

Brought to you by Eris Studios
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DIFFERENTIALS

General Description

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1. General Description

A: SPECIFICATION

1. REAR DIFFERENTIAL

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

NOTE:

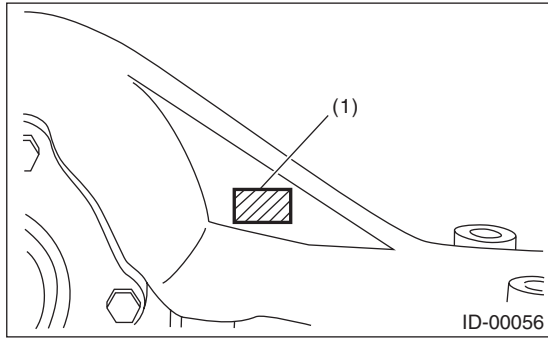
Using a different rear differential oil will cause the drive train and tires to drag or emit abnormal noise.

Model	2.5 L Non-turbo	
	4AT	5MT
Rear differential type	T-type	
Identification	T2	T1
Type of gear	Hypoid gear	
Gear ratio (Number of gear teeth)	4.111 (37/9)	3.900 (39/10)
Oil capacity	0.8 ℓ (0.8 US qt, 0.7 Imp qt)	
Rear differential gear oil	GL-5	

Model	2.5 L Turbo	
	4AT	5MT
Rear differential type	T-type	
Identification	B2	
Type of gear	Hypoid gear	
Gear ratio (Number of gear teeth)	3.900 (39/10)	
Oil capacity	0.8 ℓ (0.8 US qt, 0.7 Imp qt)	
Rear differential gear oil	GL-5	

2. IDENTIFICATION

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



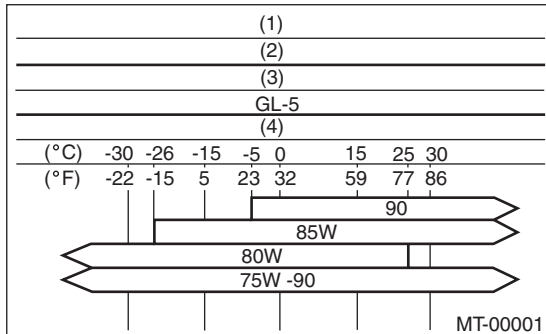
(1) Identification

3. REAR DIFFERENTIAL GEAR OIL

Recommended gear oil:
GL-5 (75W-90)

CAUTION:

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



- (1) Item
- (2) Rear differential gear oil
- (3) API classification
- (4) SAE viscosity No. and applicable temperature

4. SERVICE DATA

Drive pinion bearing preload (For new bearing)	Measure with spring measurement (Measured from the companion flange bolt)	N (kgf, lbf)	17.7 — 38.8 (1.8 — 4.0, 4.0 — 8.7)
	Measure with torque wrench	N·m(kgf-m, ft-lb)	0.67 — 1.47 (0.07 — 0.15, 0.49 — 1.08)
Side gear backlash		mm (in)	0.10 — 0.20 (0.004 — 0.008)
Side bearing standard width		mm (in)	20.00 (0.7874)
Hypoid driven gear to drive pinion backlash		mm (in)	0.10 — 0.20 (0.004 — 0.008)
Hypoid driven gear runout on its back surface		mm (in)	0.05 (0.002)

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5. ADJUSTING PARTS

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

	Part No.	Thickness mm (in)
Preload adjusting washer	383705200	2.59 (0.1020)
	383715200	2.57 (0.1012)
	383725200	2.55 (0.1004)
	383735200	2.53 (0.0996)
	383745200	2.51 (0.0988)
	383755200	2.49 (0.0980)
	383765200	2.47 (0.0972)
	383775200	2.45 (0.0965)
	383785200	2.43 (0.0957)
	383795200	2.41 (0.0949)
	383805200	2.39 (0.0941)
	383815200	2.37 (0.0933)
	383825200	2.35 (0.0925)
	383835200	2.33 (0.0917)
	383845200	2.31 (0.0909)
Pinion height adjusting washer	383495200	3.09 (0.1217)
	383505200	3.12 (0.1228)
	383515200	3.15 (0.1240)
	383525200	3.18 (0.1252)
	383535200	3.21 (0.1264)
	383545200	3.24 (0.1276)
	383555200	3.27 (0.1287)
	383565200	3.30 (0.1299)
	383575200	3.33 (0.1311)
	383585200	3.36 (0.1323)
	383595200	3.39 (0.1335)
	383605200	3.42 (0.1346)
	383615200	3.45 (0.1358)
	383625200	3.48 (0.1370)
	383635200	3.51 (0.1382)
383645200	3.54 (0.1394)	
383655200	3.57 (0.1406)	
383665200	3.60 (0.1417)	
383675200	3.63 (0.1429)	
383685200	3.66 (0.1441)	
Side gear thrust washer	383445201	0.75 — 0.80 (0.0295 — 0.0315)
	383445202	0.80 — 0.85 (0.0315 — 0.0335)
	383445203	0.85 — 0.90 (0.0335 — 0.0354)

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

Drive pinion bearing preload	Measure with spring measurement (Measured from the companion flange bolt)	N (kgf, lb)	17.7 — 38.8 (1.8 — 4.0, 4.0 — 8.7)
	Measure with torque wrench	N·m(kgf·m, ft·lb)	0.67 — 1.47 (0.07 — 0.15, 0.49 — 1.08)
Side gear backlash		mm (in)	0.10 — 0.20 (0.004 — 0.008)
Hypoid driven gear to drive pinion backlash limit		mm (in)	0.10 — 0.20 (0.004 — 0.008)
Hypoid driven gear runout limit on its back surface		mm (in)	0.05 (0.002)

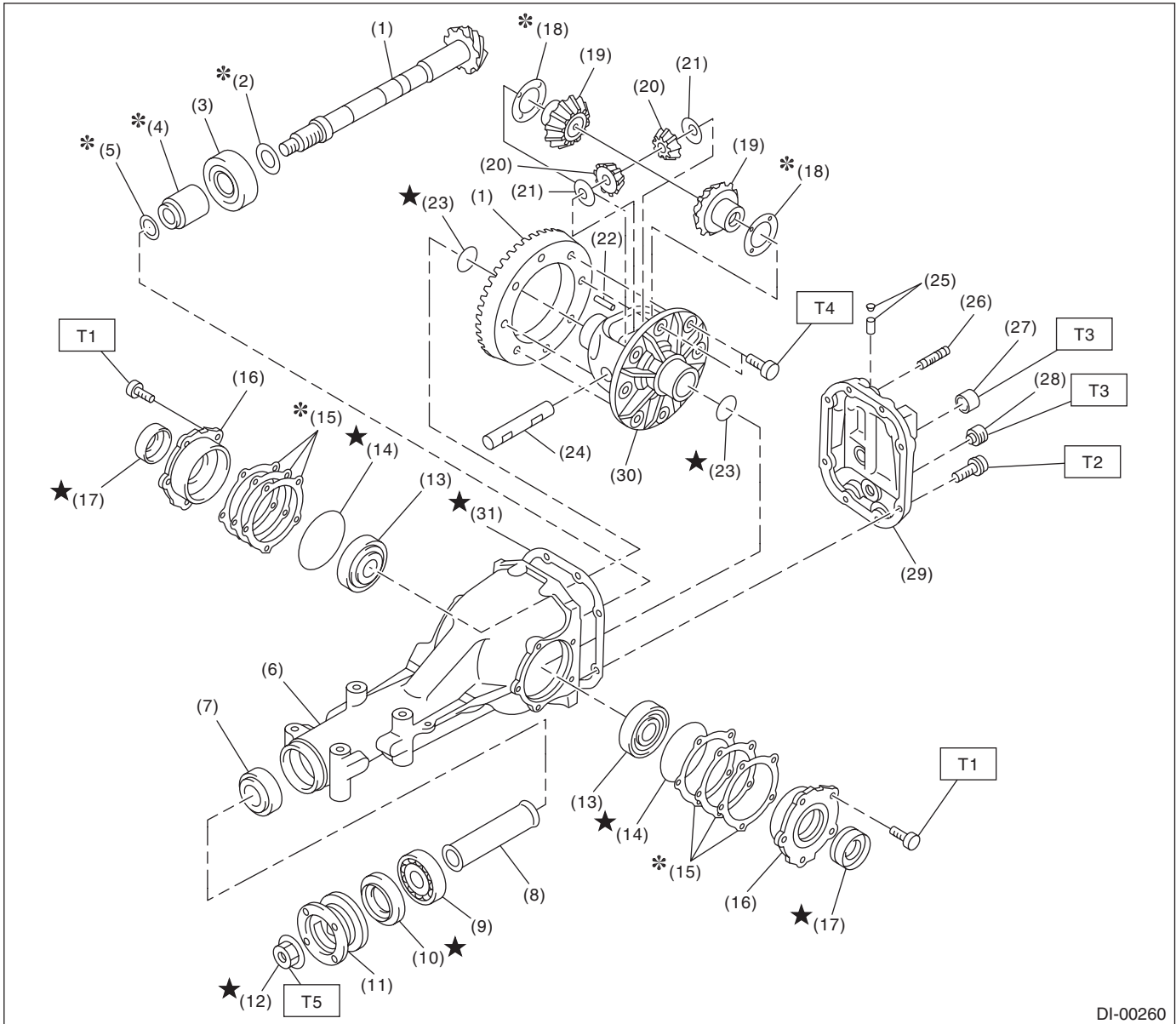
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B: COMPONENT

1. REAR DIFFERENTIAL (T-TYPE)

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DI-00260

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

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

T1: 10.5 (1.1, 7.7)

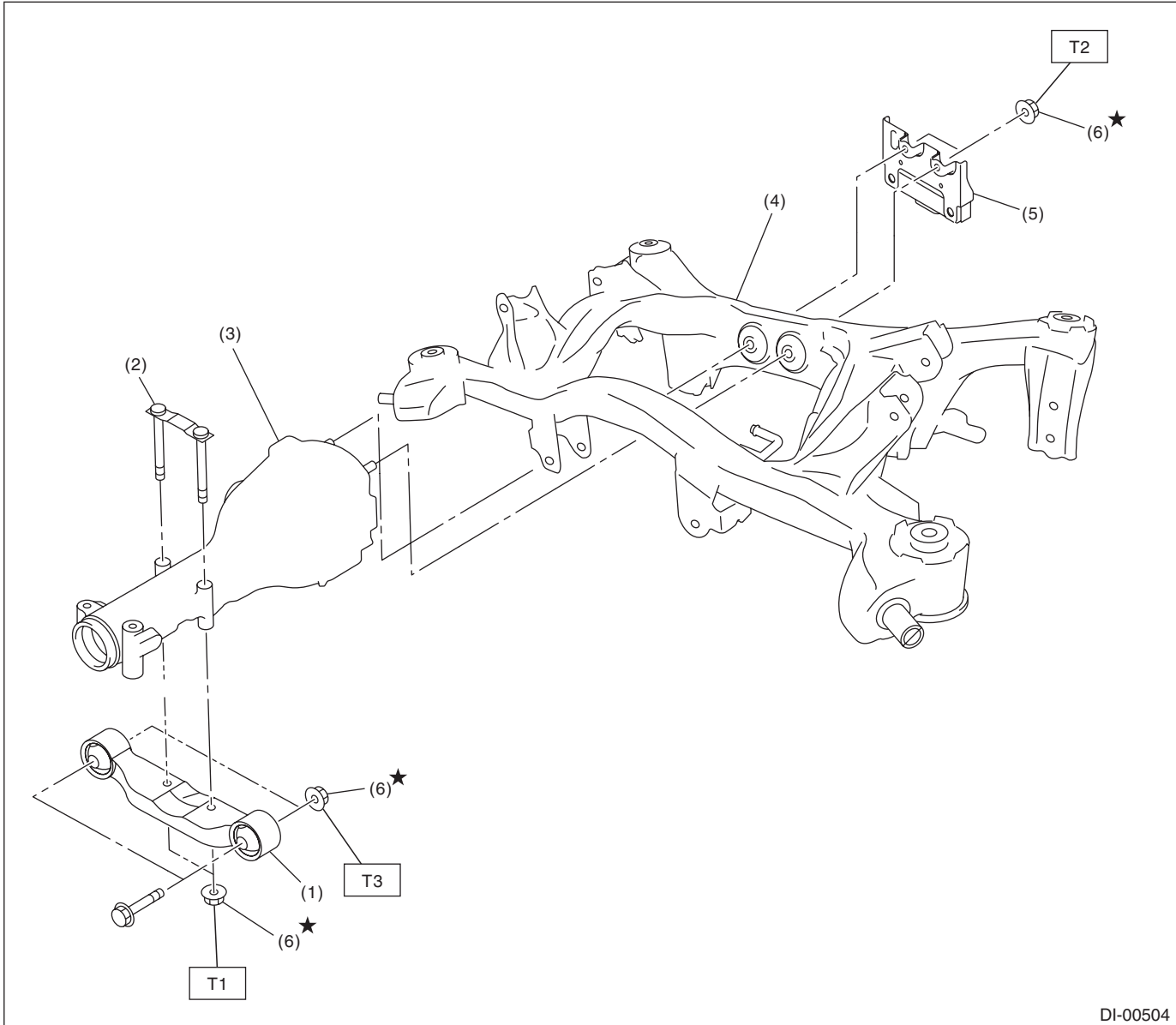
T2: 29.5 (3.0, 21.8)

T3: 49 (5.0, 36.2)

T4: 103 (10.5, 76.0)

T5: 181.5 (18.5, 134.0)

2. REAR DIFFERENTIAL MOUNTING SYSTEM



DI-00504

- | | |
|------------------------------------|--|
| (1) Rear differential front member | (5) Dynamic damper ASSY (wagon AT model) |
| (2) Rear differential member plate | (6) Self-locking nut |
| (3) Rear differential ASSY | |
| (4) Sub frame | |

Tightening torque: N·m (kgf·m, ft·lb)

T1: 50 (5.1, 36.9)

T2: 70 (7.1, 51.6)

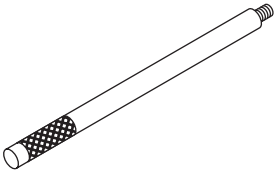
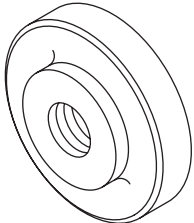
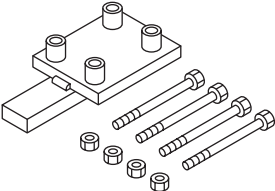
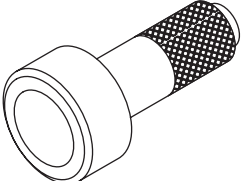
T3: 110 (11.2, 81.1)

C: CAUTION

- Wear appropriate work clothing, including a cap, protective goggles and protective shoes when performing any work.
- Remove contamination including dirt and corrosion before removal, installation or disassembly.
- Keep the disassembled parts in order and protect them from dust and dirt.
- Before removal, installation or disassembly, be sure to clarify the failure. Avoid unnecessary removal, installation, disassembly and replacement.
- Vehicle components are extremely hot after driving. Be wary of receiving burns from heated parts.
- Use SUBARU genuine gear oil, grease. Do not mix gear oil, grease, etc. of different grades or manufacturers.
- Be sure to tighten fasteners including bolts and nuts to the specified torque.
- Place shop jacks or rigid racks at the specified points.
- Apply gear oil onto sliding or revolving surfaces before installation.
- Before installing the O-ring or snap ring, apply a 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 cloth between the part and the vise.
- Avoid damaging the mating surface of the case.

