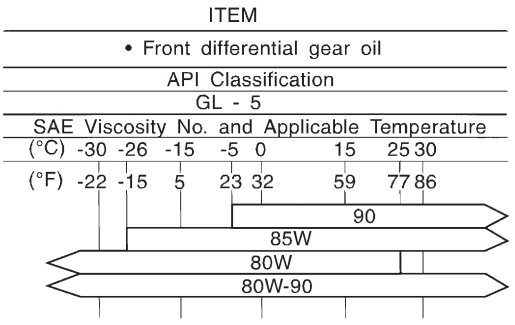
AUTOMATIC TRANSMISSION AND DIFFERENTIAL 3-2

1. Automatic Transmission and Differential

A: SPECIFICATIONS

Torque converter clutch	Type		Symmetric, 3 element, single stage, 2 phase torque converter		
	Stall torque ratio	2200 cc	2.0 — 2.2		
		2500 cc	1.9 — 2.1		
	Nominal diameter	2200 cc	236 mm (9.29 in)		
		2500 cc	246 mm (9.69 in)		
	Stall speed (at sea level)	2200 cc	2,200 — 2,700 rpm		
		2500 cc	2,100 — 2,600 rpm		
	One-way clutch		Sprague type one-way clutch		
Automatic transmission	Transmission	Type	4-forward, 1-reverse, double-row planetary gears		
		Control element	Multi-plate clutch		3 sets
			Multi-plate brake		2 sets
			One-way clutch (sprague type)		1 set
		Gear ratio	1st	2200 cc	2.785
				2500 cc	3.027
			2nd	2200 cc	1.545
				2500 cc	1.619
			3rd		1.000
			4th		0.694
			Reverse		2.272
		Tooth number of planetary gear	Front sun gear		33
			Front pinion		21
			Front internal gear		75
			Rear sun gear	2200 cc	42
				2500 cc	37
			Rear pinion	2200 cc	17
				2500 cc	19
			Rear internal gear		75
		Plate number of high clutch	Drive plate & driven plate	2200 cc	4
				2500 cc	5
		Plate number of reverse clutch	Drive plate & driven plate		2
		Plate number of 2-4 brake	Drive plate & driven plate		3
		Plate number of low clutch	Drive plate & driven plate	2200 cc	5
				2500 cc	6
		Plate number of low & reverse brake	Drive plate & driven plate	2200 cc	5
				2500 cc	6

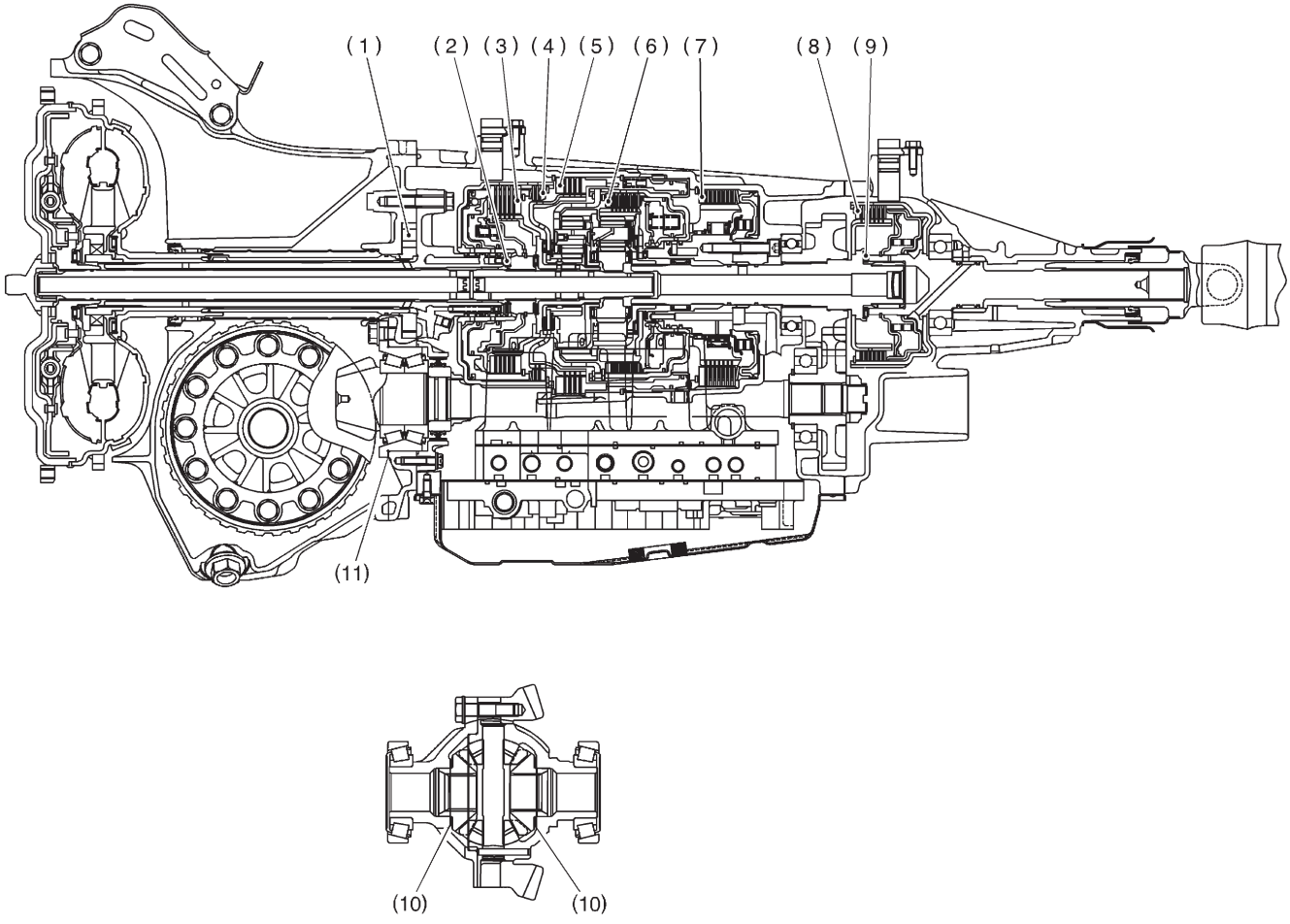
Automatic transmission	Transmission	Selector position		P (Park)	Transmission in neutral, output member immovable, and engine start possible
				R (Reverse)	Transmission in reverse for backing
				N (Neutral)	Transmission in neutral, and engine start possible
				D (Drive)	Automatic gear change 1st ←→ 2nd ←→ 3rd ←→ 4th
				3 (3rd)	Automatic gear change 1st ←→ 2nd ←→ 3rd ← 4th
				2 (2nd)	2nd gear locked (Deceleration possible 4th → 3rd → 2nd)
				1 (1st)	1st gear locked (Deceleration possible 4th → 3rd → 2nd → 1st)
		Control method		Hydraulic remote control	
	Oil pump	Type		Prachoid constant-displacement pump	
		Driving method		Driven by engine	
		Number of teeth		Inner rotor	9
				Outer rotor	10
	Hydraulic control	Type		Electronic/hydraulic control [Four forward speed changes by electrical signals of vehicle speed and accelerator (throttle) opening]	
		Fluid		Dexron IIE or Dexron III type Automatic transmission fluid	
		Fluid capacity	2200 cc	8.4 — 8.7 ℓ (8.9 — 9.2 US qt, 7.4 — 7.7 Imp qt)	
			2500 cc	9.3 — 9.6 ℓ (9.8 — 10.1 US qt, 8.2 — 8.4 Imp qt)	
	Lubrication	Lubrication system		Forced feed lubrication with oil pump	
		Oil		Automatic transmission fluid (above mentioned.)	
	Cooling	Cooling system		Liquid-cooled cooler incorporated in radiator	
	Harness	Inhibitor switch		12 poles	
		Transmission harness		17 poles	
	Transfer	Transfer clutch		Hydraulic multi-plate clutch	
		Plate number of transfer clutch		Drive plate & driven plate	5
		Control method		Electronic, hydraulic type	
		Lubricant		The same Automatic Transmission Fluid used in automatic transmission.	
		1st reduction gear ratio		1.000 (53/53)	

<table>
<tr><td rowspan="5">Final reduction</td><td rowspan="2">Final gear ratio</td><td rowspan="2">Front drive</td><td>2200 cc</td><td>4.111 (37/9)</td></tr>
<tr><td>2500 cc</td><td>4.444 (40/9)</td></tr>
<tr><td colspan="3">Lubrication oil</td><td> 

H3M1235A</td></tr>
<tr><td colspan="2">Oil capacity</td><td>Front drive</td><td>1.2 ℓ (1.3 US qt, 1.1 Imp qt)</td></tr>
<tr><td colspan="2">ATF cooling system</td><td>Radiation capacity</td><td>4.630 kW (3,981 kcal/h, 15,797 BTU/h)</td></tr>
</table>

MEMO:

B: ADJUSTING PARTS



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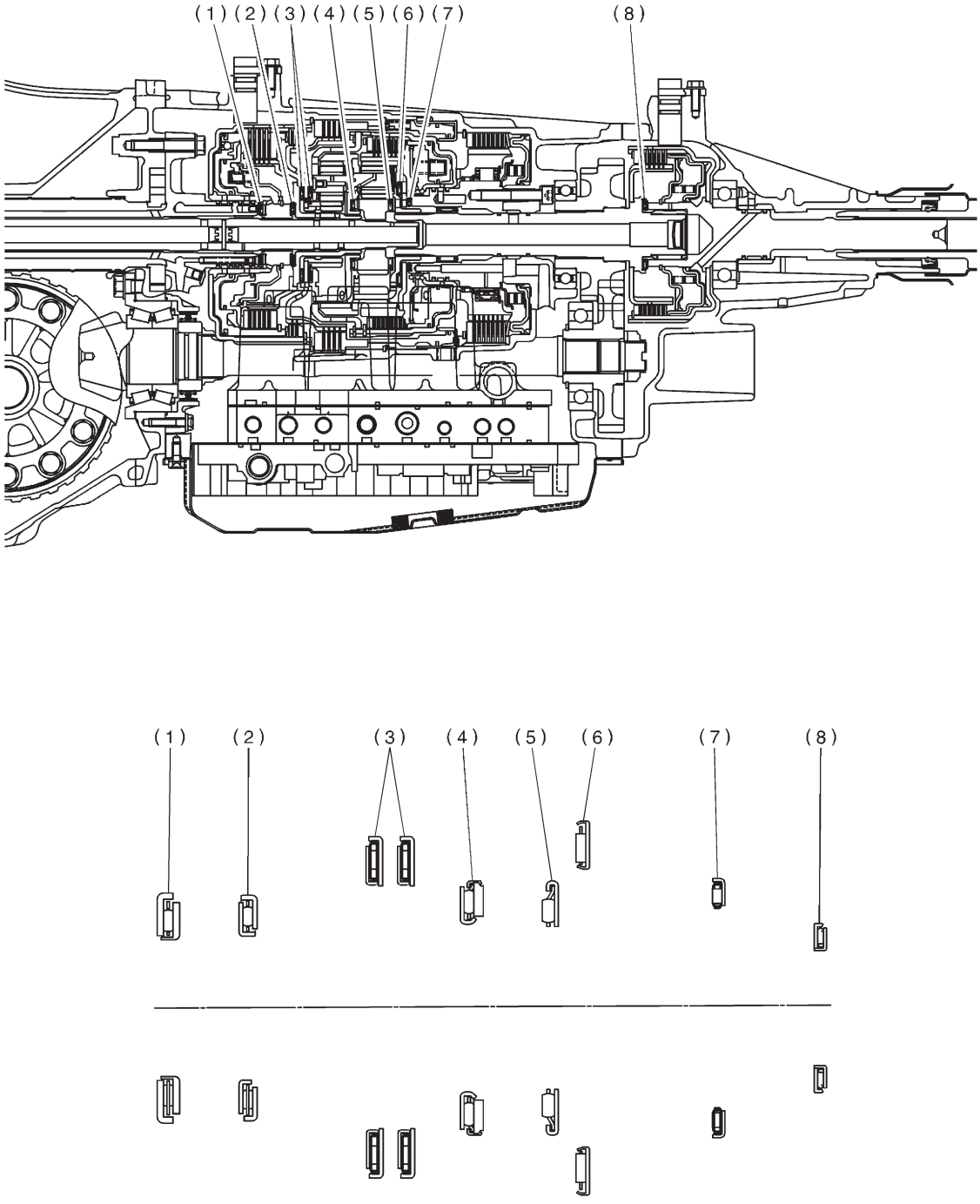
No.	Part Name	Part Number	Dimension mm (in)	Application
1	Rotor (Oil pump)	15008AA060 15008AA070 15008AA080	11.37 — 11.38 (0.4476 — 0.4480) 11.38 — 11.39 (0.4480 — 0.4484) 11.39 — 11.40 (0.4484 — 0.4488)	Adjusting side clearance of oil pump
2	Thrust bearing	806528050 806528060 806528070 806528080 806528090 806528100	4.11 (0.1618) 4.3 (0.169) 4.5 (0.177) 4.7 (0.185) 4.9 (0.193) 5.1 (0.201)	Adjusting total end play
3	Retaining plate (High clutch)	31567AA710 31567AA720 31567AA730 31567AA740 31567AA670 31567AA680 31567AA690 31567AA700	4.7 (0.185) 4.8 (0.189) 4.9 (0.193) 5.0 (0.197) 5.1 (0.201) 5.2 (0.205) 5.3 (0.209) 5.4 (0.213)	Adjusting clearance of high clutch
4	Retaining plate (Reverse clutch)	31567AA750 31567AA760 31567AA770 31567AA780 31567AA790 31567AA800 31567AA810 31567AA820	3.8 (0.150) 4.0 (0.157) 4.2 (0.165) 4.4 (0.173) 4.6 (0.181) 4.8 (0.189) 5.0 (0.197) 5.2 (0.205)	Adjusting clearance of reverse clutch
5	Retaining plate (2-4 brake)	31567AA612 31567AA622 31567AA632 31567AA642 31567AA652 31567AA662	5.6 (0.220) 5.8 (0.228) 6.0 (0.236) 6.2 (0.244) 6.4 (0.252) 6.6 (0.260)	Adjusting clearance of 2-4 brake
6	Retaining plate (Low clutch)	31567AA830 31567AA840 31567AA850 31567AA860 31567AA870	3.8 (0.150) 4.0 (0.157) 4.2 (0.165) 4.4 (0.173) 4.6 (0.181)	Adjusting clearance of low clutch
7	Retaining plate (Low and reverse brake)	31667AA320 31667AA330 31667AA340 31667AA350 31667AA360 31667AA370 31667AA380	4.2 (0.165) 4.5 (0.177) 4.8 (0.189) 5.1 (0.201) 5.4 (0.213) 5.7 (0.224) 6.0 (0.236)	Adjusting clearance of low and reverse brake
8	Pressure plate (Transfer clutch)	31593AA151 31593AA161 31593AA171 31593AA181	3.3 (0.130) 3.7 (0.146) 4.1 (0.161) 4.5 (0.177)	Adjusting clearance of transfer clutch
9	Thrust bearing (Transfer clutch)	806536020 806535030 806535040 806535050 806535060 806535070 806535090	3.8 (0.150) 4.0 (0.157) 4.2 (0.165) 4.4 (0.173) 4.6 (0.181) 4.8 (0.189) 5.0 (0.197)	Adjusting end play of transfer clutch
10	Washer (Front differential)	803038021 803038022 803038023	0.95 (0.0374) 1.00 (0.0394) 1.05 (0.0413)	Adjusting backlash of differential bevel gear

No.	Part Name	Part Number	Dimension mm (in)	Application
11	Drive pinion shim	31451AA050	0.150 (0.0059)	Adjusting drive pinion shim
		31451AA060	0.175 (0.0069)	
		31451AA070	0.200 (0.0079)	
		31451AA080	0.225 (0.0089)	
		31451AA090	0.250 (0.0098)	
		31451AA100	0.275 (0.0108)	

MEMO:

C: LOCATION AND INSTALLING DIRECTION OF THRUST NEEDLE BEARING

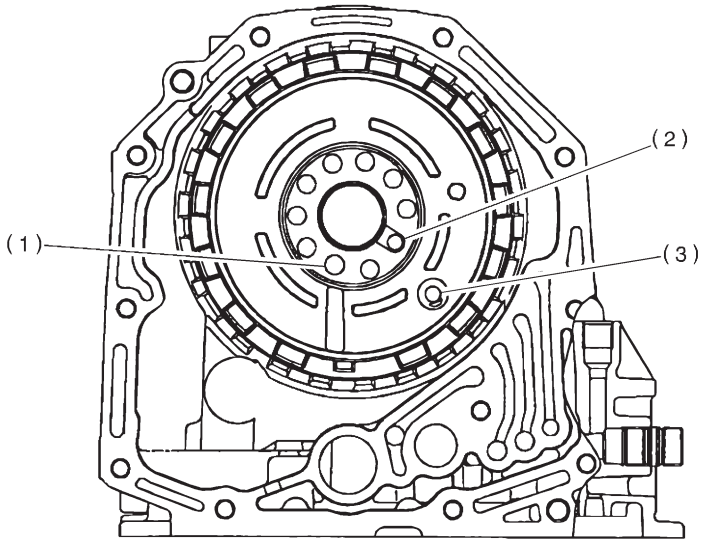


S3M0220A

No.	Part Name	Part Number	Inside diameter mm (in)	Outside diameter mm (in)	Dimension mm (in)	Application
(1)	Thrust needle bearing	806528050 806528060 806528070 806528080 806528090 806528100	28.5 (1.122)	48 (1.89)	4.11 (0.1618) 4.3 (0.169) 4.5 (0.177) 4.7 (0.185) 4.9 (0.193) 5.1 (0.201)	Adjusting total end play
(2)	Thrust needle bearing	806530040	30 (1.18)	47 (1.85)	3.8 (0.150)	Place of high clutch
(3)	Thrust needle bearing	806551020	51 (2.01)	71 (2.80)	3.3 (0.130)	Place of front sun gear
(4)	Thrust needle bearing	806535120	35 (1.38)	53 (2.09)	4.8 (0.189)	Place of rear sun gear
(5)	Thrust needle bearing	806534060	35 (1.38)	53 (2.09)	3.3 (0.130)	Place of rear sun gear
(6)	Thrust needle bearing	806558030	58 (2.28)	78 (3.07)	2.8 (0.110)	Place of rear internal gear
(7)	Thrust needle bearing	806541020	39.7 (1.563)	54 (2.13)	3.6 (0.142)	Place of one-way clutch
(8)	Thrust needle bearing	806536020 806535030 806535040 806535050 806535060 806535070 806535090	36 (1.42)	53 (2.09)	3.8 (0.150) 4.0 (0.157) 4.2 (0.165) 4.4 (0.173) 4.6 (0.181) 4.8 (0.189) 5.0 (0.197)	Adjusting end play of transfer clutch

D: FLUID PASSAGES

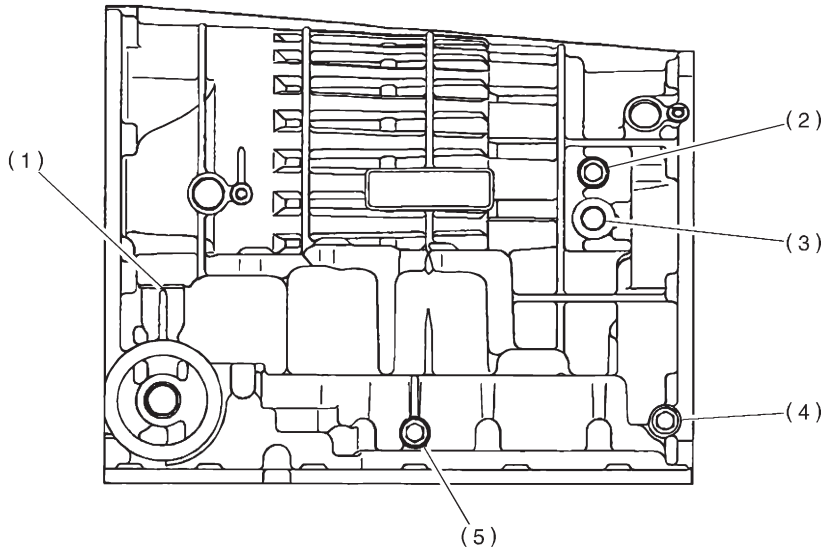
1. TRANSMISSION CASE (FRONT SIDE)



B3M0987A

(1) Low clutch pressure (2) Oil cooler inlet pressure (3) Low & reverse brake pressure

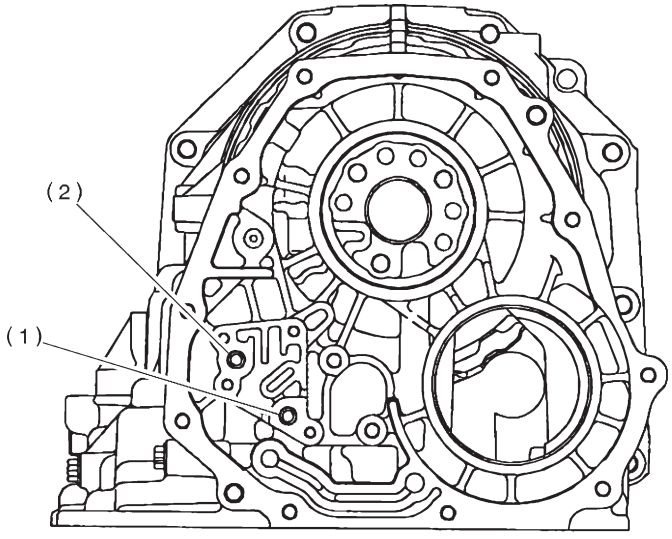
2. TRANSMISSION CASE (LH SIDE)



B3M0988A

(1) Oil cooler outlet pressure
(2) Low & reverse brake pressure
(3) Oil cooler inlet pressure
(4) Low clutch pressure
(5) 2-4 brake pressure

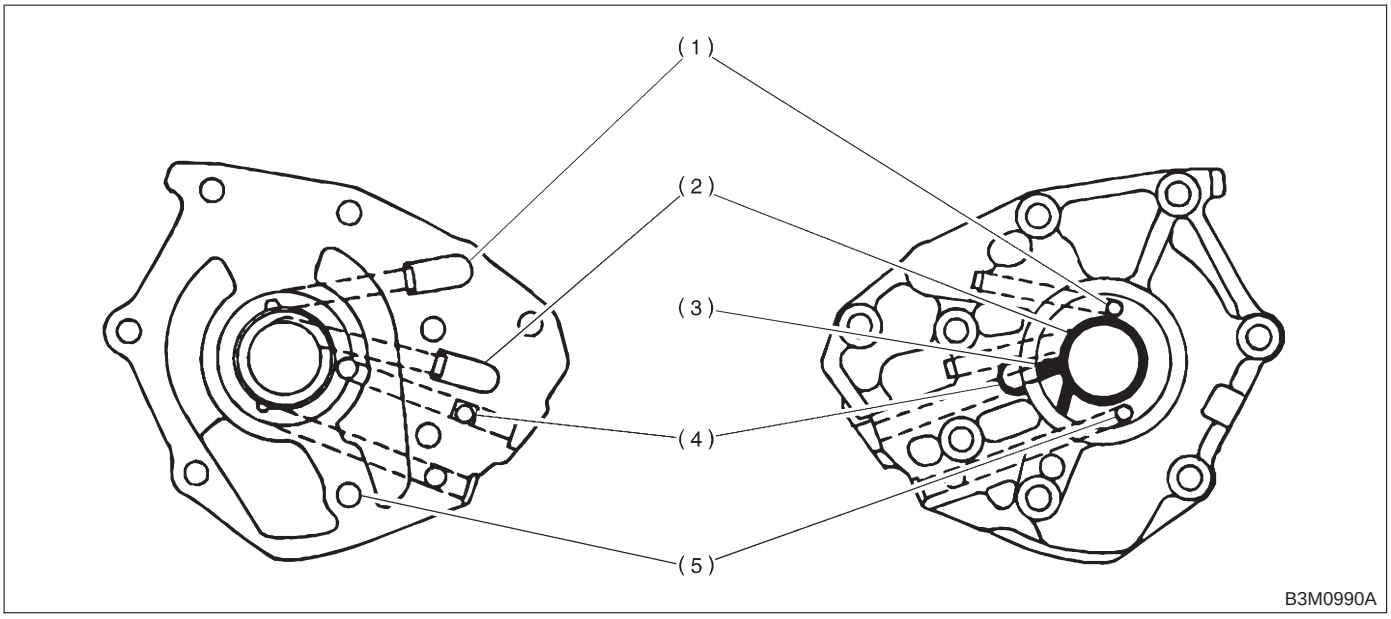
3. TRANSMISSION CASE (REAR SIDE)



B3M0989A

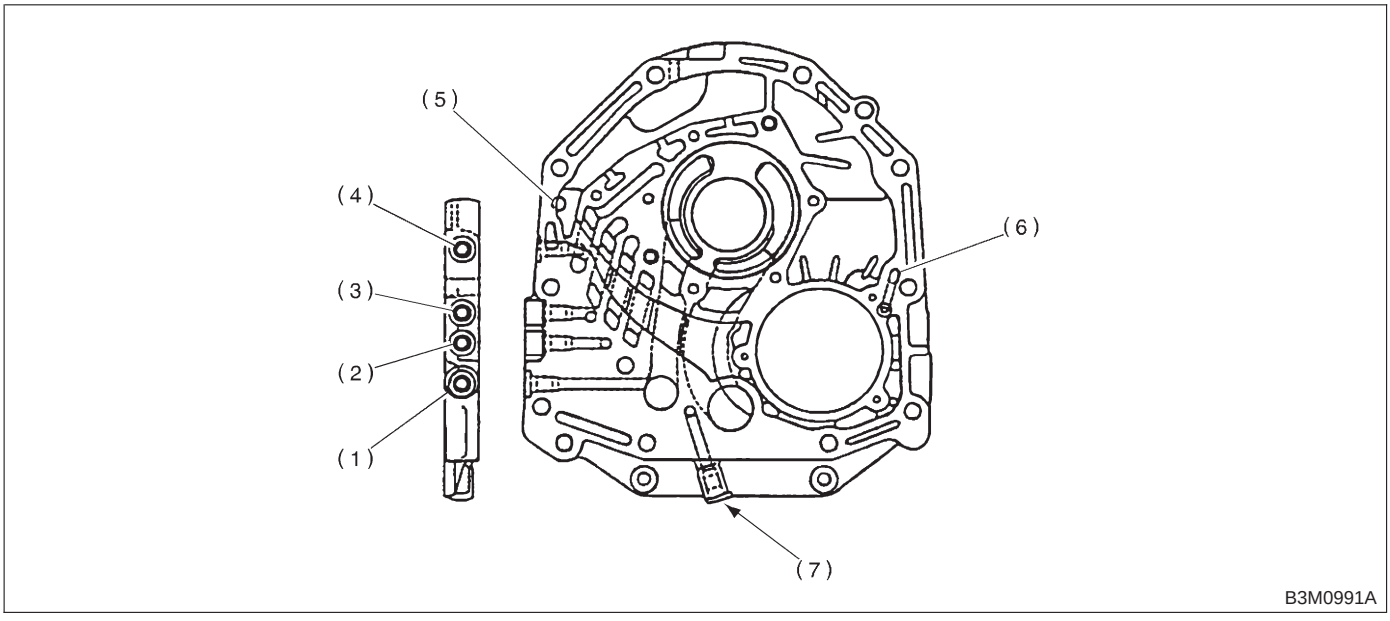
(1) Pilot pressure
(2) Line pressure

4. OIL PUMP COVER



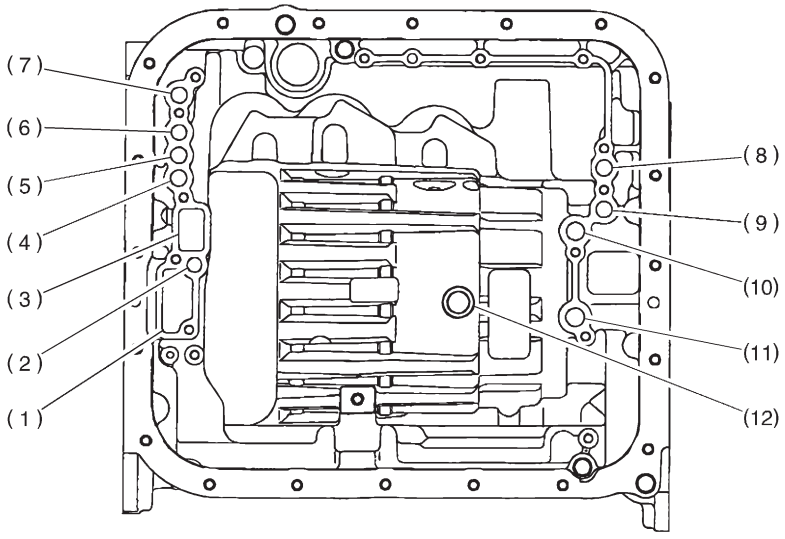
(1) High clutch pressure
(2) Lock-up release pressure
(3) Front lubricating hole
(4) Lock-up apply pressure
(5) Reverse clutch pressure

5. OIL PUMP HOUSING



(1) Oil pump outlet pressure
(2) Lock-up apply pressure
(3) Lock-up release pressure
(4) High clutch pressure
(5) Drain
(6) Air breather
(7) Reverse clutch pressure

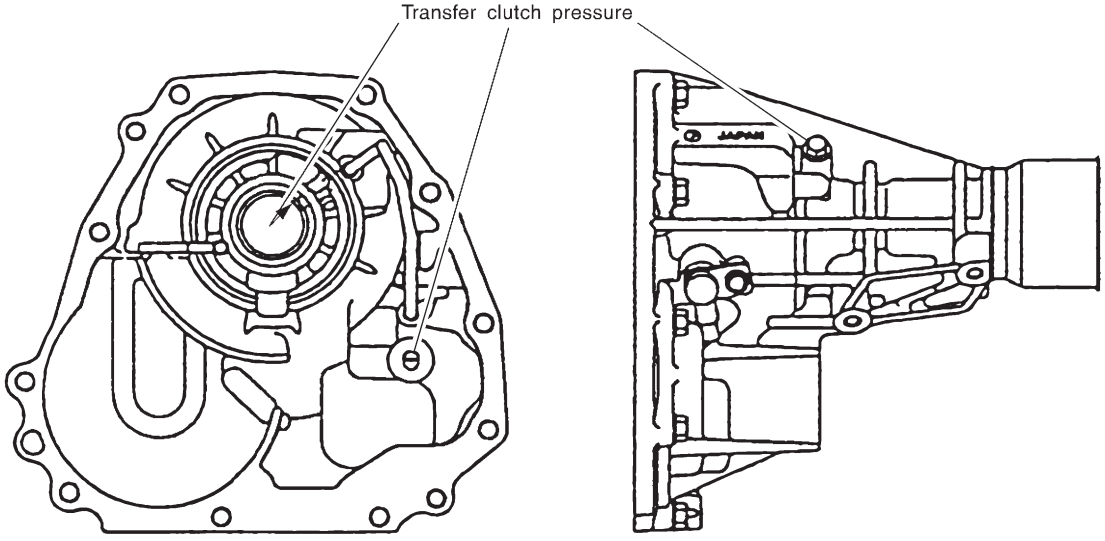
6. TRANSMISSION CASE



B3M0992A

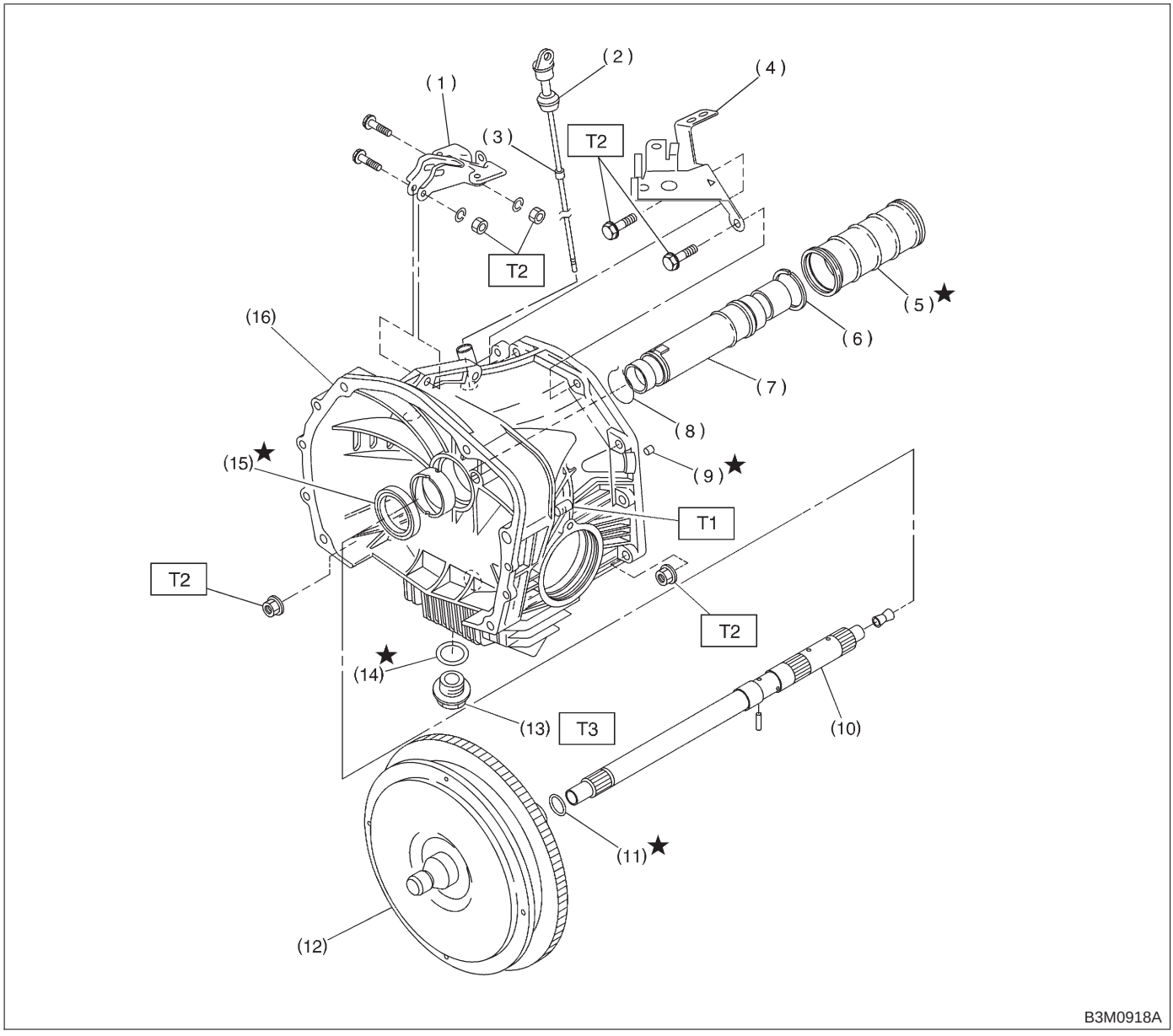
(1) Oil pump inlet port
(2) Reverse clutch pressure
(3) Oil pump outlet port
(4) Lock-up apply pressure
(5) Lock-up release pressure
(6) High clutch pressure
(7) Oil cooler outlet pressure
(8) Line pressure
(9) Pilot pressure
(10) Low & reverse brake pressure
(11) Low clutch pressure
(12) 2-4 brake pressure

7. EXTENSION CASE



B3M0993A

1. Torque Converter Clutch and Case

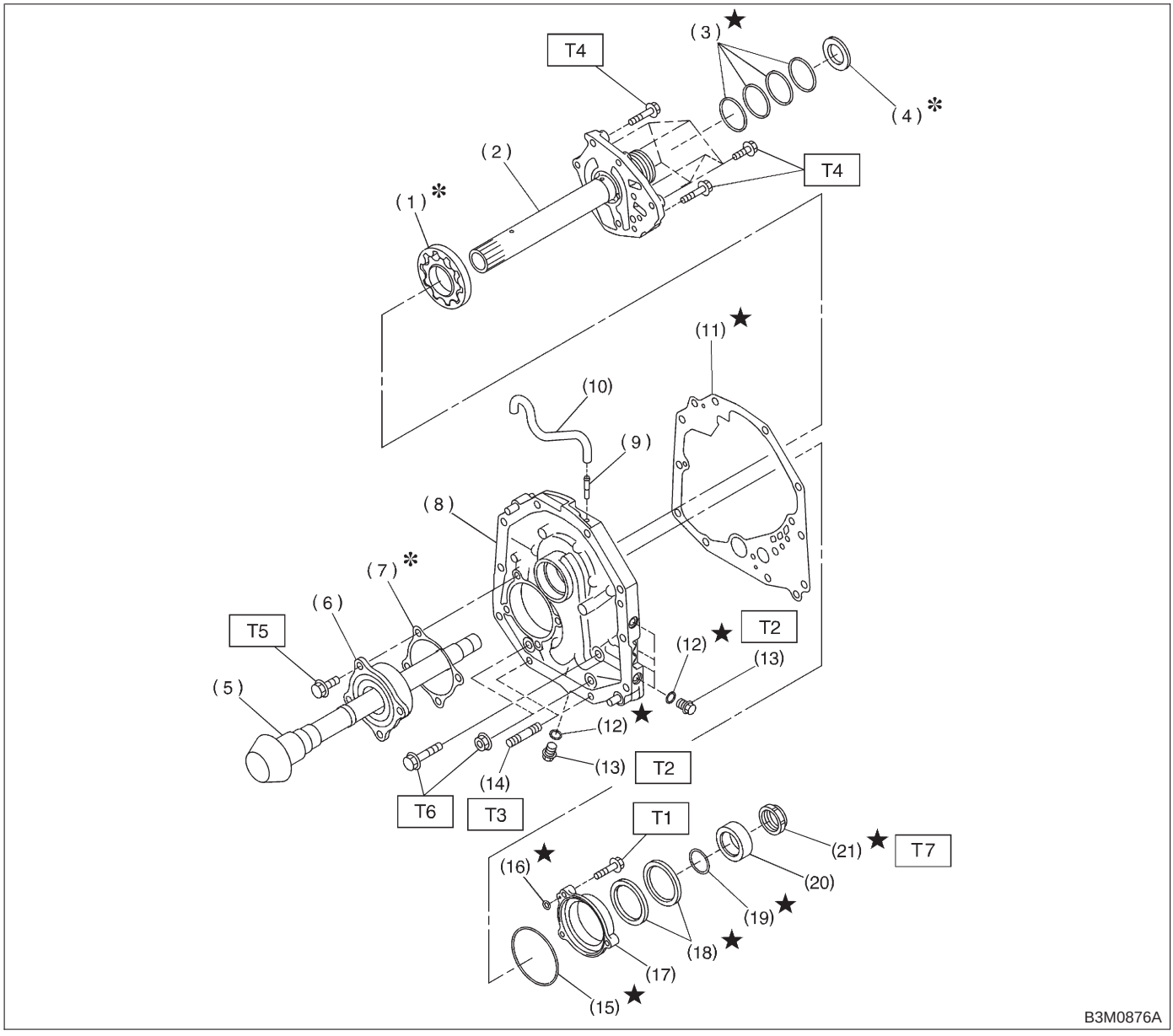


B3M0918A

(1) Pitching stopper bracket
(2) O-ring
(3) Differential oil level gauge
(4) Stay
(5) Seal pipe
(6) Seal ring
(7) Oil pump shaft
(8) Clip
(9) Oil drain pipe
(10) Input shaft
(11) O-ring
(12) Torque converter clutch
(13) Drain plug
(14) Gasket
(15) Oil seal
(16) Torque converter clutch case

Tightening torque: N·m (kg-m, ft-lb)
T1: 18±5 (1.8±0.5, 13.0±3.6)
T2: 41±3 (4.2±0.3, 30.4±2.2)
T3: 44±3 (4.5±0.3, 32.5±2.2)

2. Oil Pump

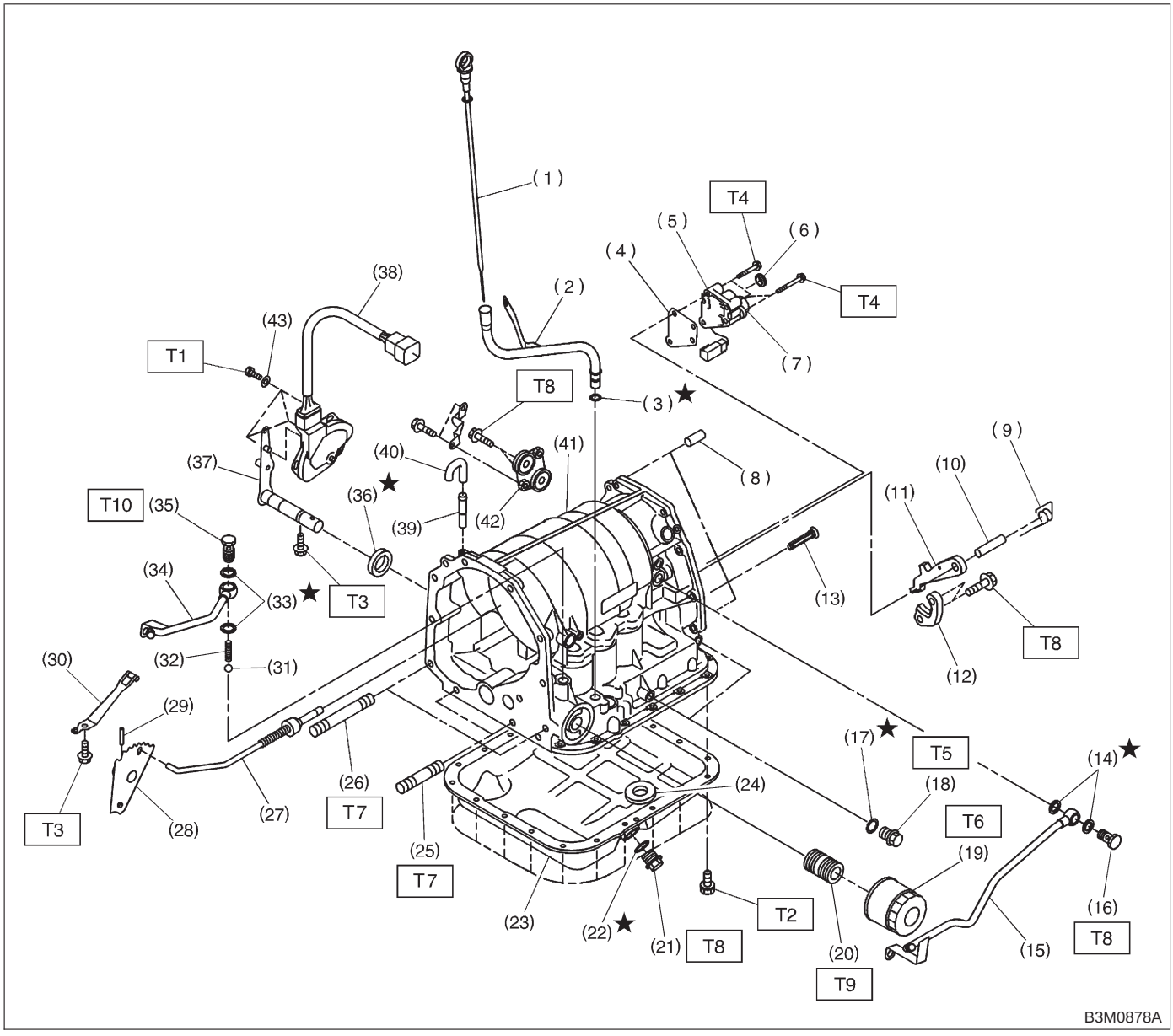


(1) Oil pump rotor
(2) Oil pump cover
(3) Seal ring
(4) Thrust needle bearing
(5) Drive pinion shaft
(6) Roller bearing
(7) Shim
(8) Oil pump housing
(9) Nipple
(10) Air breather hose
(11) Gasket
(12) O-ring
(13) Test plug
(14) Stud bolt
(15) O-ring
(16) O-ring
(17) Oil seal retainer
(18) Oil seal
(19) O-ring
(20) Drive pinion collar
(21) Lock nut

Tightening torque: N·m (kg-m, ft-lb)
T1: 7±1 (0.7±0.1, 5.1±0.7)
T2: 13±1 (1.3±0.1, 9.4±0.7)
T3: 18±5 (1.8±0.5, 13.0±3.6)
T4: 25±2 (2.5±0.2, 18.1±1.4)
T5: 39±3 (4.0±0.3, 28.9±2.2)
T6: 41±3 (4.2±0.3, 30.4±2.2)
T7: 121±5 (12.3±0.5, 89.0±3.6)

MEMO:

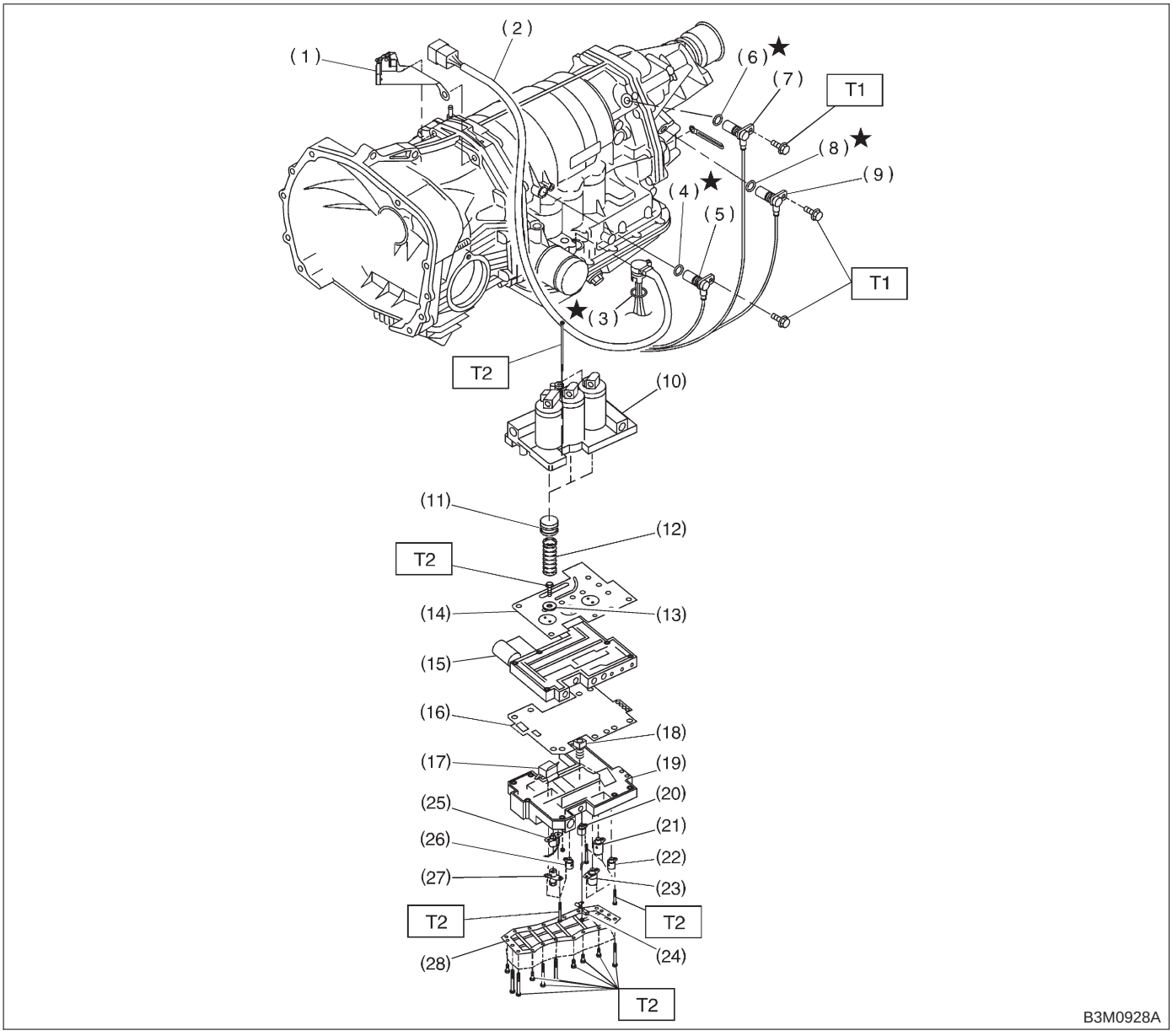
3. Transmission Case and Control Device



(1) Oil level gauge
(2) Oil charger pipe
(3) O-ring
(4) Transfer valve plate
(5) Transfer valve ASSY
(6) Transfer clutch seal
(7) Duty solenoid C (Transfer)
(8) Straight pin
(9) Return spring
(10) Shaft
(11) Parking pawl
(12) Parking support
(13) Inlet filter
(14) Gasket
(15) Inlet pipe
(16) Union screw
(17) O-ring
(18) Test plug
(19) Oil filter
(20) Oil filter stud bolt
(21) Drain plug
(22) Gasket
(23) Oil pan
(24) Magnet
(25) Stud bolt (Short)
(26) Stud bolt (Long)
(27) Parking rod
(28) Manual plate
(29) Spring pin
(30) Detention spring
(31) Ball
(32) Spring
(33) Gasket
(34) Outlet pipe
(35) Union screw
(36) Oil seal
(37) Select lever
(38) Inhibitor switch ASSY
(39) Nipple
(40) Air breather hose
(41) Transmission case
(42) Plate ASSY
(43) Washer

Tightening torque: N·m (kg-m, ft-lb)
T1: 3.4±0.5 (0.35±0.05, 2.5±0.4)
T2: 4.9±0.5 (0.50±0.05, 3.6±0.4)
T3: 5.9±1.0 (0.60±0.10, 4.3±0.7)
T4: 7.8±1.0 (0.80±0.10, 5.8±0.7)
T5: 12.7±1.0 (1.30±0.10, 9.4±0.7)
T6: 13.7±2.0 (1.4±0.2, 10.1±1.4)
T7: 17.7±2.9 (1.80±0.30, 13.0±2.2)
T8: 24.5±2.0 (2.50±0.20, 18.1±1.4)
T9: 24.5±2.9 (2.5±0.3, 18.1±2.2)
T10: 34.3±2.9 (3.50±0.30, 25.3±2.2)

