

MANUAL TRANSMISSION AND DIFFERENTIAL

3-1

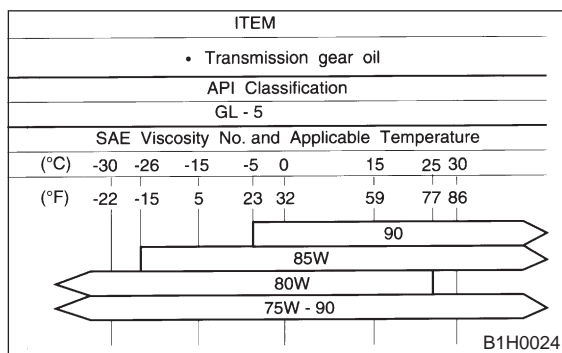
	Page
S SPECIFICATIONS AND SERVICE DATA	2
1. Manual Transmission and Differential	2
2. Transmission Gear Oil	2
3. Transmission Case Assembly	2
4. Drive Pinion Assembly	3
5. Reverse Idler Gear	3
6. Shifter Fork and Rod	4
7. Transfer Case	4
8. Extension	5
9. Extension Assembly	5
10. Front Differential	6
11. Center Differential	6
C COMPONENT PARTS	7
1. Transmission Case	7
2. Drive Pinion Assembly	8
3. Main Shaft Assembly	10
4. Shifter Fork and Shifter Rod	12
5. Transfer Case and Extension	13
6. Front Differential	14
7. Center Differential	15
W SERVICE PROCEDURE	16
1. General	16
2. Transmission Case	18
3. Drive Pinion Assembly	32
4. Main Shaft Assembly	40
5. Transfer Case and Extension	46
6. Front Differential	54
7. Center Differential	57
K DIAGNOSTICS	59
1. Manual Transmission	59
2. Differential	59

1. Manual Transmission and Differential

Item			Model	
			AWD	
			2200 cc	2500 cc
Type			5-forward speeds with synchromesh and 1-reverse	
Transmission gear ratio		1st	3.545	
		2nd	2.111	
		3rd	1.448	
		4th	1.088	
		5th	0.780	
		Reverse	3.416	
Front reduction gear	Final	Type of gear	Hypoid	
		Gear ratio	3.900	4.111
Rear reduction gear	Transfer	Type of gear	Helical	
		Gear ratio	1.000	
	Final	Type of gear	Hypoid	
		Gear ratio	3.900	4.111
Front differential	Type and number of gear		Straight bevel gear (Bevel pinion: 2, Bevel gear: 2)	
Center differen- tial	Type and number of gear		Straight bevel gear (Bevel pinion: 2, Bevel gear: 2 and viscous coupling)	
Transmission gear oil			GL-5	
Transmission oil capacity			3.5 ℓ (3.7 US qt, 3.1 Imp qt)	

2. Transmission Gear Oil

Recommended oil



3. Transmission Case Assembly

Drive pinion shim adjustment

Hypoid gear backlash:

0.13 — 0.18 mm (0.0051 — 0.0071 in)

Drive pinion shim			
Part No.	Thickness mm (in)	Part No.	Thickness mm (in)
32295AA031	0.150 (0.0059)	32295AA071	0.250 (0.0098)
32295AA041	0.175 (0.0069)	32295AA081	0.275 (0.0108)
32295AA051	0.200 (0.0079)	32295AA091	0.300 (0.0118)
32295AA061	0.225 (0.0089)	32295AA101	0.500 (0.0197)

Selection of main shaft rear plate

Main shaft rear plate		
Dimension "A" mm (in)	Part No.	Mark
4.00 — 4.13 (0.1575 — 0.1626)	32294AA041	1
3.87 — 3.99 (0.1524 — 0.1571)	32294AA051	2

4. Drive Pinion Assembly

Preload adjustment of thrust bearing

Starting torque

0.3 — 0.8 N·m

(0.03 — 0.08 kg-m, 0.2 — 0.6 ft-lb)

Adjusting washer No. 1	
Part No.	Thickness mm (in)
803025051	3.925 (0.1545)
803025052	3.950 (0.1555)
803025053	3.975 (0.1565)
803025054	4.000 (0.1575)
803025055	4.025 (0.1585)
803025056	4.050 (0.1594)
803025057	4.075 (0.1604)

Adjusting washer No. 2	
Part No.	Thickness mm (in)
803025059	3.850 (0.1516)
803025054	4.000 (0.1575)
803025058	4.150 (0.1634)

Assemble a driven shaft and 1st driven gear that are selected for the proper radial clearance adjustment.

