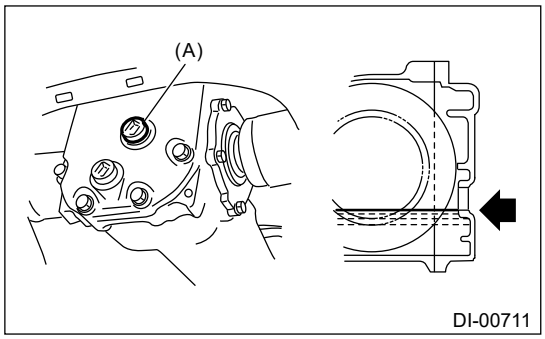
INSPECTION

1. Lift up the vehicle.
2. Remove the filler plug, and then check the gear oil. Replace the gear oil if it is contaminated, deteriorated or cloudy. Ref. to DIFFERENTIALS>Differential Gear Oil>REPLACEMENT.
3. Check that the gear oil level is within −5 mm (−0.2 in) from the bottom of the filler plug hole. If the level is low, make sure that there is no oil leakage and refill up to the bottom of filler plug hole.

   Note:

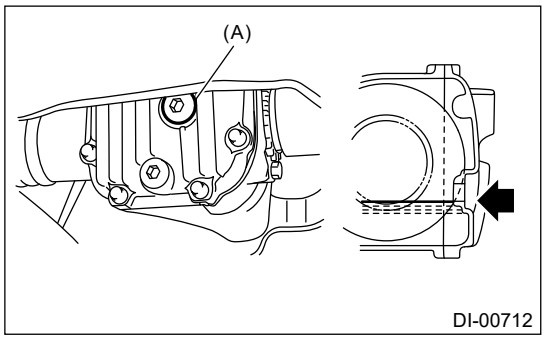
   On VA1-types at factory settings, the oil level may be within −14 mm (−0.6 in) from the bottom of the filler plug. This is at normal level, requiring no oil refill.

   - T-type



(A) Filler plug

   - VA1-type



(A) Filler plug

4. Install the filler plug.

   Note:

   - **For the T-type, degrease the thread portion sufficiently and apply liquid gasket to the filler plug.**

     Liquid gasket:

     THREE BOND 1105 (Part No. 004403010) or equivalent
   - **For VA1 type, use a new gasket.**

     Tightening torque:

     T-type:

49 N·m (5.0 kgf-m, 36.1 ft-lb)

VA1-type:

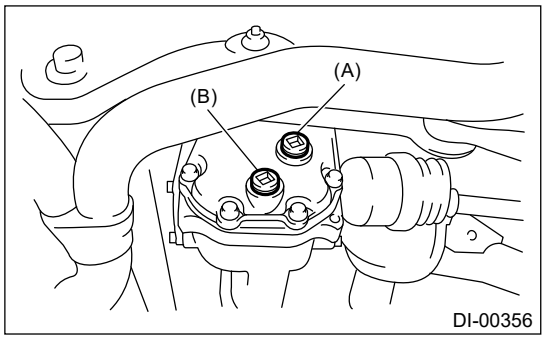
50 N·m (5.1 kgf-m, 36.9 ft-lb)

REPLACEMENT

Caution:

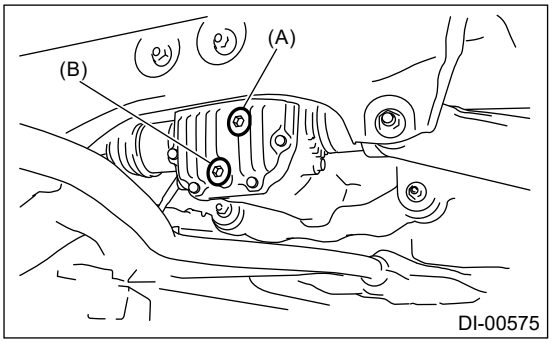
- **Gear oil is extremely hot just after driving. Be wary of receiving burns.**
- **Be careful not to spill the differential gear oil on exhaust pipe. If gear oil is spilled, wipe it off completely.**

1. Lift up the vehicle.
2. Remove the drain plug and filler plug, and drain the gear oil.
   - T-type



(A) Filler plug
(B) Drain plug

   - VA1-type



(A) Filler plug
(B) Drain plug

3. Install the drain plug.

Note:

- **For the T-type, degrease the thread portion sufficiently and apply liquid gasket to the drain plug.**
  Liquid gasket:
  THREE BOND 1105 (Part No. 004403010) or equivalent
- **For VA1 type, use a new gasket.**
  Tightening torque:
  T-type

49 N·m (5.0 kgf-m, 36.1 ft-lb)

VA1-type:

50 N·m (5.1 kgf-m, 36.9 ft-lb)

4. Fill the differential carrier with gear oil to the bottom of filler plug.

Note:

Carefully refill gear oil while watching the level. Excessive or insufficient oil must be avoided.

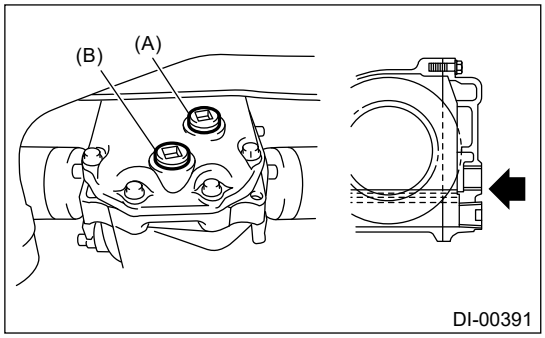
Recommended gear oil:

Ref. to DIFFERENTIALS>General Description>SPECIFICATION.

Oil capacity:

0.8 L (0.8 US qt, 0.7 Imp qt)

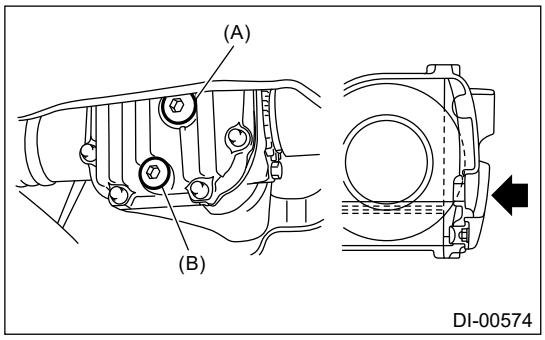
- T-type



(A) Filler plug

(B) Drain plug

- VA1-type



(A) Filler plug

(B) Drain plug

5. Install the filler plug.

Note:

- **For the T-type, degrease the thread portion sufficiently and apply liquid gasket to the filler plug.**
  Liquid gasket:
  THREE BOND 1105 (Part No. 004403010) or equivalent
- **For VA1 type, use a new gasket.**
  Tightening torque:

T-type:

49 N·m (5.0 kgf-m, 36.1 ft-lb)

VA1-type:

50 N·m (5.1 kgf-m, 36.9 ft-lb)

NOTE

1. CVT (TR580) MODEL

For front differential for the CVT (TR580) model, refer to the “CVT (TR580)” section. Ref. to CONTINUOUSLY VARIABLE TRANSMISSION(TR580)>Front Differential Assembly.

2. CVT (TR690) MODEL

For front differential for the CVT (TR690) model, refer to the “CVT (TR690)” section. Ref. to CONTINUOUSLY VARIABLE TRANSMISSION(TR690)>Front Differential Assembly.

3. MT MODEL

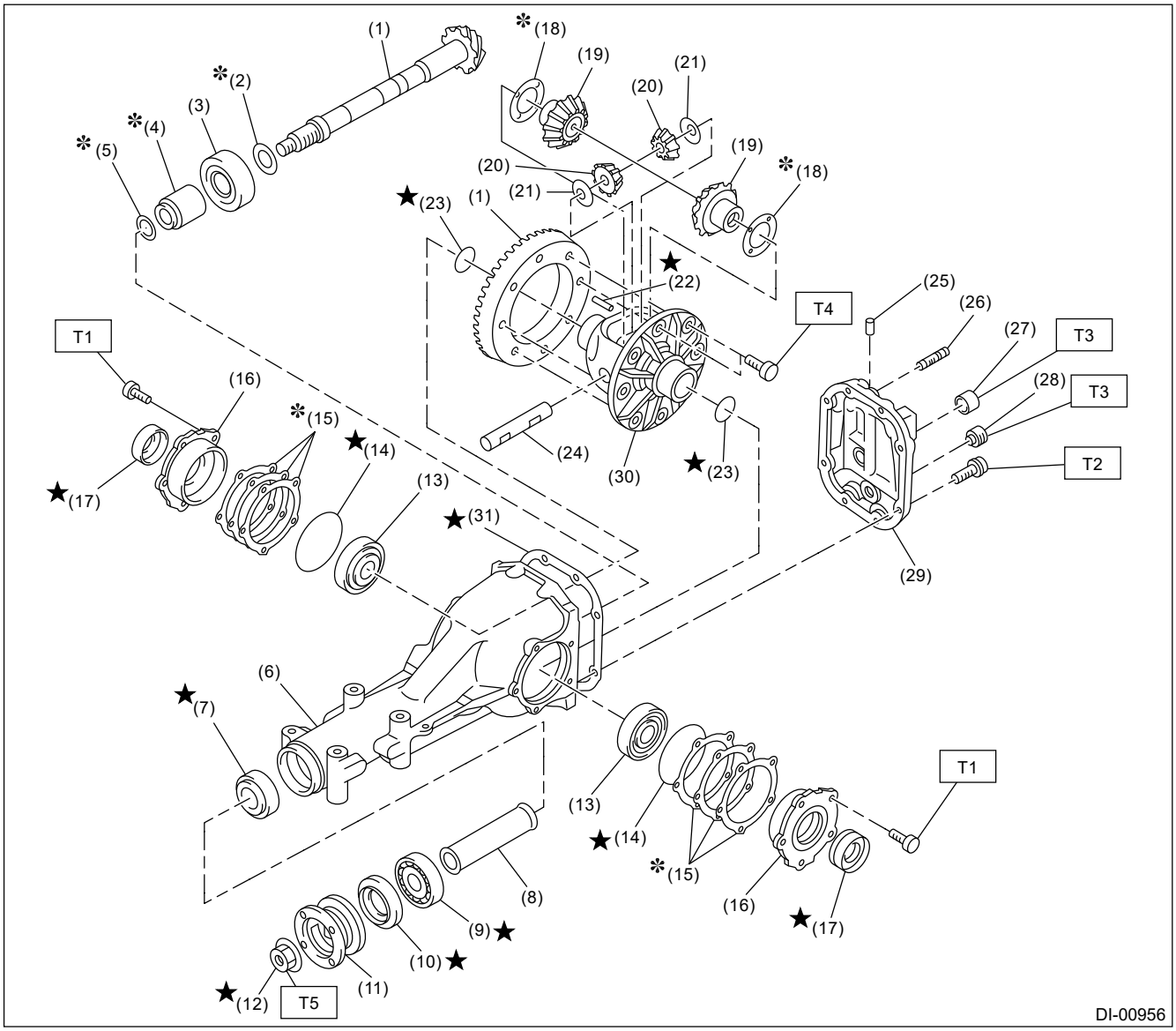
For the front differential of the manual transmission model, refer to “6MT” section. Ref. to MANUAL TRANSMISSION AND DIFFERENTIAL(6MT)>Front Differential Assembly.

CAUTION

- When performing any work, always wear work clothes, a work cap and protective shoes. Additionally, wear a helmet, protective goggles, etc. if necessary.
- Remove contamination including dirt and corrosion before removal, installation or disassembly.
- Keep the disassembled parts in order and protect them from dust and dirt.
- When performing a repair, identify the cause of trouble and avoid unnecessary removal, disassembly and replacement.
- Use SUBARU genuine grease, the recommended or equivalent. Do not mix grease etc. of different grades or manufacturers.
- Do not secure a part in a vise directly. Place cushioning materials such as wood pieces, blocks, aluminum plates, or waste cloth between the part and the vise.
- Be sure to tighten fasteners including bolts and nuts to the specified torque.
- Always use the jack-up point when the shop jacks or rigid racks are used to support the vehicle.
- Apply grease onto sliding or revolving surfaces before installation.
- Before installing the O-ring or snap ring, apply a sufficient amount of gear oil to avoid damage and deformation.
- Avoid damaging the mating surface of the case.
- For parts which are not reusable, always use new parts. Other parts should be replaced with new parts as required.
- When handling oil or fuel, adhere to the following to prevent unexpected accident.
  - Be careful with fire.
  - Prepare a container to catch grease or oil, etc. If any grease or oil spills, wipe it off and clean immediately to prevent from penetrating into floor or flowing outside.
  - Follow all government and local regulations concerning disposal of refuse when disposing.
- Before disconnecting connectors of sensors or units, be sure to disconnect the ground cable from battery.
- Some vehicle components are extremely hot immediately after driving. Be wary of receiving burns from heated parts.

COMPONENT

1. REAR DIFFERENTIAL (T-TYPE)



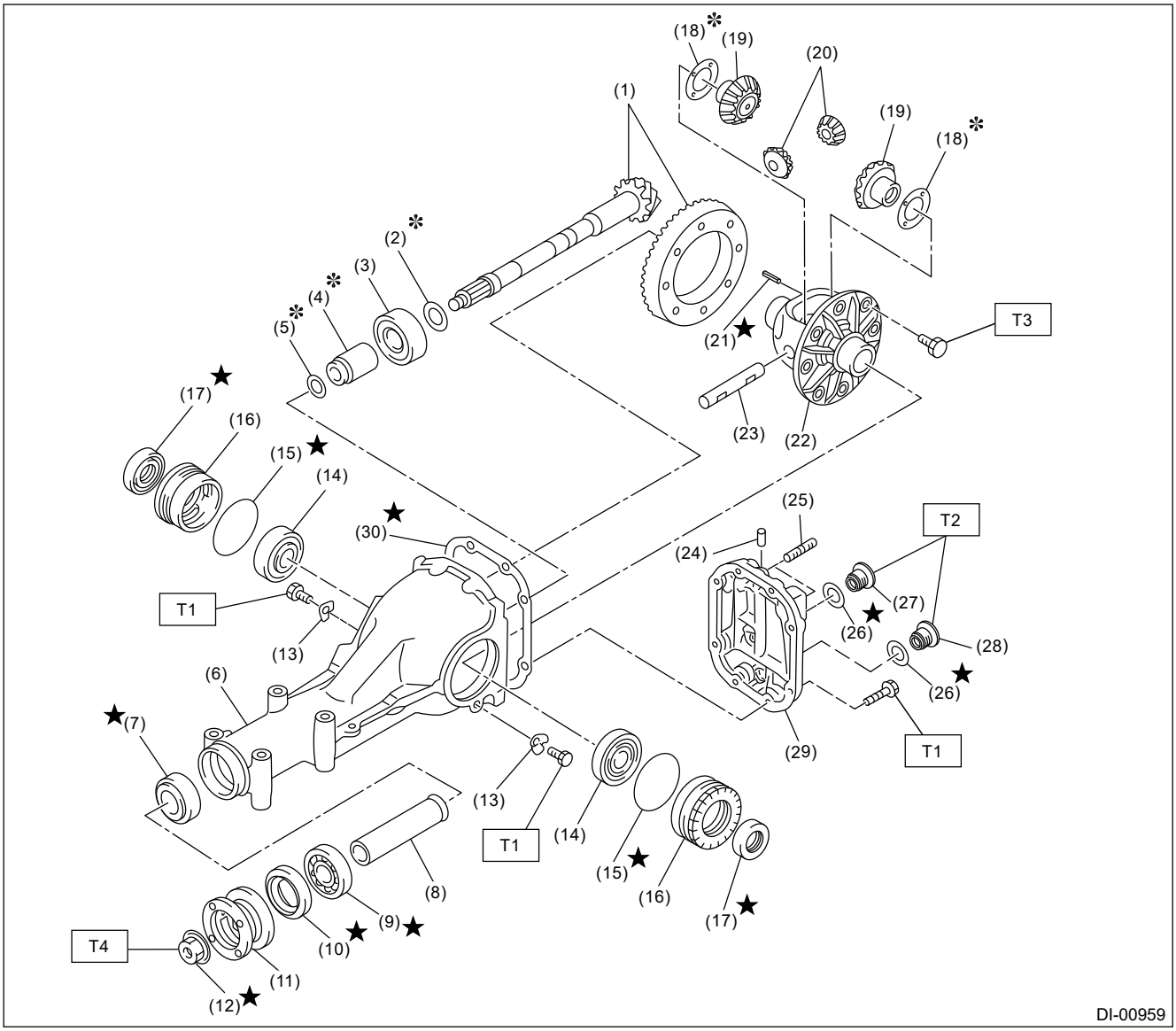
(1) Hypoid driven gear and drive pinion set
(2) Pinion height adjusting washer
(3) Rear bearing
(4) Preload adjusting spacer
(5) Preload adjusting washer
(6) Differential carrier
(7) Front bearing
(14) O-ring
(15) Side retainer shim
(16) Side retainer
(17) Side oil seal
(18) Side gear thrust washer
(19) Side gear
(20) Pinion mate gear
(27) Filler plug
(28) Drain plug
(29) Rear cover
(30) Differential case
(31) Gasket

Tightening torque: N•m (kgf-m, ft-lb)

(8) Spacer
(9) Pilot bearing
(10) Front oil seal
(11) Companion flange
(12) Self-locking nut
(13) Side bearing
(21) Pinion mate gear washer
(22) Pinion shaft lock pin
(23) Circlip
(24) Pinion mate shaft
(25) Air breather cap
(26) Stud bolt

T1: 10.5 (1.1, 7.7)
T2: 29.5 (3.0, 21.8)
T3: 49 (5.0, 36.1)
T4: 103 (10.5, 76.0)
T5: 181.5 (18.5, 133.9)

2. REAR DIFFERENTIAL (VA1-TYPE)



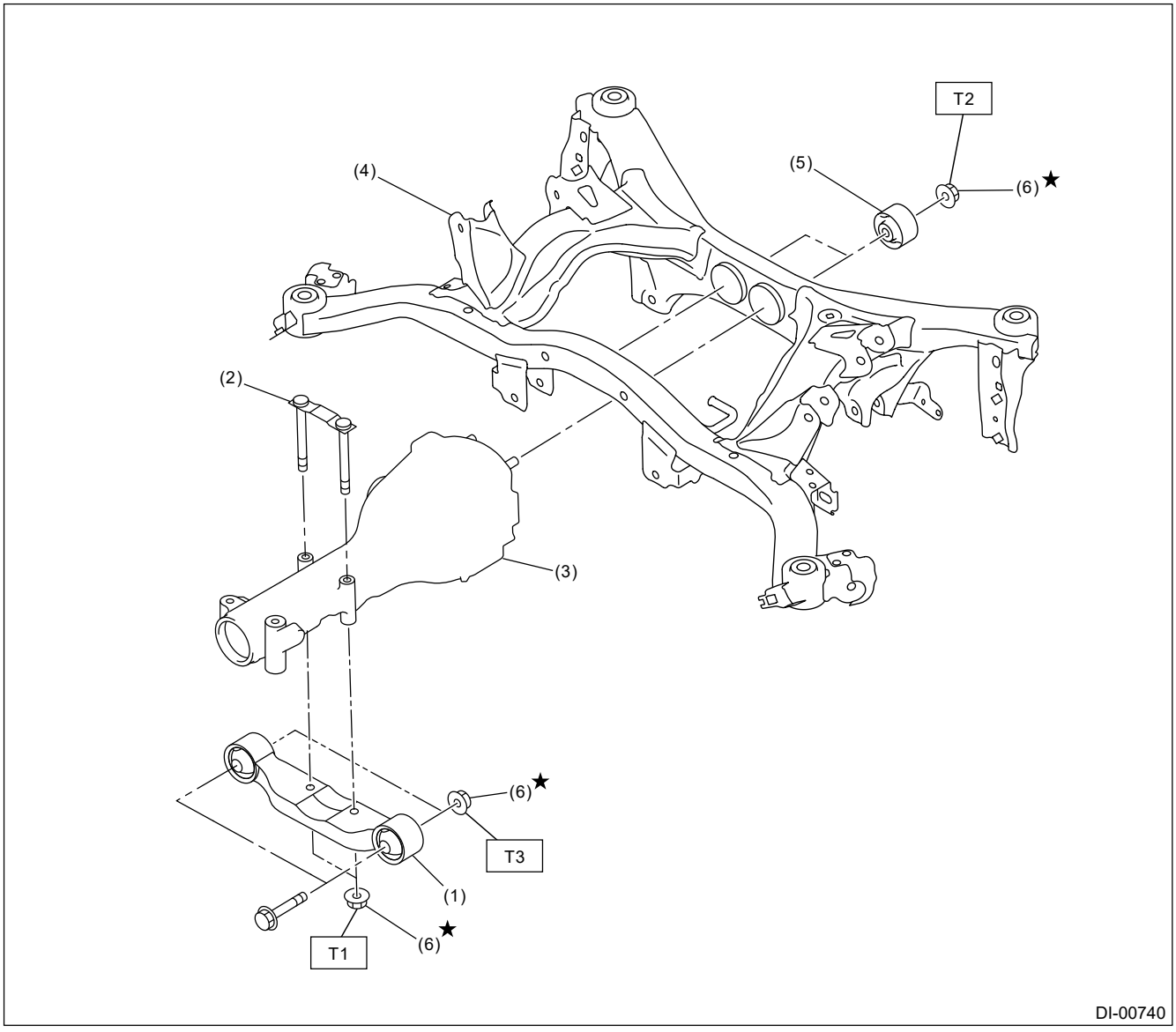
(1) Hypoid driven gear and drive pinion set
(2) Pinion height adjusting washer
(3) Rear bearing
(4) Preload adjusting spacer
(5) Preload adjusting washer
(13) Lock plate
(14) Side bearing
(15) O-ring
(16) Side retainer
(17) Side oil seal
(25) Stud bolt
(26) Gasket
(27) Filler plug
(28) Drain plug
(29) Rear cover

(6) Differential carrier
(7) Front bearing
(8) Spacer
(9) Pilot bearing
(10) Front oil seal
(11) Companion flange
(12) Self-locking nut
(18) Side gear thrust washer
(19) Side gear
(20) Pinion mate gear
(21) Spring pin
(22) Differential case
(23) Pinion mate shaft
(24) Air breather cap
(30) Gasket

Tightening torque: N•m (kgf-m, ft-lb)

T1: 25 (2.5, 18.4)
T2: 50 (5.1, 36.9)
T3: Ref. to DIFFERENTIALS>Rear Differential (VA-type)>ASSEMBLY.
T4: 191 (19.5, 140.9)

3. REAR DIFFERENTIAL MOUNTING SYSTEM



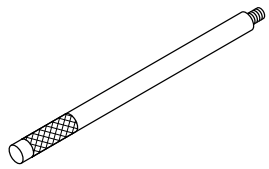
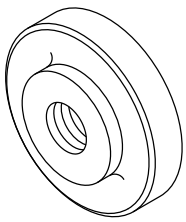
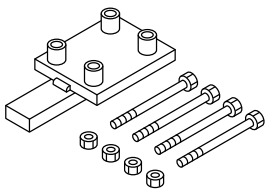
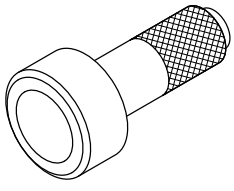
(1) Rear differential front member
(4) Rear sub frame

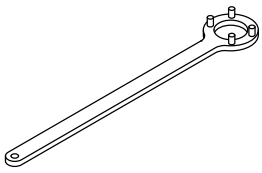
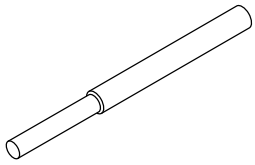
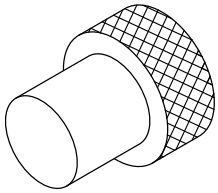
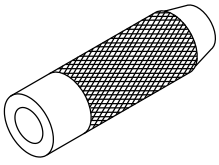
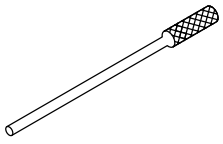
Tightening torque: N•m (kgf-m, ft-lb)

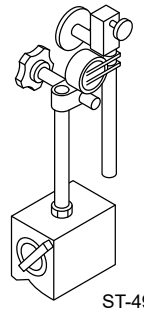
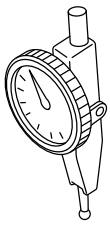
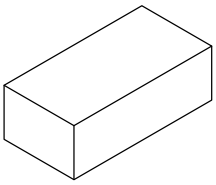
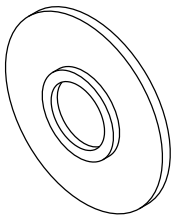
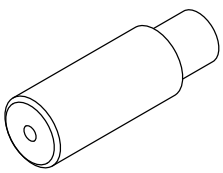
(2)	Rear differential member plate	(5)	Rear differential mount bushing	***T1: 50 (5.1, 36.9)***
(3)	Rear differential ASSY	(6)	Self-locking nut	***T2: 70 (7.1, 51.6)***
				T3: 110 (11.2, 81.1)

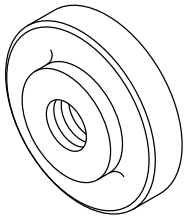
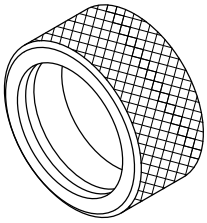
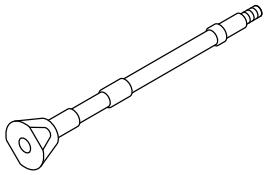
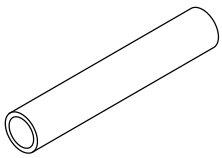
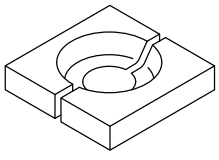
PREPARATION TOOL

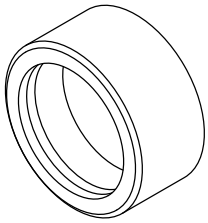
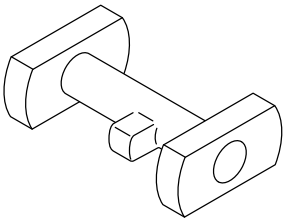
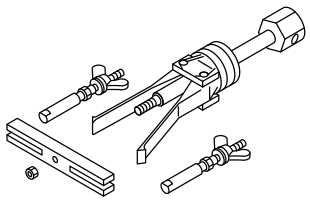
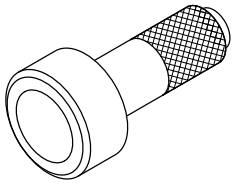
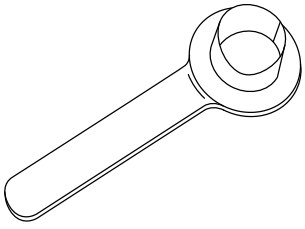
1. SPECIAL TOOL

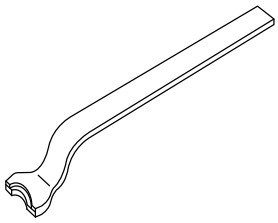
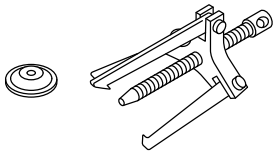
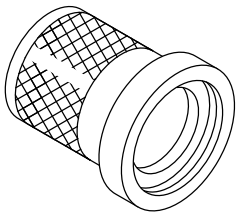
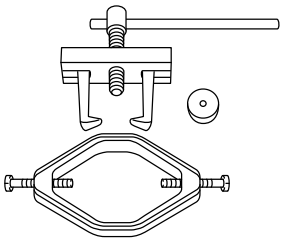
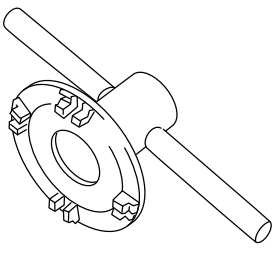
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-398477701	398477701	HANDLE	• Used for installing the rear bearing race. • Used for installing the front bearing race.
 ST-398477702	398477702	DRIFT	• Used for installing the front bearing race. (T-type) • Used for installing the rear bearing race. (VA1-type) • Used for installing side bearing race. (VA1-type)
 ST-398217700	398217700	ATTACHMENT SET	Stand for rear differential carrier disassembly and assembly.
 ST-498447120	498447120	INSTALLER	Used for installing the front oil seal.
	498427200	FLANGE WRENCH	Used for stopping rotation of companion flange when removing and tightening self-lock nut.

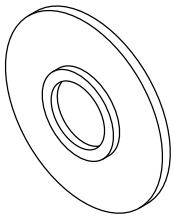
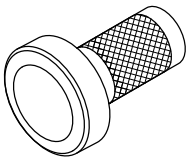
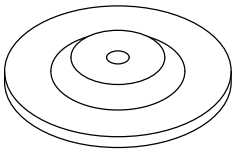
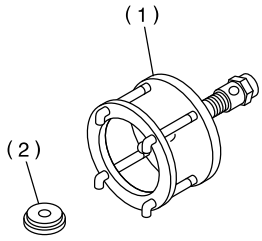
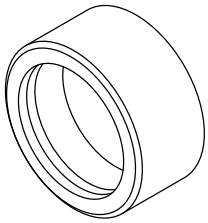
 ST-498427200			
 ST-398467700	398467700	DRIFT	Used for removing drive pinion shaft, pilot bearing and front bearing cone.
 ST-399780104	399780104	WEIGHT	• Used for installing the front bearing cone and the companion flange. • Used for installing the pilot bearing.
 ST-899580100	899580100	INSTALLER	Used for installing the front bearing cone and the pilot bearing.
 ST-899904100	899904100	STRAIGHT PIN REMOVER	• Used for removing and installing the pinion mate shaft lock pin. (T-type) • Used for removing and installing the pinion mate shaft spring pin. (VA1-type)

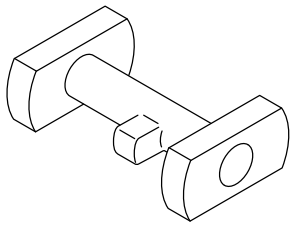
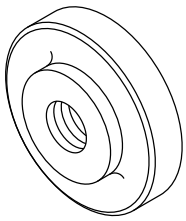
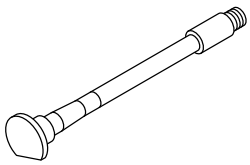
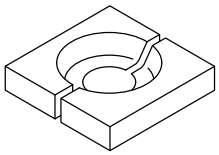
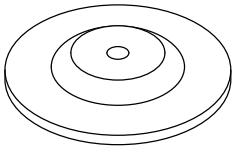
 ST-498247001	498247001	MAGNET BASE	• Used for measuring backlash between side gear and pinion, and hypoid gear. • Used together with DIAL GAUGE (498247100).
 ST-498247100	498247100	DIAL GAUGE	• Used for measuring backlash between side gear and pinion, and hypoid gear. • Used together with MAGNET BASE (498247001).
 ST-398507704	398507704	BLOCK	Used for adjusting pinion height and preload.
 ST-398177700	398177700	INSTALLER	Used for installing the rear bearing cone. (T-type)
 ST-398457700	398457700	ATTACHMENT	Used for removing the side retainer. (T-type)

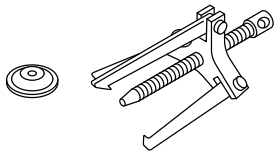
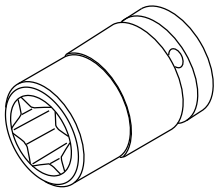
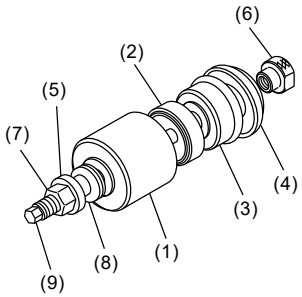
 ST-398477703	398477703	DRIFT 2	Used for installing the rear bearing race. (T-type)
 ST-398437700	398437700	OIL SEAL INSTALLER	Used for installing the side oil seal. (T-type)
 ST-398507702	398507702	DUMMY SHAFT	Used for adjusting pinion height and preload. (T-type)
 ST-398507703	398507703	DUMMY COLLAR	• Used for adjusting pinion height and preload. (T-type) • Used for installing the front bearing cone. (T-type)
 ST-398517700	398517700	REPLACER	Used for removing rear bearing cone. (T-type)

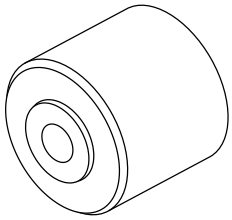
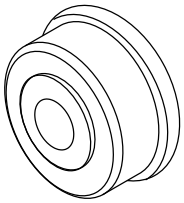
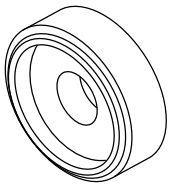
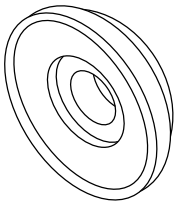
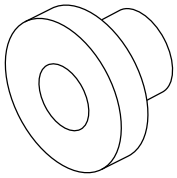
 ST-398487700	398487700	DRIFT	Used for installing side bearing cone. (T-type)
 ST-398507701	398507701	DIFFERENTIAL CARRIER GAUGE	Used for adjusting pinion height. (T-type)
 ST-398527700	398527700	PULLER ASSY	• Used for removing front oil seal. • Used for removing the side bearing race. (T-type) • Used for removing side oil seal.
 ST-398417700	398417700	DRIFT	Used for installing side bearing race. (T-type)
 ST28099PA090	28099PA090	OIL SEAL PROTECTOR	Used for installing the rear drive shaft to the rear differential. (For oil seal protection)

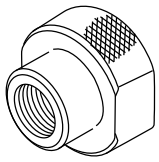
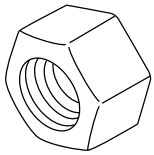
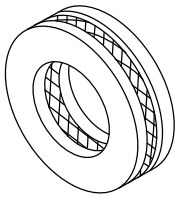
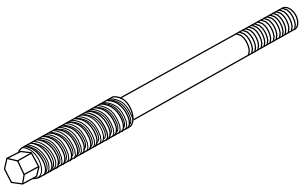
 ST28099PA100	28099PA100	DRIVE SHAFT REMOVER	Used for removing the rear drive shaft from rear differential. (T-type)
 ST-399703600	399703600	PULLER ASSY	Used for removing companion flange.
 ST-899874100	899874100	INSTALLER	Used for installing the companion flange.
 ST18759AA000	18759AA000	PULLER ASSY	Used for removing the side bearing cone. (T-type)
 ST18630AA010	18630AA010	WRENCH COMPL RETAINER	• Used for removing and installing the side retainer. (VA1-type) • WRENCH ASSY (499787000) can also be used.

 ST-498175500	498175500	INSTALLER	Used for installing the rear bearing cone. (VA1-type)
 ST498447100	498447100	INSTALLER	Used for installing the side oil seal. (VA1-type)
 ST-399520105	399520105	SEAT	• Used for removing the side bearing cone. (VA1-type) • Used together with PULLER SET (899524100). (VA1-type)
 ST-899524100	899524100	PULLER SET	• Used for removing the side bearing cone. (VA1-type) • Used together with SEAT (399520105). (1) Puller (2) Cap
 ST-498485400	498485400	DRIFT	Used for installing side bearing cone. (VA1-type)

 ST-498505501	498505501	DIFFERENTIAL CARRIER GAUGE	Used for adjusting pinion height. (VA1-type)
 ST-498447110	498447110	DRIFT	Used for installing the front bearing race. (VA1-type)
 ST-498447150	498447150	DUMMY SHAFT	Used for adjusting pinion height and preload. (VA1-type)
 ST-498515500	498515500	REMOVER	Used for removing rear bearing cone. (VA1-type)
 ST-499705404	499705404	SEAT	• Used for removing the side bearing race. (VA1-type) • Used together with PULLER ASSY (499705401).

 ST-499705401	499705401	PULLER ASSY	• Used for removing the side bearing race. (VA1-type) • Used together with SEAT (499705404).
 ST18270KA020	18270KA020	SOCKET (E20)	Used for removing and installing the hypoid driven gear. (VA1-type)
 ST41399FG001	41399FG001	SPECIAL TOOL ASSY	• Used for removing and installing the rear differential mount bushing. • Use (1), (2), (5), (6), (7), (8) and (9) for removal. • Use (3), (4), (5), (6), (7), (8) and (9) for installation. (1) SPECIAL TOOL A (41399FG010) (2) SPECIAL TOOL C (41399FG031) (3) SPECIAL TOOL B (41399FG020) (4) SPECIAL TOOL D (41399FG041) (5) SPECIAL TOOL SLEEVE (41399FG050) (6) SPECIAL TOOL RING (41399FG061) (7) SPECIAL TOOL NUT (41399FG070) (8) SPECIAL TOOL BEARING (41399FG080) (9) SPECIAL TOOL SHAFT (41399FG091)
	41399FG010	SPECIAL TOOL A	• Used for removing the rear differential mount bushing.

 ST41399FG010			• For combination of tools for removal, refer to "SPECIAL TOOL ASSY (41399FG001)".
 ST41399FG020	41399FG020	SPECIAL TOOL B	• Used for installing the rear differential mount bushing. • For combination of tools for installation, refer to "SPECIAL TOOL ASSY (41399FG001)".
 ST41399FG031	41399FG031	SPECIAL TOOL C	• Used for removing the rear differential mount bushing. • For combination of tools for removal, refer to "SPECIAL TOOL ASSY (41399FG001)".
 ST41399FG041	41399FG041	SPECIAL TOOL D	• Used for installing the rear differential mount bushing. • For combination of tools for installation, refer to "SPECIAL TOOL ASSY (41399FG001)".
 ST41399FG050	41399FG050	SPECIAL TOOL SLEEVE	• Used for removing and installing the rear differential mount bushing. • For combination of tools for removal and installation, refer to "SPECIAL TOOL ASSY (41399FG001)".

 ST41399FG061	41399FG061	SPECIAL TOOL RING	• Used for removing and installing the rear differential mount bushing. • For combination of tools for removal and installation, refer to "SPECIAL TOOL ASSY (41399FG001)".
 ST41399FG070	41399FG070	SPECIAL TOOL NUT	• Used for removing and installing the rear differential mount bushing. • For combination of tools for removal and installation, refer to "SPECIAL TOOL ASSY (41399FG001)".
 ST41399FG080	41399FG080	SPECIAL TOOL BEARING	• Used for removing and installing the rear differential mount bushing. • For combination of tools for removal and installation, refer to "SPECIAL TOOL ASSY (41399FG001)".
 ST41399FG091	41399FG091	SPECIAL TOOL SHAFT	• Used for removing and installing the rear differential mount bushing. • For combination of tools for removal and installation, refer to "SPECIAL TOOL ASSY (41399FG001)".
 STSSM4	— (Newly adopted tool)	SUBARU SELECT MONITOR 4	Used for setting of each function and troubleshooting for electrical system. **Note:** **For detailed operation procedures of Subaru Select Monitor 4, refer to "Application help".**

2. GENERAL TOOL

TOOL NAME	REMARKS
Transmission jack	Used for removing and installing the rear differential.
PULLER	Used for removing the side bearing retainer.
Thickness gauge	Used for measuring clearance.
Hexagon wrench	Used for installing and removing the oil filler plug and oil drain plug.
Tire lever	Used for removing the rear drive shaft. (VA1-type)
Angle gauge	Used for installing the hypoid driven gear.
DST-i	Used together with Subaru Select Monitor 4.

SPECIFICATION

1. REAR DIFFERENTIAL

When replacing a rear differential assembly, select the correct one according to the following table.

Note:

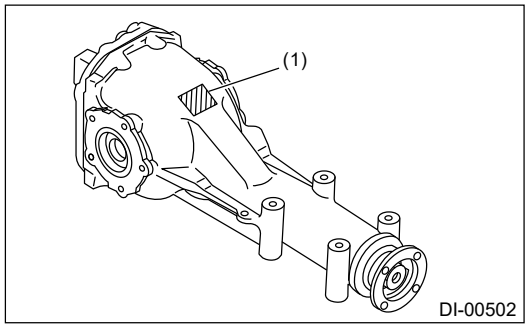
- **Using a different rear differential assembly will cause the drive train and tires to drag or emit abnormal noise.**
- **For option code, refer to "ID" section. Ref. to IDENTIFICATION.**

Model	2.5 L non-turbo		2.0 L turbo
	CVT	6MT	CVT
Rear differential type	VA1-type	T-type	T-type
Identification	XD	B4	X1
LSD type	—		
Type of gear	Hypoid gear		
Gear ratio (number of gear teeth)	3.700 (37/10)	4.444 (40/9)	4.111 (37/9)
Oil capacity	0.8 L (0.8 US qt, 0.7 Imp qt)		
Rear differential gear oil	GL-5		

2. IDENTIFICATION

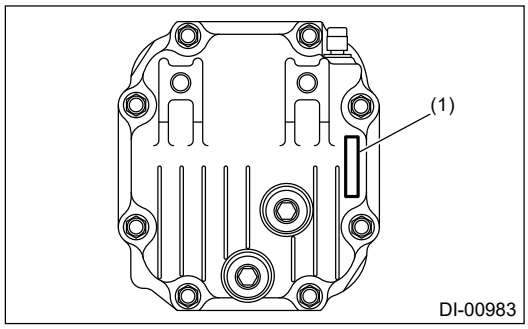
Identification positions are shown in the following figures. For details concerning identification, refer to the "ID" section.

- T-type



(1) Identification

- VA1-type



(1) Identification

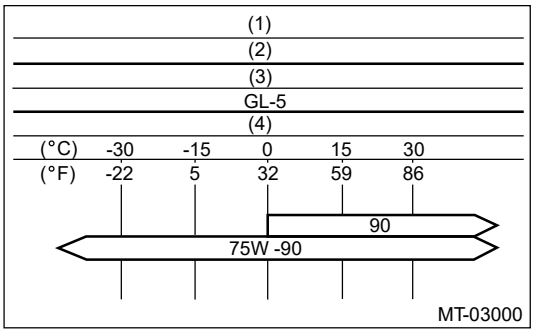
3. REAR DIFFERENTIAL GEAR OIL

Recommended gear oil:

GL-5 (75W-90) or equivalent

Caution:

Each oil manufacturer has its base oil and additives. Thus, do not mix two or more brands.



(1) Item

(2) Rear differential gear oil

(3) API classification

(4) SAE viscosity No. and applicable temperature

4. SERVICE DATA

Drive pinion bearing preload (for new bearing)	Measured with spring measurement (measured from the companion flange bolt)	N (kgf, lbf)	T-type	18.1 — 38.8 (1.8 — 4.0, 4.1 — 8.7)
			VA1-type	12.7 — 32.2 (1.3 — 3.3, 2.9 — 7.2)
	Measured with torque wrench	N·m (kgf-m, ft-lb)	T-type	0.69 — 1.47 (0.07 — 0.15, 0.51 — 1.08)
			VA1-type	0.48 — 1.22 (0.05 — 0.12, 0.35 — 0.90)
Side gear backlash		mm (in)	T-type	0.10 — 0.20 (0.004 — 0.008)
			VA1-type	0.05 — 0.15 (0.002 — 0.006)
Hypoid driven gear backlash		mm (in)	T-type	0.10 — 0.20 (0.004 — 0.008)
			VA1-type	0.10 — 0.15 (0.004 — 0.006)
Hypoid driven gear runout on its back surface		mm (in)	T-type	0.05 (0.002)
Total preload (measured from the companion flange bolt hole)		N (kgf, lbf)	T-type	20.7 — 54.4 (2.1 — 5.5, 4.7 — 12.2)
Companion flange mating surface runout			mm (in)	0.08 (0.003)
Companion flange runout on its inner side			mm (in)	0.08 (0.003)

INSPECTION

Symptom or trouble	Possible cause	Remedy
1. Oil leakage	(1) Worn, scratched, or incorrectly seated front or side oil seal. Scored, battered or excessively worn sliding surface of companion flange.	Repair or replace.
	(2) Clogged or damaged air breather cap.	Clean, repair or replace.
	(3) Loose bolts on the side retainer, or incorrectly fitted O-ring.	Tighten the bolts to specified torque. Replace the O-ring.
	(4) Loose rear cover attachment bolts or damaged gasket.	Replace the gasket, and tighten the bolts to specified torque.
	(5) Loose filler plug or drain plug.	• Apply liquid gasket, and tighten to the specified torque. (T-type) • Replace the gasket, and tighten to the specified torque. (VA1-type)
	(6) Wear, damage or incorrect fitting of drive shaft, side retainer or oil seal.	Repair or replace.
2. Seizure **Note:** **Seized or damaged parts should be replaced, and also other parts should be thoroughly checked for any defect and should be repaired or replaced as required.**	(1) Insufficient backlash for hypoid gear.	Readjust or replace.
	(2) Excessive preload for side, rear or front bearing.	Readjust or replace.
	(3) Insufficient or improper oil used.	Add recommended oil to the specified level.
3. Damage **Note:** **Damaged parts should be replaced, and also other parts should be thoroughly checked for any defect and should be repaired or replaced as required.**	(1) Improper backlash for hypoid gear.	Readjust or replace.
	(2) Insufficient or excessive preload for side, rear or front bearing.	Readjust or replace.
	(3) Excessive backlash for differential gear.	Replace gear or thrust washer.
	(4) Loose bolts and nuts such as hypoid driven gear bolt.	Retighten.

	(5) Damage due to overloading.	Replace.
4. Noises when starting or shifting gears **Note:** **Noises may be caused by differential assembly, universal joint, wheel bearing, etc. Find out what is actually making noise before disassembling.**	(1) Improper tooth contact of hypoid driven gear and drive pinion.	Readjust. (Drive pinion adjustment and backlash adjustment)
	(2) Excessive backlash for hypoid driven gear.	Replace the gear or the pinion height adjusting washer.
	(3) Excessive backlash for side gear.	Replace gear or thrust washer.
	(4) Insufficient preload for front or rear bearing.	Readjust.
	(5) Loose drive pinion nut.	Tighten to the specified torque.
	(6) Loose bolts and nuts such as side retainer attachment bolt.	Tighten to the specified torque.
5. Noises when cornering	(1) Damaged differential gear.	Replace.
	(2) Excessive wear or damage of thrust washer.	Replace.
	(3) Broken pinion mate shaft.	Replace.
	(4) Stuck or damaged side bearing.	Replace.
6. Gear Noise **Note:** **Since noises from engine, muffler, transmission, propeller shaft, wheel bearings, tires, and body are sometimes mistaken for noises from differential assembly, be careful in checking them. Inspection methods to locate noises include coasting, accelerating, cruising, and lifting-up all four wheels. Perform these inspections according to the condition of trouble. When listening to noises, shift the gear into four-wheel drive and fourth speed position, trying to pick**	(1) Improper tooth contact of hypoid driven gear and drive pinion.	Readjust or replace the hypoid gear set.
	(2) Improper backlash of the hypoid driven gear.	Readjust.
	(3) Scored or chipped teeth of hypoid gear.	Replace hypoid gear set.
	(4) Scuffed hypoid gear.	Replace hypoid gear set.
	(5) Improper preload for front or rear bearings.	Readjust.
	(6) Stuck, scored or chipped teeth of front or rear bearing.	Replace.
	(7) Stuck, scored or chipped teeth of side bearing.	Replace.

up only differential noise.	(8) Vibrating differential gear.	Replace the differential gear.

ADJUSTMENT

1. SIDE GEAR BACKLASH

Adjust the side gear backlash. Ref. to DIFFERENTIALS>Rear Differential (T-type)>ASSEMBLY.

2. HYPOID DRIVEN GEAR BACKLASH

Adjust hypoid driven gear backlash. Ref. to DIFFERENTIALS>Rear Differential (T-type)>ASSEMBLY.

3. TOOTH CONTACT BETWEEN HYPOID DRIVEN GEAR AND DRIVE PINION

Adjust the tooth contact between hypoid driven gear and drive pinion gear. Ref. to DIFFERENTIALS>Rear Differential (T-type)>ASSEMBLY.

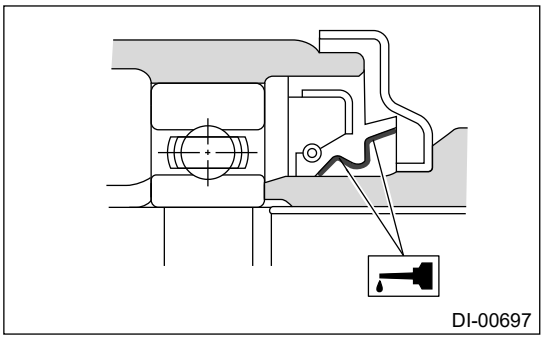
4. TOTAL PRELOAD

Adjust the side retainer shim. Ref. to DIFFERENTIALS>Rear Differential (T-type)>ASSEMBLY.

ASSEMBLY

Note:

- **Assemble in the reverse order of disassembly.**
- **Check and adjust each part during assembly.**
- **Keep the shims and washers in order, so that they are not improperly installed.**
- **Thoroughly clean the surfaces on which the shims, washers and bearings are to be installed.**
- **Apply differential gear oil when installing the bearings and thrust washers.**
- **Be careful not to mix up the RH and LH bearing races.**
- **Replace the gasket, oil seal and O-ring with a new part.**
- **Be careful not to mix up the rear differential side oil seal RH and LH.**
- **Apply differential gear oil to the lips when installing the oil seal.**



1. Adjusting preload for front and rear bearings

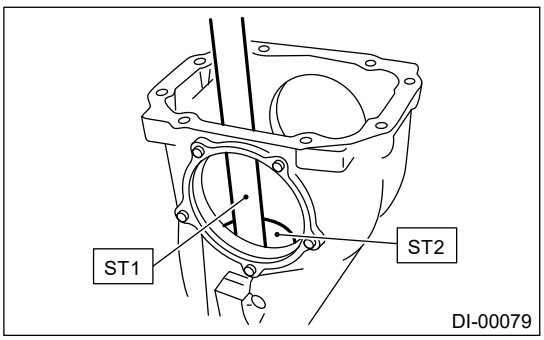
Note:

Adjust the bearing preload between front and rear bearings with preload adjusting spacer and washer. Pinion height adjusting washer is not affected by this adjustment. The adjustment must not be carried out with oil seal inserted.

(1) Install the rear bearing race into the differential carrier using ST1 and ST2.

ST1 398477701 HANDLE

ST2 398477703 DRIFT 2



(2) Install the front bearing race to the differential carrier using ST1 and ST2.

Note:

Use a new front bearing race.

ST1 398477701 HANDLE

ST2 398477702 DRIFT

(3) Insert ST1 into the differential carrier with the pinion height adjusting washer and rear bearing cone fitted onto it.

Note:

- **At this time, install a provisionally selected or previously used pinion height adjusting washer. Measure and record the thickness.**
- **If tooth contact (drive pinion, hypoid driven gear) is normal in the inspection before disassembling, verify that the washer is not deformed, and then re-use the used washer.**

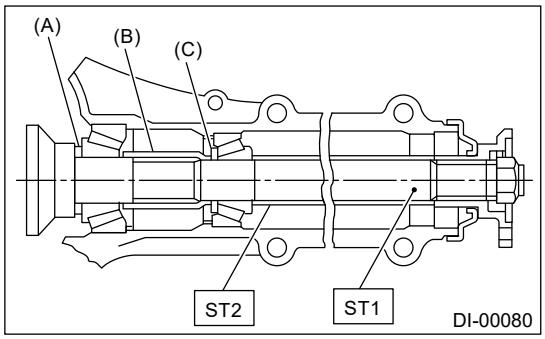
(4) Install the preload adjusting spacer and washer, front bearing cone, ST2, companion flange and self-locking nut.

Note:

Use new front bearing cone.

ST1 398507702 DUMMY SHAFT

ST2 398507703 DUMMY COLLAR



(A) Pinion height adjusting washer

(B) Preload adjusting spacer

(C) Preload adjusting washer

(5) Turn the ST1 by hand to smooth the bearing, and tighten the self-locking nut while measuring the initial load or initial torque with a spring scale or torque wrench. Select the preload adjusting washer and spacer so that the specified preload is obtained when nut is tightened to the specified torque.

Note:

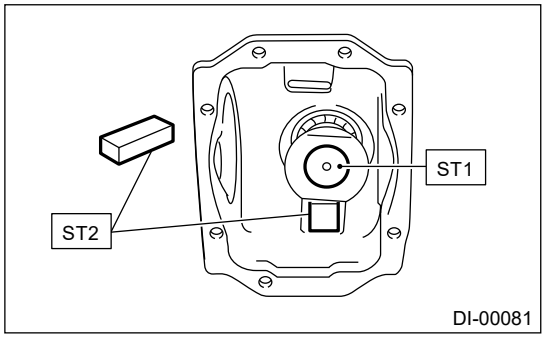
- **Measure the preload in direction of tangent to the flange.**
- **Be careful not to give excessive preload.**
- **When tightening the self-locking nut, lock ST1 with ST2 as shown in the figure.**

ST1 398507702 DUMMY SHAFT

ST2 398507704 BLOCK

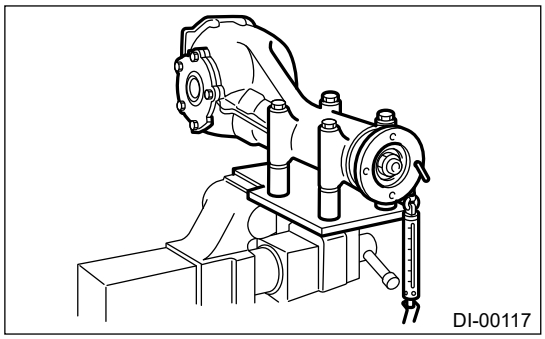
Tightening torque:

181.5 N·m (18.5 kgf-m, 133.9 ft-lb)



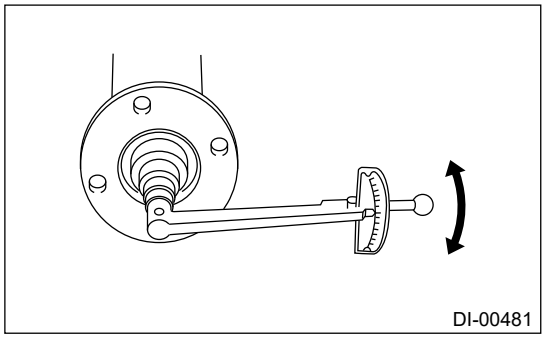
Initial load:

18.1 — 38.8 N (1.8 — 4.0 kgf, 4.1 — 8.7 lbf)



Initial torque:

0.69 — 1.47 N·m (0.07 — 0.15 kgf-m, 0.51 — 1.08 ft-lb)



Preload adjusting washer	
Part No.	**Thickness mm (in)**
383705200	2.59 (0.1020)
383715200	2.57 (0.1012)
383725200	2.55 (0.1004)
383735200	2.53 (0.0996)
383745200	2.51 (0.0988)
383755200	2.49 (0.0980)
383765200	2.47 (0.0972)
383775200	2.45 (0.0965)
383785200	2.43 (0.0957)

383795200	2.41 (0.0949)
383805200	2.39 (0.0941)
383815200	2.37 (0.0933)
383825200	2.35 (0.0925)
383835200	2.33 (0.0917)
383845200	2.31 (0.0909)

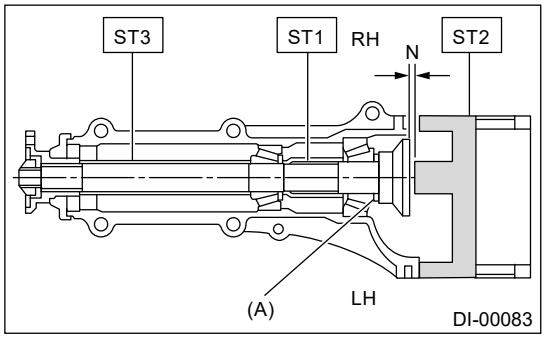
Preload adjusting spacer	
Part No.	**Length mm (in)**
383695201	56.2 (2.213)
383695202	56.4 (2.220)
383695203	56.6 (2.228)
383695204	56.8 (2.236)
383695205	57.0 (2.244)
383695206	57.2 (2.252)

2. Adjusting drive pinion height:
Adjust the drive pinion height with pinion height adjusting washer installed between the rear bearing cone and the back of pinion gear.
(1) Attach the ST2.

ST1 398507702 DUMMY SHAFT

ST2 398507701 DIFFERENTIAL CARRIER GAUGE

ST3 398507703 DUMMY COLLAR



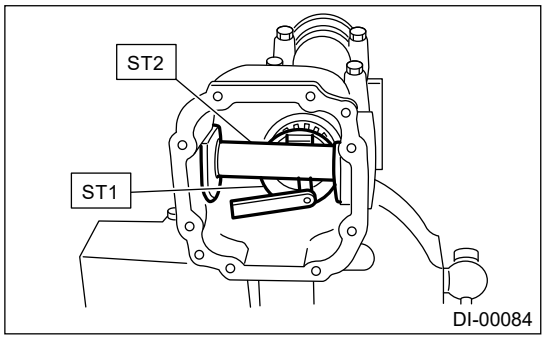
(A) Pinion height adjusting washer

(2) Measure the clearance "N" between the end of ST2 and the end surface of ST1 by using a thickness gauge.

Note:
Make sure there is no clearance between the differential carrier and ST2.

ST1 398507702 DUMMY SHAFT

ST2 398507701 DIFFERENTIAL CARRIER GAUGE



(3) Obtain the thickness of pinion height adjusting washer to be inserted from the following formula, and replace the temporarily installed washer with this one.
T = To + N − (H × 0.01) − 0.20 mm (0.0079 in)

T	Thickness of pinion height adjusting washer mm (in)
To	Thickness of washer temporarily inserted mm (in)
N	Clearance of thickness gauge mm (in)
H	Figure marked on drive pinion head
Memo:	

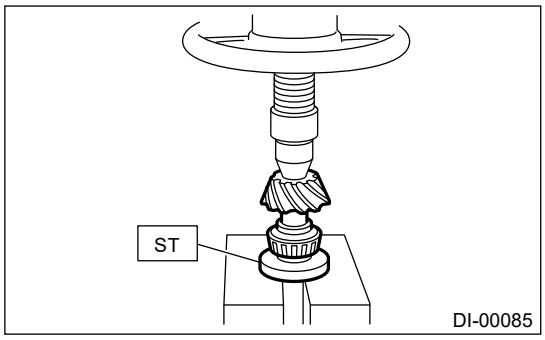
(Example of calculation)
To = 3.39 mm (0.1335 in)
N = 0.24 mm (0.0094 in)
H = + 1
T = 3.39 mm (0.1335 in) + 0.24 mm (0.0094 in) − 0.01 mm (0.0004 in) − 0.20 mm (0.0079 in) = 3.42 mm (0.1346 in)
Result: Thickness = 3.42 mm (0.1346 in)
Therefore use washer 383605200.

Pinion height adjusting washer	
Part No.	**Thickness mm (in)**
383495200	3.09 (0.1217)
383505200	3.12 (0.1228)
383515200	3.15 (0.1240)
383525200	3.18 (0.1252)
383535200	3.21 (0.1264)
383545200	3.24 (0.1276)
383555200	3.27 (0.1287)

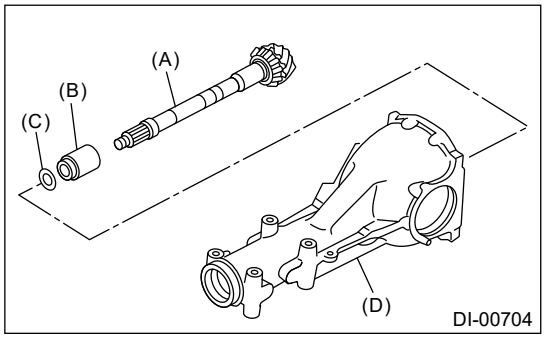
383565200	3.30 (0.1299)
383575200	3.33 (0.1311)
383585200	3.36 (0.1323)
383595200	3.39 (0.1335)
383605200	3.42 (0.1346)
383615200	3.45 (0.1358)
383625200	3.48 (0.1370)
383635200	3.51 (0.1382)
383645200	3.54 (0.1394)
383655200	3.57 (0.1406)
383665200	3.60 (0.1417)
383675200	3.63 (0.1429)
383685200	3.66 (0.1441)

3. Install the selected pinion height adjusting washer on drive pinion, and press the rear bearing cone into position with ST.

ST 398177700 INSTALLER



4. Insert the drive pinion into the differential carrier, and install the preselected preload adjusting spacer and washer.



