

FRONT DISC BRAKE ASSEMBLY

BRAKE

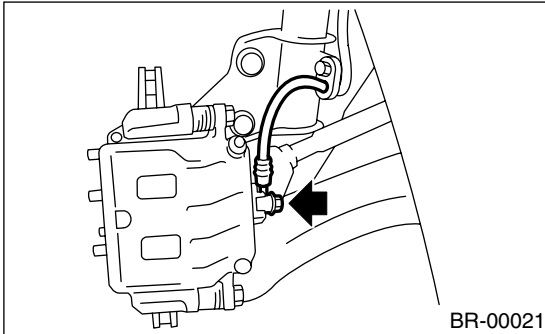
4. Front Disc Brake Assembly

A: REMOVAL

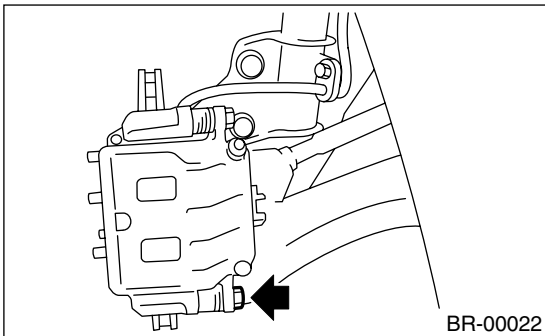
- 1) Loosen wheel nuts, jack-up vehicle, support it with safety stands, and remove wheel.
- 2) Remove union bolt and disconnect brake hose from caliper body assembly.

CAUTION:

Do not spill brake fluid on painted surface.
Wash it off immediately.



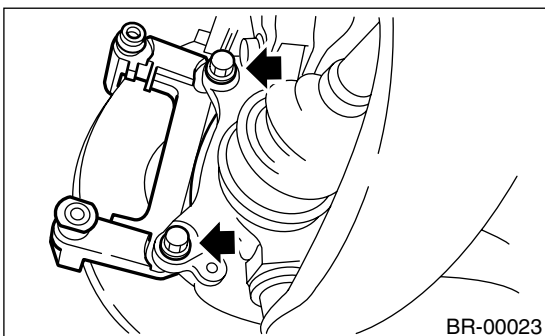
- 3) Remove bolt securing lock pin to caliper body.



- 4) Raise caliper body and move it toward vehicle center to separate it from support.
- 5) Remove support from housing.

NOTE:

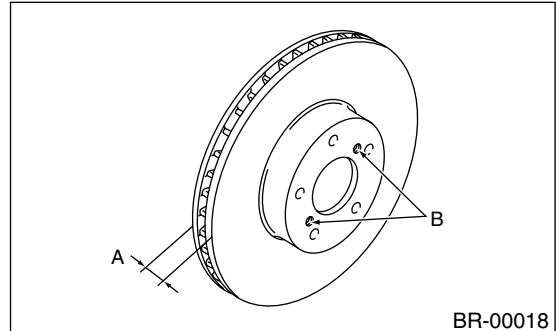
Remove support only when replacing it or the rotor. It need not be removed when servicing caliper body assembly.



- 6) Remove disc rotor from hub.

NOTE:

If disc rotor seizes up within hub, drive disc rotor out by installing an 8-mm bolt in holes B on the rotor.



- 7) Clean mud and foreign particles from caliper body assembly and support.

B: INSTALLATION

- 1) Install disc rotor on hub.
- 2) Install support on housing.

Tightening torque:

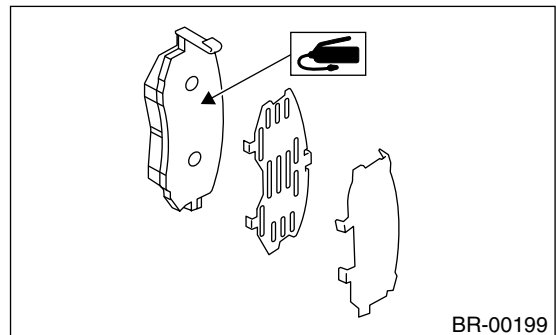
78 N·m (8 kgf-m, 58 ft-lb)

CAUTION:

- Always replace the pads for both the left and right wheels at the same time. Also replace pad clips if they are twisted or worn.
- A wear indicator is provided on the inner disc brake pad. If the pad wears down to such an extent that the end of the wear indicator contacts the disc rotor, a squeaking sound is produced as the wheel rotates. If this sound is heard, replace the pad.
- When replacing the pads, replace pads of the right and left wheels at the same time.

- 3) Apply thin coat of Molykote AS880N (Part No. 26298AC000) to the frictional portion between pad and pad clip.

- 4) Apply thin coat of Molykote AS880N (Part No. 26298AC000) to the frictional portion between pad and inner shim.



- 5) Install pads on support.

6) Install caliper body on support.

Tightening torque:

39 N·m (4.0 kgf-m, 28.9 ft-lb)

7) Connect brake hose.

Tightening torque:

18 N·m (1.8 kgf-m, 13.0 ft-lb)

CAUTION:

Replace brake hose gaskets with new ones.

8) Bleed air from brake system.

C: DISASSEMBLY

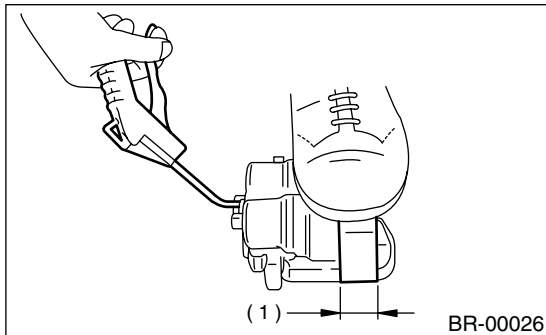
1) Clean mud and foreign particles from the caliper body assembly and support.

CAUTION:

Be careful not to allow foreign particles to enter inlet (at brake hose connector).

2) Remove the boot from piston end.

3) Place a wooden block as shown in the figure to prevent damage to the piston. Gradually supply compressed air via inlet of the brake hose to force piston out.

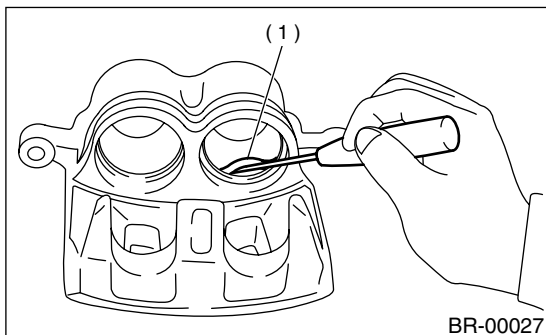


(1) Place a 30 mm (1.18 in) wide wooden block here.

4) Remove the piston seal from caliper body cylinder.

CAUTION:

Be careful not to scratch the inner surface of cylinder and piston seal groove.



(1) Piston seal

5) Remove the lock pin boot and guide pin boot.

D: ASSEMBLY

1) Clean the caliper body interior using brake fluid.

2) Apply a coat of brake fluid to the piston seal and fit piston seal in groove on caliper body.

3) Apply a coat of brake fluid to the entire inner surface of cylinder and outer surface of piston.

4) Apply a coat of specified grease to the boot and fit in groove on ends of cylinder and piston.

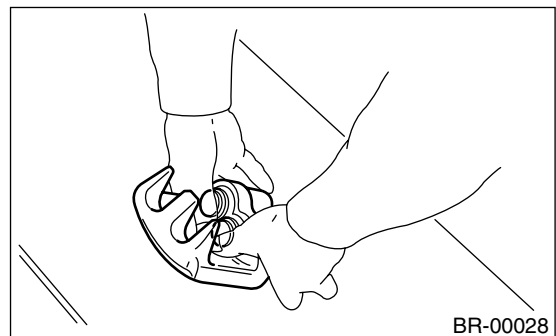
Grease:

NIGLUBE RX-2 (Part No. K0779GA102)

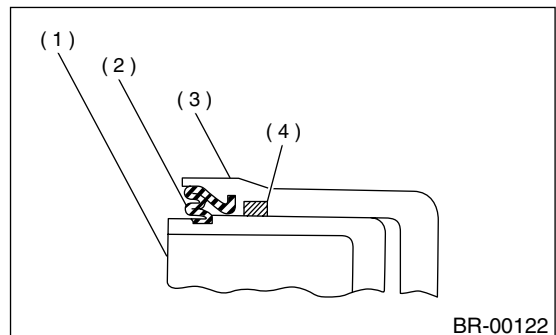
5) Insert the piston into cylinder.

CAUTION:

Do not force the piston into cylinder.



6) Position the boot in grooves on cylinder and piston.



- (1) Piston
- (2) Piston boot
- (3) Caliper body
- (4) Piston seal

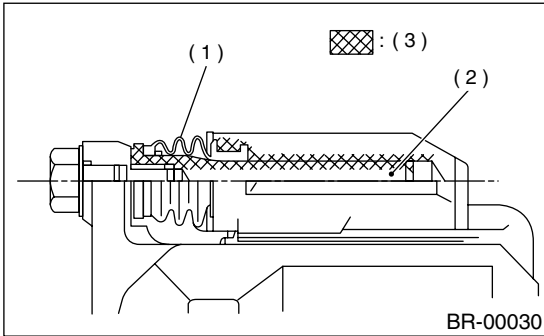
FRONT DISC BRAKE ASSEMBLY

BRAKE

7) Apply a coat of specified grease to the lock pin and guide pin, outer surface, cylinder inner surface, and boot grooves.

Grease:

NIGLUBE RX-2 (Part No. K0779GA102)



- (1) Pin boot
- (2) Lock pin or guide pin
- (3) Apply grease.

8) Install the lock pin boot and guide pin boot on support.

E: INSPECTION

- 1) Repair or replace the faulty parts.
- 2) Check the caliper body and piston for uneven wear, damage or rust.
- 3) Check the rubber parts for damage or deterioration.

GENERAL DESCRIPTION

BRAKE

1. General Description

A: SPECIFICATIONS

	Size	15 inch type	16 inch type	
			Non-TURBO	With TURBO model
Front disc brake	Type	Disc (Floating type, ventilated)		
	Effective disc diameter	228 mm (8.98 in)	244 mm (9.76 in)	
	Disc thickness × Outer diameter	24 × 277 mm (0.94 × 10.91 in)	24 × 294 mm (0.94 × 11.57 in)	
	Effective cylinder diameter	42.8 mm (1.685 in) × 2		
	Pad dimensions (length × width × thickness)	117.8 × 50.5 × 11.0 mm (4.638 × 1.988 × 0.433 in)		
	Clearance adjustment	Automatic adjustment		
	Rear disc brake	Type	Disc (Floating type)	
Effective disc diameter		254 mm (10.0 in)		
Disc thickness × Outer diameter		10 × 290 mm (0.39 × 11.42 in)		
Effective cylinder diameter		38.1 mm (1.500 in)		
Pad dimensions (length × width × thickness)		82.4 × 33.7 × 9.0 mm (3.244 × 1.327 × 0.354 in)		
Clearance adjustment		Automatic adjustment		
Master cyl- inder	Type	Tandem		
	Effective diameter	26.99 mm (17/16 in)	25.4 mm (1 in)	
	Reservoir type	Sealed type		
	Brake fluid reservoir capacity	205 cm ³ (12.51 cu in)		
Brake booster	Type	Vacuum suspended		
	Effective diameter	205 + 230 mm (8.07 + 9.06 in)		
Proportioning valve	Split point	2,942 kPa (30 kg/cm ² , 427 psi)	3,678 kPa (without VDC) (37.5 kg/cm ² , 533 psi) 2,942 kPa (without VDC) (30 kg/cm ² , 427 psi)	
	Reducing ratio	0.3		
Brake line		Dual circuit system		
Brake fluid CAUTION: • Avoid mixing brake fluid of different brands to prevent the fluid performance from degrading. • When brake fluid is supplemented, be careful not to allow any dust into the reservoir. • Use fresh DOT3 or 4 brake fluid when replacing or refilling the fluid.		FMVSS No. 116, DOT3 or DOT4		

NOTE:

Refer to “PB section” for parking brake SPECIFICATIONS.

GENERAL DESCRIPTION

BRAKE

ITEM		STANDARD	SERVICE LIMIT
Front brake	Pad thickness (including back metal)	17 mm (0.67 in)	7.5 mm (0.295 in)
	Disc thickness	24 mm (0.94 in)	22 mm (0.87 in)
	Disc runout	—	0.075 mm (0.0030 in)
Rear brake	Pad thickness (including back metal)	14 mm (0.55 in)	6.5 mm (0.256 in)
	Disc thickness	10 mm (0.39 in)	8.5 mm (0.335 in)
	Disc runout	—	0.070 mm (0.0028 in)
Parking brake	Inside diameter	170 mm (6.69 in)	171 mm (6.73 in)
	Lining thickness	3.2 mm (0.126 in)	1.5 mm (0.059 in)
	Lever stroke	7 to 8 notches/196 N (20 kgf, 44 lb)	

		Brake pedal force	Fluid pressure	
			15 inch type	16 inch type
Brake booster	Brake fluid pressure without engine running	147 N (15 kgf, 33 lb)	588 kPa (6 kg/cm ² , 85 psi)	
		294 N (30 kgf, 66 lb)	1,569 kPa (16 kg/cm ² , 228 psi)	
	Brake fluid pressure with engine running and vacuum at 66.7 kPa (500 mmHg, 19.69 inHg)	147 N (15 kgf, 33 lb)	6,178 kPa (63 kg/cm ² , 896 psi)	
		294 N (30 kgf, 66 lb)	9,709 kPa (99 kg/cm ² , 1,408 psi)	

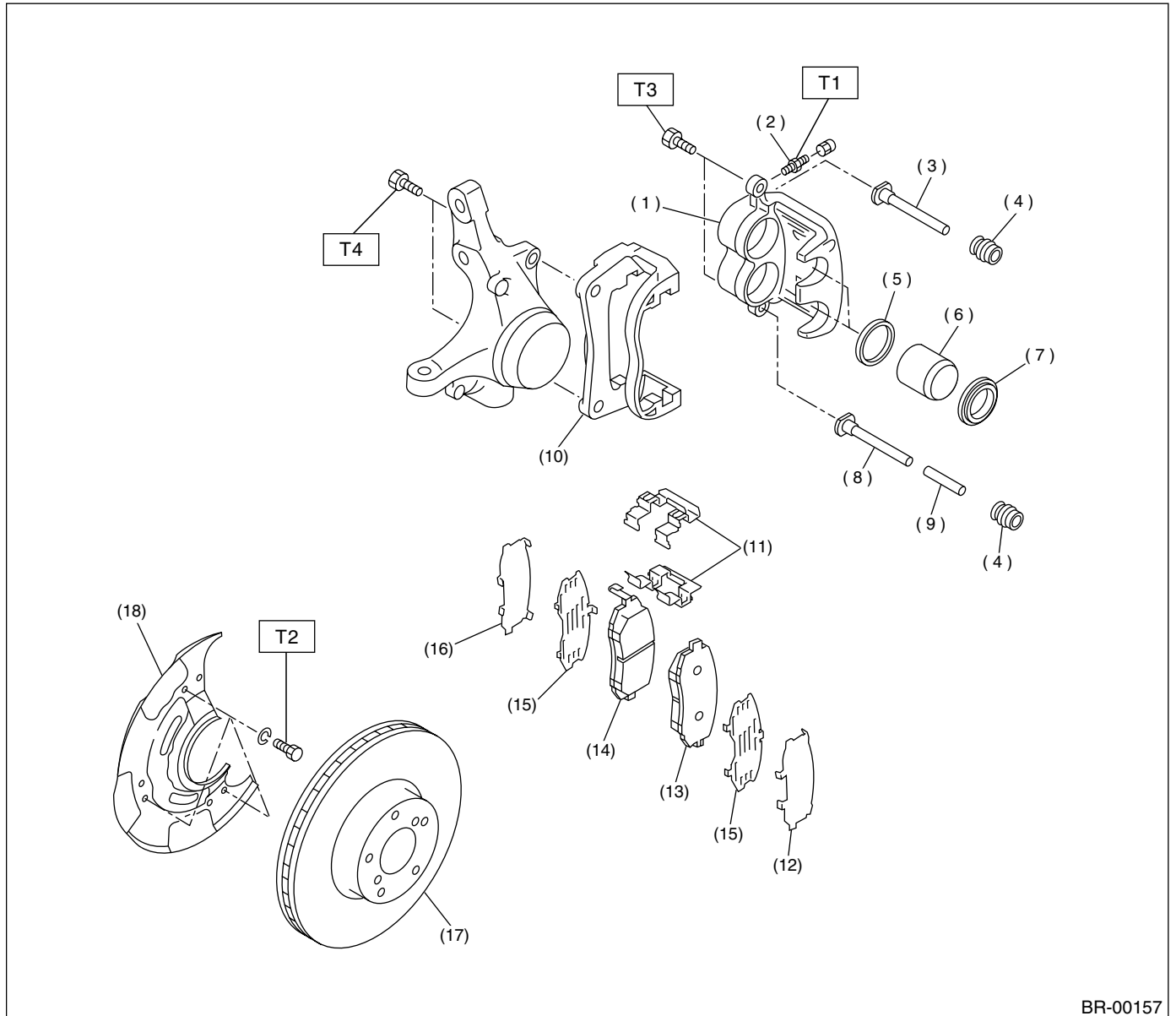
Brake pedal	Free play	1 — 3 mm (0.04 — 0.12 in) [Depress brake pedal pad with a force of less than 10 N (1 kgf, 2 lb).]
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GENERAL DESCRIPTION

BRAKE

B: COMPONENT

1. FRONT DISC BRAKE



BR-00157

- | | |
|-----------------------|-------------------------|
| (1) Caliper body | (9) Bushing |
| (2) Air bleeder screw | (10) Support |
| (3) Guide pin (Green) | (11) Pad clip |
| (4) Pin boot | (12) Outer shim |
| (5) Piston seal | (13) Pad (Outside) |
| (6) Piston | (14) Pad (Inside) |
| (7) Piston boot | (15) Rubber coated shim |
| (8) Lock pin (Yellow) | (16) Inner shim |

- (17) Disc rotor
(18) Disc cover

Tightening torque: N·m (kgf-m, ft-lb)

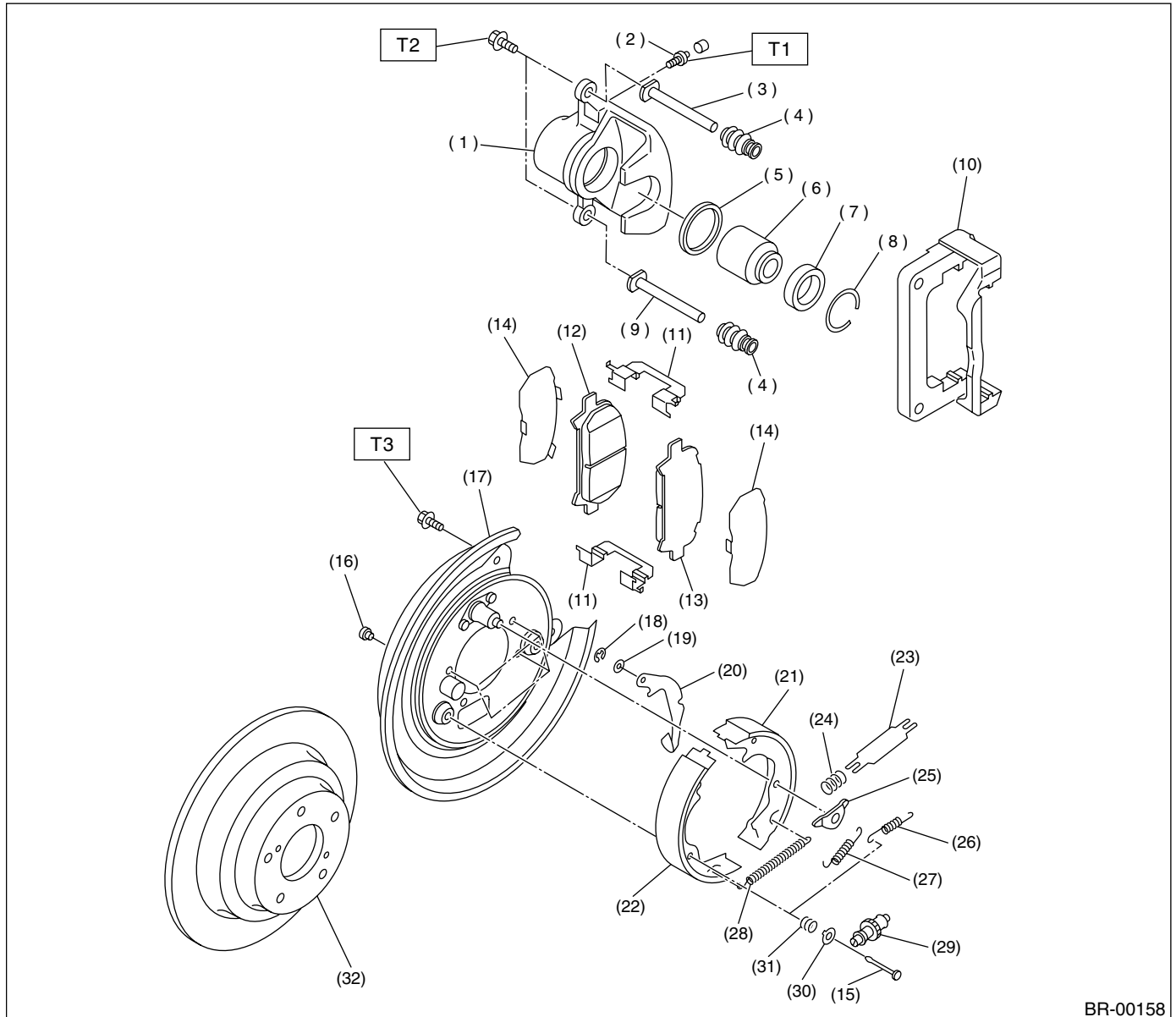
T1: 8 (0.8, 5.8)

T2: 18 (1.8, 13.0)

T3: 37 (3.8, 27.5)

T4: 80 (8.2, 59)

2. REAR DISC BRAKE



BR-00158

- | | | |
|-----------------------|-------------------------------------|---------------------------------|
| (1) Caliper body | (14) Shim | (27) Primary shoe return spring |
| (2) Air bleeder screw | (15) Shoe hold-down pin | (28) Adjusting spring |
| (3) Guide pin (Green) | (16) Cover | (29) Adjuster |
| (4) Pin boot | (17) Back plate | (30) Shoe hold-down cup |
| (5) Piston seal | (18) Retainer | (31) Shoe hold-down spring |
| (6) Piston | (19) Spring washer | (32) Disc rotor |
| (7) Piston boot | (20) Parking brake lever | |
| (8) Boot ring | (21) Parking brake shoe (Secondary) | |
| (9) Lock pin (Yellow) | (22) Parking brake shoe (Primary) | |
| (10) Support | (23) Strut | |
| (11) Pad clip | (24) Strut shoe spring | |
| (12) Inner pad | (25) Shoe guide plate | |
| (13) Outer pad | (26) Secondary shoe return spring | |

Tightening torque: N·m (kgf·m, ft·lb)

T1: 8 (0.8, 5.8)

T2: 39 (4.0, 28.9)

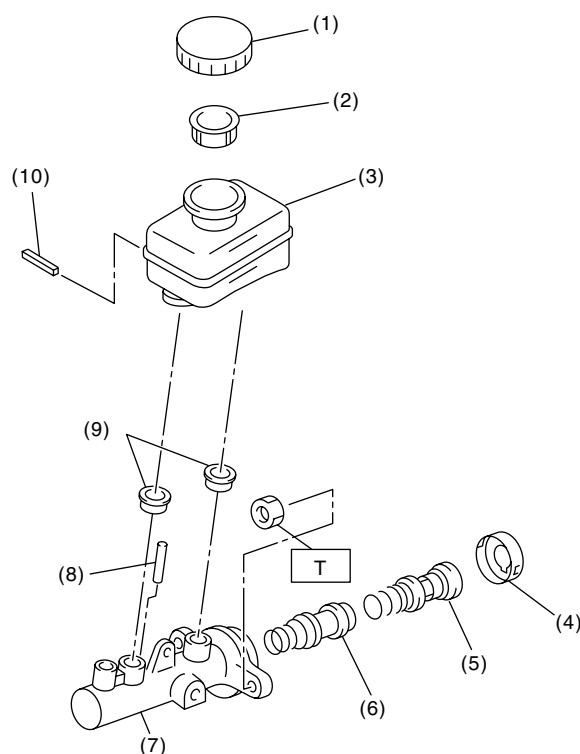
T3: 52 (5.3, 38.3)

GENERAL DESCRIPTION

BRAKE

3. MASTER CYLINDER

• Models without VDC



BR-00153

- | | |
|---------------------|-----------------------------|
| (1) Cap | (6) Secondary piston |
| (2) Filter | (7) Cylinder body |
| (3) Reservoir tank | (8) Cylinder pin (With ABS) |
| (4) Piston retainer | (9) Seal |
| (5) Primary piston | (10) Pin |

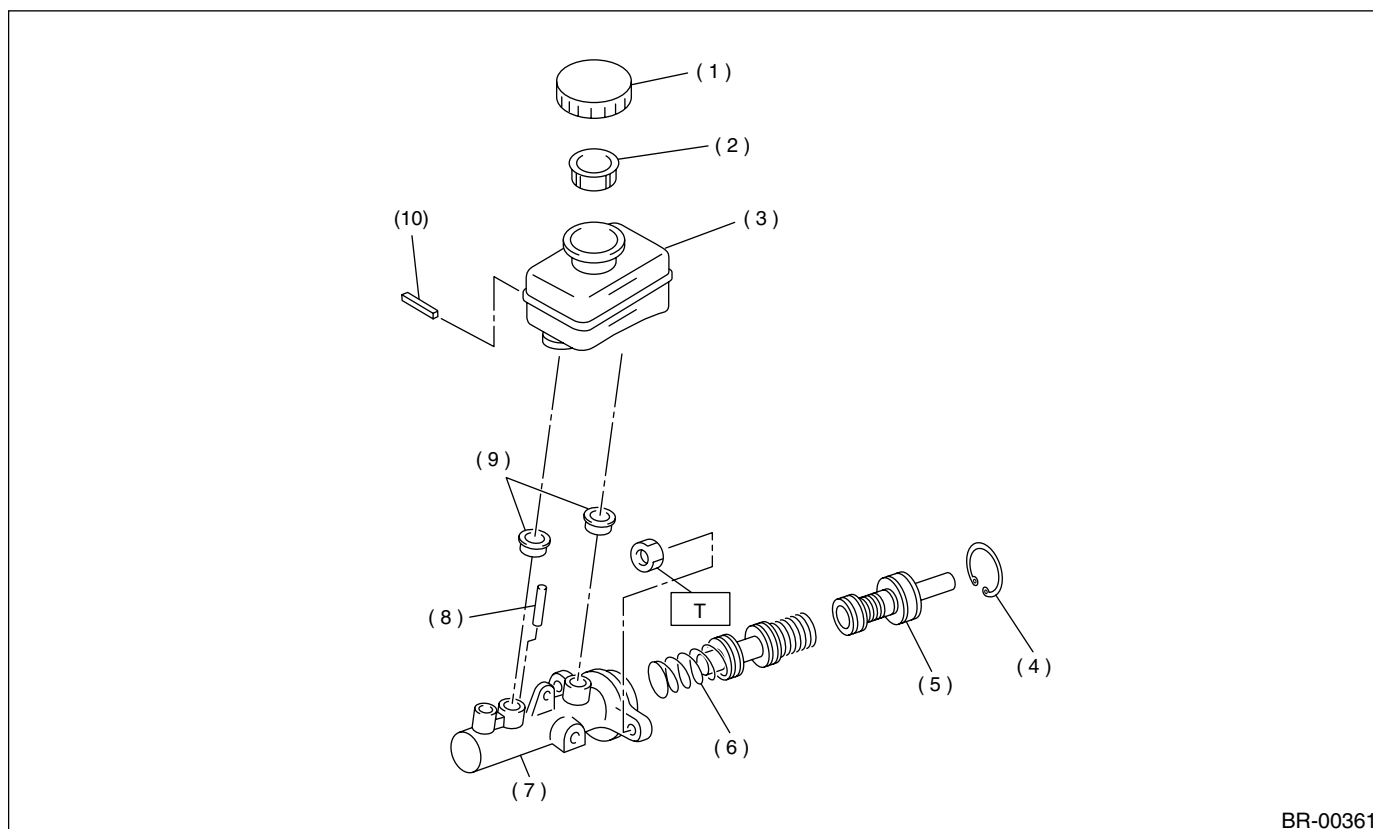
Tightening torque: N·m (kgf-m, ft-lb)

T: 14 (1.4, 10.1)

GENERAL DESCRIPTION

BRAKE

• Model with VDC



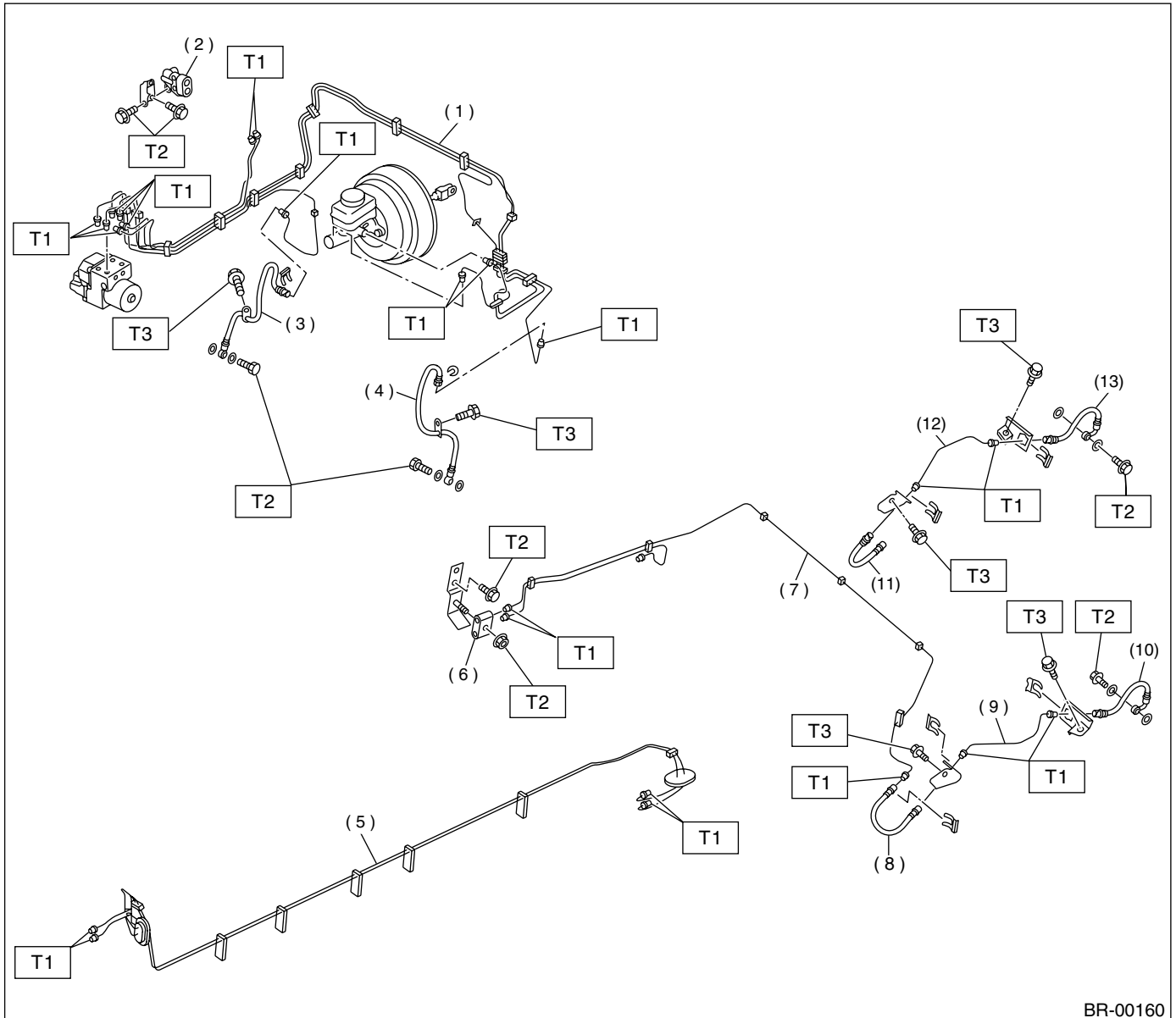
- | | |
|--------------------|----------------------|
| (1) Cap | (6) Secondary piston |
| (2) Filter | (7) Cylinder body |
| (3) Reservoir tank | (8) Cylinder pin |
| (4) C-ring | (9) Seal |
| (5) Primary piston | (10) Pin |

Tightening torque: N·m (kgf-m, ft-lb)

T: 14 (1.4, 10.1)

GENERAL DESCRIPTION

4. BRAKE PIPES AND HOSE



BR-00160

- | | |
|--------------------------------|------------------------------|
| (1) Front brake pipe assembly | (7) Rear brake pipe assembly |
| (2) Proportioning valve | (8) Rear brake hose LH |
| (3) Front brake hose RH | (9) Rear brake pipe LH |
| (4) Front brake hose LH | (10) Rear brake hose rear LH |
| (5) Center brake pipe assembly | (11) Rear brake hose RH |
| (6) Two-way connector | (12) Rear brake pipe RH |

- (13) Rear brake hose rear RH

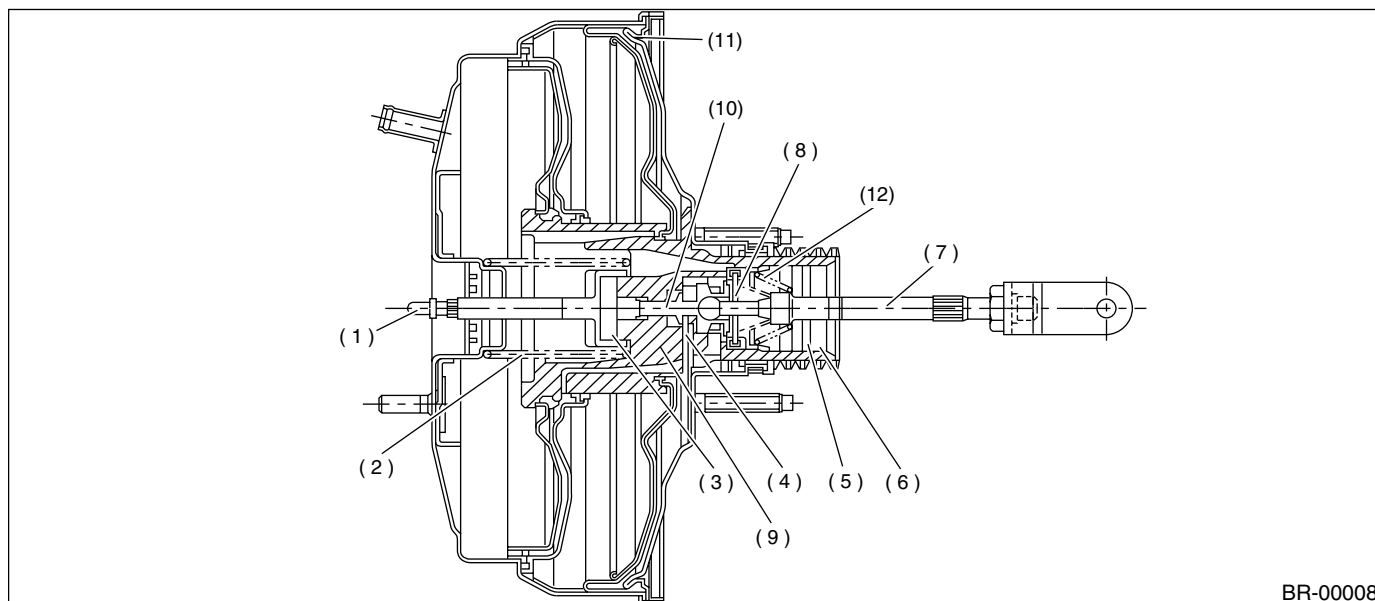
Tightening torque: N·m (kgf·m, ft·lb)

T1: 15 (1.5, 10.8)

T2: 18 (1.8, 13.0)

T3: 33 (3.3, 23.8)

5. BRAKE BOOSTER



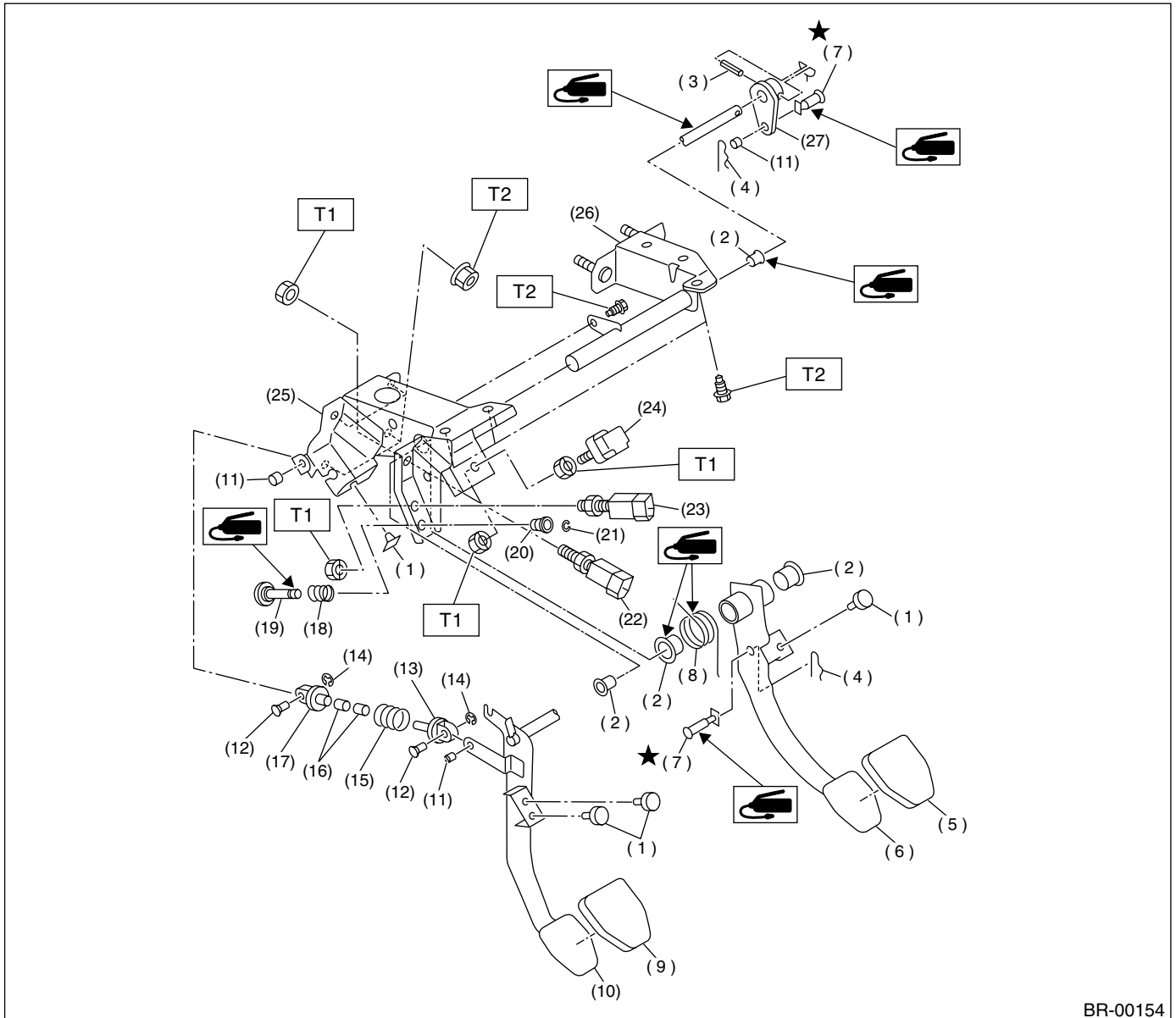
BR-00008

- | | | |
|-------------------|-------------------|--------------------------|
| (1) Push rod | (5) Filter | (9) Valve body |
| (2) Return spring | (6) Silencer | (10) Plunger valve |
| (3) Reaction disc | (7) Operating rod | (11) Diaphragm plate |
| (4) Key | (8) Poppet valve | (12) Valve return spring |

GENERAL DESCRIPTION

BRAKE

6. BRAKE PEDAL FOR MT MODEL



BR-00154

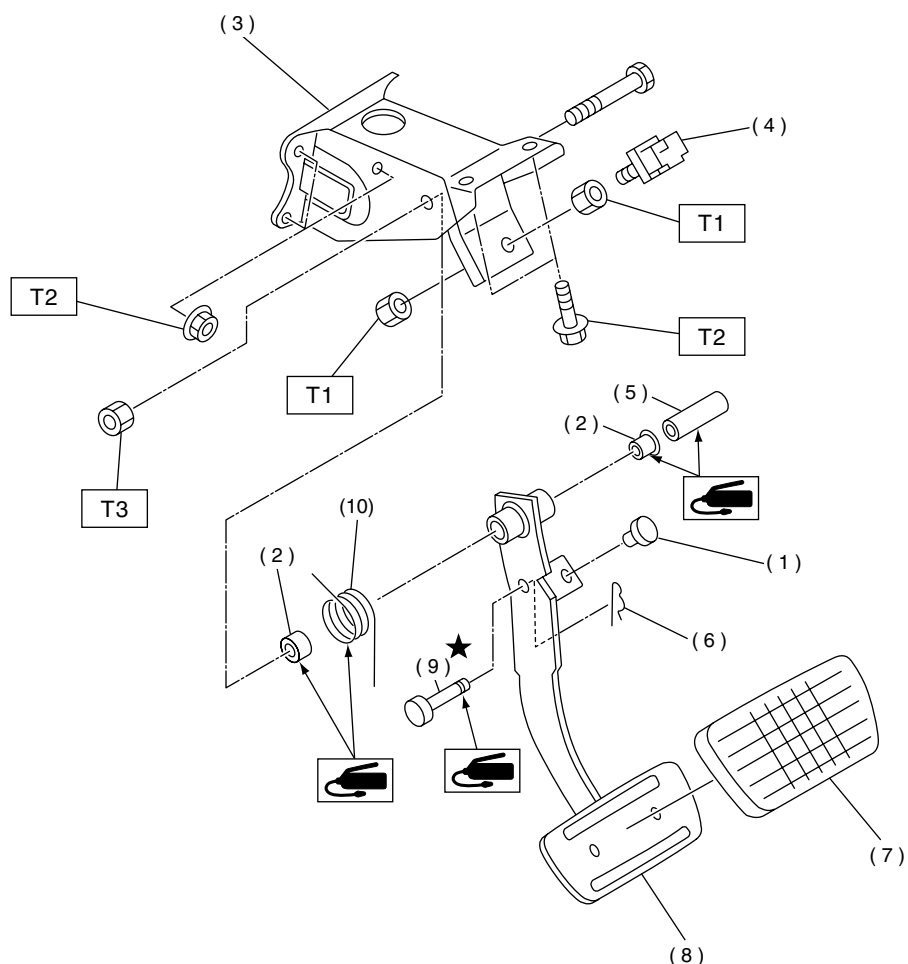
- | | | |
|------------------------|--|--|
| (1) Stopper | (12) Clutch clevis pin | (23) Clutch switch (With cruise control) |
| (2) Bushing | (13) Assist rod A | (24) Stop light switch |
| (3) Spring pin | (14) Clip | (25) Pedal bracket |
| (4) Snap pin | (15) Assist spring | (26) Clutch master cylinder bracket |
| (5) Brake pedal pad | (16) Assist bushing | (27) Lever |
| (6) Brake pedal | (17) Assist rod B | |
| (7) Clevis pin | (18) Spring S | |
| (8) Brake pedal spring | (19) Rod S | |
| (9) Clutch pedal pad | (20) Bushing S | |
| (10) Clutch pedal | (21) Clip | |
| (11) Bushing C | (22) Clutch switch (Starter interlock) | |

Tightening torque: N·m (kgf-m, ft-lb)

T1: 8 (0.8, 5.8)

T2: 18 (1.8, 13.0)

7. BRAKE PEDAL FOR AT MODEL



BR-00162

- | | |
|-----------------------|-------------------------|
| (1) Stopper | (7) Brake pedal pad |
| (2) Bushing | (8) Brake pedal |
| (3) Pedal bracket | (9) Clevis pin |
| (4) Stop light switch | (10) Brake pedal spring |
| (5) Spacer | |
| (6) Snap pin | |

Tightening torque: N·m (kgf-m, ft-lb)

T1: 8 (0.8, 5.8)

T2: 18 (1.8, 13.0)

T3: 29 (3.0, 21.7)

GENERAL DESCRIPTION

BRAKE

C: CAUTION

- Wear working clothing, including a cap, protective goggles, and protective shoes during operation.
- Remove contamination including dirt and corrosion before removal, installation or disassembly.
- Keep the disassembled parts in order and protect them from dust or dirt
- Before removal, installation or disassembly, be sure to clarify the failure. Avoid unnecessary removal, installation, disassembly, and replacement.
- Be careful not to burn your hands, because each part in the vehicle is hot after running.
- Use SUBARU genuine grease etc. or the equivalent. Do not mix grease etc. with that of another grade or from other manufacturers.
- Be sure to tighten fasteners including bolts and nuts to the specified torque.
- Place shop jacks or safety stands at the specified points.
- Apply grease onto sliding or revolving surfaces before installation.
- Before installing O-rings or snap rings, apply sufficient amount of grease to avoid damage and deformation
- Before securing a part on a vise, place cushioning material such as wood blocks, aluminum plate, or shop cloth between the part and the vise.
- Do not put fluid on body. If the body is tainted, wash away with water.