Driven shaft		1st driven gear
Part No.	Diameter A mm (in)	Part No.
32229AA150	49.959 — 49.966 (1.9669 — 1.9672)	32231AA270
32229AA140	49.967 — 49.975 (1.9672 — 1.9675)	32231AA260

5. Reverse Idler Gear

Adjustment of reverse idler gear position

Reverse idler gear to transmission case (LH) wall clearance

6.0 — 7.5 mm (0.236 — 0.295 in)

Reverse shifter lever		
Part No.	Mark	Remarks
32820AA000	0	Further from case wall
32820AA010	No mark	Standard
32820AA020	2	Closer to the case wall

After installing a suitable reverse shifter lever, adjust reverse idler gear to transmission case wall clearance to within 0 to 0.5 mm (0 to 0.020 in) using washers.

Washer (20.5 × 26 × t)			
Part No.	Thickness mm (in)	Part No.	Thickness mm (in)
803020151	0.4 (0.016)	803020154	1.9 (0.075)
803020152	1.1 (0.043)	803020155	2.3 (0.091)
803020153	1.5 (0.059)	—	—

6. Shifter Fork and Rod

Select suitable shifter forks so that both coupling sleeve and reverse driven gear are positioned in the center of their synchromesh mechanisms.

Rod end clearance

1st-2nd — 3rd-4th:

0.4 — 1.4 mm (0.016 — 0.055 in)

3rd-4th — 5th:

0.5 — 1.3 mm (0.020 — 0.051 in)

1st-2nd shifter fork		
Part No.	Mark	Remarks
32804AA060	1	Approach to 1st gear by 0.2 mm (0.008 in)
32804AA070	No mark	Standard
32804AA080	3	Approach to 2nd gear by 0.2 mm (0.008 in)

3rd-4th shifter fork		
Part No.	Mark	Remarks
32810AA061	1	Approach to 4th gear by 0.2 mm (0.008 in)
32810AA071	No mark	Standard
32810AA101	3	Approach to 3rd gear by 0.2 mm (0.008 in)

5th shifter fork		
Part No.	Mark	Remarks
32812AA200	4	Approach to 5th gear by 0.2 mm (0.008 in)
32812AA210	No mark	Standard
32812AA220	6	Become distant from 5th gear by 0.2 mm (0.008 in)

7. Transfer Case

Neutral position adjustment

Adjustment shim	
Part No.	Thickness mm (in)
32190AA000	0.15 (0.0059)
32190AA010	0.30 (0.0118)

Reverse accent shaft		
Part No.	Mark	Remarks
32188AA040	1	Neutral position is closer to 1st.
32188AA011	No mark or 2	Standard
32188AA050	3	Neutral position is closer to reverse gear.

Reverse check plate adjustment

Reverse check plate			
Part No.	Mark	Angle θ	Remarks
32189AA000	0	28°	Arm stops closer to 5th gear.
32189AA010	1	31°	Arm stops closer to 5th gear.
32189AA020	2	34°	Arm stops in the center.
32189AA030	3	37°	Arm stops closer to reverse gear.
32189AA040	4	40°	Arm stops closer to reverse gear.

8. Extension

Snap ring (Inner-72) to ball bearing side clearance
0 — 0.15 mm (0 — 0.0059 in)

Snap ring (Inner-72)	
Part No.	Thickness mm (in)
805172071	1.78 (0.0701)
805172072	1.90 (0.0748)
805172073	2.02 (0.0795)

Snap ring (Outer-30) to ball bearing side clearance
0 — 0.15 mm (0 — 0.0059 in)

Snap ring (Outer-30)	
Part No.	Thickness mm (in)
805030041	1.53 (0.0602)
805030042	1.65 (0.0650)
805030043	1.77 (0.0697)

9. Extension Assembly

Thrust washer (52 × 61 × t) to ball bearing side clearance

0.05 — 0.30 mm (0.0020 — 0.0118 in)