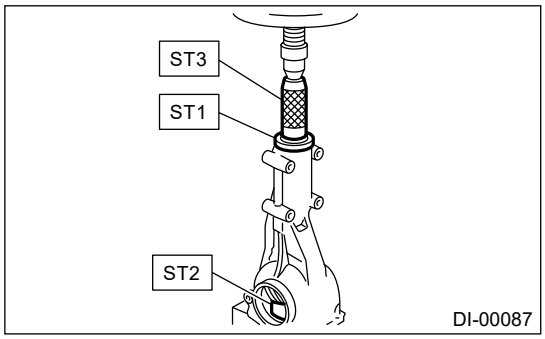
(A) Drive pinion
(B) Preload adjusting spacer
(C) Preload adjusting washer
(D) Differential carrier

5. Press-fit the front bearing cone with ST1, ST2 and ST3.

ST1 398507703 DUMMY COLLAR

ST2 399780104 WEIGHT

ST3 899580100 INSTALLER



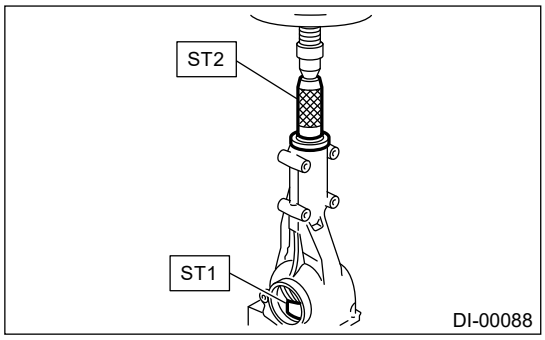
6. Insert the spacer, then press-fit the pilot bearing with ST1 and ST2.

Note:

Use a new pilot bearing.

ST1 399780104 WEIGHT

ST2 899580100 INSTALLER

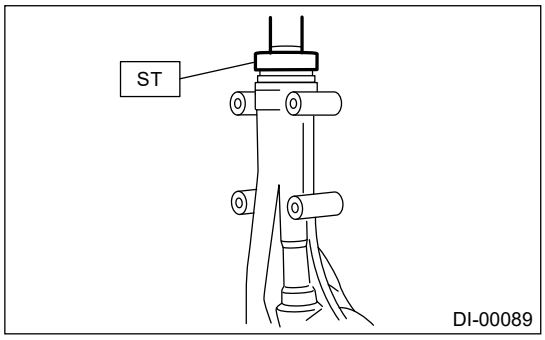


7. Using the ST, install the oil seal.

Note:

- **Use a new oil seal.**
- **Press-fit until the oil seal end comes 1 mm (0.04 in) inward from end of carrier.**
- **Apply differential gear oil to the oil seal lips.**

ST 498447120 INSTALLER



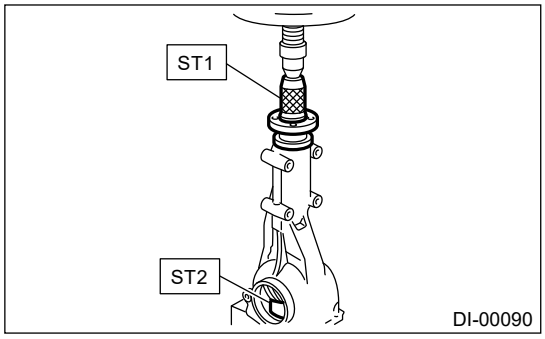
8. Press-fit the companion flange with ST1 and ST2.

Note:

Be careful not to damage the bearing.

ST1 899874100 INSTALLER

ST2 399780104 WEIGHT



9. Apply seal material on the drive pinion shaft thread and new self-locking nut seat.

Seal material:

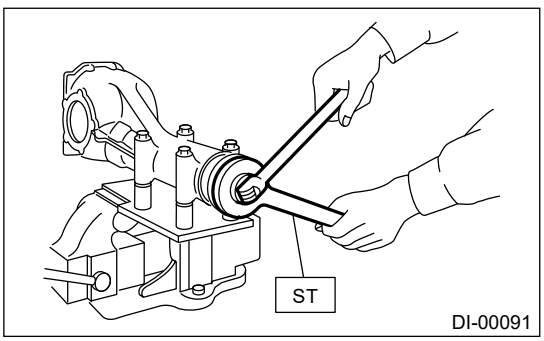
THREE BOND 1324 (Part No. 004403042) or equivalent

10. Attach the new self-locking nut and use the ST to fix the companion flange in place, then tighten the self-locking nut.

Tightening torque:

181.5 N·m (18.5 kgf-m, 133.9 ft-lb)

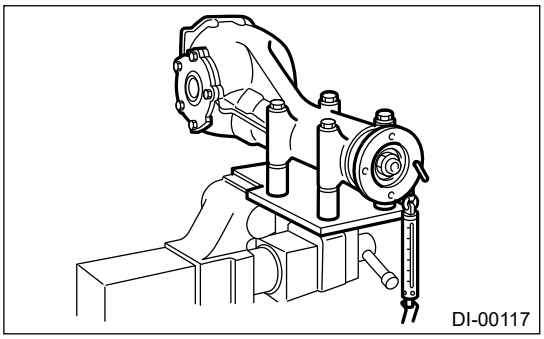
ST 498427200 FLANGE WRENCH



11. Check the initial torque or initial load.

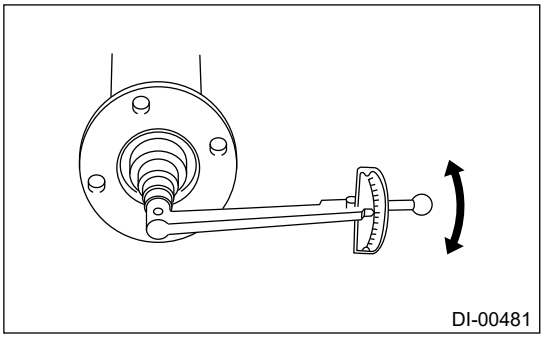
Initial load:

18.1 — 38.8 N (1.8 — 4.0 kgf, 4.1 — 8.7 lbf)



Initial torque:

0.69 — 1.47 N·m (0.07 — 0.15 kgf-m, 0.51 — 1.08 ft-lb)

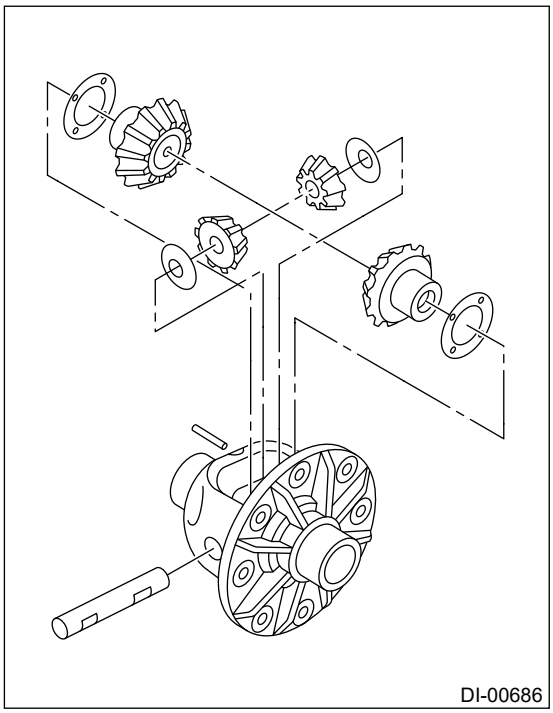


12. Assembling differential case

(1) Install the side gears and pinion mate gears, with their side gear thrust washers, pinion mate gear washer, and pinion mate shaft, into the differential case.

Note:

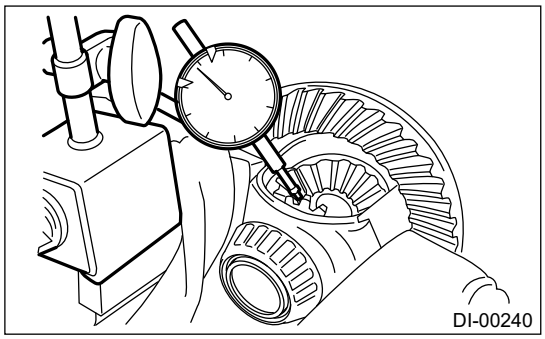
- **Apply gear oil on both sides of the washer and on the pinion mate shaft before installing.**
- **Insert the pinion mate shaft into the differential case by aligning the pin holes.**



(2) Measure the side gear backlash.

Side gear backlash:

0.10 — 0.20 mm (0.004 — 0.008 in)



(3) Adjust the backlash as specified by selecting side gear thrust washer.

Side gear thrust washer	
Part No.	**Thickness mm (in)**
383445201	0.75 — 0.80 (0.0295 — 0.0315)
383445202	0.80 — 0.85 (0.0315 — 0.0335)
383445203	0.85 — 0.90 (0.0335 — 0.0354)

(4) Check the condition of rotation after applying oil to the gear tooth surfaces and washer surfaces.

(5) Drive the pinion shaft lock pin into the differential case.

Note:

Use a new pinion shaft lock pin.

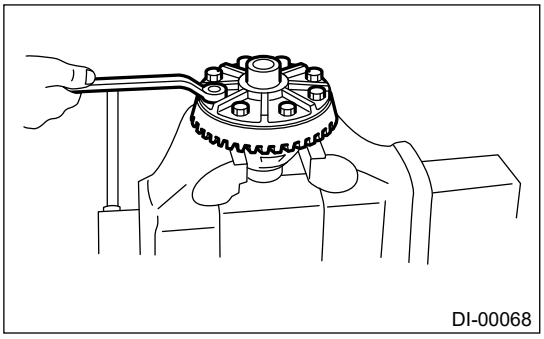
ST 899904100 STRAIGHT PIN REMOVER

13. Install the driven gear to the differential case.

Note:

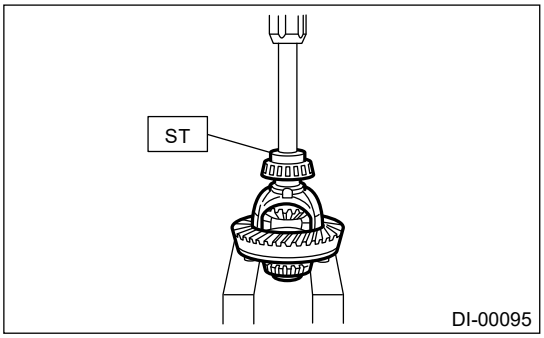
- **Before installing bolts, apply seal material to bolt threads.**
  Seal material:
  THREE BOND 1324 (Part No. 004403042) or equivalent
- **Make sure there is no clearance between the differential case and driven gear.**
- **Tighten opposing bolts in order.**

Tightening torque:
103 N·m (10.5 kgf-m, 76.0 ft-lb)



14. Using the ST, press-fit the side bearing to the differential case.

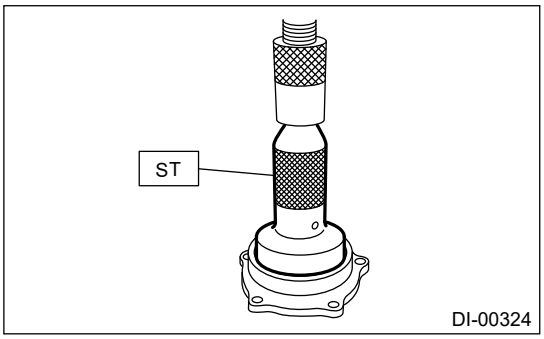
ST 398487700 DRIFT



15. Using the ST, press-fit the side bearing outer race to the side retainer.

Caution:
Make sure that the bearing outer races and cones are properly assembled.

ST 398417700 DRIFT



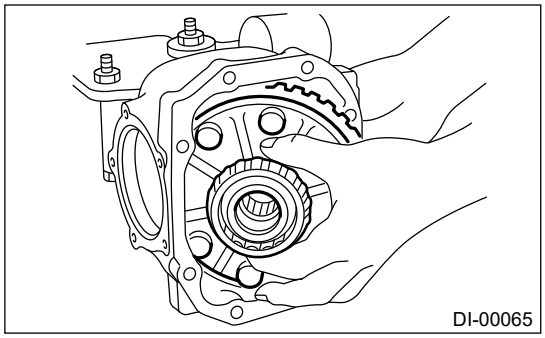
16. Side retainer shim adjustment

(1) The hypoid driven gear backlash and side bearing preload can be adjusted by the side retainer shim thickness.

(2) Install the differential case assembly into differential carrier in the reverse order of disassembly.

Note:

Be careful not to hit the teeth of hypoid driven gear against the differential carrier.



(3) Install the side retainer shim.

Note:

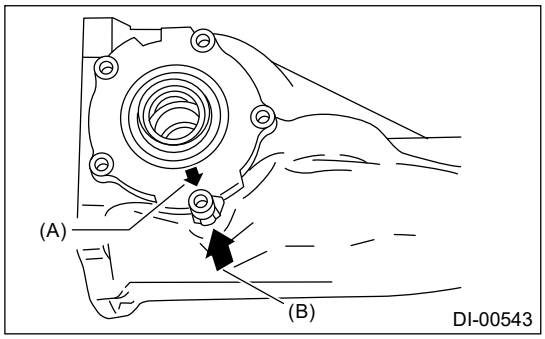
- **Be careful not to mix up the side retainer shim RH and LH.**
- **Replace broken or corroded side retainer shims with a new part of the same thickness.**

Side retainer shim	
Part No.	**Thickness mm (in)**
383475201	0.20 (0.0079)
383475202	0.25 (0.0098)
383475203	0.30 (0.0118)
383475204	0.40 (0.0157)
383475205	0.50 (0.0197)

(4) Align the arrow mark on the differential carrier with the arrow mark on the side retainer when installing the side retainer.

Note:

Be careful that the side bearing outer race is not damaged by the bearing roller.



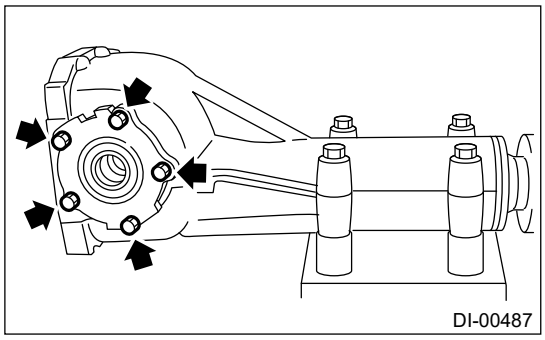
(A) Arrow mark (on the side retainer)

(B) Arrow mark (on the differential carrier)

(5) Tighten the side retainer bolts.

Tightening torque:

10.5 N·m (1.1 kgf-m, 7.7 ft-lb)



(6) Measure the hypoid driven gear to drive pinion backlash. Set the magnet base on differential carrier. Align the contact point of dial gauge with tooth face of hypoid driven gear, and move hypoid driven gear while holding drive pinion still. Read the value indicated on dial gauge. If the backlash is outside the standard range, adjust the side retainer shim by the following method.

- **When backlash is less than 0.1 mm (0.004 in):**

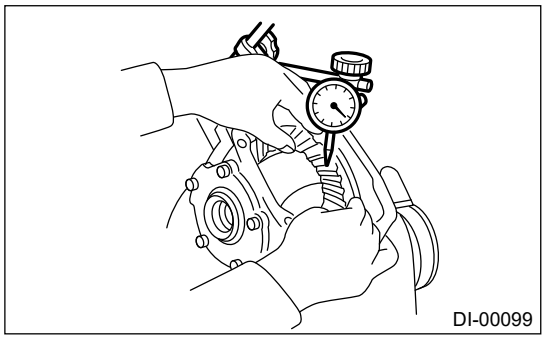
Reduce the thickness of shim on the back side of the hypoid driven gear and increase the thickness of shims on the teeth side of the hypoid driven gear.

- **When backlash exceeds 0.2 mm (0.008 in):**

Increase the thickness of shim on the back side of the hypoid driven gear and reduce the thickness of shims on the teeth side of the hypoid driven gear.

Backlash:

0.10 — 0.20 mm (0.004 — 0.008 in)



(7) Measure the total preload of the drive pinion. If the total preload is outside the specification range, adjust the thickness of side retainer shims, increasing/reducing both shims by an even amount at a time.

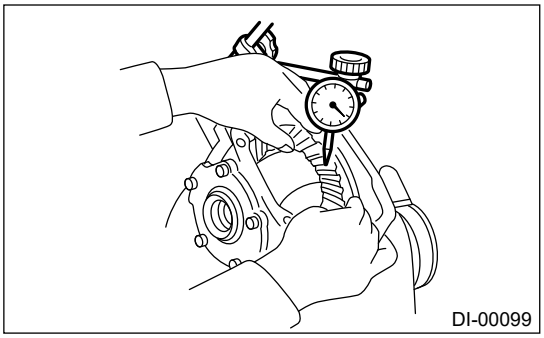
Total preload:

20.7 — 54.4 N (2.1 — 5.5 kgf, 4.7 — 12.2 lbf)

17. Recheck the hypoid driven gear to drive pinion backlash.

Backlash:

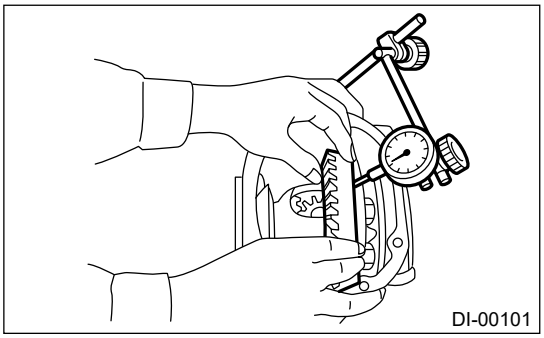
0.10 — 0.20 mm (0.004 — 0.008 in)



18. Check pinion and hypoid driven gears rotate smoothly and make sure of the hypoid driven gear runout on its back surface. If the hypoid driven gear runout on its back surface exceeds the specification, check for any foreign objects between the hypoid driven gear and differential case, and for any deformation of the differential case or hypoid driven gear.

Hypoid driven gear back surface runout:

0.05 mm (0.002 in)



19. Check and adjustment of the tooth contact of hypoid driven gear and drive pinion

(1) Apply lead-free red dye evenly on the both sides of three to four teeth of the hypoid driven gear. Check the contact pattern after rotating the hypoid driven gear several

revolutions back and forth until a definite contact pattern appears on the hypoid driven gear.

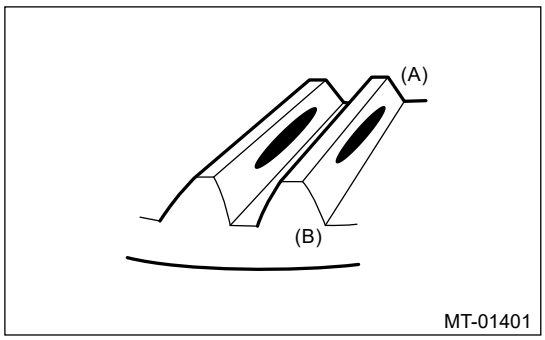
(2) When the contact pattern is not correct, readjust.

Note:

Be sure to wipe off the lead-free red dye completely after the adjustment is completed.

- Correct tooth contact

  Check item: Tooth contact pattern is slightly shifted toward toe side under no-load rotation. (When driving, it moves towards the heel side.)



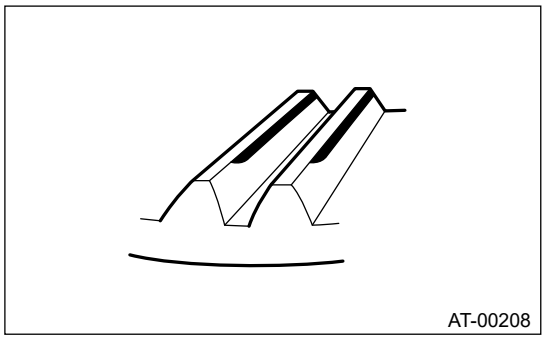
(A) Toe side

(B) Heel side

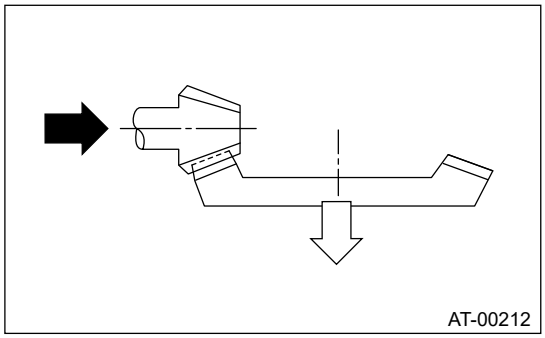
- Face contact

  Check item: Backlash is too large.

  Contact pattern

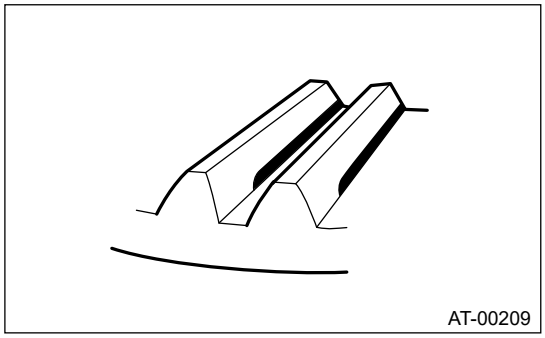


  Corrective action: Increase thickness of pinion height adjusting washer according to the procedure for bringing drive pinion close to hypoid driven gear side.

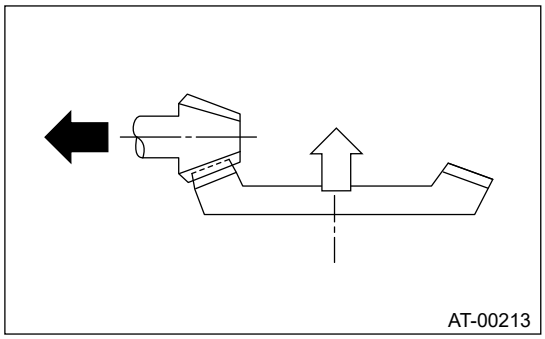


- Flank contact

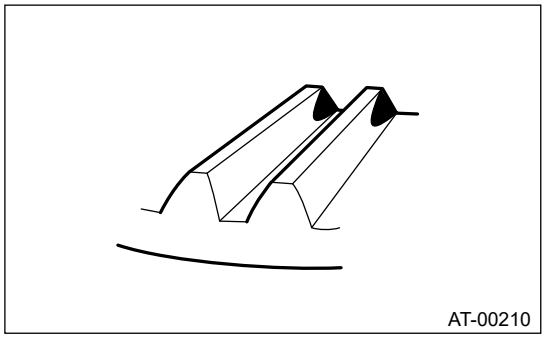
Check item: Backlash is too small.
Contact pattern



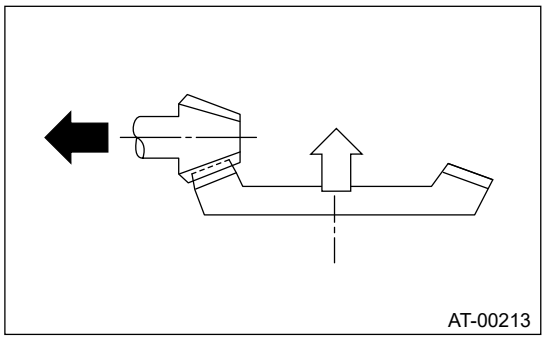
Corrective action: Reduce the thickness of pinion height adjusting washer according to the procedure for bringing drive pinion away from hypoid driven gear.



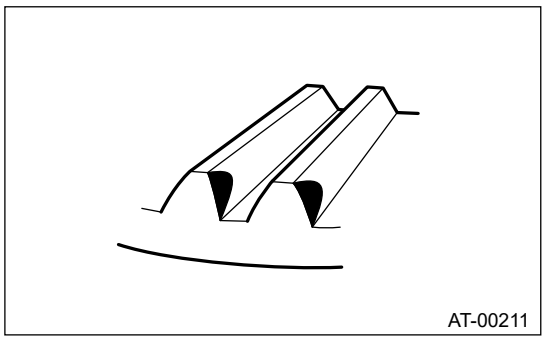
- Toe contact (inside contact)
  Check item: Teeth contact area is too small.
  Contact pattern



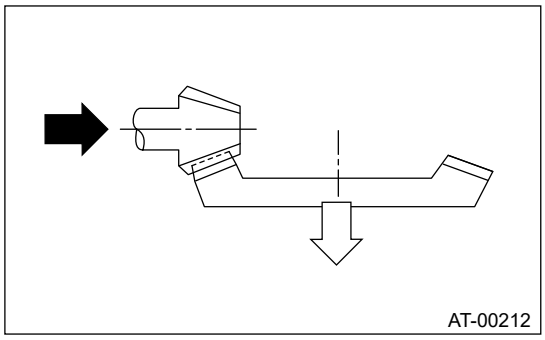
Corrective action: Reduce the thickness of pinion height adjusting washer according to the procedure for bringing drive pinion away from hypoid driven gear.



- Heel contact (outside end contact)
  Check item: Teeth contact area is too small.
  Contact pattern



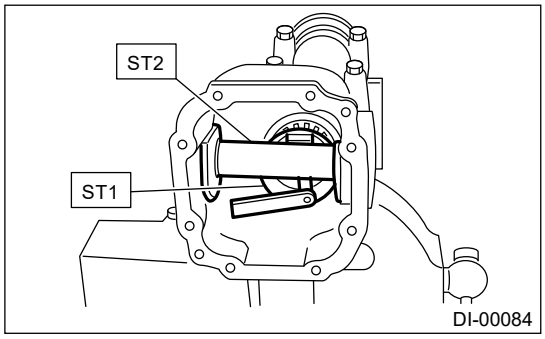
Corrective action: Increase thickness of pinion height adjusting washer according to the procedure for bringing drive pinion close to hypoid driven gear side.



20. If proper tooth contact is not obtained, readjust the drive pinion height by changing the RH and LH side retainer shims and the hypoid gear backlash.
(1) Drive pinion height

ST1 398507702 DUMMY SHAFT

ST2 398507701 DIFFERENTIAL CARRIER GAUGE



T = To + N − (H × 0.01) − 0.20 mm (0.0079 in)

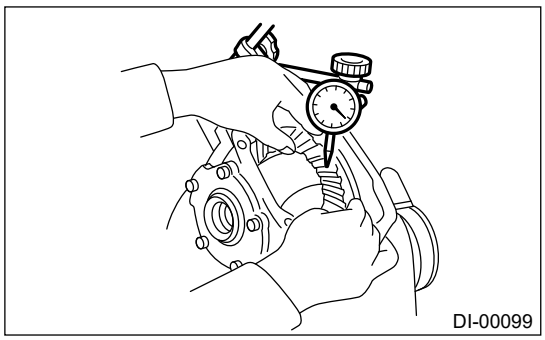
T	Thickness of pinion height adjusting washer mm (in)
To	Thickness of washer temporarily inserted mm (in)
N	Clearance of thickness gauge

	mm (in)
H	Figure marked on drive pinion head
Memo:	

(2) Hypoid gear backlash

Backlash:

0.10 — 0.20 mm (0.004 — 0.008 in)



21. Remove the RH and LH side retainers.

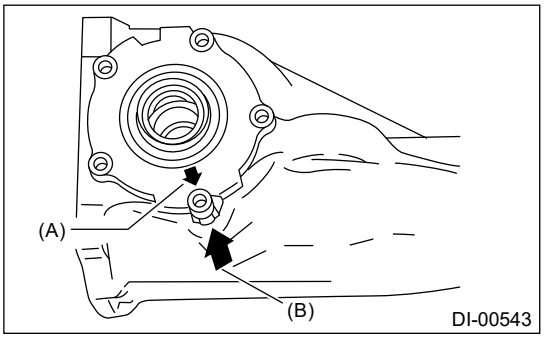
22. Install the O-ring to left and right side retainers.

Note:

Use new O-rings.

23. Install the oil seal to the side retainers on both sides. Ref. to DIFFERENTIALS>Rear Differential Side Oil Seal>REPLACEMENT.

24. Align the arrow mark on the differential carrier with the arrow mark on the side retainer when installing the side retainer.



(A) Arrow mark (on the side retainer)

(B) Arrow mark (on the differential carrier)

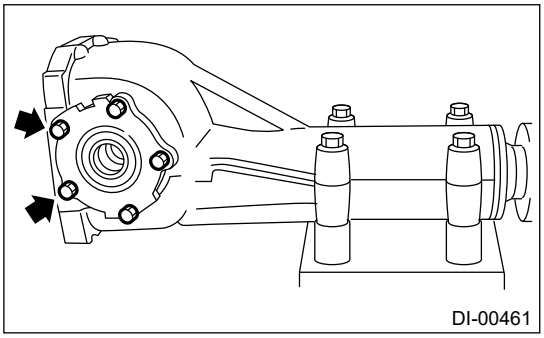
25. Apply liquid gasket to the bolts indicated by arrows, and tighten the bolts.

Liquid gasket:

THREE BOND 1110F, THREE BOND 1110B or equivalent

Tightening torque:

10.5 N·m (1.1 kgf-m, 7.7 ft-lb)



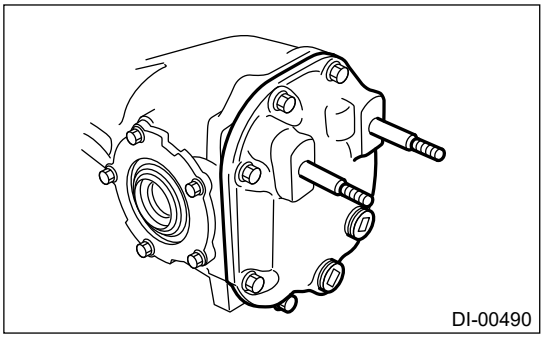
26. Install the gasket and rear cover, and tighten the bolts to specified torque.

Note:

Use a new gasket.

Tightening torque:

29.5 N·m (3.0 kgf-m, 21.8 ft-lb)



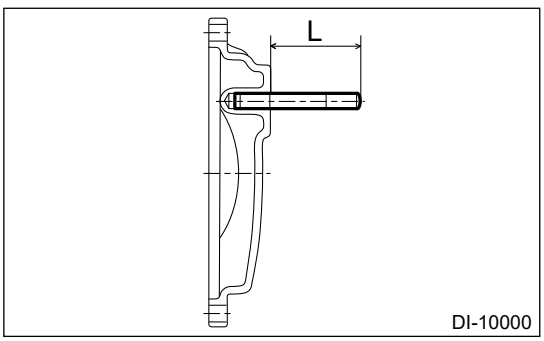
27. When the stud bolts are removed from the rear cover, install the stud bolts so that the exposed length of stud bolt is within the range of "L".

Caution:

- **Do not tighten forcibly if the exposed length of stud bolt does not fall within the specified range. Remove the stud bolt, and check for contamination of foreign matter and any defects in the screw hole.**
- **Do not tighten with a tightening torque of 49 N·m (5.0 kgf-m, 36.1 ft-lb) (reference value) or more.**

Exposed length L of stud bolt:

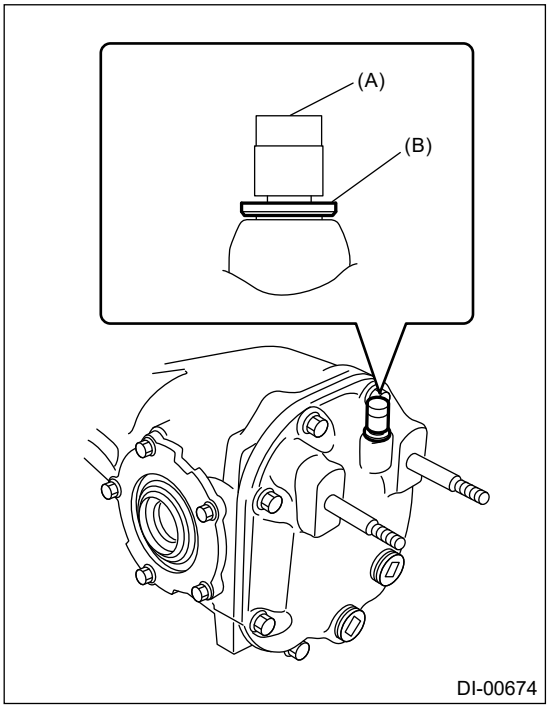
59.0 — 61.0 mm (2.32 — 2.40 in)



28. Install the air breather cap.

Note:

When installing the air breather cap, do not tap section (A). Be sure to tap section (B) to install.



29. Install the drain plug.

Note:

Apply liquid gasket to the drain plug.

Liquid gasket:

THREE BOND 1105 (Part No. 004403010) or equivalent

Tightening torque:

49 N·m (5.0 kgf-m, 36.1 ft-lb)

30. Install the filler plug.

Note:

After installing the rear differential assembly to the vehicle, fill the gear oil, then apply liquid gasket, and tighten to the specified torque. Ref. to DIFFERENTIALS>Differential Gear Oil>REPLACEMENT.

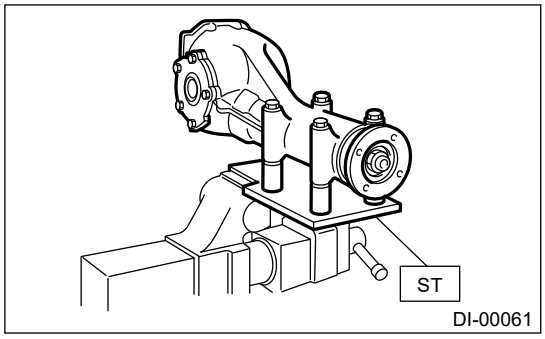
DISASSEMBLY

To detect the real cause of trouble, inspect the following items before disassembling.

- Tooth contact and backlash between hypoid driven gear and drive pinion
- Hypoid driven gear runout on its back surface
- Total preload of drive pinion

1. Set the ST on vise and install the differential assembly to ST.

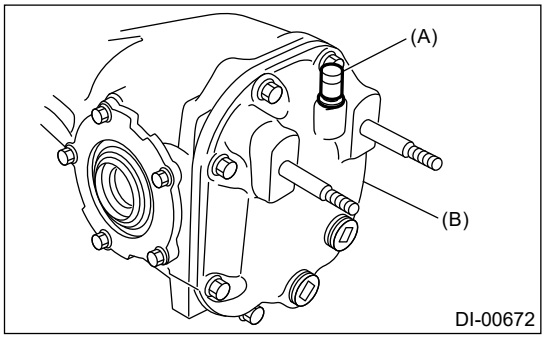
ST 398217700 ATTACHMENT SET



2. Remove the drain plug and filler plug.
3. Remove the air breather cap.

Note:

- **Do not attempt to remove the air breather cap unless necessary.**
- **Whenever the air breather cap is removed, replace it with a new part.**



(A) Air breather cap

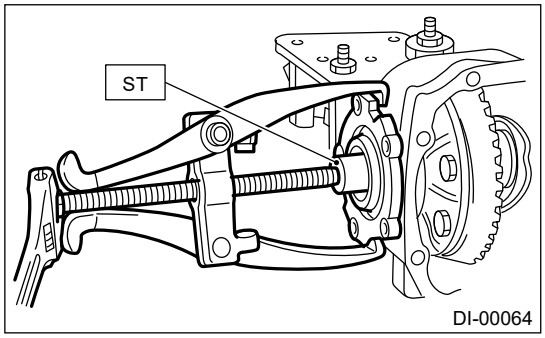
(B) Rear cover

4. Remove the bolts, and then remove the rear cover.
5. Remove the stud bolts from rear cover if necessary.
6. Remove the side retainer attachment bolts, set the ST to differential case, and extract the side retainers RH and LH with a puller.

Note:

- **Side retainer shim of each side should be kept together with its mating retainer.**
- **Keep the side retainers separate by attaching tags or in similar ways to make it possible to identify RH and LH sides during reassembly.**

ST 398457700 ATTACHMENT

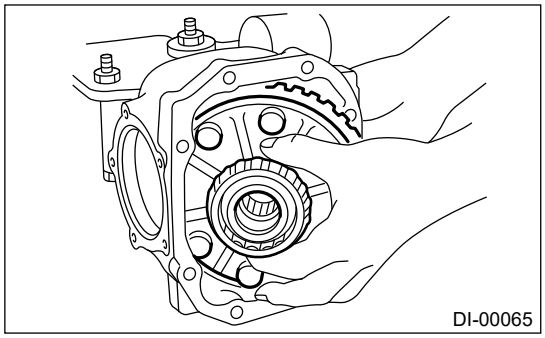


7. Remove the oil seal and O-ring from the side retainer.

8. Pull out the differential case assembly from the differential carrier.

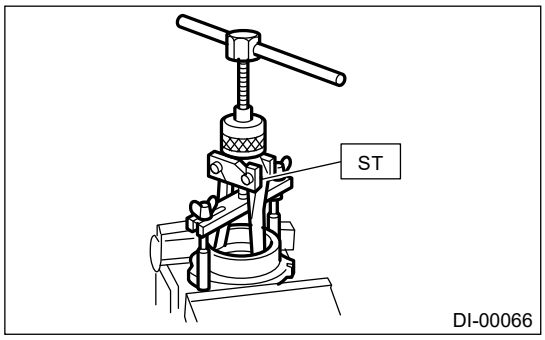
Note:

Be careful not to hit the teeth of hypoid driven gear against the differential carrier.



9. When replacing the side bearing, remove the bearing race from the side retainer using ST.

ST 398527700 PULLER ASSY

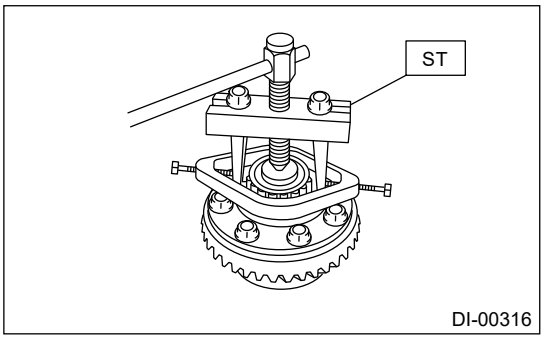


10. Using the ST, remove the bearing cone.

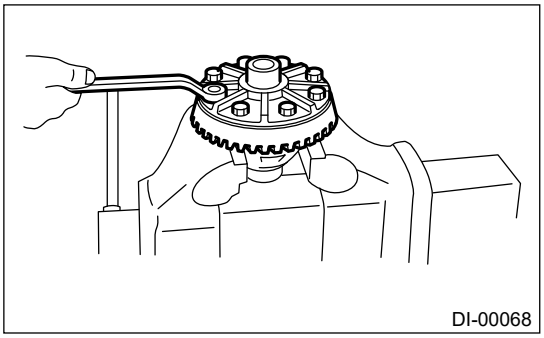
Note:

- **Do not attempt to disassemble the parts unless necessary.**
- **Set the ST so that its claws catch the edge of the bearing cone.**
- **Never mix up the RH and LH bearing races and cones.**

ST 18759AA000 PULLER ASSY

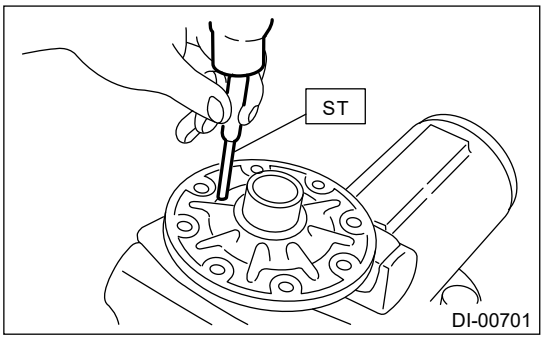


11. Remove the hypoid driven gear by loosening hypoid driven gear bolts.



12. Remove the pinion shaft lock pin from hypoid driven gear side using ST.

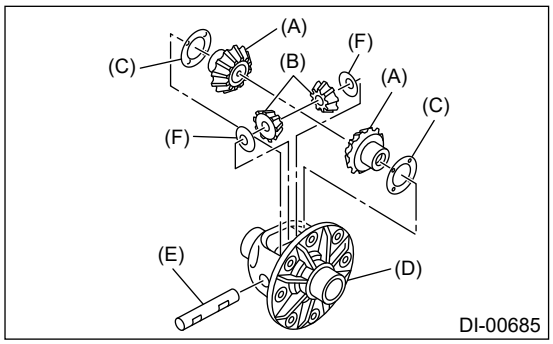
ST 899904100 STRAIGHT PIN REMOVER



13. Draw out the pinion mate shaft, and remove pinion mate gears, pinion mate gear washers, side gears, and side gear thrust washers.

Note:

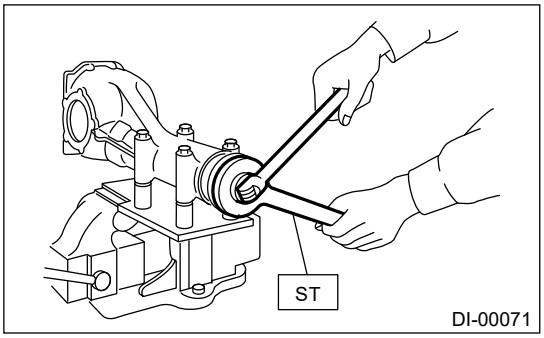
The gears and washers should be marked with RH or LH, front or rear, or kept separately.



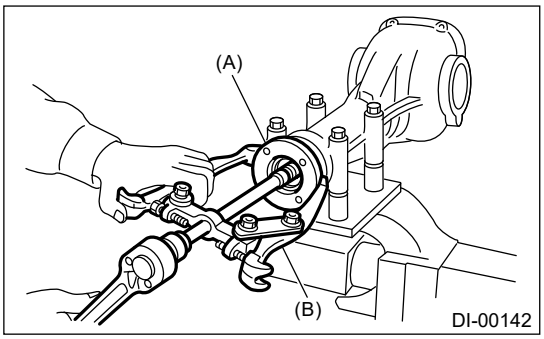
(A) Side gear
(B) Pinion mate gear
(C) Side gear thrust washer
(D) Differential case
(E) Pinion mate shaft
(F) Pinion mate gear washer

14. Remove the self-locking nut while securing the companion flange with ST.

ST 498427200 FLANGE WRENCH



15. Extract the companion flange with a puller.

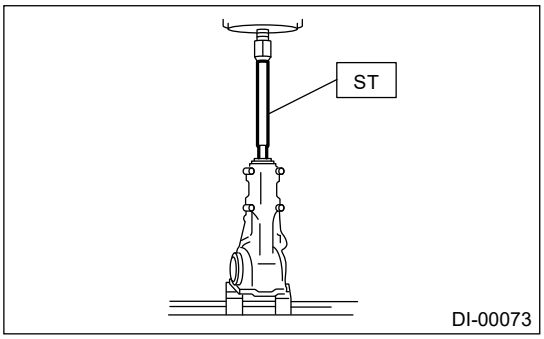


(A) Companion flange
(B) Puller

16. Press the end of drive pinion shaft using ST and remove the rear bearing cone, preload adjusting spacer and washer.

Note:
Hold the drive pinion so as not to drop it.

ST 398467700 DRIFT

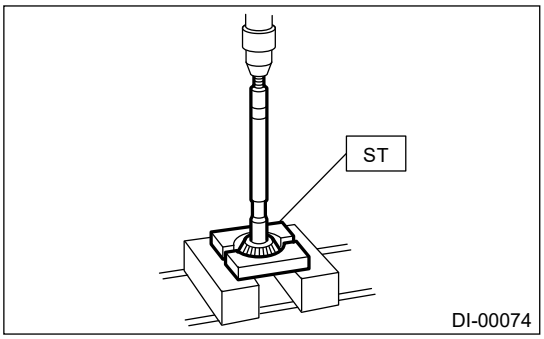


17. Remove the rear bearing cone from drive pinion by supporting the cone with ST.

Note:

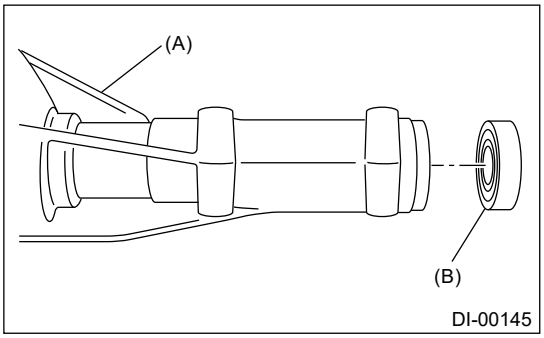
Place the replacer so that its center-recessed side faces the bearing cone.

ST 398517700 REPLACER



18. Remove the front oil seal from differential carrier using ST.

ST 398527700 PULLER ASSY

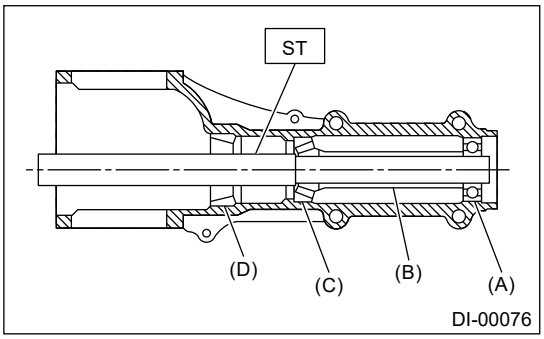


(A) Differential carrier

(B) Front oil seal

19. Remove the pilot bearing together with the front bearing cone and spacer using the ST.

ST 398467700 DRIFT



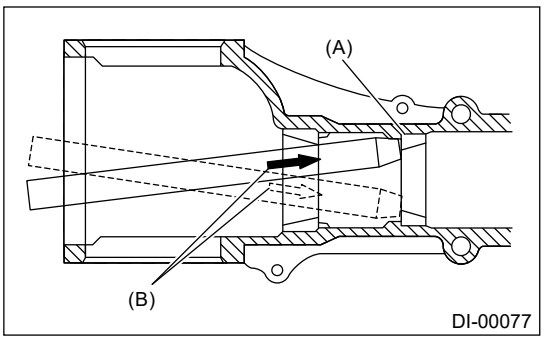
(A) Pilot bearing

(B) Spacer

(C) Front bearing

(D) Rear bearing race

20. When replacing the bearings, use a brass bar to tap out the front bearing race and rear bearing race in this order to remove them.



(A) 2 cutout portions along diagonal lines

(B) Tap alternately with brass bar.

INSPECTION

Wash all the disassembled parts clean, and examine them for wear, damage and other defects. Repair or replace the defective parts as necessary.

1. Hypoid driven gear and drive pinion
   - If there is evidently an abnormal tooth contact, find out the cause and adjust until the teeth contact correctly. Replace the gear if there is an excessive worn or an incapable adjustment.
   - If crack, cutout or seizure is found, replace the parts as a set. Slight damage of some teeth can be corrected by oil stone or the like.
2. Side gear and pinion mate gear
   - Replace if cracks, scoring or other defects are evident on the tooth surface.
   - Replace if thrust washer contact surface is worn or scored. Slight damages of the surface can be corrected by oil stones or equivalent.
3. Bearing
   Replace if seizure, peeling, wear, rust, dragging during rotation, noise or other defect is evident.
4. Thrust washer of the side gear and pinion mate gear
   Replace if seized, flawed, abnormally worn or having other defects.
5. Oil seal
   Replace if deformed or damaged, and at every disassembling.
6. Differential carrier
   Replace if the bearing bores are worn or damaged.
7. Differential case
   Replace if sliding surfaces are abnormally worn, burned, or cracked.
8. Companion flange
   Replace if the oil seal lip contact surface shows cracking.

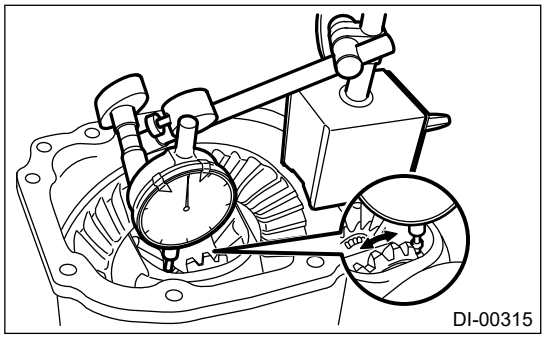
1. SIDE GEAR BACKLASH

Using a dial gauge, check the backlash of side gear.

Side gear backlash:

0.10—0.20 mm (0.004—0.008 in)

If the side gear backlash is not within the specification, select the side gear thrust washer and adjust the side gear backlash as specified.



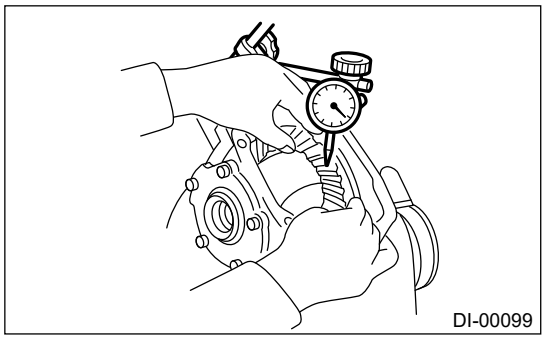
2. HYPOID DRIVEN GEAR BACKLASH

Using a dial gauge, check the backlash of hypoid driven gear.

Hypoid driven gear backlash:

0.10—0.20 mm (0.004—0.008 in)

If the hypoid driven gear backlash is outside the specification range, adjust the side bearing preload and repair if necessary.



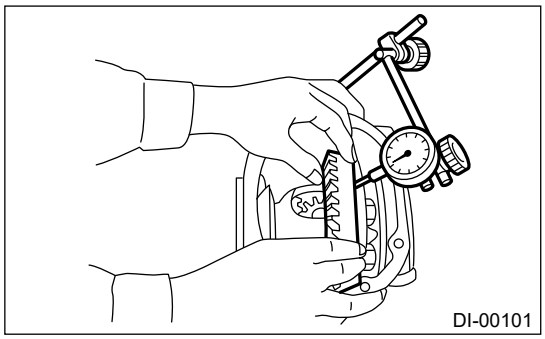
3. HYPOID DRIVEN GEAR RUNOUT ON ITS BACK SURFACE

Using a dial gauge, check the hypoid driven gear back surface runout.

Hypoid driven gear back surface runout:

0.05 mm (0.002 in)

If the hypoid driven gear runout on its back surface exceeds the limit, replace the hypoid driven gear.



4. TOOTH CONTACT BETWEEN HYPOID DRIVEN GEAR AND DRIVE PINION

Inspect the tooth contact between the hypoid driven gear and drive pinion. Ref. to DIFFERENTIALS>Rear Differential (T-type)>ASSEMBLY.

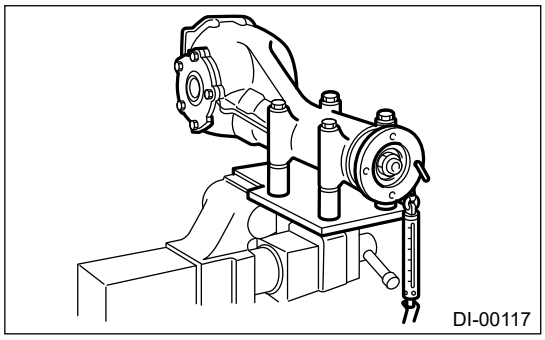
5. TOTAL PRELOAD

Using a spring scale, check the total preload.

Total preload:

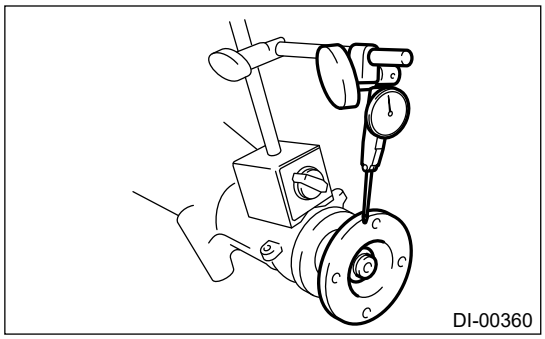
20.7—54.4 N (2.1—5.5 kgf, 4.7—12.2 lb)

If the total preload is not within the specification, adjust the side retainer shim.

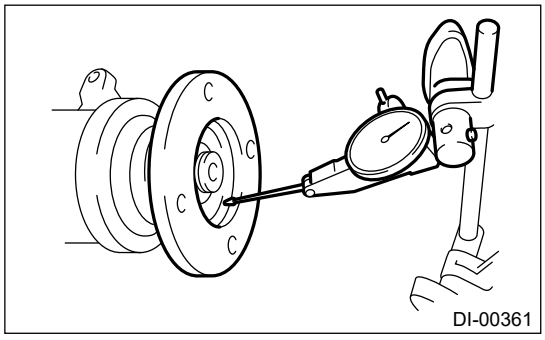


6. COMPANION FLANGE

1. If rust or dirt is attached to the companion flange, remove them.
2. Set a dial gauge at a companion flange surface (mating surface of propeller shaft and companion flange), and then measure the companion flange runout.
   Limit of runout:
   0.08 mm (0.003 in)



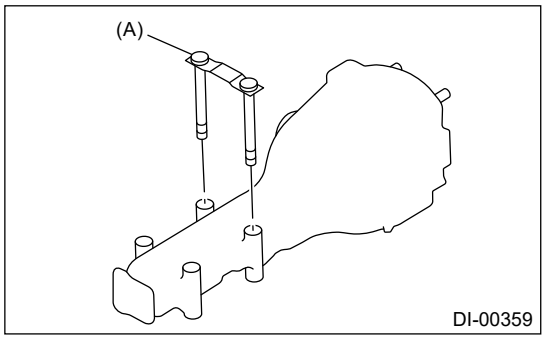
3. Set the gauge inside of the companion flange, and measure the runout.
   Limit of runout:
   0.08 mm (0.003 in)



4. If either runout exceeds the limit, move the phase of companion flange and drive pinion 90° each, and find the point where the runout is within the limit.
5. If the runout exceeds the limit after changing the phase, replace the companion flange and recheck the runout.
6. If the runout exceeds the limit after replacing the companion flange, the drive pinion may be assembled incorrectly or bearing is faulty.

INSTALLATION

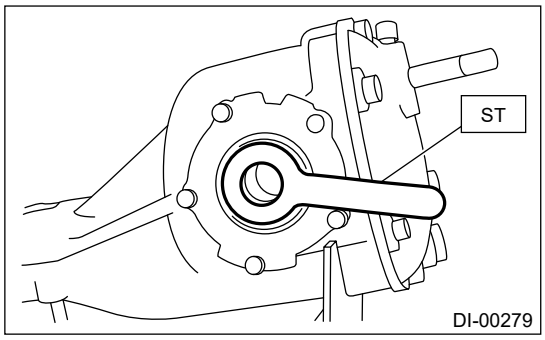
1. Attach the rear differential member plate to the rear differential.



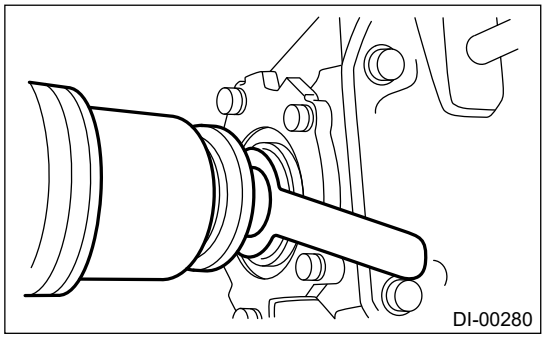
(A) Rear differential member plate

2. Set the rear differential to transmission jack.
3. Set the ST to the rear differential.

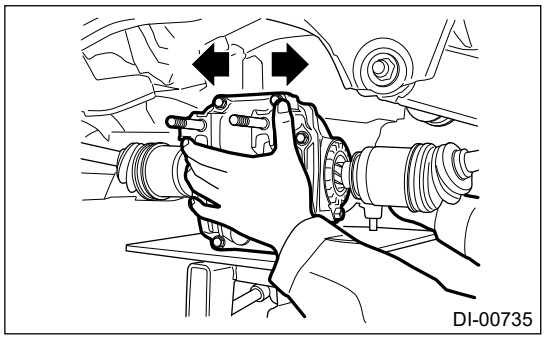
ST 28099PA090 OIL SEAL PROTECTOR



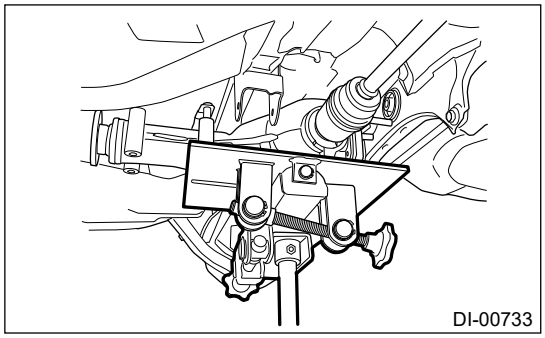
4. Insert the rear drive shaft until the spline portion of the rear drive shaft exceeds the side oil seal.



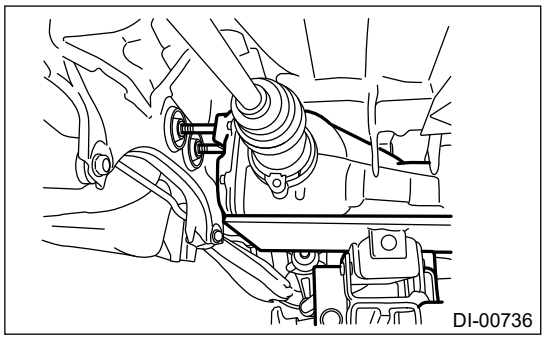
5. Remove ST from rear differential.
6. Push the rear differential from side to side to insert the DOJ into rear differential completely.



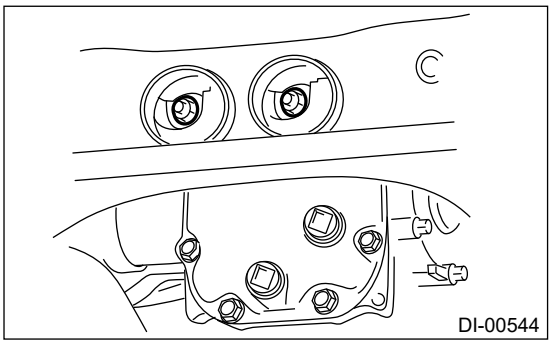
7. Adjust the transmission jack, if necessary, and insert the rear differential stud bolt into the rear differential mount bushing properly.



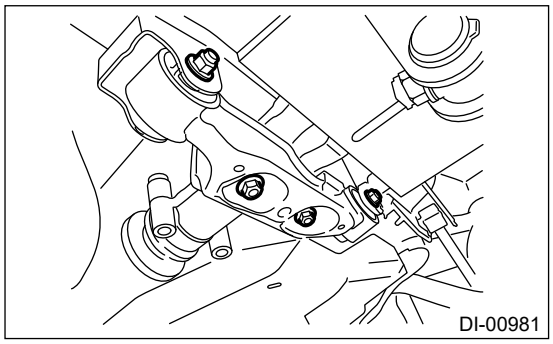
8. After inserting the rear differential stud bolt into the rear differential mount bushing, lift up the transmission jack and align the rear differential to its attachment position.



9. Tighten a new self-locking nut temporarily to the rear differential stud bolt.



10. Install the rear differential front member, and temporarily attach and tighten a new self-locking nut.



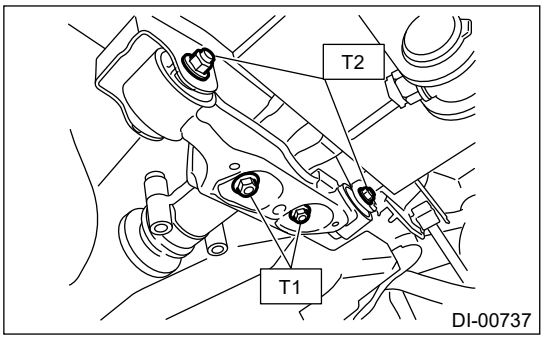
11. Remove the transmission jack.