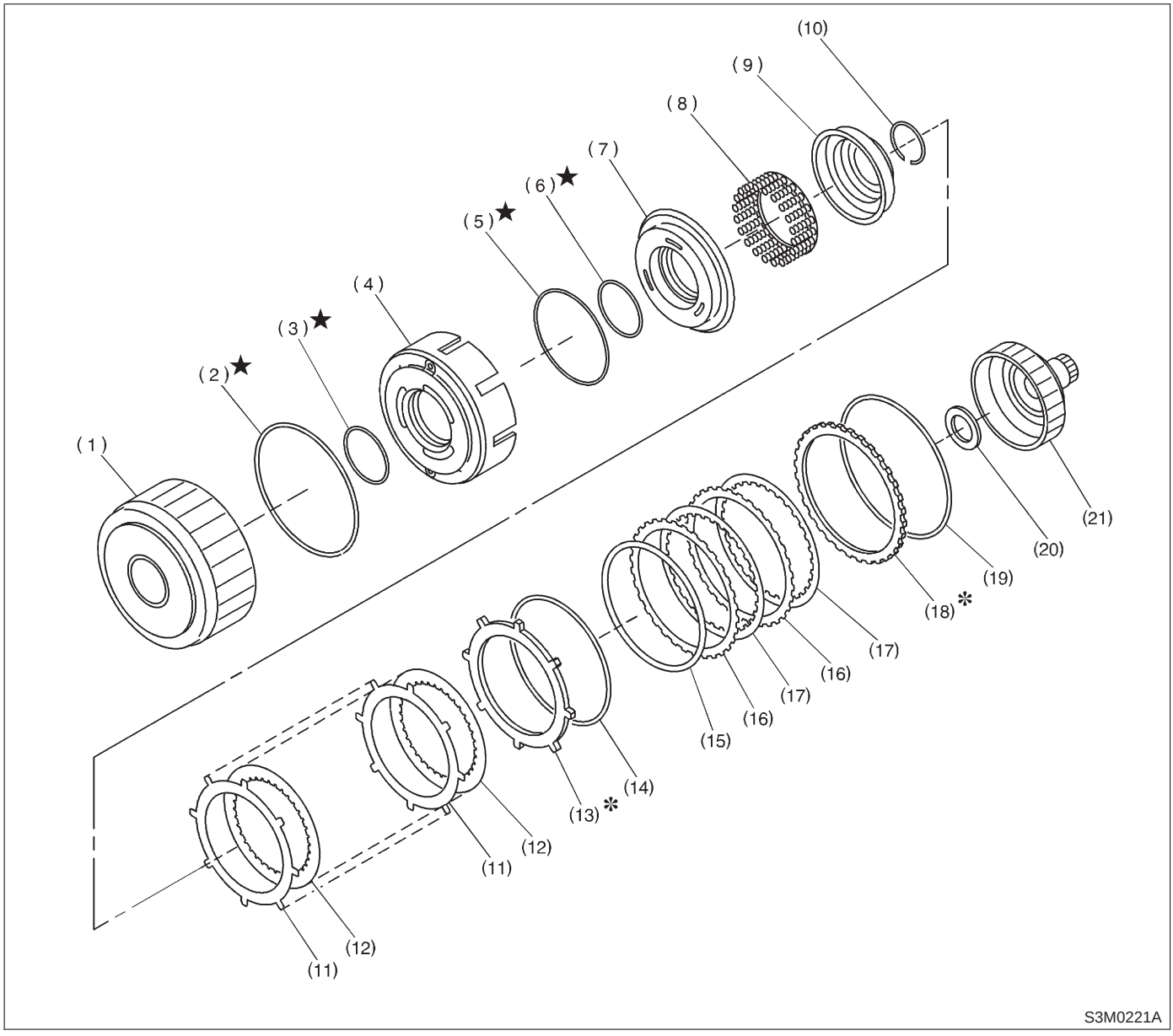
4. Control Valve and Harness Routing



(1) Stay
(2) Transmission harness
(3) O-ring
(4) O-ring
(5) Torque converter turbine speed sensor
(6) O-ring
(7) Vehicle speed sensor 2 (Front)
(8) O-ring
(9) Vehicle speed sensor 1 (Rear)
(10) Upper valve body
(11) Accumulator piston
(12) Accumulator spring
(13) Side plate
(14) Separate plate
(15) Middle valve body
(16) Separate plate
(17) Fluid filter
(18) Fluid filter
(19) Lower valve body
(20) Shift solenoid 2
(21) Shift solenoid 1
(22) 2-4 brake timing solenoid
(23) Duty solenoid D (2-4 brake)
(24) ATF temperature sensor
(25) Duty solenoid A (Line pressure)
(26) Low clutch timing solenoid
(27) Duty solenoid B (Lock-up)
(28) Oil strainer

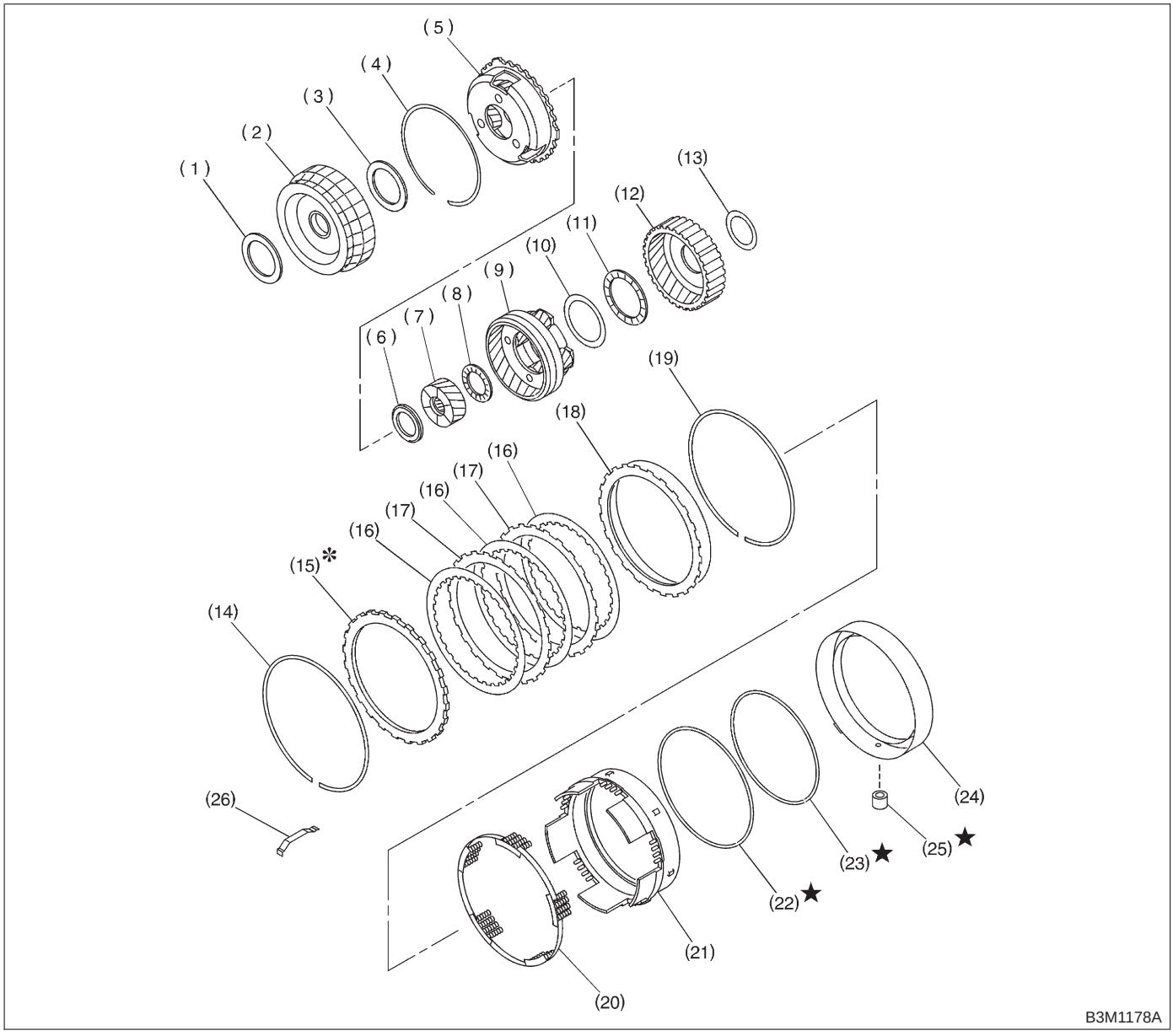
Tightening torque: N·m (kg-m, ft-lb)
T1: 7±1 (0.7±0.1, 5.1±0.7)
T2: 8±1 (0.8±0.1, 5.8±0.7)

5. High Clutch and Reverse Clutch



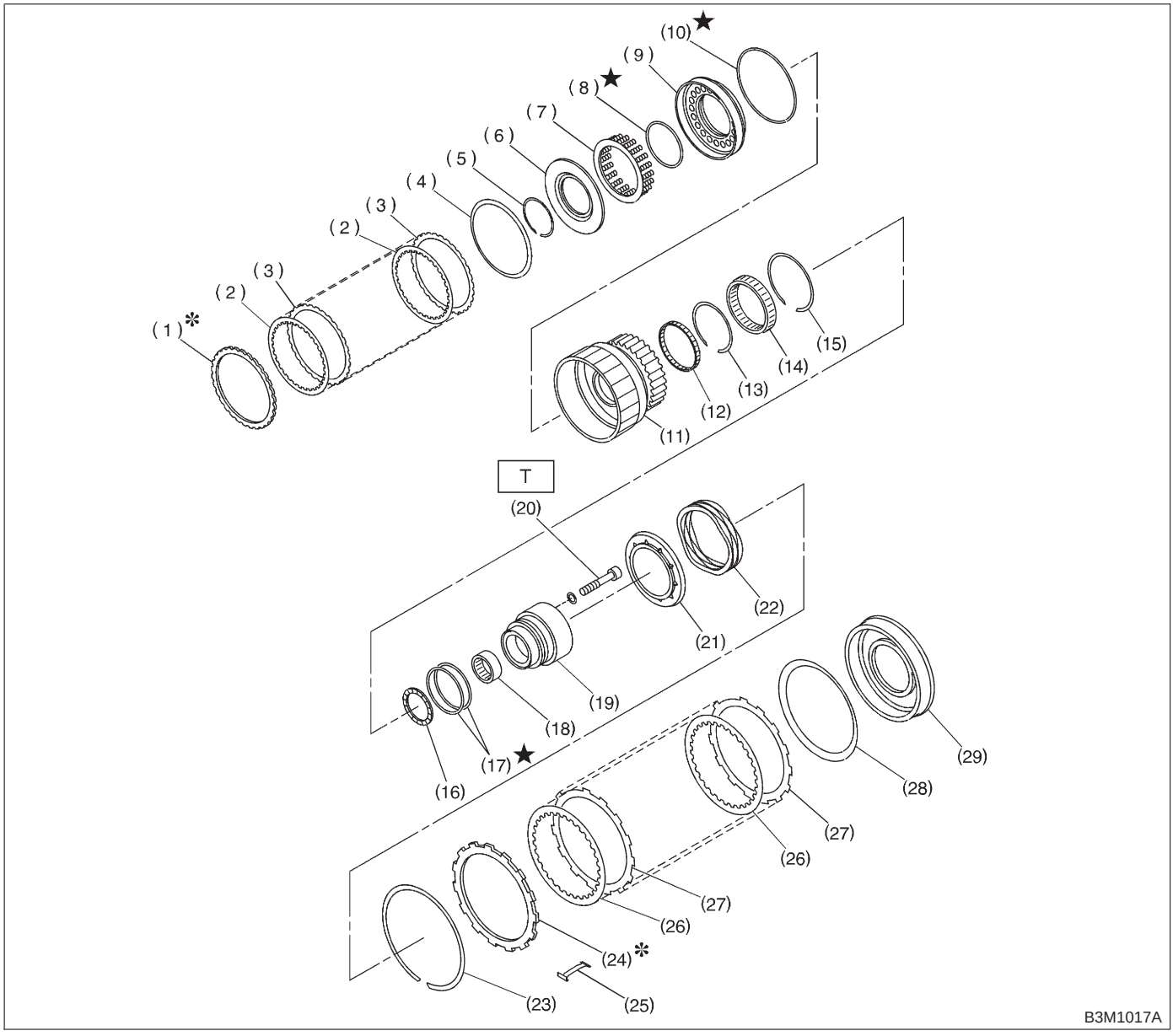
(1) High clutch drum
(2) Lip seal
(3) Lathe cut seal ring
(4) Reverse clutch piston
(5) Lathe cut seal ring
(6) Lathe cut seal ring
(7) High clutch piston
(8) Spring retainer
(9) Cover
(10) Snap ring
(11) Driven plate
(12) Drive plate
(13) Retaining plate
(14) Snap ring
(15) Dish plate
(16) Driven plate
(17) Drive plate
(18) Retaining plate
(19) Snap ring
(20) Thrust needle bearing
(21) High clutch hub

6. Planetary Gear and 2-4 Brake



(1) Thrust needle bearing
(2) Front sun gear
(3) Thrust needle bearing
(4) Snap ring
(5) Front planetary carrier
(6) Thrust needle bearing
(7) Rear sun gear
(8) Thrust needle bearing
(9) Rear planetary carrier
(10) Washer
(11) Thrust needle bearing
(12) Rear internal gear
(13) Washer
(14) Snap ring
(15) Retaining plate
(16) Drive plate
(17) Driven plate
(18) Pressure rear plate
(19) Snap ring
(20) Spring retainer
(21) 2-4 brake piston
(22) Lathe cut seal ring
(23) Lathe cut seal ring
(24) 2-4 brake piston retainer
(25) 2-4 brake seal
(26) Leaf spring

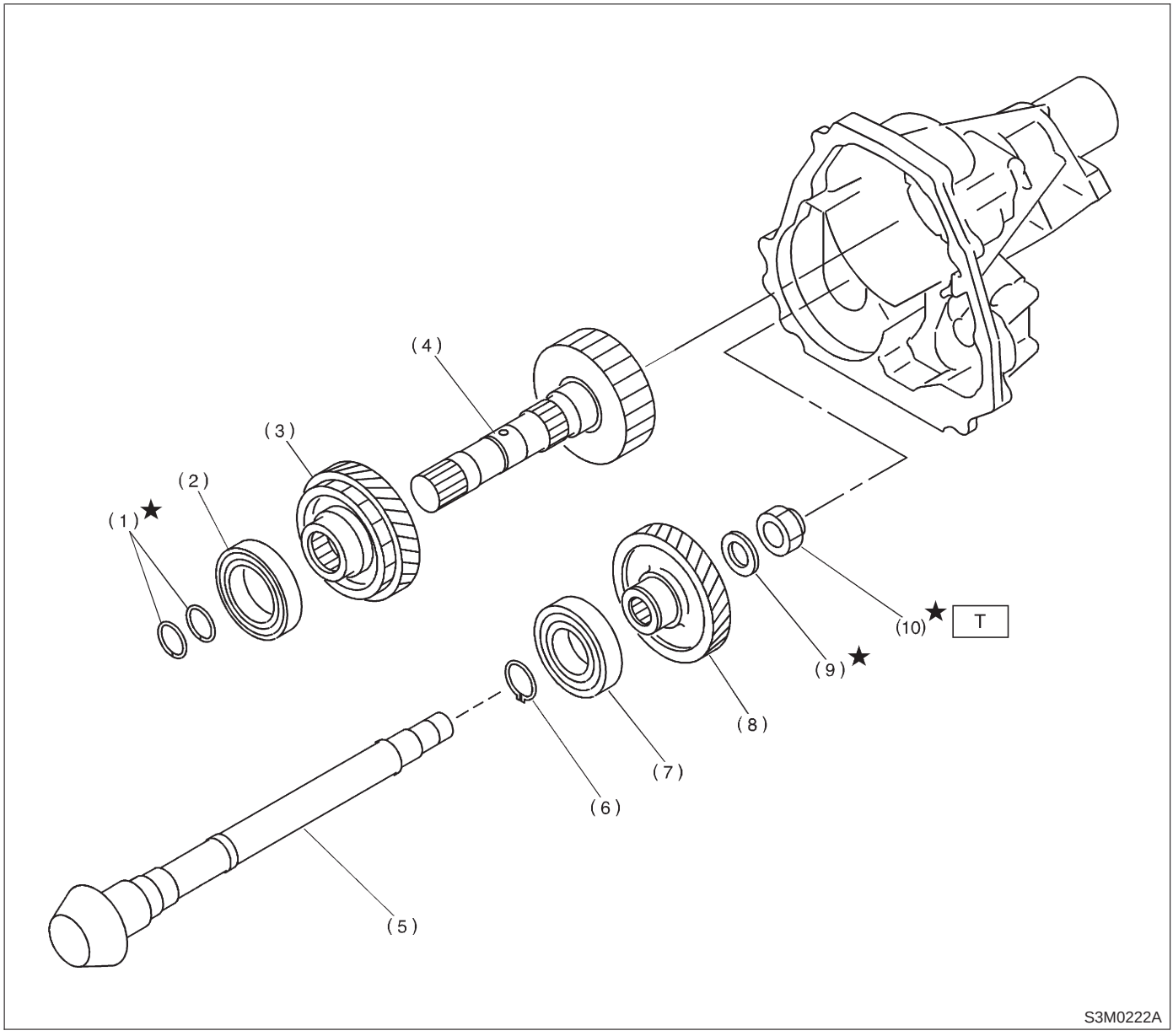
7. Low Clutch and Low & Reverse Brake



(1) Retaining plate
(2) Drive plate
(3) Driven plate
(4) Dish plate
(5) Snap ring
(6) Cover
(7) Spring retainer
(8) Lathe cut seal ring
(9) Low piston
(10) Lathe cut seal ring
(11) Low clutch drum
(12) Needle bearing
(13) Snap ring
(14) One-way clutch
(15) Snap ring
(16) Thrust needle bearing
(17) Seal ring
(18) Needle bearing
(19) One-way clutch inner race
(20) Socket bolt
(21) Spring retainer
(22) Return spring
(23) Snap ring
(24) Retaining plate
(25) Leaf spring
(26) Drive plate
(27) Driven plate
(28) Dish plate
(29) Low and reverse brake piston

Tightening torque: N·m (kg-m, ft-lb)
T: 25±2 (2.5±0.2, 18.1±1.4)

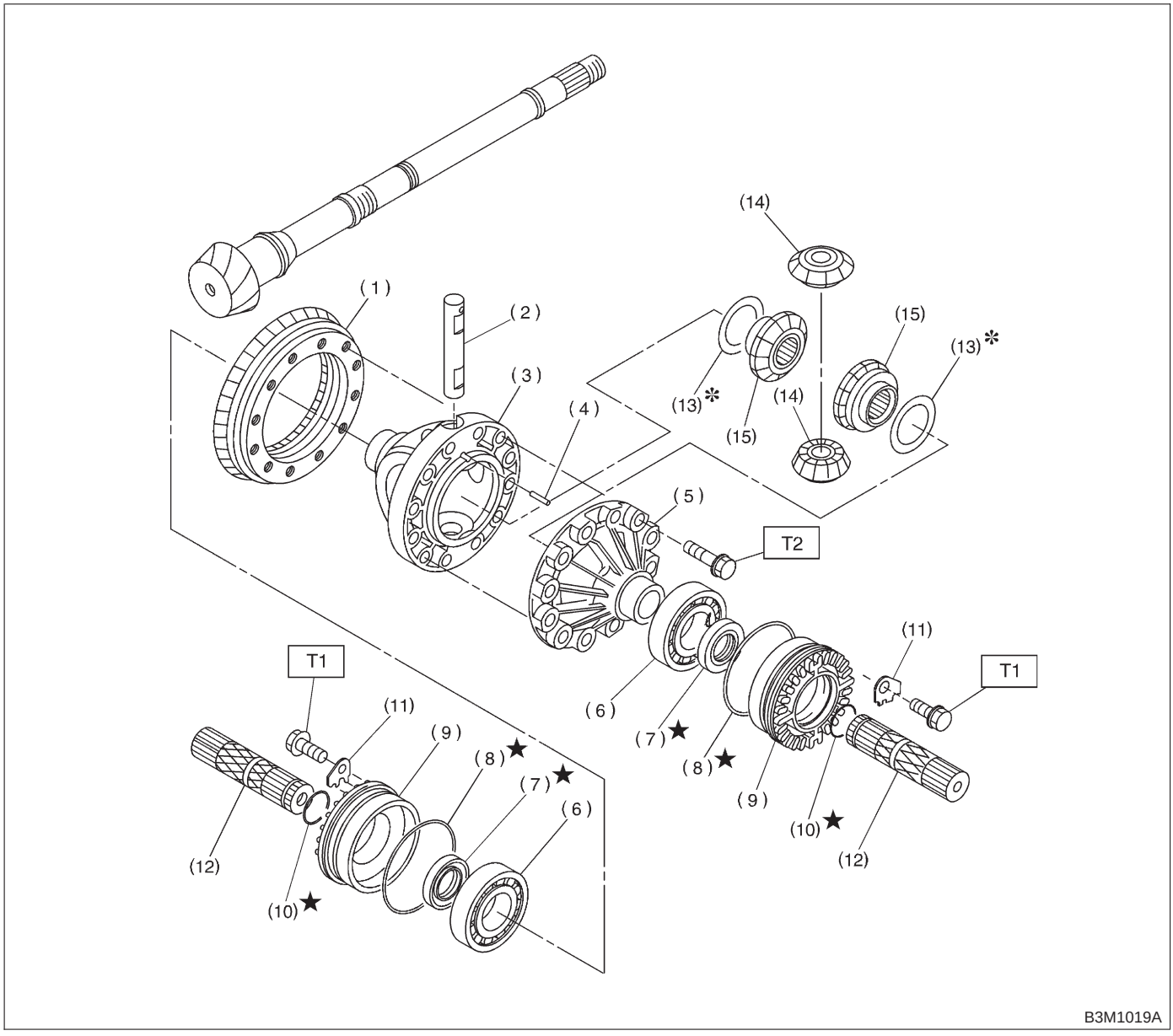
8. Reduction Gear



(1) Seal ring
(2) Ball bearing
(3) Reduction drive gear
(4) Reduction drive shaft
(5) Drive pinion shaft
(6) Snap ring
(7) Ball bearing
(8) Reduction driven gear
(9) Washer
(10) Lock nut

Tightening torque: N·m (kg-m, ft-lb)
T: 100±5 (10.2±0.5, 73.8±3.6)

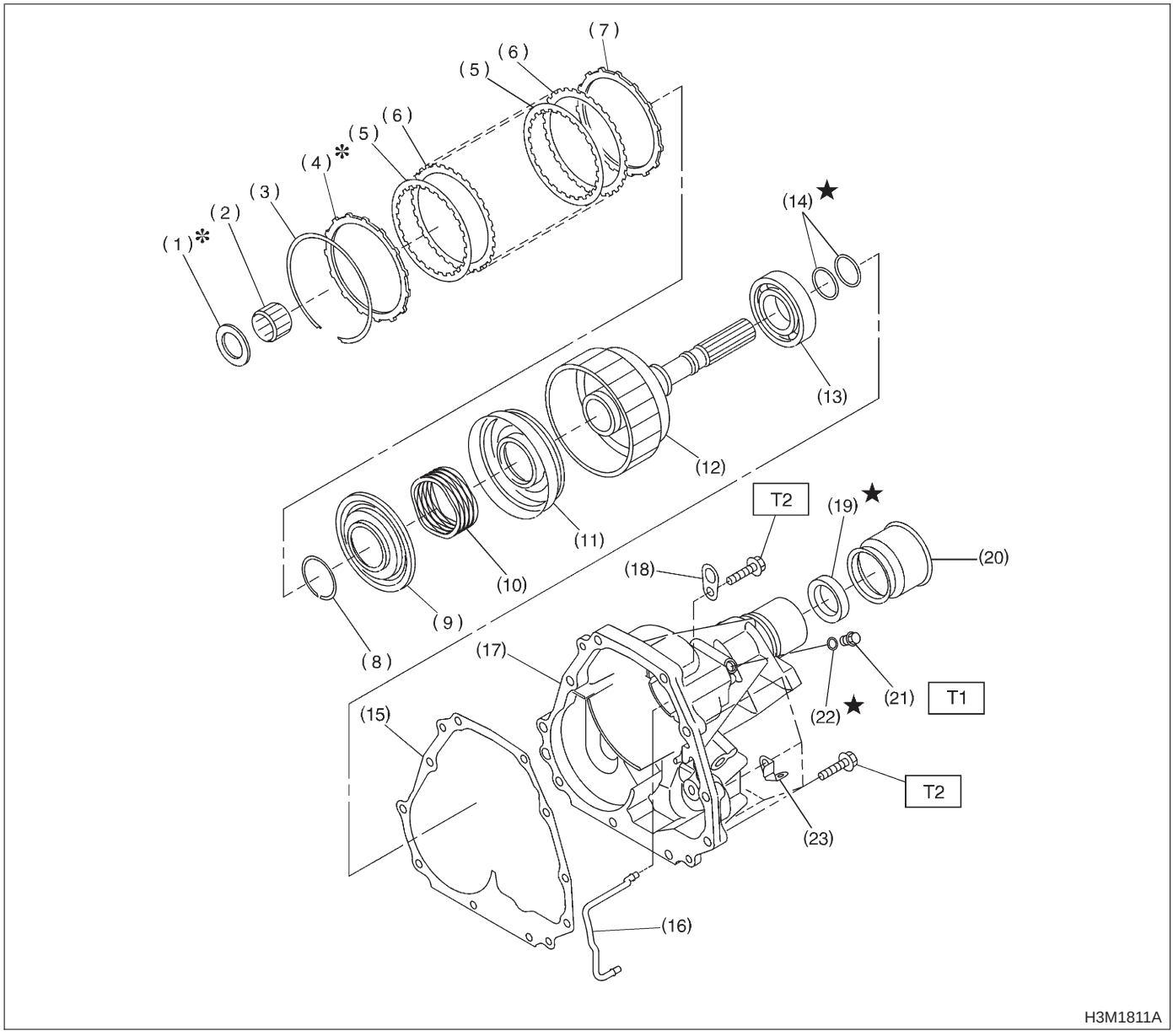
9. Differential Case



(1) Crown gear
(2) Pinion shaft
(3) Differential case (RH)
(4) Straight pin
(5) Differential case (LH)
(6) Taper roller bearing
(7) Oil seal
(8) O-ring
(9) Differential side retainer
(10) Circlip
(11) Lock plate
(12) Axle shaft
(13) Washer
(14) Differential bevel pinion
(15) Differential bevel gear

Tightening torque: N·m (kg-m, ft-lb)
T1: 25±2 (2.5±0.2, 18.1±1.4)
T2: 62±5 (6.3±0.5, 45.6±3.6)

10. Transfer and Extension



(1) Thrust needle bearing
(2) Needle bearing
(3) Snap ring
(4) Pressure plate
(5) Drive plate
(6) Driven plate
(7) Pressure plate
(8) Snap ring
(9) Transfer piston seal
(10) Return spring
(11) Transfer clutch piston
(12) Rear drive shaft
(13) Ball bearing
(14) Seal ring
(15) Gasket
(16) Transfer clutch pipe
(17) Extension case
(18) Transmission hanger
(19) Oil seal
(20) Dust cover
(21) Test plug
(22) O-ring
(23) Clip

Tightening torque: N·m (kg-m, ft-lb)
T1: 13±1 (1.3±0.1, 9.4±0.7)
T2: 25±2 (2.5±0.2, 18.1±1.4)

1. General

A: PRECAUTION

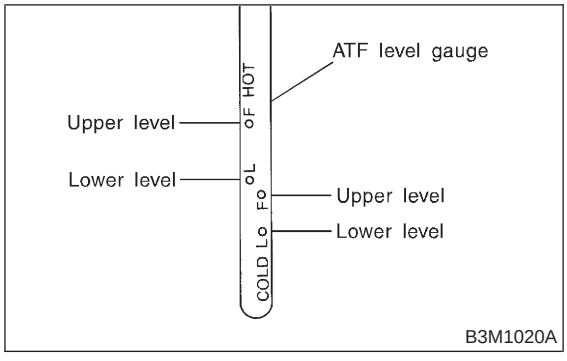
When disassembling or assembling the automatic transmission, observe the following instructions.
1) Workshop
Provide a place that is clean and free from dust. Principally the conventional workshop is suitable except for a dusty place. In a workshop where grinding work, etc. which produces fine particles is done, make independent place divided by the vinyl curtain or the equivalent.
2) Work table
The size of 1 x 1.5 m (40 x 60 in) is large enough to work, and it is more desirable that its surface be covered with flat plate like iron plate which is not rusted too much.
3) Cleaning of exterior
(1) Clean the exterior surface of transmission with steam and/or kerosene prior to disassembly, however it should be noted that vinyl tape be placed on the air breather or oil level gauge to prevent infiltration of the steam into the transmission and also the cleaning job be done away from the place of disassembly and assembly.
(2) Partial cleaning will do, depending on the extent of disassembly (such as when disassembly is limited to some certain parts).
4) Disassembly, assembly and cleaning
(1) Disassemble and assemble the transmission while inspecting the parts in accordance with the Diagnostics.
(2) During job, do not use gloves. Do not clean the parts with rags: Use chamois or nylon cloth.
(3) Pay special attention to the air to be used for cleaning. Get the moisture and the dust rid of the air as much as possible. Be careful not to scratch or dent any part while checking for proper operation with an air gun.
(4) Complete the job from cleaning to completion of assembly as continuously and speedily as possible in order to avoid occurrence of secondary troubles caused by dust. When stopping the job unavoidably cover the parts with clean chamois or nylon cloth to keep them away from any dust.
(5) Use kerosene, white gasoline or the equivalent as washing fluid. Use always new fluid for cleaning the automatic transmission parts and never reuse. The used fluid is usable in disassemble and assemble work of engine and manual transmission.
(6) Although the cleaning should be done by dipping into the washing fluid or blowing of the pressurized washing fluid, the dipping is more desirable. (Do not rub with a brush.) Assemble the parts immediately after the cleaning without exposure to the air for a while. Besides in case of washing rubber parts, perform the job quickly not to dip them into the washing fluid for long time.
(7) Apply the automatic transmission fluid (ATF) onto the parts immediately prior to assembly, and the specified tightening torque should be observed carefully.
(8) Use vaseline if it is necessary to hold parts in the position when assembling.
(9) Drain ATF and differential gear oil into a saucer so that the conditions of fluid and oil can be inspected.
(10) Do not support axle drive shaft, stator shaft, input shaft or various pipes when moving transmission from one place to another.
(11) Always discard old oil seals and O-ring, and install new ones.
(12) Always discard old oil seals and O-ring, and install new ones.
(13) Be sure to replace parts which are damaged, worn, scratched, discolored, etc.

B: INSPECTION

1. ATF LEVEL

1) Raise ATF temperature to 60 to 80°C (140 to 176°F) from 40 to 60°C (104 to 140°F) (when cold) by driving a distance of 5 to 10 km (3 to 6 miles).

NOTE:
The level of ATF varies with fluid temperature. Pay attention to the fluid temperature when checking oil level.



2) Make sure the vehicle is level. After selecting all positions (P, R, N, D, 3, 2, 1), set the selector leveler in “P” range. Measure fluid level with the engine idling.

NOTE:
After running, idle the engine for one or two minutes before measurement.

3) If the fluid level is below the center between upper and lower marks, add the recommended ATF until the fluid level is found within the specified

range (above the center between upper and lower marks). When the transmission is hot, the level should be above the center of upper and lower marks, and when it is cold, the level should be found below the center of these two marks.

CAUTION:
- **Use care not to exceed the upper limit level.**
- **ATF level varies with temperature. Remember that the addition of fluid to the upper limit mark when the transmission is cold will result in the overfilling of fluid.**

4) Fluid temperature rising speed
- By idling the engine

Time for temperature rise to 60°C (140°F) with atmospheric temperature of 0°C (32°F): More than 25 minutes
<Reference>
Time for temperature rise to 30°C (86°F) with atmospheric temperature of 0°C (32°F): Approx. 8 minutes
- By running the vehicle

Time for temperature rise to 60°C (140°F) with atmospheric temperature of 0°C (32°F): More than 10 minutes

5) Method for checking fluid level upon delivery or at periodic inspection

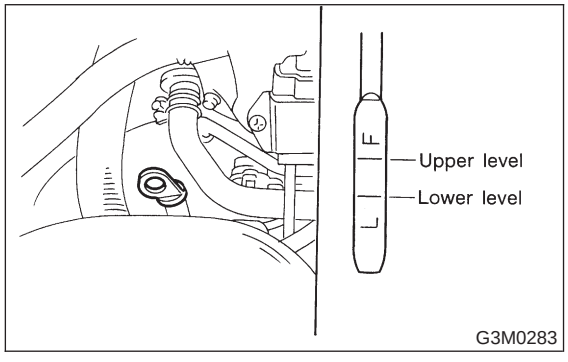
Check fluid level after a warm-up run of approx. 10 minutes. During the warm-up period, the automatic transmission functions can also be checked.

2. DIFFERENTIAL GEAR OIL LEVEL

1) Ensure the vehicle is in safe condition.

NOTE:
Do not check the oil level nor add oil to the case with the front end of the vehicle jacked-up; this will result in an incorrect reading of the oil level.

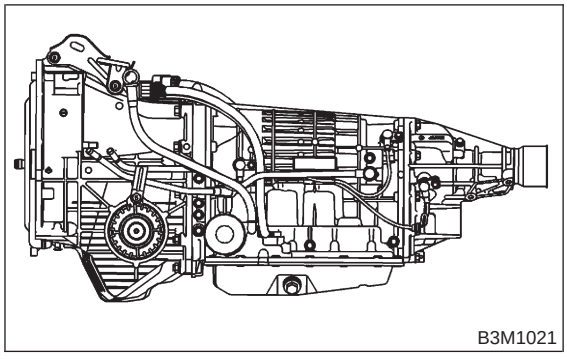
2) Check whether the oil level is between the upper (F) and lower (L) marks. If it is below the lower limit mark, add oil until the level reaches the upper mark.



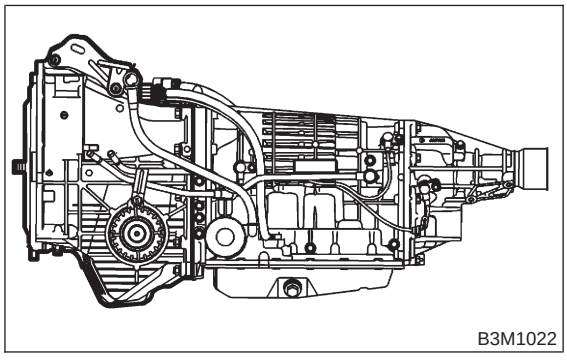
3. OIL LEAKAGE

It is difficult to accurately determine the precise position of a oil leak, since the surrounding area also becomes wet with oil. The places where oil seals and gaskets are used are as follows:

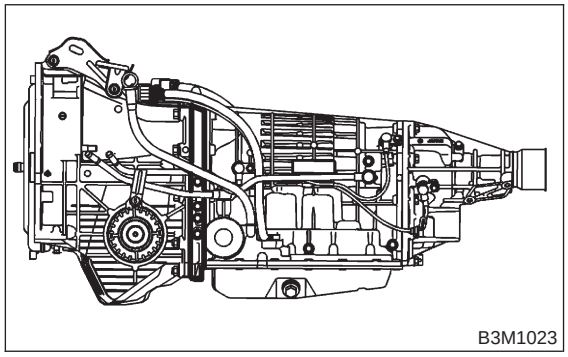
1) Jointing portion of the case
- Transmission case and oil pump housing jointing portion
- Torque converter clutch case and oil pump housing jointing portion
- Transmission case and extension case jointing portion



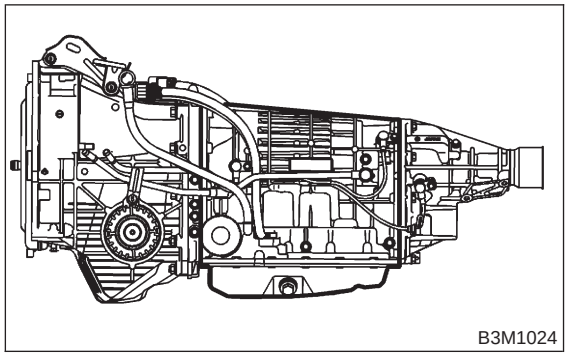
2) Torque converter clutch case
- Engine crankshaft oil seal
- Torque converter clutch impeller sleeve oil seal
- ATF cooler pipe connector
- Torque converter clutch
- Torque converter clutch case
- Axle shaft oil seal
- O-ring on the outside diameter of axle shaft oil seal holder
- O-ring on the differential oil gauge
- Differential oil drain plug
- Location of steel balls



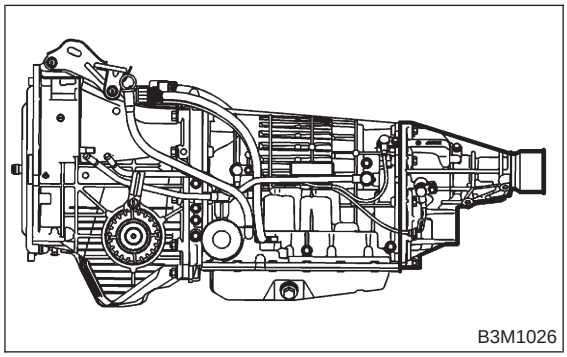
3) Oil pump housing
- Oil pump housing (Defective casting)
- O-ring on the test plugs
- Differential gear breather


B3M1023

4) Automatic transmission case
- Transmission case (Defective casting)
- Mating surface of oil pan
- O-ring on the test plugs
- Oil supply pipe connector
- ATF cooler pipe connector and gasket
- Oil pan drain plug
- O-ring on the transmission harness holder
- Oil pump plugs
- ATF breather
- Shift lever oil seal
- O-ring on the vehicle speed sensor 2 (Front)
- O-ring on the turbine revolution sensor
- ATF filter oil seal


B3M1024

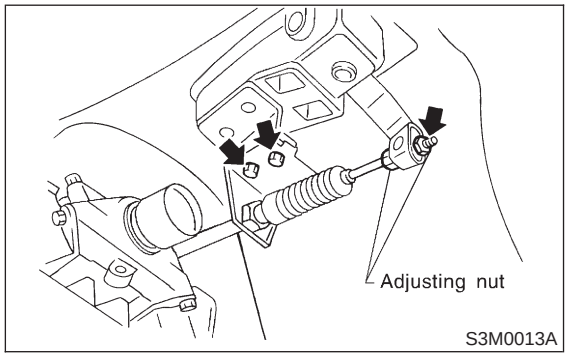
5) Extension case
- Extension case (Defective casting)
- O-ring on the vehicle speed sensor 1 (Rear)
- Rear drive shaft oil seal
- O-ring on the test plugs


B3M1026

2. Inhibitor Switch

A: INSPECTION

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

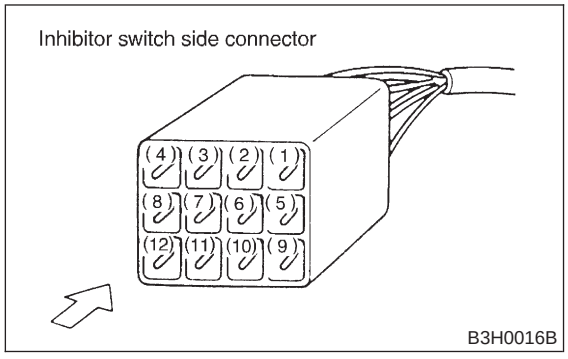


1) Disconnect cable end from select lever.
2) Disconnect inhibitor switch connector.
3) Check continuity in inhibitor switch circuits with select lever moved to each position.

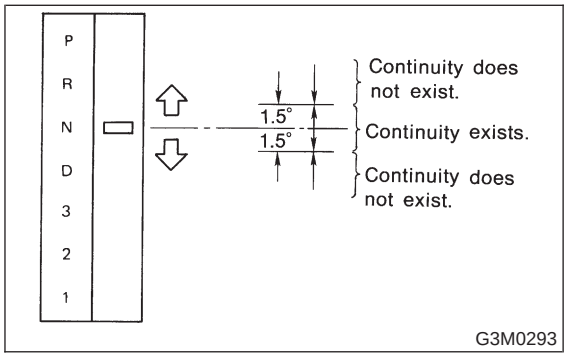
CAUTION:
Also check that continuity in ignition circuit does not exist when select lever is in R, D, 3, 2 and 1 ranges.

NOTE:
If inhibitor switch is inoperative, check for poor contact of connector on transmission side.

	Position	Pin No.
Signal sent to TCM	P	4 — 3
	R	4 — 2
	N	4 — 1
	D	4 — 8
	3	4 — 7
	2	4 — 6
	1	4 — 5
Ignition circuit	P/N	12 — 11
Back-up light circuit	R	10 — 9

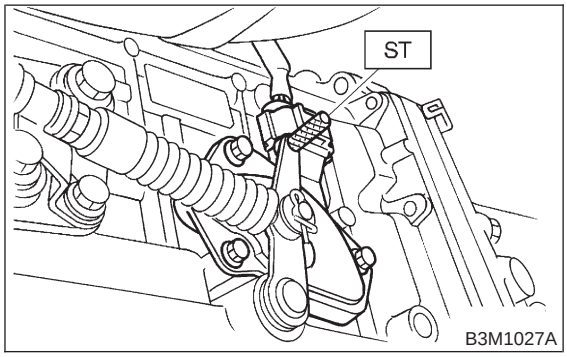


4) Check if there is continuity at equal points when the select lever is turned 1.5° in both directions from the N range.
If there is continuity in one direction and the continuity in the other or if there is continuity at unequal points, adjust the inhibitor switch.



B: ADJUSTMENT

1) Loosen the three inhibitor switch securing bolts.
2) Shift the select lever to the N range.
3) Insert ST as vertical as possible into the holes in the inhibitor switch lever and switch body.
ST 499267300 STOPPER PIN



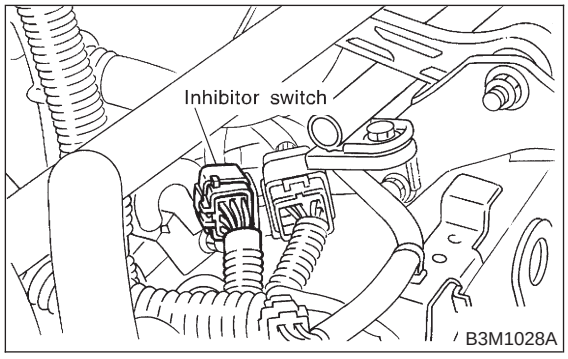
4) Tighten the three inhibitor switch bolts.

Tightening torque:
3.4±0.5 N·m (0.35±0.05 kg-m, 2.5±0.4 ft-lb)

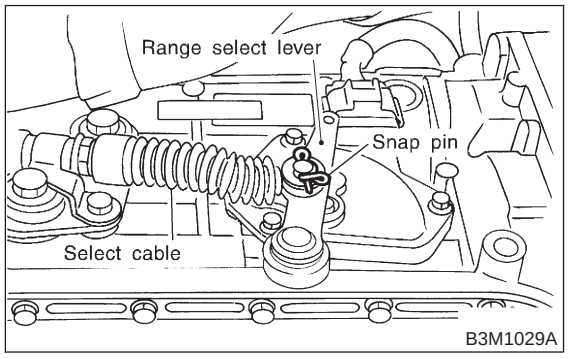
5) Repeat the above checks. If the inhibitor switch is determined to be “faulty”, replace it.

C: REMOVAL

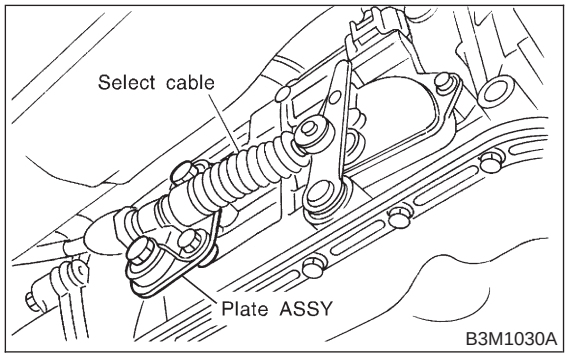
1) Move select lever to neutral position.
2) Remove air intake chamber and duct. (Except 2200 cc California spec. vehicles) <Ref. to 2-7 [W1A0].>
3) Remove air cleaner case and duct. (2200 cc California spec. vehicles) <Ref. to 2-7 [W1A0].> and <Ref. to 2-7 [W18A0].>
4) Disconnect inhibitor switch connector.



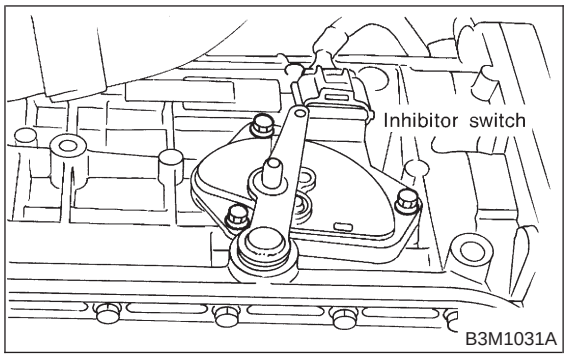
5) Remove front and center exhaust pipe. <Ref. to 2-9 [W1A0].>
6) Remove snap pin from range select lever.



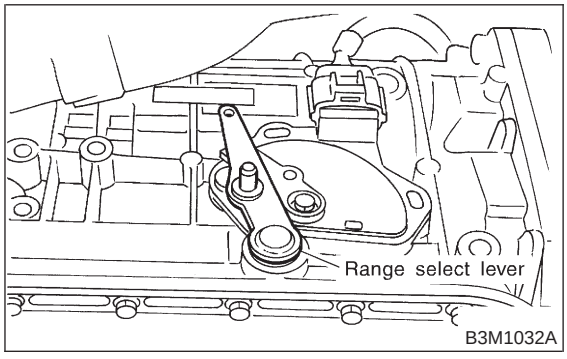
7) Remove plate assembly from transmission case.



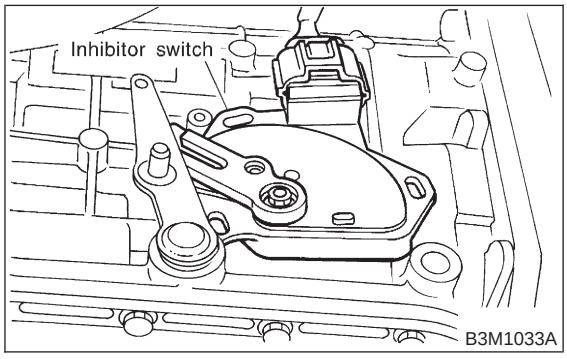
8) Remove bolts.



9) Move range select lever to parking position (left side).

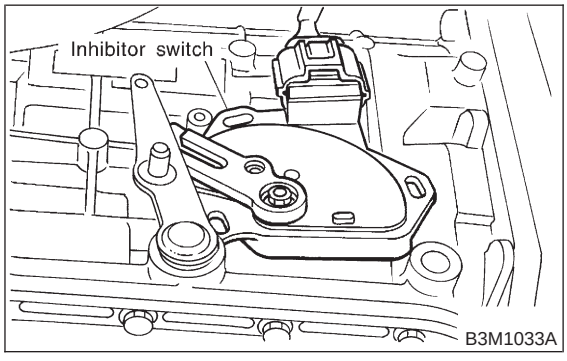


10) Remove inhibitor switch from transmission.

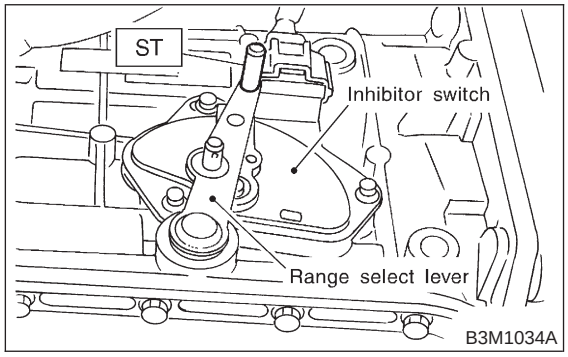


D: INSTALLATION

1) Install inhibitor switch to transmission case.

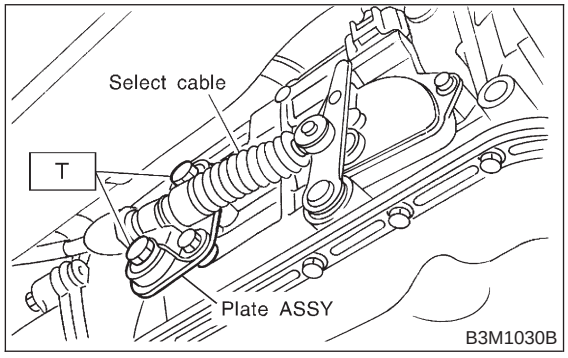


2) Move range select lever to neutral position.
3) Using ST, tighten bolts of inhibitor switch. <Ref. to 3-2 [W2B0].>
ST 499267300 STOPPER PIN

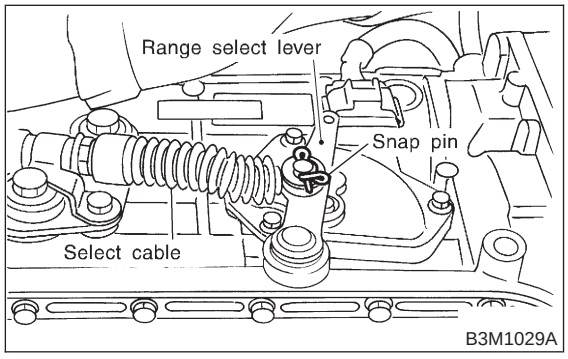


4) Install select cable to range select lever.
5) Install plate assembly to transmission.

