

CHASSIS SECTION

This service manual has been prepared to provide SUBARU service personnel with the necessary information and data for the correct maintenance and repair of SUBARU vehicles.

This manual includes the procedures for maintenance, disassembling, reassembling, inspection and adjustment of components and diagnostics for guidance of experienced mechanics.

Please peruse and utilize this manual fully to ensure complete repair work for satisfying our customers by keeping their vehicle in optimum condition. When replacement of parts during repair work is needed, be sure to use SUBARU genuine parts.

All information, illustration and specifications contained in this manual are based on the latest product information available at the time of publication approval.

FRONT SUSPENSION**FS****REAR SUSPENSION****RS****WHEEL AND TIRE SYSTEM****WT****DIFFERENTIAL****DI****TRANSFER CASE****TC****DRIVE SHAFT SYSTEM****DS****ABS****ABS****ABS (DIAGNOSTIC)****ABS****BRAKE****BR****PARKING BRAKE****PB****POWER ASSISTED SYSTEM
(POWER STEERING)****PS**

DIFFERENTIAL

DI

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General Description

DIFFERENTIAL

1. General Description

A: SPECIFICATION

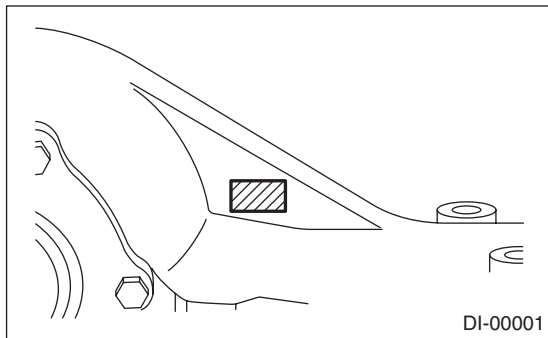
When replacing a rear differential assembly, select the correct one according to the following table.

NOTE:

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

Model	2.0L Non-turbo		2.0L Turbo				2.5 L Non-turbo		2.5L Turbo	
	MT	AT	MT		AT		MT	AT	MT	AT
			For Europe	Except For Europe	For Europe	Except For Europe				
Rear differential type	VA-type with LSD			T-type with LSD						
LSD type	Viscous coupling									
Identification	XR	XS	HP	CF	HP	JP		CF		
Type of gear	Hypoid gear									
Gear ratio (Number of gear teeth)	4.111 (37/9)	4.444 (40/9)	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									

• Identification

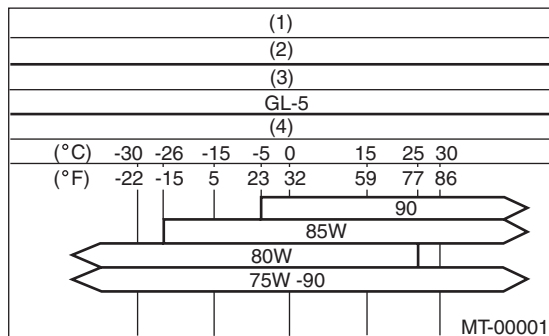


• Rear differential gear oil

Recommended oil

CAUTION:

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



- (1) Item
- (2) Differential gear oil
- (3) API Classification
- (4) SAE Viscosity No. and Application Temperature

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1. SERVICE DATA

Front and rear bearing preload at companion flange bolt hole N (kgf, lb)	New bearing	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 bearing standard width mm (in)		20.00 (0.7874)	
Hypoid driven 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)
Hypoid driven gear runout on its back surface mm (in)		Less than 0.05 (0.0020)	

2. ADJUSTING PARTS

• T-type

Front and rear bearing preload at companion flange bolt hole N (kgf, lb)	New bearing	18.1 — 38.8 (1.8 — 4.0, 4.1 — 8.7)
Preload adjusting collar	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)
Preload adjusting washer	Part No.	Length mm (in)
	383705200	2.59 (0.1020)
	383715200	2.57 (0.1012)
	383725200	2.55 (0.1004)
	383735200	2.53 (0.0996)
	383745200	2.51 (0.0988)
	383755200	2.49 (0.0980)
	383765200	2.47 (0.0972)
	383775200	2.45 (0.0965)
	383785200	2.43 (0.0957)
	383795200	2.41 (0.0949)
	383805200	2.39 (0.0941)
	383815200	2.37 (0.0933)
	383825200	2.35 (0.0925)
383835200	2.33 (0.0917)	
383845200	2.31 (0.0909)	

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Pinion height adjusting shim	Part No.	Thickness mm (in)
	383495200	3.09 (0.1217)
	383505200	3.12 (0.1228)
	383515200	3.15 (0.1240)
	383525200	3.18 (0.1252)
	383535200	3.21 (0.1264)
	383545200	3.24 (0.1276)
	383555200	3.27 (0.1287)
	383565200	3.30 (0.1299)
	383575200	3.33 (0.1311)
	383585200	3.36 (0.1323)
	383595200	3.39 (0.1335)
	383605200	3.42 (0.1346)
	383615200	3.45 (0.1358)
	383625200	3.48 (0.1370)
	383635200	3.51 (0.1382)
	383645200	3.54 (0.1394)
	383655200	3.57 (0.1406)
	383665200	3.60 (0.1417)
	383675200	3.63 (0.1429)
383685200	3.66 (0.1441)	
Side bearing standard width mm (in)	—	20.00 (0.7874)
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)
Hypoid driven gear to drive pinion backlash	Limit mm (in)	0.10 — 0.20 (0.0039 — 0.0079)
Hypoid driven gear runout on its back surface		0.05 (0.0020)

General Description

DIFFERENTIAL

• **VA-type**

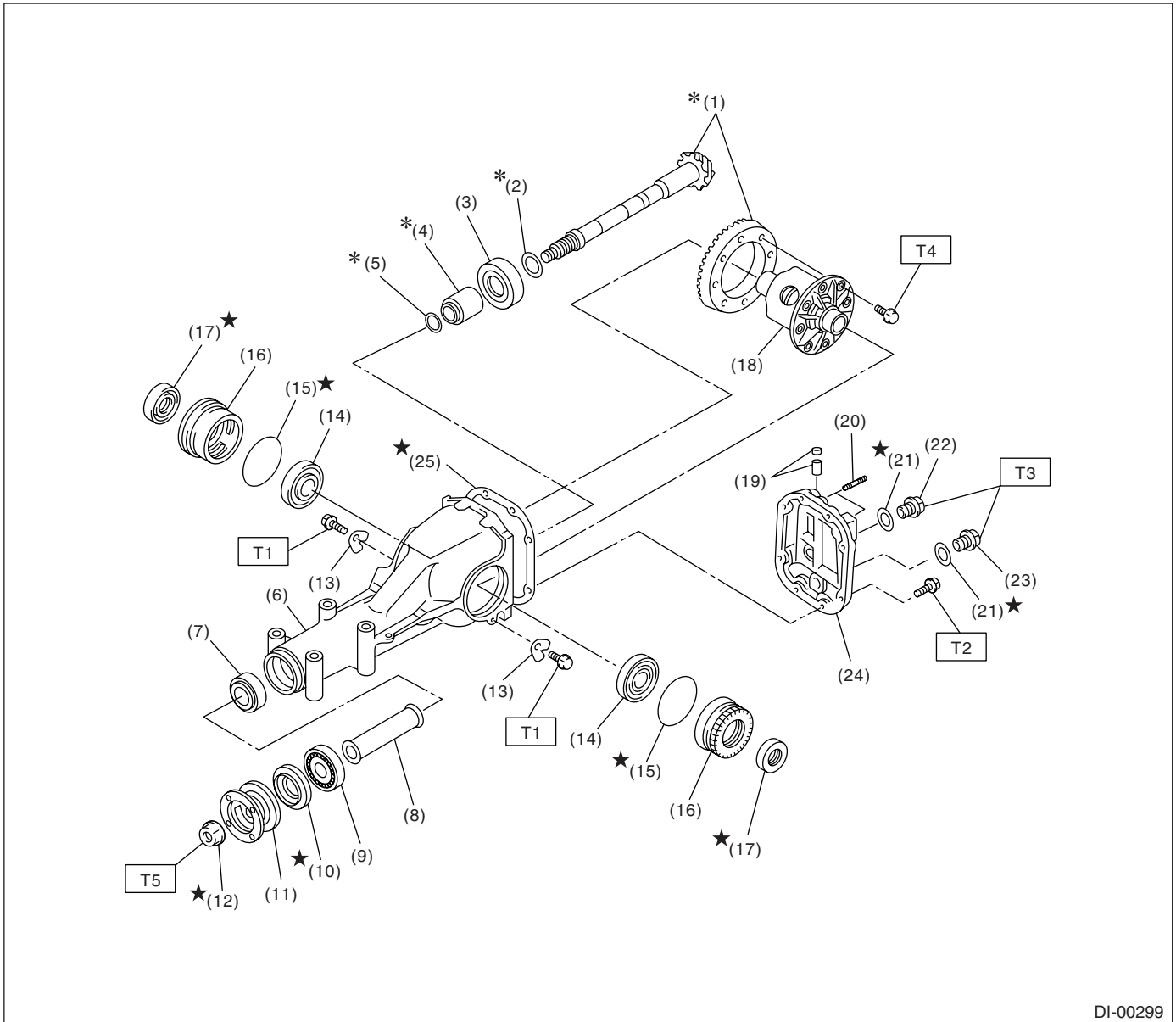
Front and rear bearing preload at companion flange bolt hole	New bearing	12.7 — 32.4 N (1.3 — 3.3 kgf, 2.9 — 7.3 lb)
Preload adjusting collar	Part No.	Length mm (in)
	32288AA040	52.3 (2.059)
	32288AA050	52.5 (2.067)
	31454AA100	52.6 (2.071)
	32288AA060	52.7 (2.075)
	31454AA110	52.8 (2.079)
	32288AA070	52.9 (2.083)
	31454AA120	53.0 (2.087)
	32288AA080	53.1 (2.091)
32288AA090	53.3 (2.098)	
Preload adjusting washer	Part No.	Thickness mm (in)
	38336AA000	1.500 (0.0591)
	38336AA120	1.513 (0.0596)
	38336AA010	1.525 (0.0600)
	38336AA130	1.538 (0.0606)
	38336AA020	1.550 (0.0610)
	38336AA140	1.563 (0.0615)
	38336AA030	1.575 (0.0620)
	38336AA150	1.588 (0.0625)
	38336AA040	1.600 (0.0630)
	38336AA160	1.613 (0.0635)
	38336AA050	1.625 (0.0640)
	38336AA170	1.638 (0.0645)
	38336AA060	1.650 (0.0650)
	38336AA180	1.663 (0.0655)
	38336AA070	1.675 (0.0659)
	38336AA190	1.688 (0.0665)
	38336AA080	1.700 (0.0669)
	38336AA200	1.713 (0.0674)
38336AA090	1.725 (0.0679)	
38336AA210	1.738 (0.0684)	
38336AA100	1.750 (0.0689)	
38336AA220	1.763 (0.0694)	
38336AA110	1.775 (0.0699)	
Pinion height adjusting shim	Part No.	Thickness mm (in)
	32295AA200	0.150 (0.0059)
	32295AA210	0.175 (0.0069)
	32295AA220	0.200 (0.0079)
	32295AA230	0.225 (0.0089)
	32295AA240	0.250 (0.0098)
32295AA250	0.275 (0.0108)	
Side gear thrust washer	Part No.	Thickness mm (in)
	803135011	0.925 — 0.950 (0.0364 — 0.0374)
	803135012	0.950 — 0.975 (0.0374 — 0.0384)
	803135013	0.975 — 1.000 (0.0384 — 0.0394)
	803135014	1.000 — 1.025 (0.0394 — 0.0404)
803135015	1.025 — 1.050 (0.0404 — 0.0413)	
Hypoid driven gear to drive pinion backlash	Limit mm (in)	0.10 — 0.15 (0.0039 — 0.0059)

General Description

DIFFERENTIAL

B: COMPONENT

1. REAR DIFFERENTIAL FOR VA-TYPE



DI-00299

- (1) Hypoid driven gear and drive pinion set
- (2) Pinion height adjusting washer
- (3) Rear bearing
- (4) Bearing preload adjusting collar
- (5) Bearing preload adjusting washer
- (6) Differential carrier
- (7) Front bearing
- (8) Collar
- (9) Pilot bearing
- (10) Front oil seal

- (11) Companion flange
- (12) Self-locking nut
- (13) Lock plate
- (14) Side bearing
- (15) O-ring
- (16) Axle shaft holder
- (17) Side oil seal
- (18) Differential case
- (19) Air breather cap
- (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)

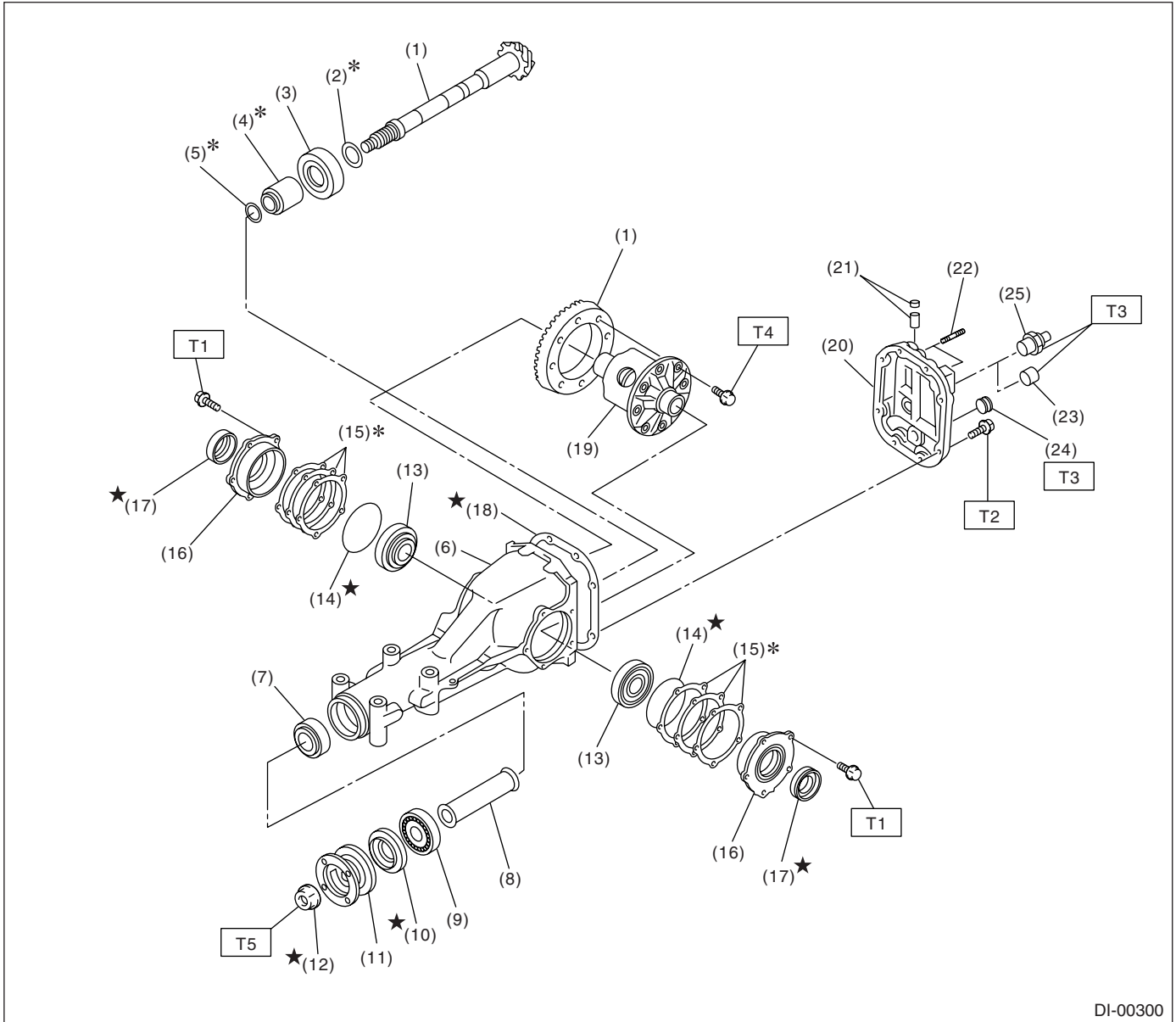
T2: 25 (2.5, 18.1)

T3: 34 (3.5, 25.3)

T4: 62 (6.3, 45.6)

T5: 188 (19.2, 139)

2. REAR DIFFERENTIAL FOR T-TYPE



DI-00300

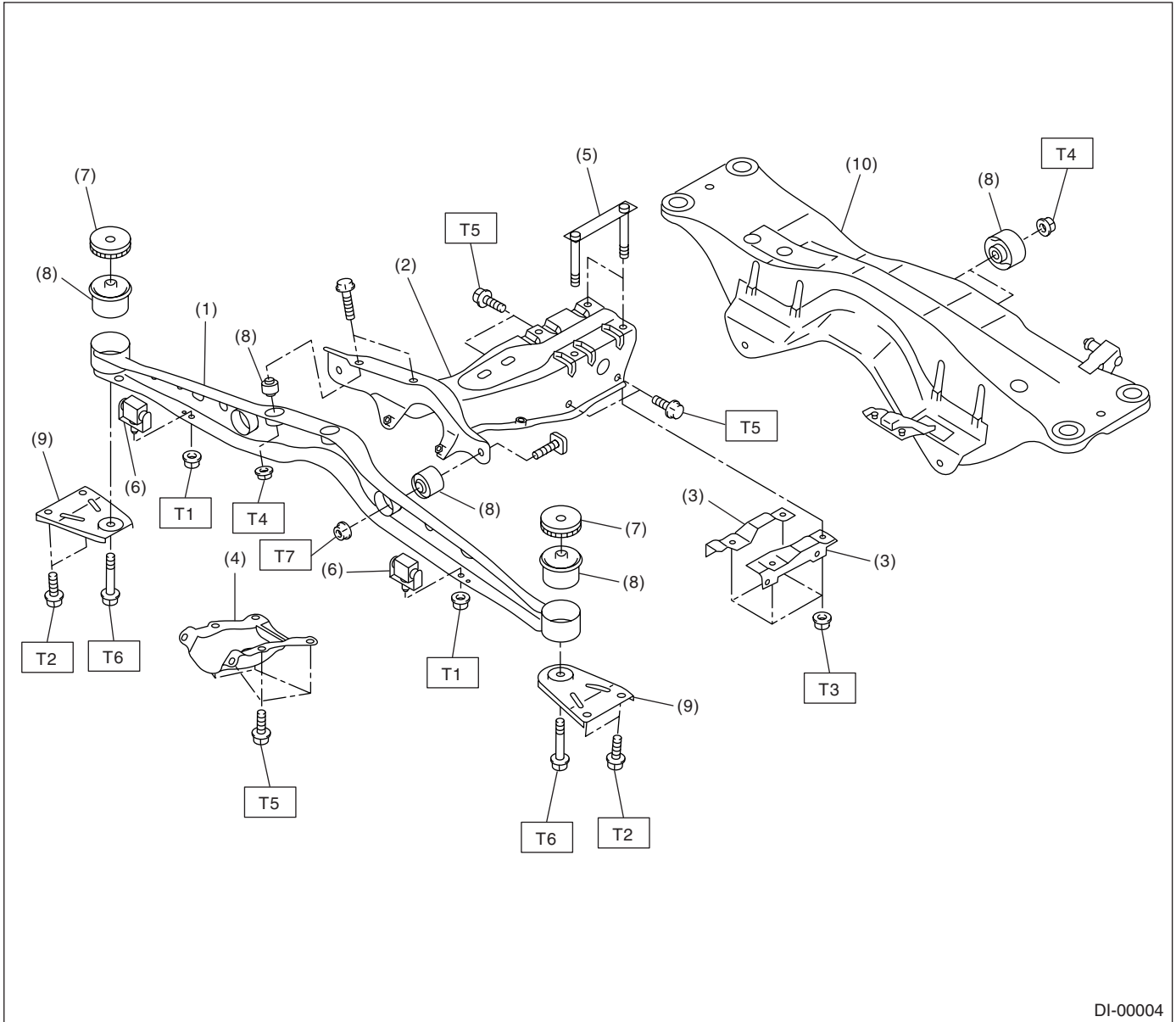
(1) Hypoid driven gear and drive pinion set	(12) Self-locking nut	(23) Oil filler plug (model without oil temperature switch)
(2) Pinion height adjusting washer	(13) Side bearing	(24) Oil drain plug
(3) Rear bearing	(14) O-ring	(25) Oil filler plug (model with oil temperature switch)
(4) Bearing preload adjusting collar	(15) Side bearing retainer shim	
(5) Bearing preload adjusting washer	(16) Side bearing retainer	
(6) Differential carrier	(17) Side oil seal	
(7) Front bearing	(18) Gasket	
(8) Collar	(19) Differential case (Viscous coupling type)	
(9) Pilot bearing	(20) Rear cover	
(10) Front oil seal	(21) Air breather cap	
(11) Companion flange	(22) Stud bolt	

Tightening torque: N·m (kgf-m, ft-lb)	
T1:	10.5 (1.07, 7.7)
T2:	29 (3.0, 21.7)
T3:	49 (5.0, 36.2)
T4:	103 (10.5, 75.9)
T5:	181 (18.5, 134)

General Description

DIFFERENTIAL

3. REAR DIFFERENTIAL MOUNTING SYSTEM



DI-00004

- | | |
|---------------------------------------|--------------------------------|
| (1) Differential front member | (8) Bushing |
| (2) Differential bracket | (9) Differential mount bracket |
| (3) Differential mount lower bracket | (10) Cross member |
| (4) Differential mounting front cover | |
| (5) Plate | |
| (6) Dynamic damper (Non-turbo model) | |
| (7) Stopper | |

Tightening torque: N·m (kgf·m, ft·lb)

- T1: 20 (2.0, 14.5)**
T2: 33 (3.4, 24.3)
T3: 65 (6.6, 47.7)
T4: 70 (7.1, 51.6)
T5: 90 (9.2, 66.4)
T6: 100 (10.2, 73.8)
T7: 135 (13.8, 97.6)

C: CAUTION

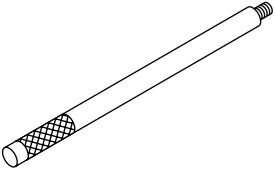
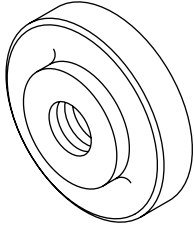
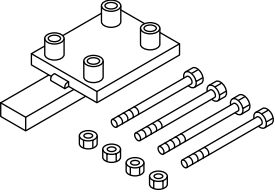
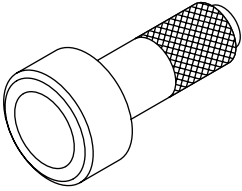
- Wear working clothing, including a cap, protective goggles, and protective shoes during operation.
- Remove contamination including dirt and corrosion before removal, installation or disassembly.
- Keep the disassembled parts in order and protect them from dust or dirt.
- Before removal, installation or disassembly, be sure to clarify the failure. Avoid unnecessary removal, installation, disassembly, and replacement.
- Be careful not to burn yourself, 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 rigid racks 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.

General Description

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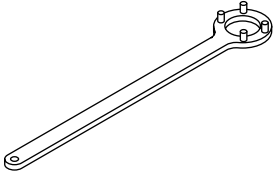
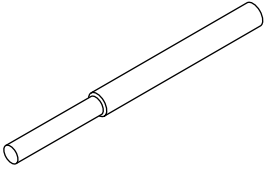
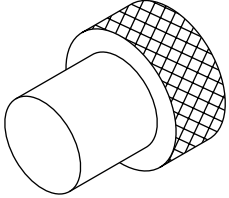
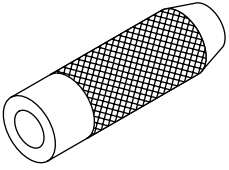
D: PREPARATION TOOL

1. SPECIAL TOOL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p style="text-align: center;">ST-398477701</p>	398477701	HANDLE	Used for installing front and rear bearing cone.
 <p style="text-align: center;">ST-398477702</p>	398477702	DRIFT	<ul style="list-style-type: none"> • Used press-fitting the bearing cone of differential carrier (front). • For T-type.
 <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 front oil seal.