D: PREPARATION TOOL

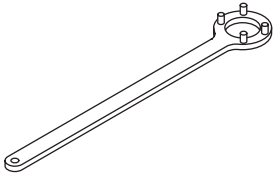
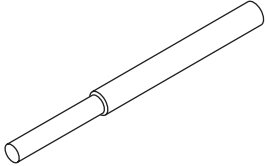
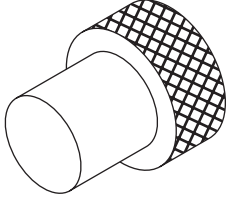
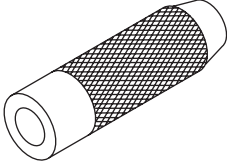
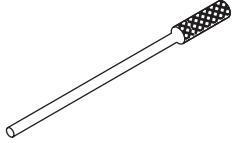
1. SPECIAL TOOL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p style="text-align: center;">ST-398477701</p>	398477701	HANDLE	Used for installing the front and rear bearing cones.
 <p style="text-align: center;">ST-398477702</p>	398477702	DRIFT	Used for press-fitting the bearing race (front) of the differential carrier.
 <p style="text-align: center;">ST-398217700</p>	398217700	ATTACHMENT SET	Stand for rear differential carrier disassembly and assembly.
 <p style="text-align: center;">ST-498447120</p>	498447120	INSTALLER	Used for installing the front oil seal.

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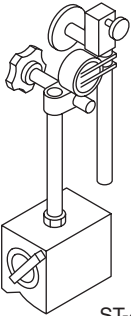
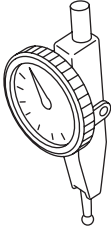
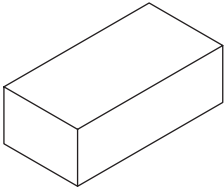
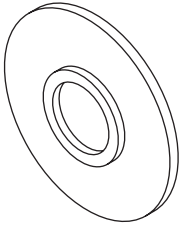
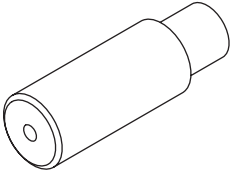
DIFFERENTIALS

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p style="text-align: center;">ST-498427200</p>	498427200	FLANGE WRENCH	Used for preventing rotation of companion flange when loosening and tightening self-lock nut.
 <p style="text-align: center;">ST-398467700</p>	398467700	DRIFT	Used for removing pinion, pilot bearing and front bearing cone.
 <p style="text-align: center;">ST-399780104</p>	399780104	WEIGHT	Used for installing the front bearing cone and the pilot bearing companion flange.
 <p style="text-align: center;">ST-899580100</p>	899580100	INSTALLER	Used for press-fitting the front bearing cone and pilot bearing.
 <p style="text-align: center;">ST-899904100</p>	899904100	STRAIGHT PIN REMOVER	Used for driving out differential pinion shaft lock pin.

General Description

DIFFERENTIALS

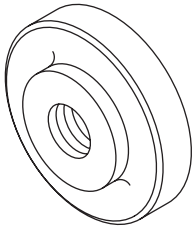
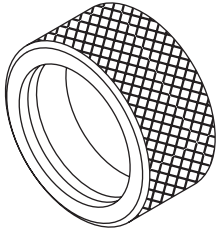
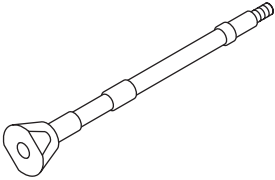
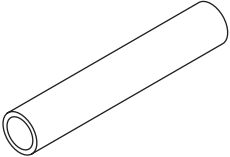
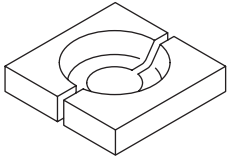
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ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p>ST-498247001</p>	498247001	MAGNET BASE	<ul style="list-style-type: none"> • Used for measuring backlash between side gear and pinion, and hypoid gear. • Used together with the DIAL GAUGE (498247100).
 <p>ST-498247100</p>	498247100	DIAL GAUGE	<ul style="list-style-type: none"> • Used for measuring backlash between side gear and pinion, and hypoid gear. • Used together with the MAGNET BASE (498247001).
 <p>ST-398507704</p>	398507704	BLOCK	Used for adjusting pinion height and preload.
 <p>ST-398177700</p>	398177700	INSTALLER	Used for installing the rear bearing cone.
 <p>ST-398457700</p>	398457700	ATTACHMENT	Used for removing the side bearing retainer.

General Description

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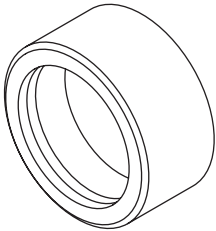
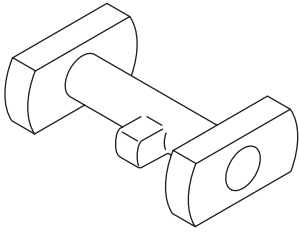
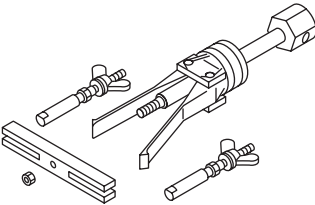
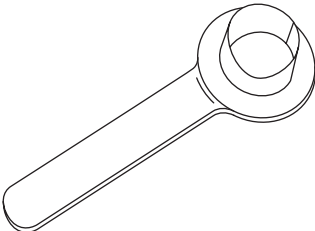
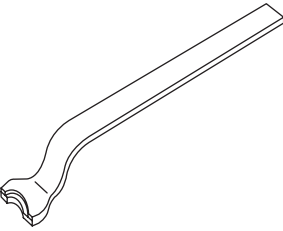
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ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p style="text-align: center;">ST-398477703</p>	398477703	DRIFT 2	Used for press-fitting bearing race (rear) of differential carrier.
 <p style="text-align: center;">ST-398437700</p>	398437700	DRIFT	Used for installing the side oil seal.
 <p style="text-align: center;">ST-398507702</p>	398507702	DUMMY SHAFT	Used for adjusting pinion height and preload.
 <p style="text-align: center;">ST-398507703</p>	398507703	DUMMY COLLAR	Used for adjusting pinion height and preload.
 <p style="text-align: center;">ST-398517700</p>	398517700	REPLACER	Used for removing rear bearing cone.

General Description

DIFFERENTIALS

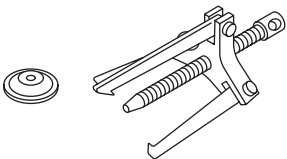
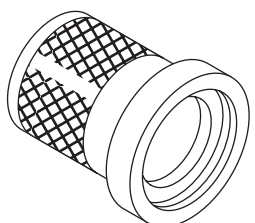
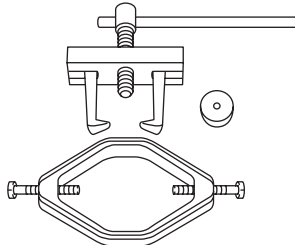
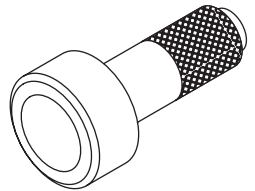
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ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p>ST-398487700</p>	398487700	DRIFT	Used for press-fitting side bearing cone.
 <p>ST-398507701</p>	398507701	DIFFERENTIAL CARRIER GAUGE	Used for adjusting pinion height.
 <p>ST-398527700</p>	398527700	PULLER ASSY	<ul style="list-style-type: none"> • Used for removing front oil seal. • Used for removing side bearing cup.
 <p>ST28099PA090</p>	28099PA090	OIL SEAL PROTECTOR	<ul style="list-style-type: none"> • Used for installing the rear drive shaft to the rear differential. • For oil seal protection
 <p>ST28099PA100</p>	28099PA100	DRIVE SHAFT REMOVER	Used for removing the rear drive shaft from rear differential.

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ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p style="text-align: center;">ST-399703600</p>	399703600	PULLER ASSY	Used for removing companion flange.
 <p style="text-align: center;">ST-899874100</p>	899874100	INSTALLER	Used for installing the companion flange.
 <p style="text-align: center;">ST18759AA000</p>	18759AA000	PULLER ASSY	Used for removing the differential side bearing cone.
 <p style="text-align: center;">ST-398417700</p>	398417700	DRIFT	Used for installing side bearing race.

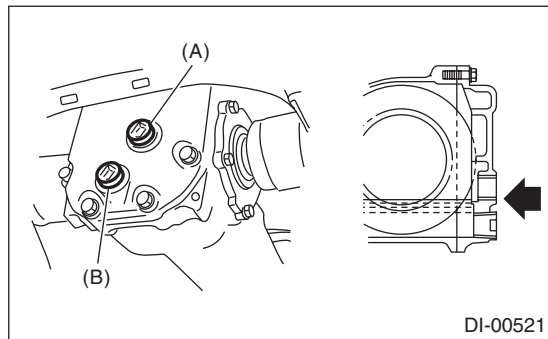
2. GENERAL TOOL

TOOL NAME	REMARKS
Transmission jack	Used for assembly/disassembly of the rear differential.
Puller	Used for removing the side bearing retainer.
Thickness gauge	Used for measuring clearance.

2. Differential Gear Oil

A: INSPECTION

- 1) Remove the filler plug, and then check the gear oil. Replace the gear oil if it is contaminated or deteriorated. <Ref. to DI-15, REPLACEMENT, Differential Gear Oil.>
- 2) Check that the gear oil level is up to the bottom of the filler plug hole. If the level is low, refill up to the bottom of filler plug.



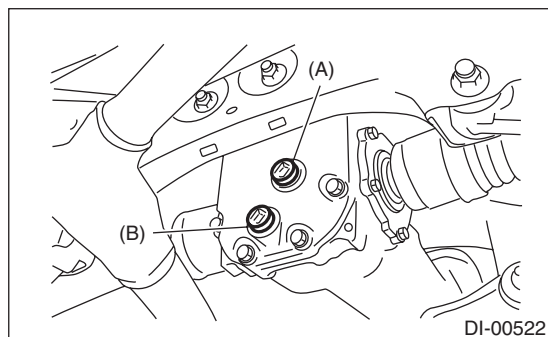
- (A) Filler plug
- (B) Drain plug

B: REPLACEMENT

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

CAUTION:

Gear oil is extremely hot just after driving. Be wary of receiving burns.



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

- 3) Tighten the oil drain plug.

NOTE:

Apply liquid gasket to the drain plug.

Liquid gasket:

THREE BOND 1105 (Part No. 004403010) or equivalent

Tightening torque:

49 N·m (5.0 kgf·m, 36.2 ft·lb)

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

NOTE:

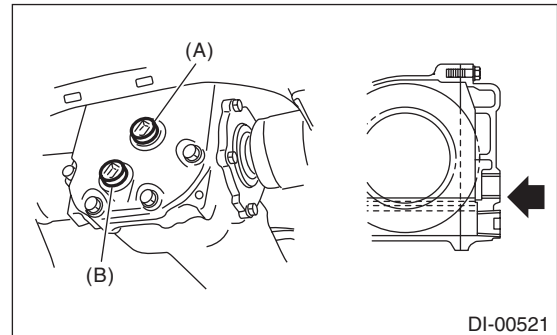
Carefully refill oil while watching the level. Excessive or insufficient oil must be avoided.

Recommended gear oil:

<Ref. to DI-2, SPECIFICATION, General Description.>

Oil capacity:

0.8 ℓ (0.8 US qt, 0.7 Imp qt)



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

- 5) Install the filler plug.

NOTE:

Apply liquid gasket to the filler plug.

Liquid gasket:

THREE BOND 1105 (Part No. 004403010) or equivalent

Tightening torque:

49 N·m (5.0 kgf·m, 36.2 ft·lb)

3. Front Differential Assembly

A: NOTE

1. AT MODEL

For front differential of automatic transmissions, refer to the “4AT” section. <Ref. to 4AT-99, Front Differential Assembly.>

2. MT MODEL

For front differential of the manual transmission, refer to “5MT” section. <Ref. to 5MT-68, Front Differential Assembly.>

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4. Rear Differential

A: REMOVAL

- 1) Set the vehicle on a lift.
- 2) Disconnect the ground cable from the battery.
- 3) Shift the select lever or gear shift lever to neutral.
- 4) Release the parking brake.
- 5) Loosen the wheel nuts.
- 6) Lift up the vehicle.
- 7) Remove the wheels.
- 8) Remove the rear exhaust pipe and muffler.

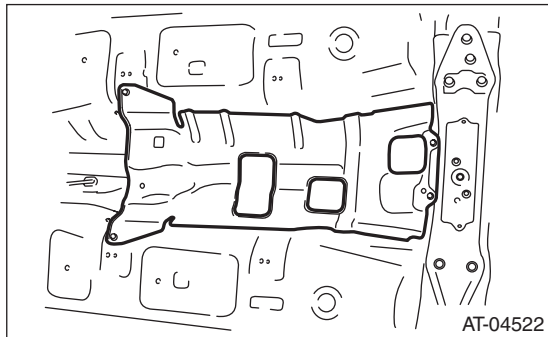
- Non-turbo model

<Ref. to EX(H4SO)-10, REMOVAL, Rear Exhaust Pipe.> <Ref. to EX(H4SO)-12, REMOVAL, Muffler.>

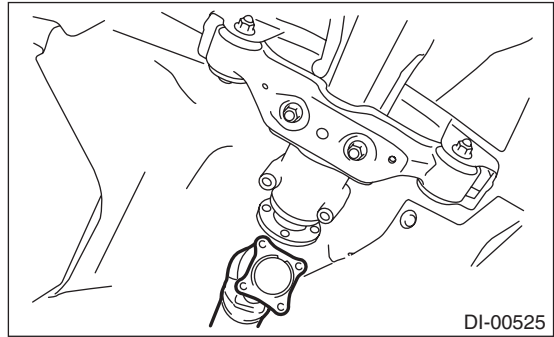
- Turbo model

<Ref. to EX(H4DOTC)-13, REMOVAL, Rear Exhaust Pipe.> <Ref. to EX(H4DOTC)-15, REMOVAL, Muffler.>

- 9) Remove the heat shield cover.

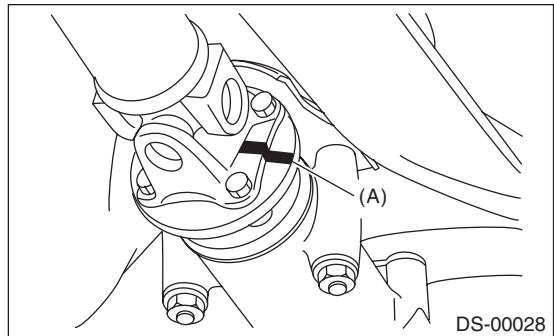


- 10) Separate the rear differential side of the propeller shaft.



NOTE:

Make alignment marks on the flange yoke and rear differential before separating it.



(A) Alignment mark

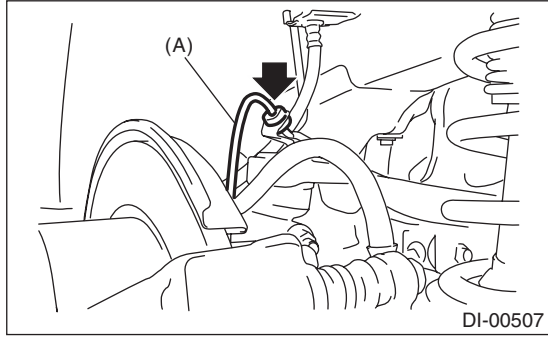
Rear Differential

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DIFFERENTIALS

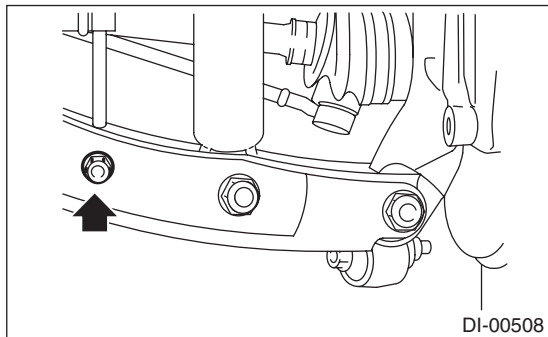
11) Remove the DOJ of rear drive shaft from rear differential.

