pinion Shaft Assembly.>
5) Install the forward clutch assembly. <Ref. to CVT(TR580)-262, INSTALLATION, Forward Clutch Assembly.>
6) Install the reverse brake assembly. <Ref. to CVT(TR580)-246, INSTALLATION, Reverse Brake Assembly.>
7) Install the primary pulley, secondary pulley and variator chain. <Ref. to CVT(TR580)-230, INSTALLATION, Primary Pulley and Secondary Pulley.>
8) Install the reduction drive gear. <Ref. to CVT(TR580)-219, INSTALLATION, Reduction Drive Gear.>
9) Install the transmission case. <Ref. to CVT(TR580)-208, INSTALLATION, Transmission Case.>
10) Install the transmission control device. <Ref. to CVT(TR580)-202, INSTALLATION, Transmission Control Device.>
11) Install the oil strainer and oil pan. <Ref. to CVT(TR580)-115, INSTALLATION, Oil Pan and Strainer.>
12) Install the reduction driven gear assembly. <Ref. to CVT(TR580)-192, INSTALLATION, Reduction Driven Gear.>
13) Install the transfer driven gear assembly. <Ref. to CVT(TR580)-187, INSTALLATION, Transfer Driven Gear.>
14) Install the transfer clutch assembly. <Ref. to CVT(TR580)-174, INSTALLATION, Transfer Clutch.>
15) Install the parking pawl. <Ref. to CVT(TR580)-190, INSTALLATION, Parking Pawl.>
16) Install the extension case. <Ref. to CVT(TR580)-169, INSTALLATION, Extension Case.>
17) Install the inhibitor switch. <Ref. to CVT(TR580)-101, INSTALLATION, Inhibitor Switch.>
18) Install the secondary speed sensor. <Ref. to CVT(TR580)-105, INSTALLATION, Secondary Speed Sensor.>
19) Install the primary speed sensor. <Ref. to CVT(TR580)-109, INSTALLATION, Primary Speed Sensor.>
20) Install the turbine speed sensor. <Ref. to CVT(TR580)-103, INSTALLATION, Turbine Speed Sensor.>
21) Install the transmission harness. <Ref. to CVT(TR580)-139, INSTALLATION, Transmission Harness.>
22) Install the control valve body. <Ref. to CVT(TR580)-124, INSTALLATION, Control Valve Body.>
23) Install the air breather hose. <Ref. to CVT(TR580)-160, INSTALLATION, Air Breather Hose.>
24) Install the transmission assembly to the vehicle. <Ref. to CVT(TR580)-72, INSTALLATION, Automatic Transmission Assembly.>

C: DISASSEMBLY

1) Remove the pitching stopper bracket and transmission radio ground cord, if mounted.
2) Remove the filler plug, oil drain plug and overflow drain plug. <Ref. to CVT(TR580)-43, REPLACEMENT, Differential Gear Oil.>
3) Remove all plugs.



D: ASSEMBLY

1) Install the oil drain plug.

Tightening torque:
70 N·m (7.1 kgf-m, 51.6 ft-lb)

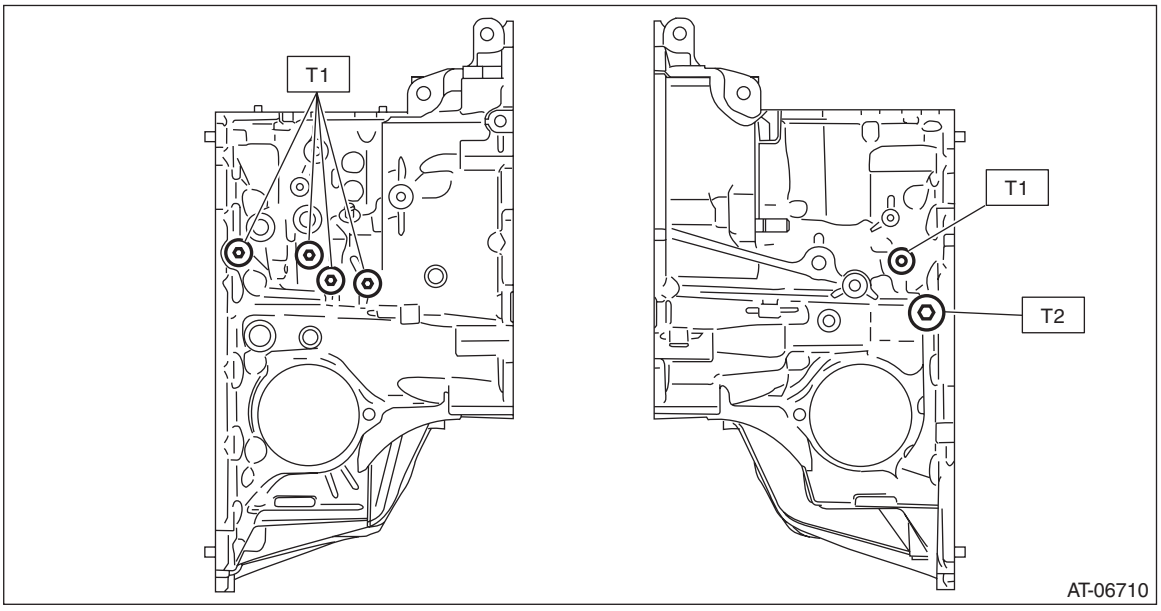
2) Install the overflow drain plug.

NOTE:
Overflow plug of differential gear oil is temporarily attached.

3) Install all plugs.

NOTE:
Use new O-rings.

Tightening torque:
T1: 25 N·m (2.5 kgf-m, 18.4 ft-lb)
T2: 22.5 N·m (2.3 kgf-m, 16.6 ft-lb)



4) Install the pitching stopper bracket and transmission radio ground cord.

Tightening torque:
41 N·m (4.2 kgf-m, 30.2 ft-lb)

E: INSPECTION

- Check for leakage of CVTF from the connection between converter case and transmission case.
- Check there is no damage or cracks on the converter case.

46.Diagnostics with Phenomenon

A: INSPECTION

Symptoms	Faulty parts
Stall speed is low after warming-up, with select lever in “D” or “R” range.	Engine control system
Vehicle does not move despite engine speed rising up, with select lever in “D” or “R” range.	• Engine control system • Select cable • CVTF • Secondary pressure circuit • Pulley, gear and variator chain • Forward/reverse changeover section • TCM • Control valve body • Inhibitor switch
Vehicle does not move by engine stall, with select lever in “D” or “R” range.	• Parking mechanism • Select cable • Bearing • Forward/reverse changeover section
Excessive shock occurs at starting, with select lever in “D” or “R” range.	• Secondary pressure circuit • Pulley, gear and variator chain
Acceleration speed from standstill is insufficient, with select lever in “D” or “R” range.	• Control valve body • Forward/reverse changeover section
Engine speed suddenly rises up during driving, with select lever in “D” or “R” range.	• Control valve body • Secondary pressure circuit • Primary pressure circuit
Vibration occurs during driving, with select lever in “D” or “R” range.	• Secondary pressure circuit • Primary pressure circuit • Forward/reverse changeover section • Pulley and variator chain • Torque converter assembly • Hydraulic pressure circuit to torque converter • Control valve body
Sudden braking occurs during driving, with select lever in “D” or “R” range.	• Secondary pressure circuit • Primary pressure circuit • Control valve body
During deceleration, lockup clutch does not disengage until just before halting, with select lever in “D” or “R” range.	• Control valve body • Torque converter assembly
Engine stalls with vehicle at a standstill, with select lever in “D” or “R” range.	• Engine control system • Control valve body
Excessive lockup shock occurs during driving, with select lever in “D” range.	Control valve body
Slipping occurs at lockup, or lockup does not occur during driving, with select lever in “D” range.	• Control valve body • Lockup hydraulic line • Torque converter assembly
Excessive shift shock occurs when shifting the select lever from “N” range to “D” range, or from “N” range to “R” range.	• Inhibitor switch • Control valve body • Forward/reverse changeover section
Vehicle does not keep at standstill with select lever in “P” range, or parking cannot be released when shifting from “P” range to another range.	• Select cable • Parking mechanism
Select lever does not shift smoothly.	• Select cable • Inhibitor switch • Detent spring • Manual plate

CONTINUOUSLY VARIABLE TRANSMISSION (DIAGNOSTICS)

CVT(w/o HEV)(diag)

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1. Basic Diagnostic Procedure

A: PROCEDURE

	Step	Check	Yes	No
1	**CHECK PRE-INSPECTION.** 1) Ask the customer when and how the trouble occurred using the interview check list. <Ref. to CVT(w/o HEV)(diag)-4, Check List for Interview.> 2) Before performing diagnostics, check the following items which might affect CVT problems. • General inspection <Ref. to CVT(w/o HEV)(diag)-5, INSPECTION, General Description.> • Disconnection of harness connector • Visual check for harness damage • Oil leakage • Stall speed test <Ref. to CVT(TR580)-47, Stall Test.> • Secondary pressure test <Ref. to CVT(TR580)-49, Secondary Pressure (Line Pressure) Test.> • Transfer clutch pressure test <Ref. to CVT(TR580)-52, Transfer Clutch Pressure Test.> • Time lag test <Ref. to CVT(TR580)-48, Time Lag Test.> • Road test <Ref. to CVT(TR580)-46, Road Test.> • Inhibitor switch <Ref. to CVT(TR580)-96, Inhibitor Switch.>	Is the item that is thought to influence the CVT problem working properly?	Go to step **2**.	Repair the items which may be affecting the CVT trouble.
2	**CHECK AT OIL TEMP LIGHT.** Turn the ignition switch to ON and wait for at least 2 seconds.	Does the AT OIL TEMP light illuminate?	Go to step **3**.	Check the AT OIL TEMP light.
3	**CHECK AT OIL TEMP LIGHT.** Start the engine and wait for 2 seconds or more.	Does the AT OIL TEMP light blink?	Go to step **4**.	Go to step **5**.
4	**CHECK DTC DISPLAY.** Read the DTC. NOTE: If the communication function of Subaru Select Monitor cannot be executed normally, check the communication circuit. <Ref. to CVT(w/o HEV)(diag)-32, COMMUNICATION FOR INITIALIZING IMPOSSIBLE, Diagnostic Procedure for Subaru Select Monitor Communication.>	Is DTC displayed on Subaru Select Monitor?	Record the DTC, time stamp and freeze frame data. Go to step **6**. NOTE: • For the time stamp, refer to LAN section. <Ref. to LAN(w/o HEV)(diag)-6, TIME STAMP, CAUTION, General Description.> • Depending on DTCs, time stamp may not be stored.	Go to step **5**.

	Step	Check	Yes	No
5	**PERFORM GENERAL DIAGNOSTICS.** 1) Inspect using “Diagnostic Procedure without Diagnostic Trouble Code (DTC)”. <Ref. to CVT(w/o HEV)(diag)-129, Diagnostic Procedure without Diagnostic Trouble Code (DTC).> 2) Inspect using “Diagnostics with Phenomenon”. <Ref. to CVT(w/o HEV)(diag)-130, Diagnostics with Phenomenon.> 3) Perform the Inspection Mode. <Ref. to CVT(w/o HEV)(diag)-19, Inspection Mode.> 4) Read the DTC.	Is DTC displayed on Subaru Select Monitor?	Go to step **6**.	Finish the diagnosis.
6	**PERFORM DIAGNOSIS.** 1) Inspect by referring to “Diagnostic Procedure with Diagnostic Trouble Code (DTC)”. <Ref. to CVT(w/o HEV)(diag)-39, Diagnostic Procedure with Diagnostic Trouble Code (DTC).> NOTE: For the DTC table, refer to “List of Diagnostic Trouble Code (DTC)”. <Ref. to CVT(w/o HEV)(diag)-34, List of Diagnostic Trouble Code (DTC).> 2) Repair the trouble cause. 3) Perform the Clear Memory Mode. 4) Perform the Inspection Mode. <Ref. to CVT(w/o HEV)(diag)-19, Inspection Mode.> 5) Read the DTC.	Is DTC displayed on Subaru Select Monitor?	Inspect by referring to “Diagnostic Procedure with Diagnostic Trouble Code (DTC)”. <Ref. to CVT(w/o HEV)(diag)-39, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>	Finish the diagnosis.

2. Check List for Interview

A: CHECK

Check the following items when a problem has occurred.

NOTE:
Use copies of this page for interviewing customers.

Customer's name			
Date of purchase			
Date of repair			
Transmission model	Transmission	V.I.N.	
Odometer reading	km (miles)		
Frequency	❑ Continuous ❑ Intermittent (times/day)		
Weather	❑ Fine ❑ Cloudy ❑ Rainy ❑ Snowy ❑ Other ( )		
Place	❑ Highland ❑ Suburbs ❑ Inner city ❑ Uphill ❑ Downhill ❑ Rough road ❑ Other ( )		
Ambient air temperature	❑ Hot ❑ Warm ❑ Cool ❑ Cold		
Vehicle speed	km/h (MPH)		
AT OIL TEMP light	❑ Blinks continuously	❑ Does not blink	
Select lever position	❑ P ❑ R ❑ N ❑ D ❑ Manual mode ❑ L range		
Driving condition	❑ Not affected ❑ At racing ❑ While decelerating	❑ At starting ❑ While accelerating ❑ While turning (❑ RH/❑ LH)	❑ While idling ❑ When cruising (Vehicle speed km/h) ❑ Immediately after starting the engine
Manual mode	❑ ON ❑ OFF		
Symptoms	❑ Vehicle does not move (❑ Any position ❑ Particular position)		
	❑ Vehicle does not move (no load racing condition as in N range)		
	❑ Vehicle does not move (engine speed does not increase, felt as stall condition)		
	❑ Noise or vibration (Describe concretely:)		
	❑ Shock felt at N → D selection (seconds after shifting, when engine cold or after warm-up)		
	❑ Shock felt at N → R selection (seconds after shifting, when engine cold or after warm-up)		
	❑ Shifting is wrong (Describe concretely:)		
	❑ Shock or judder during driving		
	❑ Fails to accelerate.		
	❑ Engine speed increases abruptly during driving		
	❑ Shock or judder during standing start		
	❑ Select lever does not move		
	❑ Other ( )		

3. General Description

A: CAUTION

1) The airbag system wiring harness is routed near the TCM.

CAUTION:
• All the airbag system wiring harnesses and connectors are colored yellow. Do not use an electric test equipment to check these circuits.
• Be careful not to damage the airbag system wiring harness when performing diagnostics or servicing the TCM.

2) When measuring the voltage or resistance of individual sensor or all electrical control modules, use a tapered pin with a diameter of 0.6 mm (0.024 in) or less and touch it to the tip of terminal. Never insert the tapered pin into the terminal because it deforms inside which may lead to malfunction.

CAUTION:
If a pin (or similar) was inserted in TCM connector, replace the TCM connector.

3) The TCM connector is waterproof. When measuring the TCM connector terminal voltage, or the resistance between the terminals, use the ST.
ST 18460AA040 CHECK BOARD

B: INSPECTION

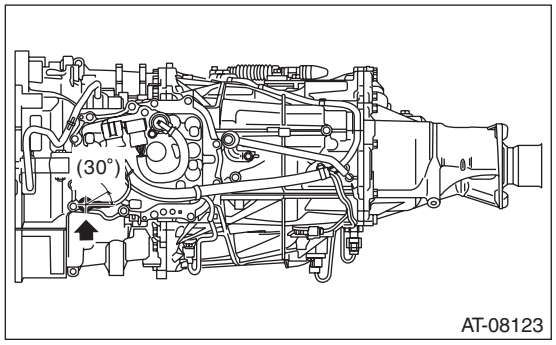
1. BATTERY

Check the battery. <Ref. to SC(H4DO(w/o HEV))-53, INSPECTION, Battery.>

2. TRANSMISSION GROUND

Make sure that the ground terminal bolt is tightened securely.

Tightening torque:
14 N·m (1.4 kgf-m, 10.3 ft-lb)



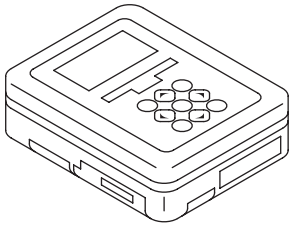
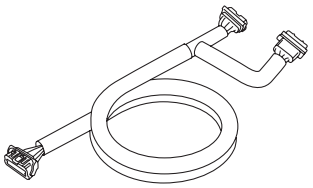
3. OPERATION OF SHIFT SELECT LEVER

Make sure there is no noise, dragging or contact pattern in each select lever range.

WARNING:
Stop the engine while checking operation of the select lever.

C: PREPARATION TOOL

1. SPECIAL TOOL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST1B022XU0	1B022XU0	SUBARU SELECT MONITOR III KIT	Used for setting of each function and trouble-shooting for electrical system. NOTE: For detailed operation procedures of SUBARU SELECT MONITOR III, refer to “PC application help for Subaru Select Monitor”.
 ST18460AA040	18460AA040	CHECK BOARD	Used for measuring the TCM terminal voltage.

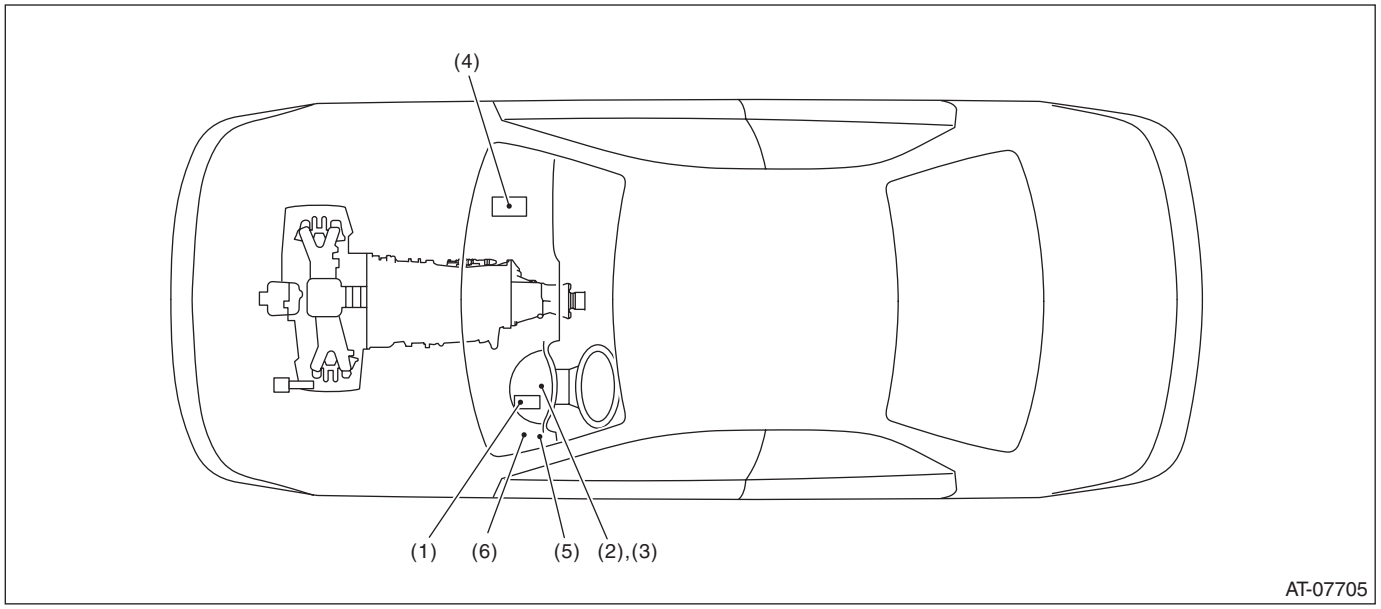
2. GENERAL TOOL

TOOL NAME	REMARKS
Circuit tester	Used for measuring resistance, voltage and current.
Oscilloscope	Used for measuring the sensor.

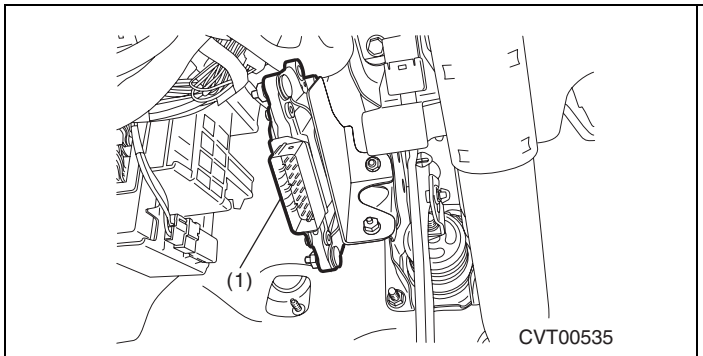
4. Electrical Component Location

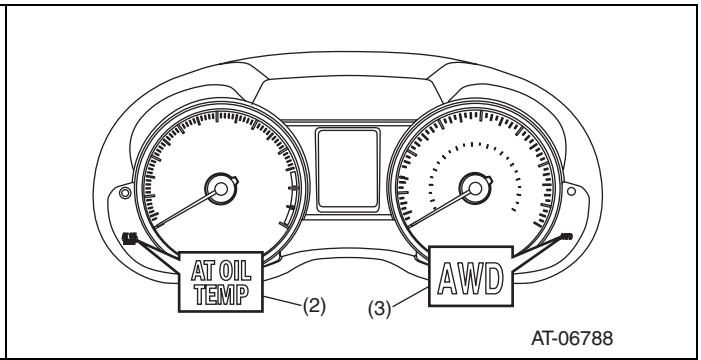
A: LOCATION

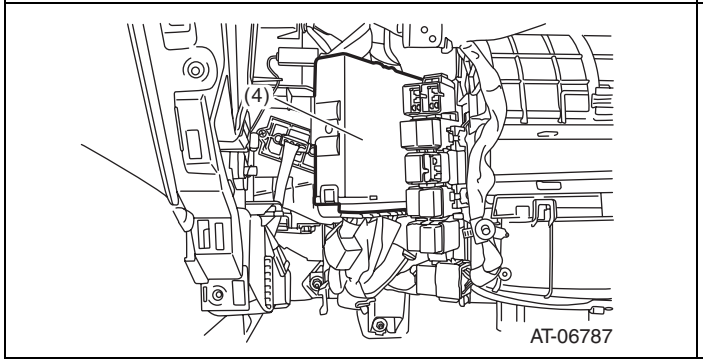
1. CONTROL MODULE

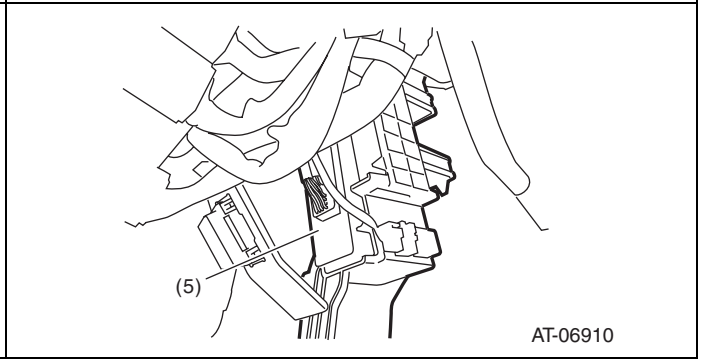


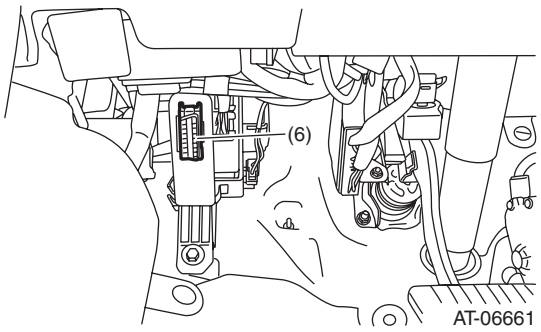
(1) Transmission control module (TCM)
(2) AT OIL TEMP light
(3) AWD light
(4) Engine control module (ECM)
(5) Body integrated unit
(6) Data link connector



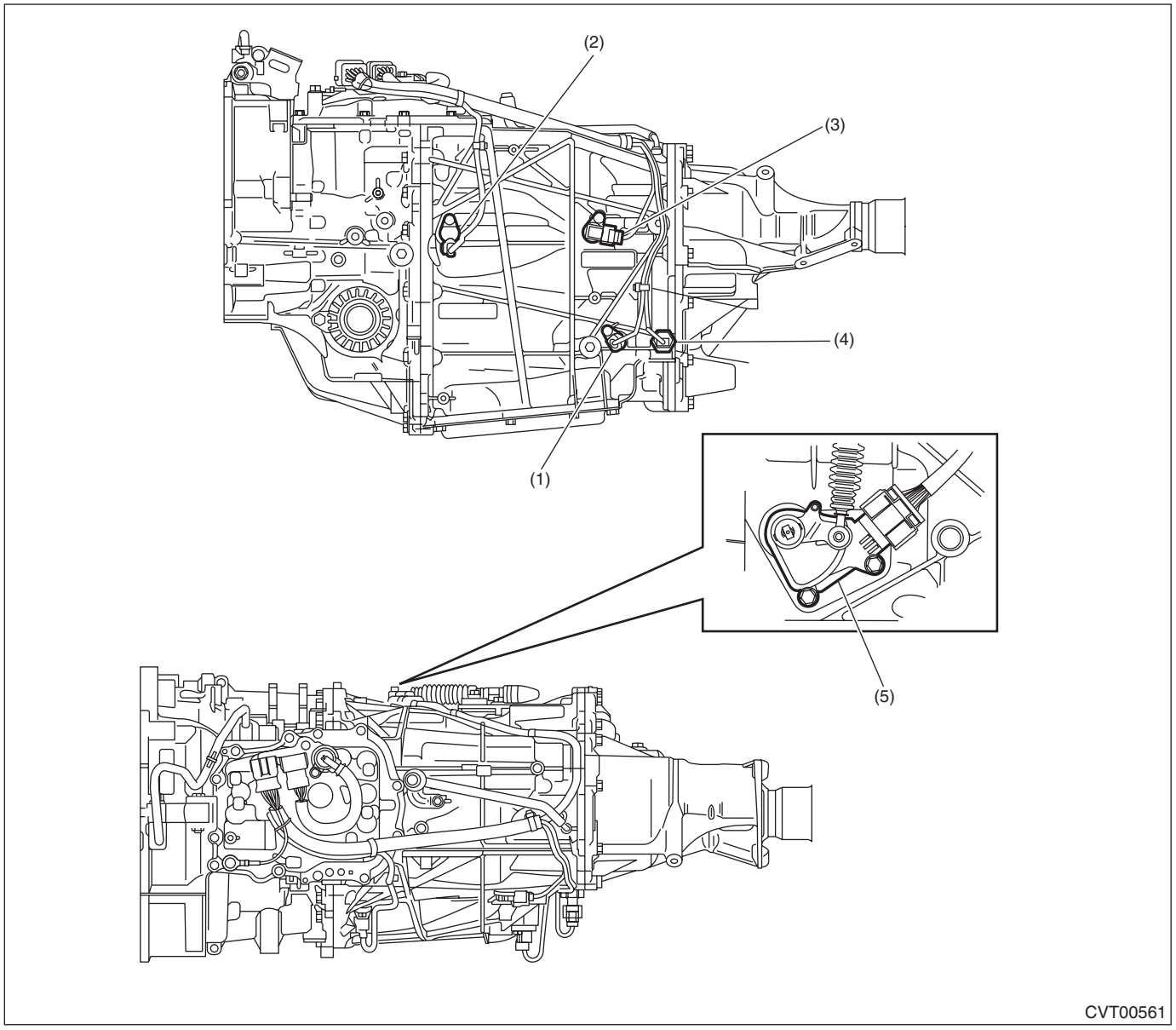






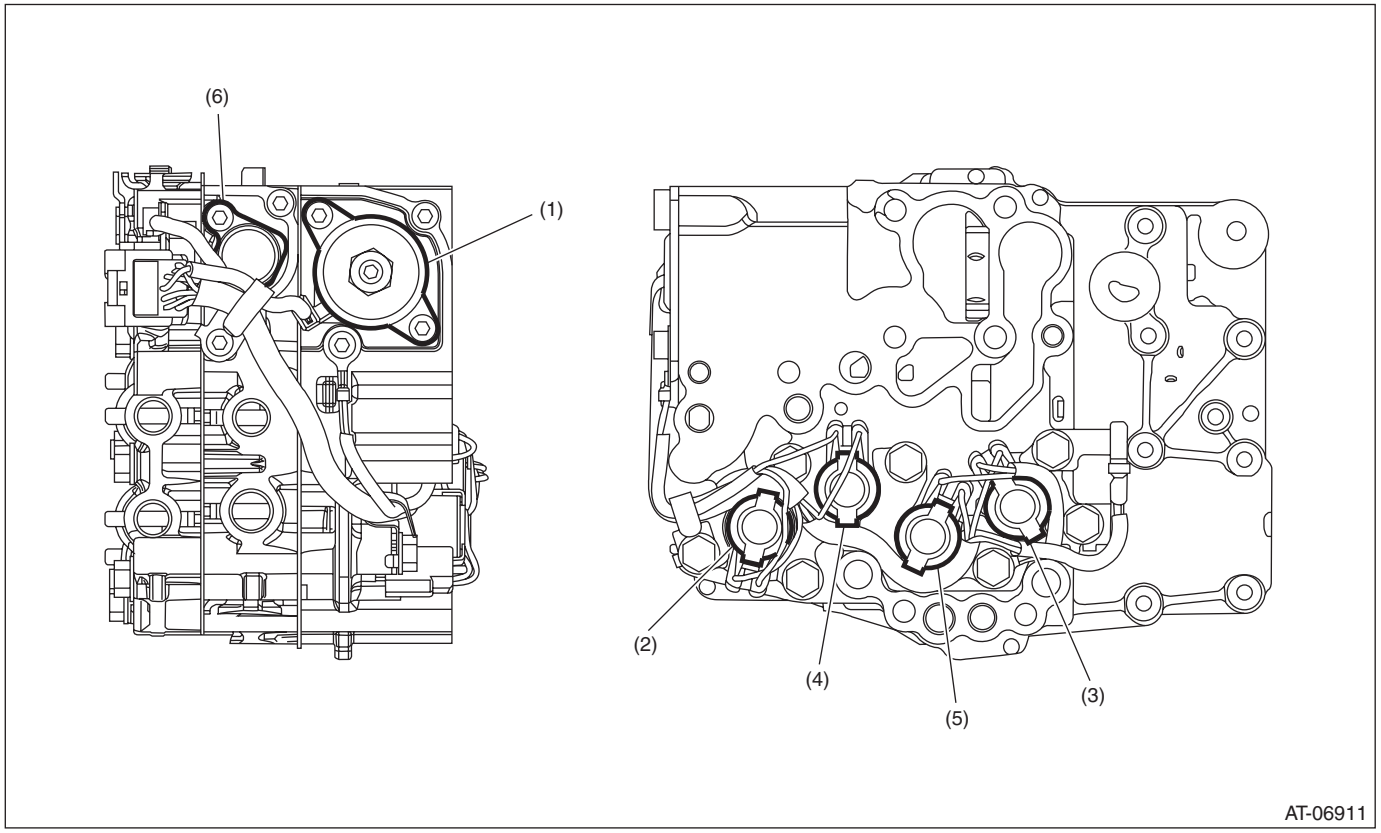


2. SENSOR



(1) Secondary speed sensor
(2) Turbine speed sensor
(3) Primary speed sensor
(4) Secondary pressure sensor
(5) Inhibitor switch

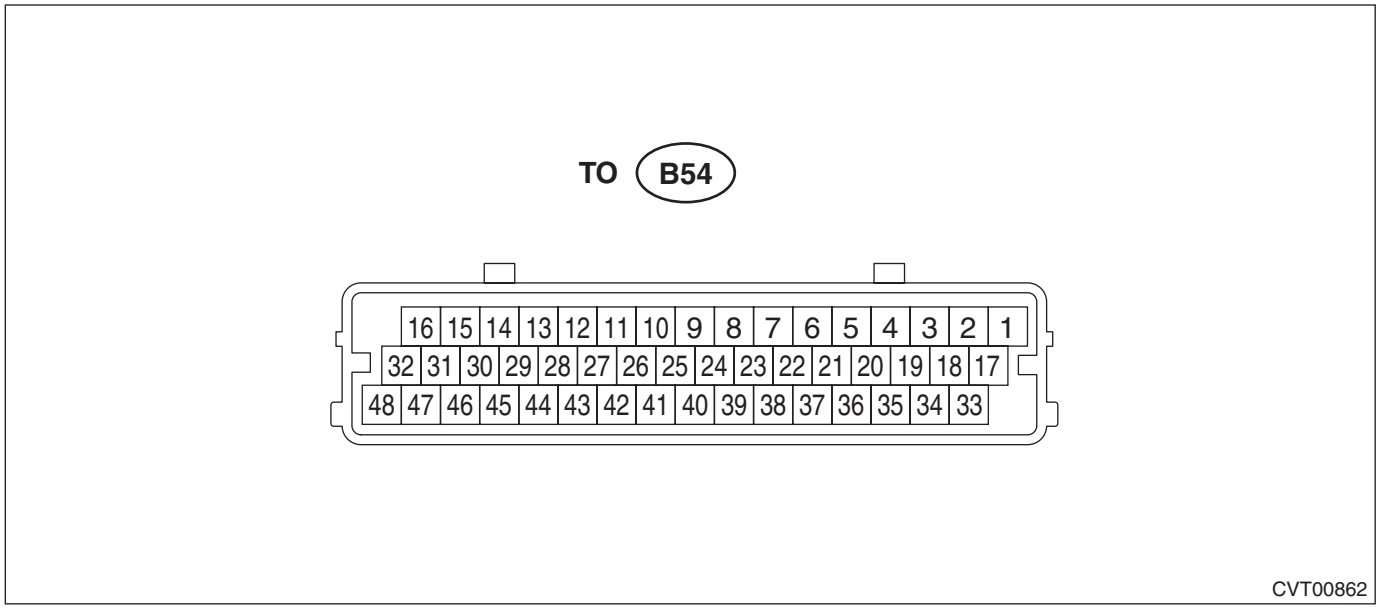
3. SOLENOID



(1) Secondary solenoid
(2) AWD solenoid
(3) Lock-up duty solenoid
(4) Primary DOWN solenoid
(5) Primary UP solenoid
(6) F&R solenoid

5. Transmission Control Module (TCM) I/O Signal

A: ELECTRICAL SPECIFICATION



NOTE:
Measure after warming up.

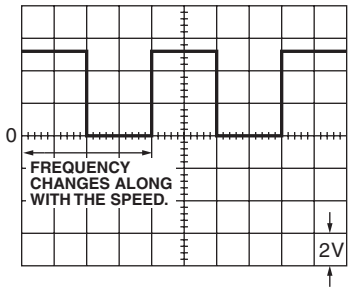
Item	Terminal No.	Measuring condition	Measurement value	Resistance between terminal and chassis ground	Remarks
Backup power supply	34	—	10 — 13 V	—	
Ignition power supply	41	—	10 — 13 V	—	
Main power supply	8	—	10 — 13 V	—	
Main power supply	24	—	10 — 13 V	—	
Main power supply	40	—	10 — 13 V	—	
Manual mode switch	20	Manual mode switch ON	Less than 1 V	—	
		Manual mode switch OFF	8 V or more	—	
Manual mode UP switch	19	Manual mode UP switch ON	Less than 1 V	—	
		Manual mode UP switch OFF	8 V or more	—	
Manual mode DOWN switch	18	Manual mode DOWN switch ON	Less than 1 V	—	
		Manual mode DOWN switch OFF	8 V or more	—	
Stop light switch	29	Stop light switch ON	8 V or more	—	
		Stop light switch OFF	Less than 1 V	—	
P range switch	38	P range	Less than 1 V	—	
		Except for P range	8 V or more	—	
R range switch	37	R range	Less than 1 V	—	
		Except for R range	8 V or more	—	
N range switch	36	N range	Less than 1 V	—	
		Except for N range	8 V or more	—	

Item	Terminal No.	Measuring condition	Measurement value	Resistance between terminal and chassis ground	Remarks
D range switch	35	D range	Less than 1 V	—	
		Except for D range	8 V or more	—	
ATF temperature sensor	6	ATF temperature at 20°C (68°F)	Approx. 2.5 V	Approx. 2.5 kΩ	
		ATF temperature at 80°C (176°F)	Approx. 0.7 V	Approx. 330 Ω	
ATF temperature sensor GND	1	Always	Approx. 0 V	—	
Secondary pressure sensor power supply output	33	Ignition switch ON	5 V	—	
Secondary pressure sensor	5	Ignition switch ON, engine OFF	Approx. 0.5 V (0 MPa)	—	Value increases with increase of engine load. (0.5 — 4.5 V)
		Ignition switch ON, engine ON	Approx. 1.0 V (1.0 MPa)	—	
Secondary pressure sensor GND	2	Always	Approx. 0 V	—	
Primary speed sensor	14	While driving	0 or 5 V	—	Refer to the waveform (sensor)
Secondary speed sensor	13	While driving	0 or 5 V	—	Refer to the waveform (sensor)
Turbine speed sensor	12	Engine ON, “P” or “N” range	0 or 5 V	—	Refer to the waveform (sensor)
Self shut output	25	For three seconds after ignition switch ON and OFF	Less than 1 V	—	
		Ignition switch OFF	8 V or more		
F&R solenoid	16	Engine ON	Refer to the waveform (solenoid (1))	Approx. 4 — 6 Ω	Resistance value at 20°C (68°F). Value is higher as the temperature increase.
Secondary solenoid	32	Engine ON	Refer to the waveform (solenoid (2))	Approx. 5 — 7 Ω	Resistance value at 20°C (68°F). Value is higher as the temperature increase.
Primary UP solenoid	47	Engine ON, while UP shifting	Refer to the waveform (solenoid (3))	Approx. 10 — 13.5 Ω	Resistance value at 20°C (68°F). Value is higher as the temperature increase.
Primary DOWN solenoid	30	Engine ON, while DOWN shifting	Refer to the waveform (solenoid (4))	Approx. 10 — 13.5 Ω	Resistance value at 20°C (68°F). Value is higher as the temperature increase.
Lock-up duty solenoid	15	Lock-up ON	Refer to the waveform (solenoid (5))	Approx. 10 — 13.5 Ω	Resistance value at 20°C (68°F). Value is higher as the temperature increase.
AWD solenoid	48	Engine ON, “P” or “N” range	Refer to the waveform (solenoid (6))	Approx. 2 — 4.5 Ω	Resistance value at 20°C (68°F). Value is higher as the temperature increase.
		Engine ON, “D” range, brake ON	Refer to the waveform (solenoid (7))		
CAN communication line (+)	43	—	—	—	

Item	Terminal No.	Measuring condition	Measurement value	Resistance between terminal and chassis ground	Remarks
CAN communication line (–)	44	—	—	—	
GND	26	Always	Approx. 0 V	—	
GND	42	Always	Approx. 0 V	—	

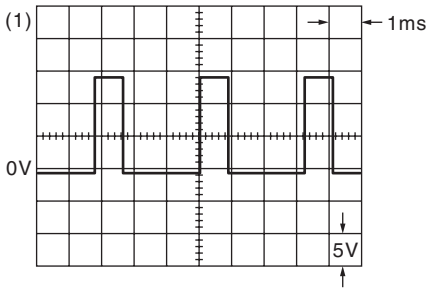
B: WAVEFORM

1. SENSOR

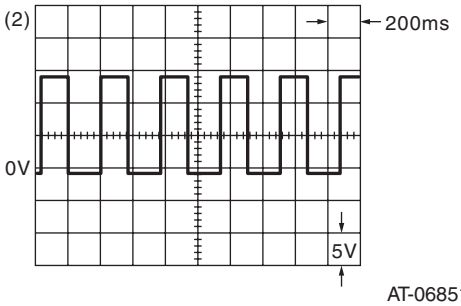


AT-04690

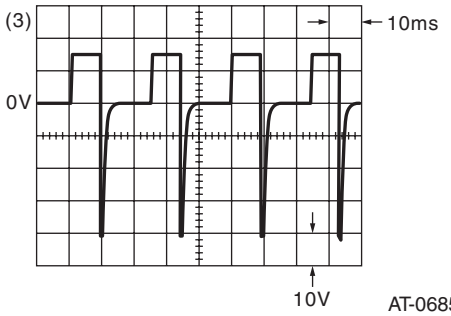
2. SOLENOID



AT-06855



AT-06851



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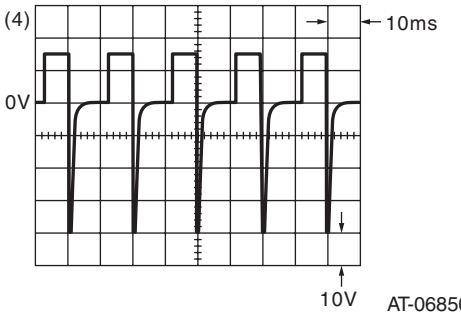
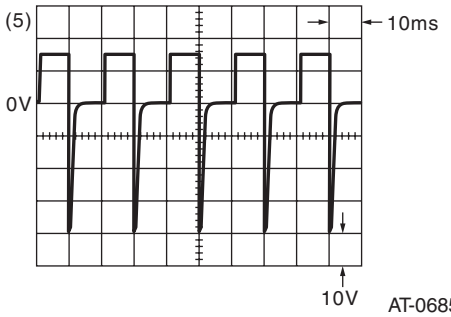
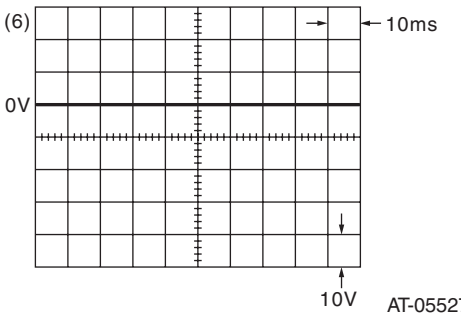


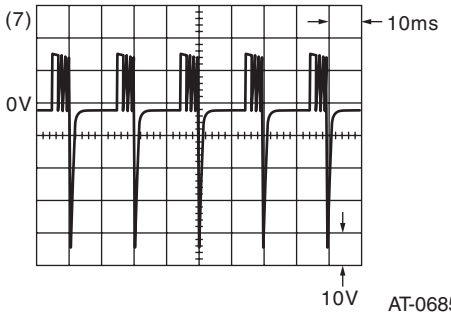
AT-06850



AT-06853



AT-05527



AT-06854

SUBARU.

6. Subaru Select Monitor

A: OPERATION

1. HOW TO USE SUBARU SELECT MONITOR

For detailed operation procedures, refer to “PC application help for Subaru Select Monitor”.

2. READ CURRENT DATA

For detailed operation procedures, refer to “PC application help for Subaru Select Monitor”.

Display	Content	Unit of measure
Engine Speed	Engine speed signal transmitted from the ECM. Calculated from crankshaft position sensor signal. TCM input value.	rpm
Turbine Speed	Turbine rotation speed calculated by the TCM using signals from the turbine speed sensor.	rpm
Accel opening angle	Accelerator pedal opening angle transmitted from the ECM. Value calculated from the accelerator pedal position sensor output. TCM input value.	%
Front Wheel Speed	Front wheel speed calculated from the secondary axis rotation speed.	km/h or MPH
ATF Temp.	Value calculated from the ATF temperature sensor output value. ATF temperature of the control valve section.	°C or °F
Lock Up Duty Ratio	Lock-up duty solenoid control duty ratio. TCM output value.	%
Transfer Duty Ratio	Transfer duty solenoid control duty ratio. TCM output value.	%
Actual Gear Ratio	Current gear ratio (rotation ratio of the pulley) calculated from the primary pulley axis rotation speed and the secondary pulley axis rotation speed.	—
Primary Rev Speed	Primary pulley rotation speed calculated by the TCM using signals from the primary speed sensor.	rpm
Secondary Rev Speed	Secondary pulley rotation speed calculated by the TCM using signals from the secondary speed sensor.	rpm
Stop light SW	Stop light SW signal. Set to ON when the brake pedal is depressed. TCM input value.	ON or OFF
Secondary Set Current	Value of the indicator current for controlling the secondary solenoid calculated by the TCM.	mA
Secondary Actual Current	Actual current value of the secondary solenoid. TCM output value.	mA
F&R Linear Solenoid Set Current	Value of the indicator current for controlling the F&R linear solenoid calculated by the TCM.	mA
F&R Linear Solenoid Actual Current	Actual current value of the F&R linear solenoid. TCM output value.	mA
ECU ACC	Battery voltage. TCM input value.	V
Primary UP Duty	Primary UP solenoid control duty ratio. TCM output value.	%
Primary DOWN Duty	Primary DOWN solenoid control duty ratio. TCM output value.	%
P Range	Inhibitor SW signal. Set to ON when the select lever is in P range. TCM input value.	ON or OFF
R Range	Inhibitor SW signal. Set to ON when the select lever is in R range. TCM input value.	ON or OFF
N Range	Inhibitor SW signal. Set to ON when the select lever is in N range. TCM input value.	ON or OFF
D Range	Inhibitor SW signal. Set to ON when the select lever is in D range. TCM input value.	ON or OFF
L-range	L range signal. Set to ON when the select lever is in the L range gate. TCM input value.	ON or OFF
Shift step in Manu. mode	Gear shift position in manual mode or in multi-stage shifting mode. TCM output value.	—
Tiptronic Mode Switch	Manual mode SW signal. Set to ON when the select lever is in the manual shift gate. TCM input value.	ON or OFF
Up Switch	Status of the paddle shift up SW. Set to ON when the plus (+) side of the steering wheel paddle shift is pulled. TCM input value.	ON or OFF

Display	Content	Unit of measure
Down Switch	Status of the paddle shift down SW. Set to ON when the minus (–) side of the steering wheel paddle shift is pulled. TCM input value.	ON or OFF
secondary pressure sensor voltage.	Voltage value after an analog/digital conversion is done inside the TCM using the signal input from the secondary pressure sensor to the TCM. TCM input value.	V
ATF Temp sensor voltage.	Sensor voltage value input from the ATF temperature sensor to the TCM. TCM input value.	V
Diagnosis Lamp	Transmission failure detection status. Set to ON when a failure is detected. AT oil temperature warning light blinks at 2 Hz. TCM output value.	ON or OFF
ATF Temperature Lamp	ATF high temperature detection status. Set to ON when high temperature is detected. AT oil temperature warning light illuminates. TCM output value.	ON or OFF
AT learning	AT initial learning completion status. AT oil temperature warning light blinks at 4 Hz when the learning is not completed. TCM output value.	Completed or Not Completed
Ignition SW ON Count	Number of times the ignition switch is turned ON since the vehicle was manufactured.	times
Count	Shows whether the elapsed time counter after turning ON the ignition switch is synchronized with the integrated unit (master unit) or an original counter. “Common” means the integrated unit, and “Originally” means that the original counter is used.	—
Time Count	Shows the elapsed time after turning ON the ignition switch.	ms
Actual Secondary Pressure	Pressure value applied to the secondary pulley cylinder (line pressure) detected by the secondary pressure sensor.	MPa
System Voltage	Power supply voltage supplied to the backup power supply (≈ battery voltage).	V

3. READ FREEZE FRAME DATA

For detailed operation procedures, refer to “PC application help for Subaru Select Monitor”.

Display	Content	Unit of measure
Engine Speed	Engine speed signal transmitted from the ECM. Calculated from crankshaft position sensor signal. TCM input value.	rpm
Turbine Speed	Turbine rotation speed calculated by the TCM using signals from the turbine speed sensor.	rpm
Accel opening angle	Accelerator pedal opening angle transmitted from the ECM. Value calculated from the accelerator pedal position sensor output. TCM input value.	%
Front Wheel Speed	Front wheel speed calculated from the secondary axis rotation speed.	km/h or MPH
ATF Temp.	Value calculated from the ATF temperature sensor output value. ATF temperature of the control valve section.	°C or °F
Lock Up Duty Ratio	Lock-up duty solenoid control duty ratio. TCM output value.	%
Transfer Duty Ratio	Transfer duty solenoid control duty ratio. TCM output value.	%
Actual Gear Ratio	Current gear ratio (rotation ratio of the pulley) calculated from the primary pulley axis rotation speed and the secondary pulley axis rotation speed.	—
Primary Rev Speed	Primary pulley rotation speed calculated by the TCM using signals from the primary speed sensor.	rpm
Secondary Rev Speed	Secondary pulley rotation speed calculated by the TCM using signals from the secondary speed sensor.	rpm
Stop light SW	Stop light SW signal. Set to ON when the brake pedal is depressed. TCM input value.	ON or OFF
Secondary Set Current	Value of the indicator current for controlling the secondary solenoid calculated by the TCM.	mA
Secondary Actual Current	Actual current value of the secondary solenoid. TCM output value.	mA
F&R Linear Solenoid Set Current	Value of the indicator current for controlling the F&R linear solenoid calculated by the TCM.	mA

Display	Content	Unit of measure
F&R Linear Solenoid Actual Current	Actual current value of the F&R linear solenoid. TCM output value.	mA
ECU ACC	Battery voltage. TCM input value.	V
Primary UP Duty	Primary UP solenoid control duty ratio. TCM output value.	%
Primary DOWN Duty	Primary DOWN solenoid control duty ratio. TCM output value.	%
P Range	Inhibitor SW signal. Set to ON when the select lever is in P range. TCM input value.	ON or OFF
R Range	Inhibitor SW signal. Set to ON when the select lever is in R range. TCM input value.	ON or OFF
N Range	Inhibitor SW signal. Set to ON when the select lever is in N range. TCM input value.	ON or OFF
D Range	Inhibitor SW signal. Set to ON when the select lever is in D range. TCM input value.	ON or OFF
Shift step in Manu. mode	Gear shift position in manual mode or in multi-stage shifting mode. TCM output value.	—
Tiptronic Mode Switch	Manual mode SW signal. Set to ON when the select lever is in the manual shift gate. TCM input value.	ON or OFF
Up Switch	Status of the paddle shift up SW. Set to ON when the plus (+) side of the steering wheel paddle shift is pulled. TCM input value.	ON or OFF
Down Switch	Status of the paddle shift down SW. Set to ON when the minus (–) side of the steering wheel paddle shift is pulled. TCM input value.	ON or OFF
secondary pressure sensor voltage.	Voltage value after an analog/digital conversion is done inside the TCM using the signal input from the secondary pressure sensor to the TCM. TCM input value.	V
ATF Temp sensor voltage.	Sensor voltage value input from the ATF temperature sensor to the TCM. TCM input value.	V
Diagnosis Lamp	Transmission failure detection status. Set to ON when a failure is detected. AT oil temperature warning light blinks at 2 Hz. TCM output value.	ON or OFF
ATF Temperature Lamp	ATF high temperature detection status. Set to ON when high temperature is detected. AT oil temperature warning light illuminates. TCM output value.	ON or OFF
Ignition SW ON Count	Number of times the ignition switch is turned ON since the vehicle was manufactured.	times
Count	Shows whether the elapsed time counter after turning ON the ignition switch is synchronized with the integrated unit (master unit) or an original counter. “Common” means the integrated unit, and “Originally” means that the original counter is used.	—
Time Count	Shows the elapsed time after turning ON the ignition switch.	ms
Actual Secondary Pressure	Pressure value applied to the secondary pulley cylinder (line pressure) detected by the secondary pressure sensor.	MPa
System Voltage	Power supply voltage supplied to the backup power supply (≈ battery voltage).	V

7. Read Diagnostic Trouble Code (DTC)

A: OPERATION

• For details concerning the work procedure, refer to the “PC application help for Subaru Select Monitor”.
• For details concerning DTC, refer to List of Diagnostic Trouble Code (DTC). <Ref. to CVT(w/o HEV)(diag)-34, List of Diagnostic Trouble Code (DTC).>

8. Clear Memory Mode

A: OPERATION

For details concerning the work procedure, refer to the “PC application help for Subaru Select Monitor”.

CAUTION:
• If the AT learning value is cleared, learned control memory is cleared.
• If the AT learning value is cleared, perform learning. <Ref. to CVT(w/o HEV)(diag)-25, Learning Control.>

9. Inspection Mode

A: PROCEDURE

<Ref. to CVT(TR580)-46, Road Test.>

10.Drive Cycle

A: PROCEDURE

It is possible to complete diagnosis of the DTC by performing the indicated drive cycle. After the repair for the DTC, perform a necessary drive cycle and make sure the function recovers and the DTC is recorded.

1. PREPARATION FOR DRIVE CYCLE

1) Check that the battery voltage is 12 V or more and fuel remains approx. half [20 — 40 L (5.3 — 10.6 US gal, 4.4 — 8.8 Imp gal)].
2) After performing the diagnostics and Clear Memory Mode, check that no DTC remains. <Ref. to CVT(w/o HEV)(diag)-18, Clear Memory Mode.>

NOTE:
Perform the drive cycle after warming up the engine except when the ATF temperature at engine start is specified.

2. DRIVE CYCLE A

DTC	Item	Condition
P0601	Internal Control Module Memory Checksum Error	Perform the drive cycle A twice.
P0604	Internal Control Module Random Access Memory (RAM) Error	Perform the drive cycle A twice.
P062F	Internal Control Module EEPROM Error	Perform the drive cycle A twice.
P0712	Transmission Fluid Temperature Sensor Circuit Low Input	—
P0776	Pressure Control Solenoid "B" Performance/Stuck Off	Perform the drive cycle D, then the drive cycle A, and perform the drive cycle D again.
P0842	Secondary Oil Pressure Sensor Circuit (Low)	—
P0843	Secondary Oil Pressure Sensor Circuit (High)	—
P0890	AT Self-Shut Relay Diagnosis (Low)	—
P0962	Secondary Solenoid Circuit (Low)	—
P0963	Secondary Solenoid Circuit (High)	—
P0966	Forward & Reverse Solenoid Circuit (Low)	—
P0967	Forward & Reverse Linear Solenoid Circuit (High)	—
P160A	Random Access Memory (RAM) Error	Perform the drive cycle A twice.
P2530	Ignition Switch Run Position Circuit	—
P2763	Lock-Up Duty Solenoid Circuit (High)	Perform the drive cycle A, then perform the drive cycle C.

Diagnostic procedure:
1) Start the engine.
2) Depress the brake pedal and move the select lever to each range at an interval of five seconds.

NOTE:
Shift the select lever in the order of “P” → “R” → “N” → “D” → “N” → “R” → “P”.

3. DRIVE CYCLE B

DTC	Item	Condition
P0711	ATF Temp. Sensor Circuit Range/Performance	Perform the drive cycle B twice.

Diagnostic procedure:
1) Start the engine while the ATF temperature is 20°C (68°F) or below.
2) Drive in any driving pattern for 20 minutes. (Include driving at a constant legal speed (for 20 seconds) at least once.)

4. DRIVE CYCLE C

DTC	Item	Condition
P0500	Vehicle Speed Sensor “A”	—
P0716	Torque Converter Turbine Speed	—
P0717	Input/Turbine Speed Sensor "A" Circuit No Signal	—
P0970	Transfer Solenoid Circuit (Low)	—
P0971	Transfer Solenoid Circuit (High)	—
P0973	Primary Solenoid System A Circuit (Low)	—
P0974	Primary Solenoid System A Circuit (High)	—
P0976	Primary Solenoid System B Circuit (Low)	—
P0977	Primary Solenoid System B Circuit (High)	—
P2158	Vehicle Speed Sensor "B"	—
P2746	Primary Pulley Revolution Speed Sensor Circuit	—
P2747	Intermediate Shaft Speed Sensor "B" Circuit No Signal	—
P2750	Sec. Pulley Revolution Speed Sensor Circuit	—
P2751	Intermediate Shaft Speed Sensor "C" Circuit No Signal	—
P2763	Lock-Up Duty Solenoid Circuit (High)	Perform the drive cycle A, then perform the drive cycle C.
P2764	Lock-Up Duty Solenoid Circuit (Low)	—

Diagnostic procedure:
1) Start the engine.
2) Accelerate slowly to a legal speed, and then decelerate slowly to a stop.

5. DRIVE CYCLE D

DTC	Item	Condition
P0713	Transmission Fluid Temperature Sensor Circuit High Input	—
P0730	Gearshift Control Performance Abnormal	—
P0746	Pressure Control Solenoid "A" Performance/Stuck Off	Perform the drive cycle D twice.
P0747	Pressure Control Solenoid "A" Stuck On	Perform the drive cycle D twice.
P0751	Shift Solenoid "A" Performance/Stuck Off	Perform the drive cycle D twice.
P0752	Shift Solenoid "A" Stuck On	Perform the drive cycle D twice.
P0756	Shift Solenoid "B" Performance/Stuck Off	Perform the drive cycle D twice.
P0757	Shift Solenoid "B" Stuck On	Perform the drive cycle D twice.
P0776	Pressure Control Solenoid "B" Performance/Stuck Off	Perform the drive cycle D, then the drive cycle A, and perform the drive cycle D again.
P0841	Secondary Oil Pressure Sensor Performance	—
P0961	Pressure Control Solenoid "A" Control Circuit Range/Performance	—
P0965	Forward & Reverse Solenoid Function	—
P2757	Torque Converter Clutch Pressure Control Solenoid Control Circuit Performance/Stuck Off	Perform the drive cycle D twice.
P2758	Torque Converter Clutch Pressure Control Solenoid Control Circuit Stuck On	Perform the drive cycle D twice.

Diagnostic procedure:
1) Start the engine.
2) Drive in any driving pattern for 20 minutes. (Include driving at a constant legal speed (for 20 seconds) at least once.)

6. DRIVE CYCLE E

DTC	Item	Condition
P0801	Reverse Inhibit Control Circuit	—
U0073	Control Module Communication Bus Off	—
U0100	Lost Communication With ECM/PCM “A”	—
U0122	Lost Communication With Vehicle Dynamics Control Module	—
U0140	Lost Communication With Body Control Module	—
U0155	Lost Communication With Instrument Panel Cluster (IPC) Control Module	—
U0164	Lost Communication With HVAC Control Module	—
U0401	Invalid Data Received From ECM/PCM “A”	—
U0416	Invalid Data Received From Vehicle Dynamics Control Module	—
U0422	Invalid Data Received From Body Control Module	—
U0423	Invalid Data Received From Instrument Panel Cluster Control Module	—
U0424	Invalid Data Received From HVAC Control Module	—
U1235	Lost Communication With EyeSight	—
U1433	Invalid Data Received From EyeSight	—

Diagnostic procedure:
1) Start the engine.

7. DRIVE CYCLE F

DTC	Item	Condition
P0705	Transmission Range Sensor Circuit (PRNDL Input)	—

Diagnostic procedure:
1) Start the engine.
2) Depress the brake pedal and move the select lever to each range at an interval of five seconds.

NOTE:
Shift the select lever in the order of “P” → “R” → “N” → “D”.
3) Maintain the engine speed to 2,000 rpm for five seconds or more.

8. DRIVE CYCLE G

DTC	Item	Condition
P0708	AT Range Switch Not Inputted	—

Diagnostic procedure:
1) Start the engine.
2) Drive the vehicle for 3 seconds at 16 km/h (10 MPH).

NOTE:
Drive the vehicle with the shift lever in “D” range and “R” range.

9. DRIVE CYCLE H

DTC	Item	Condition
P0719	Brake Switch Circuit Low	—
P0724	Brake Switch Circuit High	—
P0951	Manual Switch	—
P170A	L-Range SW System	—

Diagnostic procedure:
1) Start the engine.
2) Operate the stop light switch or the manual mode switch.

NOTE:
Drive the vehicle with the shift lever in “D” range and “R” range.
3) Read the data of the stop light switch or the manual mode switch using the Subaru Select Monitor. Or measure the terminal voltage.

11.System Operation Check Mode

A: OPERATION

CAUTION:
- **Make sure that the system operation check mode is performed when the engine is not running.**
- **After System Operation Check Mode is run, perform the Clear Memory Mode.**

1) On «Main Menu» display, select {Each System Check}.
2) On «System Selection Menu» display, select {Transmission Control System}.
3) Select {Work Support} in the «Transmission Control System» display.
4) On «Work Support» display, select {System Operation Check Mode}.

NOTE:
For detailed operation procedures, refer to “PC application help for Subaru Select Monitor”.

Item	SSM display	Execution condition
Activating the actuator ON/OFF	F&R Clutch Solenoid	When all of the following conditions are met • P range • Ignition switch is ON (engine stops) • Battery voltage is 10.9 V or more
	Secondary Solenoid	
	Primary Down Solenoid	
	Primary Up Solenoid	
	AWD Solenoid	
	Lock-Up Duty Solenoid	

12.Learning Control

A: GENERAL DESCRIPTION

- Follow the messages displayed on the Subaru Select Monitor when working.
- When the following work is performed, perform learning work for the transmission.

Replacement of TCM/Replacement or disassembly of transmission assembly/Replacement of control valve body/Clearing AT leaning value is executed.

B: PROCEDURE

1. PREPARATION FOR LEARNING

1) Warm up or cool down until the ATF temperature displayed on the Subaru Select Monitor is 40 — 65°C (104 — 149°F).
2) After stopping the vehicle, shift the select lever to “P” range.
3) Fully apply the parking brake.
4) Lift up the vehicle.

CAUTION:
While working, be sure to keep the lower edge of the tires 30 cm or more above the ground as vehicle will vibrate.
5) Connect the Subaru Select Monitor to data link connector.
6) Turn the ignition switch to ON.
7) Turn off all switches causing an electrical load, such as headlights, A/C, seat heater and rear defogger, etc.

2. SIMPLE LEARNING

NOTE:
Simple learning is performed with the vehicle lifted, without actually running the vehicle.

CAUTION:
Do not turn the power of the Subaru Select Monitor OFF during work, and do not disconnect the data link connector.
1) Select {Work Support} in the «Transmission Diagnosis» display screen of the Subaru Select Monitor.
2) Select {Compulsory learning mode} in the «Work Support» display screen of the Subaru Select Monitor.
3) Follow the messages displayed on the Subaru Select Monitor screen when working.

NOTE:
During AT learning in progress, AT OIL TEMP light in the combination meter starts flashing at 2 Hz and the learning operation starts. The following message is displayed on the screen when the AT OIL TEMP light which was flashing at 2 Hz turns off.

4) When «AT learning normally ended.» is displayed, simple AT learning is completed.

NOTE:
- If communication error occurs during learning, retry the “AT learning mode” from the beginning.
- If the message «Execute AT learning again after fixing troubles of the vehicle» appears during learning, select [OK] and display the DTC list. After repairing the locations indicated by the DTC, start the “AT learning mode” over from the beginning.
- When communication error occurs during learning, select lever does not shift occasionally. If select lever does not shift, turn the ignition switch to OFF before operating the select lever.
- If the message «AT learning ended abnormally.» is displayed, start the “AT learning mode” over from the beginning.

Display	Main causes for abnormal termination
AT learning ended abnormally.	• Fault is detected during AT learning. • The accelerator pedal is depressed during AT learning. • An unspecified operation was performed during AT learning • ATF temperature becomes out of specification during AT learning. • Battery voltage is low. • Malfunction indicator light illuminates. • Parking brake not applied strongly enough. • Brake pedal is not fully depressed. • Abnormal idle speed increase, etc.

- For detailed operation procedures, refer to “PC application help for Subaru Select Monitor”.

13.AT OIL TEMP Warning Light Display

A: OPERATION

The AT OIL TEMP light illuminates or blinks, when the ATF temperature is high and malfunction occurs in CVT.

- At normal condition

After turning the ignition switch to ON, illuminates for 2 seconds then goes off.

- When ATF temperature is high

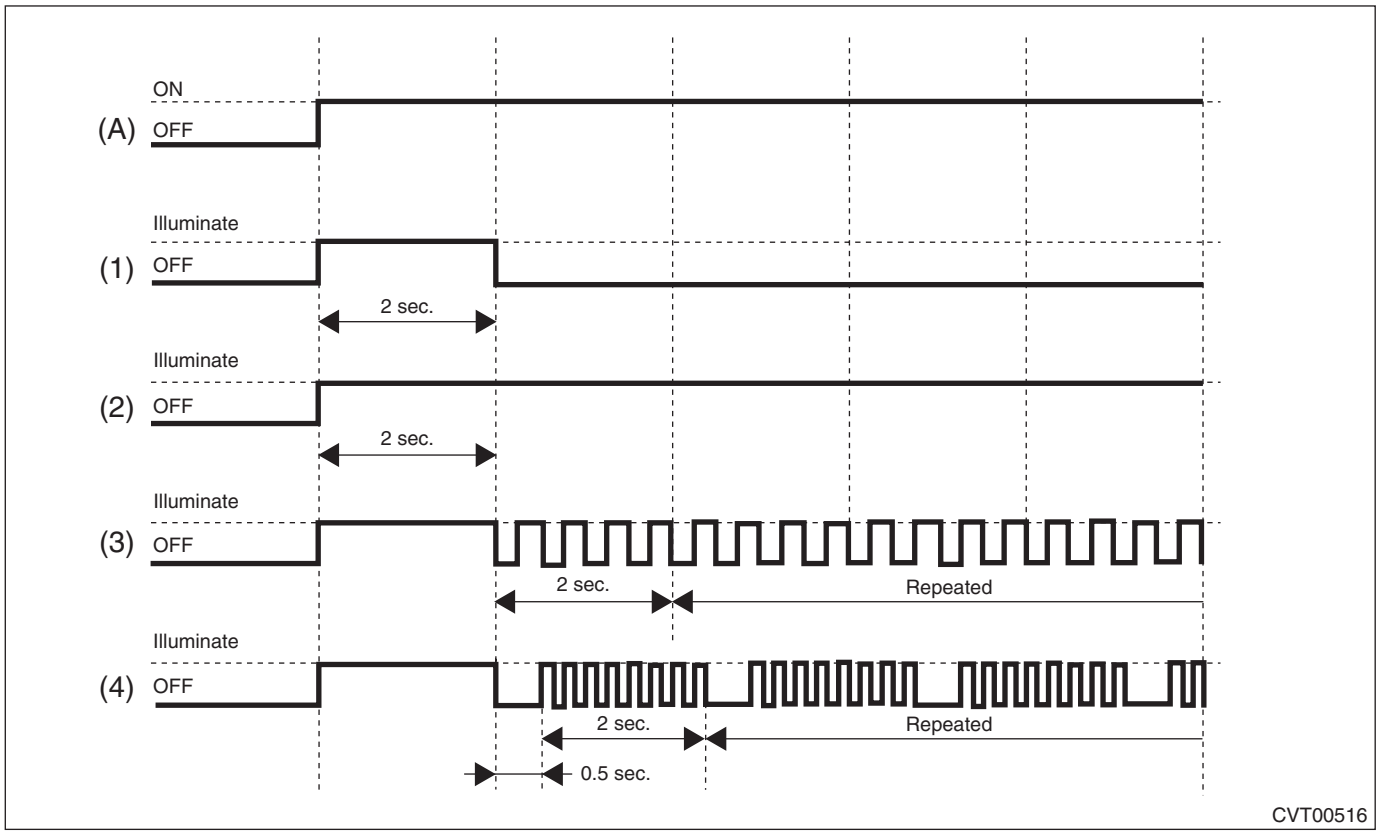
AT OIL TEMP light illuminates when the ATF temperature is abnormally high with the ignition switch ON.

- When malfunction is detected

AT OIL TEMP light blinks at 2 Hz when the TCM detects the malfunction of CVT with the ignition switch ON. In this case, inspect using “Diagnostic Procedure with Diagnostic Trouble Code (DTC)”. <Ref. to CVT(w/o HEV)(diag)-39, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

- When AT learning is not finished

AT OIL TEMP light repeats “Blinking at 4 Hz → Turning OFF” every two seconds, when the AT learning is not completed with the ignition switch ON. In this case, perform the “Learning”. (During AT learning, the light blinks at 2 Hz or illuminates.) <Ref. to CVT(w/o HEV)(diag)-25, Learning Control.>



(A) Ignition switch condition

(1) At normal condition
(2) When ATF temperature is high
(3) When malfunction is detected
(4) When AT learning is not finished

If the AT OIL TEMP light does not illuminate, or illumination patterns are not as above, check the AT OIL TEMP light circuit. <Ref. to CVT(w/o HEV)(diag)-28, INSPECTION, AT OIL TEMP Warning Light Display.>

B: INSPECTION

DIAGNOSIS:

- CAN communication is lost with the combination meter.
- Combination meter malfunction
- TCM is in special control mode.
- AT learning is not finished.

TROUBLE SYMPTOM:

- When the ignition switch is turned to ON, the AT OIL TEMP light does not illuminate.
- AT OIL TEMP light remains lit after engine start.

	Step	Check	Yes	No
1	**CHECK DTC.** Read the DTC relating the TCM using the Subaru Select Monitor.	Is DTC U0155 or U0423 displayed?	Perform the self-diagnosis of combination meter.	Go to step **2**.
2	**CHECK DTC.** Read the DTC relating the TCM using the Subaru Select Monitor.	Are DTCs other than U0155 and U0423 displayed?	Perform the diagnosis according to DTC.	Go to step **3**.
3	**CHECK COMBINATION METER.** Read DTC of combination meter.	Is DTC displayed?	Perform the diagnosis according to DTC.	Go to step **4**.
4	**CHECK AT OIL TEMP LIGHT.** Turn the ignition switch to ON.	Does AT OIL TEMP light illuminate and then go off in 2 seconds?	Go to step **5**.	Perform the self-diagnosis of combination meter. <Ref. to IDI-8, SELF-DIAGNOSIS DISPLAY MODE, OPERATION, Combination Meter System.>
5	**CHECK AT OIL TEMP LIGHT.** Start the engine.	Does the AT OIL TEMP light go off?	Current condition is normal. Go back to Basic Diagnostic Procedure. <Ref. to CVT(w/o HEV)(diag)-2, Basic Diagnostic Procedure.>	Go to step **6**.
6	**CHECK DTC.** Read the DTC relating the TCM using the Subaru Select Monitor.	Is DTC displayed?	Perform the diagnosis according to DTC.	Go to step **7**.
7	**CHECK TCM.** Read the data of «ATF Temperature Lamp» using the Subaru Select Monitor.	Is “ON” displayed?	Go to step **8**.	Perform the self-diagnosis of combination meter. <Ref. to IDI-8, SELF-DIAGNOSIS DISPLAY MODE, OPERATION, Combination Meter System.>
8	**CHECK TCM.** Read the data of «ATF Temp.» using the Subaru Select Monitor.	Is the display 125°C or more?	Go to step **9**.	Replace the TCM. <Ref. to CVT(TR580)-146, Transmission Control Module (TCM).>

	Step	Check	Yes	No
9	**CHECK ATF TEMPERATURE.** Check the real fluid temperature from the transmission case surface temperature.	Does it clearly differ from the «ATF Temp.» displayed on Subaru Select Monitor?	Perform the diagnosis according to DTC P0712. If there is no problem, perform the diagnosis according to DTC P0713.	When ATF temperature can be judged as actually high, perform the diagnosis again after the ATF temperature lowers.

14.AWD Warning Light Display

A: OPERATION

AWD light illuminates or blinks, when the AWD is in special control condition and AWD has malfunction.

- At normal condition

After turning the ignition switch to ON, illuminates for 2 seconds then goes off.

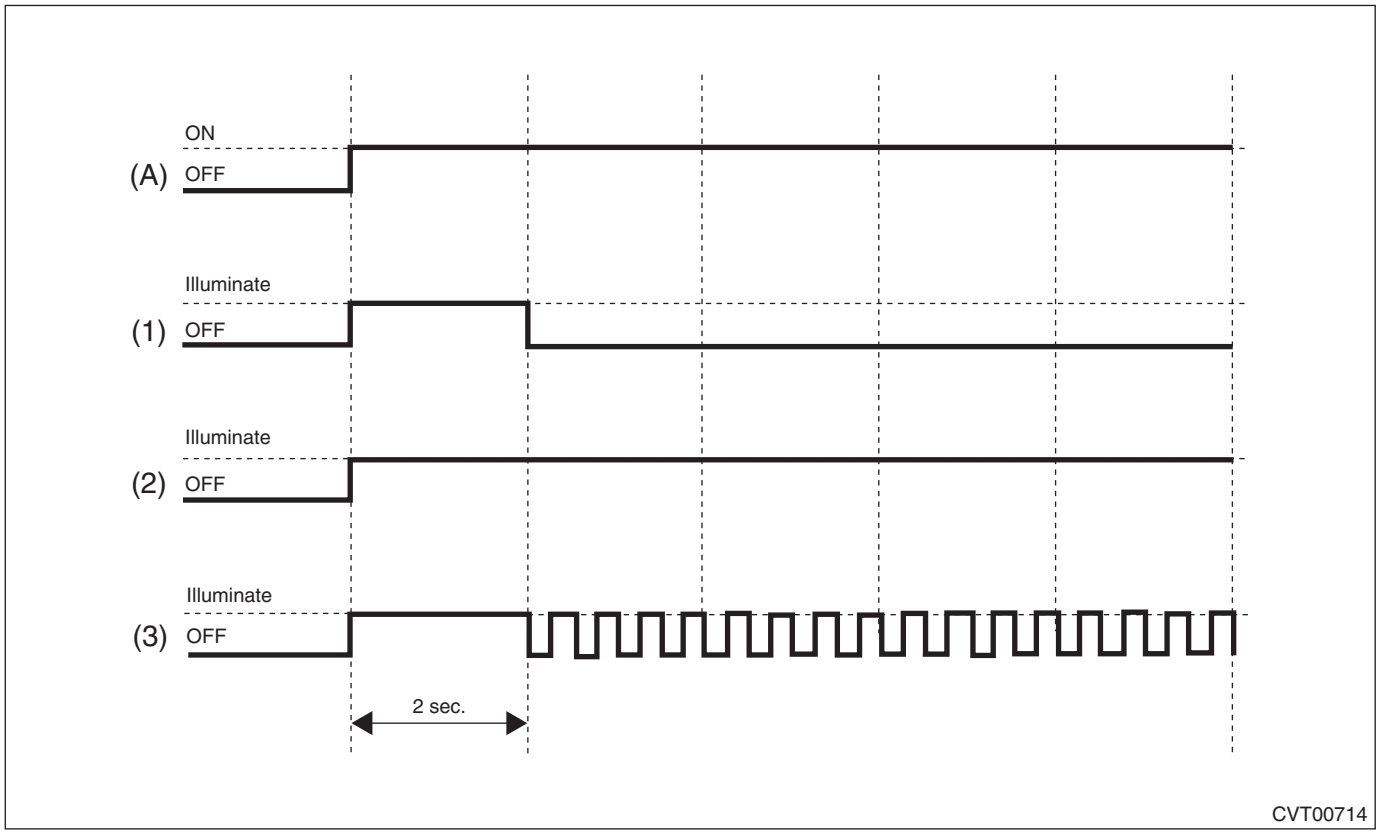
- When FF mode is selected

AWD light illuminates when the AWD ON/OFF switching function is set to “FF mode” with the ignition switch ON.

- When malfunction is detected

AWD light blinks at 2 Hz when any of the following malfunctions are detected with the ignition switch ON.

1. When tire with different diameter is installed, or air pressure of any of four wheels is excessively low.
2. When “Rear differential inspection mode” is judged as NG <Ref. to DI-63, Rear Differential Inspection Mode.>



(A) Ignition switch condition

(1) At normal condition (2) When FF mode is selected (3) When malfunction is detected

If the AWD light does not illuminate, or illumination patterns are not as above, check the AWD light circuit. <Ref. to CVT(w/o HEV)(diag)-30, INSPECTION, AWD Warning Light Display.>

B: INSPECTION

DIAGNOSIS:

- CAN communication is lost with the combination meter.
- Combination meter malfunction
- TCM is in AWD special control mode.

TROUBLE SYMPTOM:

- When the ignition switch is turned to ON, the AWD light does not illuminate.
- AWD light remains lit after engine start.

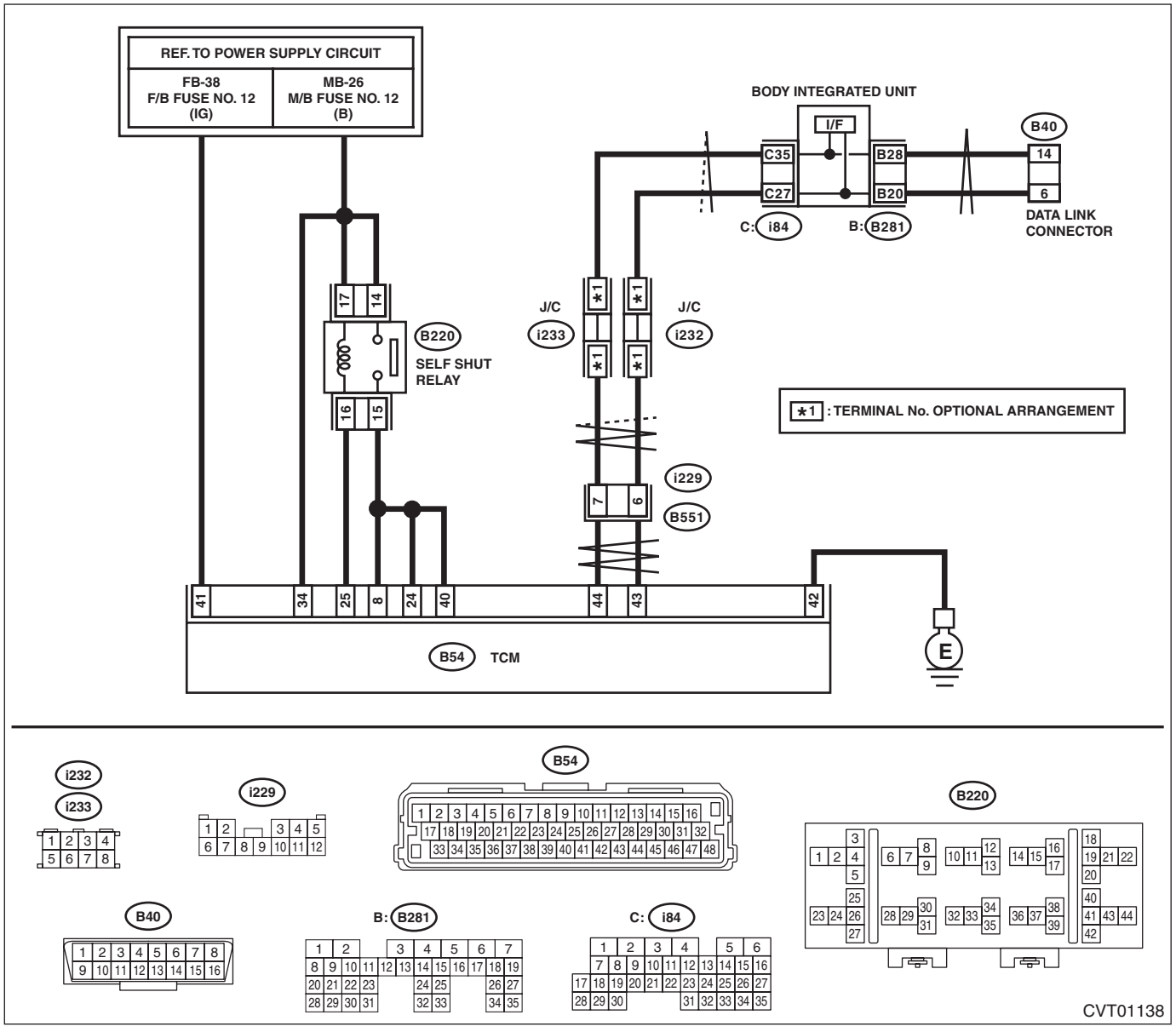
- AWD light is blinking immediately after engine start.

	Step	Check	Yes	No
1	**CHECK TCM.** Check the DTC relating the TCM using the Subaru Select Monitor.	Is DTC U0155 or U0423 displayed?	Perform the self-diagnosis of combination meter.	Go to step **2**.
2	**CHECK TCM.** Check the DTC relating the TCM using the Subaru Select Monitor.	Are DTCs other than U0155 and U0423 displayed?	Perform the diagnosis according to DTC.	Go to step **3**.
3	**CHECK COMBINATION METER.** Check the DTC of combination meter.	Is DTC displayed?	Perform the diagnosis according to DTC.	Go to step **4**.
4	**CHECK AWD LIGHT.** Turn the ignition switch to ON.	Does AWD light illuminate and then go off in 2 seconds?	Go to step **5**.	Perform the self-diagnosis of combination meter. <Ref. to IDI-8, SELF-DIAGNOSIS DISPLAY MODE, OPERATION, Combination Meter System.>
5	**CHECK AWD LIGHT.** Start the engine.	Does the AWD light go off?	Current condition is normal. Go back to Basic Diagnostic Procedure. <Ref. to CVT(w/o HEV)(diag)-2, Basic Diagnostic Procedure.>	Go to step **6**.
6	**CHECK DTC.** Read the DTC relating the TCM using the Subaru Select Monitor.	Is DTC displayed?	Perform the diagnosis according to DTC.	Go to step **7**.
7	**CHECK AWD LIGHT.** Check the display of AWD light after engine start.	Is AWD light illuminating?	Go to step **9**.	Go to step **8**.
8	**CHECK AWD LIGHT.** Check the display of AWD light after engine start.	Is AWD light blinking at 2 Hz?	Go to step **10**.	Go to step **11**.
9	**CHECK AWD ON/OFF SWITCHING FUNCTION.** Using the Subaru Select Monitor, select the «AWD ON/OFF switching mode» in «Maintenance mode» from «Work Support», and check the current mode. <Ref. to CVT(TR580)-45, AWD ON/OFF Switching Mode.>	Is the message «At present, the vehicle is in AWD. Switch to FF?» displayed?	Go to step **11**.	If the message «At present, the vehicle is in FF. Switch to AWD?» is displayed, select “OK”, and switch to AWD mode.
10	**CHECK REAR DIFFERENTIAL.** Using the Subaru Select Monitor, select «Rear differential inspection mode» in «Maintenance mode» from «Work Support», and check. <Ref. to DI-63, Rear Differential Inspection Mode.>	Does AWD light go off after inspection is finished normally?	Current condition is normal. Go back to Basic Diagnostic Procedure. <Ref. to CVT(w/o HEV)(diag)-2, Basic Diagnostic Procedure.>	Go to step **11**.
11	**CHECK COMBINATION METER.** Perform the self-diagnosis of combination meter. <Ref. to IDI-8, SELF-DIAGNOSIS DISPLAY MODE, OPERATION, Combination Meter System.>	Is there any trouble with the combination meter?	Repair the combination meter.	Replace the TCM. <Ref. to CVT(TR580)-146, Transmission Control Module (TCM).>

15.Diagnostic Procedure for Subaru Select Monitor Communication

A: COMMUNICATION FOR INITIALIZING IMPOSSIBLE

DIAGNOSIS:
Defective harness connector
TROUBLE SYMPTOM:
Subaru Select Monitor communication failure
WIRING DIAGRAM:
CVT control system <Ref. to WI(w/o HEV)-90, CVT Control System.>



	Step	Check	Yes	No
1	**CHECK IGNITION SWITCH.**	Is the ignition switch ON?	Go to step **2**.	Turn the ignition switch to ON, and select the transmission mode using the Subaru Select Monitor.
2	**CHECK BATTERY.** 1) Turn the ignition switch to OFF. 2) Measure the battery voltage.	Is the voltage 11 V or more?	Go to step **3**.	Charge or replace the battery.
3	**CHECK BATTERY TERMINAL.**	Is there poor contact at battery terminal?	Repair or tighten the battery terminal.	Go to step **4**.
4	**CHECK INSTALLATION OF TCM CONNECTOR.** Turn the ignition switch to OFF.	Is the TCM connector inserted into the TCM until the clamp locks?	Go to step **5**.	Insert the TCM connector to TCM.
5	**CHECK LAN SYSTEM.** Perform the diagnosis for LAN system. <Ref. to LAN(w/o HEV)(diag)-2, Basic Diagnostic Procedure.>	Is there any fault in LAN system?	Perform the diagnosis according to DTC for LAN system. <Ref. to LAN(w/o HEV)(diag)-64, List of Diagnostic Trouble Code (DTC).>	Go to step **6**.
6	**CHECK SUBARU SELECT MONITOR COMMUNICATION.** 1) Turn the ignition switch to ON. 2) Check whether communication to transmission system can be executed normally.	Is the system name displayed on Subaru Select Monitor?	Check DTC of TCM. <Ref. to CVT(w/o HEV)(diag)-17, Read Diagnostic Trouble Code (DTC).>	Go to step **7**.
7	**CHECK POWER SUPPLY CIRCUIT.** 1) Turn the ignition switch to ON. (engine OFF) 2) Measure the ignition power supply voltage between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 8 (+) — Chassis ground (–):*** ***(B54) No. 24 (+) — Chassis ground (–):*** ***(B54) No. 34 (+) — Chassis ground (–):*** ***(B54) No. 40 (+) — Chassis ground (–):*** ***(B54) No. 41 (+) — Chassis ground (–):***	Is the voltage 10 — 13 V?	Go to step **8**.	Repair the open circuit of harness between TCM and battery.
8	**CHECK HARNESS CONNECTOR BETWEEN TCM AND CHASSIS GROUND.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from TCM. 3) Measure the resistance of harness between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 42 — Chassis ground:***	Is the resistance less than 10 Ω?	Go to step **9**.	Repair the open circuit of the TCM ground circuit and poor contact of connector.
9	**CHECK POOR CONTACT OF CONNECTOR.**	Is there poor contact of control module power supply, ground circuit and data link connector?	Repair the connector.	Replace the TCM. <Ref. to CVT(TR580)-146, Transmission Control Module (TCM).>

16.List of Diagnostic Trouble Code (DTC)

A: LIST

DTC	Item	Content of diagnosis	Reference
P0500	Vehicle Speed Sensor “A”	Wheel speed data from VDC CM&H/U is abnormal.	<Ref. to CVT(w/o HEV)(diag)-39, DTC P0500 VEHICLE SPEED SENSOR “A”, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0601	Internal Control Module Memory Checksum Error	TCM ROM is faulty.	<Ref. to CVT(w/o HEV)(diag)-39, DTC P0601 INTERNAL CONTROL MODULE MEMORY CHECKSUM ERROR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0604	Internal Control Module Random Access Memory (RAM) Error	TCM RAM is faulty.	<Ref. to CVT(w/o HEV)(diag)-40, DTC P0604 INTERNAL CONTROL MODULE RANDOM ACCESS MEMORY (RAM) ERROR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P062F	Internal Control Module EEPROM Error	TCM EEPROM is faulty.	<Ref. to CVT(w/o HEV)(diag)-40, DTC P062F INTERNAL CONTROL MODULE EEPROM ERROR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0705	Transmission Range Sensor Circuit (PRNDL Input)	Inhibitor switch malfunction or short circuit	<Ref. to CVT(w/o HEV)(diag)-41, DTC P0705 TRANSMISSION RANGE SENSOR CIRCUIT (PRNDL INPUT), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0708	AT Range Switch Not Inputted	Inhibitor switch malfunction or open circuit	<Ref. to CVT(w/o HEV)(diag)-43, DTC P0708 AT RANGE SWITCH NOT INPUTTED, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0711	ATF Temp. Sensor Circuit Range/Performance	ATF temperature sensor is faulty or input signal circuit is faulty.	<Ref. to CVT(w/o HEV)(diag)-44, DTC P0711 ATF TEMP. SENSOR CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0712	Transmission Fluid Temperature Sensor Circuit Low Input	ATF temperature sensor is faulty or input signal circuit is shorted.	<Ref. to CVT(w/o HEV)(diag)-45, DTC P0712 TRANSMISSION FLUID TEMPERATURE SENSOR CIRCUIT LOW INPUT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0713	Transmission Fluid Temperature Sensor Circuit High Input	ATF temperature sensor is faulty or input signal circuit is open or shorted.	<Ref. to CVT(w/o HEV)(diag)-47, DTC P0713 TRANSMISSION FLUID TEMPERATURE SENSOR CIRCUIT HIGH INPUT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0716	Torque Converter Turbine Speed	Turbine speed sensor is faulty or input signal circuit is open or shorted.	<Ref. to CVT(w/o HEV)(diag)-49, DTC P0716 TORQUE CONVERTER TURBINE SPEED, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0717	Input/Turbine Speed Sensor "A" Circuit No Signal	Turbine speed sensor signal no input	<Ref. to CVT(w/o HEV)(diag)-50, DTC P0717 INPUT/TURBINE SPEED SENSOR "A" CIRCUIT NO SIGNAL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0719	Brake Switch Circuit Low	Brake switch is faulty or input signal circuit is open or shorted.	<Ref. to CVT(w/o HEV)(diag)-53, DTC P0719 BRAKE SWITCH CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

DTC	Item	Content of diagnosis	Reference
P0724	Brake Switch Circuit High	Brake switch is faulty or input signal circuit is shorted.	<Ref. to CVT(w/o HEV)(diag)-55, DTC P0724 BRAKE SWITCH CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0730	Gearshift Control Performance Abnormal	Primary speed sensor, secondary speed sensor, control valve, or chain is faulty.	<Ref. to CVT(w/o HEV)(diag)-57, DTC P0730 GEARSHIFT CONTROL PERFORMANCE ABNORMAL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0746	Pressure Control Solenoid "A" Performance/ Stuck Off	Secondary solenoid is faulty, hydraulic circuit is stuck in low pressure side.	<Ref. to CVT(w/o HEV)(diag)-58, DTC P0746 PRESSURE CONTROL SOLENOID "A" PERFORMANCE/STUCK OFF, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0747	Pressure Control Solenoid "A" Stuck On	Secondary solenoid is faulty, hydraulic circuit is stuck in high pressure side.	<Ref. to CVT(w/o HEV)(diag)-60, DTC P0747 PRESSURE CONTROL SOLENOID "A" STUCK ON, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0751	Shift Solenoid "A" Performance/Stuck Off	Primary UP solenoid is faulty, hydraulic circuit is stuck in low pressure side.	<Ref. to CVT(w/o HEV)(diag)-62, DTC P0751 SHIFT SOLENOID "A" PERFORMANCE/ STUCK OFF, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0752	Shift Solenoid "A" Stuck On	Primary UP solenoid is faulty, hydraulic circuit is stuck in high pressure side.	<Ref. to CVT(w/o HEV)(diag)-64, DTC P0752 SHIFT SOLENOID "A" STUCK ON, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0756	Shift Solenoid "B" Performance/Stuck Off	Primary DOWN solenoid is faulty, hydraulic circuit is stuck in low pressure side.	<Ref. to CVT(w/o HEV)(diag)-66, DTC P0756 SHIFT SOLENOID "B" PERFORMANCE/ STUCK OFF, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0757	Shift Solenoid "B" Stuck On	Primary DOWN solenoid is faulty, hydraulic circuit is stuck in high pressure side.	<Ref. to CVT(w/o HEV)(diag)-68, DTC P0757 SHIFT SOLENOID "B" STUCK ON, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0776	Pressure Control Solenoid "B" Performance/ Stuck Off	F&R solenoid is faulty, hydraulic circuit is stuck in low pressure side.	<Ref. to CVT(w/o HEV)(diag)-70, DTC P0776 PRESSURE CONTROL SOLENOID "B" PERFORMANCE/STUCK OFF, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0801	Reverse Inhibit Control Circuit	Shift lock solenoid is faulty or output signal circuit is open or shorted.	<Ref. to CVT(w/o HEV)(diag)-71, DTC P0801 REVERSE INHIBIT CONTROL CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0841	Secondary Oil Pressure Sensor Performance	Secondary pressure sensor or control valve is faulty	<Ref. to CVT(w/o HEV)(diag)-72, DTC P0841 SECONDARY OIL PRESSURE SENSOR PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0842	Secondary Oil Pressure Sensor Circuit (Low)	Secondary pressure sensor is faulty or input signal circuit is open or shorted.	<Ref. to CVT(w/o HEV)(diag)-76, DTC P0842 SECONDARY OIL PRESSURE SENSOR CIRCUIT (LOW), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0843	Secondary Oil Pressure Sensor Circuit (High)	Secondary pressure sensor is faulty or input signal circuit is shorted.	<Ref. to CVT(w/o HEV)(diag)-78, DTC P0843 SECONDARY OIL PRESSURE SENSOR CIRCUIT (HIGH), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0890	AT Self-Shut Relay Diagnosis (Low)	Self-shut relay is faulty or input signal circuit is open or shorted.	<Ref. to CVT(w/o HEV)(diag)-80, DTC P0890 AT SELF-SHUT RELAY DIAGNOSIS (LOW), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

DTC	Item	Content of diagnosis	Reference
P0951	Manual Switch	Manual mode switch is faulty or input signal circuit is open or shorted.	<Ref. to CVT(w/o HEV)(diag)-82, DTC P0951 MANUAL SWITCH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0961	Pressure Control Solenoid "A" Control Circuit Range/Performance	Characteristics of secondary solenoid is abnormal.	<Ref. to CVT(w/o HEV)(diag)-84, DTC P0961 PRESSURE CONTROL SOLENOID "A" CONTROL CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0962	Secondary Solenoid Circuit (Low)	Secondary solenoid is faulty or output signal circuit is shorted.	<Ref. to CVT(w/o HEV)(diag)-86, DTC P0962 SECONDARY SOLENOID CIRCUIT (LOW), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0963	Secondary Solenoid Circuit (High)	Secondary solenoid is faulty or output signal circuit is open or shorted.	<Ref. to CVT(w/o HEV)(diag)-88, DTC P0963 SECONDARY SOLENOID CIRCUIT (HIGH), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0965	Forward & Reverse Solenoid Function	F&R solenoid, forward clutch or control valve is faulty.	<Ref. to CVT(w/o HEV)(diag)-90, DTC P0965 FORWARD & REVERSE SOLENOID FUNCTION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0966	Forward & Reverse Solenoid Circuit (Low)	F&R solenoid is faulty or output signal circuit is shorted.	<Ref. to CVT(w/o HEV)(diag)-92, DTC P0966 FORWARD & REVERSE SOLENOID CIRCUIT (LOW), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0967	Forward & Reverse Linear Solenoid Circuit (High)	F&R solenoid is faulty or output signal circuit is open or shorted.	<Ref. to CVT(w/o HEV)(diag)-94, DTC P0967 FORWARD & REVERSE LINEAR SOLENOID CIRCUIT (HIGH), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0970	Transfer Solenoid Circuit (Low)	AWD solenoid is faulty or output signal circuit is shorted.	<Ref. to CVT(w/o HEV)(diag)-96, DTC P0970 TRANSFER SOLENOID CIRCUIT (LOW), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0971	Transfer Solenoid Circuit (High)	AWD solenoid is faulty or output signal circuit is open or shorted.	<Ref. to CVT(w/o HEV)(diag)-98, DTC P0971 TRANSFER SOLENOID CIRCUIT (HIGH), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0973	Primary Solenoid System A Circuit (Low)	Primary UP solenoid is faulty or output signal circuit is shorted.	<Ref. to CVT(w/o HEV)(diag)-100, DTC P0973 PRIMARY SOLENOID SYSTEM A CIRCUIT (LOW), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0974	Primary Solenoid System A Circuit (High)	Primary UP solenoid is faulty or output signal circuit is open or shorted.	<Ref. to CVT(w/o HEV)(diag)-102, DTC P0974 PRIMARY SOLENOID SYSTEM A CIRCUIT (HIGH), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0976	Primary Solenoid System B Circuit (Low)	Primary DOWN solenoid is faulty or output signal circuit is shorted.	<Ref. to CVT(w/o HEV)(diag)-104, DTC P0976 PRIMARY SOLENOID SYSTEM B CIRCUIT (LOW), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0977	Primary Solenoid System B Circuit (High)	Primary DOWN solenoid is faulty or output signal circuit is open or shorted.	<Ref. to CVT(w/o HEV)(diag)-106, DTC P0977 PRIMARY SOLENOID SYSTEM B CIRCUIT (HIGH), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P160A	Random Access Memory (RAM) Error	TCM RAM is faulty.	<Ref. to CVT(w/o HEV)(diag)-108, DTC P160A RANDOM ACCESS MEMORY (RAM) ERROR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

DTC	Item	Content of diagnosis	Reference
P170A	L-Range SW System	L range switch is faulty or input signal circuit is open or shorted.	<Ref. to CVT(w/o HEV)(diag)-108, DTC P170A L-RANGE SW SYSTEM, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2158	Vehicle Speed Sensor "B"	Wheel speed data from VDC CM&H/U is abnormal.	<Ref. to CVT(w/o HEV)(diag)-109, DTC P2158 VEHICLE SPEED SENSOR "B", Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2530	Ignition Switch Run Position Circuit	Ignition SW circuit is faulty.	<Ref. to CVT(w/o HEV)(diag)-110, DTC P2530 IGNITION SWITCH RUN POSITION CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2746	Primary Pulley Revolution Speed Sensor Circuit	Primary speed sensor is faulty or input signal circuit is open or shorted.	<Ref. to CVT(w/o HEV)(diag)-112, DTC P2746 PRIMARY PULLEY REVOLUTION SPEED SENSOR CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2747	Intermediate Shaft Speed Sensor "B" Circuit No Signal	Primary speed sensor signal no input	<Ref. to CVT(w/o HEV)(diag)-113, DTC P2747 INTERMEDIATE SHAFT SPEED SENSOR "B" CIRCUIT NO SIGNAL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2750	Sec. Pulley Revolution Speed Sensor Circuit	Secondary speed sensor is faulty or input signal circuit is open or shorted.	<Ref. to CVT(w/o HEV)(diag)-116, DTC P2750 SEC. PULLEY REVOLUTION SPEED SENSOR CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2751	Intermediate Shaft Speed Sensor "C" Circuit No Signal	Secondary speed sensor signal no input	<Ref. to CVT(w/o HEV)(diag)-117, DTC P2751 INTERMEDIATE SHAFT SPEED SENSOR "C" CIRCUIT NO SIGNAL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2757	Torque Converter Clutch Pressure Control Solenoid Control Circuit Performance/Stuck Off	Lock-up duty solenoid is faulty, hydraulic circuit is stuck in low pressure side.	<Ref. to CVT(w/o HEV)(diag)-120, DTC P2757 TORQUE CONVERTER CLUTCH PRESSURE CONTROL SOLENOID CONTROL CIRCUIT PERFORMANCE/STUCK OFF, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2758	Torque Converter Clutch Pressure Control Solenoid Control Circuit Stuck On	Lock-up duty solenoid is faulty, hydraulic circuit is stuck in high pressure side.	<Ref. to CVT(w/o HEV)(diag)-122, DTC P2758 TORQUE CONVERTER CLUTCH PRESSURE CONTROL SOLENOID CONTROL CIRCUIT STUCK ON, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2763	Lock-Up Duty Solenoid Circuit (High)	Lock-up duty solenoid is faulty or output signal circuit is open or shorted.	<Ref. to CVT(w/o HEV)(diag)-124, DTC P2763 LOCK-UP DUTY SOLENOID CIRCUIT (HIGH), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2764	Lock-Up Duty Solenoid Circuit (Low)	Lock-up duty solenoid is faulty or output signal circuit is shorted.	<Ref. to CVT(w/o HEV)(diag)-126, DTC P2764 LOCK-UP DUTY SOLENOID CIRCUIT (LOW), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0073	Control Module Communication Bus Off	CAN bus is shorted or communication error.	<Ref. to CVT(w/o HEV)(diag)-127, DTC U0073 CONTROL MODULE COMMUNICATION BUS OFF, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0100	Lost Communication With ECM/PCM “A”	Detected that the engine data has not yet arrived.	<Ref. to CVT(w/o HEV)(diag)-127, DTC U0100 LOST COMMUNICATION WITH ECM/PCM “A”, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

DTC	Item	Content of diagnosis	Reference
U0122	Lost Communication With Vehicle Dynamics Control Module	Detected that the VDC data has not yet arrived.	<Ref. to CVT(w/o HEV)(diag)-127, DTC U0122 LOST COMMUNICATION WITH VEHICLE DYNAMICS CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0140	Lost Communication With Body Control Module	Detected that the body integrated unit data has not yet arrived.	<Ref. to CVT(w/o HEV)(diag)-127, DTC U0140 LOST COMMUNICATION WITH BODY CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0155	Lost Communication With Instrument Panel Cluster (IPC) Control Module	Detected that the meter data has not yet arrived.	<Ref. to CVT(w/o HEV)(diag)-127, DTC U0155 LOST COMMUNICATION WITH INSTRUMENT PANEL CLUSTER (IPC) CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0164	Lost Communication With HVAC Control Module	Detected that the air conditioner data has not yet arrived.	<Ref. to CVT(w/o HEV)(diag)-127, DTC U0164 LOST COMMUNICATION WITH HVAC CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0401	Invalid Data Received From ECM/PCM “A”	Detected abnormality of the engine data.	<Ref. to CVT(w/o HEV)(diag)-127, DTC U0401 INVALID DATA RECEIVED FROM ECM/PCM “A”, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0416	Invalid Data Received From Vehicle Dynamics Control Module	Detected abnormality of the VDC data.	<Ref. to CVT(w/o HEV)(diag)-127, DTC U0416 INVALID DATA RECEIVED FROM VEHICLE DYNAMICS CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0422	Invalid Data Received From Body Control Module	Detected abnormality of the body integrated unit data.	<Ref. to CVT(w/o HEV)(diag)-128, DTC U0422 INVALID DATA RECEIVED FROM BODY CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0423	Invalid Data Received From Instrument Panel Cluster Control Module	Detected abnormality of the meter data.	<Ref. to CVT(w/o HEV)(diag)-128, DTC U0423 INVALID DATA RECEIVED FROM INSTRUMENT PANEL CLUSTER CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0424	Invalid Data Received From HVAC Control Module	Detected abnormality of the air conditioner data.	<Ref. to CVT(w/o HEV)(diag)-128, DTC U0424 INVALID DATA RECEIVED FROM HVAC CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U1235	Lost Communication With EyeSight	Detected that the EyeSight data has not yet arrived.	<Ref. to CVT(w/o HEV)(diag)-128, DTC U1235 LOST COMMUNICATION WITH EyeSight, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U1433	Invalid Data Received From EyeSight	Detected abnormality of the EyeSight data.	<Ref. to CVT(w/o HEV)(diag)-128, DTC U1433 INVALID DATA RECEIVED FROM EyeSight, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

17.Diagnostic Procedure with Diagnostic Trouble Code (DTC)

A: DTC P0500 VEHICLE SPEED SENSOR “A”

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(CVT)(w/o HEV)-5, DTC P0500 VEHICLE SPEED SENSOR “A”, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

VDC does not operate.

	Step	Check	Yes	No
1	**CHECK DTC.** Read the DTC of VDC system using the Subaru Select Monitor.	Is DTC displayed?	Perform the diagnosis according to DTC. <Ref. to VDC(diag)-40, List of Diagnostic Trouble Code (DTC).>	Repair the poor contact of connector and harness between VDCCM&H/U and wheel speed sensor.

B: DTC P0601 INTERNAL CONTROL MODULE MEMORY CHECKSUM ERROR

DTC DETECTING CONDITION:

- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(CVT)(w/o HEV)-6, DTC P0601 INTERNAL CONTROL MODULE MEMORY CHECKSUM ERROR, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

TCM ROM malfunction

	Step	Check	Yes	No
1	**CHECK DTC.** 1) Perform the Clear Memory Mode using the Subaru Select Monitor. <Ref. to CVT(w/o HEV)(diag)-18, Clear Memory Mode.> 2) Read the DTC.	Is DTC P0601 displayed?	Replace the TCM. <Ref. to CVT(TR580)-146, Transmission Control Module (TCM).>	Current condition is normal. Check for interference from noise, etc.

C: DTC P0604 INTERNAL CONTROL MODULE RANDOM ACCESS MEMORY (RAM) ERROR

DTC DETECTING CONDITION:

- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(CVT)(w/o HEV)-7, DTC P0604 INTERNAL CONTROL MODULE RANDOM ACCESS MEMORY (RAM) ERROR, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

TCM RAM malfunction

	Step	Check	Yes	No
1	**CHECK DTC.** 1) Perform the Clear Memory Mode using the Subaru Select Monitor. <Ref. to CVT(w/o HEV)(diag)-18, Clear Memory Mode.> 2) Read the DTC.	Is DTC P0604 displayed?	Replace the TCM. <Ref. to CVT(TR580)-146, Transmission Control Module (TCM).>	Current condition is normal. Check for interference from noise, etc.

D: DTC P062F INTERNAL CONTROL MODULE EEPROM ERROR

DTC DETECTING CONDITION:

- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(CVT)(w/o HEV)-8, DTC P062F INTERNAL CONTROL MODULE EEPROM ERROR, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

TCM EEPROM malfunction

	Step	Check	Yes	No
1	**CHECK DTC.** 1) Perform the Clear Memory Mode using the Subaru Select Monitor. <Ref. to CVT(w/o HEV)(diag)-18, Clear Memory Mode.> 2) Read the DTC.	Is DTC P062F displayed?	Replace the TCM. <Ref. to CVT(TR580)-146, Transmission Control Module (TCM).>	Current condition is normal. Check for interference from noise, etc.

E: DTC P0705 TRANSMISSION RANGE SENSOR CIRCUIT (PRNDL INPUT)

DTC DETECTING CONDITION:

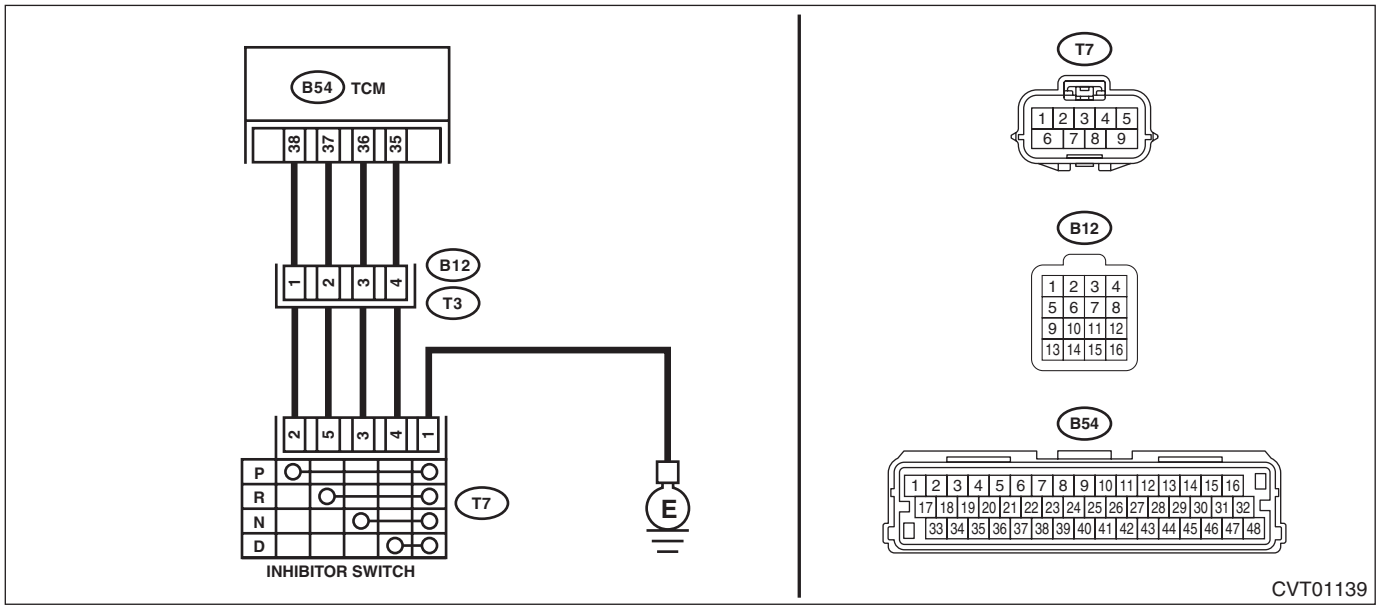
- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(CVT)(w/o HEV)-9, DTC P0705 TRANSMISSION RANGE SENSOR CIRCUIT (PRNDL INPUT), Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

- Shift characteristics are erroneous.
- The range position of the select lever and the position of shift indicator display do not match.

WIRING DIAGRAM:

CVT control system <Ref. to WI(w/o HEV)-90, CVT Control System.>



Step		Check	Yes	No
1	**CHECK INPUT SIGNAL FOR TCM.** 1) Turn the ignition switch to ON. 2) Move the select lever to each range, and read the data of «P Range», «R Range», «N Range» and «D Range» using the Subaru Select Monitor.	Is display “OFF” for the range other than corresponding range?	Go to step **5**.	Go to step **2**.
2	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the TCM and transmission connectors. 3) Measure the resistance between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 38 — Chassis ground:*** ***(B54) No. 37 — Chassis ground:*** ***(B54) No. 36 — Chassis ground:*** ***(B54) No. 35 — Chassis ground:***	Is each resistance 1 MΩ or more?	Go to step **3**.	Repair the short circuit of body harness.
3	**CHECK HARNESS.** 1) Disconnect the inhibitor switch connector. 2) Measure the resistance between transmission connector and chassis ground. ***Connector & terminal*** ***(T3) No. 1 — Chassis ground:*** ***(T3) No. 2 — Chassis ground:*** ***(T3) No. 3 — Chassis ground:*** ***(T3) No. 4 — Chassis ground:***	Is each resistance 1 MΩ or more?	Go to step **4**.	Repair the short circuit of transmission harness.

	Step	Check	Yes	No
4	**CHECK INHIBITOR SWITCH.** Move the select lever to each range, and measure the resistance between inhibitor switch connector terminals. ***Terminals*** ***No. 2 — No. 1:*** ***No. 5 — No. 1:*** ***No. 3 — No. 1:*** ***No. 4 — No. 1:***	Is the resistance other than corresponding range 1 MΩ or more?	Go to step **5**.	Replace the inhibitor switch. <Ref. to CVT(TR580)-96, Inhibitor Switch.>
5	**CHECK FOR POOR CONTACT.**	Is there poor contact between TCM, inhibitor switch, transmission ground?	Repair the poor contact.	Replace the TCM. <Ref. to CVT(TR580)-146, Transmission Control Module (TCM).>

F: DTC P0708 AT RANGE SWITCH NOT INPUTTED

DTC DETECTING CONDITION:

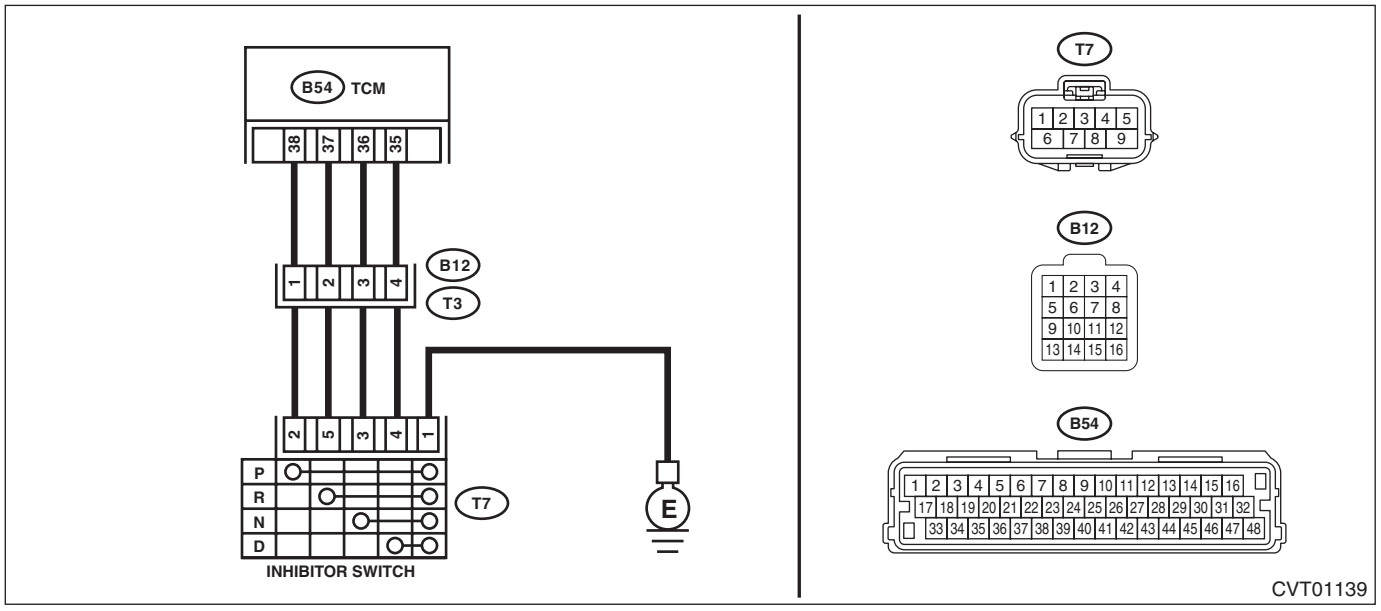
- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(CVT)(w/o HEV)-10, DTC P0708 AT RANGE SWITCH NOT INPUTTED, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

- Shift characteristics are erroneous.
- The range position of the select lever and the position of shift indicator display do not match.

WIRING DIAGRAM:

CVT control system <Ref. to WI(w/o HEV)-90, CVT Control System.>



	Step	Check	Yes	No
1	**CHECK INPUT SIGNAL FOR TCM.** 1) Turn the ignition switch to ON. 2) Move the select lever to each range, and read the data of «P Range», «R Range», «N Range» and «D Range» using the Subaru Select Monitor.	Is the display of the corresponding range “ON”?	Go to step **7**.	Go to step **2**.
2	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the TCM and transmission connectors. 3) Measure the resistance of harness between TCM connector and transmission connector. ***Connector & terminal*** ***(B54) No. 38 — (B12) No. 1:*** ***(B54) No. 37 — (B12) No. 2:*** ***(B54) No. 36 — (B12) No. 3:*** ***(B54) No. 35 — (B12) No. 4:***	Is each resistance less than 1 Ω?	Go to step **3**.	Repair the open circuit of body harness.
3	**CHECK HARNESS.** Measure the resistance of harness between inhibitor switch connector and transmission ground. ***Connector & terminal*** ***(T7) No. 1 — Transmission ground:***	Is the resistance less than 1 Ω?	Go to step **4**.	Repair the open circuit of harness.

	Step	Check	Yes	No
4	**CHECK HARNESS.** 1) Disconnect the inhibitor switch connector. 2) Measure the resistance between transmission connector and inhibitor switch connector. ***Connector & terminal*** ***(T3) No. 1 — (T7) No. 2:*** ***(T3) No. 2 — (T7) No. 5:*** ***(T3) No. 3 — (T7) No. 3:*** ***(T3) No. 4 — (T7) No. 4:***	Is each resistance less than 1 Ω?	Go to step **5**.	Repair the open circuit of transmission harness.
5	**CHECK INHIBITOR SWITCH.** Move the select lever to each range, and measure the resistance between inhibitor switch connector terminals. ***Terminals*** ***No. 2 — No. 1:*** ***No. 5 — No. 1:*** ***No. 3 — No. 1:*** ***No. 4 — No. 1:***	Is the resistance of the corresponding range less than 1 MΩ?	Go to step **6**.	Replace the inhibitor switch. <Ref. to CVT(TR580)-96, Inhibitor Switch.>
6	**CHECK HARNESS.** 1) Turn the ignition switch to ON. 2) Measure the voltage between each connector and chassis ground. ***Connector & terminal*** ***Transmission connector (B12 side)*** ***(B12) No. 1 (+) — Chassis ground (–):*** ***(B12) No. 2 (+) — Chassis ground (–):*** ***(B12) No. 3 (+) — Chassis ground (–):*** ***(B12) No. 4 (+) — Chassis ground (–):*** ***Transmission connector (T7 side)*** ***(T7) No. 2 (+) — Chassis ground (–):*** ***(T7) No. 5 (+) — Chassis ground (–):*** ***(T7) No. 3 (+) — Chassis ground (–):*** ***(T7) No. 4 (+) — Chassis ground (–):***	Is each voltage less than 1 V?	Go to step **7**.	Repair the harness which outputs 1 V or more.
7	**CHECK FOR POOR CONTACT.**	Is there poor contact between TCM, inhibitor switch, transmission ground?	Repair the poor contact.	Replace the TCM. <Ref. to CVT(TR580)-146, Transmission Control Module (TCM).>

G: DTC P0711 ATF TEMP. SENSOR CIRCUIT RANGE/PERFORMANCE

DTC DETECTING CONDITION:

- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(CVT)(w/o HEV)-11, DTC P0711 ATF TEMP. SENSOR CIRCUIT RANGE/PERFORMANCE, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

- Excessive shift shock
- Shift characteristics malfunction

NOTE:
For the diagnostic procedure, perform the diagnosis according to DTC P0712 and P0713. <Ref. to CVT(w/o HEV)(diag)-45, DTC P0712 TRANSMISSION FLUID TEMPERATURE SENSOR CIRCUIT LOW INPUT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).> <Ref. to CVT(w/o HEV)(diag)-47, DTC P0713 TRANSMISSION FLUID TEMPERATURE SENSOR CIRCUIT HIGH INPUT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

H: DTC P0712 TRANSMISSION FLUID TEMPERATURE SENSOR CIRCUIT LOW INPUT

DTC DETECTING CONDITION:

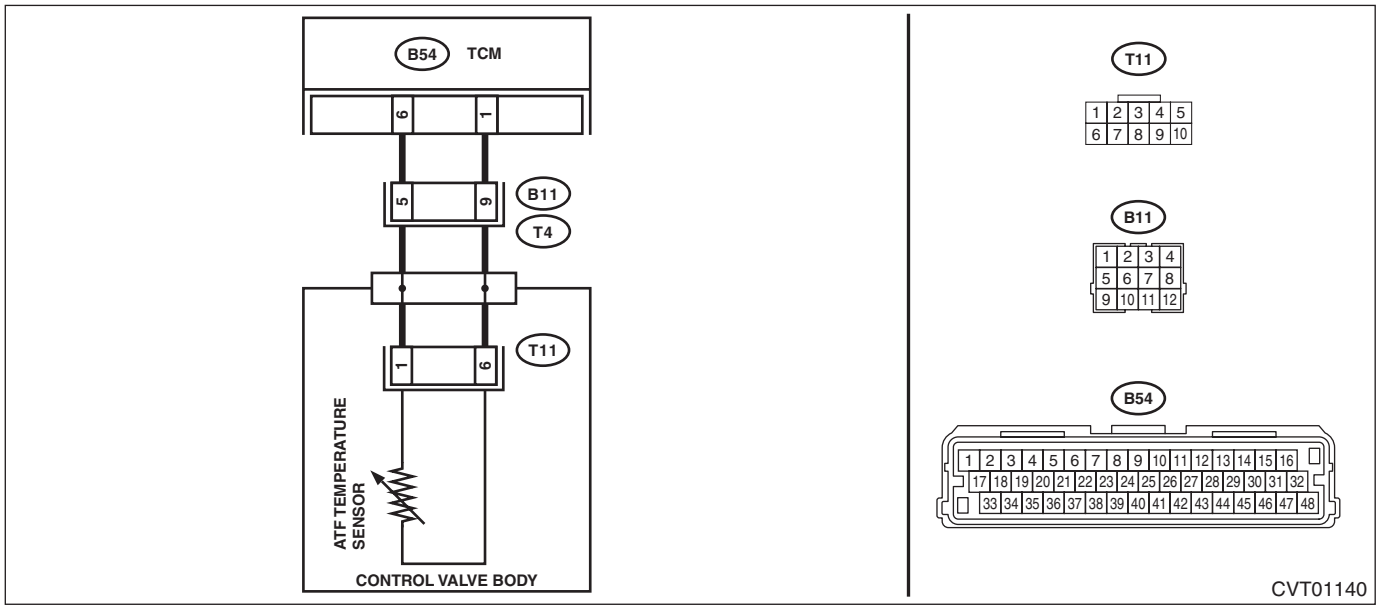
- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(CVT)(w/o HEV)-12, DTC P0712 TRANSMISSION FLUID TEMPERATURE SENSOR CIRCUIT LOW INPUT, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

- Excessive shift shock
- Shift characteristics malfunction

WIRING DIAGRAM:

CVT control system <Ref. to WI(w/o HEV)-90, CVT Control System.>



Step		Check	Yes	No
1	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the TCM connector. 3) Measure the resistance of harness between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 1 — Chassis ground:*** ***(B54) No. 6 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **4**.	Go to step **2**.
2	**CHECK HARNESS.** 1) Disconnect the transmission connector. 2) Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 5 — Transmission body:*** ***(T4) No. 9 — Transmission body:***	Is the resistance 1 MΩ or more?	Repair the short circuit of body harness.	Go to step **3**.
3	**CHECK HARNESS INSIDE TRANSMISSION.** **CAUTION:** **Start work after ATF cools down.** 1) Remove the transmission valve cover. 2) Check for the harness pinch, damage.	Is there any fault in the harness?	Replace the transmission harness.	Go to step **4**.

	Step	Check	Yes	No
4	**CHECK ATF TEMPERATURE SENSOR.** Measure the resistance between transmission connector terminals. ***Connector & terminal*** ***(T11) No. 1 — No. 6:*** NOTE: Perform the measurement under multiple oil temperatures.	Is resistance as follows? Fluid temperature 0°C → Approx. 6.0 kΩ Fluid temperature 20°C → Approx. 2.5 kΩ Fluid temperature 80°C → Approx. 330 Ω	Replace the TCM. <Ref. to CVT(TR580)-146, Transmission Control Module (TCM).>	Replace the control valve body. <Ref. to CVT(TR580)-117, Control Valve Body.>

I: DTC P0713 TRANSMISSION FLUID TEMPERATURE SENSOR CIRCUIT HIGH INPUT

DTC DETECTING CONDITION:

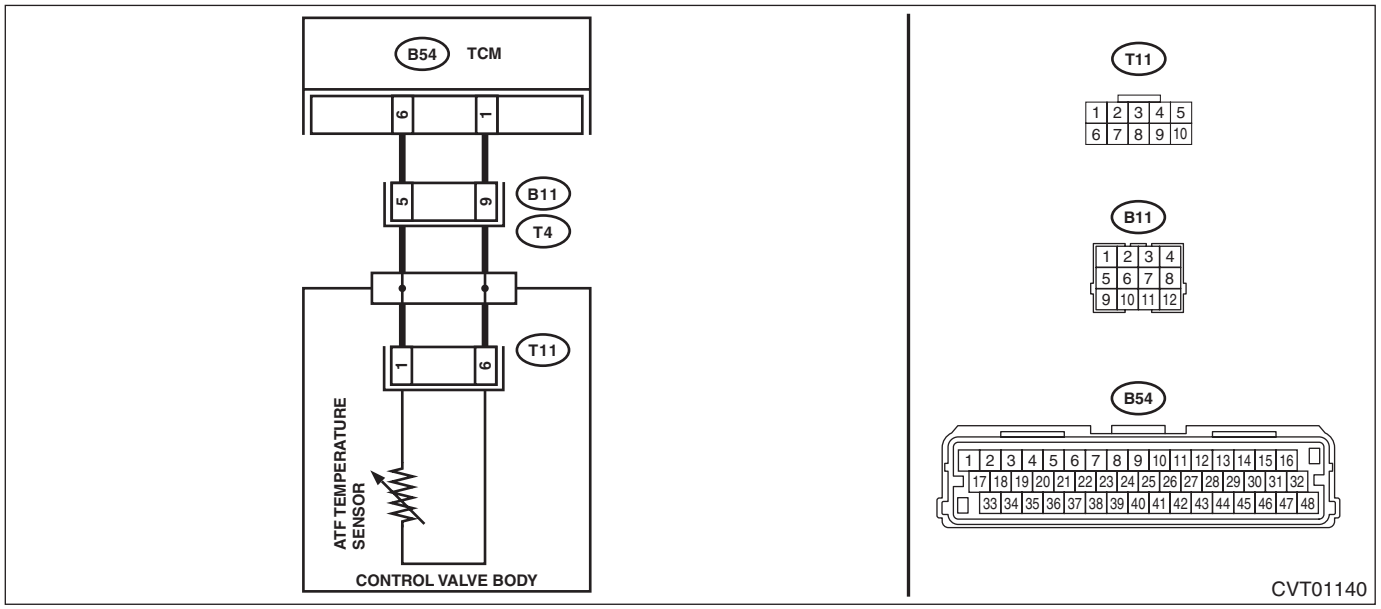
- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(CVT)(w/o HEV)-13, DTC P0713 TRANSMISSION FLUID TEMPERATURE SENSOR CIRCUIT HIGH INPUT, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

- Excessive shift shock
- Shift characteristics malfunction

WIRING DIAGRAM:

CVT control system <Ref. to WI(w/o HEV)-90, CVT Control System.>



Step		Check	Yes	No
1	**CHECK HARNESS.** 1) Turn the ignition switch to ON. 2) Measure the voltage between TCM connectors. ***Connector & terminal*** ***(B54) No. 6 (+) — (B54) No. 1 (–):***	Is the voltage 5 V or more?	Repair the short circuit of harness.	Go to step **2**.
2	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the TCM and transmission connectors. 3) Measure the resistance between TCM connector and transmission connectors. ***Connector & terminal*** ***(B54) No. 6 — (B11) No. 5:*** ***(B54) No. 1 — (B11) No. 9:***	Is the resistance less than 1 Ω?	Go to step **3**.	Repair the open circuit of body harness.
3	**CHECK ATF TEMPERATURE SENSOR.** Measure the resistance between transmission connector terminals. ***Connector & terminal*** ***(T4) No. 5 — No. 9:***	Is the resistance 1 MΩ or more?	Go to step **4**.	Go to step **5**.

	Step	Check	Yes	No
4	**CHECK HARNESS.** **CAUTION:** **Start work after ATF cools down.** 1) Remove the transmission valve cover. 2) Measure the resistance between transmission connector and control valve body connector. ***Connector & terminal*** ***(T4) No. 5 — (T11) No. 1:*** ***(T4) No. 9 — (T11) No. 6:***	Is the resistance less than 1 Ω?	Repair the open circuit of transmission harness on the control valve side.	Repair the open circuit of transmission harness on the outside of the transmission.
5	**CHECK ATF TEMPERATURE SENSOR.** 1) Connect the connectors to TCM and transmission. 2) Start the engine. 3) Warm up until the ATF temperature exceeds 50°C (122°F). 4) Turn the ignition switch to OFF. 5) Disconnect the transmission connector. 6) Measure the resistance between transmission connector terminals. ***Connector & terminal*** ***(T4) No. 5 — No. 9:***	Is the resistance 650 — 990 Ω?	Go to step **6**.	Go to step **8**.
6	**CHECK ATF TEMPERATURE SENSOR.** Measure the resistance between transmission connector terminals. ***Connector & terminal*** ***(T4) No. 5 — No. 9:***	Does the resistance value increase gradually while the ATF temperature decreases?	Go to step **7**.	Replace the control valve body. <Ref. to CVT(TR580)-117, Control Valve Body.>
7	**CHECK INPUT SIGNAL FOR TCM.** 1) Connect the connector to transmission. 2) Turn the ignition switch to ON. (Do not start engine.) 3) Read the data of «ATF Temp.» using the Subaru Select Monitor.	Does the ATF temperature gradually decrease?	Check for poor contact of the ATF temperature sensor and transmission connector harness, and repair the defective part.	Go to step **8**.
8	**CHECK FOR POOR CONTACT.**	Is there poor contact of ATF temperature sensor circuit?	Repair the poor contact.	Replace the TCM. <Ref. to CVT(TR580)-146, Transmission Control Module (TCM).>

J: DTC P0716 TORQUE CONVERTER TURBINE SPEED

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(CVT)(w/o HEV)-14, DTC P0716 TORQUE CONVERTER TURBINE SPEED, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

- No lock-up occurs.
- Shock occurs when selecting shift position.
- Shift control malfunction

	Step	Check	Yes	No
1	**CHECK DTC.** Read the DTC using Subaru Select Monitor.	Besides DTC P0716, is DTC U0122 or U0416 displayed?	Perform the diagnosis according to DTCs other than P0716.	Perform the diagnosis according to DTC P0717. <Ref. to CVT(w/o HEV)(diag)-50, DTC P0717 INPUT/TURBINE SPEED SENSOR "A" CIRCUIT NO SIGNAL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

K: DTC P0717 INPUT/TURBINE SPEED SENSOR "A" CIRCUIT NO SIGNAL

DTC DETECTING CONDITION:

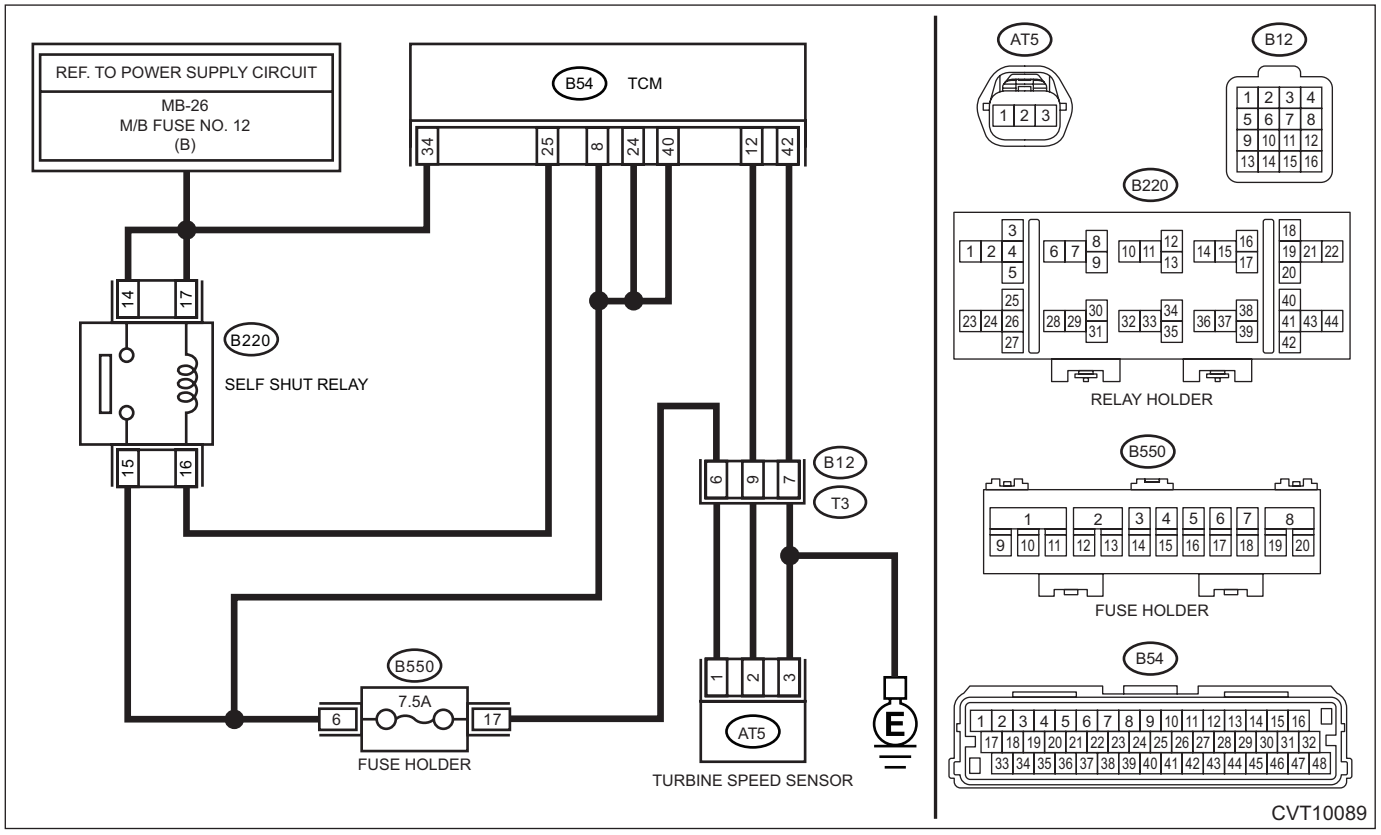
- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(CVT)(w/o HEV)-15, DTC P0717 INPUT/TURBINE SPEED SENSOR "A" CIRCUIT NO SIGNAL, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

- Standing start problems
- Shock occurs when engaging the lockup clutch.
- Shock occurs when selecting shift position.

WIRING DIAGRAM:

CVT control system <Ref. to WI(w/o HEV)-90, CVT Control System.>



Step		Check	Yes	No
1	**CHECK FUSE.** 1) Turn the ignition switch to OFF. 2) Remove the fuse (7.5 A) from the fuse holder.	Is the fuse OK?	Go to step **2**.	Replace the fuse. If the fuse blows out easily, repair the short circuit of harness.
2	**CHECK HARNESS.** 1) Disconnect the TCM and self shut relay connectors. 2) Measure the resistance between TCM connector and self shut relay connector. ***Connector & terminal*** ***(B54) No. 25 — (B220) No. 16:*** ***(B54) No. 8 — (B220) No. 15:*** ***(B54) No. 24 — (B220) No. 15:*** ***(B54) No. 40 — (B220) No. 15:***	Is the resistance less than 1 Ω?	Go to step **3**.	Repair the open circuit of harness.

	Step	Check	Yes	No
3	**CHECK HARNESS.** Measure the resistance between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 25 — Chassis ground:*** ***(B54) No. 8 — Chassis ground:*** ***(B54) No. 24 — Chassis ground:*** ***(B54) No. 40 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **4**.	Repair the short circuit of harness.
4	**CHECK RELAY POWER SUPPLY.** Measure the voltage between self shut relay connector and chassis ground. ***Connector & terminal*** ***(B220) No. 14 (+) — Chassis ground (–):*** ***(B220) No. 17 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **5**.	Repair the open or short circuit of harness.
5	**CHECK SELF SHUT RELAY.** Measure the resistance between self shut relay terminals. ***Terminals*** ***No. 16 — No. 17:***	Is the resistance 110 — 140 Ω?	Go to step **6**.	Replace the self shut relay.
6	**CHECK SELF SHUT RELAY.** Measure the resistance between self shut relay terminals. ***Terminals*** ***No. 14 — No. 15:***	Is the resistance 1 MΩ or more?	Go to step **7**.	Replace the self shut relay.
7	**CHECK INPUT SIGNAL FOR TCM.** 1) Connect the connectors of TCM and self shut relay. 2) Read the data of «Control module voltage» using Subaru Select Monitor.	Is the «Control module voltage» 10 V or more?	Current condition is normal. Check for poor contact in connectors or harnesses, and repair the defective part.	Go to step **8**.
8	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the TCM and transmission connectors. 3) Measure the resistance between TCM connector and transmission connectors. ***Connector & terminal*** ***(B54) No. 12 — (B12) No. 9:*** ***(B54) No. 42 — (B12) No. 7:*** ***(B550) No. 17 — (B12) No. 6:***	Is the resistance less than 1 Ω?	Go to step **9**.	Repair the open circuit of harness.
9	**CHECK HARNESS.** Measure the resistance between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 12 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **10**.	Repair the short circuit of harness.
10	**CHECK HARNESS.** Measure the resistance between self shut relay connector and fuse holder. ***Connector & terminal*** ***(B220) No. 15 — (B550) No. 6:***	Is the resistance less than 1 Ω?	Go to step **11**.	Repair the open circuit of harness.
11	**CHECK TRANSMISSION HARNESS.** 1) Install the fuse. 2) Connect the TCM connector. 3) Turn the ignition switch to ON. 4) Measure the voltage between transmission connector terminals. ***Connector & terminal*** ***(B12) No. 6 (+) — Chassis ground (–):***	Is the voltage 10 — 13 V?	Go to step **12**.	Repair the open circuit of harness or poor contact of connector.

	Step	Check	Yes	No
12	**CHECK INPUT SIGNAL FOR TCM.** 1) Turn the ignition switch to OFF. 2) Connect the transmission connector. 3) Lift up the vehicle. 4) Start the engine. 5) Read the data of «Turbine Revolution Speed» using the Subaru Select Monitor.	Does the value of «Turbine Revolution Speed» change according to the engine speed?	Current condition is normal. Repair the poor contacts of harnesses of turbine speed sensor and transmission connector.	Go to step **13**.
13	**CHECK TRANSMISSION HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the transmission connector. 3) Disconnect the turbine speed sensor connector. 4) Measure the resistance between transmission connector and turbine speed sensor connector. ***Connector & terminal*** ***(T3) No. 6 — (AT5) No. 1:*** ***(T3) No. 7 — (AT5) No. 3:*** ***(T3) No. 9 — (AT5) No. 2:***	Is the resistance less than 1 Ω?	Go to step **14**.	Replace the transmission harness.
14	**CHECK TURBINE SPEED SENSOR HARNESS.** Measure the resistance between transmission connector and chassis ground. ***Connector & terminal*** ***(T3) No. 6 — Chassis ground:*** ***(T3) No. 9 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **15**.	Repair the short circuit of harness.
15	**CHECK TURBINE SPEED SENSOR.** 1) Turn the ignition switch to OFF. 2) Replace the turbine speed sensor. <Ref. to CVT(TR580)-103, Turbine Speed Sensor.> 3) Perform the Clear Memory Mode. <Ref. to CVT(w/o HEV)(diag)-18, Clear Memory Mode.> 4) Read the DTC.	Is DTC P0717 displayed?	Go to step **16**.	The original turbine speed sensor is defective.
16	**CHECK SELF SHUT RELAY.** 1) Turn the ignition switch to OFF. 2) Replace the self shut relay. 3) Perform the Clear Memory Mode. <Ref. to CVT(w/o HEV)(diag)-18, Clear Memory Mode.> 4) Read the DTC.	Is DTC P0717 displayed?	Replace the TCM. <Ref. to CVT(TR580)-146, Transmission Control Module (TCM).>	The original self shut relay is defective.