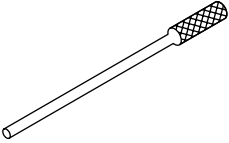
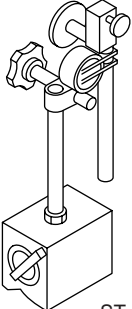
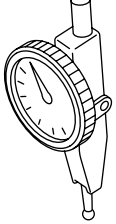
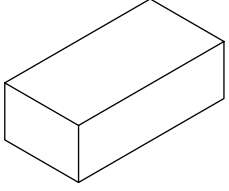
General Description

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ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p style="text-align: center;">ST-498427200</p>	498427200	FLANGE WRENCH	Used for stopping rotation of companion flange when loosening and tightening self-locking 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 front bearing cone, pilot bearing companion flange.
 <p style="text-align: center;">ST-899580100</p>	899580100	INSTALLER	Used for press-fitting the front bearing cone, pilot bearing.

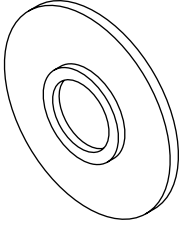
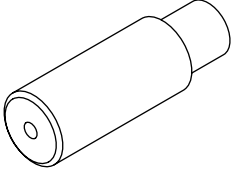
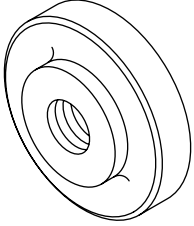
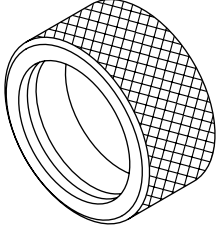
General Description

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ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p style="text-align: center;">ST-899904100</p>	899904100	STRAIGHT PIN REMOVER	Used for driving out differential pinion shaft lock pin.
 <p style="text-align: center;">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 with DIAL GAUGE (498247100).
 <p style="text-align: center;">ST-498247100</p>	498247100	DIAL GAUGE	<ul style="list-style-type: none"> • Used measuring backlash between side gear and pinion, hypoid gear. • Used with MAGNET BASE (498247001).
 <p style="text-align: center;">ST-398507704</p>	398507704	BLOCK	Used for adjusting pinion height and preload.

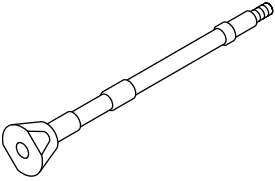
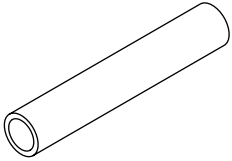
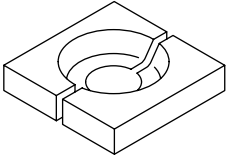
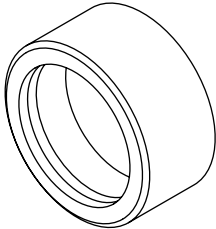
General Description

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ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p style="text-align: center;">ST-398177700</p>	398177700	INSTALLER	<ul style="list-style-type: none"> • Used for installing rear bearing cone. • For T-type.
 <p style="text-align: center;">ST-398457700</p>	398457700	ATTACHMENT	<ul style="list-style-type: none"> • Used for removing side bearing retainer. • For T-type.
 <p style="text-align: center;">ST-398477703</p>	398477703	DRIFT2	<ul style="list-style-type: none"> • Used for press-fitting the bearing race (rear) of differential carrier. • For T-type.
 <p style="text-align: center;">ST-398437700</p>	398437700	DRIFT	<ul style="list-style-type: none"> • Used for installing side oil seal. • For T-type.

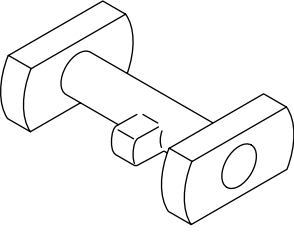
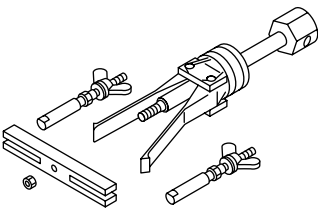
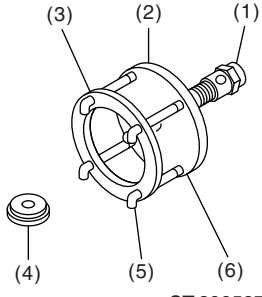
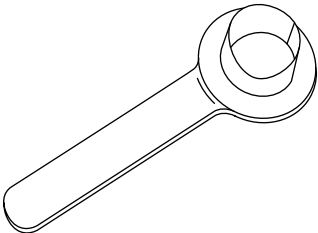
General Description

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ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p style="text-align: center;">ST-398507702</p>	398507702	DUMMY SHAFT	<ul style="list-style-type: none"> • Used for adjusting pinion height and preload. • For T-type.
 <p style="text-align: center;">ST-398507703</p>	398507703	DUMMY COLLAR	<ul style="list-style-type: none"> • Used for adjusting pinion height and preload. • For T-type.
 <p style="text-align: center;">ST-398517700</p>	398517700	REPLACER	<ul style="list-style-type: none"> • Used for removing rear bearing cone. • For T-type.
 <p style="text-align: center;">ST-398487700</p>	398487700	DRIFT	<ul style="list-style-type: none"> • Used for press-fitting the side bearing cone. • For T-type.

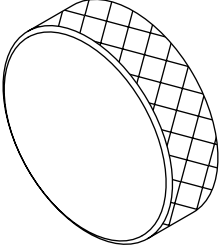
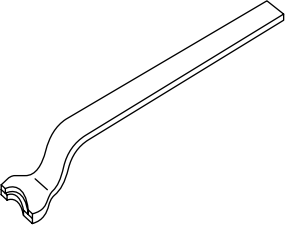
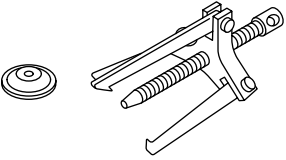
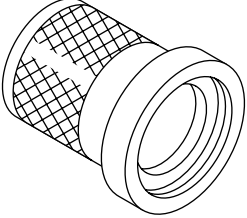
General Description

DIFFERENTIAL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p style="text-align: center;">ST-398507701</p>	398507701	DIFFERENTIAL CARRIER GAUGE	<ul style="list-style-type: none"> • Used for adjusting pinion height. • For T-type.
 <p style="text-align: center;">ST-398527700</p>	398527700	PULLEY ASSY	<ul style="list-style-type: none"> • Used for removing front oil seal. • Used for removing side bearing cup. (T-type)
 <p style="text-align: center;">ST-399527700</p>	399527700	PULLER SET	<ul style="list-style-type: none"> • 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.
 <p style="text-align: center;">ST28099PA090</p>	28099PA090	OIL SEAL PROTECTOR	<ul style="list-style-type: none"> • Used for installing rear drive shaft into rear differential. • For protecting oil seal.

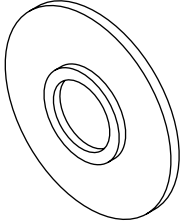
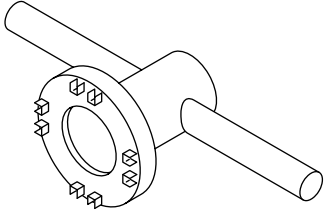
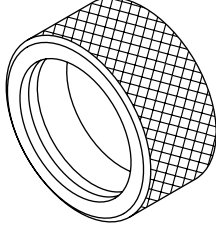
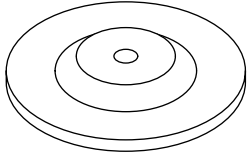
General Description

DIFFERENTIAL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p style="text-align: center;">ST-398237700</p>	398237700	DRIFT	<ul style="list-style-type: none"> • Used for installing side bearing. • For T-type.
 <p style="text-align: center;">ST28099PA100</p>	28099PA100	DRIVE SHAFT REMOVER	<ul style="list-style-type: none"> • Used for removing rear drive shaft from rear differential. • For T-type.
 <p style="text-align: center;">ST-399703600</p>	399703600	PULLEY ASSY	Used for removing companion flange
 <p style="text-align: center;">ST-899874100</p>	899874100	INSTALLER	Used for installing companion flange.

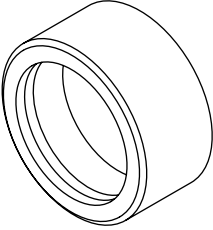
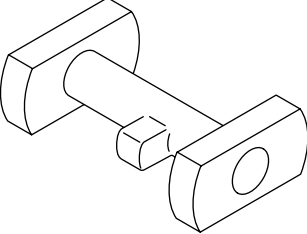
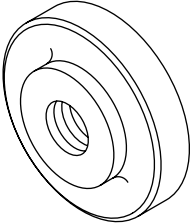
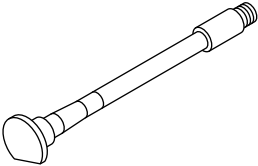
General Description

DIFFERENTIAL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p style="text-align: center;">ST-498175500</p>	498175500	INSTALLER	<ul style="list-style-type: none"> • Used for installing rear bearing cone. • For VA-type.
 <p style="text-align: center;">ST-499785500</p>	499785500	OIL SEAL HOLDER WRENCH	<ul style="list-style-type: none"> • Used for removing and installing side oil seal holder. • For VA-type.
 <p style="text-align: center;">ST-498447100</p>	498447100	INSTALLER	<ul style="list-style-type: none"> • Used for installing oil seal. • For VA-type.
 <p style="text-align: center;">ST-399520105</p>	399520105	SEAT	<ul style="list-style-type: none"> • Used for removing side bearing cone. • Used with PULLER SET (899524100). • For VA-type.

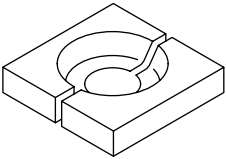
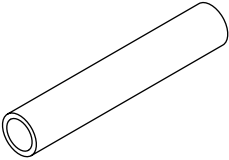
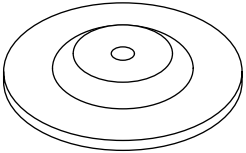
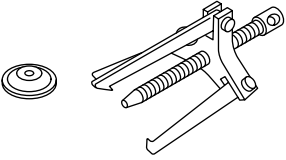
General Description

DIFFERENTIAL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p style="text-align: center;">ST-498485400</p>	498485400	DRIFT	<ul style="list-style-type: none"> • Used for installing side bearing cone. • For VA-type.
 <p style="text-align: center;">ST-498505501</p>	498505501	DIFFERENTIAL CARRIER GAUGE	<ul style="list-style-type: none"> • Used for adjusting pinion height. • For VA-type.
 <p style="text-align: center;">ST-498447110</p>	498447110	DRIFT	<ul style="list-style-type: none"> • Used for press-fitting the bearing race (front) of differential carrier. • For VA-type.
 <p style="text-align: center;">ST-498447150</p>	498447150	DUMMY SHAFT	<ul style="list-style-type: none"> • Used for adjusting pinion height and pre-load. • For VA-type.

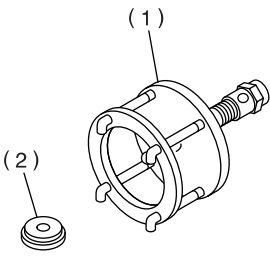
General Description

DIFFERENTIAL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p style="text-align: center;">ST-498515500</p>	498515500	REPLACER	<ul style="list-style-type: none"> • Used for removing rear bearing cone. • For VA-type.
 <p style="text-align: center;">ST32285AA000</p>	32285AA000	DUMMY COLLAR	<ul style="list-style-type: none"> • Used for adjusting pinion height and pre-load. • For VA-type.
 <p style="text-align: center;">ST-499705404</p>	499705404	SEAT	<ul style="list-style-type: none"> • Used for removing side bearing race. • Used with PULLER ASSY (499705401). • For VA-type.
 <p style="text-align: center;">ST-499705401</p>	499705401	PULLER ASSY	<ul style="list-style-type: none"> • Used for removing side bearing race. • Used with SEAT (499705404). • For VA-type.

General Description

DIFFERENTIAL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p style="text-align: center;">ST-899524100</p>	899524100	PULLER SET	<ul style="list-style-type: none"> • Used for removing side bearing cone of differential. • For VA-type. (1) Puller (2) Cap

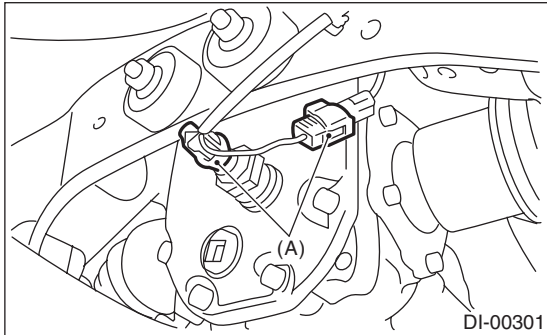
2. GENERAL TOOL

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)

2. Differential Gear Oil

A: INSPECTION

1) Disconnect the oil temperature switch connector (For Europe model with turbo).



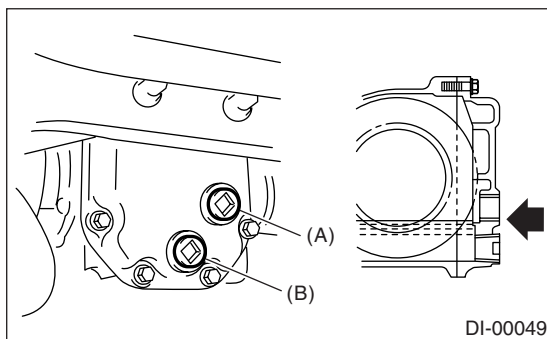
(A) Connector

2) Remove the filler plug or oil temperature switch, and then check the gear oil. If it is contaminated or deteriorated, replace the gear oil. <Ref. to DI-21, REPLACEMENT, Differential Gear Oil.>

NOTE:

Remove the oil temperature switch (for Europe model with turbo) and filler plug as a unit.

3) Check the gear oil level is up to the bottom part of filler bolt or oil temperature switch. If the level is low, refill up to the bottom of filler bolt.



(A) Filler plug
(B) Drain plug

4) After the inspection, tighten the filler plug or oil temperature switch.

NOTE:

- Install the oil temperature switch (for Europe model with turbo) and filler plug as a unit.
- Apply liquid gasket to the drain plug for T-type.
- Use a new aluminum gasket for VA-type.

Liquid gasket:

THREE BOND 1105 (Part No. 004403010) or equivalent

Tightening torque:

T-TYPE

49 N·m (5.0 kgf-m, 36.2 ft-lb)

VA-type

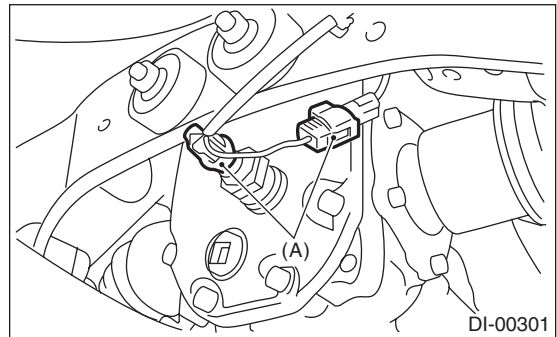
34 N·m (3.5 kgf-m, 25.3 ft-lb)

5) Connect the connector to oil temperature switch. (For Europe model with turbo)

B: REPLACEMENT

1) Jack-up the vehicle and support it with rigid racks.

2) Disconnect the oil temperature switch connector (For Europe model with turbo).



(A) Connector

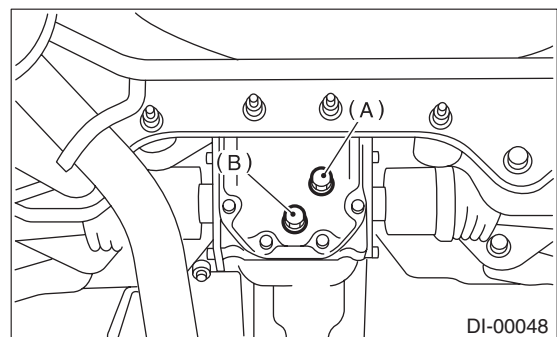
3) Remove the oil drain plug and filler plug or oil temperature switch, and drain the gear oil.

NOTE:

Remove the oil temperature switch (for Europe model with turbo) and filler plug as a unit.

CAUTION:

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



(A) Filler plug
(B) Drain plug

Differential Gear Oil

DIFFERENTIAL

4) Tighten the oil drain plug.

NOTE:

- Apply liquid gasket to the drain plug for T-type.
- Use a new aluminum gasket for VA-type.

Liquid gasket:

THREE BOND 1105 (Part No. 004403010) or equivalent

Tightening torque:

T-TYPE

49 N·m (5.0 kgf·m, 36.2 ft·lb)

VA-type

34 N·m (3.5 kgf·m, 25.3 ft·lb)

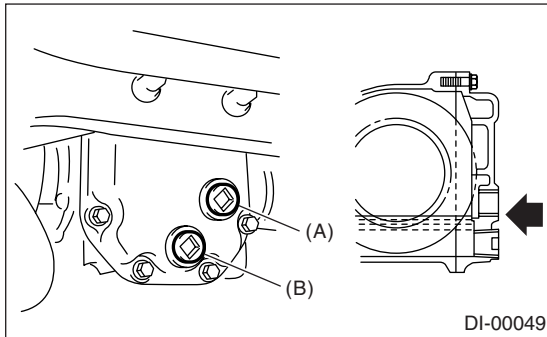
5) Fill the differential carrier with gear oil to the upper plug level.

NOTE:

Carefully refill 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 the filler plug or oil temperature switch.

NOTE:

- Install the oil temperature switch (for Europe model with turbo) and filler plug as a unit.
- Apply liquid gasket to the filler plug or oil temperature switch for T-type.
- Use a new aluminum gasket for VA-type.

Liquid gasket:

THREE BOND 1105 (Part No. 004403010) or equivalent

Tightening torque:

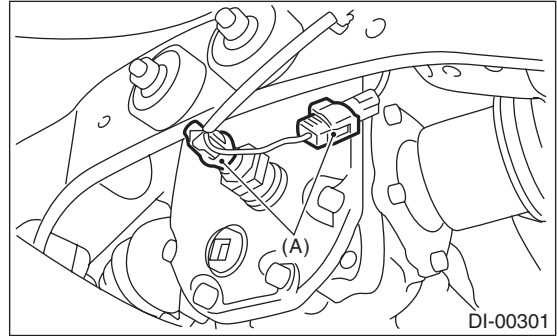
T-type

49 N·m (5.0 kgf·m, 36.2 ft·lb)

VA-type

34 N·m (3.5 kgf·m, 25.3 ft·lb)

7) Connect the oil temperature switch connector (For Europe model with turbo).



- (A) Connector

3. Front Differential

A: NOTE

1. AT MODEL

For front differential of AUTOMATIC TRANSMISSION, refer to "AT" section. <Ref. to 4AT-117, Front Differential.>

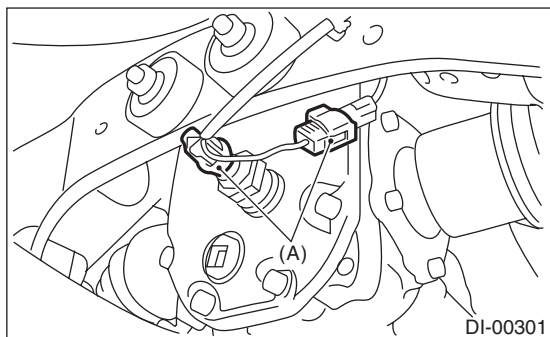
2. MT MODEL

For front differential of manual transmission, refer to "MT" section. <Ref. to 5MT-96, Front Differential Assembly.>

4. Rear Differential for T-type

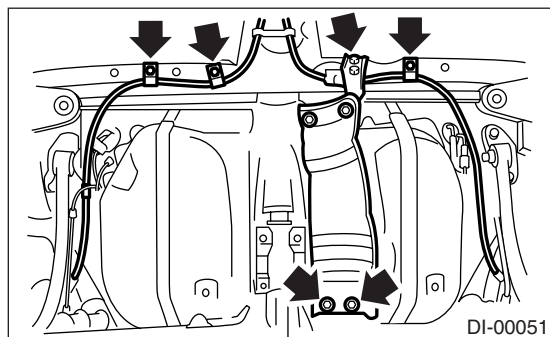
A: REMOVAL

- 1) Set the vehicle on a lift.
- 2) Disconnect the ground cable from battery.
- 3) Move the select lever or gear shift lever to "N".
- 4) Release the parking brake.
- 5) Loosen the wheel nuts.
- 6) Jack-up the vehicle and support it with rigid racks.
- 7) Remove the wheels.
- 8) Disconnect the connector from oil temperature switch. (For Europe model with turbo)

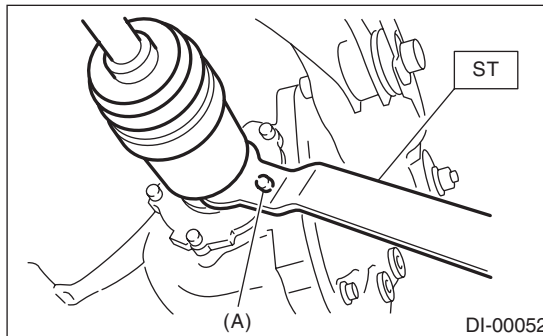


(A) Connector

- 9) Remove the rear exhaust pipe and muffler.
 - Non-turbo model
<Ref. to EX(H4SO)-11, REMOVAL, Rear Exhaust Pipe.> <Ref. to EX(H4SO)-13, REMOVAL, Muffler.>
 - Turbo model
<Ref. to EX(H4DOTC)-14, REMOVAL, Rear Exhaust Pipe.> <Ref. to EX(H4DOTC)-16, REMOVAL, Muffler.>
- 10) Remove the propeller shaft. <Ref. to DS-15, REMOVAL, Propeller Shaft.>
- 11) Remove the clamps and bracket of parking brake cable.

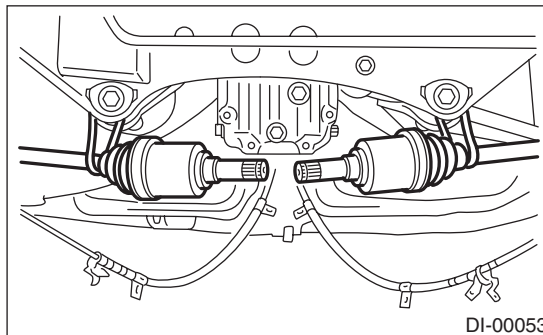


- 12) Remove the DOJ of rear drive shaft from rear differential using ST. <Ref. to DI-55, REPLACEMENT, Rear Differential Side Oil Seal.>
ST 28099PA100 DRIVE SHAFT REMOVER

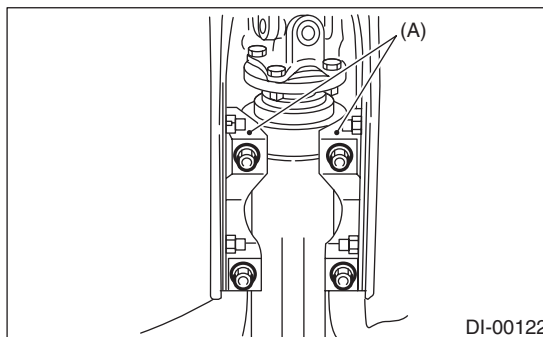


(A) Bolt

- 13) Secure the rear drive shaft to rear crossmember using wire.

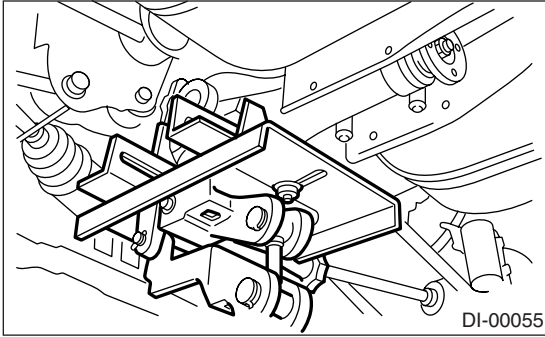


- 14) Remove the lower differential bracket.