Thrust washer (52 × 61 × t)	
Part No.	Thickness mm (in)
803052021	0.50 (0.0197)
803052022	0.75 (0.0295)
803052023	1.00 (0.0394)

10. Front Differential

Bevel gear to pinion backlash

0.13 — 0.18 mm (0.0051 — 0.0071 in)

Washer (38.1 × 50 × t)			
Part No.	Thickness mm (in)	Part No.	Thickness mm (in)
803038021	0.925 — 0.950 (0.0364 — 0.0374)	803038023	1.025 — 1.050 (0.0404 — 0.0413)
803038022	0.975 — 1.000 (0.0384 — 0.0394)	—	—

Pinion shaft to axle drive shaft clearance

0 — 0.2 mm (0 — 0.008 in)

Snap ring (Outer-28)			
Part No.	Thickness mm (in)	Part No.	Thickness mm (in)
805028011	1.05 (0.0413)	805028012	1.20 (0.0472)

11. Center Differential

Snap ring (Inner-110) to center differential case clearance

0 — 0.15 mm (0 — 0.0059 in)

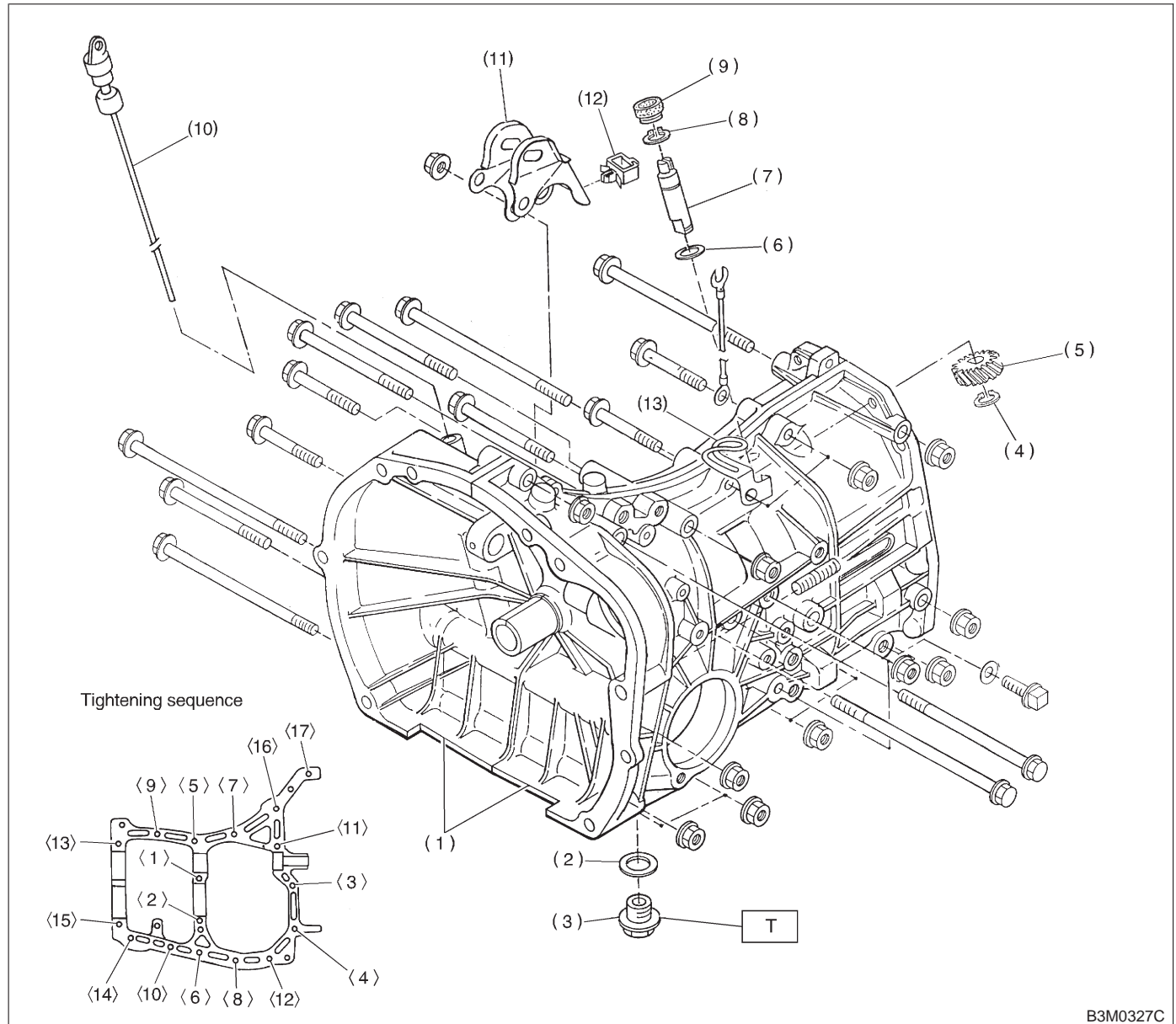
Snap ring (Inner-110)	
Part No.	Thickness mm (in)
805100061	2.10 (0.0827)
805100062	2.21 (0.0870)
805100063	2.32 (0.0913)