(1) Remove the ABS wheel speed sensor cable from the clamp.

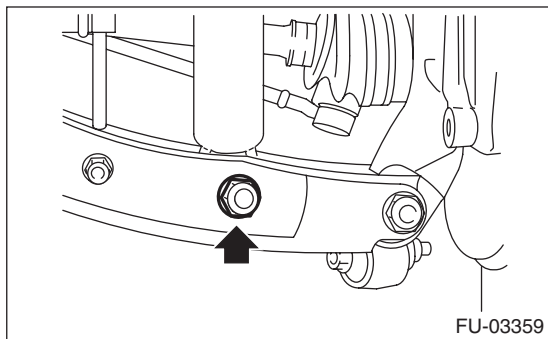


(A) ABS wheel speed sensor cable

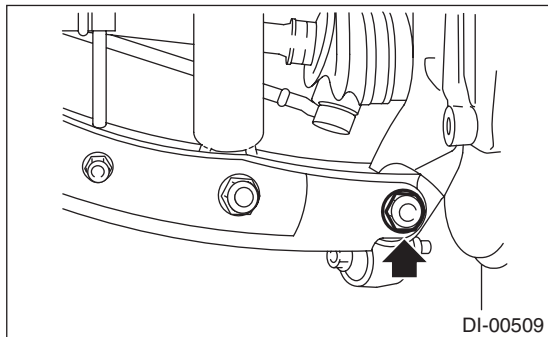
(2) Remove the bolts which secure the rear stabilizer link to the rear lateral link.



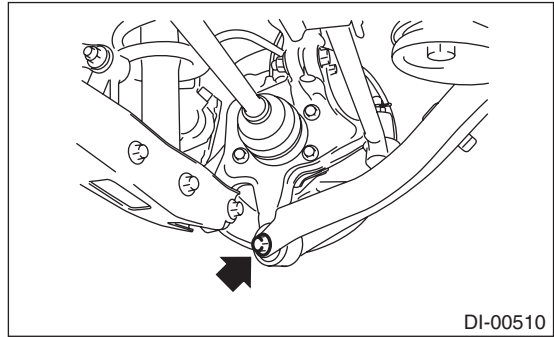
(3) Remove the bolts which secure the shock absorber to the rear lateral link.



(4) Remove the bolts which secure the rear lateral link to the housing.



(5) Remove the bolts which secure the trailing link to the housing.

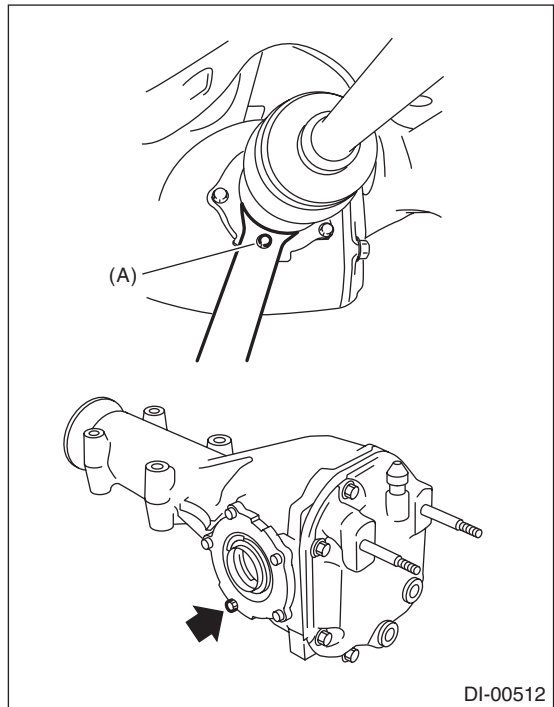


(6) Remove the DOJ from the rear differential by using ST.

NOTE:

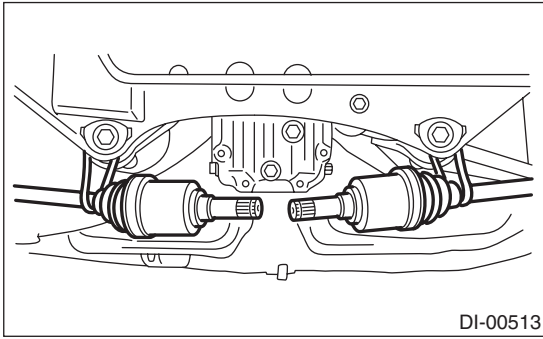
When removing the DOJ from the rear differential, fit the ST to the bolts as shown in the figure so as not to damage the side bearing retainer.

ST 208099PA100 DRIVE SHAFT REMOVER

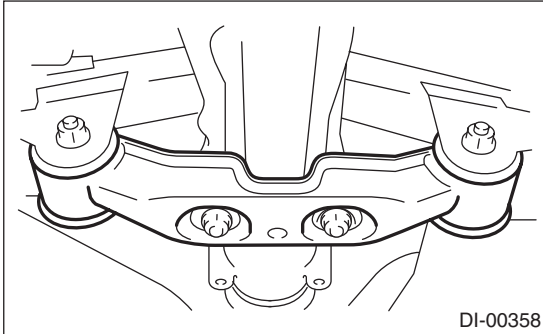


(A) Bolt

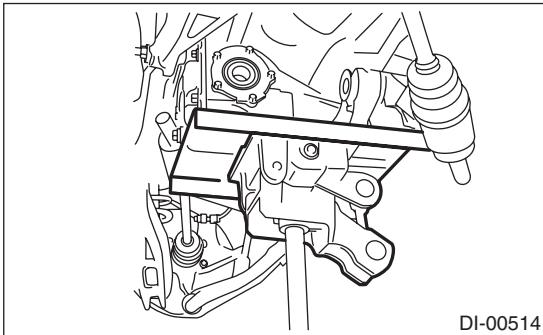
12) Suspend the rear drive shaft to the rear cross-member using wire.



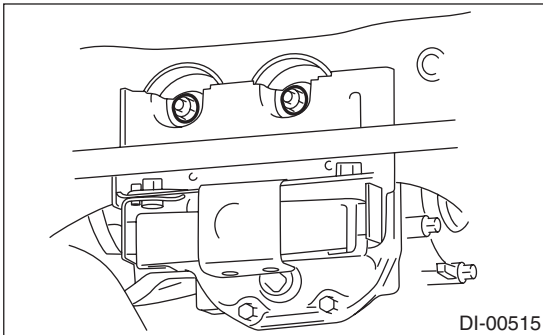
13) Remove the rear differential front member.



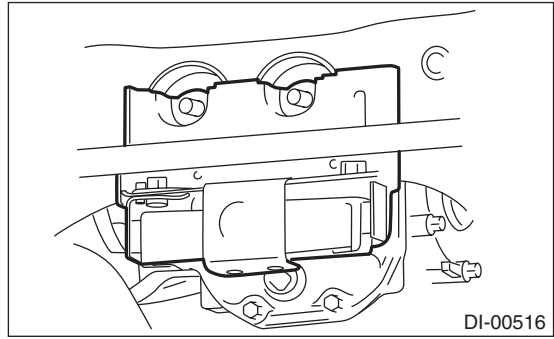
14) Support the rear differential with the transmission jack.



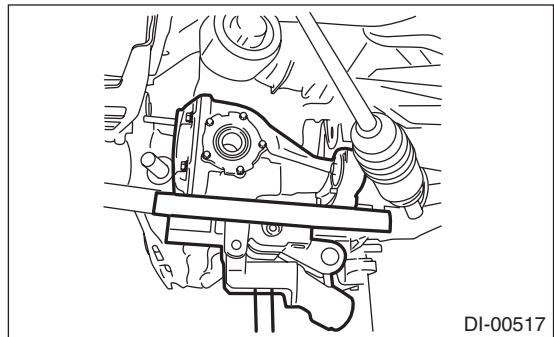
15) Remove the self-lock nuts which hold the rear differential to the rear crossmember.



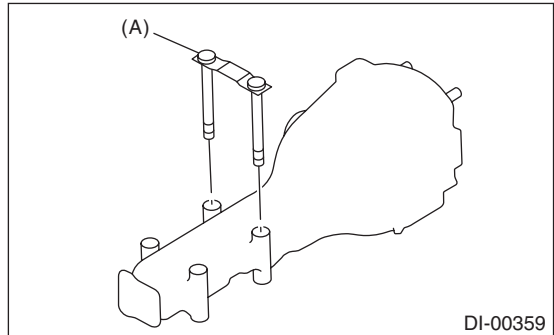
16) Remove the dynamic damper assembly. (wagon AT model)



17) While slowly lowering the transmission jack, move the rear differential forward, and remove the rear differential from vehicle.



18) Remove the rear differential member plate from rear differential.

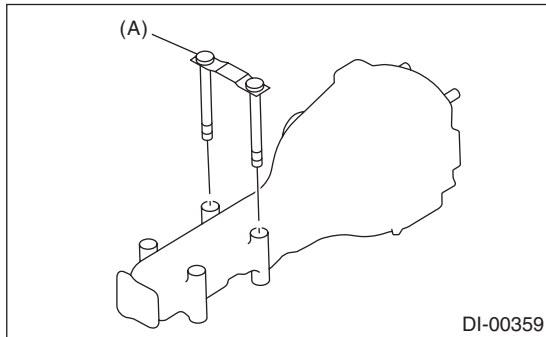


(A) Rear differential member plate

DIFFERENTIALS

B: INSTALLATION

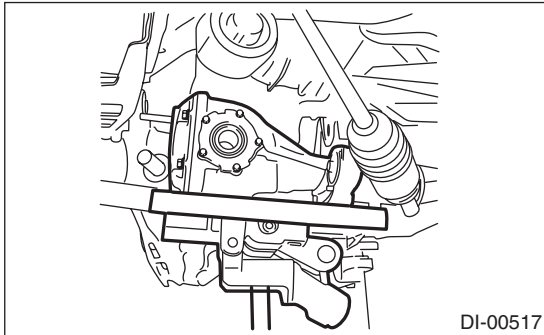
1) Install the rear differential member plate to the rear differential.



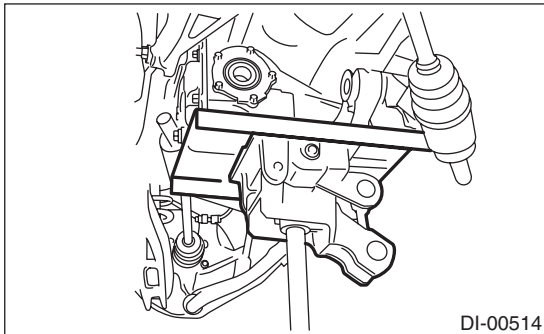
(A) Rear differential member plate

2) Set the rear differential to transmission jack.

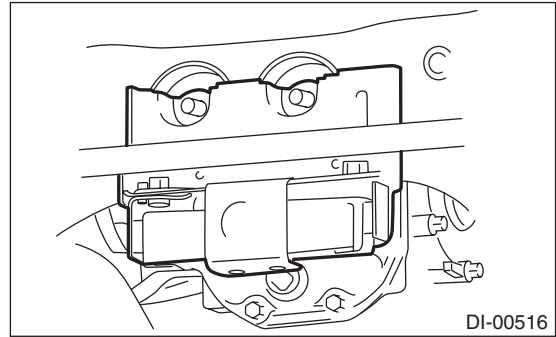
3) Adjust the transmission jack, and insert the rear differential stud bolt into rear crossmember bushing properly.



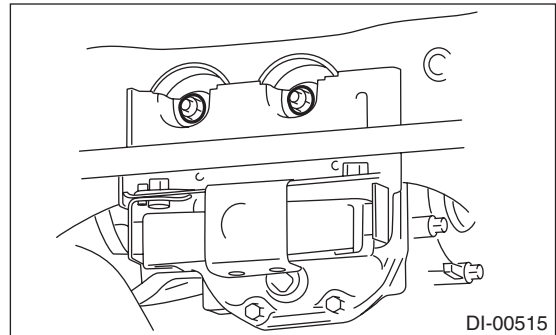
4) After inserting the rear differential stud bolt into the rear crossmember bushing, lift up the transmission jack and align the rear differential to its attachment position.



5) Install the dynamic damper assembly. (wagon AT model)



6) Tighten a new self-locking nut temporarily to rear crossmember.

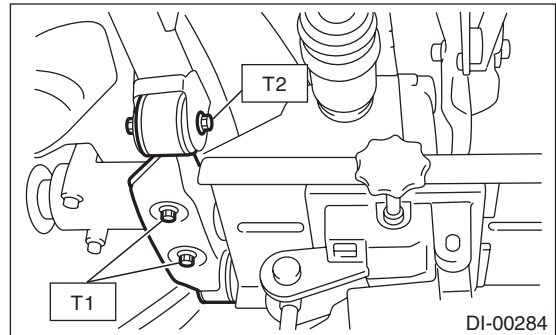


7) Install the rear differential front member with a new self-locking nut.

Tightening torque:

T1: 50 N·m (5.1 kgf-m, 36.9 ft-lb)

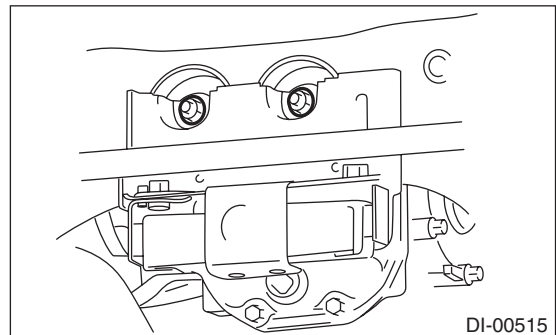
T2: 110 N·m (11.2 kgf-m, 81.1 ft-lb)



8) Tighten the self-locking nut.

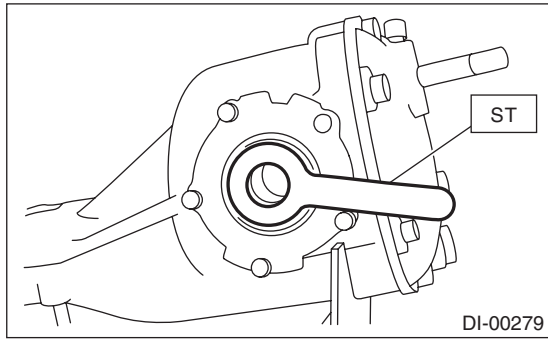
Tightening torque:

70 N·m (7.1 kgf-m, 51.6 ft-lb)

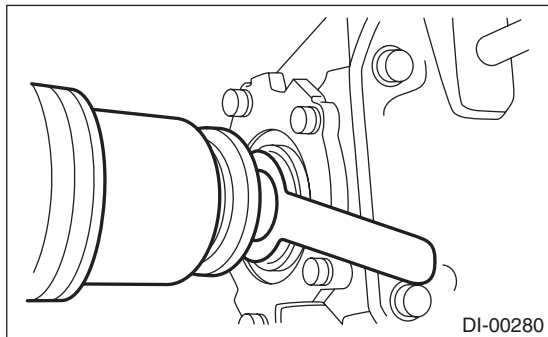


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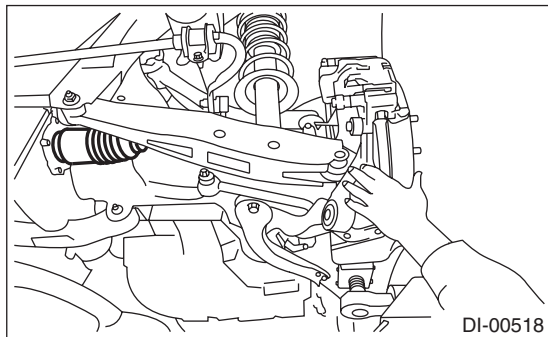
- 9) Attach the ST to rear differential.
 ST 28099PA090 OIL SEAL PROTECTOR



- 10) Insert the spline shaft until the spline portion comes inside the side oil seal.



