DIFFERENTIALS

DI

SPECIFICATION

1. REAR DIFFERENTIAL

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

Note:

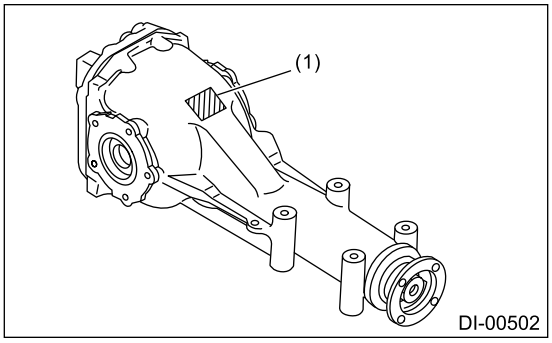
- **Using a different rear differential will cause the drive train and tires to drag or emit abnormal noise.**
- **For option code, refer to "ID" section. Ref. to IDENTIFICATION.**

Model	2.5 L high power turbo	2.0 L turbo	
	6MT	6MT	CVT
Rear differential type	T-type	VB3-type	
Identification	H5	E2	E3
LSD type	Torsen	—	
Type of gear	Hypoid gear		
Gear ratio (number of gear teeth)	3.545 (39/11)	4.111 (37/9)	3.900 (39/10)
Oil capacity	1.0 L (1.1 US qt, 0.9 Imp qt)	0.8 L (0.8 US qt, 0.7 Imp qt)	
Rear differential gear oil	GL-5		

2. IDENTIFICATION

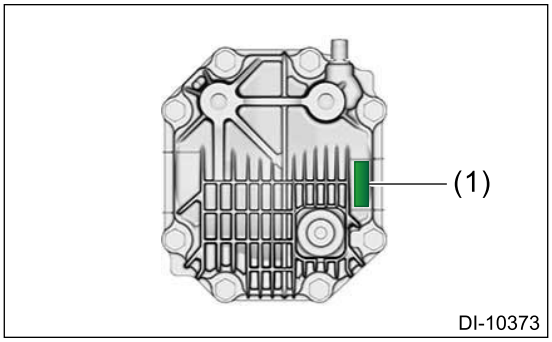
Identification positions are shown in the following figures.

- T-type



(1) Identification

- VB3-type



(1) Identification

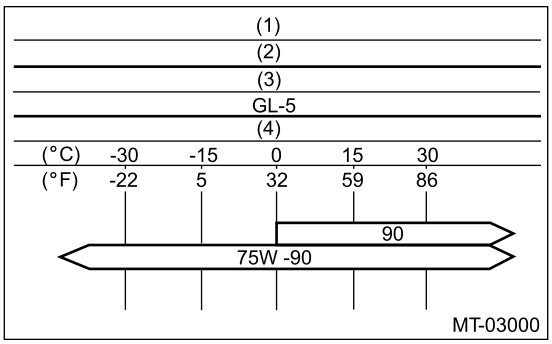
3. REAR DIFFERENTIAL GEAR OIL

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

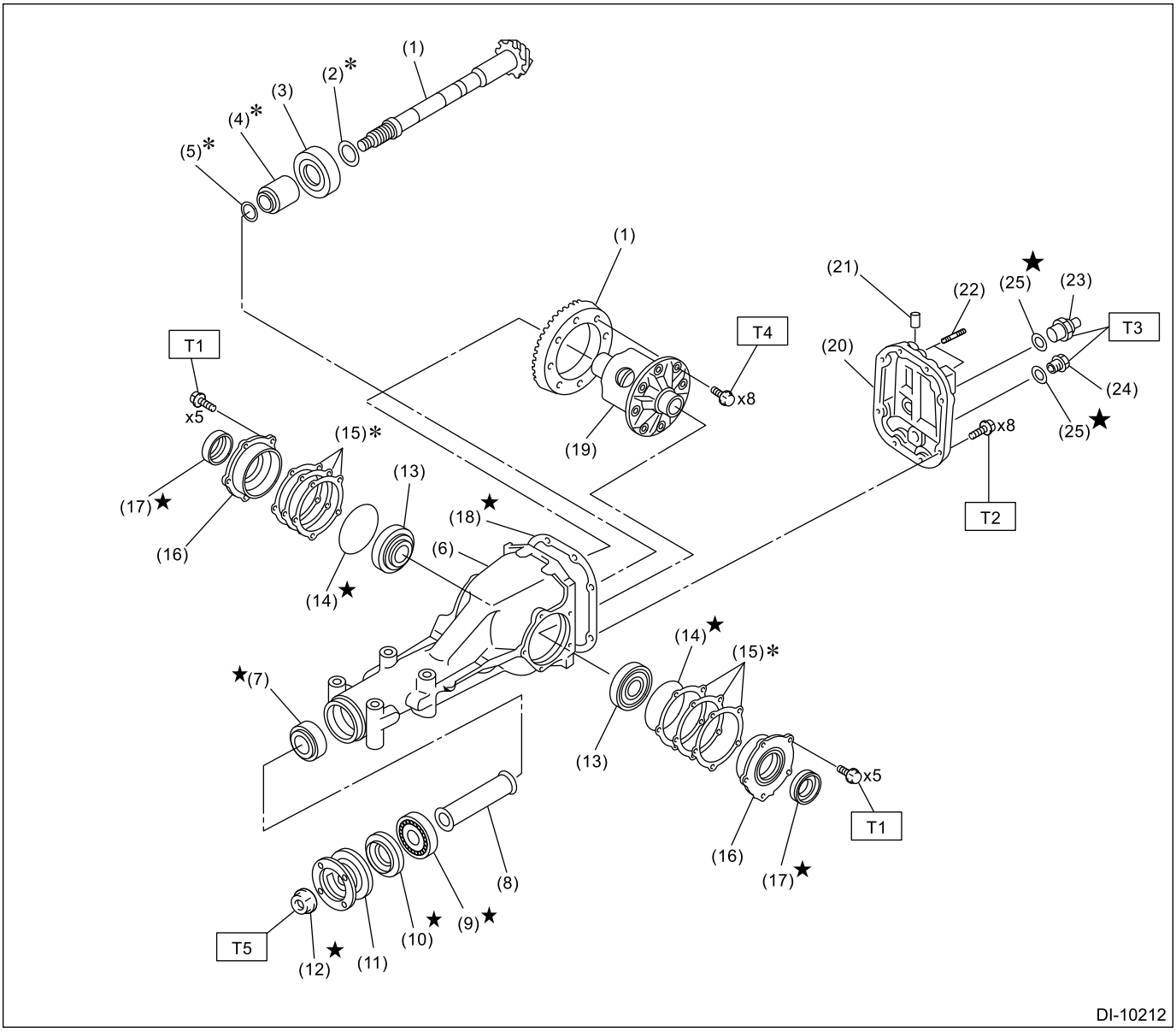
4. SERVICE DATA

Drive pinion bearing preload (for new bearing)	Measured with spring measurement (measured from the companion flange bolt)	N (kgf, lbf)	T-type	24.1 — 38.6 (2.5 — 3.9, 5.4 — 8.7)
			VB3-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	0.98 — 1.57 (0.10 — 0.16, 0.72 — 1.16)
			VB3-type	0.48 — 1.22 (0.05 — 0.12, 0.35 — 0.90)
Differential bevel gear and differential bevel pinion backlash		mm (in)	VB3-type	0.13 — 0.18 (0.005 — 0.007)
Hypoid driven gear to drive pinion backlash		mm (in)	T-type	0.10 — 0.20 (0.004 — 0.008)
			VB3-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)
Companion flange mating surface runout	mm (in)		0.08 (0.003)
Companion flange runout on its inner surface	mm (in)		0.08 (0.003)
Total preload (measured from the companion flange bolt hole)	N (kgf, lbf)	T-type	26.5 — 53 (2.7 — 5.4, 6.0 — 11.9)

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
(8) Spacer
(9) Pilot bearing
(10) Front oil seal
(12) Self-locking nut
(13) Side bearing
(14) O-ring
(15) Side retainer shim
(16) Side retainer
(17) Side oil seal
(18) Gasket
(19) Differential case ASSY
(20) Rear cover
(21) Air breather cap
(23) Oil temperature sensor
(24) Drain plug
(25) Gasket

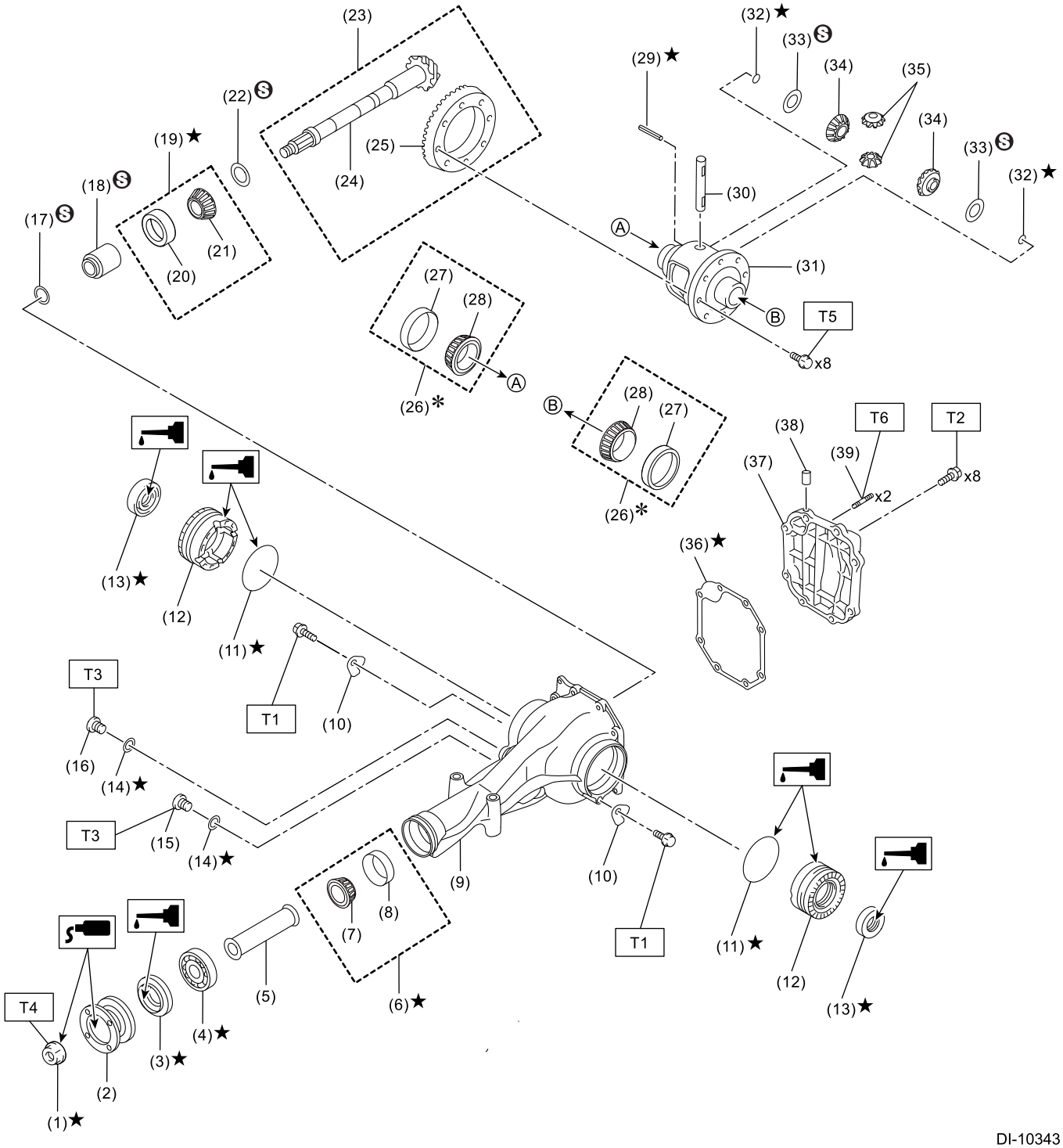
Tightening torque: N·m (kgf-m, ft-lb)

T1: 10.5 (1.1, 7.7)
T2: 44 (4.5, 32.5)
T3: 60 (6.1, 44.3)
T4: 103 (10.5, 76.0)
T5: 181.5 (18.5, 133.9)

(11) Companion flange

(22) Stud bolt

2. REAR DIFFERENTIAL (VB3-TYPE)



DI-10343

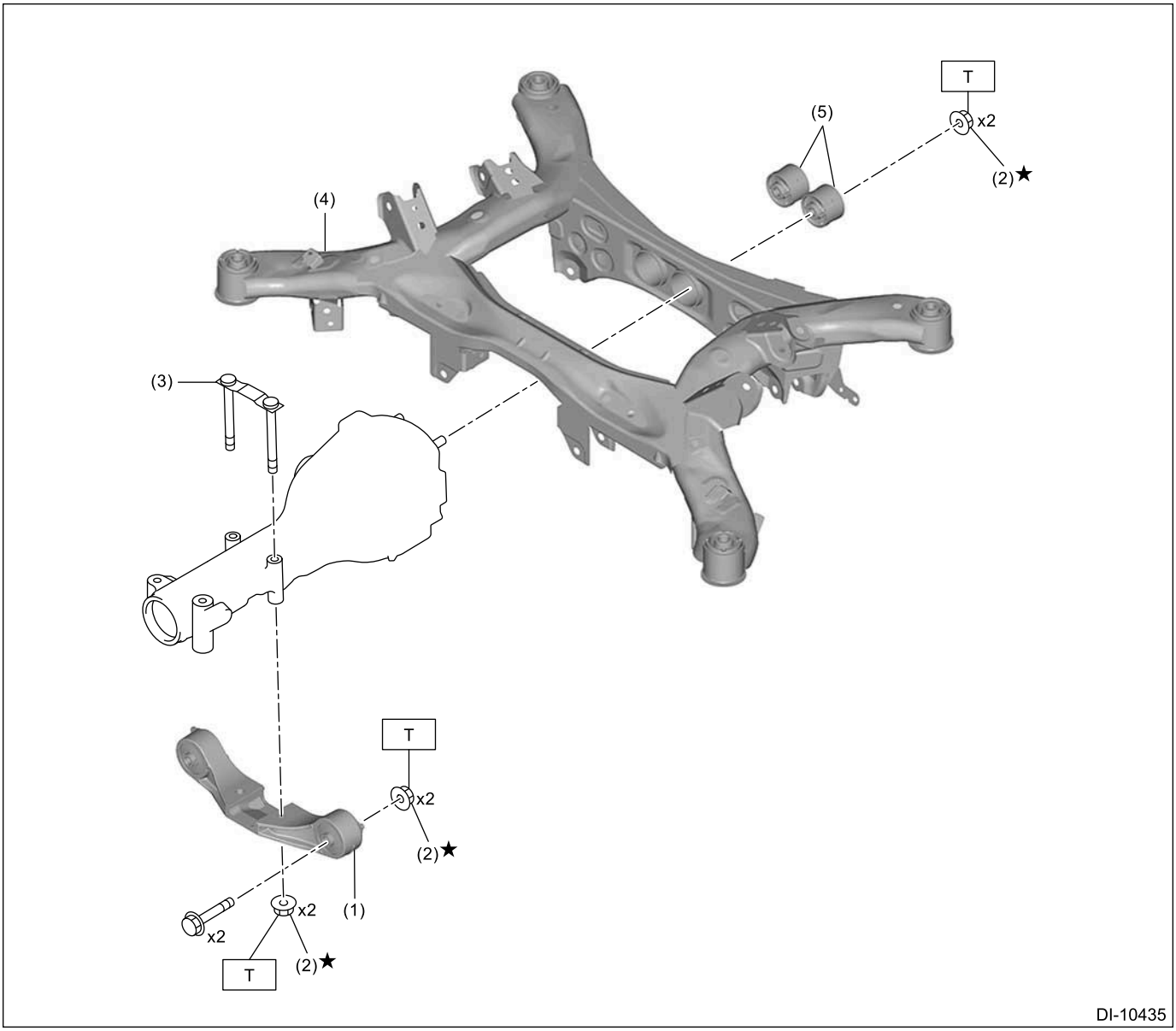
(1) Self-locking nut
(2) Companion flange
(3) Front oil seal
(4) Pilot bearing
(5) Spacer
(17) Preload adjusting washer
(18) Preload adjusting spacer
(19) Rear bearing
(20) Rear bearing race
(21) Rear bearing cone
(33) Thrust washer
(34) Differential bevel gear
(35) Differential bevel pinion
(36) Gasket
(37) Rear cover

(6)	Front bearing	(22)	Pinion height adjusting washer	(38)	Air breather cap
(7)	Front bearing cone	(23)	Hypoid driven gear and drive pinion set	(39)	Stud bolt
(8)	Front bearing race	(24)	Drive pinion		
(9)	Differential carrier	(25)	Hypoid driven gear	***Tightening torque: N·m (kgf-m, ft-lb)***	
(10)	Lock plate	(26)	Side bearing	***T1:***	***25 (2.5, 18.4)***
(11)	O-ring	(27)	Side bearing race	***T2:***	***34 (3.5, 25.1)***
(12)	Side retainer	(28)	Side bearing cone	***T3:***	***50 (5.1, 36.9)***
(13)	Side oil seal	(29)	Spring pin	***T4:***	***191 (19.5, 140.9)***
(14)	Gasket	(30)	Pinion shaft	***T5:***	***Ref. to DIFFERENTIALS>Rear Differential (VB-type)>ASSEMBLY.***
(15)	Filler plug	(31)	Differential case	***T6:***	***Ref. to DIFFERENTIALS>Rear Differential (VB-type)>ASSEMBLY.***
(16)	Drain plug	(32)	Circlip		

∗: If the side bearing race is removed from the side retainer, or if the side bearing cone is removed from the differential case, replace the side bearing with a new part.

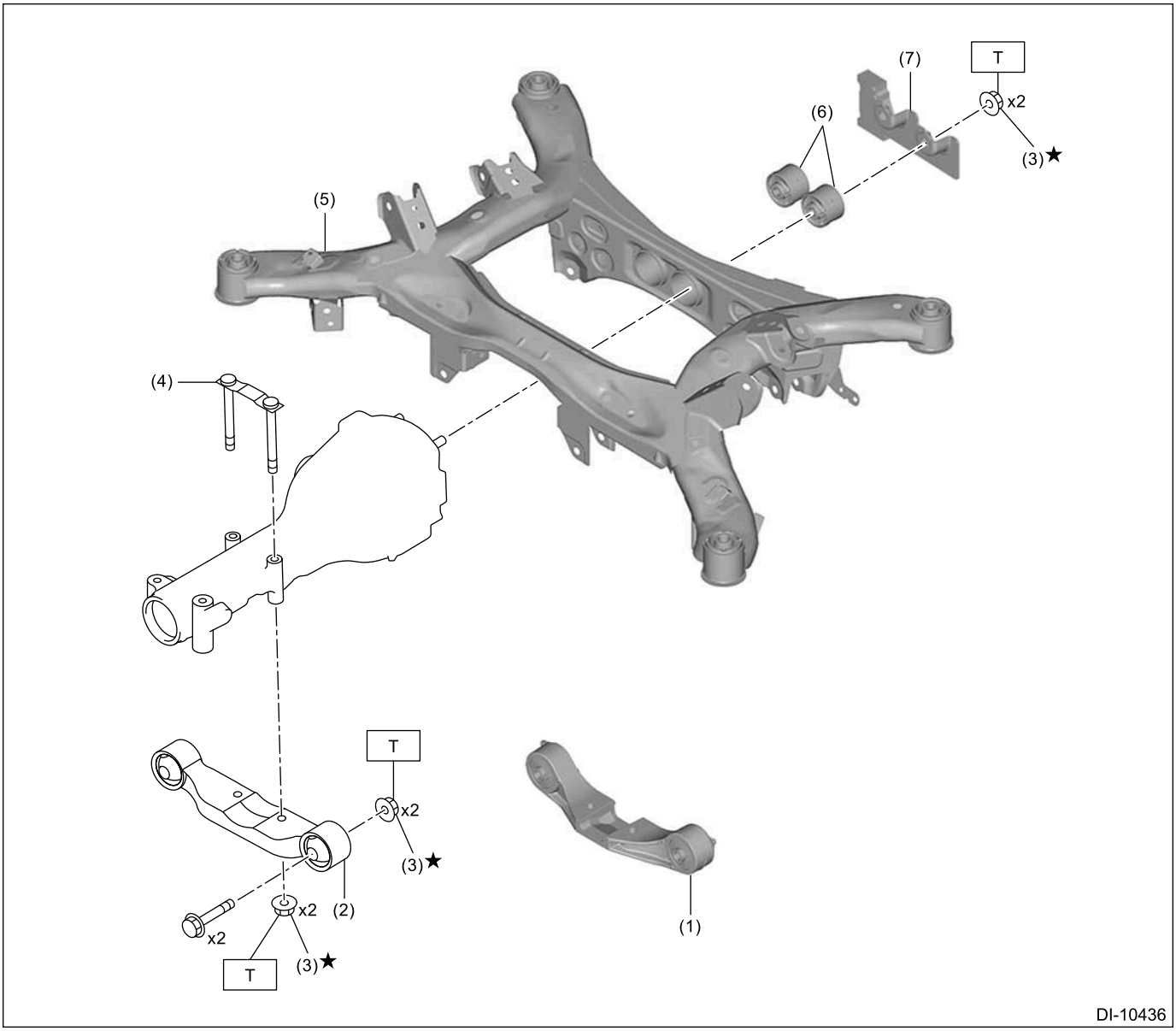
3. REAR DIFFERENTIAL MOUNTING SYSTEM

- T-type



(1) Rear differential front member	(4) Rear sub frame ASSY	***Tightening torque: N·m (kgf-m, ft-lb)***
(2) Self-locking nut	(5) Rear differential mount bushing	***T:*** ***Ref. to DIFFERENTIALS>Rear Differential (T-type)>INSTALLATION.***
(3) Rear differential member plate		

- VB3-type



(1)	Rear differential front member (6MT model)	(5)	Rear sub frame ASSY	***Tightening torque: N·m (kgf-m, ft-lb)***
(2)	Rear differential front member (CVT model)	(6)	Rear differential mount bushing	***T:*** ***Ref. to DIFFERENTIALS>Rear Differential (T-type)>INSTALLATION.***
(3)	Self-locking nut	(7)	Mass damper	
(4)	Rear differential member plate			

DIFFERENTIALS > General Description

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.
- 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.

PREPARATION TOOL

1. SPECIAL TOOL

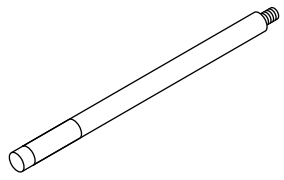
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-398477701	398477701	HANDLE	Used for installing the rear bearing race. (VB3-type)

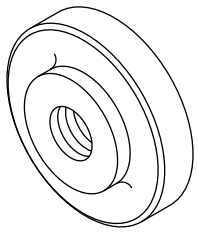
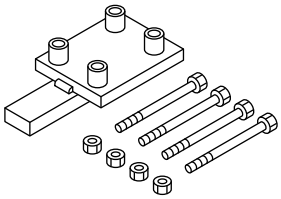
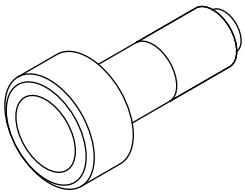
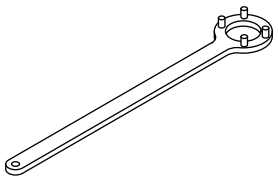
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-398477702	398477702	DRIFT	Used for installing the front bearing race. (T-type)
 ST-398217700	398217700	ATTACHMENT SET	Stand for differential carrier disassembly and assembly.
 ST-498447120	498447120	INSTALLER	Used for installing the front oil seal.
 ST-498427200	498427200	FLANGE WRENCH	Used for stopping rotation of companion flange when removing and tightening self-lock nut. (VB3-type)

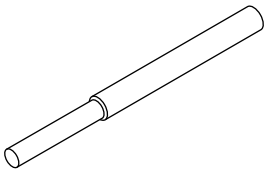
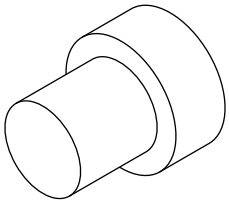
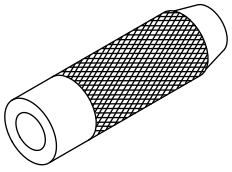
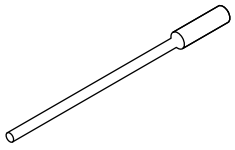
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-398467700	398467700	DRIFT	Used for removing drive pinion shaft, pilot bearing and front bearing cone. (T-type)
 ST-399780104	399780104	WEIGHT	• Used for installing the pilot bearing and the companion flange. (T-type) • Used for installing the front bearing cone, the front oil seal and the companion flange. (VB3-type)
 ST-899580100	899580100	INSTALLER	Used for installing the pilot bearing. (T-type)
 ST-899904100	899904100	STRAIGHT PIN REMOVER	Used for removing and installing the pinion shaft spring pin. (VB3-type)

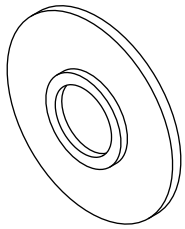
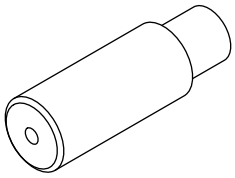
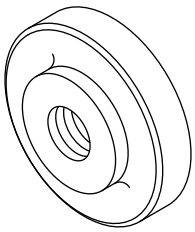
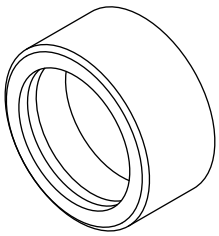
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-398177700	398177700	INSTALLER	Used for installing the rear bearing cone. (VB3-type)
 ST-398457700	398457700	ATTACHMENT	Used for removing the side retainer. (T-type)
 ST-398477703	398477703	DRIFT 2	• Used for installing the front bearing race. (VB3-type) • Used for installing the rear bearing race. (VB3-type)
 ST-398437700	398437700	OIL SEAL INSTALLER	Used for installing the side oil seal.

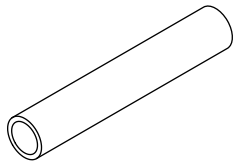
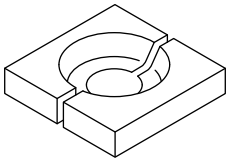
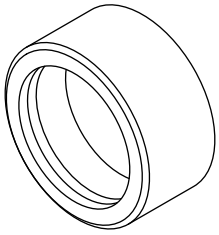
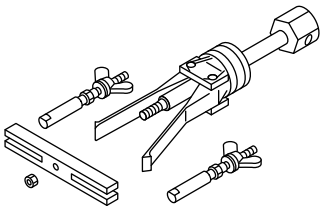
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-398507703	398507703	DUMMY COLLAR	Used for installing the pilot bearing. (T-type)
 ST-398517700	398517700	REPLACER	Used for removing rear bearing cone. (T-type)
 ST-398487700	398487700	DRIFT	Used for installing side bearing cone.
 ST-398527700	398527700	PULLER ASSY	• Used for removing front oil seal. (T-type) • Used for removing the side bearing race.

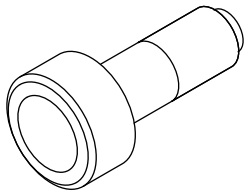
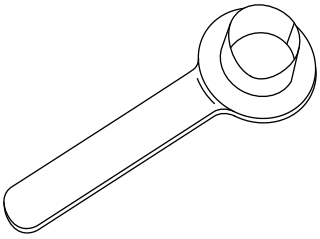
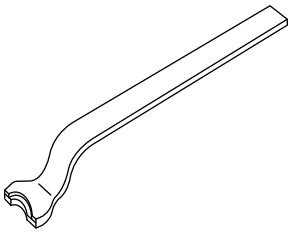
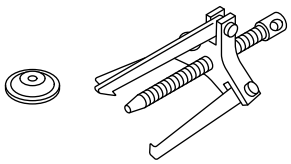
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-398417700	398417700	DRIFT	• Used for installing side bearing race. • Used for installing the rear bearing race. (T-type)
 ST28099PA090	28099PA090	OIL SEAL PROTECTOR	Used for installing the rear drive shaft. (For oil seal protection)
 ST28099PA100	28099PA100	DRIVE SHAFT REMOVER	Used for removing the rear drive shaft. (T-type)
 ST-399703600	399703600	PULLER ASSY	Used for removing companion flange.

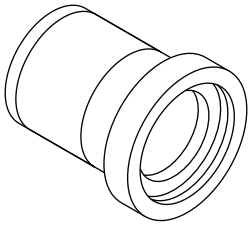
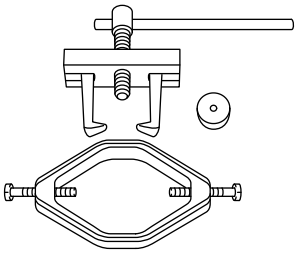
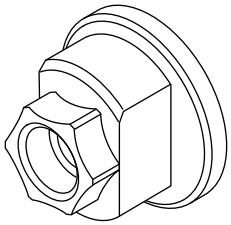
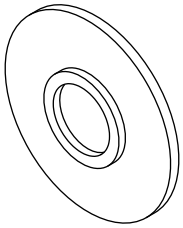
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-899874100	899874100	INSTALLER	Used for installing the companion flange.
 ST18759AA000	18759AA000	PULLER ASSY	Used for removing the side bearing cone. (T-type)
 ST-498937110	498937110	HOLDER DRIVE PINION	Used for installing the pilot bearing and the companion flange. (T-type)
 ST18674AA000	18674AA000	INSTALLER	Used for installing the rear bearing cone. (T-type)

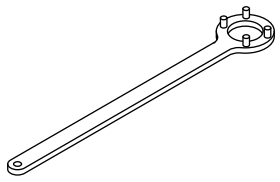
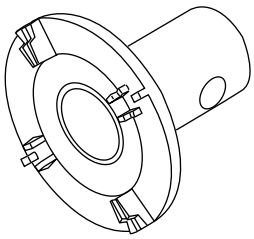
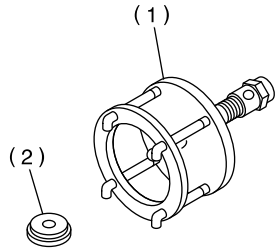
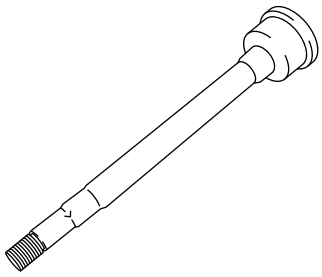
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST18633AA000	18633AA000	WRENCH COMPL	Used for preventing rotation of companion flange when loosening and tightening self-lock nut. (T-type)
 ST18658AA021	18658AA021	WRENCH COMPL RETAINER	Used for removing and installing the side retainer. (VB3-type)
 ST-899524100	899524100	PULLER SET	• Used for removing the side bearing cone. (VB3-type) • Used together with SEAT (399520105). (1) Puller (2) Cap
 ST18678AA000	18678AA000	DUMMY SHAFT	• Used for adjusting drive pinion height and preload. (VB3-type) • Used together with DIFFERENTIAL CARRIER GAUGE (18831AA010) when adjusting the drive pinion height.

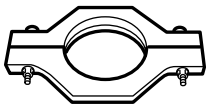
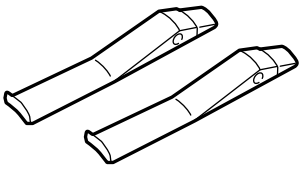
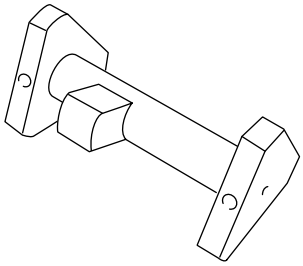
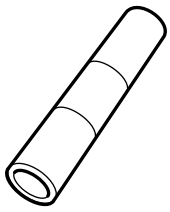
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST18720AA000	18720AA000	REMOVER	Used for removing the rear bearing cone and the pinion height adjusting washer. (VB3-type)
 ST18760AA000	18760AA000	CLAW	• Used for removing the side bearing race. (VB3-type) • Used together with PULLER ASSY (398527700).
 ST18831AA010	18831AA010	DIFFERENTIAL CARRIER GAUGE	• Used for adjusting drive pinion height. (VB3-type) • Used together with DUMMY SHAFT (18678AA000).
 ST18654AA000	18654AA000	INSTALLER	• Used for installing the front bearing race. (VB3-type) • Used together with DRIFT 2 (398477703).

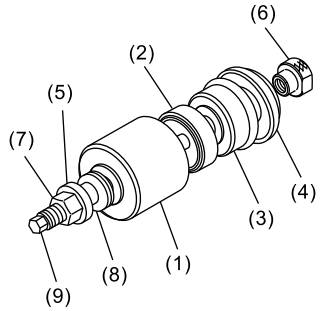
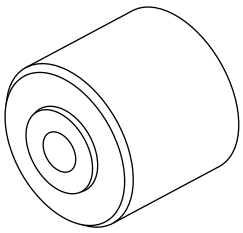
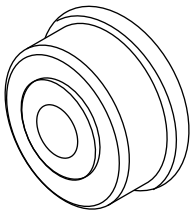
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST41399FG001	41399FG001	SPECIAL TOOL ASSY	• Used for removing and installing the rear differential mount bushing. • Use (1), (2), (5), (6), (7), (8) and (9) for removal. • Use (3), (4), (5), (6), (7), (8) and (9) for installation. (1) SPECIAL TOOL A (41399FG010) (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)
 ST41399FG010	41399FG010	SPECIAL TOOL A	• Used for removing the rear differential mount bushing. • 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)”.