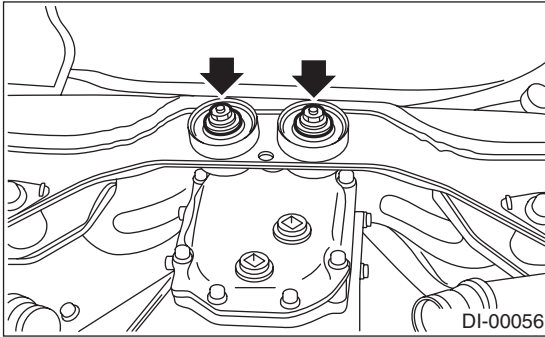


(A) Lower differential bracket

15) Support the rear differential with transmission jack.



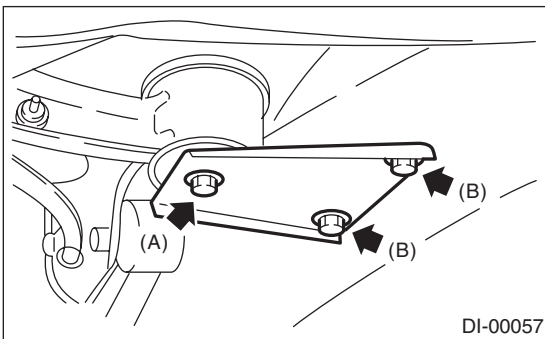
16) Remove the self-locking nuts and bolts.



17) Remove the bolts which secure differential front member to vehicle.
Loosen the bolt A first, then remove the bolts B.

NOTE:

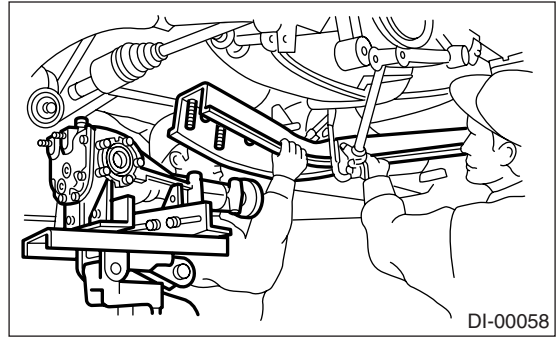
Support the differential front member with use of a helper to prevent it from dropping.



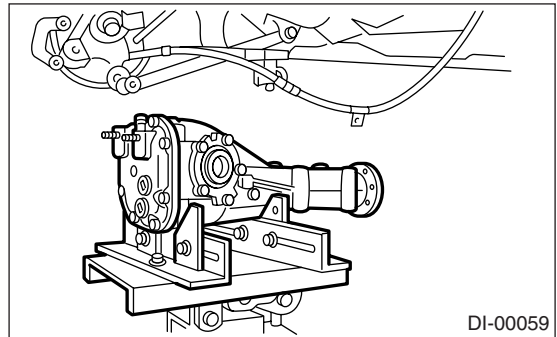
- (A) Bolt A
- (B) Bolt B

18) Remove the bolt A.

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



20) Remove the rear differential from differential front member.



Rear Differential for T-type

DIFFERENTIAL

B: INSTALLATION

Install in the reverse order of removal.

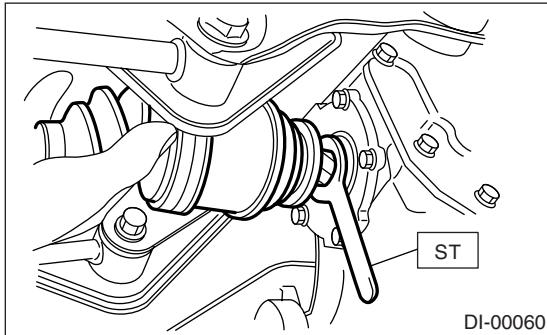
1) Position the differential front member on vehicle by passing it under the parking brake cable and securing to rear differential.

NOTE:

When installing the rear differential front member, pay attention the installation sequence of the upper and lower stoppers.

2) Install the DOJ of drive shaft into rear differential. <Ref. to DI-55, REPLACEMENT, Rear Differential Side Oil Seal.>

ST 28099PA090 SIDE OIL SEAL PROTECTOR



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

4) After installation, fill the differential carrier with gear oil to the filler plug level.

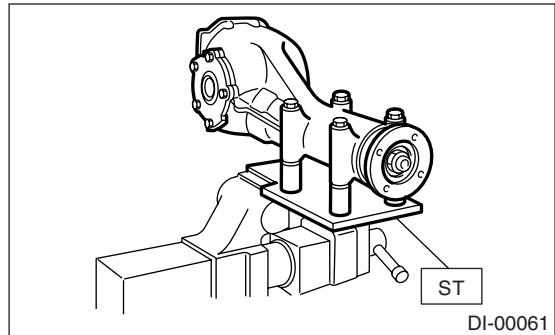
C: DISASSEMBLY

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

- Tooth contact of hypoid driven gear and pinion, and backlash
- Runout of hypoid driven gear at its back surface
- Turning resistance of drive pinion

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

ST 398217700 ATTACHMENT

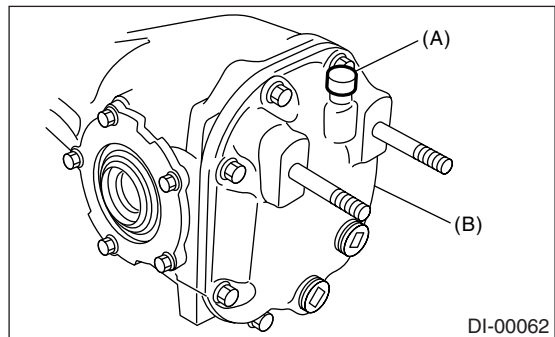


2) Drain the gear oil by removing the plug.

3) Remove the air breather cap.

NOTE:

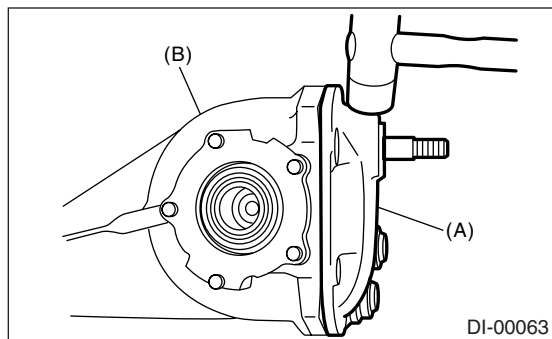
- Do not attempt to remove the air breather cap unless necessary.
- When removing the air breather cap, replace the air breather cap with a new one.



(A) Air breather cap

(B) Rear cover

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



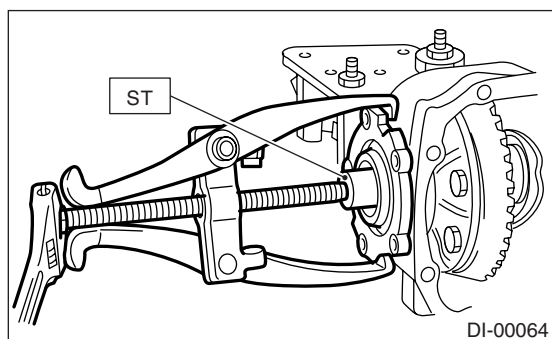
(A) Rear cover
(B) Differential carrier

5) Make right and left side bearing retainers in order to identify them at reassembly. Remove the side bearing retainer attaching bolts, set the ST to differential case, and extract right and left side bearing retainers with a puller.

NOTE:

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

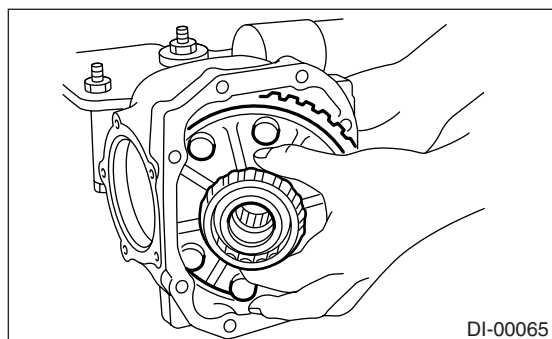
ST 398457700 ATTACHMENT



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

NOTE:

Be careful not to hit the teeth against the case.

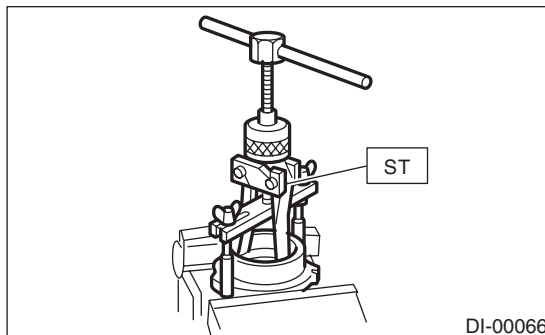


7) Remove the O-ring from side bearing retainer.

8) Remove the oil seal from side bearing retainer. <Ref. to DI-55, REPLACEMENT, Rear Differential Side Oil Seal.>

9) Pull the bearing cup from side bearing retainer using ST.

ST 398527700 PULLER ASSY

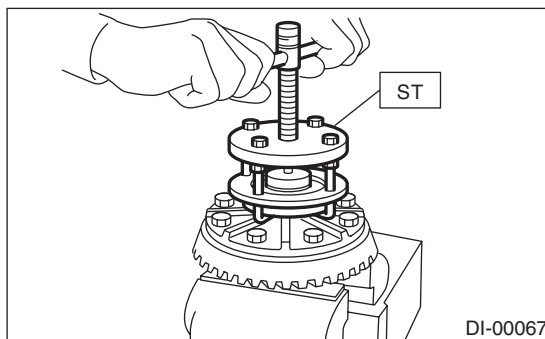


10) Extract the bearing cone with ST.

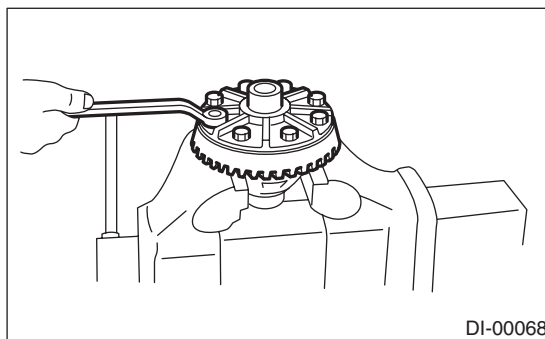
NOTE:

- Do not disassemble the parts unless necessary.
- Set the puller so that its claws catch the edge of bearing cone.
- Never mix up the right and left hand bearing races and cones.

ST 399527700 PULLER SET



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

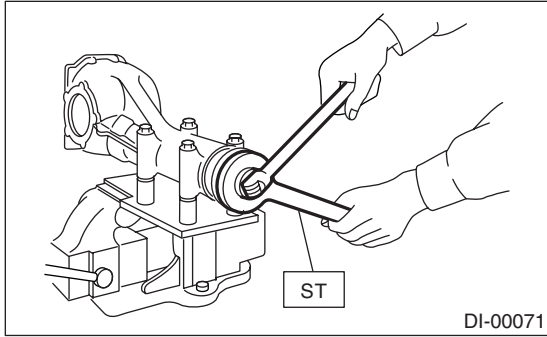


Rear Differential for T-type

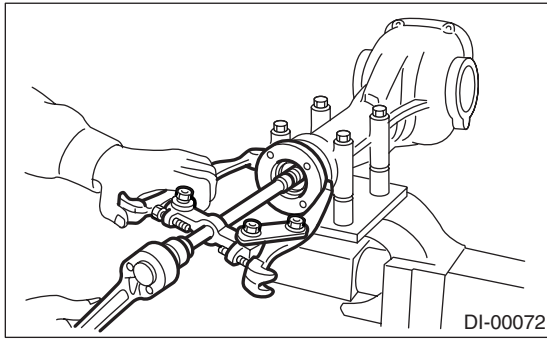
DIFFERENTIAL

12) Hold the companion flange with ST and remove the self-locking nut.

ST 498427200 FLANGE WRENCH



13) Extract the companion flange with a puller.

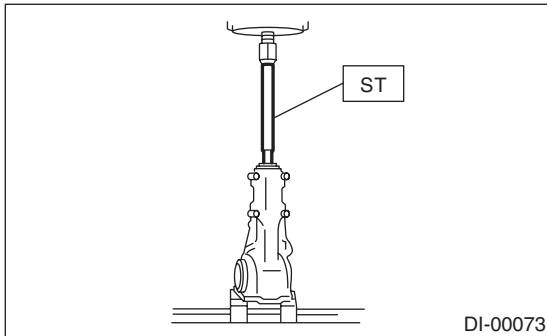


14) Press the end of drive pinion shaft and extract it together with the rear bearing cone, preload adjusting collar and washer.

NOTE:

Hold the drive pinion so as not to drop it.

ST 398467700 DRIFT

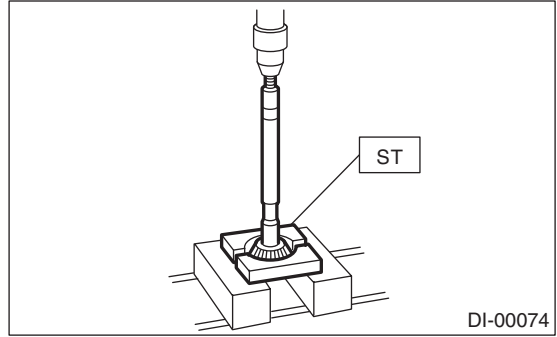


15) Remove the rear bearing cone from drive pinion by supporting the cone with ST.

NOTE:

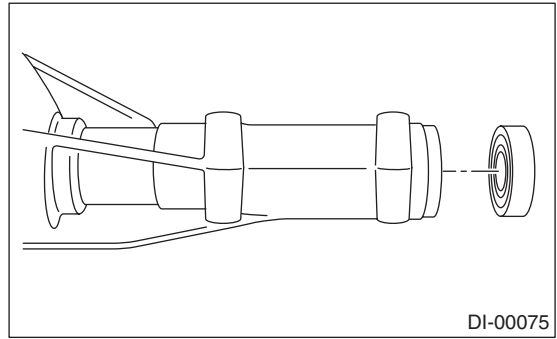
Place the replacer so that its center-recessed side faces the pinion gear.

ST 398517700 REPLACER



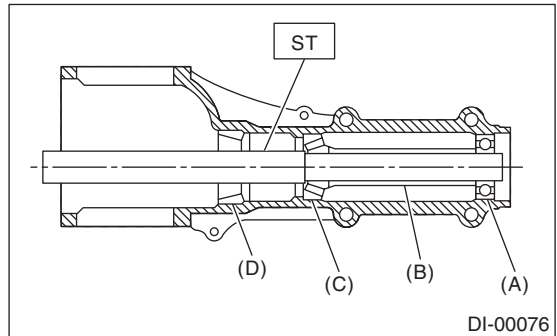
16) Remove the front oil seal from differential carrier using ST.

ST 398527700 PULLER ASSY



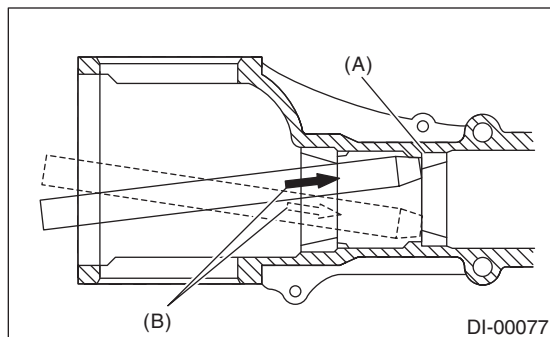
17) Remove the pilot bearing together with front bearing cone using ST.

ST 398467700 DRIFT



- (A) Pilot bearing
- (B) Collar
- (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 out of case by using a brass bar.

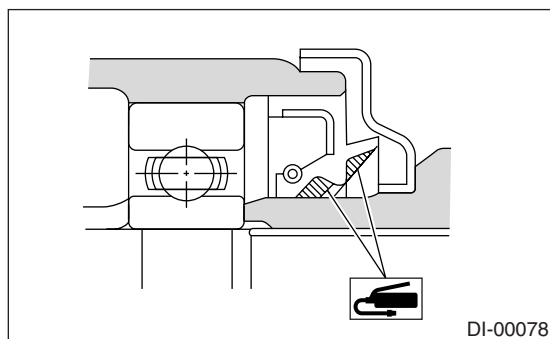


- (A) 2 cutouts along diagonal lines
- (B) Hit out alternately with brass bar.

D: ASSEMBLY

NOTE:

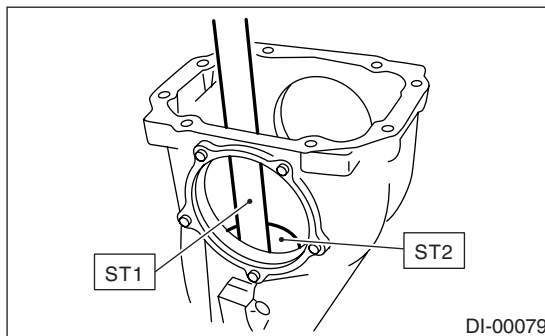
- Assemble in the reverse order of disassembling.
- Check and adjust each part during assembly.
- Keep the shims and washers in order, so that they are not improperly installed.
- Thoroughly clean the surfaces on which the shims, washers and bearings are to be installed.
- Apply gear oil when installing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



1) Adjusting preload for front and rear bearings
Adjust the bearing preload with collar and washer between front and rear bearings. Pinion height adjusting washer are not affected by this adjustment. The adjustment must be carried out without oil seal inserted.

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

- ST1 398477701 HANDLE
- ST2 398477703 DRIFT 2



(2) Using ST1 and ST2, install the rear bearing race (front) to differential carrier.

- ST1 398477701 HANDLE
- ST2 398477702 DRIFT

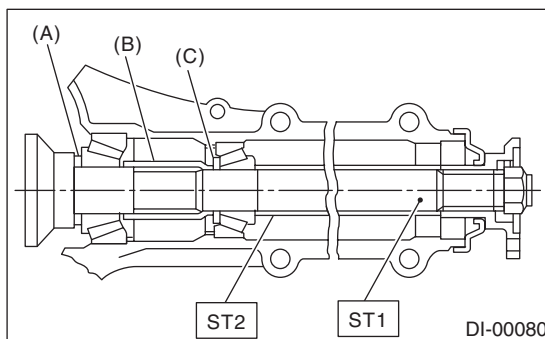
(3) Insert the ST1 into carrier with pinion height adjusting washer and rear bearing cone fitted onto it.

NOTE:

- If tooth contact is normal in the inspection before disassembling, verify that the washer is not deformed, and then re-use the used washer.
- Use a new rear bearing cone.

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

- ST1 398507702 DUMMY SHAFT
- ST2 398507703 DUMMY COLLAR



- (A) Pinion height adjusting shim
- (B) Preload adjusting collar
- (C) Preload adjusting washer

Rear Differential for T-type

DIFFERENTIAL

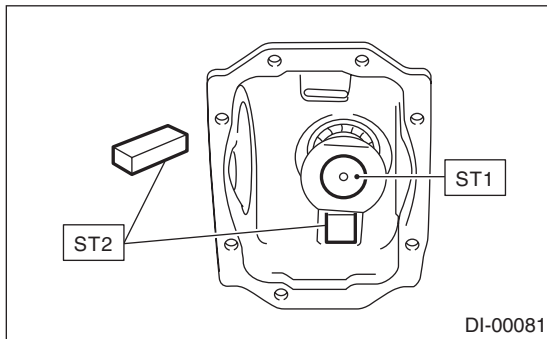
(5) Turn the ST1 with hand to make it seated, and tighten the self-locking nut while measuring the preload with spring balance. Select the preload adjusting washer and collar so that the specified preload is obtained when nut is tightened to the specified torque.

NOTE:

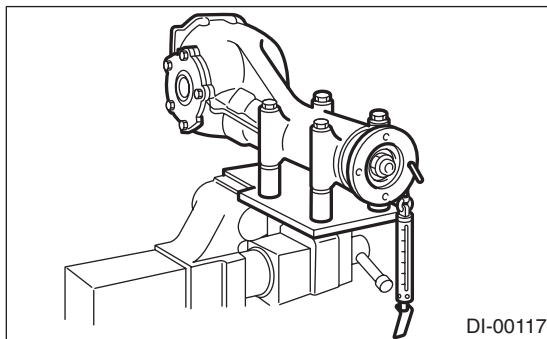
- Use a self-locking nut.
- Be careful not to give excessive preload.
- When tightening the self-locking nut, lock ST1 with ST2 as shown in the figure.

ST1 398507704 BLOCK
 ST2 398507702 DUMMY SHAFT

Tightening torque:
181 N·m (18.5 kgf·m, 134 ft·lb)



Front and rear bearing preload
For new bearing: 18.1 — 38.8 N (1.8 — 4.0 kgf, 4.1 — 8.7 lb) at companion flange bolt hole



Preload adjusting washer	Part No.	Thickness mm (in)
	383705200	2.59 (0.1020)
	383715200	2.57 (0.1012)
	383725200	2.55 (0.1004)
	383735200	2.53 (0.0996)
	383745200	2.51 (0.0988)
	383755200	2.49 (0.0980)
	383765200	2.47 (0.0972)
	383775200	2.45 (0.0965)
	383785200	2.43 (0.0957)
	383795200	2.41 (0.0949)
	383805200	2.39 (0.0941)
	383815200	2.37 (0.0933)
	383825200	2.35 (0.0925)
383835200	2.33 (0.0917)	
383845200	2.31 (0.0909)	
Preload adjusting collar	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 shim installed between the rear bearing cone and back of pinion gear.

- (1) Do not remove the ST1, ST2 and ST3 out of position after adjusting pinion bearing preload in previous step.

Front and rear bearing preload
For new bearing: 18.1 — 38.8 N (1.8 — 4.0 kgf, 4.1 — 8.7 lb) at companion flange bolt hole

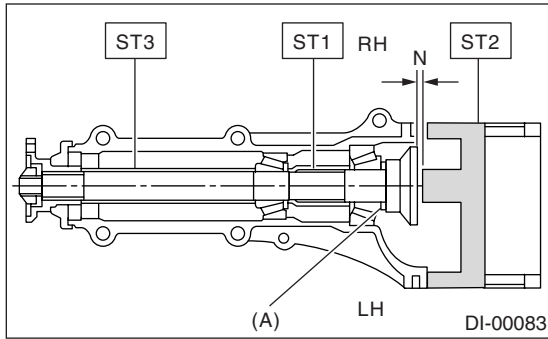
Adjusting preload for front and rear bearings

NOTE:
 At this time, install a pinion height adjusting shim which is temporarily selected or the same as that used before. Measure and record the thickness.

Rear Differential for T-type

DIFFERENTIAL

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



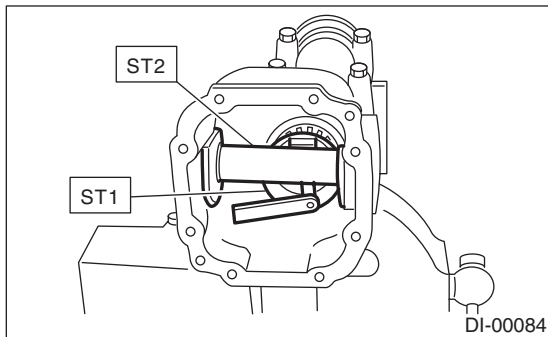
(A) Pinion height adjusting washer

(2) Measure the clearance N between the end of ST2 and 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 shim to be inserted from the following formula, and replace the temporarily installed shim 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 shim mm (in)	
T _o	Thickness of shim temporarily inserted mm (in)	
N	Reading of thickness gauge mm (in)	
H	Figure marked on drive pinion head	
Memo:		

(Example of calculation)

$$T_o = 2.20 + 1.20 = 3.40 \text{ mm}$$

$$N = 0.23 \text{ mm } H = +1,$$

$$T = 3.40 + 0.23 - 0.01 - 0.20 = 3.42$$

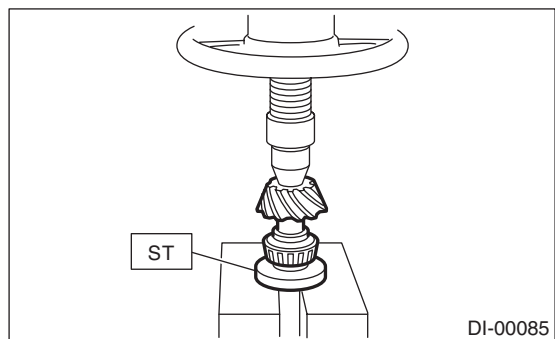
Result: Thickness = 3.42 mm

Therefore use the shim 383605200.