12. Tighten the self-locking nut.

Tightening torque:

T1: 50 N•m (5.1 kgf-m, 36.9 ft-lb)

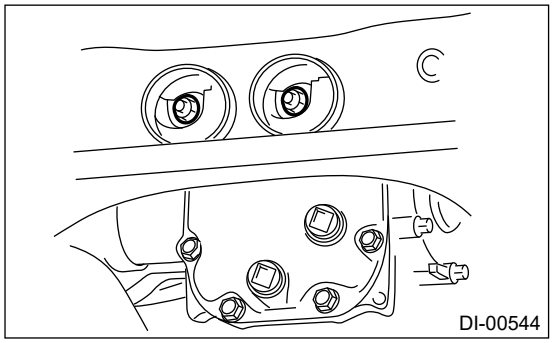
T2: 110 N•m (11.2 kgf-m, 81.1 ft-lb)



13. Tighten the self-locking nut.

Tightening torque:

70 N•m (7.1 kgf-m, 51.6 ft-lb)

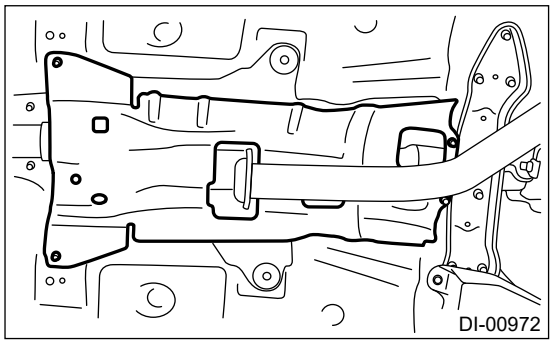


14. Install the propeller shaft. Ref. to DRIVE SHAFT SYSTEM>Propeller Shaft>INSTALLATION.

15. Install the center exhaust cover.

Tightening torque:

18 N•m (1.8 kgf-m, 13.3 ft-lb)



16. Install the rear exhaust pipe.
- 2.5 L non-turbo model
  Ref. to EXHAUST(H4DO)>Rear Exhaust Pipe>INSTALLATION.
- 2.0 L turbo model
  Ref. to EXHAUST(H4DOTC)>Rear Exhaust Pipe>INSTALLATION.

17. Fill differential gear oil. Ref. to DIFFERENTIALS>Differential Gear Oil>REPLACEMENT.

18. Installing procedure hereafter is in the reverse order of removal.

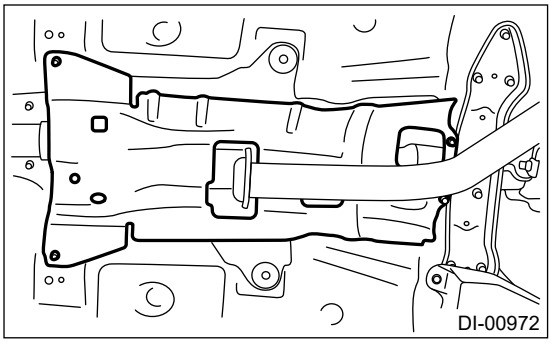
19. Perform "Rear differential inspection mode" using the Subaru Select Monitor. (CVT model)
Ref. to DIFFERENTIALS>Rear Differential Inspection Mode.

Caution:

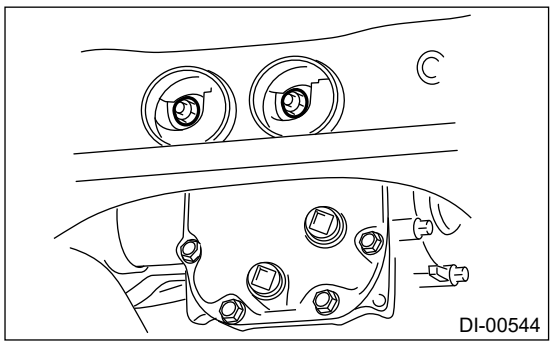
Be sure to perform rear differential inspection mode when the following work has been performed.
- **Replacement of rear differential**
- **Replacement of rear differential hypoid gear set**
- **Replacement of transmission assembly**
- **Replacement of front differential hypoid gear set**

REMOVAL

1. Shift the select lever or gear shift lever to neutral.
2. Disconnect the ground cable from battery.
3. Release the parking brake.
4. Lift up the vehicle.
5. Remove the rear wheels.
6. Drain differential gear oil. Ref. to DIFFERENTIALS>Differential Gear Oil>REPLACEMENT.
7. Remove the rear exhaust pipe.
   - 2.5 L non-turbo model
     Ref. to EXHAUST(H4DO)>Rear Exhaust Pipe>REMOVAL.
   - 2.0 L turbo model
     Ref. to EXHAUST(H4DOTC)>Rear Exhaust Pipe>REMOVAL.
8. Remove the center exhaust cover.



9. Remove the propeller shaft. Ref. to DRIVE SHAFT SYSTEM>Propeller Shaft>REMOVAL.
10. Loosen the self-lock nuts which hold the rear differential to the rear sub frame assembly.



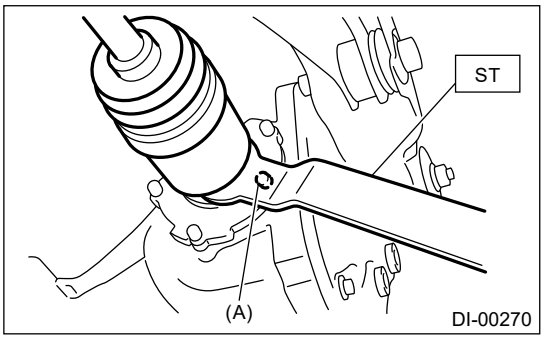
11. Remove the DOJ of rear drive shaft from rear differential using ST or tire lever.

Note:

- **For the T-type, use the ST.**
- **For the VA1-type, use the tire lever.**
- **When removing the DOJ from the rear differential, fit the tire lever or ST to the bolts as shown in the figure so as not to damage the side retainer.**

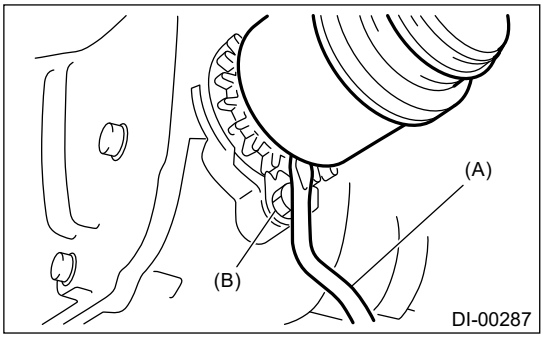
T-type

ST 28099PA100 DRIVE SHAFT REMOVER



(A) Bolt

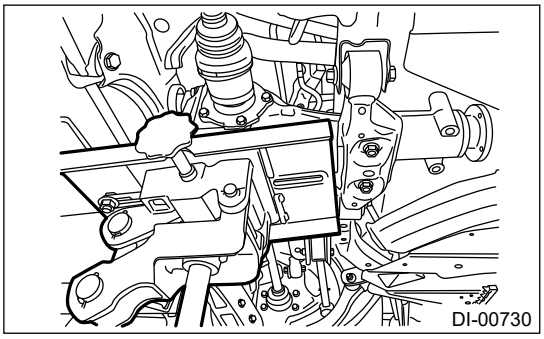
VA1-type



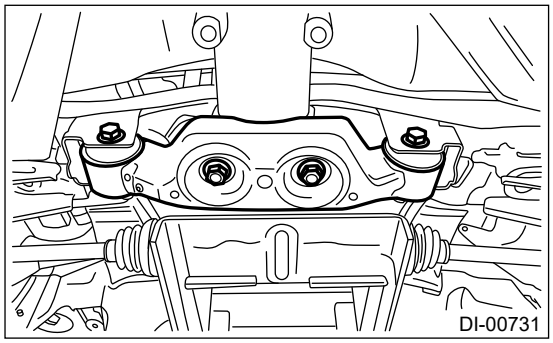
(A) Tire lever

(B) Bolt

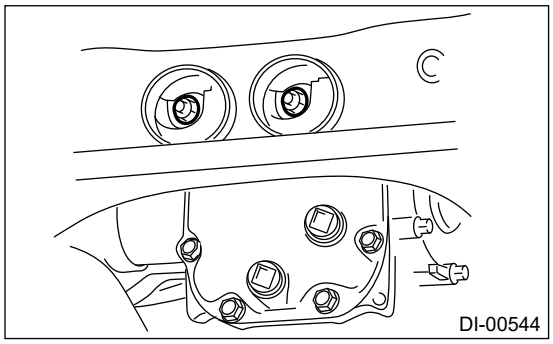
12. Set the rear differential to transmission jack.



13. Remove the rear differential front member.



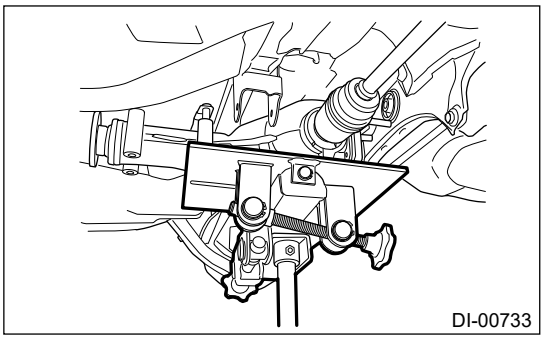
14. Remove the self-lock nuts which hold the rear differential to the rear sub frame assembly.



15. Pull out the rear differential stud bolt from rear differential mount bushing.

Note:

When removing the stud bolt from the rear differential mount bushing, carefully adjust the angle and location of transmission jack and jack stand, if necessary.



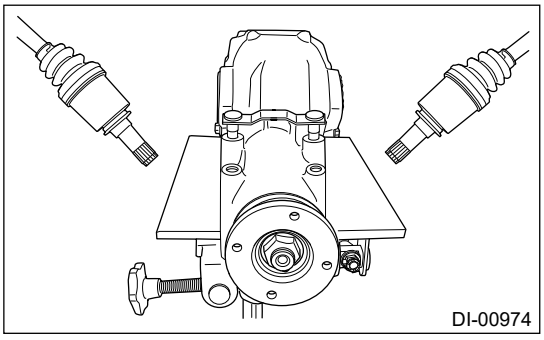
16. Lower the transmission jack.

17. Pull out the rear drive shaft from the rear differential.

Note:

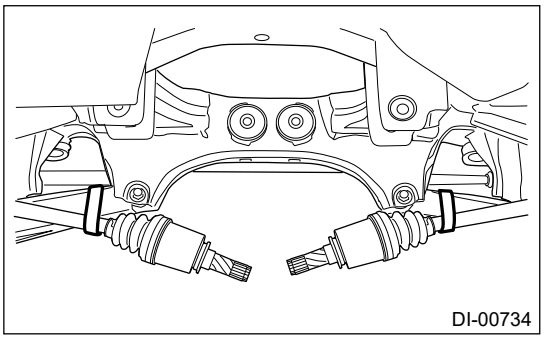
If it is difficult to pull out the rear drive shaft from rear differential, use the ST for T-type and the tire lever for VA1-type.

ST 28099PA100 DRIVE SHAFT REMOVER

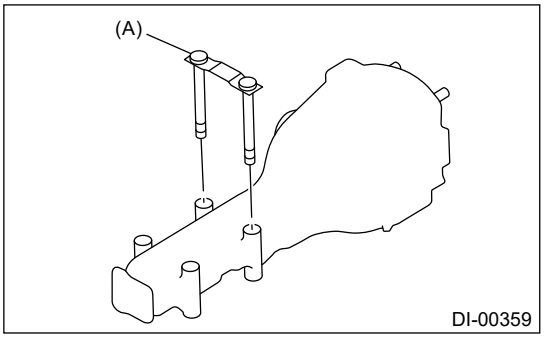


18. Lower the transmission jack.

19. Secure the rear drive shaft to rear lateral link using wire.



20. Remove the rear differential member plate from rear differential.



(A) Rear differential member plate

ADJUSTMENT

1. SIDE GEAR BACKLASH

Adjust the side gear backlash. Ref. to DIFFERENTIALS>Rear Differential (VA-type)>ASSEMBLY.

2. HYPOID DRIVEN GEAR BACKLASH

Adjust hypoid driven gear backlash. Ref. to DIFFERENTIALS>Rear Differential (VA-type)>ASSEMBLY.

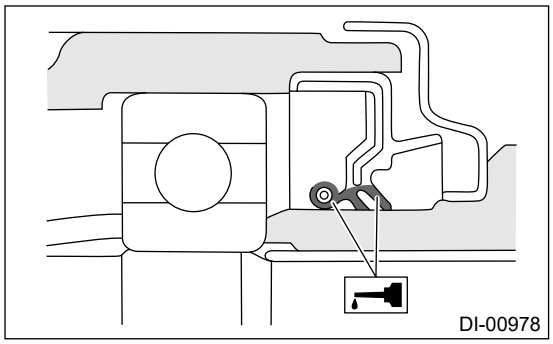
3. TOOTH CONTACT BETWEEN HYPOID DRIVEN GEAR AND DRIVE PINION

Adjust the tooth contact between hypoid driven gear and drive pinion gear. Ref. to DIFFERENTIALS>Rear Differential (VA-type)>ASSEMBLY.

ASSEMBLY

Note:

- **Assemble in the reverse order of disassembly.**
- **Check and adjust each part during assembly.**
- **Keep the shims and washers in order, so that they are not improperly installed.**
- **Thoroughly clean the surfaces on which the shims, washers and bearings are to be installed.**
- **Apply differential gear oil when installing the bearings and thrust washers.**
- **Be careful not to mix up the RH and LH bearing races.**
- **Replace the gasket, oil seal and O-ring with a new part.**
- **Be careful not to mix up the rear differential side oil seal RH and LH.**
- **Apply differential gear oil to the lips when installing the oil seal.**



1. Adjusting preload for front and rear bearings

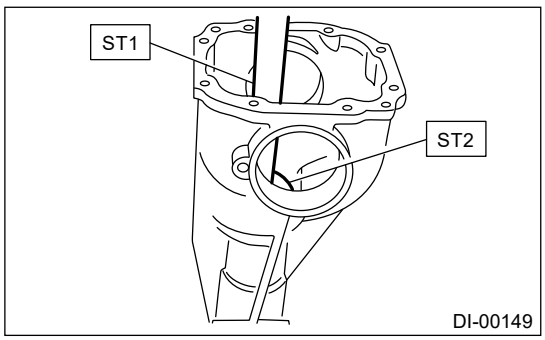
Note:

Adjust the bearing preload between front and rear bearings with preload adjusting spacer and washer. Pinion height adjusting washer is not affected by this adjustment. The adjustment must be carried out with oil seal removed.

(1) Install the rear bearing race into the differential carrier using ST1 and ST2.

ST1 398477701 HANDLE

ST2 398477702 DRIFT



(2) Install the front bearing race to the differential carrier using ST1 and ST2.

Note:

Use a new front bearing race.

ST1 398477701 HANDLE

ST2 498447110 DRIFT

(3) Insert the front bearing cone.

Note:

Use new front bearing cone.

(4) Measure and record the thickness of pinion height adjusting washer.

Note:

- **At this time, install a provisionally selected or previously used pinion height adjusting washer.**
- **If tooth contact (drive pinion and hypoid driven gear) is normal in the inspection before disassembling, verify that the washer is not deformed, and then reuse the used washer.**

(5) Insert the ST (DUMMY SHAFT) into case with the pinion height adjusting washer and rear bearing cone fitted onto it.

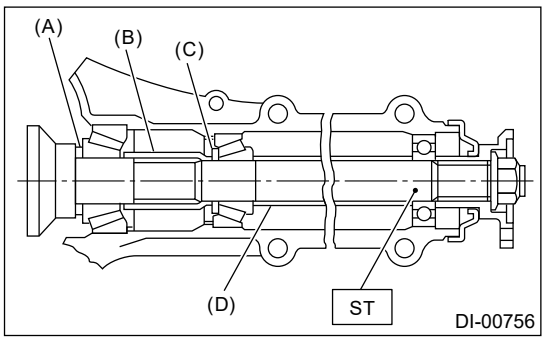
(6) Install the preload adjusting spacer, washer, front bearing cone, spacer, pilot bearing, companion flange, and self-locking nut.

Note:

Use a new pilot bearing.

ST 498447150 DUMMY SHAFT

Part No. 32285AA000 Spacer



(A) Pinion height adjusting washer

(B) Preload adjusting spacer

(C) Preload adjusting washer

(D) Spacer (SUBARU genuine parts)

(7) Turn the ST by hand to slowly seat the bearing, and tighten the self-locking nut while measuring the initial load or initial torque with a spring scale or torque wrench. Select the preload adjusting washer and spacer so that the specified preload is obtained when nut is tightened to the specified torque.

Note:

- **Measure the preload in direction of tangent to the flange.**
- **Be careful not to give excessive preload.**

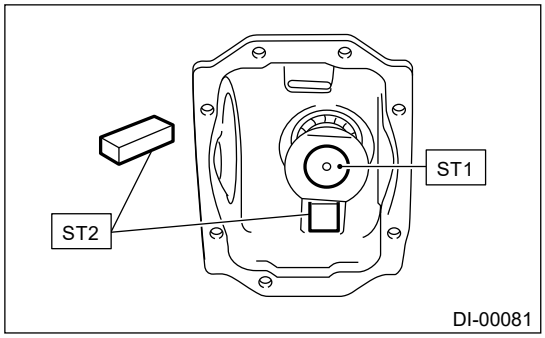
- **When tightening the self-locking nut, lock ST1 with ST2 as shown in the figure.**

ST1 498447150 DUMMY SHAFT

ST2 398507704 BLOCK

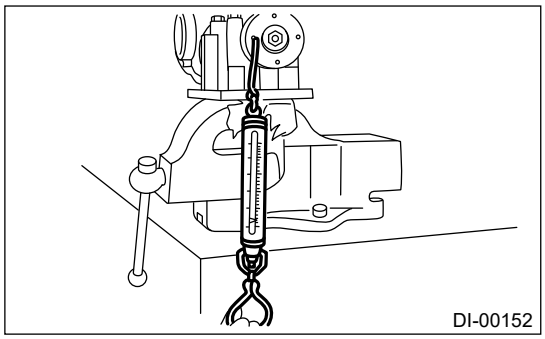
Tightening torque:

191 N·m (19.5 kgf-m, 140.9 ft-lb)



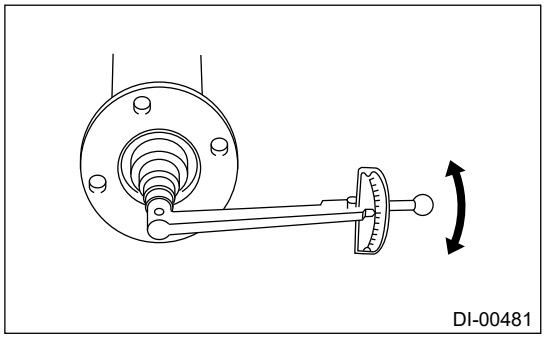
Initial load:

12.7 — 32.2 N (1.3 — 3.3 kgf, 2.9 — 7.2 lbf)



Initial torque:

0.48 — 1.22 N·m (0.05 — 0.12 kgf-m, 0.35 — 0.90 ft-lb)



Preload adjusting washer	
Part No.	**Thickness mm (in)**
38336AA000	1.500 (0.0591)
38336AA120	1.513 (0.0596)
38336AA010	1.525 (0.0600)
38336AA130	1.538 (0.0606)

38336AA020	1.550 (0.0610)
38336AA140	1.563 (0.0615)
38336AA030	1.575 (0.0620)
38336AA150	1.588 (0.0625)
38336AA040	1.600 (0.0630)
38336AA160	1.613 (0.0635)
38336AA050	1.625 (0.0640)
38336AA170	1.638 (0.0645)
38336AA060	1.650 (0.0650)
38336AA180	1.663 (0.0655)
38336AA070	1.675 (0.0659)
38336AA190	1.688 (0.0665)
38336AA080	1.700 (0.0669)
38336AA200	1.713 (0.0674)
38336AA090	1.725 (0.0679)
38336AA210	1.738 (0.0684)
38336AA100	1.750 (0.0689)
38336AA220	1.763 (0.0694)
38336AA110	1.775 (0.0699)

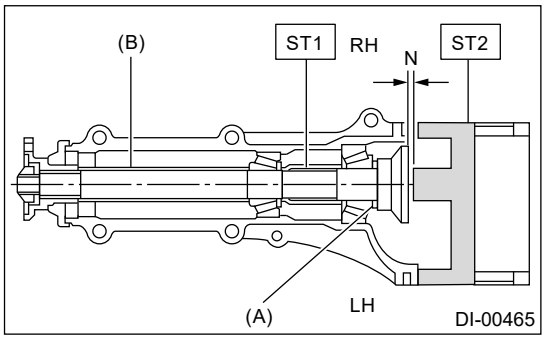
Preload adjusting spacer	
Part No.	**Length mm (in)**
32288AA040	52.3 (2.059)
32288AA050	52.5 (2.067)
31454AA100	52.6 (2.071)
32288AA060	52.7 (2.075)
31454AA110	52.8 (2.079)
32288AA070	52.9 (2.083)
31454AA120	53.0 (2.087)
32288AA080	53.1 (2.091)
32288AA090	53.3 (2.098)

2. Adjusting drive pinion height:
Adjust the drive pinion height with pinion height adjusting washer installed between the rear bearing cone and the back of pinion gear.
(1) Attach the ST2.

ST1 498447150 DUMMY SHAFT

ST2 498505501 DIFFERENTIAL CARRIER GAUGE

Part No. 32285AA000 Spacer



(A) Pinion height adjusting washer

(B) Spacer (SUBARU genuine parts)

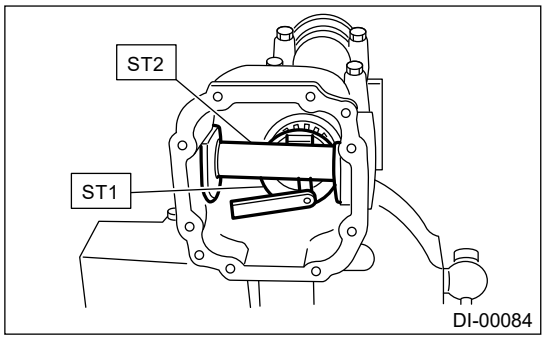
(2) Measure the clearance "N" between the end of ST2 and the end surface of ST1 by using a thickness gauge.

Note:

Make sure there is no clearance between the differential carrier and ST2.

ST1 498447150 DUMMY SHAFT

ST2 498505501 DIFFERENTIAL CARRIER GAUGE



(3) Obtain the thickness of pinion height adjusting washer to be inserted from the following formula, and replace the temporarily installed washer with this one.

Note:

Adjust it using the 1 — 3 washers.

T = To + N − 0.05 mm (0.0020 in)

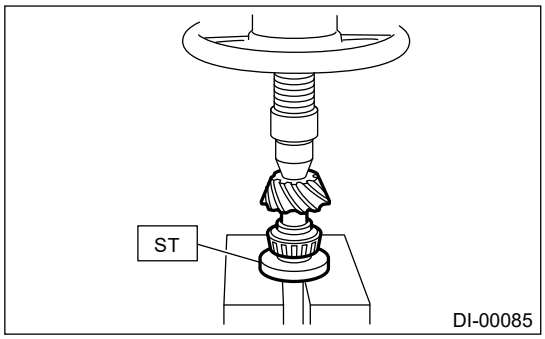
T	Thickness of pinion height adjusting washer mm (in)
To	Thickness of washer temporarily inserted mm (in)
N	Clearance of thickness gauge mm (in)
Memo:	

(Example of calculation)
To = 0.15 mm (0.0059 in)
N = 0.1 mm (0.0039 in)
T = 0.15+ 0.1− 0.05 = 0.2 mm (0.0079 in)
Result: Thickness = 0.2 mm (0.0079 in)
Therefore use part number 32295AA220.

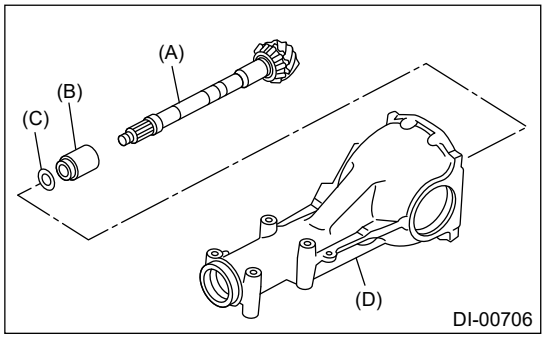
Pinion height adjusting washer	
Part No.	**Thickness mm (in)**
32295AA200	0.150 (0.0059)
32295AA210	0.175 (0.0069)
32295AA220	0.200 (0.0079)
32295AA230	0.225 (0.0089)
32295AA240	0.250 (0.0098)
32295AA250	0.275 (0.0108)

3. Install the selected pinion height adjusting washer on drive pinion, and press the rear bearing cone into position with ST.

ST 498175500 INSTALLER



4. Insert the drive pinion into the differential carrier, and install the preselected preload adjusting spacer and washer.



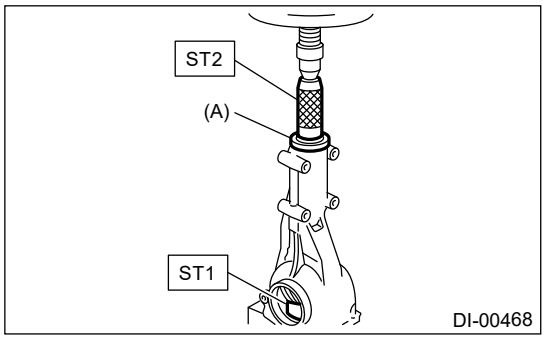
(A) Drive pinion
(B) Preload adjusting spacer
(C) Preload adjusting washer
(D) Differential carrier

5. Press-fit the front bearing cone into the carrier with ST1, ST2 and the spacer.

ST1 399780104 WEIGHT

ST2 899580100 INSTALLER

Part No. 32285AA000 Spacer

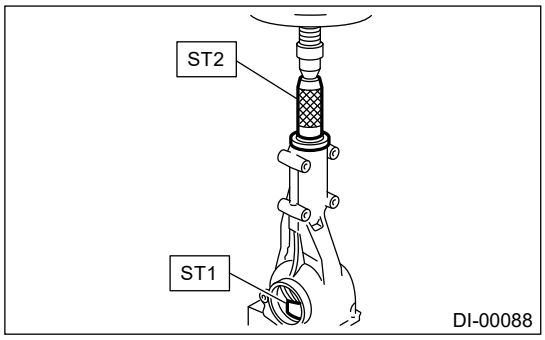


(A) Spacer (SUBARU genuine parts)

6. Insert the spacer, then press-fit the pilot bearing with ST1 and ST2.

ST1 399780104 WEIGHT

ST2 899580100 INSTALLER

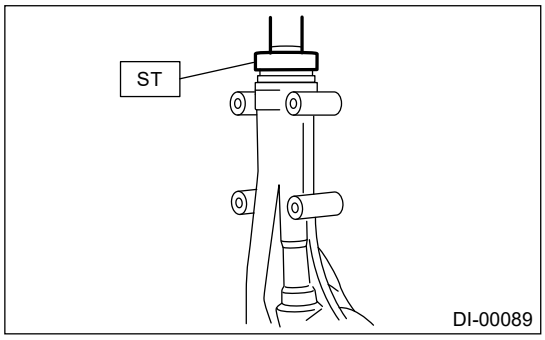


7. Using the ST, install the oil seal.

Note:

- **Use a new oil seal.**
- **Press-fit until the oil seal end comes 1 mm (0.04 in) inward from end of carrier.**
- **Apply differential gear oil to the oil seal lips.**

ST 498447120 INSTALLER



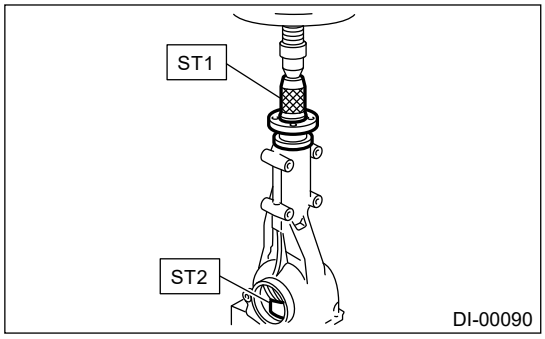
8. Press-fit the companion flange with ST1 and ST2.

Note:

Be careful not to damage the pilot bearing.

ST1 899874100 INSTALLER

ST2 399780104 WEIGHT



9. Attach the self-locking nut and use the ST to fix the companion flange in place, then tighten the self-locking nut.

Note:

- **Use a new self-locking nut.**
- **Before installing the self-locking nut, apply the seal material to the threads of the drive pinion shaft and to the seating surface of the self-locking nut.**

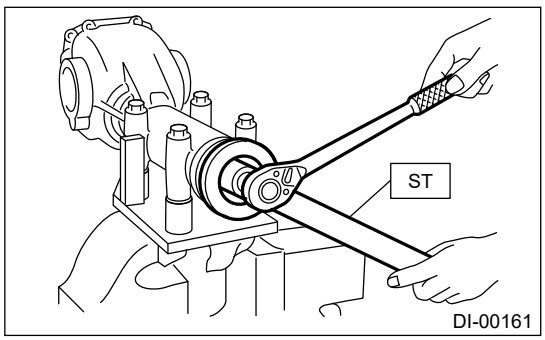
Seal material:

THREE BOND 1324 (Part No. 004403042) or equivalent

Tightening torque:

191 N·m (19.5 kgf-m, 140.9 ft-lb)

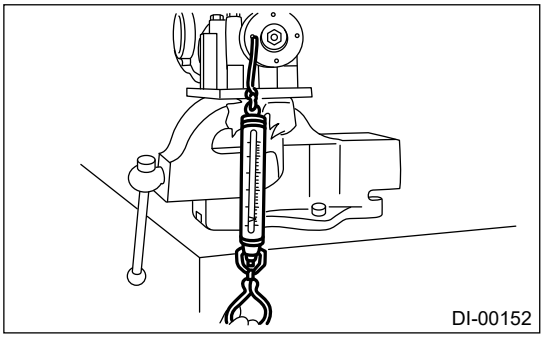
ST 498427200 FLANGE WRENCH



10. Check the initial torque or initial load.

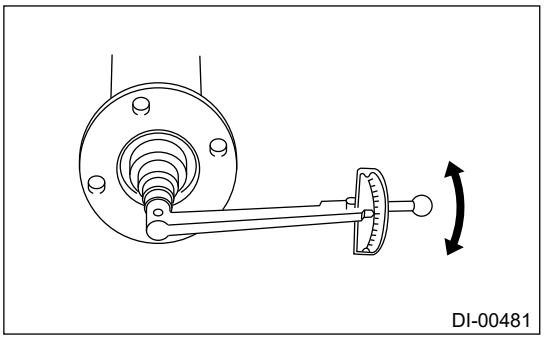
Initial load:

12.7 — 32.2 N (1.3 — 3.3 kgf, 2.9 — 7.2 lbf)



Initial torque:

0.48 — 1.22 N·m (0.05 — 0.12 kgf-m, 0.35 — 0.90 ft-lb)

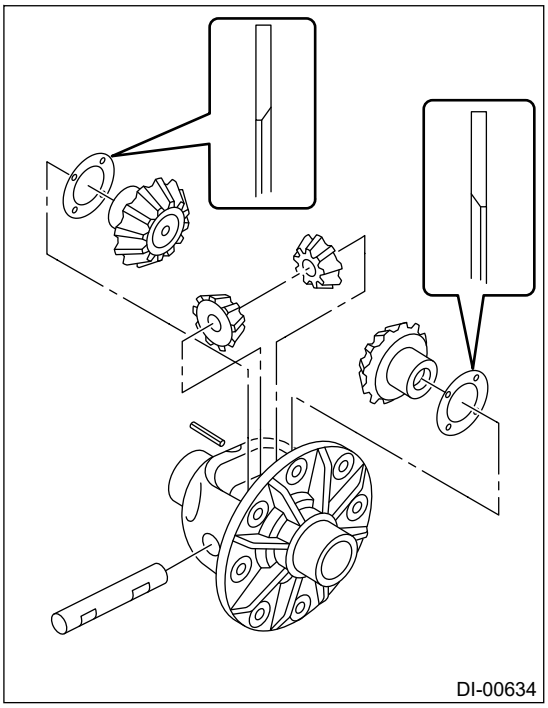


11. Assembling differential case

(1) Install the side gears and pinion mate gears, with their side gear thrust washers and pinion mate shaft, into the differential case.

Note:

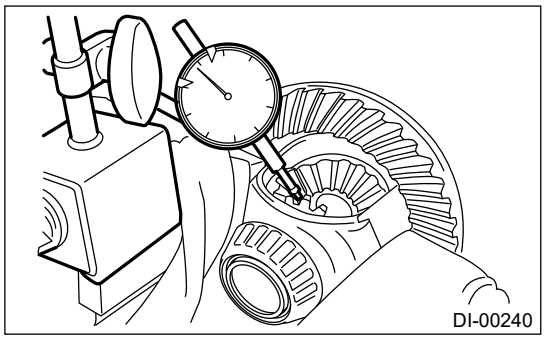
- **Apply gear oil on both sides of the washer and on the side gear shaft before installing.**
- **Insert the pinion mate shaft into the differential case by aligning the pin holes.**
- **The thrust washer inner surface has a chamfered side. Install the washer with the chamfered side facing toward the side gear.**



(2) Measure the side gear backlash.

Side gear backlash:

0.05 — 0.15 mm (0.002 — 0.006 in)



(3) Adjust the side gear backlash by selecting side gear thrust washer.

Side gear thrust washer	
Part No.	**Thickness mm (in)**
803135011	0.925 — 0.950 (0.0364 — 0.0374)
803135012	0.950 — 0.975 (0.0374 — 0.0384)
803135013	0.975 — 1.000 (0.0384 — 0.0394)
803135014	1.000 — 1.025 (0.0394 — 0.0404)
803135015	1.025 — 1.050 (0.0404 — 0.0413)

(4) Check the condition of rotation after applying oil to the gear tooth surfaces and washer surfaces.

(5) Drive the spring pin into the differential case.

Note:

Use new spring pin.

12. Install the hypoid driven gear to differential case.

Note:

- **Before installing bolts, apply seal material to bolt threads.**

  Seal material:

  THREE BOND 1324 (Part No. 004403042) or equivalent

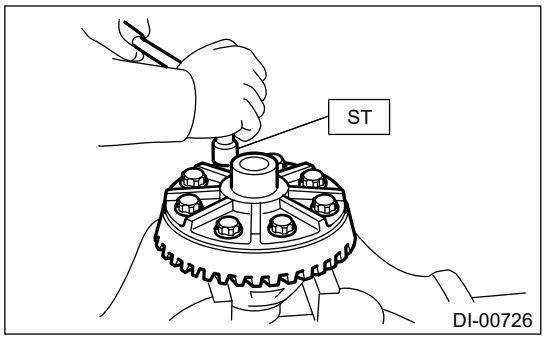
- **Tighten opposing bolts in order.**

(1) Tighten the hypoid driven gear mounting bolts to the specified torque using the ST.

ST 18270KA020 SOCKET (E20)

Tightening torque:

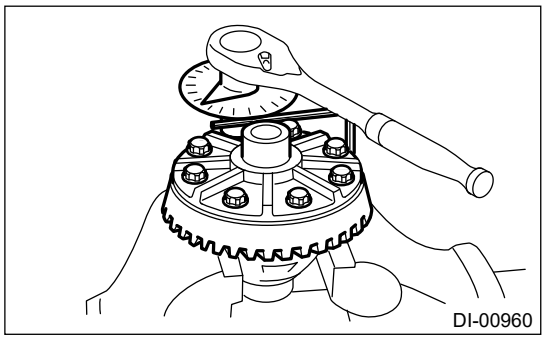
20 N·m (2.0 kgf-m, 14.8 ft-lb)



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

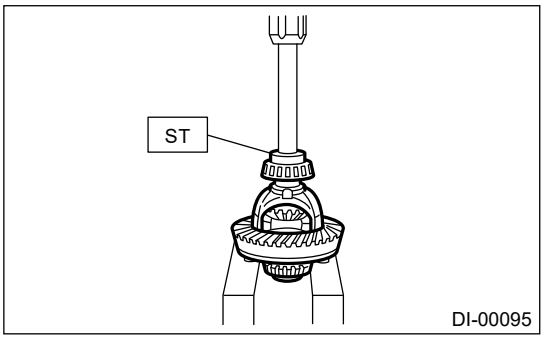
Tightening angle:

35°±2°



13. Using the ST, press-fit the side bearing to the differential case.

ST 498485400 DRIFT



14. Assemble the side retainer.

(1) Install the oil seal into side retainer RH and LH.

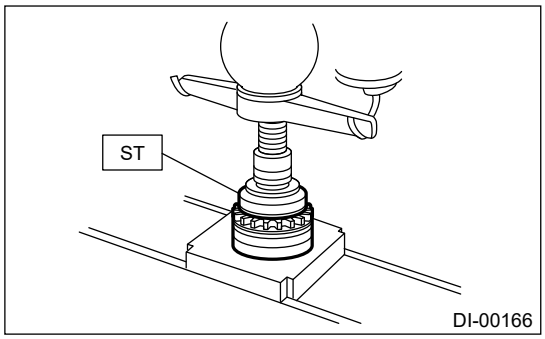
Caution:

Pay attention to the left and right of the oil seal.

Note:

- **Use a new oil seal.**
- **Apply differential gear oil to the oil seal lip.**

ST 498447100 INSTALLER

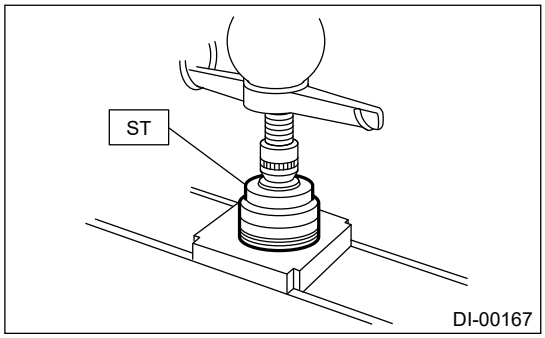


(2) Install the bearing race into side retainer RH and LH.

Caution:

Make sure that the bearing outer races and cones are properly assembled.

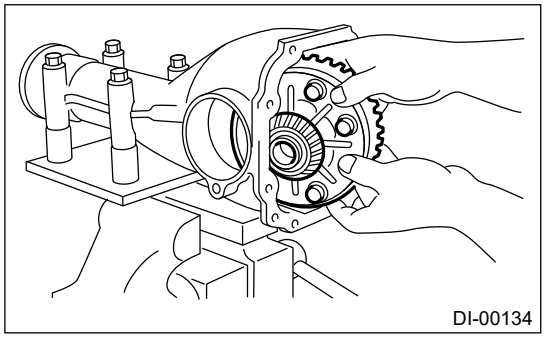
ST 398477702 DRIFT



(3) Install the differential case assembly into differential carrier in the reverse order of disassembly.

Note:

Be careful not to hit the teeth of hypoid driven gear against the differential carrier.

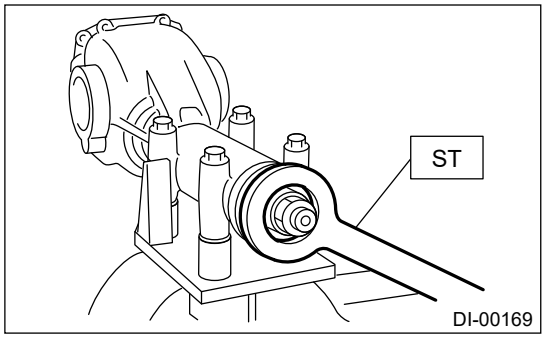


(4) Temporally tighten the side retainers RH and LH in differential carrier to install.

15. Perform the backlash adjustment between the hypoid driven gear and drive pinion, and preload adjustment of differential side bearing.

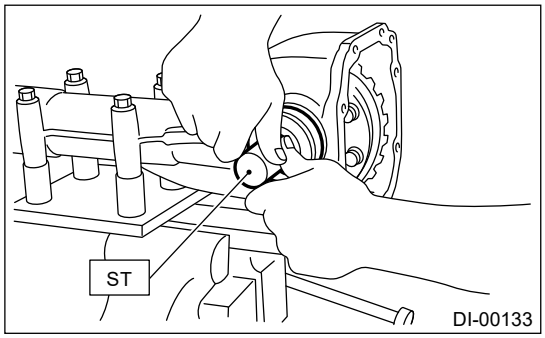
(1) Turn the drive pinion with ST for better fitting of differential side bearing.

ST 498427200 FLANGE WRENCH



(2) Using the ST, tighten side retainer RH, and then tighten side retainer LH until there is no backlash.

ST 18630AA010 WRENCH COMPL RETAINER

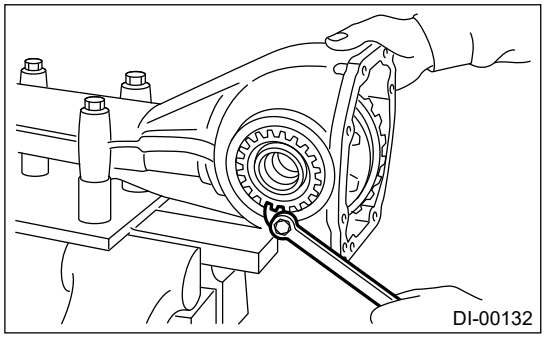


(3) Loosen the side retainer LH by approx. 1.5 teeth, and tighten the side retainer RH by approx. 2 teeth [amount that the side retainer LH is turned back (approx. 1.5 teeth) + approx. 0.5 teeth]. Difference between [amount that the side retainer LH is turned back (approx. 1.5 teeth)] and [amount that the side retainer RH is tightened (approx. 2 teeth)] gives preload.

(4) Temporarily tighten the lock plate.

Note:

Turn over the lock plate to shift the holder by 0.5 teeth.



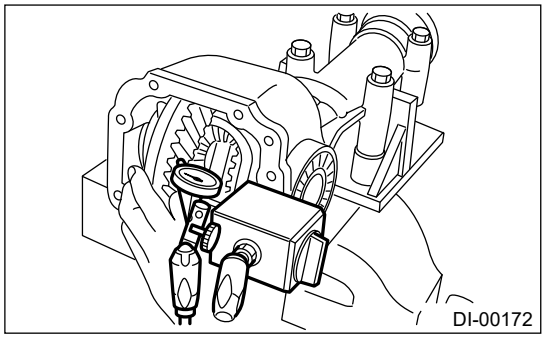
(5) Measure the hypoid driven gear-to-drive pinion backlash. Set the magnet base on differential carrier. Align the contact point of dial gauge with tooth face of hypoid driven gear, and move hypoid driven gear while holding drive pinion still. Read the value indicated on dial gauge.

Note:

If measured value of backlash is not within the specified range, repeat the procedures for pinion driven gear set backlash adjustment and the differential side bearing preload adjustment.

Backlash:

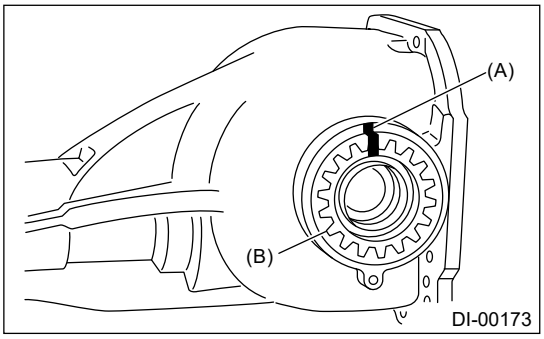
0.10 — 0.15 mm (0.004 — 0.006 in)



16. Put alignment marks on both the differential carrier and side retainer. Remove the side retainers one side at a time. After installing an O-ring and applying oil to the threaded portion, restore them to the original position.

Note:

Use new O-rings.



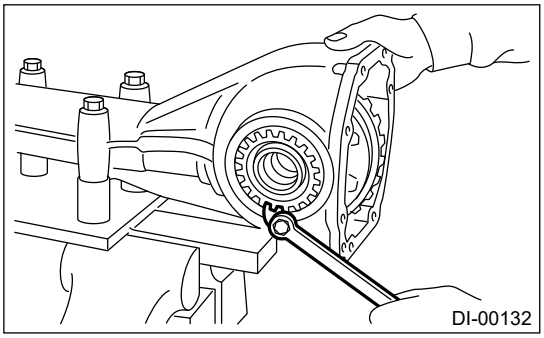
(A) Alignment mark

(B) Side retainer

17. Install the lock plate, and tighten the bolts to the specified torque.

Tightening torque:

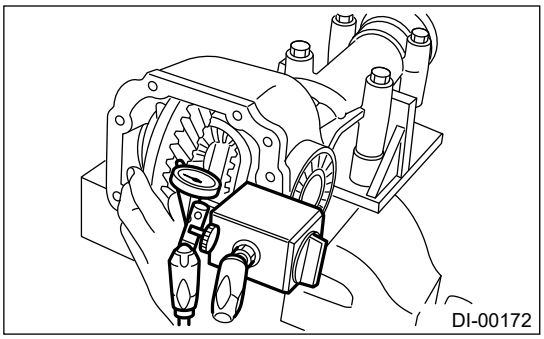
25 N·m (2.5 kgf-m, 18.4 ft-lb)



18. Recheck the backlash between hypoid driven gear and drive pinion.

Backlash:

0.10 — 0.15 mm (0.004 — 0.006 in)



19. Checking and adjusting the tooth contact of hypoid driven gear

(1) Apply lead-free red dye evenly on the both sides of three to four teeth of the hypoid driven gear. Check the contact pattern after rotating the hypoid driven gear several revolutions back and forth until a definite contact pattern appears on the hypoid driven gear.

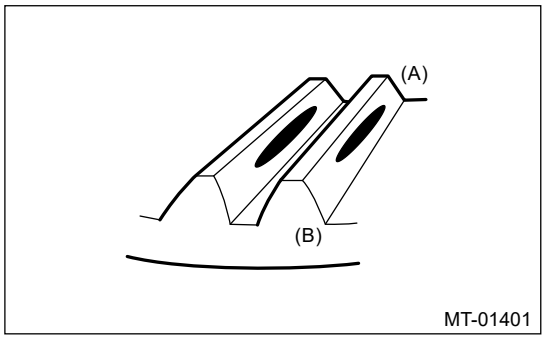
(2) When the contact pattern is not correct, readjust.

Note:

Be sure to wipe off the lead-free red dye completely after the adjustment is completed.

- Correct tooth contact

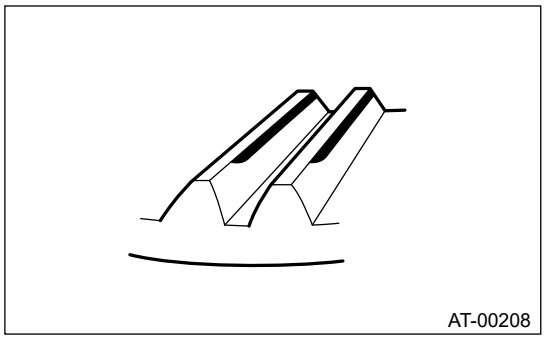
  Check item: Tooth contact pattern is slightly shifted toward toe side under no-load rotation. (When driving, it moves towards the heel side.)



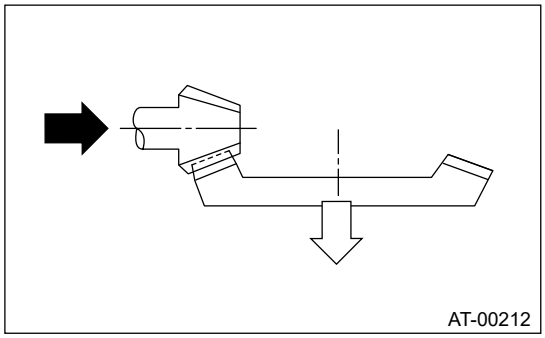
(A) Toe side

(B) Heel side

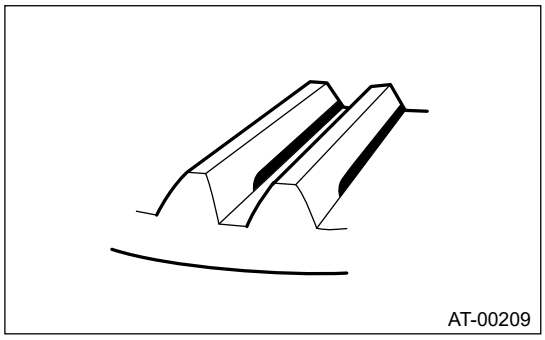
- Face contact
  Check item: Backlash is too large.
  Contact pattern



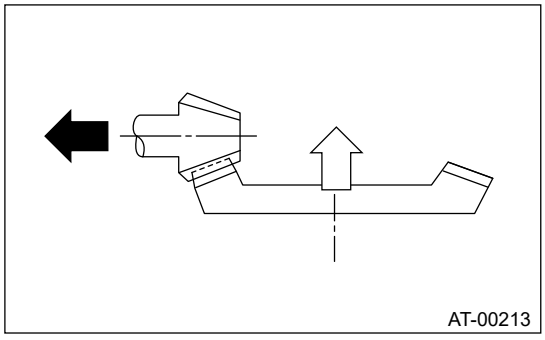
Corrective action: Increase thickness of pinion height adjusting washer according to the procedure for bringing drive pinion close to hypoid driven gear side.



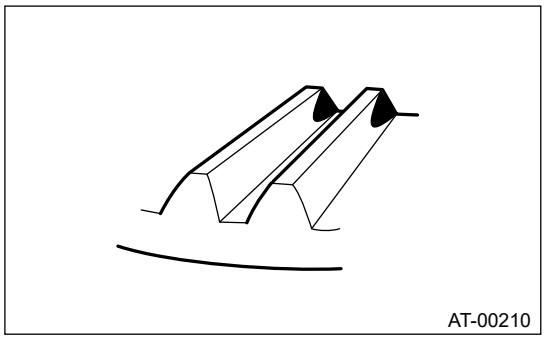
- Flank contact
  Check item: Backlash is too small.
  Contact pattern



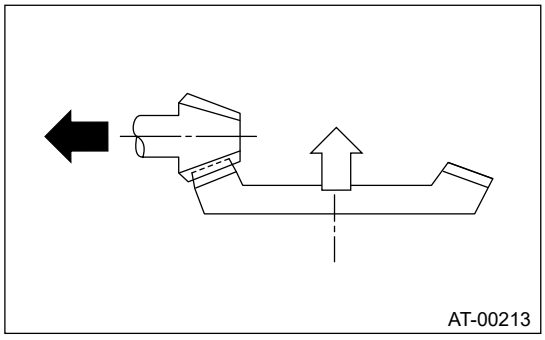
Corrective action: Reduce the thickness of pinion height adjusting washer according to the procedure for bringing drive pinion away from hypoid driven gear.



- Toe contact (inside contact)
  Check item: Teeth contact area is too small.
  Contact pattern

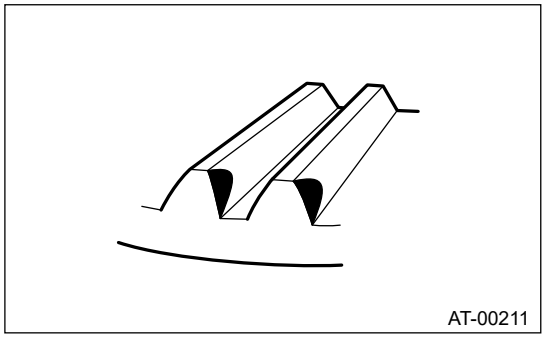


Corrective action: Reduce the thickness of pinion height adjusting washer according to the procedure for bringing drive pinion away from hypoid driven gear side.

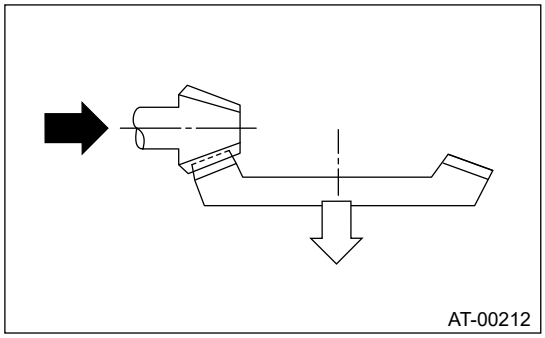


- Heel contact (outside end contact)
  Check item: Teeth contact area is too small.

Contact pattern



Corrective action: Increase thickness of pinion height adjusting washer according to the procedure for bringing drive pinion close to hypoid driven gear side.



20. If correct tooth contact is not obtained, readjust the drive pinion height and the differential side bearing preload (already mentioned) and the hypoid gear backlash.

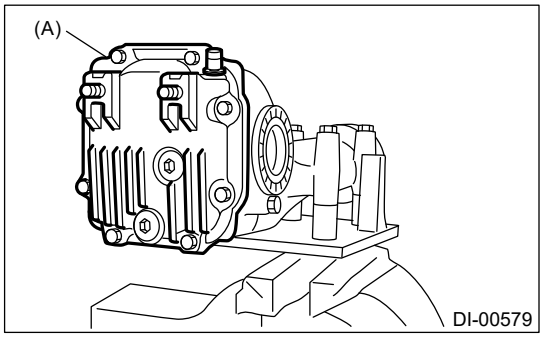
21. Install the gasket and rear cover to the differential carrier, and tighten the bolts to specified torque.

Note:

Use a new gasket.

Tightening torque:

25 N·m (2.5 kgf-m, 18.4 ft-lb)



(A) Rear cover

22. When the stud bolts are removed from the rear cover, install the stud bolts so that the exposed length of stud bolt is within the range of "L".

Caution:

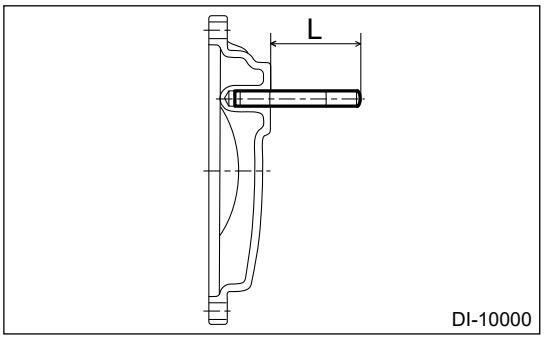
- **Do not tighten forcibly if the exposed length of stud bolt does not fall within the specified range. Remove the stud bolt, and check for contamination of**

foreign matter and any defects in the screw hole.

- **Do not tighten with a tightening torque of 55 N·m (5.6 kgf-m, 40.6 ft-lb) (reference value) or more.**

Exposed length L of stud bolt:

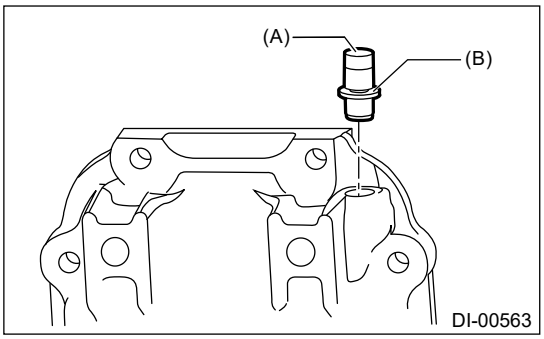
59.0 — 61.0 mm (2.32 — 2.40 in)



23. Install the air breather cap.

Note:

When installing the air breather cap, do not tap section (A). Be sure to tap section (B) to install.



24. Install the drain plug.

Note:

Use a new gasket.

Tightening torque:

50 N·m (5.1 kg-m, 36.9 ft-lb)

25. Install the filler plug.

Note:

After installing the rear differential assembly to the vehicle, fill the gear oil, then use a new gasket, and tighten to the specified torque. **Ref. to DIFFERENTIALS>Differential Gear Oil>REPLACEMENT.**

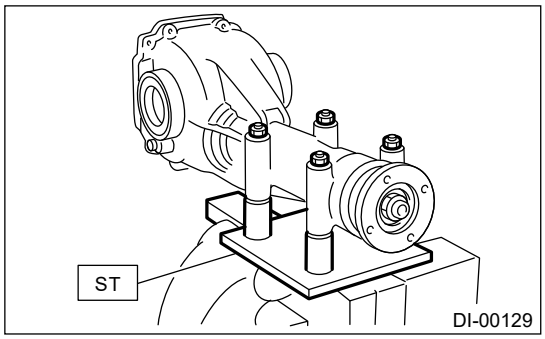
DISASSEMBLY

To detect the real cause of trouble, inspect the following items before disassembling.

- Tooth contact and backlash between hypoid driven gear and drive pinion

1. Set the ST on vise and install the differential assembly to ST.

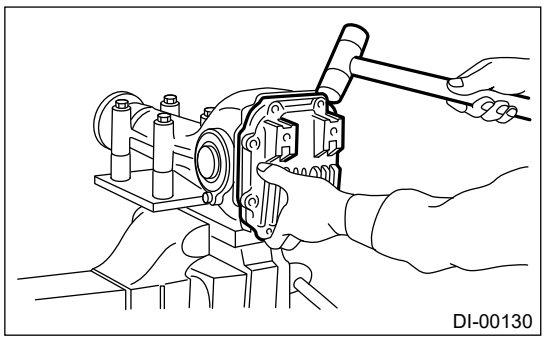
ST 398217700 ATTACHMENT SET



2. Remove the drain plug and filler plug.
3. Remove the rear cover by removing retaining bolts.

Note:

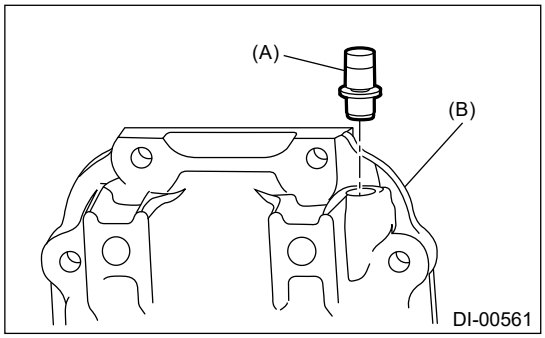
Remove it by tapping with a plastic hammer.



4. Remove the stud bolts from rear cover if necessary.
5. Remove the air breather cap.

Note:

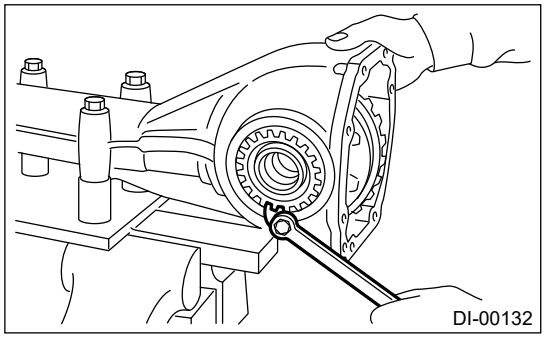
- **Do not attempt to remove the air breather cap unless necessary.**
- **Whenever the air breather cap is removed, replace it with a new part.**



(A) Air breather cap

(B) Rear cover

6. Remove the lock plate RH and LH.

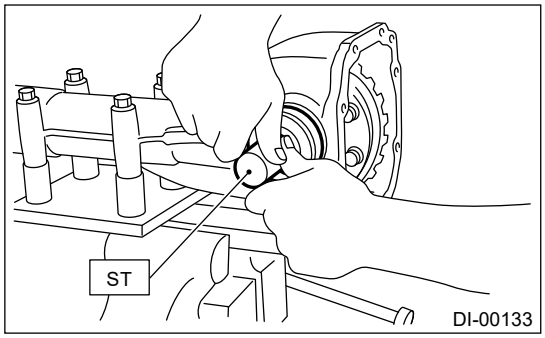


7. Remove the side retainer RH and LH with ST.

Note:

When keeping the retainers aside, use labels etc. to avoid confusing the left and right.

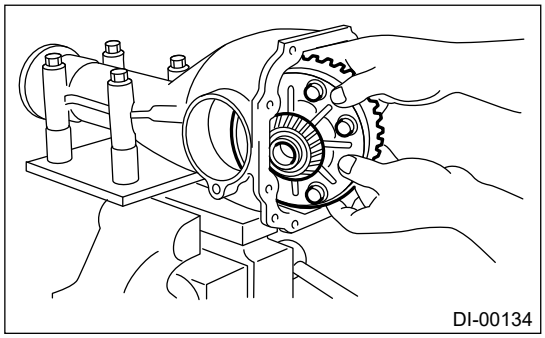
ST 18630AA010 WRENCH COMPL RETAINER



8. Pull out the differential case assembly from differential carrier.

Note:

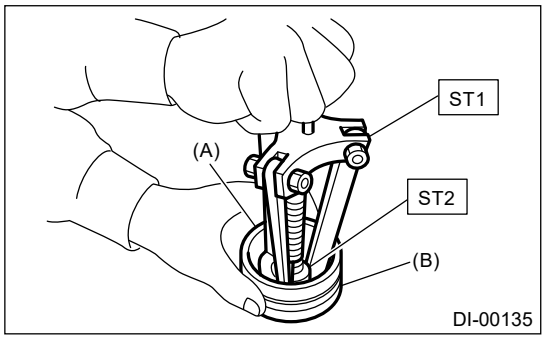
Be careful not to hit the teeth of hypoid driven gear against the differential carrier.