D: PREPARATION TOOL

1. GENERAL PURPOSE TOOLS

TOOL NAME	REMARKS
Snap Ring Pliers	Used for removing and installing snap ring.

GENERAL DIAGNOSTICS

BRAKE

17. General Diagnostics

A: INSPECTION

	Trouble and possible cause	Corrective action
1. Insufficient braking	(1) Fluid leakage from the hydraulic mechanism	Repair or replace (cup, piston seal, piston boot, master cylinder piston kit, pipe or hose).
	(2) Entry of air into the hydraulic mechanism	Bleed the air.
	(3) Excessively wide shoe clearance	Adjust the clearance.
	(4) Wear, deteriorated surface material, adhering water or fluid on the lining	Replace, grind or clean.
	(5) Improper operation of master cylinder, disc caliper, brake booster or check valve	Correct or replace.
2. Unstable or uneven braking	(1) Fluid on the lining or rotor	Eliminate cause of fluid leakage, clean, or replace.
	(2) Rotor eccentricity	Correct or replace the rotor.
	(3) Improper lining contact, deteriorated surface material, improper inferior material, or wear	Correct by grinding, or replace.
	(4) Deformed back plate	Correct or replace.
	(5) Improper tire inflation	Inflate to correct pressure.
	(6) Disordered wheel alignment	Adjust alignment.
	(7) Loosened back plate or the support installing bolts	Retighten.
	(8) Loosened wheel bearing	Retighten to normal tightening torque or replace.
	(9) Trouble in the hydraulic system	Replace the cylinder, brake pipe or hose.
	(10) Uneven effect of the parking brake	Check, adjust, or replace the rear brake and cable system.
3. Excessive pedal stroke	(1) Entry of air into the hydraulic mechanism	Bleed the air.
	(2) Excessive play in the master cylinder push rod	Adjust.
	(3) Fluid leakage from the hydraulic mechanism	Repair or replace (cup, piston seal, piston boot, master cylinder piston kit, pipe or hose).
	(4) Improperly adjusted shoe clearance	Adjust.
	(5) Improper lining contact or worn lining	Correct or replace.
4. Brake dragging or improper brake return	(1) Insufficient pedal play	Adjust play.
	(2) Improper master cylinder return	Clean or replace the cylinder.
	(3) Clogged hydraulic system	Replace.
	(4) Improper return or adjustment of parking brake	Correct or adjust.
	(5) Weakened spring tension or breakage of shoe return spring	Replace the spring.
	(6) Excessively narrow shoe clearance	Adjust the clearance.
	(7) Improper disc caliper operation	Correct or replace.
	(8) Improper adjusted wheel bearing	Adjust or replace.
5. Brake noise (1) (creak sound)	(1) Hardened or deteriorated lining	Replace the shoe assembly or pad.
	(2) Worn lining	Replace the shoe assembly or pad.
	(3) Loosened back plate or the support installing bolts	Retighten.
	(4) Loose wheel bearing	Retighten to normal tightening torque.
	(5) Dirty rotor	Clean the rotor, or clean and replace the brake assembly.
6. Brake noise (2) (hissing sound)	(1) Worn lining	Replace the shoe assembly or pad.
	(2) Improper installed shoe or pad	Correct or replace the shoe assembly or pad.
	(3) Loose or bent rotor	Retighten or replace.
7. Brake noise (3) (click sound)	(1) Excessively worn pad or the support	Replace the pad or the support.
	(2) Excessively worn shoe ridge	Replace the back plate.
	(3) Lack of oil on the shoe ridge surface and anchor	Add more grease.

REAR DISC BRAKE ASSEMBLY

BRAKE

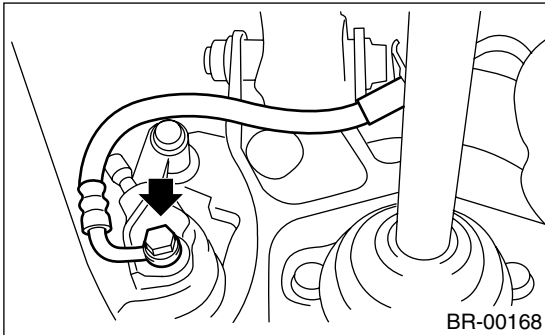
7. Rear Disc Brake Assembly

A: REMOVAL

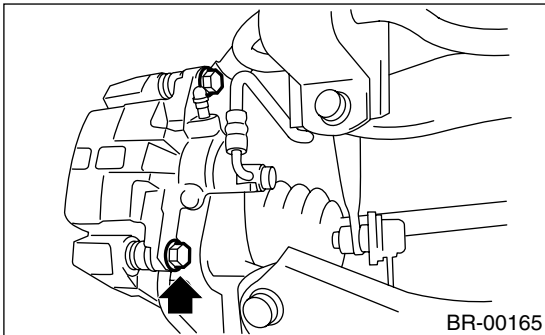
- 1) Lift-up vehicle and remove wheels.
- 2) Disconnect brake hose from caliper body assembly.

CAUTION:

Do not spill brake fluid on painted surface.
Wash it off immediately.



- 3) Remove bolt securing lock pin to caliper body.



- 4) Raise caliper body and move it toward vehicle center to separate it from support.
- 5) Remove support from back plate.

NOTE:

Remove support only when replacing it or the rotor. It need not be removed when servicing caliper body assembly.

- 6) Clean mud and foreign particles from caliper body assembly and support.

CAUTION:

Be careful not to allow foreign particles to enter inlet (at brake hose connector).

B: INSTALLATION

- 1) Install disc rotor on hub.
- 2) Install support on back plate.

Tightening torque:

78 N·m (8.0 kgf-m, 58 ft-lb)

CAUTION:

- Always replace the pads for both the left and right wheels at the same time. Also replace pad clips if they are twisted or worn.
 - A wear indicator is provided on the inner disc brake pad. If the pad wears down to such an extent that the end of the wear indicator contacts the disc rotor, a squeaking sound is produced as the wheel rotates. If this sound is heard, replace the pad.
 - Replace pads if there is oil or grease on them.
- 3) Apply thin coat of Molykote AS880N (Part No. 26298AC000) to the frictional portion between pad and pad clip.

CAUTION:

Do not allow oil or grease to adhere to the sliding surface of pad and disc rotor.

- 4) Install pads on support.
- 5) Install caliper body on support.

Tightening torque:

39 N·m (4.0 kgf-m, 28.9 ft-lb)

- 6) Connect brake hose.

Tightening torque:

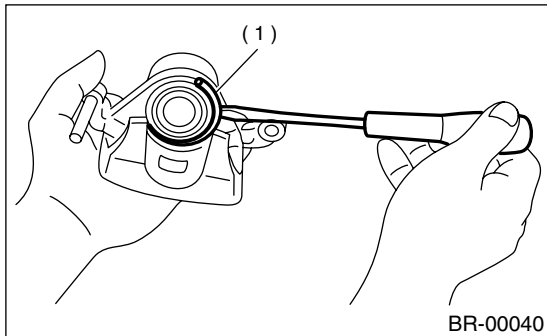
18 N·m (1.8 kgf-m, 13.0 ft-lb)

CAUTION:

- The brake hose must be connected without any twist.
 - Replace brake hose gaskets with new ones.
- 7) Bleed air from brake system.
- <Ref. to BR-34, Air Bleeding.>

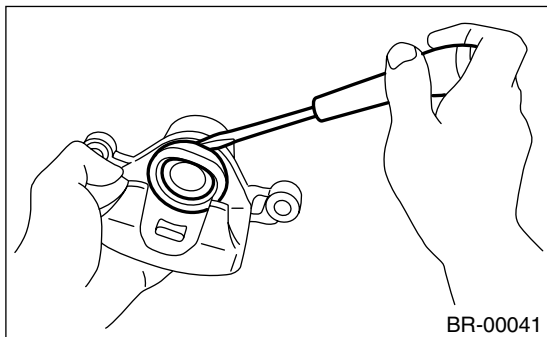
C: DISASSEMBLY

1) Remove the boot ring.



(1) Boot ring

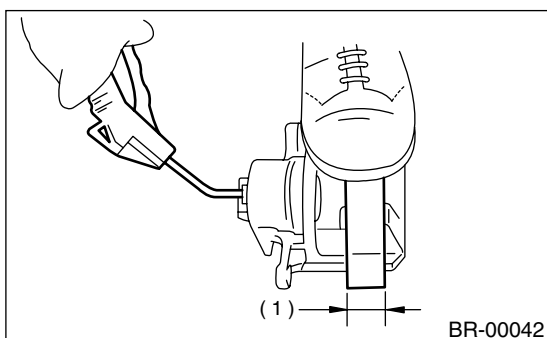
2) Remove the piston boot.



3) Gradually supply compressed air via inlet of caliper body to force piston out.

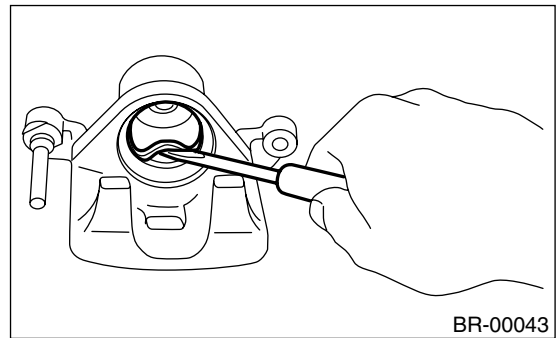
CAUTION:

- Place a wooden block as shown in Figure to prevent damage to piston.
- Do not apply excessively high-pressure.



(1) Place a 30 mm (1.18 in) wide wooden block here.

4) Remove piston seal from caliper body cylinder.



5) Remove lock pin sleeve and boot from caliper body.

6) Remove guide pin boot.

D: ASSEMBLY

1) Clean caliper body interior using brake fluid.

2) Apply a coat of brake fluid to piston seal and fit piston seal in groove on caliper body.

3) Apply a coat of brake fluid to the entire inner surface of cylinder and outer surface of piston.

4) Insert piston into cylinder.

CAUTION:

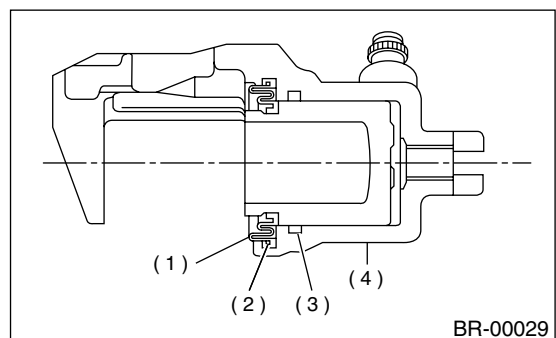
Do not force piston into cylinder.

5) Apply a coat of specified grease to boot and fit in groove on ends of cylinder and piston.

Grease:

NIGLUBE RX-2 (Part No. 003606000)

6) Install the piston boot to the caliper body, and attach boot ring.



- (1) Piston boot
- (2) Piston
- (3) Piston seal
- (4) Caliper body

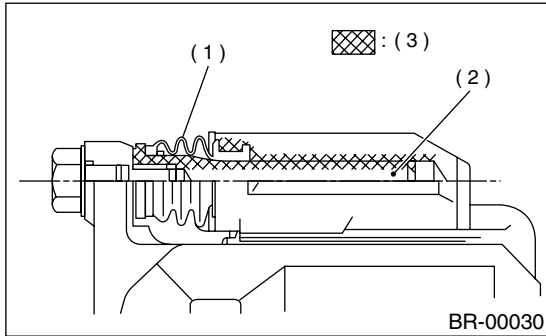
REAR DISC BRAKE ASSEMBLY

BRAKE

7) Apply a coat of specified grease to guide pin, outer surface, sleeve outer surface, cylinder inner surface, and boot grooves.

Grease:

NIGLUBE RX-2 (Part No. 003606000)



- (1) Pin boot
- (2) Lock pin or guide pin
- (3) Apply grease.

8) Install guide pin boot on caliper body.

9) Install lock pin boot on caliper body and insert lock pin sleeve into place.

E: INSPECTION

- 1) Repair or replace faulty parts.
- 2) Check caliper body and piston for uneven wear, damage or rust.
- 3) Check rubber parts for damage or deterioration.

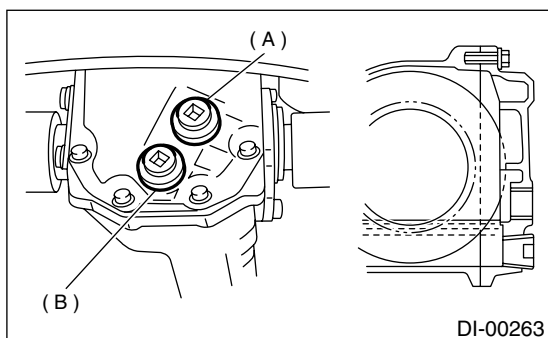
DIFFERENTIAL GEAR OIL

DIFFERENTIALS

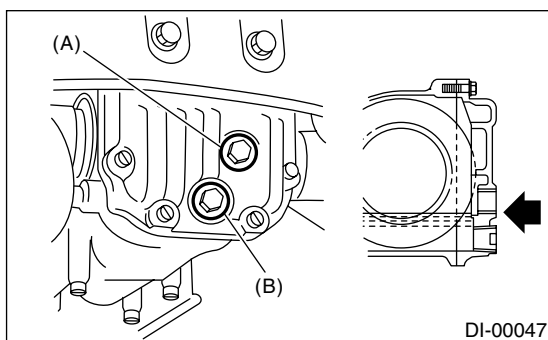
2. Differential Gear Oil

A: INSPECTION

- 1) Take out filler plug, and replace gear oil if it is contaminated or deteriorated. <Ref. to DI-22, REPLACEMENT, Differential Gear Oil.>
- 2) Check gear oil level is up to the bottom part of filler bolt. If the level is low, refill up to the bottom of filler bolt.



- (A) Filler plug
(B) Drain plug



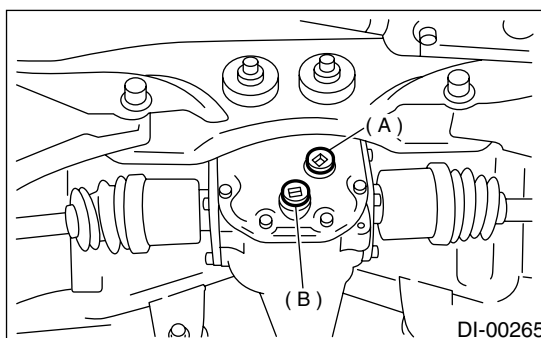
- (A) Filler plug
(B) Drain plug

B: REPLACEMENT

- 1) Disconnect ground cable from battery.
- 2) Jack-up vehicle and support it with sturdy racks.
- 3) Remove the oil drain plug and filler plug, and drain the gear oil.

CAUTION:

Be careful not to burn your hands, because gear oil becomes extremely hot after running.



- (A) Filler plug
(B) Drain plug

- 4) Tighten oil drain plug.

NOTE:

- Apply fluid gasket to drain plug for T-type.
- VA-type uses a new aluminum gasket.

Fluid gasket:

**THREE BOND 1105 (Part No.: 004403010)
or equivalent**

Tightening torque:

T-type;

49.0 N·m (5.0 kgf-m, 36.2 ft-lb)

VA-type;

34 N·m (3.5 kgf-m, 25.3 ft-lb)

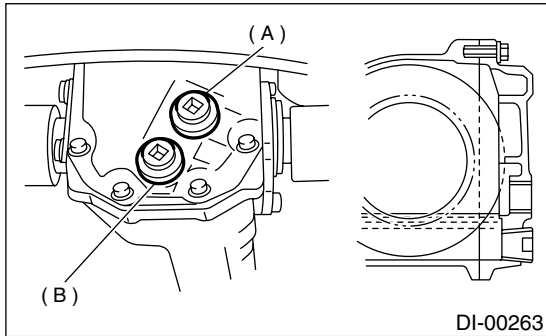
5) Fill differential carrier with gear oil to the upper plug level.

CAUTION:

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

Oil capacity:

0.8 ℓ (0.8 US qt, 0.7 Imp qt)



- (A) Filler plug
- (B) Drain plug

6) Install filler plug.

NOTE:

- Apply fluid gasket to filler plug for T-type.
- VA-type uses a new aluminum gasket.

Fluid gasket:

THREE BOND 1105 (Part No.: 004403010)
or equivalent

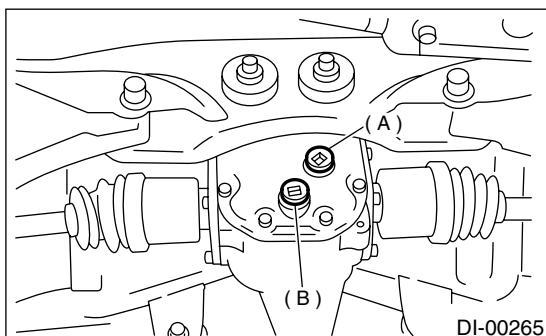
Tightening torque:

T-type;

49.0 N·m (5.0 kgf-m, 36.2 ft-lb)

VA-type;

34 N·m (3.5 kgf-m, 25.3 ft-lb)



- (A) Filler plug
- (B) Drain plug

GENERAL DESCRIPTION

DIFFERENTIALS

1. General Description

A: SPECIFICATIONS

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

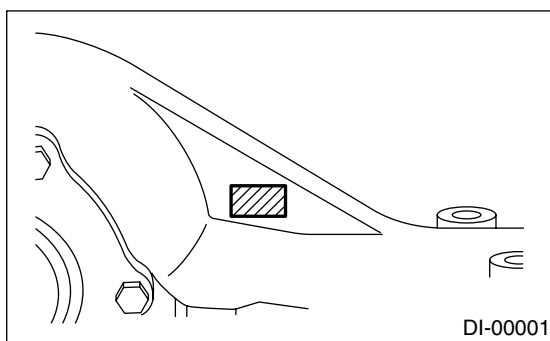
NOTE:

Using the different rear differential assembly causes the drive line and tires to “drag” or emit abnormal noise.

MODEL	2.5 L Non-turbo					
	L-S and L		Except BAJA, L-S and L		BAJA	
	MT	AT	MT	AT	MT	AT
	T-type	VA-type	T-type		T-type	VA-type
Rear differential type	T1	XJ	JE (with LSD)	CD (with LSD)	J (with LSD)	XS (with LSD)
Gear	Hypoid gear					
Gear ratio (Number of gear teeth)	3.900 (39/10)	4.111 (37/9)	4.111 (37/9)	4.444 (40/9)	4.111 (37/9)	4.444 (40/9)
Oil capacity	0.8 ℓ (0.8 US qt, 0.7 Imp qt)					
Rear differential gear oil	GL-5					

MODEL	2.5 L turbo		3.0 L	
	BAJA		OUTBACK SEDAN, OUTBACK	
	MT	AT	With VDC	Without VDC
	T-type		T-type	
Rear differential type	F (with LSD)		T2	JE (with LSD)
Gear	Hypoid gear		Hypoid gear	
Gear ratio (Number of gear teeth)	4.444 (40/9)		4.111 (37/9)	
Oil capacity	0.8 ℓ (0.8 US qt, 0.7 Imp qt)			
Rear differential gear oil	GL-5		GL-5	

• Identification

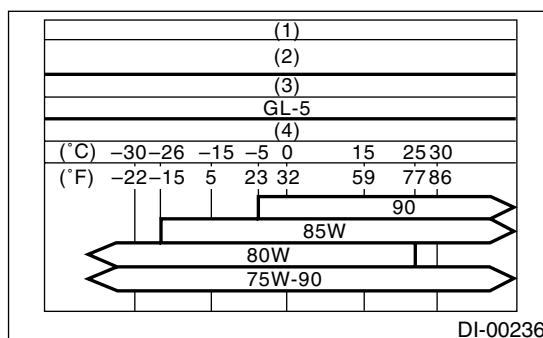


• Rear differential gear oil

Recommended oil

NOTE:

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 Application Temperature

GENERAL DESCRIPTION

DIFFERENTIALS

1. SERVICE DATA

Front and rear bearing preload at companion flange bolt hole N (kgf, lb)	T-type	18.1 — 38.8 (1.8 — 4.0, 4.1 — 8.7)
	VA-type	12.7 — 32.4 (1.3 — 3.3, 2.9 — 7.3)
Side gear backlash mm (in)	T-type	0.10 — 0.20 (0.0039 — 0.0079)
	VA-type	0.05 — 0.15 (0.0020 — 0.0059)
Side bearing standard width mm (in)		20.00 (0.7874)
Crown gear to drive pinion backlash mm (in)	T-type	0.10 — 0.20 (0.0039 — 0.0079)
	VA-type	0.10 — 0.15 (0.0039 — 0.0059)
Crown gear runout on its back surface mm (in)	T-type only	0.05 (0.0020) or less

GENERAL DESCRIPTION

DIFFERENTIALS

2. ADJUSTING PARTS

• VA-type

Item	Part No.	Length or thickness
Preload adjusting spacer	32288AA040	52.3 mm (2.059 in)
	32288AA050	52.5 mm (2.067 in)
	31454AA100	52.6 mm (2.071 in)
	32288AA060	52.7 mm (2.075 in)
	31454AA110	52.8 mm (2.079 in)
	32288AA070	52.9 mm (2.083 in)
	31454AA120	53.0 mm (2.087 in)
	32288AA080	53.1 mm (2.091 in)
	32288AA090	53.3 mm (2.098 in)
Preload adjusting washer	38336AA000	1.500 mm (0.0591 in)
	38336AA120	1.513 mm (0.0596 in)
	38336AA010	1.525 mm (0.0600 in)
	38336AA130	1.538 mm (0.0606 in)
	38336AA020	1.550 mm (0.0610 in)
	38336AA140	1.563 mm (0.0615 in)
	38336AA030	1.575 mm (0.0620 in)
	38336AA150	1.588 mm (0.0625 in)
	38336AA040	1.600 mm (0.0630 in)
	38336AA160	1.613 mm (0.0635 in)
	38336AA050	1.625 mm (0.0640 in)
	38336AA170	1.638 mm (0.0645 in)
	38336AA060	1.650 mm (0.0650 in)
	38336AA180	1.663 mm (0.0655 in)
	38336AA070	1.675 mm (0.0659 in)
	38336AA190	1.688 mm (0.0665 in)
	38336AA080	1.700 mm (0.0669 in)
	38336AA200	1.713 mm (0.0674 in)
	38336AA090	1.725 mm (0.0679 in)
	38336AA210	1.738 mm (0.0684 in)
	38336AA100	1.750 mm (0.0689 in)
	38336AA220	1.763 mm (0.0694 in)
	38336AA110	1.775 mm (0.0699 in)
Pinion height adjusting shim	32295AA200	0.150 mm (0.0059 in)
	32295AA210	0.175 mm (0.0069 in)
	32295AA220	0.200 mm (0.0079 in)
	32295AA230	0.225 mm (0.0089 in)
	32295AA240	0.250 mm (0.0098 in)
	32295AA250	0.275 mm (0.0108 in)
Side gear thrust washer (Without LSD)	803135011	0.925 — 0.950 mm (0.0364 — 0.0374 in)
	803135012	0.950 — 0.975 mm (0.0374 — 0.0384 in)
	803135013	0.975 — 1.000 mm (0.0384 — 0.0394 in)
	803135014	1.000 — 1.025 mm (0.0394 — 0.0404 in)
	803135015	1.025 — 1.050 mm (0.0404 — 0.0413 in)

GENERAL DESCRIPTION

DIFFERENTIALS

• T-type

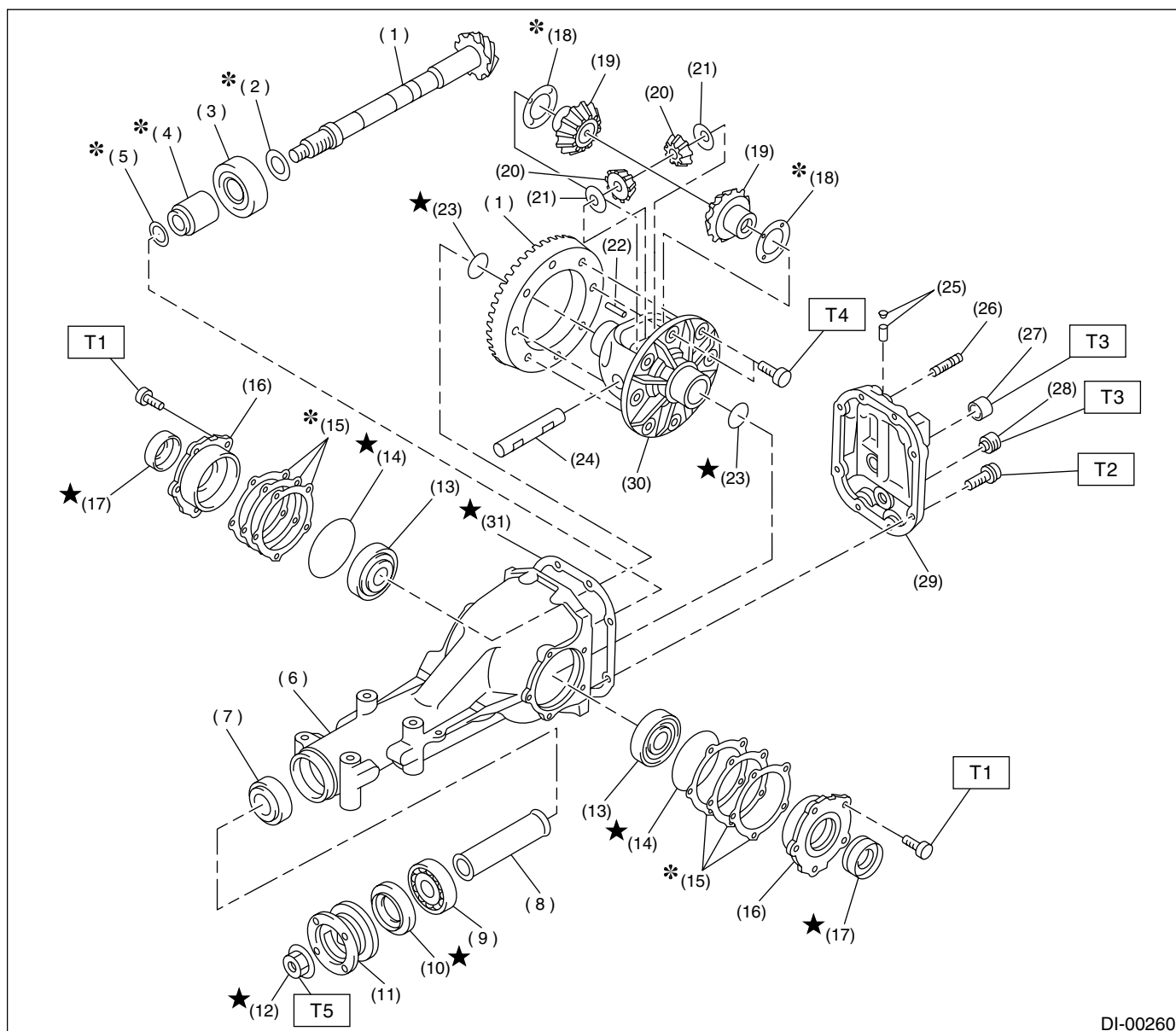
Item	Part No.	Length or thickness
Preload adjusting spacer	383695201	56.2 mm (2.213 in)
	383695202	56.4 mm (2.220 in)
	383695203	56.6 mm (2.228 in)
	383695204	56.8 mm (2.236 in)
	383695205	57.0 mm (2.244 in)
	383695206	57.2 mm (2.252 in)
Preload adjusting washer	383705200	2.59 mm (0.1020 in)
	383715200	2.57 mm (0.1012 in)
	383725200	2.55 mm (0.1004 in)
	383735200	2.53 mm (0.0996 in)
	383745200	2.51 mm (0.0988 in)
	383755200	2.49 mm (0.0980 in)
	383765200	2.47 mm (0.0972 in)
	383775200	2.45 mm (0.0965 in)
	383785200	2.43 mm (0.0957 in)
	383795200	2.41 mm (0.0949 in)
	383805200	2.39 mm (0.0941 in)
	383815200	2.37 mm (0.0933 in)
	383825200	2.35 mm (0.0925 in)
	383835200	2.33 mm (0.0917 in)
	383845200	2.31 mm (0.0909 in)
Pinion height adjusting shim	383495200	3.09 mm (0.1217 in)
	383505200	3.12 mm (0.1228 in)
	383515200	3.15 mm (0.1240 in)
	383525200	3.18 mm (0.1252 in)
	383535200	3.21 mm (0.1264 in)
	383545200	3.24 mm (0.1276 in)
	383555200	3.27 mm (0.1287 in)
	383565200	3.30 mm (0.1299 in)
	383575200	3.33 mm (0.1311 in)
	383585200	3.36 mm (0.1323 in)
	383595200	3.39 mm (0.1335 in)
	383605200	3.42 mm (0.1346 in)
	383615200	3.45 mm (0.1358 in)
	383625200	3.48 mm (0.1370 in)
	383635200	3.51 mm (0.1382 in)
	383645200	3.54 mm (0.1394 in)
	383655200	3.57 mm (0.1406 in)
	383665200	3.60 mm (0.1417 in)
	383675200	3.63 mm (0.1429 in)
	383685200	3.66 mm (0.1441 in)
Side gear thrust washer (Without LSD)	383445201	0.75 — 0.80 mm (0.0295 — 0.0315 in)
	383445202	0.80 — 0.85 mm (0.0315 — 0.0335 in)
	383445203	0.85 — 0.90 mm (0.0335 — 0.0354 in)
Side bearing retainer shim	383475201	0.20 mm (0.0079 in)
	383475202	0.25 mm (0.0098 in)
	383475203	0.30 mm (0.0118 in)
	383475204	0.40 mm (0.0157 in)
	383475205	0.50 mm (0.0197 in)

GENERAL DESCRIPTION

DIFFERENTIALS

B: COMPONENT

1. REAR DIFFERENTIAL FOR T-TYPE WITHOUT LSD



DI-00260

- | | | |
|--|---------------------------------|------------------------|
| (1) Pinion crown gear and drive pinion set | (14) O-ring | (28) Oil drain plug |
| (2) Pinion height adjusting washer | (15) Side bearing retainer shim | (29) Rear cover |
| (3) Rear bearing | (16) Side bearing retainer | (30) Differential case |
| (4) Bearing preload adjusting spacer | (17) Side oil seal | (31) Gasket |
| (5) Bearing preload adjusting washer | (18) Side gear thrust washer | |
| (6) Differential carrier | (19) Side gear | |
| (7) Front bearing | (20) Pinion mate gear | |
| (8) Collar | (21) Pinion mate gear washer | |
| (9) Pilot bearing | (22) Pinion shaft lock pin | |
| (10) Front oil seal | (23) Circlip | |
| (11) Companion flange | (24) Pinion mate shaft | |
| (12) Self-locking nut | (25) Air breather cap | |
| (13) Side bearing | (26) Stud bolt | |
| | (27) Oil filler plug | |

Tightening torque: N·m (kgf-m, ft-lb)

T1: 10.3 (1.05, 7.6)

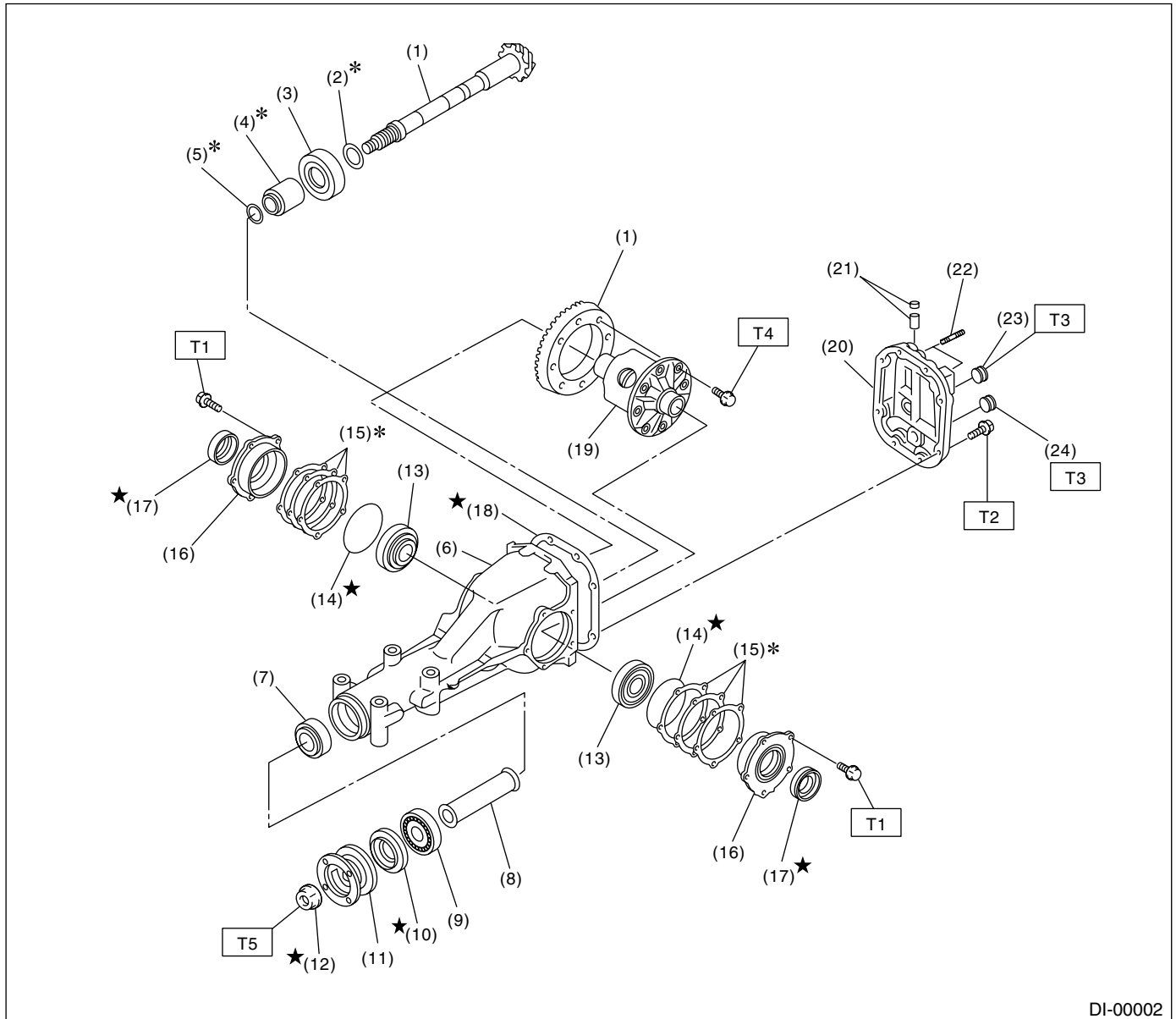
T2: 29 (3.00, 21.7)

T3: 49.0 (5.0, 36.2)

T4: 105 (10.7, 77.4)

T5: 181 (18.5, 134)