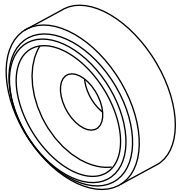
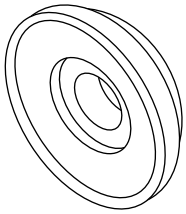
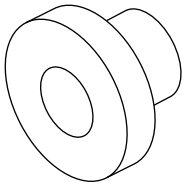
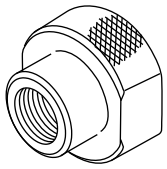
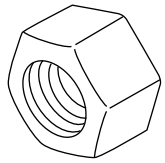
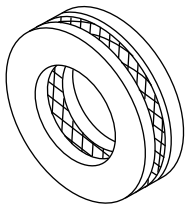
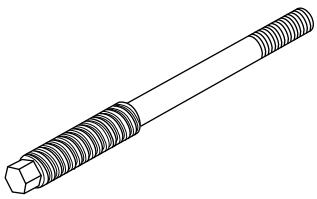
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST41399FG031	41399FG031	SPECIAL TOOL C	• Used for removing the rear differential mount bushing. • For combination of tools for removal, refer to “SPECIAL TOOL ASSY (41399FG001)”.
 ST41399FG041	41399FG041	SPECIAL TOOL D	• Used for installing the rear differential 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)”.

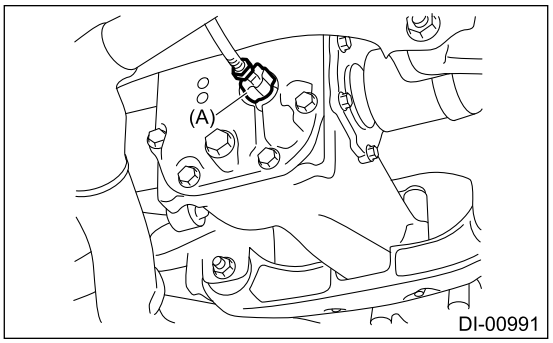
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST41399FG070	41399FG070	SPECIAL TOOL NUT	• Used for removing and installing the rear differential mount bushing. • For combination of tools for removal and installation, refer to “SPECIAL TOOL ASSY (41399FG001)”.
 ST41399FG080	41399FG080	SPECIAL TOOL BEARING	• 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)”.

2. GENERAL TOOL

TOOL NAME	REMARKS
Transmission jack	Used for removing and installing the rear differential.
Puller	• Used for removing the side retainer. (T-type) • Used for removing companion flange. (T-type)
Thickness gauge	Used for measuring clearance.
Hexagon wrench	Used for installing and removing the oil filler plug and oil drain plug.
Angle gauge	Used for installing the hypoid driven gear. (VB3-type)
Dial gauge	Used for measuring backlash.
Magnet stand	Used for measuring backlash.

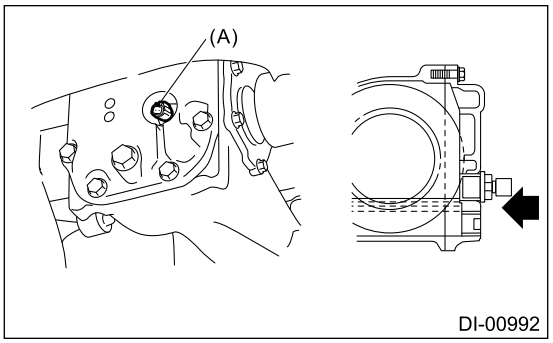
INSPECTION

1. Disconnect the ground terminal from battery. Ref. to NOTE>NOTE > BATTERY.
   Note:
   For models other than STI model, disconnect the ground terminal from battery sensor.
2. Lift up the vehicle.
3. Disconnect the oil temperature sensor connector. (T-type)



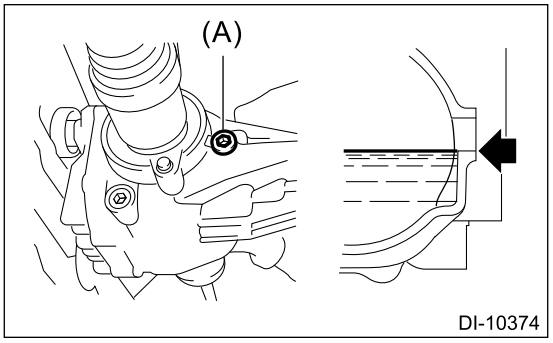
(A) Oil temperature sensor connector

4. Remove the filler plug or the oil temperature sensor, and then check the differential gear oil. Replace the differential gear oil if it is contaminated, deteriorated or cloudy. Ref. to DIFFERENTIALS>Differential Gear Oil>REPLACEMENT.
5. 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 add oil up to the bottom of filler plug hole.
   - T-type



(A) Oil temperature sensor

   - VB3-type



(A) Filler plug

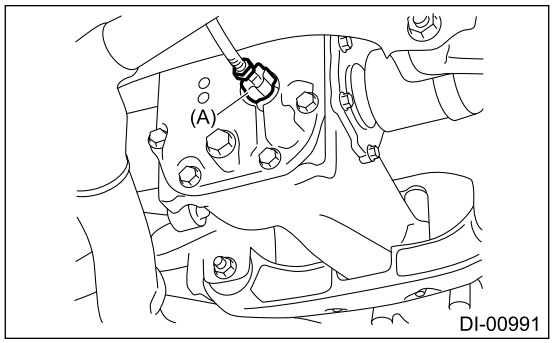
6. Install the filler plug or the oil temperature sensor.
Note:
Use a new gasket.
Tightening torque:
T-type
60 N·m (6.1 kgf-m, 44.3 ft-lb)
VB3-type
50 N·m (5.1 kgf-m, 36.9 ft-lb)

DIFFERENTIALS > Differential Gear Oil

REPLACEMENT

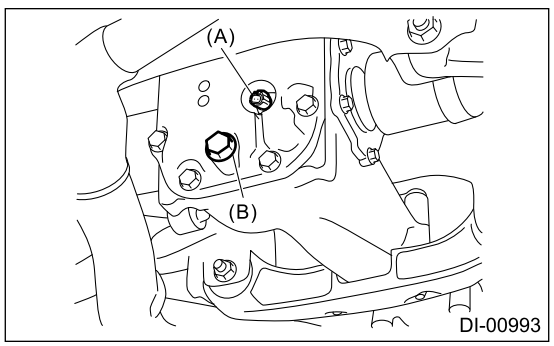
Caution:
- **Gear oil is extremely hot just after driving. Be wary of receiving burns.**
- **Be careful not to spill the gear oil on exhaust pipe. If gear oil is spilled, wipe it off completely.**

1. Disconnect the ground terminal from battery. Ref. to NOTE>NOTE > BATTERY.
Note:
For models other than STI model, disconnect the ground terminal from battery sensor.
2. Lift up the vehicle.
3. Disconnect the oil temperature sensor connector. (T-type)



(A) Oil temperature sensor connector

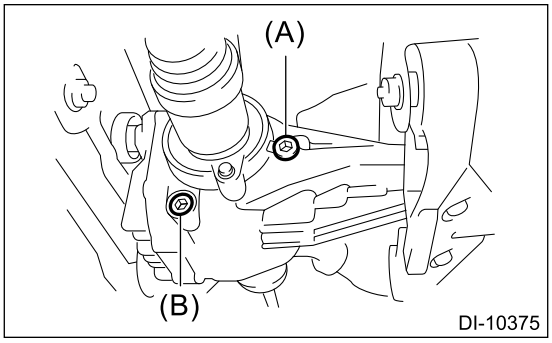
4. Remove the drain plug and filler plug or the oil temperature sensor, and drain the gear oil.
- T-type



(A) Oil temperature sensor

(B) Drain plug

- VB3-type



(A) Filler plug

(B) Drain plug

5. Install the drain plug.

Note:

Use a new gasket.

Tightening torque:

T-type

60 N·m (6.1 kgf-m, 44.3 ft-lb)

VB3-type

50 N·m (5.1 kgf-m, 36.9 ft-lb)

6. Fill the differential carrier with gear oil to the bottom of filler plug hole or the oil temperature sensor hole.

Note:

In order to prevent insufficiency of oil, supply gear oil until it flows out of the plug hole.

Recommended gear oil:

Ref. to DIFFERENTIALS>General Description>SPECIFICATION.

Oil capacity:

Ref. to DIFFERENTIALS>General Description>SPECIFICATION.

7. Install the filler plug or the oil temperature sensor.

Note:

Use a new gasket.

Tightening torque:

T-type

60 N·m (6.1 kgf-m, 44.3 ft-lb)

VB3-type

50 N·m (5.1 kgf-m, 36.9 ft-lb)

NOTE

1. CVT MODEL

Regarding the front differential, refer to the "CVT (TR690)" section. Ref. to CONTINUOUSLY VARIABLE TRANSMISSION(TR690)>Front Differential Assembly.

2. 6MT (TY75) MODEL

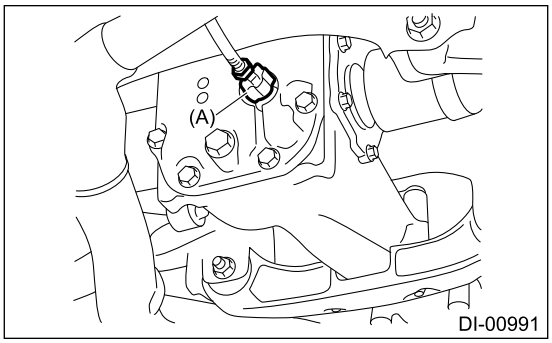
Regarding the front differential, refer to the "6MT (TY75)" section. Ref. to MANUAL TRANSMISSION AND DIFFERENTIAL(6MT)(TY75)>Front Differential Assembly>REMOVAL.

3. 6MT (TY85) MODEL

Regarding the front differential, refer to the "6MT (TY85)" section. Ref. to MANUAL TRANSMISSION AND DIFFERENTIAL(6MT)(TY85)>Front Differential Assembly>REMOVAL.

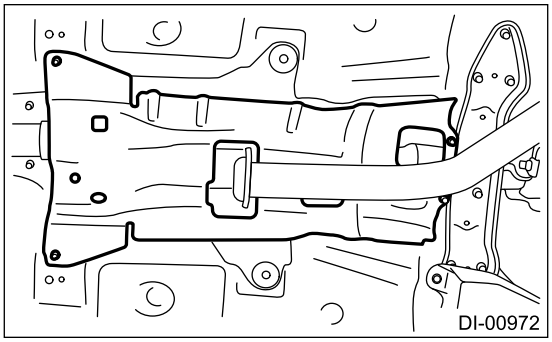
REMOVAL

1. Shift the select lever or gear shift lever to neutral.
2. Release the parking brake.
3. Disconnect the ground terminal from battery. Ref. to NOTE>NOTE > BATTERY.
   Note:
   For models other than STI model, disconnect the ground terminal from battery sensor.
4. Lift up the vehicle.
5. Remove the rear tires. Ref. to WHEEL AND TIRE SYSTEM>Tire and Wheel>REMOVAL.
6. Disconnect the oil temperature sensor connector. (T-type)

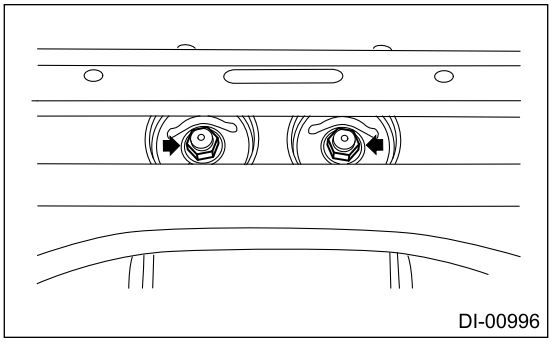


(A) Oil temperature sensor connector

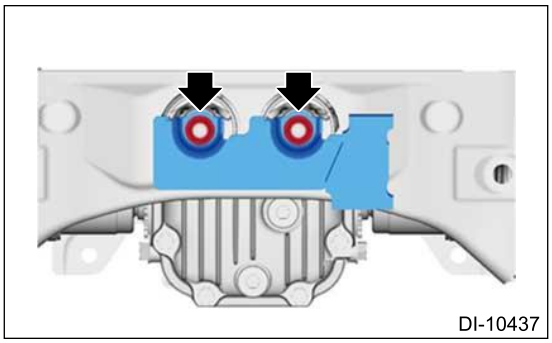
7. Drain differential gear oil. Ref. to DIFFERENTIALS>Differential Gear Oil>REPLACEMENT.
8. Remove the rear exhaust pipe.
   Except for STI model:
   Ref. to EXHAUST(w/o STI)>Rear Exhaust Pipe>REMOVAL.
   STI model:
   Ref. to EXHAUST(STI)>Rear Exhaust Pipe>REMOVAL.
9. Remove the center exhaust cover.



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



- VB3-type



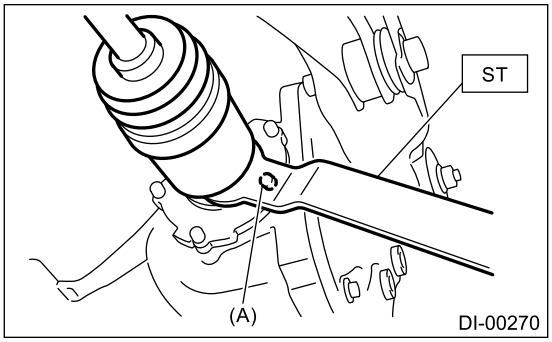
12. Remove the DOJ of the rear drive shaft using the ST.

Note:

- **For the T-type, use the ST.**
- **For the VB3-type, use the tire lever.**
- **When removing the DOJ, fit the ST or tire lever to the bolts as shown in the figure so as not to damage the side retainer.**

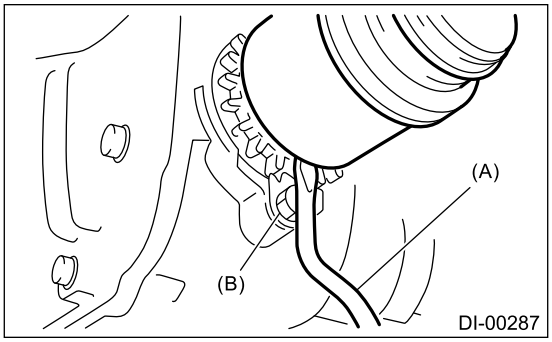
T-type

ST 28099PA100 DRIVE SHAFT REMOVER



(A) Bolt

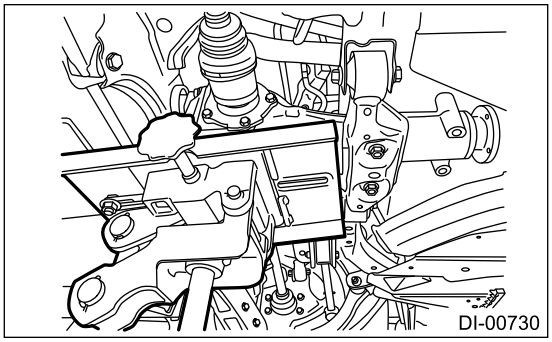
VB3-type



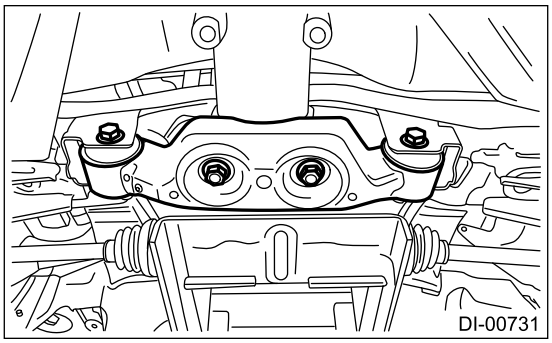
(A) Tire lever

(B) Bolt

13. Set the transmission jack.

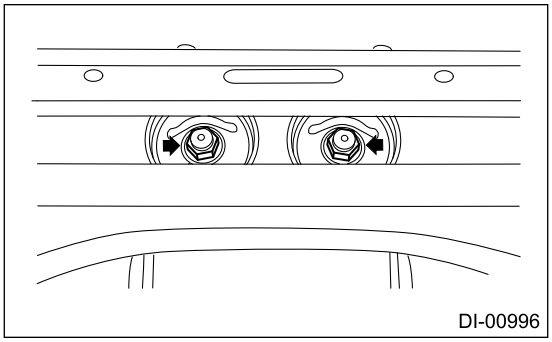


14. Remove the rear differential front member.

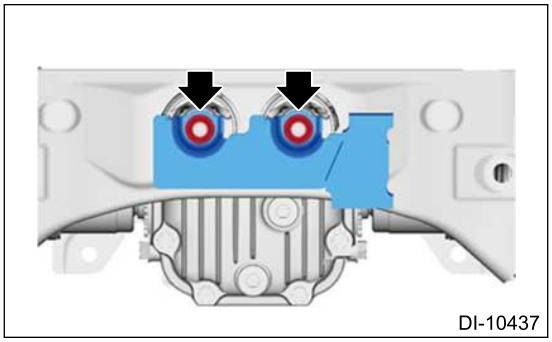


15. Remove the self-lock nuts which hold the rear differential to the rear sub frame assembly.

- T-type



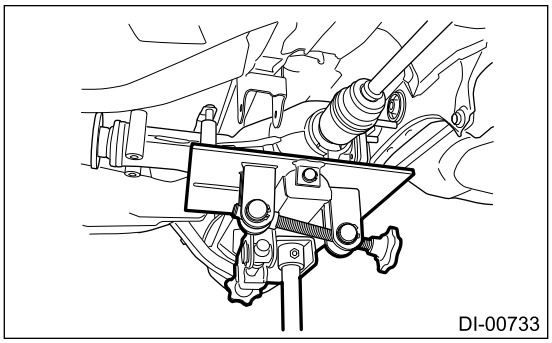
- VB3-type



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

Note:

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



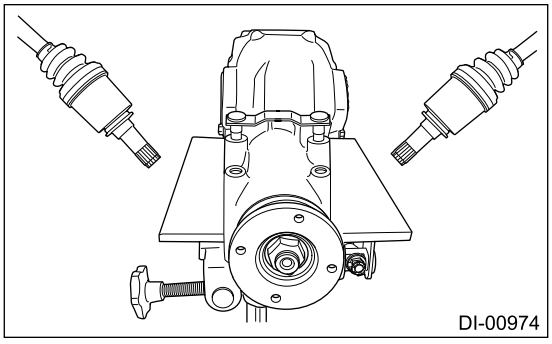
17. Lower the transmission jack.

18. Pull out the rear drive shaft.

Note:

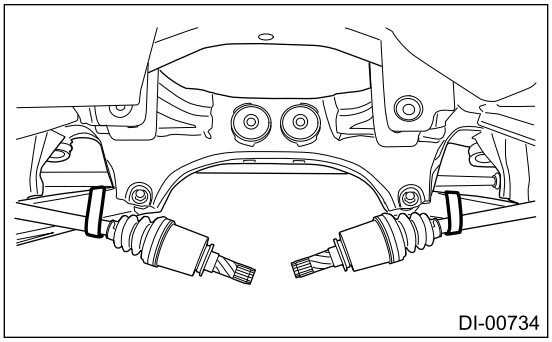
If it is difficult to pull out the rear drive shaft, use the ST for T-type and the tire lever for VB3-type.

ST 28099PA100 DRIVE SHAFT REMOVER



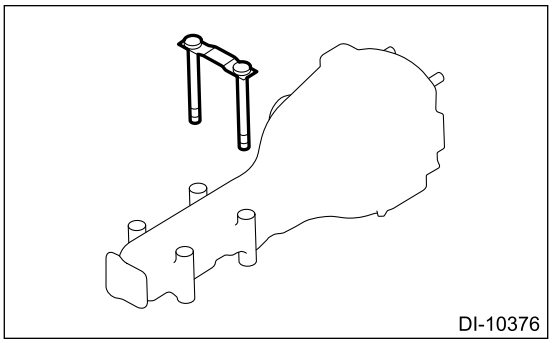
19. Lower the transmission jack.

20. Secure the rear drive shaft using a wire.

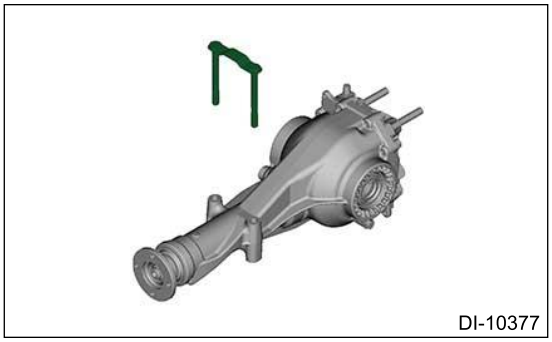


21. Remove the rear differential member plate.

- T-type



- VB3-type

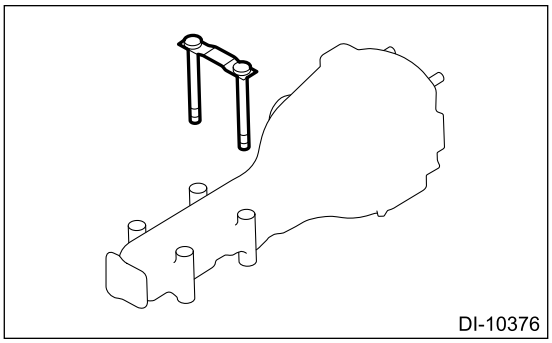


DIFFERENTIALS > Rear Differential (T-type)

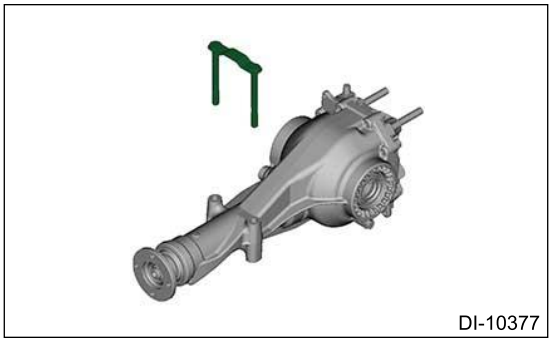
INSTALLATION

1. Install the rear differential member plate.

- T-type

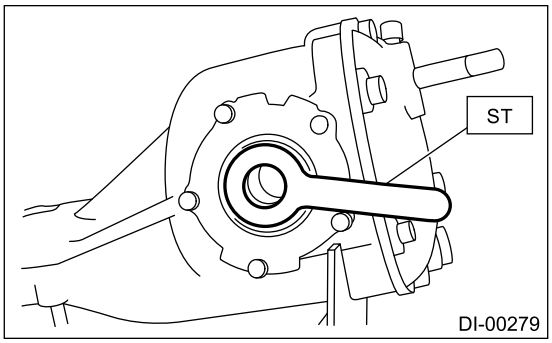


- VB3-type

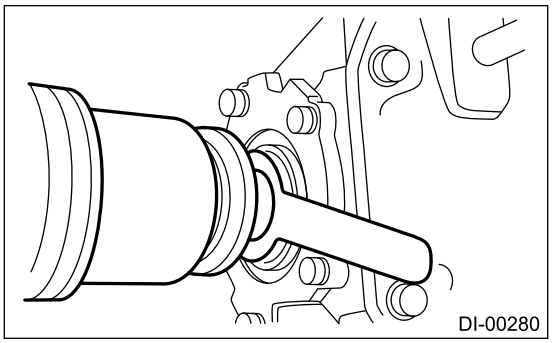


2. Set the rear differential to transmission jack.
3. Set the ST to the rear differential.

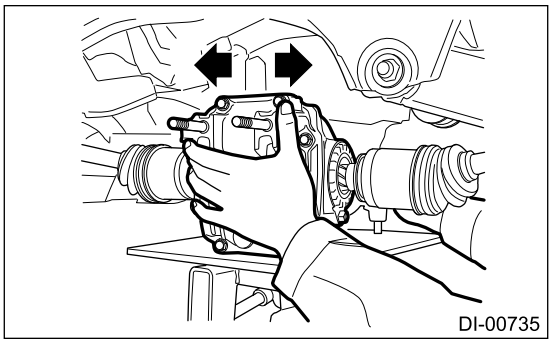
ST 28099PA090 OIL SEAL PROTECTOR



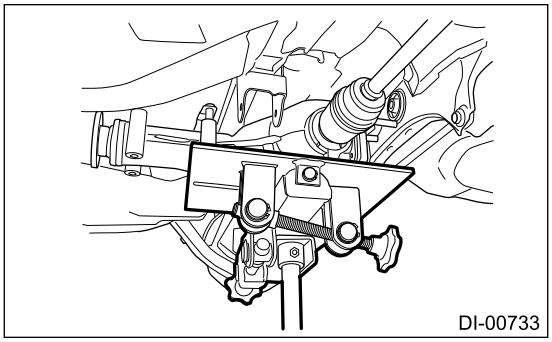
4. Insert the rear drive shaft until the spline portion of the rear drive shaft exceeds the side oil seal.



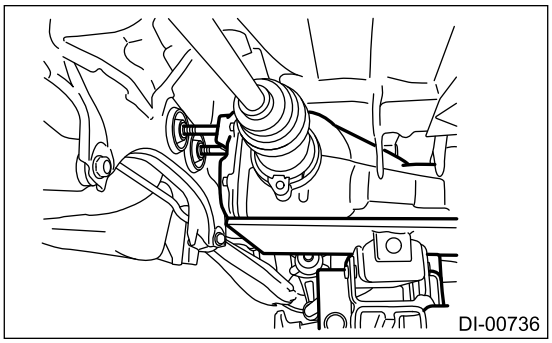
5. Remove ST from rear differential.
6. Push the rear differential from side to side to insert the DOJ completely.



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

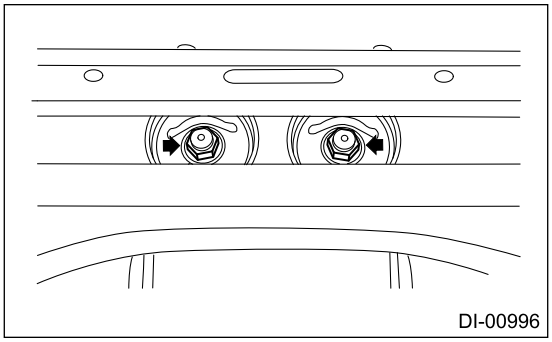


8. Raise the transmission jack to align the rear differential to its attachment position.

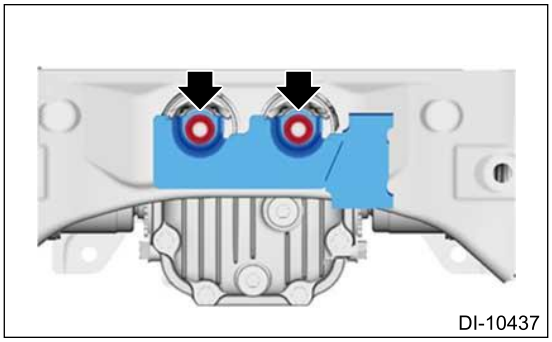


9. Temporarily install a new self-locking nut to the rear differential stud bolt.

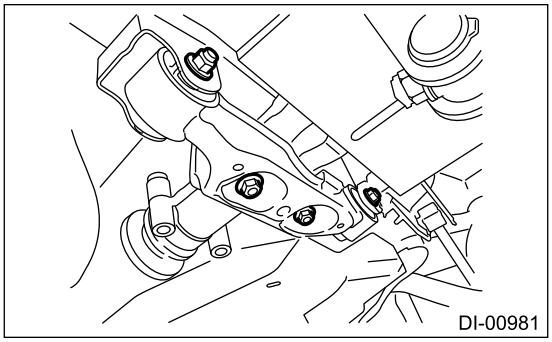
- T-type



- VB3-type



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



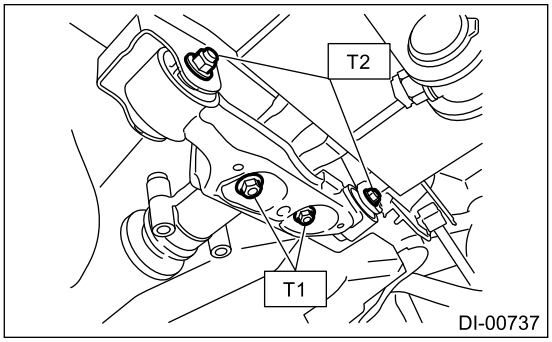
11. Remove the transmission jack.

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)

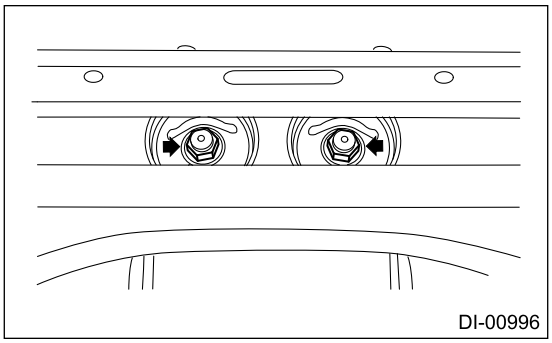


13. Tighten the self-locking nut.

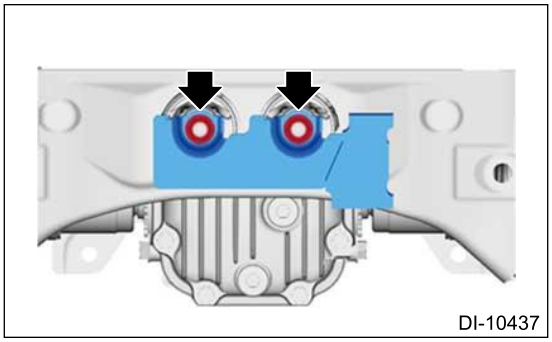
Tightening torque:

70 N·m (7.1 kgf-m, 51.6 ft-lb)

- T-type



- VB3-type

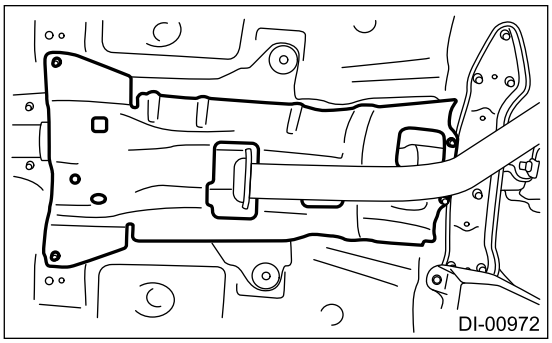


14. Install the propeller shaft. Ref. to DRIVE SHAFT SYSTEM>Propeller Shaft>INSTALLATION.

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.

Except for STI model:

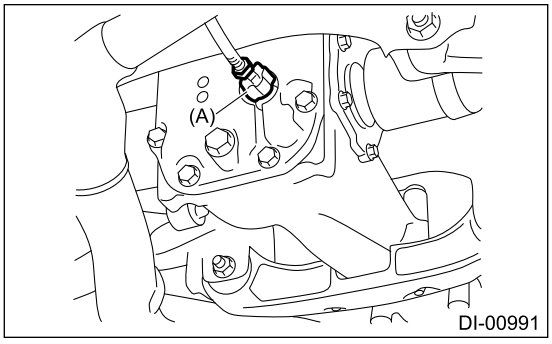
Ref. to EXHAUST(w/o STI)>Rear Exhaust Pipe>INSTALLATION.

STI model:

Ref. to EXHAUST(STI)>Rear Exhaust Pipe>INSTALLATION.

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

18. Connect the oil temperature sensor connector. (T-type)



(A) Oil temperature sensor connector

19. Lower the vehicle.

20. Install the rear tires. Ref. to WHEEL AND TIRE SYSTEM>Tire and Wheel>INSTALLATION.

21. Connect the battery ground terminal. Ref. to NOTE>NOTE > BATTERY.

Note:

For models other than STI model, connect the ground terminal to battery sensor.