Backlash adjustment axial movement

0.62 — 0.86 mm (0.0244 — 0.0339 in)

Adjusting washer (45 × 62 × t)	
Part No.	Thickness mm (in)
803045041	1.60 (0.0630)
803045042	1.80 (0.0709)
803045043	2.00 (0.0787)
803045044	2.20 (0.0866)
803045045	2.40 (0.0945)

1. Transmission Case



B3M0327C

- | | |
|-----------------------------|-------------------------------|
| (1) Transmission case ASSY | (7) Speedometer shaft |
| (2) Gasket | (8) Snap ring (Outer) |
| (3) Drain plug | (9) Oil seal |
| (4) Snap ring (Outer) | (10) Oil level gauge |
| (5) Speedometer driven gear | (11) Pitching stopper bracket |
| (6) Washer | (12) Clamp |

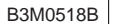
(13) Clip

Tightening torque: N·m (kg·m, ft·lb)

T: 44±3 (4.5±0.3, 32.5±2.2)

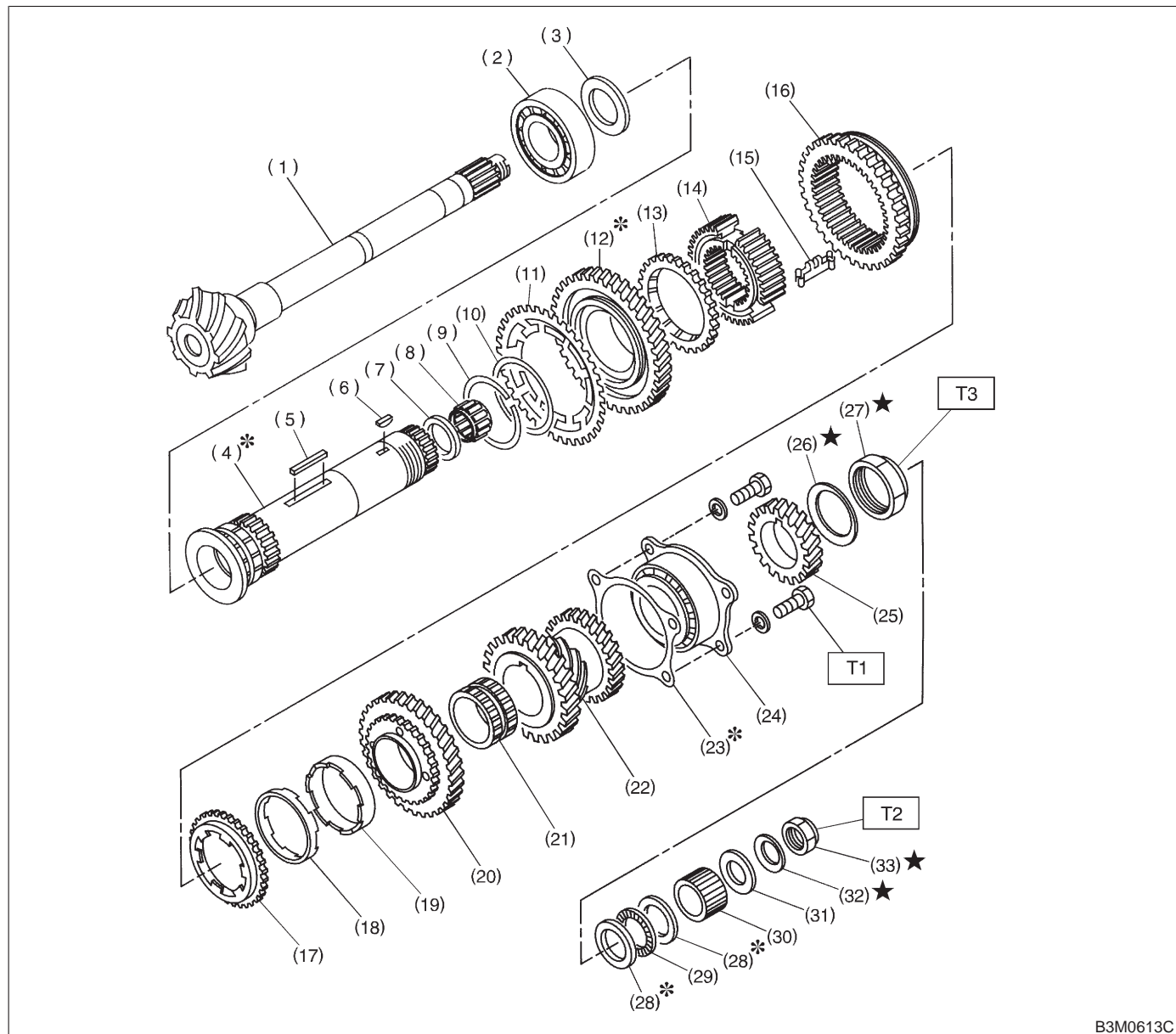
Size	All models	Torque
8 mm bolt	<5> — <15>	25±2 N·m (2.5±0.2 kg·m, 18.1±1.4 ft·lb)
10 mm bolt	<1> — <4> <16> — <17>	39±2 N·m (4.0±0.2 kg·m, 28.9±1.4 ft·lb)