2. REAR DIFFERENTIAL FOR T-TYPE WITH LSD



DI-00002

- | | |
|--|---------------------------------|
| (1) Pinion crown gear and drive pinion set | (11) Companion flange |
| (2) Pinion height adjusting shim | (12) Self-locking nut |
| (3) Rear bearing | (13) Side bearing |
| (4) Bearing preload adjusting spacer | (14) O-ring |
| (5) Bearing preload adjusting washer | (15) Side bearing retainer shim |
| (6) Differential carrier | (16) Side bearing retainer |
| (7) Front bearing | (17) Side oil seal |
| (8) Collar | (18) Gasket |
| (9) Pilot bearing | (19) Differential case ASSY |
| (10) Front oil seal | (20) Rear cover |
| | (21) Air breather cap |

- | |
|----------------------|
| (22) Stud bolt |
| (23) Oil filler plug |
| (24) Oil drain plug |

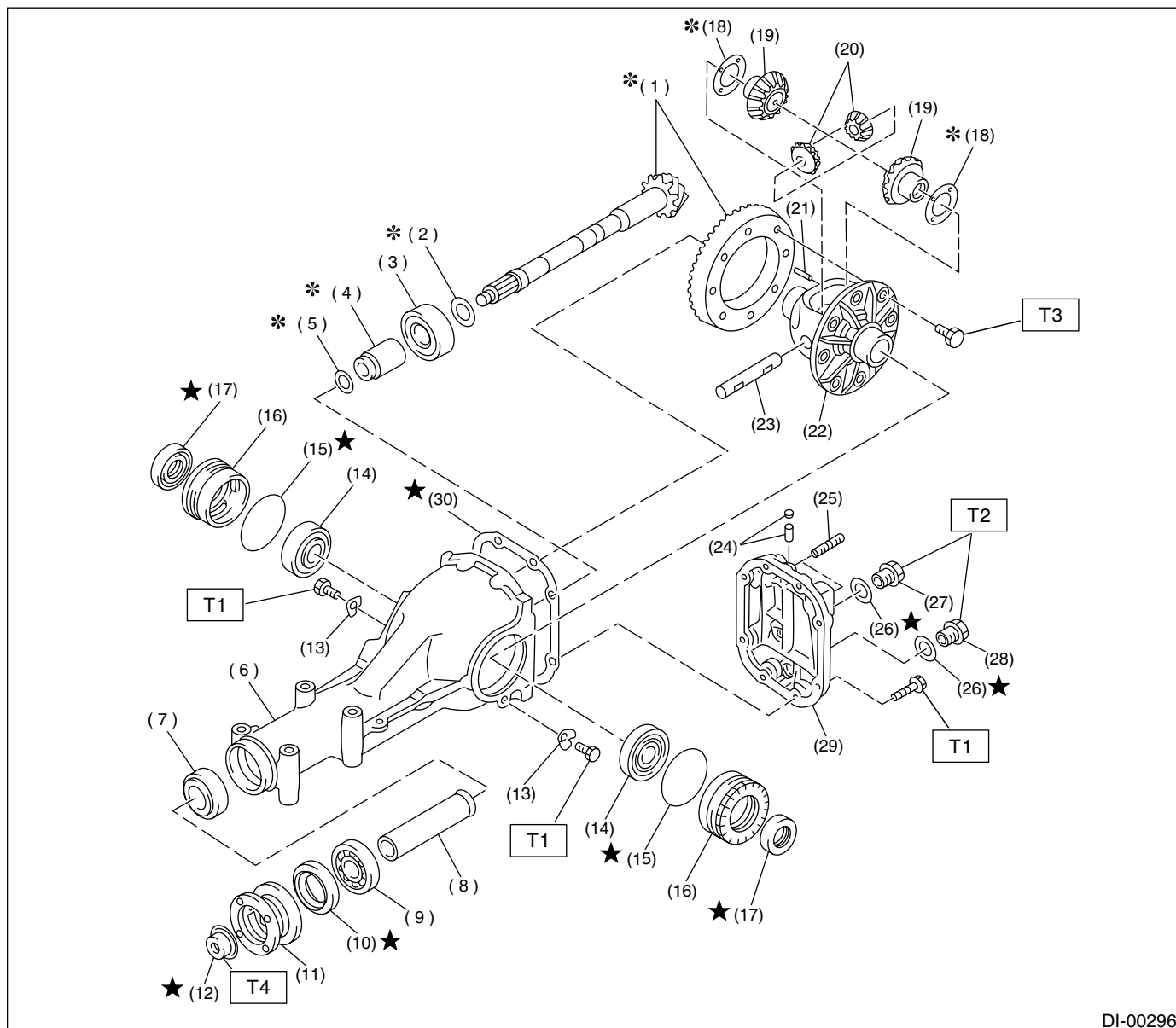
Tightening torque: N·m (kgf-m, ft-lb)

- | | |
|------------|--------------------------|
| T1: | 10.3 (1.05, 7.6) |
| T2: | 29.0 (3.00, 21.7) |
| T3: | 49.0 (5.00, 36.2) |
| T4: | 105 (10.7, 77.4) |
| T5: | 181 (18.5, 134) |

GENERAL DESCRIPTION

DIFFERENTIALS

3. REAR DIFFERENTIAL FOR VA-TYPE WITHOUT LSD



DI-00296

- | | | |
|--|------------------------------|----------------------|
| (1) Pinion crown gear and drive pinion set | (13) Lock plate | (26) Gasket |
| (2) Pinion height adjusting shim | (14) Side bearing | (27) Oil filler plug |
| (3) Rear bearing | (15) O-ring | (28) Oil drain plug |
| (4) Bearing preload adjusting spacer | (16) Axle shaft holder | (29) Rear cover |
| (5) Bearing preload adjusting washer | (17) Side oil seal | (30) Gasket |
| (6) Differential carrier | (18) Side gear thrust washer | |
| (7) Front bearing | (19) Side gear | |
| (8) Collar | (20) Pinion mate gear | |
| (9) Pilot bearing | (21) Pinion shaft lock pin | |
| (10) Front oil seal | (22) Differential case | |
| (11) Companion flange | (23) Pinion mate shaft | |
| (12) Self-locking nut | (24) Air breather cap | |
| | (25) Stud bolt | |

Tightening torque: N·m (kgf-m, ft-lb)

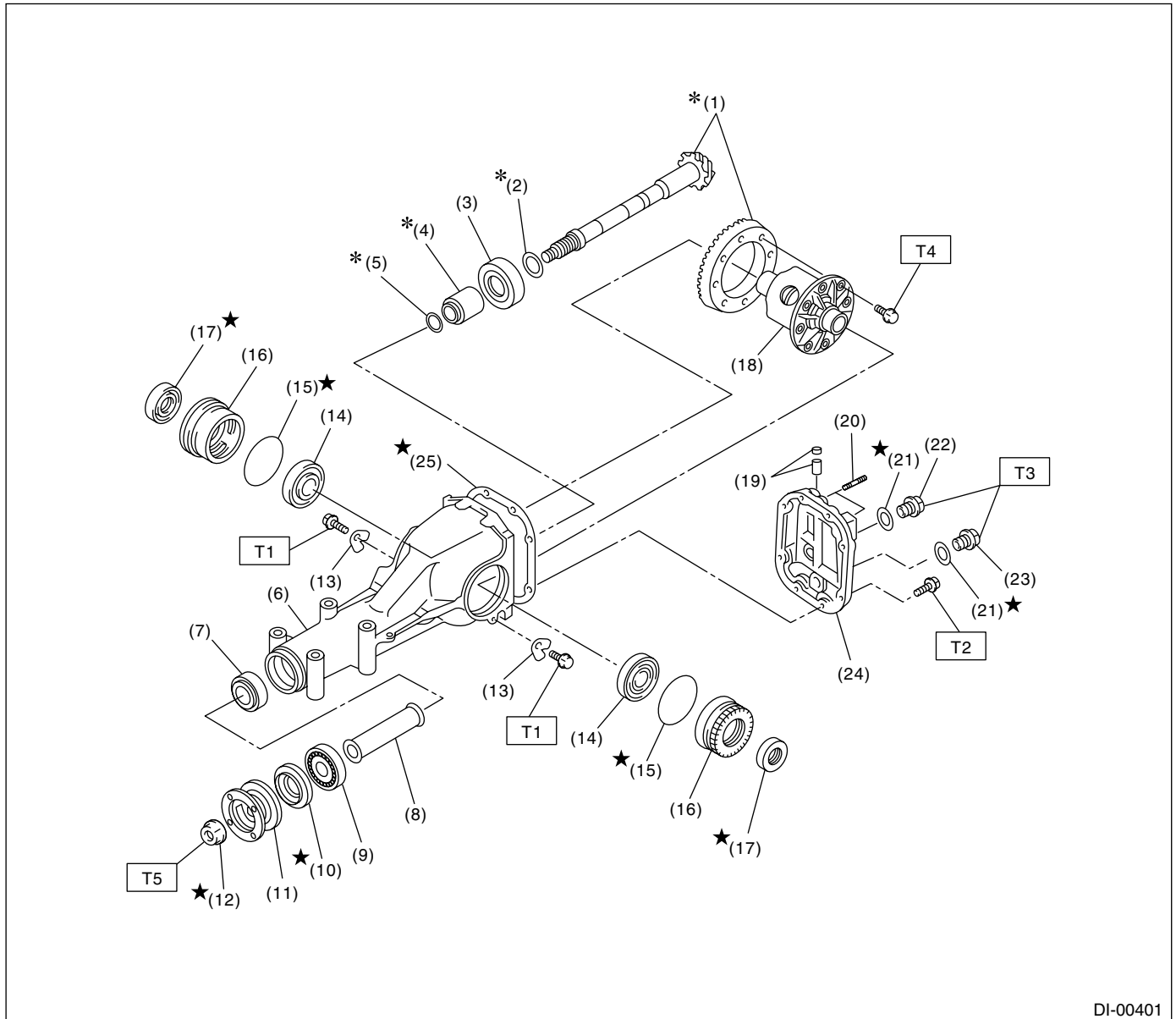
T1: 25 (2.5, 18.1)

T2: 34 (3.5, 25.3)

T3: 62 (6.3, 45.6)

T4: 191 (19.5, 141)

4. REAR DIFFERENTIAL FOR VA-TYPE WITH LSD



DI-00401

- | | |
|--|-----------------------------|
| (1) Pinion crown gear and drive pinion set | (11) Companion flange |
| (2) Pinion height adjusting shim | (12) Self-locking nut |
| (3) Rear bearing | (13) Lock plate |
| (4) Bearing preload adjusting spacer | (14) Side bearing |
| (5) Bearing preload adjusting washer | (15) O-ring |
| (6) Differential carrier | (16) Axle shaft holder |
| (7) Front bearing | (17) Side oil seal |
| (8) Collar | (18) Differential case ASSY |
| (9) Pilot bearing | (19) Air breather cap |
| (10) Front oil seal | (20) Stud bolt |
| | (21) Gasket |

- | |
|----------------------|
| (22) Oil filler plug |
| (23) Oil drain plug |
| (24) Rear cover |
| (25) Gasket |

Tightening torque: N·m (kgf-m, ft-lb)

T1: 25 (2.5, 18.1)

T2: 25 (2.5, 18.1)

T3: 34 (3.5, 25.3)

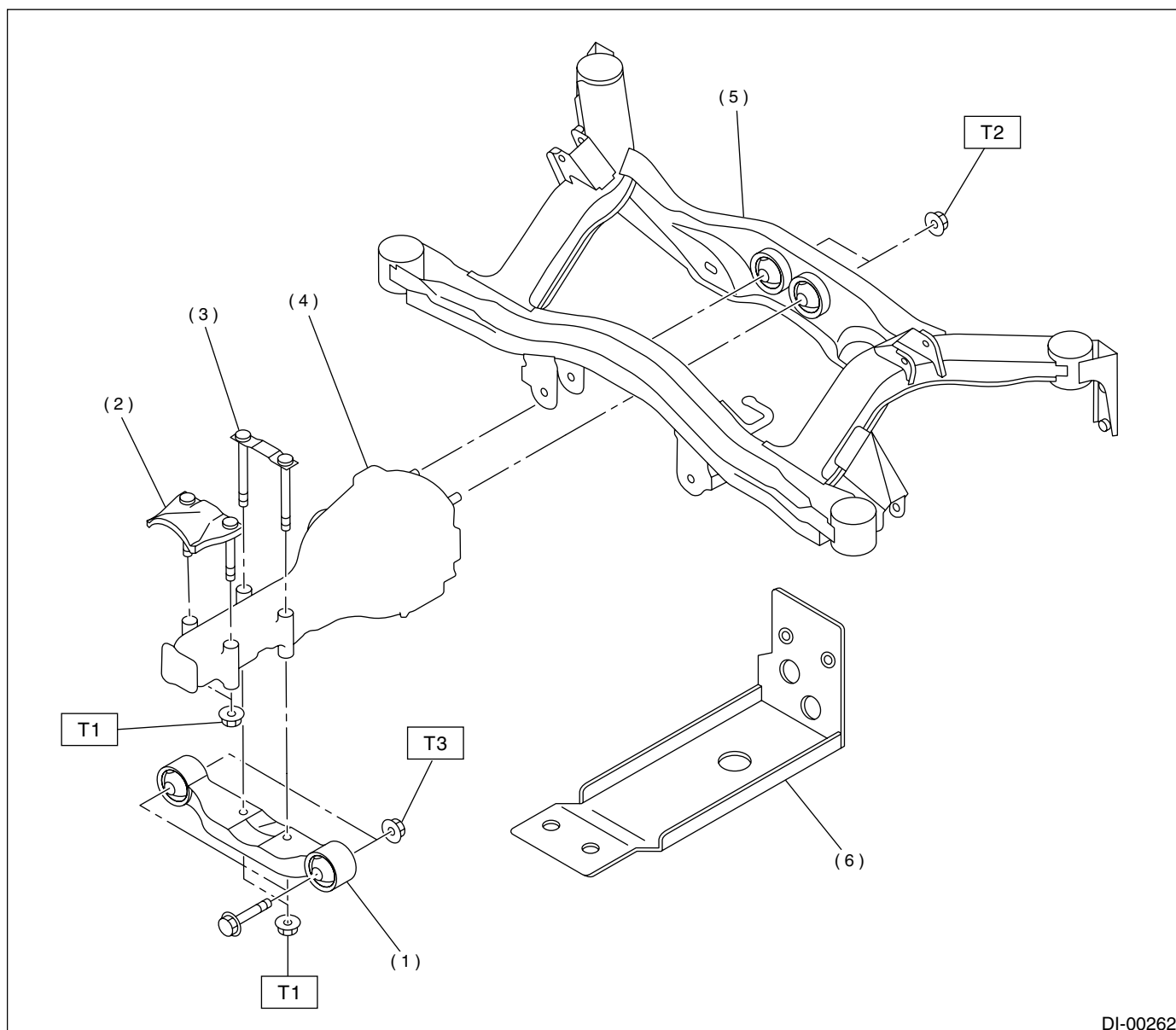
T4: 62 (6.3, 45.6)

T5: 191 (19.5, 141)

GENERAL DESCRIPTION

DIFFERENTIALS

5. REAR DIFFERENTIAL MOUNTING SYSTEM



DI-00262

- (1) Rear differential front member
- (2) Protector
- (3) Rear differential member plate
- (4) Rear differential ASSY

- (5) Sub frame
- (6) Rear differential protector (if equipped)

Tightening torque: N·m (kgf-m, ft-lb)

T1: 65 (6.6, 48)

T2: 70 (7.1, 51)

T3: 110 (11.2, 81)

GENERAL DESCRIPTION

DIFFERENTIALS

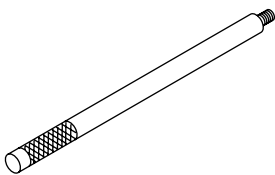
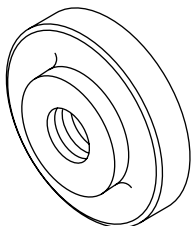
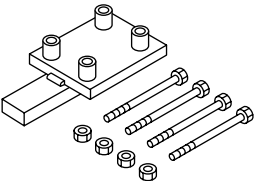
C: CAUTION

- Wear working clothing, including a cap, protective goggles, and protective shoes during operation.
- Remove contamination including dirt and corrosion before removal, installation or disassembly.
- Keep the disassembled parts in order and protect them from dust or dirt.
- Before removal, installation or disassembly, be sure to clarify the failure. Avoid unnecessary removal, installation, disassembly, and replacement.
- Be careful not to burn your hands, because each part on the vehicle is hot after running.

- Use SUBARU genuine gear oil, grease etc. or the equivalent. Do not mix gear oil, grease etc. with that of another grade or from other manufacturers.
- Be sure to tighten fasteners including bolts and nuts to the specified torque.
- Place shop jacks or safety stands at the specified points.
- Apply gear oil onto sliding or revolution surfaces before installation.
- Before installing O-rings or snap rings, apply sufficient amount of gear oil to avoid damage and deformation.
- Before securing a part on a vise, place cushioning material such as wood blocks, aluminum plate, or shop cloth between the part and the vise.
- Avoid damaging the mating face of the case.

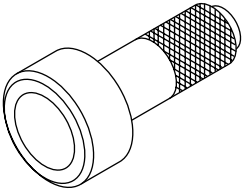
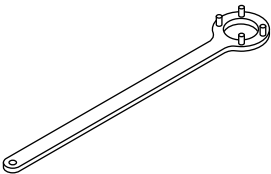
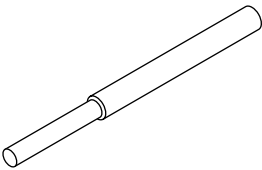
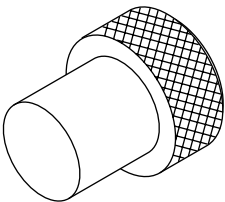
D: PREPARATION TOOL

1. SPECIAL TOOLS

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-398477701	398477701	HANDLE	Used for installing front and rear bearing cone.
 ST-398477702	398477702	DRIFT	Used press-fitting the bearing cone of differential carrier (front).
 ST-398217700	398217700	ATTACHMENT SET	Stand for rear differential carrier disassembly and assembly.

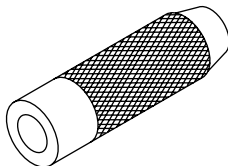
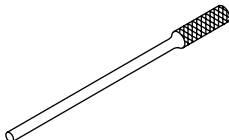
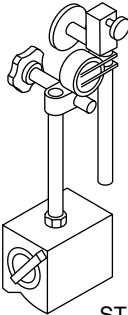
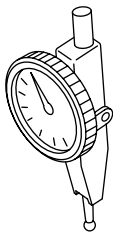
GENERAL DESCRIPTION

DIFFERENTIALS

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-498447120	498447120	INSTALLER	Used for installing front oil seal.
 ST-498427200	498427200	FLANGE WRENCH	Used for stopping rotation of companion flange when loosening and tightening self-lock nut.
 ST-398467700	398467700	DRIFT	Used for removing pinion, pilot bearing and front bearing cone.
 ST-399780104	399780104	WEIGHT	Used for installing front bearing cone, pilot bearing companion flange.

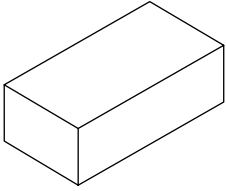
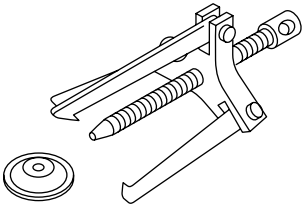
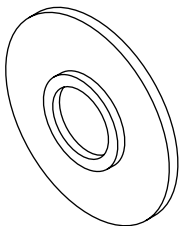
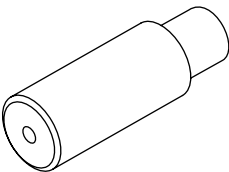
GENERAL DESCRIPTION

DIFFERENTIALS

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-899580100	899580100	INSTALLER	Used for press-fitting the front bearing cone, pilot bearing.
 ST-899904100	899904100	STRAIGHT PIN REMOVER	Used for driving out differential pinion shaft lock pin.
 ST-498247001	498247001	MAGNET BASE	• Used for measuring backlash between side gear and pinion, and hypoid gear. • Used with DIAL GAUGE (498247100).
 ST-498247100	498247100	DIAL GAUGE	• Used measuring backlash between side gear and pinion, hypoid gear. • Used with MAGNET BASE (498247001).

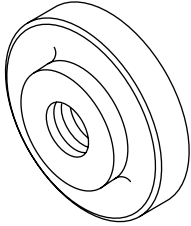
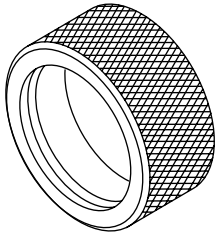
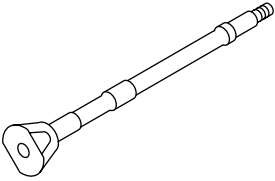
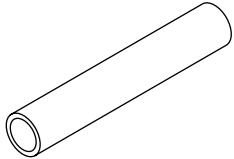
GENERAL DESCRIPTION

DIFFERENTIALS

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-398507704	398507704	BLOCK	Used for adjusting pinion height and preload.
 ST-399703600	399703600	PULLER ASSY	Use for removing companion flange.
 ST-398177700	398177700	INSTALLER	• Used for installing rear bearing cone. • For T-type.
 ST-398457700	398457700	ATTACHMENT	• Used for removing side bearing retainer. • For T-type.

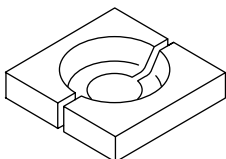
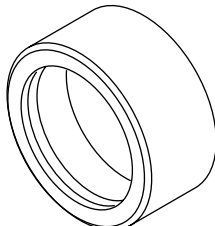
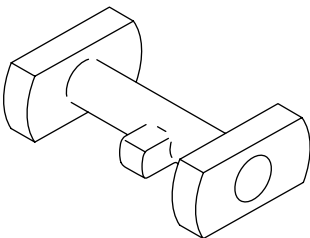
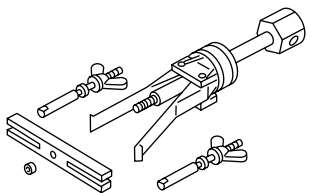
GENERAL DESCRIPTION

DIFFERENTIALS

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-398477703	398477703	DRIFT 2	- Used for press-fitting the bearing race (rear) of differential carrier. - For T-type.
 ST-398437700	398437700	DRIFT	- Used for installing side oil seal. - For T-type.
 ST-398507702	398507702	DUMMY SHAFT	- Used for adjusting pinion height and preload. - For T-type.
 ST-398507703	398507703	DUMMY COLLAR	- Used for adjusting pinion height and preload. - For T-type.

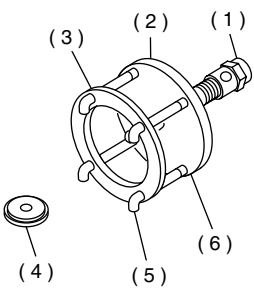
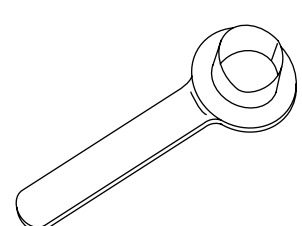
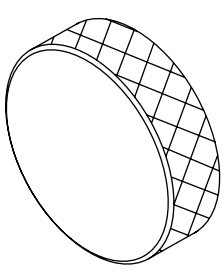
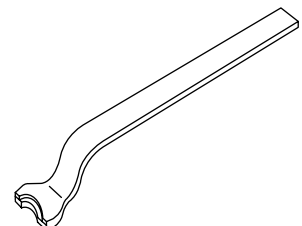
GENERAL DESCRIPTION

DIFFERENTIALS

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-398517700	398517700	REPLACER	- Used for removing rear bearing cone. - For T-type.
 ST-398487700	398487700	DRIFT	- Used for press-fitting the side bearing cone. - For T-type.
 ST-398507701	398507701	GAUGE	- Used for adjusting pinion height. - For T-type.
 ST-398527700	398527700	PULLER ASSY	- Used for removing oil seal and side bearing cup. - For T-type.

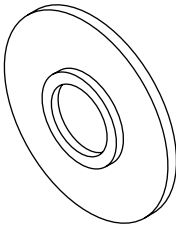
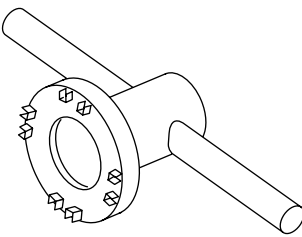
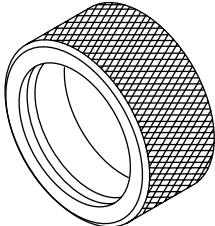
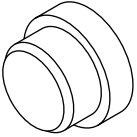
GENERAL DESCRIPTION

DIFFERENTIALS

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-399527700	399527700	PULLER SET	- Used for extracting side bearing cone. (1) BOLT (899521412) (2) PULLER (399527702) (3) HOLDER (399527703) (4) ADAPTER (398497701) (5) BOLT (899520107) (6) NUT (021008000) - For T-type.
 ST28099PA090	28099PA090	OIL SEAL PRO-TECTOR	- Used for installing rear drive shaft into rear differential. - For protecting oil seal.
 ST-398237700	398237700	GAUGE	- Used for installing side bearing. - For T-type.
 ST28099PA100	28099PA100	DRIVE SHAFT REMOVER	- Used for removing rear drive shaft from rear differential. - For T-type.

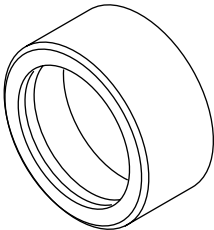
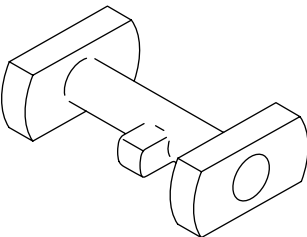
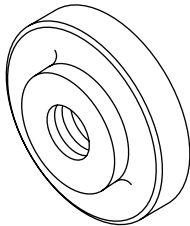
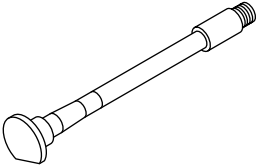
GENERAL DESCRIPTION

DIFFERENTIALS

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-498175500	498175500	INSTALLER	- Used for installing rear bearing cone. - For VA-type.
 ST-499785500	499785500	WRENCH ASSY	- Used for removing and installing side oil seal holder. - For VA-type.
 ST-498447100	498447100	INSTALLER	- Used for installing oil seal. - For VA-type.
 ST-399520105	399520105	SEAT	- Used for removing side bearing cone. - Used with PULLER SET (899524100). - For VA-type.

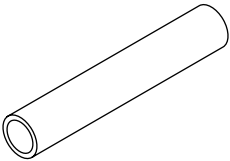
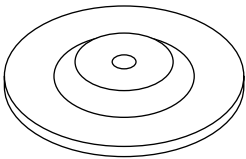
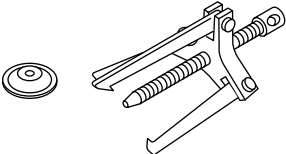
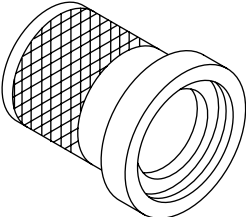
GENERAL DESCRIPTION

DIFFERENTIALS

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-498485400	498485400	DRIFT	- Used for installing side bearing cone. - For VA-type.
 ST-498505501	498505501	GAUGE	- Used for adjusting pinion height. - For VA-type.
 ST-498447110	498447110	BEARING OUTER RACE DRIFT	- Used for press-fitting the bearing race (front) of differential carrier. - For VA-type.
 ST-498447150	498447150	DUMMY SHAFT	- Used for adjusting pinion height and pre-load. - For VA-type.

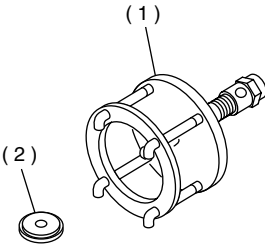
GENERAL DESCRIPTION

DIFFERENTIALS

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST32285AA000	32285AA000	DUMMY COLLAR	- Used for adjusting pinion height and pre-load. - For VA-type.
 ST-499705404	499705404	SEAT	- Used for removing side bearing race. - Used with PULLER ASSY (499705401). - For VA-type.
 ST-499705401	499705401	PULLER ASSY	- Used for removing side bearing race. - Used with SEAT (499705404). - For VA-type.
 ST-899874100	899874100	INSTALLER	- Used for installing companion flange. - For VA-type.

GENERAL DESCRIPTION

DIFFERENTIALS

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-899524100	899524100	DIFFERENTIAL BEARING PULLER SET	- Used for removing side bearing cone of differential. - For VA-type. (1) Puller (2) Cap

2. GENERAL PURPOSE TOOLS

TOOL NAME	REMARKS
Transmission Jack	Used for assembly/disassembly of rear differential.
Puller	Used for removal of side bearing retainer. (T-type)
Thickness Gauge	Used for measuring clearance.
Tire Lever	Used for removal of rear drive shaft. (VA-type)

GENERAL DIAGNOSTIC TABLE

DIFFERENTIALS

8. General Diagnostic Table

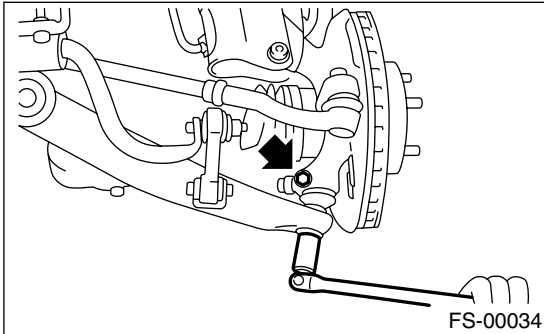
A: INSPECTION

Symptom or trouble	Possible cause	Remedy
1. Oil leakage	Worn, scratched, or incorrectly seated front or side oil seal. Scored, battered, or excessively worn sliding surface of companion flange.	Repair or replace.
	Clogged or damaged air breather.	Clean, repair or replace.
	Loose bolts on side retainer, or incorrectly fitted O-ring.	Tighten bolts to specified torque. Replace O-ring.
	Loose rear cover attaching bolts or damaged gasket.	Tighten bolts to specified torque. Replace gasket and apply liquid packing.
	Loose oil filler or drain plug.	Retighten and apply liquid packing.
	Wear, damage or incorrectly fitting for side retainer and 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.	Insufficient backlash for hypoid gear.	Readjust or replace.
	Excessive preload for side, rear, or front bearing.	Readjust or replace.
	Insufficient or improper oil used.	Replace seized part and fill with specified oil to 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.	Improper backlash for hypoid gear.	Replace.
	Insufficient or excessive preload for side, rear, or front bearing.	Readjust or replace.
	Excessive backlash for differential gear.	Replace gear or thrust washer.
	Loose bolts and nuts such as crown gear bolt.	Retighten.
	Damage due to overloading.	Replace.
4. Noises when starting or shifting gears NOTE: Noises may be caused by differential assembly, universal joint, wheel bearing, etc. Find out what is actually making noise before disassembly.	Excessive backlash for hypoid gear.	Readjust.
	Excessive backlash for differential gear.	Replace gear or thrust washer.
	Insufficient preload for front or rear bearing.	Readjust.
	Loose drive pinion nut.	Tighten to specified torque.
	Loose bolts and nuts such as side bearing retainer attaching bolt.	Tighten to specified torque.
5. Noises when cornering	Damaged differential gear.	Replace.
	Excessive wear or damage of thrust washer.	Replace.
	Broken pinion mate shaft.	Replace.
	Seized or damaged side bearing.	Replace.
6. Gear noises NOTE: Since noises from engine, muffler, transmission, propeller shaft, wheel bearings, tires, and body are sometimes mistaken for noises from differential assembly, be careful in checking them. Inspection methods to locate noises include coasting, accelerating, cruising, and jacking-up all four wheels. Perform these inspections according to condition of trouble. When listening to noises, shift gears into four wheel drive and fourth speed position, trying to pick up only differential noise.	Improper tooth contact of hypoid gear.	Readjust or replace hypoid gear set.
	Improper backlash for hypoid gear.	Readjust.
	Scored or chipped teeth of hypoid gear.	Replace hypoid gear set.
	Seized hypoid gear.	Replace hypoid gear set.
	Improper preload for front or rear bearings.	Readjust.
	Seized, scored, or chipped front or rear bearing.	Replace.
	Seized, scored, or chipped side bearing.	Replace.
	Vibrating differential carrier.	Replace.

4. Front Ball Joint

A: REMOVAL

- 1) Set vehicle on a lift.
- 2) Disconnect ground cable from battery.
- 3) Lift-up the vehicle and remove the wheel.
- 4) Pull out the cotter pin from the ball stud, remove the castle nut, and extract the ball stud from the transverse link.
- 5) Remove the bolt securing the ball joint to the housing.



- 6) Extract the ball joint from the housing.

B: INSTALLATION

- 1) Install ball joint onto housing.

Tightening torque (Bolt):

50 N·m (5.1 kgf-m, 37 ft-lb)

CAUTION:

Do not apply grease to tapered portion of ball stud.

- 2) Connect ball joint to transverse link.

Tightening torque (Castle nut):

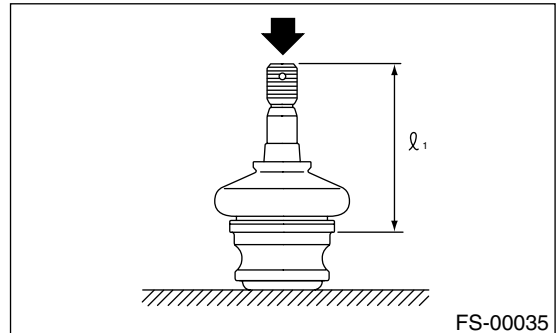
39 N·m (4.0 kgf-m, 29 ft-lb)

- 3) Retighten castle nut further within 60° until a slot in castle nut is aligned with the hole in ball stud end, then insert new cotter pin and bend it around castle nut.
- 4) Install front wheel.

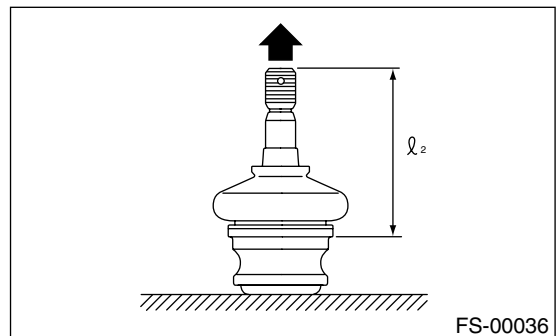
C: INSPECTION

- 1) Measure free play of ball joint by the following procedures. Replace with a new one when the free play exceeds the specified value.

- (1) With 686 N (70 kgf, 154 lb) loaded in the direction shown in the figure, measure dimension ℓ_1 .



- (2) With 686 N (70 kgf, 154 lb) loaded in the opposite direction shown in the figure, measure dimension ℓ_2 .



- (3) Calculate free play from the following formula. $S = \ell_2 - \ell_1$

- (4) When free play is larger than the following value, replace with a new one.

FRONT BALL JOINT

Standard for replacement: S

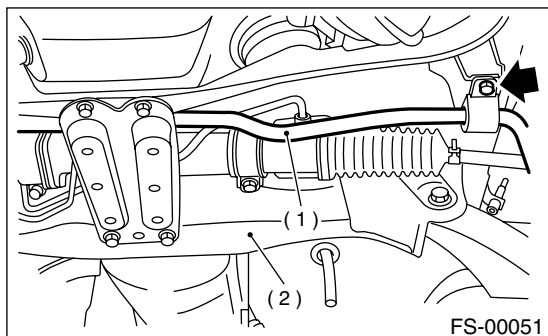
Less than 0.3 mm (0.012 in)

- 2) When free play is smaller than the specified value, visually inspect the dust cover.
- 3) The ball joint and cover that have been removed must be checked for wear, damage or cracks, and any defective part must be replaced.
- 4) If the dust cover is damaged, replace with the new ball joint.

7. Front Crossmember

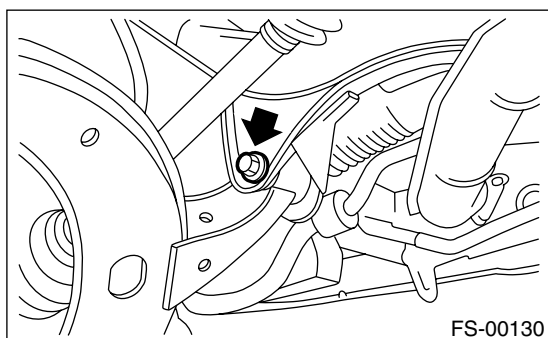
A: REMOVAL

- 1) Set vehicle on a lift.
- 2) Disconnect ground cable from battery.
- 3) Lift-up vehicle and remove front tires and wheels.
- 4) Remove both stabilizer and jack-up plate.

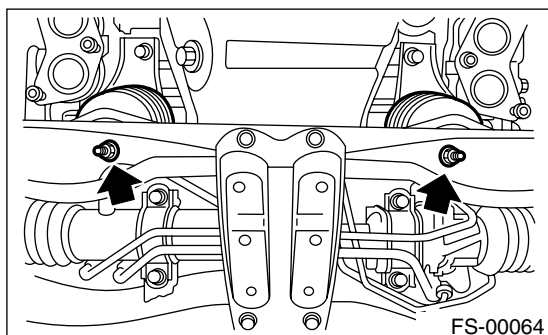


- (1) Front stabilizer
(2) Front crossmember

- 5) Disconnect tie-rod end from housing.
- 6) Remove front exhaust pipe.
- 7) Remove front transverse link from front crossmember and body.



- 8) Remove nuts attaching engine mount cushion rubber to crossmember.



- 9) Remove steering universal joint. <Ref. to PS-19, REMOVAL, Universal Joint.>
- 10) Disconnect power steering hose from steering gear box.

11) Lift engine by approx. 10 mm (0.39 in) by using chain block.

12) Support crossmember with a jack, remove nuts securing crossmember to body and gradually lower crossmember along with steering gearbox.

CAUTION:

When removing crossmember downward, be careful that tie-rod end does not interfere with SFJ boot.

B: INSTALLATION

- 1) Install in the reverse order of removal.

CAUTION:

Always tighten rubber bushing when wheels are in full contact with the ground and vehicle is at curb weight.

Tightening torque:

Transverse link bushing to crossmember:

95 N·m (9.7 kgf-m, 71 ft-lb)

Stabilizer to bushing:

25 N·m (2.5 kgf-m, 18.1 ft-lb)

Tie-rod end to housing:

27.0 N·m (2.75 kgf-m, 19.9 ft-lb)

Front cushion rubber to crossmember:

75 N·m (7.6 kgf-m, 55 ft-lb)

Universal joint to pinion shaft:

24 N·m (2.4 kgf-m, 17.4 ft-lb)

Crossmember to body:

95 N·m (9.7 kgf-m, 71 ft-lb)

Gearbox to steering hose:

15 N·m (1.5 kgf-m, 10.8 ft-lb)

- 2) Purge air from power steering system.

NOTE:

Check wheel alignment and adjust if necessary.

C: INSPECTION

Check crossmember for wear, damage and cracks, and correct or replace if defective.

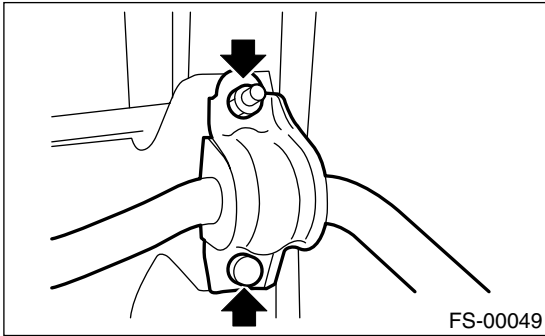
FRONT STABILIZER

FRONT SUSPENSION

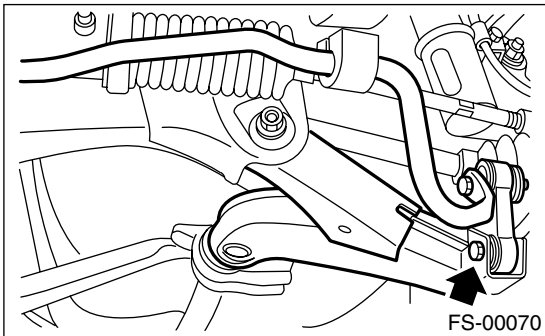
6. Front Stabilizer

A: REMOVAL

- 1) Jack-up the front part of the vehicle and support it with safety stand (rigid racks).
- 2) Remove jack-up plate from lower part of cross-member.
- 3) Remove bolts which secure stabilizer to cross-member.