L: DTC P0719 BRAKE SWITCH CIRCUIT LOW

DTC DETECTING CONDITION:

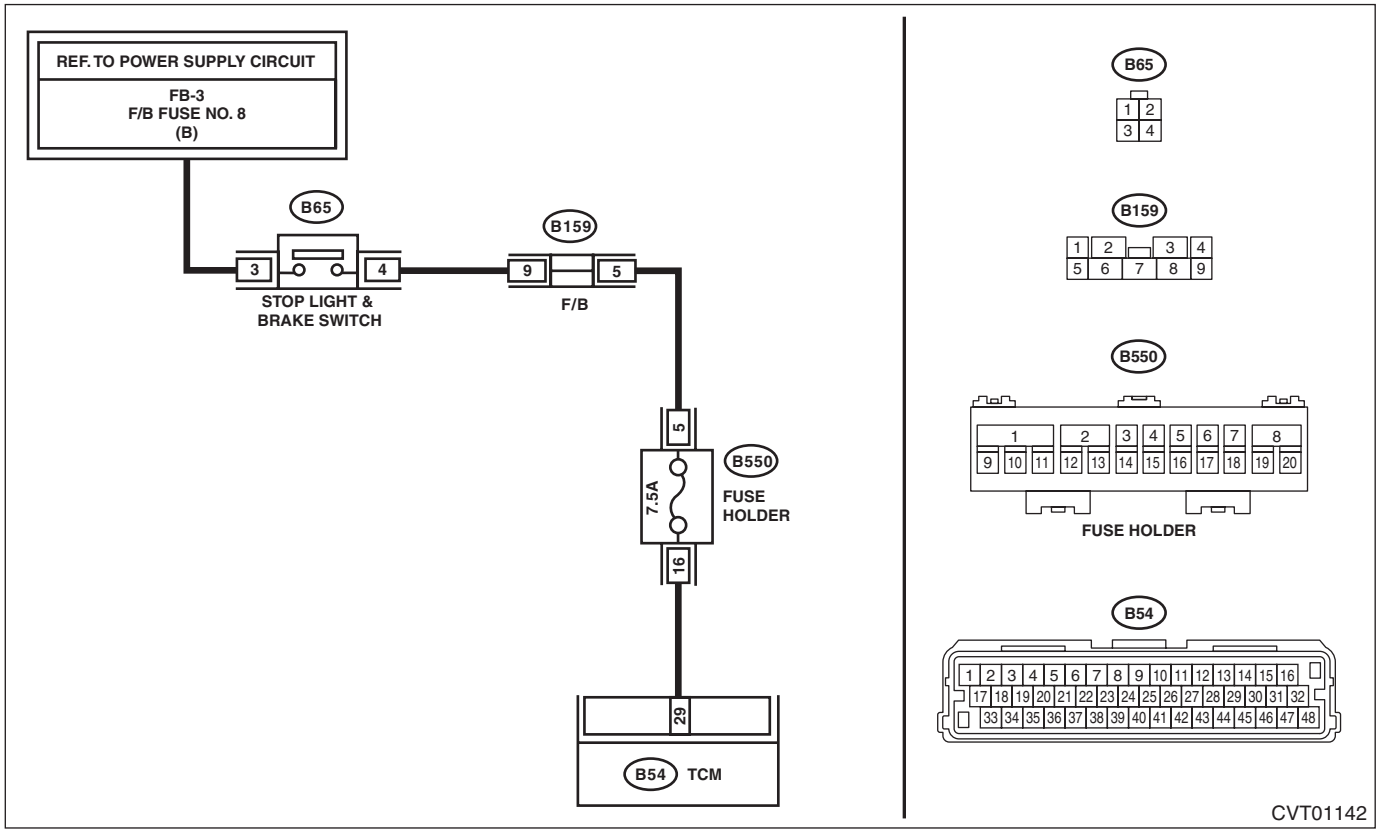
- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(CVT)(w/o HEV)-16, DTC P0719 BRAKE SWITCH CIRCUIT LOW, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

Gear is not shifted down when climbing a hill or driving down a hill.

WIRING DIAGRAM:

Stop light system <Ref. to WI(w/o HEV)-211, Stop Light System.>



Step		Check	Yes	No
1	**CHECK FUSE (NO. 8).** 1) Turn the ignition switch to OFF. 2) Remove the fuse (No. 8).	Is the fuse (No. 8) blown out?	Replace the fuse (No. 8). If the new fuse (No. 8) has blown out easily, repair the short circuit of harness between fuse (No. 8) and stop light switch.	Go to step **2**.
2	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the TCM and stop light switch connector. 3) Measure the resistance between TCM connector and stop light switch connector. ***Connector & terminal*** ***(B54) No. 29 — (B65) No. 4:***	Is the resistance less than 1 Ω?	Go to step **3**.	Repair the open circuit of harness.

	Step	Check	Yes	No
3	**CHECK HARNESS.** Measure the resistance between the stop light switch connector and fuse (No. 8). ***Connector & terminal*** ***(B65) No. 3 — fuse (No. 8):***	Is the resistance less than 1 Ω?	Go to step **4**.	Repair the open circuit of harness.
4	**CHECK INPUT SIGNAL FOR TCM.** 1) Install the fuse (No. 8). 2) Connect the TCM and stop light switch connector. 3) Depress the brake pedal. 4) Measure the voltage between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 29 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **5**.	Replace the stop light switch. <Ref. to BR-74, Stop Light Switch.>
5	**CHECK INPUT SIGNAL FOR TCM.** With brake pedal depressed, read the data of «Stop Light Switch» using Subaru Select Monitor.	Is “ON” displayed?	Current condition is normal. Check for poor contact in connectors or harnesses, and repair the defective part.	Go to step **6**.
6	**CHECK FOR POOR CONTACT.**	Is there poor contact of input signal of stop light switch?	Repair the poor contact.	Replace the TCM. <Ref. to CVT(TR580)-146, Transmission Control Module (TCM).>

M: DTC P0724 BRAKE SWITCH CIRCUIT HIGH

DTC DETECTING CONDITION:

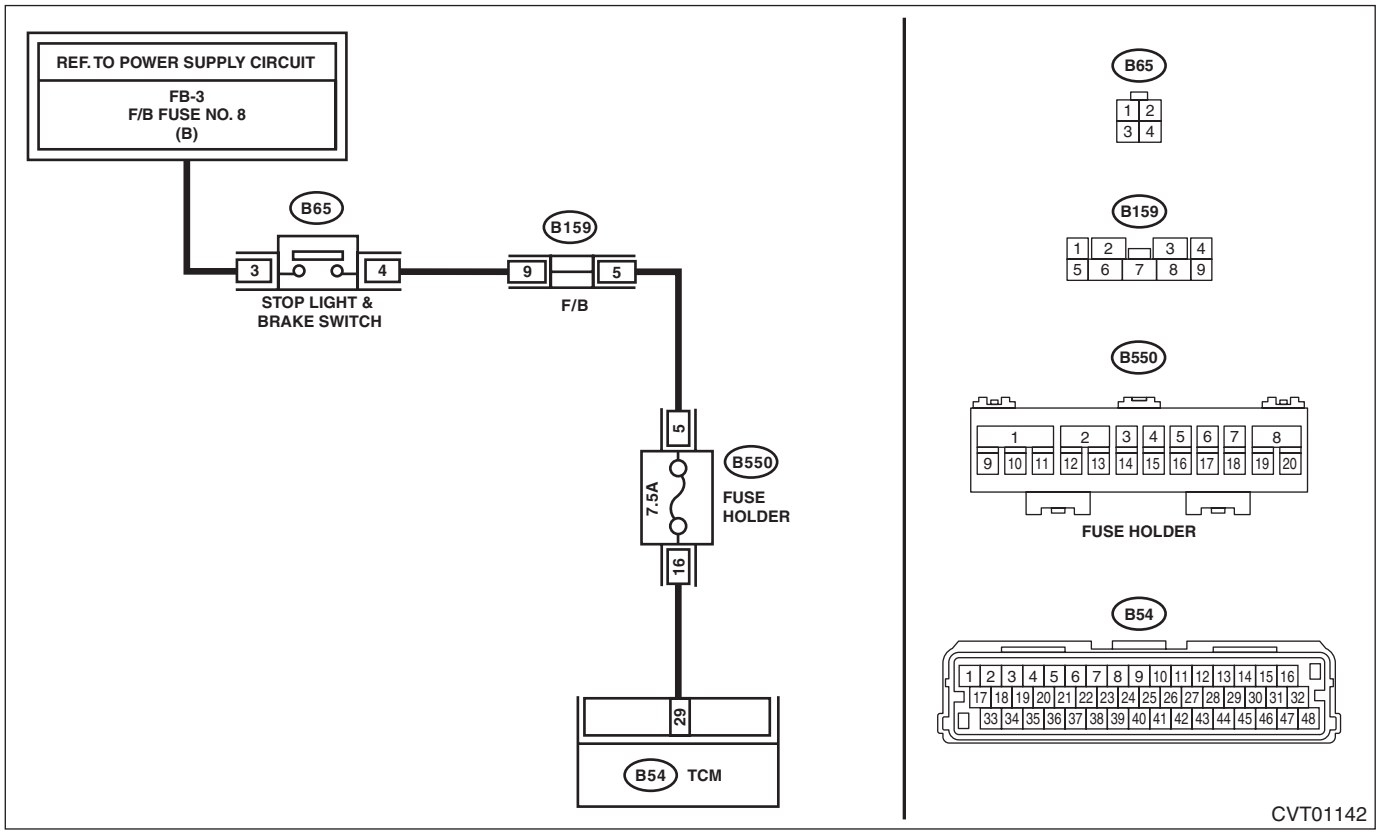
- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(CVT)(w/o HEV)-17, DTC P0724 BRAKE SWITCH CIRCUIT HIGH, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

Gear is not shifted down when climbing a hill or driving down a hill.

WIRING DIAGRAM:

Stop light system <Ref. to WI(w/o HEV)-211, Stop Light System.>



	Step	Check	Yes	No
1	**CHECK STOP LIGHT SWITCH.** 1) Turn the ignition switch to OFF. 2) Disconnect the stop light switch connector. 3) Measure the resistance between stop light switch connectors. ***Connector & terminal*** ***(B65) No. 3 — No. 4:***	Is the resistance 1 MΩ or more?	Go to step **2**.	Replace the stop light switch. <Ref. to BR-74, Stop Light Switch.>
2	**CHECK HARNESS.** 1) Disconnect the TCM connector. 2) Turn the ignition switch to ON. 3) Measure the voltage between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 29 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Repair the short circuit of harness.	Go to step **3**.
3	**CHECK INPUT SIGNAL FOR TCM.** 1) Connect the TCM and stop light switch connector. 2) Turn the ignition switch to ON. 3) Read the data of «Stop Light Switch» using Subaru Select Monitor.	Is “OFF” displayed?	Current condition is normal. Check for poor contact in connectors or harnesses, and repair the defective part.	Go to step **4**.

Step		Check	Yes	No
4	CHECK FOR POOR CONTACT.	Is there poor contact of input signal of stop light switch?	Repair the poor contact.	Replace the TCM. <Ref. to CVT(TR580)-146, Transmission Control Module (TCM).>

N: DTC P0730 GEARSHIFT CONTROL PERFORMANCE ABNORMAL

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(CVT)(w/o HEV)-18, DTC P0730 GEARSHIFT CONTROL PERFORMANCE ABNORMAL, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

- Acceleration is poor during standing start.
- Shift control malfunction
- Engine speed increases abruptly.

	Step	Check	Yes	No
1	**CHECK TRANSMISSION FLUID.** Check the amount of ATF. <Ref. to CVT(TR580)-36, ADJUSTMENT, CVTF.>	Is the ATF amount correct?	Go to step **2**.	Adjust the amount of ATF. <Ref. to CVT(TR580)-36, ADJUSTMENT, CVTF.>
2	**CHECK TRANSMISSION FLUID.** Check the condition of ATF. <Ref. to CVT(TR580)-40, CONDITION CHECK, CVTF.>	Is the ATF OK?	Go to step **3**.	Check according to the “Corrective action” of ATF (CVTF) “CONDITION CHECK”. <Ref. to CVT(TR580)-40, CONDITION CHECK, CVTF.>
3	**CHECK INPUT SIGNAL FOR TCM.** 1) Lift up the vehicle. 2) Start the engine. 3) Warm up until the ATF temperature reaches to 40 — 70°C (104 — 158°F). 4) Depress the brake pedal, and shift the select lever to “D” range. 5) Shift the select lever to “P” range. 6) Stabilize the engine speed at idle. 7) Read the data of «Actual secondary pressure» using Subaru Select Monitor.	Is the «Actual secondary pressure» 0.5 — 1.5 MPa?	Go to step **4**.	Perform the diagnosis according to DTC P0841. <Ref. to CVT(w/o HEV)(diag)-72, DTC P0841 SECONDARY OIL PRESSURE SENSOR PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
4	**CHECK INPUT SIGNAL FOR TCM.** 1) Set the select lever to “D” range. 2) Release the brake pedal to stabilize the engine speed and front wheel speed. 3) Read the data of «Actual Gear Ratio» using Subaru Select Monitor.	Is the «Actual Gear Ratio» 1.5 — 2.6?	Go to step **5**.	Go to step **6**.
5	**CHECK INPUT SIGNAL FOR TCM.** 1) Set the select lever to “D” range. 2) Slowly increase the speed to 40 km/h (25 MPH) and keep the constant speed. 3) Read the data of «Actual Gear Ratio» using Subaru Select Monitor.	Is the «Actual Gear Ratio» 0.5 — 0.9?	Go to step **6**.	Replace the transmission assembly. <Ref. to CVT(TR580)-60, Automatic Transmission Assembly.>
6	**DRIVING CHECK BY INSPECTION MODE.** 1) Turn the ignition switch to OFF. 2) Perform a drive check based on the “Inspection Mode”. <Ref. to CVT(w/o HEV)(diag)-19, Inspection Mode.>	Does the AT OIL TEMP light blink and is DTC P0730 displayed?	Replace the transmission assembly. <Ref. to CVT(TR580)-60, Automatic Transmission Assembly.>	Current condition is normal. It is possible that temporary poor contact occurs.

O: DTC P0746 PRESSURE CONTROL SOLENOID "A" PERFORMANCE/STUCK OFF

DTC DETECTING CONDITION:

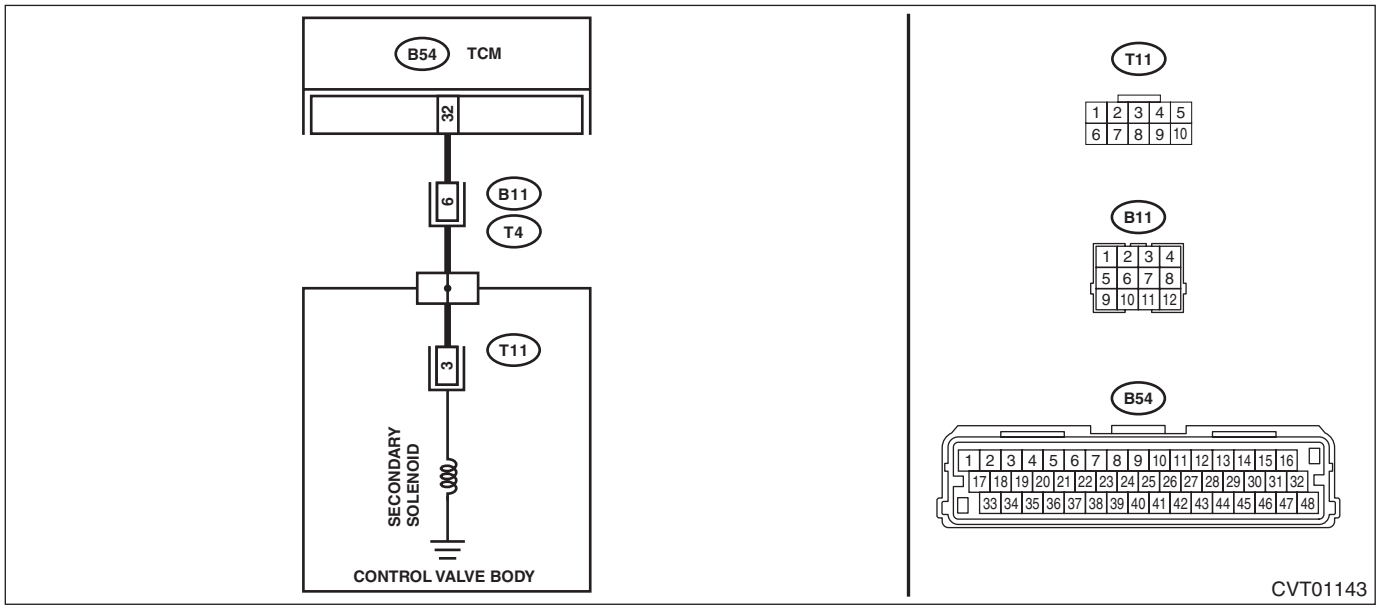
- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(CVT)(w/o HEV)-19, DTC P0746 PRESSURE CONTROL SOLENOID "A" PERFORMANCE/STUCK OFF, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

- Shift control malfunction
- CVT chain slippage

WIRING DIAGRAM:

CVT control system <Ref. to WI(w/o HEV)-90, CVT Control System.>



Step		Check	Yes	No
1	**CHECK DTC.** Read the DTC using Subaru Select Monitor.	Besides DTC P0746, is any of the DTCs P0842, P0843, P0962 and P0963 displayed?	Perform the diagnosis according to DTCs other than P0746.	Go to step **2**.
2	**CHECK SECONDARY SOLENOID (SYSTEM OPERATION CHECK MODE).** 1) Turn the ignition switch to ON. 2) Using the Subaru Select Monitor, perform forced operation of the secondary solenoid. <Ref. to CVT(w/o HEV)(diag)-24, System Operation Check Mode.>	Does the indication of 0 → 500 mA appear repeatedly during forced operation, and does operating sound emit during indicating 500 mA?	Go to step **5**.	Go to step **3**.
3	**CHECK SECONDARY SOLENOID.** 1) Turn the ignition switch to OFF. 2) Disconnect the transmission connector. 3) Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 6 — Transmission body:***	Is the resistance approx. 5 — 7 Ω? (when cold)	Go to step **7**.	Go to step **4**.
4	**CHECK HARNESS.** Check the continuity of transmission harness.	Is the harness normal? (Is it free from defects such as open circuit, power supply-output short or GND-output short circuit, or poor contact?)	Go to step **7**.	Repair the harness.

	Step	Check	Yes	No
5	**CHECK TRANSMISSION FLUID.** 1) Connect the transmission connector. 2) Check the amount of ATF. <Ref. to CVT(TR580)-36, ADJUSTMENT, CVTF.>	Is the ATF amount correct?	Go to step **6**.	Adjust the amount of ATF. <Ref. to CVT(TR580)-36, ADJUSTMENT, CVTF.>
6	**CHECK TRANSMISSION FLUID.** Check the condition of ATF. <Ref. to CVT(TR580)-40, CONDITION CHECK, CVTF.>	Is the ATF OK?	Go to step **7**.	Check according to the "Corrective action" of ATF (CVTF) "CONDITION CHECK". <Ref. to CVT(TR580)-40, CONDITION CHECK, CVTF.>
7	**CHECK INPUT SIGNAL FOR TCM.** 1) Lift up the vehicle. 2) Start the engine. 3) Warm up until the ATF temperature reaches to 40 — 70°C (104 — 158°F). 4) Depress the brake pedal, and shift the select lever to "D" range. 5) Shift the select lever to "P" range. 6) Stabilize the engine speed at idle. 7) Read the data of «Actual secondary pressure» using Subaru Select Monitor.	Is the «Actual secondary pressure» 0.5 — 1.5 MPa?	Go to step **8**.	Replace the control valve body. <Ref. to CVT(TR580)-117, Control Valve Body.>
8	**CHECK INPUT SIGNAL FOR TCM.** 1) Keep the engine speed at 3,000 rpm. 2) Read the data of «Actual secondary pressure» using Subaru Select Monitor.	Is the «Actual secondary pressure» higher than step 7 value? Does the value change according to the engine speed, within the range of 1.5 — 2.5 MPa?	Go to step **9**.	Replace the control valve body. <Ref. to CVT(TR580)-117, Control Valve Body.>
9	**CHECK TCM INPUT SIGNAL (STALL TEST).** 1) Apply the parking brake. 2) Set the select lever to "D" range. 3) Depress the brake pedal firmly. 4) Slowly open the accelerator fully, and stabilize the engine speed. 5) Read the data of «Actual secondary pressure» using Subaru Select Monitor. **CAUTION:** **Do not perform a stall test for over 5 seconds at a time.**	Is the «Actual secondary pressure» higher than step 8 value? Does the value change according to the engine speed, within the range of 4.5 — 6.0 MPa?	Go to step **10**.	Replace the control valve body. <Ref. to CVT(TR580)-117, Control Valve Body.>
10	**DRIVING CHECK BY INSPECTION MODE.** 1) Turn the ignition switch to OFF. 2) Perform a drive check based on the "Inspection Mode". <Ref. to CVT(w/o HEV)(diag)-19, Inspection Mode.>	Does the AT OIL TEMP light blink and is DTC P0746 displayed?	Perform the secondary pressure test. <Ref. to CVT(TR580)-49, Secondary Pressure (Line Pressure) Test.>	Current condition is normal. It is possible that temporary poor contact occurs.

P: DTC P0747 PRESSURE CONTROL SOLENOID "A" STUCK ON

DTC DETECTING CONDITION:

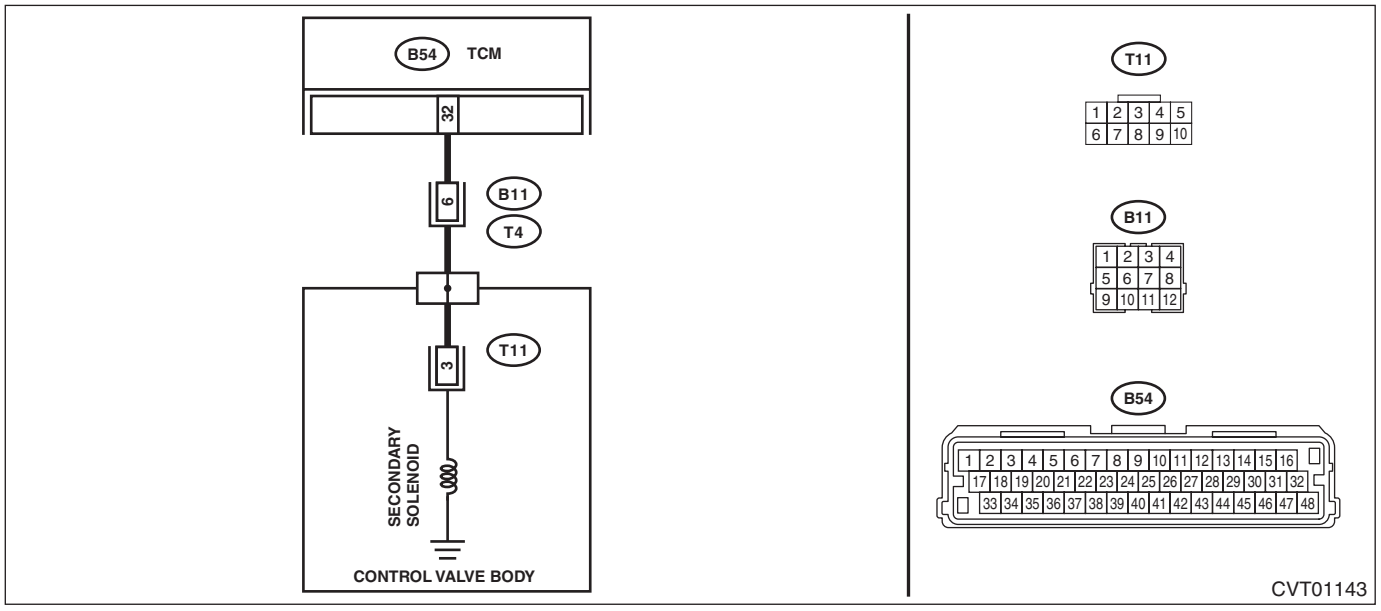
- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(CVT)(w/o HEV)-20, DTC P0747 PRESSURE CONTROL SOLENOID "A" STUCK ON, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

- Acceleration is poor during standing start.
- Shift control malfunction

WIRING DIAGRAM:

CVT control system <Ref. to WI(w/o HEV)-90, CVT Control System.>



Step		Check	Yes	No
1	**CHECK DTC.** Read the DTC using Subaru Select Monitor.	Besides DTC P0747, is any of the DTCs P0842, P0843, P0962 and P0963 displayed?	Perform the diagnosis according to DTCs other than P0747.	Go to step **2**.
2	**CHECK SECONDARY SOLENOID (SYSTEM OPERATION CHECK MODE).** 1) Turn the ignition switch to ON. 2) Using the Subaru Select Monitor, perform forced operation of the secondary solenoid. <Ref. to CVT(w/o HEV)(diag)-24, System Operation Check Mode.>	Does the indication of 0 → 500 mA appear repeatedly during forced operation, and does operating sound emit during indicating 500 mA?	Go to step **5**.	Go to step **3**.
3	**CHECK SECONDARY SOLENOID.** 1) Turn the ignition switch to OFF. 2) Disconnect the transmission connector. 3) Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 6 — Transmission body:***	Is the resistance approx. 5 — 7 Ω? (when cold)	Go to step **7**.	Go to step **4**.
4	**CHECK HARNESS.** Check the continuity of transmission harness.	Is the harness normal? (Is it free from defects such as open circuit, power supply-output short or GND-output short circuit, or poor contact?)	Go to step **7**.	Repair the harness.

	Step	Check	Yes	No
5	**CHECK TRANSMISSION FLUID.** 1) Connect the transmission connector. 2) Check the amount of ATF. <Ref. to CVT(TR580)-36, ADJUSTMENT, CVTF.>	Is the ATF amount correct?	Go to step **6**.	Adjust the amount of ATF. <Ref. to CVT(TR580)-36, ADJUSTMENT, CVTF.>
6	**CHECK TRANSMISSION FLUID.** Check the condition of ATF. <Ref. to CVT(TR580)-40, CONDITION CHECK, CVTF.>	Is the ATF OK?	Go to step **7**.	Check according to the "Corrective action" of ATF (CVTF) "CONDITION CHECK". <Ref. to CVT(TR580)-40, CONDITION CHECK, CVTF.>
7	**CHECK INPUT SIGNAL FOR TCM.** 1) Lift up the vehicle. 2) Start the engine. 3) Warm up until the ATF temperature reaches to 40 — 70°C (104 — 158°F). 4) Depress the brake pedal, and shift the select lever to "D" range. 5) Shift the select lever to "P" range. 6) Stabilize the engine speed at idle. 7) Read the data of «Actual secondary pressure» using Subaru Select Monitor.	Is the «Actual secondary pressure» 0.5 — 1.5 MPa?	Go to step **8**.	Replace the control valve body. <Ref. to CVT(TR580)-117, Control Valve Body.>
8	**CHECK INPUT SIGNAL FOR TCM.** 1) Keep the engine speed at 3,000 rpm. 2) Read the data of «Actual secondary pressure» using Subaru Select Monitor.	Is the «Actual secondary pressure» higher than step 7 value? Does the value change according to the engine speed, within the range of 1.5 — 2.5 MPa?	Go to step **9**.	Replace the control valve body. <Ref. to CVT(TR580)-117, Control Valve Body.>
9	**CHECK TCM INPUT SIGNAL (STALL TEST).** 1) Apply the parking brake. 2) Set the select lever to "D" range. 3) Depress the brake pedal firmly. 4) Slowly open the accelerator fully, and stabilize the engine speed. 5) Read the data of «Actual secondary pressure» using Subaru Select Monitor. **CAUTION:** **Do not perform a stall test for over 5 seconds at a time.**	Is the «Actual secondary pressure» higher than step 8 value? Does the value change according to the engine speed, within the range of 4.5 — 6.0 MPa?	Go to step **10**.	Replace the control valve body. <Ref. to CVT(TR580)-117, Control Valve Body.>
10	**DRIVING CHECK BY INSPECTION MODE.** 1) Turn the ignition switch to OFF. 2) Perform a drive check based on the "Inspection Mode". <Ref. to CVT(w/o HEV)(diag)-19, Inspection Mode.>	Does the AT OIL TEMP light blink and is DTC P0747 displayed?	Perform the secondary pressure test. <Ref. to CVT(TR580)-49, Secondary Pressure (Line Pressure) Test.>	Current condition is normal. It is possible that temporary poor contact occurs.

Q: DTC P0751 SHIFT SOLENOID "A" PERFORMANCE/STUCK OFF

DTC DETECTING CONDITION:

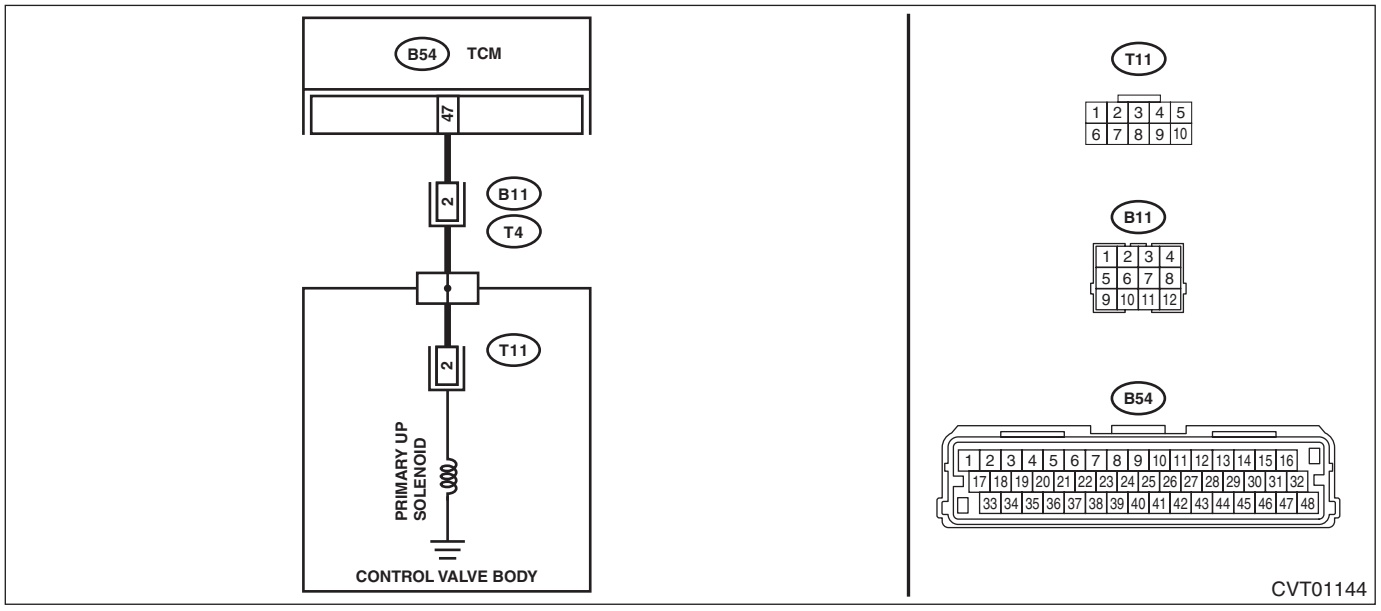
- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(CVT)(w/o HEV)-21, DTC P0751 SHIFT SOLENOID "A" PERFORMANCE/STUCK OFF, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

- Shift control malfunction
- Engine speed increases abruptly.

WIRING DIAGRAM:

CVT control system <Ref. to WI(w/o HEV)-90, CVT Control System.>



Step		Check	Yes	No
1	**CHECK DTC.** Read the DTC using Subaru Select Monitor.	Besides DTC P0751, is any of the DTCs P0973, P0974, P0976, P0977, P2747 and P2751 displayed?	Perform the diagnosis according to DTCs other than P0751.	Go to step **2**.
2	**CHECK PRIMARY UP SOLENOID (SYSTEM OPERATION CHECK MODE).** 1) Turn the ignition switch to ON. 2) Using the Subaru Select Monitor, perform forced operation of the primary UP solenoid. <Ref. to CVT(w/o HEV)(diag)-24, System Operation Check Mode.>	Does the indication of 0 → 50% appear repeatedly during forced operation, and does operating sound emit during indicating 50%?	Go to step **5**.	Go to step **3**.
3	**CHECK PRIMARY UP SOLENOID.** 1) Turn the ignition switch to OFF. 2) Disconnect the transmission connector. 3) Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 2 — Transmission body:***	Is the resistance approx. 10 — 13.5 Ω? (when cold)	Go to step **7**.	Go to step **4**.
4	**CHECK HARNESS.** Check the continuity of transmission harness.	Is the harness normal? (Is it free from defects such as open circuit, power supply-output short or GND-output short circuit, or poor contact?)	Go to step **7**.	Repair the harness.

	Step	Check	Yes	No
5	**CHECK TRANSMISSION FLUID.** 1) Connect the transmission connector. 2) Check the amount of ATF. <Ref. to CVT(TR580)-36, ADJUSTMENT, CVTF.>	Is the ATF amount correct?	Go to step **6**.	Adjust the amount of ATF. <Ref. to CVT(TR580)-36, ADJUSTMENT, CVTF.>
6	**CHECK TRANSMISSION FLUID.** Check the condition of ATF. <Ref. to CVT(TR580)-40, CONDITION CHECK, CVTF.>	Is the ATF OK?	Go to step **7**.	Check according to the “Corrective action” of ATF (CVTF) “CONDITION CHECK”. <Ref. to CVT(TR580)-40, CONDITION CHECK, CVTF.>
7	**CHECK INPUT SIGNAL FOR TCM.** 1) Lift up the vehicle. 2) Start the engine. 3) Warm up until the ATF temperature reaches to 40 — 70°C (104 — 158°F). 4) Depress the brake pedal, and shift the select lever to “D” range. 5) Shift the select lever to “P” range. 6) Stabilize the engine speed at idle. 7) Read the data of «Actual secondary pressure» using Subaru Select Monitor.	Is the «Actual secondary pressure» 0.5 — 1.5 MPa?	Go to step **8**.	Replace the transmission assembly. <Ref. to CVT(TR580)-60, Automatic Transmission Assembly.>
8	**CHECK INPUT SIGNAL FOR TCM.** 1) Set the select lever to “D” range. 2) Release the brake pedal to stabilize the engine speed and front wheel speed. 3) Read the data of «Actual Gear Ratio» using Subaru Select Monitor.	Is the «Actual Gear Ratio» 1.5 — 2.6?	Go to step **9**.	Replace the transmission assembly. <Ref. to CVT(TR580)-60, Automatic Transmission Assembly.>
9	**CHECK INPUT SIGNAL FOR TCM.** 1) Set the select lever to “D” range. 2) Slowly increase the speed to 40 km/h (25 MPH) and keep the constant speed. 3) Read the data of «Actual Gear Ratio» using Subaru Select Monitor.	Is the «Actual Gear Ratio» 0.5 — 0.9?	Go to step **10**.	Replace the transmission assembly. <Ref. to CVT(TR580)-60, Automatic Transmission Assembly.>
10	**DRIVING CHECK BY INSPECTION MODE.** 1) Turn the ignition switch to OFF. 2) Perform a drive check based on the “Inspection Mode”. <Ref. to CVT(w/o HEV)(diag)-19, Inspection Mode.>	Does the AT OIL TEMP light blink and is DTC P0751 displayed?	Replace the transmission assembly. <Ref. to CVT(TR580)-60, Automatic Transmission Assembly.>	Current condition is normal. It is possible that temporary poor contact occurs.

R: DTC P0752 SHIFT SOLENOID "A" STUCK ON

DTC DETECTING CONDITION:

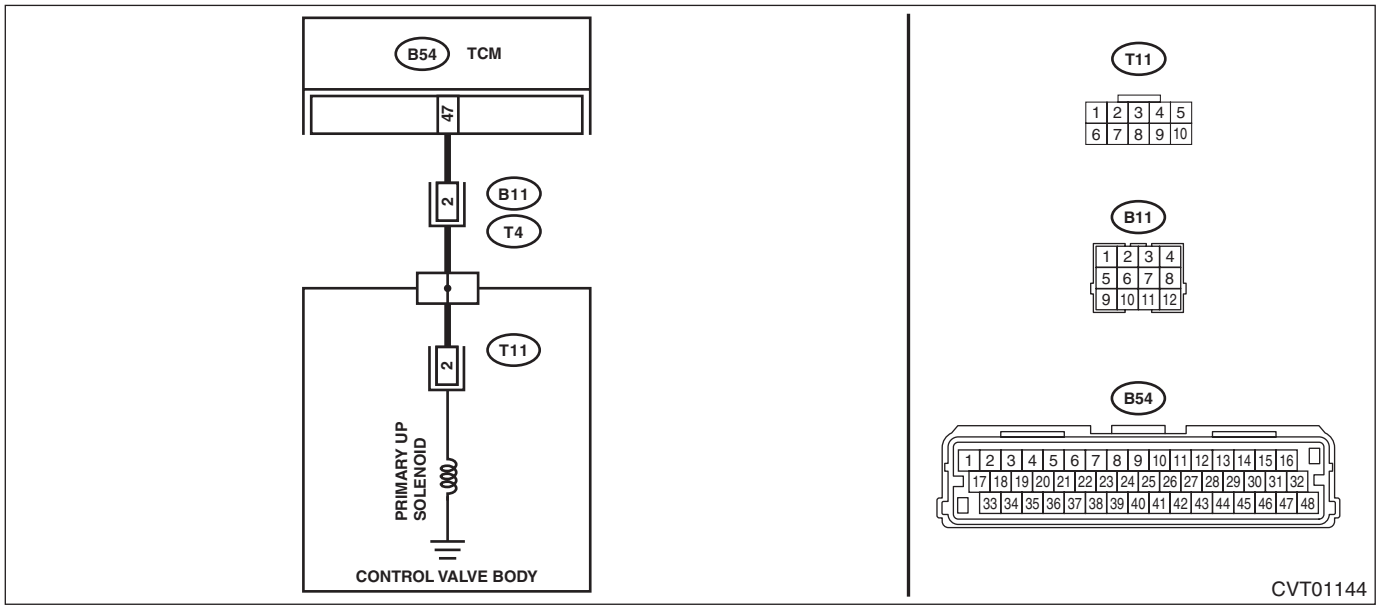
- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(CVT)(w/o HEV)-22, DTC P0752 SHIFT SOLENOID "A" STUCK ON, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

- Acceleration is poor during standing start.
- Shift control malfunction

WIRING DIAGRAM:

CVT control system <Ref. to WI(w/o HEV)-90, CVT Control System.>



	Step	Check	Yes	No
1	**CHECK DTC.** Read the DTC using Subaru Select Monitor.	Besides DTC P0752, is any of the DTCs P0973, P0974, P0976, P0977, P2747 and P2751 displayed?	Perform the diagnosis according to DTCs other than P0752.	Go to step **2**.
2	**CHECK PRIMARY UP SOLENOID (SYSTEM OPERATION CHECK MODE).** 1) Turn the ignition switch to ON. 2) Using the Subaru Select Monitor, perform forced operation of the primary UP solenoid. <Ref. to CVT(w/o HEV)(diag)-24, System Operation Check Mode.>	Does the indication of 0 → 50% appear repeatedly during forced operation, and does operating sound emit during indicating 50%?	Go to step **5**.	Go to step **3**.
3	**CHECK PRIMARY UP SOLENOID.** 1) Turn the ignition switch to OFF. 2) Disconnect the transmission connector. 3) Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 2 — Transmission body:***	Is the resistance approx. 10 — 13.5 Ω? (when cold)	Go to step **7**.	Go to step **4**.
4	**CHECK HARNESS.** Check the continuity of transmission harness.	Is the harness normal? (Is it free from defects such as open circuit, power supply-output short or GND-output short circuit, or poor contact?)	Go to step **7**.	Repair the harness.

	Step	Check	Yes	No
5	**CHECK TRANSMISSION FLUID.** 1) Connect the transmission connector. 2) Check the amount of ATF. <Ref. to CVT(TR580)-36, ADJUSTMENT, CVTF.>	Is the ATF amount correct?	Go to step **6**.	Adjust the amount of ATF. <Ref. to CVT(TR580)-36, ADJUSTMENT, CVTF.>
6	**CHECK TRANSMISSION FLUID.** Check the condition of ATF. <Ref. to CVT(TR580)-40, CONDITION CHECK, CVTF.>	Is the ATF OK?	Go to step **7**.	Check according to the “Corrective action” of ATF (CVTF) “CONDITION CHECK”. <Ref. to CVT(TR580)-40, CONDITION CHECK, CVTF.>
7	**CHECK INPUT SIGNAL FOR TCM.** 1) Lift up the vehicle. 2) Start the engine. 3) Warm up until the ATF temperature reaches to 40 — 70°C (104 — 158°F). 4) Depress the brake pedal, and shift the select lever to “D” range. 5) Shift the select lever to “P” range. 6) Stabilize the engine speed at idle. 7) Read the data of «Actual secondary pressure» using Subaru Select Monitor.	Is the «Actual secondary pressure» 0.5 — 1.5 MPa?	Go to step **8**.	Replace the transmission assembly. <Ref. to CVT(TR580)-60, Automatic Transmission Assembly.>
8	**CHECK INPUT SIGNAL FOR TCM.** 1) Set the select lever to “D” range. 2) Release the brake pedal to stabilize the engine speed and front wheel speed. 3) Read the data of «Actual Gear Ratio» using Subaru Select Monitor.	Is the «Actual Gear Ratio» 1.5 — 2.6?	Go to step **9**.	Replace the transmission assembly. <Ref. to CVT(TR580)-60, Automatic Transmission Assembly.>
9	**CHECK INPUT SIGNAL FOR TCM.** 1) Set the select lever to “D” range. 2) Slowly increase the speed to 40 km/h (25 MPH) and keep the constant speed. 3) Read the data of «Actual Gear Ratio» using Subaru Select Monitor.	Is the «Actual Gear Ratio» 0.5 — 0.9?	Go to step **10**.	Replace the transmission assembly. <Ref. to CVT(TR580)-60, Automatic Transmission Assembly.>
10	**DRIVING CHECK BY INSPECTION MODE.** 1) Turn the ignition switch to OFF. 2) Perform a drive check based on the “Inspection Mode”. <Ref. to CVT(w/o HEV)(diag)-19, Inspection Mode.>	Does the AT OIL TEMP light blink and is DTC P0752 displayed?	Replace the transmission assembly. <Ref. to CVT(TR580)-60, Automatic Transmission Assembly.>	Current condition is normal. It is possible that temporary poor contact occurs.

S: DTC P0756 SHIFT SOLENOID "B" PERFORMANCE/STUCK OFF

DTC DETECTING CONDITION:

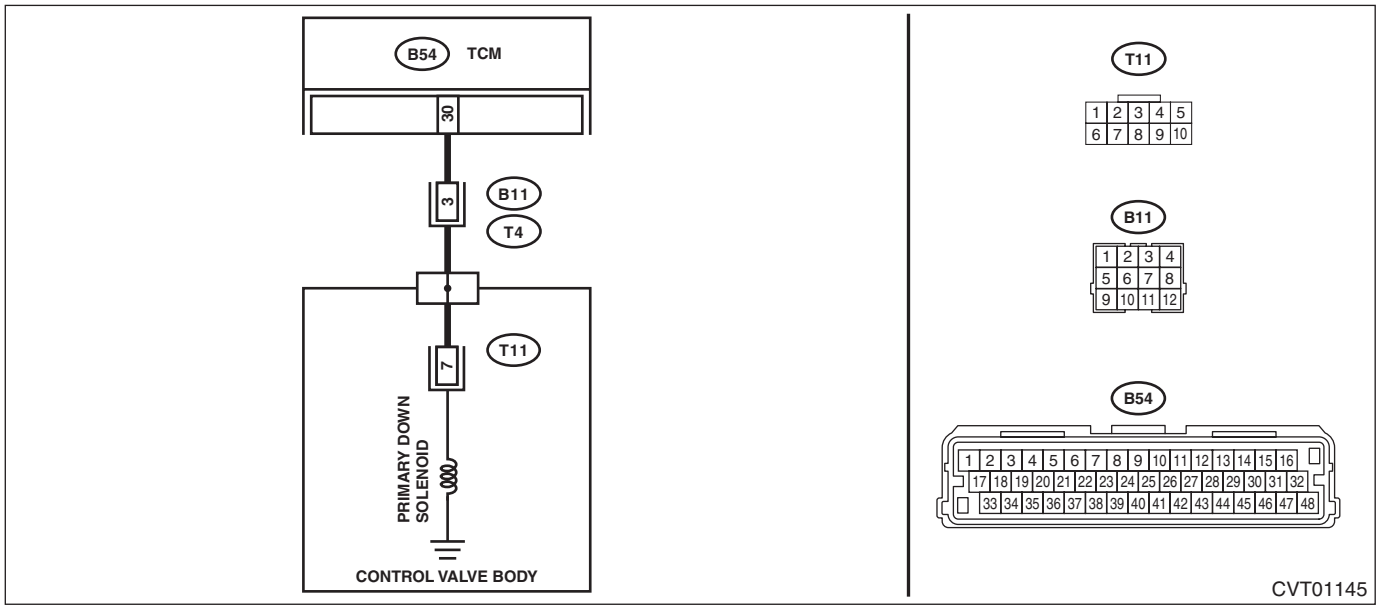
- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(CVT)(w/o HEV)-23, DTC P0756 SHIFT SOLENOID "B" PERFORMANCE/STUCK OFF, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

- Acceleration is poor during standing start.
- Shift control malfunction

WIRING DIAGRAM:

CVT control system <Ref. to WI(w/o HEV)-90, CVT Control System.>



Step		Check	Yes	No
1	**CHECK DTC.** Read the DTC using Subaru Select Monitor.	Besides DTC P0756, is any of the DTCs P0973, P0974, P0976, P0977, P2747 and P2751 displayed?	Perform the diagnosis according to DTCs other than P0756.	Go to step **2**.
2	**CHECK PRIMARY DOWN SOLENOID (SYSTEM OPERATION CHECK MODE).** 1) Turn the ignition switch to ON. 2) Using the Subaru Select Monitor, perform forced operation of the primary DOWN solenoid. <Ref. to CVT(w/o HEV)(diag)-24, System Operation Check Mode.>	Does the indication of 0 → 50% appear repeatedly during forced operation, and does operating sound emit during indicating 50%?	Go to step **5**.	Go to step **3**.
3	**CHECK PRIMARY DOWN SOLENOID.** 1) Turn the ignition switch to OFF. 2) Disconnect the transmission connector. 3) Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 3 — Transmission body:***	Is the resistance approx. 10 — 13.5 Ω? (when cold)	Go to step **7**.	Go to step **4**.
4	**CHECK HARNESS.** Check the continuity of transmission harness.	Is the harness normal? (Is it free from defects such as open circuit, power supply-output short or GND-output short circuit, or poor contact?)	Go to step **7**.	Repair the harness.

	Step	Check	Yes	No
5	**CHECK TRANSMISSION FLUID.** 1) Connect the transmission connector. 2) Check the amount of ATF. <Ref. to CVT(TR580)-36, ADJUSTMENT, CVTF.>	Is the ATF amount correct?	Go to step **6**.	Adjust the amount of ATF. <Ref. to CVT(TR580)-36, ADJUSTMENT, CVTF.>
6	**CHECK TRANSMISSION FLUID.** Check the condition of ATF. <Ref. to CVT(TR580)-40, CONDITION CHECK, CVTF.>	Is the ATF OK?	Go to step **7**.	Check according to the “Corrective action” of ATF (CVTF) “CONDITION CHECK”. <Ref. to CVT(TR580)-40, CONDITION CHECK, CVTF.>
7	**CHECK INPUT SIGNAL FOR TCM.** 1) Lift up the vehicle. 2) Start the engine. 3) Warm up until the ATF temperature reaches to 40 — 70°C (104 — 158°F). 4) Depress the brake pedal, and shift the select lever to “D” range. 5) Shift the select lever to “P” range. 6) Stabilize the engine speed at idle. 7) Read the data of «Actual secondary pressure» using Subaru Select Monitor.	Is the «Actual secondary pressure» 0.5 — 1.5 MPa?	Go to step **8**.	Replace the transmission assembly. <Ref. to CVT(TR580)-60, Automatic Transmission Assembly.>
8	**CHECK INPUT SIGNAL FOR TCM.** 1) Set the select lever to “D” range. 2) Release the brake pedal to stabilize the engine speed and front wheel speed. 3) Read the data of «Actual Gear Ratio» using Subaru Select Monitor.	Is the «Actual Gear Ratio» 1.5 — 2.6?	Go to step **9**.	Replace the transmission assembly. <Ref. to CVT(TR580)-60, Automatic Transmission Assembly.>
9	**CHECK INPUT SIGNAL FOR TCM.** 1) Set the select lever to “D” range. 2) Slowly increase the speed to 40 km/h (25 MPH) and keep the constant speed. 3) Read the data of «Actual Gear Ratio» using Subaru Select Monitor.	Is the «Actual Gear Ratio» 0.5 — 0.9?	Go to step **10**.	Replace the transmission assembly. <Ref. to CVT(TR580)-60, Automatic Transmission Assembly.>
10	**DRIVING CHECK BY INSPECTION MODE.** 1) Turn the ignition switch to OFF. 2) Perform a drive check based on the “Inspection Mode”. <Ref. to CVT(w/o HEV)(diag)-19, Inspection Mode.>	Does the AT OIL TEMP light blink and is DTC P0756 displayed?	Replace the transmission assembly. <Ref. to CVT(TR580)-60, Automatic Transmission Assembly.>	Current condition is normal. It is possible that temporary poor contact occurs.

T: DTC P0757 SHIFT SOLENOID "B" STUCK ON

DTC DETECTING CONDITION:

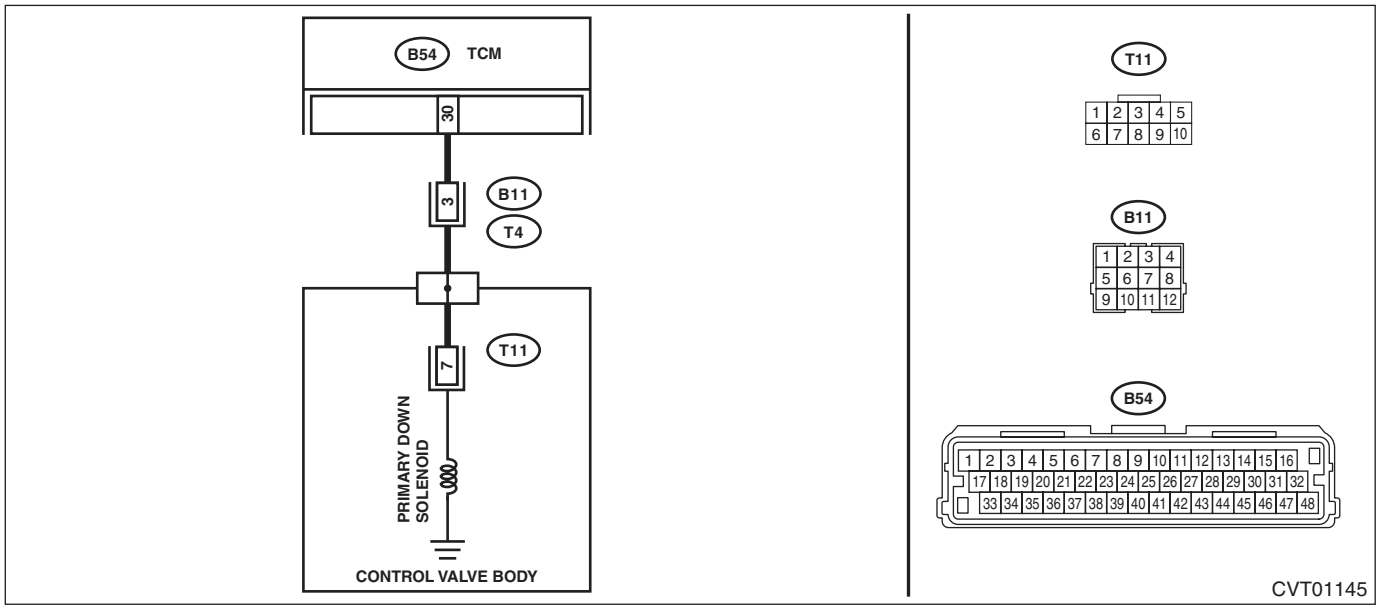
- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(CVT)(w/o HEV)-24, DTC P0757 SHIFT SOLENOID "B" STUCK ON, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

- Vibration occurs at shift change.
- Shift control malfunction

WIRING DIAGRAM:

CVT control system <Ref. to WI(w/o HEV)-90, CVT Control System.>



Step		Check	Yes	No
1	**CHECK DTC.** Read the DTC using Subaru Select Monitor.	Besides DTC P0757, is any of the DTCs P0973, P0974, P0976, P0977, P2747 and P2751 displayed?	Perform the diagnosis according to DTCs other than P0757.	Go to step **2**.
2	**CHECK PRIMARY DOWN SOLENOID (SYSTEM OPERATION CHECK MODE).** 1) Turn the ignition switch to ON. 2) Using the Subaru Select Monitor, perform forced operation of the primary DOWN solenoid. <Ref. to CVT(w/o HEV)(diag)-24, System Operation Check Mode.>	Does the indication of 0 → 50% appear repeatedly during forced operation, and does operating sound emit during indicating 50%?	Go to step **5**.	Go to step **3**.
3	**CHECK PRIMARY DOWN SOLENOID.** 1) Turn the ignition switch to OFF. 2) Disconnect the transmission connector. 3) Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 3 — Transmission body:***	Is the resistance approx. 10 — 13.5 Ω? (when cold)	Go to step **7**.	Go to step **4**.
4	**CHECK HARNESS.** Check the continuity of transmission harness.	Is the harness normal? (Is it free from defects such as open circuit, power supply-output short or GND-output short circuit, or poor contact?)	Go to step **7**.	Repair the harness.

	Step	Check	Yes	No
5	**CHECK TRANSMISSION FLUID.** 1) Connect the transmission connector. 2) Check the amount of ATF. <Ref. to CVT(TR580)-36, ADJUSTMENT, CVTF.>	Is the ATF amount correct?	Go to step **6**.	Adjust the amount of ATF. <Ref. to CVT(TR580)-36, ADJUSTMENT, CVTF.>
6	**CHECK TRANSMISSION FLUID.** Check the condition of ATF. <Ref. to CVT(TR580)-40, CONDITION CHECK, CVTF.>	Is the ATF OK?	Go to step **7**.	Check according to the “Corrective action” of ATF (CVTF) “CONDITION CHECK”. <Ref. to CVT(TR580)-40, CONDITION CHECK, CVTF.>
7	**CHECK INPUT SIGNAL FOR TCM.** 1) Lift up the vehicle. 2) Start the engine. 3) Warm up until the ATF temperature reaches to 40 — 70°C (104 — 158°F). 4) Depress the brake pedal, and shift the select lever to “D” range. 5) Shift the select lever to “P” range. 6) Stabilize the engine speed at idle. 7) Read the data of «Actual secondary pressure» using Subaru Select Monitor.	Is the «Actual secondary pressure» 0.5 — 1.5 MPa?	Go to step **8**.	Replace the transmission assembly. <Ref. to CVT(TR580)-60, Automatic Transmission Assembly.>
8	**CHECK INPUT SIGNAL FOR TCM.** 1) Set the select lever to “D” range. 2) Release the brake pedal to stabilize the engine speed and front wheel speed. 3) Read the data of «Actual Gear Ratio» using Subaru Select Monitor.	Is the «Actual Gear Ratio» 1.5 — 2.6?	Go to step **9**.	Replace the transmission assembly. <Ref. to CVT(TR580)-60, Automatic Transmission Assembly.>
9	**CHECK INPUT SIGNAL FOR TCM.** 1) Set the select lever to “D” range. 2) Slowly increase the speed to 40 km/h (25 MPH) and keep the constant speed. 3) Read the data of «Actual Gear Ratio» using Subaru Select Monitor.	Is the «Actual Gear Ratio» 0.5 — 0.9?	Go to step **10**.	Replace the transmission assembly. <Ref. to CVT(TR580)-60, Automatic Transmission Assembly.>
10	**DRIVING CHECK BY INSPECTION MODE.** 1) Turn the ignition switch to OFF. 2) Perform a drive check based on the “Inspection Mode”. <Ref. to CVT(w/o HEV)(diag)-19, Inspection Mode.>	Does the AT OIL TEMP light blink and is DTC P0757 displayed?	Replace the transmission assembly. <Ref. to CVT(TR580)-60, Automatic Transmission Assembly.>	Current condition is normal. It is possible that temporary poor contact occurs.

U: DTC P0776 PRESSURE CONTROL SOLENOID "B" PERFORMANCE/STUCK OFF

DTC DETECTING CONDITION:

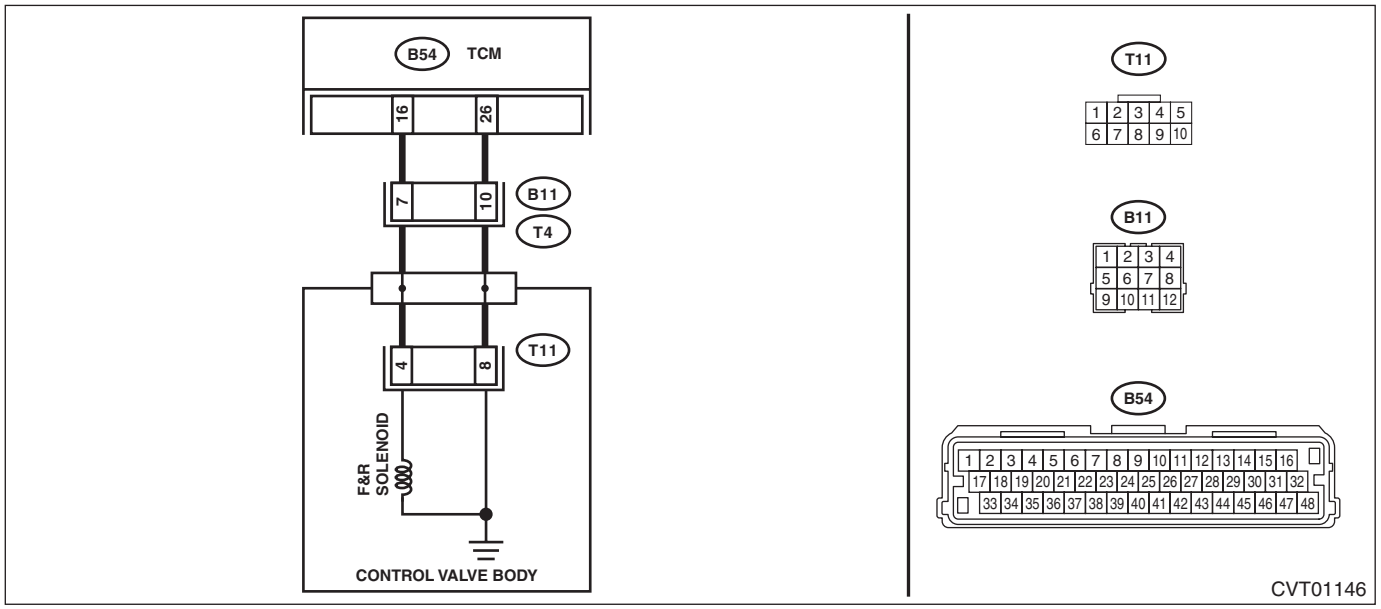
- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(CVT)(w/o HEV)-25, DTC P0776 PRESSURE CONTROL SOLENOID "B" PERFORMANCE/STUCK OFF, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

- Engine speed increases abruptly, and can not accelerate.
- Excessive slippage is felt.

WIRING DIAGRAM:

CVT control system <Ref. to WI(w/o HEV)-90, CVT Control System.>



	Step	Check	Yes	No
1	**CHECK DTC.** Read the DTC using Subaru Select Monitor.	Besides DTC P0776, is any of the DTC P0717, P0966, P0967 or P2747 displayed?	Perform the diagnosis according to DTCs other than P0776.	Go to step **2**.
2	**CHECK F&R SOLENOID (SYSTEM OPERATION CHECK MODE).** 1) Turn the ignition switch to ON. 2) Using the Subaru Select Monitor, perform forced operation of the F&R solenoid. <Ref. to CVT(w/o HEV)(diag)-24, System Operation Check Mode.>	Does the indication of 0 → 500 mA appear repeatedly during forced operation, and does operating sound emit during indicating 500 mA?	Go to step **5**.	Go to step **3**.
3	**CHECK F&R SOLENOID.** 1) Turn the ignition switch to OFF. 2) Disconnect the transmission connector. 3) Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 7 — Transmission body:***	Is the resistance approx. 4 — 6 Ω? (when cold)	Go to step **7**.	Go to step **4**.
4	**CHECK HARNESS.** Check the continuity of transmission harness.	Is the harness normal? (Is it free from defects such as open circuit, power supply-output short or GND-output short circuit, or poor contact?)	Go to step **7**.	Repair the harness.

	Step	Check	Yes	No
5	**CHECK TRANSMISSION FLUID.** 1) Connect the transmission connector. 2) Check the amount of ATF. <Ref. to CVT(TR580)-36, ADJUSTMENT, CVTF.>	Is the ATF amount correct?	Go to step **6**.	Adjust the amount of ATF. <Ref. to CVT(TR580)-36, ADJUSTMENT, CVTF.>
6	**CHECK TRANSMISSION FLUID.** Check the condition of ATF. <Ref. to CVT(TR580)-40, CONDITION CHECK, CVTF.>	Is the ATF OK?	Go to step **7**.	Check according to the “Corrective action” of ATF (CVTF) “CONDITION CHECK”. <Ref. to CVT(TR580)-40, CONDITION CHECK, CVTF.>
7	**CHECK INPUT SIGNAL FOR TCM.** 1) Start the engine. 2) Warm up until the ATF temperature reaches to 40 — 70°C (104 — 158°F). 3) Depress the brake pedal, and shift the select lever to “D” range. 4) Shift the select lever to “P” range. 5) Stabilize the engine speed at idle. 6) Read the data of «Actual secondary pressure» using Subaru Select Monitor.	Is the «Actual secondary pressure» 0.5 — 1.5 MPa?	Go to step **8**.	Perform the diagnosis according to DTC P0841. <Ref. to CVT(w/o HEV)(diag)-72, DTC P0841 SECONDARY OIL PRESSURE SENSOR PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
8	**STALL TEST.** Perform the stall test. <Ref. to CVT(TR580)-47, Stall Test.>	Is the stall test normal?	Go to step **9**.	Replace the transmission assembly if the stall speed is higher than the standard value of the stall test. <Ref. to CVT(TR580)-60, Automatic Transmission Assembly.>
9	**DRIVING CHECK BY INSPECTION MODE.** 1) Turn the ignition switch to OFF. 2) Perform a drive check based on the “Inspection Mode”. <Ref. to CVT(w/o HEV)(diag)-19, Inspection Mode.>	Does the AT OIL TEMP light blink and is DTC P0776 displayed?	Replace the transmission assembly. <Ref. to CVT(TR580)-60, Automatic Transmission Assembly.>	Current condition is normal. It is possible that temporary poor contact occurs.

V: DTC P0801 REVERSE INHIBIT CONTROL CIRCUIT

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(CVT)(w/o HEV)-26, DTC P0801 REVERSE INHIBIT CONTROL CIRCUIT, Diagnostic Trouble Code (DTC) Detecting Criteria.>

NOTE:
For diagnostic procedures, refer to “BODY CONTROL SYSTEM (DIAGNOSTICS)”. <Ref. to BC(diag)-38, DTC B1016 SHIFT LOCK CIRCUIT FAILURE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

W: DTC P0841 SECONDARY OIL PRESSURE SENSOR PERFORMANCE

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(CVT)(w/o HEV)-27, DTC P0841 SECONDARY OIL PRESSURE SENSOR PERFORMANCE, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

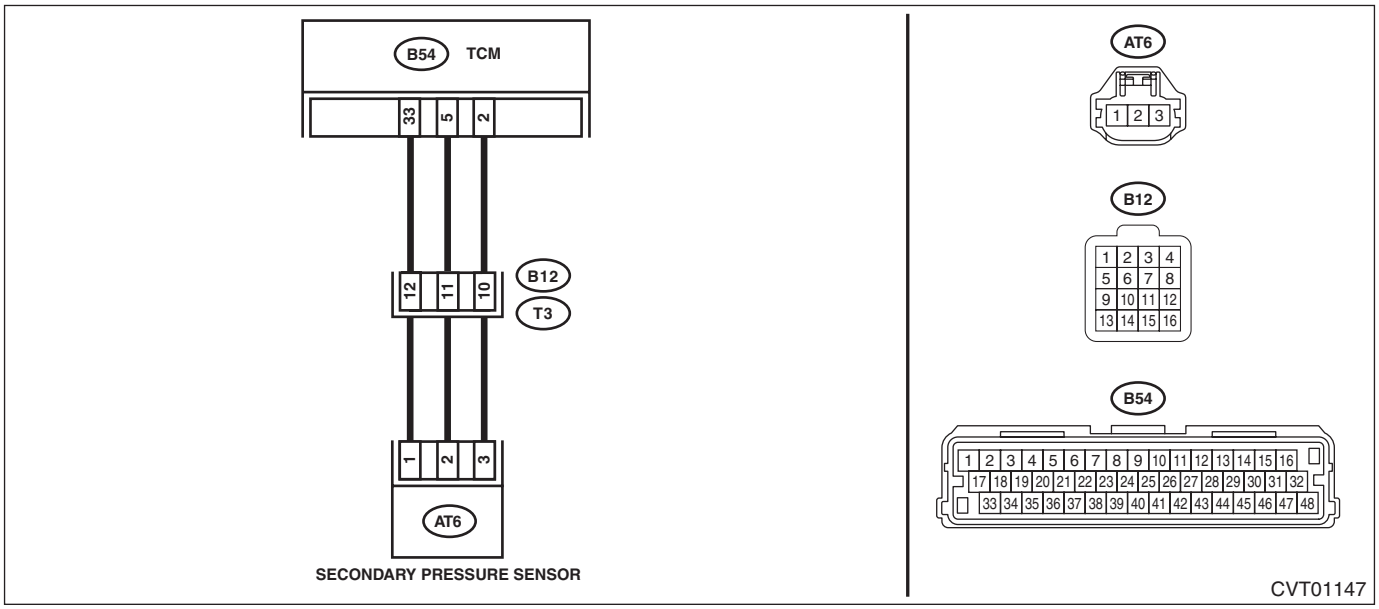
- Acceleration is poor during standing start.
- Shift control malfunction
- Engine speed increases abruptly.

CAUTION:

- **Before performing diagnosis, record the freeze frame data.**
- **Use the check board when measuring the TCM terminal voltage and resistance.**

WIRING DIAGRAM:

CVT control system <Ref. to WI(w/o HEV)-90, CVT Control System.>



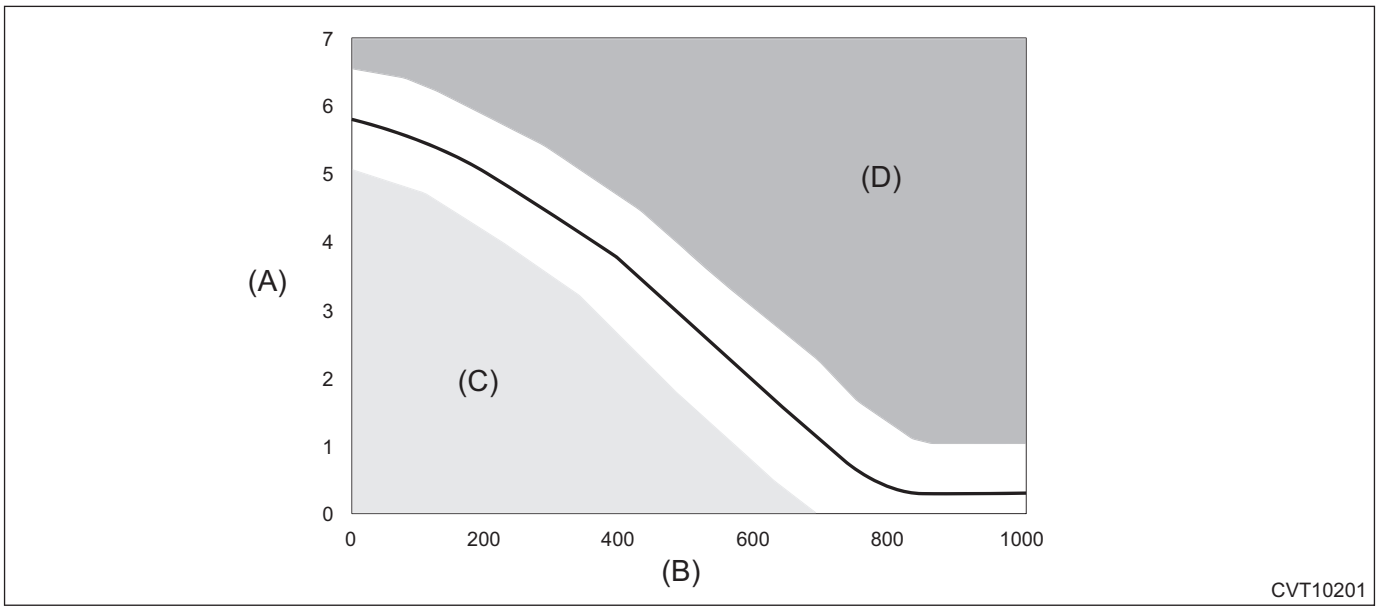
Step		Check	Yes	No
1	**CHECK DTC.** Read the DTC using Subaru Select Monitor.	Are DTCs other than P0841 displayed?	Perform the diagnosis according to DTC. After the diagnosis, start the engine, and drive for 20 minutes in any driving pattern. (Include driving at a constant legal speed (for 20 seconds) at least once.) Read the DTC, and if P0841 alone is detected, Go to step **2**.	Go to step **2**.
2	**CHECK INPUT SIGNAL FOR TCM.** 1) Turn the ignition switch to ON. 2) Read the data of «secondary pressure sensor voltage» using Subaru Select Monitor. (While shaking the secondary pressure sensor harness)	Is the value of «secondary pressure sensor voltage» 0.39 — 0.61 V?	Go to step **10**.	Go to step **3**.

	Step	Check	Yes	No
3	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector of TCM and secondary pressure sensor. 3) Measure the resistance between TCM connector and secondary pressure sensor connector. ***Connector & terminal*** ***(B54) No. 2 — (AT6) No. 3:*** ***(B54) No. 5 — (AT6) No. 2:*** ***(B54) No. 33 — (AT6) No. 1:***	Is the resistance less than 1 Ω?	Go to step **4**.	Repair the open circuit of harness.
4	**CHECK HARNESS.** Measure the resistance between TCM connectors. ***Connector & terminal*** ***(B54) No. 2 — (B54) No. 33:*** ***(B54) No. 5 — (B54) No. 2:*** ***(B54) No. 33 — (B54) No. 5:***	Is the resistance 1 MΩ or more?	Go to step **5**.	Repair the short circuit of harness.
5	**CHECK HARNESS.** Measure the resistance between TCM connector and transmission body. ***Connector & terminal*** ***(B54) No. 2 — Transmission body:*** ***(B54) No. 5 — Transmission body:*** ***(B54) No. 33 — Transmission body:***	Is the resistance 1 MΩ or more?	Go to step **6**.	Repair the short circuit of harness.
6	**CHECK POWER SUPPLY FOR SECONDARY PRESSURE SENSOR.** 1) Turn the ignition switch to ON. 2) Measure the voltage between TCM connectors. ***Connector & terminal*** ***(B54) No. 33 (+) — (B54) No. 2 (–):***	Is the voltage 4.6 — 5.4 V?	Go to step **7**.	Check for poor contact of connector, and if no fault is found, replace the TCM. <Ref. to CVT(TR580)-146, Transmission Control Module (TCM).>
7	**CHECK POWER SUPPLY FOR SECONDARY PRESSURE SENSOR.** 1) Turn the ignition switch to OFF. 2) Connect the secondary pressure sensor connector. 3) Turn the ignition switch to ON. 4) Measure the voltage between TCM connectors. ***Connector & terminal*** ***(B54) No. 33 (+) — (B54) No. 2 (–):***	Is the voltage 4.6 — 5.4 V?	Go to step **8**.	Replace the secondary pressure sensor. <Ref. to CVT(TR580)-111, Secondary Pressure Sensor.>
8	**CHECK SECONDARY PRESSURE SENSOR OUTPUT.** Measure the voltage between TCM connectors. ***Connector & terminal*** ***(B54) No. 5 (+) — (B54) No. 2 (–):***	Is the voltage 0.39 — 0.61 V?	Check for poor contact of connector, and if no fault is found, replace the TCM. <Ref. to CVT(TR580)-146, Transmission Control Module (TCM).>	Go to step **9**.
9	**CHECK CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector of TCM and secondary pressure sensor. 3) Check the TCM connector (B54) and the secondary pressure sensor connector (AT6).	Is there any fault in the TCM connector or the secondary pressure connector?	Repair the connector, or replace harness.	Go to step **10**.

	Step	Check	Yes	No
10	**CHECK TRANSMISSION FLUID.** 1) Connect all connectors. 2) Check the amount of ATF. <Ref. to CVT(TR580)-36, ADJUSTMENT, CVTF.>	Is the ATF amount correct?	Go to step **11**.	Adjust the amount of ATF. <Ref. to CVT(TR580)-36, ADJUSTMENT, CVTF.> Go to step **11**.
11	**CHECK INPUT SIGNAL FOR TCM.** 1) Perform the Clear Memory Mode. 2) Start the engine. 3) Warm up until the ATF temperature reaches to 40 — 70°C (104 — 158°F). 4) Depress the brake pedal and move the select lever to each range at an interval of five seconds. NOTE: Move the select lever in the following order: “P” → “R” → “N” → “D” → “N” → “R” → “P”. 5) Stabilize the engine speed at idle. 6) Read the data of «Actual secondary pressure» using Subaru Select Monitor.	Is the «Actual secondary pressure» 0.5 — 1.5 MPa?	Go to step **12**.	Replace the secondary pressure sensor. <Ref. to CVT(TR580)-111, Secondary Pressure Sensor.>
12	**CHECK INPUT SIGNAL FOR TCM.** 1) Shift the select lever to “P” range. 2) Keep the engine speed at 3,000 rpm. 3) Read the data of «Actual secondary pressure» using Subaru Select Monitor.	Is the «Actual secondary pressure» 1.5 — 2.5 MPa? And is the difference of the actual oil pressure 0.2 MPa or more compared with the value measured in step 11?	Go to step **13**.	Replace the secondary pressure sensor. <Ref. to CVT(TR580)-111, Secondary Pressure Sensor.>
13	**CHECK FREEZE FRAME DATA.** 1) Turn the ignition switch to OFF. 2) Check the recorded freeze frame data.	Was the detected symptom low-voltage malfunction? <Ref. to CVT(w/o HEV)(diag)-75, CLASSIFICATION OF SYMPTOM USING FREEZE FRAME DATA, DTC P0841 SECONDARY OIL PRESSURE SENSOR PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>	Replace the transmission assembly. <Ref. to CVT(TR580)-60, Automatic Transmission Assembly.>	Go to step **14**.
14	**CHECK TCM INPUT SIGNAL (STALL TEST).** 1) Lift up the vehicle. 2) Start the engine. 3) Apply the parking brake. 4) Set the select lever to “D” range. 5) Depress the brake pedal firmly. 6) Slowly open the accelerator fully, and stabilize the engine speed. 7) Read the data of «Actual secondary pressure» using Subaru Select Monitor.	Is the «Actual secondary pressure» 4.5 — 6.0 MPa?	Replace the transmission assembly. <Ref. to CVT(TR580)-60, Automatic Transmission Assembly.>	Go to step **15**.
15	**CHECK TCM INPUT SIGNAL (STALL TEST).** Check the «Actual Secondary Pressure» in step 14.	Is the «Actual secondary pressure» 4.5 MPa or less?	Replace the transmission assembly. <Ref. to CVT(TR580)-60, Automatic Transmission Assembly.>	Replace the control valve body. <Ref. to CVT(TR580)-117, Control Valve Body.>

1. CLASSIFICATION OF SYMPTOM USING FREEZE FRAME DATA

Apply the values of «Actual Secondary Pressure» and «Secondary Actual Current» recorded in the freeze frame data onto the graph shown in the following figure, and judge if either low-voltage malfunction or high-voltage malfunction occurs.



(A) Actual secondary pressure (MPa)
(B) Secondary actual current (mA)
(C) Low-voltage malfunction
(D) High-voltage malfunction

NOTE:
Symptom that the DTC P0841 illuminates can be classified into 2 patterns.
- Low-voltage malfunction: detected due to insufficient oil pressure
- High-voltage malfunction: detected due to excessive oil pressure

X: DTC P0842 SECONDARY OIL PRESSURE SENSOR CIRCUIT (LOW)

DTC DETECTING CONDITION:

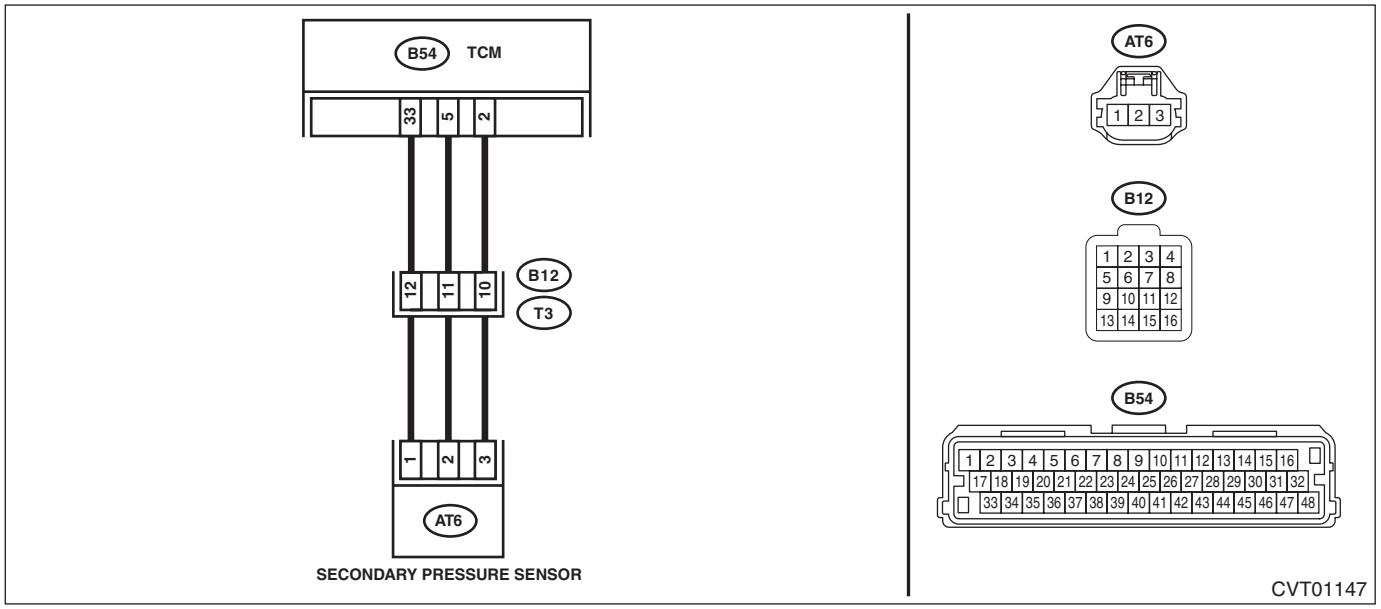
- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(CVT)(w/o HEV)-28, DTC P0842 SECONDARY OIL PRESSURE SENSOR CIRCUIT (LOW), Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

Shift characteristics malfunction

WIRING DIAGRAM:

CVT control system <Ref. to WI(w/o HEV)-90, CVT Control System.>



	Step	Check	Yes	No
1	**CHECK INPUT SIGNAL FOR TCM.** 1) Start the engine. 2) Warm up until the ATF temperature reaches to 40 — 70°C (104 — 158°F). 3) Depress the brake pedal, and shift the select lever to “D” range. 4) Shift the select lever to “P” range. 5) Stabilize the engine speed at idle. 6) Read the data of «Actual secondary pressure» using Subaru Select Monitor.	Is the «Actual secondary pressure» 0.5 — 1.5 MPa?	Check for poor contact of connector.	Go to step **2**.
2	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the TCM and transmission connectors. 3) Measure the resistance between TCM connector and transmission connectors. ***Connector & terminal*** ***(B54) No. 2 — (B12) No. 10:*** ***(B54) No. 5 — (B12) No. 11:*** ***(B54) No. 33 — (B12) No. 12:***	Is the resistance less than 1 Ω?	Go to step **3**.	Repair the open circuit of harness.
3	**CHECK HARNESS.** Measure the resistance between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 5 — Chassis ground:*** ***(B54) No. 33 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **4**.	Repair the short circuit of harness.

	Step	Check	Yes	No
4	**CHECK TRANSMISSION HARNESS.** 1) Disconnect the secondary pressure sensor connector. 2) Measure the resistance between transmission connector and secondary pressure sensor connector. ***Connector & terminal*** ***(T3) No. 10 — (AT6) No. 3:*** ***(T3) No. 11 — (AT6) No. 2:*** ***(T3) No. 12 — (AT6) No. 1:***	Is the resistance less than 1 Ω?	Go to step **5**.	Repair the open circuit of harness.
5	**CHECK TRANSMISSION HARNESS.** Measure the resistance between transmission connector and chassis ground. ***Connector & terminal*** ***(T3) No. 11 — Chassis ground:*** ***(T3) No. 12 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **6**.	Repair the short circuit of harness.
6	**CHECK SENSOR POWER SUPPLY.** 1) Connect the connectors of TCM and transmission. 2) Turn the ignition switch to ON. 3) Measure the voltage between secondary pressure sensor connector terminals. ***Connector & terminal*** ***(AT6) No. 1 (+) — (AT6) No. 3 (–):***	Is the voltage 4.5 V or more?	Replace the secondary pressure sensor. <Ref. to CVT(TR580)-111, Secondary Pressure Sensor.>	Check for poor contact of connector, and if no fault is found, replace the TCM. <Ref. to CVT(TR580)-146, Transmission Control Module (TCM).>

Y: DTC P0843 SECONDARY OIL PRESSURE SENSOR CIRCUIT (HIGH)

DTC DETECTING CONDITION:

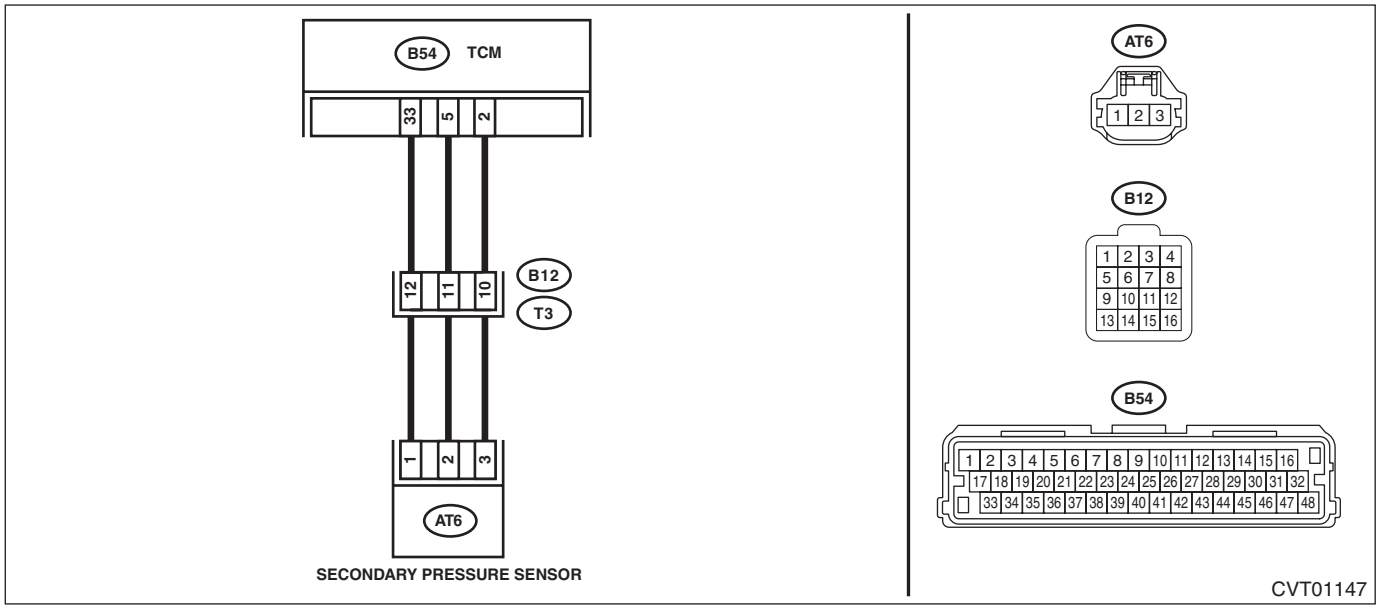
- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(CVT)(w/o HEV)-29, DTC P0843 SECONDARY OIL PRESSURE SENSOR CIRCUIT (HIGH), Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

Shift characteristics malfunction

WIRING DIAGRAM:

CVT control system <Ref. to WI(w/o HEV)-90, CVT Control System.>



Step		Check	Yes	No
1	**CHECK INPUT SIGNAL FOR TCM.** 1) Start the engine. 2) Warm up until the ATF temperature reaches to 40 — 70°C (104 — 158°F). 3) Depress the brake pedal, and shift the select lever to “D” range. 4) Shift the select lever to “P” range. 5) Stabilize the engine speed at idle. 6) Read the data of «Actual secondary pressure» using Subaru Select Monitor.	Is the «Actual secondary pressure» 0.5 — 1.5 MPa?	Check for poor contact of connector.	Go to step **2**.
2	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the TCM and transmission connectors. 3) Turn the ignition switch to ON. 4) Measure the voltage between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 5 (+) — Chassis ground (–):*** ***(B54) No. 33 (+) — Chassis ground (–):***	Is the voltage approx. 0 V?	Go to step **3**.	Repair the short circuit of harness.
3	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Measure the resistance between TCM connector terminals. ***Connector & terminal*** ***(B54) No. 5 — (B54) No. 33:***	Is the resistance less than 1 Ω?	Repair the short circuit of harness.	Go to step **4**.

	Step	Check	Yes	No
4	**CHECK TRANSMISSION HARNESS.** 1) Disconnect the secondary pressure sensor connector. 2) Turn the ignition switch to ON. 3) Measure the voltage between transmission connector and chassis ground. ***Connector & terminal*** ***(T3) No. 11 (+) — Chassis ground (–):*** ***(T3) No. 12 (+) — Chassis ground (–):***	Is the voltage approx. 0 V?	Go to step **5**.	Repair the short circuit of harness.
5	**CHECK TRANSMISSION HARNESS.** 1) Turn the ignition switch to OFF. 2) Measure the resistance between transmission connector terminals. ***Connector & terminal*** ***(T3) No. 11 — (T3) No. 12:***	Is the resistance less than 1 Ω?	Repair the short circuit of harness.	Go to step **6**.
6	**CHECK SENSOR POWER SUPPLY.** 1) Connect the connectors of TCM and transmission. 2) Turn the ignition switch to ON. 3) Measure the voltage between secondary pressure sensor connector terminals. ***Connector & terminal*** ***(AT6) No. 1 (+) — (AT6) No. 3 (–):***	Is the voltage 4.5 V or more?	Replace the secondary pressure sensor. <Ref. to CVT(TR580)-111, Secondary Pressure Sensor.>	Check for poor contact of connector, and if no fault is found, replace the TCM. <Ref. to CVT(TR580)-146, Transmission Control Module (TCM).>

Z: DTC P0890 AT SELF-SHUT RELAY DIAGNOSIS (LOW)

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(CVT)(w/o HEV)-30, DTC P0890 AT SELF-SHUT RELAY DIAGNOSIS (LOW), Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

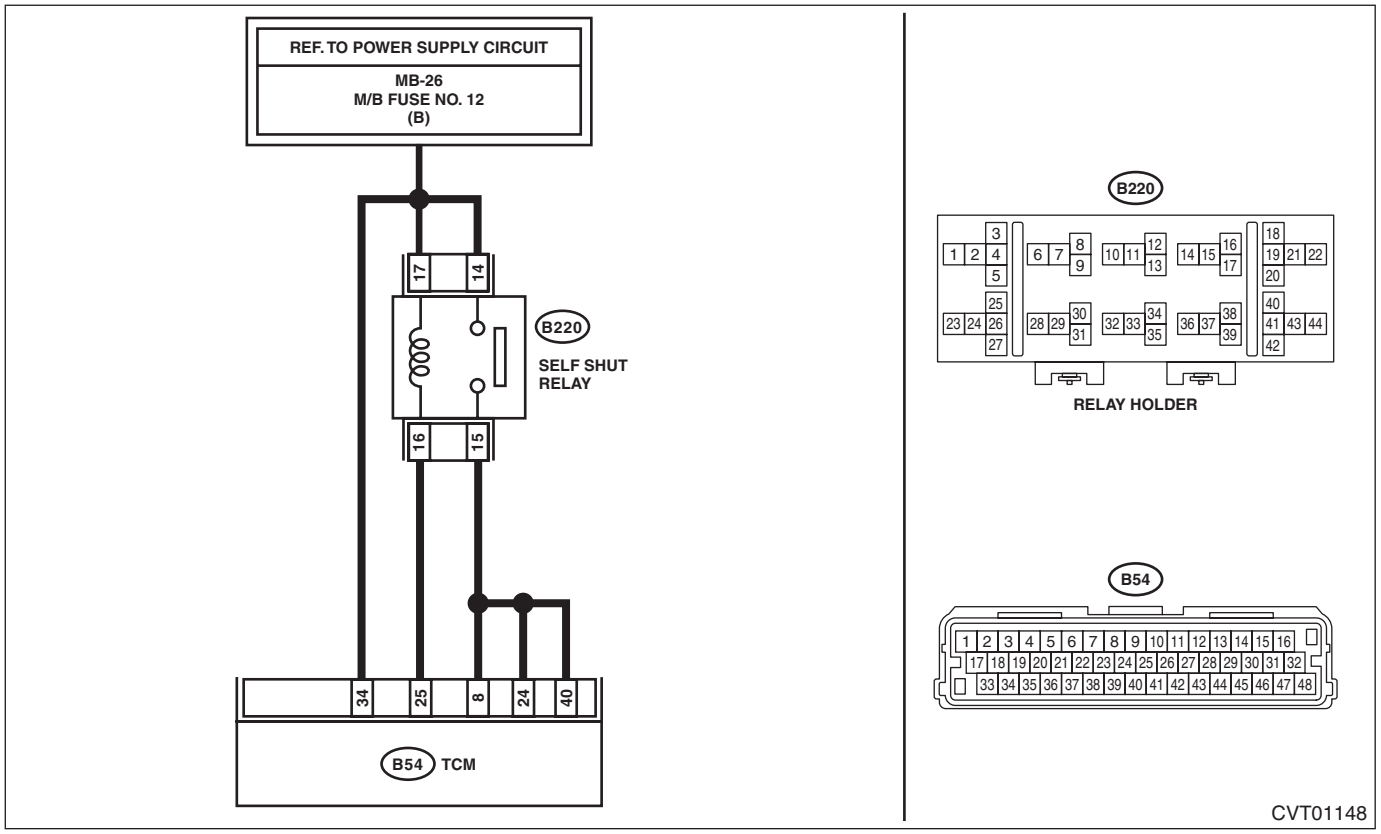
Gear is not changed.

CAUTION:

After diagnosis, perform Clear Memory Mode for ECM. <Ref. to EN(H4DO w/o HEV)(diag)-65, Clear Memory Mode.>

WIRING DIAGRAM:

CVT control system <Ref. to WI(w/o HEV)-90, CVT Control System.>



Step		Check	Yes	No
1	**CHECK HARNESS.** 1) Disconnect the TCM and self shut relay connectors. 2) Measure the resistance between TCM connector and self shut relay connector. ***Connector & terminal*** ***(B54) No. 25 — (B220) No. 16:*** ***(B54) No. 8 — (B220) No. 15:*** ***(B54) No. 24 — (B220) No. 15:*** ***(B54) No. 40 — (B220) No. 15:***	Is the resistance less than 1 Ω?	Go to step **2**.	Repair the open circuit of harness.

	Step	Check	Yes	No
2	**CHECK HARNESS.** Measure the resistance between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 25 — Chassis ground:*** ***(B54) No. 8 — Chassis ground:*** ***(B54) No. 24 — Chassis ground:*** ***(B54) No. 40 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **3**.	Repair the short circuit of harness.
3	**CHECK RELAY POWER SUPPLY.** Measure the voltage between self shut relay connector and chassis ground. ***Connector & terminal*** ***(B220) No. 14 (+) — Chassis ground (–):*** ***(B220) No. 17 (+) — Chassis ground (–):***	Is the voltage 11 — 13 V or more?	Go to step **4**.	Repair the open or short circuit of harness.
4	**CHECK SELF SHUT RELAY.** Measure the resistance between self shut relay terminals. ***Connector & terminal*** ***(B220) No. 16 — (B220) No. 17:***	Is the resistance 110 — 140 Ω?	Go to step **5**.	Replace the self shut relay.
5	**CHECK SELF SHUT RELAY.** Measure the resistance between self shut relay terminals. ***Connector & terminal*** ***(B220) No. 14 — (B220) No. 15:***	Is the resistance 1 MΩ or more?	Go to step **6**.	Replace the self shut relay.
6	**CHECK INPUT SIGNAL FOR TCM.** 1) Connect the connectors of TCM and self shut relay. 2) Read the data of «Control module voltage» using Subaru Select Monitor.	Is the «Control module voltage» 10 V or more?	Current condition is normal. Check for poor contact in connectors or harnesses, and repair the defective part.	Go to step **7**.
7	**CHECK FOR POOR CONTACT.**	Is there poor contact of the self shut relay circuit?	Repair the poor contact.	Replace the TCM. <Ref. to CVT(TR580)-146, Transmission Control Module (TCM).>

AA:DTC P0951 MANUAL SWITCH

DTC DETECTING CONDITION:

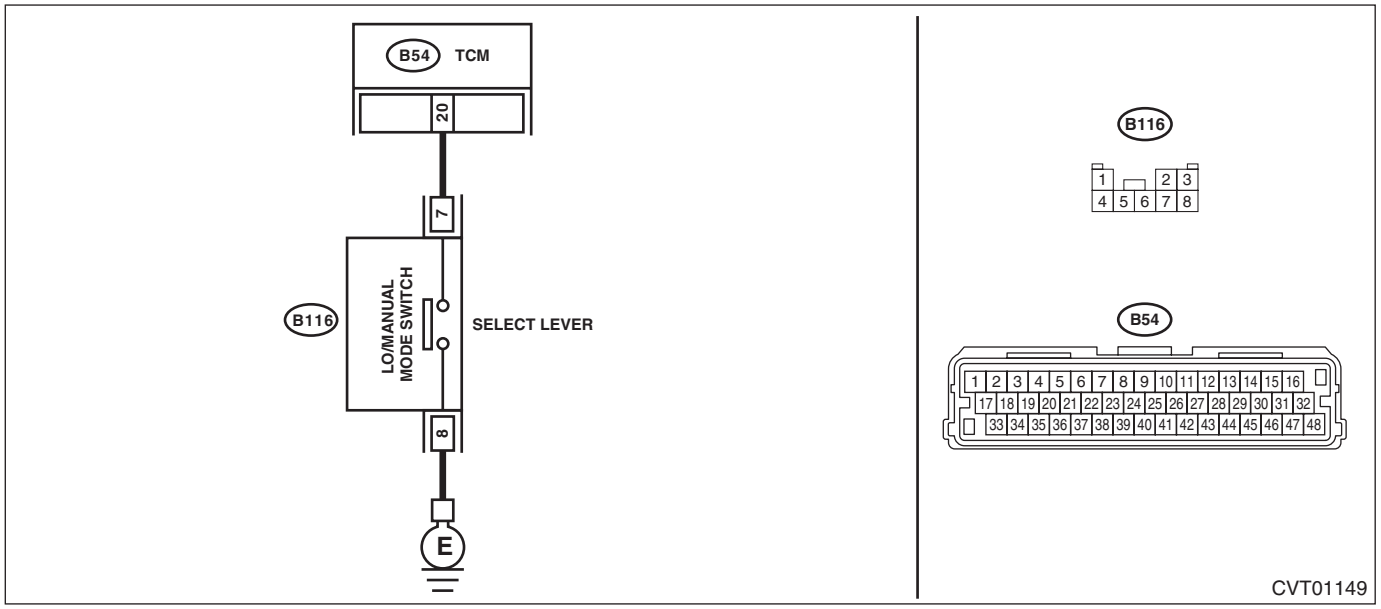
- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(CVT)(w/o HEV)-31, DTC P0951 MANUAL SWITCH, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

Manual mode can not be set.

WIRING DIAGRAM:

CVT control system <Ref. to WI(w/o HEV)-90, CVT Control System.>



Step		Check	Yes	No
1	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the manual mode switch connector. 3) Measure the resistance between manual mode switch connector and chassis ground. ***Connector & terminal*** ***(B116) No. 8 — Chassis ground:***	Is the resistance less than 1 Ω?	Go to step **2**.	Repair the open circuit of harness.
2	**CHECK MANUAL MODE SWITCH.** Measure the resistance between manual mode switch terminals. ***Connector & terminal*** ***(B116) No. 7 — No. 8:***	Is the resistance 1 MΩ or more?	Go to step **3**.	Replace the select lever assembly. <Ref. to CS-24, Select Lever.>
3	**CHECK MANUAL MODE SWITCH.** 1) Shift the select lever to manual mode. 2) Measure the resistance between manual mode switch terminals. ***Connector & terminal*** ***(B116) No. 7 — No. 8:***	Is the resistance less than 1 Ω?	Go to step **4**.	Replace the select lever assembly. <Ref. to CS-24, Select Lever.>
4	**CHECK HARNESS.** 1) Disconnect the TCM connector. 2) Measure the resistance between TCM connector and manual mode switch connector. ***Connector & terminal*** ***(B54) No. 20 — (B116) No. 7:***	Is the resistance less than 1 Ω?	Go to step **5**.	Repair the open circuit of harness or poor contact of connector.

	Step	Check	Yes	No
5	**CHECK HARNESS.** Measure the resistance between manual mode switch connector and chassis ground. ***Connector & terminal*** ***(B116) No. 7 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **6**.	Repair the short circuit of harness.
6	**CHECK INPUT SIGNAL FOR TCM.** 1) Connect the TCM and manual mode switch connector. 2) Turn the ignition switch to ON. 3) Set the select lever to “D” range. 4) Read the data of «Tiptronic Mode Switch» using Subaru Select Monitor.	Does the value of «Tiptronic Mode Switch» change to “ON” with select lever in manual mode, and “OFF” with select lever in other than manual mode?	Current condition is normal.	Go to step **7**.
7	**CHECK FOR POOR CONTACT.**	Is there poor contact of the manual mode switch circuit?	Repair the poor contact.	Replace the TCM. <Ref. to CVT(TR580)-146, Transmission Control Module (TCM).>

AB:DTC P0961 PRESSURE CONTROL SOLENOID "A" CONTROL CIRCUIT RANGE/PERFORMANCE

DTC DETECTING CONDITION:

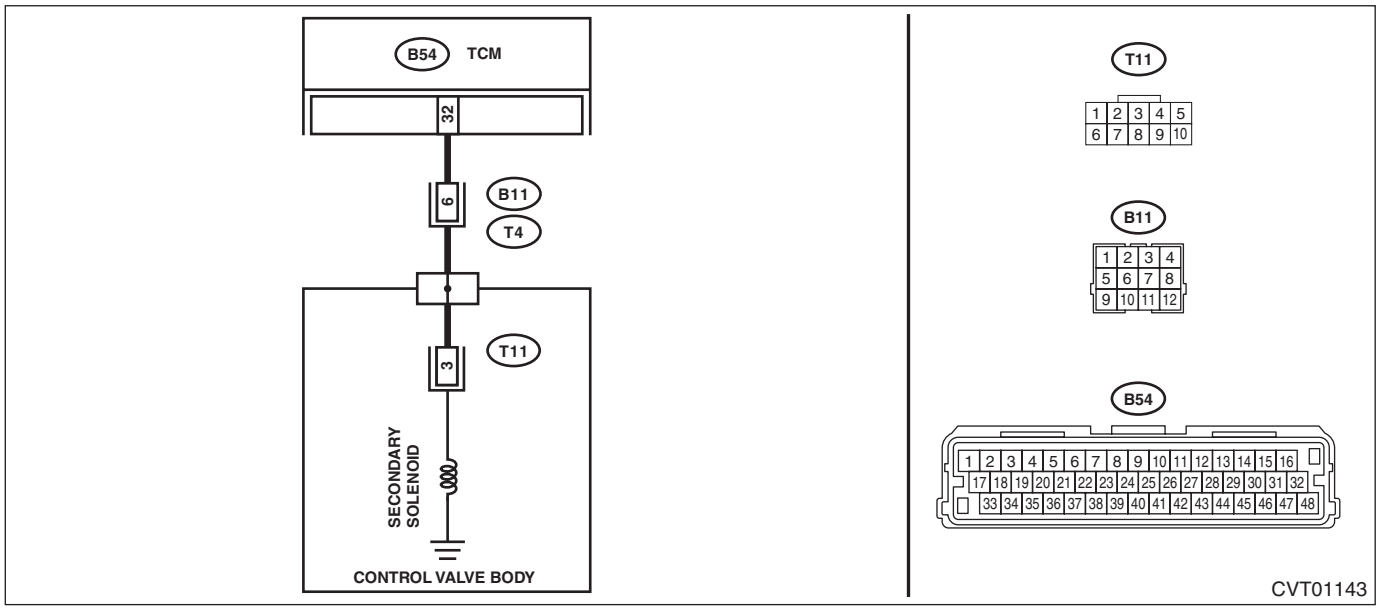
- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(CVT)(w/o HEV)-32, DTC P0961 PRESSURE CONTROL SOLENOID "A" CONTROL CIRCUIT RANGE/PERFORMANCE, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

- Acceleration is poor during standing start.
- Shift control malfunction
- Engine speed increases abruptly.

WIRING DIAGRAM:

CVT control system <Ref. to WI(w/o HEV)-90, CVT Control System.>



	Step	Check	Yes	No
1	**CHECK DTC.** Read the DTC using Subaru Select Monitor.	Besides DTC P0961, is DTC P0962 or P0963 displayed?	Perform the diagnosis according to DTCs other than P0961.	Go to step **2**.
2	**CHECK SECONDARY SOLENOID (SYSTEM OPERATION CHECK MODE).** 1) Turn the ignition switch to ON. 2) Using the Subaru Select Monitor, perform forced operation of the secondary solenoid. <Ref. to CVT(w/o HEV)(diag)-24, System Operation Check Mode.>	Does the indication change as 300 → 500 → 700 mA during forced operation, and does «Sec. Sol. Actual Current» synchronize with «Sec. Sol. Set Current»?	Go to step **3**.	Go to step **4**.
3	**CHECK FOR POOR CONTACT.** Check for poor contact of harness and connector between TCM and secondary solenoid.	Is there poor contact?	Repair the poor contact of harness and connector.	Recheck the poor contact of harness and connector. Replace the TCM if no fault is found. <Ref. to CVT(TR580)-146, Transmission Control Module (TCM).>

	Step	Check	Yes	No
4	**CHECK SECONDARY SOLENOID.** 1) Turn the ignition switch to OFF. 2) Disconnect the transmission connector. 3) Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 6 — Transmission body:***	Is the resistance approx. 5 — 7 Ω? (when cold)	Replace the control valve body. <Ref. to CVT(TR580)-117, Control Valve Body.>	Repair or replace the harness.

AC:DTC P0962 SECONDARY SOLENOID CIRCUIT (LOW)

DTC DETECTING CONDITION:

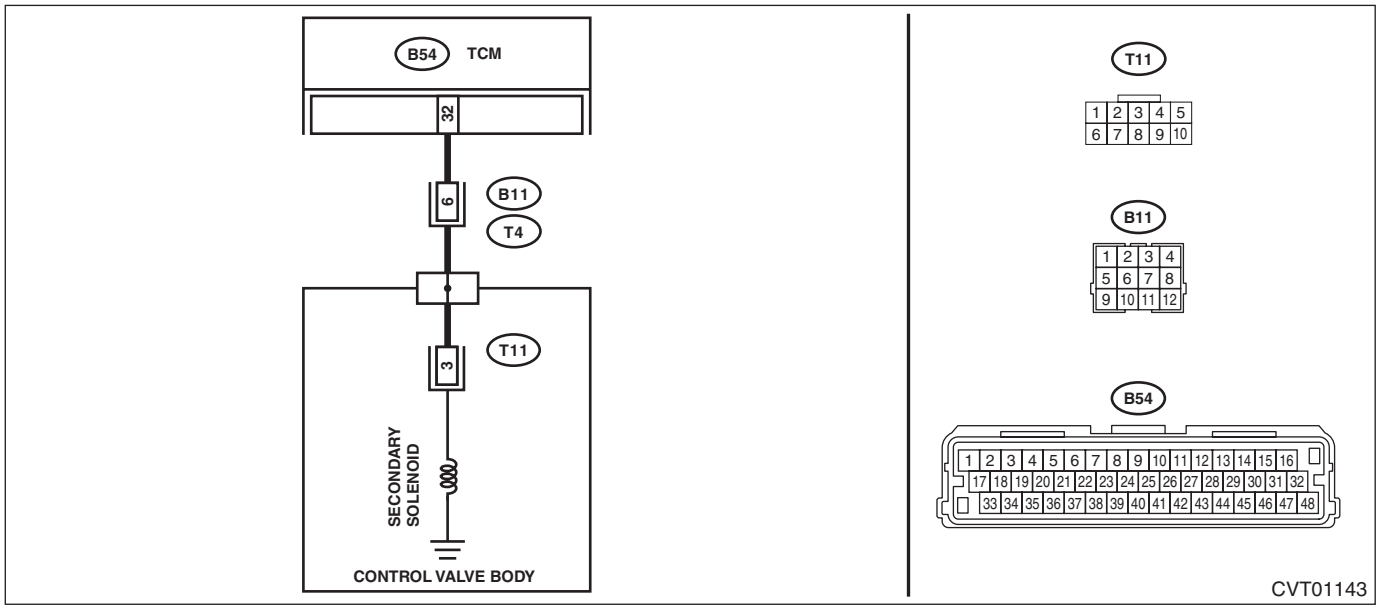
- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(CVT)(w/o HEV)-33, DTC P0962 SECONDARY SOLENOID CIRCUIT (LOW), Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

- Engine speed increases abruptly, and can not start.
- Engine speed increases abruptly during driving.

WIRING DIAGRAM:

CVT control system <Ref. to WI(w/o HEV)-90, CVT Control System.>



	Step	Check	Yes	No
1	**CHECK INPUT SIGNAL FOR TCM.** 1) After driving with warm up condition, park the vehicle while depressing the brake pedal at "N" range. 2) Read the data of «Sec. Sol. Set Current» and «Sec. Sol. Actual Current» using Subaru Select Monitor.	Does the value of «Sec. Sol. Set Current» and «Sec. Sol. Actual Current» almost correspond?	Check for poor contact of connector.	Go to step **2**.
2	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the TCM and transmission connectors. 3) Measure the resistance between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 32 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **3**.	Repair the short circuit of harness.
3	**CHECK SECONDARY SOLENOID.** Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 6 — Transmission body:***	Is the resistance approx. 5 — 7 Ω? (when cold)	Check for poor contact of connector, and if no fault is found, replace the TCM. <Ref. to CVT(TR580)-146, Transmission Control Module (TCM).>	Go to step **4**.

	Step	Check	Yes	No
4	**CHECK HARNESS INSIDE TRANSMISSION.** **CAUTION:** **Start work after ATF cools down.** 1) Remove the transmission valve cover. 2) Check for the harness pinch, damage.	Is there any fault in the harness?	Replace the transmission harness.	Go to step **5**.
5	**CHECK HARNESS INSIDE TRANSMISSION.** 1) Disconnect the control valve body connector. 2) Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 6 — Transmission body:***	Is the resistance 1 MΩ or more?	Replace the control valve body. <Ref. to CVT(TR580)-117, Control Valve Body.>	Replace the transmission harness.

AD:DTC P0963 SECONDARY SOLENOID CIRCUIT (HIGH)

DTC DETECTING CONDITION:

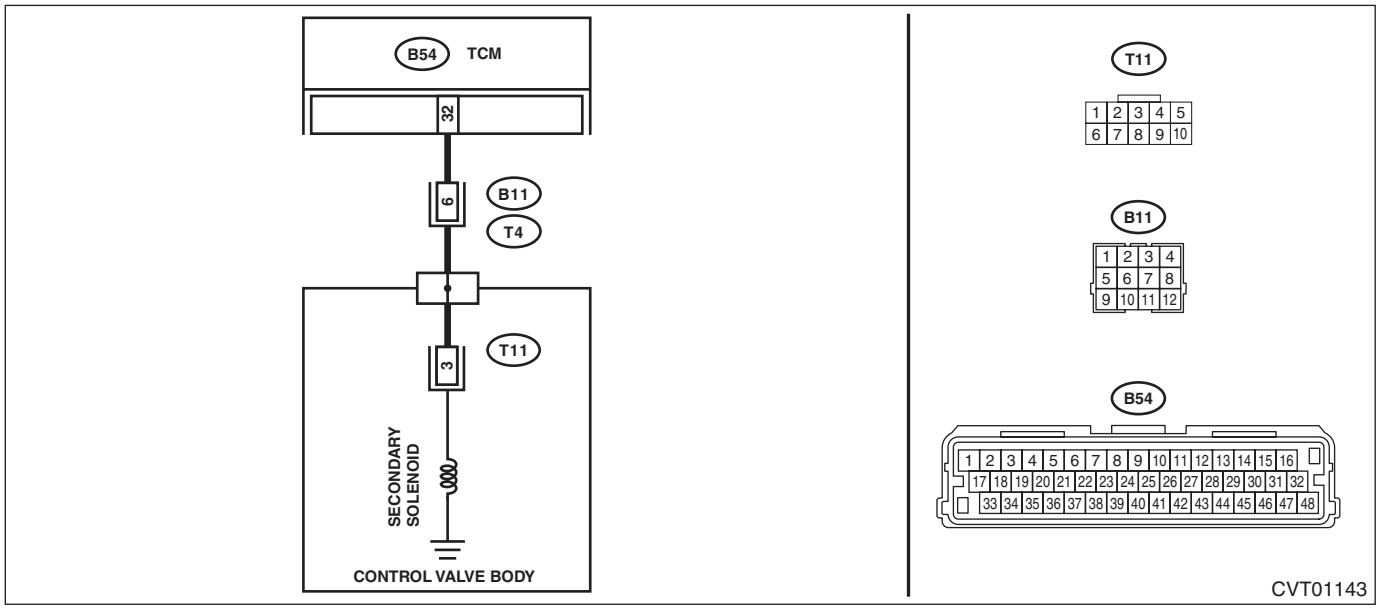
- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(CVT)(w/o HEV)-34, DTC P0963 SECONDARY SOLENOID CIRCUIT (HIGH), Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

- Engine speed increases abruptly, and can not start.
- Engine speed increases abruptly during driving.

WIRING DIAGRAM:

CVT control system <Ref. to WI(w/o HEV)-90, CVT Control System.>



	Step	Check	Yes	No
1	**CHECK INPUT SIGNAL FOR TCM.** 1) After driving with warm up condition, park the vehicle while depressing the brake pedal at "N" range. 2) Read the data of «Sec. Sol. Set Current» and «Sec. Sol. Actual Current» using Subaru Select Monitor.	Does the value of «Sec. Sol. Set Current» and «Sec. Sol. Actual Current» almost correspond?	Check for poor contact of connector.	Go to step **2**.
2	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the TCM and transmission connectors. 3) Measure the resistance between TCM connector and transmission connectors. ***Connector & terminal*** ***(B54) No. 32 — (B11) No. 6:***	Is the resistance less than 1 Ω?	Go to step **3**.	Repair the open circuit of harness.
3	**CHECK HARNESS.** 1) Turn the ignition switch to ON. 2) Measure the voltage between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 32 (+) — Chassis ground (–):***	Is the voltage approx. 0 V?	Go to step **4**.	Repair the short circuit of harness.

	Step	Check	Yes	No
4	**CHECK SECONDARY SOLENOID.** Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 6 — Transmission body:***	Is the resistance approx. 5 — 7 Ω? (when cold)	Check for poor contact of connector, and if no fault is found, replace the TCM. <Ref. to CVT(TR580)-146, Transmission Control Module (TCM).>	Go to step **5**.
5	**CHECK HARNESS INSIDE TRANSMISSION.** **CAUTION:** **Start work after ATF cools down.** 1) Remove the transmission valve cover. 2) Check for the harness pinch, damage.	Is there any fault in the harness?	Replace the transmission harness.	Go to step **6**.
6	**CHECK HARNESS INSIDE TRANSMISSION.** 1) Disconnect the control valve body connector. 2) Turn the ignition switch to ON. 3) Measure the voltage between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 6 (+) — Transmission body (–):***	Is the voltage approx. 0 V?	Replace the control valve body. <Ref. to CVT(TR580)-117, Control Valve Body.>	Replace the transmission harness.

AE:DTC P0965 FORWARD & REVERSE SOLENOID FUNCTION

DTC DETECTING CONDITION:

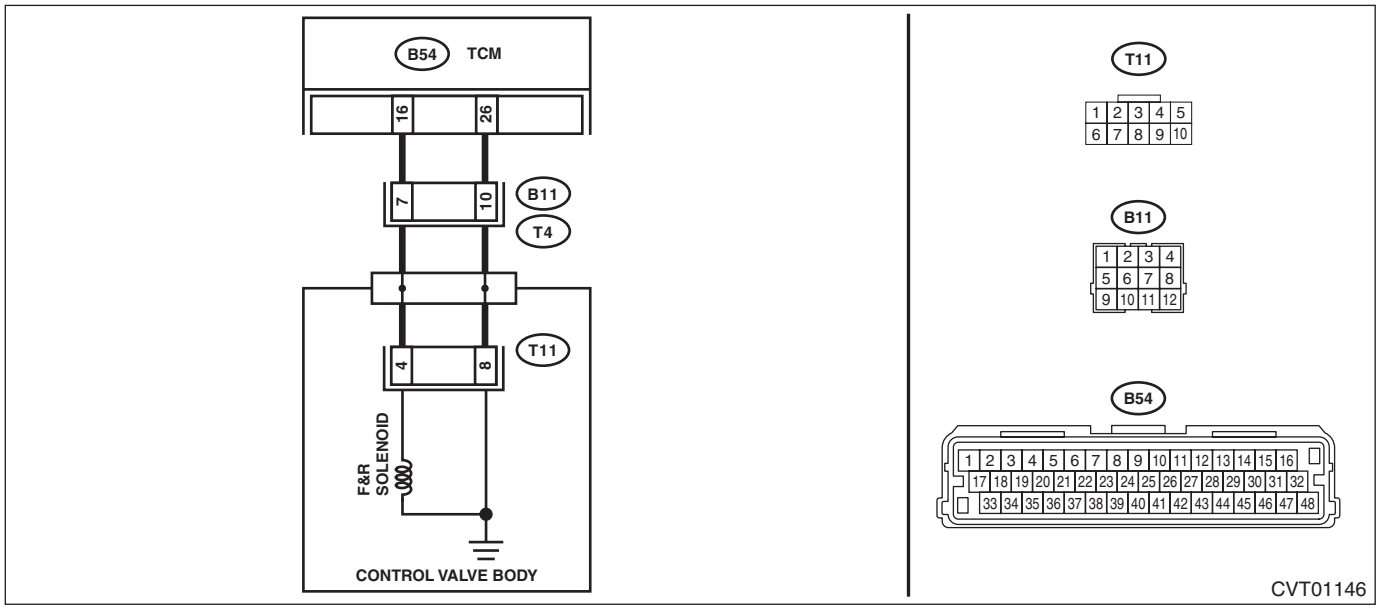
- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(CVT)(w/o HEV)-35, DTC P0965 FORWARD & REVERSE SOLENOID FUNCTION, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

- Engine speed increases abruptly, and can not accelerate.
- Excessive slippage is felt.

WIRING DIAGRAM:

CVT control system <Ref. to WI(w/o HEV)-90, CVT Control System.>



	Step	Check	Yes	No
1	**CHECK DTC.** Read the DTC using Subaru Select Monitor.	Besides DTC P0965, is any of the DTC P0717, P0966, P0967 or P2747 displayed?	Perform the diagnosis according to DTCs other than P0965.	Go to step **2**.
2	**CHECK F&R SOLENOID (SYSTEM OPERATION CHECK MODE).** 1) Turn the ignition switch to ON. 2) Using the Subaru Select Monitor, perform forced operation of the F&R solenoid. <Ref. to CVT(w/o HEV)(diag)-24, System Operation Check Mode.>	Does the indication change as 300 → 500 → 700 mA during forced operation, and does «F&R Linear Solenoid Actual Current» synchronize with «F&R Linear Solenoid Set Current»?	Go to step **3**.	Go to step **4**.
3	**CHECK FOR POOR CONTACT.** Check for poor contact of harness and connector between TCM and F&R solenoid.	Is there poor contact?	Repair the poor contact of harness and connector.	Recheck the poor contact of harness and connector. Replace the TCM if no fault is found. <Ref. to CVT(TR580)-146, Transmission Control Module (TCM).>

	Step	Check	Yes	No
4	**CHECK F&R SOLENOID.** 1) Turn the ignition switch to OFF. 2) Disconnect the transmission connector. 3) Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 7 — Transmission body:***	Is the resistance approx. 4 — 6 Ω? (when cold)	Replace the control valve body. <Ref. to CVT(TR580)-117, Control Valve Body.>	Repair or replace the harness.

AF:DTC P0966 FORWARD & REVERSE SOLENOID CIRCUIT (LOW)

DTC DETECTING CONDITION:

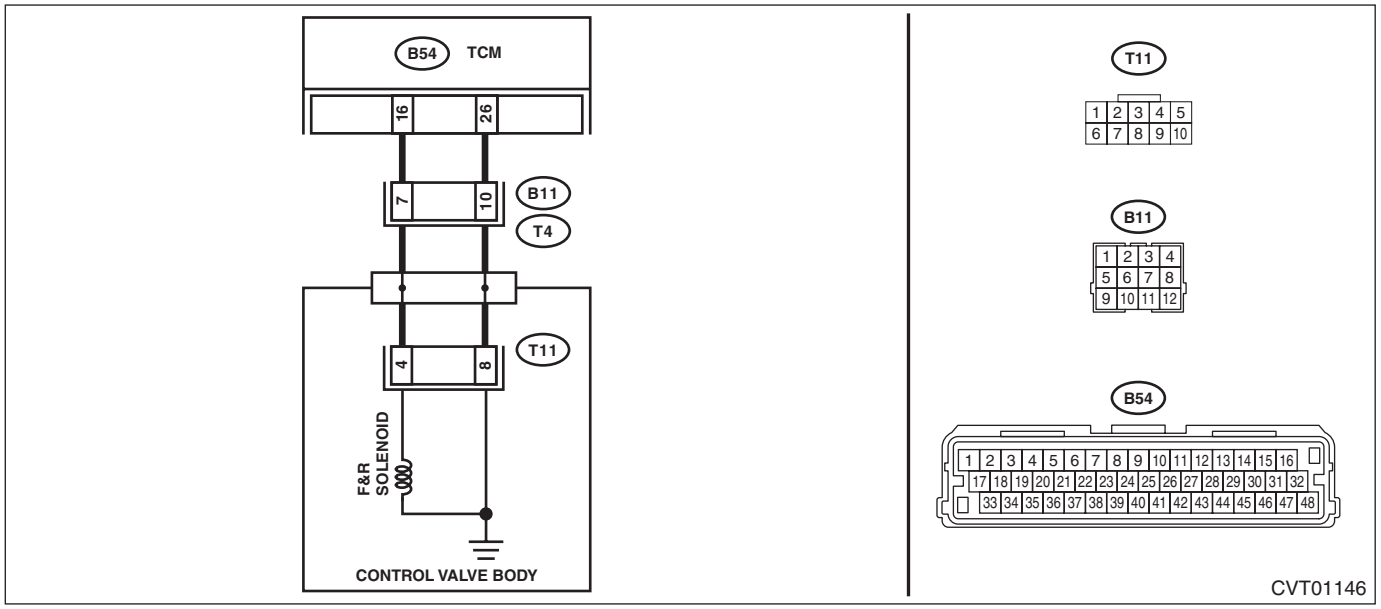
- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(CVT)(w/o HEV)-36, DTC P0966 FORWARD & REVERSE SOLENOID CIRCUIT (LOW), Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

Excessive shift shock

WIRING DIAGRAM:

CVT control system <Ref. to WI(w/o HEV)-90, CVT Control System.>



	Step	Check	Yes	No
1	**CHECK INPUT SIGNAL FOR TCM.** 1) After driving with warm up condition, park the vehicle while depressing the brake pedal at "D" range. 2) Read the data of «F&R Linear Solenoid Set Current» and «F&R Linear Solenoid Actual Current» using Subaru Select Monitor.	Does the value of «F&R Linear Solenoid Set Current» and «F&R Linear Solenoid Actual Current» almost correspond?	Check for poor contact of connector.	Go to step **2**.
2	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the TCM and transmission connectors. 3) Measure the resistance between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 16 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **3**.	Repair the short circuit of harness.
3	**CHECK F&R SOLENOID.** Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 7 — Transmission body:***	Is the resistance approx. 4 — 6 Ω? (when cold)	Check for poor contact of connector, and if no fault is found, replace the TCM. <Ref. to CVT(TR580)-146, Transmission Control Module (TCM).>	Go to step **4**.

	Step	Check	Yes	No
4	**CHECK HARNESS INSIDE TRANSMISSION.** **CAUTION:** **Start work after ATF cools down.** 1) Remove the transmission valve cover. 2) Check for the harness pinch, damage.	Is there any fault in the harness?	Replace the transmission harness.	Go to step **5**.
5	**CHECK HARNESS INSIDE TRANSMISSION.** 1) Disconnect the control valve body connector. 2) Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 7 — Transmission body:***	Is the resistance 1 MΩ or more?	Replace the control valve body. <Ref. to CVT(TR580)-117, Control Valve Body.>	Replace the transmission harness.

AG:DTC P0967 FORWARD & REVERSE LINEAR SOLENOID CIRCUIT (HIGH)

DTC DETECTING CONDITION:

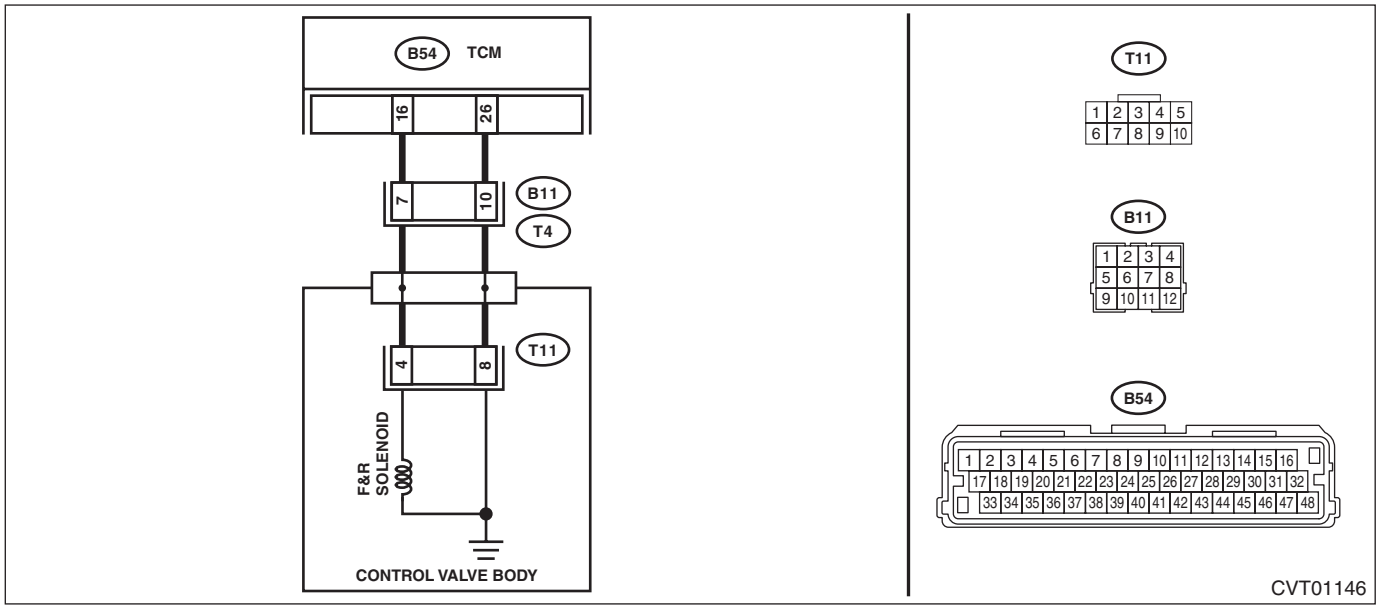
- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(CVT)(w/o HEV)-37, DTC P0967 FORWARD & REVERSE LINEAR SOLENOID CIRCUIT (HIGH), Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

Engine speed increases abruptly, and can not start.

WIRING DIAGRAM:

CVT control system <Ref. to WI(w/o HEV)-90, CVT Control System.>



Step		Check	Yes	No
1	**CHECK INPUT SIGNAL FOR TCM.** 1) After driving with warm up condition, park the vehicle while depressing the brake pedal at "D" range. 2) Read the data of «F&R Linear Solenoid Set Current» and «F&R Linear Solenoid Actual Current» using Subaru Select Monitor.	Does the value of «F&R Linear Solenoid Set Current» and «F&R Linear Solenoid Actual Current» almost correspond?	Check for poor contact of connector.	Go to step **2**.
2	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the TCM and transmission connectors. 3) Measure the resistance between TCM connector and transmission connectors. ***Connector & terminal*** ***(B54) No. 16 — (B11) No. 7:***	Is the resistance less than 1 Ω?	Go to step **3**.	Repair the open circuit of harness.
3	**CHECK HARNESS.** 1) Turn the ignition switch to ON. 2) Measure the voltage between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 16 (+) — Chassis ground (–):***	Is the voltage approx. 0 V?	Go to step **4**.	Repair the short circuit of harness.

	Step	Check	Yes	No
4	**CHECK F&R SOLENOID.** Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 7 — Transmission body:***	Is the resistance approx. 4 — 6 Ω? (when cold)	Check for poor contact of connector, and if no fault is found, replace the TCM. <Ref. to CVT(TR580)-146, Transmission Control Module (TCM).>	Go to step **5**.
5	**CHECK HARNESS INSIDE TRANSMISSION.** **CAUTION:** **Start work after ATF cools down.** 1) Remove the transmission valve cover. 2) Check for the harness pinch, damage.	Is there any fault in the harness?	Replace the transmission harness.	Go to step **6**.
6	**CHECK HARNESS INSIDE TRANSMISSION.** 1) Disconnect the control valve body connector. 2) Turn the ignition switch to ON. 3) Measure the voltage between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 7 (+) — Transmission body (–):***	Is the voltage approx. 0 V?	Replace the control valve body. <Ref. to CVT(TR580)-117, Control Valve Body.>	Replace the transmission harness.

AH:DTC P0970 TRANSFER SOLENOID CIRCUIT (LOW)

DTC DETECTING CONDITION:

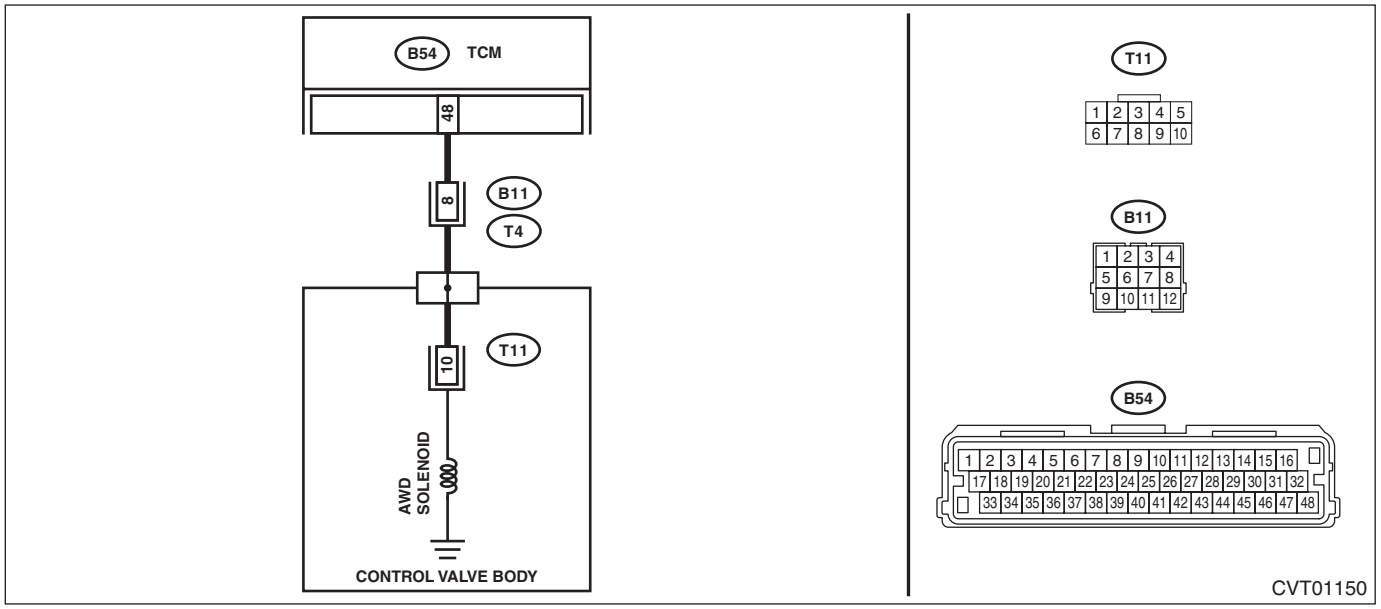
- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(CVT)(w/o HEV)-38, DTC P0970 TRANSFER SOLENOID CIRCUIT (LOW), Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

Drivability getting worse.

WIRING DIAGRAM:

CVT control system <Ref. to WI(w/o HEV)-90, CVT Control System.>



	Step	Check	Yes	No
1	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the TCM and transmission connectors. 3) Measure the resistance between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 48 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **2**.	Repair the short circuit of harness.
2	**CHECK AWD SOLENOID.** Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 8 — Transmission body:***	Is the resistance approx. 2 — 4.5 Ω? (when cold)	Check for poor contact of connector, and if no fault is found, replace the TCM. <Ref. to CVT(TR580)-146, Transmission Control Module (TCM).>	Go to step **3**.
3	**CHECK HARNESS INSIDE TRANSMISSION.** **CAUTION:** **Start work after ATF cools down.** 1) Remove the transmission valve cover. 2) Check for the harness pinch, damage.	Is there any fault in the harness?	Replace the transmission harness.	Go to step **4**.

	Step	Check	Yes	No
4	**CHECK HARNESS INSIDE TRANSMISSION.** 1) Disconnect the control valve body connector. 2) Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 8 — Transmission body:***	Is the resistance 1 MΩ or more?	Replace the control valve body. <Ref. to CVT(TR580)-117, Control Valve Body.>	Replace the transmission harness.

AI: DTC P0971 TRANSFER SOLENOID CIRCUIT (HIGH)

DTC DETECTING CONDITION:

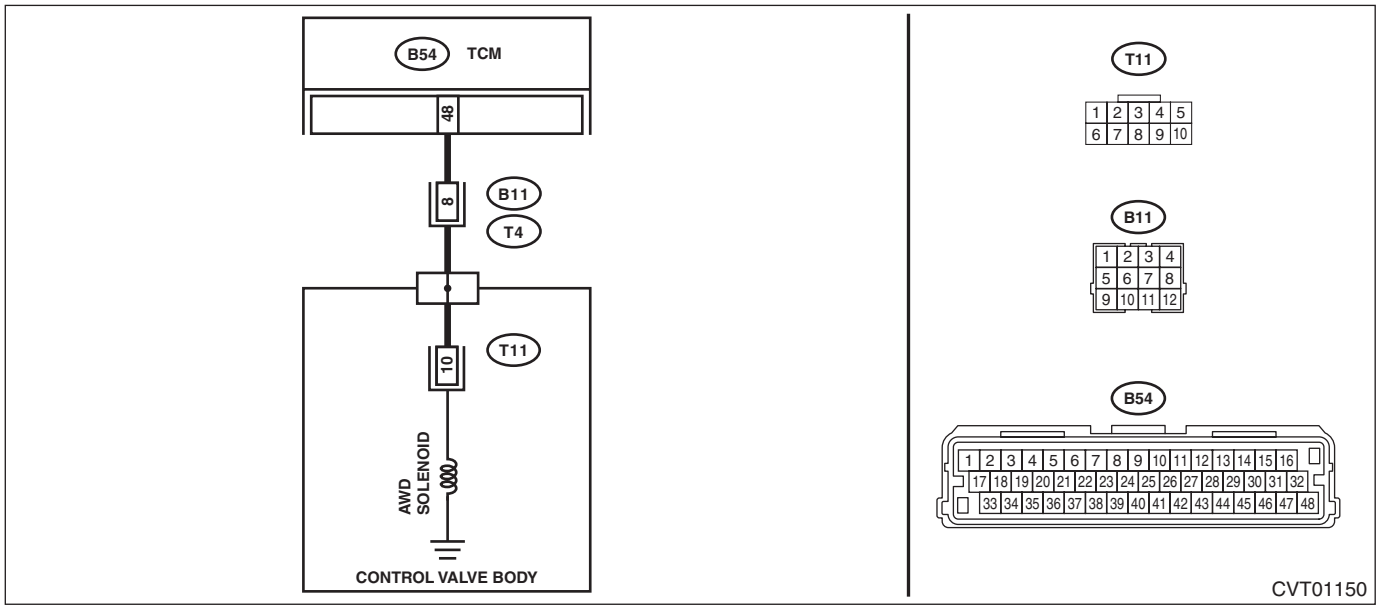
- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(CVT)(w/o HEV)-39, DTC P0971 TRANSFER SOLENOID CIRCUIT (HIGH), Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

- Tight corner braking phenomenon occurs.
- Drivability getting worse.

WIRING DIAGRAM:

CVT control system <Ref. to WI(w/o HEV)-90, CVT Control System.>



Step		Check	Yes	No
1	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the TCM and transmission connectors. 3) Measure the resistance between TCM connector and transmission connectors. ***Connector & terminal*** ***(B54) No. 48 — (B11) No. 8:***	Is the resistance less than 1 Ω?	Go to step **2**.	Repair the open circuit of harness.
2	**CHECK HARNESS.** 1) Turn the ignition switch to ON. 2) Measure the voltage between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 48 (+) — Chassis ground (–):***	Is the voltage approx. 0 V?	Go to step **3**.	Repair the short circuit of harness.
3	**CHECK AWD SOLENOID.** Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 8 — Transmission body:***	Is the resistance approx. 2 — 4.5 Ω? (when cold)	Check for poor contact of connector, and if no fault is found, replace the TCM. <Ref. to CVT(TR580)-146, Transmission Control Module (TCM).>	Go to step **4**.

	Step	Check	Yes	No
4	**CHECK HARNESS INSIDE TRANSMISSION.** **CAUTION:** **Start work after ATF cools down.** 1) Remove the transmission valve cover. 2) Check for the harness pinch, damage.	Is there any fault in the harness?	Replace the transmission harness.	Go to step **5**.
5	**CHECK HARNESS INSIDE TRANSMISSION.** 1) Disconnect the control valve body connector. 2) Turn the ignition switch to ON. 3) Measure the voltage between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 8 (+) — Transmission body (–):***	Is the voltage approx. 0 V?	Replace the control valve body. <Ref. to CVT(TR580)-117, Control Valve Body.>	Replace the transmission harness.

AJ:DTC P0973 PRIMARY SOLENOID SYSTEM A CIRCUIT (LOW)

DTC DETECTING CONDITION:

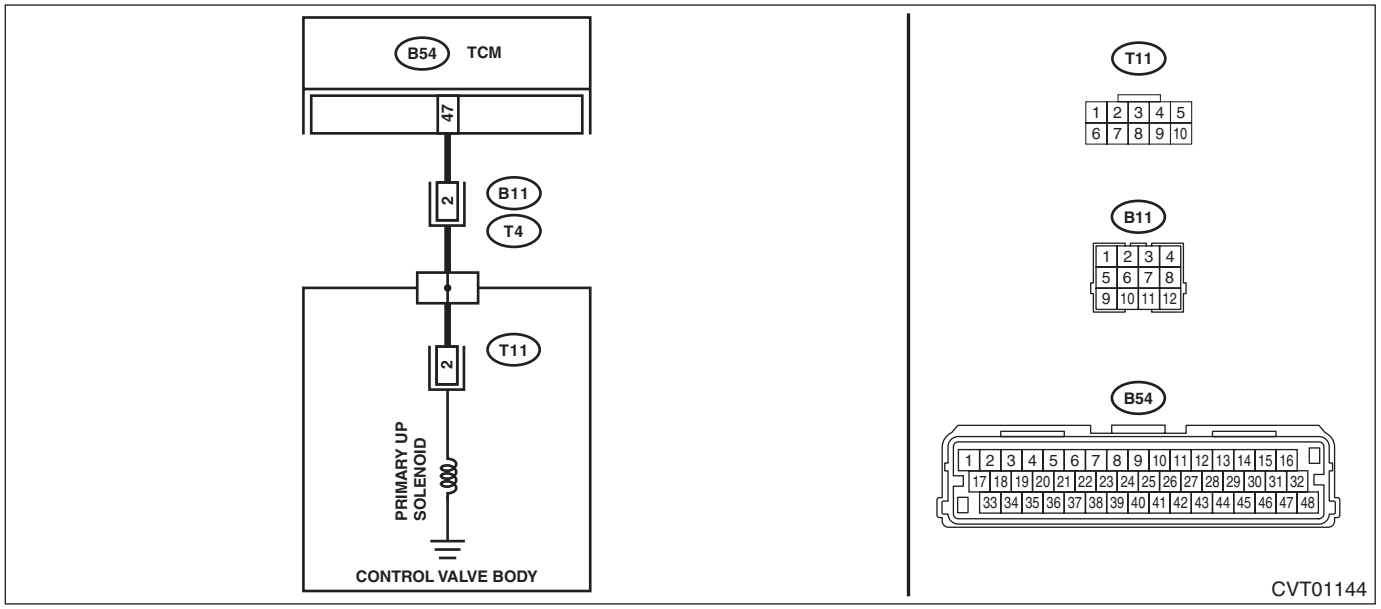
- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(CVT)(w/o HEV)-40, DTC P0973 PRIMARY SOLENOID SYSTEM A CIRCUIT (LOW), Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

Gear is not changed. (No up-shift)

WIRING DIAGRAM:

CVT control system <Ref. to WI(w/o HEV)-90, CVT Control System.>



Step		Check	Yes	No
1	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the TCM and transmission connectors. 3) Measure the resistance between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 47 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **2**.	Repair the short circuit of harness.
2	**CHECK PRIMARY UP SOLENOID.** Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 2 — Transmission body:***	Is the resistance approx. 10 — 13.5 Ω? (when cold)	Check for poor contact of connector, and if no fault is found, replace the TCM. <Ref. to CVT(TR580)-146, Transmission Control Module (TCM).>	Go to step **3**.
3	**CHECK HARNESS INSIDE TRANSMISSION.** **CAUTION:** **Start work after ATF cools down.** 1) Remove the transmission valve cover. 2) Check for the harness pinch, damage.	Is there any fault in the harness?	Replace the transmission harness.	Go to step **4**.

