

GENERAL DESCRIPTION

Differentials

1. General Description S303001

A: SPECIFICATIONS S303001E49

MODEL	BRIGHTON	
	L	
	MT	AT
	T-type	VA-type
Rear differential type	T1	XK
Gear	Hypoid gear	
Gear ratio (Number of gear teeth)	3.900 (39/10)	4.111 (37/9)
Oil capacity	0.8 ℓ (0.8 US qt, 0.7 Imp qt)	
Rear differential gear oil	GL-5	

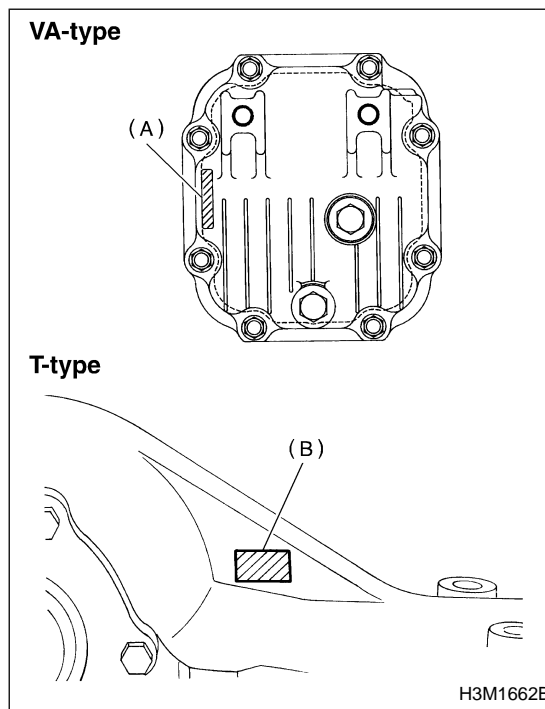
MODEL	GT GT-LTD		OUTBACK	OUTBACK-CW OUTBACK-LTD	OUTBACK SEDAN
	MT	AT	MT	MT	AT
	T-type				
Rear differential type	BK (with LSD)	CD (with LSD)	BK (with LSD)		CD (with LSD)
Gear	Hypoid gear				
Gear ratio (Number of gear teeth)	4.111 (37/9)	4.444 (40/9)	4.111 (37/9)	4.111 (37/9)	4.444 (40/9)
Oil capacity	0.8 ℓ (0.8 US qt, 0.7 Imp qt)				
Rear differential gear oil	GL-5				

● **Identification**

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

CAUTION:

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



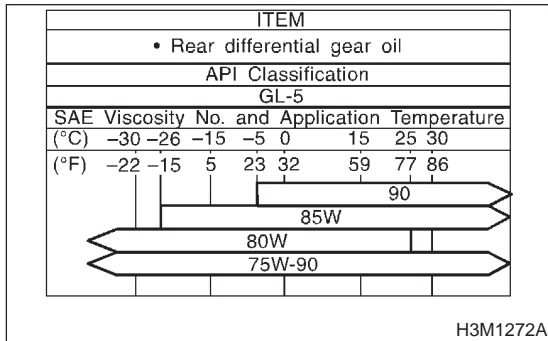
- (A) Level location
- (B) Stamp location

● **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. SERVICE DATA

S303001E4901

Front and rear bearing preload at companion flange bolt hole N (kgf, lb)	New bearing	T-type	19.6 — 28.4 (2.0 — 2.9, 4.4 — 6.4)
		VA-type	12.7 — 32.4 (1.3 — 3.3, 2.9 — 7.3)
	Used bearing	T-type	8.34 — 16.67 (0.85 — 1.7, 1.87 — 3.75)
		VA-type	0.10 — 0.20 (0.0039 — 0.0079)
Side gear backlash mm (in)		VA-type	0.05 — 0.15 (0.0020 — 0.0059)
Side bearing standard width mm (in)			20.00 (0.7874)
Crown gear to drive pinion backlash mm (in)		T-type	0.10 — 0.20 (0.0039 — 0.0079)
		VA-type	0.10 — 0.15 (0.0039 — 0.0059)
Crown gear runout on its back surface mm (in)			Less than 0.05 (0.0020)

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2. ADJUSTING PARTS S303001E4902

● VA-type

Item	Part No.	Length or thickness
Preload adjusting spacer	32288AA040	52.3 mm (2.059 in)
	32288AA050	52.5 mm (2.067 in)
	31454AA100	52.6 mm (2.071 in)
	32288AA060	52.7 mm (2.075 in)
	31454AA110	52.8 mm (2.079 in)
	32288AA070	52.9 mm (2.083 in)
	31454AA120	53.0 mm (2.087 in)
	32288AA080	53.1 mm (2.091 in)
	32288AA090	53.3 mm (2.098 in)
Preload adjusting washer	38336AA000	1.500 mm (0.0591 in)
	38336AA120	1.513 mm (0.0596 in)
	38336AA010	1.525 mm (0.0600 in)
	38336AA130	1.538 mm (0.0606 in)
	38336AA020	1.550 mm (0.0610 in)
	38336AA140	1.563 mm (0.0615 in)
	38336AA030	1.575 mm (0.0620 in)
	38336AA150	1.588 mm (0.0625 in)
	38336AA040	1.600 mm (0.0630 in)
	38336AA160	1.613 mm (0.0635 in)
	38336AA050	1.625 mm (0.0640 in)
	38336AA170	1.638 mm (0.0645 in)
	38336AA060	1.650 mm (0.0650 in)
	38336AA180	1.663 mm (0.0655 in)
	38336AA070	1.675 mm (0.0659 in)
	38336AA190	1.688 mm (0.0665 in)
	38336AA080	1.700 mm (0.0669 in)
	38336AA200	1.713 mm (0.0674 in)
	38336AA090	1.725 mm (0.0679 in)
	38336AA210	1.738 mm (0.0684 in)
38336AA100	1.750 mm (0.0689 in)	
38336AA220	1.763 mm (0.0694 in)	
38336AA110	1.775 mm (0.0699 in)	
Pinion height adjusting shim	32295AA200	0.150 mm (0.0059 in)
	32295AA210	0.175 mm (0.0069 in)
	32295AA220	0.200 mm (0.0079 in)
	32295AA230	0.225 mm (0.0089 in)
	32295AA240	0.250 mm (0.0098 in)
	32295AA250	0.275 mm (0.0108 in)
Side gear thrust washer	803135011	0.925 — 0.950 mm (0.0364 — 0.0374 in)
	803135012	0.950 — 0.975 mm (0.0374 — 0.0384 in)
	803135013	0.975 — 1.000 mm (0.0384 — 0.0394 in)
	803135014	1.000 — 1.025 mm (0.0394 — 0.0404 in)
	803135015	1.025 — 1.050 mm (0.0404 — 0.0413 in)

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● T-type

Item	Part No.	Length or thickness
Preload adjusting spacer	383695201	56.2 mm (2.213 in)
	383695202	56.4 mm (2.220 in)
	383695203	56.6 mm (2.228 in)
	383695204	56.8 mm (2.236 in)
	383695205	57.0 mm (2.244 in)
	383695206	57.2 mm (2.252 in)
Preload adjusting washer	383705200	2.59 mm (0.1020 in)
	383715200	2.57 mm (0.1012 in)
	383725200	2.55 mm (0.1004 in)
	383735200	2.53 mm (0.0996 in)
	383745200	2.51 mm (0.0988 in)
	383755200	2.49 mm (0.0980 in)
	383765200	2.47 mm (0.0972 in)
	383775200	2.45 mm (0.0965 in)
	383785200	2.43 mm (0.0957 in)
	383795200	2.41 mm (0.0949 in)
	383805200	2.39 mm (0.0941 in)
	383815200	2.37 mm (0.0933 in)
	383825200	2.35 mm (0.0925 in)
	383835200	2.33 mm (0.0917 in)
	383845200	2.31 mm (0.0909 in)
Pinion height adjusting shim	383495200	3.09 mm (0.1217 in)
	383505200	3.12 mm (0.1228 in)
	383515200	3.15 mm (0.1240 in)
	383525200	3.18 mm (0.1252 in)
	383535200	3.21 mm (0.1264 in)
	383545200	3.24 mm (0.1276 in)
	383555200	3.27 mm (0.1287 in)
	383565200	3.30 mm (0.1299 in)
	383575200	3.33 mm (0.1311 in)
	383585200	3.36 mm (0.1323 in)
	383595200	3.39 mm (0.1335 in)
	383605200	3.42 mm (0.1346 in)
	383615200	3.45 mm (0.1358 in)
	383625200	3.48 mm (0.1370 in)
	383635200	3.51 mm (0.1382 in)
	383645200	3.54 mm (0.1394 in)
	383655200	3.57 mm (0.1406 in)
	383665200	3.60 mm (0.1417 in)
383675200	3.63 mm (0.1429 in)	
383685200	3.66 mm (0.1441 in)	
Side gear thrust washer (Non-Turbo model)	383445201	0.75 — 0.80 mm (0.0295 — 0.0315 in)
	383445202	0.80 — 0.85 mm (0.0315 — 0.0335 in)
	383445203	0.85 — 0.90 mm (0.0335 — 0.0354 in)
	383445204	0.90 — 0.95 mm (0.0354 — 0.0374 in)
	383445205	0.95 — 1.0 mm (0.0374 — 0.0394 in)

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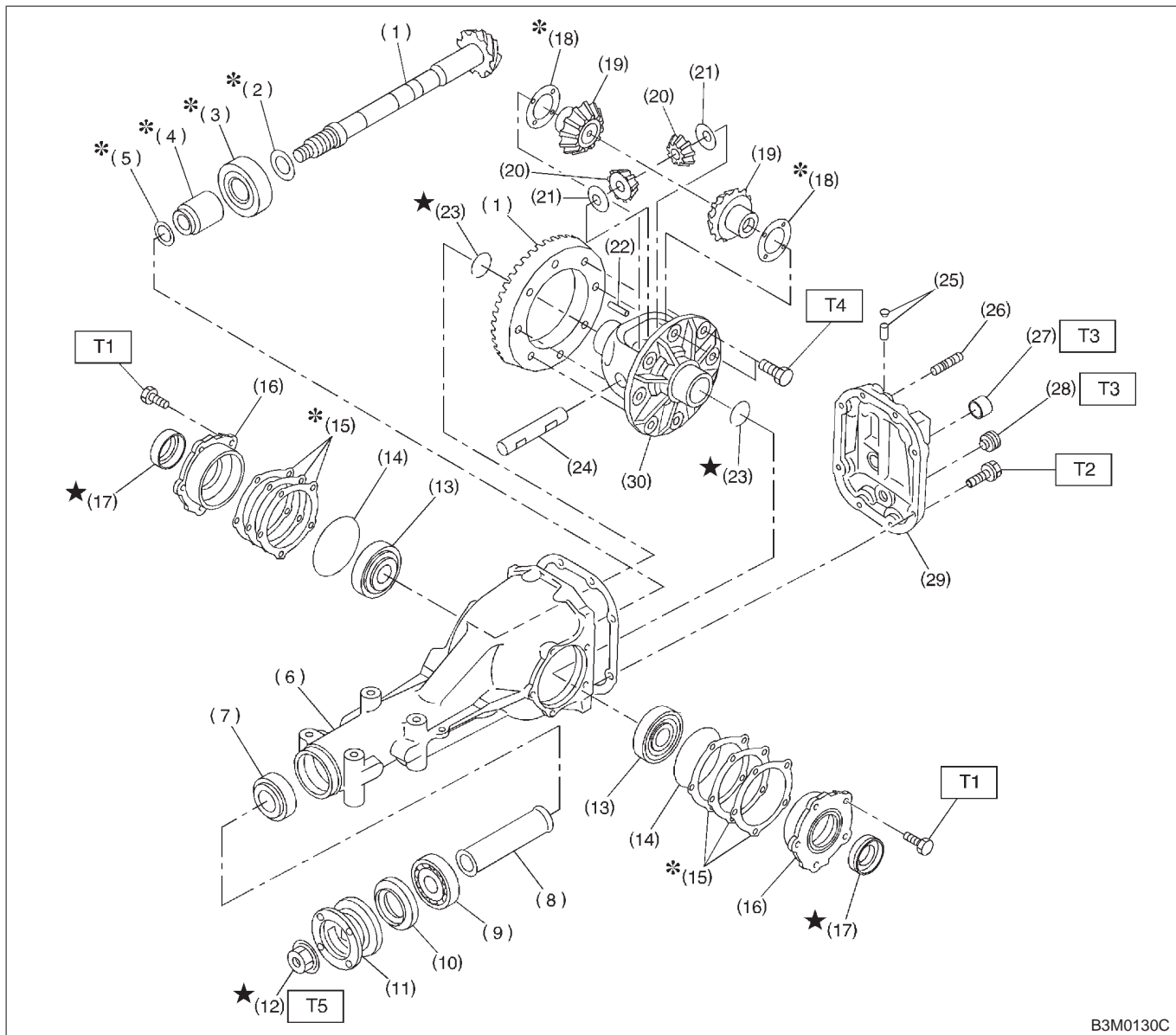
Differentials

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

DI-6

B: COMPONENT S303001A05

1. REAR DIFFERENTIAL FOR T-TYPE WITHOUT LSD S303001A0501



B3M0130C

- (1) Pinion crown gear set
- (2) Pinion height adjusting washer
- (3) Rear bearing
- (4) Bearing preload adjusting spacer
- (5) Bearing preload adjusting washer
- (6) Differential carrier
- (7) Front bearing
- (8) Spacer
- (9) Pilot bearing
- (10) Front oil seal
- (11) Companion flange
- (12) Self-locking nut

- (13) Side bearing
- (14) O-ring
- (15) Side bearing retainer shim
- (16) Side bearing retainer
- (17) Side oil seal
- (18) Side gear thrust washer
- (19) Side gear
- (20) Pinion mate gear
- (21) Pinion mate gear washer
- (22) Pinion shaft lock pin
- (23) Circlip
- (24) Pinion mate shaft
- (25) Air breather cap

- (26) Stud bolt
- (27) Oil filler plug
- (28) Oil drain plug
- (29) Rear cover
- (30) Differential case

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

T1: 10.3 (1.05, 7.6)

T2: 29.4 (3.00, 21.7)

T3: 49.0 (5.0, 36.2)

T4: 103.0 (10.50, 75.9)

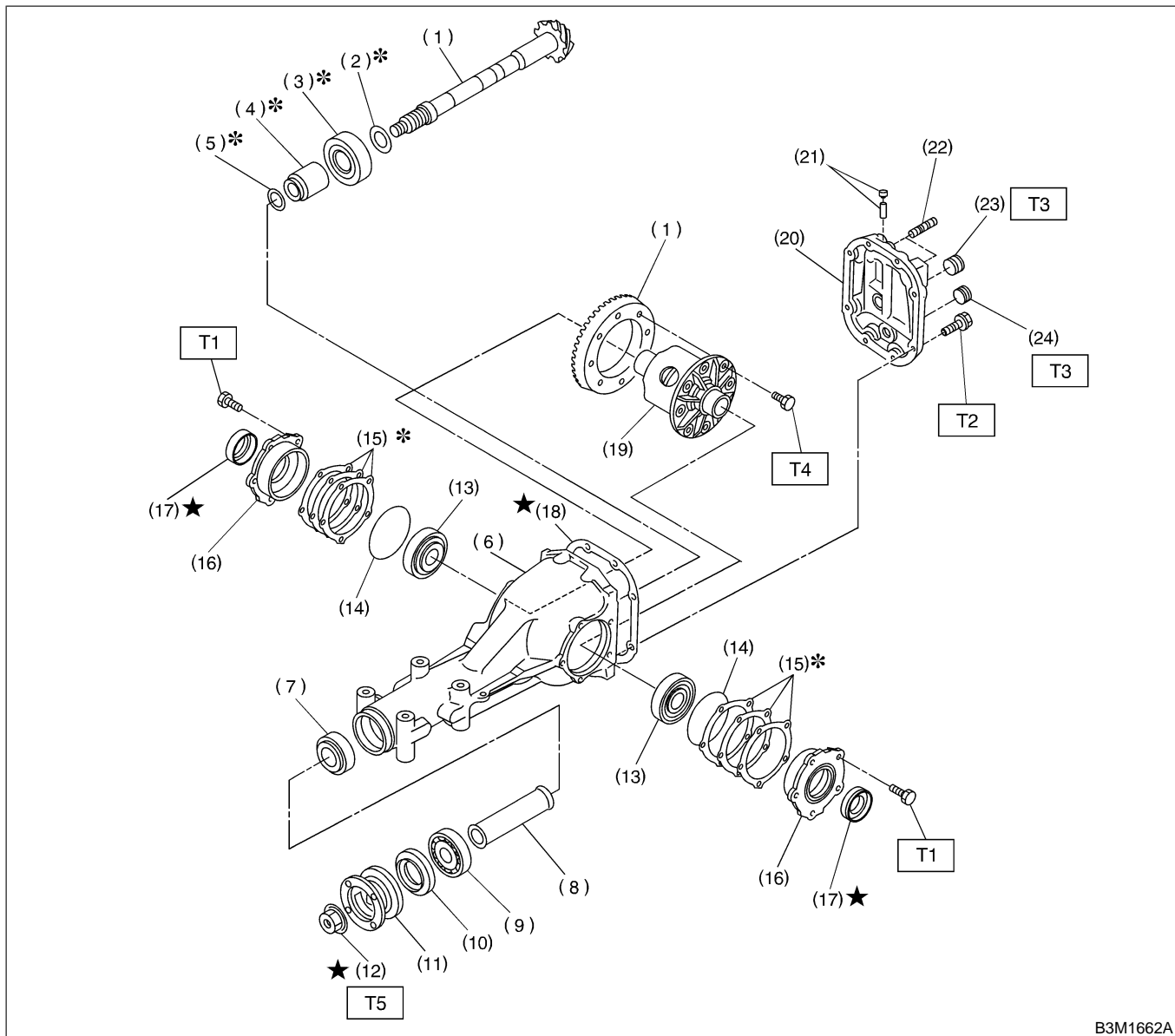
T5: 181.4 (18.50, 133.8)

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2. REAR DIFFERENTIAL FOR T-TYPE WITH LSD

S303001A0502



B3M1662A

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

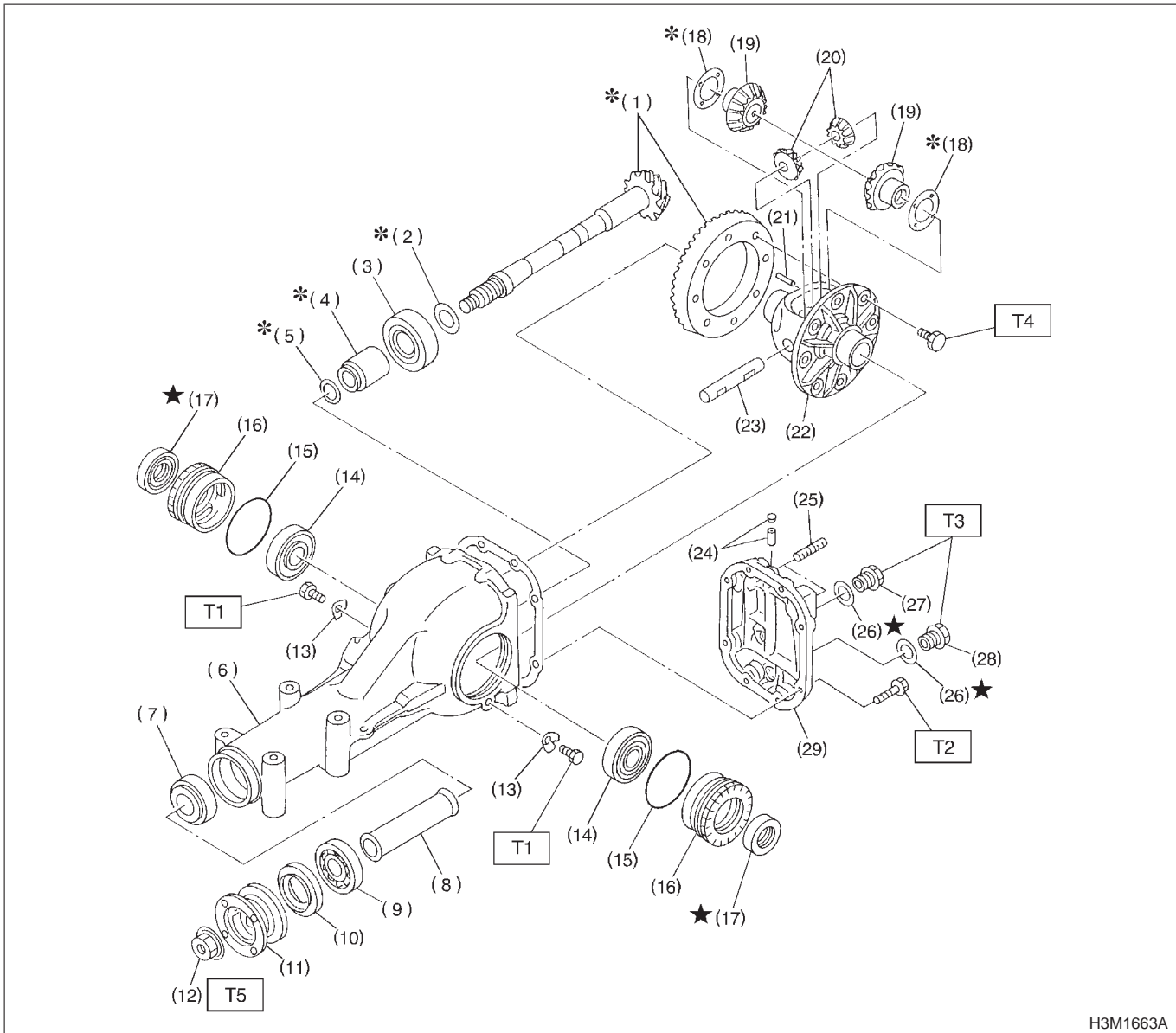
- | |
|----------------------|
| (22) Stud bolt |
| (23) Oil filler plug |
| (24) Oil drain plug |

Tightening torque: N·m (kgf·m, ft·lb)

- T1: 10.3 (1.05, 7.6)**
T2: 29.4 (3.00, 21.7)
T3: 49.0 (5.00, 36.2)
T4: 103.0 (10.50, 75.9)
T5: 181.4 (18.50, 133.8)

3. REAR DIFFERENTIAL FOR VA-TYPE

S303001A0503



H3M1663A

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

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

T1: 25 (2.5, 18.1)

T2: 25 (2.5, 18.1)

T3: 34 (3.5, 25.3)

T4: 62 (6.3, 45.6)

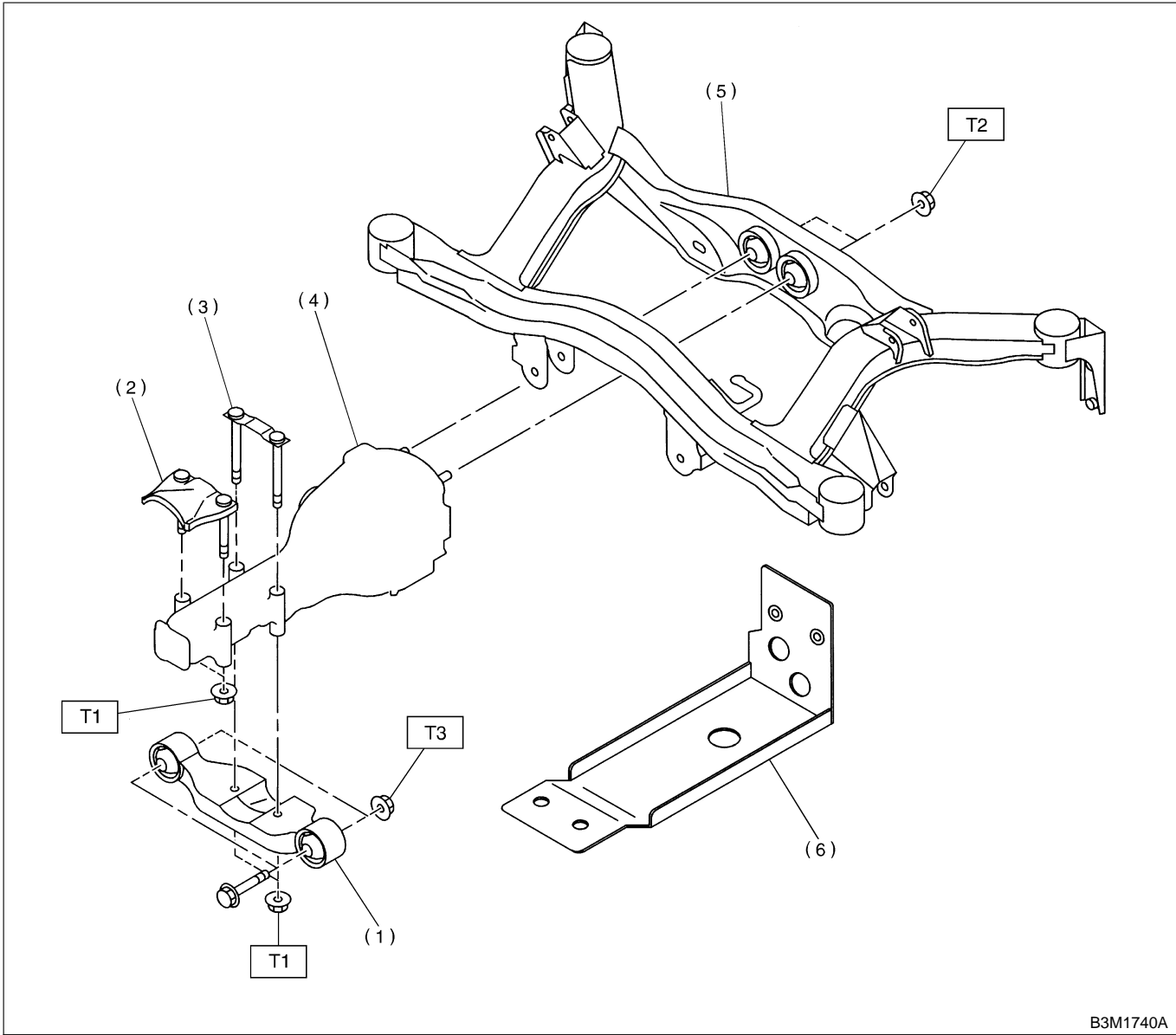
T5: 188 (19.2, 139)

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4. REAR DIFFERENTIAL MOUNTING SYSTEM

S303001A0504



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

- (6) Rear differential protector (if equipped)

Tightening torque: N·m (kgf·m, ft·lb)

T1: 65 (6.6, 48)

T2: 70 (7.1, 51)

T3: 110 (11.2, 81)

C: CAUTION S303001A03

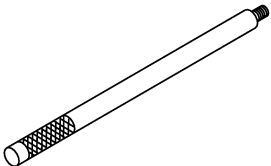
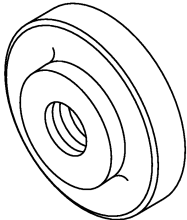
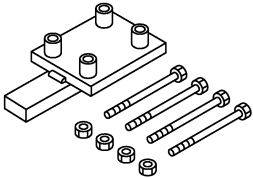
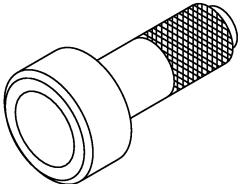
- Wear working clothing, including a cap, protective goggles, and protective shoes during operation.
- Remove contamination including dirt and corrosion before removal, installation or disassembly.
- Keep the disassembled parts in order and protect them from dust or dirt.
- Before removal, installation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

GENERAL DESCRIPTION

Differentials

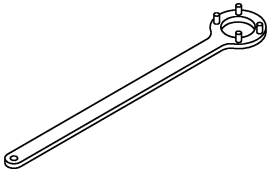
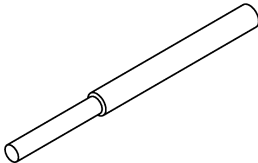
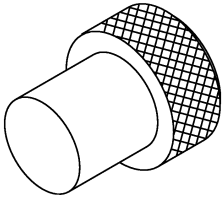
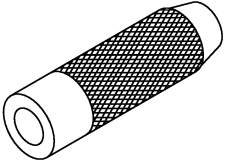
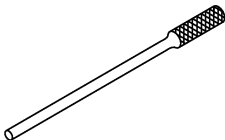
D: PREPARATION TOOL S303001A17

1. SPECIAL TOOLS S303001A1701

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 B3M1893	398477701	HANDLE	Used for installing front and rear bearing cone.
 B3M1894	398477702	DRIFT	Used press-fitting the bearing cone of differential carrier (rear).
 B3M1895	398217700	ATTACHEMENT SET	Stand for rear differential carrier disassembly and assembly.
 B3M1896	498447120	DRIFT	Used for installing front oil seal.

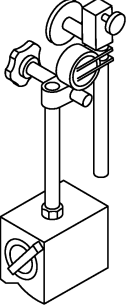
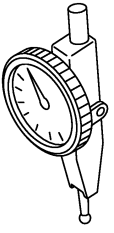
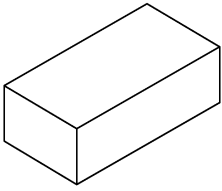
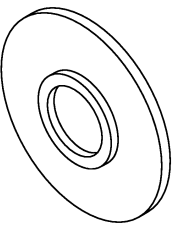
GENERAL DESCRIPTION

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ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p style="text-align: center;">B3M1897</p>	498427200	FLANGE WRENCH	Used for stopping rotation of companion flange when loosening and tightening self-lock nut.
 <p style="text-align: center;">B3M1898</p>	398467700	DRIFT	Used for removing pinion, pilot bearing and front bearing cone.
 <p style="text-align: center;">B3M1899</p>	399780104	WEIGHT	Used for installing front bearing cone, pilot bearing companion flange.
 <p style="text-align: center;">B3M1900</p>	899580100	INSTALLER	Used for press-fitting the front bearing cone, pilot bearing.
 <p style="text-align: center;">B3M1901</p>	899904100	STRAIGHT PIN REMOVER	Used for driving out differential pinion shaft lock pin.

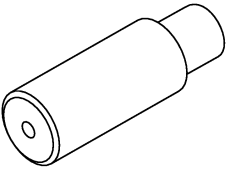
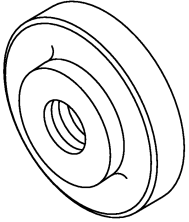
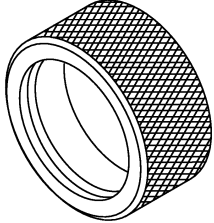
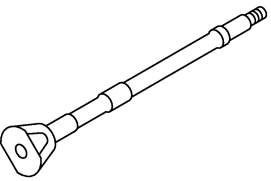
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ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p style="text-align: right; margin-right: 10px;">B3M1902</p>	498247001	MAGENT BASE	<ul style="list-style-type: none"> ● Used for measuring backlash between side gear and pinion, and hypoid gear.. ● Used with DIAL GAUGE (498247100).
 <p style="text-align: right; margin-right: 10px;">B3M1903</p>	498247100	DAIL GAUGE	<ul style="list-style-type: none"> ● Used measurng backlash between side gear and pinion, hypoid gear. ● Used with MAGNET BASE (498247001).
 <p style="text-align: right; margin-right: 10px;">B3M1904</p>	398507704	BLOCK	Used for adjusting pinion height and preload.
 <p style="text-align: right; margin-right: 10px;">B3M1905</p>	398177700	INSTALLER	<ul style="list-style-type: none"> ● Used for installing rear bearing cone. ● For T-type.

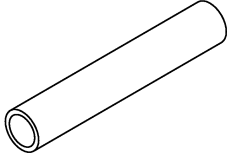
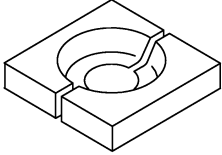
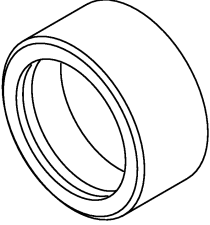
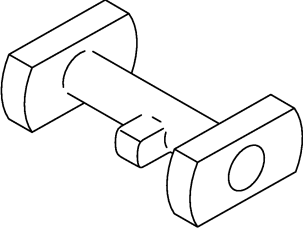
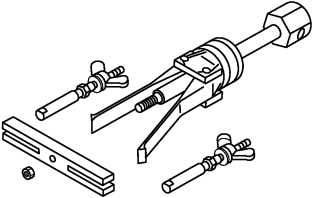
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ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p style="text-align: center;">B3M1906</p>	398457700	ATTACHMENT	<ul style="list-style-type: none"> ● Used for removing side bearing retainer. ● For T-type.
 <p style="text-align: center;">B3M1907</p>	398477703	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;">B3M1908</p>	398437700	DRIFT	<ul style="list-style-type: none"> ● Used for installing said oil seal. ● For T-type.
 <p style="text-align: center;">B3M1909</p>	398507702	DUMMY SHAFT	<ul style="list-style-type: none"> ● Used for adjusting pinion height and preload. ● For T-type.

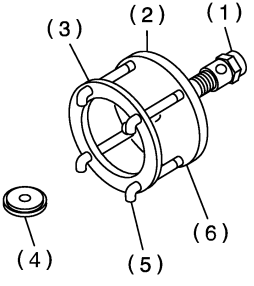
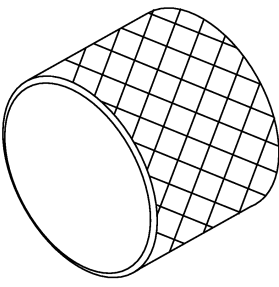
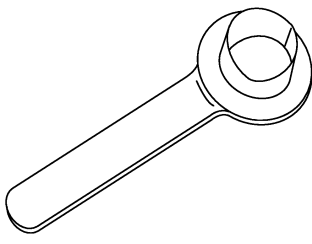
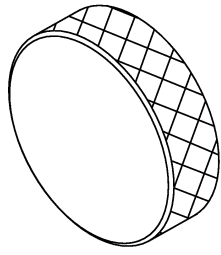
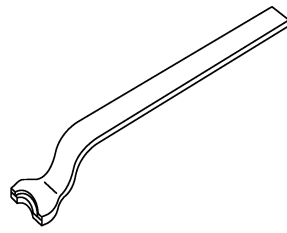
GENERAL DESCRIPTION

Differentials

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p style="text-align: center;">B3M1910</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;">B3M1911</p>	398517700	REPLACER	<ul style="list-style-type: none"> ● Used for removing rear bearing cone. ● For T-type.
 <p style="text-align: center;">B3M1912</p>	398487700	DRIFT	<ul style="list-style-type: none"> ● Used for press-fitting the side bearing cone. ● For T-type.
 <p style="text-align: center;">B3M1913</p>	398507701	GAUGE	<ul style="list-style-type: none"> ● Used for adjusting pinion height. ● For T-type.
 <p style="text-align: center;">B3M1914</p>	398527700	PULLEY ASSY	<ul style="list-style-type: none"> ● Used for removing oil seal and side bearing cup. ● For T-type.

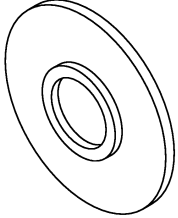
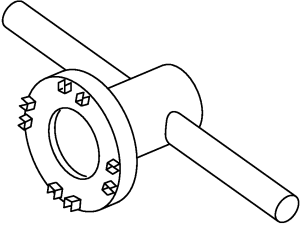
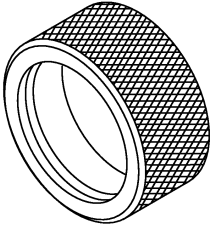
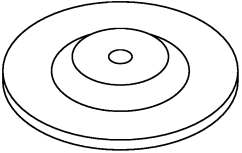
GENERAL DESCRIPTION

Differentials

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p style="text-align: center;">B3M1915A</p>	398527700	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;">B3M1916</p>	398227700	WEIGHT	<ul style="list-style-type: none"> ● Used for installing side bearing. ● For T-type.
 <p style="text-align: center;">B3M1917</p>	28099PA090	OIL SEAL PROTECTOR	<ul style="list-style-type: none"> ● Used for installing rear drive shaft into rear differential. ● For protecting oil seal. ● For T-type.
 <p style="text-align: center;">B3M1918</p>	398237700	GAUGE	<ul style="list-style-type: none"> ● Used for installing side bearing. ● For T-type.
 <p style="text-align: center;">B3M1919</p>	28099PA100	DRIVE SHAFT REMOVER	<ul style="list-style-type: none"> ● Used for removing rear drive shaft from rear differential. ● For T-type.

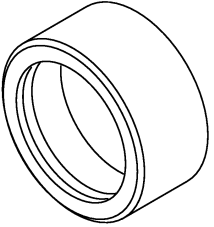
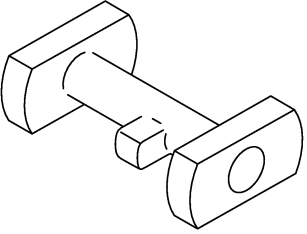
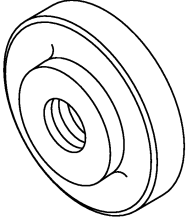
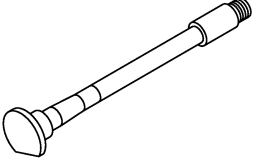
GENERAL DESCRIPTION

Differentials

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p style="text-align: center;">B3M1920</p>	498175500	INSTALLER	<ul style="list-style-type: none"> ● Used for installing rear bearing cone. ● For VA-type.
 <p style="text-align: center;">B3M1921</p>	499785500	WRENCH ASSY	<ul style="list-style-type: none"> ● Used for removing and installing side oil seal holder. ● For VA-type.
 <p style="text-align: center;">B3M1922</p>	498447100	DRIFT	<ul style="list-style-type: none"> ● Used for installing oil seal. ● For VA-type.
 <p style="text-align: center;">B3M1923</p>	399520105	SEAT	<ul style="list-style-type: none"> ● Used for removing side bearing cone. ● Used with PULLER SET (899524100). ● For VA-type.

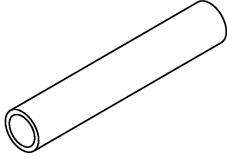
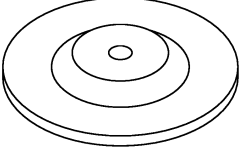
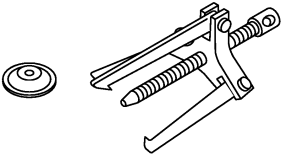
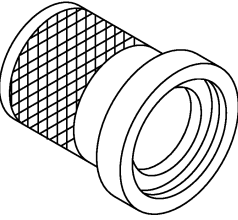
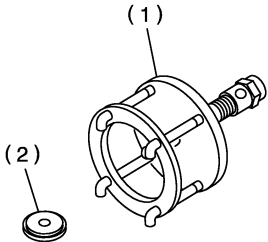
GENERAL DESCRIPTION

Differentials

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p style="text-align: right;">B3M1924</p>	498485400	DRIFT	<ul style="list-style-type: none"> ● Used for installing side bearing cone. ● For VA-type.
 <p style="text-align: right;">B3M1925</p>	498505501	GAUGE	<ul style="list-style-type: none"> ● Used for adjusting pinion height. ● For VA-type.
 <p style="text-align: right;">B3M1926</p>	498447110	BEARING OUTER RACE 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: right;">B3M1927</p>	498447150	DUMMY SHAFT	<ul style="list-style-type: none"> ● Used for adjusting pinion height and Pre-load. ● For VA-type.