- 4) Remove bolts which secure stabilizer link to front transverse link.



B: INSTALLATION

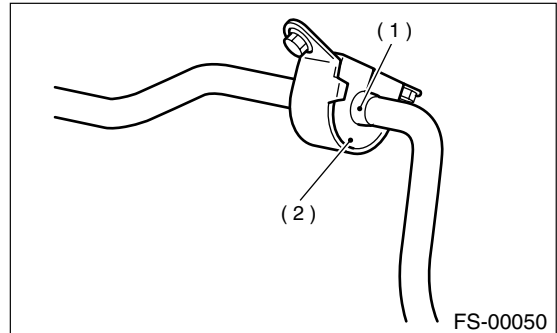
CAUTION:

When self-locking nut is removed, replace with a new one.

- 1) Install in the reverse order of removal.

NOTE:

- Install bushing (on front crossmember side) while aligning it with paint mark on stabilizer.
- Ensure that bushing and stabilizer have the same identification colors when installing.



- (1) Mark stamped on stabilizer
- (2) Bushing identification color

- 2) Always tighten rubber bushing location when wheels are in full contact with the ground and vehicle is at curb weight.

Tightening torque:

Jack-up plate to crossmember:

20 N·m (2.0 kgf-m, 14 ft-lb)

Stabilizer link to front transverse link:

30 N·m (3.1 kgf-m, 22 ft-lb)

Stabilizer to crossmember:

25 N·m (2.5 kgf-m, 18.1 ft-lb)

C: INSPECTION

- 1) Check bushing for cracks, fatigue or damage.
- 2) Check stabilizer link for deformities, cracks, or damage, and bushing for protrusions from the hole of stabilizer link.

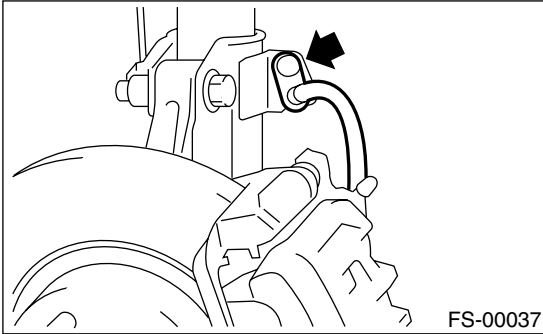
FRONT STRUT

FRONT SUSPENSION

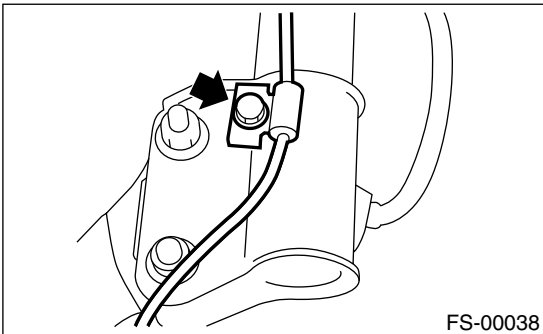
5. Front Strut

A: REMOVAL

- 1) Set vehicle on a lift.
- 2) Disconnect ground cable from battery.
- 3) Lift-up the vehicle and remove the wheel.
- 4) Remove bolt securing brake hose to strut.



- 5) Scribe an alignment mark on the camber adjusting bolt which secures strut to housing.
- 6) Remove bolt securing the ABS sensor harness.

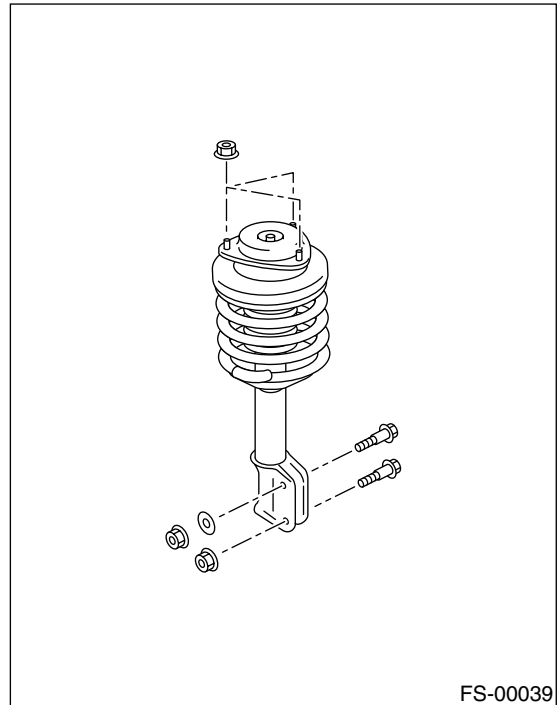


- 7) Remove two bolts securing housing to strut.

CAUTION:

While holding head of adjusting bolt, loosen self-locking nut.

- 8) Remove the three nuts securing strut mount to body.



B: INSTALLATION

- 1) Install strut mount at upper side of strut to body and tighten with nuts.

Tightening torque:

20 N·m (2.0 kgf-m, 14.5 ft-lb)

- 2) Position aligning mark on camber adjustment bolt with aligning mark on lower side of strut.

CAUTION:

- While holding head of adjusting bolt, tighten self-locking nut.
- When self-locking nut is removed, replace with a new one.

Tightening torque:

152 N·m (16 kgf-m, 112 ft-lb)

- 3) Install ABS sensor harness to strut.

Tightening torque:

32 N·m (3.3 kgf-m, 23.9 ft-lb)

- 4) Install bolts which secure brake hose to strut.

Tightening torque:

32 N·m (3.3 kgf-m, 23.9 ft-lb)

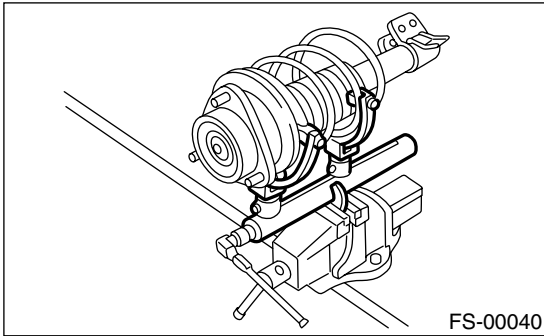
- 5) Install wheels.

NOTE:

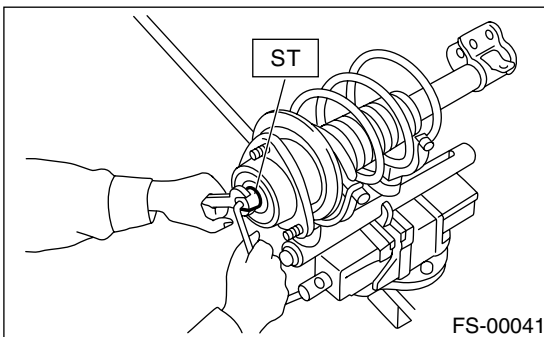
Check wheel alignment and adjust if necessary.

C: DISASSEMBLY

- 1) Using a coil spring compressor, compress coil spring.



- 2) Using ST, remove self-locking nut.
ST 927760000 STRUT MOUNT SOCKET



- 3) Remove strut mount, upper spring seat and rubber seat from strut.
- 4) Gradually decreasing compression force, and remove coil spring.
- 5) Remove dust cover and helper spring.

D: ASSEMBLY

- 1) Before installing coil spring, strut mount, etc., on the strut, check for the presence of air in the dampening force generating mechanism of the strut since air prevents proper dampening force from being produced.
- 2) Checking for the presence of air
 - (1) Place the strut vertically with the piston rod facing up.
 - (2) Move the piston rod to the center of its entire stroke.
 - (3) While holding the piston rod end with fingertips, move the rod up and down.
 - (4) If the piston rod moves at least 10 mm (0.39 in) in the former step, purge air from the strut.
- 3) Air purging procedure
 - (1) Place the strut vertically with the piston rod facing up.
 - (2) Fully extend the piston rod.
 - (3) With the piston rod fully extended, place the piston rod side down. The strut must stand vertically.

- (4) Fully contract the piston rod.
- (5) Repeat 3 or 4 times from the first step.

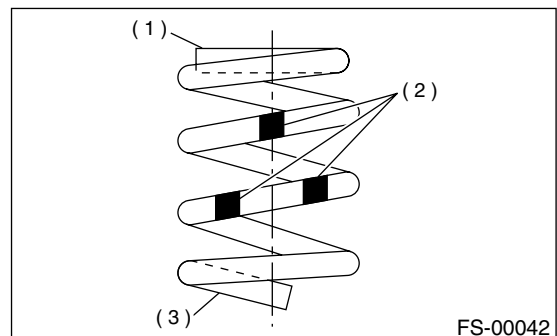
NOTE:

After completely purging air from the strut, be sure to place the strut with the piston rod facing up. If it is laid down, check for entry of air in the strut as outlined under "Checking for the presence of air".

- 4) Using a coil spring compressor, compress the coil spring.

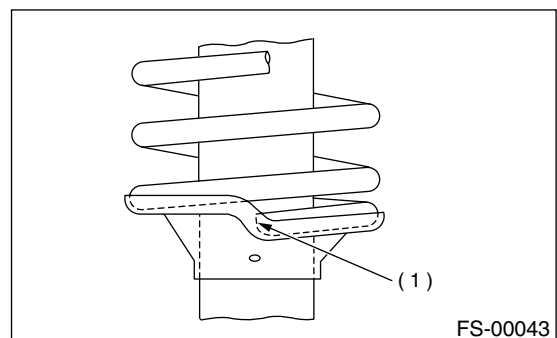
NOTE:

Make sure that the vertical installing direction of coil spring is as shown in figure.



- (1) Flat (top side)
- (2) Identification paint
- (3) Inclined (bottom side)

- 5) Set the coil spring correctly so that its end face (1) fits well into the spring seat as shown in the figure.



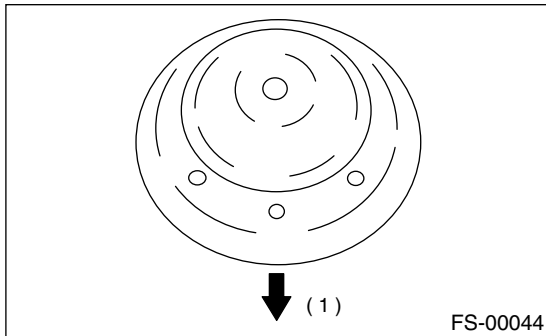
- 6) Install helper and dust cover to the piston rod.
- 7) Pull the piston rod fully upward, and install rubber seat and upper spring seat.

FRONT STRUT

FRONT SUSPENSION

NOTE:

Ensure that upper spring seat is positioned as shown in figure.



(1) Outside of body

8) Install strut mount to the piston rod, and tighten the self-locking nut temporarily.

CAUTION:

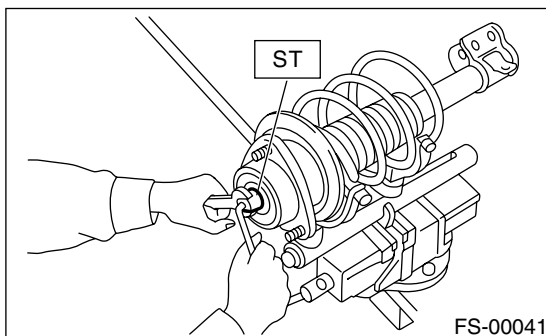
Be sure to use a new self-locking nut.

9) Using hexagon wrench to prevent strut rod from turning, tighten self-locking nut with ST.

ST 927760000 STRUT MOUNT SOCKET

Tightening torque:

55 N·m (5.6 kgf-m, 41 ft-lb)



10) Loosen the coil spring carefully.

E: INSPECTION

Check the disassembled parts for cracks, damage and wear, and replace with new parts if defective.

1. DAMPER STRUT

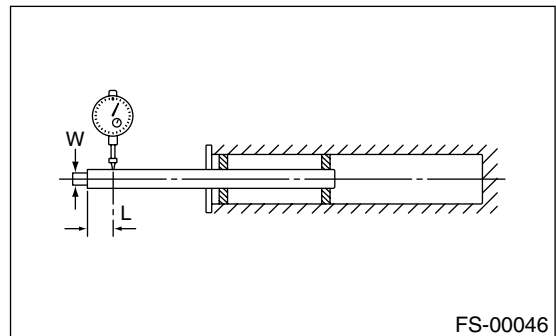
1) Check for oil leakage.

2) Move the piston rod up and down to check it operates smoothly without any binding.

3) Play of piston rod

- Measure the play as follows:

Fix outer shell and fully extend the rod. Set a dial gauge at the end of the rod: L [10 mm (0.39 in)], then apply a force of W [20 N (2 kgf, 4 lb)] to threaded portion. With the force of 20 N (2 kgf, 4 lb) applied, read dial gauge indication: P₁. Apply a force of 20 N (2 kgf, 4 lb) in the opposite direction of "W", then read dial gauge indication: P₂.



The free play is determined by the following equation:

$$\text{Play} = P_1, P_2$$

Standard of play:

Less than 0.8 mm (0.031 in)

If the play is greater than the standard, replace the strut.

2. STRUT MOUNT

Check rubber part for creep, cracks and deterioration, and replace it with new one if defective.

3. DUST COVER

If any cracks or damage are found, replace it with a new one.

4. COIL SPRING

One having permanent strain should be replaced with a new one. When vehicle posture is uneven, although there are no considerable reasons like tire puncture, uneven loading, etc., check coil spring for its free length referring to specifications, cracks, etc., and replace it with a new one if defective.

5. HELPER

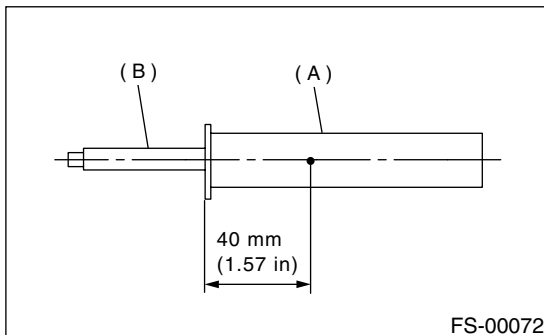
Replace it with new one if cracked or damaged.

F: DISPOSAL

CAUTION:

- Do not disassemble the strut damper or place it into a fire.
- Drill a hole before disposal of strut.
- Before handling gas filled struts, be sure to wear goggles to protect eyes from gas, oil and/or filings.

- 1) Place the gas filled strut (A) on a flat and level surface with piston rod (B) fully extended.
- 2) Using a 2 to 3 mm (0.08 to 0.12 in) dia. drill, make a hole in area shown in the figure.



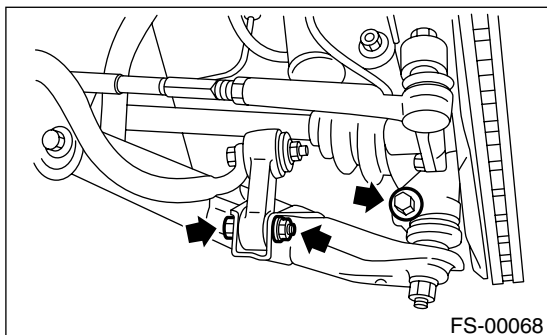
FRONT TRANSVERSE LINK

FRONT SUSPENSION

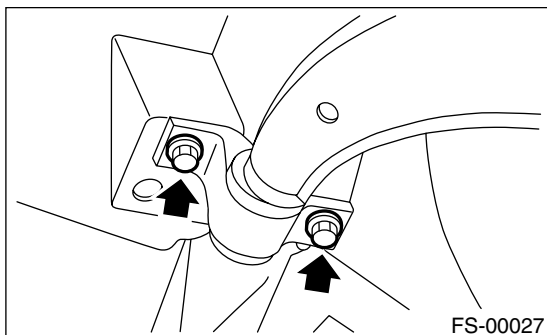
3. Front Transverse Link

A: REMOVAL

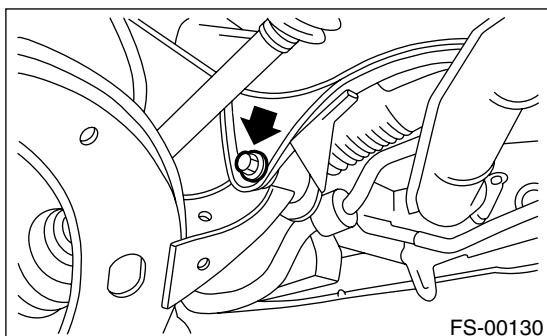
- 1) Set vehicle on a lift.
- 2) Disconnect ground cable from battery.
- 3) Lift-up the vehicle and remove the wheel.
- 4) Disconnect stabilizer link from transverse link.
- 5) Remove bolt securing ball joint of transverse link to housing.



- 6) Remove nut (do not remove bolt.) securing transverse link to crossmember.
- 7) Remove two bolts securing bushing bracket of transverse link to vehicle body at rear bushing location.



- 8) Extract ball joint from housing.
- 9) Remove bolt securing transverse link to crossmember and extract transverse link from crossmember.



B: INSTALLATION

- 1) Temporarily tighten the two bolts used to secure rear bushing of the transverse link to body.

NOTE:

These bolts should be tightened to such an extent that they can still move back and forth in the oblong shaped hole in the bracket (which holds the bushing).

- 2) Install bolts used to connect transverse link to crossmember and temporarily tighten with nut.

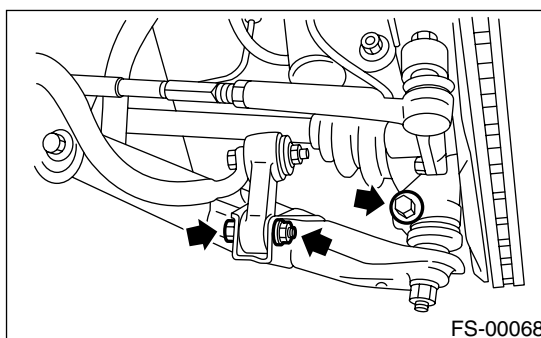
CAUTION:

When self-locking nut is removed, replace with a new one.

- 3) Insert ball joint into housing.
- 4) Connect stabilizer link to transverse link, and temporarily tighten bolts.

CAUTION:

When self-locking nut is removed, replace with a new one.



5) Tighten the following points in the order shown below when wheels are in full contact with the ground and vehicle is at curb weight.

- (1) Transverse link and stabilizer

Tightening torque:

30 N·m (3.1 kgf-m, 22 ft-lb)

- (2) Transverse link and crossmember

Tightening torque:

95 N·m (9.7 kgf-m, 71 ft-lb)

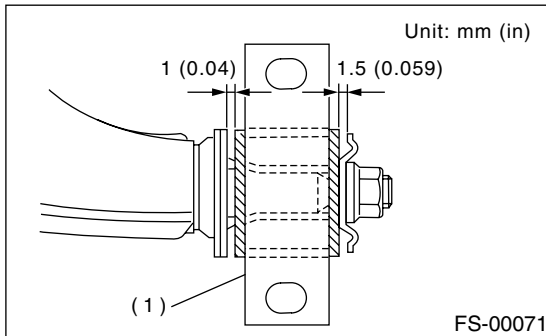
- (3) Transverse link rear bushing and body

Tightening torque:

245 N·m (25 kgf-m, 181 ft-lb)

NOTE:

- Move rear bushing back and forth until transverse link-to-rear bushing clearance is established (as indicated in figure.) before tightening.
- Check wheel alignment and adjust if necessary.



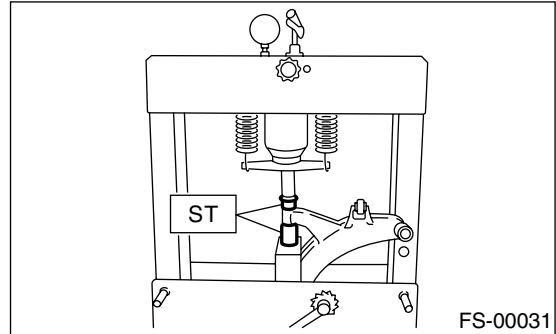
(1) Rear bushing

C: DISASSEMBLY

1. FRONT BUSHING

Using ST, press front bushing out of place.

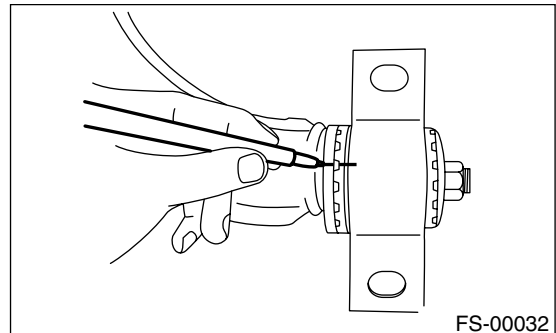
ST 927680000 INSTALLER & REMOVER SET



2. REAR BUSHING

1) Scribe an aligning mark on transverse link and rear bushing.

2) Loosen nut and remove rear bushing.



FRONT TRANSVERSE LINK

FRONT SUSPENSION

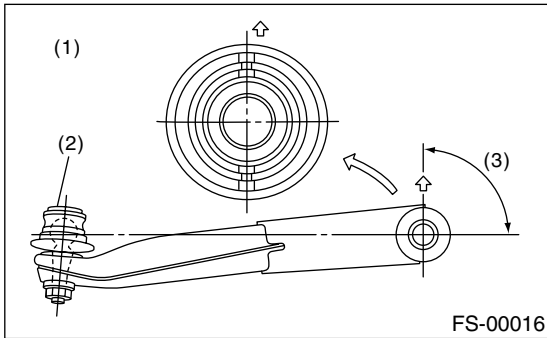
D: ASSEMBLY

1. FRONT BUSHING

To reassemble, reverse disassembly procedures.

CAUTION:

Install front bushing in correct direction, as shown in figure.



- (1) Face bushing toward center of ball joint
- (2) Ball joint

2. REAR BUSHING

- 1) Install rear bushing to transverse link and align aligning marks scribed on the two.
- 2) Tighten self-locking nut.

CAUTION:

- When self-locking nut is removed, replace with a new one.
- While holding rear bushing so as not to change position of aligning marks, tighten self-locking nut.

Tightening torque:

186 N·m (19.0 kgf-m, 137 ft-lb)

E: INSPECTION

- 1) Check transverse link for wear, damage and cracks, and correct or replace if defective.
- 2) Check bushings for cracks, fatigue or damage.
- 3) Check rear bushing for oil leaks.

GENERAL DESCRIPTION

FRONT SUSPENSION

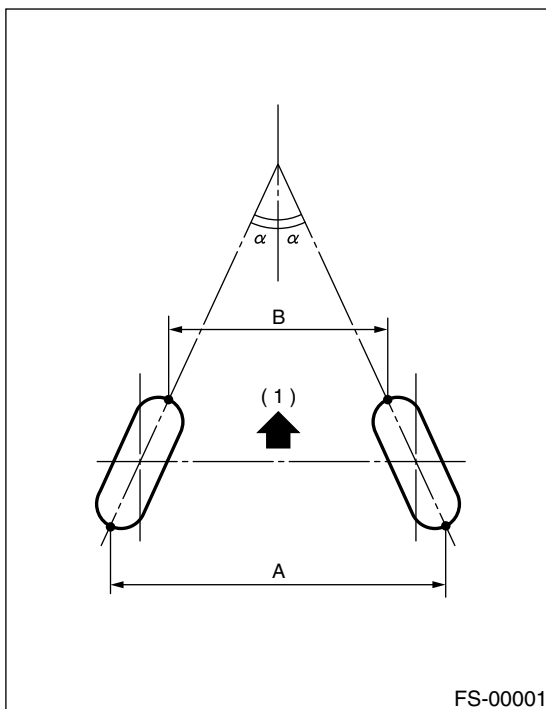
1. General Description

A: SPECIFICATIONS

	Model	Sedan	Wagon	OUTBACK	PICKUP
Front	Camber (Tolerance: $\pm 0^{\circ}45'$ Adjustment standard: $\pm 0^{\circ}30'$)	$-0^{\circ}05'$	$-0^{\circ}05'$	$0^{\circ}20'$	$0^{\circ}40'$
	Caster	$3^{\circ}05'$	$2^{\circ}50'$	$2^{\circ}40'$	$2^{\circ}45'$
	Toe-in	Tolerance: 0 ± 3 mm (0 ± 0.12 in), Toe angle (The sum of both wheels): $\pm 0^{\circ}15'$ Tolerance: 0 ± 2 mm (0 ± 0.08 in), Toe angle (The sum of both wheels): $\pm 0^{\circ}10'$			
	Kingpin angle	$14^{\circ}15'$	$14^{\circ}15'$	$13^{\circ}30'$	$13^{\circ}00'$
	Wheel arch height [Tolerance: $+12/-24$ mm ($+0.47/-0.94$ in)]	388 mm (15.28 in)	388 mm (15.28 in)	424 mm (16.69 in)	436 mm (17.17 in)
	Diameter of stabilizer	21 mm (0.83 in)			
Rear	Camber (Tolerance: $\pm 0^{\circ}45'$ Adjustment standard: $\pm 0^{\circ}30'$)	$-0^{\circ}30'$	$-0^{\circ}20'$	$0^{\circ}10'$	$0^{\circ}05'$
	Toe-in	Tolerance: 0 ± 3 mm (0 ± 0.12 in), Toe angle (The sum of both wheels): $\pm 0^{\circ}15'$ Tolerance: 0 ± 2 mm (0 ± 0.08 in), Toe angle (The sum of both wheels): $\pm 0^{\circ}10'$			
	Wheel arch height [Tolerance: $+12/-24$ mm ($+0.47/-0.94$ in)]	371 mm (14.61 in)	381 mm (15.00 in)	421 mm (16.57 in)	441 mm (17.36 in)
	Thrust angle	Tolerance: $\pm 0^{\circ}30'$, Adjustment standard: $\pm 0^{\circ}20'$			
	Diameter of stabilizer	16 mm (0.63 in)			

NOTE:

- Front and rear toe-in and front camber can be adjusted. If toe-in or camber exceeds tolerance, adjust toe-in and camber to the adjustment standard.
- The other items indicated in the specification table cannot be adjusted. If the other items exceed specifications, check suspension parts and connections for deformities; replace with new ones as required.

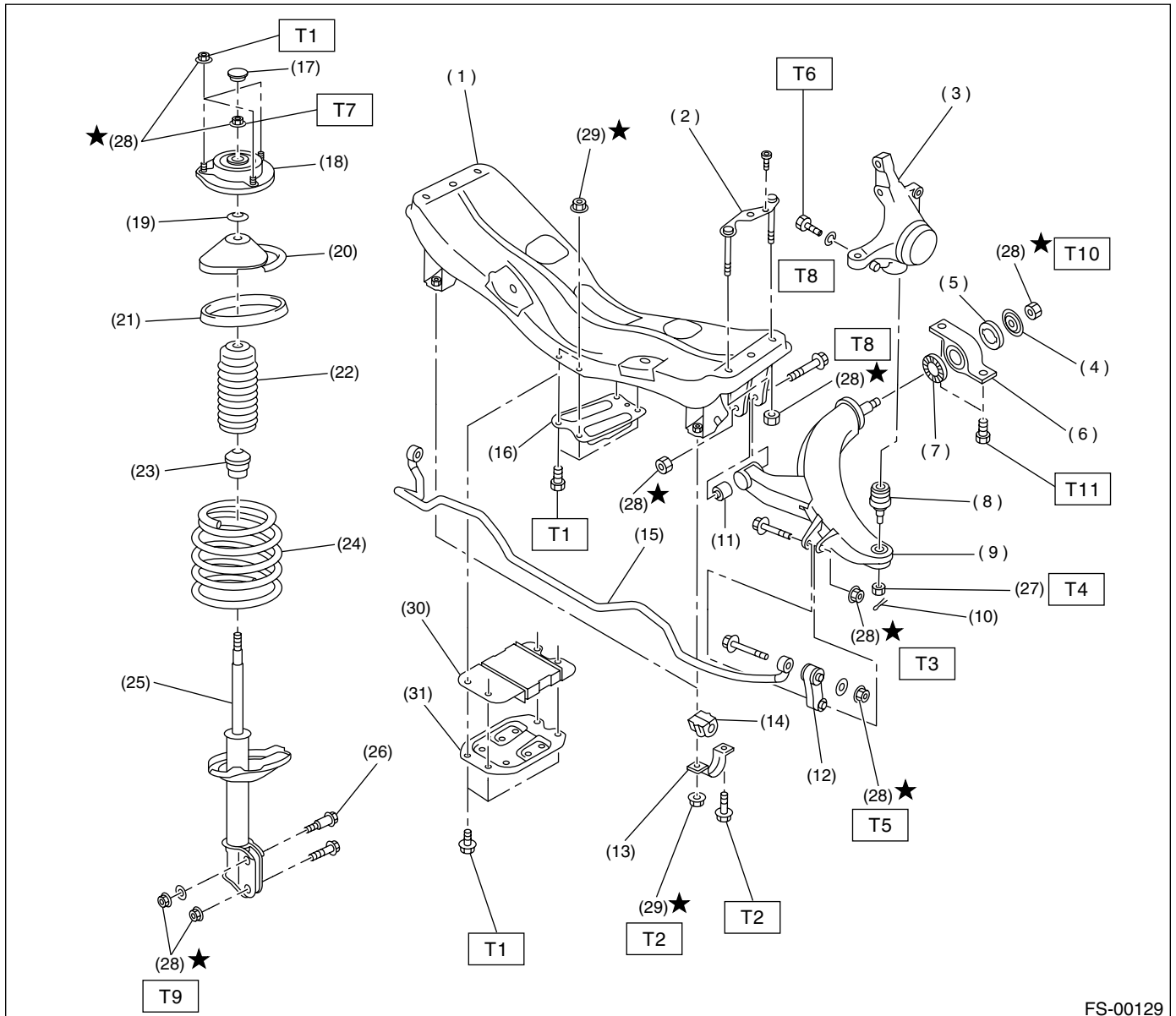


(1) Front

A – B = Positive: Toe-in, Negative: Toe-out

α = Each toe angle

B: COMPONENT



FS-00129

(1) Front crossmember	(17) Dust seal	(31) Dynamic plate (Non-TURBO, MT model)
(2) Bolt ASSY	(18) Strut mount	
(3) Housing	(19) Spacer	
(4) Washer	(20) Upper spring seat	<i>Tightening torque: N·m (kgf-m, ft-lb)</i>
(5) Stopper rubber (Rear)	(21) Rubber seat	<i>T1: 20 (2.0, 14.5)</i>
(6) Rear bushing	(22) Dust cover	<i>T2: 25 (2.5, 18.1)</i>
(7) Stopper rubber (Front)	(23) Helper	<i>T3: 30 (3.1, 22)</i>
(8) Ball joint	(24) Coil spring	<i>T4: 39 (4, 29)</i>
(9) Transverse link	(25) Damper strut	<i>T5: 45 (4.6, 33)</i>
(10) Cotter pin	(26) Adjusting bolt	<i>T6: 50 (5.1, 37)</i>
(11) Front bushing	(27) Castle nut	<i>T7: 54 (5.5, 39.8)</i>
(12) Stabilizer link	(28) Self-locking nut	<i>T8: 95 (9.7, 71)</i>
(13) Clamp	(29) Flange nut	<i>T9: 152 (16, 116)</i>
(14) Bushing	(30) Dynamic damper (Non-TURBO, MT model)	<i>T10: 186 (19.0, 137)</i>
(15) Stabilizer		<i>T11: 245 (25.0, 181)</i>
(16) Jack-up plate		

Tightening torque: N·m (kgf-m, ft-lb)

T1: 20 (2.0, 14.5)

T2: 25 (2.5, 18.1)

$T3: 30 (3.1, 22)$

T4: 39 (4, 29)

T5: 45 (4.6, 33)

T6: 50 (5.1, 37)

T7: 54 (5.5, 39.8)

T8: 95 (9.7, 71)

T9: 152 (16, 116)

T10: 186 (19.0, 137)

T11: 245 (25.0, 181)

GENERAL DESCRIPTION

FRONT SUSPENSION

C: CAUTION

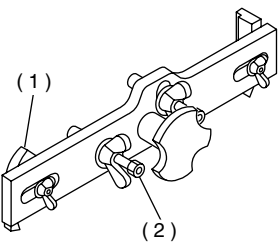
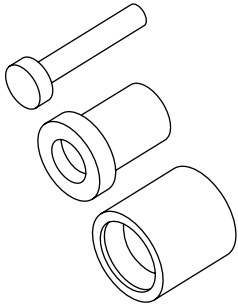
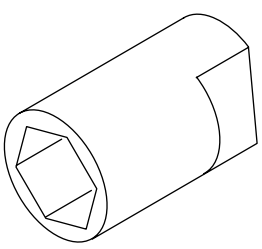
- Wear working clothing, including a cap, protective goggles, and protective shoes during operation.
- Remove contamination including dirt and corrosion before removal, installation or disassembly.
- Keep the disassembled parts in order and protect them from dust or dirt.
- Before removal, installation or disassembly, be sure to clarify the failure. Avoid unnecessary removal, installation, disassembly, and replacement.
- Use SUBARU genuine grease etc. or the equivalent. Do not mix grease etc. with that of another grade or from other manufacturers.
- Be sure to tighten fasteners including bolts and nuts to the specified torque.
- Place shop jacks or safety stands at the specified points.
- Apply grease onto sliding or revolution surfaces before installation.
- Before installing O-rings or snap rings, apply sufficient amount of grease to avoid damage and deformation.
- Before securing a part on a vise, place cushioning material such as wood blocks, aluminum plate, or shop cloth between the part and the vise.

GENERAL DESCRIPTION

FRONT SUSPENSION

D: PREPARATION TOOL

1. SPECIAL TOOLS

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-927380002	927380002	ADAPTER	Used as an adapter for camber & caster gauge when measuring camber and caster. (1) 28199AC000 PLATE (2) 28199AC010 BOLT
 ST-927680000	927680000	INSTALLER & REMOVER SET	Used for replacing transverse link bushing.
 ST-927760000	927760000	STRUT MOUNT SOCKET	Used for disassembling and assembling strut and shock mount.

2. GENERAL PURPOSE TOOLS

TOOL NAME	REMARKS
Alignment gauge	Used for wheel alignment measurement.
Turning radius gauge	Used for wheel alignment measurement.
Toe-in gauge	Used for toe-in measurement.
Dial gauge	Used for damper strut measurement.

GENERAL DIAGNOSTIC TABLE

FRONT SUSPENSION

8. General Diagnostic Table

A: INSPECTION

1. IMPROPER VEHICLE POSTURE OR IMPROPER WHEEL ARCH HEIGHT

Possible causes	Countermeasures
(1) Permanent distortion or breakage of coil spring	Replace.
(2) Unsmooth operation of damper strut and/or shock absorber	Replace.
(3) Installation of wrong strut and/or shock absorber	Replace with proper parts.
(4) Installation of wrong coil spring	Replace with proper parts.

2. POOR RIDE COMFORT

- 1) Large rebound shock
- 2) Rocking of vehicle continues too long after running over bump and/or hump.
- 3) Large shock in bumping

Possible causes	Countermeasures
(1) Breakage of coil spring	Replace.
(2) Overinflation pressure of tire	Adjust.
(3) Improper wheel arch height	Adjust or replace coil springs with new ones.
(4) Fault in operation of damper strut and/or shock absorber	Replace.
(5) Damage or deformation of strut mount and/or shock absorber mount	Replace.
(6) Unsuitability of maximum and/or minimum length of damper strut and/or shock absorber	Replace with proper parts.
(7) Deformation or loss of bushing	Replace.
(8) Deformation or damage of helper in strut assembly and/or shock absorber	Replace.
(9) Oil leakage of damper strut and/or shock absorber	Replace.

3. NOISE

Possible causes	Countermeasures
(1) Wear or damage of damper strut and/or shock absorber component parts	Replace.
(2) Loosening of suspension link installing bolt	Retighten to the specified torque.
(3) Deformation or loss of bushing	Replace.
(4) Unsuitability of maximum and/or minimum length of damper strut and/or shock absorber	Replace with proper parts.
(5) Breakage of coil spring	Replace.
(6) Wear or damage of ball joint	Replace.
(7) Deformation of stabilizer clamp	Replace.

WHEEL ALIGNMENT

FRONT SUSPENSION

2. Wheel Alignment

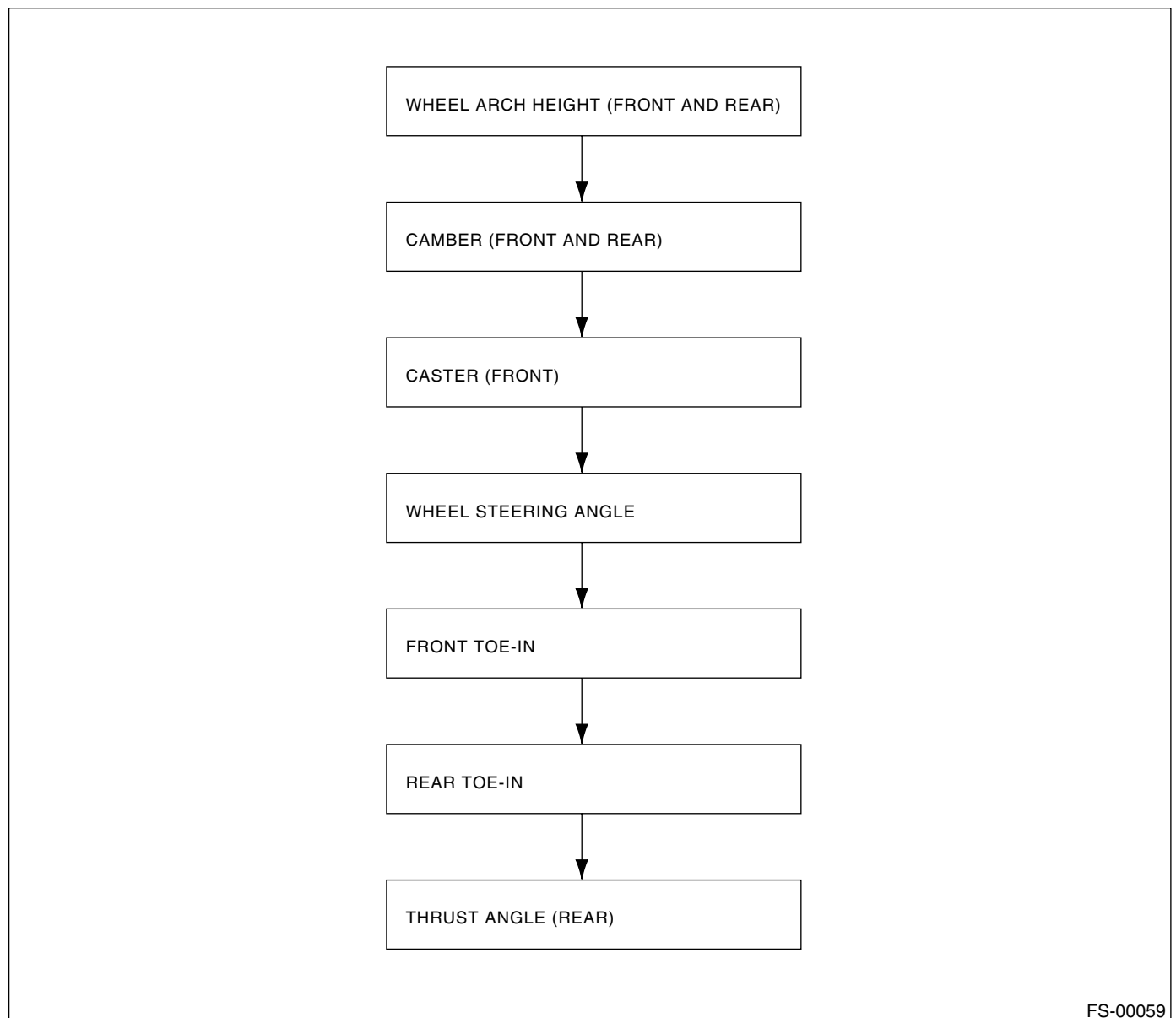
A: INSPECTION

Check the following items before taking wheel alignment measurement.