	Step	Check	Yes	No
4	**CHECK HARNESS INSIDE TRANSMISSION.** 1) Disconnect the control valve body connector. 2) Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 2 — Transmission body:***	Is the resistance 1 MΩ or more?	Replace the control valve body. <Ref. to CVT(TR580)-117, Control Valve Body.>	Replace the transmission harness.

AK:DTC P0974 PRIMARY SOLENOID SYSTEM A CIRCUIT (HIGH)

DTC DETECTING CONDITION:

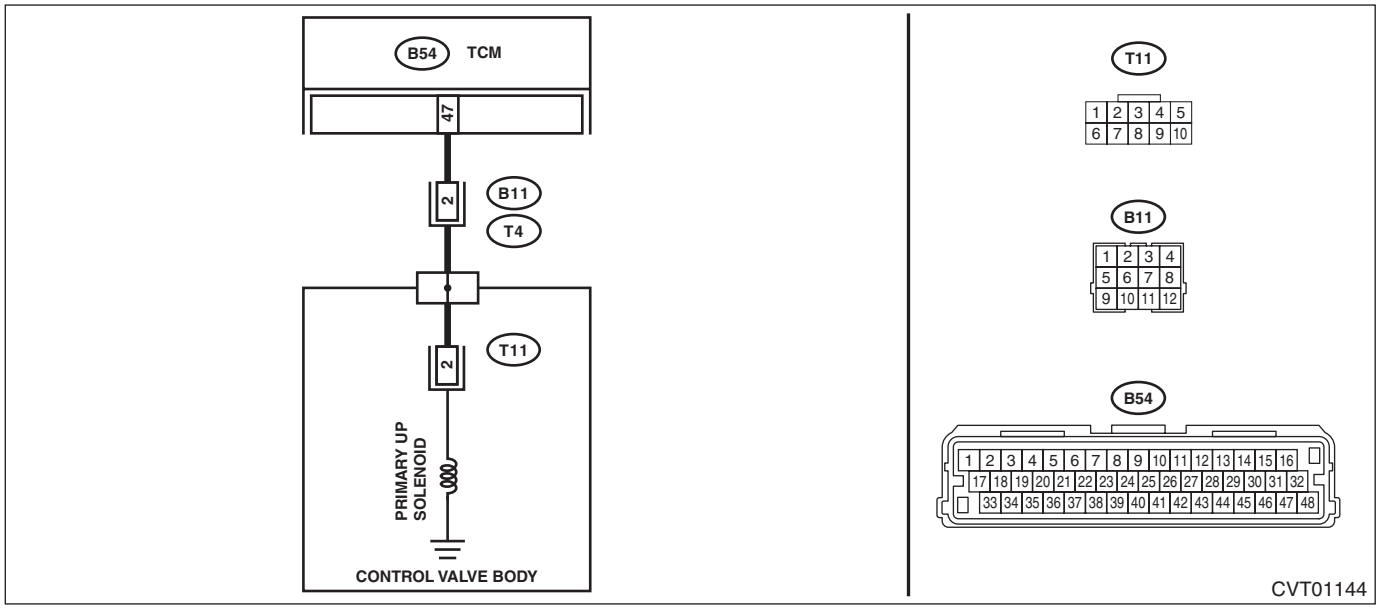
- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(CVT)(w/o HEV)-41, DTC P0974 PRIMARY SOLENOID SYSTEM A CIRCUIT (HIGH), Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

Gear is not changed. (No up-shift)

WIRING DIAGRAM:

CVT control system <Ref. to WI(w/o HEV)-90, CVT Control System.>



Step		Check	Yes	No
1	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the TCM and transmission connectors. 3) Measure the resistance between TCM connector and transmission connectors. ***Connector & terminal*** ***(B54) No. 47 — (B11) No. 2:***	Is the resistance less than 1 Ω?	Go to step **2**.	Repair the open circuit of harness.
2	**CHECK HARNESS.** 1) Turn the ignition switch to ON. 2) Measure the voltage between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 47 (+) — Chassis ground (–):***	Is the voltage approx. 0 V?	Go to step **3**.	Repair the short circuit of harness.
3	**CHECK PRIMARY UP SOLENOID.** Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 2 — Transmission body:***	Is the resistance approx. 10 — 13.5 Ω? (when cold)	Check for poor contact of connector, and if no fault is found, replace the TCM. <Ref. to CVT(TR580)-146, Transmission Control Module (TCM).>	Go to step **4**.
4	**CHECK HARNESS INSIDE TRANSMISSION.** **CAUTION:** **Start work after ATF cools down.** 1) Remove the transmission valve cover. 2) Check for the harness pinch, damage.	Is there any fault in the harness?	Replace the transmission harness.	Go to step **5**.

	Step	Check	Yes	No
5	**CHECK HARNESS INSIDE TRANSMISSION.** 1) Disconnect the control valve body connector. 2) Turn the ignition switch to ON. 3) Measure the voltage between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 2 (+) — Transmission body (–):***	Is the voltage approx. 0 V?	Replace the control valve body. <Ref. to CVT(TR580)-117, Control Valve Body.>	Replace the transmission harness.

AL:DTC P0976 PRIMARY SOLENOID SYSTEM B CIRCUIT (LOW)

DTC DETECTING CONDITION:

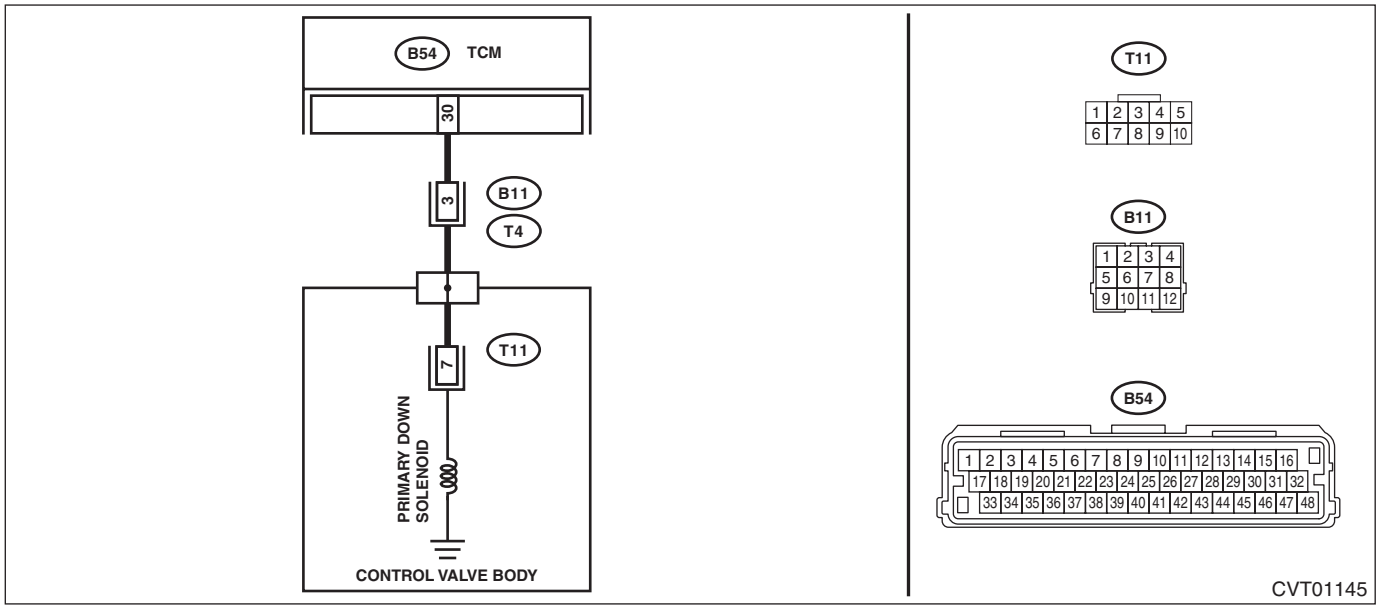
- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(CVT)(w/o HEV)-42, DTC P0976 PRIMARY SOLENOID SYSTEM B CIRCUIT (LOW), Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

Gear is not changed. (No down-shift)

WIRING DIAGRAM:

CVT control system <Ref. to WI(w/o HEV)-90, CVT Control System.>



	Step	Check	Yes	No
1	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the TCM and transmission connectors. 3) Measure the resistance between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 30 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **2**.	Repair the short circuit of harness.
2	**CHECK PRIMARY DOWN SOLENOID.** Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 3 — Transmission body:***	Is the resistance approx. 10 — 13.5 Ω? (when cold)	Check for poor contact of connector, and if no fault is found, replace the TCM. <Ref. to CVT(TR580)-146, Transmission Control Module (TCM).>	Go to step **3**.
3	**CHECK HARNESS INSIDE TRANSMISSION.** **CAUTION:** **Start work after ATF cools down.** 1) Remove the transmission valve cover. 2) Check for the harness pinch, damage.	Is there any fault in the harness?	Replace the transmission harness.	Go to step **4**.

	Step	Check	Yes	No
4	**CHECK HARNESS INSIDE TRANSMISSION.** 1) Disconnect the control valve body connector. 2) Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 3 — Transmission body:***	Is the resistance 1 MΩ or more?	Replace the control valve body. <Ref. to CVT(TR580)-117, Control Valve Body.>	Replace the transmission harness.

AM:DTC P0977 PRIMARY SOLENOID SYSTEM B CIRCUIT (HIGH)

DTC DETECTING CONDITION:

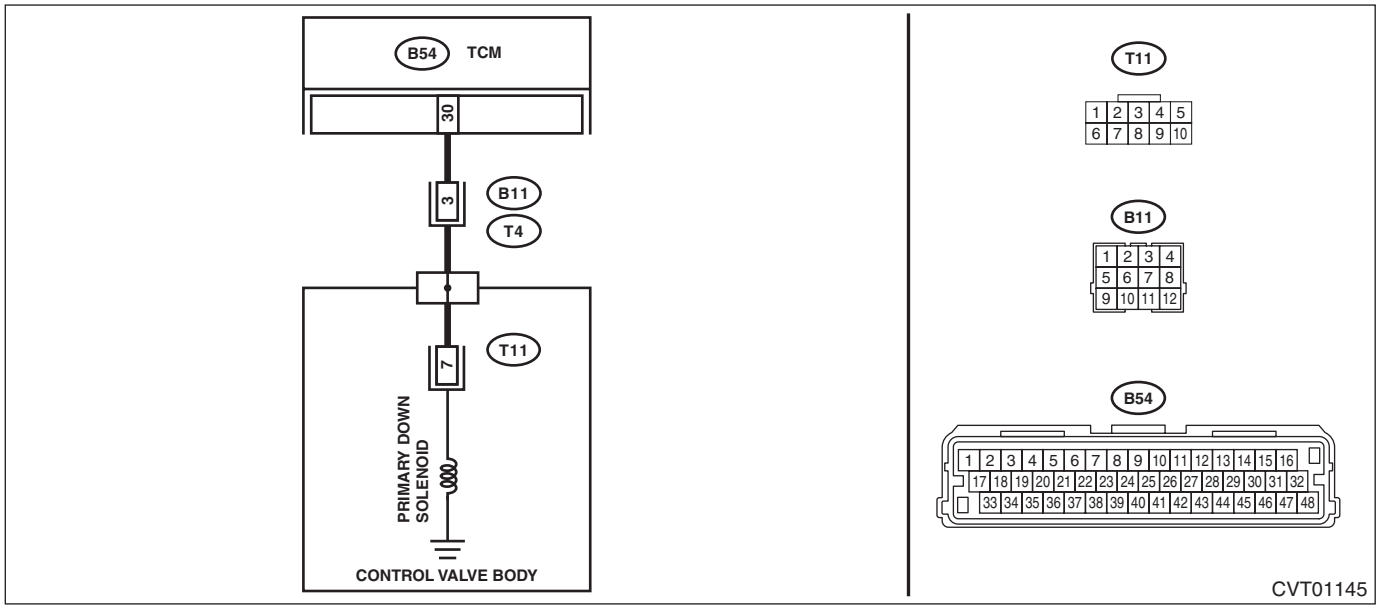
- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(CVT)(w/o HEV)-43, DTC P0977 PRIMARY SOLENOID SYSTEM B CIRCUIT (HIGH), Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

Gear is not changed. (No down-shift)

WIRING DIAGRAM:

CVT control system <Ref. to WI(w/o HEV)-90, CVT Control System.>



	Step	Check	Yes	No
1	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the TCM and transmission connectors. 3) Measure the resistance between TCM connector and transmission connectors. ***Connector & terminal*** ***(B54) No. 30 — (B11) No. 3:***	Is the resistance less than 1 Ω?	Go to step **2**.	Repair the open circuit of harness.
2	**CHECK HARNESS.** 1) Turn the ignition switch to ON. 2) Measure the voltage between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 30 (+) — Chassis ground (–):***	Is the voltage approx. 0 V?	Go to step **3**.	Repair the short circuit of harness.
3	**CHECK PRIMARY DOWN SOLENOID.** Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 3 — Transmission body:***	Is the resistance approx. 10 — 13.5 Ω? (when cold)	Check for poor contact of connector, and if no fault is found, replace the TCM. <Ref. to CVT(TR580)-146, Transmission Control Module (TCM).>	Go to step **4**.
4	**CHECK HARNESS INSIDE TRANSMISSION.** **CAUTION:** **Start work after ATF cools down.** 1) Remove the transmission valve cover. 2) Check for the harness pinch, damage.	Is there any fault in the harness?	Replace the transmission harness.	Go to step **5**.

	Step	Check	Yes	No
5	**CHECK HARNESS INSIDE TRANSMISSION.** 1) Disconnect the control valve body connector. 2) Turn the ignition switch to ON. 3) Measure the voltage between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 3 (+) — Transmission body (–):***	Is the voltage approx. 0 V?	Replace the control valve body. <Ref. to CVT(TR580)-117, Control Valve Body.>	Replace the transmission harness.

AN:DTC P160A RANDOM ACCESS MEMORY (RAM) ERROR

DTC DETECTING CONDITION:

- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(CVT)(w/o HEV)-44, DTC P160A RANDOM ACCESS MEMORY (RAM) ERROR, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

TCM RAM malfunction

	Step	Check	Yes	No
1	**CHECK DTC.** 1) Perform the Clear Memory Mode using the Subaru Select Monitor. <Ref. to CVT(w/o HEV)(diag)-18, Clear Memory Mode.> 2) Read the DTC.	Is DTC P160A displayed?	Replace the TCM. <Ref. to CVT(TR580)-146, Transmission Control Module (TCM).>	Current condition is normal. Check for interference from noise, etc.

AO:DTC P170A L-RANGE SW SYSTEM

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(CVT)(w/o HEV)-45, DTC P170A L-RANGE SW SYSTEM, Diagnostic Trouble Code (DTC) Detecting Criteria.>

NOTE:

Refer to “DTC P0951 MANUAL SWITCH” for diagnostic procedure. <Ref. to CVT(w/o HEV)(diag)-82, DTC P0951 MANUAL SWITCH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

AP:DTC P2158 VEHICLE SPEED SENSOR "B"

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(CVT)(w/o HEV)-46, DTC P2158 VEHICLE SPEED SENSOR "B", Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

VDC does not operate.

	Step	Check	Yes	No
1	**CHECK DTC.** Read the DTC of VDC system using the Subaru Select Monitor.	Is DTC displayed?	Perform the diagnosis according to DTC. <Ref. to VDC(diag)-40, List of Diagnostic Trouble Code (DTC).>	Repair the poor contact of connector and harness between VDCCM&H/U and wheel speed sensor.

AQ:DTC P2530 IGNITION SWITCH RUN POSITION CIRCUIT

DTC DETECTING CONDITION:

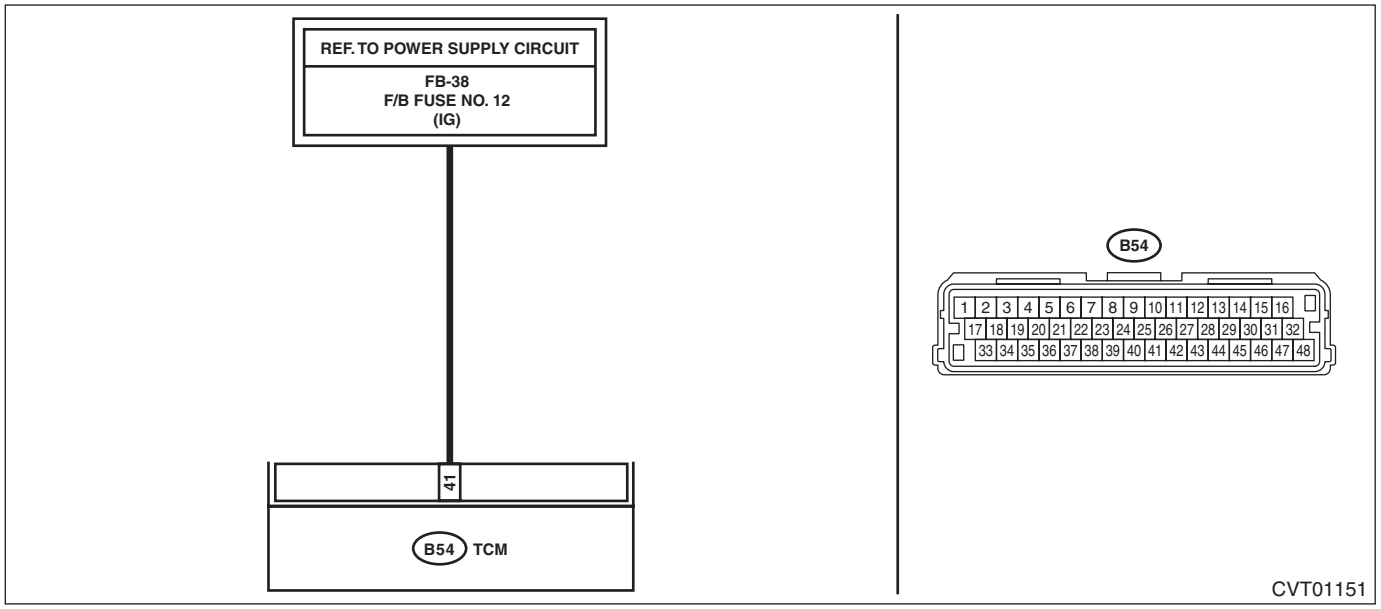
- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(CVT)(w/o HEV)-47, DTC P2530 IGNITION SWITCH RUN POSITION CIRCUIT, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

Faulty TCM operation

WIRING DIAGRAM:

CVT control system <Ref. to WI(w/o HEV)-90, CVT Control System.>



Step		Check	Yes	No
1	**CHECK CONNECTOR.** Check the installing condition of TCM connector.	Is the TCM connector installed properly?	Go to step **2**.	Install the TCM connector.

	Step	Check	Yes	No
2	**CHECK INPUT VOLTAGE OF TCM.** 1) Turn the ignition switch to ON. 2) Measure the voltage between TCM connector and chassis ground. (While wiggling the harness) ***Connector & terminal*** ***(B54) No. 41 (+) — Chassis ground (–):***	Is the voltage 8 V or more?	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, the following items may be the cause of fault. • Open circuit or short circuit to ground of harness between TCM connector and ignition switch connector (IG relay 1 connector for model with push button start) • Poor contact of ignition switch connector (IG relay 1 connector for model with push button start) • Poor contact of ignition switch (IG relay 1 for model with push button start)	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit or short circuit to ground of harness between TCM connector and ignition switch connector (IG relay 1 connector for model with push button start) • Poor contact of ignition switch connector (IG relay 1 connector for model with push button start) • Poor contact of ignition switch (IG relay 1 for model with push button start)

AR:DTC P2746 PRIMARY PULLEY REVOLUTION SPEED SENSOR CIRCUIT

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(CVT)(w/o HEV)-48, DTC P2746 PRIMARY PULLEY REVOLUTION SPEED SENSOR CIRCUIT, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

- Standing start problems
- Shock occurs when engaging the lockup clutch.
- Shock occurs when selecting shift position.

Step		Check	Yes	No
1	**CHECK DTC.** Read the DTC using Subaru Select Monitor.	Besides DTC P2746, is DTC P2747 or P2751 displayed?	Perform the diagnosis according to DTCs other than P2746.	Perform the diagnosis according to DTC P2747. <Ref. to CVT(w/o HEV)(diag)-113, DTC P2747 INTERMEDIATE SHAFT SPEED SENSOR "B" CIRCUIT NO SIGNAL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

AS:DTC P2747 INTERMEDIATE SHAFT SPEED SENSOR "B" CIRCUIT NO SIGNAL

DTC DETECTING CONDITION:

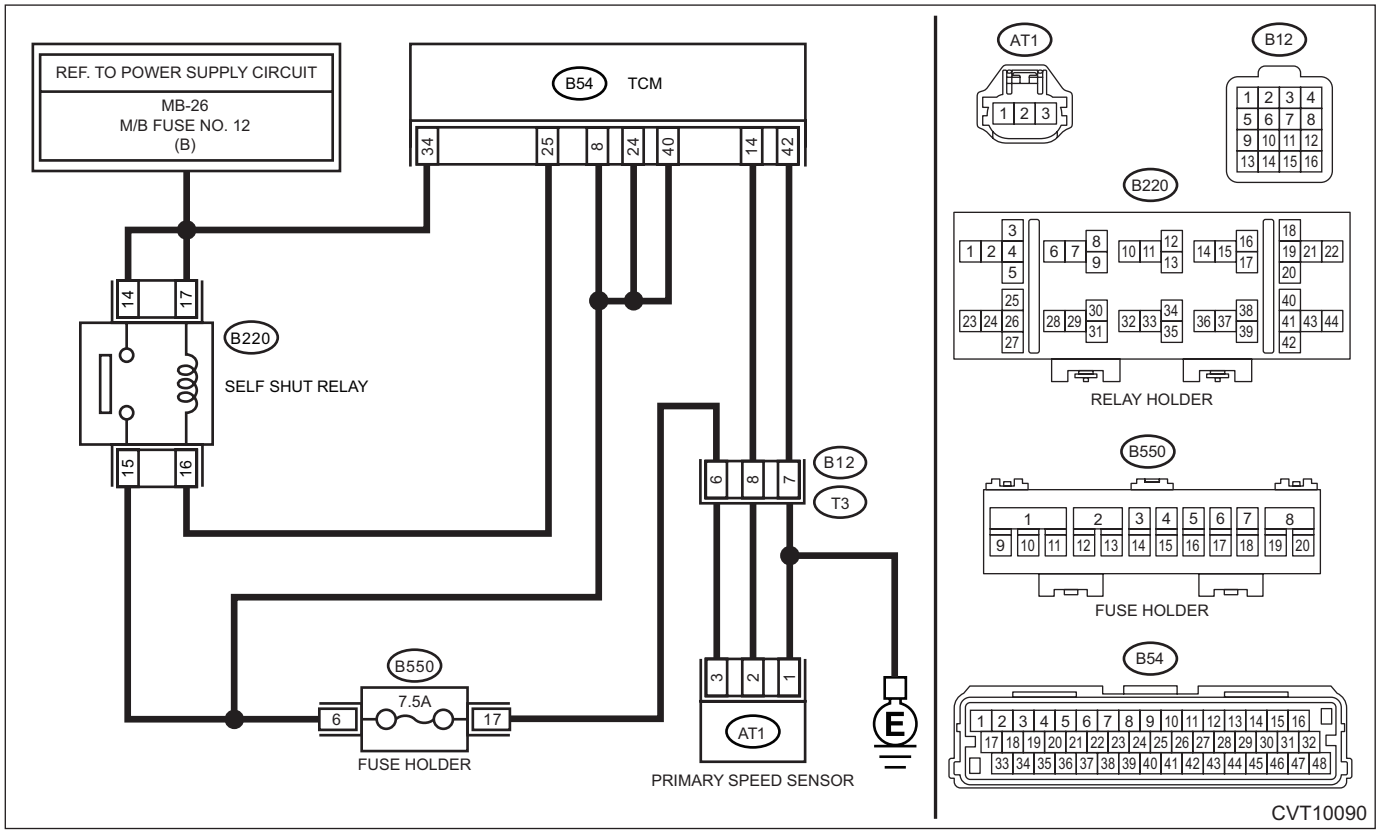
- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(CVT)(w/o HEV)-49, DTC P2747 INTERMEDIATE SHAFT SPEED SENSOR "B" CIRCUIT NO SIGNAL, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

- Standing start problems
- Shock occurs when engaging the lockup clutch.
- Shock occurs when selecting shift position.

WIRING DIAGRAM:

CVT control system <Ref. to WI(w/o HEV)-90, CVT Control System.>



Step		Check	Yes	No
1	**CHECK FUSE.** 1) Turn the ignition switch to OFF. 2) Remove the fuse (7.5 A) from the fuse holder.	Is the fuse OK?	Go to step **2**.	Replace the fuse. If the fuse blows out easily, repair the short circuit of harness.
2	**CHECK HARNESS.** 1) Disconnect the TCM and self shut relay connectors. 2) Measure the resistance between TCM connector and self shut relay connector. ***Connector & terminal*** ***(B54) No. 25 — (B220) No. 16:*** ***(B54) No. 8 — (B220) No. 15:*** ***(B54) No. 24 — (B220) No. 15:*** ***(B54) No. 40 — (B220) No. 15:***	Is the resistance less than 1 Ω?	Go to step **3**.	Repair the open circuit of harness.

	Step	Check	Yes	No
3	**CHECK HARNESS.** Measure the resistance between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 25 — Chassis ground:*** ***(B54) No. 8 — Chassis ground:*** ***(B54) No. 24 — Chassis ground:*** ***(B54) No. 40 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **4**.	Repair the short circuit of harness.
4	**CHECK RELAY POWER SUPPLY.** Measure the voltage between self shut relay connector and chassis ground. ***Connector & terminal*** ***(B220) No. 14 (+) — Chassis ground (–):*** ***(B220) No. 17 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **5**.	Repair the open or short circuit of harness.
5	**CHECK SELF SHUT RELAY.** Measure the resistance between self shut relay terminals. ***Terminals*** ***No. 16 — No. 17:***	Is the resistance 110 — 140 Ω?	Go to step **6**.	Replace the self shut relay.
6	**CHECK SELF SHUT RELAY.** Measure the resistance between self shut relay terminals. ***Terminals*** ***No. 14 — No. 15:***	Is the resistance 1 MΩ or more?	Go to step **7**.	Replace the self shut relay.
7	**CHECK INPUT SIGNAL FOR TCM.** 1) Connect the connectors of TCM and self shut relay. 2) Read the data of «Control module voltage» using Subaru Select Monitor.	Is the «Control module voltage» 10 V or more?	Current condition is normal. Check for poor contact in connectors or harnesses, and repair the defective part.	Go to step **8**.
8	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the TCM and transmission connectors. 3) Measure the resistance between TCM connector and transmission connectors. ***Connector & terminal*** ***(B54) No. 14 — (B12) No. 8:*** ***(B54) No. 42 — (B12) No. 7:*** ***(B550) No. 17 — (B12) No. 6:***	Is the resistance less than 1 Ω?	Go to step **9**.	Repair the open circuit of harness.
9	**CHECK HARNESS.** Measure the resistance between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 14 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **10**.	Repair the short circuit of harness.
10	**CHECK HARNESS.** Measure the resistance between self shut relay connector and fuse holder. ***Connector & terminal*** ***(B220) No. 15 — (B550) No. 6:***	Is the resistance less than 1 Ω?	Go to step **11**.	Repair the open circuit of harness.
11	**CHECK TRANSMISSION HARNESS.** 1) Install the fuse. 2) Connect the TCM connector. 3) Turn the ignition switch to ON. 4) Measure the voltage between transmission connector terminals. ***Connector & terminal*** ***(B12) No. 6 (+) — Chassis ground (–):***	Is the voltage 10 — 13 V?	Go to step **12**.	Repair the open circuit of harness or poor contact of connector.

	Step	Check	Yes	No
12	**CHECK INPUT SIGNAL FOR TCM.** 1) Turn the ignition switch to OFF. 2) Connect the transmission connector. 3) Lift up the vehicle. 4) Start the engine. 5) Set the select lever to “D” range. 6) Read the data of “Primary Pulley Speed” using Subaru Select Monitor.	Does the value of «Primary Pulley Speed» change according to those of «Turbine Revolution Speed»?	Current condition is normal. Repair the poor contacts of harnesses of primary speed sensor and transmission connector.	Go to step **13**.
13	**CHECK TRANSMISSION HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the transmission connector. 3) Disconnect the primary speed sensor connector. 4) Measure the resistance between transmission connector and primary speed sensor connector. ***Connector & terminal*** ***(T3) No. 6 — (AT1) No. 3:*** ***(T3) No. 7 — (AT1) No. 1:*** ***(T3) No. 8 — (AT1) No. 2:***	Is the resistance less than 1 Ω?	Go to step **14**.	Replace the transmission harness.
14	**CHECK PRIMARY SPEED SENSOR HARNESS.** Measure the resistance between transmission connector and chassis ground. ***Connector & terminal*** ***(T3) No. 6 — Chassis ground:*** ***(T3) No. 8 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **15**.	Repair the short circuit of harness.
15	**CHECK PRIMARY SPEED SENSOR.** 1) Turn the ignition switch to OFF. 2) Replace the primary speed sensor. <Ref. to CVT(TR580)-108, Primary Speed Sensor.> 3) Perform the Clear Memory Mode. <Ref. to CVT(w/o HEV)(diag)-18, Clear Memory Mode.> 4) Read the DTC.	Is DTC P2747 displayed?	Go to step **16**.	The original primary speed sensor is defective.
16	**CHECK SELF SHUT RELAY.** 1) Turn the ignition switch to OFF. 2) Replace the self shut relay. 3) Perform the Clear Memory Mode. <Ref. to CVT(w/o HEV)(diag)-18, Clear Memory Mode.> 4) Read the DTC.	Is DTC P2747 displayed?	Replace the TCM. <Ref. to CVT(TR580)-146, Transmission Control Module (TCM).>	The original self shut relay is defective.

AT:DTC P2750 SEC. PULLEY REVOLUTION SPEED SENSOR CIRCUIT

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(CVT)(w/o HEV)-50, DTC P2750 SEC. PULLEY REVOLUTION SPEED SENSOR CIRCUIT, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

- Shifting shock is felt.
- Acceleration is poor during standing start.
- Shift control malfunction

Step		Check	Yes	No
1	**CHECK DTC.** Read the DTC using Subaru Select Monitor.	Besides DTC P2750, is any of the DTC P2751, U0122 or U0416 displayed?	Perform the diagnosis according to DTCs other than P2750.	Perform the diagnosis according to DTC P2751. <Ref. to CVT(w/o HEV)(diag)-117, DTC P2751 INTERMEDIATE SHAFT SPEED SENSOR "C" CIRCUIT NO SIGNAL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

AU:DTC P2751 INTERMEDIATE SHAFT SPEED SENSOR "C" CIRCUIT NO SIGNAL

DTC DETECTING CONDITION:

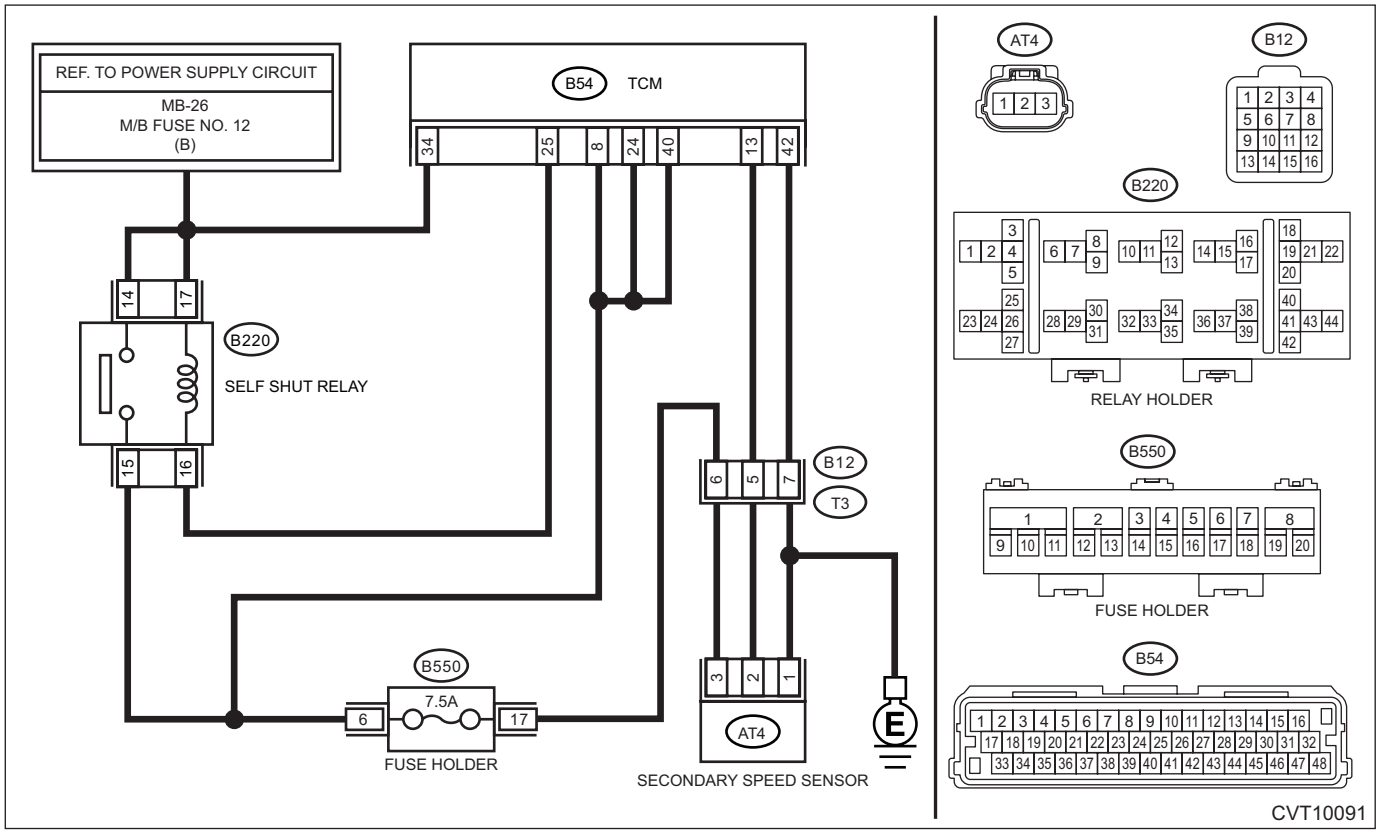
- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(CVT)(w/o HEV)-51, DTC P2751 INTERMEDIATE SHAFT SPEED SENSOR "C" CIRCUIT NO SIGNAL, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

- Shifting shock is felt.
- Acceleration is poor during standing start.
- Shift control malfunction

WIRING DIAGRAM:

CVT control system <Ref. to WI(w/o HEV)-90, CVT Control System.>



Step		Check	Yes	No
1	**CHECK FUSE.** 1) Turn the ignition switch to OFF. 2) Remove the fuse (7.5 A) from the fuse holder.	Is the fuse OK?	Go to step **2**.	Replace the fuse. If the fuse blows out easily, repair the short circuit of harness.
2	**CHECK HARNESS.** 1) Disconnect the TCM and self shut relay connectors. 2) Measure the resistance between TCM connector and self shut relay connector. ***Connector & terminal*** ***(B54) No. 25 — (B220) No. 16:*** ***(B54) No. 8 — (B220) No. 15:*** ***(B54) No. 24 — (B220) No. 15:*** ***(B54) No. 40 — (B220) No. 15:***	Is the resistance less than 1 Ω?	Go to step **3**.	Repair the open circuit of harness.

	Step	Check	Yes	No
3	**CHECK HARNESS.** Measure the resistance between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 25 — Chassis ground:*** ***(B54) No. 8 — Chassis ground:*** ***(B54) No. 24 — Chassis ground:*** ***(B54) No. 40 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **4**.	Repair the short circuit of harness.
4	**CHECK RELAY POWER SUPPLY.** Measure the voltage between self shut relay connector and chassis ground. ***Connector & terminal*** ***(B220) No. 14 (+) — Chassis ground (–):*** ***(B220) No. 17 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **5**.	Repair the open or short circuit of harness.
5	**CHECK SELF SHUT RELAY.** Measure the resistance between self shut relay terminals. ***Terminals*** ***No. 16 — No. 17:***	Is the resistance 110 — 140 Ω?	Go to step **6**.	Replace the self shut relay.
6	**CHECK SELF SHUT RELAY.** Measure the resistance between self shut relay terminals. ***Terminals*** ***No. 14 — No. 15:***	Is the resistance 1 MΩ or more?	Go to step **7**.	Replace the self shut relay.
7	**CHECK INPUT SIGNAL FOR TCM.** 1) Connect the connectors of TCM and self shut relay. 2) Read the data of «Control module voltage» using Subaru Select Monitor.	Is the «Control module voltage» 10 V or more?	Current condition is normal. Check for poor contact in connectors or harnesses, and repair the defective part.	Go to step **8**.
8	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the TCM and transmission connectors. 3) Measure the resistance between TCM connector and transmission connectors. ***Connector & terminal*** ***(B54) No. 13 — (B12) No. 5:*** ***(B54) No. 42 — (B12) No. 7:*** ***(B550) No. 17 — (B12) No. 6:***	Is the resistance less than 1 Ω?	Go to step **9**.	Repair the open circuit of harness.
9	**CHECK HARNESS.** Measure the resistance between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 13 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **10**.	Repair the short circuit of harness.
10	**CHECK HARNESS.** Measure the resistance between self shut relay connector and fuse holder. ***Connector & terminal*** ***(B220) No. 15 — (B550) No. 6:***	Is the resistance less than 1 Ω?	Go to step **11**.	Repair the open circuit of harness.
11	**CHECK TRANSMISSION HARNESS.** 1) Install the fuse. 2) Connect the TCM connector. 3) Turn the ignition switch to ON. 4) Measure the voltage between transmission connector terminals. ***Connector & terminal*** ***(B12) No. 6 (+) — Chassis ground (–):***	Is the voltage 10 — 13 V?	Go to step **12**.	Repair the open circuit of harness or poor contact of connector.

	Step	Check	Yes	No
12	**CHECK INPUT SIGNAL FOR TCM.** 1) Turn the ignition switch to OFF. 2) Connect the transmission connector. 3) Lift up the vehicle. 4) Start the engine. 5) Set the select lever to “D” range. 6) Read the data of “Secondary Pulley Speed” using Subaru Select Monitor.	Does the value of «Secondary Pulley Speed» change according to those of «Front Wheel Speed»?	Current condition is normal. Repair the poor contacts of harnesses of secondary speed sensor and transmission connector.	Go to step **13**.
13	**CHECK TRANSMISSION HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the transmission connector. 3) Disconnect the secondary speed sensor connector. 4) Measure the resistance between transmission connector and secondary speed sensor connector. ***Connector & terminal*** ***(T3) No. 5 — (AT4) No. 2:*** ***(T3) No. 6 — (AT4) No. 3:*** ***(T3) No. 7 — (AT4) No. 1:***	Is the resistance less than 1 Ω?	Go to step **14**.	Replace the transmission harness.
14	**CHECK SECONDARY SPEED SENSOR HARNESS.** Measure the resistance between transmission connector and chassis ground. ***Connector & terminal*** ***(T3) No. 5 — Chassis ground:*** ***(T3) No. 6 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **15**.	Repair the short circuit of harness.
15	**CHECK SECONDARY SPEED SENSOR.** 1) Turn the ignition switch to OFF. 2) Replace the secondary speed sensor. <Ref. to CVT(TR580)-105, Secondary Speed Sensor.> 3) Perform the Clear Memory Mode. <Ref. to CVT(w/o HEV)(diag)-18, Clear Memory Mode.> 4) Read the DTC.	Is DTC P2751 displayed?	Go to step **16**.	The original secondary speed sensor is defective.
16	**CHECK SELF SHUT RELAY.** 1) Turn the ignition switch to OFF. 2) Replace the self shut relay. 3) Perform the Clear Memory Mode. <Ref. to CVT(w/o HEV)(diag)-18, Clear Memory Mode.> 4) Read the DTC.	Is DTC P2751 displayed?	Replace the TCM. <Ref. to CVT(TR580)-146, Transmission Control Module (TCM).>	The original self shut relay is defective.

AV:DTC P2757 TORQUE CONVERTER CLUTCH PRESSURE CONTROL SOLENOID CONTROL CIRCUIT PERFORMANCE/STUCK OFF

DTC DETECTING CONDITION:

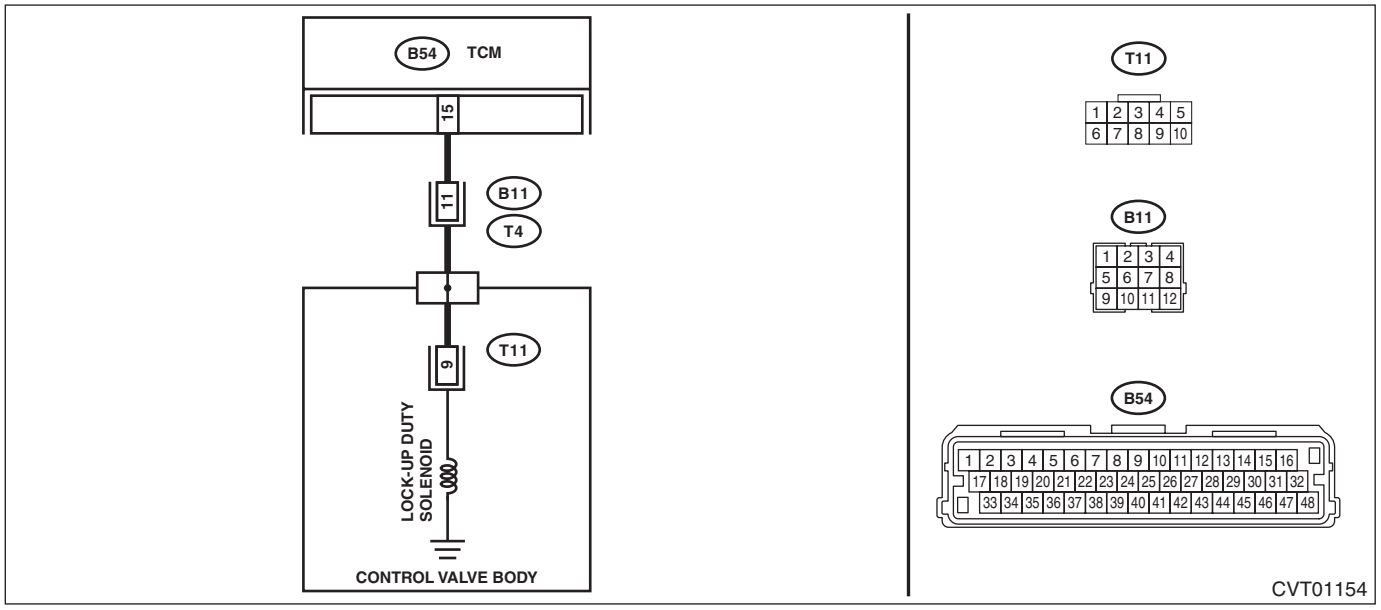
- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(CVT)(w/o HEV)-52, DTC P2757 TORQUE CONVERTER CLUTCH PRESSURE CONTROL SOLENOID CONTROL CIRCUIT PERFORMANCE/STUCK OFF, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

No lock-up occurs.

WIRING DIAGRAM:

CVT control system <Ref. to WI(w/o HEV)-90, CVT Control System.>



	Step	Check	Yes	No
1	**CHECK DTC.** Read the DTC using Subaru Select Monitor.	Besides DTC P2757, is any of the DTC P0717, P2763, P2764, U0100 or U0401 displayed?	Perform the diagnosis according to DTCs other than P2757.	Go to step **2**.
2	**CHECK LOCK-UP DUTY SOLENOID (SYSTEM OPERATION CHECK MODE).** 1) Turn the ignition switch to ON. 2) Using the Subaru Select Monitor, perform forced operation of the lock-up duty solenoid. <Ref. to CVT(w/o HEV)(diag)-24, System Operation Check Mode.>	Does the indication of 0 → 50% appear repeatedly during forced operation, and does operating sound emit during indicating 50%?	Go to step **5**.	Go to step **3**.
3	**CHECK LOCK-UP DUTY SOLENOID.** 1) Turn the ignition switch to OFF. 2) Disconnect the transmission connector. 3) Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 11 — Transmission body:***	Is the resistance approx. 10 — 13.5 Ω? (when cold)	Go to step **7**.	Go to step **4**.
4	**CHECK HARNESS.** Check the continuity of transmission harness.	Is the harness normal? (Is it free from defects such as open circuit, power supply-output short or GND-output short circuit, or poor contact?)	Go to step **7**.	Repair the harness.

	Step	Check	Yes	No
5	**CHECK TRANSMISSION FLUID.** 1) Connect the transmission connector. 2) Check the amount of ATF. <Ref. to CVT(TR580)-36, ADJUSTMENT, CVTF.>	Is the ATF amount correct?	Go to step **6**.	Adjust the amount of ATF. <Ref. to CVT(TR580)-36, ADJUSTMENT, CVTF.>
6	**CHECK TRANSMISSION FLUID.** Check the condition of ATF. <Ref. to CVT(TR580)-40, CONDITION CHECK, CVTF.>	Is the ATF OK?	Go to step **7**.	Check according to the "Corrective action" of ATF (CVTF) "CONDITION CHECK". <Ref. to CVT(TR580)-40, CONDITION CHECK, CVTF.>
7	**CHECK INPUT SIGNAL FOR TCM.** 1) Lift up the vehicle. 2) Start the engine. 3) Warm up until the ATF temperature reaches to 40 — 70°C (104 — 158°F). 4) Depress the brake pedal, and shift the select lever to "D" range. 5) Shift the select lever to "P" range. 6) Stabilize the engine speed at idle. 7) Read the data of «Actual secondary pressure» using Subaru Select Monitor.	Is the «Actual secondary pressure» 0.5 — 1.5 MPa?	Go to step **8**.	Perform the diagnosis according to DTC P0841. <Ref. to CVT(w/o HEV)(diag)-72, DTC P0841 SECONDARY OIL PRESSURE SENSOR PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
8	**DRIVING CHECK FOR LOCK-UP CONDITION.** 1) Perform the Clear Memory Mode. <Ref. to CVT(w/o HEV)(diag)-18, Clear Memory Mode.> 2) Turn the ignition switch to OFF. 3) Start the engine. 4) Warm up until the ATF temperature exceeds 50°C. 5) Drive the vehicle for one minute or more while keeping such constant speed that «Lock Up Duty Ratio» is 70% or more, and «Front Wheel Speed» is 40 km/h (25 MPH) or more, which are displayed on the Subaru Select Monitor. 6) Turn the ignition switch to OFF. 7) Start the engine. 8) Perform the procedure in step 5) again. 9) Read the DTC using Subaru Select Monitor.	Does the AT OIL TEMP light blink and is DTC P2757 displayed?	Perform the secondary pressure test. <Ref. to CVT(TR580)-49, Secondary Pressure (Line Pressure) Test.> When DTC other than P2757 is displayed, perform the diagnosis corresponding to the DTC.	Current condition is normal. Temporary oil pressure malfunction.

AW:DTC P2758 TORQUE CONVERTER CLUTCH PRESSURE CONTROL SOLENOID CONTROL CIRCUIT STUCK ON

DTC DETECTING CONDITION:

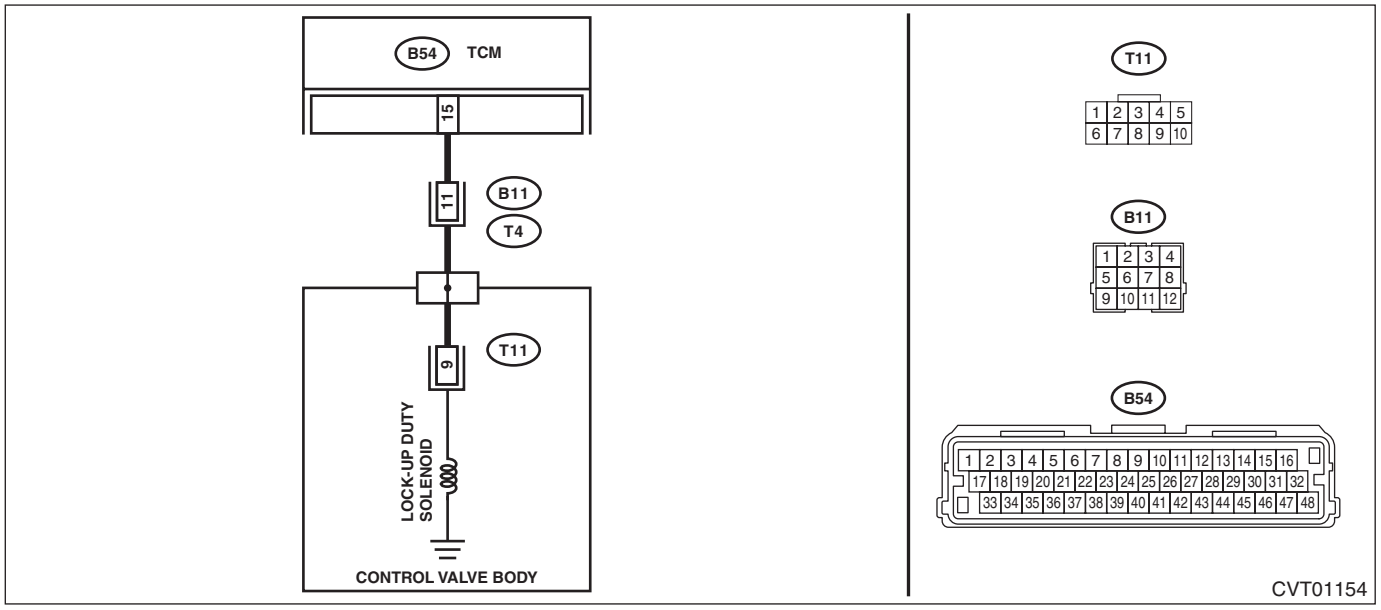
- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(CVT)(w/o HEV)-53, DTC P2758 TORQUE CONVERTER CLUTCH PRESSURE CONTROL SOLENOID CONTROL CIRCUIT STUCK ON, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

The engine stalls when the vehicle is stopped.

WIRING DIAGRAM:

CVT control system <Ref. to WI(w/o HEV)-90, CVT Control System.>



Step		Check	Yes	No
1	**CHECK DTC.** Read the DTC using Subaru Select Monitor.	Besides DTC P2758, is any of the DTC P0717, P2763, P2764, U0100 or U0401 displayed?	Perform the diagnosis according to DTCs other than P2758.	Go to step **2**.
2	**CHECK LOCK-UP DUTY SOLENOID (SYSTEM OPERATION CHECK MODE).** 1) Turn the ignition switch to ON. 2) Using the Subaru Select Monitor, perform forced operation of the lock-up duty solenoid. <Ref. to CVT(w/o HEV)(diag)-24, System Operation Check Mode.>	Does the indication of 0 → 50% appear repeatedly during forced operation, and does operating sound emit during indicating 50%?	Go to step **5**.	Go to step **3**.
3	**CHECK LOCK-UP DUTY SOLENOID.** 1) Turn the ignition switch to OFF. 2) Disconnect the transmission connector. 3) Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 11 — Transmission body:***	Is the resistance approx. 10 — 13.5 Ω? (when cold)	Go to step **7**.	Go to step **4**.
4	**CHECK HARNESS.** Check the continuity of transmission harness.	Is the harness normal? (Is it free from defects such as open circuit, power supply-output short or GND-output short circuit, or poor contact?)	Go to step **7**.	Repair the harness.

	Step	Check	Yes	No
5	**CHECK TRANSMISSION FLUID.** 1) Connect the transmission connector. 2) Check the amount of ATF. <Ref. to CVT(TR580)-36, ADJUSTMENT, CVTF.>	Is the ATF amount correct?	Go to step **6**.	Adjust the amount of ATF. <Ref. to CVT(TR580)-36, ADJUSTMENT, CVTF.>
6	**CHECK TRANSMISSION FLUID.** Check the condition of ATF. <Ref. to CVT(TR580)-40, CONDITION CHECK, CVTF.>	Is the ATF OK?	Go to step **7**.	Check according to the “Corrective action” of ATF (CVTF) “CONDITION CHECK”. <Ref. to CVT(TR580)-40, CONDITION CHECK, CVTF.>
7	**CHECK INPUT SIGNAL FOR TCM.** 1) Lift up the vehicle. 2) Start the engine. 3) Warm up until the ATF temperature reaches to 40 — 70°C (104 — 158°F). 4) Depress the brake pedal, and shift the select lever to “D” range. 5) Shift the select lever to “P” range. 6) Stabilize the engine speed at idle. 7) Read the data of «Actual secondary pressure» using Subaru Select Monitor.	Is the «Actual secondary pressure» 0.5 — 1.5 MPa?	Go to step **8**.	Perform the diagnosis according to DTC P0841. <Ref. to CVT(w/o HEV)(diag)-72, DTC P0841 SECONDARY OIL PRESSURE SENSOR PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
8	**DRIVING CHECK FOR LOCK-UP CONDITION.** 1) Perform the Clear Memory Mode. <Ref. to CVT(w/o HEV)(diag)-18, Clear Memory Mode.> 2) Turn the ignition switch to OFF. 3) Start the engine. 4) Warm up until the ATF temperature exceeds 50°C. 5) Drive the vehicle for one minute or more while keeping such constant speed that «Lock Up Duty Ratio» is 0%, and «Front Wheel Speed» is 5 km/h (3 MPH) or less, which are displayed on the Subaru Select Monitor. 6) Turn the ignition switch to OFF. 7) Start the engine. 8) Perform the procedure in step 5) again. 9) Read the DTC using Subaru Select Monitor.	Does the AT OIL TEMP light blink and is DTC P2758 displayed? Or does the engine stall?	Perform the secondary pressure test. <Ref. to CVT(TR580)-49, Secondary Pressure (Line Pressure) Test.> When DTC other than P2758 is displayed, perform the diagnosis according to the DTC.	Current condition is normal. Temporary oil pressure malfunction.

AX:DTC P2763 LOCK-UP DUTY SOLENOID CIRCUIT (HIGH)

DTC DETECTING CONDITION:

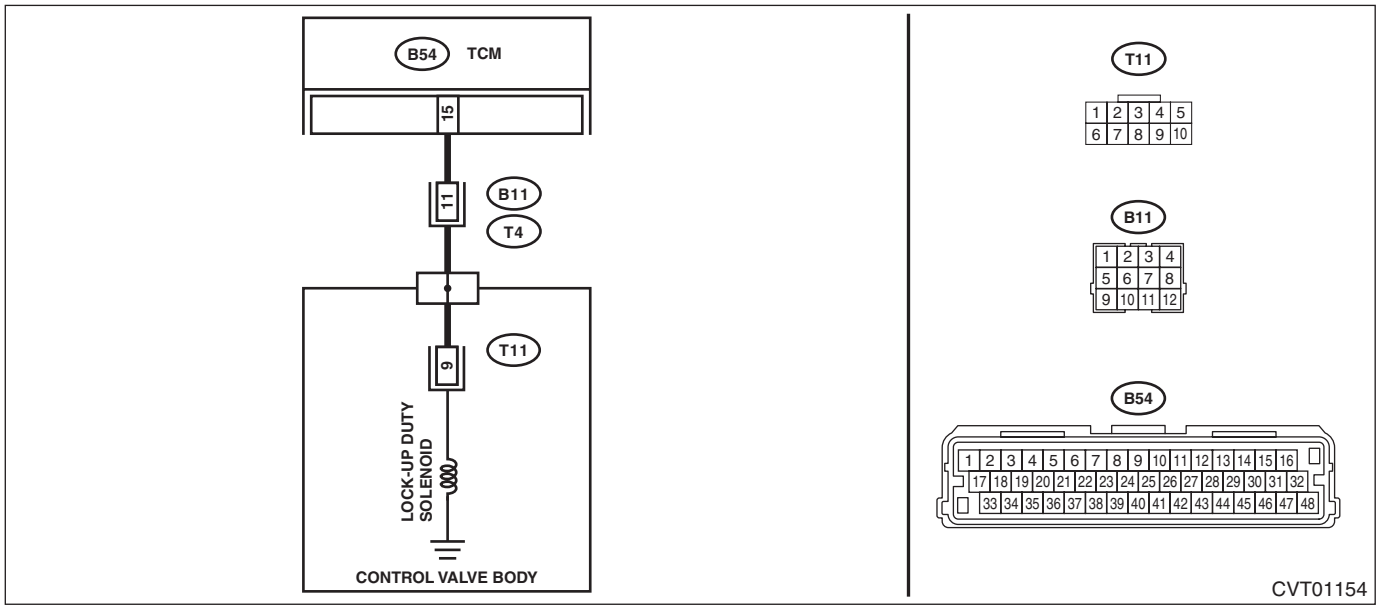
- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(CVT)(w/o HEV)-54, DTC P2763 LOCK-UP DUTY SOLENOID CIRCUIT (HIGH), Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

- No lock-up occurs.
- Engine stalls.

WIRING DIAGRAM:

CVT control system <Ref. to WI(w/o HEV)-90, CVT Control System.>



Step		Check	Yes	No
1	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the TCM and transmission connectors. 3) Measure the resistance between TCM connector and transmission connectors. ***Connector & terminal*** ***(B54) No. 15 — (B11) No. 11:***	Is the resistance less than 1 Ω?	Go to step **2**.	Repair the open circuit of harness.
2	**CHECK HARNESS.** 1) Turn the ignition switch to ON. 2) Measure the voltage between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 15 (+) — Chassis ground (–):***	Is the voltage approx. 0 V?	Go to step **3**.	Repair the short circuit of harness.
3	**CHECK LOCK-UP DUTY SOLENOID.** Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 11 — Transmission body:***	Is the resistance approx. 10 — 13.5 Ω? (when cold)	Check for poor contact of connector, and if no fault is found, replace the TCM. <Ref. to CVT(TR580)-146, Transmission Control Module (TCM).>	Go to step **4**.

	Step	Check	Yes	No
4	**CHECK HARNESS INSIDE TRANSMISSION.** **CAUTION:** **Start work after ATF cools down.** 1) Remove the transmission valve cover. 2) Check for the harness pinch, damage.	Is there any fault in the harness?	Replace the transmission harness.	Go to step **5**.
5	**CHECK HARNESS INSIDE TRANSMISSION.** 1) Disconnect the control valve body connector. 2) Turn the ignition switch to ON. 3) Measure the voltage between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 11 (+) — Transmission body (–):***	Is the voltage approx. 0 V?	Replace the control valve body. <Ref. to CVT(TR580)-117, Control Valve Body.>	Replace the transmission harness.

AY:DTC P2764 LOCK-UP DUTY SOLENOID CIRCUIT (LOW)

DTC DETECTING CONDITION:

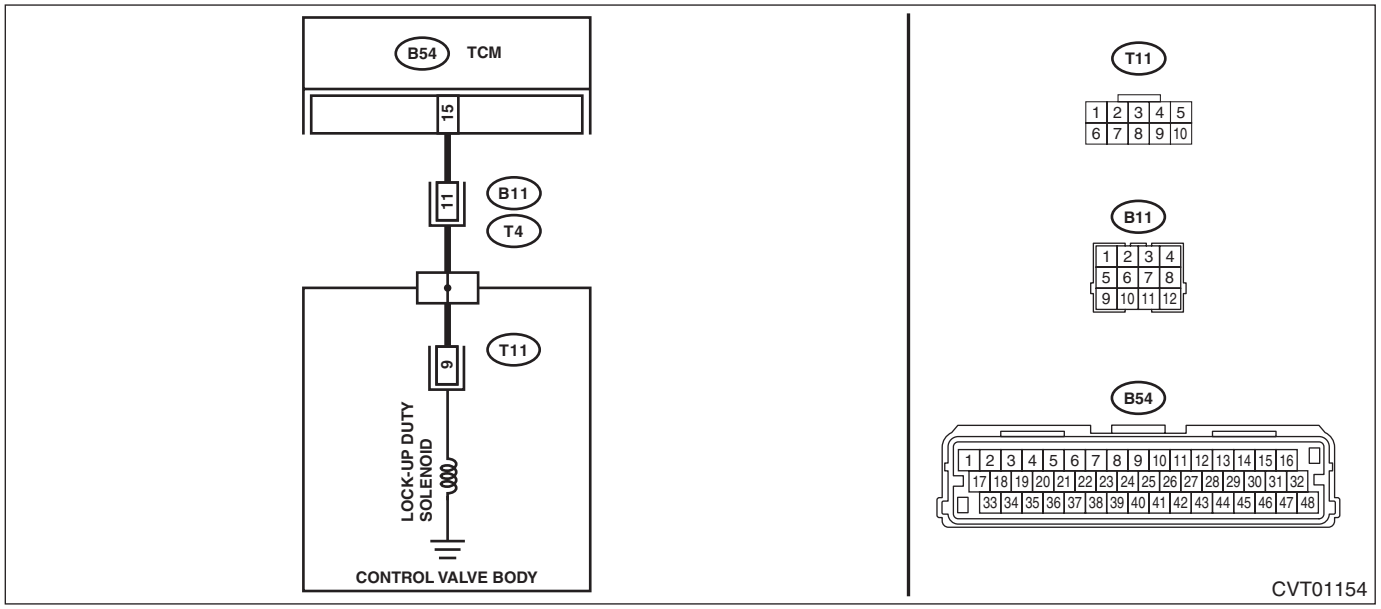
- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(CVT)(w/o HEV)-55, DTC P2764 LOCK-UP DUTY SOLENOID CIRCUIT (LOW), Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

No lock-up occurs.

WIRING DIAGRAM:

CVT control system <Ref. to WI(w/o HEV)-90, CVT Control System.>



	Step	Check	Yes	No
1	**CHECK HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the TCM and transmission connectors. 3) Measure the resistance between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 15 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **2**.	Repair the short circuit of harness.
2	**CHECK LOCK-UP DUTY SOLENOID.** Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 11 — Transmission body:***	Is the resistance approx. 10 — 13.5 Ω? (when cold)	Check for poor contact of connector, and if no fault is found, replace the TCM. <Ref. to CVT(TR580)-146, Transmission Control Module (TCM).>	Go to step **3**.
3	**CHECK HARNESS INSIDE TRANSMISSION.** **CAUTION:** **Start work after ATF cools down.** 1) Remove the transmission valve cover. 2) Check for the harness pinch, damage.	Is there any fault in the harness?	Replace the transmission harness.	Go to step **4**.

	Step	Check	Yes	No
4	**CHECK HARNESS INSIDE TRANSMISSION.** 1) Disconnect the control valve body connector. 2) Measure the resistance between transmission connector and transmission body. ***Connector & terminal*** ***(T4) No. 11 — Transmission body:***	Is the resistance 1 MΩ or more?	Replace the control valve body. <Ref. to CVT(TR580)-117, Control Valve Body.>	Replace the transmission harness.

AZ:DTC U0073 CONTROL MODULE COMMUNICATION BUS OFF

NOTE:
Refer to “LAN SYSTEM (DIAGNOSTICS)” for diagnostic procedure. <Ref. to LAN(w/o HEV)(diag)-2, Basic Diagnostic Procedure.>

BA:DTC U0100 LOST COMMUNICATION WITH ECM/PCM “A”

NOTE:
Refer to “LAN SYSTEM (DIAGNOSTICS)” for diagnostic procedures. <Ref. to LAN(w/o HEV)(diag)-2, Basic Diagnostic Procedure.>

BB:DTC U0122 LOST COMMUNICATION WITH VEHICLE DYNAMICS CONTROL MODULE

NOTE:
Refer to “LAN SYSTEM (DIAGNOSTICS)” for diagnostic procedures. <Ref. to LAN(w/o HEV)(diag)-2, Basic Diagnostic Procedure.>

BC:DTC U0140 LOST COMMUNICATION WITH BODY CONTROL MODULE

NOTE:
Refer to “LAN SYSTEM (DIAGNOSTICS)” for diagnostic procedures. <Ref. to LAN(w/o HEV)(diag)-2, Basic Diagnostic Procedure.>

BD:DTC U0155 LOST COMMUNICATION WITH INSTRUMENT PANEL CLUSTER (IPC) CONTROL MODULE

NOTE:
Refer to “LAN SYSTEM (DIAGNOSTICS)” for diagnostic procedures. <Ref. to LAN(w/o HEV)(diag)-2, Basic Diagnostic Procedure.>

BE:DTC U0164 LOST COMMUNICATION WITH HVAC CONTROL MODULE

NOTE:
Refer to “LAN SYSTEM (DIAGNOSTICS)” for diagnostic procedure. <Ref. to LAN(w/o HEV)(diag)-2, Basic Diagnostic Procedure.>

BF:DTC U0401 INVALID DATA RECEIVED FROM ECM/PCM “A”

NOTE:
Refer to “LAN SYSTEM (DIAGNOSTICS)” for diagnostic procedures. <Ref. to LAN(w/o HEV)(diag)-2, Basic Diagnostic Procedure.>

BG:DTC U0416 INVALID DATA RECEIVED FROM VEHICLE DYNAMICS CONTROL MODULE

NOTE:
Refer to “LAN SYSTEM (DIAGNOSTICS)” for diagnostic procedures. <Ref. to LAN(w/o HEV)(diag)-2, Basic Diagnostic Procedure.>

BH:DTC U0422 INVALID DATA RECEIVED FROM BODY CONTROL MODULE

NOTE:
Refer to “LAN SYSTEM (DIAGNOSTICS)” for diagnostic procedures. <Ref. to LAN(w/o HEV)(diag)-2, Basic Diagnostic Procedure.>

BI: DTC U0423 INVALID DATA RECEIVED FROM INSTRUMENT PANEL CLUSTER CONTROL MODULE

NOTE:
Refer to “LAN SYSTEM (DIAGNOSTICS)” for diagnostic procedures. <Ref. to LAN(w/o HEV)(diag)-2, Basic Diagnostic Procedure.>

BJ:DTC U0424 INVALID DATA RECEIVED FROM HVAC CONTROL MODULE

NOTE:
Refer to “LAN SYSTEM (DIAGNOSTICS)” for diagnostic procedure. <Ref. to LAN(w/o HEV)(diag)-2, Basic Diagnostic Procedure.>

BK:DTC U1235 LOST COMMUNICATION WITH EyeSight

NOTE:
Refer to “LAN SYSTEM (DIAGNOSTICS)” for diagnostic procedure. <Ref. to LAN(w/o HEV)(diag)-2, Basic Diagnostic Procedure.>

BL:DTC U1433 INVALID DATA RECEIVED FROM EyeSight

NOTE:
Refer to “LAN SYSTEM (DIAGNOSTICS)” for diagnostic procedure. <Ref. to LAN(w/o HEV)(diag)-2, Basic Diagnostic Procedure.>

18.Diagnostic Procedure without Diagnostic Trouble Code (DTC)

A: CHECK SHIFT INDICATOR

DIAGNOSIS:

- CAN communication is abnormal with the combination meter.
- Combination meter malfunction

TROUBLE SYMPTOM:

- Shift indicator does not display or remains displayed.
- Shift indicator display does not change.

	Step	Check	Yes	No
1	**CHECK DTC.** Read the DTC relating the TCM using the Subaru Select Monitor.	Is DTC U0155 or U0423 displayed?	Perform the self-diagnosis of combination meter.	Go to step **2**.
2	**CHECK DTC.** Read the DTC relating the TCM using the Subaru Select Monitor.	Are DTCs other than U0155 and U0423 displayed?	Perform the diagnosis according to DTC.	Go to step **3**.
3	**CHECK COMBINATION METER.** Read DTC of combination meter.	Is DTC displayed?	Perform the diagnosis according to DTC.	Go to step **4**.
4	**CHECK TCM.** 1) Operate the + side of the paddle shift switch. 2) Read the data of «Up Switch» using the Subaru Select Monitor.	Does it change between ON and OFF according to the operation?	Go to step **5**.	Check for poor contact between TCM and paddle shift UP switch, and repair the defective part.
5	**CHECK TCM.** 1) Operate the – side of the paddle shift switch. 2) Read the data of «Down Switch» using the Subaru Select Monitor.	Does it change between ON and OFF according to the operation?	Go to step **6**.	Check for poor contact between TCM and paddle shift down switch, and repair the defective part.
6	**CHECK TCM.** 1) Turn the ignition switch OFF, then turn it ON again. 2) Shift the select lever to manual mode. 3) Read the data of «Shift Step in Manual Mode» using the Subaru Select Monitor.	Is “1” displayed?	Go to step **7**.	Perform the diagnosis according to DTC P0951. <Ref. to CVT(w/o HEV)(diag)-82, DTC P0951 MANUAL SWITCH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
7	**CHECK TCM.** 1) Shift up the select lever. 2) Read the data of «Shift Step in Manual Mode» using the Subaru Select Monitor.	Is “2” displayed?	Currently, shift indicator is normal.	Replace the TCM. <Ref. to CVT(TR580)-146, Transmission Control Module (TCM).>

19.Diagnostics with Phenomenon

A: INSPECTION

Symptoms	Faulty parts
Engine stalls when driving in “D” or “R” range, or selecting “N” → “D”, “N” → “R”.	• Control valve • Engine control system
While driving in “D” range, vibration occurs immediately before the stop or engine stalls.	• Control valve • Torque converter
Vehicle cannot shift while driving in “D” range.	• Control valve • TCM • Shift mechanism • Power supply system
Excessive shock when selecting “N” → “D”, and “N” → “R”.	• Control valve • TCM • F&R clutch pack • ATF deterioration or lack
Excessive shock at standing start in “D” range.	• Control valve • TCM • F&R clutch pack • ATF deterioration or lack
Engine speed increases abruptly during driving in “D” or “R” range.	• Control valve • Secondary pressure sensor • F&R clutch pack • ATF deterioration or lack
Vehicle can not start when depressing the accelerator pedal in “D” or “R” range, or acceleration is very poor. (without abrupt engine increase)	• Control valve • F&R clutch pack • Shift mechanism • Parking mechanism • Engine control system • Power supply system
Shift indicator in combination meter displays the position which differs from select lever position.	• Inhibitor switch • Select cable related • Combination meter
Manual mode enters even though the select lever and paddle shift switch is not operated.	• Manual mode switch • Paddle shift switch • Select lever • TCM
Engine speed increases abruptly in “D” or “R” range, vehicle can not start.	• F&R clutch pack • Select cable related
Manual mode can not be set	• Select lever • TCM

GENERAL DESCRIPTION (CVT)

GD(CVT)(w/o HEV)

Page

1. List of Diagnostic Trouble Code (DTC) 2
2. Diagnostic Trouble Code (DTC) Detecting Criteria 5

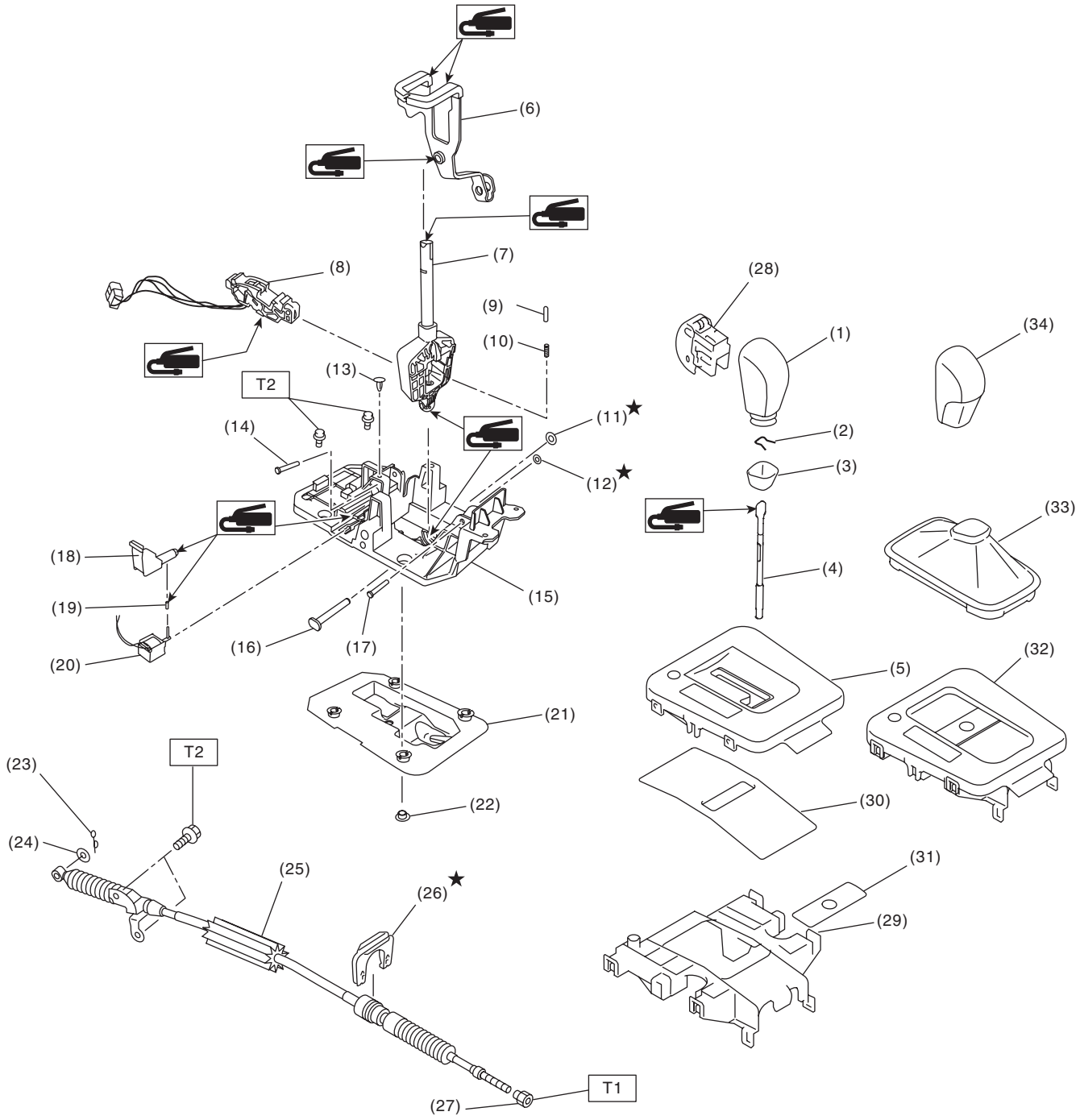
1. General Description

A: SPECIFICATION

Item	Specifications
Swing torque of rod against lever N (kgf, lb)	3.7 (0.38, 0.83) or less

B: COMPONENT

1. AT SELECT LEVER

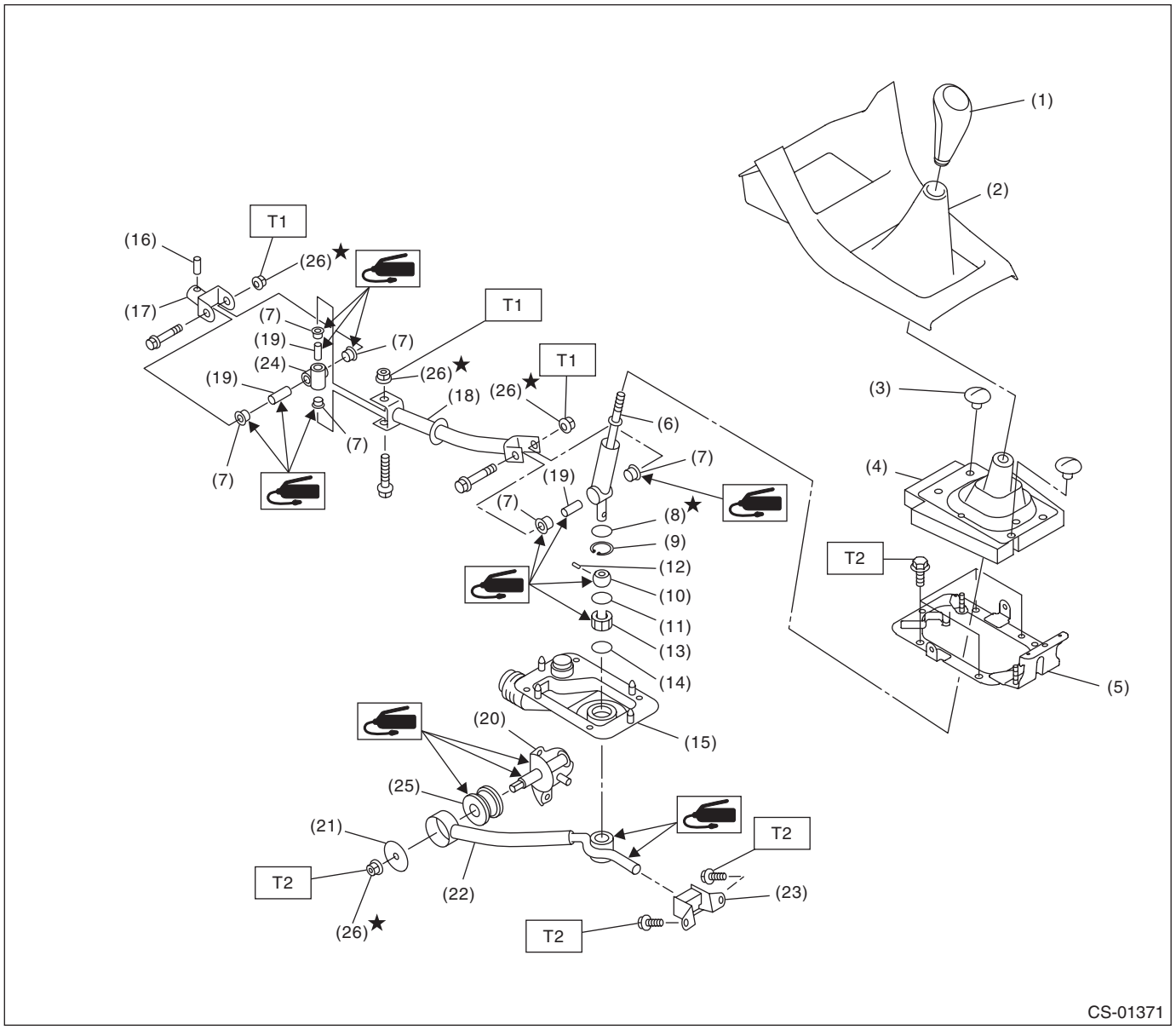


CS-01952

(1) Grip sub ASSY (model with gate shifter)
(2) Clamp grip pin
(3) Cover grip AT (model with gate shifter)
(4) Rod COMPL
(5) Indicator cover (model with gate shifter)
(6) Arm COMPL
(7) Select lever COMPL
(8) Plate guide
(9) Rod detent
(10) Detent spring
(11) Clamp push nut
(12) Clamp push nut
(13) Clamp pin
(14) Spacer pin guide
(15) Plate COMPL
(16) Shaft control
(17) Spacer pin guide
(18) Rod shift lock
(19) Cushion solenoid
(20) Solenoid unit
(21) Gasket
(22) Spacer plate
(23) Snap pin
(24) Washer
(25) Select cable
(26) Clamp
(27) Nut
(28) Button ASSY-AT
(29) Housing
(30) Blind A (model with gate shifter)
(31) Blind B (model with gate shifter)
(32) Indicator assembly (model with boot shifter)
(33) Boot ASSY (model with boot shifter)
(34) Grip sub ASSY (model with boot shifter)

Tightening torque: N·m (kgf-m, ft-lb)
T1: 7.5 (0.8, 5.5)
T2: 18 (1.8, 13.3)

2. 5MT GEAR SHIFT LEVER

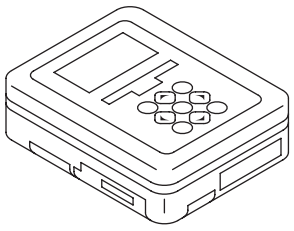


(1) Gear shift knob
(2) Console front cover ASSY
(3) Clamp
(4) Boot and insulator ASSY
(5) Plate COMPL
(6) Lever
(7) Bushing
(8) Lock wire
(9) Snap ring
(10) Bushing
(11) O-ring
(12) Spring pin
(13) Bushing B
(14) O-ring
(15) Boot
(16) Spring pin
(17) Joint
(18) Rod
(19) Spacer
(20) Shift bracket
(21) Plate
(22) Stay
(23) Cushion rubber
(24) Boss
(25) Bushing
(26) Self-locking nut

Tightening torque: N·m (kgf-m, ft-lb)
T1: 12 (1.2, 8.9)
T2: 18 (1.8, 13.3)

C: PREPARATION TOOL

1. SPECIAL TOOL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST1B022XU0	1B022XU0	SUBARU SELECT MONITOR III KIT	Used for setting of each function and trouble-shooting for electrical system. NOTE: For detailed operation procedures of Subaru Select Monitor III, refer to “PC application help for Subaru Select Monitor”.

2. GENERAL TOOL

TOOL NAME	REMARKS
Circuit tester	Used for measuring resistance and voltage.

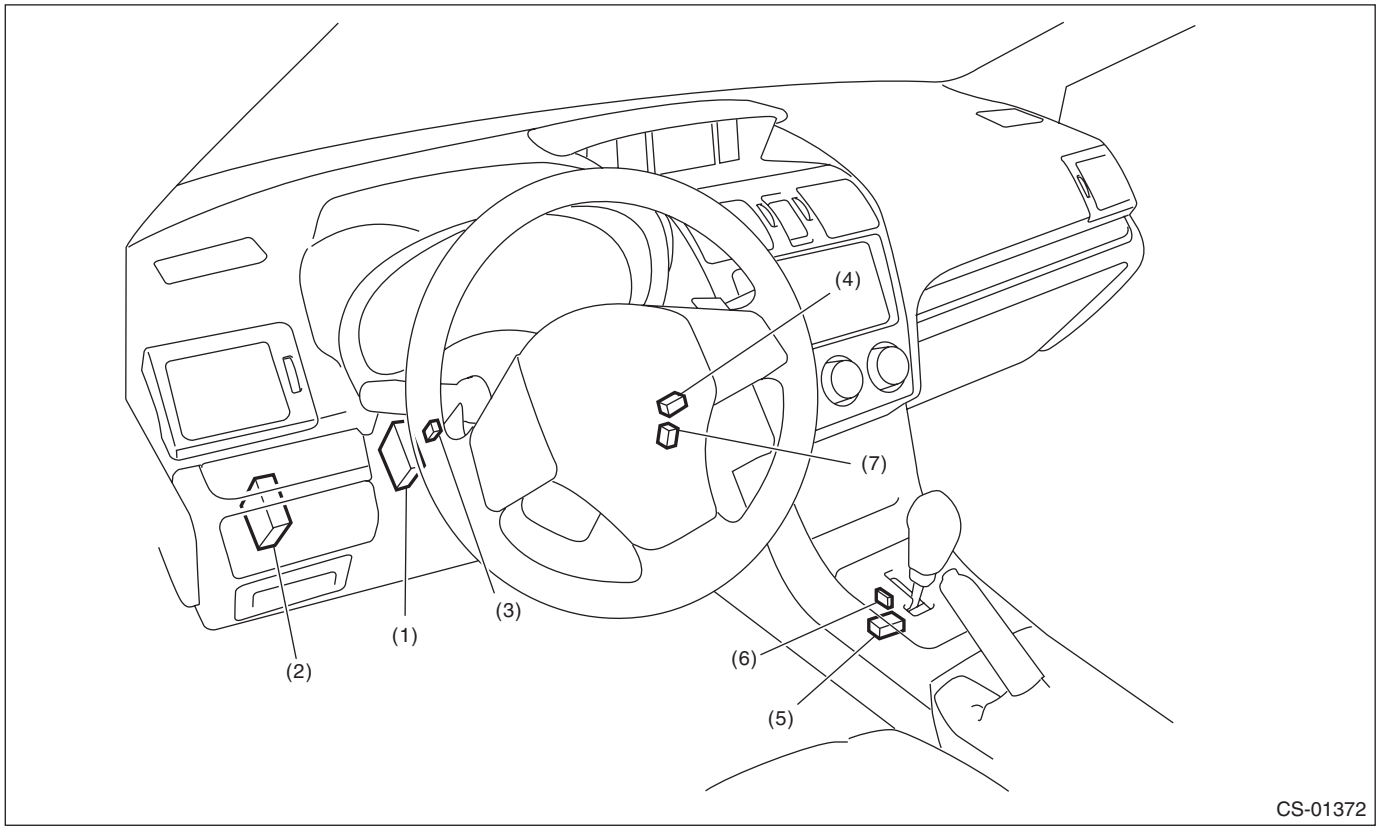
D: CAUTION

- Wear appropriate work clothing, including a cap, protective goggles and protective shoes when performing any work.
- Remove contamination including dirt and corrosion before removal, installation or disassembly.
- Keep the disassembled parts in order and protect them from dust and dirt.
- Before removal, installation or disassembly, be sure to clarify the failure. Avoid unnecessary removal, installation, disassembly and replacement.
- Use SUBARU genuine fluid, grease etc. or equivalent. Do not mix fluid, grease, etc. of different grades or manufacturers.
- Be sure to tighten fasteners including bolts and nuts to the specified torque.
- Place shop jacks or rigid racks at the specified points.
- Apply grease onto sliding or revolving surfaces before installation.
- Before installing O-rings or snap rings, apply sufficient amount of fluid to avoid damage and deformation.
- Before securing a part in a vise, place cushioning material such as wood blocks, aluminum plate or cloth between the part and the vise.
- Before disconnecting electrical connectors, be sure to disconnect the negative terminal from battery.

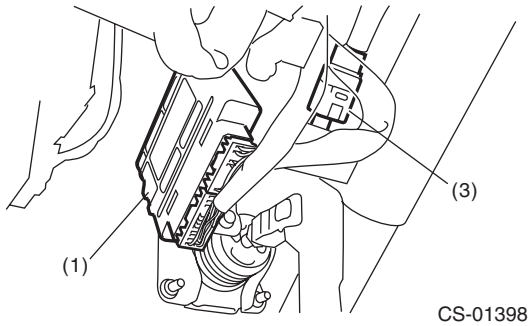
2. AT Shift Lock Control System

A: LOCATION

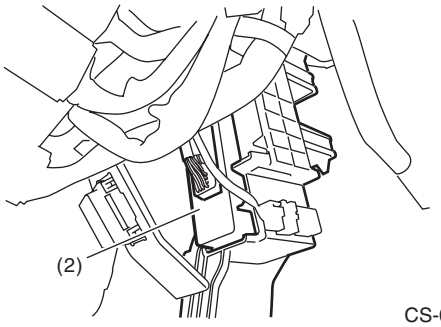
1. MODEL WITHOUT PUSH BUTTON IGNITION SWITCH



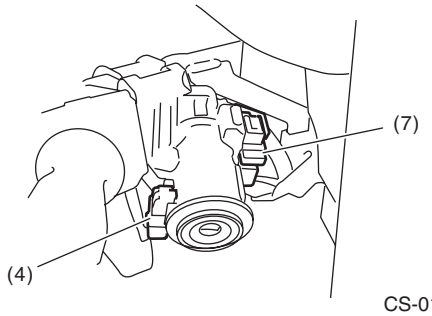
(1) TCM (“P” range)
(2) Body integrated unit
(3) Stop light and brake switch
(4) Key cylinder (with built-in key warning switch)
(5) Solenoid unit
(6) “P” range switch
(7) Key lock solenoid



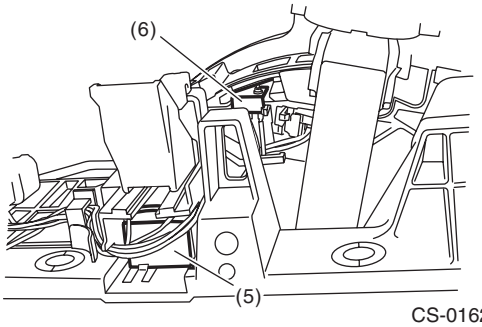
CS-01398



CS-01399

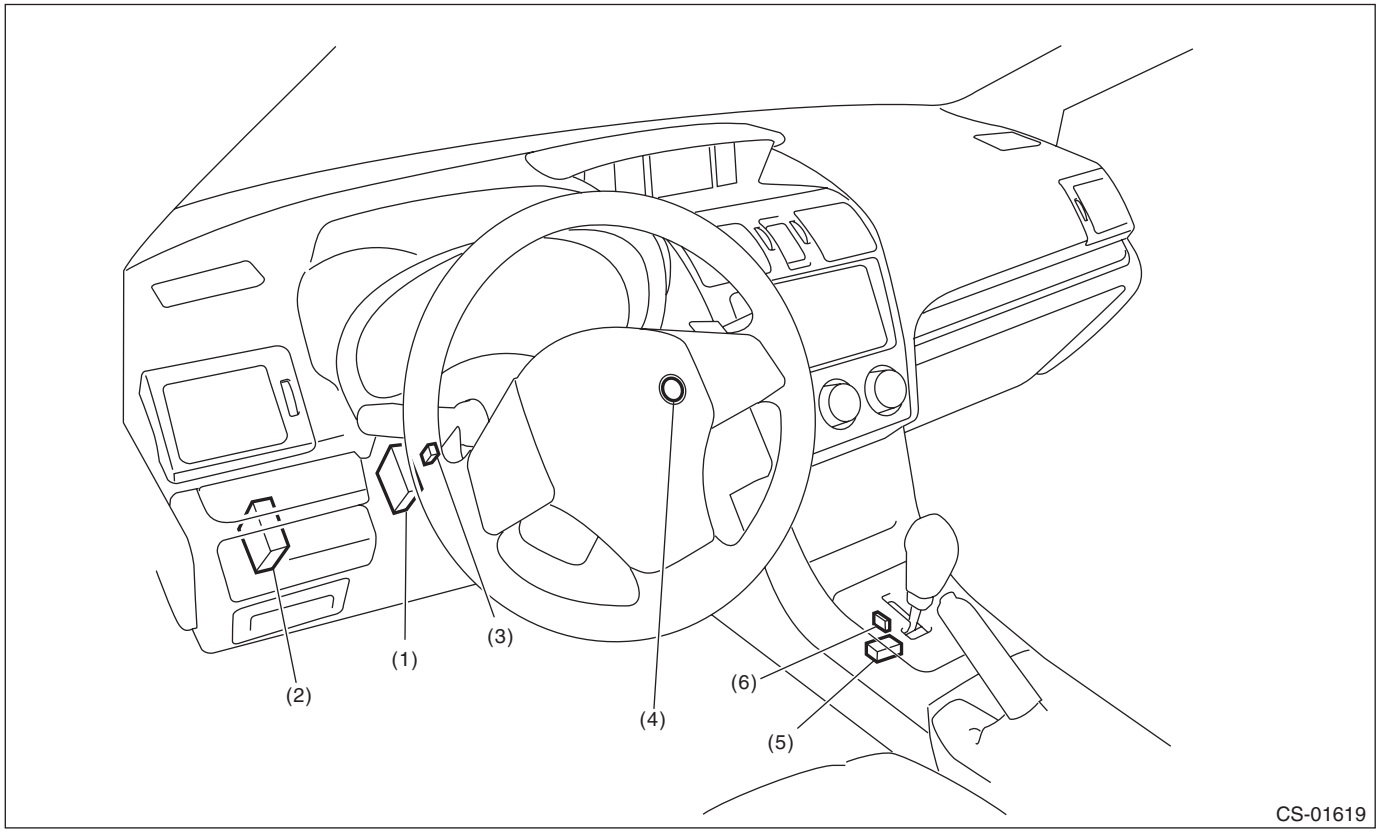


CS-01400

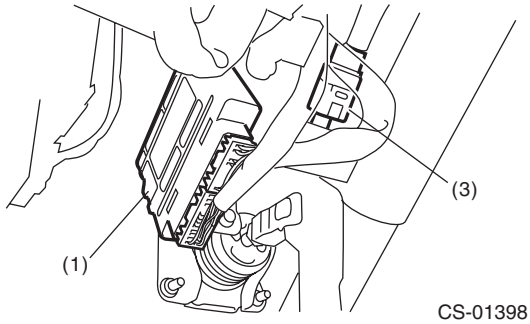


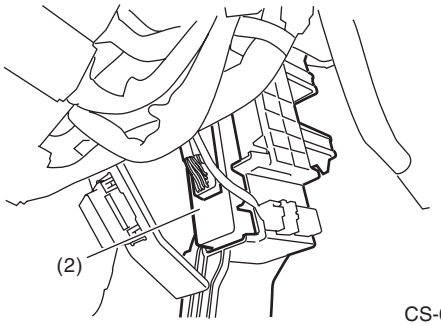
CS-01624

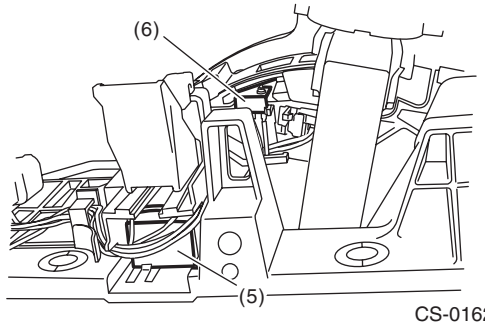
2. MODEL WITH PUSH BUTTON IGNITION SWITCH



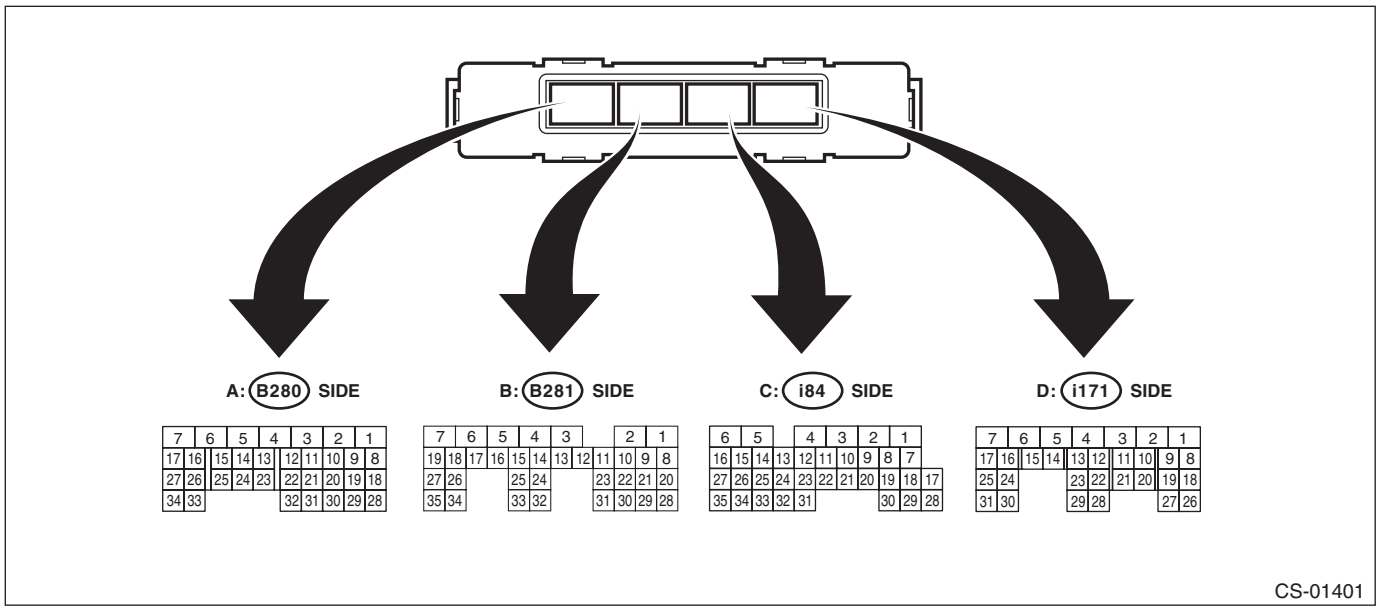
(1) TCM (“P” range)
(2) Body integrated unit
(3) Stop light and brake switch
(4) Push button ignition switch
(5) Solenoid unit
(6) “P” range switch







B: ELECTRICAL SPECIFICATION



- Model without push button ignition switch

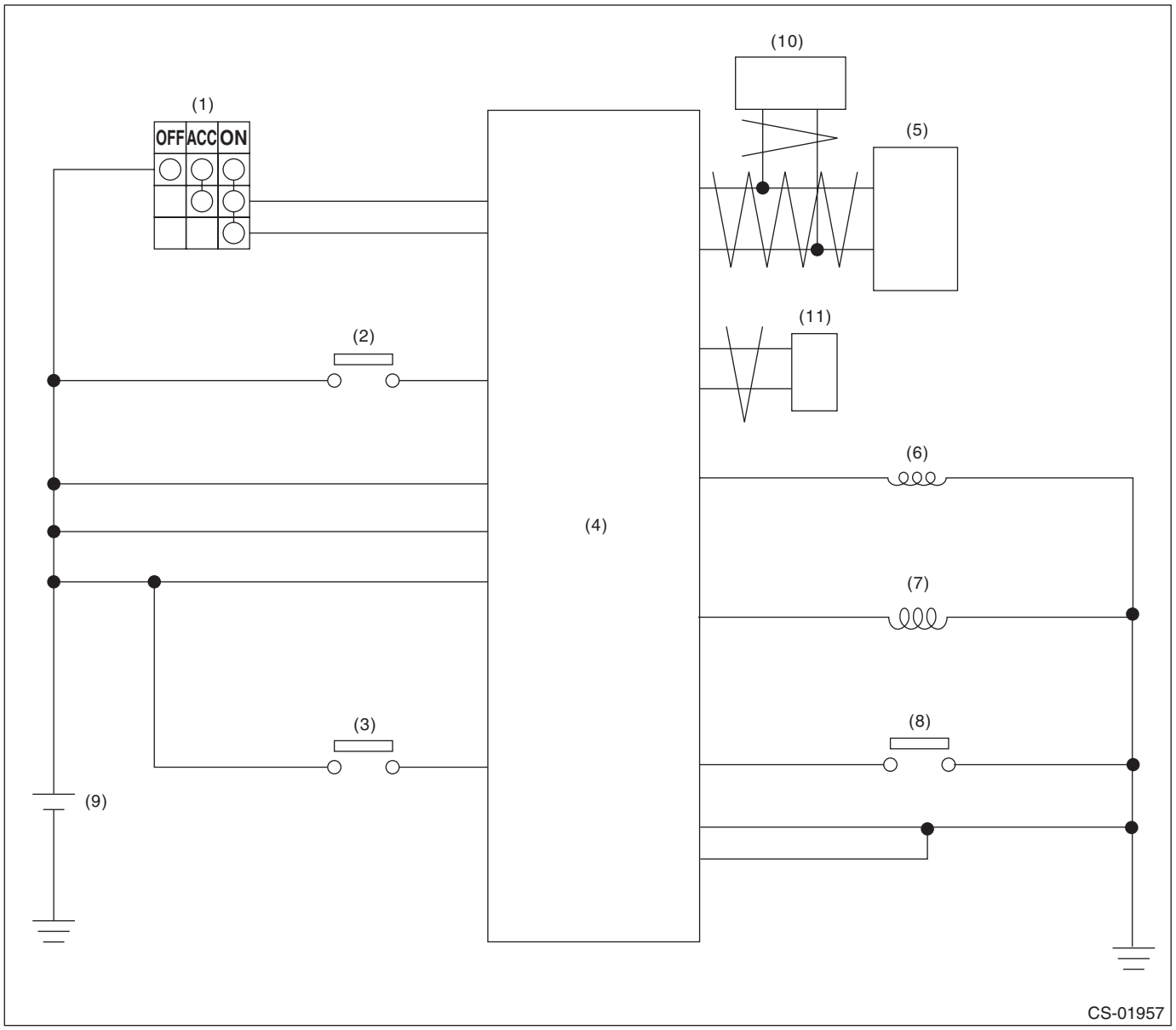
Item	Connector No.	Terminal No.	Input/Output signal
			Measured value and measuring conditions
Battery power supply	B281	6	9 — 16 V
		7	
	i84	6	
Ignition power supply	B280	32	10 — 15 V when ignition switch is at ACC.
	B281	3	10 — 15 V when ignition switch is at ON or START.
TCM (“P” range)	B281	20	Can not be measured because of digital communication
		28	
Stop light and brake switch	B280	10	9 — 16 V when the stop light & brake switch is ON. 0 V when the stop light & brake switch is OFF.
“P” range switch	B281	18	0 V when select lever is in “P” range. 9 — 16 V when select lever is in other positions than “P” range.
Solenoid unit signal	B281	5	8.5 — 16 V when shift lock is released. 0 V when shift lock is operating.
Key warning switch signal	B280	4	9 — 16 V when key is inserted. 0 V when key is removed.
Key lock solenoid signal	B281	4	7.5 — 16 V when the key is inserted with the select lever shifted in positions other than “P” range. 0 V at other conditions than above.
Ground	B280	1	—
	i84	1	
Delivery (test) mode signal	i84	27	Can not be measured because of digital communication
		35	

- Model with push button ignition switch

Item	Connector No.	Terminal No.	Input/Output signal Measured value and measuring conditions
Battery power supply	B281	6	9 — 16 V
		7	
	i84	6	
Ignition power supply	B280	32	10 — 15 V when ignition switch is at ACC.
	B281	3	10 — 15 V when ignition switch is at ON or START.
TCM (“P” range)	B281	20	Can not be measured because of digital communication
		28	
Stop light and brake switch	B280	10	9 — 16 V when the stop light & brake switch is ON. 0 V when the stop light & brake switch is OFF.
“P” range switch	B281	18	0 V when select lever is in “P” range. 9 — 16 V when select lever is in other positions than “P” range.
Solenoid unit signal	B281	5	8.5 — 16 V when shift lock is released. 0 V when shift lock is operating.
Ground	B280	1	—
	i84	1	
Delivery (test) mode signal	i84	27	Can not be measured because of digital communication
		35	

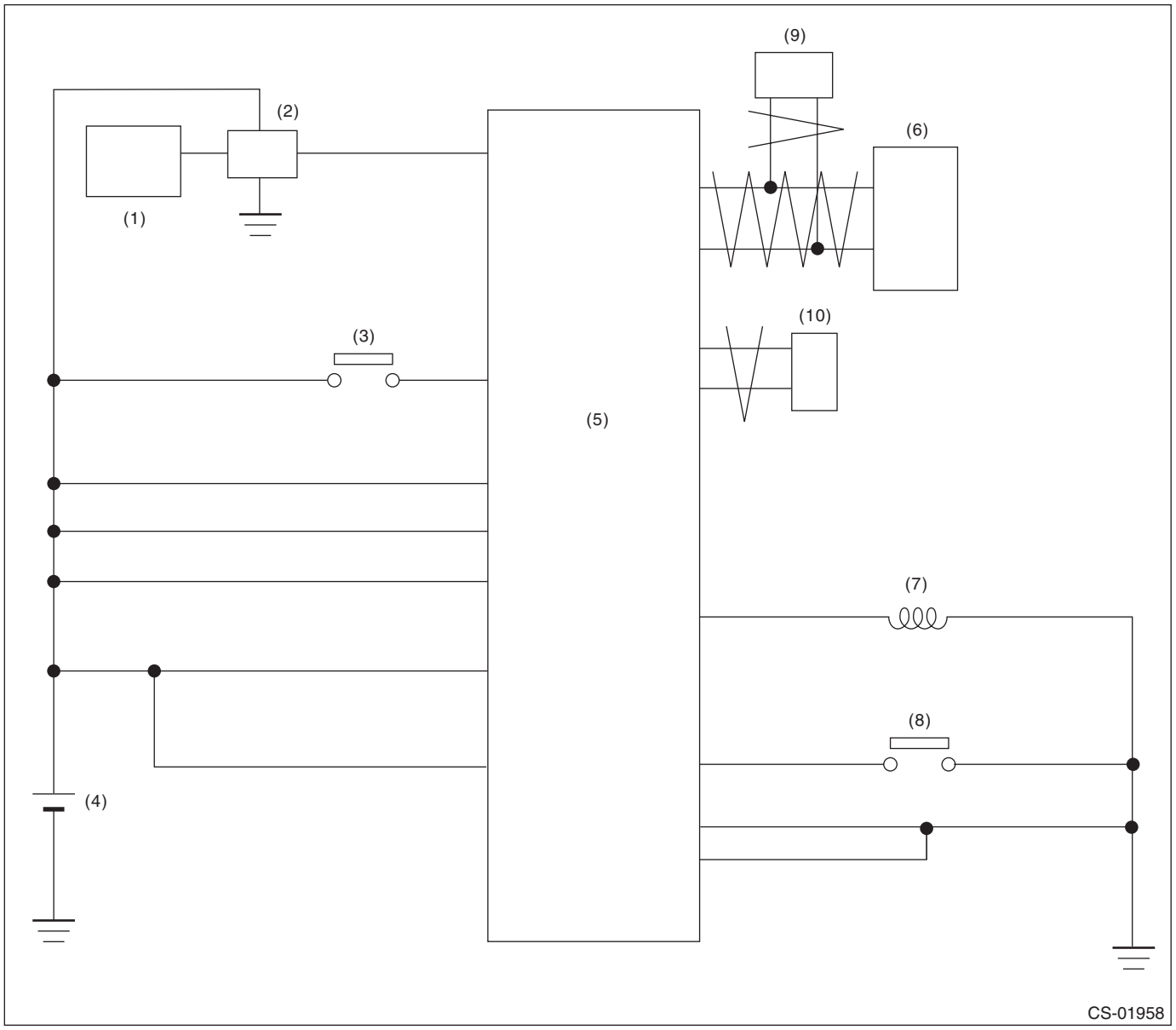
C: WIRING DIAGRAM

1. MODEL WITHOUT PUSH BUTTON IGNITION SWITCH



(1) Ignition switch
(2) Stop light and brake switch
(3) Key warning switch
(4) Body integrated unit
(5) TCM (shift range information)
(6) Key lock solenoid
(7) Shift lock solenoid
(8) “P” range switch
(9) Battery
(10) ECM (delivery (test) mode signal)
(11) VDC CM (vehicle speed information)

2. MODEL WITH PUSH BUTTON IGNITION SWITCH



(1) Keyless access CM
(2) IG relay 1 (push button start)
(3) Stop light and brake switch
(4) Battery
(5) Body integrated unit
(6) TCM (shift range information)
(7) Shift lock solenoid
(8) “P” range switch
(9) ECM (delivery (test) mode signal)
(10) VDC CM (vehicle speed information)

D: INSPECTION

1. SHIFT LOCK OPERATION

- Model without push button ignition switch

	Step	Check	Yes	No
1	**CHECK COMMUNICATION OF SUBARU SELECT MONITOR.** 1) Turn the ignition switch to ON. 2) Using the Subaru Select Monitor, check whether communication to all systems can be executed normally.	Is the system name displayed?	Go to step **2**.	Perform the inspection following the diagnostic procedure in BODY CONTROL SYSTEM (DIAGNOSTICS) section. <Ref. to BC(diag)-2, Basic Diagnostic Procedure.>
2	**CHECK SHIFT LOCK.** 1) Turn the ignition switch to ON. 2) Shift the select lever to “P” range.	While brake pedal is not depressed, is it possible to move the select lever from the “P” range to other ranges?	Perform the inspection of “SELECT LEVER CANNOT BE LOCKED OR RELEASED”. <Ref. to CS-18, SELECT LEVER CANNOT BE LOCKED OR RELEASED, INSPECTION, AT Shift Lock Control System.>	Go to step **3**.
3	**CHECK SHIFT LOCK.**	While brake pedal is depressed, is it possible to move the select lever from the “P” range to other ranges?	Go to step **4**.	Perform the inspection of “SELECT LEVER CANNOT BE LOCKED OR RELEASED”. <Ref. to CS-18, SELECT LEVER CANNOT BE LOCKED OR RELEASED, INSPECTION, AT Shift Lock Control System.>
4	**CHECK SHIFT LOCK.** Shift the select lever to “N” range.	Is it possible to move the select lever from the “N” range to the “P” range?	Go to step **5**.	Perform the inspection of “SELECT LEVER CANNOT BE LOCKED OR RELEASED”. <Ref. to CS-18, SELECT LEVER CANNOT BE LOCKED OR RELEASED, INSPECTION, AT Shift Lock Control System.>

	Step	Check	Yes	No
5	**CHECK SHIFT LOCK.** 1) Shift the select lever to “N” range. 2) Turn the ignition switch to ACC.	While brake pedal is depressed, is it possible to move the select lever from the “N” range to the “P” range?	Go to step **6**.	Perform the inspection of “SELECT LEVER CANNOT BE LOCKED OR RELEASED”. <Ref. to CS-18, SELECT LEVER CANNOT BE LOCKED OR RELEASED, INSPECTION, AT Shift Lock Control System.>
6	**CHECK KEY INTERLOCK.** 1) Turn the ignition switch to OFF. 2) Shift the select lever to other than “P” range.	Can the ignition key be removed?	Perform the inspection of “KEY INTERLOCK CANNOT BE LOCKED OR RELEASED”. <Ref. to CS-21, KEY INTERLOCK CANNOT BE LOCKED OR RELEASED, INSPECTION, AT Shift Lock Control System.>	Go to step **7**.
7	**CHECK KEY INTERLOCK.** Shift the select lever to “P” range.	Can the ignition key be removed?	AT shift lock system is normal.	Perform the inspection of “KEY INTERLOCK CANNOT BE LOCKED OR RELEASED”. <Ref. to CS-21, KEY INTERLOCK CANNOT BE LOCKED OR RELEASED, INSPECTION, AT Shift Lock Control System.>

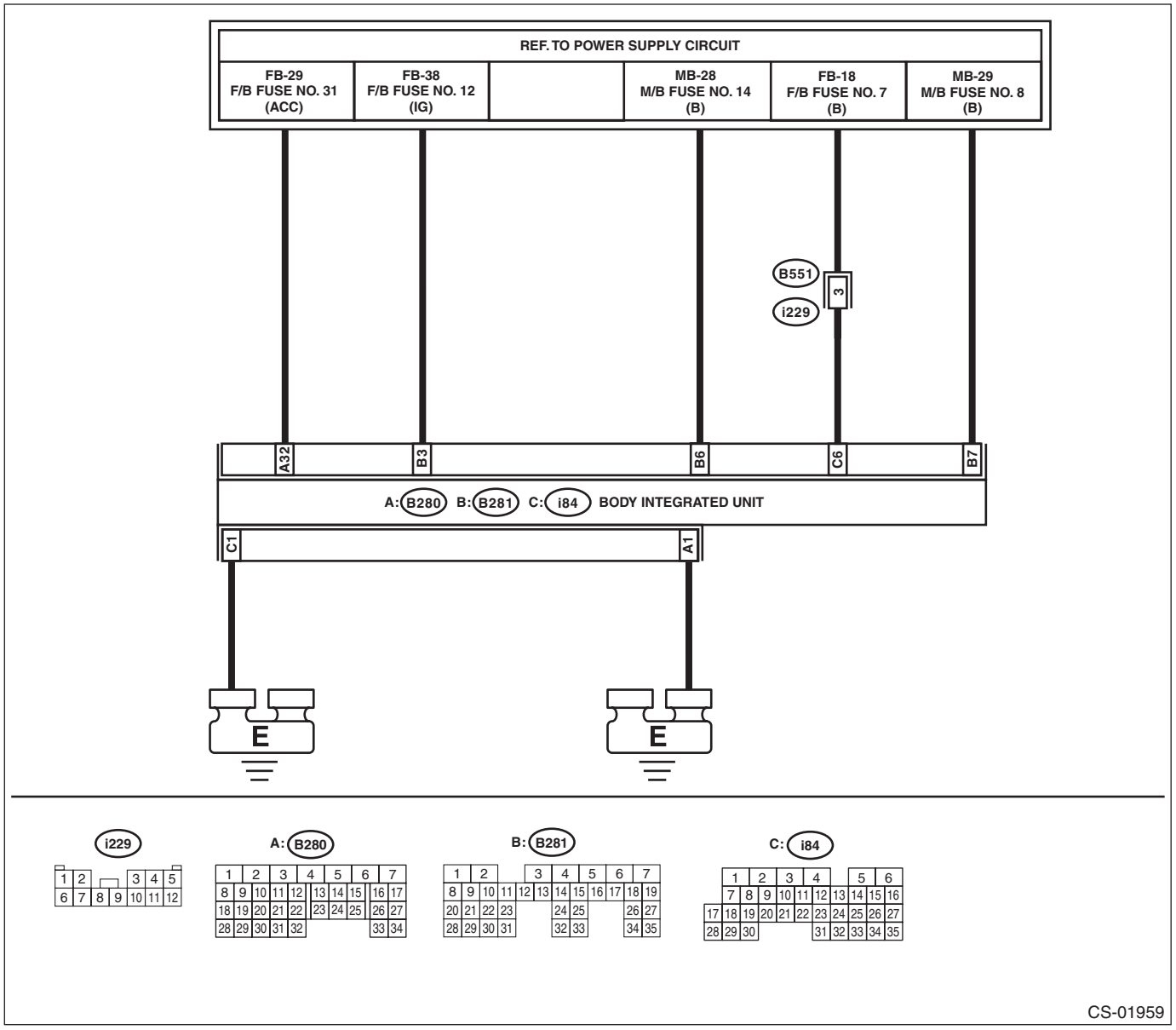
- Model with push button ignition switch

	Step	Check	Yes	No
1	**CHECK COMMUNICATION OF SUBARU SELECT MONITOR.** 1) Turn the ignition switch to ON. 2) Using the Subaru Select Monitor, check whether communication to all systems can be executed normally.	Is the system name displayed?	Go to step **2**.	Perform the inspection following the diagnostic procedure in BODY CONTROL SYSTEM (DIAGNOSTICS) section. <Ref. to BC(diag)-2, Basic Diagnostic Procedure.>

	Step	Check	Yes	No
2	**CHECK SHIFT LOCK.** 1) Turn the ignition switch to ON. 2) Shift the select lever to “P” range.	While brake pedal is not depressed, is it possible to move the select lever from the “P” range to other ranges?	Perform the inspection of “SELECT LEVER CANNOT BE LOCKED OR RELEASED”. <Ref. to CS-18, SELECT LEVER CANNOT BE LOCKED OR RELEASED, INSPECTION, AT Shift Lock Control System.>	Go to step **3**.
3	**CHECK SHIFT LOCK.**	While brake pedal is depressed, is it possible to move the select lever from the “P” range to other ranges?	Go to step **4**.	Perform the inspection of “SELECT LEVER CANNOT BE LOCKED OR RELEASED”. <Ref. to CS-18, SELECT LEVER CANNOT BE LOCKED OR RELEASED, INSPECTION, AT Shift Lock Control System.>
4	**CHECK SHIFT LOCK.** Shift the select lever to “N” range.	Is it possible to move the select lever from the “N” range to the “P” range?	Go to step **5**.	Perform the inspection of “SELECT LEVER CANNOT BE LOCKED OR RELEASED”. <Ref. to CS-18, SELECT LEVER CANNOT BE LOCKED OR RELEASED, INSPECTION, AT Shift Lock Control System.>
5	**CHECK SHIFT LOCK.** 1) Shift the select lever to “N” range. 2) Turn the ignition switch to ACC.	While brake pedal is depressed, is it possible to move the select lever from the “N” range to the “P” range?	AT shift lock system is normal.	Perform the inspection of “SELECT LEVER CANNOT BE LOCKED OR RELEASED”. <Ref. to CS-18, SELECT LEVER CANNOT BE LOCKED OR RELEASED, INSPECTION, AT Shift Lock Control System.>

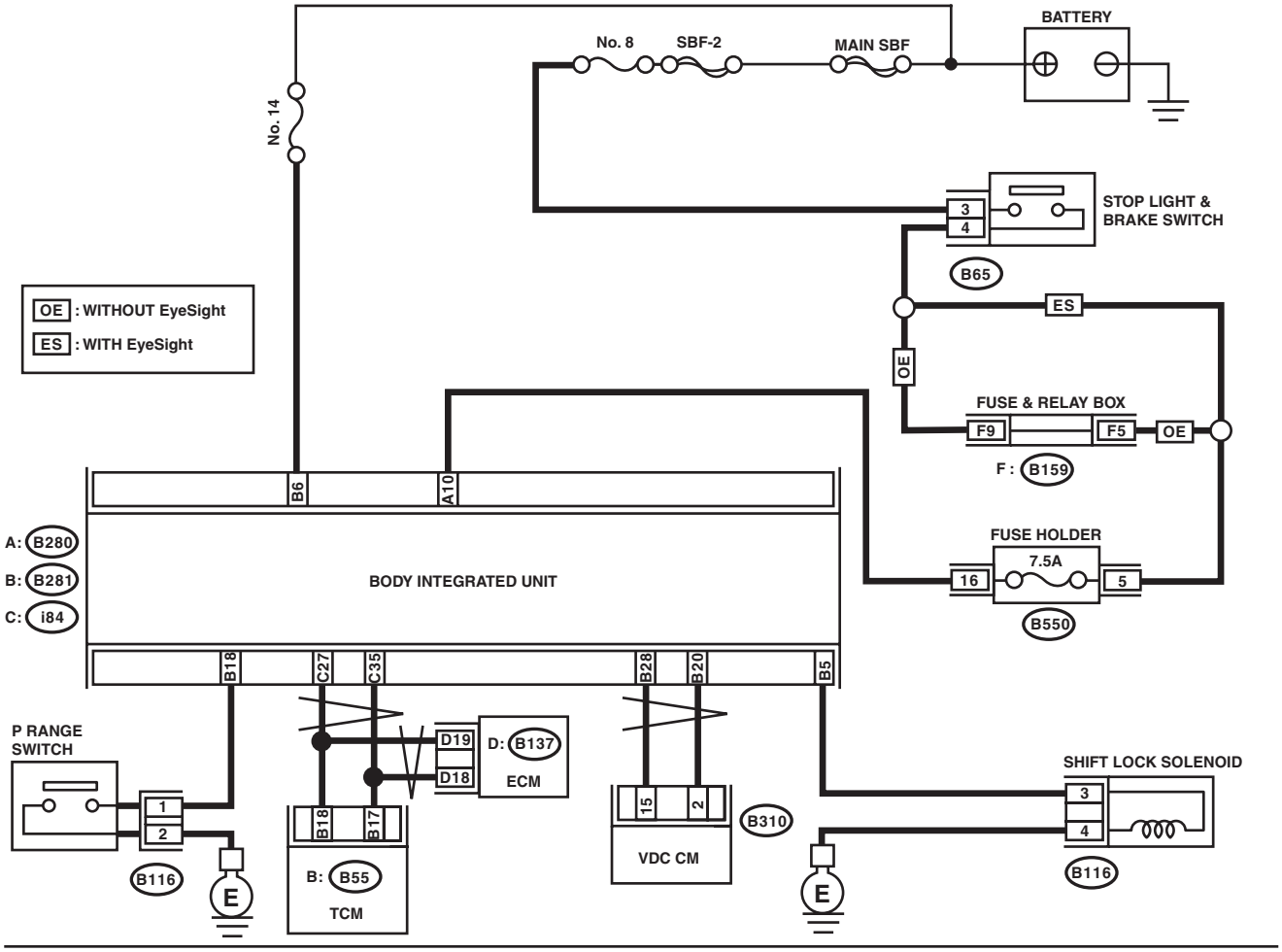
2. BODY INTEGRATED UNIT POWER SUPPLY AND GROUND CIRCUIT

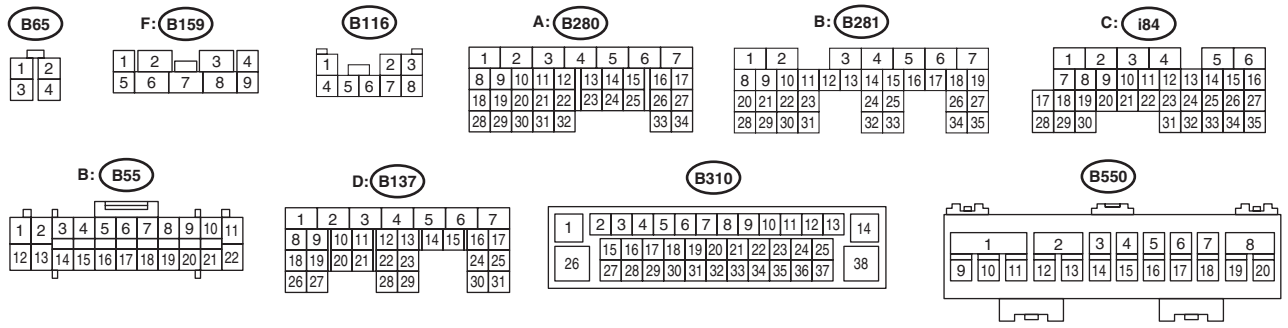
NOTE:
For the DC power supply circuit, refer to “WIRING DIAGRAMS”. <Ref. to WI(w/o HEV)-16, Power Supply Circuit.> <Ref. to WI(HEV)-21, Power Supply Circuit.>



	Step	Check	Yes	No
1	**CHECK DTC OF BODY INTEGRATED UNIT.** Check DTC of body integrated unit. <Ref. to BC(diag)-10, Read Diagnostic Trouble Code (DTC).>	Is the DTC of power line displayed on body integrated unit?	Repair or replace it according to the DTC.	Go to step **2**.
2	**CHECK HARNESS BETWEEN BODY INTEGRATED UNIT AND BATTERY.** 1) Turn the ignition switch to ON. 2) Measure the voltage between body integrated unit and chassis ground. ***Connector & terminal*** ***(B281) No. 3 (+) — Chassis ground (–):*** ***(B280) No. 32 (+) — Chassis ground (–):*** ***(B281) No. 6 (+) — Chassis ground (–):*** ***(B281) No. 7 (+) — Chassis ground (–):*** ***(i84) No. 6 (+) — Chassis ground (–):***	Is the voltage 9 — 16 V?	Go to step **3**.	Check harness for open circuit between the body integrated unit and the battery (for HEV model, 12 volt auxiliary battery) or a blown fuse.
3	**CHECK HARNESS BETWEEN BODY INTEGRATED UNIT AND CHASSIS GROUND.** 1) Turn the ignition switch to OFF. 2) Measure the harness resistance between the body integrated unit and chassis ground. ***Connector & terminal*** ***(B280) No. 1 — Chassis ground:*** ***(i84) No. 1 — Chassis ground:***	Is the resistance less than 1 Ω?	Go to step **4**.	Repair the open circuit of harness between the body integrated unit and chassis ground.
4	**CHECK FOR POOR CONTACT.**	Is there poor contact of connector?	Repair the poor contact.	Check body integrated unit.

3. SELECT LEVER CANNOT BE LOCKED OR RELEASED





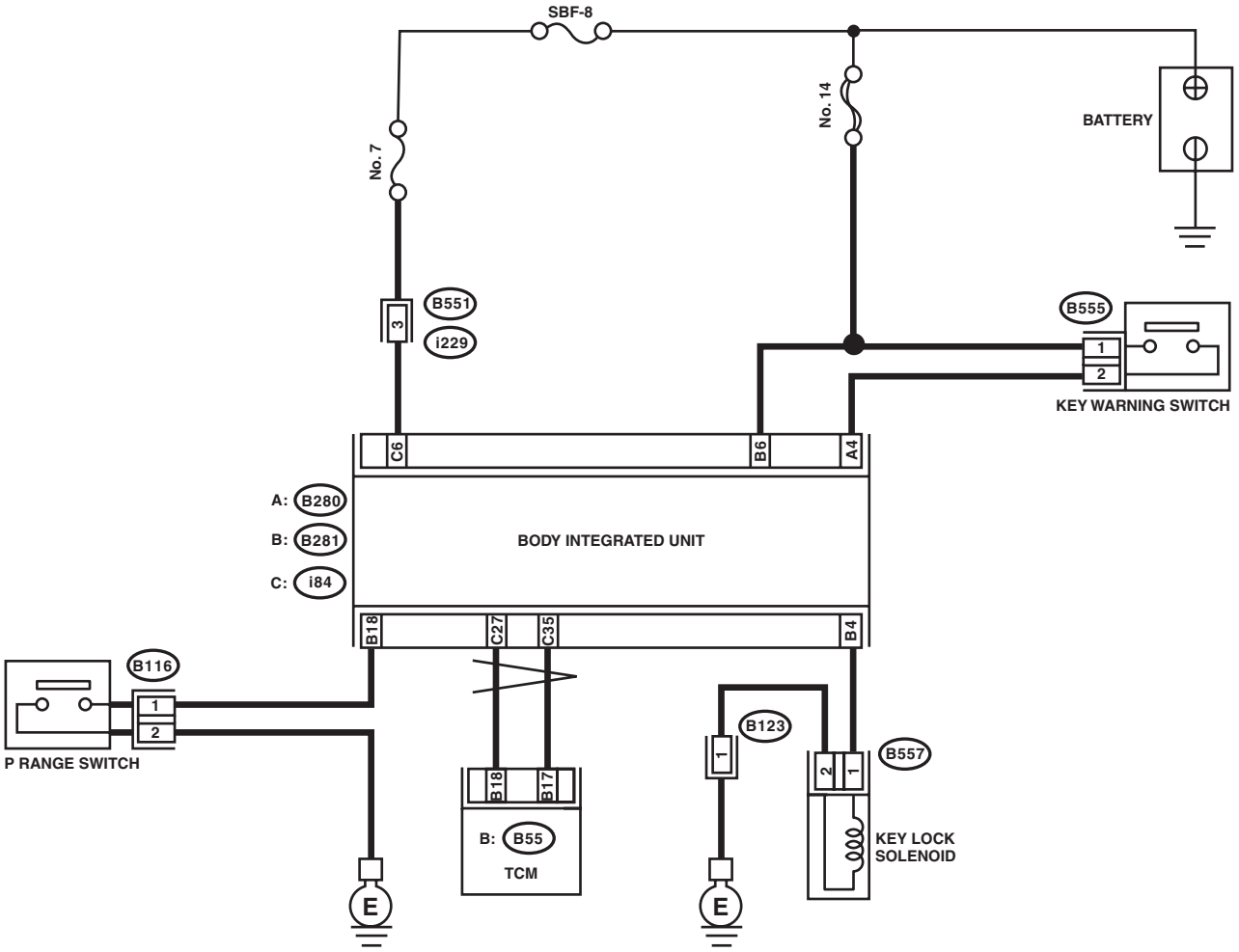
CS-01960

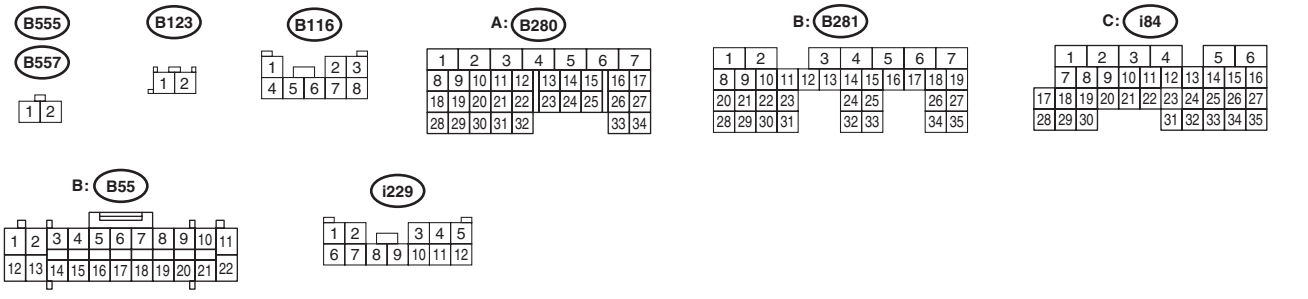
	Step	Check	Yes	No
1	**CHECK BODY INTEGRATED UNIT POWER SUPPLY AND GROUND CIRCUIT.** <Ref. to CS-16, BODY INTEGRATED UNIT POWER SUPPLY AND GROUND CIRCUIT, INSPECTION, AT Shift Lock Control System.>	Is there any fault?	Follow the procedures to perform inspection and repair.	Go to step **2**.
2	**CHECK CURRENT DATA.** 1) Connect the Subaru Select Monitor. 2) Shift the select lever to "P" range. 3) Turn the ignition switch to ON. 4) Select the current data display and display «P SW». <Ref. to BC(diag)-12, Read Current Data.>	Is the display "ON" in the P range and "OFF" in ranges other than P?	Go to step **3**.	Go to step **8**.
3	**CHECK CURRENT DATA.** Select the current data display and display «Stop Light Switch». <Ref. to BC(diag)-12, Read Current Data.>	Is "ON" displayed when the brake pedal is depressed and "OFF" displayed when the brake pedal is released?	Go to step **4**.	Go to step **11**.
4	**CHECK BODY INTEGRATED UNIT DTC.** Check the DTC of the body integrated unit when the brake pedal is pressed and when it is released. (Hold each condition for 5 seconds or more.)	Is there a DTC of a current malfunction?	Follow the DTC to perform inspection and repair.	Go to step **5**.
5	**CHECK CURRENT DATA.** Select the current data display and display «Shift Lock Solenoid». <Ref. to BC(diag)-12, Read Current Data.>	Is "ON" displayed when the brake pedal is depressed and "OFF" displayed when the brake pedal is released?	Go to step **6**.	Replace the body integrated unit.
6	**CHECK CURRENT DATA.** Select the current data display and display «Shift Position». <Ref. to BC(diag)-12, Read Current Data.>	Is the display "P" in the P range and other than "P" in ranges other than P?	Go to step **7**.	Check the following items. • Inhibitor switch • Harness between inhibitor switch and TCM • TCM input signal • TCM CAN communication • Body integrated unit CAN receive
7	**CHECK CURRENT DATA.** 1) Select the current data display and display «Front Wheel Speed». <Ref. to BC(diag)-12, Read Current Data.> 2) Start the engine. 3) Raise vehicle speed gradually up to approximately 20 km/h (12 MPH).	Is a figure equivalent to the speedometer being indicated?	Go to step **12**.	Check the following items. • Wheel speed sensor • CAN communication by VDC unit • Body integrated unit CAN receive Replace the wheel speed sensor, VDC unit or body integrated unit, or both.

	Step	Check	Yes	No
8	**CHECK HARNESS BETWEEN BODY INTEGRATED UNIT AND "P" RANGE SWITCH.** 1) Disconnect the connector from body integrated unit. 2) Disconnect the connector of "P" range switch. 3) Check for open circuit of harness, short circuit to battery or short circuit to ground between the body integrated unit and "P" range switch. ***Connector & terminal*** ***(B281) No. 18 — (B116) No. 1:***	Is there any fault in the harness?	Repair or replace the harness between the body integrated unit and the "P" range switch.	Go to step **9**.
9	**CHECK HARNESS BETWEEN "P" RANGE SWITCH AND CHASSIS GROUND.** Measure the resistance of harness between "P" range switch and chassis ground. ***Connector & terminal*** ***(B116) No. 2 — Chassis ground:***	Is it less than 10 Ω?	Go to step **10**.	Repair the harness between the "P" range switch and chassis ground.
10	**CHECK "P" RANGE SWITCH.** Measure the resistance between "P" range switch connector terminals. ***Terminals*** ***No. 2 — No. 1:***	Is it less than 10 Ω in the "P" range, and 1 MΩ or more in ranges other than "P"?	Replace the body integrated unit.	Replace the "P" range switch.
11	**CHECK STOP LIGHT SWITCH INPUT SIGNAL.** 1) Disconnect the connector from body integrated unit. 2) Measure the voltage between the body integrated unit connector terminal and chassis ground. ***Connector & terminal*** ***(B280) No. 10 (+) — Chassis ground (–):***	Is the voltage 9 V to 16 V when the brake pedal is depressed, and approx. 0 V when not depressed?	Replace the body integrated unit.	Check the stop light system.
12	**CHECK SOLENOID UNIT OPERATION.** Connect the battery to the solenoid unit connector terminal, and operate the solenoid unit. ***Terminals*** ***No. 3 (+) — No. 4 (–):***	Does the solenoid unit operate normally?	Check the lock mechanism of the select lever body.	Replace the solenoid unit.

4. KEY INTERLOCK CANNOT BE LOCKED OR RELEASED

NOTE:
Check of this item only applies to models without a push button ignition switch.





CS-01761

	Step	Check	Yes	No
1	**CHECK D CHECK FUSE.** Check that the D check fuse is disconnected.	Is the D check fuse disconnected?	Go to step **2**.	Remove the D check fuse and then turn the ignition switch to ON.
2	**CHECK BODY INTEGRATED UNIT POWER SUPPLY AND GROUND CIRCUIT.** <Ref. to CS-16, BODY INTEGRATED UNIT POWER SUPPLY AND GROUND CIRCUIT, INSPECTION, AT Shift Lock Control System.>	Is there any fault?	Follow the procedures to inspect and repair.	Go to step **3**.
3	**CHECK CURRENT DATA.** 1) Connect the Subaru Select Monitor. 2) Shift the select lever to "P" range. 3) Turn the ignition switch to ON. 4) Select the current data display and display «P SW». <Ref. to BC(diag)-12, Read Current Data.>	Is the display "ON" in the P range and "OFF" in ranges other than P?	Go to step **4**.	Go to step **7**.
4	**CHECK CURRENT DATA.** 1) Select the current data display and display the «key-lock warning SW». <Ref. to BC(diag)-12, Read Current Data.> 2) Turn the ignition switch to OFF.	Does the display change from "ON" ←→ "OFF" when the key is inserted and removed?	Go to step **5**.	Go to step **10**.
5	**CHECK CURRENT DATA.** 1) Turn the ignition switch to ON. 2) Select the current data display and display «Key locking output». <Ref. to BC(diag)-12, Read Current Data.>	Is the display "OFF" in the P range and "ON" in ranges other than P?	Go to step **11**.	Go to step **6**.
6	**CHECK DTC OF BODY INTEGRATED UNIT.** 1) Set the select lever to other than "P" range. 2) Check DTC of body integrated unit.	Is B1015 (key interlock circuit abnormal) a current malfunction?	Follow the DTC to perform inspection and repair.	Go to step **11**.
7	**CHECK HARNESS BETWEEN BODY INTEGRATED UNIT AND "P" RANGE SWITCH.** 1) Disconnect the connector from body integrated unit. 2) Disconnect the connector of "P" range switch. 3) Check for open circuit of harness, short circuit to battery or short circuit to ground between the body integrated unit and "P" range switch. ***Connector & terminal*** ***(B281) No. 18 — (B116) No. 1:***	Is there any fault in the harness?	Repair or replace the harness between the body integrated unit and the "P" range switch.	Go to step **8**.
8	**CHECK HARNESS BETWEEN "P" RANGE SWITCH AND CHASSIS GROUND.** Measure the resistance of harness between "P" range switch and chassis ground. ***Connector & terminal*** ***(B116) No. 2 — Chassis ground:***	Is it less than 10 Ω?	Go to step **9**.	Repair the harness between the "P" range switch and chassis ground.
9	**CHECK "P" RANGE SWITCH.** Measure the resistance between "P" range switch connector terminals. ***Terminals*** ***No. 2 — No. 1:***	Is it less than 10 Ω in the "P" range, and 1 MΩ or more in ranges other than "P"?	Replace the body integrated unit.	Replace the "P" range switch.

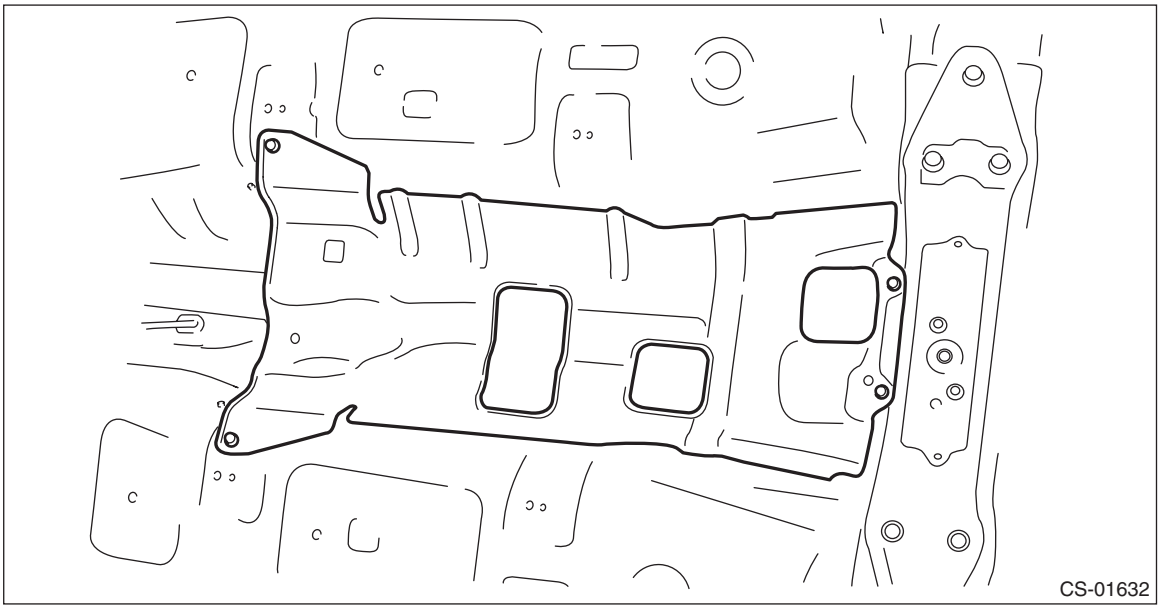
	Step	Check	Yes	No
10	**CHECK HARNESS BETWEEN BATTERY AND KEY WARNING SWITCH AND BODY INTEGRATED UNIT.** 1) Disconnect the connector from body integrated unit. 2) Measure the voltage between body integrated unit and chassis ground. ***Connector & terminal*** ***(B280) No. 4 (+) — Chassis ground (–):***	Is the display 9 V or more when the key is inserted, and less than 1.5 V with the key removed?	Replace the body integrated unit.	Check the following items. • Key warning switch • Harness/fuse • Ignition circuit
11	**CHECK HARNESS BETWEEN BODY INTEGRATED UNIT AND KEY LOCK SOLENOID.** 1) Disconnect the connector from body integrated unit. 2) Disconnect the connector of key lock solenoid. 3) Check for open circuit of harness, short circuit to battery or short circuit to ground between the body integrated unit and key lock solenoid. ***Connector & terminal*** ***(B281) No. 4 — (B557) No. 1:***	Is there any fault in the harness?	Repair or replace the harness between the body integrated unit and the key lock solenoid.	Go to step **12**.
12	**CHECK HARNESS BETWEEN KEY LOCK SOLENOID AND CHASSIS GROUND.** Measure the resistance of harness between key lock solenoid and chassis ground. ***Connector & terminal*** ***(B557) No. 2 — Chassis ground:***	Is it less than 10 Ω?	Go to step **13**.	Repair or replace the harness between the key lock solenoid and chassis ground.
13	**CHECK KEY LOCK SOLENOID OPERATION.** Connect the battery to the key lock solenoid connector terminal, and operate the solenoid. ***Terminals*** ***No. 2 (+) — No. 1 (–):***	Does the key lock solenoid operate normally?	Go to step **14**.	Replace the key lock solenoid.
14	**CHECK OUTPUT OF BODY INTEGRATED UNIT.** 1) Connect all connectors. 2) Insert the key. 3) Measure the voltage between body integrated unit and chassis ground. ***Connector & terminal*** ***(B281) No. 4 — Chassis ground:***	Is it 7.5 V to 16 V in ranges other than “P”, and 0 V in the “P” range?	Check the lock mechanism of the steering lock body.	Replace the body integrated unit.