9. Remove the bearing race from side retainer RH and LH with ST1 and ST2.

ST1 499705401 PULLER ASSY

ST2 499705404 SEAT



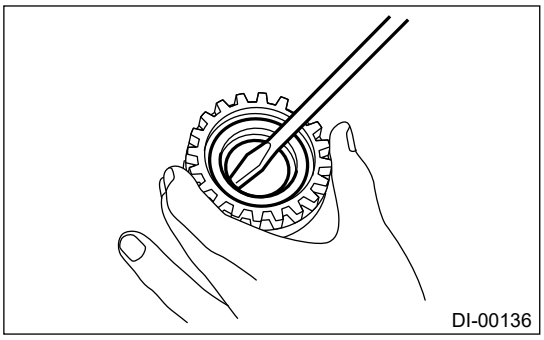
(A) Bearing race

(B) Side retainer

10. Remove the oil seal from RH and LH side retainers.

Note:

Perform this operation only when changing oil seal.



11. Remove the O-rings.

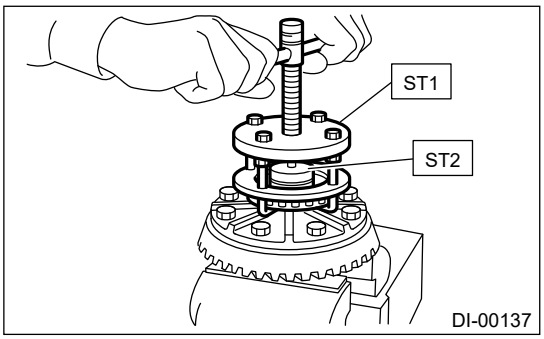
12. Extract the bearing cone with ST1 and ST2.

Note:

- **Do not attempt to disassemble the parts unless necessary.**
- **Set the puller so that its claws catch the edge of the bearing cone.**
- **Store so that the right and left side bearing races and cones are not mixed together.**

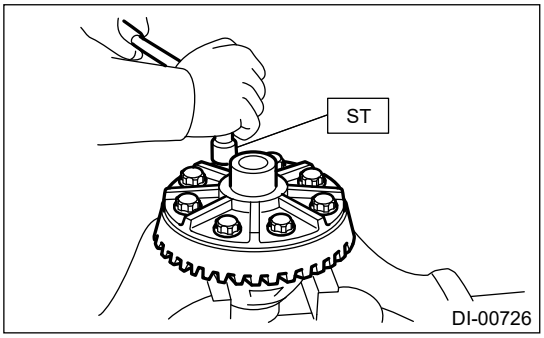
ST1 899524100 PULLER SET

ST2 399520105 SEAT



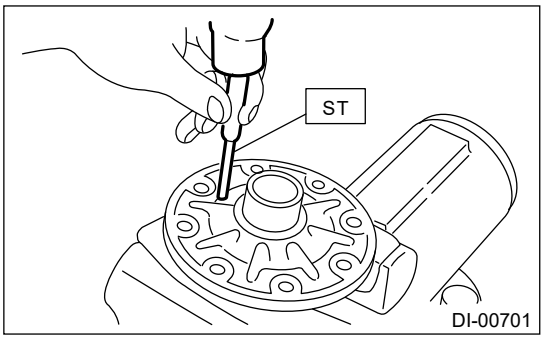
13. Using the ST, loosen the hypoid driven gear bolt and remove the hypoid driven gear.

ST 18270KA020 SOCKET (E20)



14. Remove the spring pin from hypoid driven gear side using ST.

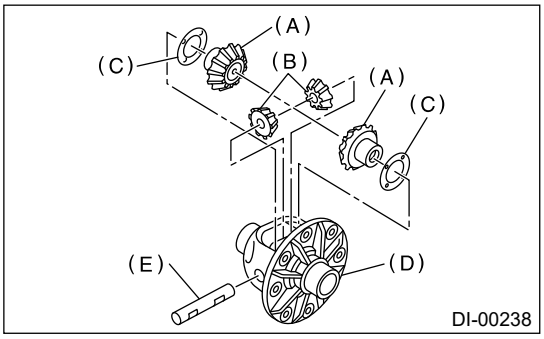
ST 899904100 STRAIGHT PIN REMOVER



15. Draw out the pinion mate shaft and remove pinion mate gears, side gears and side gear thrust washers.

Note:

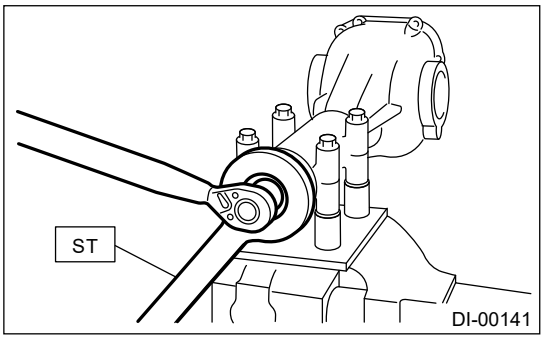
The gears and washers should be marked with RH or LH, front or rear, or kept separately.



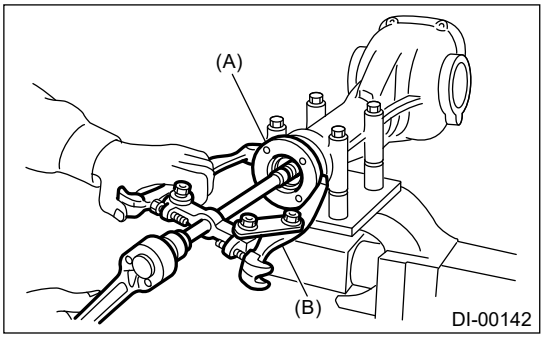
(A) Side gear
(B) Pinion mate gear
(C) Side gear thrust washer
(D) Differential case
(E) Pinion mate shaft

16. Remove the self-locking nut while securing the companion flange with ST.

ST 498427200 FLANGE WRENCH



17. Extract the companion flange with a puller.



(A) Companion flange

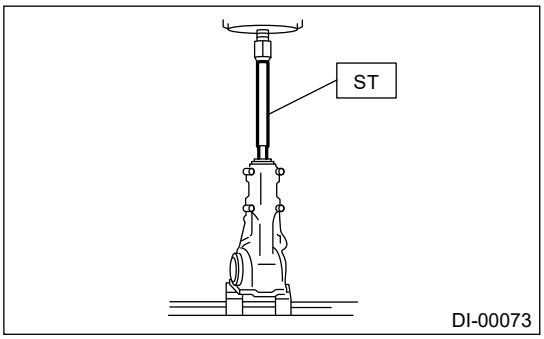
(B) Puller

18. Press the end of drive pinion shaft using ST and remove the rear bearing cone, pinion height adjusting washer, preload adjusting spacer and washer.

Note:

Hold the drive pinion so as not to drop it.

ST 398467700 DRIFT

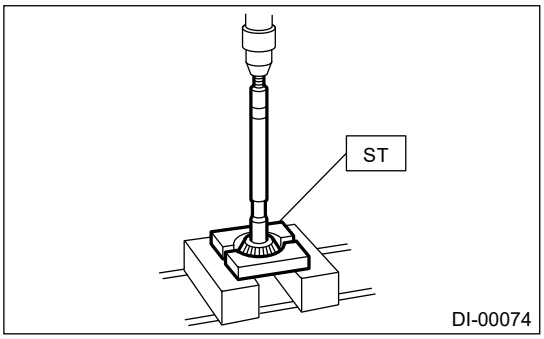


19. Remove the rear bearing cone from drive pinion by supporting the cone with ST.

Note:

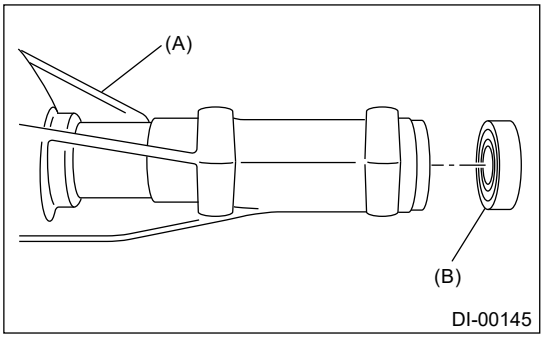
Place the remover so that its center-recessed side faces the bearing cone.

ST 498515500 REMOVER



20. Remove the front oil seal from differential carrier using ST.

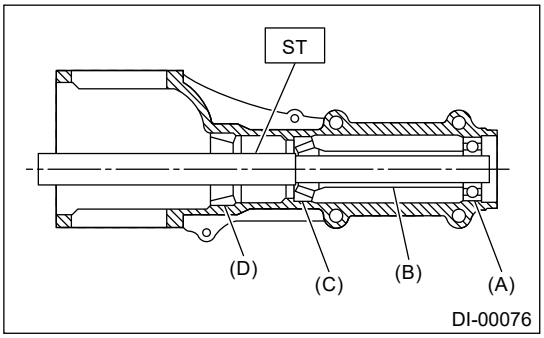
ST 398527700 PULLER ASSY



(A) Differential carrier
(B) Front oil seal

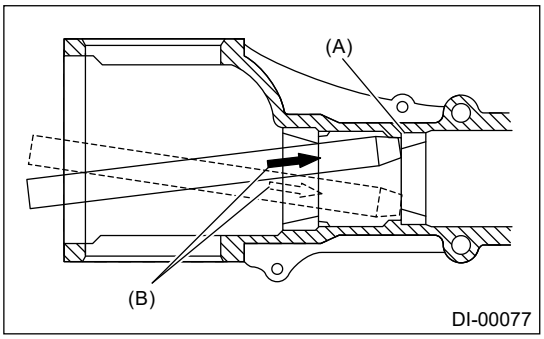
21. Remove the pilot bearing together with the front bearing cone and spacer using the ST.

ST 398467700 DRIFT



(A) Pilot bearing
(B) Spacer
(C) Front bearing
(D) Rear bearing race

22. When replacing the bearings, tap out the front bearing race and rear bearing race in this order using a brass bar to remove them.



(A) 2 cutout portions along diagonal lines

(B) Tap alternately with brass bar.

INSPECTION

Wash all the disassembled parts clean, and examine them for wear, damage or other defects. Repair or replace the defective parts as necessary.

1. Hypoid driven gear and drive pinion
   - If there is evidently an abnormal tooth contact, find out the cause and adjust until the teeth contact correctly. Replace the gear if there is an excessive worn or an incapable adjustment.
   - If crack, cutout or seizure is found, replace the parts as a set. Slight damage of some teeth can be corrected by oil stone or the like.
2. Side gear and pinion mate gear
   - Replace if cracks, scoring or other defects are evident on the tooth surface.
   - Replace if thrust washer contact surface is worn or seized. Slight damages of the surface can be corrected by oil stones or equivalent.
3. Bearing
   Replace if seizure, peeling, wear, rust, dragging during rotation, noise or other defect is evident.
4. Thrust washer of the side gear and pinion mate gear
   Replace if seized, flawed, abnormally worn or having other defects.
5. Oil seal
   Replace if deformed or damaged, and at every disassembling.
6. Differential carrier
   Replace if the bearing bores are worn or damaged.
7. Differential case
   Replace if its sliding surfaces are abnormally worn, burned, or cracked.
8. Companion flange
   Replace if the oil seal lip contact surface shows cracking.

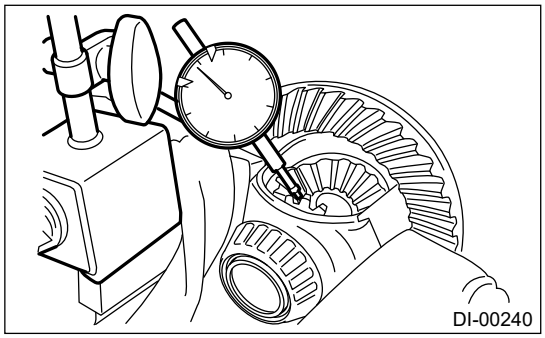
1. SIDE GEAR BACKLASH

Using a dial gauge, check the backlash of side gear.

Side gear backlash:

0.05—0.15 mm (0.002—0.006 in)

If the side gear backlash is outside the specification range, select the side gear thrust washer and adjust the side gear backlash as specified.



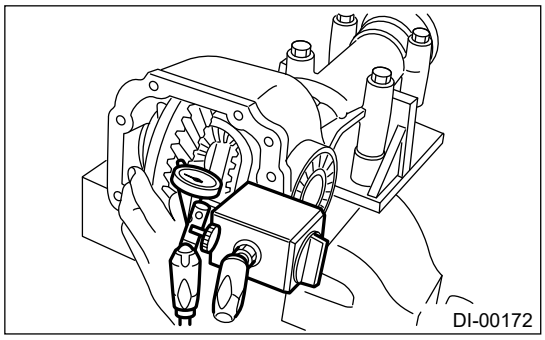
2. HYPOID DRIVEN GEAR BACKLASH

Using a dial gauge, check the backlash of hypoid driven gear.

Hypoid driven gear backlash:

0.10—0.15 mm (0.004—0.006 in)

If the hypoid driven gear backlash is outside the specification range, adjust the side bearing preload and repair if necessary.

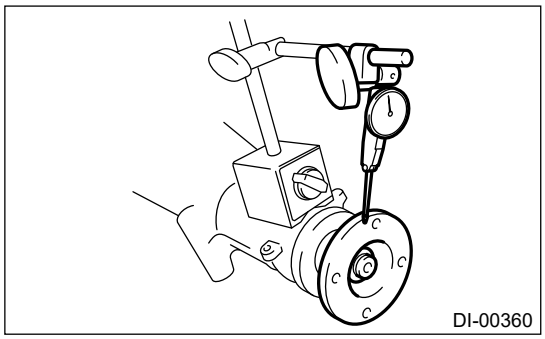


3. COMPANION FLANGE

1. If rust or dirt is attached to the companion flange, remove them.
2. Set a dial gauge at a companion flange surface (mating surface of propeller shaft and companion flange), and then measure the companion flange runout.

   Limit of runout:

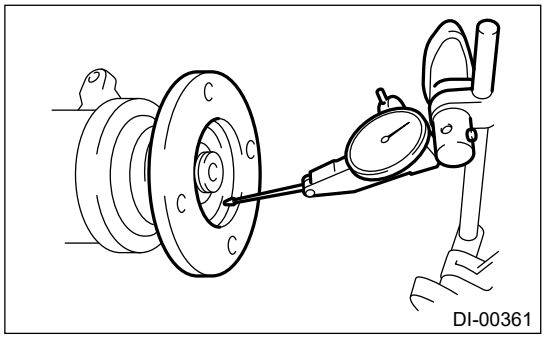
   0.08 mm (0.003 in)



3. Set the gauge inside of the companion flange, and measure the runout.

   Limit of runout:

   0.08 mm (0.003 in)



4. If either runout exceeds the limit, move the phase of companion flange and drive pinion 90° each, and find the point where the runout is within the limit.

5. If the runout exceeds the limit after changing the phase, replace the companion flange and recheck the runout.
6. If the runout exceeds the limit after replacing the companion flange, the drive pinion may be assembled incorrectly or bearing is faulty.

4. TOOTH CONTACT BETWEEN HYPOID DRIVEN GEAR AND DRIVE PINION

Inspect the tooth contact between the hypoid driven gear and drive pinion. Ref. to DIFFERENTIALS>Rear Differential (VA-type)>ASSEMBLY.

INSTALLATION

The installation procedure for VA1-type is included in "INSTALLATION" for T-type. Ref. to DIFFERENTIALS>Rear Differential (T-type)>INSTALLATION.

REMOVAL

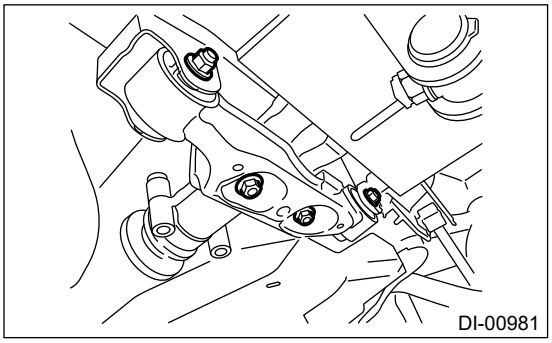
The removal procedure for VA1-type is included in "REMOVAL" for T-type. Ref. to DIFFERENTIALS>Rear Differential (T-type)>REMOVAL.

INSPECTION

1. Check the rear differential front member for damage, bend and corrosion.
   If damage, bend or corrosion is excessive, replace the rear differential front member.
2. Check the bushings of rear differential front member for cracking, hardening and damage. If cracking, hardening or damage is excessive, replace rear differential front member.

INSTALLATION

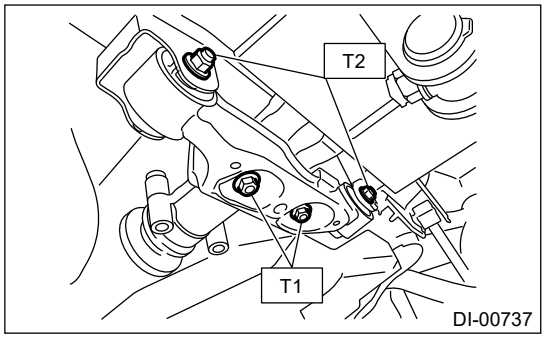
1. Install the rear differential front member, and temporarily attach and tighten a new self-locking nut.



2. Remove the transmission jack.
3. Tighten the self-locking nut.

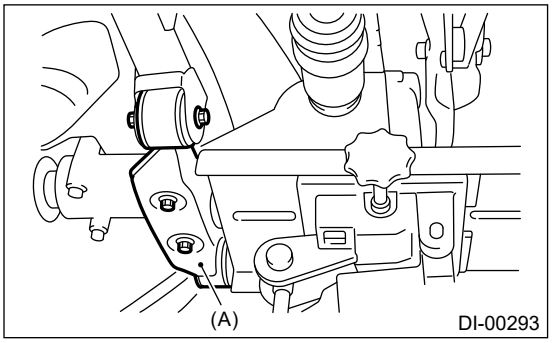
Tightening torque:

T1: 50 N·m (5.1 kgf-m, 36.9 ft-lb)
T2: 110 N·m (11.2 kgf-m, 81.1 ft-lb)



REMOVAL

1. Disconnect the ground cable from battery.
2. Lift up the vehicle.
3. Support the rear differential using transmission jack, and then remove the rear differential front member.



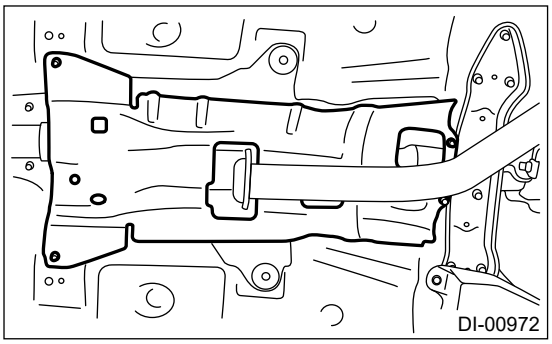
(A) Rear differential front member

INSPECTION

Make sure that there is no leakage from front oil seal portion. If there is any leakage replace the oil seal and inspect the propeller shaft.

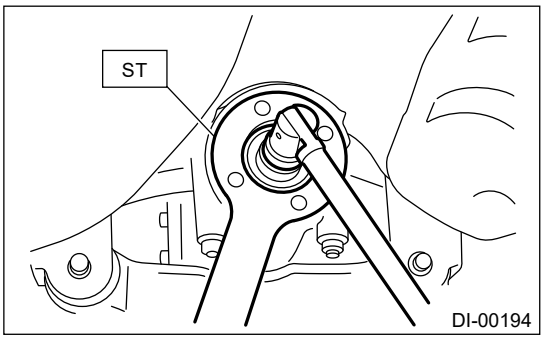
REPLACEMENT

1. Shift the select lever or gear shift lever to neutral.
2. Disconnect the ground cable from battery.
3. Release the parking brake.
4. Lift up the vehicle.
5. Drain differential gear oil. Ref. to DIFFERENTIALS>Differential Gear Oil>REPLACEMENT.
6. Remove the rear exhaust pipe.
   - 2.5 L non-turbo model
     Ref. to EXHAUST(H4DO)>Rear Exhaust Pipe>REMOVAL.
   - 2.0 L turbo model
     Ref. to EXHAUST(H4DOTC)>Rear Exhaust Pipe>REMOVAL.
7. Remove the center exhaust cover.



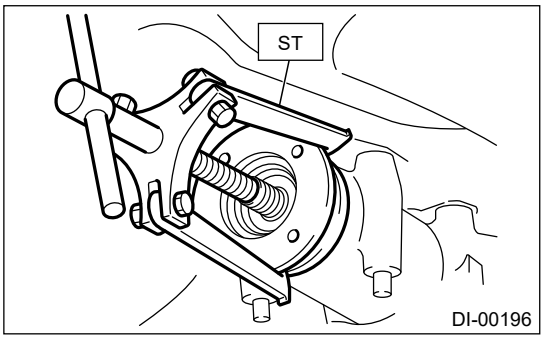
8. Remove the propeller shaft. Ref. to DRIVE SHAFT SYSTEM>Propeller Shaft>REMOVAL.
9. Check the initial torque and write it down.
10. Remove the self-locking nut while holding the companion flange with ST.

ST 498427200 FLANGE WRENCH



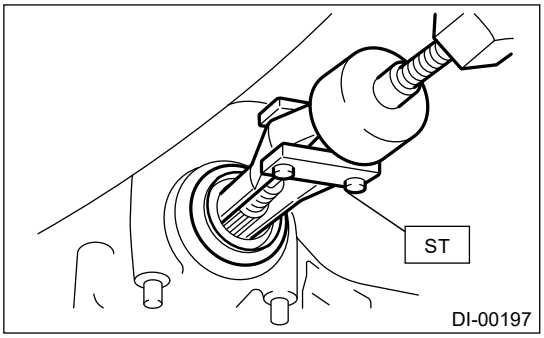
11. Extract the companion flange using the ST.

ST 399703600 PULLER ASSY



12. Remove the oil seal using ST or screwdriver.

ST 398527700 PULLER ASSY

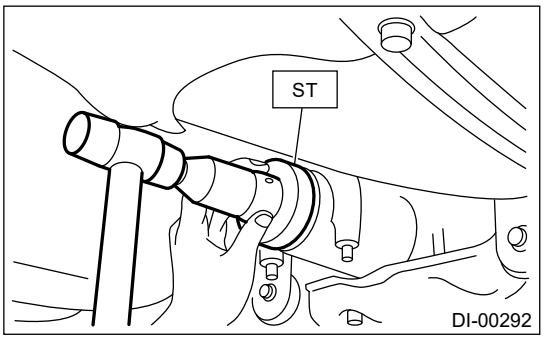


13. Using the ST, install the oil seal.

Note:

- **Use a new oil seal.**
- **Apply differential gear oil to the oil seal lips.**

ST 498447120 INSTALLER



14. Install the companion flange.

Note:

Use a plastic hammer to install companion flange.

15. Tighten the self-locking nut to the specified torque so that the initial torque of companion flange becomes the same as that of before oil seal replacement.

Note:

- **Use a new self-locking nut.**
- **Before installing the self-locking nut, apply the seal material to the threads of the drive pinion shaft and to the seating surface of the self-locking nut.**

Seal material:

THREE BOND 1324 (Part No. 004403042) or equivalent

Tightening torque:

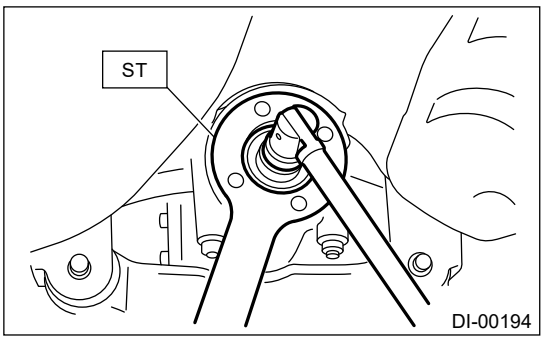
T-type

167 — 196 N·m (17.0 — 20.0 kgf-m, 123.2 — 144.6 ft-lb)

VA1-type

162 — 220 N·m (16.5 — 22.5 kgf-m, 119.5 — 162.3 ft-lb)

ST 498427200 FLANGE WRENCH



16. Hereafter, perform assembly in the reverse order of disassembly.

17. Fill differential gear oil. Ref. to DIFFERENTIALS>Differential Gear Oil>REPLACEMENT.

GENERAL DESCRIPTION

Caution:
Be sure to perform rear differential inspection mode.

- Follow the messages displayed on the Subaru Select Monitor when working.
- "Rear differential inspection mode" using the Subaru Select Monitor is available only for the CVT model.
- Perform rear differential inspection mode when the following work has been performed.
  Transmission assembly replacement/Replacement of rear differential/Replacement of front differential hypoid gear set/Replacement of rear differential hypoid gear set

PROCEDURE

Caution:
Do not turn the power of the Subaru Select Monitor OFF during work, and do not disconnect the data link connector.

1. Shift the select lever to "P" range.
2. Apply the parking brake.
3. Lift up the vehicle.
   Warning:
   Lift up the vehicle until the tire bottom is 30 cm or more above the ground.
4. Connect the Subaru Select Monitor to data link connector.
5. Turn the ignition switch to ON. (For model with push button start, press the push button ignition switch twice without depressing brake pedal.)
6. Select «Diagnosis» in the «Start» screen of Subaru Select Monitor.
7. On «Vehicle selection» display, input the vehicle information and select «Confirmed».
8. On «Main Menu» display, select «Each System».
9. On «Select System» display, select «Transmission Control System».
10. On «Select Function» display, select «Work Support».
11. On «Work Support» display, select «Rear differential inspection mode».
12. Follow the messages displayed on the Subaru Select Monitor screen when working.
13. The results of the rear differential inspection mode are displayed on the Subaru Select Monitor screen.
    - When ended normally: "The rear differential has been replaced normally."
    - When ended abnormally: "A rear differential abnormality has been detected. Reinspect the items at the time of rear differential installation."
    - When interrupted: "Inspection is stopped. Restart this inspection mode from the beginning."
14. After the message "Inspection has been completed. Set the ignition switch to OFF." appears, the rear differential inspection mode completes.
    Note:
    - **When the rear differential inspection mode is completed properly, the following warning lights may illuminate. But this is not a malfunction. If warning light illuminates, clear the memory.**
      VDC/ABS, engine, power steering, EyeSight
    - **For detailed operation procedures, refer to "Application help".**
    - **If the rear differential inspection mode does not end normally, repeat the mode until it ends normally.**
    - **When the inspection mode does not end normally, the AWD warning light will start blinking at 2 Hz.**
    - **When the rear differential inspection mode ends abnormally, the front differential and rear differential may be different from the specifications for the vehicle.**
    - **When the rear differential inspection mode is interrupted, the following reasons are possible.**

Message	Main reasons for abnormal termination	Action to take
• "Inspection is stopped."	TCM has detected a failure.	Perform the diagnosis for TCM. Ref. to TRANSMISSION

• “Inspection is stopped. Restart this inspection mode from the beginning.”		(DIAGNOSTICS)>Basic Diagnostic Procedure.
	VDC has a failure.	Perform the diagnosis for VDC. Ref. to BRAKE CONTROL (DIAGNOSTICS)>Basic Diagnostic Procedure.
	Brake is applied after start during automatic running.	—
	Too delayed operation to the instructions displayed on the Subaru Select Monitor.	—
“TCM incompatible. Rear differential inspection mode is stopped.”	The model does not support the rear differential inspection mode.	Check the specification.
The TCM has detected a fault. Inspect following the manual.	TCM has detected a failure.	Perform the diagnosis for TCM. Ref. to TRANSMISSION (DIAGNOSTICS)>Basic Diagnostic Procedure.

INSPECTION

Check the rear differential mount bushing for cracks, hardening or damage. If cracking, hardening or damage is excessive, replace rear differential mount bushing.

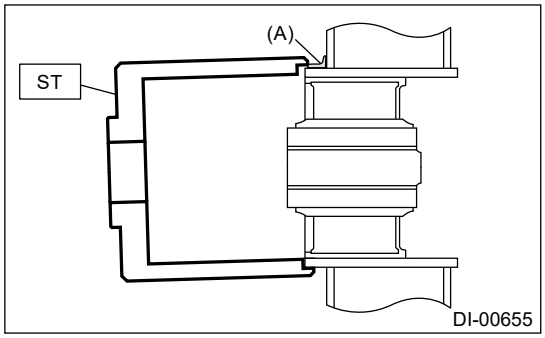
REPLACEMENT

Caution:

- **Apply the molybdenum grease on the square thread of the ST (shaft and nut) before use.**
- **If there was so much rust in the rear differential mount bushing, remove the rust before starting work.**

1. Remove the rear differential. Ref. to DIFFERENTIALS>Rear Differential (T-type)>REMOVAL. Ref. to DIFFERENTIALS>Rear Differential (VA-type)>REMOVAL.
2. Fit the ST to the periphery of the sub frame cylinder, and make sure that the ST does not contact with welded spots or spatters.

ST 41399FG010 SPECIAL TOOL A



(A) Welded spot

3. If the ST contacts with welded spots or spatters, remove the excessive welds or spatters with sander or the equivalent so that the ST contacts the cylinder peripheral part.

Caution:

Performing the operation with the ST contacting with welded spots or spatters may break the ST. Be sure to remove excessive welds or spatters before the operation.

4. Set ST1, ST2, ST3, ST4 and ST5 as shown in the figure.

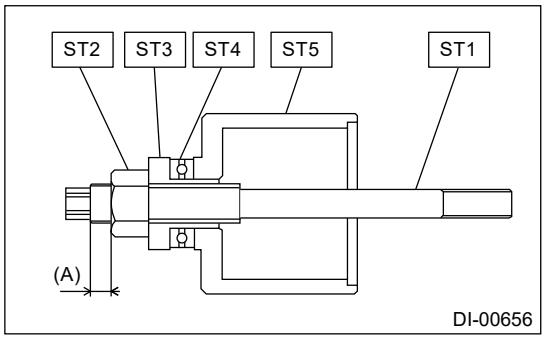
ST1 41399FG091 SPECIAL TOOL SHAFT

ST2 41399FG070 SPECIAL TOOL NUT

ST3 41399FG050 SPECIAL TOOL SLEEVE

ST4 41399FG080 SPECIAL TOOL BEARING

ST5 41399FG010 SPECIAL TOOL A

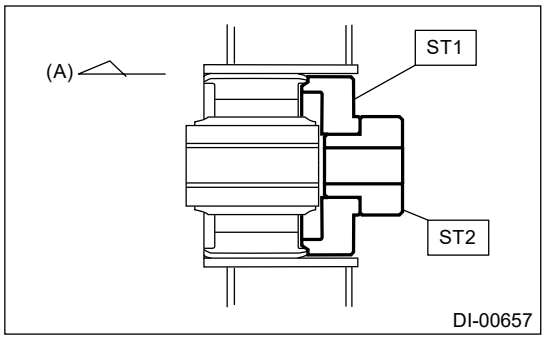


(A) 5 mm (0.2 in) or less

5. Fit and hold the ST1 and ST2 to the rear differential mount bushing from the rear side of vehicle.

ST1 41399FG031 SPECIAL TOOL C

ST2 41399FG061 SPECIAL TOOL RING

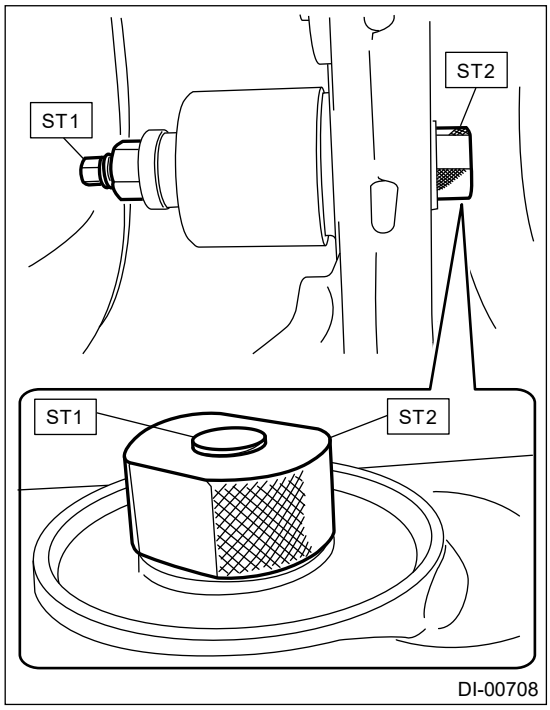


(A) Front side of vehicle

6. Insert the ST set in the step 4) through the rear differential mount bushing hole from the front side of vehicle, and screw in the ST1 by hand till the front end of ST1 comes out slightly from the rear end of ST2.

ST1 41399FG091 SPECIAL TOOL SHAFT

ST2 41399FG061 SPECIAL TOOL RING

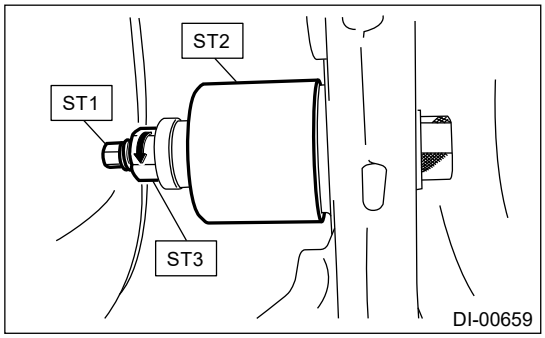


7. Hold the ST1 to prevent it from rotating, and screw in the ST3 by hand till there is no loose fit on the ST2.

Caution:

When setting the ST to the vehicle, always make sure that the ST2 fits the periphery of the sub frame cylinder and is not tilted.

ST1	**41399FG091**	**SPECIAL TOOL SHAFT**
ST2	**41399FG010**	**SPECIAL TOOL A**
ST3	**41399FG070**	**SPECIAL TOOL NUT**



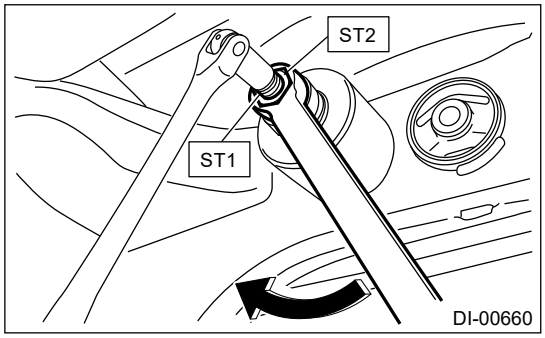
8. Hold the ST1 with a tool to prevent it from rotating, and screw in the ST2 to remove the rear differential mount bushing.

Caution:

- **Rotation of ST1 will damage the screw at the rear end of rear differential mount bushing. Never rotate the ST1.**
- **If the ST starts to tilt while removing the rear differential mount bushing, stop the work and set the ST again.**

ST1	**41399FG091**	**SPECIAL TOOL SHAFT**

ST2 41399FG070 SPECIAL TOOL NUT



9. Set ST1, ST2, ST3, ST4, ST5 and rear differential mount bushing as shown in the figure.

Note:

- **Set the ST2 nut near to the end of ST1 screw.**
- **Hold the rear differential mount bushing with the arrow marked side facing toward the rear of the vehicle, and set the rear differential mount bushing to the ST so that the arrow mark faces upward.**
- **Mark the bottom end of rear differential mount bushing to identify the installing direction.**

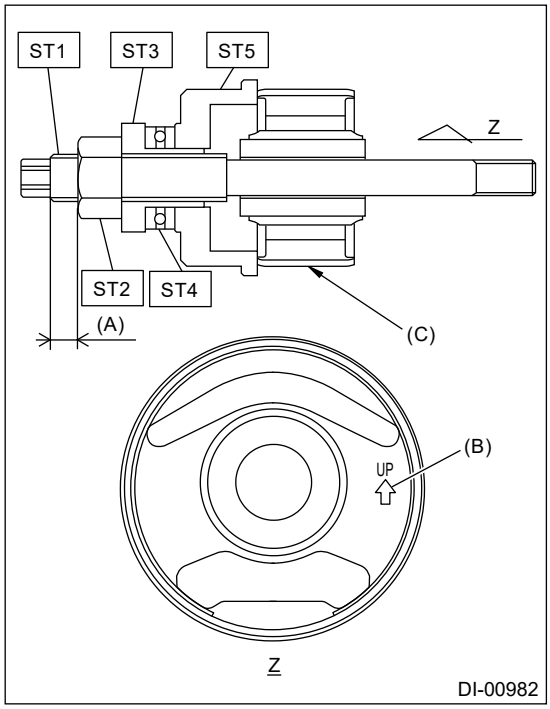
ST1 41399FG091 SPECIAL TOOL SHAFT

ST2 41399FG070 SPECIAL TOOL NUT

ST3 41399FG050 SPECIAL TOOL SLEEVE

ST4 41399FG080 SPECIAL TOOL BEARING

ST5 41399FG020 SPECIAL TOOL B



(A) 8 mm (0.31 in) or more

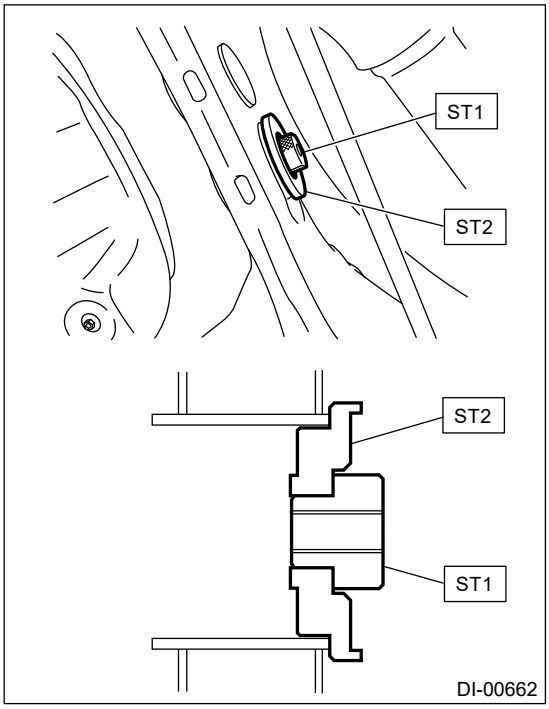
(B) Arrow mark

(C) Marked position

10. Attach ST1 to the ST2, and fit and hold the STs as a unit to the sub frame from the rear side of vehicle.

ST1 41399FG061 SPECIAL TOOL RING

ST2 41399FG041 SPECIAL TOOL D



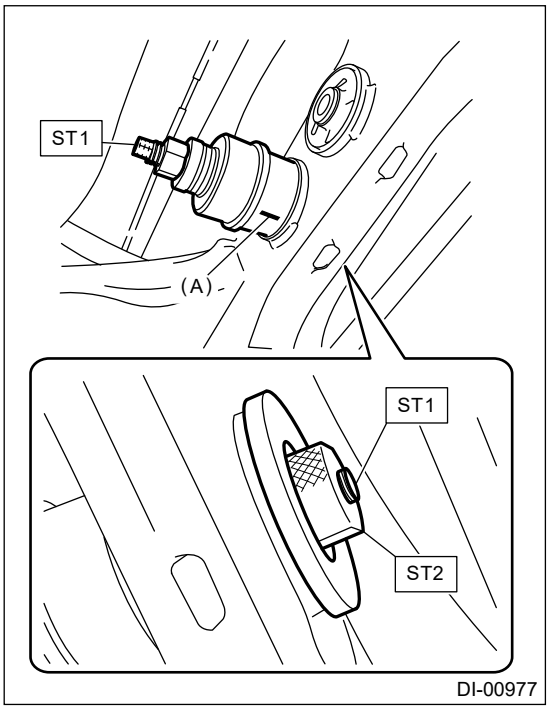
11. Insert the ST and rear differential mount bushing set in the step 9) through the sub frame from the front side of vehicle, and screw in the ST1 by hand till the front end of ST1 comes out slightly from the rear end of ST2.

Caution:

Set the rear differential mount bushing with its mark facing the bottom end direction.

ST1 41399FG091 SPECIAL TOOL SHAFT

ST2 41399FG061 SPECIAL TOOL RING



(A) Mark

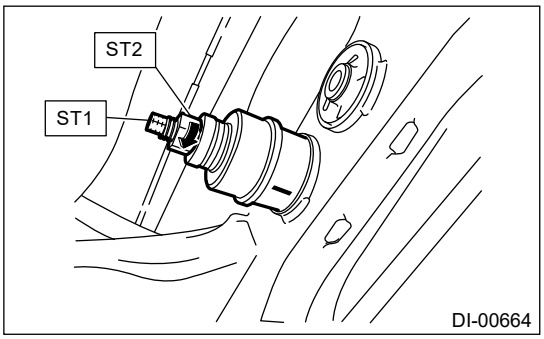
12. Hold the ST1 to prevent it from rotating, and screw in the ST2 by hand till there is no loose fit on the ST and the rear differential mount bushing.

Caution:

Make sure that the ST and rear differential mount bushing are not tilted.

ST1 41399FG091 SPECIAL TOOL SHAFT

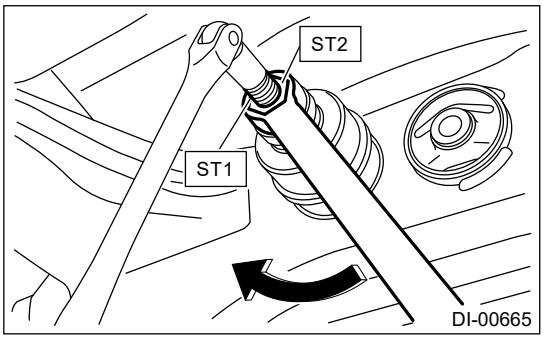
ST2 41399FG070 SPECIAL TOOL NUT



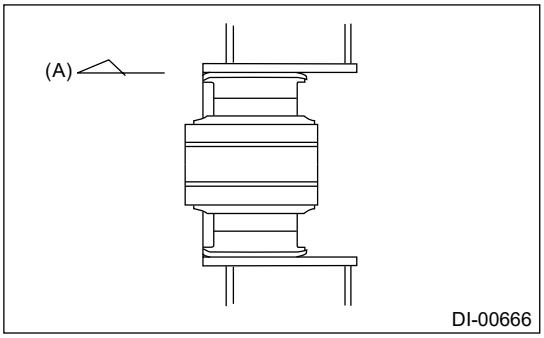
13. Screw in the ST2 while holding the ST1 with a tool to prevent it from rotating, and press-fit the rear differential mount bushing to the front end of sub frame cylinder.

ST1 41399FG091 SPECIAL TOOL SHAFT

ST2 41399FG070 SPECIAL TOOL NUT



14. Make sure that the rear differential mount bushing is inserted to the front end of sub frame cylinder.



(A) Front side of vehicle

15. Install the rear differential. Ref. to DIFFERENTIALS>Rear Differential (T-type)>INSTALLATION. Ref. to DIFFERENTIALS>Rear Differential (VA-type)>INSTALLATION.

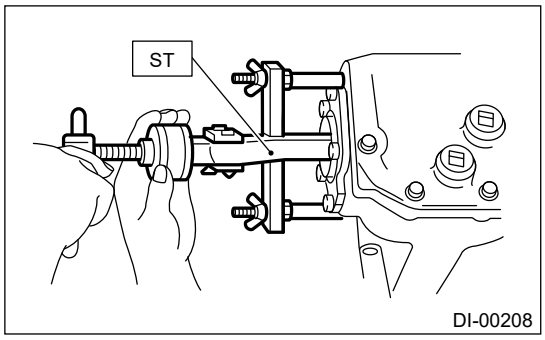
INSPECTION

Check that there is no oil leakage from the side oil seal. If there is any leakage, replace the oil seal.

REPLACEMENT

1. Remove the rear differential. Ref. to DIFFERENTIALS>Rear Differential (T-type)>REMOVAL. Ref. to DIFFERENTIALS>Rear Differential (VA-type)>REMOVAL.
2. Remove the rear differential side oil seal using a ST or screwdriver wrapped with vinyl tape to prevent the side retainer from scratching.

ST 398527700 PULLER ASSY



3. Using the ST, install the oil seal.

Caution:

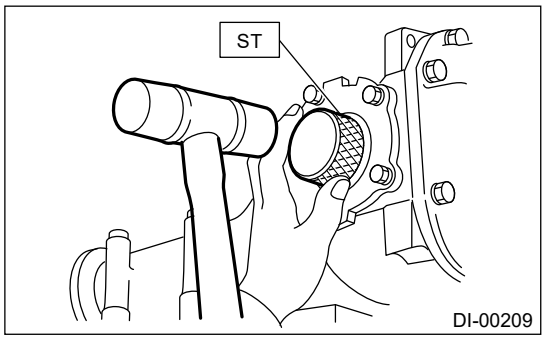
Pay attention to the left and right of the oil seal.

Note:

- **Use a new oil seal.**
- **Apply differential gear oil to the oil seal lips.**

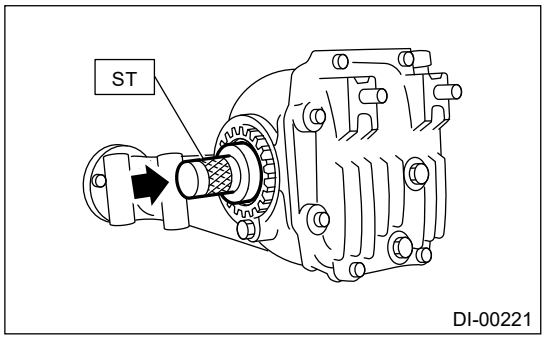
- T-type

ST 398437700 OIL SEAL INSTALLER



- VA1-type

ST 498447100 INSTALLER



4. Install the rear differential. Ref. to DIFFERENTIALS>Rear Differential (T-type)>INSTALLATION. Ref. to DIFFERENTIALS>Rear Differential (VA-type)>INSTALLATION.

INSTALLATION

1. Install the front drive shaft assembly.

   Caution:

   - **Do not hammer the drive shaft assembly when installing.**
   - **Use new nut - axle.**

   (1) Insert the drive shaft assembly into the hub spline, and pull it into the specified position.

   (2) Install the housing assembly - front axle to the strut assembly.

   Caution:

   Align alignment marks on the adjusting bolt and strut assembly before installation.

   Tightening torque:

   155 N·m (15.81 kgf-m, 114.3 ft-lb)

   (3) Temporarily tighten the nut - axle.

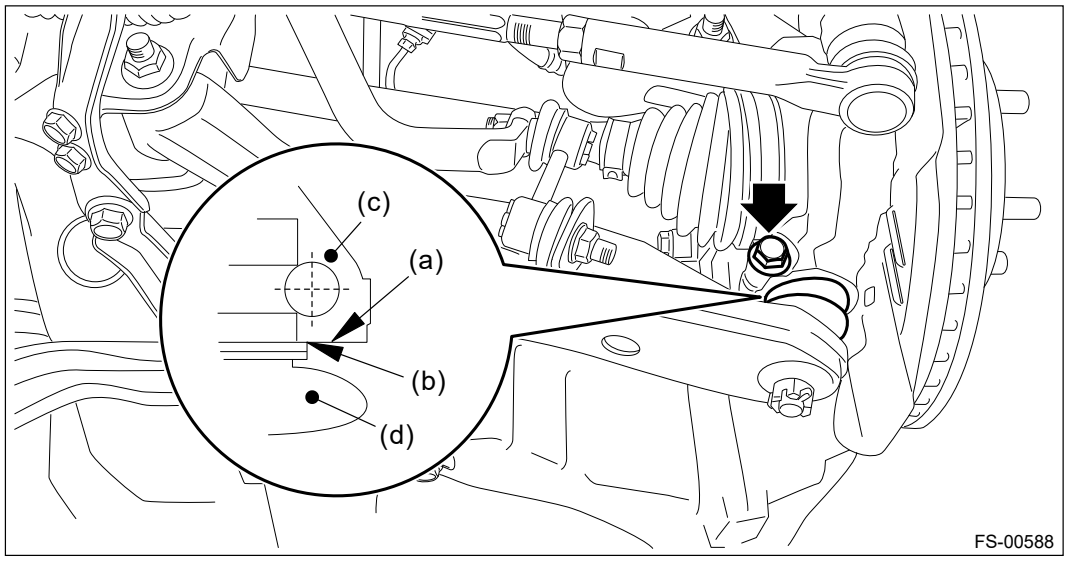
2. Install the ball joint into the housing assembly - front axle.

   Caution:

   - **Before tightening, make sure the bottom surface of the housing assembly - front axle and the stepped section of ball joint are in contact.**
   - **Be careful not to damage the boot of the joint.**

   Tightening torque:

   50 N·m (5.10 kgf-m, 36.9 ft-lb)



(a) Bottom surface of housing ASSY - front axle
(b) Raised section of ball joint
(c) Housing ASSY - front axle
(d) Ball joint ASSY

3. Install the front ABS wheel speed sensor.

   Tightening torque:

   7.5 N·m (0.76 kgf-m, 5.5 ft-lb)

4. Install the disc rotor.
5. Install the caliper body assembly and the brake hose bracket.

   Tightening torque:

   Brake hose bracket: 33 N·m (3.36 kgf-m, 24.3 ft-lb)
   Mounting bolt: 80 N·m (8.16 kgf-m, 59.0 ft-lb)

6. Install the stabilizer link.

Tightening torque:

60 N·m (6.12 kgf-m, 44.3 ft-lb)

7. Connect the tie-rod ends.

(1) Connect the tie-rod end (c) to the housing assembly - front axle.

(2) Tighten the castle nuts (b) to the specified torque.

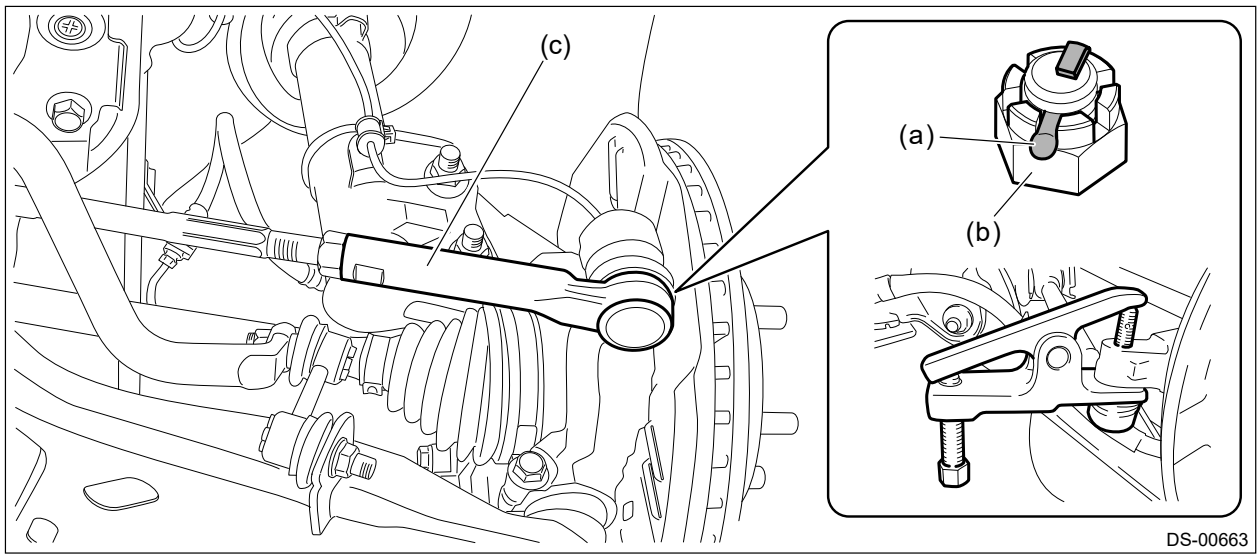
Caution:

When connecting the tie-rod, do not hit the cap at bottom of tie-rod end with a hammer.

Tightening torque:

27 N·m (2.75 kgf-m, 19.9 ft-lb)

(3) Tighten the castle nut (b) within the range of 60° so that the cotter pin (a) hole and cutout portion of the castle nut (b) are aligned.



(4) Insert the cotter pin (a), and bend the tip of the pin to fix it.

8. While depressing the brake pedal, tighten a new nut - axle to the specified torque and lock it securely.

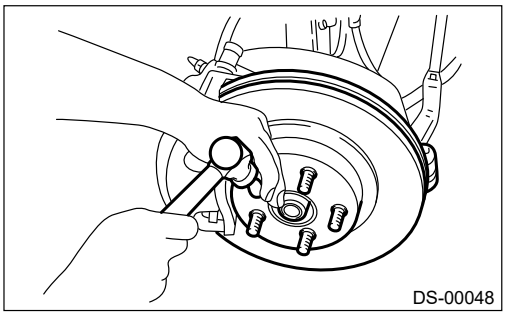
Caution:

Do not load the front axle before tightening the nut - axle. Doing so may damage the hub unit COMPL.

Tightening torque:

220 N·m (22.43 kgf-m, 162.3 ft-lb)

9. After tightening the nut - axle, lock it securely.



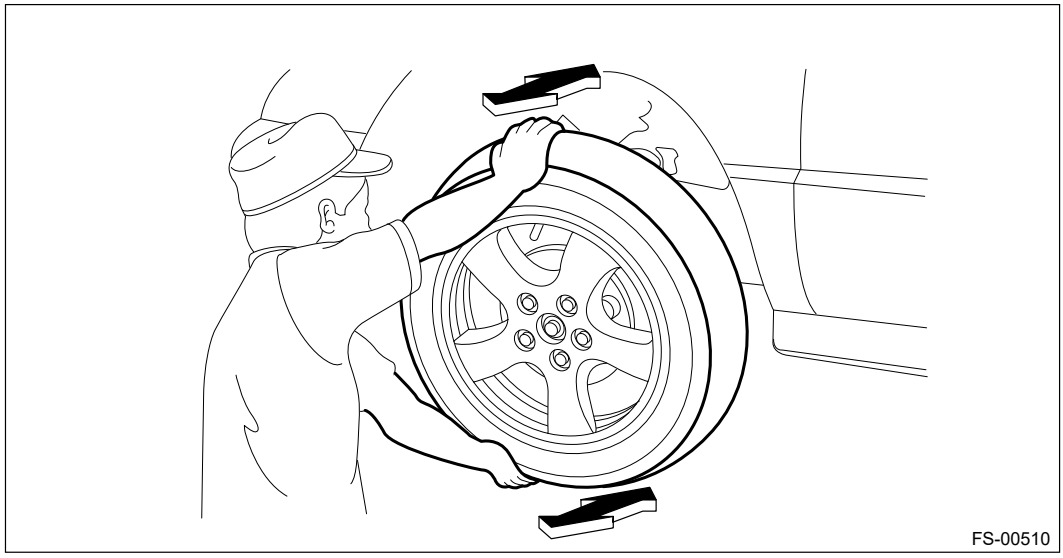
10. Install the front wheels, and perform the following inspections.

Tightening torque:

120 N·m (12.24 kgf-m, 88.5 ft-lb)

1. Check the wheels for smooth rotation.

2. Check that there is no looseness by moving the upper and lower portions of front tire in an axial direction with the brake pedal released.
   - **Looseness exists** → Check the hub unit COMPL - front axle. Ref. to DRIVE SHAFT SYSTEM>Front Hub Unit Bearing>INSPECTION.



3. Check that there is no looseness by moving the upper and lower portions of front tire in an axial direction with the brake pedal depressed.
   - **Looseness exists** → Replace the ball joint. Ref. to FRONT SUSPENSION>Front Ball Joint>REMOVAL.

11. Inspect the wheel alignment and adjust if necessary.
- Inspection: Ref. to FRONT SUSPENSION>Wheel Alignment>INSPECTION.
- Adjustment: Ref. to FRONT SUSPENSION>Wheel Alignment>ADJUSTMENT.

Caution:

When the wheel alignment has been adjusted, perform "VDC sensor midpoint setting mode".

12. Perform reinitialization of the auto headlight beam leveler system. (Model with auto headlight beam leveler) Ref. to LIGHTING SYSTEM>Auto Headlight Beam Leveler System>PROCEDURE.

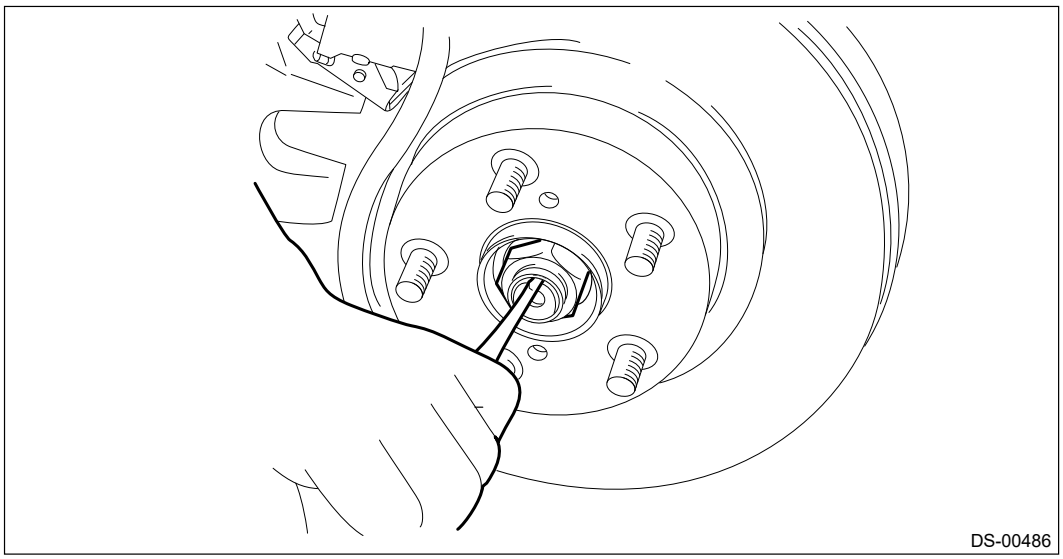
REMOVAL

1. Lift up the vehicle, and then remove the front wheels.
2. Remove the nut - axle.

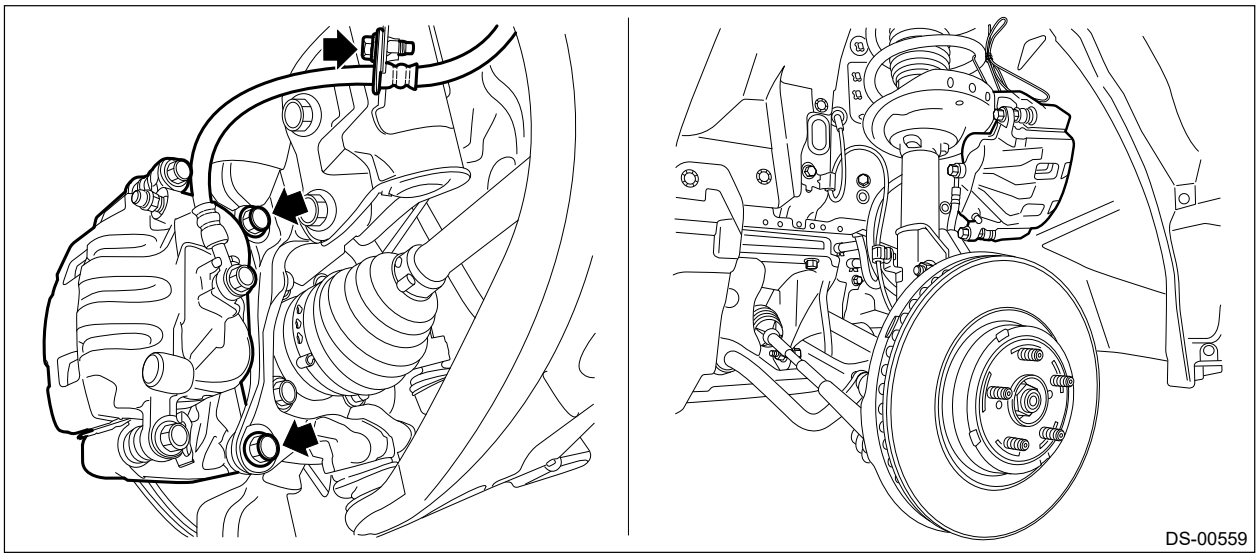
   Caution:

   Do not loosen the nut - axle while the front axle is loaded. Doing so may damage the hub unit COMPL.

   (1) Lift the crimped section of the nut - axle.
   (2) Remove the nut - axle using a socket wrench while depressing the brake pedal.



3. Remove the caliper body assembly from the housing assembly - front axle.
   (1) Remove the mounting bolts and the brake hose bracket, and remove the caliper body assembly.
   (2) Prepare wiring harnesses etc. to be discarded, and suspend the caliper body assembly from the strut assembly.