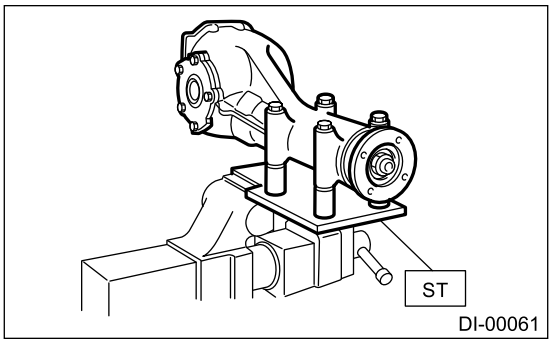
DISASSEMBLY

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

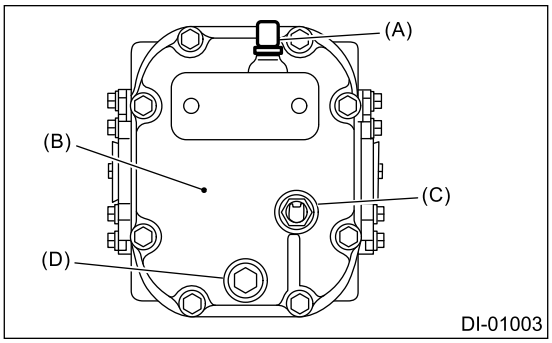
- Tooth contact and backlash between hypoid driven gear and drive pinion
- Hypoid driven gear runout on its back surface
- Total preload of drive pinion

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

ST 398217700 ATTACHMENT SET



2. Remove the drain plug and the oil temperature sensor, and drain the gear oil.
   Note:
   Remove the oil temperature sensor and the adapter as a unit.
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.**



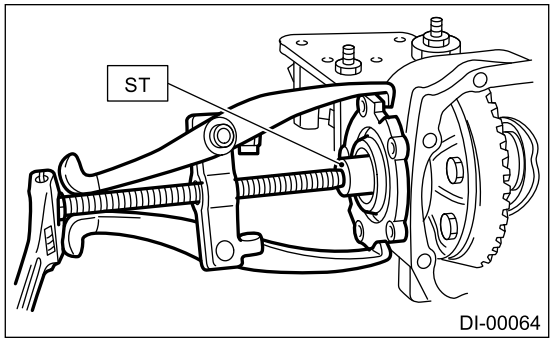
(A) Air breather cap
(B) Rear cover
(C) Oil temperature sensor
(D) Drain plug

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 retainer 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

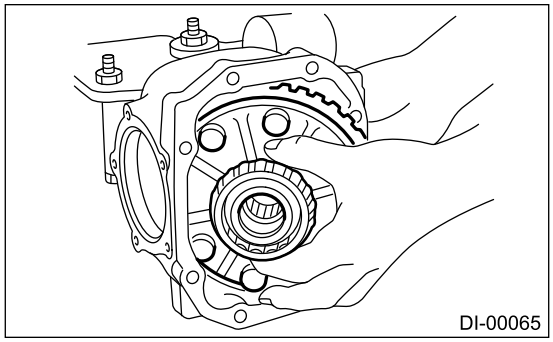


7. Remove the side oil seal and O-ring from the side retainer.

8. Remove the differential case.

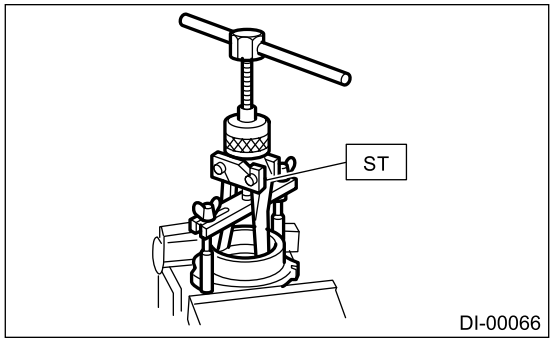
Note:

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



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

ST 398527700 PULLER ASSY

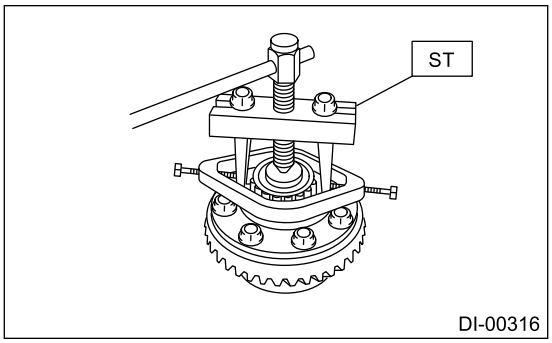


10. Remove the side bearing cone using the ST.

Note:

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

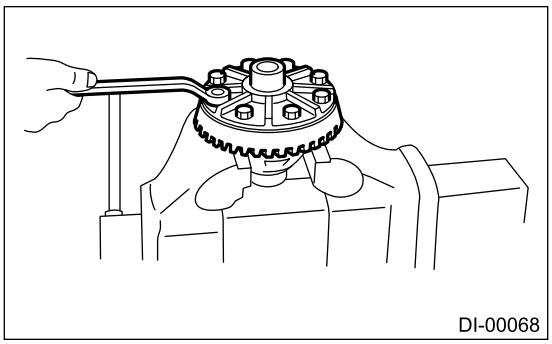
ST 18759AA000 PULLER ASSY



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

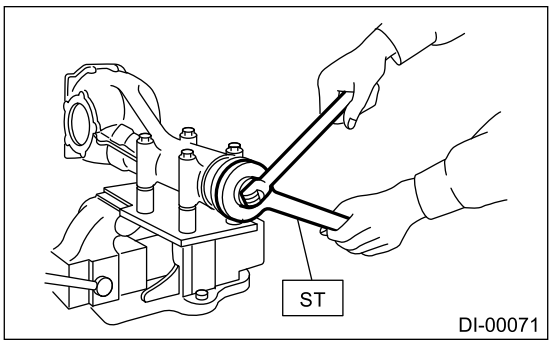
Note:

Do not disassemble the differential case.

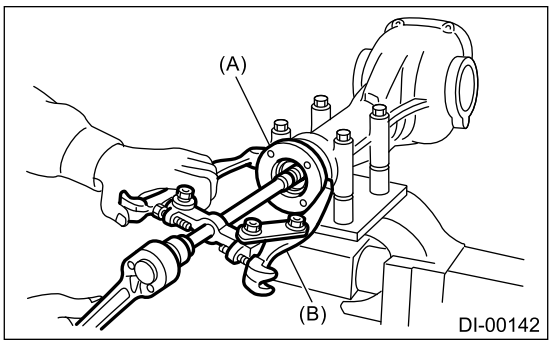


12. Remove the self-locking nut while securing the companion flange with ST.

ST 18633AA000 WRENCH COMPL



13. Extract the companion flange with a puller.



(A) Companion flange

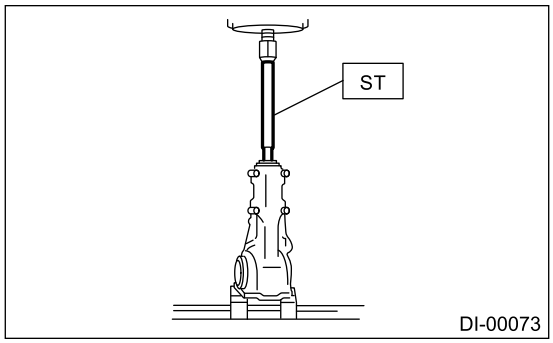
(B) Puller

14. 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

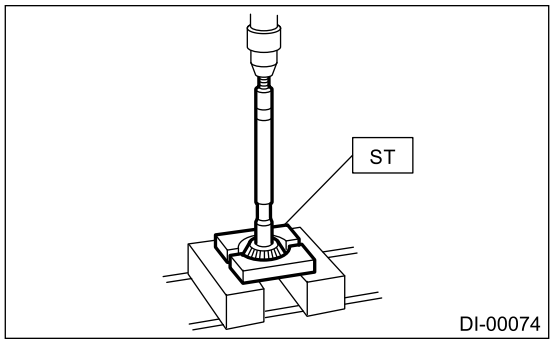


15. Support the rear bearing cone with ST, and remove it from the drive pinion.

Note:

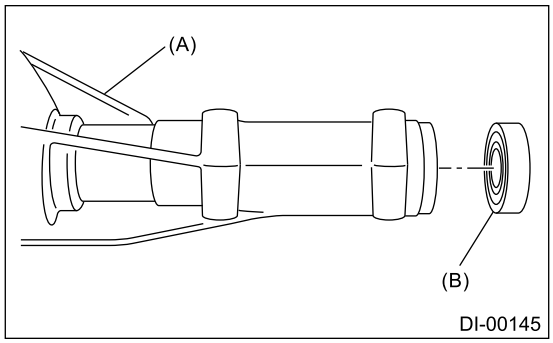
Place the replacer so that its center-recessed side faces the bearing cone.

ST 398517700 REPLACER



16. Remove the front oil seal using ST.

ST 398527700 PULLER ASSY

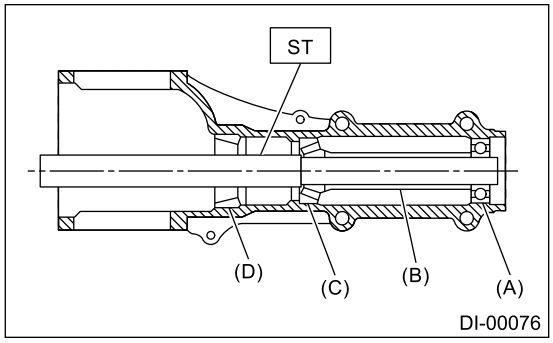


(A) Differential carrier

(B) Front oil seal

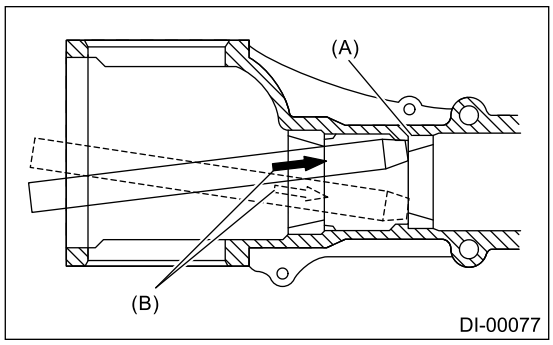
17. Remove the pilot bearing together with the front bearing cone and spacer using the ST.

ST 398467700 DRIFT



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

18. 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.

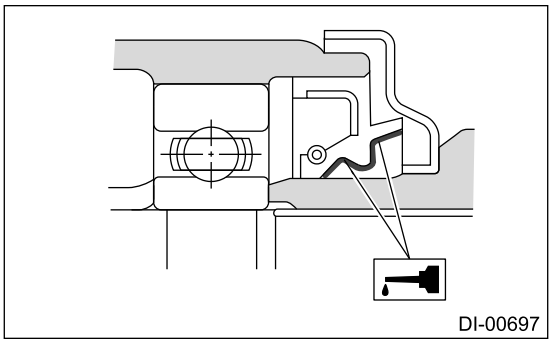
DIFFERENTIALS > Rear Differential (T-type)

ASSEMBLY

1. T-TYPE (H5)

Note:

- **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 gear oil when installing the bearings and thrust washers.**
- **Be careful not to mix up the side bearing races RH and LH.**
- **Replace the gasket, oil seal and O-ring with a new part.**
- **Be careful not to mix up the side oil seals RH and LH.**
- **Apply gear oil to the lips when installing the oil seal.**



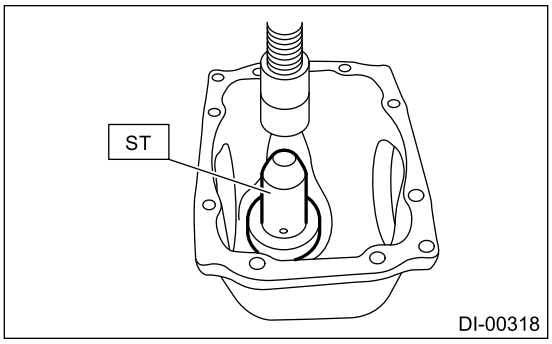
1. Adjusting preload for front and rear bearings

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.

2. Press-fit the rear bearing race using the ST.

ST 398417700 DRIFT

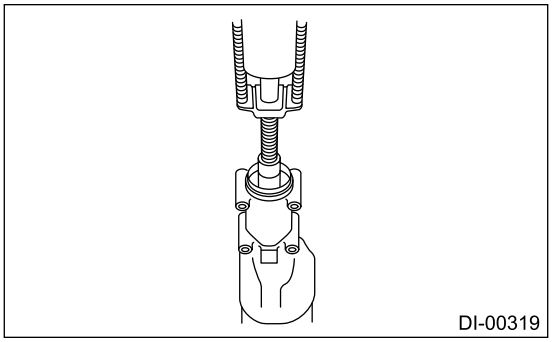


3. Press-fit the front bearing race using the ST.

Note:

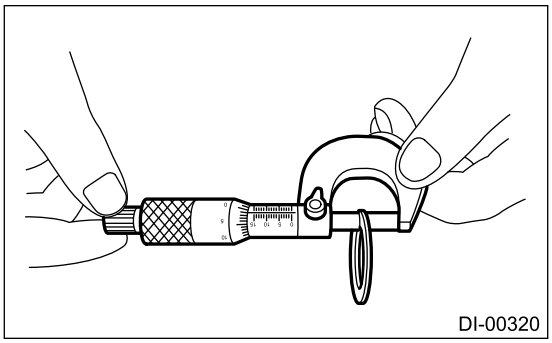
Use a new front bearing race.

ST 398477702 DRIFT



4. Selecting the pinion height adjusting washer

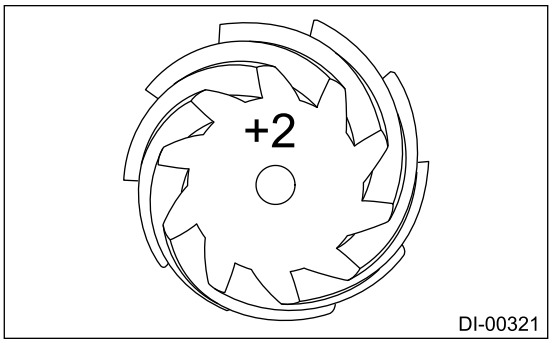
(1) Measure the thickness of the inserted pinion height adjusting washer.



(2) Read the markings on both the current drive pinion gear and the new pinion gear.

Note:

No marking means 0 (zero).



(3) Calculate the thickness of pinion height adjusting washer to be inserted from the following formula, and replace the installed washer with a new washer of the calculated thickness.

$T = T1 + (T2 \times 0.01 - T3 \times 0.01)$

T	Thickness of selected pinion height adjusting washer mm (in)	
T1	Thickness of inserted pinion height adjusting washer mm (in)	
T2	Number of the installed drive pinion gear marking mm (in)	
T3	Number of new drive pinion gear marking mm (in)	

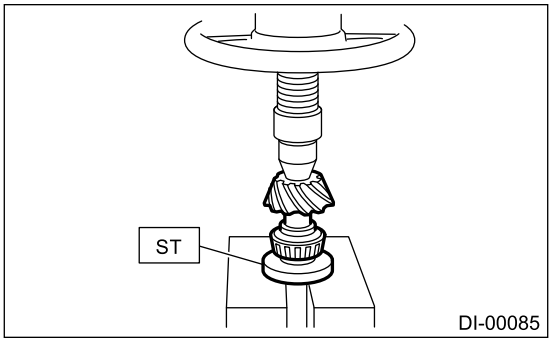
Memo:

(Example of calculation)
T1 = 3.30 mm (0.1299 in), T2 = +2, T3 = −1
T = 3.30 mm (0.1299 in) + {(2 × 0.01) − (−1 × 0.01)} = 3.33 mm (0.1311 in)
Result: Thickness = 3.33 mm (0.1311 in)
The washer with part number 38336AA310 is used.

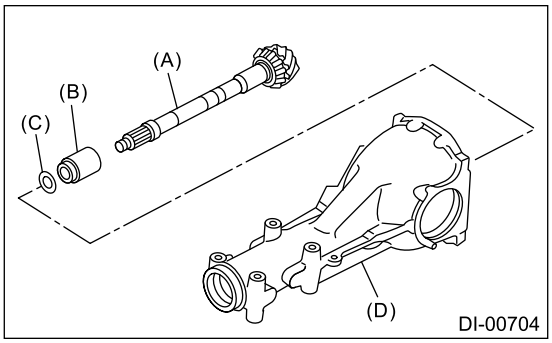
Pinion height adjusting washer	
Part No.	**Thickness mm (in)**
38336AA230	3.09 (0.1217)
38336AA240	3.12 (0.1228)
38336AA250	3.15 (0.1240)
38336AA260	3.18 (0.1252)
38336AA270	3.21 (0.1264)
38336AA280	3.24 (0.1276)
38336AA290	3.27 (0.1287)
38336AA300	3.30 (0.1299)
38336AA310	3.33 (0.1311)
38336AA320	3.36 (0.1323)
38336AA330	3.39 (0.1335)
38336AA340	3.42 (0.1346)
38336AA350	3.45 (0.1358)
38336AA360	3.48 (0.1370)
38336AA370	3.51 (0.1382)
38336AA380	3.54 (0.1394)
38336AA390	3.57 (0.1406)
38336AA400	3.60 (0.1417)
38336AA410	3.63 (0.1429)
38336AA420	3.66 (0.1441)

5. Install the selected pinion height adjusting washer on drive pinion, and press in the rear bearing cone with ST.

ST 18674AA000 INSTALLER



6. Insert the drive pinion, and install the originally attached preload adjusting spacer and washer.

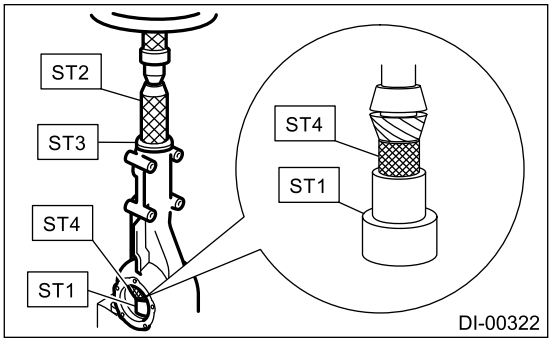


(A) Drive pinion
(B) Preload adjusting spacer
(C) Preload adjusting washer
(D) Differential carrier

7. Install the front bearing cone.
Note:
Use new front bearing cone.

8. Insert the spacer and press-fit the pilot bearing using ST.
Note:
Use a new pilot bearing.

ST1	**399780104**	**WEIGHT**
ST2	**899580100**	**INSTALLER**
ST3	**398507703**	**DUMMY COLLAR**
ST4	**498937110**	**HOLDER DRIVE PINION**

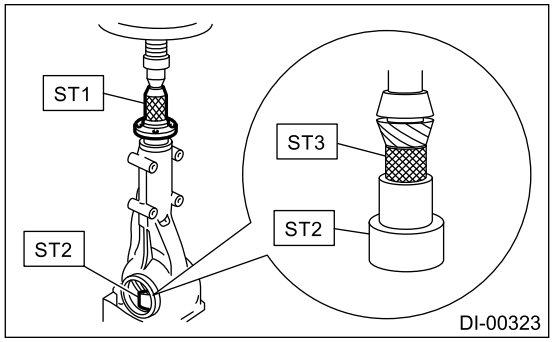


9. Press-fit the companion flange with ST1, ST2, and ST3.

Note:

Be careful not to damage the pilot bearing.

ST1	**899874100**	**INSTALLER**
ST2	**399780104**	**WEIGHT**
ST3	**498937110**	**HOLDER DRIVE PINION**

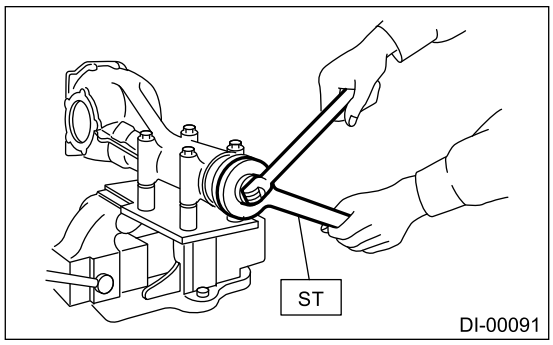


10. Tighten the self-locking nut while securing the companion flange with ST.

Tightening torque:

181.5 N·m (18.5 kgf-m, 133.9 ft-lb)

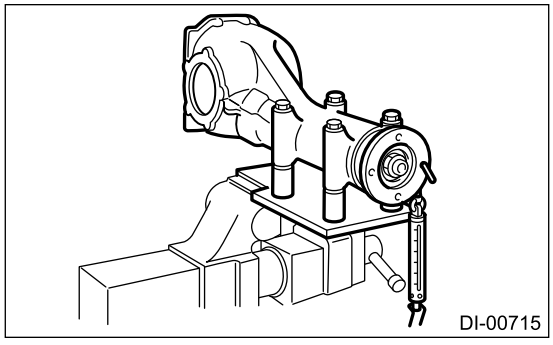
ST	**18633AA000**	**WRENCH COMPL**



11. Rotate the drive pinion shaft 10 times or more to fit it in the respective taper roller bearing, and then measure the initial load or initial torque.

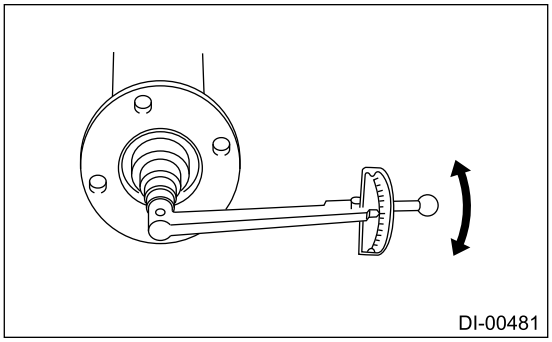
Initial load:

24.1 — 38.6 N (2.5 — 3.9 kgf, 5.4 — 8.7 lbf)



Initial torque:

0.98 — 1.57 N·m (0.10 — 0.16 kgf-m, 0.72 — 1.16 ft-lb)



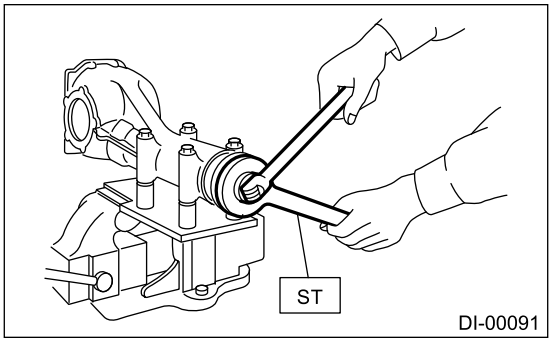
12. When the bearing preload is out of the specified range, select the preload adjusting washer and spacer from the following table in order to make it within the specified range.

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)

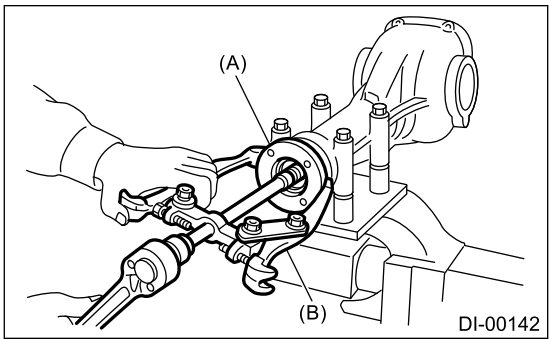
Preload adjusting spacer	
Part No.	**Length mm (in)**
31454AA130	52.2 (2.055)
31454AA140	52.4 (2.063)
31454AA150	52.6 (2.071)
31454AA160	52.8 (2.079)
31454AA170	53.0 (2.087)
31454AA180	53.2 (2.094)

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

ST 18633AA000 WRENCH COMPL



14. Extract the companion flange with a puller.



(A) Companion flange

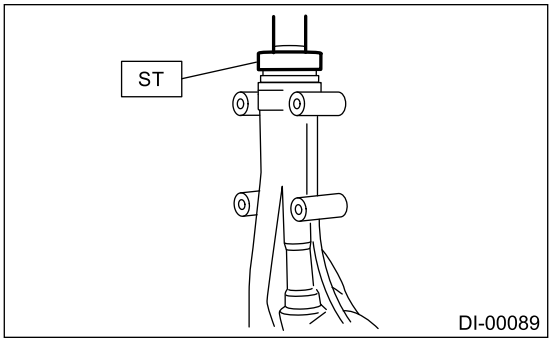
(B) Puller

15. Using the ST, install the front 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 gear oil to the oil seal lips.**

ST 498447120 INSTALLER



16. Press-fit the companion flange with ST1, ST2, and ST3.

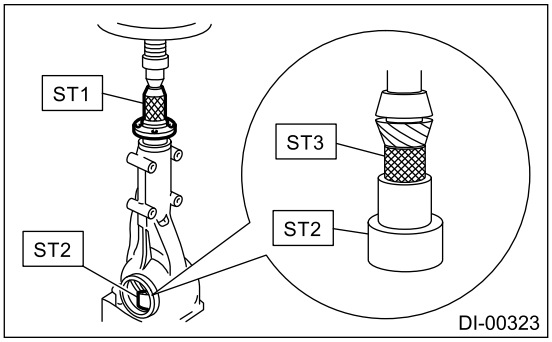
ST1 899874100 INSTALLER

ST2 399780104 WEIGHT

ST3 498937110 HOLDER DRIVE PINION

Note:

Be careful not to damage the pilot bearing.



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

Seal material:

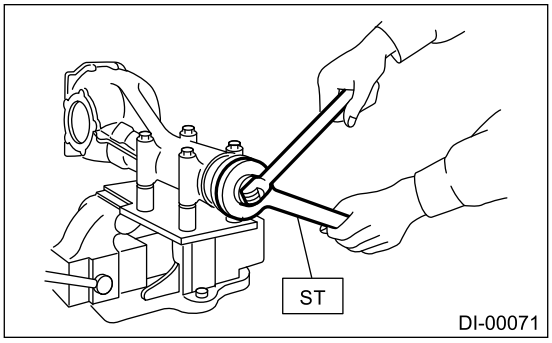
THREE BOND 1324 (Part No. 004403042) or equivalent

18. Tighten the new self-locking nut while securing the companion flange with ST.

Tightening torque:

181.5 N·m (18.5 kgf-m, 133.9 ft-lb)

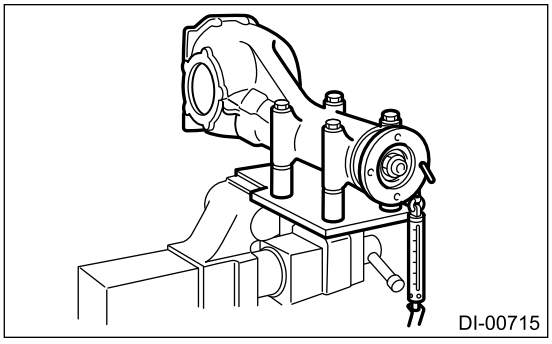
ST 18633AA000 WRENCH COMPL



19. Check the initial torque or initial load.

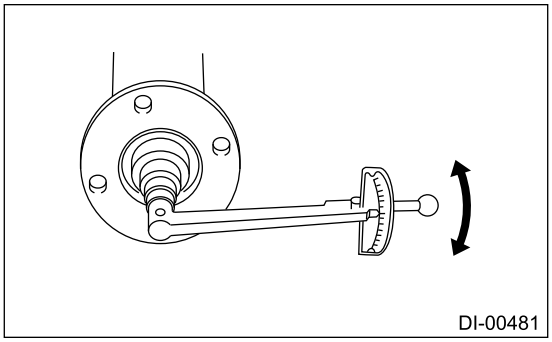
Initial load:

24.1 — 38.6 N (2.5 — 3.9 kgf, 5.4 — 8.7 lbf)



Initial torque:

0.98 — 1.57 N·m (0.10 — 0.16 kgf-m, 0.72 — 1.16 ft-lb)



20. Install the hypoid driven gear to differential case.

Note:

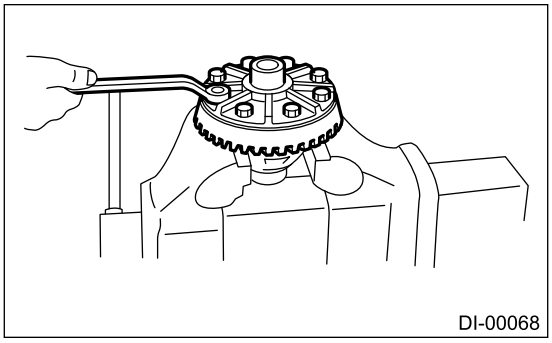
- **Before installing bolts, apply seal material to bolt threads.**

  Seal material:

  THREE BOND 1324 (Part No. 004403042) or equivalent
- **Make sure there is no clearance between the differential case and driven gear.**
- **Tighten opposing bolts in order.**

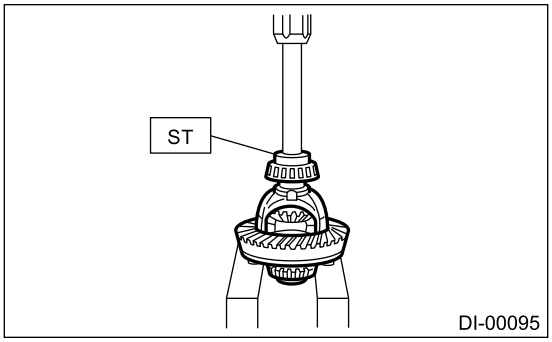
Tightening torque:

103 N·m (10.5 kgf-m, 76.0 ft-lb)



21. Press-fit the side bearing cone using the ST.

ST 398487700 DRIFT

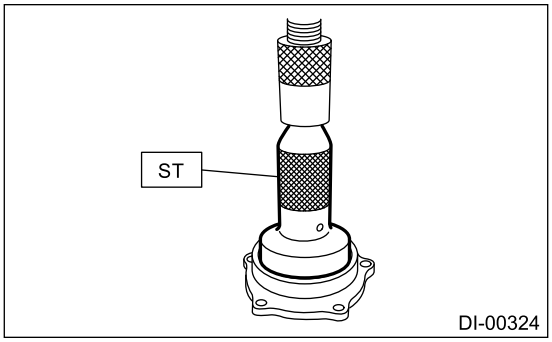


22. Using the ST, press-fit the side bearing race to the side retainer.

Caution:

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

ST 398417700 DRIFT



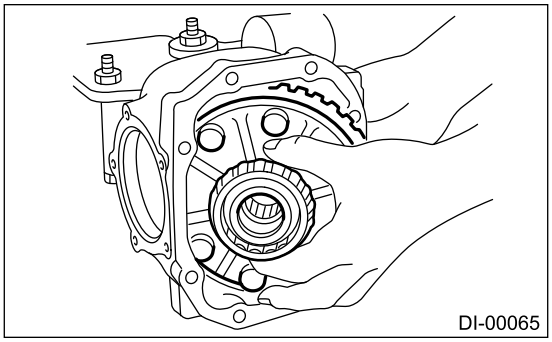
23. Side retainer shim adjustment

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

(2) Install the differential case.

Note:

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



(3) Install the side retainer shim.

Note:

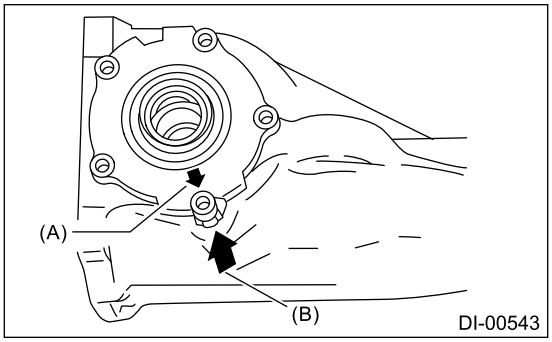
- **Be careful not to mix up the side retainer shim RH and LH.**
- **If the side retainer shim has been broken or corroded, replace it with a new part.**

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 side bearing race does not damage the bearing roller.



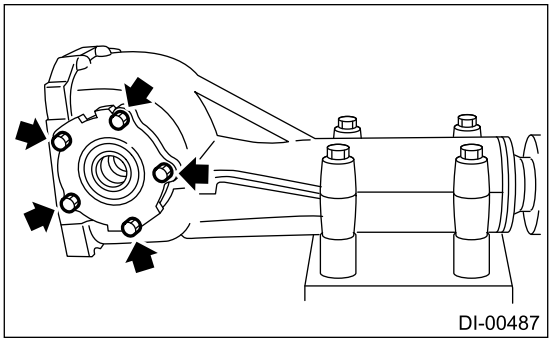
(A) Arrow mark (on the side retainer)

(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)

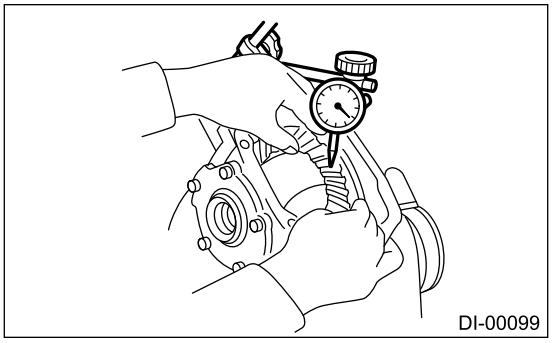


(6) Measure the hypoid driven gear to drive pinion backlash. Set the magnet stand on differential carrier. Align the contact point of dial gauge with tooth face of hypoid driven gear, and move hypoid driven gear while holding drive pinion still. Read the value indicated on dial gauge. If the backlash 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 not within specification, adjust it by increasing/reducing the thickness of side retainer shims on both sides by the same amount.