GENERAL DESCRIPTION

Differentials

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p style="text-align: right;">B3M1928</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: right;">B3M1929</p>	499705404	SEAT	<ul style="list-style-type: none"> ● Used for removing side bearing race. ● Used with PULLEY ASSY (499705401). ● For VA-type.
 <p style="text-align: right;">B3M1930</p>	499705401	PULLEY ASSY	<ul style="list-style-type: none"> ● Used for removing side bearing race. ● Used with SEAT (499705404). ● For VA-type.
 <p style="text-align: right;">B3M1931</p>	899874100	INSTALLER	<ul style="list-style-type: none"> ● Used for installing companion flange. ● For VA-type.
 <p style="text-align: right;">B3M1932A</p>	899524100	DIFFERENTIAL BEARING 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 PURPOSE TOOLS S301001A1702

TOOL NAME	REMERKS
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)

DIFFERENTIAL GEAR OIL

Differentials

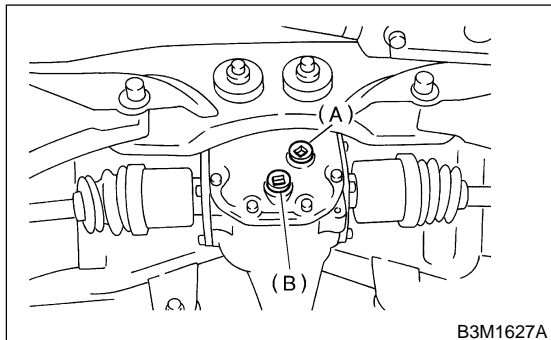
2. Differential Gear Oil S303150

A: REPLACEMENT S303150A20

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

CAUTION:

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



- (A) Filler plug
(B) Drain plug

- 4) Tighten oil drain plug.

CAUTION:

Apply fluid packing to oil drain plug.

Fluid packing:

THREE BOND 1105 or equivalent

Tightening torque:

49.0 N·m (5.0 kgf-m, 36.2 ft-lb)

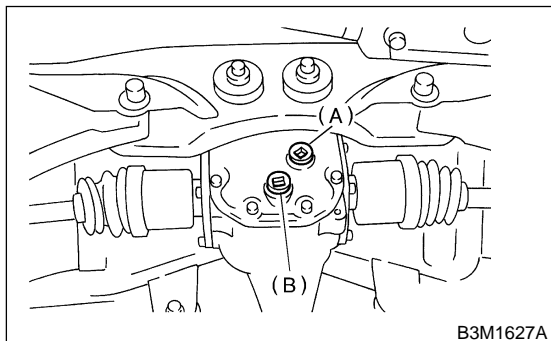
- 5) Fill differential carrier with gear oil to the upper plug level.

CAUTION:

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)



- 6) Install filler plug.

CAUTION:

Apply fluid packing to oil drain plug.

Fluid packing:

THREE BOND 1105 or equivalent

Tightening torque:

T-type;

49.0 N·m (5.0 kgf-m, 36.2 ft-lb)

VA-type;

33 N·m (3.4 kgf-m, 24.6 ft-lb)

3. Front Differential S303152

A: NOTE S303152A15

1. AT MODEL S303152A1501

Refer to AUTOMATIC TRANSMISSION in separate publication "AUTOMATIC TRANSMISSION for Front Differential.

2. MT MODEL S303152A1502

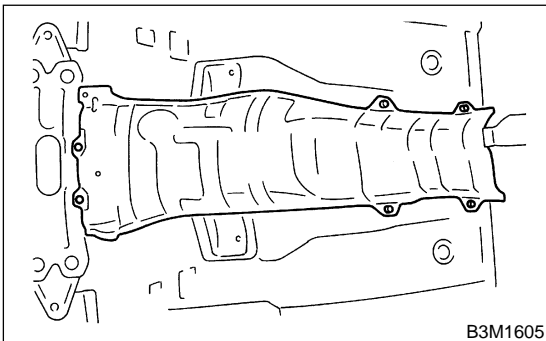
For front differential of manual transmission, refer to "MT" section.

4. Rear Differential for T-type

S303145

A: REMOVAL S303145A18

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



- 9) Remove propeller shaft.
<Ref. to DS-13 REMOVAL, Propeller Shaft.>

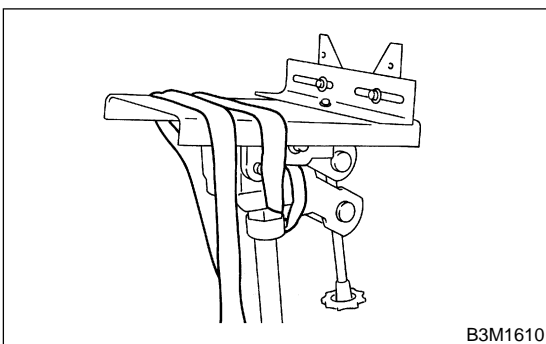
CAUTION:

When removing propeller shaft, pay attention not to damage the sliding surfaces of rear drive shaft (extension) spline, oil seal and sleeve yoke.

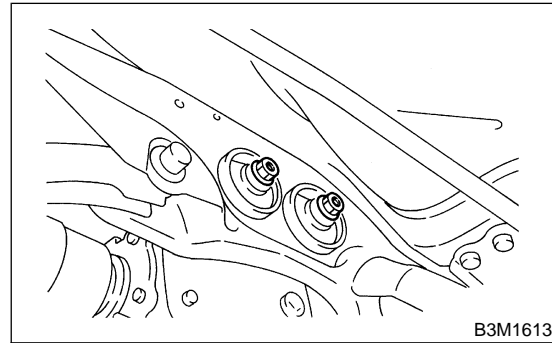
NOTE:

- Prepare an oil can and cap since the transmission oil flows out from the extension at removing propeller shaft.
- Insert the cap into the extension to prevent transmission oil from flowing out immediately after removing the propeller shaft.

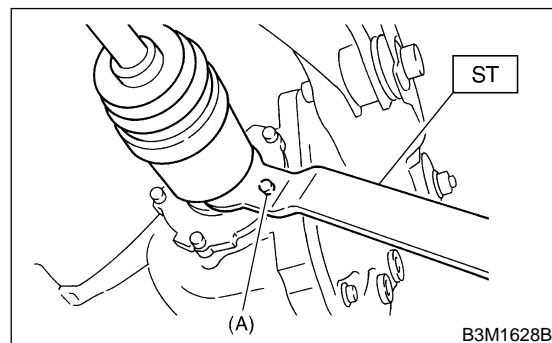
- 10) Remove rear differential protector. (if equipped)
- 11) Prepare a transmission jack and a band.



- 12) Loosen self-locking nuts connecting rear differential to rear crossmember.

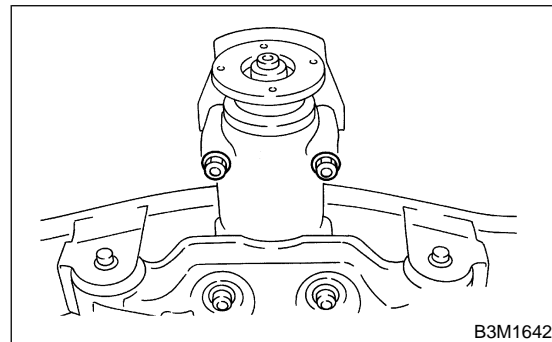


- 13) Remove DOJ of rear drive shaft from rear differential using ST.
ST 28099PA100 DRIVE SHAFT REMOVER

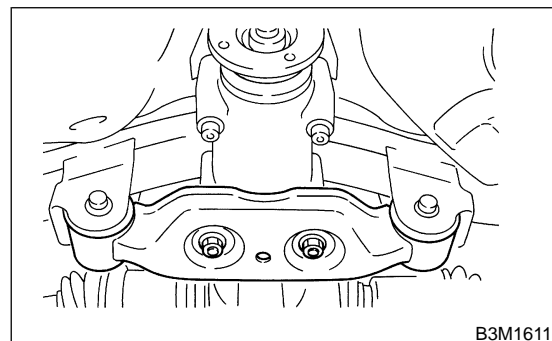


(A) Bolt

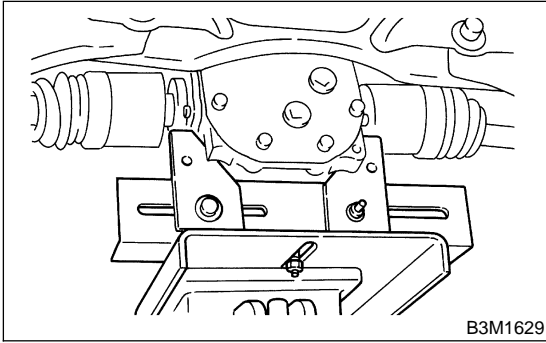
- 14) Remove protector nut.



- 15) Remove differential member.



16) Support rear differential with transmission jack.



17) Remove differential member.
18) Fix rear differential at band.

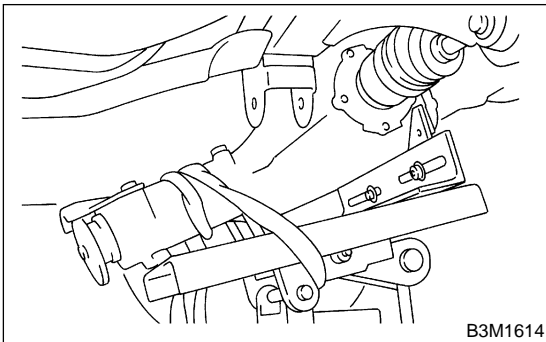
CAUTION:

Be sure to secure the rear differential on the transmission jack.

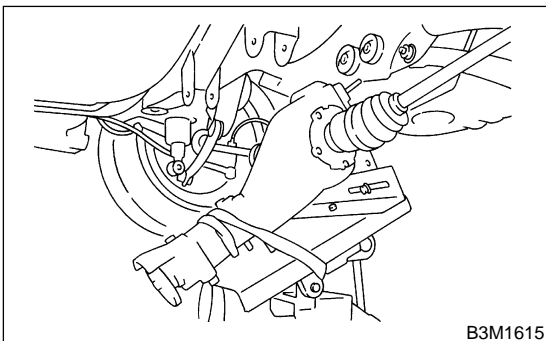
19) Remove self-locking nuts connecting rear differential to crossmember.
20) Remove rear differential stud bolt from rear crossmember bushing.

NOTE:

Carefully adjust angle and position of transmission jack and jack stand as required during stud bolt removal.



21) After removing rear differential stud bolt from rear crossmember, lower transmission jack stand. Do not allow rear drive shaft to strike lateral link bolt.

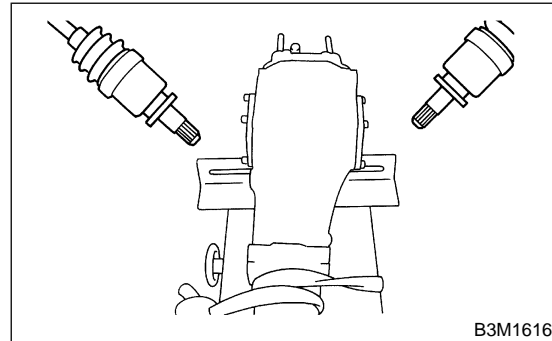


22) Pull out axle shaft from rear differential.

NOTE:

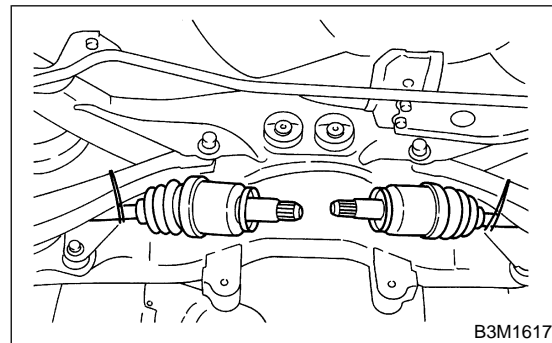
If axle shaft is difficult to remove from rear differential, use ST to remove it.

ST 28099PA100 DRIVE SHAFT REMOVER

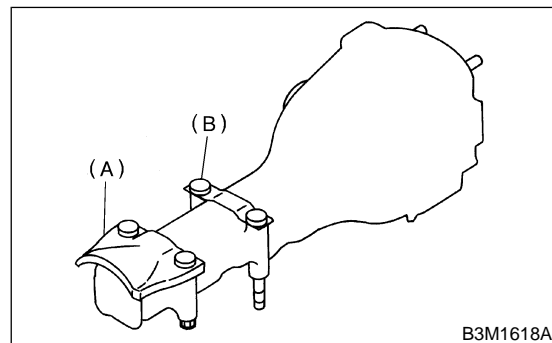


23) Take down transmission jack.

24) Secure rear drive shaft to lateral link use wire.



25) Remove protector and plate from rear differential.



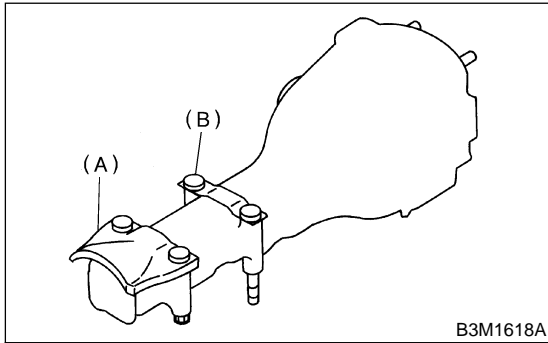
- (A) Protector
- (B) Rear differential member plate

REAR DIFFERENTIAL FOR T-TYPE

Differentials

B: INSTALLATION S303145A11

- 1) Install protector and plate to rear differential.



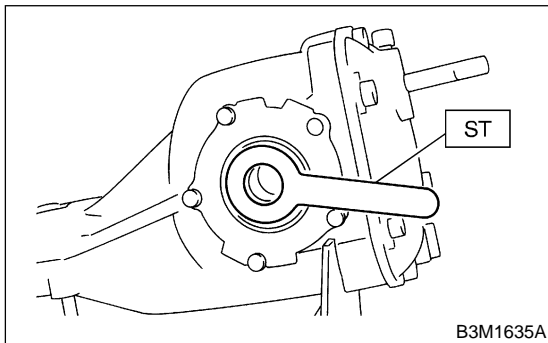
- (A) Protector
(B) Rear differential member plate

- 2) Set rear differential to transmission jack.

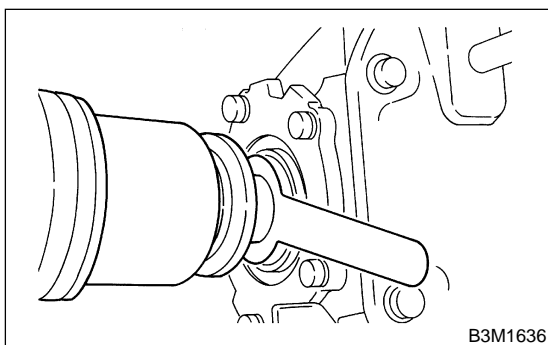
NOTE:

Secure rear differential to transmission jack using a band.

- 3) Install ST to rear differential.
ST 28099PA090 OIL SEAL PROTECTOR

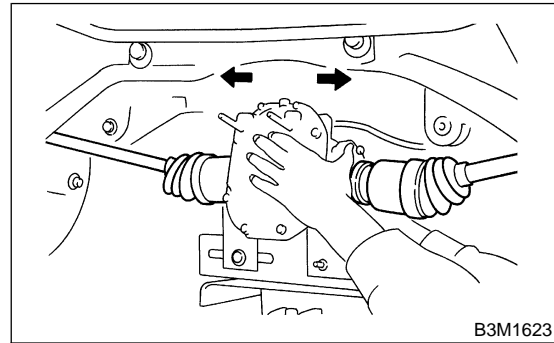


- 4) Insert the spline shaft until the spline portion is inside the side oil seal.

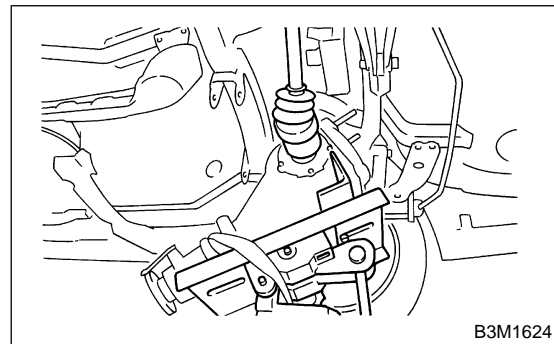


- 5) Remove ST from rear differential.
ST 28099PA090 OIL SEAL PROTECTOR

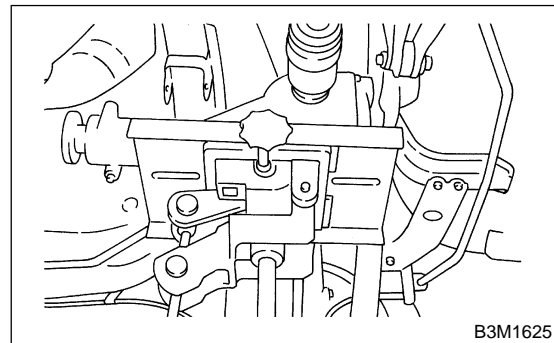
- 6) Completely insert axle shaft into rear differential by pressing rear differential.



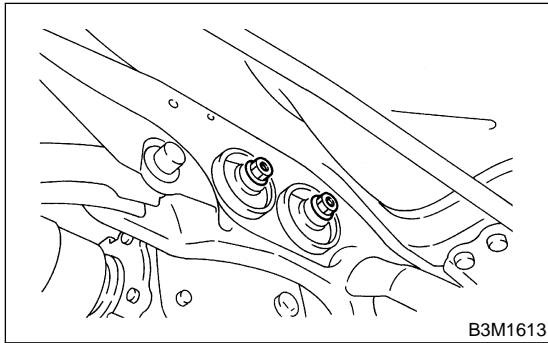
- 7) Adjust transmission jack as required so rear differential stud bolt is properly inserted into rear crossmember bushing.



- 8) After rear differential stud bolt has been inserted into rear crossmember bushing, raise transmission jack to make jack rear differential level.



9) Temporarily tighten rear crossmember self-locking nuts.



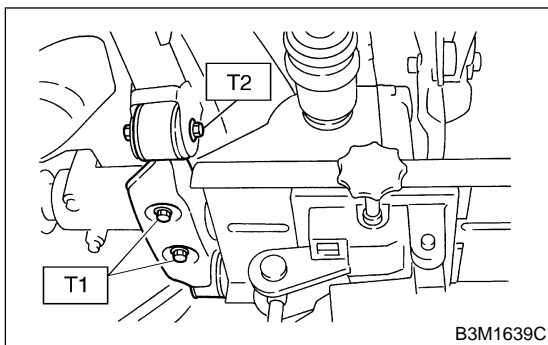
10) Remove band from rear differential. Raise rear differential just enough to move transmission jack away from it.

11) Install differential member.

Tightening torque:

T1: 65 N·m (6.6 kgf-m, 48 ft-lb)

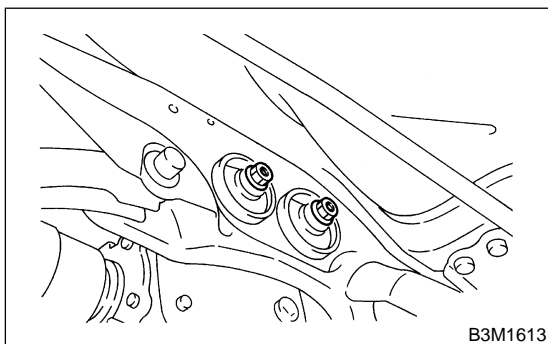
T2: 110 N·m (11.2 kgf-m, 81 ft-lb)



12) Tighten self-locking nut.

Tightening torque:

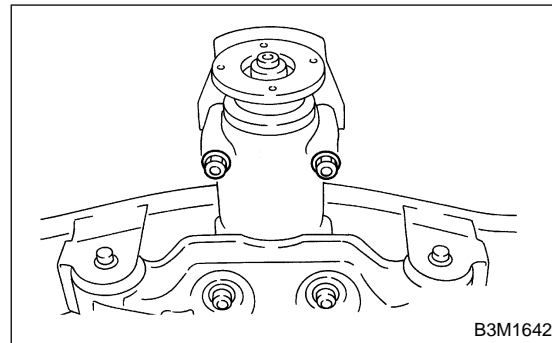
70 N·m (7.1 kgf-m, 51 ft-lb)



13) Tighten protector nut.

Tightening torque:

64 N·m (6.5 kgf-m, 47.0 ft-lb)



14) Take down transmission jack.

15) Install propeller shaft.

<Ref. to DS-14 INSTALLATION, Propeller Shaft.>

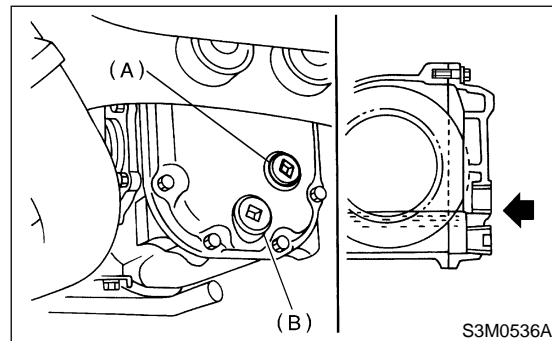
16) Install heat shield cover.

17) Install rear exhaust pipe and muffler.

18) After installing rear differential carrier on vehicle, remove filler plug and replenish gear oil up to upper level mark.

Oil capacity:

0.8 l (0.8 US qt, 0.7 Imp qt)



(A) Filler plug

(B) Drain plug

19) Tighten filler plug.

CAUTION:

Apply fluid packing to plug.

Fluid packing:

THREE BOND 1205 or equivalent

Tightening torque:

49.0 N·m (5.0 kgf-m, 36.2 ft-lb)

20) Install rear differential protector. (if equipped)

C: DISASSEMBLY S303145A06

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

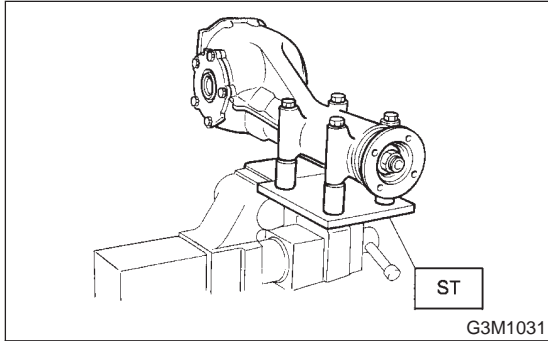
REAR DIFFERENTIAL FOR T-TYPE

Differentials

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

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

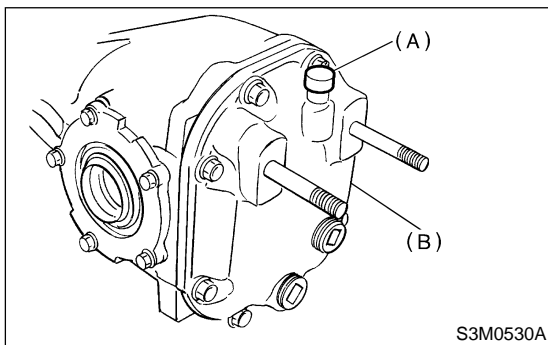
ST 398217700 ATTACHMENT



- 2) Drain gear oil by removing plug.
3) Remove the air breather cap.

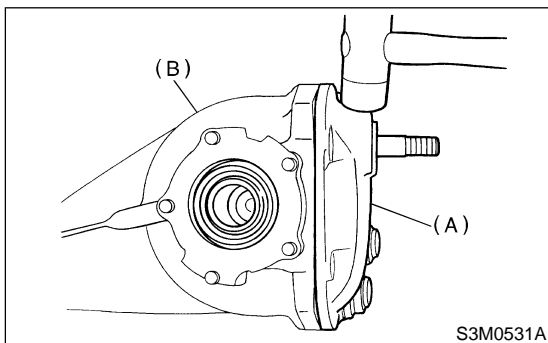
NOTE:

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



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

4) Remove rear cover by loosening retaining bolts.



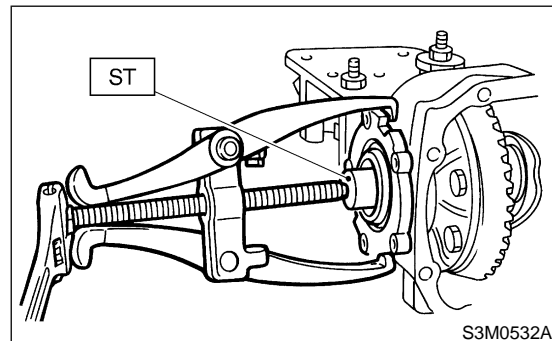
- (A) Rear cover
(B) Differential carrier

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

CAUTION:

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

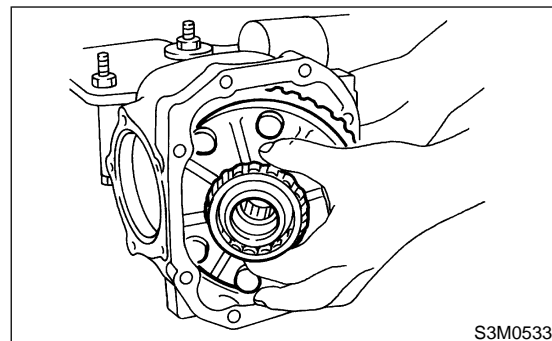
ST 398457700 ATTACHMENT



6) Pull out differential case assembly from differential carrier.

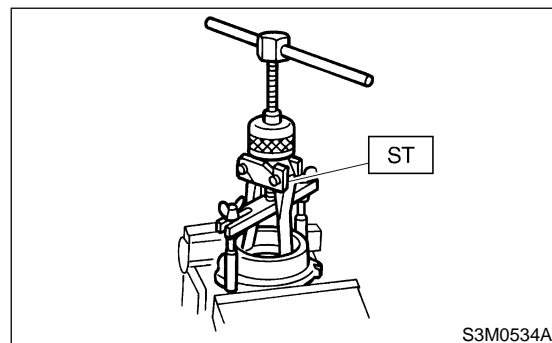
CAUTION:

Be careful not to hit the teeth against the case.



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

ST 398527700 PULLER ASSY



8) Extract bearing cone with ST.

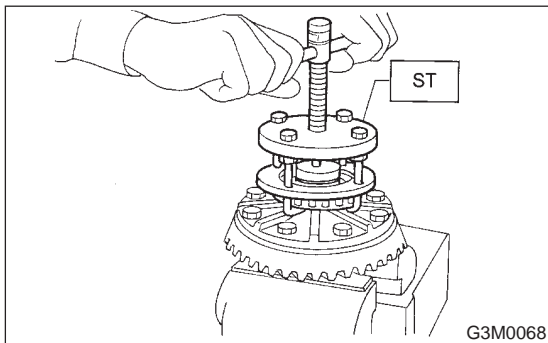
CAUTION:

Do not attempt to disassemble the parts unless necessary.

NOTE:

- Set puller so that its claws catch the edge of the bearing cone.
- Never mix up the right and left hand bearing races and cones.

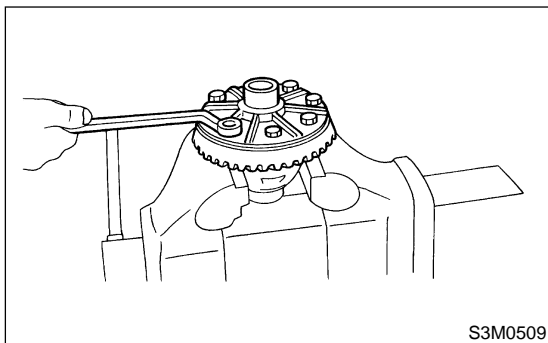
ST 399527700 PULLER SET



9) Remove crown gear by loosening crown gear bolts.

CAUTION:

Further disassembling is not allowed.

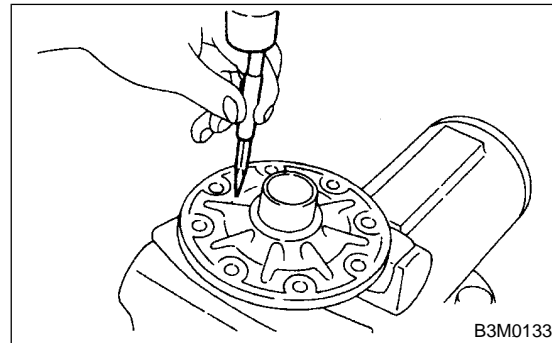


10) Drive out pinion shaft lock pin from crown gear side. (Without LSD)

NOTE:

The lock pin is staked at the pin hole end on the differential carrier; do not drive it out forcibly before unstaking it.

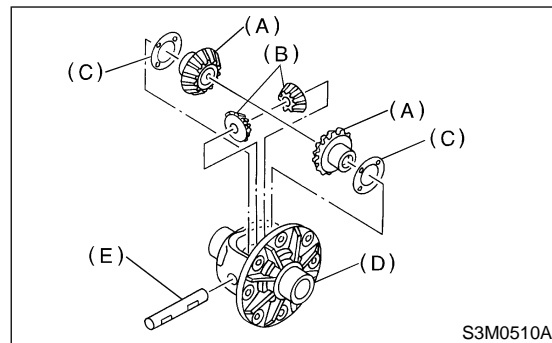
ST 899904100 STRAIGHT PIN REMOVER



11) Draw out pinion mate shaft and remove pinion mate gears, side gears and thrust washers. (Without LSD)

NOTE:

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



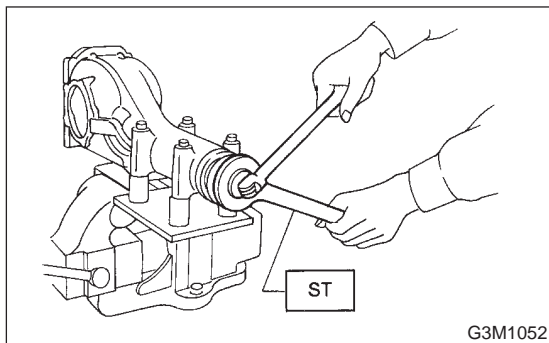
- (A) Side gear
- (B) Pinion mate gear
- (C) Thrust washer
- (D) Differential case
- (E) Pinion mate shaft

REAR DIFFERENTIAL FOR T-TYPE

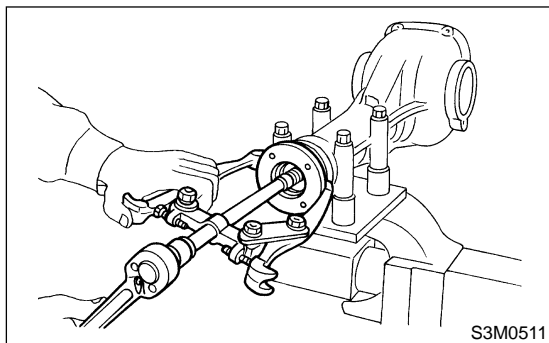
Differentials

12) Hold companion flange with ST and remove drive pinion nut.

ST 498427200 FLANGE WRENCH



13) Extract the companion flange with a puller.

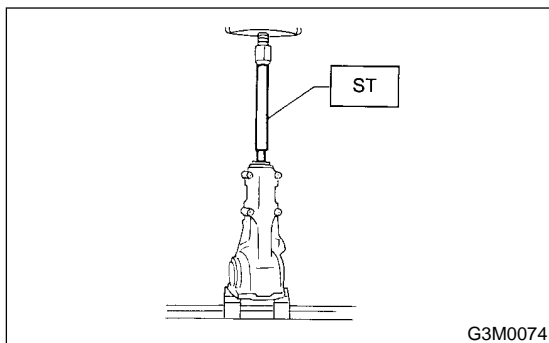


14) Press the end of drive pinion shaft and extract it together with rear bearing cone, preload adjusting spacer and washer.

NOTE:

Hold the drive pinion so as not to drop it.

ST 398467700 DRIFT

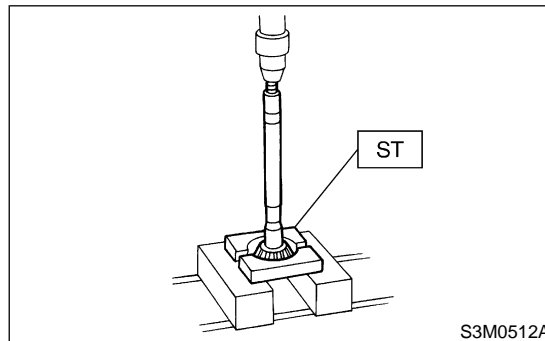


15) Remove rear bearing cone from drive pinion by supporting cone with ST.

NOTE:

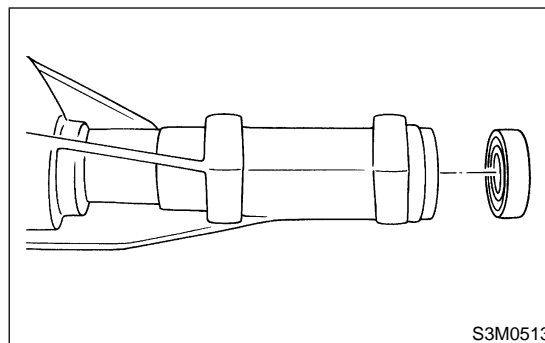
Place the replacer so that its center-recessed side faces the pinion gear.

ST 398517700 REPLACER



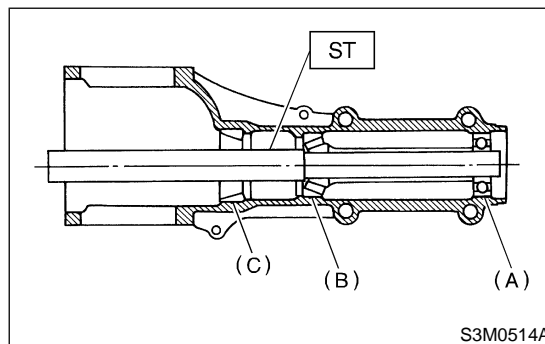
16) Remove front oil seal from differential carrier using ST.

ST 398527700 PULLER ASSY



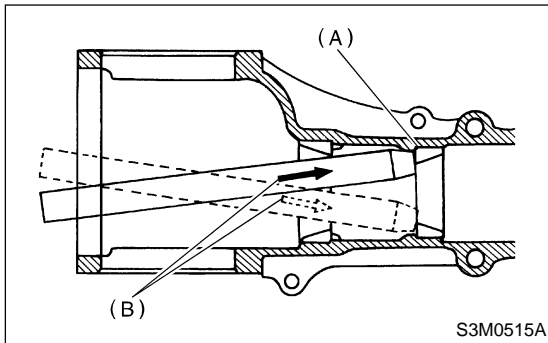
17) Remove pilot bearing together with front bearing cone using ST.

ST 398467700 DRIFT



- (A) Pinion bearing
- (B) Front bearing
- (C) Rear bearing cup

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

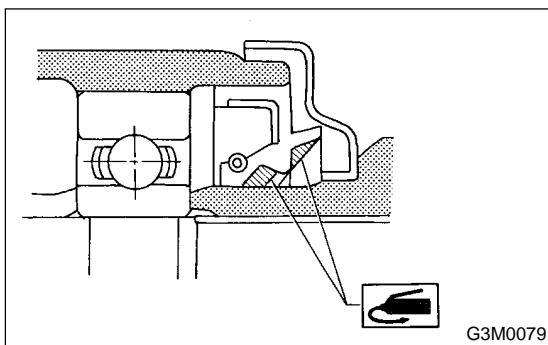


- (A) 2 cutouts along diagonal lines
- (B) Tap alternately with brass bar.

D: ASSEMBLY S303145A02

1) Precautions for assembling

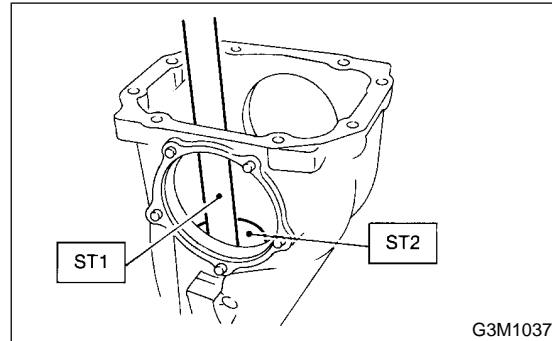
- Assemble in the reverse order of disassembling.
- Check and adjust each part during assembly.
- Keep the shims and washers in order, so that they are not misinstalled.
- Thoroughly clean the surfaces on which the shims, washers and bearings are to be installed.
- Apply gear oil when installing the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



2) Adjusting preload for front and rear bearings
Adjust the bearing preload with spacer 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 rear bearing race into differential carrier with ST1 and ST2.

- ST1 398477701 HANDLE
- ST2 398477703 DRIFT 2



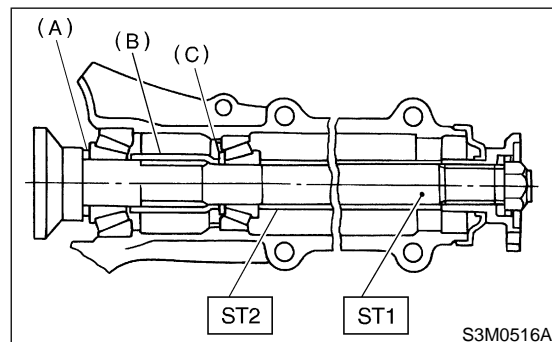
(2) Insert ST1 into carrier with pinion height adjusting washer and rear bearing cone fitted onto it.

CAUTION:

- Re-use the used washer if not deformed.
- Use a new rear bearing cone.

(3) Then install preload adjusting spacer and washer, front bearing cone, ST2, companion flange, and washer and drive pinion nut.

- ST1 398507702 DUMMY SHAFT
- ST2 398507703 DUMMY COLLAR



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

REAR DIFFERENTIAL FOR T-TYPE

Differentials

(4) Turn ST1 with hand to make it seated, and tighten drive pinion nut while measuring the preload with spring balance. Select preload adjusting washer and spacer so that the specified preload is obtained when nut is tightened to the specified torque.

CAUTION:

Use a new lock nut.

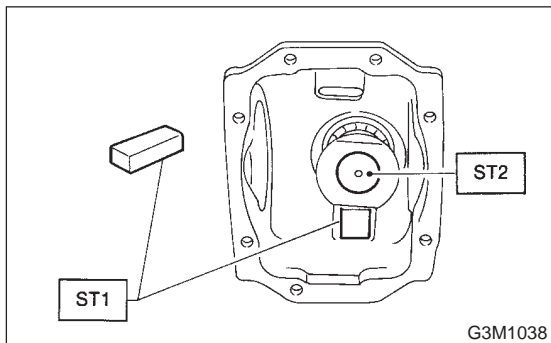
NOTE:

- Be careful not to give excessive preload.
- When tightening the drive pinion nut, lock ST1 with ST2 as shown in the figure.