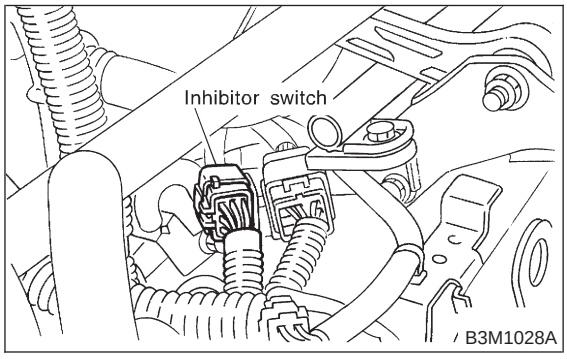
Tightening torque:
T: 24.5±2.0 N·m (2.50±0.20 kg-m, 18.1±1.4 ft-lb)



6) Install snap pin to range select lever.



7) Install front and center exhaust pipe. <Ref. to 2-9 [W1B0].>
8) Connect inhibitor switch connector.

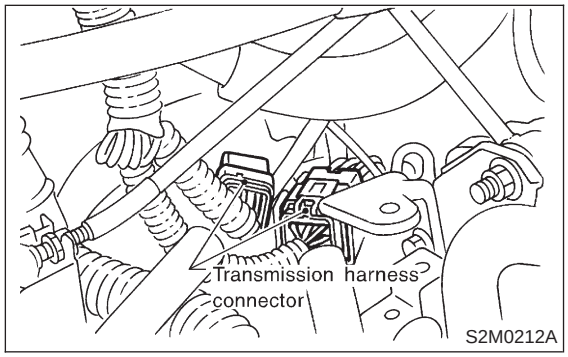


9) Install air intake chamber and duct. (Except 2200 cc California spec. vehicles) <Ref. to 2-7 [W1A0].>
10) Install air cleaner case and duct. (2200 cc California spec. vehicles) <Ref. to 2-7 [W1A0].> and <Ref. to 2-7 [W18A0].>

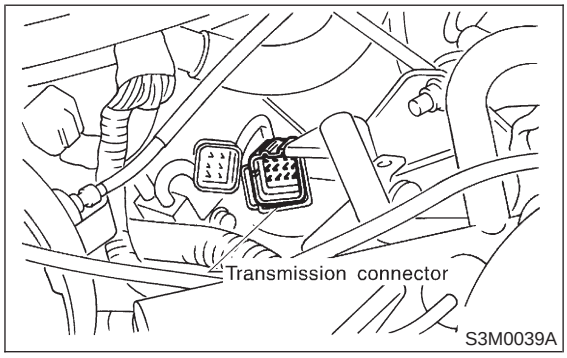
3. Sensor (in transmission)

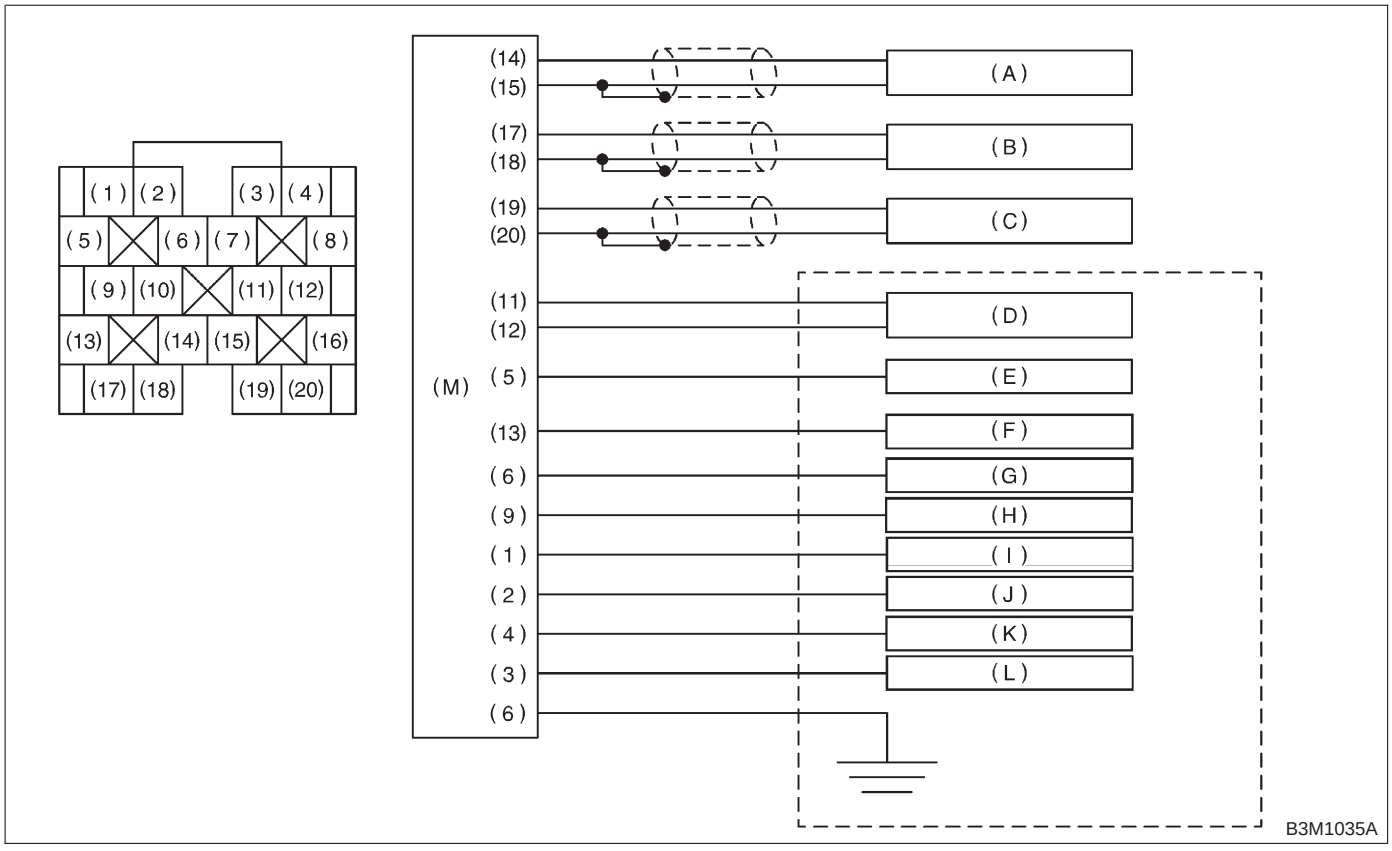
A: INSPECTION

1) Remove air intake chamber and duct.
2) Disconnect transmission connector.



3) Check each sensor, solenoid and ground system for short circuits.





(A) Torque converter turbine speed sensor
(B) Vehicle speed sensor 2 (Front)
(C) Vehicle speed sensor 1 (Rear)
(D) ATF temperature sensor
(E) Duty solenoid A (Line pressure)
(F) Duty solenoid B (Lock-up)
(G) Duty solenoid C (Transfer)
(H) Duty solenoid D (2-4 brake)
(I) Shift solenoid 1
(J) Shift solenoid 2
(K) 2-4 brake timing solenoid
(L) Low clutch timing solenoid
(M) Transmission connector

1. EVALUATION

NOTE:
If part is faulty, its resistance value will be different from the standard value indicated.

Part name	Terminal	Resistance (Ω)
Vehicle speed sensor 1	17 — 18	450 — 650
Vehicle speed sensor 2	19 — 20	450 — 650
ATF temperature sensor	11 — 12	2,100 — 2,900/ 20°C (68°F) 275 — 375/ 80°C (176°F)
Torque converter turbine speed sensor	14 — 15	450 — 650
Shift solenoid 1	1 — 16	10 — 17
Shift solenoid 2	2 — 16	10 — 17
Duty solenoid A (Line pressure solenoid)	5 — 16	2.0 — 4.5
Duty solenoid B (Lock-up solenoid)	13 — 16	10 — 17
Duty solenoid D (2-4 brake solenoid)	9 — 16	2.0 — 4.5
Low clutch timing solenoid	3 — 16	10 — 16
2-4 brake timing solenoid	4 — 16	10 — 16
Duty solenoid C (Transfer clutch solenoid)	6 — 16	10 — 17

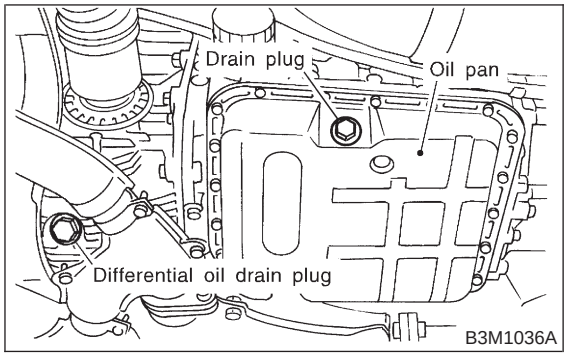
4. Shift Solenoid, Duty Solenoid and Valve

A: REMOVAL

1) Clean transmission exterior.
2) Drain ATF completely.

NOTE:
Tighten ATF drain plug after draining ATF.

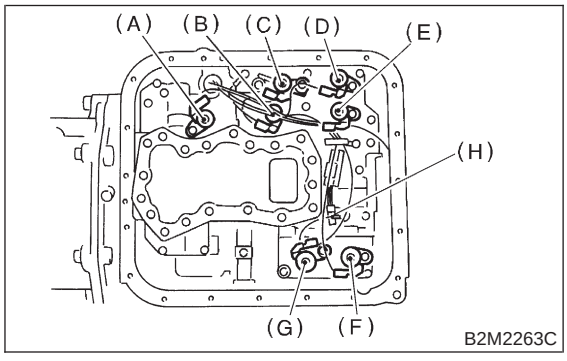
Tightening torque:
25±2 N·m (2.5±0.2 kg-m, 18.1±1.4 ft-lb)



3) Remove oil pan.

NOTE:
Drain oil into a container.

4) Disconnect solenoid and sensor connectors.
Remove connectors from clip and disconnect connectors at 8 places.

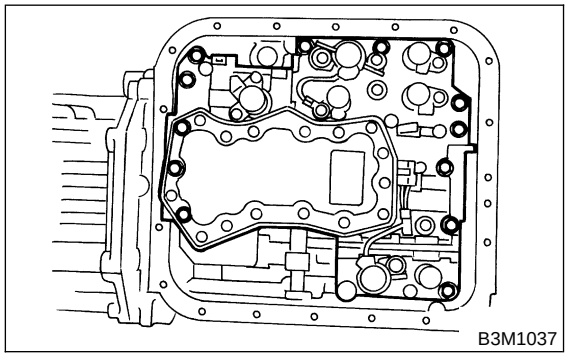


(A) Lock-up duty solenoid (Blue)
(B) Low clutch timing solenoid (Gray)
(C) Line pressure duty solenoid (Red)
(D) Shift solenoid 2 (Yellow)
(E) Shift solenoid 1 (Green)
(F) 2-4 brake timing solenoid (Black)
(G) 2-4 brake duty solenoid (Red)
(H) ATF temperature sensor

5) Remove control valve body.

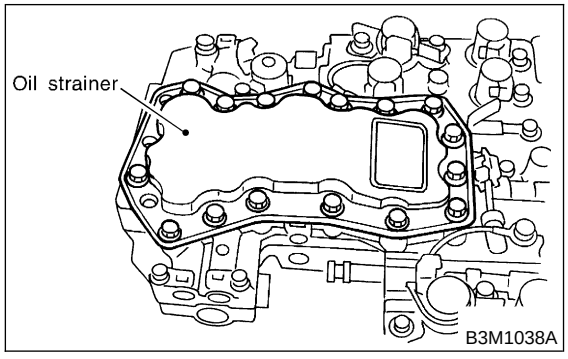
CAUTION:
When removing control valve body, be careful not to interfere with transfer duty solenoid C wiring.

NOTE:
Be careful because oil flows from valve body.

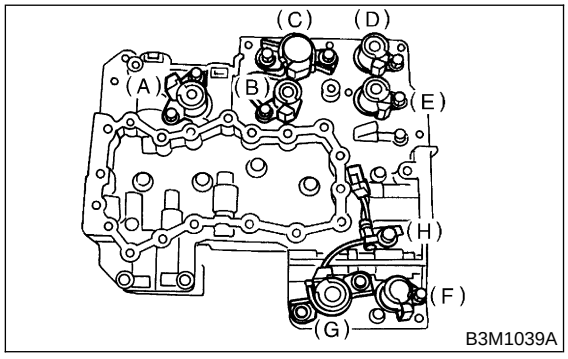


6) Remove oil strainer.

NOTE:
Be careful because oil flows from oil strainer.



7) Remove solenoids and duty solenoids.

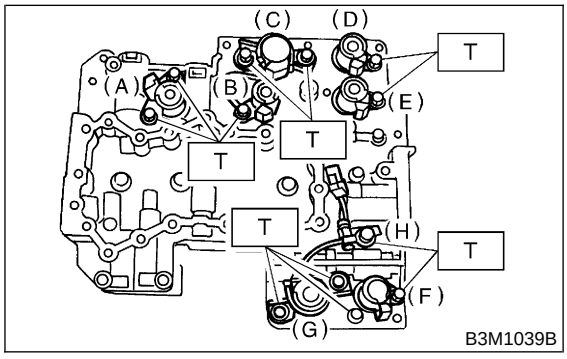


(A) Lock-up duty solenoid (Blue)
(B) Low clutch timing solenoid (Gray)
(C) Line pressure duty solenoid (Red)
(D) Shift solenoid 2 (Yellow)
(E) Shift solenoid 1 (Green)
(F) 2-4 brake timing solenoid (Black)
(G) 2-4 brake duty solenoid (Red)
(H) ATF temperature sensor

B: INSTALLATION

1) Install 7 solenoids and ATF temperature sensor.

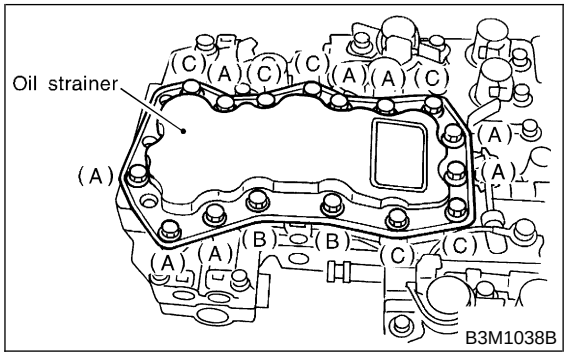
Tightening torque:
T: 8±1 N·m (0.8±0.1 kg-m, 5.8±0.7 ft-lb)



(A) Lock-up duty solenoid (Blue)
(B) Low clutch timing solenoid (Gray)
(C) Line pressure duty solenoid (Red)
(D) Shift solenoid 2 (Yellow)
(E) Shift solenoid 1 (Green)
(F) 2-4 brake timing solenoid (Black)
(G) 2-4 brake duty solenoid (Red)
(H) ATF temperature sensor

2) Install oil strainer.

Tightening torque:
8±1 N·m (0.8±0.1 kg-m, 5.8±0.7 ft-lb)



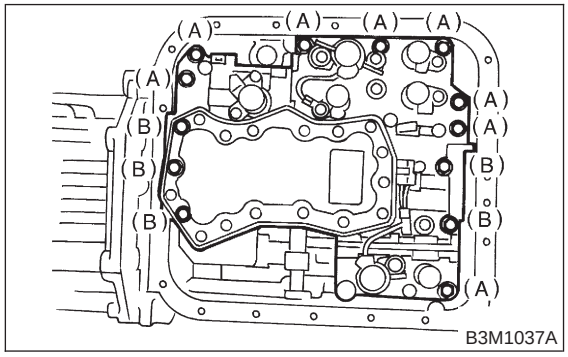
(A) Short bolt
(B) Middle bolt
(C) Long bolt

3) Install valve body to transmission case.
(1) Temporarily tighten the valve body on the transmission case.

CAUTION:
When installing control valve body, be careful not to interfere with transfer duty solenoid wiring (brown).

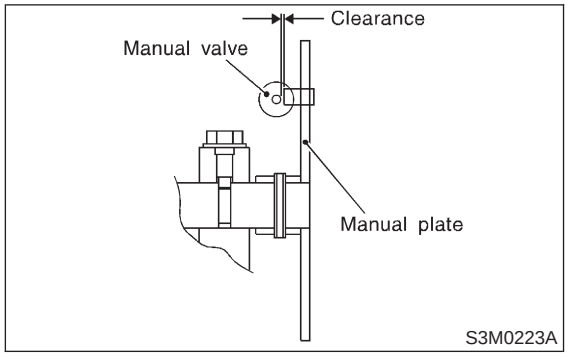
NOTE:
Align manual valve connections.

Tightening torque:
8±1 N·m (0.8±0.1 kg-m, 5.8±0.7 ft-lb)



(A) Short bolts
(B) Long bolts

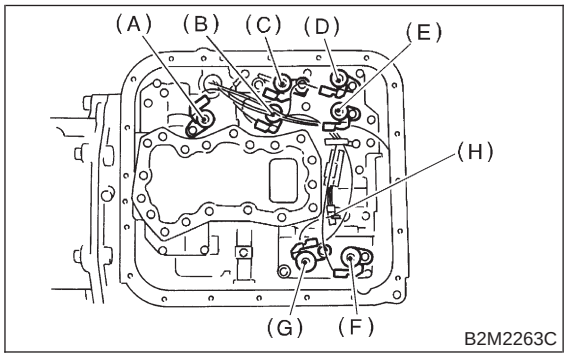
(2) Adjust the clearance between the manual valve and manual plate in the 0.1 to 0.9 mm (0.004 to 0.035 in) range.



(3) Tighten the valve body to the specified torque.

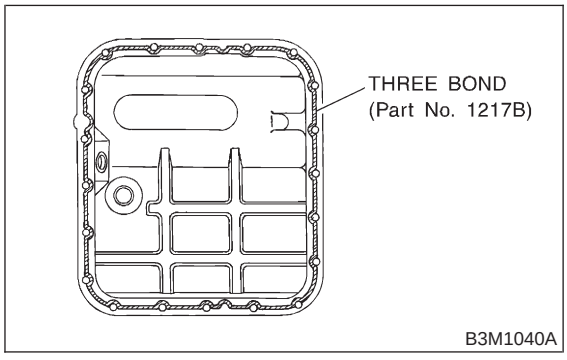
Tightening torque:
8±1 N·m (0.8±0.1 kg-m, 5.8±0.7 ft-lb)

4) Connect harness connectors at 8 places.
Connect connectors of same color, and secure connectors to valve body using clips.



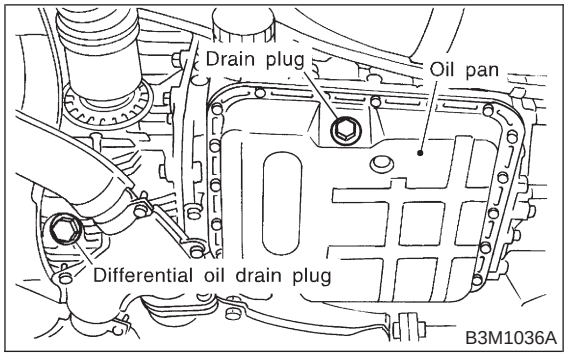
(A) Lock-up duty solenoid (Blue)
(B) Low clutch timing solenoid (Gray)
(C) Line pressure duty solenoid (Red)
(D) Shift solenoid 2 (Yellow)
(E) Shift solenoid 1 (Green)
(F) 2-4 brake timing solenoid (Black)
(G) 2-4 brake duty solenoid (Red)
(H) ATF temperature sensor

5) Apply proper amount of liquid gasket (THREE BOND Part No. 1217B) to the entire oil pan mating surface.

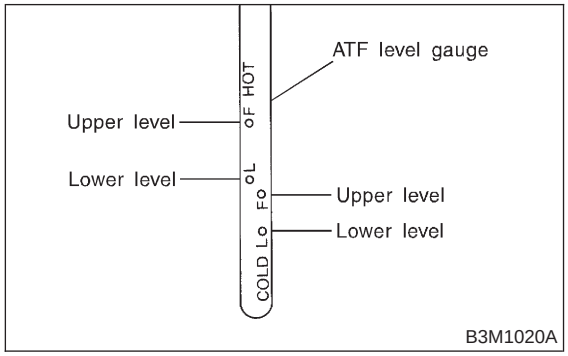


6) Install oil pan.

Tightening torque:
4.9±0.5 N·m (0.50±0.05 kg-m, 3.6±0.4 ft-lb)



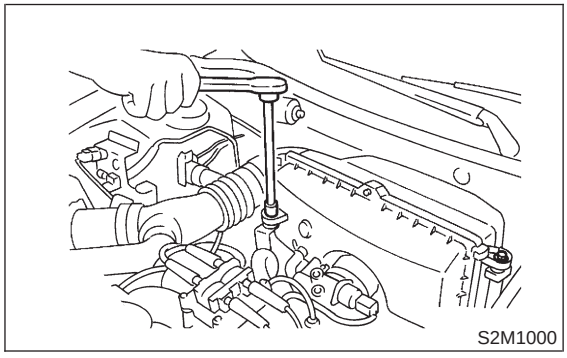
7) Add ATF and check level.



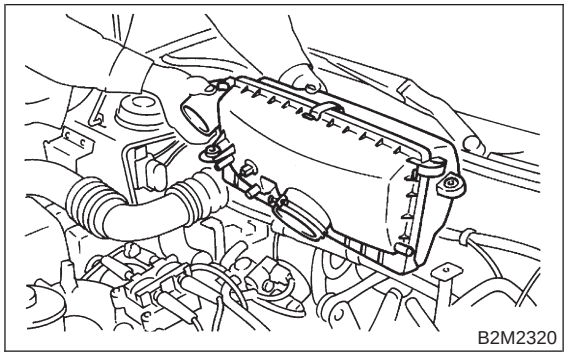
5. Duty Solenoid C and Transfer Valve Body

A: REMOVAL

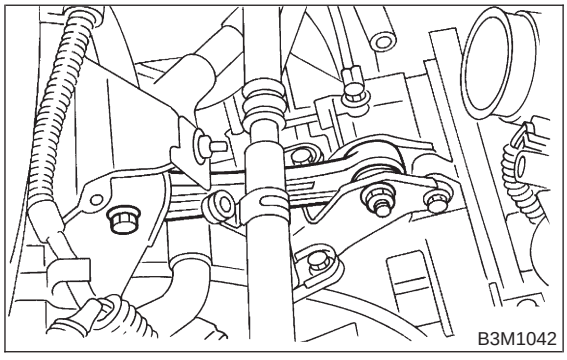
1) Remove air intake duct and chamber. (Except 2200 cc California spec. vehicles)
<Ref. to 2-7 [W1A0].>



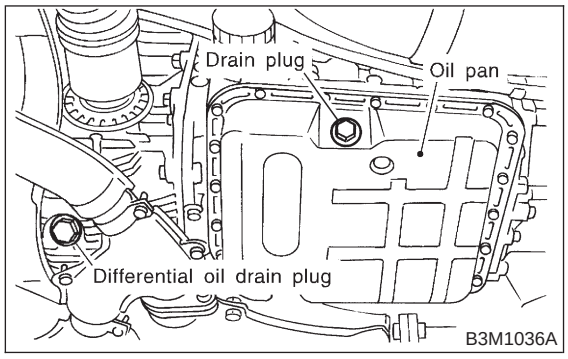
2) Remove air intake duct and cleaner case. (2200 cc California spec. vehicles)
<Ref. to 2-7 [W1A0].> and <Ref. to 2-7 [W18A0].>



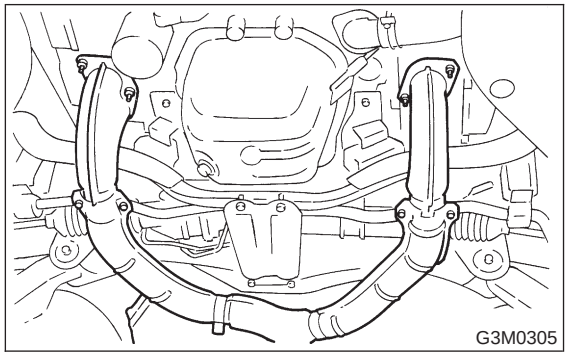
3) Remove pitching stopper.



4) Raise vehicle and drain ATF.

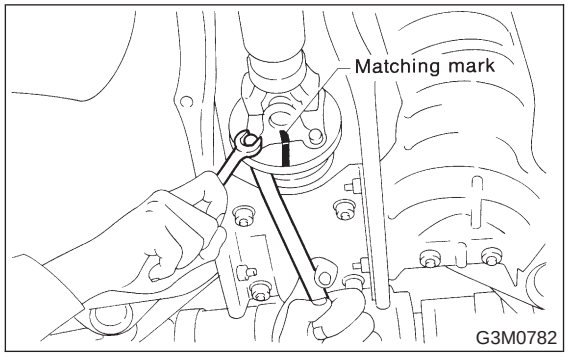


5) Remove front and center exhaust pipe assembly.
Disconnect oxygen sensor connector, and remove front and center exhaust pipes.
<Ref. to 2-9 [W1A0].>

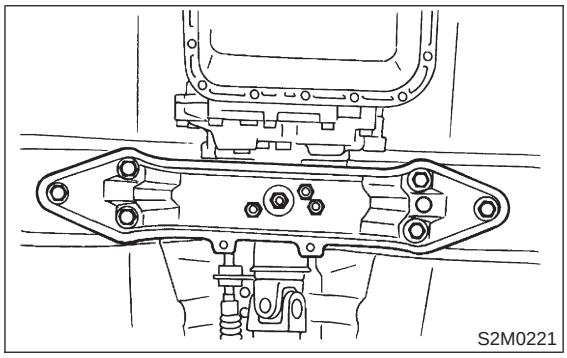


6) Remove propeller shaft.
<Ref. to 3-4 [W1B0].>

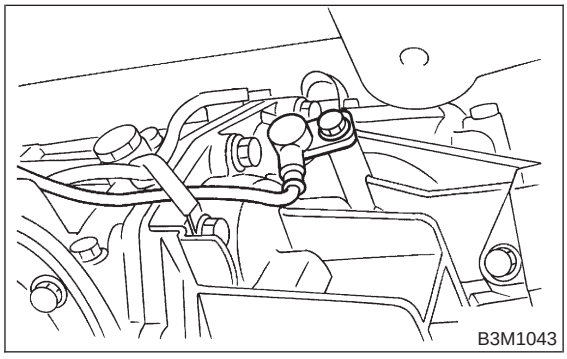
NOTE:
Before removing propeller shaft, scribe matching marks on propeller shaft and rear differential coupling.



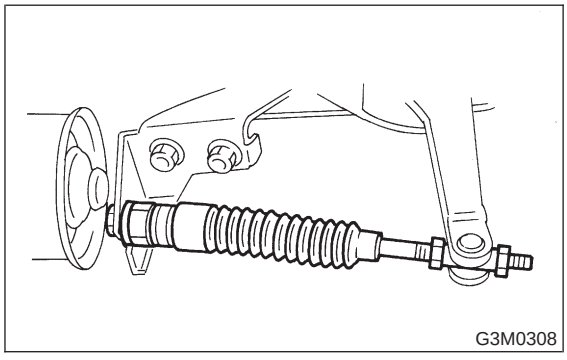
7) Remove rear crossmember.
(1) Support transmission using a transmission jack and raise slightly.
(2) Remove bolts and nuts as shown in Figure.



8) Remove vehicle speed sensor 1 (rear).



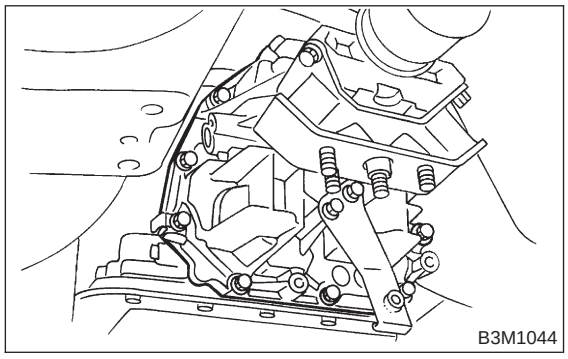
9) Remove extension and gasket.
(1) Remove select cable nut.



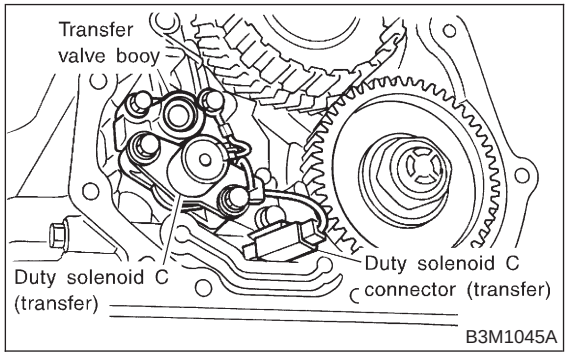
(2) Move gear select cable so that extension bolts can be removed.
(3) Remove bolts.

(4) Remove extension case.

NOTE:
Use a container to catch oil flowing from extension.



10) Disconnect duty solenoid C (transfer) connector.
11) Remove duty solenoid C (transfer) and transfer valve body.

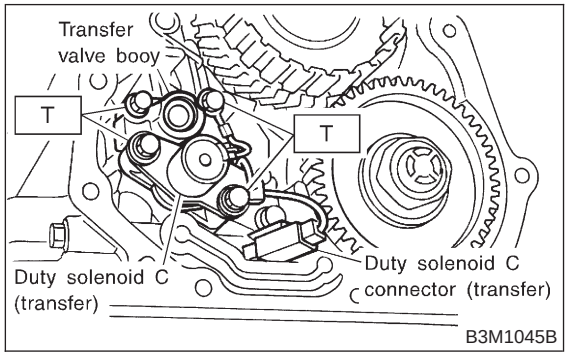


B: INSTALLATION

1) Install duty solenoid C and transfer valve body.
(1) Install duty solenoid C and transfer valve body.

Tightening torque:
T: 8±1 N·m (0.8±0.1 kg-m, 5.8±0.7 ft-lb)

(2) Connect duty solenoid C (transfer) connector.

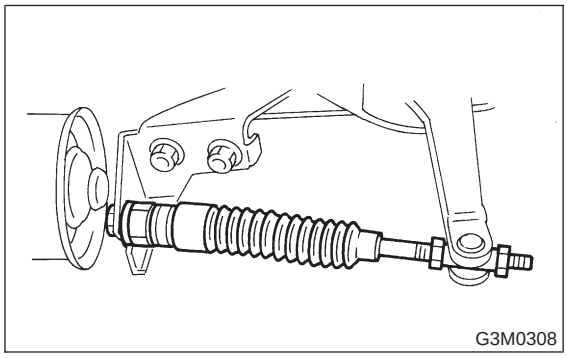


2) Install extension case to transmission case.
(1) Tighten 11 bolts.

Tightening torque:
25±2 N·m (2.5±0.2 kg-m, 18.1±1.4 ft-lb)

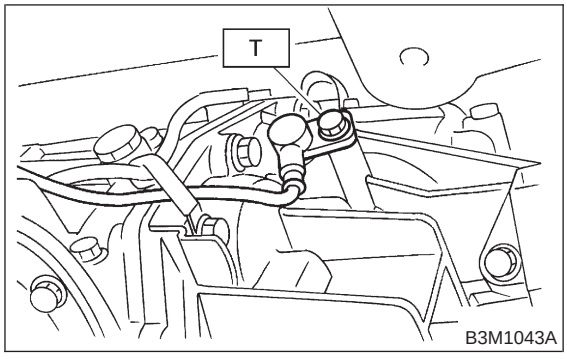
(2) Install select cable.

Tightening torque:
14±4 N·m (1.4±0.4 kg-m, 10.1±2.9 ft-lb)



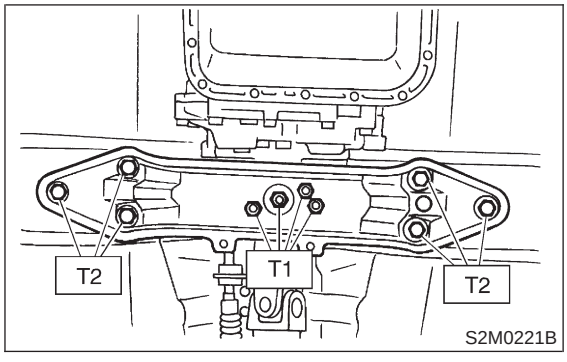
3) Install vehicle speed sensor 1 (rear).

Tightening torque:
T: 7±1 N·m (0.7±0.1 kg-m, 5.1±0.7 ft-lb)



4) Install rear crossmember.
(1) Tighten bolts.

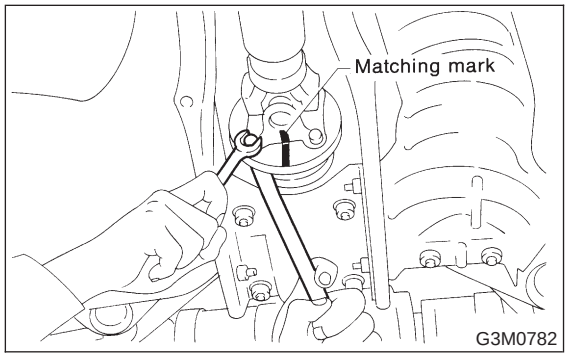
Tightening torque:
T1: 37±10 N·m (3.8±1.0 kg-m, 27±7 ft-lb)
T2: 69±15 N·m (7.0±1.5 kg-m, 51±11 ft-lb)



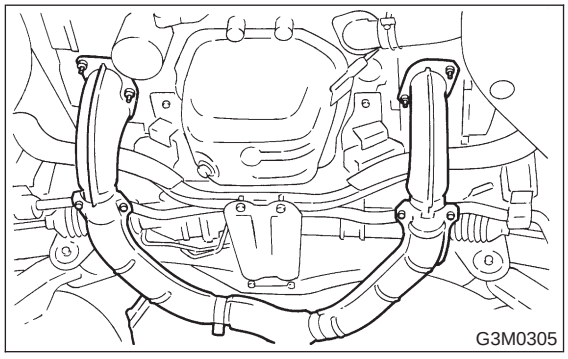
(2) Lower and remove transmission jack.

5) Install propeller shaft.
<Ref. to 3-4 [W1F0].>

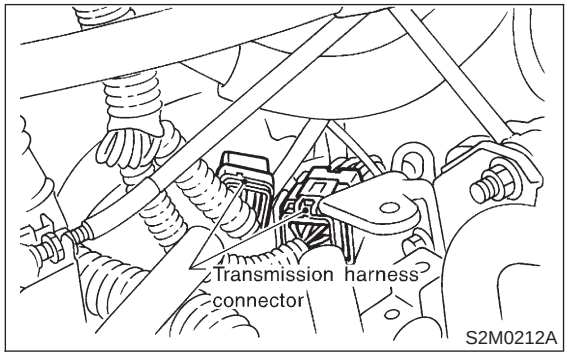
NOTE:
Align matching marks on propeller shaft and rear differential coupling.



6) Install front and center exhaust pipe assembly.
<Ref. to 2-9 [W1B0].>

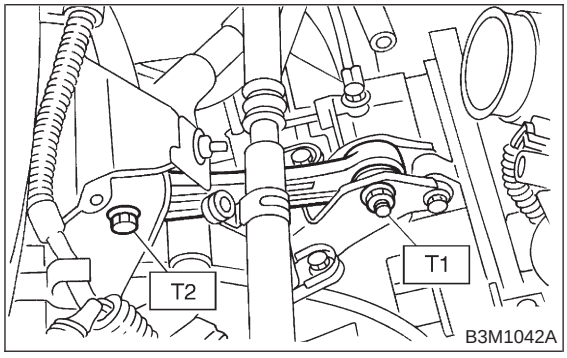


7) Lower and remove jack.
8) Connect the following parts:
(1) Oxygen sensor connector
(2) Transmission harness connector

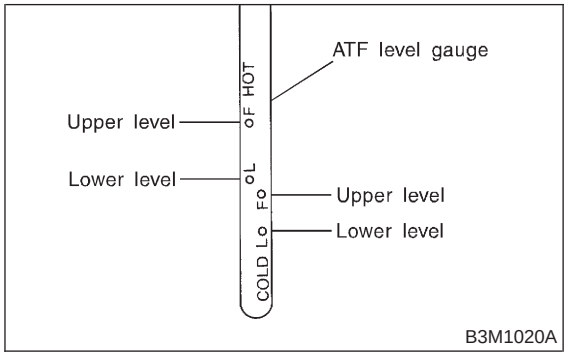


9) Install pitching stopper.

Tightening torque:
T1: 49±5 N·m (5.0±0.5 kg-m, 36.2±3.6 ft-lb)
T2: 57±10 N·m (5.8±1.0 kg-m, 42±7 ft-lb)



10) Replenish ATF and check oil level. Check for leaks.



MEMO:

6. Road Test

A: INSPECTION

1. GENERAL PRECAUTION

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

CAUTION:
When performing test, do not exceed posted speed limit.

2. SHIFT PATTERNS

Check “kick-down”.

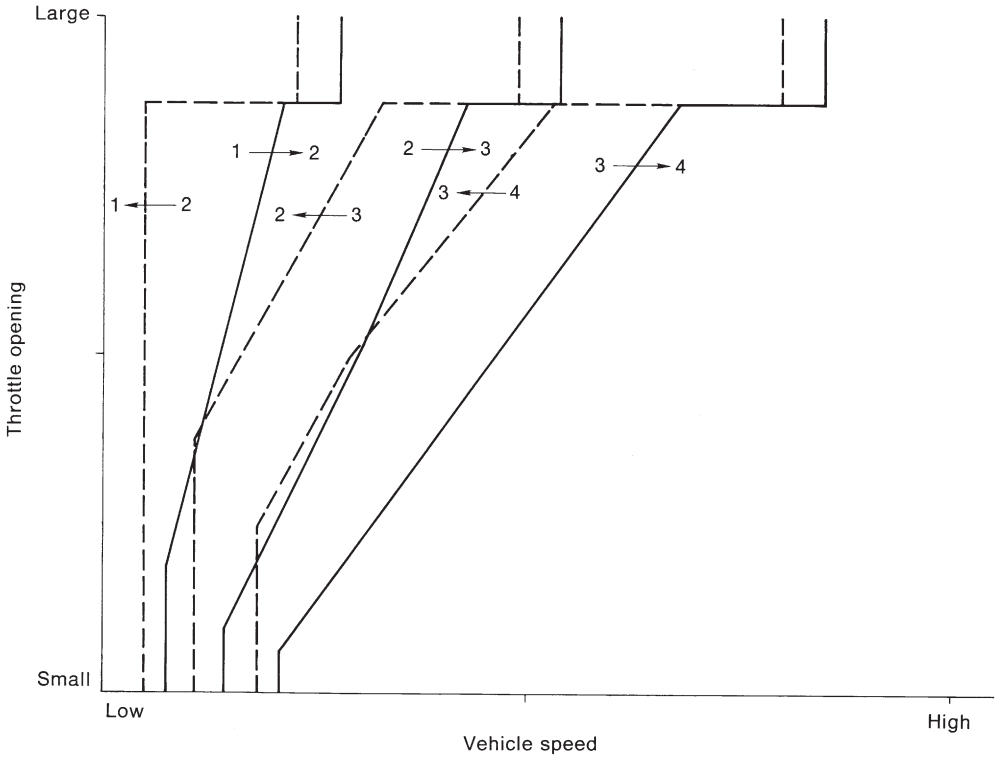
D range: 1st ←→ 2nd ←→ 3rd ←→ 4th

3 range: 1st ←→2nd ←→ 3rd ← 4th

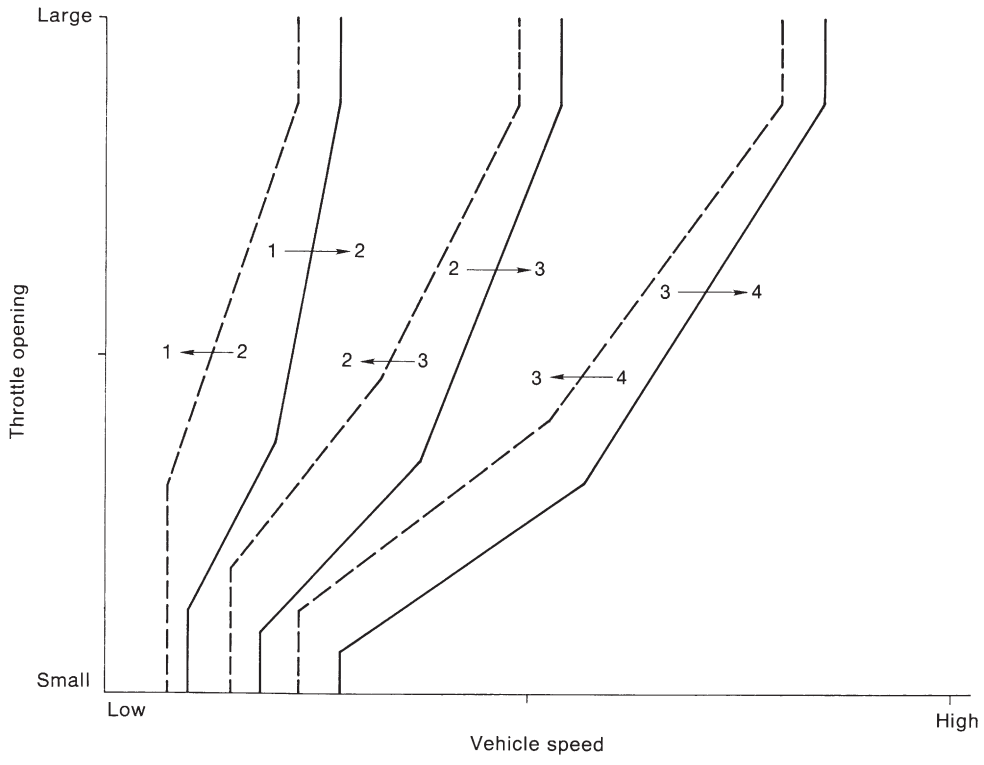
2 range: 2nd ← 3rd ← 4th

1 range: 1st ← 2nd ← 3rd ← 4th

AWD model ‘‘D’’ range (Normal pattern)



AWD model "D" range (Power pattern)



G3M0322

3. ENGINE BRAKE OPERATION

Engine brake operation:
D range → 4th gear
3 range → 3rd gear
2 range → 2nd gear
1 range → 1st gear

4. AWD FUNCTION

If "tight-corner braking" occurs when the steering wheel is fully turned at low speed:
1) Determine the applicable trouble code and check the corresponding duty solenoid C (transfer) for improper operation.
2) If the solenoid is operating properly, check transfer clutch pressure.
3) If oil pressure is normal but "tight-corner braking" occurs:
Check the transfer control valve for sticking, and the transfer clutch facing for wear. <Ref. to 3-2 [W20B0].> and <Ref. to 3-2 [W21B0].>

7. Stall Test

A: MEASUREMENT

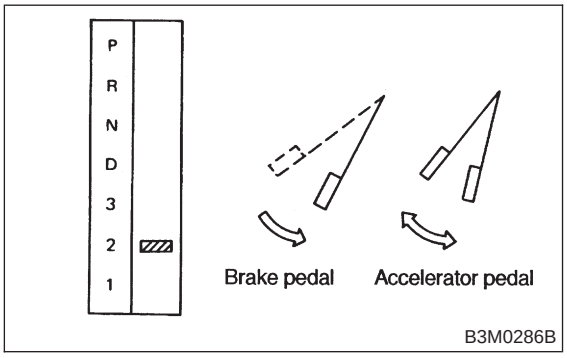
1. GENERAL INFORMATION

The stall test is of extreme importance in diagnosing the condition of the automatic transmission and the engine. It should be conducted to measure the engine stall speeds in R and 2 ranges.
Purposes of the stall test:
1) To check the operation of the automatic transmission clutch.
2) To check the operation of the torque converter clutch.
3) To check engine performance.

2. TEST METHODS

1) Preparations before test:
   (1) Check that throttle valve opens fully.
   (2) Check that engine oil level is correct.
   (3) Check that coolant level is correct.
   (4) Check that ATF level is correct.
   (5) Check that differential gear oil level is correct.
   (6) Increase ATF temperature to 50 to 80°C (122 to 176°F) by idling the engine for approximately 30 minutes (with select lever set to "N" or "P").
2) Install an engine tachometer at a location visible from the driver's compartment and mark the

stall speed range on the tachometer scale.
3) Place the wheel chocks at the front and rear of all wheels and engage the parking brake.
4) Move the manual linkage to ensure it operates properly, and shift the select lever to the 2 range.
5) While forcibly depressing the foot brake pedal, gradually depress the accelerator pedal until the engine operates at full throttle.



6) When the engine speed is stabilized, read that speed quickly and release the accelerator pedal.
7) Shift the select lever to Neutral, and cool down the engine by idling it for more than one minute.
8) Record the stall speed.
9) If stall speed in 2 range is higher than specifications, low clutch slipping and 2-4 brake slipping may occur. To identify it, conduct the same test as above in D range.
10) Perform the stall tests with the select lever in the R range.

NOTE:
● Do not continue the stall test for MORE THAN FIVE SECONDS at a time (from closed throttle, fully open throttle to stall speed reading). Failure to follow this instruction causes the engine oil and ATF 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 lower than 1,200 rpm.
● 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 automatic transmission from sustaining damage.

Stall speed (at sea level):
2200 cc 2,200 — 2,700 rpm
2500 cc 2,100 — 2,600 rpm

3. EVALUATION

Stall speed (at sea level)	Position	Cause
Less than specifications	2 R	● Throttle valve not fully open ● Erroneous engine operation ● Torque converter clutch's one-way clutch slipping
Greater than specifications	D	● Low clutch slipping ● One-way clutch malfunctioning
	R	● Line pressure too low ● Reverse clutch slipping ● Low & reverse brake slipping
	2	● Line pressure too low ● Low clutch slipping ● 2-4 brake slipping

8. Time Lag Test

A: INSPECTION

1. GENERAL INFORMATION

If the shift lever is shifted while the engine is idling, there will be a certain time elapse or lag before the shock can be felt. This is used for checking the condition of the low clutch, reverse clutch, low & reverse brake and one-way clutch.

CAUTION:
● Perform the test at normal operation fluid temperature 60 to 80°C (140 to 176°F).
● Be sure to allow a one minute interval between tests.
● Make three measurements and take the average value.

2. TEST METHODS

1) Fully apply the parking brake.
2) Start the engine.
Check idling speed (A/C OFF).
"N" range: 700±100 rpm
3) Shift the shift lever from "N" to "D" range.
Using a stop watch, measure the time it takes from shifting the lever until the shock is felt.
Time lag: Less than 1.2 seconds
4) In same manner, measure the time lag for "N" → "R".
Time lag: Less than 1.5 seconds

3. EVALUATION

1) If "N" → "D" time lag is longer than specified:
● Line pressure too low
● Low clutch worn
● One-way clutch not operating properly
2) If "N" → "R" time lag is longer than specified:
● Line pressure too low
● Reverse clutch worn
● Low & reverse brake worn

9. Line Pressure Test

A: MEASUREMENT

1. GENERAL INFORMATION

If the clutch or the brake shows a sign of slippage or shifting sensation is not correct, the line pressure should be checked.
● Excessive shocks during upshifting or shifting takes place at a higher point than under normal circumstances, may be due to the line pressure being too high.
● Slippage or inability to operate the vehicle may, in most cases, be due to loss of oil pressure for the operation of the clutch, brake or control valve.
1) Line pressure measurement (under no load)

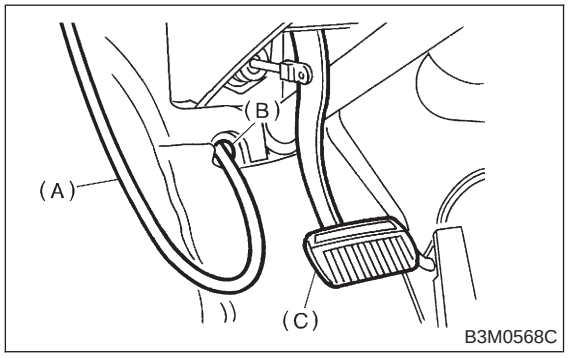
CAUTION:
● Before measuring line pressure, jack-up all wheels.
● Maintain temperature of ATF at approximately 50°C (122°F) during measurement.
(ATF will reach the above temperature after idling the engine for approximately 30 minutes with select lever in "N" or "P".)

2) Line pressure measurement (under heavy load)

CAUTION:
● Before measuring line pressure, apply both foot and parking brakes with all wheels chocked (Same as for "stall" test conditions).
● Measure line pressure when select lever is in "R", "2" with engine under stall conditions.
● Measure line pressure within 5 seconds after shifting the select lever to each position. (If line pressure needs to be measured again, allow the engine to idle and then stop. Wait for at least one minute before measurement.)
● Maintain the temperature of ATF at approximately 50°C (122°F) during measurement. (ATF will reach the above temperature after idling the engine for approximately 30 minutes with the select lever in "N" or "P".)