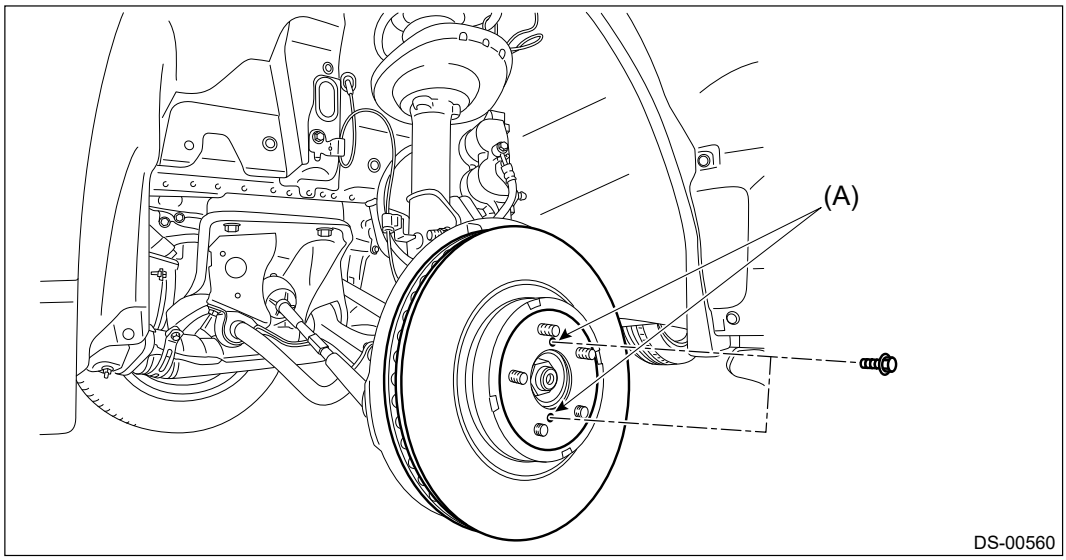


4. Remove the disc rotor.

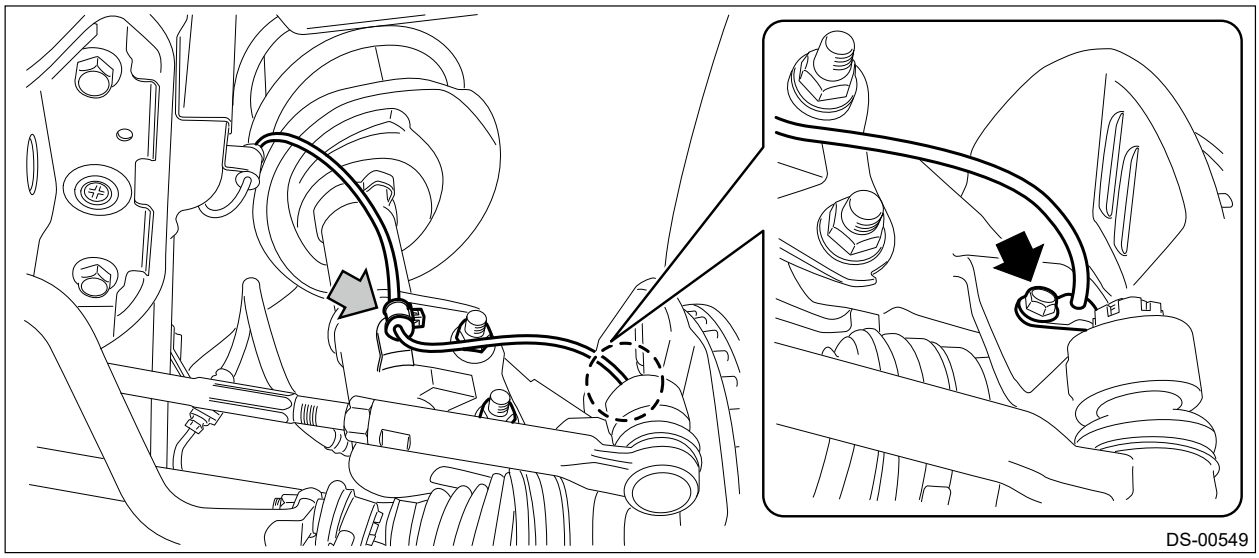
   Note:

   When the disc rotor is difficult to be removed from the hub unit COMPL - front axle, screw in 8 mm (0.31 in) bolt to the threaded part of the disc rotor (A), and remove the

disc rotor.



5. Remove the bolts, and remove the front ABS wheel speed sensor.



6. Disconnect the tie-rod end.

(1) Pull out the cotter pin (a).

(2) Remove the castle nut (b).

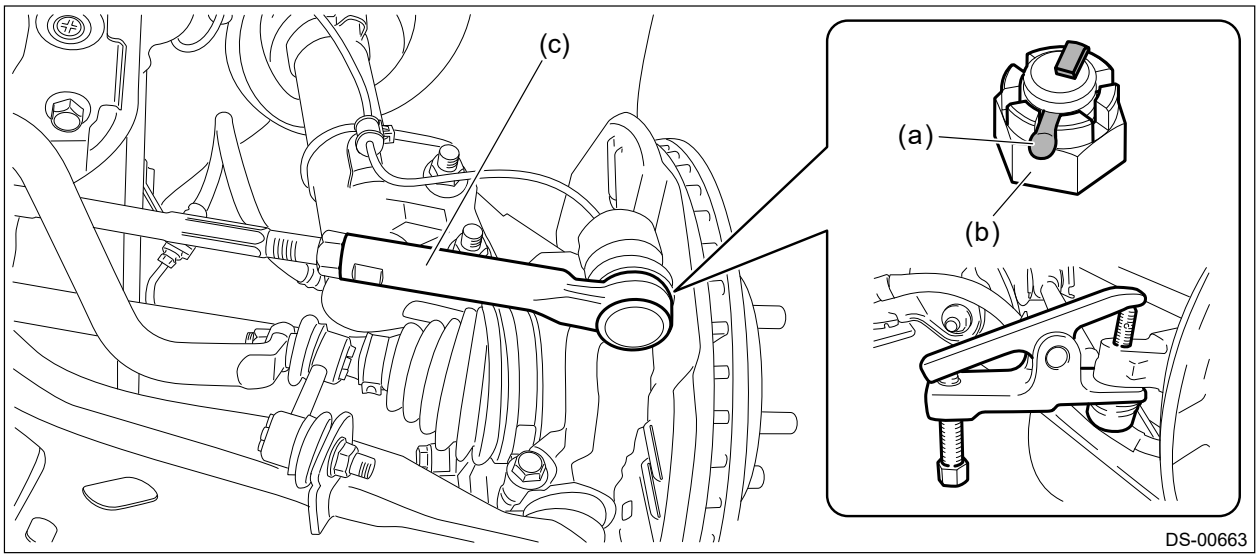
(3) Using a tie-rod ball joint puller, remove the tie-rod end (c).

Caution:

Be careful not to damage the boot of the joint.

Preparation tool:

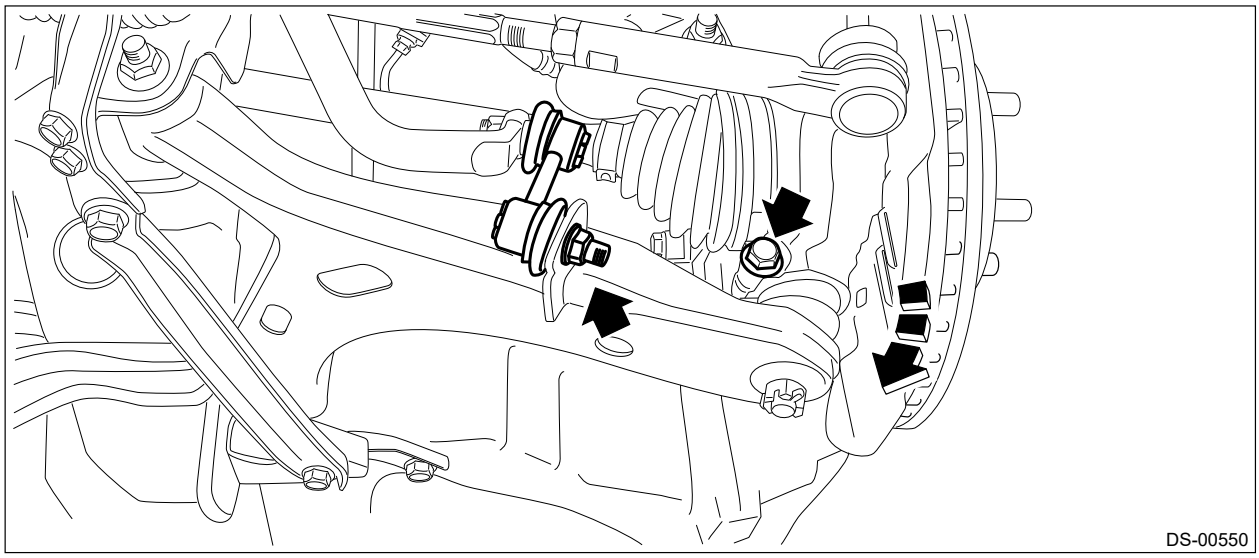
Tie-rod ball joint puller



7. Remove the stabilizer link and ball joint.

Caution:

Be careful not to damage the boot of the joint.



8. Using a bar, remove the front drive shaft from transmission.

Caution:

Be careful not to allow the bar to damage holder area.

9. Remove the front drive shaft assembly from the hub unit COMPL - front axle.

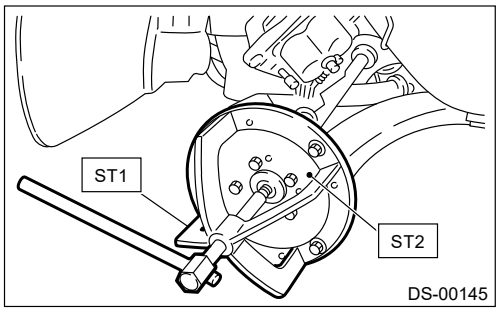
Note:

If it is hard to remove, use the ST.

Preparation tool:

ST1: AXLE SHAFT PULLER (926470000)

ST2: AXLE SHAFT PULLER PLATE (28099PA110)



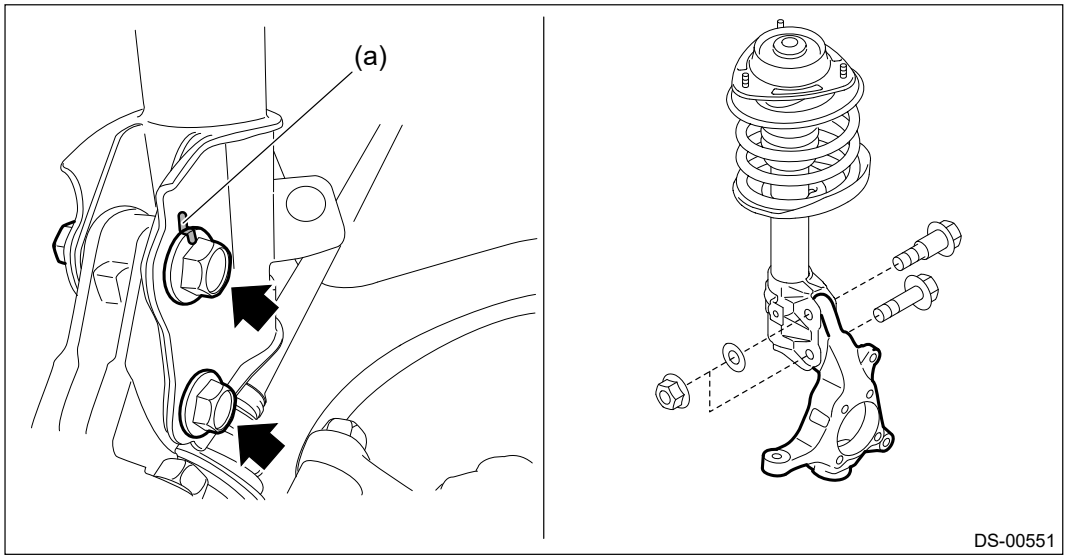
10. Remove the housing assembly - front axle.

(1) Place an alignment mark (a) on the adjusting bolt and the strut.

(2) Remove the adjusting bolts and flange bolts for the strut assembly, and then remove the housing assembly - front axle.

Caution:

- **While holding the head of the adjusting bolt, loosen the flange nut.**
- **Be careful of the weight of the housing assembly - front axle.**
- **Be careful not to damage the spline portion of the drive shaft.**



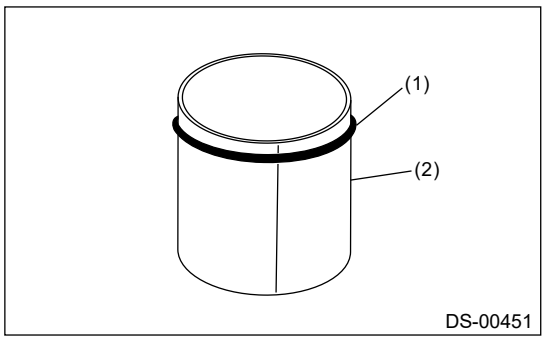
11. For removal of the hub unit COMPL - front axle, refer to "Front Hub Unit Bearing". Ref. to DRIVE SHAFT SYSTEM>Front Hub Unit Bearing>REMOVAL.

ASSEMBLY

1. Roll up a thick piece of paper to a size where the shaft can pass through, and affix with tape to form a cylinder.
2. Attach a new O-ring on this cylinder.

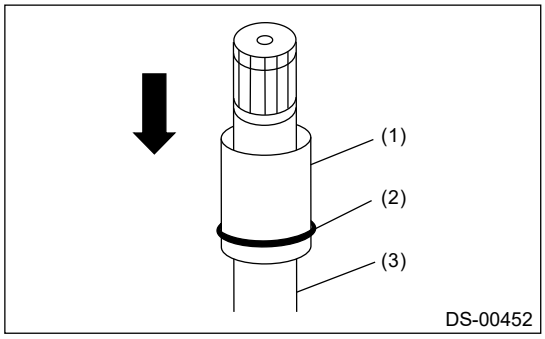
   Caution:

   - **Always use a new O-ring.**
   - **Be careful that the O-ring does not become scratched and that there are no foreign objects attached to it.**
   - **Make sure to install the O-ring so that it does not twist as much as possible.**
   - **Do not stretch the O-ring to 30 mm (1.18 in) or more in an inner diameter.**



(1) O-ring
(2) Cylinder made with thick paper, etc.

3. Pass the cylinder material onto the shaft, and slide in the direction of the shaft axis.



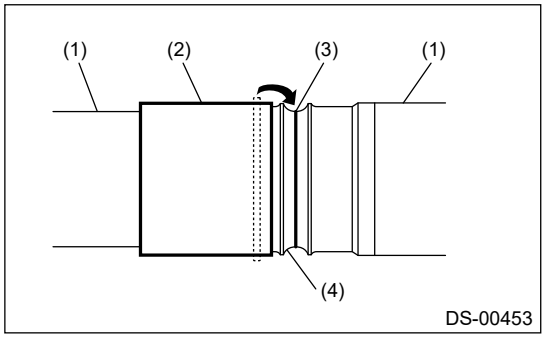
(1) Cylinder material
(2) O-ring
(3) Shaft

4. Clean the shaft boot groove, and wipe off the grease.
5. Slide the cylinder material near the shaft boot groove, and move the O-ring from the cylinder material onto the shaft boot groove.

   Caution:

   - **Attach the O-ring to the shaft boot groove center.**
   - **Be careful that the O-ring does not become scratched and that there are no foreign objects attached to it.**

- **Make sure to install the O-ring so that it does not twist as much as possible.**
- **With the O-ring attached, do not wash with kerosene, gasoline, etc.**



(1) Shaft
(2) Cylinder material
(3) O-ring
(4) Boot groove

6. Pass the PTJ small diameter boot band through the shaft.
7. Wrap vinyl tape around the splines of the shaft.

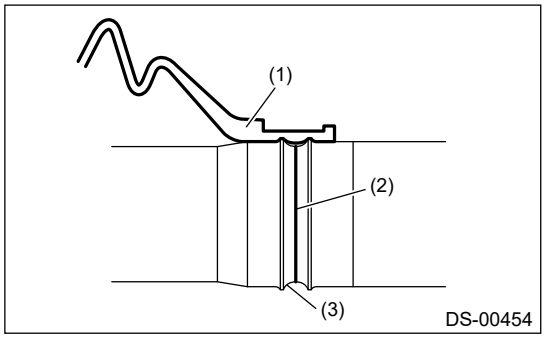
Caution:

To prevent damage to the boots, make sure to always wrap with vinyl tape for protection.

8. Install a new PTJ boot.

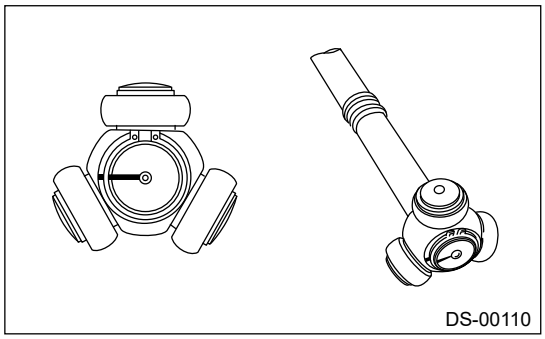
Caution:

Make sure to fit securely on the boot groove of the shaft.



(1) PTJ boot
(2) O-ring
(3) Boot groove

9. Match the alignment marks, and attach the trunnion onto the shaft.



10. Attach the snap ring to the shaft.

Caution:

Confirm that the snap ring is completely fitted in the shaft groove.

11. Fill 100 — 110 g (3.53 — 3.88 oz) of specified grease into the interior of the PTJ outer race.

Grease:

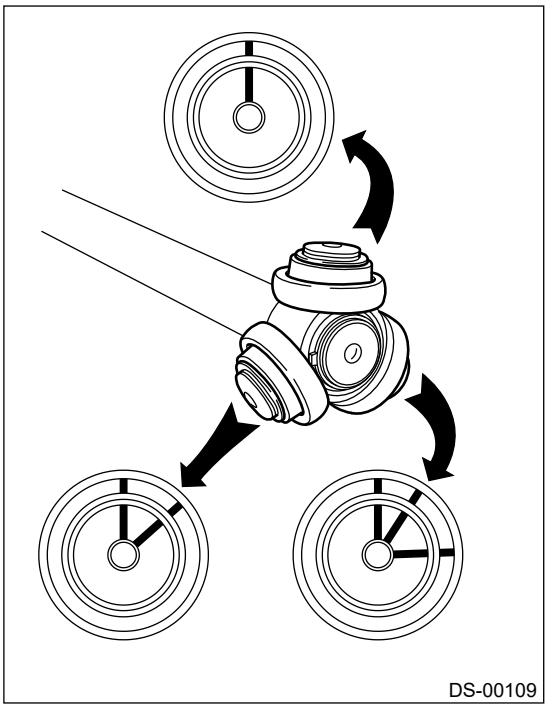
NKG302

12. Apply a thin coat of specified grease to the roller kit and trunnion.

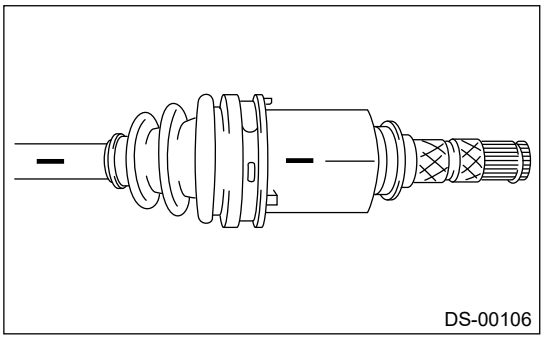
13. Match the alignment marks of the roller kit and trunnion, and attach the roller kit.

Caution:

Be careful with the roller kit position.



14. Match the alignment marks of the shaft and outer race, and attach the outer race.



15. Install the snap ring in the groove of the PTJ outer race.

Caution:

Pull the shaft lightly and make sure that the snap ring is completely fitted in the groove.

16. Apply an even coat of the specified grease at an amount of 30 — 40 g (1.06 — 1.41 oz) on the entire inner surface of boot.

17. Attach the PTJ boot taking care not to twist it.

Caution:

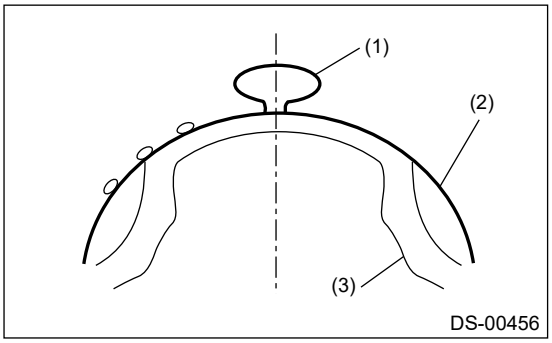
- **Clean the large end of PTJ boot and the boot groove well, and remove the grease and other substances.**
- **When installing the PTJ boot, position the outer race of the PTJ at center of the stroke.**

18. Set the new boot band at the specified position.

19. Tighten the boot bands using ST, torque wrench and socket flex handle.

Caution:

The large boot band is to be tightened so that the omega shaped part is at the position indicated in the figure below.



(1) Omega shaped part

(2) Boot band

(3) Outer race

Tightening torque:

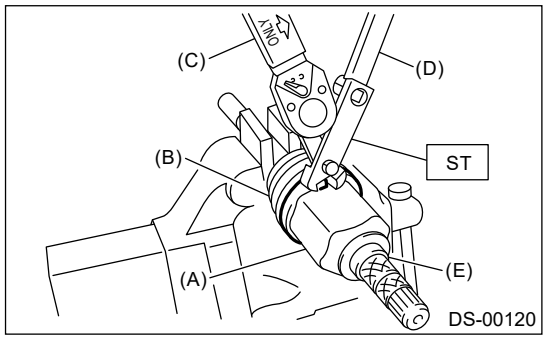
Large boot band

178 N·m (18.15 kgf-m, 131.3 ft-lb)

Small boot band

145 N·m (14.79 kgf-m, 106.9 ft-lb)

ST 28099AC000 BOOT BAND PLIER

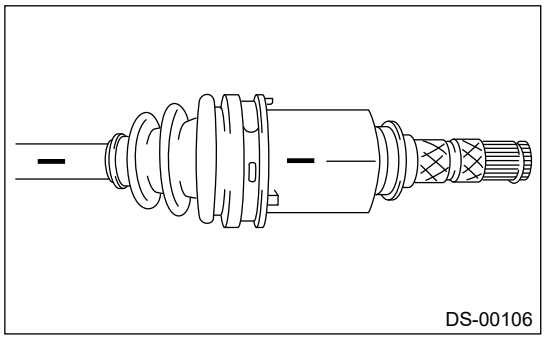


(A) Large boot band
(B) Boot
(C) Torque wrench
(D) Socket flex handle
(E) Outer race

20. Extend and retract the PTJ repeatedly so that grease is spread evenly.

DISASSEMBLY

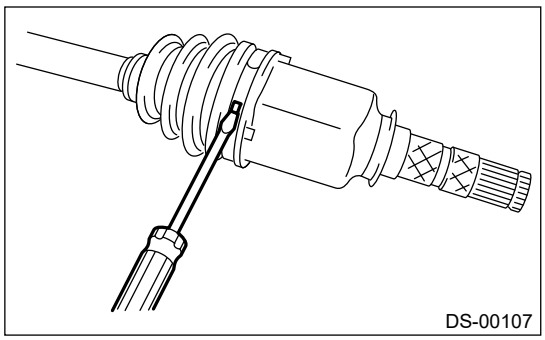
1. Place alignment marks on the shaft and outer race.



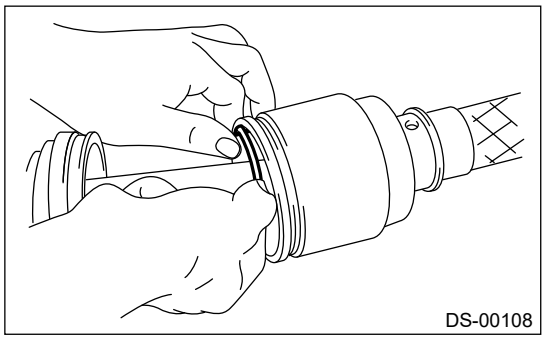
2. Remove the PTJ boot band and boot.

Caution:

Be careful not to damage the boot.



3. Remove the snap ring from PTJ outer race.

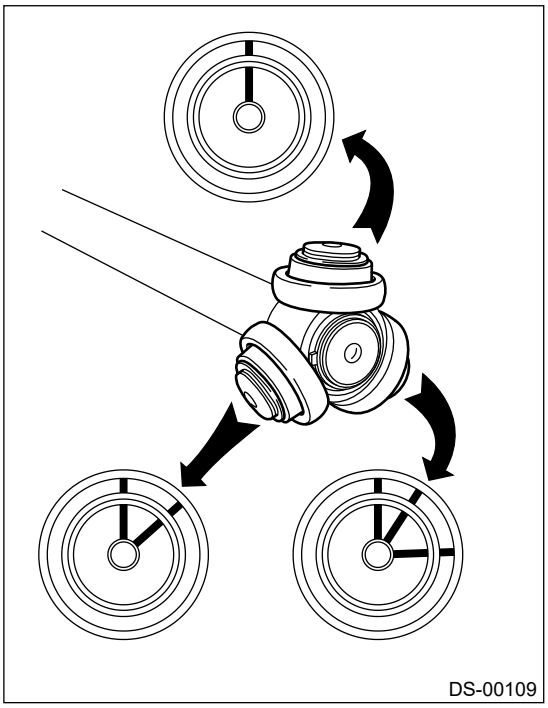


4. Remove the PTJ outer race from shaft assembly.
5. Wipe off grease.

Caution:

The grease is a special type of grease. Do not mix with other grease.

6. Place alignment marks on the roller kit and trunnion.

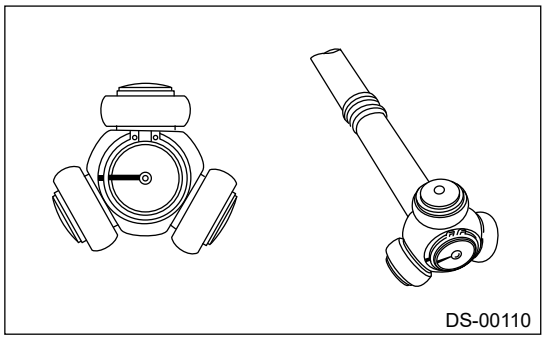


7. Remove the roller kit from trunnion.

Caution:

Be careful with the roller kit position.

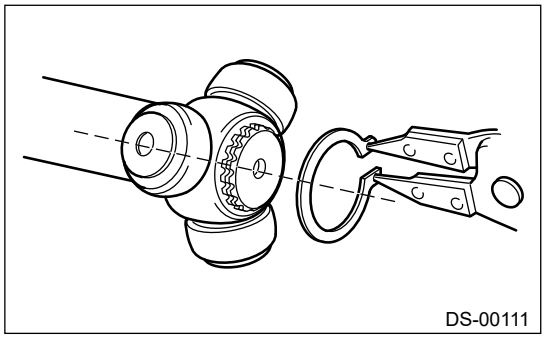
8. Place alignment marks on the trunnion and shaft.



9. Remove the snap ring and trunnion.

Caution:

Be sure to wrap shaft splines with vinyl tape to protect the boot from scratches.



10. Remove the PTJ boot.

11. Remove the O-ring from the groove of the shaft.

Note:

The EBJ is a non-disassembly part, so the axle disassembly stops here.

INSPECTION

Check the removed parts for damage, wear, corrosion etc. If faulty, repair or replace.

- **PTJ (pillow tripod joint)**
  Check for seizure, corrosion, damage, wear and excessive play.
- **EBJ (high-efficiency compact ball fixed joint)**
  Check for seizure, corrosion, damage and excessive play.
- **Shaft:**
  Check for excessive bending, twisting, damage and wear.
- **Boot:**
  Check for wear, warping, breakage and scratches.
- **Grease:**
  Check for discoloration and fluidity.

INSTALLATION

1. Before installation, check the drive shaft assembly. Ref. to DRIVE SHAFT SYSTEM>Front Drive Shaft>INSPECTION.
2. Replace the differential side retainer oil seal with a new part.
   - MT model: Ref. to MANUAL TRANSMISSION AND DIFFERENTIAL(6MT)>Differential Side Retainer Oil Seal>REPLACEMENT.
   - CVT (TR580) model: Ref. to CONTINUOUSLY VARIABLE TRANSMISSION(TR580)>Differential Side Retainer Oil Seal>REPLACEMENT.
   - CVT (TR690) model: Ref. to CONTINUOUSLY VARIABLE TRANSMISSION(TR690)>Differential Side Retainer Oil Seal>REPLACEMENT.

   Note:

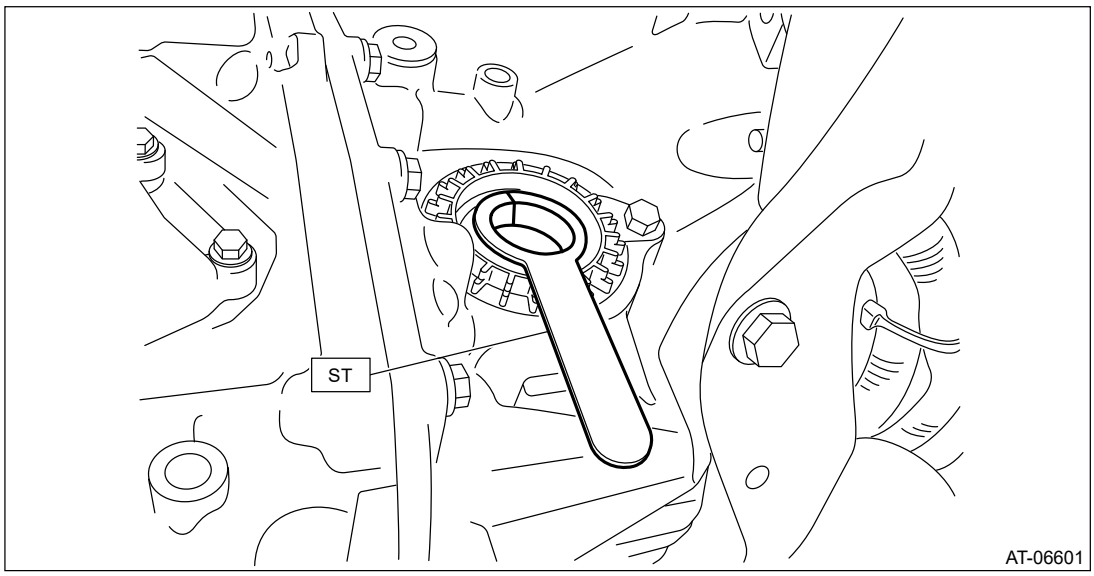
   After pulling out the drive shaft assembly, be sure to replace with a new oil seal.
3. Insert the drive shaft assembly into the hub spline, and pull it into the specified position.

   Caution:

   Do not hammer the drive shaft assembly when installing.
4. Temporarily tighten the nut - axle.
5. Using the ST, install the front drive shaft assembly to the transmission.

   Preparation tool:

   ST: OIL SEAL PROTECTOR (28399SA010)



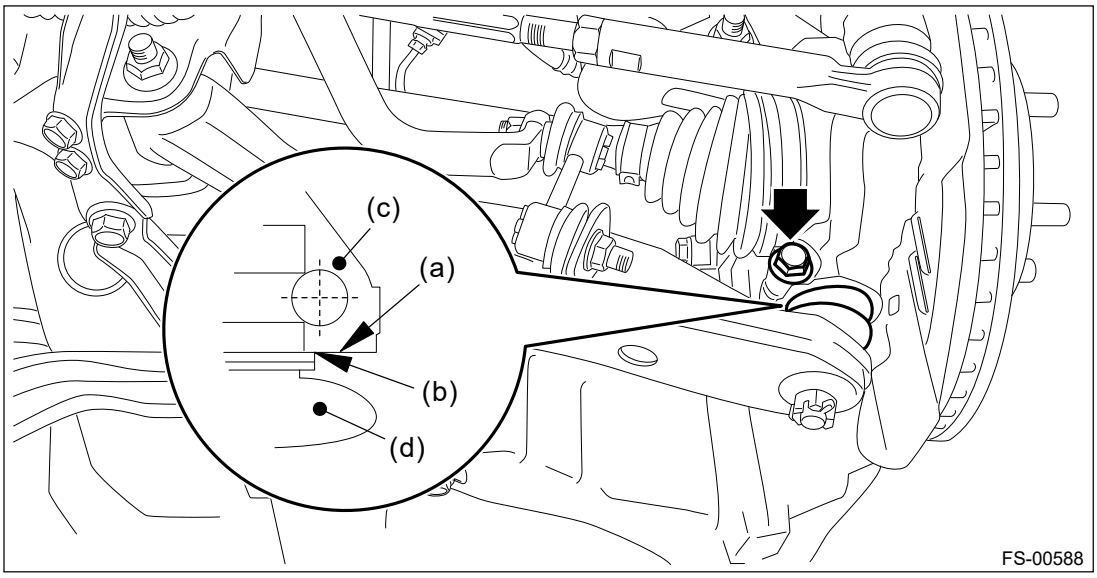
6. Install the ball joint into the housing assembly - front axle.

   Caution:

   - **Before tightening, make sure the bottom surface of the housing assembly - front axle and the stepped section of ball joint are in contact.**
   - **Be careful not to damage the boot of the joint.**

   Tightening torque:

   50 N·m (5.10 kgf-m, 36.9 ft-lb)



(a) Bottom surface of housing ASSY - front axle
(c) Housing ASSY - front axle
(d) Ball joint
(b) Raised section of ball joint

7. Install the stabilizer link.

Tightening torque:

60 N·m (6.12 kgf-m, 44.3 ft-lb)

8. While depressing the brake pedal, tighten new nuts - axle to the specified torque.

Caution:

Do not load the front axle before tightening the nut - axle. Doing so may damage the hub unit COMPL.

Tightening torque:

220 N·m (22.43 kgf-m, 162.3 ft-lb)

9. After tightening the nut - axle, lock it securely.

10. Fill transmission gear oil. (MT model)

11. Fill differential gear oil. (CVT model)

12. Install the front wheels.

Tightening torque:

120 N·m (12.24 kgf-m, 88.5 ft-lb)

13. Inspect the wheel alignment and adjust if necessary.

- Inspection: Ref. to FRONT SUSPENSION>Wheel Alignment>INSPECTION.
- Adjustment: Ref. to FRONT SUSPENSION>Wheel Alignment>ADJUSTMENT.

Caution:

When the wheel alignment has been adjusted, perform "VDC sensor midpoint setting mode".

14. Perform reinitialization of the auto headlight beam leveler system. (Model with auto headlight beam leveler) Ref. to LIGHTING SYSTEM>Auto Headlight Beam Leveler System>PROCEDURE.

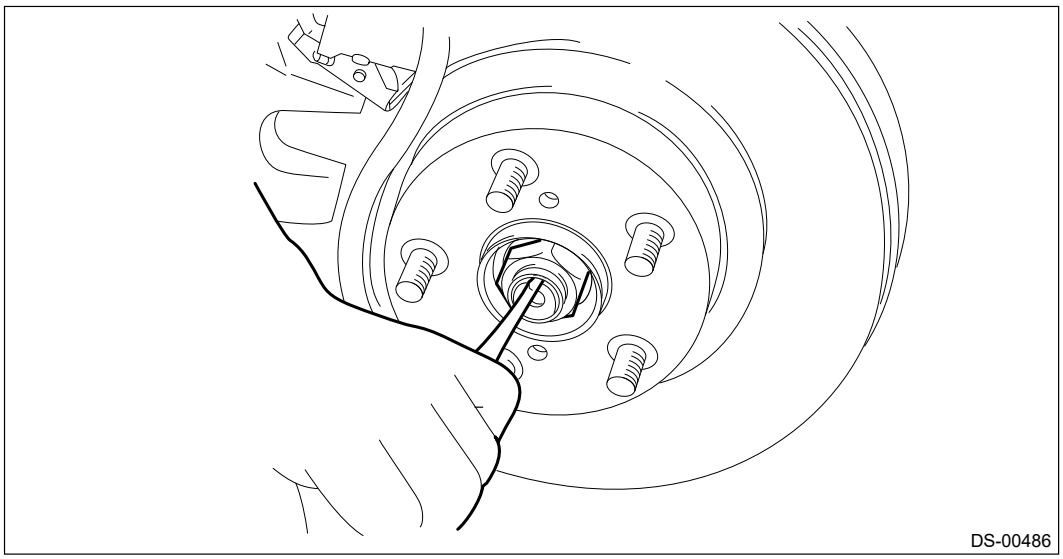
REMOVAL

1. Lift up the vehicle, and then remove the front wheels.
2. Remove the nut - axle.

   Caution:

   Do not loosen the nut - axle while the front axle is loaded. Doing so may damage the hub unit COMPL.

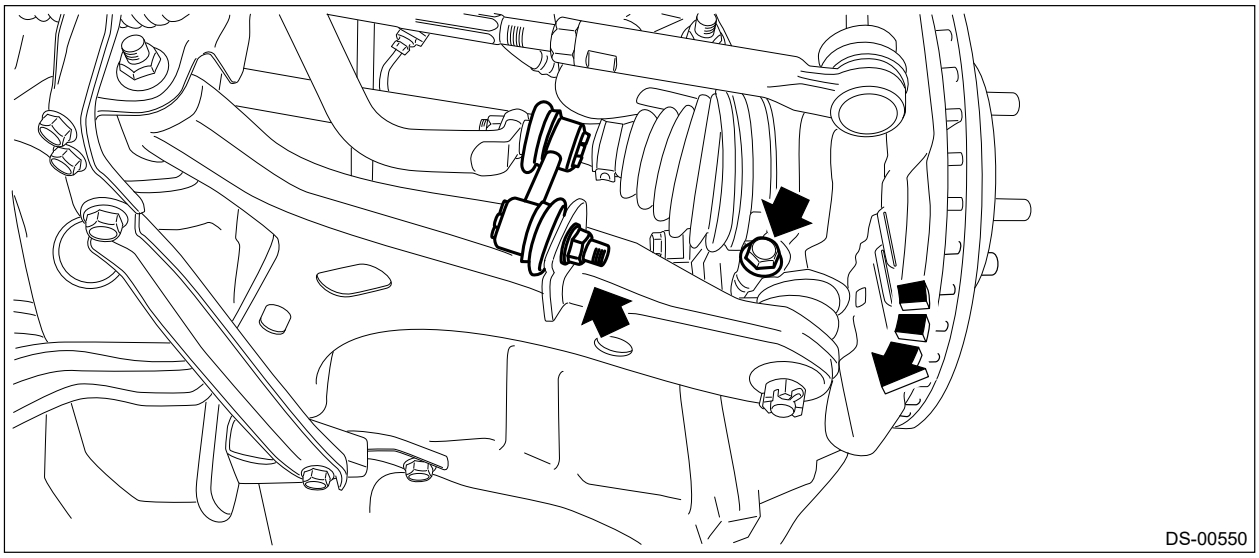
   (1) Lift the crimped section of the nut - axle.
   (2) Remove the nut - axle using a socket wrench while depressing the brake pedal.



3. Drain the transmission gear oil. (MT model)
4. Drain differential gear oil. (CVT model)
5. Disconnect the ball joint.
   (1) Remove the nut and disconnect the front stabilizer link.
   (2) Remove the bolts, disconnect the front arm ball joint, and lower the front arm assembly.

   Caution:

   Be careful not to damage the boot of the joint.



6. Remove the front drive shaft assembly from the housing assembly - front axle.

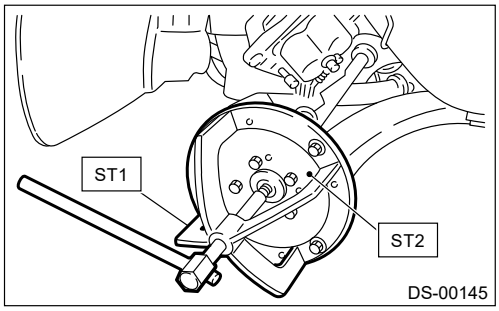
Note:

If it is hard to remove, use the ST.

Preparation tool:

ST1: AXLE SHAFT PULLER (926470000)

ST2: AXLE SHAFT PULLER PLATE (28099PA110)



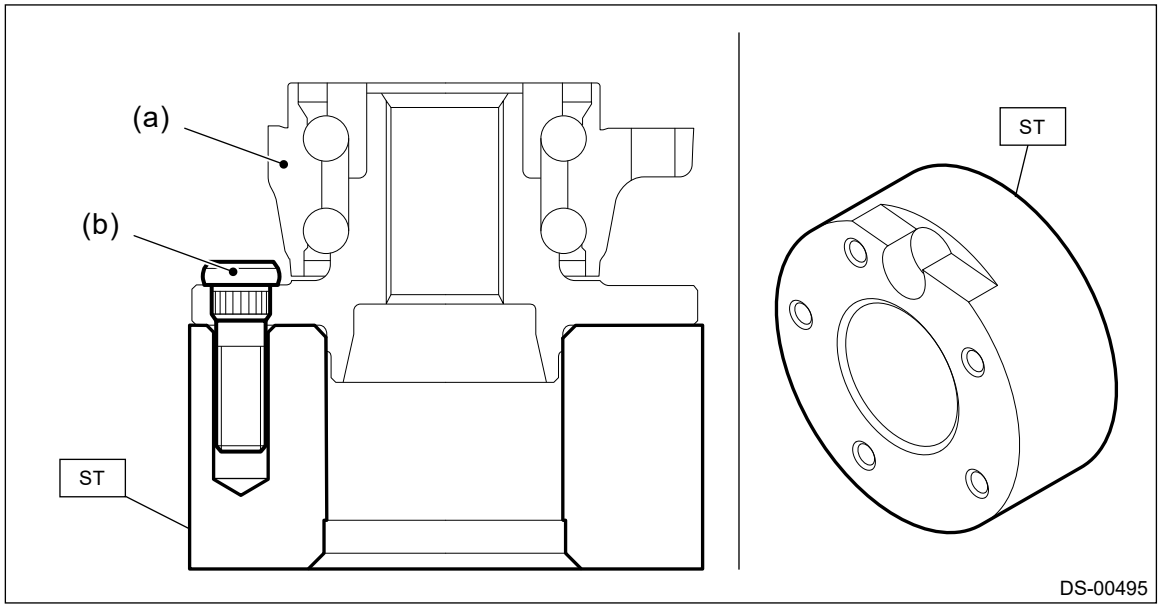
7. Using a bar, remove the front drive shaft assembly from transmission.

Caution:

Be careful not to allow the bar to damage holder area.

ASSEMBLY

1. Install the hub unit COMPL to the ST securely.
   Preparation tool:
   ST: HUB STAND (927080000)
2. Using a press, press new bolts - hub (b) until their seating surfaces contact the hub unit COMPL (a).
   Note:
   Use the 12 mm (0.47 in) dia. holes in the HUB STAND to prevent bolts from tilting.



DISASSEMBLY

Using the ST or a hydraulic press, push out the bolt - hub (b) from the hub unit COMPL - front axle (a).

Caution:

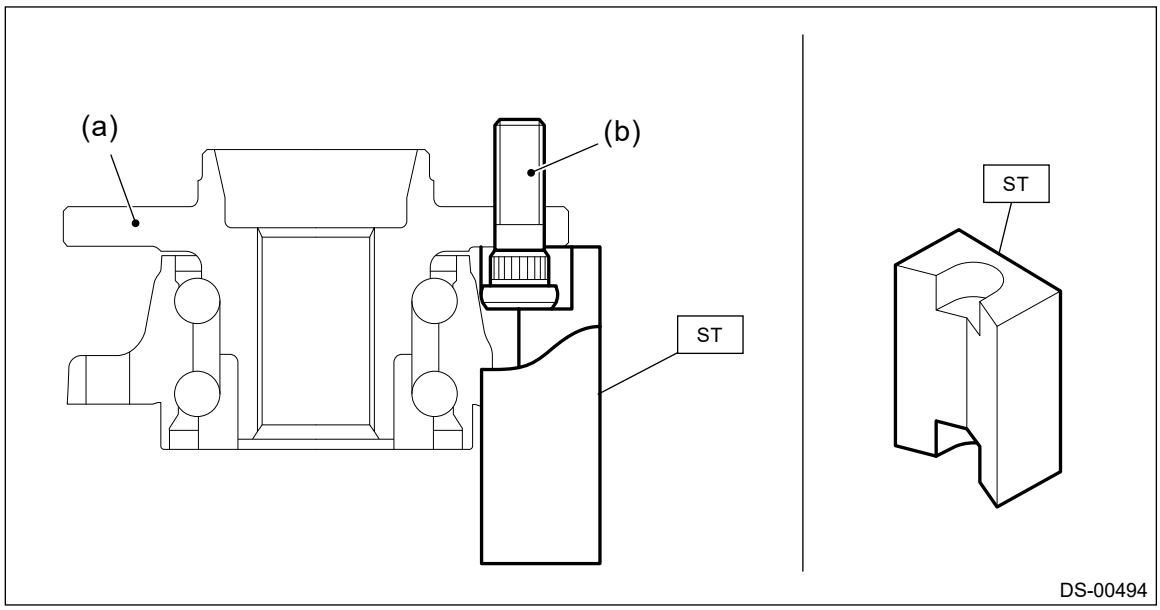
- **Be careful not to hammer the bolts - hub. This may deform the hub unit COMPL.**
- **Do not reuse the bolt - hub.**

Note:

Since the hub unit COMPL can not be disassembled, only bolts - hub can be removed.

Preparation tool:

ST: HUB STAND (28399AG000)

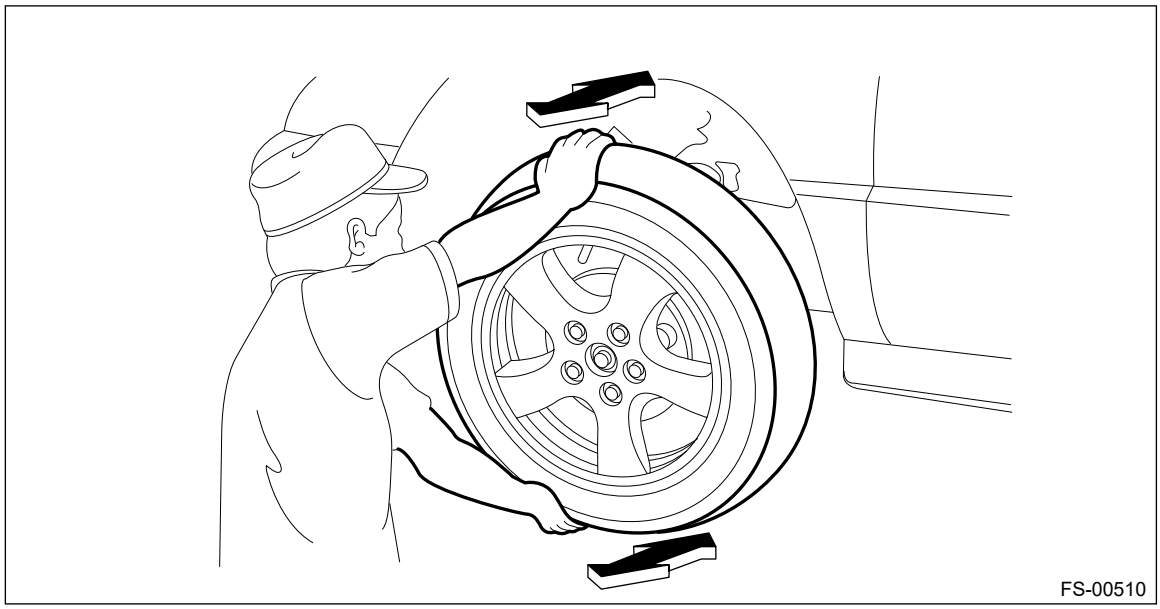


INSPECTION

1. Moving the front tire up and down by hand, check there is no looseness in bearing, and check the wheel rotates smoothly.

   Caution:

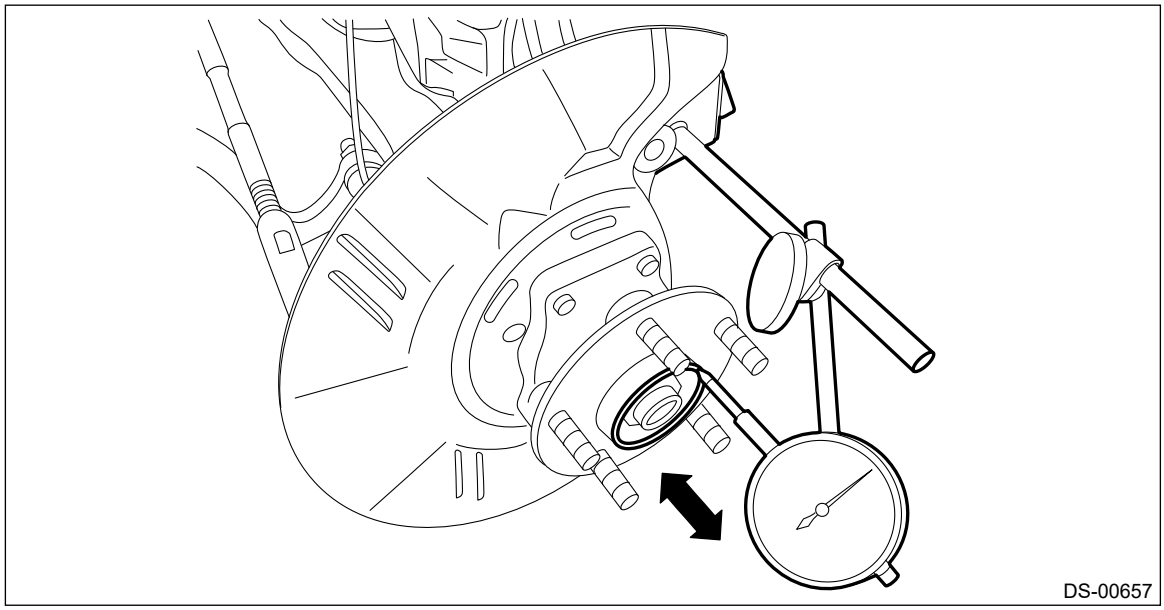
   If there is unsmooth sliding operation or abnormal noise in the bearing, replace the hub unit COMPL.



2. Inspect the hub unit bearing for axial looseness.
   1. Remove the tire and disc rotor.
   2. Using a dial gauge, check the axial looseness. Replace the hub unit COMPL if looseness exceeds the limit.

   Service limit:

   Maximum: 0.05 mm (0.0020 in)

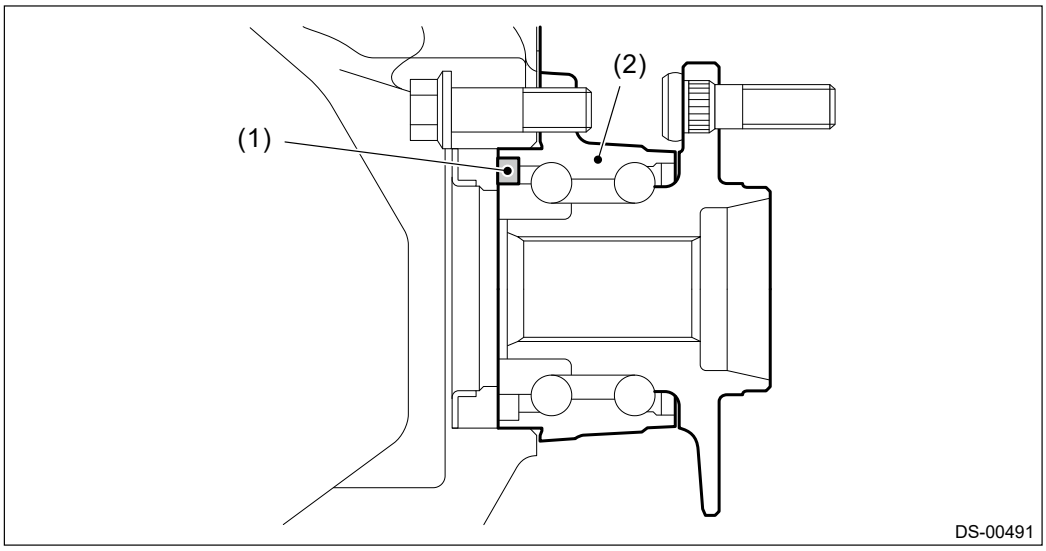

DS-00657

INSTALLATION

1. Place the back plate - front brake between the housing assembly - front axle and the hub unit COMPL - front axle, and tighten the bolt.

Caution:

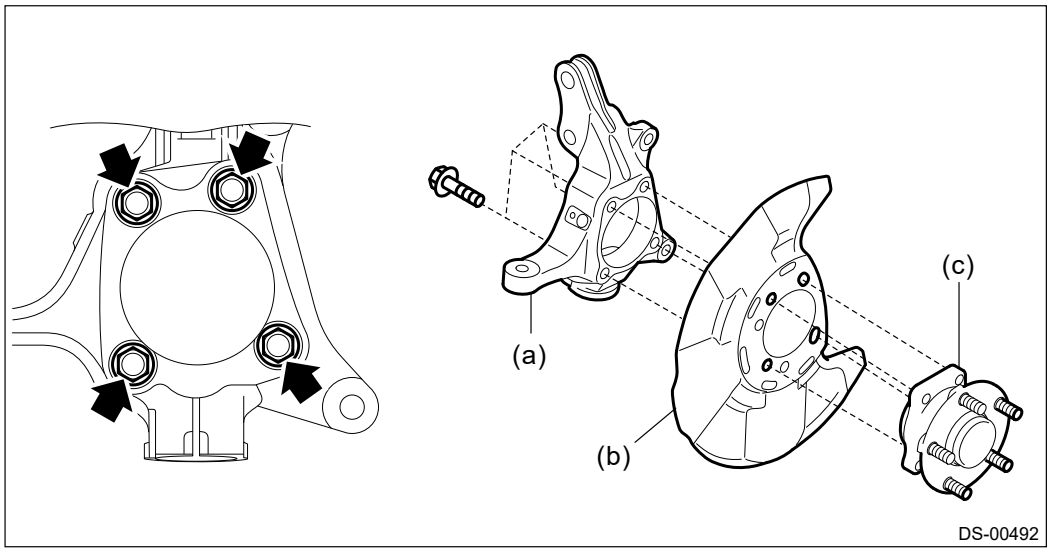
- **Do not get closer the tool which charged magnetism to magnetic encoder.**
- **Be careful not to damage the magnetic encoder.**



(1) Magnetic encoder (2) Hub unit COMPL - front axle

Tightening torque:

65 N·m (6.63 kgf-m, 47.9 ft-lb)



(a) Housing ASSY - front axle (b) Back plate - front brake (c) Hub unit COMPL - front axle

2. Install the front drive shaft assembly.

Caution:

- **Do not hammer the drive shaft assembly when installing.**
- **Use new nut - axle.**

(1) Insert the drive shaft assembly into the hub spline, and pull it into the specified position.

(2) Temporarily tighten the nut - axle.

3. Install the disc rotor to the hub unit COMPL - front axle.
4. Install the caliper body assembly and the brake hose bracket.

Tightening torque:

Brake hose bracket: 33 N·m (3.36 kgf-m, 24.3 ft-lb)

Mounting bolt: 80 N·m (8.16 kgf-m, 59.0 ft-lb)

5. Install the front ABS wheel speed sensor.

Tightening torque:

7.5 N·m (0.76 kgf-m, 5.5 ft-lb)

6. While depressing the brake pedal, tighten new nuts - axle to the specified torque.

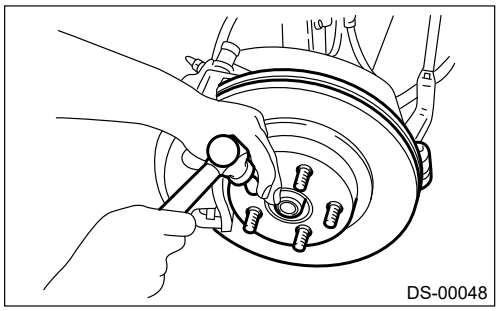
Caution:

Do not load the front axle before tightening the nut - axle. Doing so may damage the hub unit COMPL.

Tightening torque:

220 N·m (22.43 kgf-m, 162.3 ft-lb)

7. After tightening the nut - axle, lock it securely.

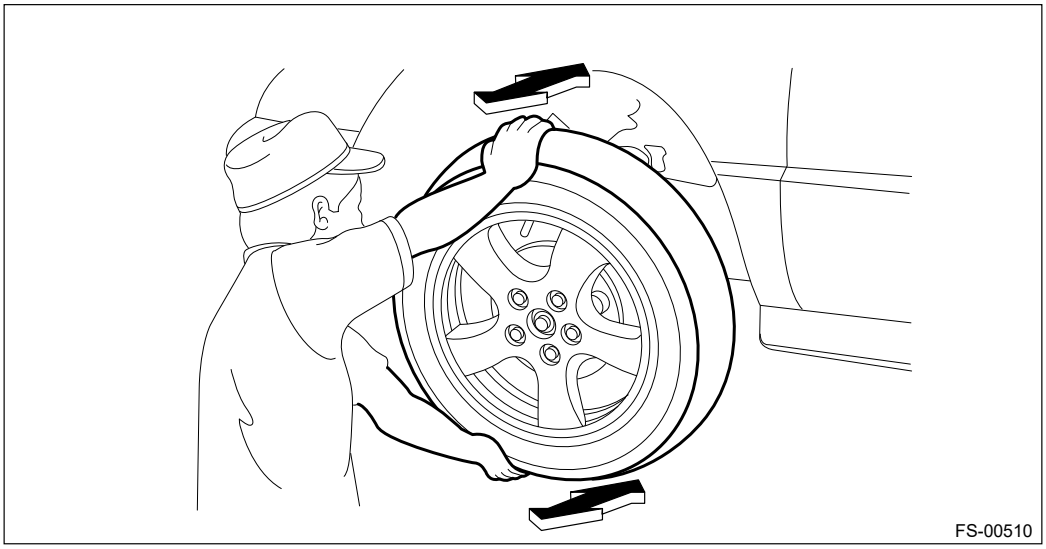


8. Install the front wheels, and perform the following inspections.

Tightening torque:

120 N·m (12.24 kgf-m, 88.5 ft-lb)

1. Check the wheels for smooth rotation.
2. Check that there is no looseness by moving the upper and lower portions of front tire in an axial direction with the brake pedal released.
   - **Looseness exists** → Check the hub unit COMPL - front axle. Ref. to DRIVE SHAFT SYSTEM>Front Hub Unit Bearing>INSPECTION.



3. Check that there is no looseness by moving the upper and lower portions of front tire in an axial direction with the brake pedal depressed.

- **Looseness exists** → Replace the ball joint. Ref. to FRONT SUSPENSION>Front Ball Joint>REMOVAL.