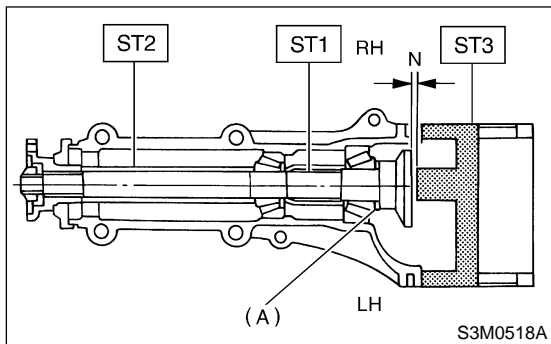
ST1 398507704 BLOCK
ST2 398507702 DUMMY SHAFT

Tightening torque:

181 N·m (18.5 kgf-m, 134 ft-lb)



Front and rear bearing preload
For new bearing: 19.6 — 28.4 N (2.0 — 2.9 kg, 4.4 — 6.4 lb) at companion flange bolt hole
For used bearing: 8.34 — 16.67 N (0.85 — 1.7 kg, 1.87 — 3.75 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 spacer	Part No.	Length mm (in)
	383695201	56.2 (2.213)
	383695202	56.4 (2.220)
	383695203	56.6 (2.228)
	383695204	56.8 (2.236)
	383695205	57.0 (2.244)
	383695206	57.2 (2.252)

3) Adjusting drive pinion height

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

- (1) Install ST1, ST2 and ST3, as shown in the figure, and apply the specified preload on the bearings.

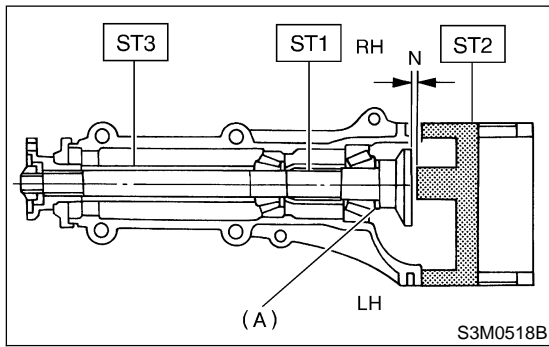
Front and rear bearing preload
For new bearing: 19.6 — 28.4 N (2.0 — 2.9 kg, 4.4 — 6.4 lb) at companion flange bolt hole
For used bearing: 8.34 — 16.67 N (0.85 — 1.7 kg, 1.87 — 3.75 lb) at companion flange bolt hole

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.

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



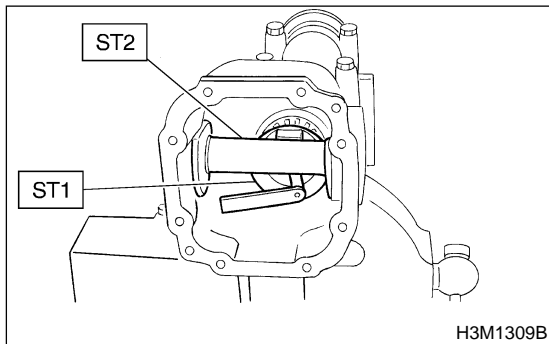
(A) Pinion height adjusting shim

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

NOTE:

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

- ST1 398507702 DUMMY SHAFT
- ST2 398507701 DIFFERENTIAL CARRIER GAUGE



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

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

NOTE:

Use copies of this page.

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

(Example of calculation)

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

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

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

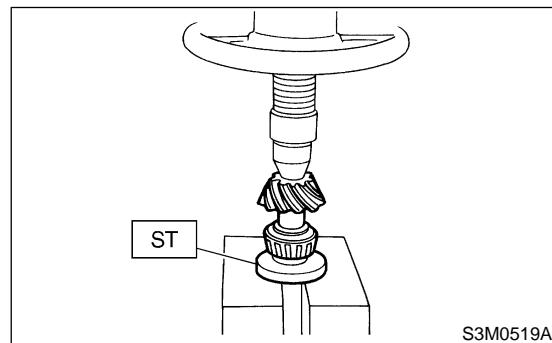
Result: Thickness = 3.42 mm

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)

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

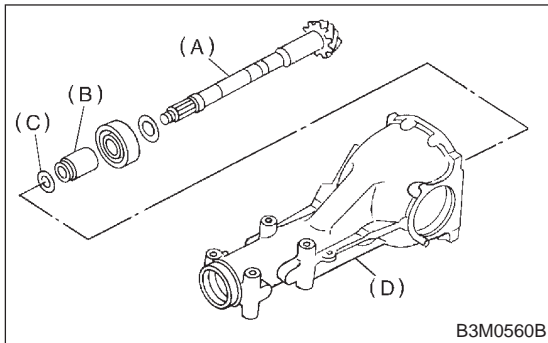
ST 398177700 INSTALLER



REAR DIFFERENTIAL FOR T-TYPE

Differentials

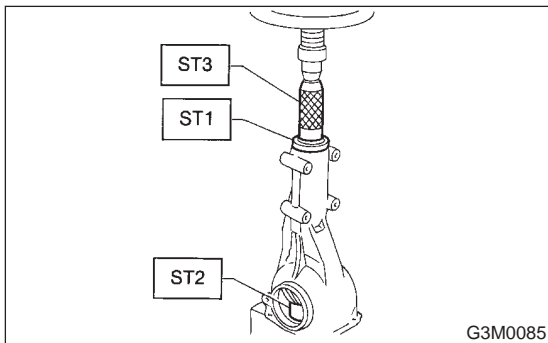
5) Insert drive pinion into differential carrier, install the previously selected bearing preload adjusting spacer and washer.



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

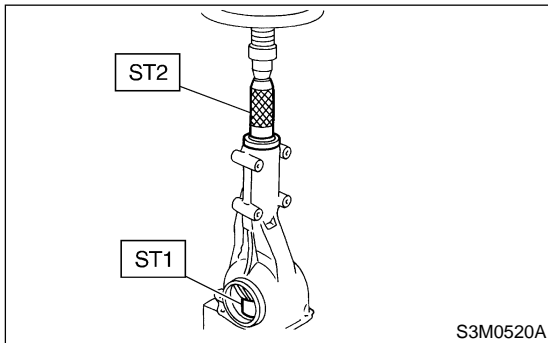
6) Press-fit front bearing cone into case with ST1, ST2 and ST3.

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



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

- ST1 399780104 WEIGHT
- ST2 899580100 INSTALLER

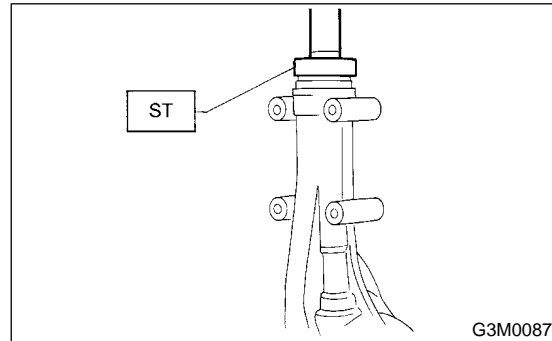


8) Fit a new oil seal with ST.

NOTE:

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

ST 498447120 OIL SEAL INSTALLER

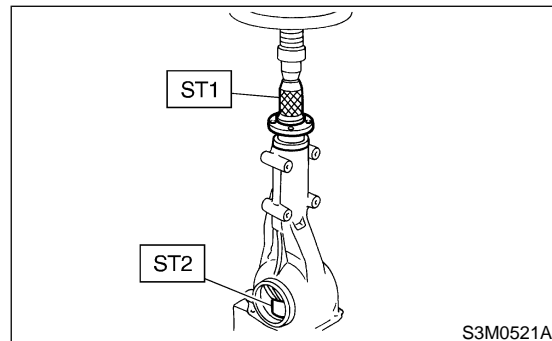


9) Press-fit companion flange with ST1 and ST2.

CAUTION:

Be careful not to damage bearing.

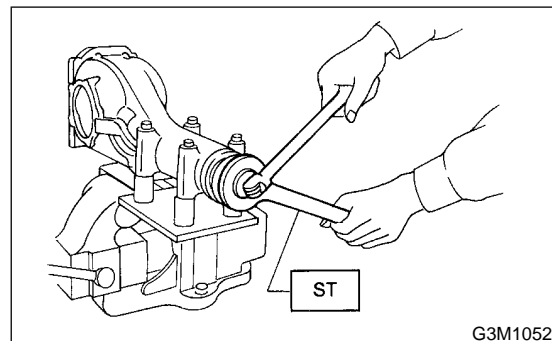
- ST1 899874100 INSTALLER
- ST2 399780104 WEIGHT



10) Install self-locking nut. Then tighten it with ST.

ST 498427200 FLANGE WRENCH

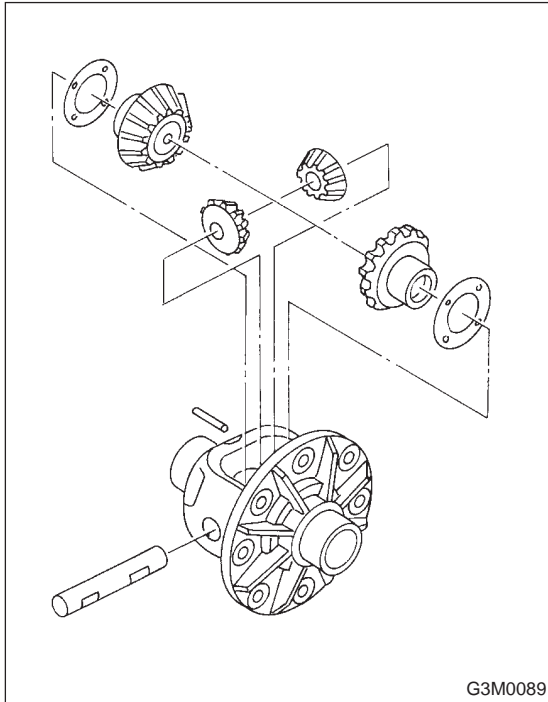
Tightening torque:
181 N-m (18.5 kgf-m, 134 ft-lb)



11) Assembling differential case
Install side gears and pinion mate gears, with their thrust washers and pinion mate shaft, into differential case. (Without LSD)

CAUTION:

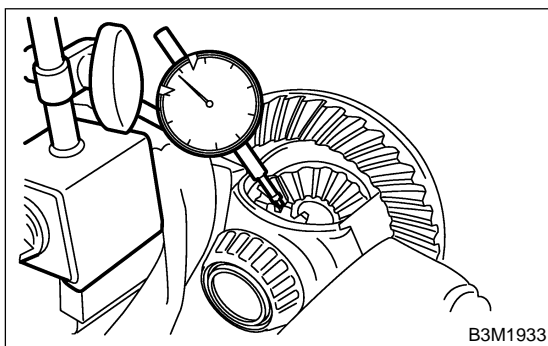
- Apply gear oil on both sides of the washer and on the side gear shaft before installing.
- Insert the pinion mate shaft into the differential case by aligning the lock pin holes.



G3M0089

(1) Measure the side gear backlash.

Side gear back clearance:
0.10 — 0.20 mm (0.0039 — 0.0079 in)



B3M1933

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

Side gear thrust washer	
Part No.	Thickness mm (in)
383445201	0.75 — 0.80 (0.0295 — 0.0315)
383445202	0.80 — 0.85 (0.0315 — 0.0335)
383445203	0.85 — 0.90 (0.0335 — 0.0354)
383445204	0.90 — 0.95 (0.0354 — 0.0374)
383445205	0.95 — 1.00 (0.0374 — 0.0394)

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

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

12) Install crown gear on differential case.

CAUTION:

Before installing bolts, apply Lock Tite to bolt threads.

Lock Tite:

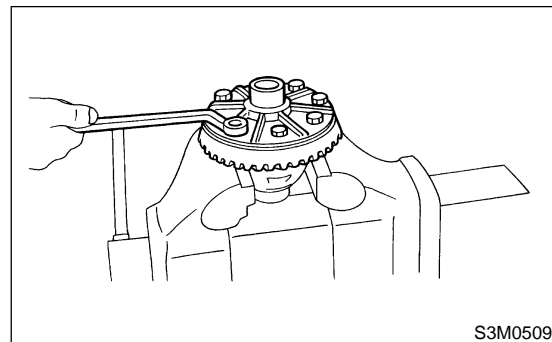
THREE BOND 1324 or equivalent

NOTE:

Tighten diagonally while tapping the bolt heads.

Tightening torque:

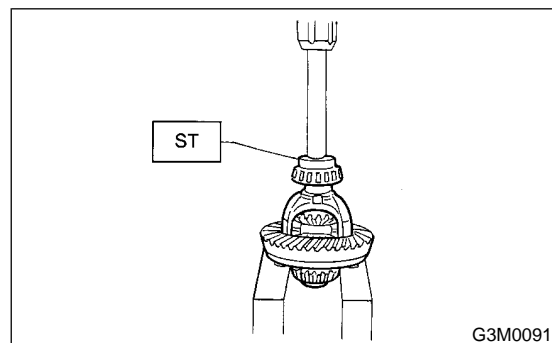
103 N·m (10.5 kgf·m, 76 ft·lb)



S3M0509

13) Press side bearing cone onto differential case with ST.

ST 398487700 DRIFT

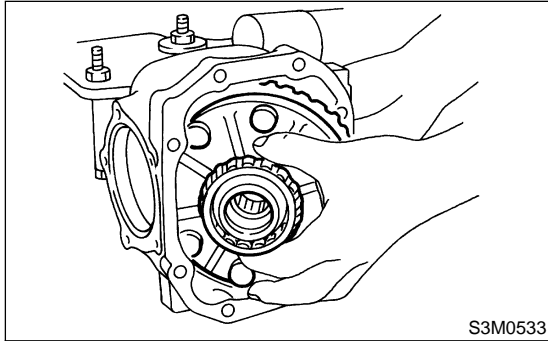


G3M0091

REAR DIFFERENTIAL FOR T-TYPE

Differentials

- 14) 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 side retainer shims and O-rings to the left and right retainers from which they were removed.

NOTE:

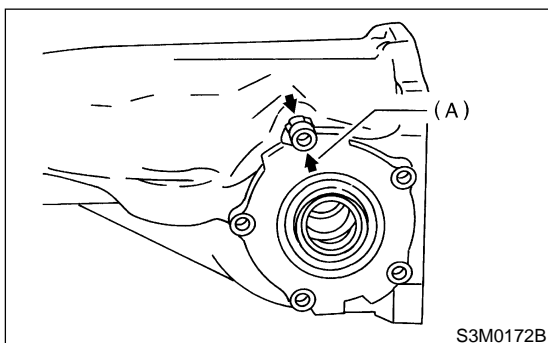
- Replace broken or cracked O-ring with new one.
- Replace broken or corroded side retainer shim with new one of same thickness.

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 arrow marked on differential carrier with that marked on side retainer during installation.

CAUTION:

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



(A) Arrow mark

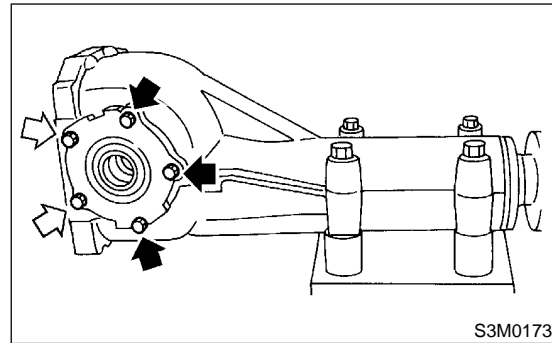
- (5) Tighten side bearing retainer bolts.

CAUTION:

Before tightening the two side bearing retainer bolts, apply Lock Tite to bolt threads.

⇒ **Lock Tite:**
THREE BOND 1105 or equivalent

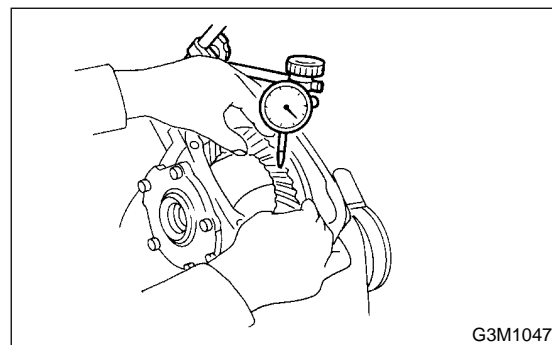
Tightening torque:
10.3 N·m (1.05 kgf-m, 7.6 ft-lb)



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

Backlash:

0.10 — 0.20 mm (0.0039 — 0.0079 in)



- (7) At the same time, measure the turning resistance of drive pinion. Compared with the resistance when differential case is not installed, if the increase of the resistance is not within the specified range, readjust side bearing retainer shims.

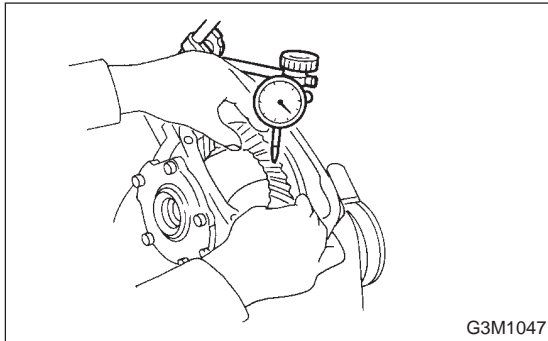
Turning resistance increase:

2.9 — 10.8 N (0.3 — 1.1 kgf, 0.7 — 2.4 lb)

15) Re-check crown gear-to-pinion backlash.

Backlash:

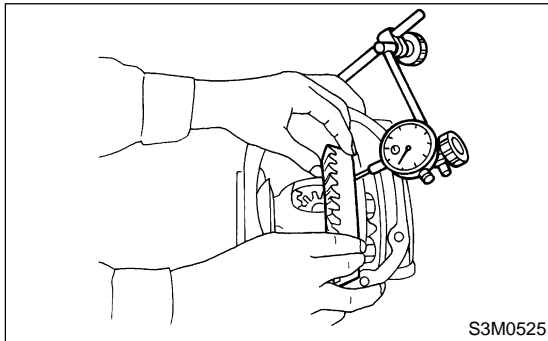
0.10 — 0.20 mm (0.0039 — 0.0079 in)



16) Check the crown gear runout on its back surface, and make sure pinion and crown gear rotate smoothly.

Limit of runout:

Less than 0.05 mm (0.0020 in)



17) Checking and adjusting tooth contact of crown gear

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

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

NOTE:

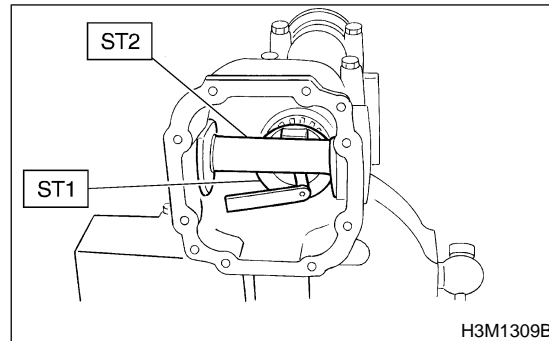
Be sure to wipe off red lead completely after adjustment is completed.

18) If proper tooth contact is not obtained, once again adjust the drive pinion height 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



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

Where:

T = Thickness of pinion height adjusting shim (mm)

To = Thickness of shim temporarily inserted (mm)

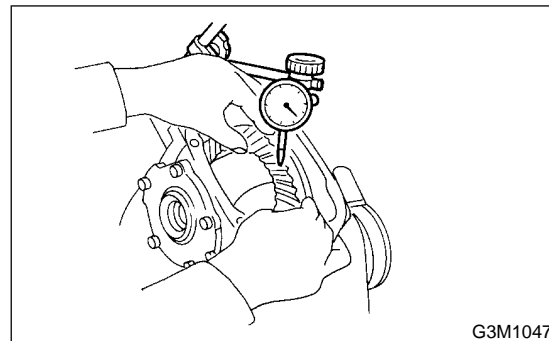
N = Reading of thickness gauge (mm)

H = Figure marked on drive pinion head

(2) Hypoid gear backlash

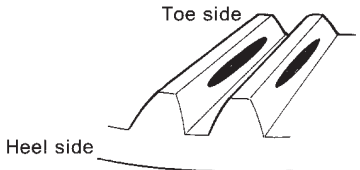
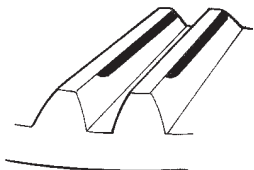
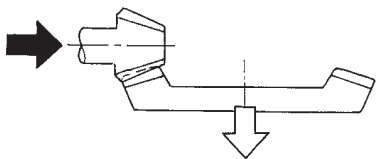
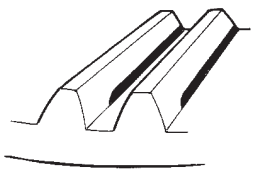
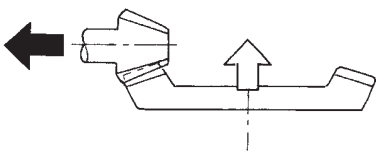
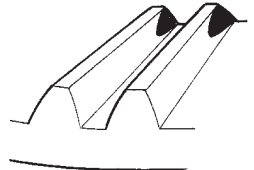
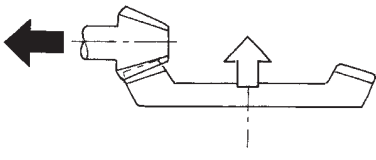
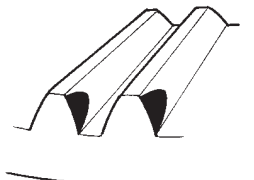
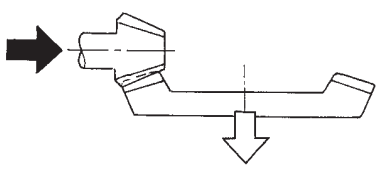
Backlash:



0.10 — 0.20 mm (0.0039 — 0.0079 in)



REAR DIFFERENTIAL FOR T-TYPE

Differentials

TOOTH CONTACT PATTERN		
Condition	Contact pattern	Adjustment
<p>Correct tooth contact</p> <p>Tooth contact pattern slightly shifted towards toe under no load rotation. (When loaded, contact pattern moves toward heel.)</p>	<p>Toe side</p>  <p>Heel side</p> <p>G3M0098A</p>	<p>—</p>
<p>Face contact</p> <p>Backlash is too large.</p>	<p>This may cause noise and chipping at tooth ends.</p>  <p>G3M0098B</p>	<p>Increase thickness of drive pinion height adjusting shim in order to bring drive pinion closer to crown gear center.</p>  <p>G3M0098F</p>
<p>Flank contact</p> <p>Backlash is too small.</p>	<p>This may cause noise and stepped wear on surfaces.</p>  <p>G3M0098C</p>	<p>Reduce thickness of drive pinion height adjusting shim in order to move drive pinion away from crown gear center.</p>  <p>G3M0098G</p>
<p>Toe contact</p> <p>Contact area is small.</p>	<p>This may cause chipping at toe ends.</p>  <p>G3M0098D</p>	<p>Adjust as for flank contact.</p>  <p>G3M0098G</p>
<p>Heel contact</p> <p>Contact area is small.</p>	<p>This may cause chipping at heel ends.</p>  <p>G3M0098E</p>	<p>Adjust as for face contact.</p>  <p>G3M0098F</p>

 : Adjusting direction of drive pinion
 : Adjusting direction of crown gear

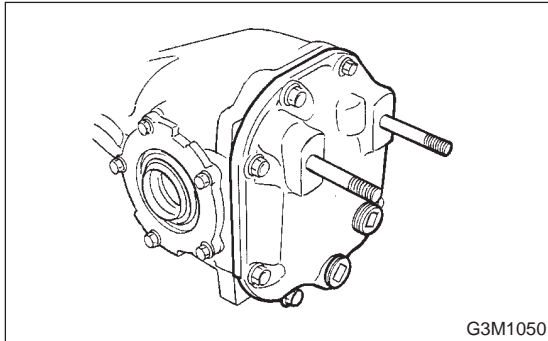
19) Install rear cover and tighten bolts to specified torque.

CAUTION:

Securely connect ground terminal of rear differential temperature sensor.

Tightening torque:

29 N·m (3.0 kgf·m, 21.7 ft·lb)



E: INSPECTION

S303145A10

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

1) Crown 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.

- 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) Side gear and pinion mate gear

- Replace if crack, score, or other defects are evident on tooth surface.

- Replace if thrust washer contacting surface is worn or seized. Slight damage of the surface can be corrected by oil stone or the like.

3) Bearing

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

4) Thrust washers of side gear and pinion mate gear

Replace if seizure, flaw, abnormal wear or other defect is evident.

5) Oil seal

Replace if deformed or damaged, and at every disassembling.

6) Differential carrier

Replace if the bearing bores are worn or damaged.

7) Differential case

Replace if its sliding surfaces are worn or cracked.

8) Companion flange

Replace if the oil seal lip contacting surfaces have flaws.

1. SIDE GEAR BACKLASH

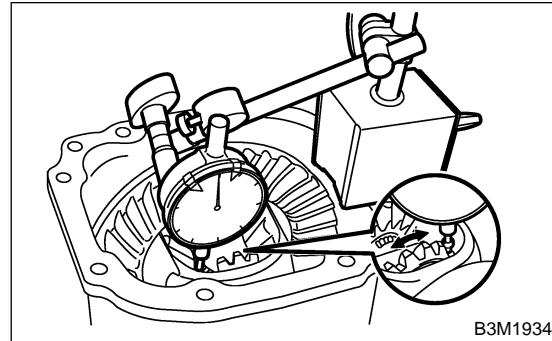
S303145A1001

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

Side gear backlash:

0.1 — 0.2 mm (0.004 — 0.008 in)

If side gear backlash is not within the specification, adjust clearance as specified by selecting side gear thrust washer.



2. CROWN GEAR BACKLASH

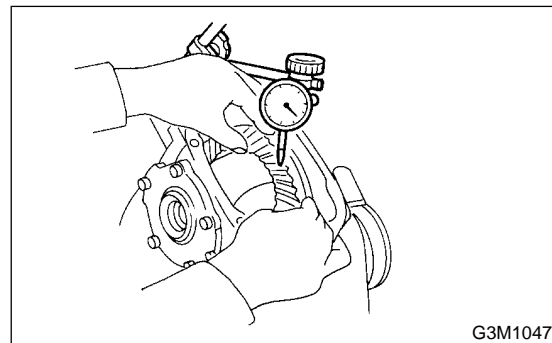
S303145A1002

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

Crown gear backlash:

0.1 — 0.2 mm (0.004 — 0.008 in)

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



REAR DIFFERENTIAL FOR T-TYPE

Differentials

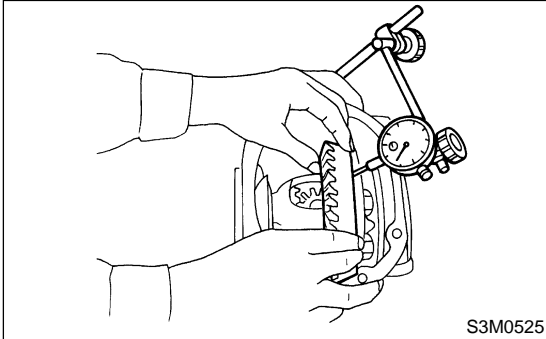
3. CROWN GEAR RUNOUT S303145A1003

Using a dial gauge, check the crown gear runout.

Crown gear runout:

Less than 0.05 mm (0.0020 in)

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



4. TOOTH CONTACT BETWEEN CROWN GEAR AND DRIVE PINION S303145A1004

Inspect tooth contact between crown gear and driven pinion. <Ref. to DI-31 ASSEMBLY, Differential for T-type.>

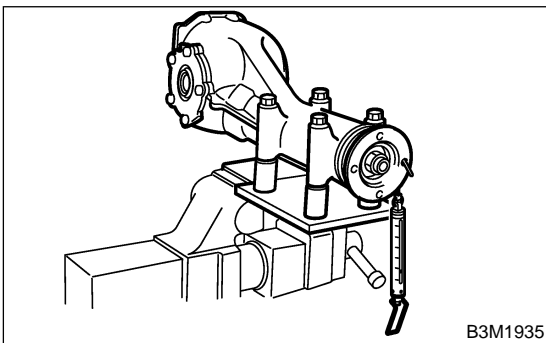
5. TOTAL PRELOAD S303145A1005

Using a gauge, check the turning resistance increase.

Total preload:

2.9 — 10.8 N (0.3 — 1.1 kg, 0.7 — 2.4 lb)

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



F: ADJUSTMENT S303145A01

1. SIDE GEAR BACKLASH A303145A0101

Adjust side gear backlash.
<Ref. to DI-31 ASSEMBLY, Differential for T-type.>

2. CROWN GEAR BACKLASH A303145A0102

Adjust crown gear backlash.
<Ref. to DI-31 ASSEMBLY, Differential for T-type.>

3. TOOTH CONTACT BETWEEN CROWN GEAR AND DRIVE PINION A303145A0103

Adjust the tooth contact between crown gear and drive pinion gear.
<Ref. to DI-31 ASSEMBLY, Differential for T-type.>

4. TOTAL PRELOAD A303145A0104

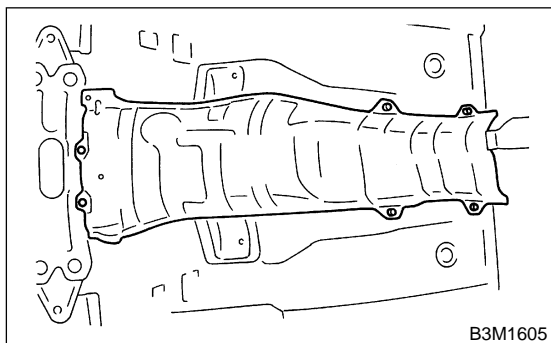
Adjust side bearing shim.
<Ref. to DI-31 ASSEMBLY, Differential for T-type.>

5. Rear Differential for VA-type

S303151

A: REMOVAL S303151A18

- 1) Disconnect ground terminal from battery.
- 2) Move select lever or gear shift lever to "N".
- 3) Loosen wheel nuts.
- 4) Release the parking brake.
- 5) Jack-up vehicle and support it with sturdy racks.
- 6) Remove wheels.
- 7) Remove center exhaust pipes.
- 8) Remove rear exhaust pipe and muffler.
- 9) Remove heat shield cover.



- 10) Remove propeller shaft.
<Ref. to DS-13 REMOVAL, Propeller Shaft.>

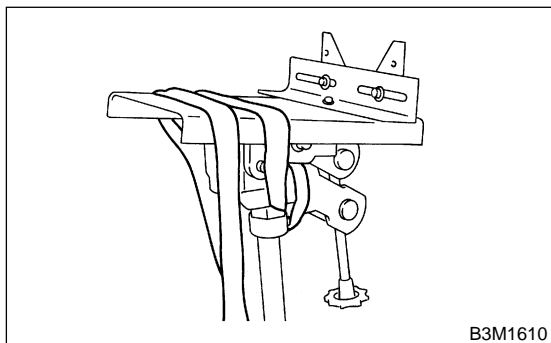
CAUTION:

When removing propeller shaft, pay attention not to damage the sliding surfaces of rear drive shaft (extension) spline, oil seal and sleeve yoke.

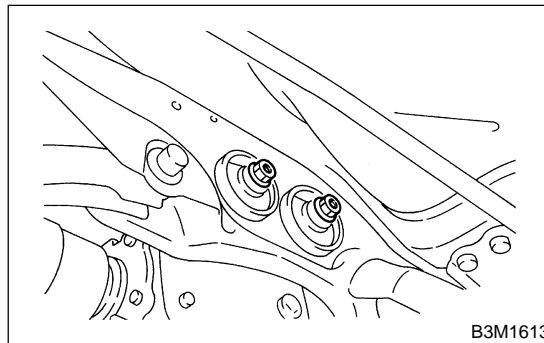
NOTE:

- Prepare an oil can and cap since the transmission oil flows out from the extension at removing propeller shaft.
- Insert the cap into the extension to prevent transmission oil from flowing out immediately after removing the propeller shaft.

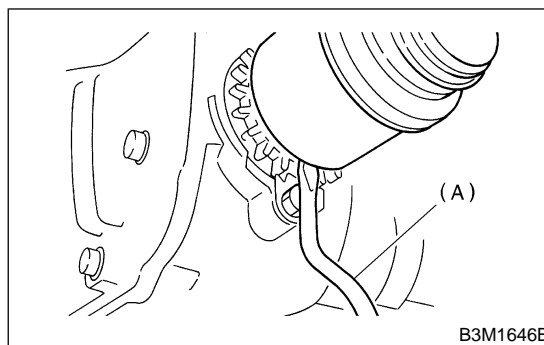
- 11) Prepare a transmission jack and a band.



- 12) Loosen self-locking nuts connecting rear differential to rear crossmember.

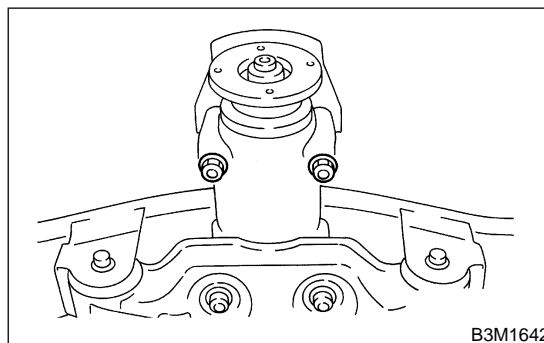


- 13) Remove DOJ of rear drive shaft from rear differential.

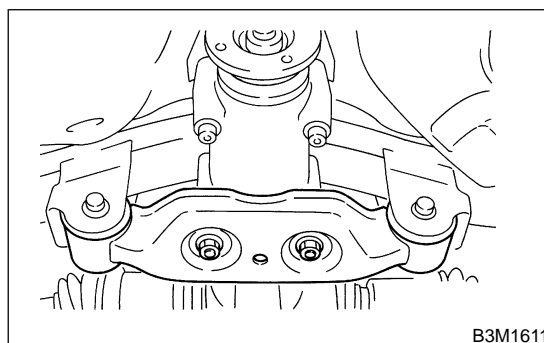


(A) Tire lever

- 14) Remove protector nut.



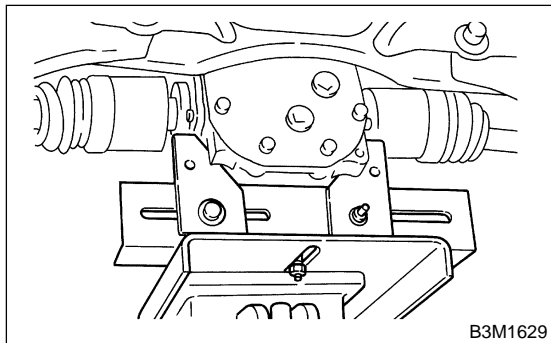
- 15) Remove nuts which secure differential member.



REAR DIFFERENTIAL FOR VA-TYPE

Differentials

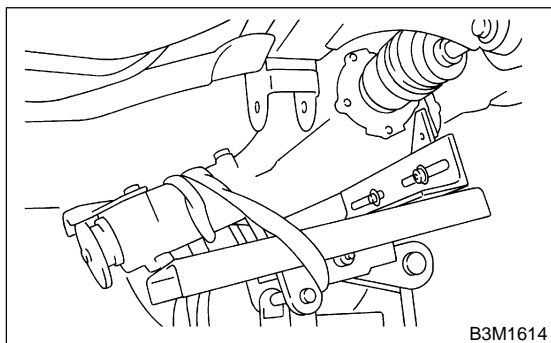
16) Support rear differential with transmission jack.



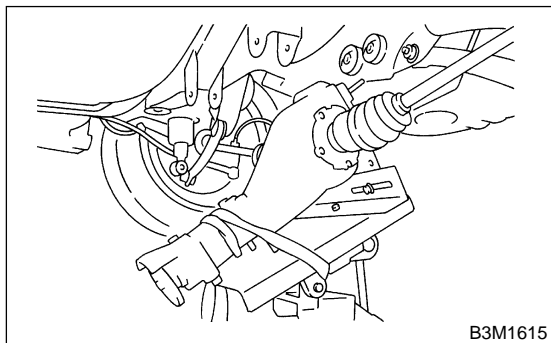
- 17) Remove differential member.
- 18) Fix rear differential at band.
- 19) Remove self-locking nuts connecting rear differential to rear crossmember.
- 20) Remove rear differential stud bolt from rear crossmember bushing.

NOTE:

Carefully adjust angle and position of transmission jack and jack stand as required during stud bolt removal.



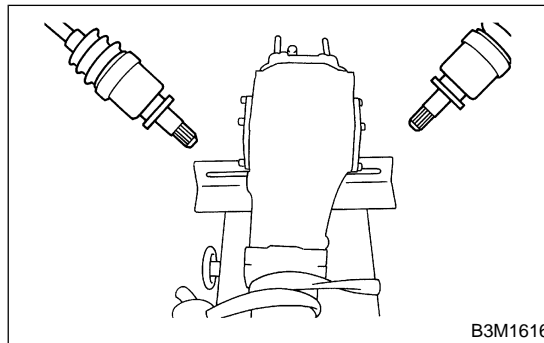
21) After removing rear differential stud bolt from rear crossmember, lower transmission jack stand. Do not allow rear drive shaft to strike lateral link bolt.



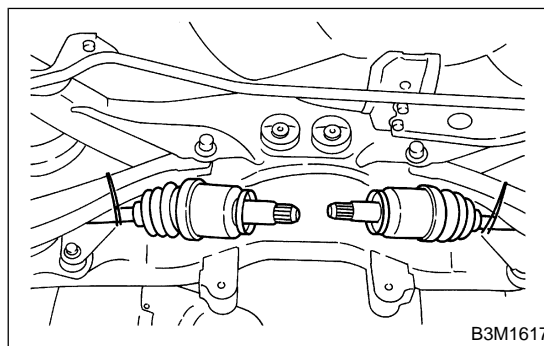
22) Pull out axle shaft from rear differential.

NOTE:

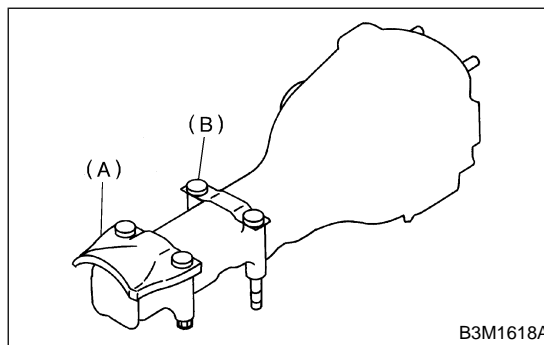
If axle shaft is difficult to remove from rear differential, use a tire lever to remove it.



- 23) Take down transmission jack.
- 24) Secure rear drive shaft to lateral link using wire.



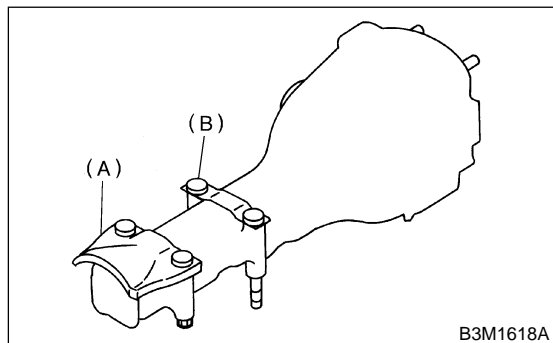
25) Remove protector and plate from rear differential.