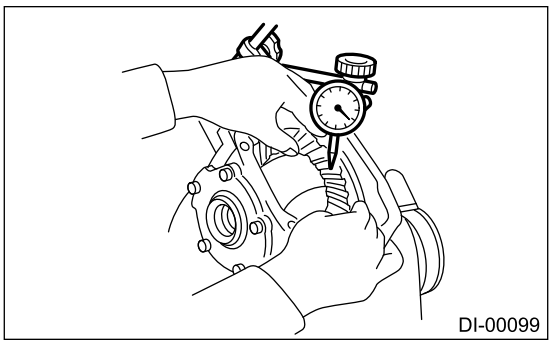
Total preload:

26.5 — 53 N (2.7 — 5.4 kgf, 6.0 — 11.9 lbf)

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

Backlash:

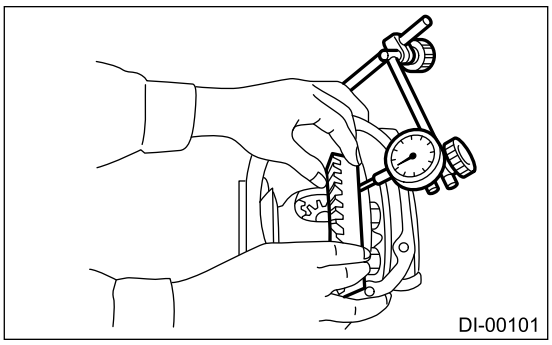
0.10 — 0.20 mm (0.004 — 0.008 in)



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

Hypoid driven gear back surface runout:

0.05 mm (0.002 in)



26. 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.

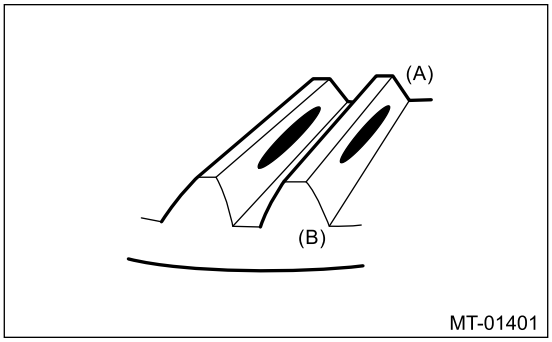
(2) When the contact pattern is not correct, readjust.

Note:

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

- Correct tooth contact

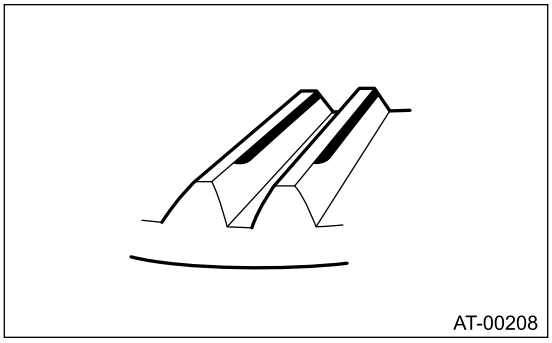
  Check item: Tooth contact pattern is slightly shifted toward toe side under no-load rotation. (When driving, it moves towards the heel side.)



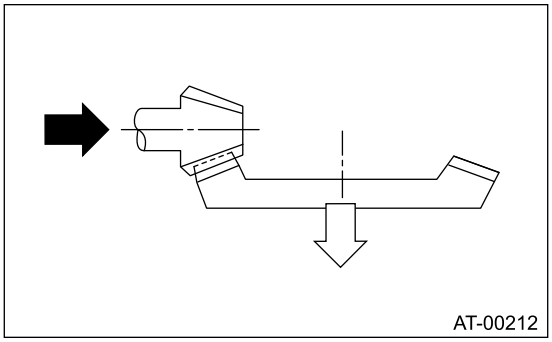
(A) Toe side

(B) Heel side

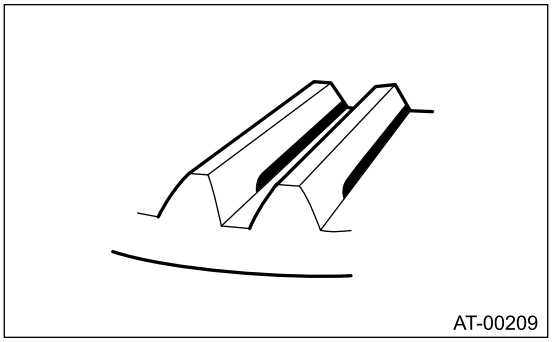
- Face contact
  Check item: Backlash is too large.
  Contact pattern



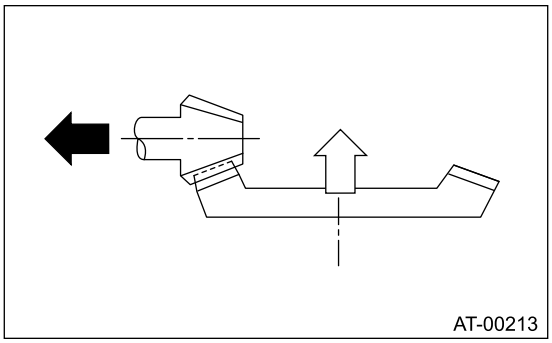
Corrective action: Increase thickness of pinion height adjusting washer according to the procedure for bringing drive pinion close to hypoid driven gear side.



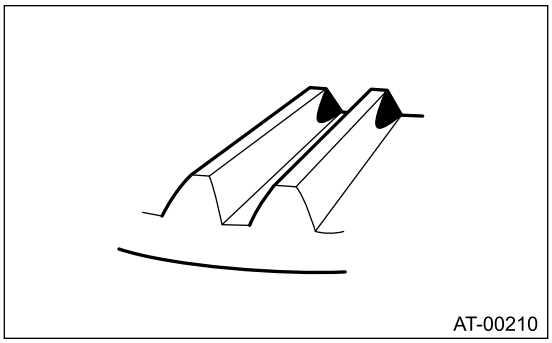
- Flank contact
  Check item: Backlash is too small.
  Contact pattern



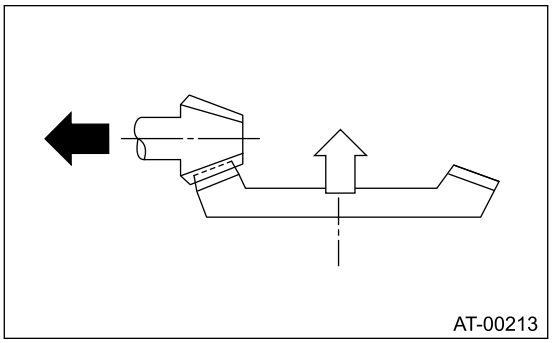
Corrective action: Reduce the thickness of pinion height adjusting washer according to the procedure for bringing drive pinion away from hypoid driven gear.



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

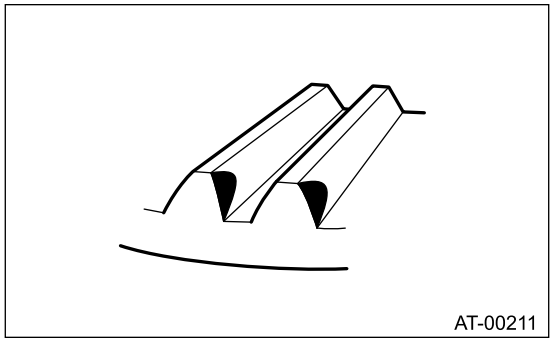


Corrective action: Reduce the thickness of pinion height adjusting washer according to the procedure for bringing drive pinion away from hypoid driven gear.

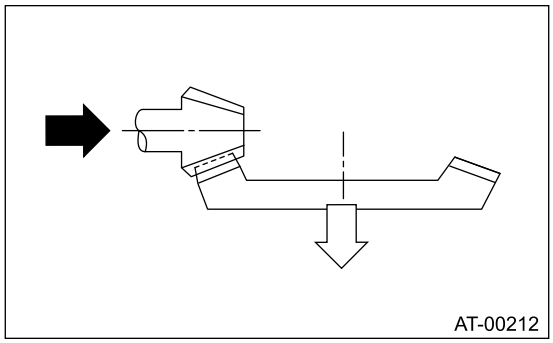


- Heel contact (outside end contact)
  Check item: Teeth contact area is too small.

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.



27. If proper tooth contact is not obtained, readjust the drive pinion height by changing the RH and LH side retainer shims and the hypoid driven gear backlash.

28. Remove the side retainer.

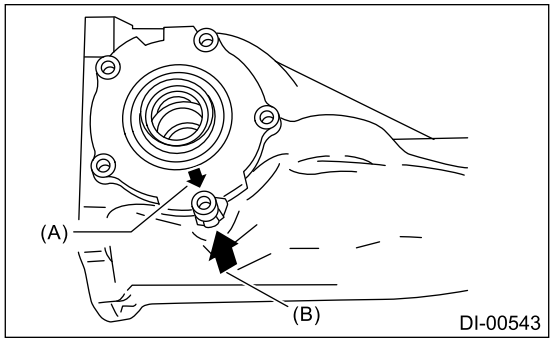
29. Install the O-ring to the side retainer.

Note:

Use new O-rings.

30. Install the side oil seal to the side retainer. Ref. to DIFFERENTIALS>Rear Differential Side Oil Seal>REPLACEMENT.

31. Align the arrow mark on the differential carrier with the arrow mark on the side retainer.



(A) Arrow mark (on the side retainer)

(B) Arrow mark (on the differential carrier)

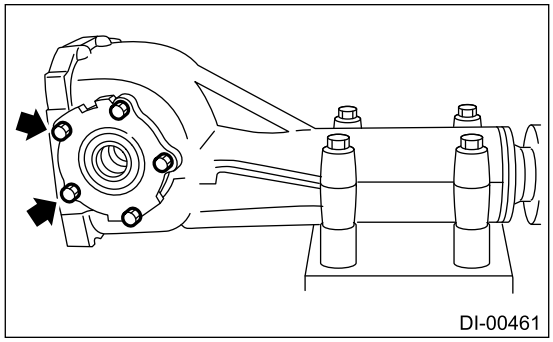
32. Apply liquid gasket to the bolts indicated by arrows, and tighten the bolt.

Liquid gasket:

THREE BOND 1110F (Part No. K0879Y0021), THREE BOND 1110B or equivalent

Tightening torque:

10.5 N·m (1.1 kgf-m, 7.7 ft-lb)



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

Note:

Use a new gasket.

Tightening torque:

44 N·m (4.5 kgf-m, 32.5 ft-lb)

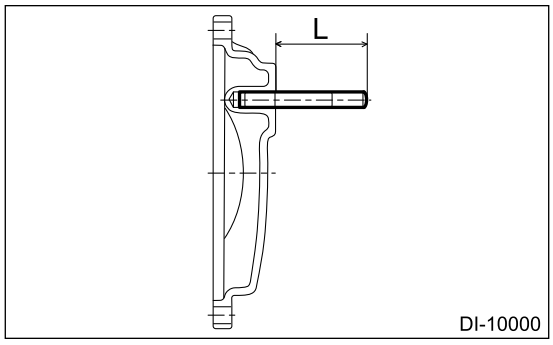
34. When the stud bolts are removed from the rear cover, install the stud bolts so that the exposed length of stud bolt is within the range of "L".

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:

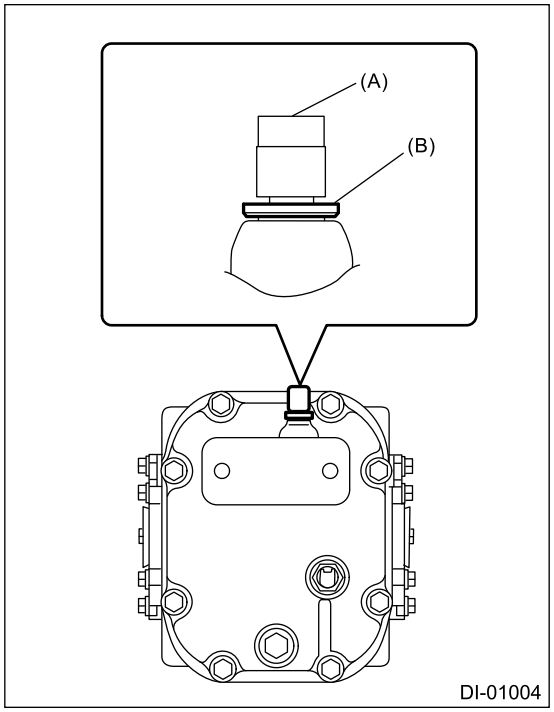
59.0 — 61.0 mm (2.32 — 2.40 in)



35. 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.



36. Install the drain plug.

Note:

Use a new gasket.

Tightening torque:

60 N·m (6.1 kg-m, 44.3 ft-lb)

37. Install the oil temperature sensor.

Note:

- **Install the oil temperature sensor and the adapter as a unit.**
- **After installing the rear differential to the vehicle, fill the differential gear oil, then set a new gasket and tighten to the specified torque. Ref. to DIFFERENTIALS>Differential Gear Oil>REPLACEMENT.**

DIFFERENTIALS > Rear Differential (T-type)

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. Bearing

Replace if seizure, peeling, wear, rust, dragging during rotation, noise or other defect is evident.

3. Oil seal

Replace if deformed or damaged, and at every disassembling.

4. Differential carrier

Replace if the bearing bores are worn or damaged.

5. Differential case
Replace if sliding surfaces are abnormally worn, burned, or cracked.

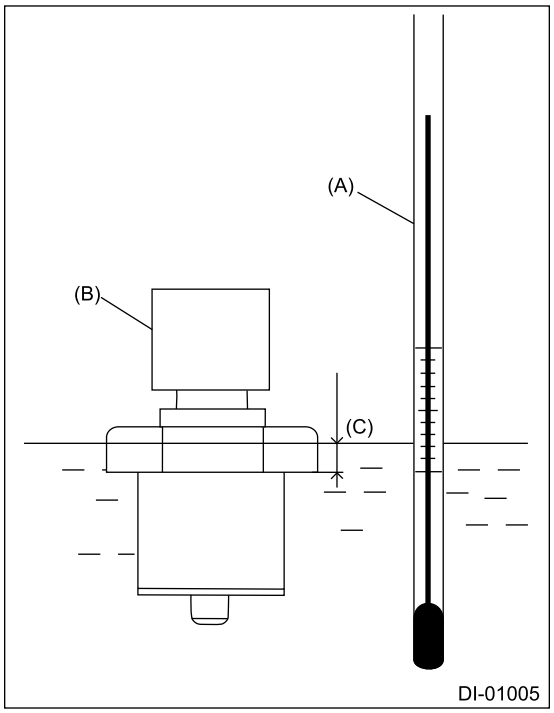
6. Companion flange
Replace if the oil seal lip contact surface shows cracking.

7. Rear differential oil temperature sensor

(1) Check that the rear differential oil temperature sensor has no deformation, cracks or other damages.

(2) Immerse the rear differential oil temperature sensor and a thermometer in water.

Caution:
Take care not to allow water to get into the rear differential oil temperature sensor connector. If water gets into the connector, completely remove any water inside.

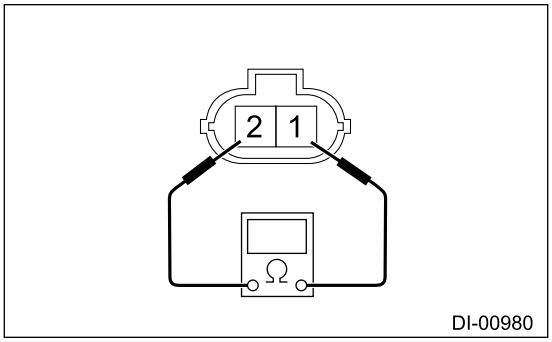


(A) Thermometer
(B) Rear differential oil temperature sensor
(C) Hexagonal part height: To approx. $^{2}/_{3}$

(3) Raise water temperature gradually, measure the resistance between the rear differential oil temperature sensor terminals when the temperature is 20°C (68°F) and 80°C (176°F).

Note:

- **Stir the water to make the temperature of the water as uniform as possible.**
- **Take the resistance value only after it becomes steady.**
- **After inspection, wipe off the water completely.**



Water temperature	Terminal No.	Standard
20°C (68°F)	1 and 2	2.233 — 2.701 [kΩ]
80°C (176°F)		0.313 — 0.338 [kΩ]

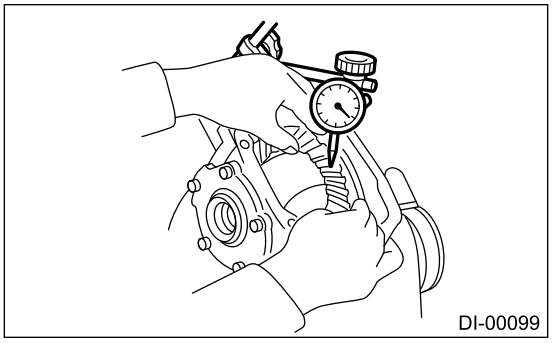
1. HYPOID DRIVEN GEAR TO DRIVE PINION BACKLASH

Using a dial gauge, check the backlash between hypoid driven gear and drive pinion.

Hypoid driven gear to drive pinion backlash:

0.10 — 0.20 mm (0.004 — 0.008 in)

If the backlash between hypoid driven gear and drive pinion is not within the specified range, adjust the side bearing preload and repair if necessary.



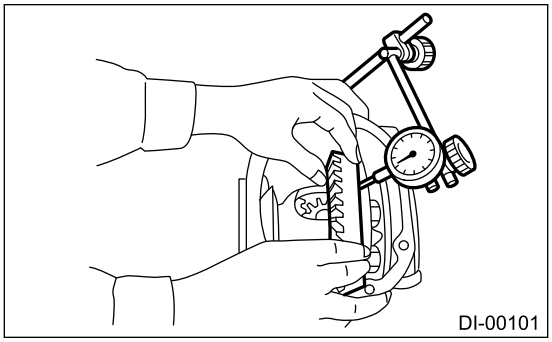
2. HYPOID DRIVEN GEAR RUNOUT ON ITS BACK SURFACE

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.



3. 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.

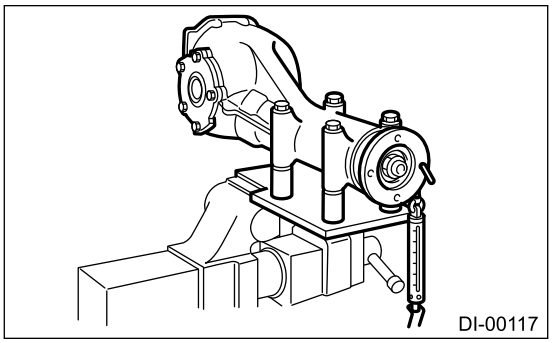
4. TOTAL PRELOAD

Using a spring scale, check the total preload.

Total preload:

26.5 — 53 N (2.7 — 5.4 kgf, 6.0 — 11.9 lbf)

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

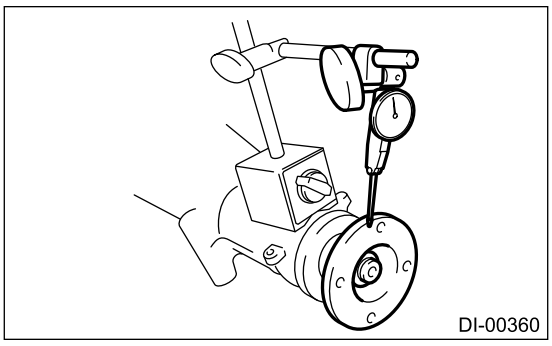


5. COMPANION FLANGE

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:

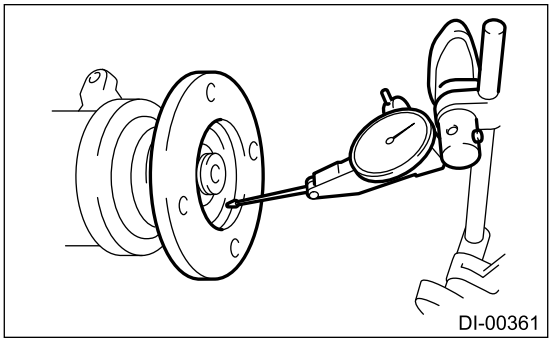
   0.08 mm (0.003 in)



3. Set the dial 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.

DIFFERENTIALS > Rear Differential (T-type)

ADJUSTMENT

1. HYPOID DRIVEN GEAR TO DRIVE PINION BACKLASH

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

2. 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.

3. TOTAL PRELOAD

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

DIFFERENTIALS > Rear Differential (VB-type)

REMOVAL

The removal procedure for VB3-type is included in “REMOVAL” for T-type. Ref. to DIFFERENTIALS>Rear Differential (T-type)>REMOVAL.

DIFFERENTIALS > Rear Differential (VB-type)

INSTALLATION

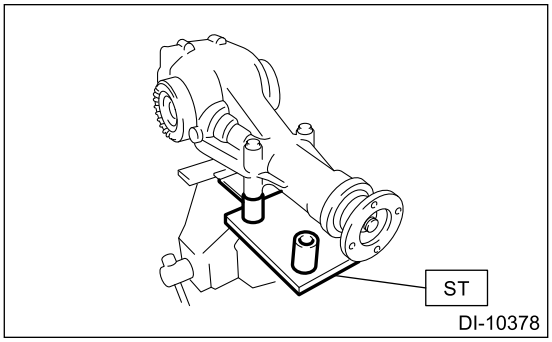
The installation procedure for VB3-type is included in “INSTALLATION” for T-type. Ref. to DIFFERENTIALS>Rear Differential (T-type)>INSTALLATION.

DIFFERENTIALS > Rear Differential (VB-type)

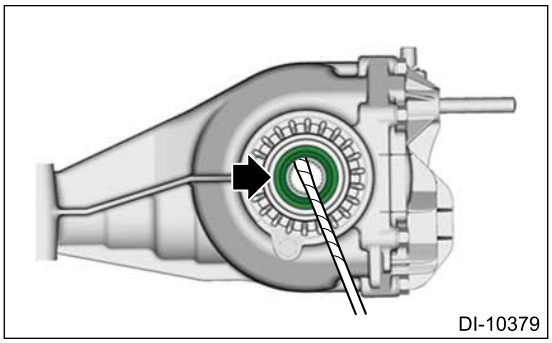
DISASSEMBLY

1. Set the ST on a vise and install the rear differential.

   ST 398217700 ATTACHMENT SET

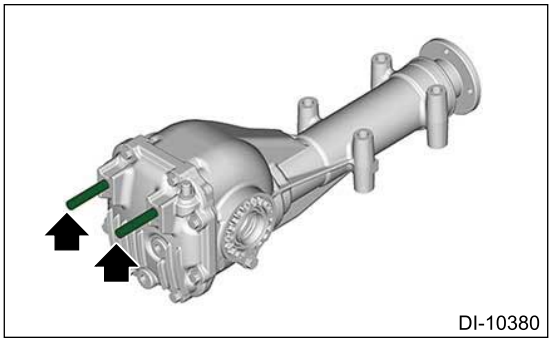


2. Remove the side oil seal using a flat tip screwdriver wrapped with vinyl tape, etc.



3. Remove the stud bolt from the rear cover.

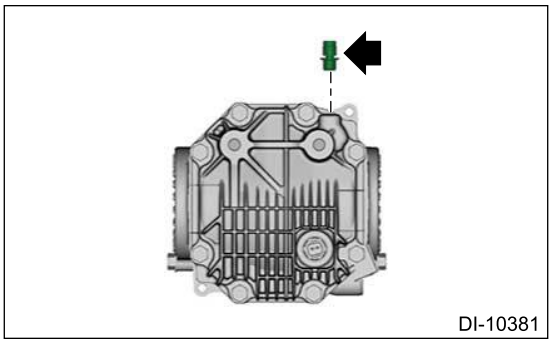
   Note:
   Perform this procedure only when it is necessary.



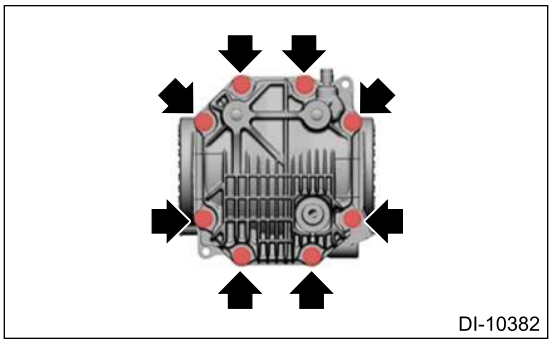
4. Remove the air breather cap.

Note:

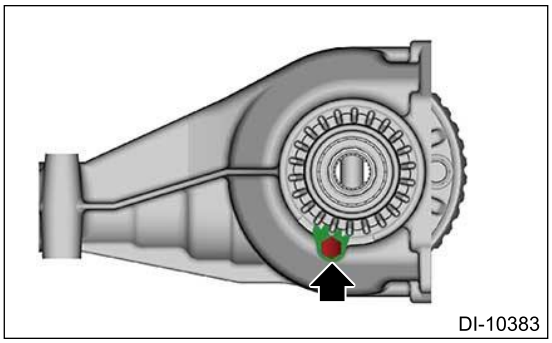
Perform this procedure only when it is necessary.



5. Remove the bolt, and remove the rear cover by lightly tapping with a plastic hammer.



6. Measure and record the tooth contact and the backlash between hypoid driven gear and drive pinion set. Ref. to DIFFERENTIALS>Rear Differential (VB-type)>ASSEMBLY.
7. Remove the lock plate.



8. Remove the side retainer using the ST.

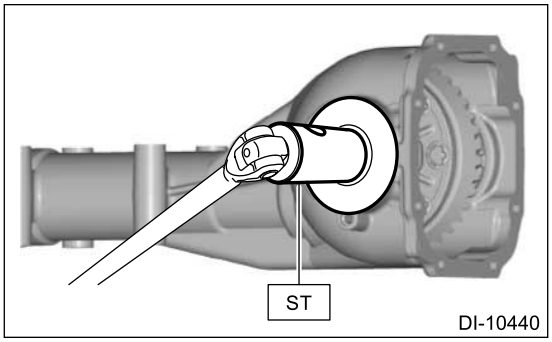
Caution:

- **Be careful not to drop the differential case.**
- **Be careful not to allow the hypoid driven gear teeth to contact the differential carrier.**

Note:

Do not mix up the side bearings RH and LH when they are not replaced with new parts.

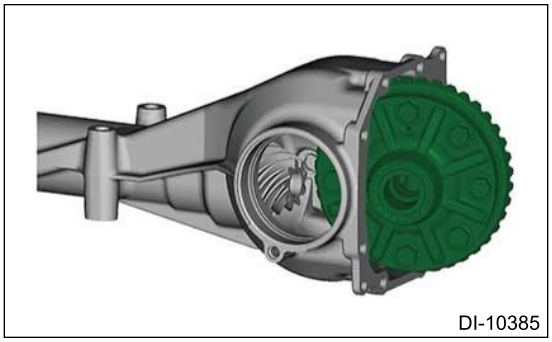
ST 18658AA021 WRENCH COMPL RETAINER



9. Remove the differential case.

Note:

Be careful not to allow the hypoid driven gear teeth to contact the differential carrier.



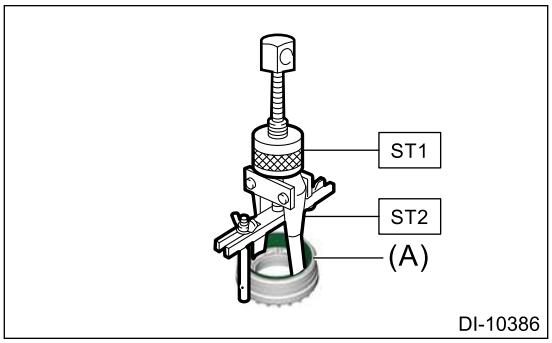
10. Remove the side bearing race (A) with ST1 and ST2.

Note:

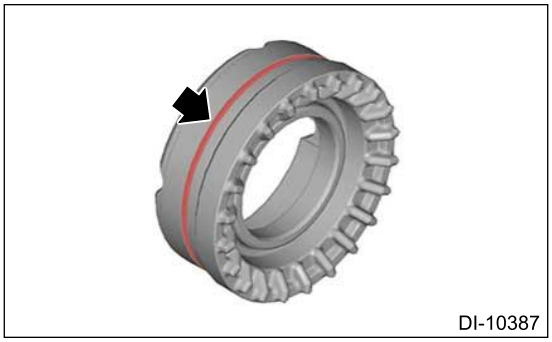
Perform this procedure only when it is necessary.

ST1 398527700 PULLER ASSY

ST2 18760AA000 CLAW



11. Remove the O-ring from the side retainer.



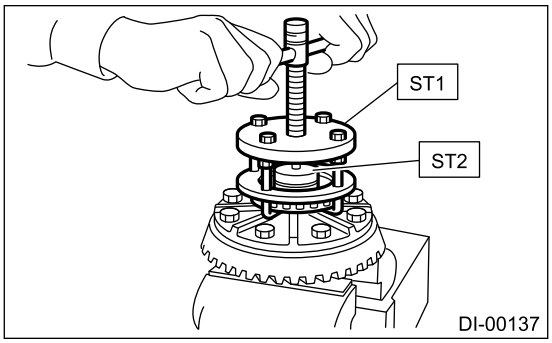
12. Remove the side bearing cone with ST1 and ST2.

Note:

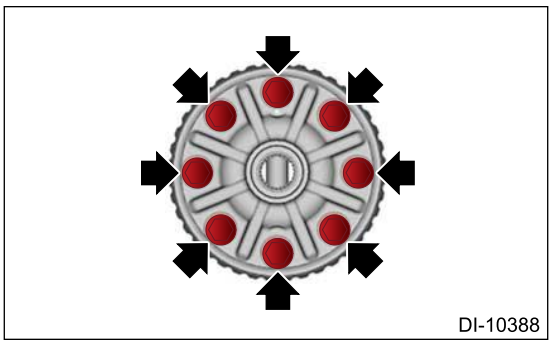
Perform this procedure only when it is necessary.

ST1 899524100 PULLER SET

ST2 398497701 SEAT

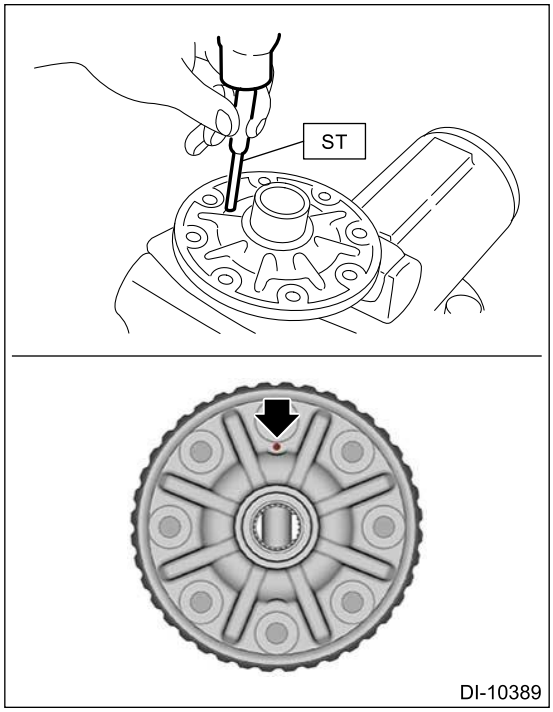


13. Remove the hypoid driven gear from the differential case.



14. Using the ST, remove the spring pin.

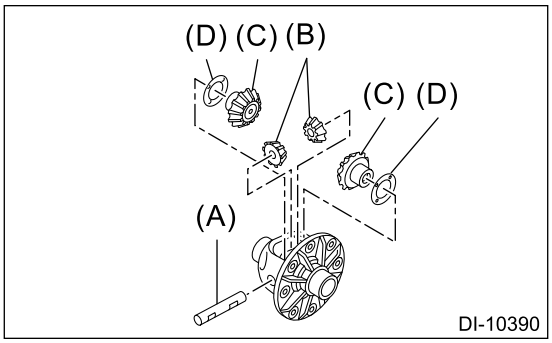
ST 899904100 STRAIGHT PIN REMOVER



15. Pull out the pinion shaft to remove the differential bevel pinion, the differential bevel gear and the thrust washer.

Note:

Do not mix up the installation position of each part when reusing it.



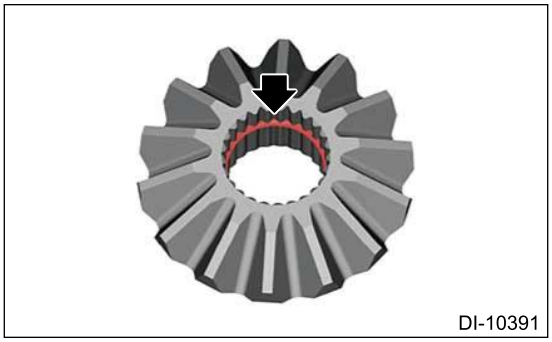
(A) Pinion shaft

(B) Differential bevel pinion

(C) Differential bevel gear

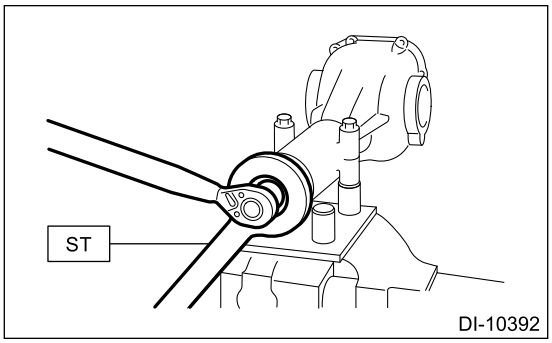
(D) Thrust washer

16. Remove the circlip from the differential bevel gear.



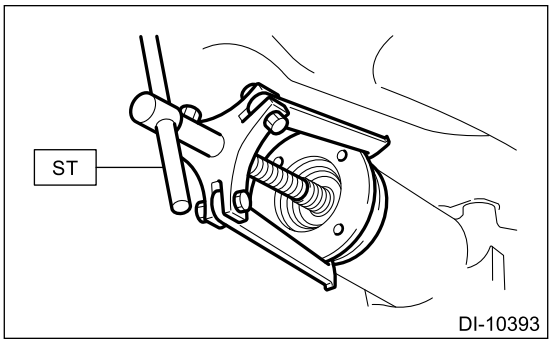
17. Remove the self-locking nut while securing the companion flange with ST.