Pinion height adjusting shim	
Part No.	Thickness mm (in)
383495200	3.09 (0.1217)
383505200	3.12 (0.1228)
383515200	3.15 (0.1240)
383525200	3.18 (0.1252)
383535200	3.21 (0.1264)
383545200	3.24 (0.1276)
383555200	3.27 (0.1287)
383565200	3.30 (0.1299)
383575200	3.33 (0.1311)
383585200	3.36 (0.1323)
383595200	3.39 (0.1335)
383605200	3.42 (0.1346)
383615200	3.45 (0.1358)
383625200	3.48 (0.1370)
383635200	3.51 (0.1382)
383645200	3.54 (0.1394)
383655200	3.57 (0.1406)
383665200	3.60 (0.1417)
383675200	3.63 (0.1429)
383685200	3.66 (0.1441)

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

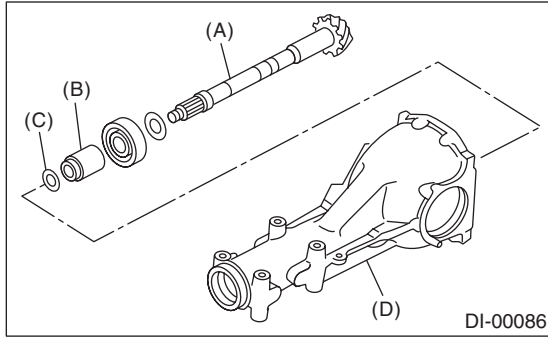
ST 398177700 INSTALLER



Rear Differential for T-type

DIFFERENTIAL

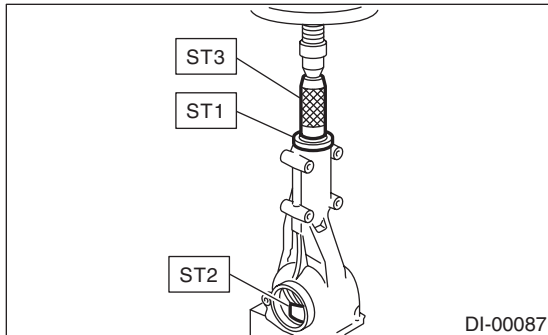
4) Insert the drive pinion into differential carrier, install the previously selected bearing preload adjusting collar and washer.



- (A) Drive pinion
- (B) Bearing adjusting collar
- (C) Washer
- (D) Differential carrier

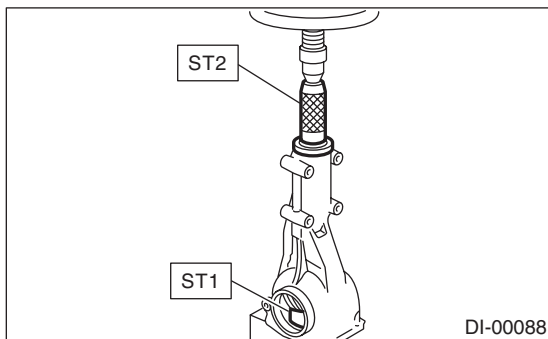
5) Press-fit the front bearing cone into case with ST1, ST2 and ST3.

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



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

- ST1 399780104 WEIGHT
- ST2 899580100 INSTALLER

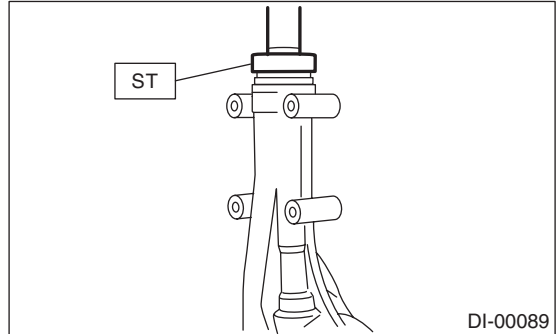


7) Fit a new oil seal with ST.

NOTE:

- Press-fit until the end of oil seal is 1 mm (0.04 in) inward from end of carrier.
- Apply grease between the oil seal lips.

- ST 498447120 INSTALLER

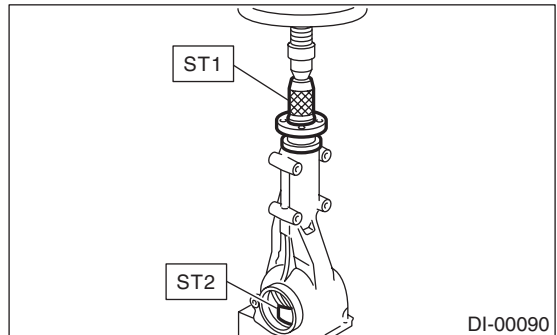


8) Press-fit the companion flange with ST1 and ST2.

NOTE:

Be careful not to damage the bearing.

- ST1 899874100 INSTALLER
- ST2 399780104 WEIGHT

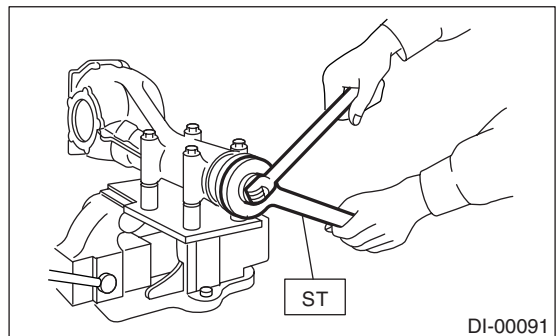


9) Install a new self-locking nut. Then tighten it with the ST.

- ST 498427200 FLANGE WRENCH

Tightening torque:

181 N·m (18.5 kgf·m, 134 ft·lb)



10) Install the hypoid driven gear on differential case.

NOTE:

Before installing the bolts, apply Lock Tite to bolt threads.

Lock Tite:

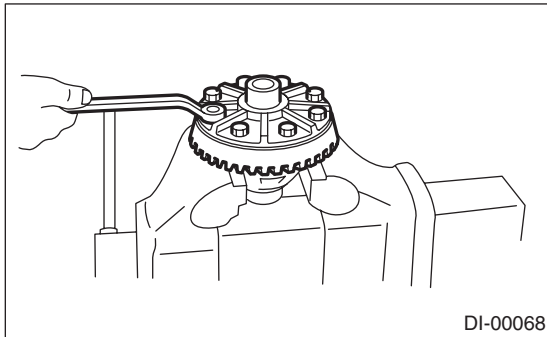
THREE BOND 1324 (Part No. 004403042) or equivalent

NOTE:

Tighten diagonally while tapping the bolt heads.

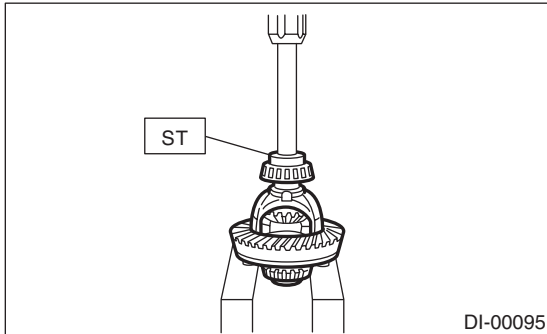
Tightening torque:

105 N·m (10.7 kgf·m, 77.4 ft·lb)



11) Press the side bearing onto differential case with ST.

ST 398237700 DRIFT



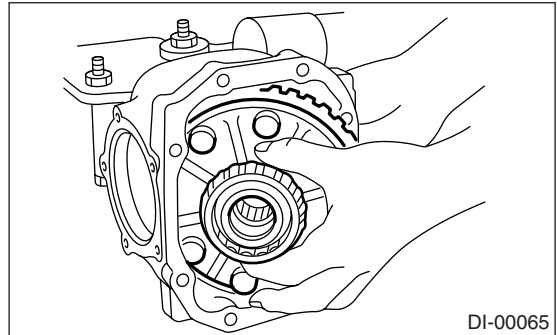
12) Press the side bearing cone into side bearing retainer using ST.

ST 398487700 DRIFT

13) Adjusting side bearing retainer shims

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

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



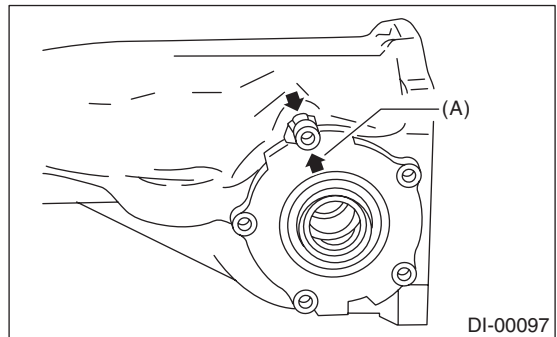
(3) Install the side retainer shims to the right and left retainers from which they were removed.

NOTE:

Replace the broken or corroded side retainer shim with a new one of 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)

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



(A) Arrow mark

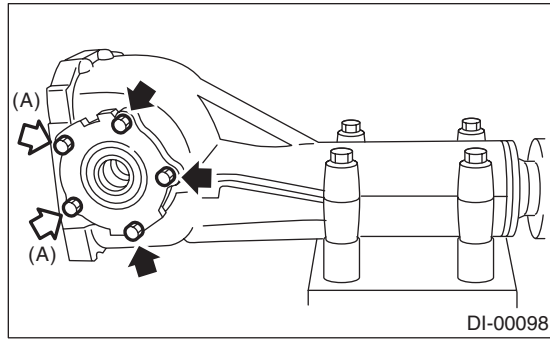
Rear Differential for T-type

DIFFERENTIAL

(5) Tighten the side bearing retainer bolts.

Tightening torque:

10.3 N·m (1.05 kgf·m, 7.6 ft·lb)



(A) Retainer bolt

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

If the backlash is not within specification, adjust the side bearing retainer shim as follows.

- **When backlash is more than 0.2 mm (0.0079 in):**

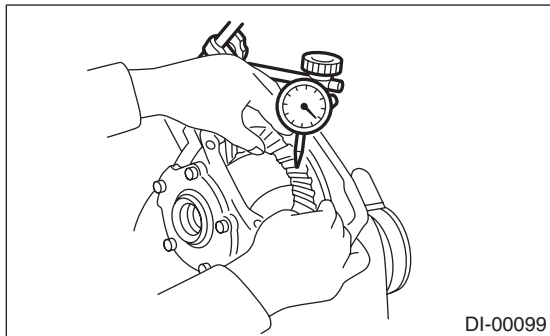
Reduce shim thickness of behind hypoid driven gear, and increase shim thickness of hypoid driven gear side.

- **When backlash is less than 0.1 mm (0.0039 in):**

Increase shim thickness of behind hypoid driven gear, and reduce shim thickness of hypoid driven gear side.

Backlash:

0.10 — 0.20 mm (0.0039 — 0.0079 in)



(7) At the same time, measure the turning resistance increase of 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 by an even amount at a time.

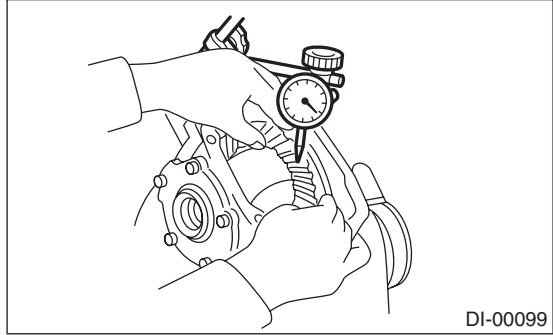
Turning resistance increase:

20.7 — 54.4 N (2.3 — 5.5 kgf, 4.7 — 12.2 lb)

14) Re-check the hypoid driven gear-to-pinion backlash.

Backlash:

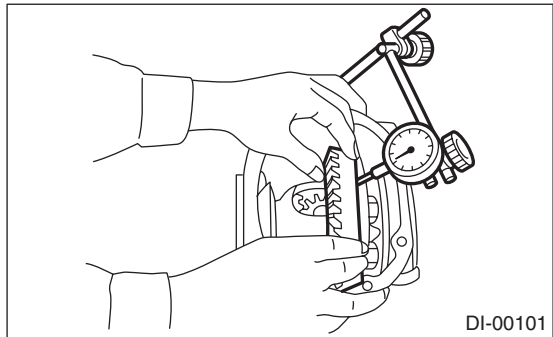
0.10 — 0.20 mm (0.0039 — 0.0079 in)



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

Limit of runout:

Less than 0.05 mm (0.0020 in)



16) Checking and adjusting tooth contact of hypoid driven gear

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

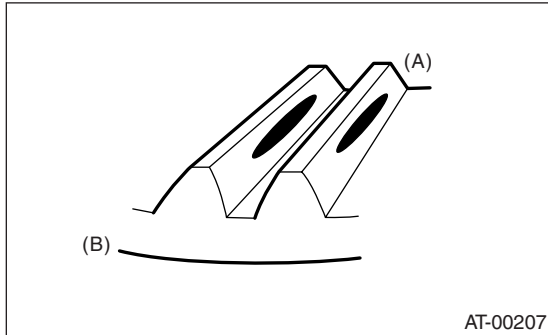
(2) When the contact pattern is incorrect, readjust according to the instructions given in "TOOTH CONTACT PATTERN".

NOTE:

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

- Correct tooth contact

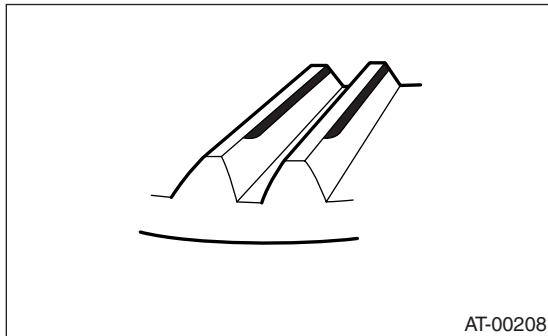
Checking item: Tooth contact pattern is slightly shifted toward to toe side under no-load rotation. (When loaded, contact pattern moves toward heel)



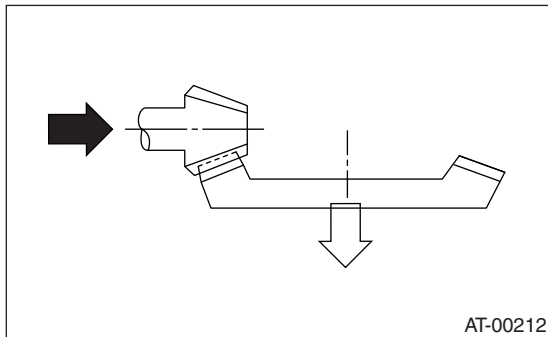
(A) Toe side
(B) Heel side

- Face contact

Checking item: Backlash is too large.
Contact pattern

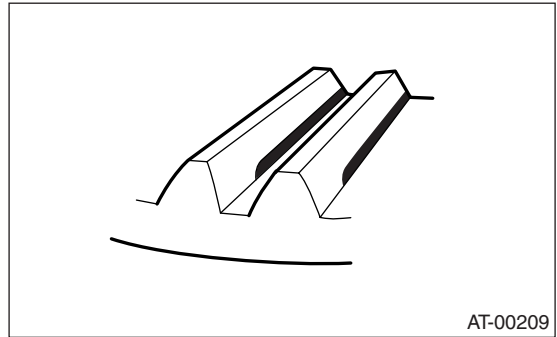


Corrective action: Increase thickness of drive pinion height adjusting shim in order to bring drive pinion close to hypoid driven gear.

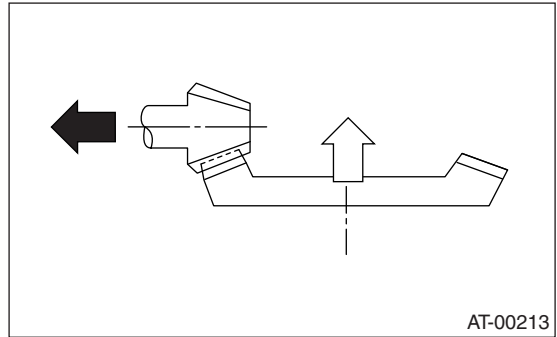


- Flank contact

Checking item: Backlash is too small.
Contact pattern

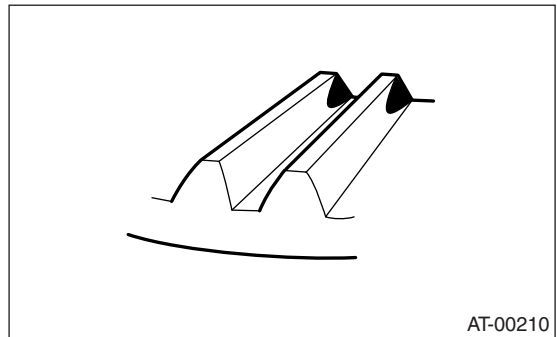


Corrective action: Reduce thickness of drive pinion height adjusting shim in order to move drive pinion away from hypoid driven gear.

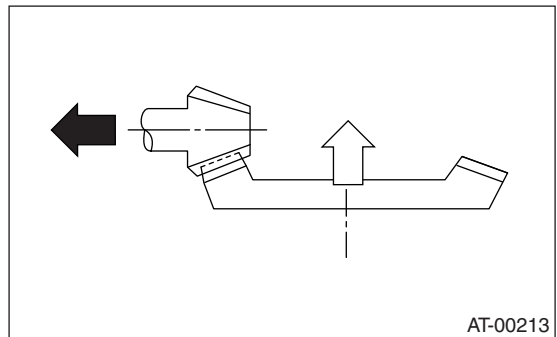


- Toe contact (Inside end contact)

Checking item: Contact area is small.
Contact pattern



Corrective action: Reduce thickness of drive pinion height adjusting shim in order to move drive pinion away from hypoid driven gear.



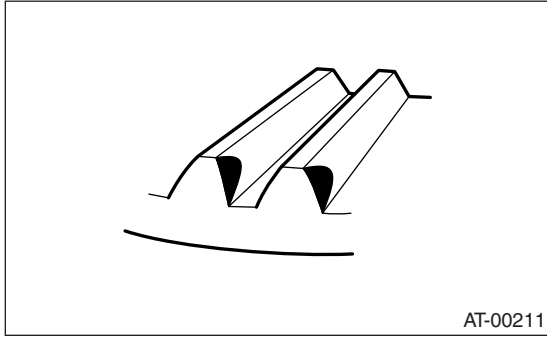
Rear Differential for T-type

DIFFERENTIAL

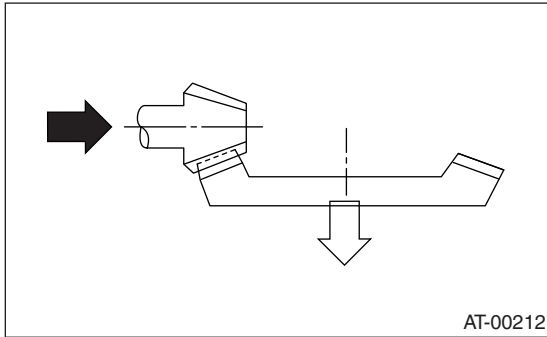
- Heel contact (Outside end contact)

Checking item: Contact area is small.

Contact pattern



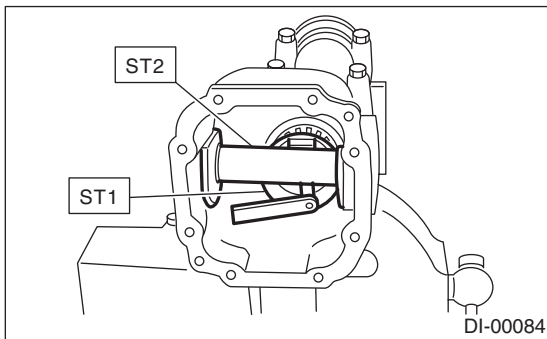
Corrective action: Increase thickness of drive pinion height adjusting shim in order to bring drive pinion close to hypoid driven gear.



17) If proper tooth contact is not obtained, once again adjust the drive pinion height by changing 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 |



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

Where:

T = Thickness of pinion height adjusting shim (mm)

T_o = Thickness of shim temporarily inserted (mm)

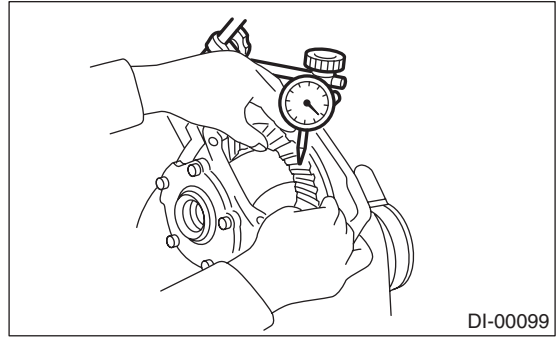
N = Reading of thickness gauge (mm)

H = Figure marked on drive pinion head

(2) Hypoid gear backlash

Backlash:

0.10 — 0.20 mm (0.0039 — 0.0079 in)

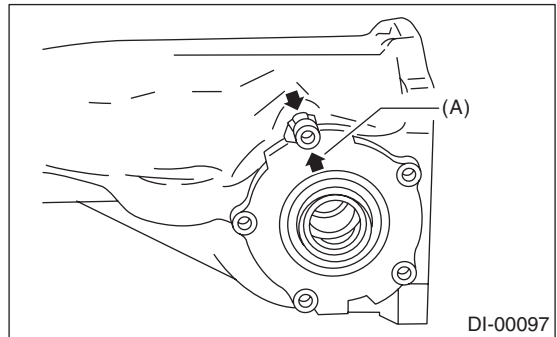


18) Remove the right and left side bearing retainers.

19) Install the right and left side bearing retainer, O-rings and side bearing retainer shims.

20) Install the oil seals to the right and left side bearing retainers.

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

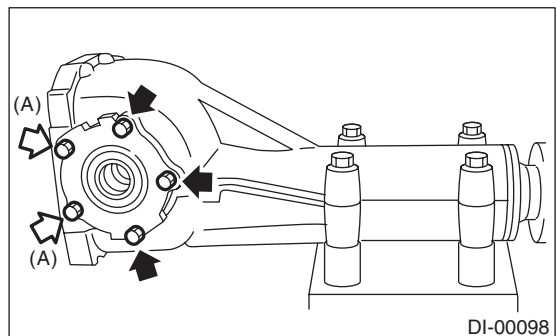


(A) Arrow mark

22) Tighten the side bearing retainer bolts.

Tightening torque:

10.3 N·m (1.05 kgf·m, 7.6 ft·lb)

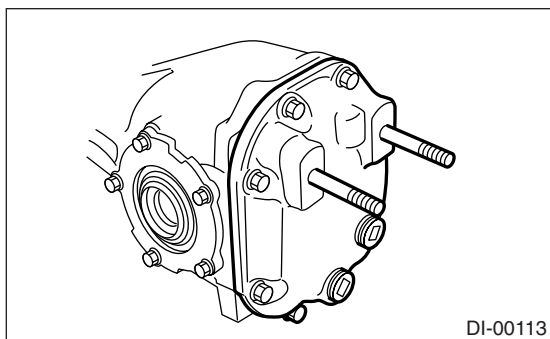


(A) Retainer bolt

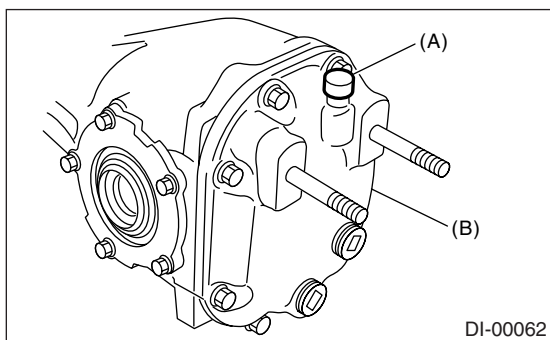
23) Install the new gasket and rear cover and tighten the bolts to specified torque.

Tightening torque:

29 N·m (3.0 kgf·m, 21.7 ft·lb)



24) Install the air breather cap.



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

E: INSPECTION

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

- 1) Hypoid driven gear and drive pinion
 - If abnormal tooth contact is evident, find out the cause and adjust to give correct tooth contact at assembly. Replace the gear if excessively worn or incapable of adjustment.
 - If crack, score, or seizure is evident, replace as a set. Slight damage of tooth can be corrected by oil stone or the like.
- 2) Bearing

Replace if seizure, peeling, wear, rust, dragging during rotation, noise or other defect is evident.
- 3) Oil seal

Replace if deformed or damaged, and at every disassembling.
- 4) Differential carrier

Replace if the bearing bores are worn or damaged.
- 5) Differential case

Replace if its sliding surfaces are worn or cracked.
- 6) Companion flange

Replace if the oil seal lip contacting surfaces have flaws.