3. Select Lever

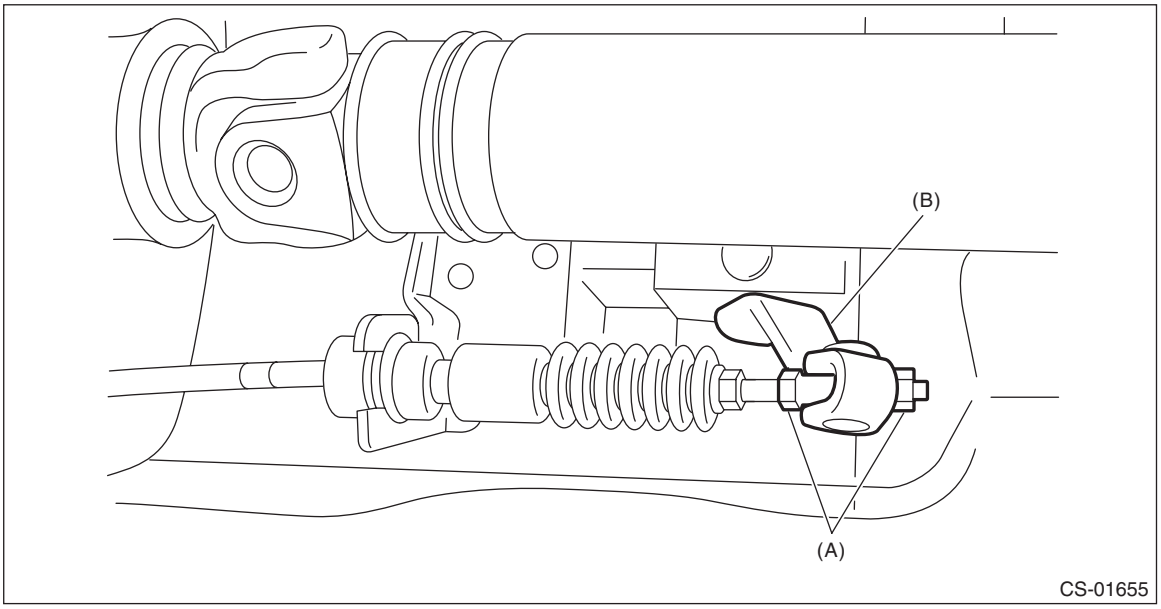
A: REMOVAL

1) Shift the select lever to “N” range.
2) Disconnect the ground cable from battery. <Ref. to NT-5, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
3) Lift up the vehicle.
4) Remove the center exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-14, REMOVAL, Center Exhaust Pipe.>
5) Remove the center exhaust cover.

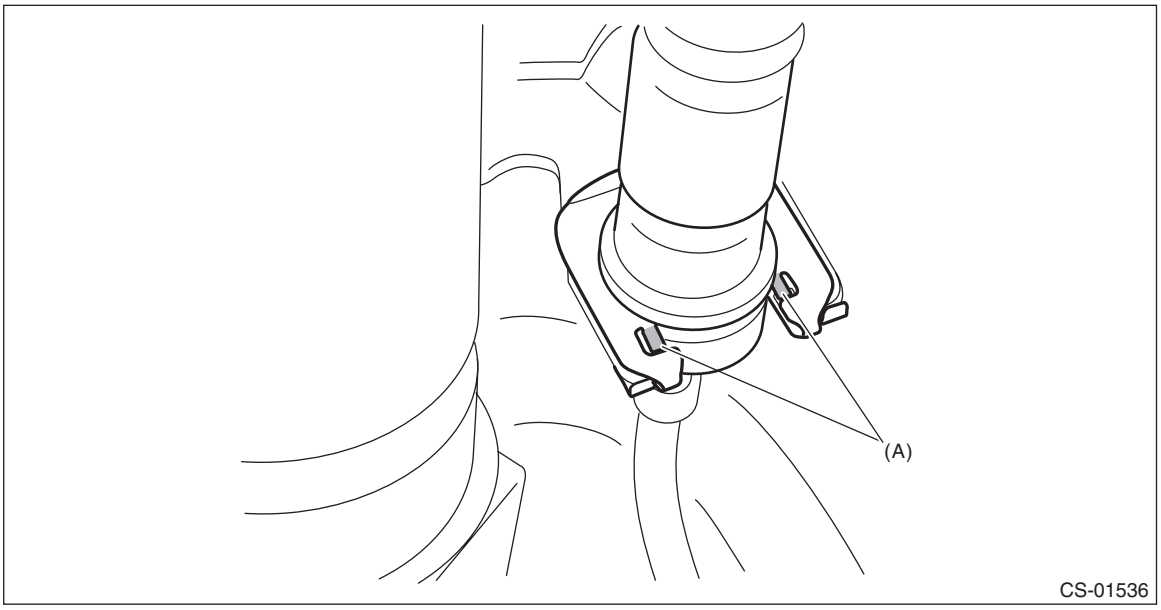


6) Disconnect the cable from the arm COMPL.



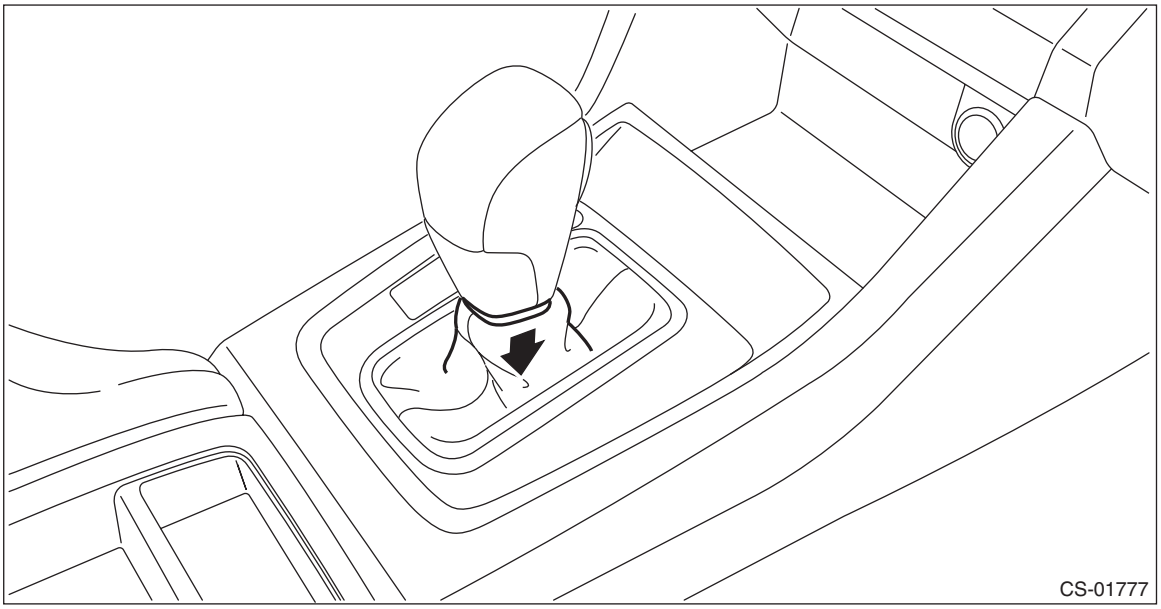
(A) Adjusting nut
(B) Arm COMPL

7) Raise the claw of clamp and remove the cable.

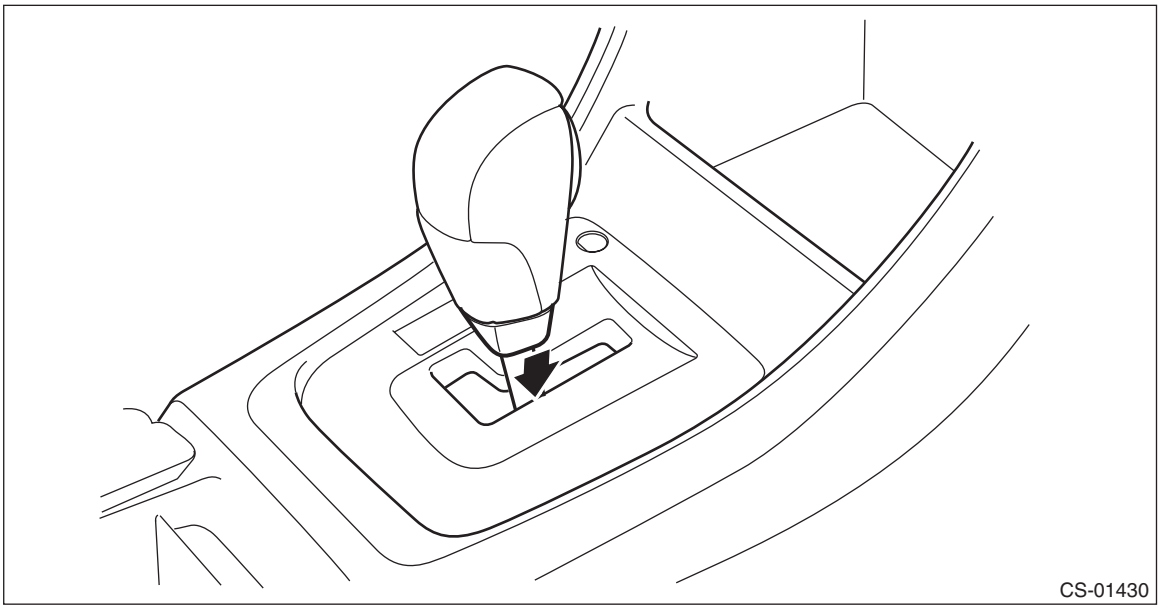


(A) Claw

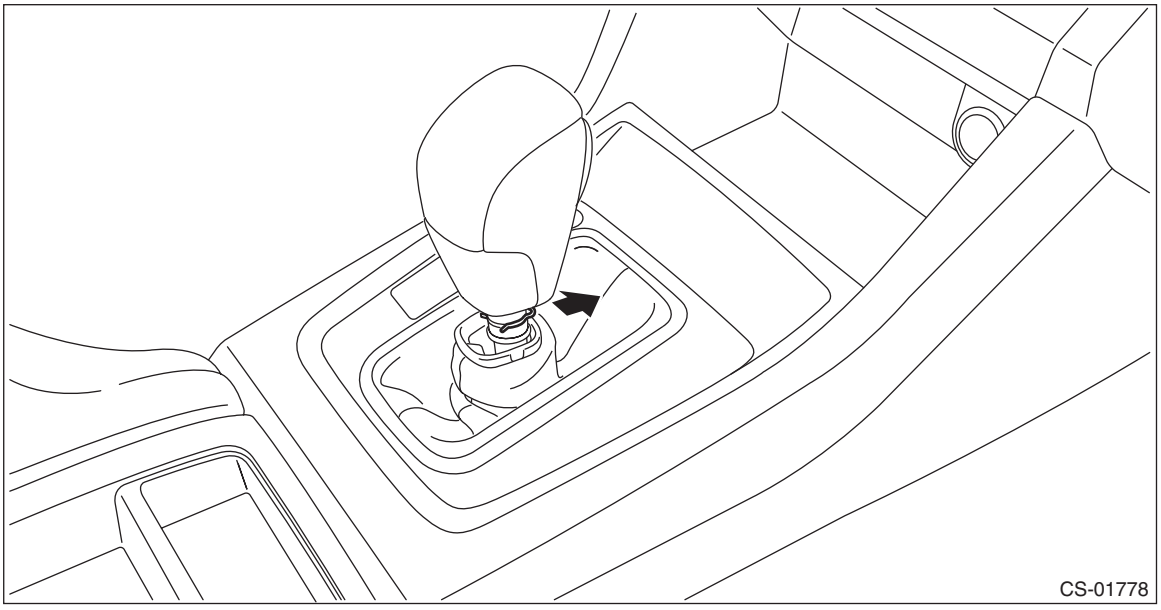
8) Lower the vehicle.
9) Shift the select lever to “N” range.
10) Lower the boot assembly vertically toward the lever. (Model with boot shifter)



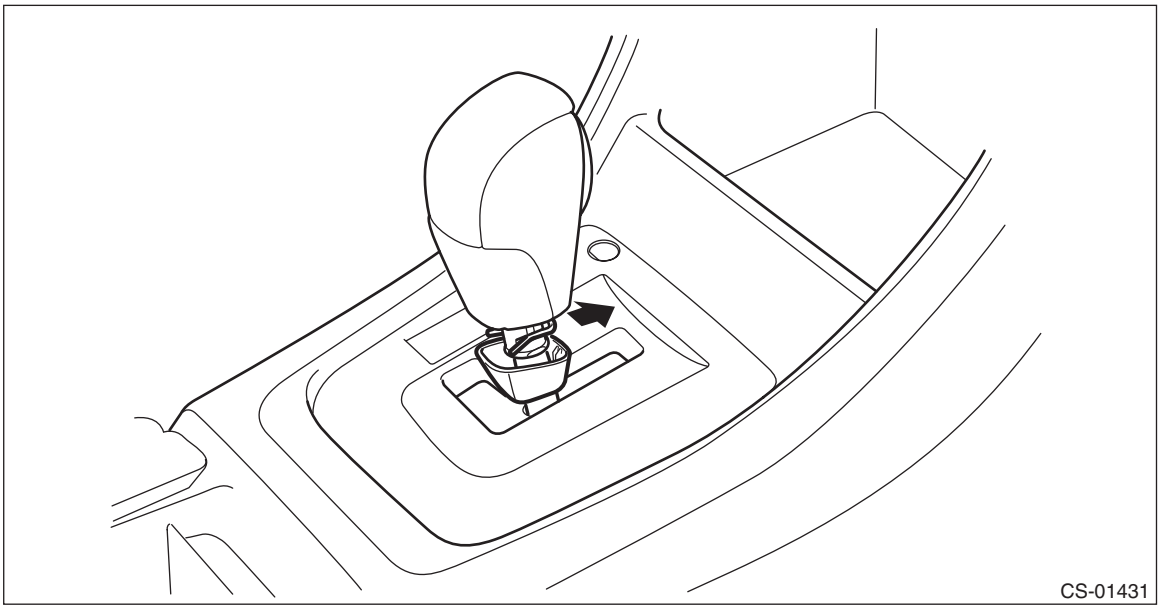
11) Lower the cover grip AT vertically toward the lever. (Model with gate shifter)



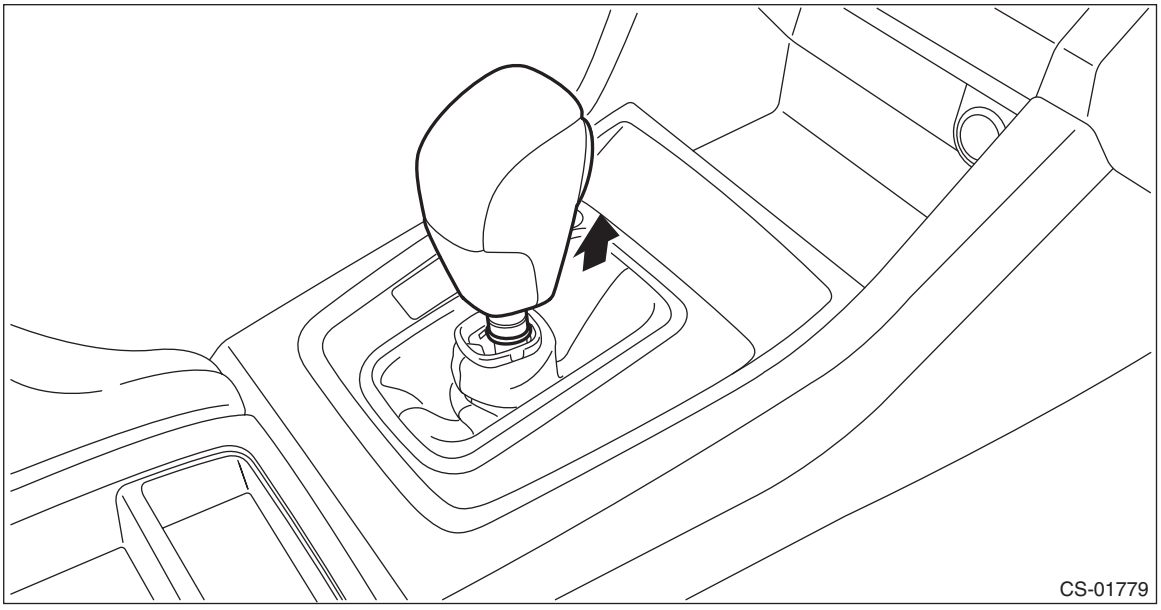
12) Remove the clamp grip pin.
- Model with boot shifter



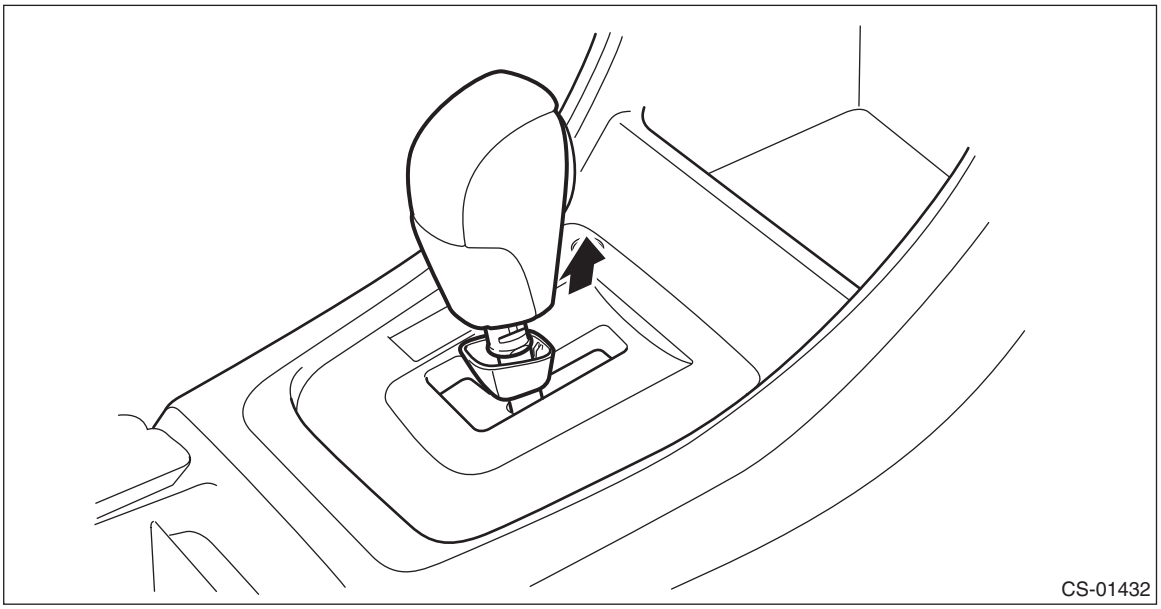
- Model with gate shifter



13) Remove the grip assembly.
- Model with boot shifter

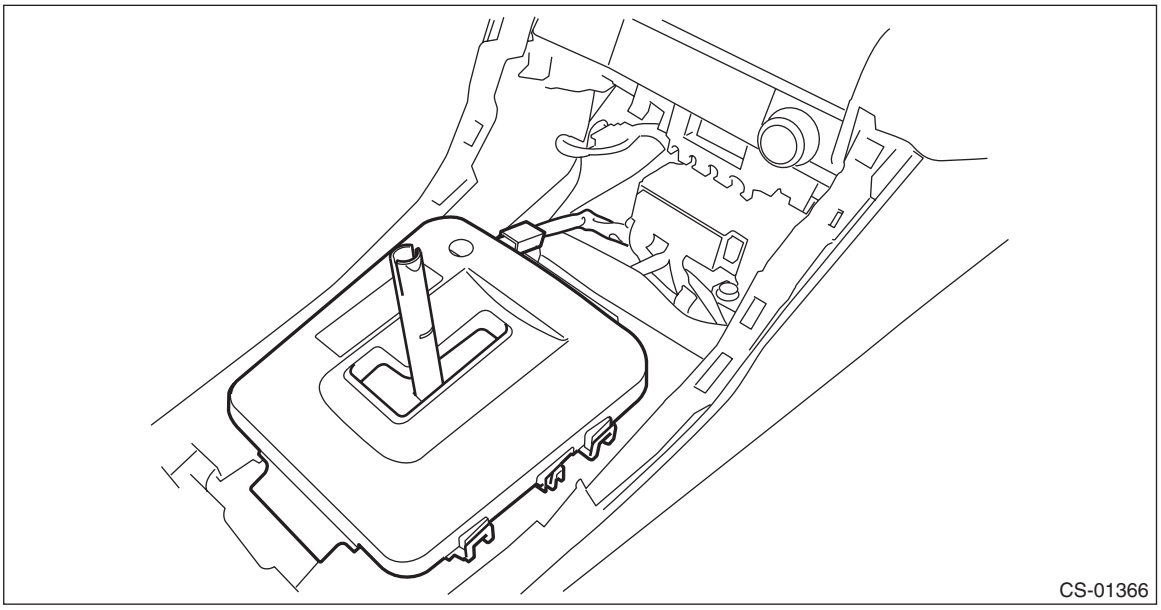


- Model with gate shifter

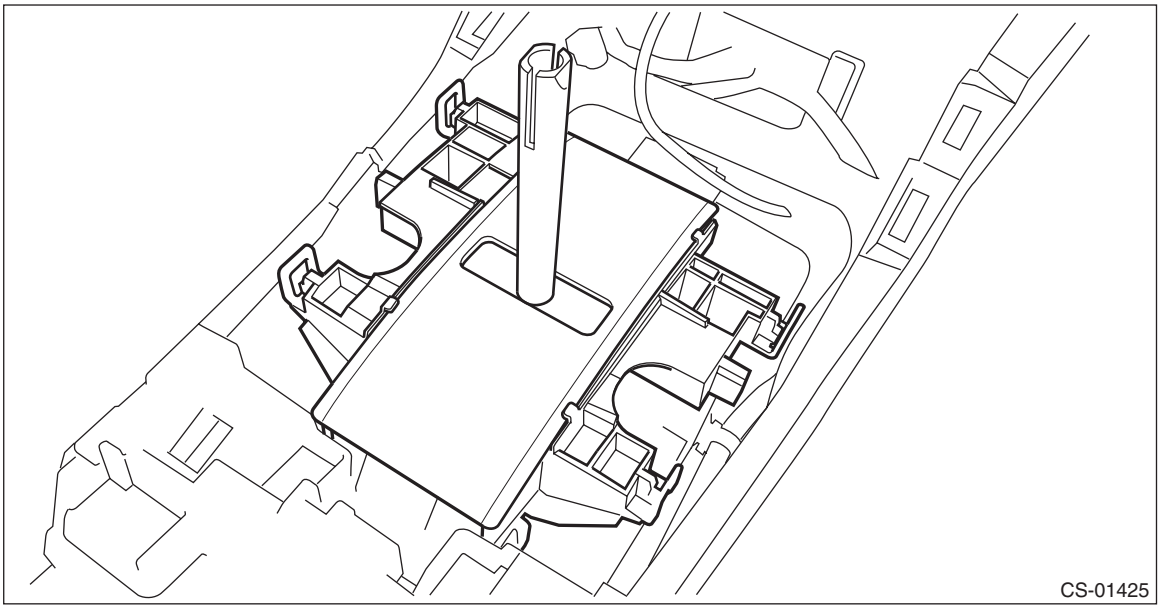


14) Remove the console box. <Ref. to EI-81, REMOVAL, Console Box.>
15) Remove the cover - shift lever. <Ref. to EI-81, REMOVAL, Console Box.>

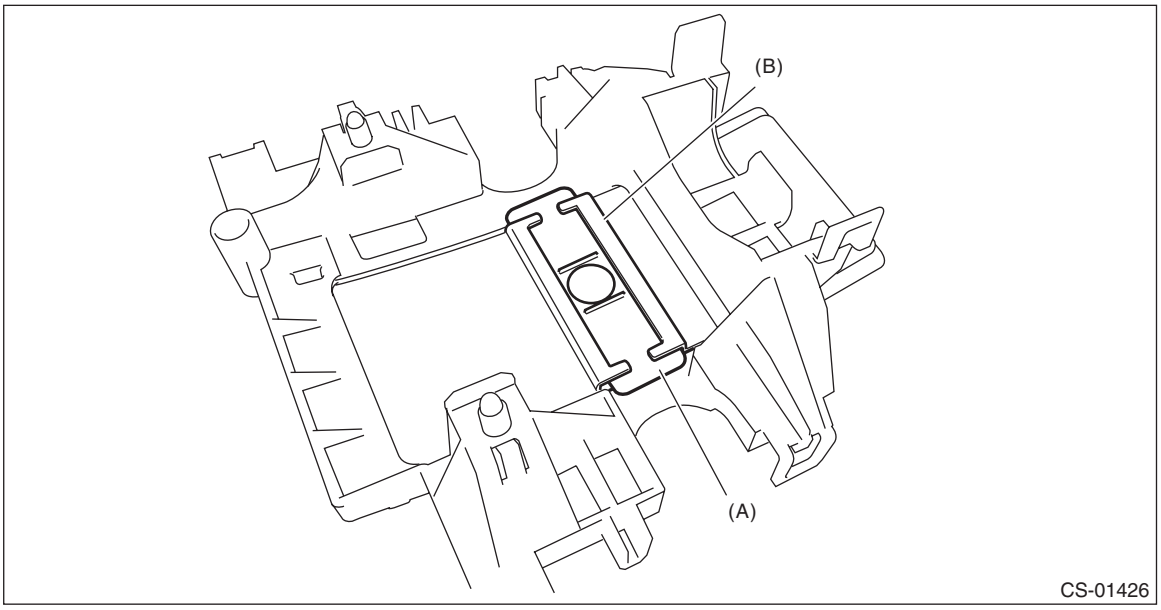
16) Disconnect the connector, and remove the indicator cover from the housing. (Model with gate shifter)



17) Remove the housing with the blind A and blind B. (Model with gate shifter)

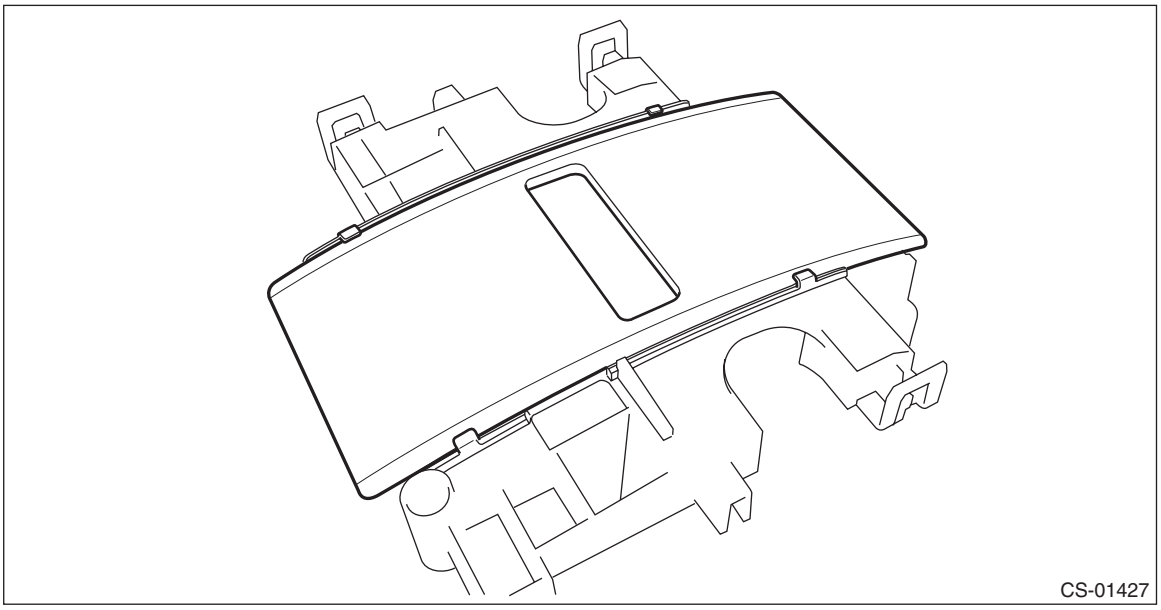


18) Remove the blind B. (Model with gate shifter)



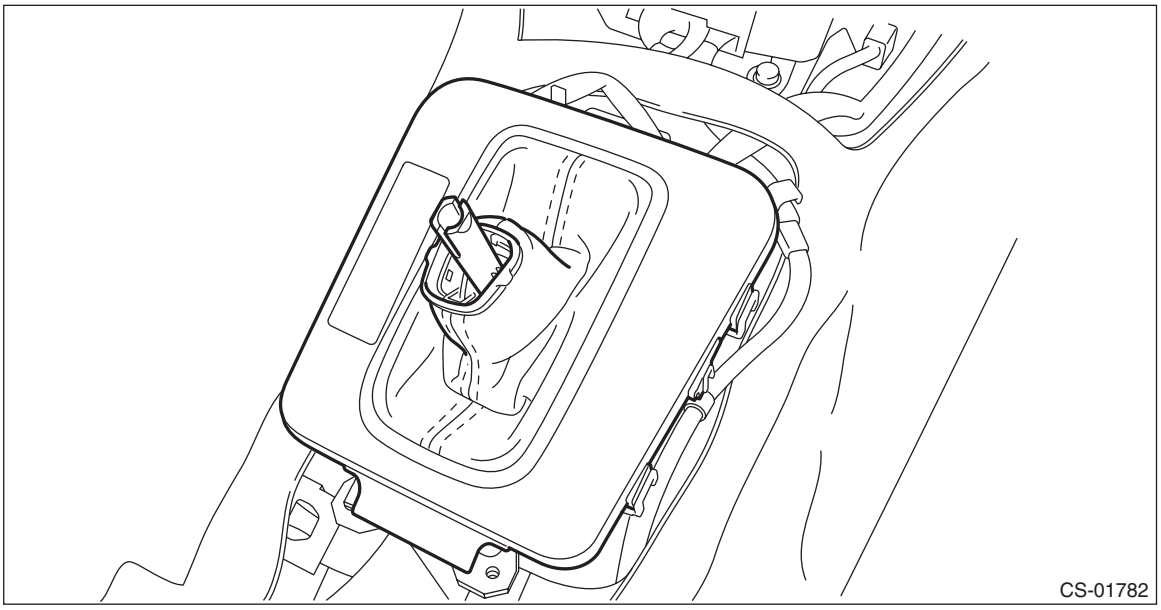
(A) Blind B
(B) Blind A

19) Remove the blind A from the housing. (Model with gate shifter)

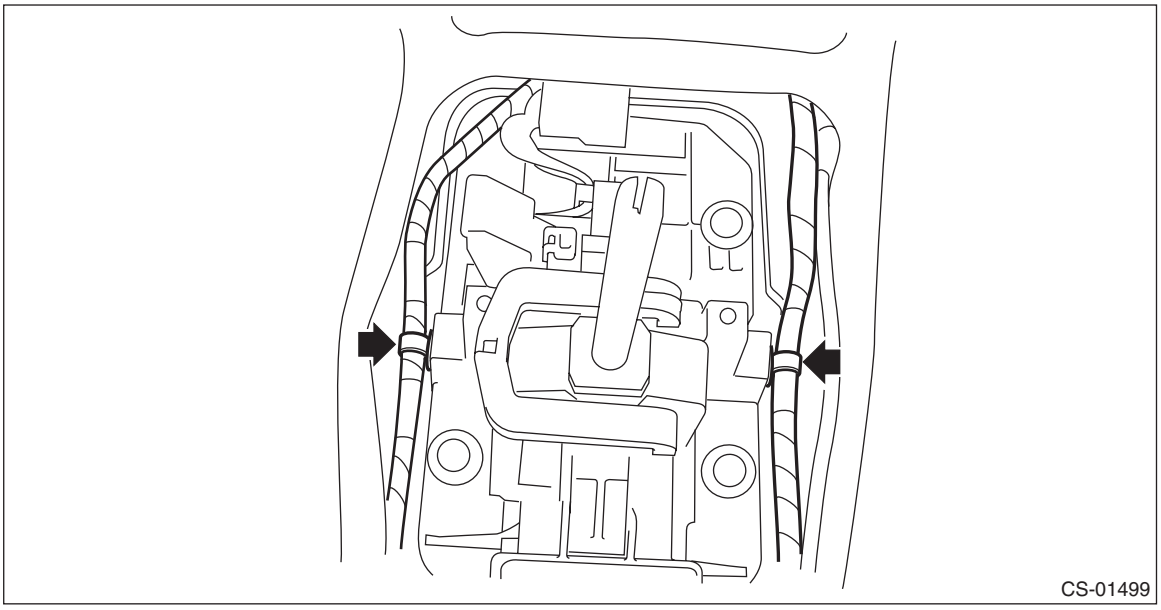


20) Remove the panel center LWR LH and RH. <Ref. to EI-81, REMOVAL, Console Box.>

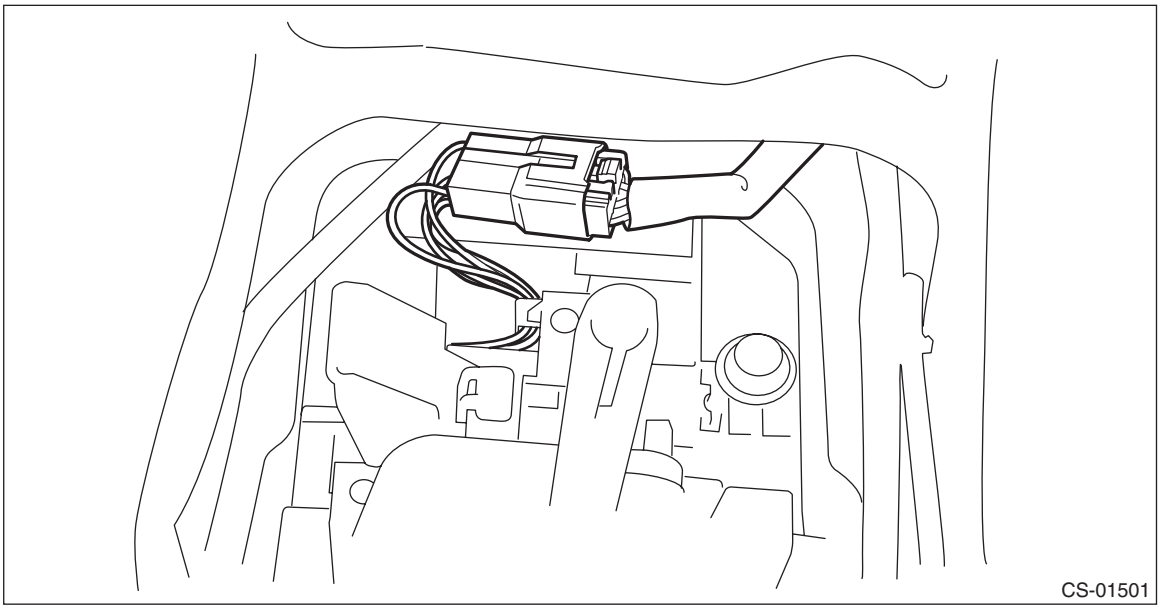
21) Disconnect the connector, and remove the indicator assembly. (Model with boot shifter)



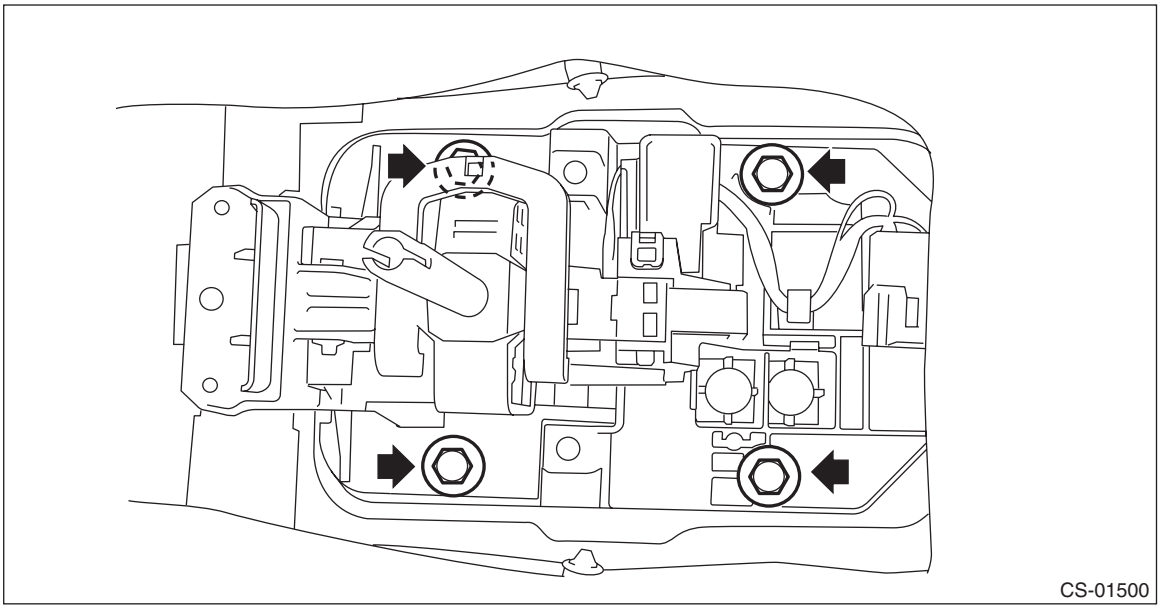
22) Remove the harness clip from the select lever assembly.



23) Disconnect the harness connector.



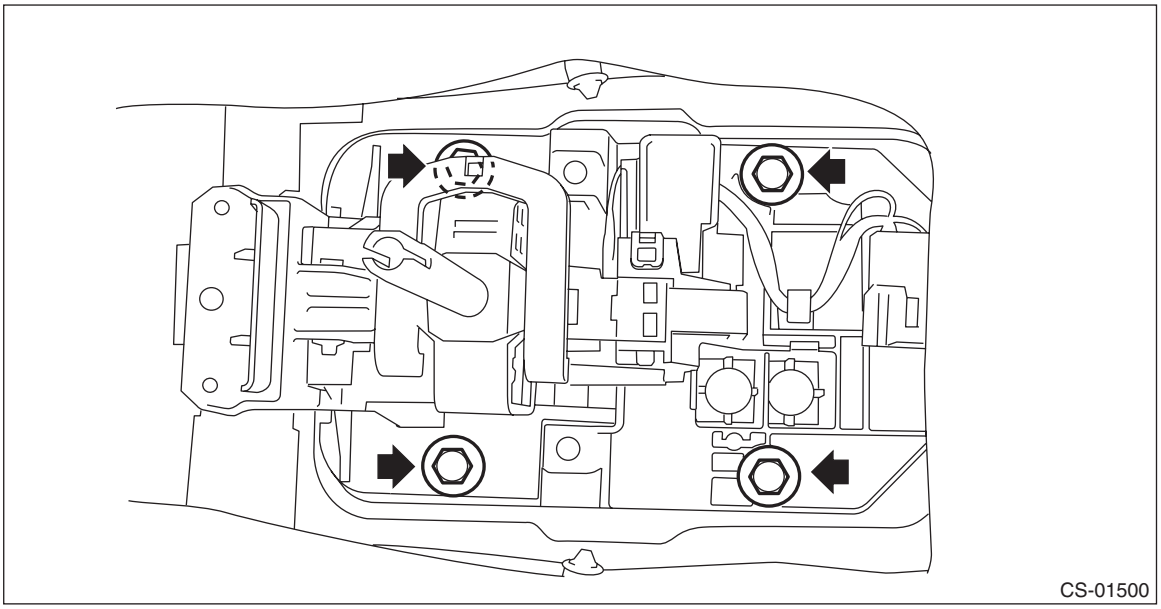
24) Remove the four bolts to remove the select lever assembly.



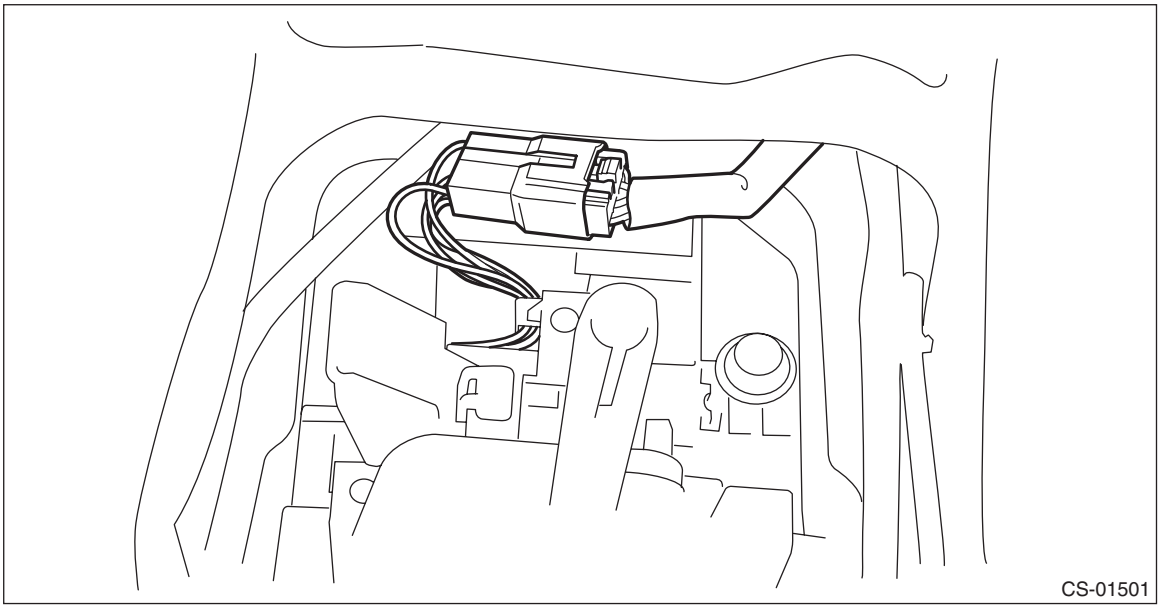
B: INSTALLATION

1) Set the select lever assembly to the vehicle body.
2) Tighten the four mounting bolts to attach the select lever assembly to the vehicle body.

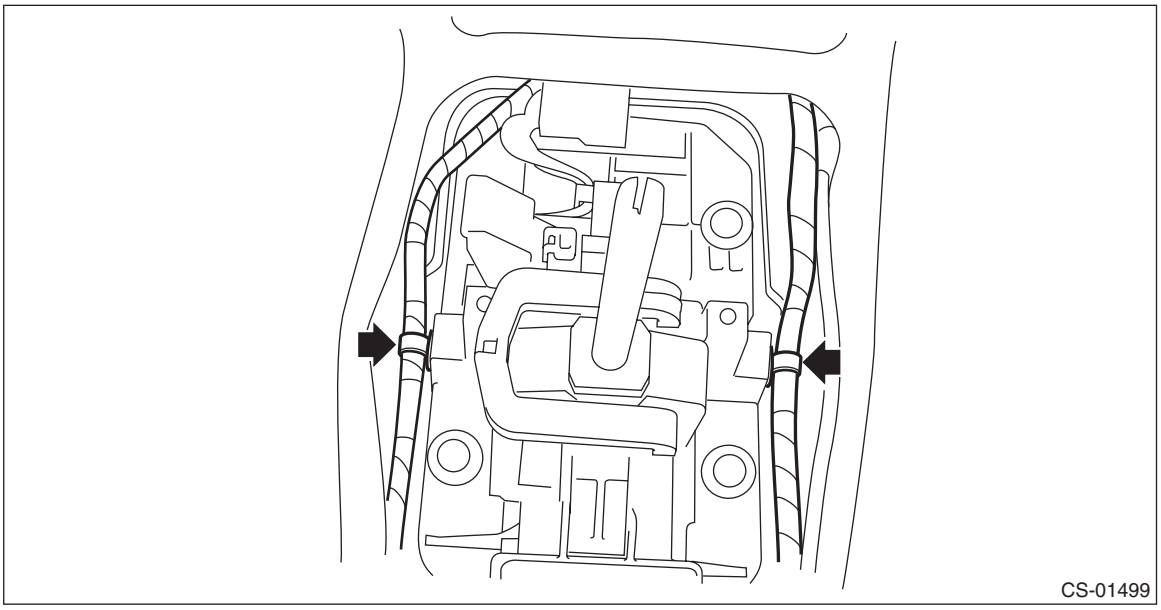
Tightening torque:
18 N·m (1.8 kgf-m, 13.3 ft-lb)



3) Connect the harness connector.

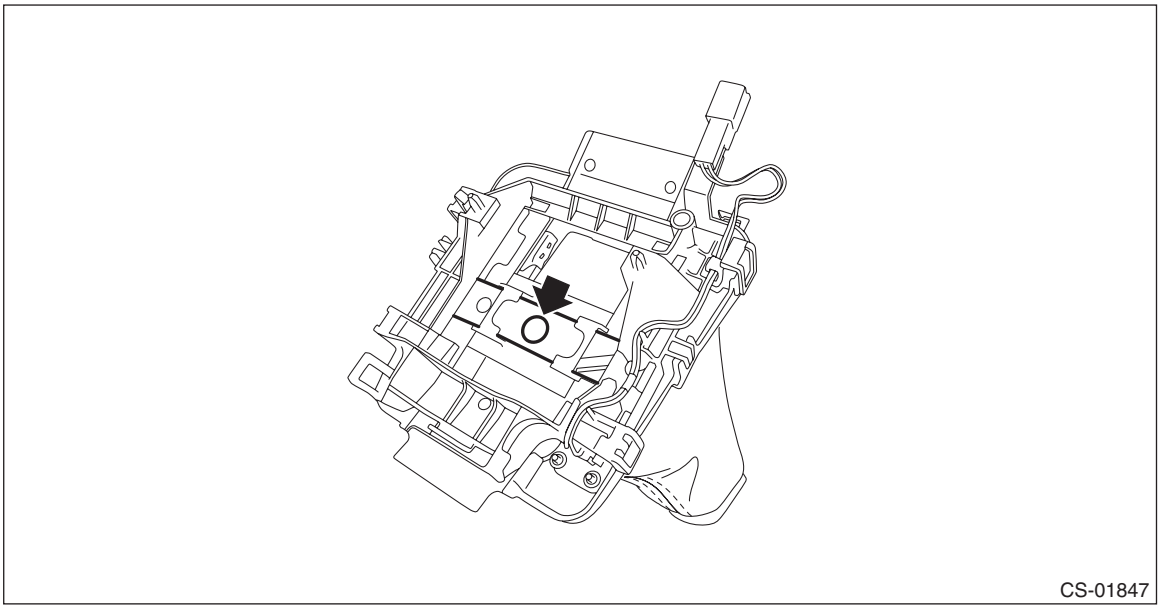


4) Install the harness clip to the select lever assembly.



5) Shift the select lever to “N” range.
6) Install the indicator assembly, then connect the connector. (Model with boot shifter)

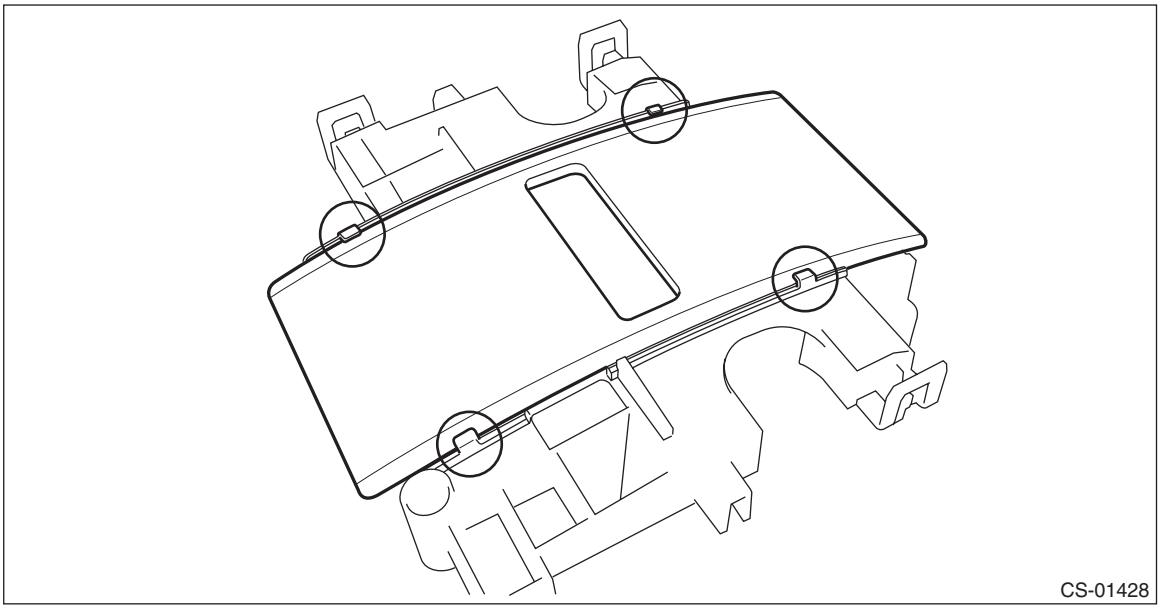
NOTE:
Insert the select lever through the blind hole sufficiently.



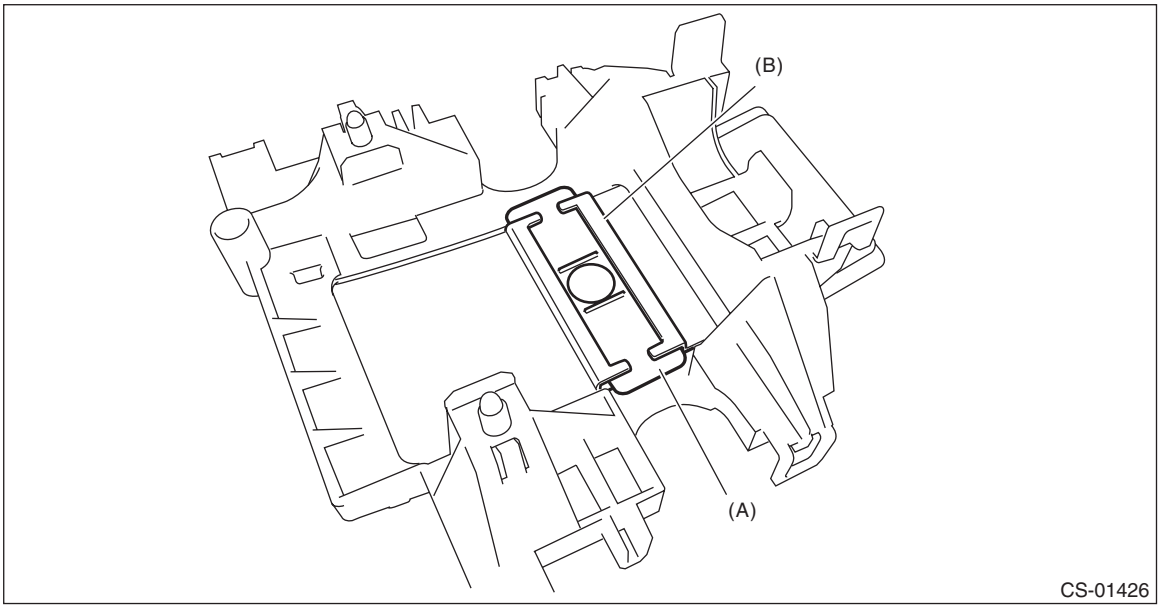
7) Install the panel center LWR LH and RH. <Ref. to EI-82, INSTALLATION, Console Box.>

8) Install the blind A to the housing. (Model with gate shifter)

NOTE:
The blind A should be installed so that it is securely caught inside the tab of the housing.

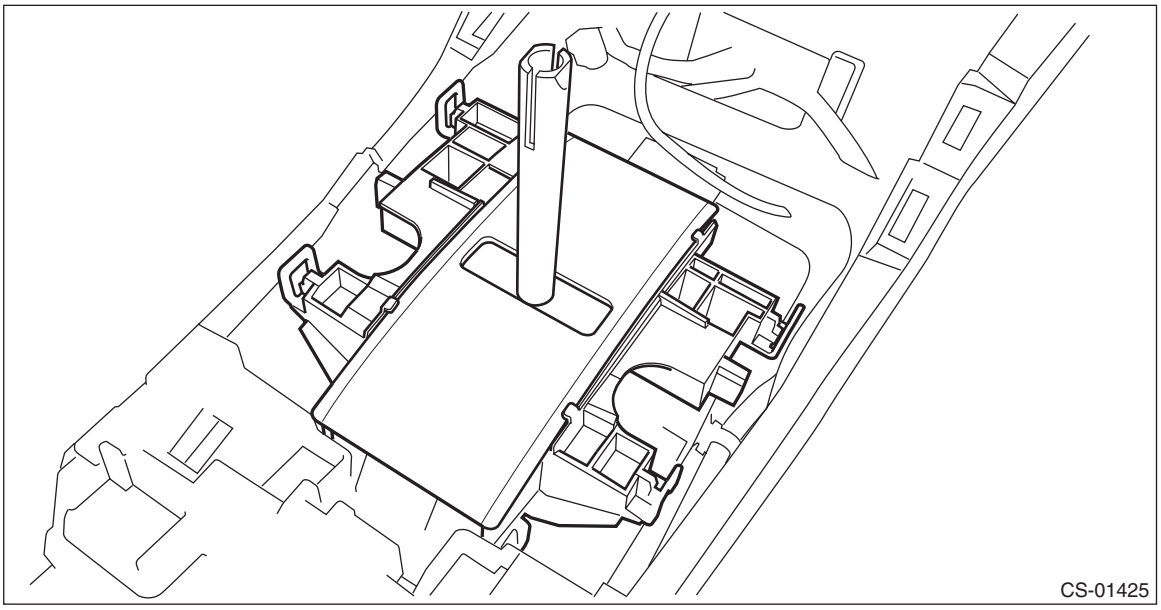


9) Install the blind B behind the blind A. (Model with gate shifter)

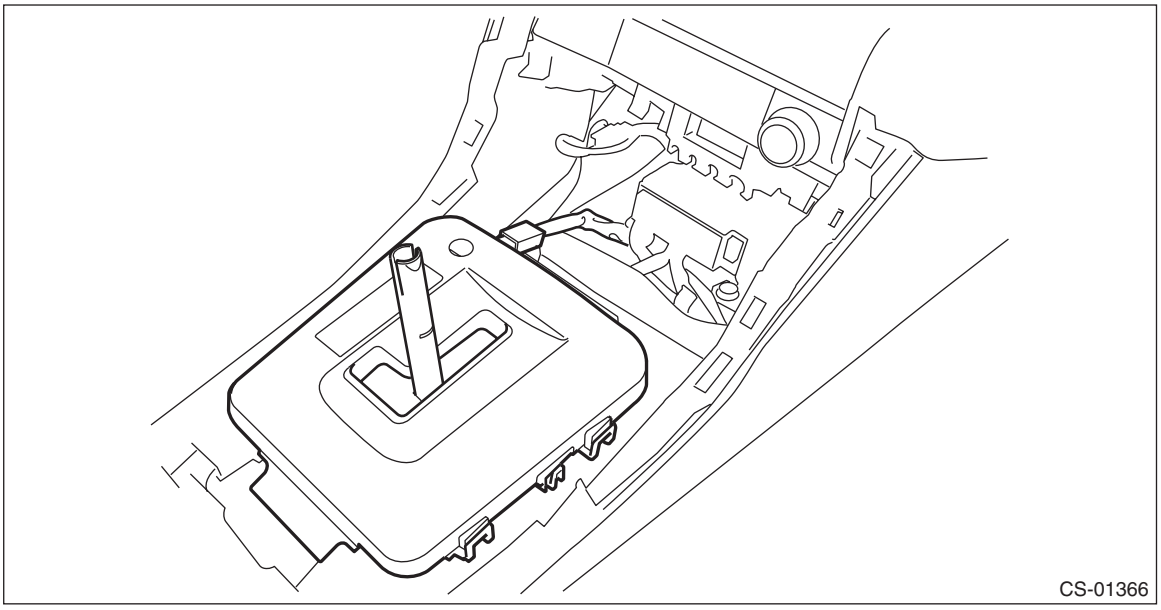


(A) Blind B
(B) Blind A

10) Install the housing. (Model with gate shifter)

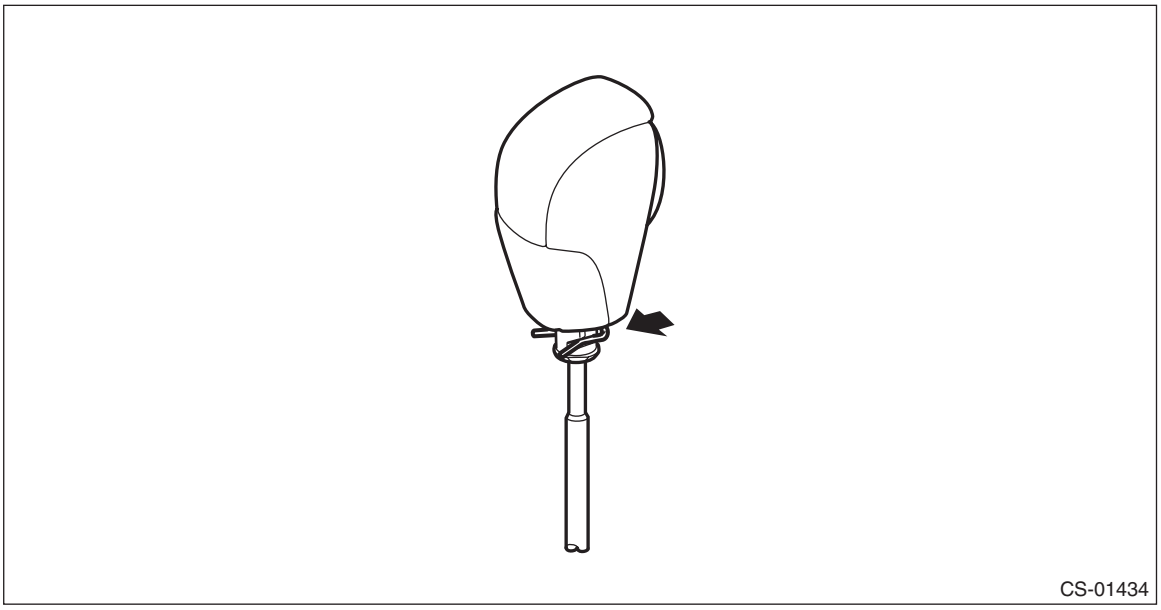


11) Install the indicator cover, then connect the connector. (Model with gate shifter)



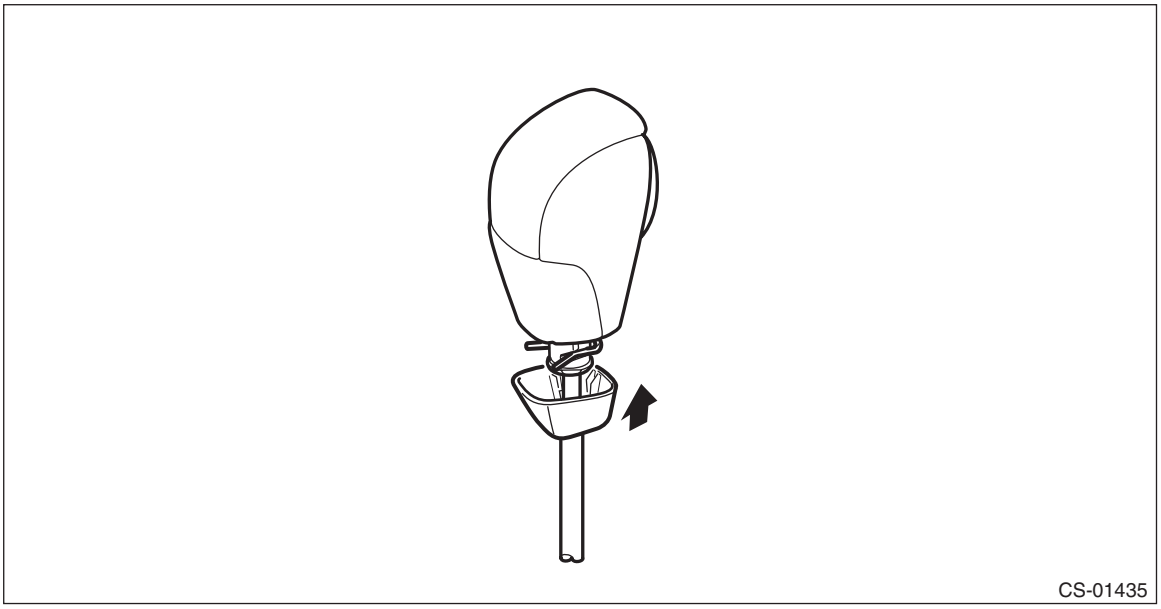
12) Install the cover shift lever. <Ref. to EI-82, INSTALLATION, Console Box.>

13) Accessing from the button side of the grip, attach the clamp grip pin.



14) Install the cover grip AT securely. (Model with gate shifter)

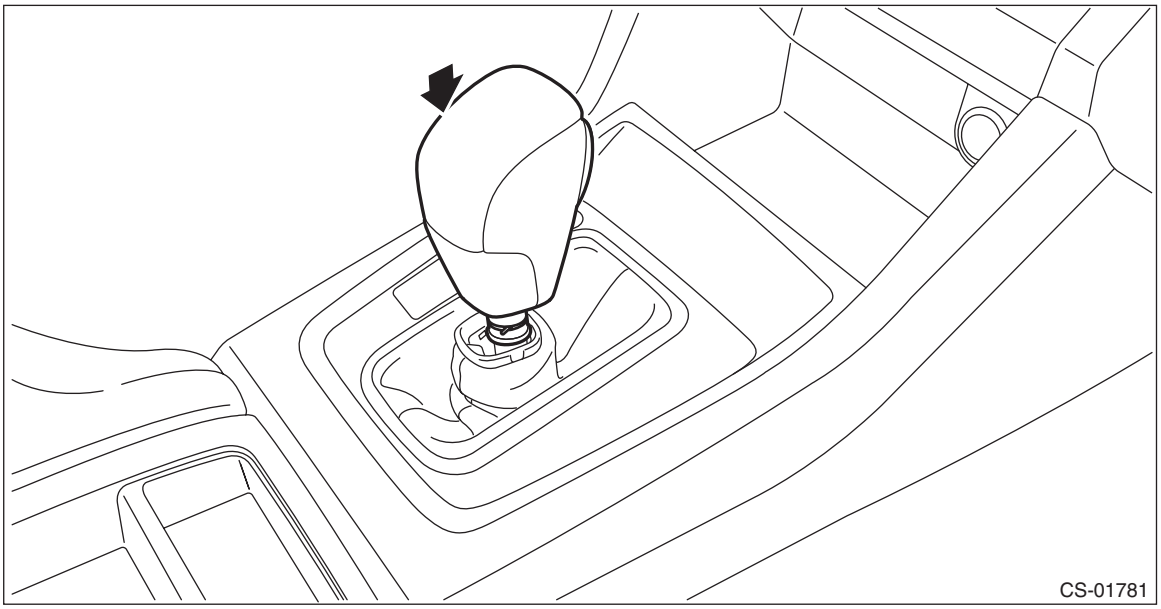
NOTE:
After installation, check that the cover grip AT cannot be detached.



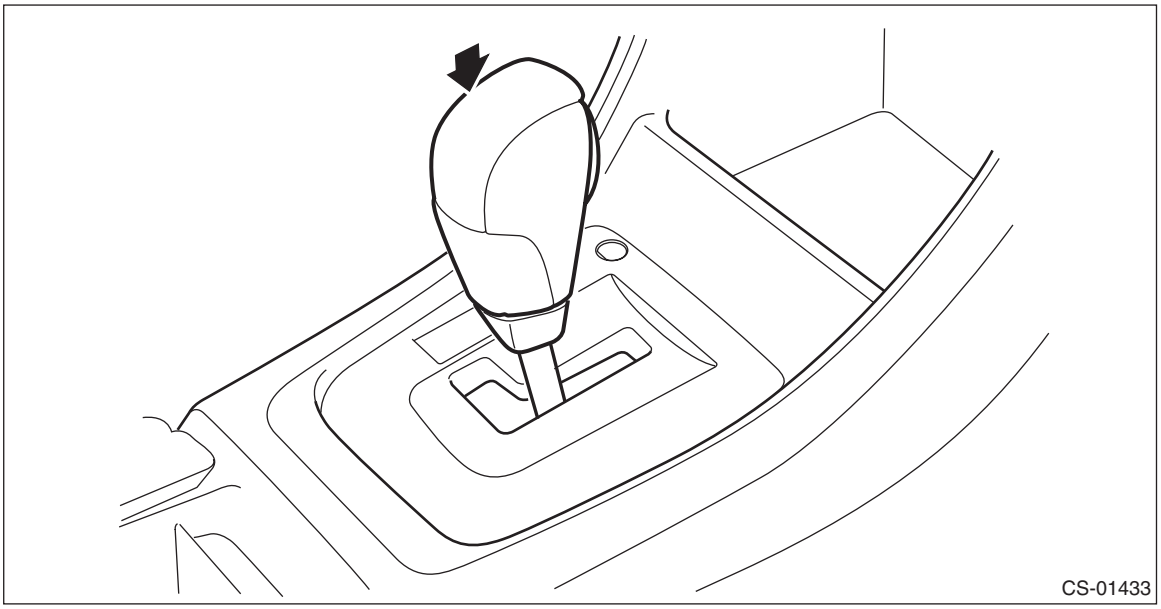
15) Insert the grip assembly to the select lever and press it down until a click is heard.

NOTE:
For the model with boot shifter, insert the grip assembly while holding with your fingers so that the clamp grip pin does not come out.

- Model with boot shifter

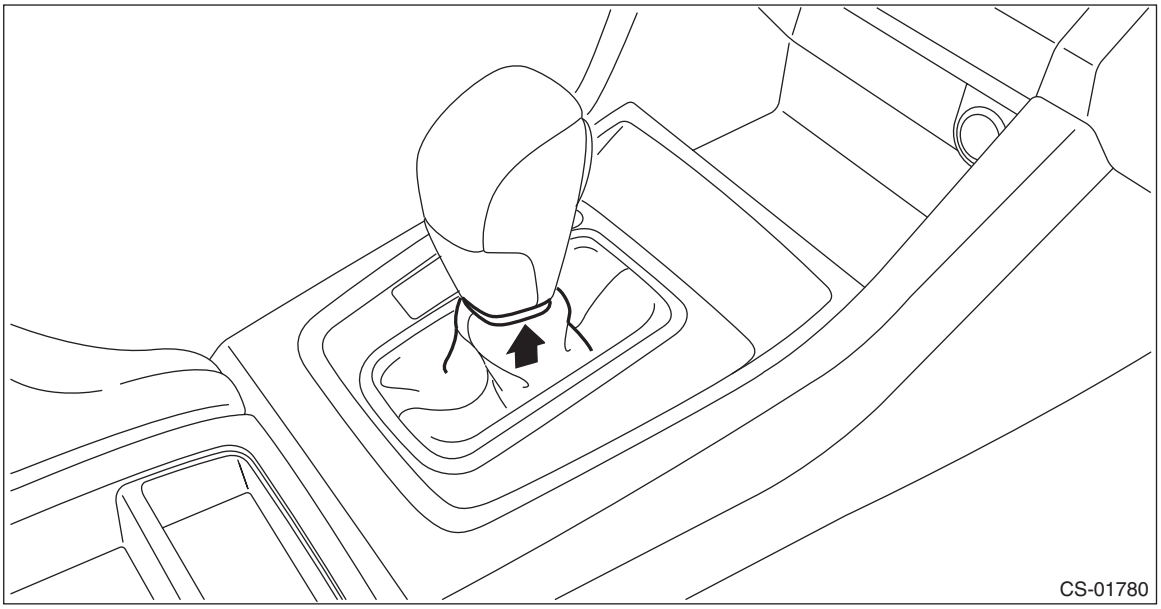


- Model with gate shifter



16) Securely install the boot assembly. (Model with boot shifter)

NOTE:
After installation, check that the boot assembly does not come off.



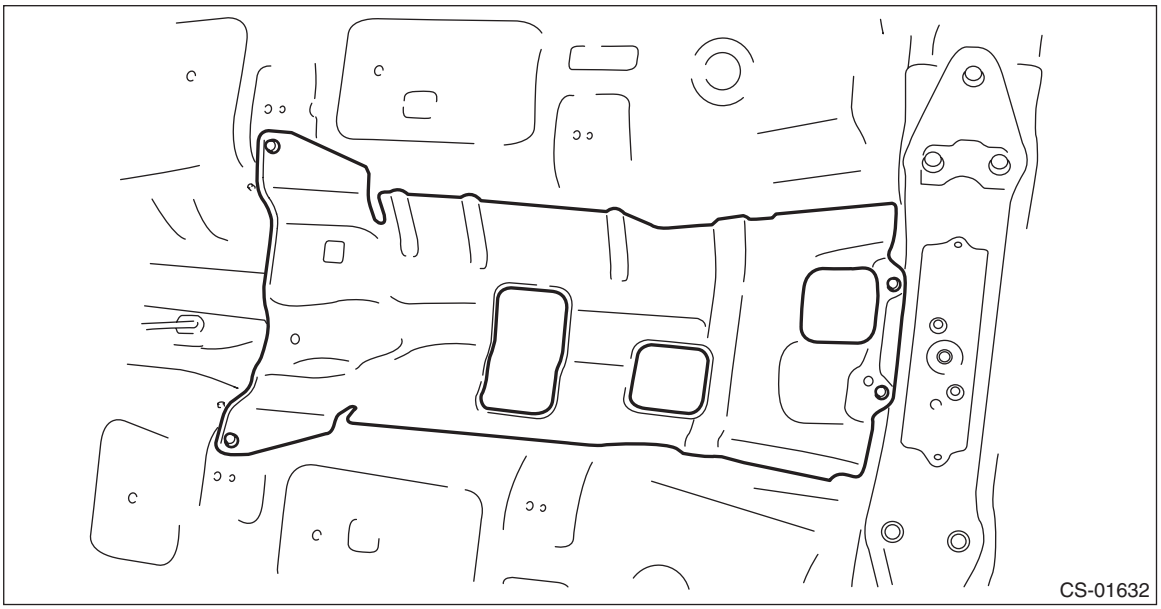
17) After installation of grip, check the following points.
- The grip will not come off.
- The button on the grip operates normally.

18) Install the console box. <Ref. to EI-82, INSTALLATION, Console Box.>
19) Shift the select lever to “N” range.
20) Lift up the vehicle.
21) Secure the cable to the bracket. <Ref. to CS-53, INSTALLATION, Select Cable.>
22) Adjust the select cable position. <Ref. to CS-57, ADJUSTMENT, Select Cable.>
23) After adjustment, confirm that the select lever operates properly at all range positions using the shift lock release button.

NOTE:
According to the select lever operation, confirm that the indicator positions are shown correctly.

24) Install the center exhaust cover.

Tightening torque:
18 N·m (1.8 kgf-m, 13.3 ft-lb)

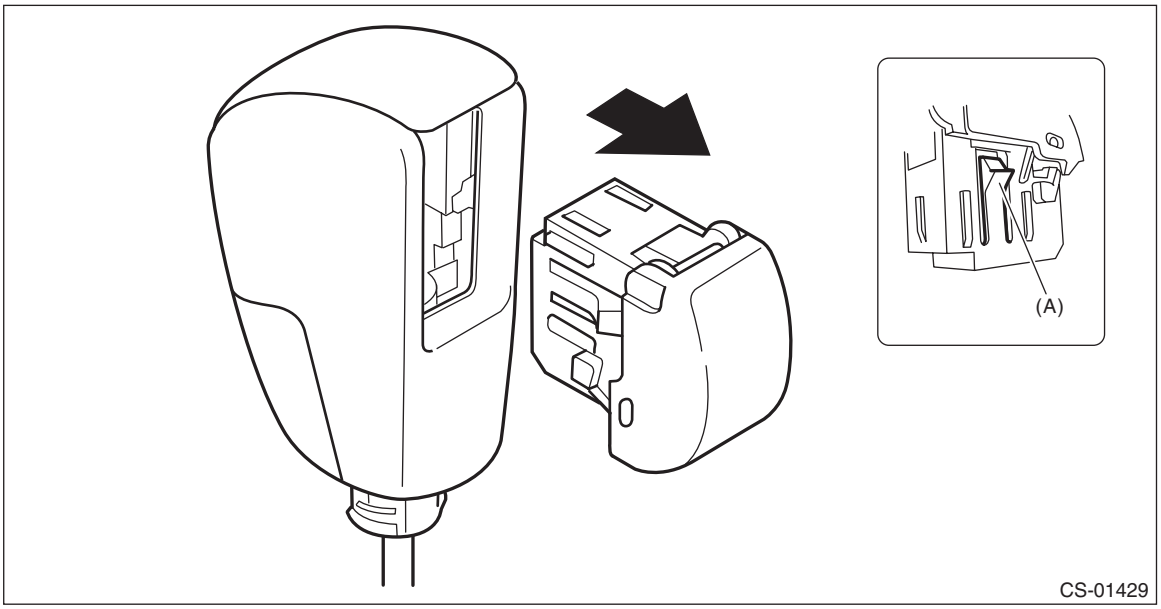


25) Install the center exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-15, INSTALLATION, Center Exhaust Pipe.>
26) Lower the vehicle.
27) Connect the battery ground terminal. <Ref. to NT-5, BATTERY, NOTE, Note.>
28) Inspect the following items. If a malfunction is found in the inspection, adjust the select cable or inhibitor switch.
(1) The shift lock operates normally. <Ref. to CS-13, SHIFT LOCK OPERATION, INSPECTION, AT Shift Lock Control System.>
(2) Engine starts when the select lever is in “P” or “N” range, but not in other ranges.
(3) Back-up light illuminates when the select lever is in the “R” range, but not in other ranges.
(4) Select lever and indicator positions are matched.

C: DISASSEMBLY

1. GRIP ASSY

1) Remove the button assembly_AT.

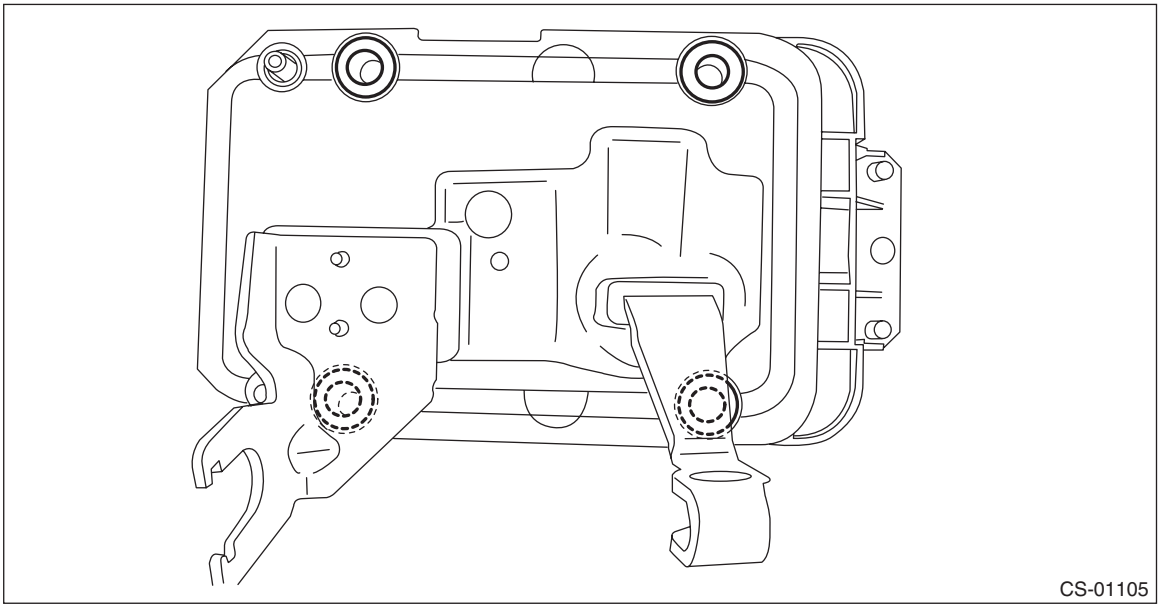


(A) Claw

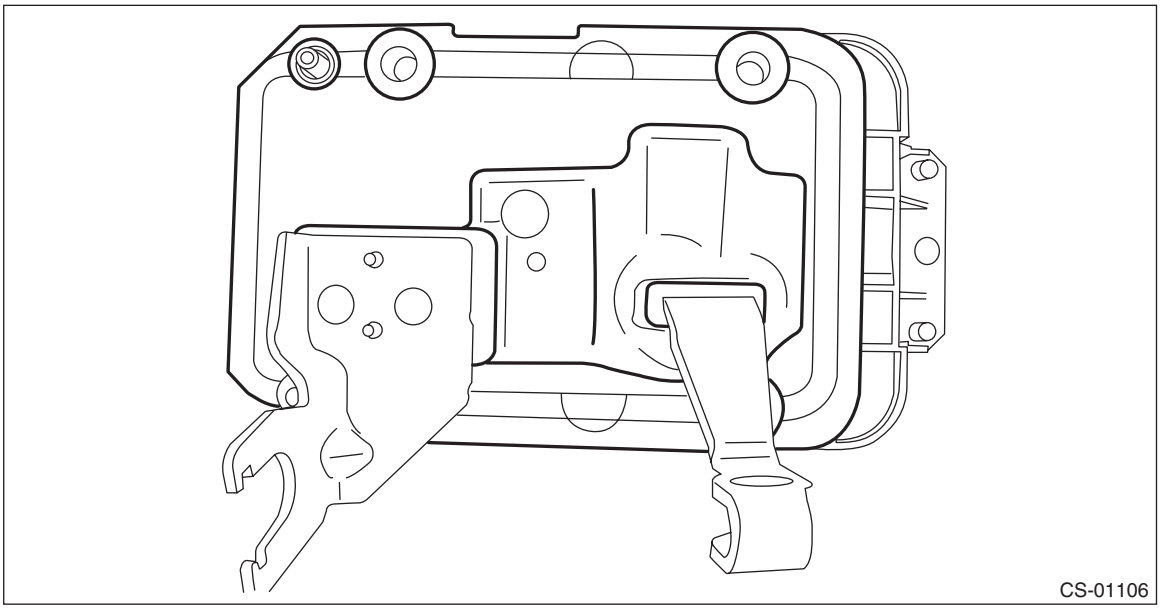
2) Remove the rod COMPL.

2. AT SELECT LEVER ASSEMBLY

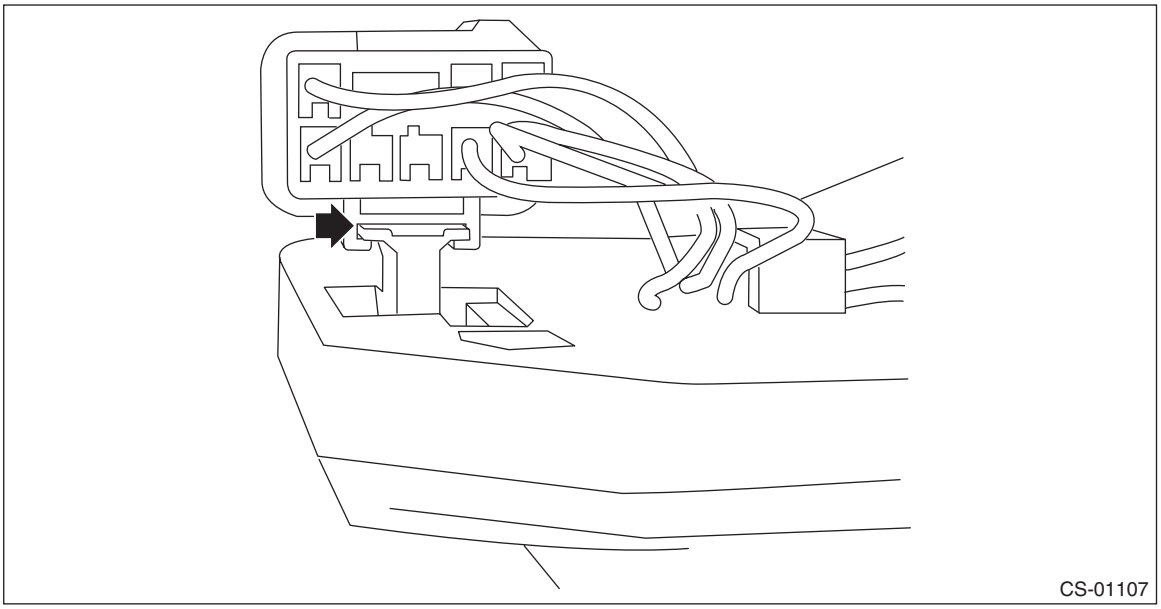
1) Remove the spacer plate.



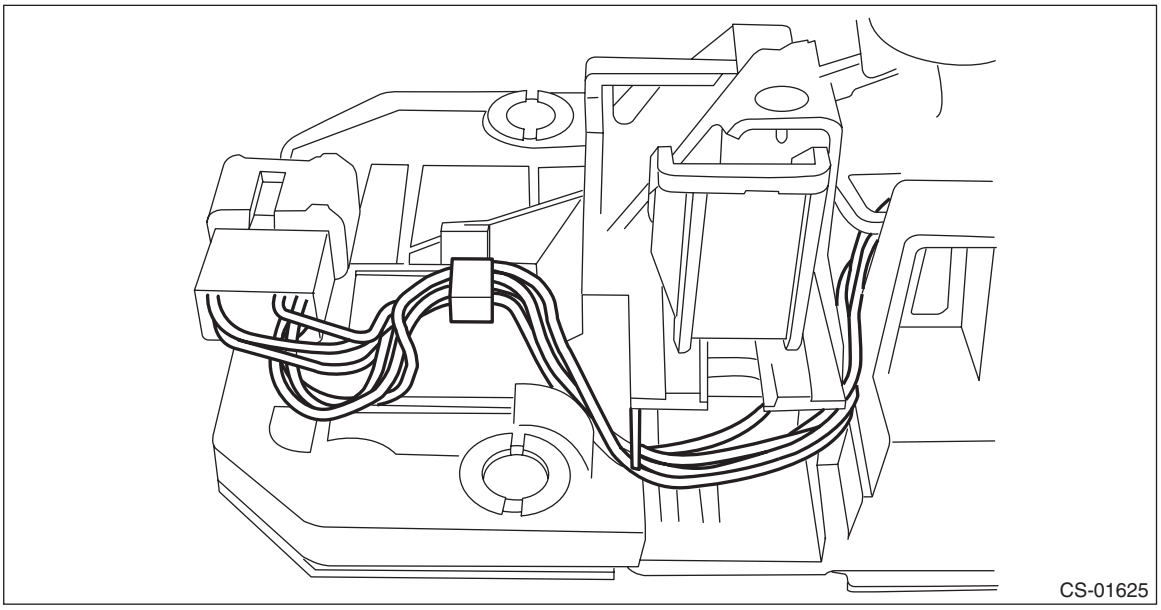
2) Remove the gasket.



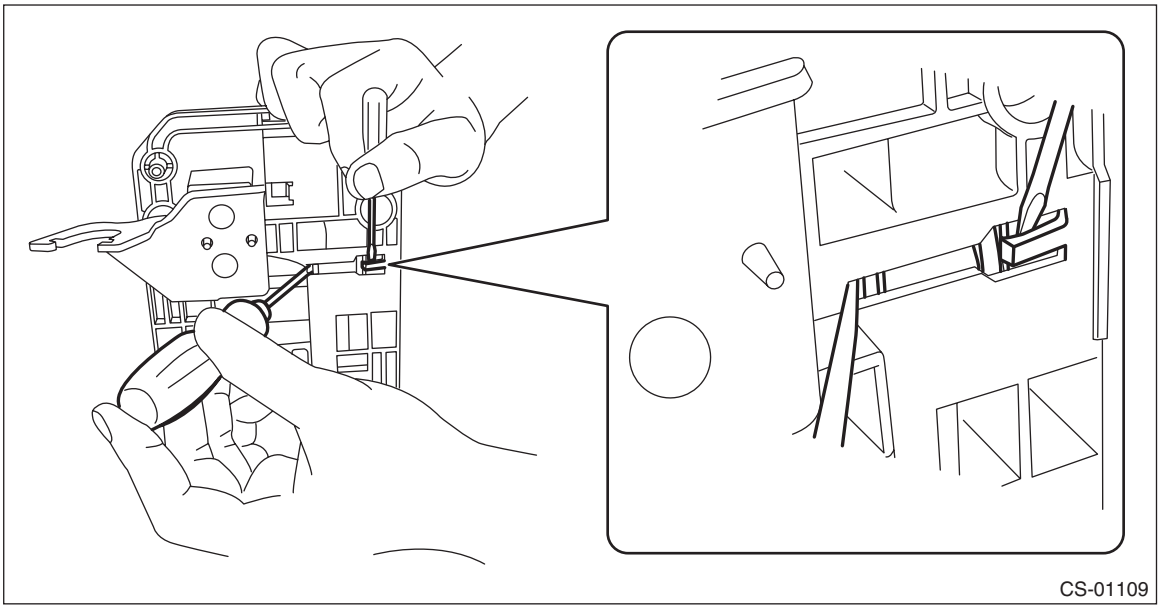
3) Insert a flat tip screwdriver with a thin tip under the connector and disconnect the harness connector from the plate COMPL.



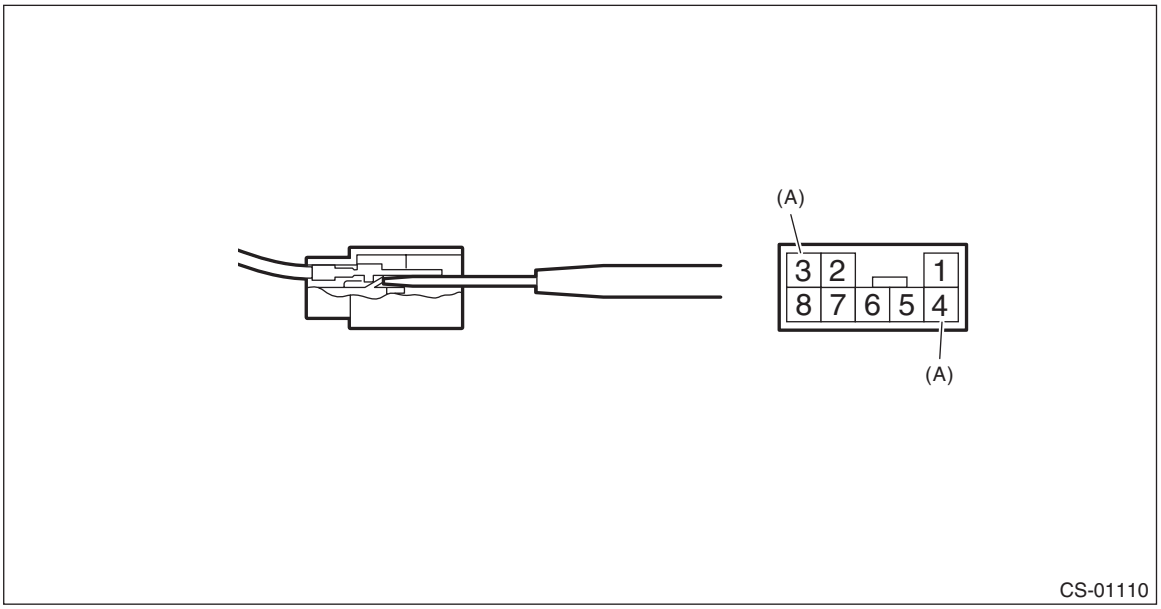
4) Remove the harness from the plate COMPL.



5) Raise the claw with a flat tip screwdriver with a thin tip and remove the solenoid unit.



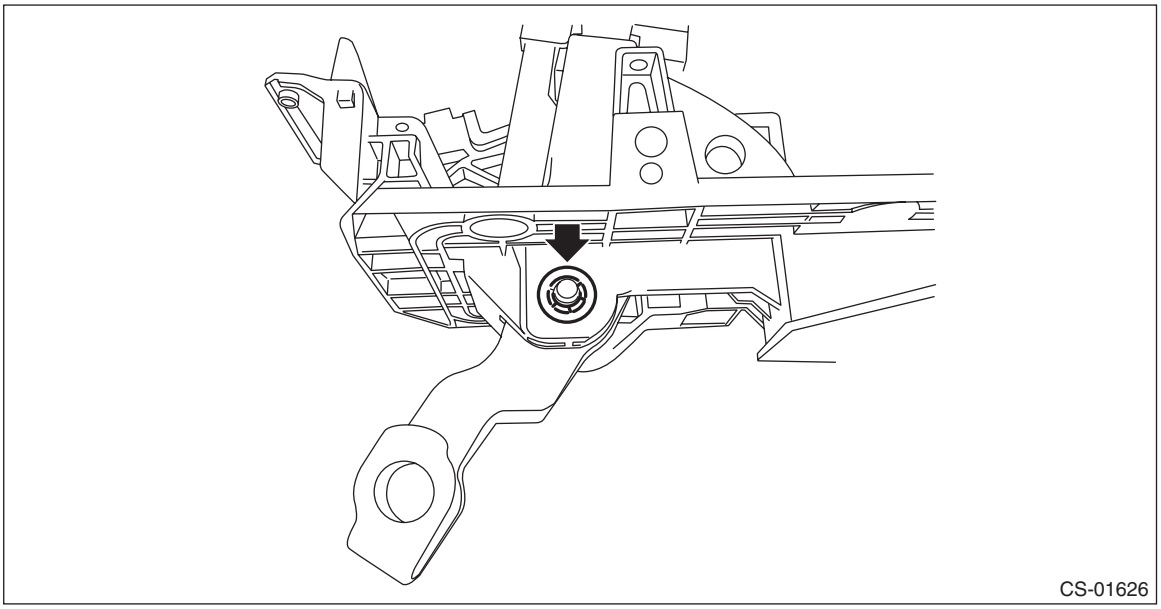
6) Remove the terminal of the solenoid unit using a flat tip precision screwdriver with a tip width of 1.3 mm (0.05 in) or less, KTC connector terminal tool ECC-1T or equivalent.



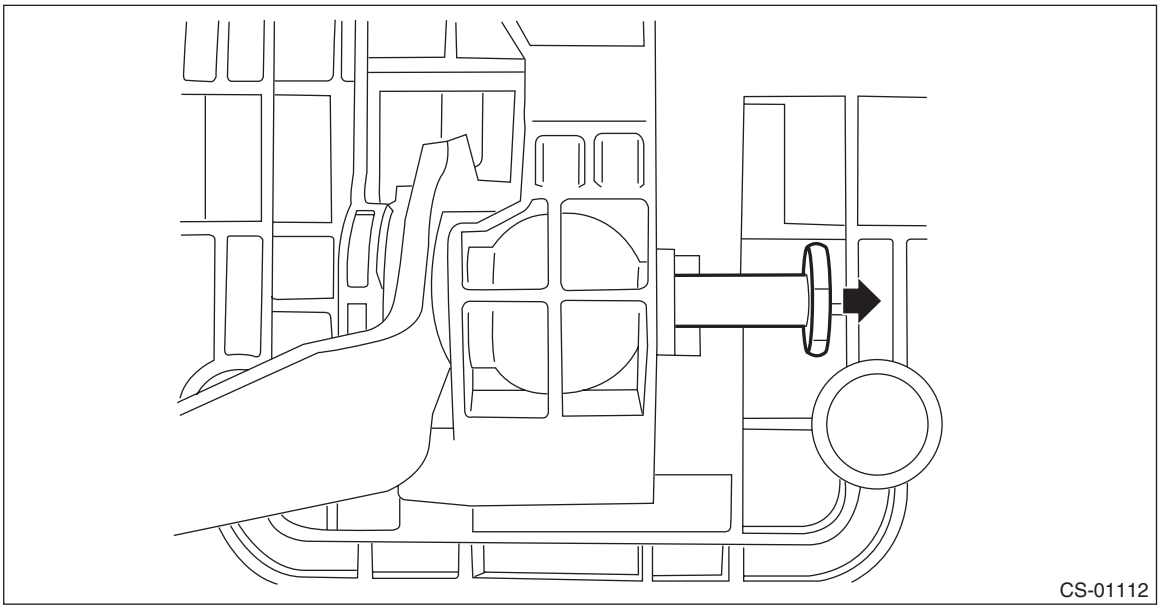
(A) Solenoid unit terminals

7) Remove the clamp push nut.

NOTE:
Replace the clamp push nut with a new part.

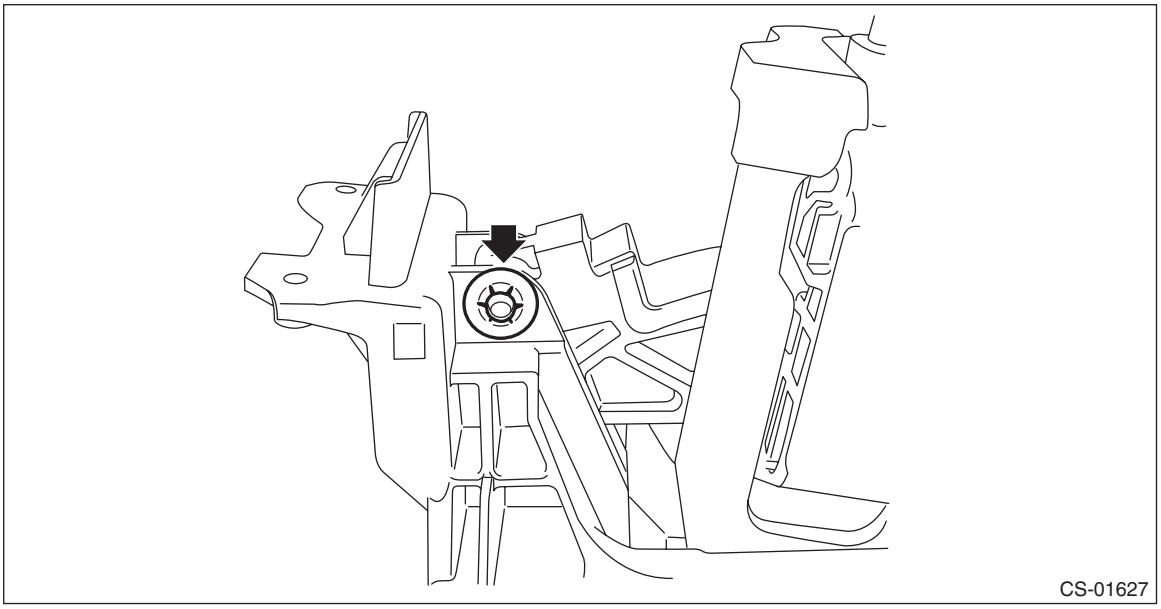


8) Pull out shaft control.

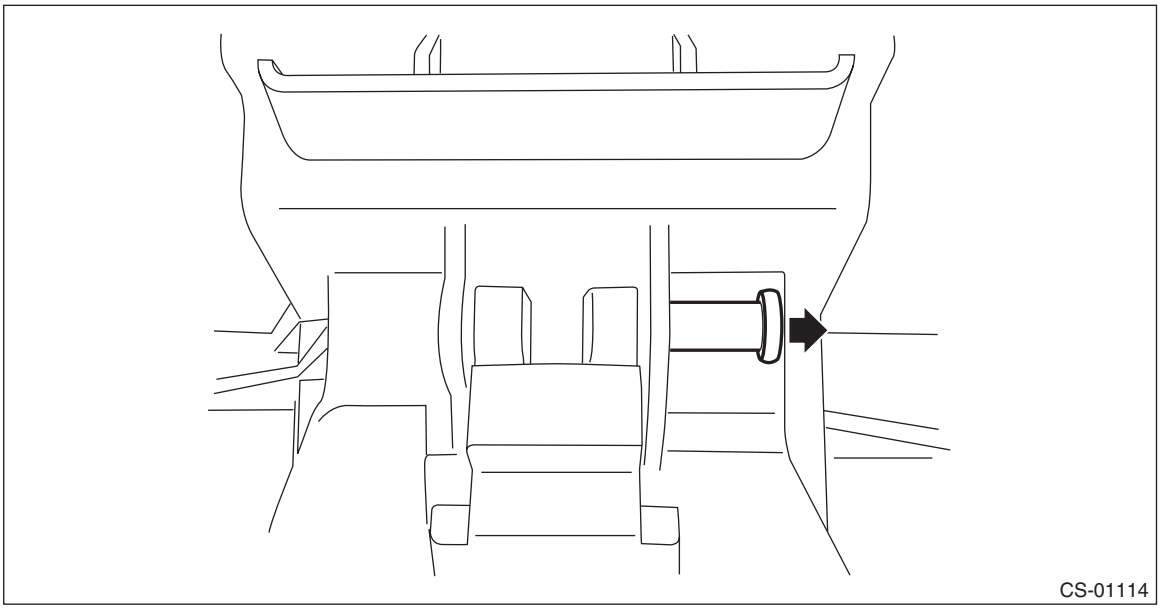


9) Remove the clamp push nut.

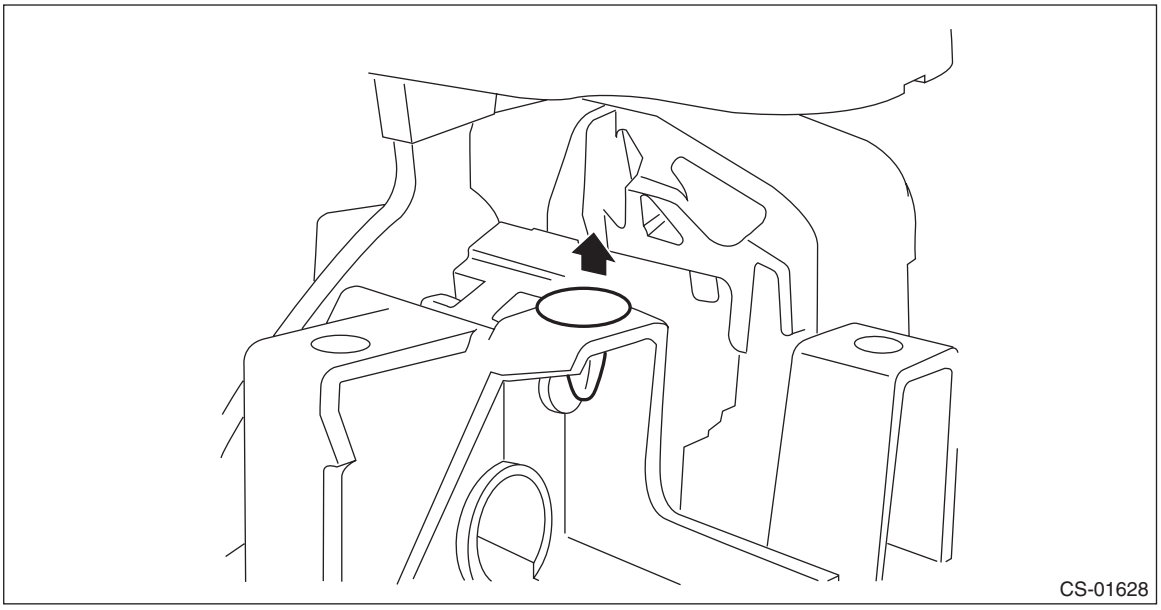
NOTE:
Replace the clamp push nut with a new part.



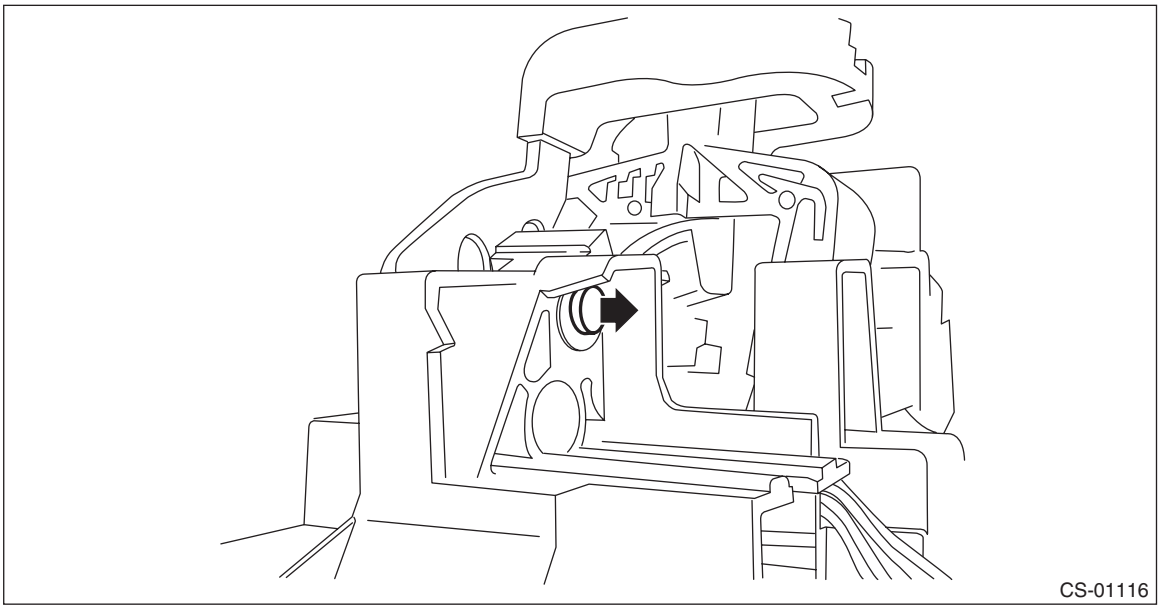
10) Pull out spacer pin guide.



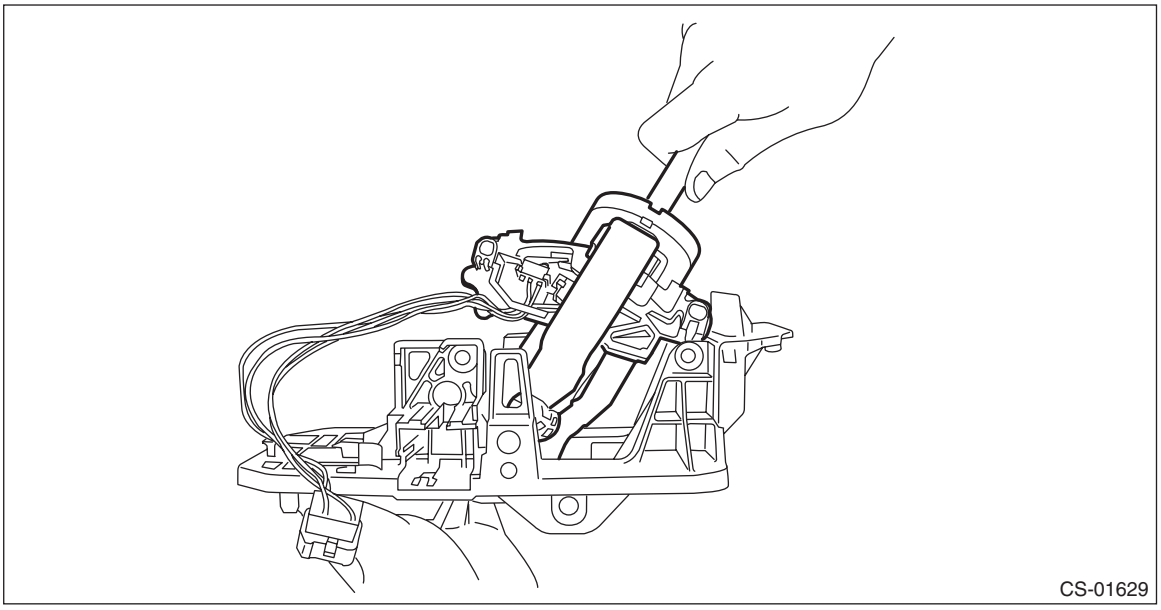
11) Remove the clamp pin.



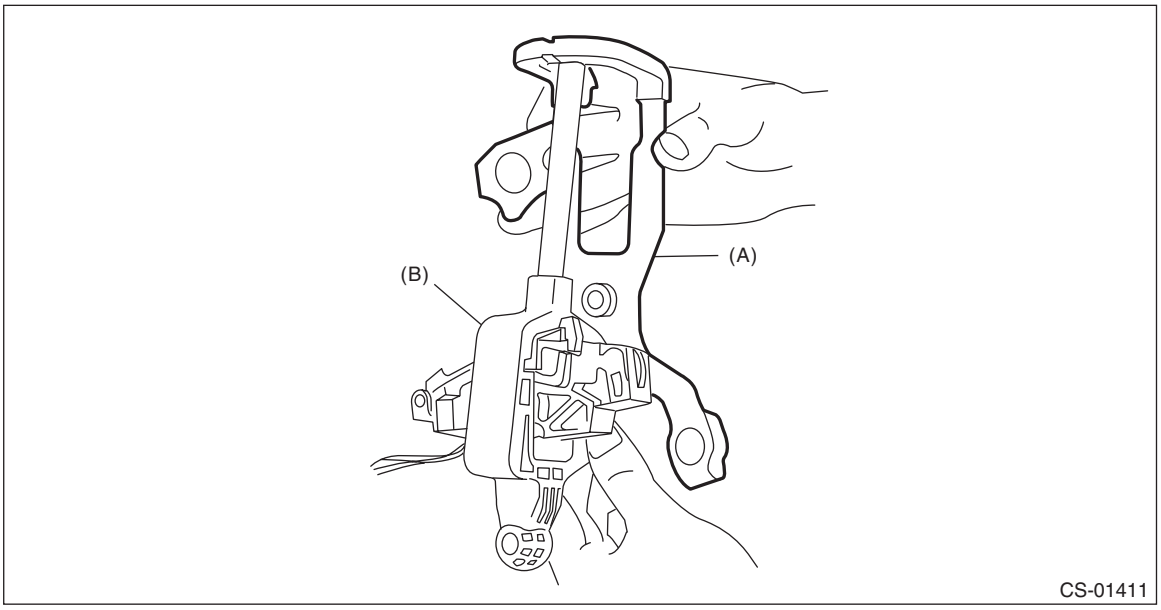
12) Remove the spacer pin guide.



13) Remove the select lever COMPL from the plate COMPL.

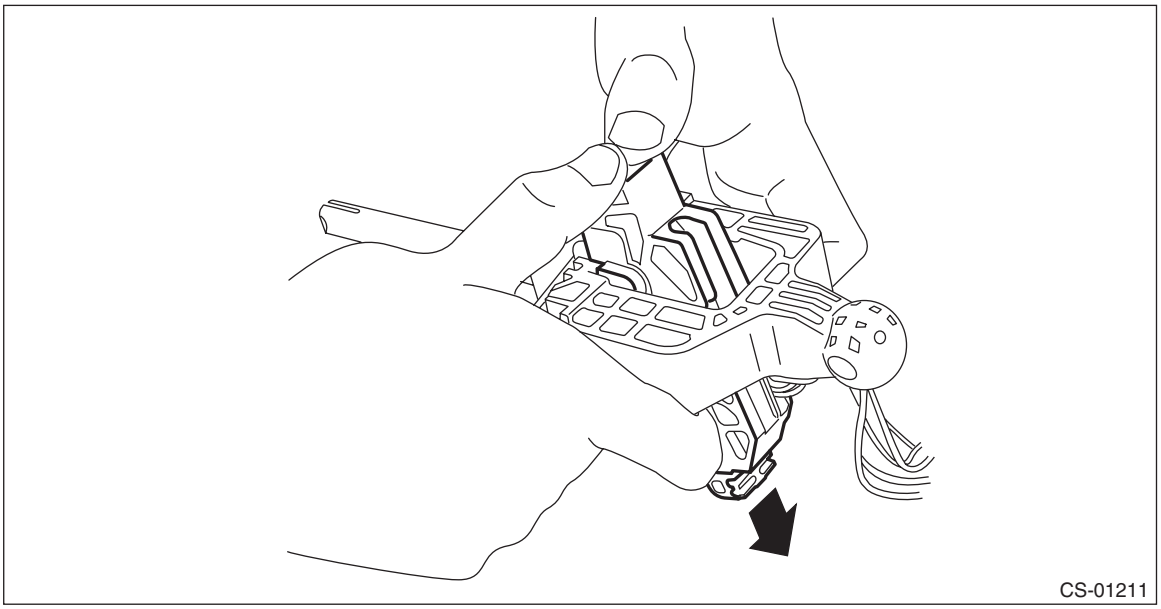


14) Remove the arm COMPL.

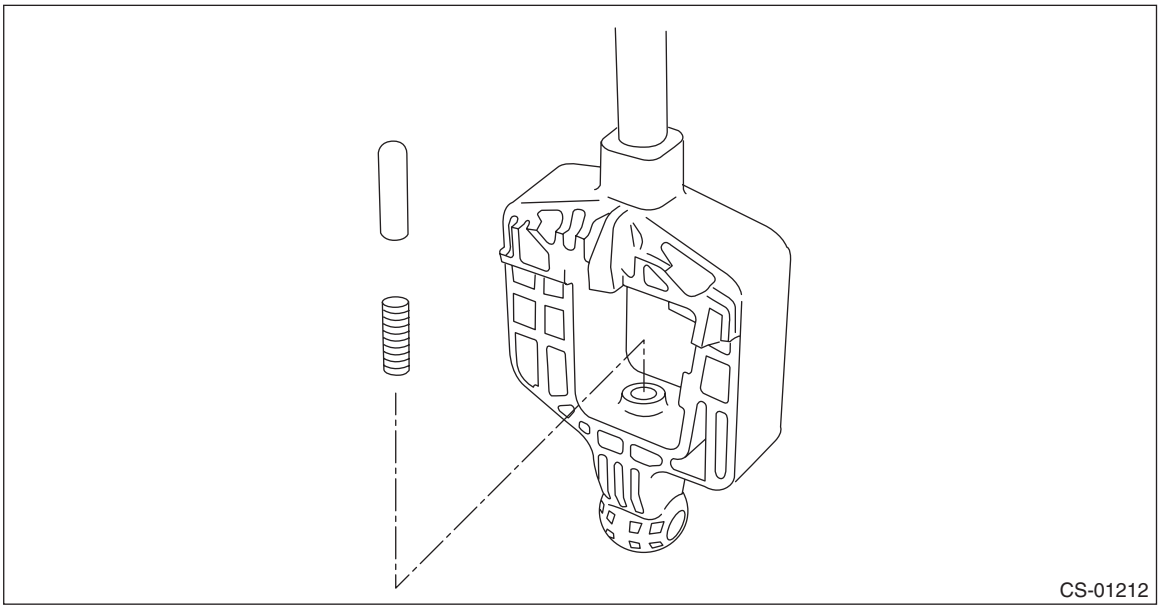


(A) Arm COMPL
(B) Select lever COMPL

15) Remove the plate guide from the select lever COMPL.



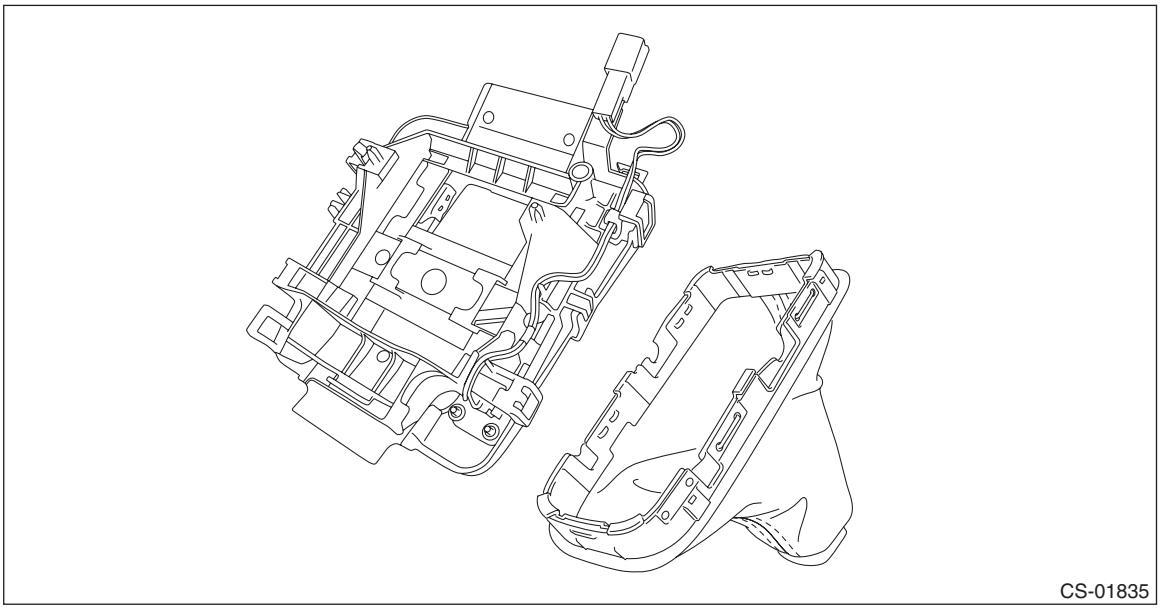
16) Remove the rod detent and detent spring from the select lever COMPL.



3. INDICATOR ASSY

1) Remove the boot assembly from the indicator assembly.

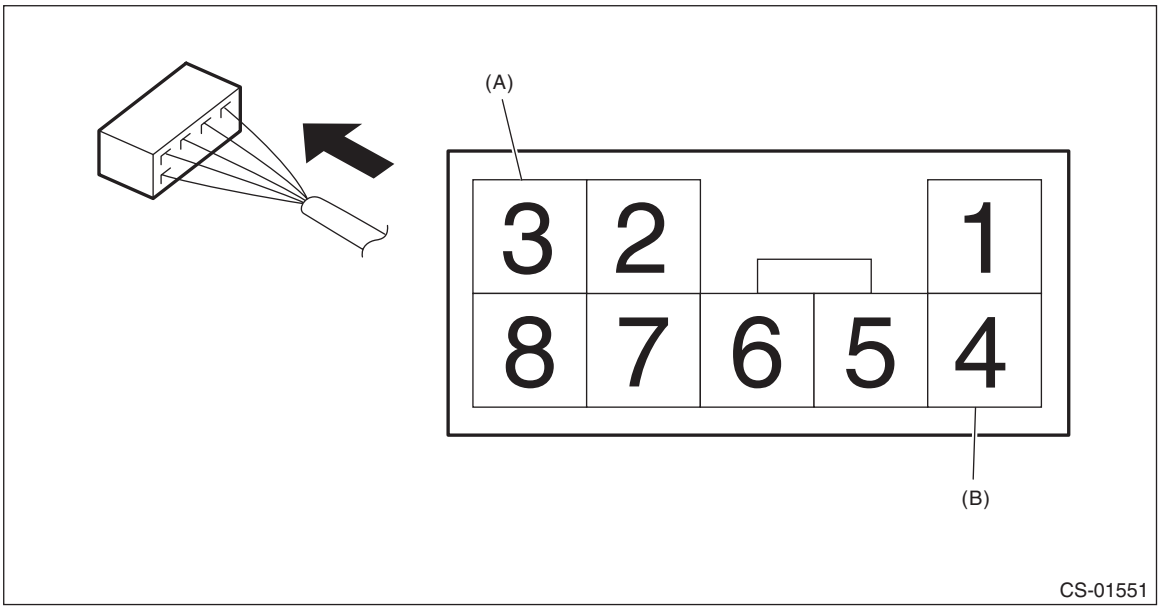
CAUTION:
When removing the boot assembly, be careful not to damage the boot assembly claws and adjacent parts.



D: ASSEMBLY

1) Clean all the parts before assembly.
2) Apply Multemp D or equivalent to the sliding portion of each part.
3) Assemble in the reverse order of disassembly.

NOTE:
Insert the solenoid unit terminals to the harness connector.



(A) Solenoid unit (color code: blue)
(B) Solenoid unit (color code: black)

4) After installation, check the following points.
• The select indicator matches the select lever position when the select lever is changed from “P” range to “D” range.
• The select lever position and the position mark match each other.
• Operating force to move the select lever from “P” to “D” range

E: INSPECTION

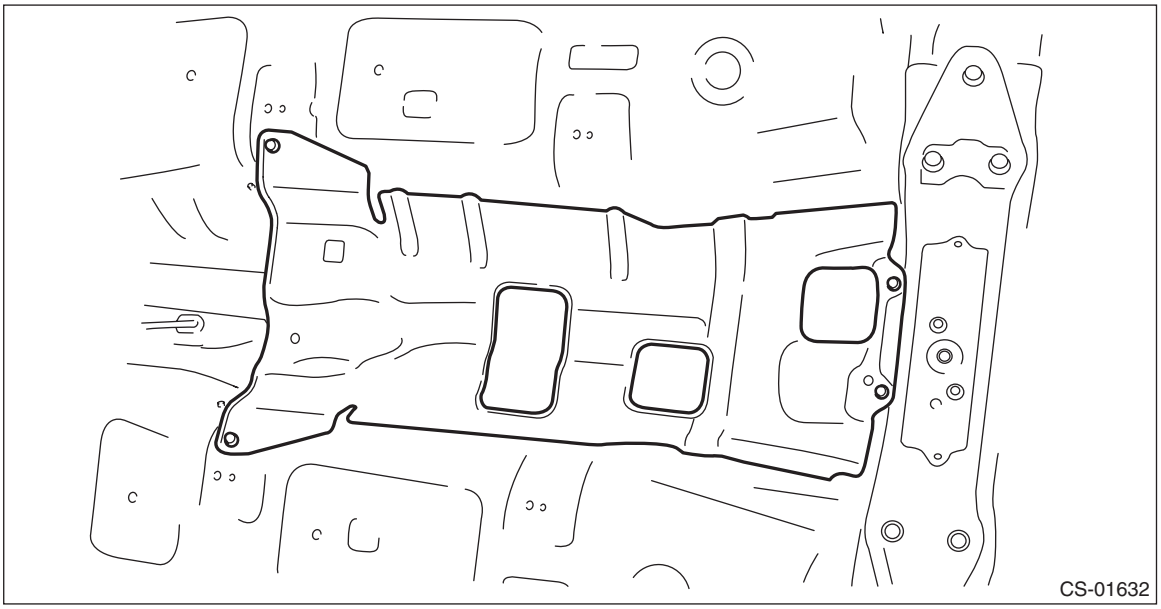
1) Inspect the removed parts by comparing with new parts for deformation, damage and wear. Repair or replace if defective.
2) Inspect the select lever assembly operating condition before assembly. Normal if it operates smoothly.

4. Select Cable

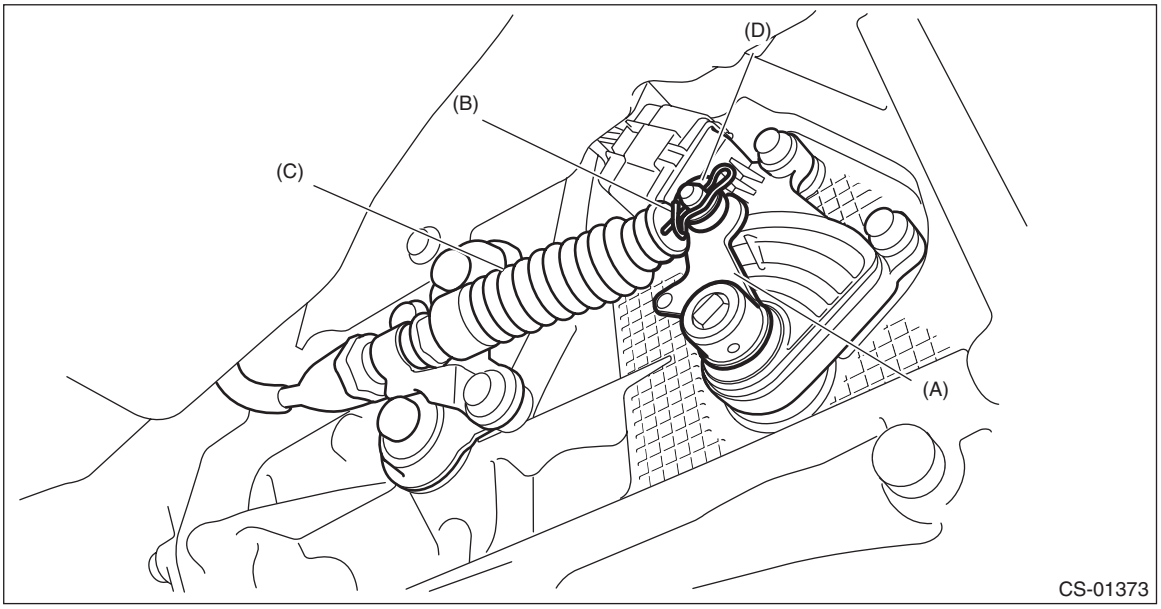
A: REMOVAL

1) Shift the select lever to “N” range.
2) Disconnect the ground cable from battery. <Ref. to NT-5, BATTERY, NOTE, Note.>

NOTE:
For the 12 volt engine restart battery of HEV model, disconnect the ground terminal from 12V engine restart battery sensor.
3) Lift up the vehicle.
4) Remove the center exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-14, REMOVAL, Center Exhaust Pipe.>
5) Remove the center exhaust cover.

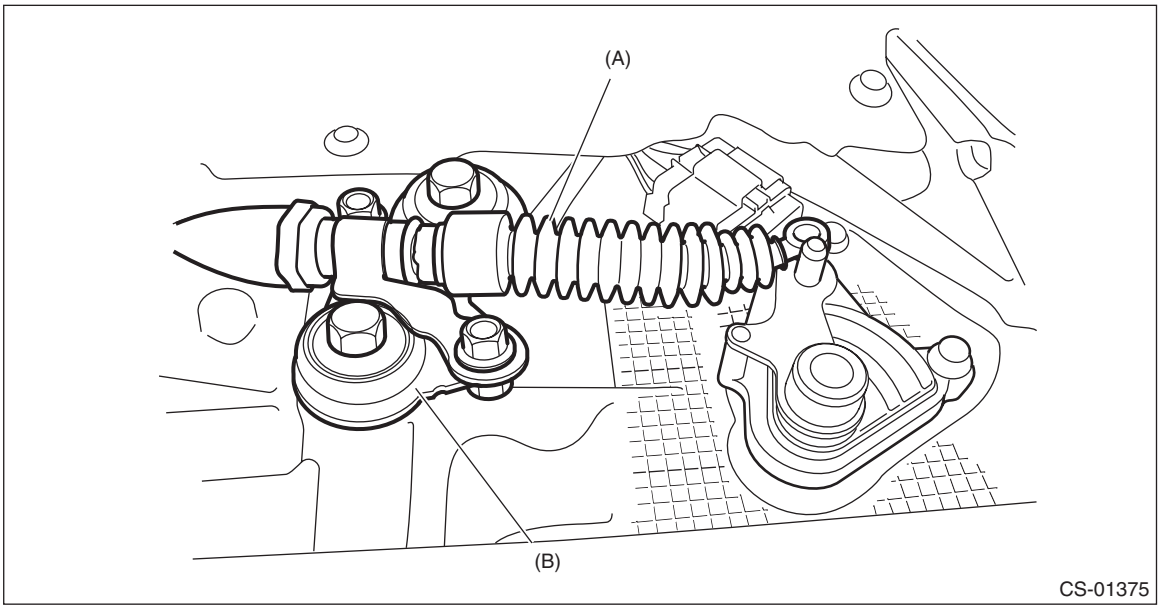


6) Remove the snap pin and washer from the shifter arm.



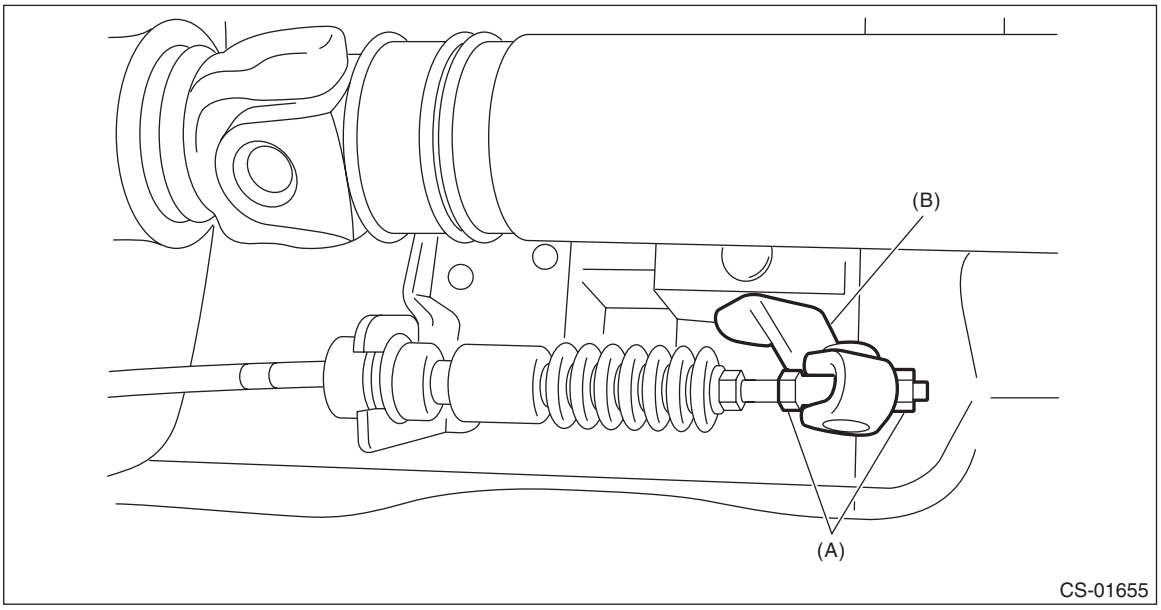
(A) Shifter arm
(B) Snap pin
(C) Select cable
(D) Washer

7) Remove the plate assembly from the transmission case.



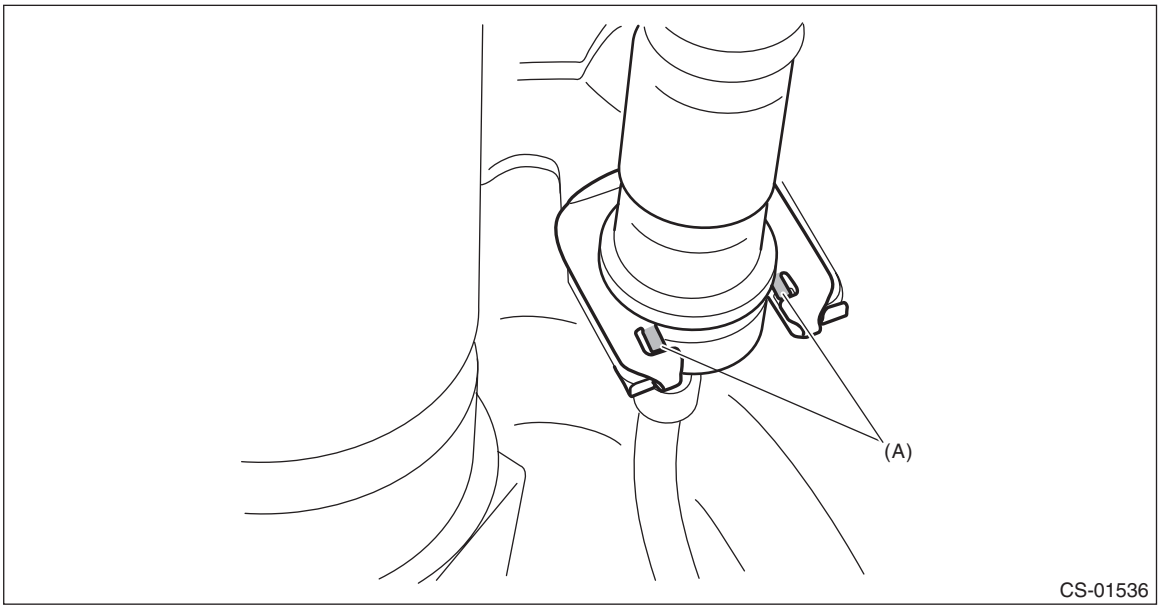
(A) Select cable
(B) Plate ASSY

8) Disconnect the cable from arm COMPL.



(A) Adjusting nut
(B) Arm COMPL

9) Raise the claw of clamp to remove the cable from bracket.



(A) Claw

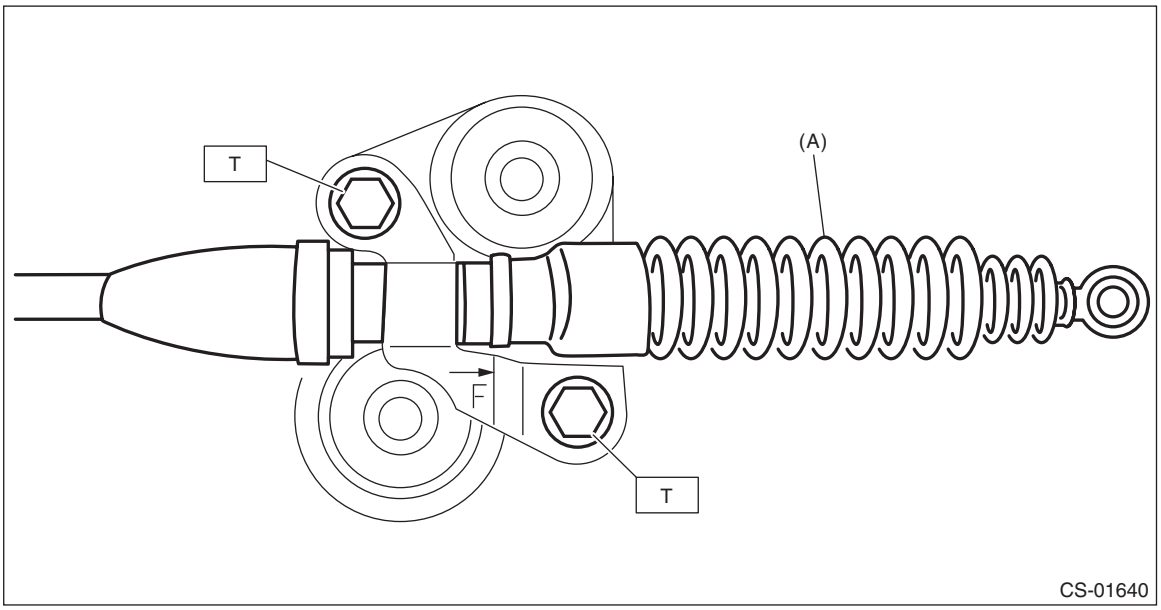
10) Remove the select cable from plate assembly.

B: INSTALLATION

1) Position the select cable as shown in the figure, and install it to the plate assembly.

CAUTION:
• If the cable is installed in the wrong direction, loosen the bracket bolts, and then reinstall the cable in the correct direction.
• Do not adjust the cable end direction by turning it forcibly to prevent the boot from being twisted.

Tightening torque:
18 N·m (1.8 kgf-m, 13.3 ft-lb)

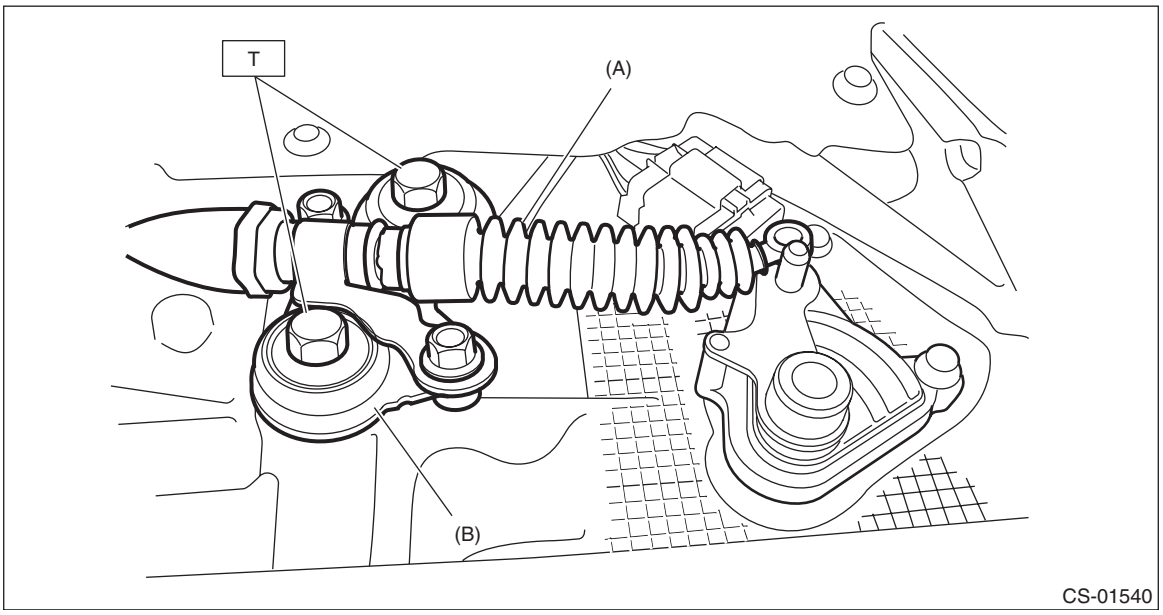


(A) Select cable

2) Install the select cable to the shifter arm.

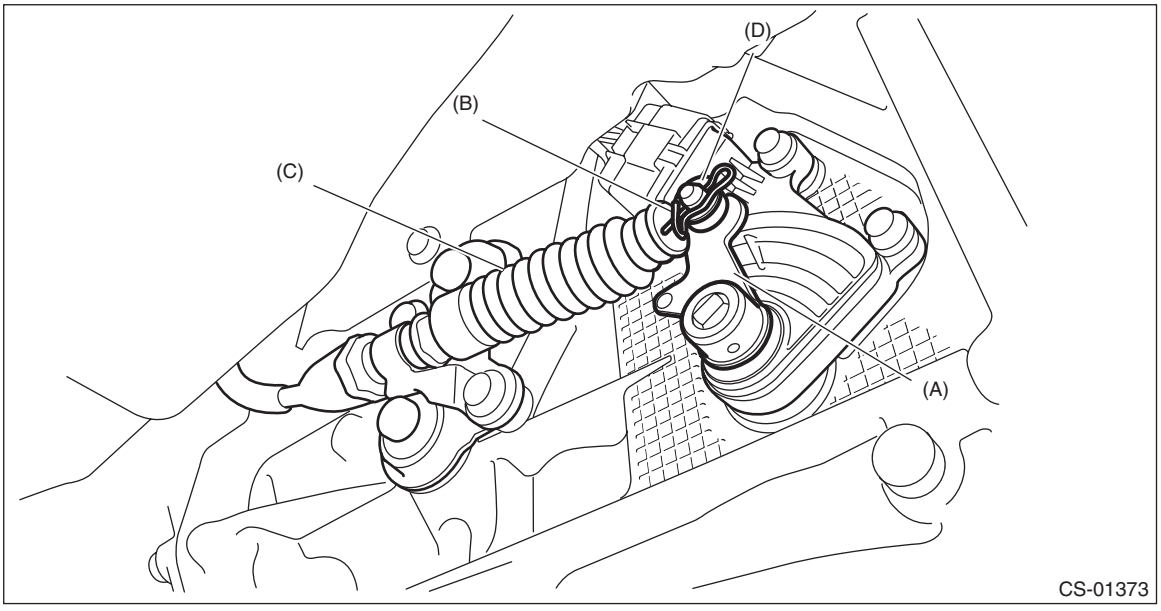
3) Install the plate assembly to transmission.

Tightening torque:
T: 25 N·m (2.5 kgf-m, 18.4 ft-lb)



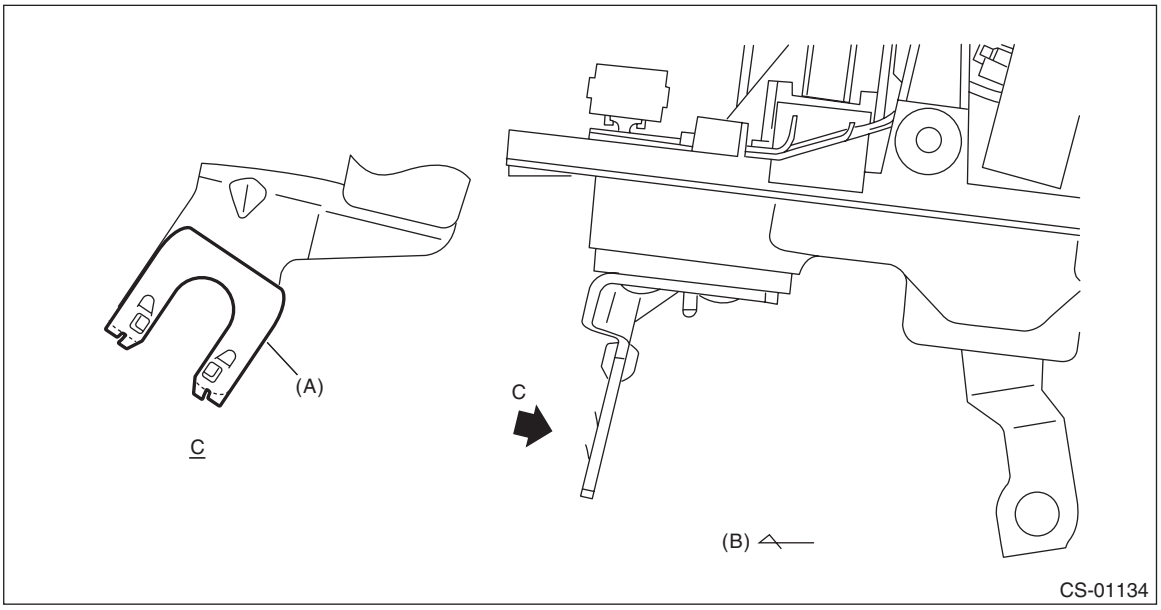
(A) Select cable
(B) Plate ASSY

4) Install the washer and snap pin to the shifter arm.