A: 2200 cc MODEL



- T3: 265 ± 10 (27 ± 1 , 195 ± 7)**

B: 2500 cc MODEL



B3M0613C

- | | | |
|-------------------------|-------------------------------|-------------------------------------|
| (1) Drive pinion shaft | (14) 1st-2nd synchronizer hub | (27) Lock nut |
| (2) Roller bearing | (15) Insert key | (28) Washer |
| (3) Washer | (16) Reverse driven gear | (29) Thrust bearing |
| (4) Driven shaft | (17) Outer baulk ring | (30) Differential bevel gear sleeve |
| (5) Key | (18) Synchro cone | (31) Washer |
| (6) Woodruff key | (19) Inner baulk ring | (32) Lock washer |
| (7) Drive pinion collar | (20) 2nd driven gear | (33) Lock nut |
| (8) Needle bearing | (21) 2nd driven gear bush | |
| (9) Snap ring (Outer) | (22) 3rd-4th driven gear | |
| (10) Washer | (23) Driven pinion shim | |
| (11) Sub gear | (24) Roller bearing | |
| (12) 1st driven gear | (25) 5th driven gear | |
| (13) Baulk ring | (26) Lock washer | |

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

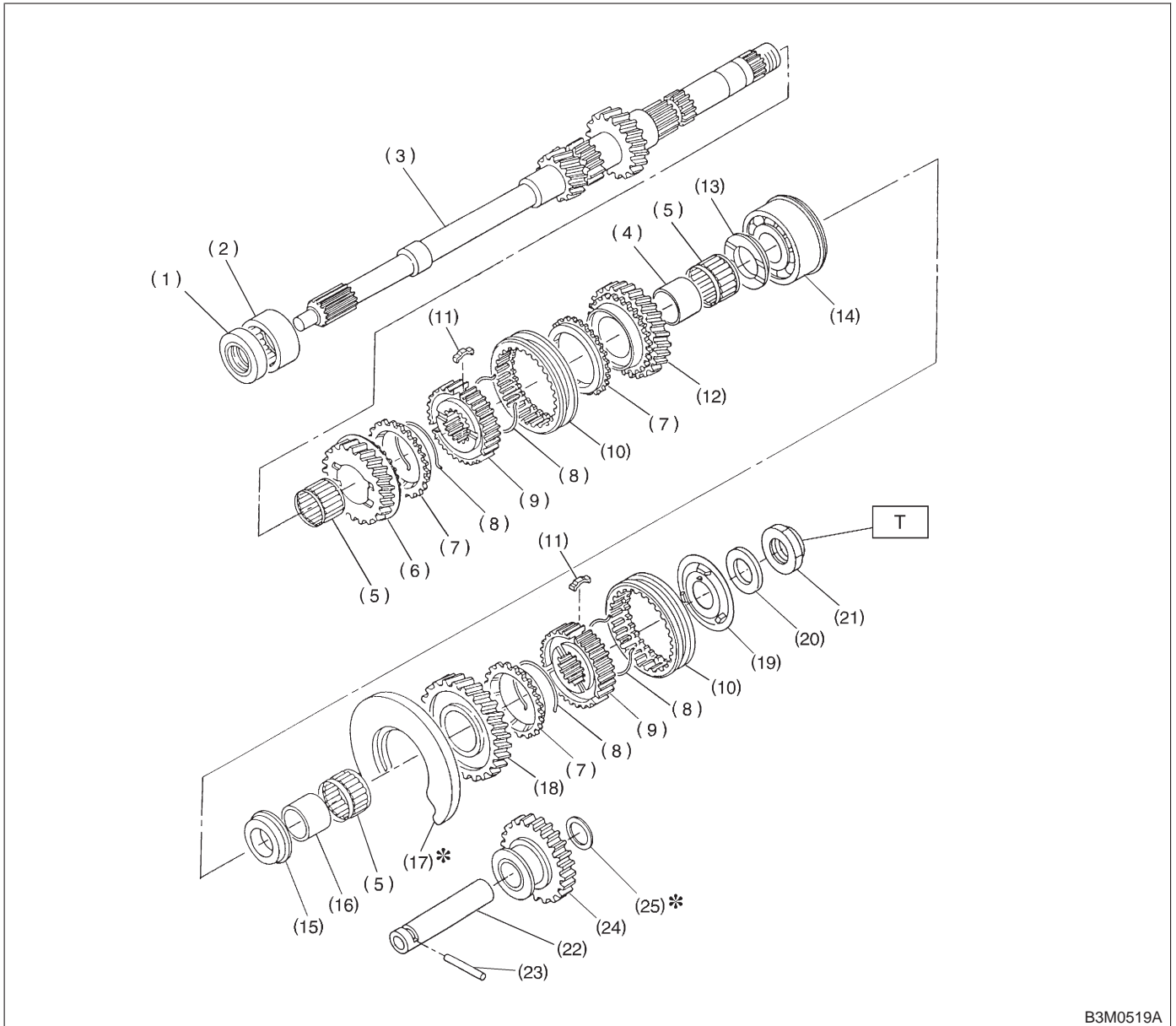
T1: 29±3 (3.0±0.3, 21.7±2.2)

T2: 118±8 (12.0±0.8, 86.8±5.8)

T3: 265±10 (27±1, 195±7)