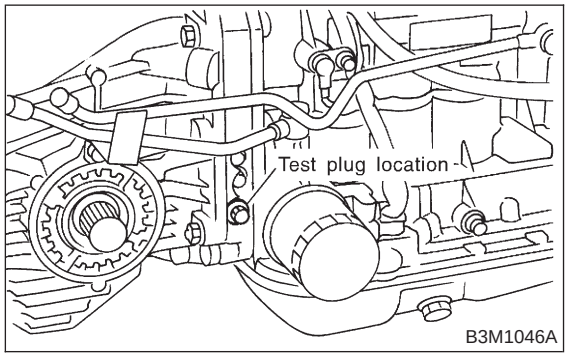
2. TEST METHODS

1) Temporarily attach the ST to a suitable place in the driver's compartment, remove the blind plug located in front of the toe board and pass the hose of the ST to the engine compartment.
ST 498575400 OIL PRESSURE GAUGE ASSY



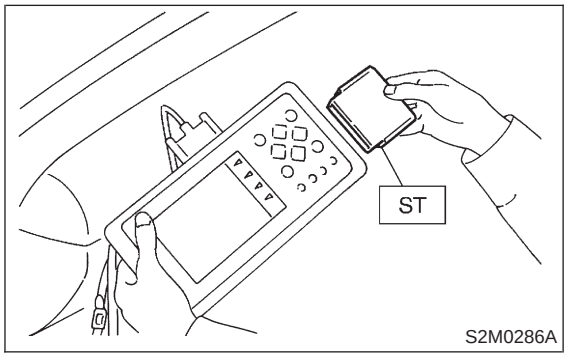
(A) Pressure gauge hose
(B) Hole in toe board (blank cap hole)
(C) Brake pedal

2) Remove the test plug and install ST instead.
ST 498897200 OIL PRESSURE GAUGE ADAPTER



3) Connect ST1 with ST2.
ST1 498897200 OIL PRESSURE GAUGE ADAPTER
ST2 498575400 OIL PRESSURE GAUGE ASSY

4) Check for duty ratio changes by opening and closing throttle valve using Subaru Select Monitor.
(1) Insert the cartridge to Subaru Select Monitor.
ST 24082AA090 CARTRIDGE



(2) Connect Subaru Select Monitor to data link connector.
5) Check line pressure in accordance with the following chart.

3. EVALUATION

NOTE:
- Under no load: "D"
- Under full load: "R", "2"

(With engine running at stall speed)

Standard line pressure		
Range position	Line pressure duty ratio (%)	Line pressure kPa (kg/cm^2, psi)
2	5	1,128 — 1,304 (11.5 — 13.3, 164 — 189)
R	5	1,520 — 1,716 (15.5 — 17.5, 220 — 249)
D	95	304 — 412 (3.1 — 4.2, 44 — 60)

10. Transfer Clutch Pressure Test

A: MEASUREMENT

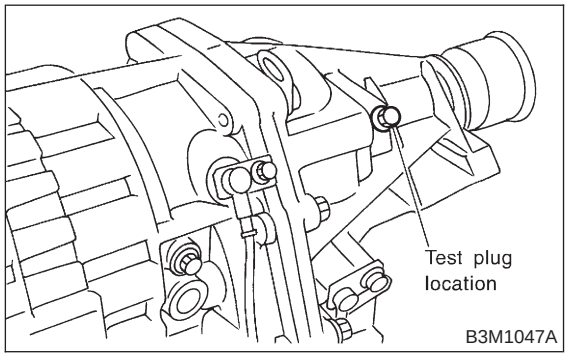
1. TEST METHODS

Check transfer clutch pressure in accordance with the following chart in the same manner as with line pressure.

ST 499897700 OIL PRESSURE ADAPTER SET
ST 498575400 OIL PRESSURE GAUGE ASSY

AWD mode: “D” range
FWD mode: “P” range, engine speed 2,000 rpm

CAUTION:
Before setting in FWD mode, install spare fuse on FWD mode switch.



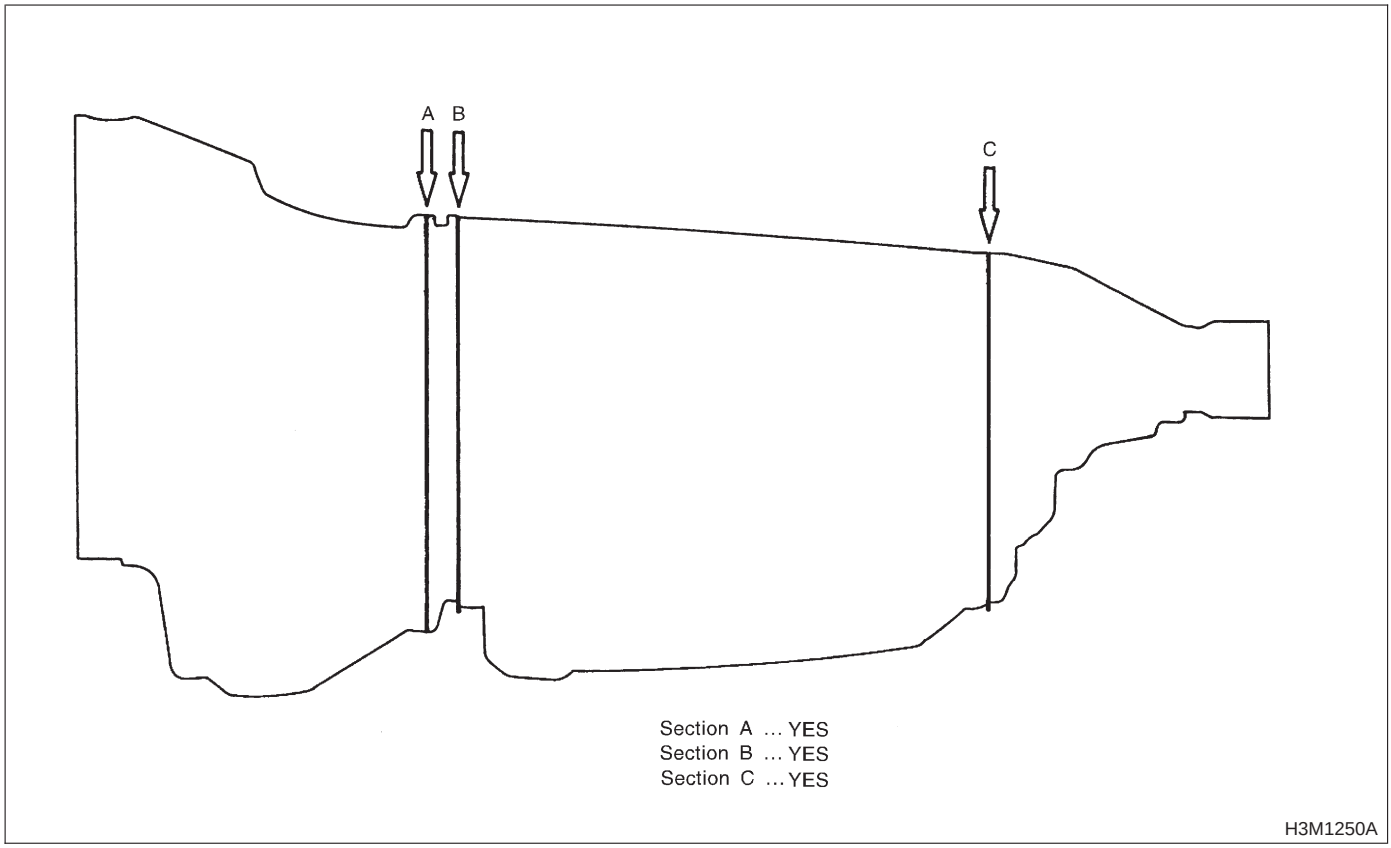
2. EVALUATION

NOTE:
If oil pressure is not produced or if it does not change in the AWD mode, the duty solenoid C or transfer valve assembly may be malfunctioning. If oil pressure is produced in the FWD mode, the problem is similar to that in the AWD mode.

Standard transfer clutch pressure kPa (kg/cm^2, psi)		
Duty ratio (%)	AWD mode	FWD mode
5	951 — 1,089 (9.7 — 11.1, 138 — 158)	—
60	226 — 294 (2.3 — 3.0, 33 — 43)	—
95	—	0 (0, 0)

11. Overall Transmission

A: SECTIONS THAT CAN BE DETACHED/ASSEMBLED

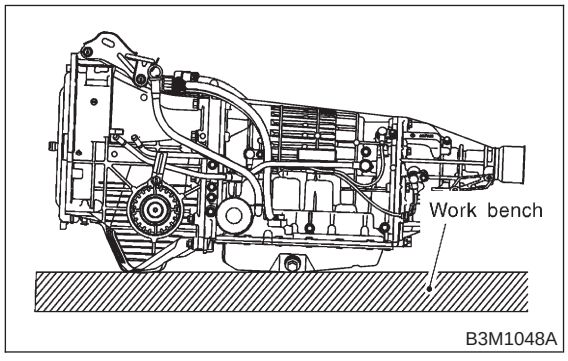


B: DISASSEMBLY

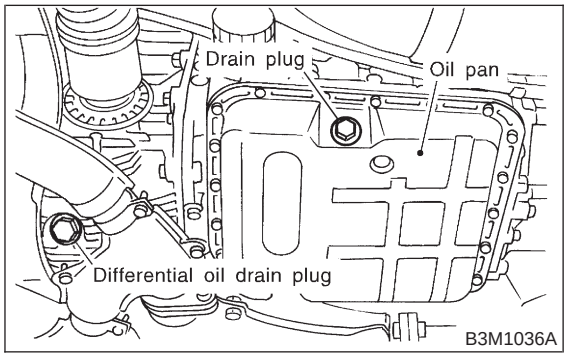
1. EXTERNAL PARTS

1) Place the transmission unit on a work bench, with the oil pan facing down.

CAUTION:
Be careful not to bend or damage external parts.

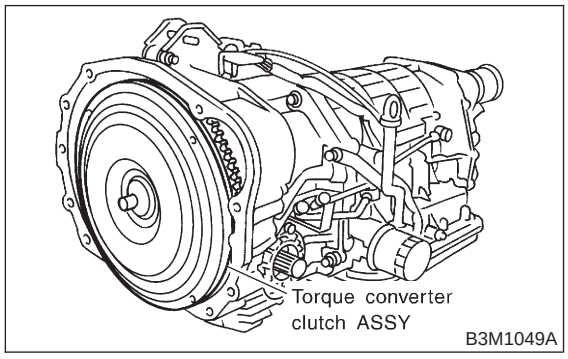


2) Remove the drain plug, and drain differential oil. Tighten the plug temporarily after draining.
3) Remove the drain plug, and drain automatic transmission fluid (ATF). Tighten the plug temporarily after draining.

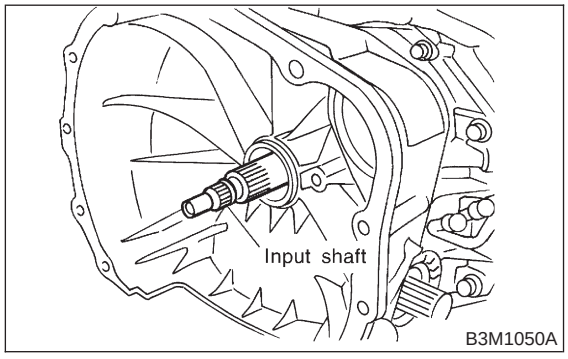


4) Extract the torque converter clutch assembly.

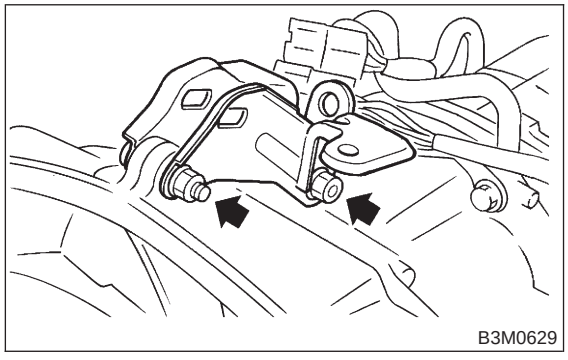
NOTE:
● Extract the torque converter clutch horizontally. Be careful not to scratch the bushing inside the oil pump shaft.
● Note that oil pump shaft also comes out.



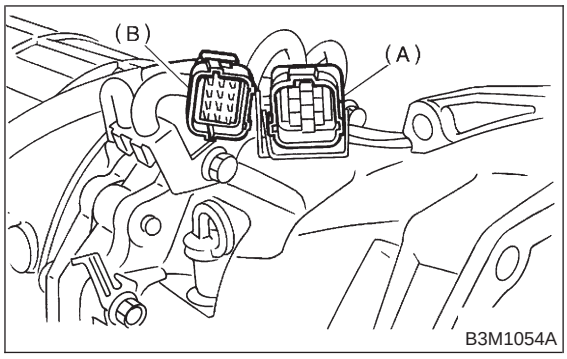
5) Remove the input shaft.



6) Remove the pitching stopper bracket.

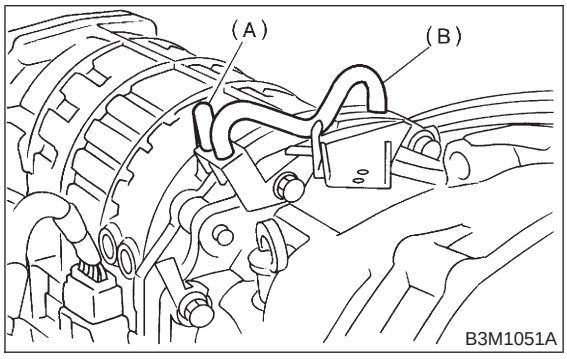


7) Remove harnesses from bracket.



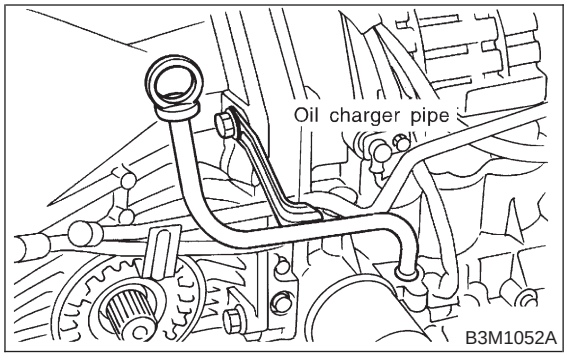
(A) Transmission harness
(B) Inhibitor switch harness

8) Disconnect the air breather hose.



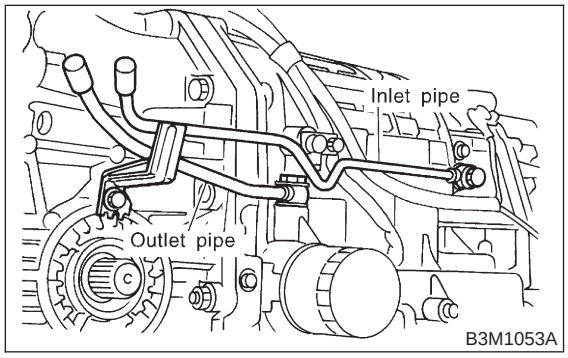
(A) Air breather hose (Transmission case)
(B) Air breather hose (Oil pump housing)

9) Remove the oil charger pipe, and remove the O-ring from the flange face. Attach the O-ring to the pipe.



10) Remove the oil cooler inlet and outlet pipes.

CAUTION:
When removing outlet pipes, be careful not to lose balls and springs used with retaining screws.

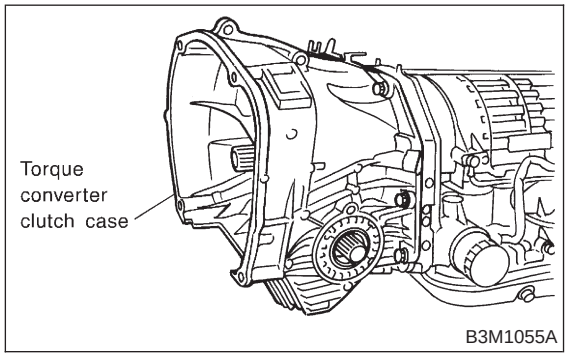


2. SEPARATION OF EACH SECTION

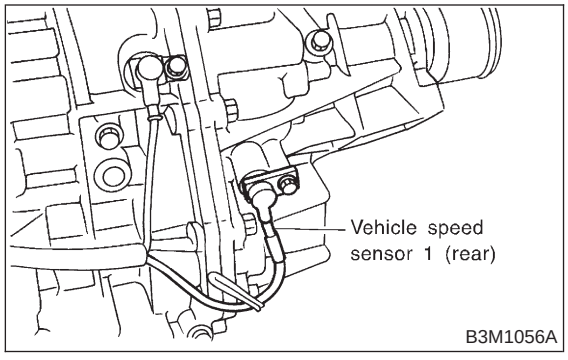
1) Separation of torque converter clutch case and transmission case sections

CAUTION:
- **Be careful not to damage the oil seal and bushing inside the torque converter clutch case by the oil pump cover.**
- **Be careful not to lose the rubber seal.**

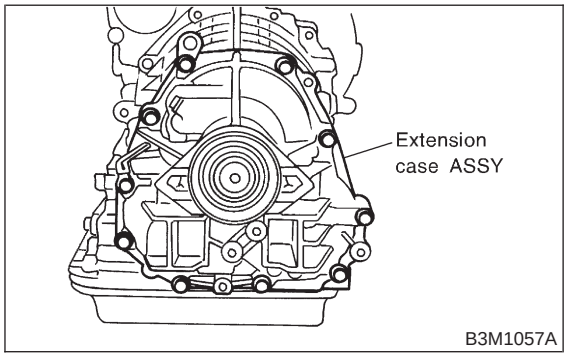
NOTE:
Separate these cases while tapping lightly on the housing.



2) Separation of transmission case and extension sections
(1) Remove vehicle speed sensor 1 (rear).



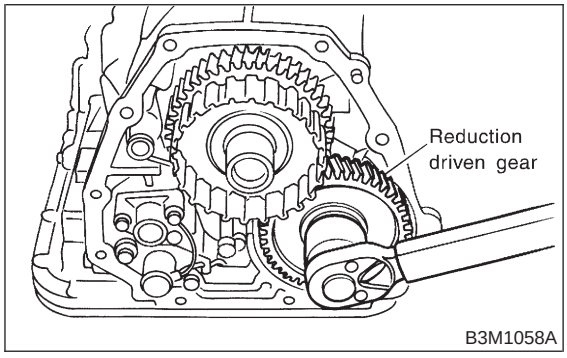
(2) Separation of transmission case and extension case sections



3. TRANSMISSION CASE SECTION

1) Remove the reduction driven gear.
(1) Straighten the staked portion, and remove the lock nut.

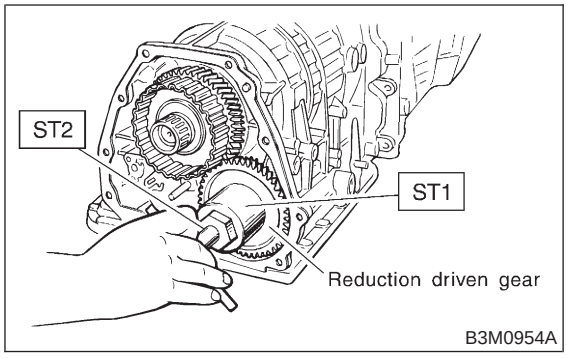
NOTE:
Set the range selector lever to “P”.



(2) Using the ST1 and ST2, extract the reduction driven gear.

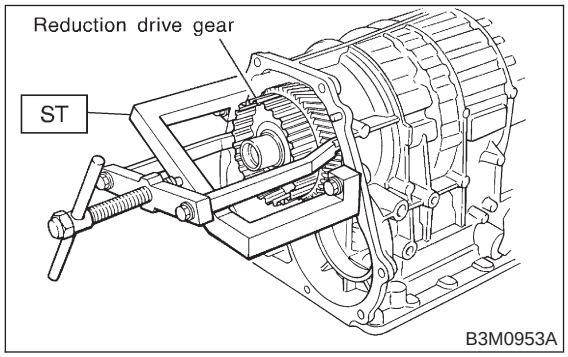
NOTE:

ST1 499737000 PULLER
ST2 899524100 PULLER SET



(3) Using the ST, extract the reduction drive gear.

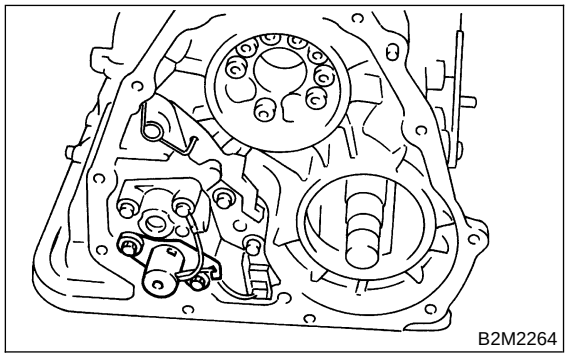
ST 499737100 PULLER SET



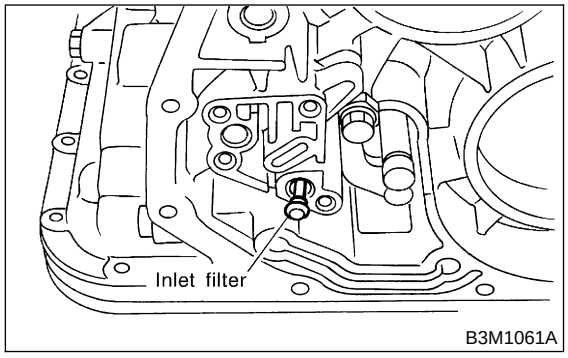
2) Remove transfer valve body and duty solenoid C (Transfer).

(1) Disconnect connector from duty solenoid C (Transfer).

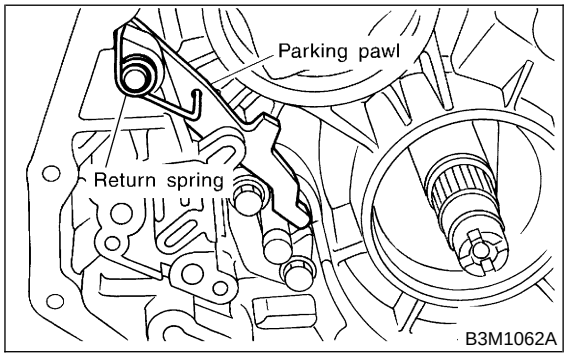
(2) Remove transfer valve body and duty solenoid C (Transfer).



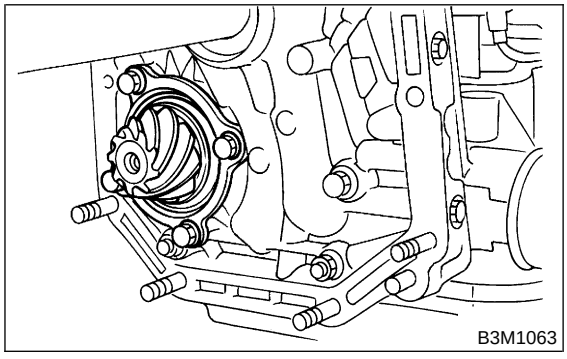
(3) Pull out inlet filter



3) Remove the parking pawl, return spring and shaft.



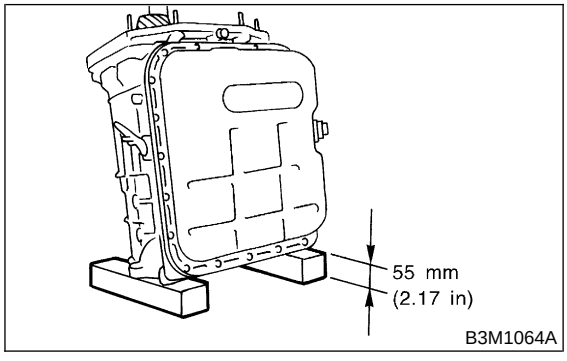
4) Loosen the taper roller bearing mounting bolts.



5) Place two wooden blocks on the workbench, and stand the transmission case with its rear end facing down.

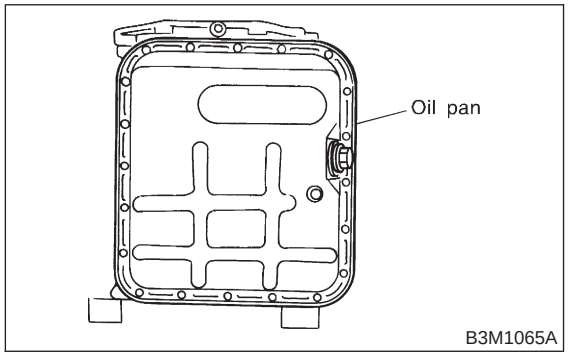
CAUTION:

- **Be careful not to scratch the rear mating surface of the transmission case.**
- **Note that the parking rod and drive pinion protrude from the mating surface.**

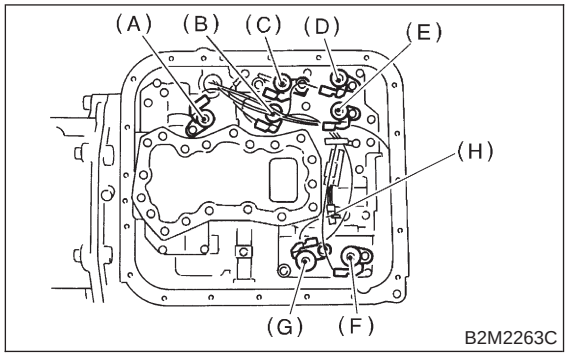


6) Remove the oil pan.

NOTE:
Use a scraper to remove oil pan.



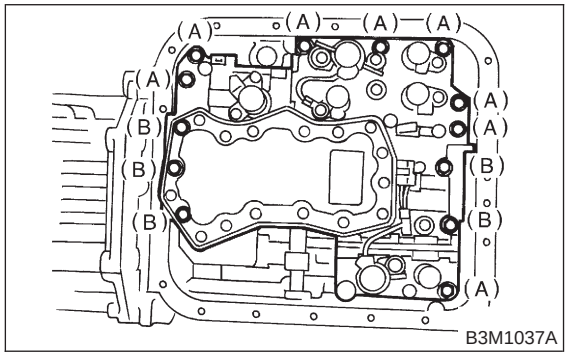
7) Disconnect the harness connectors for the solenoids, duty solenoids, ATF temperature sensor and the ground cord.



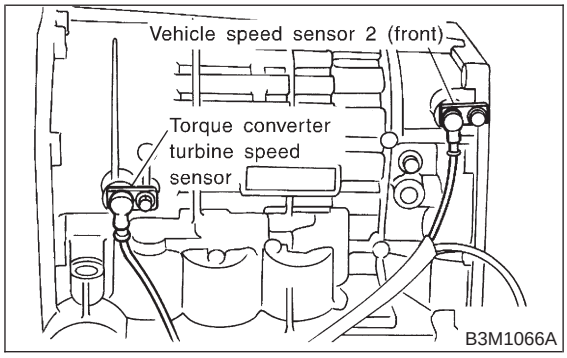
(A) Lock-up duty solenoid (Blue)
(B) Low clutch timing solenoid (Gray)
(C) Line pressure duty solenoid (Red)
(D) Shift solenoid 2 (Yellow)
(E) Shift solenoid 1 (Green)
(F) 2-4 brake timing solenoid (Black)
(G) 2-4 brake duty solenoid (Red)
(H) ATF temperature sensor

8) Remove the control valve body.

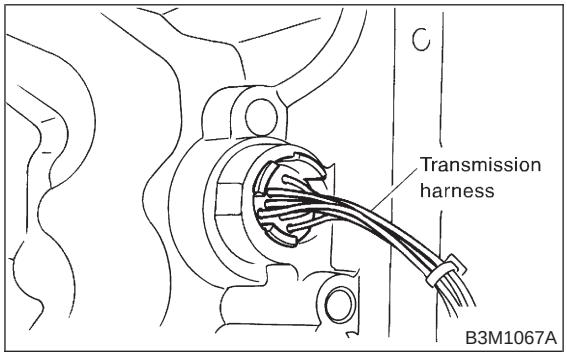
CAUTION:
When removing control valve body, be careful not to interfere with transfer duty solenoid C wiring.



9) Remove vehicle speed sensor 2 (front) and torque converter turbine speed sensor.

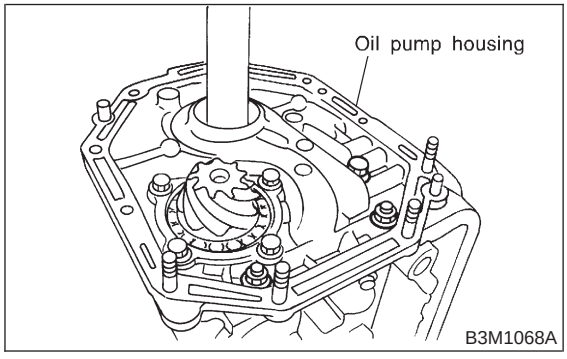


10) Remove transmission harness.

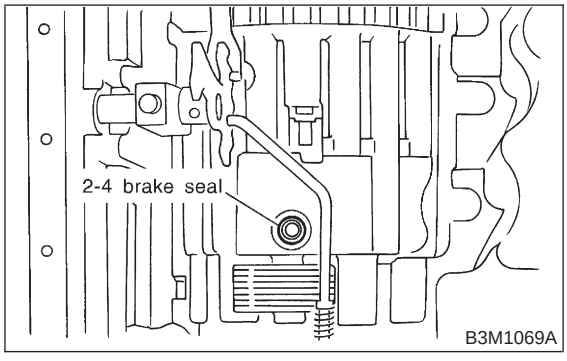


11) Remove the oil pump housing.

CAUTION:
Be careful not to lose the total end play adjusting thrust washer.

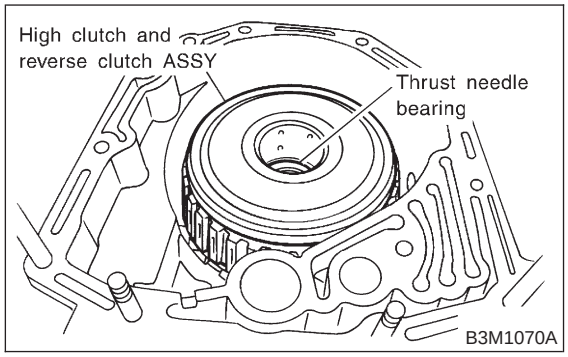


12) Remove 2-4 brake seal.

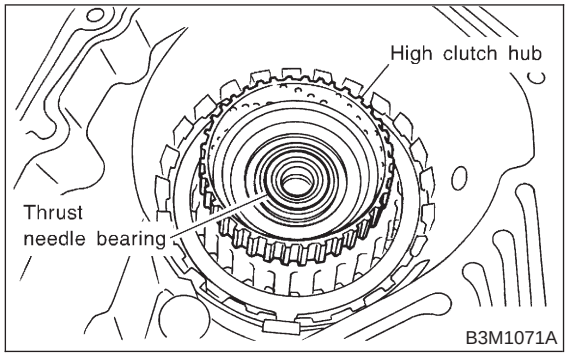


13) Take out the high clutch and reverse clutch assembly.

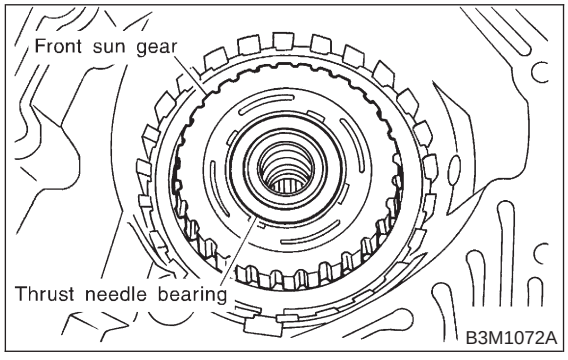
CAUTION:
Be careful not to lose thrust needle bearing.



14) Take out the high clutch hub and the thrust bearing.



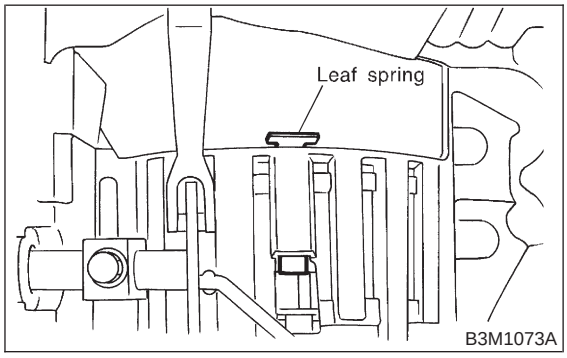
15) Take out the front sun gear and the thrust bearing.



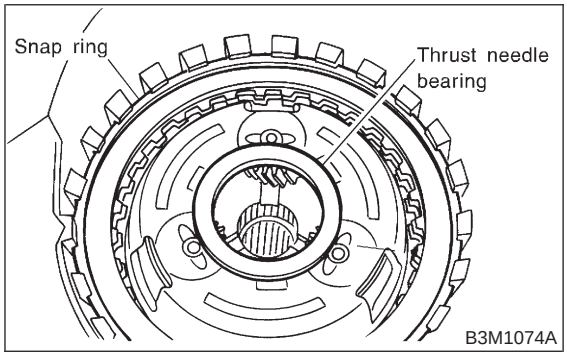
16) Pull out leaf spring.

CAUTION:
Be careful not to bend leaf spring during removal.

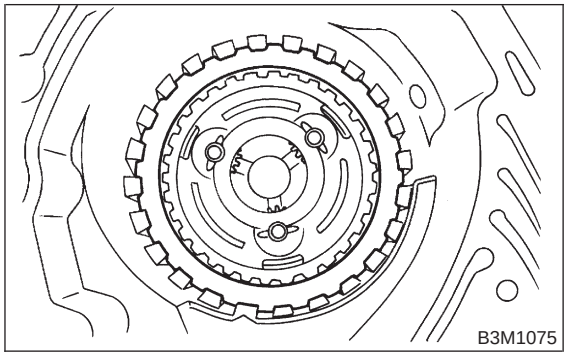
NOTE:
Remove it while pressing down on lower leaf spring.



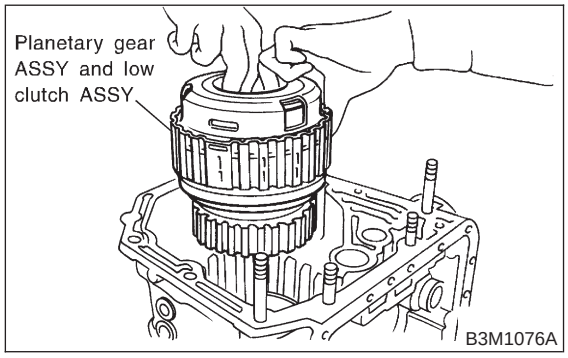
17) Remove snap ring and thrust needle bearing.



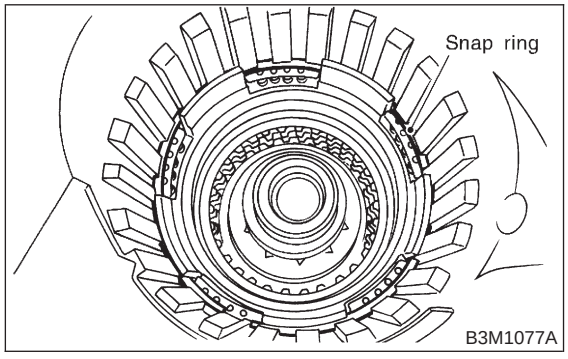
18) Take out retaining plate, drive plate and driven plate of 2-4 brake.



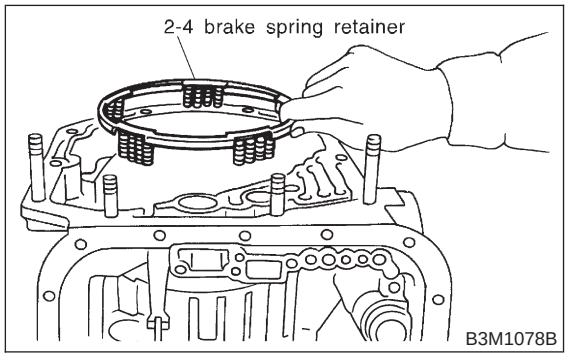
19) Take out the thrust needle bearing, planetary gear assembly and the low clutch assembly.



20) Remove snap ring.

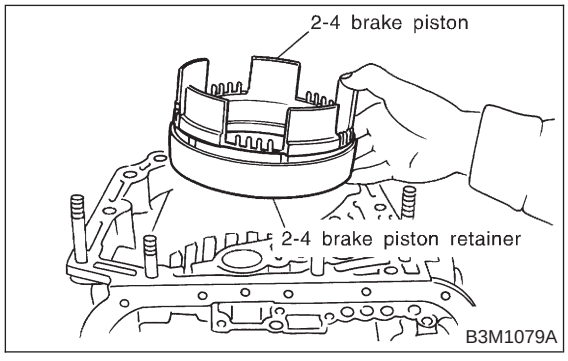


21) Take out 2-4 brake spring retainer.

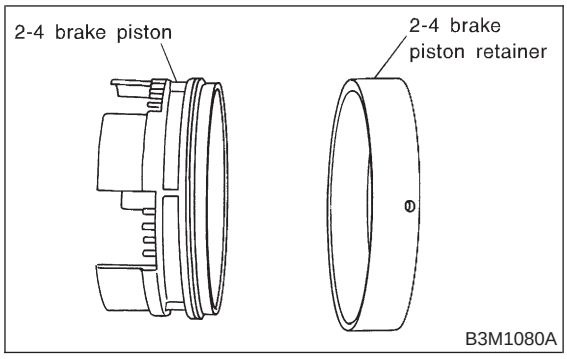


22) Take out 2-4 brake piston and piston retainer.

CAUTION:
When removing the brake piston 2-4 and piston retainer, be careful not to rub or bump them against the transmission case.

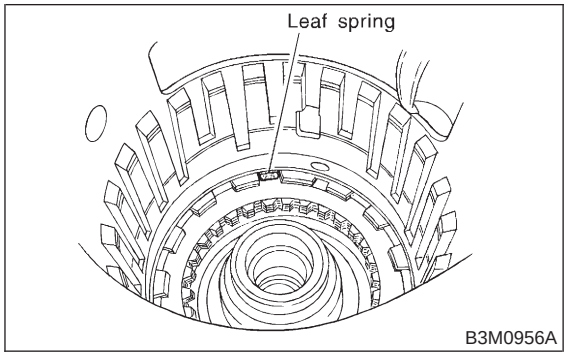


23) Separate 2-4 brake piston and piston retainer.

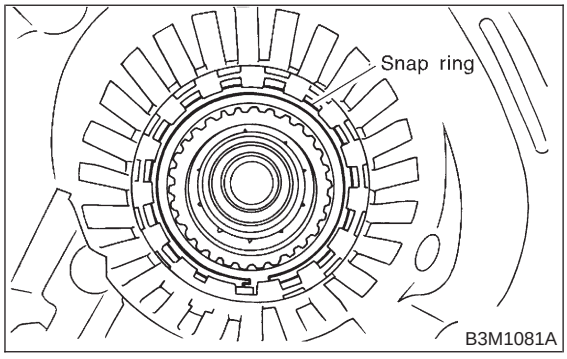


24) Pull out leaf spring.

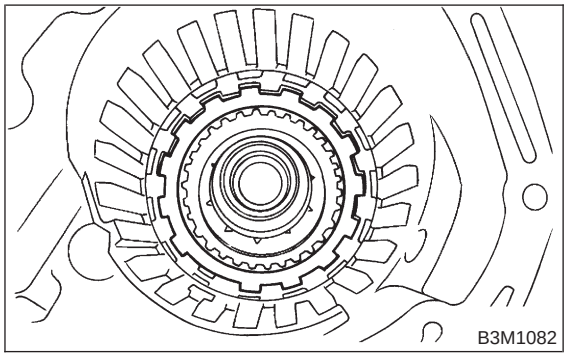
CAUTION:
Be careful not to bend leaf spring during removal.



25) Remove snap ring.

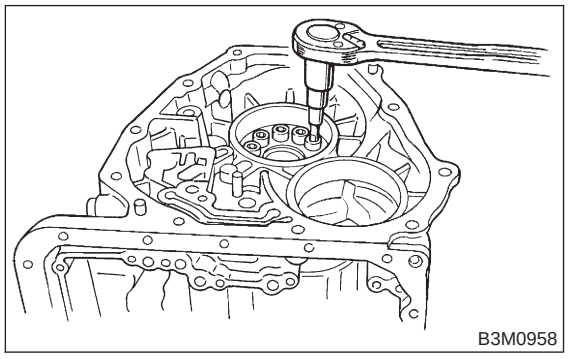


26) Take out retaining plate, drive plate, driven plate and dish plate.

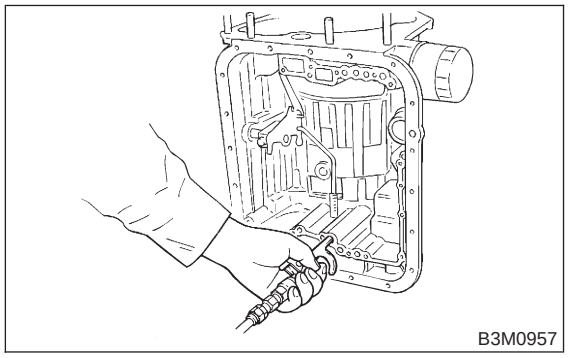


27) Turning the case upside down, take out the one-way clutch inner race, retainer and wave spring.

NOTE:
After loosening all socket bolts, place the side of the transmission case on the floor.


B3M0958

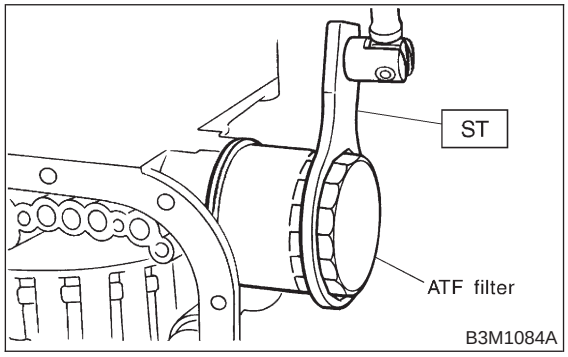
28) Take out the low & reverse piston by applying compressed air.


B3M0957

29) Using ST, remove ATF filter.

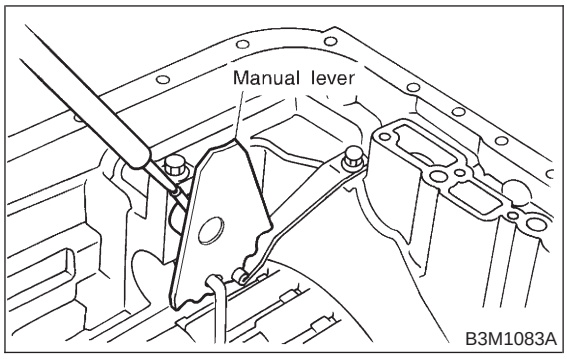
NOTE:
If any of the clutches or brakes are abnormally worn, replace ATF filter and oil seal with new ones.

ST 498545400 OIL FILTER WRENCH



B3M1084A

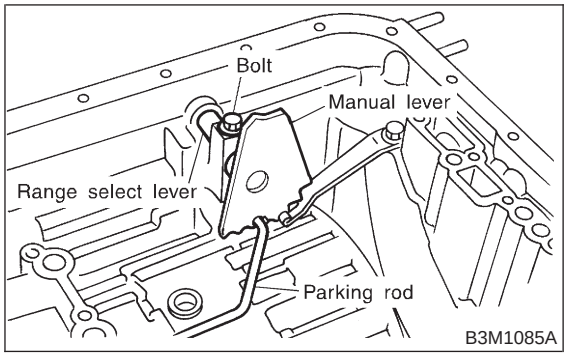
30) Pull off the straight pin of manual lever.



B3M1083A

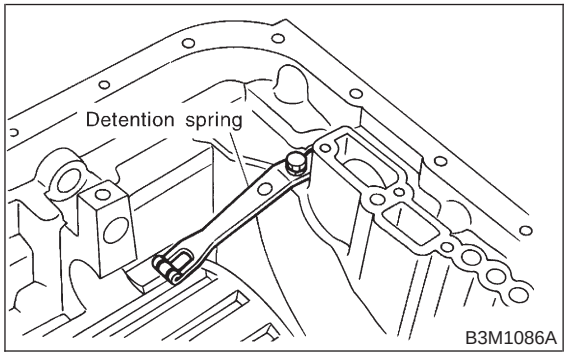
31) Remove bolts securing select lever, then remove select lever, manual lever and parking rod.

CAUTION:
Be careful not to damage the lips of the press-fitted oil seal in the case.



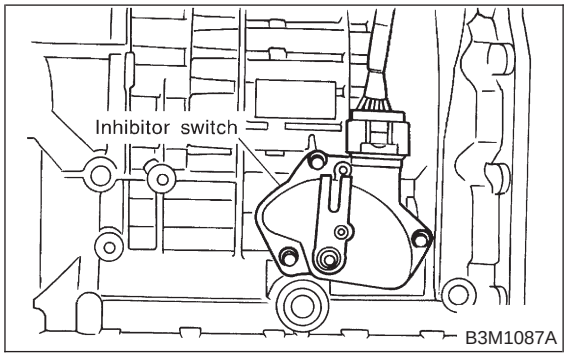
B3M1085A

32) Remove the detention spring.



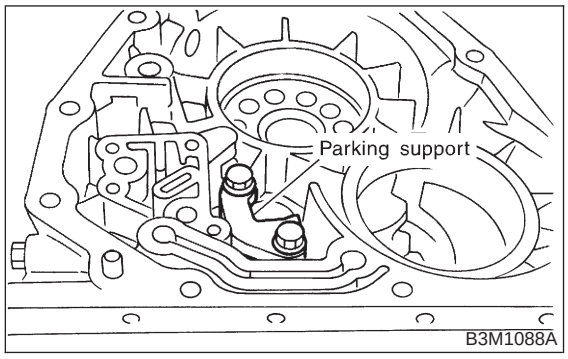
B3M1086A

33) Remove the inhibitor switch.



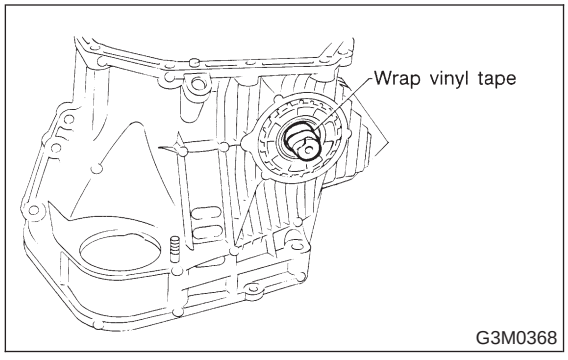
B3M1087A

34) Remove parking support.



4. TORQUE CONVERTER CLUTCH CASE SECTION

1) Wrap the axle shaft serration with vinyl tape.



2) Remove the differential side retainer with ST.

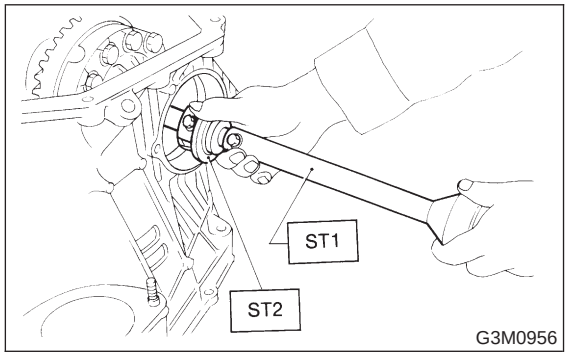
CAUTION:
Hold the differential case assembly by hand to avoid damaging retainer mounting hole of the torque converter clutch case and speedometer gears.

ST 499787000 WRENCH ASSY

3) Extract the axle shaft with ST1 and ST2.

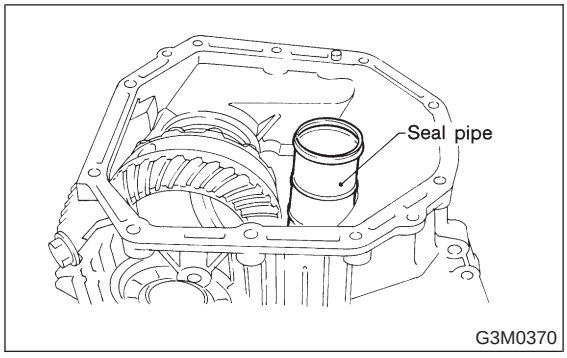
CAUTION:
Do not reuse the circlip.

ST1 499095500 REMOVER
ST2 499247300 INSTALLER



4) Remove the differential case assembly.

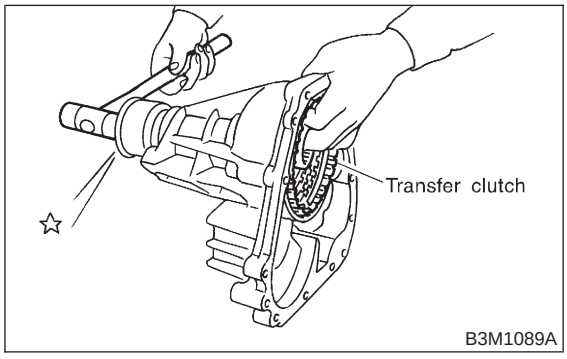
CAUTION:
- **Remove the seal pipe if it is attached. (Reusing is not allowed.)**
- **Be careful not to damage the retainer mounting hole of the torque converter clutch case and the speedometer gears.**



5. EXTENSION SECTION

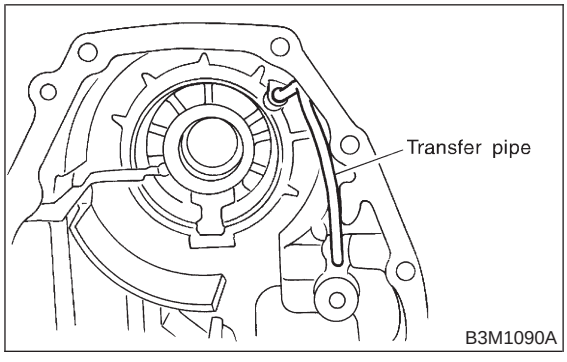
1) Take out the transfer clutch by lightly tapping the end of the rear drive shaft.

CAUTION:
Be careful not to damage the oil seal in the extension.



2) Remove the transfer pipe.

CAUTION:
Be careful not to bend the pipe.