7) Rear differential oil temperature switch (Turbo model for Europe).

If the results of the following inspections are not satisfactory, replace rear differential temperature switch.

- (1) At room temperature, check for continuity between the sensor terminal and body.
- (2) Soak the sensor in oil, then raise the oil temperature. Check that the continuity is cut off when the oil temperature is between 144°C (291°F) and 156°C (313°F). Then, check that the continuity resumes by the time the oil temperature drops to 135°C (275°F).

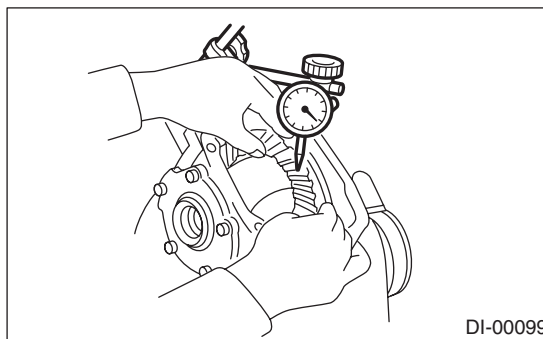
1. HYPOID DRIVEN GEAR BACKLASH

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

Hypoid driven gear backlash:

0.1 — 0.2 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.



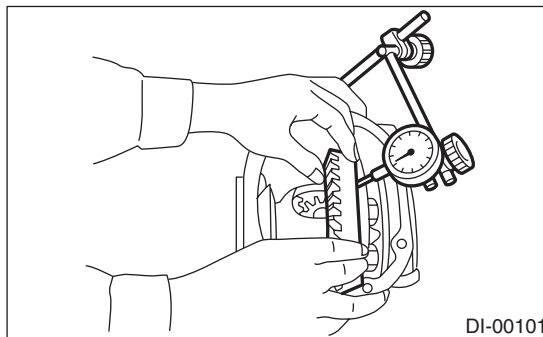
2. HYPOID DRIVEN GEAR RUNOUT

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

Hypoid driven gear runout:

Less than 0.05 mm (0.0020 in)

If the hypoid driven gear runout exceeds 0.05 mm (0.0020 in), replace the hypoid driven gear.



Rear Differential for T-type

DIFFERENTIAL

3. TOOTH CONTACT BETWEEN HYPOID DRIVEN GEAR AND DRIVE PINION

Inspect the tooth contact between hypoid driven gear and drive pinion. <Ref. to DI-29, ASSEMBLY, Rear Differential for T-type.>

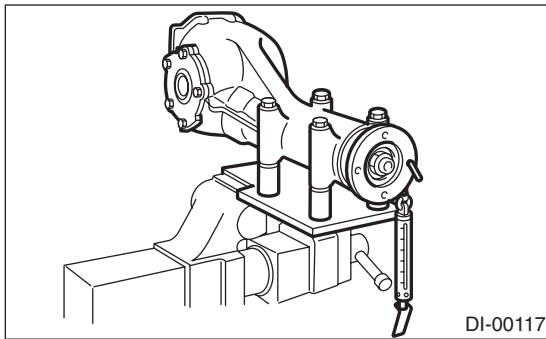
4. TOTAL PRELOAD

Using a gauge, check the turning resistance increase.

Turning resistance increase:

20.7 — 54.4 N (21 — 5.5 kgf, 0.7 — 12.2 lb)

If the turning resistance increase is not within the specification, adjust the side bearing retainer shims.



F: ADJUSTMENT

1. HYPOID DRIVEN GEAR BACKLASH

Adjust the hypoid driven gear backlash.
<Ref. to DI-29, ASSEMBLY, Rear Differential for T-type.>

2. TOOTH CONTACT BETWEEN HYPOID DRIVEN GEAR AND DRIVE PINION

Adjust the tooth contact between hypoid driven gear and drive pinion gear.
<Ref. to DI-29, ASSEMBLY, Rear Differential for T-type.>

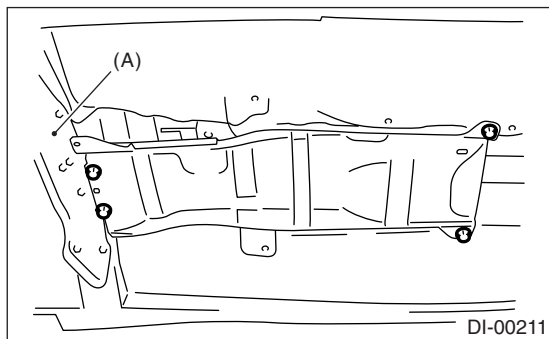
3. TOTAL PRELOAD

Adjust the side bearing shim.
<Ref. to DI-29, ASSEMBLY, Rear Differential for T-type.>

5. Rear Differential for VA-type

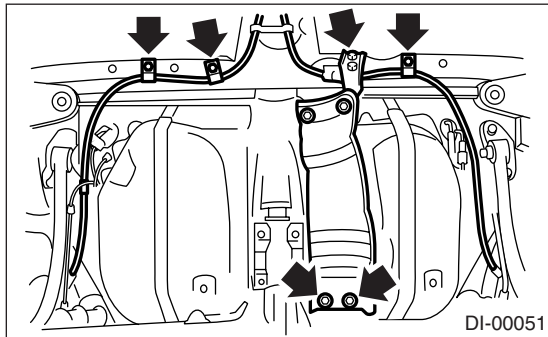
A: REMOVAL

- 1) Set the vehicle on a lift.
- 2) Disconnect the ground cable from battery.
- 3) Move the select lever or gear shift lever to "N".
- 4) Release the parking brake.
- 5) Loosen the wheel nuts.
- 6) Jack-up the vehicle and support it with rigid racks.
- 7) Remove the wheels.
- 8) Remove the rear exhaust pipe and muffler.
<Ref. to EX(H4SO)-11, REMOVAL, Rear Exhaust Pipe.> <Ref. to EX(H4SO)-13, REMOVAL, Muffler.>
- 9) Remove the heat shield cover. (if equipped)

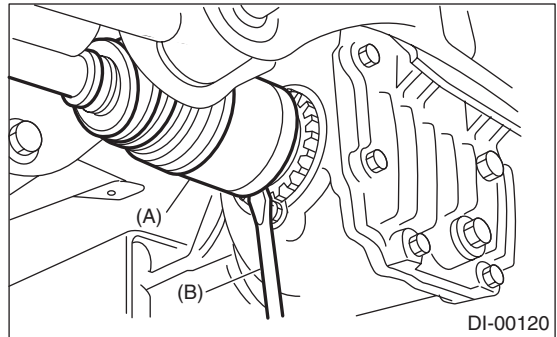


(A) Transmission mounting

- 10) Remove the propeller shaft. <Ref. to DS-15, REMOVAL, Propeller Shaft.>
- 11) Remove the clamps and bracket of parking brake cable.

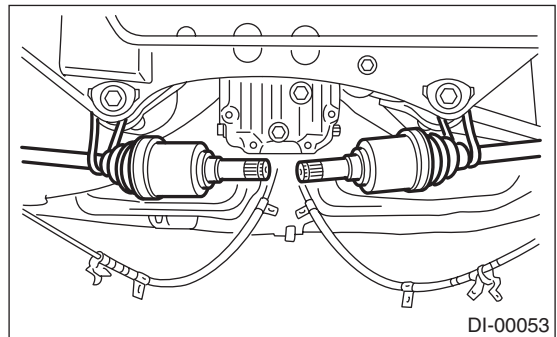


- 12) Remove the DOJ of rear drive shaft from rear differential. <Ref. to DI-55, REPLACEMENT, Rear Differential Side Oil Seal.>

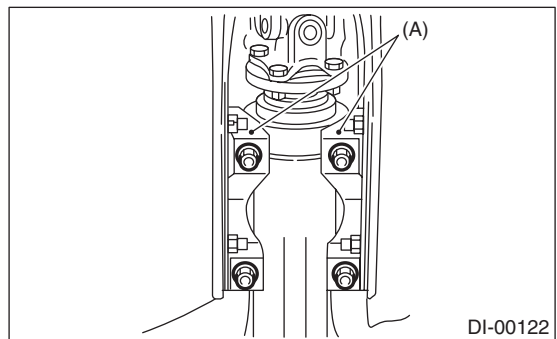


(A) DOJ
(B) Tire lever

- 13) Secure the rear drive shaft to rear crossmember using wire.



- 14) Remove the lower differential bracket.

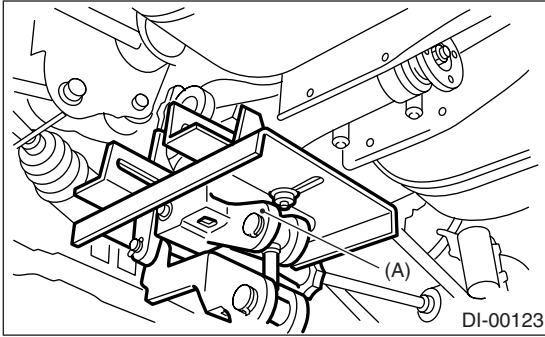


(A) Lower differential bracket

Rear Differential for VA-type

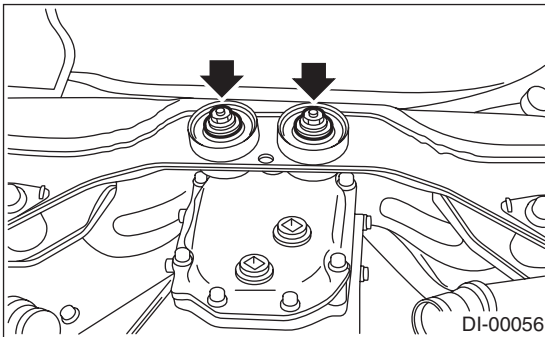
DIFFERENTIAL

15) Support the rear differential with transmission jack.



(A) Transmission jack

16) Remove the self-locking nuts and bolts.

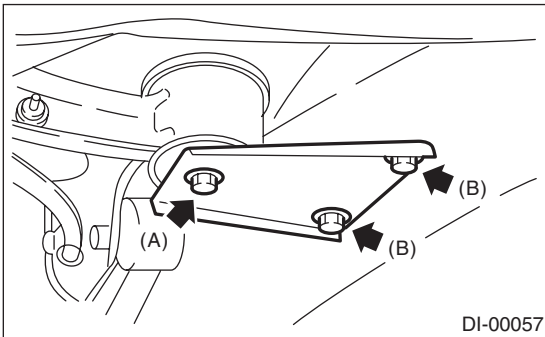


17) Remove the bolts which secure rear differential front member to vehicle.

Loosen the bolt A, and remove the bolt B.

NOTE:

Support the front member with use of a helper to prevent it from dropping.



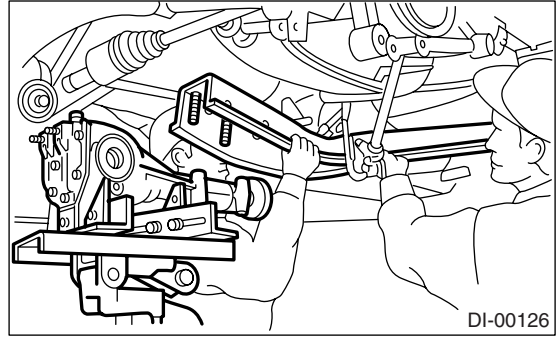
(A) Bolt A

(B) Bolt B

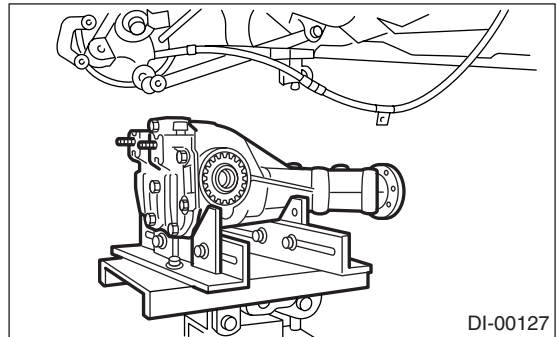
18) Remove the bolt A.

19) While slowly lowering the transmission jack, move the rear differential forward and remove bolts from front member.

20) Remove the front member from vehicle.



21) Remove the rear differential from front member.



B: INSTALLATION

Install in the reverse order of removal.

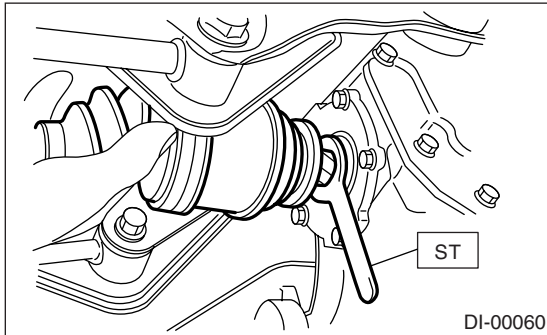
1) Position the front member on vehicle by passing it under the parking brake cable and securing to rear differential.

NOTE:

When installing the rear differential front member, do not confuse the installation sequence of the upper and lower stoppers.

2) Install the DOJ of rear drive shaft into rear differential. <Ref. to DI-55, REPLACEMENT, Rear Differential Side Oil Seal.>

ST 28099PA090 SIDE OIL SEAL PROTECTOR



3) Install in the reverse order of removal.

4) After installation, fill the differential carrier with gear oil to the upper plug level. <Ref. to DI-23, Front Differential.>

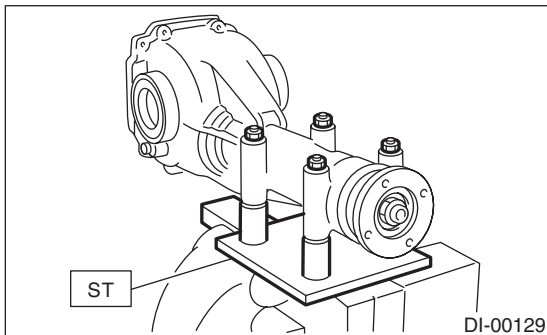
C: DISASSEMBLY

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

- Tooth contact of hypoid driven gear and pinion, and backlash.
- Turning resistance of drive pinion.

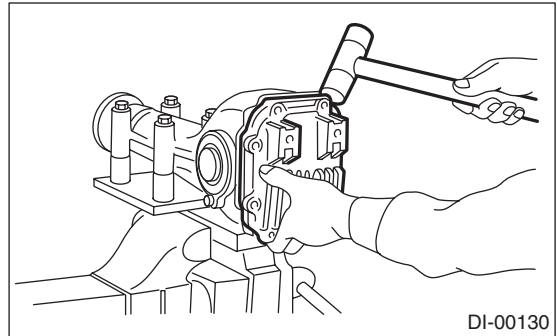
1) Set the ST on vise and install the differential assembly to ST.

ST 398217700 ATTACHMENT



2) Drain the gear oil by removing the plug.

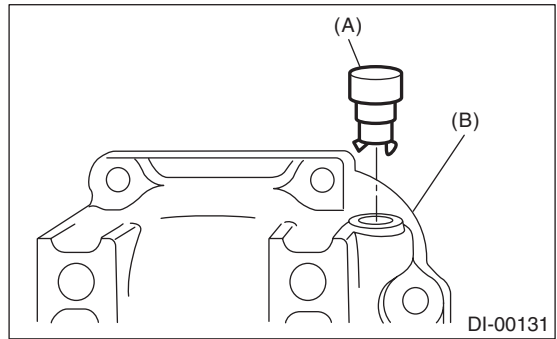
3) Remove the rear cover by loosening the retaining bolts.



4) Replace the air breather cap.

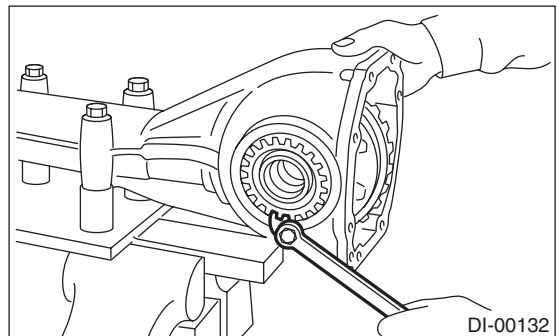
NOTE:

Do not attempt to replace the air breather cap unless necessary.



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

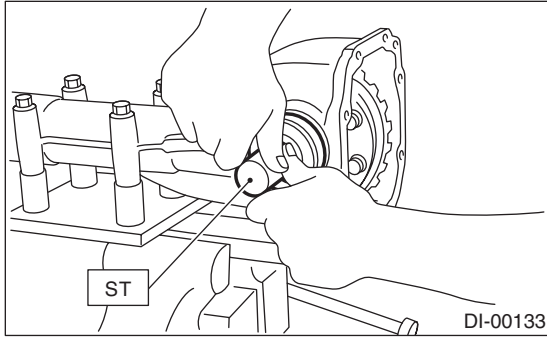
5) Remove the right and left lock plates.



Rear Differential for VA-type

DIFFERENTIAL

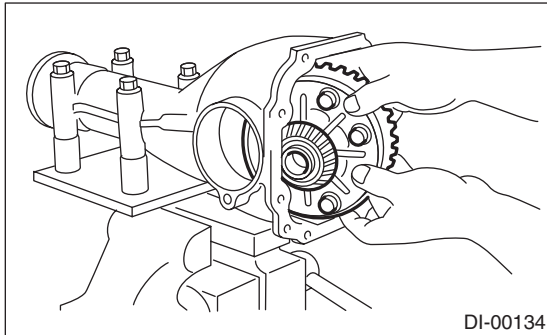
- 6) Remove the right and left holders with ST.
ST 499785500 OIL SEAL HOLDER
WRENCH



- 7) Pull out the differential assembly from differential case.

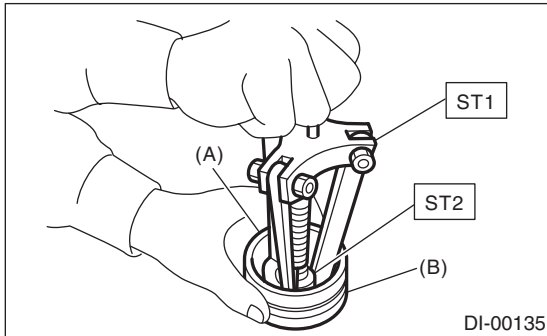
NOTE:

Be careful not to hit the teeth against the carrier.



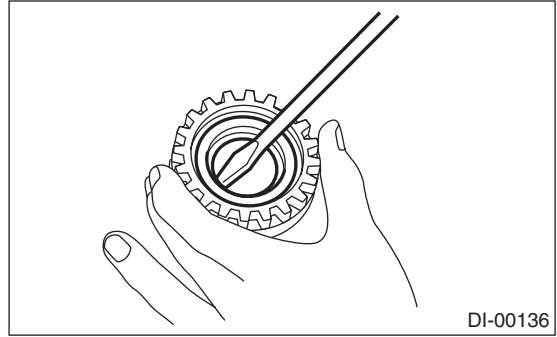
- 8) Remove the bearing race from right and left holders with ST1 and ST2.

ST1 499705401 PULLER ASSY
ST2 499705404 SEAT



- (A) Bearing race
(B) Holder

- 9) Remove the oil seal from right and left holders using screwdriver.

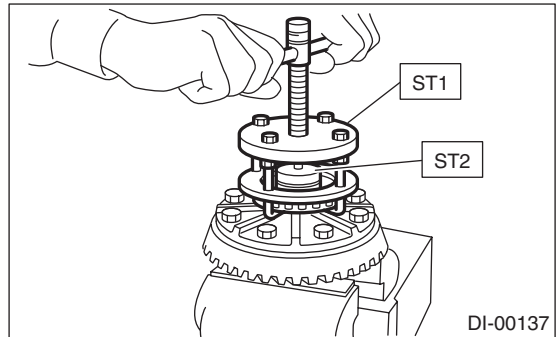


- 10) Extract the bearing cone with ST1 and ST2.

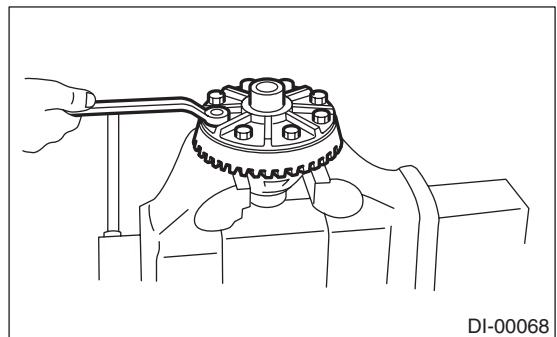
NOTE:

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

ST1 899524100 PULLER SET
ST2 399520105 SEAT

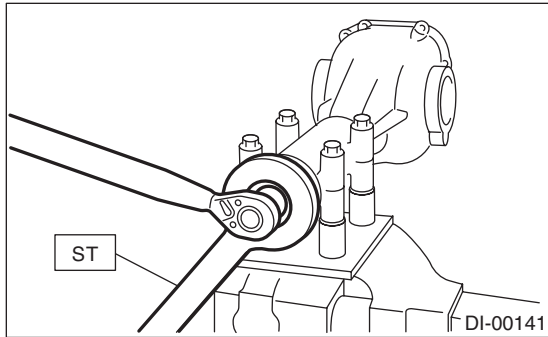


- 11) Remove the hypoid driven gear by loosening the hypoid driven gear bolts.

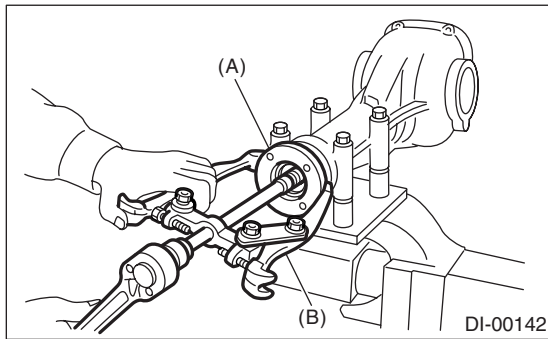


12) Hold the companion flange with ST and remove the self-locking nut.

ST 498427200 FLANGE WRENCH



13) Extract the companion flange with a puller.



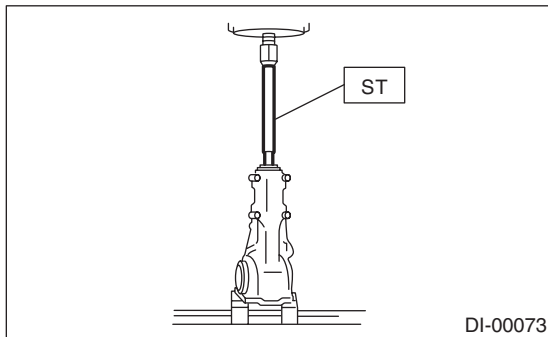
- (A) Companion
- (B) Puller

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

NOTE:

Hold the drive pinion so as not to drop it.

ST 398467700 DRIFT

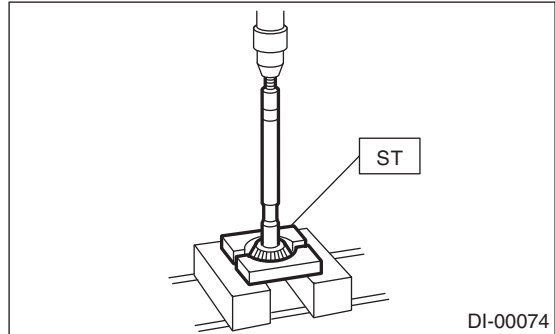


15) Remove the rear bearing cone from drive pinion by supporting the cone with ST.

NOTE:

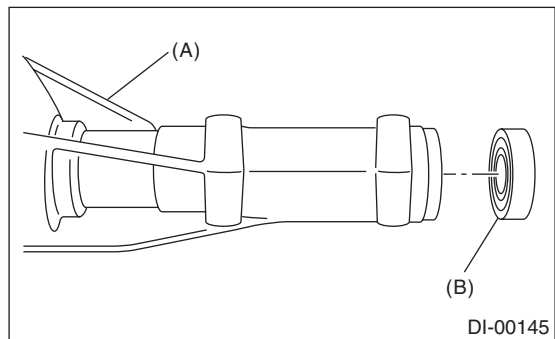
Place the replacer so that its center-recessed side faces the pinion gear.