3. Main Shaft Assembly

A: 2200 cc MODEL

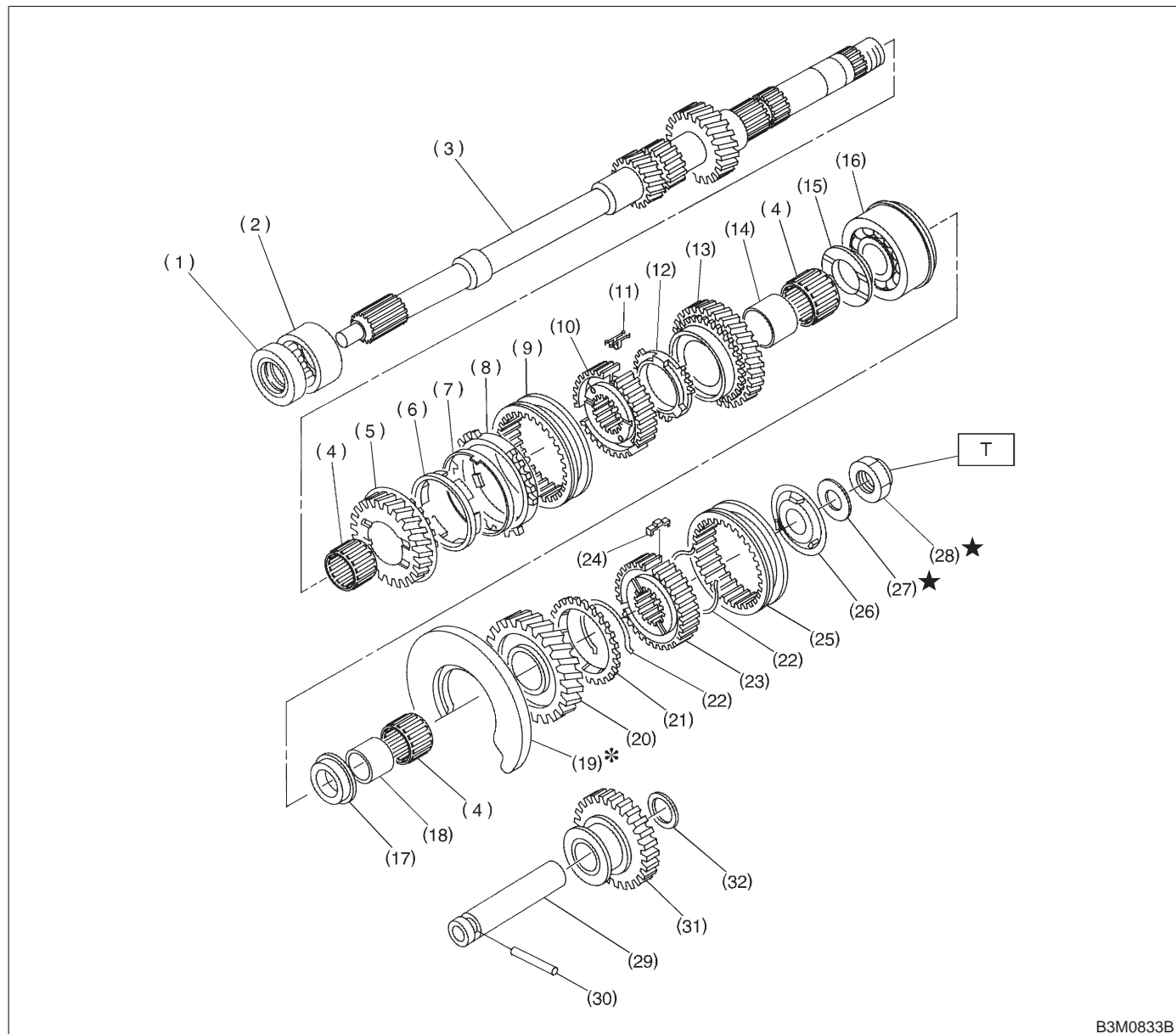


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- | | | |
|-----------------------------|------------------------------|-------------------------------|
| (1) Oil seal | (11) Shifting insert | (21) Lock nut |
| (2) Needle bearing | (12) 4th drive gear | (22) Reverse idler gear shaft |
| (3) Transmission main shaft | (13) 4th gear thrust washer | (23) Straight pin |
| (4) 4th needle bearing race | (14) Ball bearing | (24) Reverse idler gear |
| (5) Needle bearing | (15) 5th gear thrust washer | (25) Washer |
| (6) 3rd drive gear | (16) 5th needle bearing race | |
| (7) Baulk ring | (17) Main shaft rear plate | |
| (8) Synchronizer spring | (18) 5th drive gear | |
| (9) Synchronizer hub | (19) Insert stopper plate | |
| (10) Coupling sleeve | (20) Lock washer | |

Tightening torque: N·m (kg·m, ft·lb)
T: 118±6 (12.0±0.6, 86.8±4.3)