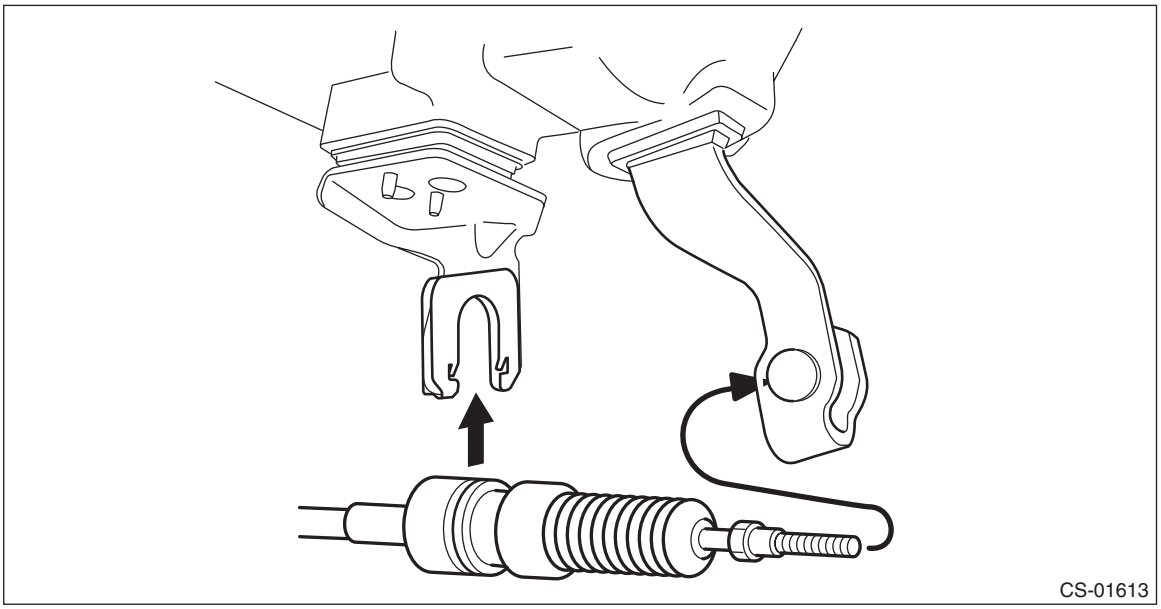
(A) Shifter arm
(B) Snap pin
(C) Select cable
(D) Washer

5) Install new clamp paying attention to the installing direction.



(A) Clamp
(B) Forward

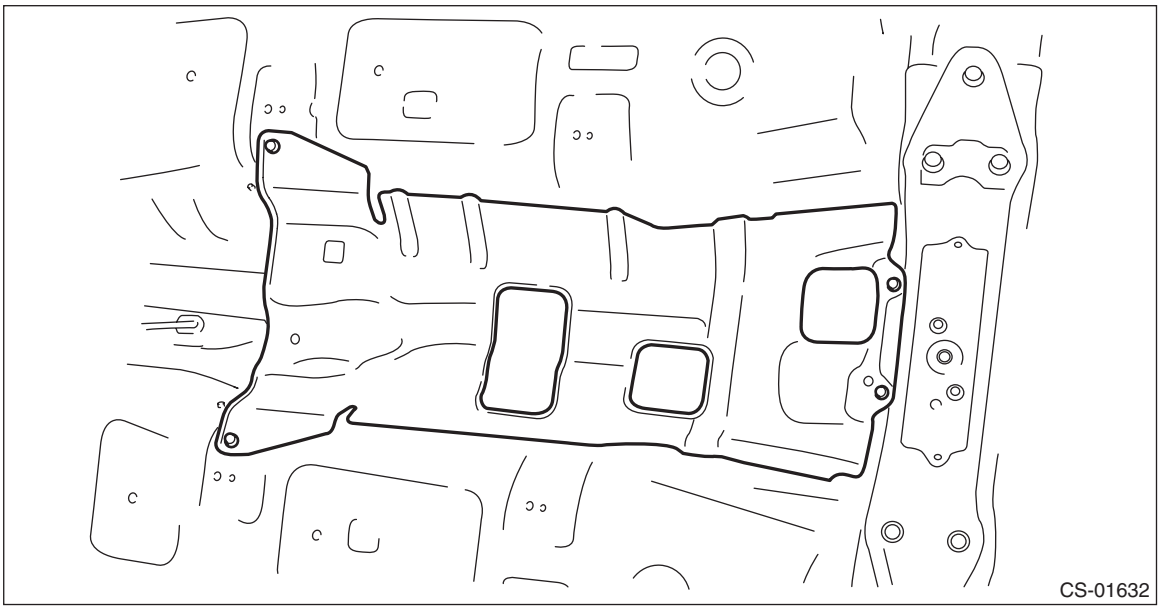
6) Insert the tip of inner cable into connector hole of select lever, and fix the cable to bracket.



7) Shift the select lever to the “N” range, and then adjust the select cable position. <Ref. to CS-57, ADJUSTMENT, Select Cable.>

8) Install the center exhaust cover.

Tightening torque:
18 N·m (1.8 kgf-m, 13.3 ft-lb)



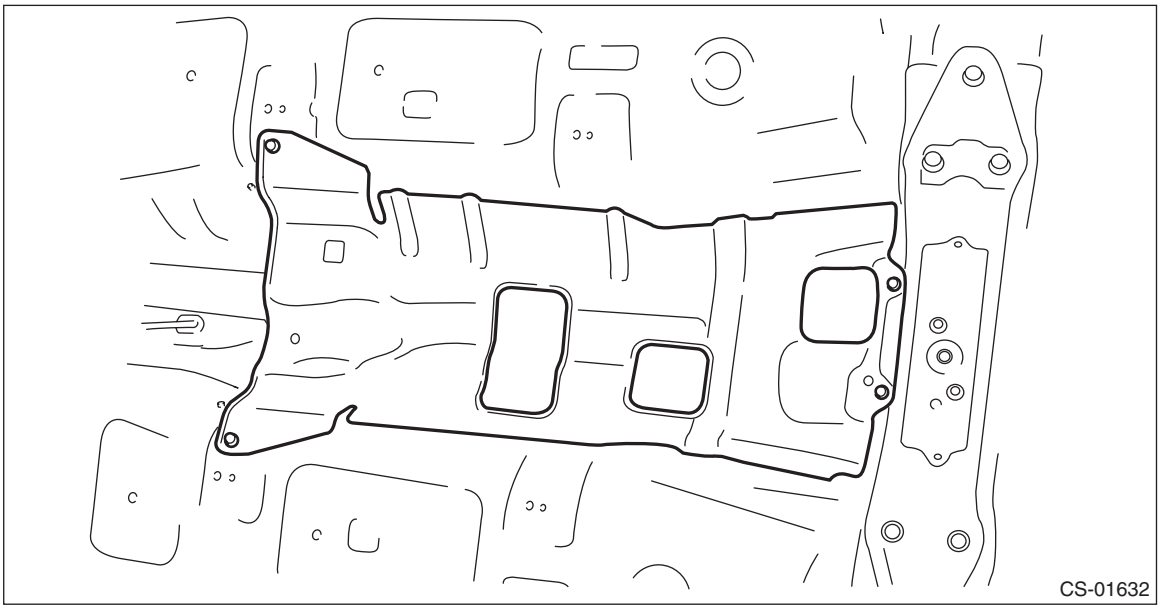
9) Install the center exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-15, INSTALLATION, Center Exhaust Pipe.>
10) Lower the vehicle.
11) Connect the battery ground terminal. <Ref. to NT-5, BATTERY, NOTE, Note.>

C: INSPECTION

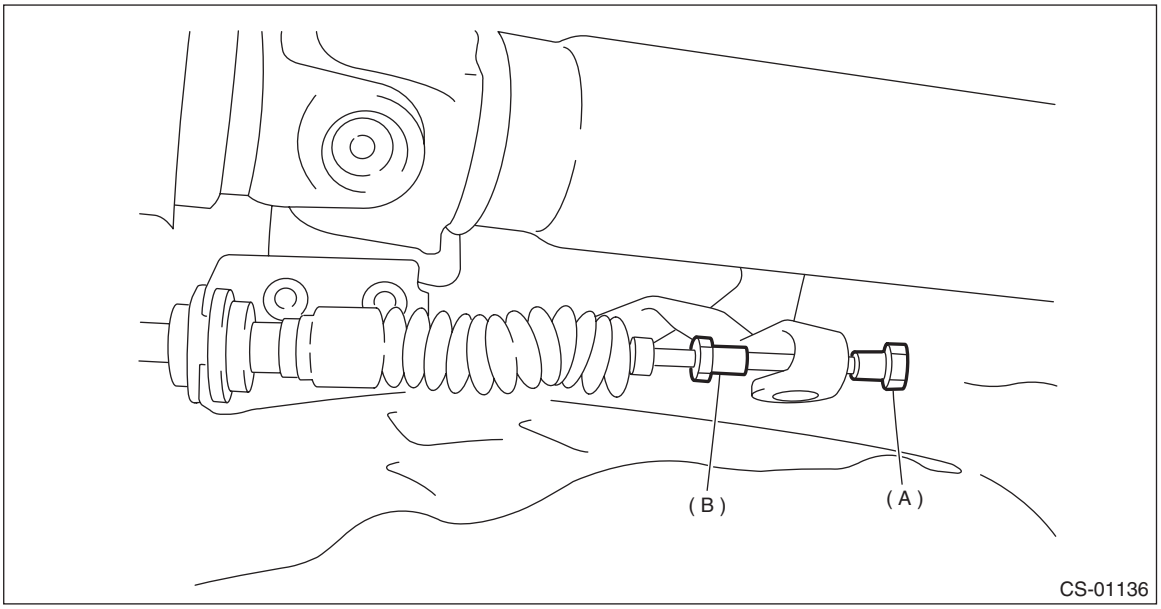
Check the removed cable and replace or adjust if damaged, rusty or malfunctioning.
1) Check the cable for smooth operation.
2) Check the inner cable for damage and rust.
3) Check the outer cable for damage, bends and cracks.
4) Check the boot for damage, cracks and deterioration.
5) Move the select lever from “P” to “D” range. Check the existence of feel to contact the detents in each range. If the detents cannot be felt or the position pointer is improperly aligned, adjust the cable.
6) Check if the starter motor rotates when the select lever is set to “P” range.
7) Check the back-up light illumination when the select lever is in “R” range.
8) Check the parking lock operation when the select lever is in “P” range.

D: ADJUSTMENT

1) Shift the select lever to “N” range.
2) Lift up the vehicle.
3) Remove the center exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-14, REMOVAL, Center Exhaust Pipe.>
4) Remove the center exhaust cover.

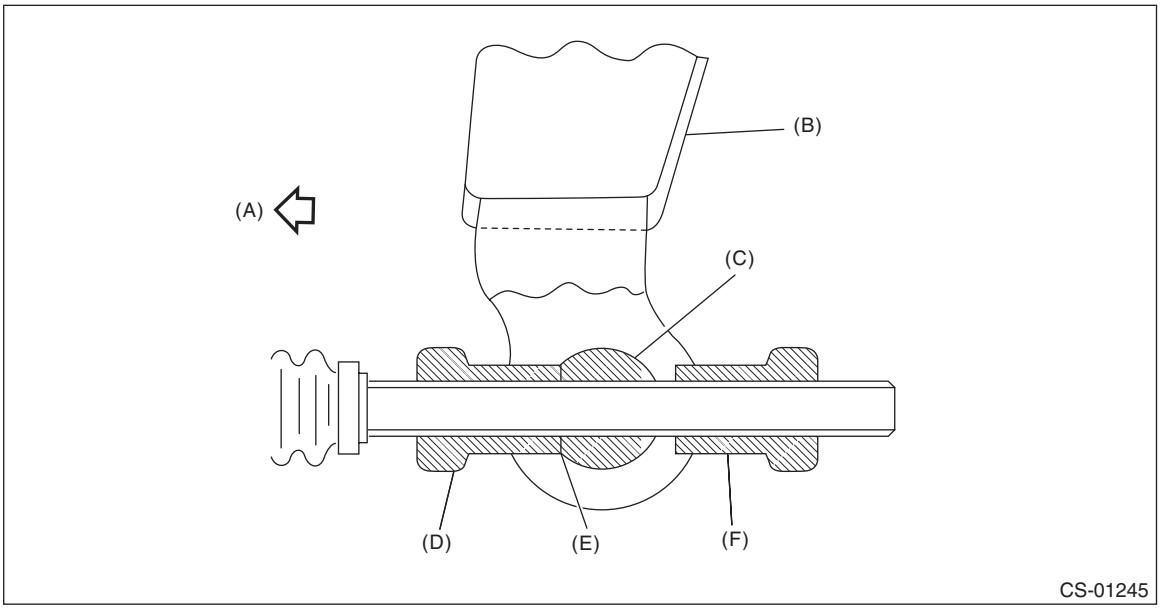


5) Loosen the adjusting nuts on both sides.



(A) Adjusting nut A
(B) Adjusting nut B

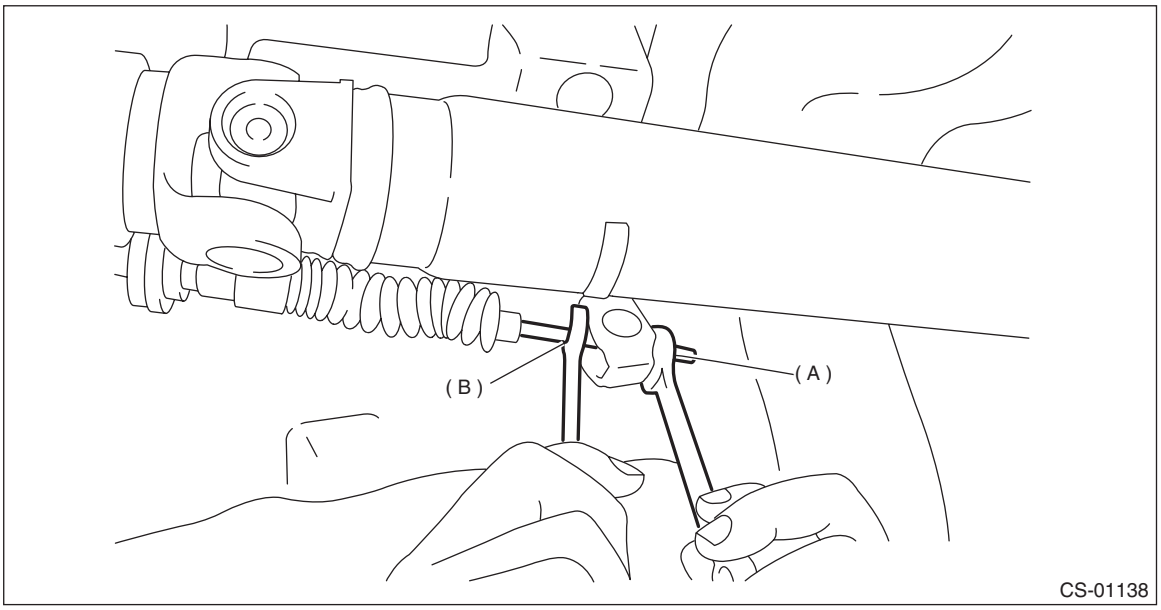
6) Turn adjusting nut B until it lightly touches the connector.



(A) Forward side
(B) Select lever
(C) Connector
(D) Adjusting nut B
(E) Contact point
(F) Adjusting nut A

7) Set a spanner wrench to adjusting nut B so that it does not rotate, and then tighten the adjusting nut A.

Tightening torque:
7.5 N·m (0.8 kgf-m, 5.5 ft-lb)



(A) Adjusting nut A
(B) Adjusting nut B

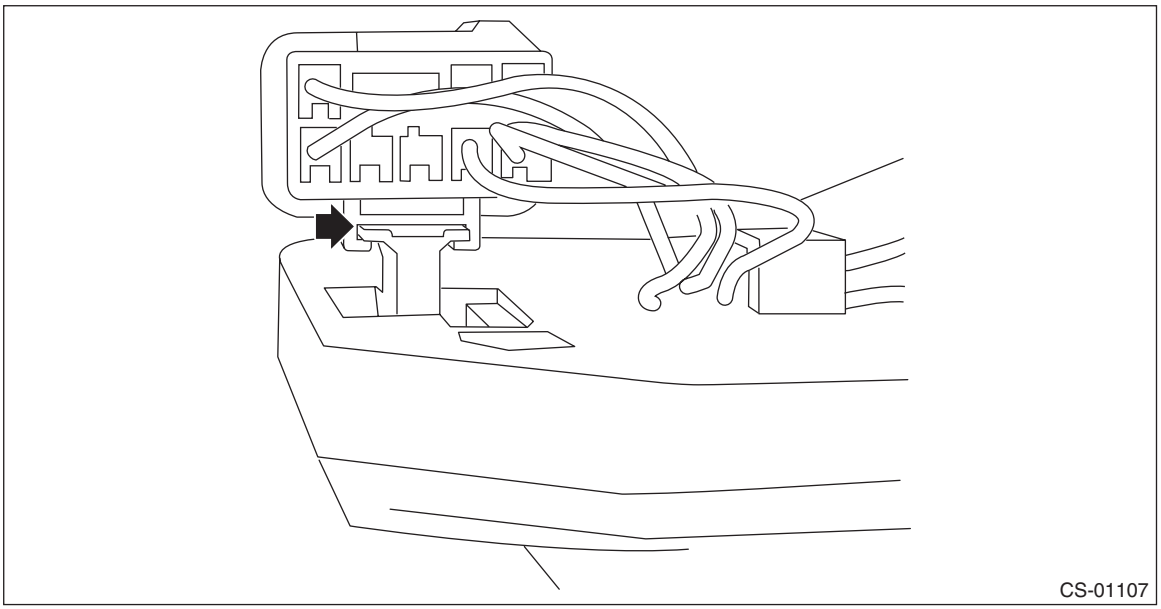
8) After the completion of adjustment, confirm that the select lever operates normally at all ranges.
9) Install in the reverse order of removal.

5. AT Shift Lock Solenoid and “P” Range Switch

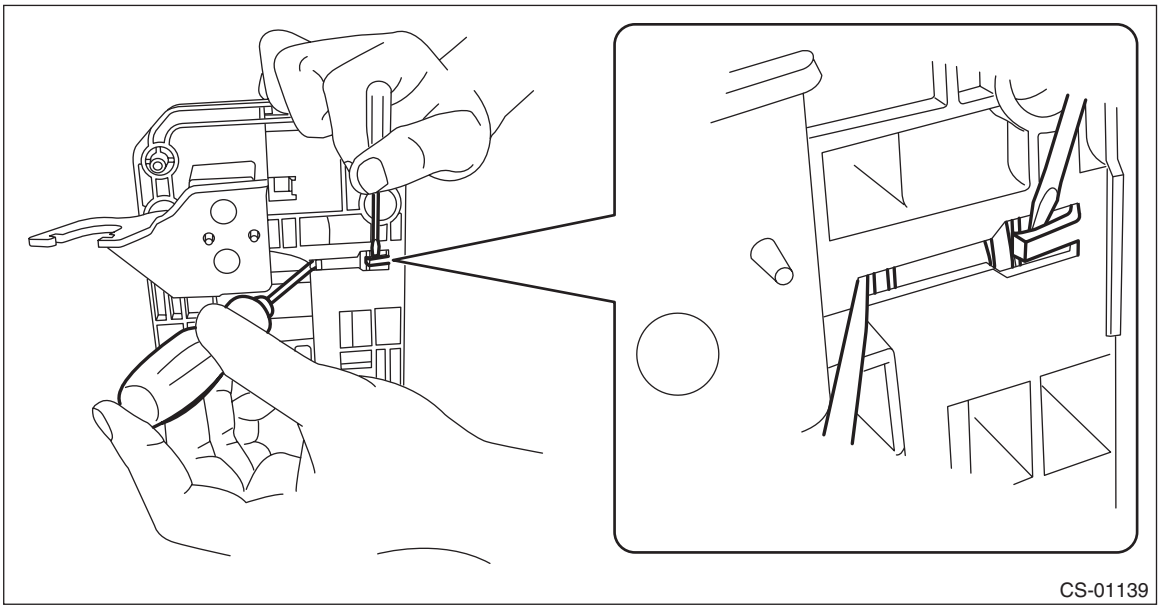
A: REMOVAL

1. SOLENOID UNIT

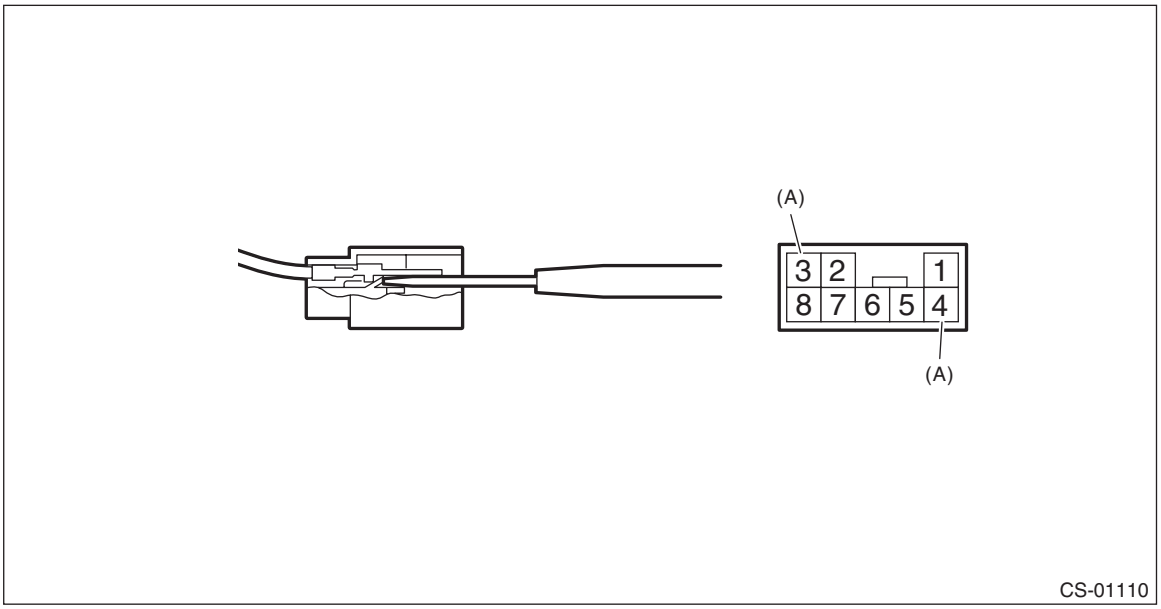
1) Remove the AT select lever. <Ref. to CS-24, REMOVAL, Select Lever.>
2) Remove the spacer and gasket. <Ref. to CS-41, DISASSEMBLY, Select Lever.>
3) Using a flat tip screwdriver with a thin tip, remove the harness connector from the plate COMPL.



4) Raise the claw using a flat tip screwdriver with a thin tip, and remove the solenoid unit from the plate COMPL.



5) Remove the terminal of the solenoid unit using a flat tip precision screwdriver with a tip width of 1.3 mm (0.05 in) or less, KTC connector terminal tool ECC-1T or equivalent.



(A) Solenoid unit terminals

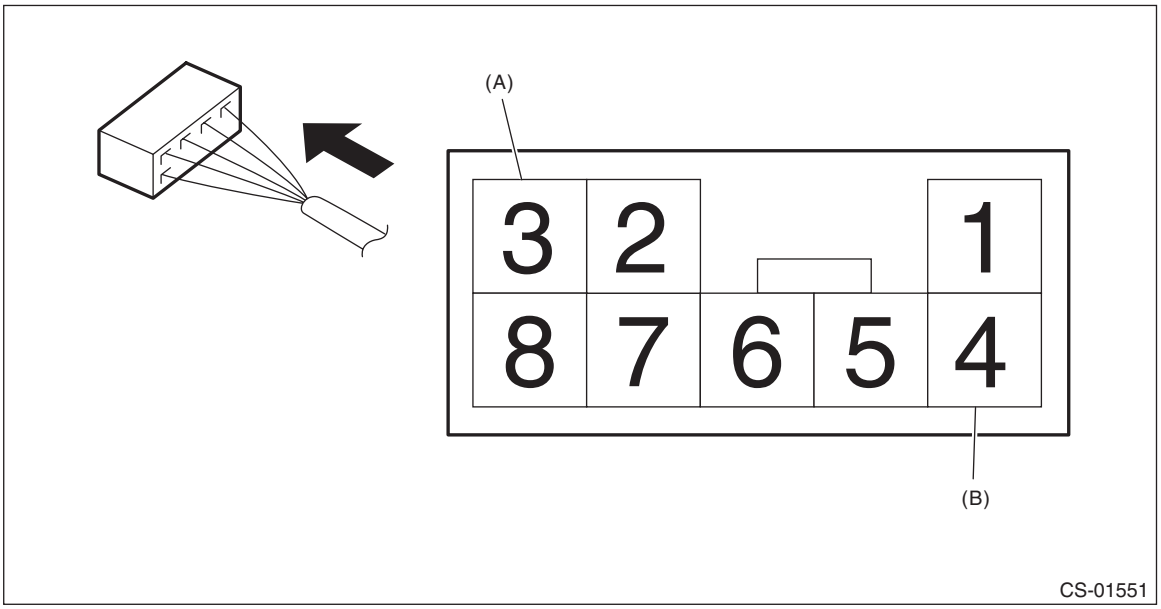
2. “P” RANGE SWITCH

For the removal of “P” range switch, refer to the procedure for AT select lever. <Ref. to CS-41, DISASSEMBLY, Select Lever.>

B: INSTALLATION

Install in the reverse order of removal.

NOTE:
Insert the solenoid unit terminals to the harness connector.



(A) Solenoid unit (color code: blue)
(B) Solenoid unit (color code: black)

C: INSPECTION

	Step	Check	Yes	No
1	**CHECK SOLENOID UNIT.** Measure the resistance of solenoid unit connector terminals. ***Terminals*** ***No. 4 — No. 3:***	Is the resistance 27.6 — 30.5 Ω?	Go to step **2**.	Replace the solenoid unit. <Ref. to CS-59, AT Shift Lock Solenoid and “P” Range Switch.>
2	**CHECK SOLENOID UNIT.** Connect the battery to the solenoid unit connector terminals, and then operate the solenoid. ***Terminals*** ***No. 3 (+) — No. 4 (–):***	Does the solenoid unit operate normally?	Go to step **3**.	Replace the solenoid unit. <Ref. to CS-59, AT Shift Lock Solenoid and “P” Range Switch.>
3	**CHECK “P” RANGE SWITCH.** 1) Shift the select lever to “P” range. 2) Measure the resistance between “P” range switch connector terminals. ***Terminals*** ***No. 1 — No. 2:***	Is the resistance less than 1 Ω?	Go to step **4**.	Replace the “P” range switch. <Ref. to CS-59, AT Shift Lock Solenoid and “P” Range Switch.>
4	**CHECK “P” RANGE SWITCH.** 1) Set the select lever to other than “P” range. 2) Measure the resistance between “P” range switch connector terminals. ***Terminals*** ***No. 1 — No. 2:***	Is the resistance 1 MΩ or more?	Normal	Replace the “P” range switch. <Ref. to CS-59, AT Shift Lock Solenoid and “P” Range Switch.>

6. Body Integrated Unit

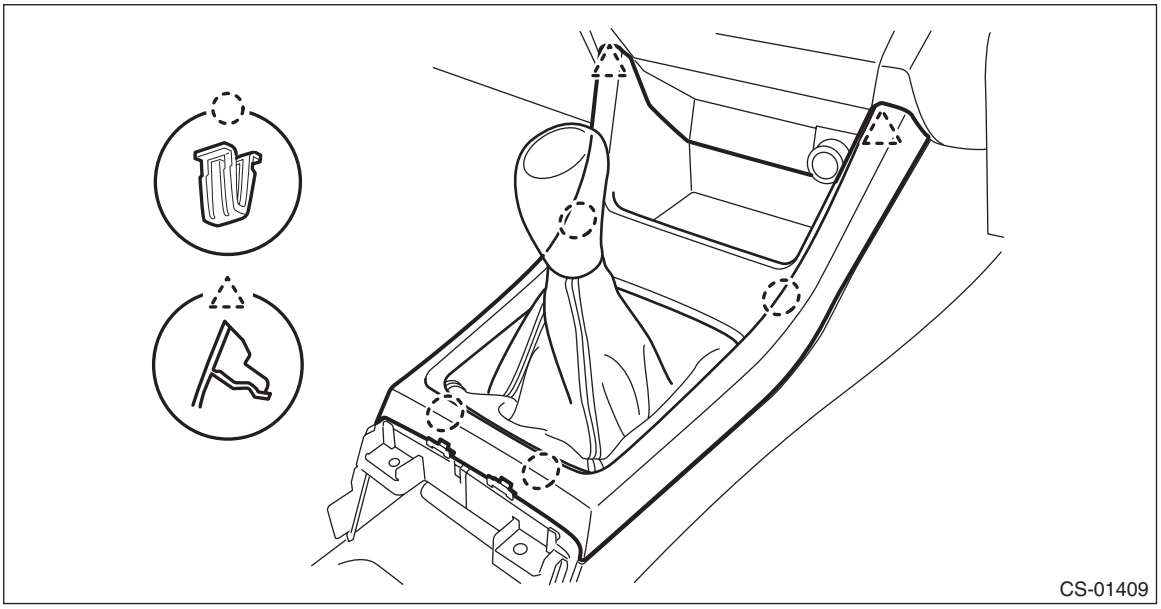
A: NOTE

Refer to “Body Integrated Unit” for removal and installation procedure. <Ref. to SL-87, Body Integrated Unit.>

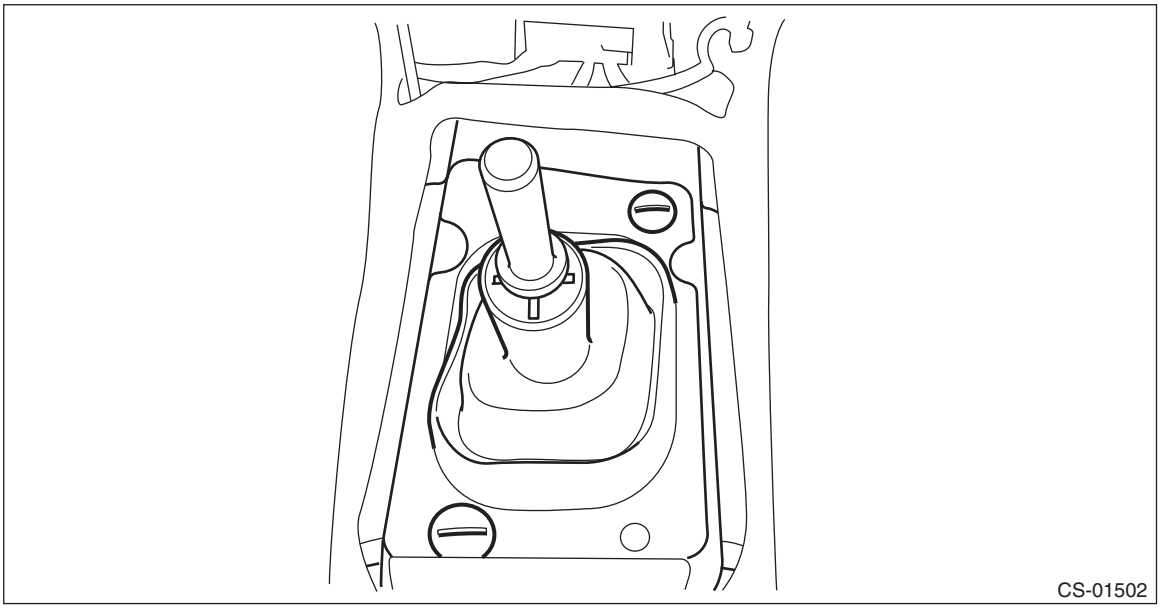
7. MT Gear Shift Lever

A: REMOVAL

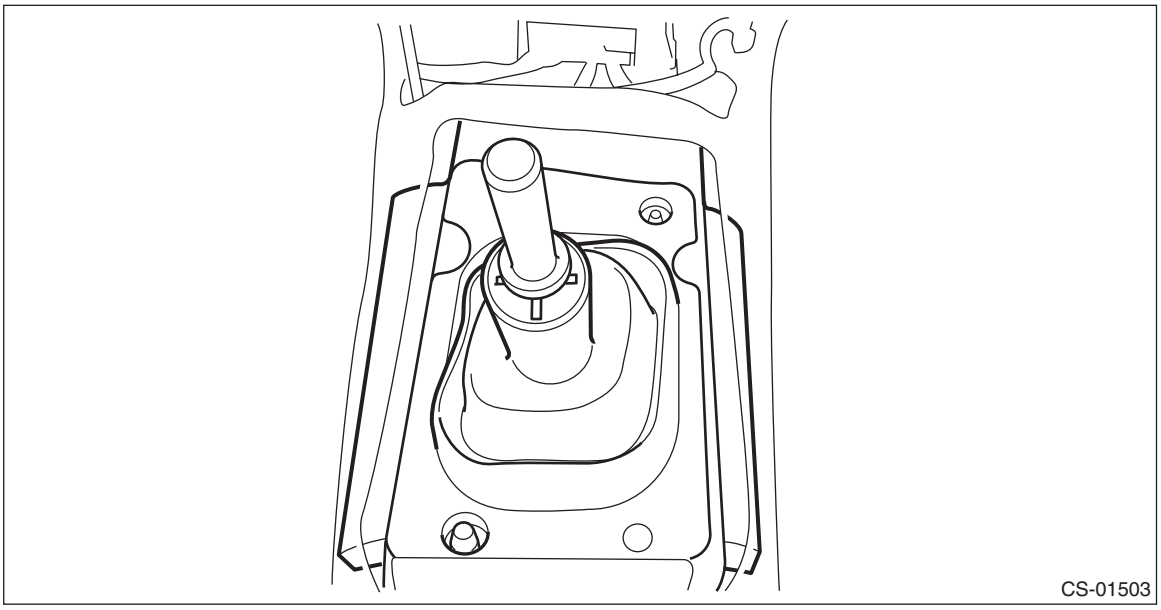
1) Disconnect the ground cable from battery.
2) Remove the console box. <Ref. to EI-81, REMOVAL, Console Box.>
3) Remove the gear shift knob and remove the cover - shift lever.



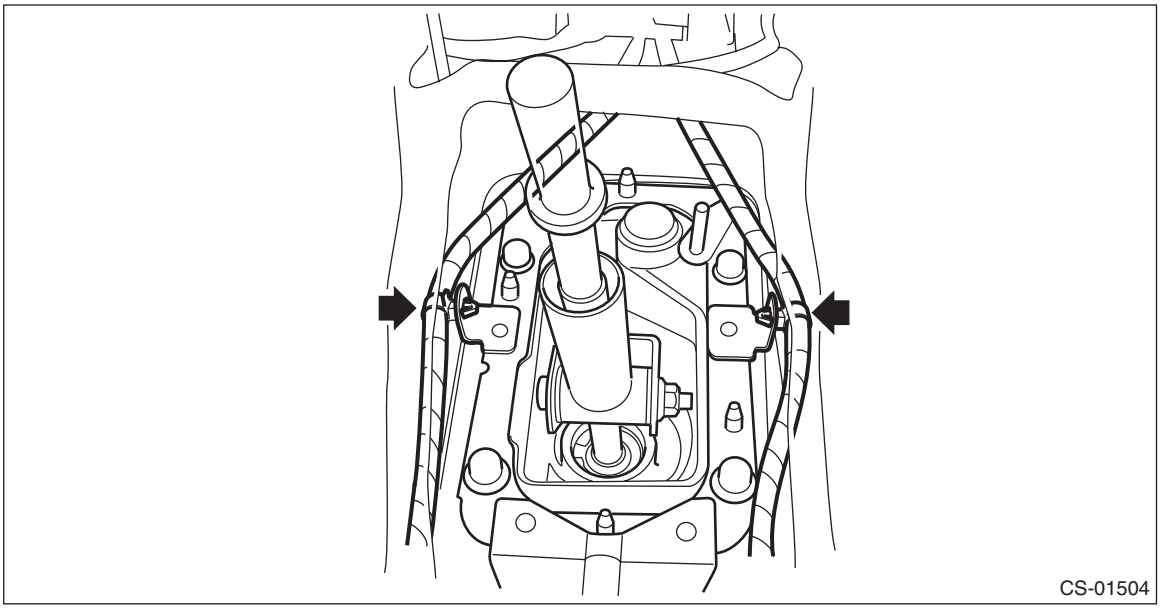
4) Remove the panel center LWR LH and RH. <Ref. to EI-81, REMOVAL, Console Box.>
5) Remove the clamp.



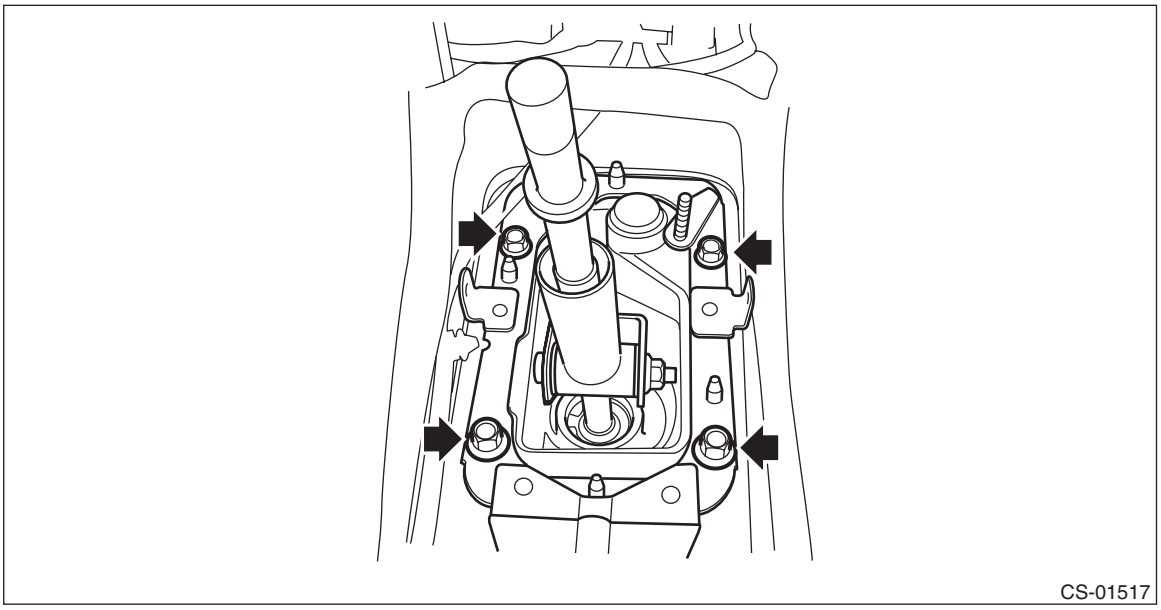
6) Remove the boot and insulator assembly.



7) Remove the harness clamp from the plate COMPL.

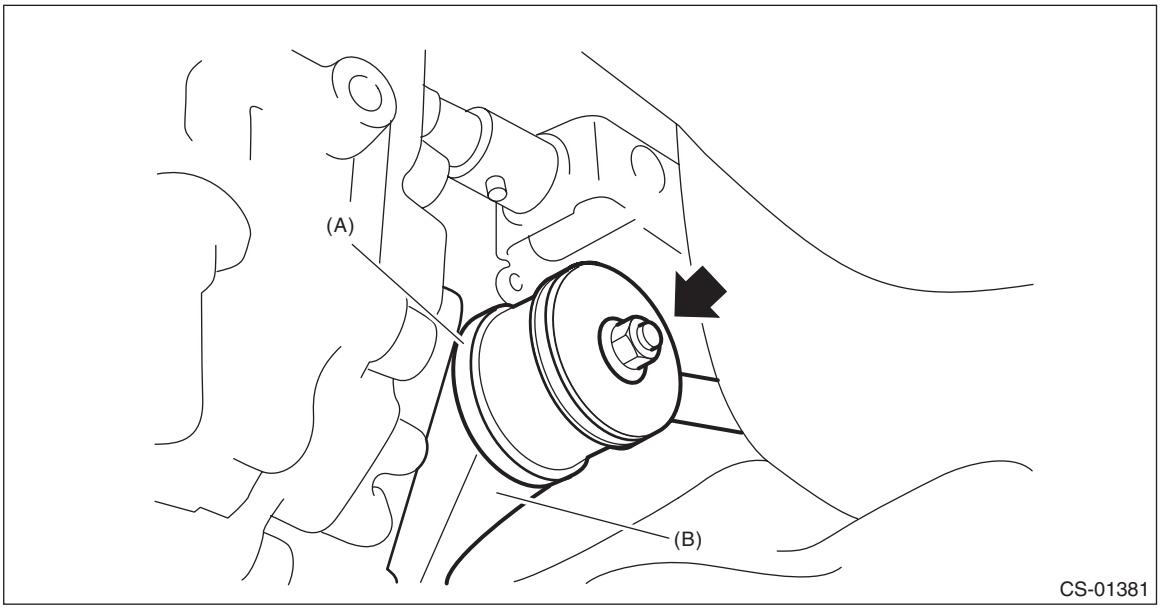


8) Remove the plate COMPL from the vehicle body.



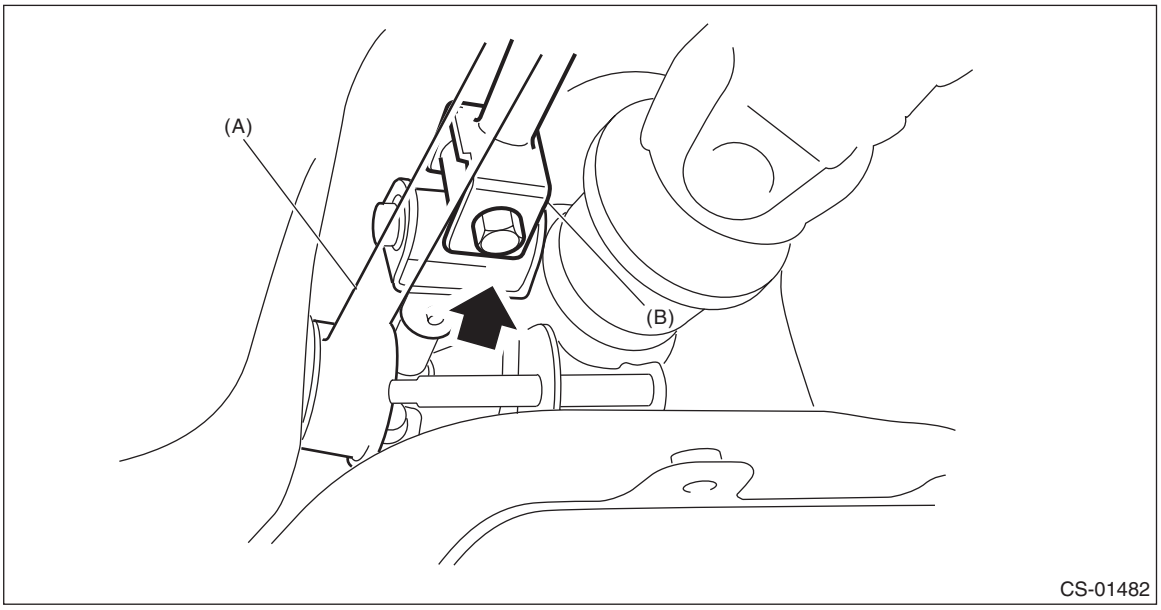
9) Lift up the vehicle.
10) Remove the center exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-14, REMOVAL, Center Exhaust Pipe.>
11) Remove the center exhaust cover.

12) Remove the stay from the shift bracket.



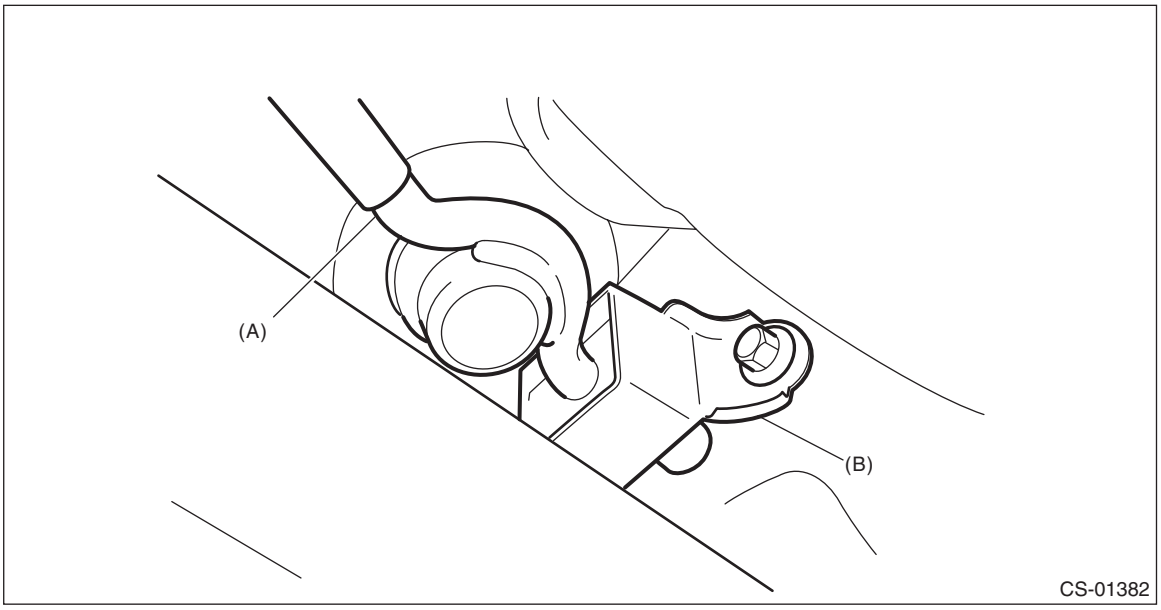
(A) Stay
(B) Shift bracket

13) Remove the rod from joint.



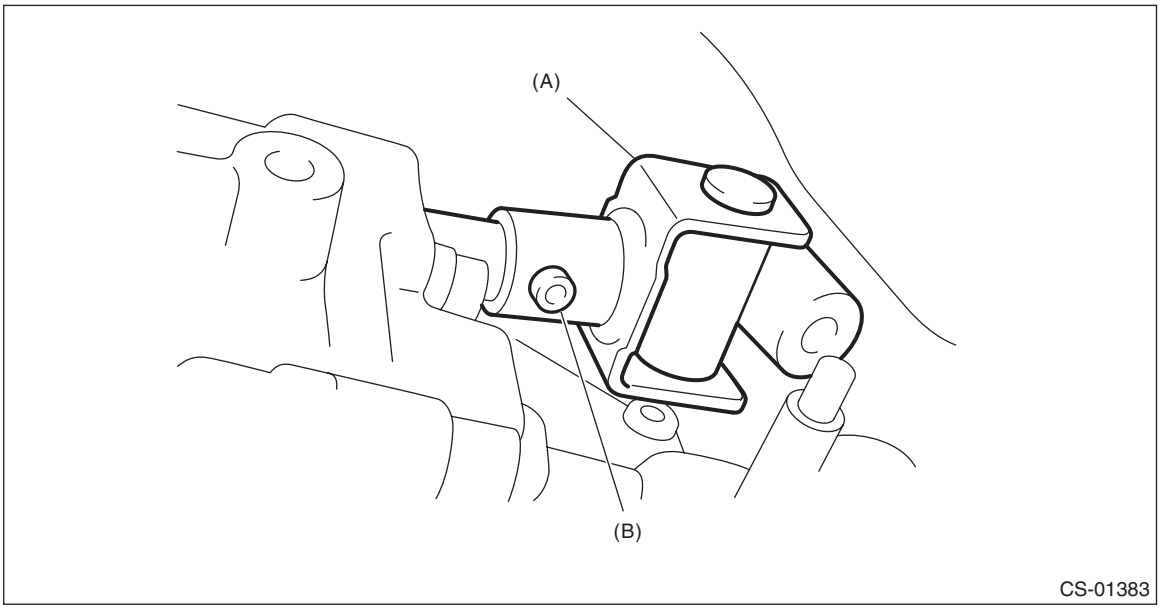
(A) Stay
(B) Rod

14) Remove the cushion rubber from the vehicle body.



(A) Stay
(B) Cushion rubber

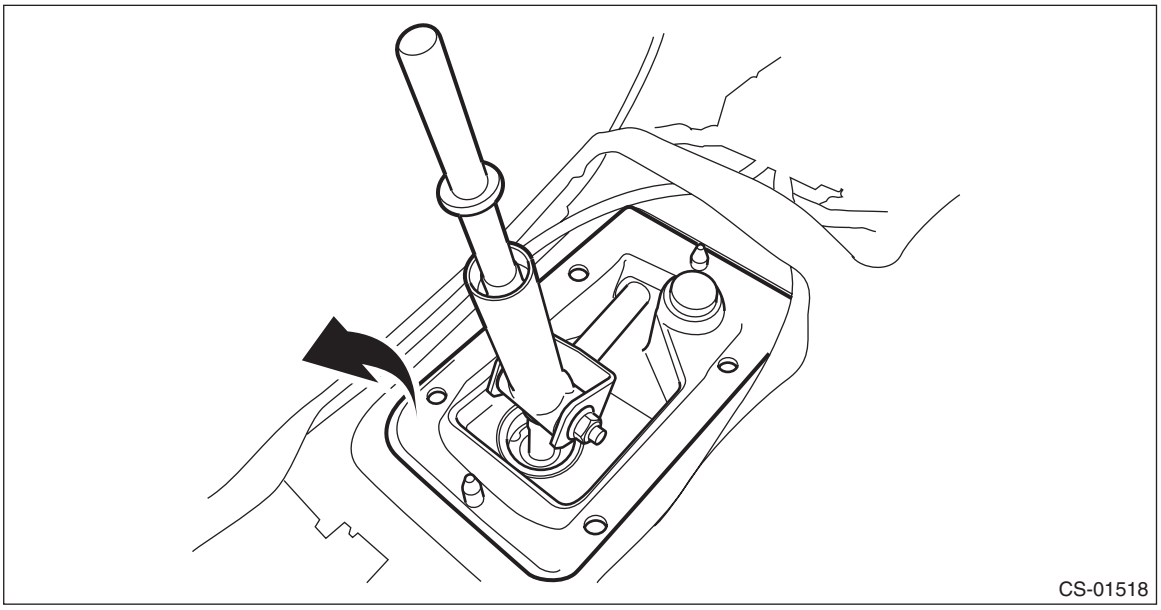
15) Extract the spring pin and remove the joint.



(A) Joint
(B) Spring pin

16) Lower the vehicle.

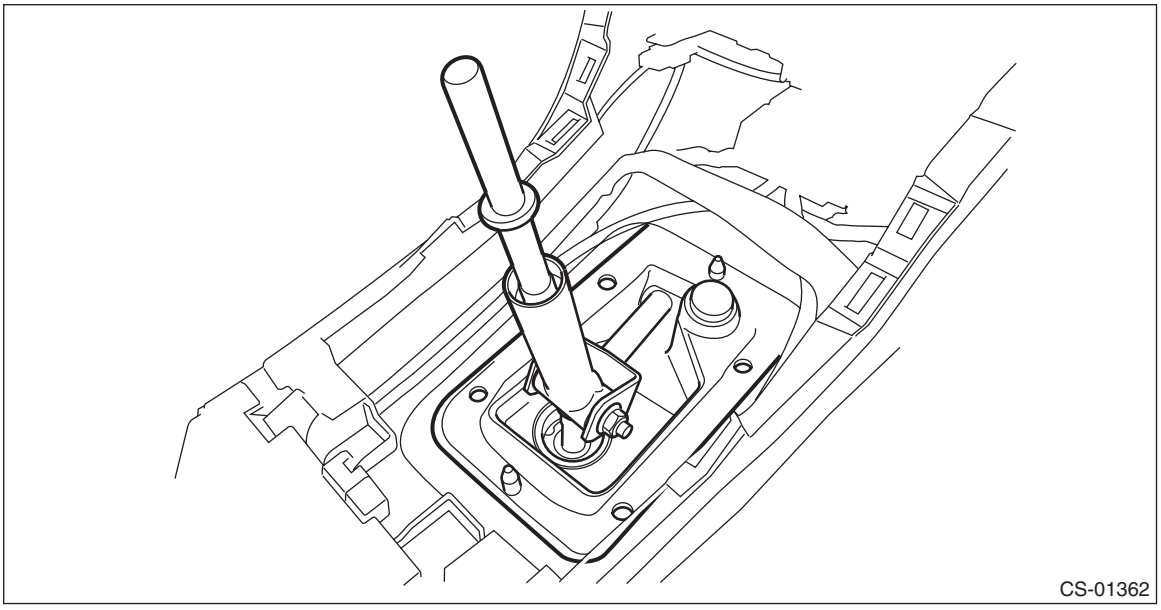
17) Remove the gear shift lever.



B: INSTALLATION

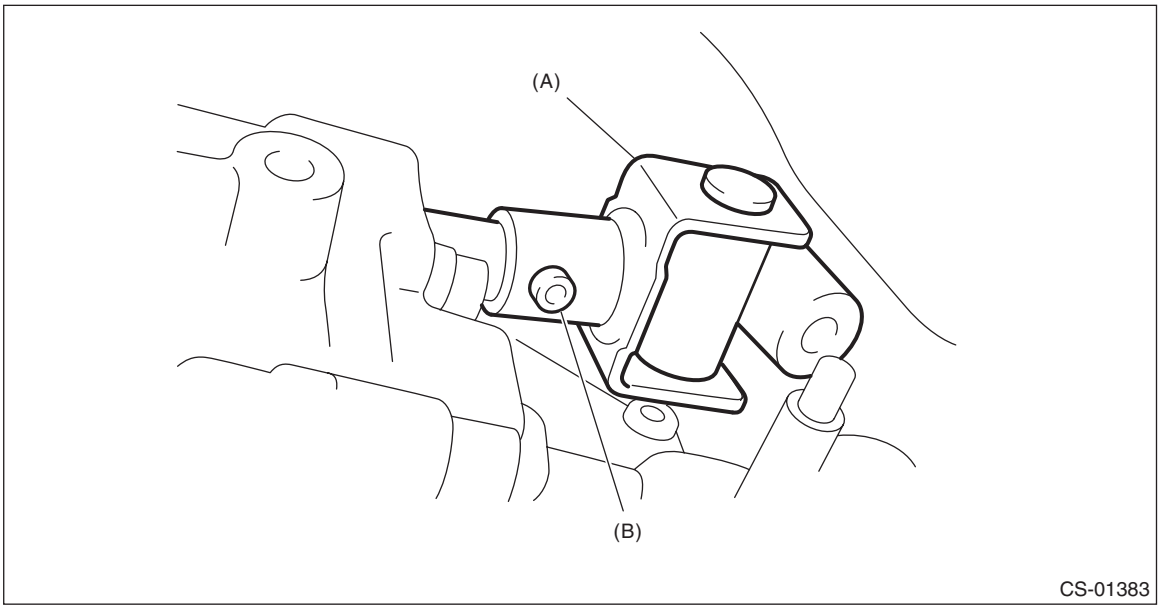
1) Insert the gear shift lever from the room side.

NOTE:
Insert the rod and the stay, and then temporarily set them onto the transmission mount.



2) Lift up the vehicle.

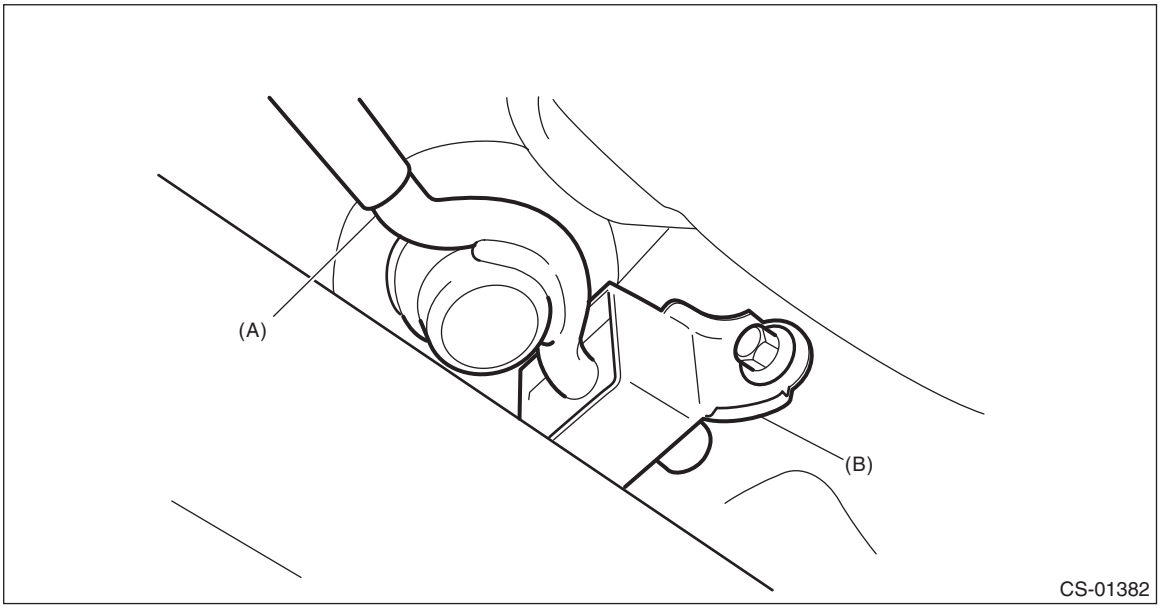
3) Install the joint to the transmission and secure with a spring pin.



(A) Joint
(B) Spring pin

4) Mount the cushion rubber on the vehicle body.

Tightening torque:
18 N·m (1.8 kgf-m, 13.3 ft-lb)

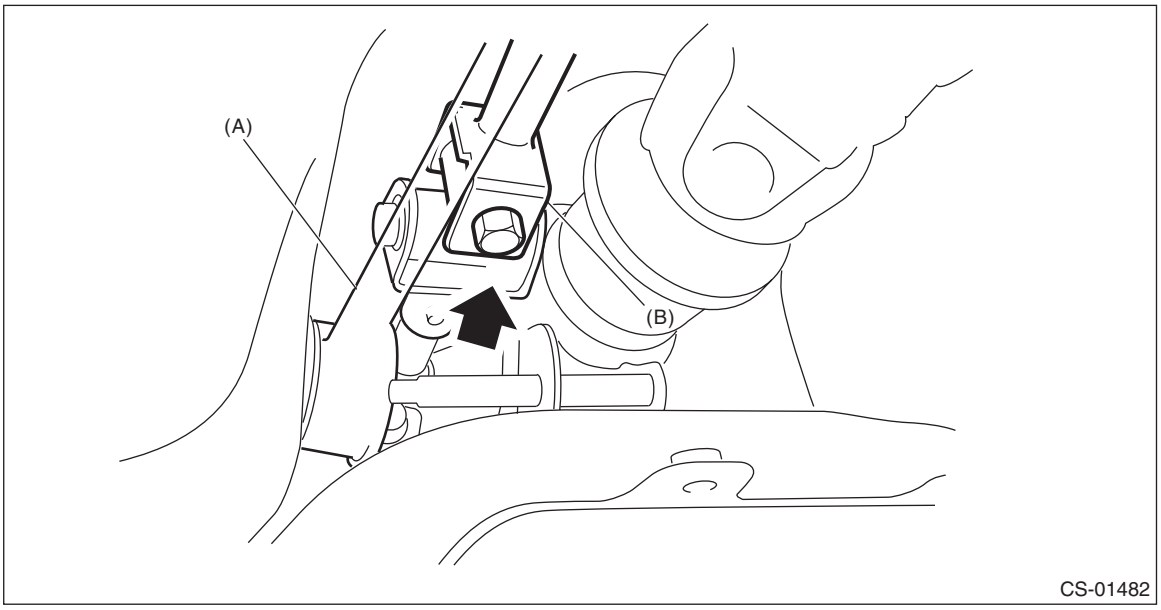


(A) Stay
(B) Cushion rubber

5) Connect the rod to the joint.

NOTE:
Use a new self-locking nut.

Tightening torque:
12 N·m (1.2 kgf-m, 8.9 ft-lb)

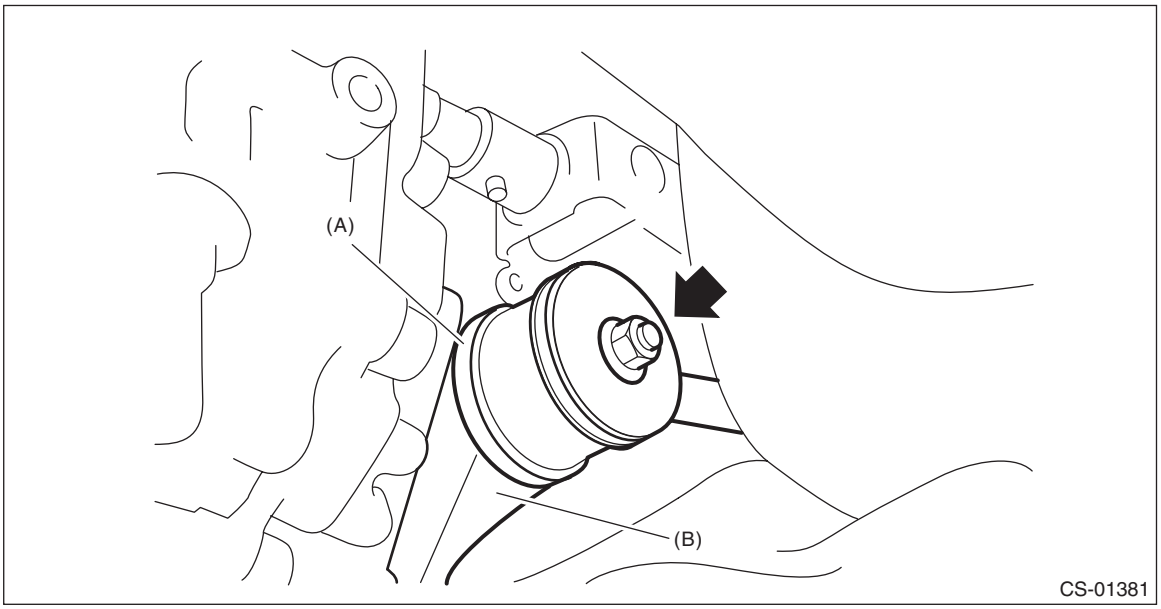


(A) Stay
(B) Rod

6) Connect the stay to the shift bracket, and tighten the self-locking nut.

NOTE:
Use a new self-locking nut.

Tightening torque:
18 N·m (1.8 kgf-m, 13.3 ft-lb)



(A) Stay
(B) Shift bracket

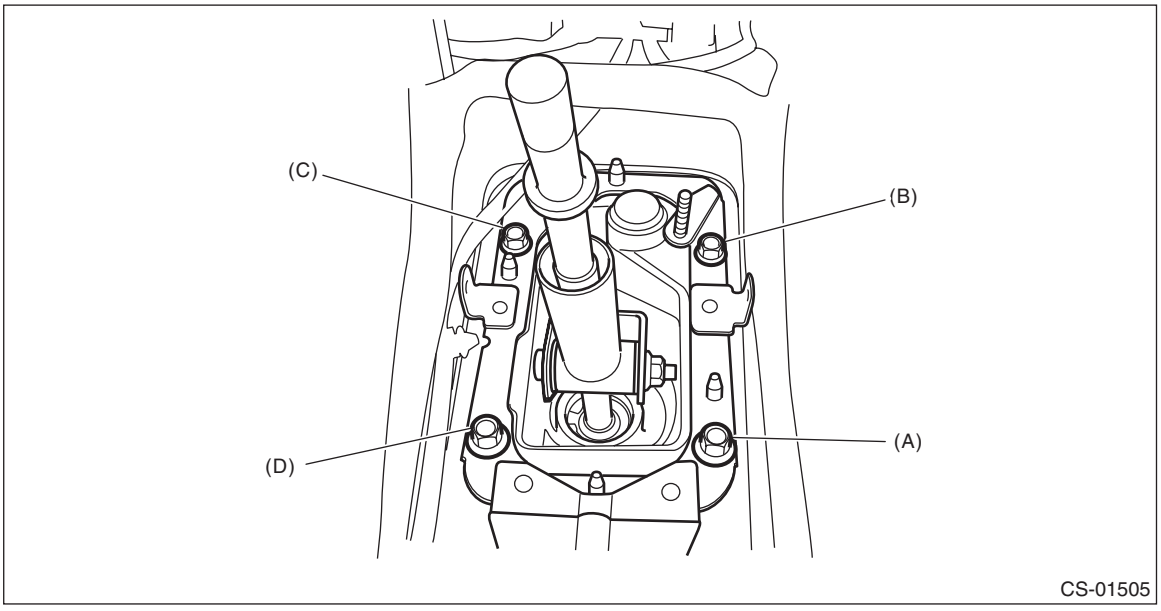
7) Install the center exhaust cover.

Tightening torque:
18 N·m (1.8 kgf-m, 13.3 ft-lb)

8) Install the center exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-15, INSTALLATION, Center Exhaust Pipe.>
9) Lower the vehicle.
10) Install the plate COMPL to the body.

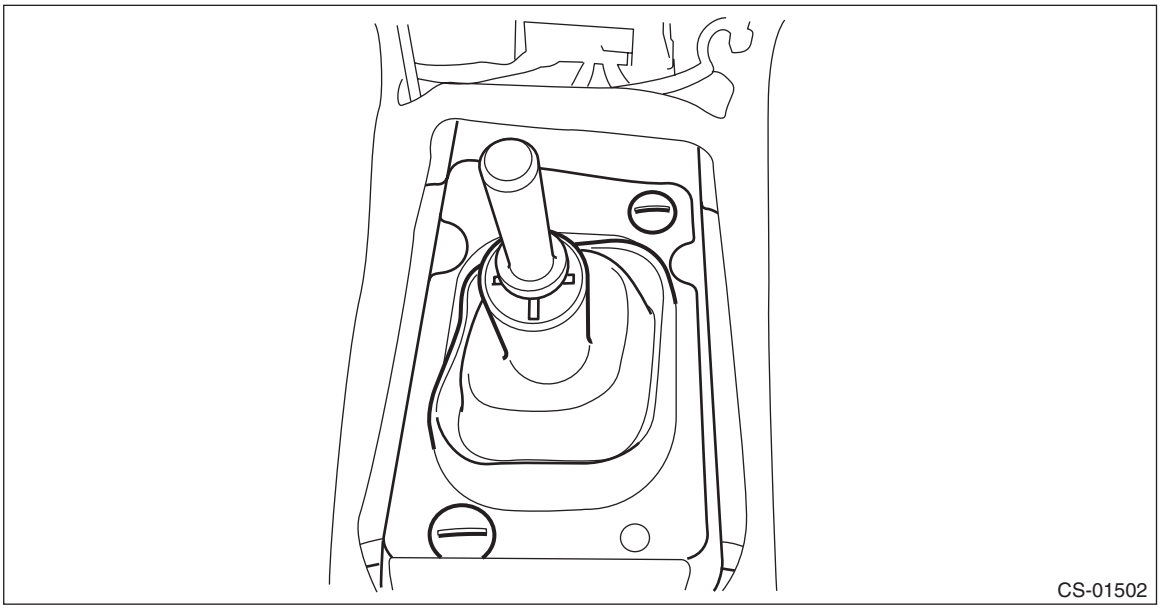
Tightening torque:
18 N·m (1.8 kgf-m, 13.3 ft-lb)

(1) Set the plate COMPL to the vehicle.
(2) Temporarily tighten the bolt (A).
(3) Tighten the bolt (B).
(4) Tighten the bolt (A).
(5) Tighten the bolts (C) and (D).



11) Install the harness clamp to the plate.

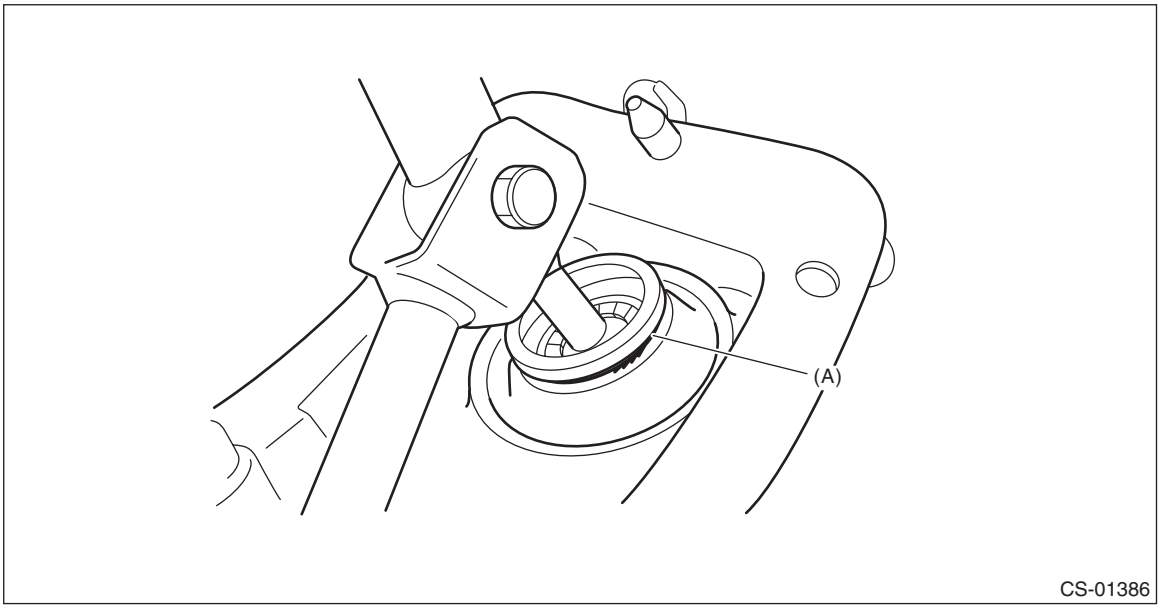
12) Install the boot and insulator assembly, and secure with a clamp.



13) Install the panel center LWR LH and RH. <Ref. to EI-82, INSTALLATION, Console Box.>
14) Install the cover - shift lever, and install the gear shift knob.
15) Install the console box. <Ref. to EI-82, INSTALLATION, Console Box.>
16) Make sure the gears can be shifted accurately into each gear.
17) Connect the battery ground terminal.

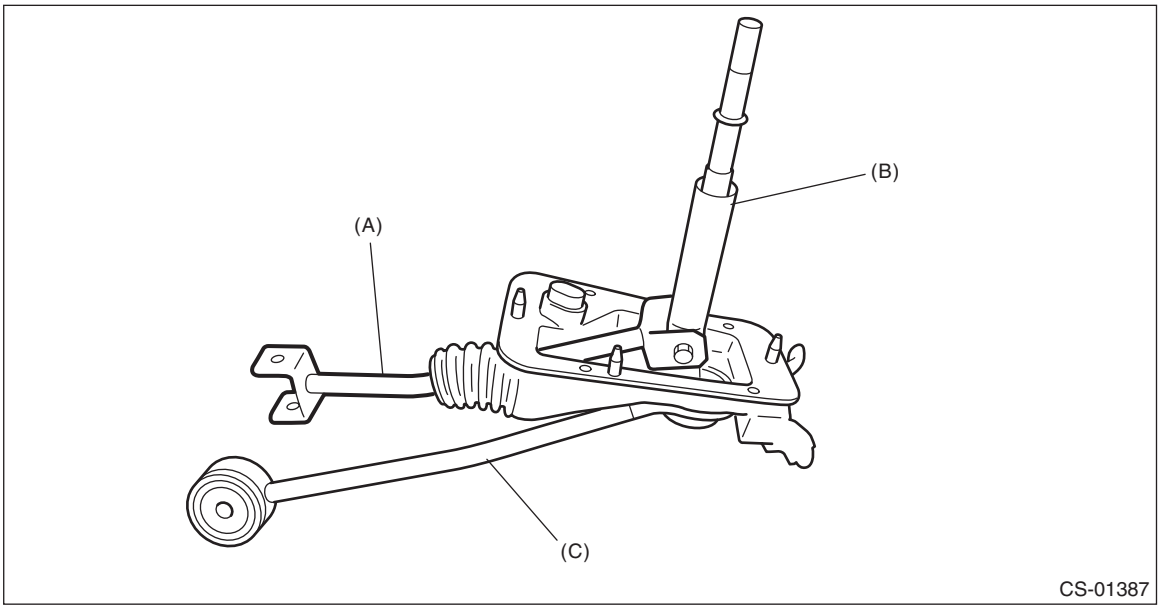
C: DISASSEMBLY

1) Remove the lock wires.



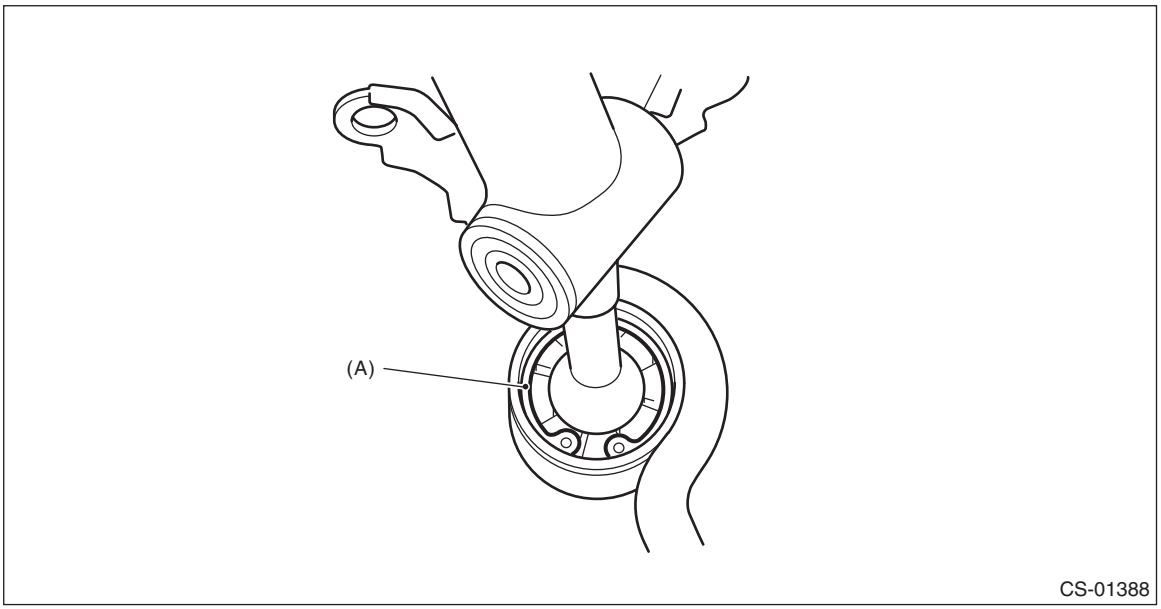
(A) Lock wire

2) Remove the rod from gear shift lever.



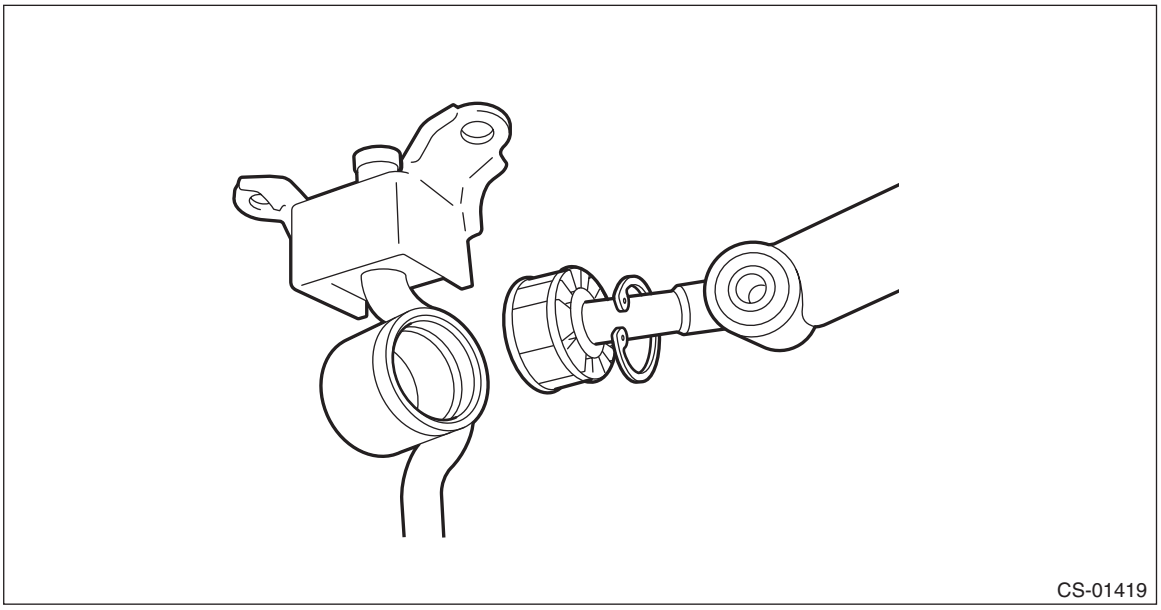
(A) Rod
(B) Lever
(C) Stay

3) Separate the rod and inner boot.
4) Remove the snap ring from the stay.

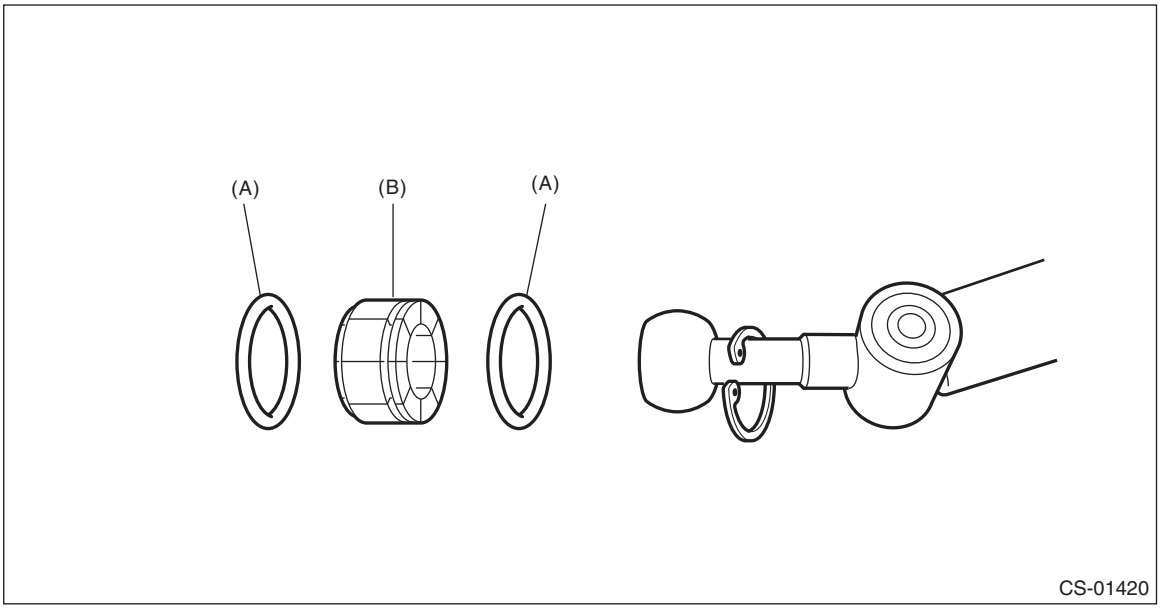


(A) Snap ring

5) Separate the gear shift lever and the stay.


CS-01419

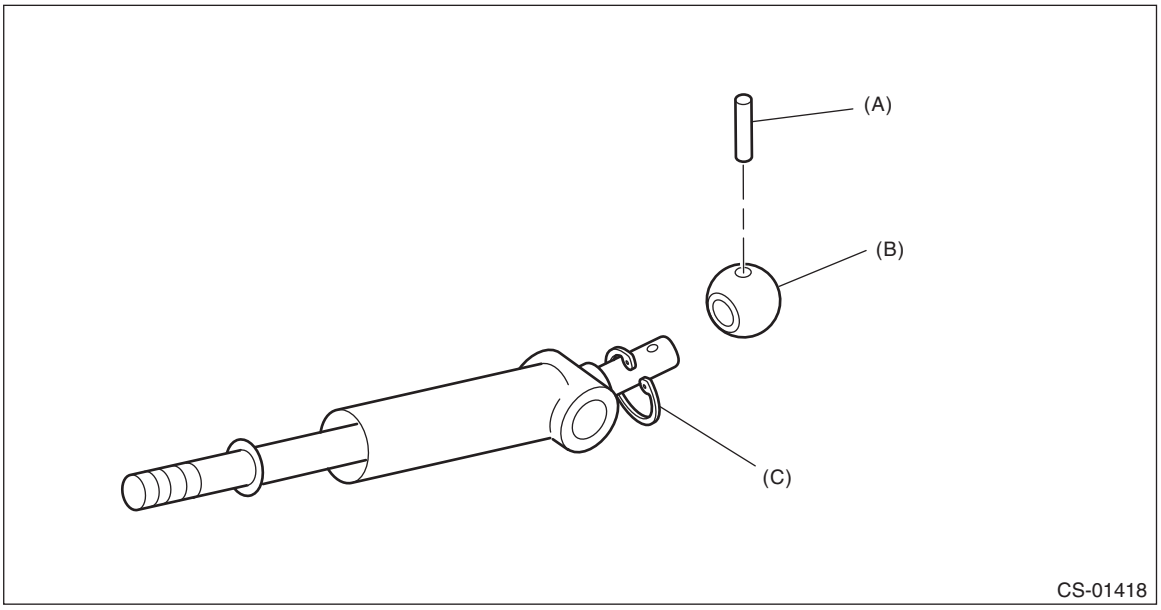
6) Remove the boot and bushing from the gear shift lever.



CS-01420

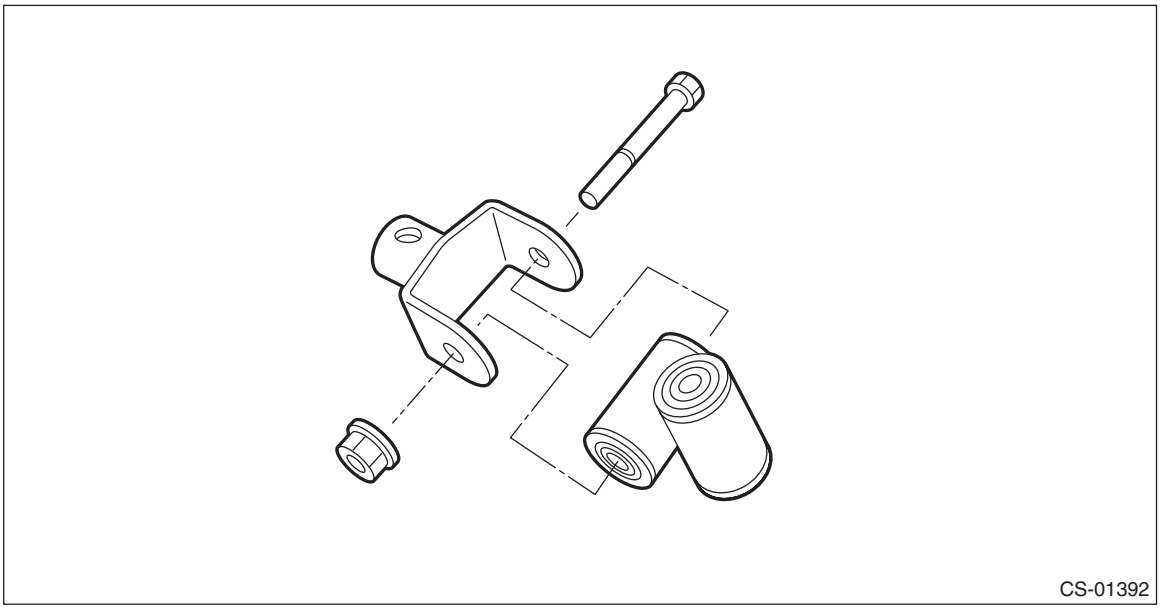
(A) O-ring
(B) Bushing

7) Remove the spring pin, and then remove the bushing and snap ring.

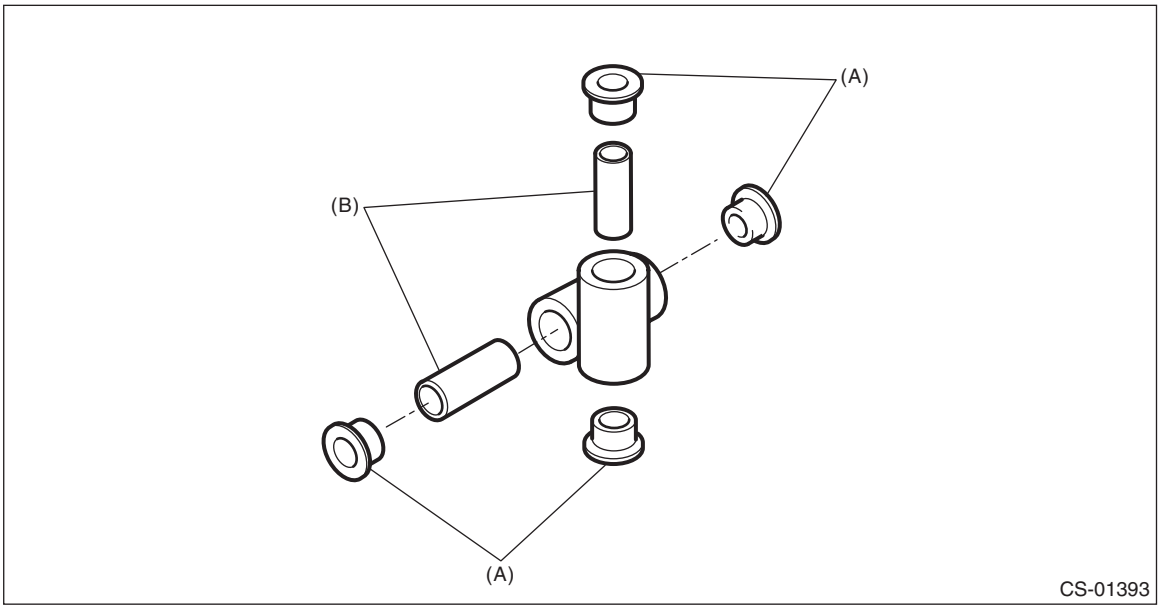


(A) Spring pin
(B) Bushing
(C) Snap ring

8) Remove the boss from the joint.

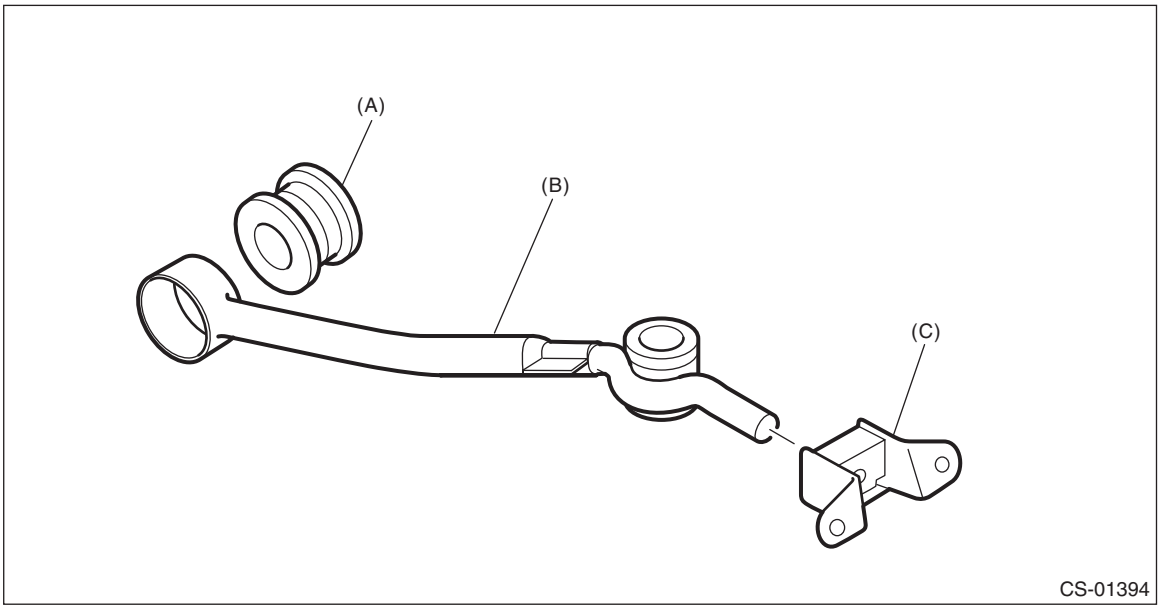


9) Remove the bushing and spacer from the boss.



(A) Bushing
(B) Spacer

10) Remove the bushing and cushion rubber from the stay.

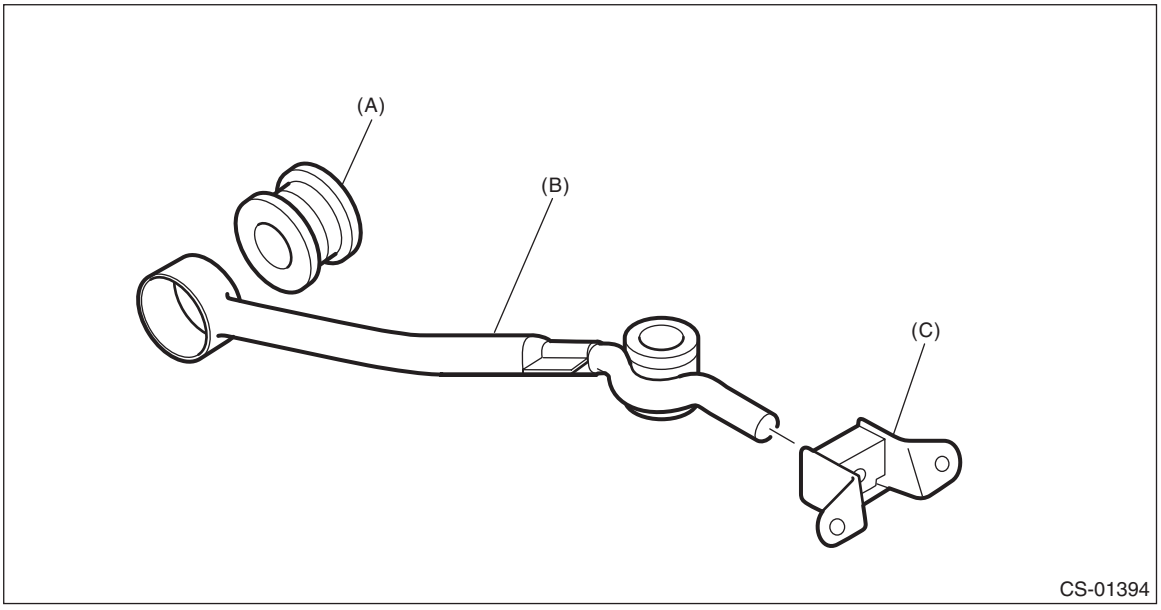


(A) Bushing B
(B) Stay
(C) Cushion rubber

D: ASSEMBLY

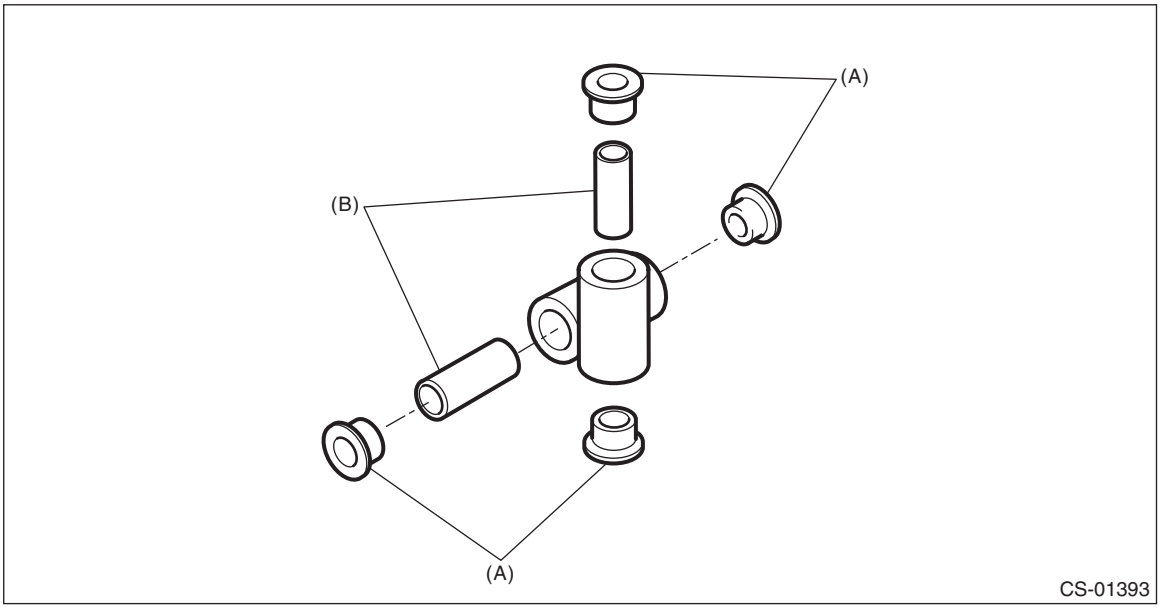
NOTE:
- Clean all the parts before assembly.
- Apply NIGTIGHT LYW No. 2 grease or equivalent to each part. <Ref. to CS-4, 5MT GEAR SHIFT LEVER, COMPONENT, General Description.>

1) Mount the bushing and cushion rubber to the stay.



(A) Bushing
(B) Stay
(C) Cushion rubber

2) Install the bushing and spacer to boss.

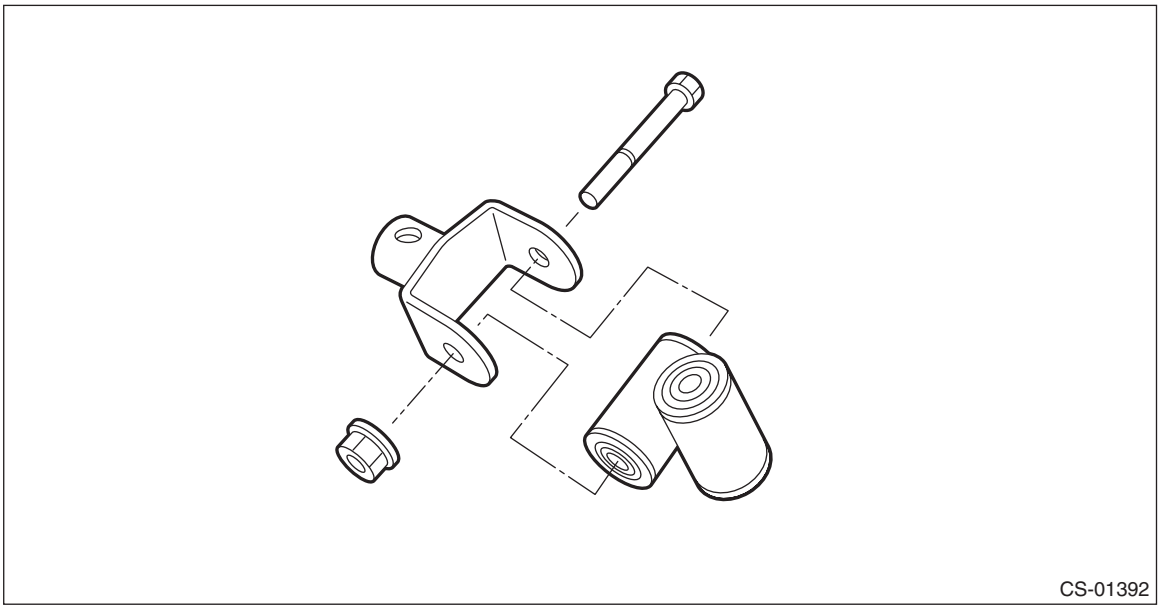


(A) Bushing
(B) Spacer

3) Install the boss to the joint.

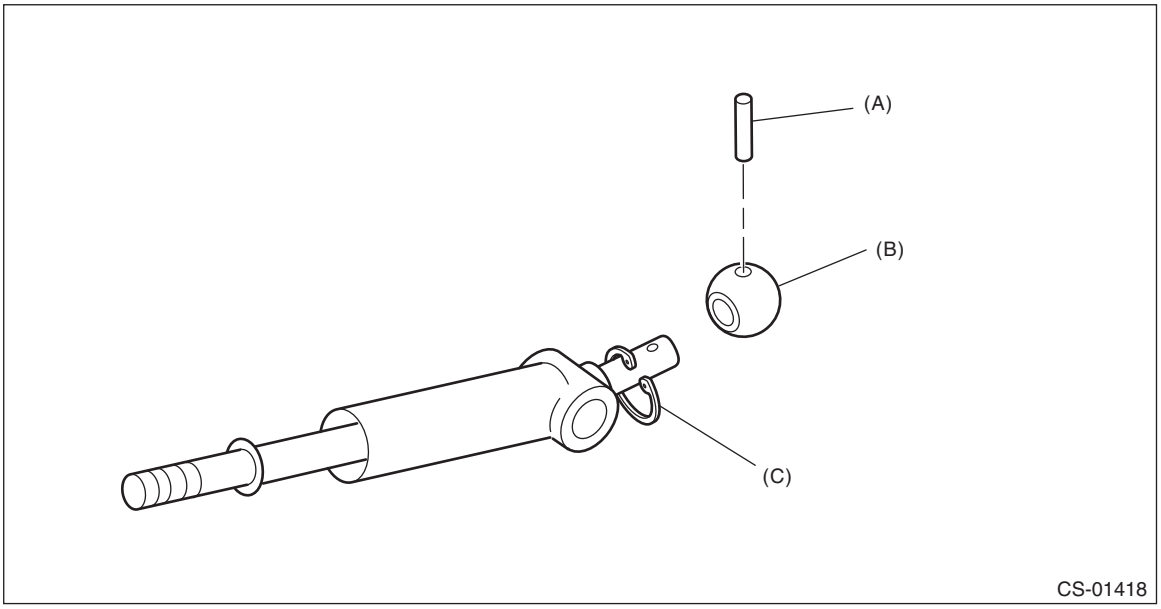
NOTE:
Use a new self-locking nut.

Tightening torque:
12 N·m (1.2 kgf-m, 8.9 ft-lb)



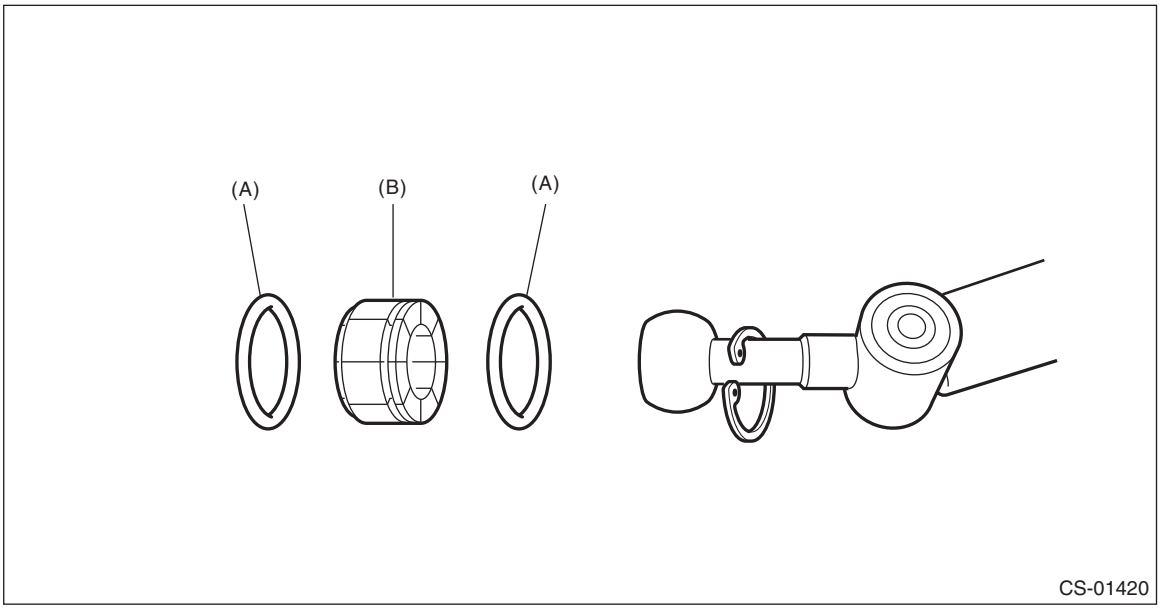
4) Install the snap ring to gear shift lever and install the bushing.

NOTE:
Apply grease to the bushing.



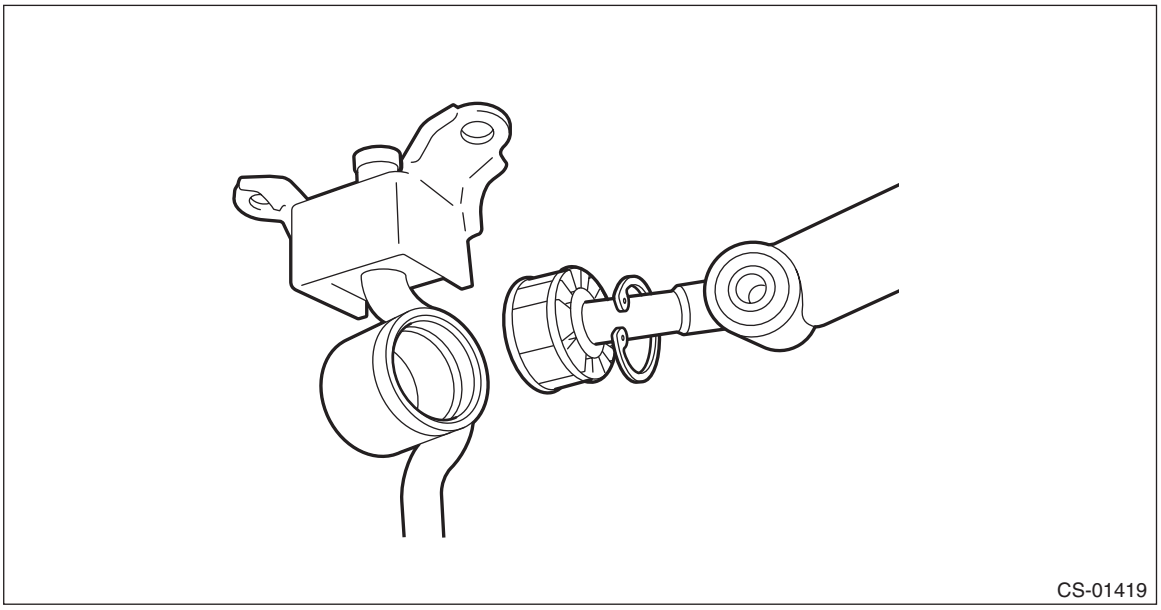
(A) Spring pin
(B) Bushing
(C) Snap ring

5) Apply grease to the bushing and O-ring, and then install to gear shift lever.

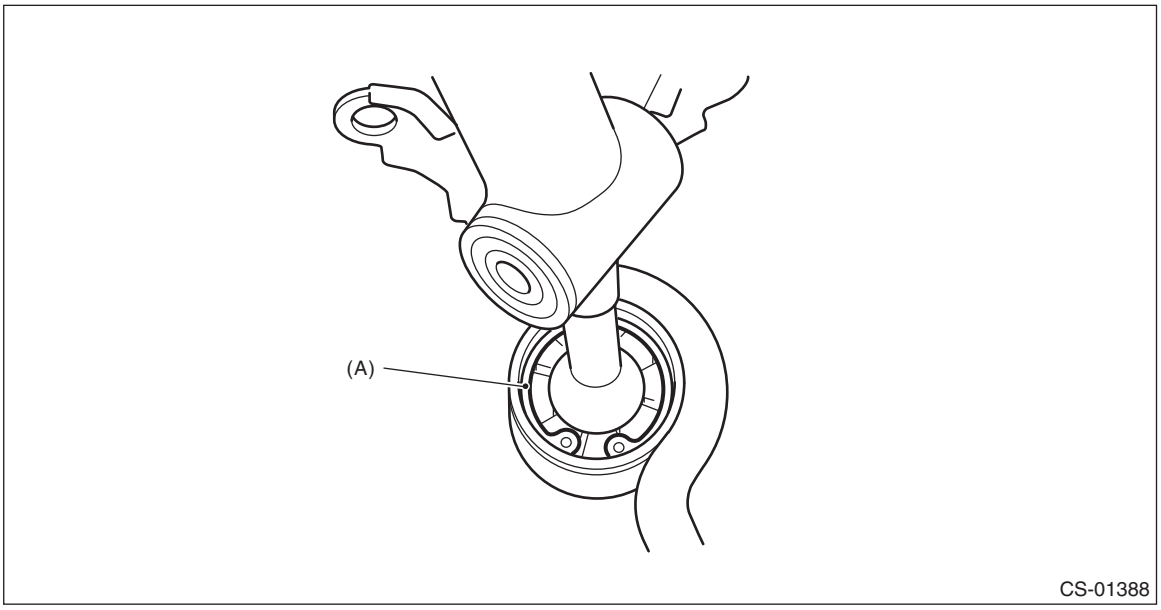


(A) O-ring
(B) Bushing

6) Apply sufficient grease into boss, and then install the gear shift lever to the stay.



7) Install the snap ring.

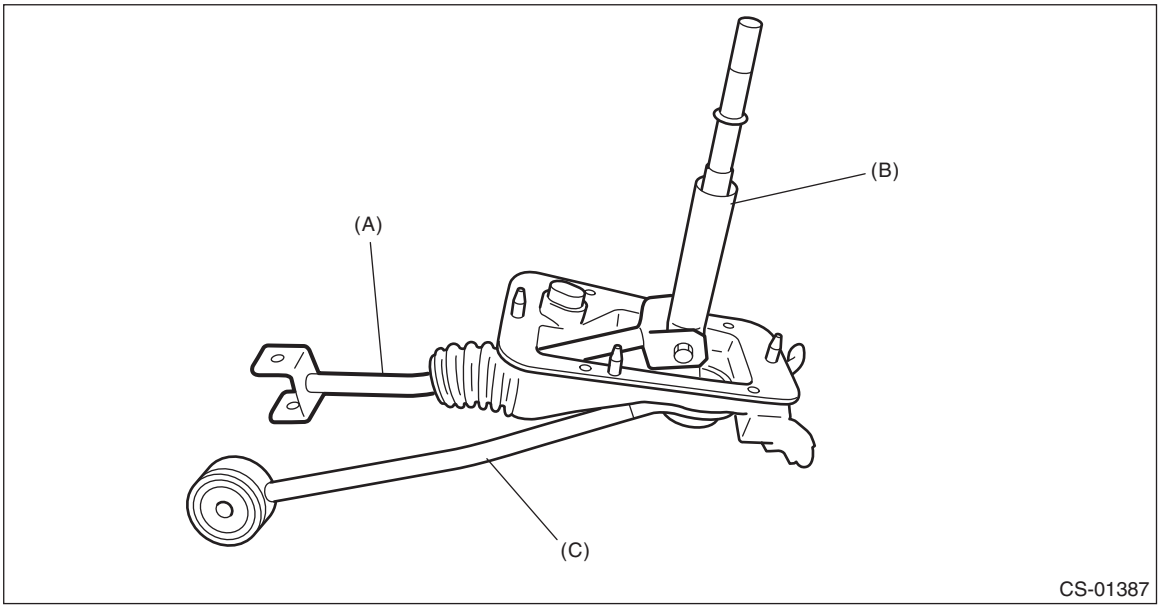


(A) Snap ring

8) Insert the gear shift lever and rod into boot hole.
9) Install the rod.

NOTE:
Use a new self-locking nut.

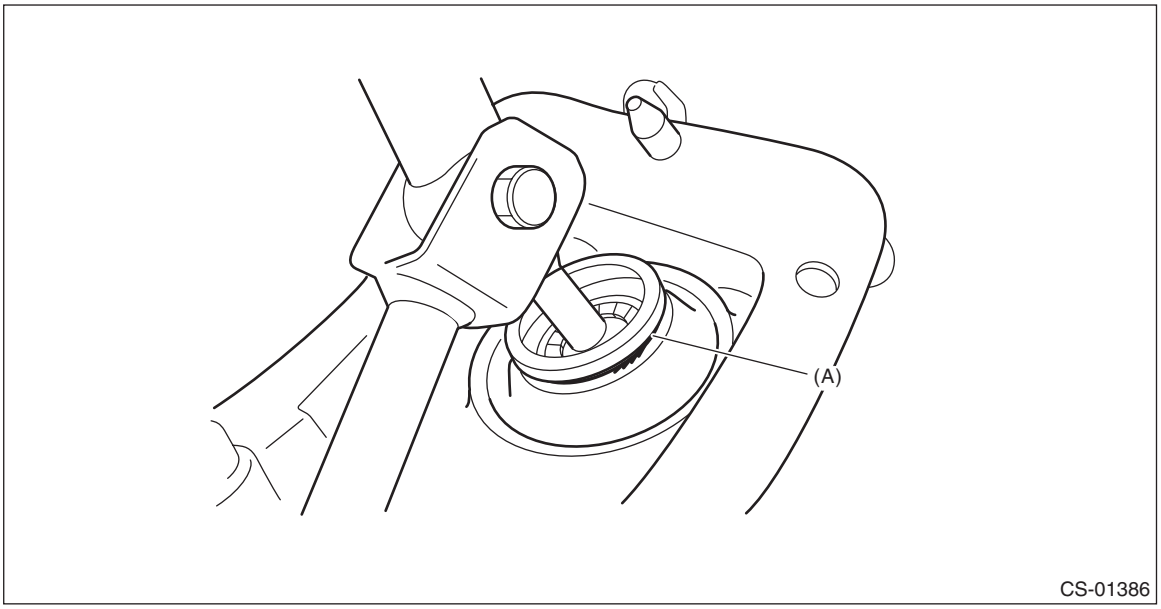
Tightening torque:
12 N·m (1.2 kgf-m, 8.9 ft-lb)



(A) Rod
(B) Lever
(C) Stay

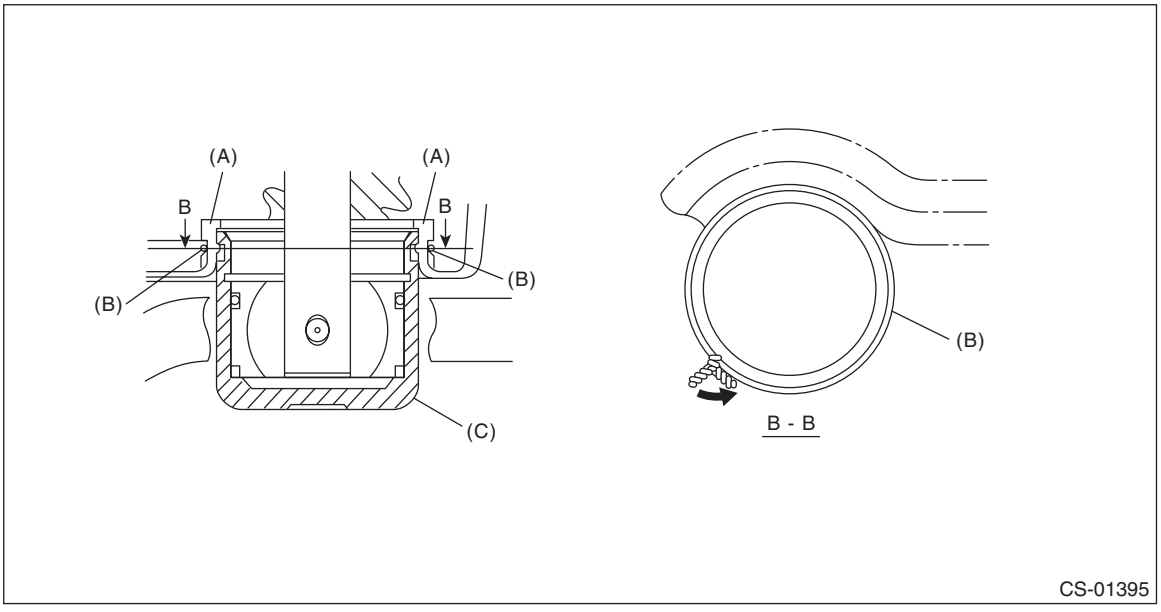
10) Install the lock wire.

NOTE:
Use a new lock wire.



(A) Lock wire

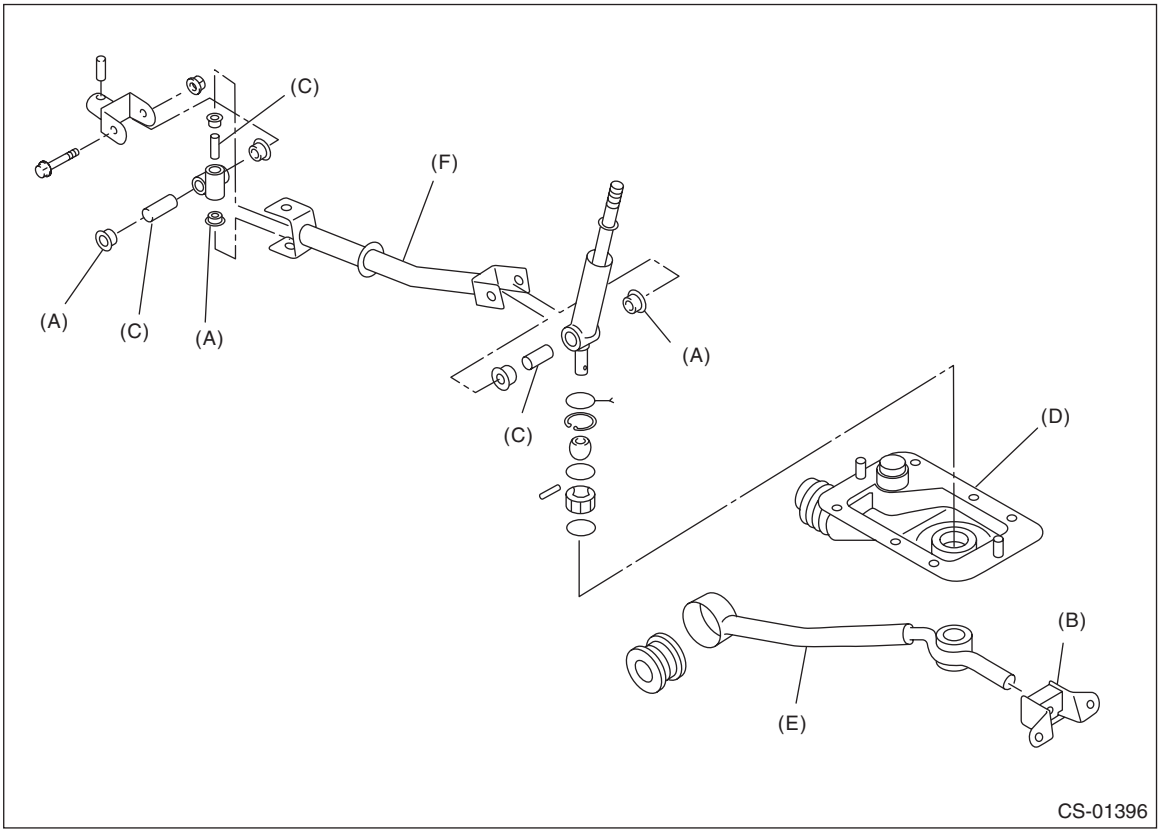
NOTE:
- Install the lock wire to the stay groove.
- Bend the extra wire to the same direction of lock wire winding.



(A) Inner boot
(B) Lock wire
(C) Stay

E: INSPECTION

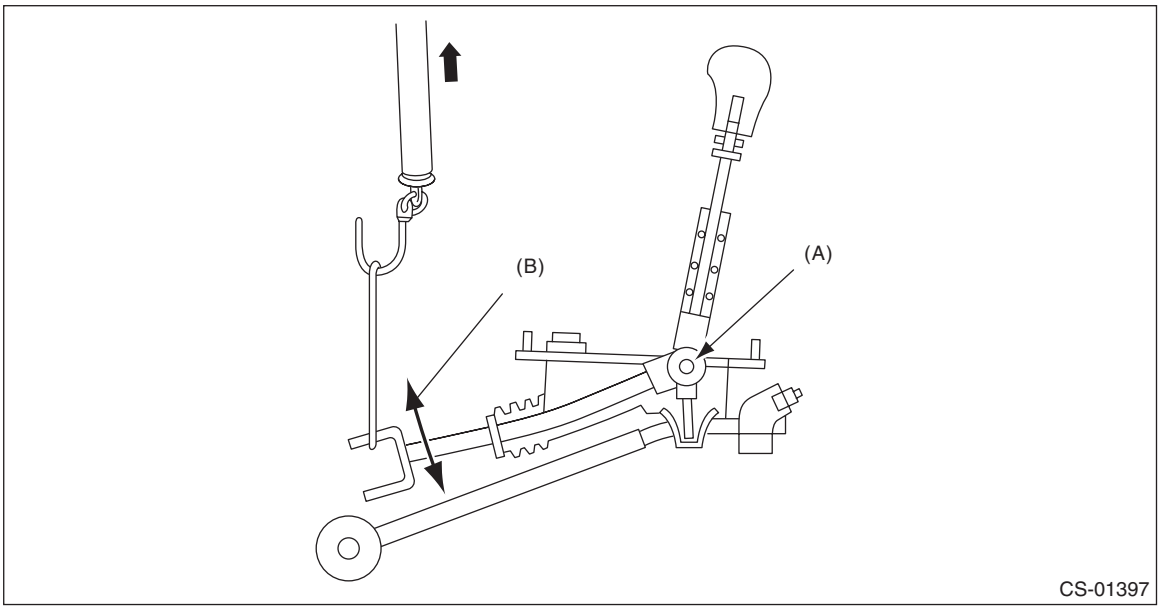
1) Check the parts (bushing, cushion rubber, spacer, boot, stay and rod, etc.) for deformation, damage and wear. If necessary, correct or replace faulty parts. Compare the removed parts with new parts to judge if there are damages or not.



(A) Bushing
(B) Cushion rubber
(C) Spacer
(D) Boot
(E) Stay
(F) Rod

2) Check the swing torque of rod linked with the gear shift lever. If the torque exceeds the specifications, replace the bushing or retighten nuts.

Swing torque:
3.7 N (0.38 kgf, 0.83 lbf) or less



(A) Pivot
(B) Swing torque

8. General Diagnostic Table

A: INSPECTION

Symptoms	Possible cause	Corrective action
Select lever	Starter does not run.	Adjust the select cable and inhibitor switch, or inspect the circuit.
	Back-up light does not illuminate.	Adjust the select cable and inhibitor switch, or inspect the circuit.
	AT shift lock system does not operate normally.	Adjust the select cable and inhibitor switch, or inspect the circuit.
	Manual mode can not be set.	Inspect the mode switch and select lever, or inspect the circuit.
	Up-shift is not engaged at manual mode.	Check the shift-up switch and circuit.
	Down-shift is not engaged at manual mode.	Check the shift-down switch and circuit.

CONTINUOUSLY VARIABLE TRANSMISSION
CVT(TR580)

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1. List of Diagnostic Trouble Code (DTC)

A: LIST

DTC	Item	Note
P0500	Vehicle Speed Sensor “A”	<Ref. to GD(CVT)(HEV)-6, DTC P0500 VEHICLE SPEED SENSOR “A”, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0560	System Voltage	<Ref. to GD(CVT)(HEV)-7, DTC P0560 SYSTEM VOLTAGE, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0601	Internal Control Module Memory Checksum Error	<Ref. to GD(CVT)(HEV)-8, DTC P0601 INTERNAL CONTROL MODULE MEMORY CHECKSUM ERROR, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0603	Internal Control Module Keep Alive Memory (KAM) Error	<Ref. to GD(CVT)(HEV)-9, DTC P0603 INTERNAL CONTROL MODULE KEEP ALIVE MEMORY (KAM) ERROR, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0604	Internal Control Module Random Access Memory (RAM) Error	<Ref. to GD(CVT)(HEV)-10, DTC P0604 INTERNAL CONTROL MODULE RANDOM ACCESS MEMORY (RAM) ERROR, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P062F	Internal Control Module EEPROM Error	<Ref. to GD(CVT)(HEV)-11, DTC P062F INTERNAL CONTROL MODULE EEPROM ERROR, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0705	Transmission Range Sensor Circuit (PRNDL Input)	<Ref. to GD(CVT)(HEV)-12, DTC P0705 TRANSMISSION RANGE SENSOR CIRCUIT (PRNDL INPUT), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0708	AT Range Switch Not Inputted	<Ref. to GD(CVT)(HEV)-13, DTC P0708 AT RANGE SWITCH NOT INPUTTED, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0711	ATF Temp. Sensor Circuit Range/Performance	<Ref. to GD(CVT)(HEV)-14, DTC P0711 ATF TEMP. SENSOR CIRCUIT RANGE/PERFORMANCE, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0712	Transmission Fluid Temperature Sensor Circuit Low Input	<Ref. to GD(CVT)(HEV)-15, DTC P0712 TRANSMISSION FLUID TEMPERATURE SENSOR CIRCUIT LOW INPUT, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0713	Transmission Fluid Temperature Sensor Circuit High Input	<Ref. to GD(CVT)(HEV)-16, DTC P0713 TRANSMISSION FLUID TEMPERATURE SENSOR CIRCUIT HIGH INPUT, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0716	Torque Converter Turbine Speed	<Ref. to GD(CVT)(HEV)-17, DTC P0716 TORQUE CONVERTER TURBINE SPEED, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0717	Input/Turbine Speed Sensor "A" Circuit No Signal	<Ref. to GD(CVT)(HEV)-18, DTC P0717 INPUT/TURBINE SPEED SENSOR "A" CIRCUIT NO SIGNAL, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0719	Brake Switch Circuit Low	<Ref. to GD(CVT)(HEV)-19, DTC P0719 BRAKE SWITCH CIRCUIT LOW, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0720	Output Speed Sensor Circuit	<Ref. to GD(CVT)(HEV)-20, DTC P0720 OUTPUT SPEED SENSOR CIRCUIT, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0721	Output Shaft Speed Sensor Circuit Range/Performance	<Ref. to GD(CVT)(HEV)-21, DTC P0721 OUTPUT SHAFT SPEED SENSOR CIRCUIT RANGE/PERFORMANCE, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0724	Brake Switch Circuit High	<Ref. to GD(CVT)(HEV)-22, DTC P0724 BRAKE SWITCH CIRCUIT HIGH, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0730	Gearshift Control Performance Abnormal	<Ref. to GD(CVT)(HEV)-23, DTC P0730 GEARSHIFT CONTROL PERFORMANCE ABNORMAL, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0746	Pressure Control Solenoid "A" Performance/Stuck Off	<Ref. to GD(CVT)(HEV)-24, DTC P0746 PRESSURE CONTROL SOLENOID "A" PERFORMANCE/STUCK OFF, Diagnostic Trouble Code (DTC) Detecting Criteria.>

DTC	Item	Note
P0747	Pressure Control Solenoid "A" Stuck On	<Ref. to GD(CVT)(HEV)-25, DTC P0747 PRESSURE CONTROL SOLENOID "A" STUCK ON, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0751	Shift Solenoid "A" Performance/Stuck Off	<Ref. to GD(CVT)(HEV)-26, DTC P0751 SHIFT SOLENOID "A" PERFORMANCE/STUCK OFF, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0752	Shift Solenoid "A" Stuck On	<Ref. to GD(CVT)(HEV)-27, DTC P0752 SHIFT SOLENOID "A" STUCK ON, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0756	Shift Solenoid "B" Performance/Stuck Off	<Ref. to GD(CVT)(HEV)-28, DTC P0756 SHIFT SOLENOID "B" PERFORMANCE/STUCK OFF, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0757	Shift Solenoid "B" Stuck On	<Ref. to GD(CVT)(HEV)-29, DTC P0757 SHIFT SOLENOID "B" STUCK ON, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0776	Pressure Control Solenoid "B" Performance/Stuck Off	<Ref. to GD(CVT)(HEV)-30, DTC P0776 PRESSURE CONTROL SOLENOID "B" PERFORMANCE/STUCK OFF, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0841	Secondary Oil Pressure Sensor Performance	<Ref. to GD(CVT)(HEV)-31, DTC P0841 SECONDARY OIL PRESSURE SENSOR PERFORMANCE, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0842	Secondary Oil Pressure Sensor Circuit (Low)	<Ref. to GD(CVT)(HEV)-32, DTC P0842 SECONDARY OIL PRESSURE SENSOR CIRCUIT (LOW), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0843	Secondary Oil Pressure Sensor Circuit (High)	<Ref. to GD(CVT)(HEV)-33, DTC P0843 SECONDARY OIL PRESSURE SENSOR CIRCUIT (HIGH), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0890	AT Self-Shut Relay Diagnosis (Low)	<Ref. to GD(CVT)(HEV)-34, DTC P0890 AT SELF-SHUT RELAY DIAGNOSIS (LOW), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0961	Pressure Control Solenoid "A" Control Circuit Range/Performance	<Ref. to GD(CVT)(HEV)-35, DTC P0961 PRESSURE CONTROL SOLENOID "A" CONTROL CIRCUIT RANGE/PERFORMANCE, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0962	Secondary Solenoid Circuit (Low)	<Ref. to GD(CVT)(HEV)-36, DTC P0962 SECONDARY SOLENOID CIRCUIT (LOW), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0963	Secondary Solenoid Circuit (High)	<Ref. to GD(CVT)(HEV)-37, DTC P0963 SECONDARY SOLENOID CIRCUIT (HIGH), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0965	Forward & Reverse Solenoid Function	<Ref. to GD(CVT)(HEV)-38, DTC P0965 FORWARD & REVERSE SOLENOID FUNCTION, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0966	Forward & Reverse Solenoid Circuit (Low)	<Ref. to GD(CVT)(HEV)-39, DTC P0966 FORWARD & REVERSE SOLENOID CIRCUIT (LOW), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0967	Forward & Reverse Linear Solenoid Circuit (High)	<Ref. to GD(CVT)(HEV)-40, DTC P0967 FORWARD & REVERSE LINEAR SOLENOID CIRCUIT (HIGH), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0973	Primary Solenoid System A Circuit (Low)	<Ref. to GD(CVT)(HEV)-41, DTC P0973 PRIMARY SOLENOID SYSTEM A CIRCUIT (LOW), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0974	Primary Solenoid System A Circuit (High)	<Ref. to GD(CVT)(HEV)-42, DTC P0974 PRIMARY SOLENOID SYSTEM A CIRCUIT (HIGH), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0976	Primary Solenoid System B Circuit (Low)	<Ref. to GD(CVT)(HEV)-43, DTC P0976 PRIMARY SOLENOID SYSTEM B CIRCUIT (LOW), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0977	Primary Solenoid System B Circuit (High)	<Ref. to GD(CVT)(HEV)-44, DTC P0977 PRIMARY SOLENOID SYSTEM B CIRCUIT (HIGH), Diagnostic Trouble Code (DTC) Detecting Criteria.>

DTC	Item	Note
P0B0A	Auxiliary Transmission Fluid Pump Motor Supply Voltage Circuit Low	<Ref. to GD(CVT)(HEV)-45, DTC P0B0A AUXILIARY TRANSMISSION FLUID PUMP MOTOR SUPPLY VOLTAGE CIRCUIT LOW, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0B0B	Auxiliary Transmission Fluid Pump Motor Supply Voltage Circuit High	<Ref. to GD(CVT)(HEV)-46, DTC P0B0B AUXILIARY TRANSMISSION FLUID PUMP MOTOR SUPPLY VOLTAGE CIRCUIT HIGH, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0B0D	Auxiliary Transmission Fluid Pump Motor Control Module	<Ref. to GD(CVT)(HEV)-47, DTC P0B0D AUXILIARY TRANSMISSION FLUID PUMP MOTOR CONTROL MODULE, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0C21	Auxiliary Transmission Fluid Pump Phase U-V-W Circuit Low	<Ref. to GD(CVT)(HEV)-48, DTC P0C21 AUXILIARY TRANSMISSION FLUID PUMP PHASE U-V-W CIRCUIT LOW, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0C22	Auxiliary Transmission Fluid Pump Phase U-V-W Circuit High	<Ref. to GD(CVT)(HEV)-49, DTC P0C22 AUXILIARY TRANSMISSION FLUID PUMP PHASE U-V-W CIRCUIT HIGH, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0C29	Auxiliary Transmission Fluid Pump Driver Current Performance	<Ref. to GD(CVT)(HEV)-50, DTC P0C29 AUXILIARY TRANSMISSION FLUID PUMP DRIVER CURRENT PERFORMANCE, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0C2A	Auxiliary Transmission Fluid Pump Motor Stalled	<Ref. to GD(CVT)(HEV)-51, DTC P0C2A AUXILIARY TRANSMISSION FLUID PUMP MOTOR STALLED, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P160A	Random Access Memory (RAM) Error	<Ref. to GD(CVT)(HEV)-52, DTC P160A RANDOM ACCESS MEMORY (RAM) ERROR, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P172A	Auxiliary Transmission Fluid Pump Reverse Rotation	<Ref. to GD(CVT)(HEV)-53, DTC P172A AUXILIARY TRANSMISSION FLUID PUMP REVERSE ROTATION, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P2530	Ignition Switch Run Position Circuit	<Ref. to GD(CVT)(HEV)-54, DTC P2530 IGNITION SWITCH RUN POSITION CIRCUIT, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P2714	Pressure Control Solenoid "D" Performance/Stuck Off	<Ref. to GD(CVT)(HEV)-55, DTC P2714 PRESSURE CONTROL SOLENOID "D" PERFORMANCE/STUCK OFF, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P2719	Pressure Control Solenoid D Control Circuit Range/Performance	<Ref. to GD(CVT)(HEV)-56, DTC P2719 PRESSURE CONTROL SOLENOID D CONTROL CIRCUIT RANGE/PERFORMANCE, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P2720	Pressure Control Solenoid D Control Circuit Low	<Ref. to GD(CVT)(HEV)-57, DTC P2720 PRESSURE CONTROL SOLENOID D CONTROL CIRCUIT LOW, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P2721	Pressure Control Solenoid D Control Circuit High	<Ref. to GD(CVT)(HEV)-58, DTC P2721 PRESSURE CONTROL SOLENOID D CONTROL CIRCUIT HIGH, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P2750	Sec. Pulley Revolution Speed Sensor Circuit	<Ref. to GD(CVT)(HEV)-59, DTC P2750 SEC. PULLEY REVOLUTION SPEED SENSOR CIRCUIT, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P2751	Intermediate Shaft Speed Sensor "C" Circuit No Signal	<Ref. to GD(CVT)(HEV)-60, DTC P2751 INTERMEDIATE SHAFT SPEED SENSOR "C" CIRCUIT NO SIGNAL, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P2757	Torque Converter Clutch Pressure Control Solenoid Control Circuit Performance/ Stuck Off	<Ref. to GD(CVT)(HEV)-61, DTC P2757 TORQUE CONVERTER CLUTCH PRESSURE CONTROL SOLENOID CONTROL CIRCUIT PERFORMANCE/STUCK OFF, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P2758	Torque Converter Clutch Pressure Control Solenoid Control Circuit Stuck On	<Ref. to GD(CVT)(HEV)-62, DTC P2758 TORQUE CONVERTER CLUTCH PRESSURE CONTROL SOLENOID CONTROL CIRCUIT STUCK ON, Diagnostic Trouble Code (DTC) Detecting Criteria.>

DTC	Item	Note
P2763	Lock-Up Duty Solenoid Circuit (High)	<Ref. to GD(CVT)(HEV)-63, DTC P2763 LOCK-UP DUTY SOLENOID CIRCUIT (HIGH), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P2764	Lock-Up Duty Solenoid Circuit (Low)	<Ref. to GD(CVT)(HEV)-64, DTC P2764 LOCK-UP DUTY SOLENOID CIRCUIT (LOW), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P2797	Auxiliary Transmission Fluid Pump	<Ref. to GD(CVT)(HEV)-65, DTC P2797 AUXILIARY TRANSMISSION FLUID PUMP, Diagnostic Trouble Code (DTC) Detecting Criteria.>
U0073	Control Module Communication Bus Off	<Ref. to GD(CVT)(HEV)-66, DTC U0073 CONTROL MODULE COMMUNICATION BUS OFF, Diagnostic Trouble Code (DTC) Detecting Criteria.>
U0075	Control Module Communication Bus "PU-CAN" Off	<Ref. to GD(CVT)(HEV)-67, DTC U0075 CONTROL MODULE COMMUNICATION BUS "PU-CAN" OFF, Diagnostic Trouble Code (DTC) Detecting Criteria.>
U0100	Lost Communication With ECM/PCM “A”	<Ref. to GD(CVT)(HEV)-68, DTC U0100 LOST COMMUNICATION WITH ECM/PCM “A”, Diagnostic Trouble Code (DTC) Detecting Criteria.>
U0110	Lost Communication With Drive Motor Control Module "A"	<Ref. to GD(CVT)(HEV)-69, DTC U0110 LOST COMMUNICATION WITH DRIVE MOTOR CONTROL MODULE "A", Diagnostic Trouble Code (DTC) Detecting Criteria.>
U0122	Lost Communication With Vehicle Dynamics Control Module	<Ref. to GD(CVT)(HEV)-70, DTC U0122 LOST COMMUNICATION WITH VEHICLE DYNAMICS CONTROL MODULE, Diagnostic Trouble Code (DTC) Detecting Criteria.>
U0287	Lost Communication With Transmission Fluid Pump Module	<Ref. to GD(CVT)(HEV)-71, DTC U0287 LOST COMMUNICATION WITH TRANSMISSION FLUID PUMP MODULE, Diagnostic Trouble Code (DTC) Detecting Criteria.>
U0293	Lost Communication With Hybrid Powertrain Control Module	<Ref. to GD(CVT)(HEV)-72, DTC U0293 LOST COMMUNICATION WITH HYBRID POWERTRAIN CONTROL MODULE, Diagnostic Trouble Code (DTC) Detecting Criteria.>
U0401	Invalid Data Received From ECM/PCM “A”	<Ref. to GD(CVT)(HEV)-73, DTC U0401 INVALID DATA RECEIVED FROM ECM/PCM “A”, Diagnostic Trouble Code (DTC) Detecting Criteria.>
U0411	Invalid Data Received From Drive Motor Control Module "A"	<Ref. to GD(CVT)(HEV)-74, DTC U0411 INVALID DATA RECEIVED FROM DRIVE MOTOR CONTROL MODULE "A", Diagnostic Trouble Code (DTC) Detecting Criteria.>
U0416	Invalid Data Received From Vehicle Dynamics Control Module	<Ref. to GD(CVT)(HEV)-75, DTC U0416 INVALID DATA RECEIVED FROM VEHICLE DYNAMICS CONTROL MODULE, Diagnostic Trouble Code (DTC) Detecting Criteria.>
U0588	Invalid Data Received From Transmission Fluid Pump Module	<Ref. to GD(CVT)(HEV)-76, DTC U0588 INVALID DATA RECEIVED FROM TRANSMISSION FLUID PUMP MODULE, Diagnostic Trouble Code (DTC) Detecting Criteria.>
U0594	Invalid Data Received From Hybrid Powertrain Control Module	<Ref. to GD(CVT)(HEV)-77, DTC U0594 INVALID DATA RECEIVED FROM HYBRID POWERTRAIN CONTROL MODULE, Diagnostic Trouble Code (DTC) Detecting Criteria.>
U1100	Lost Communication With ECM/PCM PU-CAN	<Ref. to GD(CVT)(HEV)-78, DTC U1100 LOST COMMUNICATION WITH ECM/PCM PU-CAN, Diagnostic Trouble Code (DTC) Detecting Criteria.>
U1293	Lost Communication With Hybrid Powertrain Control Module PU-CAN	<Ref. to GD(CVT)(HEV)-79, DTC U1293 LOST COMMUNICATION WITH HYBRID POWERTRAIN CONTROL MODULE PU-CAN, Diagnostic Trouble Code (DTC) Detecting Criteria.>
U1401	Invalid Data Received From ECM/PCM PU-CAN	<Ref. to GD(CVT)(HEV)-80, DTC U1401 INVALID DATA RECEIVED FROM ECM/PCM PU-CAN, Diagnostic Trouble Code (DTC) Detecting Criteria.>
U1594	Invalid Data Received From Hybrid Powertrain Control Module PU-CAN	<Ref. to GD(CVT)(HEV)-81, DTC U1594 INVALID DATA RECEIVED FROM HYBRID POWERTRAIN CONTROL MODULE PU-CAN, Diagnostic Trouble Code (DTC) Detecting Criteria.>

2. Diagnostic Trouble Code (DTC) Detecting Criteria

A: DTC P0500 VEHICLE SPEED SENSOR “A”

1. OUTLINE OF DIAGNOSIS

- Detect the malfunction of VDC wheel speed sensor.
- Judge as NG when the VDC wheel speed sensor value is a specified value or more.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
12 V battery system voltage	≥ 10.9 V

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Vehicle speed (from Vehicle Dynamics Control Module) NOTE: The VDC controller detects malfunction if one of the speed sensors does not output a signal and the other vehicle speed sensor output signal is above 7.46 MPH.	≥ 186.4 MPH

Time Needed for Diagnosis: 2.5 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

B: DTC P0560 SYSTEM VOLTAGE

1. OUTLINE OF DIAGNOSIS

- Detect the abnormality of back-up power supply voltage.
- Judge as NG when the back-up power supply voltage is a specified value or less even though the battery voltage is normal.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
12 V battery system voltage (Ignition state = Run or crank)	≥ 9 V

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Voltage of back-up power (TCM input voltage)	< 5 V

Time Needed for Diagnosis: 10 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

C: DTC P0601 INTERNAL CONTROL MODULE MEMORY CHECKSUM ERROR

1. OUTLINE OF DIAGNOSIS

- Detect the malfunction in ROM area of the TCM.
- Judge as NG when the consistency in the ROM area is lost.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
12 V battery system voltage	≥ 9 V

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Checksum (ROM)	Error

Time Needed for Diagnosis: Immediately
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

D: DTC P0603 INTERNAL CONTROL MODULE KEEP ALIVE MEMORY (KAM) ERROR

1. OUTLINE OF DIAGNOSIS

- Detect the malfunction in the back-up RAM area of the TCM.
- Judge as NG when the consistency in the back-up RAM area is lost.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
12 V battery system voltage	≥ 9 V

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Checksum (KAM)	Error

Time Needed for Diagnosis: Immediately
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

E: DTC P0604 INTERNAL CONTROL MODULE RANDOM ACCESS MEMORY (RAM) ERROR

1. OUTLINE OF DIAGNOSIS

- Detect the malfunction in RAM area of the TCM.
- Judge as NG if an attempt to write to RAM area failed.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
12 V battery system voltage	≥ 10 V

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Writing-check (RAM) NOTE: This check is carried out about the RAM only used for CAN communication.	Error

Time Needed for Diagnosis: Immediately
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

F: DTC P062F INTERNAL CONTROL MODULE EEPROM ERROR

1. OUTLINE OF DIAGNOSIS

- Detect TCM EEPROM malfunction.
- Judge as NG when the SUM check result of EEPROM writing value is abnormal and the contents of EEPROM can not be read.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Diagnosis 1	
12 V battery system voltage	≥ 9 V
Diagnosis 2	
12 V battery system voltage	≥ 9 V

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
Writing-check (EEPROM)	Error
Diagnosis 2	
Checksum (EEPROM)	Error

Time Needed for Diagnosis: Immediately
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

G: DTC P0705 TRANSMISSION RANGE SENSOR CIRCUIT (PRNDL INPUT)

1. OUTLINE OF DIAGNOSIS

- Detect the malfunction of the Range Switch.
- Judge as NG when multiple Range Switch inputs are detected.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
12 V battery system voltage	≥ 9 V

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Two or more transmission range switches ON NOTE: “Transmission range switch ON” is defined as transmission range switch input voltage < 2.9 V.	True

Time Needed for Diagnosis: 5 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

H: DTC P0708 AT RANGE SWITCH NOT INPUTTED

1. OUTLINE OF DIAGNOSIS

- Detect the malfunction of the Range Switch.
- Judge as NG when no Range Switch inputs are detected.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
12 V battery system voltage	≥ 9 V
Brake switch B OFF NOTE: "Brake switch B OFF" is defined as Brake switch B input voltage ≥ 4.1 V.	True

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
All transmission range switches OFF NOTE: "Transmission range switch OFF" is defined as transmission range switch input voltage ≥ 4.1 V.	True

Time Needed for Diagnosis: 10 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

I: DTC P0711 ATF TEMP. SENSOR CIRCUIT RANGE/PERFORMANCE

1. OUTLINE OF DIAGNOSIS

Diagnosis 1
- Detect the malfunction of transmission oil temperature sensor.
- Transmission oil temperature sensor is below the specified value (20°C (68°F))
- Judge as characteristics malfunction (transmission oil temperature sensor signal stuck) when a condition where the voltage change detected by transmission oil temperature sensor is 0.049 V or less is detected, even after driving for 10 minutes.