ST 498515500 REPLACER



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

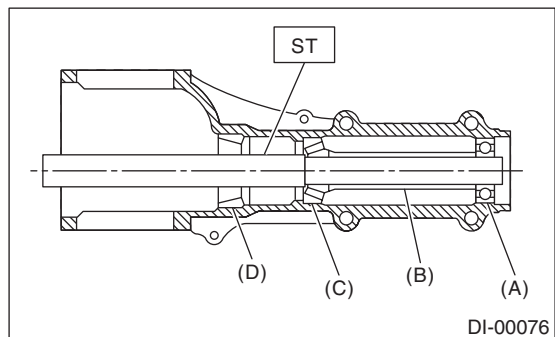
ST 398527700 PULLER SET



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

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

ST 398467700 DRIFT

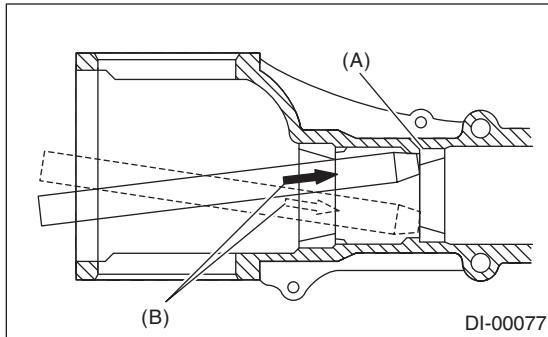


- (A) Pilot bearing
- (B) Collar
- (C) Front bearing
- (D) Rear bearing cup

Rear Differential for VA-type

DIFFERENTIAL

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

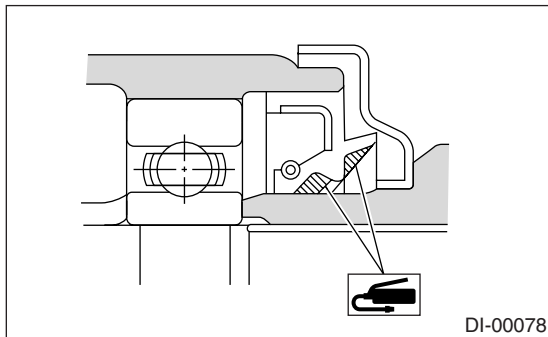


- (A) 2 cutouts along diagonal lines
- (B) Tap alternately with brass bar.

D: ASSEMBLY

NOTE:

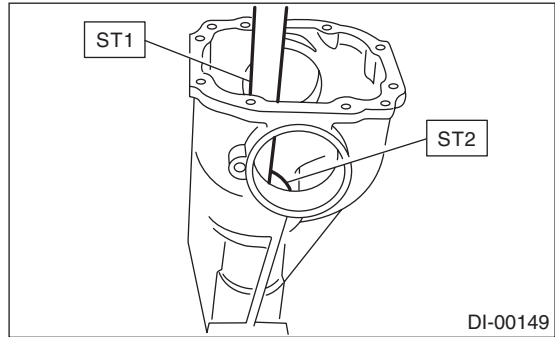
- Assemble in the reverse order of disassembly.
- Check and adjust each part during assembly.
- Use a new gasket.
- Keep the shims and washers in order, so that they are not improperly installed.
- Thoroughly clean the surfaces on which the shims, washers and bearings are to be installed.
- Apply gear oil when installing the bearings and thrust washers.
- Be careful not to mix up the right and left hand races of the bearings.
- Replace the oil seal with a new one at every disassembly. Apply chassis grease between the lips when installing the oil seal.
- Be careful to install the differential oil seal to proper side.



1) Adjust preload for front and rear bearings. Adjust the bearing preload with collar and washer between front and rear bearings. Pinion height adjusting washer are not affected by this adjustment. The adjustment must be carried out without oil seal inserted.

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

- ST1 398477701 HANDLE
- ST2 398477702 DRIFT



(2) Press the front bearing race into differential carrier using ST1 and ST2.

- ST1 398477701 HANDLE
- ST2 398447110 DRIFT

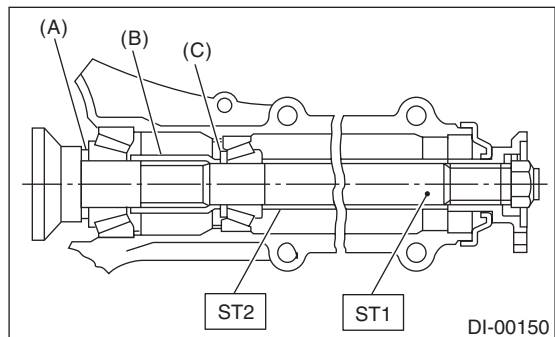
(3) Insert the ST1 into case with pinion height adjusting washer and rear bearing cone fitted onto it.

NOTE:

- If the tooth contact (drive pinion, driven gear) is not wrong at inspection before disassembly, re-use the used washer after confirming that the washer is not damaged.
- Use a new rear bearing cone.

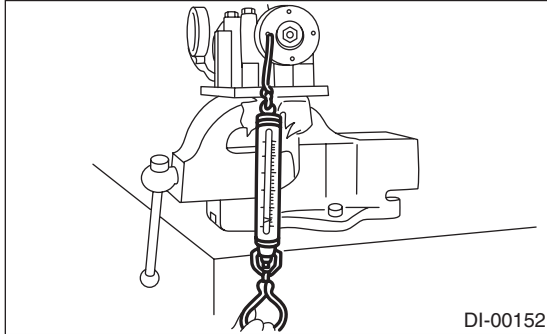
(4) Then install the preload adjusting collar and washer, front bearing cone, ST2, companion flange, and washer and self-locking nut.

- ST1 498447150 DUMMY SHAFT
- ST2 32285AA000 DUMMY COLLAR



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

(5) Turn the ST1 with hand to make it seated, and tighten the self-locking nut while measuring the preload with spring balance. Select the preload adjusting washer and collar so that the specified preload is obtained when nut is tightened to the specified torque.



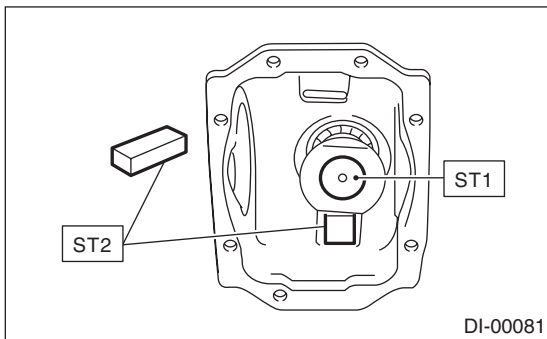
NOTE:

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

ST1 398507704 BLOCK
 ST2 498447150 DUMMY SHAFT

Tightening torque:

191 N·m (19.5 kgf·m, 141 ft·lb)



	Part No.	Thickness mm (in)	
Preload adjusting washer	38336AA000	1.500 (0.0591)	
	38336AA120	1.513 (0.0596)	
	38336AA010	1.525 (0.0600)	
	38336AA130	1.538 (0.0606)	
	38336AA020	1.550 (0.0610)	
	38336AA140	1.563 (0.0615)	
	38336AA030	1.575 (0.0620)	
	38336AA150	1.588 (0.0625)	
	38336AA040	1.600 (0.0630)	
	38336AA160	1.613 (0.0635)	
	38336AA050	1.625 (0.0640)	
	38336AA170	1.638 (0.0645)	
	38336AA060	1.650 (0.0650)	
	38336AA180	1.663 (0.0655)	
	38336AA070	1.675 (0.0659)	
	38336AA190	1.688 (0.0665)	
	38336AA080	1.700 (0.0669)	
	38336AA200	1.713 (0.0674)	
38336AA090	1.725 (0.0679)		
38336AA210	1.738 (0.0684)		
38336AA100	1.750 (0.0689)		
38336AA220	1.763 (0.0694)		
38336AA110	1.775 (0.0699)		
	Part No.	Length mm (in)	
Preload adjusting collar	32288AA040	52.3 (2.059)	
	32288AA050	52.5 (2.067)	
	31454AA100	52.6 (2.071)	
	32288AA060	52.7 (2.075)	
	31454AA110	52.8 (2.079)	
	32288AA070	52.9 (2.083)	
	31454AA120	53.0 (2.087)	
	32288AA080	53.1 (2.091)	
	32288AA090	53.3 (2.098)	

Front and rear bearing preload
For new bearing: 12.7 — 32.2 N (1.3 — 3.3 kgf, 2.9 — 7.3 lb) at companion flange bolt hole

Rear Differential for VA-type

DIFFERENTIAL

2) Adjusting drive pinion height

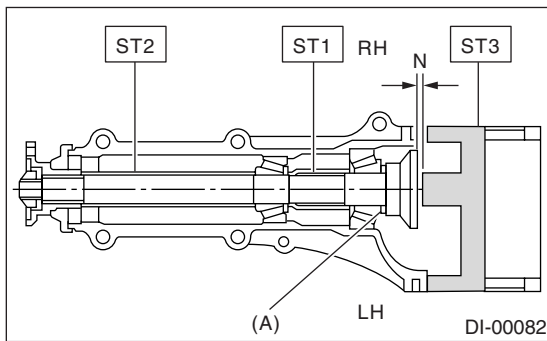
Adjust the drive pinion height with shim installed between the rear bearing cone and back of pinion gear.

- (1) Do not remove the ST1, ST2 and ST3 out of position after adjusting pinion bearing preload in previous step.

NOTE:

At this time, install the pinion height adjusting shim which is temporarily selected or same as that used before.

ST1 498447150 DUMMY SHAFT
 ST2 32285AA000 DUMMY COLLAR
 ST3 498505501 DIFFERENTIAL CARRIER GAUGE



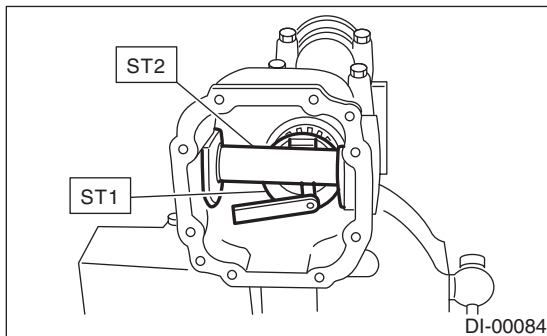
(A) Pinion height adjusting shim

- (2) Measure the clearance N between the end of ST3 and end surface of ST1 by using a thickness gauge.

NOTE:

Make sure there is no clearance between the case and ST3.

ST1 498447150 DUMMY SHAFT
 ST2 498505501 DIFFERENTIAL CARRIER GAUGE



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

NOTE:

Use 1 to 3 shims as required for adjustment.

$$T = T_o + N - 0.05 \text{ (mm)}$$

where

T = Thickness of pinion height adjusting washer (mm)

T_o = Thickness of shim originally installed (mm)

N = Reading of thickness gauge (mm)

H = Figure marked on drive pinion head

(Example of calculation)

$$T_o = 0.15 \text{ mm}$$

$$N = 0.1 \text{ mm}$$

$$T = 0.15 + 0.1 - 0.05 = 0.2 \text{ mm}$$

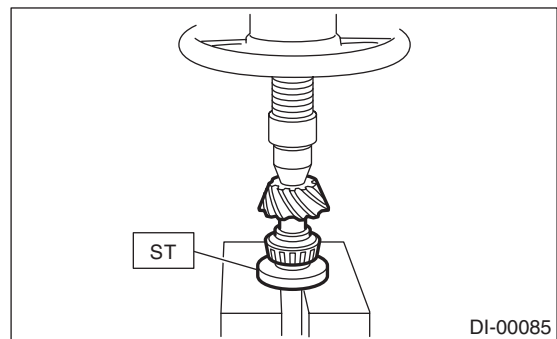
Result: Thickness = 0.2 mm

Therefore use the 32295AA220.

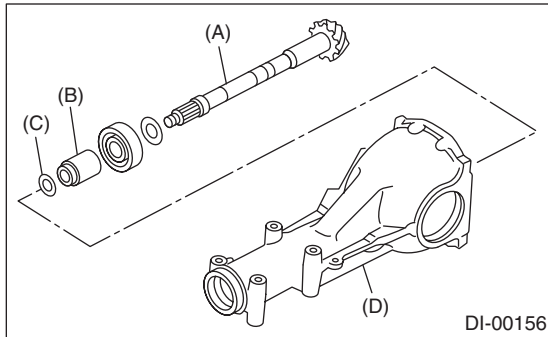
Pinion height adjusting shim	
Part No.	Thickness mm (in)
32295AA200	0.150 (0.0059)
32295AA210	0.175 (0.0069)
32295AA220	0.200 (0.0079)
32295AA230	0.225 (0.0089)
32295AA240	0.250 (0.0098)
32295AA250	0.275 (0.0108)

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

ST 498175500 INSTALLER



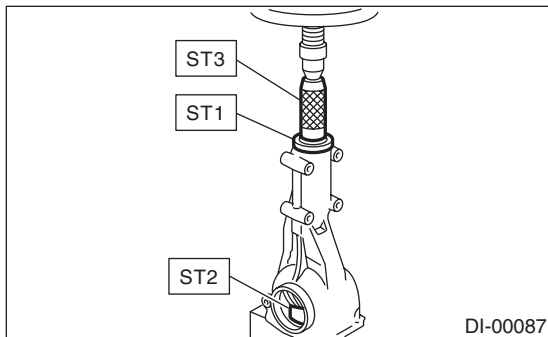
4) Insert the drive pinion into differential carrier, install the previously selected bearing preload adjusting collar and washer.



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

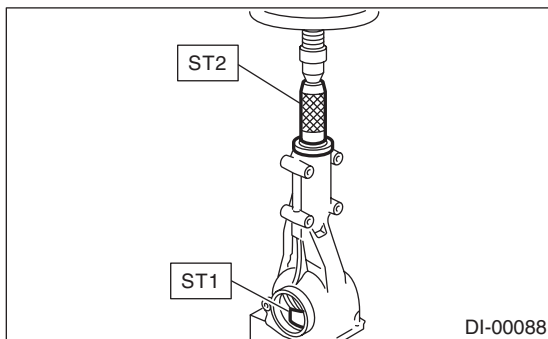
5) Press-fit the front bearing cone into carrier with ST1, ST2 and ST3.

- ST1 32285AA000 DUMMY COLLAR
- ST2 399780104 WEIGHT
- ST3 899580100 INSTALLER



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

- ST1 399780104 WEIGHT
- ST2 899580100 INSTALLER

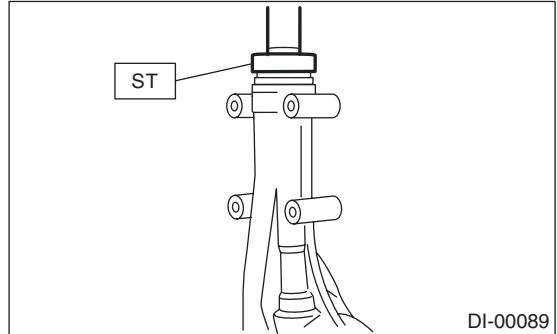


7) Fit a new oil seal with ST.

NOTE:

- Press-fit until the end of oil seal is 1 mm (0.04 in) inward from end of carrier.
- Apply grease between the oil seal lips.

- ST 498447120 INSTALLER

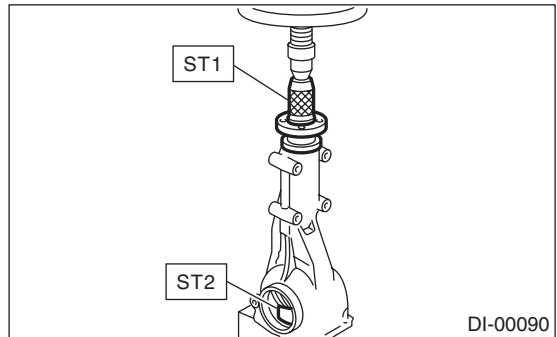


8) Press-fit the companion flange with ST1 and ST2.

NOTE:

Be careful not to damage the bearing.

- ST1 899874100 INSTALLER
- ST2 399780104 WEIGHT

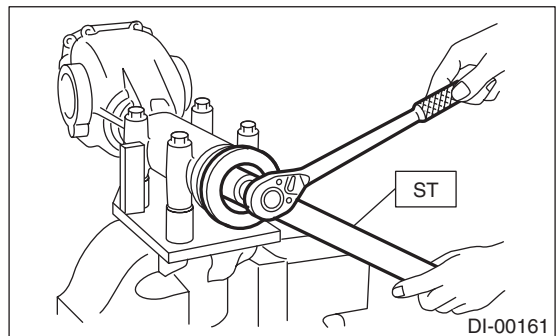


9) Install the self-locking nut. Then secure the companion flange with the ST, and tighten the nut.

- ST 498427200 FLANGE WRENCH

Tightening torque:

191 N·m (19.1 kgf·m, 141 ft·lb)



Rear Differential for VA-type

DIFFERENTIAL

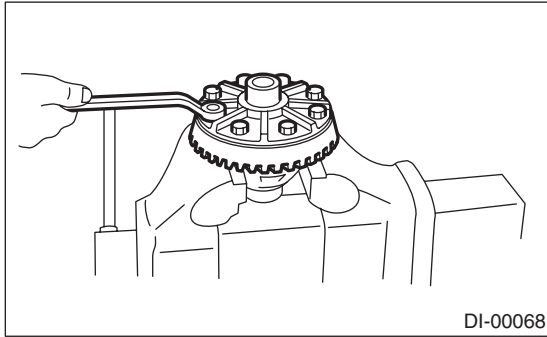
10) Install the hypoid driven gear on differential case.

NOTE:

Tighten diagonally while tapping the bolt heads.

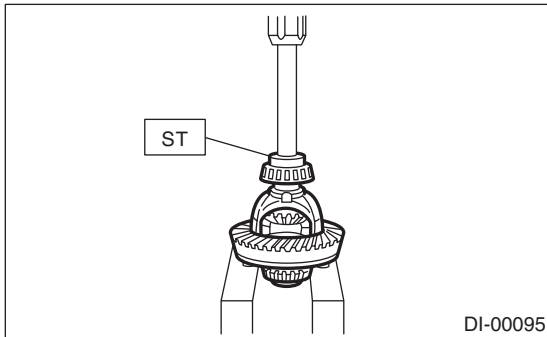
Tightening torque:

62 N·m (6.3 kgf·m, 45.6 ft·lb)



11) Press the side bearing cone onto differential case with ST.

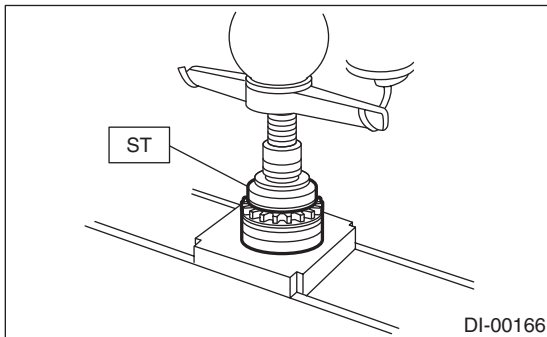
ST 498485400 DRIFT



12) Assemble holders.

(1) Install the oil seal into right and left holders.

ST 498447100 INSTALLER

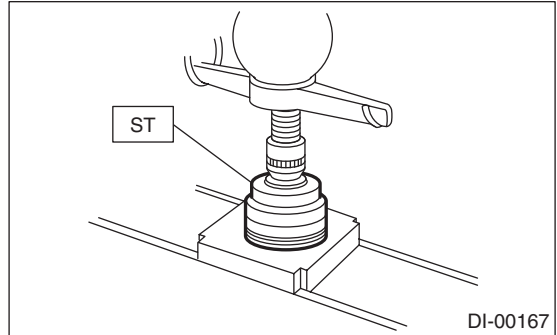


(2) Install the bearing race into right and left holders.

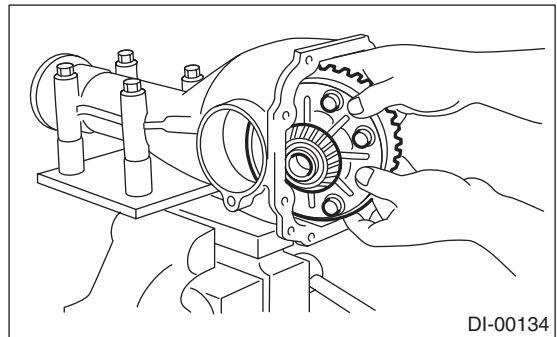
ST 398477702 BEARING OUTER RACE DRIFT

CAUTION:

Make sure that the oil seal, bearing outer race and cone are properly assembled.



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

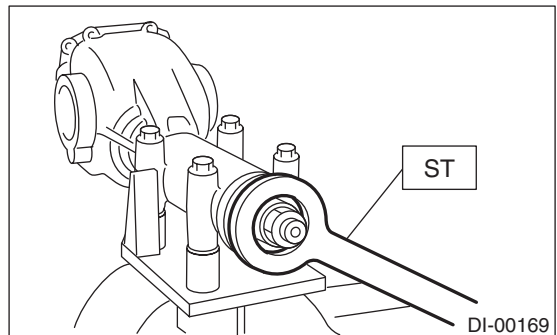


(4) Temporarily tighten the side holder RH and LH in differential carrier to install.

13) Perform the backlash adjustment of pinion hypoid driven gear set and preload adjustment of differential side bearing.

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

ST 498427200 FLANGE WRENCH

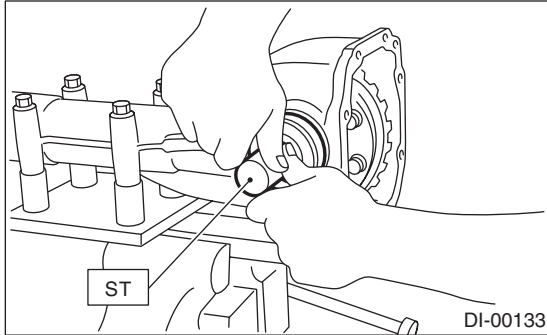


(2) Screw in the side (left-side) holder until light contact is made with ST.

ST 499785500 OIL SEAL HOLDER
WRENCH

NOTE:

- Be careful to install the differential oil seal to proper side.
- Do not install the O-ring.

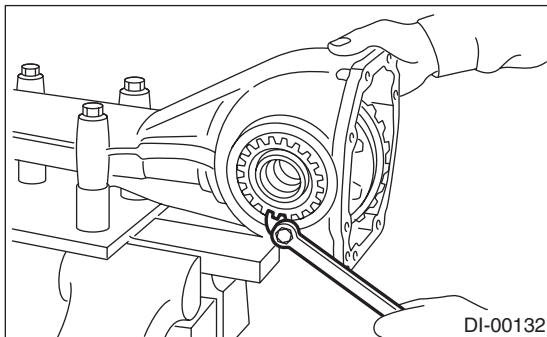


(3) Back off the driven gear side holder approx. 1 1/2 teeth of holder, and tighten the opposite side holder by approx. 2 teeth (approx. 1 1/2+1/2 teeth). [Back off amount of driven gear side holder (approx. 1 1/2 teeth) +1/2 tooth.] This+2 tooth gives preload.

(4) Temporarily tighten the lock plate.

NOTE:

If the positions of lock plate and tooth are not aligned, turn over the lock plate to displace the holder 1/2 tooth.



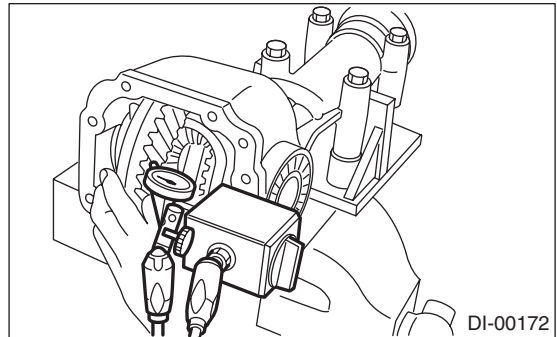
(5) Measure the hypoid driven gear-to-drive pinion backlash. Set the magnet base on differential carrier. Align the contact point of dial gauge with tooth face of hypoid driven gear, and move the hypoid driven gear while holding drive pinion still. Read the value indicated on dial gauge.