- (A) Protector
- (B) Rear differential member plate

B: INSTALLATION S303151A11

1) Insert protector and plate to rear differential.



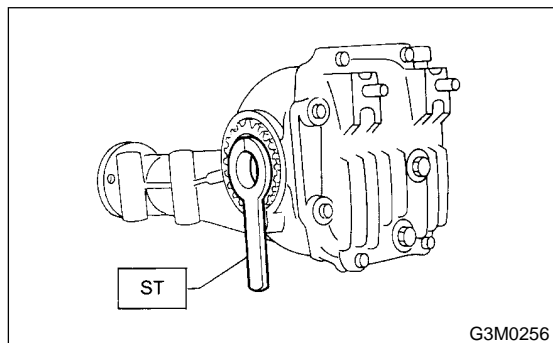
- (A) Protector
- (B) Rear differential member plate

2) Set rear differential to transmission jack.

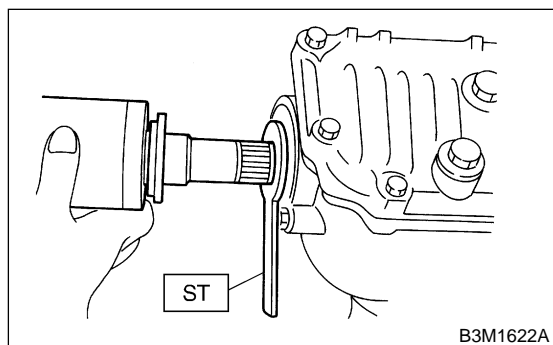
NOTE:

Secure rear differential to transmission jack using a band.

3) Install ST to rear differential.
ST 28099PA090 OIL SEAL PROTECTOR

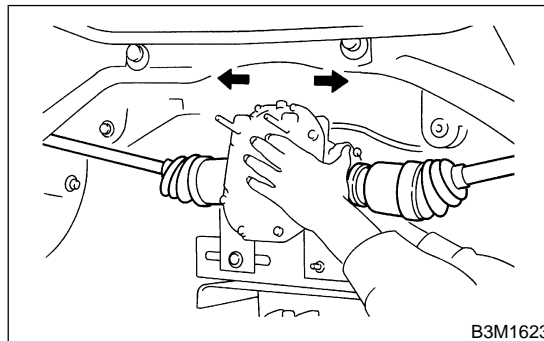


4) Insert the spline shaft until the spline portion is inside the side oil seal.

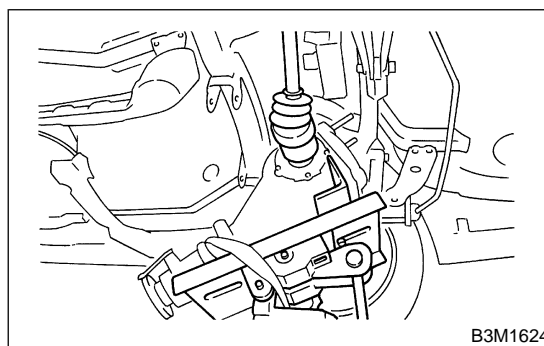


5) Remove ST from rear differential.
ST 28099PA090 OIL SEAL PROTECTOR

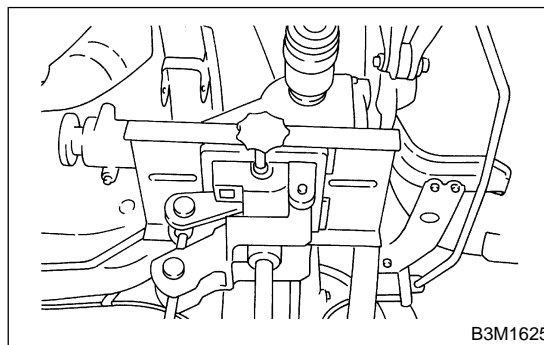
6) Completely insert axle shaft into rear differential by pressing rear differential.



7) Adjust transmission jack as required so rear differential stud bolt is properly inserted into rear crossmember bushing.



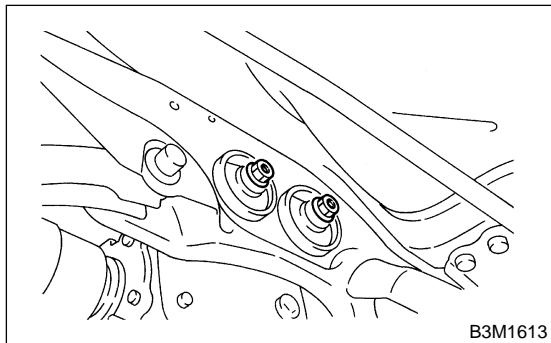
8) After rear differential stud bolt has been inserted into rear crossmember bushing, raise transmission jack to make jack rear differential level.



REAR DIFFERENTIAL FOR VA-TYPE

Differentials

9) Temporarily tighten rear crossmember self-locking nuts.



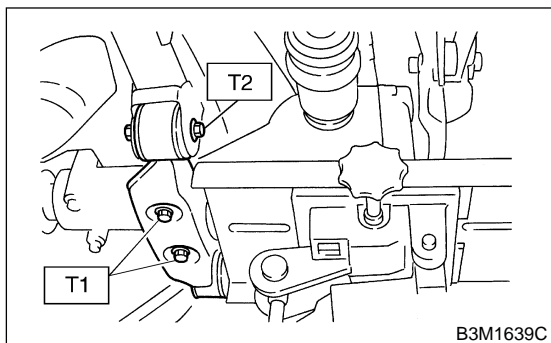
10) Remove band from rear differential. Raise rear differential just enough to move transmission jack away from it.

11) Install differential member.

Tightening torque:

T1: 65 N·m (6.6 kgf-m, 48 ft-lb)

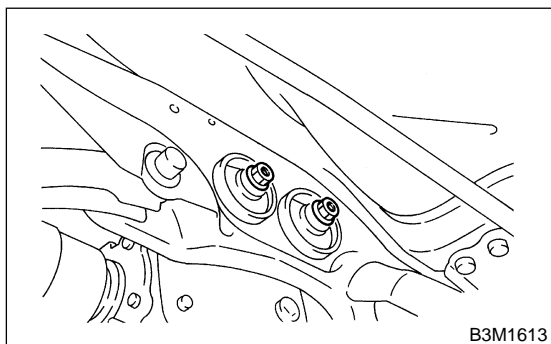
T2: 110 N·m (11.2 kgf-m, 81 ft-lb)



12) Tighten self-locking nut.

Tightening torque:

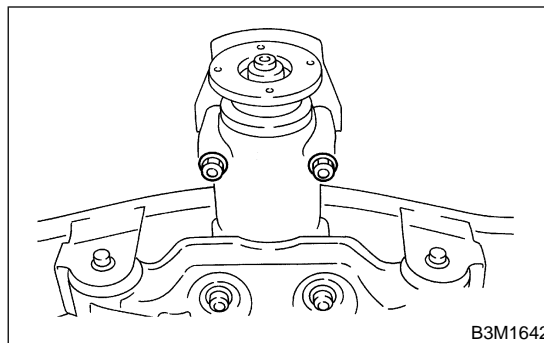
70 N·m (7.1 kgf-m, 51 ft-lb)



13) Tighten protector nut.

Tightening torque:

64 N·m (6.5 kgf-m, 47.0 ft-lb)



14) Take down transmission jack.

15) Install propeller shaft.

<Ref. to DS-14 INSTALLATION, Propeller Shaft.>

16) Install heat shield cover.

17) Install rear exhaust pipe and muffler.

C: DISASSEMBLY S303151A06

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

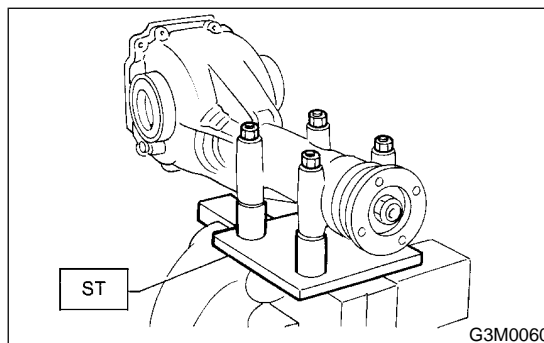
- Tooth contact of crown gear and pinion, and backlash

- Runout of crown gear at its back surface

- Turning resistance of drive pinion

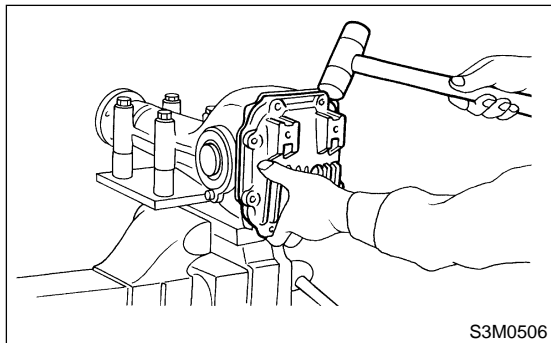
1) Set ST on vise and install the differential assembly to ST.

ST 398217700 ATTACHMENT



2) Drain gear oil by removing plug.

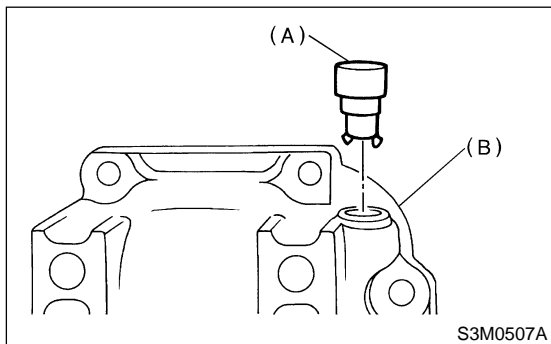
3) Remove rear cover by loosening retaining bolts.



4) Replace air breather cap.

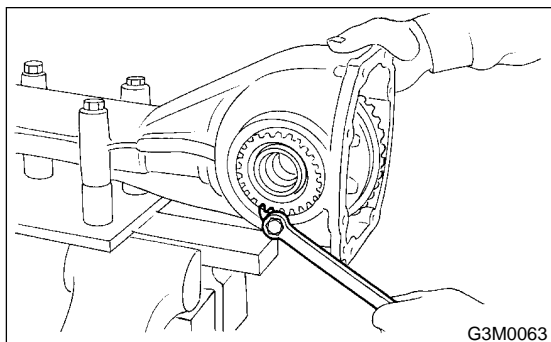
NOTE:

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

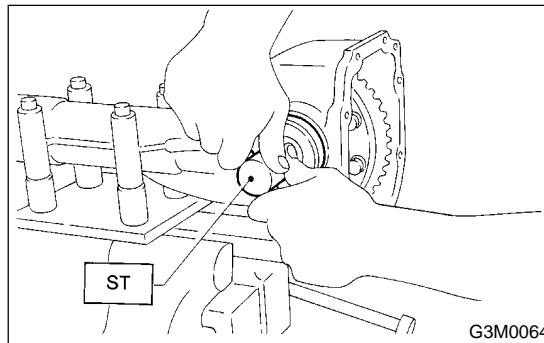


- (A) Air breather cap
- (B) Rear cover

5) Remove right and left lock plates.



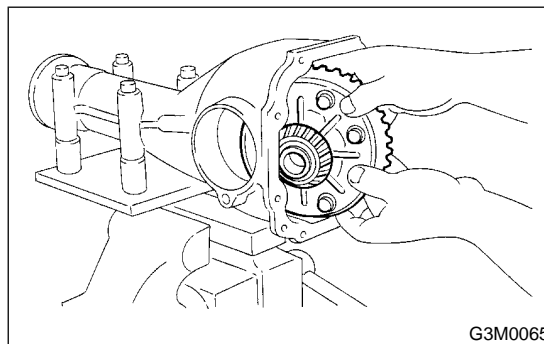
6) Remove right and left holders with ST.
ST 399780111 WRENCH



7) Pull out differential assembly from differential case.

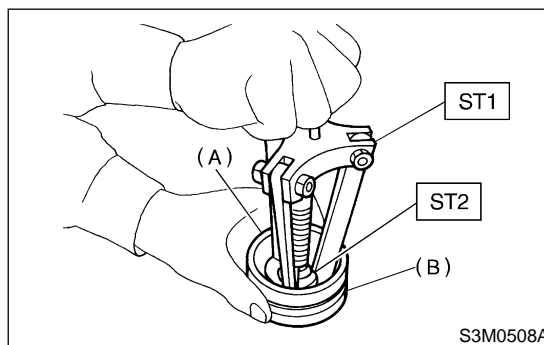
CAUTION:

Be careful not to hit the teeth against the case.



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

- ST1 499705401 BEARING OUTER RACE PULLER ASSY
- ST2 499705404 OUTER RACE PULLER SEAT



- (A) Bearing race
- (B) Holder

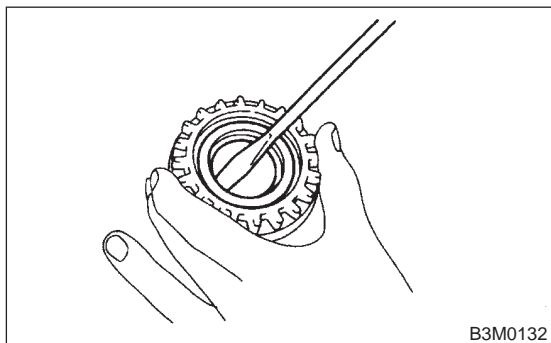
REAR DIFFERENTIAL FOR VA-TYPE

Differentials

9) Remove oil seal from right and left holders with screwdriver.

CAUTION:

Perform this operation only when changing oil seal.



10) Extract bearing cone with ST1 and ST2.

CAUTION:

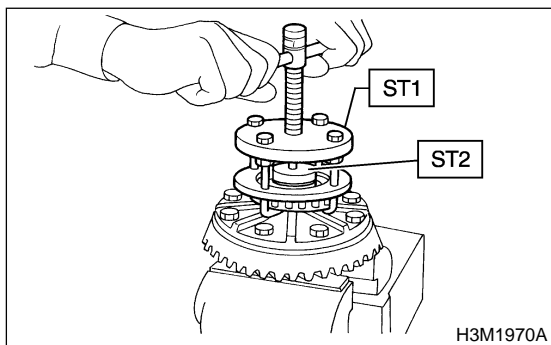
Do not attempt to disassemble the parts unless necessary.

NOTE:

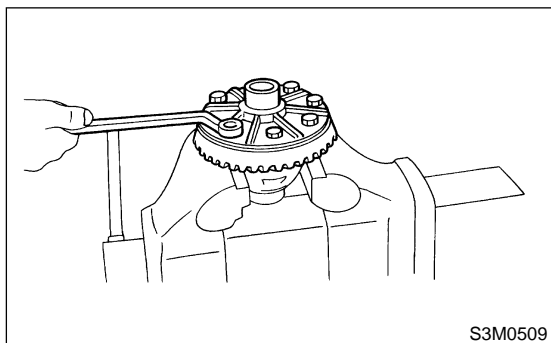
- Set Puller so that its claws catch the edge of the bearing cone.
- Never mix up the right and left hand bearing races and cones.

ST1 899524100 PULLER SET

ST2 399520105 SEAT



11) Remove crown gear by loosening crown gear bolts.

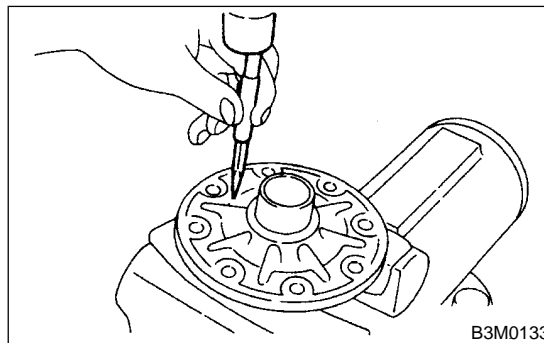


12) Drive out pinion shaft lock pin from crown gear side.

NOTE:

The lock pin is staked at the pin hole end on the differential case; do not drive it out forcibly before unstaking it.

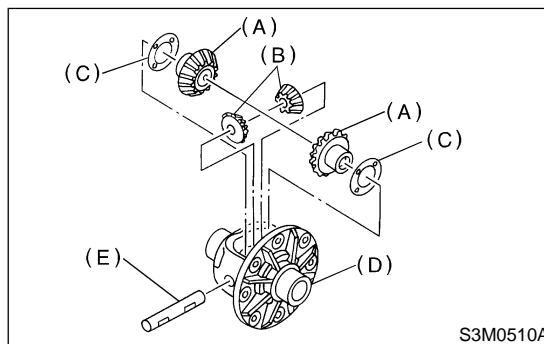
ST 899904100 STRAIGHT PIN REMOVER



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

NOTE:

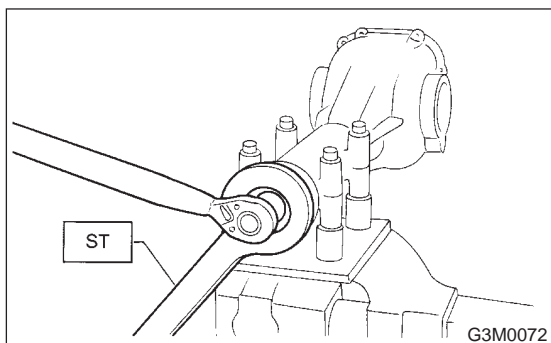
The gears as well as thrust washers should be marked or kept separated left and right, and front and rear.



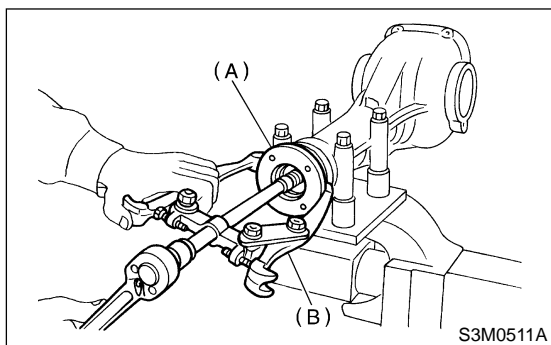
- (A) Side gear
- (B) Pinion mate gear
- (C) Thrust washer
- (D) Differential case
- (E) Pinion mate shaft

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

ST 498427200 FLANGE WRENCH



15) Extract the companion flange with a puller.



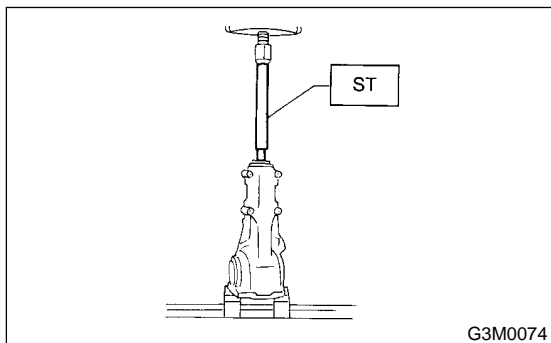
- (A) Companion
- (B) Puller

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

NOTE:

Hold the drive pinion so as not to drop it.

ST 398467700 DRIFT

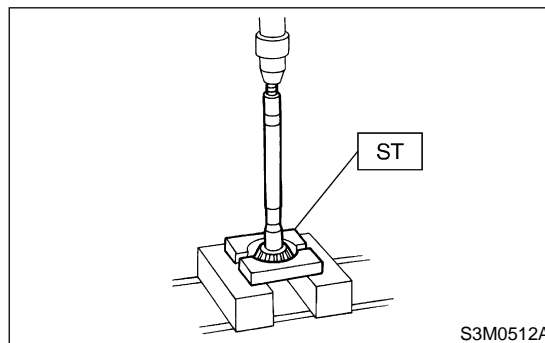


17) Remove rear bearing cone from drive pinion by supporting cone with ST.

NOTE:

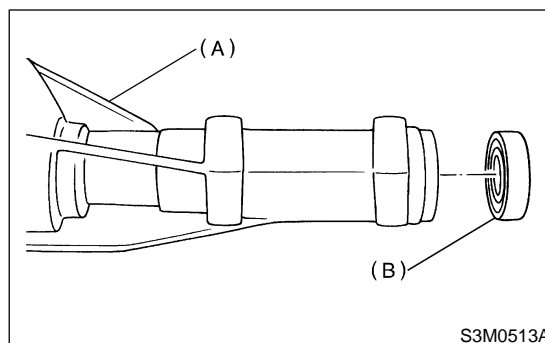
Place the replacer so that its center-recessed side faces the pinion gear.

ST 498515500 REPLACER



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

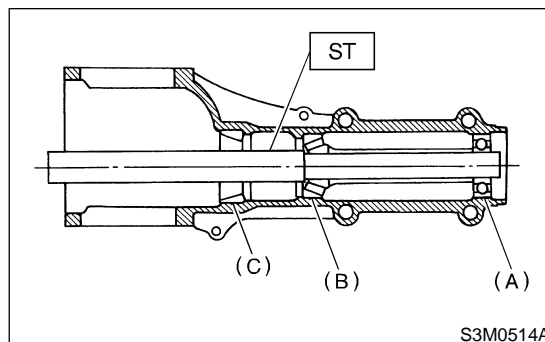
ST 398527700 PULLER ASSY



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

19) Remove pilot bearing together with front bearing cone using ST.

ST 398467700 DRIFT

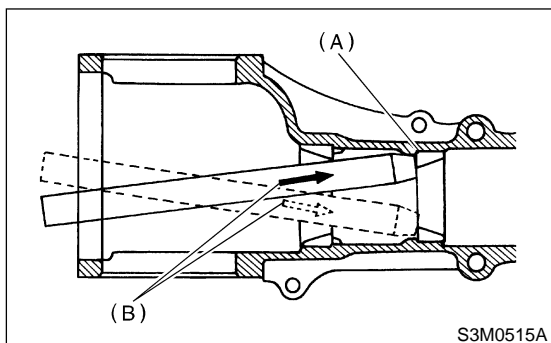


- (A) Pilot bearing
- (B) Front bearing
- (C) Rear bearing cup

REAR DIFFERENTIAL FOR VA-TYPE

Differentials

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

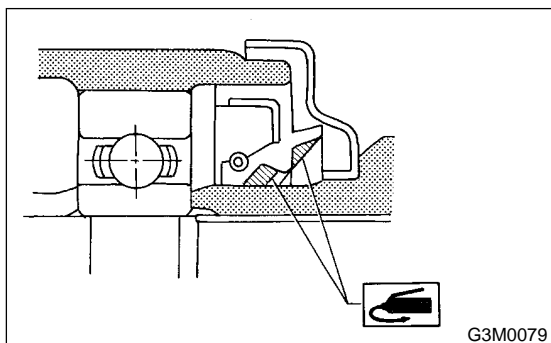


- (A) 2 cutouts along diagonal lines
 (B) Tap alternately with brass bar.

D: ASSEMBLY S303151A02

1) Precautions for assembling

- 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 misinstalled.
- 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 new one at every disassembly. Apply chassis grease between the lips when installing the oil seal.



2) Adjust preload for front and rear bearings.

Adjust the bearing preload with spacer 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 rear bearing race into differential carrier with ST1 and ST2.

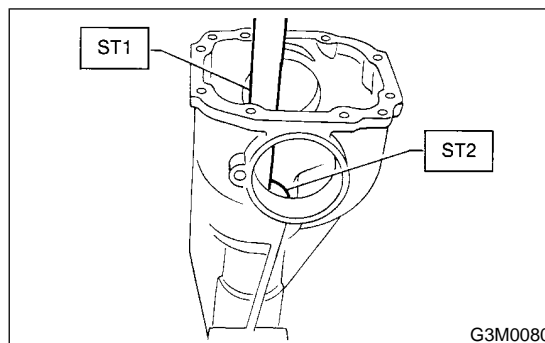
ST1 398477701 HANDLE

ST2 398477702 DRIFT

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

ST1 398477701 HANDLE

ST2 498447110 DRIFT



(3) Insert front bearing cone.

CAUTION:

Use a new front bearing cone.

(4) Insert ST1 into case with pinion height adjusting shim and rear bearing cone fitted onto it.

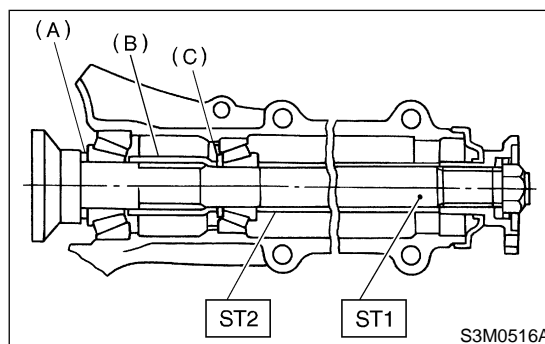
CAUTION:

- Re-use the used washer if not deformed.
- Use a new rear bearing cone.

(5) Then install preload adjusting spacer 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 shim
 (B) Preload adjusting spacer
 (C) Preload adjusting washer

(6) Turn ST1 with hand to make it seated, and tighten drive pinion nut while measuring the preload with spring balance. Select preload adjusting washer and spacer so that the specified preload is obtained when nut is tightened to the specified torque.

CAUTION:

Use a new self-locking nut.

NOTE:

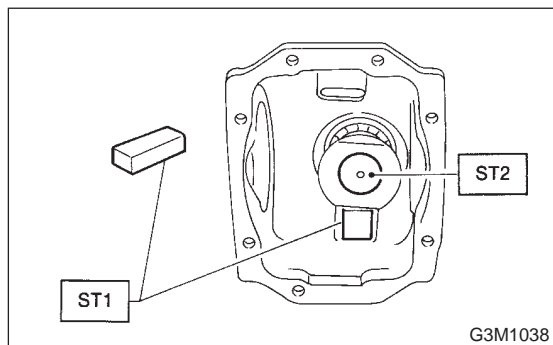
- Be careful not to give excessive preload.
- When tightening the drive pinion nut, lock ST1 with ST2 as shown in the figure.

ST1 398507704 BLOCK

ST2 498447150 DUMMY SHAFT

Tightening torque:

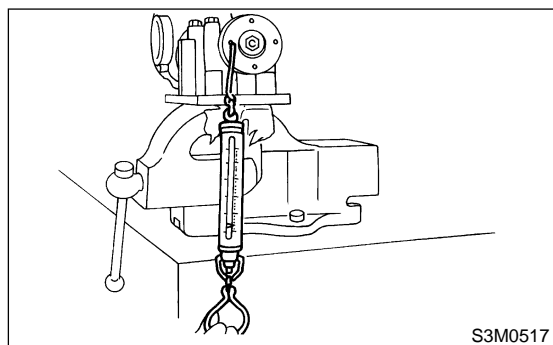
188 N·m (19.2 kgf·m, 139 ft·lb)



Front and rear bearing preload

For new bearing:

12.7 — 32.4 N (1.3 — 3.3 kg, 2.9 — 7.3 lb)
at companion flange bolt hole



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

REAR DIFFERENTIAL FOR VA-TYPE

Differentials

3) Adjusting drive pinion height

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

- (1) Install ST1, ST2 and ST3, as shown in the figure, and apply the specified preload on the bearings

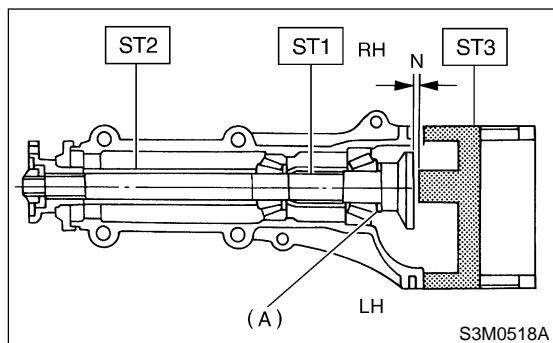
Front and rear bearing preload
For new bearing: 12.7 — 32.4 N (1.3 — 3.3 kg, 2.9 — 7.3 lb) at companion flange bolt hole

Adjusting preload for front and rear bearings

NOTE:

At this time, install an original pinion height adjusting shim.

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



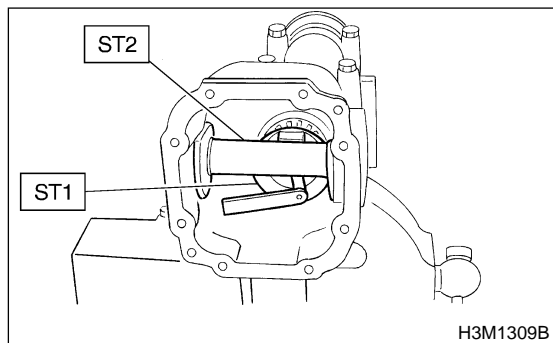
(A) Pinion height adjusting shim

- (2) Measure the clearance N between the end of ST3 and the 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 shim 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 shim (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)

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

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

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

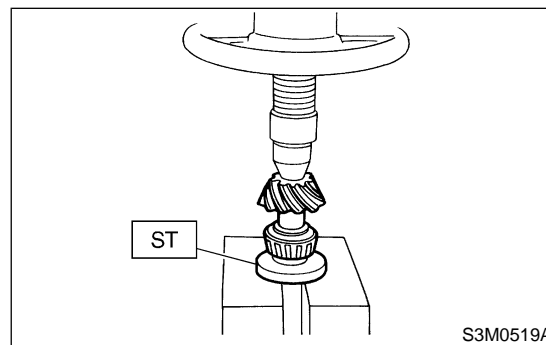
Result: Thickness = 0.2 mm

Therefore use the 32295AA220.

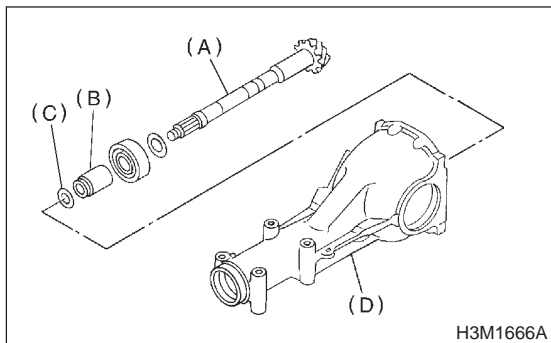
Pinion height adjusting shim	
Part No.	Thickness mm (in)
32295AA200	0.150 (0.0059)
32295AA210	0.175 (0.0069)
32295AA220	0.200 (0.0079)
32295AA230	0.225 (0.0089)
32295AA240	0.250 (0.0098)
32295AA250	0.275 (0.0108)

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

ST 498175500 INSTALLER



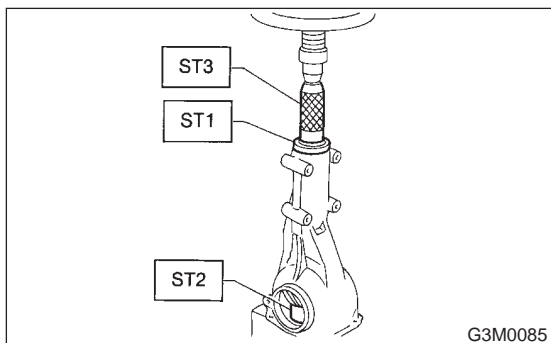
5) Insert drive pinion into differential carrier, install the previously selected bearing preload adjusting spacer and washer.



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

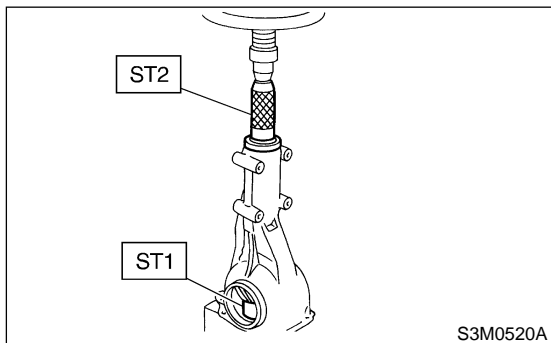
6) Press-fit front bearing cone into carrier with ST1, ST2 and ST3.

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



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

- ST1 399780104 WEIGHT
- ST2 899580100 INSTALLER

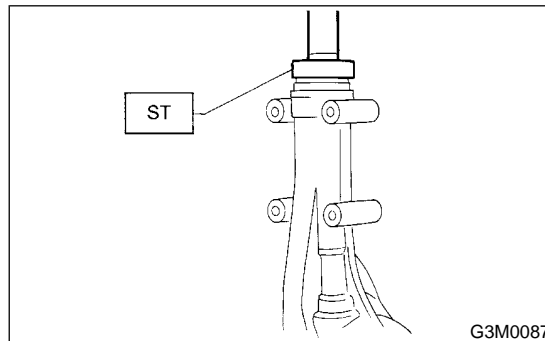


8) Fit a new oil seal with ST.

NOTE:

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

ST 498447120 OIL SEAL INSTALLER

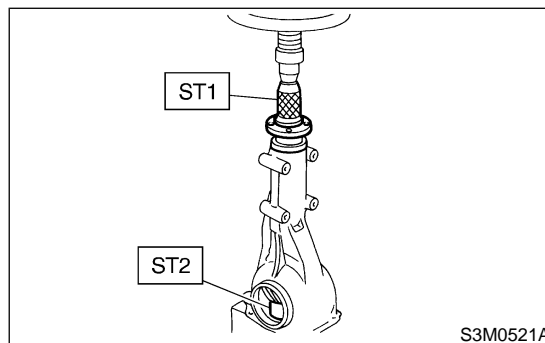


9) Press-fit companion flange with ST1 and ST2.

CAUTION:

Be careful not to damage bearing.

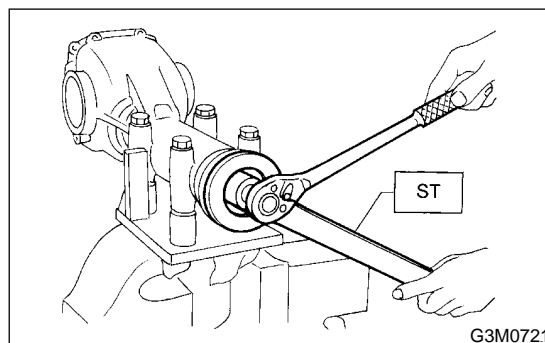
- ST1 899874100 INSTALLER
- ST2 399780104 WEIGHT



10) Install self-locking nut. Then tighten it with ST.

ST 398427200 FLANGE WRENCH

Tightening torque:
188 N-m (19.2 kgf-m, 139 ft-lb)



REAR DIFFERENTIAL FOR VA-TYPE

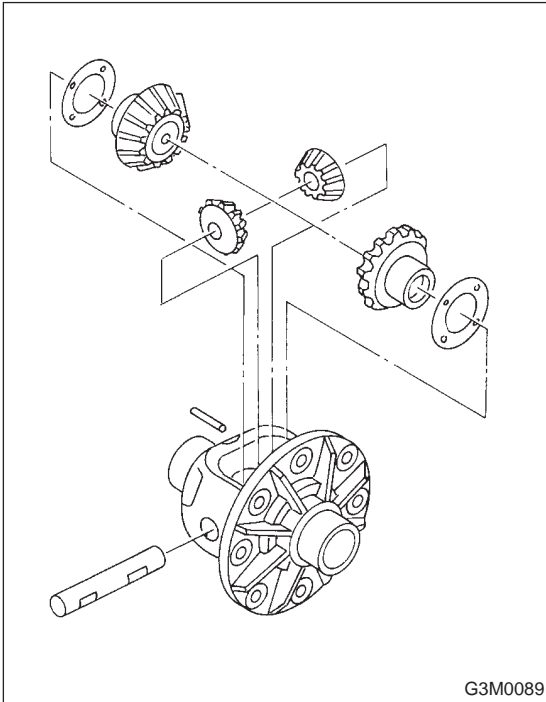
Differentials

11) Assembling differential case

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

NOTE:

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

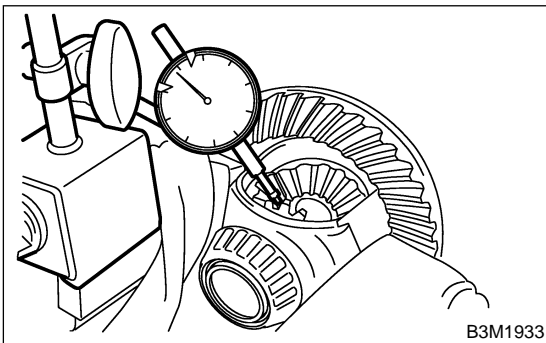


G3M0089

(1) Measure the side gear backlash.

Side gear back clearance:

0.05 — 0.15 mm (0.0020 — 0.0059 in)



B3M1933

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

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

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

(4) After driving in pinion shaft lock pin, stake the both sides of the hole to prevent pin from falling off.

(5) Install crown gear on differential case.

CAUTION:

Before installing bolts, apply Lock Tite to bolt threads.

Lock Tite

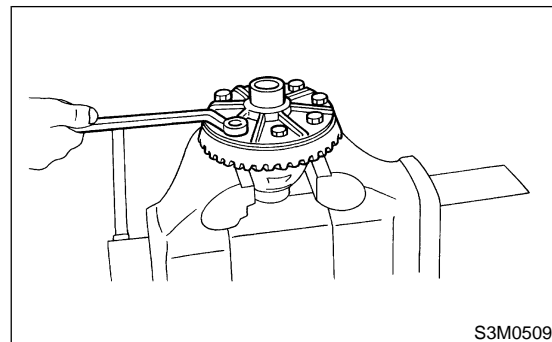
THREE BOND 1324 or equivalent

NOTE:

Tighten diagonally while tapping the bolt heads.

Tightening torque:

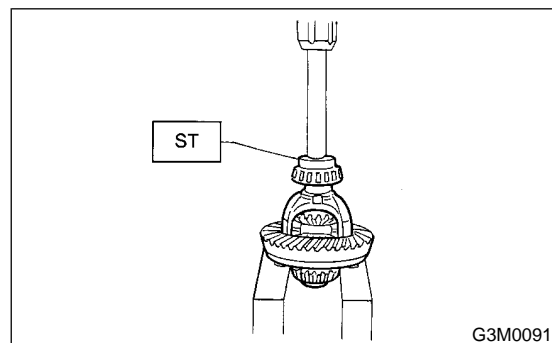
62 N·m (6.3 kgf·m, 45.6 ft·lb)



S3M0509

12) Press side bearing cone onto differential case with ST.

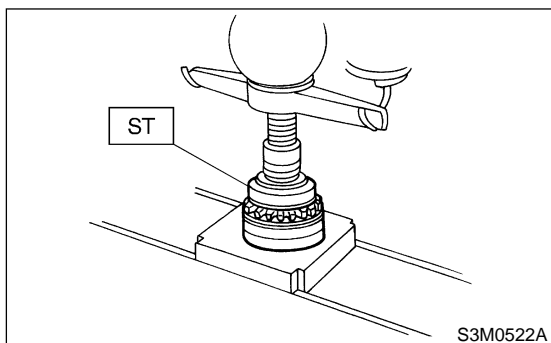
ST 498485400 DRIFT



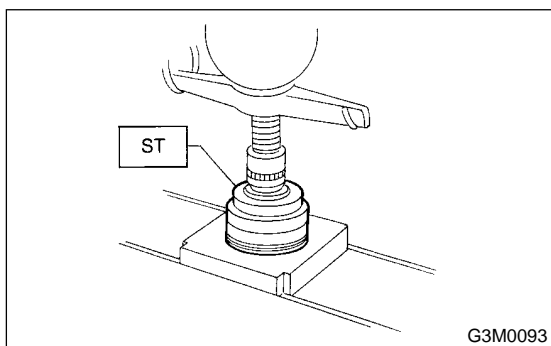
G3M0091

13) Assemble holders.