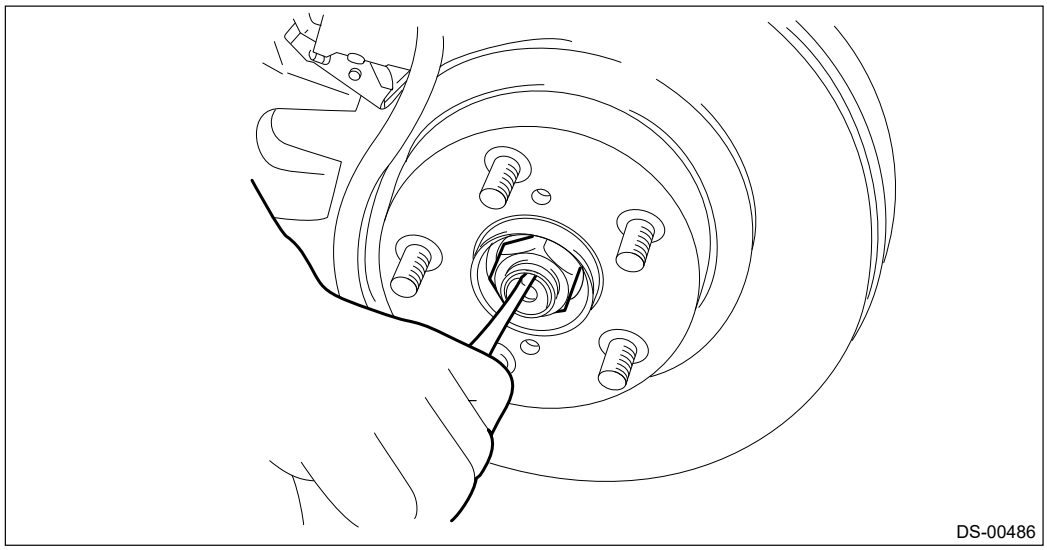
REMOVAL

1. Lift up the vehicle, and then remove the front wheels.
2. Remove the nut - axle.

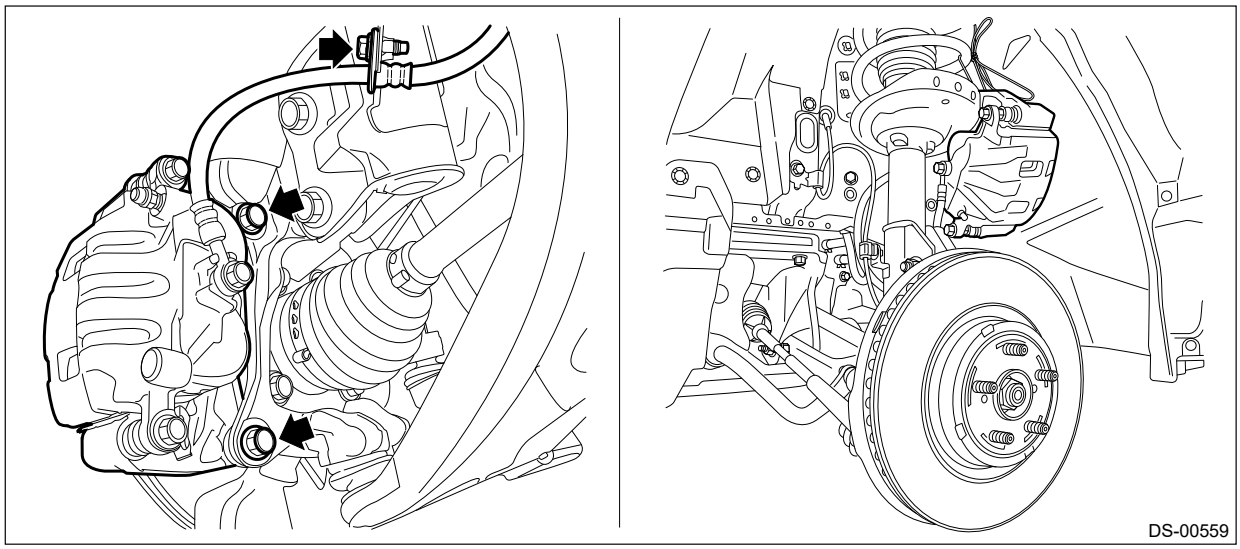
   Caution:

   Do not loosen the nut - axle while the front axle is loaded. Doing so may damage the hub unit COMPL.

   (1) Lift the crimped section of the nut - axle.
   (2) Remove the nut - axle using a socket wrench while depressing the brake pedal.



3. Remove the caliper body assembly from the housing assembly - front axle.
   (1) Remove the mounting bolts, and then remove the caliper body assembly.
   (2) Prepare wiring harnesses etc. to be discarded, and suspend the caliper body assembly from the strut assembly.

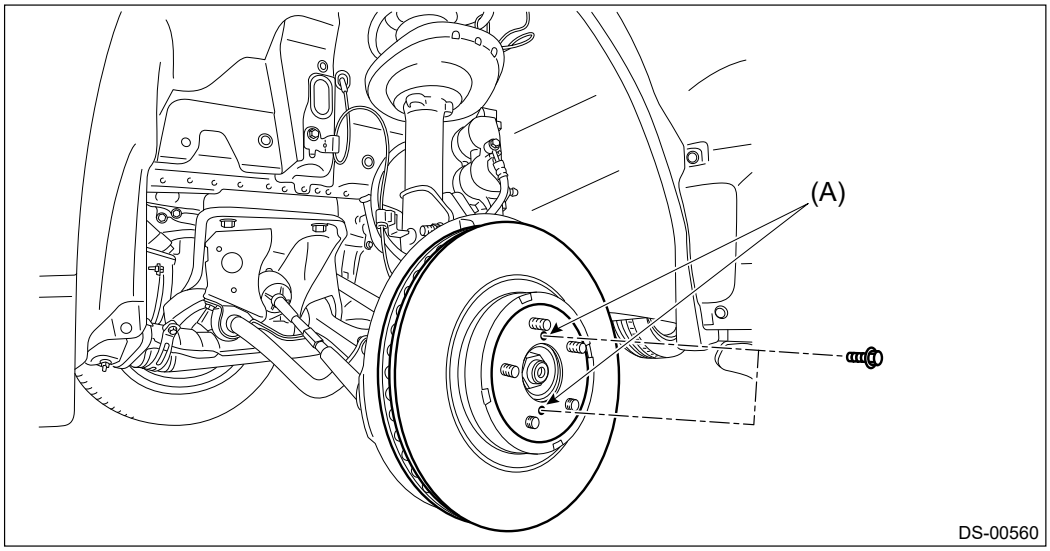


4. Remove the disc rotor.

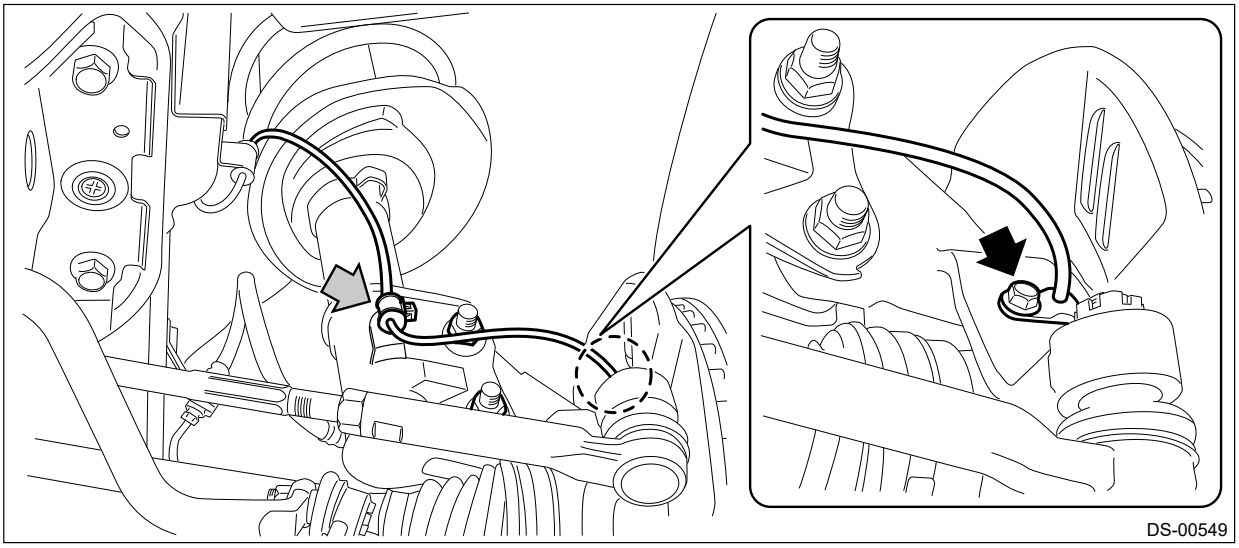
   Note:

   When the disc rotor is difficult to be removed from the hub unit COMPL - front axle, screw in 8 mm (0.31 in) bolt to the threaded part of the disc rotor (A), and remove the disc

rotor.



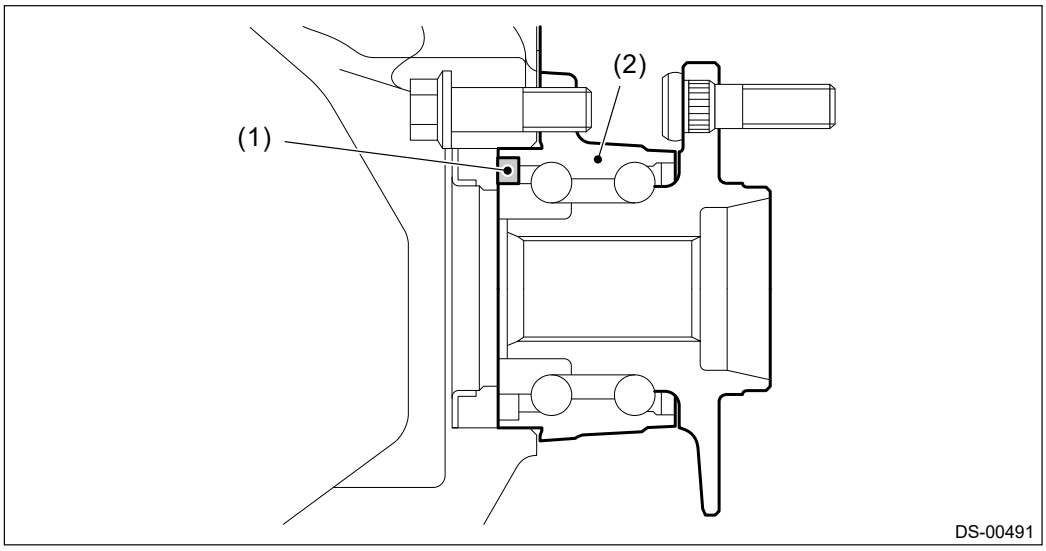
5. Remove the bolts, and remove the front ABS wheel speed sensor.



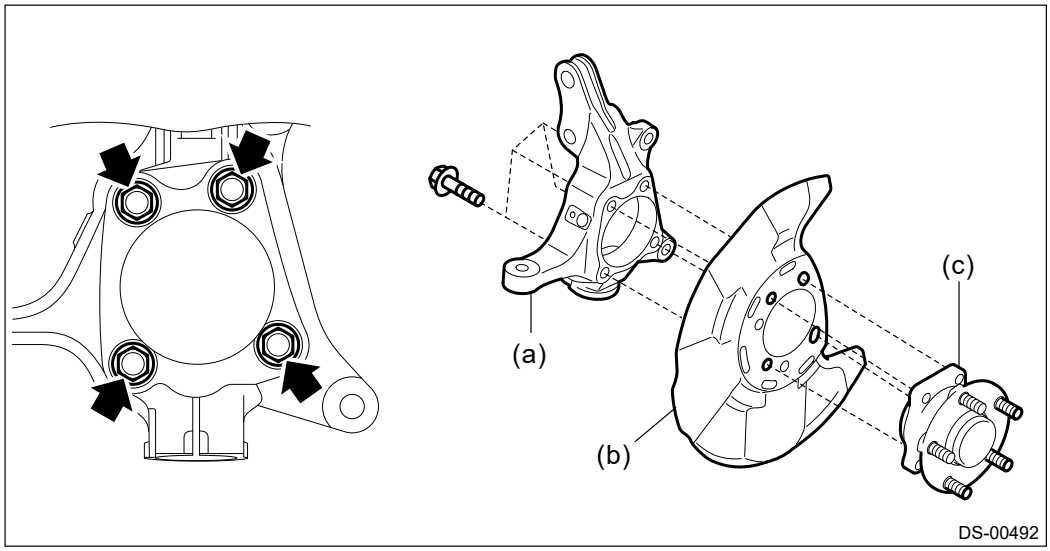
6. Remove the bolts from the housing assembly - front axle, and then remove the hub unit COMPL - front axle.

Caution:

- **Do not get closer the tool which charged magnetism to magnetic encoder.**
- **Be careful not to damage the magnetic encoder.**



(1) Magnetic encoder (2) Hub unit COMPL - front axle



(a) Housing ASSY - front axle (b) Back plate - front brake (c) Hub unit COMPL - front axle

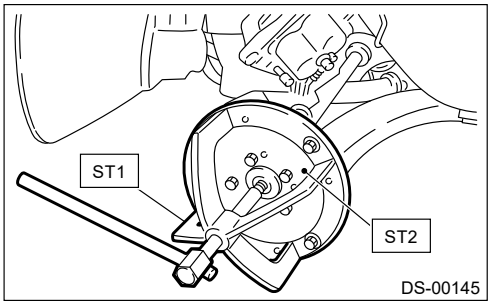
Note:

If it is hard to remove, use the ST.

Preparation tool:

ST1: AXLE SHAFT PULLER (926470000)

ST2: AXLE SHAFT PULLER PLATE (28099PA110)

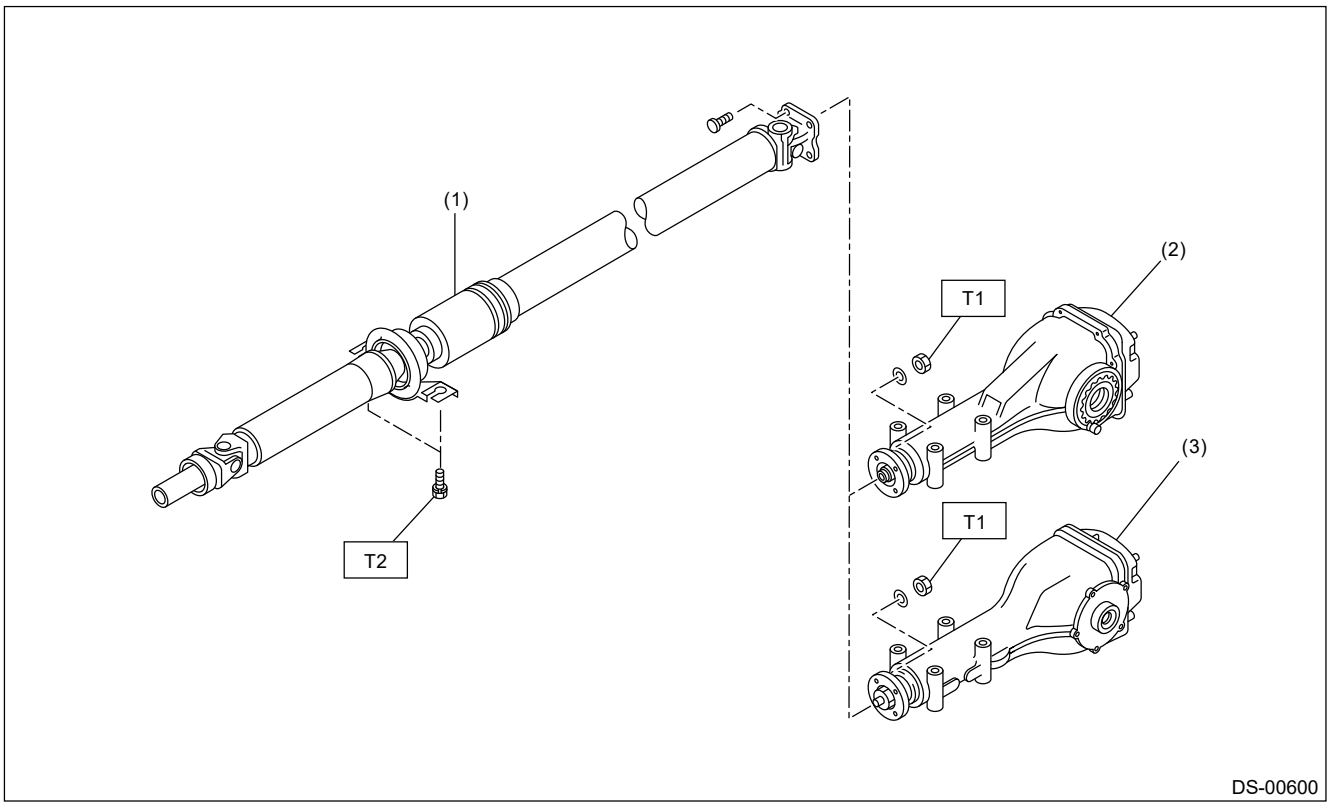


CAUTION

- When performing any work, always wear work clothes, a work cap and protective shoes. Additionally, wear a helmet, protective goggles, etc. if necessary.
- Remove contamination including dirt and corrosion before removal, installation, disassembly or assembly.
- When performing a repair, identify the cause of trouble and avoid unnecessary removal, disassembly and replacement.
- Some vehicle components are extremely hot immediately after driving. Be wary of receiving burns from heated parts.
- Vehicle components are extremely hot after driving. Be wary of receiving burns from heated parts.
- Use SUBARU genuine grease, the recommended or equivalent. Do not mix grease etc. of different grades or manufacturers.
- Be sure to tighten fasteners including bolts and nuts to the specified torque.
- Always use the jack-up point when the shop jacks or rigid racks are used to support the vehicle.
- Apply grease onto sliding or revolving surfaces before installation.
- Be sure that the surface of brake disc, brake pad or brake shoe is free from grease or oil.
- Do not secure a part in a vise directly. Place cushioning materials such as wood blocks, aluminum plates, or waste cloth between the part and the vise.
- When the suspension-related components have been removed or replaced, perform "VDC sensor midpoint setting mode" of the VDC. Ref. to VEHICLE DYNAMICS CONTROL (VDC)>VDC Control Module and Hydraulic Control Unit (VDCCM&H/U)>ADJUSTMENT.

COMPONENT

1. PROPELLER SHAFT



(1) Propeller shaft

(2) Rear differential (VA1-type)

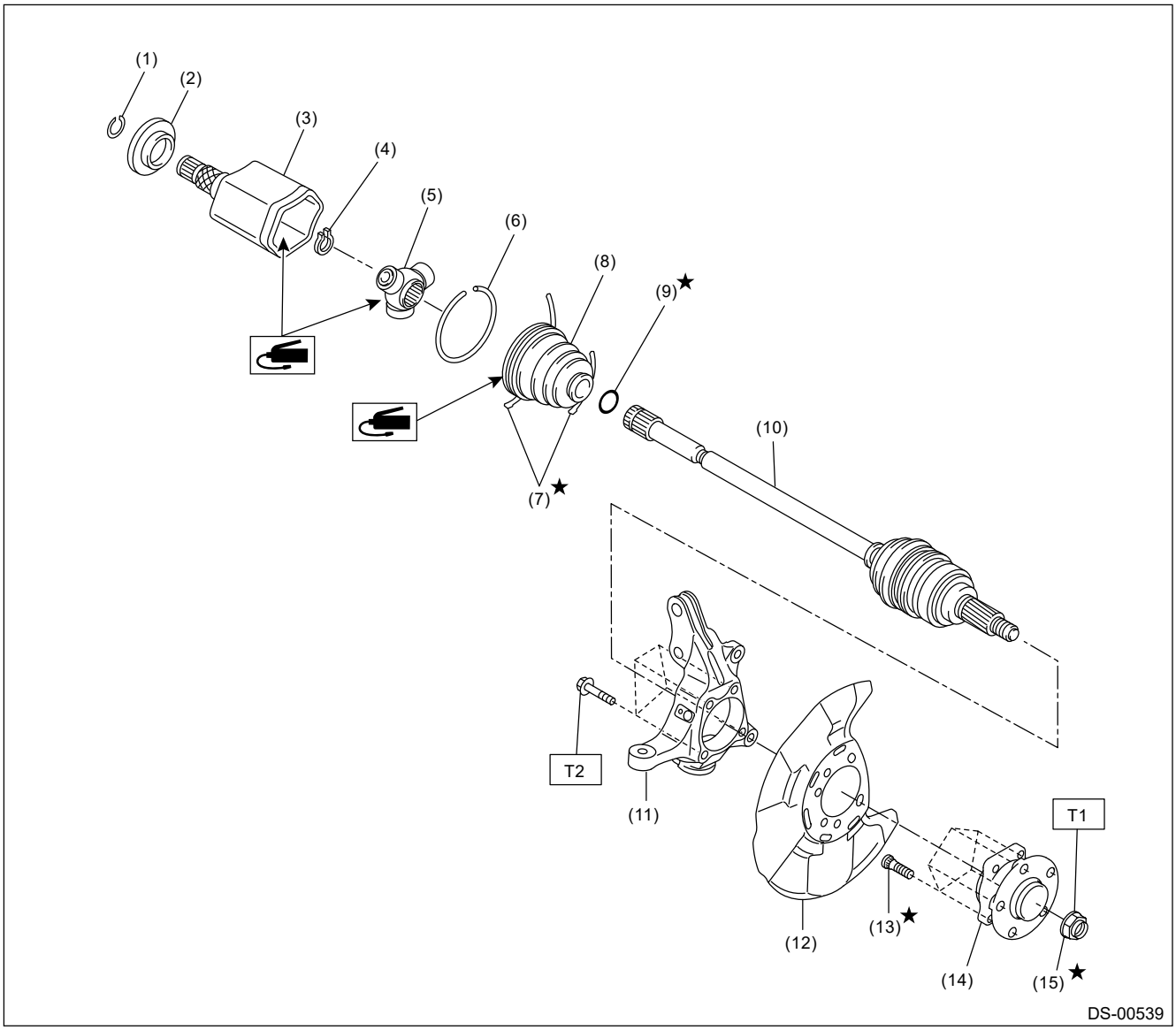
(3) Rear differential (T-type)

Tightening torque: N·m (kgf-m, ft-lb)

T1: 31 (3.16, 22.9)

T2: 52 (5.30, 38.4)

2. FRONT AXLE

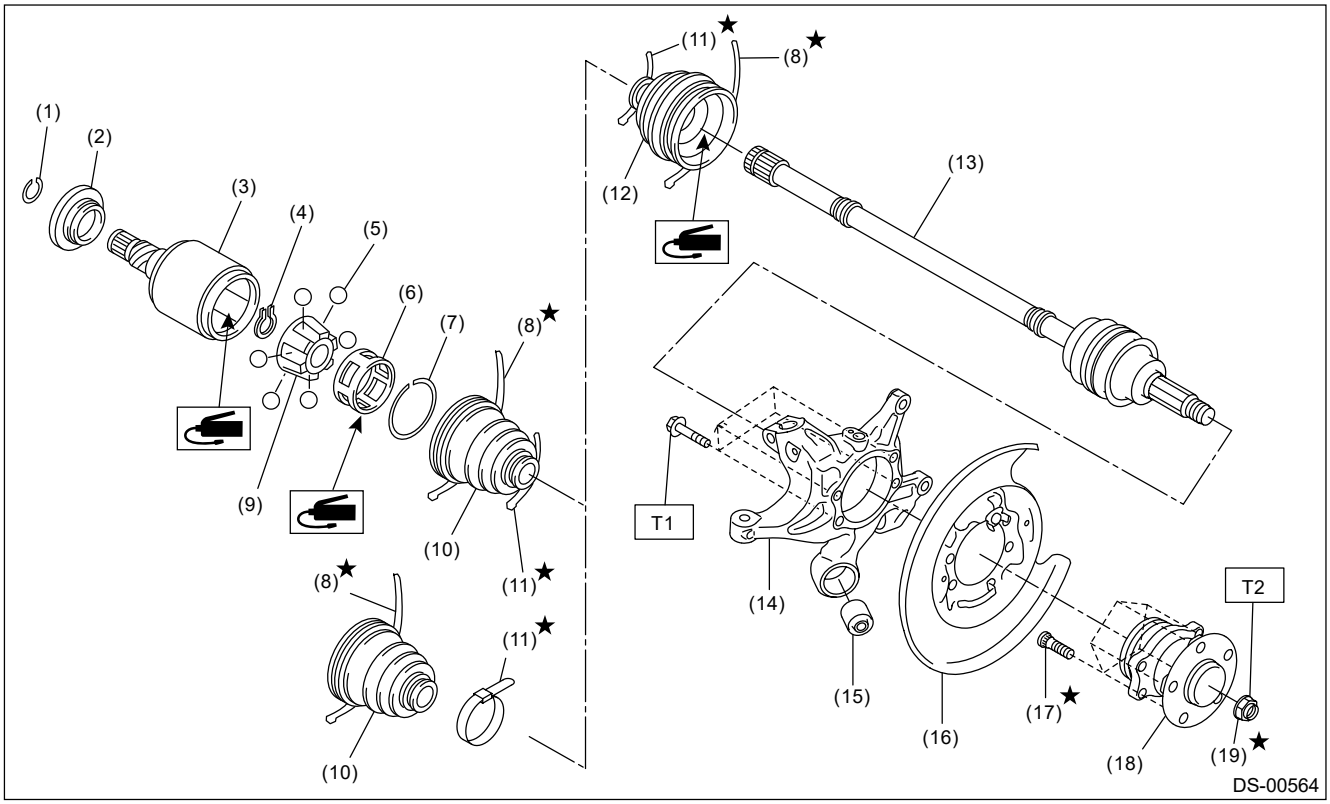


(1) Circlip
(2) Baffle plate
(3) Outer race (PTJ)
(4) Snap ring
(5) Trunnion
(6) Snap ring
(7) Boot band
(8) Boot (PTJ)
(9) O-ring
(10) EBJ shaft ASSY
(11) Housing ASSY - front axle
(12) Back plate - front brake
(13) Bolt - hub
(14) Hub unit COMPL - front axle
(15) Nut - axle

Tightening torque: N·m (kgf-m, ft-lb)

T1: 220 (22.43, 162.3)
T2: 65 (6.63, 47.9)

3. REAR AXLE



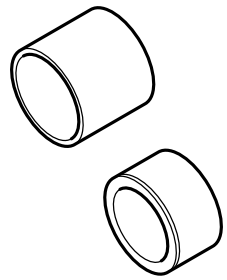
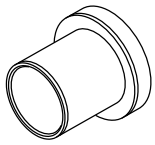
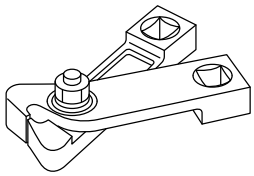
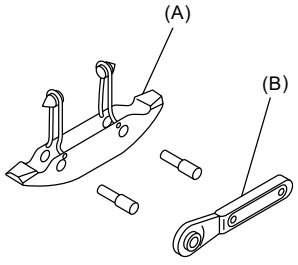
(1) Circlip A
(2) Baffle plate
(3) Outer race (DOJ)
Outer race (EDJ)
(4) Snap ring
(5) Ball
(6) Cage
(7) Circlip B
(8) Band - drive shaft A
(9) Inner race
(10) Boot - drive shaft (DOJ)
Boot - drive shaft (EDJ)
(11) Band - drive shaft B (locking tab type)
Band - drive shaft B (double loop type)
(12) Boot - drive shaft (BJ)
Boot - drive shaft (EBJ)
(13) Shaft ASSY (BJ)
Shaft ASSY (EBJ)
(14) Housing ASSY - rear axle
(15) Bushing - trailing link
(16) Back plate - rear brake
(17) Bolt - hub
(18) Hub unit COMPL - rear axle
(19) Nut - axle

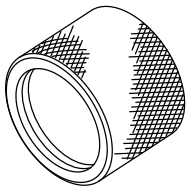
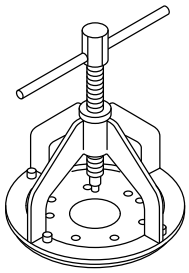
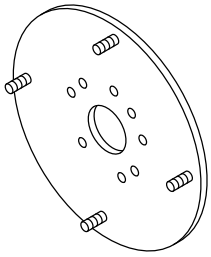
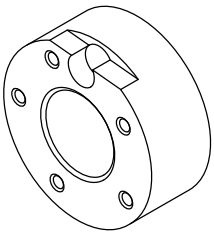
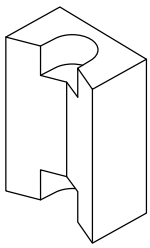
Tightening torque: N·m (kgf-m, ft-lb)

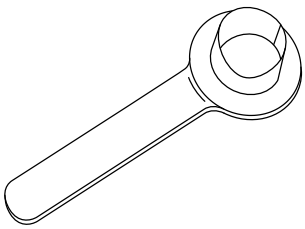
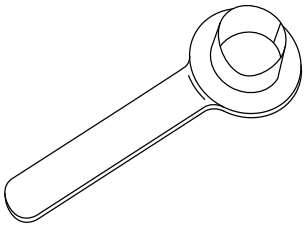
T1: 65 (6.63, 47.9)
T2: 190 (19.37, 140.13)

PREPARATION TOOL

1. SPECIAL TOOL

ILLUSTRATION	Part No.	DESCRIPTION	REMARKS
 ST20099PA010	20099PA010	INSTALLER & REMOVER	• Used for replacing the bushing - trailing link of the housing assembly - rear axle. • Used together with BUSHING REMOVER (20099FG000).
 ST20099FG000	20099FG000	BUSHING REMOVER	• Used for replacing the bushing - trailing link of the housing assembly - rear axle. • Used together with base part of INSTALLER & REMOVER (20099PA010).
 ST28099AC000	28099AC000	BOOT BAND PLIER	Used for tightening the band - boot. (For front drive shaft)
 ST-925091000	925091000	BAND TIGHTENING TOOL	Used for tightening the band - boot. (A) Jig for the band (B) Ratchet wrench
	18675AA000	DIFFERENTIAL SIDE OIL SEAL INSTALLER	Used for installing the differential side retainer oil seal.

 ST18675AA000			
 ST-926470000	926470000	AXLE SHAFT PULLER	• Used for removing the drive shaft. • Used together with AXLE SHAFT PULLER PLATE (28099PA110).
 ST28099PA110	28099PA110	AXLE SHAFT PULLER PLATE	Exchange with the plate of the AXLE SHAFT PULLER (926470000) to use.
 ST-927080000	927080000	HUB STAND	Used for assembling the bolt - hub of the hub.
 ST28399AG000	28399AG000	HUB STAND	Used for extracting the bolt - hub.

 ST28399SA010	28399SA010	OIL SEAL PROTECTOR	• Used for installing front drive shaft into front differential. • For protecting the oil seal.
 ST28099PA090	28099PA090	OIL SEAL PROTECTOR	• Used for installing the rear drive shaft to the rear differential. • For protecting the oil seal.

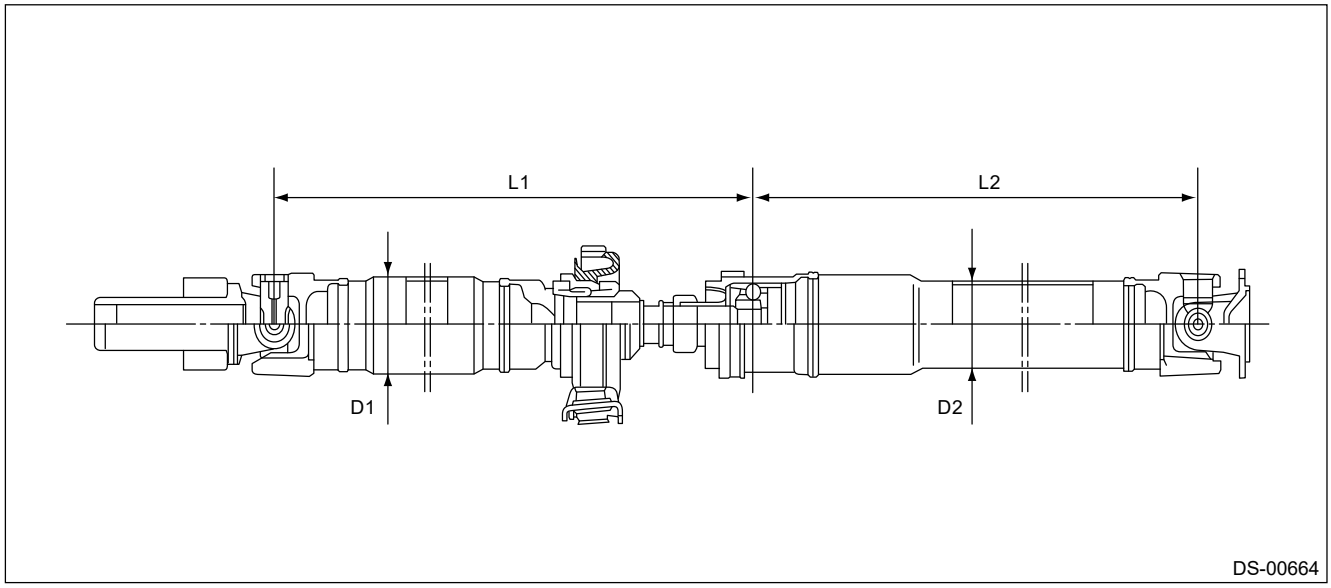
2. GENERAL TOOL

TOOL NAME	REMARKS
Tie-rod ball joint puller	Used for disconnecting joints.
Dial gauge	Used for inspecting the propeller shaft run-out.
Extension cap	Used for preventing leakage of gear oil or CVTF.
Crowbar	Used for extracting drive shaft.
Needle nose pliers	Used for tightening the band - boot of the rear drive shaft. • Snap-on 96BCP Or equivalent.

SPECIFICATION

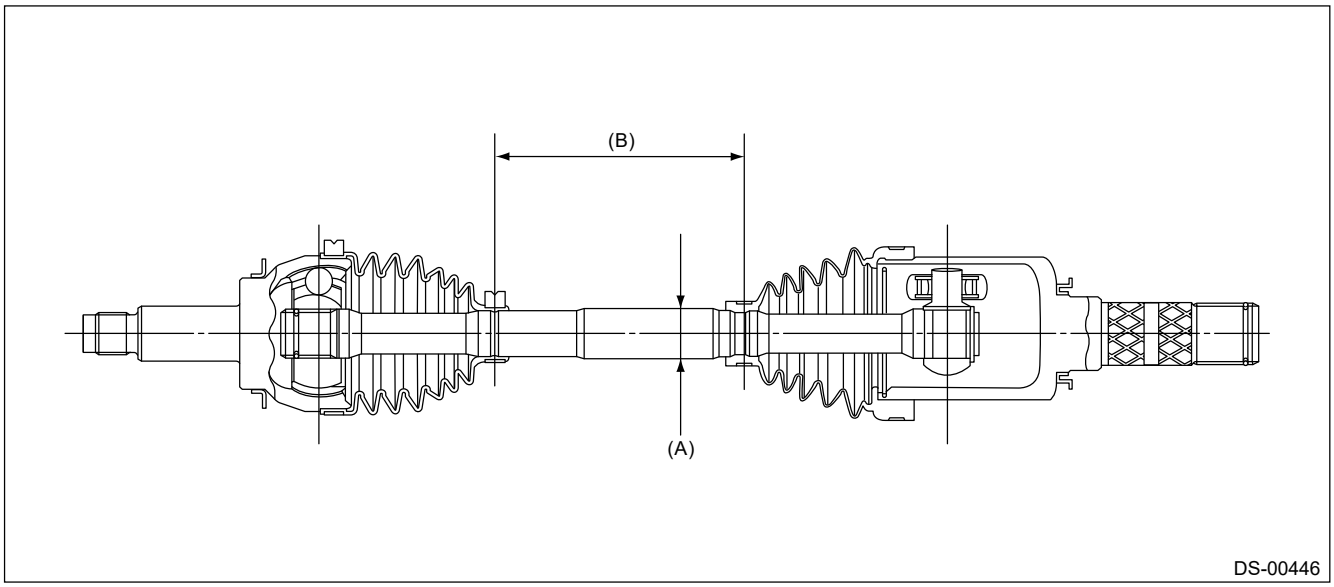
1. PROPELLER SHAFT

Model			All models
Propeller shaft type			EDJ
Front propeller shaft joint-to-joint length: L_1	mm (in)	CVT (690)	578.0 (22.76)
		CVT (580)	675.5 (26.59)
		MT	735.5 (28.96)
Rear propeller shaft joint-to-joint length: L_2		mm (in)	723.0 (28.46)
Outer diameter of tube:	mm (in)	D_1	63.5 (2.50)
		D_2	57.5 (2.26)



2. FRONT DRIVE SHAFT ASSEMBLY

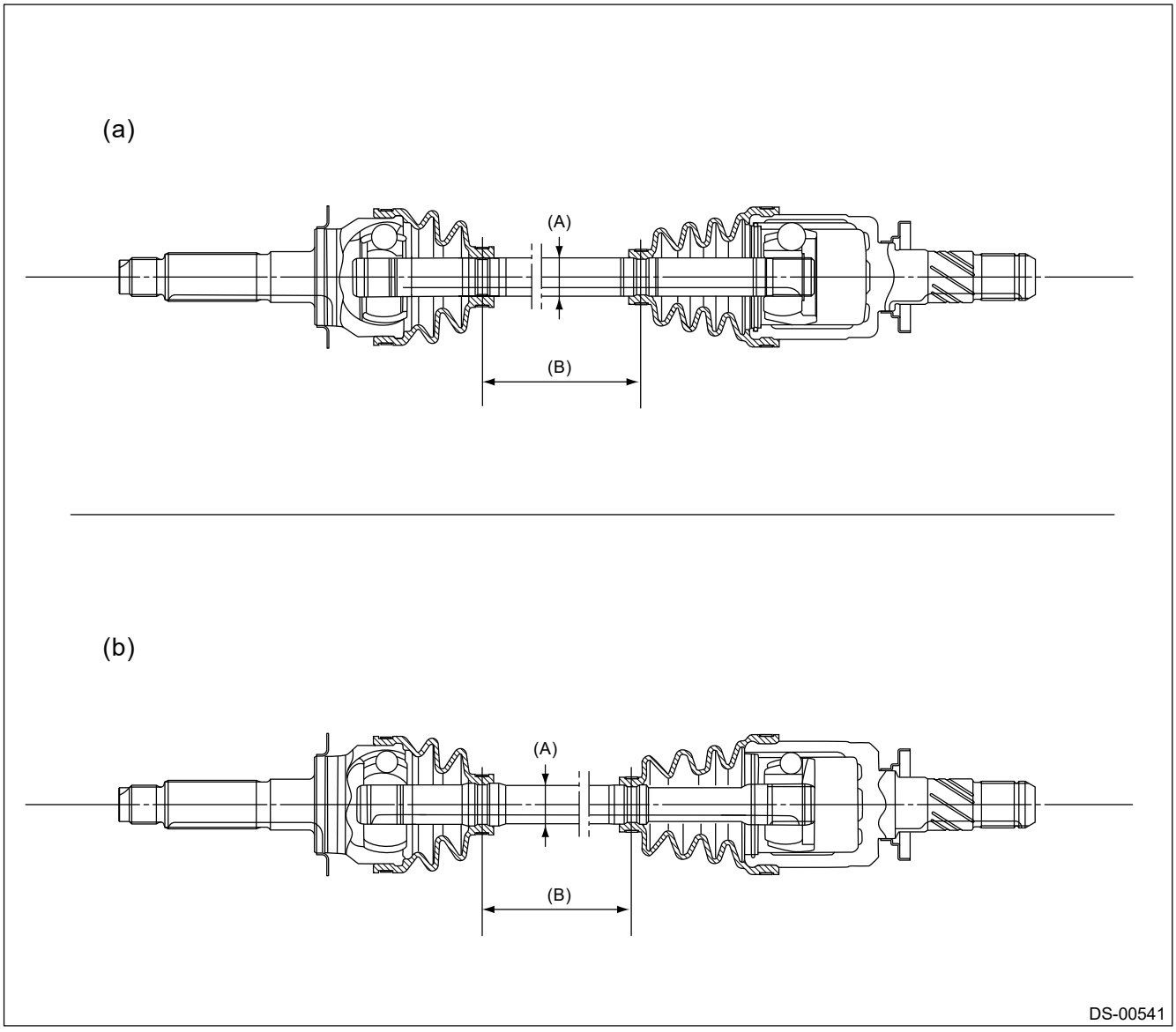
Model	Type of drive shaft	Axle diameter ⌀ mm (in)	Axle length mm (in)
MT	EBJ + PTJ	22 (0.87)	369.4 (14.54)
CVT	EBJ + PTJ	22 (0.87)	356 (14.02)



(A) Axle diameter (B) Axle length

3. REAR DRIVE SHAFT ASSEMBLY

Model	Type of drive shaft	Axle diameter ⌀ mm (in)	Axle length mm (in)
MT, CVT (TR690)	EBJ + EDJ	22 (0.87)	384.4 (15.13)
CVT (TR580)	BJ + DOJ	22 (0.87)	399.2 (15.72)



(a) BJ + DOJ type

(b) EBJ + EDJ type

(A) Axle diameter

(B) Axle length

INSPECTION

Note:

Vibration while cruising may be caused by an unbalanced tire, improper tire inflation pressure, improper wheel alignment, etc.

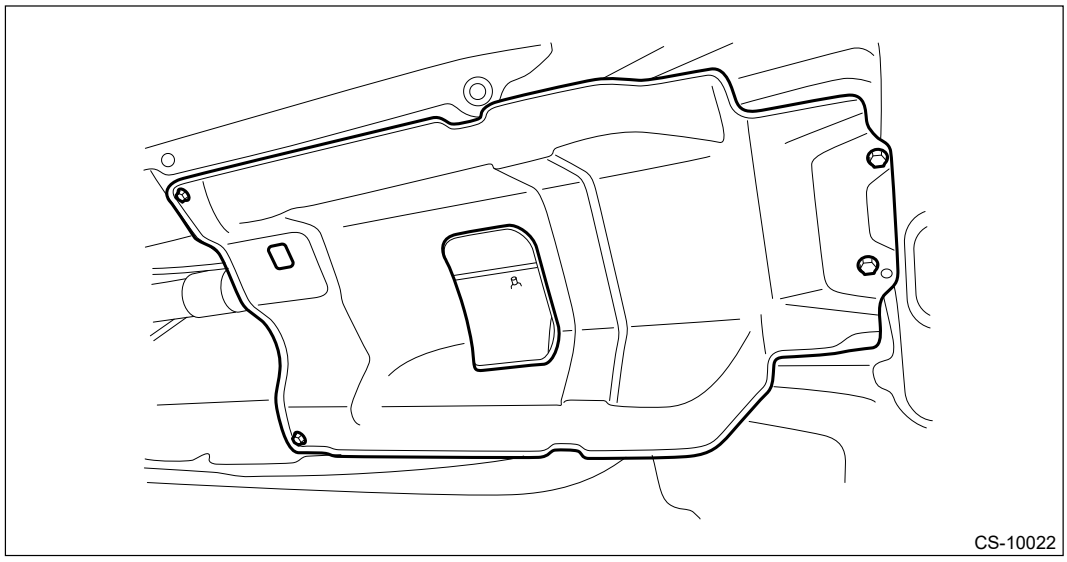
Symptoms	Possible cause	Corrective action
Noise or vibration from propeller shaft	• Center bearing • Runout of propeller shaft • Loose or gap at connections	Inspect the propeller shaft. Ref. to DRIVE SHAFT SYSTEM>Propeller Shaft>INSPECTION.
Abnormal wheel vibration	Wheel is out of balance.	Check the wheel balance. Ref. to WHEEL AND TIRE SYSTEM>Tire and Wheel>INSPECTION > WHEEL BALANCING.
	Front wheel alignment	Check the front wheel alignment. Ref. to FRONT SUSPENSION>Wheel Alignment>INSPECTION.
	Rear wheel alignment	Check the rear wheel alignment. Ref. to REAR SUSPENSION>Wheel Alignment>INSPECTION.
	Front strut	Check the front strut. Ref. to FRONT SUSPENSION>Front Strut>INSPECTION.
	Rear shock absorber	Check the rear shock absorber. Ref. to REAR SUSPENSION>Rear Shock Absorber>INSPECTION.
	Front drive shaft	Check the front drive shaft. Ref. to DRIVE SHAFT SYSTEM>Front Drive Shaft>INSPECTION.
	Rear drive shaft	Check the rear drive shaft. Ref. to DRIVE SHAFT SYSTEM>Rear Drive Shaft>INSPECTION.
	Hub unit COMPL - front axle	Check the hub unit COMPL - front axle. Ref. to DRIVE SHAFT SYSTEM>Front Hub Unit Bearing>INSPECTION.
	Hub unit COMPL - rear axle	Check the hub unit COMPL - rear axle. Ref. to DRIVE SHAFT SYSTEM>Rear Hub Unit Bearing>INSPECTION.
Noise from the underbody	Wheel is out of balance.	Check the wheel balance. Ref. to

		WHEEL AND TIRE SYSTEM>Tire and Wheel>INSPECTION > WHEEL BALANCING.
	Front wheel alignment	Check the front wheel alignment. Ref. to FRONT SUSPENSION>Wheel Alignment>INSPECTION.
	Rear wheel alignment	Check the rear wheel alignment. Ref. to REAR SUSPENSION>Wheel Alignment>INSPECTION.
	Front strut	Check the front strut. Ref. to FRONT SUSPENSION>Front Strut>INSPECTION.
	Rear shock absorber	Check the rear shock absorber. Ref. to REAR SUSPENSION>Rear Shock Absorber>INSPECTION.

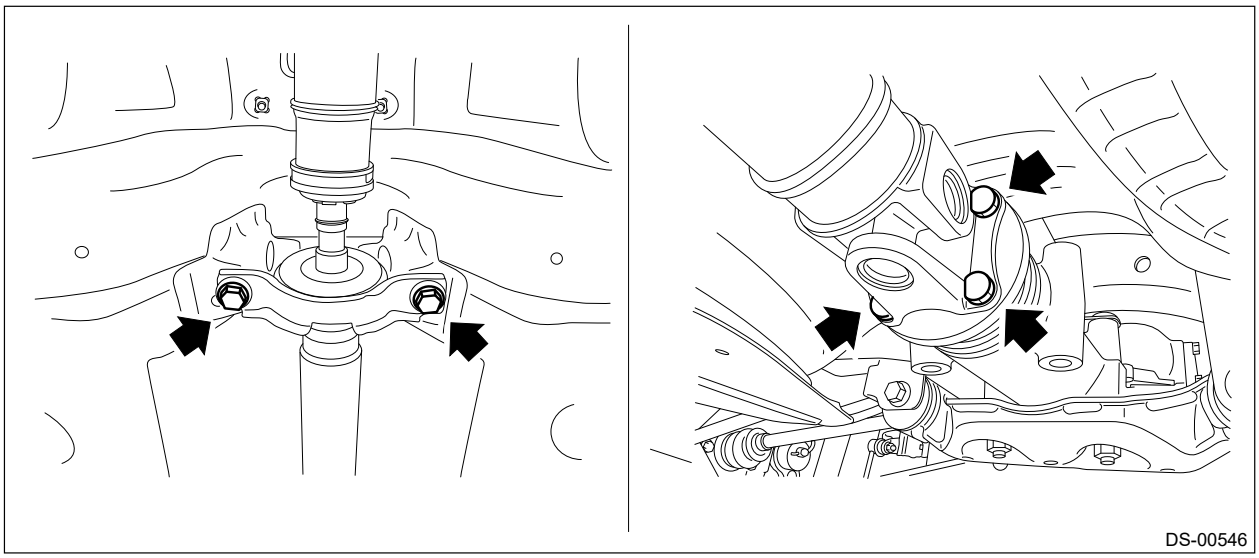
INSPECTION

Check the propeller shaft with the propeller shaft installed to the vehicle.

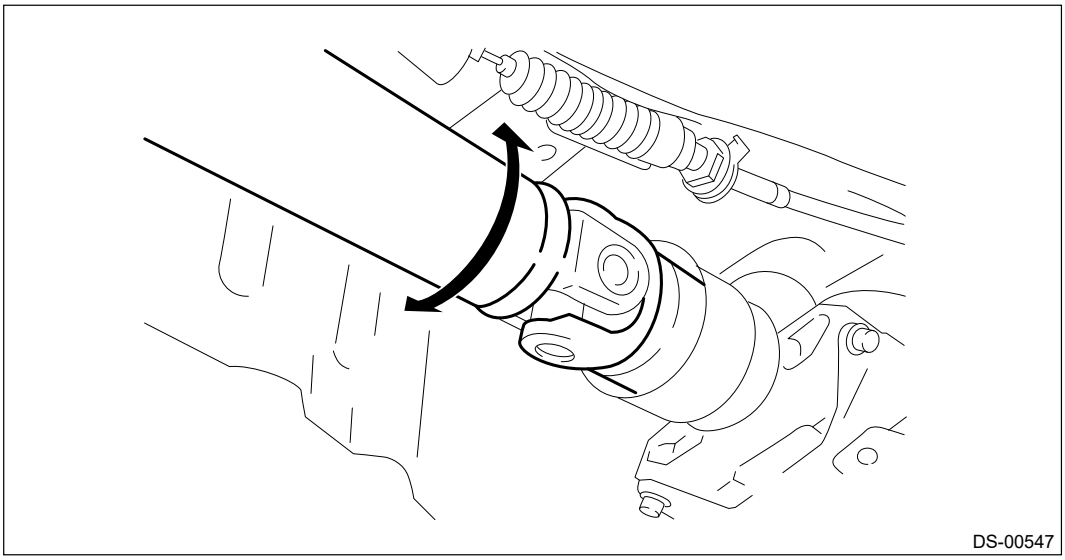
1. Remove the center exhaust pipe, rear exhaust pipe, and muffler.
   - Center exhaust pipe:
     - Turbo model: Ref. to EXHAUST(H4DOTC)>Center Exhaust Pipe>REMOVAL.
     - Non-turbo model: Ref. to EXHAUST(H4DO)>Center Exhaust Pipe>REMOVAL.
   - Rear exhaust pipe:
     - Turbo model: Ref. to EXHAUST(H4DOTC)>Rear Exhaust Pipe>REMOVAL.
     - Non-turbo model: Ref. to EXHAUST(H4DO)>Rear Exhaust Pipe>REMOVAL.
   - Muffler:
     - Turbo model: Ref. to EXHAUST(H4DOTC)>Muffler>REMOVAL.
     - Non-turbo model: Ref. to EXHAUST(H4DO)>Muffler>REMOVAL.
2. Remove the bolts, and then remove the center exhaust cover.



3. Check the propeller shaft mounting bolt for looseness.
   (1) Yoke flange mounting bolts which connect to the rear differential
   (2) Center bearing bracket mounting bolts



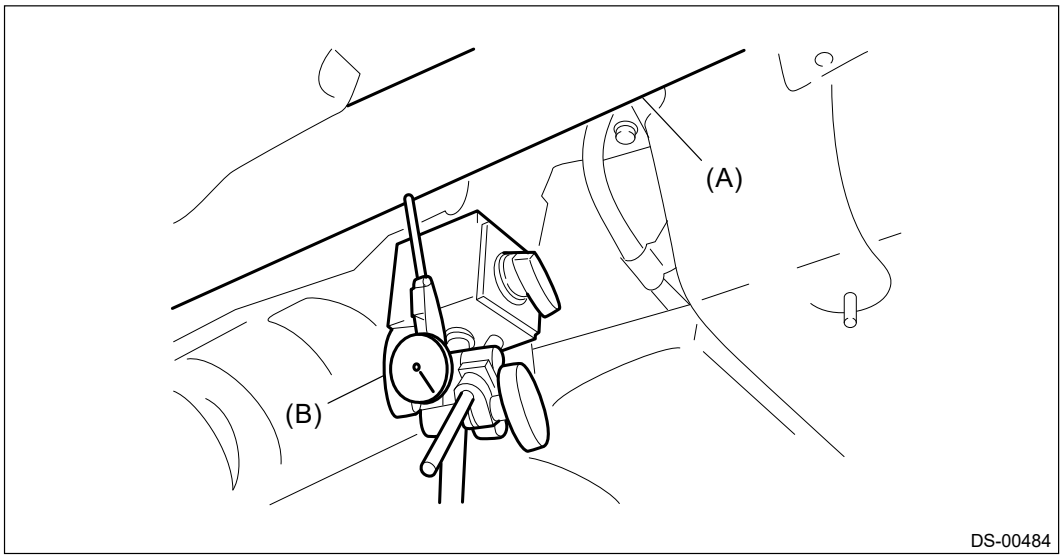
4. Check the spline and bearing for the propeller shaft.
(1) Turn the propeller shaft by hand to check if abnormal free play exists at splines.
(2) Also move yokes to check if abnormal free play exists at spiders and bearings.



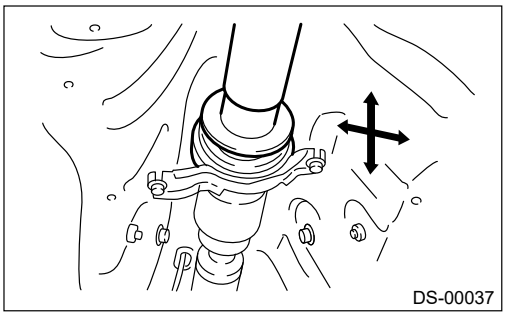
5. Measure the deflection of the propeller shaft.
(1) Set the dial gauge (B) with its indicator stem at the center of the propeller shaft (A).
(2) Turn the propeller shaft (A) slowly by hands to check for runout of the propeller shaft.

Runout:

Limit: 0.6 mm (0.024 in)



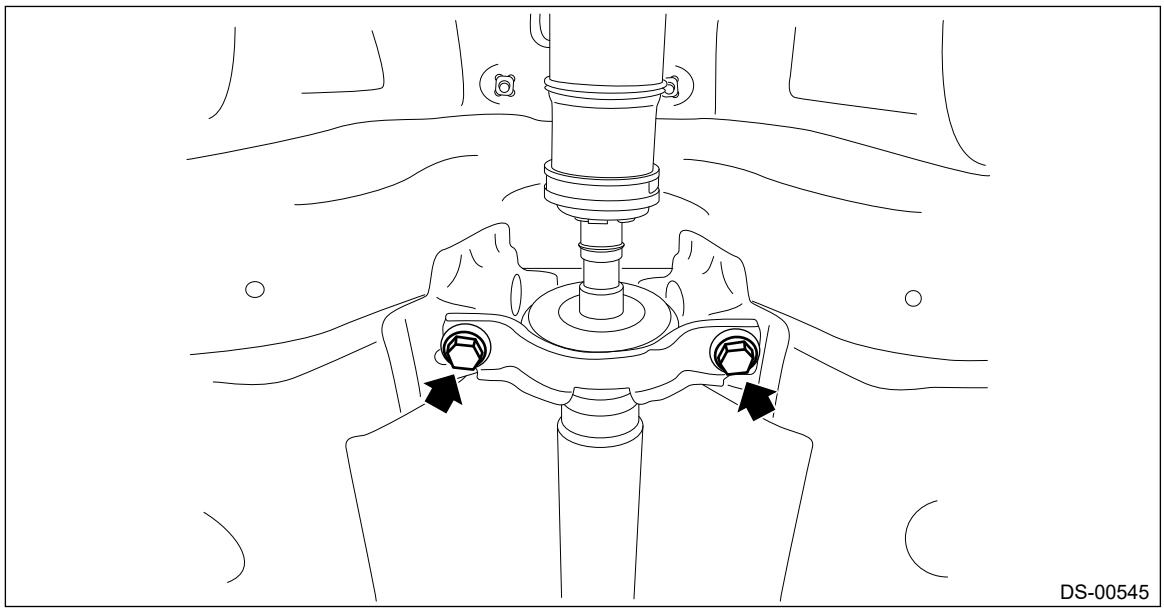
6. Check the center bearing for free play.
Move the propeller shaft near the center bearing up, down, left, right by hand, to check for any abnormal free play of the bearings.



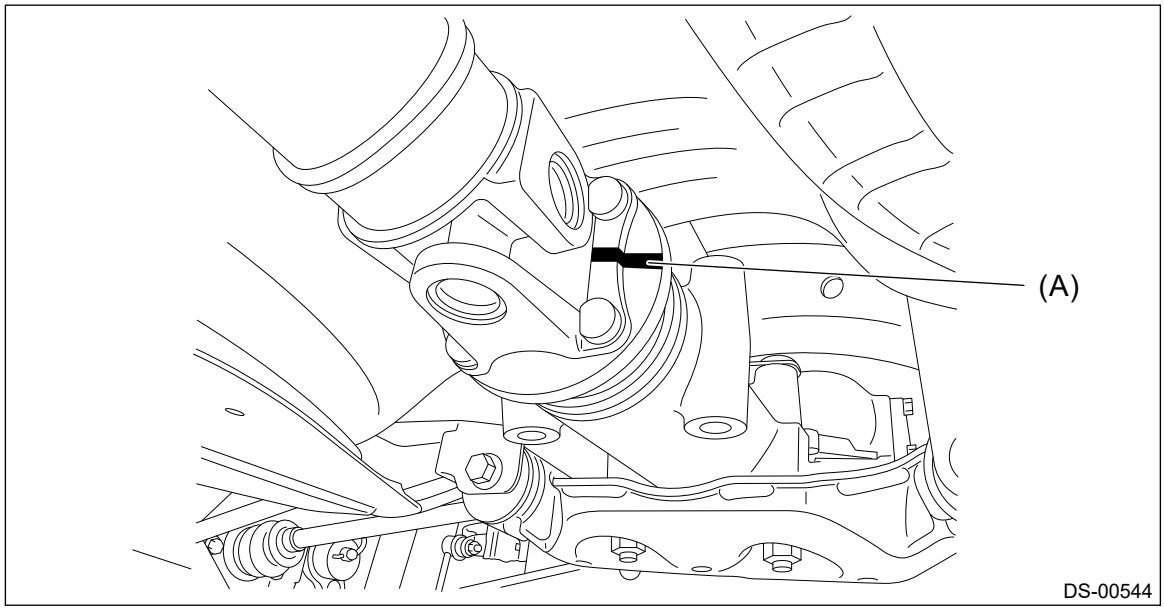
7. Replace the propeller shaft assembly if faulty is found in the inspection.

INSTALLATION

1. Before installation, check the following items, and replace the propeller shaft assembly as necessary.
   - Dents or cracks on the tube surface
   - Splines for deformation or abnormal wear
   - Unsmooth joint operation or abnormal noise
   - Center bearing for free play, noise or non-smooth operation
   - Oil seals for abnormal wear or damage
   - Damaged center bearing
2. Apply fluid or gear oil to the oil seal lip and the propeller shaft.
   Recommended fluid/oil:
   Refer to the fluids in the RM section. Ref. to RECOMMENDED MATERIALS > FLUID.
3. Insert the sleeve yoke into the transmission and attach center bearing to body.
   Tightening torque:
   52 N·m (5.30 kgf-m, 38.4 ft-lb)



4. Align the alignment marks (A), and connect the yoke flange and rear differential.
   Tightening torque:
   31 N·m (3.16 kgf-m, 22.9 ft-lb)

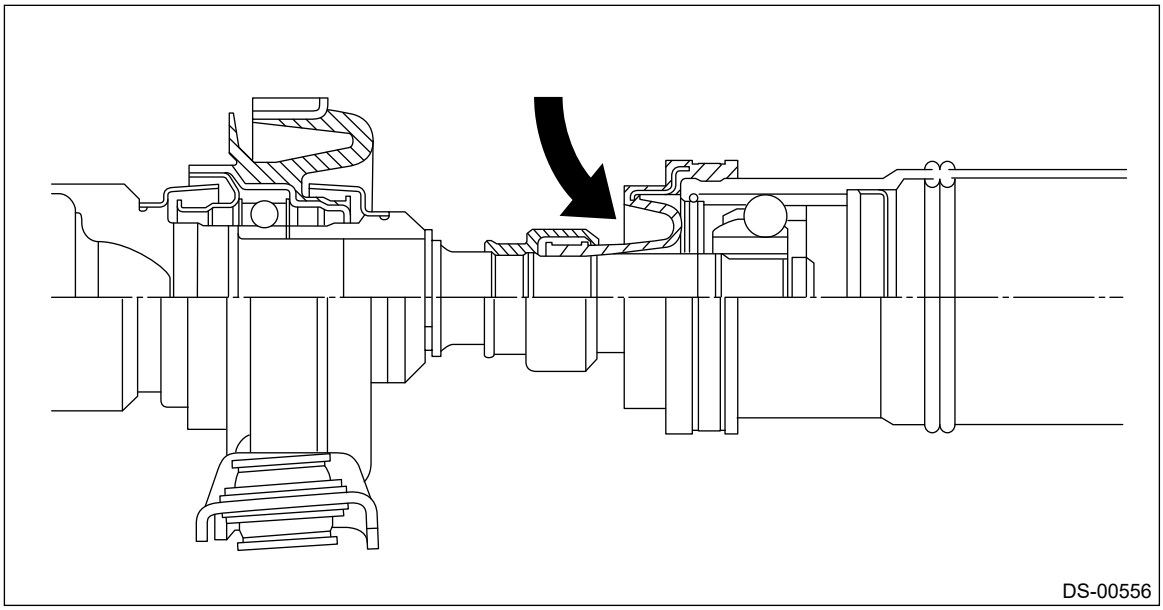


5. Check the propeller shaft with the propeller shaft installed to the vehicle. Ref. to DRIVE SHAFT SYSTEM>Propeller Shaft>INSPECTION.
6. Install the center exhaust cover.
   Tightening torque:
   18 N·m (1.84 kgf-m, 13.3 ft-lb)
7. Install the center exhaust pipe and rear exhaust pipe.
8. Lower the vehicle.