- 11) Remove ST from rear differential.
 ST 28099PA090 OIL SEAL PROTECTOR
 12) Push the housing to insert DOJ into rear differential.



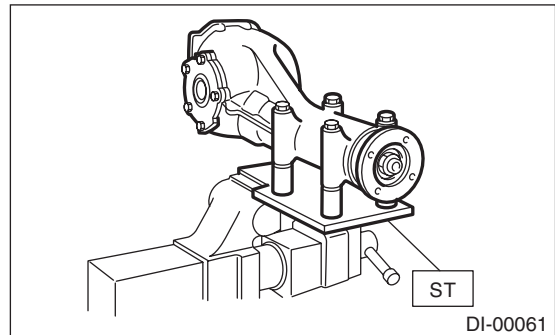
- 13) Lower the transmission jack.
 14) Installing procedure hereafter is in the reverse order of removal.
 15) After installing, fill the differential carrier with gear oil up to the bottom of the filler plug hole. <Ref. to DI-15, Differential Gear Oil.>

C: DISASSEMBLY

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

- Tooth contact and backlash between hypoid driven gear and drive pinion
 - Hypoid driven gear runout on its back surface
 - Total preload of drive pinion
- 1) Set the ST on vise and install the differential assembly to ST.

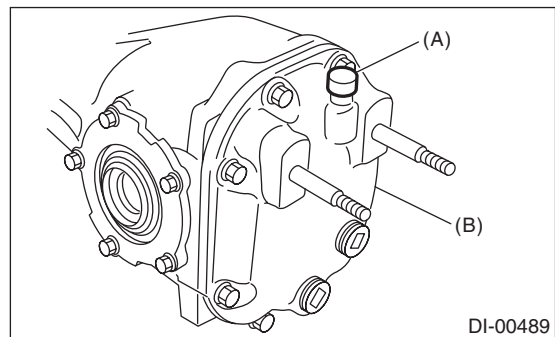
ST 398217700 ATTACHMENT



- 2) Remove the oil drain plug and filler plug, and drain the gear oil.
 3) Remove the air breather cap.

NOTE:

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



- (A) Air breather cap
 (B) Rear cover

- 4) Remove the bolts, and then remove the rear cover.

Rear Differential

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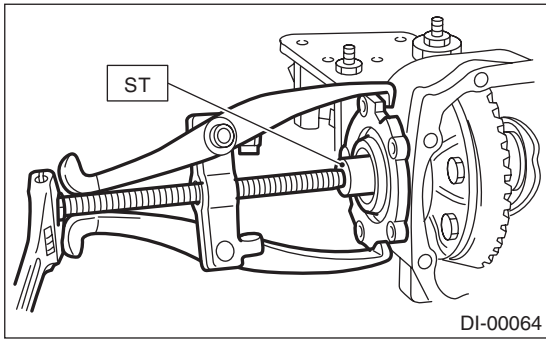
DIFFERENTIALS

5) Keep the side bearing retainers separate to make it possible to identify RH and LH sides. Remove the side bearing retainer attaching bolts, set the ST to differential case, and extract the side bearing retainers RH and LH with a puller.

NOTE:

Each shim, which is installed to adjusted the side bearing preload, should be kept together with its mating retainer.

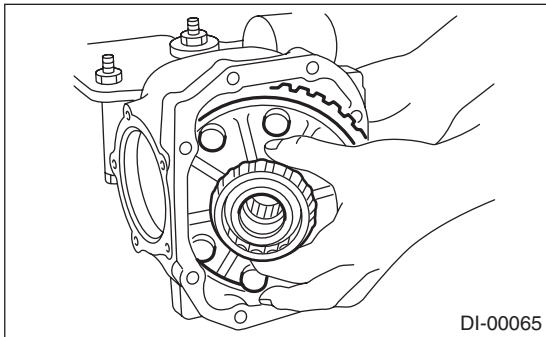
ST 398457700 ATTACHMENT



6) Pull out the differential case assembly from differential carrier.

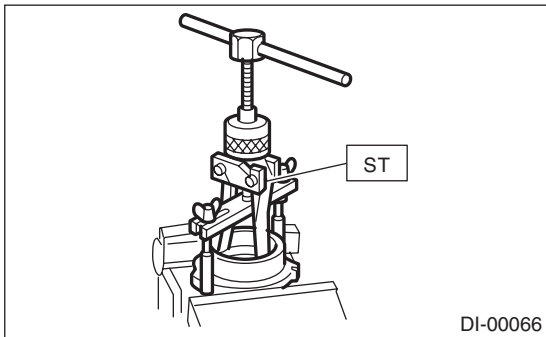
NOTE:

Be careful so that the teeth do not hit against the case.



7) When replacing the side bearing, remove the bearing cup from the side bearing retainer using ST.

ST 398527700 PULLER ASSY

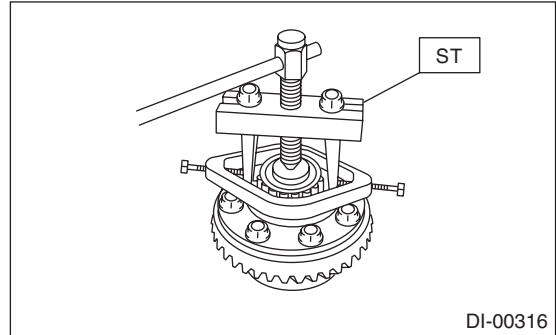


8) Remove the bearing cone with ST.

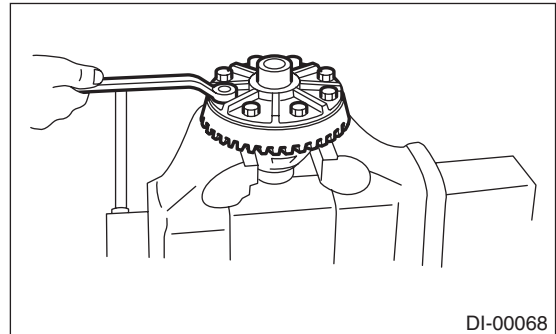
NOTE:

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

ST 18759AA000 PULLER ASSY



9) Remove the hypoid driven gear by loosening hypoid driven gear bolts.

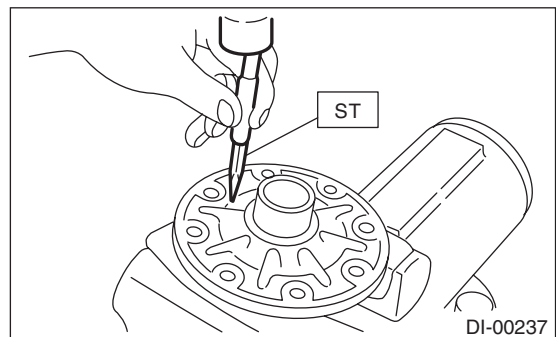


10) Drive out the pinion shaft lock pin from the hypoid driven gear side.

NOTE:

The lock pin is staked at the pin hole end on the differential carrier. Do not drive it out forcibly before removing the stake.

ST 899904100 STRAIGHT PIN REMOVER

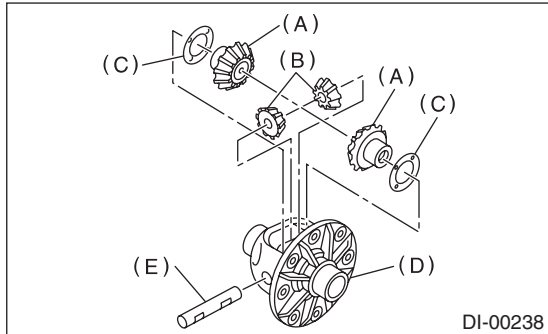


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11) Draw out the pinion mate shaft and remove pinion mate gears, side gears and thrust washers.

NOTE:

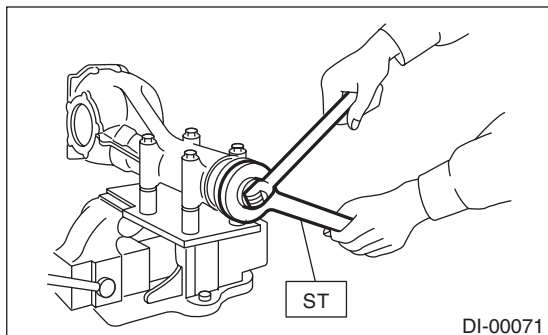
The gears should be marked or kept separated right and left, and front and rear as well as thrust washers.



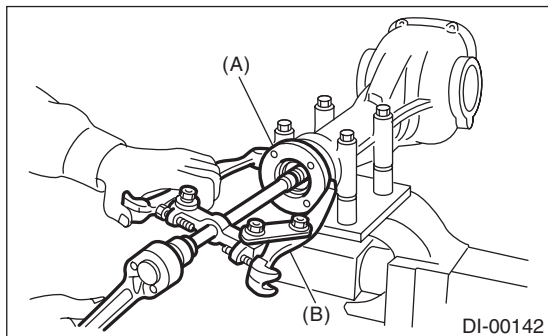
- (A) Side gear
- (B) Pinion mate gear
- (C) Thrust washer
- (D) Differential case
- (E) Pinion mate shaft

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

ST 498427200 FLANGE WRENCH



13) Extract the companion flange with a puller.



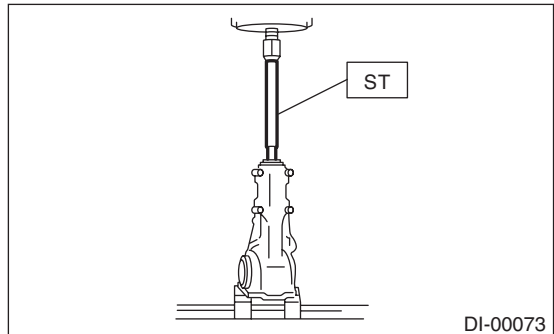
- (A) Companion flange
- (B) PULLER

14) Press the end of drive pinion shaft and extract it together with rear bearing cone, pinion height adjusting washer and washer.

NOTE:

Hold the drive pinion so as not to drop it.

ST 398467700 DRIFT

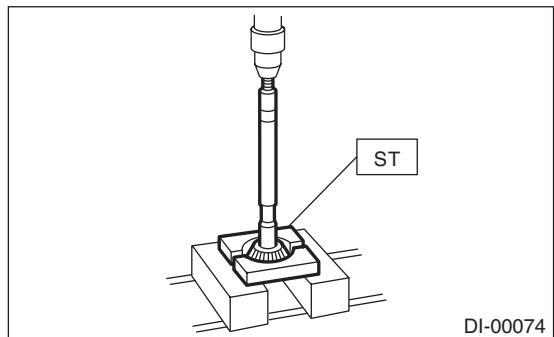


15) Remove the rear bearing cone from drive pinion by supporting the cone with ST.

NOTE:

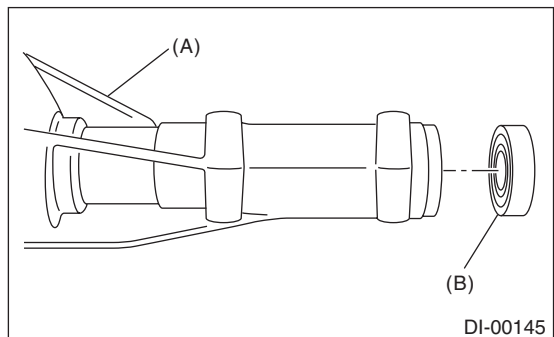
Place the replacer so that its center-recessed side faces the pinion gear.

ST 398517700 REPLACER



16) Remove the front oil seal from differential carrier using ST.

ST 398527700 PULLER ASSY

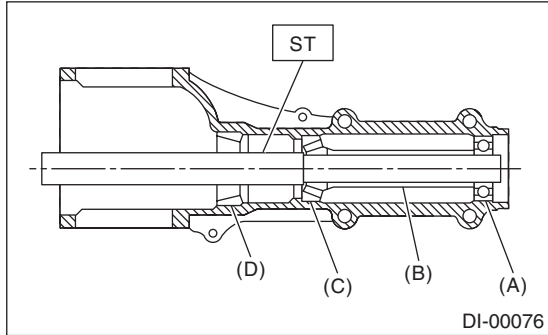


- (A) Differential carrier
- (B) Front oil seal

DIFFERENTIALS

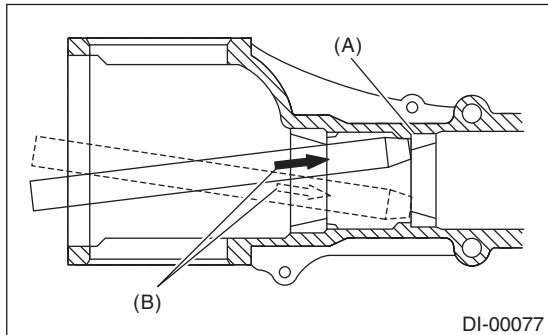
17) Remove the pilot bearing together with the front bearing cone and spacer using the ST.

ST 398467700 DRIFT



- (A) Pilot bearing
- (B) Spacer
- (C) Front bearing
- (D) Rear bearing cup

18) When replacing the bearings, hit out the front bearing cup and rear bearing cup in this order using a brass bar.

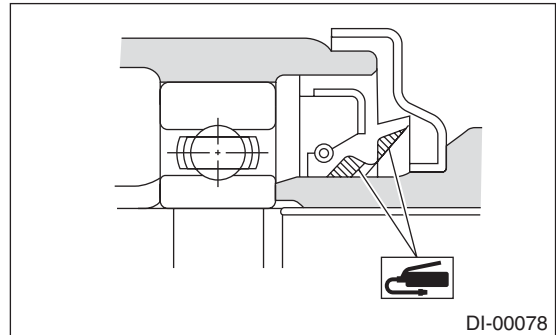


- (A) 2 cutout portions along diagonal lines
- (B) Tap alternately with brass bar.

D: ASSEMBLY

NOTE:

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



1) Adjusting preload for front and rear bearings

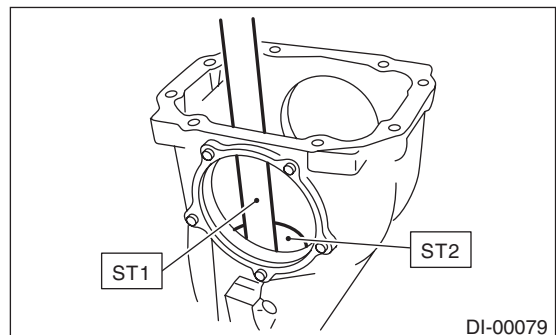
NOTE:

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

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

ST1 398477701 HANDLE

ST2 398477703 DRIFT 2



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

ST1 398477701 HANDLE

ST2 398477702 DRIFT

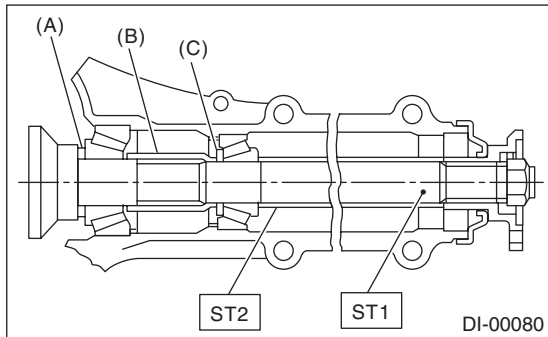
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(3) Insert the ST1 into carrier with the pinion height adjusting washer and rear bearing cone fitted onto it.

NOTE:

- If tooth contact (drive pinion, hypoid driven gear) is normal in the inspection before disassembling, verify that the washer is not deformed, and then re-use the used washer.
 - Use new rear bearing cone.
- (4) Install the preload adjusting spacer & washer, front bearing cone, ST2, companion flange, and washer & self-locking nut.