NOTE:

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

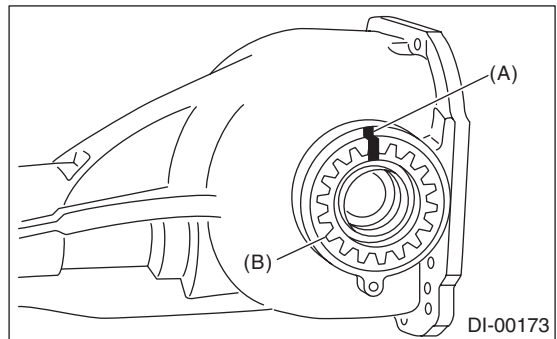
Backlash:

0.10 — 0.15 mm (0.0039 — 0.0059 in)



14) Draw a matching mark on both differential carrier and holder. Remove the holder one side at a time.

Replace in the original position after inserting an O-ring and applying grease to threaded portion.

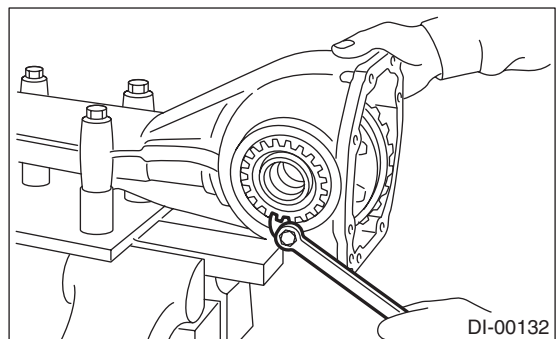


- (A) Matching mark
- (B) Holder

15) Tighten the bolt of lock plate to specified torque.

Tightening torque:

25 N·m (2.5 kgf-m, 18.1 ft-lb)



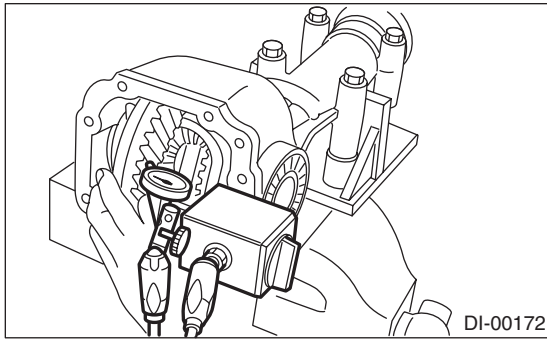
Rear Differential for VA-type

DIFFERENTIAL

16) Re-check the hypoid driven gear-to-pinion backlash.

Backlash:

0.10 — 0.15 mm (0.0039 — 0.0059 in)



17) Checking and adjusting tooth contact of hypoid driven gear.

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

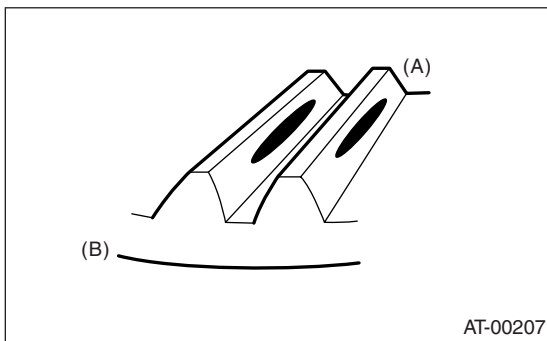
(2) When the contact pattern is incorrect, readjust according to the instructions given in "TOOTH CONTACT PATTERN".

NOTE:

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

- Correct tooth contact

Checking item: Tooth contact pattern is slightly shifted toward to under no-load rotation. (When loaded, contact pattern moves toward heel.)

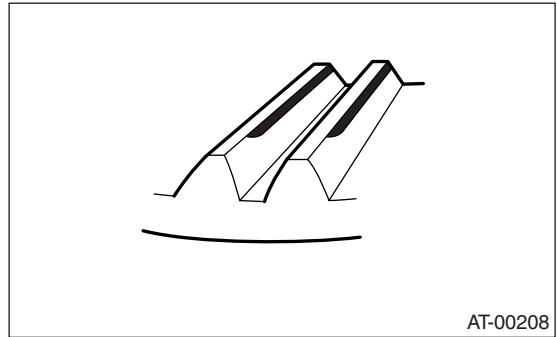


- (A) Toe side
- (B) Heel side

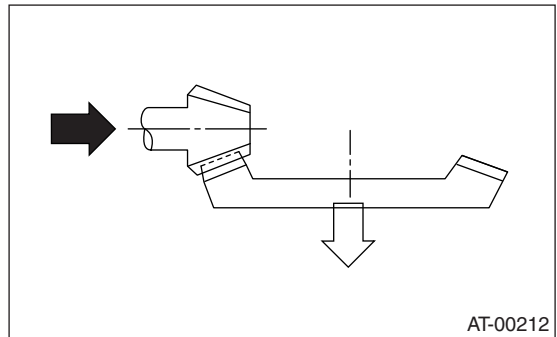
- Face contact

Checking item: Backlash is too large.

Contact pattern



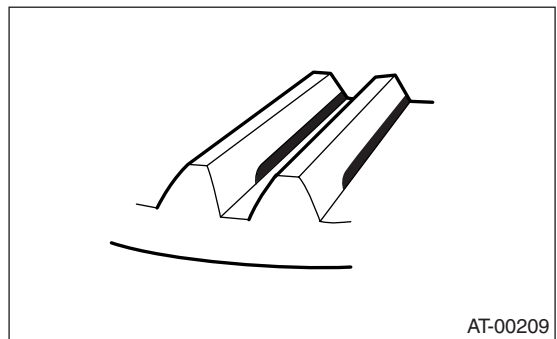
Corrective action: Increase thickness of drive pinion height adjusting shim in order to bring drive pinion close to hypoid driven gear.



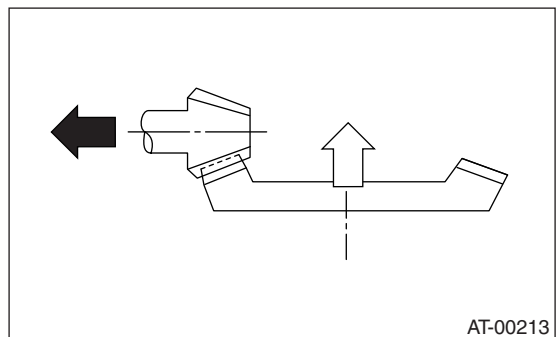
- Flank contact

Checking item: Backlash is too small.

Contact pattern



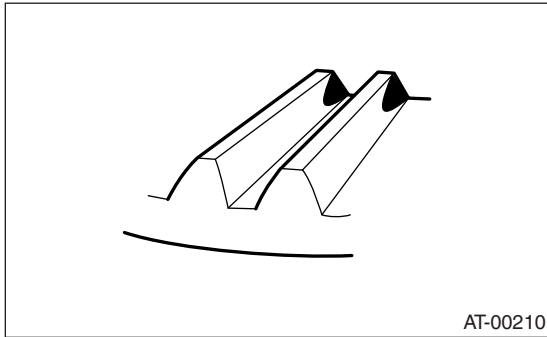
Corrective action: Reduce thickness of drive pinion height adjusting shim in order to move drive pinion away from hypoid driven gear.



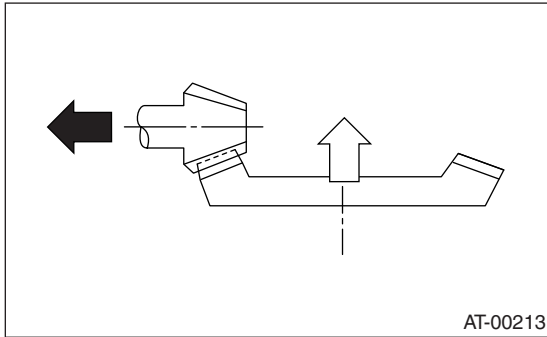
- Toe contact (Inside end contact)

Checking item: Contact area is small.

Contact pattern



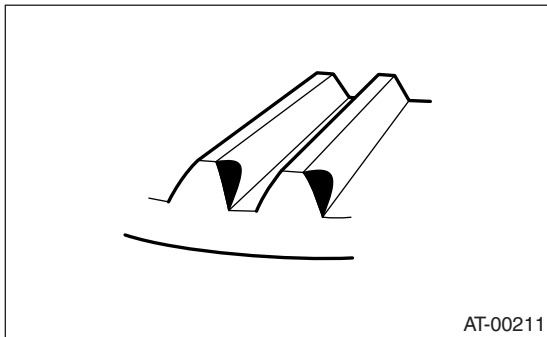
Corrective action: Reduce thickness of drive pinion height adjusting shim in order to move drive pinion away from hypoid driven gear.



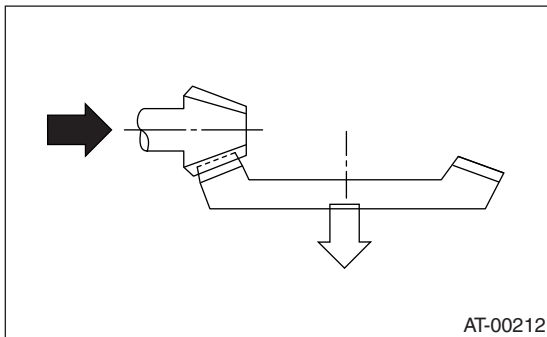
- Heel contact (Outside end contact)

Checking item: Contact area is small.

Contact pattern



Corrective action: Increase thickness of drive pinion height adjusting shim in order to move drive pinion away from hypoid driven gear.

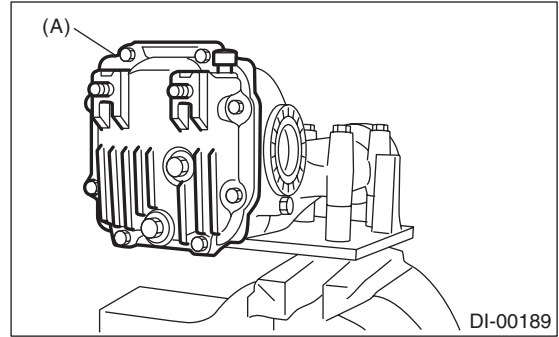


18) If proper tooth contact is not obtained, once again adjust the drive pinion height and the differential side bearing preload (already mentioned) and the hypoid gear backlash.

19) Install a new gasket and rear cover to differential carrier, and tighten the bolts to specified torque.

Tightening torque:

25 N·m (2.5 kgf·m, 18.1 ft·lb)



(A) Rear cover

E: INSPECTION

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

1) Hypoid driven gear and drive pinion

- If abnormal tooth contact is evident, find out the cause and adjust to give correct tooth contact at assembly. Replace the gear if excessively worn or incapable of adjustment.
- If crack, score, or seizure is evident, replace as a set. Slight damage of tooth can be corrected by oil stone or the like.

2) Bearing

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

3) Oil seal

Replace if deformed or damaged, and at every disassembling.

4) Differential carrier

Replace if the bearing bores are worn or damaged.

5) Differential case

Replace if its sliding surfaces are worn or cracked.

6) Companion flange

Replace if the oil seal lip contacting surfaces have flaws.

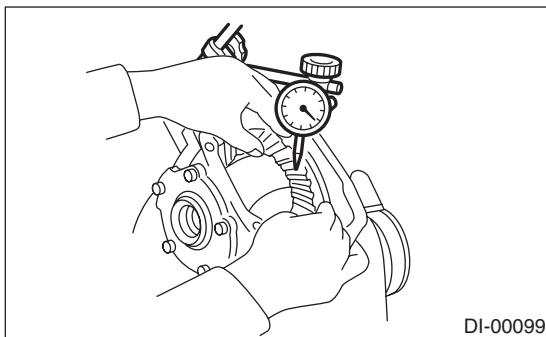
1. HYPOID DRIVEN GEAR BACKLASH

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

Hypoid driven gear backlash:

0.10 — 0.15 mm (0.0039 — 0.0059 in)

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



2. TOOTH CONTACT BETWEEN HYPOID DRIVEN GEAR AND DRIVE PINION

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

<Ref. to DI-44, ASSEMBLY, Rear Differential for VA-type.>

F: ADJUSTMENT

1. HYPOID DRIVEN GEAR BACKLASH

Adjust the hypoid driven gear backlash.

<Ref. to DI-44, ASSEMBLY, Rear Differential for VA-type.>

2. TOOTH CONTACT BETWEEN HYPOID DRIVEN GEAR AND DRIVE PINION

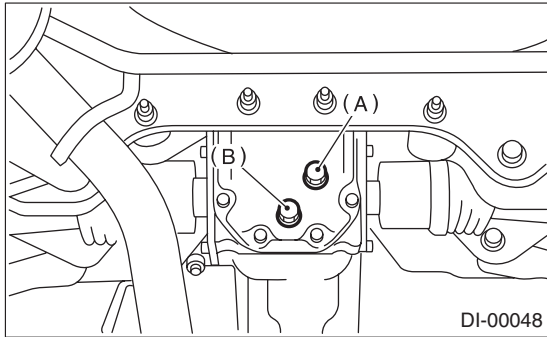
Adjust the tooth contact between hypoid driven gear and drive pinion gear.

<Ref. to DI-44, ASSEMBLY, Rear Differential for VA-type.>

6. Rear Differential Front Oil Seal

A: REPLACEMENT

- 1) Set the vehicle on a lift.
- 2) Disconnect the ground cable from battery.
- 3) Move the select lever or gear shift lever to "N".
- 4) Release the parking brake.
- 5) Remove the oil drain plug, and drain the gear oil.



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

- 6) Install the oil drain plug.

NOTE:

- Apply liquid gasket to the drain plug for T-type.
- Use a new aluminum gasket for VA-type.

Liquid gasket:

THREE BOND 1105 (Part No. 004403010) or equivalent

Tightening torque:

T-TYPE

49 N·m (5.0 kgf-m, 36.2 ft-lb)

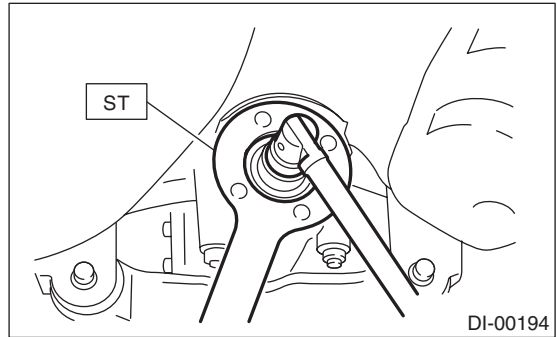
VA-type

34 N·m (3.5 kgf-m, 25.3 ft-lb)

- 7) Jack-up the rear wheels and support the vehicle body with rigid racks.
- 8) Remove the rear exhaust pipe and muffler.
- 9) Remove the propeller shaft from body. <Ref. to DS-15, REMOVAL, Propeller Shaft.>

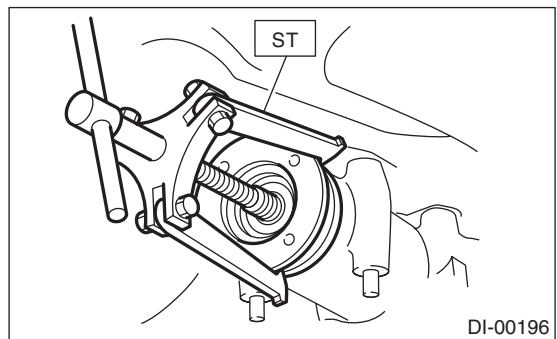
- 10) Remove the self-locking nut while holding the companion flange with ST.

ST 498427200 FLANGE WRENCH



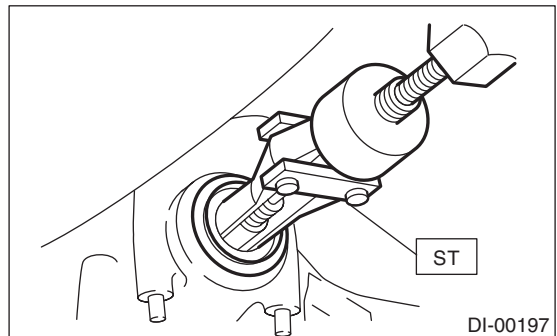
- 11) Remove the companion flange using ST.

ST 399703600 PULLEY ASSY



- 12) Remove the oil seal using ST.

ST 398527700 PULLER ASSY

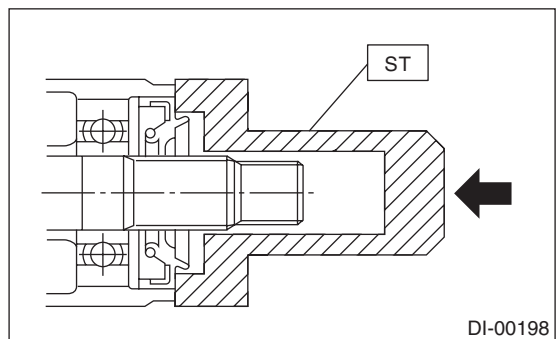


- 13) Fit a new oil seal using ST.

NOTE:

Apply oil to the outer surface of oil seal.

ST 498447120 INSTALLER



Rear Differential Front Oil Seal

DIFFERENTIAL

14) Install the companion flange.

NOTE:

Use a plastic hammer to install the companion flange.

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

ST 498427200 FLANGE WRENCH

NOTE:

Use a new self-locking nut.

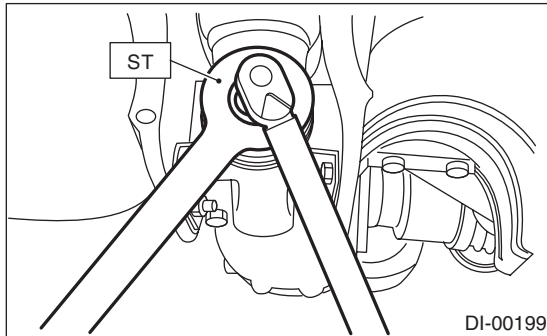
Tightening torque:

T-type

181 N·m (18.5 kgf-m, 134 ft-lb)

VA-type

191 N·m (19.5 kgf-m, 141 ft-lb)



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

7. Rear Differential Side Oil Seal

A: INSPECTION

Make sure that there is no oil leakage from side oil seal.

If there is any oil leakage, replace the oil seal.

B: REPLACEMENT

1. T-TYPE

- 1) Disconnect the ground cable from battery.
- 2) Move the select lever or gear shift lever to "N".
- 3) Release the parking brake.
- 4) Loosen both wheel nuts.
- 5) Jack-up the vehicle and support it with rigid racks.
- 6) Remove the wheels.
- 7) Remove the rear exhaust pipe and muffler.

Non-turbo model

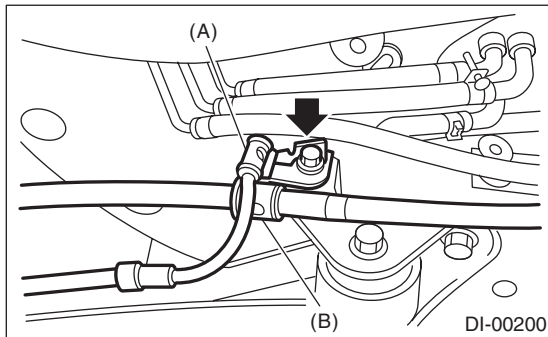
<Ref. to EX(H4SO)-11, REMOVAL, Rear Exhaust Pipe.> <Ref. to EX(H4SO)-13, REMOVAL, Muffler.>

Turbo model

<Ref. to EX(H4DOTC)-14, REMOVAL, Rear Exhaust Pipe.> <Ref. to EX(H4DOTC)-16, REMOVAL, Muffler.>

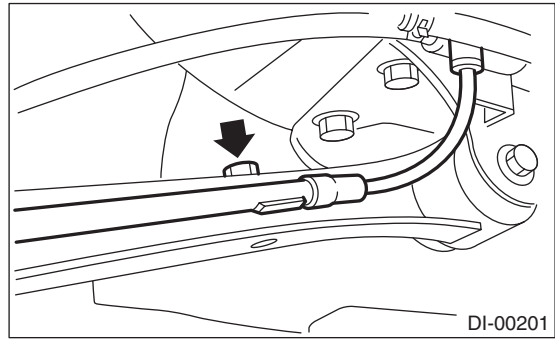
- 8) Remove the DOJ of rear drive shaft from rear differential.

- (1) Remove the ABS wheel speed sensor cable clamp and parking brake cable clamp from bracket.

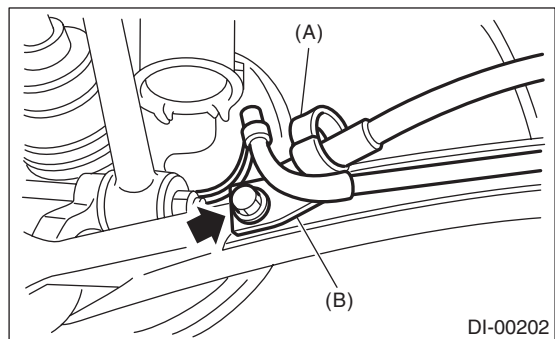


- (A) ABS wheel speed sensor cable clamp
- (B) Parking brake cable clamp

- (2) Remove the ABS wheel speed sensor cable clamp from trailing link.

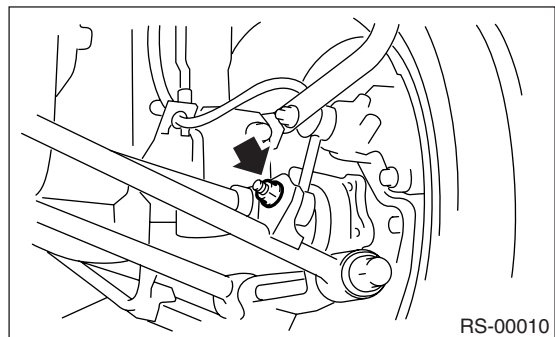


- (3) Remove the ABS wheel speed sensor cable clamp and parking brake cable guide from trailing link.

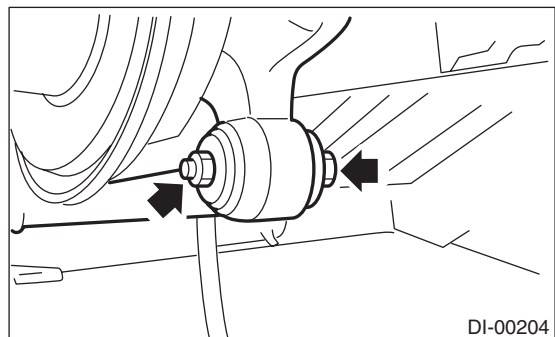


- (A) Parking brake cable guide
- (B) ABS wheel speed sensor cable clamp

- (4) Remove the rear stabilizer link.



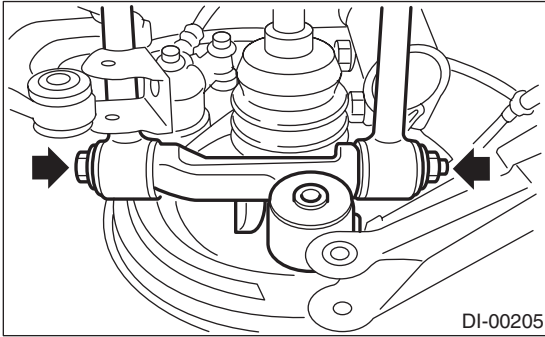
- (5) Remove the bolts which secure trailing link to housing.



Rear Differential Side Oil Seal

DIFFERENTIAL

(6) Remove the bolts which secure front and rear lateral link to rear housing.

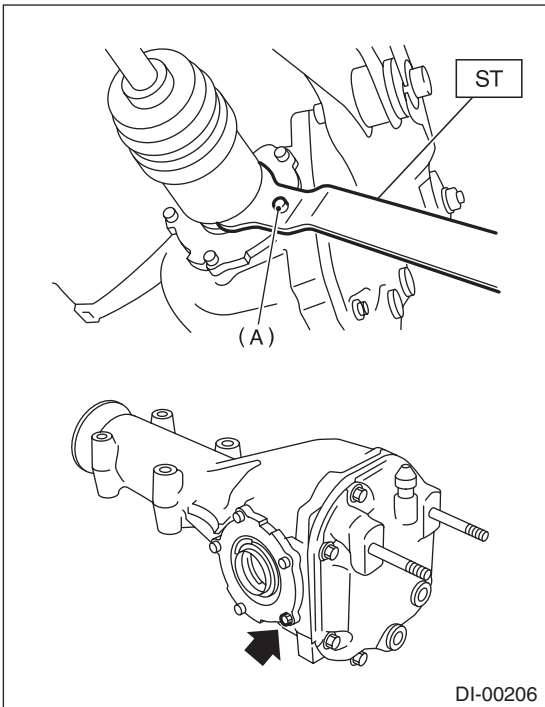


(7) Remove the DOJ from the rear differential by using ST.