ST 498427200 FLANGE WRENCH

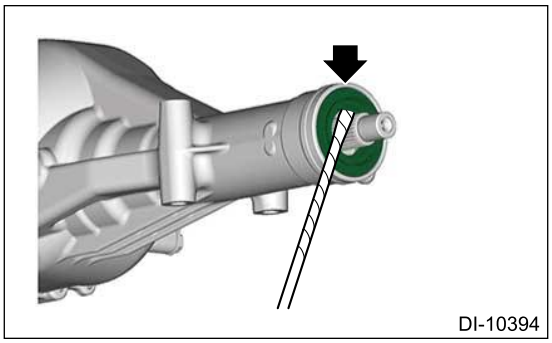


18. Remove the companion flange using ST.

ST 399703600 PULLER ASSY



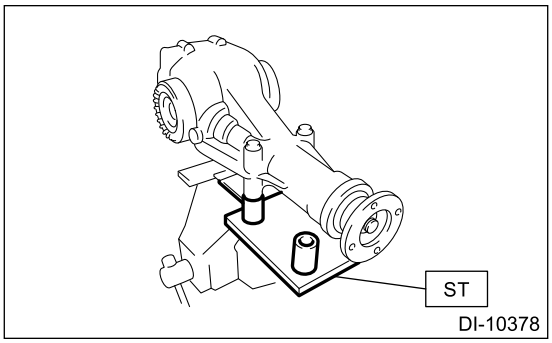
19. Remove the front oil seal using a flat tip screwdriver wrapped with vinyl tape, etc.



20. Remove sealant from the threaded portions of the companion flange and the drive pinion.

21. Remove the rear differential from ST.

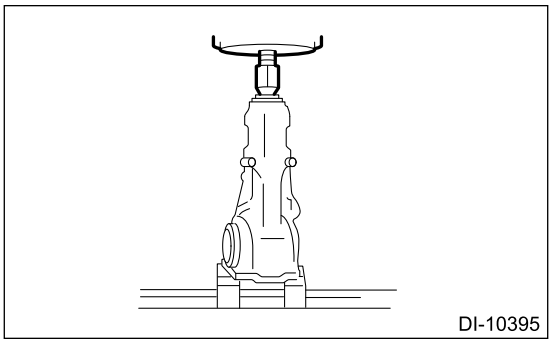
ST 398217700 ATTACHMENT SET



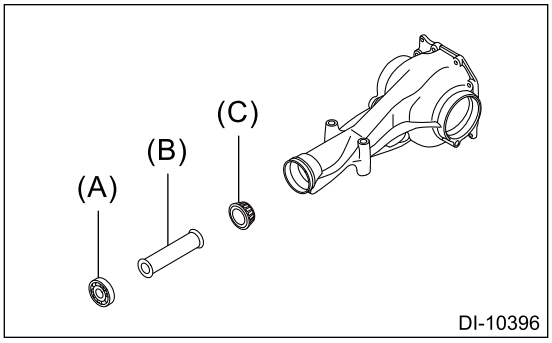
22. Press the end of drive pinion using a press, and remove the drive pinion, pinion height adjusting washer, rear bearing cone, preload adjusting spacer and preload adjusting washer as a single unit.

Caution:

Be careful not to drop the drive pinion.



23. Remove the pilot bearing, the spacer and the front bearing cone from the differential carrier.



(A) Pilot bearing

(B) Spacer

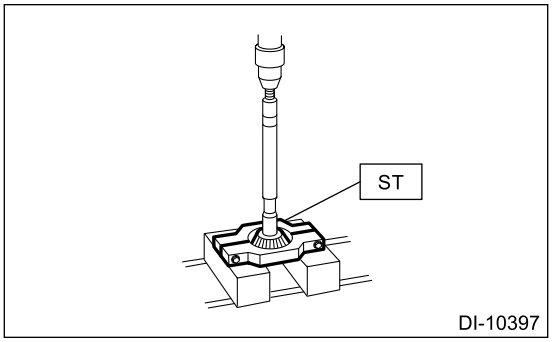
(C) Front bearing cone

24. Using ST and a press, remove the rear bearing cone and the pinion height adjusting washer from drive pinion.

Caution:

Be careful not to drop the drive pinion.

ST 18720AA000 REMOVER

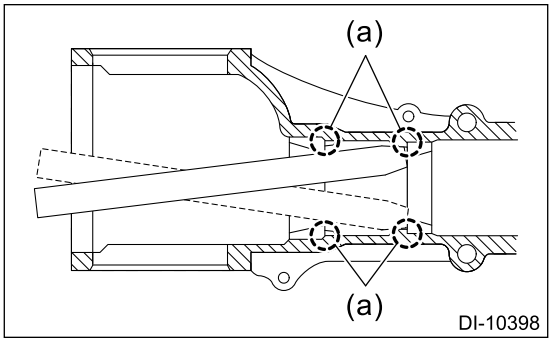


25. Measure and record the thickness of the pinion height adjusting washer.

26. Using a brass bar, tap out the front bearing race and the rear bearing race to remove.

Note:

- **Remove the front bearing race first.**
- **Remove the rear bearing race by tapping it from the front side.**
- **Using the recess (a) on the differential carrier, tap the 2 points alternately to remove.**



DIFFERENTIALS > Rear Differential (VB-type)

ASSEMBLY

1. Adjusting preload for front bearing and rear bearing

Note:

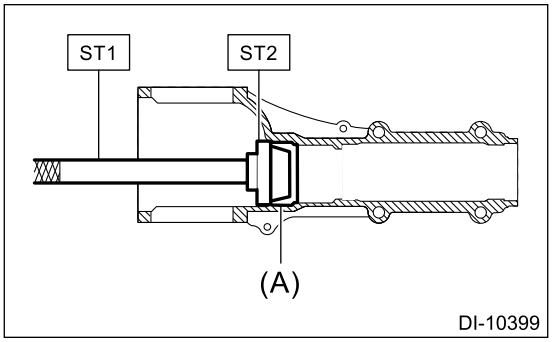
The adjustment must be carried out with front oil seal removed.

(1) Press-fit a new rear bearing race (A) with ST1, ST2 and a press.

Note:

Apply gear oil to the rear bearing race.

ST1	**398477701**	**HANDLE**
ST2	**398477703**	**DRIFT 2**



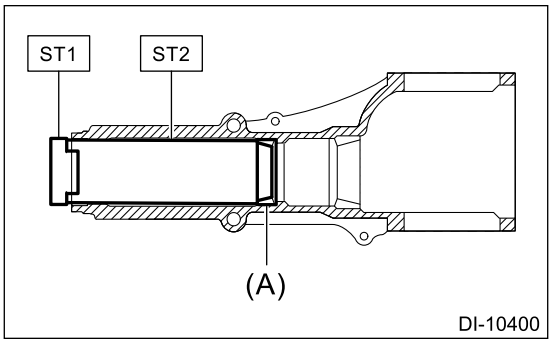
(2) Press-fit a new front bearing race (A) with ST1, ST2 and a press.

Note:

Apply gear oil to the front bearing race.

ST1 398477703 DRIFT 2

ST2 18654AA000 INSTALLER



(3) Based on values of the backlash and tooth contact between hypoid driven gear and drive pinion and the thickness of the pinion height adjusting washer, which are measured during disassembly, select the pinion height adjusting washer to replace.

Note:

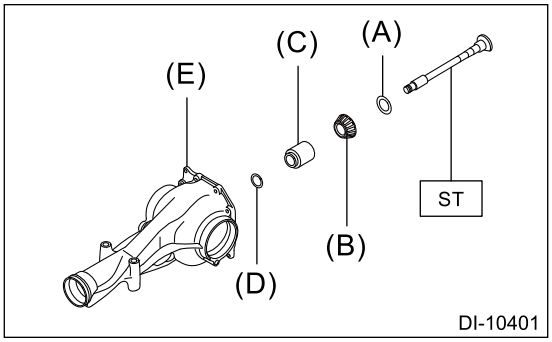
If the backlash and tooth contact between hypoid driven gear and drive pinion are normal in the inspection before disassembly, verify that the pinion height adjusting washer is not deformed or damaged, and reuse it.

(4) Set the selected pinion height adjusting washer, new rear bearing cone, preload adjusting spacer and preload adjusting washer to the ST, and insert them into the differential carrier.

Note:

Apply gear oil to the rear bearing cone.

ST 18678AA000 DUMMY SHAFT

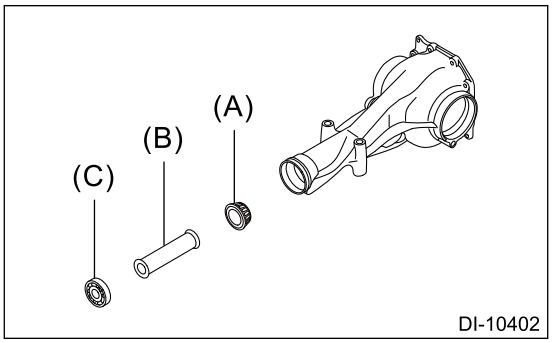


(A) Pinion height adjusting washer
(B) Rear bearing cone
(C) Preload adjusting spacer
(D) Preload adjusting washer
(E) Differential carrier

(5) Set new front bearing cone, spacer and new pilot bearing.

Note:

Apply gear oil to the front bearing cone and the pilot bearing.

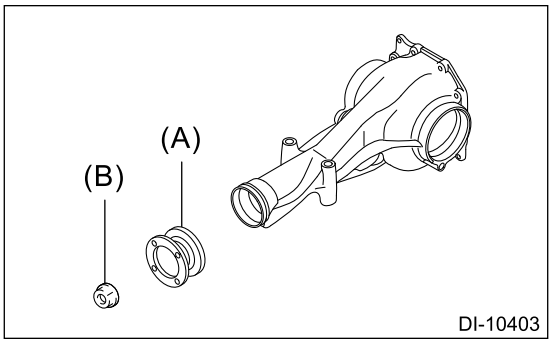


(A) Front bearing cone
(B) Spacer
(C) Pilot bearing

(6) Set the companion flange, and temporarily attach the self-locking nut.

Note:

- **Use the self-locking nut that has been removed during disassembly.**
- **Do not install the front oil seal.**

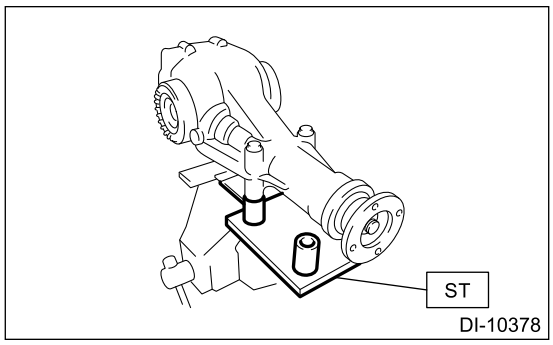


(A) Companion flange

(B) Self-locking nut

(7) Set the ST on a vise and install the rear differential.

ST 398217700 ATTACHMENT SET



(8) Rotate the companion flange by hand to make the bearings fit in.

(9) Tighten the self-lock nut while measuring the initial torque or initial load using a torque wrench or a spring scale.

Caution:

Immediately stop tightening if the initial torque or initial load exceeds the standard value before the tightening torque reaches the specified value.

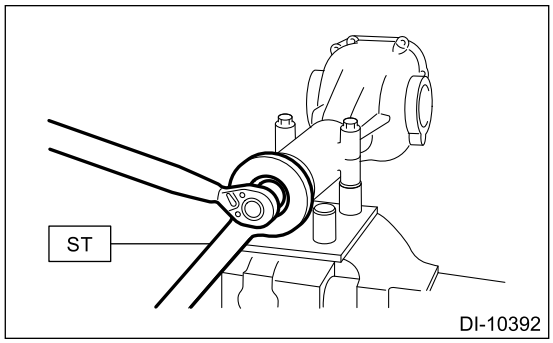
Note:

- **When tightening the self-locking nut, use the ST to fix the companion flange in place.**
- **Select the preload adjusting washer and the preload adjusting spacer so that the initial torque or the initial load is within the standard value when tightening to the specified torque.**

ST 498427200 FLANGE WRENCH

Tightening torque:

191 N·m (19.5 kgf-m, 140.9 ft-lb)

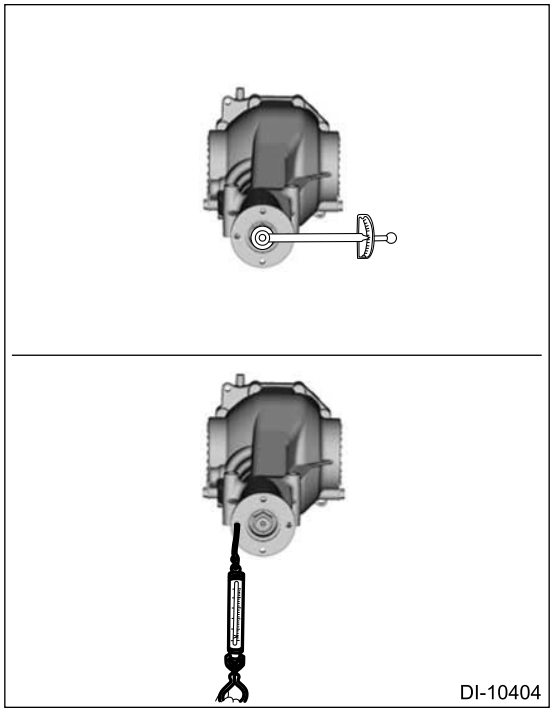


Initial torque:

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

Initial load:

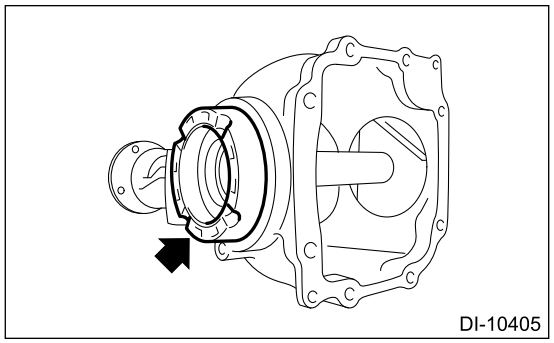
12.7 — 32.2 N (1.3 — 3.3 kgf, 2.9 — 7.2 lbf)



(10)Record the initial torque or the initial load after adjusting the preload.

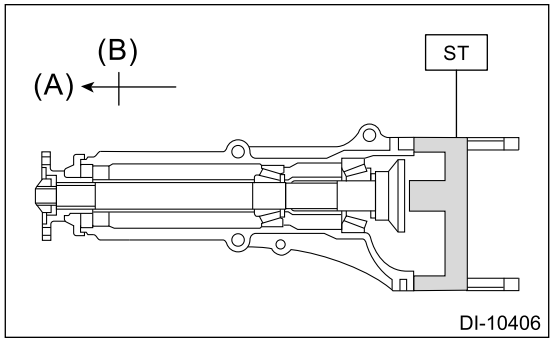
2. Adjusting drive pinion height:

(1) Install the side retainer in the reverse direction to the left side of the differential carrier.



(2) Set the ST.

ST 18831AA010 DIFFERENTIAL CARRIER GAUGE



(A) Front side

(B) RH side

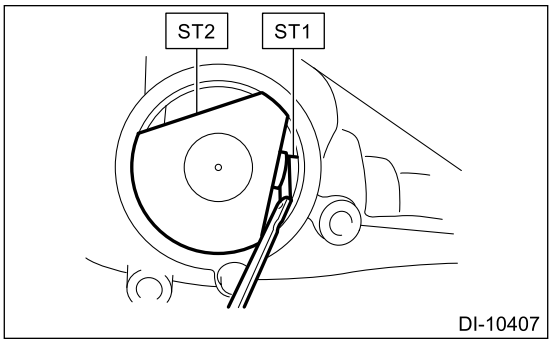
(3) Measure the gap between ST1 and ST2 using a thickness gauge.

Note:

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

ST1 18678AA000 DUMMY SHAFT

ST2 18831AA010 DIFFERENTIAL CARRIER GAUGE



(4) Select the correct pinion height adjusting washer using the following calculation.

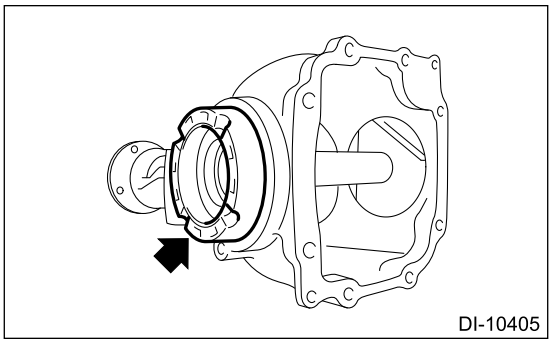
Note:

Use one to three pinion height adjusting washer(s).

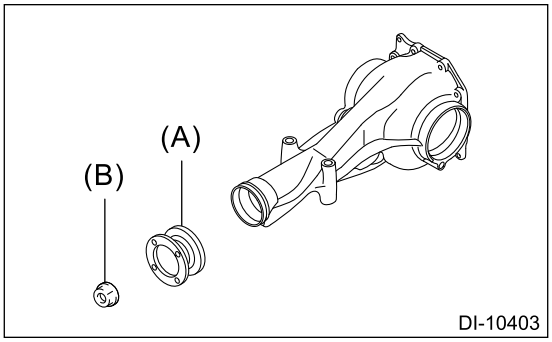
T = To + C − 0.05 mm (0.0020 in)

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

3. Remove the side retainer from the differential carrier.



4. Remove the self-locking nut and the companion flange.



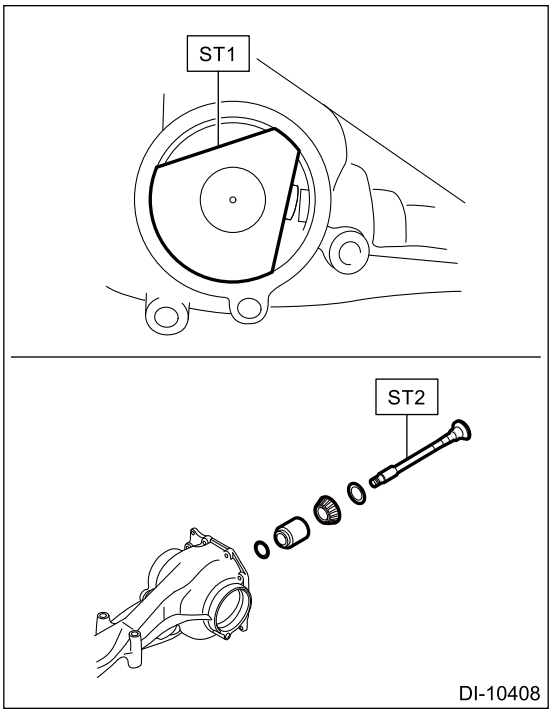
(A) Companion flange

(B) Self-locking nut

5. Remove the ST1, ST2 and each component from the differential carrier.

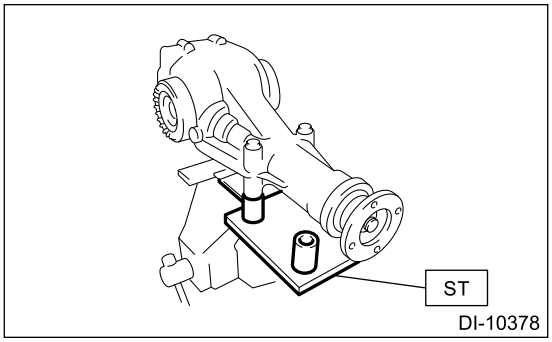
ST1 18831AA010 DIFFERENTIAL CARRIER GAUGE

ST2 18678AA000 DUMMY SHAFT

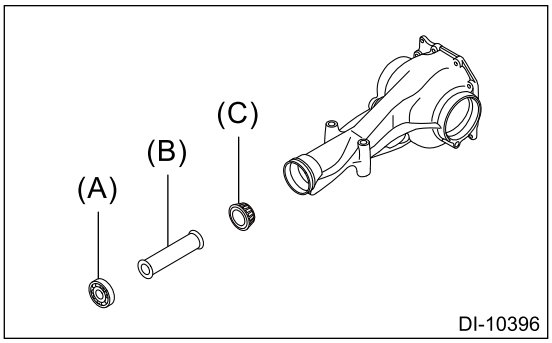


6. Remove the rear differential from ST.

ST 398217700 ATTACHMENT SET



7. Remove the pilot bearing, spacer and front bearing cone.



(A) Pilot bearing

(B) Spacer

(C) Front bearing cone

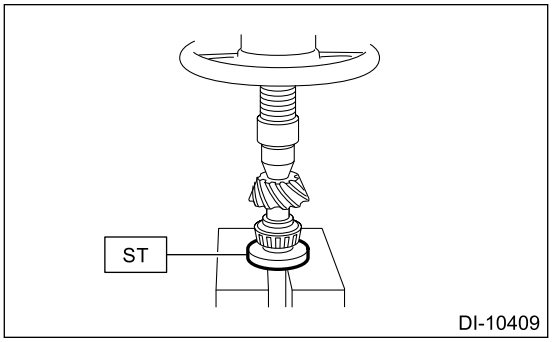
8. Set the selected pinion height adjusting washer to the drive pinion.

9. Press-fit the rear bearing cone to the drive pinion using the ST and a press.

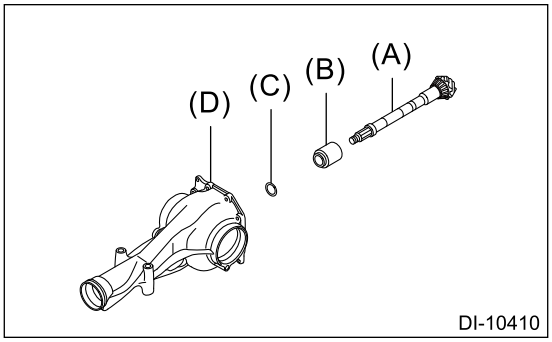
Note:

Apply gear oil to the rear bearing cone.

ST 398177700 INSTALLER



10. Set the preload adjusting spacer and preload adjusting washer to the drive pinion, and insert them into the differential carrier.



(A) Drive pinion

(B) Preload adjusting spacer

(C) Preload adjusting washer

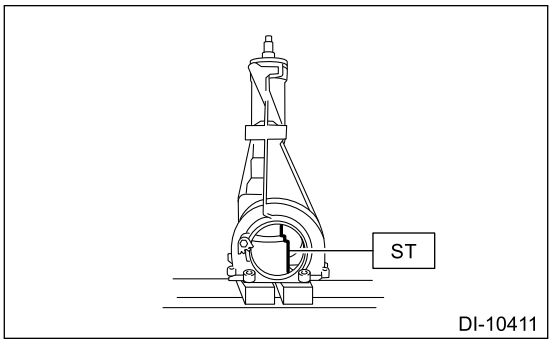
(D) Differential carrier

11. Set the ST and differential carrier to the press.

Note:

Leave the ST and the differential carrier set to the press, until the companion flange is pressed in.

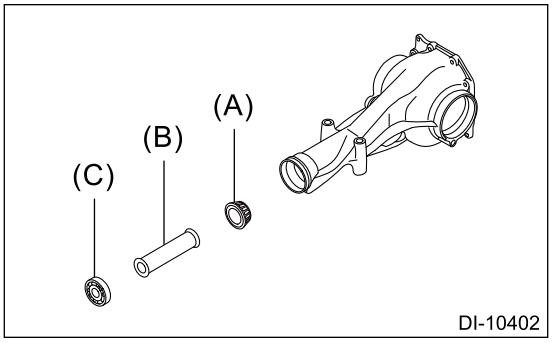
ST 399780104 WEIGHT



12. Set the front bearing cone, the spacer and the pilot bearing.

Note:

Apply gear oil to the front bearing cone and the pilot bearing.



(A) Front bearing cone

(B) Spacer

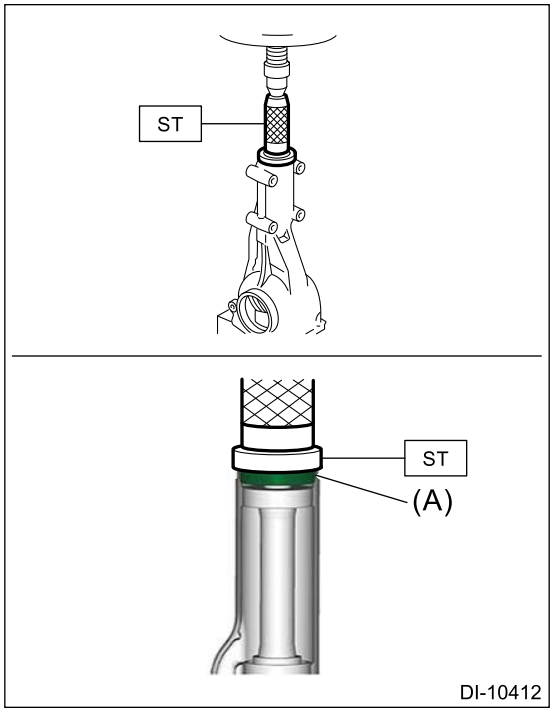
(C) Pilot bearing

13. Install a new front oil seal (A) using ST and a press.

Note:

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

ST 498447120 INSTALLER

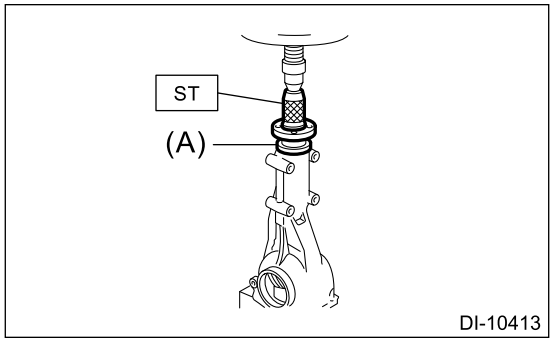


14. Press-fit the companion flange (A) using the ST and a press.

Caution:

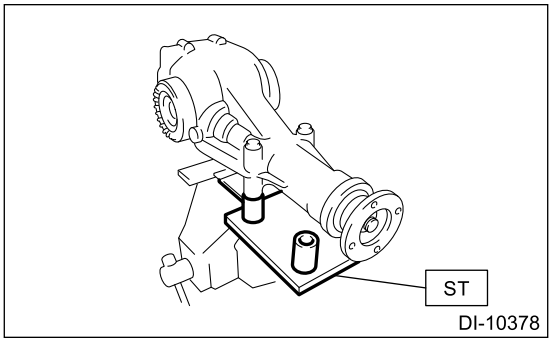
Be careful not to damage the pilot bearing.

ST 899874100 INSTALLER



15. Install the rear differential from ST.

ST 398217700 ATTACHMENT SET



16. Apply seal material to the drive pinion thread portion and the self-locking nut seating surface.

Caution:

Always use a new self-locking nut.

Note:

Before applying seal material, degrease the contact surface between the self-locking nut and the companion flange and the drive pinion threads.

Seal material:

THREE BOND 1324 (Part No. 004403042) or equivalent

17. Install the self-locking nut while securing the companion flange with ST.

Caution:

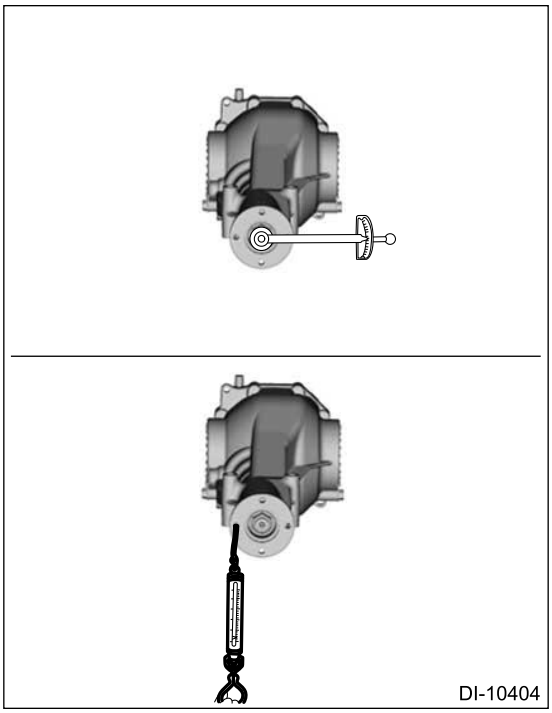
Tighten while adjusting the tightening torque within the range so that the initial torque or the initial load of the companion flange is within the standard value.

Initial torque:

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

Initial load:

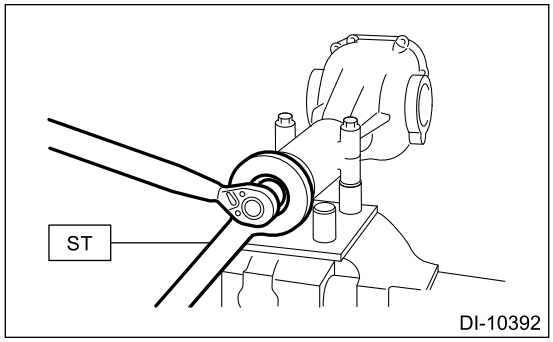
12.7 — 32.2 N (1.3 — 3.3 kgf, 2.9 — 7.2 lbf)



ST 498427200 FLANGE WRENCH

Tightening torque:

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

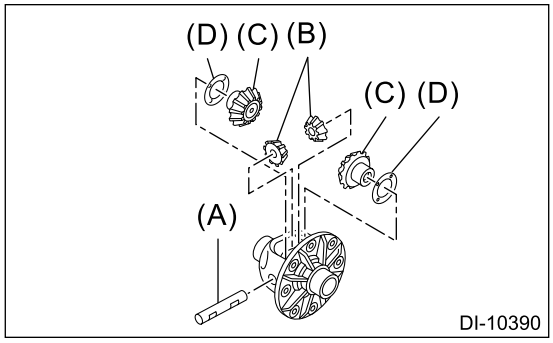


18. Assembling differential case

(1) Set the differential bevel pinion, the differential bevel gear and the thrust washer, and install the pinion shaft.

Note:

- **Apply gear oil to the sliding portions of the differential bevel gear, thrust washer and pinion shaft.**
- **Install the thrust washer so that the chamfered side faces toward the differential bevel gear.**



(A) Pinion shaft

(B) Differential bevel pinion

(C) Differential bevel gear

(D) Thrust washer

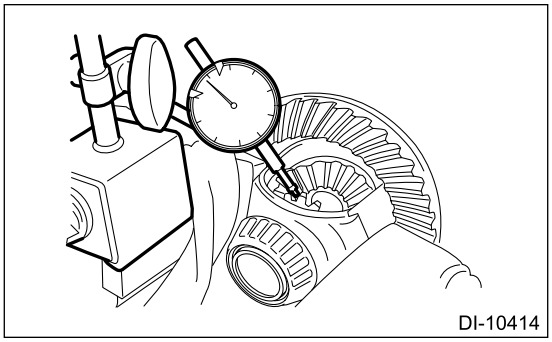
(2) Using a magnet stand or a dial gauge, measure the backlash between differential bevel gear and differential bevel pinion.

Note:

If the measured value of the backlash between differential bevel gear and differential bevel pinion is not within the specified range, select and replace the thrust washer so that the value falls within a specified range.

Differential bevel gear and differential bevel pinion backlash:

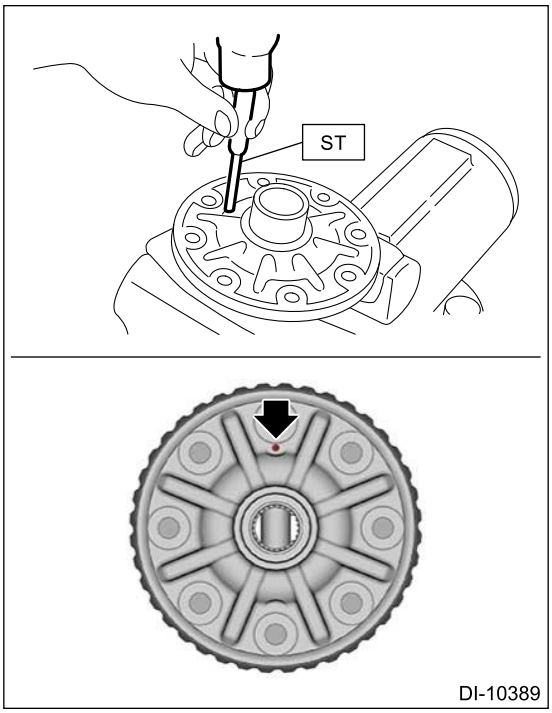
0.13 — 0.18 mm (0.005 — 0.007 in)



(3) Rotate each gear by hand for smooth movement.

(4) Using the ST, drive in a new spring pin.