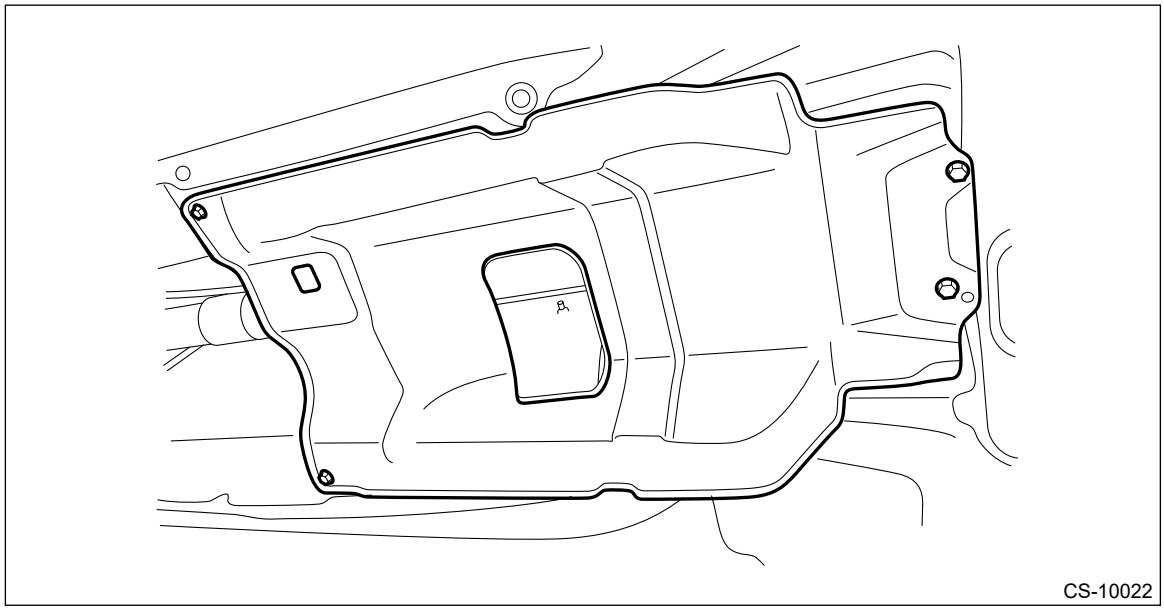
REMOVAL

Caution:

- **Do not disassemble the propeller shaft.**
- **Before removing propeller shaft, wrap the metal parts attached to the rubber boot of the center joint with a cloth or rubber material, as shown in the figure. The rubber boot may be damaged due to interference with adjacent metal parts while bending the joint during removal.**



1. Shift the select lever or gear shift lever to neutral.
2. Release the parking brake.
3. Lift up the vehicle.
4. Remove the exhaust pipe and muffler.
   - Center exhaust pipe:
     - Turbo model: Ref. to EXHAUST(H4DOTC)>Center Exhaust Pipe>REMOVAL.
     - Non-turbo model: Ref. to EXHAUST(H4DO)>Center Exhaust Pipe>REMOVAL.
   - Rear exhaust pipe:
     - Turbo model: Ref. to EXHAUST(H4DOTC)>Rear Exhaust Pipe>REMOVAL.
     - Non-turbo model: Ref. to EXHAUST(H4DO)>Rear Exhaust Pipe>REMOVAL.
   - Muffler:
     - Turbo model: Ref. to EXHAUST(H4DOTC)>Muffler>REMOVAL.
     - Non-turbo model: Ref. to EXHAUST(H4DO)>Muffler>REMOVAL.
5. Remove the bolts, and then remove the center exhaust cover.



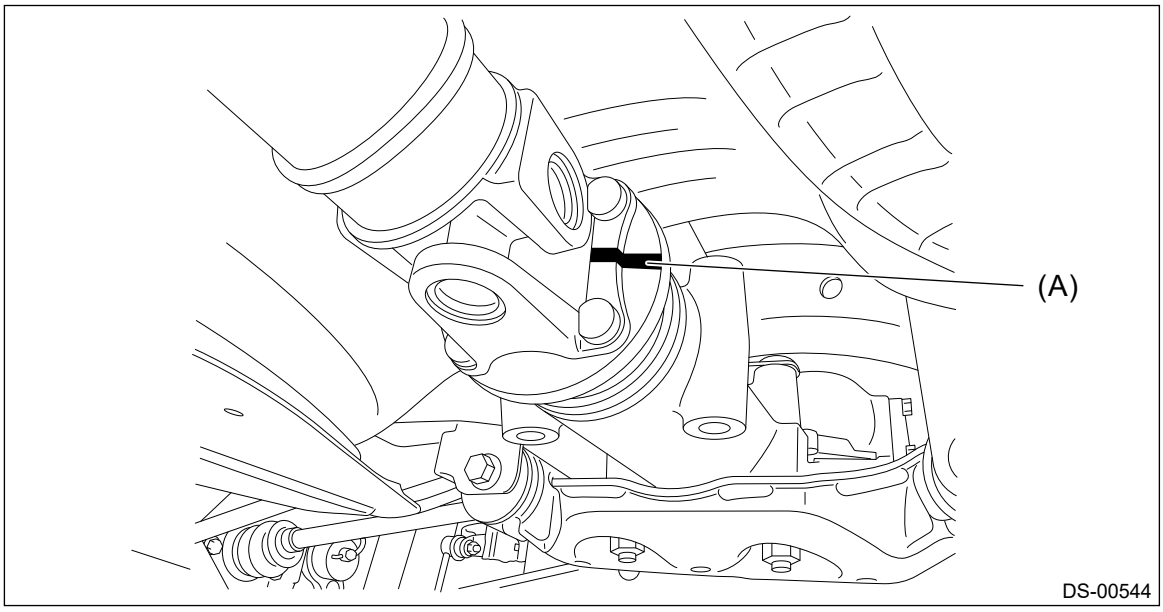
6. Remove the propeller shaft assembly.

Caution:

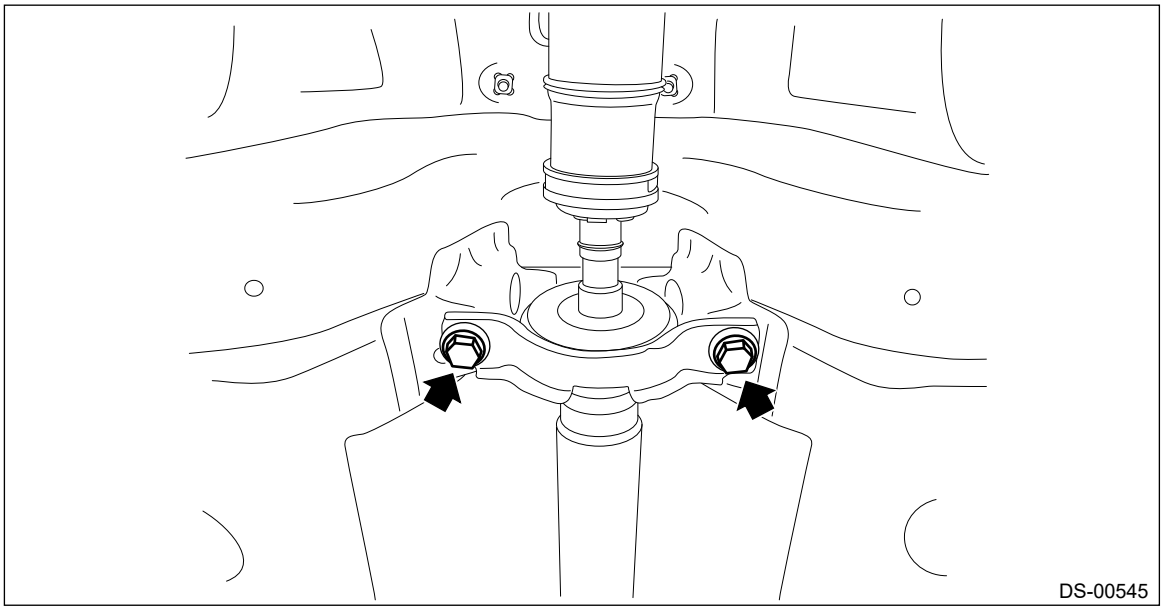
Do not disassemble the propeller shaft.

(1) Place alignment marks (A) on the flange yoke and rear differential.

(2) Remove four bolts and nuts holding the propeller shaft to the rear differential.



(3) Remove the center bearing.



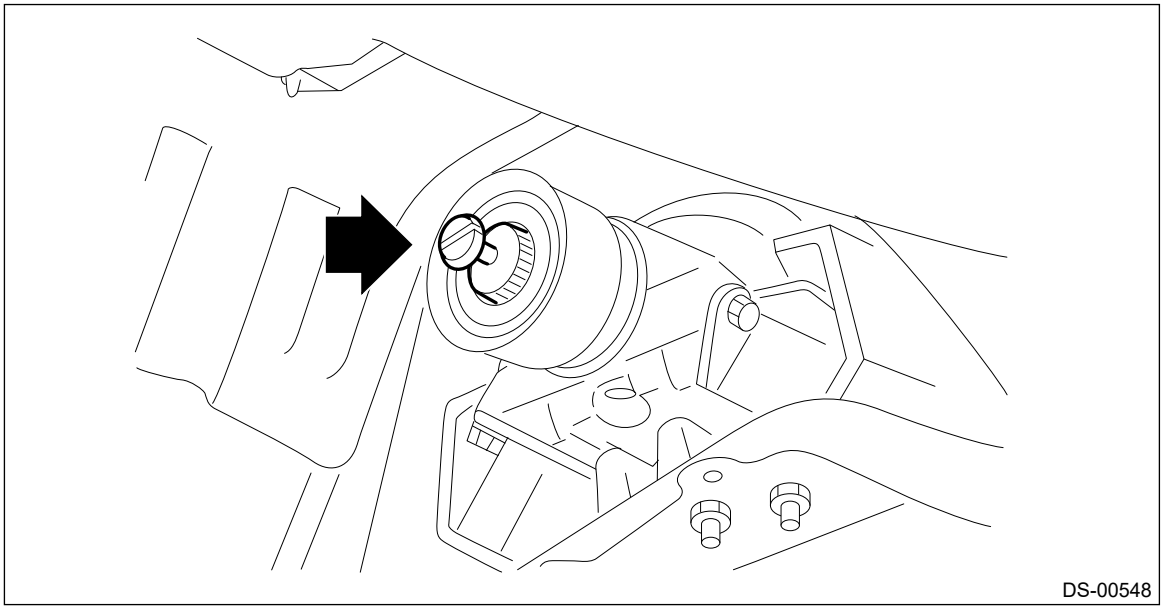
(4) Remove the propeller shaft from transmission.

Caution:

Be careful not to damage oil seals and contact surface of the sleeve yoke.

Note:

- **Use a container to catch CVTF or oil flowing from propeller shaft.**
- **To prevent CVTF from leaking, install extension cap etc. to the transmission.**



ASSEMBLY

1. BUSHING - PILLOW BALL

Do not remove the bushing - pillow ball from the housing assembly - rear axle because the bushing cannot be replaced when once removed. If it is removed, replace the housing assembly - rear axle.

2. BUSHING - TRAILING LINK

1. Before assembly, inspect the following items and replace any faulty part with a new one.
   - Perform visual check for damage or bend on the trailing link.
   - Visually check the bushing for abnormal cracks, fatigue or damage.
2. Press-fit the bushing using ST and the hydraulic press.

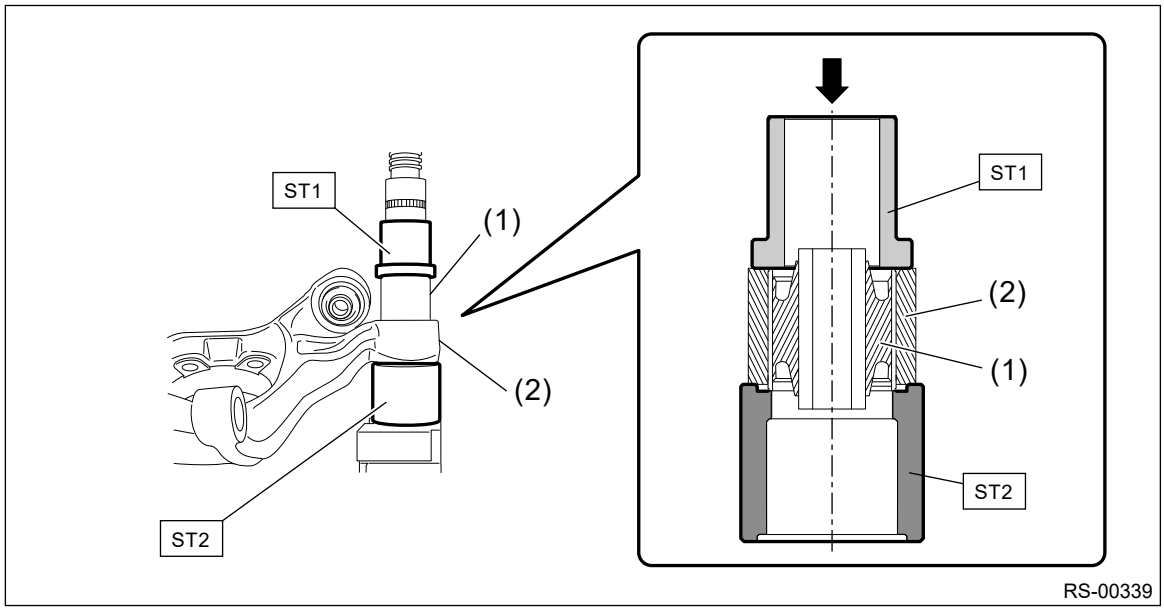
Caution:

Make sure to press the bushing straight in.

Preparation tool:

ST1: BUSHING REMOVER (20099FG000)

ST2: INSTALLER & REMOVER (20099PA010)



(1) Bushing

(2) Housing ASSY - rear axle

DISASSEMBLY

1. BUSHING - PILLOW BALL

Do not remove the bushing - pillow ball from the housing assembly - rear axle because the bushing cannot be replaced when once removed. If it is removed, replace the housing assembly - rear axle.

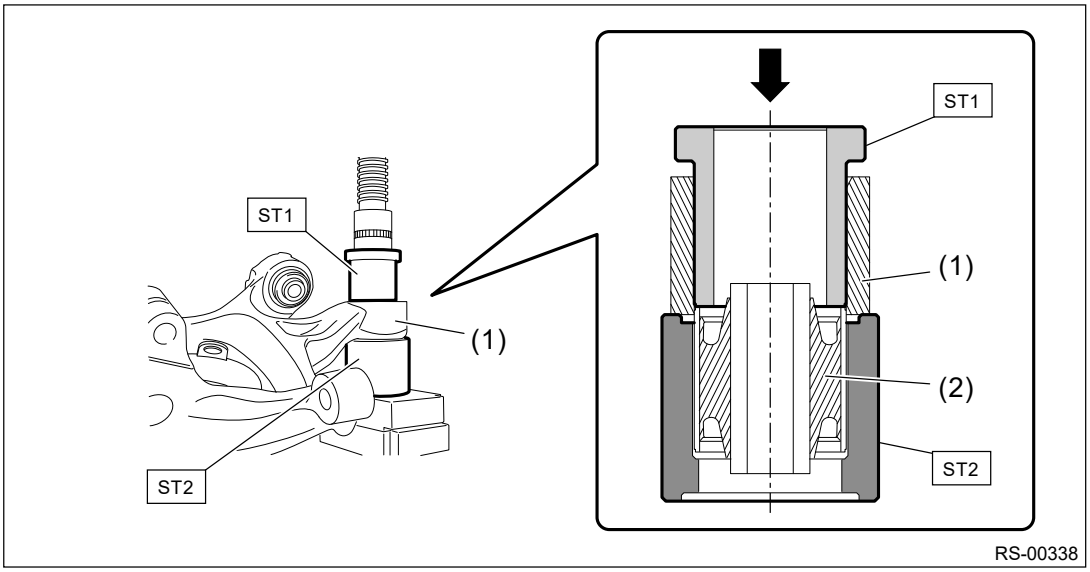
2. BUSHING - TRAILING LINK

1. Remove the housing assembly - rear axle. Ref. to DRIVE SHAFT SYSTEM>Rear Axle>REMOVAL.
2. Using the ST and a hydraulic press, push out the bushing.

Preparation tool:

ST1: BUSHING REMOVER (20099FG000)

ST2: INSTALLER & REMOVER (20099PA010)



(1) Housing ASSY - rear axle (2) Bushing - trailing link

INSTALLATION

1. Temporarily tighten the housing assembly - rear axle to the upper arm assembly.
2. Install the rear drive shaft assembly.

   Caution:

   - **Do not hammer the drive shaft assembly when installing.**
   - **Use new nut - axle.**

   (1) Insert the drive shaft assembly into the hub spline, and pull it into the specified position.

   (2) Temporarily tighten the nut - axle.
3. Tighten the rear strut assembly, rear stabilizer link and other links to the specified torque.

   Tightening torque:

   Rear suspension: Ref. to REAR SUSPENSION>General Description>COMPONENT > REAR SUSPENSION.

   Rear strut: Ref. to REAR SUSPENSION>General Description>COMPONENT > REAR SHOCK ABSORBER.
4. Install the rear disc rotor.
5. Install the caliper body assembly.

   Tightening torque:

   66 N·m (6.73 kgf-m, 48.7 ft-lb)
6. Install the brake hose bracket and rear ABS wheel speed sensor.

   Tightening torque:

   Brake hose bracket: 33 N·m (3.36 kgf-m, 24.3 ft-lb)

   Rear ABS wheel speed sensor: 7.5 N·m (0.76 kgf-m, 5.5 ft-lb)
7. Install the sensor assembly - headlight beam leveler. (Model with auto headlight beam leveler)

   Tightening torque:

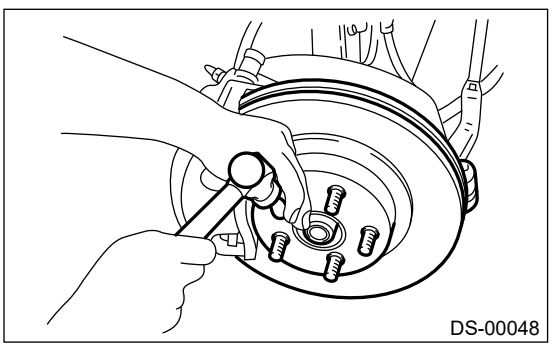
   7.5 N·m (0.76 kgf-m, 5.5 ft-lb)
8. While depressing the brake pedal, tighten new nuts - axle to the specified torque.

   Caution:

   Do not load the rear axle before tightening the nut - axle. Doing so may damage the hub unit COMPL.

   Tightening torque:

   190 N·m (19.37 kgf-m, 140.1 ft-lb)
9. After tightening the nut - axle, lock it securely.

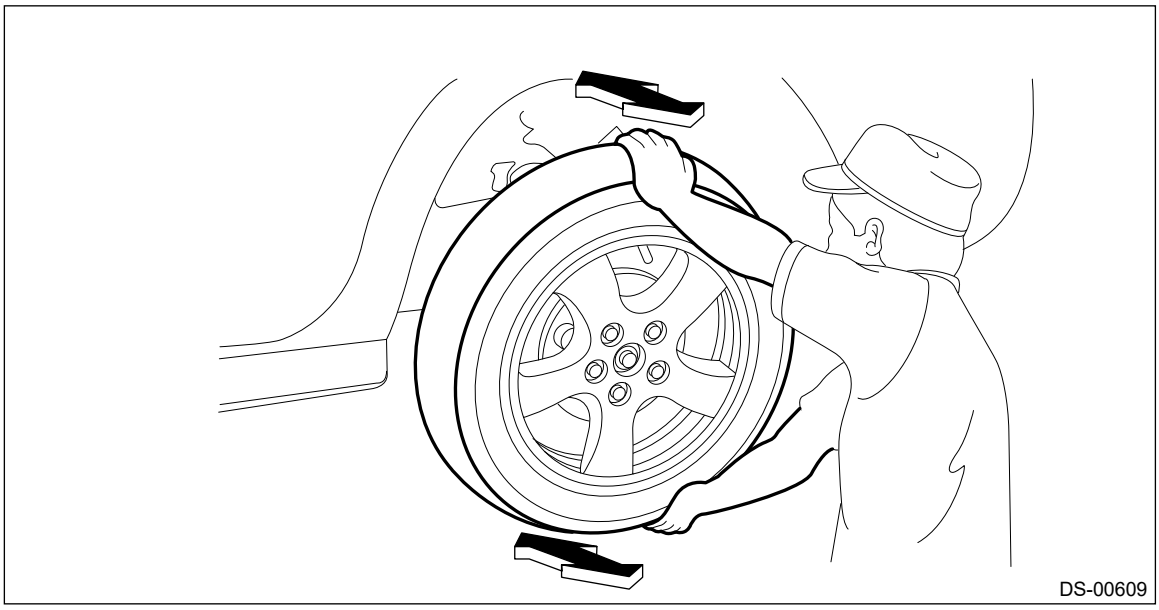


10. Install the rear wheels, and perform the following inspections.

    Tightening torque:

120 N·m (12.24 kgf-m, 88.5 ft-lb)

1. Check the wheels for smooth rotation.
2. Check that there is no looseness by moving the upper and lower portions of rear tire in an axial direction with the brake pedal released.
   - **Looseness exists** → Check the hub unit COMPL - rear axle. Ref. to DRIVE SHAFT SYSTEM>Rear Hub Unit Bearing>INSPECTION.



11. Inspect the wheel alignment and adjust if necessary.
- Inspection: Ref. to FRONT SUSPENSION>Wheel Alignment>INSPECTION.
- Adjustment: Ref. to FRONT SUSPENSION>Wheel Alignment>ADJUSTMENT.

12. Perform reinitialization of the auto headlight beam leveler system. (Model with auto headlight beam leveler) Ref. to LIGHTING SYSTEM>Auto Headlight Beam Leveler System>PROCEDURE.

REMOVAL

1. Disconnect the ground cable from battery. Ref. to NOTE>NOTE > BATTERY.

   Note:

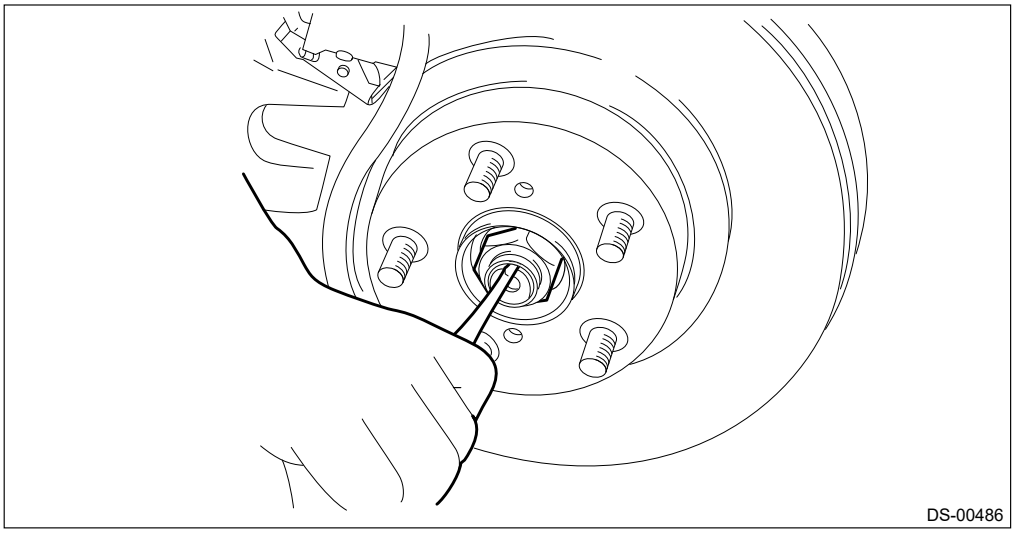
   For model with battery sensor, disconnect the ground terminal from battery sensor.

2. Lift up the vehicle, and then remove the rear wheels.
3. Remove the nut - axle.

   Caution:

   Do not loosen the nut - axle while the rear axle is loaded. Doing so may damage the hub unit COMPL.

   (1) Lift the crimped section of the nut - axle.
   (2) Remove the nut - axle using a socket wrench while depressing the brake pedal.

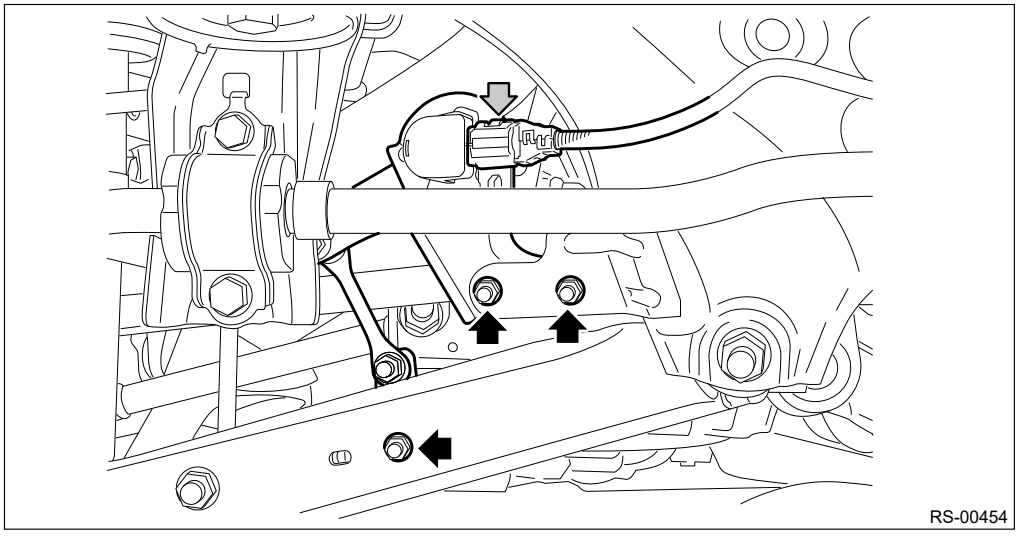


4. Remove the sensor assembly - headlight beam leveler. (Model with auto headlight beam leveler)

   Caution:

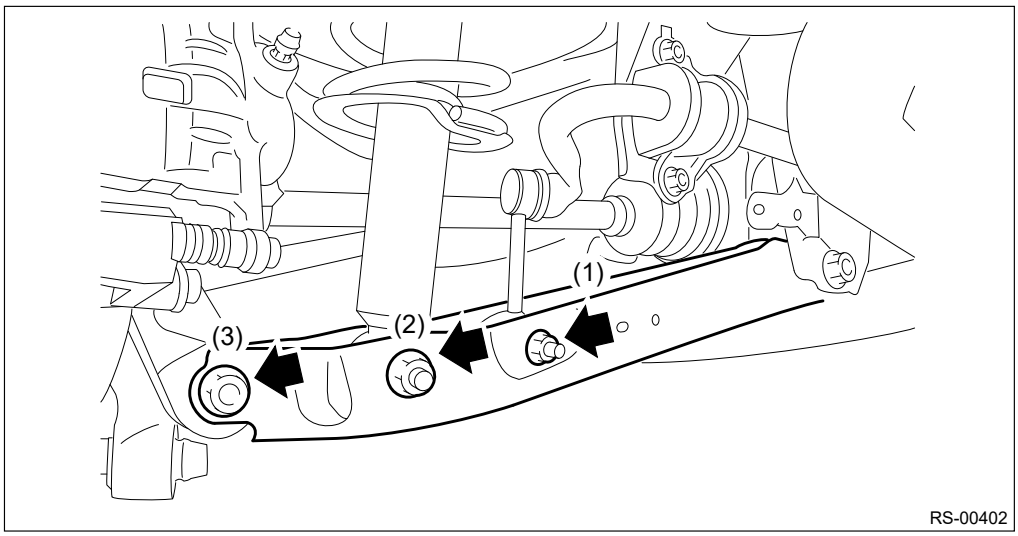
   Do not apply impact to the sensor assembly - headlight beam leveler or forcibly move the arm. Doing so may cause sensor damage and malfunction.

   (1) Disconnect the connector of the sensor assembly - headlight beam leveler.
   (2) Remove the bolts and nuts, and remove the sensor assembly - headlight beam leveler.



5. Remove the bolts and nuts, and lower the lateral link assembly - rear.

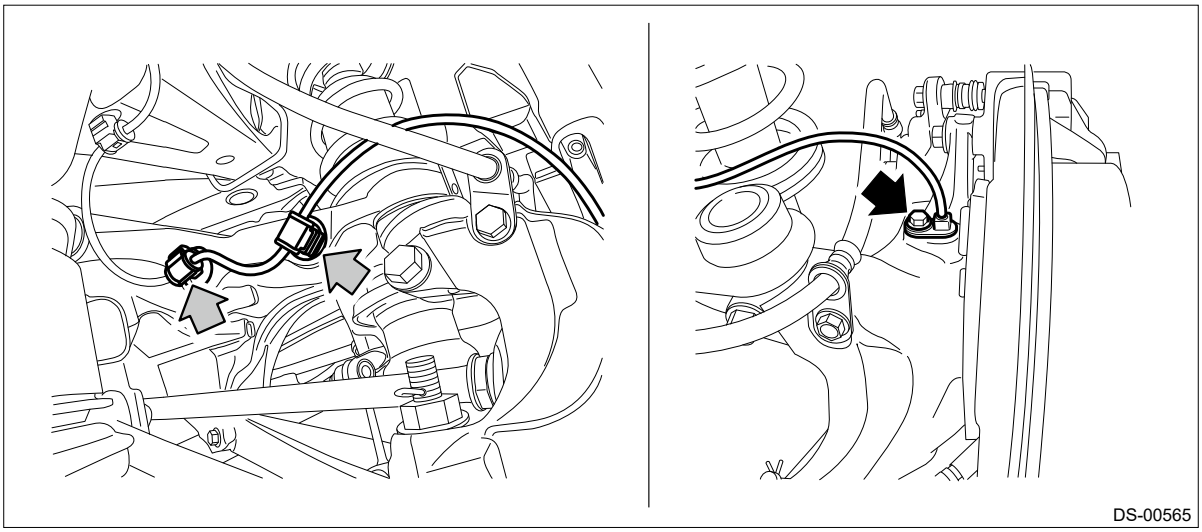
(1) Remove the nut and disconnect the rear stabilizer link. (Model with rear stabilizer)
(2) Remove the bolts at the bottom of rear strut assembly.
(3) Disconnect the housing assembly - rear axle from the lateral link assembly - rear.



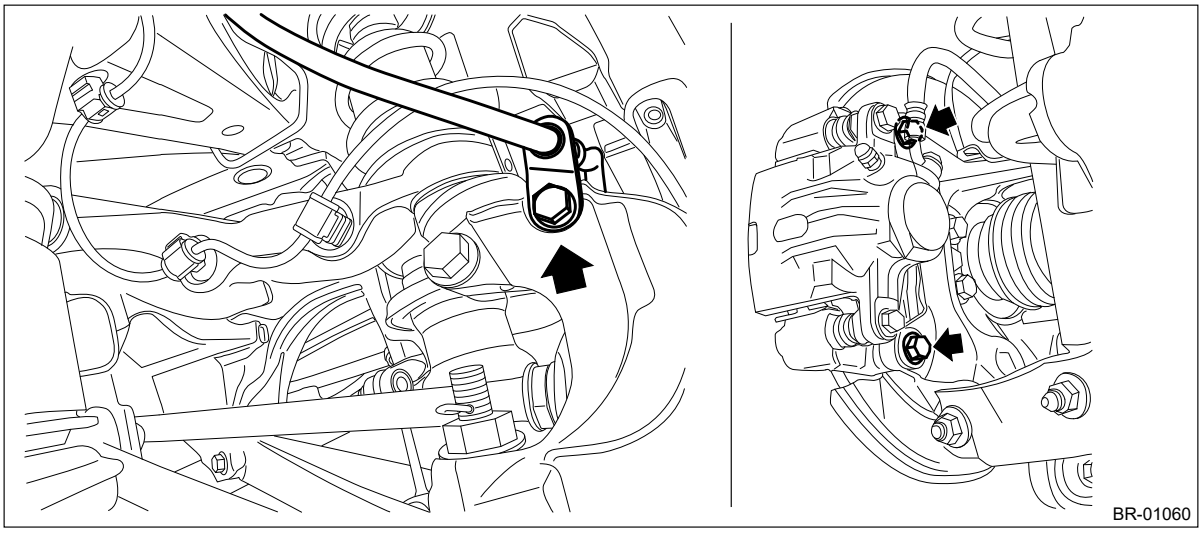
6. Remove the caliper body assembly from the housing assembly - rear axle.
(1) Remove the bolts, and remove the brake hose bracket and ABS wheel speed sensor.
(2) Remove the mounting bolts, and then remove the caliper body assembly.

Caution:

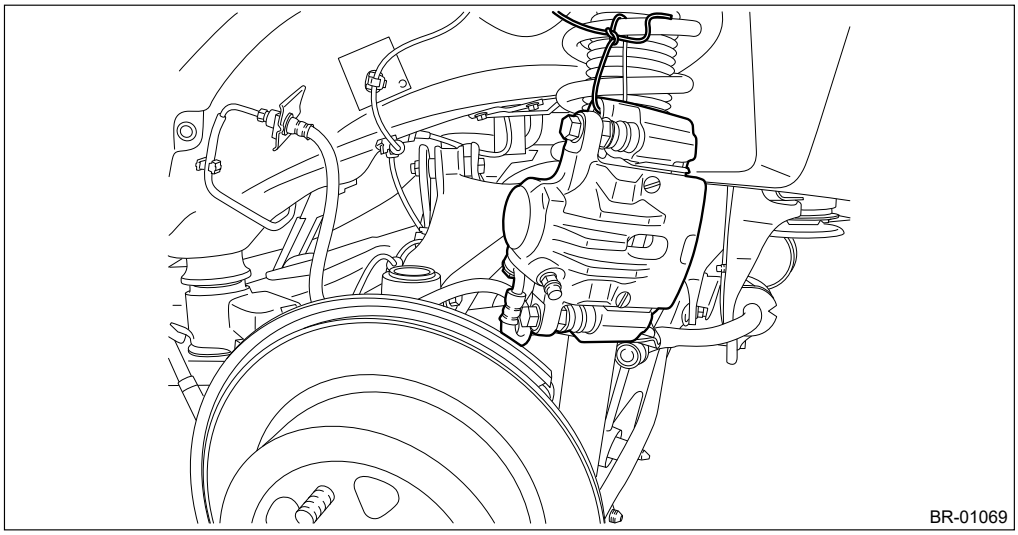
- **Be careful not to damage the sensor.**
- **Do not apply excessive force to the sensor harness.**



7. Remove the caliper body assembly from the housing assembly - rear axle.
(1) Remove the bolts and then remove the brake hose bracket and caliper body assembly.



(2) Prepare wiring harnesses etc. to be discarded, and suspend the caliper body assembly from the strut assembly.

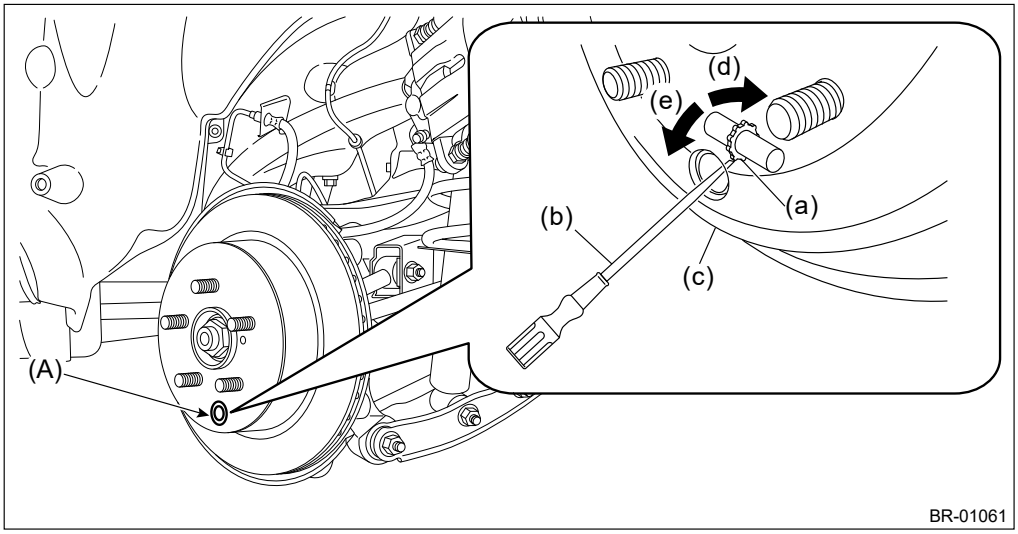


8. Remove the rear disc rotor.

Note:

If the disc rotor is difficult to remove, proceed as follows.

1. **Remove the adjusting hole cover (A) of the rear disc rotor.**
2. **Turn the adjuster assembly - rear brake using a flat tip screwdriver until the parking brake shoes get further enough away from the rear disc rotor surface.**



(a) Adjuster ASSY - rear brake

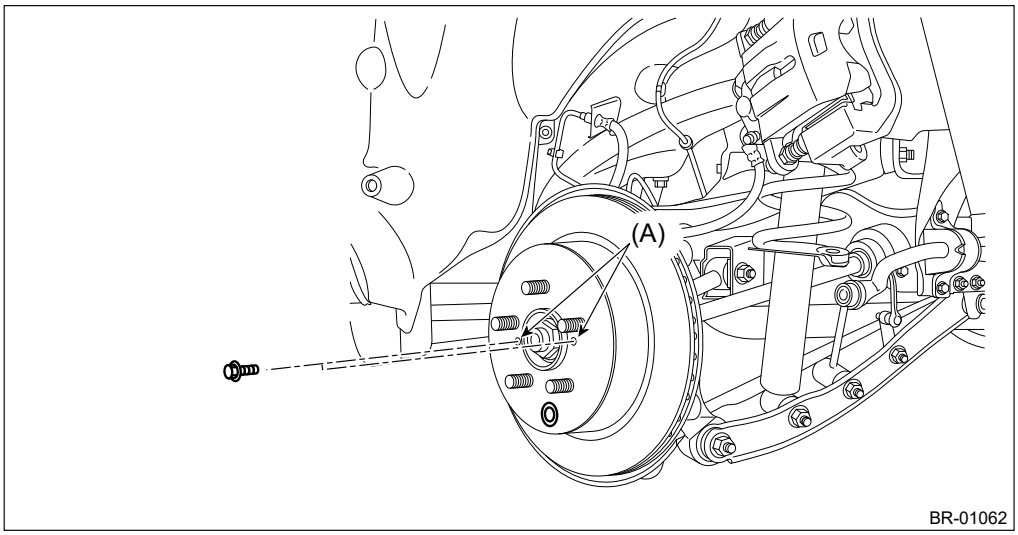
(b) Flat tip screwdriver

(c) Disc rotor

(d) Extend the adjuster ASSY - rear brake

(e) Shorten the adjuster ASSY - rear brake

3. If the disc rotor is not removed after performing above step, screw in an 8 mm (0.31 in) bolt to the threaded part (A) of the disc rotor, and remove the disc rotor.



9. Remove the rear drive shaft assembly from the hub unit COMPL - rear axle.

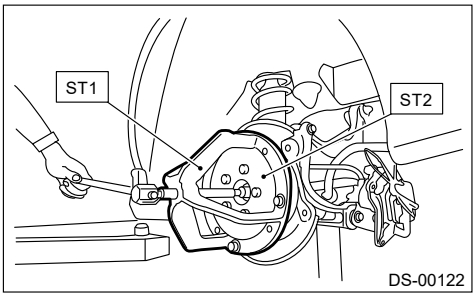
Note:

If it is hard to remove, use the ST.

Preparation tool:

ST1: AXLE SHAFT PULLER (926470000)

ST2: AXLE SHAFT PULLER PLATE (28099PA110)



10. Remove the lateral link assembly - front.

(1) Remove the snap pin (a) and nut (b).

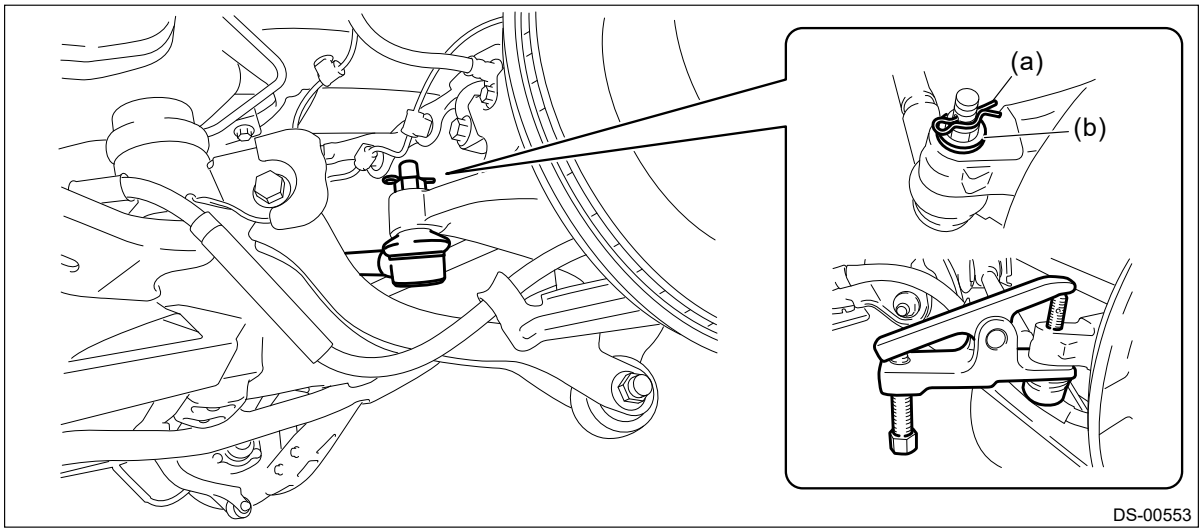
(2) Remove the ball joint from the housing assembly - rear axle.

Caution:

Be careful not to damage the boot of the joint.

Preparation tool:

Tie-rod ball joint puller

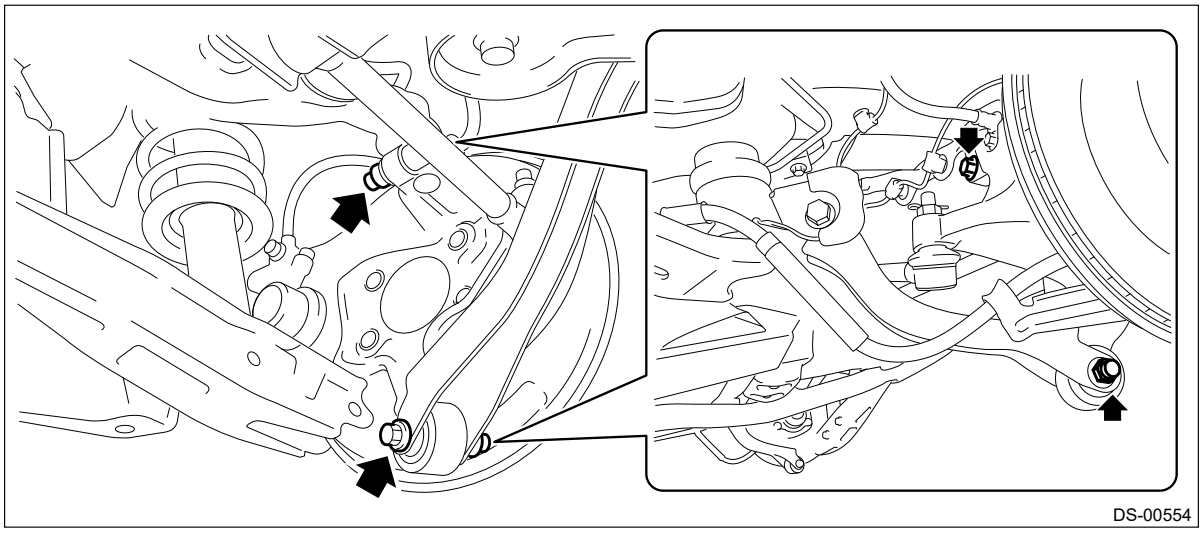


11. Remove the housing assembly - rear axle.

(1) Remove the bolts for the upper arm, the trailing link, and the lateral link assembly - rear, and then separate the housing assembly - rear axle.

Caution:

Be careful not to damage the boot of the joint.



(2) Remove the housing assembly - rear axle.

Caution:

- **Be careful of the weight of the housing assembly - rear axle.**
- **Be careful not to damage the spline portion of the drive shaft.**

12. Refer to "Rear Hub Unit Bearing" for removal of the hub unit COMPL - rear axle. Ref. to DRIVE SHAFT SYSTEM>Rear Hub Unit Bearing>REMOVAL.

ASSEMBLY

Caution:

Wrap shaft splines with vinyl tape to protect the boot from scratches.

Note:

Use specified grease.

Grease:

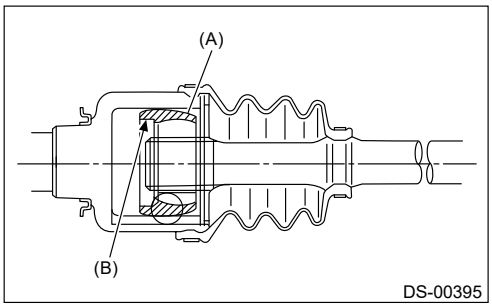
EDJ, DOJ side: NKG814

BJ side, DOJ side: NKG814

1. Install the BJ or EBJ boot in specified position on the shaft assembly, and fill it with 50 — 60 g (1.76— 2.12 oz) of specified grease.
2. Install the DOJ inner race to the shaft.
   (1) Install the DOJ or EDJ boot onto shaft.
   (2) Insert the cage onto shaft.

Note:

Insert the cage with the cutout portion facing the shaft end, since the cage has an orientation.



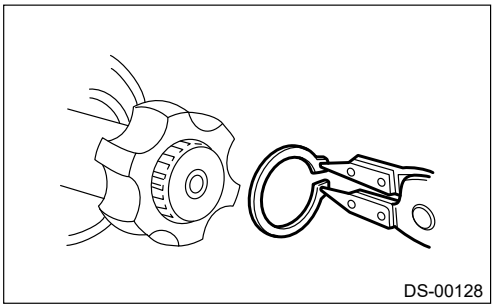
(A) Cage

(B) Cutout portion

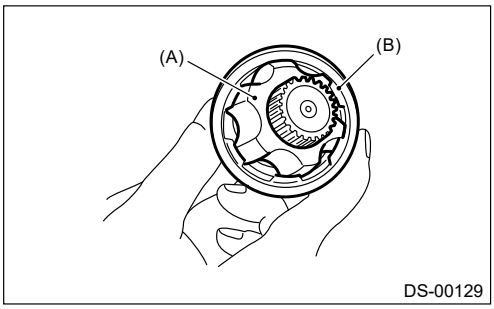
   (3) Install the inner race on shaft and fix the snap ring in place with pliers.

Note:

Confirm that the snap ring is completely fitted in the shaft groove.



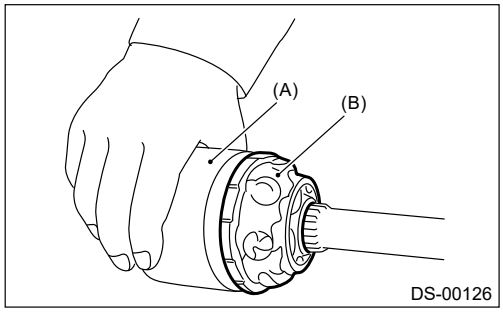
3. Install the cage, which is already inserted into the shaft assembly to the inner race.
   (1) Install the cage (B) with the protruding section aligned with the track on the inner race (A), and turn by a half pitch.



(2) Fill 80 — 90 g (2.82—3.17 oz) of specified grease into the inner side of the DOJ or EDJ outer race.
(3) Apply a thin coat of specified grease to the cage pocket and ball.
(4) Insert the ball bearings into the cage pocket.

4. Connect the outer race to the shaft assembly.

(1) Align the outer race track and ball positions, and place the shaft, inner race, cage and ball bearings in the original positions, and then fix outer race in place.



(A) Outer race
(B) Grease

(2) Install the snap ring in the groove on the DOJ outer race.

Caution:

Be careful of the following items during installation:

- **Make sure that the balls, cage and inner race are completely fitted in the outer race of DOJ.**
- **Use care not to place the matched position of snap ring in the ball groove of outer race.**
- **Pull the shaft lightly and assure that the circlip is completely fitted in the groove.**

(3) Apply an even coat of the specified grease [20 — 30 g (0.71—1.06 oz)] to the entire inner surface of boot. Also apply grease to the shaft.
(4) Install the DOJ boot and EDJ boot taking care not to twist it.

Note:

- **The inside of the large end of DOJ or EDJ boot and the boot groove shall be cleaned so as to be free from grease and other substances.**
- **When installing the DOJ or EDJ boot, position the outer race of DOJ or EDJ boot at center of the stroke.**

5. Tighten the boot band. (double loop type)

Caution:

- **Be careful not to damage the boot.**
- **When tightening boot, use care so that the air within the boot is appropriate.**
- **Once assembled, extend and retract the DOJ repeatedly to provide an equal coating of grease.**

(1) Put a new band through the clip and wind twice in the band groove of the boot.

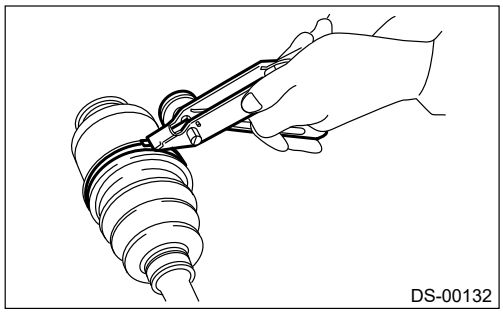
(2) Pinch the end of band with pliers. Hold the clip and tighten securely.
(3) Tighten the band using the ST.

Note:

Tighten the band until it cannot be moved by hand.

Preparation tool:

ST: BAND TIGHTENING TOOL (925091000)



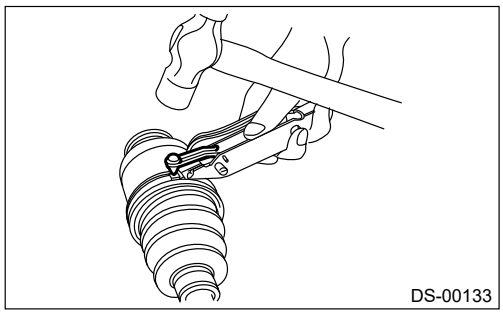
(4) Tap the clip with the punch provided at the end of the ST.

Note:

Tap to an extent that the boot underneath is not damaged.

Preparation tool:

ST: BAND TIGHTENING TOOL (925091000)



(5) Cut off the band with an allowance of about 10 mm (0.39 in) left from the clip and bend this allowance over the clip.

Caution:

Make sure that the end of the band is in close contact with clip.

6. Tighten the boot band. (locking tab type)

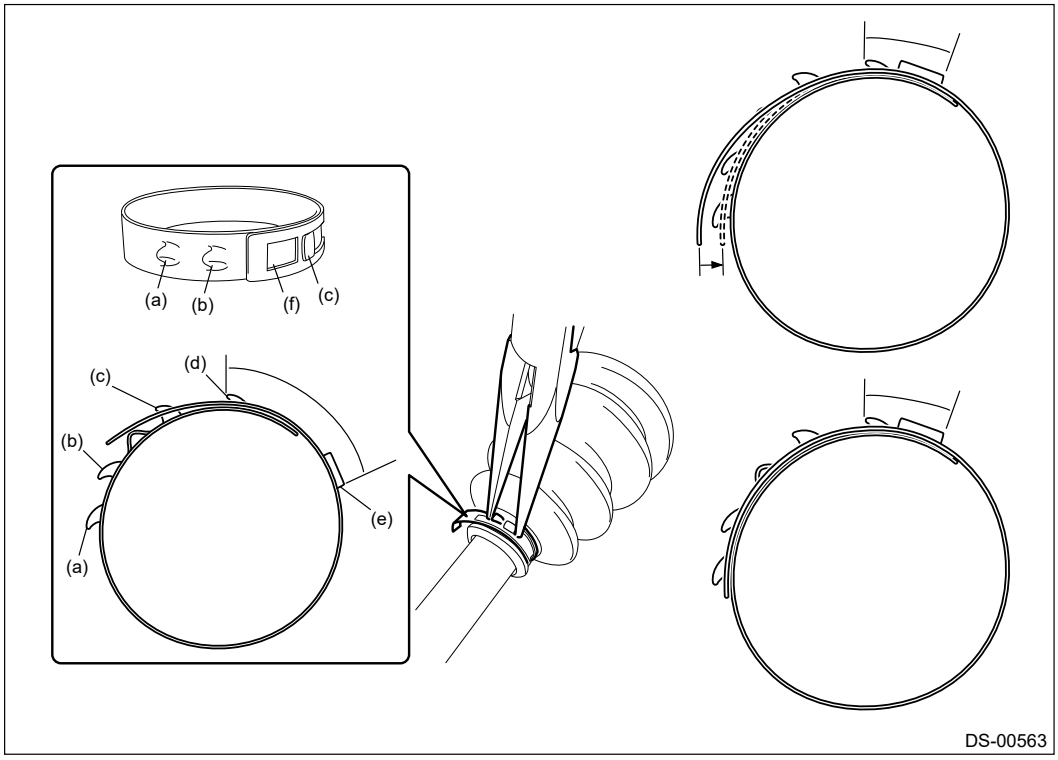
Caution:

- **Be careful not to damage the boot.**
- **When tightening boot, use care so that the air within the boot is appropriate.**
- **Once assembled, extend and retract the DOJ repeatedly to provide an equal coating of grease.**

Preparation tool:

Needle nose pliers

(1) Place a new band onto the groove of the boot.
(2) Pinch (e) and (d) of the band with needle nose pliers, and align with the convex claw (c) for temporarily tightening position.
(3) Keep tightening until claw (a) is seen through the claw window (f) and hold.
(4) While holding the end of the band, hook the claw (a) with the claw window (f).
(5) Make sure the claw (a) and claw (b) are both securely engage to the claw window.



(a) Claw

(b) Claw

(c) Convex claw for temporarily tightening position

(d) Holding portion using pliers

(e) Holding portion using pliers

(f) Claw window

7. Extend and retract the DOJ or EDJ repeatedly to provide an equal coating of grease.

DISASSEMBLY

1. Take out the DOJ outer race from the shaft assembly.

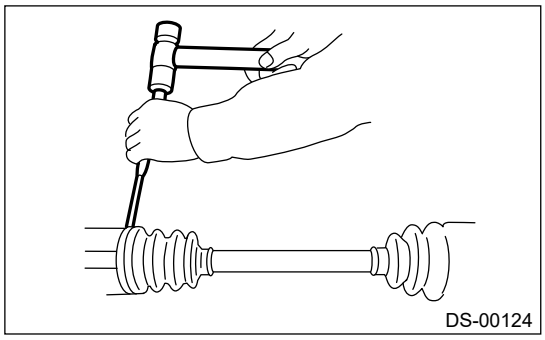
Caution:

Be careful not to damage the boot.

(1) Using a flat tip screwdriver or pliers, loosen the boot band on the large end of DOJ boot.

Caution:

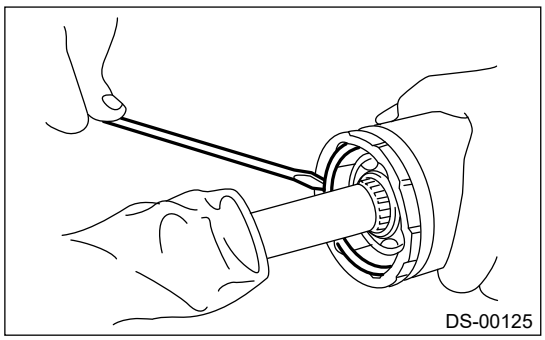
Be careful not to damage the boot.



(2) Remove the boot band on the small end of DOJ boot in the same manner.

(3) Remove the large end of DOJ boot from DOJ outer race.

(4) Remove the round snap ring at the neck of DOJ outer race with a flat tip screwdriver.



(5) Take out the DOJ outer race from the shaft assembly.

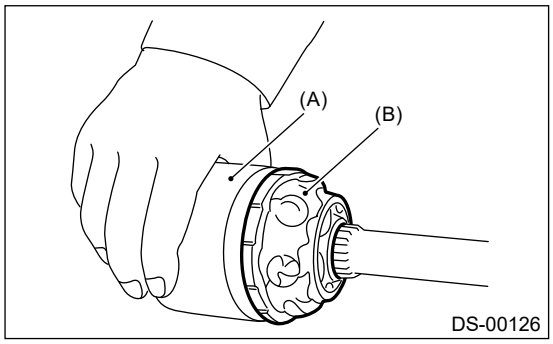
(6) Wipe off the grease and take out the ball bearings.

Caution:

The grease is a special grease (grease for constant velocity joints). Do not mix with other greases.

Note:

Disassemble the parts taking care not to lose balls.



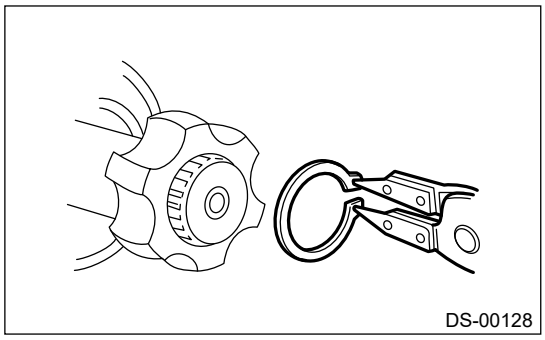
(A) Outer race

(B) Grease

2. Remove the cage from the inner race.

(1) Turn the cage by a half pitch to the track groove of inner race and shift the cage.

(2) Using pliers, remove the snap ring fixing the inner race to the shaft.



(3) Take out the DOJ inner race.

(4) Take off the DOJ cage from shaft and remove the DOJ boot.

Caution:

Wrap shaft splines with vinyl tape to protect the boot from scratches.

3. Remove the BJ boot or EBJ boot in the same procedure as the DOJ boot.

Note:

The BJ is a non-disassembly part, so the drive shaft disassembly stops here.

INSPECTION

Check the removed parts for damage, wear, corrosion etc. Repair or replace if defective.

- **DOJ (Double Offset Joint):**
  Check for seizure, corrosion, damage, wear and excessive play.
- **BJ (Bell Joint):**
  Check for seizure, corrosion, damage and excessive play.
- **EBJ (high-efficiency compact ball fixed joint)**
  Check for seizure, corrosion, damage and excessive play.
- **Shaft:**
  Check for excessive bending, twisting, damage and wear.
- **Boot:**
  Check for wear, warping, breakage and scratches.
- **Grease:**
  Check for discoloration and fluidity.

INSTALLATION

1. Replace the rear differential side oil seal. Ref. to DIFFERENTIALS>Rear Differential Side Oil Seal>REPLACEMENT.

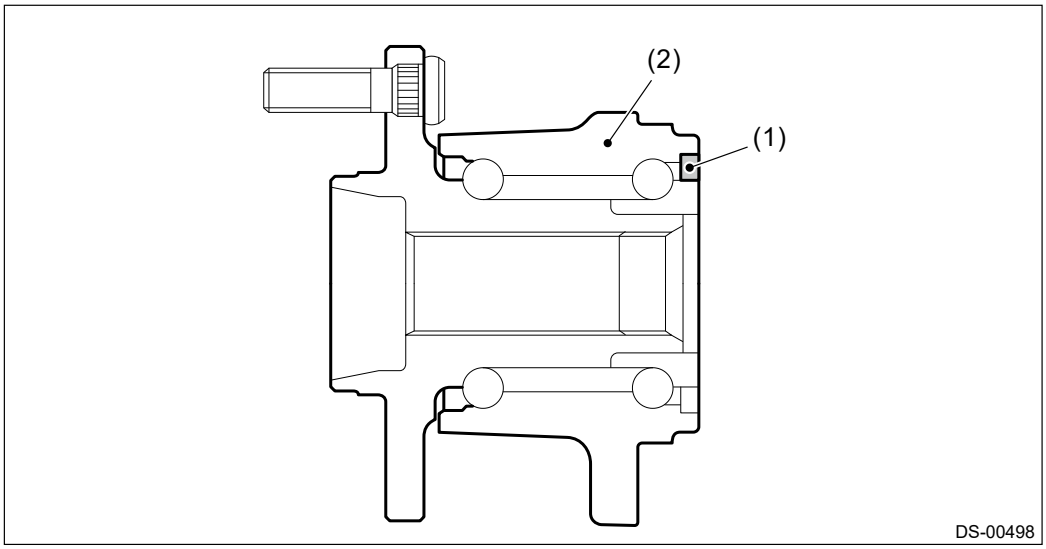
   Note:

   After pulling out the drive shaft assembly, be sure to replace with a new oil seal.