ST1 398507702 DUMMY SHAFT
ST2 398507703 DUMMY COLLAR



- (A) Pinion height adjusting washer
- (B) Preload adjusting spacer
- (C) Preload adjusting washer

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

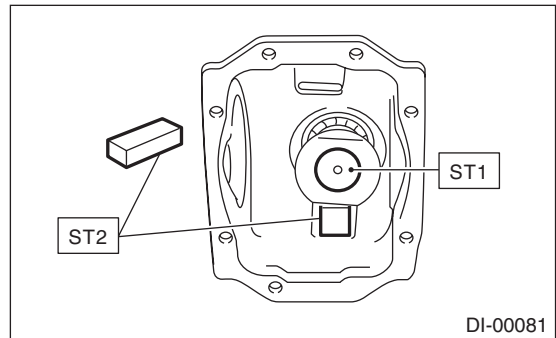
NOTE:

- Use a new self-locking nut.
- Be careful not to give excessive preload.
- When tightening the self-locking nut, lock ST1 with ST2 as shown in the figure.

ST1 398507702 DUMMY SHAFT
ST2 398507704 BLOCK

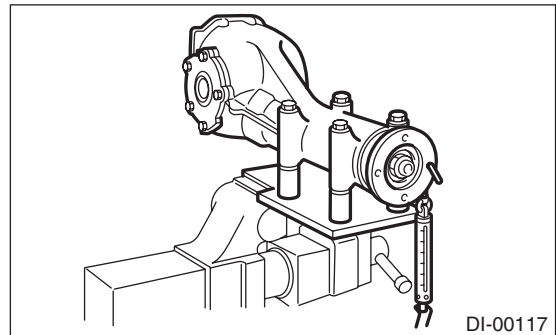
Tightening torque:

181.5 N·m (18.5 kgf·m, 134.0 ft·lb)



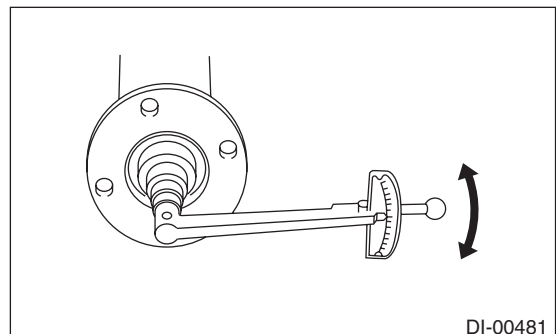
Initial load:

17.7 — 38.8 N (1.8 — 4.0 kgf, 4.0 — 8.7 lb)



Initial torque:

**0.67 — 1.47 N·m
(0.07 — 0.15 kgf·m, 0.49 — 1.08 ft·lb)**



Rear Differential

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DIFFERENTIALS

Preload adjusting washer	Part No.	Thickness mm (in)
	383705200	2.59 (0.1020)
	383715200	2.57 (0.1012)
	383725200	2.55 (0.1004)
	383735200	2.53 (0.0996)
	383745200	2.51 (0.0988)
	383755200	2.49 (0.0980)
	383765200	2.47 (0.0972)
	383775200	2.45 (0.0965)
	383785200	2.43 (0.0957)
	383795200	2.41 (0.0949)
	383805200	2.39 (0.0941)
	383815200	2.37 (0.0933)
	383825200	2.35 (0.0925)
Preload adjusting spacer	Part No.	Length mm (in)
	383695201	56.2 (2.213)
	383695202	56.4 (2.220)
	383695203	56.6 (2.228)
	383695204	56.8 (2.236)
	383695205	57.0 (2.244)
	383695206	57.2 (2.252)

2) Adjusting drive pinion height:

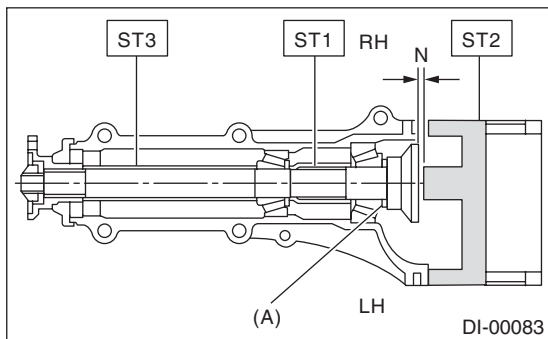
Adjust the drive pinion height with washer installed between the rear bearing cone and the back of pinion gear.

(1) Attach the ST2.

NOTE:

At this time, install a pinion height adjusting washer, temporarily selected, or the same as that used before. Measure and record the thickness.

- ST1 398507702 DUMMY SHAFT
- ST2 398507701 DIFFERENTIAL CARRIER GAUGE
- ST3 398507703 DUMMY COLLAR



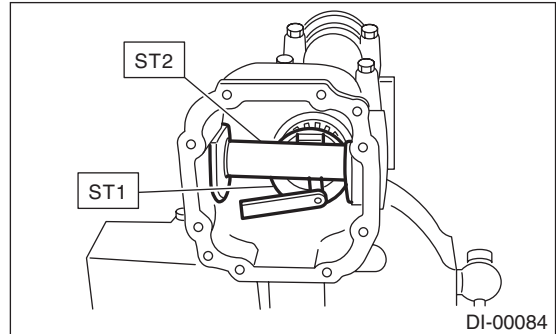
(A) Pinion height adjusting washer

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

NOTE:

Make sure there is no clearance between the case and ST2.

- ST1 398507702 DUMMY SHAFT
- ST2 398507701 DIFFERENTIAL CARRIER GAUGE



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

$$T = T_o + N - (H \times 0.01) - 0.20 \text{ mm (0.0079 in)}$$

NOTE:

Use copies of this page.

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

(Example of calculation)

$$T_o = 2.20 \text{ mm (0.0866 in)} + 1.20 \text{ mm (0.0472 in)} = 3.40 \text{ mm (0.1339 in)}$$

$$N = 0.23 \text{ mm (0.0091 in)}$$

$$H = + 1$$

$$T = 3.40 \text{ mm (0.1339 in)} + 0.23 \text{ mm (0.0091 in)} - 0.01 \text{ mm (0.0004 in)} - 0.20 \text{ mm (0.0079 in)} = 3.42 \text{ mm (0.1346 in)}$$

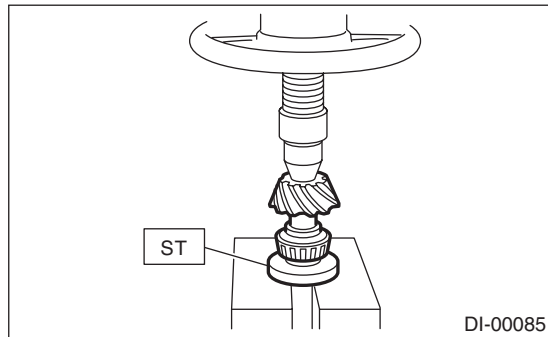
$$\text{Thickness} = 3.42 \text{ mm (0.1346 in)}$$

Therefore use washer 383605200.

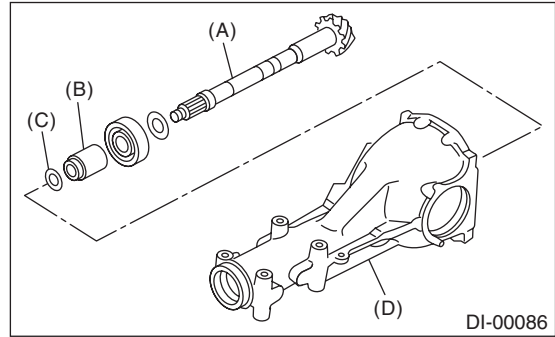
Pinion height adjusting washer	
Part No.	Thickness mm (in)
383495200	3.09 (0.1217)
383505200	3.12 (0.1228)
383515200	3.15 (0.1240)
383525200	3.18 (0.1252)
383535200	3.21 (0.1264)
383545200	3.24 (0.1276)
383555200	3.27 (0.1287)
383565200	3.30 (0.1299)
383575200	3.33 (0.1311)
383585200	3.36 (0.1323)
383595200	3.39 (0.1335)
383605200	3.42 (0.1346)
383615200	3.45 (0.1358)
383625200	3.48 (0.1370)
383635200	3.51 (0.1382)
383645200	3.54 (0.1394)
38365200	3.57 (0.1406)
383665200	3.60 (0.1417)
383675200	3.63 (0.1429)
383685200	3.66 (0.1441)

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

ST 398177700 INSTALLER



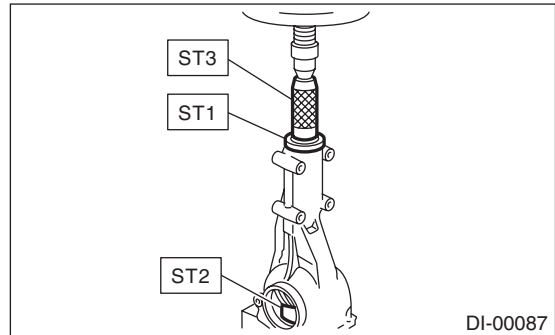
4) Insert the drive pinion into the differential carrier, and install the preselected bearing preload adjusting spacer and washer.



- (A) Drive pinion
- (B) Bearing preload adjusting spacer
- (C) Bearing preload adjusting washer
- (D) Differential carrier

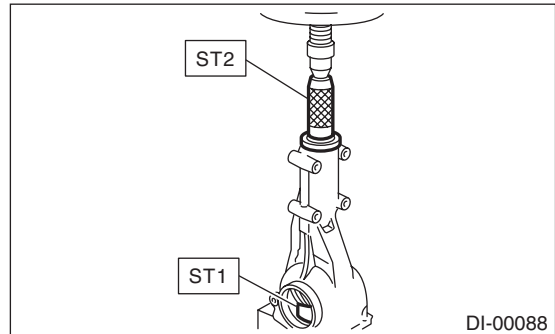
5) Press-fit the front bearing cone into case with ST1, ST2 and ST3.

- ST1 398507703 DUMMY COLLAR
- ST2 399780104 WEIGHT
- ST3 899580100 INSTALLER



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

- ST1 399780104 WEIGHT
- ST2 899580100 INSTALLER



Rear Differential

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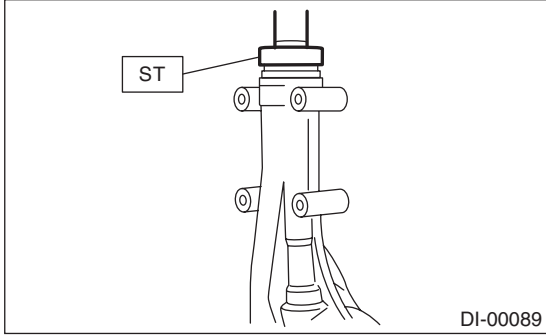
DIFFERENTIALS

7) Fit a new oil seal with ST.

NOTE:

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

ST 498447120 INSTALLER



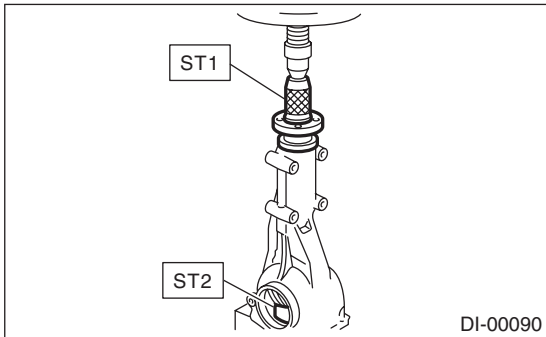
8) Press-fit the companion flange with ST1 and ST2.

NOTE:

Be careful not to damage the bearing.

ST1 899874100 INSTALLER

ST2 399780104 WEIGHT



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

SEAL MATERIAL

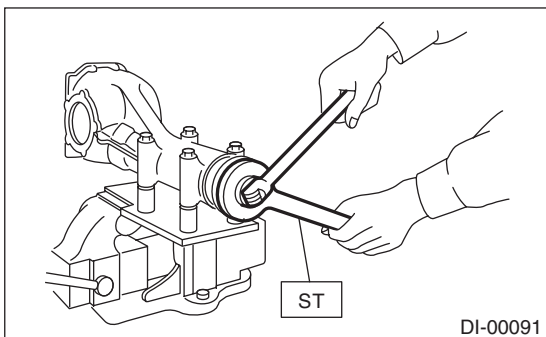
THREE BOND 1324 (Part No. 004403042) or equivalent

10) Attach a new self-locking nut and tighten it with the ST.

ST 498427200 FLANGE WRENCH

Tightening torque:

181.5 N·m (18.5 kgf·m, 134.0 ft·lb)

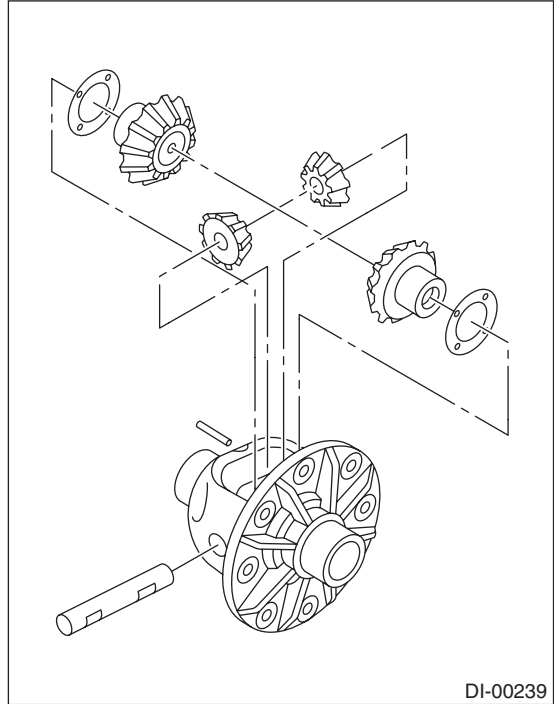


11) Assembling differential case

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

NOTE:

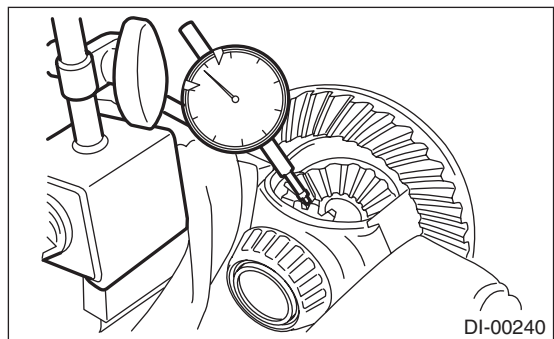
- Apply gear oil on both sides of the washer and on the side gear shaft before installing.
- Insert the pinion mate shaft into the differential case by aligning the lock pin holes.



(1) Measure the side gear backlash.

Side gear backlash:

0.10 — 0.20 mm (0.004 — 0.008 in)



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

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

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

(4) After inserting the pinion shaft lock pin into differential case, stake the both sides of the hole to prevent pin from falling off.

12) Install the driven gear to the differential case.

NOTE:

- Before installing bolts, apply seal material to bolt threads.
- Make sure there is no clearance between the differential case and driven gear.

SEAL MATERIAL

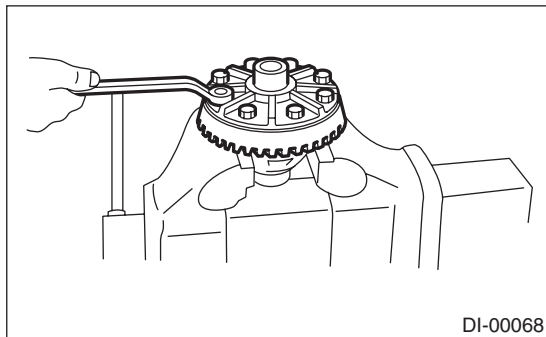
THREE BOND 1324 (Part No. 004403042) or equivalent

NOTE:

Tighten the bolts diagonally.