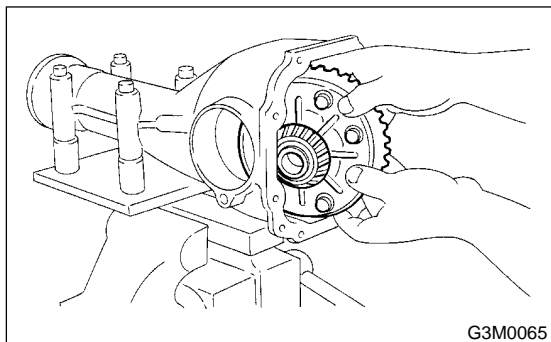
(1) Install oil seal into right and left holders.
 ST 498447100 AXLE SHAFT OIL SEAL
 INSTALLER



(2) Install bearing race into right and left holders.
 ST 398477702 BEARING OUTER RACE
 DRIFT

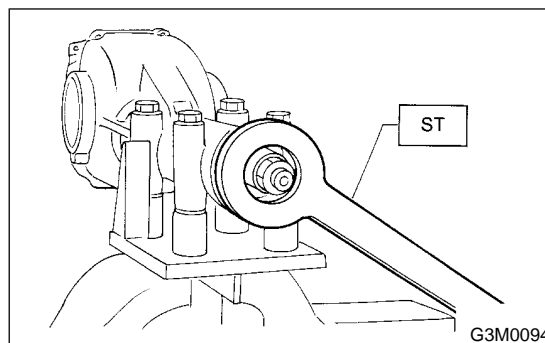


(3) Install the differential case assembly into differential carrier in the reverse order of disassembly.

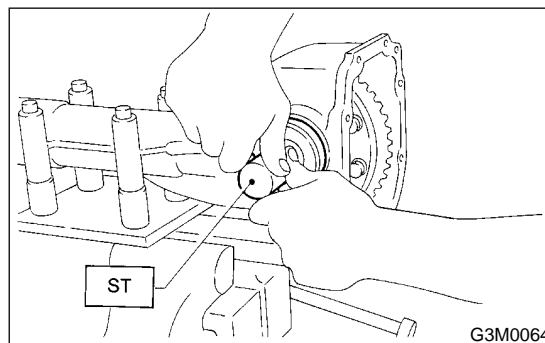


14) Perform adjustment of backlash of pinion crown gear set and adjustment of preload of differential side bearing.

(1) Turn drive pinion with ST for better fitting of differential side bearing.
 ST 498427200 FLANGE WRENCH



(2) Screw in side (left-side) holder until light contact is made with ST.
 ST 399780111 WRENCH



(3) Back off side (left-side) holder approximately 1 1/2 teeth of holder, and tighten left-side holder by approximately 2 teeth (approximately 1 1/2 + 1/2 teeth).

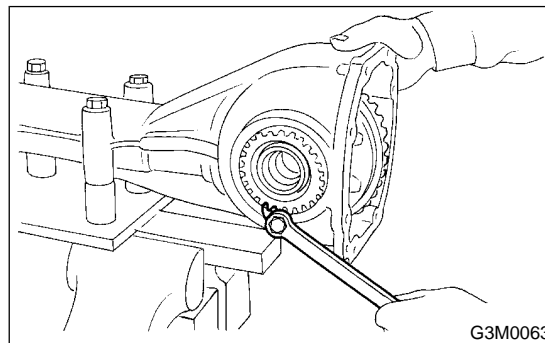
[Back off amount of side (left-side) holder + 1/2 tooth.]

This + 1/2 tooth gives preload.

(4) Temporarily tighten lock plate.

NOTE:

Turn over lock plate to displace holder 1/2 tooth.



REAR DIFFERENTIAL FOR VA-TYPE

Differentials

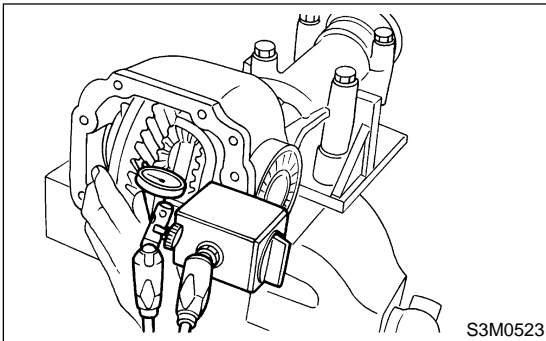
(5) Measure the crown gear-to-drive pinion backlash. Set magnet base on differential carrier. Align contact point of dial gauge with tooth face of crown gear, and move crown gear while holding drive pinion still. Read value indicated on dial gauge.

NOTE:

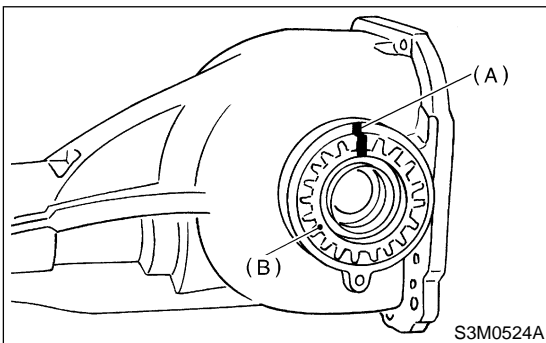
If measured backlash is not within specified range, repeat procedures for pinion crown gear set backlash adjustment and differential side bearing preload adjustment.

Backlash:

0.10 — 0.15 mm (0.0039 — 0.0059 in)



15) Draw a matching mark on both differential carrier and holder. Remove holder one side at a time. Replace in the original position after inserting an O-ring and applying grease to threaded portion.

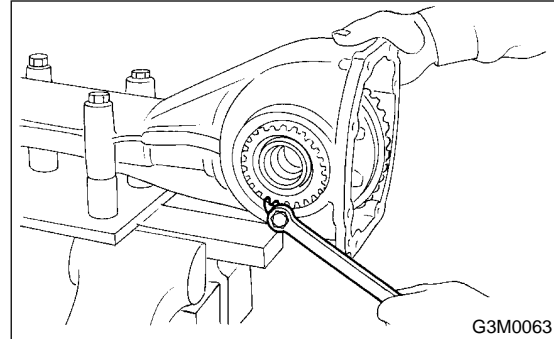


- (A) Matching mark
- (B) Holder

16) Tighten bolt of lock plate to specified torque.

Tightening torque:

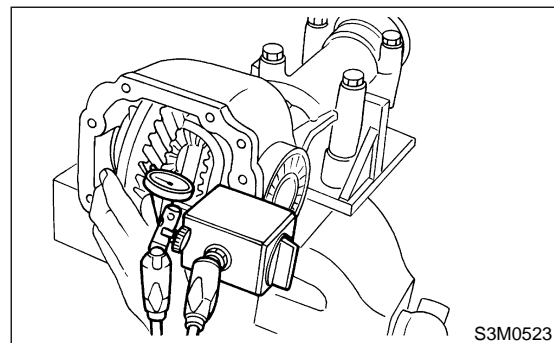
25 N·m (2.5 kgf-m, 18.1 ft-lb)



17) Re-check crown gear-to-pinion backlash.

Backlash:

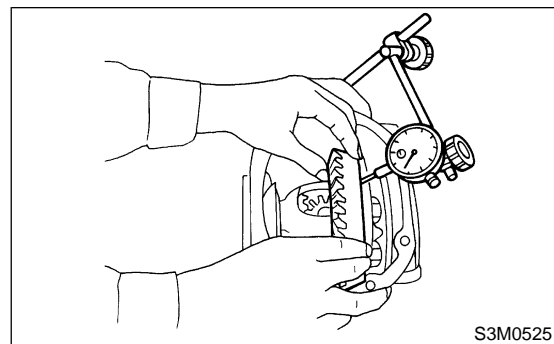
0.10 — 0.15 mm (0.0039 — 0.0059 in)



18) Check the crown gear runout on its back surface, and make sure pinion and crown gear rotate smoothly.

Limit of runout:

0.05 mm (0.0020 in)



19) Checking and adjusting tooth contact of crown gear.

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

20) 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.

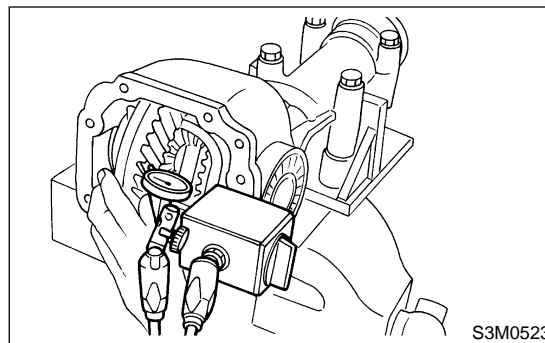
(1) Drive pinion height

- ST1 498447150 DUMMY SHAFT
- ST2 498505501 DIFFERENTIAL GAUGE

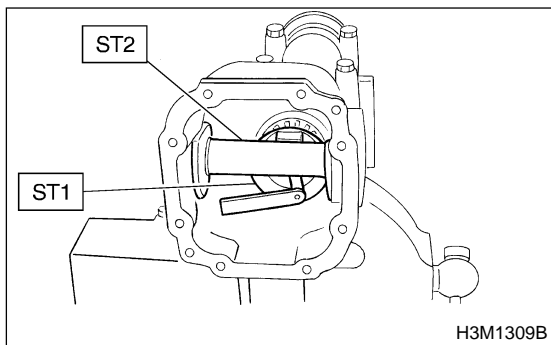
(3) Hypoid gear backlash

Backlash:

0.10 — 0.15 mm (0.0039 — 0.0059 in)



S3M0523



H3M1309B

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

where

T = Thickness of pinion height adjusting shim (mm)

T_o = Thickness of shim originally installed (mm)

N = Reading of thickness gauge (mm)

(2) Differential side bearing preload

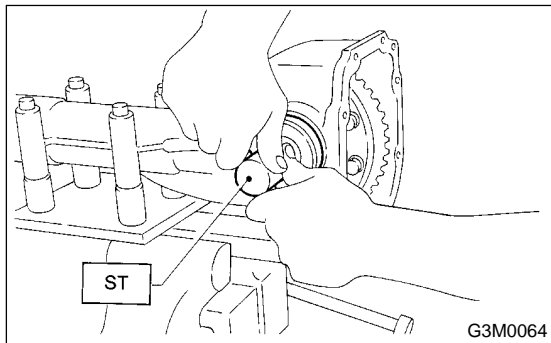
Screw in side (left-side) holder until light contact is made with ST.

Back off side (left-side) holder approximately 1 1/2 teeth of holder, and tighten left-side holder by approximately 2 teeth (approximately 1 1/2 + 1/2 teeth).

[Back off amount of side (left-side) holder + 1/2 tooth.]

This + 1/2 tooth gives preload.

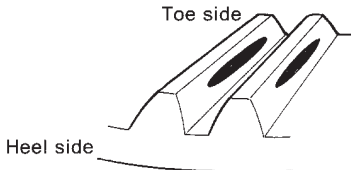
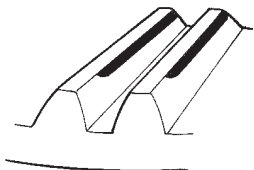
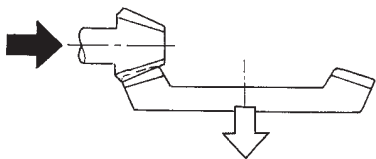
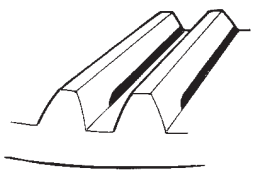
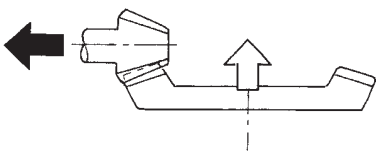
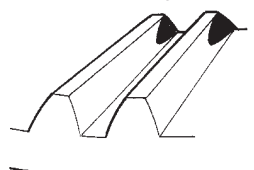
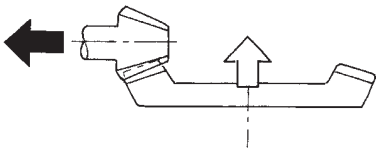
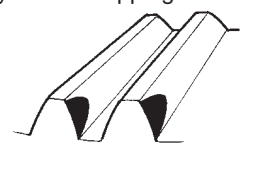
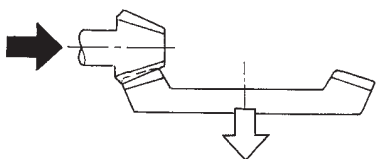
- ST 399780111 WRENCH



G3M0064

REAR DIFFERENTIAL FOR VA-TYPE

Differentials

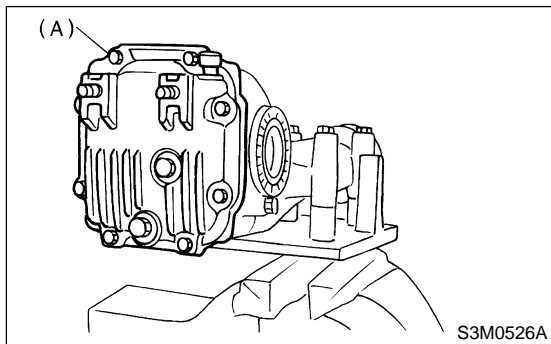
TOOTH CONTACT PATTERN		
Condition	Contact pattern	Adjustment
<p>Correct tooth contact</p> <p>Tooth contact pattern slightly shifted towards toe under no load rotation. (When loaded, contact pattern moves toward heel.)</p>	<p>Toe side</p>  <p>Heel side</p> <p>G3M0098A</p>	<p>—</p>
<p>Face contact</p> <p>Backlash is too large.</p>	<p>This may cause noise and chipping at tooth ends.</p>  <p>G3M0098B</p>	<p>Increase thickness of drive pinion height adjusting washer in order to bring drive pinion closer to crown gear center.</p>  <p>G3M0098F</p>
<p>Flank contact</p> <p>Backlash is too small.</p>	<p>This may cause noise and stepped wear on surfaces.</p>  <p>G3M0098C</p>	<p>Reduce thickness of drive pinion height adjusting washer in order to move drive pinion away from crown gear.</p>  <p>G3M0098G</p>
<p>Toe contact</p>	<p>Contact area is small. This may cause chipping at toe ends.</p>  <p>G3M0098D</p>	<p>Adjust as for flank contact.</p>  <p>G3M0098G</p>
<p>Heel contact</p>	<p>Contact area is small. This may cause chipping at heel ends.</p>  <p>G3M0098E</p>	<p>Adjust as for face contact.</p>  <p>G3M0098F</p>

 : Adjusting direction of drive pinion
 : Adjusting direction of crown gear

21) Install rear cover and tighten bolts to specified torque.

Tightening torque:

25 N·m (2.5 kgf·m, 18.1 ft·lb)



(A) Rear cover

E: INSPECTION S303151A10

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

- 1) Crown 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) Side gear and pinion mate gear
 - Replace if crack, score, or other defects are evident on tooth surface.
 - Replace if thrust washer contacting surface is worn or seized. Slight damage of the surface can be corrected by oil stone or the like.
- 3) Bearing

Replace if seizure, peeling, wear, rust, dragging during rotation, abnormal noise or other defect is evident.
- 4) Thrust washers of side gear and pinion mate gear

Replace if seizure, flaw, abnormal wear or other defect is evident.
- 5) Oil seal

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

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

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

Replace if the oil seal lip contacting surfaces have flaws.

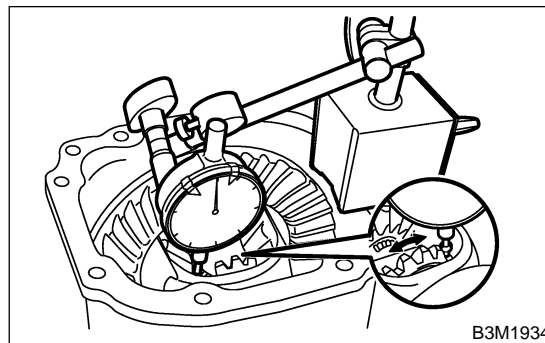
1. SIDE GEAR BACKLASH S303151A1001

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

Side gear backlash:

0.05 — 0.15 mm (0.0020 — 0.0059 in)

If side gear backlash is not within the specification, adjust clearance as specified by selecting side gear thrust washer.



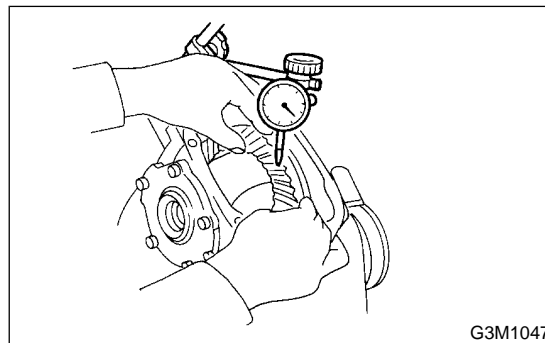
2. CROWN GEAR BACKLASH S303151A1002

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

Crown gear backlash:

0.10 — 0.15 mm (0.0039 — 0.0059 in)

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



REAR DIFFERENTIAL FOR VA-TYPE

Differentials

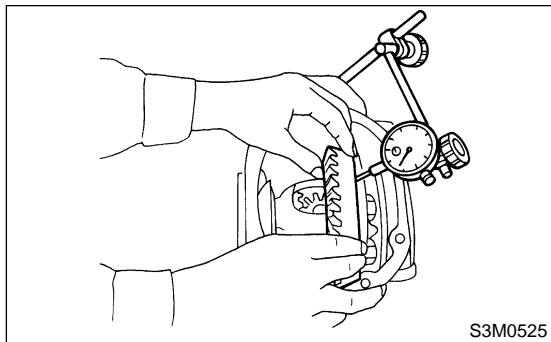
3. CROWN GEAR RUNOUT S303151A1003

Using a dial gauge, check the crown gear runout.

Crown gear runout:

Less than 0.05 mm (0.0020 in)

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



4. TOOTH CONTACT BETWEEN CROWN GEAR AND DRIVE PINION S303151A1004

Inspect tooth contact between crown gear and drive pinion.

<Ref. to DI-48 ASSEMBLY Rear Differential for VA-type.>

F: ADJUSTMENT S303151A01

1. SIDE GEAR BACKLASH A303151A0101

Adjust side gear backlash.

<Ref. to DI-48 ASSEMBLY Rear Differential for VA-type.>

2. CROWN GEAR BACKLASH A303151A0102

Adjust crown gear backlash.

<Ref. to DI-48 ASSEMBLY Rear Differential for VA-type.>

3. TOOTH CONTACT BETWEEN CROWN GEAR AND DRIVE PINION A303151A0103

Adjust the tooth contact between crown gear and drive pinion gear.

<Ref. to DI-48 ASSEMBLY Rear Differential for VA-type.>

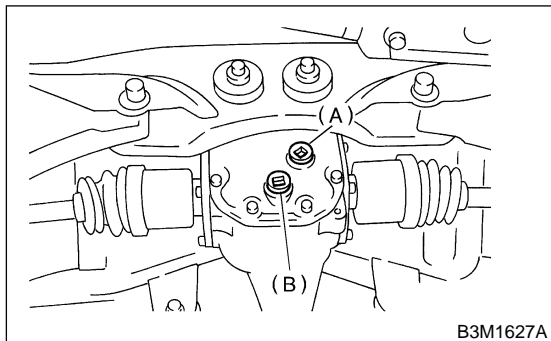
6. Rear Differential Front Oil Seal

S303139

A: REPLACEMENT

S303139A20

- 1) Disconnect ground cable from battery.
- 2) Move select lever or gear shift lever to "N".
- 3) Release the parking brake.
- 4) Remove rear differential protector. (if equipped)
- 5) Remove oil drain plug, and drain gear oil.



- (A) Filler plug
(B) Drain plug

- 6) Install oil drain plug.

Tightening torque:

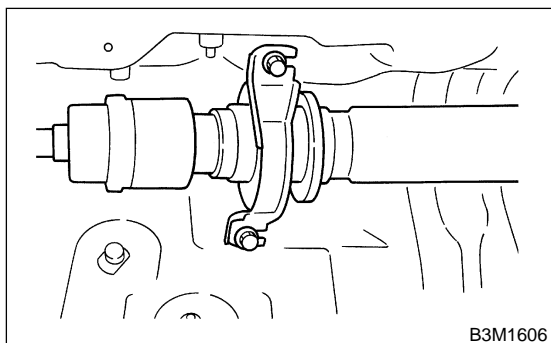
T-type;

49 N·m (5.0 kgf-m, 36.2 ft-lb)

VA-type;

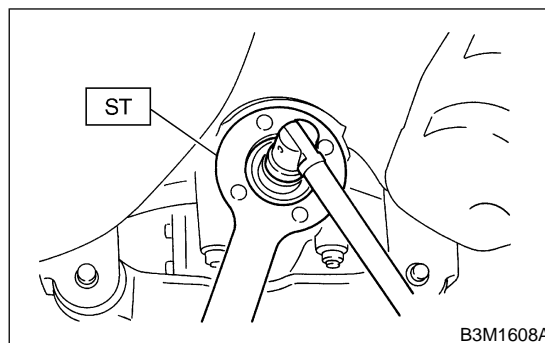
33 N·m (3.4 kgf-m, 24.6 ft-lb)

- 7) Jack-up rear wheels and support the vehicle body with sturdy racks.
- 8) Remove rear exhaust pipe and muffler.
- 9) Remove propeller shaft from body. <Ref. to DS-16 REMOVAL, Propeller Shaft.>

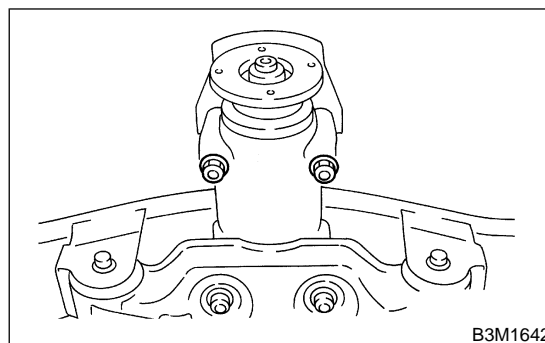


- 10) Remove self-locking nut while holding companion flange with ST.

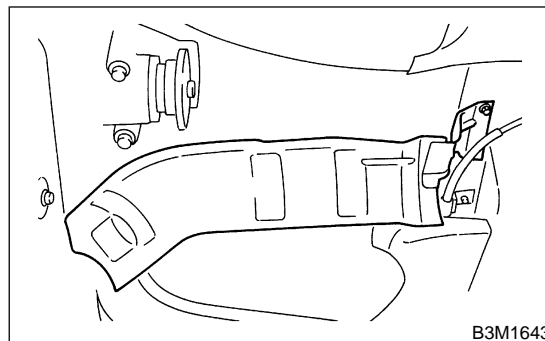
ST 498427200 FLANGE WRENCH



- 11) Remove nut of protector.

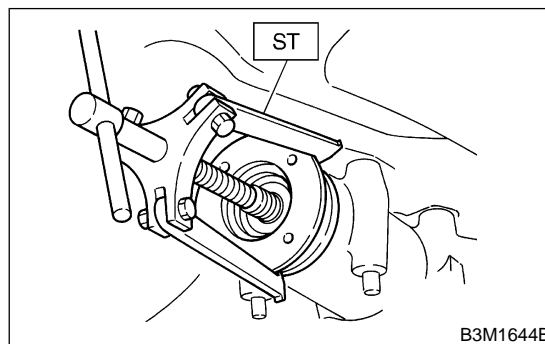


- 12) Remove tank cover.



- 13) Extract companion flange using ST.

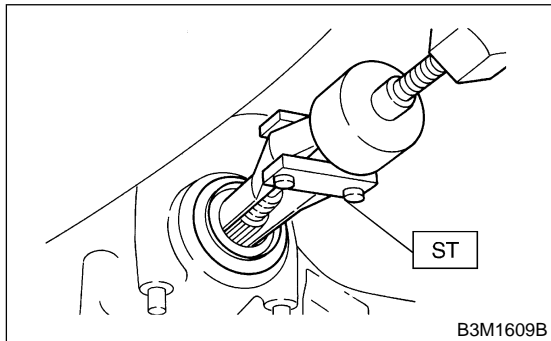
ST 399703602 PULLEY ASSY



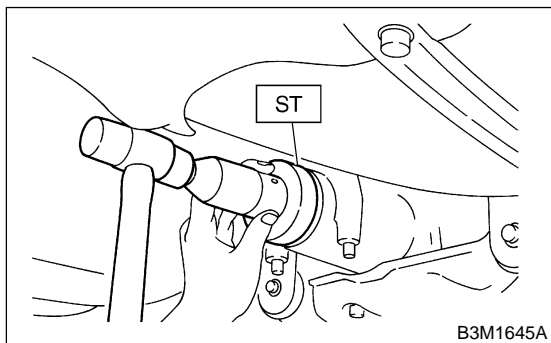
REAR DIFFERENTIAL FRONT OIL SEAL

Differentials

- 14) Remove oil seal using ST.
ST 499705401 PULLER ASSY



- 15) Fit a new oil seal using ST.
ST 498447120 OIL SEAL INSTALLER



- 16) Install companion flange.

NOTE:

Use a plastic hammer to install companion flange.

- 17) Tighten 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.

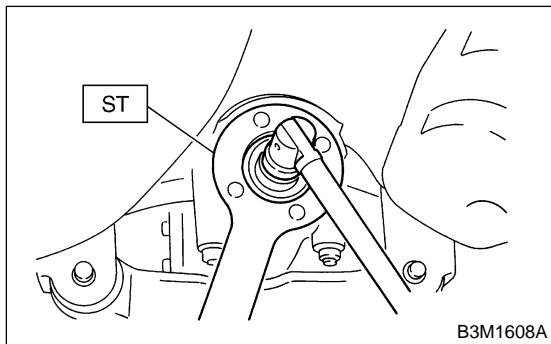
ST 498427200 FLANGE WRENCH

CAUTION:

Use a new self-locking nut.

Tightening torque:

181.4 N·m (18.50 kgf·m, 133.8 ft·lb)

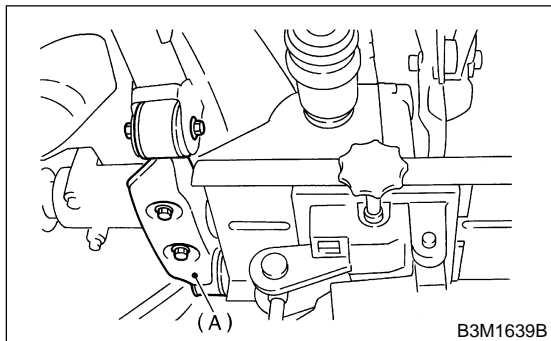


- 18) Reassembling procedure hereafter is the reverse of the disassembling.

7. Rear Differential Member S303135

A: REMOVAL S303135A18

- 1) Disconnect ground terminal from battery.
- 2) Jack-up the vehicle.
- 3) Using a transmission jack, support rear differential, and remove rear differential member.



(A) Rear differential member

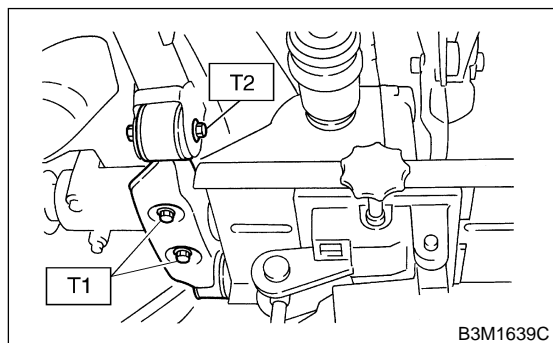
B: INSTALLATION S303135A11

- 1) Install rear differential member.

Tightening torque:

T1: 65 N·m (6.6 kgf·m, 48 ft·lb)

T2: 110 N·m (11.2 kgf·m, 81 ft·lb)



C: INSPECTION S303135A10

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

GENERAL DIAGNOSTIC TABLE

Differentials

8. General Diagnostic Table S303257

A: INSPECTION S303257A10

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 differential spindle or side retainer, or incorrectly fitted O-ring.	Tighten bolts to specified torque. Replace O-ring.
	(4) Loose rear cover attaching bolts or damaged gasket.	Tighten bolts to specified torque. Replace gasket and apply liquid packing.
	(5) Loose oil filler or drain plug.	Retighten and apply liquid packing.
	(6) Wear, damage or incorrectly fitting for spindle, side retainer and oil seal.	Repair or replace.
2. Seizure NOTE: Seized or damaged parts should be replaced, and also other parts should be thoroughly checked for any defect and should be repaired or replaced as required.	(1) Insufficient backlash for hypoid gear.	Readjust or replace.
	(2) Excessive preload for side, rear, or front bearing.	Readjust or replace.
	(3) Insufficient or improper oil used.	Replace seized part and fill with specified oil to specified level.
3. Damage NOTE: Damaged parts should be replaced, and also other parts should be thoroughly checked for any defect and should be repaired or replaced as required.	(1) Improper backlash for hypoid gear.	Replace.
	(2) Insufficient or excessive preload for side, rear, or front bearing.	Readjust or replace.
	(3) Excessive backlash for differential gear.	Replace gear or thrust washer.
	(4) Loose bolts and nuts such as crown 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 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.
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 hypoid gear set.
	(2) Improper backlash for hypoid gear.	Readjust.
	(3) Scored or chipped teeth of hypoid gear.	Replace hypoid gear set.
	(4) Seized hypoid gear.	Replace hypoid gear set.
	(5) Improper preload for front or rear bearings.	Readjust.
	(6) Seized, scored, or chipped front or rear bearing.	Replace.
	(7) Seized, scored, or chipped side bearing.	Replace.
	(8) Vibrating differential carrier.	Replace.

GENERAL DESCRIPTION

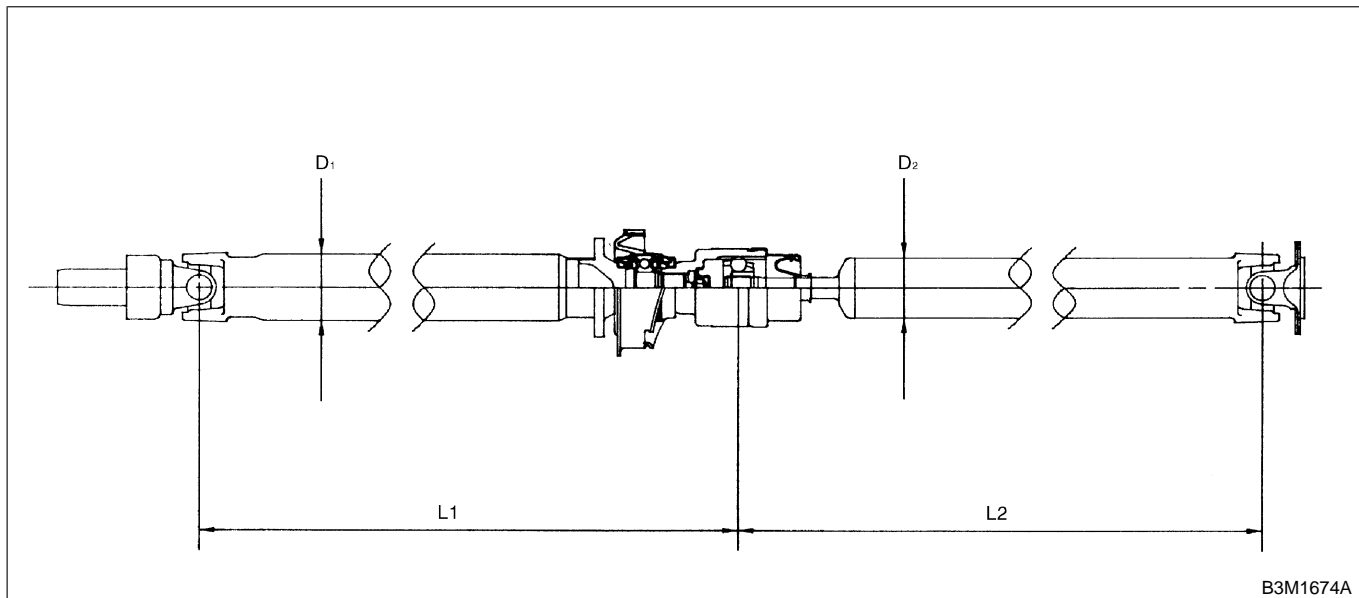
Drive Shaft System

1. General Description S301001

A: SPECIFICATIONS S301001E49

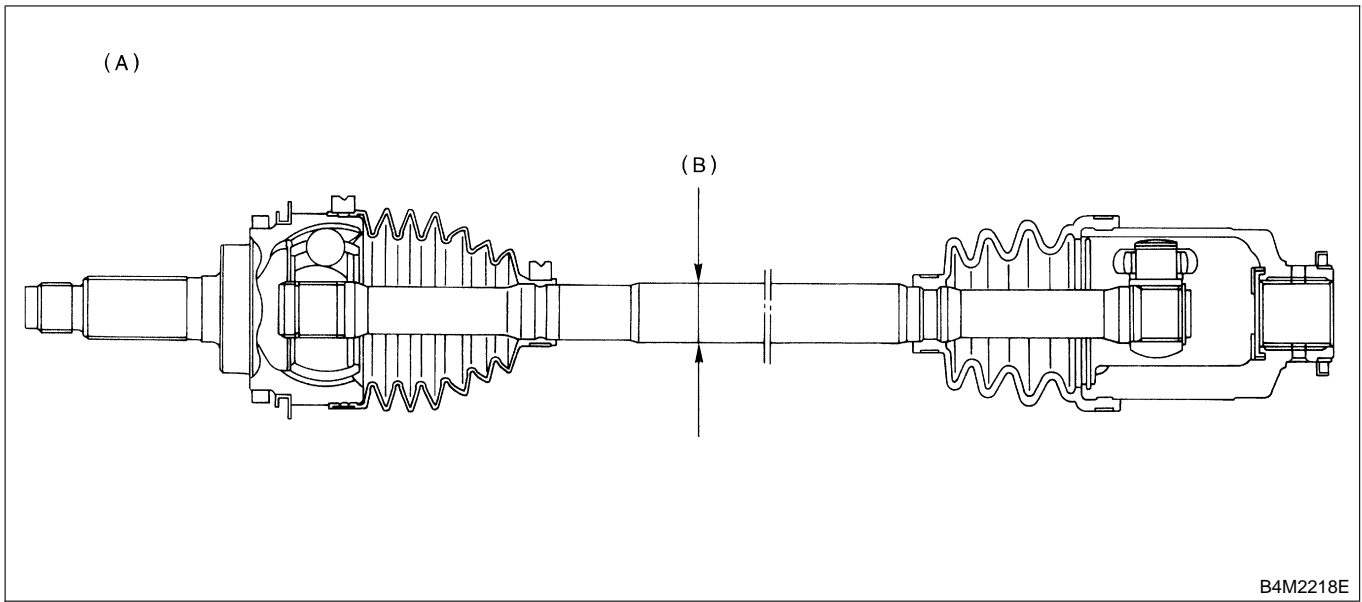
1. PROPELLER SHAFT S301001E4901

Propeller shaft type	DOJ type	
Front propeller shaft Joint-to-joint length: L_1 mm (in)	AT	629 (24.76)
	MT	688 (27.09)
Rear propeller shaft Joint-to-joint length: L_2 mm (in)	773 (30.43)	
Outside diameter of tube: mm (in)	D_1	63.5 (2.500)
	D_2	57.0 (2.244)



2. FRONT DRIVE SHAFT ASSEMBLY S301001E4902

Type of drive shaft assembly	SHAFT
	Shaft diameter
BJ87+SFJ82	26 mm (1.02 in)



B4M2218E

(A) BJ87+SFJ82

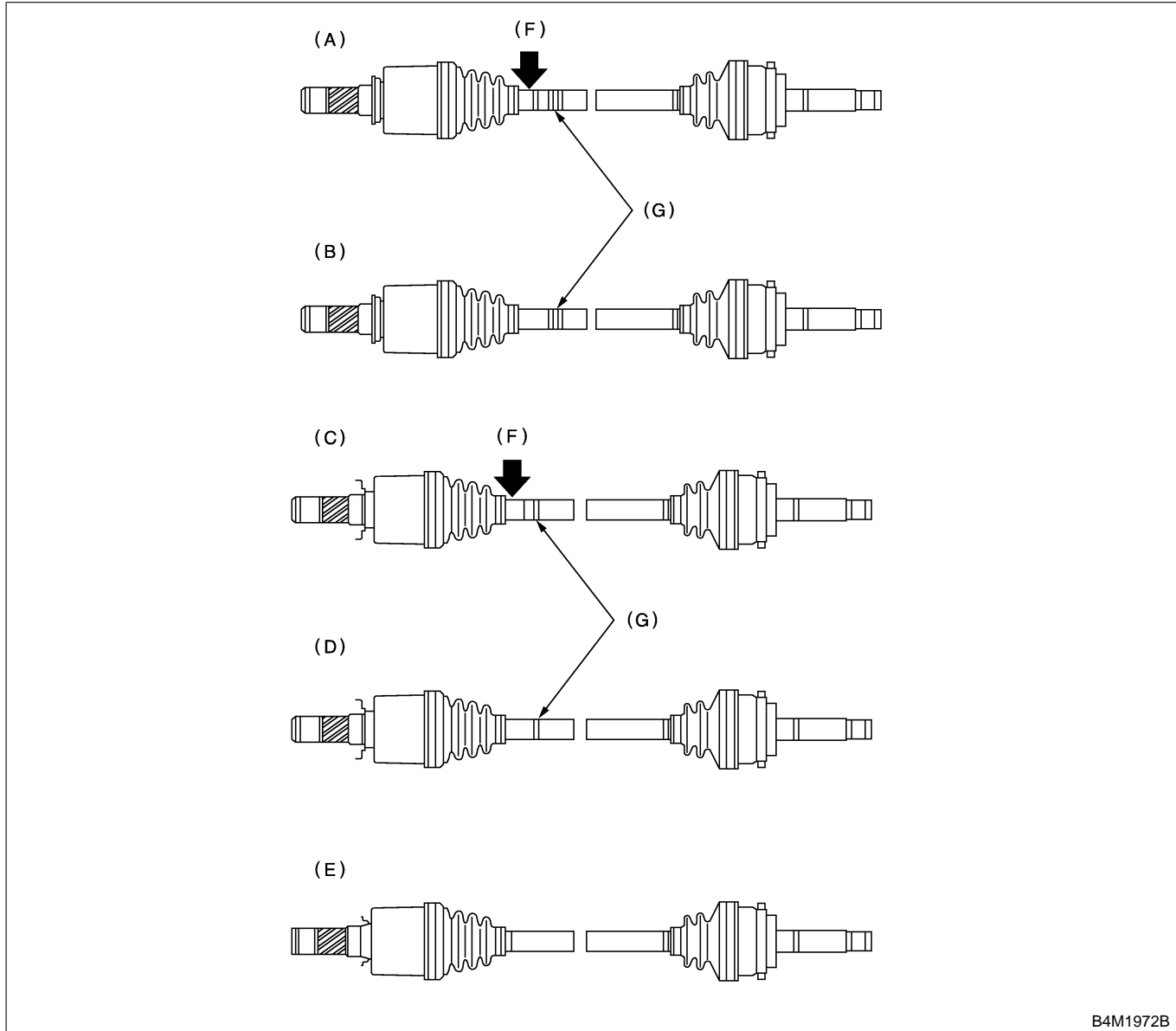
(B) Measuring point

GENERAL DESCRIPTION

Drive Shaft System

3. REAR DRIVE SHAFT ASSEMBLY S301001E4903

Type of axle shaft assembly	SHAFT
	No. of identification, protrusion on shaft
82AC-RH, 82AC-LH	2 (Two)
79AC-RH, 79AC-LH	1 (One)
79AC	None