2. Insert the drive shaft assembly into the rear hub spline, and pull it into the specified position.

   Caution:

   - **Be careful not to damage the magnetic encoder.**
   - **Do not get closer the tool which charged magnetism to magnetic encoder.**
   - **Do not hammer the drive shaft assembly when installing.**

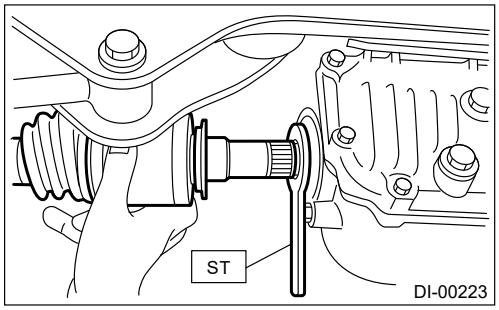


(1) Magnetic encoder (2) Hub unit COMPL - rear axle

3. Temporarily tighten the nut - axle.
4. Using the ST, install the rear drive shaft assembly to the rear differential.

   Preparation tool:

   ST: OIL SEAL PROTECTOR (28099PA090)



5. Install the rear differential assembly to the rear sub frame assembly.

   For installation of VA type and T type, refer to the differential section. Ref. to DIFFERENTIALS>Rear Differential (T-type)>INSTALLATION.

   Caution:

   Be sure to use a new self-locking nut.

6. Install the sensor assembly - headlight beam leveler.

   Tightening torque:

7.5 N·m (0.76 kgf-m, 5.5 ft-lb)

7. While pressing the brake pedal, tighten the new axle nuts to the specified torque.

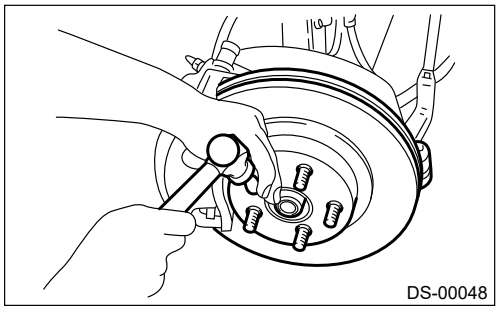
Caution:

Do not load the rear axle before tightening the nut - axle. Doing so may damage the hub unit COMPL.

Tightening torque:

190 N·m (19.37 kgf-m, 140.1 ft-lb)

8. Lock the nut - axle securely.



9. Fill differential gear oil.

10. Install the rear wheels.

Tightening torque:

120 N·m (12.24 kgf-m, 88.5 ft-lb)

11. Perform reinitialization of the auto headlight beam leveler system. (Model with auto headlight beam leveler) Ref. to LIGHTING SYSTEM>Auto Headlight Beam Leveler System>PROCEDURE.

REMOVAL

1. Disconnect the ground cable from battery. Ref. to NOTE>NOTE > BATTERY.

   Note:

   For model with battery sensor, disconnect the ground terminal from battery sensor.

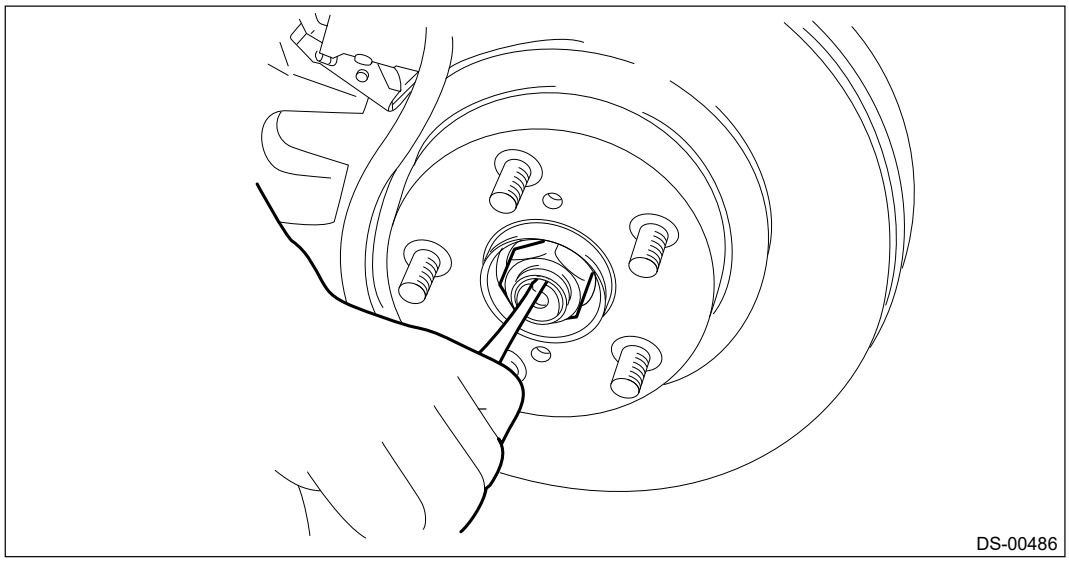
2. Lift up the vehicle, and then remove the rear wheels.
3. Remove the nut - axle.

   Caution:

   Do not loosen the nut - axle while the rear axle is loaded. Doing so may damage the hub unit COMPL.

   (1) Lift the crimped section of the nut - axle.

   (2) Remove the nut - axle using a socket wrench while depressing the brake pedal.



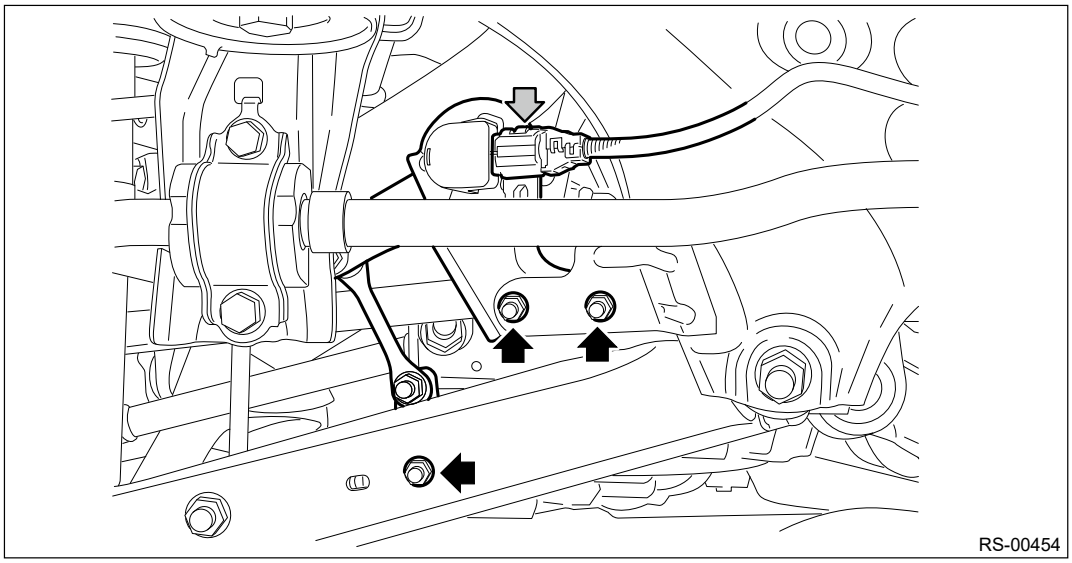
4. Remove the sensor assembly - headlight beam leveler. (Model with auto headlight beam leveler)

   Caution:

   Do not apply impact to the sensor assembly - headlight beam leveler or forcibly move the arm. Doing so may cause sensor damage and malfunction.

   (1) Disconnect the connector of the sensor assembly - headlight beam leveler.

   (2) Remove the bolts and nuts, and remove the sensor assembly - headlight beam leveler.



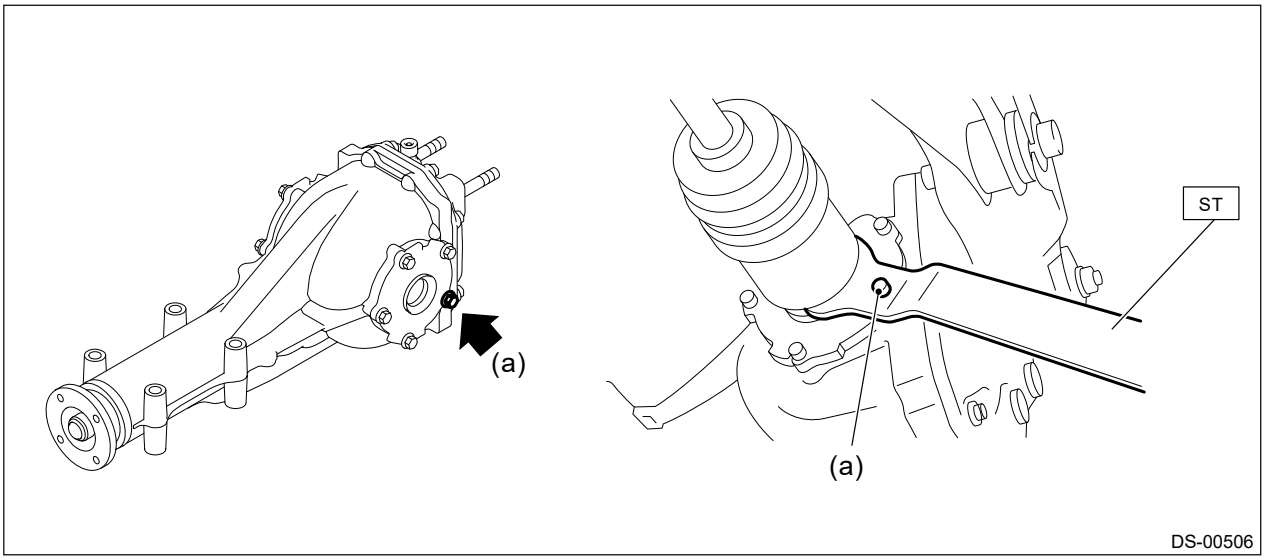
5. Drain differential gear oil.
6. Remove the propeller shaft. Ref. to DRIVE SHAFT SYSTEM>Propeller Shaft>REMOVAL.
7. Remove the rear drive shaft assembly from the rear differential assembly.
   - T type: Pull out the rear drive shaft assembly by fitting the ST to the bolt (a) as shown in the figure.

     Caution:

     Fit the ST to the bolts as shown in the figure to prevent damage of the side bearing retainer.

     Preparation tool:

     ST: DRIVE SHAFT REMOVER (28099PA100)



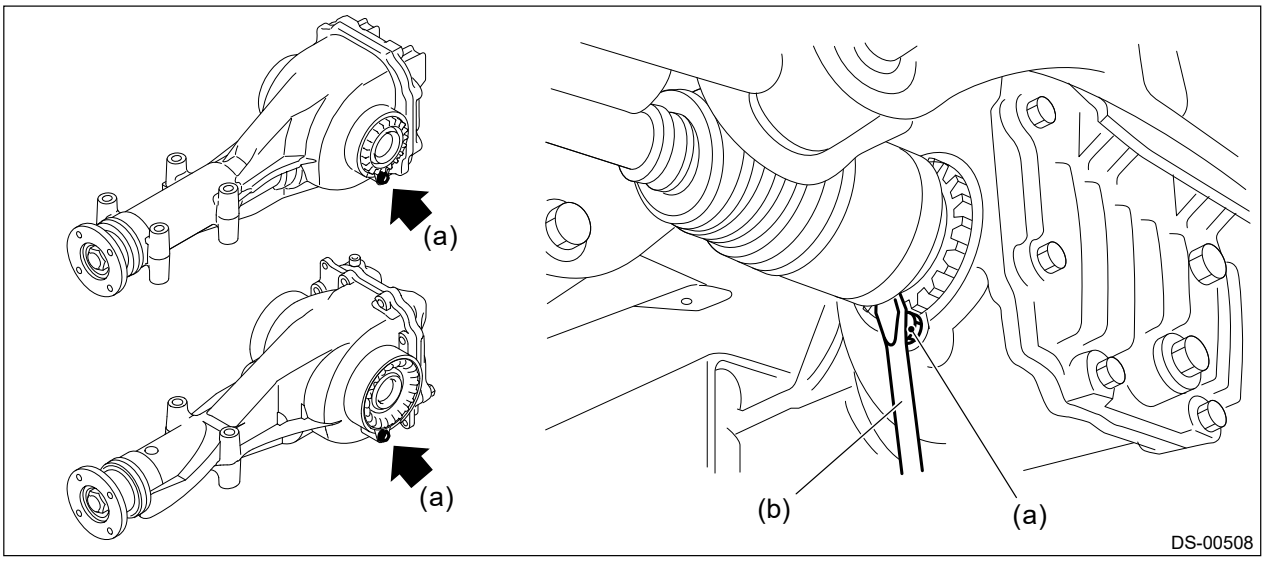
   - VA type: Pull out the rear drive shaft assembly by fitting the tire lever (b) to the bolt (a) as shown in the figure.

     Caution:

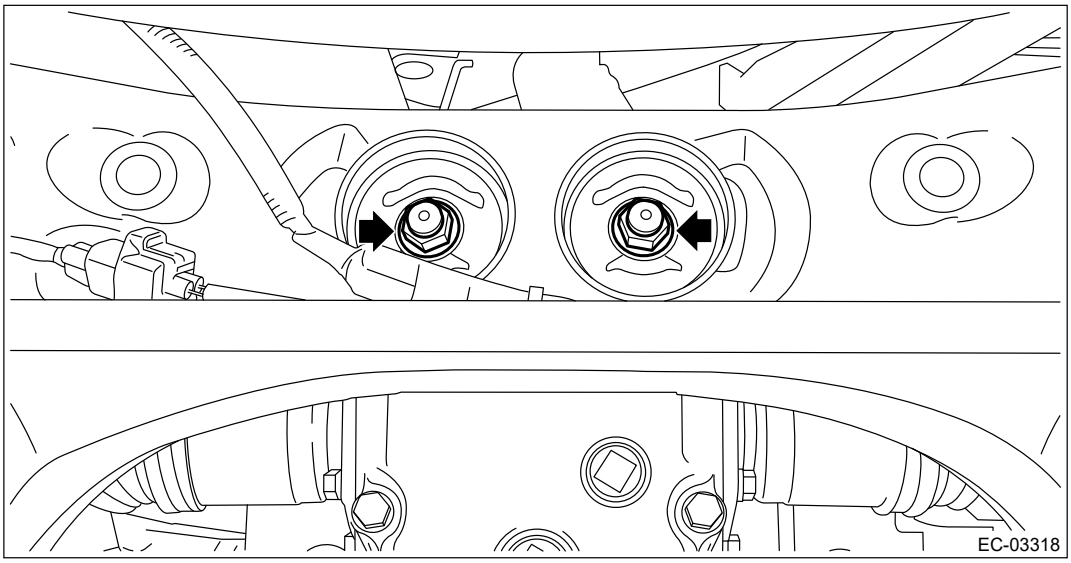
     To prevent damage to the side bearing retainer, use by placing the tire lever against the bolt as shown in the figure.

     Preparation tool:

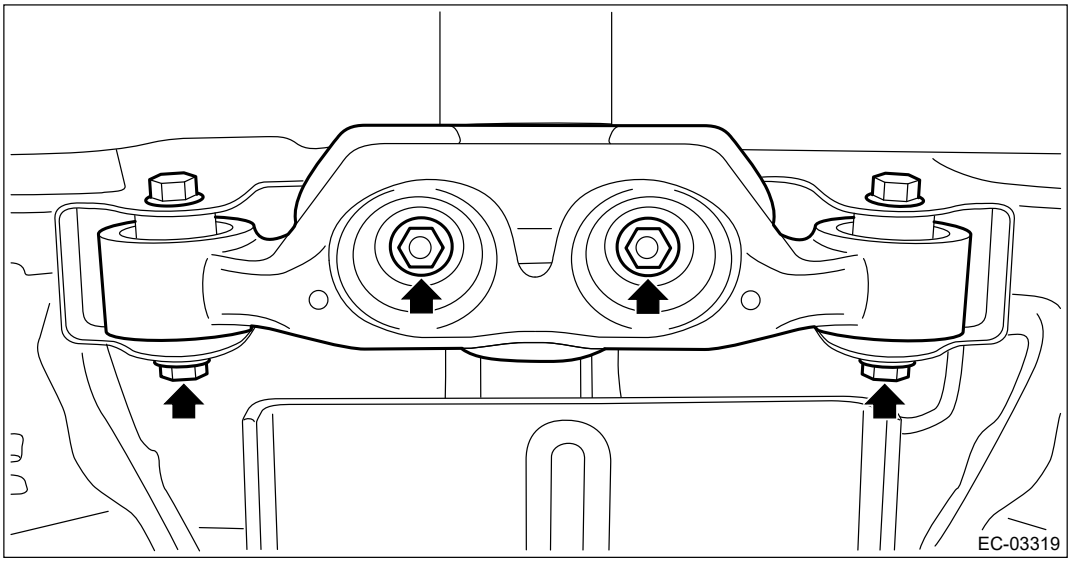
     Tire lever



8. Remove the self-locking nuts which hold the rear differential to the rear sub frame assembly.



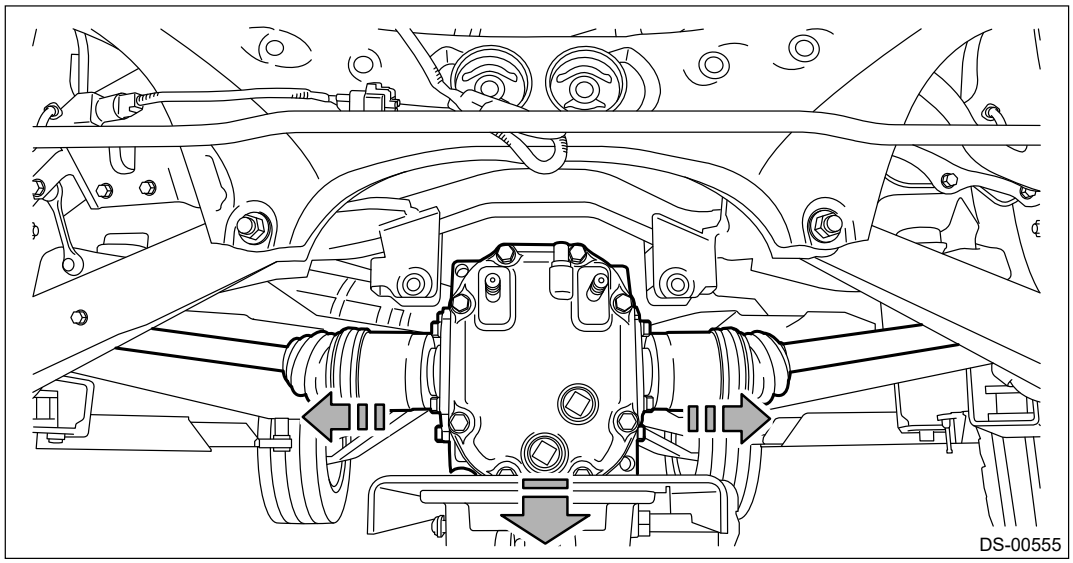
9. Remove the rear differential member from the rear sub frame assembly and the rear differential.



10. Completely pull out the rear drive shaft assembly while lowering the rear differential.

Caution:

Pay attention to avoid damaging the boot of drive shaft.



11. Remove the rear drive shaft assembly from the housing assembly - rear axle.

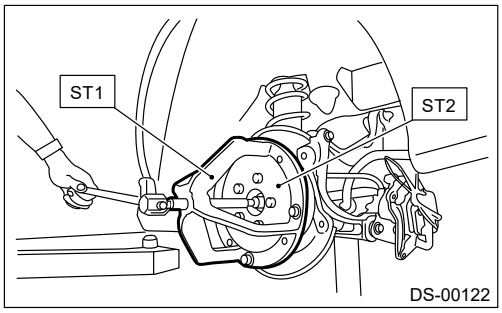
Note:

If it is hard to remove, use the ST.

Preparation tool:

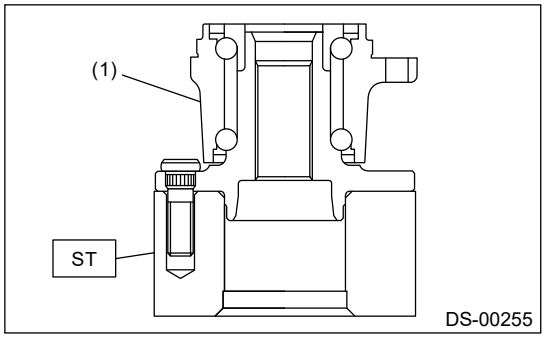
ST1: AXLE SHAFT PULLER(926470000)

ST2: AXLE SHAFT PULLER PLATE (28099PA110)



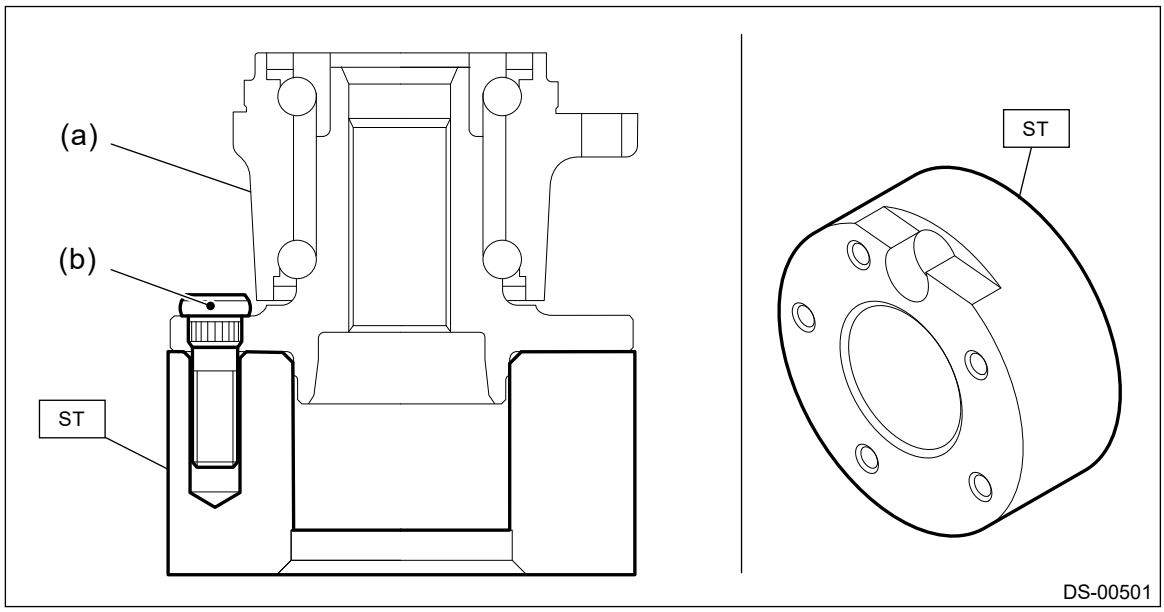
ASSEMBLY

1. Install the hub unit COMPL - rear axle to the ST securely.
   Preparation tool:
   ST: HUB STAND (927080000)



(1) Hub unit COMPL - rear axle

2. Using a press, press new bolts - hub (b) until their seating surfaces contact the hub unit COMPL - rear axle (a).
   Note:
   Use the 12 mm (0.47 in) dia. holes in the HUB STAND to prevent bolts from tilting.



DISASSEMBLY

Using the ST or a hydraulic press, push out the bolt - hub (b) from the hub unit COMPL - rear axle (a).

Caution:

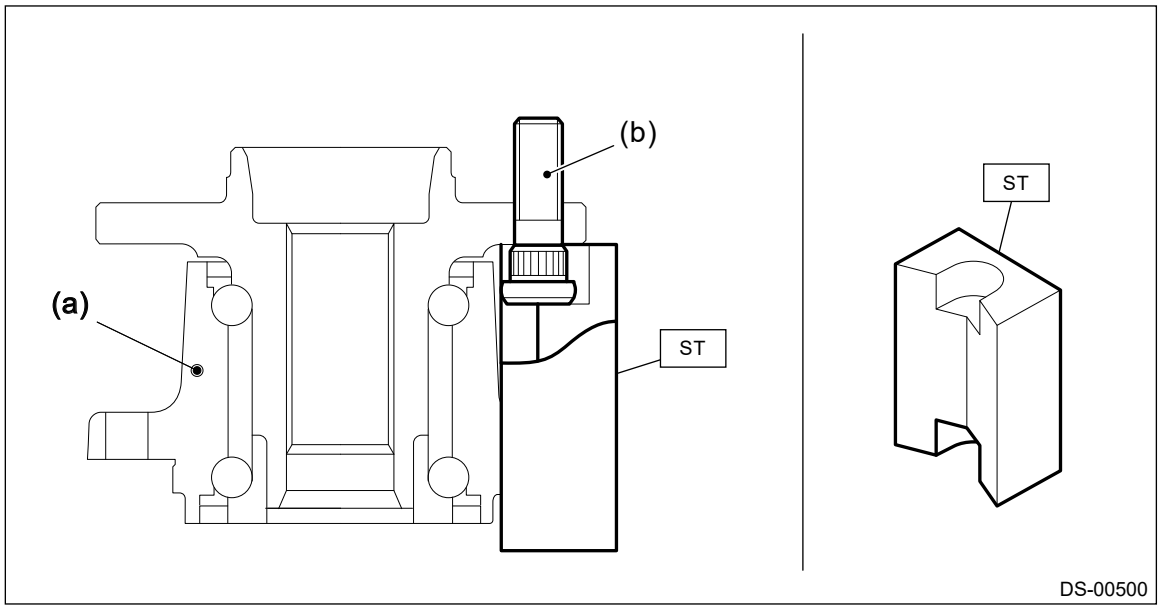
- **Be careful not to hammer the bolts - hub. This may deform the hub unit COMPL.**
- **Do not reuse the bolt - hub.**

Note:

Since the hub unit COMPL - rear axle cannot be disassembled, only bolts - hub can be removed.

Preparation tool:

ST: HUB STAND (28399AG000)

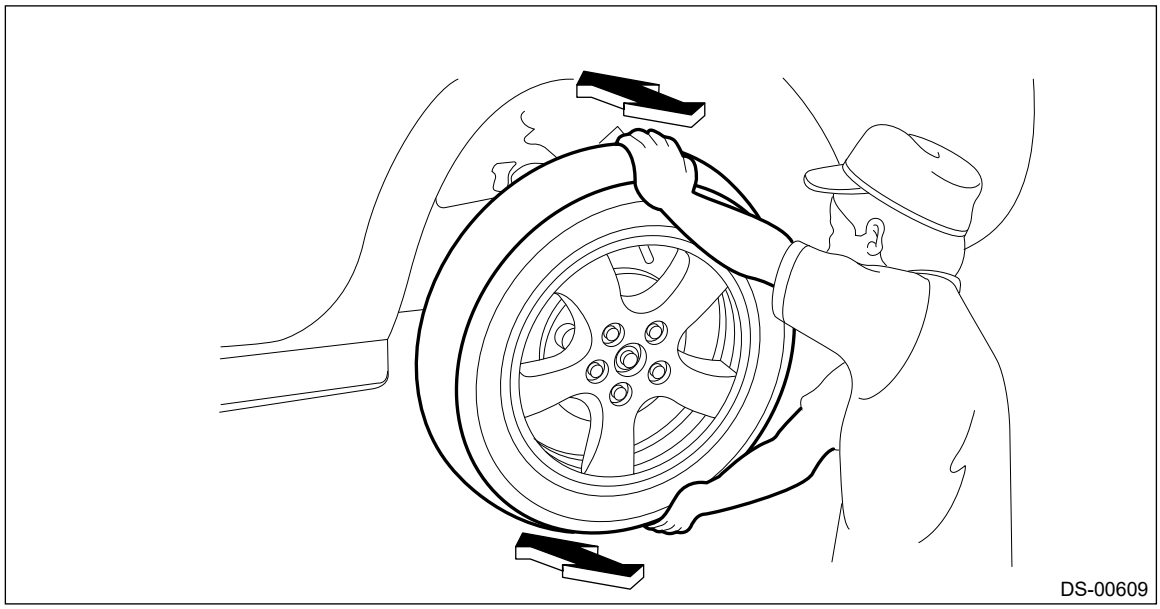


INSPECTION

1. Moving the rear tire up and down by hand, check there is no looseness in bearing, and check the wheel rotates smoothly.

   Caution:

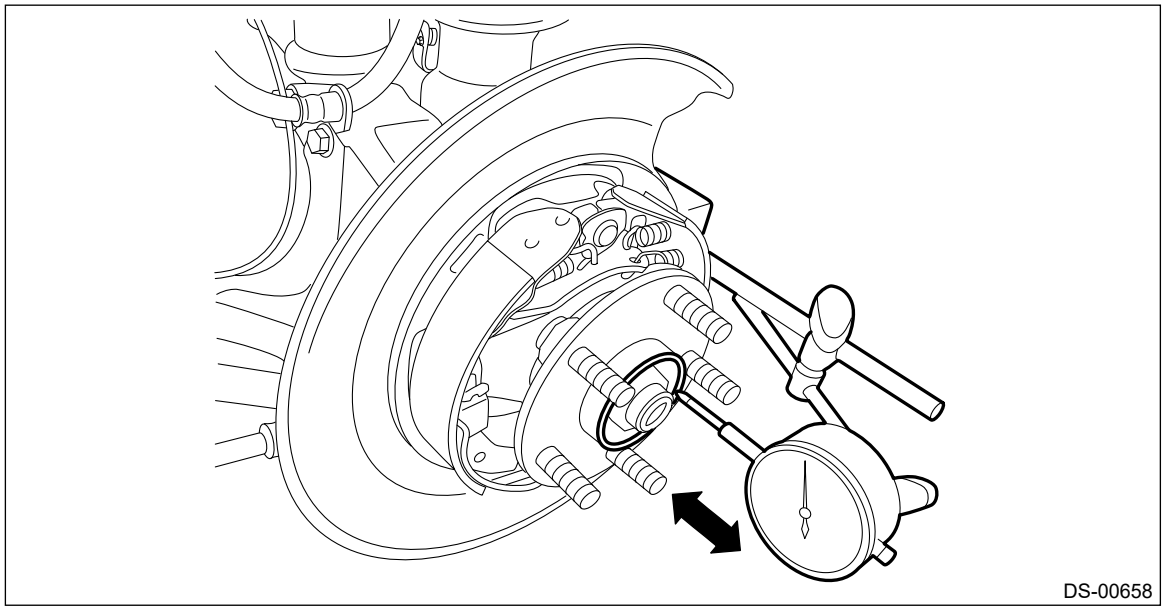
   If there is unsmooth sliding operation or abnormal noise in the bearing, replace the hub unit COMPL - rear axle.



2. Inspect the hub unit bearing for axial looseness.
   1. Remove the tire and disc rotor.
   2. Using a dial gauge, check the axial looseness. Replace the hub unit COMPL if looseness exceeds the limit.

   Service limit:

   Maximum: 0.05 mm (0.0020 in)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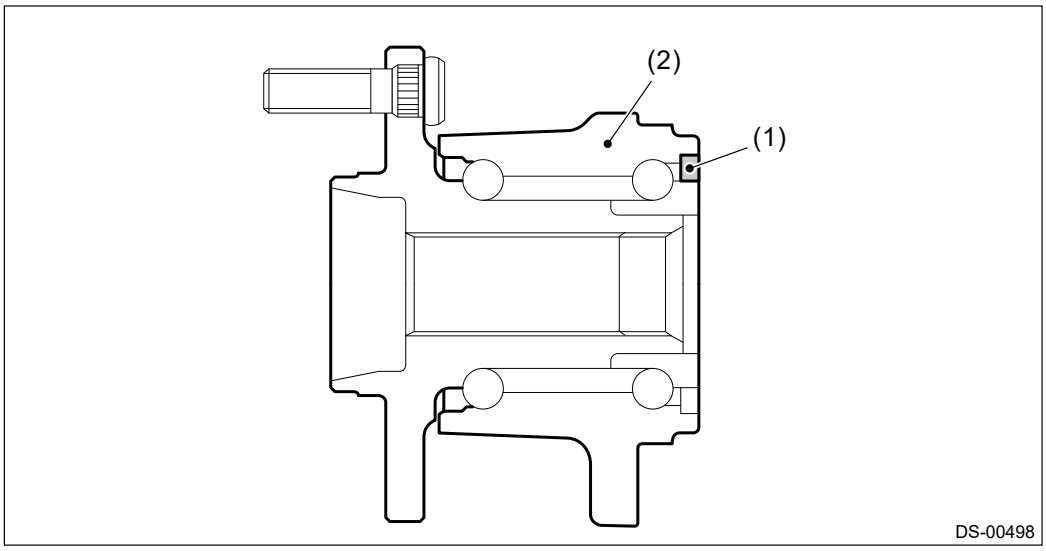
INSTALLATION

1. Place the back plate - rear brake between the housing assembly - rear axle and the hub unit COMPL - rear axle, and tighten the bolt.

Caution:

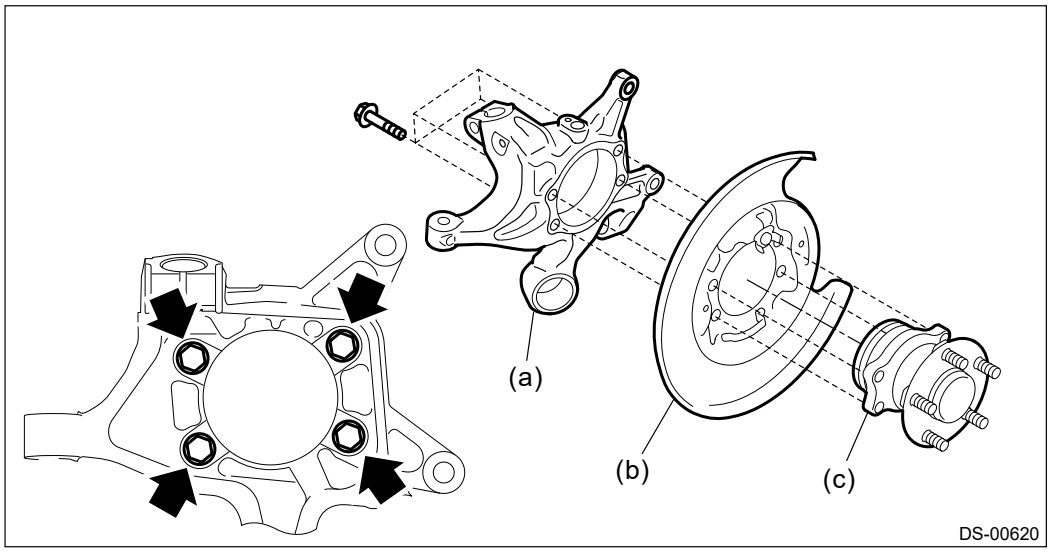
- **Be careful not to damage the magnetic encoder.**
- **Do not get closer the tool which charged magnetism to magnetic encoder.**



(1) Magnetic encoder (2) Hub unit COMPL - rear axle

Tightening torque:

65 N·m (6.63 kgf-m, 47.9 ft-lb)



(a) Housing ASSY - rear axle (b) Back plate - rear brake (c) Hub unit COMPL - rear axle

2. Install the rear drive shaft assembly.

Caution:

- **Do not hammer the drive shaft assembly when installing.**
- **Use new nut - axle.**

(1) Insert the drive shaft assembly into the hub spline, and pull it into the specified position.

(2) Temporarily tighten the nut - axle.

3. Install the disc rotor to the hub unit COMPL - rear axle.
4. Install the caliper body assembly and the brake hose bracket.

Tightening torque:

Brake hose bracket: 33 N·m (3.36 kgf-m, 24.3 ft-lb)

Mounting bolt: 66 N·m (6.73 kgf-m, 48.7 ft-lb)

5. Install the rear ABS wheel speed sensor.

Tightening torque:

7.5 N·m (0.76 kgf-m, 5.5 ft-lb)

6. While depressing the brake pedal, tighten new nuts - axle to the specified torque.

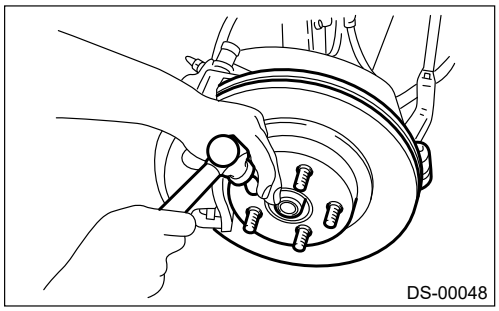
Caution:

Do not load the rear axle before tightening the nut - axle. Doing so may damage the hub unit COMPL.

Tightening torque:

190 N·m (19.37 kgf-m, 140.1 ft-lb)

7. After tightening the nut - axle, lock it securely.

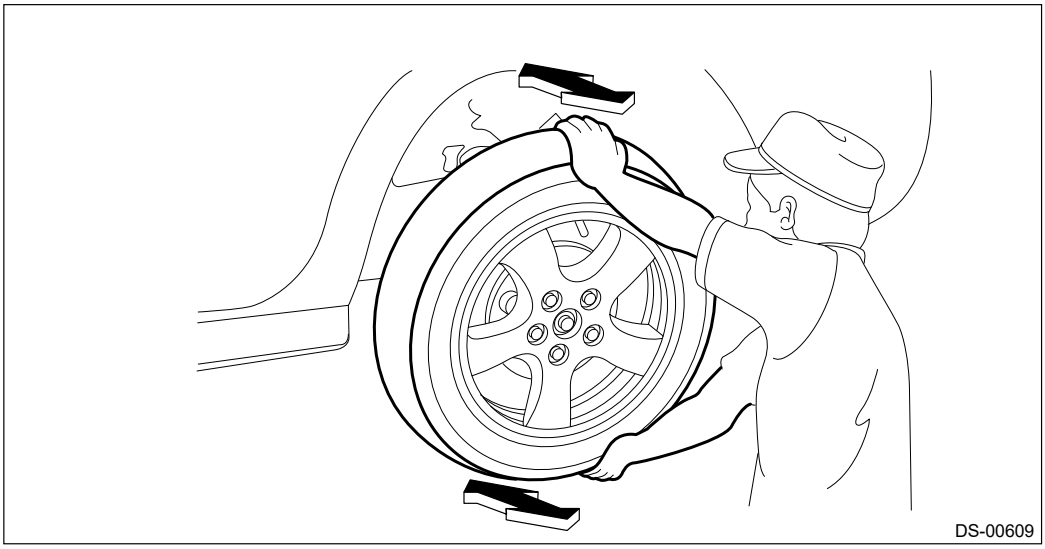


8. Install the rear wheels, and perform the following inspections.

Tightening torque:

120 N·m (12.24 kgf-m, 88.5 ft-lb)

1. Check the wheels for smooth rotation.
2. Check that there is no looseness by moving the upper and lower portions of rear tire in an axial direction with the brake pedal released.
   - **Looseness exists** → Check the hub unit COMPL - rear axle. Ref. to DRIVE SHAFT SYSTEM>Rear Hub Unit Bearing>INSPECTION.



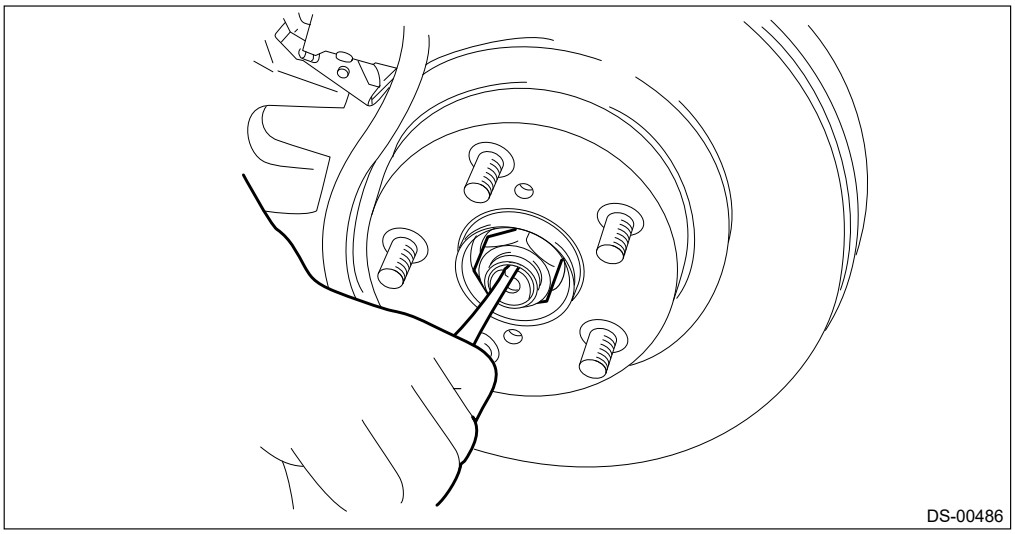
REMOVAL

1. Lift up the vehicle, and then remove the rear wheels.
2. Remove the nut - axle.

   Caution:

   Do not loosen the nut - axle while the rear axle is loaded. Doing so may damage the hub unit COMPL.

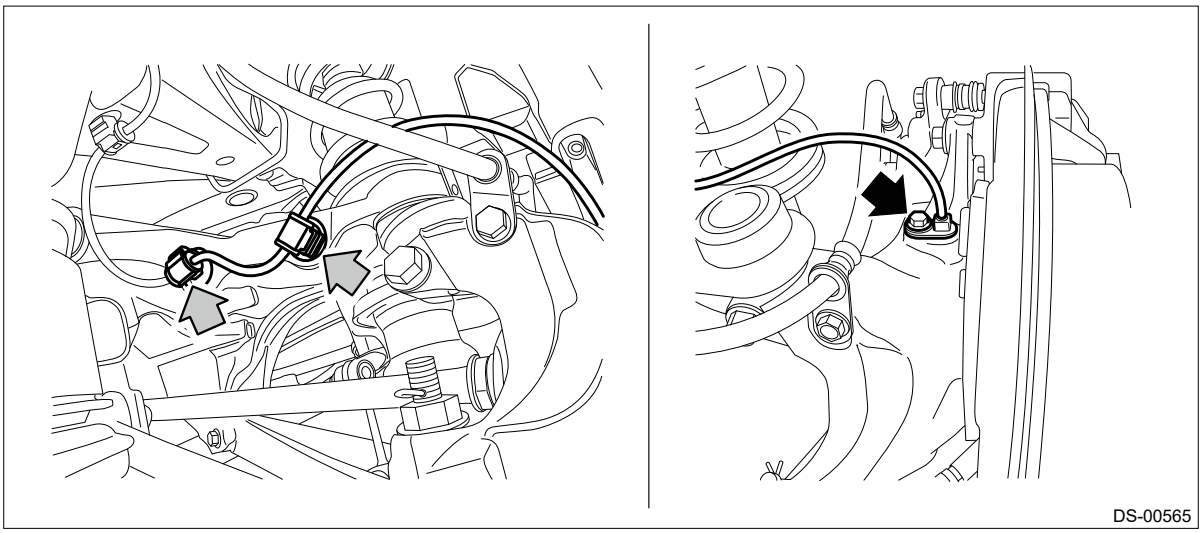
   (1) Lift the crimped section of the nut - axle.
   (2) Remove the nut - axle using a socket wrench while depressing the brake pedal.



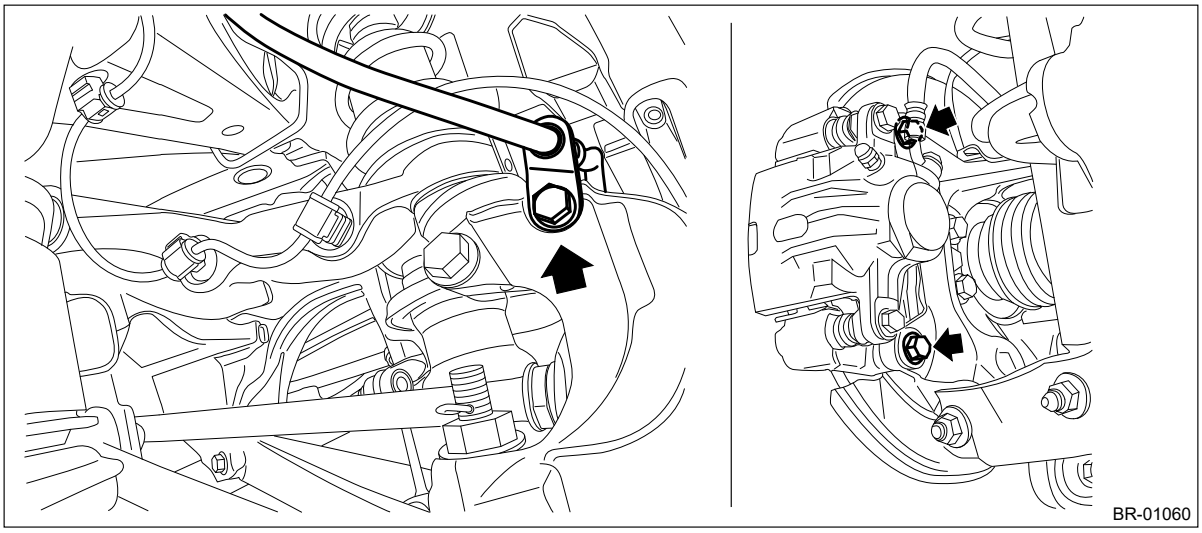
3. Remove the rear ABS wheel speed sensor from the rear axle housing.
   (1) Remove the bolts, and remove the rear ABS wheel speed sensor.
   (2) Remove the rear ABS wheel speed sensor harness from the upper arm.

   Caution:

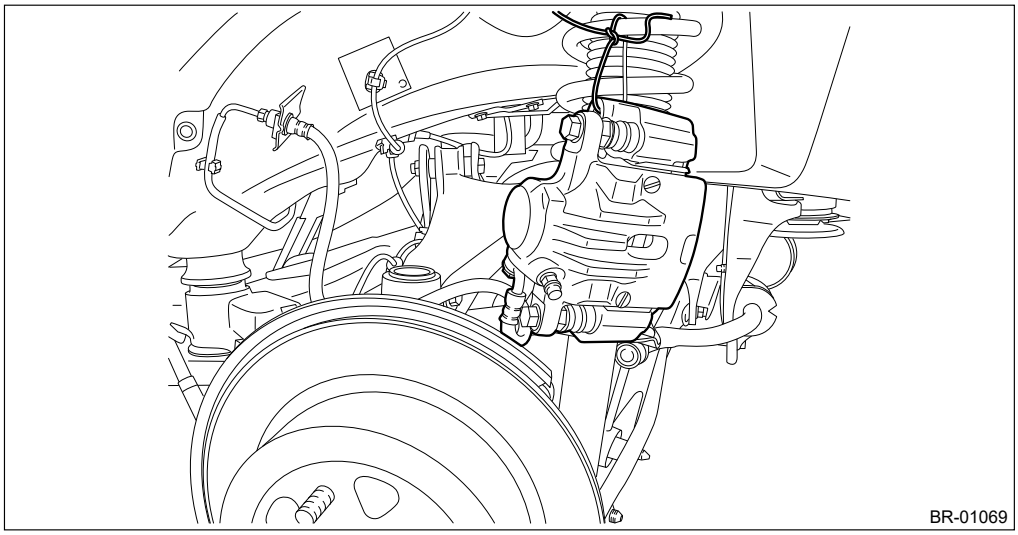
   - **Be careful not to damage the sensor.**
   - **Do not apply excessive force to the sensor harness.**



4. Remove the caliper body assembly from the housing assembly - rear axle.
   (1) Remove the bolts and then remove the brake hose bracket and caliper body assembly.



(2) Prepare wiring harnesses etc. to be discarded, and suspend the caliper body assembly from the strut assembly.

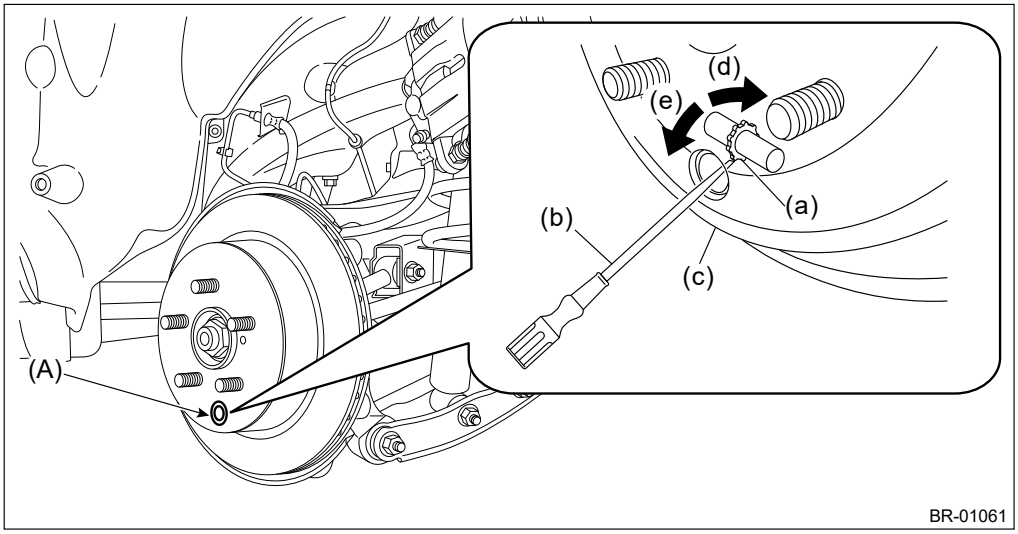


5. Remove the rear disc rotor.

Note:

If the disc rotor is difficult to remove, proceed as follows.

1. **Remove the adjusting hole cover (A) of the rear disc rotor.**
2. **Turn the adjuster assembly - rear brake using a flat tip screwdriver until the parking brake shoes get further enough away from the rear disc rotor surface.**



(a) Adjuster ASSY - rear brake

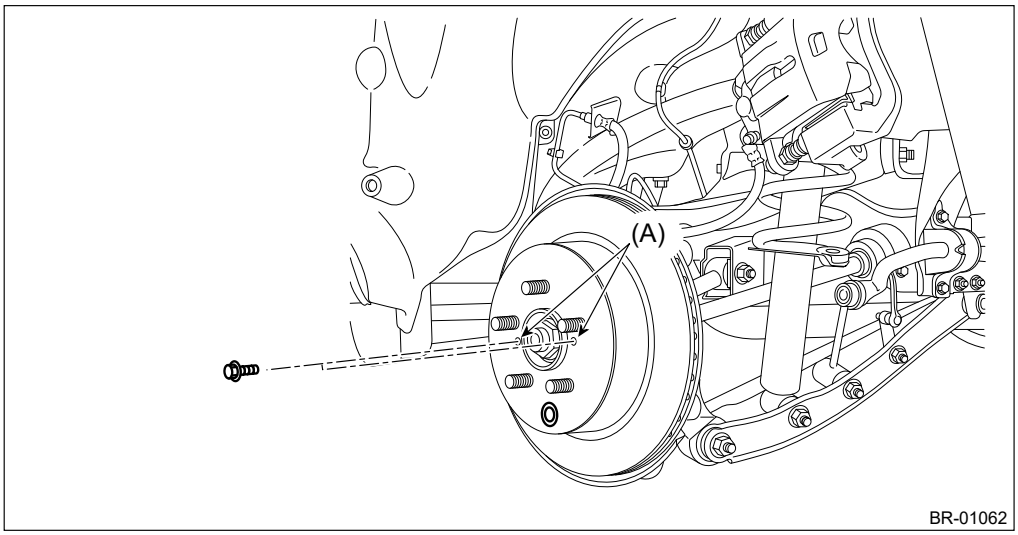
(b) Flat tip screwdriver

(c) Disc rotor

(d) Extend the adjuster ASSY - rear brake

(e) Shorten the adjuster ASSY - rear brake

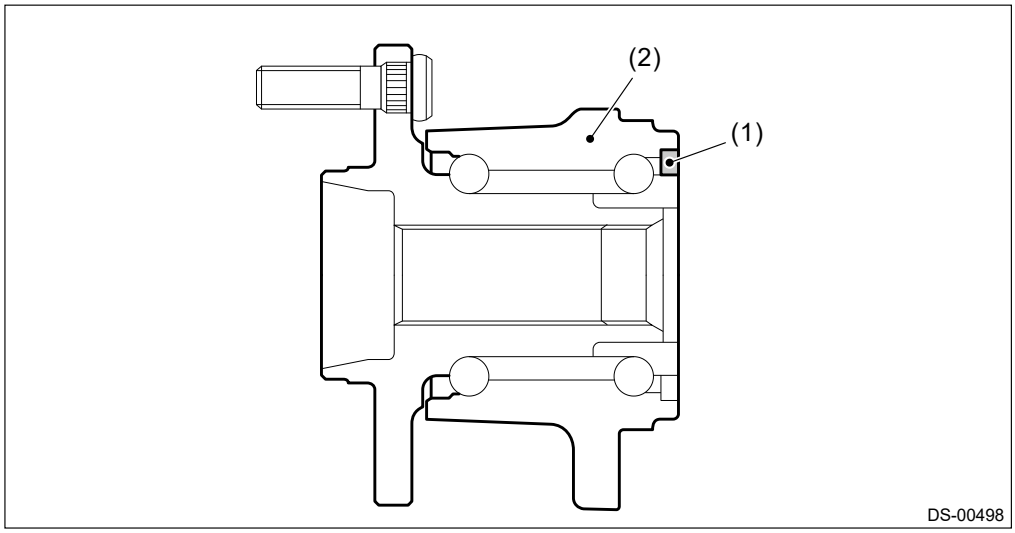
3. If the disc rotor is not removed after performing above step, screw in an 8 mm (0.31 in) bolt to the threaded part (A) of the disc rotor, and remove the disc rotor.



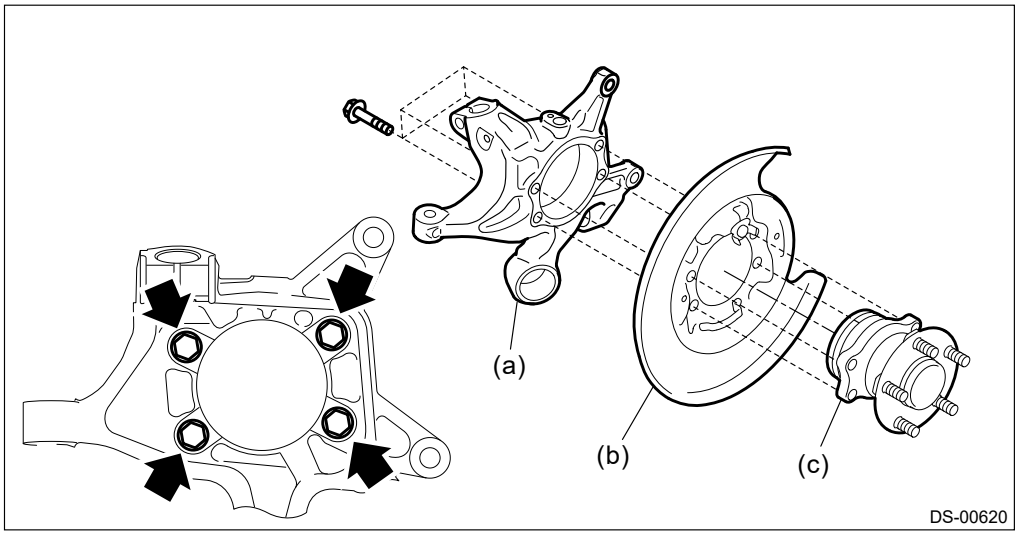
6. Remove the bolts from the housing assembly - rear axle, and then remove the hub unit COMPL - rear axle.

Caution:

- **Be careful not to damage the magnetic encoder.**
- **Do not get closer the tool which charged magnetism to magnetic encoder.**



(1) Magnetic encoder (2) Hub unit COMPL - rear axle



(a) Housing ASSY - rear axle (b) Back plate - rear brake (c) Hub unit COMPL - rear axle

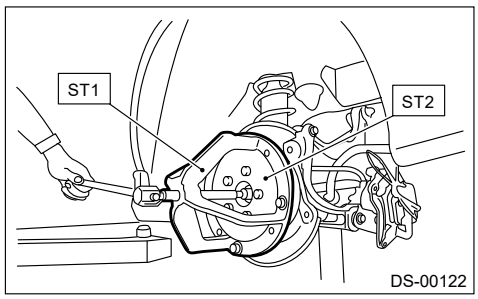
Note:

If it is hard to remove, use the ST.

Preparation tool:

ST1: AXLE SHAFT PULLER (926470000)

ST2: AXLE SHAFT PULLER PLATE (28099PA110)



TRANSFER CASE > Center Differential

NOTE

For removal, installation and inspection, refer to “6MT” section. Ref. to MANUAL TRANSMISSION AND DIFFERENTIAL(6MT)>Center Differential.

NOTE

For removal, installation and inspection, refer to “CVT (TR580)” or “CVT (TR690)” section.
CVT (TR580) model:
Ref. to CONTINUOUSLY VARIABLE TRANSMISSION(TR580)>Extension Case.
CVT (TR690) model:
Ref. to CONTINUOUSLY VARIABLE TRANSMISSION(TR690)>Extension Case.

TRANSFER CASE > General Description

NOTE

For general description, refer to “CVT (TR580)”, “CVT (TR690)” or “6MT” section.
CVT (TR580) model:
Ref. to CONTINUOUSLY VARIABLE TRANSMISSION(TR580)>General Description.
CVT (TR690) model:
Ref. to CONTINUOUSLY VARIABLE TRANSMISSION(TR690)>General Description.
6MT model:
Ref. to MANUAL TRANSMISSION AND DIFFERENTIAL(6MT)>General Description.

TRANSFER CASE > Oil Seal

NOTE

For removal, installation and inspection, refer to “CVT (TR580)”, “CVT (TR690)” or “6MT” section.
CVT (TR580) model:
Ref. to CONTINUOUSLY VARIABLE TRANSMISSION(TR580)>Extension Case Oil Seal.
CVT (TR690) model:
Ref. to CONTINUOUSLY VARIABLE TRANSMISSION(TR690)>Extension Case Oil Seal.
6MT model:
Ref. to MANUAL TRANSMISSION AND DIFFERENTIAL(6MT)>Oil Seal.

TRANSFER CASE > Reduction Drive Gear

NOTE

For removal, installation and inspection, refer to “CVT (TR580)” section. Ref. to CONTINUOUSLY VARIABLE TRANSMISSION(TR580)>Reduction Drive Gear.

TRANSFER CASE > Reduction Driven Gear

NOTE

For removal, installation and inspection, refer to “CVT (TR580)” or “CVT (TR690)” section.
CVT (TR580) model:
Ref. to CONTINUOUSLY VARIABLE TRANSMISSION(TR580)>Reduction Driven Gear.
CVT (TR690) model:
Ref. to CONTINUOUSLY VARIABLE TRANSMISSION(TR690)>Reduction Driven Gear.

TRANSFER CASE > Transfer Case and Extension Case Assembly

NOTE

For removal, installation and inspection, refer to “6MT” section. Ref. to MANUAL TRANSMISSION AND DIFFERENTIAL(6MT)>Transfer Case and Extension Case Assembly.

TRANSFER CASE > Transfer Clutch Pressure Test

NOTE

For inspection, refer to “CVT (TR580)” or “CVT (TR690)” section.
CVT (TR580) model:
Ref. to CONTINUOUSLY VARIABLE TRANSMISSION(TR580)>Transfer Clutch Pressure Test.
CVT (TR690) model:
Ref. to CONTINUOUSLY VARIABLE TRANSMISSION(TR690)>Transfer Clutch Pressure Test.

NOTE

For removal, installation and inspection, refer to “CVT (TR580)” or “CVT (TR690)” section.
CVT (TR580) model:
Ref. to CONTINUOUSLY VARIABLE TRANSMISSION(TR580)>Transfer Clutch.
CVT (TR690) model:
Ref. to CONTINUOUSLY VARIABLE TRANSMISSION(TR690)>Transfer Clutch.

TRANSFER CASE > Transfer Drive Gear

NOTE

For removal, installation and inspection, refer to “6MT” section. Ref. to MANUAL TRANSMISSION AND DIFFERENTIAL(6MT)>Transfer Drive Gear.

TRANSFER CASE > Transfer Driven Gear

NOTE

For removal, installation and inspection, refer to “CVT (TR580)” or “6MT” section.
CVT (TR580) model:
Ref. to CONTINUOUSLY VARIABLE TRANSMISSION(TR580)>Transfer Driven Gear.
6MT model:
Ref. to MANUAL TRANSMISSION AND DIFFERENTIAL(6MT)>Transfer Driven Gear.