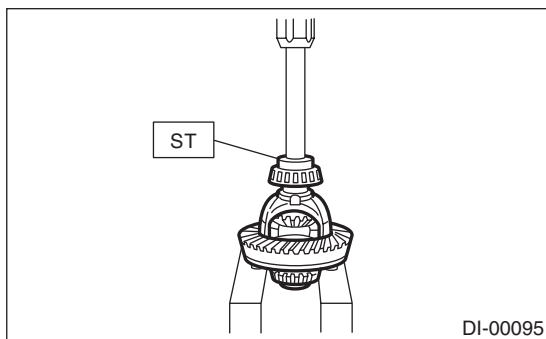
Tightening torque:

103 N·m (10.5 kgf·m, 76.0 ft·lb)



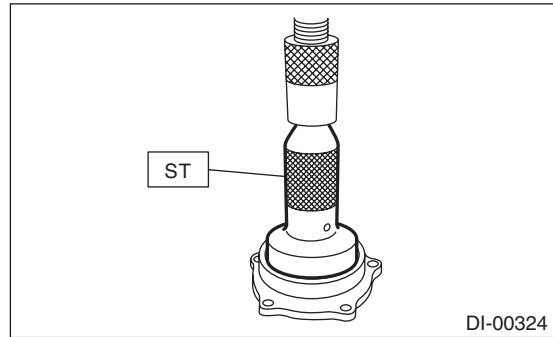
13) Press the side bearing into differential case using ST.

ST 398487700 DRIFT



14) Press the side bearing outer race into side bearing retainer using ST.

ST 398417700 DRIFT



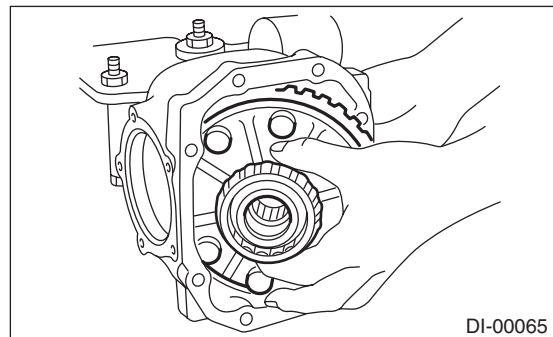
15) Adjusting the side bearing retainer shims

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

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

NOTE:

Be careful so that the teeth do not hit against the case.



(3) Install the side bearing retainer shims and O-ring to retainers RH and LH on which they were installed.

NOTE:

- Replace the broken or cracked O-ring with a new part.
- Replace broken or corroded side retainer shims with a new part of the same thickness.

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

Rear Differential

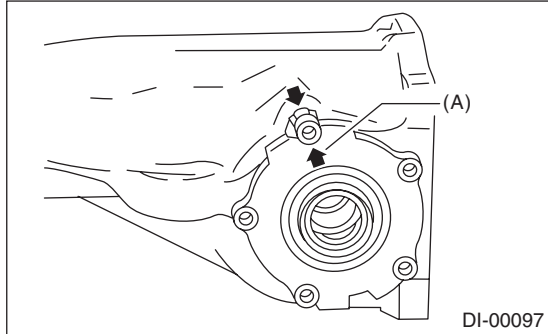
DIFFERENTIALS

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(4) Align the arrow mark on differential carrier with the mark on side retainer during installation.

NOTE:

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

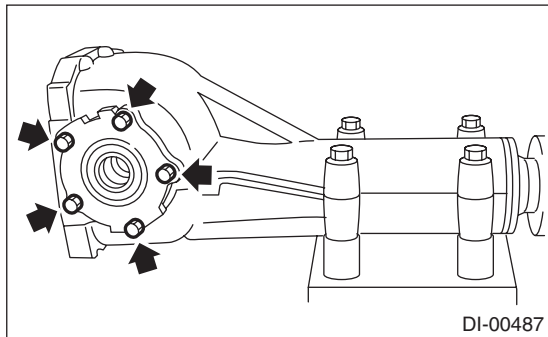


(A) Arrow mark

(5) Tighten the side bearing retainer bolts.

Tightening torque:

10.5 N·m (1.1 kgf·m, 7.7 ft·lb)



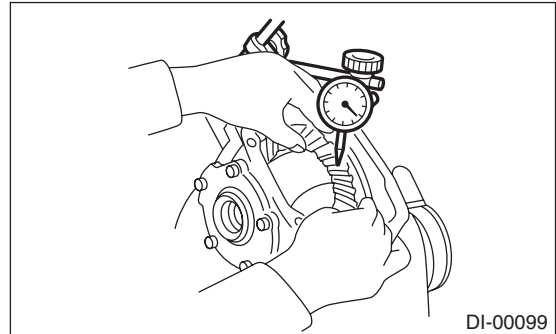
(6) Measure the backlash between the hypoid driven gear and drive pinion. Set the magnet base on differential carrier. Align the contact point of dial gauge with the tooth surface of hypoid driven gear, and move the hypoid driven gear while securing the drive pinion. Read the value indicated on dial gauge. If the backlash is not within the range of specifications, adjust the side bearing retainer shim using the following procedures.

•When backlash is less than 0.1 mm (0.004 in):
Reduce the hypoid driven gear rear face shim thickness and increase the hypoid driven gear tooth surface side shim thickness.

•When backlash exceeds 0.2 mm (0.008 in):
Increase the hypoid driven gear rear face shim thickness and reduce the tooth surface side shim thickness.

Backlash:

0.10 — 0.20 mm (0.004 — 0.008 in)



(7) At the same time, measure the total preload of the drive pinion. Compared with the resistance when differential case is not installed, if the total preload is not within specification, adjust the thickness of side bearing retainer shims, increasing/reducing both shims by an even amount at a time.

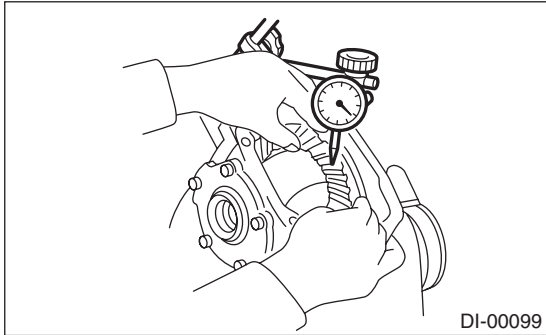
Total preload:

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

16) Recheck the backlash between the hypoid driven gear and drive pinion.

Backlash:

0.10 — 0.20 mm (0.004 — 0.008 in)

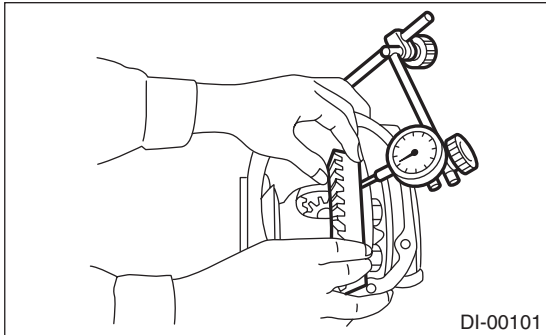


17) Check the driven gear runout on its back surface, and make sure that the pinion and driven gear rotate smoothly.

If the hypoid driven gear runout on its back surface exceeds the specification, check for any foreign objects between the hypoid driven gear and differential case, and for any deformation of the case or gear.

Hypoid driven gear back surface runout:

0.05 mm (0.002 in)



18) Checking and adjusting the tooth contact of hypoid driven gear

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

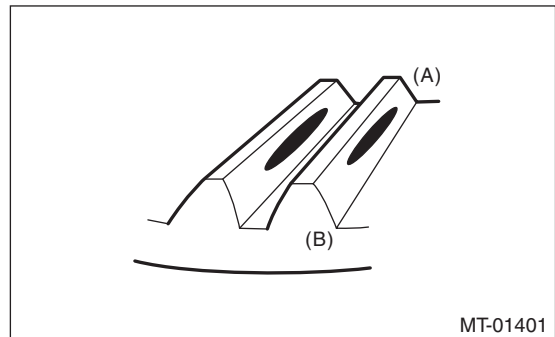
(2) When the contact pattern is not correct, re-adjust.

NOTE:

Be sure to wipe off the red lead after the adjustment is completed.

- Correct tooth contact

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



(A) Toe side

(B) Heel side

Rear Differential

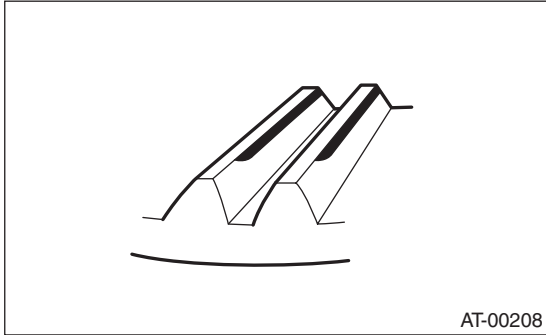
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DIFFERENTIALS

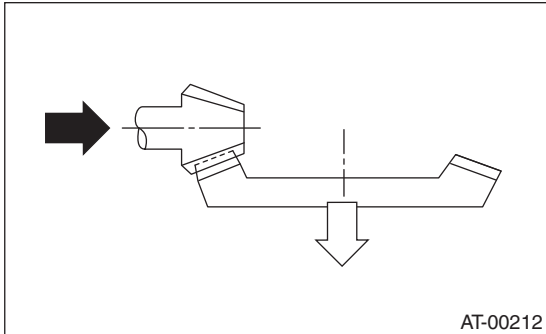
- Face contact

Check item: Backlash is too large.

Contact pattern



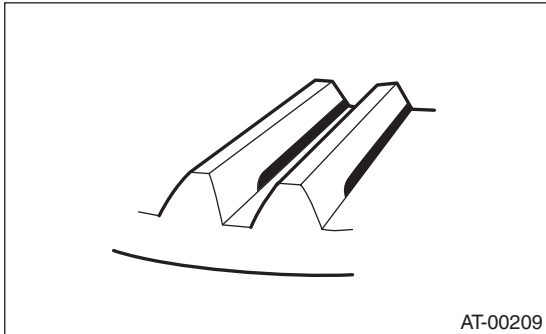
Corrective action: Increase thickness of drive pinion height adjusting washer in order to bring drive pinion close to hypoid driven gear.



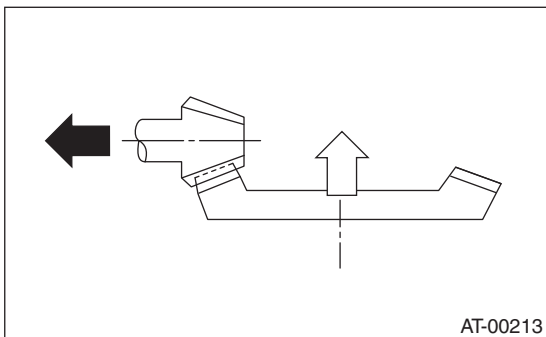
- Flank contact

Check item: Backlash is too small.

Contact pattern



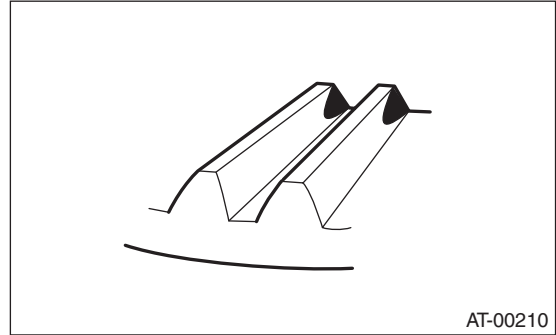
Adjustment: Reduce the thickness of pinion height adjusting washer according to the procedure for bringing the drive pinion away from hypoid driven gear.



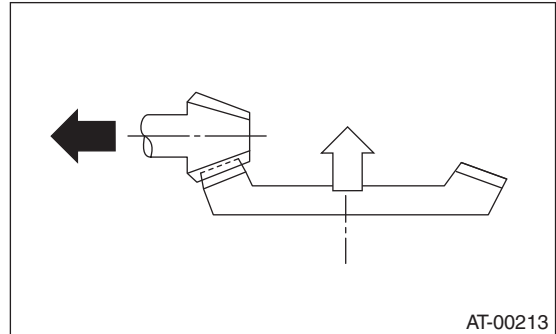
- Toe contact (inner side contact)

Check item: Contact area is too small.

Contact pattern



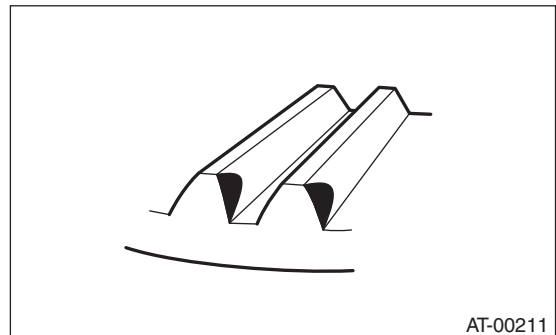
Adjustment: Reduce the thickness of pinion height adjusting washer according to the procedure for bringing the drive pinion away from hypoid driven gear.



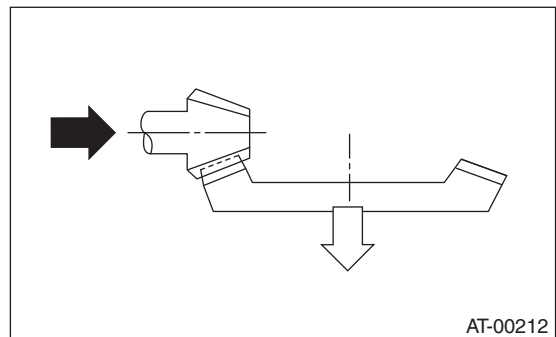
- Heel contact (outside end contact)

Check item: Contact area is too small.

Contact pattern



Corrective action: Increase thickness of drive pinion height adjusting washer in order to bring drive pinion close to hypoid driven gear.

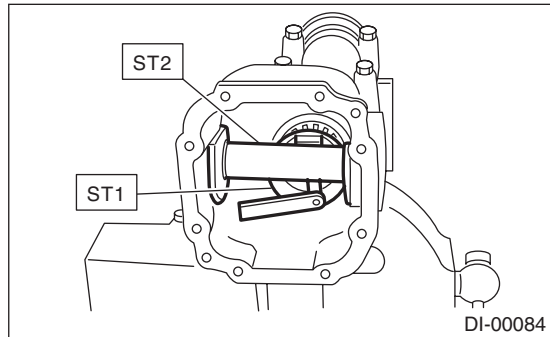


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19) If proper tooth contact is not obtained, once again adjust the drive pinion height by changing the RH and LH side bearing retainer shims and the hypoid gear backlash.

(1) Drive pinion height

ST1 398507702 DUMMY SHAFT
ST2 398507701 DIFFERENTIAL CARRIER GAUGE



$$T = T_o + N - (H \times 0.01) - 0.20 \text{ (mm)}$$

Place:

T = Thickness of pinion height adjusting washer (mm)

T_o = Thickness of washer temporarily inserted (mm)

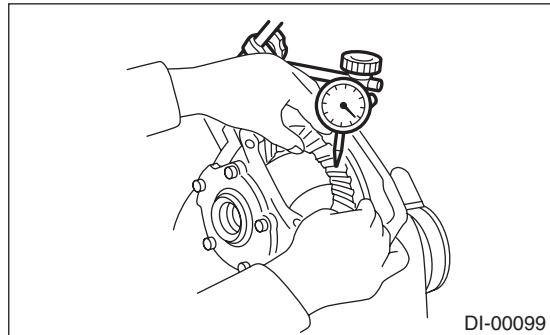
N = Clearance of thickness gauge (mm)

H = Figure marked on drive pinion head

(2) Hypoid gear backlash

Backlash:

0.10 — 0.20 mm (0.004 — 0.008 in)

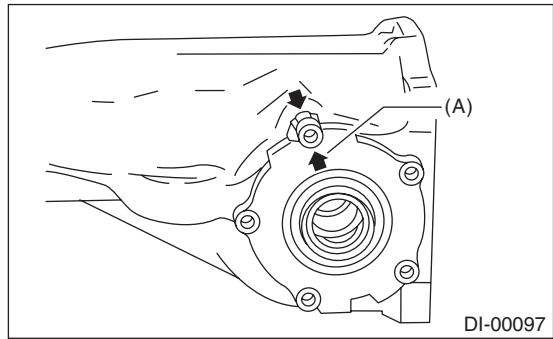


20) Remove the RH and LH side bearing retainer.