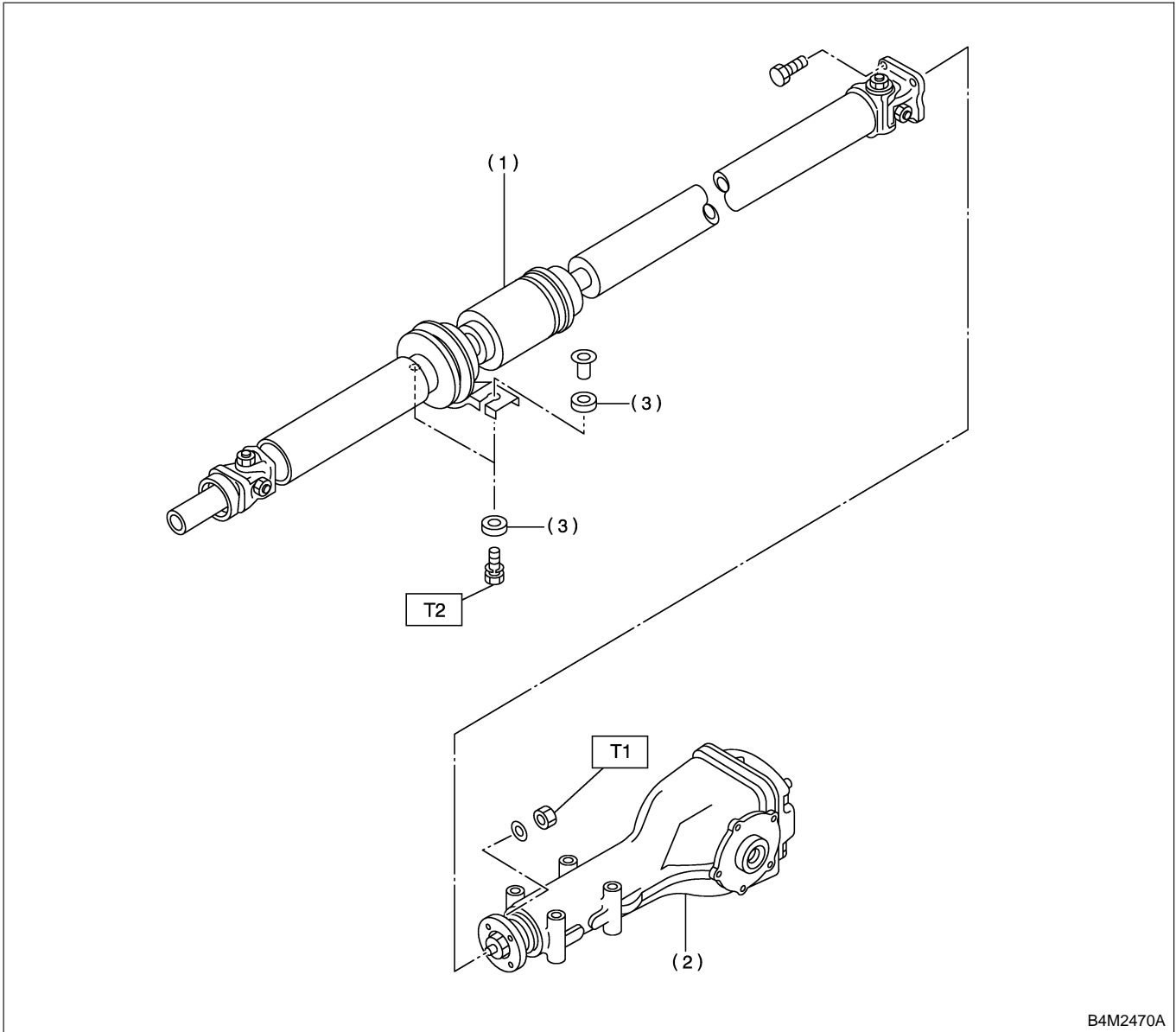


B4M1972B

- (A) 82AC-RH
- (B) 82AC-LH
- (C) 79AC-RH
- (D) 79AC-LH
- (E) 79AC
- (F) Indication mark of RH
- (G) Identification protrusion

B: COMPONENT S301001A05

1. PROPELLER SHAFT S301001A0501



B4M2470A

- (1) Propeller shaft
- (2) Rear differential
- (3) Bush

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

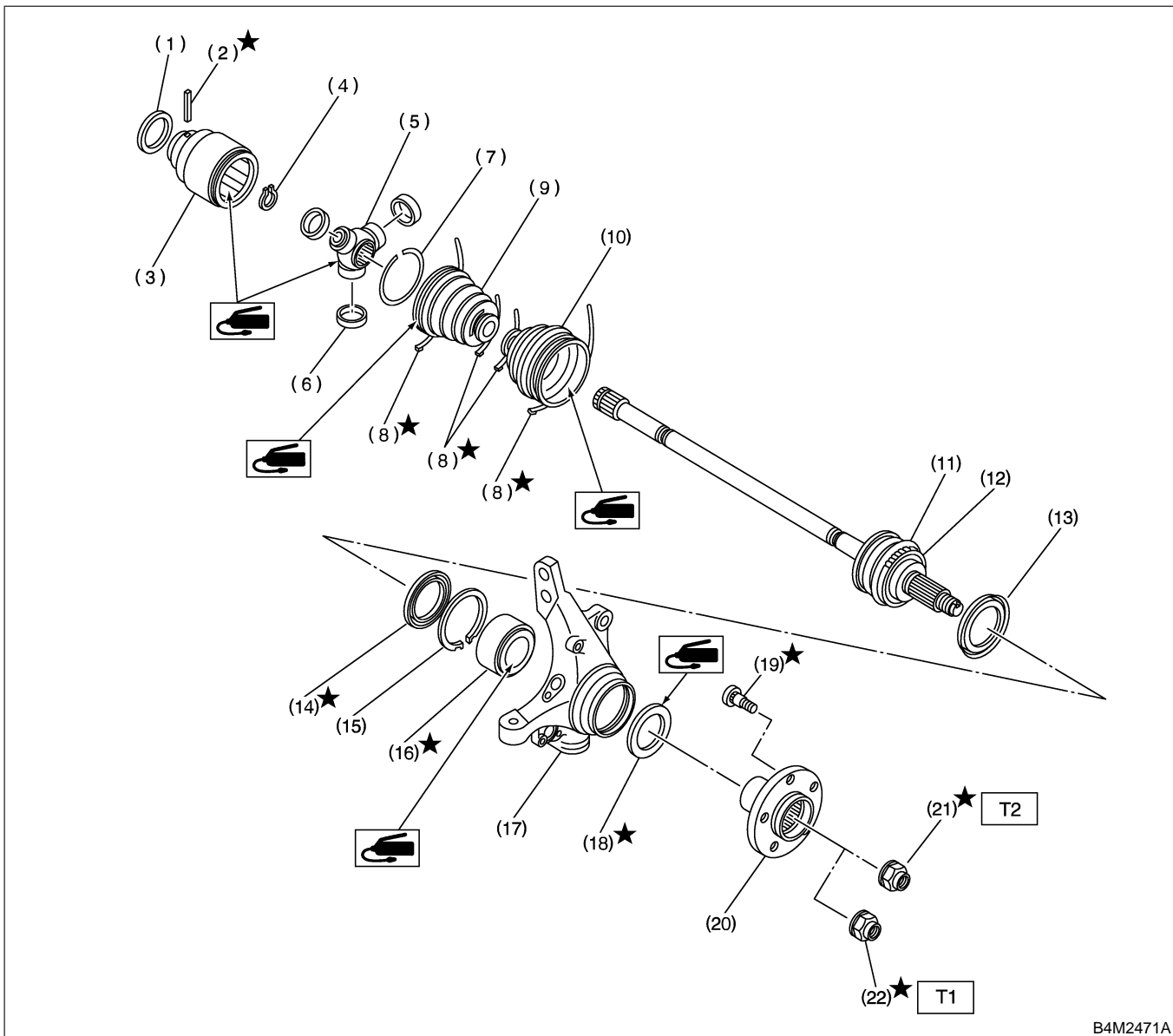
T1: 31 (3.2, 23.1)

T2: 52 (5.3, 38.3)

GENERAL DESCRIPTION

Drive Shaft System

2. FRONT AXEL S301001A0502



B4M2471A

- (1) Baffle plate (SFJ)
- (2) Spring pin
- (3) Outer race (SFJ)
- (4) Snap ring
- (5) Trunnion
- (6) Free ring
- (7) Circlip
- (8) Boot band
- (9) Boot band
- (10) Boot (BJ)

- (11) BJ ASSY
- (12) Tone wheel
- (13) Baffle plate
- (14) Oil seal (IN)
- (15) Snap ring
- (16) Bearing
- (17) Housing
- (18) Oil seal (OUT)
- (19) Hub bolt
- (20) Hub

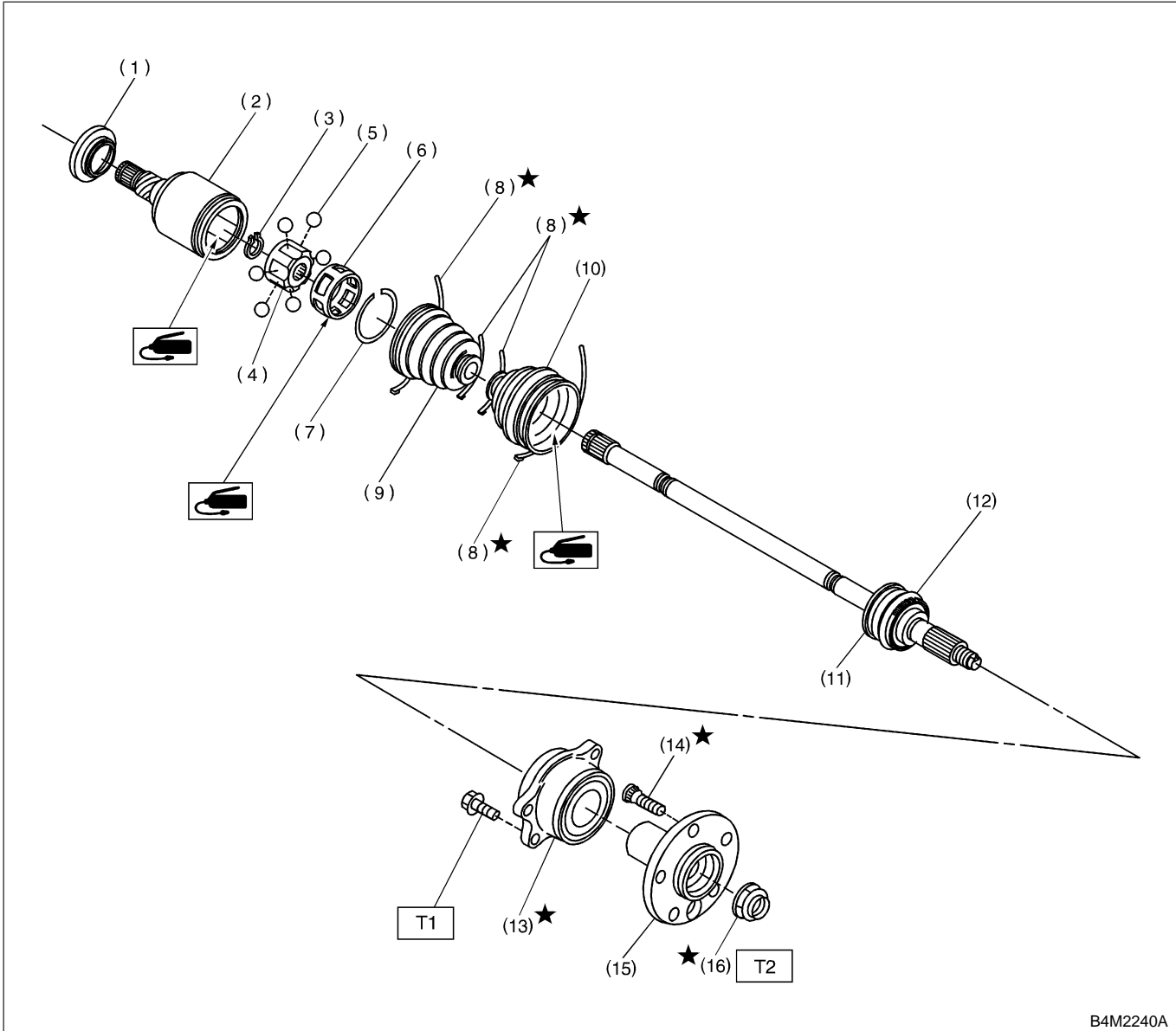
- (21) Axle nut (3.0 ℓ model: Olive color)
- (22) Axle nut (2.5 ℓ model: Gold color)

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

T1: 186 (19, 137)

T2: 216 (22, 159)

3. REAR AXLE S301001A0503



B4M2240A

- (1) Baffle plate (DOJ)
- (2) Outer race (DOJ)
- (3) Snap ring
- (4) Inner race
- (5) Ball
- (6) Cage
- (7) Circlip

- (8) Boot band
- (9) Boot (DOJ)
- (10) Boot (BJ)
- (11) BJ ASSY
- (12) Tone wheel
- (13) Hub unit bearing
- (14) Hub bolt

- (15) Hub
- (16) Axle nut (Olive color)

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

T1: 66 (6.7, 48.5)

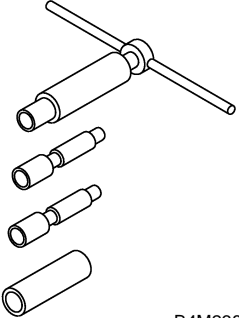
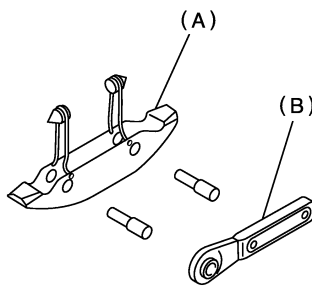
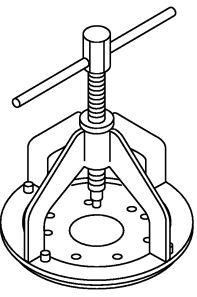
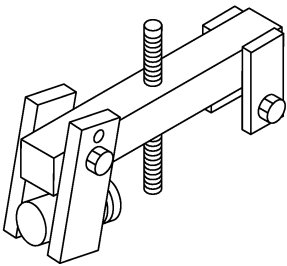
T2: 235 (24, 174)

C: CAUTION S301001A03

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

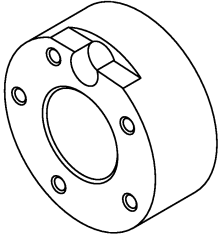
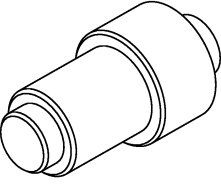
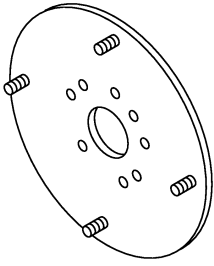
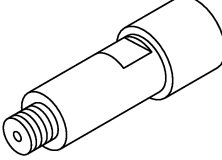
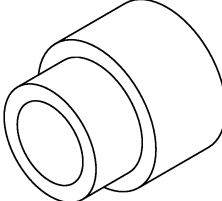
D: PREPARATION TOOL S301001A17

1. SPECIAL TOOLS S301001A1701

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p style="text-align: right;">B4M2386</p>	922431000	AXLE SHAFT INSTALLER	<ul style="list-style-type: none"> ● Used for installing axle shaft into housing. ● Used with ADAPTER (927390000).
 <p style="text-align: right;">B4M2387A</p>	925091000	BAND TIGHTENING TOOL	<ul style="list-style-type: none"> ● Used for tightening boot band. (A) Jig for band (B) Ratchet wrench
 <p style="text-align: right;">B4M2388</p>	926470000	AXLE SHAFT PULLER	Used for removing axle shaft.
 <p style="text-align: right;">B4M2389</p>	927060000	HUB REMOVER	<ul style="list-style-type: none"> ● Used for removing front hub. ● Used with HUB STAND (927080000).

GENERAL DESCRIPTION

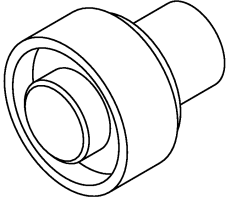
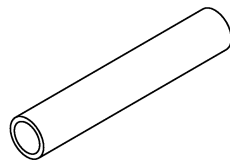
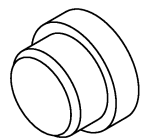
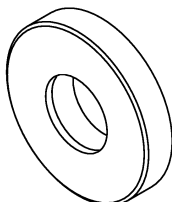
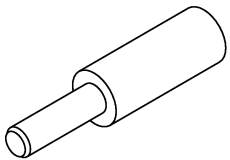
Drive Shaft System

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p style="text-align: center;">B4M2390</p>	927080000	HUB STAND	Used for disassembling and assembling hub bolt in hub.
 <p style="text-align: center;">B4M2391</p>	927100000	BEARING PULLER	<ul style="list-style-type: none"> ● Used for disassembling and assembling front housing bearing. ● Used with HOUSING STAND (927400000).
 <p style="text-align: center;">B4M2392</p>	927140000	AXLE SHAFT PULLER PLATE	Same as plate 2 included in AXLE SHAFT PULLER (926470000).
 <p style="text-align: center;">B4M2393</p>	927390000	ADAPTER	Used as an adapter for AXLE SHAFT INSTALLER (922431000).
 <p style="text-align: center;">B4M2394</p>	927400000	HOUSING STAND	<ul style="list-style-type: none"> ● Used for disassembling and assembling front housing bearing. ● Used with BEARING PULLER (927100000).

DS-10

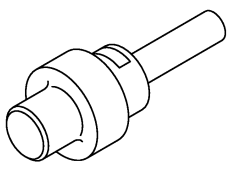
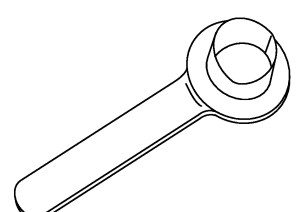
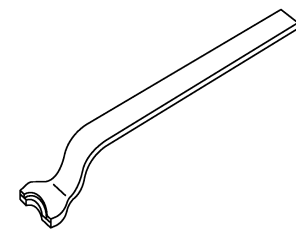
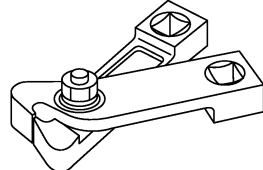
GENERAL DESCRIPTION

Drive Shaft System

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p style="text-align: center;">B4M2395</p>	927410000	OIL SEAL INSTALLER	<ul style="list-style-type: none"> ● Used for installing oil seal into front housing. ● Used with HOUSING STAND (927400000).
 <p style="text-align: center;">B4M2396</p>	398507703	DUMMY COLLAR	Used for removing hub ASSY from hub unit.
 <p style="text-align: center;">B4M2397</p>	399520105	SEAT	Used for removing inner race from hub ASSY.
 <p style="text-align: center;">B4M2398</p>	28499AE000	BEARING SPACHER	Used for installing hub unit into hub ASSY.
 <p style="text-align: center;">B4M2399</p>	927120000	HUB INSTALLER	Used for installing hub.

GENERAL DESCRIPTION

Drive Shaft System

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p style="text-align: center;">B4M2400</p>	927450000	HUB INSTALLER	<ul style="list-style-type: none"> Used for installing hub unit into hub ASSY. Used with BEARING SPACER (28499AE000) and HUB STAND (927080000).
 <p style="text-align: center;">B4M2401</p>	28099PA090	OIL SEAL PROTECTOR	<ul style="list-style-type: none"> Used for installing rear drive shaft into rear differential. For protecting oil seal.
 <p style="text-align: center;">B4M2402</p>	28099PA100	DRIVE SHAFT REMOVER	Used for removing rear drive shaft from rear differential.
 <p style="text-align: center;">B4M2403</p>	28099AC000	BOOT BAND PLIERS	Used for tightening front BJ boot band.

2. GENERAL PURPOSE TOOLS S301001A1702

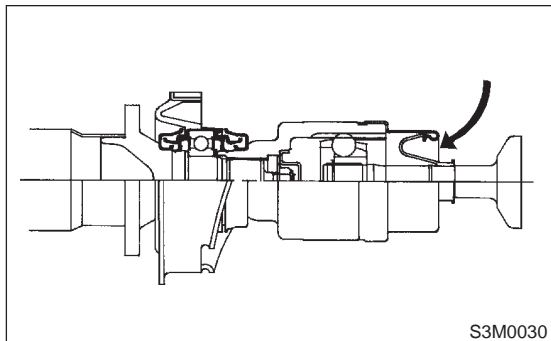
TOOL NAME	REMERKS
Puller	Used for removing ball joint from knuckle arm.
Dial gauge	Used for inspecting propeller shaft run-out.
Snap ring pliers	Used for installing and removing snap ring.

2. Propeller Shaft S301160

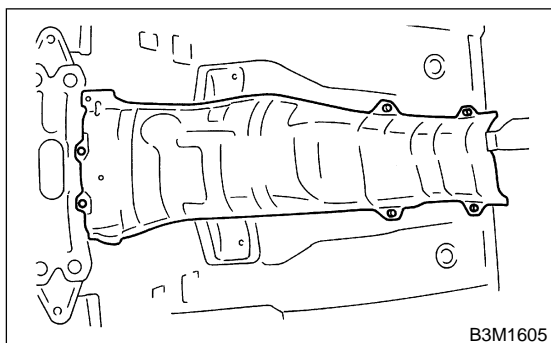
A: REMOVAL S301160A18

NOTE:

- Before removing propeller shaft, wrap metal parts with a cloth or rubber material.
- In case of DOJ type, before removing propeller shaft, wrap metal parts (installed at the rubber boot of center DOJ) with a cloth or rubber material, as shown in the figure. Rubber boot may be damaged due to interference with adjacent metal parts while bending the DOJ during removal.



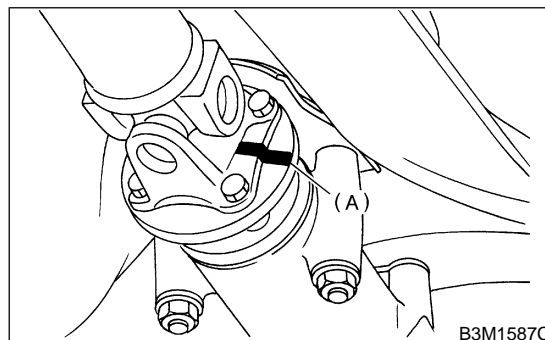
- 1) Disconnect ground terminal from battery.
- 2) Move select lever or gear shift lever to "N".
- 3) Release the parking brake.
- 4) Jack-up vehicle and support it with sturdy racks.
- 5) Remove center exhaust pipes.
- 6) Remove rear exhaust pipe and muffler.
- 7) Remove heat shield cover.



- 8) Remove the four bolts which hold propeller shaft to rear differential.

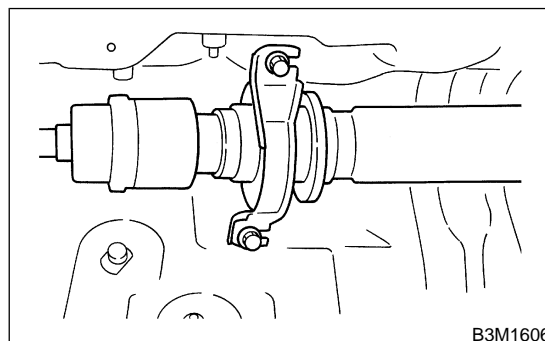
NOTE:

- Put matching mark on affected parts before removal.
- Remove all but one bolt.



(A) Matching mark

- 9) Remove the two bolts which hold center bearing to vehicle body.



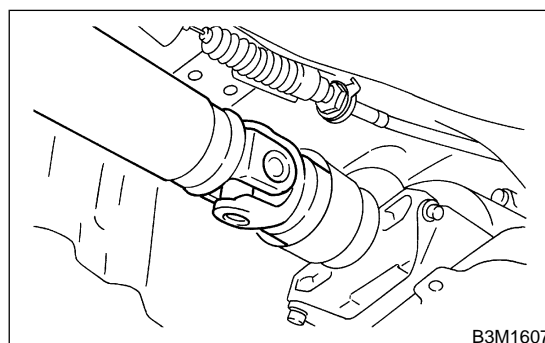
- 10) Remove propeller shaft from transmission.

CAUTION:

Be sure not to damage oil seals and the frictional surface of sleeve yoke.

NOTE:

- Be sure to use an empty oil can to catch oil flowing out when removing propeller shaft.
- Be sure to plug the opening in transmission after removal of propeller shaft.



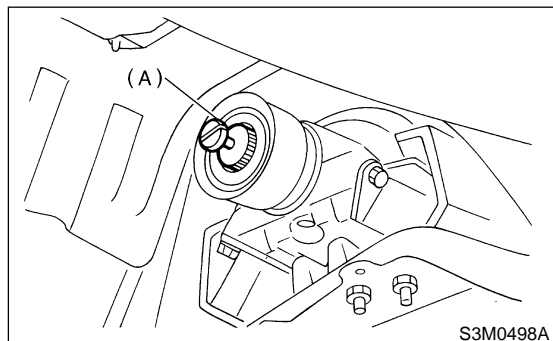
PROPELLER SHAFT

Drive Shaft System

11) Install the extension cap to transmission.

NOTE:

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



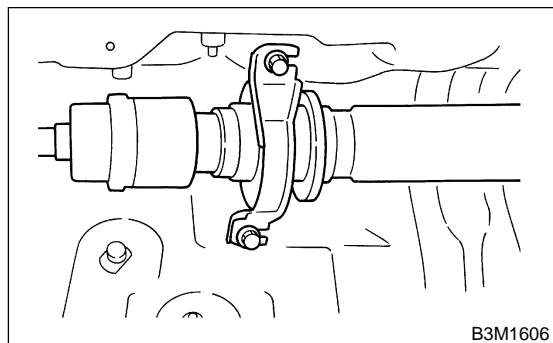
(A) Extension cap

B: INSTALLATION S301160A11

1) Insert sleeve yoke into transmission and attach center bearing to body.

Tightening torque:

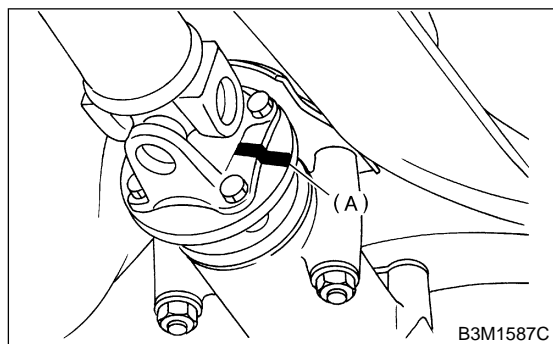
52 N·m (5.3 kgf-m, 38.3 ft-lb)



2) Align matching marks and connect flange yoke and rear differential.

Tightening torque:

31 N·m (3.2 kgf-m, 23.1 ft-lb)



(A) Matching mark

3) Install heat shield cover.
4) Install center exhaust pipes.

5) Install rear exhaust pipe and muffler.

C: INSPECTRION S301160A10

NOTE:

Do not disassemble propeller shaft. Check the following and replace if necessary.

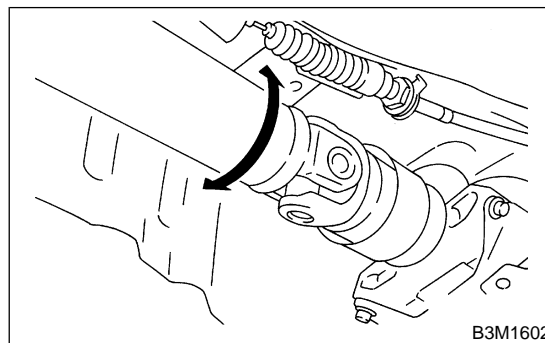
- 1) Tube surfaces for dents or cracks
 - 2) Splines for deformation or abnormal wear
 - 3) Joints for non-smooth operation or abnormal noise
 - 4) Center bearing for free play, noise or non-smooth operation
 - 5) Oil seals for abnormal wear or damage
 - 6) Center bearing for breakage
- Check the following points with propeller shaft installed in vehicle.

1. JOINTS AND CONNECTIONS S301160A1001

- 1) Remove center exhaust pipes.
- 2) Remove heat shield cover.
- 3) Check for any looseness of yoke flange connecting bolts and center bearing retaining bolts.

2. SPLINES AND BEARING LOCATIONS S301160A1002

- 1) Remove center exhaust pipes.
- 2) Remove rear exhaust pipe and muffler.
- 3) Remove heat shield cover.
- 4) Turn propeller shaft by hand to see if abnormal free play exists at splines. Also move yokes to see if abnormal free play exists at spiders and bearings.



3. RUNOUT OF PROPELLER SHAFT

S301160A1003

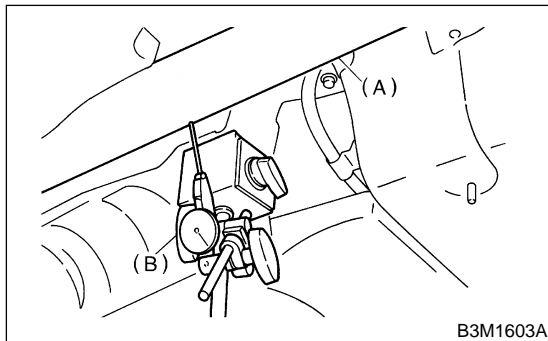
- 1) Remove center exhaust pipes.
- 2) Remove rear exhaust pipe and muffler.
- 3) Remove heat shield cover.
- 4) Turn rear wheels by hand to check for "runout" of propeller shaft.

NOTE:

Measure runout with a dial gauge at the center of front and rear propeller shaft tubes.

Runout:

Limit 0.6 mm (0.024 in)

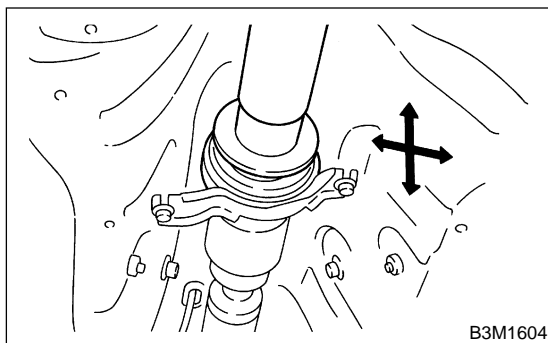


- (A) Propeller shaft
- (B) Dial gauge

4. CENTER BEARING FREE PLAY

S301160A1004

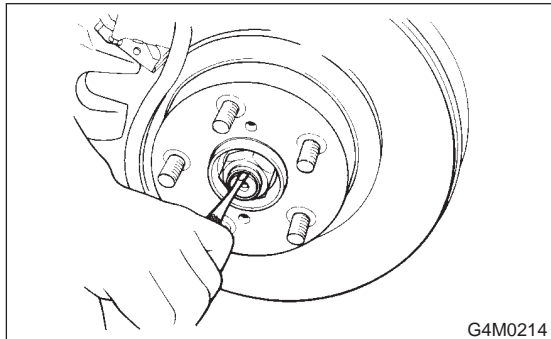
- 1) Remove front and center exhaust pipes.
- 2) Remove rear exhaust pipe and muffler.
- 3) Remove heat shield cover.
- 4) While holding propeller shaft near center bearing with your hand, move it up and down, and left and right to check for any abnormal bearing free play.



3. Front Axle S301148

A: REMOVAL S301148A18

- 1) Disconnect ground cable from battery.
- 2) Jack-up vehicle, support it with safety stands, and remove front wheels.
- 3) Unlock axle nut.

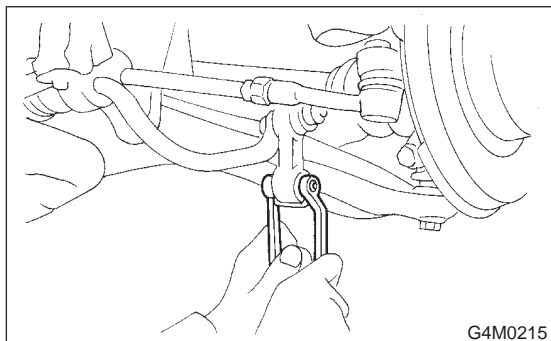


- 4) Remove axle nut using a socket wrench.

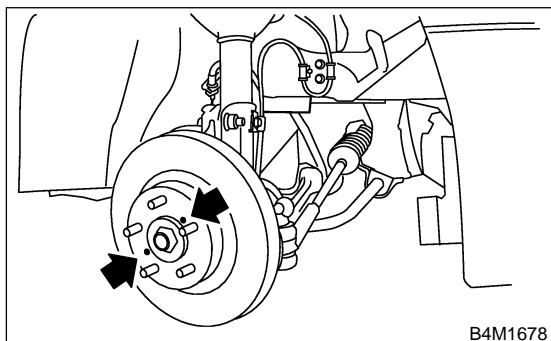
CAUTION:

Be sure to loose and retighten axle nut after removing wheel from vehicle. Failure to follow this rule may damage wheel bearings.

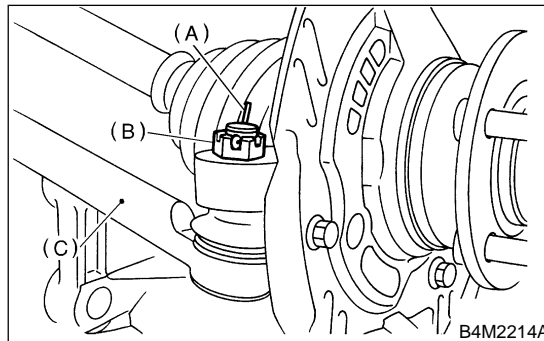
- 5) Remove stabilizer link.



- 6) Remove disc brake caliper from housing, and suspend it from strut using a wire.
- 7) Remove disc rotor from hub.
If disc rotor seizes up within hub, drive disc rotor out by installing an 8-mm bolt in screw hole on the rotor.

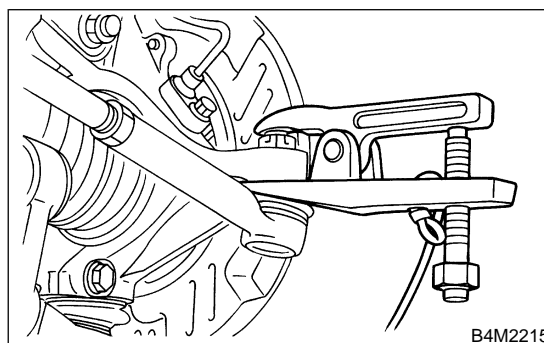


- 8) Remove cotter pin and castle nut which secure tie-rod end to housing knuckle arm.

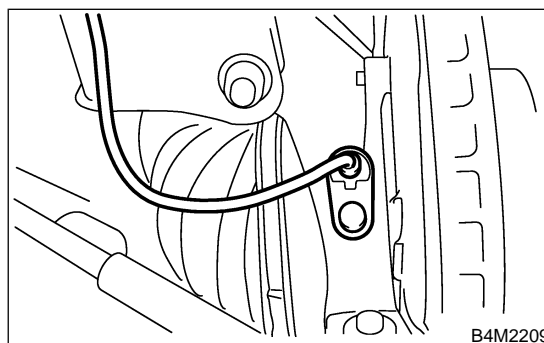


- (A) Cotter pin
- (B) Castle nut
- (C) Tie-rod

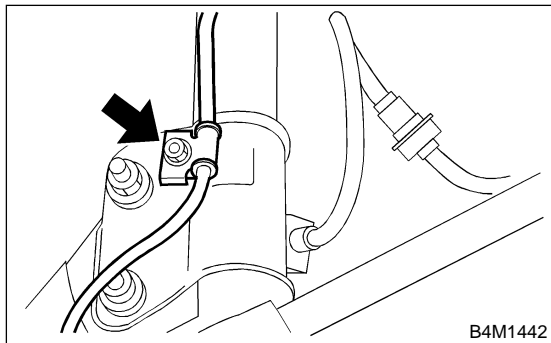
- 9) Using a puller, remove tie-rod ball joint from knuckle arm.



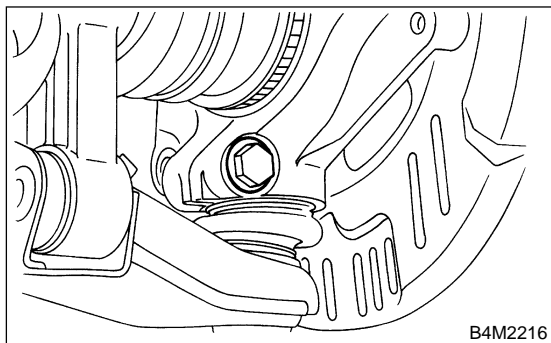
- 10) Remove ABS sensor assembly and harness in advance.



11) Remove bolt which secures sensor harness to strut.



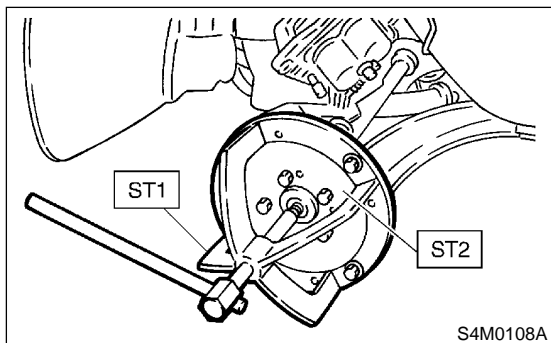
12) Remove transverse link ball joint from housing.



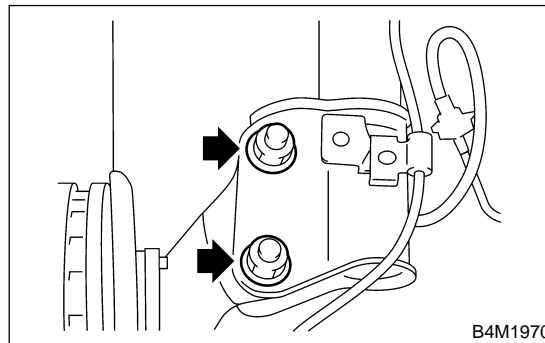
13) Remove SFJ from transmission spindle.
 14) Remove front drive shaft assembly from hub.
 If it is hard to remove, use STs.
 ST1 926470000 AXLE SHAFT PULLER
 ST2 927140000 PLATE

CAUTION:

- Be careful not to damage oil seal lip and tone wheel when removing front drive shaft.
- When replacing front drive shaft, also replace inner oil seal.