ST 899904100 STRAIGHT PIN REMOVER



19. Install the hypoid driven gear to differential case.

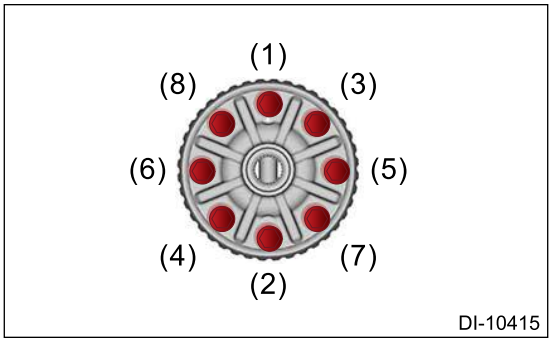
(1) Tighten the bolts in the numerical order as shown in the figure.

Note:

Make sure there is no clearance between the differential case and hypoid driven gear.

Tightening torque:

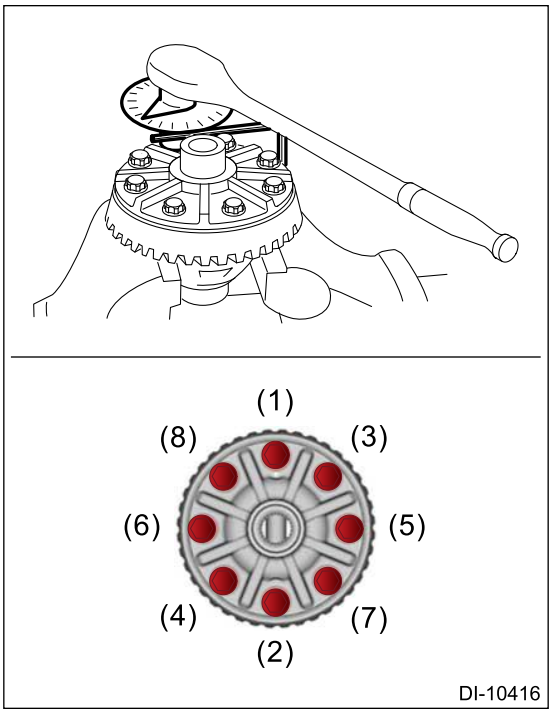
20 N·m (2.0 kgf-m, 14.8 ft-lb)



(2) Using an angle gauge, further tighten the bolts in numerical order as shown in the figure.

Tightening angle:

46°

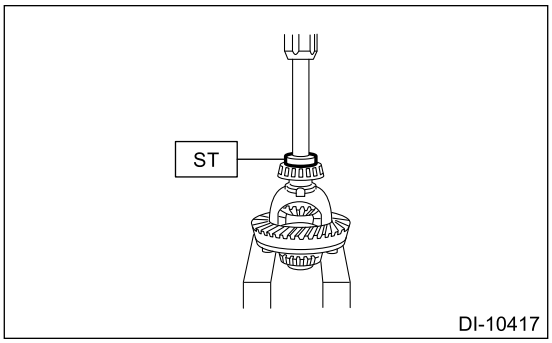


20. Press-fit a new side bearing cone using the ST and a press.

Note:

Apply gear oil to the side bearing cone.

ST 398487700 DRIFT



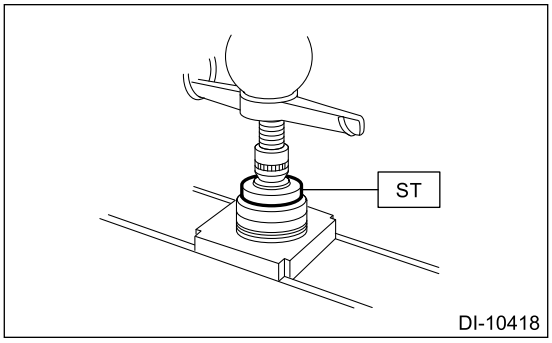
21. Assemble the side retainer.

(1) Install a new side bearing race using ST and a press.

Note:

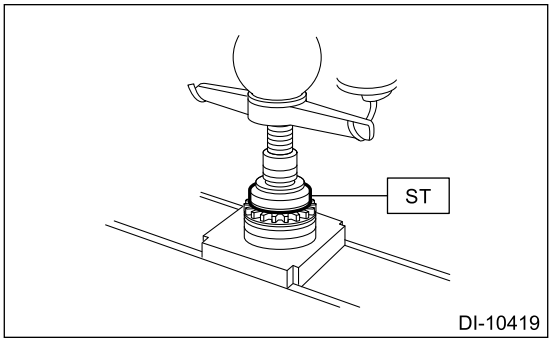
Apply gear oil to the side bearing race.

ST 398417700 DRIFT



(2) Install a new side oil seal.

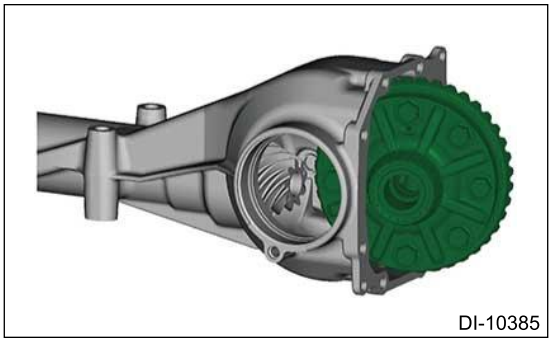
ST 398437700 OIL SEAL INSTALLER



22. Set the differential case.

Caution:

- **Be careful not to drop the differential carrier.**
- **Be careful not to allow the hypoid driven gear teeth to contact the differential carrier.**



23. Temporarily install the side retainer.

Caution:

- **Be careful not to drop the differential carrier.**
- **Be careful not to allow the hypoid driven gear teeth to contact the differential carrier.**

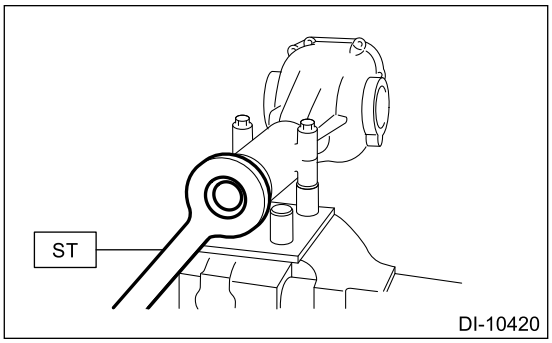
Note:

- **Do not mix up the side bearings RH and LH when reusing them.**
- **Apply gear oil to the threads of the side bearing and the side retainer.**
- **Do not install the O-ring.**

24. Backlash adjustment between hypoid driven gear and drive pinion and preload adjustment of side bearing

(1) Using the ST, turn the drive pinion for better fitting of side bearing.

ST 498427200 FLANGE WRENCH

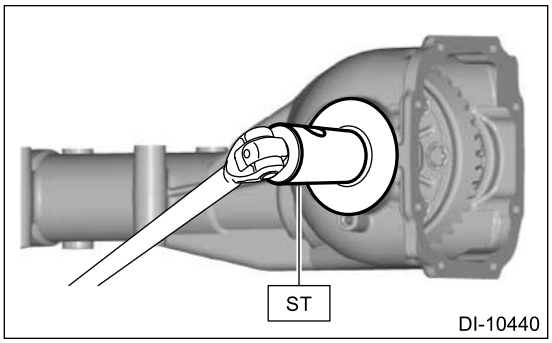


(2) Using the ST, tighten the side retainer (RH side), and then tighten the side retainer (LH side) until there is no backlash.

Caution:

Be careful not to overtighten.

ST 18658AA021 WRENCH COMPL RETAINER



(3) Turn back the side retainer (LH side) by approx. 1.5 notches, and tighten the side retainer (RH side) by 2 notches.

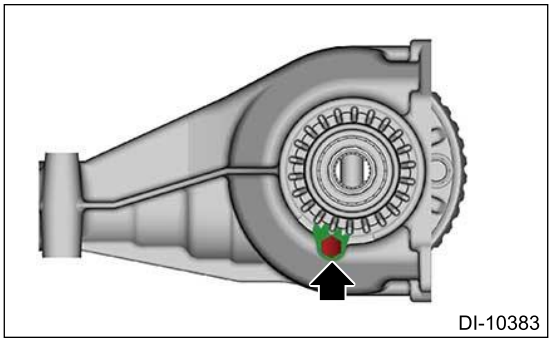
Note:

This sets the preload.

(4) Temporarily attach the lock plate.

Note:

Turn over the lock plate to shift the holder by 1/2 teeth.



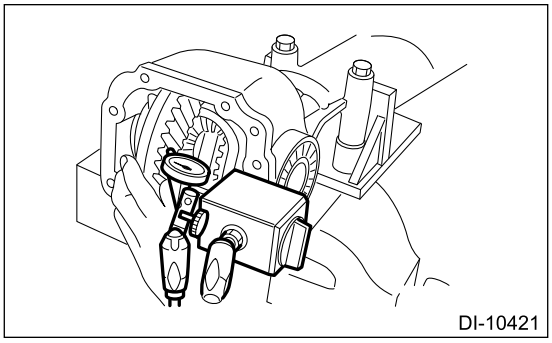
(5) Using a magnet stand or a dial gauge, measure the backlash between hypoid driven gear and drive pinion.

Note:

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

Hypoid driven gear to drive pinion backlash:

0.10 — 0.15 mm (0.004 — 0.006 in)



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

(1) Apply lead-free red dye evenly on three to four teeth of the hypoid driven gear.

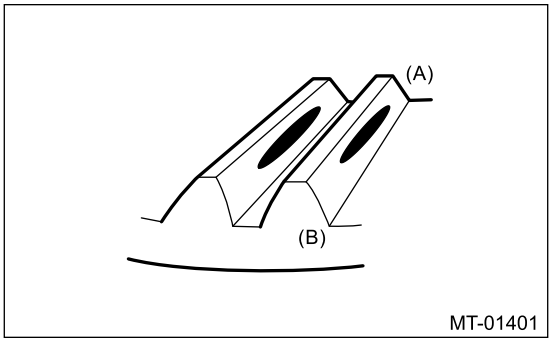
(2) Check the contact pattern after rotating the hypoid driven gear back and forth until a definite contact pattern appears on the hypoid driven gear.

Note:

- **If proper tooth contact is not obtained, readjust the backlash between hypoid driven gear and drive pinion and the drive pinion height.**
- **Wipe off the lead-free red dye after the check and adjustment are completed.**

a. Correct tooth contact

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

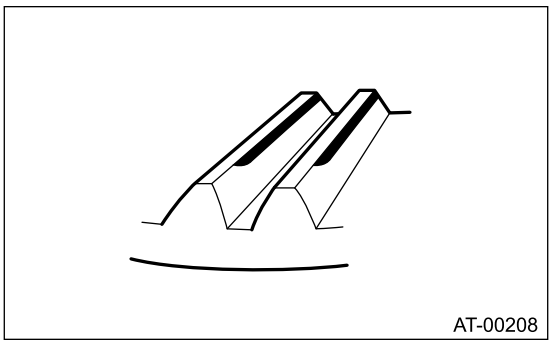


(A) Toe side (inside)

(B) Heel side (outside)

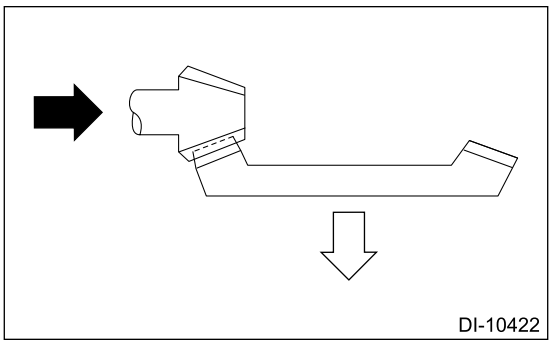
b. Face contact

Cause: Backlash is too large.



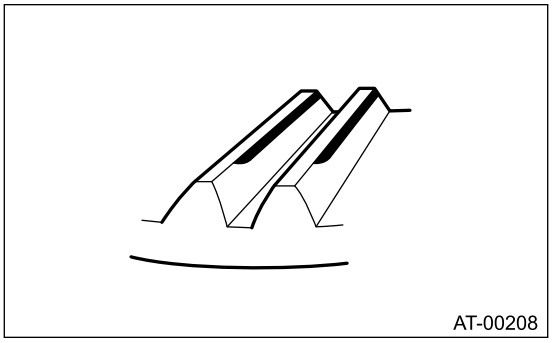
Corrective action: Loosen the side retainer RH, and tighten the side retainer LH by the same amount.

Otherwise, adjust the thickness of the pinion height adjusting washer to move the drive pinion to the hypoid driven gear side.



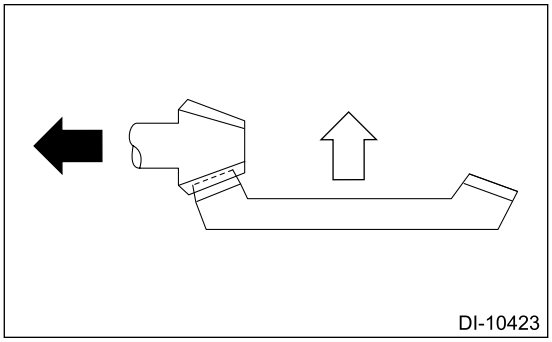
c. Flank contact

Cause: Backlash is too small.

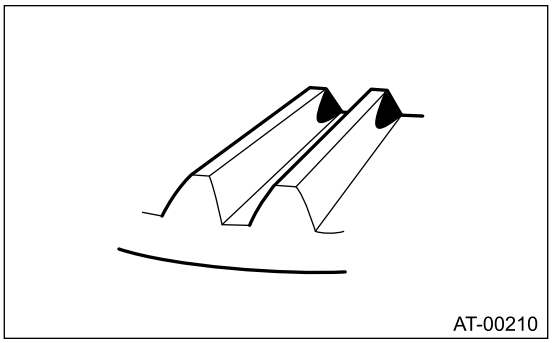


Corrective action: Loosen the side retainer LH, and tighten the side retainer RH by the same amount.

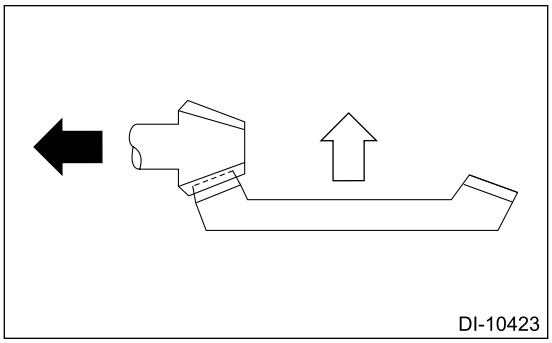
Otherwise, adjust the thickness of the pinion height adjusting washer to move the drive pinion away from the hypoid driven gear side.



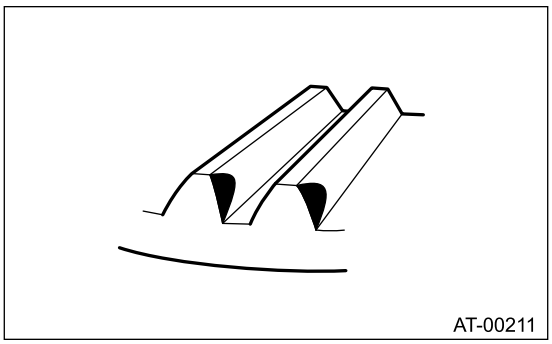
d. Toe contact (inside contact)
Cause: Teeth contact area is too small.



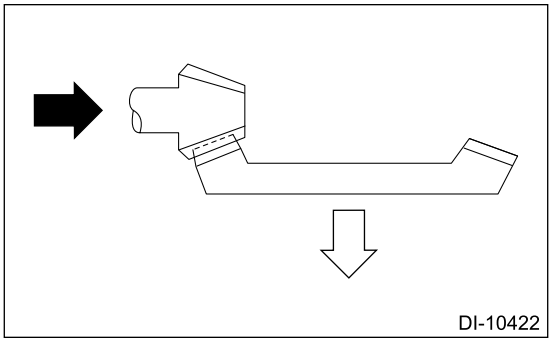
Corrective action: Adjust the thickness of the pinion height adjusting washer to move the drive pinion away from the hypoid driven gear.



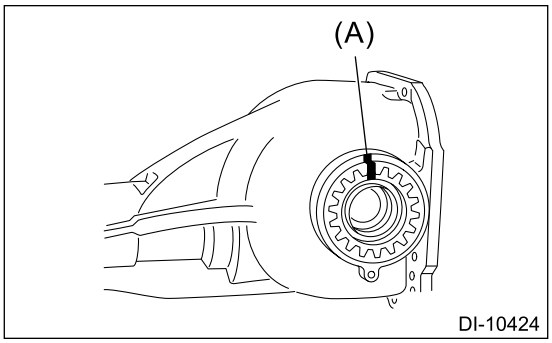
e. Heel contact (outside end contact)
Cause: Teeth contact area is too small.



Corrective action: Adjust the thickness of the pinion height adjusting washer to move the drive pinion from the hypoid driven gear.



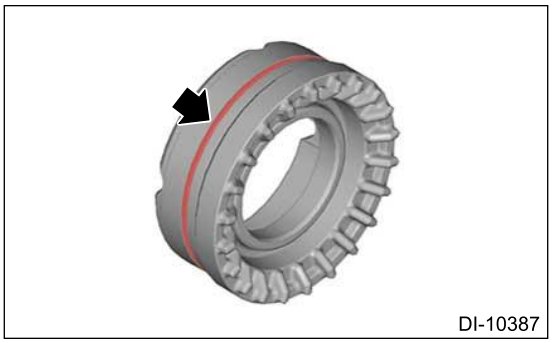
26. Place alignment marks (A) on the differential carrier and the side retainers.



27. Remove the side retainers one side at a time, and install new O-rings.

Note:

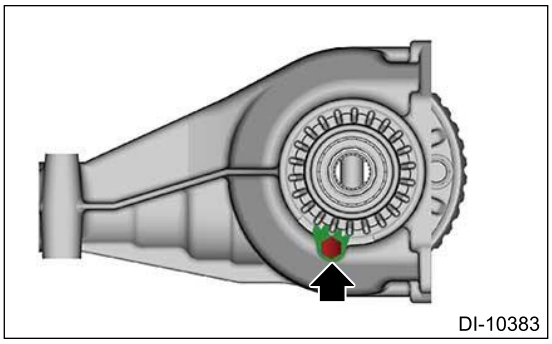
Apply gear oil to the threads of the side bearing, the side retainers and the O-rings.



28. Restore the side retainers to the original positions and install the lock plate.

Tightening torque:

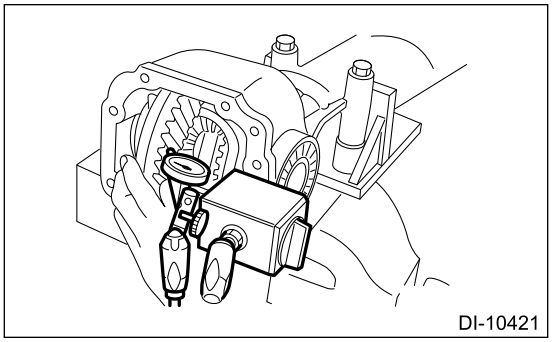
25 N·m (2.5 kgf-m, 18.4 ft-lb)



29. Using a magnet stand or a dial gauge, recheck the backlash between hypoid driven gear and drive pinion.

Hypoid driven gear to drive pinion backlash:

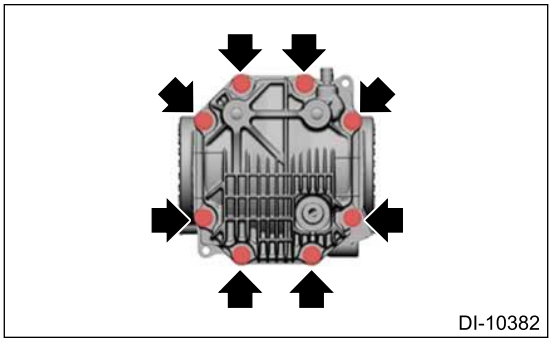
0.10 — 0.15 mm (0.004 — 0.006 in)



30. Using a new gasket, install the rear cover.

Tightening torque:

34 N·m (3.5 kgf-m, 25.1 ft-lb)



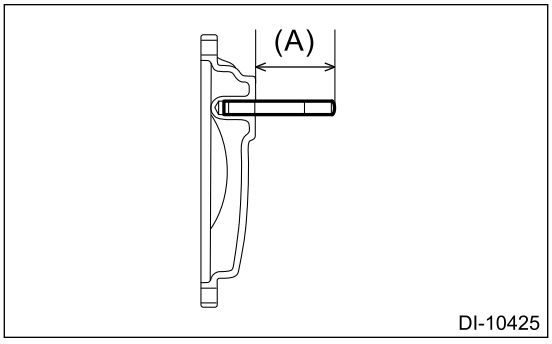
31. Install the stud bolt so that the exposed length of the stud bolt is within the range (A).

Caution:

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 (A) of stud bolt:

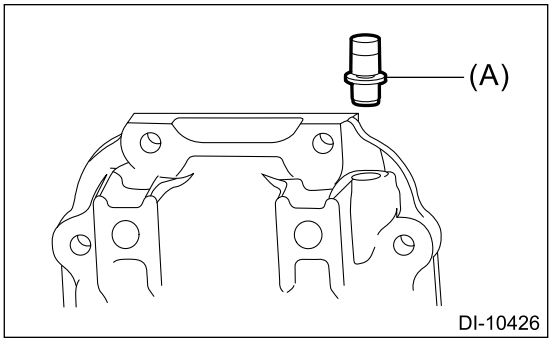
59.0 — 61.0 mm (2.32 — 2.40 in)



32. Install the air breather cap.

Note:

When installing the air breather cap, do not tap any section other than (A).



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. Differential bevel gear and differential bevel pinion
   - 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
   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.

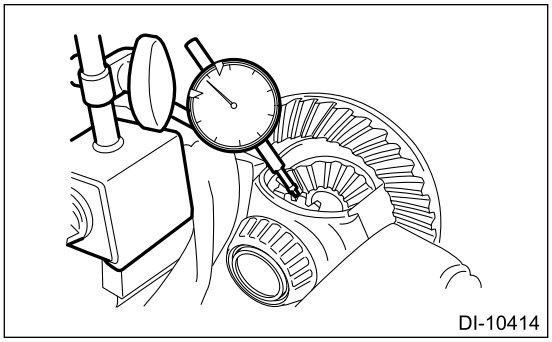
1. DIFFERENTIAL BEVEL GEAR AND DIFFERENTIAL BEVEL PINION BACKLASH

Using a dial gauge, check the backlash between differential bevel gear and differential bevel pinion.

Differential bevel gear and differential bevel pinion backlash:

0.13 — 0.18 mm (0.005 — 0.007 in)

If the backlash between differential bevel gear and differential bevel pinion is not within the specified range, select the thrust washer and readjust.



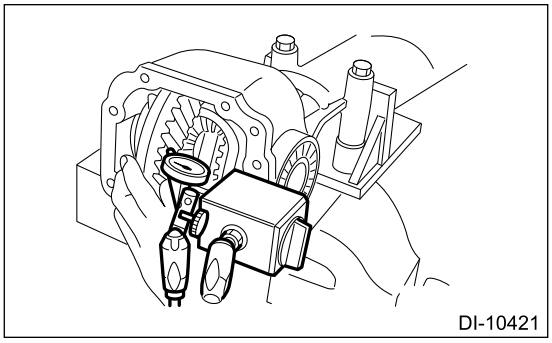
2. HYPOID DRIVEN GEAR TO DRIVE PINION BACKLASH

Using a dial gauge, check the backlash between hypoid driven gear and drive pinion.

Hypoid driven gear to drive pinion backlash:

0.10 — 0.15 mm (0.004 — 0.006 in)

If the backlash between hypoid driven gear and drive pinion is not within the specified range, adjust the side bearing preload and repair if necessary.

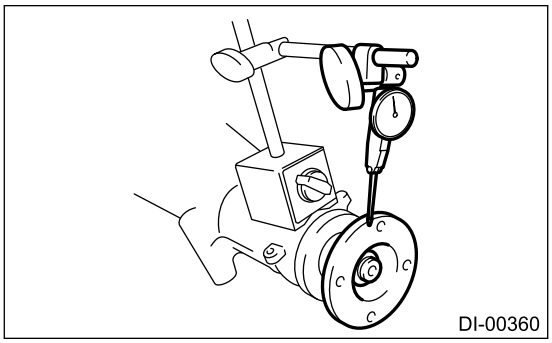


3. COMPANION FLANGE

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:

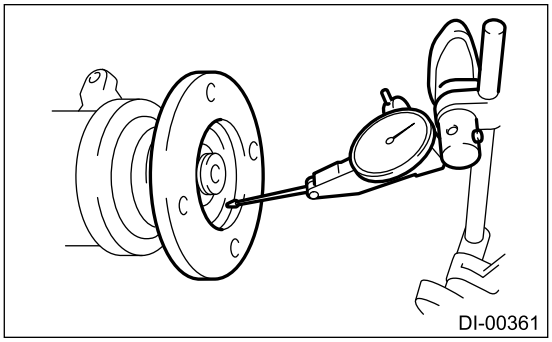
   0.08 mm (0.003 in)



3. Set the dial 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 (VB-type)>ASSEMBLY.

DIFFERENTIALS > Rear Differential (VB-type)

ADJUSTMENT

1. DIFFERENTIAL BEVEL GEAR AND DIFFERENTIAL BEVEL PINION BACKLASH

Adjust the backlash between differential bevel gear and differential bevel pinion. Ref. to DIFFERENTIALS>Rear Differential (VB-type)>ASSEMBLY.

2. HYPOID DRIVEN GEAR TO DRIVE PINION BACKLASH

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

DIFFERENTIALS > Rear Differential Front Oil Seal

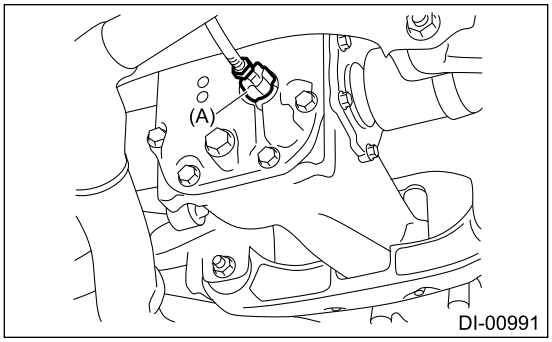
INSPECTION

Check that there is no leakage from the oil seal. If there is any leakage, replace the oil seal and inspect the propeller shaft.

DIFFERENTIALS > Rear Differential Front Oil Seal

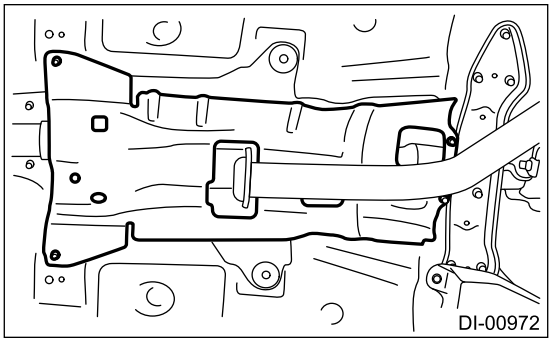
REPLACEMENT

1. Shift the select lever or gear shift lever to neutral.
2. Release the parking brake.
3. Disconnect the ground terminal from battery. Ref. to NOTE>NOTE > BATTERY.
   Note:
   For models other than STI model, disconnect the ground terminal from battery sensor.
4. Lift up the vehicle.
5. Disconnect the oil temperature sensor connector. (T-type)



(A) Oil temperature sensor connector

6. Drain differential gear oil. Ref. to DIFFERENTIALS>Differential Gear Oil>REPLACEMENT.
7. Remove the rear exhaust pipe.
   Except for STI model:
   Ref. to EXHAUST(w/o STI)>Rear Exhaust Pipe>REMOVAL.
   STI model:
   Ref. to EXHAUST(STI)>Rear Exhaust Pipe>REMOVAL.
8. Remove the center exhaust cover.



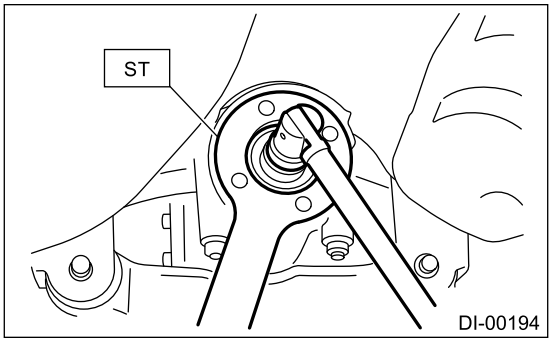
9. Remove the propeller shaft. Ref. to DRIVE SHAFT SYSTEM>Propeller Shaft>REMOVAL.
10. Check the initial torque and write it down.
11. Remove the self-locking nut while holding the companion flange with ST.

- T-type

  ST 18633AA000 WRENCH COMPL

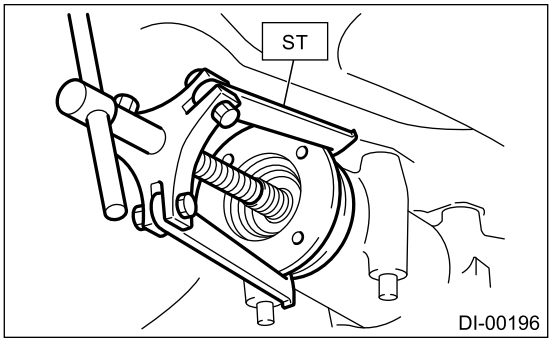
- VB3-type

  ST 498427200 FLANGE WRENCH



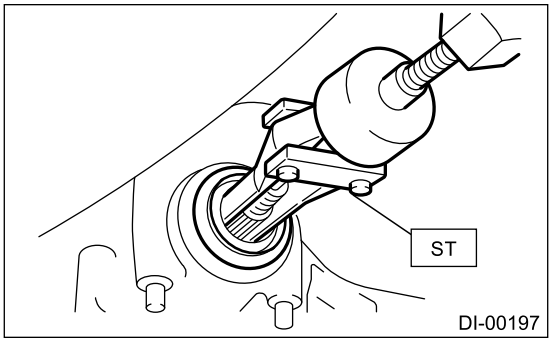
12. Remove the companion flange using ST.

ST 399703600 PULLER ASSY



13. Remove the front oil seal using ST or screwdriver.

ST 398527700 PULLER ASSY

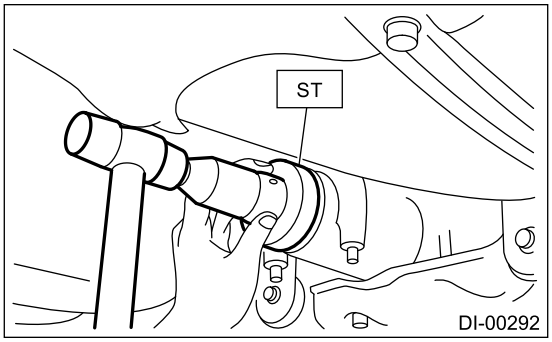


14. Using the ST, install the front oil seal.

Note:

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

ST 498447120 INSTALLER



15. Install the companion flange.

Note:

Use a plastic hammer to install companion flange.

16. 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)

VB3-type

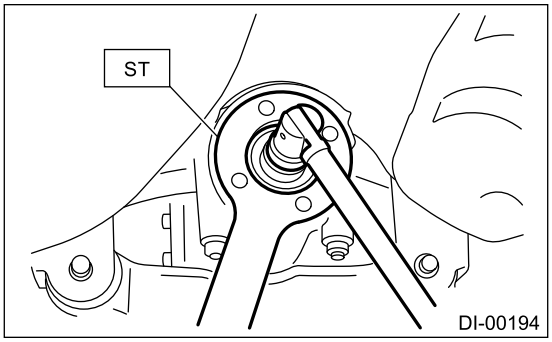
162 — 220 N·m (16.5 — 22.5 kgf-m, 119.5 — 162.3 ft-lb)

- T-type

ST 18633AA000 WRENCH COMPL

- VB3-type

ST 498427200 FLANGE WRENCH

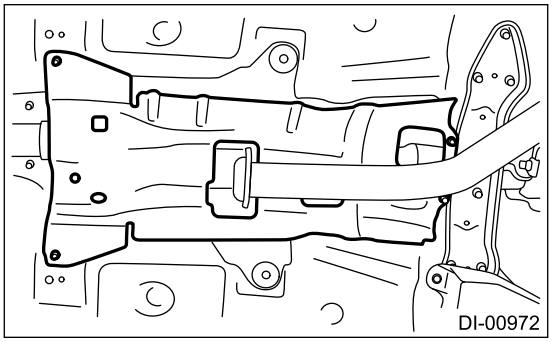


17. Install the propeller shaft. Ref. to DRIVE SHAFT SYSTEM>Propeller Shaft>INSTALLATION.

18. Install the center exhaust cover.

Tightening torque:

18 N·m (1.8 kgf-m, 13.3 ft-lb)



19. Install the rear exhaust pipe.

Except for STI model:

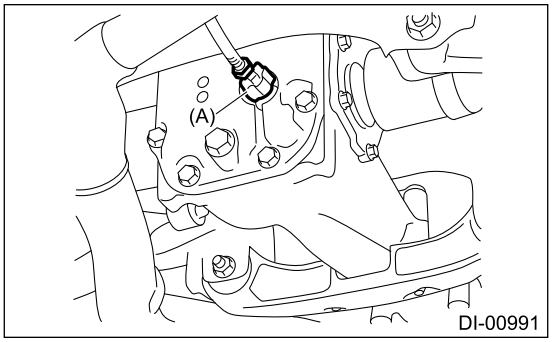
Ref. to EXHAUST(w/o STI)>Rear Exhaust Pipe>INSTALLATION.