Diagnosis 2
- Judge the malfunction of transmission oil temperature sensor characteristics (stuck to high temperature side).
- Judge as malfunction when the difference of engine coolant temperature and CVT oil temperature at starting is a predetermined value or more.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Diagnosis 1	
12 V battery system voltage	≥ 10 V
Engine speed (The timer is held when the following conditions are not satisfied.)	> 600 rpm
Transmission range	Drive
Vehicle speed (from output shaft speed sensor)	≥ 21.9 MPH
Diagnosis 2	
12 V battery system voltage	≥ 10 V
Engine coolant temperature at the end of the previous drive cycle – Engine coolant temperature at engine start	≥ 40 degC

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
Absolute change of measured Transmission fluid temperature sensor input voltage	≤ 0.049 V
Transmission fluid temperature	< 20°C
Diagnosis 2	
Transmission fluid temperature – Engine coolant temperature at engine start	> 46 degC

Time Needed for Diagnosis:
- **Diagnosis 1:** 600 s
- **Diagnosis 2:** 300 s

Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

J: DTC P0712 TRANSMISSION FLUID TEMPERATURE SENSOR CIRCUIT LOW INPUT

1. OUTLINE OF DIAGNOSIS

- Detect the ground short circuit of transmission oil temperature sensor.
- Judge as NG if the voltage detected by the transmission oil temperature sensor is lower than 0.117 V.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
12 V battery system voltage	≥ 9 V

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Measured Transmission fluid temperature sensor input voltage (Transmission fluid temperature)	< 0.117 V (> 146°C (294.8°F))

Time Needed for Diagnosis: 1 second
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

K: DTC P0713 TRANSMISSION FLUID TEMPERATURE SENSOR CIRCUIT HIGH INPUT

1. OUTLINE OF DIAGNOSIS

• Detect open circuit or short circuit to power supply of the 5 V system in the transmission oil temperature sensor.
• Judge as NG if the voltage detected by the transmission oil temperature sensor is higher than 4.507 V.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
12 V battery system voltage	≥ 9 V
Vehicle speed (from Output shaft speed sensor)	≥ 6.3 MPH
Above condition satisfied for	≥ 50 s

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Measured Transmission fluid temperature sensor input voltage	> 4.507 V
(Transmission fluid temperature)	(< –52°C (–61.6°F))

Time Needed for Diagnosis: 1 second
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

L: DTC P0716 TORQUE CONVERTER TURBINE SPEED

1. OUTLINE OF DIAGNOSIS

- Detect the malfunction of turbine speed sensor characteristics.
- Judge as NG when the deviation between engine speed and turbine speed becomes equal to or larger than the predetermined value.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
12 V battery system voltage	≥ 10 V
Measured turbine shaft speed	≥ 50 rpm

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Engine speed – Measured turbine shaft speed	> Table 1 rpm

Table 1

Measured turbine shaft speed (rpm)	0	500	1000	1500	2000	2500	3000	3500
Engine speed – Measured turbine shaft speed (rpm)	3700	3227	2755	2282	1856	1519	1213	956

Measured turbine shaft speed (rpm)	4000	4500	5000	5500	6000	6500	7000
Engine speed – Measured turbine shaft speed (rpm)	786	713	651	601	569	544	520

Time Needed for Diagnosis: 10 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

M: DTC P0717 INPUT/TURBINE SPEED SENSOR "A" CIRCUIT NO SIGNAL

1. OUTLINE OF DIAGNOSIS

- Detect no signal input of turbine speed sensor.
- Judge as NG when the turbine speed is not input while the primary speed on the same axis has been input with the forward/reverse clutch engaged in “D”, “R” range.
- Judge as NG when the turbine speed is not input while the engine speed sensor signal on the same axis has been input with the forward/reverse clutch released in “P”, “N” range.
- Judge as NG when no speed sensor inputs are received from TCM connector during driving.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Condition 1	
12 V battery system voltage	≥ 10 V
Engine speed	≥ 400 rpm
Actual primary pulley shaft speed	≥ 500 rpm
Transmission range	Drive or Reverse
Condition 2	
12 V battery system voltage	≥ 10 V
Engine speed	≥ 400 rpm
Transmission range	Park or Neutral
Condition 3	
12 V battery system voltage	≥ 10 V
Measured secondary pulley shaft speed	0 rpm
Measured output shaft speed	0 rpm
Actual primary pulley shaft speed	≥ 500 rpm
Transmission range	Drive or Reverse
Vehicle speed (from vehicle dynamics control module)	≥ 6.3 MPH

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Measured turbine shaft speed	0 rpm

Time Needed for Diagnosis:

- **Condition 1:** 1 s
- **Condition 2:** 3 s
- **Condition 3:** 0.6 s

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

N: DTC P0719 BRAKE SWITCH CIRCUIT LOW

1. OUTLINE OF DIAGNOSIS

- Detect the malfunction of brake SW signal Low.
- Judge as NG when detecting the condition ten times where the vehicle speed is from more than 18.8 MPH to less than 0.6 MPH with brake SW signal OFF.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
12 V battery system voltage	≥ 9 V

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
The brake switch B is continuously OFF while the vehicle speed changed from “X” to “Y”.	
Vehicle speed “X”	≥ 18.8 MPH
Vehicle speed “Y”	< 0.6 MPH
NOTE: “Brake switch B OFF” is defined as Brake switch B input voltage ≤ 2.9 V.	

Time Needed for Diagnosis: 10 times
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

O: DTC P0720 OUTPUT SPEED SENSOR CIRCUIT

1. OUTLINE OF DIAGNOSIS

- Detect no signal input of front wheel speed sensor.
- Judge as NG if the front wheel speed is not input while vehicle speed is detected by VDC wheel speed sensor when driving in “D”, “R” range.
- Judge as NG if the front wheel speed sensor has no input signals while the secondary speed sensor on the same axle has input signals when driving in “D” or “R” range.
- Judge as NG when no speed sensor inputs are received from TCM connector during driving.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Condition 1	
12 V battery system voltage	≥ 10 V
Vehicle speed (from vehicle dynamics control module)	≥ 3.1 MPH
Transmission range	Drive or Reverse
MIL is illuminated for DTCs.	P0500, U0073, U0122, U0416
Condition 2	
12 V battery system voltage	≥ 10 V
Secondary pulley shaft speed	≥ 800 rpm
Transmission range	Drive or Reverse
Condition 3	
12 V battery system voltage	≥ 10 V
Measured turbine shaft speed	0 rpm
Measured secondary pulley shaft speed	0 rpm
Actual primary pulley shaft speed	≥ 500 rpm
Transmission range	Drive or Reverse
Vehicle speed (from vehicle dynamics control module)	≥ 6.3 MPH

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Measured output shaft speed	0 rpm

Time Needed for Diagnosis:

- **Condition 1:** 1 s
- **Condition 2:** 1 s
- **Condition 3:** 0.6 s

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

P: DTC P0721 OUTPUT SHAFT SPEED SENSOR CIRCUIT RANGE/PERFORMANCE

1. OUTLINE OF DIAGNOSIS

- Detect the malfunction of front wheel speed sensor characteristics.
- Judge as NG when the deviation between vehicle speeds from VDC and from front wheel speed sensor becomes 10 MPH or more.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
12 V battery system voltage	≥ 10 V
Vehicle speed (from vehicle dynamics control module)	≥ 12 MPH

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Absolute value (Vehicle speed (calculated from output shaft speed) – Vehicle speed (from vehicle dynamics control module))	> 10 MPH

Time Needed for Diagnosis: 5 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

Q: DTC P0724 BRAKE SWITCH CIRCUIT HIGH

1. OUTLINE OF DIAGNOSIS

- Detect the malfunction of brake SW signal High.
- Judge as NG when detecting the condition ten times where the vehicle speed is from less than 0.6 MPH to more than 18.8 MPH with brake SW signal ON.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
12 V battery system voltage	≥ 9 V

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
The brake switch B is continuously ON while the vehicle speed changed from “Y” to “X”.	
Vehicle speed “Y”	< 0.6 MPH
Vehicle speed “X”	≥ 18.8 MPH
NOTE: “Brake switch B ON” is defined as Brake switch B input voltage ≥ 4.1 V.	

Time Needed for Diagnosis: 10 times
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

R: DTC P0730 GEARSHIFT CONTROL PERFORMANCE ABNORMAL

1. OUTLINE OF DIAGNOSIS

- Detect the malfunction of transmission gear ration control function.
- Judge as NG when the difference between the transmission target gear ratio that is an internal data and the actual gear ratio is larger than the predetermined value (compare the “Target gear ratio × Secondary pulley speed ≈ Target primary speed equivalent value” with the primary pulley speed).

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
12 V battery system voltage	≥ 10 V
Transmission range	Drive
Transmission fluid pump speed (MTFP or ETFP)	≥ 500 rpm
Measured secondary pulley shaft speed	> 150 rpm

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Absolute value (Target primary pulley shaft speed – Actual primary pulley shaft speed)	≥ 800 rpm
(Commanded duty of shift up pressure control solenoid or Commanded duty of shift down pressure control solenoid)	≥ 100%

Time Needed for Diagnosis: 5 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

S: DTC P0746 PRESSURE CONTROL SOLENOID "A" PERFORMANCE/STUCK OFF

1. OUTLINE OF DIAGNOSIS

• Detect the malfunction of transmission line pressure solenoid and hydraulic circuit (stuck to low pressure side).
• Judge as NG when the actual line pressure is smaller than the predetermined value.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
12 V battery system voltage	≥ 10 V
Engine speed	≥ 500 rpm
or	
Actual primary pulley shaft speed	
Measured line pressure control solenoid valve current	≤ 0.78 A

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Measured line pressure	< Map 1 kPa

Map 1

		Engine speed (rpm)						
		0	500	1000	1500	2000	2500	3000
Transmission fluid temperature (degC)	– 40	0	0	377	421	462	514	570
	– 20	0	0	299	336	384	436	499
	0	0	0	277	323	359	414	474
	20	0	0	278	323	367	412	464
	40	0	0	280	335	371	420	475
	60	0	0	260	316	353	403	457
	80	0	0	245	304	353	394	440
	100	0	0	227	286	323	369	412
	120	0	0	211	260	300	340	385
	140	0	0	184	230	273	310	357

		Engine speed (rpm)						
		3500	4000	4500	5000	5500	6000	6500
Transmission fluid temperature (degC)	– 40	648	722	810	904	1010	1105	1175
	– 20	555	633	711	808	923	1038	1130
	0	544	615	682	767	873	1001	1111
	20	527	590	668	761	854	980	1110
	40	533	591	666	742	836	937	1071
	60	515	573	641	713	800	897	1024
	80	493	548	607	675	749	839	916
	100	468	521	576	632	697	756	824
	120	440	484	536	589	638	691	737
	140	397	449	728	533	564	595	623

Time Needed for Diagnosis: 5 seconds
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

T: DTC P0747 PRESSURE CONTROL SOLENOID "A" STUCK ON

1. OUTLINE OF DIAGNOSIS

- Detect the malfunction of transmission line pressure solenoid and hydraulic circuit (stuck to high pressure side).
- Judge as NG when the actual line pressure is larger than the predetermined value.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
12 V battery system voltage	≥ 10 V
Engine speed	≥ 500 rpm
or	
Actual primary pulley shaft speed	
Measured line pressure control solenoid valve current	≥ 0.5 A

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Measured line pressure	> Map 1 kPa

Map 1

		Engine speed (rpm)						
		0	500	1000	1500	2000	2500	3000
Transmission fluid temperature (degC)	– 40	25600	25600	5590	5769	5915	5970	6000
	– 20	25600	25600	5925	6012	6064	6083	6115
	0	25600	25600	5887	5971	6015	6023	6035
	20	25600	25600	5451	5491	5568	5598	5610
	40	25600	25600	4564	5429	5461	5542	5576
	60	25600	25600	2598	4527	5412	5455	5514
	80	25600	25600	1798	3735	5271	5368	5402
	100	25600	25600	993	2867	4341	5282	5353
	120	25600	25600	742	2556	3969	5200	5254
	140	25600	25600	438	1902	3293	4531	5114

		Engine speed (rpm)						
		3500	4000	4500	5000	5500	6000	6500
Transmission fluid temperature (degC)	– 40	5988	5988	6040	6100	6100	6110	6200
	– 20	6130	6170	6190	6240	6250	6250	6250
	0	6056	6078	6145	6176	6201	6212	6256
	20	5637	5675	5693	5740	5752	5752	5797
	40	5626	5640	5676	5700	5711	5751	5787
	60	5546	5576	5612	5636	5658	5658	5715
	80	5502	5525	5545	5597	5602	5602	5684
	100	5422	5460	5504	5538	5574	5574	5624
	120	5326	5391	5429	5457	5472	5472	5533
	140	5185	5280	5337	5365	5377	5377	5440

Time Needed for Diagnosis: 5 seconds
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

U: DTC P0751 SHIFT SOLENOID "A" PERFORMANCE/STUCK OFF

1. OUTLINE OF DIAGNOSIS

• Detect the malfunction of shift-up fluid pressure control solenoid characteristics and hydraulic circuit characteristics (stuck to low pressure side).
• Judge as NG when the gear ratio is more than 1.5 and less than 2.549 and the variation amount of the gear ratio per second is –0.12 or more even though up-shift command is issued.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
12 V battery system voltage	≥ 10 V
Engine speed	≥ 1000 rpm
or	
Actual primary pulley shaft speed	≥ 1000 rpm
Commanded duty of shift down pressure control solenoid	0%
Actual pulley ratio*	> 1.5 and < 2.549

* Actual pulley ratio: Actual primary pulley shaft speed / Measured secondary pulley shaft speed

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Actual pulley ratio change for 1 second	> – 0.12
Commanded duty of shift up pressure control solenoid	≥ 90%

Time Needed for Diagnosis: 1 second
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

V: DTC P0752 SHIFT SOLENOID "A" STUCK ON

1. OUTLINE OF DIAGNOSIS

• Detect the malfunction of shift-up fluid pressure control solenoid and hydraulic circuit characteristics (stuck to high pressure side).
• Judge as NG when the gear ratio is less than 0.5 and the variation amount of the gear ratio per second is between –0.12 and 0.12 even though down-shift command is issued.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
12 V battery system voltage	≥ 10 V
Engine speed	≥ 1000 rpm
or	
Actual primary pulley shaft speed	≥ 1000 rpm
Commanded duty of shift up pressure control solenoid	0%
Actual pulley ratio*	< 0.5

* Actual pulley ratio: Actual primary pulley shaft speed / Measured secondary pulley shaft speed

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Actual pulley ratio change for 1 second	> – 0.12
	and
	< 0.12
Commanded duty of shift down pressure control solenoid	> 80%

Time Needed for Diagnosis: 1 second
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

W: DTC P0756 SHIFT SOLENOID "B" PERFORMANCE/STUCK OFF

1. OUTLINE OF DIAGNOSIS

• Detect the malfunction of shift-down fluid pressure control solenoid characteristics and hydraulic circuit characteristics (stuck to low pressure side).
• Judge as NG if the variation amount of gear rate per second is between –0.12 and 0.12 even though the down-shift command is issued.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
12 V battery system voltage	≥ 10 V
Engine speed	≥ 1000 rpm
or	
Actual primary pulley shaft speed	≥ 1000 rpm
Commanded duty of shift up pressure control solenoid	0%
Actual pulley ratio*	≥ 0.406
	and
	≤ 2.549

* Actual pulley ratio: Actual primary pulley shaft speed / Measured secondary pulley shaft speed

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Actual pulley ratio change for 1 second	> – 0.12
	and
	< 0.12
Commanded duty of shift down pressure control solenoid	> 80%

Time Needed for Diagnosis: 1 second
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

X: DTC P0757 SHIFT SOLENOID "B" STUCK ON

1. OUTLINE OF DIAGNOSIS

• Detect the malfunction of shift-down fluid pressure control solenoid characteristics and hydraulic circuit characteristics (stuck to high pressure side).
• Judge as NG if the variation amount of gear ratio per second is 0.04 or more even though the up-shift command is issued.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
12 V battery system voltage	≥ 10 V
Engine speed	≥ 1000 rpm
or	
Actual primary pulley shaft speed	≥ 1000 rpm
Commanded duty of shift down pressure control solenoid	0%
Actual pulley ratio*	≥ 0.406
	and
	≤ 2.549

* Actual pulley ratio: Actual primary pulley shaft speed / Measured secondary pulley shaft speed

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Actual pulley ratio change for 1 second	> 0.04
Commanded duty of shift up pressure control solenoid	> 50%

Time Needed for Diagnosis: 1 s × 10 times
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

Y: DTC P0776 PRESSURE CONTROL SOLENOID "B" PERFORMANCE/STUCK OFF

1. OUTLINE OF DIAGNOSIS

- Detect the malfunction of the transmission forward/reverse clutch control function.
- Judge as NG if the deviation between the turbine speed and primary pulley speed becomes the predetermined value or more, even though the forward/reverse clutch should be engaged in the current control status.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Diagnosis 1	
12 V battery system voltage	≥ 10 V
Transmission range	Drive
Actual primary pulley shaft speed	≥ 100 rpm
Measured turbine shaft speed	≥ 100 rpm
Vehicle speed (from vehicle dynamics control module)	≥ 6 MPH
Commanded forward & reverse clutch pressure control solenoid current	< 0.8 A
Engine speed	≥ 500 rpm
Diagnosis 2	
12 V battery system voltage	≥ 10 V
Transmission range	Drive
Actual primary pulley shaft speed	< 100 rpm
Vehicle speed (from vehicle dynamics control module)	< 6 MPH
Commanded forward & reverse clutch pressure control solenoid current	< 0.8 A
Accelerator pedal position (from ECM)	> 6%
Engine speed	≥ 500 rpm

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
Absolute value (Measured turbine shaft speed – Actual primary pulley shaft speed)	> Table 1 rpm
Diagnosis 2	
Measured turbine shaft speed	> 2000 rpm

Table 1

Vehicle speed (MPH)	0	13	25	38	50	63	75
Absolute value (Measured turbine shaft speed – Actual primary pulley shaft speed) (rpm)	150	100	100	100	100	100	100

Vehicle speed (MPH)	88	100	113	125	138	150	159
Absolute value (Measured turbine shaft speed – Actual primary pulley shaft speed) (rpm)	100	100	100	100	100	100	100

Time Needed for Diagnosis: 5 seconds
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

Z: DTC P0841 SECONDARY OIL PRESSURE SENSOR PERFORMANCE

1. OUTLINE OF DIAGNOSIS

- Detect the malfunction of transmission fluid pressure control function.
- Judge as NG when the pressure difference of 0.5 MPa or more occurs by comparing the Secondary Pressure Target, which is an internal data, and Secondary pressure sensor detecting value.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
12 V battery system voltage	≥ 10 V
Transmission fluid pump speed (MTFP or ETFP)	≥ Table 1 rpm

Table 1

Target line pressure (MPa)	0	500	1000	1500	2000	3000	4000	5000	6000
Transmission fluid pump speed * (rpm)	665	1144	1463	1702	1822	2128	2500	2793	3059

* MTFP or ETFP

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Absolute value (Target line pressure – Measured line pressure)	≥ 500 kPa
Absolute value (Correction value of line pressure control solenoid valve feedback control)	≥ 0.2 A

Time Needed for Diagnosis: 5 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

AA:DTC P0842 SECONDARY OIL PRESSURE SENSOR CIRCUIT (LOW)

1. OUTLINE OF DIAGNOSIS

- Detect the ground short circuit of the transmission line pressure sensor.
- Judge as NG if the detected voltage of transmission line pressure sensor is less than 0.195 V.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
12 V battery system voltage	≥ 9 V

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Measured line pressure sensor input voltage (Line pressure)	< 0.195 V (< – 574 kPa)

Time Needed for Diagnosis: 0.5 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

AB:DTC P0843 SECONDARY OIL PRESSURE SENSOR CIRCUIT (HIGH)

1. OUTLINE OF DIAGNOSIS

- Detect open circuit or short circuit to power supply of the 5 V system in the transmission line pressure sensor.
- Judge as NG if the voltage detected by the transmission line pressure sensor is higher than 4.883 V.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
12 V battery system voltage	≥ 9 V

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Measured line pressure sensor input voltage (Line pressure)	> 4.883 V (> 8200 kPa)

Time Needed for Diagnosis: 1.5 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

AC:DTC P0890 AT SELF-SHUT RELAY DIAGNOSIS (LOW)

1. OUTLINE OF DIAGNOSIS

- Detect the malfunction of transmission fluid pressure solenoid drive power supply relay circuit.
- Judge as NG when a status where transmission fluid pressure solenoid drive power supply voltage is less than 2 V is detected.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
TCM Power Relay output command	ON
Ignition state	Run or crank

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Measured TCM input voltage which is supplied from 12 V battery system through the TCM Power Relay	< 2 V

Time Needed for Diagnosis: 0.5 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

AD:DTC P0961 PRESSURE CONTROL SOLENOID "A" CONTROL CIRCUIT RANGE/PERFORMANCE

1. OUTLINE OF DIAGNOSIS

- Detect the malfunction of transmission line pressure solenoid drive circuit.
- Judge as NG when the deviation between target current and actual current of the transmission line pressure solenoid becomes equal to or larger than the predetermined value.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
12 V battery system voltage	≥ 9 V

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Absolute value (Target line pressure control solenoid valve current – Measured line pressure control solenoid valve current)	> 0.2 A

Time Needed for Diagnosis: 5 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

AE:DTC P0962 SECONDARY SOLENOID CIRCUIT (LOW)

1. OUTLINE OF DIAGNOSIS

Diagnosis 1
- Detect the ground short of the transmission line pressure solenoid drive circuit.
- Judge as NG if the transmission line pressure solenoid drive current is more than 1.1 A.

Diagnosis 2
- Detect the ground short of the transmission line pressure solenoid drive circuit.
- Judge as NG if the solenoid current of the transmission line pressure solenoid drive circuit is more than 1.2 A.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Diagnosis 1	
12 V battery system voltage	≥ 9 V
Commanded line pressure control solenoid current	≥ 0.1 A
Diagnosis 2	
12 V battery system voltage	≥ 9 V

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
Measured line pressure control solenoid current	≥ 1.1 A
Diagnosis 2	
Signal of malfunction from solenoid driver IC	ON
As defined by:	
Measured line pressure control solenoid current	≥ 1.2 A

Time Needed for Diagnosis: 0.5 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

AF:DTC P0963 SECONDARY SOLENOID CIRCUIT (HIGH)

1. OUTLINE OF DIAGNOSIS

- Detect short circuit to power supply or open circuit of the transmission line pressure solenoid drive circuit.
- Judge as NG if the transmission line pressure solenoid drive current is less than 0.1 A.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
12 V battery system voltage	≥ 9 V
Commanded line pressure control solenoid valve current	≥ 0.2 A

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Measured line pressure control solenoid valve current	< 0.1 A

Time Needed for Diagnosis: 0.5 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

AG:DTC P0965 FORWARD & REVERSE SOLENOID FUNCTION

1. OUTLINE OF DIAGNOSIS

Diagnosis 1
• Detect the malfunction of transmission forward/reverse clutch pressure solenoid drive circuit characteristics.
• Judge as NG when the deviation between set current and actual current of the transmission forward/reverse clutch pressure solenoid drive circuit becomes equal to or larger than the predetermined value (0.2 A).
Diagnosis 2
• Detect the malfunction of transmission forward/reverse clutch pressure solenoid drive circuit characteristics.
• Judge as NG when the transmission forward/reverse clutch pressure solenoid drive current is within the predetermined value.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Diagnosis 1	
12 V battery system voltage	≥ 9 V
Diagnosis 2	
12 V battery system voltage	≥ 9 V

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
Absolute value (Target forward & reverse clutch pressure control solenoid current – Measured forward & reverse clutch pressure control solenoid circuit)	> 0.2 A
Diagnosis 2	
Measured forward & reverse clutch pressure control solenoid current	> 1.08 A and ≤ 1.9 A

Time Needed for Diagnosis: 5 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

AH:DTC P0966 FORWARD & REVERSE SOLENOID CIRCUIT (LOW)

1. OUTLINE OF DIAGNOSIS

- Detect the GND-output short in transmission forward/reverse clutch pressure solenoid circuit.
- Judge as NG when the transmission forward/reverse clutch pressure solenoid drive current is 1.9 A or more.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
12 V battery system voltage	≥ 9 V

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Signal of malfunction from solenoid driver IC As defined by: Measured line pressure control solenoid current ≥ 1.9 A	ON

Time Needed for Diagnosis: 0.02 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

AI: DTC P0967 FORWARD & REVERSE LINEAR SOLENOID CIRCUIT (HIGH)

1. OUTLINE OF DIAGNOSIS

- Detect open circuit or short circuit to power supply in the transmission forward/reverse clutch pressure solenoid circuit.
- Judge as NG if the transmission forward/reverse clutch pressure solenoid drive current is less than 0.15 A.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
12 V battery system voltage	≥ 9 V
Commanded forward & reverse clutch pressure control solenoid current	≥ 0.3 A

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Measured forward & reverse clutch pressure control solenoid current	< 0.15 A

Time Needed for Diagnosis: 1 second
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

AJ:DTC P0973 PRIMARY SOLENOID SYSTEM A CIRCUIT (LOW)

1. OUTLINE OF DIAGNOSIS

- Detect the ground short of the shift-up fluid pressure control solenoid drive circuit.
- Judge as NG when the shift-up hydraulic control solenoid drive voltage is 0.8 V or less.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
12 V battery system voltage	≥ 9 V
Commanded duty of shift up pressure control solenoid	100%

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Signal of malfunction from solenoid driver IC As defined by: Measured shift up pressure control solenoid voltage ≤ 0.8 V	ON

Time Needed for Diagnosis: 0.2 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

AK:DTC P0974 PRIMARY SOLENOID SYSTEM A CIRCUIT (HIGH)

1. OUTLINE OF DIAGNOSIS

- Detect short circuit to power supply or open circuit of the shift-up fluid pressure control solenoid drive circuit.
- Judge as NG when the shift-up hydraulic control solenoid drive voltage is 2.5 V or more.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
12 V battery system voltage	≥ 9 V
Commanded duty of shift up pressure control solenoid	0%

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Signal of malfunction from solenoid driver IC As defined by: Measured shift up pressure control solenoid voltage ≥ 2.5 V	ON

Time Needed for Diagnosis: 0.2 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

AL:DTC P0976 PRIMARY SOLENOID SYSTEM B CIRCUIT (LOW)

1. OUTLINE OF DIAGNOSIS

- Detect the ground short of the shift-down fluid pressure control solenoid drive circuit.
- Judge as NG when the shift-down hydraulic control solenoid drive voltage is 0.8 V or less.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
12 V battery system voltage	≥ 9 V
Commanded duty of shift down pressure control solenoid	100%

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Signal of malfunction from solenoid driver IC	ON
As defined by:	
Measured shift down pressure control solenoid voltage ≤ 0.8 V	

Time Needed for Diagnosis: 0.2 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

AM:DTC P0977 PRIMARY SOLENOID SYSTEM B CIRCUIT (HIGH)

1. OUTLINE OF DIAGNOSIS

- Detect short circuit to power supply or open circuit of the shift-down fluid pressure control solenoid drive circuit.
- Judge as NG when the shift-down hydraulic control solenoid drive voltage is 2.5 V or more.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
12 V battery system voltage	≥ 9 V
Commanded duty of shift down pressure control solenoid	0%

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Signal of malfunction from solenoid driver IC As defined by: Measured shift down pressure control solenoid voltage ≥ 2.5 V	ON

Time Needed for Diagnosis: 0.2 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

AN:DTC P0B0A AUXILIARY TRANSMISSION FLUID PUMP MOTOR SUPPLY VOLTAGE CIRCUIT LOW

1. OUTLINE OF DIAGNOSIS

- Detect the short to 100 V system GND of electric oil pump 100 V power supply.
- Judge as NG when a status where 100 V power supply voltage is less than 66 V is detected.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
12 V battery system voltage	≥ 10 V
Pre-charge contactor (in the hybrid battery pack)	Open
Positive contactor (in the hybrid battery pack)	Closed
Negative contactor (in the hybrid battery pack)	Closed

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Signal of malfunction from ETFP control module As defined by: ETFP control module input voltage < 66 V	ON

Time Needed for Diagnosis: 0.5 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

AO:DTC P0B0B AUXILIARY TRANSMISSION FLUID PUMP MOTOR SUPPLY VOLTAGE CIRCUIT HIGH

1. OUTLINE OF DIAGNOSIS

- Detect the malfunction of electric oil pump 100 V power supply HIGH side.
- Judge as NG when the 100 V power supply voltage is 210 V or more.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
12 V battery system voltage	≥ 10 V
Pre-charge contactor (in the hybrid battery pack)	Open
Positive contactor (in the hybrid battery pack)	Closed
Negative contactor (in the hybrid battery pack)	Closed

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Signal of malfunction from ETFP control module As defined by: ETFP control module input voltage ≥ 210 V	ON

Time Needed for Diagnosis: 10 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

AP:DTC P0B0D AUXILIARY TRANSMISSION FLUID PUMP MOTOR CONTROL MODULE

1. OUTLINE OF DIAGNOSIS

- Detect ROM/RAM malfunction of the electric oil pump.
- Judge as NG through a ROM/RAM diagnosis executed at the electric oil pump inverter.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
12 V battery system voltage	≥ 10 V

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Signal of malfunction from ETFP control module	ON
As defined by:	
Writing-check (RAM) or Checksum (ROM)	Error

Time Needed for Diagnosis: 1 count
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

AQ:DTC P0C21 AUXILIARY TRANSMISSION FLUID PUMP PHASE U-V-W CIRCUIT LOW

1. OUTLINE OF DIAGNOSIS

Diagnosis 1
- Detect the open or ground short circuit of electric oil pump U/V/W line.
- Judge as NG when a status where the total current value of three phase line is 50 A or more and then any of voltage sensor values of U/V/W lines is less than 2.7 V.

Diagnosis 2
- Detect the open or ground short circuit of electric oil pump U/V/W line.
- Judge as NG when IGBT of V line is ON and any of voltage sensor values of U/V/W lines is 58 V or less.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Diagnosis 1	
12 V battery system voltage	≥ 10 V
Pre-charge contactor (in the hybrid battery pack)	Open
Positive contactor (in the hybrid battery pack)	Closed
Negative contactor (in the hybrid battery pack)	Closed
Diagnosis 2	
12 V battery system voltage	≥ 10 V
Pre-charge contactor (in the hybrid battery pack)	Open
Positive contactor (in the hybrid battery pack)	Closed
Negative contactor (in the hybrid battery pack)	Closed

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
Signal of malfunction from ETFP control module	ON
As defined by: Inverter phase U voltage < 2.7 V or Inverter phase V voltage < 2.7 V or Inverter phase W voltage < 2.7 V Actual current of ETFP inverter ≥ 50 A	
Diagnosis 2	
Signal of malfunction from ETFP control module	ON
As defined by: Inverter phase U voltage when the V phase high side IGBT is ON ≤ 58 V or Inverter phase V voltage when the V phase high side IGBT is ON ≤ 58 V or Inverter phase W voltage when the V phase high side IGBT is ON ≤ 58 V	

Time Needed for Diagnosis: 0.2 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

AR:DTC P0C22 AUXILIARY TRANSMISSION FLUID PUMP PHASE U-V-W CIRCUIT HIGH

1. OUTLINE OF DIAGNOSIS

- Detect the short circuit to 100 V power supply system of electric oil pump U/V/W line.
- Judge as NG when a status where the total current value of three phase line is 50 A or more and then any of voltage sensor values of U/V/W lines is more than 58 V.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
12 V battery system voltage	≥ 10 V
Pre-charge contactor (in the hybrid battery pack)	Open
Positive contactor (in the hybrid battery pack)	Closed
Negative contactor (in the hybrid battery pack)	Closed

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Signal of malfunction from ETFP control module As defined by: Inverter phase U voltage > 58 V or Inverter phase V voltage > 58 V or Inverter phase W voltage > 58 V Actual current of ETFP control module ≥ 50 A	ON

Time Needed for Diagnosis: 0.2 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

AS:DTC P0C29 AUXILIARY TRANSMISSION FLUID PUMP DRIVER CURRENT PERFORMANCE

1. OUTLINE OF DIAGNOSIS

Diagnosis 1
- Detect the overcurrent of electric oil pump U/V/W line.
- Judge as NG when a status where the total current value of three phase line is 14 A or more lasts 3 seconds or more.

Diagnosis 2
- Detect the overcurrent of electric oil pump U/V/W line.
- Judge as NG when a status where the total current value of three phase line is 50 A or more is detected two times or more in one driving cycle.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Diagnosis 1	
12 V battery system voltage	≥ 10 V
Diagnosis 2	
12 V battery system voltage	≥ 10 V

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
Signal of malfunction from ETFP control module	ON
As defined by:	
Actual current of ETFP control module ≥ 14 A	
Diagnosis 2	
Signal of malfunction from ETFP control module	ON
As defined by:	
Actual current of ETFP control module ≥ 50 A	

Time Needed for Diagnosis:
- **Diagnosis 1:** 3 s
- **Diagnosis 2:** 2 s

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

AT:DTC P0C2A AUXILIARY TRANSMISSION FLUID PUMP MOTOR STALLED

1. OUTLINE OF DIAGNOSIS

- Detect low speed revolution malfunction of electric oil pump.
- Judge as NG if the Set speed – Actual speed of electric oil pump is more than the predetermined value.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
12 V battery system voltage	≥ 10 V
Commanded ETFP speed	≥ 800 rpm
Pre-charge contactor (in the hybrid battery pack)	Open
Positive contactor (in the hybrid battery pack)	Closed
Negative contactor (in the hybrid battery pack)	Closed

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Signal of malfunction from ETFP control module As defined by: Commanded ETFP speed – Actual ETFP speed > 270 rpm	ON

Time Needed for Diagnosis: 3 sec × 2 times
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

AU:DTC P160A RANDOM ACCESS MEMORY (RAM) ERROR

1. OUTLINE OF DIAGNOSIS

- Detect the malfunction in RAM area of the TCM.
- Judge as NG if an attempt to write to RAM area has failed.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
12 V battery system voltage	≥ 9 V

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Writing-check (RAM) NOTE: This check is carried out about the RAM used except for CAN communication.	Error

Time Needed for Diagnosis: Immediately
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

AV:DTC P172A AUXILIARY TRANSMISSION FLUID PUMP REVERSE ROTATION

1. OUTLINE OF DIAGNOSIS

- Detect high speed revolution malfunction of electric oil pump.
- Judge as NG when a status where 100 V power supply voltage is more than 225 V is detected.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
12 V battery system voltage	≥ 10 V
Commanded ETFP speed	0 rpm
Pre-charge contactor (in the hybrid battery pack)	Open
Positive contactor (in the hybrid battery pack)	Closed
Negative contactor (in the hybrid battery pack)	Closed

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Signal of malfunction from ETFP control module As defined by: ETFP control module input voltage ≥ 225 V	ON

Time Needed for Diagnosis: 1 second
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

AW:DTC P2530 IGNITION SWITCH RUN POSITION CIRCUIT

1. OUTLINE OF DIAGNOSIS

- Detect the malfunction of ignition SW circuit.
- Judge as NG if the ignition SW signals are lost 5 times or more even though the engine is ON.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
12 V battery system voltage	≥ 10.9 V
Engine speed	≥ 500 rpm
or	
Vehicle speed	≥ 1.2 MPH

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Count of temporarily discontinuous input of ignition switch	≥ 5 count

Time Needed for Diagnosis: 5 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

AX:DTC P2714 PRESSURE CONTROL SOLENOID "D" PERFORMANCE/STUCK OFF

1. OUTLINE OF DIAGNOSIS

- Detect the malfunction of the transmission output clutch control function.
- Judge as NG when the deviation between values of the output clutch output speed and the output clutch input speed calculated from the secondary speed becomes equal to or larger than the predetermined value (180 rpm), even though the output clutch should be engaged in the current control status.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
12 V battery system voltage	≥ 10 V
Transmission fluid pump speed (MTFP or ETFP)	≥ 700 rpm
Transmission range	Drive or Reverse
Commanded output clutch control solenoid current	≤ 0.8 A
Measured secondary pulley shaft speed	≥ 100 rpm
Measured output shaft speed	≥ 100 rpm
or	
MIL is not illuminated for DTCs	P0500, U0073, U0122, U0416
Vehicle speed (from vehicle dynamics control module)	0 MPH
Measured output shaft speed	0 rpm

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Absolute value (Input speed of output clutch* – Measured output shaft speed)	≥ 180 rpm

* Input speed of output clutch: Measured secondary pulley shaft speed / 1.405**
**1.405: Secondary reduction gear ratio

Time Needed for Diagnosis: Table 1 s

Table 1

Absolute value (Input speed of output clutch – Measured output shaft speed)	30	40	100	200	300	400	500
Time Required (sec)	10.0	10.0	10.0	10.0	7.0	5.0	5.0

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

AY:DTC P2719 PRESSURE CONTROL SOLENOID D CONTROL CIRCUIT RANGE/PERFORMANCE

1. OUTLINE OF DIAGNOSIS

Diagnosis 1
- Detect the characteristic malfunction of the transmission output clutch linear solenoid drive circuit.
- Judge as NG when the deviation between set current and actual current of the transmission output clutch linear solenoid drive circuit becomes equal to or larger than the predetermined value (0.2 A).

Diagnosis 2
- Detect the characteristic malfunction of the transmission output clutch linear solenoid drive circuit.
- Judge as NG when the transmission output clutch linear solenoid drive current is within the predetermined value.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Diagnosis 1	
12 V battery system voltage	≥ 9 V
Diagnosis 2	
12 V battery system voltage	≥ 9 V

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
Absolute value (Target output clutch pressure control solenoid current – Measured output clutch pressure control solenoid current)	> 0.2 A
Diagnosis 2	
Measured output clutch pressure control solenoid current	> 1.08 A and < 1.9 A

Time Needed for Diagnosis: 5 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

AZ:DTC P2720 PRESSURE CONTROL SOLENOID D CONTROL CIRCUIT LOW

1. OUTLINE OF DIAGNOSIS

- Detect the GND-output short in transmission output clutch pressure solenoid circuit.
- Judge as NG when the transmission output clutch pressure solenoid drive current is 1.9 A or more.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
12 V battery system voltage	≥ 9 V

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Signal of malfunction from solenoid driver IC As defined by: Measured output clutch pressure control solenoid current ≥ 1.9 A	ON

Time Needed for Diagnosis: 0.02 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

BA:DTC P2721 PRESSURE CONTROL SOLENOID D CONTROL CIRCUIT HIGH

1. OUTLINE OF DIAGNOSIS

- Detect open circuit or short circuit to power supply in the transmission output clutch pressure solenoid circuit.
- Judge as NG if the transmission output clutch pressure solenoid drive current is less than 0.15 A.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
12 V battery system voltage	≥ 9 V
Commanded output clutch control solenoid current	≥ 0.3 A

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Measured output clutch pressure control solenoid current	< 0.15 A

Time Needed for Diagnosis: 1 second
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

BB:DTC P2750 SEC. PULLEY REVOLUTION SPEED SENSOR CIRCUIT

1. OUTLINE OF DIAGNOSIS

Diagnosis 1
- Detect the malfunction of secondary speed sensor signal characteristics.
- Judge as NG if the secondary speed, compared with the primary speed, is outside the possible range considering the hardware capabilities.

Diagnosis 2
- Detect the malfunction of secondary speed sensor signal characteristics.
- Judge as NG when the secondary speed exceeds 13500 rpm.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Diagnosis 1	
12 V battery system voltage	≥ 9 V
Transmission range	Drive or Reverse
(Actual primary pulley shaft speed / Measured front output shaft speed)	≥ 0.36 and ≤ 2.34
Diagnosis 2	
12 V battery system voltage	≥ 9 V
Transmission range	Drive or Reverse
(Actual primary pulley shaft speed / Measured front output shaft speed)	≥ 0.36 and ≤ 2.34

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
(Measured primary pulley shaft speed / Measured secondary pulley shaft speed)	< 0.33 or > 2.58
Diagnosis 2	
Measured secondary pulley shaft speed	> 13500 rpm

Time Needed for Diagnosis: 5 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

BC:DTC P2751 INTERMEDIATE SHAFT SPEED SENSOR "C" CIRCUIT NO SIGNAL

1. OUTLINE OF DIAGNOSIS

- Detect no signal input of secondary speed sensor.
- Judge as NG when there is no input to the secondary speed sensor while the primary speed is input.
- Judge as NG when no speed sensor inputs are received from TCM connector during driving.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Condition 1	
12 V battery system voltage	≥ 10 V
Transmission range	Drive or Reverse
Actual primary pulley shaft speed	≥ 1000 rpm
Condition 2	
12 V battery system voltage	≥ 10 V
Measured turbine shaft speed	0 rpm
Measured output shaft speed	0 rpm
Actual primary pulley shaft speed	≥ 500 rpm
Transmission range	Drive or Reverse
Vehicle speed (from vehicle dynamics control module)	≥ 6.3 MPH

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Measured secondary pulley shaft speed	0 rpm

Time Needed for Diagnosis:

- **Condition 1:** 0.5 s
- **Condition 2:** 0.6 s

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

BD:DTC P2757 TORQUE CONVERTER CLUTCH PRESSURE CONTROL SOLENOID CONTROL CIRCUIT PERFORMANCE/STUCK OFF

1. OUTLINE OF DIAGNOSIS

- Detect the malfunction of lock-up clutch pressure control function.
- Judge as NG when the deviation between the engine speed and the turbine speed is the predetermined value or more, even though the lock-up hydraulic pressure control solenoid is issuing an engagement command.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
12 V battery system voltage	≥ 10 V
Transmission range	Drive
Commanded Torque converter clutch pressure	≥ 700 kPa

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Absolute value (Engine speed – Measured turbine shaft speed)	≥ 40 + Vehicle speed / 1.25 rpm (Vehicle speed: MPH)

Time Needed for Diagnosis: 10 seconds
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

BE:DTC P2758 TORQUE CONVERTER CLUTCH PRESSURE CONTROL SOLENOID CONTROL CIRCUIT STUCK ON

1. OUTLINE OF DIAGNOSIS

• Detect the malfunction of lock-up fluid pressure control solenoid, and hydraulic circuit, or drive circuit characteristics (stuck to high pressure side).
• Judge as NG if the deviation between engine speed and turbine speed is the predetermined value or less, even though the lock-up open request has been issued.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
12 V battery system voltage	≥ 10 V
Engine speed	≥ 1000 rpm
Transmission range	Drive
Engine torque	> Table 1 N·m
Commanded duty of torque converter clutch pressure control solenoid	≤ 0%

Table 1

Vehicle speed (rpm)	0	13	25	38	50	63	75	88	100	113
Engine torque (N·m)	60	73	92	118	154	170	205	244	286	332

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Absolute value (Engine speed – Measured turbine shaft speed)	< Table 2 rpm

Table 2

Measured turbine shaft speed (rpm)	0	500	1000	1500	2000	2500	3000	3500
Absolute value (Engine speed – Measured turbine shaft speed) (rpm)	0	0	50	50	50	50	50	50

Measured turbine shaft speed (rpm)	4000	4500	5000	5500	6000	6500	7000
Absolute value (Engine speed – Measured turbine shaft speed) (rpm)	50	50	50	50	50	50	50

Time Needed for Diagnosis: 10 seconds
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

BF:DTC P2763 LOCK-UP DUTY SOLENOID CIRCUIT (HIGH)

1. OUTLINE OF DIAGNOSIS

- Detect short circuit to power supply or open circuit of the lock-up clutch pressure control solenoid drive circuit.
- Judge as NG when the lock-up clutch pressure control solenoid drive voltage is 0.8 V or less.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
12 V battery system voltage	≥ 9 V
Commanded duty of torque converter clutch pressure control solenoid	0%

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Signal of malfunction from solenoid driver IC As defined by: Measured torque converter clutch pressure control solenoid voltage ≤ 0.8 V	ON

Time Needed for Diagnosis: 0.2 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

BG:DTC P2764 LOCK-UP DUTY SOLENOID CIRCUIT (LOW)

1. OUTLINE OF DIAGNOSIS

- Detect the ground short of the lock-up clutch pressure control solenoid drive circuit.
- Judge as NG when the lock-up clutch pressure control solenoid drive voltage is 2.5 V or more.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
12 V battery system voltage	≥ 9 V
Commanded duty of torque converter clutch pressure control solenoid	100%

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Signal of malfunction from solenoid driver IC	ON
As defined by:	
Measured torque converter clutch pressure control solenoid voltage ≥ 2.5 V	≥ 2.5 V

Time Needed for Diagnosis: 0.2 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

BH:DTC P2797 AUXILIARY TRANSMISSION FLUID PUMP

1. OUTLINE OF DIAGNOSIS

- Detect function malfunction of electric oil pump.
- Judge as NG if the secondary pressure is less than 0.2 MPa while the electric oil pump is driven.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
12 V battery system voltage	≥ 10 V
Commanded ETFP speed	≥ 800 rpm
Pre-charge contactor (in the hybrid battery pack)	Open
Positive contactor (in the hybrid battery pack)	Closed
Negative contactor (in the hybrid battery pack)	Closed

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Measured line pressure	< 200 kPa

Time Needed for Diagnosis: 1 second
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

BI: DTC U0073 CONTROL MODULE COMMUNICATION BUS OFF

1. OUTLINE OF DIAGNOSIS

- Detect malfunction of CAN communication.
- Judge as NG when CAN communication failure has occurred.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
12 V battery system voltage	≥ 10 V

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
CAN bus condition	Bus off

Time Needed for Diagnosis: 2 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

BJ:DTC U0075 CONTROL MODULE COMMUNICATION BUS "PU-CAN" OFF

1. OUTLINE OF DIAGNOSIS

- Detect malfunction of CAN communication.
- Judge as NG when CAN communication failure has occurred.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
12 V battery system voltage	≥ 10 V

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
CAN bus condition	Bus off

Time Needed for Diagnosis: 2 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

BK:DTC U0100 LOST COMMUNICATION WITH ECM/PCM “A”

1. OUTLINE OF DIAGNOSIS

- Detect malfunction of CAN communication.
- Judge as NG when CAN communication with ECM is not possible.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
12 V battery system voltage	≥ 10 V

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
CAN data from ECM	Lost

Time Needed for Diagnosis: 0.5 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

BL:DTC U0110 LOST COMMUNICATION WITH DRIVE MOTOR CONTROL MODULE "A"

1. OUTLINE OF DIAGNOSIS

- Detect malfunction of CAN communication.
- Judge as NG when CAN communication with drive motor CM is not possible.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
12 V battery system voltage	≥ 10 V

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
CAN data from Drive Motor Control Module	Lost

Time Needed for Diagnosis: 0.5 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

BM:DTC U0122 LOST COMMUNICATION WITH VEHICLE DYNAMICS CONTROL MODULE

1. OUTLINE OF DIAGNOSIS

- Detect malfunction of CAN communication.
- Judge as NG when CAN communication with VDCCM is not possible.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
12 V battery system voltage	≥ 10 V

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
CAN data from Vehicle Dynamics Control Module	Lost

Time Needed for Diagnosis: 0.5 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

BN:DTC U0287 LOST COMMUNICATION WITH TRANSMISSION FLUID PUMP MODULE

1. OUTLINE OF DIAGNOSIS

- Detect malfunction of CAN communication.
- Judge as NG when CAN communication with electric oil pump inverter is not possible.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
12 V battery system voltage	≥ 10 V

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
CAN data from ETFP Control Module	Lost

Time Needed for Diagnosis: 0.5 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

BO:DTC U0293 LOST COMMUNICATION WITH HYBRID POWERTRAIN CONTROL MODULE

1. OUTLINE OF DIAGNOSIS

- Detect malfunction of CAN communication.
- Judge as NG when CAN communication with hybrid powertrain CM is not possible.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
12 V battery system voltage	≥ 10 V

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
CAN data from HPCM	Lost

Time Needed for Diagnosis: 0.5 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

BP:DTC U0401 INVALID DATA RECEIVED FROM ECM/PCM “A”

1. OUTLINE OF DIAGNOSIS

- Detect malfunction of CAN communication.
- Judge as NG when data received from ECM is not normal.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
12 V battery system voltage	≥ 10 V

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
CAN data from ECM	Did not change

Time Needed for Diagnosis: 2 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

BQ:DTC U0411 INVALID DATA RECEIVED FROM DRIVE MOTOR CONTROL MODULE "A"

1. OUTLINE OF DIAGNOSIS

- Detect malfunction of CAN communication.
- Judge as NG when data received from drive motor CM is not normal.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Diagnosis 1	
12 V battery system voltage	≥ 10 V
Diagnosis 2	
12 V battery system voltage	≥ 10 V

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
CAN data from Drive Motor Control Module	Did not change
Diagnosis 2	
CAN data from Drive Motor Control Module	Check sum error

Time Needed for Diagnosis:

- **Diagnosis 1:** 2 s
- **Diagnosis 2:** 3 times

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

BR:DTC U0416 INVALID DATA RECEIVED FROM VEHICLE DYNAMICS CONTROL MODULE

1. OUTLINE OF DIAGNOSIS

- Detect malfunction of CAN communication.
- Judge as NG when data received from the VDCCM is not normal.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
12 V battery system voltage	≥ 10 V

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
CAN data from Vehicle Dynamics Control Module	Did not change

Time Needed for Diagnosis: 2 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

BS:DTC U0588 INVALID DATA RECEIVED FROM TRANSMISSION FLUID PUMP MODULE

1. OUTLINE OF DIAGNOSIS

- Detect malfunction of CAN communication.
- Judge as NG when data received from electric oil pump inverter is not normal.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Diagnosis 1	
12 V battery system voltage	≥ 10 V
Diagnosis 2	
12 V battery system voltage	≥ 10 V

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
CAN data from ETFP Control Module	Did not change
Diagnosis 2	
CAN data from ETFP Control Module	Check sum error

Time Needed for Diagnosis:

- **Diagnosis 1:** 2 s
- **Diagnosis 2:** 3 times

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

BT:DTC U0594 INVALID DATA RECEIVED FROM HYBRID POWERTRAIN CONTROL MODULE

1. OUTLINE OF DIAGNOSIS

- Detect malfunction of CAN communication.
- Judge as NG when data received from hybrid powertrain CM is not normal.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
12 V battery system voltage	≥ 10 V

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
CAN data from HPCM	Did not change

Time Needed for Diagnosis: 2 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

BU:DTC U1100 LOST COMMUNICATION WITH ECM/PCM PU-CAN

1. OUTLINE OF DIAGNOSIS

- Detect malfunction of CAN communication.
- Judge as NG when CAN communication with ECM is not possible.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
12 V battery system voltage	≥ 10 V

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
CAN data from ECM	Lost

Time Needed for Diagnosis: 2 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

BV:DTC U1293 LOST COMMUNICATION WITH HYBRID POWERTRAIN CONTROL MODULE PU-CAN

1. OUTLINE OF DIAGNOSIS

- Detect malfunction of CAN communication.
- Judge as NG when CAN communication with hybrid powertrain CM is not possible.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
12 V battery system voltage	≥ 10 V

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
CAN data from HPCM	Lost

Time Needed for Diagnosis: 2 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

BW:DTC U1401 INVALID DATA RECEIVED FROM ECM/PCM PU-CAN

1. OUTLINE OF DIAGNOSIS

- Detect malfunction of CAN communication.
- Judge as NG when data received from ECM is not normal.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Diagnosis 1	
12 V battery system voltage	≥ 10 V
Diagnosis 2	
12 V battery system voltage	≥ 10 V

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
CAN data from ECM	Did not change
Diagnosis 2	
CAN data from ECM	Check sum error

Time Needed for Diagnosis:

- **Diagnosis 1:** 2 s
- **Diagnosis 2:** 3 times

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

BX:DTC U1594 INVALID DATA RECEIVED FROM HYBRID POWERTRAIN CONTROL MODULE PU-CAN

1. OUTLINE OF DIAGNOSIS

- Detect malfunction of CAN communication.
- Judge as NG when data received from hybrid powertrain CM is not normal.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Diagnosis 1	
12 V battery system voltage	≥ 10 V
Diagnosis 2	
12 V battery system voltage	≥ 10 V

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
CAN data from HPCM	Did not change
Diagnosis 2	
CAN data from HPCM	Check sum error

Time Needed for Diagnosis:

- **Diagnosis 1:** 2 s
- **Diagnosis 2:** 3 times

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

MANUAL TRANSMISSION AND DIFFERENTIAL

5MT

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1. List of Diagnostic Trouble Code (DTC)

A: LIST

DTC	Item	Note
P0500	Vehicle Speed Sensor “A”	<Ref. to GD(CVT)(w/o HEV)-5, DTC P0500 VEHICLE SPEED SENSOR “A”, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0601	Internal Control Module Memory Checksum Error	<Ref. to GD(CVT)(w/o HEV)-6, DTC P0601 INTERNAL CONTROL MODULE MEMORY CHECKSUM ERROR, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0604	Internal Control Module Random Access Memory (RAM) Error	<Ref. to GD(CVT)(w/o HEV)-7, DTC P0604 INTERNAL CONTROL MODULE RANDOM ACCESS MEMORY (RAM) ERROR, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P062F	Internal Control Module EEPROM Error	<Ref. to GD(CVT)(w/o HEV)-8, DTC P062F INTERNAL CONTROL MODULE EEPROM ERROR, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0705	Transmission Range Sensor Circuit (PRNDL Input)	<Ref. to GD(CVT)(w/o HEV)-9, DTC P0705 TRANSMISSION RANGE SENSOR CIRCUIT (PRNDL INPUT), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0708	AT Range Switch Not Inputted	<Ref. to GD(CVT)(w/o HEV)-10, DTC P0708 AT RANGE SWITCH NOT INPUTTED, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0711	ATF Temp. Sensor Circuit Range/Performance	<Ref. to GD(CVT)(w/o HEV)-11, DTC P0711 ATF TEMP. SENSOR CIRCUIT RANGE/PERFORMANCE, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0712	Transmission Fluid Temperature Sensor Circuit Low Input	<Ref. to GD(CVT)(w/o HEV)-12, DTC P0712 TRANSMISSION FLUID TEMPERATURE SENSOR CIRCUIT LOW INPUT, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0713	Transmission Fluid Temperature Sensor Circuit High Input	<Ref. to GD(CVT)(w/o HEV)-13, DTC P0713 TRANSMISSION FLUID TEMPERATURE SENSOR CIRCUIT HIGH INPUT, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0716	Torque Converter Turbine Speed	<Ref. to GD(CVT)(w/o HEV)-14, DTC P0716 TORQUE CONVERTER TURBINE SPEED, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0717	Input/Turbine Speed Sensor "A" Circuit No Signal	<Ref. to GD(CVT)(w/o HEV)-15, DTC P0717 INPUT/TURBINE SPEED SENSOR "A" CIRCUIT NO SIGNAL, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0719	Brake Switch Circuit Low	<Ref. to GD(CVT)(w/o HEV)-16, DTC P0719 BRAKE SWITCH CIRCUIT LOW, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0724	Brake Switch Circuit High	<Ref. to GD(CVT)(w/o HEV)-17, DTC P0724 BRAKE SWITCH CIRCUIT HIGH, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0730	Gearshift Control Performance Abnormal	<Ref. to GD(CVT)(w/o HEV)-18, DTC P0730 GEARSHIFT CONTROL PERFORMANCE ABNORMAL, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0746	Pressure Control Solenoid "A" Performance/Stuck Off	<Ref. to GD(CVT)(w/o HEV)-19, DTC P0746 PRESSURE CONTROL SOLENOID "A" PERFORMANCE/STUCK OFF, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0747	Pressure Control Solenoid "A" Stuck On	<Ref. to GD(CVT)(w/o HEV)-20, DTC P0747 PRESSURE CONTROL SOLENOID "A" STUCK ON, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0751	Shift Solenoid "A" Performance/Stuck Off	<Ref. to GD(CVT)(w/o HEV)-21, DTC P0751 SHIFT SOLENOID "A" PERFORMANCE/STUCK OFF, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0752	Shift Solenoid "A" Stuck On	<Ref. to GD(CVT)(w/o HEV)-22, DTC P0752 SHIFT SOLENOID "A" STUCK ON, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0756	Shift Solenoid "B" Performance/Stuck Off	<Ref. to GD(CVT)(w/o HEV)-23, DTC P0756 SHIFT SOLENOID "B" PERFORMANCE/STUCK OFF, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0757	Shift Solenoid "B" Stuck On	<Ref. to GD(CVT)(w/o HEV)-24, DTC P0757 SHIFT SOLENOID "B" STUCK ON, Diagnostic Trouble Code (DTC) Detecting Criteria.>

DTC	Item	Note
P0776	Pressure Control Solenoid "B" Performance/Stuck Off	<Ref. to GD(CVT)(w/o HEV)-25, DTC P0776 PRESSURE CONTROL SOLENOID "B" PERFORMANCE/STUCK OFF, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0801	Reverse Inhibit Control Circuit	<Ref. to GD(CVT)(w/o HEV)-26, DTC P0801 REVERSE INHIBIT CONTROL CIRCUIT, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0841	Secondary Oil Pressure Sensor Performance	<Ref. to GD(CVT)(w/o HEV)-27, DTC P0841 SECONDARY OIL PRESSURE SENSOR PERFORMANCE, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0842	Secondary Oil Pressure Sensor Circuit (Low)	<Ref. to GD(CVT)(w/o HEV)-28, DTC P0842 SECONDARY OIL PRESSURE SENSOR CIRCUIT (LOW), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0843	Secondary Oil Pressure Sensor Circuit (High)	<Ref. to GD(CVT)(w/o HEV)-29, DTC P0843 SECONDARY OIL PRESSURE SENSOR CIRCUIT (HIGH), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0890	AT Self-Shut Relay Diagnosis (Low)	<Ref. to GD(CVT)(w/o HEV)-30, DTC P0890 AT SELF-SHUT RELAY DIAGNOSIS (LOW), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0951	Manual Switch	<Ref. to GD(CVT)(w/o HEV)-31, DTC P0951 MANUAL SWITCH, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0961	Pressure Control Solenoid "A" Control Circuit Range/Performance	<Ref. to GD(CVT)(w/o HEV)-32, DTC P0961 PRESSURE CONTROL SOLENOID "A" CONTROL CIRCUIT RANGE/PERFORMANCE, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0962	Secondary Solenoid Circuit (Low)	<Ref. to GD(CVT)(w/o HEV)-33, DTC P0962 SECONDARY SOLENOID CIRCUIT (LOW), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0963	Secondary Solenoid Circuit (High)	<Ref. to GD(CVT)(w/o HEV)-34, DTC P0963 SECONDARY SOLENOID CIRCUIT (HIGH), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0965	Forward & Reverse Solenoid Function	<Ref. to GD(CVT)(w/o HEV)-35, DTC P0965 FORWARD & REVERSE SOLENOID FUNCTION, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0966	Forward & Reverse Solenoid Circuit (Low)	<Ref. to GD(CVT)(w/o HEV)-36, DTC P0966 FORWARD & REVERSE SOLENOID CIRCUIT (LOW), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0967	Forward & Reverse Linear Solenoid Circuit (High)	<Ref. to GD(CVT)(w/o HEV)-37, DTC P0967 FORWARD & REVERSE LINEAR SOLENOID CIRCUIT (HIGH), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0970	Transfer Solenoid Circuit (Low)	<Ref. to GD(CVT)(w/o HEV)-38, DTC P0970 TRANSFER SOLENOID CIRCUIT (LOW), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0971	Transfer Solenoid Circuit (High)	<Ref. to GD(CVT)(w/o HEV)-39, DTC P0971 TRANSFER SOLENOID CIRCUIT (HIGH), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0973	Primary Solenoid System A Circuit (Low)	<Ref. to GD(CVT)(w/o HEV)-40, DTC P0973 PRIMARY SOLENOID SYSTEM A CIRCUIT (LOW), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0974	Primary Solenoid System A Circuit (High)	<Ref. to GD(CVT)(w/o HEV)-41, DTC P0974 PRIMARY SOLENOID SYSTEM A CIRCUIT (HIGH), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0976	Primary Solenoid System B Circuit (Low)	<Ref. to GD(CVT)(w/o HEV)-42, DTC P0976 PRIMARY SOLENOID SYSTEM B CIRCUIT (LOW), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0977	Primary Solenoid System B Circuit (High)	<Ref. to GD(CVT)(w/o HEV)-43, DTC P0977 PRIMARY SOLENOID SYSTEM B CIRCUIT (HIGH), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P160A	Random Access Memory (RAM) Error	<Ref. to GD(CVT)(w/o HEV)-44, DTC P160A RANDOM ACCESS MEMORY (RAM) ERROR, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P170A	L-Range SW System	<Ref. to GD(CVT)(w/o HEV)-45, DTC P170A L-RANGE SW SYSTEM, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P2158	Vehicle Speed Sensor "B"	<Ref. to GD(CVT)(w/o HEV)-46, DTC P2158 VEHICLE SPEED SENSOR "B", Diagnostic Trouble Code (DTC) Detecting Criteria.>

DTC	Item	Note
P2530	Ignition Switch Run Position Circuit	<Ref. to GD(CVT)(w/o HEV)-47, DTC P2530 IGNITION SWITCH RUN POSITION CIRCUIT, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P2746	Primary Pulley Revolution Speed Sensor Circuit	<Ref. to GD(CVT)(w/o HEV)-48, DTC P2746 PRIMARY PULLEY REVOLUTION SPEED SENSOR CIRCUIT, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P2747	Intermediate Shaft Speed Sensor "B" Circuit No Signal	<Ref. to GD(CVT)(w/o HEV)-49, DTC P2747 INTERMEDIATE SHAFT SPEED SENSOR "B" CIRCUIT NO SIGNAL, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P2750	Sec. Pulley Revolution Speed Sensor Circuit	<Ref. to GD(CVT)(w/o HEV)-50, DTC P2750 SEC. PULLEY REVOLUTION SPEED SENSOR CIRCUIT, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P2751	Intermediate Shaft Speed Sensor "C" Circuit No Signal	<Ref. to GD(CVT)(w/o HEV)-51, DTC P2751 INTERMEDIATE SHAFT SPEED SENSOR "C" CIRCUIT NO SIGNAL, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P2757	Torque Converter Clutch Pressure Control Solenoid Control Circuit Performance/ Stuck Off	<Ref. to GD(CVT)(w/o HEV)-52, DTC P2757 TORQUE CONVERTER CLUTCH PRESSURE CONTROL SOLENOID CONTROL CIRCUIT PERFORMANCE/STUCK OFF, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P2758	Torque Converter Clutch Pressure Control Solenoid Control Circuit Stuck On	<Ref. to GD(CVT)(w/o HEV)-53, DTC P2758 TORQUE CONVERTER CLUTCH PRESSURE CONTROL SOLENOID CONTROL CIRCUIT STUCK ON, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P2763	Lock-Up Duty Solenoid Circuit (High)	<Ref. to GD(CVT)(w/o HEV)-54, DTC P2763 LOCK-UP DUTY SOLENOID CIRCUIT (HIGH), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P2764	Lock-Up Duty Solenoid Circuit (Low)	<Ref. to GD(CVT)(w/o HEV)-55, DTC P2764 LOCK-UP DUTY SOLENOID CIRCUIT (LOW), Diagnostic Trouble Code (DTC) Detecting Criteria.>
U0073	Control Module Communication Bus Off	<Ref. to GD(CVT)(w/o HEV)-56, DTC U0073 CONTROL MODULE COMMUNICATION BUS OFF, Diagnostic Trouble Code (DTC) Detecting Criteria.>
U0100	Lost Communication With ECM/PCM “A”	<Ref. to GD(CVT)(w/o HEV)-57, DTC U0100 LOST COMMUNICATION WITH ECM/PCM “A”, Diagnostic Trouble Code (DTC) Detecting Criteria.>
U0122	Lost Communication With Vehicle Dynamics Control Module	<Ref. to GD(CVT)(w/o HEV)-58, DTC U0122 LOST COMMUNICATION WITH VEHICLE DYNAMICS CONTROL MODULE, Diagnostic Trouble Code (DTC) Detecting Criteria.>
U0140	Lost Communication With Body Control Module	<Ref. to GD(CVT)(w/o HEV)-59, DTC U0140 LOST COMMUNICATION WITH BODY CONTROL MODULE, Diagnostic Trouble Code (DTC) Detecting Criteria.>
U0155	Lost Communication With Instrument Panel Cluster (IPC) Control Module	<Ref. to GD(CVT)(w/o HEV)-60, DTC U0155 LOST COMMUNICATION WITH INSTRUMENT PANEL CLUSTER (IPC) CONTROL MODULE, Diagnostic Trouble Code (DTC) Detecting Criteria.>
U0401	Invalid Data Received From ECM/PCM “A”	<Ref. to GD(CVT)(w/o HEV)-61, DTC U0401 INVALID DATA RECEIVED FROM ECM/PCM “A”, Diagnostic Trouble Code (DTC) Detecting Criteria.>
U0416	Invalid Data Received From Vehicle Dynamics Control Module	<Ref. to GD(CVT)(w/o HEV)-62, DTC U0416 INVALID DATA RECEIVED FROM VEHICLE DYNAMICS CONTROL MODULE, Diagnostic Trouble Code (DTC) Detecting Criteria.>
U0422	Invalid Data Received From Body Control Module	<Ref. to GD(CVT)(w/o HEV)-63, DTC U0422 INVALID DATA RECEIVED FROM BODY CONTROL MODULE, Diagnostic Trouble Code (DTC) Detecting Criteria.>
U0423	Invalid Data Received From Instrument Panel Cluster Control Module	<Ref. to GD(CVT)(w/o HEV)-64, DTC U0423 INVALID DATA RECEIVED FROM INSTRUMENT PANEL CLUSTER CONTROL MODULE, Diagnostic Trouble Code (DTC) Detecting Criteria.>
U1235	Lost Communication With EyeSight	<Ref. to GD(CVT)(w/o HEV)-65, DTC U1235 LOST COMMUNICATION WITH EyeSight, Diagnostic Trouble Code (DTC) Detecting Criteria.>
U1433	Invalid Data Received From EyeSight	<Ref. to GD(CVT)(w/o HEV)-66, DTC U1433 INVALID DATA RECEIVED FROM EyeSight, Diagnostic Trouble Code (DTC) Detecting Criteria.>

2. Diagnostic Trouble Code (DTC) Detecting Criteria

A: DTC P0500 VEHICLE SPEED SENSOR “A”

1. OUTLINE OF DIAGNOSIS

- Judge the malfunction of VDC wheel speed sensor.
- Judge as NG when the wheel speed sensor normal status signal from VDC is cleared.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
12 V battery system voltage	≥ 10.9 V

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Signal of malfunction from Vehicle Dynamics Control Module NOTE: The VDC controller detects malfunction if one of the speed sensors does not output a signal and the other vehicle speed sensor output signal is above 7.46 MPH.	ON

Time Needed for Diagnosis: 2.5 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

B: DTC P0601 INTERNAL CONTROL MODULE MEMORY CHECKSUM ERROR

1. OUTLINE OF DIAGNOSIS

- Judge the malfunction in ROM area of the TCM.
- Judge as NG when the consistency in the ROM area is lost.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
12 V battery system voltage	≥ 9 V

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Checksum (ROM)	Error

Time Needed for Diagnosis: Immediately
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

C: DTC P0604 INTERNAL CONTROL MODULE RANDOM ACCESS MEMORY (RAM) ERROR

1. OUTLINE OF DIAGNOSIS

- Judge the malfunction in RAM area of the TCM.
- Judge as NG if an attempt to write to RAM area failed.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
12 V battery system voltage	≥ 10 V

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Writing-check (RAM) NOTE: This check is carried out about the RAM only used for CAN communication.	Error

Time Needed for Diagnosis: Immediately
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

D: DTC P062F INTERNAL CONTROL MODULE EEPROM ERROR

1. OUTLINE OF DIAGNOSIS

Diagnosis 1
- Judge the malfunction in EEPROM area of the TCM.
- Judge as NG if an attempt to write to EEPROM area failed.

Diagnosis 2
- Judge the malfunction in EEPROM area of the TCM.
- Judge as malfunction when the consistency in the EEPROM area is lost.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Diagnosis 1	
12 V battery system voltage	≥ 9 V
Diagnosis 2	
12 V battery system voltage	≥ 9 V

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
Writing-check (EEPROM)	Error
Diagnosis 2	
Checksum (EEPROM)	Error

Time Needed for Diagnosis: Immediately
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

E: DTC P0705 TRANSMISSION RANGE SENSOR CIRCUIT (PRNDL INPUT)

1. OUTLINE OF DIAGNOSIS

- Detect the malfunction of Range Switch.
- Judge as NG if more than one input of Range Switch are detected.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
12 V battery system voltage	≥ 10 V
Engine speed	≥ 1500 rpm

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Two or more transmission range switches ON NOTE: "Transmission range switch ON" is defined as transmission range switch input voltage < 1.7 V.	True

Time Needed for Diagnosis: 5 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

F: DTC P0708 AT RANGE SWITCH NOT INPUTTED

1. OUTLINE OF DIAGNOSIS

- Detect the malfunction of Range Switch.
- Judge as NG if there is no input from all Range Switches.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
12 V battery system voltage	≥ 10 V
Vehicle speed (calculated from secondary pulley shaft speed)	≥ 6 MPH

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
All transmission range switches OFF NOTE: “Transmission range switch OFF” is defined as transmission range switch input voltage ≥ 3.4 V.	True

Time Needed for Diagnosis: 3 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

G: DTC P0711 ATF TEMP. SENSOR CIRCUIT RANGE/PERFORMANCE

1. OUTLINE OF DIAGNOSIS

Diagnosis 1
• Judge the malfunction of transmission oil temperature sensor characteristics (stuck to low temperature side).
• Judge as NG if the amount of oil temperature change since ignition ON is equal to or below the predetermined value.
Diagnosis 2
• Judge the malfunction of transmission oil temperature sensor characteristics (stuck to high temperature side).
• Judge as malfunction when the difference of engine coolant temperature and CVT oil temperature at starting is a predetermined value or more.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Diagnosis 1	
12 V battery system voltage	≥ 10 V
Engine speed (The timer is held when the following conditions are not satisfied.)	> 600 rpm
Transmission range	Drive
Vehicle speed (calculated from secondary pulley shaft speed)	≥ 21.9 MPH
Diagnosis 2	
12 V battery system voltage	≥ 10 V
Engine coolant temperature at the end of the previous drive cycle – Engine coolant temperature at engine start	≥ 40 degC

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
Absolute change of measured Transmission fluid temperature sensor input voltage	≤ 0.049 V
Transmission fluid temperature	< 20 degC
Diagnosis 2	
Transmission fluid temperature – Engine coolant temperature at engine start	> 46 degC

Time Needed for Diagnosis:
- **Diagnosis 1:** 600 s
- **Diagnosis 2:** 300 s

Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

H: DTC P0712 TRANSMISSION FLUID TEMPERATURE SENSOR CIRCUIT LOW INPUT

1. OUTLINE OF DIAGNOSIS

- Detect the ground short circuit of transmission oil temperature sensor.
- Judge as NG if the detected voltage of transmission oil temperature sensor is lower than the predetermined value.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
12 V battery system voltage	≥ 9 V

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Measured Transmission fluid temperature sensor input voltage (Transmission fluid temperature)	< 0.117 V (> 146 degC)

Time Needed for Diagnosis: 1 second
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

I: DTC P0713 TRANSMISSION FLUID TEMPERATURE SENSOR CIRCUIT HIGH INPUT

1. OUTLINE OF DIAGNOSIS

- Detect open circuit or short circuit to power supply of the transmission oil temperature sensor 5 V system.
- Judge as NG if the detected voltage of transmission oil temperature sensor is higher than the predetermined value.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
12 V battery system voltage	≥ 9 V
Vehicle speed (calculated from secondary pulley speed)	≥ 6.3 MPH
Above condition satisfied for	≥ 50 s

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Measured Transmission fluid temperature sensor input voltage	> 4.507 V
(Transmission fluid temperature)	(< – 52 degC)

Time Needed for Diagnosis: 1 second
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

J: DTC P0716 TORQUE CONVERTER TURBINE SPEED

1. OUTLINE OF DIAGNOSIS

- Detect the malfunction of turbine speed sensor signal characteristics.
- Judge as NG if the turbine speed against the engine speed is outside the possible range considering the hardware capabilities.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
12 V battery system voltage	≥ 10 V
Measured turbine shaft speed	≥ 50 rpm

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Engine Speed – Measured turbine shaft speed	> Table 1 rpm

Table 1

Measured turbine shaft speed (rpm)	0	500	1000	1500	2000	2500	3000	3500
Engine Speed – Measured turbine shaft speed (rpm)	3700	3227	2755	2282	1856	1519	1213	956

Measured turbine shaft speed (rpm)	4000	4500	5000	5500	6000	6500	7000
Engine Speed – Measured turbine shaft speed (rpm)	786	713	651	601	569	544	520

Time Needed for Diagnosis: 10 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

K: DTC P0717 INPUT/TURBINE SPEED SENSOR "A" CIRCUIT NO SIGNAL

1. OUTLINE OF DIAGNOSIS

- Detect the no input signal from the turbine speed sensor.
- Judge as NG if there is no input signal from the turbine speed sensor, while the primary speed sensor on the same shaft has the input signal with the forward/reverse clutch engaged.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
12 V battery system voltage	≥ 10 V
Engine speed	≥ 400 rpm
Transmission range	Drive or Reverse
Measured primary pulley shaft speed	≥ 500 rpm

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Measured turbine shaft speed	0 rpm

Time Needed for Diagnosis: 0.5 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

L: DTC P0719 BRAKE SWITCH CIRCUIT LOW

1. OUTLINE OF DIAGNOSIS

- Detect no input from the brake signal.
- Judge as NG if a predetermined number of deceleration occurs while the cruise control is set to OFF and the brake is OFF.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Cruise control	OFF
Malfunctions listed on the right column are not detected:	P0717

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Number of times that vehicle speed changes from 30 km/h to 1 km/h while the brake SW is OFF	> 10 count

Malfunction Indicator Light Illumination: Malfunction indicator light does not illuminate.

M: DTC P0724 BRAKE SWITCH CIRCUIT HIGH

1. OUTLINE OF DIAGNOSIS

- Detect the brake signal stuck to ON.
- Judge as NG if a predetermined number of acceleration occurs while the cruise control is set to OFF and the brake is ON.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Cruise control	OFF
Malfunctions listed on the right column are not detected:	P0717

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Number of times that vehicle speed changes from 1 km/h to 30 km/h while the brake SW is ON	> 10 count

Malfunction Indicator Light Illumination: Malfunction indicator light does not illuminate.

N: DTC P0730 GEARSHIFT CONTROL PERFORMANCE ABNORMAL

1. OUTLINE OF DIAGNOSIS

- Detect the abnormality in transmission gear ratio control function.
- Judge as NG if a discrepancy between the transmission target gear ratio (as internal data) and the actual gear ratio becomes the specified value or more. (Compare the value of "Gear Ratio Target × Secondary pulley speed ≈ Target primary speed equivalent value" with the value of primary pulley speed sensor.)

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
12 V battery system voltage	≥ 10 V
Engine speed	≥ 500 rpm
Transmission range	Drive

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
|Target primary pulley shaft speed – Measured primary pulley shaft speed|	≥ 600 rpm
(Commanded duty of shift up pressure control solenoid valve	≥ 90%
or	
Commanded duty of shift down pressure control solenoid valve)	≥ 90%

Time Needed for Diagnosis: 5 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

O: DTC P0746 PRESSURE CONTROL SOLENOID "A" PERFORMANCE/STUCK OFF

1. OUTLINE OF DIAGNOSIS

• Detect the malfunction of transmission line pressure solenoid and hydraulic circuit (stuck to low pressure side).
• Judge as NG if “Target line pressure – Actual line pressure” becomes the predetermined value or more, while the actual line pressure is equal to or more than the predetermined value.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
12 V battery system voltage	≥ 10 V
Engine speed	≥ 1000 rpm
Measured line pressure control solenoid valve current	≤ 0.78 A

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Measured line pressure	< Map1 kPa

Map 1

		Engine speed (rpm)						
		0	500	1000	1500	2000	2500	3000
Transmission fluid temperature (degC)	– 40	0	0	340	404	478	558	643
	– 20	0	0	340	404	478	558	643
	0	0	0	324	382	454	532	616
	20	0	0	366	425	490	565	649
	40	0	0	345	400	466	536	613
	60	0	0	341	389	447	512	591
	80	0	0	319	371	429	488	571
	100	0	0	298	356	412	476	551
	120	0	0	271	329	384	451	519
	140	0	0	243	302	357	425	487

		Engine speed (rpm)						
		3500	4000	4500	5000	5500	6000	6500
Transmission fluid temperature (degC)	– 40	751	883	1042	1167	1264	1292	1274
	– 20	751	883	1042	1167	1264	1342	1424
	0	722	840	991	1135	1240	1319	1395
	20	751	861	1000	1160	1258	1350	1417
	40	708	817	943	1103	1223	1312	1385
	60	677	779	906	1064	1187	1266	1339
	80	652	748	874	1000	1135	1223	1299
	100	629	719	831	947	1069	1181	1251
	120	593	678	780	880	990	1109	1171
	140	557	637	728	813	911	1037	1090

Time Needed for Diagnosis: 5 seconds
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

P: DTC P0747 PRESSURE CONTROL SOLENOID "A" STUCK ON

1. OUTLINE OF DIAGNOSIS

• Detect the malfunction of transmission line pressure solenoid and hydraulic circuit (stuck to high pressure side).
• Judge as NG if “Target line pressure – Actual line pressure” becomes the predetermined value or less, while the actual line pressure is equal to or more than the predetermined value.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
12 V battery system voltage	≥ 10 V
Engine speed	≥ 1000 rpm
Measured line pressure control solenoid valve current	≥ 0.5 A

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Measured line pressure	> Map1 kPa

Map 1

		Engine speed (rpm)						
		0	500	1000	1500	2000	2500	3000
Transmission fluid temperature (degC)	– 40	25600	25600	6231	6302	6341	6375	6404
	– 20	25600	25600	6231	6302	6341	6375	6404
	0	25600	25600	5977	6055	6102	6138	6120
	20	25600	25600	5624	5708	5764	5801	5836
	40	25600	25600	5547	5659	5726	5769	5804
	60	25600	25600	5420	5420	5540	5600	5643
	80	25600	25600	5351	5351	5487	5568	5609
	100	25600	25600	5422	5422	5422	5514	5553
	120	25600	25600	5266	5266	5266	5375	5444
	140	25600	25600	5236	5236	5236	5236	5335

		Engine speed (rpm)						
		3500	4000	4500	5000	5500	6000	6500
Transmission fluid temperature (degC)	– 40	6428	6462	6498	6532	6562	6588	6613
	– 20	6428	6462	6498	6532	6562	6588	6613
	0	6147	6184	6224	6260	6288	6314	6338
	20	5867	5905	5950	5988	6013	6041	6062
	40	5838	5878	5920	5956	5983	6008	6036
	60	5678	5718	5755	5785	5816	5836	5880
	80	5646	5680	5718	5745	5785	5816	5859
	100	5596	5635	5677	5711	5743	5780	5817
	120	5489	5522	5564	5600	5639	5682	5685
	140	5381	5408	5451	5489	5535	5585	5552

Time Needed for Diagnosis: 5 seconds
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

Q: DTC P0751 SHIFT SOLENOID "A" PERFORMANCE/STUCK OFF

1. OUTLINE OF DIAGNOSIS

• Detect the malfunction of shift-up fluid pressure control solenoid characteristics and hydraulic circuit characteristics (stuck to low pressure side).
• Judge as NG if the amount of gear rate change per second is equal to or larger than the predetermined value, even though the up-shift command is issued.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
12 V battery system voltage	≥ 10 V
Engine speed	≥ 1000 rpm
Commanded duty of shift down pressure control solenoid	0%
Actual pulley ratio *	> 1.5 and < 2.549

* Actual pulley ratio: Measured primary pulley shaft speed / Measured secondary pulley shaft speed

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Actual pulley ratio change for 1 second	> – 0.08
Commanded duty of shift up pressure control solenoid	≥ 90%

Time Needed for Diagnosis: 1 second
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

R: DTC P0752 SHIFT SOLENOID "A" STUCK ON

1. OUTLINE OF DIAGNOSIS

• Detect the malfunction of shift-up fluid pressure control solenoid and hydraulic circuit characteristics (stuck to high pressure side).
• Judge as NG if the amount of gear rate change per second is within the predetermined value, even though the down-shift command is issued.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
12 V battery system voltage	≥ 10 V
Engine speed	≥ 1000 rpm
Commanded duty of shift up pressure control solenoid	0%
Actual pulley ratio *	< 0.5

* Actual pulley ratio: Measured primary pulley shaft speed / Measured secondary pulley shaft speed

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Actual pulley ratio change for 1 second	> – 0.08 and < 0.08
Commanded duty of shift down pressure control solenoid	> 80%

Time Needed for Diagnosis: 1 second
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

S: DTC P0756 SHIFT SOLENOID "B" PERFORMANCE/STUCK OFF

1. OUTLINE OF DIAGNOSIS

• Detect the malfunction of shift-down fluid pressure control solenoid characteristics and hydraulic circuit characteristics (stuck to low pressure side).
• Judge as NG if the amount of gear rate change per second is within the predetermined value, even though the down-shift command is issued.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
12 V battery system voltage	≥ 10 V
Engine speed	≥ 1000 rpm
Commanded duty of shift up pressure control solenoid	0%
Actual pulley ratio *	≥ 0.406 and ≤ 2.549

* Actual pulley ratio: Measured primary pulley shaft speed / Measured secondary pulley shaft speed

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Actual pulley ratio change for 1 second	> – 0.08 and < 0.08
Commanded duty of shift down pressure control solenoid	> 80%

Time Needed for Diagnosis: 1 second
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

T: DTC P0757 SHIFT SOLENOID "B" STUCK ON

1. OUTLINE OF DIAGNOSIS

• Detect the malfunction of shift-down fluid pressure control solenoid characteristics and hydraulic circuit characteristics (stuck to high pressure side).
• Judge as NG if the amount of gear rate change per second is equal to or larger than the predetermined value, even though the up-shift command is issued.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
12 V battery system voltage	≥ 10 V
Engine speed	≥ 1000 rpm
Commanded duty of shift down pressure control solenoid	0%
Actual pulley ratio *	≥ 0.406 and ≤ 2.549

* Actual pulley ratio: Measured primary pulley shaft speed / Measured secondary pulley shaft speed

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Actual pulley ratio change for 1 second	> 0.04
Commanded duty of shift up pressure control solenoid	> 50%

Time Needed for Diagnosis: 1 s × 10 times
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

U: DTC P0776 PRESSURE CONTROL SOLENOID "B" PERFORMANCE/STUCK OFF

1. OUTLINE OF DIAGNOSIS

• Detect the malfunction of transmission forward/reverse clutch pressure solenoid and hydraulic circuit characteristics (stuck to low pressure side).
• Judge as NG if the value calculated by “turbine speed – primary pulley speed” becomes the predetermined value or more, even though the forward/reverse clutch is engaged.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Diagnosis 1	
12 V battery system voltage	≥ 10 V
Transmission range	Drive
Measured turbine shaft speed	≥ 100 rpm
Measured primary pulley shaft speed	≥ 100 rpm
Vehicle speed (from vehicle dynamics control module)	≥ 6 MPH
Commanded forward & reverse clutch pressure control solenoid current	< 0.9 A
Engine speed	≥ 500 rpm
Diagnosis 2	
12 V battery system voltage	≥ 10 V
Transmission range	Drive
Measured turbine shaft speed	> 2000 rpm
Vehicle speed (from vehicle dynamics control module)	< 6 MPH
Commanded forward & reverse clutch pressure control solenoid current	< 0.9 A
Accelerator pedal position (from ECM)	> 6%
Engine speed	≥ 500 rpm

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
|Measured turbine shaft speed – Measured primary pulley shaft speed|	> Table 1 rpm
Diagnosis 2	
Measured turbine shaft speed	> 2000 rpm

Table 1

Vehicle speed (MPH)	0	13	25	38	50	63	75
|Measured turbine shaft speed – Measured primary pulley shaft speed|(rpm)	150	100	100	100	100	100	100

Vehicle speed (MPH)	88	100	113	125	138	150	159
|Measured turbine shaft speed – Measured primary pulley shaft speed|(rpm)	100	100	100	100	100	100	100

Time Needed for Diagnosis: 5 seconds
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

V: DTC P0801 REVERSE INHIBIT CONTROL CIRCUIT

1. OUTLINE OF DIAGNOSIS

- Detect the malfunction of shift lock solenoid or circuit.
- Judge as NG if abnormal signal from the integrated unit is received, when bus off is not detected and there is no trouble in CAN between the integrated unit.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Malfunctions listed on the right column are not detected:	U0073 U0140, U0422

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Shift lock solenoid system circuit abnormal (received from BIU)	ON

Time Needed for Diagnosis: 1 second
Malfunction Indicator Light Illumination: Malfunction indicator light does not illuminate.

W: DTC P0841 SECONDARY OIL PRESSURE SENSOR PERFORMANCE

1. OUTLINE OF DIAGNOSIS

- Detect the malfunction of transmission fluid pressure control function.
- Judge as NG if a discrepancy between the target secondary oil pressure (as internal data) and the detected value of the secondary oil pressure sensor becomes the specified value or more.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
12 V battery system voltage	≥ 10 V
Engine speed	≥ Table 1 rpm

Table 1

Target line pressure (kPa)	0	500	1000	1500	2000	3000	4000	5000	6000
Engine speed (rpm)	400	600	965	1180	1370	1670	1930	2150	2340

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
|Target line pressure – Measured line pressure|	≥ 500 kPa

Time Needed for Diagnosis: 5 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

X: DTC P0842 SECONDARY OIL PRESSURE SENSOR CIRCUIT (LOW)

1. OUTLINE OF DIAGNOSIS

- Detect the ground short circuit of the transmission line pressure sensor.
- Judge as NG if the detected voltage of transmission line pressure sensor is lower than the predetermined value.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
12 V battery system voltage	≥ 9 V

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Measured line pressure sensor input voltage (Line pressure)	< 0.195 V (< – 574 kPa)

Time Needed for Diagnosis: 0.5 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

Y: DTC P0843 SECONDARY OIL PRESSURE SENSOR CIRCUIT (HIGH)

1. OUTLINE OF DIAGNOSIS

- Detect short circuit to power supply or open circuit of the transmission line pressure sensor 5 V system.
- Judge as NG if the detected voltage of the transmission line pressure sensor is higher than the predetermined value.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
12 V battery system voltage	≥ 9 V

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Measured line pressure sensor input voltage (Line pressure)	> 4.883 V (> 8200 kPa)

Time Needed for Diagnosis: 1.5 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

Z: DTC P0890 AT SELF-SHUT RELAY DIAGNOSIS (LOW)

1. OUTLINE OF DIAGNOSIS

- Detect the malfunction of transmission fluid pressure solenoid drive power supply relay circuit.
- Judge as NG if the transmission fluid pressure solenoid drive power supply voltage is lower than the predetermined value.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
12 V battery system voltage	≥ 9 V
Ignition state	Run or Crank

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Measured TCM input voltage which is supplied from 12 V battery system through the TCM Power Relay	< 2 V

Time Needed for Diagnosis: 0.5 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

AA:DTC P0951 MANUAL SWITCH

1. OUTLINE OF DIAGNOSIS

- Detect the GND-output short (ground-fault) in manual SW circuit.
- Judge as NG if the manual SW is ON in P, R or N range.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Malfunctions listed on the right column are not detected:	P0705, P0708

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Manual SW status in other than D range	ON

Time Needed for Diagnosis: 5 s
Malfunction Indicator Light Illumination: Malfunction indicator light does not illuminate.

AB:DTC P0961 PRESSURE CONTROL SOLENOID "A" CONTROL CIRCUIT RANGE/PERFORMANCE

1. OUTLINE OF DIAGNOSIS

- Detect the malfunction of transmission line pressure solenoid drive circuit.
- Judge as NG when the deviation between target current and actual current of the transmission line pressure solenoid becomes equal to or larger than the predetermined value.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
12 V battery system voltage	≥ 9 V

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
| Target line pressure control solenoid valve current – Measured line pressure control solenoid valve current |	> 0.2 A

Time Needed for Diagnosis: 5 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

AC:DTC P0962 SECONDARY SOLENOID CIRCUIT (LOW)

1. OUTLINE OF DIAGNOSIS

Diagnosis 1
- Detect the ground short of the transmission line pressure solenoid drive circuit.
- Judge as NG if the transmission line pressure solenoid drive current is higher than the predetermined value.

Diagnosis 2
- Detect the ground short of the transmission line pressure solenoid drive circuit.
- Judge as NG if an overcurrent is detected more than 10 times in the transmission line pressure solenoid drive circuit.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Diagnosis 1	
12 V battery system voltage	≥ 9 V
Commanded line pressure control solenoid valve current	≥ 0.1 A
Diagnosis 2	
12 V battery system voltage	≥ 9 V

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
Measured line pressure control solenoid valve current	≥ 1.1 A
Diagnosis 2	
Signal of malfunction from solenoid driver IC	ON
As defined by:	
Measured line pressure control solenoid valve current ≥ 1.2 A	

Time Needed for Diagnosis: 0.5 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

AD:DTC P0963 SECONDARY SOLENOID CIRCUIT (HIGH)

1. OUTLINE OF DIAGNOSIS

- Detect short circuit to power supply or open circuit of the transmission line pressure solenoid drive circuit.
- Judge as NG if the transmission line pressure solenoid drive current is lower than the predetermined value.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
12 V battery system voltage	≥ 9 V
Commanded line pressure control solenoid valve current	≥ 0.2 A

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Measured line pressure control solenoid valve current	< 0.1 A

Time Needed for Diagnosis: 0.5 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

AE:DTC P0965 FORWARD & REVERSE SOLENOID FUNCTION

1. OUTLINE OF DIAGNOSIS

Diagnosis 1
• Detect the malfunction of transmission forward/reverse clutch pressure solenoid drive circuit characteristics.
• Judge as NG when the deviation between set current and actual current of the transmission forward/reverse clutch pressure solenoid drive circuit becomes equal to or larger than the predetermined value.
Diagnosis 2
• Detect the malfunction of transmission forward/reverse clutch pressure solenoid drive circuit characteristics.
• Judge as NG when the transmission forward/reverse clutch pressure solenoid drive current is within the predetermined value.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Diagnosis 1	
12 V battery system voltage	≥ 9 V
Diagnosis 2	
12 V battery system voltage	≥ 9 V

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
|Target forward & reverse clutch pressure control solenoid current – Measured forward & reverse clutch pressure control solenoid current|	> 0.2 A
Diagnosis 2	
Measured forward & reverse clutch pressure control solenoid current	> 1.08 A and ≤ 1.6 A

Time Needed for Diagnosis: 5 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

AF:DTC P0966 FORWARD & REVERSE SOLENOID CIRCUIT (LOW)

1. OUTLINE OF DIAGNOSIS

- Detect the GND-output short in transmission forward/reverse clutch pressure solenoid circuit.
- Judge as NG if an overcurrent is detected more than 10 times in the transmission forward/reverse clutch pressure solenoid drive circuit.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
12 V battery system voltage	≥ 9 V

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Signal of malfunction from solenoid driver IC As defined by: Measured forward & reverse clutch pressure control solenoid current > 1.6 A	ON

Time Needed for Diagnosis: 0.02 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

AG:DTC P0967 FORWARD & REVERSE LINEAR SOLENOID CIRCUIT (HIGH)

1. OUTLINE OF DIAGNOSIS

• Detect open circuit or power supply-output short circuit in the transmission forward/reverse clutch pressure solenoid circuit.
• Judge as NG if the transmission forward/reverse clutch pressure solenoid drive current is lower than the predetermined value.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
12 V battery system voltage	≥ 9 V
Target forward & reverse clutch pressure control solenoid current	≥ 0.3 A

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Signal of malfunction from solenoid driver IC	ON
As defined by:	
Measured forward & reverse clutch pressure control solenoid current < 5.9 mA	

Time Needed for Diagnosis: 1 second
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

AH:DTC P0970 TRANSFER SOLENOID CIRCUIT (LOW)

1. OUTLINE OF DIAGNOSIS

- Detect the GND-output short in transfer solenoid circuit.
- Judge as NG if a ground short circuit is detected more than 10 times via the detection circuit for the transfer solenoid drive circuit.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Target duty cycle	0%

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Malfunction signal from solenoid driver IC	≥ 10 count

Time Needed for Diagnosis: Immediately
Malfunction Indicator Light Illumination: Malfunction indicator light does not illuminate.

AI: DTC P0971 TRANSFER SOLENOID CIRCUIT (HIGH)

1. OUTLINE OF DIAGNOSIS

- Detect open circuit or power supply-output short circuit in the transfer solenoid circuit.
- Judge as NG if an open circuit or a short circuit to ground is detected more than 10 times via the detection circuit in the transfer solenoid drive circuit.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Target duty cycle	100%

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Malfunction signal from solenoid driver IC	≥ 10 count

Time Needed for Diagnosis: Immediately
Malfunction Indicator Light Illumination: Malfunction indicator light does not illuminate.

AJ:DTC P0973 PRIMARY SOLENOID SYSTEM A CIRCUIT (LOW)

1. OUTLINE OF DIAGNOSIS

- Detect the ground short of the shift-up fluid pressure control solenoid drive circuit.
- Judge as NG if a ground short circuit is detected more than 10 times in the shift-up fluid pressure control solenoid drive circuit.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
12 V battery system voltage	≥ 9 V
Commanded duty of shift up pressure control solenoid	100%

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Signal of malfunction from solenoid driver IC As defined by: Measured shift up pressure control solenoid voltage ≤ 0.8 V	ON

Time Needed for Diagnosis: 0.2 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

AK:DTC P0974 PRIMARY SOLENOID SYSTEM A CIRCUIT (HIGH)

1. OUTLINE OF DIAGNOSIS

• Detect short circuit to power supply or open circuit of the shift-up fluid pressure control solenoid drive circuit.
• Judge as NG if an open circuit or a power-supply short circuit is detected more than 10 times in the shift-up fluid pressure control solenoid drive circuit.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
12 V battery system voltage	≥ 9 V
Commanded duty of shift up pressure control solenoid	0%

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Signal of malfunction from solenoid driver IC	ON
As defined by:	
Measured shift up pressure control solenoid voltage ≥ 2.5 V	

Time Needed for Diagnosis: 0.2 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

AL:DTC P0976 PRIMARY SOLENOID SYSTEM B CIRCUIT (LOW)

1. OUTLINE OF DIAGNOSIS

- Detect the ground short of the shift-down fluid pressure control solenoid drive circuit.
- Judge as NG if a ground short circuit is detected more than 10 times in the shift-down fluid pressure control solenoid drive circuit.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
12 V battery system voltage	≥ 9 V
Commanded duty of shift down pressure control solenoid	100%

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Signal of malfunction from solenoid driver IC As defined by: Measured shift down pressure control solenoid voltage ≤ 0.8 V	ON

Time Needed for Diagnosis: 0.2 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

AM:DTC P0977 PRIMARY SOLENOID SYSTEM B CIRCUIT (HIGH)

1. OUTLINE OF DIAGNOSIS

• Detect short circuit to power supply or open circuit of the shift-down fluid pressure control solenoid drive circuit.
• Judge as NG if an open circuit or a power-supply short circuit is detected more than 10 times in the shift-down fluid pressure control solenoid drive circuit.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
12 V battery system voltage	≥ 9 V
Commanded duty of shift down pressure control solenoid	0%

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Signal of malfunction from solenoid driver IC As defined by: Measured shift down pressure control solenoid voltage ≥ 2.5 V	ON

Time Needed for Diagnosis: 0.2 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

AN:DTC P160A RANDOM ACCESS MEMORY (RAM) ERROR

1. OUTLINE OF DIAGNOSIS

- Judge the malfunction in RAM area of the TCM.
- Judge as NG if an attempt to write to RAM area failed.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
12 V battery system voltage	≥ 9 V

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Writing-check (RAM) NOTE: This check is carried out about the RAM used except for CAN communication.	Error

Time Needed for Diagnosis: Immediately
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

AO:DTC P170A L-RANGE SW SYSTEM

1. OUTLINE OF DIAGNOSIS

- Detect the GND-output short (ground-fault) in L range SW circuit.
- Judge as NG if the L range SW is ON in P, R or N range.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Malfunctions listed on the right column are not detected:	P0705, P0708

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
L range SW status in other than D range	ON

Time Needed for Diagnosis: 5 s
Malfunction Indicator Light Illumination: Malfunction indicator light does not illuminate.

AP:DTC P2158 VEHICLE SPEED SENSOR "B"

1. OUTLINE OF DIAGNOSIS

- Judge the malfunction of VDC wheel speed sensor.
- Judge as NG when the wheel speed sensor normal status signal from VDC is cleared.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
12 V battery system voltage	≥ 10.9 V

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Signal of malfunction from Vehicle Dynamics Control Module NOTE: The VDC controller detects malfunction if one of the speed sensors does not output a signal and the other vehicle speed sensor output signal is above 7.46 MPH.	ON

Time Needed for Diagnosis: 2.5 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

AQ:DTC P2530 IGNITION SWITCH RUN POSITION CIRCUIT

1. OUTLINE OF DIAGNOSIS

- Detect the malfunction of ignition SW circuit.
- Judge as NG if the ignition SW signals are lost 5 times or more even though the engine is ON.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
12 V battery system voltage	≥ 10.9 V
Engine speed	≥ 500 rpm

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Count of temporarily discontinuous input of ignition switch	≥ 5 count

Time Needed for Diagnosis: 5 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

AR:DTC P2746 PRIMARY PULLEY REVOLUTION SPEED SENSOR CIRCUIT

1. OUTLINE OF DIAGNOSIS

Diagnosis 1
- Detect the malfunction of primary speed sensor signal characteristics.
- Judge as NG if the primary speed, compared with the speeds of other parts, is outside the possible range considering the hardware capabilities.

Diagnosis 2
- Detect the malfunction of primary speed sensor signal characteristics.
- Judge as NG if the primary speed exceeds the predetermined value.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Diagnosis 1	
12 V battery system voltage	≥ 9 V
Transmission range	Drive or Reverse
(Measured turbine shaft speed / Measured secondary pulley shaft speed)	≥ 0.4 and ≤ 2.55
Diagnosis 2	
12 V battery system voltage	≥ 9 V
Transmission range	Drive or Reverse
(Measured turbine shaft speed / Measured secondary pulley shaft speed)	≥ 0.4 and ≤ 2.55

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis 1	
(Measured primary pulley shaft speed / Measured secondary pulley shaft speed)	< 0.36 or > 2.80
Diagnosis 2	
Measured primary pulley shaft speed	> 7140 rpm

Time Needed for Diagnosis: 5 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

AS:DTC P2747 INTERMEDIATE SHAFT SPEED SENSOR "B" CIRCUIT NO SIGNAL

1. OUTLINE OF DIAGNOSIS

- Detect the no input signal from the primary speed sensor.
- Judge as NG if there is no input signal from the primary pulley speed sensor, while the secondary pulley speed sensor has the input signal although the primary and secondary pulleys are interlocked via the chain.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
12 V battery system voltage	≥ 9 V
Measured secondary pulley shaft speed	≥ 500 rpm

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Measured primary pulley shaft speed	0 rpm

Time Needed for Diagnosis: 0.5 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

AT:DTC P2750 SEC. PULLEY REVOLUTION SPEED SENSOR CIRCUIT

1. OUTLINE OF DIAGNOSIS

- Detect the malfunction of the secondary speed sensor characteristics.
- Judge as NG if the deviation of vehicle speed between VDC and the secondary speed sensor becomes the predetermined value or more.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
12 V battery system voltage	≥ 10 V
Vehicle speed (from vehicle dynamics control module)	≥ 5 MPH

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
|Vehicle speed (calculated from secondary pulley shaft speed) – Vehicle speed (from vehicle dynamics control module)|	> 10 MPH

Time Needed for Diagnosis: 5 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

AU:DTC P2751 INTERMEDIATE SHAFT SPEED SENSOR "C" CIRCUIT NO SIGNAL

1. OUTLINE OF DIAGNOSIS

- Detect the no input signal from the secondary speed sensor.
- Judge as NG if there is no input signal from the secondary pulley speed sensor, while the primary pulley speed sensor has the input signal although the primary and secondary pulleys are interlocked via the chain.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
12 V battery system voltage	≥ 9 V
Transmission range	Drive or Reverse
Measured primary pulley shaft speed	≥ 1000 rpm

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Measured secondary pulley shaft speed	0 rpm

Time Needed for Diagnosis: 0.5 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

AV:DTC P2757 TORQUE CONVERTER CLUTCH PRESSURE CONTROL SOLENOID CONTROL CIRCUIT PERFORMANCE/STUCK OFF

1. OUTLINE OF DIAGNOSIS

• Detect the malfunction of lock-up fluid pressure control solenoid, and hydraulic circuit, or drive circuit characteristics (stuck to low pressure side).
• Judge as NG if the deviation between engine speed and turbine speed is the predetermined value or more, even though the lock-up request has been issued.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
12 V battery system voltage	≥ 10 V
Engine speed	≥ 1000 rpm
Transmission range	Drive
Commanded duty of torque converter clutch pressure control solenoid	≥ 95%

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
|Engine speed – Measured turbine shaft speed|	> Table1 rpm

Table 1

Measured turbine shaft speed (rpm)	0	500	1000	1500	2000	2500	3000	3500
|Engine speed – Measured turbine shaft speed|(rpm)	200	200	200	200	200	200	200	200

Measured turbine shaft speed (rpm)	4000	4500	5000	5500	6000	6500	7000
|Engine speed – Measured turbine shaft speed|(rpm)	200	200	200	200	200	200	200

Time Needed for Diagnosis: 10 seconds
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

AW:DTC P2758 TORQUE CONVERTER CLUTCH PRESSURE CONTROL SOLENOID CONTROL CIRCUIT STUCK ON

1. OUTLINE OF DIAGNOSIS

• Detect the malfunction of lock-up fluid pressure control solenoid, and hydraulic circuit, or drive circuit characteristics (stuck to high pressure side).
• Judge as NG if the deviation between engine speed and turbine speed is the predetermined value or less, even though the lock-up open request has been issued.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
12 V battery system voltage	≥ 10 V
Engine speed	≥ 1000 rpm
Transmission range	Drive
Engine torque	> Table 1 N·m
Commanded duty of torque converter clutch pressure control solenoid	≤ 0%

Table 1

Engine coolant temperature (degC)	– 40	– 20	0	20	40	60	80	100
Engine torque (N·m)	80	80	80	80	80	50	50	50

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
|Engine speed – Measured turbine shaft speed|	< Table 2 rpm

Table 2

Measured turbine shaft speed	0	500	1000	1500	2000	2500	3000	3500
|Engine speed – Measured turbine shaft speed|(rpm)	0	0	50	50	50	50	50	50

Measured turbine shaft speed	4000	4500	5000	5500	6000	6500	7000
|Engine speed – Measured turbine shaft speed|(rpm)	50	50	50	50	50	50	50

Time Needed for Diagnosis: 10 seconds
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

AX:DTC P2763 LOCK-UP DUTY SOLENOID CIRCUIT (HIGH)

1. OUTLINE OF DIAGNOSIS

• Detect short circuit to power supply or open circuit of the lock-up clutch pressure control solenoid drive circuit.
• Judge as NG if an open circuit or a power-supply short circuit is detected more than 10 times in the lock-up clutch pressure control solenoid drive circuit.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
12 V battery system voltage	≥ 9 V
Commanded duty of torque converter clutch pressure control solenoid	0%

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Signal of malfunction from solenoid driver IC	ON
As defined by:	
Measured torque converter clutch pressure control solenoid voltage ≥ 2.5 V	

Time Needed for Diagnosis: 0.2 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

AY:DTC P2764 LOCK-UP DUTY SOLENOID CIRCUIT (LOW)

1. OUTLINE OF DIAGNOSIS

- Detect the ground short of the lock-up clutch pressure control solenoid drive circuit.
- Judge as NG if a ground short circuit is detected more than 10 times in the lock-up clutch pressure control solenoid drive circuit.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
12 V battery system voltage	≥ 9 V
Commanded duty of torque converter clutch pressure control solenoid	100%

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Signal of malfunction from solenoid driver IC	ON
As defined by:	
Measured torque converter clutch pressure control solenoid voltage ≤ 0.8 V	

Time Needed for Diagnosis: 0.2 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

AZ:DTC U0073 CONTROL MODULE COMMUNICATION BUS OFF

1. OUTLINE OF DIAGNOSIS

- Detect malfunction of CAN communication.
- Judge as NG when CAN communication failure has occurred.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
12 V battery system voltage	≥ 10 V
Measured turbine shaft speed	> 0 rpm
or	
Transmission range	Drive or Reverse

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
CAN bus condition	Bus off

Time Needed for Diagnosis: 2 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

BA:DTC U0100 LOST COMMUNICATION WITH ECM/PCM "A"

1. OUTLINE OF DIAGNOSIS

- Detect malfunction of CAN communication.
- Judge as NG when CAN communication failure occurs with the ECM.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
12 V battery system voltage	≥ 10 V
Measured turbine shaft speed	> 0 rpm
or	
Transmission range	Drive or Reverse

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
CAN data from ECM	Lost

Time Needed for Diagnosis: 0.5 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

BB:DTC U0122 LOST COMMUNICATION WITH VEHICLE DYNAMICS CONTROL MODULE

1. OUTLINE OF DIAGNOSIS

- Detect malfunction of CAN communication.
- Judge as NG when CAN communication with VDCCM is not possible.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
12 V battery system voltage	≥ 10 V
Measured turbine shaft speed	> 0 rpm
or	
Transmission range	Drive or Reverse

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
CAN data from Vehicle Dynamics Control Module	Lost

Time Needed for Diagnosis: 0.5 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

BC:DTC U0140 LOST COMMUNICATION WITH BODY CONTROL MODULE

1. OUTLINE OF DIAGNOSIS

- Detect malfunction of CAN communication.
- Judge as NG when CAN communication failure occurs with the body integrated unit.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Turbine shaft speed or D range switch	> 0 rpm ON

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
CAN data from BIU	Lost

Time Needed for Diagnosis: 2 seconds
Malfunction Indicator Light Illumination: Malfunction indicator light does not illuminate.

BD:DTC U0155 LOST COMMUNICATION WITH INSTRUMENT PANEL CLUSTER (IPC) CONTROL MODULE

1. OUTLINE OF DIAGNOSIS

- Detect malfunction of CAN communication.
- Judge as NG when CAN communication failure occurs with the combination meter.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Turbine shaft speed or D range switch	> 0 rpm ON

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
CAN data from meter	Lost

Time Needed for Diagnosis: 2 seconds
Malfunction Indicator Light Illumination: Malfunction indicator light does not illuminate.

BE:DTC U0401 INVALID DATA RECEIVED FROM ECM/PCM "A"

1. OUTLINE OF DIAGNOSIS

- Detect malfunction of CAN communication.
- Judge as NG when data received from ECM is not normal.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
12 V battery system voltage	≥ 10 V
Measured turbine shaft speed	> 0 rpm
or	
Transmission range	Drive or Reverse

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
CAN data from ECM	Did not change

Time Needed for Diagnosis: 2 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

BF:DTC U0416 INVALID DATA RECEIVED FROM VEHICLE DYNAMICS CONTROL MODULE

1. OUTLINE OF DIAGNOSIS

- Detect malfunction of CAN communication.
- Judge as NG when data received from the VDCCM is not normal.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
12 V battery system voltage	≥ 10 V
Measured turbine shaft speed	> 0 rpm
or	
Transmission range	Drive or Reverse

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
CAN data from Vehicle Dynamics Control Module	Did not change

Time Needed for Diagnosis: 2 seconds
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

BG:DTC U0422 INVALID DATA RECEIVED FROM BODY CONTROL MODULE

1. OUTLINE OF DIAGNOSIS

- Detect malfunction of CAN communication.
- Judge as NG when data received from the body integrated unit is not normal.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Turbine shaft speed or D range switch	> 0 rpm ON

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
CAN data from BIU	Freeze

Time Needed for Diagnosis: 2 seconds
Malfunction Indicator Light Illumination: Malfunction indicator light does not illuminate.

BH:DTC U0423 INVALID DATA RECEIVED FROM INSTRUMENT PANEL CLUSTER CONTROL MODULE

1. OUTLINE OF DIAGNOSIS

- Detect malfunction of CAN communication.
- Judge as NG when data received from the combination meter is not normal.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Turbine shaft speed or D range switch	> 0 rpm ON

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
CAN data from meter	Freeze

Time Needed for Diagnosis: 2 seconds
Malfunction Indicator Light Illumination: Malfunction indicator light does not illuminate.

BI: DTC U1235 LOST COMMUNICATION WITH EyeSight

1. OUTLINE OF DIAGNOSIS

- Detect malfunction of CAN communication.
- Judge as NG when CAN communication failure occurs with the stereo camera.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Turbine shaft speed or D range switch	> 0 rpm ON

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
CAN data from stereo camera	Lost

Time Needed for Diagnosis: 2 seconds
Malfunction Indicator Light Illumination: Malfunction indicator light does not illuminate.

BJ:DTC U1433 INVALID DATA RECEIVED FROM EyeSight

1. OUTLINE OF DIAGNOSIS

- Detect malfunction of CAN communication.
- Judge as NG when data received from the stereo camera is not normal.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Turbine shaft speed or D range switch	> 0 rpm ON

3. DIAGNOSTIC METHOD

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
CAN data from stereo camera	Freeze

Time Needed for Diagnosis: 2 seconds
Malfunction Indicator Light Illumination: Malfunction indicator light does not illuminate.

CONTINUOUSLY VARIABLE TRANSMISSION
CVT(TH58A)

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1. General Description

A: SPECIFICATION

1. MANUAL TRANSMISSION AND DIFFERENTIAL

Model			Except for XV model	XV model
Type			5-forward speeds and 1-reverse (all stage with synchromesh)	
Transmission gear ratio		1st	3.454	3.545
		2nd	1.888	
		3rd	1.296	
		4th	0.972	
		5th	0.738	0.780
		Reverse	3.333	
Front reduction gear	Final	Type of gear	Hypoid	
		Gear ratio	4.111	4.444
Rear reduction gear	Transfer	Type of gear	Helical	
		Gear ratio	1.000	
	Final	Type of gear	Hypoid	
		Gear ratio	4.111	4.444
Front differential	Type and number of gear		Straight bevel gear (bevel pinion: 2, bevel gear: 2)	
Center differential	Type and number of gear		Straight bevel gear (bevel pinion: 2, bevel gear: 2 and viscous coupling)	
Transmission gear oil			SUBARU GEAR OIL EXTRA MT or equivalent	
Transmission gear oil capacity			3.5 L (3.7 US qt, 3.1 Imp qt)	

2. TRANSMISSION GEAR OIL

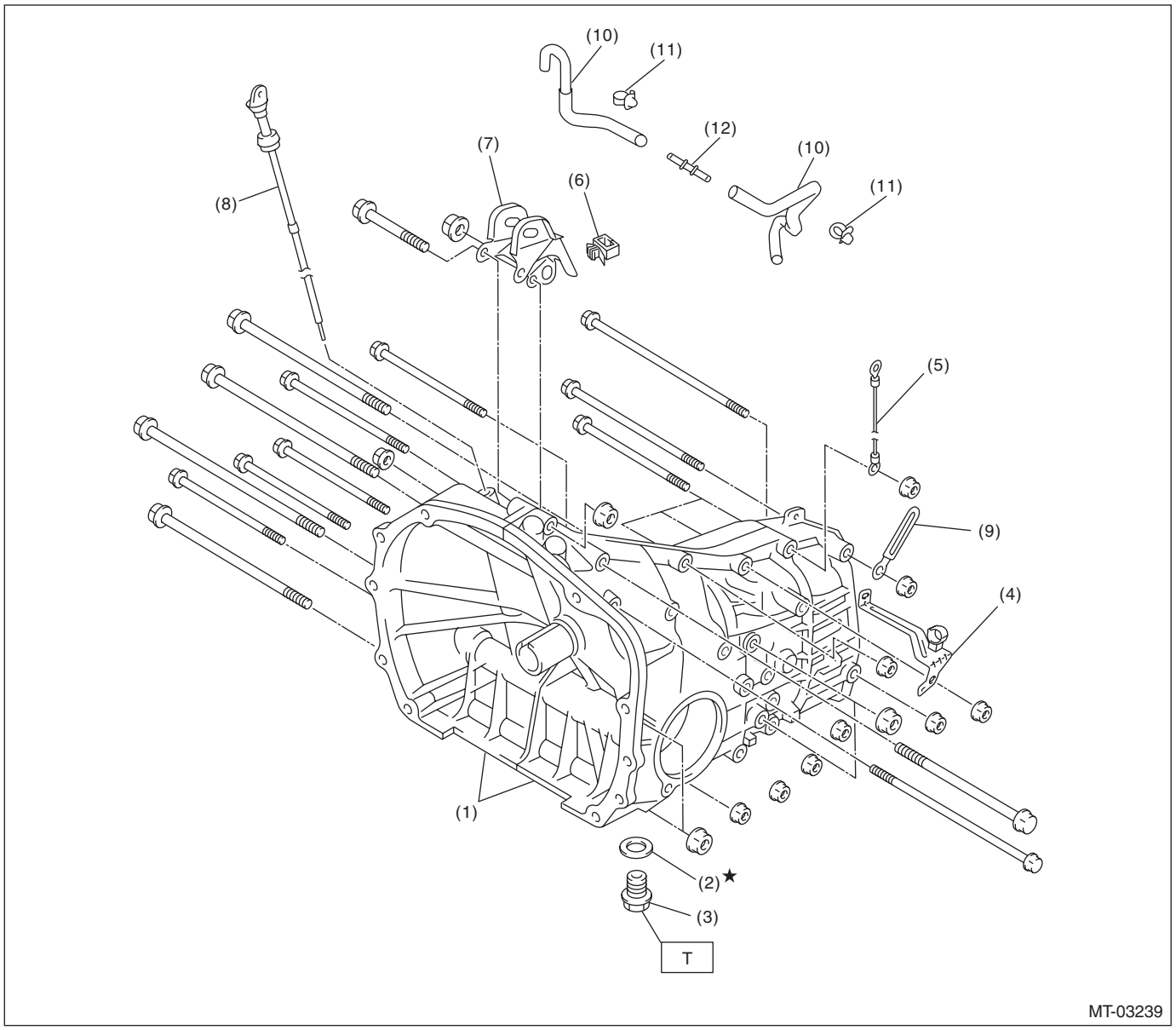
Recommended oil:
SUBARU GEAR OIL EXTRA MT

Alternative:
GL-5 (75W-90)

CAUTION:
If an alternative gear oil is used, you may not have expected functionality and performance.

B: COMPONENT

1. TRANSMISSION CASE

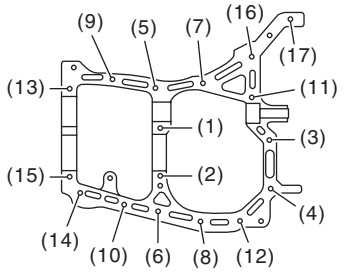


(1)	Transmission case ASSY	(7)	Pitching stopper bracket
(2)	Gasket	(8)	Oil level gauge
(3)	Drain plug	(9)	Harness clip
(4)	Harness bracket	(10)	Air breather hose
(5)	Transmission radio ground cord	(11)	Clip
(6)	Clamp	(12)	Hose connector

Tightening torque: N·m (kgf-m, ft-lb)

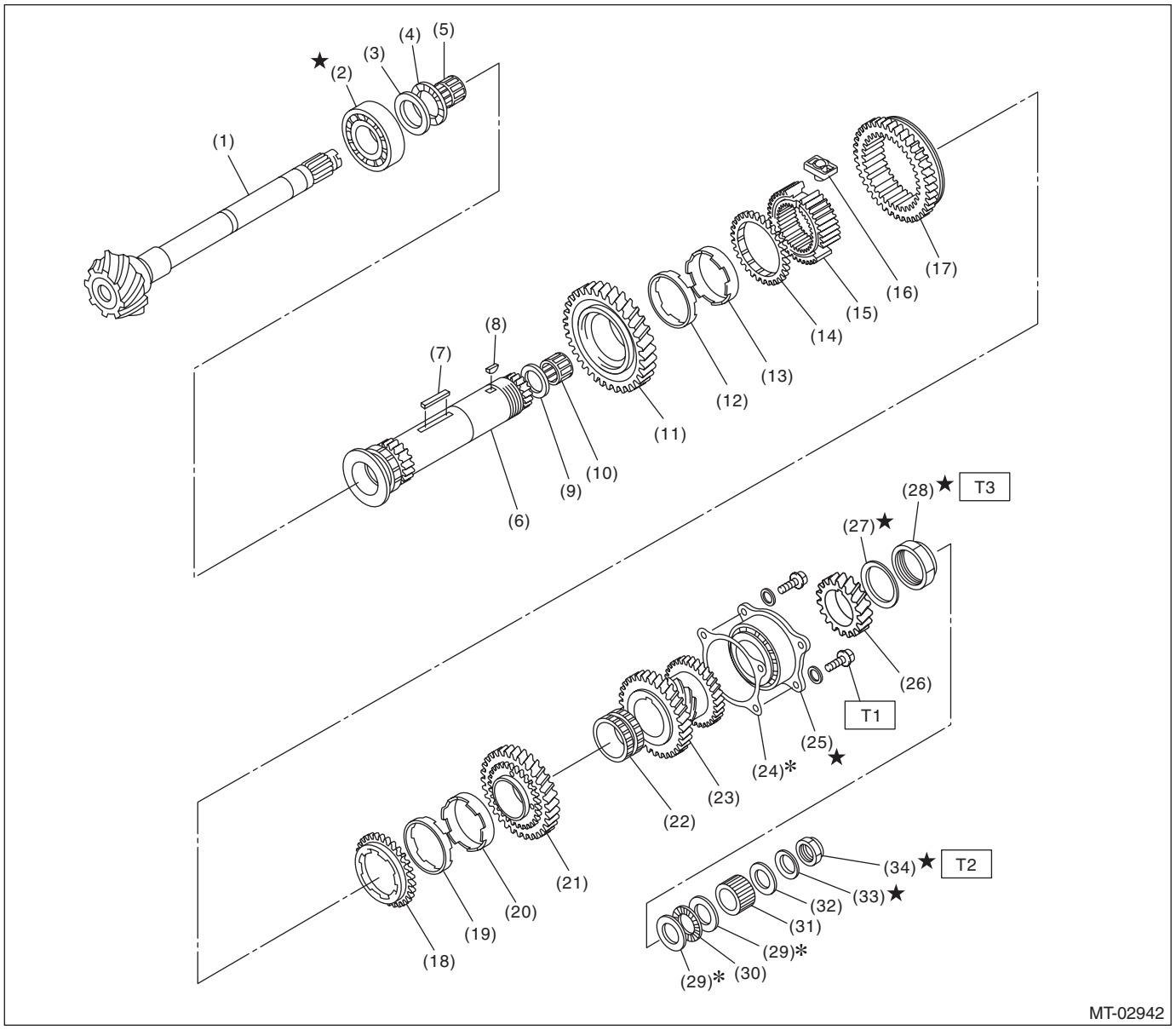
T: 44 (4.5, 32.5) (aluminum gasket, silver)
70 (7.1, 51.6) (copper gasket, brown)
70 (7.1, 51.6) (metal gasket, black)

Transmission case tightening torque



Bolt No.	Bolt size mm	Tightening torque: N·m (kgf-m, ft-lb)
(5) — (15)	8	25 (2.5, 18.4)
(1) — (4) (16), (17)	10	39 (4.0, 28.8)

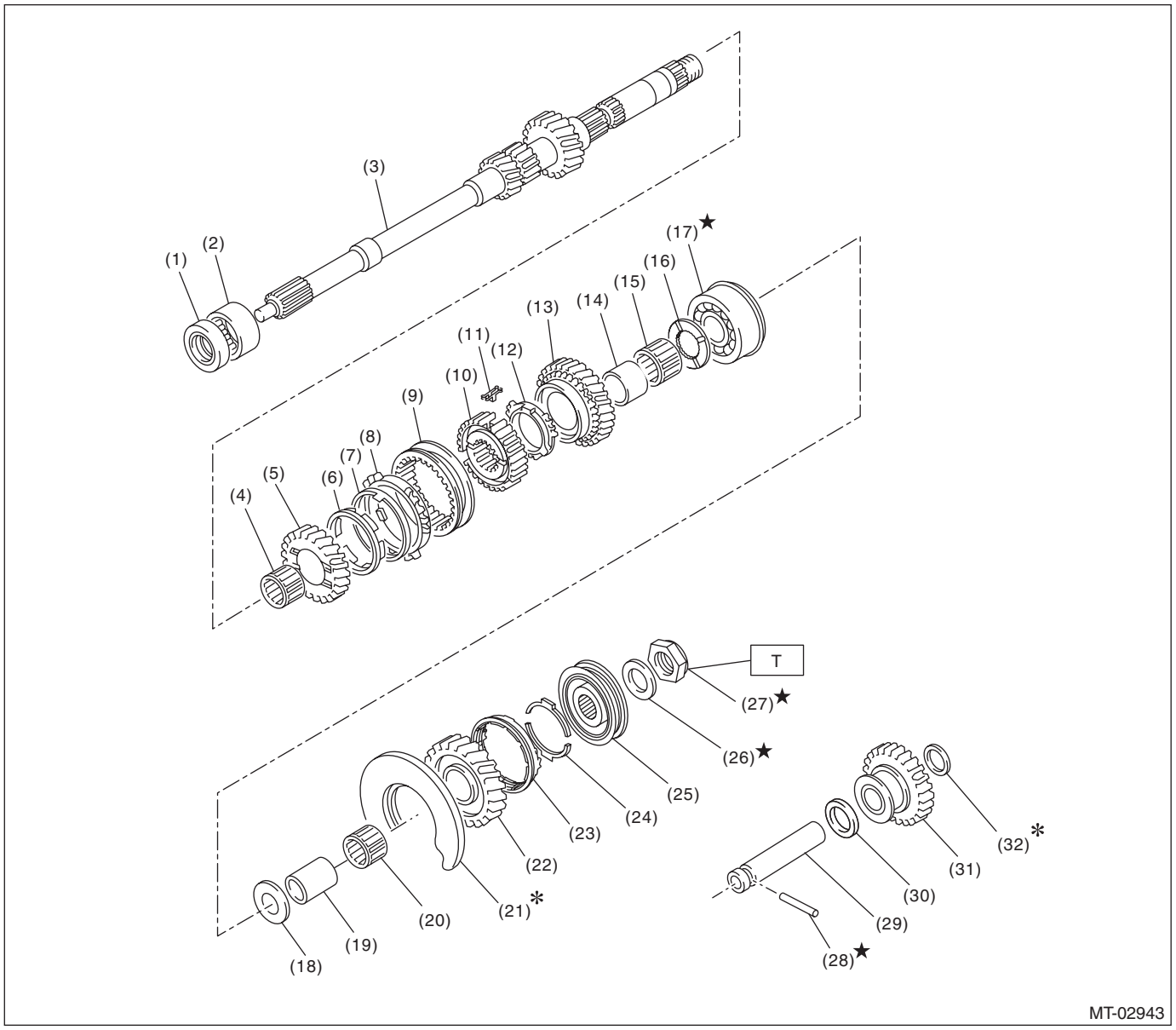
2. DRIVE PINION SHAFT ASSEMBLY



(1) Drive pinion shaft
(2) Roller bearing
(3) Washer
(4) Thrust bearing
(5) Needle bearing
(6) Driven shaft
(7) Key
(8) Woodruff key
(9) Drive pinion collar
(10) Needle bearing
(11) 1st driven gear
(12) Inner baulk ring
(13) Synchro cone
(14) Outer baulk ring
(15) 1st-2nd synchronizer hub
(16) Ball detent
(17) Reverse driven gear
(18) Outer baulk ring
(19) Synchro cone
(20) Inner baulk ring
(21) 2nd driven gear
(22) 2nd driven gear bushing
(23) 3rd-4th driven gear
(24) Drive pinion shim
(25) Double taper roller bearing
(26) 5th driven gear
(27) Lock washer
(28) Lock nut
(29) Adjusting washer
(30) Thrust bearing
(31) Differential bevel gear sleeve
(32) Washer
(33) Lock washer
(34) Lock nut

Tightening torque: N·m (kgf-m, ft-lb)
T1: 30 (3.1, 22.1)
T2: 120 (12.2, 88.5)
T3: 260 (26.5, 191.8)

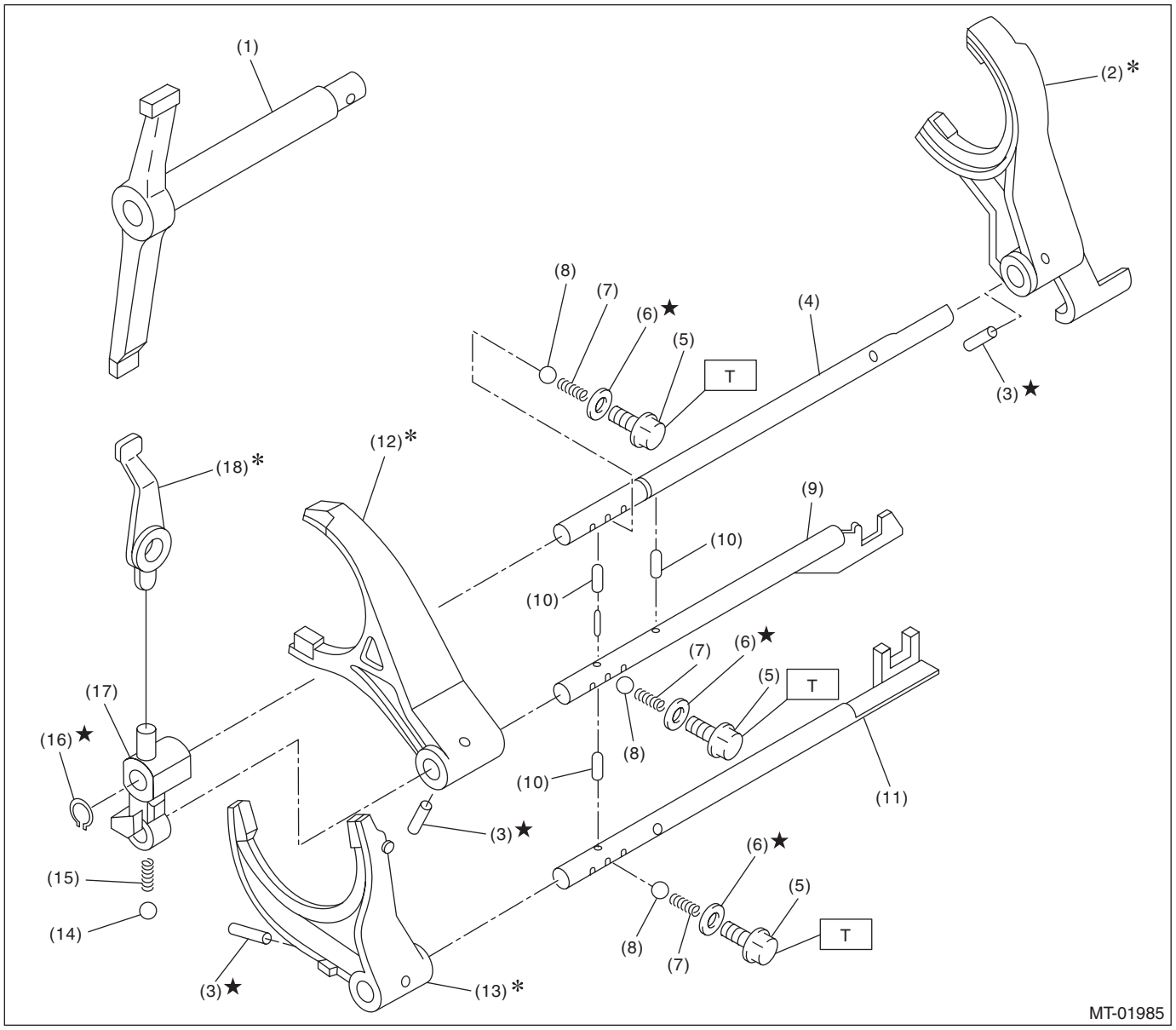
3. MAIN SHAFT ASSY



(1) Oil seal
(2) Needle bearing
(3) Main shaft
(4) Needle bearing
(5) 3rd drive gear
(6) Inner baulk ring
(7) 3rd synchro cone
(8) Outer baulk ring
(9) 3rd-4th coupling sleeve
(10) 3rd-4th synchronizer hub
(11) 3rd-4th shifting insert key
(12) 4th baulk ring
(13) 4th drive gear
(14) 4th needle bearing race
(15) Needle bearing
(16) 4th gear thrust washer
(17) Double ball bearing
(18) 5th gear thrust washer
(19) 5th needle bearing race
(20) Needle bearing
(21) Main shaft rear plate
(22) 5th drive gear
(23) 5th baulk ring
(24) Baulk lever
(25) 5th hub & sleeve No. 2
(26) Lock washer
(27) Lock nut
(28) Straight pin
(29) Reverse idler gear shaft
(30) Reverse idler gear washer
(31) Reverse idler gear
(32) Adjusting washer

Tightening torque: N·m (kgf-m, ft-lb)
T: 120 (12.2, 88.5)

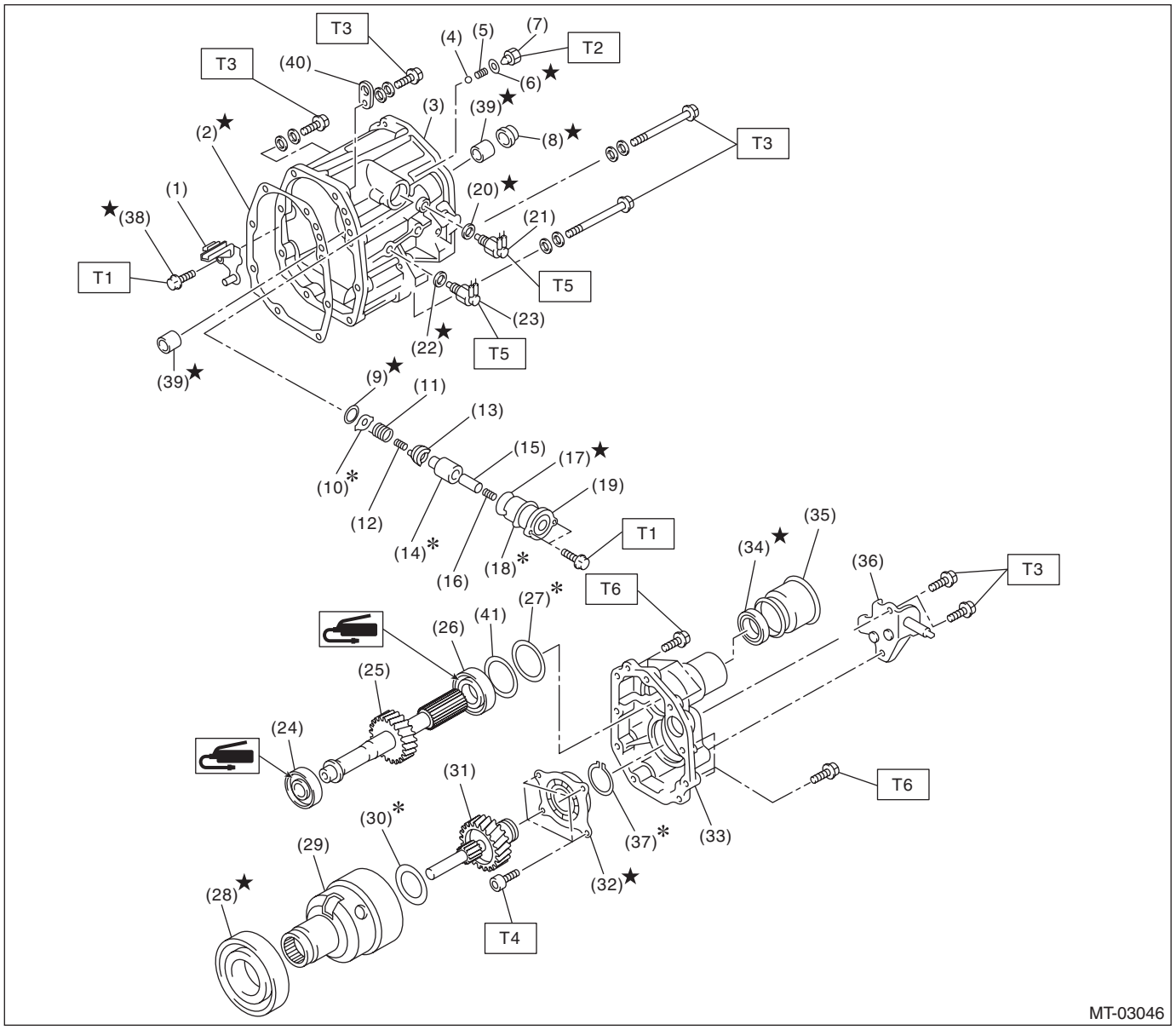
4. SHIFTER FORK AND SHIFTER ROD



(1) Shifter arm
(2) 5th shifter fork
(3) Straight pin
(4) Reverse fork rod
(5) Checking ball plug
(6) Gasket
(7) Checking ball spring
(8) Ball
(9) 3rd-4th fork rod
(10) Interlock plunger
(11) 1st-2nd fork rod
(12) 3rd-4th shifter fork
(13) 1st-2nd shifter fork
(14) Ball
(15) Spring
(16) Snap ring (outer)
(17) Reverse fork rod arm
(18) Reverse shifter lever

Tightening torque: N·m (kgf-m, ft-lb)
T: 20 (2.0, 14.8)

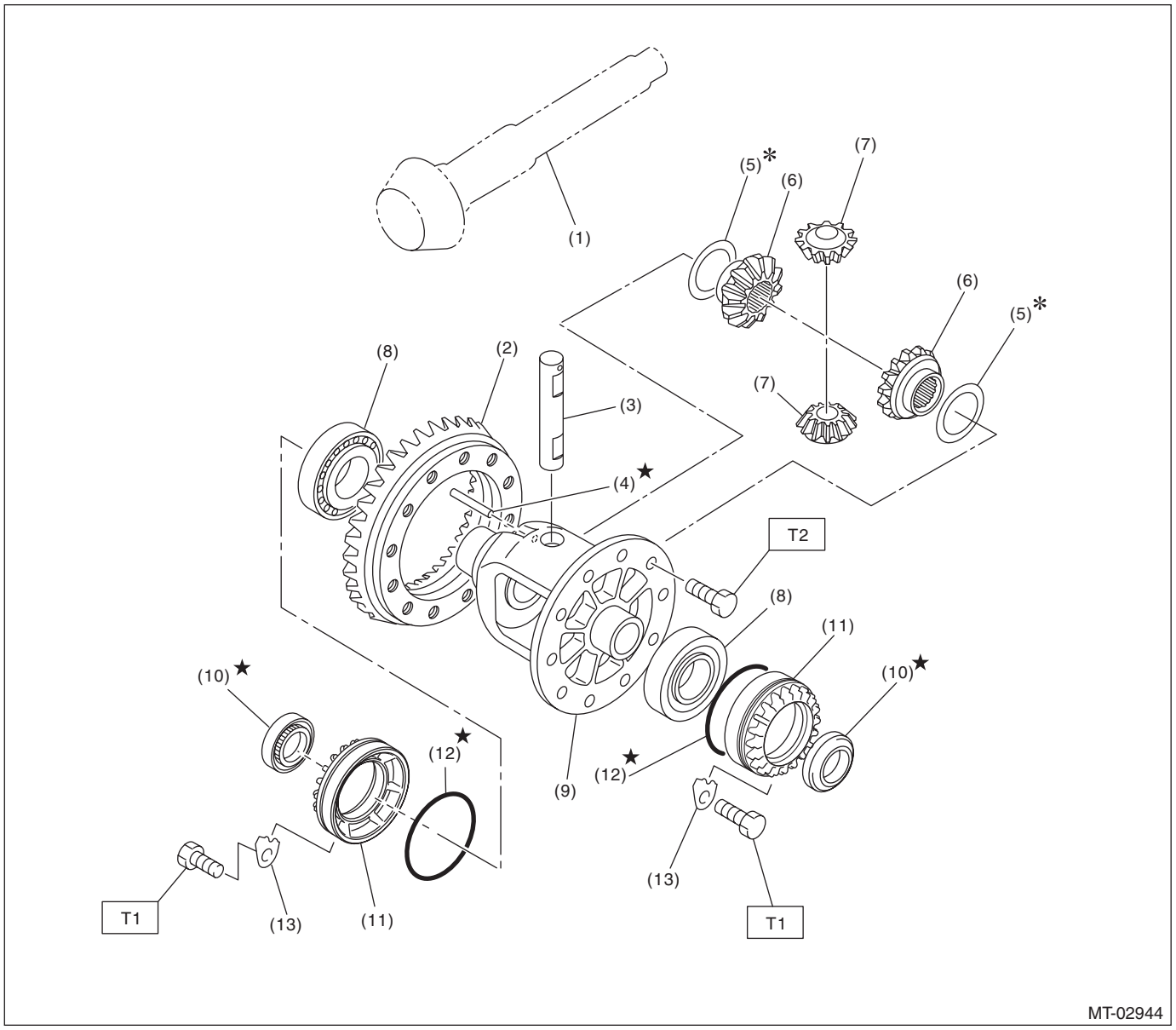
5. TRANSFER CASE AND EXTENSION



(1) Oil guide
(2) Gasket
(3) Transfer case
(4) Ball
(5) Reverse accent spring
(6) Gasket
(7) Plug
(8) Oil seal
(9) Snap ring (inner)
(10) Reverse check plate
(11) Reverse check spring
(12) Reverse return spring
(13) Reverse check cam
(14) Reverse accent shaft
(15) Return spring cap
(16) Return spring
(17) O-ring
(18) Adjusting select shim
(19) Reverse check sleeve
(20) Gasket
(21) Neutral position switch
(22) Gasket
(23) Back-up light switch
(24) Taper roller bearing (transfer case side)
(25) Transfer driven gear
(26) Taper roller bearing (extension case side)
(27) Adjusting washer
(28) Ball bearing
(29) Center differential
(30) Adjusting washer
(31) Transfer drive gear
(32) Ball bearing
(33) Extension case
(34) Oil seal
(35) Dust cover
(36) Shift bracket
(37) Snap ring
(38) Precoat bolt
(39) Roller bearing
(40) Transmission hanger
(41) Dish plate

Tightening torque: N·m (kgf-m, ft-lb)	
T1:	***6.4 (0.7, 4.7)***
T2:	***9.75 (1.0, 7.2)***
T3:	***24.5 (2.5, 18.1)***
T4:	***26 (2.7, 19.2)***
T5:	***32.3 (3.3, 23.8)***
T6:	***40 (4.1, 29.5)***

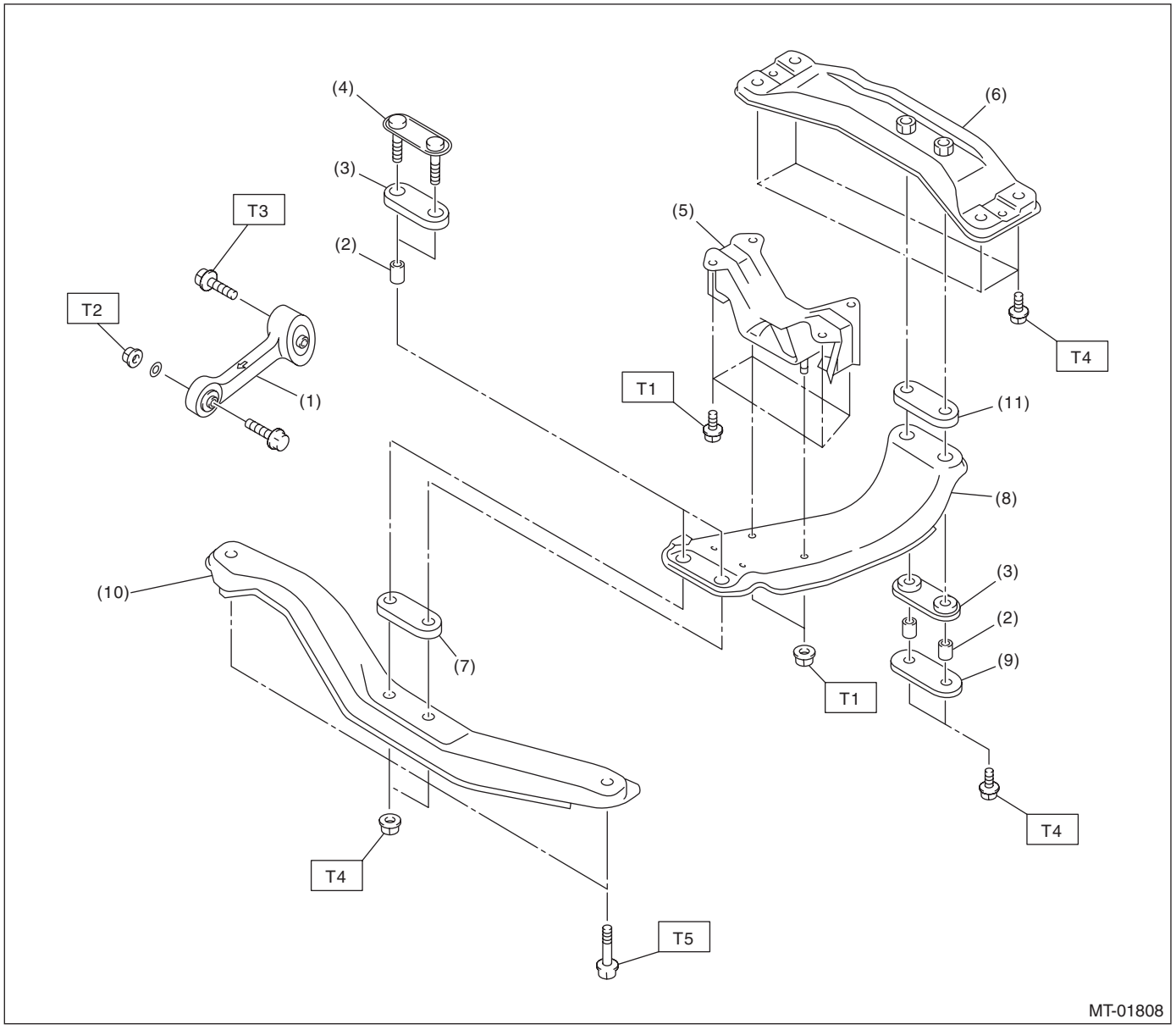
6. FRONT DIFFERENTIAL



(1) Drive pinion shaft
(2) Hypoid driven gear
(3) Pinion shaft
(4) Straight pin
(5) Adjusting washer
(6) Differential bevel gear
(7) Differential bevel pinion
(8) Taper roller bearing
(9) Differential case
(10) Oil seal
(11) Differential side retainer
(12) O-ring
(13) Retainer lock plate

Tightening torque: N·m (kgf-m, ft-lb)
T1: 25 (2.5, 18.4)
T2: 62 (6.3, 45.7)

7. TRANSMISSION MOUNTING



(1)	Pitching stopper	(7)	Upper cushion rubber	***Tightening torque: N·m (kgf-m, ft-lb)***
(2)	Spacer	(8)	Center crossmember	***T1: 35 (3.6, 25.8)***
(3)	Lower cushion rubber	(9)	Rear plate	***T2: 50 (5.1, 36.9)***
(4)	Front plate	(10)	Front crossmember	***T3: 58 (5.9, 42.8)***
(5)	Transmission cushion rubber	(11)	Rear cushion rubber	***T4: 70 (7.1, 51.6)***
(6)	Rear crossmember			***T5: 140 (14.3, 103.3)***

C: CAUTION

- Remove contamination including dirt and corrosion before removal, installation or disassembly.
- Keep the disassembled parts in order and protect them from dust and dirt.
- Before removal, installation or disassembly, be sure to clarify the failure. Avoid unnecessary removal, installation, disassembly and replacement.
- When disassembling the case and other light alloy parts, disassemble by using a plastic hammer. Do not pry apart with screwdrivers or other tools.
- Vehicle components are extremely hot after driving. Be wary of receiving burns from heated parts.
- Use SUBARU genuine gear oil, grease or equivalent. Do not mix gear oil, grease, etc. of different grades or manufacturers.
- Be sure to tighten fasteners including bolts and nuts to the specified torque.
- Place shop jacks or rigid racks at the specified points.
- Apply gear oil onto sliding or revolving surfaces before installation.
- Replace deformed or damaged snap rings with new parts.
- Before installing O-rings or oil seals, apply sufficient amount of gear oil to avoid damage and deformation.
- Be careful not to incorrectly install or fail to install O-rings, snap rings and other such parts.
- Before securing a part on a vise, place cushioning material such as wood blocks, aluminum plate, or cloth between the part and the vise.
- Avoid damaging the mating surface of the case.
- Before applying liquid gasket, completely remove and clean the old liquid gasket.
- Be careful of handling the oil seal, O-ring and gasket. If the contact surface of them is damaged, oil leakage may occur.
- When pressing-in the oil seal, make sure that the oil seal lip portion and outer surface are not damaged or tilted.
- When replacing the taper roller bearing, replace the outer race and inner race as a set.
- When replacing the hypoid gear, replace the hypoid driven gear and drive pinion shaft as a set.
- Replace the bolts if the seating surface or the thread surface is excessively rusted.