15) After scribing an alignment mark on camber adjusting bolt head, remove bolts which connect housing and strut, and disconnect housing from strut.



B: INSTALLATION S301148A11

1) Install transverse link ball joint to housing.

Tightening torque:
49 N·m (5.0 kgf-m, 36 ft-lb)

2) While aligning alignment mark on camber adjusting bolt head, connect housing and strut.

CAUTION:
Use a new self-locking nut.

Tightening torque:
177 N·m (18.0 kgf-m, 130 ft-lb)

3) Install ABS sensor on housing.

Tightening torque:
32 N·m (3.3 kgf-m, 23.9 ft-lb)

4) Install ABS sensor harness on strut.

5) Install disc rotor on hub.

6) Install disc brake caliper on housing.

Tightening torque:
78 N·m (8 kgf-m, 57.9 ft-lb)

7) Install front drive shaft. <Ref. to DS-28 INSTALLATION, Front Drive Shaft.>

8) Connect stabilizer link.

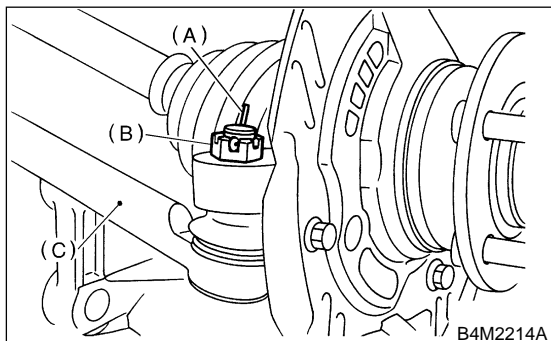
FRONT AXLE

Drive Shaft System

9) Connect tie-rod end ball joint and knuckle arm with a castle nut, and insert cotter pin into tie-rod end.

Tightening torque:

27.0 N·m (2.75 kgf-m, 19.9 ft-lb)



- (A) Cotter pin
- (B) Castle nut
- (C) Tie-rod

10) While depressing brake pedal, tighten axle nut and lock it securely.

Tightening torque:

2.5 ℓ MODEL

186 N·m (19 kgf-m, 137 ft-lb)

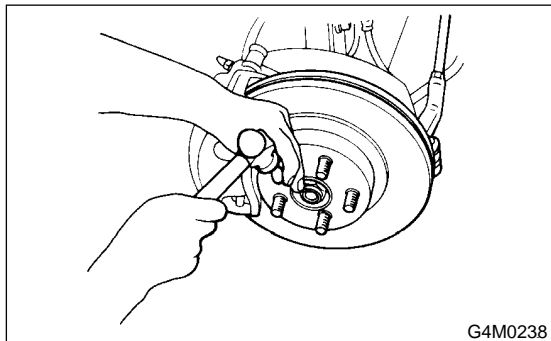
3.0 ℓ MODEL

216 N·m (22 kgf-m, 159 ft-lb)

CAUTION:

- Use a new axle nut (3.0 ℓ model: Olive color, 2.5 ℓ model: Gold color).
- Always tighten axle nut before installing wheel on vehicle. If wheel is installed and comes in contact with ground when axle nut is loose, wheel bearings may be damaged.
- Be sure to tighten axle nut to specified torque. Do not overtighten it as this may damage wheel bearing.

11) After tightening axle nut, lock it securely.



12) Install wheel and tighten wheel nuts to specified torque.

Tightening torque:

88 N·m (9 kgf-m, 65 ft-lb)

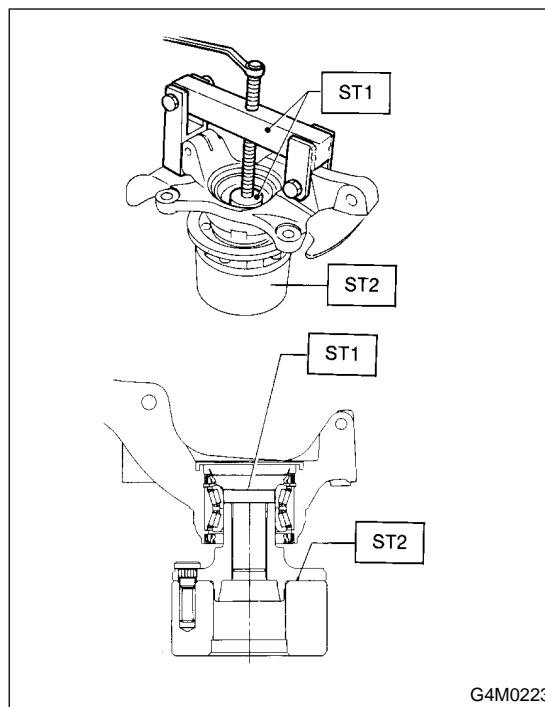
C: DISASSEMBLY S301148A06

1) Using ST1, support housing and hub securely.

2) Attach ST2 to housing and drive hub out.

ST1 927060000 HUB REMOVER

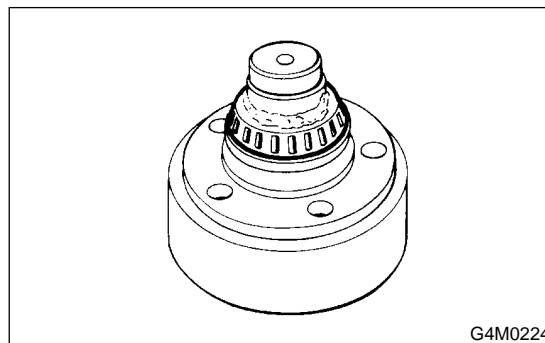
ST2 927080000 HUB STAND



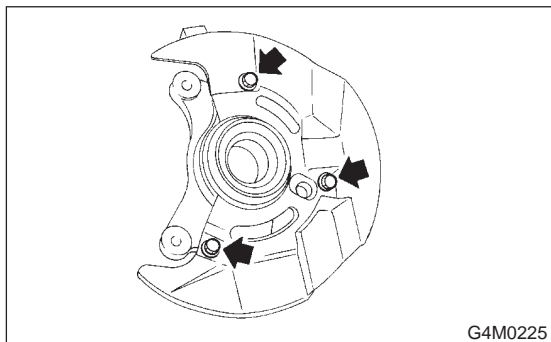
If inner bearing race remains in the hub, remove it with a suitable tool (commercially available).

CAUTION:

- Be careful not to scratch polished area of hub.
- Be sure to install inner race on the side of outer race from which it was removed.



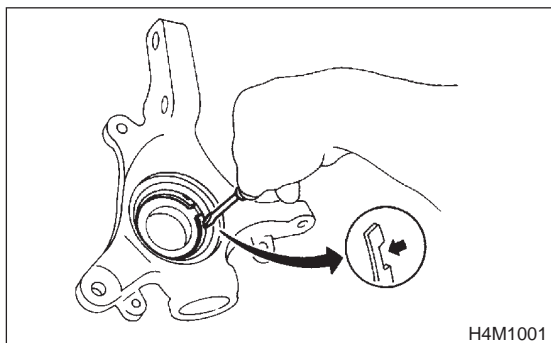
3) Remove disc cover from housing.



4) Using a standard screwdriver, remove outer and inner oil seals.

CAUTION:
Do not use old oil seals.

5) Using flat bladed screwdriver, remove snap ring.

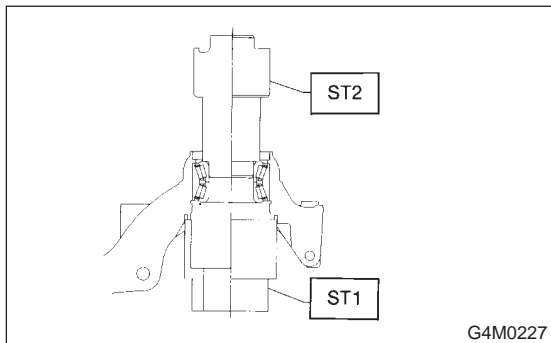


6) Using ST1, support housing securely.
7) Using ST2, press inner race to drive out outer bearing.

ST1 927400000 HOUSING STAND
ST2 927100000 BEARING REMOVER

CAUTION:

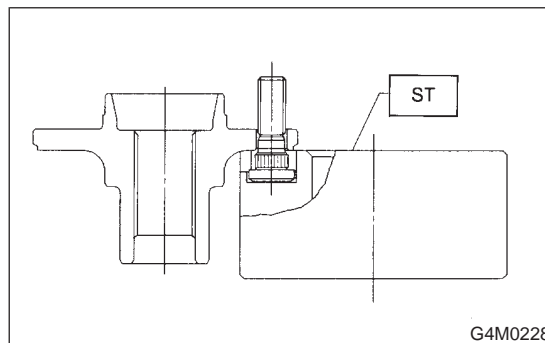
- Do not remove outer race unless it is faulty.
- Discard outer race after removal.
- Do not replace inner or outer race separately; always replace as a unit.



8) Using ST and a hydraulic press, drive hub bolts out.

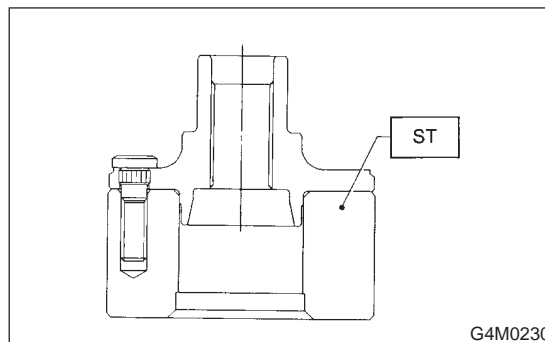
ST 927080000 HUB STAND

CAUTION:
Be careful not to hammer hub bolts. This may deform hub.



D: ASSEMBLY S301148A02

1) Attach hub to ST securely.
ST 927080000 HUB STAND



2) Using a hydraulic press, press new hub bolts into place.

CAUTION:
Be sure to press hub bolts until their seating surfaces contact the hub.

NOTE:
Use 12 mm (0.47 in) dia. holes in HUB STAND to prevent bolts from tilting.

3) Clean dust or foreign particles from inside the housing.

FRONT AXLE

Drive Shaft System

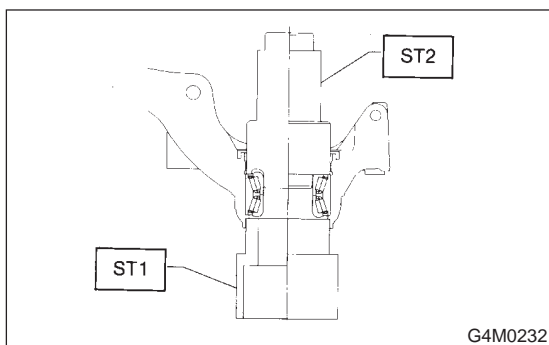
4) Using ST1 and ST2, press a new bearing into place.

ST1 927400000 HOUSING STAND
ST2 927100000 BEARING REMOVER

CAUTION:

- Always press outer race when installing bearing.
- Be careful not to remove plastic lock from inner race when installing bearing.
- Charge bearing with new grease when outer race is not removed.

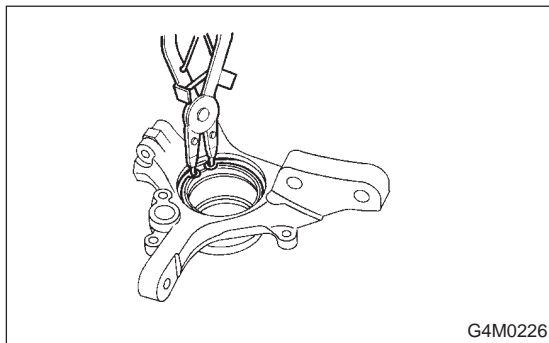
Specified grease:
SHELL 6459N



5) Using pliers, install snap ring in its groove.

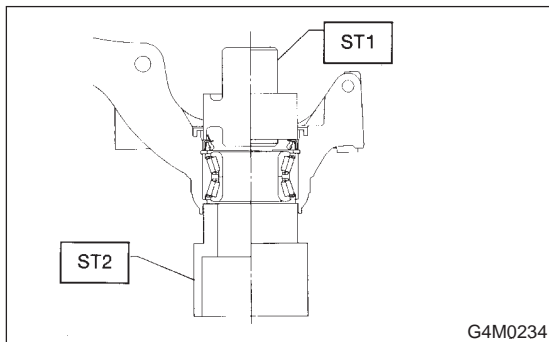
CAUTION:

Make sure to install it firmly to groove.



6) Using ST1 and ST2, press inner oil seal until it contacts circlip.

ST1 927410000 OIL SEAL INSTALLER
ST2 927400000 HOUSING STAND

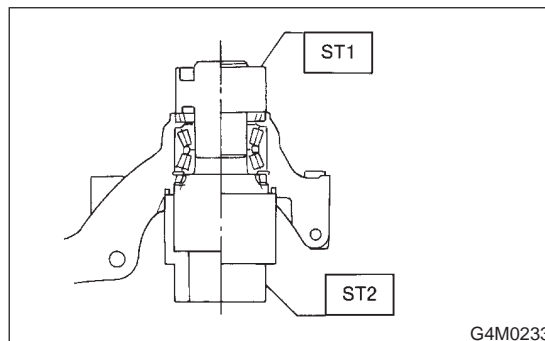


7) Invert ST and housing.

ST 927400000 HOUSING STAND

8) Using ST1 and ST2, press outer oil seal until it contacts the bottom of housing.

ST1 927410000 OIL SEAL INSTALLER
ST2 927400000 HOUSING STAND



9) Apply sufficient grease to oil seal lip.

Specified grease
SHELL 6459N

CAUTION:

- If specified grease is not available, remove bearing grease and apply Auto Rex A instead.
- Do not mix different types of grease.

10) Install disc cover to housing the three bolts.

Tightening torque:

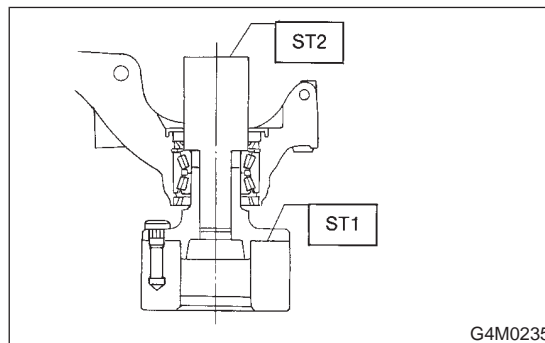
18 N·m (1.8 kgf·m, 13.0 ft·lb)

11) Attach hub to ST1 securely.

12) Clean dust or foreign particles from the polished surface of hub.

13) Using ST2, press bearing into hub by driving inner race.

ST1 927080000 HUB STAND
ST2 927120000 HUB INSTALLER

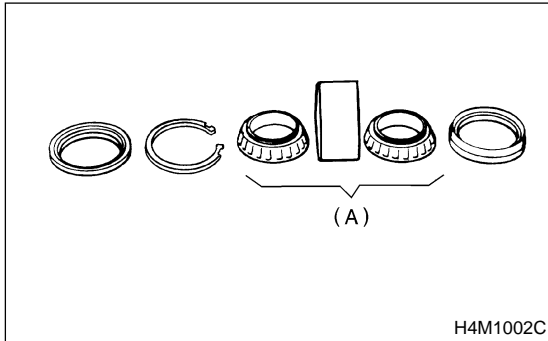


E: INSPECTION S301148A10

Check the removed parts for wear and damage. If defective, replace with new ones.

CAUTION:

- If bearing is faulty, replace it as the bearing set.
- Be sure to replace oil seal at every overhaul.



(A) Replace as a seat.

HUB UNIT BEARING

4. Hub Unit Bearing S301155

A: REMOVAL S301155A18

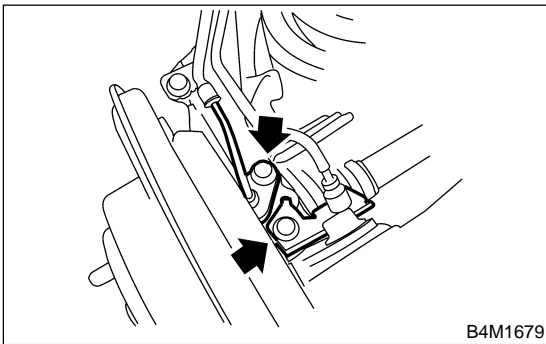
1. DISC BRAKE S301155A1801

- 1) Disconnect ground cable from battery.
- 2) Jack-up vehicle, and remove rear wheel cap and wheels.

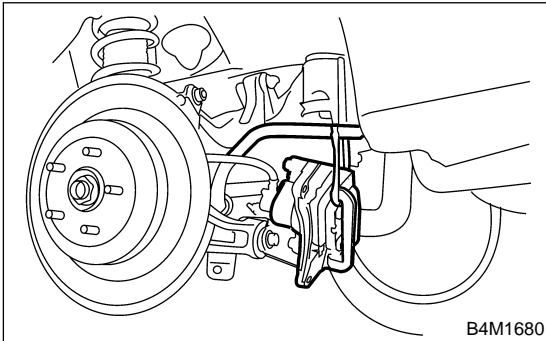
CAUTION:

Be sure to loosen and retighten axle nut after removing wheel from vehicle. Failure to follow this rule may damage wheel bearings.

- 3) Unlock axle nut.
- 4) Remove axle nut using a socket wrench.
- 5) Return parking brake lever.
- 6) Remove ABS sensor.



- 7) Remove brake caliper from back plate and suspend it from stabilizer using a piece of wire.

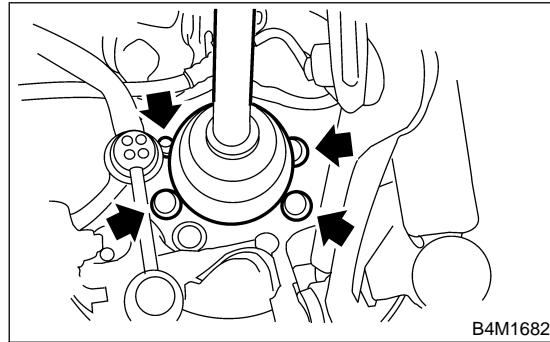


- 8) Remove disc rotor from hub.

NOTE:

- Before removing disc rotor, mark the matching surface of hub and disc rotor so as not to be confused when installing.
- If disc rotor seizes up within hub, drive it out by installing an 8 mm bolt into disc rotor bolt hole.

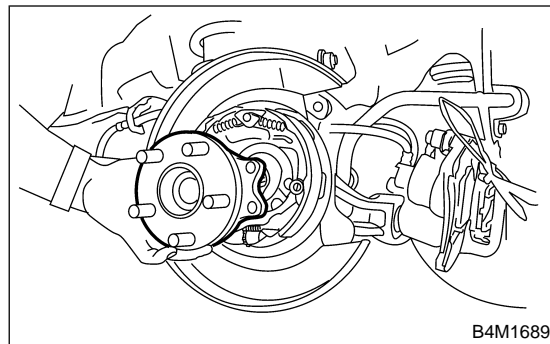
- 9) Remove four bolts from rear arm.



- 10) Remove hub unit bearing.

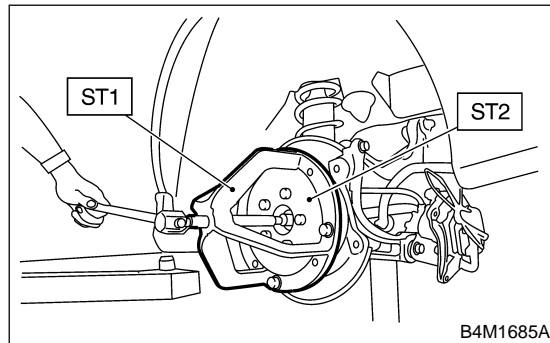
CAUTION:

Be careful not to damage tone wheel.



If it is hard to remove, use STs.

- ST1 926470000 AXLE SHAFT PULLER
- ST2 927140000 PLATE



2. DRUM BRAKE S301155A1802

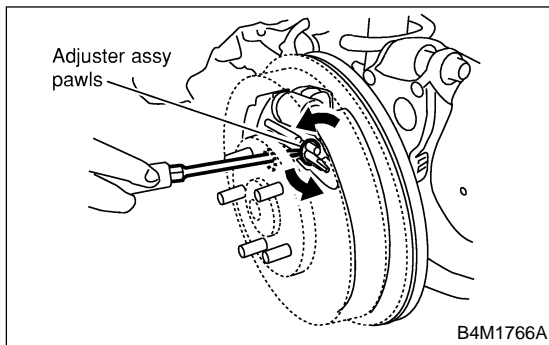
- 1) Disconnect ground cable from battery.
- 2) Jack-up vehicle, and remove rear wheel cap and wheels.

CAUTION:

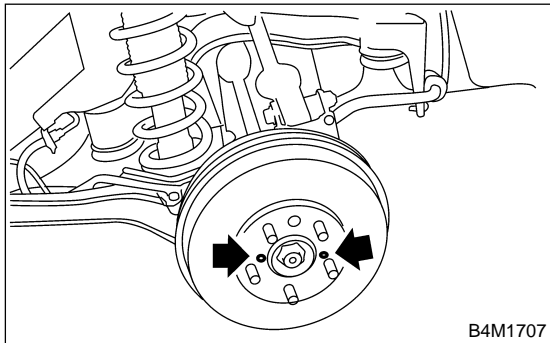
Be sure to loosen and retighten axle nut after removing wheel from vehicle. Failure to follow this rule may damage wheel bearings.

- 3) Unlock axle nut.
- 4) Remove axle nut using a socket wrench.
- 5) Return parking brake lever.
- 6) Remove brake drum from hub.

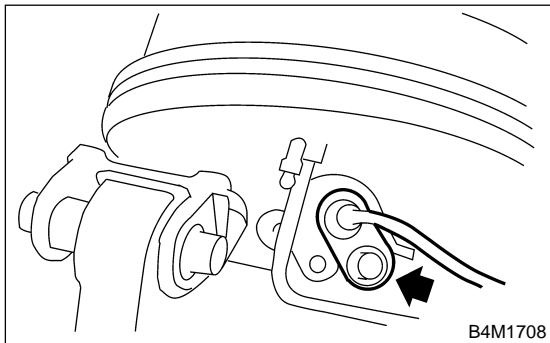
7) If it is difficult to remove brake drum, turn adjusting screw using a slot-type screwdriver until brake shoe separates from the drum.



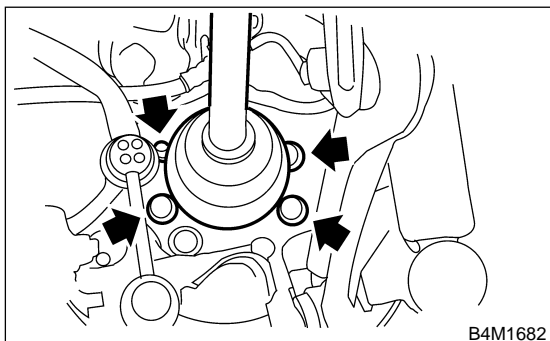
NOTE:
If brake drum is difficult to remove, drive it out by installing an 8-mm bolt into bolt hole in brake drum.



8) Remove ABS sensor.

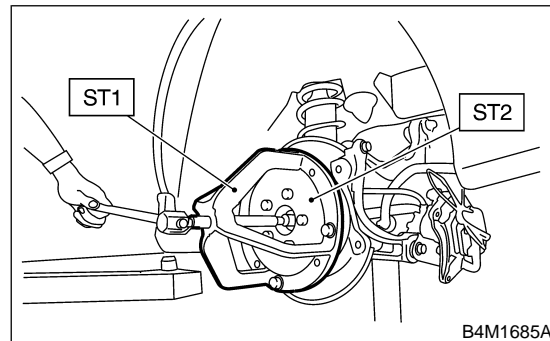


9) Remove four bolts from rear arm.



10) Remove hub unit bearing.
If it is hard to remove, use STs.
ST1 926470000 AXLE SHAFT PULLER
ST2 927140000 PLATE

CAUTION:
Be careful not to damage tone wheel.

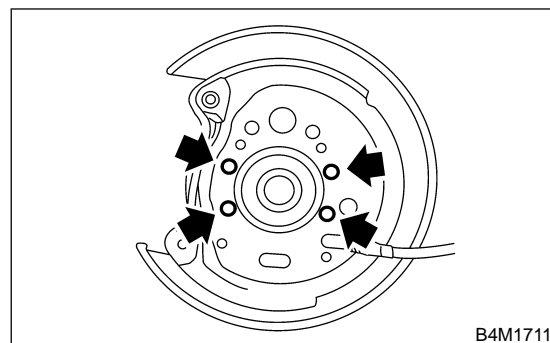


B: INSTALLATION S301155A11

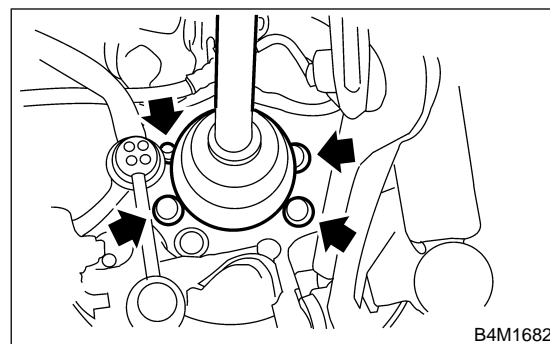
1. DISC BRAKE S301155A1101

1) Align hub unit bearing with back plate at mounting holes and install hub unit assembly and back plate. Temporarily tighten axle nuts.

CAUTION:
Be careful not to damage tone wheel.



2) Tighten four bolts to back plate.

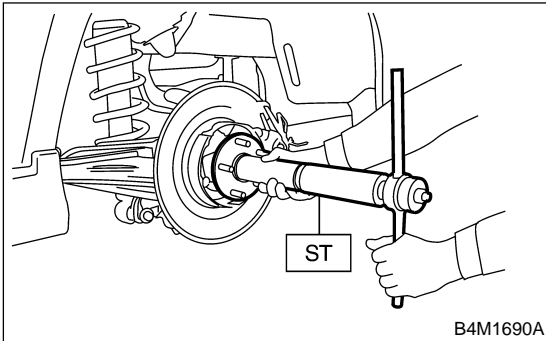


3) Remove axle nut.

HUB UNIT BEARING

Drive Shaft System

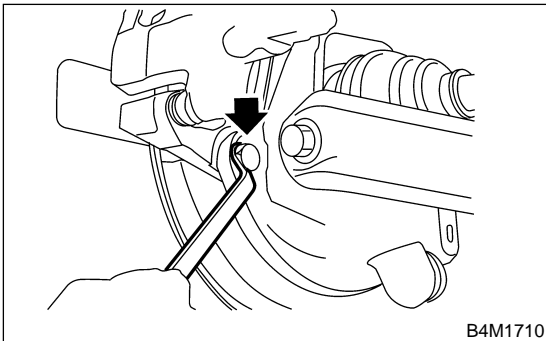
- 4) Using ST1 and ST2, pull axle shaft into place.
ST1 922431000 AXLE SHAFT INSTALLER
ST2 927390000 ADAPTER



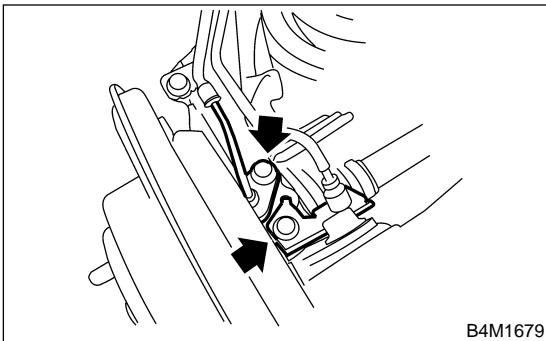
- 5) Temporarily tighten axle nuts.
6) Install disc rotor on hub.
7) Install disc brake caliper on back plate.

Tightening torque:

52 N·m (5.3 kgf-m, 38.3 ft-lb)



- 8) Install rear ABS sensor and brake cable bracket.



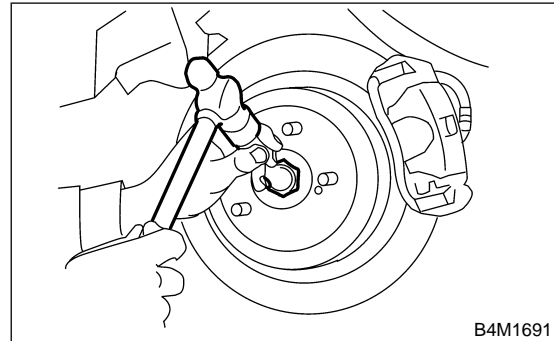
- 9) Adjust parking brake lever stroke by turning adjuster. <Ref. to PB-6 ADJUSTMENT, Parking Brake Lever.>
10) Move brake lever back to apply brakes. While depressing brake pedal, tighten axle nut using a socket wrench. Lock axle nut after tightening.

Tightening torque:

235 N·m (24 kgf-m, 174 ft-lb)

CAUTION:

- Use a new axle nut for rear use only (Olive color).
- Always tighten axle nut before installing wheel on vehicle. If wheel is installed and comes in contact with ground when axle nut is loose, wheel bearings may be damaged.
- Be sure to tighten axle nut to specified torque. Do not overtighten it as this may damage wheel bearing.



- 11) Install wheel and tighten wheel nuts to specified torque.

Tightening torque:

88 N·m (9 kgf-m, 65 ft-lb)

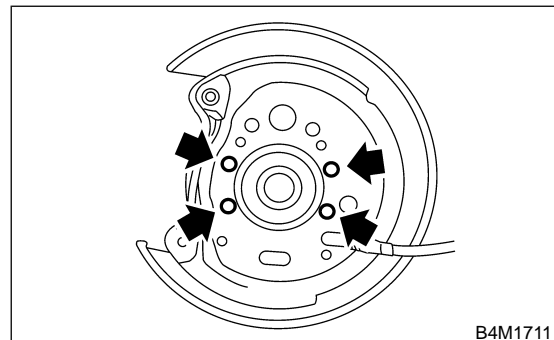
2. DRUM BRAKE

S301155A1102

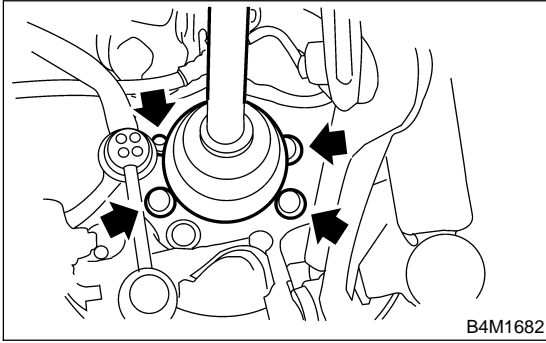
- 1) Align hub unit bearing with back plate at mounting holes and install hub unit assembly and back plate. Temporarily tighten axle nuts.

CAUTION:

Be careful not to damage tone wheel.



2) Tighten four bolts to back plate.



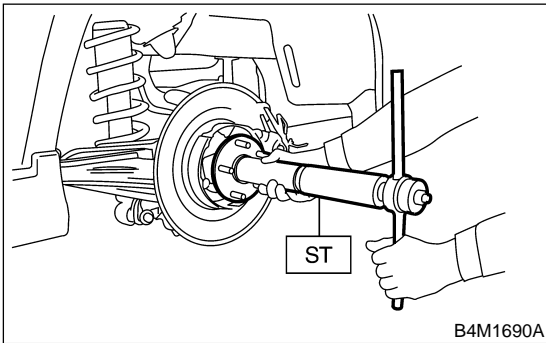
3) Remove axle nut.

4) Using ST1 and ST2, pull axle shaft into place.

ST1 922431000 AXLE SHAFT INSTALLER

ST2 927390000 ADAPTER

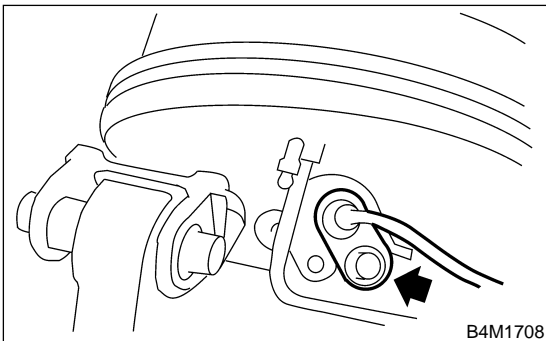
5) Temporarily tighten axle nuts.



6) Install rear ABS sensor.

Tightening torque:

32 N·m (3.3 kgf-m, 23.9 ft-lb)



7) Install brake drum on rear housing assembly.

8) Move brake lever back to apply brakes. While depressing brake pedal, tighten axle nut using a socket wrench. Lock axle nut after tightening.

Tightening torque:

235 N·m (24 kgf-m, 174 ft-lb)

CAUTION:

- Use a new axle nut for rear use only (Olive color).
- Always tighten axle nut before installing wheel on vehicle. If wheel is installed and comes in contact with ground when axle nut is loose, wheel bearings may be damaged.
- Be sure to tighten axle nut to specified torque. Do not overtighten it as this may damage wheel bearing.

9) Install wheel and tighten wheel nuts to specified torque.

Tightening torque:

88 N·m (9 kgf-m, 65 ft-lb)

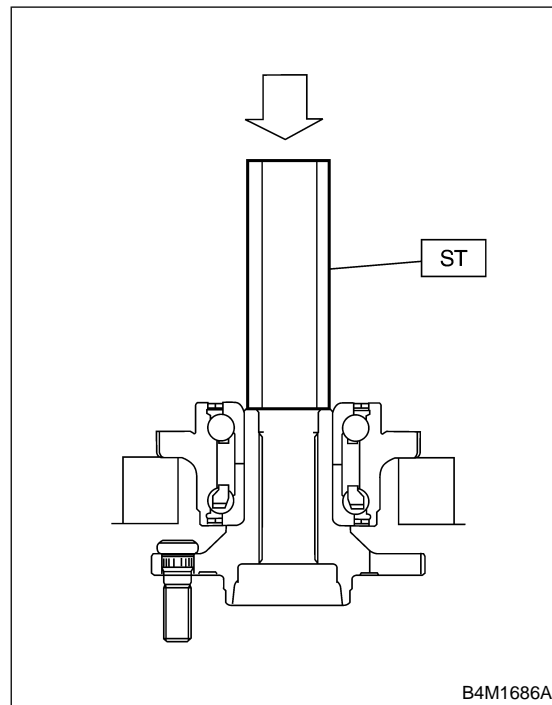
C: DISASSEMBLY S301155A06

1) Using ST, remove hub unit from hub assembly.

CAUTION:

Securely set hub assembly so that it does not lean.

ST 398507703 DUMMY COLLAR



HUB UNIT BEARING

Drive Shaft System

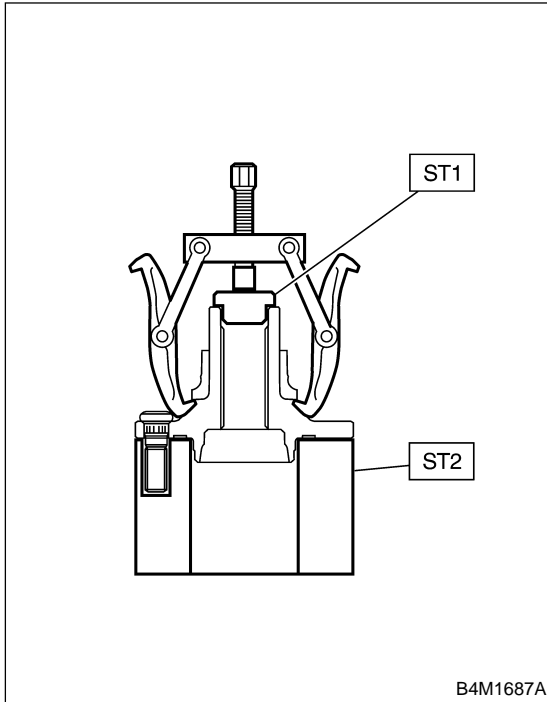
2) Using ST and a puller (common hand tool), remove bearing inner race.

ST1 399520105 SEAT

ST2 927080000 HUB STAND

CAUTION:

- Do not remove hub unit bearing unless damaged.
- Do not re-use hub unit bearing after removal.

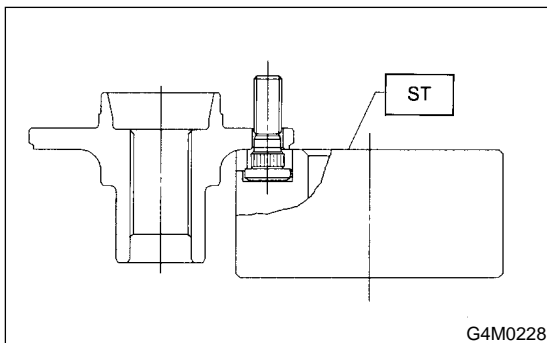


3) Using ST, press hub bolt out.

ST 927080000 HUB STAND

CAUTION:

Be careful not to hammer hub bolts. This may deform hub.



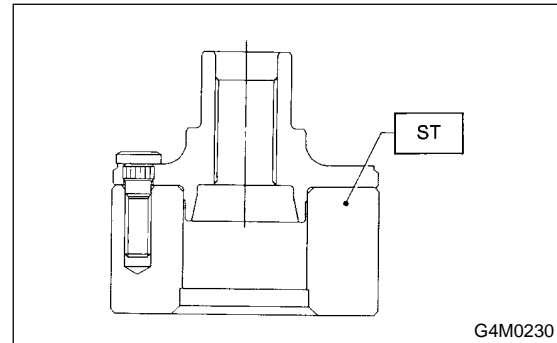
D: ASSEMBLY S301155A02

1) Using ST, press new hub bolt into place.

CAUTION:

- Ensure hub bolt closely contacts hub.
- Use a 12 mm (0.47 in) hole in the ST to prevent hub bolt from tilting during installation.

ST 927080000 HUB STAND

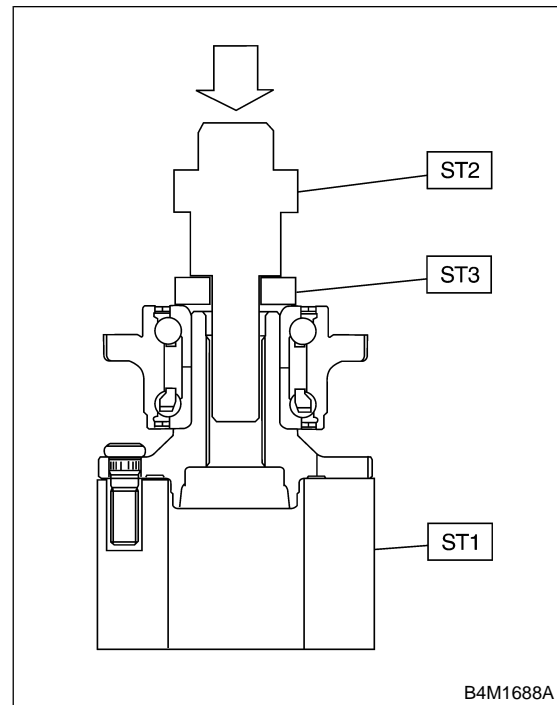


2) Using ST1, ST2 and ST3, press hub unit bearing into hub.

ST1 927080000 HUB STAND

ST2 927450000 HUB INSTALLER

ST3 28499AE000 SPACER



CAUTION:

- Always press inner race when installing hub unit bearing.
- Use a new hub unit bearing.