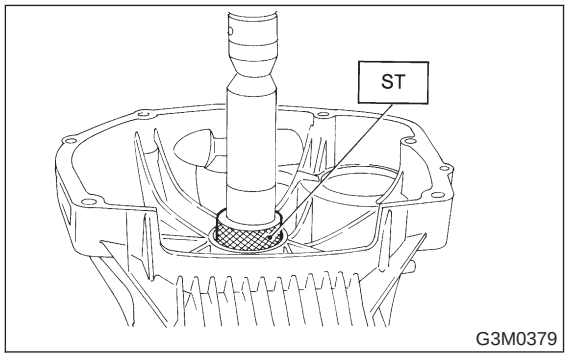
C: ASSEMBLY OF OVERALL TRANSMISSION

1. TORQUE CONVERTER CLUTCH CASE SECTION

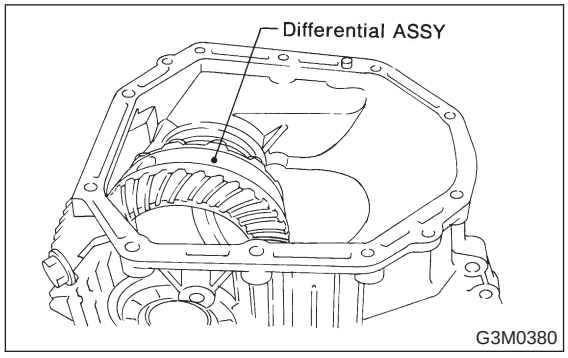
1) Check the appearance of each component and clean.

CAUTION:
Make sure each part is free of harmful cuts, damage and other faults.

2) Force-fit the oil seal to the torque converter clutch case with ST.
ST 398437700 DRIFT



3) Install the differential assembly to the case, paying special attention not to damage the inside of the case (particularly, the differential side retainer contact surface).

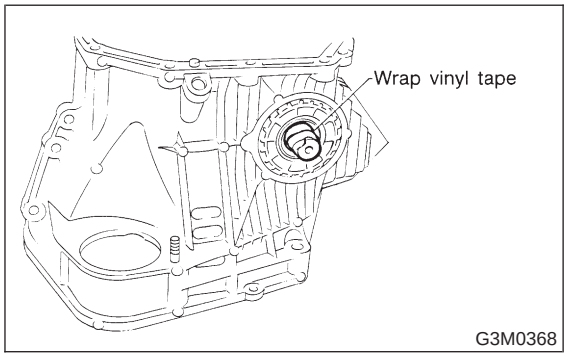


4) Install the circlip to the axle shaft, insert the shaft into the differential assembly, and tap it into position with a plastic hammer.

CAUTION:
- **If no play is felt, check whether the shaft is fully inserted. If shaft insertion is correct, replace the axle shaft.**
- **Be sure to use a new circlip.**

Thrust play:
0.3 — 0.5 mm (0.012 — 0.020 in)

5) Wrap vinyl tape around the splined portion of the axle shaft.



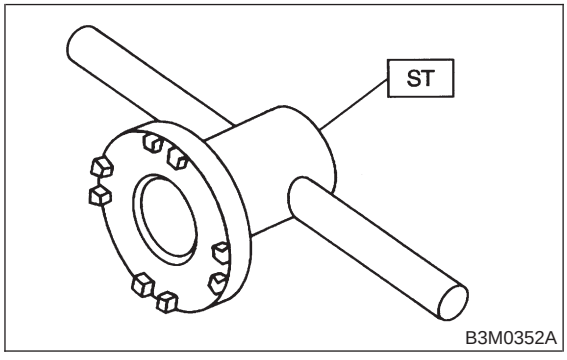
6) Install the oil seal and outer race (taper roller bearing) to the differential side retainer. Then screw in the retainer and the O-ring after coating the threads with oil.

CAUTION:
- **Pay attention not to damage the oil seal lips.**
- **Do not confuse the RH and LH oil seals.**
- **Keep the O-ring removed from the retainer.**

7) Using the ST, screw in the retainer until light contact is felt.

NOTE:
Screw in the RH side slightly deeper than the LH side.

ST 499787000 WRENCH ASSY

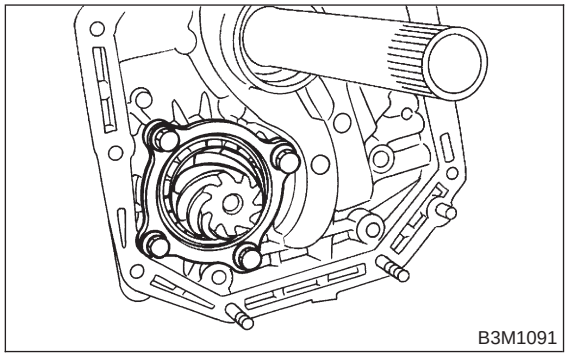


8) Hypoid gear backlash adjustment and tooth contact check
(1) Assemble the drive pinion assembly to the oil pump housing.

CAUTION:
- **Be careful not to bend the shims.**
- **Be careful not to force the pinion against the housing bore.**

(2) Tighten four bolts to secure the roller bearing.

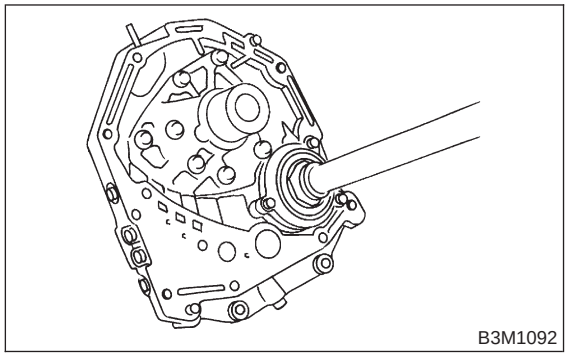
Tightening torque:
41±3 N·m (4.2±0.3 kg-m, 30.4±2.2 ft-lb)


B3M1091

(3) Install the oil pump housing assembly to the torque converter clutch case, and secure evenly by tightening four bolts.

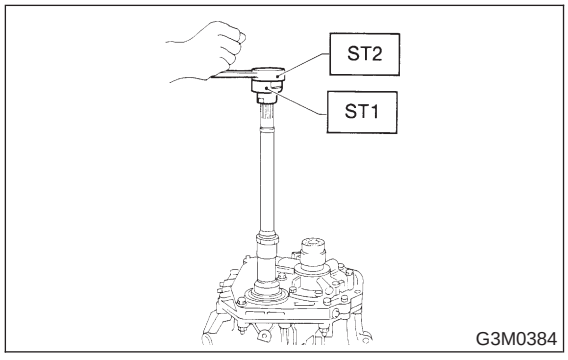
CAUTION:
● Thoroughly remove the liquid gasket from the case mating surface beforehand.
● Use an old gasket or an aluminum washer so as not to damage the mating surface of the housing.

Tightening torque:
41±3 N·m (4.2±0.3 kg-m, 30.4±2.2 ft-lb)


B3M1092

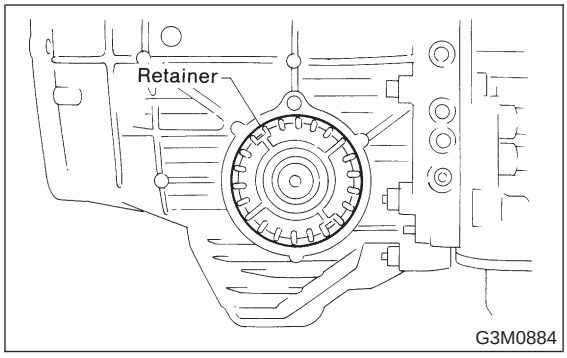
(4) Rotate the drive pinion several times with ST1 and ST2.

ST1 498937100 HOLDER
ST2 499787100 WRENCH



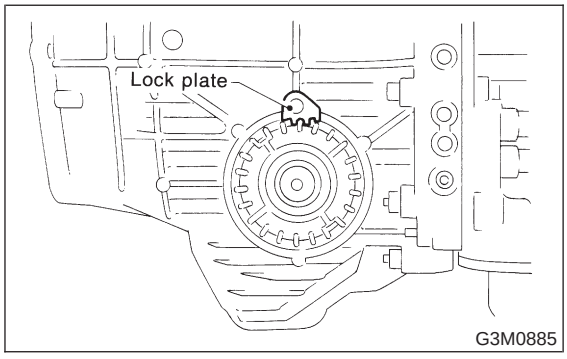
G3M0384

(5) Tighten the LH retainer until contact is felt while rotating the shaft. Then loosen the RH retainer. Keep tightening the LH retainer and loosening the RH retainer until the pinion shaft can no longer be turned. This is the “zero” state.



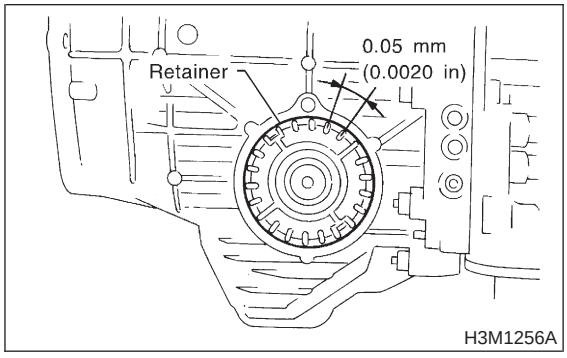
G3M0884

(6) After the “zero” state is established, back off the LH retainer 3 notches and secure it with the lock plate. Then back off the RH retainer and retighten until it stops. Repeat this procedure several times. Tighten the RH retainer 1-3/4 notches further. This sets the preload. Finally, secure the retainer with its lock plate.



G3M0885

NOTE:
Turning the retainer by one tooth changes the backlash about 0.05 mm (0.0020 in).



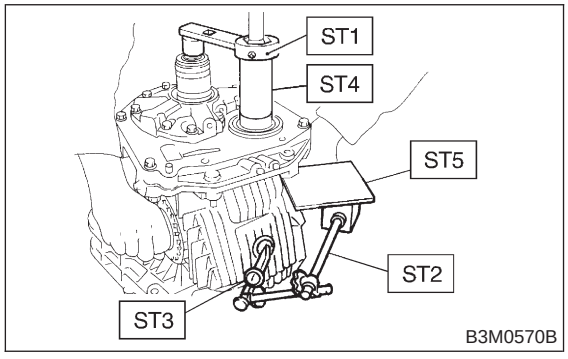
H3M1256A

(7) Turn the drive pinion several rotations with ST1 and check to see if the backlash is within the standard value with ST2, ST3, ST4 and ST5.

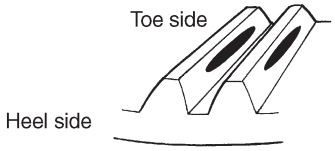
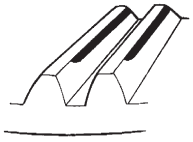
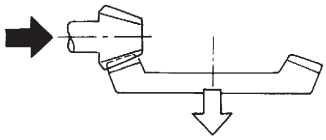
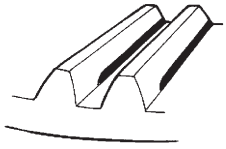
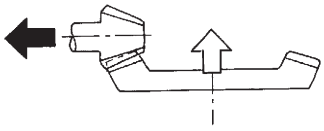
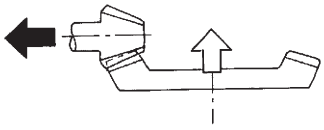
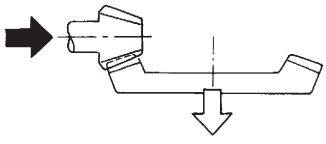
NOTE:
After confirming that the backlash is correct, check the tooth contact.

ST1	499787100	WRENCH
ST2	498247001	MAGNET BASE
ST3	498247100	DIAL GAUGE
ST4	499787500	ADAPTER WRENCH
ST5	498255400	PLATE

Backlash:
0.13 — 0.18 mm (0.0051 — 0.0071 in)



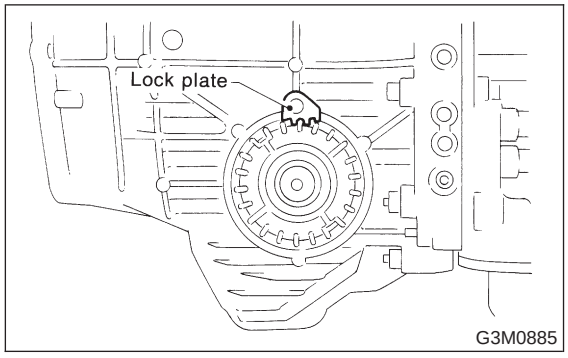
(8) Apply red lead evenly to the surfaces of three or four teeth of the crown gear. Rotate the drive pinion in the forward and reverse directions several times. Then remove the oil pump housing, and check the tooth contact pattern.
If tooth contact is improper, readjust the backlash or shim thickness.

Checking item	Contact pattern	Corrective action
Tooth contact Tooth contact pattern is slightly shifted toward to under no-load rotation. [When loaded, contact pattern moves toward heel.]	 B3M0317A	—
Face contact Backlash is too large.	This may cause noise and chipping at tooth ends.  B3M0319	Increase thickness of drive pinion height adjusting shim in order to bring drive pinion close to crown gear.  B3M0323
Flank contact Backlash is too small.	This may cause noise and stepped wear on surfaces.  B3M0320	Reduce thickness of drive pinion height adjusting shim in order to move drive pinion away from crown gear.  B3M0324
Toe contact (Inside end contact) Contact areas is small.	This may cause chipping at toe.  B3M0321	Adjust as for flank contact.  B3M0324
Heel contact (Outside end contact) Contact area is small.	This may cause chipping at heel ends.  B3M0322	Adjust as for face contact.  B3M0323

➡ : Adjusting direction of drive pinion
⇨ : Adjusting direction of crown gear

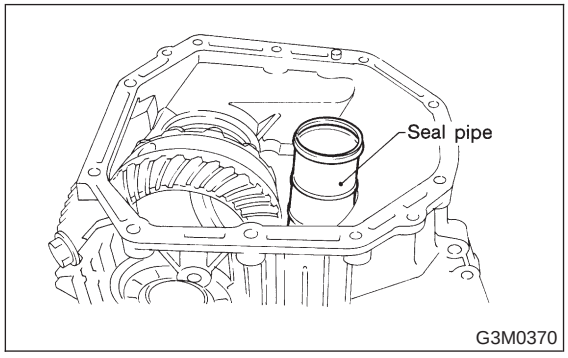
(9) If tooth contact is correct, mark the retainer position and loosen it. After fitting the O-ring, screw in the retainer to the marked position. Then tighten the lock plate to the specified torque.

Tightening torque:
25±2 N·m (2.5±0.2 kg-m, 18.1±1.4 ft-lb)



9) Install the seal pipe to the torque converter clutch case.

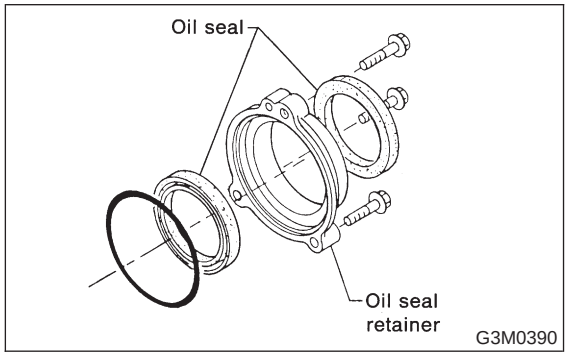
CAUTION:
Be sure to use a new seal pipe.



10) Install two oil seals to the oil seal retainer with ST.

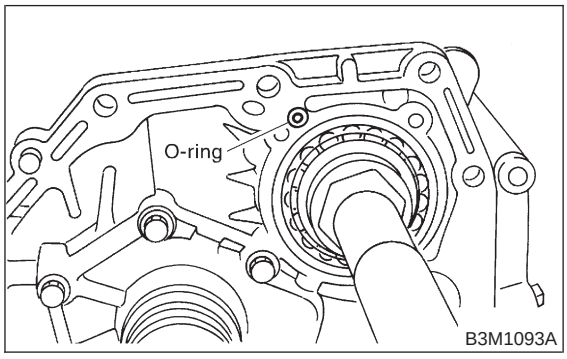
CAUTION:
● Always discard old oil seals, and install new ones.
● Pay attention to the orientation of the oil seals.

ST 499247300 INSTALLER



11) Attach the O-ring to the oil seal retainer with vaseline. Install the seal to the oil pump housing bore.

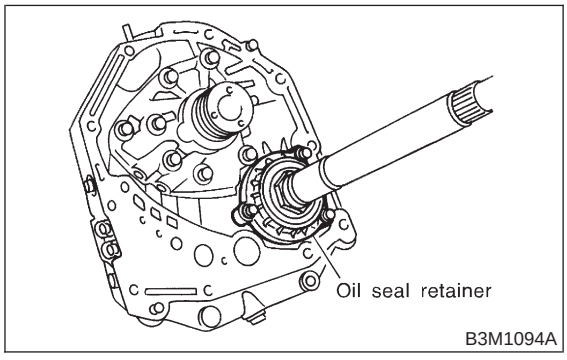
CAUTION:
Always discard old O-rings and install new ones.



12) Install the oil seal retainer taking care not to damage the oil seal lips. Then secure with three bolts.

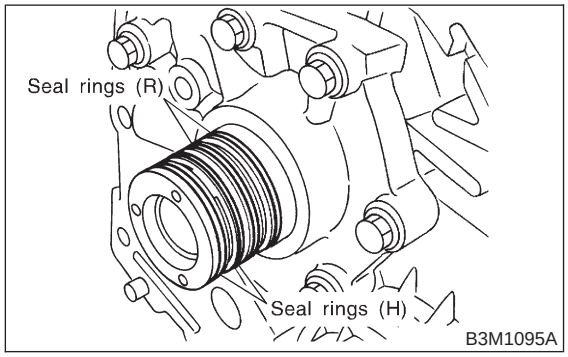
NOTE:
Make sure the O-ring is fitted correctly in position.

Tightening torque:
7±1 N·m (0.7±0.1 kg-m, 5.1±0.7 ft-lb)



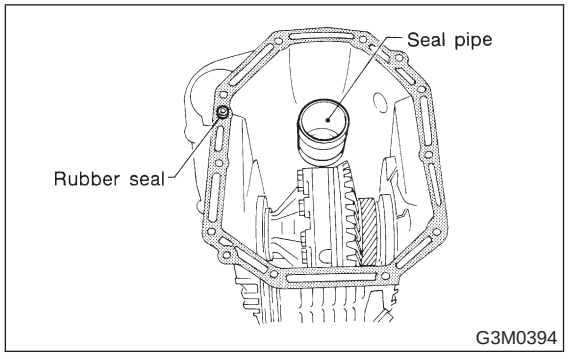
13) Apply vaseline to the groove on the oil pump cover, and install two (R) seal rings and two (H) seal rings.

NOTE:
● Fit the seal ring after compressing, and rub vaseline into the seal ring to avoid expansion.
● The “R” seal ring has a large diameter, while “H” has small diameter.



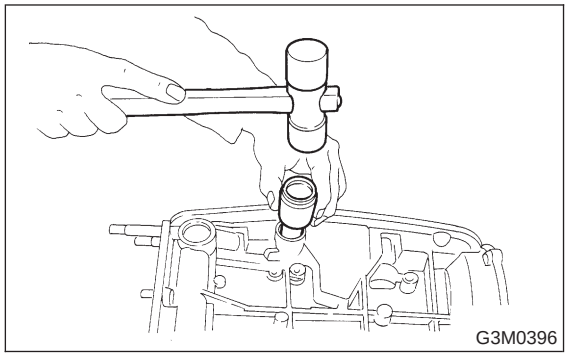
14) Install the rubber seal to the torque converter clutch case.

CAUTION:
Be careful not to lose the rubber seal.



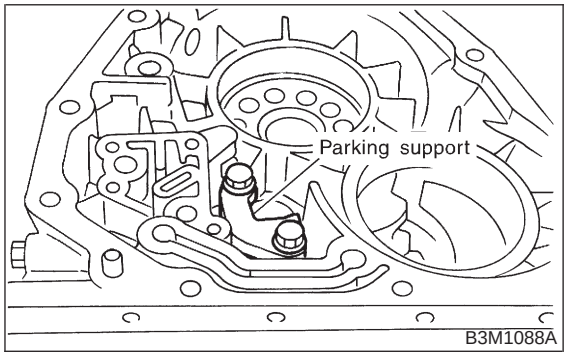
2. TRANSMISSION CASE SECTION

1) Using a plastic hammer, force-fit the oil seal.



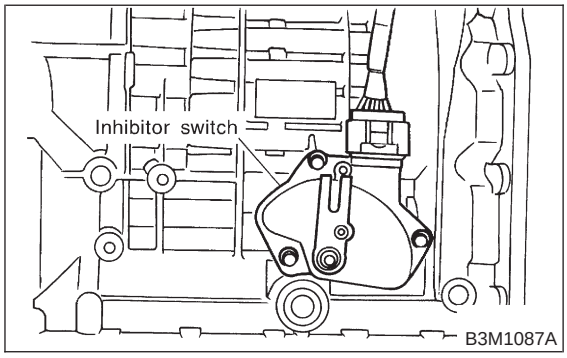
2) Install parking support to transmission case.

Tightening torque:
25±2 N·m (2.5±0.2 kg-m, 18.1±1.4 ft-lb)



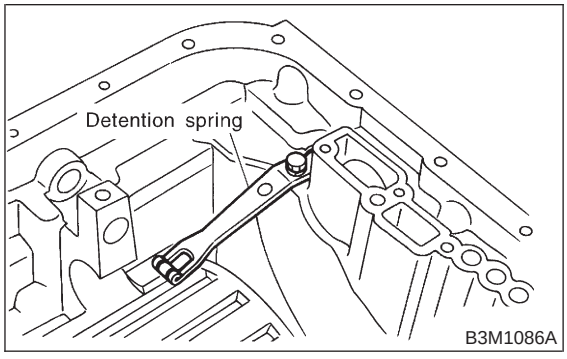
3) Install inhibitor switch to transmission case.

NOTE:
Temporary tighten inhibitor switch.



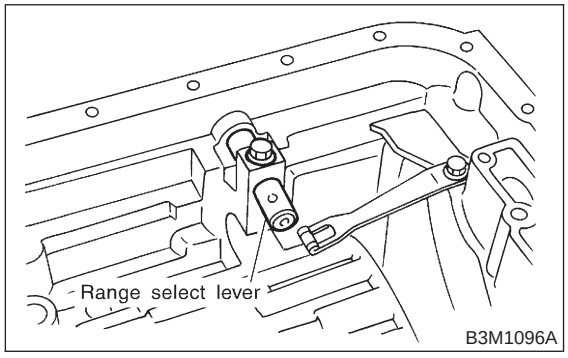
4) Install detention spring to transmission case.

Tightening torque:
6±1 N·m (0.6±0.1 kg-m, 4.3±0.7 ft-lb)

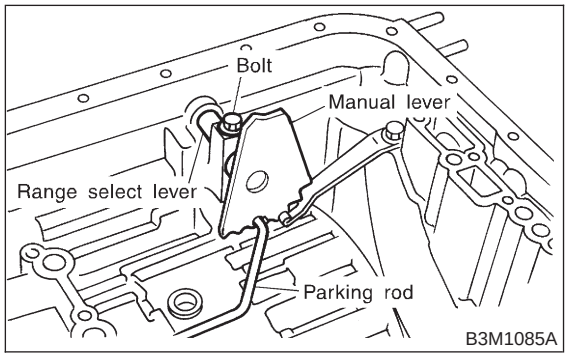


5) Insert range select lever, and tighten bolt.

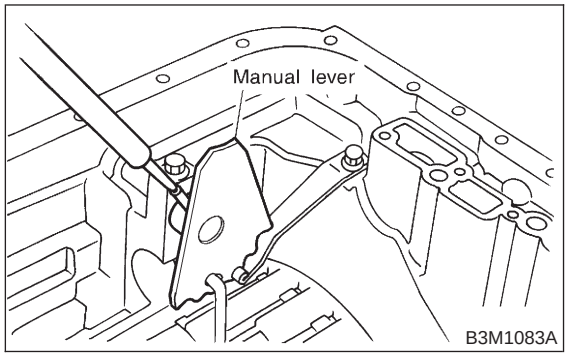
Tightening torque:
6±1 N·m (0.6±0.1 kg-m, 4.3±0.7 ft-lb)



6) Insert manual lever and parking rod.

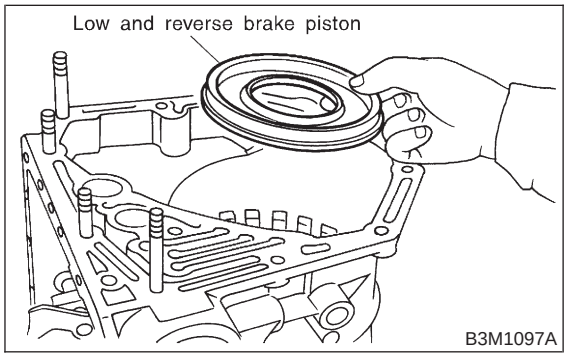


7) Insert spring pin to manual lever.

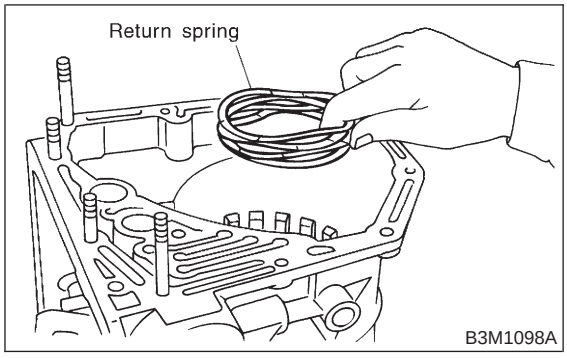


8) Install the low and reverse piston.

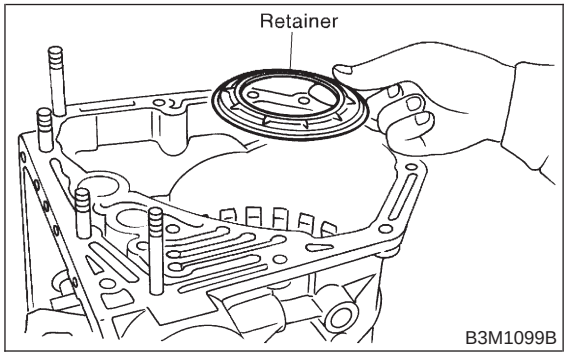
CAUTION:
- **Be careful not to tilt the piston when installing.**
- **Be careful not to damage the lip seal.**



9) Install return spring.



10) Install spring retainer.



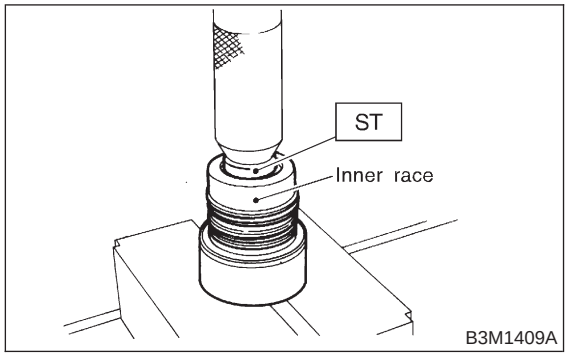
11) Install the one-way clutch inner race.

(1) Using a press and ST1, install the needle bearing to the inner race.

ST1 398497701 INSTALLER

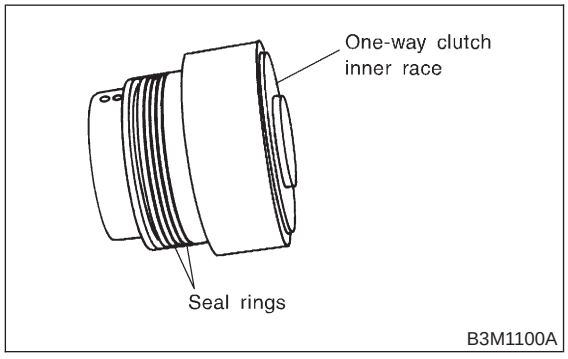
NOTE:
Use the following ST when removing.

ST 398527700 PULLER ASSY



(2) Install two seal rings to one-way clutch inner race.

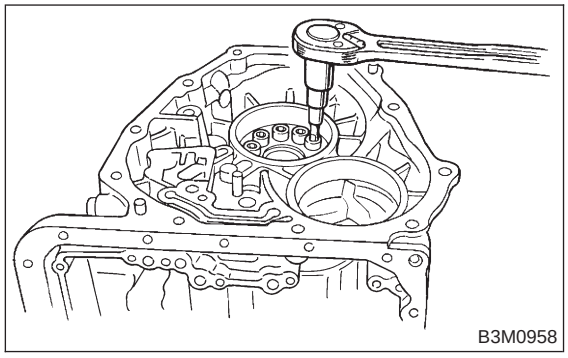
NOTE:
Apply vaseline to the groove of the inner race and to the seal ring after installation, so that the seal ring will not expand.



(3) Tighten eight socket head bolts from the rear side of the transmission case.

Tightening torque:
25±2 N·m (2.5±0.2 kg-m, 18.1±1.4 ft-lb)

CAUTION:
Be sure to tighten evenly.

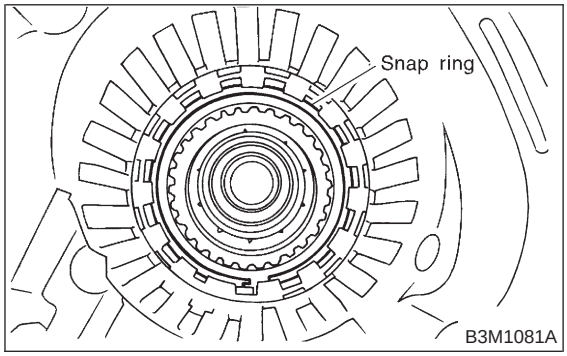


(4) Install thrust needle bearing.

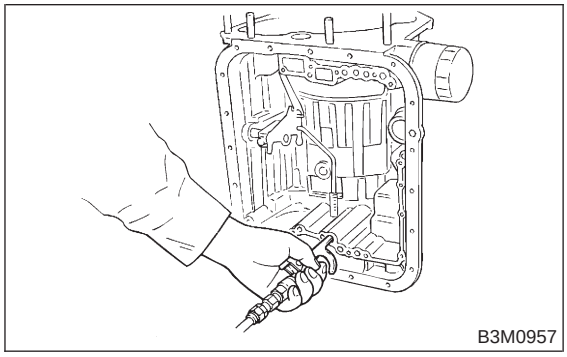
NOTE:
Place transmission case with the front facing up.

12) Installation of the low & reverse brake:
(1) Install dish plate, driven plates, drive plates, and a retaining plate, and secure with a snap ring.

NOTE:
Pay attention to the orientation of the dish plate.



(2) Apply compressed air intermittently to check for operation.

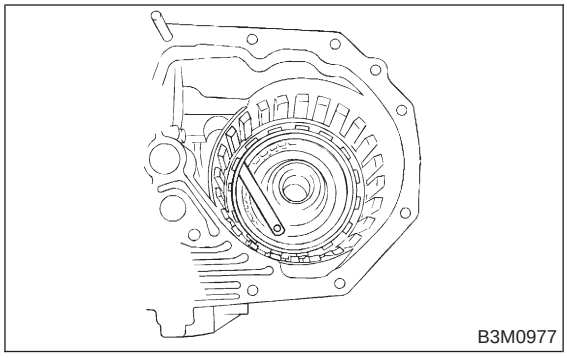


(3) Check the clearance. (Selection of retaining plate)

NOTE:
Before measuring clearance, place the same thickness of shim on both sides to prevent retaining plate from tilting.

Standard value:
0.7 — 1.2 mm (0.028 — 0.047 in)

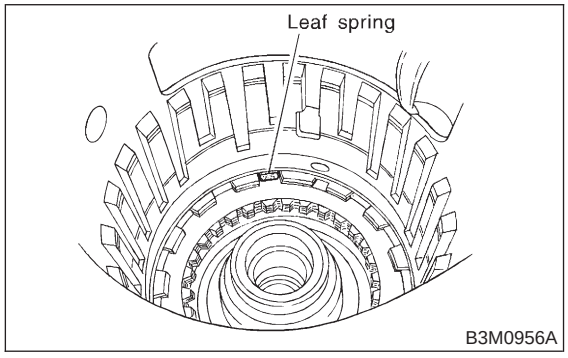
Allowable limit:
2.2 mm (0.087 in)



Available retaining plates	
Part No.	Thickness mm (in)
31667AA320	4.2 (0.165)
31667AA330	4.5 (0.177)
31667AA340	4.8 (0.189)
31667AA350	5.1 (0.201)
31667AA360	5.4 (0.213)
31667AA370	5.7 (0.224)
31667AA380	6.0 (0.236)

13) Install leaf spring of low and reverse brake.

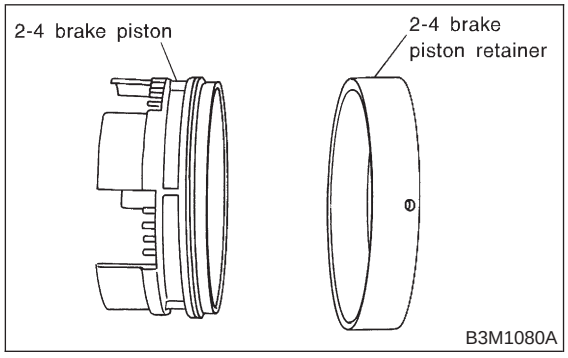
CAUTION:
Pay attention to the direction and position of leaf spring during installation.



14) Install O-ring to 2-4 brake piston.

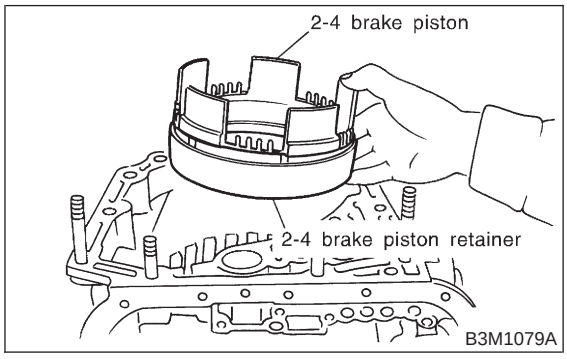
CAUTION:
- **If O-ring breaks or damage is noted, replace with new O-ring.**
- **Apply a coat of vaseline to inner side of O-ring before installation.**

15) Install 2-4 brake piston to 2-4 brake piston retainer.

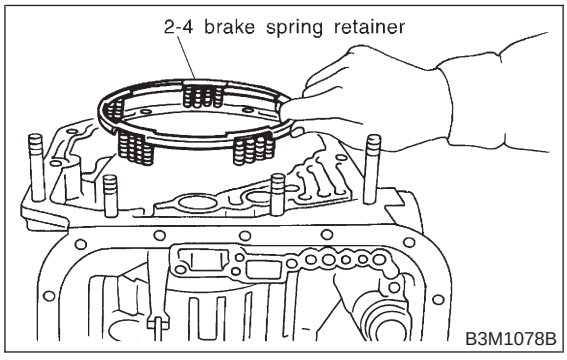


16) Install 2-4 brake piston and retainer to transmission case.

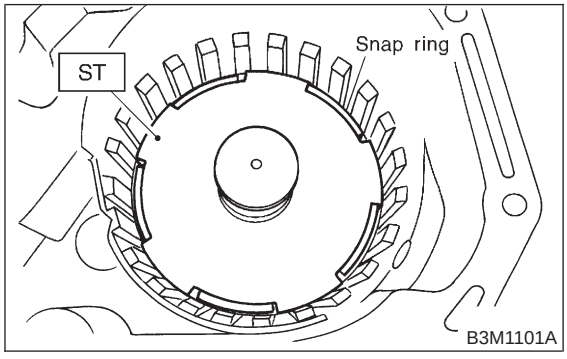
CAUTION:
Align the hole in the 2-4 brake seal of transmission case with the hole in 2-4 brake piston retainer during installation.



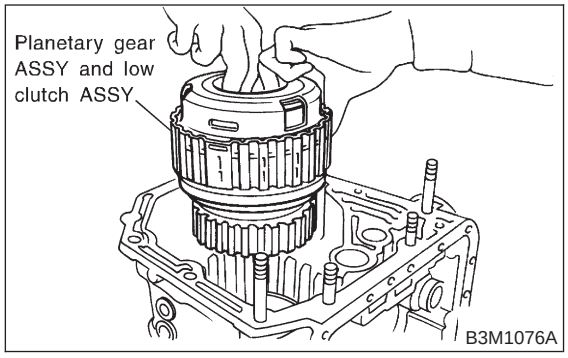
17) Install 2-4 brake piston spring retainer to transmission case.



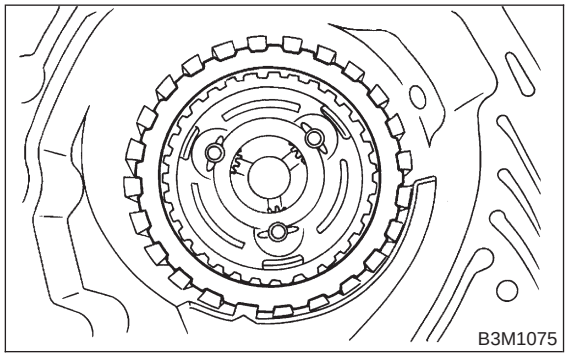
18) Position snap ring in transmission. Using ST, press the snap ring into place.
ST 498677100 COMPRESSOR



19) Install planetary gear and low clutch assembly to transmission case.
Install carefully while rotating the low clutch and planetary gear assembly slowly paying special attention not to damage the seal ring.

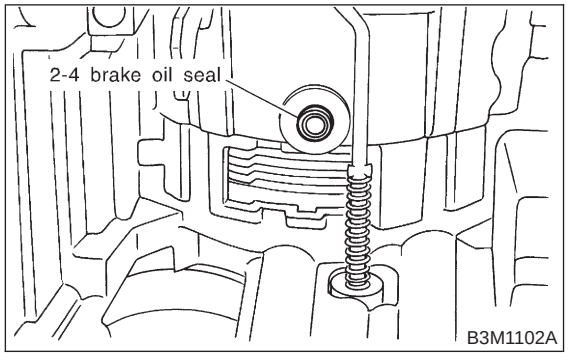


20) Installation of the 2-4 brake:
(1) Install pressure plate, drive plate, driven plate, retaining plate and snap ring.

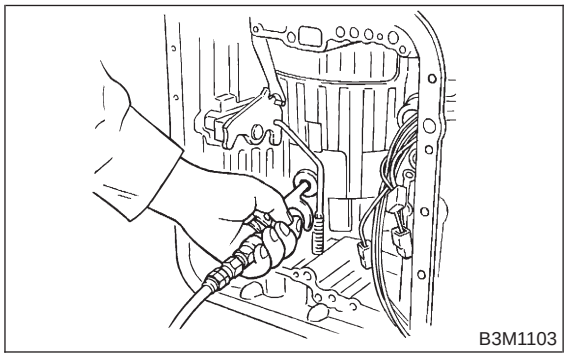


(2) Install 2-4 brake oil seal to transmission case.

NOTE:
Be sure to use a new one.



(3) After all 2-4 brake component parts have been installed, blow in air intermittently and confirm the operation of the brake.

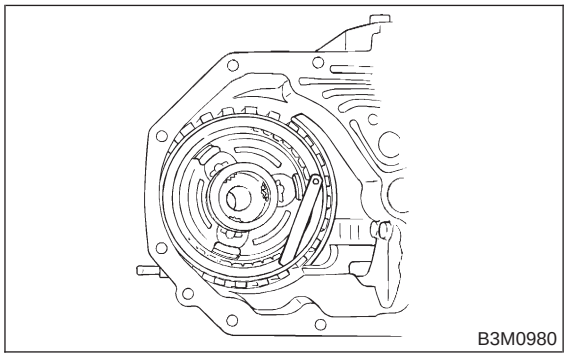


(4) Measure the clearance between the retaining plate and the snap ring.

NOTE:
Select a retaining plate with a suitable value from the following table, so that the clearance becomes the standard value.

Standard value:
0.8 — 1.2 mm (0.031 — 0.047 in)

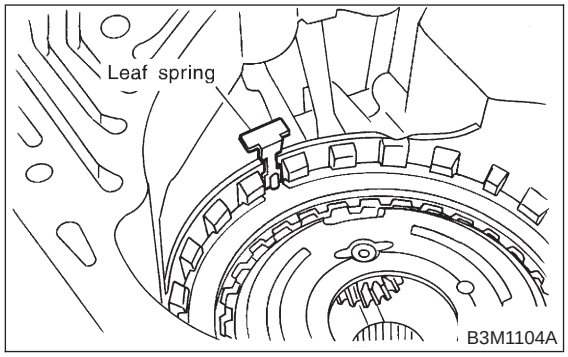
Allowable limit:
1.5 mm (0.059 in)



Available retaining plates	
Part No.	Thickness mm (in)
31567AA610	5.6 (0.220)
31567AA620	5.8 (0.228)
31567AA630	6.0 (0.236)
31567AA640	6.2 (0.244)
31567AA650	6.4 (0.252)
31567AA660	6.6 (0.260)

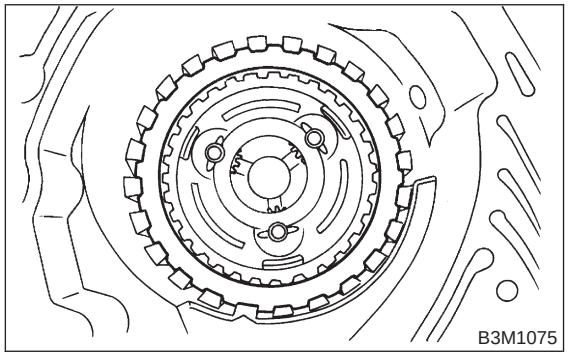
21) Install leaf spring of 2-4 brake.

NOTE:
Be careful not to mistake the location of the leaf spring to be inserted.



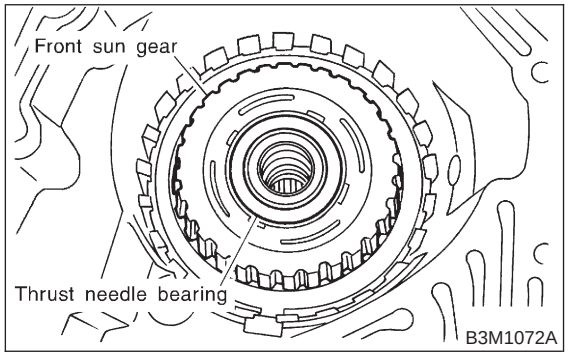
22) Install thrust needle bearing.

CAUTION:
Install thrust needle bearing in the correct direction. <Ref. to 3-2 [S1C0].>



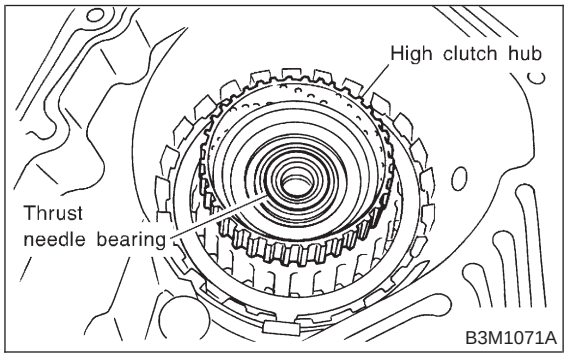
23) Install front sun gear and thrust needle bearing.

CAUTION:
Install thrust needle bearing in the correct direction. <Ref. to 3-2 [S1C0].>



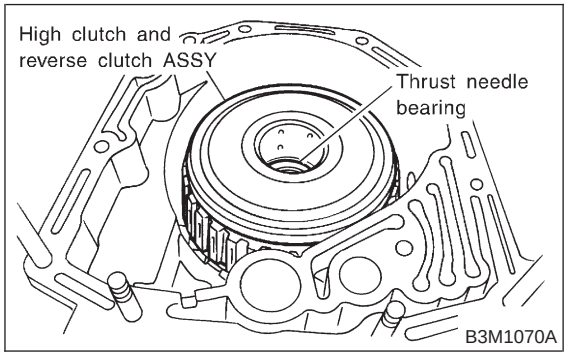
24) Install the high clutch hub and thrust needle bearing.
Attach the thrust needle bearing to the hub with vaseline and install the hub by correctly engaging the splines of the front planetary carrier.

CAUTION:
Install thrust needle bearing in the correct direction. <Ref. to 3-2 [S1C0].>

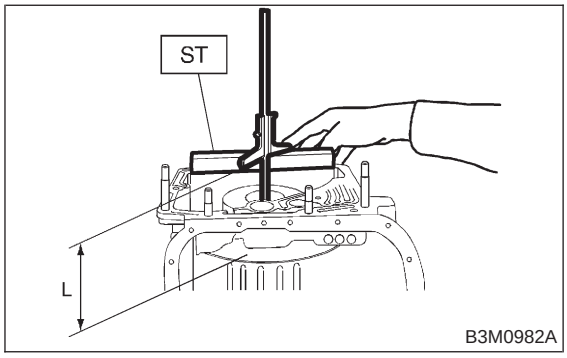


25) Install the high clutch assembly.

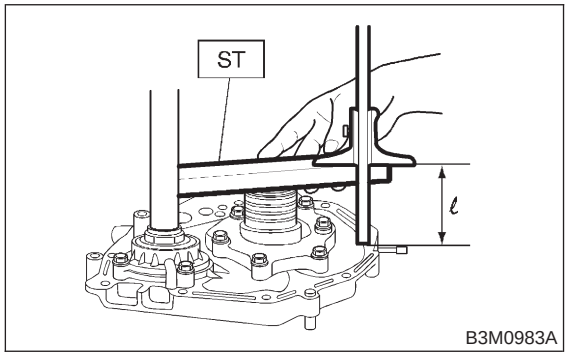
NOTE:
Correctly engage the high clutch hub and clutch splines.



26) Adjustment of total end play:
(1) Using ST, measure the distance from the transmission case mating surface to the recessed portion of the high clutch drum “L”.
ST 398643600 GAUGE

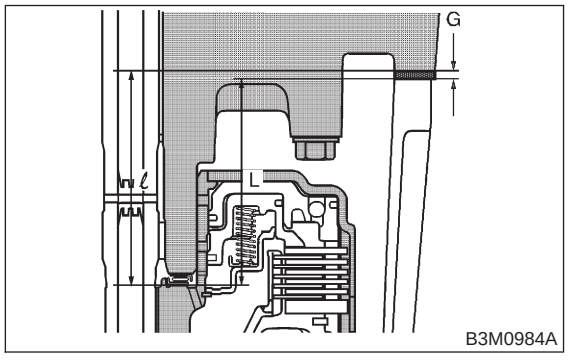


(2) Using ST, measure the distance from the oil pump housing mating surface to the top surface of the oil pump cover with thrust needle bearing.
ST 398643600 GAUGE



(3) Calculation of total end play
Select suitable bearing race from among those listed in this table so that clearance C is in the 0.25 — 0.55 mm (0.0098 — 0.0217 in) range.
C = (L + G) − ℓ

C	Clearance between concave portion of high clutch and end of clutch drum support
L	Length from case mating surface to concave portion of high clutch
G	Gasket thickness (0.28 mm, 0.0110 in)
ℓ	Height from housing mating surface to upper surface of clutch drum support



Thrust needle bearing	
Part No.	Thickness mm (in)
806528050	4.1 (0.161)
806528060	4.3 (0.169)
806528070	4.5 (0.177)
806528080	4.7 (0.185)
806528090	4.9 (0.193)
806528100	5.1 (0.201)

27) Install the oil pump housing assembly.
(1) After completing end play adjustment, insert the bearing race in the recess of the high clutch. Attach the thrust needle bearing to the oil pump cover with vaseline.

(2) After correctly installing the gasket to the case mating surface, carefully install the oil pump housing assembly. Be careful to avoid hitting the drive pinion against the inside of the case.

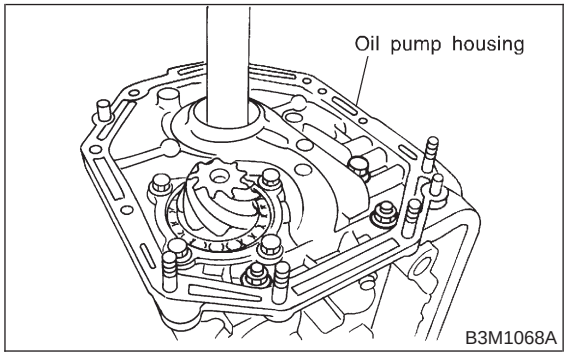
CAUTION:
- **Be careful not to damage the seal ring.**
- **Be sure to use a new gasket.**

(3) Install both parts with dowel pins aligned. Make sure no clearance exists at the mating surface.

NOTE:
Any clearance suggests a damaged seal ring.

(4) Secure the housing with two nuts.

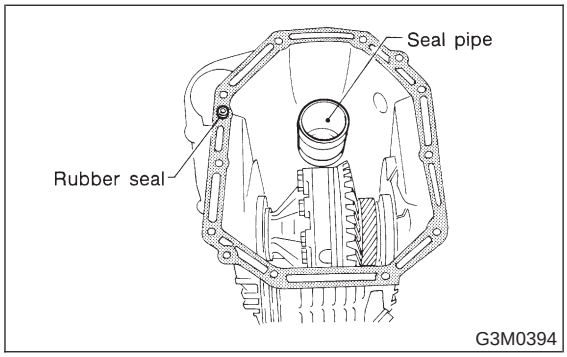
Tightening torque:
T: 41±3 N·m (4.2±0.3 kg-m, 30.4±2.2 ft-lb)



3. TORQUE CONVERTER CLUTCH CASE AND TRANSMISSION CASE

1) Apply proper amount of liquid gasket (THREE BOND Part No. 1215) to the entire torque converter clutch case mating surface.

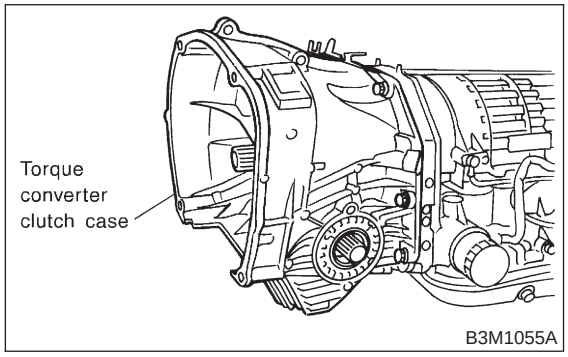
NOTE:
Make sure that the rubber seal and seal pipe are fitted in position.