21) Install new O-rings to side bearing retainers of both sides.

22) Install oil seal to side bearing retainers of both sides. <Ref. to DI-39, REPLACEMENT, Rear Differential Side Oil Seal.>

23) Align the arrow mark on differential carrier with the mark on side retainer during installation.



(A) Arrow mark

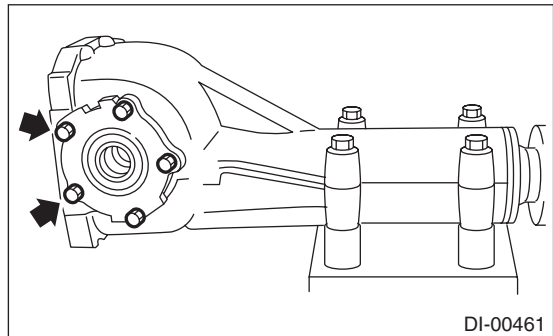
24) Apply liquid gasket to the bolt with arrow marks, and install the side bearing retainer.

Liquid gasket:

THREE BOND 1105 (Part No. 004403010) or equivalent

Tightening torque:

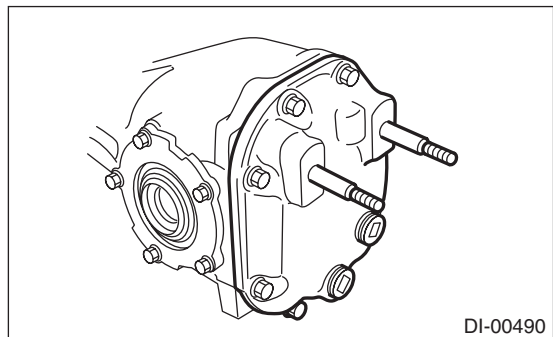
10.5 N·m (1.1 kgf-m, 7.7 ft-lb)



25) Install the new gasket and rear cover, and tighten the bolts to specified torque.

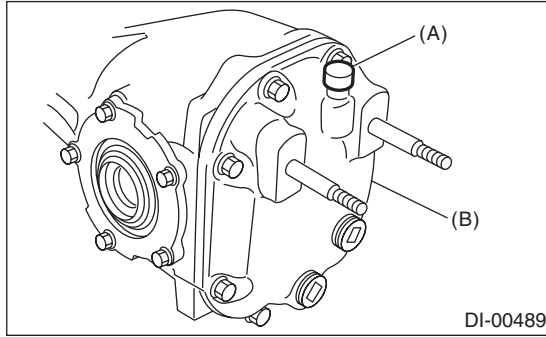
Tightening torque:

29.5 N·m (3.0 kgf-m, 21.8 ft-lb)



DIFFERENTIALS

26) Install the air breather cap.



- (A) Air breather cap
- (B) Rear cover

27) Install the oil drain plug and filler plug.

Tightening torque:

49 N·m (5.0 kgf·m, 36.2 ft·lb)

E: INSPECTION

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

1) Hypoid driven gear and drive pinion

- If there is evidently an abnormal tooth contact, find out the cause and adjust until the teeth contact correctly. Replace the gear if there is an excessive worn or an incapable adjustment.

- If crack, cutout or seizure is found, replace the parts as a set. Slight damage of some teeth can be corrected by oil stone or the like.

2) Side gear and pinion mate gear

- Replace if cracks, scoring or other defects are evident on the tooth surface.

- Replace if thrust washer contact surface is worn or seized. Slight damages of the surface can be corrected by oil stones or equivalent.

3) Bearing

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

4) Thrust washer of the side gear and pinion mate gear:

Replace if seized, flawed, abnormally worn or having other defects.

5) Oil seal

Replace if deformed or damaged, and at every disassembling.

6) Differential carrier

Replace if the bearing bores are worn or damaged.

7) Differential case

Replace if its sliding surfaces are abnormally worn, burned, or cracked.

8) Companion flange

Replace if the oil seal lip contact surface shows cracking.

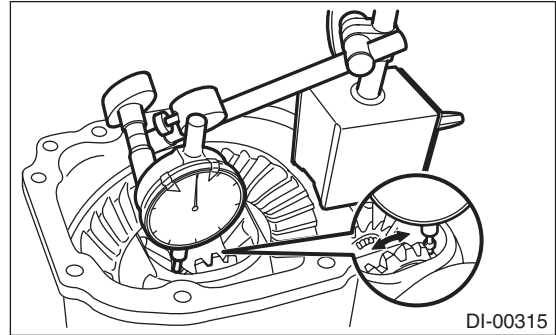
1. SIDE GEAR BACKLASH

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

Side gear backlash:

0.10 — 0.20 mm (0.004 — 0.008 in)

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



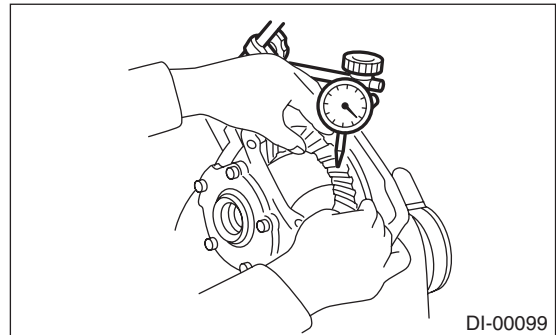
2. HYPOID DRIVEN GEAR BACKLASH

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

Hypoid driven gear backlash:

0.10 — 0.20 mm (0.004 — 0.008 in)

If the hypoid driven gear backlash is not within the specification, adjust the side bearing preload or repair if necessary.



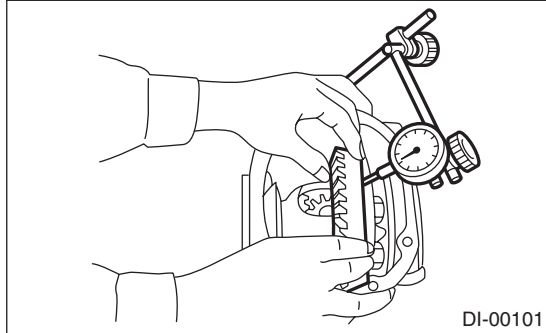
3. HYPOID DRIVEN GEAR RUNOUT ON ITS BACK SURFACE

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

Hypoid driven gear back surface runout:

0.05 mm (0.002 in)

If the hypoid driven gear runout exceeds 0.05 mm (0.002 in), replace the hypoid driven gear.



4. TOOTH CONTACT BETWEEN HYPOID DRIVEN GEAR AND DRIVE PINION

Inspect the tooth contact between the hypoid driven gear and drive pinion. <Ref. to DI-24, ASSEMBLY, Rear Differential.>

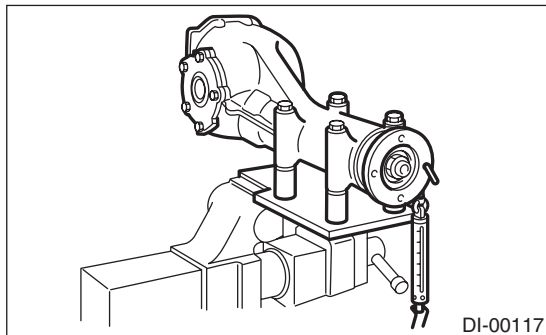
5. TOTAL PRELOAD

Using a spring scale, check the total preload.

Total preload:

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

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

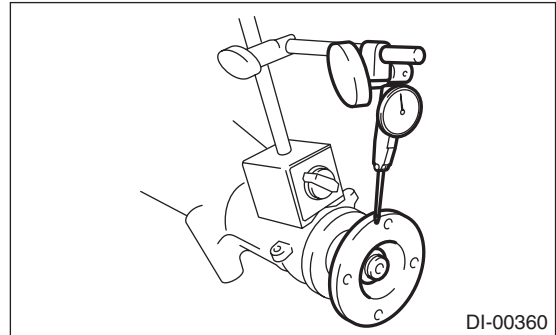


6. COMPANION FLANGE

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

Limit of runout:

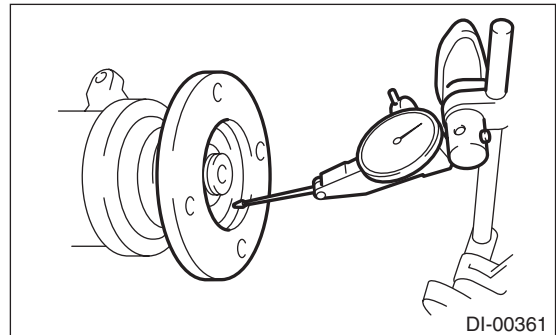
0.08 mm (0.003 in)



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

Limit of runout:

0.08 mm (0.003 in)



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

F: ADJUSTMENT

1. SIDE GEAR BACKLASH

Adjust the side gear backlash.

<Ref. to DI-24, ASSEMBLY, Rear Differential.>

2. HYPOID DRIVEN GEAR BACKLASH

Adjust hypoid driven gear backlash.

<Ref. to DI-24, ASSEMBLY, Rear Differential.>

3. TOOTH CONTACT BETWEEN HYPOID DRIVEN GEAR AND DRIVE PINION

Adjust the tooth contact between hypoid driven gear and drive pinion gear.

<Ref. to DI-24, ASSEMBLY, Rear Differential.>

4. TOTAL PRELOAD

Adjust the side bearing shim.

<Ref. to DI-24, ASSEMBLY, Rear Differential.>

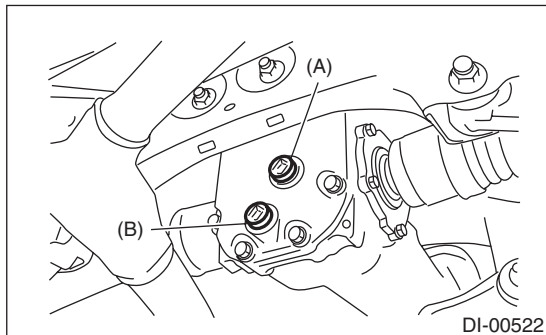
5. Rear Differential Front Oil Seal

A: INSPECTION

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

B: REPLACEMENT

- 1) Disconnect the ground cable from the battery.
- 2) Shift the select lever or gear shift lever to neutral.
- 3) Release the parking brake.
- 4) Remove the oil drain plug, and drain gear oil.



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

- 5) Install the oil drain plug.

NOTE:

Apply liquid gasket to the drain plug.

Liquid gasket:

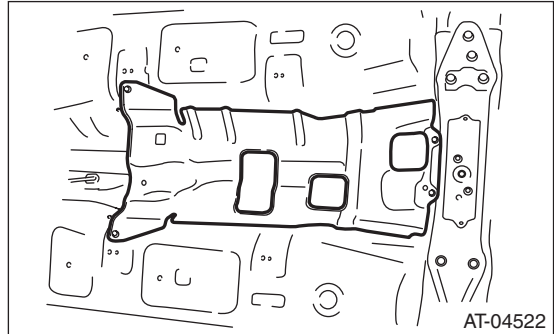
THREE BOND 1105 (Part No. 004403010) or equivalent

Tightening torque:

49 N·m (5.0 kgf·m, 36.2 ft·lb)

- 6) Lift up the vehicle.
- 7) Remove the rear exhaust pipe and muffler.
 - Non-turbo model
<Ref. to EX(H4SO)-10, REMOVAL, Rear Exhaust Pipe.> <Ref. to EX(H4SO)-12, REMOVAL, Muffler.>
 - Turbo model
<Ref. to EX(H4DOTC)-13, REMOVAL, Rear Exhaust Pipe.> <Ref. to EX(H4DOTC)-15, REMOVAL, Muffler.>

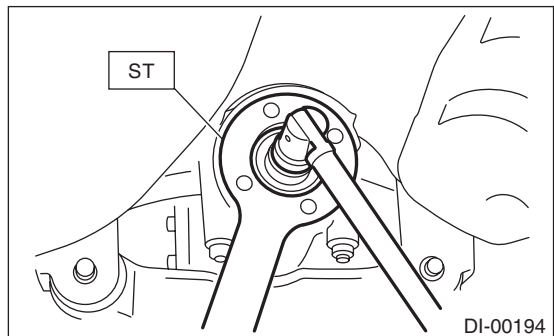
- 8) Remove the heat shield cover.



- 9) Remove the propeller shaft. <Ref. to DS-10, REMOVAL, Propeller Shaft.>

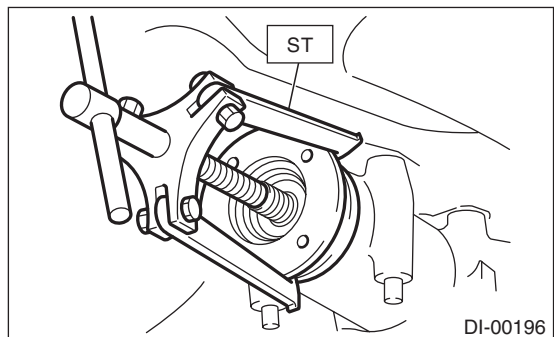
- 10) Remove the self-locking nut while holding the companion flange with ST.

ST 498427200 FLANGE WRENCH



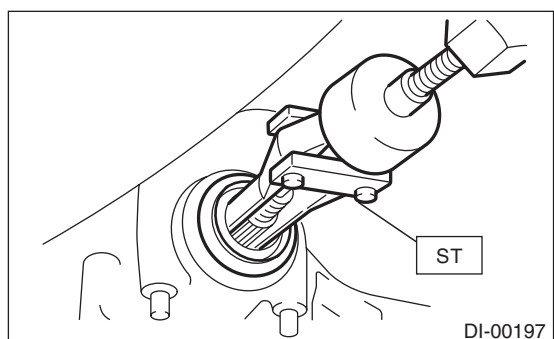
- 11) Extract the companion flange using ST.

ST 399703600 PULLER ASSY



- 12) Remove the oil seal using ST or screwdriver.

ST 398527700 PULLER ASSY

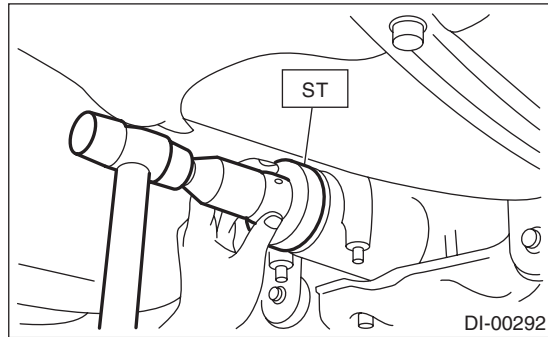


Rear Differential Front Oil Seal

DIFFERENTIALS

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- 13) Install a new oil seal using ST.
ST 498447120 INSTALLER



- 14) Install the companion flange.

NOTE:

Use a plastic hammer to install companion flange.

- 15) Tighten the self-locking nut to the specified torque so that rotating resistance of the companion flange becomes the same value as that before replacing the oil seal.

ST 498427200 FLANGE WRENCH

NOTE:

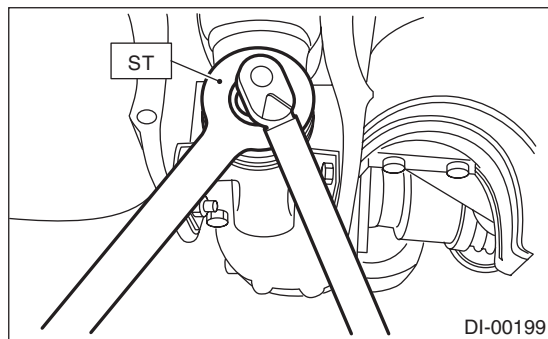
- Use a new self-locking nut.
- Before installing the self-locking nut, apply seal material to self-locking nut threads.