E: INSPECTION S301155A10

Check the removed parts for wear and damage. If defective, replace with new ones.

CAUTION:

If a bearing is faulty, replace it as a hub unit bearing.

FRONT DRIVE SHAFT

Drive Shaft System

5. Front Drive Shaft S301153

A: REMOVAL S301153A18

- 1) Disconnect ground cable from battery.
- 2) Jack-up vehicle, support it with safety stands (rigid rocks), and remove front wheel cap and wheels.
- 3) Unlock axle nut.
- 4) Depress brake pedal and remove axle nut using a socket wrench.

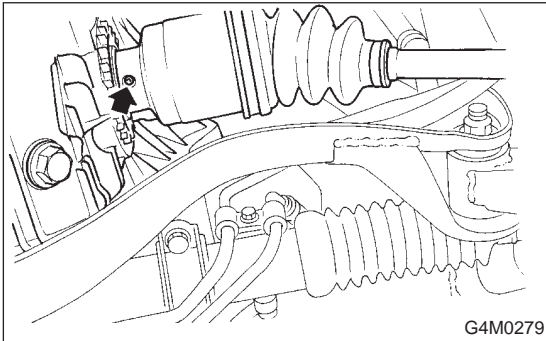
CAUTION:

Be sure to loosen and retighten axle nut after removing wheel from vehicle. Failure to follow this rule may damage wheel bearings.

- 5) Remove stabilizer link from transverse link.
- 6) Disconnect transverse link from housing.
- 7) Remove spring pin which secures transmission spindle to SFJ.

CAUTION:

Use a new spring pin.

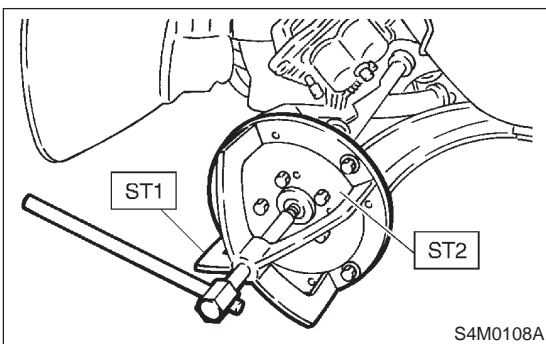


- 8) Remove front drive shaft assembly. If it is hard to remove, use ST1 and ST2.

ST1 926470000 AXLE SHAFT PULLER
ST2 927140000 PLATE

CAUTION:

- Be careful not to damage oil seal lip and tone wheel when removing front drive shaft.
- When front drive shaft is to be replaced, also replace inner oil seal.



B: INSTALLATION S301153A11

- 1) Insert BJ into hub splines.

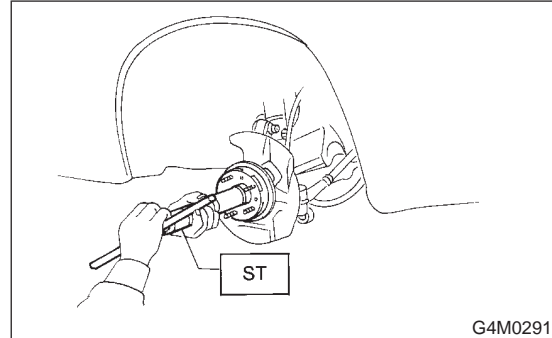
CAUTION:

Be careful not to damage inner oil seal lip and tone wheel.

- 2) Using ST1 and ST2, pull drive shaft into place.
ST1 922431000 AXLE SHAFT INSTALLER
ST2 927390000 ADAPTER

CAUTION:

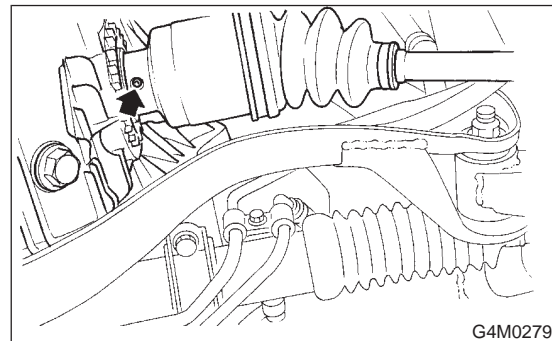
Do not hammer drive shaft when installing it.



- 3) Tighten axle nut temporarily.
- 4) Install SFJ on transmission spindle and drive spring pin into place.

CAUTION:

Always use a new spring pin.



- 5) Connect transverse link to housing.

Tightening torque (self-locking nut):
49 N·m (5.0 kgf-m, 36 ft-lb)

CAUTION:

Use a new self-locking nut.

- 6) Install stabilizer bracket.
- 7) While depressing brake pedal, tighten axle nut to the specified torque.

Tightening torque:

2.5 l MODEL
186 N·m (19 kgf-m, 137 ft-lb)

3.0 l MODEL
216 N·m (22 kgf-m, 159 ft-lb)

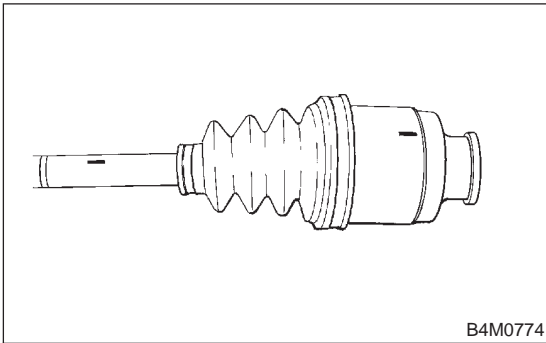
CAUTION:

- Use a new axle nut (3.0 l model: Olive color, 2.5 l model: Gold color).
- Always tighten axle nut before installing wheel on vehicle. If wheel is installed and comes in contact with ground when axle nut is loose, wheel bearings may be damaged.
- Be sure to tighten axle nut to specified torque. Do not overtighten it as this may damage wheel bearing.

8) After tightening axle nut, lock it securely.

C: DISASSEMBLY S301153A06

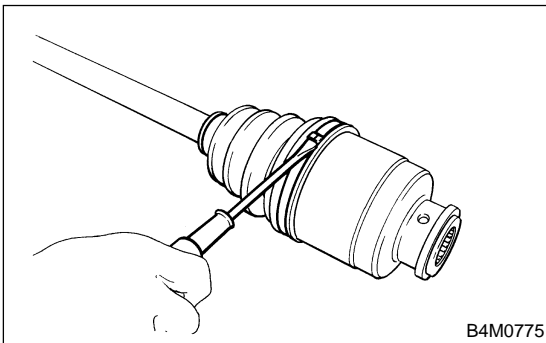
1) Place alignment marks on shaft and outer race.



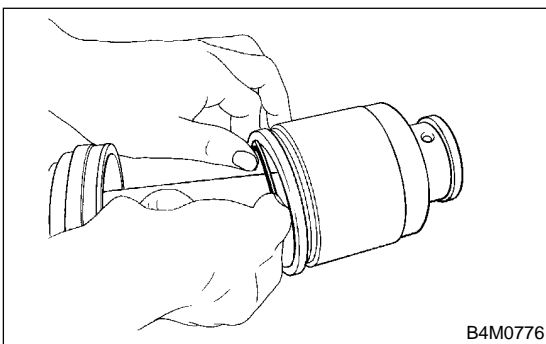
2) Remove SFJ boot band and boot.

CAUTION:

Be careful not to damage boot.



3) Remove circlip from SFJ outer race using screwdriver.



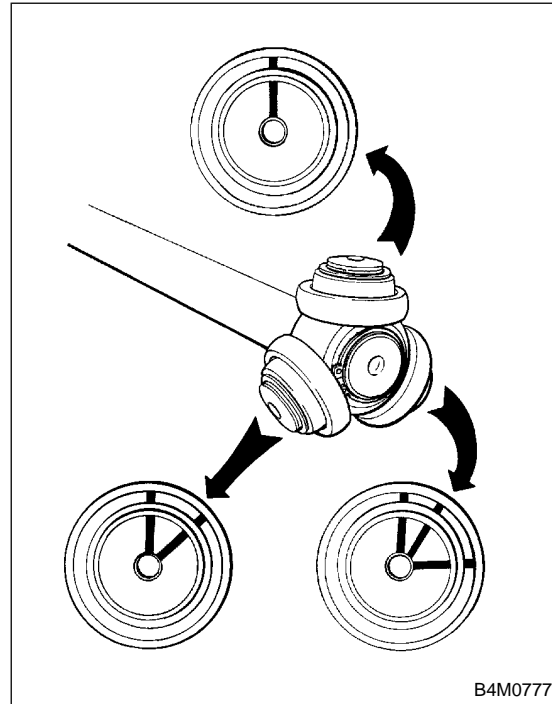
4) Remove SFJ outer race from shaft assembly.

5) Wipe off grease.

CAUTION:

The grease is a special grease. Do not confuse with other greases.

6) Place alignment mark on free ring and trunnion.

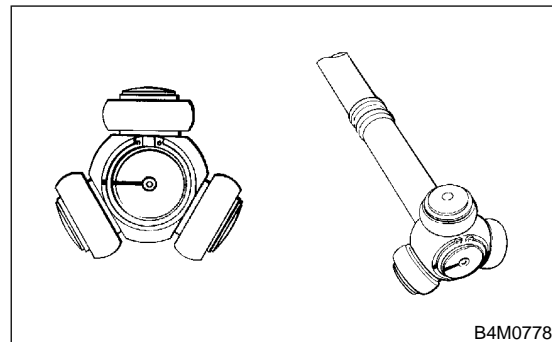


7) Remove free ring from trunnion.

CAUTION:

Be careful with the free ring position.

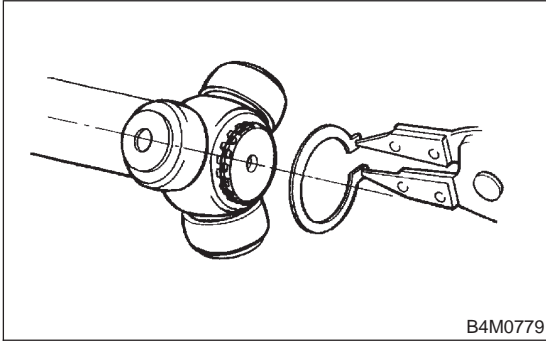
8) Place alignment mark on trunnion and shaft.



FRONT DRIVE SHAFT

Drive Shaft System

- 9) Remove snap ring and trunnion.



CAUTION:

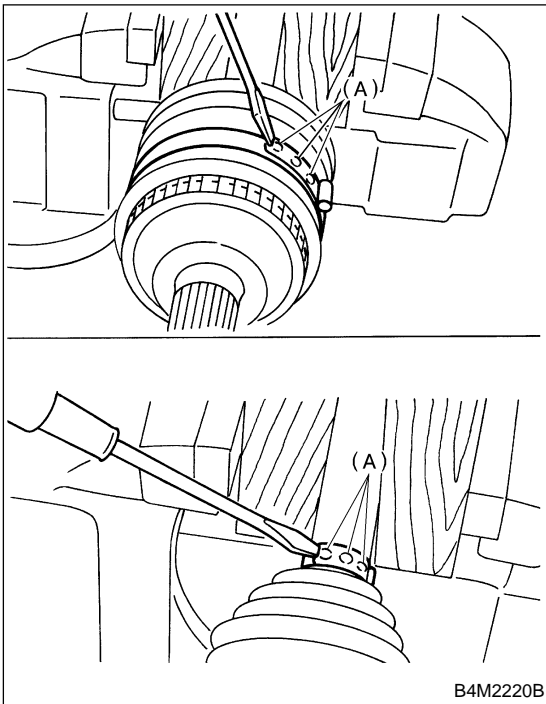
Be sure to wrap shaft splines with vinyl tape to prevent boot from scratches.

- 10) Remove SFJ boot.
11) Place drive shaft in a vise between wooden blocks.

CAUTION:

Do not place drive shaft directly in the vise; use wooden block.

- 12) Raise boot band claws by means of screwdriver and hammer.

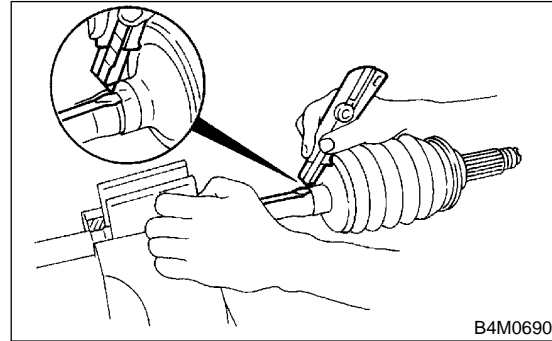


(A) Boot band claws

- 13) Cut and remove the boot.

CAUTION:

The boot must be replaced with a new one whenever it is removed.



- 14) Thus, disassembly of axle is completed, but BJ cannot be disassembled.

D: ASSEMBLY

S301153A02

CAUTION:

Use specified grease.

BJ side:

NTG2218 (Part No. 28093AA000)

SFJ side:

SSG6003 (Part No. 28093TA000)

- 1) Place BJ boot and small boot band on BJ side of shaft.

CAUTION:

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

- 2) Place drive shaft in a vise.

CAUTION:

Do not place drive shaft directly in the vise; use wooden blocks.

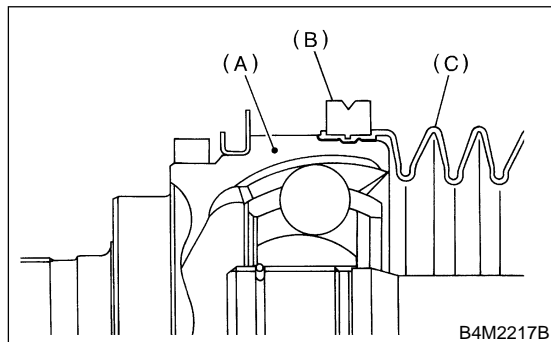
- 3) Apply a coat of specified grease [60 to 70 g (2.12 to 2.47 oz)] to BJ.

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

NOTE:

The inside of the larger end of BJ boot and the boot groove shall be cleaned so as to be free from grease and other substances.

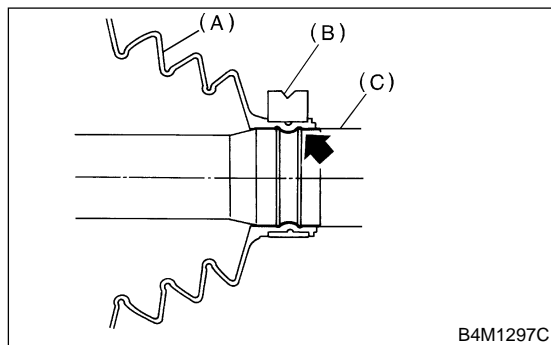
5) Install boot projecting portion to BJ groove.



- (A) BJ
- (B) Large boot band
- (C) Boot

6) Set large boot band in place.

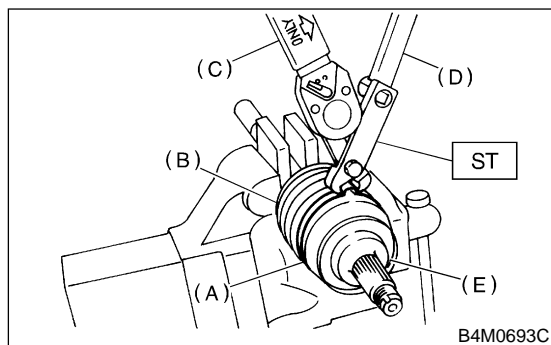
7) Install boot projecting portion to shaft groove.



- (A) Boot
- (B) Small boot band
- (C) Shaft

8) Tighten boot bands using ST, torque wrench and socket flex handle.

ST 28099AC000 BOOT BAND PLIER



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

Tightening torque:

Large boot band

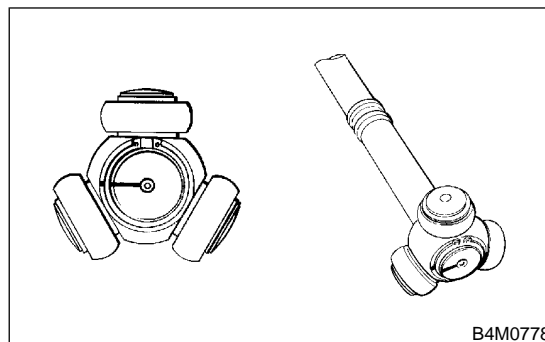
157 N·m (16.0 kgf-m, 116 ft-lb) or more

Small boot band

133 N·m (13.6 kgf-m, 98 ft-lb) or more

9) Place SFJ boot at the center of shaft.

10) Align alignment marks and install trunnion on shaft.



11) Install snap ring to shaft.

CAUTION:

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

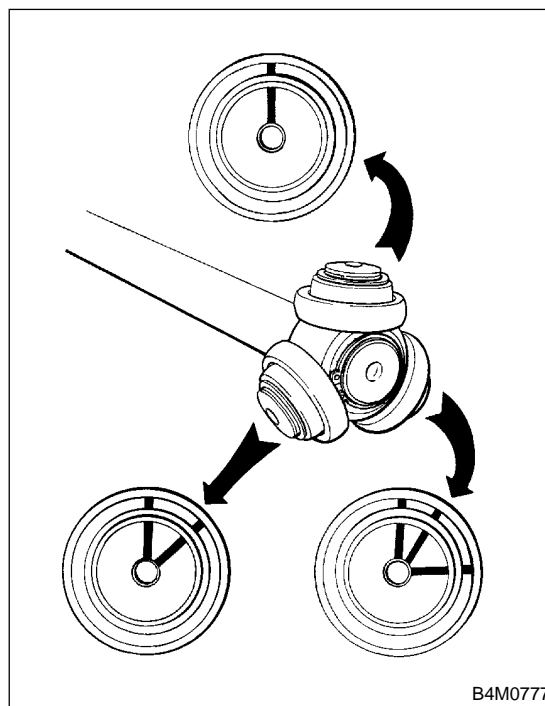
12) Fill 100 to 110 g (3.53 to 3.88 oz) of specified grease into the interior of SFJ outer race.

13) Apply a coat of specified grease to free ring and trunnion.

14) Align alignment marks on free ring and trunnion and install free ring.

CAUTION:

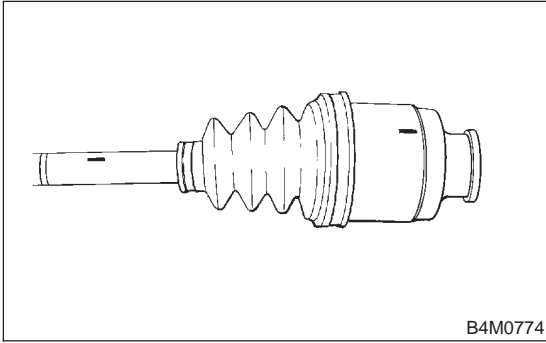
Be careful with the free ring position.



FRONT DRIVE SHAFT

Drive Shaft System

15) Align alignment marks on shaft and outer race, and install outer race.



16) Install circlip in the groove on SFJ outer race.

CAUTION:

Pull the shaft lightly and assure that the circlip is completely fitted in the groove.

17) Apply an even coat of the specified grease 30 to 40 g (1.06 to 1.41 oz) to the entire inner surface of boot.

18) Install SFJ boot taking care not to twist it.

CAUTION:

- The inside of the larger end of SFJ boot and the boot groove shall be cleaned so as to be free from grease and other substances.

- When installing SFJ boot, position outer race of SFJ at center of its travel.

19) Put a band through the clip and wind twice in alignment with band groove of boot.

CAUTION:

Use a new band.

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

NOTE:

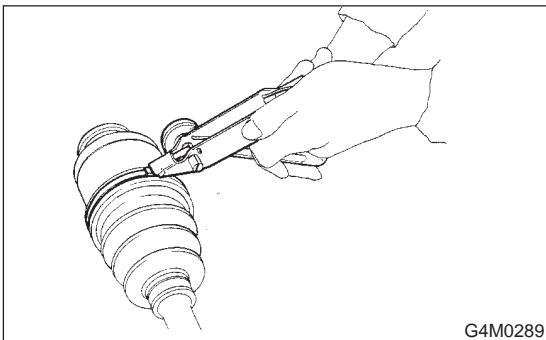
When tightening boot, exercise care so that the air within the boot is appropriate.

21) Tighten band by using ST.

ST 925091000 BAND TIGHTENING TOOL

NOTE:

Tighten band until it cannot be moved by hand.

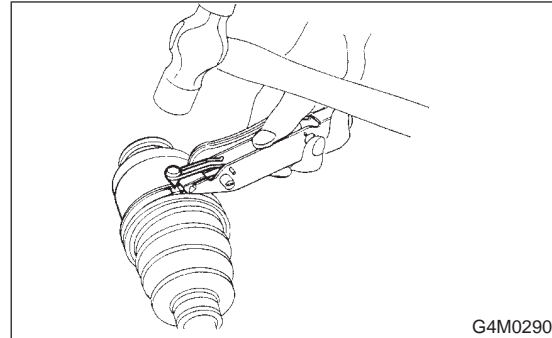


22) Tap on the clip with the punch provided at the end of ST.

ST 925091000 BAND TIGHTENING TOOL

CAUTION:

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



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

CAUTION:

Be careful so that the end of the band is in close contact with clip.

24) Fix up boot on BJ in the same manner.

NOTE:

Extend and retract SFJ to provide equal grease coating.

E: INSPECTION

S301153A10

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

1) DOJ (Double Offset Joint)

Check seizure, corrosion, damage, wear and excessive play.

2) SFJ (Shudder-less Freering tripod Joint)

Check seizure, corrosion, damage and excessive play.

3) Shaft

Check excessive bending, twisting, damage and wear.

4) BJ (Bell Joint)

Check seizure, corrosion, damage and excessive play.

5) Boot

Check for wear, warping, breakage or scratches.

6) Grease

Check for discoloration or fluidity.

6. Rear Drive Shaft S301156

A: REMOVAL S301156A18

- 1) Disconnect ground cable from battery.
- 2) Lift-up vehicle, and remove rear wheel cap and wheels.

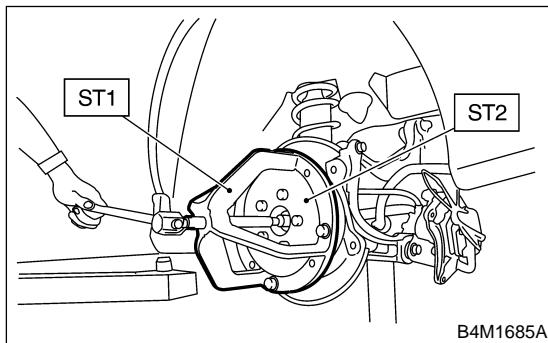
CAUTION:

Be sure to loosen and retighten axle nut after removing wheel from vehicle. Failure to follow this rule may damage wheel bearings.

- 3) Unlock axle nut.
- 4) Remove axle nut using a socket wrench.
- 5) Remove rear differential assembly.
with T-type
<Ref. to DI-24 REMOVAL, Rear Differential for T-type.>
with VA-type
<Ref. to DI-41 REMOVAL, Rear Differential for VA-type.>
- 6) Remove axle nut and drive shaft. If it is hard to remove, use ST1 and ST2.
ST1 926470000 AXLE SHAFT PULLER
ST2 927140000 PLATE

CAUTION:

Be careful not to damage tone wheel when removing rear drive shaft.



B: INSTALLATION S301156A11

- 1) Insert BJ into rear hub splines.

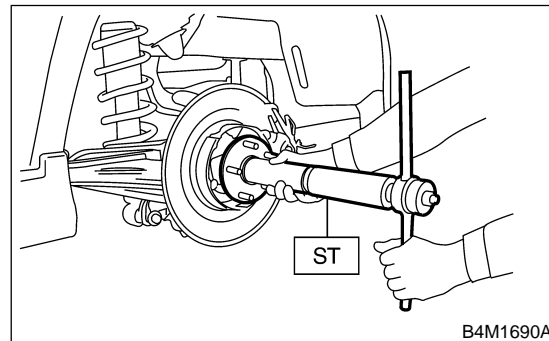
CAUTION:

Be careful not to damage tone wheel.

- 2) Using ST1 and ST2, pull drive shaft into place.
ST1 922431000 AXLE SHAFT INSTALLER
ST2 927390000 ADAPTER

CAUTION:

Do not hammer drive shaft when installing it.



- 3) Tighten axle nut temporarily.
- 4) Install rear differential.
with T-type
<Ref. to DI-26 INSTALLATION, Rear Differential for T-type.>
with VA-type
<Ref. to DI-43 INSTALLATION, Rear Differential for VA-type.>
- 5) While depressing brake pedal, tighten axle nut using a socket wrench.

Tightening torque:

235 N·m (24 kgf-m, 174 ft-lb)

CAUTION:

- Use a new axle nut for rear use only (Olive color).
- Always tighten axle nut before installing wheel on vehicle. If wheel is installed and comes in contact with ground when axle nut is loose, wheel bearings may be damaged.
- Be sure to tighten axle nut to specified torque. Do not overtighten it as this may damage wheel bearing.

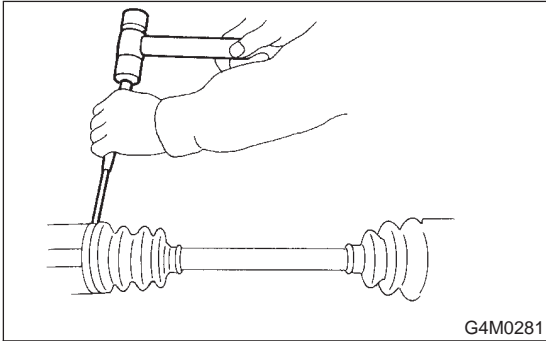
- 6) After tightening axle nut, lock it securely.

REAR DRIVE SHAFT

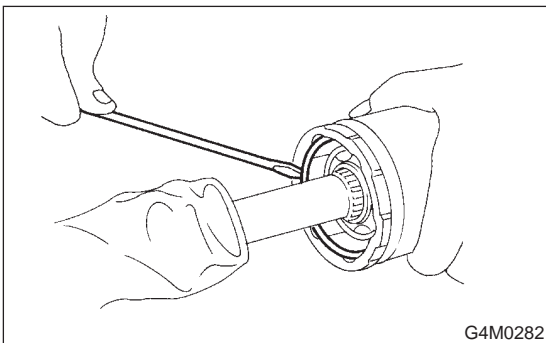
Drive Shaft System

C: DISASSEMBLY S301156A06

- 1) Straighten bent claw of larger end of DOJ boot.
- 2) Loosen band by means of screwdriver or pliers with care of not damaging boot.



- 3) Remove boot band on the small end of DOJ boot in the same manner.
- 4) Remove the larger end of DOJ boot from DOJ outer race.
- 5) Pry and remove round circlip located at the neck of DOJ outer race with a screwdriver.



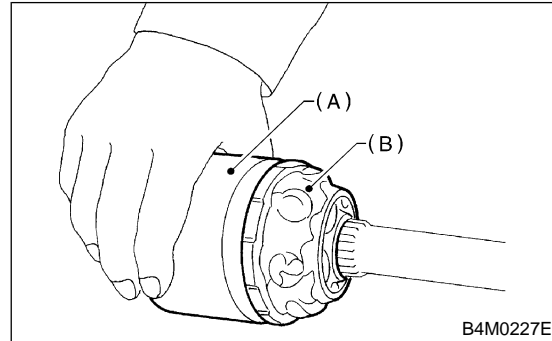
- 6) Take out DOJ outer race from shaft assembly.
- 7) Wipe off grease and take out balls.

CAUTION:

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

NOTE:

Disassemble exercising care not to lose balls (6 pcs).



- (A) Outer race
- (B) Grease

- 8) To remove the cage from the inner race, turn the cage by a half pitch to the track groove of the inner race and shift the cage.
- 9) Remove snap ring, which fixes inner race to shaft, by using pliers.
- 10) Take out DOJ inner race.
- 11) Take off DOJ cage from shaft and remove DOJ boot.

CAUTION:

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

- 12) Remove BJ boot in the same procedure as DOJ boot.
- 13) Thus, disassembly of axle is completed, but BJ is unable to be disassembled.

D: ASSEMBLY S301156A02

CAUTION:

Use specified grease.

BJ side:

Molylex No. 2 (Part No. 723223010)

DOJ side:

VU-3A702 (Yellow) (Part No. 23223GA050)

- 1) Install BJ boot in specified position, and fill it with 60 to 70 g (2.12 to 2.47 oz) of specified grease.
- 2) Place DOJ boot at the center of shaft.

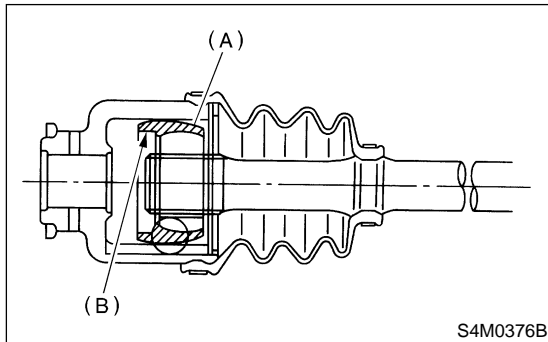
CAUTION:

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

3) Insert DOJ cage onto shaft.

NOTE:

Insert the cage with the cut-out portion facing the shaft end, since the cage has an orientation.

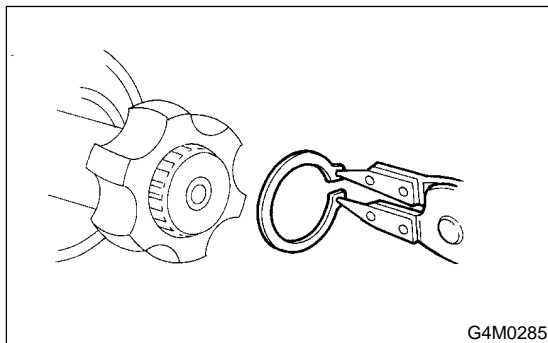


(A) Cage
(B) Cut-out portion

4) Install DOJ inner race on shaft and fit snap ring with pliers.

NOTE:

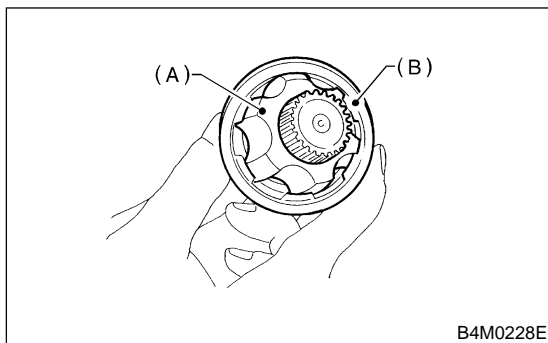
Confirm that the snap ring is completely fitted in the shaft groove.



5) Install cage, which was previously fitted, to inner race fixed upon shaft.

NOTE:

Fit the cage with the protruded part aligned with the track on the inner race and then turn by a half pitch.



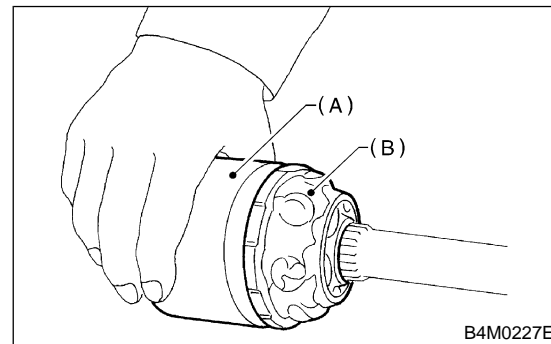
(A) Inner race
(B) Cage

6) Fill 80 to 90 g (2.82 to 3.17 oz) of specified grease into the interior of DOJ outer race.

7) Apply a coat of specified grease to the cage pocket and six balls.

8) Insert six balls into the cage pocket.

9) Align the outer race track and ball positions and place in the part where shaft, inner race, cage and balls are previously installed, and then fit outer race.

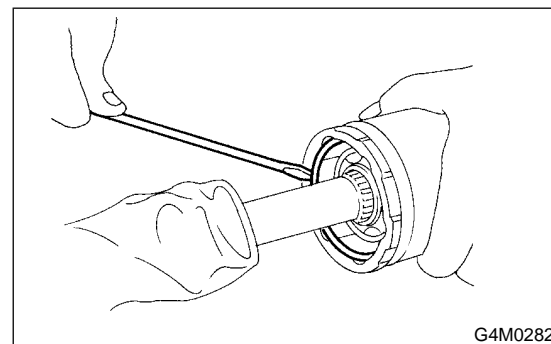


(A) Outer race
(B) Grease

10) Install circlip in the groove on DOJ outer race.

NOTE:

- Assure that the balls, cage and inner race are completely fitted in the outer race of DOJ.
- Exercise care not to place the matched position of circlip in the ball groove of outer race.
- Pull the shaft lightly and assure that the circlip is completely fitted in the groove.



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

12) Install DOJ boot taking care not to twist it.

NOTE:

- The inside of the larger end of DOJ boot and the boot groove shall be cleaned so as to be free from grease and other substances.
- When installing DOJ boot, position outer race of DOJ at center of its travel.

13) Put a band through the clip and wind twice in alignment with band groove of boot.

REAR DRIVE SHAFT

Drive Shaft System

CAUTION:

Use a new band.

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

NOTE:

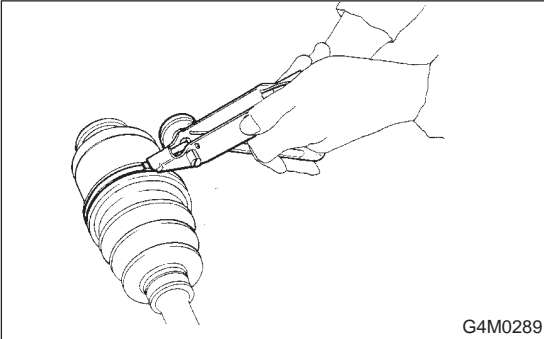
When tightening boot, exercise care so that the air within the boot is appropriate.

15) Tighten band by using ST.

ST 925091000 BAND TIGHTENING TOOL

NOTE:

Tighten band until it cannot be moved by hand.

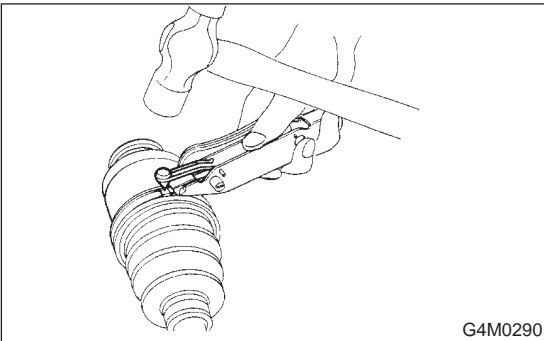


16) Tap on the clip with the punch provided at the end of ST.

ST 925091000 BAND TIGHTENING TOOL

CAUTION:

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



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

CAUTION:

Be careful so that the end of the band is in close contact with clip.

18) Fix up boot on BJ in the same manner.

NOTE:

Extend and retract DOJ to provide equal grease coating.

E: INSPECTION

S301156A10

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

1) DOJ (Double Offset Joint)

Check seizure, corrosion, damage, wear and excessive play.

2) SFJ (Shudder-less Freering tripod Joint)

Check seizure, corrosion, damage and excessive play.

3) Shaft

Check excessive bending, twisting, damage and wear.

4) BJ (Bell Joint)

Check seizure, corrosion, damage and excessive play.

5) Boot

Check for wear, warping, breakage or scratches.

6) Grease

Check for discoloration or fluidity.

7. General Diagnostic Table S301257

A: INSPECTION S301257A10

NOTE:

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

Symptom	Possible cause	Remedy
1. Vibration of propeller shaft NOTE: Vibration is caused by propeller shaft during operation and is transferred to vehicle body. Generally vibration increase in proportion to vehicle speed.	(1) Worn or damaged universal joint.	Replace.
	(2) Unbalanced propeller shaft due to bend or dent.	Replace.
	(3) Loose installation of propeller shaft.	Retighten.
	(4) Worn or damaged center bearing and damaged center mounting rubber.	Replace.
2. Tapping when starting and noise while cruising, caused by propeller shaft.	(1) Worn or damaged universal joint.	Replace.
	(2) Worn spline of sleeve yoke.	Replace.
	(3) Loose installation of propeller shaft.	Retighten.
	(4) Loose installation of joint.	Replace.
	(5) Worn or damaged center bearing and damaged center mounting rubber.	Replace.

GENERAL DIAGNOSTIC TABLE

Drive Shaft System

MEMO:

1. General Description S302001

A: NOTE S302001A15

For removal, installation and inspection work, refer to "AUTOMATIC TRANSMISSION" (a separate publication: Pub. No. G0853ZE) or "MT" section.

2. Transfer Case and Extension for MT S302138

A: NOTE S302138A15

For removal, installation and inspection work, refer to "MT" section.

3. Transfer Clutch and Extension for AT S302142

A: NOTE S302142A15

For removal, installation and inspection work, refer to "AUTOMATIC TRANSMISSION" (a separate publication: Pub. No. G0853ZE).

4. Oil Seal S302143

A: NOTE S302143A15

For removal, installation and inspection work, refer to "AUTOMATIC TRANSMISSION" (a separate publication: Pub. No. G0853ZE) or "MT" section.

TRANSFER DRIVE GEAR (MT)

Transfer Case

5. Transfer Drive Gear (MT) S302146

A: NOTE S302146A15

For removal, installation and inspection work, refer to "MT" section.

6. Transfer Driven Gear (MT) S302141

A: NOTE S302141A15

For removal, installation and inspection work, refer to "MT" section.

7. Reduction Drive Gear without VTD S302144

A: NOTE S302144A15

For removal, installation and inspection work, refer to "AUTOMATIC TRANSMISSION" (a separate publication: Pub. No. G0853ZE)

8. Reduction Drive Gear with VTD S302136

A: NOTE S302136A15

For removal, installation and inspection work, refer to "AUTOMATIC TRANSMISSION" (a separate publication: Pub. No. G0853ZE)

9. Reduction Driven Gear without VTD S302147

A: NOTE S302147A15

For removal, installation and inspection work, refer to "AUTOMATIC TRANSMISSION" (a separate publication: Pub. No. G0853ZE).

10. Reduction Driven Gear with VTD S302157

A: NOTE S302157A15

For removal, installation and inspection work, refer to "AUTOMATIC TRANSMISSION" (a separate publication: Pub. No. G0853ZE)

11. Center Differential S302158

A: NOTE S302158A15

For removal, installation and inspection work, refer to "AUTOMATIC TRANSMISSION" (a separate publication: Pub. No. G0853ZE) or "MT" section.

12. Transfer Clutch Pressure Test S302159

A: NOTE S302159A15

For removal, installation and inspection work, refer to "AUTOMATIC TRANSMISSION" (a separate publication: Pub. No. G0853ZE).

13. Transfer Duty Solenoid and Valve Body S302161

A: NOTE S302161A15

For removal, installation and inspection work, refer to "AUTOMATIC TRANSMISSION" (a separate publication: Pub. No. G0853ZE).

TRANSFER DUTY SOLENOID AND VALVE BODY

Transfer Case

MEMO:

TRANSFER DUTY SOLENOID AND VALVE BODY

Transfer Case