2) Install the torque converter clutch case assembly to the transmission case assembly, and secure with six bolts and four nuts.

CAUTION:
When installing, be careful not to damage the torque converter clutch case bushing and oil seal.

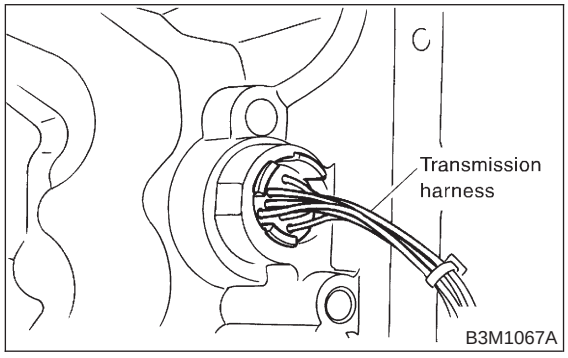
Tightening torque:
41±3 N·m (4.2±0.3 kg-m, 30.4±2.2 ft-lb)



4. CONTROL VALVE AND OIL PAN

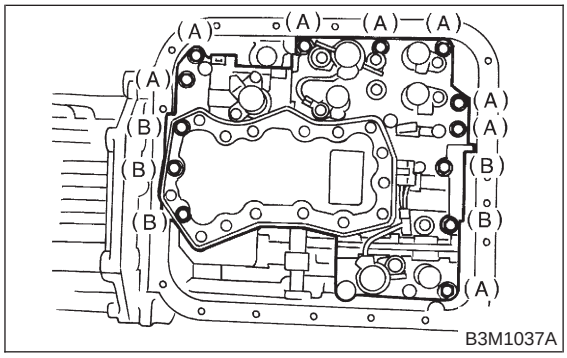
1) Install and route the transmission harness.

CAUTION:
Be careful not to damage the harness.



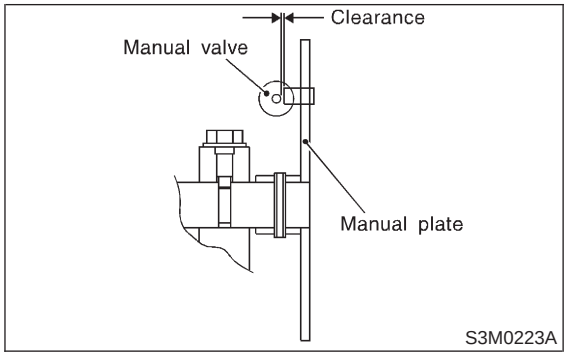
2) Install the control valve assembly.
(1) Set the select lever in range “N”.
(2) Temporarily tighten the valve body on the transmission case.

CAUTION:
Be sure to engage the manual valve with the manual plate during installation.



(A) Short bolts
(B) Long bolts

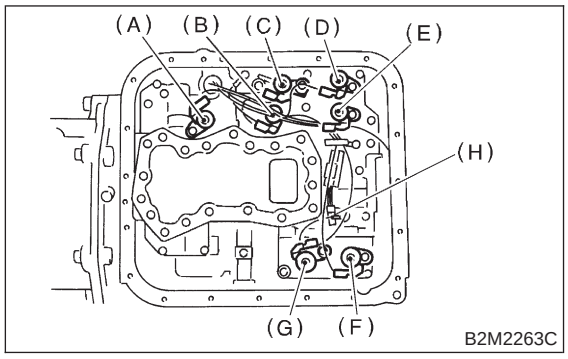
(3) Adjust the clearance between the manual valve and manual plate in the 0.1 to 0.9 mm (0.004 to 0.035 in) range.



(4) Tighten the valve body to the specified torque.

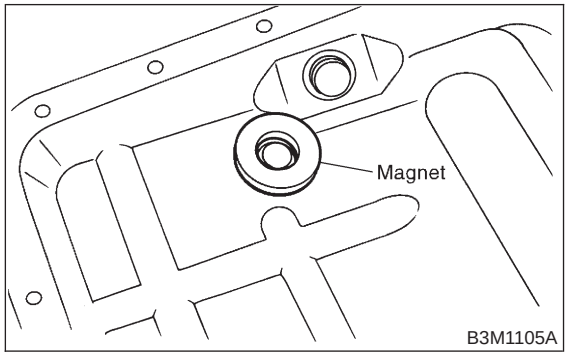
Tightening torque:
8±1 N·m (0.8±0.1 kg-m, 5.8±0.7 ft-lb)

3) Connect all connectors.

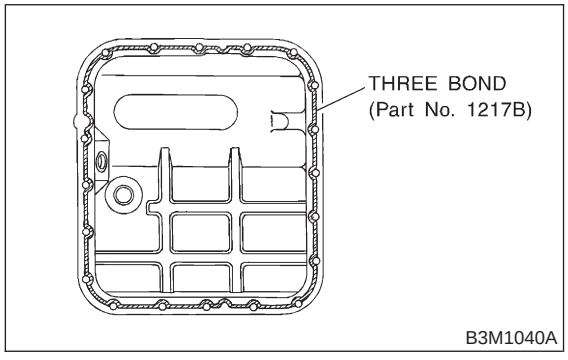


(A) Lock-up duty solenoid (Blue)
(B) Low clutch timing solenoid (Gray)
(C) Line pressure duty solenoid (Red)
(D) Shift solenoid 2 (Yellow)
(E) Shift solenoid 1 (Green)
(F) 2-4 brake timing solenoid (Black)
(G) 2-4 brake duty solenoid (Red)
(H) ATF temperature sensor

4) Install the oil pan.
(1) Attach the magnet at the specified position.



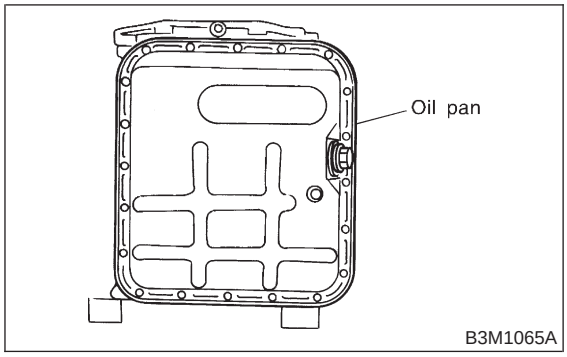
(2) Apply proper amount of liquid gasket (THREE BOND Part No. 1217B) to the entire oil pan mating surace.



(3) Install the oil pan to the transmission case assembly, and secure with 20 bolts.

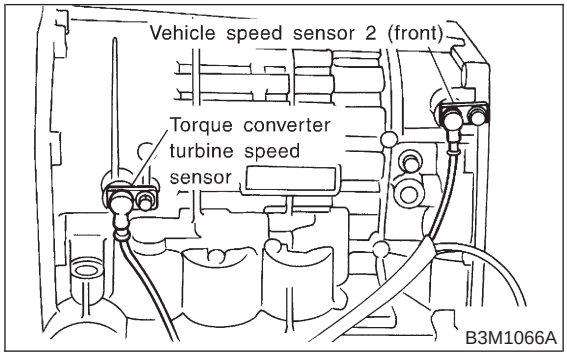
NOTE:
Tighten the bolts evenly.

Tightening torque:
4.9±0.5 N·m (0.50±0.05 kg-m, 3.6±0.4 ft-lb)



5) Install torque converter turbine speed sensor and vehicle speed sensor 2 (front).

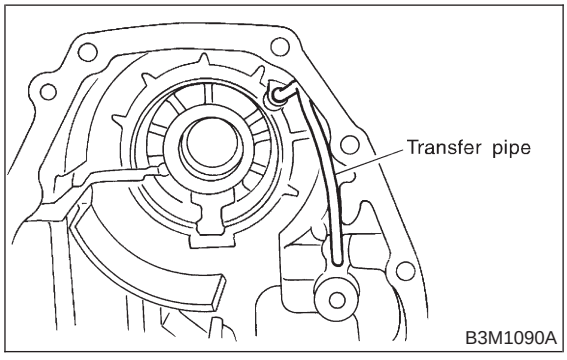
Tightening torque:
7±1 N·m (0.7±0.1 kg-m, 5.1±0.7 ft-lb)



5. EXTENSION SECTION

NOTE:
When installing new oil seal into extension case, press it with ST.

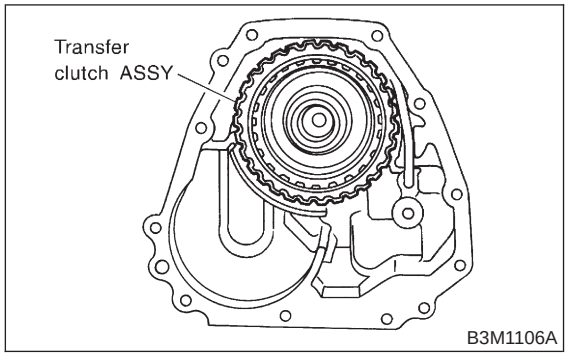
ST 498057300 INSTALLER
1) Install the transfer pipe to extension case.



2) Install the transfer clutch assembly to the case.

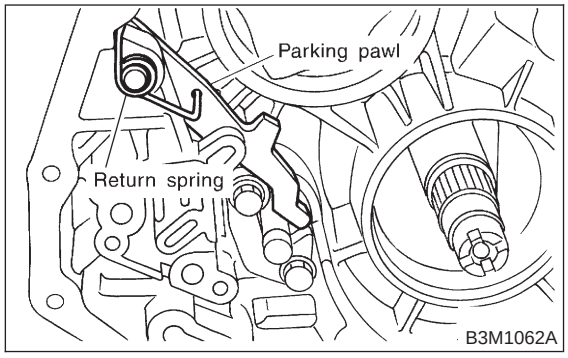
CAUTION:
Be careful not to damage the seal rings.

NOTE:
Insert the clutch assembly fully into position until the bearing shoulder bottoms.

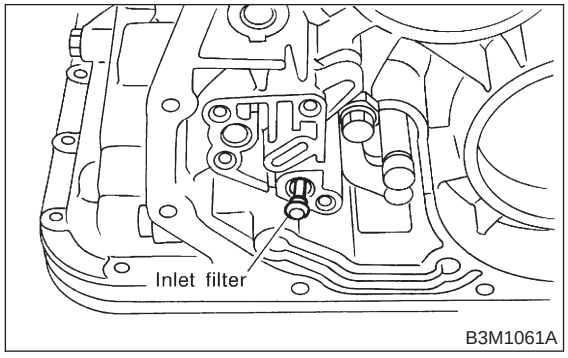


6. CONNECTION OF EACH SECTION

1) Install the parking pawl, shaft and return spring.



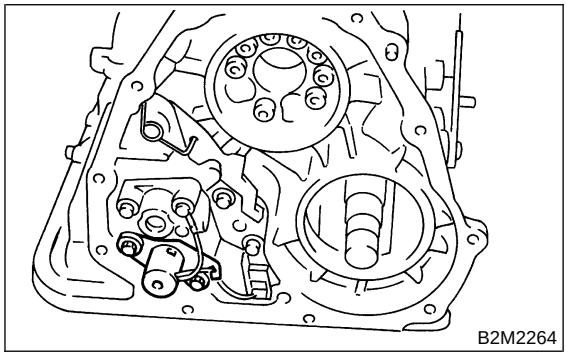
2) Install inlet filter to transmission case.



3) Install transfer valve plate, valve body and duty solenoid C (transfer) to transmission case.

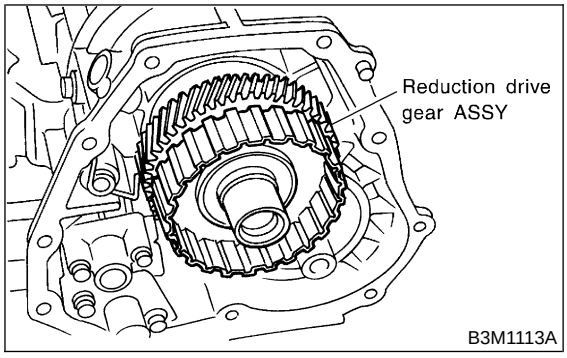
CAUTION:
- **Be sure to install transfer seal lip to transfer control valve body.**
- **If transfer seal lip is damaged, replace seal with new one.**

Tightening torque:
8±1 N·m (0.8±0.1 kg-m, 5.8±0.7 ft-lb)



4) Connect connector to duty solenoid C (transfer).
5) Install the reduction drive gear assembly.

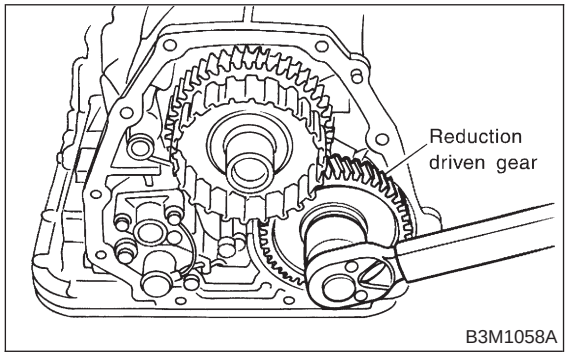
NOTE:
Insert it fully into position until the bearing shoulder bottoms.



6) Using a plastic hammer, install reduction driven gear assembly, and tighten drive pinion lock nut.

NOTE:
- Be sure to use a new lock nut and a washer.
- Set the select lever in the “P” range.
- After tightening, stake the lock nut securely.

Tightening torque:
98±5 N·m (10.0±0.5 kg-m, 72.3±3.6 ft-lb)

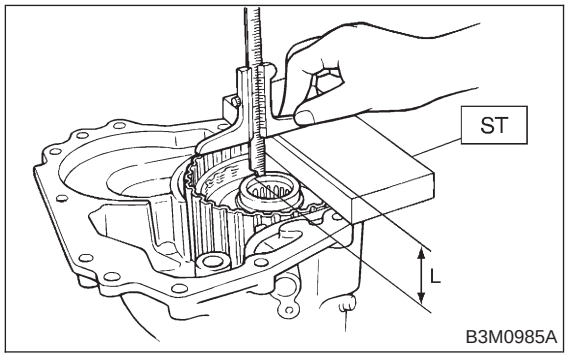


7) Measurement and adjustment of extension end play

(1) Measure distance L from end of extension case and rear drive shaft with ST.

ST 398643600 GAUGE

L = Measured value − 15 mm

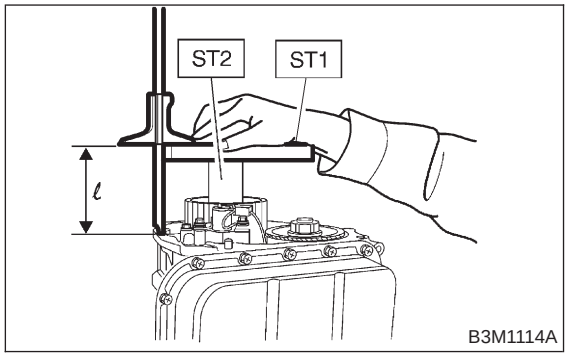


(2) Measure the distance “ℓ” from the transmission case mating surface to the reduction drive gear end surface with ST1 and ST2.

ℓ = Measured value − 50 mm

ST1 398643600 GAUGE

ST2 499577000 GAUGE



(3) Calculation equation:

NOTE:
Add 0.05 mm (0.0020 in) and 0.20 mm (0.0079 in) thick shims to area “T”. Calculate formula 2 to determine “H”. The calculated “H” refers to the shim thickness range. Select shims of suitable thicknesses within the calculated “H” range.

T = (L + G) − ℓ − H

T : Shim clearance

L : Distance from end of extension case to end of rear drive shaft

G: Gasket thickness (0.45 mm, 0.0177 in)

ℓ : Height from end of transmission case to end of reduction drive gear

H : Thrust needle bearing thickness

0.05 — 0.25 mm (0.0020 — 0.0098 in)

Thrust needle bearing	
Part No.	Thickness mm (in)
806536020	3.8 (0.150)
806535030	4.0 (0.157)
806535040	4.2 (0.165)
806535050	4.4 (0.173)
806535060	4.6 (0.181)
806535070	4.8 (0.189)
806535090	5.0 (0.197)

8) Installation of extension case and transmission case

(1) Attach the selected thrust needle bearing to the end surface of reduction drive gear with vaseline.

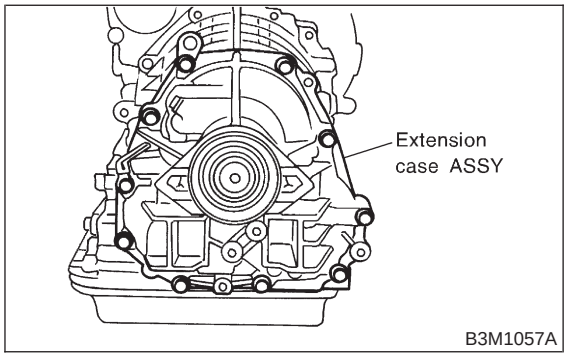
CAUTION:
Install thrust needle bearing in the correct direction. <Ref. to 3-2 [S1C0].>

(2) Install the extension case to the transmission case.

CAUTION:
Be sure to use a new gasket.

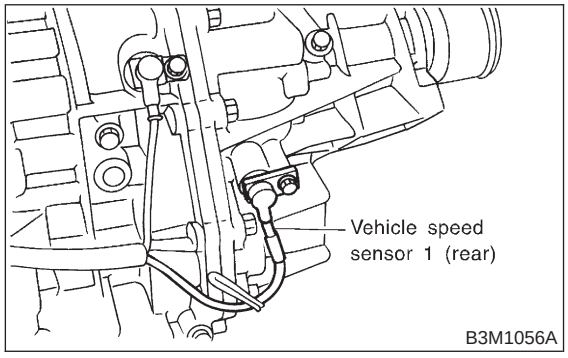
(3) Tighten bolts to secure the case.

Tightening torque:
25±2 N·m (2.5±0.2 kg-m, 18.1±1.4 ft-lb)



9) Install the vehicle speed sensor 1 (rear).

Tightening torque:
7±1 N·m (0.7±0.1 kg-m, 5.1±0.7 ft-lb)

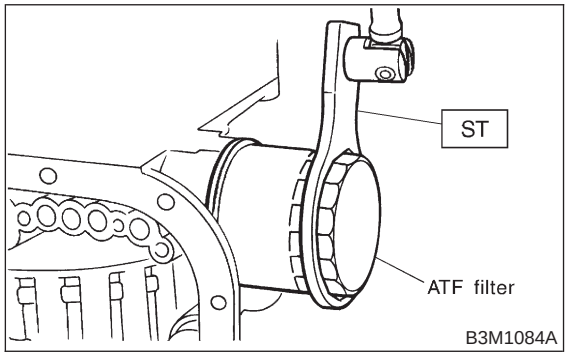


7. EXTERNAL PARTS

1) Using ST, install ATF filter to transmission case. Calculate ATF filter torque specifications using the following formula.
$T_2 = L_2/(L_1 + L_2) \times T_1$
T_1: 14±2 N·m (1.4±0.2 kg-m, 10.1±1.4 ft-lb) [Required torque setting]
T_2: Tightening torque
L_1: ST length 0.078 m (3.07 in)
L_2: Torque wrench length

CAUTION:
Align ST with torque wrench while tightening AFT filter.

ST 498545400 OIL FILTER WRENCH

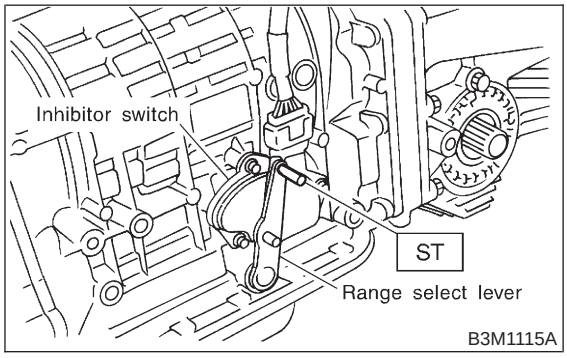


2) Adjustment of inhibitor switch

(1) With the select lever set to "N" adjust the inhibitor switch so that the hole of range select lever is aligned with the inhibitor switch hole with ST.

NOTE:
Ensure that gauge moves properly.

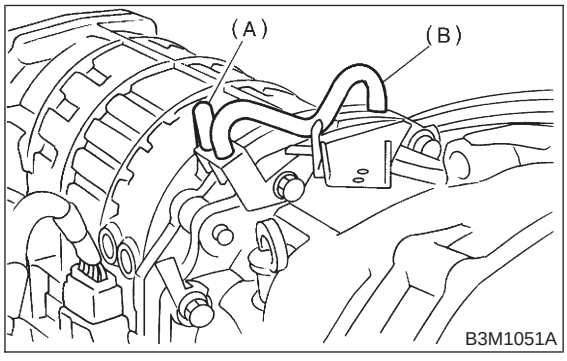
ST 499267300 STOPPER PIN



(2) With hole aligned, tighten three bolts to secure the inhibitor switch.

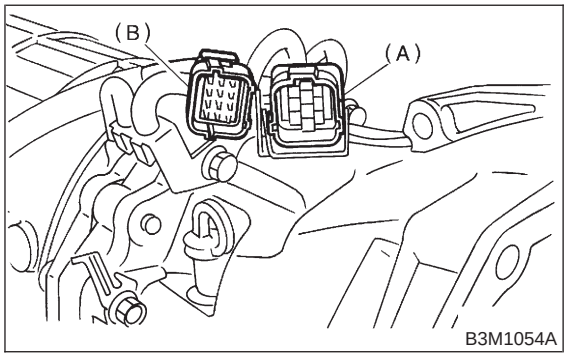
Tightening torque:
3.4±0.5 N·m (0.35±0.05 kg-m, 2.5±0.4 ft-lb)

3) Install air breather hose.



(A) Air breather hose (Transmission case)
(B) Air breather hose (Oil pump housing)

4) Clip the following cords and harness.



(A) Transmission harness
(B) Inhibitor switch harness

5) Install the oil cooler outlet pipe.

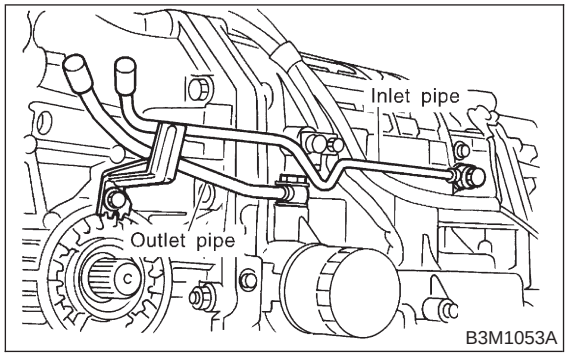
CAUTION:
Be sure to use a new aluminum washer.

Tightening torque:
34±3 N·m (3.5±0.3 kg-m, 25.3±2.2 ft-lb)

6) Install the oil cooler inlet pipe.

CAUTION:
Be sure to use a new aluminum washer.

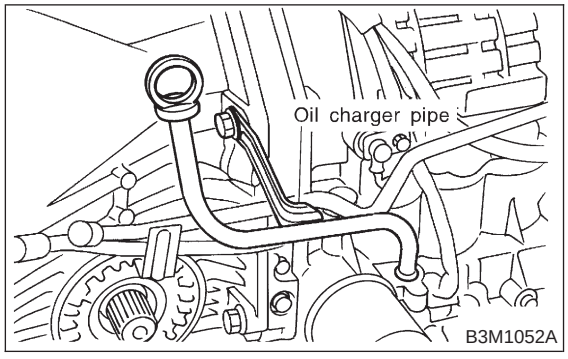
Tightening torque:
25±2 N·m (2.5±0.2 kg-m, 18.1±1.4 ft-lb)



7) Install the oil charge pipe.

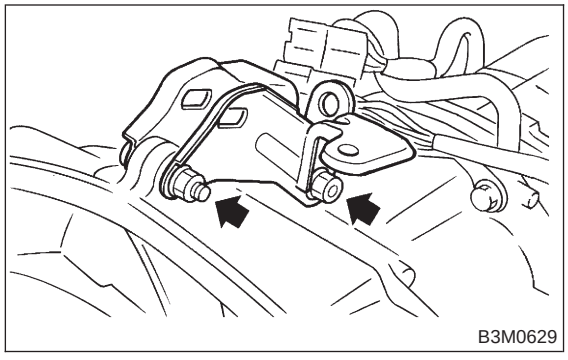
CAUTION:
Be careful not to damage the O-ring.

Tightening torque:
41±3 N·m (4.2±0.3 kg-m, 30.4±2.2 ft-lb)



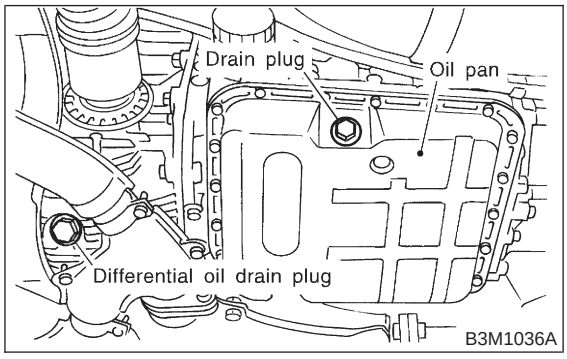
8) Install the pitching stopper bracket.

Tightening torque:
41±3 N·m (4.2±0.3 kg-m, 30.4±2.2 ft-lb)



9) Tighten the drain plugs.

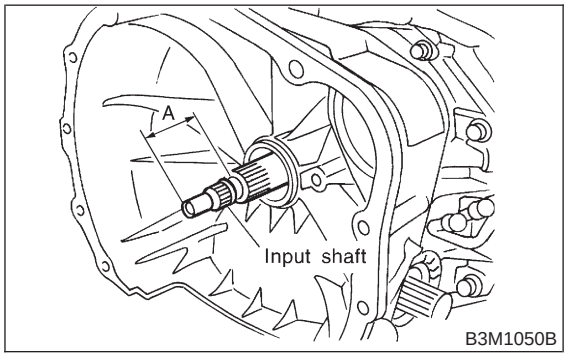
Tightening torque:
Diff.
44±3 N·m (4.5±0.3 kg-m, 32.5±2.2 ft-lb)
ATF
25±2 N·m (2.5±0.2 kg-m, 18.1±1.4 ft-lb)



10) Insert the input shaft while turning lightly by hand.

CAUTION:
Be careful not to damage the bushing.

Normal protrusion A:
50 — 55 mm (1.97 — 2.17 in)



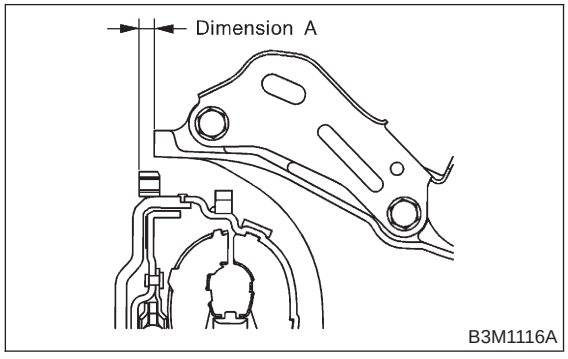
11) Install the torque converter clutch assembly.
(1) Install the oil pump shaft to the torque converter clutch.

NOTE:
Make sure the clip fits securely in its groove.

(2) Holding the torque converter clutch assembly by hand, carefully install it to the torque converter clutch case. Be careful not to damage the bushing. Also avoid undue contact between the oil pump shaft bushing and stator shaft portion of the oil pump cover.

(3) Rotate the shaft lightly by hand to engage the splines securely.

Dimension A:
2200 cc; −1.3 to −1.1 mm (−0.051 to −0.043 in)
2500 cc; 2.7 — 2.9 mm (0.106 — 0.114 in)



12) Fill ATF and differential gear oil.

NOTE:
After filling oil, insert the oil level gauge into the oil inlet.

Differential gear oil capacity:
1.1 — 1.3 ℓ (1.2 — 1.4 US qt, 1.0 — 1.1 Imp qt)

Automatic transmission fluid capacity:
2200 cc; 8.4 — 8.7 ℓ (8.9 — 9.2 US qt, 7.4 — 7.7 Imp qt)
2500 cc; 9.3 — 9.6 ℓ (9.8 — 10.1 US qt, 8.2 — 8.4 Imp qt)

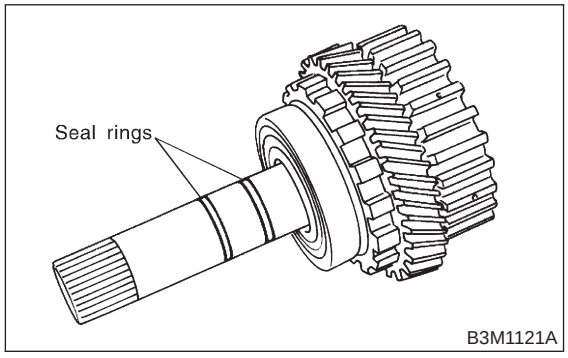
Recommended fluid:
Dexron IIE or Dexron III type automatic transmission

12. Reduction Drive Gear Assembly

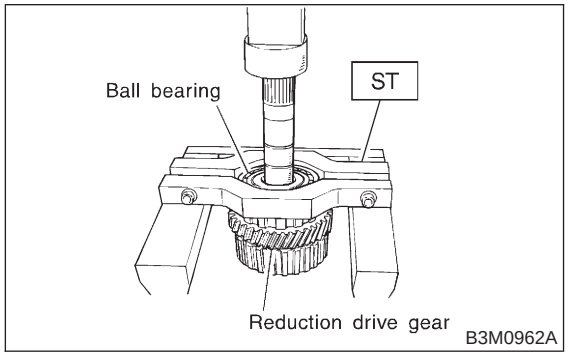
A: DISASSEMBLY

1) Take out the seal rings.

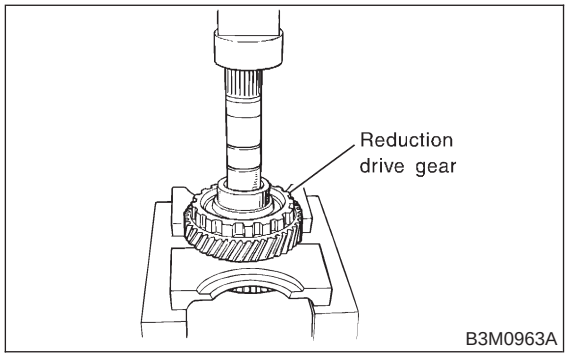
CAUTION:
Be careful not to damage the seal rings.



2) Using ST, remove the ball bearing.
ST 498077600 REMOVER



3) Using a press, remove the reduction drive gear.



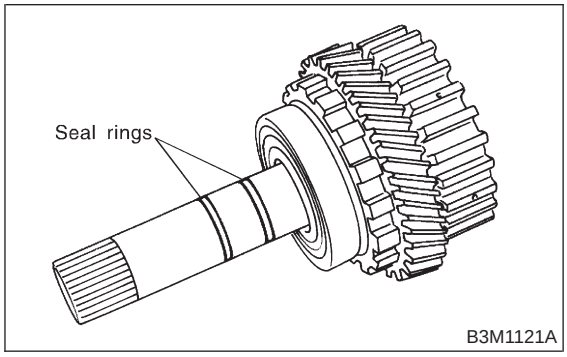
B: INSPECTION

Make sure that each component is free of harmful gouges, cuts, or dust.

C: ASSEMBLY

1) Press-fit the reduction drive gear to the shaft.
2) Press-fit the ball bearing to the reduction drive gear.
3) Attach two seal rings.

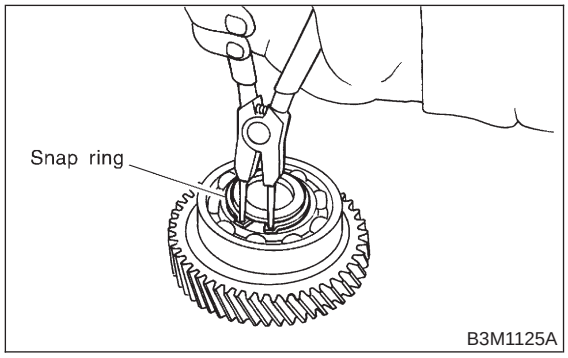
NOTE:
To make subsequent assembly easier, apply vaseline to the grooves of the shaft and to the exterior of the seal ring.



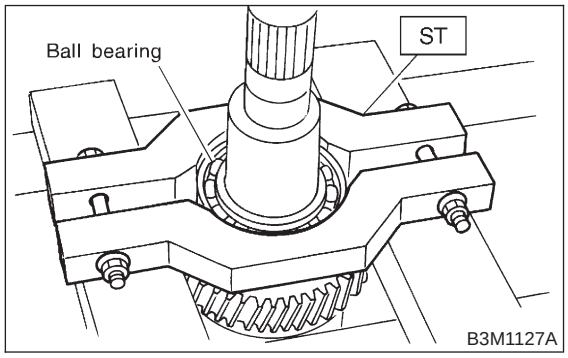
13. Reduction Driven Gear

A: DISASSEMBLY

1) Remove snap ring from reduction driven gear.



2) Using ST, remove ball bearing from reduction driven gear.
ST 498077600 REMOVER

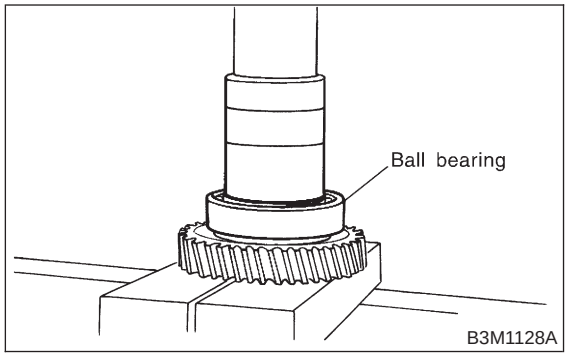


B: INSPECTION

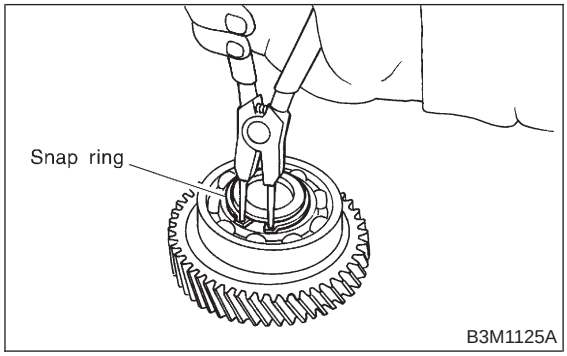
Check ball bearing and gear for dents or damage.

C: ASSEMBLY

1) Using a press, install ball bearing to reduction driven gear.



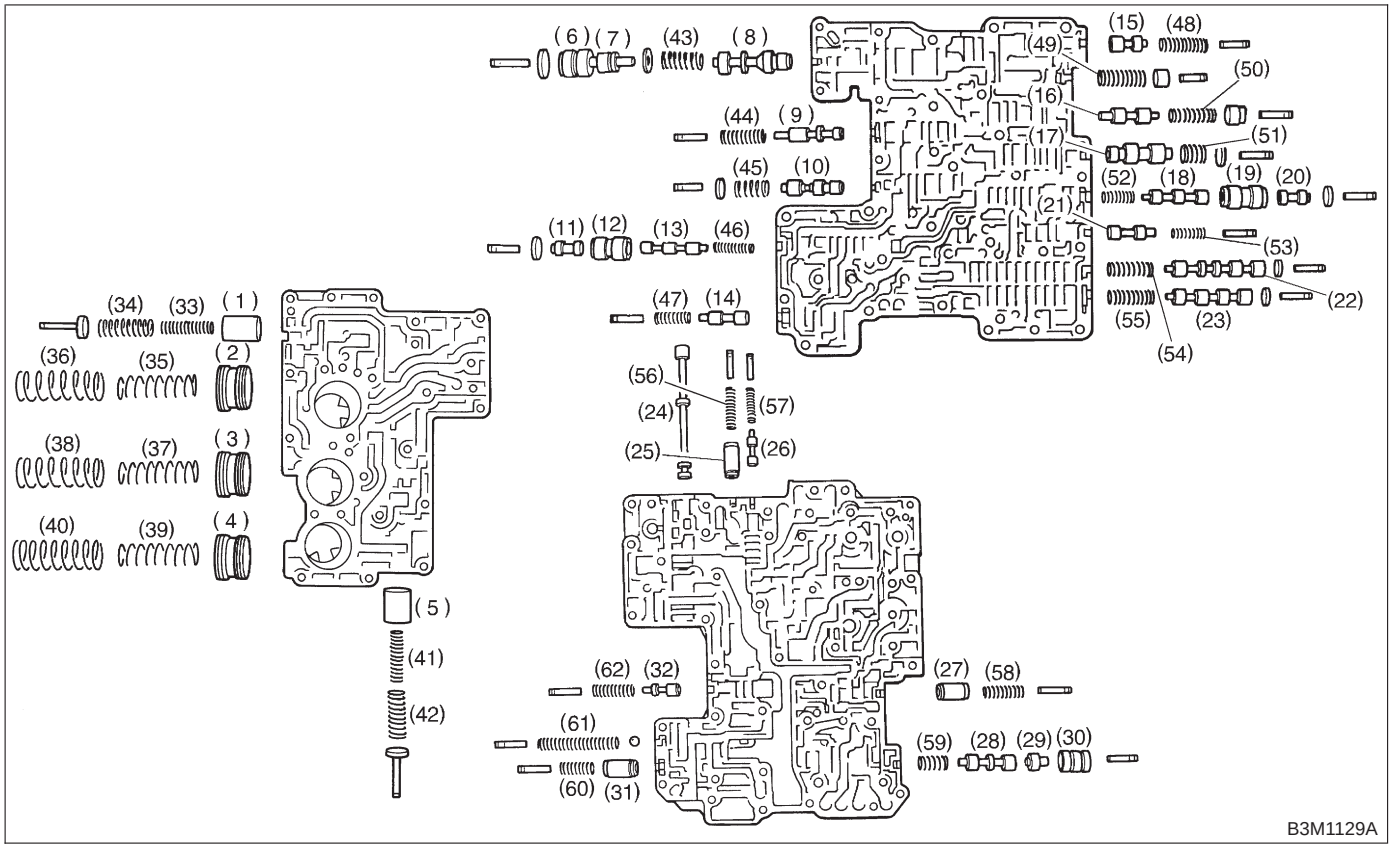
2) Install snap ring to reduction driven gear.



14. Control Valve Body

A: PRECAUTION

The control valve is composed of parts which are accurately machined to a high degree and should be handled carefully during disassembly and assembly. As these parts are similar in shape, they should be arranged in neat order on a table after disassembly so that they can be easily installed to their original positions. Spring loaded parts should be also handled carefully, as springs may jump out of place when the parts are disassembled or removed. Extreme care should be taken so as not to drop valves on the floor. Before assembling, the parts and valves should be dipped in a container filled with the ATF. Make sure that the valves are clean and free from any foreign material before assembly. Torque specifications should also be observed.

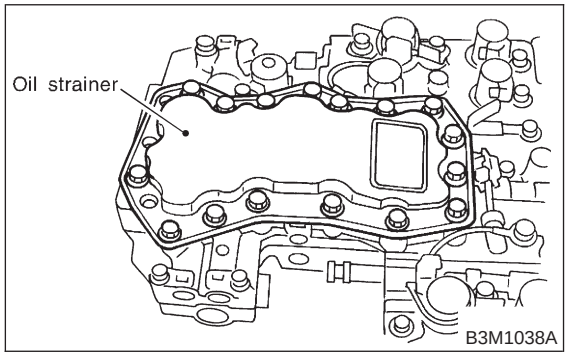


(1) 2-4 brake clutch accumulator piston B
(2) 2-4 brake clutch accumulator piston A
(3) Low clutch accumulator piston
(4) High clutch accumulator piston A
(5) High clutch accumulator piston B
(6) Pressure regulator sleeve
(7) Pressure regulator plug
(8) Pressure regulator valve
(9) Reverse inhibit valve
(10) Accumulator control valve B
(11) 2-4 brake timing plug
(12) 2-4 brake timing sleeve
(13) 2-4 brake timing valve A
(14) 2-4 brake timing valve B
(15) Torque convertor regulator valve
(16) Pressure modifier valve
(17) Accumulator control valve A
(18) Low clutch timing valve A
(19) Low clutch timing sleeve
(20) Low clutch timing plug
(21) Low clutch timing valve B
(22) Shift valve B
(23) Shift valve A
(24) Manual valve
(25) Throttle accumulator piston B
(26) 1st reducing valve
(27) Throttle accumulator piston A
(28) Lock-up control valve
(29) Lock-up control plug
(30) Lock-up control sleeve
(31) Modifier accumulator piston
(32) Pilot valve

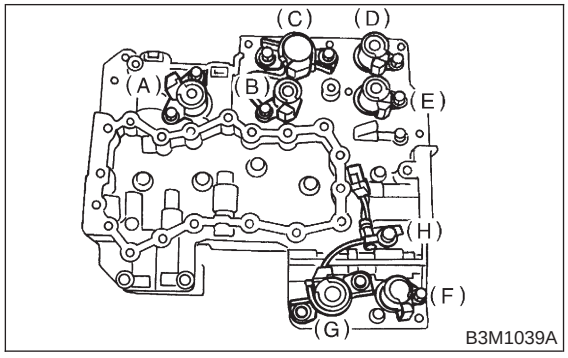
No.	Part name	Wire dia. mm (in)	Average dia. mm (in)	Effective turn	Free length mm (in)
33	2-4 brake accumulator B spring (Inlet)	1.6 (0.063)	9.3 (0.366)	14.6	47.0 (1.850)
34	2-4 brake accumulator B spring (Outlet)	2.3 (0.091)	13.7 (0.539)	8.79	45.0 (1.772)
35	2-4 brake accumulator A spring (Inlet)	1.8 (0.071)	21.3 (0.839)	8.0	69.1 (2.720)
36	2-4 brake accumulator A spring (Outlet)	1.7 (0.067)	25.3 (0.996)	6.3	69.1 (2.720)
37	Low clutch accumulator spring (Inlet)	1.8 (0.071)	21.3 (0.839)	8.0	69.1 (2.720)
38	Low clutch accumulator spring (Outlet)	1.7 (0.067)	25.3 (0.996)	6.3	69.1 (2.720)
39	High clutch accumulator A spring (Inlet)	1.8 (0.071)	21.3 (0.839)	8.0	69.1 (2.720)
40	High clutch accumulator A spring (Outlet)	1.7 (0.067)	25.3 (0.996)	6.3	69.1 (2.720)
41	High clutch accumulator B spring (Inlet)	1.6 (0.063)	9.3 (0.366)	14.6	47.0 (1.850)
42	High clutch accumulator B spring (Outlet)	2.3 (0.091)	13.7 (0.539)	8.79	45.0 (1.772)
43	Pressure regulator valve spring	1.0 (0.039)	13.5 (0.531)	6.5	35.0 (1.378)
44	Reverse inhibit valve spring	0.65 (0.0256)	8.4 (0.331)	7.7	26.5 (1.043)
45	Accumulator control valve B spring	0.5 (0.020)	10.5 (0.413)	4.5	21.5 (0.846)
46	2-4 brake timing valve A spring	0.50 (0.0197)	6.5 (0.256)	7.78	19.3 (0.760)
47	2-4 brake timing valve B spring	0.60 (0.0236)	5.8 (0.228)	7.7	20.0 (0.787)
48	Torque converter regulator valve spring	1.40 (0.0551)	7.6 (0.299)	12.1	34.7 (1.366)
49	Hold spring	0.8 (0.031)	9.7 (0.382)	11.5	40.0 (1.575)
50	Pressure modifier valve spring	0.7 (0.028)	8.3 (0.327)	8.2	26.9 (1.059)
51	Accumulator control valve A	0.7 (0.028)	10.3 (0.406)	3.6	15.1 (0.594)
52	Low clutch timing valve A spring	0.5 (0.020)	6.5 (0.256)	7.78	19.3 (0.760)
53	Low clutch timing valve B spring	0.60 (0.0236)	5.8 (0.228)	7.7	20.0 (0.787)
54	Shift valve B spring	0.80 (0.0315)	8.2 (0.323)	7.9	25.2 (0.992)
55	Shift valve A spring	0.80 (0.0315)	8.2 (0.323)	7.9	25.2 (0.992)
56	Throttle accumulator B spring	1.6 (0.063)	8.4 (0.331)	9.77	36.0 (1.417)
57	1st reducing valve spring	0.75 (0.0295)	6.0 (0.236)	12.5	25.4 (1.000)
58	Throttle accumulator A spring	1.7 (0.067)	8.0 (0.315)	9.61	36.0 (1.417)
59	Lock-up control valve spring	0.9 (0.035)	11.2 (0.441)	4.0	19.7 (0.776)
60	Modifier accumulator spring	1.7 (0.067)	8.0 (0.315)	9.61	36.0 (1.417)
61	Line pressure relief valve spring	1.6 (0.063)	8.0 (0.315)	22.5	69.3 (2.728)
62	Pilot valve spring	1.1 (0.043)	7.9 (0.311)	10.76	30.6 (1.205)

B: DISASSEMBLY

1) Remove oil strainer from lower control valve body.

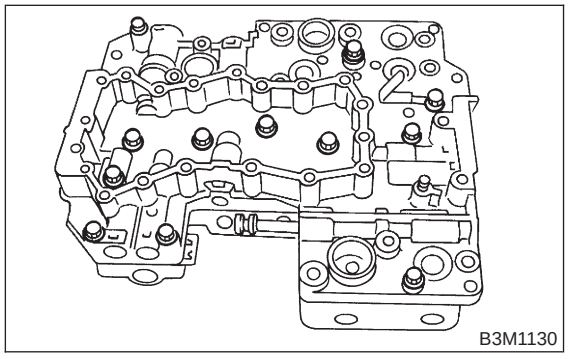


2) Remove the duty solenoid S, solenoids and sensor from the lower valve body.



(A) Lock-up duty solenoid (Blue)
(B) Low clutch timing solenoid (Gray)
(C) Line pressure duty solenoid (Red)
(D) Shift solenoid 1 (Yellow)
(E) Shift solenoid 2 (Green)
(F) 2-4 brake timing solenoid (Black)
(G) 2-4 brake duty solenoid D (Red)
(H) ATF temperature sensor

3) Remove the upper-lower valve body tightening bolts.

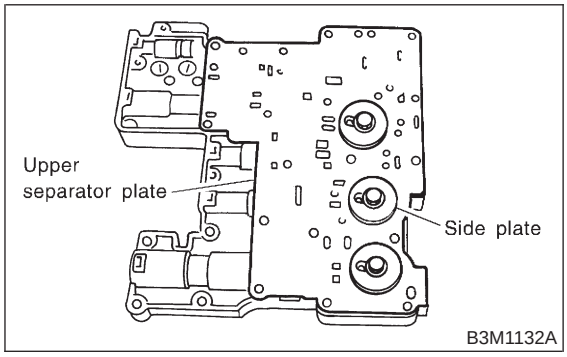


4) Separate the control valve body.

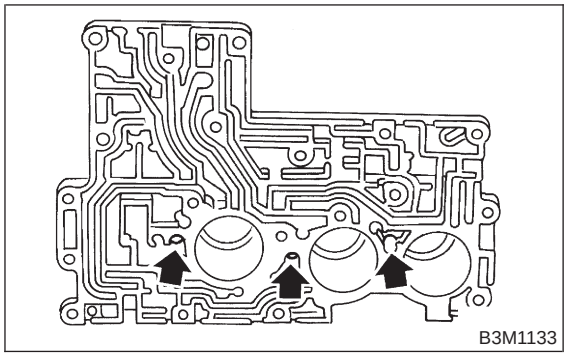
CAUTION:
● Do not lose the ten (10) steel balls contained in the upper valve body and middle valve body.
● Do not lose strainers contained in the lower valve body.

NOTE:
During ordinary servicing, clean the control valve bodies in this condition, without further disassembly. In the event of a seized clutch or other problem, disassemble the control valve bodies further, and clean the component parts.

5) Remove upper separator plate from middle valve body.



6) Remove valve springs from upper valve body.
7) Using air compressor, remove accumulator piston from upper valve body.



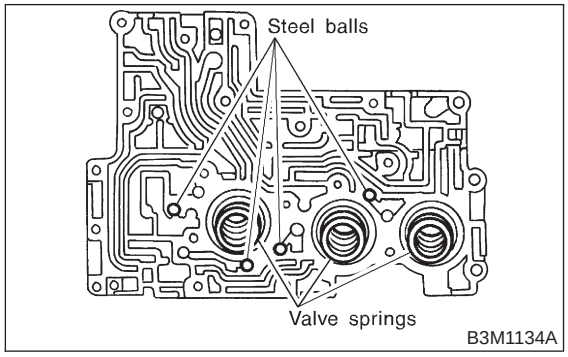
C: INSPECTION

Make sure that each component is free of harmful gouges, cuts, or dust.

D: ASSEMBLY

1) Install accumulator pistons, valve springs and steel balls to upper valve body.

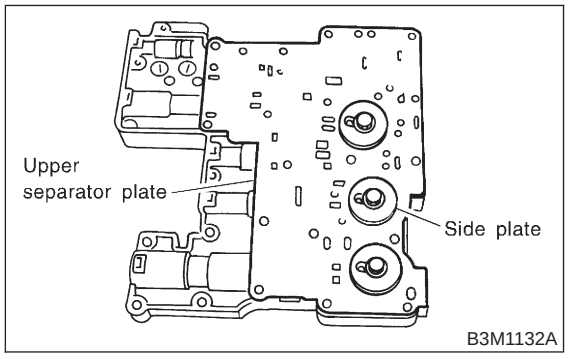
CAUTION:
Insert steel balls in their proper positions.



2) Install support plate and upper separate plate to middle valve body.