D: PREPARATION TOOL

1. SPECIAL TOOL

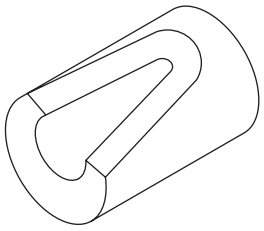
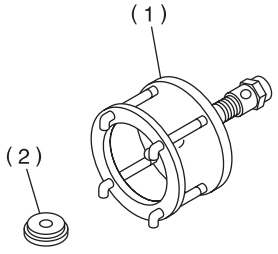
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-399411700	399411700	ACCENT BALL INSTALLER	Used for installing reverse fork rod arm.
 ST-899524100	899524100	PULLER SET	Used for removing the front differential taper roller bearing. (1) Puller (2) Cap

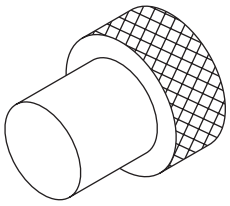
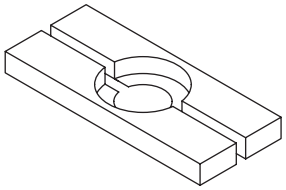
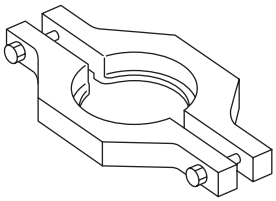
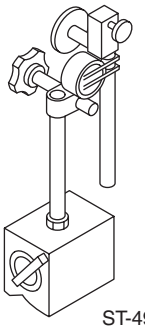
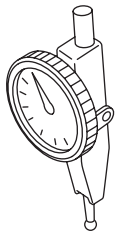
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-399780104	399780104	WEIGHT	Used for adjusting preload on the front differential taper roller bearing.
 ST-498077000	498077000	REMOVER	• Used for removing the taper roller bearing of the drive pinion shaft assembly. • Used for removing the roller bearing of the transfer driven gear.
 ST-498077300	498077300	CENTER DIFFERENTIAL BEARING REMOVER	Used for removing the center differential ball bearing.
 ST-498247001	498247001	MAGNET BASE	• Used for measuring the backlash of differential bevel pinion gear and hypoid driven gear. • Used together with DIAL GAUGE (498247100).
 ST-498247100	498247100	DIAL GAUGE	• Used for measuring the backlash of differential bevel pinion gear and hypoid driven gear. • Used together with MAGNET BASE (498247001).

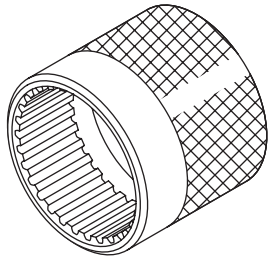
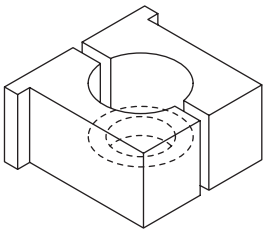
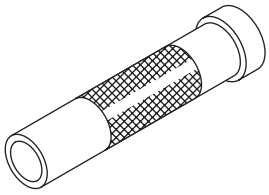
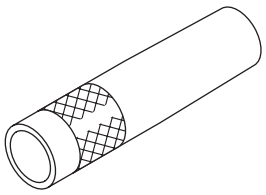
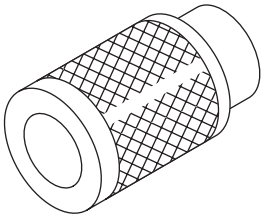
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-498427100	498427100	STOPPER	• Used for removing and installing the drive pinion shaft assembly lock nut. • Used for measuring the backlash of hypoid driven gear. • Used for adjusting preload on the front differential taper roller bearing.
 ST-498937000	498937000	TRANSMISSION HOLDER	Used for removing and installing the main shaft assembly lock nut.
 ST-499277100	499277100	BUSHING 1-2 INSTALLER	• Used for installing the drive pinion shaft assembly washer. • Used for installing the front differential taper roller bearing inner race.
 ST-499277200	499277200	INSTALLER	• Used for installing the drive pinion shaft assembly washer. • Used for installing the 2nd driven gear bushing, 3rd-4th driven gear, double taper roller bearing and 5th driven gear.
 ST-499757002	499757002	INSTALLER	Used for removing the double taper roller bearing and driven gear of the drive pinion shaft assembly.

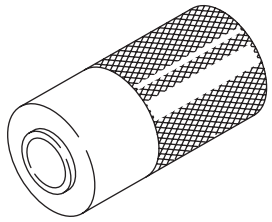
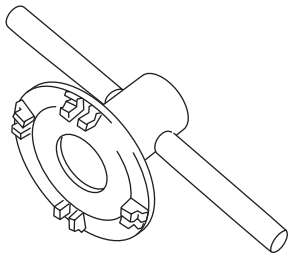
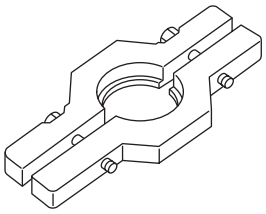
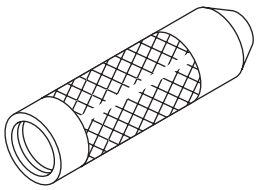
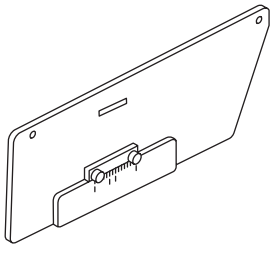
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-927640000	927640000	INSTALLER	Used for installing the taper roller bearing (transfer case side) of transfer driven gear.
 ST18630AA010	18630AA010	WRENCH COMPL RETAINER	• Used for removing and installing the differential side retainer. • Used for adjusting preload on the front differential taper roller bearing. • Used for adjusting the backlash of hypoid driven gear. • WRENCH ASSY (499787000) can also be used.
 ST-499857000	499857000	5TH DRIVEN GEAR REMOVER	Used for removing the 5th driven gear.
 ST-499877000	499877000	RACE 4-5 INSTALLER	• Used for installing the 4th needle bearing race. • Used together with REMOVER (899714110). • Used for installing the ball bearing of the main shaft assembly. • Used for installing the 5th gear thrust washer.
 ST-499917500	499917500	DRIVE PINION GAUGE ASSY	Used for adjusting the drive pinion shaft assembly shim.

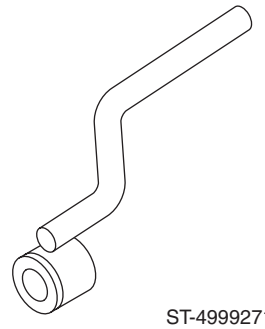
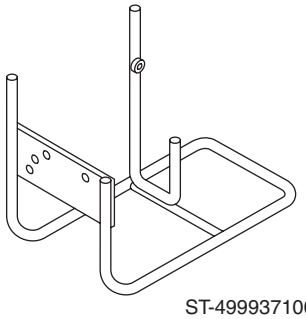
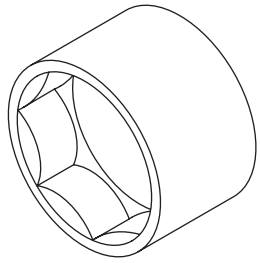
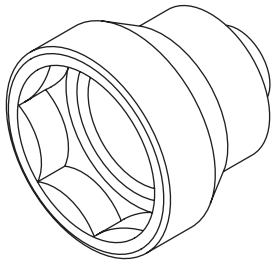
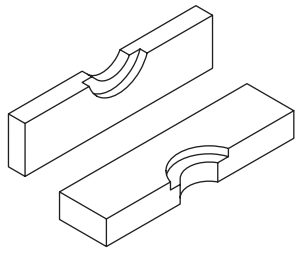
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-499927100	499927100	HANDLE	Used for backlash adjustment of the front differential hypoid driven gear and preload adjustment of the taper roller bearing.
 ST-499937100	499937100	TRANSMISSION STAND SET	Used for disassembling and assembling the transmission.
 ST-499987003	499987003	SOCKET WRENCH (35)	Used for removing and installing the main shaft assembly lock nut.
 ST-499987300	499987300	SOCKET WRENCH (50)	Used for removing and installing the driven shaft lock nut.
 ST-899714110	899714110	REMOVER	Used for removing and installing the parts of main shaft assembly and driven shaft.

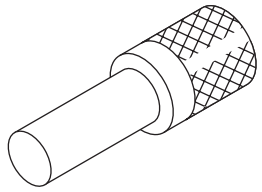
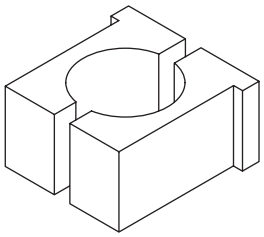
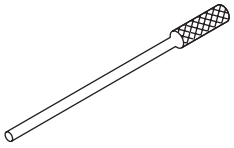
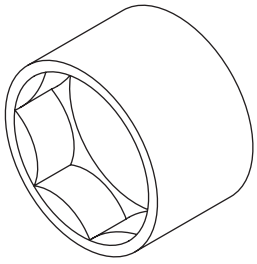
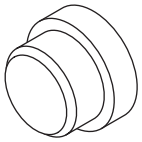
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-899864100	899864100	REMOVER	• Used for removing the parts of the main shaft assembly. • Used for installing the transfer case roller bearing. • Used for removing the taper roller bearing of transfer driven gear (transfer case side). • Used for installing the taper roller bearing of transfer driven gear (extension case side).
 ST-899884100	899884100	HOLDER	• Used for removing and installing the drive pinion shaft assembly lock nut. • Used for removing and installing the driven shaft lock nut. • Used for measuring the starting torque of the drive pinion shaft assembly.
 ST-899904100	899904100	STRAIGHT PIN REMOVER	Used for removing and installing the straight pin.
 ST-899988608	899988608	SOCKET WRENCH (27)	• Used for removing and installing the drive pinion shaft assembly lock nut. • Used for measuring the starting torque of the drive pinion shaft assembly.
 ST-398497701	398497701	ADAPTER	Used for installing the front differential taper roller bearing.

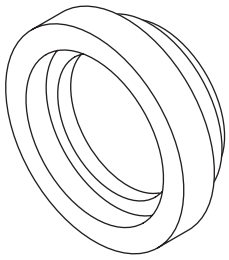
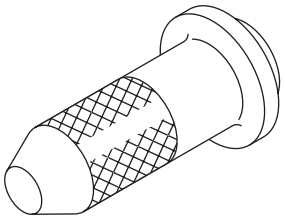
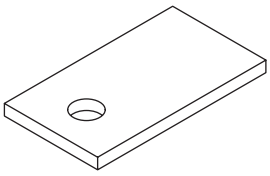
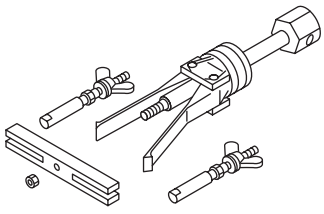
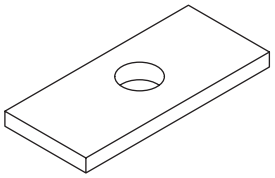
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-499587000	499587000	INSTALLER	Used for installing the driven shaft parts.
 ST-498057300	498057300	INSTALLER	Used for installing the oil seal of extension case.
 ST-498255400	498255400	PLATE	Used for measuring the hypoid driven gear backlash.
 ST-398527700	398527700	PULLER ASSY	• Used for removing the oil seal of extension case. • Used for removing the taper roller bearing outer race of front differential. • Used for removing the oil seal of front differential side retainer.
 ST-398643600	398643600	GAUGE	Used for adjusting the extension end play.

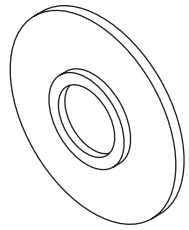
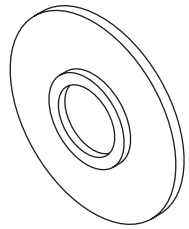
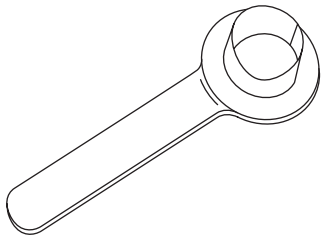
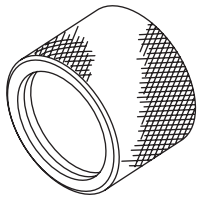
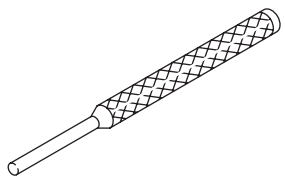
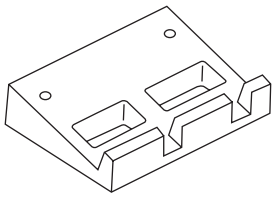
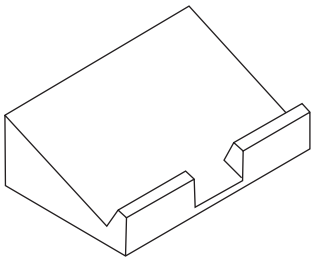
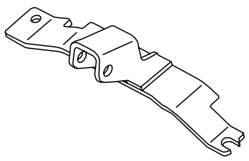
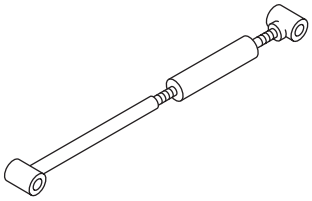
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-398177700	398177700	INSTALLER	Used for installing the ball bearing of the transfer drive gear.
 ST-498175500	498175500	INSTALLER	Used for installing the taper roller bearing of transfer driven gear (extension case side).
 ST28399SA010	28399SA010	OIL SEAL PROTECTOR	Used for protecting oil seal when inserting the front drive shaft.
 ST18675AA000	18675AA000	DIFFERENTIAL SIDE OIL SEAL INSTALLER	Used for installing the differential side retainer oil seal.
 ST-398791700	398791700	STRAIGHT PIN REMOVER 2	Used for removing and installing the straight pin.

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-498267200	498267200	CYLINDER HEAD TABLE	Used for removing and installing the roller bearing of the transfer case.
 ST-498267300	498267300	CYLINDER HEAD TABLE	Used for removing and installing the roller bearing of the transfer case.
 ST41099AA012	41099AA012 (Newly adopted tool)	ENGINE SUPPORT BRACKET	• Used for supporting engine. • ENGINE SUPPORT BRACKET (41099AA010) can also be used.
 ST41099AA020	41099AA020	ENGINE SUPPORT	Used for supporting engine.

2. GENERAL TOOL

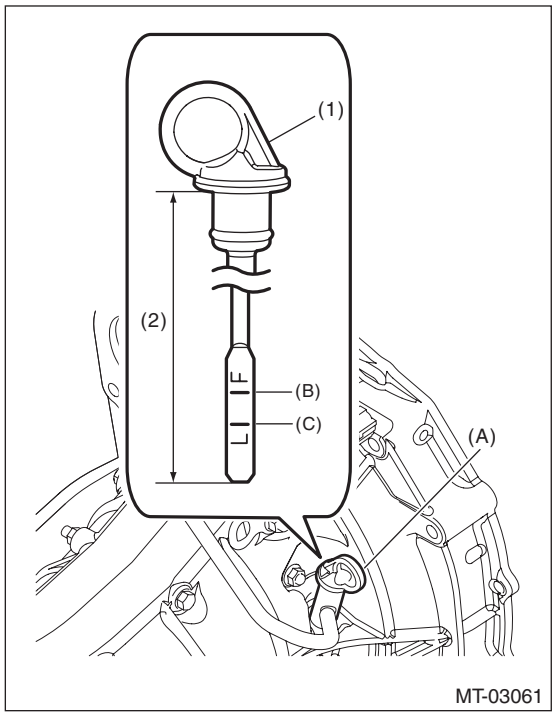
TOOL NAME	REMARKS
Circuit tester	Used for measuring resistance, voltage and current.
TORX® bit T70	Used for removing and installing the drain plug.

2. Transmission Gear Oil

A: INSPECTION

1) Park the vehicle on a level surface.
2) Turn the ignition switch to OFF, and wait until the engine cools.
3) Remove the oil level gauge and wipe it clean.
4) Reinsert the oil level gauge all the way. Be sure that the oil level gauge is correctly inserted in the proper direction.
5) Pull out the oil level gauge again, and check the oil level. If it is below the lower level, add oil through the oil level gauge hole to bring the level up to the upper level.

CAUTION:
The length of the oil level gauge varies depending on models and destinations. Make sure to use the appropriate oil level gauge.



(A) Oil level gauge
(B) Upper level
(C) Lower level

(1) Gray
(2) 195.9 mm (7.71 in)

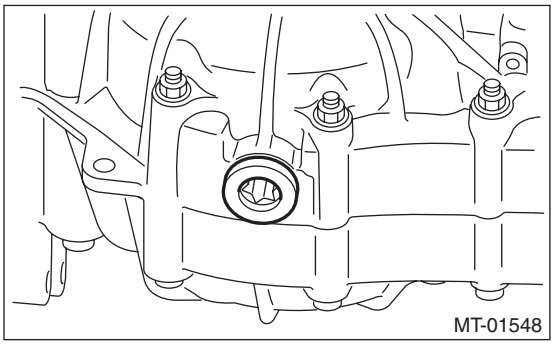
B: REPLACEMENT

1) Pull out the oil level gauge.
2) Lift up the vehicle.
3) Using the TORX® bit T70, remove the drain plug, and drain the gear oil completely.

CAUTION:
• Immediately after the vehicle has been running or after idling for a long time, the gear oil will be hot. Be careful not to receive burns.
• Be careful not to spill the gear oil on the exhaust pipe, to prevent emission of smoke or causing a fire. If gear oil is spilled, wipe it off completely.
4) Tighten the drain plug using TORX® bit T70.

NOTE:
- Tighten the drain plug after draining the gear oil.
- Use a new gasket.

Tightening torque:
44 N·m (4.5 kgf-m, 32.5 ft-lb) (aluminum gasket, silver)
70 N·m (7.1 kgf-m, 51.6 ft-lb) (copper gasket, brown)
70 N·m (7.1 kgf-m, 51.6 ft-lb) (metal gasket, black)



5) Lower the vehicle.
6) Pour gear oil through the oil level gauge hole.

Recommended gear oil:
SUBARU GEAR OIL EXTRA MT

Alternative:
GL-5 (75W-90)

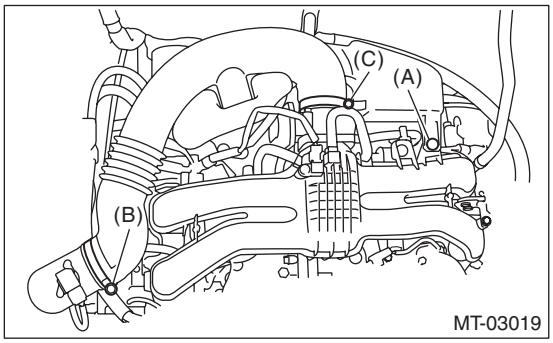
CAUTION:
If an alternative gear oil is used, you may not have expected functionality and performance.

Gear oil capacity:
3.5 L (3.7 US qt, 3.1 Imp qt)
7) Measure the gear oil amount, and check that it is within the specification.

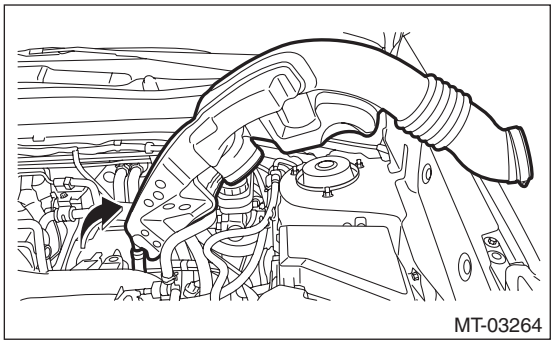
3. Manual Transmission Assembly

A: REMOVAL

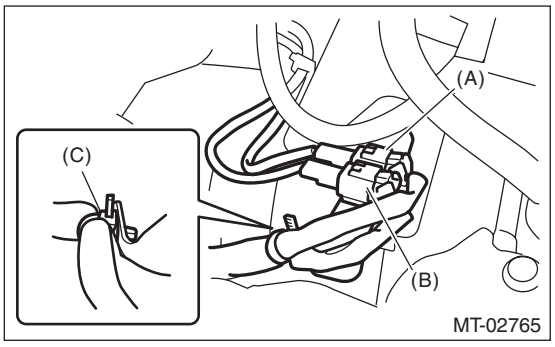
1) Disconnect the ground cable from battery.
2) Remove the clip (A) from the air intake boot.
3) Loosen the clamp (B) connecting the air intake boot and air cleaner case (rear).
4) Loosen the clamp (C) which connects the air intake boot and throttle body.



5) Remove the air intake boot from the throttle body, and move it to the left side wheel apron.

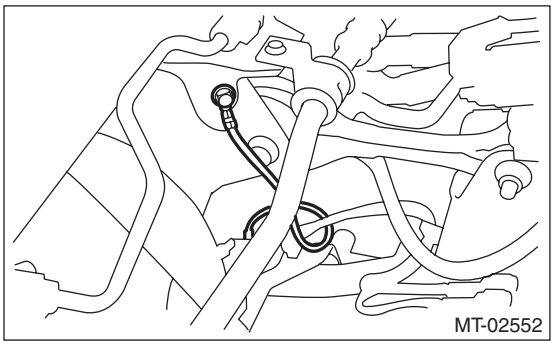


6) Disconnect the following connectors and remove the clip.

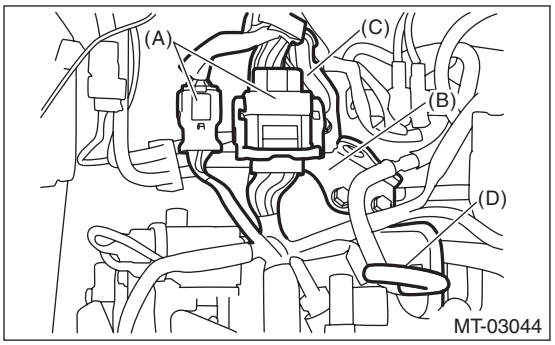


(A) Neutral position switch connector (brown)
(B) Back-up light switch connector (gray)
(C) Clip

7) Disconnect the transmission radio ground cord terminal.

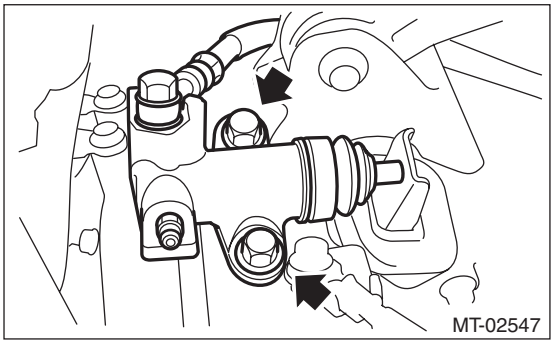


8) Remove the harness bracket, disconnect the engine harness connectors, remove the air breather hose, and then remove the engine hanger rear.

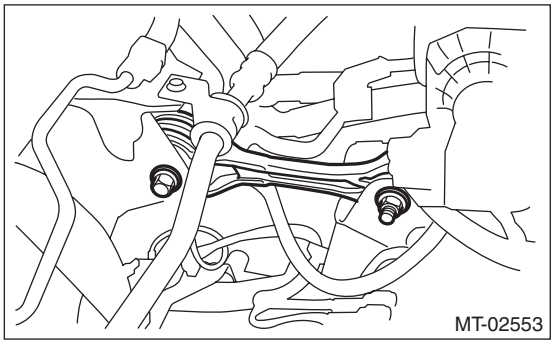


(A) Engine harness connectors
(B) Engine hanger rear
(C) Harness bracket
(D) Air breather hose

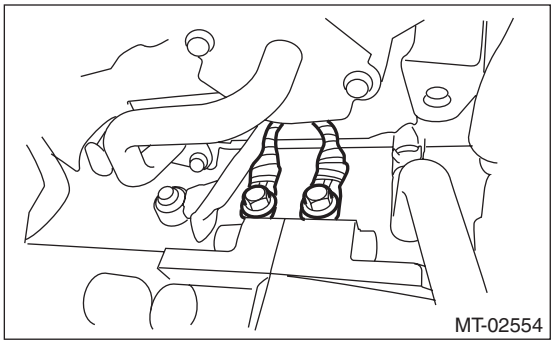
9) Remove the starter. <Ref. to SC(H4DO(w/o HEV))-8, REMOVAL, Starter.>
10) Remove the operating cylinder and suspend on a wire.



11) Remove the pitching stopper.

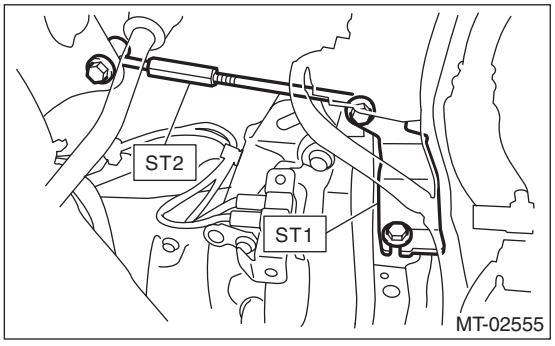


12) Disconnect two ground cables from rear end of the engine.

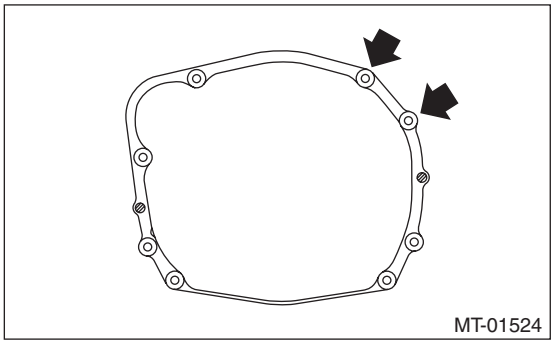


13) Set the ST.

ST1	41099AA012	ENGINE SUPPORT BRACKET
ST2	41099AA020	ENGINE SUPPORT



14) Remove the bolts which hold upper side of transmission to engine.



15) Remove the front tires.

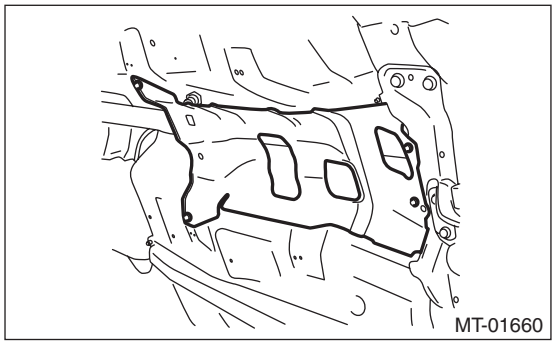
16) Lift up the vehicle.

17) Remove the under cover. <Ref. to EI-32, REMOVAL, Front Under Cover.>

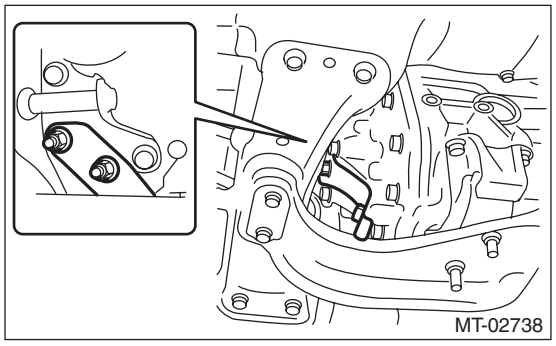
18) Remove the center exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-14, REMOVAL, Center Exhaust Pipe.>

19) Drain transmission gear oil completely. <Ref. to 5MT-21, REPLACEMENT, Transmission Gear Oil.>

20) Remove the center exhaust cover.



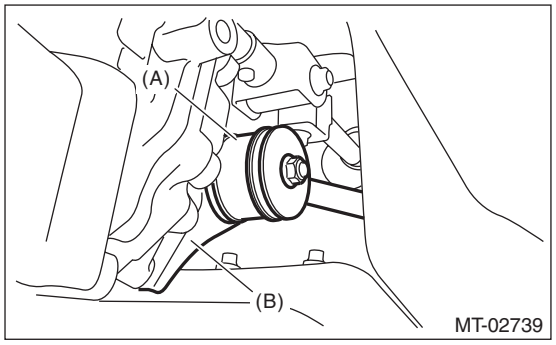
21) Remove the hanger bracket.



22) Remove the propeller shaft. <Ref. to DS-12, REMOVAL, Propeller Shaft.>

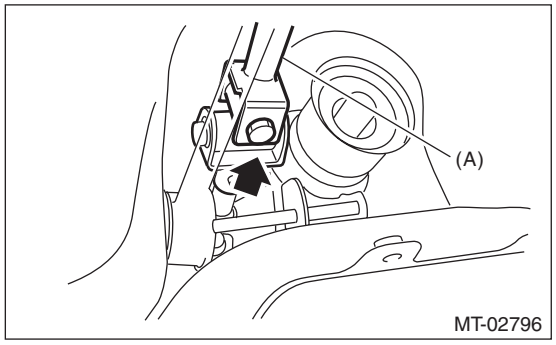
23) Remove the gear shift rod and stay.

(1) Remove the stay.



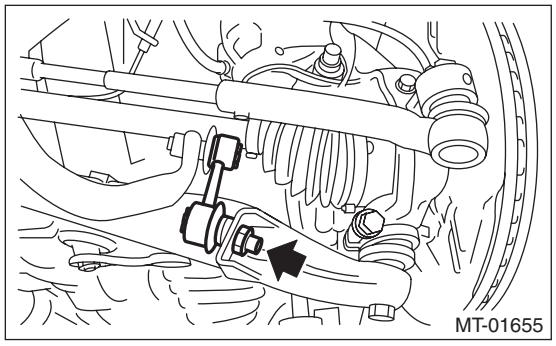
(A) Stay
(B) Shift bracket

(2) Remove the gear shift rod.

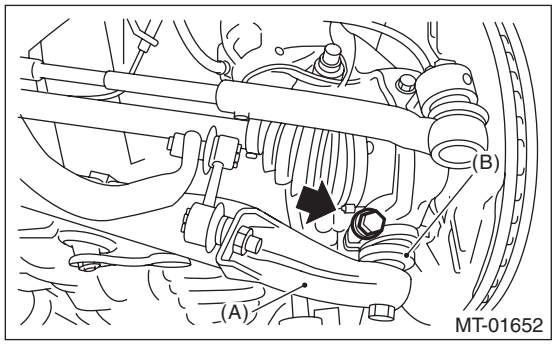


(A) Gear shift rod

24) Disconnect the stabilizer link.

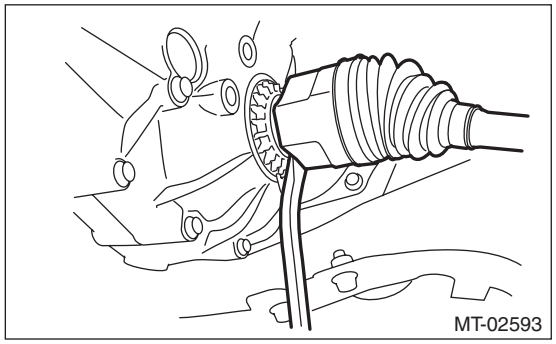


25) Remove the bolt securing the ball joint of the front arm to the housing, then separate the front arms and the housing.

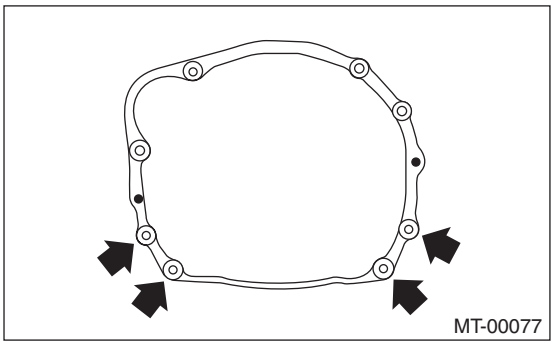


(A) Front arm
(B) Ball joint

26) Using a crowbar, separate the left and right front drive shafts.

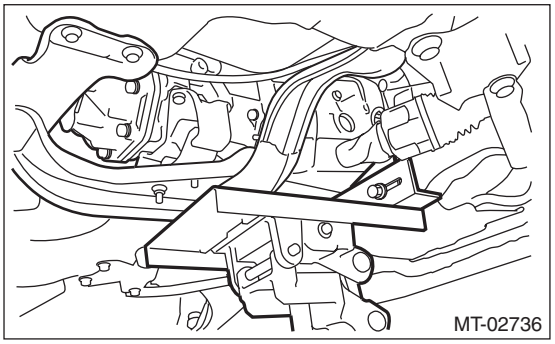


27) Remove the bolts and nuts which hold lower side of transmission to engine.

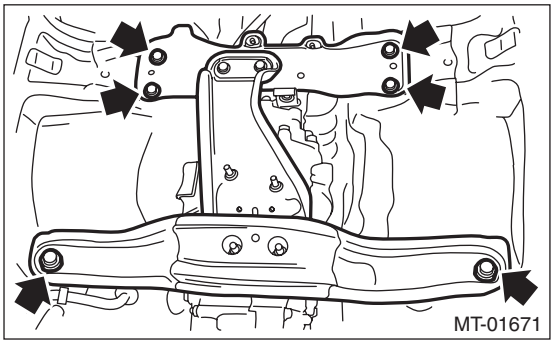


28) Place the transmission jack under the transmission.

CAUTION:
Always support the transmission case with a transmission jack.



29) Remove the front crossmember and the rear crossmember.



30) While lowering the transmission jack, tighten the turnbuckle of the ST, and incline the engine unit rearward.
31) Remove the transmission.

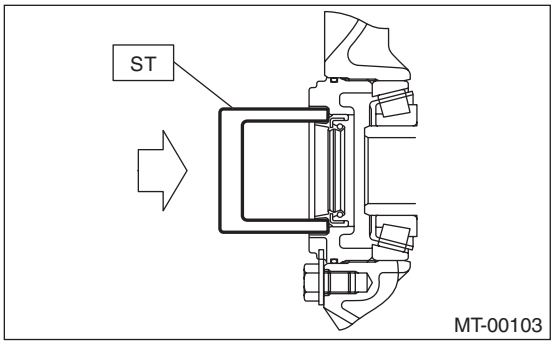
NOTE:
Move the transmission jack towards the rear until the main shaft is withdrawn from the clutch disc.
32) Remove the transmission cushion rubber.

B: INSTALLATION

1) Replace the differential side retainer oil seal. <Ref. to 5MT-33, REPLACEMENT, Differential Side Retainer Oil Seal.>

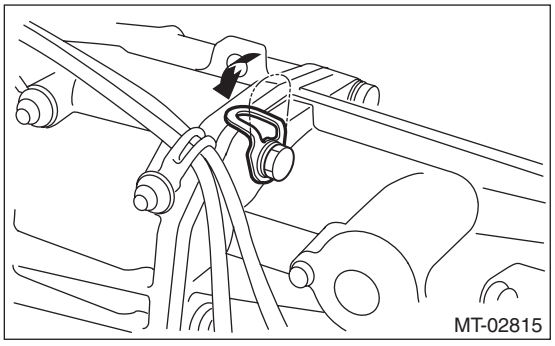
NOTE:
• Be sure to replace the oil seal after removing the front drive shaft.
• When a new oil seal has been installed, replacement is not required.

ST 18675AA000 DIFFERENTIAL SIDE OIL SEAL INSTALLER



2) Tap the transmission hanger in the rear side of transmission with a rubber hammer to bend it until full contact is obtained.

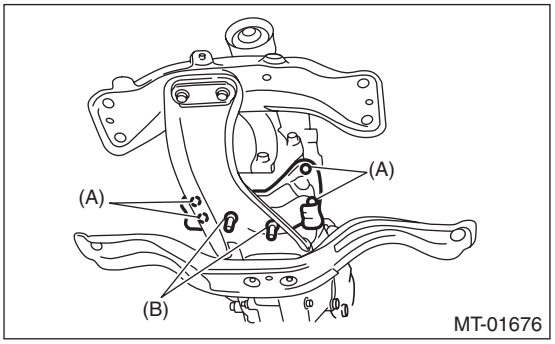
CAUTION:
Do not apply excessive load or impact to the transmission case.



3) Install the transmission cushion rubber to the transmission, and tighten the bolt (A).

4) Install the transmission cushion rubber to the center crossmember, and temporarily tighten the nut (B).

Tightening torque:
Bolt (A)
35 N·m (3.6 kgf-m, 25.8 ft-lb)

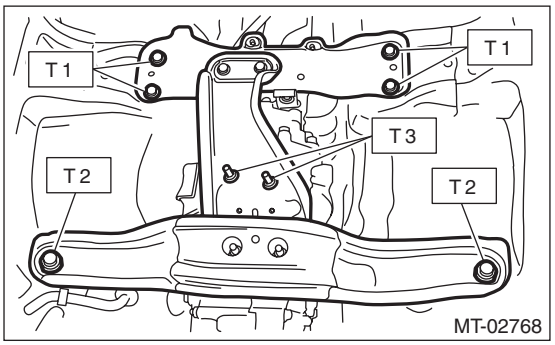


5) Install the transmission onto the engine.
(1) Lift up the transmission gradually using a transmission jack.
(2) Engage at the spline section.

NOTE:
Be careful not to hit the main shaft against the clutch cover.

6) While raising the transmission jack, loosen the turnbuckle of the ST, and set the engine unit to the original position.
7) Install the front crossmember and rear crossmember.
8) Tighten the transmission cushion rubber mounting nut.

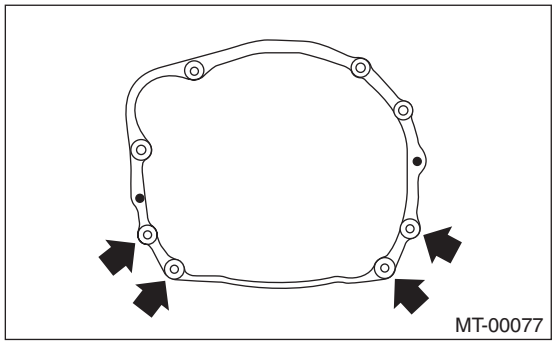
Tightening torque:
T1: 70 N·m (7.1 kgf-m, 51.6 ft-lb)
T2: 140 N·m (14.3 kgf-m, 103.3 ft-lb)
T3: 35 N·m (3.6 kgf-m, 25.8 ft-lb)



9) Take out the transmission jack.

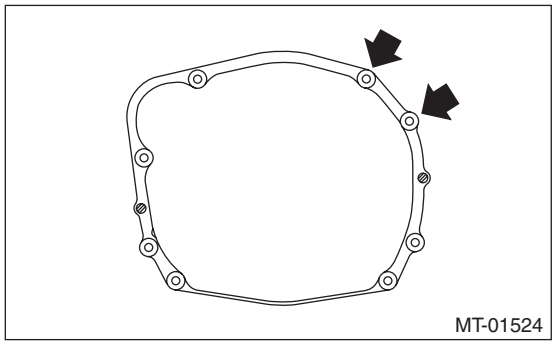
10) Tighten the bolts and nuts which hold the lower side of transmission to the engine.

Tightening torque:
50 N·m (5.1 kgf-m, 36.9 ft-lb)

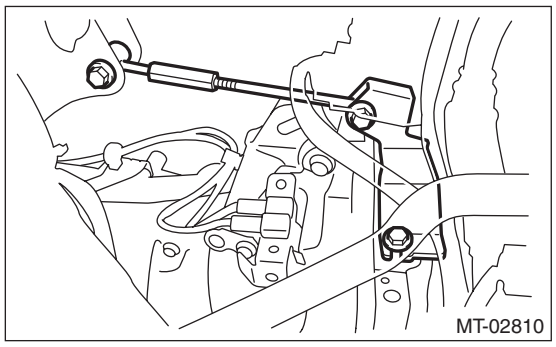


11) Lower the vehicle.
12) Install the starter. <Ref. to SC(H4DO(w/o HEV))-10, INSTALLATION, Starter.>
13) Tighten the bolts which hold the upper side of the transmission to the engine.

Tightening torque:
50 N·m (5.1 kgf-m, 36.9 ft-lb)

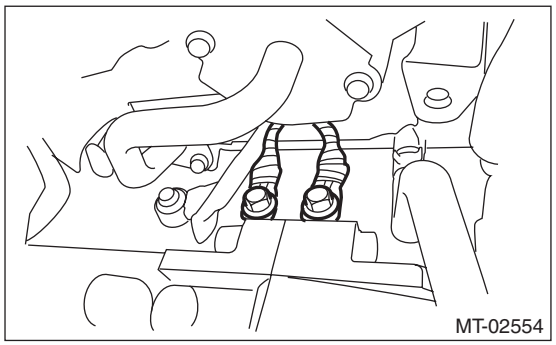


14) Remove the ST.



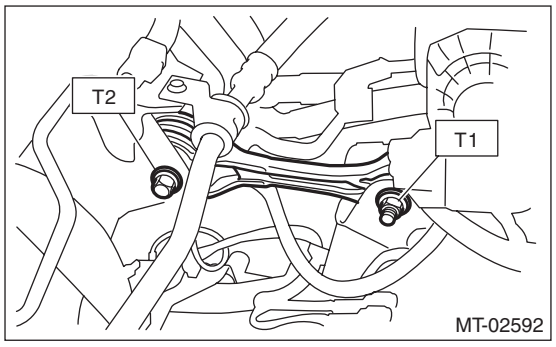
15) Install the ground cable.

Tightening torque:
19 N·m (1.9 kgf-m, 14.0 ft-lb)

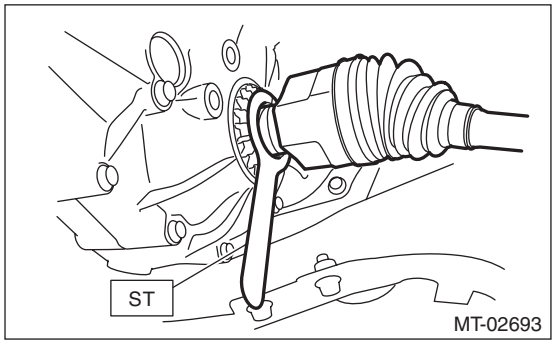


16) Install the pitching stopper.

Tightening torque:
T1: 50 N·m (5.1 kgf-m, 36.9 ft-lb)
T2: 58 N·m (5.9 kgf-m, 42.8 ft-lb)

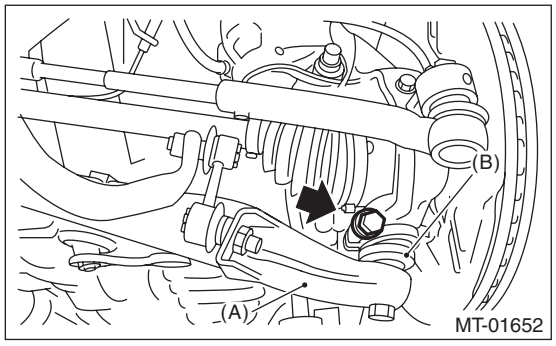


17) Lift up the vehicle.
18) Install the ST to the transmission, and then install the front drive shaft.
ST 28399SA010 OIL SEAL PROTECTOR



19) Insert the front arm ball joint and tighten the mounting bolt.

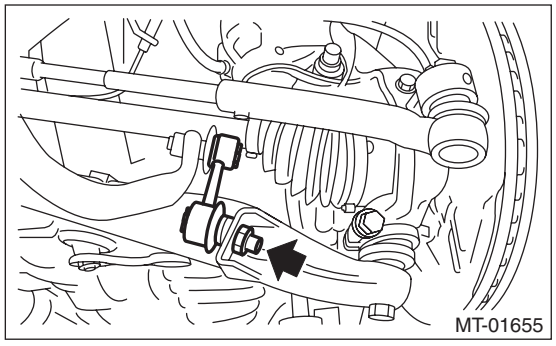
Tightening torque:
50 N·m (5.1 kgf-m, 36.9 ft-lb)



(A) Front arm
(B) Ball joint

20) Install the stabilizer link.

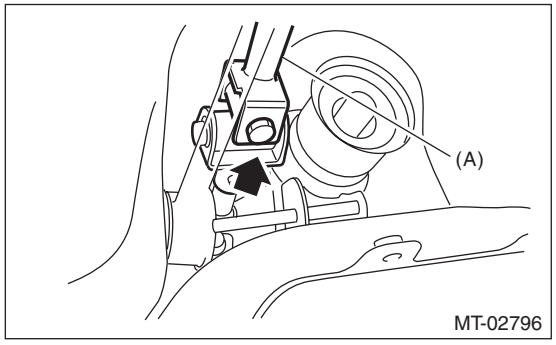
Tightening torque:
30 N·m (3.1 kgf-m, 22.1 ft-lb)



21) Attach the gear shift rod and stay.
(1) Install the gear shift rod.

NOTE:
Use a new self-locking nut.

Tightening torque:
12 N·m (1.2 kgf-m, 8.9 ft-lb)

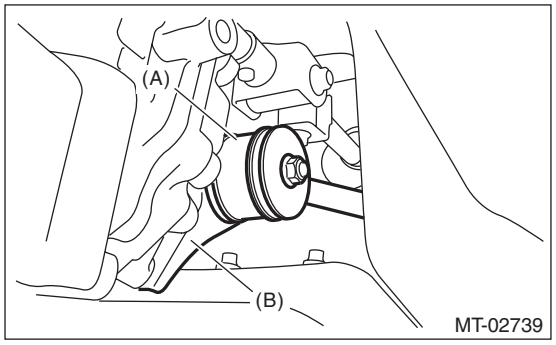


(A) Gear shift rod

(2) Install the stay.

NOTE:
Use a new self-locking nut.

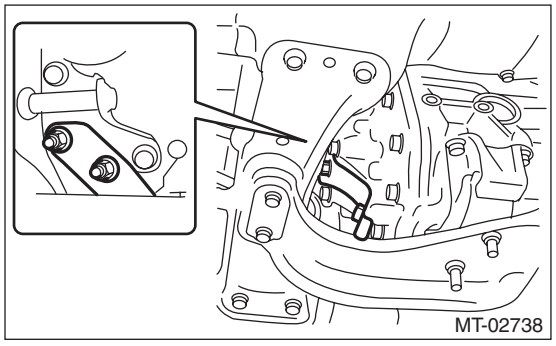
Tightening torque:
18 N·m (1.8 kgf-m, 13.3 ft-lb)



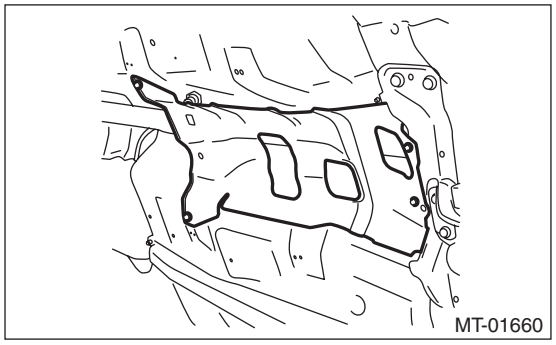
(A) Stay
(B) Shift bracket

22) Install the propeller shaft. <Ref. to DS-13, INSTALLATION, Propeller Shaft.>
23) Install the hanger bracket.

Tightening torque:
23 N·m (2.3 kgf-m, 17.0 ft-lb)



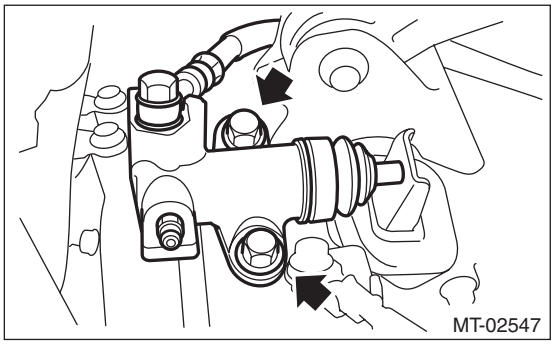
24) Install the center exhaust cover.
Tightening torque:
18 N·m (1.8 kgf-m, 13.3 ft-lb)



25) Install the center exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-15, INSTALLATION, Center Exhaust Pipe.>
26) Install the under cover. <Ref. to EI-32, INSTALLATION, Front Under Cover.>
27) Lower the vehicle.

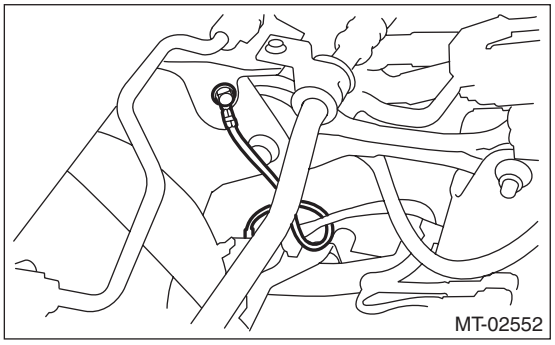
28) Install the operating cylinder.

Tightening torque:
37 N·m (3.8 kgf-m, 27.3 ft-lb)



29) Install the transmission radio ground cord terminal.

Tightening torque:
13 N·m (1.3 kgf-m, 9.6 ft-lb)

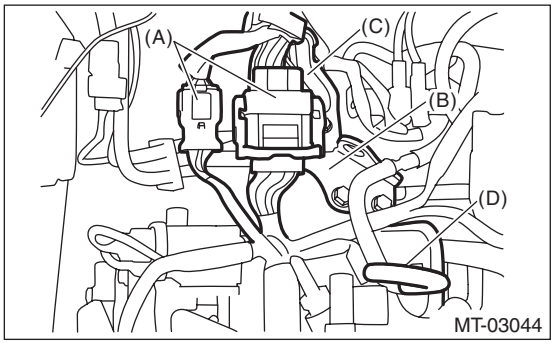


30) Install the engine hanger rear.

Tightening torque:
21 N·m (2.1 kgf-m, 15.5 ft-lb)

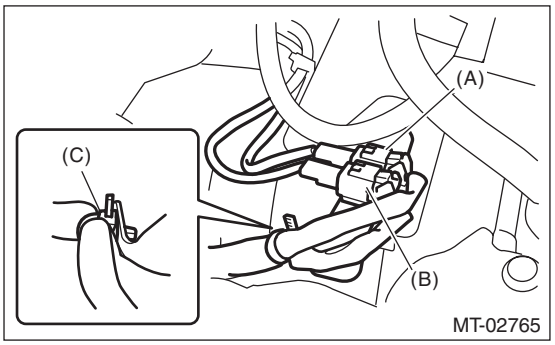
31) Install the air breather hose.
32) Connect the engine harness connector, then attach the harness bracket.

Tightening torque:
7.5 N·m (0.8 kgf-m, 5.5 ft-lb)



(A) Engine harness connectors
(B) Engine hanger rear
(C) Harness bracket
(D) Air breather hose

33) Connect the following connectors and secure the clip on the bracket.



(A) Neutral position switch connector (brown)
(B) Back-up light switch connector (gray)
(C) Clip

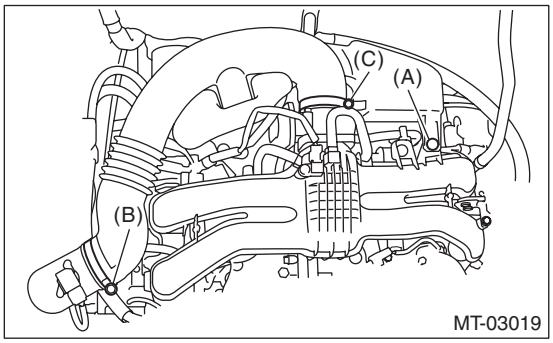
34) Pour in transmission gear oil and check the oil level. <Ref. to 5MT-21, Transmission Gear Oil.>
35) Install the air intake boot. <Ref. to IN(H4DO(w/o HEV))-12, INSTALLATION, Air Intake Boot.>
36) Install the front tires.
37) Connect the battery ground terminal.

4. Transmission Mounting System

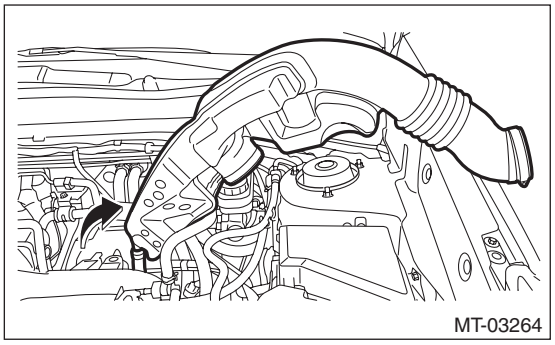
A: REMOVAL

1. PITCHING STOPPER

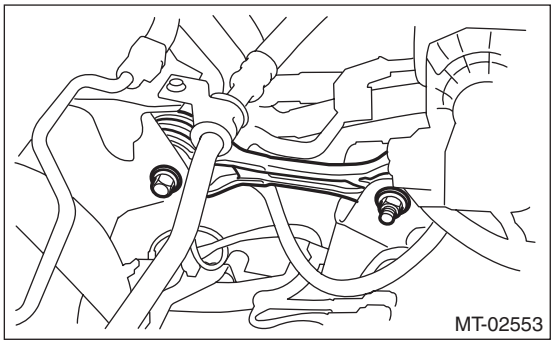
1) Disconnect the ground cable from battery.
2) Remove the clip (A) from the air intake boot.
3) Loosen the clamp (B) connecting the air intake boot and air cleaner case (rear).
4) Loosen the clamp (C) which connects the air intake boot and throttle body.



5) Remove the air intake boot from the throttle body, and move it to the left side wheel apron.

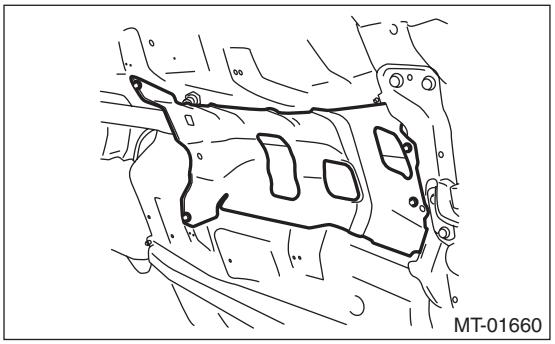


6) Remove the pitching stopper.



2. CROSSMEMBER AND CUSHION RUBBER

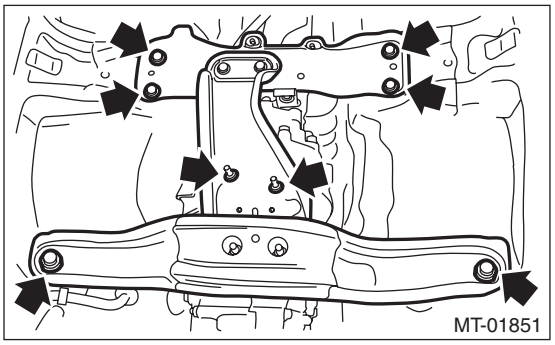
1) Disconnect the ground cable from battery.
2) Lift up the vehicle.
3) Remove the center exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-14, REMOVAL, Center Exhaust Pipe.>
4) Remove the center exhaust cover.



5) Set the transmission jack.

CAUTION:
Always support the transmission case with a transmission jack.

6) Remove the front crossmember and the rear crossmember.



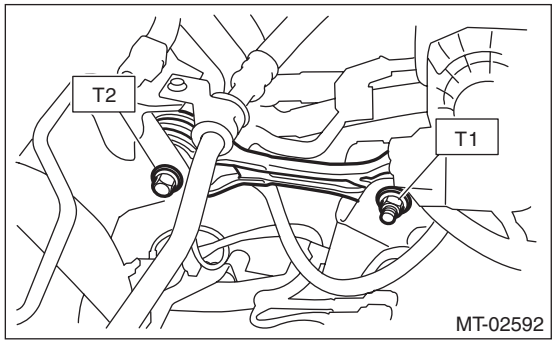
7) Remove the transmission cushion rubber.

B: INSTALLATION

1. PITCHING STOPPER

1) Install the pitching stopper.

Tightening torque:
T1: 50 N·m (5.1 kgf-m, 36.9 ft-lb)
T2: 58 N·m (5.9 kgf-m, 42.8 ft-lb)

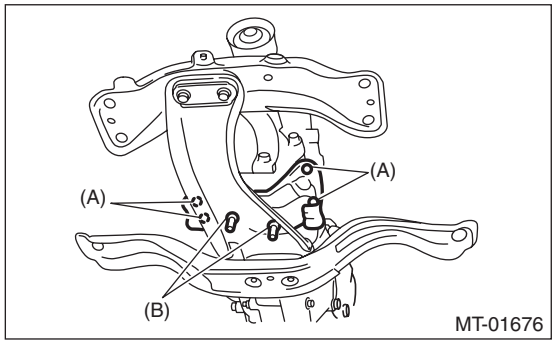


2) Install the air intake boot. <Ref. to IN(H4DO(w/o HEV))-12, INSTALLATION, Air Intake Boot.>
3) Connect the battery ground terminal.

2. CROSSMEMBER AND CUSHION RUBBER

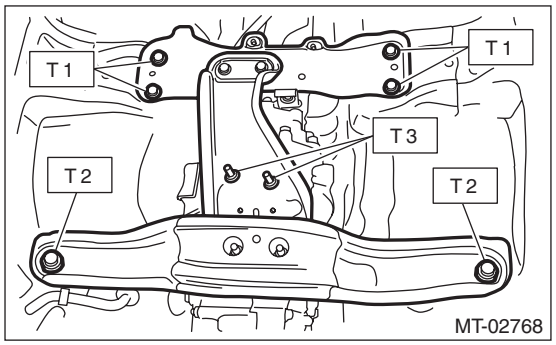
1) Install the transmission cushion rubber to the transmission, and tighten the bolt (A).
2) Install the transmission cushion rubber to the center crossmember, and temporarily tighten the nut (B).

Tightening torque:
Bolt (A)
35 N·m (3.6 kgf-m, 25.8 ft-lb)



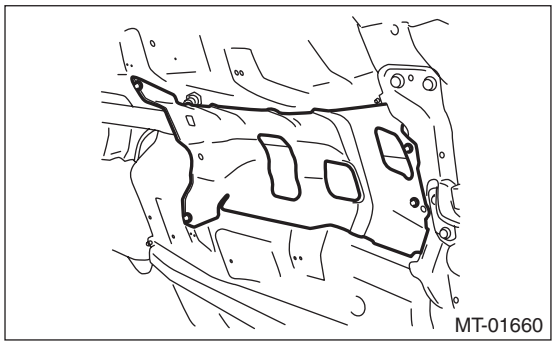
3) Install the front crossmember and rear crossmember.
4) Tighten the transmission cushion rubber mounting nut.

Tightening torque:
T1: 70 N·m (7.1 kgf-m, 51.6 ft-lb)
T2: 140 N·m (14.3 kgf-m, 103.3 ft-lb)
T3: 35 N·m (3.6 kgf-m, 25.8 ft-lb)



5) Remove the transmission jack.
6) Install the center exhaust cover.

Tightening torque:
18 N·m (1.8 kgf-m, 13.3 ft-lb)



7) Install the center exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-15, INSTALLATION, Center Exhaust Pipe.>
8) Lower the vehicle.
9) Connect the battery ground terminal.

C: INSPECTION

Check the following; repair or replace the faulty parts.

1. PITCHING STOPPER

Check the pitching stopper for bends or damage. Check that the rubber is not stiff, cracked or otherwise damaged.

2. CROSSMEMBER AND CUSHION RUBBER

Check the crossmember for bending or damage. Check that the cushion rubber does not have hardening, cracks or other damages.

5. Oil Seal

A: INSPECTION

Check for leakage of transmission gear oil from the oil seal. If there is oil leakage, replace the oil seal with the new part and check the propeller shaft.

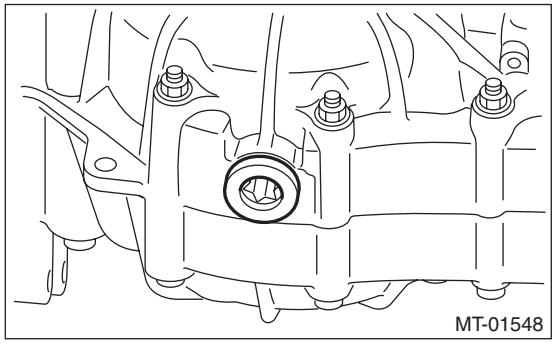
B: REPLACEMENT

1) Disconnect the ground cable from battery.
2) Lift up the vehicle.
3) Clean the transmission exterior.
4) Using the TORX® bit T70, remove the drain plug, and drain the transmission gear oil completely.

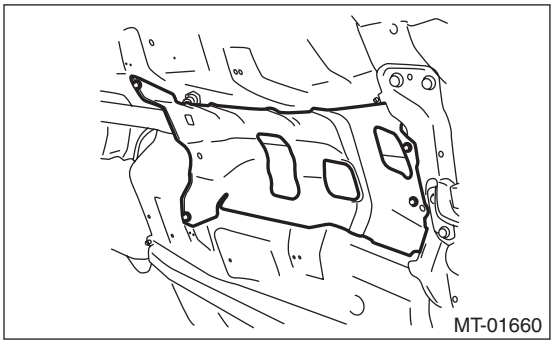
CAUTION:
• Immediately after the vehicle has been running or after idling for a long time, the gear oil will be hot. Be careful not to receive burns.
• Be careful not to spill the gear oil on the exhaust pipe, to prevent emission of smoke or causing a fire. If gear oil is spilled, wipe it off completely.
5) Tighten the drain plug using TORX® bit T70.

NOTE:
Use a new gasket.

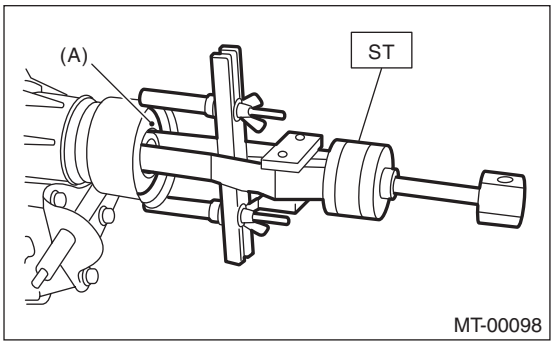
Tightening torque:
44 N·m (4.5 kgf-m, 32.5 ft-lb) (aluminum gasket, silver)
70 N·m (7.1 kgf-m, 51.6 ft-lb) (copper gasket, brown)
70 N·m (7.1 kgf-m, 51.6 ft-lb) (metal gasket, black)



6) Remove the rear exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-18, REMOVAL, Rear Exhaust Pipe.>
7) Remove the center exhaust cover.



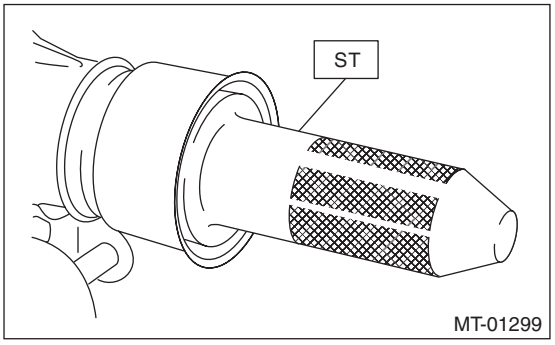
8) Remove the propeller shaft. <Ref. to DS-12, REMOVAL, Propeller Shaft.>
9) Using the ST, remove the oil seal.
ST 398527700 PULLER ASSY



(A) Oil seal

10) Using the ST, install the oil seal.

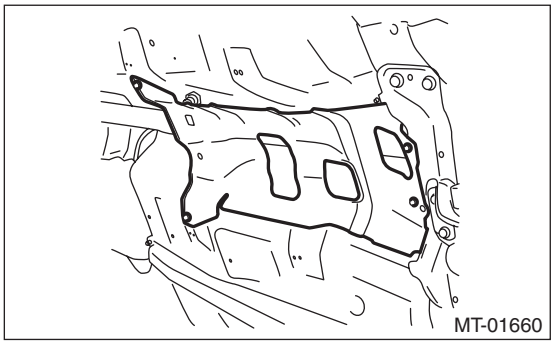
NOTE:
• When grease is not applied to the oil seal lips, apply the transmission gear oil to the oil seal lips.
• Use a new oil seal.
ST 498057300 INSTALLER



11) Install the propeller shaft. <Ref. to DS-13, INSTALLATION, Propeller Shaft.>

12) Install the center exhaust cover.

Tightening torque:
18 N·m (1.8 kgf-m, 13.3 ft-lb)



13) Install the rear exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-20, INSTALLATION, Rear Exhaust Pipe.>
14) Lower the vehicle.
15) Pour in transmission gear oil and check the oil level. <Ref. to 5MT-21, Transmission Gear Oil.>
16) Connect the battery ground terminal.

6. Differential Side Retainer Oil Seal

A: INSPECTION

Check for leakage of gear oil from differential side retainer oil seal part. If there is oil leakage, replace the oil seal with the new part and check the drive shaft.

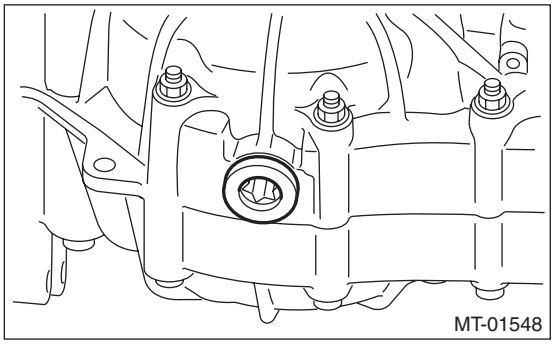
B: REPLACEMENT

1) Disconnect the ground cable from battery.
2) Remove the front tires.
3) Lift up the vehicle.
4) Using the TORX® bit T70, remove the drain plug, and drain the transmission gear oil completely.

CAUTION:
• Immediately after the vehicle has been running or after idling for a long time, the gear oil will be hot. Be careful not to receive burns.
• Be careful not to spill the gear oil on the exhaust pipe, to prevent emission of smoke or causing a fire. If gear oil is spilled, wipe it off completely.
5) Tighten the drain plug using TORX® bit T70.

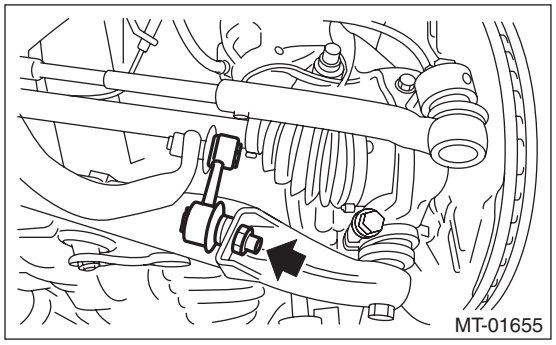
NOTE:
Use a new gasket.

Tightening torque:
44 N·m (4.5 kgf-m, 32.5 ft-lb) (aluminum gasket, silver)
70 N·m (7.1 kgf-m, 51.6 ft-lb) (copper gasket, brown)
70 N·m (7.1 kgf-m, 51.6 ft-lb) (metal gasket, black)

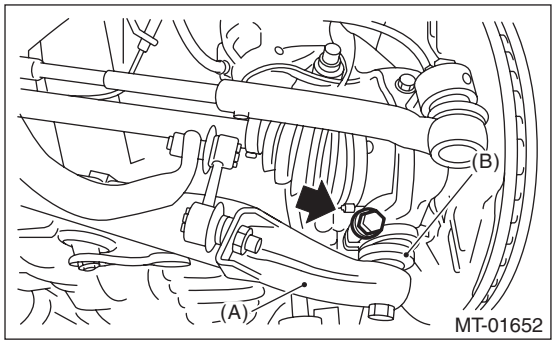


6) Remove the center exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-14, REMOVAL, Center Exhaust Pipe.>

7) Disconnect the stabilizer link.

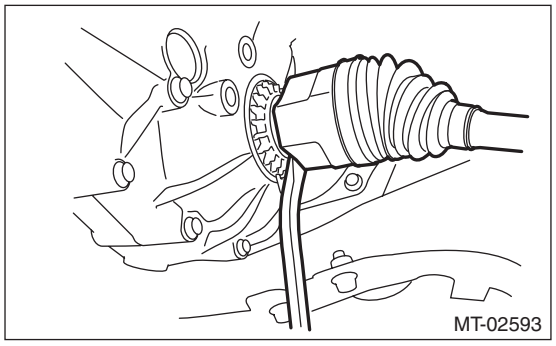


8) Remove the bolt securing the ball joint of the front arm to the housing, then separate the front arms and the housing.



(A) Front arm
(B) Ball joint

9) Using a crowbar, separate the left and right front drive shafts.



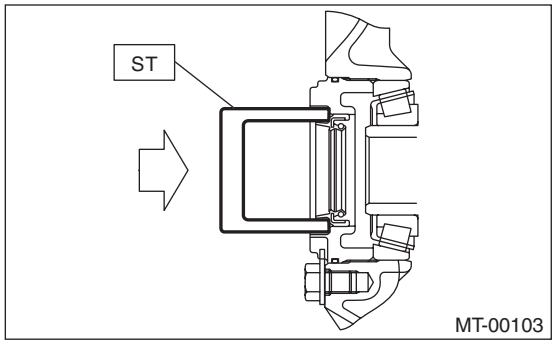
10) Remove the differential side retainer oil seal.

NOTE:
• Be sure to replace the oil seal after removing front drive shaft from transmission.
• Use the ST 398527700 PULLER ASSY to remove the oil seal. If removing the oil seal with a flat tip screwdriver, be careful not to scratch the differential side retainer.

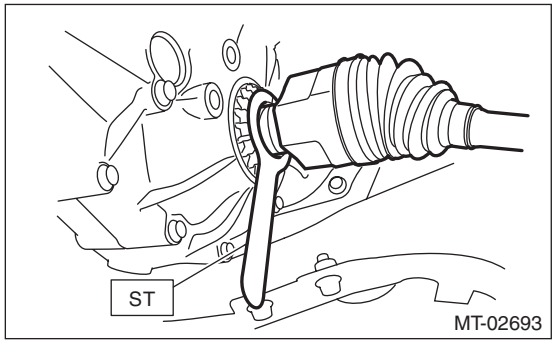
11) Using the ST, install the differential side retainer oil seal by lightly tapping with a plastic hammer.

CAUTION:
• Apply transmission gear oil to the oil seal lips, and install the oil seal while being careful not to deform the lip.
• Check the identification marks (R, L) during the installation so as not to mix up the oil seal RH and LH.

NOTE:
Use a new oil seal.
ST 18675AA000 DIFFERENTIAL SIDE OIL SEAL INSTALLER

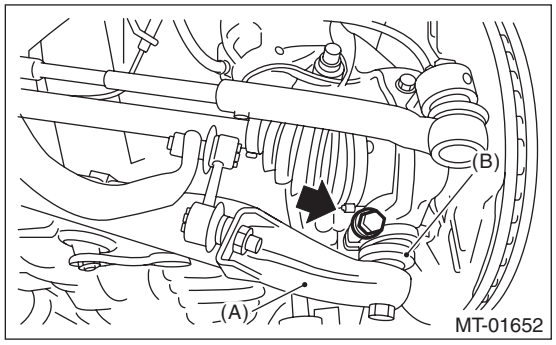


12) Install the front drive shaft.
ST 28399SA010 OIL SEAL PROTECTOR



13) Insert the front arm ball joint and tighten the mounting bolt.

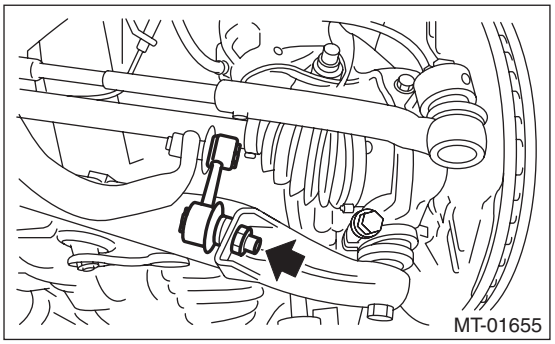
Tightening torque:
50 N·m (5.1 kgf-m, 36.9 ft-lb)



(A) Front arm
(B) Ball joint

14) Install the stabilizer link.

Tightening torque:
30 N·m (3.1 kgf-m, 22.1 ft-lb)



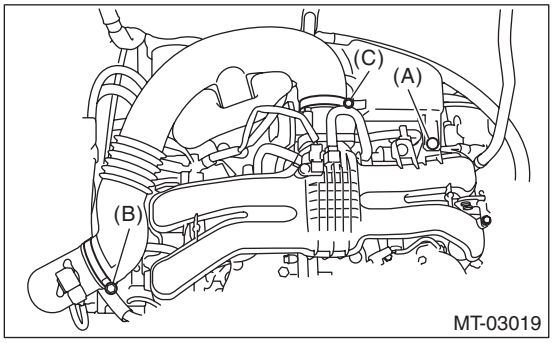
15) Install the center exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-15, INSTALLATION, Center Exhaust Pipe.>
16) Lower the vehicle.
17) Pour in transmission gear oil and check the oil level. <Ref. to 5MT-21, REPLACEMENT, Transmission Gear Oil.>
18) Install the front tires.
19) Connect the battery ground terminal.

7. Switches and Harness

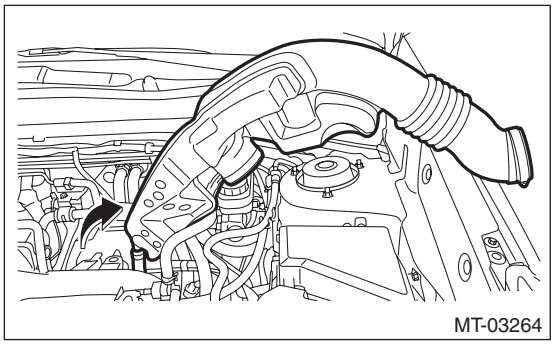
A: REMOVAL

1. BACK-UP LIGHT AND NEUTRAL POSITION SWITCH

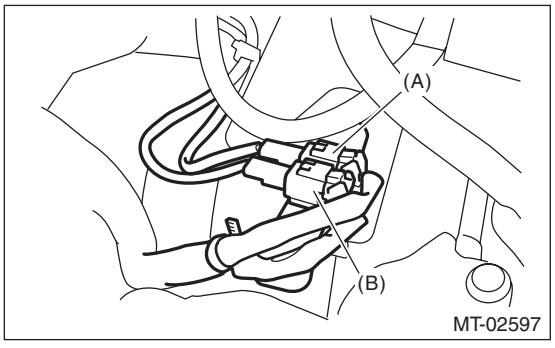
1) Disconnect the ground cable from battery.
2) Remove the clip (A) from the air intake boot.
3) Loosen the clamp (B) connecting the air intake boot and air cleaner case (rear).
4) Loosen the clamp (C) which connects the air intake boot and throttle body.



5) Remove the air intake boot from the throttle body, and move it to the left side wheel apron.

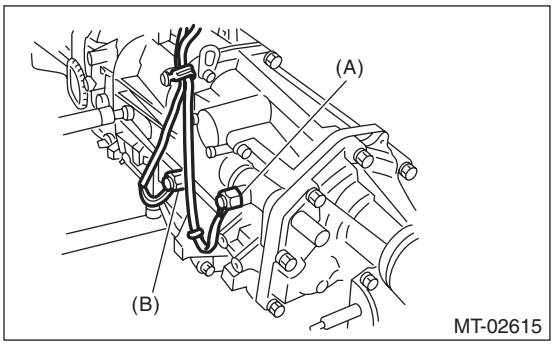


6) Disconnect the connector back-up light switch & neutral position switch.



(A) Neutral position switch connector (brown)
(B) Back-up light switch connector (gray)

7) Remove the harness connector from bracket.
8) Lift up the vehicle.
9) Remove the harness from each clip.
10) Remove the back-up light switch & neutral position switch with the harness.



(A) Neutral position switch
(B) Back-up light switch

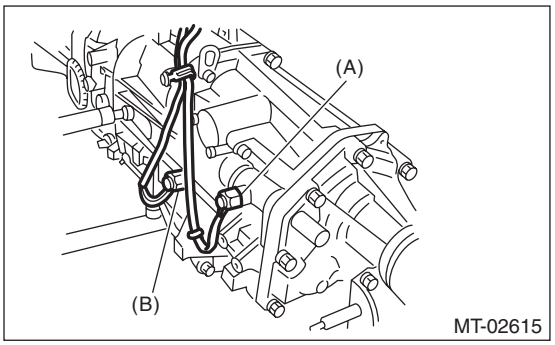
B: INSTALLATION

1. BACK-UP LIGHT AND NEUTRAL POSITION SWITCH

1) Install the back-up light switch & neutral position switch with the harness.

NOTE:
Use a new gasket.

Tightening torque:
32.3 N·m (3.3 kgf-m, 23.8 ft-lb)



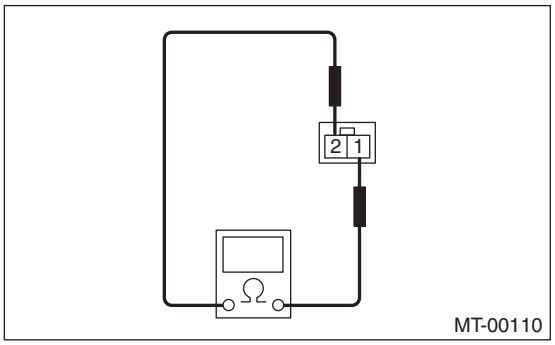
(A) Neutral position switch
(B) Back-up light switch

2) Secure the harness on each clip.
3) Lower the vehicle.
4) Connect the connectors for back-up light switch and neutral position switch, and secure the connector to the bracket.
5) Install the air intake boot. <Ref. to IN(H4DO(w/o HEV))-12, INSTALLATION, Air Intake Boot.>
6) Connect the battery ground terminal.

C: INSPECTION

1. BACK-UP LIGHT SWITCH

1) Turn the ignition switch to OFF.
2) Disconnect the back light switch connector.
3) Measure the resistance between the back-up light switch terminals.

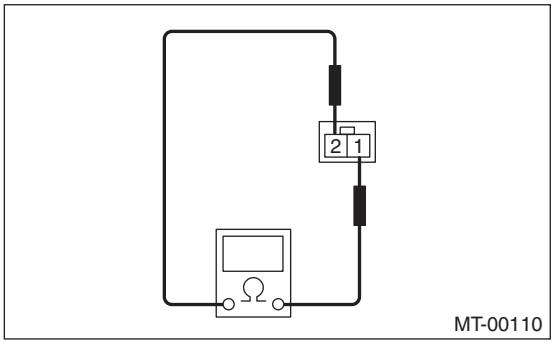


Gear shift position	Terminal No.	Specified resistance
Reverse position	1 and 2	Less than 1 Ω
Other positions		1 MΩ or more

4) Replace faulty parts.

2. NEUTRAL POSITION SWITCH

1) Turn the ignition switch to OFF.
2) Disconnect the connector of neutral position switch.
3) Measure the resistance between neutral position switch terminals.



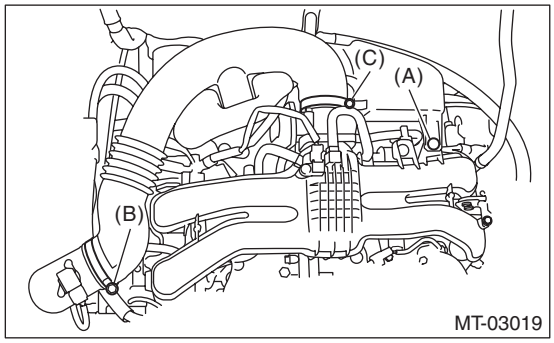
Gear shift position	Terminal No.	Specified resistance
Neutral position	1 and 2	Less than 1 Ω
Other positions		1 MΩ or more

4) Replace faulty parts.

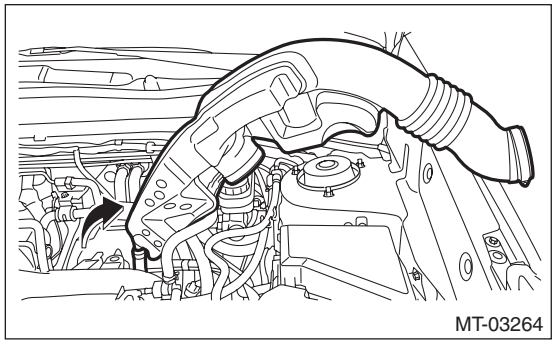
8. Air Breather Hose

A: REMOVAL

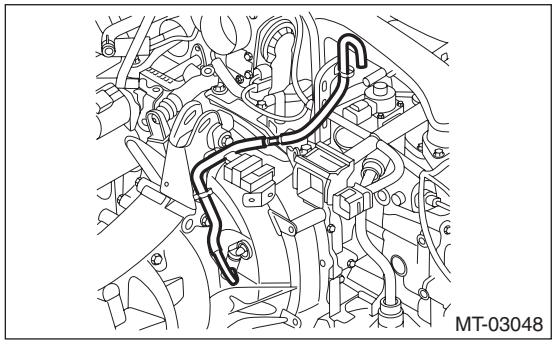
1) Disconnect the ground cable from battery.
2) Remove the clip (A) from the air intake boot.
3) Loosen the clamp (B) connecting the air intake boot and air cleaner case (rear).
4) Loosen the clamp (C) which connects the air intake boot and throttle body.



5) Remove the air intake boot from the throttle body, and move it to the left side wheel apron.



6) Remove the air breather hose.



B: INSTALLATION

Install in the reverse order of removal.

C: INSPECTION

Check the hose for peeling, crack or clogging.

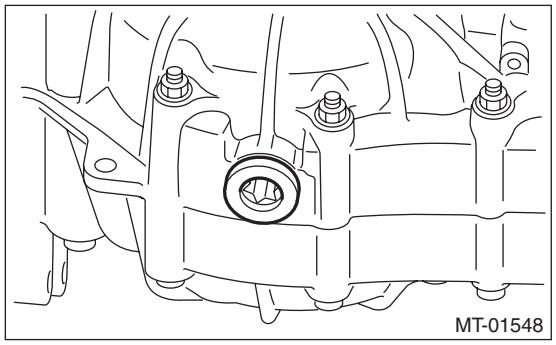
9. Preparation for Overhaul

A: PROCEDURE

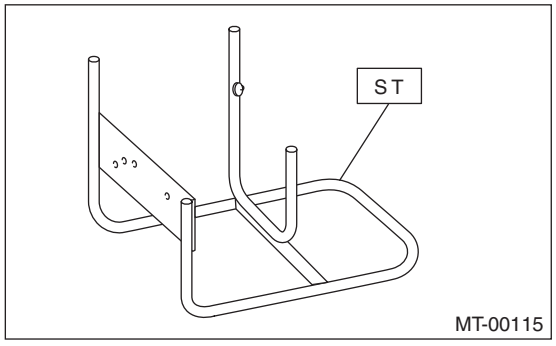
1) Clean oil, grease, dirt and dust from the transmission.
2) When transmission gear oil remains in the transmission, using the TORX® bit T70, remove the drain plug, and drain the gear oil completely.
3) Tighten the drain plug using TORX® bit T70.

NOTE:
Use a new gasket.

Tightening torque:
44 N·m (4.5 kgf-m, 32.5 ft-lb) (aluminum gasket, silver)
70 N·m (7.1 kgf-m, 51.6 ft-lb) (copper gasket, brown)
70 N·m (7.1 kgf-m, 51.6 ft-lb) (metal gasket, black)



4) Attach the transmission to the ST.
ST 499937100 TRANSMISSION STAND

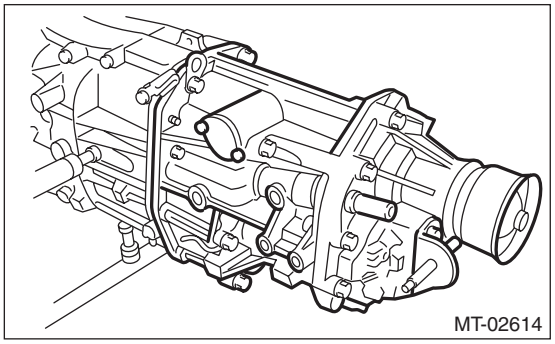


5) Apply oil to rotating parts before assembly.
6) All disassembled parts, if to be reused, should be reinstalled in the original positions.
7) Gaskets, lock washers and lock nuts must be replaced with new ones.
8) Apply liquid gasket to the specified areas to prevent leakage.

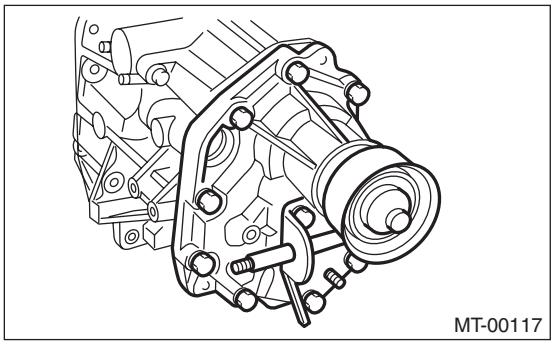
10. Transfer Case and Extension Case Assembly

A: REMOVAL

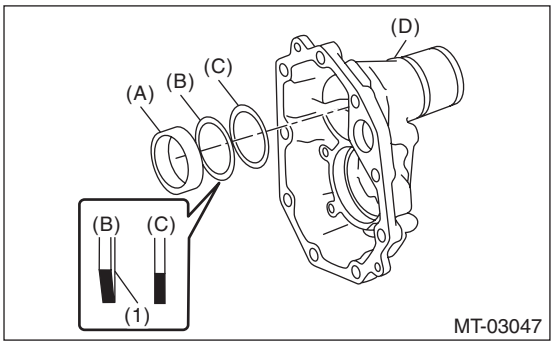
1) Remove the manual transmission assembly from the vehicle. <Ref. to 5MT-22, REMOVAL, Manual Transmission Assembly.>
2) Remove the back-up light switch and the neutral position switch. <Ref. to 5MT-35, REMOVAL, Switches and Harness.>
3) Remove the transfer case together with the extension case assembly.


MT-02614

4) Remove the gasket.
5) Remove the shifter arm.
6) Remove the extension case assembly.


MT-00117

7) Remove the transfer driven gear.
8) Remove the taper roller bearing (extension case side) outer race, dish plate and adjusting washer.



MT-03047

(A) Taper roller bearing (extension case side) outer race
(B) Dish plate
(C) Adjusting washer
(D) Extension case

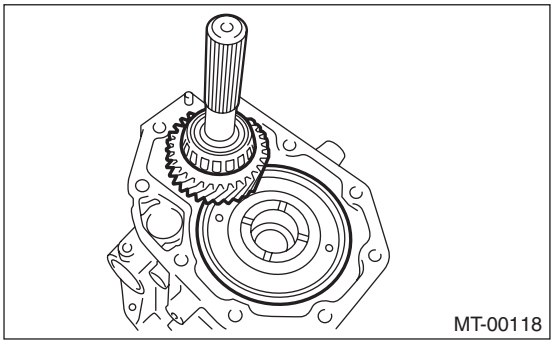
(1) Paint side

B: INSTALLATION

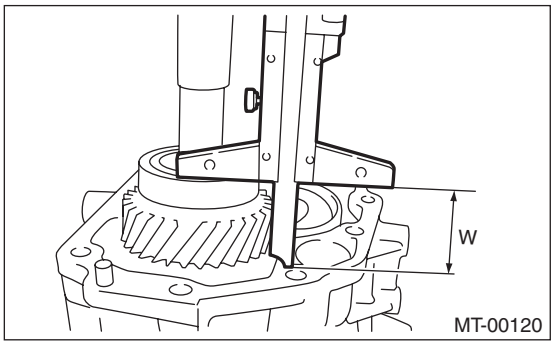
1) Clean the mating surfaces of the transmission case, transfer case and extension case.
2) Apply a coat of grease to the taper roller bearing (transfer case side) of transfer driven gear and the roller rolling surface of the taper roller bearing (extension case side).

Grease:
NICHIMOLY N-130 or equivalent

3) Install the center differential and the transfer driven gear.

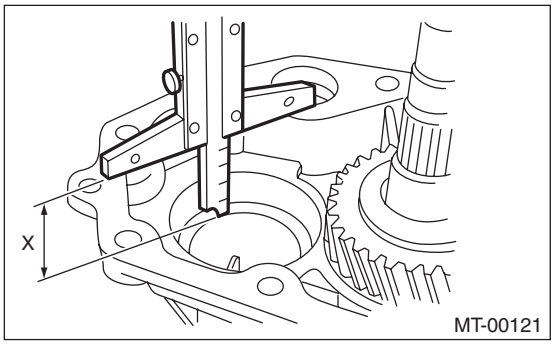

MT-00118

4) Install the taper roller bearing (extension case side) outer race to the transfer driven gear.
5) While pressing the taper roller bearing (extension case side) outer race horizontally, rotate the driven shaft for ten turns.
6) Measure the height “W” between transfer case and taper roller bearing on the transfer driven gear.



7) Measure the depth “X” of taper roller bearing insertion part of the extension case.

NOTE:
Measure while the taper roller bearing (extension case side) outer race, dish plate and adjusting washer are removed.



8) Calculate the adjusting washer thickness “t” using the following calculation.
t = X – W – (1.715 — 1.765 mm (0.686 — 0.706 in))
X: Depth of taper roller bearing insertion part of extension case
W: Height between transfer case and taper roller bearing on the transfer driven gear

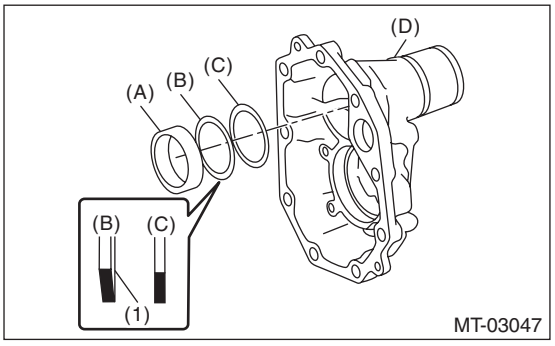
9) Select the adjusting washer with the nearest value in the following table.

NOTE:
Be sure that it is always within the preload.

Adjusting washer (61 × 50 × t)	
Part No.	Thickness mm (in)
803050060	0.50 (0.0197)
803050061	0.55 (0.0217)
803050062	0.60 (0.0236)
803050063	0.65 (0.0256)
803050064	0.70 (0.0276)
803050065	0.75 (0.0295)
803050066	0.80 (0.0315)
803050067	0.85 (0.0335)
803050068	0.90 (0.0354)
803050069	0.95 (0.0374)
803050070	1.00 (0.0394)
803050071	1.05 (0.0413)
803050072	1.10 (0.0433)
803050073	1.15 (0.0453)
803050074	1.20 (0.0472)
803050075	1.25 (0.0492)
803050076	1.30 (0.0512)
803050077	1.35 (0.0531)
803050078	1.40 (0.0551)
803050079	1.45 (0.0571)

10) Install the selected adjusting washer, dish plate and taper roller bearing (extension case side) outer race.

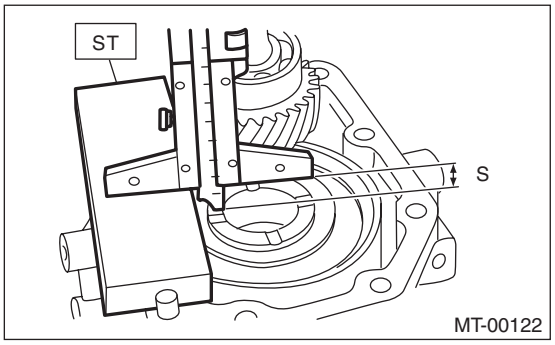
NOTE:
Make sure the dish plate is installed in the proper direction.



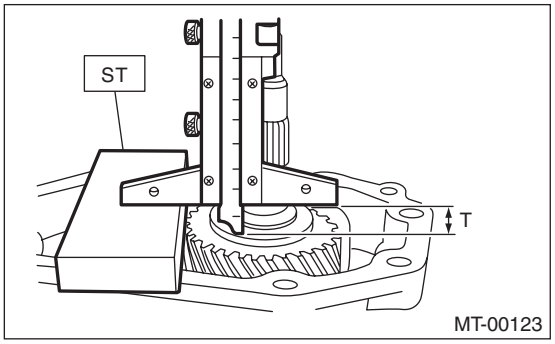
(A) Taper roller bearing (extension case side) outer race
(B) Dish plate
(C) Adjusting washer
(D) Extension case

(1) Paint side

11) Measure the depth “S” between the transfer case + ST and the center differential.
ST 398643600 GAUGE



12) Measure the height “T” between the extension case + ST and the transfer drive gear.
ST 398643600 GAUGE



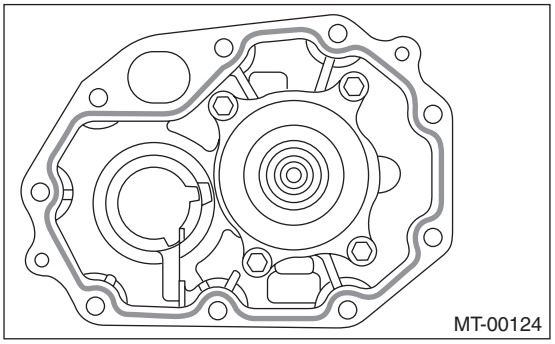
13) Calculate the adjusting washer thickness “U” using the following calculation.
U = S + T – 30 mm (1.18 in) – (0.15 — 0.35 mm (0.0059 — 0.0138 in))
S: Depth between the transfer case + ST and the center differential
T: Height between the extension case + ST and the transfer gear
30 mm (1.18 in): Thickness of ST (× 2 pieces)
0.15 — 0.35 mm (0.0059 — 0.0138 in): Clearance
14) Select a suitable adjusting washer in the following table.

Clearance:
0.15 — 0.35 mm (0.0059 — 0.0138 in)

Adjusting washer	
Part No.	Thickness mm (in)
803036050	0.9 (0.035)
803036054	1.0 (0.039)
803036051	1.1 (0.043)
803036055	1.2 (0.047)
803036052	1.3 (0.051)
803036056	1.4 (0.055)
803036053	1.5 (0.059)
803036057	1.6 (0.063)
803036058	1.7 (0.067)
803036080	1.8 (0.071)
803036081	1.9 (0.075)

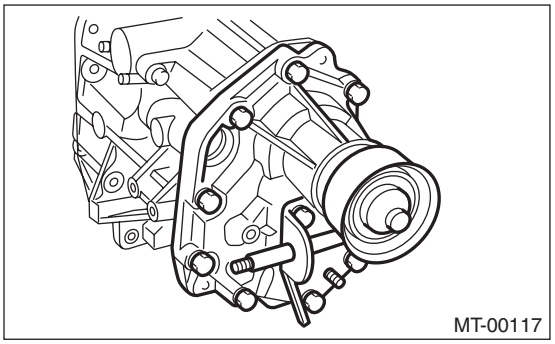
15) Install the selected adjusting washer to the center differential.
16) Apply a proper amount of liquid gasket.

Liquid gasket:
THREE BOND 1215B or equivalent



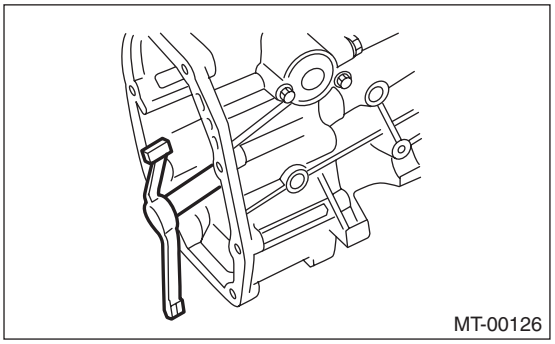
17) Install the extension case assembly.

Tightening torque:
40 N·m (4.1 kgf-m, 29.5 ft-lb)



18) Install the shifter arm.

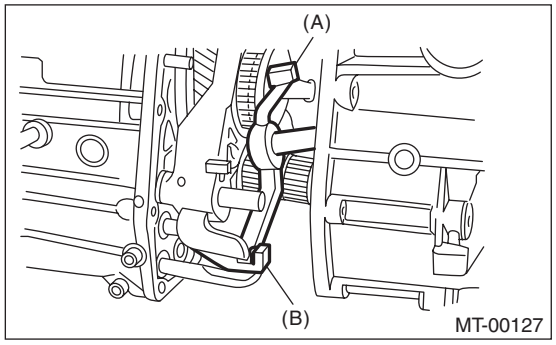
NOTE:
Apply transmission gear oil to the oil seal lips.



19) Attach the gasket.

NOTE:
Use a new gasket.

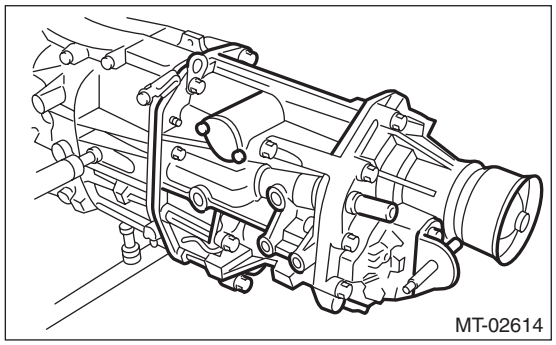
20) Hang the shifter arm on 3rd-4th fork rod.



(A) Shifter arm
(B) 3rd-4th fork rod

21) Install the transfer case together with the extension case assembly.

Tightening torque:
24.5 N·m (2.5 kgf-m, 18.1 ft-lb)

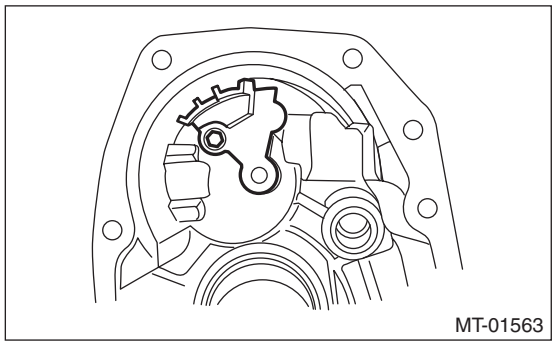


22) Install the back-up light switch and the neutral position switch. <Ref. to 5MT-35, INSTALLATION, Switches and Harness.>
23) Install the manual transmission assembly to the vehicle. <Ref. to 5MT-25, INSTALLATION, Manual Transmission Assembly.>

C: DISASSEMBLY

1. TRANSFER CASE

1) Remove the reverse check sleeve assembly. <Ref. to 5MT-50, REMOVAL, Reverse Check Sleeve.>
2) Remove the oil guide.

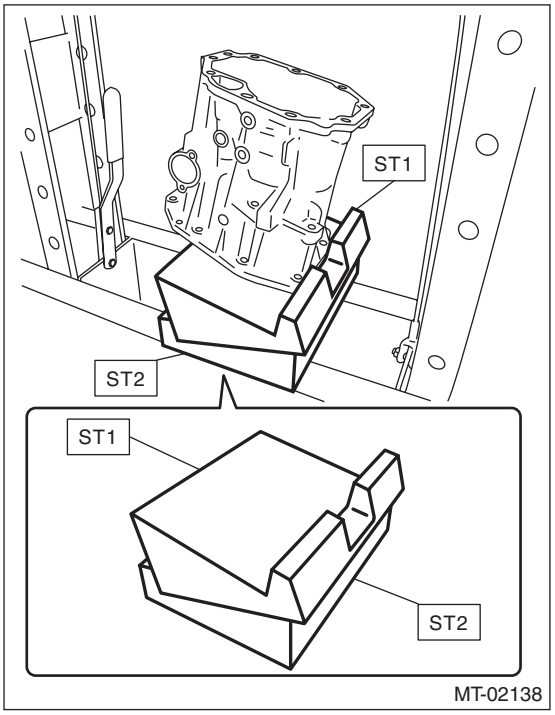


3) Remove the oil seal.

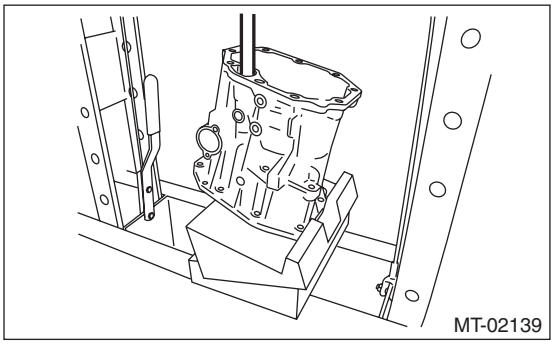
4) Set ST1, ST2 and transfer case to a press.

NOTE:
- Set the ST2 under ST1.
- Set the transfer case so that the hole for shifter arm is positioned vertically.

ST1 498267300 CYLINDER HEAD TABLE
ST2 498267200 CYLINDER HEAD TABLE

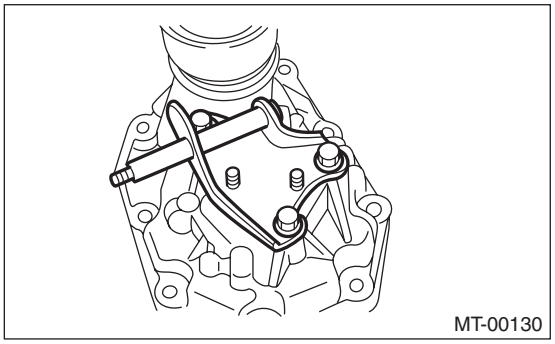


5) Using the round bar with diameter of 22 mm (0.87 in) or 23 mm (0.91 in), remove the roller bearing.



2. EXTENSION CASE

1) Remove the transfer drive gear assembly. <Ref. to 5MT-45, REMOVAL, Transfer Drive Gear.>
2) Remove the shift bracket.



3) Remove the oil seal from the extension case. <Ref. to 5MT-31, Oil Seal.>
4) Remove the dust cover.

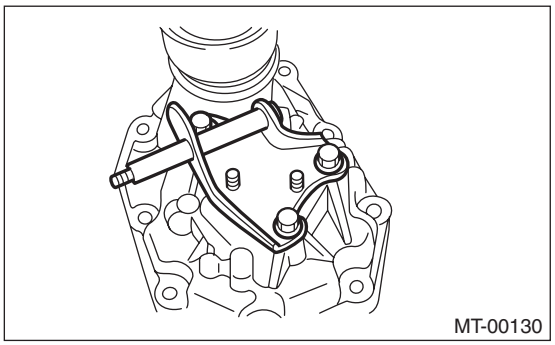
D: ASSEMBLY

1. EXTENSION CASE

1) Using the ST, install the oil seal to the extension case. <Ref. to 5MT-31, Oil Seal.>

NOTE:
Use a new oil seal.
2) Install the dust cover.
3) Install the shift bracket.

Tightening torque:
24.5 N·m (2.5 kgf-m, 18.1 ft-lb)



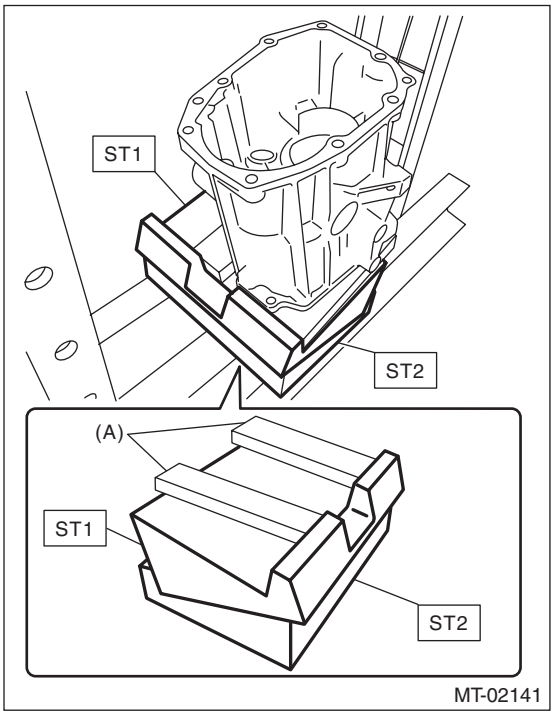
4) Install the transfer drive gear to the extension case. <Ref. to 5MT-45, INSTALLATION, Transfer Drive Gear.>

2. TRANSFER CASE

1) Set the ST1, ST2, iron plate and the transfer case to the press.

NOTE:
- Set the ST2 under ST1.
- Set the transfer case so that the hole for shifter arm is positioned vertically.
- Insert the iron plate which is thicker than the exposed length of the transfer case knock pin between the ST and transfer case.
- Set the iron plate so that the transfer case knock pin does not ride on the iron plate.

ST1 498267300 CYLINDER HEAD TABLE
ST2 498267200 CYLINDER HEAD TABLE

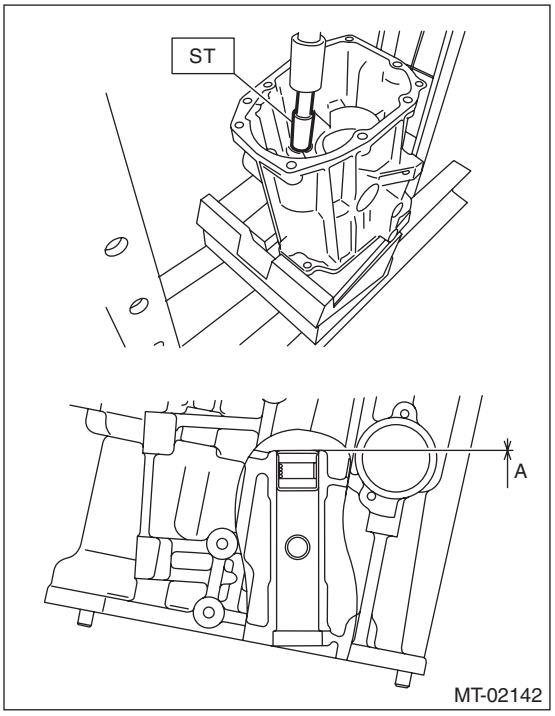


(A) Iron plate

2) Press-fit the roller bearing using the ST.

Press-fit depth of roller bearing:
A: 0±0.2 mm (0±0.01 in) from the end of transfer case

ST 899864100 REMOVER



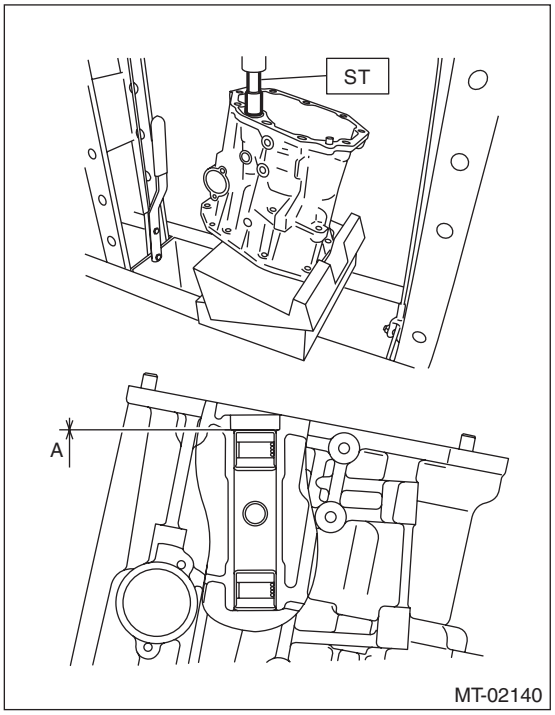
3) Remove the iron plate, and turn over the transfer case.

NOTE:
Set the transfer case so that the hole for shifter arm is positioned vertically.

4) Press-fit the roller bearing using the ST.

Press-fit depth of roller bearing:
A: 0±0.2 mm (0±0.01 in) from the end of transfer case

ST 899864100 REMOVER

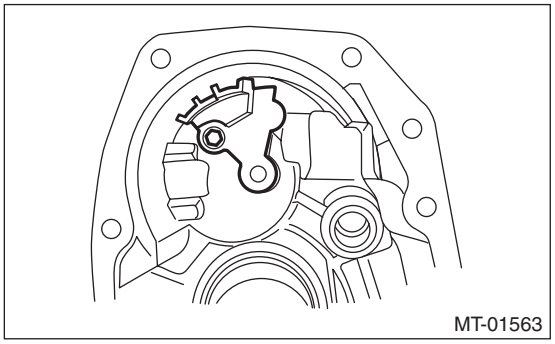


5) Install the shifter arm to the transfer case, and make sure that the shift arm moves smoothly.

6) Install the oil guide.

NOTE:
Use a new installing bolt.

Tightening torque:
6.4 N·m (0.7 kgf-m, 4.7 ft-lb)

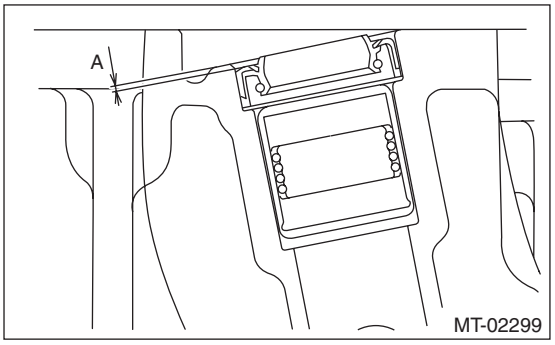


7) Install the reverse check sleeve assembly to the transfer case. <Ref. to 5MT-50, INSTALLATION, Reverse Check Sleeve.>

8) Install the oil seal.

NOTE:
Use a new oil seal.

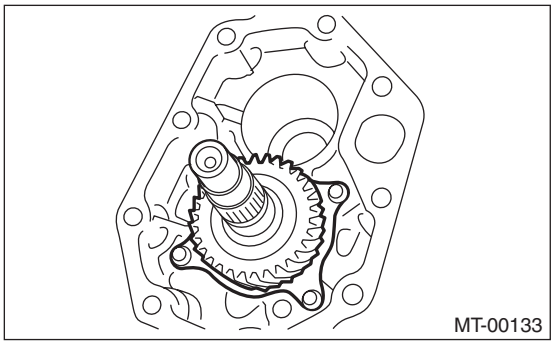
Press-fit depth of oil seal:
A: 1±0.2 mm (0.04±0.01 in) from the end of transfer case



11.Transfer Drive Gear

A: REMOVAL

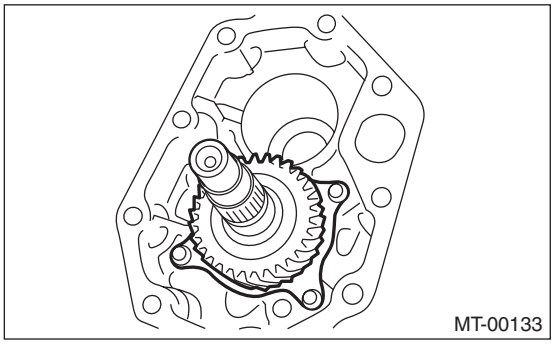
1) Remove the manual transmission assembly from the vehicle. <Ref. to 5MT-22, REMOVAL, Manual Transmission Assembly.>
2) Remove the back-up light switch and the neutral position switch. <Ref. to 5MT-35, REMOVAL, Switches and Harness.>
3) Remove the transfer case together with the extension case assembly. <Ref. to 5MT-39, REMOVAL, Transfer Case and Extension Case Assembly.>
4) Remove the extension case assembly.
5) Remove the transfer driven gear.
6) Remove the transfer drive gear.


MT-00133

B: INSTALLATION

1) Install the transfer drive gear.

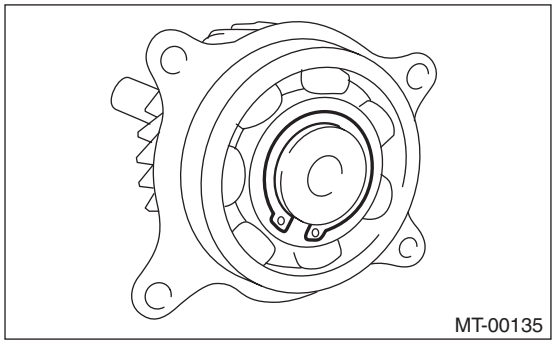
Tightening torque:
26 N·m (2.7 kgf-m, 19.2 ft-lb)


MT-00133

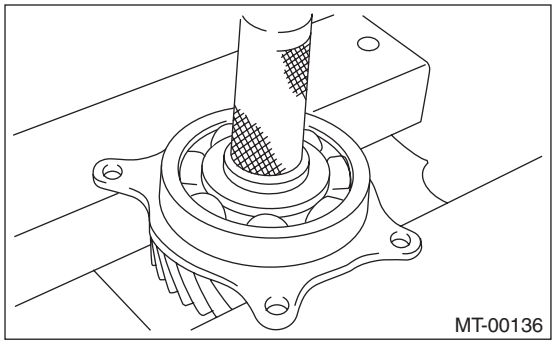
2) Select the adjusting washer. <Ref. to 5MT-39, INSTALLATION, Transfer Case and Extension Case Assembly.>
3) Install the transfer driven gear.
4) Install the transfer case and the extension case assembly. <Ref. to 5MT-39, INSTALLATION, Transfer Case and Extension Case Assembly.>
5) Install the back-up light switch and the neutral position switch. <Ref. to 5MT-35, INSTALLATION, Switches and Harness.>
6) Install the manual transmission assembly to the vehicle. <Ref. to 5MT-25, INSTALLATION, Manual Transmission Assembly.>

C: DISASSEMBLY

1) Remove the snap ring.


MT-00135

2) Remove the ball bearing.

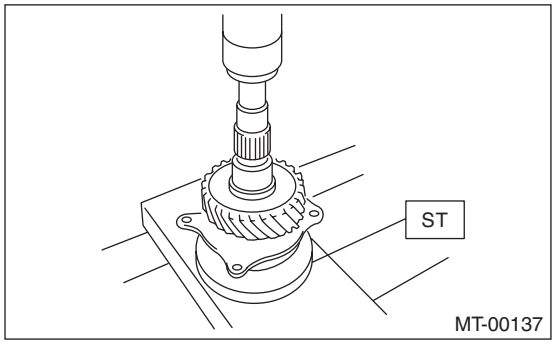

MT-00136

D: ASSEMBLY

1) Set the ST against the inner race of the ball bearing, and install the drive shaft.

CAUTION:
Do not apply a load in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).

NOTE:
Use a new ball bearing.
ST 398177700 INSTALLER



MT-00137

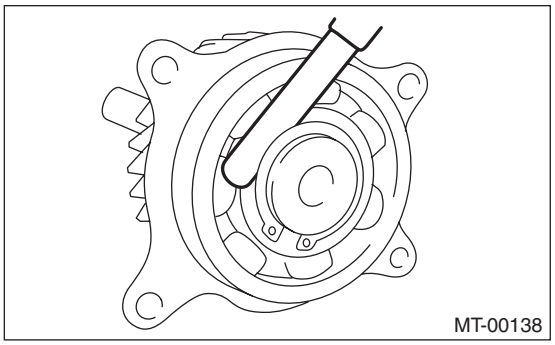
2) Install the snap ring on the transfer drive shaft.
3) Inspect the clearance between the snap ring and the ball bearing. <Ref. to 5MT-46, INSPECTION, Transfer Drive Gear.>

E: INSPECTION

1) Ball bearing
Replace the bearings in the following cases.
- In case of broken or rusty bearings
- In case of worn or damaged bearings
- When the bearings fail to turn smoothly or emit noise in rotation after transmission gear oil lubrication.

2) Transfer drive gear
If the drive gear tooth surface and shaft are excessively broken or damaged, replace the drive gear.
3) Measure the clearance between snap ring and inner race of ball bearing with a thickness gauge.

Clearance:
0.01 — 0.15 mm (0.0004 — 0.0059 in)



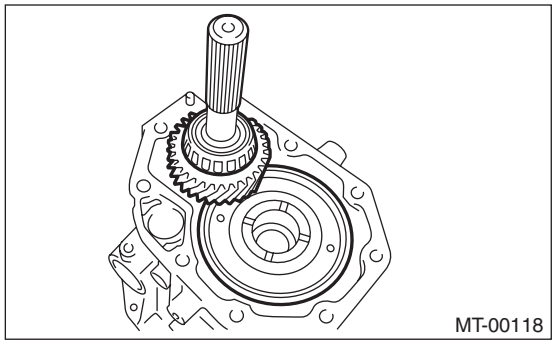
If the measurement is not within specification, select a suitable snap ring and replace it.

Snap ring (outer-30)	
Part No.	Thickness mm (in)
805030041	1.53 (0.0602)
805030042	1.65 (0.0650)
805030043	1.77 (0.0697)

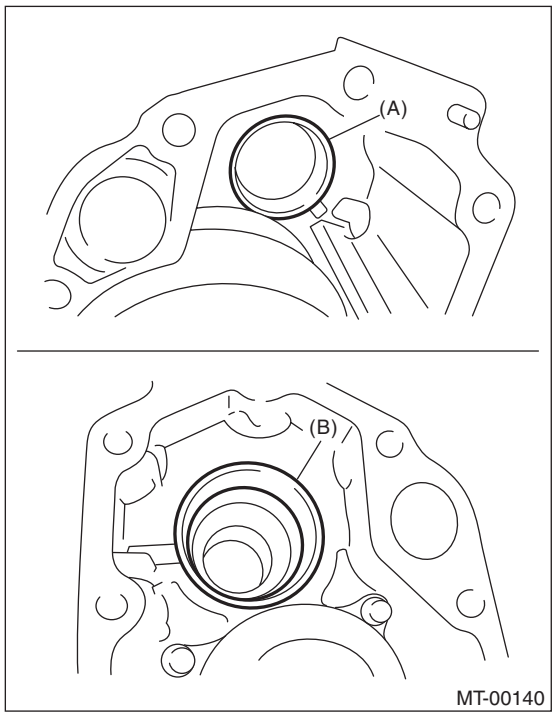
12.Transfer Driven Gear

A: REMOVAL

1) Remove the manual transmission assembly from the vehicle. <Ref. to 5MT-22, REMOVAL, Manual Transmission Assembly.>
2) Remove the back-up light switch and the neutral position switch. <Ref. to 5MT-35, REMOVAL, Switches and Harness.>
3) Remove the transfer case together with the extension case assembly. <Ref. to 5MT-39, REMOVAL, Transfer Case and Extension Case Assembly.>
4) Remove the extension case assembly.
5) Remove the transfer driven gear.



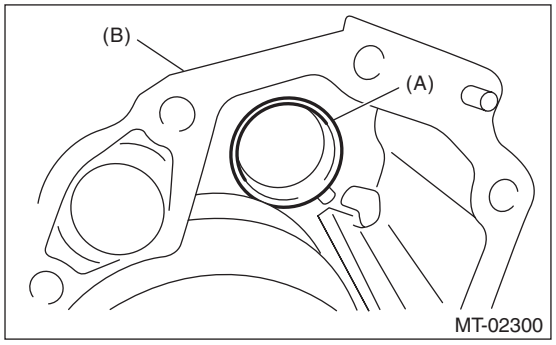
6) Remove the taper roller bearing outer race.



(A) Taper roller bearing (transfer case side) outer race
(B) Taper roller bearing (extension case side) outer race

B: INSTALLATION

1) Install the taper roller bearing (transfer case side) outer race.

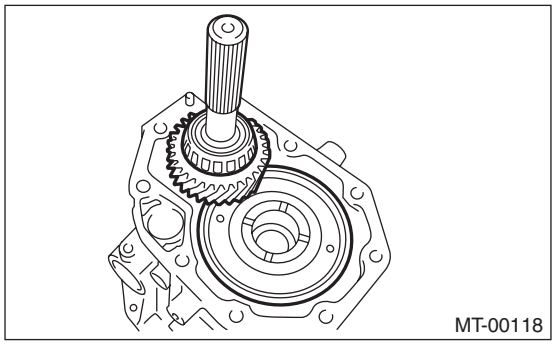


(A) Taper roller bearing (transfer case side) outer race
(B) Transfer case

2) Apply a coat of grease to the taper roller bearing (transfer case side) of transfer driven gear and the roller rolling surface of the taper roller bearing (extension case side).

Grease:
NICHIMOLY N-130 or equivalent

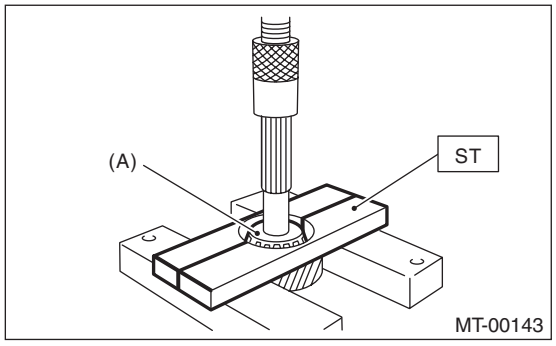
3) Install the transfer driven gear.



4) Select the adjusting washer. <Ref. to 5MT-39, INSTALLATION, Transfer Case and Extension Case Assembly.>
5) Install the transfer case and the extension case assembly. <Ref. to 5MT-39, INSTALLATION, Transfer Case and Extension Case Assembly.>
6) Install the back-up light switch and the neutral position switch. <Ref. to 5MT-35, INSTALLATION, Switches and Harness.>
7) Install the manual transmission assembly to the vehicle. <Ref. to 5MT-25, INSTALLATION, Manual Transmission Assembly.>

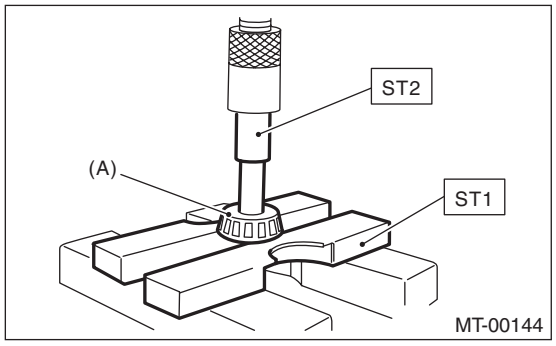
C: DISASSEMBLY

1) Using the ST, remove the taper roller bearing (extension case side).
ST 498077000 REMOVER



(A) Taper roller bearing (extension case side)

2) Using ST1 and ST2, remove the taper roller bearing (transfer case side).
ST1 498077000 REMOVER
ST2 899864100 REMOVER



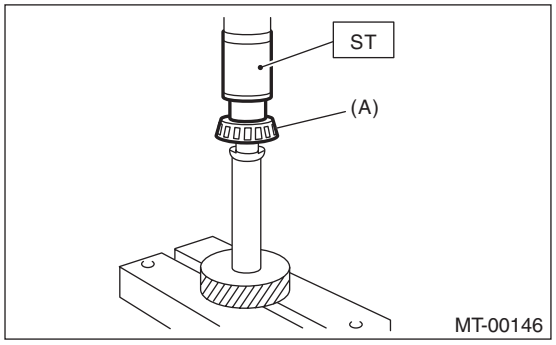
(A) Taper roller bearing (transfer case side)

D: ASSEMBLY

NOTE:
Be careful when handling because the taper roller bearing outer race and inner race are used as a set.
1) Using the ST, install the taper roller bearing (transfer case side).

CAUTION:
Do not apply a load in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).

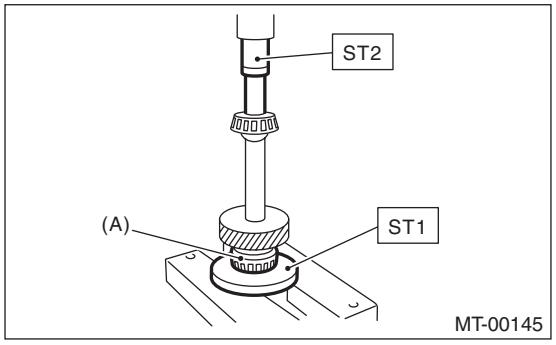
ST 927640000 INSTALLER



(A) Taper roller bearing (transfer case side)

2) Using the ST, install the taper roller bearing (extension case side).

CAUTION:
Do not apply a load in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).
ST1 498175500 INSTALLER
ST2 899864100 REMOVER



(A) Taper roller bearing (extension case side)

E: INSPECTION

1) Taper roller bearing
Replace the bearings in the following cases.
- In case of broken or rusty bearings
- In case of worn or damaged bearings
- When the bearings fail to turn smoothly or emit noise in rotation after transmission gear oil lubrication.

2) Transfer driven gear
If the tooth face of driven gear and the shaft are excessively broken or damaged, replace the driven gear.

13.Center Differential

A: REMOVAL

1) Remove the manual transmission assembly from the vehicle. <Ref. to 5MT-22, REMOVAL, Manual Transmission Assembly.>
2) Remove the back-up light switch and the neutral position switch. <Ref. to 5MT-35, REMOVAL, Switches and Harness.>
3) Remove the transfer case together with the extension case assembly. <Ref. to 5MT-39, REMOVAL, Transfer Case and Extension Case Assembly.>
4) Remove the extension case assembly.
5) Remove the transfer driven gear. <Ref. to 5MT-47, REMOVAL, Transfer Driven Gear.>
6) Remove the center differential.

B: INSTALLATION

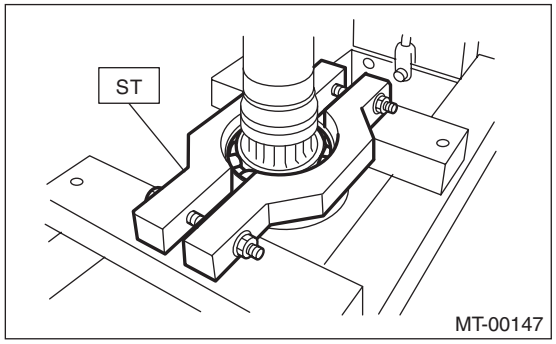
1) Attach the center differential to transfer case.
2) Install the transfer driven gear. <Ref. to 5MT-47, INSTALLATION, Transfer Driven Gear.>
3) Install the transfer case together with the extension case assembly. <Ref. to 5MT-39, INSTALLATION, Transfer Case and Extension Case Assembly.>
4) Install the back-up light switch and the neutral position switch. <Ref. to 5MT-35, INSTALLATION, Switches and Harness.>
5) Install the manual transmission assembly to the vehicle. <Ref. to 5MT-25, INSTALLATION, Manual Transmission Assembly.>

C: DISASSEMBLY

Remove the ball bearing using ST.

NOTE:
Center differential is a non-disassembled part which should not be disassembled.

ST 498077300 CENTER DIFFERENTIAL BEARING REMOVER

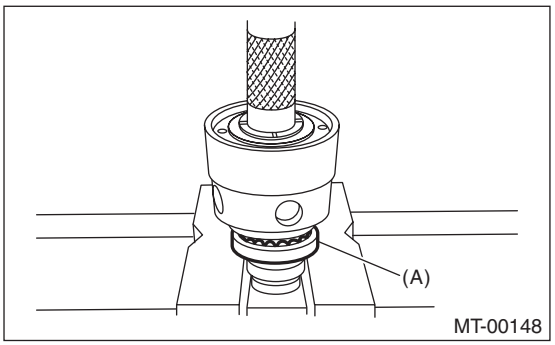


D: ASSEMBLY

Install the ball bearings.

CAUTION:
Do not apply a load in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).

NOTE:
Use a new ball bearing.