Check items before taking wheel alignment measurement:

- tire air pressure
- unbalanced right and left tire wear, size difference
- tire run-out
- ball joint excessive play, wear
- tie rod end excessive play, wear
- wheel bearing excessive play
- right and left wheel base imbalance
- steering link part deformed, excessive play
- suspension part deformed, excessive play

Check, adjust and/or measure wheel alignment in accordance with procedures indicated in figure:

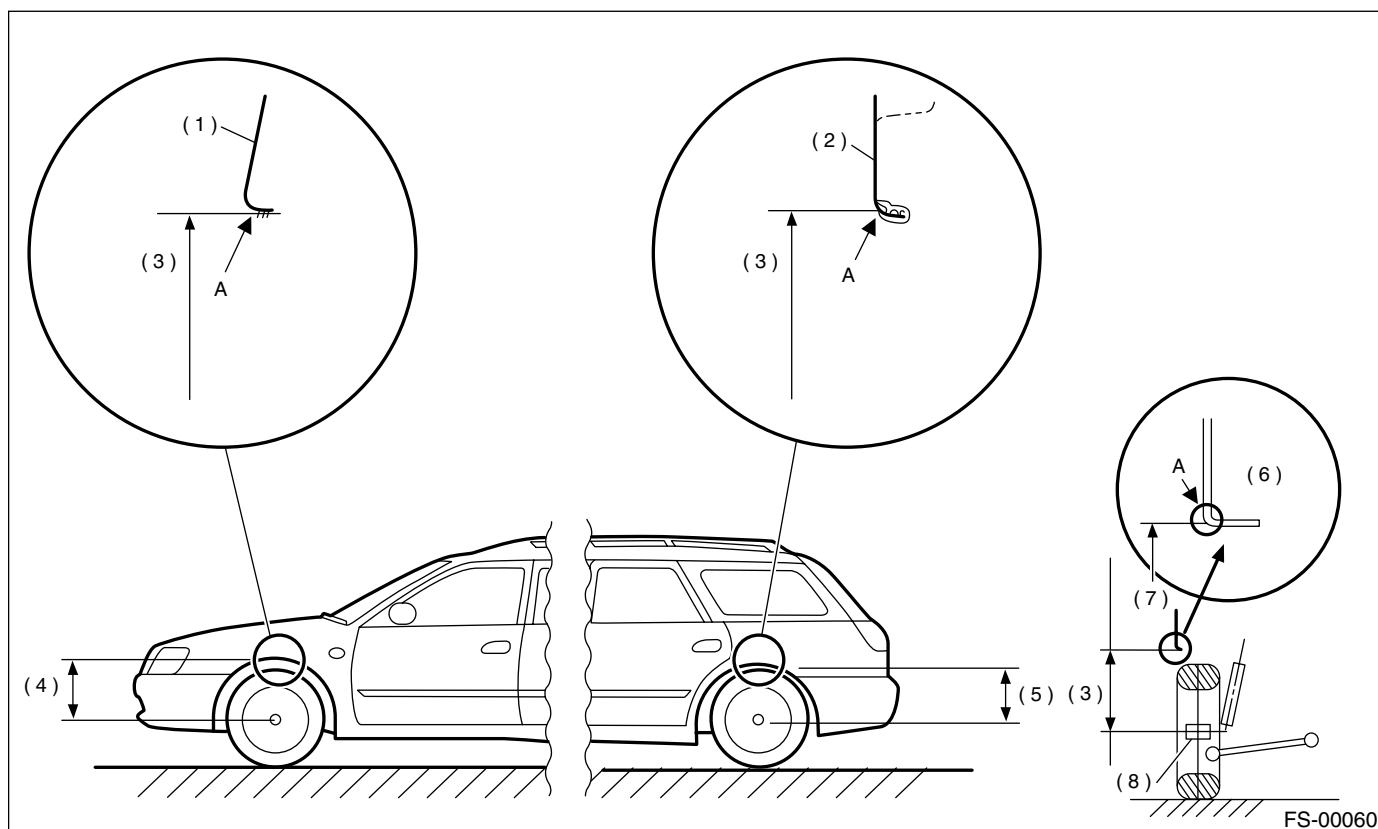


WHEEL ALIGNMENT

FRONT SUSPENSION

1. WHEEL ARCH HEIGHT

- 1) Set vehicle on a level surface.
- 2) Set vehicle to “curb weight” conditions. (Empty luggage compartment, install spare tire, jack, service tools, and top up fuel tank.)
- 3) Set steering wheel in a straight line, then move the vehicle straight ahead more than 5 m (16 ft) to settle the suspension.
- 4) Suspend thread from wheel arch (point “A” in figure below) to determine a point directly above center of wheel.
- 5) Measure distance between measuring point “A” and center of wheel.



FS-00060

- | | | |
|------------------------|-----------------------------|---------------------|
| (1) Front fender | (4) Front wheel arch height | (7) Measuring point |
| (2) Outer rear quarter | (5) Rear wheel arch height | (8) End of spindle |
| (3) Wheel arch height | (6) Cross-section of arch | |

Model	Specified wheel arch height	
	Front	Rear
Sedan	388 ⁺¹² / ₋₂₄ mm (15.28 ^{+0.47} / _{-0.94} in)	371 ⁺¹² / ₋₂₄ mm (14.61 ^{+0.47} / _{-0.94} in)
Wagon	388 ⁺¹² / ₋₂₄ mm (15.28 ^{+0.47} / _{-0.94} in)	381 ⁺¹² / ₋₂₄ mm (15.00 ^{+0.47} / _{-0.94} in)
OUTBACK	424 ⁺¹² / ₋₂₄ mm (16.69 ^{+0.47} / _{-0.94} in)	421 ⁺¹² / ₋₂₄ mm (16.51 ^{+0.47} / _{-0.94} in)
PICKUP	436 ⁺¹² / ₋₂₄ mm (17.17 ^{+0.47} / _{-0.94} in)	441 ⁺¹² / ₋₂₄ mm (17.36 ^{+0.47} / _{-0.94} in)

WHEEL ALIGNMENT

FRONT SUSPENSION

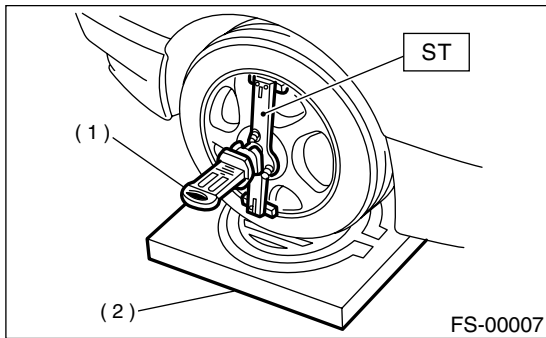
2. CAMBER

• Inspection

1) Place front wheel on turning radius gauge. Make sure ground contacting surfaces of front and rear wheels are set at the same height.

2) Set ST into the center of the wheel, and then install the wheel alignment gauge.

ST 927380002 ADAPTER



- (1) Alignment gauge
- (2) Turning radius gauge

3) Follow the wheel alignment gauge operation manual to measure the camber angle.

NOTE:

Refer to the "SPECIFICATIONS" for the camber values.

Front: <Ref. to FS-2, SPECIFICATIONS, General Description.>

Rear: <Ref. to RS-2, SPECIFICATIONS, General Description.>

• Front Camber Adjustment

When exceeding the tolerance, adjust it as follows.

1) Loosen two self-locking nuts located at lower front portion of strut.

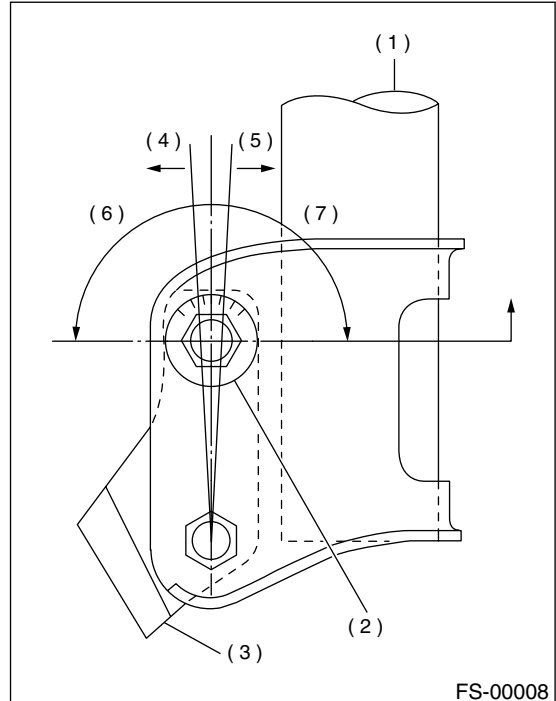
CAUTION:

- When adjusting bolt needs to be loosened or tightened, hold its head with a wrench and turn self-locking nut.
- When self-locking nut is removed, replace with a new one.

2) Turn camber adjusting bolt so that camber is set at the specification.

NOTE:

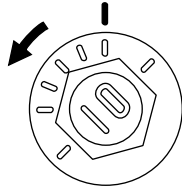
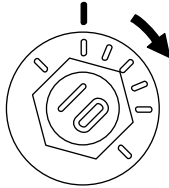
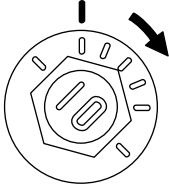
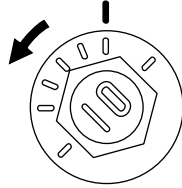
Moving the adjusting bolt by one scale graduation changes camber by approximately $0^{\circ}15'$.



- (1) Strut
- (2) Adjusting bolt
- (3) Housing
- (4) Outer
- (5) Inner
- (6) Camber is increased.
- (7) Camber is decreased.

WHEEL ALIGNMENT

FRONT SUSPENSION

	Left side	Right side
Camber is increased.	 Rotate counter-clockwise. FS-00009	 Rotate clockwise. FS-00010
Camber is decreased.	 Rotate clockwise. FS-00010	 Rotate counter-clockwise. FS-00009

3) Tighten the two self-locking nuts.

Tightening torque:

152 N·m (16 kgf-m, 116 ft-lb)

3. CASTER

• Inspection

1) Place front wheel on turning radius gauge. Make sure ground contacting surfaces of front and rear wheels are set at the same height.

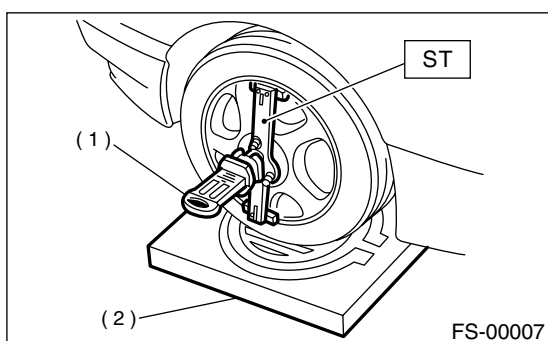
2) Set ST into the center of the wheel, and then install the wheel alignment gauge.

ST 927380002 ADAPTER

3) Follow the wheel alignment gauge operation manual to measure the caster angle.

NOTE:

Refer to the “SPECIFICATIONS” for the caster values. <Ref. to FS-2, SPECIFICATIONS, General Description.>



- (1) Alignment gauge
- (2) Turning radius gauge

WHEEL ALIGNMENT

FRONT SUSPENSION

4. STEERING ANGLE

• Inspection

- 1) Place vehicle on a turning radius gauge.
- 2) While depressing brake pedal, turn steering wheel fully to the left and right. With steering wheel held at each fully turned position, measure both the inner and outer wheel steering angle.

Steering angle:

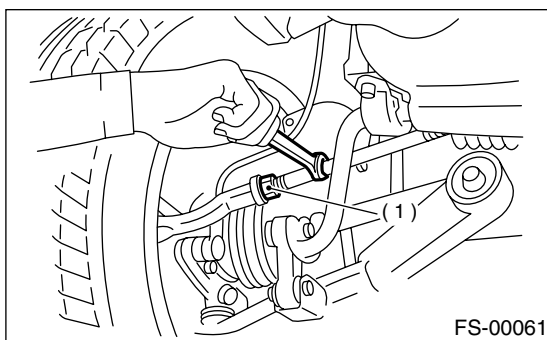
Model	Others	OUTBACK, PICKUP
Inner wheel	$36.3^{\circ} \pm 1.5^{\circ}$	$34.5^{\circ} \pm 1.5^{\circ}$
Outer wheel	$31.6^{\circ} \pm 1.5^{\circ}$	$30.3^{\circ} \pm 1.5^{\circ}$

• Adjustment

Turn tie-rod to adjust steering angle of both inner and outer wheels.

CAUTION:

- Check toe-in.
- Correct boot if it is twisted.



(1) Lock nut

5. FRONT WHEEL TOE-IN

• Inspection

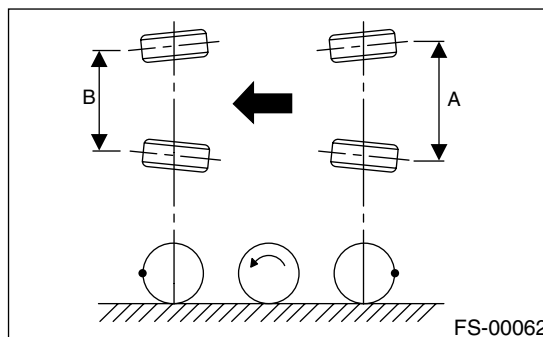
- 1) Using a toe gauge, measure front wheel toe-in.

Toe-in:

$0 \pm 3 \text{ mm } (0 \pm 0.12 \text{ in})$ (tolerance)

- 2) Mark rear sides of left and right tires at height corresponding to center of spindles and measure distance "A" between marks.
- 3) Move vehicle forward so that marks line up with front sides at height corresponding to center of spindles.
- 4) Measure distance "B" between left and right marks. Toe-in can then be obtained by the following equation:

$$A - B = \text{Toe-in}$$



• Adjustment

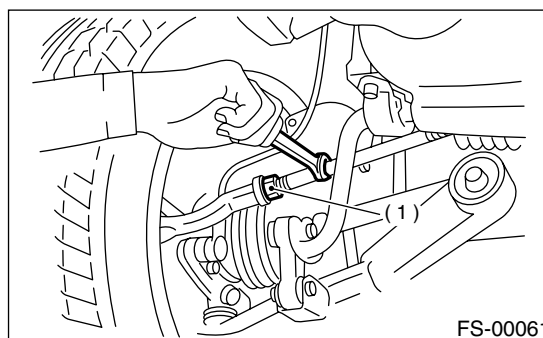
When exceeding the tolerance, adjust it as follows.

- 1) Loosen the left and right side steering tie-rods lock nuts.
- 2) Turn the left and right tie rods equal amounts until the toe-in is at the adjustment standard.

Toe-in:

$0 \pm 2 \text{ mm } (0 \pm 0.08 \text{ in})$ (adjustment standard)

Both the left and right tie-rods are right-hand threaded. To increase toe-in, turn both tie-rods clockwise equal amounts (as viewed from the inside of the vehicle).



(1) Lock nut

3) Tighten tie-rod lock nut.

Tightening torque:

83 N·m (8.5 kgf-m, 61.5 ft-lb)

CAUTION:

Correct tie-rod boot, if it is twisted.

NOTE:

Check the left and right wheel steering angle is within specifications.

6. REAR WHEEL TOE-IN

• Inspection

1) Using a toe-in gauge, measure rear wheel toe-in.

Toe-in:

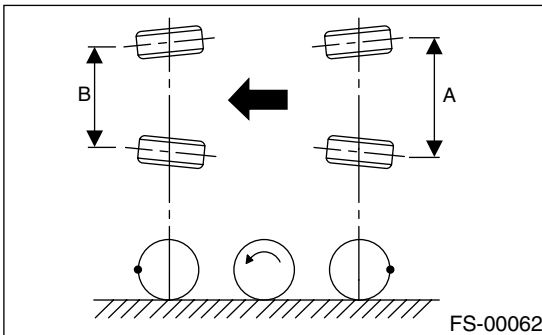
$0 \pm 3 \text{ mm } (0 \pm 0.12 \text{ in})$ (tolerance)

2) Mark rear sides of left and right tires at height corresponding to center of spindles and measure distance "A" between marks.

3) Move vehicle forward so that marks line up with front sides at height corresponding to center of spindles.

4) Measure distance "B" between left and right marks. Toe-in can then be obtained by the following equation:

$$A - B = \text{Toe-in}$$



• Adjustment

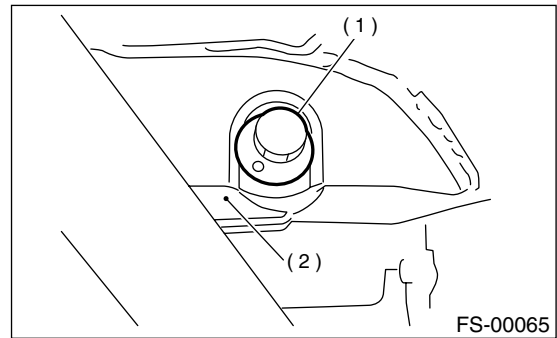
When exceeding the tolerance, adjust it as follows.

1) Loosen self-locking nut on inner side of link rear.

CAUTION:

• When loosening or tightening adjusting bolt, hold bolt head and turn self-locking nut.

• When self-locking nut is removed, replace with a new one.



(1) Adjusting bolt

(2) Link rear

2) Turn adjusting bolt head until toe-in is at the adjustment standard.

Toe-in:

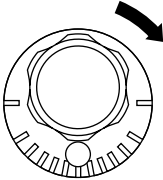
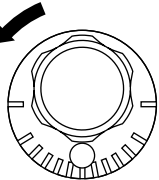
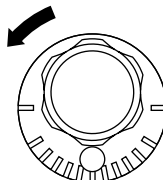
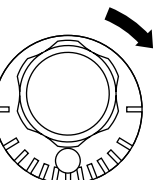
$0 \pm 2 \text{ mm } (0 \pm 0.08 \text{ in})$ (adjustment standard)

WHEEL ALIGNMENT

FRONT SUSPENSION

NOTE:

When left and right wheels are adjusted for toe-in at the same time, the movement of one scale graduation changes toe-in by approximately 6 mm (0.24 in).

	Left side	Right side
Toe-in is increased.	 Rotate clockwise. FS-00066	 Rotate counter-clockwise. FS-00067
Toe-in is decreased.	 Rotate counter-clockwise. FS-00067	 Rotate clockwise. FS-00066

3) Tighten self-locking nut.

Tightening torque:

120 N·m (12.2 kgf-m, 88 ft-lb)

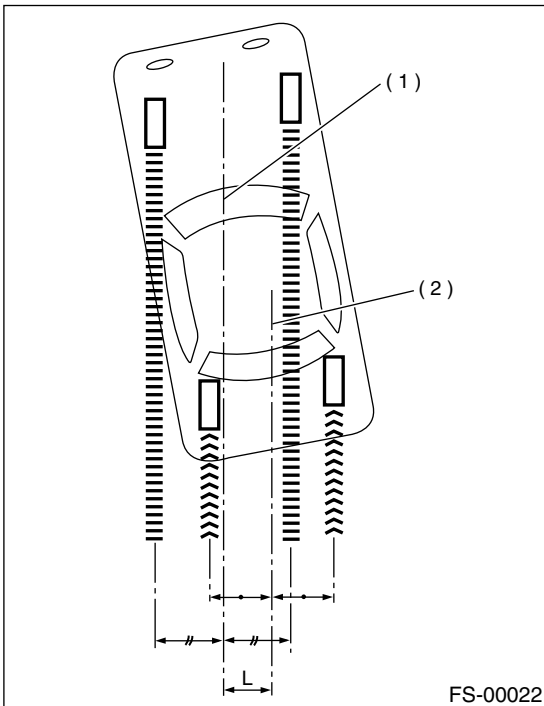
7. THRUST ANGLE

• Inspection

- 1) Position vehicle on a level surface.
- 2) Move vehicle 3 to 4 meters directly forward.
- 3) Determine locus of both front and rear axles.
- 4) Measure distance "L" between center line of loci of the axles.

Thrust angle: $0^\circ \pm 30'$ (tolerance)

[Less than $30'$ when "L" is equal to or less than 23 mm (0.91 in).]



- (1) Center line of loci (front axle)
(2) Center line of loci (rear axle)

• Adjustment

When exceeding the tolerance, adjust it as follows.

- 1) Make thrust angle adjustments by turning toe-in adjusting bolts of rear suspension equally in the same direction.
- 2) When one rear wheel is adjusted in a toe-in direction, adjust the other rear wheel equally in toe-out direction, in order to make thrust angle adjustment.

- 3) When left and right adjusting bolts are turned incrementally by one graduation in the same direction, the thrust angle will change approximately $15'$ ["L" is almost equal to 11 mm (0.46 in)].

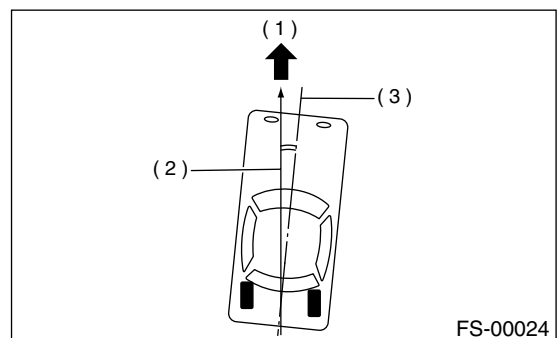
Thrust angle:

$0^\circ \pm 20'$ (adjustment standard)

[Less than $20'$ when "L" is equal to or less than 15 mm (0.59 in).]

NOTE:

Thrust angle refers to a mean value of left and right rear wheel toe angles in relation to vehicle body center line. Vehicle is driven straight in the thrust angle direction while swinging in the oblique direction depending on the degree of the mean thrust angle.



- (1) Front
(2) Thrust angle
(3) Body center line

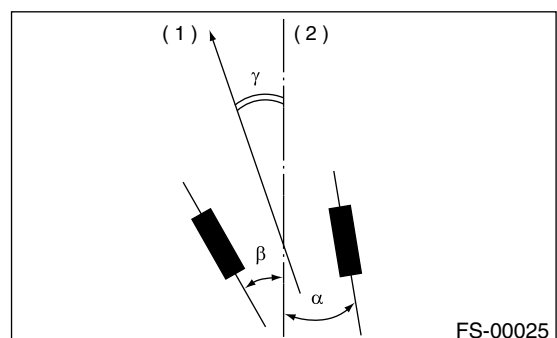
Thrust angle: $r = (\alpha - \beta)/2$

α : Right rear wheel toe-in angle

β : Left rear wheel toe-in angle

NOTE:

Here, use only positive toe-in values from each wheel to substitute for α and β in the equation.



- (1) Front
(2) Body center line

GENERAL DESCRIPTION

POWER ASSISTED SYSTEM (POWER STEERING)

1. General Description

A: SPECIFICATIONS

Model			Except OUTBACK	Pick-up	OUTBACK	
			Non-TURBO model	TURBO model	2.5 L model	3.0 L model
Whole system	Minimum turning radius m (ft)		5.4±0.5 (17.7±1.6)	5.6±0.5 (18.4±1.6)	5.6±0.5 (18.4±1.6)	
	Steering angle (Inside — Outside)		36.3°±1.5° — 31.6°±1.5°	34.5°±1.5° — 30.3°±1.5°	34.5°±1.5° — 30.3°±1.5°	
	Steering wheel diameter mm (in)		385 (15.16)			
	Overall gear ratio		16.5	19.0	19.0	
	Turns lock to lock		3.2	3.4	3.4	
Gearbox	Type		Rack and pinion, Integral			
	Backlash		0 (Automatically adjustable)			
	Valve (Power steering system)		Rotary valve			
Pump (Power steering system)	Type		Vane pump			
	Oil tank		Installed on body			
	Output cm ³ (cu in)/rev.		7.2 (0.439)	8.5 — 0.6 (0.582 — 0.037)	7.2 (0.439)	9.6 — 0.65 (0.586 — 0.040)
	Relief pressure kPa (kg/cm ² , psi)		9,807 (100, 1,422)	7,846 (80, 1,138)	9,807 (100, 1,422)	7,846 (80, 1,138)
	Hydraulic fluid control		Dropping in response to increased engine revolutions			
	Hydraulic fluid ℓ (US qt, Imp qt)		1,000 rpm: 6 (6.3, 5.3) 3,000 rpm: 5 (5.3, 4.4)	1,000 rpm: 7 (7.4, 6.2) 3,000 rpm: 5 (5.3, 4.4)	1,000 rpm: 7 (7.4, 6.2) 3,000 rpm: 5 (5.3, 4.4)	
	Range of revolution		500 — 9,000			500 — 8,000
	Revolving direction		Clockwise			
	Working fluid (Power steering system)	Name		ATF DEXRON IIE or III		
Capacity		Oil tank ℓ (US qt, Imp qt)	0.3 (0.3, 0.3)			
		Total ℓ (US qt, Imp qt)	0.7 (0.7, 0.6)			

GENERAL DESCRIPTION

POWER ASSISTED SYSTEM (POWER STEERING)

Steering wheel	Free play mm (in)		17 (0.67)
Turning angle	Inner tire & wheel	Except OUTBACK, Pick-up model	36.3°±1.5°
		OUTBACK, Pick-up model	34.5°±1.5°
	Outer tire & wheel	Except OUTBACK, Pick-up model	31.6°±1.5°
		OUTBACK, Pick-up model	30.3°±1.5°
Steering shaft	Clearance between steering wheel and column cover mm (in)		3.0 (0.118)
Steering gearbox (Power steering system)	Sliding resistance N (kgf, lb)		304.0 (31.0, 68.4) or less
	Rack shaft play in radial direction	Right-turn steering mm (in)	0.15 (0.0059) or less
		Left-turn steering mm (in)	Horizontal movement: 0.3 (0.012) or less Vertical movement: 0.15 (0.0059) or less
	Input shaft play	In radial direction mm (in)	0.18 (0.0071) or less
		In axial direction mm (in)	0.1 (0.004) or less
	Turning resistance N (kgf, lb)		Within 30 mm (1.18 in) from rack center in straight ahead position: Less than 11.18 (1.14, 2.51) Maximum allowable value: 12.7 (1.3, 2.9)
Oil pump (Power steering system)	Pulley shaft	Radial play mm (in)	0.4 (0.016) or less
		Axial play mm (in)	0.6 (0.024) or less
	Pulley	Ditch deflection mm (in)	1.0 (0.039) or less
		Resistance to rotation N (kgf, lb)	9.22 (0.94, 2.07) or less
	Regular pressure kPa (kg/cm ² , psi)		981 (10, 142) or less
	Relief pressure kPa (kg/cm ² , psi)		9,807 (100, 1,422)
Steering wheel effort (Power steering system)	At standstill with engine idling on a concrete road N (kgf, lb)		29.4 (3.0, 6.6) or less
	At standstill with engine stalled on a concrete road N (kgf, lb)		294.2 (30, 66.2) or less

Recommended power steering fluid	Manufacturer
ATF DEXRON III or equivalent	B.P.
	CALTEX
	CASTROL
	MOBIL
	SHELL
	TEXACO

GENERAL DESCRIPTION

POWER ASSISTED SYSTEM (POWER STEERING)

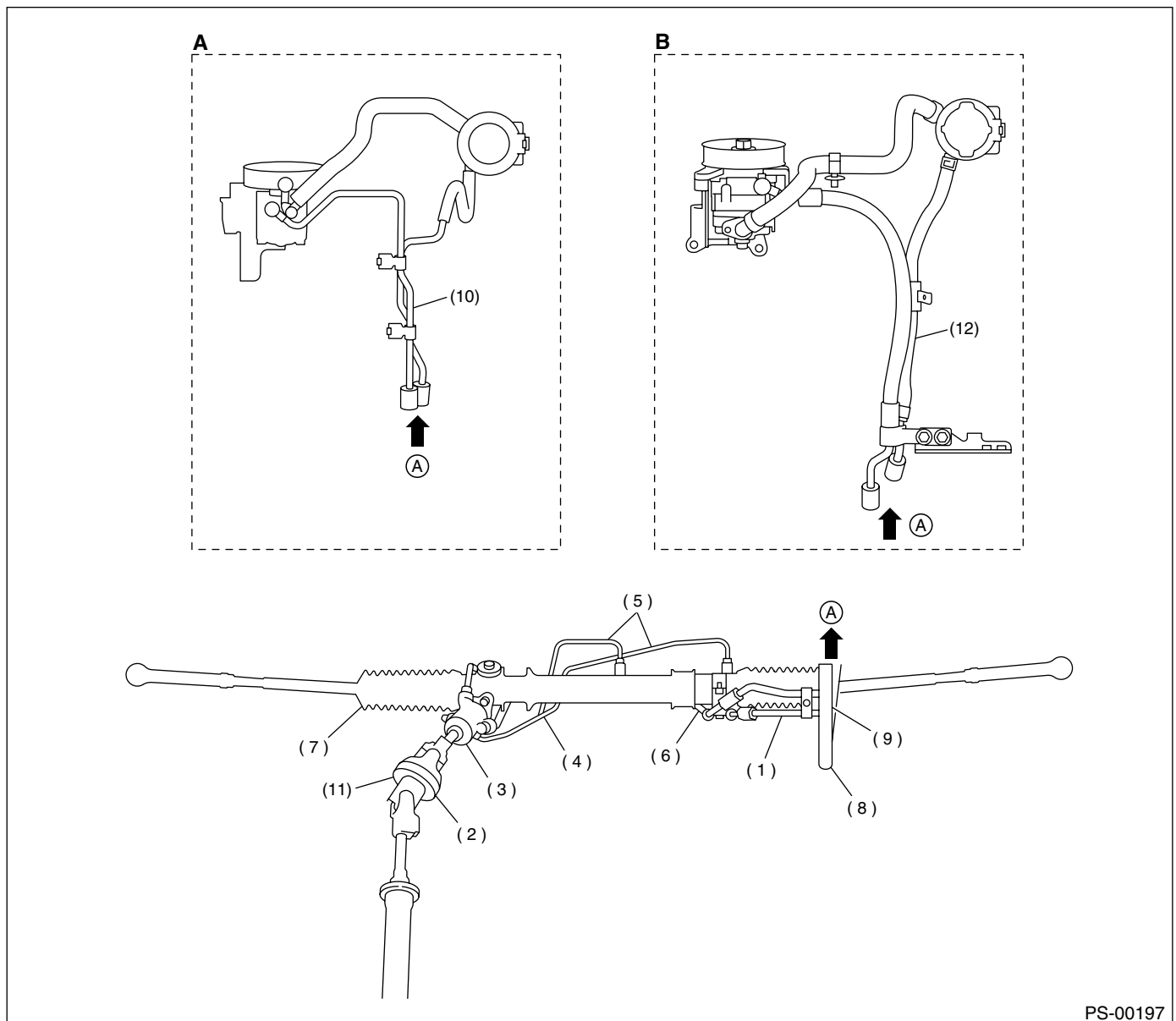
CAUTION:

This table lists various clearances that must be correctly adjusted to ensure normal vehicle driving without interfering noise, or any other faults.

Location	Minimum allowance	
	2.5 L model	3.0 L model
(1) Crossmember — Pipe	5 mm (0.20 in)	
(2) DOJ — Shaft or joint	14 mm (0.55 in)	
(3) DOJ — Valve housing	11 mm (0.43 in)	
(4) Pipe — Pipe	2 mm (0.08 in)	
(5) Stabilizer — Pipe	5 mm (0.20 in)	
(6) Exhaust pipe — Pipe	15 mm (0.59 in)	
(7) Exhaust pipe — Gearbox boot	15 mm (0.59 in)	
(8) Side frame — Hose A and B	15 mm (0.59 in)	
(9) Cruise control pump — Hose A and B	15 mm (0.59 in)	
(10) Pipe portion of hose A — Pipe portion of hose B	1.5 mm (0.059 in)	—
(11) AT cooling hose — Joint	20 mm (0.79 in)	—
(12) Pressure hose — Return hose	—	3.0 mm (0.12 in)

GENERAL DESCRIPTION

POWER ASSISTED SYSTEM (POWER STEERING)



PS-00197

(A) 2.5 L model

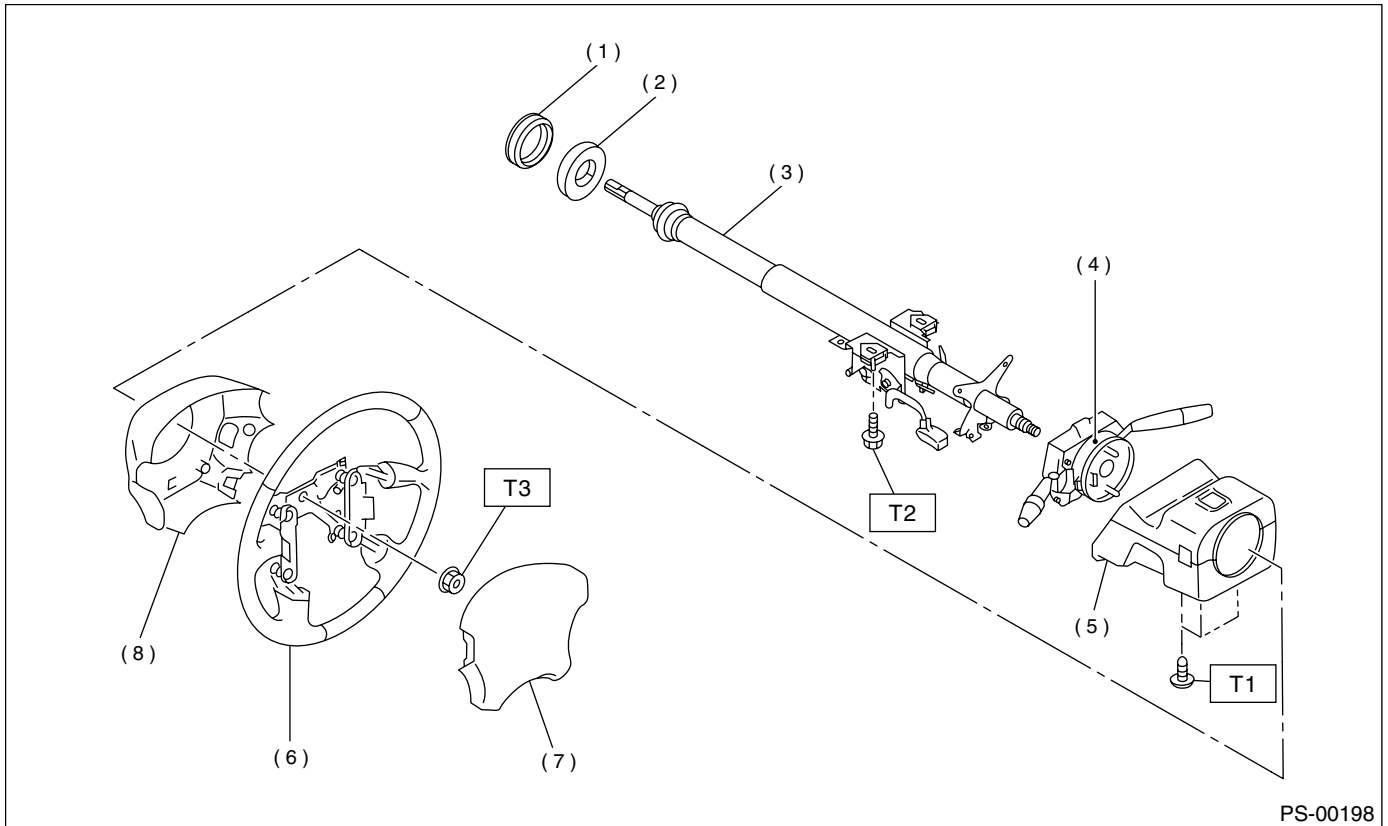
(B) 3.0 L model

GENERAL DESCRIPTION

POWER ASSISTED SYSTEM (POWER STEERING)

B: COMPONENT

1. STEERING WHEEL AND COLUMN



- | | |
|-----------------------------|--------------------------------|
| (1) Bushing | (6) Steering wheel |
| (2) Seal | (7) Airbag module |
| (3) Steering shaft | (8) Lower steering wheel cover |
| (4) Steering roll connector | |
| (5) Column cover | |

Tightening torque: N·m (kgf-m, ft-lb)

T1: 1.2 (0.12, 0.9)

T2: 25 (2.5, 18.1)

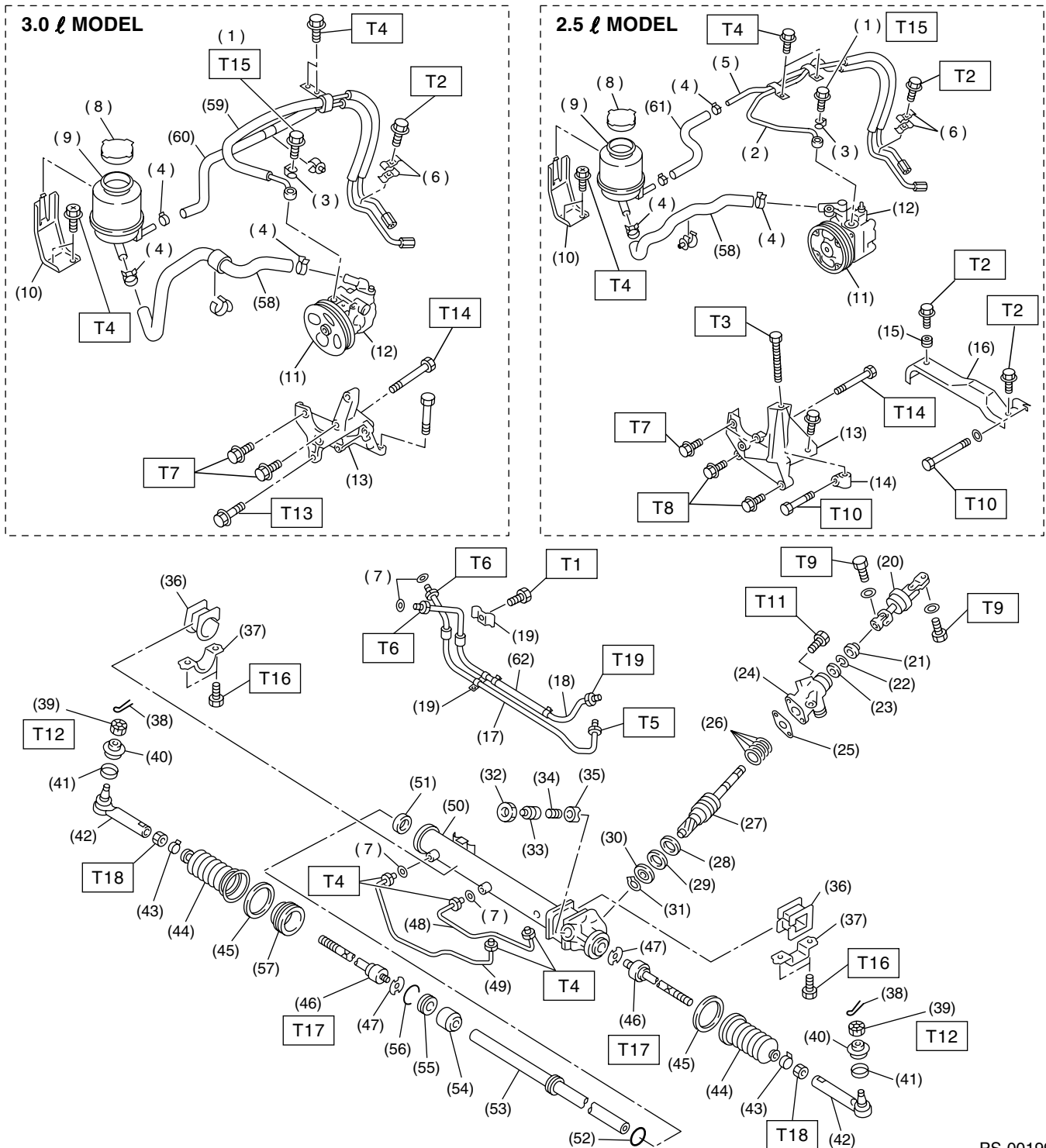
T3: 44 (4.5, 32.5)

GENERAL DESCRIPTION

POWER ASSISTED SYSTEM (POWER STEERING)