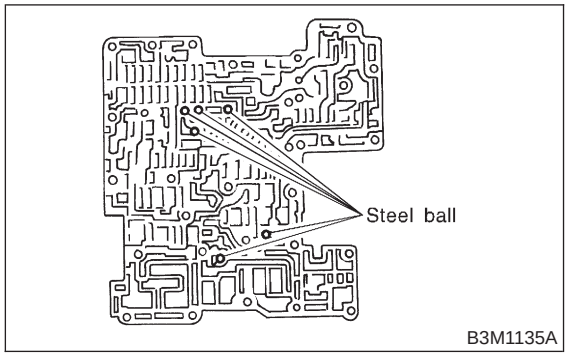
CAUTION:
Align the hole in support plate with the hole in separate plate.

Tightening torque:
8±1 N·m (0.8±0.1 kg-m, 5.8±0.7 ft-lb)



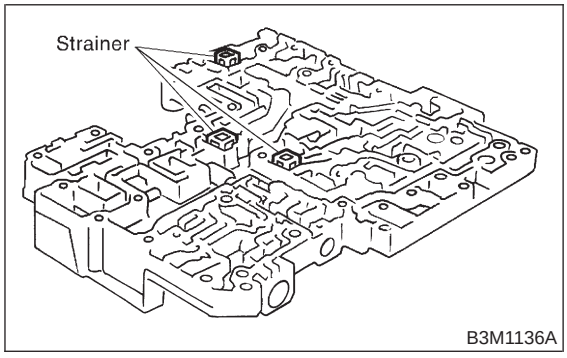
3) Install steel balls to middle valve body.

CAUTION:
Insert steel balls in their proper positions.

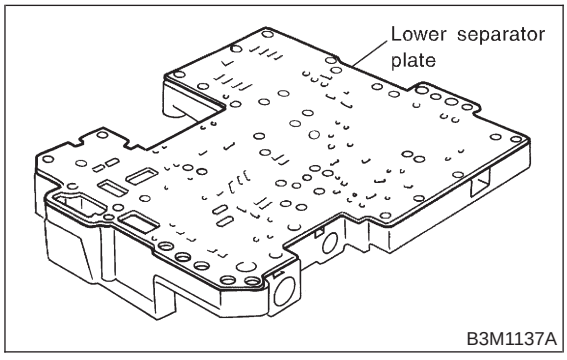


4) Install three filters to lower valve body.

CAUTION:
Pay attention to the location of filters.

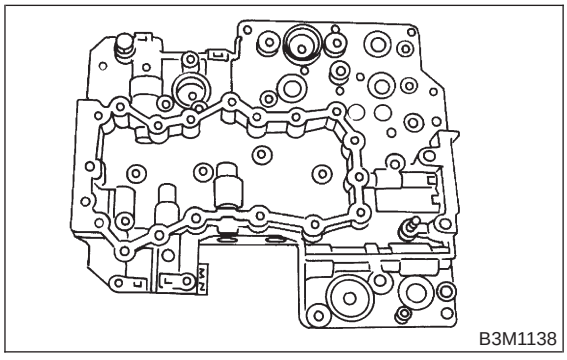


5) Install lower separate plate to lower valve body.



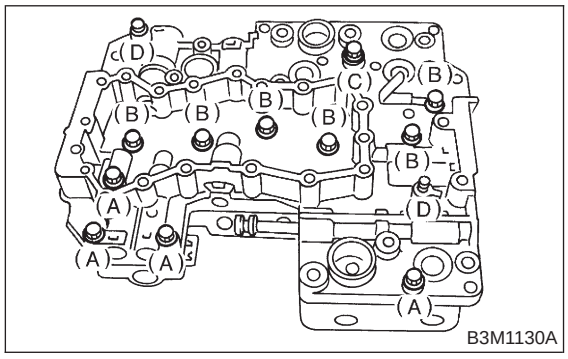
6) Temporarily assemble valve body.

CAUTION:
Be careful not to drop the middle valve body and upper body interior steel ball, or the lower body filter.



7) Tighten bolts.

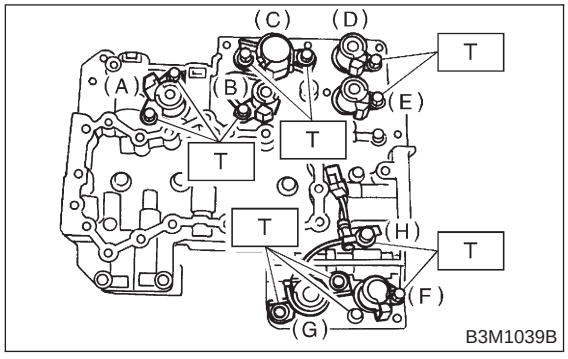
Tightening torque:
8±1 N·m (0.8±0.1 kg-m, 5.8±0.7 ft-lb)



(A) Short bolts
(B) Middle bolts
(C) Long bolt
(D) Reamer bolts

8) Install the sensor, solenoids and duty solenoid S.

Tightening torque:
T: 8±1 N·m (0.8±0.1 kg-m, 5.8±0.7 ft-lb)



(A) Lock-up duty solenoid (Blue)
(B) Low clutch timing solenoid (Gray)
(C) Line pressure duty solenoid (Red)
(D) Shift solenoid 1 (Yellow)
(E) Shift solenoid 2 (Green)
(F) 2-4 brake timing solenoid (Black)
(G) 2-4 brake duty solenoid D (Red)
(H) ATF temperature sensor

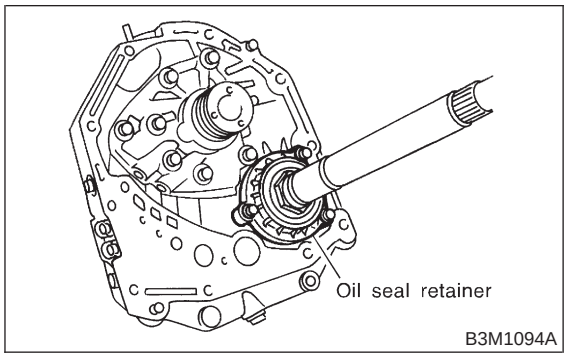
9) Install oil strainer to lower valve body.

Tightening torque:
8±1 N·m (0.8±0.1 kg-m, 5.8±0.7 ft-lb)

15. Oil Pump Assembly

A: DISASSEMBLY

1) Remove the oil seal retainer.
Also remove the O-ring and oil seal (air breather).

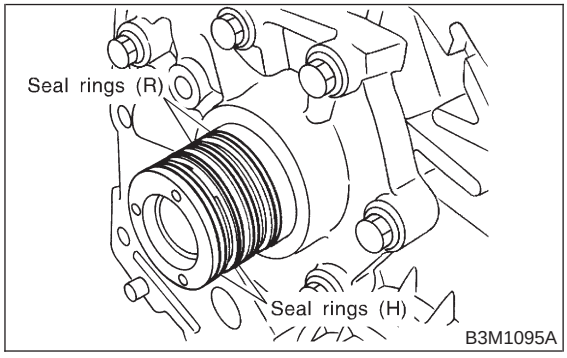


2) Remove O-rings from oil pump housing.

CAUTION:
Be careful not to damage O-ring.

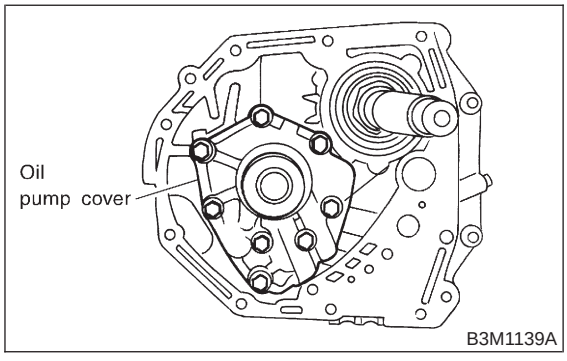
3) Remove four seal rings.

CAUTION:
Be careful not to damage O-ring.

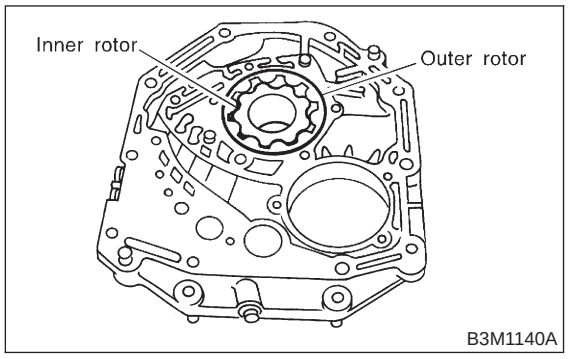


4) Remove the oil pump cover.

NOTE:
Lightly tap the end of the stator shaft to remove the cover.



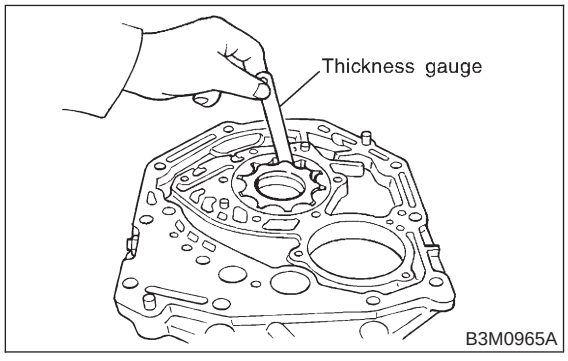
5) Remove the inner and outer rotor.



B: INSPECTION

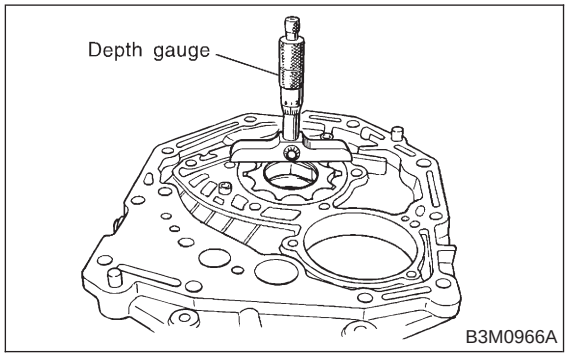
1) Check seal ring and O-ring oil seal for breaks or damage.
2) Check other parts for dents or abnormalities.
3) Selection of oil pump rotor assembly
(1) Tip clearance
Install inner rotor and outer rotor to oil pump. With rotor gears facing each other, measure crest-to-crest clearance.

Tip clearance:
0.02 — 0.15 mm (0.0008 — 0.0059 in)



(2) Side clearance
Set a depth gauge to oil pump housing, then measure oil pump housing-to-rotor clearances.

Side clearance:
0.02 — 0.04 mm (0.0008 — 0.0016 in)

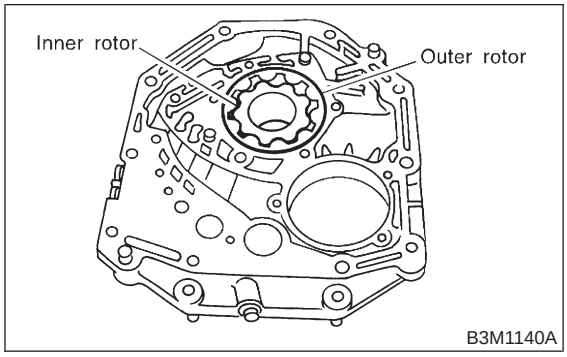


(3) If depth and/or side clearances are outside specifications, replace rotor assembly.

Oil pump rotor assembly	
Part No.	Thickness mm (in)
15008AA060	11.37 — 11.38 (0.4476 — 0.4480)
15008AA070	11.38 — 11.39 (0.4480 — 0.4484)
15008AA080	11.39 — 11.40 (0.4484 — 0.4488)

C: ASSEMBLY

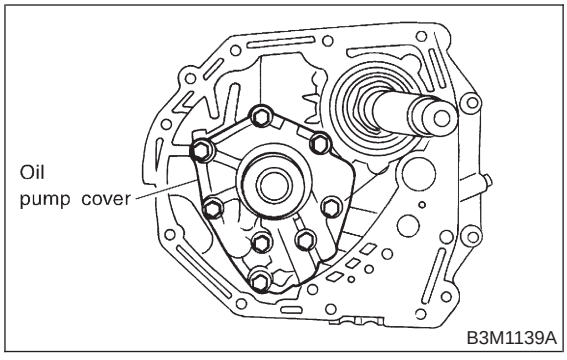
1) Install oil pump rotor assembly to oil pump housing.



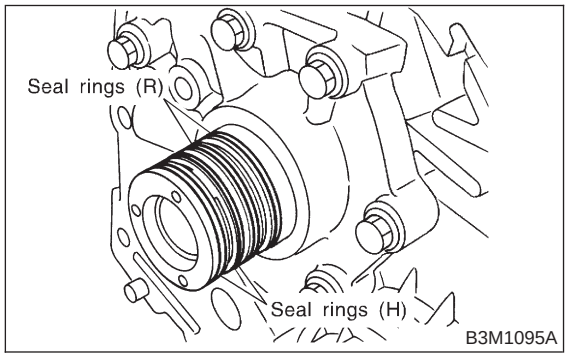
2) Install the oil pump cover.

Tightening torque:
25±2 N·m (2.5±0.2 kg-m, 18.1±1.4 ft-lb)

NOTE:
● Align both pivots with the pivot holes of the cover, and install the cover being careful not to apply undue force to the pivots.
● After assembling, turn the oil pump shaft to check for smooth rotation of the rotor.



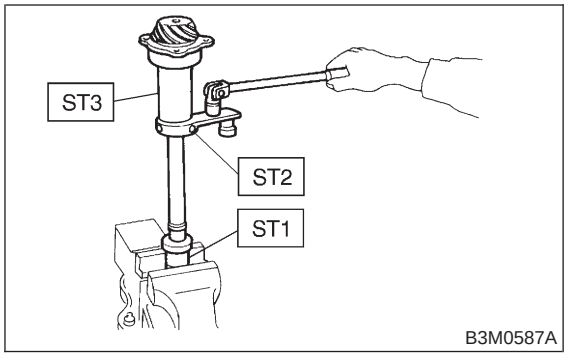
● Install the oil seal retainer and seal rings. After adjusting the drive pinion backlash and tooth contact.



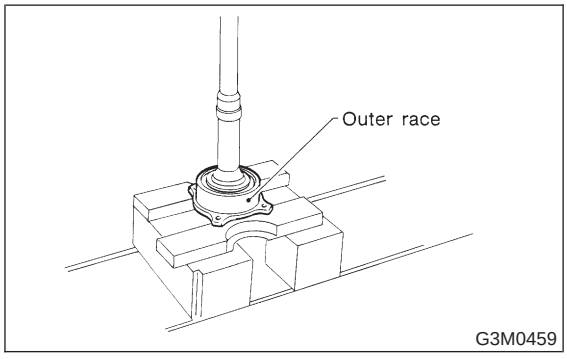
16. Drive Pinion Shaft

A: DISASSEMBLY

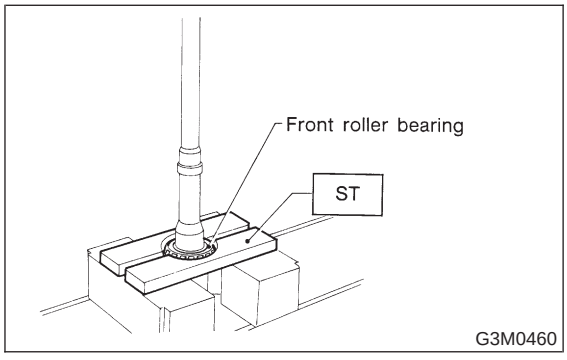
1) Straighten the staked portion of the lock nut, and remove the lock nut while locking the rear spline portion of the shaft with ST1 and ST2. Then pull off the drive pinion collar.
ST1 498937100 HOLDER
ST2 499787100 WRENCH
ST3 499787500 ADAPTER



2) Remove the O-ring.
3) Using a press, separate the rear roller bearing and outer race from the shaft.



4) Using a press and ST, separate the front roller bearing from the shaft.
ST 498517000 REPLACER

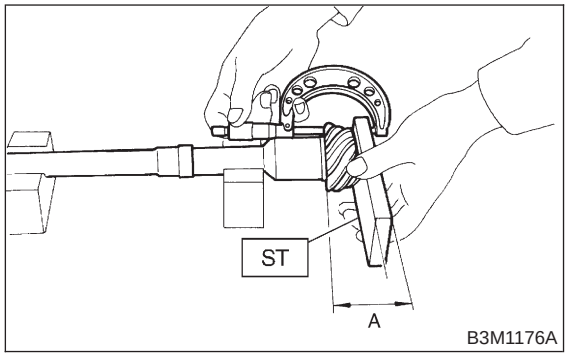


B: INSPECTION

Make sure that all component parts are free of harmful cuts, gouges, and other faults.

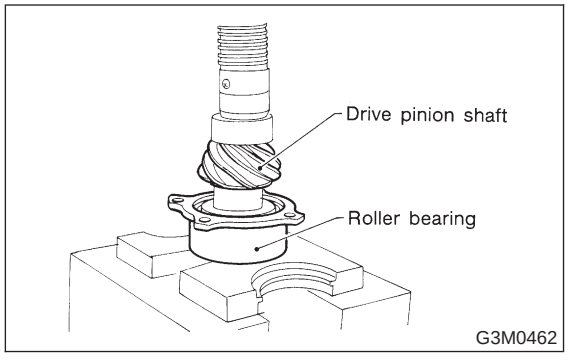
C: ASSEMBLY

1) Measure dimension “A” of the drive pinion shaft.
ST 398643600 GAUGE



2) Using a press, force-fit the roller bearing in position.

CAUTION:
Do not change the relative positions of the outer race and bearing cone.



3) After fitting the O-ring to the shaft, attach the drive pinion collar to the shaft.

CAUTION:
Be careful not to damage the O-ring.

4) Tighten the lock washer and lock nut with ST1, ST2 and ST3.
ST1 498937110 HOLDER
ST2 499787100 WRENCH
ST3 499787500 ADAPTER

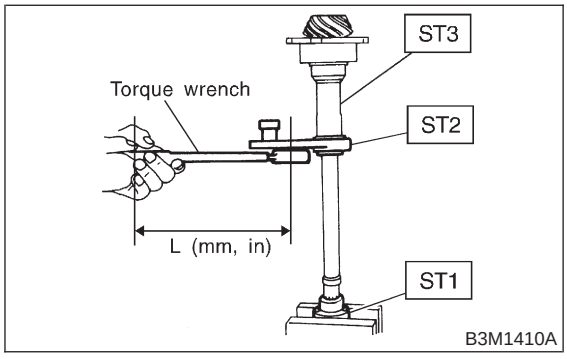
Actual tightening torque:
116±5 N·m (11.8±0.5 kg-m, 85.3±3.6 ft-lb)

NOTE:
- Pay attention to the orientation of lock washer.
- Tightening torque using torque wrench is determined by the following equation.

$$T_1 = L/_{L + 72.2} \times T$$

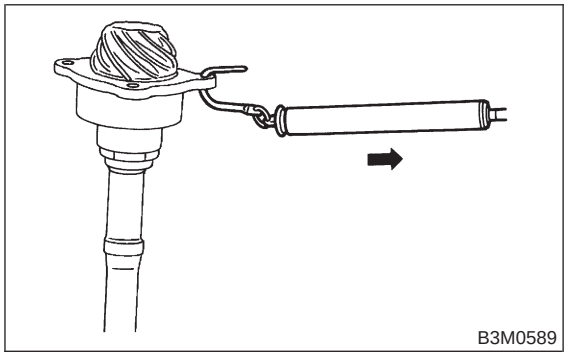
T: Actual tightening torque

- Install ST2 to torque wrench as straight as possible.



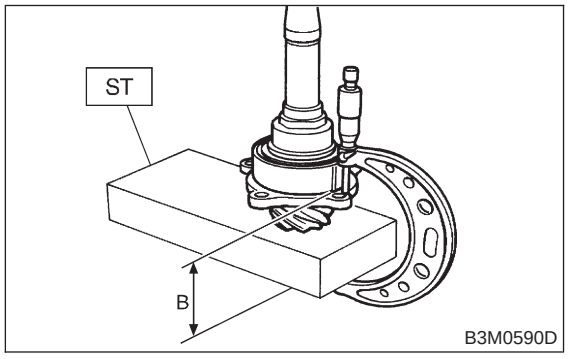
5) Measure the starting torque of the bearing. Make sure the starting torque is within the specified range. If out of the allowable range, replace the roller bearing.

Starting torque:
0.3 — 2.0 N·m (0.03 — 0.2 kg-m, 0.2 — 1.4 ft-lb)



6) Stake the lock nut securely at two places.

7) Measure dimension “B” of the drive pinion shaft.
ST 398643600 GAUGE



8) Determine the thickness “t” (mm) of the drive pinion shim.

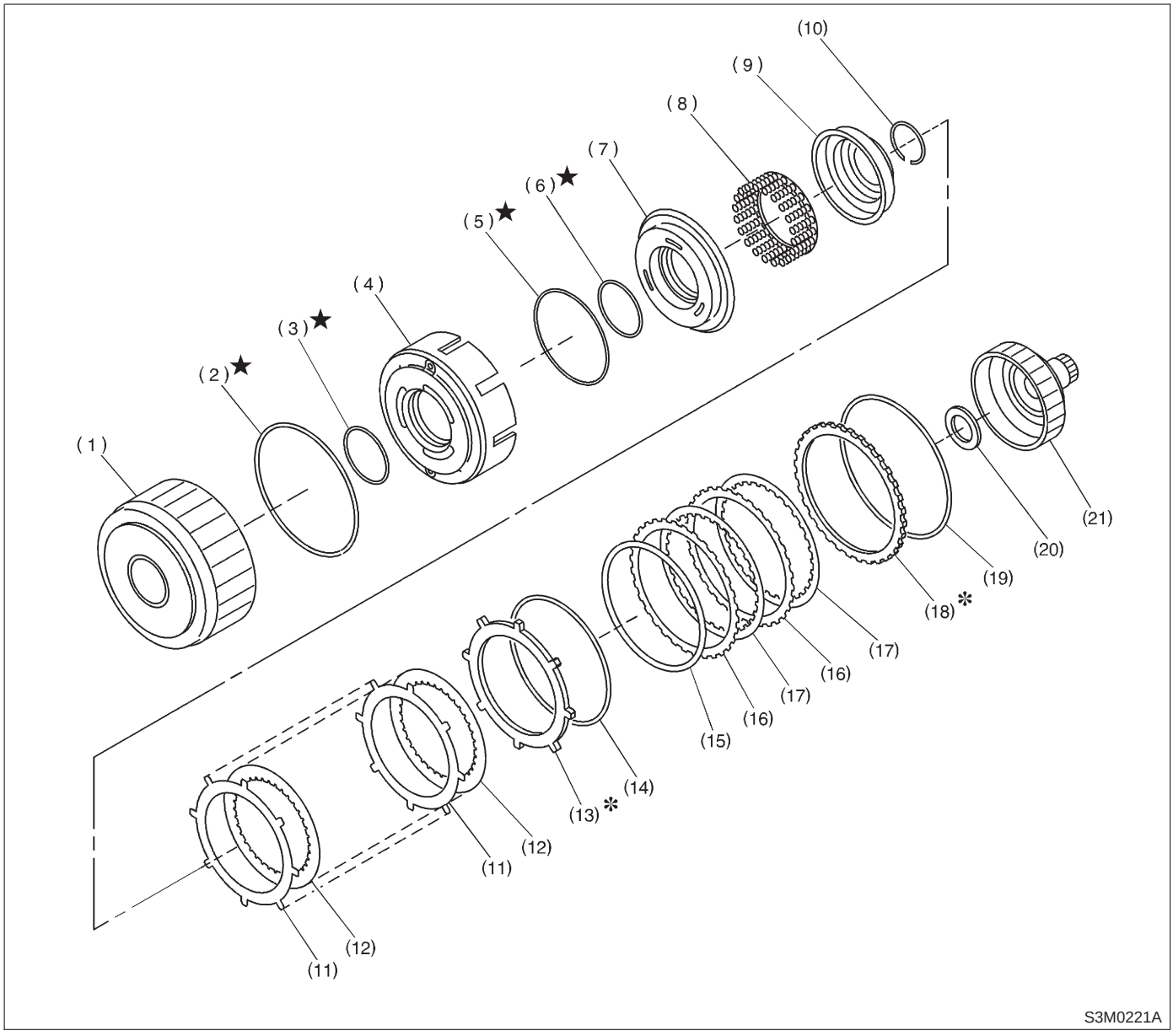
NOTE:
The number of shims must be three or less.

t = 6.5±0.0625 − (B − A)

Available drive pinion shims	
Part No.	Thickness mm (in)
31451AA050	0.150 (0.0059)
31451AA060	0.175 (0.0069)
31451AA070	0.200 (0.0079)
31451AA080	0.225 (0.0089)
31451AA090	0.250 (0.0098)
31451AA100	0.275 (0.0108)

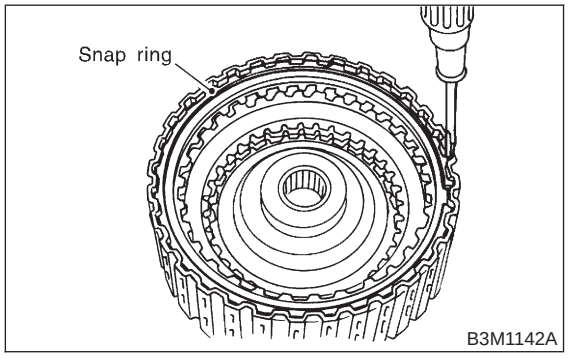
17. High Clutch and Reverse Clutch

A: DISASSEMBLY

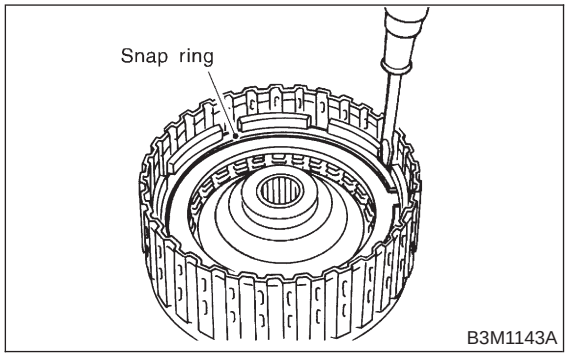


(1) Reverse clutch drum
(2) Lip seal
(3) Lathe cut seal ring
(4) Reverse clutch piston
(5) Lathe cut seal ring
(6) Lathe cut seal ring
(7) High clutch piston
(8) Spring retainer
(9) Cover
(10) Snap ring
(11) Driven plate
(12) Drive plate
(13) Retaining plate
(14) Snap ring
(15) Dish plate
(16) Driven plate
(17) Drive plate
(18) Retaining plate
(19) Snap ring
(20) Thrust needle bearing
(21) High clutch hub

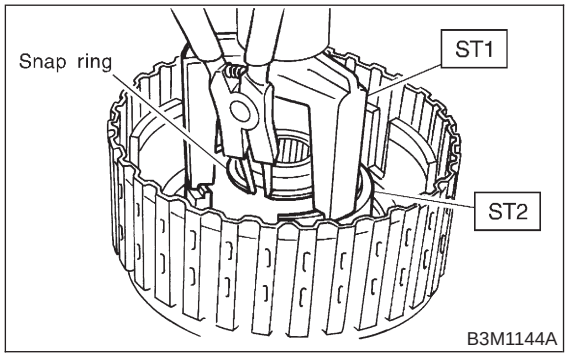
1) Remove the snap ring, and take out the retaining plate, drive plates, driven plates.



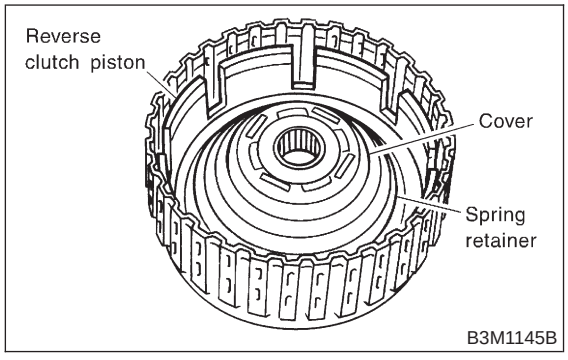
2) Remove snap ring, and take out the retaining plate, drive plates and driven plates.



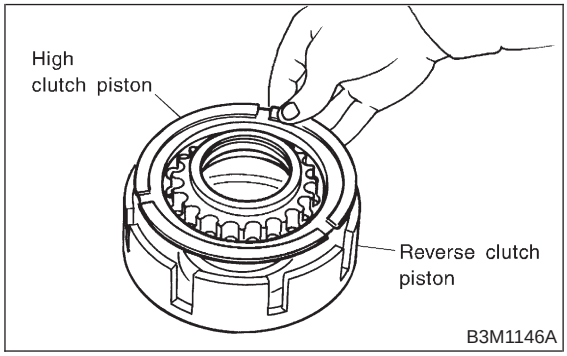
3) Using ST1 and ST2, remove snap ring.
ST1 398673600 COMPRESSOR
ST2 498627100 SEAT



4) Take out clutch cover, spring retainer, high clutch piston and reverse clutch piston.



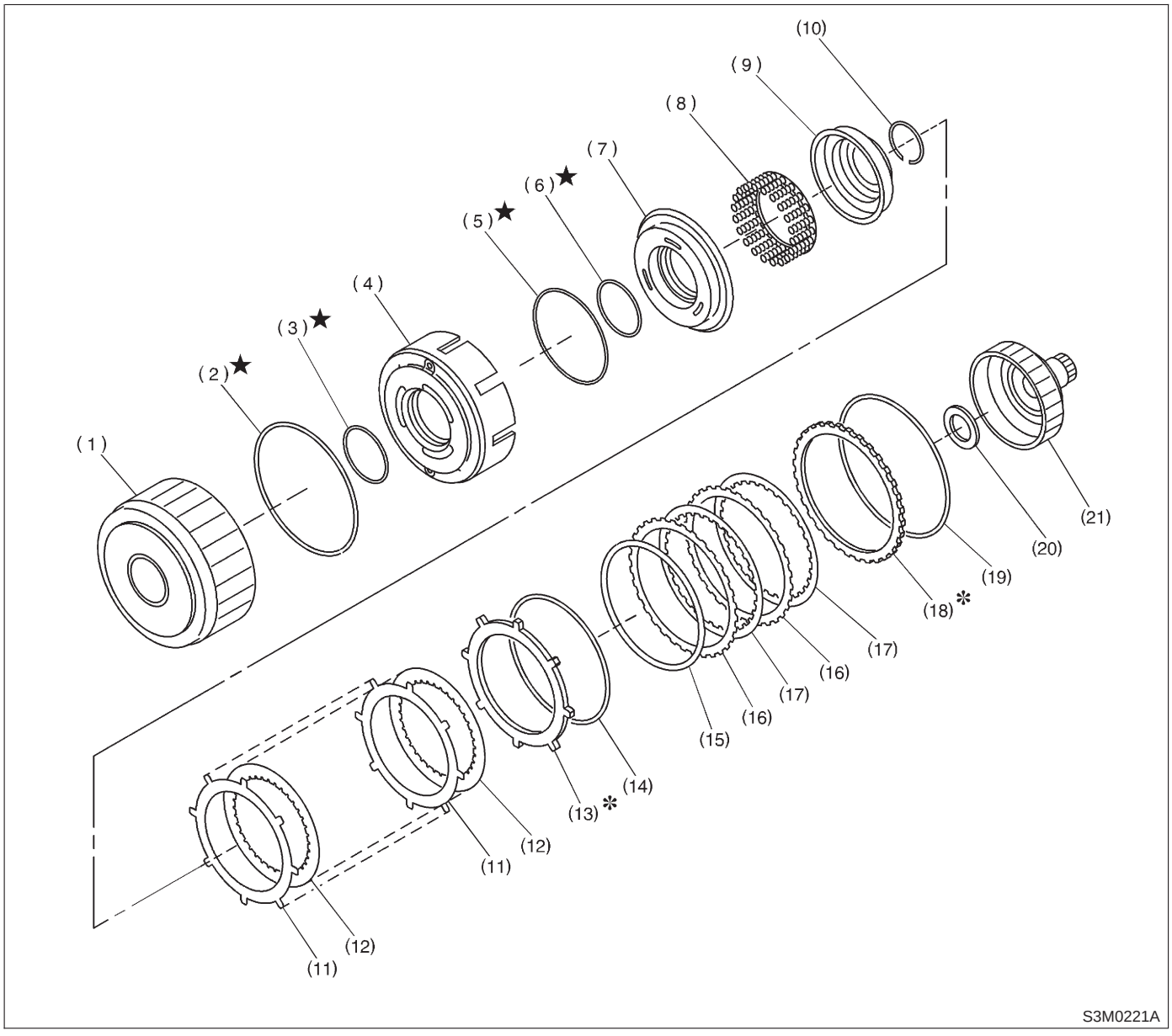
5) Remove seal rings and lip seal from high clutch piston and reverse clutch piston.



B: INSPECTION

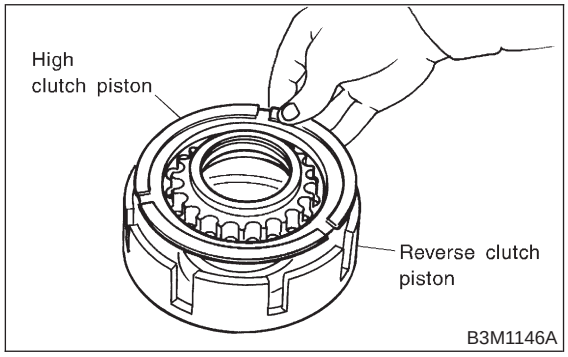
1) Drive plate facing for wear and damage
2) Snap ring for wear, return spring for breakage or setting, and spring retainer for deformation
3) Lip seal and lathe cut seal ring for damage
4) Piston check ball for operation

C: ASSEMBLY



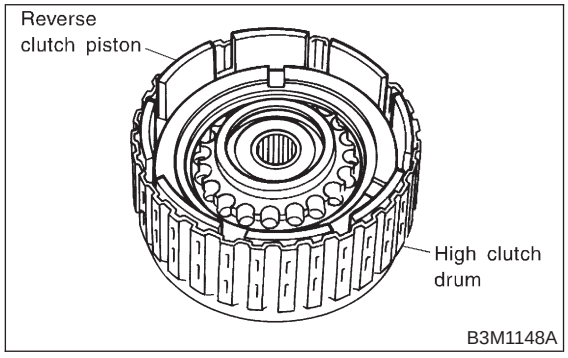
(1) Reverse clutch drum
(2) Lip seal
(3) Lathe cut seal ring
(4) Reverse clutch piston
(5) Lathe cut seal ring
(6) Lathe cut seal ring
(7) High clutch piston
(8) Spring retainer
(9) Cover
(10) Snap ring
(11) Driven plate
(12) Drive plate
(13) Retaining plate
(14) Snap ring
(15) Dish plate
(16) Driven plate
(17) Drive plate
(18) Retaining plate
(19) Snap ring
(20) Thrust needle bearing
(21) High clutch hub

1) Install seal rings and lip seal to high clutch piston and reverse clutch piston.
2) Install high clutch piston to reverse clutch piston.

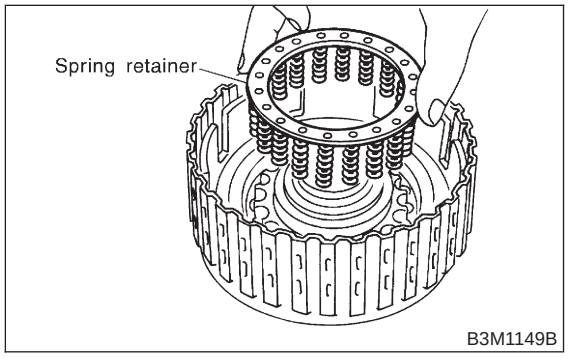


3) Install reverse clutch to high clutch drum.

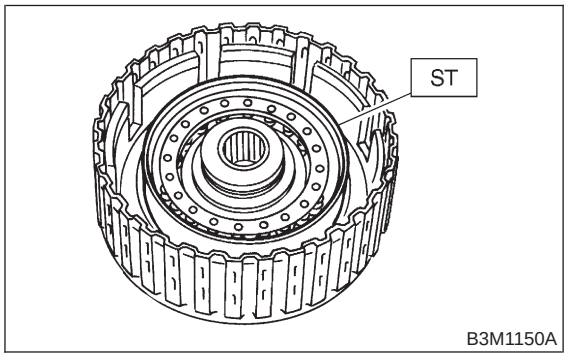
NOTE:
Align the groove on the reverse clutch piston with the groove on the high clutch drum during installation.



4) Install spring retainer to high clutch piston.



5) Install ST to high clutch piston.
ST 498437000 HIGH CLUTCH PISTON GAUGE



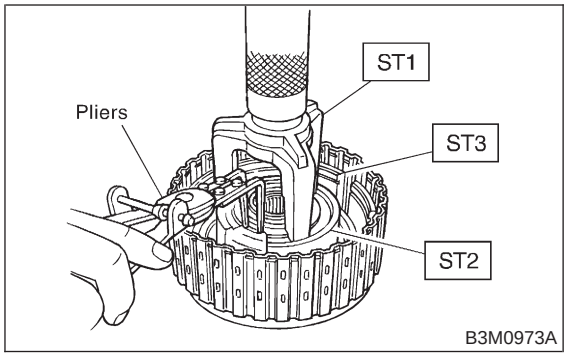
6) Install cover to high clutch piston.

CAUTION:
Be careful not to fold over the high clutch piston seal during installation.

7) Using ST1 and ST2, install snap ring.

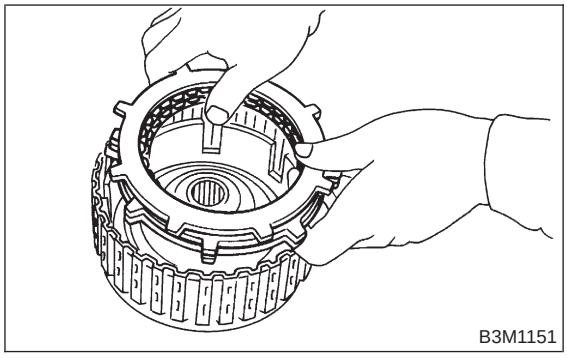
NOTE:
After installing snap ring, remove STs.

ST1 398673600 COMPRESSOR
ST2 498627100 SEAT
ST3 498437000 HIGH CLUTCH PISTON GAUGE



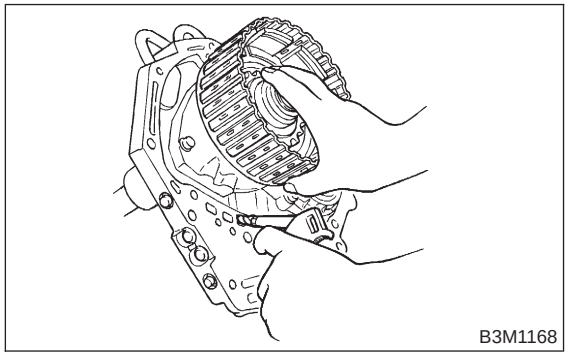
8) Install driven plate, drive plate and retaining plate to high clutch drum.

NOTE:
Install thicker driven plate on the piston side.



9) Install snap ring to high clutch drum.

10) Apply compressed air intermittently to check for operation.

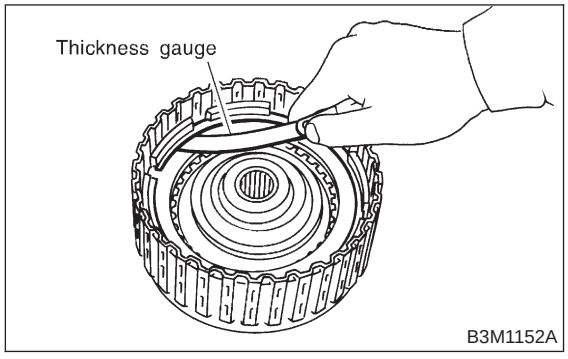


11) Measure the clearance between the retaining plate and snap ring.

CAUTION:
Do not press down retaining plate during clearance measurements.

Standard value:
0.8 — 1.1 mm (0.031 — 0.043 in)

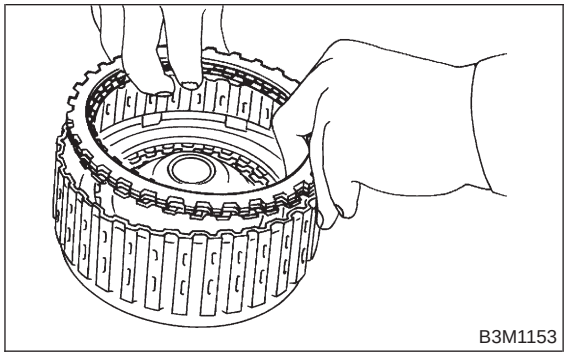
Allowable limit:
1.5 mm (0.059 in)



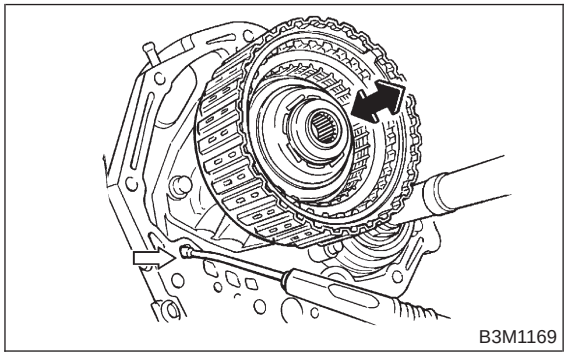
12) If specified tolerance limits are exceeded, select a suitable high clutch retaining plate.

High clutch retaining plate	
Part No.	Thickness mm (in)
31567AA710	4.7 (0.185)
31567AA720	4.8 (0.189)
31567AA730	4.9 (0.193)
31567AA740	5.0 (0.197)
31567AA670	5.1 (0.201)
31567AA680	5.2 (0.205)
31567AA690	5.3 (0.209)
31567AA700	5.4 (0.213)

13) Install driven plate, drive plate, retaining plate and snap ring.



14) Apply compressed air intermittently to check for operation.

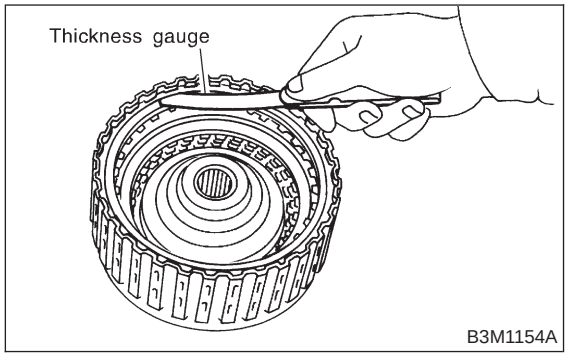


15) Measure the clearance between the retaining plate and snap ring.

CAUTION:
Do not press down retaining plate during clearance measurements.

Standard value:
0.5 — 0.8 mm (0.020 — 0.031 in)

Allowable limit:
1.2 mm (0.047 in)

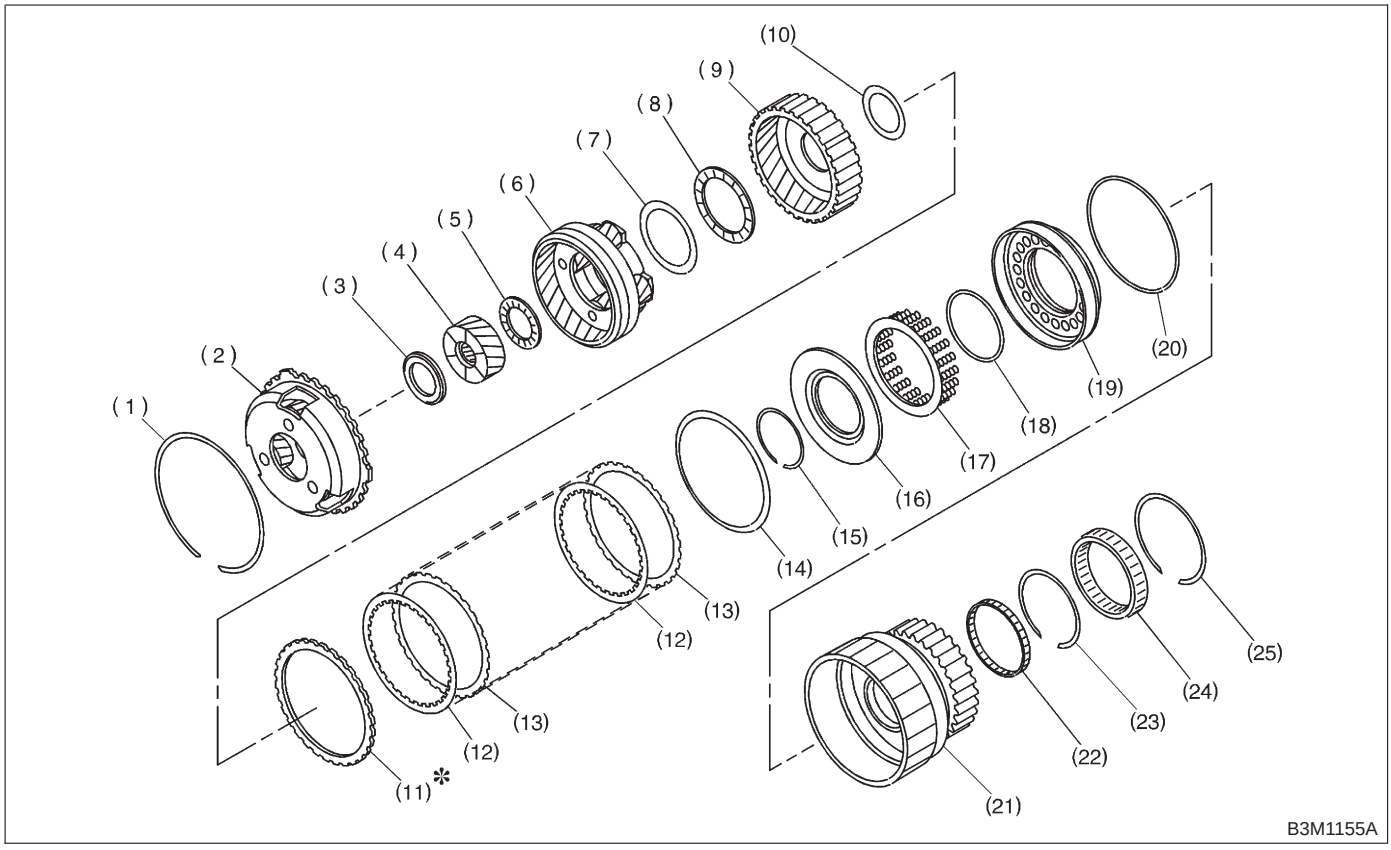


16) If specified tolerance limits are exceeded, select a suitable high clutch retaining plate.

Reverse clutch retaining plates	
Part No.	Thickness mm (in)
31567AA750	3.8 (0.150)
31567AA760	4.0 (0.157)
31567AA770	4.2 (0.165)
31567AA780	4.4 (0.173)
31567AA790	4.6 (0.181)
31567AA800	4.8 (0.189)
31567AA810	5.0 (0.197)
31567AA820	5.2 (0.205)

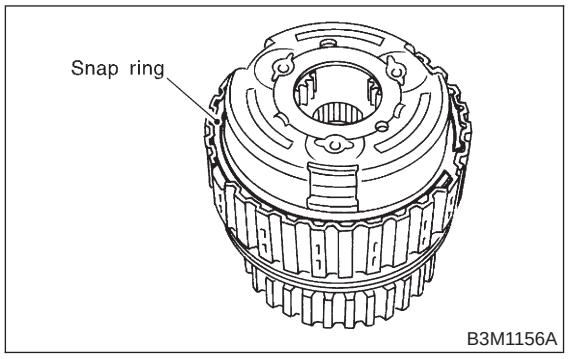
18. Low Clutch Drum and Planetary Gear

A: DISASSEMBLY

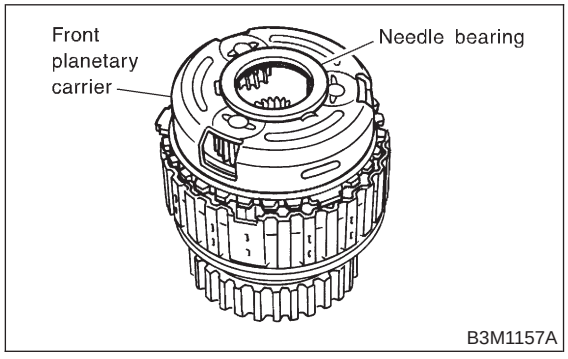


(1) Snap ring
(2) Front planetary carrier
(3) Thrust needle bearing
(4) Rear sun gear
(5) Thrust needle bearing
(6) Rear planetary carrier
(7) Washer
(8) Thrust needle bearing
(9) Rear internal gear
(10) Washer
(11) Retaining plate
(12) Drive plate
(13) Driven plate
(14) Dish plate
(15) Snap ring
(16) Cover
(17) Spring retainer
(18) Lathe cut seal ring
(19) Low clutch piston
(20) Lathe cut seal ring
(21) Low clutch drum
(22) Needle bearing
(23) Inner snap ring
(24) One-way clutch
(25) Outer snap ring

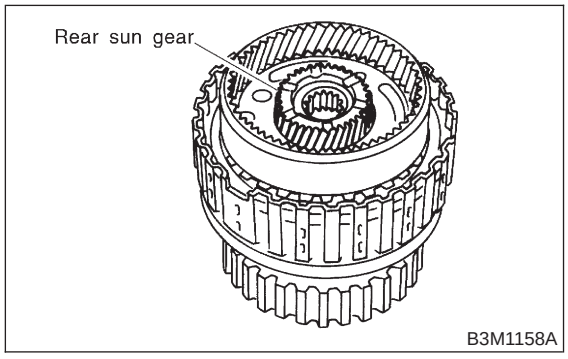
1) Remove snap ring from the low clutch drum.



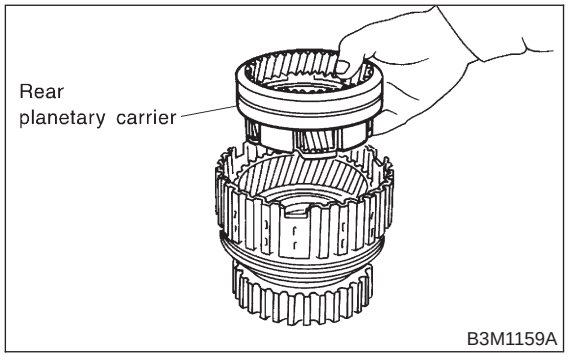
2) Take out front planetary carrier and thrust needle bearing from low clutch drum.