STI model:

Ref. to EXHAUST(STI)>Rear Exhaust Pipe>INSTALLATION.

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

21. Connect the oil temperature sensor connector. (T-type)



(A) Oil temperature sensor connector

22. Lower the vehicle.

23. Connect the battery ground terminal. Ref. to NOTE>NOTE > BATTERY.

Note:

For models other than STI model, connect the ground terminal to battery sensor.

DIFFERENTIALS > Rear Differential Side Oil Seal

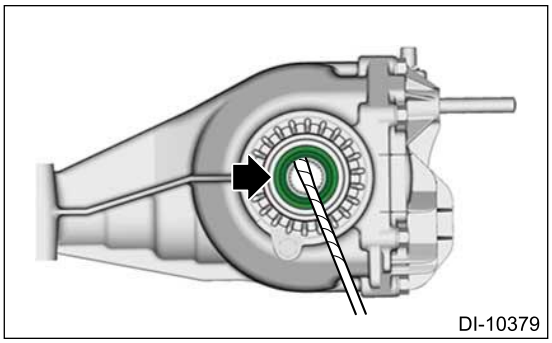
INSPECTION

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

DIFFERENTIALS > Rear Differential Side Oil Seal

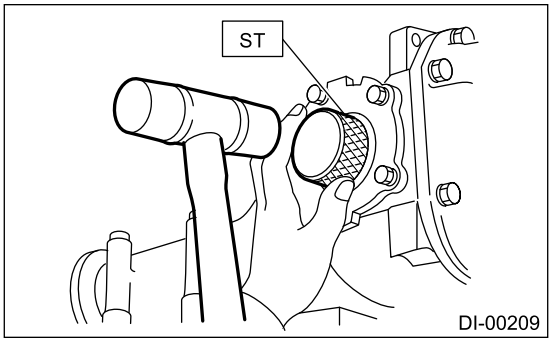
REPLACEMENT

1. Remove the rear differential.
   T-type:
   Ref. to DIFFERENTIALS>Rear Differential (T-type)>REMOVAL.
   VB3-type:
   Ref. to DIFFERENTIALS>Rear Differential (VB-type)>REMOVAL.
2. Wrap vinyl tape around the screwdriver, and remove the side oil seal while taking care not to damage the side retainer.



3. Using the ST, install the side oil seal.
   Caution:
   Pay attention to the left and right of the side oil seal.
   Note:
   - **Use a new side oil seal.**
   - **Apply gear oil to the side oil seal lips.**

   ST 398437700 OIL SEAL INSTALLER

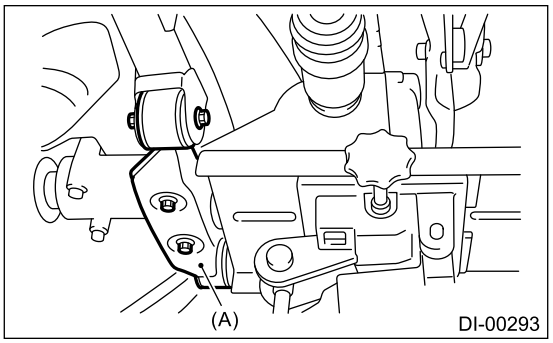


4. Install the rear differential.
   T-type:
   Ref. to DIFFERENTIALS>Rear Differential (T-type)>INSTALLATION.
   VB3-type:
   Ref. to DIFFERENTIALS>Rear Differential (VB-type)>INSTALLATION.

DIFFERENTIALS > Rear Differential Front Member

REMOVAL

1. Disconnect the ground cable from battery. Ref. to NOTE>NOTE > BATTERY.
   Note:
   For models other than STI model, disconnect the ground terminal from battery sensor.
2. Lift up the vehicle.
3. Set the transmission jack.
4. Remove the rear differential front member.

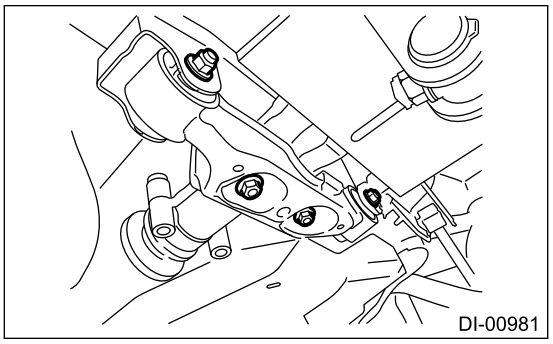


(A) Rear differential front member

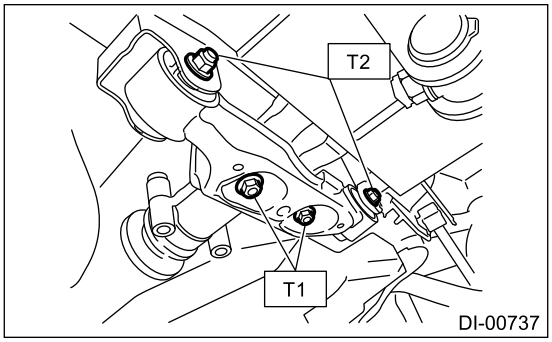
DIFFERENTIALS > Rear Differential Front Member

INSTALLATION

1. Install the rear differential front member, and temporarily attach 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)



4. Lower the vehicle.
5. Connect the battery ground terminal. Ref. to NOTE>NOTE > BATTERY.
   Note:
   For models other than STI model, connect the ground terminal to battery sensor.

DIFFERENTIALS > Rear Differential Front Member

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.

DIFFERENTIALS > Rear Differential Mount Bushing

INSPECTION

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

DIFFERENTIALS > 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.

   T-type:

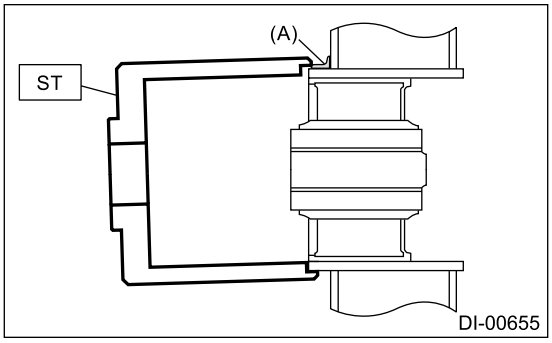
   Ref. to DIFFERENTIALS>Rear Differential (T-type)>REMOVAL.

   VB3-type:

   Ref. to DIFFERENTIALS>Rear Differential (VB-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.

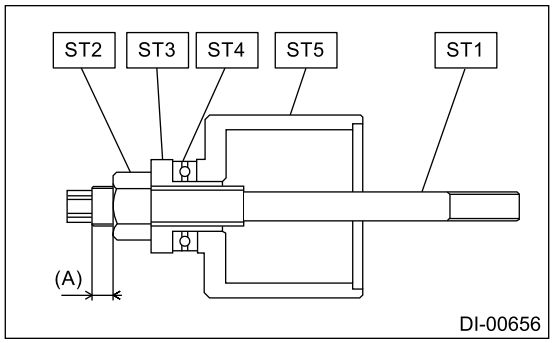
   ST1 41399FG091 SPECIAL TOOL SHAFT

   ST2 41399FG070 SPECIAL TOOL NUT

   ST3 41399FG050 SPECIAL TOOL SLEEVE

   ST4 41399FG080 SPECIAL TOOL BEARING

ST5 41399FG010 SPECIAL TOOL A

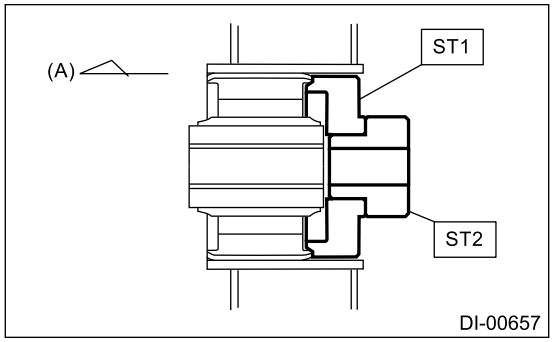


(A) 5 mm (0.2 in) or less

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

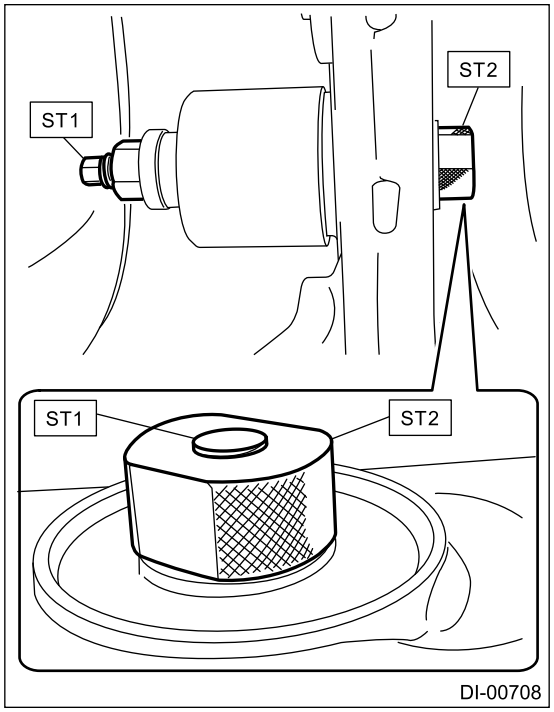


(A) Front side of vehicle

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

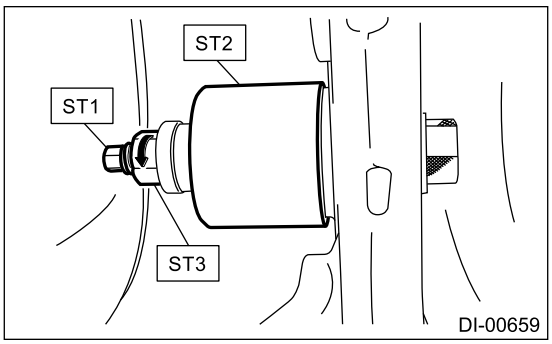


7. Hold the ST1 to prevent it from rotating, and screw in the ST3 by hand till there is no loose fit on the ST2.

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**



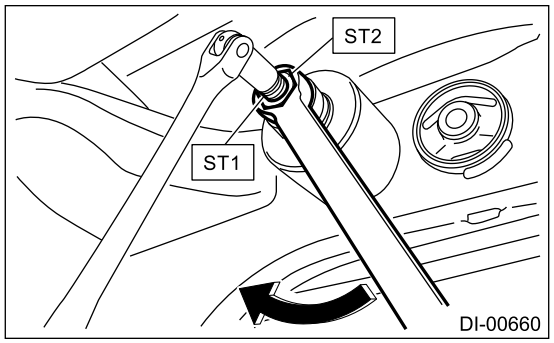
8. Hold the ST1 with a tool to prevent it from rotating, and screw in the ST2 to remove the rear differential mount bushing.

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.**

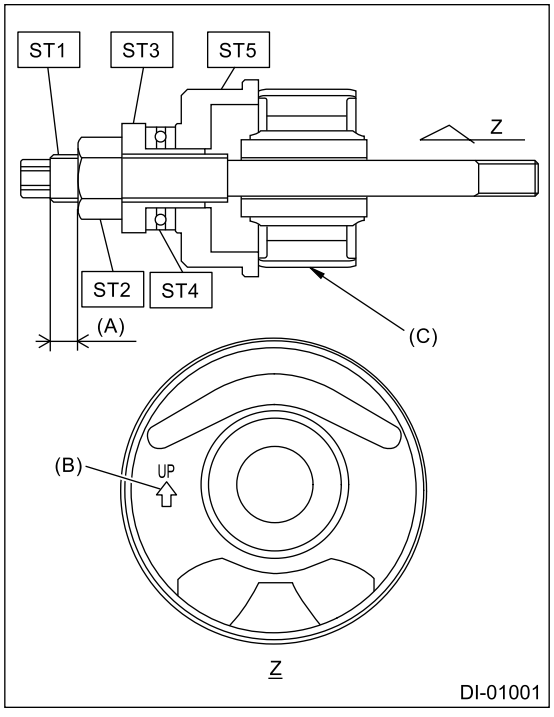
ST1 41399FG091 SPECIAL TOOL SHAFT

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

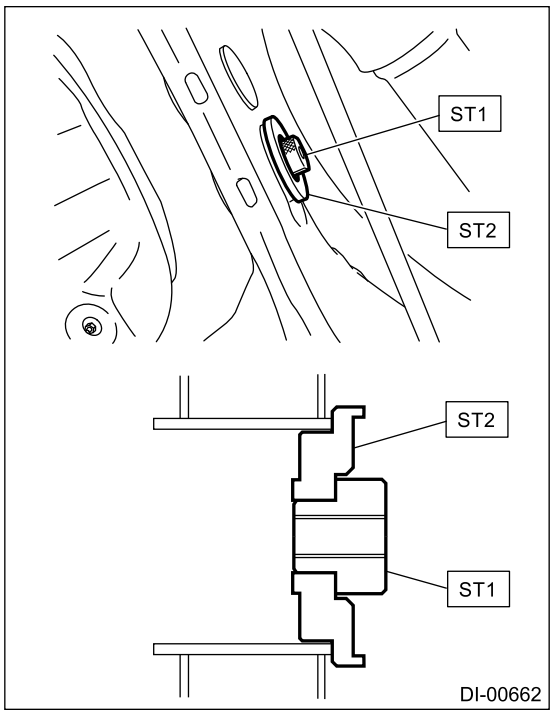
(B) Arrow mark

(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



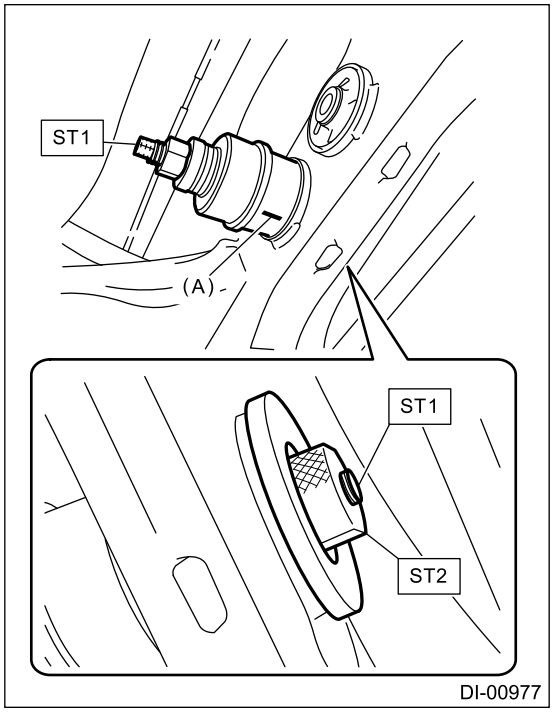
11. Insert the ST and rear differential mount bushing set in the step 9) through the sub frame from the front side of vehicle, and screw in the ST1 by hand till the front end of ST1 comes out slightly from the rear end of ST2.

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

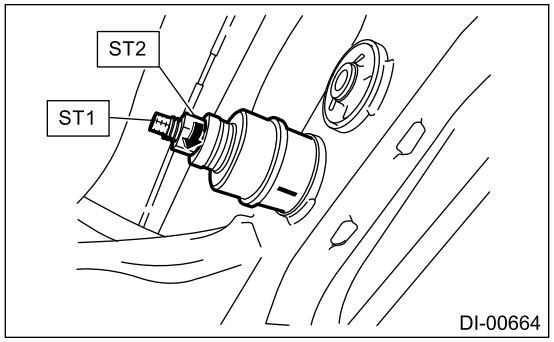
12. Hold the ST1 to prevent it from rotating, and screw in the ST2 by hand till there is no loose fit on the ST and the rear differential mount bushing.

Caution:

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

ST1 41399FG091 SPECIAL TOOL SHAFT

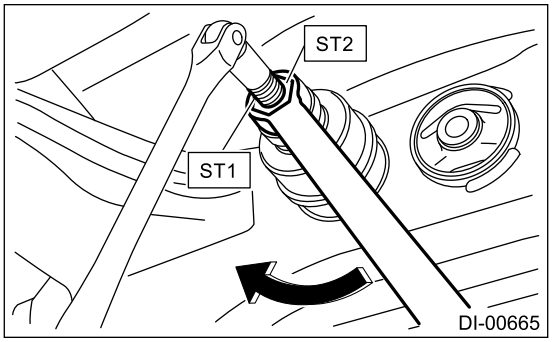
ST2 41399FG070 SPECIAL TOOL NUT



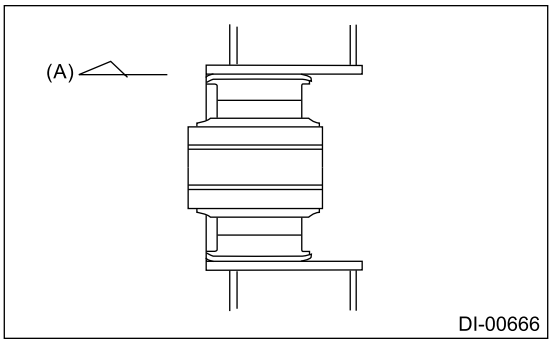
13. Screw in the ST2 while holding the ST1 with a tool to prevent it from rotating, and press-fit the rear differential mount bushing to the front end of sub frame cylinder.

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.

T-type:

Ref. to DIFFERENTIALS>Rear Differential (T-type)>INSTALLATION.

VB3-type:

Ref. to DIFFERENTIALS>Rear Differential (VB-type)>INSTALLATION.

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 (oil temperature sensor) or drain plug.	Replace the gasket, and tighten to the specified torque.
	(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 between hypoid driven gear and drive pinion.	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) Incorrect backlash between hypoid driven gear and drive pinion.	Readjust or replace.
	(2) Insufficient or excessive preload for side, rear or front bearing.	Readjust or replace.
	(3) Excessive backlash between differential bevel gear and differential bevel pinion.	• Replace gear or thrust washer. (VB3-type) • Replace the differential case. (T-type)
	(4) Loose bolts and nuts such as hypoid driven gear bolt.	Retighten.
	(5) Damage due to overloading.	Replace.

Symptom or trouble	Possible cause	Remedy
4. Noises when starting or shifting gears **Note:** **Noises may be caused by rear differential, 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 between hypoid driven gear and drive pinion.	Replace the gear or the pinion height adjusting washer.
	(3) Excessive backlash between differential bevel gear and differential bevel pinion.	• Replace gear or thrust washer. (VB3-type) • Replace the differential case. (T-type)
	(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. (VB3-type) • Replace the differential case. (T-type)
	(2) Excessive wear or damage of thrust washer.	Replace. (VB3-type)
	(3) Broken pinion shaft.	Replace. (VB3-type)
	(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 rear differential, 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 up only differential noise.**	(1) Improper tooth contact of hypoid driven gear and drive pinion.	Readjust or replace the hypoid driven gear & drive pinion set.
	(2) Improper backlash between hypoid driven gear and drive pinion.	Readjust.
	(3) Scored or chipped teeth of hypoid driven gear.	Replace the hypoid driven gear & drive pinion set.
	(4) Scuffed hypoid driven gear.	Replace the hypoid driven gear & drive pinion 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.
	(8) Vibrating differential gear.	Replace the differential gear.

TRANSFER CASE

TC

TRANSFER CASE > General Description

NOTE

For general description, refer to “CVT (TR690)”, “6MT (TY85)” or “6MT (TY75)” section.
CVT (TR690) model:
Ref. to CONTINUOUSLY VARIABLE TRANSMISSION(TR690)>General Description.
6MT (TY85) model:
Ref. to MANUAL TRANSMISSION AND DIFFERENTIAL(6MT)(TY85)>General Description.
6MT (TY75) model:
Ref. to MANUAL TRANSMISSION AND DIFFERENTIAL(6MT)(TY75)>General Description.

TRANSFER CASE > Transfer Case and Extension Case Assembly

NOTE

For removal, installation and inspection, refer to “6MT (TY75)” section. Ref. to MANUAL TRANSMISSION AND DIFFERENTIAL(6MT)(TY75)>Transfer Case and Extension Case Assembly.

TRANSFER CASE > Transfer Clutch

NOTE

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

TRANSFER CASE > Extension Case

NOTE

For removal, installation and inspection, refer to “CVT (TR690)” or “6MT (TY85)” section.
CVT (TR690) model:
Ref. to CONTINUOUSLY VARIABLE TRANSMISSION(TR690)>Extension Case.
6MT (TY85) model:
Ref. to MANUAL TRANSMISSION AND DIFFERENTIAL(6MT)(TY85)>Extension Case.

TRANSFER CASE > Oil Seal

NOTE

For removal, installation and inspection, refer to “CVT (TR690)”, “6MT (TY85)” or “6MT (TY75)” section.
CVT (TR690) model:
Ref. to CONTINUOUSLY VARIABLE TRANSMISSION(TR690)>Extension Case Oil Seal.
6MT (TY85) model:
Ref. to MANUAL TRANSMISSION AND DIFFERENTIAL(6MT)(TY85)>Oil Seal.
6MT (TY75) model:
Ref. to MANUAL TRANSMISSION AND DIFFERENTIAL(6MT)(TY75)>Oil Seal.

TRANSFER CASE > Transfer Drive Gear

NOTE

For removal, installation and inspection, refer to “6MT (TY85)” or “6MT (TY75)” section.
6MT (TY85) model:
Ref. to MANUAL TRANSMISSION AND DIFFERENTIAL(6MT)(TY85)>Transfer Drive Gear.
6MT (TY75) model:
Ref. to MANUAL TRANSMISSION AND DIFFERENTIAL(6MT)(TY75)>Transfer Drive Gear.

TRANSFER CASE > Transfer Driven Gear

NOTE

For removal, installation and inspection, refer to “6MT (TY85)” or “6MT (TY75)” section.
6MT (TY85) model:
Ref. to MANUAL TRANSMISSION AND DIFFERENTIAL(6MT)(TY85)>Transfer Driven Gear.
6MT (TY75) model:
Ref. to MANUAL TRANSMISSION AND DIFFERENTIAL(6MT)(TY75)>Transfer Driven Gear.

TRANSFER CASE > Reduction Driven Gear

NOTE

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

TRANSFER CASE > Center Differential Carrier

NOTE

For removal, installation and inspection, refer to “CVT (TR690)” section. Ref. to CONTINUOUSLY VARIABLE TRANSMISSION(TR690)>Center Differential Carrier.

TRANSFER CASE > Center Differential

NOTE

For removal, installation and inspection, refer to “6MT (TY85)” and “6MT (TY75)” sections.
6MT (TY85) model:
Ref. to MANUAL TRANSMISSION AND DIFFERENTIAL(6MT)(TY85)>Center Differential.
6MT (TY75) model:
Ref. to MANUAL TRANSMISSION AND DIFFERENTIAL(6MT)(TY75)>Center Differential.

TRANSFER CASE > Transfer Clutch Pressure Test

NOTE

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

DRIVE SHAFT SYSTEM

DS

SPECIFICATION

1. PROPELLER SHAFT

Model		STI model	Except for STI model	
			MT	CVT
Type*		Type A	Type B	
Joint type		Cardan joint	Cardan joint + Double offset constant velocity joint	
Front propeller shaft joint-to-joint length: L_1	mm (in)	633.0 (24.92)	735.5 (28.96)	578.0 (22.76)
Rear propeller shaft joint-to-joint length: L_2	mm (in)	753.5 (29.67)	723.0 (28.46)	
Outer diameter of tube:	mm (in) D_1	70.0 (2.76)	63.5 (2.50)	
	mm (in) D_2	57.0 (2.24)	57.5 (2.26)	

*: Used for identifying the types of propeller shafts. They are not referred to as the models or the names of propeller shafts.

(A) Type A

(B) Type B

(C) Cardan joint

(D) Double offset constant velocity joint

2. FRONT DRIVE SHAFT ASSEMBLY

Model		STI model	Except for STI model
Joint type	IN side	Sliding tripod constant velocity joint	
	OUT side	Rzeppa constant velocity joint	
Axle diameter	mm (in)	28 (1.10)	22 (0.87)
Axle length	mm (in)	343.1 (13.52)	338.4 (13.32)

(A) Axle diameter

(B) Axle length

3. REAR DRIVE SHAFT ASSEMBLY

Model		STI model	Except for STI model
Joint type	IN side	Double offset constant velocity joint	
	OUT side	Rzeppa constant velocity joint	
Axle diameter	mm (in)	25 (0.98)	22 (0.87)
Axle length	mm (in)	339.5 (13.37)	388.5 (15.30)

(A) Axle diameter (B) Axle length

COMPONENT

1. PROPELLER SHAFT

(1) Propeller shaft (type B)
(2) Propeller shaft (type A)
(3) Rear differential (T-type)
(4) Rear differential (VB-type)

Tightening torque: N·m (kgf-m, ft-lb)
T1: 31 (3.2, 22.9)
T2: 52 (5.3, 38.4)

2. FRONT AXLE

- Except for STI model

(1) Circlip
(2) Baffle plate
(3) Outer race (IN side)
(4) Snap ring
(5) Trunnion
(6) Snap ring
(7) Boot band
(8) Boot (IN side)
(9) O-ring
(10) Shaft ASSY
(11) Bolt
(12) Front axle housing
(13) Front brake back plate
(14) Hub bolt
(15) Front hub unit bearing
(16) Axle nut

Tightening torque: N·m (kgf-m, ft-lb)

T1: 18 (1.8, 13.3)
T2: 95 (9.7, 70.1)
T3: 220 (22.4, 162.3)

- STI model

(1) Circlip
(2) Baffle plate
(3) Outer race (IN side)
(4) Snap ring
(5) Trunnion
(6) Grommet
(7) Boot band
(8) Boot (IN side)
(9) Shaft ASSY
(10) Bolt
(11) Front axle housing
(12) Front brake back plate
(13) Hub bolt
(14) Front hub unit bearing
(15) Axle nut

Tightening torque: N·m (kgf-m, ft-lb)

T1: 18 (1.8, 13.3)
T2: 95 (9.7, 70.1)
T3: 220 (22.4, 162.3)

3. REAR AXLE

- Except for STI model

(1) Baffle plate
(2) Outer race (IN side)
(3) Snap ring
(4) Inner race
(5) Ball
(6) Cage
(7) Snap ring
(8) Boot band
(9) Boot (IN side)
(10) Boot (OUT side)
(11) Shaft ASSY
(12) Bolt
(13) Rear axle housing
(14) Bushing D - rear axle housing
(15) Rear brake back plate
(16) Hub bolt
(17) Rear hub unit bearing
(18) Axle nut

Tightening torque: N·m (kgf-m, ft-lb)

T1: 85 (8.7, 62.7)
T2: 190 (19.4, 140.1)

- STI model

(1) Baffle plate
(2) Outer race (IN side)
(3) Snap ring
(4) Inner race
(5) Ball
(6) Cage
(7) Snap ring
(8) Boot band
(9) Boot (IN side)
(10) Boot (OUT side)
(11) Shaft ASSY
(12) Bolt
(13) Rear axle housing
(14) Bushing D - rear axle housing
(15) Rear brake back plate
(16) Hub bolt
(17) Rear hub unit bearing
(18) Axle nut

Tightening torque: N·m (kgf-m, ft-lb)

T1: 85 (8.7, 62.7)
T2: 190 (19.4, 140.1)

DRIVE SHAFT SYSTEM > General Description

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.
- 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, installed or replaced, perform the following adjustment.
  - Lane keep assist learning value clear (model with EyeSight): Ref. to EyeSight (DIAGNOSTICS)>Clear Active Lane Keep System Learning Value>OPERATION.
  - VDC sensor midpoint setting mode: Ref. to VEHICLE DYNAMICS CONTROL (VDC)>VDC Control Module and Hydraulic Control Unit (VDCCM&H/U)>ADJUSTMENT.

DRIVE SHAFT SYSTEM > General Description

PREPARATION TOOL

1. SPECIAL TOOL

ILLUSTRATION	Part No.	DESCRIPTION	REMARKS
	20099PA010	INSTALLER & REMOVER	• Used for replacing the bushing D - rear axle housing of the rear axle housing. • Used together with BUSHING REMOVER (20099FG000).
	20099FG000	BUSHING REMOVER	• Used for replacing the bushing D - rear axle housing of the rear axle housing. • Used together with base part of INSTALLER & REMOVER (20099PA010).
	28099AC000	BOOT BAND PLIERS	Used for tightening the boot band. (For front drive shaft)

ILLUSTRATION	Part No.	DESCRIPTION	REMARKS
	925091000	BAND TIGHTENING TOOL	Used for tightening the boot band. (A) Jig for the band (B) Ratchet wrench
	18675AA000	DIFFERENTIAL SIDE OIL SEAL INSTALLER	Used for installing the differential side retainer oil seal.
	926470000	AXLE SHAFT PULLER	• Used for removing the drive shaft. • Used together with AXLE SHAFT PULLER PLATE (28099PA110).
	28099PA110	AXLE SHAFT PULLER PLATE	• Used for removing the drive shaft. • Exchange with the plate of the AXLE SHAFT PULLER (926470000) to use.

ILLUSTRATION	Part No.	DESCRIPTION	REMARKS
	28099PA080	HUB STAND	Used for assembling the hub bolt.
	28399AG000	HUB STAND	Used for extracting hub bolt.
	28399SA010	OIL SEAL PROTECTOR	• Used for installing front drive shaft into front differential. • For protecting the oil seal.
	28099PA090	OIL SEAL PROTECTOR	• Used for installing the rear drive shaft to the rear differential. • For protecting the oil seal.

ILLUSTRATION	Part No.	DESCRIPTION	REMARKS
	28099PA100	DRIVE SHAFT REMOVER	Used for removing the rear drive shaft from rear differential. (T-type)

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 boot band of the rear drive shaft. • Snap-on 96BCP Or equivalent.
Band tightening tool	Used for tightening the boot band of the rear drive shaft. **Note:** **It is recommended to use OJT CV joint banding tool and cutter (item number: 4623) as a band tightening tool.**

REMOVAL

Caution:
- **Before removing propeller shaft, wrap metal parts with a cloth or rubber material.**
- **Do not disassemble the joint of the propeller shaft.**
- **Before removing the propeller shaft, wrap the center joint part with a cloth, etc. If the joint is bent during removal, the rubber boot may be damaged due to interference with metal parts.**

1. Shift the select lever or gear shift lever to neutral.
2. Release the parking brake.
3. Lift up the vehicle.
4. Remove the center exhaust pipe.
   - STI model: Ref. to EXHAUST(STI)>Center Exhaust Pipe>REMOVAL.
   - Except for STI model: Ref. to EXHAUST(w/o STI)>Center Exhaust Pipe>REMOVAL.
5. Remove the rear exhaust pipe.
   - STI model: Ref. to EXHAUST(STI)>Rear Exhaust Pipe>REMOVAL.
   - Except for STI model: Ref. to EXHAUST(w/o STI)>Rear Exhaust Pipe>REMOVAL.
6. Remove the bolts, and then remove the center exhaust cover.

7. Remove the propeller shaft assembly.
   Caution:
   - **Do not disassemble the propeller shaft.**
   - **Use a container to catch CVTF or oil flowing from propeller shaft.**
   - **To prevent CVTF from leaking, install extension cap etc. to the transmission.**
   - **Be careful not to damage oil seals and contact surface of the sleeve yoke.**

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

(2) Remove the bolts and remove the propeller shaft from the rear differential.

(3) Remove the end of propeller shaft from the transmission.

Note:

Use a container to catch oil flowing from propeller shaft.

(4) Install extension cap (A) to the transmission.

Note:

If extension cap (A) is not available, place vinyl bag over opening and fasten with string to prevent gear oil from leaking.

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: Ref. to RECOMMENDED MATERIALS > FLUID.
3. Insert the sleeve yoke into the transmission and attach center bearing to body.
   Tightening torque:
   52 N·m (5.3 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 (3.2 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 (1.8 kgf-m, 13.3 ft-lb)
7. Install the rear exhaust pipe.
   - STI model: Ref. to EXHAUST(STI)>Rear Exhaust Pipe>INSTALLATION.
   - Except for STI model: Ref. to EXHAUST(w/o STI)>Rear Exhaust Pipe>INSTALLATION.
8. Install the center exhaust pipe.
   - STI model: Ref. to EXHAUST(STI)>Center Exhaust Pipe>INSTALLATION.
   - Except for STI model: Ref. to EXHAUST(w/o STI)>Center Exhaust Pipe>INSTALLATION.
9. Lower the vehicle.

DRIVE SHAFT SYSTEM > Propeller Shaft

INSPECTION

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

1. Shift the select lever or gear shift lever to neutral.
2. Release the parking brake.
3. Lift up the vehicle.
4. Remove the center exhaust pipe.
   - STI model: Ref. to EXHAUST(STI)>Center Exhaust Pipe>REMOVAL.
   - Except for STI model: Ref. to EXHAUST(w/o STI)>Center Exhaust Pipe>REMOVAL.
5. Remove the rear exhaust pipe.
   - STI model: Ref. to EXHAUST(STI)>Rear Exhaust Pipe>REMOVAL.
   - Except for STI model: Ref. to EXHAUST(w/o STI)>Rear Exhaust Pipe>REMOVAL.
6. Remove the bolts, and then remove the center exhaust cover.