2. POWER ASSISTED SYSTEM

• Except TURBO model

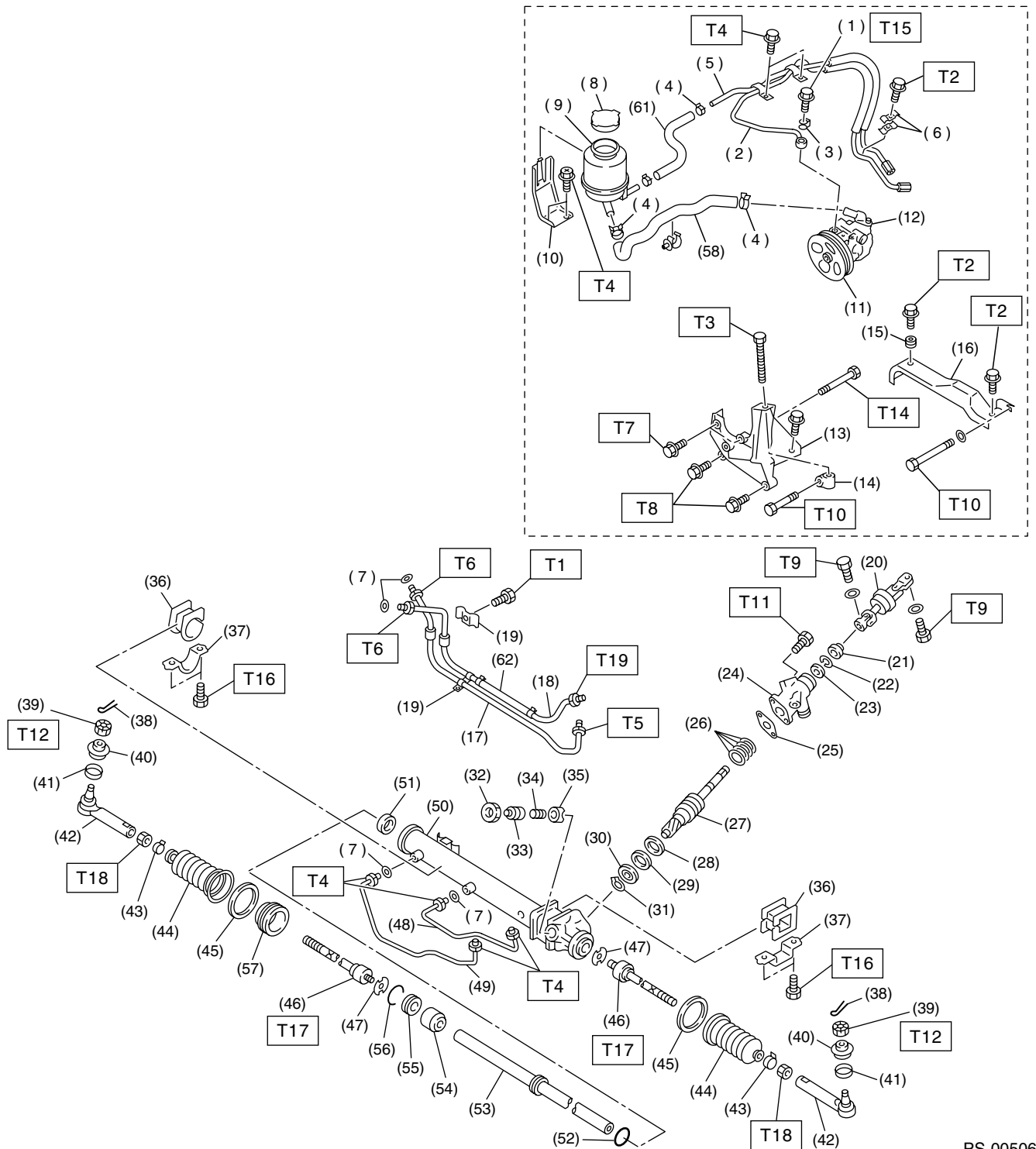


PS-00199

GENERAL DESCRIPTION

POWER ASSISTED SYSTEM (POWER STEERING)

• TURBO model



PS-00506

GENERAL DESCRIPTION

POWER ASSISTED SYSTEM (POWER STEERING)

(1) Eye bolt	(29) Back-up washer	(57) Spacer
(2) Pipe C	(30) Ball bearing	(58) Suction hose
(3) Gasket	(31) Snap ring	(59) Pressure hose ASSY
(4) Clip	(32) Lock nut	(60) Return hose ASSY
(5) Pipe D	(33) Adjusting screw	(61) Return hose
(6) Clamp E	(34) Spring	(62) Hose
(7) O-ring	(35) Sleeve	
(8) Cap	(36) Adapter	
(9) Reservoir tank	(37) Clamp	
(10) Reservoir tank bracket	(38) Cotter pin	
(11) Pulley	(39) Castle nut	
(12) Oil pump	(40) Dust cover	
(13) Bracket	(41) Clip	
(14) Belt tension nut	(42) Tie-rod end	
(15) Bushing	(43) Clip	
(16) Belt cover	(44) Boot	
(17) Pipe E	(45) Band	
(18) Pipe F	(46) Tie-rod	
(19) Clamp plate	(47) Lock washer	
(20) Universal joint	(48) Pipe B	
(21) Dust seal	(49) Pipe A	
(22) C-ring	(50) Steering body	
(23) Oil seal	(51) Oil seal	
(24) Valve housing	(52) Piston ring	
(25) Gasket	(53) Rack	
(26) Seal ring	(54) Rack bushing	
(27) Pinion and valve ASSY	(55) Rack stopper	
(28) Oil seal	(56) Circlip	

Tightening torque: N·m (kgf-m, ft-lb)

T1: 6 (0.6, 4.3)

T2: 7.4 (0.75, 5.4)

T3: 8 (0.8, 5.8)

T4: 13 (1.3, 9.4)

T5: 15 (1.5, 10.8)

T6: 15 (1.5, 10.8)

T7: 15.7 (1.6, 11.6)

T8: 22 (2.2, 15.9)

T9: 24 (2.4, 17.4)

T10: 24.5 (2.5, 18.1)

T11: 25 (2.5, 18.1)

T12: 27 (2.75, 19.9)

T13: 33 (3.4, 25)

T14: 37.3 (3.8, 27.5)

T15: 39 (4.0, 28.9)

T16: 59 (6.0, 43)

T17: 78 (8.0, 58)

T18: 83 (8.5, 61.5)

T19: 25 (2.5, 18.1)

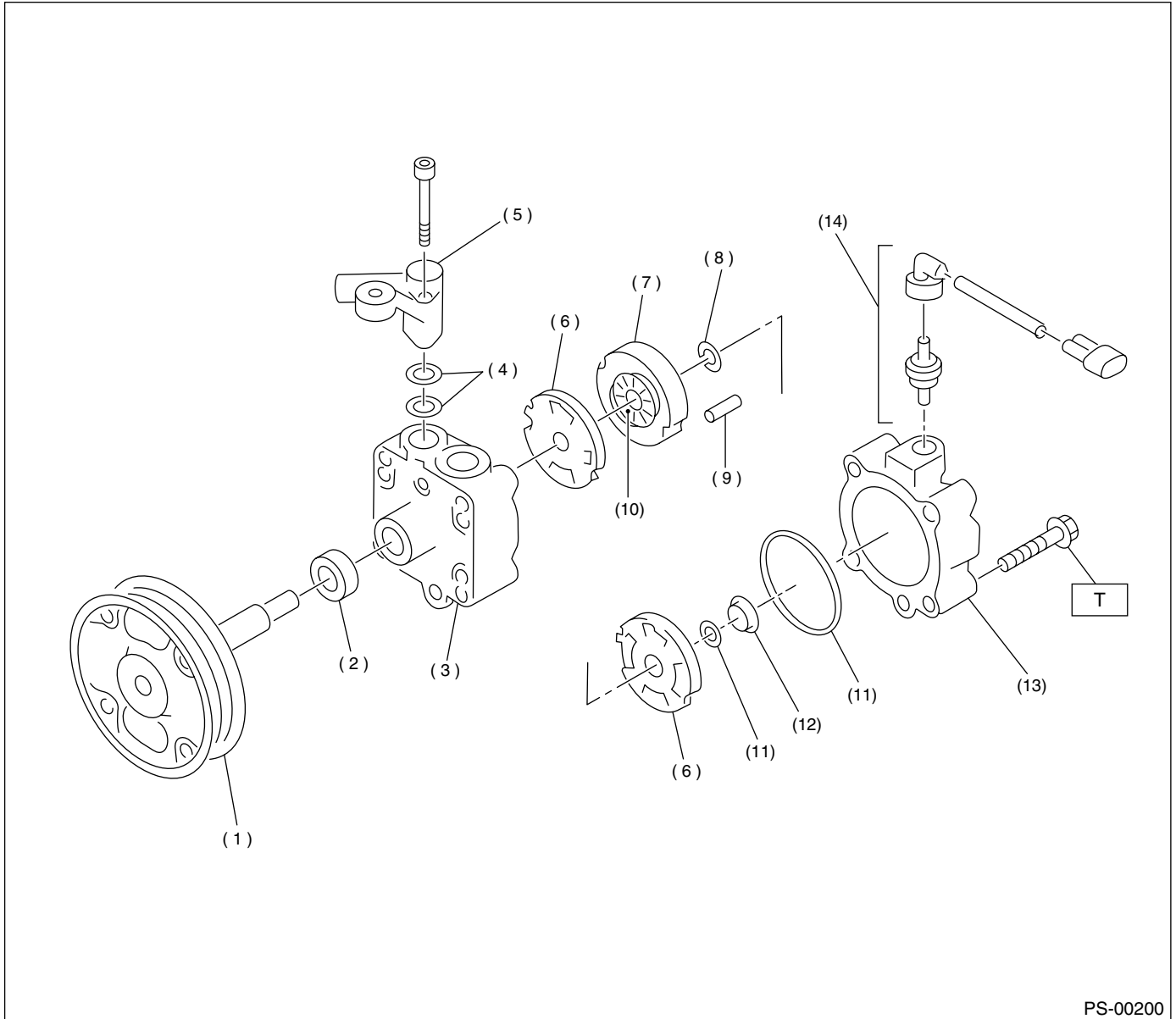
GENERAL DESCRIPTION

POWER ASSISTED SYSTEM (POWER STEERING)

3. OIL PUMP

NOTE:

The illustration for 2.5 L Non-TURBO model is shown below. (Not shown for TURBO model and 3.0 L model because it cannot be disassembled.)



- (1) Pulley
- (2) Oil seal
- (3) Front casing
- (4) O-ring
- (5) Socket
- (6) Pressure plate

- (7) Cam ring
- (8) Circlip
- (9) Straight pin
- (10) Rotor
- (11) O-ring
- (12) Seal ring

- (13) Rear body
- (14) Connector

Tightening torque: N·m (kgf-m, ft-lb)
T: 27.5 (2.8, 20.3)

GENERAL DESCRIPTION

POWER ASSISTED SYSTEM (POWER STEERING)

C: CAUTION

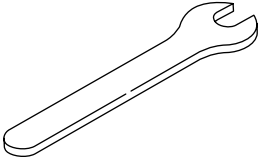
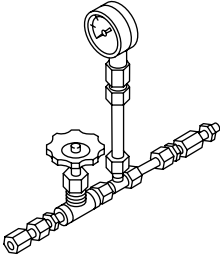
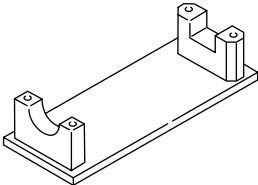
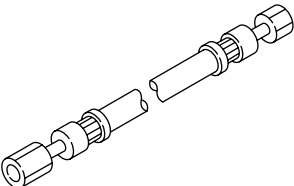
- This section includes Airbag related repair works. For those corresponding to the repair procedures, read carefully CAUTION items in AB section before working and be sure to follow the instructions.
- Wear working clothing, including a cap, protective goggles, and protective shoes during operation.
- Remove contamination including dirt and corrosion before removal, installation or disassembly.
- Keep the disassembled parts in order and protect them from dust or dirt.
- Before removal, installation or disassembly, be sure to clarify the failure. Avoid unnecessary removal, installation, disassembly and replacement.
- Be careful not to burn your hands, because each part on the vehicle is hot after running.
- Use SUBARU genuine steering fluid, grease etc. or the equivalent. Do not mix steering fluid, grease etc. with that of another grade or from other manufacturers.
- Be sure to tighten fasteners including bolts and nuts to the specified torque.
- Place shop jacks or safety stands at the specified points.
- Apply steering fluid onto sliding or revolution surfaces before installation.
- Before installing O-rings or snap rings, apply sufficient amount of steering fluid to avoid damage and deformation.
- Before securing a part on a vise, place cushioning material such as wood blocks, aluminum plate, or shop cloth between the part and the vise.

GENERAL DESCRIPTION

POWER ASSISTED SYSTEM (POWER STEERING)

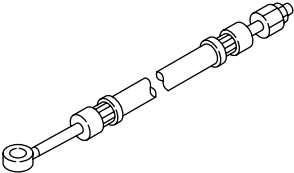
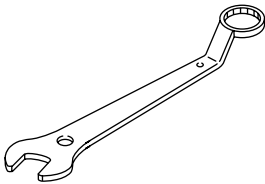
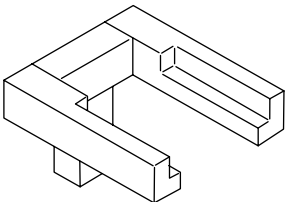
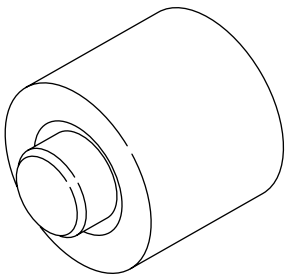
D: PREPARATION TOOL

1. SPECIAL TOOLS

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-925700000	925700000	WRENCH	- Used for removing and installing tie-rod. - Apply this tool to rack.
 ST-925711000	925711000	PRESSURE GAUGE	Used for measuring oil pump pressure.
 ST-926200000	926200000	STAND	Used when inspecting characteristic of gearbox assembly and disassembling it.
 ST34099AC010	34099AC010	ADAPTER HOSE A	Used with PRESSURE GAUGE (925711000).

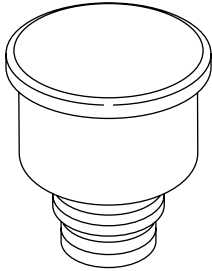
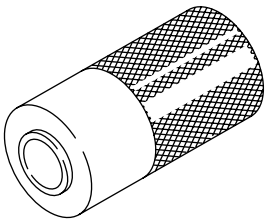
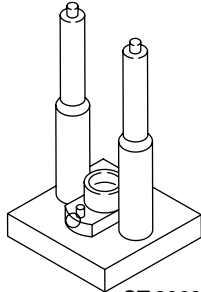
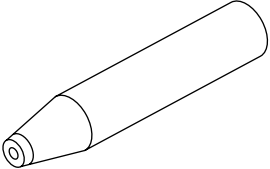
GENERAL DESCRIPTION

POWER ASSISTED SYSTEM (POWER STEERING)

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST34099AC020	34099AC020	ADAPTER HOSE B	Used with PRESSURE GAUGE (925711000).
 ST-926230000	926230000	SPANNER	• For the lock nut when adjusting backlash of gearbox. • Measurement of rotating resistance of gearbox assembly.
 ST34199AE020	34199AE020	MOUNT	Used for disassembling oil pump.
 ST34199AE030	34199AE030	INSTALLER	Used for installing oil seal into oil pump.

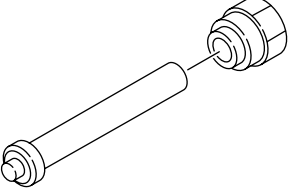
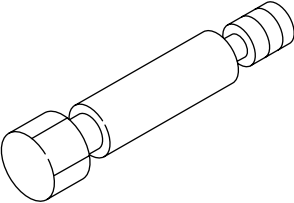
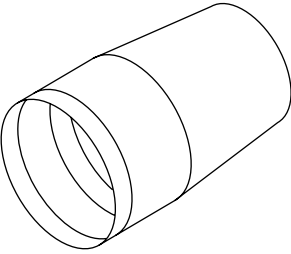
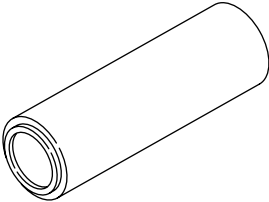
GENERAL DESCRIPTION

POWER ASSISTED SYSTEM (POWER STEERING)

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST34199AE040	34199AE040	OIL CHARGE GUIDE	Used for charging power steering oil.
 ST-927640000	927640000	INSTALLER B	Used for installing ball bearing into housing.
 ST-926370000	926370000	INSTALLER A	• Used for installing valve assembly into valve housing assembly. • Used with STAND BASE (927630000).
 ST-926390001	926390001	COVER & REMOVER ASSY	Used for assembling rack assembly.

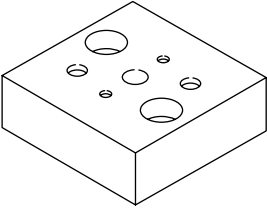
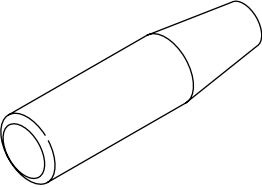
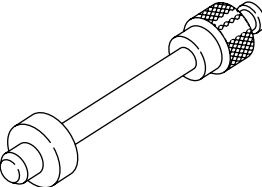
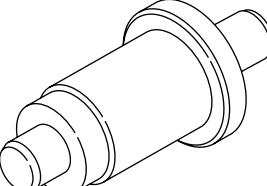
GENERAL DESCRIPTION

POWER ASSISTED SYSTEM (POWER STEERING)

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-926420000	926420000	PLUG	When oil leaks from pinion side of gearbox assembly, remove pipe B from valve housing, attach this tool and check oil leaking points.
 ST-926400000	926400000	GUIDE	• Right side of rack when installing rack bushing. • Used with GUIDE (927660000).
 ST-927660000	927660000	GUIDE	• Right side of rack when installing rack bushing. • Used with GUIDE (926400000).
 ST-927620000	927620000	INSTALLER B	• Used for installing oil seal of valve housing. • Used with INSTALLER A (926360000).

GENERAL DESCRIPTION

POWER ASSISTED SYSTEM (POWER STEERING)

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-927630000	927630000	STAND BASE	Used for assembling power steering gearbox.
 ST-926360000	926360000	INSTALLER A	• Used as a guide to install oil seal. • Used with INSTALLER B (927620000).
 ST34199AE060	34199AE060	INSTALLER	Used for installing oil seal.
 ST-927610000	927610000	INSTALLER & REMOVER SEAL	Used for installing valve housing oil seal.

GENERAL DESCRIPTION

POWER ASSISTED SYSTEM (POWER STEERING)

2. GENERAL PURPOSE TOOLS

TOOL NAME	REMARKS
Spring scale	Used for measuring tightening torque.
Snap ring pliers	Used for removing and installing snap ring.
Dial gauge	Used for measuring steering gearbox.

OIL PUMP

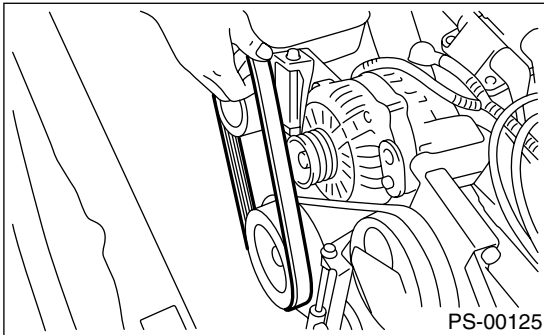
POWER ASSISTED SYSTEM (POWER STEERING)

7. Oil Pump

A: REMOVAL

1. 2.5 L MODEL

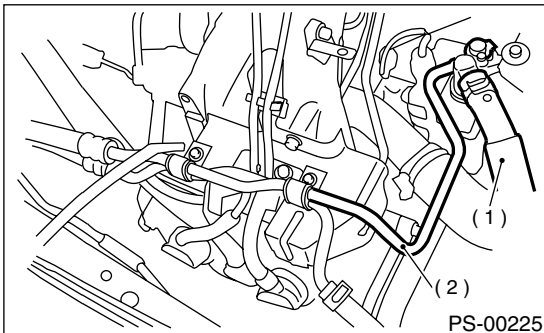
- 1) Remove ground cable from battery.
- 2) Remove pulley belt cover bracket.
- 3) Loosen lock bolt and slider bolt and remove power steering pump drive V-belt.



- 4) Disconnect connector from power steering pump switch.
- 5) Disconnect pipe C and suction hose from oil pump.

CAUTION:

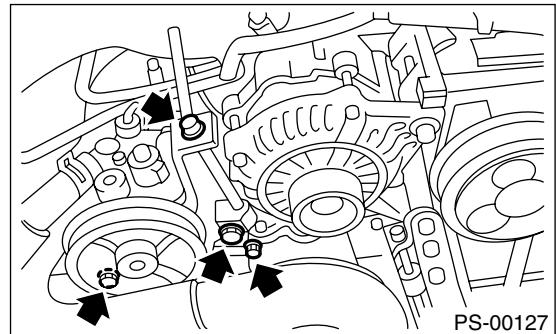
- Do not allow fluid from the hose end to come into contact with pulley belt.
- To prevent foreign matter from entering the hose and pipe, cover the open ends of them with a clean cloth.



- (1) Suction hose
(2) Pipe C

- 10) Disassemble oil pump and bracket by inserting a screwdriver as shown in the figure.

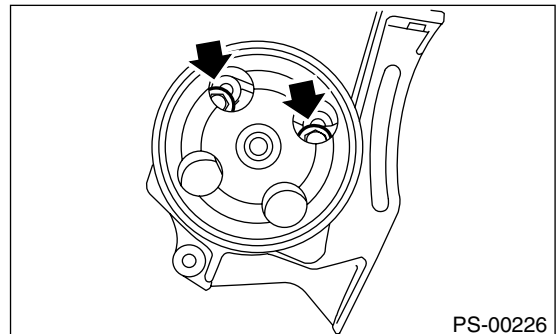
- 6) Remove bolts which install power steering pump bracket.



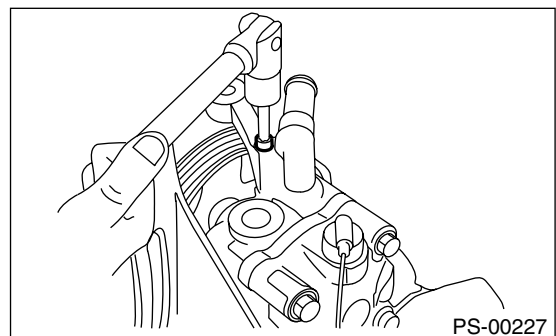
- 7) Place oil pump bracket in a vise, remove two bolts from the front side of oil pump.

CAUTION:

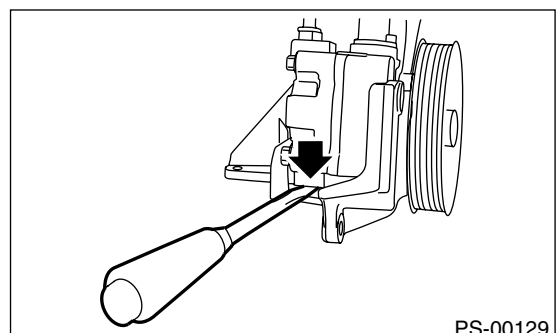
Do not place oil pump bracket directly in the vise; use soft pads and hold oil pump lightly to protect the pump.



- 8) Remove socket from oil pump.



- 9) Remove bolt from the rear side of oil pump.



OIL PUMP

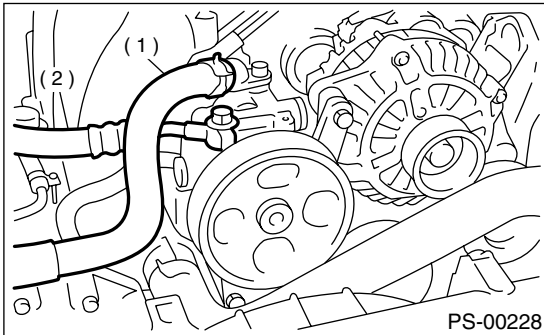
POWER ASSISTED SYSTEM (POWER STEERING)

2. 3.0 L MODEL

- 1) Remove ground cable from battery.
- 2) Remove pulley belt cover.
- 3) Remove V-belt.
- 4) Disconnect connector from power steering pressure switch.
- 5) Remove tensioner adjuster.
- 6) Disconnect pressure hose and suction hose from oil pump.

CAUTION:

- Do not allow fluid from the hose end to come into contact with pulley belt.
- To prevent foreign matter from entering the hose, cover the open ends of them with a clean cloth.



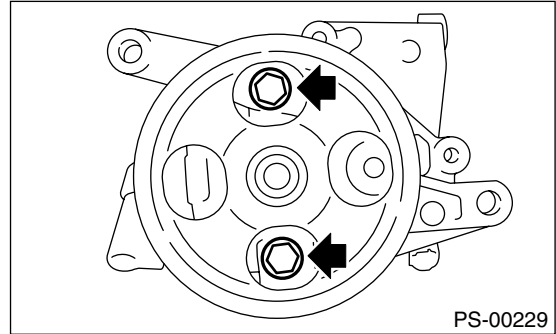
- (1) Pressure hose
(2) Suction hose

- 7) Remove bolts, which install power steering pump bracket.

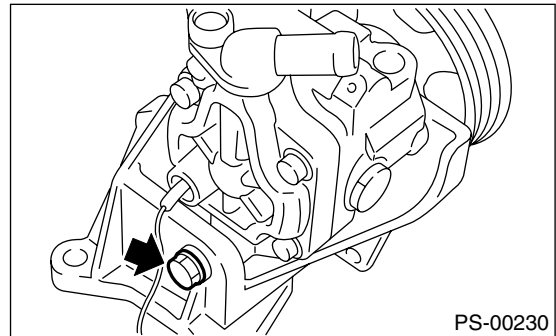
- 8) Place oil pump bracket in a vise, remove two bolts from the front side of oil pump.

CAUTION:

Do not place oil pump bracket directly in the vise; use soft pads and hold oil pump lightly to protect the pump.



- 9) Remove bolt from the rear side of oil pump.



- 10) Remove oil pump from bracket.

OIL PUMP

POWER ASSISTED SYSTEM (POWER STEERING)

B: INSTALLATION

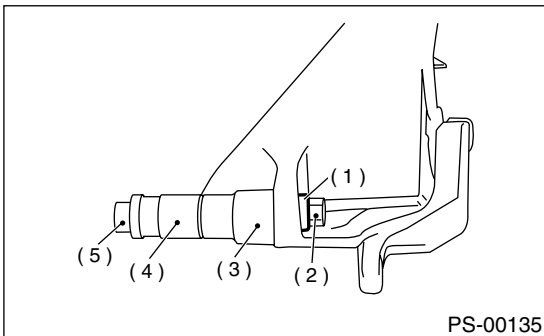
1. 2.5 L MODEL

1) Install oil pump to bracket.

(1) Place oil pump bracket in a vise. Tighten bushing using a 12.7 mm (1/2") type 14- and 21-mm box wrench until it is in contact with oil pump mounting surface.

CAUTION:

Do not place oil pump bracket directly in the vise; use soft pads and hold oil pump lightly to protect the pump.

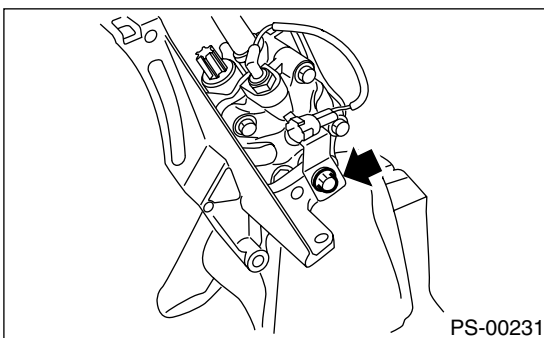


- (1) Bushing
- (2) Nut
- (3) 21 mm
- (4) 14 mm
- (5) Bolt

(2) Tighten bolt which installs oil pump and switch bracket to bracket.

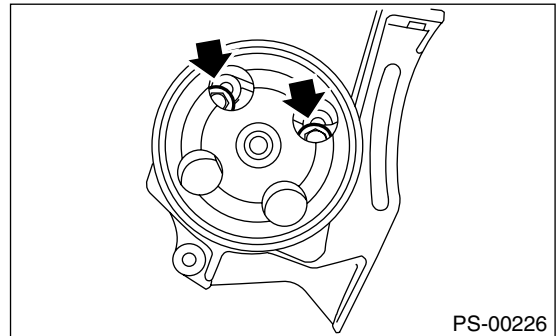
Tightening torque:

37.3 N·m (3.8 kgf-m, 27.5 ft-lb)



Tightening torque:

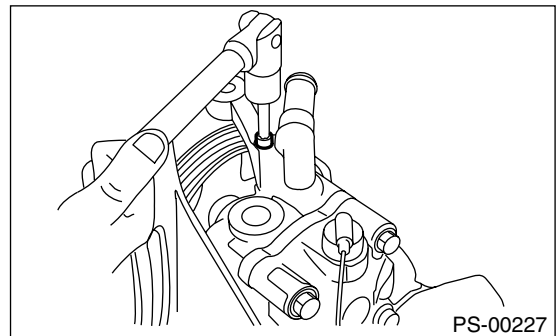
15.7 N·m (1.6 kgf-m, 11.6 ft-lb)



2) Install socket to oil pump.

Tightening torque:

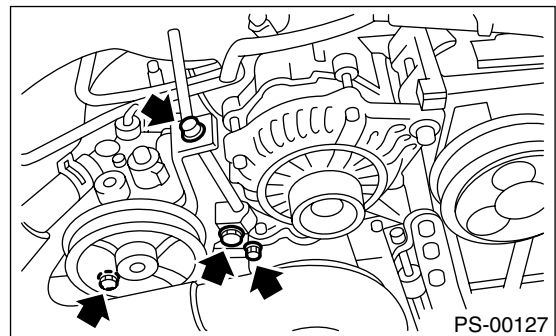
6.5 N·m (0.66 kgf-m, 4.8 ft-lb)



3) Tighten bolts which install power steering pump bracket.

Tightening torque:

22 N·m (2.2 kgf-m, 15.9 ft-lb)



OIL PUMP

POWER ASSISTED SYSTEM (POWER STEERING)

- 4) Interconnect pipes C and suction hose.

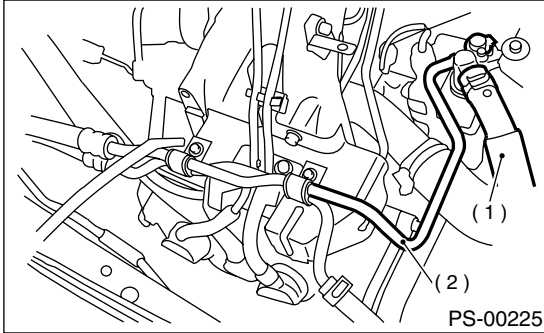
Tightening torque:

Joint nut

39.2 N·m (4 kgf-m, 28.9 ft-lb)

CAUTION:

If a hose is twisted at this step, the hose may come into contact with some other parts.



- (1) Suction hose
(2) Pipe C

- 5) Connect connector to power steering oil pressure switch.
6) Install pulley belt to oil pump.
7) Check pulley belt tension. <Ref. to ME(H4SO)-43, V-belt.> and <Ref. to ME(H6DO)-28, V-belt.>
8) Tighten lock bolt.

Tightening torque:

24.5 N·m (2.5 kgf-m, 18.1 ft-lb)

- 9) Tighten bolt belt tension.

Tightening torque:

8 N·m (0.8 kgf-m, 5.8 ft-lb)

- 10) Install pulley belt cover bracket.
11) Connect ground terminal of battery.
12) Feed the specified power steering fluid <Ref. to PS-64, Power Steering Fluid.>

CAUTION:

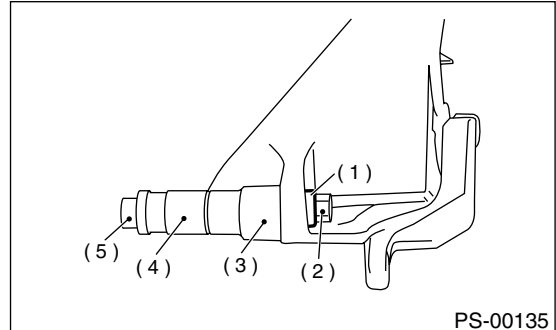
Never start the engine before feeding the fluid; otherwise vane pump might be seized up.

2. 3.0 L MODEL

- 1) Install oil pump to bracket.
(1) Place oil pump bracket in a vise. Tighten bushing using a 12.7 mm (1/2") type 14 and 21-mm box wrench until it is in contact with oil pump mounting surface.

CAUTION:

Do not place oil pump bracket directly in the vise; use soft pads and hold oil pump lightly to protect the pump.

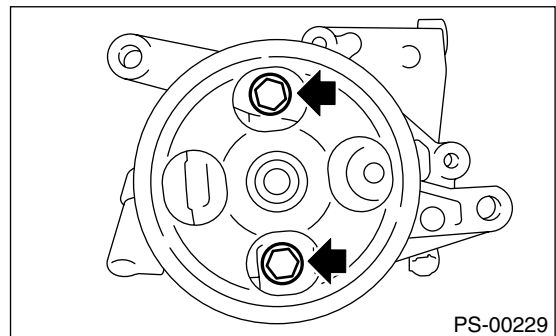


- (1) Bushing
(2) Nut
(3) 21 mm
(4) 14 mm
(5) Bolt

- (2) Tighten bolt which installs oil pump to bracket.

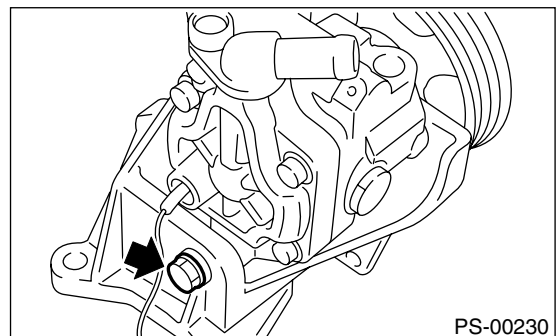
Tightening torque:

15.7 N·m (1.6 kgf-m, 11.6 ft-lb)



Tightening torque:

37.3 N·m (3.8 kgf-m, 27.5 ft-lb)



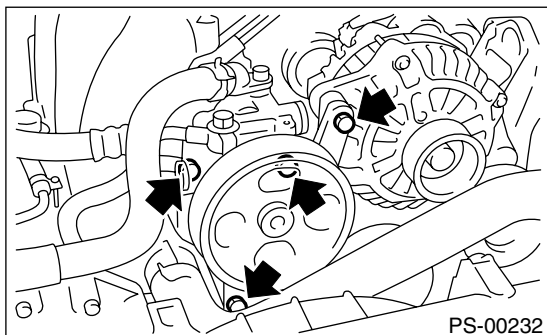
OIL PUMP

POWER ASSISTED SYSTEM (POWER STEERING)

2) Tighten bolts which install power steering pump bracket.

Tightening torque:

33.3 N·m (3.4 kgf-m, 24.5 ft-lb)



3) Interconnect pressure hose and suction hose.

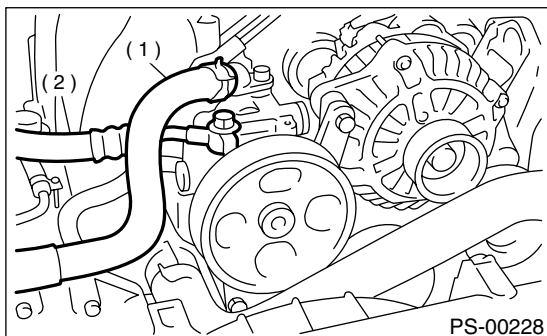
Tightening torque:

Eye bolt

39.2 N·m (4 kgf-m, 28.9 ft-lb)

CAUTION:

If a hose is twisted at this step, the hose may come into contact with some other parts.



- (1) Suction hose
- (2) Pressure hose

4) Connect connector to power steering oil pressure switch.

5) Install tensioner adjuster.

6) Install V-belt.

7) Install pulley belt cover.

8) Connect ground terminal of battery.

9) Feed the specified power steering fluid. <Ref. to PS-64, Power Steering Fluid.>

CAUTION:

Never start the engine before feeding the fluid; otherwise vane pump might be seized up.

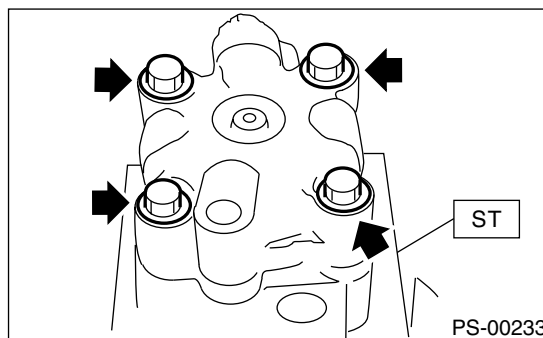
C: DISASSEMBLY

NOTE:

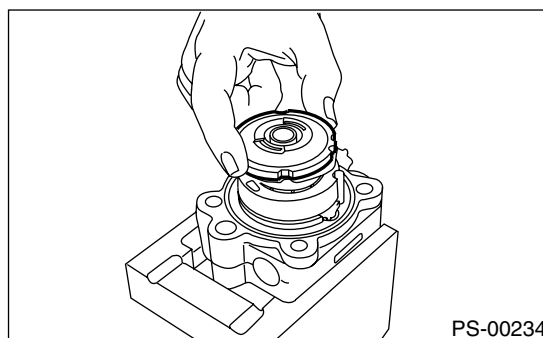
Oil pump for TURBO model and 3.0 L model cannot be disassembled. If the oil pump is malfunctioning, replace the oil pump as an assembly.

1) Using ST, place oil pump in a vise and remove four bolts which secure rear cover.

ST 34199AE020 ATTACHMENT



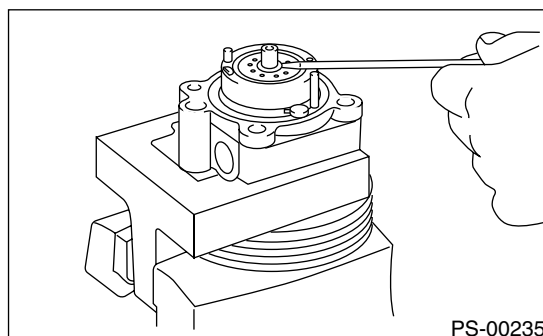
2) Remove pressure plate.



3) Using a screwdriver, pry retaining ring off.

CAUTION:

Do not remove cam ring, rotor, etc.



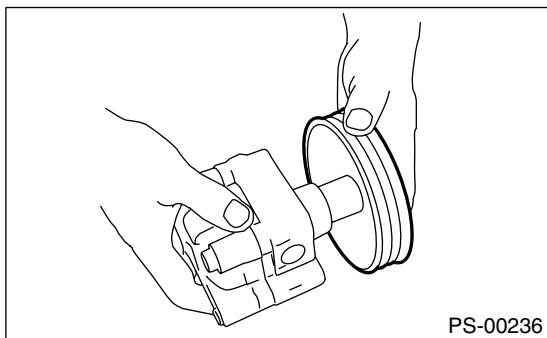
4) Install pressure plate.

5) Temporarily install rear cover to front casing.

OIL PUMP

POWER ASSISTED SYSTEM (POWER STEERING)

6) Remove oil pump pulley.



7) Place oil pump in a vise.

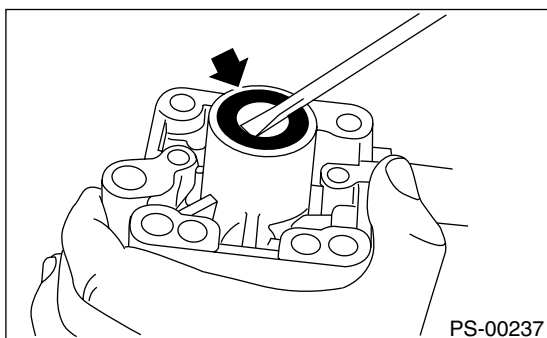
CAUTION:

Do not place oil pump directly in the vise, use soft pads and hold oil pump lightly to protect the pump.

8) Pry oil seal off using a screwdriver.

CAUTION:

Be careful not to scratch inner surface of casing.



D: ASSEMBLY

1) Reassembly precautions

(1) Whenever O-rings, oil seals, and snap rings are removed, they must be replaced with new ones.

(2) Thoroughly wash parts and allow to dry. They must be kept free from cleaning oil and dust.

(3) Reassembly procedure must be performed in clean place. Ensure that parts are kept away from waste threads or other dust particles.

(4) Cleaning oil tends to stay inside the front casing. Remove it completely by blowing compressed air.

(5) Ensure that parts are free from rust. (Use specified hydraulic oil for rust prevention after cleaning and drying.)

(6) Reverse the sequence of disassembly procedures.

2) Apply grease to oil seal and inner surface of front casing (at bearing location).

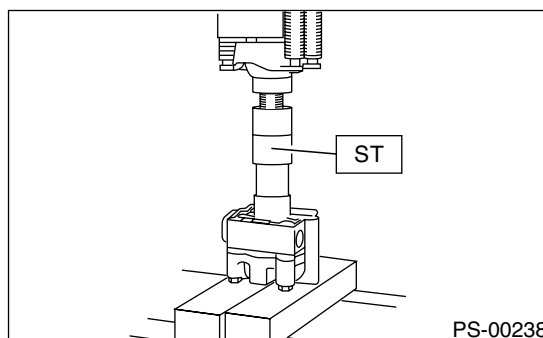
CAUTION:

Make sure that the front body internal surfaces are free from damage.