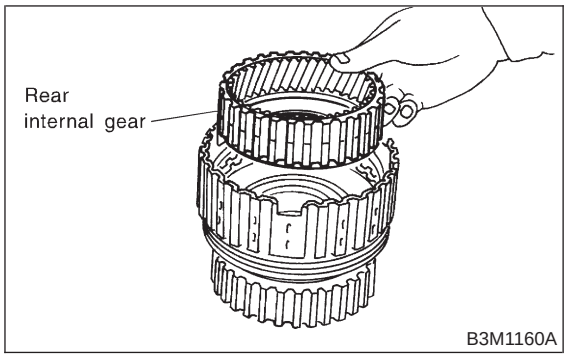
3) Take out rear sun gear.



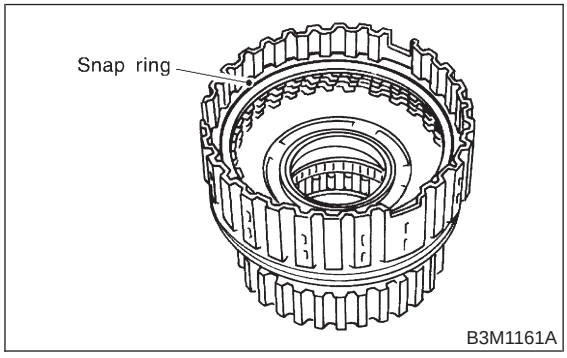
4) Take out rear planetary carrier, washer and thrust needle bearing.



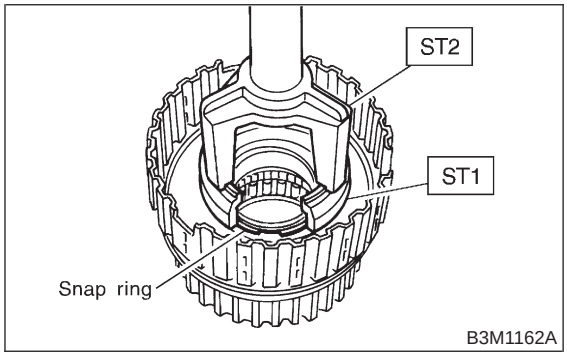
5) Take out rear internal gear.



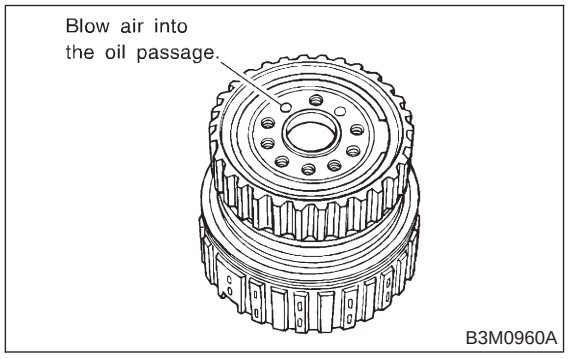
6) Remove the snap ring from the low clutch drum.



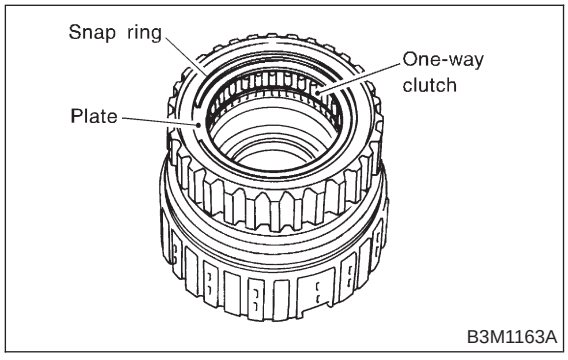
7) Remove the retaining plate, drive plates, driven plates and dish plate.
8) Compress the spring retainer, and remove the snap ring from the low clutch drum, by using ST1 and ST2.
ST1 498627100 SEAT
ST2 398673600 COMPRESSOR



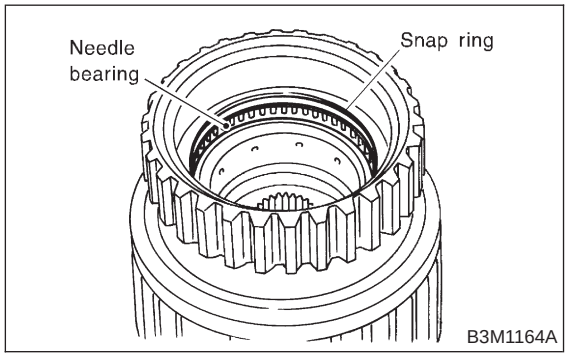
9) Install the one-way clutch inner race to the low clutch drum, and apply compressed air to remove the low clutch piston.



10) Remove the one-way clutch inner race.
11) Remove the one-way clutch after taking out the snap ring.



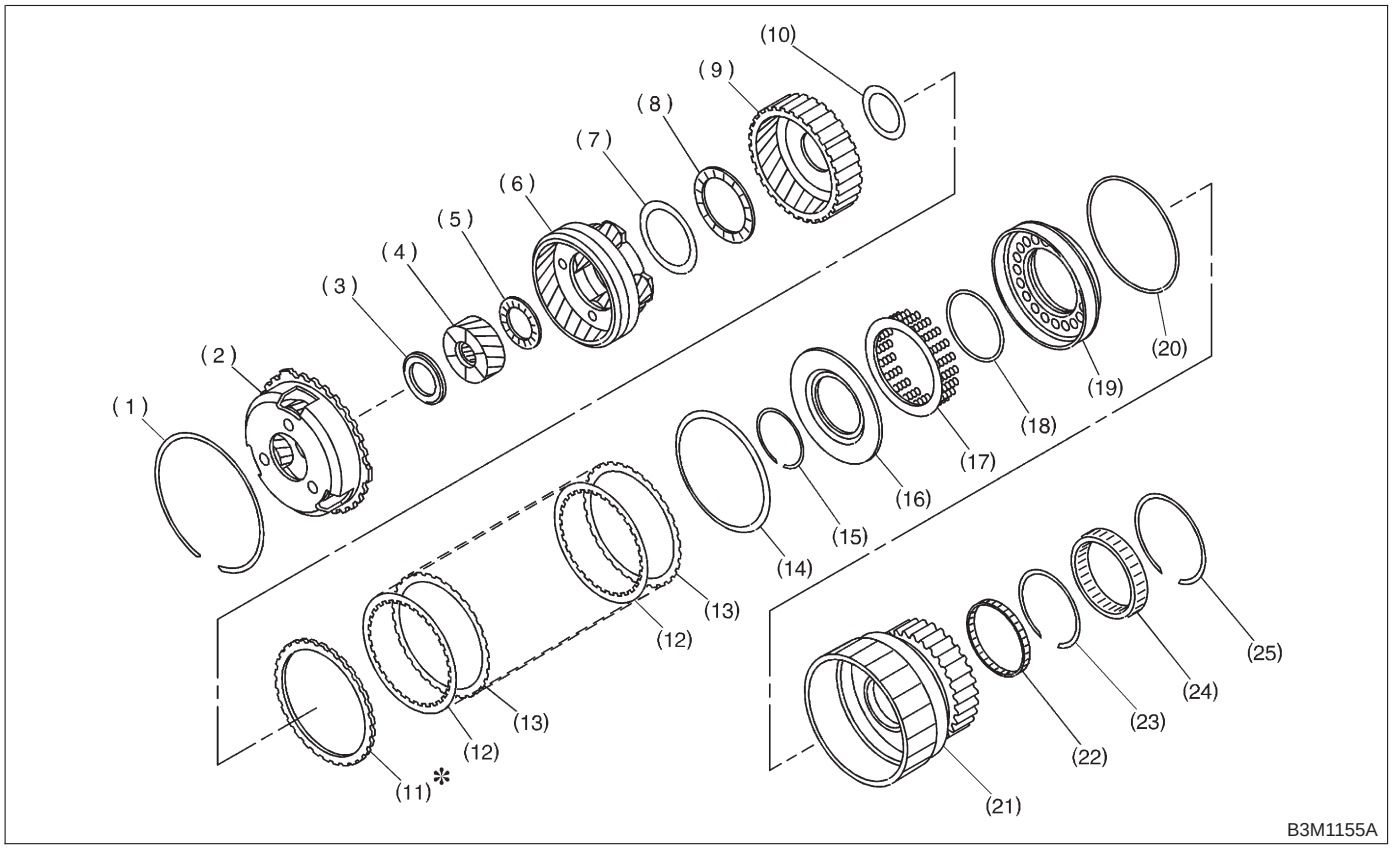
12) Remove the needle bearing after taking out the snap ring.



B: INSPECTION

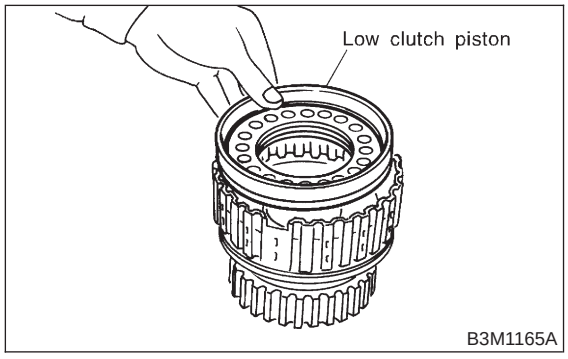
1) Drive plate facing for wear and damage
2) Snap ring for wear, return spring for setting and breakage, and snap ring retainer for deformation
3) Lip seal and lathe cut ring for damage
4) Piston and drum check ball for operation

C: ASSEMBLY

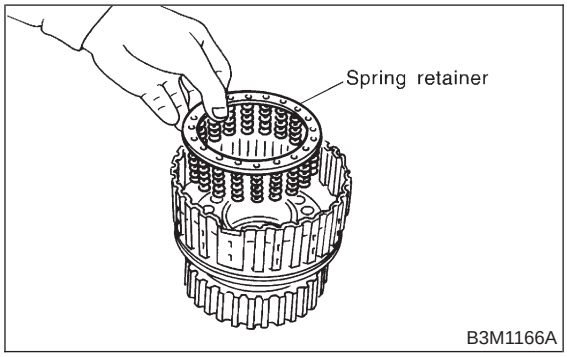


(1) Snap ring
(2) Front planetary carrier
(3) Thrust needle bearing
(4) Rear sun gear
(5) Thrust needle bearing
(6) Rear planetary carrier
(7) Washer
(8) Thrust needle bearing
(9) Rear internal gear
(10) Washer
(11) Retaining plate
(12) Drive plate
(13) Driven plate
(14) Dish plate
(15) Snap ring
(16) Cover
(17) Spring retainer
(18) Lathe cut seal ring
(19) Low clutch piston
(20) Lathe cut seal ring
(21) Low clutch drum
(22) Needle bearing
(23) Inner snap ring
(24) One-way clutch
(25) Outer snap ring

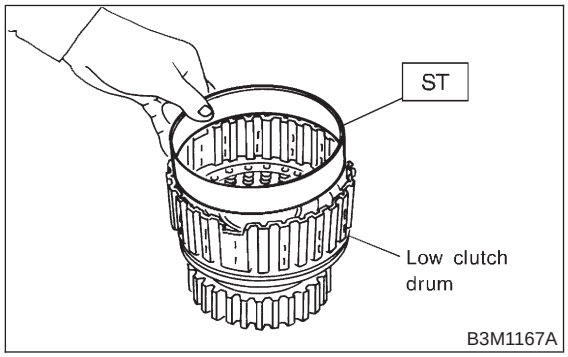
1) Install lathe cut seal ring to low clutch piston.
2) Fit the low clutch piston to the low clutch drum.



3) Install spring retainer to low clutch piston.



4) Install ST to low clutch drum.
ST 498437100 LOW CLUTCH PISTON GUIDE

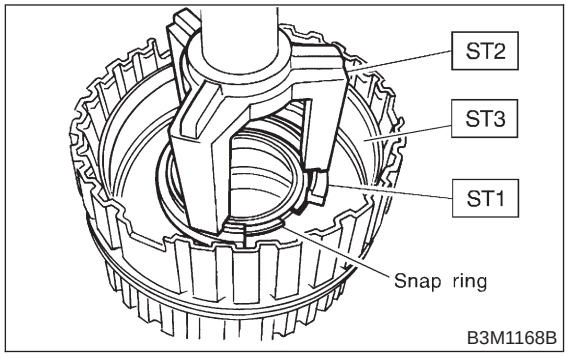


5) Set the cover on the piston with a press using ST1 and ST2, and attach the snap ring.

CAUTION:
Be careful not to fold cover seal during installation.

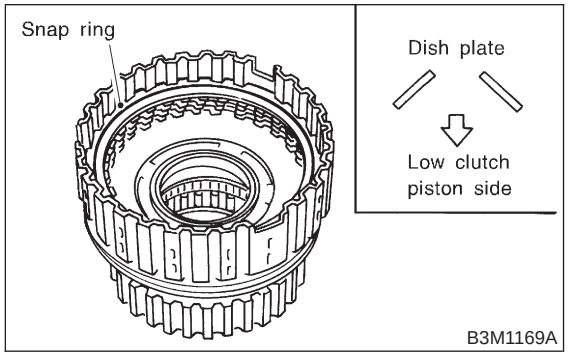
NOTE:
After installing snap ring, remove ST1, ST2 and ST3.

ST1 498627100 SEAT
ST2 398673600 COMPRESSOR
ST3 498437100 LOW CLUTCH PISTON GUIDE

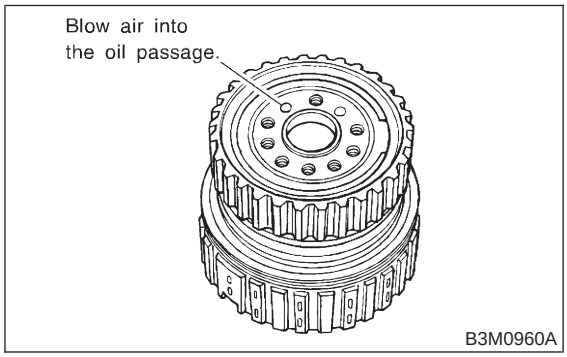


6) Install the dish plate, driven plates, drive plates, and retaining plate, and secure with the snap ring.

NOTE:
Pay attention to the orientation of the dish plate.



7) Check the low clutch for operation.
Set the one-way clutch inner race, and apply compressed air for checking.

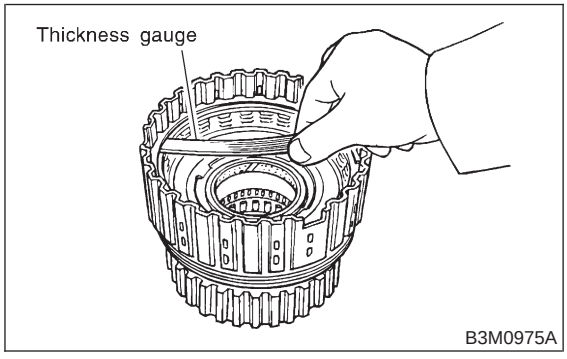


8) Checking low clutch clearance
Measure the gap between the retaining plate and the operation of the low clutch.

NOTE:
Before measuring clearance, place the same thickness of shim on both sides to prevent retaining plate from tilting.
If the clearance is out of the specified range, select a proper retaining plate so that the standard clearance can be obtained.

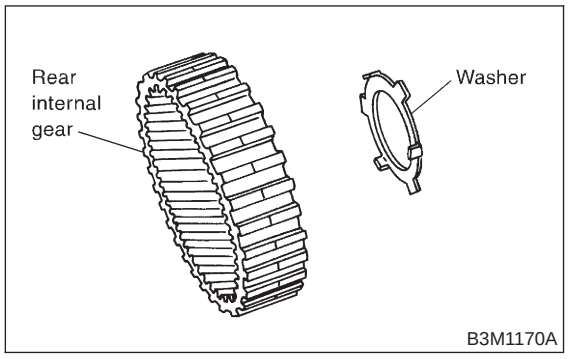
Standard value:
0.7 — 1.1 mm (0.028 — 0.043 in)

Allowable limit:
1.6 mm (0.063 in)

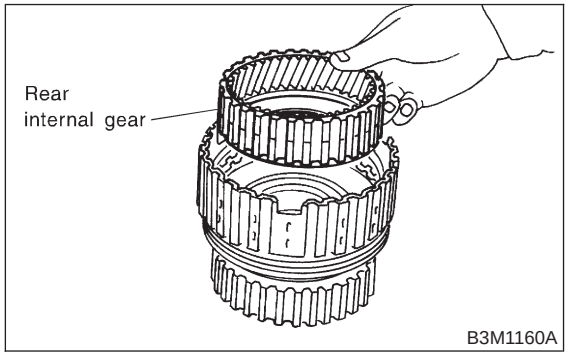


Available retaining plates	
Part No.	Thickness mm (in)
31567AA830	3.8 (0.150)
31567AA840	4.0 (0.157)
31567AA850	4.2 (0.165)
31567AA860	4.4 (0.173)
31567AA870	4.6 (0.181)

9) Install washer to rear internal gear.

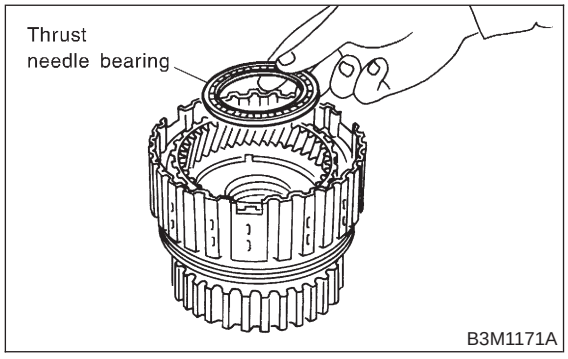


10) Install rear internal gear.



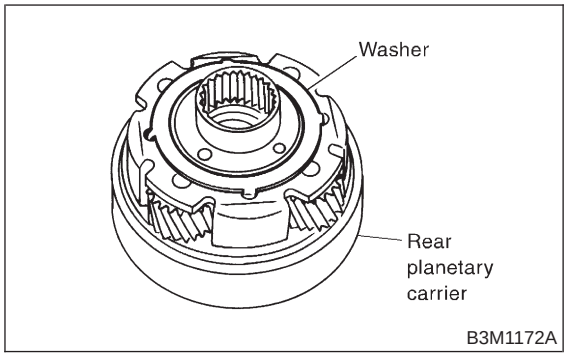
11) Install thrust needle bearing.

CAUTION:
Install thrust needle bearing in the correct direction. <Ref. to 3-2 [S1C0].>

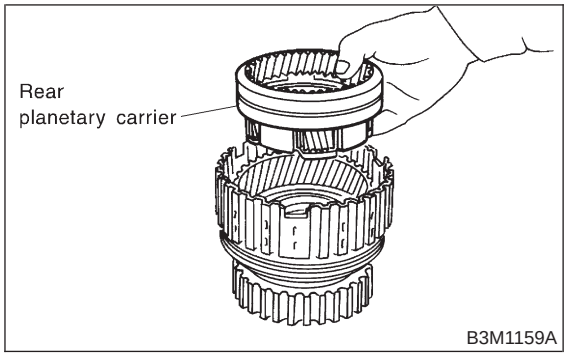


12) Install washer to rear planetary carrier.

NOTE:
Make sure washer tooth is inserted into hole on planetary carrier.

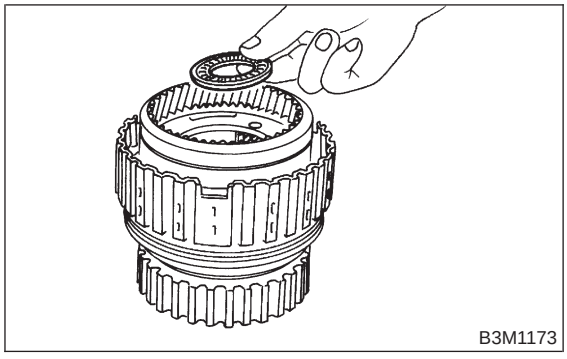


13) Install rear planetary carrier to low clutch drum.



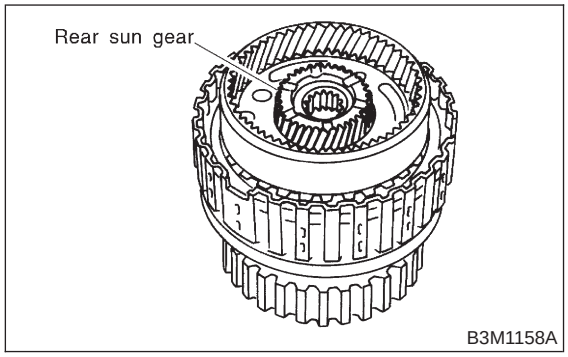
14) Install thrust needle bearing to rear planetary carrier.

CAUTION:
Install thrust needle bearing in the correct direction. <Ref. to 3-2 [S1C0].>



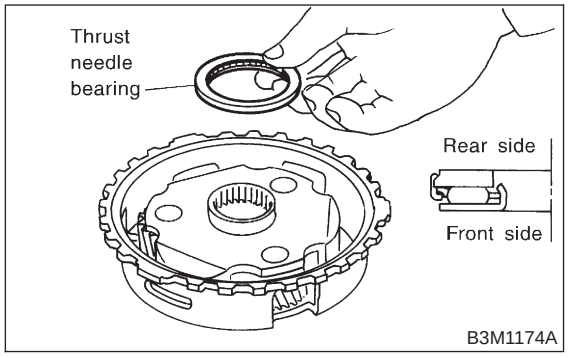
15) Install rear sun gear.

NOTE:
Pay attention to the orientation of the rear sun gear.

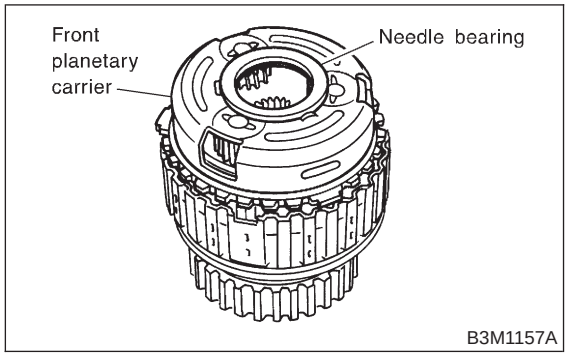


16) Install thrust needle bearing to front planetary carrier.

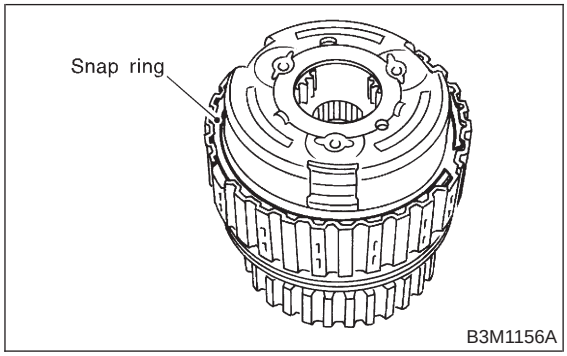
NOTE:
Pay attention to the orientation of the thrust needle bearing.



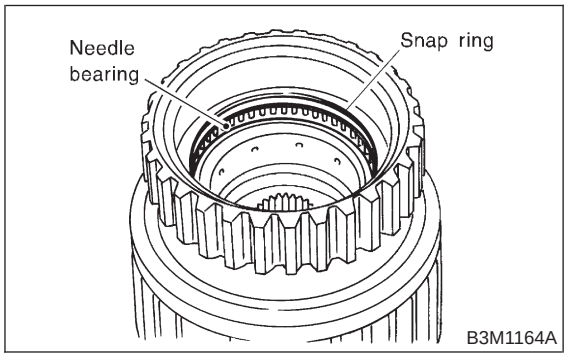
17) Install front planetary carrier to low clutch drum.



18) Install snap ring to low clutch drum.

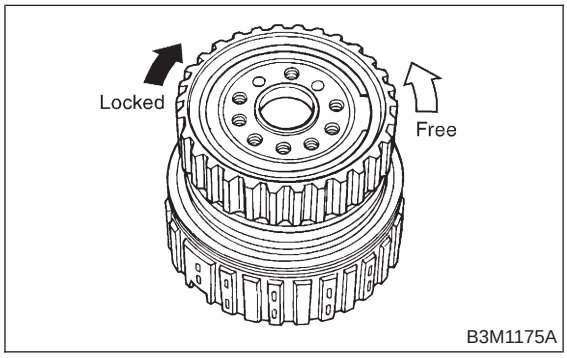


19) Install the needle bearing, and secure with the snap ring.



20) Install the one-way clutch, one-way clutch inner race and plate, and secure with the snap ring.

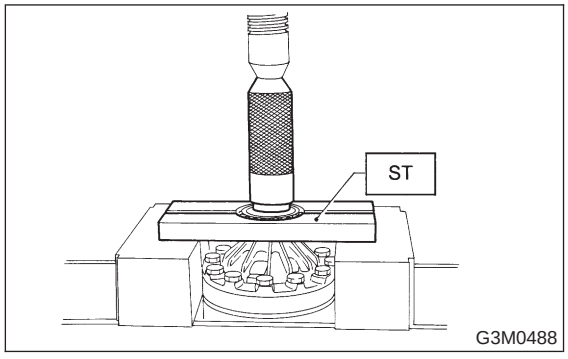
NOTE:
Set the inner race. Make sure that the forward clutch is free in the clockwise direction and locked in the counterclockwise direction, as viewed from the front of the vehicle.



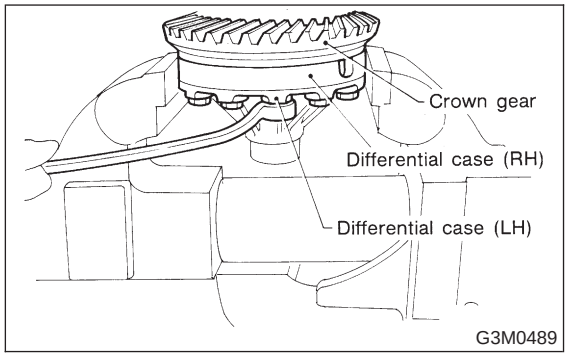
19. Differential Case Assembly

A: DISASSEMBLY

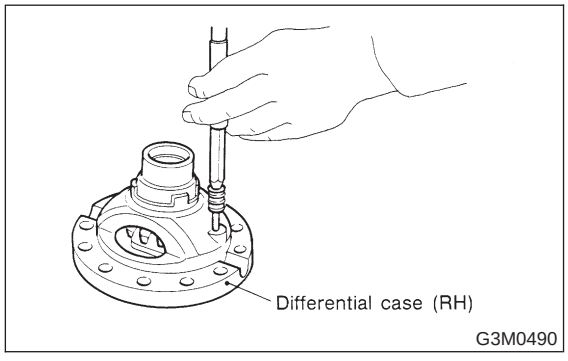
1) Using a press and ST, remove the taper roller bearing.
ST 498077000 REMOVER



2) Secure the case in a vise and remove the crown gear tightening bolts, then separate the crown gear, case (RH) and case (LH).



3) Pull out the straight pin and shaft, and remove the differential bevel gear, washer, and differential bevel pinion.



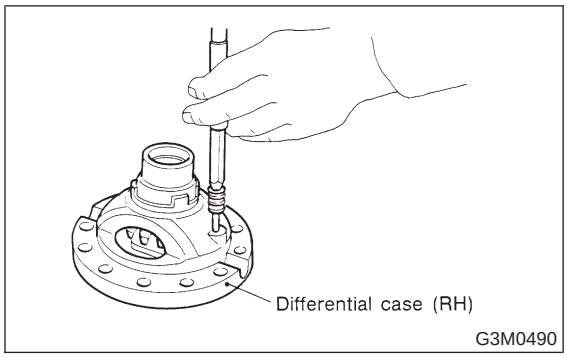
B: INSPECTION

Check each component for harmful cuts, damage and other faults.

C: ASSEMBLY

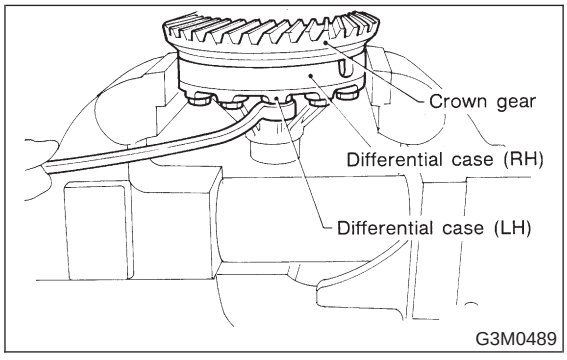
1) Install the washer, differential bevel gear and differential bevel pinion in the differential case (RH). Insert the pinion shaft, and fit the straight pin.

NOTE:
Install straight pin from reverse direction.



2) Install the washer and differential bevel gear to the differential case (LH). Then put the case over the differential case (RH), and connect both cases.
3) Install the crown gear and secure by tightening the bolt.

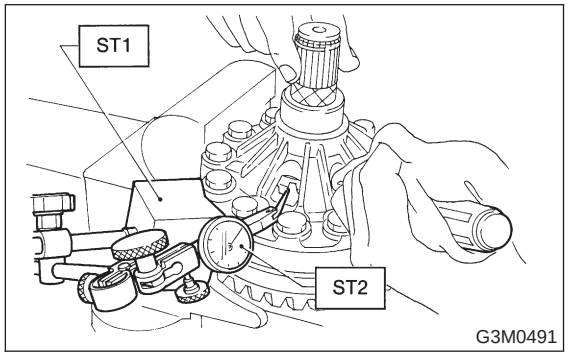
Standard tightening torque:
62±5 N·m (6.3±0.5 kg-m, 45.6±3.6 ft-lb)



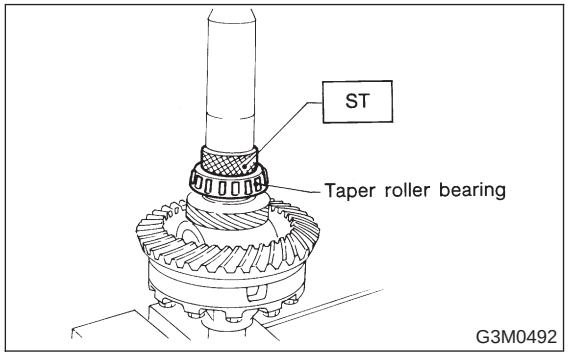
4) Measurement of backlash (Selection of washer)
Measure the gear backlash with ST1 and ST2, and insert ST2 through the access window of the case.
ST1 498247001 MAGNET BASE
ST2 498247100 DIAL GAUGE

NOTE:
Measure the backlash by applying a pinion tooth between two bevel gear teeth.

Standard value:
0.13 — 0.18 mm (0.0051 — 0.0071 in)



5) Using ST, install taper roller bearing.
ST 398487700 DRIFT

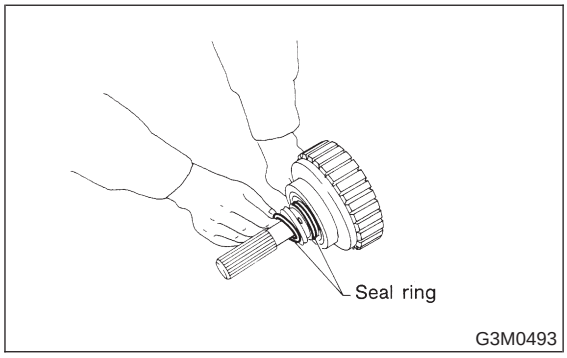


20. Transfer Clutch

A: DISASSEMBLY

1) Remove the seal ring.

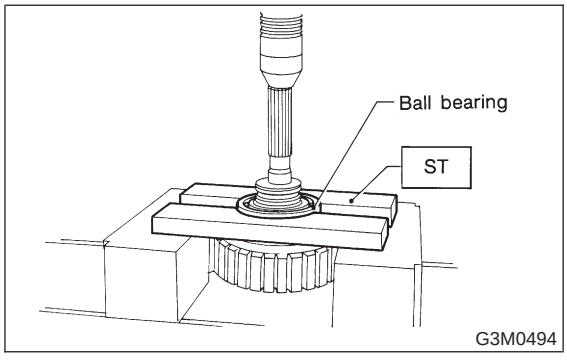
CAUTION:
Be careful not to damage the seal ring.



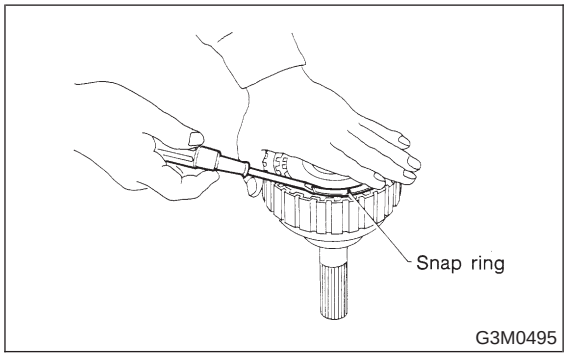
2) Using a press and ST, remove the ball bearing.

CAUTION:
Do not reuse the bearing.

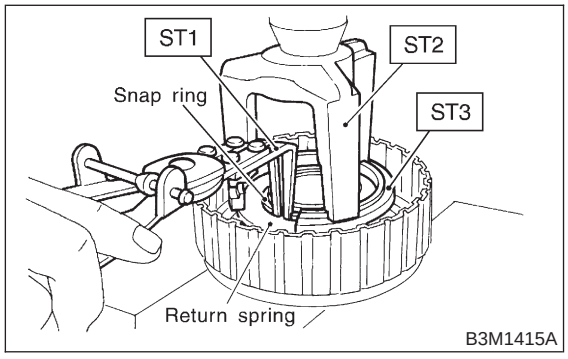
ST 498077600 REMOVER



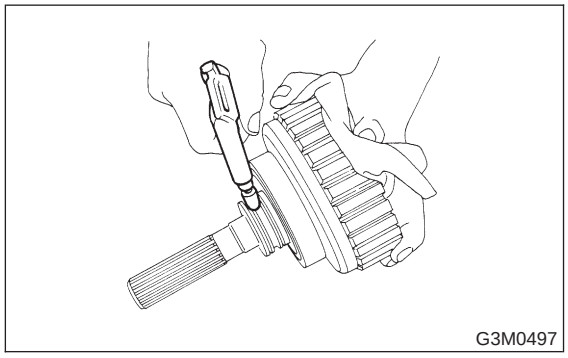
3) Remove the snap ring, and take out the pressure plate, drive plates, and driven plates.



4) Remove the snap ring with ST1, ST2 and ST3, and take out the return spring and transfer clutch piston seal.
ST1 399893600 PLIERS
ST2 398673600 COMPRESSOR
ST3 398623600 SEAT



5) Apply compressed air to the rear drive shaft to remove the piston.

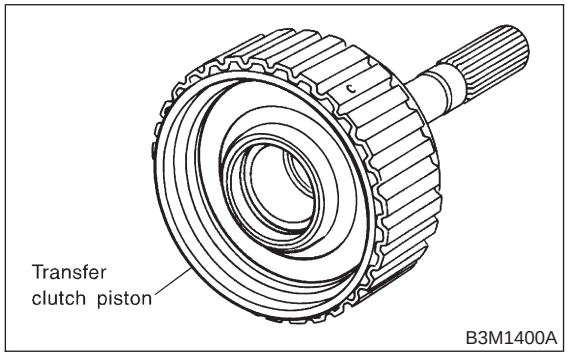


B: INSPECTION

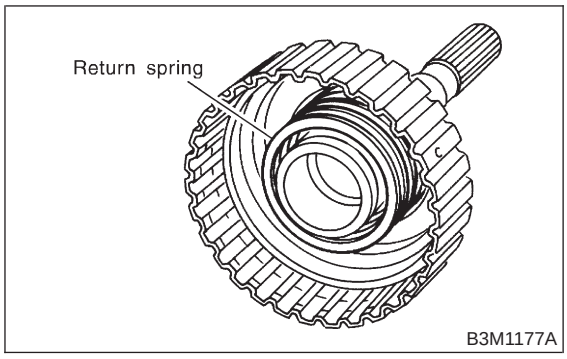
1) Check the drive plate facing for wear and damage.
2) Check the snap ring for wear, return spring for permanent set and breakage, and return spring for deformation.
3) Check the lathe cut ring for damage.

C: ASSEMBLY

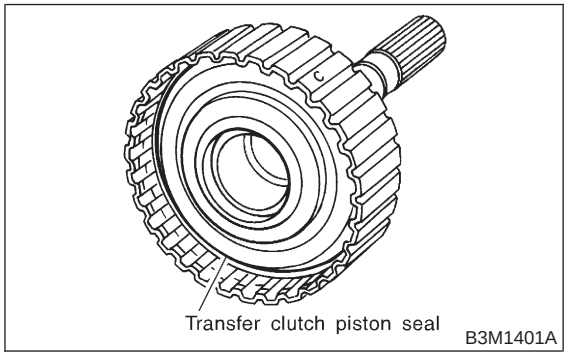
1) Install the transfer clutch piston.



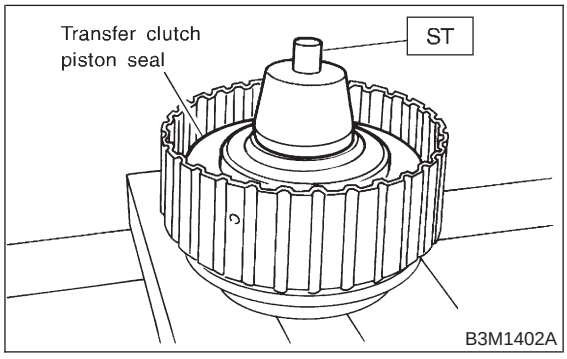
2) Install return spring to transfer piston.



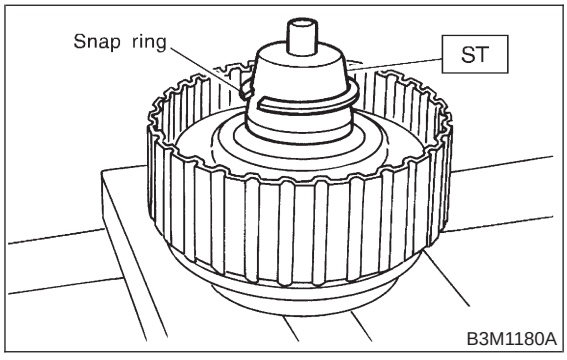
3) Install transfer clutch piston seal.



4) Install ST to rear drive shaft.
ST 499257300 SNAP RING OUTER GUIDE



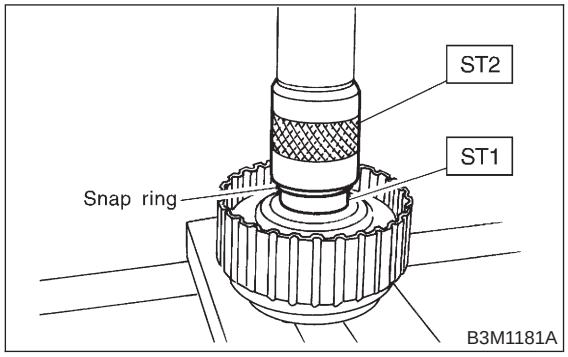
5) Install snap ring to ST.
ST 499257300 SNAP RING OUTER GUIDE



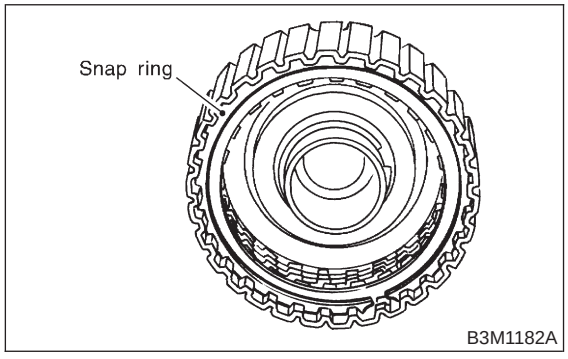
6) Using ST1 and ST2, install snap ring to rear drive shaft.

NOTE:
After installing snap ring, remove ST1 and ST2.

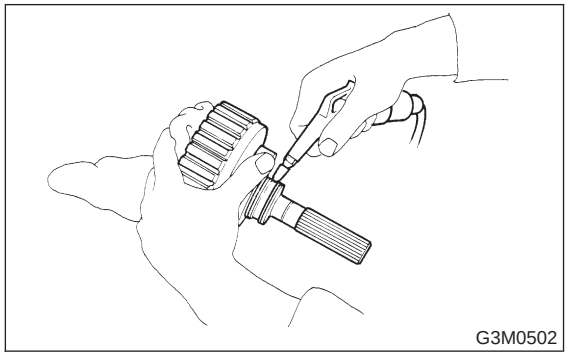
ST1 499257300 SNAP RING OUTER GUIDE
ST2 499247400 INSTALLER



7) Install the driven plates, drive plates, pressure plate and snap ring.



8) Apply compressed air to see if the assembled parts move smoothly.



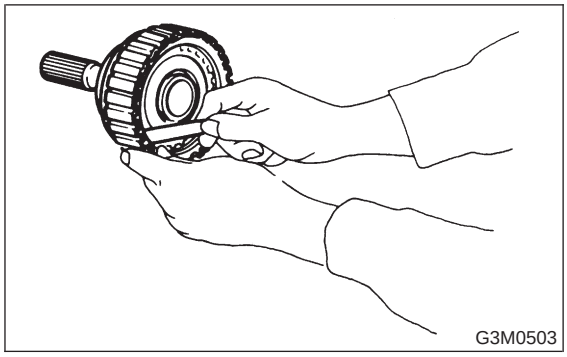
9) Check the clearance.

NOTE:
Before measuring clearance, place the same thickness of shim on both sides to prevent pressure plate from tilting.

If the clearance is not within the specified range, select a proper pressure plate.

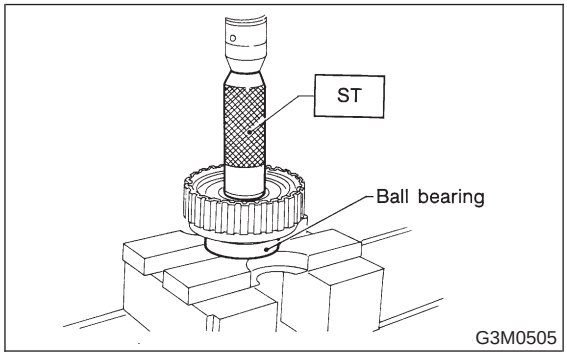
Standard value:
0.2 — 0.6 mm (0.008 — 0.024 in)

Allowable limit:
1.6 mm (0.063 in)



Available pressure plates	
Part No.	Thickness mm (in)
31593AA151	3.3 (0.130)
31593AA161	3.7 (0.146)
31593AA171	4.1 (0.161)
31593AA181	4.5 (0.177)

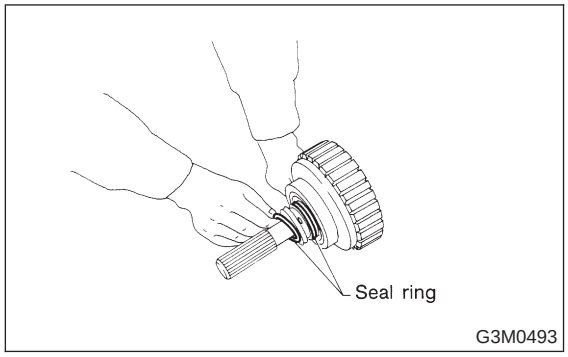
10) Press-fit the ball bearing with ST.
ST 899580100 INSTALLER



11) Coat the seal ring with vaseline, and install it in the seal ring groove of the shaft.

CAUTION:
Do not expand the seal ring excessively when installing.

ST 899580100 INSTALLER

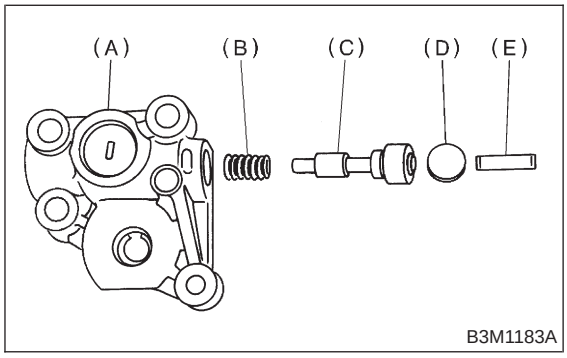


21. Transfer Valve Body

A: DISASSEMBLY

1) Separate duty solenoid C (transfer) and transfer valve body.
2) Remove the stopper plate and pry out the plug with a screwdriver. Then extract the spring and transfer control valve together.

CAUTION:
Be careful not to damage the valve and valve body.



(A) Transfer valve body
(B) Return spring
(C) Transfer control valve
(D) Plug
(E) Stopper plate

B: INSPECTION

Check each component for harmful cuts, damage, or other faults.

C: ASSEMBLY

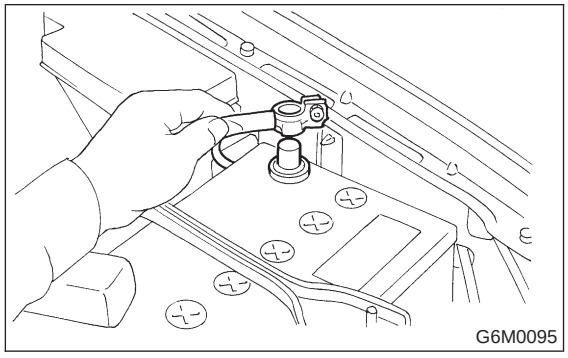
To assemble, reverse the removal sequence.

NOTE:
Make sure the valve slides smoothly after assembling.

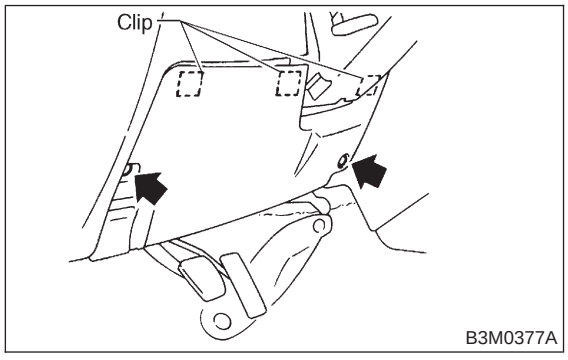
22. Transmission Control Module

A: REMOVAL

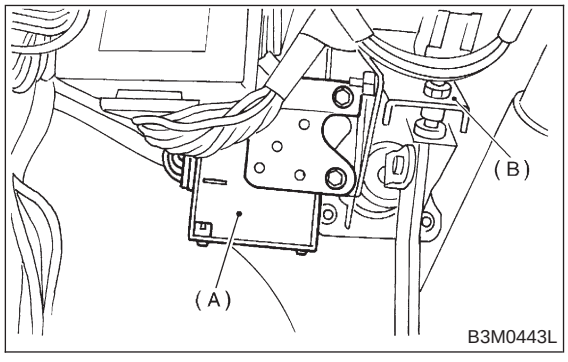
1) Disconnect battery ground cable.



2) Remove lower cover and then disconnect connector.



3) Remove transmission control module.



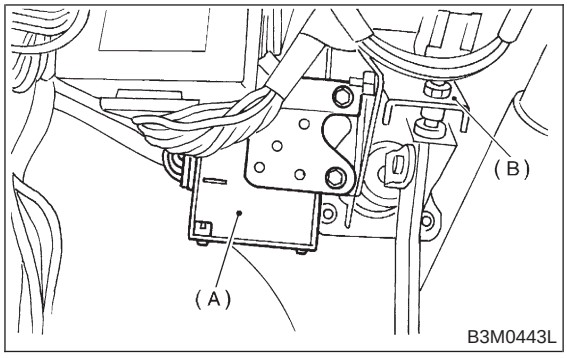
(A) Transmission control module
(B) Pedal bracket

4) Disconnect connectors form TCM.

B: INSTALLATION

1) Connect connectors to TCM.
2) Install TCM to steering support beam.

Tightening torque:
7.4±2.0 N·m (0.75±0.2 kg-m, 5.4±1.4 ft-lb)



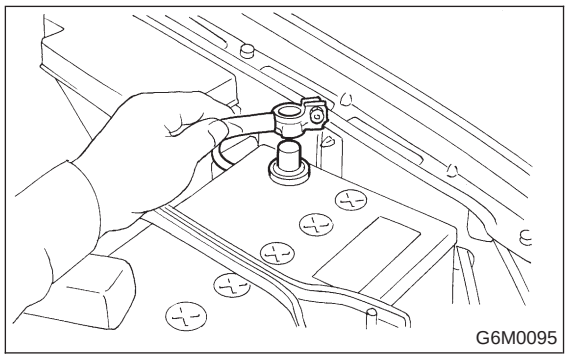
(A) Transmission control module
(B) Pedal bracket

3) Remove TCM from steering support beam.

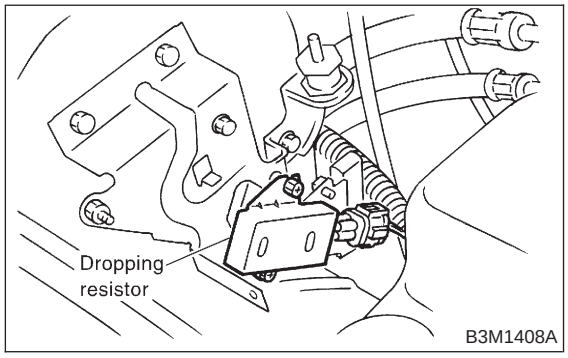
23. Dropping Resistor

A: REMOVAL AND INSTALLATION

1) Disconnect battery ground cable.



2) Remove air intake duct. <Ref. to 2-7 [W1A0].>
3) Disconnect connector from dropping resistor.
4) Remove dropping resistor from bracket.



5) Installation is in the reverse order of removal.

Tightening torque:
6.4±0.5 N·m (0.65±0.05 kg-m, 4.7±0.4 ft-lb)