NOTE:

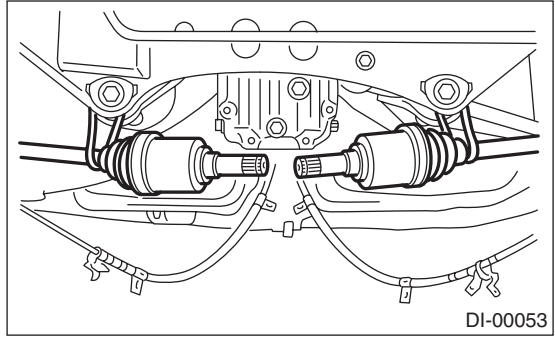
When removing the DOJ from rear differential, fit ST to the bolts as shown in the figure so as not to damage the side bearing retainer.

ST 28099PA100 DRIVE SHAFT REMOVER

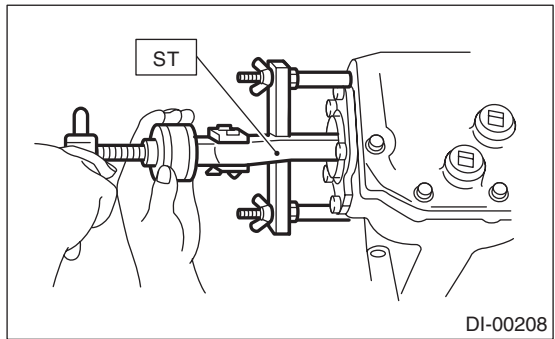


(A) Bolt

9) Remove the rear drive shaft to the rear cross-member using wire.



10) Using the ST, remove the oil seal.
ST 398527700 PULLER ASSY

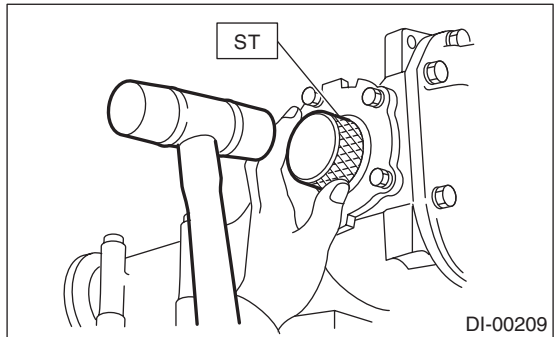


11) Drive in a new side oil seal using ST.

NOTE:

Apply chassis grease between the oil seal lips.

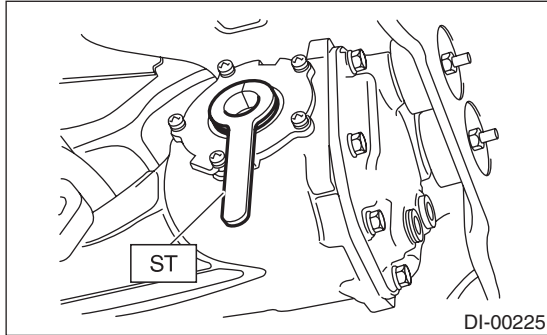
ST 398437700 DRIFT



12) Insert the DOJ into rear differential.

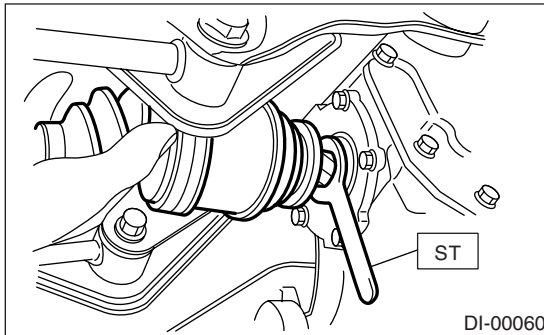
(1) Install the ST to rear differential.

ST 28099PA090 SIDE OIL SEAL PROTECTOR



(2) Install the spline shaft until the spline portion is inside the side oil seal using ST.

ST 28099PA090 SIDE OIL SEAL PROTECTOR



(3) Remove the ST.

ST 28099PA090 SIDE OIL SEAL PROTECTOR

13) Hereafter, reassemble in the reverse order of disassembly.

2. VA-TYPE

1) Disconnect the ground cable from battery.

2) Move the select lever or gear shift lever to "N".

3) Release the parking brake.

4) Loosen both wheel nuts.

5) Jack-up the vehicle and support it with rigid racks.

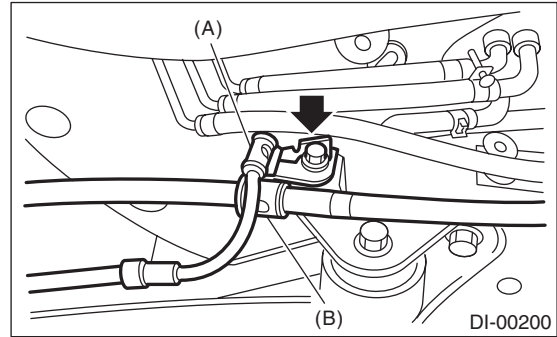
6) Remove the wheels.

7) Remove the rear exhaust pipe and muffler.

<Ref. to EX(H4SO)-11, REMOVAL, Rear Exhaust Pipe.> <Ref. to EX(H4SO)-13, REMOVAL, Muffler.>

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

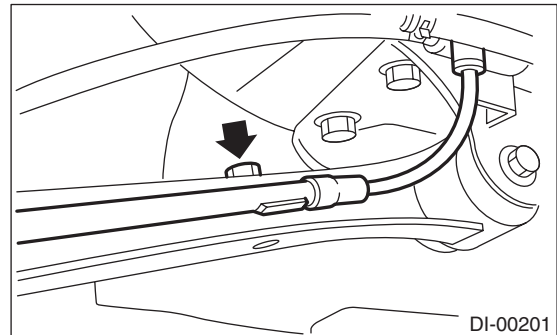
(1) Remove the ABS wheel speed sensor cable clamp and parking brake cable clamp from bracket.



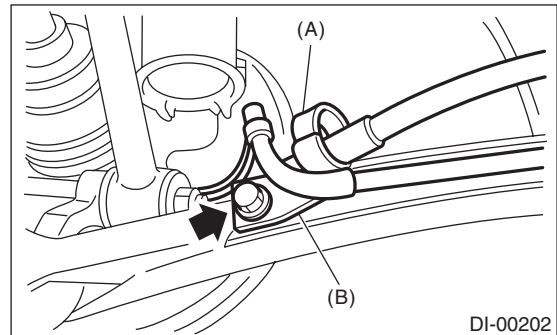
(A) ABS wheel speed sensor cable clamp

(B) Parking brake cable clamp

(2) Remove the ABS wheel speed sensor cable clamp from trailing link.



(3) Remove the ABS wheel speed sensor cable clamp and parking brake cable guide from trailing link.



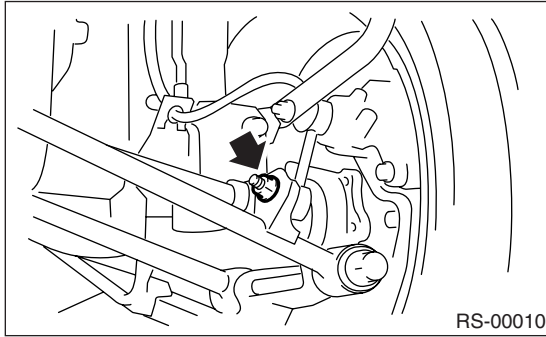
(A) Parking brake cable guide

(B) ABS wheel speed sensor cable clamp

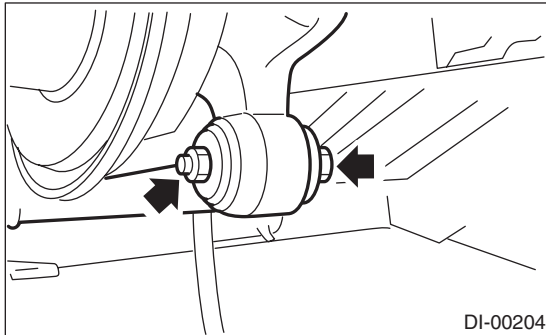
Rear Differential Side Oil Seal

DIFFERENTIAL

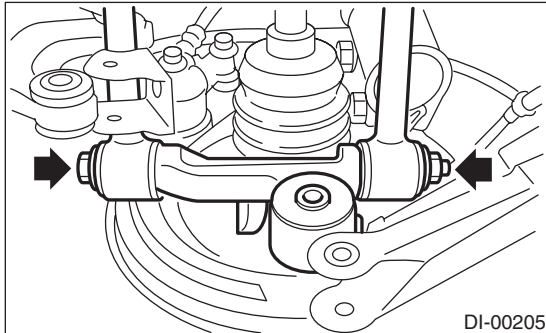
(4) Remove the rear stabilizer link.



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



(6) Remove the bolts which secure front and rear lateral link to rear housing.



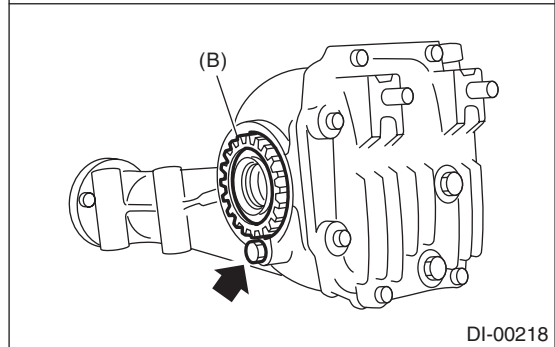
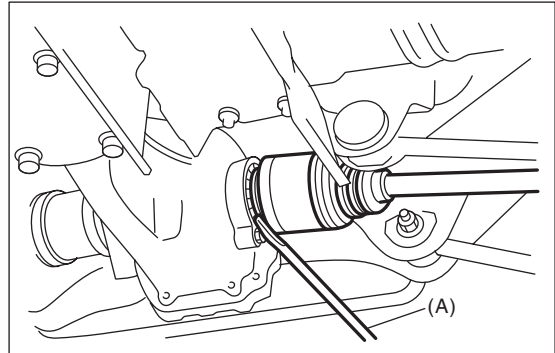
(7) Remove the DOJ from the rear differential using tire lever.

NOTE:

When removing the DOJ from rear differential, fit tire lever to the bolt as shown in the figure so as not to damage the axle shaft holder.

NOTE:

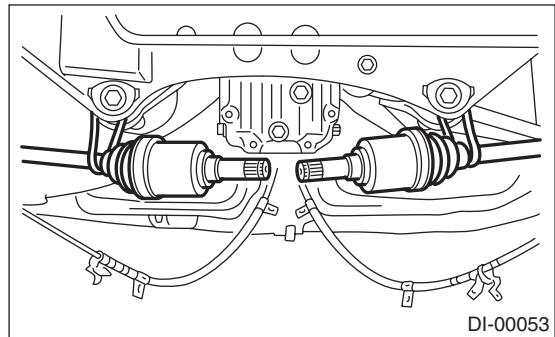
The side spline shaft circlip comes out together with the shaft.



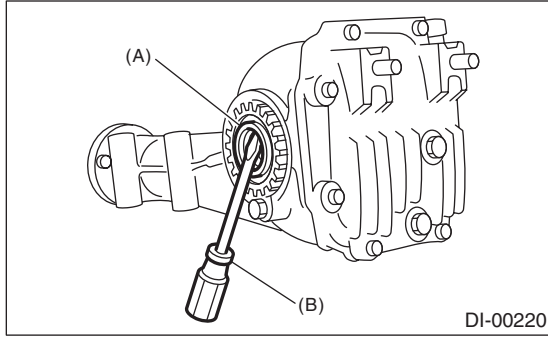
(A) Tire lever

(B) Axle shaft holder

9) Secure the rear drive shaft to rear crossmember using wire.



10) Remove the oil seal with screwdriver.



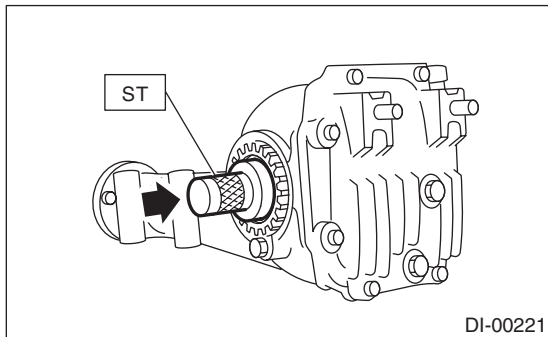
- (A) Side oil seal
- (B) Screwdriver

11) Drive in a new side oil seal using ST.

NOTE:

Apply chassis grease between the oil seal lips.

ST 498447100 OIL SEAL INSTALLER



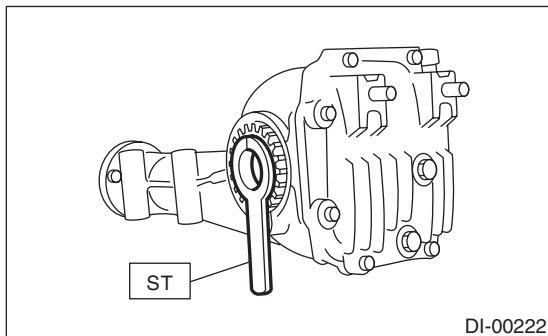
12) Insert the DOJ into rear differential.

NOTE:

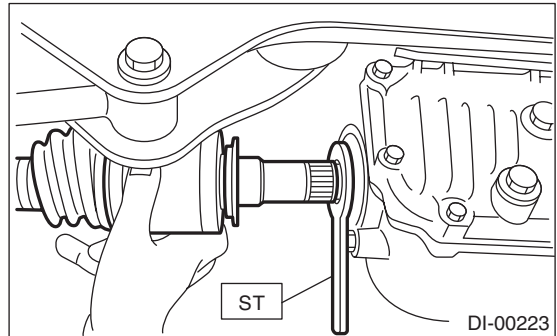
Before inserting, replace the circlip at the end of spline shaft with a new one.

(1) Install the ST to rear differential.

ST 28099PA090 SIDE OIL SEAL PROTECTOR



(2) Install the spline shaft until the spline portion is inside the side oil seal.



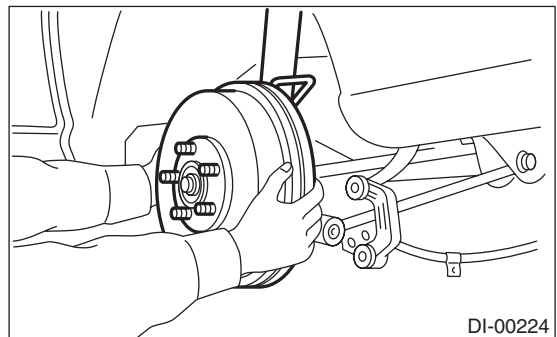
(3) Remove the ST.

ST 28099PA090 SIDE OIL SEAL PROTECTOR

(4) Completely insert the DOJ into rear differential by pressing rear housing.

NOTE:

Make sure that the oil seal lip is not folded over inward.



13) Hereafter, reassemble in the reverse order of disassembly.

8. Rear Differential Member

A: REMOVAL

- 1) Set the vehicle on a lift.
- 2) Disconnect the ground cable from battery.
- 3) Move the selector lever or gear shift lever to "N".
- 4) Release the parking brake.
- 5) Loosen the wheel nuts.
- 6) Jack-up the vehicle and support it with rigid racks.
- 7) Remove the wheels.
- 8) Remove the rear exhaust pipe and muffler.

Non-turbo model

<Ref. to EX(H4SO)-11, REMOVAL, Rear Exhaust Pipe.> <Ref. to EX(H4SO)-13, REMOVAL, Muffler.>

Turbo model

<Ref. to EX(H4DOTC)-14, REMOVAL, Rear Exhaust Pipe.> <Ref. to EX(H4DOTC)-16, REMOVAL, Muffler.>

- 9) Remove the rear differential front member.

NOTE:

When removing the rear differential front member, work the removal procedure as rear differential.

T-type

<Ref. to DI-24, REMOVAL, Rear Differential for T-type.>

VA-type

<Ref. to DI-39, REMOVAL, Rear Differential for VA-type.>

- 10) Remove the differential rear member.

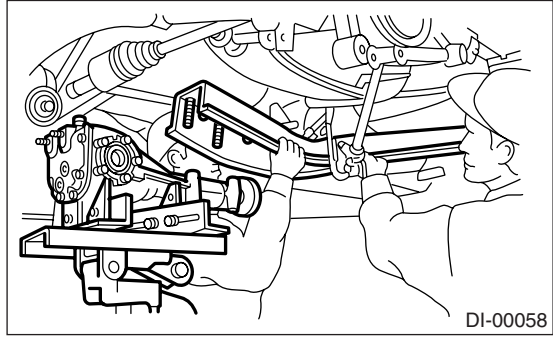
B: INSTALLATION

Install in the reverse order of removal.

- 1) Position the front member on body by passing it under the parking brake cable and securing to rear differential.

NOTE:

When installing the rear differential front member, pay attention the installation sequence of the stopper.

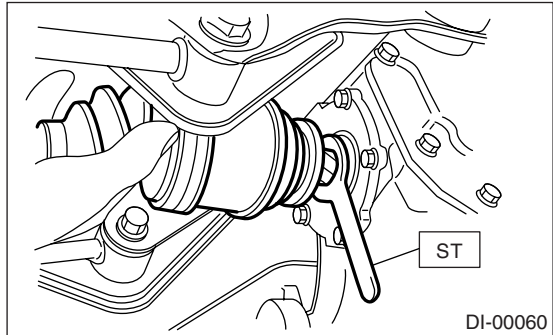


- 2) Insert the DOJ of rear drive shaft into rear differential.

NOTE:

Before inserting, replace the side oil seal with a new one.

ST 28099PA090 SIDE OIL SEAL PROTECTOR



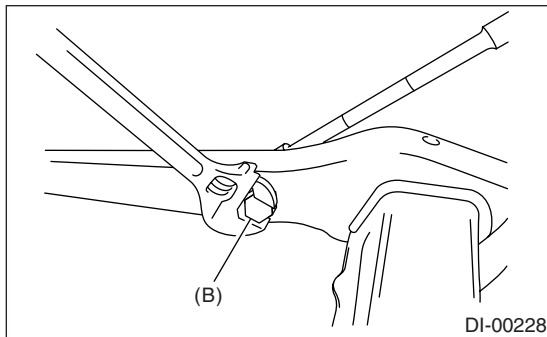
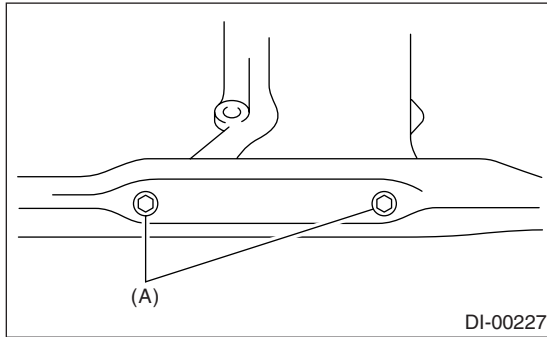
- 3) Hereafter, install in the reverse order of removal.

C: DISASSEMBLY

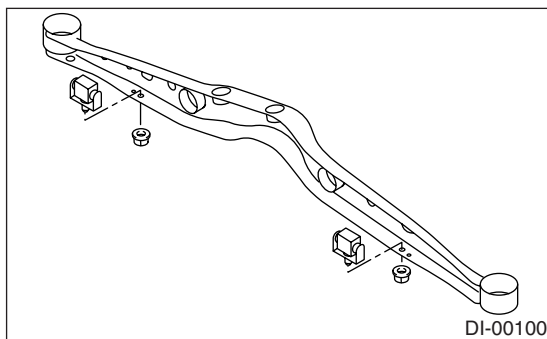
NOTE:

Clean the rear differential member before disassembly.

1) Remove the bolt (A) and (B) which connect front differential member and differential mounting bracket.



2) Remove the dynamic damper from front differential member. (Non-turbo model)



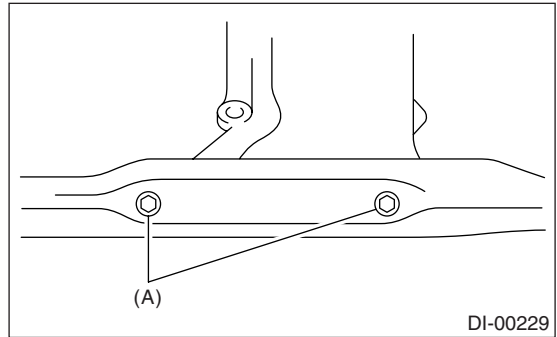
D: ASSEMBLY

1) Install the dynamic damper to front differential member. (Non-turbo model)

Tightening torque:

20 N·m (2.0 kgf-m, 14.5 ft-lb)

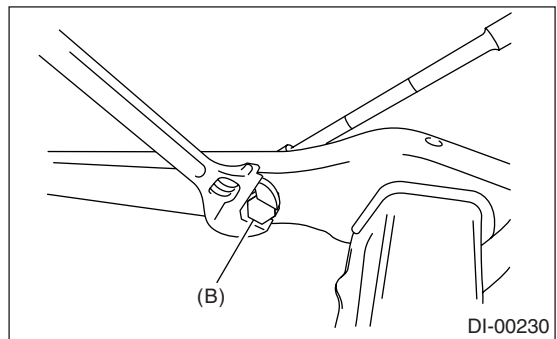
2) Temporarily tighten the connecting bolt (A) which secures front differential to differential mount.



3) Tighten the nut of connecting bolt (B).

Tightening torque:

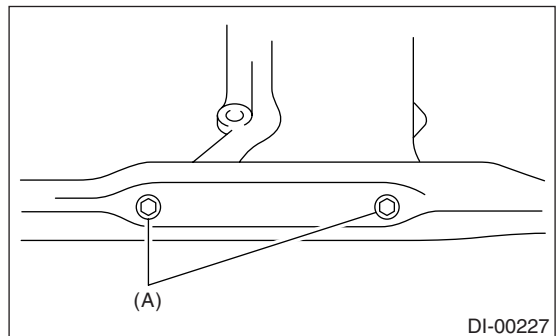
125 N·m (12.7 kgf-m, 92.2 ft-lb)



4) Tighten the nut of connecting bolt (A).

Tightening torque:

70 N·m (7.1 kgf-m, 51.6 ft-lb)



Rear Differential Member

DIFFERENTIAL

E: INSPECTION

1) Check the rear differential member for damage, bend, or corrosion.

If damage, bend, or corrosion is excessive, replace the rear differential member.

2) Check the bushings of rear differential member for cracking, hardening, or damage.

If cracking, hardening, or damage is excessive, replace the rear differential member.

9. 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.	Repair or replace.
	(2) Clogged or damaged air breather.	Clean, repair or replace.
	(3) Loose bolts on side 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 the gasket and apply liquid gasket.
	(5) Loose oil filler or drain plug.	Retighten and apply liquid gasket.
	(6) Wear, damage or incorrectly fitting for side retainer and oil seal.	Repair or replace.
2. Seizure NOTE: Improper 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 the improper 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 the 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 disassembly.	(1) Excessive backlash for hypoid gear.	Readjust.
	(2) Excessive backlash for differential gear.	Replace the gear or thrust washer.
	(3) Insufficient preload for front or rear bearing.	Readjust.
	(4) Loose drive pinion nut.	Tighten to specified torque.
	(5) Loose bolts and nuts such as side bearing retainer attaching bolt.	Tighten to 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

DIFFERENTIAL

Symptom or trouble	Possible cause	Remedy
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.	(1) Improper tooth contact of hypoid gear.	Readjust or replace the hypoid gear set.
	(2) Improper backlash for hypoid gear.	Readjust.
	(3) Scored or chipped teeth of hypoid gear.	Replace the hypoid gear set.
	(4) Seized hypoid gear.	Replace the hypoid gear set.
	(5) Improper preload for front or rear bearings.	Readjust.
	(6) Seized, scored, or chipped front or rear bearing.	Replace.
	(7) Seized, scored, or chipped side bearing.	Replace.
	(8) Vibrating differential carrier.	Replace.