3) Temporarily install rear cover to front body.

4) Attach ST to front body. Using a press, install oil seal.

ST 34199AE030 INSTALLER



5) Install pump pulley to front body.

6) Using ST, place oil pump in a vise.

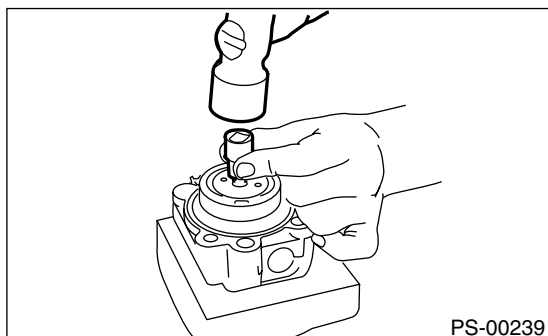
ST 34199AE020 ATTACHMENT

7) Remove rear cover.

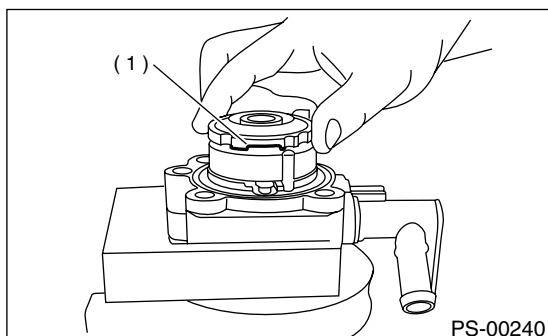
OIL PUMP

POWER ASSISTED SYSTEM (POWER STEERING)

8) Using 10-mm box wrench, tap retaining ring into shaft groove.



9) Install pressure plate as shown in the figure.



(1) Groove

10) Apply specified hydraulic oil to O-rings and fit them into front casing and pressure plate.

11) Install seal ring to pressure plate.

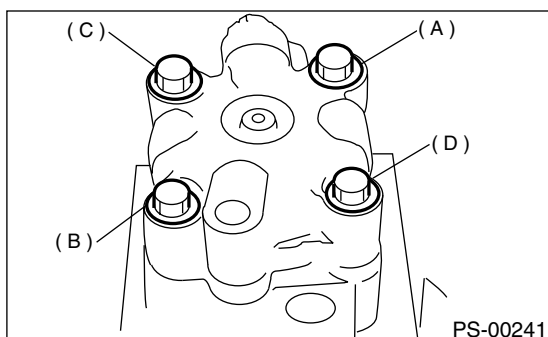
12) With knock pin positions aligned, install rear cover.

Tightening torque:

27.5 N·m (2.8 kgf-m, 20.3 ft-lb)

CAUTION:

Loosely tighten bolts in the sequence (A), (B), (C), and (D) shown in figure. Then, tighten in the same sequence.



13) When reassembly procedures have been completed, turn shaft by hand to ensure it turns smoothly. If it binds or other unusual conditions are evident, disassemble again and check for foreign

matter trapped on sliding surfaces and improper installation. Eliminate the cause of trouble.

14) Check followings by referring to "CHECK" article.

- Excessive play in pulley shaft
- Ditch deflection of pulley
- Resistance to rotation of pulley
- Measurement of generated oil pressure

OIL PUMP

POWER ASSISTED SYSTEM (POWER STEERING)

E: INSPECTION

1. BASIC INSPECTION

Perform the following inspection procedures and repair or replace defective parts.

Part name	Description	Remedy
1. Front casing	1) Damage on body surfaces 2) Excessive wear on hole, into which spool valve is inserted. 3) Wear and damage on cartridge assembly mounting surface 4) Wear and damage on surfaces in contact with shaft and oil seal	Replace with a new one together with spool valve as selective fit is made.
2. Rear cover	1) Damage on body surfaces 2) Wear and damage on sliding surfaces	Replace with a new one.
3. Shaft	1) Shaft bend 2) Wear and damage on surfaces in contact with bushing and oil seal 3) Wear and damage on rotor mounting surfaces 4) Bearing damage	Replace with a new one.
4. Pressure plate	Wear and damage on sliding surfaces	Replace with a new one.
5. Cam ring	Ridge wear on sliding surfaces	If damage is serious, replace with a new cartridge assembly.
6. Vane	Excessive wear on nose radius and side surfaces	
7. Rotor	1) Wear and damage on sliding surfaces 2) Ridge wear on vane sliding grooves (If light leaks with vane in slit against light source) 3) Damage resulting from snap ring removal	
8. Connector	Damage on threads	Correct with oil stone. If damage is serious, replace with a new cartridge assembly.
9. Spring	Damage	Replace with a new one.
10. Bolts and nuts	Damage on threads	Replace with a new one.

• In accordance with the following table, check all removed parts for wear and damage, and make repair or replacement if necessary.

No.	Parts	Inspection	Corrective action
1	Oil pump (Exterior)	(1) Crack, damage or oil leakage	Replace oil pump with a new one.
		(2) Play of pulley shaft	Measure radial play and axial play. If any of these exceeds the service limit, replace oil pump with a new one.
2	Pulley	(1) Damage	Replace it with a new one.
		(2) Bend	Measure V ditch deflection. If it exceeds the service limit, replace pulley with a new one.
3	Oil pump (Interior)	(1) Defect or burning of vane pump	Check resistance to rotation of pulley. If it is past the service limit, replace oil pump with a new one.
		(2) Bend in the shaft or damage to bearing	Oil pump emits a noise that is markedly different in tone and loudness from a sound of a new oil pump when turning with a string put around its pulley, replace oil pump with a new one.
4	O-ring	Crack or deterioration	Replace it with a new one.
5	Bracket	Crack	Replace it with a new one.

OIL PUMP

POWER ASSISTED SYSTEM (POWER STEERING)

2. SERVICE LIMIT

Make a measurement as follows. If it exceeds the specified service limit, replace the parts with new ones.

CAUTION:

- Fix oil pump on a vise to make a measurement. At this time, hold oil pump with the least possible force between two wood pieces.
- Do not set outside of flow control valve or pulley on a vise; otherwise outside or pulley might be deformed. Select properly sized wood pieces.

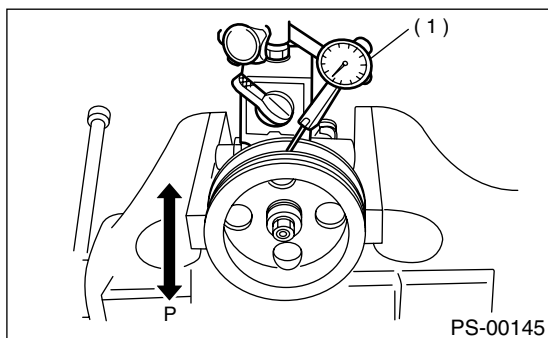
1) Play of pulley shaft

On condition:

P: 9.8 N (1.0 kgf, 2.2 lb)

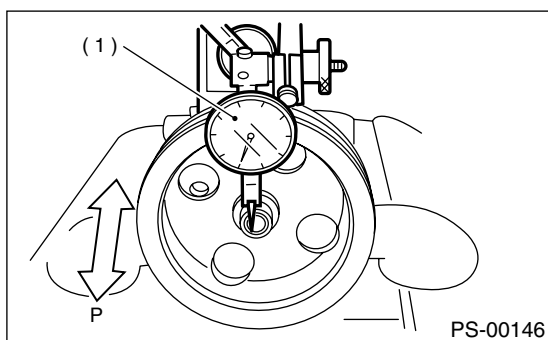
Service limit:

Radial play (Direction $\longleftrightarrow$)
0.4 mm (0.016 in) or less



(1) Dial indicator

Axial play (Direction $\longleftrightarrow$)
0.6 mm (0.024 in) or less



(1) Dial indicator

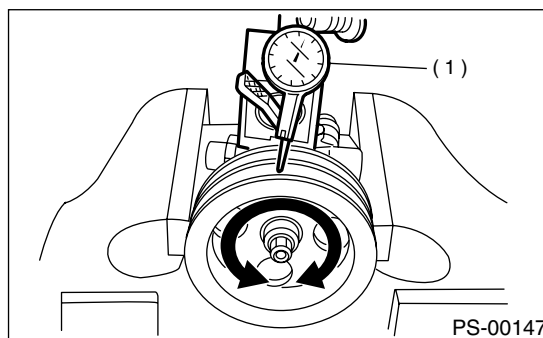
2) Ditch deflection of pulley

Service limit:

1.0 mm (0.039 in) or less

NOTE:

Read the value for one surface of V ditch, and then the value for another off the dial.



(1) Dial indicator

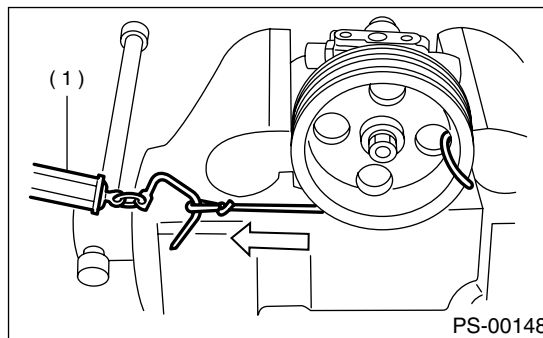
3) Resistance to rotation of pulley

Service limit:

Maximum load; 9.22 N (0.94 kgf, 2.07 lb) or less

NOTE:

- A rather higher value may be indicated when pulley starts turning.
- Measure the load during rotation and make a judgment.



(1) Spring balance

OIL PUMP

POWER ASSISTED SYSTEM (POWER STEERING)

3. HYDRAULIC PRESSURE

CAUTION:

- Be sure to complete all items aforementioned in "INSPECTION", prior to measuring hydraulic pressure. Otherwise, pressure can not be measured correctly. <Ref. to PS-66, INSPECTION, General Diagnostic Table.>
- Do not leave the valve of pressure gauge closed or hold the steering wheel at stop end for 5 seconds or more in any case, as the oil pump may be damaged due to long keep of these conditions.
- Put cotton cloth waste at a place where fluid drops before pressure gauge is installed. Wipe off split fluid thoroughly after the measurement.

NOTE:

Keep engine idling during the measurement.

1) REGULAR PRESSURE MEASUREMENT

- (1) Connect ST1, ST2 and ST3.

ST1 92511000 PRESSURE GAUGE

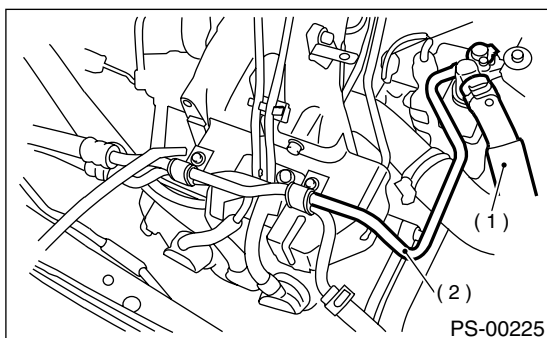
ST2 34099AC020 ADAPTER HOSE B

ST3 34099AC010 ADAPTER HOSE A

- (2) Disconnect pressure hose from the pump.

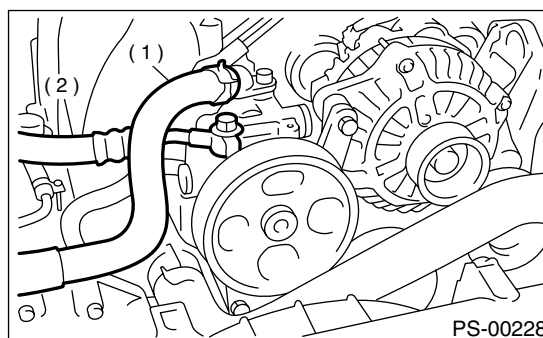
- (3) Using gasket (Part No. 34621AC021) and bolt (Part No. 34620AC010), instal ST2 to the pump instead of pressure hose.

2.5 L model:



- (1) Suction hose
(2) Pressure hose

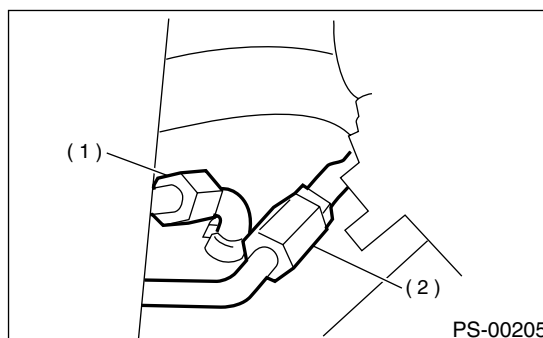
3.0 L model:



- (1) Suction hose
(2) Pressure hose

- (4) Disconnect pipe C form pipe (on gearbox side).

- (5) Install ST3 to pipe C.



- (1) Pipe C
(2) Pipe D

- (6) Replenish power steering fluid up to specified level.

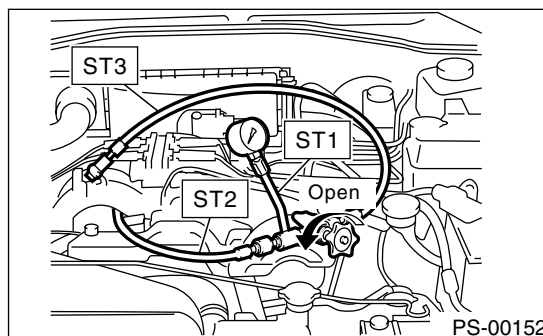
- (7) Open valve, and start the engine.

- (8) Measure regular pressure.

ST1 925711000 PRESSURE GAUGE

ST2 34099AC020 ADAPTER HOSE B

ST3 34099AC010 ADAPTER HOSE A



Service limit:

981 kPa (10 kg/cm², 142 psi) or less

OIL PUMP

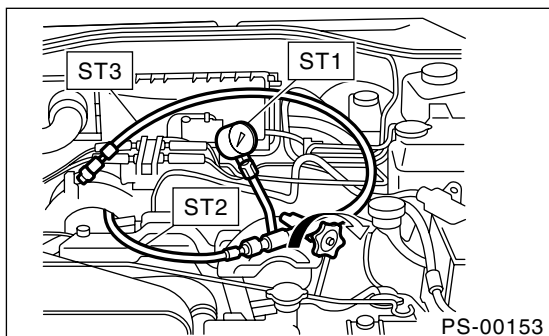
POWER ASSISTED SYSTEM (POWER STEERING)

(9) If it is not within the specified value, replace the troubled part caused by the following symptoms; pipe or hose clogged, leaks from fluid line, and mix of foreign objects in fluid line.

2) Measure relief pressure.

- (1) Using STs, measure relief pressure.
- (2) Close valve.
- (3) Measure relief pressure.

ST1 925711000 PRESSURE GAUGE
ST2 34099AC020 ADAPTER HOSE B
ST3 34099AC010 ADAPTER HOSE A



Service limit:

2.5 L model

**9,611 — 10,199 kPa (98 — 104 kg/cm²,
1,394 — 1,479 psi)**

TURBO model and 3.0 L model

**7,650 — 8,340 kPa (78.03 — 88.13 kg/cm²,
1,109 — 1,209 psi)**

(4) If it is within the specified value, measure steering effort. <Ref. to PS-69, MEASUREMENT OF STEERING EFFORT, INSPECTION, General Diagnostic Table.> If it is not within specified value, replace control valve itself or control valve and pinion as a single unit with new ones.

Service limit:

2.5 L model

**9,611 — 10,199 kPa (98 — 104 kg/cm²,
1,394 — 1,479 psi)**

TURBO model and 3.0 L model

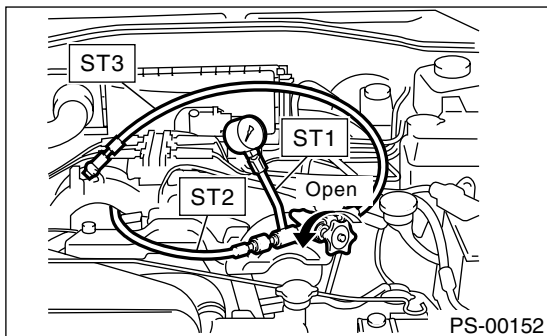
**7,650 — 8,340 kPa (78.03 — 88.13 kg/cm²,
1,109 — 1,209 psi)**

(4) If it is not within the specified value, replace the oil pump.

3) Measure working pressure.

- (1) Using STs, measure working pressure.
- (2) Open valve.
- (3) Measure working pressure of control valve by turning wheel from stop to stop.

ST1 925711000 PRESSURE GAUGE
ST2 34099AC020 ADAPTER HOSE B
ST3 34099AC010 ADAPTER HOSE A



STEERING WHEEL

POWER ASSISTED SYSTEM (POWER STEERING)

2. Steering Wheel

A: REMOVAL

- 1) Disconnect ground cable from battery.
- 2) Set tires to straight-ahead position.
- 3) Remove airbag module. <Ref. to AB-13, REMOVAL, Driver's Airbag Module.>

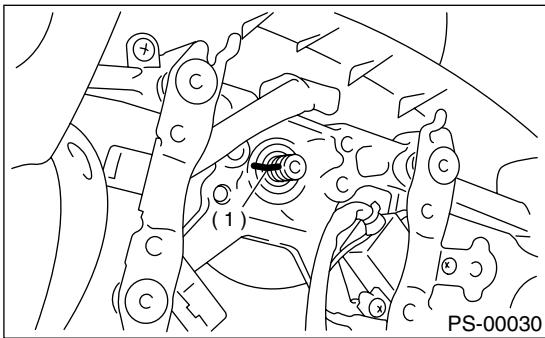
WARNING:

Always refer to "Airbag System" before performing airbag module service (if so equipped). <Ref. to AB-13, INSPECTION, Driver's Airbag Module.>

- 4) Remove steering wheel nut, and then draw out steering wheel from shaft using steering puller.

NOTE:

Make matching marks on steering wheel and steering column in advance.



(1) Matching mark

B: INSTALLATION

- 1) Align center of roll connector. <Ref. to AB-20, ADJUSTMENT, Roll Connector.>
- 2) Install in the reverse order of removal.

NOTE:

Align matching marks on steering wheel and steering column.

Tightening torque:

4.5 N·m (4.5 kgf-m, 32.5 ft-lb)

Column cover-to-steering wheel clearance:

2 — 4 mm (0.08 — 0.16 in)

WARNING:

Always refer to "Airbag System" before performing airbag module service (if so equipped). <Ref. to AB-13, INSPECTION, Driver's Airbag Module.>

CAUTION:

Insert roll connector guide pin into guide hole on lower end of surface of steering wheel to prevent damage. Draw out airbag system connector, horn connector and cruise control con-

nectors from guide hole of steering wheel lower end.

C: INSPECTION

- 1) Check steering wheel for deformation. If the deformation is excessive, replace steering wheel.
- 2) Check splines on steering wheel for damage. If the damage is excessive, replace steering wheel.

GENERAL DESCRIPTION

REAR SUSPENSION

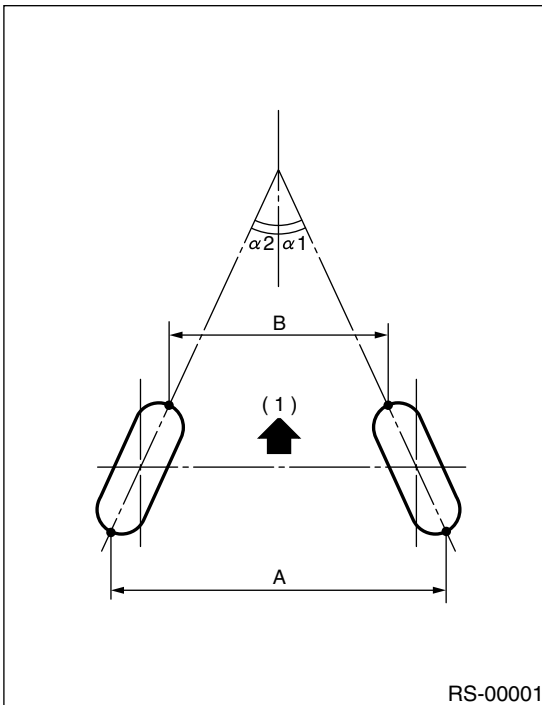
1. General Description

A: SPECIFICATIONS

Refer to "General Description" of FS section about value of wheel alignment. <Ref. to FS-2, General Description.>

NOTE:

- Front and rear toe-in and front camber can be adjusted. If toe-in or camber tolerance exceeds specifications, adjust toe-in and camber to the adjustment standard value.
- The other items indicated in the specification table cannot be adjusted. If the other items exceed specifications, check suspension parts and connections for deformities; replace with new ones as required.



(1) Front

$A - B$ = Positive: Toe-in, Negative: Toe-out

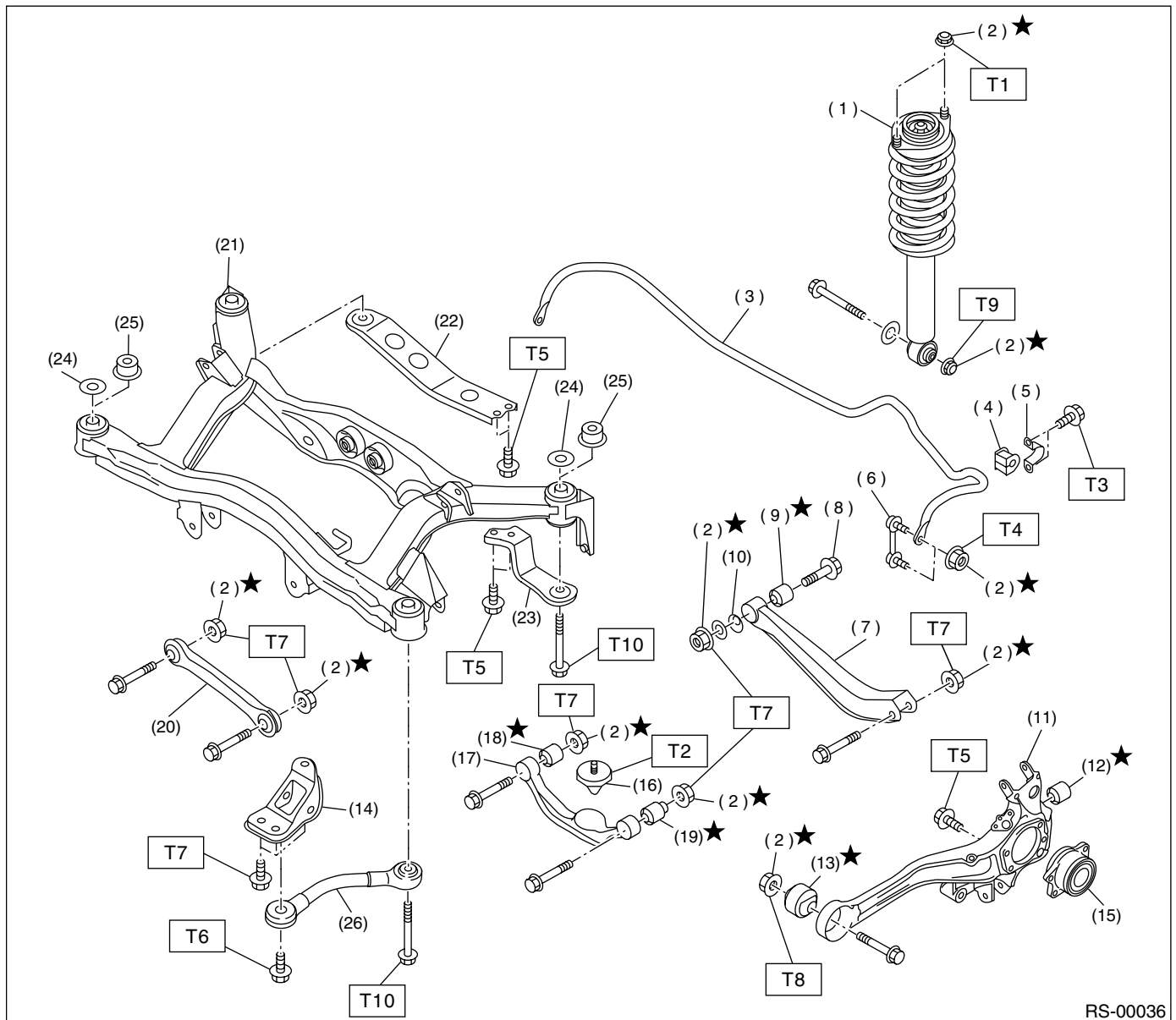
$\alpha 1, \alpha 2$: Each toe-in angle

GENERAL DESCRIPTION

REAR SUSPENSION

B: COMPONENT

1. REAR SUSPENSION



RS-00036

- | | |
|-----------------------------|---|
| (1) Shock absorber | (15) Hub bearing unit |
| (2) Self-locking nut | (16) Helper |
| (3) Stabilizer | (17) Link upper |
| (4) Stabilizer bushing | (18) Link upper bushing (Inside) |
| (5) Clamp | (19) Link upper bushing (Outside) |
| (6) Stabilizer link | (20) Link front |
| (7) Link rear | (21) Rear sub frame |
| (8) Adjusting bolt | (22) Support sub frame (RH) |
| (9) Link rear bushing | (23) Support sub frame (LH) |
| (10) Adjusting washer | (24) Stopper upper (Except OUTBACK model) |
| (11) Rear arm | (25) Stopper upper (OUTBACK MODEL) |
| (12) Rear arm rear bushing | (26) Support sub frame front |
| (13) Rear arm front bushing | |
| (14) Rear arm bracket | |

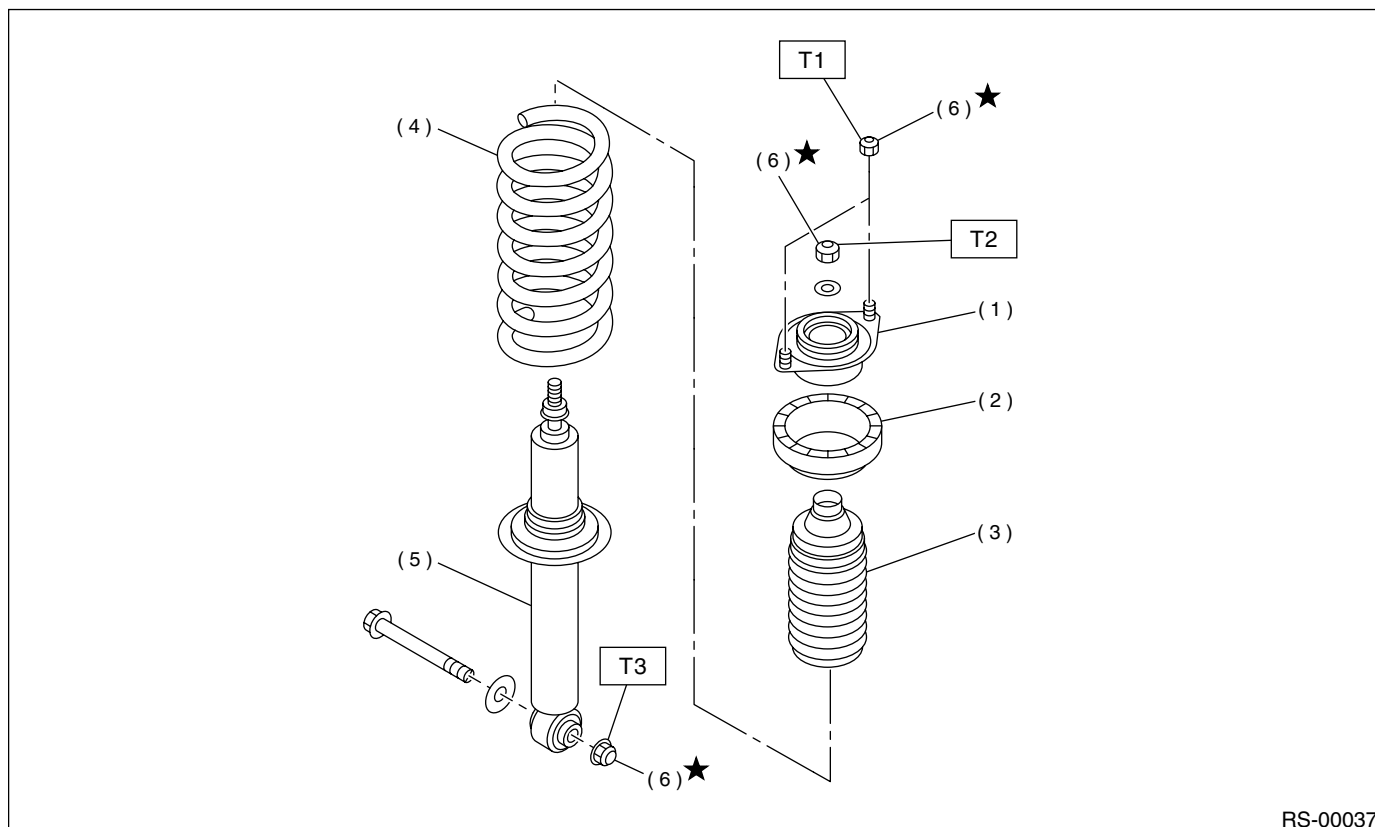
Tightening torque: N-m (kgf-m, ft-lb)

- | | |
|-------------|------------------------|
| T1: | 30 (3.1, 22.4) |
| T2: | 32 (3.3, 24) |
| T3: | 40 (4.1, 30) |
| T4: | 44 (4.5, 32.5) |
| T5: | 65 (6.6, 48) |
| T6: | 80 (8.2, 59) |
| T7: | 120 (12.2, 88) |
| T8: | 150 (15.3, 111) |
| T9: | 160 (16.3, 118) |
| T10: | 175 (17.8, 129) |

GENERAL DESCRIPTION

REAR SUSPENSION

2. SHOCK ABSORBER



- | | |
|-----------------------|----------------------|
| (1) Mount | (4) Coil spring |
| (2) Rubber seat upper | (5) Shock absorber |
| (3) Dust cover | (6) Self-locking nut |

Tightening torque: N·m (kgf-m, ft-lb)

T1: 30 (3.1, 22.4)

T2: 35 (3.6, 26)

T3: 160 (16.3, 118)

GENERAL DESCRIPTION

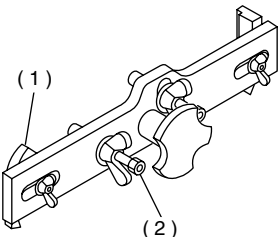
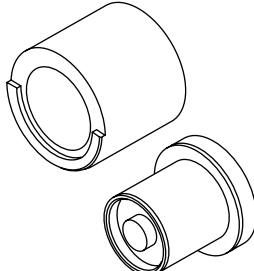
REAR SUSPENSION

C: CAUTION

- Wear working clothing, including a cap, protective goggles, and protective shoes during operation.
- Remove contamination including dirt and corrosion before removal, installation or disassembly.
- Keep the disassembled parts in order and protect them from dust or dirt.
- Before removal, installation or disassembly, be sure to clarify the failure. Avoid unnecessary removal, installation, disassembly, and replacement.
- Use SUBARU genuine grease etc. or the equivalent. Do not mix grease etc. with that of another grade or from other manufacturers.
- Be sure to tighten fasteners including bolts and nuts to the specified torque.
- Place shop jacks or safety stands at the specified points.
- Apply grease onto sliding or revolution surfaces before installation.
- Before installing O-rings or snap rings, apply sufficient amount of grease to avoid damage and deformation.
- Before securing a part on a vise, place cushioning material such as wood blocks, aluminum plate, or shop cloth between the part and the vise.
- Before disposing shock absorbers, be sure to bleed gas completely. Also, do not throw away in fire.

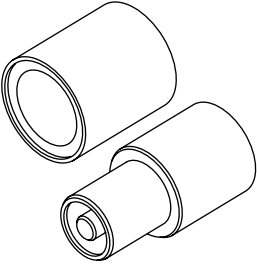
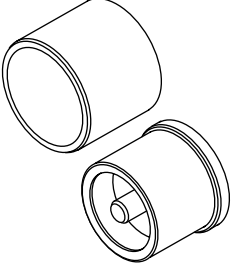
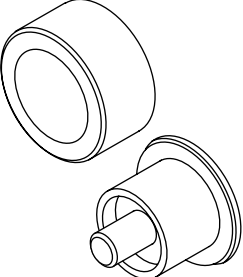
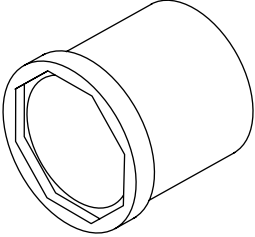
D: PREPARATION TOOL

1. SPECIAL TOOLS

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-927380002	927380002	ADAPTER	Used as an adapter for camber & caster gauge when measuring camber and caster. (1) 28199AC000 PLATE (2) 28199AC010 BOLT
 ST20099AE000	20099AE000	INSTALLER & REMOVER	Used for replacing link rear bushing.

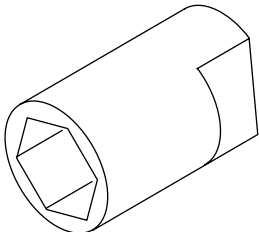
GENERAL DESCRIPTION

REAR SUSPENSION

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST20099AE010	20099AE010	INSTALLER & REMOVER	Used for replacing link upper bushing.
 ST20099AE020	20099AE020	INSTALLER & REMOVER SET	Used for replacing rear arm front bushing.
 ST20099AE040	20099AE040	INSTALLER & REMOVER SET	Used for replacing rear arm rear bushing.
 ST20099AE030	20099AE030	HELPER SOCKET WRENCH	Used for replacing helper.

GENERAL DESCRIPTION

REAR SUSPENSION

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-927760000	927760000	STRUT MOUNT SOCKET	Used for disassembling and assembling strut and shock mount.

2. GENERAL PURPOSE TOOLS

TOOL NAME	REMARKS
Alignment gauge	Used for wheel alignment measurement.
Turning radius gauge	Used for wheel alignment measurement.
Toe-in gauge	Used for toe-in measurement.
Transmission jack	Used for suspension assembly/disassembly.
Bearing puller	Used for removing bushings.

GENERAL DIAGNOSTIC TABLE

REAR SUSPENSION

12.General Diagnostic Table

A: INSPECTION

1. IMPROPER VEHICLE POSTURE OR IMPROPER WHEEL ARCH HEIGHT

Possible causes	Countermeasures
(1) Permanent distortion or breakage of coil spring	Replace.
(2) Unsmooth operation of damper strut and/or shock absorber	Replace.
(3) Installation of wrong strut and/or shock absorber	Replace with proper parts.
(4) Installation of wrong coil spring	Replace with proper parts.

2. POOR RIDE COMFORT

- 1) Large rebound shock
- 2) Rocking of vehicle continues too long after running over bump and/or hump.
- 3) Large shock in bumping

Possible causes	Countermeasures
(1) Breakage of coil spring	Replace.
(2) Overinflation pressure of tire	Adjust.
(3) Improper wheel arch height	Adjust or replace coil springs with new ones.
(4) Fault in operation of damper strut and/or shock absorber	Replace.
(5) Damage or deformation of strut mount and/or shock absorber mount	Replace.
(6) Unsuitability of maximum and/or minimum length of damper strut and/or shock absorber	Replace with proper parts.
(7) Deformation or loss of bushing	Replace.
(8) Deformation or damage of helper in strut assembly and/or shock absorber	Replace.
(9) Oil leakage of damper strut and/or shock absorber	Replace.

3. NOISE

Possible causes	Countermeasures
(1) Wear or damage of damper strut and/or shock absorber component parts	Replace.
(2) Loosening of suspension link installing bolt	Retighten to the specified torque.
(3) Deformation or loss of bushing	Replace.
(4) Unsuitability of maximum and/or minimum length of damper strut and/or shock absorber	Replace with proper parts.
(5) Breakage of coil spring	Replace.
(6) Wear or damage of ball joint	Replace.
(7) Deformation of stabilizer clamp	Replace.

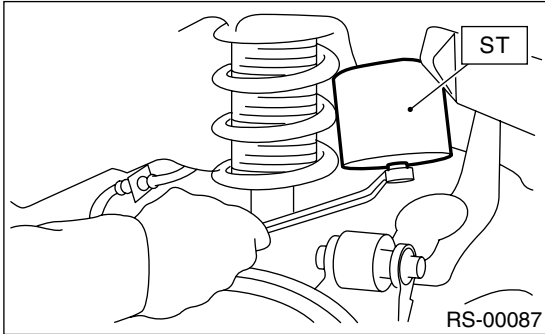
11.Helper

A: REMOVAL

1) Jack-up the rear part of the vehicle, support it with safety stands (rigid racks).

2) Using ST, remove helper.

ST 20099AE030 HELPER SOCKET WRENCH



B: INSTALLATION

Install in the reverse order of removal.

Tightening torque:

32 N·m (3.3 kgf-m, 24 ft-lb)

C: INSPECTION

Check helper for cracks, fatigue or damage.

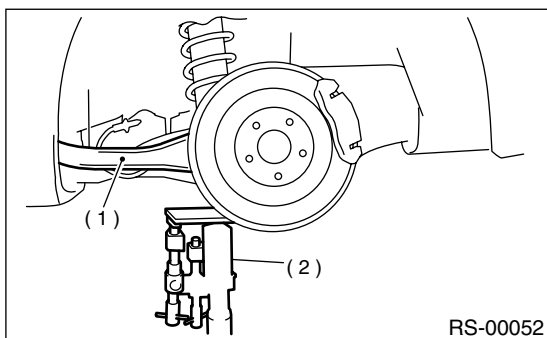
LINK FRONT

REAR SUSPENSION

7. Link Front

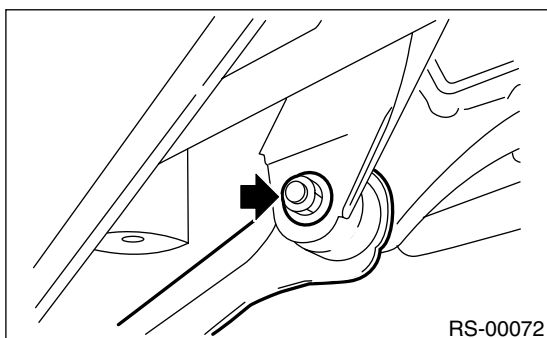
A: REMOVAL

- 1) Loosen wheel nuts. Lift-up vehicle and remove wheel.
- 2) Use transmission jack to support rear arm horizontally.

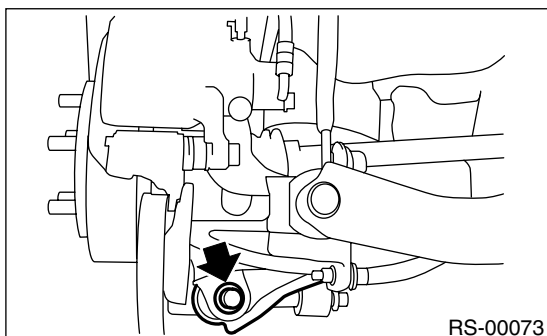


- (1) Rear arm
(2) Transmission jack

- 3) Remove bolt securing link front to sub frame.



- 4) Remove bolts which secure link front to rear arm and detach link front.



NOTE:

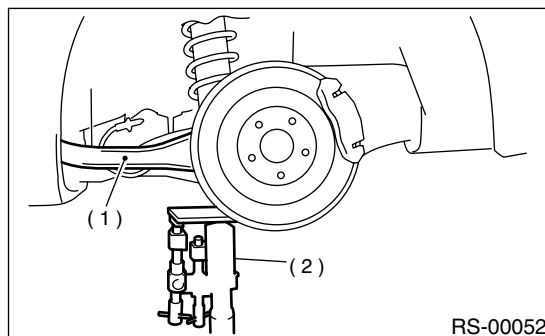
Link front bushing cannot be replaced alone. Always replace link front and bushing as a single unit.

B: INSTALLATION

Install in the reverse order of removal, observing the following instructions.

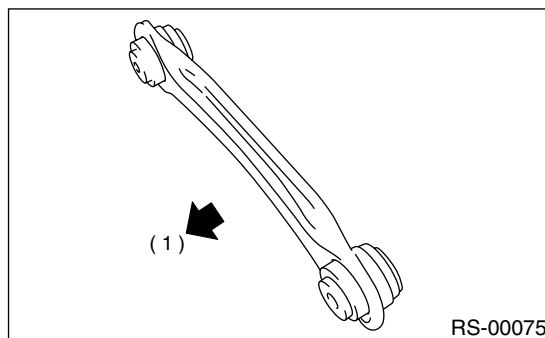
CAUTION:

- Using transmission jack, support rear arm horizontally, install link front and tighten nuts to specified torque.