(A) Ball bearing

E: INSPECTION

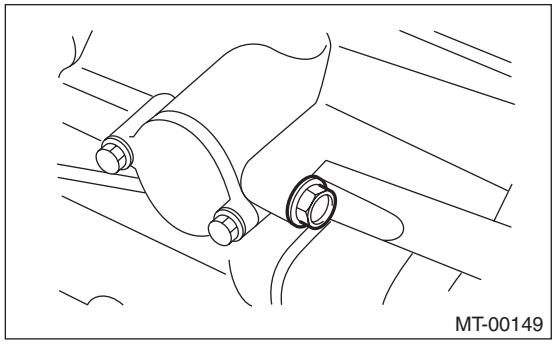
1) Ball bearing
Replace the bearings in the following cases.
- In case of broken or rusty bearings
- In case of worn or damaged bearings
- When the bearings fail to turn smoothly or emit noise in rotation after transmission gear oil lubrication.
- When bearing has other defects.

2) Center differential
If there is wear or damage, replace the center differential case assembly.

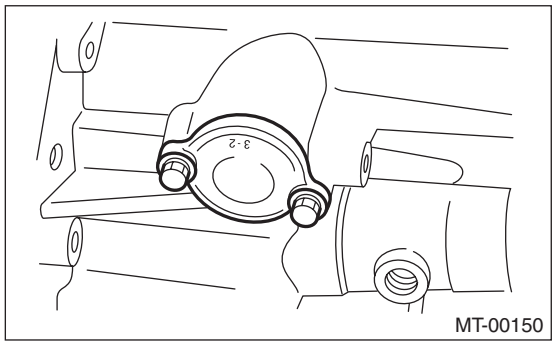
14.Reverse Check Sleeve

A: REMOVAL

1) Remove the manual transmission assembly from the vehicle. <Ref. to 5MT-22, REMOVAL, Manual Transmission Assembly.>
2) Remove the transfer case together with the extension case assembly. <Ref. to 5MT-39, REMOVAL, Transfer Case and Extension Case Assembly.>
3) Remove the shifter arm.
4) Remove the plug, gasket, reverse accent spring, and reverse check ball.


MT-00149

5) Remove the reverse check sleeve.

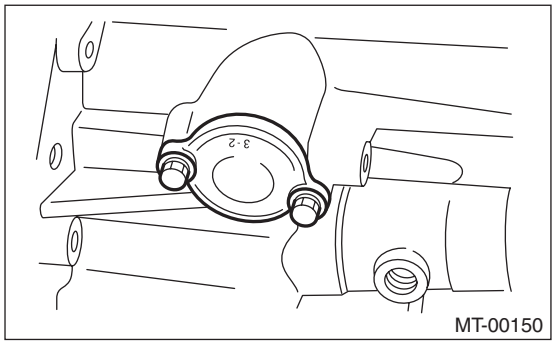


MT-00150

B: INSTALLATION

1) Install the reverse check sleeve.

Tightening torque:
6.4 N·m (0.7 kgf-m, 4.7 ft-lb)

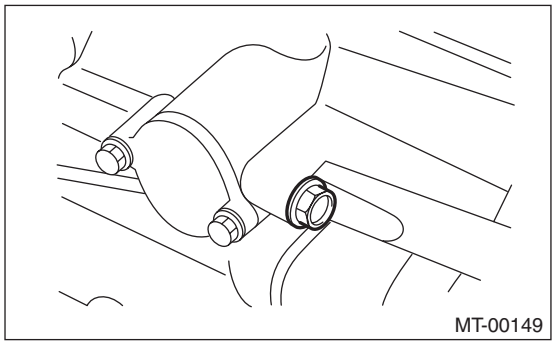


MT-00150

2) Install the reverse check ball, reverse accent spring, gasket and plug.

NOTE:
Use a new gasket.

Tightening torque:
9.75 N·m (1.0 kgf-m, 7.2 ft-lb)

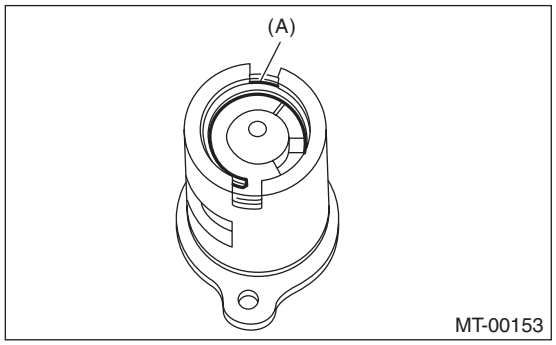

MT-00149

3) Install the transfer case together with the extension case assembly. <Ref. to 5MT-39, INSTALLATION, Transfer Case and Extension Case Assembly.>
4) Install the manual transmission assembly to the vehicle. <Ref. to 5MT-25, INSTALLATION, Manual Transmission Assembly.>

C: DISASSEMBLY

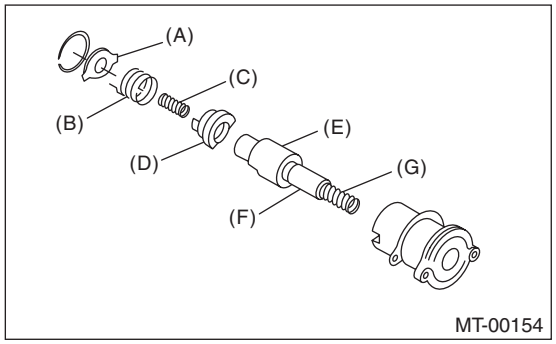
1) Cover the reverse check sleeve with cloth, and remove the snap ring by using screwdriver.

NOTE:
If the snap ring is deformed or the spring repulsive force is not enough, replace with a new snap ring.



(A) Snap ring

2) Remove the reverse check plate, reverse check spring, reverse check cam, return spring (5th-Reverse), reverse accent shaft, return spring cap, and return spring (1st-2nd).



(A) Reverse check plate
(B) Reverse check spring
(C) Return spring (5th-Reverse)
(D) Reverse check cam
(E) Reverse accent shaft
(F) Return spring cap
(G) Return spring (1st-2nd)

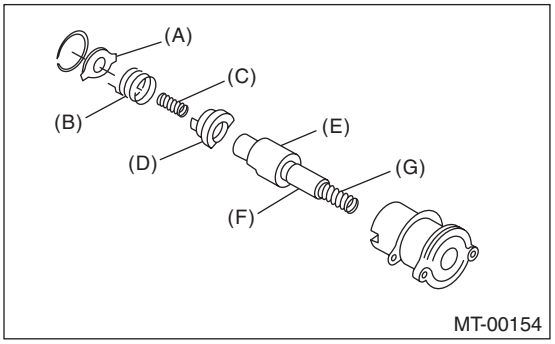
3) Remove the O-ring.

NOTE:
Be careful not to damage the adjusting shim between reverse check sleeve assembly and case.

D: ASSEMBLY

1) Install the return spring (1st-2nd), return spring cap, reverse accent shaft, reverse check cam, return spring (5th-Reverse) and reverse check spring.

NOTE:
Be sure to insert the curved part of reverse check spring into the check cam groove.



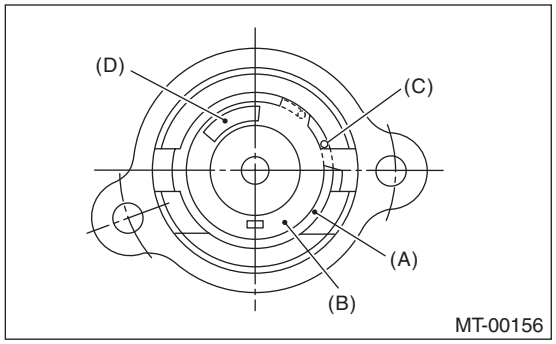
(A) Reverse check plate
(B) Reverse check spring
(C) Return spring (5th-Reverse)
(D) Reverse check cam
(E) Reverse accent shaft
(F) Return spring cap
(G) Return spring (1st-2nd)

2) Hook the curved part of reverse check spring onto the reverse check plate.
3) Rotate the cam so that the protrusion on the reverse check cam is located at the plate opening.
4) While fixing the cam to that position, attach the reverse check plate to the reverse check sleeve, and secure with snap ring.
5) Insert the O-ring into the sleeve groove.

NOTE:
Use new O-rings.

E: INSPECTION

• Make sure the cutout of the reverse accent shaft is aligned with the opening in the reverse check sleeve.
• Turn the cam by hand to check for smooth rotation.
• Move the cam and shaft all the way toward the plate, and make sure it releases.
If the cam does not return properly, replace the reverse check spring. If the shaft does not return, check for scratches on the inner surface of sleeve. If the sleeve is in good order, replace the spring.



(A) Snap ring
(B) Reverse check plate
(C) Reverse check spring
(D) Reverse check cam

• Select a suitable reverse accent shaft and reverse check plate. <Ref. to 5MT-52, ADJUSTMENT, Reverse Check Sleeve.>

F: ADJUSTMENT

1. NEUTRAL POSITION ADJUSTMENT

1) Shift the gear into 3rd gear position.
2) Because of the return spring, until the arm contacts the stopper the shifter arm will feel lighter moving towards 1st/2nd gear and heavier towards the reverse gear.
3) Make adjustment so that the heavy stroke (reverse side) is a little heavier than the lighter stroke (1st/2nd side).
4) To adjust, remove the bolts holding the reverse check sleeve assembly to the case, and move the sleeve assembly outward, then place an adjustment shim between the sleeve assembly and the case to adjust the clearance.

CAUTION:
Be careful not to damage the O-ring when placing shims.

NOTE:
• When the shim is removed, the neutral position will move closer to reverse; when the shim is added, the neutral position will move closer to 1st gear.
• If it is not possible to adjust the clearance with only shims, replace the reverse accent shaft and re-adjust.

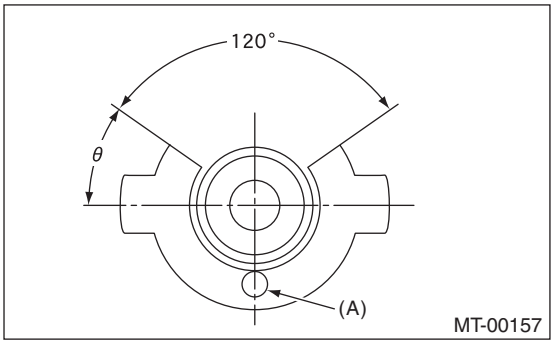
Adjusting shim	
Part No.	Thickness mm (in)
32190AA000	0.15 (0.0059)
32190AA010	0.30 (0.0118)

Reverse accent shaft		
Part No.	Mark	Remarks
32188AA130	S	Neutral position is closer to 1st gear.
32188AA140	T	Standard
32188AA150	U	Neutral position is closer to reverse gear.

2. REVERSE CHECK PLATE ADJUSTMENT

1) Shift the shifter arm to “5th” and then to reverse to see if the reverse check mechanism operates properly.
2) Also check to see if the arm returns to neutral when released from the reverse position. If the arm does not return properly, replace the reverse check plate.

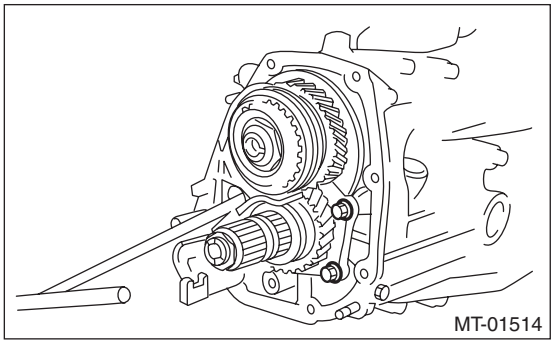
Reverse check plate			
Part No.	(A): No.	Angleθ	Content
32189AA001	0	28°	Arm stops closer to 5th gear.
32189AA011	1	31°	Arm stops closer to 5th gear.
32189AA021	2	34°	Arm stops in the center.
32189AA031	3	37°	Arm stops closer to reverse gear.
32189AA041	4	40°	Arm stops closer to reverse gear.



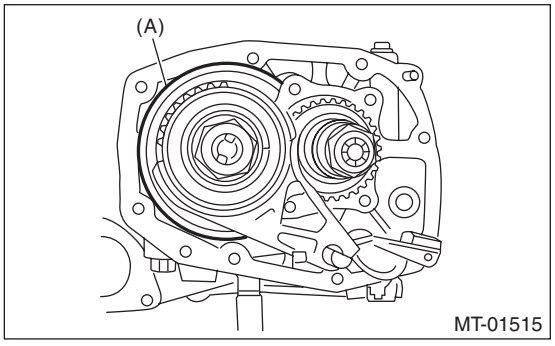
15.Transmission Case

A: REMOVAL

1) Remove the manual transmission assembly from the vehicle. <Ref. to 5MT-22, REMOVAL, Manual Transmission Assembly.>
2) Remove the clutch release lever. <Ref. to CL-13, REMOVAL, Release Bearing and Lever.>
3) Remove the transfer case together with the extension case assembly. <Ref. to 5MT-39, REMOVAL, Transfer Case and Extension Case Assembly.>
4) Remove the bearing mounting bolt.


MT-01514

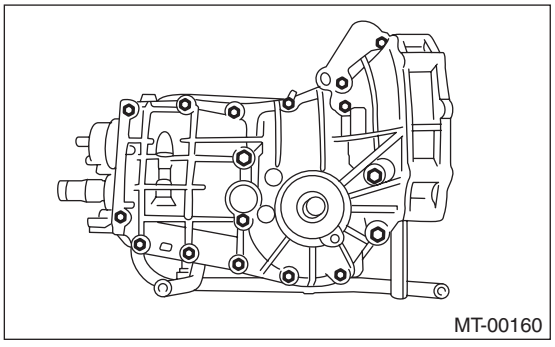
5) Remove the main shaft rear plate.



MT-01515

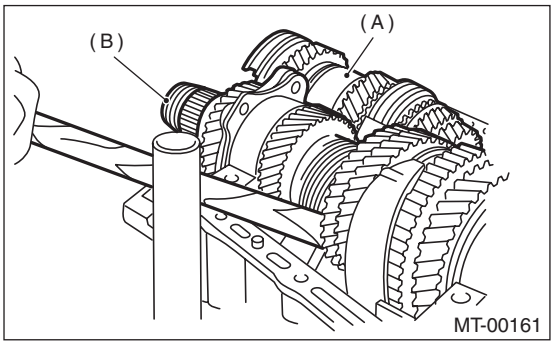
(A) Main shaft rear plate

6) Remove the bolts and nuts, and separate the transmission case into the right and left cases.


MT-00160

7) Remove the drive pinion shaft assembly.

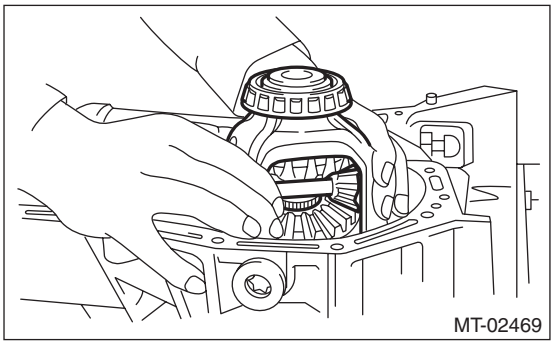
NOTE:
Use a hammer handle, etc. to remove if too tight.



MT-00161

(A) Main shaft ASSY
(B) Drive pinion shaft assembly

8) Remove the main shaft assembly.
9) Remove the front differential assembly.


MT-02469

10) Remove the differential side retainers and taper roller bearing outer races on the left and right sides. <Ref. to 5MT-72, REMOVAL, Front Differential Assembly.>

NOTE:
Do not confuse the right and left taper roller bearing outer races.
11) Remove the reverse idler gear. <Ref. to 5MT-81, REMOVAL, Shifter Fork and Rod.>
12) Remove the shifter fork and rod. <Ref. to 5MT-81, REMOVAL, Shifter Fork and Rod.>

B: INSTALLATION

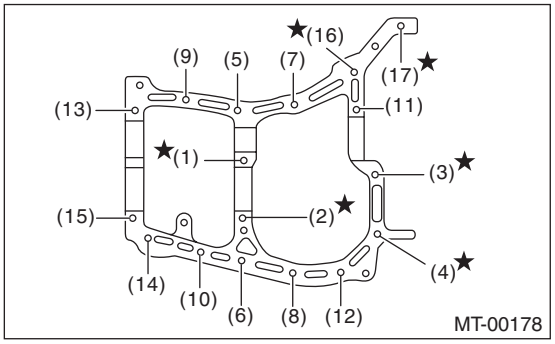
1) Wipe off grease, oil and dust on the mating surfaces of transmission cases with cleaning solvent.
2) Install the reverse idler gear. <Ref. to 5MT-79, INSTALLATION, Reverse Idler Gear.>
3) Install the shifter fork and rod. <Ref. to 5MT-82, INSTALLATION, Shifter Fork and Rod.>
4) Select the drive pinion shim. <Ref. to 5MT-62, INSTALLATION, Drive Pinion Shaft Assembly.>
5) Install the taper roller bearing outer race to the transmission case LH side, and install the differential side retainer with the O-ring removed.
6) Install the front differential assembly.
7) Install the main shaft assembly.

NOTE:
Align the needle bearing knock pin hole to the transmission case knock pin.
8) Install the selected drive pinion shims and drive pinion shaft assembly.

NOTE:
Align the roller bearing knock pin hole to the transmission case knock pin.
9) Align the left and right side of the transmission case, and tighten it with 17 mounting bolts.

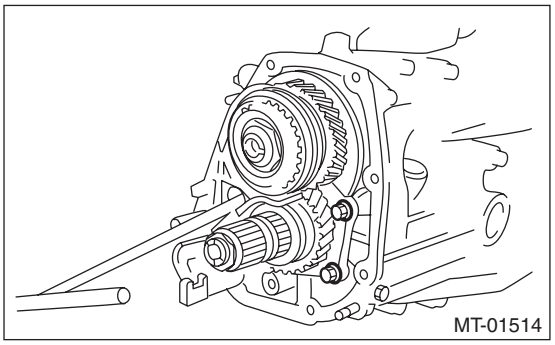
NOTE:
• Insert bolts (11) and (16) from the LH side of the transmission case.
• Match the cases together so that the drive pinion shims are not caught between the cases.

Tightening torque:
8 mm bolt
25 N·m (2.5 kgf-m, 18.4 ft-lb)
★ ***10 mm bolt***
39 N·m (4.0 kgf-m, 28.8 ft-lb)

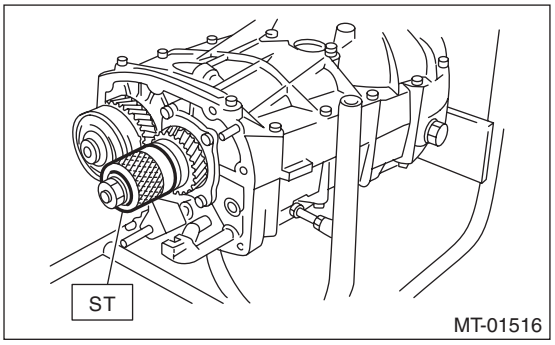


10) Install the taper roller bearing outer race to the RH side of the transmission case.
11) Tighten the bearing mounting bolts.

Tightening torque:
30 N·m (3.1 kgf-m, 22.1 ft-lb)

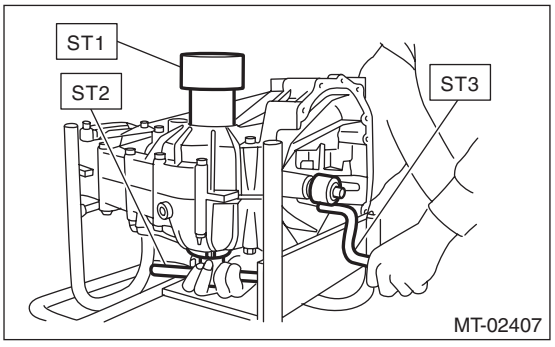


12) Adjust the backlash of the hypoid driven gear and the preload of the taper roller bearing.
(1) Attach the ST on drive pinion assembly.
ST 498427100 STOPPER



(2) Place the transmission case with the LH side facing downward, and put ST1 on the taper roller bearing outer race.
(3) Screw in the differential side retainer from the bottom into LH side case using ST2. Fit the ST3 on the main shaft. Shift the gear into 4th or 5th, and turn the shaft several times. Screw in the side retainer while rotating the ST3 until a slight resistance is felt on ST2.
This is the contact point of the hypoid driven gear and the drive pinion shaft. Repeat the above sequence several times to ensure the contact point.

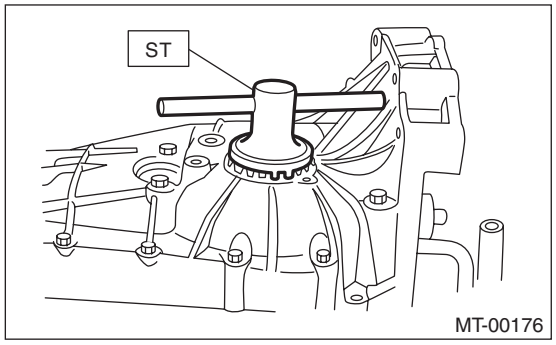
ST1	399780104	WEIGHT
ST2	18630AA010	WRENCH COMPL RETAINER
ST3	499927100	HANDLE



(4) Remove the WEIGHT, and screw in the differential side retainer without the O-ring into the RH side of the transmission case, and stop at the point where a slight resistance is felt.

NOTE:
In this condition, the backlash between hypoid driven gear and drive pinion shaft is zero.

ST 18630AA010 WRENCH COMPL RETAINER



(5) Loosen the differential side retainer on the LH side of the transmission case by 3 notches, and turn the side retainer on the RH side of the transmission case by 3 notches in order to apply backlash.

(6) Screw in the differential side retainer of the RH side of the transmission case additionally by 1 notch in order to apply preload on taper roller bearing.

(7) Tighten temporarily both the retainer lock plates LH and RH, and put marks on both the differential side retainer and lock plate for later readjustment.

NOTE:
If it is hard to install the lock plates, reverse the sides and install them.

(8) Turn the main shaft several times while tapping around the differential side retainer lightly with a plastic hammer.

13) Inspect and adjust backlash and tooth contact of the hypoid driven gear. <Ref. to 5MT-75, INSPECTION, Front Differential Assembly.>

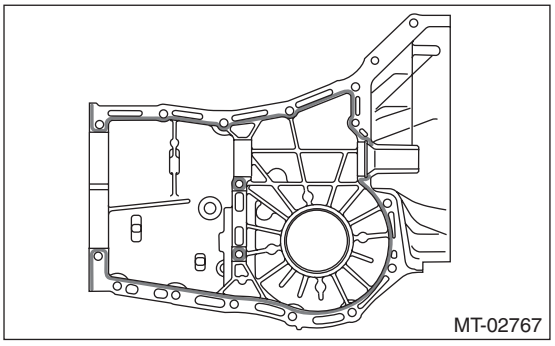
14) Separate the transmission case into left and right parts. <Ref. to 5MT-53, REMOVAL, Transmission Case.>

15) Check each shifter fork. <Ref. to 5MT-83, INSPECTION, Shifter Fork and Rod.>

16) Select a main shaft rear plate. <Ref. to 5MT-61, ADJUSTMENT, Main Shaft Assembly.>

17) Apply liquid gasket, then join the right side and left side of the case together.

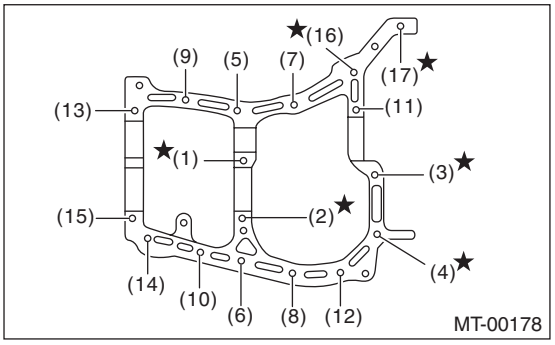
Liquid gasket:
THREE BOND 1215B or equivalent



18) Tighten the bolts together with brackets and clips as shown in the figure (17 locations).

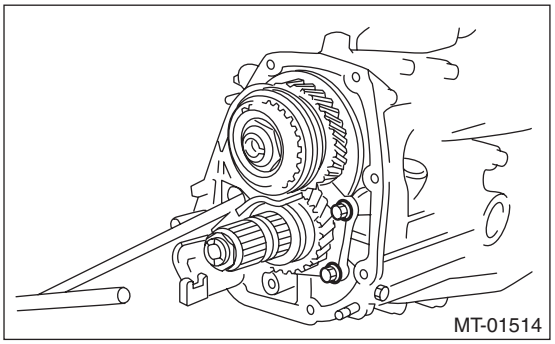
NOTE:
- Insert bolts (11) and (16) from the LH side of the transmission case.
- Match the cases together so that the drive pinion shims are not caught between the cases.

Tightening torque:
8 mm bolt
25 N·m (2.5 kgf-m, 18.4 ft-lb)
★ ***10 mm bolt***
39 N·m (4.0 kgf-m, 28.8 ft-lb)



19) Tighten the bearing mounting bolts.

Tightening torque:
30 N·m (3.1 kgf-m, 22.1 ft-lb)

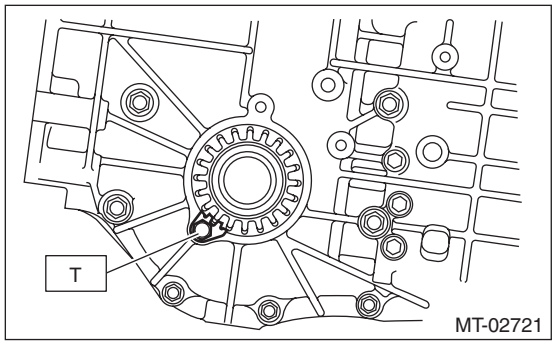


20) Remove the retainer lock plate, and loosen the differential side retainer until the groove of the O-ring appears. Fit the O-ring into the groove and tighten the side retainer into the position where it was not loosened.

NOTE:
• When loosening the side retainer, record the number of the turns made.
• Perform this for both left and right side retainers.
• Use new O-rings.
• Apply transmission gear oil to O-ring.

21) Install the retainer lock plate.

Tightening torque:
T: 25 N·m (2.5 kgf-m, 18.4 ft-lb)



22) Install the transfer case together with the extension case assembly. <Ref. to 5MT-39, INSTALLATION, Transfer Case and Extension Case Assembly.>
23) Install the clutch release lever and bearing. <Ref. to CL-13, INSTALLATION, Release Bearing and Lever.>
24) Install the manual transmission assembly to the vehicle. <Ref. to 5MT-25, INSTALLATION, Manual Transmission Assembly.>

C: INSPECTION

Check the transmission case for cracks, damage, or oil leaks.

16.Main Shaft Assembly

A: REMOVAL

1) Remove the manual transmission assembly from the vehicle. <Ref. to 5MT-22, REMOVAL, Manual Transmission Assembly.>
2) Remove the transfer case together with the extension case assembly. <Ref. to 5MT-39, REMOVAL, Transfer Case and Extension Case Assembly.>
3) Remove the transmission case. <Ref. to 5MT-53, REMOVAL, Transmission Case.>
4) Remove the drive pinion shaft assembly. <Ref. to 5MT-62, REMOVAL, Drive Pinion Shaft Assembly.>
5) Remove the main shaft assembly.

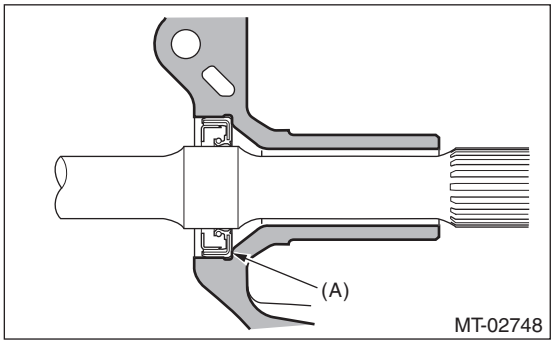
B: INSTALLATION

1) Attach the needle bearing and oil seal to the front of the main shaft assembly.

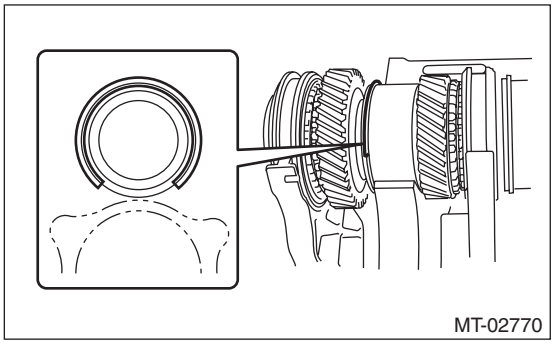
NOTE:
• Wrap the clutch splined section with vinyl tape to prevent damage to the oil seal.
• Apply NICHIMOLY N-130 or the equivalent to the sealing lip of the oil seal.
• Use a new oil seal.

2) Fit the knock pin hole of the needle bearing outer race to the transmission case knock pin, and install the main shaft assembly.

NOTE:
• Align the end face of the seal with surface (A) when installing the oil seal.



• Face the cutout portion of the snap ring for the ball bearing to the drive pinion shaft assembly.



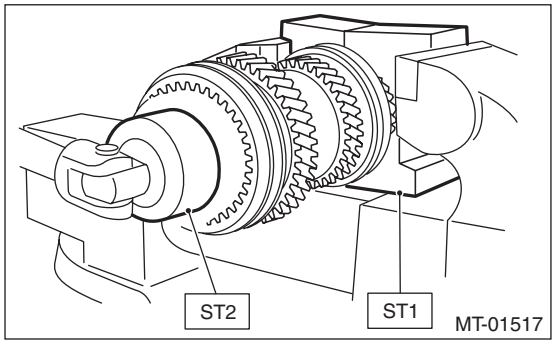
3) Install the drive pinion shaft assembly. <Ref. to 5MT-62, INSTALLATION, Drive Pinion Shaft Assembly.>
4) Check each shifter fork. <Ref. to 5MT-83, INSPECTION, Shifter Fork and Rod.>
5) Select a main shaft rear plate. <Ref. to 5MT-61, ADJUSTMENT, Main Shaft Assembly.>
6) Install the transmission case. <Ref. to 5MT-54, INSTALLATION, Transmission Case.>
7) Install the transfer case together with the extension case assembly. <Ref. to 5MT-39, INSTALLATION, Transfer Case and Extension Case Assembly.>
8) Install the manual transmission assembly to the vehicle. <Ref. to 5MT-25, INSTALLATION, Manual Transmission Assembly.>

C: DISASSEMBLY

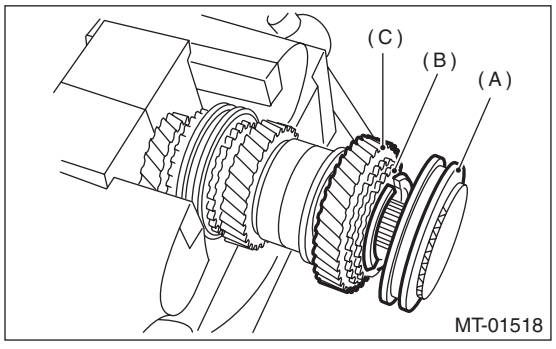
1) Put vinyl tape around main shaft spline to protect the oil seal from damage. Then pull out the oil seal and needle bearing by hand.
2) Remove the lock nut and lock washer.

NOTE:
Flatten the lock nut tab before removing the lock nut.

ST1	498937000	TRANSMISSION HOLDER
ST2	499987003	SOCKET WRENCH (35)



3) Remove the 5th hub & sleeve No. 2, baulk lever, baulk ring, and 5th drive gear & needle bearing.

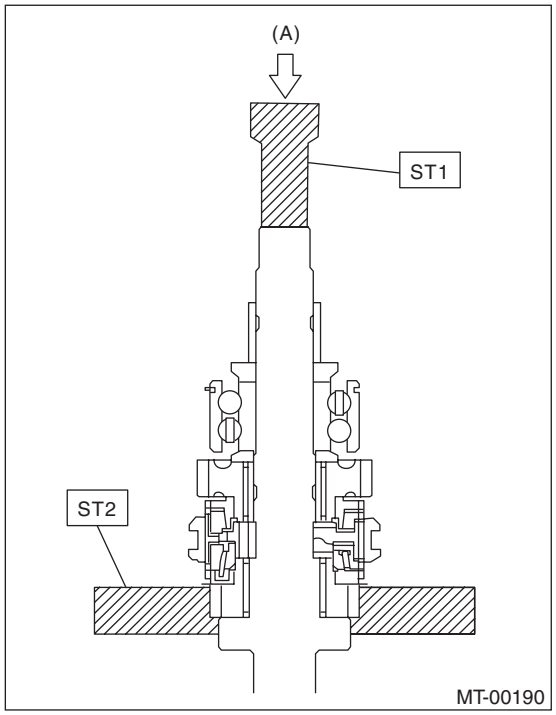


(A) 5th hub & sleeve No. 2
(B) Baulk ring
(C) 5th drive gear

4) Using ST1 and ST2, remove the rest of the parts.

NOTE:
• When replacing the sleeve & hub, replace them as a set.
• Do not disassemble the sleeve & hub; the engaging point is pre-determined.
• If it is necessary to disassemble, mark the engaging points on the splines beforehand.

ST1 899864100 REMOVER
ST2 899714110 REMOVER

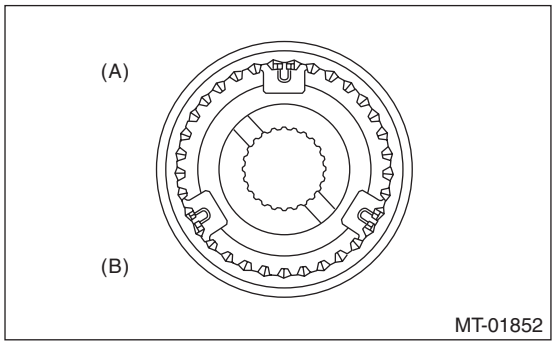


(A) Press

D: ASSEMBLY

1) When the sleeve & hub assemblies have been disassembled, reassemble by aligning the alignment marks.

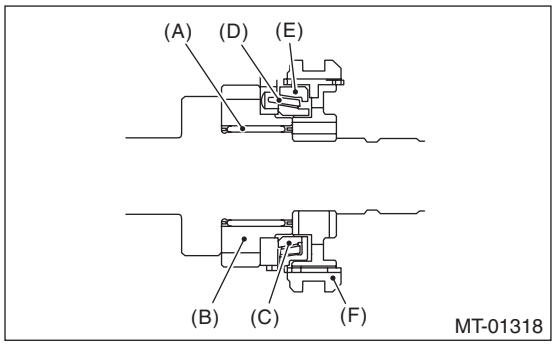
NOTE:
Position the open ends of the spring 120° apart.



(A) 3rd-4th coupling sleeve & synchronizer hub ASSY
(B) 3rd gear side

2) Install the 3rd drive gear, outer baulk ring, synchro cone, inner baulk ring, 3rd needle bearing and sleeve & hub assembly.

NOTE:
Align the groove in baulk ring with the shifting insert.

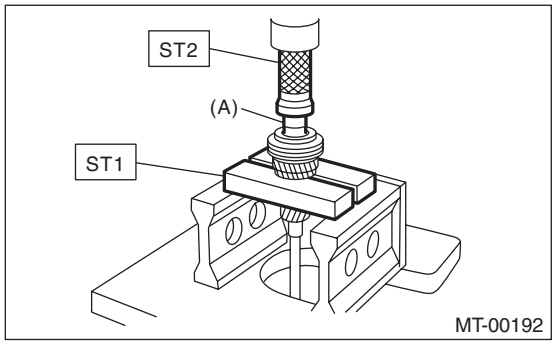


(A) 3rd needle bearing
(B) 3rd drive gear
(C) Inner baulk ring
(D) Synchro cone
(E) Outer baulk ring
(F) Sleeve & hub ASSY

3) Install the 4th needle bearing race using ST1, ST2 and a press.

CAUTION:
Do not apply a load in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).

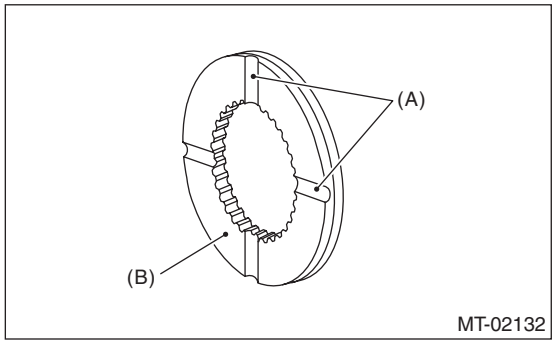
ST1 899714110 REMOVER
ST2 499877000 RACE 4-5 INSTALLER



(A) 4th needle bearing race

4) Install the baulk ring, needle bearing, 4th drive gear and 4th gear thrust washer to the main shaft.

NOTE:
• Align the baulk ring and hub & sleeve assembly with the key groove.
• Make sure the thrust washer is facing the correct direction.



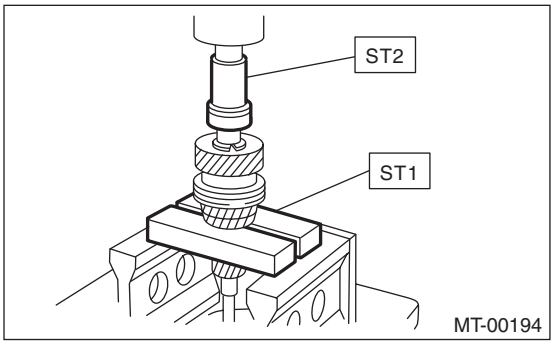
(A) Groove
(B) Face this surface to the 4th gear side.

5) Press-fit the double ball bearing using ST1, ST2 and a press.

CAUTION:
Do not apply a load in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).

NOTE:
• Install the snap ring side of the double ball bearing facing the 5th drive gear side.
• Use a new double ball bearing.

ST1 899714110 REMOVER
ST2 499877000 RACE 4-5 INSTALLER

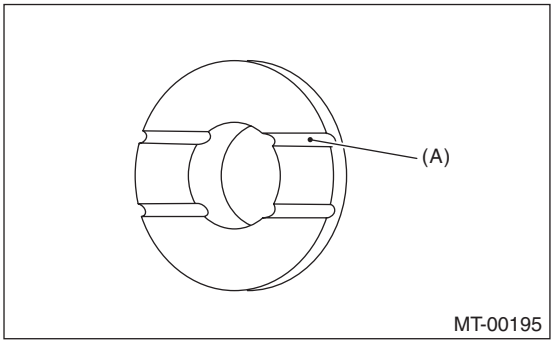


6) Using the ST1 and ST2, install the 5th gear thrust washer and 5th needle bearing race onto the rear section of the main shaft.

CAUTION:
Do not apply a load in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).

NOTE:
Make sure the thrust washer is facing the correct direction.

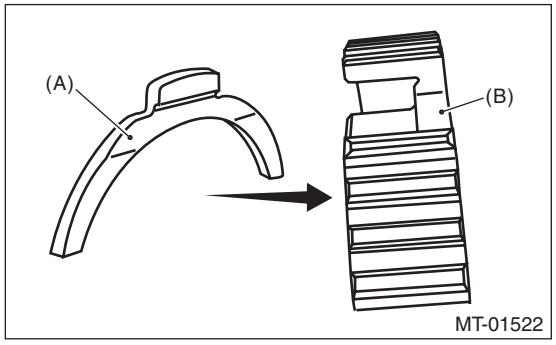
ST1 899714110 REMOVER
ST2 499877000 RACE 4-5 INSTALLER



(A) Face this surface to the 5th gear side.

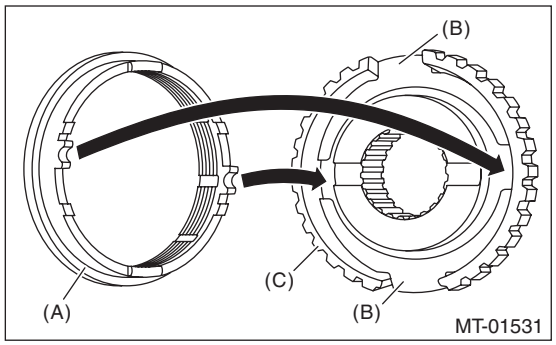
7) Install the rest of the parts to the rear section of the main shaft.

CAUTION:
• Install the baulk lever so that the concave side faces toward the 5th hub.



(A) Baulk lever
(B) 5th hub

• Align the protruded section of baulk ring between the baulk levers.



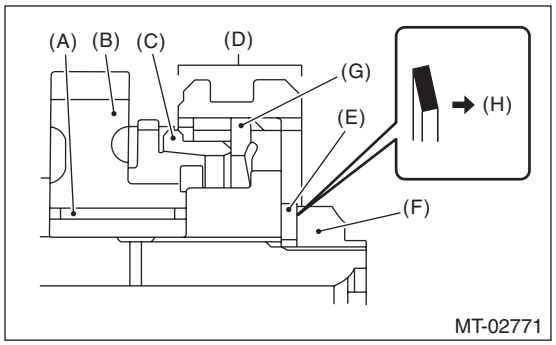
(A) Baulk ring
(B) Baulk lever
(C) 5th hub

8) Tighten the lock nuts to the specified torque using ST1 and ST2.

NOTE:
• Use new lock nuts and lock washers.
• Make sure the lock washer is installed in the proper direction.

ST1	499987003	SOCKET WRENCH (35)
ST2	498937000	TRANSMISSION HOLDER

Tightening torque:
120 N·m (12.2 kgf-m, 88.5 ft-lb)



(A) Needle bearing
(B) 5th drive gear
(C) Baulk ring
(D) 5th hub & sleeve No. 2
(E) Lock washer
(F) Lock nut
(G) Baulk lever
(H) Nut side

9) Crimp lock nuts in two locations after tightening.

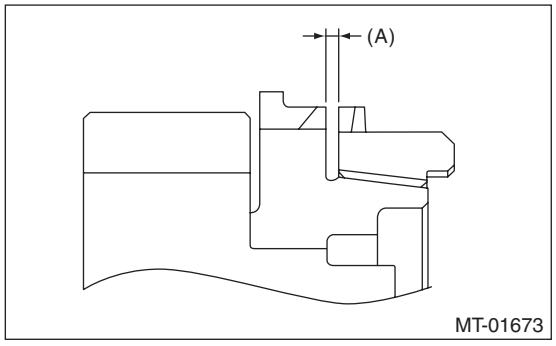
CAUTION:
When crimping the lock nut, be careful not to crack it.

E: INSPECTION

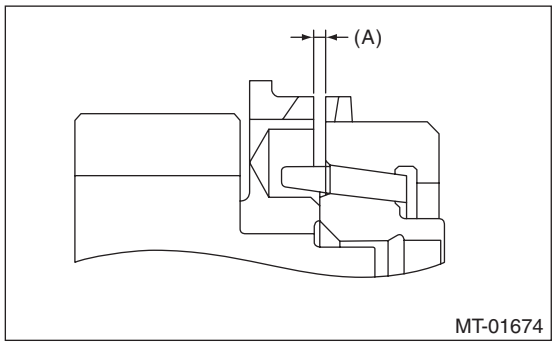
Disassembled parts should be washed with cleaning solvent first, then inspected carefully.
1) Bearing
Replace the bearings in the following cases.
• When the bearing balls, outer races and inner races are broken or rusty.
• When the bearing is worn.
• When the bearings fail to turn smoothly or emit noise in rotation after transmission gear oil lubrication.
• When bearing has other defects.
2) Bushing (each gear)
Replace the bushing in following cases.
• When the sliding surface is damaged or abnormally worn.
• When the inner wall is abnormally worn.

3) Gear
Replace gears in the following cases.
• Replace the gear with new part if its tooth surfaces are broken, damaged or excessively worn.
• Correct or replace if the contact surface between the cone and baulk ring is rough or damaged.
• Correct or replace if the inner surface or end face is damaged.
4) Baulk ring, synchro cone
Replace the baulk ring and synchro cone in the following cases.
• When the inner surface and end face are damaged.
• When the baulk ring inner surface is abnormally or partially worn down.
• When the contact surface of the baulk ring insert section is cracked or abnormally worn.
• If the gap between the end faces of the baulk ring and the gear splined part is excessively small, check the clearance (A) while pressing the ring against the cone.

Clearance (A):
0.5 mm (0.020 in) or more
Single cone



Double cone



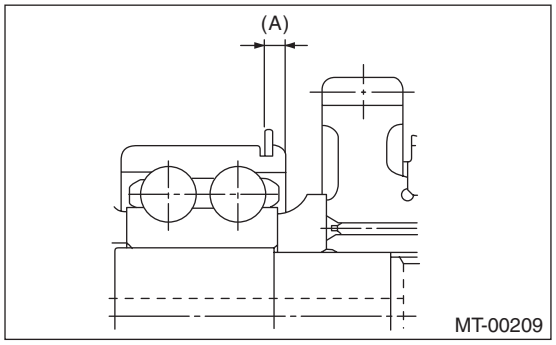
• Apply transmission gear oil to the cone of the gear and while press-fitting the baulk ring, check there is no rotation in the circumferential direction.
5) Shifting insert key
Replace the insert key if deformed, excessively worn or defective in any way.
6) Coupling sleeve and synchronizer hub
• Check the slipping condition of the coupling sleeve.
• Check the splines on the coupling sleeve and synchronizer hub for wear.
7) Oil seal
Replace the oil seal if the lip is deformed, hardened, worn or defective in any way.
8) Gearshift mechanism
Repair or replace the gearshift mechanism if excessively worn, bent or defective in any way.

F: ADJUSTMENT

Selection of main shaft rear plate:
Measure the protrusion amount (A) of ball bearing from transmission main case surface, and select a suitable plate in the following table.

NOTE:
Before measuring, tap the end of main shaft with a plastic hammer lightly in order to make the clearance zero between the main case surface and moving flange of bearing.

Dimension (A) mm (in)	Part No.	Mark
4.00 — 4.13 (0.1575 — 0.1626)	32294AA041	1
3.87 — 4.00 (0.1524 — 0.1575)	32294AA051	2

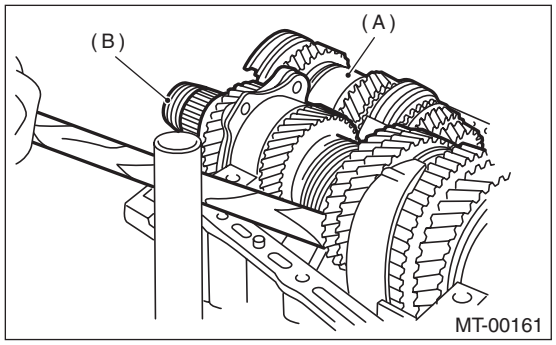


17.Drive Pinion Shaft Assembly

A: REMOVAL

1) Remove the manual transmission assembly from the vehicle. <Ref. to 5MT-22, REMOVAL, Manual Transmission Assembly.>
2) Remove the transfer case together with the extension case assembly. <Ref. to 5MT-39, REMOVAL, Transfer Case and Extension Case Assembly.>
3) Remove the transmission case. <Ref. to 5MT-53, REMOVAL, Transmission Case.>
4) Remove the drive pinion shaft assembly.

NOTE:
Use a hammer handle, etc. to remove if too tight.

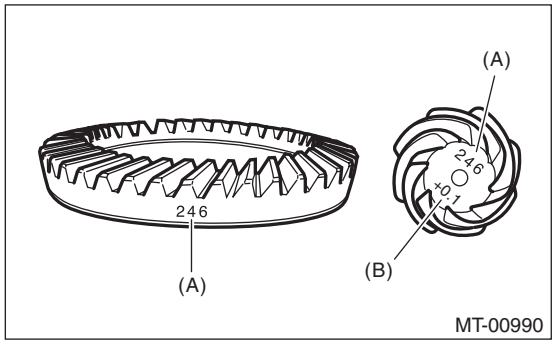


(A) Main shaft ASSY
(B) Drive pinion shaft assembly

5) Remove the main shaft assembly. <Ref. to 5MT-57, REMOVAL, Main Shaft Assembly.>

B: INSTALLATION

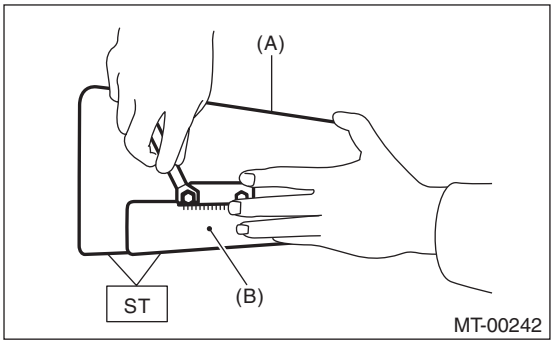
1) Remove the front differential assembly.
2) Hypoid gear set match mark/No.: The number (A) on top of the drive pinion, and the number on the hypoid driven gear are set numbers for the two gears. Use a pair having the same numbers.
The figure (B) below shows a number for shim adjustment. If no number is shown, the value is zero.



(A) Set number
(B) Number for shim adjustment

3) Place the drive pinion shaft assembly on transmission main case RH without shim and tighten the bearing mounting bolts.
4) Perform the adjustment of ST.
(1) Loosen the two bolts and adjust so that the scale indicates 0.5 correctly when the plate end and the scale end are on the same level.

ST 499917500 DRIVE PINION GAUGE ASSY



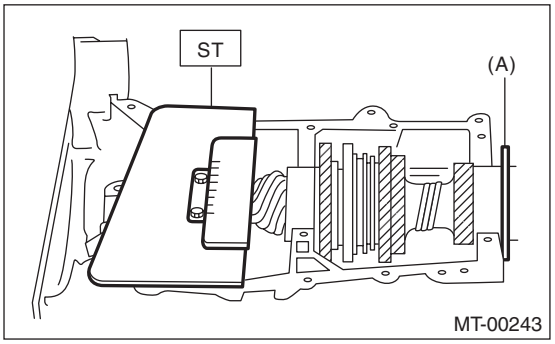
(A) Plate
(B) Scale

(2) Tighten the two bolts.
5) Position the ST by inserting the knock pin of ST into the knock hole of transmission case.

ST 499917500 DRIVE PINION GAUGE ASSY

6) Slide the drive pinion gauge scale with finger tip and read the value at the point where it matches with the end face of drive pinion.

ST 499917500 DRIVE PINION GAUGE ASSY



(A) Adjust the clearance to zero without shim.

7) The thickness of shim shall be determined by adding the value indicated on drive pinion to the value indicated on the ST. (Add if the number on drive pinion is prefixed by +, and subtract if the number is prefixed by –.)

ST 499917500 DRIVE PINION GAUGE ASSY

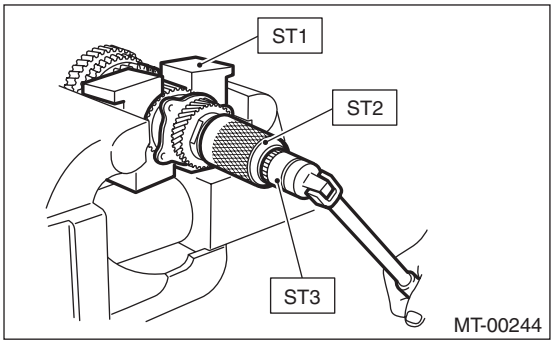
8) Select one to three shims in the following table for the value determined as described above, and take the shim(s) which thickness is closest to the said value.

Drive pinion shim	
Part No.	Thickness mm (in)
32295AA031	0.150 (0.0059)
32295AA041	0.175 (0.0069)
32295AA051	0.200 (0.0079)
32295AA061	0.225 (0.0089)
32295AA071	0.250 (0.0098)
32295AA081	0.275 (0.0108)
32295AA091	0.300 (0.0118)
32295AA101	0.500 (0.0197)

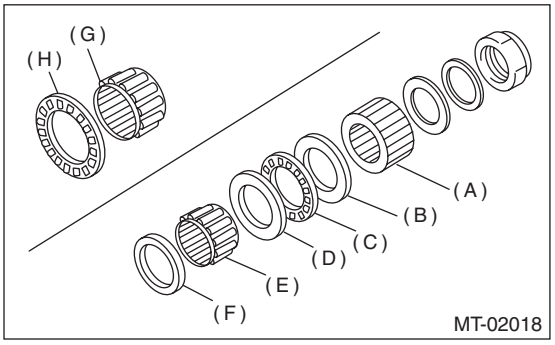
9) Install the front differential assembly. <Ref. to 5MT-72, INSTALLATION, Front Differential Assembly.>
10) Fit the transmission case knock pin to the knock pin hole of the roller bearing and install the drive pinion shaft assembly.
11) Install the main shaft assembly. <Ref. to 5MT-57, INSTALLATION, Main Shaft Assembly.>
12) Check each shifter fork. <Ref. to 5MT-83, INSPECTION, Shifter Fork and Rod.>
13) Install the transmission case. <Ref. to 5MT-54, INSTALLATION, Transmission Case.>
14) Install the transfer case together with the extension case assembly. <Ref. to 5MT-39, INSTALLATION, Transfer Case and Extension Case Assembly.>
15) Install the manual transmission assembly to the vehicle. <Ref. to 5MT-25, INSTALLATION, Manual Transmission Assembly.>

C: DISASSEMBLY

NOTE:
Attach a cloth to the end of driven shaft (on the frictional side of the thrust needle bearing) to prevent damage during disassembly or reassembly.
1) Flatten the tab of the lock nut. Remove the lock nut with ST1, ST2 and ST3.
ST1 899884100 HOLDER
ST2 498427100 STOPPER
ST3 899988608 SOCKET WRENCH (27)

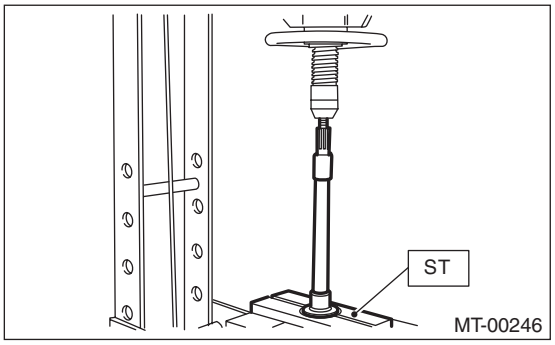


2) Remove the lock washer, washer, differential bevel gear sleeve, adjusting washers No. 1, No. 2 and thrust bearing.
3) Pull out the drive pinion shaft, and remove the needle bearing and drive pinion collar from driven shaft.
4) Remove the needle bearing and thrust bearing from drive pinion shaft.

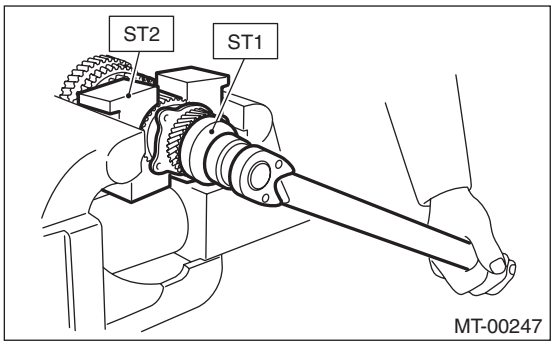


(A) Differential bevel gear sleeve
(B) Adjusting washer No. 1 (25 × 37.5 × t)
(C) Thrust bearing (25 × 37.5 × 3)
(D) Adjusting washer No. 2 (25 × 37.5 × t)
(E) Needle bearing (25 × 30 × 20)
(F) Drive pinion collar
(G) Needle bearing (30 × 37 × 23)
(H) Thrust bearing (33 × 50 × 3)

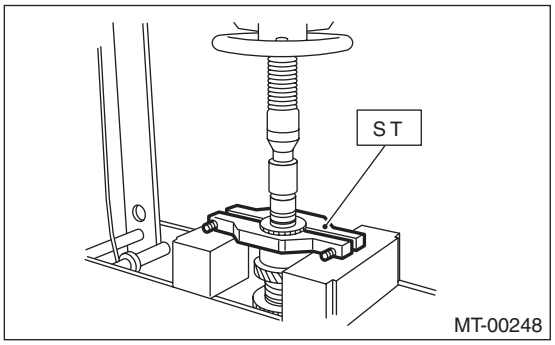
5) Remove the roller bearing and washer using ST and a press.
ST 498077000 REMOVER



6) Flatten the tab of the lock nut. Remove the lock nut and lock washer using ST1 and ST2.
ST1 499987300 SOCKET WRENCH (50)
ST2 899884100 HOLDER

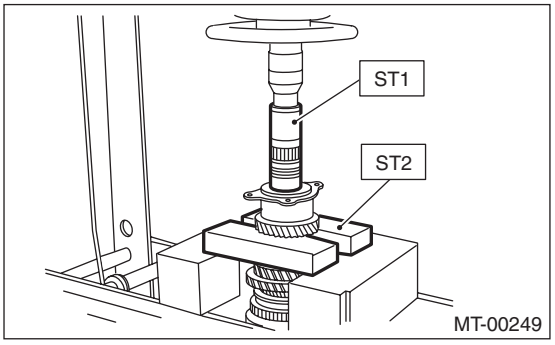


7) Remove the 5th driven gear using ST.
ST 499857000 5TH DRIVEN GEAR REMOVER

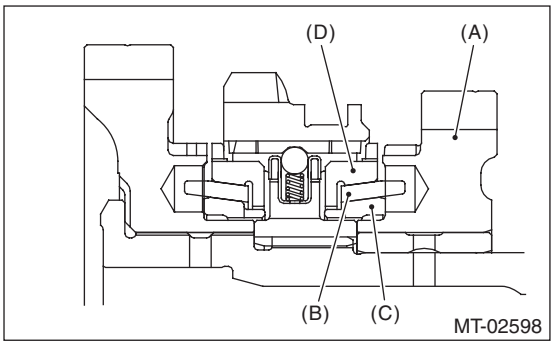


8) Remove the woodruff key.

9) Remove the double taper roller bearing and 3rd-4th driven gear using ST1 and ST2.
ST1 499757002 INSTALLER
ST2 899714110 REMOVER

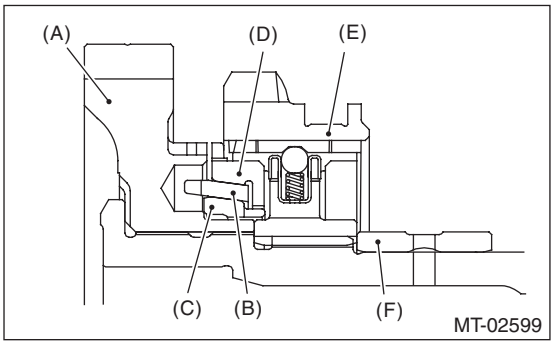


10) Remove the key.
11) Remove the 2nd driven gear, inner baulk ring, synchro cone and outer baulk ring.



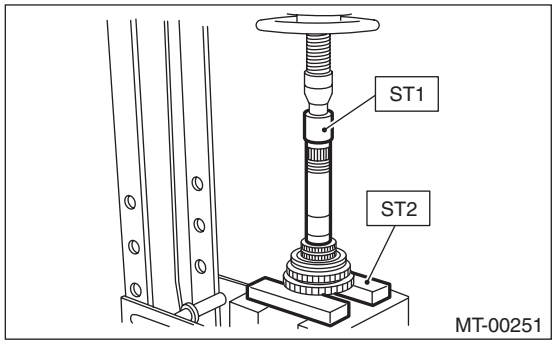
(A) 2nd driven gear
(B) Synchro cone
(C) Inner baulk ring
(D) Outer baulk ring

12) Remove the 1st driven gear, inner baulk ring, synchro cone, outer baulk ring, 2nd gear bushing and gear & hub assembly using ST1 and ST2.



(A) 1st driven gear
(B) Synchro cone
(C) Inner baulk ring
(D) Outer baulk ring
(E) Gear & hub
(F) 2nd gear bushing

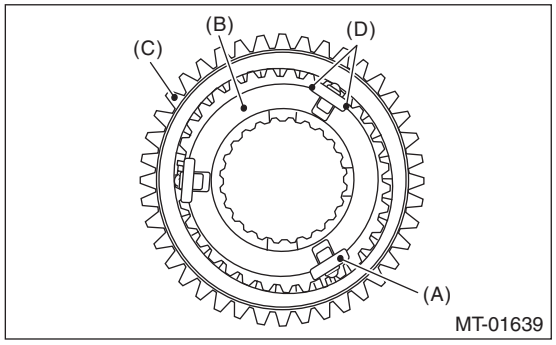
NOTE:
If necessary, use a new gear and hub assembly as a set, when replacing the gear or hub. Because these must engage at the specified point, avoid disassembly as much as possible. If it must be disassembled, mark the engaging point on the spline beforehand.
ST1 499757002 INSTALLER
ST2 899714110 REMOVER



D: ASSEMBLY

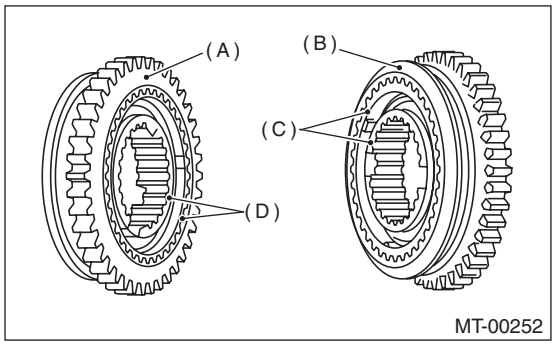
1) Install the sleeve and the gear and hub assembly by matching the alignment marks.

NOTE:
• Make sure that there is no large clearance at both sides of ball detent after assembly.



(A) Ball detent
(B) 1st-2nd synchronizer hub
(C) Reverse driven gear
(D) There is no large clearance at this part.

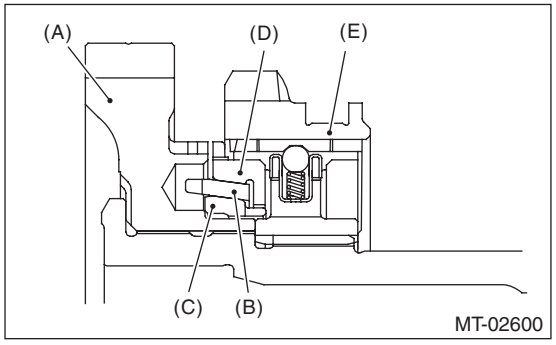
• Use the new gear & hub assembly, if replacing the gear or hub.



(A) 1st gear side
(B) 2nd gear side
(C) Flush surface
(D) Stepped surface

2) Install the 1st driven gear, inner baulk ring, synchro cone, outer baulk ring, and gear & hub assembly.

NOTE:
• Install the gear & hub assembly in the proper position while paying attention to the installing direction.
• Align the baulk ring and gear & hub assembly with the key groove.



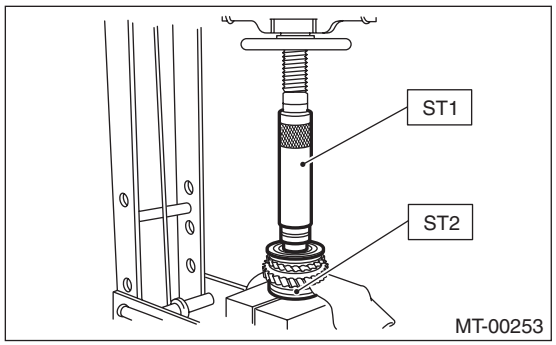
(A) 1st driven gear
(B) Synchro cone
(C) Inner baulk ring
(D) Outer baulk ring
(E) Gear & hub

3) Install the 2nd driven gear bushing using ST1, ST2 and a press.

CAUTION:
Do not apply a load in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).

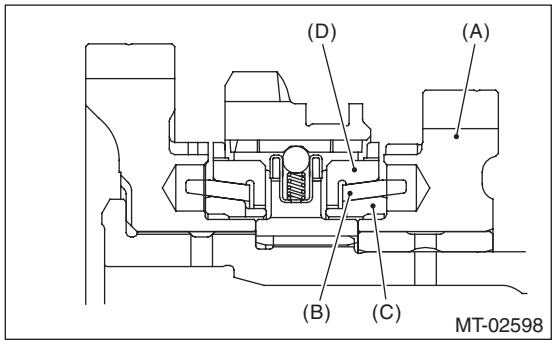
NOTE:
• Attach a cloth to the end of the driven shaft to prevent damage.
• When press fitting, align the oil holes of the shaft and bushing.

ST1 499277200 INSTALLER
ST2 499587000 INSTALLER



4) Attach and insert the 2nd driven gear, inner baulk ring, synchro cone and outer baulk ring.

NOTE:
Align the groove in baulk ring with the insert.

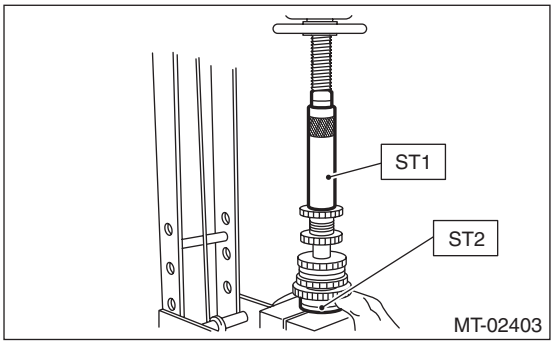


(A) 2nd driven gear
(B) Synchro cone
(C) Inner baulk ring
(D) Outer baulk ring

5) After installing key onto the driven shaft, install the 3rd-4th driven gear using ST1, ST2 and a press.

CAUTION:
Do not apply a load in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).

ST1 499277200 INSTALLER
ST2 499587000 INSTALLER

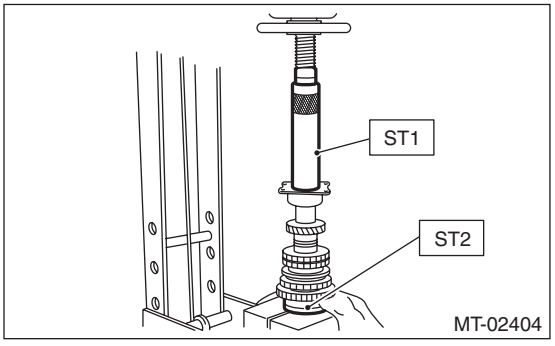


6) Install the set of double taper roller bearings using ST1, ST2 and a press.

CAUTION:
Do not apply a load in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).

NOTE:
Use a new double taper roller bearing.

ST1 499277200 INSTALLER
ST2 499587000 INSTALLER

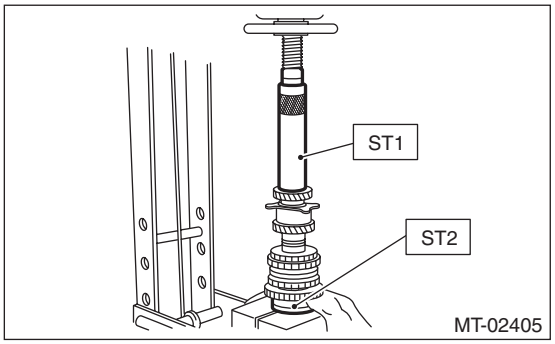


7) Position the woodruff key in groove of the rear of driven shaft. Install the 5th driven gear using ST1, ST2 and a press.

CAUTION:
Do not apply a load in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).

NOTE:
Face the groove for identification of the 5th driven gear toward the nut.

ST1 499277200 INSTALLER
ST2 499587000 INSTALLER

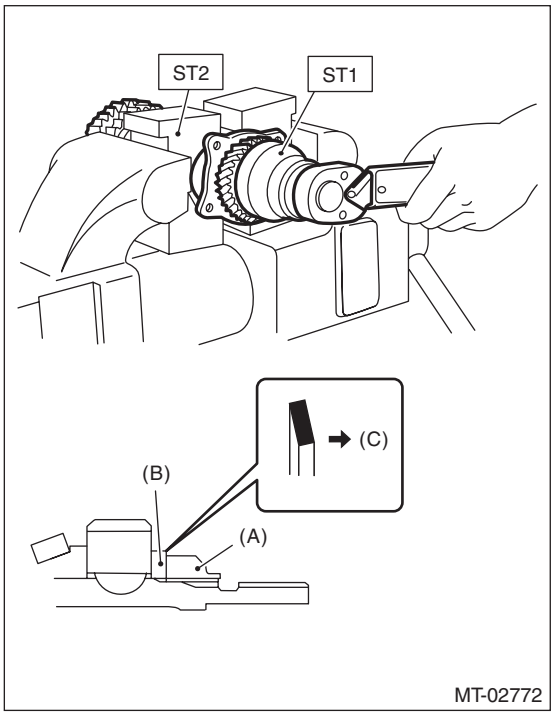


8) Install the lock washer. Tighten the lock nuts to the specified torque using ST1 and ST2.

NOTE:
- Use new lock nuts and lock washers.
- Make sure the lock washer is installed in the proper direction.

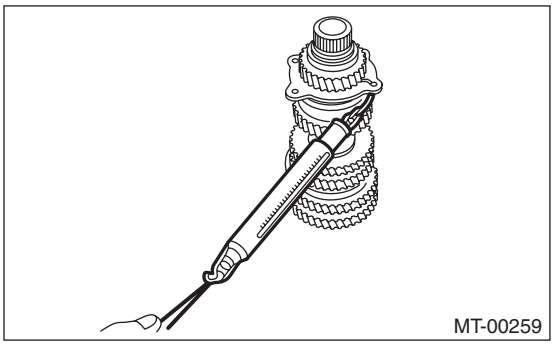
ST1 499987300 SOCKET WRENCH (50)
ST2 899884100 HOLDER

Tightening torque:
260 N·m (26.5 kgf-m, 191.8 ft-lb)



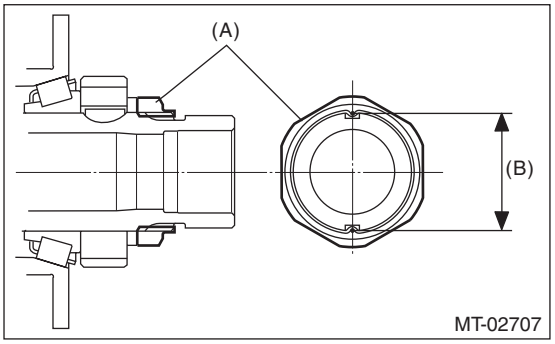
(A) Lock nut
(B) Lock washer
(C) Nut side

9) Using a spring scale, check that starting torque of the double taper roller bearing is 0.1 to 1.5 N (0.01 to 0.15 kgf, 0.02 to 0.34 lbf).



10) Crimp the lock nut at two locations so that the dimension (B) becomes 41.1 mm (1.62 in) or less.

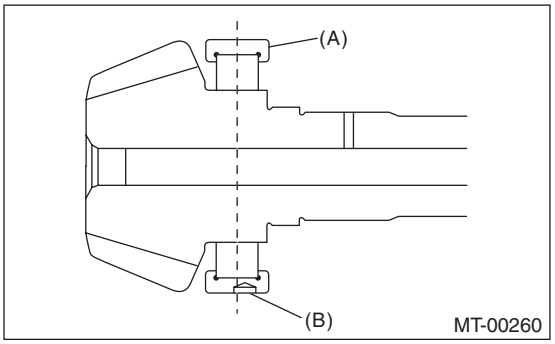
CAUTION:
When crimping the lock nut, be careful not to crack it.



(A) Lock nut
(B) Outer dimension after crimping

11) Install the roller bearing.

NOTE:
- Use a new roller bearing.
- Install with the knock pin hole of the roller bearing outer race facing the rear side.

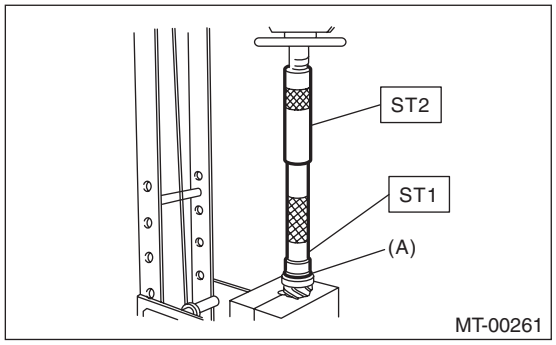


(A) Roller bearing
(B) Knock pin hole

12) Install the washer using ST1, ST2 and a press.

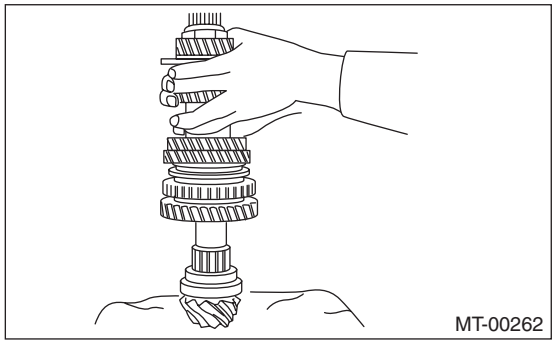
CAUTION:
Do not apply a load in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).

ST1 499277100 BUSHING 1-2 INSTALLER
ST2 499277200 INSTALLER

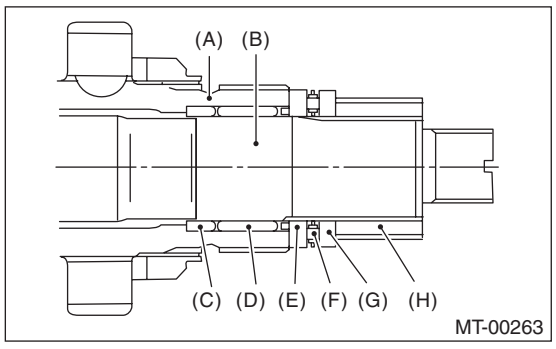


(A) Washer

13) Install the thrust bearing and needle bearing and install the driven shaft assembly.



14) Install the drive pinion collar, needle bearing, adjusting washer No. 2, thrust bearing, adjusting washer No. 1 and differential bevel gear sleeve in this order.



(A) Driven shaft
(B) Drive shaft
(C) Drive pinion collar
(D) Needle bearing (25 × 30 × 20)
(E) Adjusting washer No. 2 (25 × 36 × t)
(F) Thrust bearing (25 × 37.5 × 3)
(G) Adjusting washer No. 1 (25 × 36 × t)
(H) Differential bevel gear sleeve

15) Adjust the thrust bearing preload. <Ref. to 5MT-69, THRUST BEARING PRELOAD, ADJUSTMENT, Drive Pinion Shaft Assembly.>

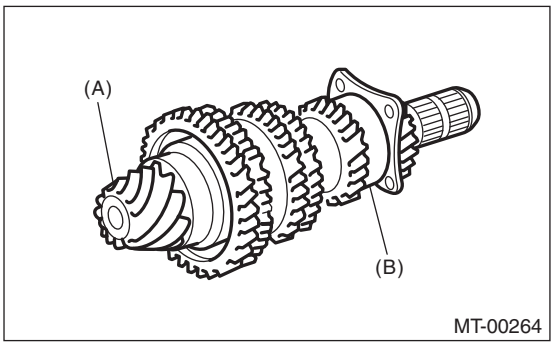
E: INSPECTION

Disassembled parts should be washed with cleaning solvent first, then inspected carefully.

1) Bearing

Replace the bearings in the following cases.

- When the bearing balls, outer races and inner races are broken or rusty.
- When the bearing is worn.
- When the bearings fail to turn smoothly or emit noise in rotation after transmission gear oil lubrication.
- The double taper roller bearing on the rear side of the drive pinion shaft should be checked for smooth rotation before the drive pinion shaft assembly is disassembled. In this case, because a preload is working on the bearing, its rotation feels like it is slightly dragging unlike other bearings.



(A) Drive pinion shaft
(B) Double taper roller bearing

- When bearing has other defects.

2) Bushing (each gear)

Replace the bushing in following cases.

- When the sliding surface is damaged or abnormally worn.
- When the inner wall is abnormally worn.

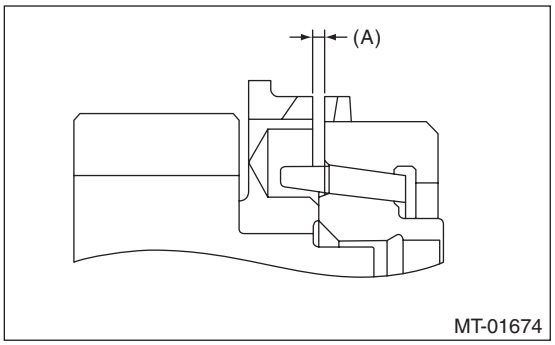
3) Gear

Replace gears in the following cases.

- Replace the gear with new part if its tooth surfaces are broken, damaged or excessively worn.
- Correct or replace if the contact surface between the cone and baulk ring is rough or damaged.
- Correct or replace if the inner surface or end face is damaged.

4) Baulk ring, synchro cone
Replace the baulk ring and synchro cone in the following cases.
• When the inner surface and end face are damaged.
• When the baulk ring inner surface is abnormally or partially worn down.
• When the contact surface of the baulk ring insert section is cracked or abnormally worn.
• If the gap between the end faces of the baulk ring and the gear splined part is excessively small, check the clearance (A) while pressing the ring against the cone.

Clearance (A):
0.5 mm (0.020 in) or more

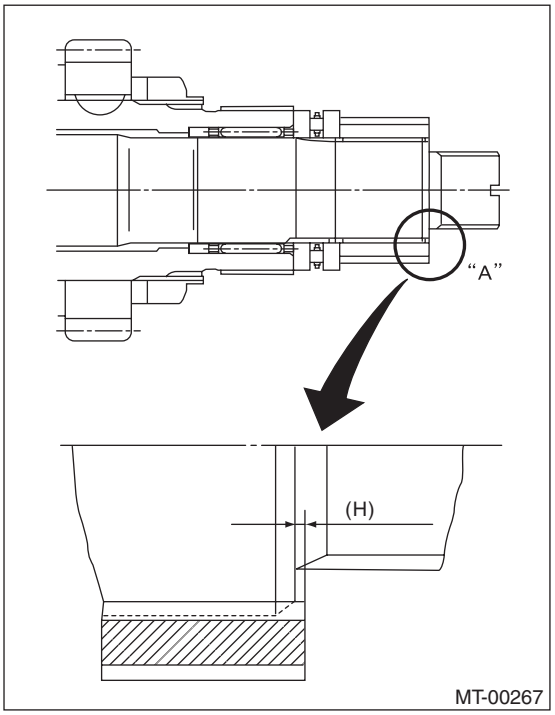


• Apply transmission gear oil to the cone of the gear and while press-fitting the baulk ring, check there is no rotation in the circumferential direction.
5) Coupling sleeve and synchronizer hub
• Check the slipping condition of the coupling sleeve.
• Check the splines on the coupling sleeve and synchronizer hub for wear.
6) Ball detent
Replace the ball detent if deformed, excessively worn or defective in any way.

F: ADJUSTMENT

1. THRUST BEARING PRELOAD

1) Select a suitable adjusting washer No. 1 so that dimension (H) will be zero in a visual check. Position the washer (18.3 × 30 × t) and lock washer (18 × 30 × 2) and attach the lock nut.

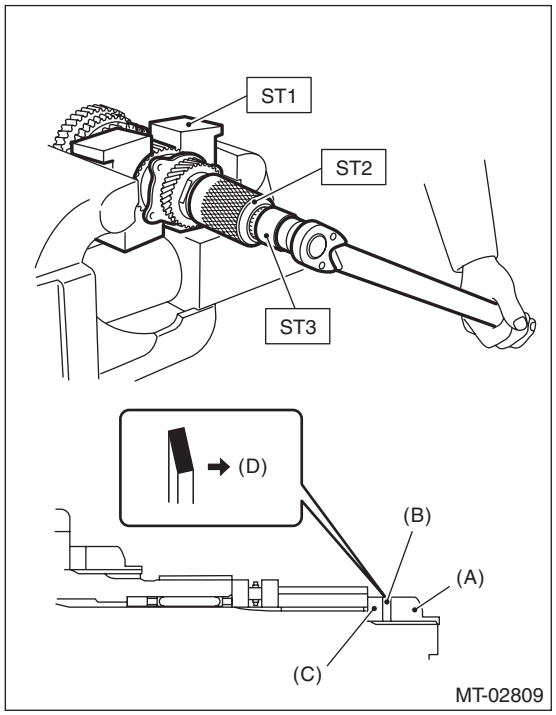


2) Using the ST1, ST2 and ST3, tighten the lock nut to the specified torque.

NOTE:
- Use new lock nuts and lock washers.
- Make sure the lock washer is installed in the proper direction.

ST1 899884100 HOLDER
ST2 498427100 STOPPER
ST3 899988608 SOCKET WRENCH (27)

Tightening torque:
120 N·m (12.2 kgf-m, 88.5 ft-lb)

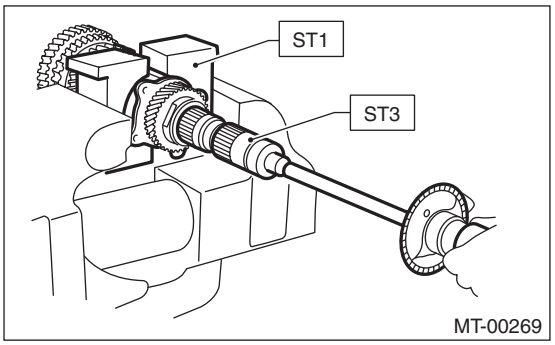


(A) Lock nut
(B) Lock washer
(C) Washer
(D) Nut side

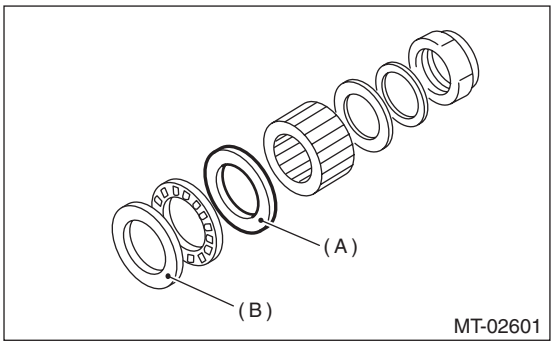
3) After removing the ST2, measure the starting torque using torque driver.

ST1 899884100 HOLDER
ST3 899988608 SOCKET WRENCH (27)

Starting torque:
0.3 — 0.8 N·m (0.03 — 0.08 kgf-m, 0.22 — 0.59 ft-lb)



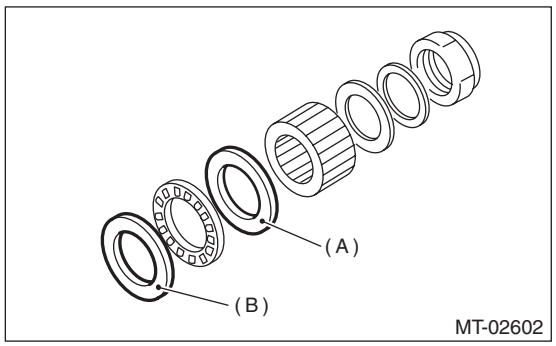
4) If the starting torque is not within the specified limit, select new adjusting washer No. 1 and re-check starting torque.



(A) Adjusting washer No. 1
(B) Adjusting washer No. 2

Adjusting washer No. 1	
Part No.	Thickness mm (in)
803025051	3.925 (0.1545)
803025052	3.950 (0.1555)
803025053	3.975 (0.1565)
803025054	4.000 (0.1575)
803025055	4.025 (0.1585)
803025056	4.050 (0.1594)
803025057	4.075 (0.1604)

5) If the specified starting torque cannot be obtained by the selection of adjusting washer No. 1, select adjusting washer No. 2 from the list below. Repeat steps 1) through 4) to adjust starting torque.



(A) Adjusting washer No. 1
(B) Adjusting washer No. 2

Starting torque	Dimension H	Adjusting washer No. 2
Low	Small	Select thicker one.
High	Large	Select thinner one.

Adjusting washer No. 2	
Part No.	Thickness mm (in)
803025059	3.850 (0.1516)
803025054	4.000 (0.1575)
803025058	4.150 (0.1634)

6) Recheck that the starting torque is within the specified range, then crimp the lock nut at four positions.

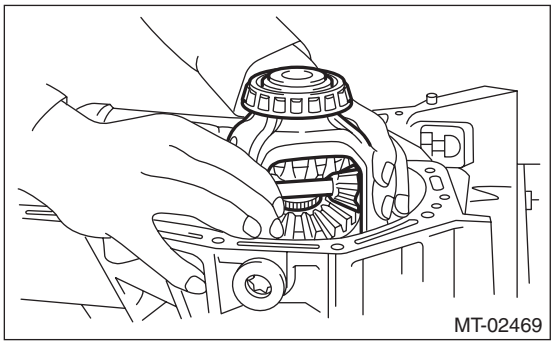
CAUTION:
When crimping the lock nut, be careful not to crack it.

18.Front Differential Assembly

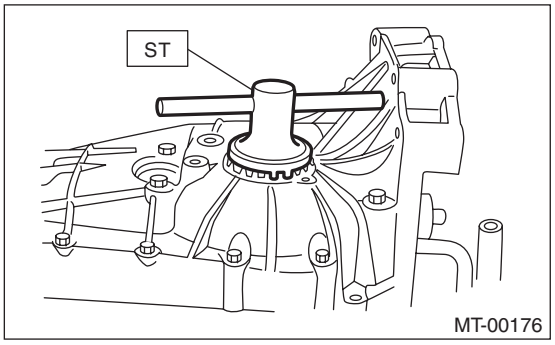
A: REMOVAL

1) Remove the manual transmission assembly from the vehicle. <Ref. to 5MT-22, REMOVAL, Manual Transmission Assembly.>
2) Remove the transfer case together with the extension case assembly. <Ref. to 5MT-39, REMOVAL, Transfer Case and Extension Case Assembly.>
3) Remove the transmission case. <Ref. to 5MT-53, REMOVAL, Transmission Case.>
4) Remove the drive pinion shaft assembly. <Ref. to 5MT-62, REMOVAL, Drive Pinion Shaft Assembly.>
5) Remove the main shaft assembly. <Ref. to 5MT-57, REMOVAL, Main Shaft Assembly.>
6) Remove the front differential assembly.

NOTE:
• Do not confuse the right and left taper roller bearing outer races.
• Be careful not to damage the oil seal of differential side retainer.



7) Remove the differential side retainers using ST.
ST 18630AA010 WRENCH COMPL RETAINER

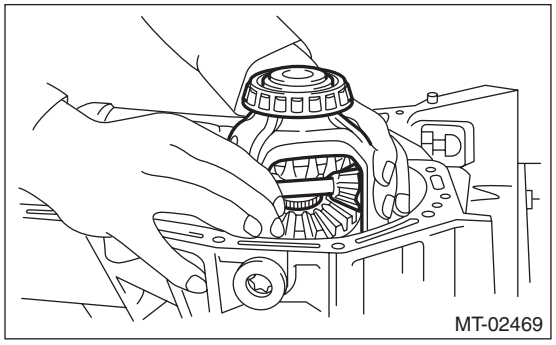


8) Remove the taper roller bearing outer race from the transmission case.
ST 398527700 PULLER ASSY

B: INSTALLATION

1) Install the differential side retainers using ST.
ST 18630AA010 WRENCH COMPL RETAINER
2) Install the taper roller bearing outer race to the transmission case.
3) Install the front differential assembly.

NOTE:
Be careful not to bend the seal lips of oil seal.

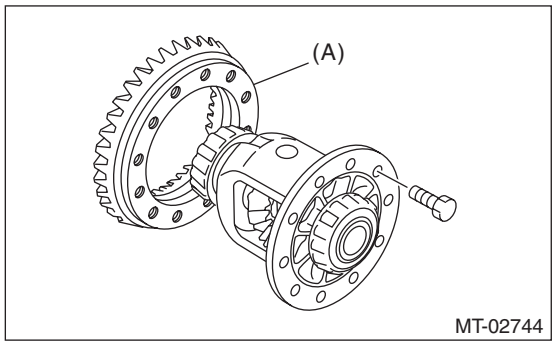


4) Install the main shaft assembly. <Ref. to 5MT-57, INSTALLATION, Main Shaft Assembly.>
5) Install the drive pinion shaft assembly. <Ref. to 5MT-62, INSTALLATION, Drive Pinion Shaft Assembly.>
6) Install the transmission case. <Ref. to 5MT-54, INSTALLATION, Transmission Case.>
7) Install the transfer case together with the extension case assembly. <Ref. to 5MT-39, INSTALLATION, Transfer Case and Extension Case Assembly.>
8) Install the manual transmission assembly to the vehicle. <Ref. to 5MT-25, INSTALLATION, Manual Transmission Assembly.>

C: DISASSEMBLY

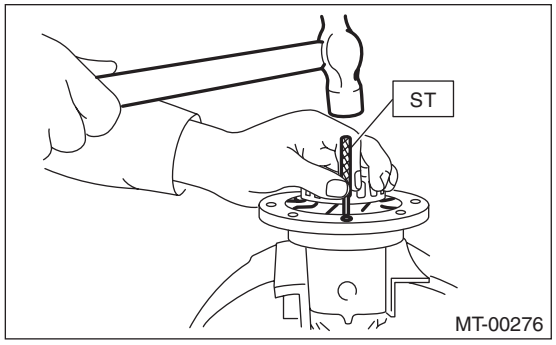
1. DIFFERENTIAL CASE ASSEMBLY

1) Remove the twelve bolts and remove hypoid driven gear.

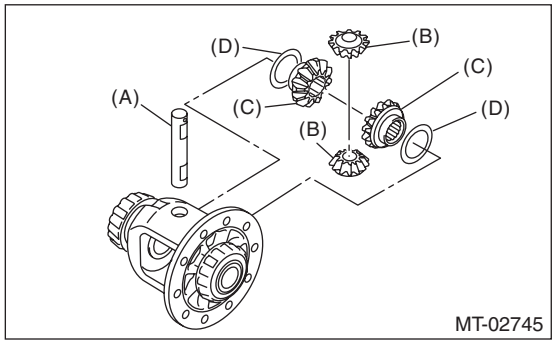


(A) Hypoid driven gear

2) Drive out the straight pin from differential assembly toward hypoid driven gear side.
ST 899904100 STRAIGHT PIN REMOVER

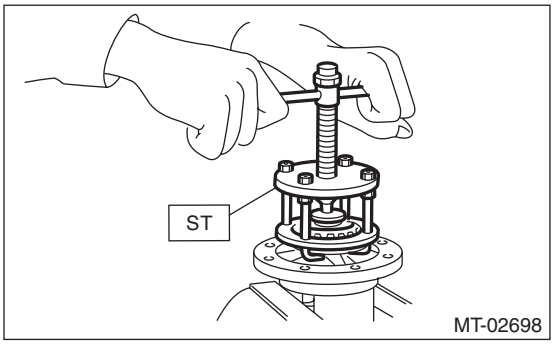


3) Pull out the pinion shaft, and remove the differential bevel pinion, differential bevel gear and adjusting washer.



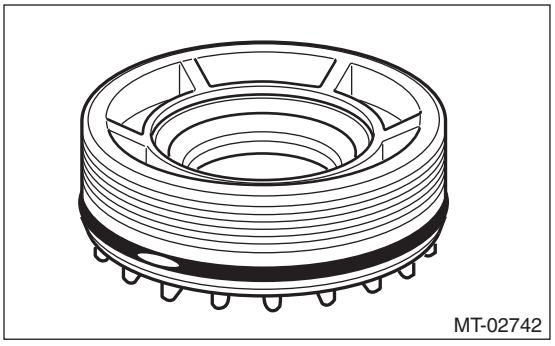
(A) Pinion shaft
(B) Differential bevel pinion
(C) Differential bevel gear
(D) Adjusting washer

4) Using the ST, remove the taper roller bearing.
ST 899524100 PULLER SET



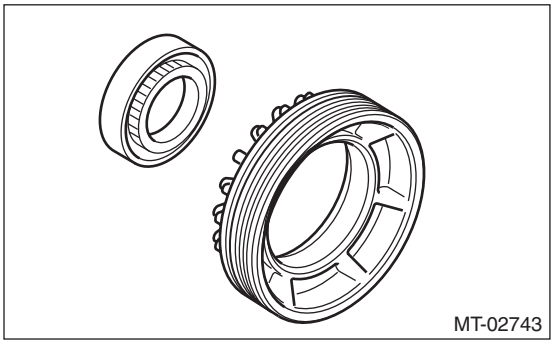
2. DIFFERENTIAL SIDE RETAINER

1) Remove the O-ring.



2) Remove the oil seal.

NOTE:
Remove it using a flat tip screwdriver wrapped with cloth or tape, etc.

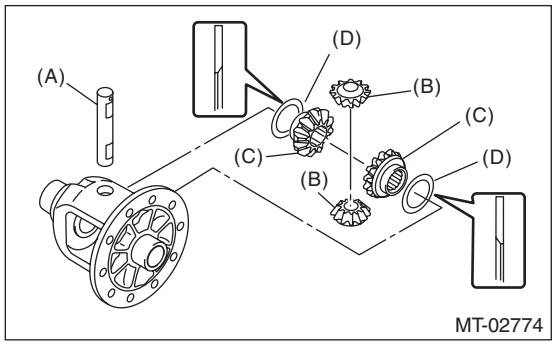


D: ASSEMBLY

1. DIFFERENTIAL CASE ASSEMBLY

1) Install the differential bevel gear and differential bevel pinion together with adjusting washer, and insert the pinion shaft.

NOTE:
Face the chamfered side of adjusting washer toward gear.

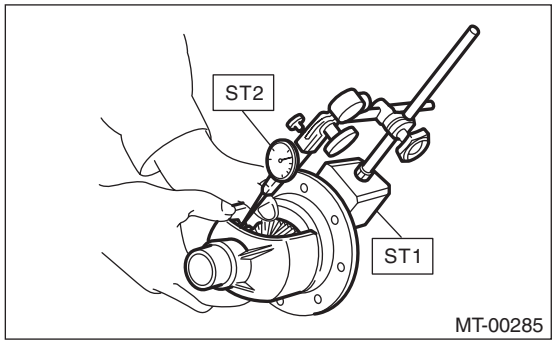


(A) Pinion shaft
(B) Differential bevel pinion
(C) Differential bevel gear
(D) Adjusting washer

2) Measure the backlash between the differential bevel gear and differential bevel pinion. Adjust the backlash if not within specified limit. <Ref. to 5MT-76, DIFFERENTIAL BEVEL PINION GEAR BACKLASH, ADJUSTMENT, Front Differential Assembly.>

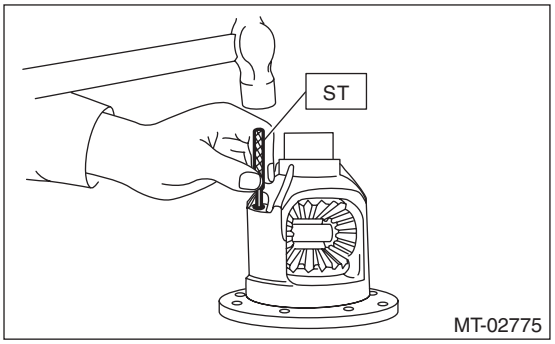
NOTE:
Be sure the bevel pinion gear teeth contact adjacent gear teeth during measurement.
ST1 498247001 MAGNET BASE
ST2 498247100 DIAL GAUGE

Standard backlash
0.13 — 0.18 mm (0.0051 — 0.0071 in)



3) Align the pinion shaft and differential case with each hole, and drive the straight pin into the holes from the hypoid driven gear side using the ST.

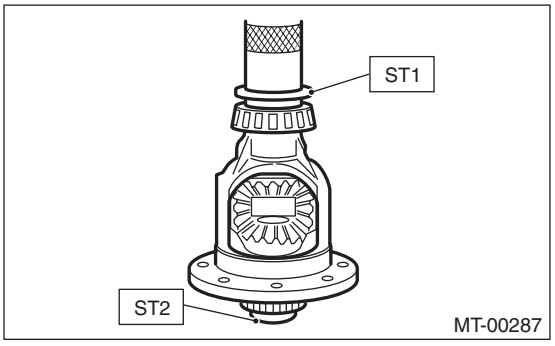
NOTE:
Use a new straight pin. After driving the straight pin, crimp the area around the hole in order to prevent the straight pin from coming out.
ST 899904100 STRAIGHT PIN REMOVER



4) Install the taper roller bearing.

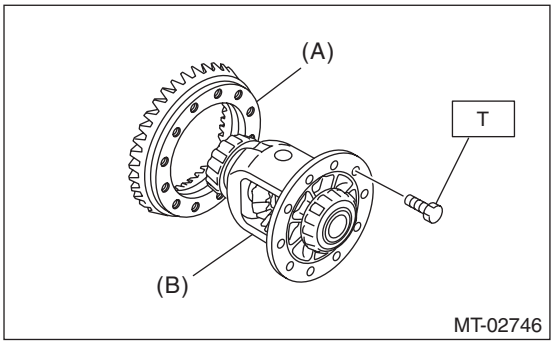
CAUTION:
Do not apply a load in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).

NOTE:
Be careful when handling because the taper roller bearing and the outer race are used as a set.
ST1 499277100 BUSHING 1-2 INSTALLER
ST2 398497701 ADAPTER



5) Install the hypoid driven gear using twelve bolts.

Tightening torque:
T: 62 N·m (6.3 kgf-m, 45.7 ft-lb)



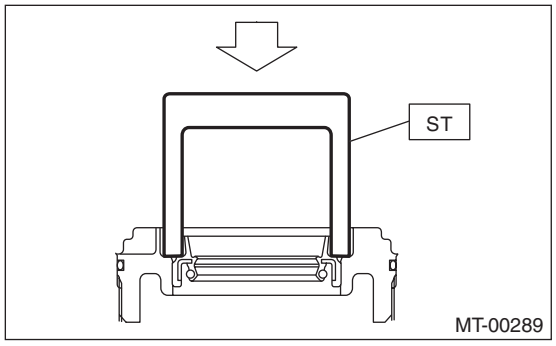
(A) Hypoid driven gear
(B) Differential case

2. DIFFERENTIAL SIDE RETAINER

1) Using the ST, install the oil seal by lightly tapping with a plastic hammer.

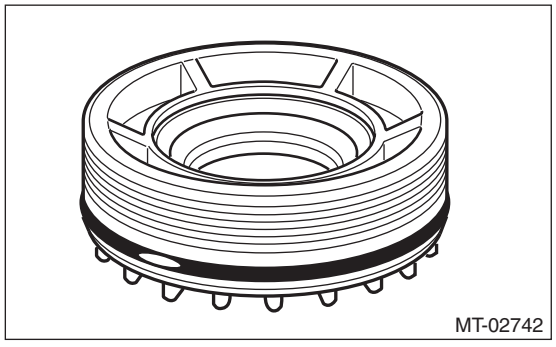
NOTE:
- Use a new oil seal.
- Apply transmission gear oil to the oil seal lips, and install the oil seal while being careful not to deform the lip.
- Check the identification marks (R, L), and attach the oil seal RH and LH.

ST 18675AA000 DIFFERENTIAL SIDE OIL SEAL INSTALLER



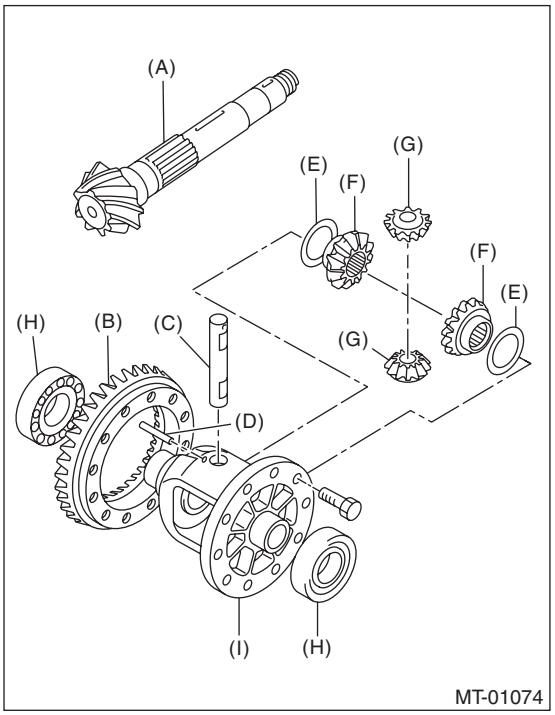
2) Install the O-ring.

NOTE:
- Use new O-rings.
- Apply transmission gear oil to O-ring.
- Do not stretch or damage the O-ring.
- Install the O-ring after adjusting the backlash of the hypoid driven gear and the preload of the taper roller bearing.



E: INSPECTION

Repair or replace the differential gear in the following cases:
- When the hypoid driven gear and drive pinion shaft tooth surfaces are damaged, excessively worn, or seized.
- When the roller bearing on the drive pinion shaft has a worn or damaged roller path.
- When there is damage, wear or seizure of the differential bevel pinion, differential bevel gear, adjusting washer, pinion shaft or straight pin.
- When the differential case sliding surfaces are worn or damaged.



(A) Drive pinion shaft
(B) Hypoid driven gear
(C) Pinion shaft
(D) Straight pin
(E) Adjusting washer
(F) Differential bevel gear
(G) Differential bevel pinion
(H) Taper roller bearing
(I) Differential case

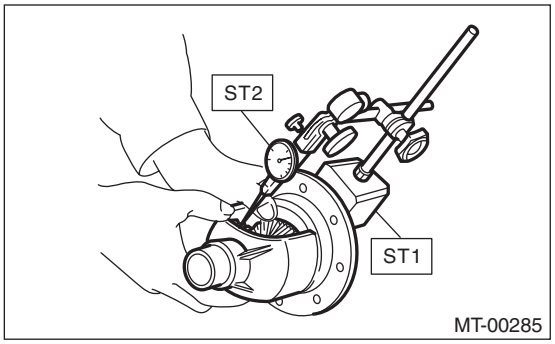
1. DIFFERENTIAL BEVEL PINION GEAR BACKLASH

Measure the backlash between the differential bevel gear and differential bevel pinion. Adjust the backlash if not within specified limit. <Ref. to 5MT-76, ADJUSTMENT, Front Differential Assembly.>

NOTE:
Be sure the bevel pinion gear teeth contact adjacent gear teeth during measurement.

ST1 498247001 MAGNET BASE
ST2 498247100 DIAL GAUGE

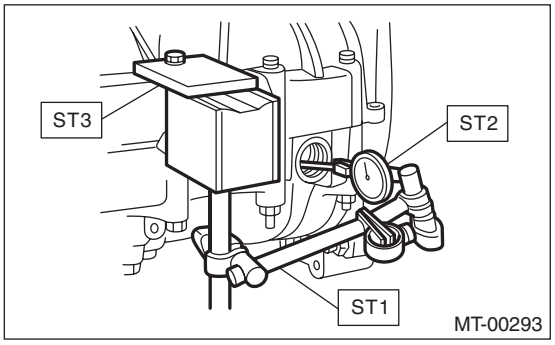
Standard backlash
0.13 — 0.18 mm (0.0051 — 0.0071 in)



2. HYPOID DRIVEN GEAR BACKLASH

1) Set the ST1, ST2 and ST3. Insert the needle through drain plug hole so that the needle comes in contact with the tooth surface on the right corner, and check the backlash.

ST1 498247001 MAGNET BASE
ST2 498247100 DIAL GAUGE
ST3 498255400 PLATE



2) Install SUBARU genuine axle shafts to both sides, rotate in the inversion direction so that the gauge contacts the tooth surface, and read the dial gauge.

NOTE:
If the backlash is outside the specified range, adjust it by turning the differential side retainer in the right side case.

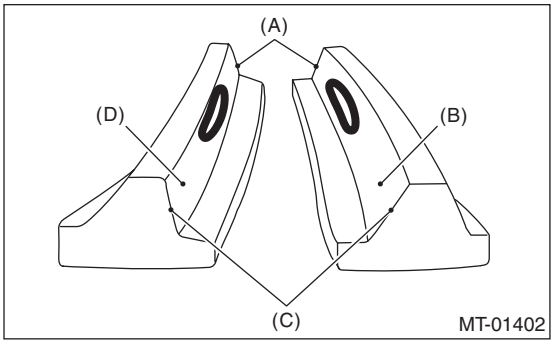
Part No. 38415AA100 Axle shaft

Backlash
0.13 — 0.18 mm (0.0051 — 0.0071 in)

3. TOOTH CONTACT OF HYPOID DRIVEN GEAR

Check tooth contact of hypoid driven gear as follows: Apply a thin uniform coat of red lead on both teeth surfaces of three to four teeth of the driven gear. Move the driven gear back and forth by turning the main shaft until a definite contact pattern is developed on the driven gear, and judge whether face contact is correct. When the contact pattern is not correct, adjust. <Ref. to 5MT-76, ADJUSTMENT, Front Differential Assembly.>

- Tooth contact is correct.



(A) Toe
(B) Coast side
(C) Heel
(D) Drive side

F: ADJUSTMENT

1. DIFFERENTIAL BEVEL PINION GEAR BACKLASH

1) Disassemble the front differential assembly. <Ref. to 5MT-73, DISASSEMBLY, Front Differential Assembly.>
2) Select the adjusting washer from the table and install.

Adjusting washer	
Part No.	Thickness mm (in)
803038021	0.925 — 0.950 (0.0364 — 0.0374)
803038022	0.975 — 1.000 (0.0384 — 0.0394)
803038023	1.025 — 1.050 (0.0404 — 0.0413)

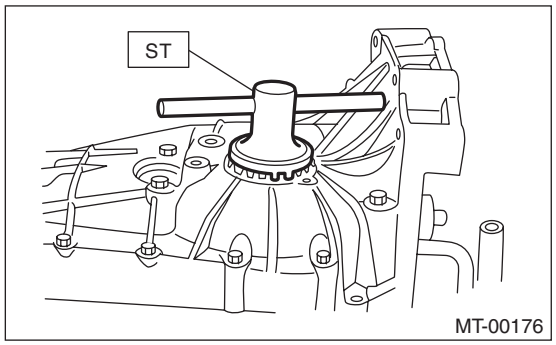
3) Adjust until the standard value is obtained.

Backlash:
Standard
0.13 — 0.18 mm (0.0051 — 0.0071 in)

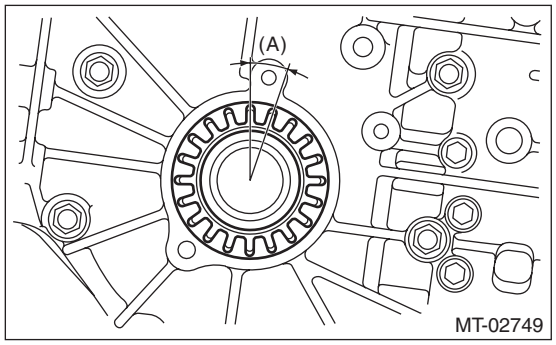
2. HYPOID DRIVEN GEAR BACKLASH

Adjust the backlash by rotating the differential side retainer in the RH side case.

ST 18630AA010 WRENCH COMPL RETAINER



NOTE:
Each time the side retainer rotates by one notch (A), the backlash changes by 0.05 mm (0.020 in).

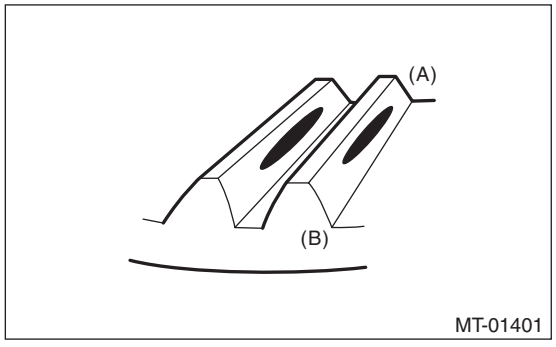


3. TOOTH CONTACT OF HYPOID DRIVEN GEAR

1) Adjust until correct teeth contact is obtained.
2) Check tooth contact, and perform the adjustment as follows.

- Correct tooth contact

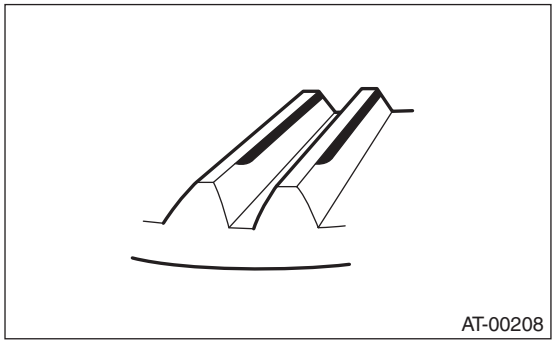
Check item: Tooth contact surface is slightly shifted toward the toe side under a no-load condition. (When driving, it moves towards the heel side.)



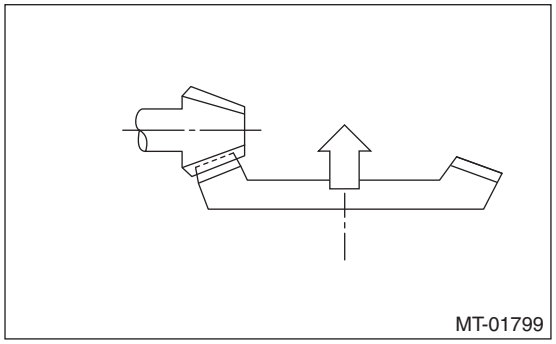
(A) Toe side
(B) Heel side

- Face contact

Check item: Backlash is too large.
Contact pattern

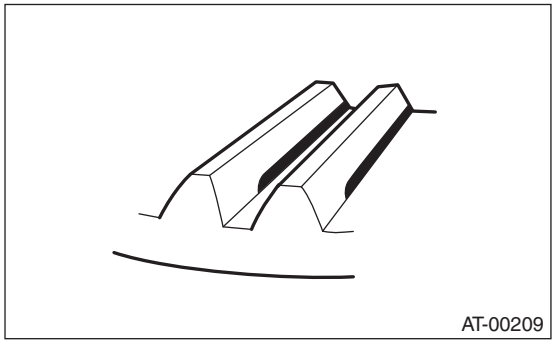


Corrective action: Tighten the differential side retainer to move the driven gear closer to the drive pinion shaft.

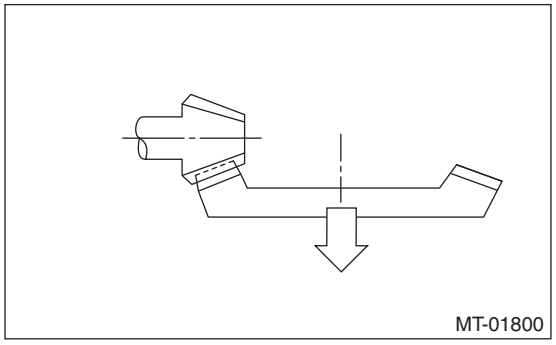


- Flank contact

Check item: Backlash is too small.
Contact pattern

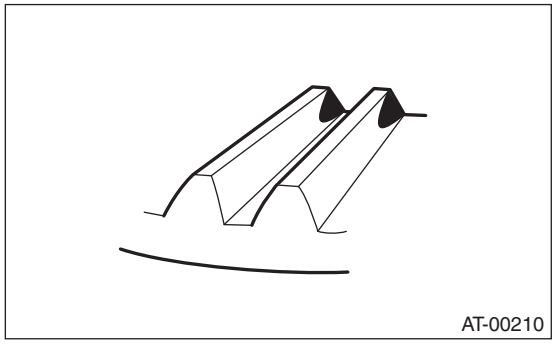


Corrective action: Loosen the differential side retainer to move the driven gear away from the drive pinion shaft.

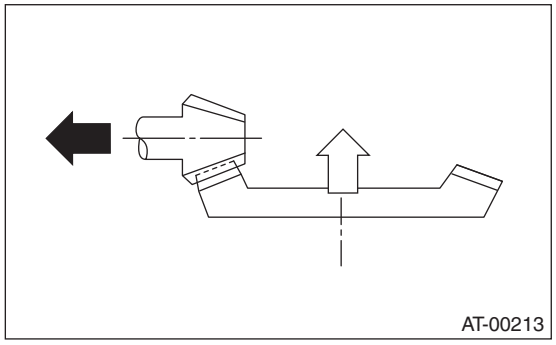


- Toe contact (inside contact)

Check item: Teeth contact area is too small.
Contact pattern

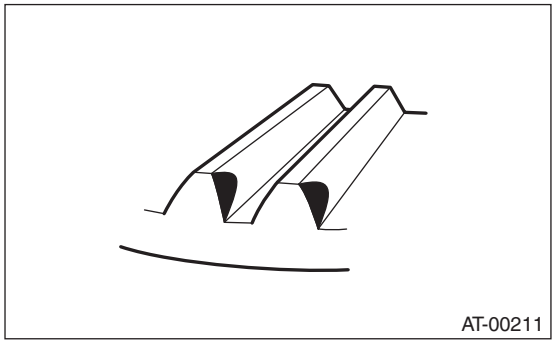


Corrective action: Increase the thickness of drive pinion shim and tighten the differential side retainer to move the driven gear closer to the drive pinion shaft according to the procedure for bringing drive pinion shaft away from driven gear.

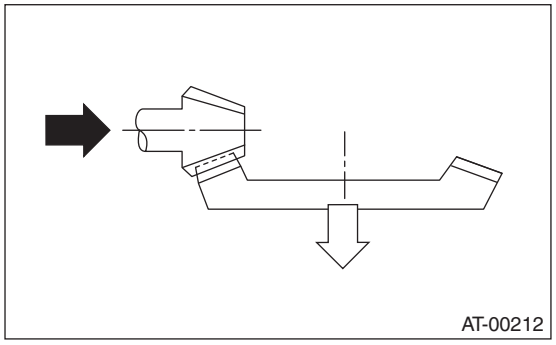


- Heel contact (outside end contact)

Check item: Teeth contact area is too small.
Contact pattern



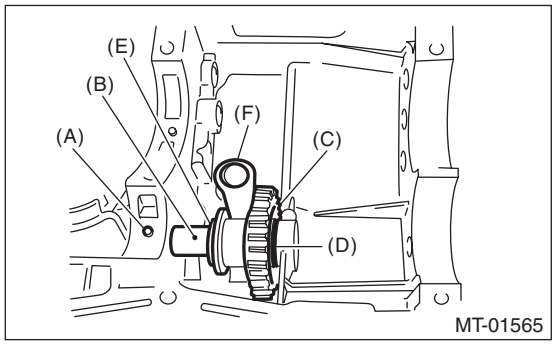
Corrective action: Reduce the thickness of drive pinion shim and loosen the differential side retainer to move the driven gear away from the drive pinion according to the procedure for moving drive pinion shaft closer to the driven gear.



19.Reverse Idler Gear

A: REMOVAL

1) Remove the manual transmission assembly from the vehicle. <Ref. to 5MT-22, REMOVAL, Manual Transmission Assembly.>
2) Remove the back-up light switch and the neutral position switch. <Ref. to 5MT-35, REMOVAL, Switches and Harness.>
3) Remove the transfer case together with the extension case assembly. <Ref. to 5MT-39, REMOVAL, Transfer Case and Extension Case Assembly.>
4) Remove the transmission case. <Ref. to 5MT-53, REMOVAL, Transmission Case.>
5) Remove the drive pinion shaft assembly. <Ref. to 5MT-62, REMOVAL, Drive Pinion Shaft Assembly.>
6) Remove the main shaft assembly. <Ref. to 5MT-57, REMOVAL, Main Shaft Assembly.>
7) Remove the front differential assembly. <Ref. to 5MT-72, REMOVAL, Front Differential Assembly.>
8) Remove the shifter forks and rods. <Ref. to 5MT-81, REMOVAL, Shifter Fork and Rod.>
9) Pull out the straight pin, and remove the reverse idler gear shaft, adjusting washer, reverse idler gear and washer.



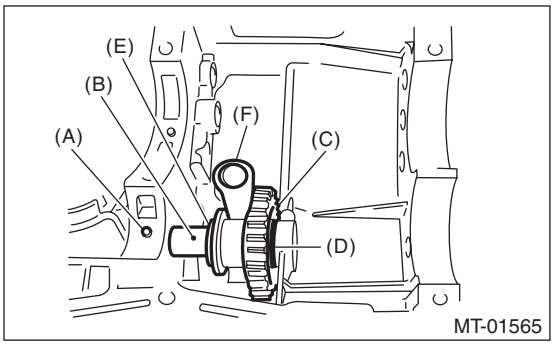
(A) Straight pin
(B) Reverse idler gear shaft
(C) Reverse idler gear
(D) Adjusting washer
(E) Reverse idler gear washer
(F) Reverse shifter lever

10) Remove the reverse shifter lever.

B: INSTALLATION

1) Install the reverse shifter lever, adjusting washer, reverse idler gear, reverse idler gear shaft and washer, and secure them with the straight pin.

NOTE:
- Be sure to install the reverse idler gear shaft from rear side.
- Use a new straight pin.



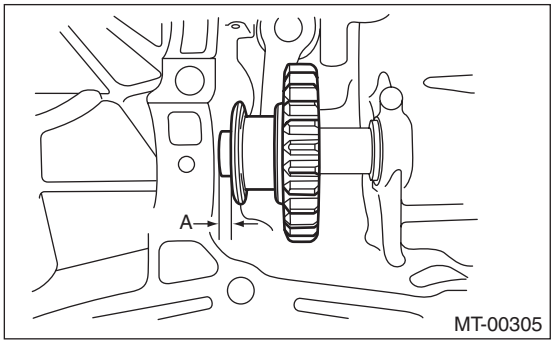
(A) Straight pin
(B) Reverse idler gear shaft
(C) Reverse idler gear
(D) Adjusting washer
(E) Reverse idler gear washer
(F) Reverse shifter lever

2) Check and adjust clearance between the reverse idler gear and the timing case wall surface. <Ref. to 5MT-79, INSTALLATION, Reverse Idler Gear.> <Ref. to 5MT-80, ADJUSTMENT, Reverse Idler Gear.>
3) Install the shifter forks and rods. <Ref. to 5MT-82, INSTALLATION, Shifter Fork and Rod.>
4) Install the front differential assembly. <Ref. to 5MT-72, INSTALLATION, Front Differential Assembly.>
5) Install the main shaft assembly. <Ref. to 5MT-57, INSTALLATION, Main Shaft Assembly.>
6) Install the drive pinion shaft assembly. <Ref. to 5MT-62, INSTALLATION, Drive Pinion Shaft Assembly.>
7) Install the transmission case. <Ref. to 5MT-54, INSTALLATION, Transmission Case.>
8) Install the transfer case together with the extension case assembly. <Ref. to 5MT-39, INSTALLATION, Transfer Case and Extension Case Assembly.>
9) Install the back-up light switch and the neutral position switch. <Ref. to 5MT-35, INSTALLATION, Switches and Harness.>
10) Install the manual transmission assembly to the vehicle. <Ref. to 5MT-25, INSTALLATION, Manual Transmission Assembly.>

C: INSPECTION

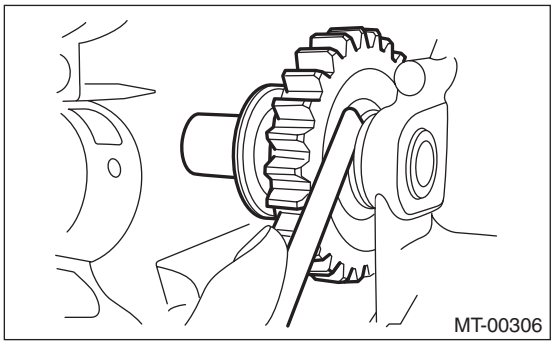
1) Move the reverse shifter rod toward the reverse side. Check the clearance between the reverse idler gear and the transmission case wall surface.
If the value is out of specification, select the appropriate reverse shifter lever and adjust. <Ref. to 5MT-80, ADJUSTMENT, Reverse Idler Gear.>

Clearance A:
6.0 — 7.5 mm (0.236 — 0.295 in)



2) After installing a suitable reverse shifter lever, shift into neutral. Check the clearance between the reverse idler gear and the transmission case wall surfaces.
If the value is out of specification, select the appropriate adjusting washer and adjust. <Ref. to 5MT-80, ADJUSTMENT, Reverse Idler Gear.>

Clearance:
0 — 0.5 mm (0 — 0.020 in)

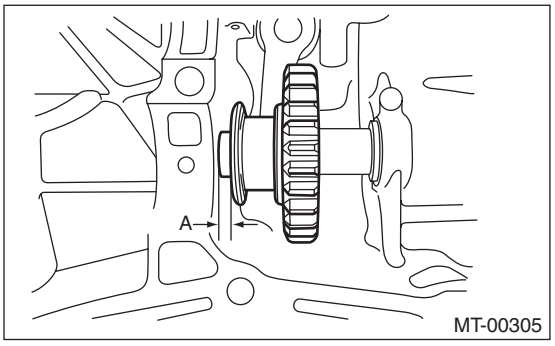


3) Check the reverse idler gear and shaft for damage. Replace if it is damaged.

D: ADJUSTMENT

1) Select the appropriate reverse shifter lever from the table below, and adjust until the clearance between the reverse idler gear and transmission case wall is within specification.

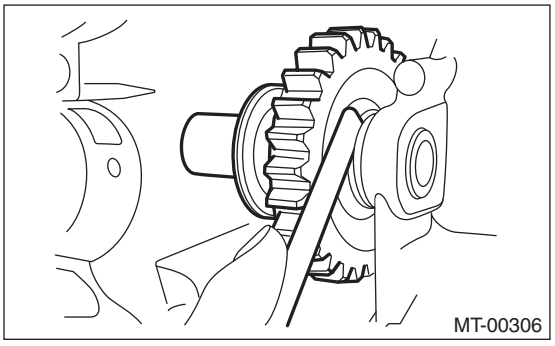
Clearance A:
6.0 — 7.5 mm (0.236 — 0.295 in)



Reverse shifter lever		
Part No.	Mark	Contents
32820AA070	7	Far from case wall
32820AA080	8	Standard
32820AA090	9	Closer to case wall

2) Select the appropriate adjusting washer from the table below, and adjust until the clearance between the reverse idler gear and transmission case wall is within specification.

Clearance:
0 — 0.5 mm (0 — 0.020 in)

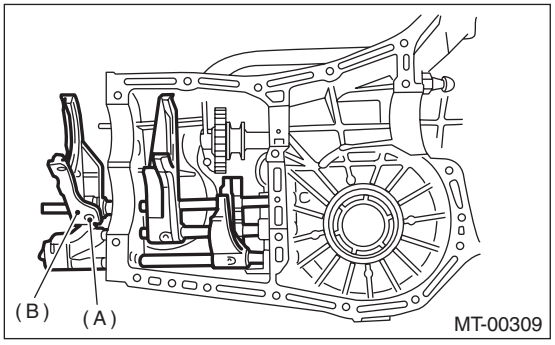


Adjusting washer	
Part No.	Thickness mm (in)
803020151	0.4 (0.016)
803020152	1.1 (0.043)
803020153	1.5 (0.059)
803020154	1.9 (0.075)
803020155	2.3 (0.091)

20.Shifter Fork and Rod

A: REMOVAL

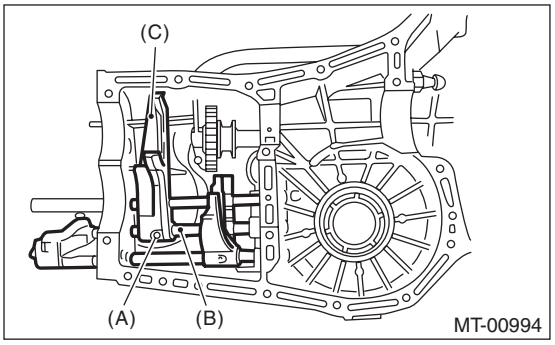
1) Remove the manual transmission assembly from the vehicle. <Ref. to 5MT-22, REMOVAL, Manual Transmission Assembly.>
2) Remove the back-up light switch and the neutral position switch. <Ref. to 5MT-35, REMOVAL, Switches and Harness.>
3) Remove the transfer case together with the extension case assembly. <Ref. to 5MT-39, REMOVAL, Transfer Case and Extension Case Assembly.>
4) Remove the transmission case. <Ref. to 5MT-53, REMOVAL, Transmission Case.>
5) Remove the drive pinion shaft assembly. <Ref. to 5MT-62, REMOVAL, Drive Pinion Shaft Assembly.>
6) Remove the main shaft assembly. <Ref. to 5MT-57, REMOVAL, Main Shaft Assembly.>
7) Remove the front differential assembly. <Ref. to 5MT-72, REMOVAL, Front Differential Assembly.>
8) Drive out the straight pin by tapping it with the ST, and remove the 5th shifter fork.
ST 398791700 STRAIGHT PIN REMOVER 2



(A) Straight pin
(B) 5th shifter fork

9) Remove the plugs, springs and check balls.
10) Drive out the straight pin by tapping with the ST, and remove the 3rd – 4th fork rod and shifter fork.

NOTE:
When removing the rod, keep other rods in neutral. When driving out the straight pin, remove it toward the inside of case so that it does not hit against the case.
ST 398791700 STRAIGHT PIN REMOVER 2



(A) Straight pin
(B) 3rd-4th fork rod
(C) Shifter fork

11) Drive out the straight pin by tapping with the ST, and pull out the 1st – 2nd fork rod and shifter fork.
ST 398791700 STRAIGHT PIN REMOVER 2
12) Remove the snap ring (outer), and pull out the reverse fork rod from the reverse fork rod arm. Then take out the ball, spring and interlock plunger from the reverse fork rod arm. And then remove the rod.

NOTE:
When pulling out the reverse fork rod arm, be careful not to let the ball pop out of arm.
13) Remove the reverse shifter lever.

B: INSTALLATION

1) Install the spring and ball to the reverse fork rod arm, and press in the ST.
ST 399411700 ACCENT BALL INSTALLER
2) Install the reverse fork rod through the hole on the rear of the transmission case. Press out the ST using the reverse fork rod, and fix with outer snap ring.
3) Install the interlock plunger to reverse fork rod arm.

NOTE:
Apply grease to plunger to prevent it from falling.
4) Position the ball, spring and gasket in the reverse fork rod hole on the left side of transmission case, and tighten the checking ball plug.

NOTE:
Use a new gasket.

Tightening torque:
20 N·m (2.0 kgf-m, 14.8 ft-lb)
5) Install the 1st-2nd fork rod into 1st-2nd shifter fork through the hole on the rear of transmission case.

NOTE:
- Set the reverse fork rod to neutral.
- Check that the positions of interlock plunger is correct.

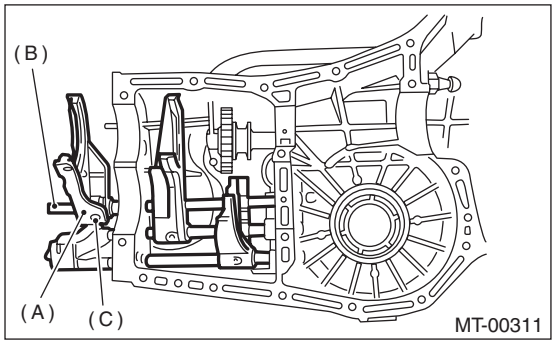
6) Align the holes in the rod and the fork, and drive the new straight pin into these holes using the ST.
ST 398791700 STRAIGHT PIN REMOVER 2
7) Install the interlock plunger (thin) onto the 3rd–4th fork rod.

NOTE:
Apply grease to plunger to prevent it from falling.
8) Attach the 3rd – 4th fork rod into 3rd – 4th shifter fork and reverse fork rod arm through the hole on the rear of the transmission case.
9) Align the holes in the rod and the fork, and drive the new straight pin into these holes.

NOTE:
- Set the reverse fork rod and the 1st – 2nd fork rod to neutral.
- Check that the positions of interlock plunger is correct.

ST 398791700 STRAIGHT PIN REMOVER 2
10) Install the 5th shifter fork onto the rear of reverse fork rod. Align the holes in the two parts and drive new straight pin into the specified place.

ST 398791700 STRAIGHT PIN REMOVER 2

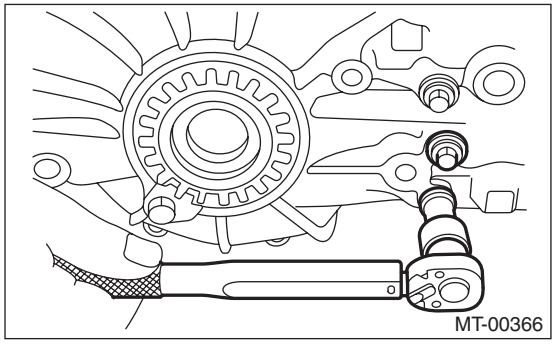


(A) 5th shifter fork
(B) Reverse fork rod
(C) Straight pin

11) Position the balls, checking ball springs and gaskets to the 3rd – 4th fork rod and 1st – 2nd fork rod holes, and install plugs.

NOTE:
Use a new gasket.

Tightening torque:
20 N·m (2.0 kgf-m, 14.8 ft-lb)

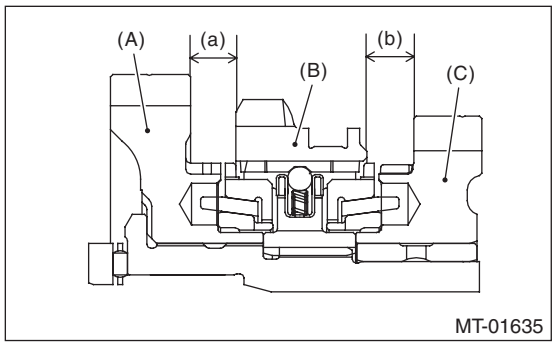


12) Install the front differential assembly. <Ref. to 5MT-72, INSTALLATION, Front Differential Assembly.>
13) Install the main shaft assembly. <Ref. to 5MT-57, INSTALLATION, Main Shaft Assembly.>
14) Install the drive pinion shaft assembly. <Ref. to 5MT-62, INSTALLATION, Drive Pinion Shaft Assembly.>
15) Install the transmission case. <Ref. to 5MT-54, INSTALLATION, Transmission Case.>
16) Install the transfer case together with the extension case assembly. <Ref. to 5MT-39, INSTALLATION, Transfer Case and Extension Case Assembly.>
17) Install the back-up light switch and the neutral position switch. <Ref. to 5MT-35, INSTALLATION, Switches and Harness.>
18) Install the manual transmission assembly to the vehicle. <Ref. to 5MT-25, INSTALLATION, Manual Transmission Assembly.>

C: INSPECTION

1) Check the fork and rod for damage. Replace if it is damaged.
2) Gearshift mechanism
Repair or replace the gearshift mechanism if excessively worn, bent or defective in any way.
3) Inspect the clearance between 1st, 2nd driven gear and reverse driven gear. If any clearance is not within specifications, replace the shifter fork as required.

Clearance (a) and (b):
9.5 mm (0.374 in)

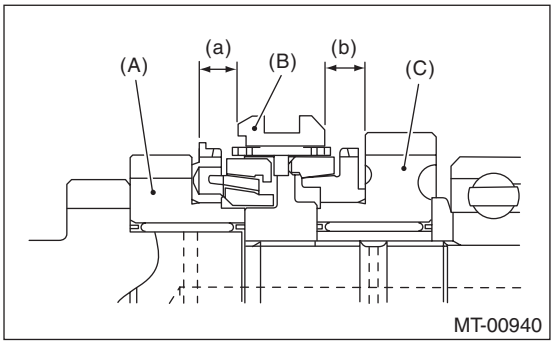


(A) 1st driven gear
(B) Reverse driven gear
(C) 2nd driven gear

1st-2nd shifter fork		
Part No.	Mark	Remarks
32804AA060	1	Approaches 1st gear by 0.2 mm (0.008 in)
32804AA070	No mark	Standard
32804AA080	3	Approaches 2nd gear by 0.2 mm (0.008 in)

4) Inspect the clearance between the 3rd, 4th drive gear and the coupling sleeve. If any clearance is not within specifications, replace the shifter fork as required.

Clearance (a) and (b):
9.3 mm (0.366 in)

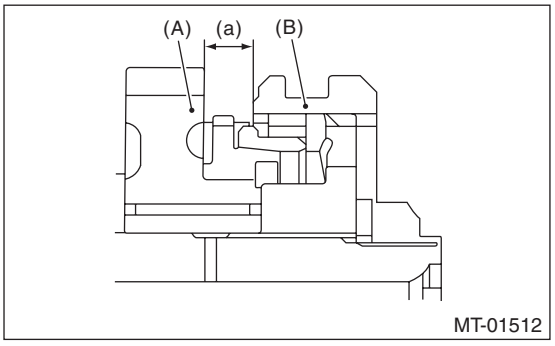


(A) 3rd drive gear
(B) Coupling sleeve
(C) 4th drive gear

3rd-4th shifter fork		
Part No.	Mark	Remarks
32810AA061	1	Approaches 4th gear by 0.2 mm (0.008 in)
32810AA071	No mark	Standard
32810AA101	3	Approaches 3rd gear by 0.2 mm (0.008 in)

5) Inspect the clearance between 5th drive gear and coupling sleeve. If any clearance is not within specifications, replace the shifter fork as required.

Clearance (a):
9.3 mm (0.366 in)



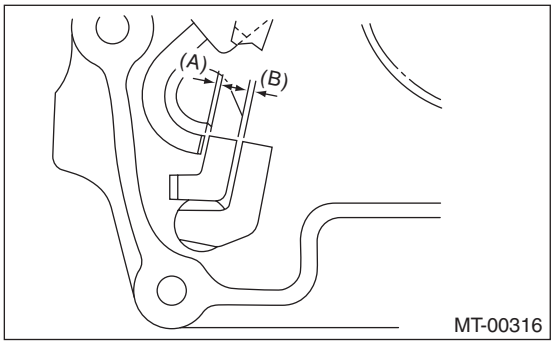
(A) 5th drive gear
(B) Coupling sleeve

5th shifter fork		
Part No.	Mark	Remarks
32812AA201	7	Approaches 5th gear by 0.2 mm (0.008 in).
32812AA211	No mark	Standard
32812AA221	9	Moves away from 5th gear by 0.2 mm (0.008 in).

6) Inspect the rod end clearances (A) and (B). If any clearance is not within specifications, replace the rod or fork as required.

Clearance (A):
3rd-4th — 5th
0.5 — 1.3 mm (0.020 — 0.051 in)

Clearance (B):
1st-2nd — 3rd-4th
0.4 — 1.4 mm (0.016 — 0.055 in)



21.General Diagnostic Table

A: INSPECTION

1. MANUAL TRANSMISSION

Symptoms	Possible cause	Corrective action
1. Gears are difficult to intermesh. NOTE: The cause for difficulty in shifting gears can be classified into two types: One is a defective gear shift system and the other is defective transmission. However, if the operation is heavy and engagement of the gears is difficult, a defective clutch disengagement may also be responsible. Check whether the clutch is correctly functioning, before checking the gear shift system and transmission.	(a) Worn, damaged or burred chamfer at internal spline of the sleeve and reverse driven gear	Replace.
	(b) Worn, damaged or burred chamfer of gear spline	Replace.
	(c) Worn or scratched bushings	Replace.
	(d) Incorrect contact or wear between baulk ring and gear cone	Repair or replace.
2. Gear slip-out • Gear slips out when coasting on rough road. • Gear slips out during acceleration.	(a) Defective pitching stopper adjustment	Replace.
	(b) Loose engine mounting bolts	Tighten.
	(c) Worn shifter fork or broken shifter check ball spring	Replace.
	(d) Worn or damaged ball bearing	Replace.
	(e) Excessive clearance between splines of synchronizer hub and synchronizer sleeve	Replace.
	(f) Synchronizer hub tooth step wear	Replace.
	(g) Worn 1st driven gear and driven shaft	Replace.
	(h) Worn 2nd driven gear and bushing	Replace.
	(i) Worn 3rd drive gear and needle bearing	Replace.
	(j) Worn 4th drive gear and needle bearing	Replace.
	(k) Worn 5th drive gear and needle bearing	Replace.
	(l) Worn reverse idler gear and bushing	Replace.
3. Noise emitted from transmission NOTE: If a noise is heard when the vehicle is parked with its engine idling and if a noise ceases when the clutch is disengaged, it may be considered that the noise is coming from the transmission.	(a) Insufficient or improper lubrication	Lubricate with specified oil or replace.
	(b) Worn or damaged gears and bearings NOTE: If the trouble is only wear of the gear teeth surfaces, only a high whirring noise will occur at high speeds, but if any part is broken, rhythmical clicking sounds will be heard even at low speeds.	Replace.

2. DIFFERENTIAL

Symptoms	Possible cause	Corrective action
1. Broken differential (case, gear, bearing, etc.) NOTE: Noise will occur, and eventually the differential will not be able to operate due to broken pieces obstructing the gear revolution.	(a) Insufficient or improper oil	Disassemble the differential and replace broken components. At the same time check other components for any trouble, and replace if necessary.
	(b) Use of vehicle under severe conditions such as excessive load and improper use of the clutch	Readjust the preload and backlash of the bearing, and the contact surface of gear.
	(c) Improper adjustment of taper roller bearing	Adjust.
	(d) Improper adjustment of the drive pinion and the hypoid driven gear	Adjust.
	(e) Excessive backlash of a vehicle under severe operating conditions due to worn differential side gear, washer or differential pinion	Add recommended oil to the specified level. Do not use vehicle under severe operating conditions.
	(f) Loose hypoid driven gear clamping bolts	Tighten.
2. Differential and hypoid driven gear noises Troubles of the differential and driven gear always appear as noise problems. Therefore noise is the first indication of trouble. However, noises from the engine, muffler, tire, exhaust gas, bearing, body, etc. are easily mistaken for the differential noise. Pay special attention to the driven gear noise because it is easily confused with other gear noises. There are the following four kinds of noises. • Gear noise when driving: If noise increases as the vehicle speed increases, it may be due to insufficient gear oil, incorrect gear engagement, damaged gears, etc. • Gear noise when coasting: Damaged gears due to misadjusted bearings and incorrect shim adjustment • Bearing noise when driving or coasting: Cracked, broken or damaged bearings • Noise mainly when turning: Noise from differential side gear, differential pinion or differential pinion shaft, etc.	(a) Insufficient oil	Replenish or replace with the specified amount of recommended oil.
	(b) Improper adjustment of hypoid driven gear and drive pinion	Check the tooth contact.
	(c) Worn teeth of hypoid driven gear and drive pinion	Replace as a set. Readjust the bearing preload.
	(d) Loose roller bearing	Readjust the backlash of the hypoid driven gear to drive pinion, and check the tooth contact.
	(e) Distorted hypoid driven gear or differential case	Replace.
	(f) Worn washer and differential pinion shaft	Replace.

CLUTCH SYSTEM

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