7. 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

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

9. 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)

10. Check the center bearing for play.

Hold the propeller shaft near the center bearing section and move it by hand to upward, downward and sideways, in order to check for any abnormal free play of the bearings.

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

REMOVAL

1. Lift up the vehicle, and then remove the front wheels.
2. Remove the axle nut.
   Caution:
   Do not loosen the axle nut while the front axle is loaded. Doing so may damage the hub unit bearing.
   (1) Lift the crimped section of axle nut.
   (2) Remove the axle nut using a socket wrench while depressing the brake pedal.
3. Remove the disc brake assembly and disc rotor. Ref. to BRAKE>Front Disc Rotor>REMOVAL.
4. Remove the bolts, and remove the front ABS wheel speed sensor.
5. 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

6. Remove the stabilizer link and ball joint.

Caution:
Be careful not to damage the boot of the joint.

7. Remove the front drive shaft. Ref. to DRIVE SHAFT SYSTEM>Front Drive Shaft>REMOVAL.

8. Remove the front axle housing.

Caution:
- **Be careful of the weight of front axle housing.**
- **Be careful not to damage the spline portion of the drive shaft.**

(1) Place an alignment mark (a) on the adjusting bolt and the strut assembly.
(2) Remove the adjusting bolts and flange bolts for the strut assembly, and then remove the front axle housing.

Note:

While holding the adjusting bolt side, tighten the nut side.

9. Refer to "Front Hub Unit Bearing" for removal of the front hub unit bearing. Ref. to DRIVE SHAFT SYSTEM>Front Hub Unit Bearing>REMOVAL.

DRIVE SHAFT SYSTEM > Front Axle

INSTALLATION

1. Install the front axle housing to the strut assembly.
   (1) Align alignment marks on the camber adjusting bolt and strut.
   (2) While holding the bolt head of adjusting bolt, tighten the nut.
   Tightening torque:
   155 N·m (15.8 kgf-m, 114.3 ft-lb)
2. Install the front drive shaft assembly. Ref. to DRIVE SHAFT SYSTEM>Front Drive Shaft>INSTALLATION.
3. Install the ball joint.
   Caution:
   - **Before tightening, make sure the lower side of front axle housing and stepped section of ball joint are in contact.**
   - **Be careful not to damage the boot of the joint.**

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

(a) Lower side of front axle housing
(b) Raised section of ball joint
(c) Front axle housing
(d) Ball joint

4. Install the front ABS wheel speed sensor.
   Tightening torque:
   7.5 N·m (0.8 kgf-m, 5.5 ft-lb)
5. Install the disc rotor.
6. Install the disc brake assembly.
   Tightening torque:
   Refer to "COMPONENT" of "General Description" for the tightening torque. Ref. to BRAKE>General Description>COMPONENT > FRONT DISC BRAKE.
7. Install the brake hose bracket.
   Tightening torque:
   33 N·m (3.4 kgf-m, 24.3 ft-lb)
8. Install the stabilizer link.
   Tightening torque:
   60 N·m (6.1 kgf-m, 44.3 ft-lb)
9. Connect the tie-rod ends.
   (1) Connect the tie-rod ends to the front axle housing.
   (2) Tighten the castle nuts 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 (2.8 kgf-m, 19.9 ft-lb)
   (3) Tighten the castle nut within the range of 60° so that the cotter pin hole and cutout portion of the castle nut are aligned.
   (4) Insert a new cotter pin (c), and bend the tip of the pin to fix it.

(a) Tie-rod end (b) Castle nut (c) Cotter pin

10. While depressing the brake pedal, tighten the axle nut to the specified torque.

Caution:

- **Always use a new axle nut.**
- **Do not load the front axle before tightening the axle nut. Doing so may damage the hub unit bearing.**

Tightening torque:

220 N·m (22.4 kgf-m, 162.3 ft-lb)

11. After tightening the axle nut, lock it securely.

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

Tightening torque:

120 N·m (12.2 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 front hub unit bearing. 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.

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 the following adjustment.
– Lane keep assist learning value clear (model with EyeSight): Ref. to EyeSight (DIAGNOSTICS)>Clear Active Lane Keep System Learning Value>OPERATION.
– VDC sensor midpoint setting mode: Ref. to VEHICLE DYNAMICS CONTROL (VDC)>VDC Control Module and Hydraulic Control Unit (VDCCM&H/U)>ADJUSTMENT.

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 axle nut.
   Caution:
   Do not loosen the axle nut while the front axle is loaded. Doing so may damage the hub unit bearing.
   (1) Lift the crimped section of axle nut.
   (2) Remove the axle nut using a socket wrench while depressing the brake pedal.
3. Remove the disc brake assembly and disc rotor. Ref. to BRAKE>Front Disc Rotor>REMOVAL.
4. Remove the bolts, and remove the front ABS wheel speed sensor.
5. Remove the front hub unit bearing.

Caution:

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

(a) Front axle housing
(b) Front brake back plate
(c) Front hub unit bearing
(d) Magnetic encoder

Note:
If it is hard to remove, use the ST.
Preparation tool:
ST1: AXLE SHAFT PULLER (926470000)
ST2: AXLE SHAFT PULLER PLATE (28099PA110)

DRIVE SHAFT SYSTEM > Front Hub Unit Bearing

INSTALLATION

1. Tighten the front hub unit bearing to the front axle housing with the bolt.
   Caution:
   - **Do not get closer the tool which charged magnetism to magnetic encoder.**
   - **Be careful not to damage the magnetic encoder.**
   - **Use a new mounting bolt for the front hub unit bearing.**
   Tightening torque:

Front brake back plate: 18 N·m (1.8 kgf-m, 13.3 ft-lb)
Front hub unit bearing: 95 N·m (9.7 kgf-m, 70.1 ft-lb)

(a) Front axle housing
(b) Front brake back plate
(c) Front hub unit bearing
(d) Magnetic encoder

2. Install the front drive shaft assembly.
   Caution:
   - **Do not hammer the drive shaft assembly when installing.**
   - **Use new axle nuts.**

   (1) Insert the drive shaft assembly into the hub spline, and pull it into the specified position.
   (2) Tighten the new axle nut temporarily.
3. Install the disc rotor to the front hub unit bearing.
4. Install the disc brake assembly to the front axle housing.
   Tightening torque:
   Refer to "COMPONENT" of "General Description" for the tightening torque. Ref. to BRAKE>General Description>COMPONENT > FRONT DISC BRAKE.
5. Install the brake hose bracket.
   Tightening torque:
   33 N·m (3.4 kgf-m, 24.3 ft-lb)
6. Install the front ABS wheel speed sensor.
   Tightening torque:
   7.5 N·m (0.8 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 front axle before tightening the axle nut. Doing so may damage the hub unit bearing.
   Tightening torque:
   220 N·m (22.4 kgf-m, 162.3 ft-lb)
8. After tightening the axle nut, lock it securely.

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

Tightening torque:

120 N·m (12.2 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 front hub unit bearing. 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.

DRIVE SHAFT SYSTEM > Front Hub Unit Bearing

DISASSEMBLY

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

Caution:

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

Note:
Since the hub unit bearing can not be disassembled, only hub bolts can be removed.
Preparation tool:
ST: HUB STAND (28399AG000)

DRIVE SHAFT SYSTEM > Front Hub Unit Bearing

ASSEMBLY

1. Install the hub unit bearing to the ST securely.
   Preparation tool:
   ST: HUB STAND (28099PA080)
2. Using a press, press the new hub bolts until their seating surfaces contact the hub unit bearing.
   Note:
   Use the 12 mm (0.47 in) dia. holes in the HUB STAND to prevent bolts from tilting.

(1) Front hub unit bearing

DRIVE SHAFT SYSTEM > Front Hub Unit Bearing

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 bearing.

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

   Service limit:

   Maximum: 0.05 mm (0.0020 in)

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 axle nut.
   Caution:
   Do not loosen the axle nut while the rear axle is loaded. Doing so may damage the hub unit bearing.
   (1) Lift the crimped section of axle nut.
   (2) Remove the axle nut using a socket wrench while depressing the brake pedal.
4. Remove the sensor assembly - headlight beam leveler. (Model with auto headlight beam leveler) Ref. to LIGHTING SYSTEM>Rear Height Sensor>REMOVAL.
5. Remove the bolts and nuts, and lower the lateral link assembly - rear.
   (1) Remove the nut and disconnect the rear stabilizer link.
   (2) Remove the bolts from the lower side of rear shock absorber assembly.
   (3) Disconnect the rear axle housing from the lateral link assembly - rear.

6. Remove the rear ABS wheel speed sensor from the rear axle housing.
   (1) Remove the bolts, and remove the 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.**

7. Remove the disc brake assembly and disc rotor. Ref. to BRAKE>Rear Disc Rotor>REMOVAL.
8. Remove the cable assembly - hand brake cable from the parking lever - rear. (Drum-in-disc type model) Ref. to PARKING BRAKE>Parking Brake Assembly (Rear Disc Brake)>REMOVAL > DRUM IN DISC TYPE MODEL.
9. Remove the clamp B - hand brake cable from the rear brake back plate, and pull out the cable assembly - parking brake. (Drum-in-disc type model)
10. Remove the electronic parking brake harness clamp from the rear brake back plate. (Electronic parking brake model)

11. Remove the rear drive shaft assembly. Ref. to DRIVE SHAFT SYSTEM>Rear Drive Shaft>REMOVAL.

12. Remove the lateral link assembly - front.

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

(2) Disconnect the ball joint from the rear axle housing.

Caution:

Be careful not to damage the boot of the joint.

Preparation tool:

Tie-rod ball joint puller

13. Remove the rear axle housing.

Caution:

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

(1) Remove the bolts, and disconnect the upper arm and trailing link.

Caution:

Be careful not to damage the boot of the joint.

(2) Remove the rear axle housing.

14. Refer to "Rear Hub Unit Bearing" for removal of the rear hub unit bearing. Ref. to DRIVE SHAFT SYSTEM>Rear Hub Unit Bearing>REMOVAL.

DRIVE SHAFT SYSTEM > Rear Axle

INSTALLATION

1. Temporarily tighten the rear axle housing to the upper arm assembly.
2. Install the rear drive shaft assembly. Ref. to DRIVE SHAFT SYSTEM>Rear Drive Shaft>INSTALLATION.

   Caution:

   Do not hammer the drive shaft assembly when installing.

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

   (2) Tighten the new axle nut temporarily.
3. Tighten the rear shock absorber assembly, rear stabilizer link and other links to the specified torque.

   Tightening torque:

   Rear suspension: Ref. to REAR SUSPENSION>General Description>COMPONENT > REAR SUSPENSION.
4. Install the electronic parking brake harness clamp to the rear brake back plate. (Electronic parking brake model)

   Tightening torque:

   18 N·m (1.8 kgf-m, 13.3 ft-lb)
5. Insert the cable assembly - parking brake into the rear back plate, and install the clamp B - hand brake cable. (Drum-in-disc type model)
6. Install the cable assembly - hand brake cable to the parking lever - rear. (Drum-in-disc type model) Ref. to PARKING BRAKE>Parking Brake Assembly (Rear Disc Brake)>INSTALLATION > DRUM IN DISC TYPE MODEL.
7. Install the rear disc rotor.
8. Install the disc brake assembly.

   Tightening torque:

   Refer to "COMPONENT" of "General Description" for the tightening torque. Ref. to BRAKE>General Description>COMPONENT > REAR DISC BRAKE (DRUM IN DISC TYPE).
9. Install the brake hose bracket and rear ABS wheel speed sensor.

   Tightening torque:

   Brake hose bracket: 33 N·m (3.4 kgf-m, 24.3 ft-lb)

   Rear ABS wheel speed sensor: 7.5 N·m (0.8 kgf-m, 5.5 ft-lb)
10. Install the sensor assembly - headlight beam leveler. (Model with auto headlight beam leveler)

    Tightening torque:

    7.5 N·m (0.8 kgf-m, 5.5 ft-lb)
11. While pressing the brake pedal, tighten the new axle nuts to the specified torque.

    Caution:

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

    Tightening torque:

    190 N·m (19.4 kgf-m, 140.1 ft-lb)
12. After tightening the axle nut, lock it securely.

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

Tightening torque:

120 N·m (12.2 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 rear hub unit bearing. Ref. to DRIVE SHAFT SYSTEM>Rear Hub Unit Bearing>INSPECTION.

14. 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 the following adjustment.

– Lane keep assist learning value clear (model with EyeSight): Ref. to EyeSight (DIAGNOSTICS)>Clear Active Lane Keep System Learning Value>OPERATION.

– VDC sensor midpoint setting mode: Ref. to VEHICLE DYNAMICS CONTROL (VDC)>VDC Control Module and Hydraulic Control Unit (VDCCM&H/U)>ADJUSTMENT.

15. 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.

DRIVE SHAFT SYSTEM > Rear Axle

DISASSEMBLY

1. PILLOW BALL BUSHING

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

2. BUSHING D - REAR AXLE HOUSING

1. Remove the rear axle housing. 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 (BASE) (20099PA010)

(1) Rear axle housing (2) Bushing D - rear axle housing

ASSEMBLY

1. PILLOW BALL BUSHING

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

2. BUSHING D - REAR AXLE HOUSING

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 (BASE) (20099PA010)

(1) Bushing D - rear axle housing (2) Rear axle housing

REMOVAL

1. Lift up the vehicle, and then remove the rear wheels.
2. Remove the axle nut.
   Caution:
   Do not loosen the axle nut while the rear axle is loaded. Doing so may damage the hub unit bearing.
   (1) Lift the crimped section of axle nut.
   (2) Remove the axle nut using a socket wrench while depressing the brake pedal.

3. Remove the rear ABS wheel speed sensor.
   (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 rear disc brake assembly and rear disc rotor. Ref. to BRAKE>Rear Disc Rotor>REMOVAL.
5. Remove the rear hub unit bearing.

Caution:

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

(a) Rear axle housing
(b) Rear brake back plate
(c) Rear hub unit bearing
(d) Magnetic encoder

Note:

If it is hard to remove, use the ST.

Preparation tool:

ST1: AXLE SHAFT PULLER (926470000)
ST2: AXLE SHAFT PULLER PLATE (28099PA110)

INSTALLATION

1. Place the rear brake back plate between the rear axle housing and the rear hub unit bearing, 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.**
   - **Use a new bolt.**

   Tightening torque:

   85 N·m (8.7 kgf-m, 62.7 ft-lb)

(a) Rear axle housing
(b) Rear brake back plate
(c) Rear hub unit bearing
(d) Magnetic encoder

2. Install the rear drive shaft assembly.

   Caution:

   Do not hammer the drive shaft assembly when installing.

   (1) Insert the drive shaft assembly into the hub spline, and pull it into the specified position.
   (2) Tighten the new axle nut temporarily.
3. Install the disc rotor to the rear hub unit bearing.

4. Install the disc brake assembly to the rear axle housing.
   Tightening torque:
   Refer to "COMPONENT" of "General Description" for the tightening torque. Ref. to BRAKE>General Description>COMPONENT > REAR DISC BRAKE (DRUM IN DISC TYPE).
5. Install the brake hose bracket.
   Tightening torque:
   33 N·m (3.4 kgf-m, 24.3 ft-lb)
6. Install the rear ABS wheel speed sensor.
   Tightening torque:
   7.5 N·m (0.8 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 axle nut. Doing so may damage the hub unit bearing.
   Tightening torque:
   190 N·m (19.4 kgf-m, 140.1 ft-lb)
8. After tightening the axle nut, lock it securely.

9. Install the rear wheels, and perform the following inspections.
   Tightening torque:
   120 N·m (12.2 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 rear hub unit bearing. Ref. to DRIVE SHAFT SYSTEM>Rear Hub Unit Bearing>INSPECTION.

DISASSEMBLY

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

Caution:

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

Note:

Since the rear hub unit bearing can not be disassembled, only hub bolts can be removed.

Preparation tool:

ST: HUB STAND (28399AG000)

ASSEMBLY

1. Install the rear hub unit bearing to the ST securely.
   Preparation tool:
   ST: HUB STAND (28099PA080)

   (1) Rear hub unit bearing

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

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 rear hub unit bearing.

2. Inspect the hub unit bearing for axial looseness.

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

Service limit:

Maximum: 0.05 mm (0.0020 in)

REMOVAL

1. Lift up the vehicle, and then remove the front wheels.
2. Remove the axle nut.
   Caution:
   Do not loosen the axle nut while the front axle is loaded. Doing so may damage the hub unit bearing.
   (1) Lift the crimped section of axle nut.
   (2) Remove the axle nut 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.

6. Remove the front drive shaft.
   (1) Disconnect the front axle housing from the front drive shaft.
   Note:
   If it is hard to remove, use the ST.
   Preparation tool:
   ST1: AXLE SHAFT PULLER (926470000)
   ST2: AXLE SHAFT PULLER PLATE (28099PA110)

   (2) Using a tire lever, remove the front drive shaft from transmission.
   Caution:
   Be careful not to allow the tire lever to damage holder area.
   Preparation tool:
   Tire lever

DRIVE SHAFT SYSTEM > Front Drive Shaft

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)(TY85)>Differential Side Retainer Oil Seal>REPLACEMENT.

- CVT model: Ref. to CONTINUOUSLY VARIABLE TRANSMISSION(TR690)>Differential Side Retainer Oil Seal>REPLACEMENT.

Caution:

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

3. Replace the circlip with a new part.
4. 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.
5. Tighten the new axle nut temporarily.
6. Using the ST, install the front drive shaft assembly to the transmission.

   Preparation tool:

   ST: OIL SEAL PROTECTOR (28399SA010)

7. Install the ball joint to the front axle housing.

   Caution:

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

(a) Lower side of front axle housing
(b) Raised section of ball joint
(c) Front axle housing
(d) Ball joint

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

8. Install the stabilizer link.
Tightening torque:
60 N·m (6.1 kgf-m, 44.3 ft-lb)
9. While pressing the brake pedal, tighten the new axle nuts to the specified torque.
Caution:
Do not load the front axle before tightening the axle nut. Doing so may damage the hub unit bearing.
Tightening torque:
220 N·m (22.4 kgf-m, 162.3 ft-lb)
10. After tightening axle nut, lock it securely.
11. Fill transmission gear oil. (MT model)
12. Fill differential gear oil. (CVT model)
13. Install the front wheels.
Tightening torque:
120 N·m (12.2 kgf-m, 88.5 ft-lb)
14. 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 the following adjustment.
– Lane keep assist learning value clear (model with EyeSight): Ref. to EyeSight (DIAGNOSTICS)>Clear Active Lane Keep System Learning Value>OPERATION.
– VDC sensor midpoint setting mode: Ref. to VEHICLE DYNAMICS CONTROL (VDC)>VDC Control Module and Hydraulic Control Unit (VDCCM&H/U)>ADJUSTMENT.

15. 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.

DRIVE SHAFT SYSTEM > Front Drive Shaft

DISASSEMBLY

1. STI MODEL

1. Remove the outer race from shaft assembly.
   Caution:
   Be careful not to damage the boot.
   (1) Place alignment marks on the shaft and outer race.

   (2) Remove the boot band and boot.

   (3) Place the drive shaft between wooden blocks and fix it on a vise.
   Caution:
   Do not set the drive shaft directly on a vise.

   (4) Tap the staking are of the outer race alternately with a plastic or wooden bar, and remove one roller at a time.

Caution:

- **Tap the staking area (A) of the outer race.**
- **Do not use a metal bar as the outer race may deform.**
- **Be careful not to damage the roller parts.**

(5) Remove the outer race from shaft assembly.

Caution:

Make sure to have your associate hold the outer race when removing the third roller to prevent the outer race from falling.

(6) Wipe off grease.

Caution:

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

2. Remove the roller kit from trunnion.

Caution:

Be careful with the roller kit position.

(1) Place alignment marks on the roller kit and trunnion.

(2) Remove the roller kit from trunnion.

3. Remove the trunnion from the shaft.

(1) Place alignment marks on the trunnion and shaft.

(2) Remove the snap ring and trunnion.

Caution:

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

4. Remove the boot.

Note:

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

2. EXCEPT FOR STI MODEL

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

2. Remove the boot band and boot (IN side).

Caution:

Be careful not to damage the boot.

3. Remove the snap ring from outer race.

4. Remove the 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 boot (IN side).
11. Remove the O-ring from the groove of the shaft.
    Note:
    The OUT side is a non-disassembly part, so the axle disassembly stops here.

ASSEMBLY

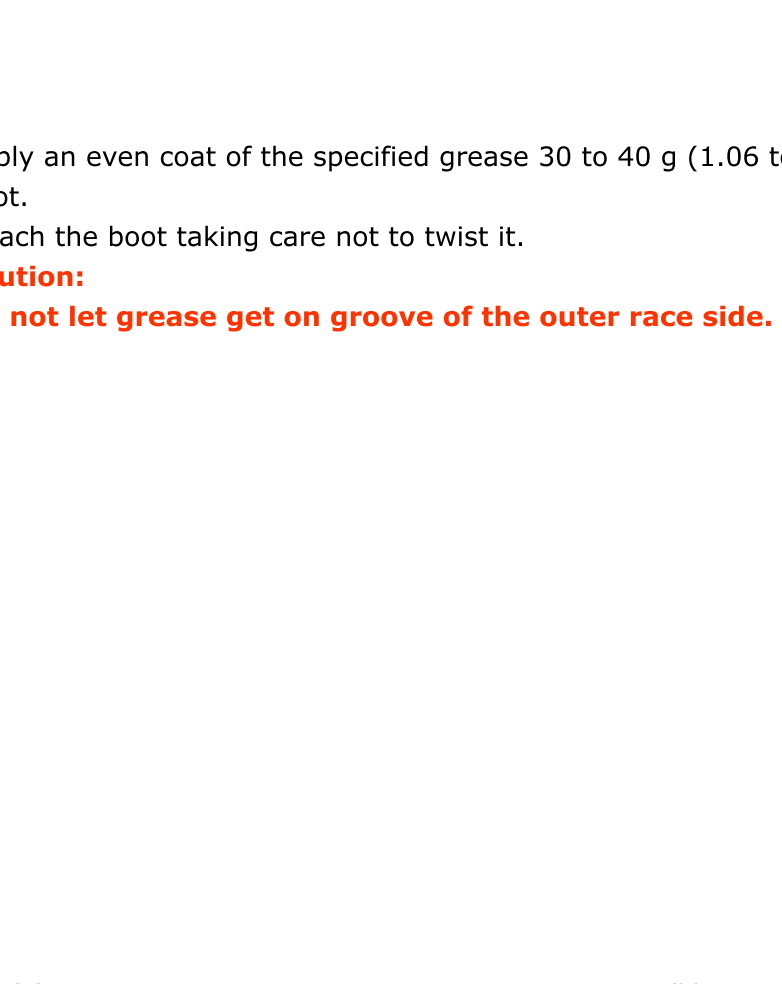
1. STI MODEL

Note:
Use specified grease.
Grease:
Ref. to RECOMMENDED MATERIALS > GREASE.

1. Pass the boot through the shaft.
2. Install the trunnion to the shaft.
   (1) Match the alignment marks, and attach the trunnion onto the shaft.
   (2) Attach the snap ring to the shaft.
   Caution:
   Confirm that the snap ring is completely fitted in the shaft groove.

3. Fill 50 to 60 g (1.76 to 2.12 oz) of specified grease into the interior of outer race.
4. Install the roller kit to the trunnion.
   (1) Apply a thin coat of specified grease to the roller kit and trunnion.
   (2) Place the drive shaft between wooden blocks and fix it on a vise.
   Caution:
   Do not set the drive shaft directly on a vise.
5. Align the alignment marks on the shaft and outer race.
6. Tap the insertion upper part of the outer race alternately using a plastic or wood bar shown in the figure, and then insert the roller one by one.
   Caution:
   - **Do not use a metal bar as the outer race may deform.**
   - **Do not tap on the end of outer race (shaft part).**
   - **Be careful not to deform the baffle plate.**

7. Apply an even coat of the specified grease 30 to 40 g (1.06 to 1.41 oz) to the entire inner surface of boot.
8. Attach the boot taking care not to twist it.
   Caution:
   Do not let grease get on groove of the outer race side.



(a) Outer race (b) Boot

9. Insert a flat tip screwdriver, etc. between outer race and boot to make pressure inside of boot as high as barometric pressure.
10. Tighten the boot band.
    (1) Install the new large boot band and small boot band at the required positions.
    (2) Connect the torque wrench and socket flex handle to the ST.
    Preparation tool:
    ST: BOOT BAND PLIERS (28099AC000)
    Torque wrench
    Socket flex handle
    (3) Use a prepared tool, tighten the boot band.
    Clearance at the crimped section of the boot band:
    Large boot band: 1 mm (0.04 in) or less
    Small boot band: 1 mm (0.04 in) or less
    Tightening torque:
    Large boot band: 178 N·m (18.2 kgf-m, 131.3 ft-lb)
    Small boot band: 145 N·m (14.8 kgf-m, 106.9 ft-lb)

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

11. Extend and retract the boot repeatedly to provide an equal coating of grease.

2. EXCEPT FOR STI MODEL

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) inner diameter or more.**

(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 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 the boot (IN side).
   Caution:
   Make sure to fit securely on the boot groove of the shaft.

(1) Boot (IN side)
(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 to 110 g (3.53 to 3.88 oz) of specified grease into the interior of the outer race (IN side).

Grease:

Ref. to RECOMMENDED MATERIALS > GREASE.

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 outer race (IN side).
    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 30 to 40 g (1.06 to 1.41 oz) to the entire inner surface of boot.
17. Attach the boot (IN side) taking care not to twist it.
    Caution:
    - **Clean the large end of boot (IN side) and the boot groove well, and remove the grease and other substances.**
    - **When installing the boot (IN side), position the outer race 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 (18.2 kgf-m, 131.3 ft-lb)
Small boot band: 145 N·m (14.8 kgf-m, 106.9 ft-lb)
Preparation tool:
ST: BOOT BAND PLIERS (28099AC000)

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

20. Extend and retract the boot (IN side) repeatedly so that grease is spread evenly.

DRIVE SHAFT SYSTEM > Front Drive Shaft

INSPECTION

1. Check that there is no deformation, cracks and any other damage.

2. Check for grease leakage.
3. Check the joint for looseness.
4. Check for excessive wear.
5. Check for excessive rusting.

REMOVAL

1. Disconnect the ground terminal 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 axle nut.
   Caution:
   Do not loosen the axle nut while the rear axle is loaded. Doing so may damage the hub unit bearing.
   (1) Lift the crimped section of axle nut.
   (2) Remove the axle nut using a socket wrench while depressing the brake pedal.
4. Remove the sensor assembly - headlight beam leveler. (Model with auto headlight beam leveler) Ref. to LIGHTING SYSTEM>Rear Height Sensor>REMOVAL.
5. Disconnect the oil temperature sensor connector. (Model with oil temperature sensor)
6. Drain differential gear oil.
7. Remove the bolts, then disconnect the rear stabilizer. (VB-type)

8. Remove the propeller shaft. Ref. to DRIVE SHAFT SYSTEM>Propeller Shaft>REMOVAL.
9. Loosen the joint of rear differential assembly and rear drive shaft 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)

   - VB 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

10. Remove the installation section of rear differential assembly.

(1) Support the rear differential assembly with a transmission jack.

(2) Remove the bolts which hold the rear differential front crossmember from the rear sub frame assembly.

(3) Remove the self-locking nuts which hold the rear differential to the rear sub frame assembly. (T-type)

(4) Remove the mass damper and the self-locking nuts which hold the rear differential to the rear sub frame assembly. (VB-type)

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

Caution:

Be careful not to damage the drive shaft boot.

12. Remove the rear drive shaft assembly from the rear axle housing.

Note:

If it is hard to remove, use the ST.

Preparation tool:

ST1: AXLE SHAFT PULLER (926470000)

ST2: AXLE SHAFT PULLER PLATE (28099PA110)

DRIVE SHAFT SYSTEM > Rear Drive Shaft

INSTALLATION

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

   Caution:

   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) Rear hub unit bearing

3. Tighten the new axle nut temporarily.
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. (T-type)

   Caution:

   Be sure to use a new self-locking nut.

   Tightening torque:

   Differential assembly — Bushing - differential: 70 N·m (7.1 kgf-m, 51.6 ft-lb)

   Differential assembly — Rear sub frame assembly: 110 N·m (11.2 kgf-m, 81.1 ft-lb)
6. Install the rear differential assembly and the mass damper to the rear sub frame assembly. (VB-type)

   Caution:

   Be sure to use a new self-locking nut.

   Tightening torque:

   Differential assembly — Bushing - differential: 70 N·m (7.1 kgf-m, 51.6 ft-lb)

Differential assembly — Rear sub frame assembly: 110 N·m (11.2 kgf-m, 81.1 ft-lb)

7. Install the sensor assembly - headlight beam leveler. (Model with auto headlight beam leveler)

   Tightening torque:

   7.5 N·m (0.8 kgf-m, 5.5 ft-lb)

8. Install the oil temperature sensor connector. (Model with oil temperature sensor)
9. Install the rear stabilizer. (VB-type)

   Caution:

   - **Always tighten the bushing in the state where the vehicle is at curb weight and the wheels are in full contact with the ground.**
   - **Install the clamp - stabilizer bushing with the "G" character facing upward.**
   - **When installing, align the edge of identification paint (a) to the end face of the bushing (b).**

   Tightening torque:

   30 N·m (3.1 kgf-m, 22.1 ft-lb)

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

    Caution:

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

    Tightening torque:

    190 N·m (19.4 kgf-m, 140.1 ft-lb)

11. Lock the axle nut securely.

12. Fill differential gear oil.
13. Install the rear wheels.
    Tightening torque:
    120 N·m (12.2 kgf-m, 88.5 ft-lb)
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.

DRIVE SHAFT SYSTEM > Rear Drive Shaft

DISASSEMBLY

1. Using a flat tip screwdriver or pliers, loosen the boot band on the large end of boot (IN side).
   Caution:
   Be careful not to damage the boot.

2. Remove the boot band on the small end of boot (IN side) in the same manner.
3. Remove the large end of boot (IN side) from the outer race.
4. Remove the round snap ring at the neck of outer race with a flat tip screwdriver.

5. Remove the outer race from shaft assembly.
6. Wipe off the grease and take out the balls.
   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

7. To remove the cage from inner race, turn the cage by a half pitch to the track groove of inner race and shift the cage.
8. Using pliers, remove the snap ring fixing the inner race to the shaft.
9. Take out the inner race.
10. Remove the cage from the shaft and remove the boot (IN side).

    Caution:

    Be sure to wrap shaft splines with vinyl tape to protect the boot from scratches.
11. Remove the boot (OUT side) using the same procedures as for the boot (IN side).

    Note:

    The joint on the OUT side is a non-disassembly part, so the drive shaft disassembly stops here.

DRIVE SHAFT SYSTEM > Rear Drive Shaft

ASSEMBLY

Caution:

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

Note:

Use specified grease.

Grease:

Ref. to RECOMMENDED MATERIALS > GREASE.

1. Install the boot (OUT side) to the specified position, and fill it with 50 to 60 g (1.76 to 2.12 oz) of specified grease.
2. Place the boot (IN side) at the center of shaft.
3. Insert the cage onto shaft.

    Note:

    Insert the cage with the cutout portion facing the outer race side, since the cage has an orientation.

(A) Cage
(B) Cutout portion

4. 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.

5. Install the cage to inner race fixed upon shaft.
Note:
Fit the cage with the protruding section aligned with the track on the inner race, and turn by a half pitch.

(A) Inner race
(B) Cage

6. Fill 80 to 90 g (2.82 to 3.17 oz) of specified grease into the interior of outer race.
7. Apply a thin coat of specified grease to the cage pocket and ball.
8. Insert the ball bearings into the cage pocket.
9. 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

10. Install the snap ring in the groove of the outer race.

Note:

- **Assure that the balls, cage and inner race are completely fitted in the outer race.**
- **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.**

11. Apply an even coat of the specified grease [20 to 30 g (0.71 to 1.06 oz)] to the entire inner surface of boot. Also apply grease to the shaft.

12. Attach the boot (IN side) taking care not to twist it.

Note:

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

13. Put a new band through the clip and wind twice in the band groove of the boot.

14. Pinch the end of band with pliers. Hold the clip and tighten securely.

Note:

When tightening boot, use care so that the air within the boot is appropriate.

15. Tighten the band using the band tightening tool.

Note:

- **For the band tightening tool, OTC CV joint banding tool and cutter (Part No. 4623) is recommended.**
- **Wind the band until it cannot be moved by hand.**
- **Bend the band using the tool while keeping the band wound tight.**

16. 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.
    Note:
    Be careful so that the end of the band is in close contact with clip.
17. Install the boot band using the same procedures as for the boot (IN side).
18. Extend and retract the boot (IN side) repeatedly to provide an equal coating of grease.

INSPECTION

1. Check that there is no deformation, cracks and any other damage.
2. Check for grease leakage.
3. Check the joint for looseness.
4. Check for excessive wear.
5. Check for excessive rusting.

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 play 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.
	Front hub unit bearing	Check the front hub unit bearing. Ref. to DRIVE SHAFT SYSTEM>Front Hub Unit Bearing>INSPECTION.
	Rear hub unit bearing	Check the rear hub unit bearing. 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.

Symptoms	Possible cause	Corrective action
	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.