- (1) Rear arm
(2) Transmission jack

- Install link front with protruded side facing front.



- (1) Front

CAUTION:

Use a new self-locking nut.

NOTE:

Check wheel alignment and adjust if necessary.

Tightening torque:

120 N·m (12.2 kgf-m, 88 ft-lb)

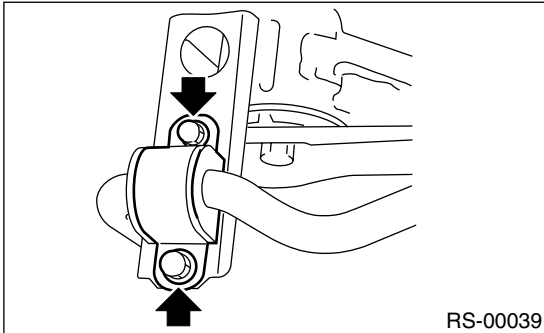
C: INSPECTION

Visually check link front for damage or bends.

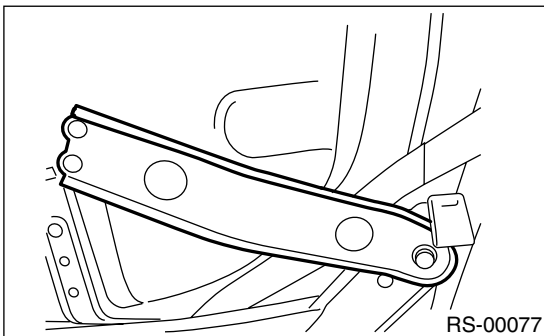
8. Link Rear

A: REMOVAL

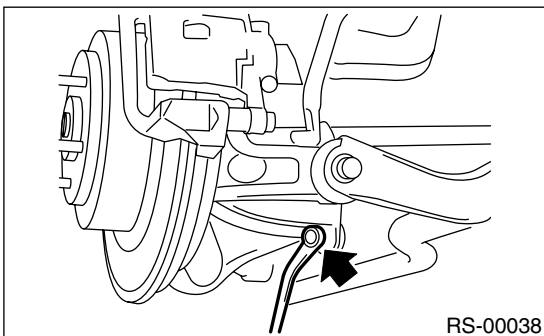
- 1) Loosen wheel nuts. Lift-up vehicle and remove wheel.
- 2) Remove bolt securing stabilizer clamps to sub frame.



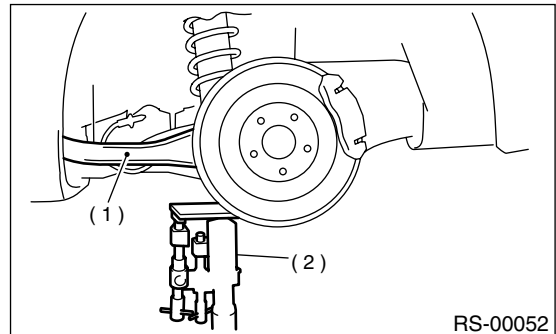
- 3) Remove support sub frame RH. (When removing RH side link rear.)



- 4) Remove stabilizer link.

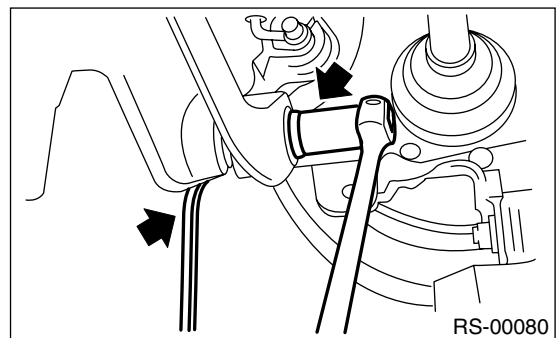


- 5) Use transmission jack to support rear arm horizontally.



- (1) Rear arm
- (2) Transmission jack

- 6) Remove bolt securing link rear to rear arm.

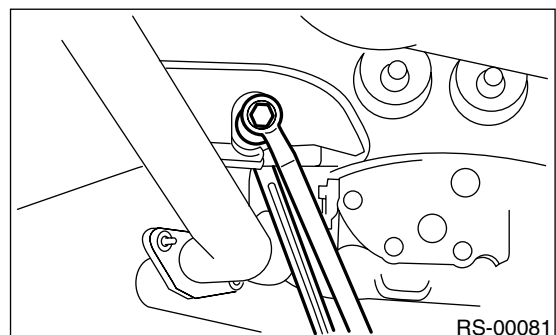


- 7) Scribe an alignment mark on link rear adjusting bolt and sub frame.

- 8) Remove bolts securing link rear to sub frame, detach link rear.

CAUTION:

To loosen adjusting bolt, always loosen nut while holding the head of adjusting bolt.



LINK REAR

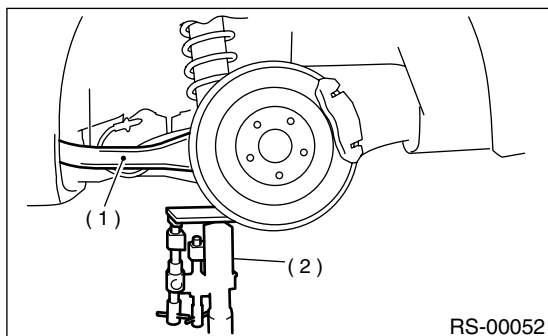
REAR SUSPENSION

B: INSTALLATION

Install in the reverse order of removal, observing the following instructions.

CAUTION:

Using transmission jack, support rear arm horizontally, install link rear and tighten nuts to specified torque.



- (1) Rear arm
- (2) Transmission jack

CAUTION:

- Tighten nut when installing adjusting bolt.
- Use a new self-locking nut.

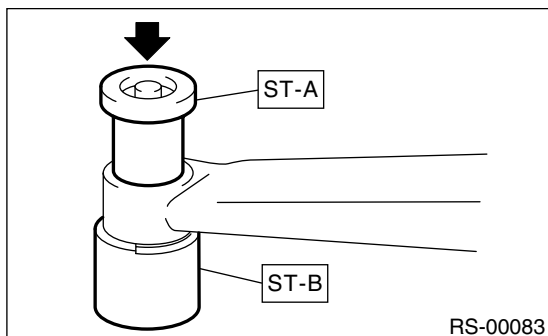
NOTE:

Check wheel alignment and adjust if necessary.

C: DISASSEMBLY

Using ST-A, B, press bushing out of place.

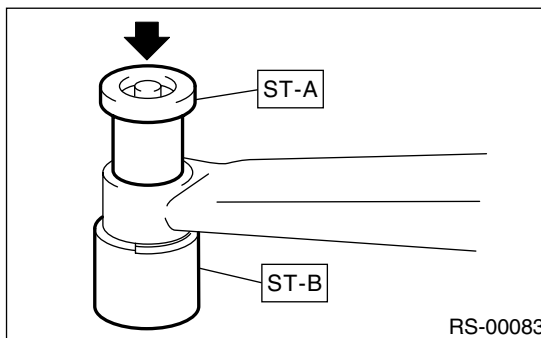
ST-A, B 20099AE000INSTALLER & REMOVER



D: ASSEMBLY

Using ST-A and ST-B, press bushing into place.

ST-A, B 20099AE000INSTALLER & REMOVER



E: INSPECTION

Visually check link rear for damage or bends.

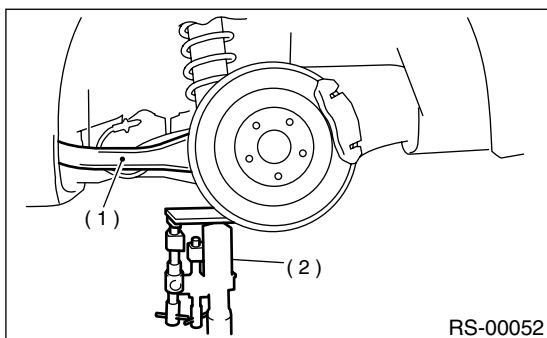
LINK UPPER

REAR SUSPENSION

5. Link Upper

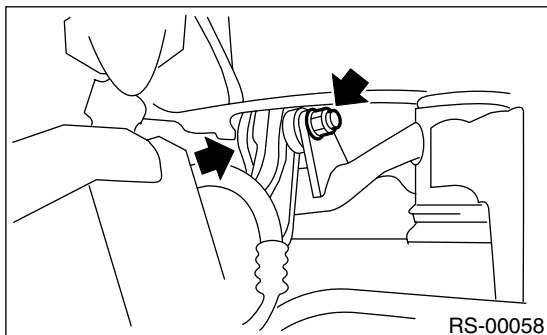
A: REMOVAL

- 1) Loosen wheel nuts. Lift-up vehicle and remove wheel.
- 2) Use transmission jack to support rear arm horizontally.

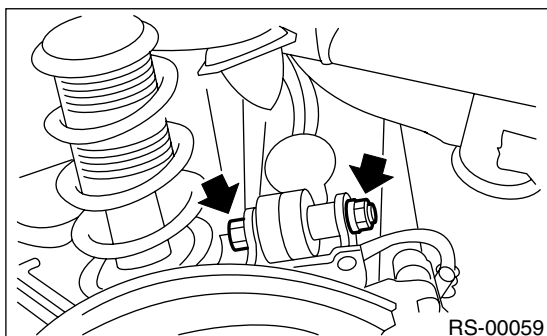


- (1) Rear arm
(2) Transmission jack

- 3) Remove bolt securing link upper to sub frame.



- 4) Remove bolts which secure link upper to rear arm and detach link upper.

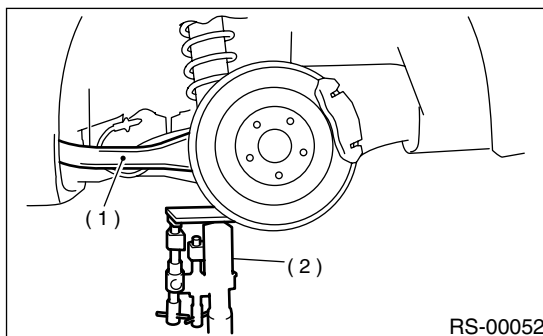


B: INSTALLATION

Install in the reverse order of removal, observing the following instructions.

CAUTION:

Using transmission jack, support rear arm horizontally, install link upper and tighten nuts to specified torque.



- (1) Rear arm
(2) Transmission jack

CAUTION:

- Tighten nut when installing adjusting bolt.
- Use a new self-locking nut.

NOTE:

Check wheel alignment and adjust if necessary.

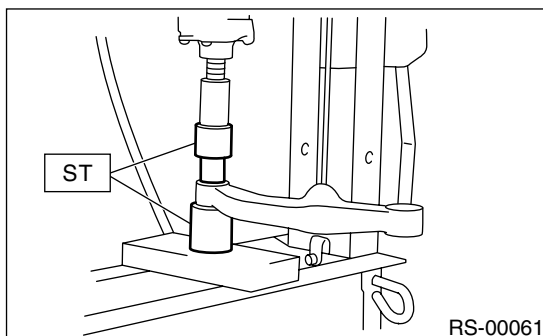
Tightening torque:

120 N·m (12.2 kgf-m, 88 ft-lb)

C: DISASSEMBLY

Using ST, press bushing out of place.

ST 20099AE010 INSTALLER & REMOVER



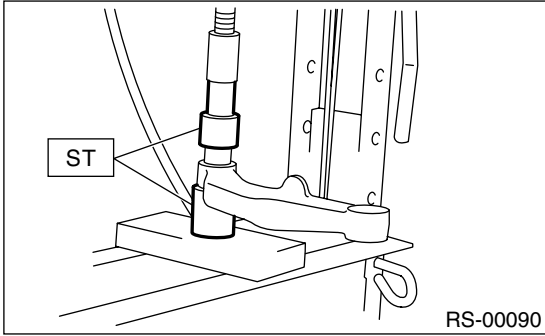
D: ASSEMBLY

1) Using ST, press bushing into place.

ST 20099AE010 INSTALLER & REMOVER

CAUTION:

Outer bushing has a “directional” design. Be sure to install bushing with longer inner housing side facing vehicle rear.



E: INSPECTION

Visually check link upper for damage or bends.

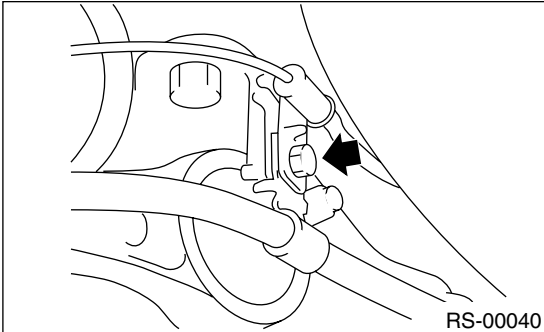
REAR ARM

REAR SUSPENSION

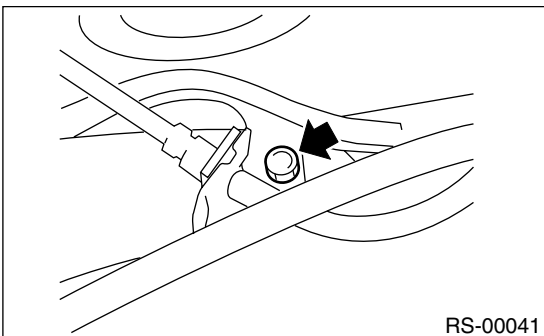
4. Rear Arm

A: REMOVAL

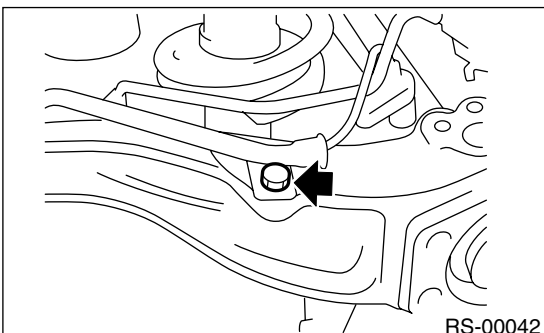
- 1) Lift-up the vehicle and remove rear wheel.
- 2) Remove support sub frame front.
<Ref. to RS-21, REMOVAL, Support Sub Frame Front.>
- 3) Remove bearing unit.
<Ref. to DS-24, REMOVAL, Hub Unit Bearing.>
- 4) Remove bolt securing parking brake cable clamp to rear arm.



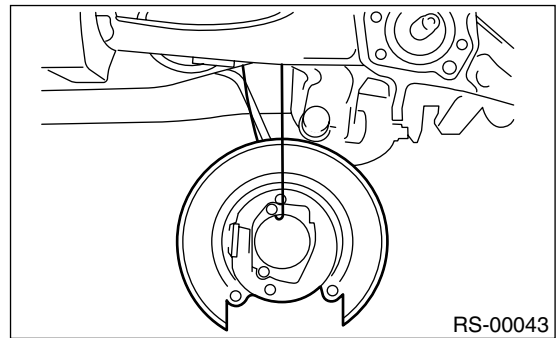
- 5) Remove bolt securing brake hose to rear arm.



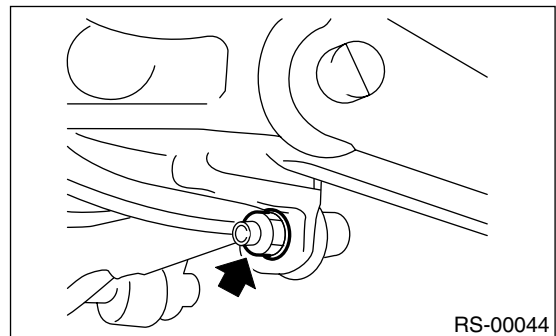
- 6) Remove bolt securing ABS sensor to rear arm.



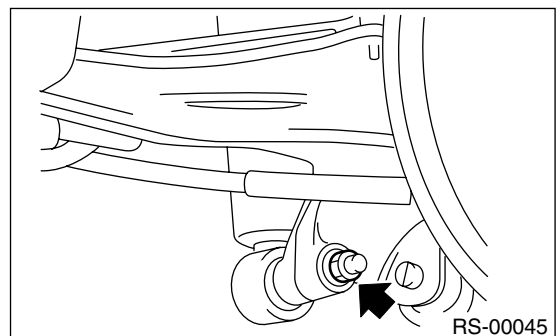
- 7) Suspend the back plate from sub frame.



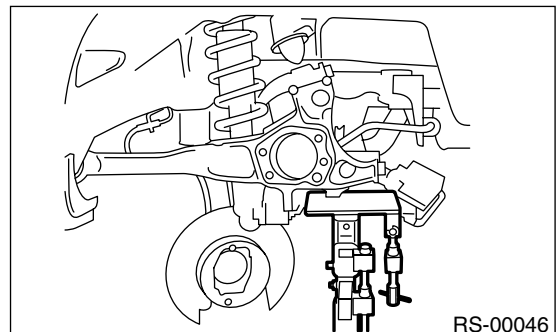
- 8) Remove nut securing stabilizer link to rear arm.



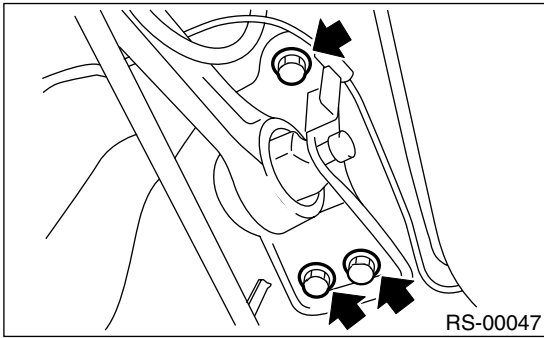
- 9) Remove bolt securing shock absorber to rear arm.



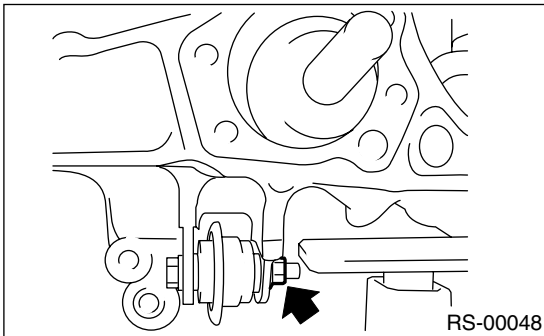
- 10) Use transmission jack to support rear arm horizontally.



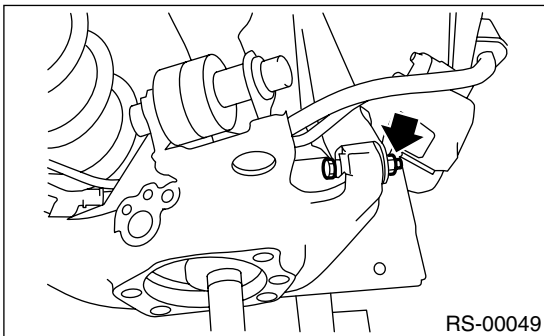
- 11) Remove bolt securing rear arm to body.



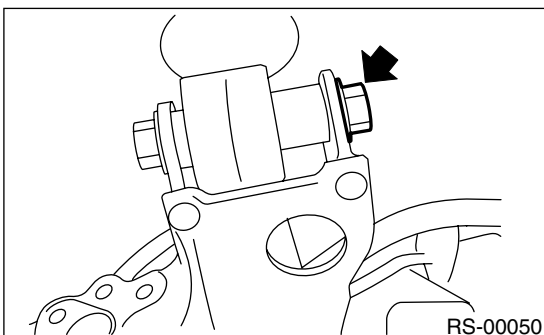
- 12) Loosen nut securing link front to rear arm.



- 13) Loosen nut securing link rear to rear arm.



- 14) Loosen nut securing link upper to rear arm.



- 15) Remove bolts securing rear arm to links and remove rear arm.

B: INSTALLATION

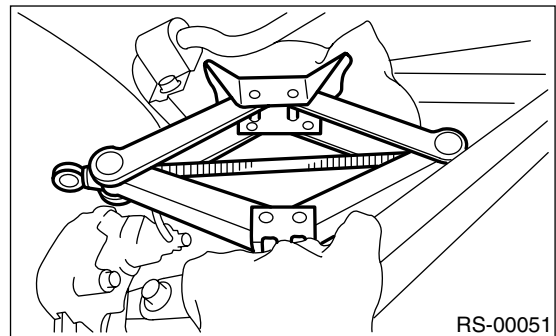
CAUTION:

Use a new self-locking nut.

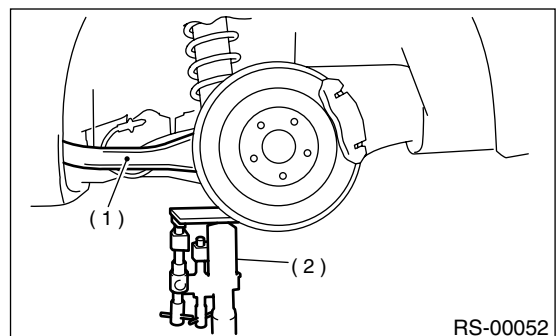
- 1) Use a transmission jack to support the rear arm.
- 2) Install rear arm and temporarily tighten bolts securing rear arm to links.
- 3) Install bearing unit.
<Ref. to DS-25, INSTALLATION, Hub Unit Bearing.>
- 4) Install bolt securing ABS sensor to rear arm.
- 5) Install bolt securing brake hose to rear arm.
- 6) Install bolt securing parking brake cable clamp to rear arm.
- 7) Place jack (furnished with vehicle) upside down and position it between link rear and sub frame. Adjust jack position so rear shock absorber is aligned with rear arm at their corresponding holes. Install lower shock absorber bolts.

CAUTION:

Put a cloth between jack and its mating area to protect link rear and sub frame from scratches.



- 8) Using transmission jack, support rear arm horizontally and tighten nuts and bolts securing rear arm, link front, link rear, link upper and shock absorber.



- (1) Rear arm
(2) Transmission jack

REAR ARM

REAR SUSPENSION

9) Install support sub frame front.

NOTE:

Check wheel alignment and adjust if necessary.

Tightening torque:

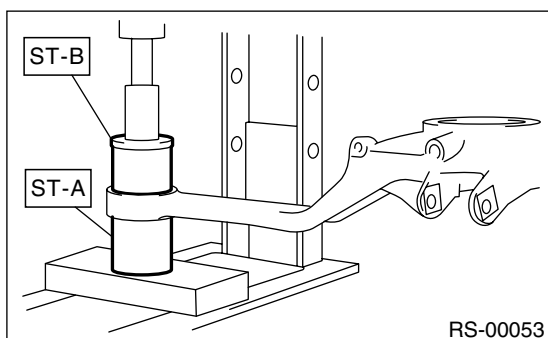
Refer to COMPONENT of General Description for tightening torque. <Ref. to RS-3, REAR SUSPENSION, COMPONENT, General Description.>

C: DISASSEMBLY

1. FRONT BUSHING

1) Using ST-A, B, press front bushing out of place.
ST-A, B 20099AE020INSTALLER & REMOVER SET

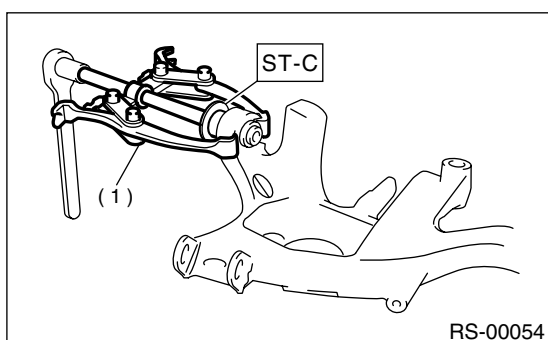
- (1) Set ST-A in position with larger inside diameter side facing up.
- (2) Set rear arm with protruded bushing side facing down.
- (3) Place ST-B on upper side of bushing, then press bushing out of position.



2. REAR BUSHING

Using ST-C and bearing puller, press rear bushing out of place.

ST-C 20099AE040INSTALLER & REMOVER SET



(1) Bearing puller

D: ASSEMBLY

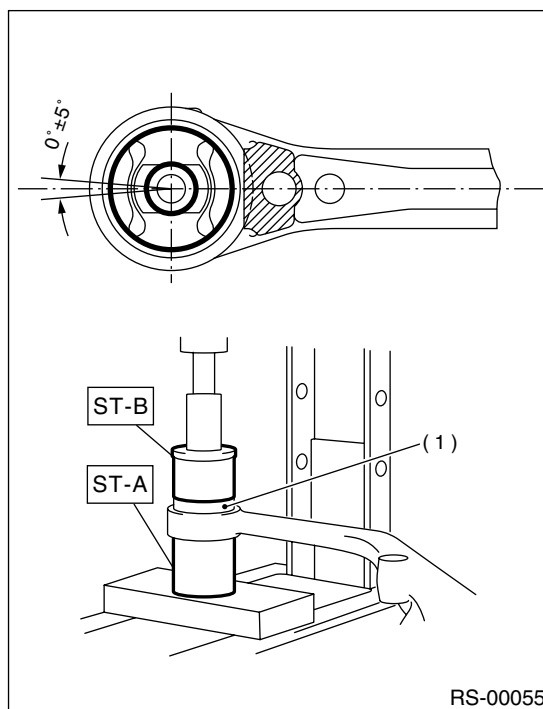
1. FRONT BUSHING

1) Using ST-A, B, press bushing into rear arm.
ST-A, B 20099AE020INSTALLER & REMOVER SET

- (1) Set ST-A in position with smaller inside diameter side facing up.
- (2) Set rear arm in position with outer side of vehicle body facing down.
- (3) Place bushing on upper side of rear arm.
- (4) Place ST-B on upper side of bushing, then press bushing into position.

CAUTION:

- Install bushing with painted side facing up.
- Install front bushing in the proper direction, as shown in figure.



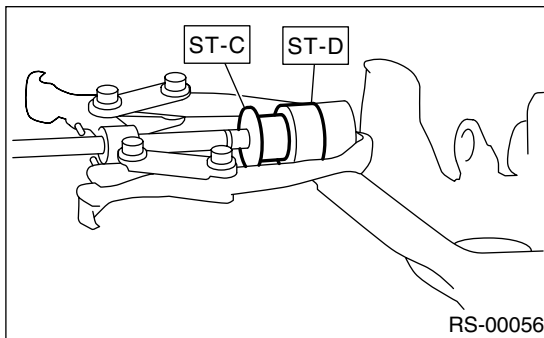
(1) Bushing

2. REAR BUSHING

1) Using ST-C, D and bearing puller, press bushing into rear arm.

ST-C, D 20099AE040INSTALLER & REMOVER SET

- (1) Insert bushing into bore in ST-D.
- (2) Set ST-C, ST-D and bearing puller in position, as shown in the figure, and press bushing into position.



E: INSPECTION

Check rear arm for bends, corrosion or damage.

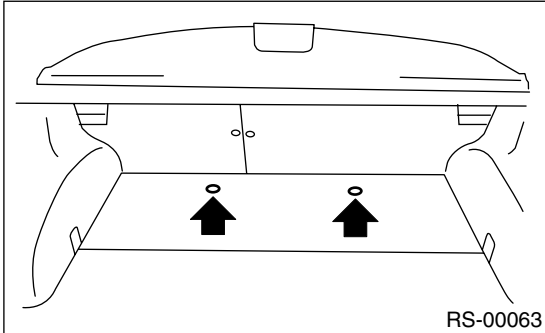
REAR SHOCK ABSORBER

REAR SUSPENSION

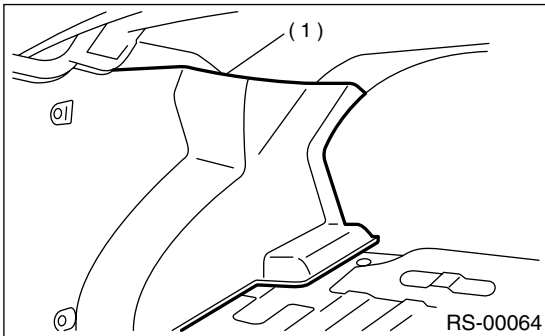
6. Rear Shock Absorber

A: REMOVAL

- 1) Lift-up vehicle and remove rear wheels.
- 2) Remove clip and detach floor mat. (Wagon model)

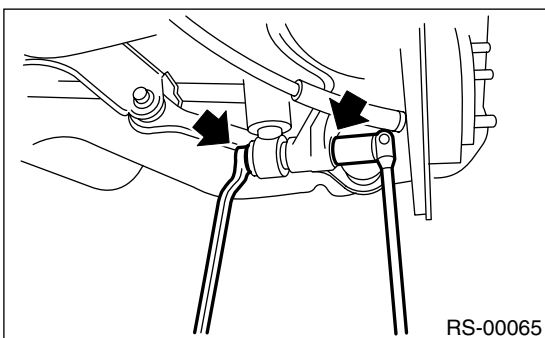


- 3) Detach trunk mat. (Sedan model)
- 4) Roll up the trunk side trim. (Sedan model)



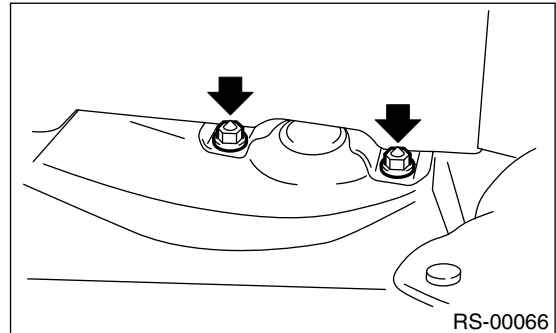
(1) Trunk side trim

- 5) Remove bolt securing shock absorber to rear arm.

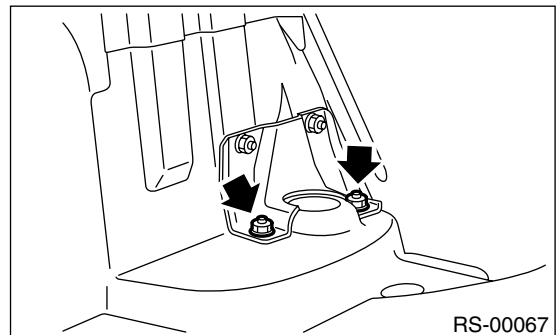


- 6) Use a jack to support the shock absorber.
- 7) Remove nuts securing shock absorber mount to body.

• Wagon



• Sedan



- 8) Remove shock absorber.

B: INSTALLATION

- 1) Use a jack to support the shock absorber.
- 2) Tighten self-locking nut used to secure shock absorber to vehicle body.

CAUTION:

Use a new self-locking nut.

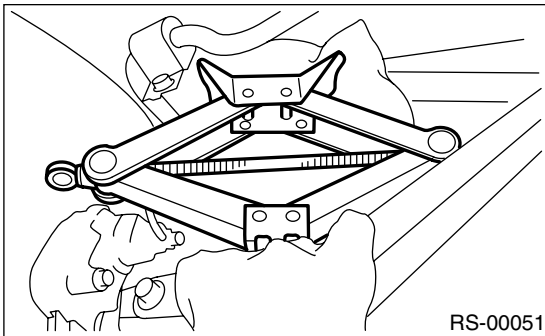
Tightening torque:

30 N·m (3.1 kgf-m, 22 ft-lb)

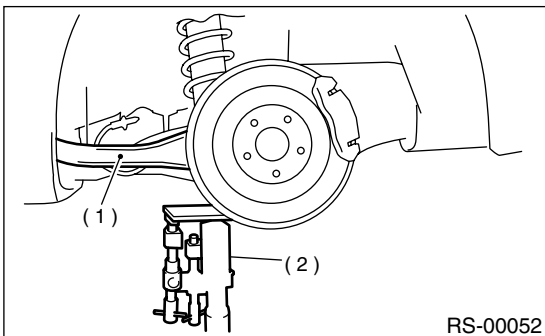
- 3) Place jack (furnished with vehicle) upside down and position it between link rear and sub frame. Adjust jack position so rear shock absorber is aligned with rear arm at their corresponding holes. Install lower shock absorber bolts.

CAUTION:

Put a cloth between jack and its mating area to protect link rear and sub frame from scratches.



- 4) Using transmission jack, support rear arm horizontally and tighten shock absorber nuts and bolts to specified torque.



- (1) Rear arm
- (2) Transmission jack

Tightening torque:

160 N·m (16.3 kgf-m, 118 ft-lb)

CAUTION:

Use a new self-locking nut.

- 5) Install floor mat. (Wagon model)
- 6) Set trunk side trim. (Sedan model)

- 7) Install trunk mat. (Sedan model)

NOTE:

Check wheel alignment and adjust if necessary.

C: DISASSEMBLY

For disassembly of shock absorber, refer to procedures outlined under front strut as a guide.

<Ref. to FS-19, DISASSEMBLY, Front Strut.>

D: ASSEMBLY

Refer to Front Strut as a guide for assembly procedures.

<Ref. to FS-19, ASSEMBLY, Front Strut.>

E: INSPECTION

Refer to Front Strut as a guide for inspection procedures.

<Ref. to FS-20, INSPECTION, Front Strut.>

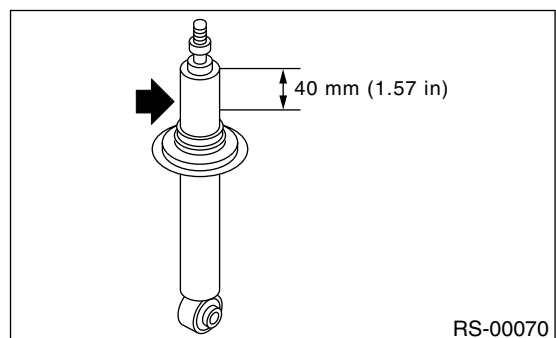
F: DISPOSAL

CAUTION:

- Before handling shock absorber, be sure to wear goggles to protect eyes from gas, oil and/or filings.
- Completely discharge the gas from the shock absorber before disposal. Follow the disposal procedure outlined below.
- Do not disassemble shock absorber or place into a fire.
- Drill holes before disposing of shock absorber.

- 1) Place shock absorber on a flat and level surface with piston rod fully extended.

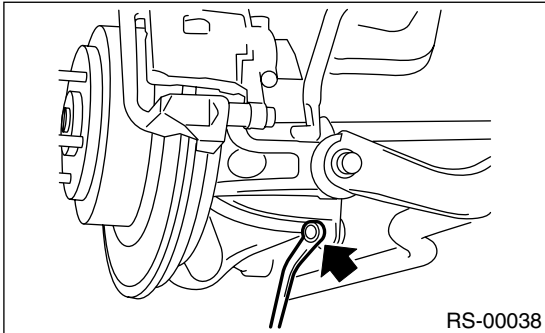
- 2) Using a 2 to 3 mm (0.08 to 0.12 in) dia. drill, drill 30 mm (1.18 in) deep holes in areas shown in the figure.



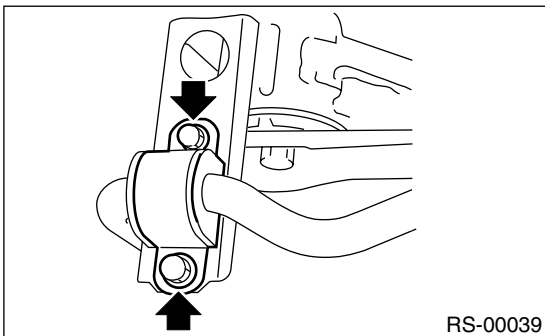
3. Rear Stabilizer

A: REMOVAL

- 1) Jack-up the rear part of the vehicle, support it with safety stands (rigid racks).
- 2) Remove bolts which secure stabilizer link to rear arm.



- 3) Remove bolts which secure stabilizer to sub frame.



B: INSTALLATION

Install in the reverse order of removal.

NOTE:

Ensure that bushing and stabilizer have the same identification colors when installing.

CAUTION:

Use a new self-locking nut.

Tightening torque:

Stabilizer link to rear arm

44 N·m (4.5 kgf-m, 32.5 ft-lb)

Clamp to sub frame

40 N·m (4.1 kgf-m, 30 ft-lb)

C: INSPECTION

- 1) Check bushing for cracks, fatigue or damage.
- 2) Check stabilizer links for deformities, cracks, or damage, and bushing for protrusions from the hole of stabilizer link.

REAR SUB FRAME

REAR SUSPENSION

10. Rear Sub Frame

A: REMOVAL

1) Separate front exhaust pipe and rear exhaust pipe.

2) Remove rear exhaust pipe and muffler.

3) Remove rear differential.

With T-type

<Ref. to DI-25, REMOVAL, Rear Differential for T-type.>

With VA-type

<Ref. to DI-42, REMOVAL, Rear Differential for VA-type.>

4) Disconnect link front from sub frame.

<Ref. to RS-18, REMOVAL, Link Front.>

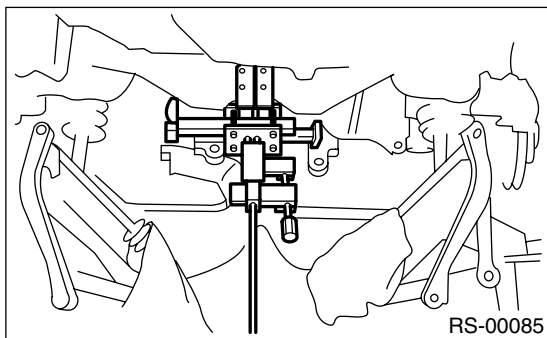
5) Disconnect link rear from sub frame.

<Ref. to RS-19, REMOVAL, Link Rear.>

6) Disconnect link upper from sub frame.

<Ref. to RS-14, REMOVAL, Link Upper.>

7) Place transmission jack under sub frame.



8) Remove support sub frame front.

9) After removing bolts, remove sub frame and support sub frame from vehicle body.

B: INSTALLATION

1) Install in reverse order of removal.

2) For installation and tightening torque of rear differential.

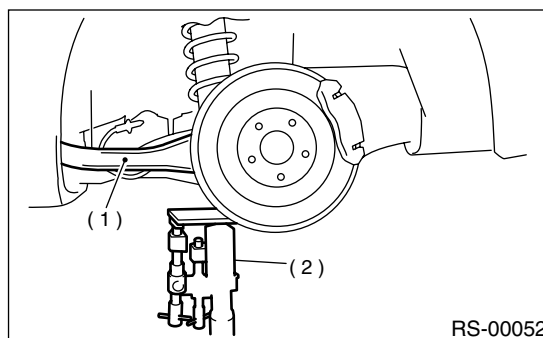
With T-type

<Ref. to DI-26, INSTALLATION, Rear Differential for T-type.>

With VA-type

<Ref. to DI-43, INSTALLATION, Rear Differential for VA-type.>

3) Using transmission jack, support rear arm horizontally and tighten nuts and bolts securing rear arm, link front, link rear, link upper and shock absorber.



(1) Rear arm

(2) Transmission jack

4) Install support sub frame front.

NOTE:

Check wheel alignment and adjust if necessary.

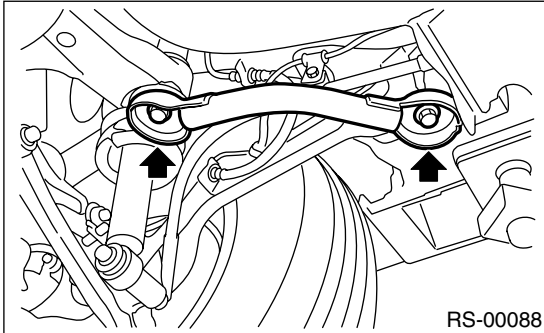
C: INSPECTION

Check removed parts for wear, damage and cracks, and correct or replace if defective.

9. Support Sub Frame Front

A: REMOVAL

- 1) Lift-up the vehicle, using support stand to support rear sub frame.
- 2) Remove support sub frame front.



B: INSTALLATION

- 1) Install in reverse order of removal.

Tightening torque:

Support sub frame front to rear arm bracket
80 N·m (8.2 kgf-m, 59 ft-lb)

Support sub frame front to rear sub frame
175 N·m (17.8 kgf-m, 129 ft-lb)

C: INSPECTION

Visually check support sub frame front for damage or bends.

2. Wheel Alignment

A: INSPECTION

NOTE:

The front and rear wheel alignment must be measured and/or adjusted at once to obtain accuracy. Measure and/or adjust the rear wheel alignment together with the front. Follow the procedure in “FS” section “Wheel Alignment” for measurement and/or adjustment of wheel alignment. <Ref. to FS-6, Wheel Alignment.>