SEAL MATERIAL:

THREE BOND 1324 (Part No. 004403042) or equivalent

Tightening torque:

181.5 N·m (18.5 kgf·m, 134.0 ft·lb)



- 16) Hereafter, reassemble in the reverse order of disassembly.

- 17) After installing, fill the differential carrier with gear oil up to the bottom of the filler plug hole. <Ref. to DI-15, Differential Gear Oil.>

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6. Rear Differential Side Oil Seal

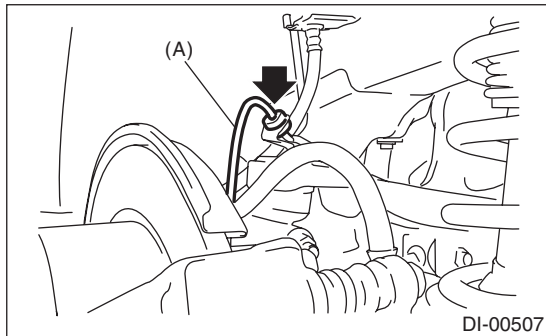
A: INSPECTION

Inspect for oil leakage from the side oil seal.
 If there is oil leakage, replace the oil seal.

B: REPLACEMENT

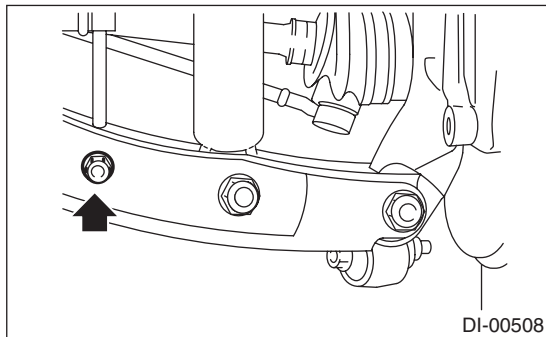
- 1) Shift the select lever or gear shift lever to neutral.
- 2) Release the parking brake.
- 3) Loosen the wheel nuts.
- 4) Lift up the vehicle.
- 5) Remove the wheels.
- 6) Remove the rear exhaust pipe and muffler.
 - Non-turbo model
 <Ref. to EX(H4SO)-10, REMOVAL, Rear Exhaust Pipe.> <Ref. to EX(H4SO)-12, REMOVAL, Muffler.>
 - Turbo model
 <Ref. to EX(H4DOTC)-13, REMOVAL, Rear Exhaust Pipe.> <Ref. to EX(H4DOTC)-15, REMOVAL, Muffler.>
- 7) Remove the DOJ of rear drive shaft from rear differential.

- (1) Remove the ABS wheel speed sensor cable from the clamp.

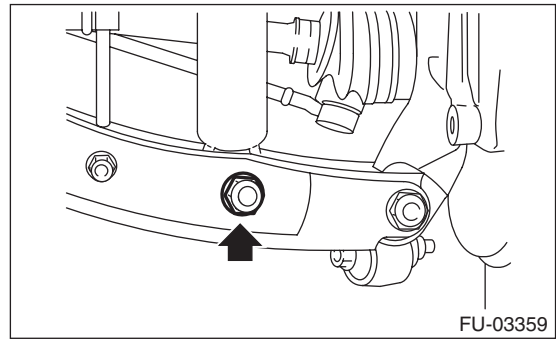


(A) ABS wheel speed sensor cable

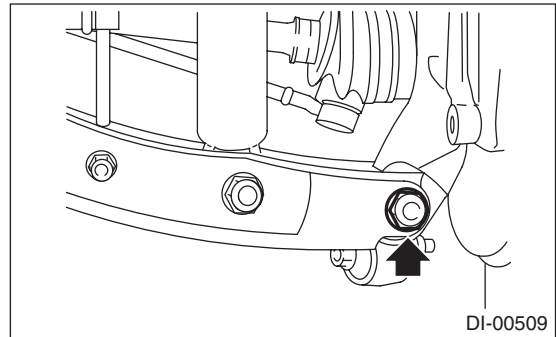
- (2) Remove the bolts which secure the rear stabilizer link to the rear lateral link.



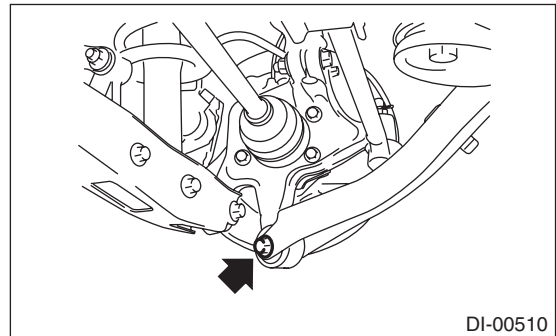
- (3) Remove the bolts which secure the shock absorber to the rear lateral link.



- (4) Remove the bolts which secure the rear lateral link to the housing.



- (5) Remove the bolts which secure the trailing link to the housing.



Rear Differential Side Oil Seal

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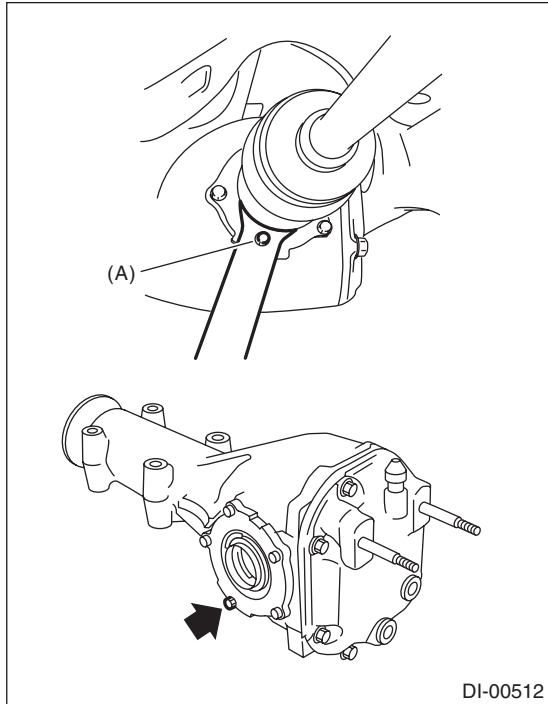
DIFFERENTIALS

(6) Remove the DOJ from the rear differential by using ST.

NOTE:

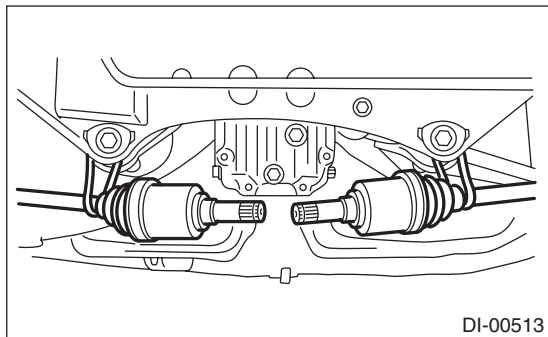
When removing the DOJ from the rear differential, fit the ST to the bolts as shown in the figure so as not to damage the side bearing retainer.

ST 208099PA100 DRIVE SHAFT REMOVER

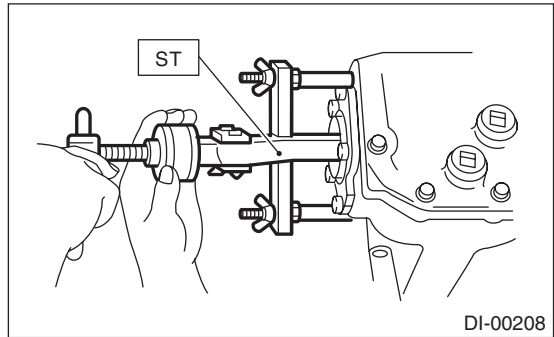


(A) Bolt

8) Suspend the rear drive shaft to the rear cross-member using wire.



9) Remove the oil seal using ST.
ST 398527700 PULLER ASSY

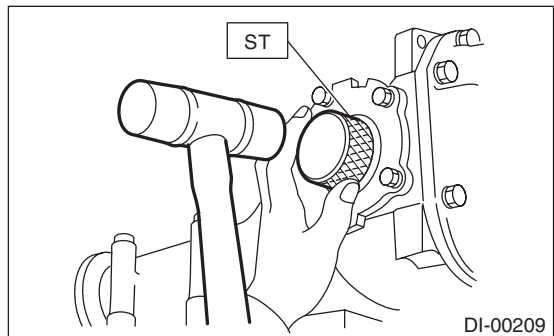


10) Install a new side oil seal using the ST.

NOTE:

Apply differential oil to the oil seal lips.

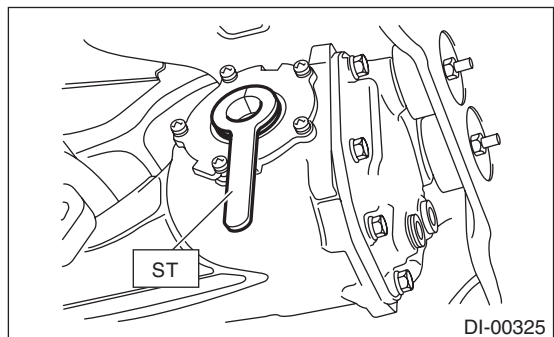
ST 398437700 DRIFT



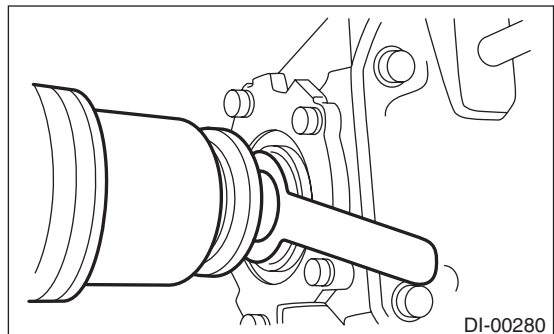
11) Insert the DOJ into rear differential.

(1) Attach the ST to rear differential.

ST 28099PA090 OIL SEAL PROTECTOR



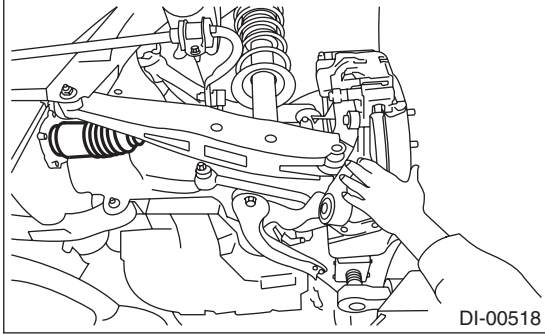
(2) Insert the spline shaft until the spline portion comes inside the side oil seal.



Rear Differential Side Oil Seal

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DIFFERENTIALS

- (3) Remove ST from rear differential.
- ST 28099PA090 OIL SEAL PROTECTOR
- (4) Push the housing to insert DOJ into rear differential.

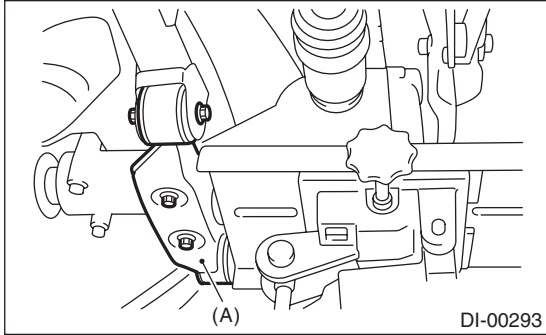


- 12) Installing procedure hereafter is in the reverse order of removal.

7. Rear Differential Front Member

A: REMOVAL

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



(A) Rear differential front member

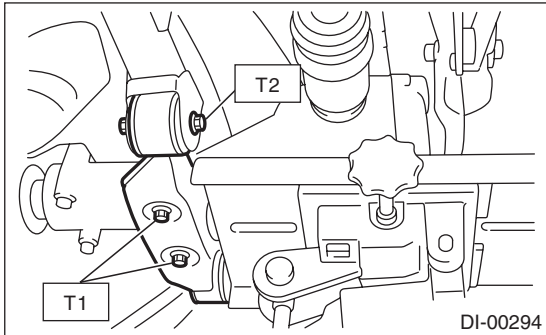
B: INSTALLATION

Using new self-locking nuts, install the rear differential front member.

Tightening torque:

T1: 50 N·m (5.1 kgf-m, 36.9 ft-lb)

T2: 110 N·m (11.2 kgf-m, 81.1 ft-lb)



C: INSPECTION

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

8. General Diagnostic Table

A: INSPECTION

Symptom or trouble	Possible cause	Remedy
1. Oil leakage	(1) Worn, scratched, or incorrectly seated front or side oil seal. Scored, battered or excessively worn sliding surface of companion flange.	Correct or replace.
	(2) Clogged or damaged air breather cap.	Clean, repair or replace.
	(3) Loose bolts on side bearing retainer, or incorrectly fitted O-ring.	Tighten the bolts to specified torque. Replace the O-ring.
	(4) Loose rear cover attaching bolts or damaged gasket.	Tighten the bolts to specified torque. Replace gasket and apply liquid gasket.
	(5) Loose oil filler or drain plug.	Retighten and apply liquid gasket.
	(6) Wear, damage or incorrect fitting of drive shaft, side bearing retainer or oil seal.	Correct or replace.
2. Seizure NOTE: Seized or damaged parts should be replaced, and also other parts should be thoroughly checked for any defect and should be repaired or replaced as required.	(1) Insufficient backlash for hypoid gear.	Readjust or replace.
	(2) Excessive preload for side, rear or front bearing.	Readjust or replace.
	(3) Insufficient or improper oil used.	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.	(1) Improper backlash for hypoid gear.	Replace.
	(2) Insufficient or excessive preload for side, rear or front bearing.	Readjust or replace.
	(3) Excessive backlash for differential gear.	Replace gear or thrust washer.
	(4) Loose bolts and nuts such as hypoid driven gear bolt.	Retighten.
	(5) Damage due to overloading.	Replace.
4. Noises when starting or shifting gears NOTE: Noises may be caused by differential assembly, universal joint, wheel bearing, etc. Find out what is actually making noise before disassembling.	(1) Improper tooth contact of hypoid gear.	Readjust. (Drive pinion shim adjustment, backlash adjustment)
	(2) Excessive backlash for differential gear or hypoid gear.	Replace gear or thrust washer.
	(3) Insufficient preload for front or rear bearing.	Readjust.
	(4) Loose drive pinion nut.	Tighten to the specified torque.
	(5) Loose bolts and nuts such as side bearing retainer attaching bolt.	Tighten to the specified torque.
5. Noises when cornering	(1) Damaged differential gear.	Replace.
	(2) Excessive wear or damage of thrust washer.	Replace.
	(3) Broken pinion mate shaft.	Replace.
	(4) Seized or damaged side bearing.	Replace.

General Diagnostic Table

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DIFFERENTIALS

Symptom or trouble	Possible cause	Remedy
6. Gear noise NOTE: Since noises from engine, muffler, transmission, propeller shaft, wheel bearings, tires, and body are sometimes mistaken for noises from differential assembly, be careful in checking them. Inspection methods to locate noises include coasting, accelerating, cruising, and lift up all four wheels. Perform these inspections according to the condition of trouble. When listening to noises, shift the gear into four wheel drive and fourth speed position, trying to pick up only differential noise.	(1) Improper tooth contact of hypoid gear.	Readjust or replace hypoid gear set.
	(2) Improper backlash of the hypoid gear.	Readjust.
	(3) Scored or chipped teeth of hypoid gear.	Replace hypoid gear set.
	(4) Seized hypoid gear.	Replace hypoid gear set.
	(5) Improper preload for front or rear bearings.	Readjust.
	(6) Seized, cut-away or chipped front or rear bearing.	Replace.
	(7) Seized, cut-away or chipped side bearing.	Replace.
	(8) Vibrating differential gear.	Replace.