B: 2500 cc MODEL



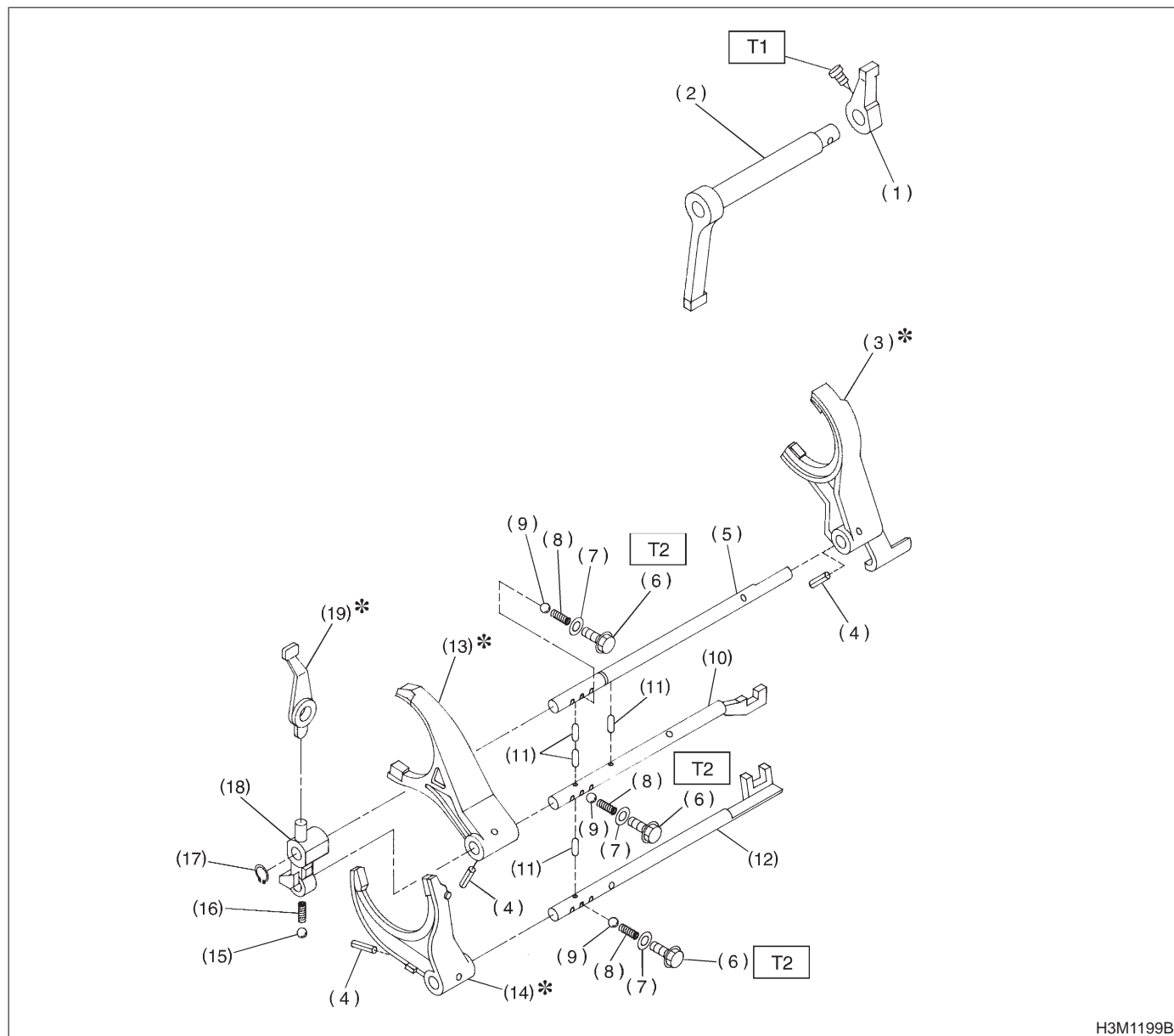
B3M0833B

- | | | |
|-----------------------------|------------------------------|-------------------------------|
| (1) Oil seal | (13) 4th drive gear | (25) Coupling sleeve |
| (2) Needle bearing | (14) 4th needle bearing race | (26) Insert stopper plate |
| (3) Transmission main shaft | (15) 4th gear thrust washer | (27) Lock washer |
| (4) Needle bearing | (16) Ball bearing | (28) Lock nut |
| (5) 3rd drive gear | (17) 5th gear thrust washer | (29) Reverse idler gear shaft |
| (6) Inner baulk ring | (18) 5th needle bearing race | (30) Straight pin |
| (7) Synchro cone | (19) Main shaft rear plate | (31) Reverse idler gear |
| (8) Outer baulk ring | (20) 5th drive gear | (32) Washer |
| (9) Coupling sleeve | (21) 5th baulk ring | |
| (10) Synchronizer hub | (22) Synchronizer spring | |
| (11) Insert key | (23) Synchronizer hub | |
| (12) 4th baulk ring | (24) Shifting insert | |

Tightening torque: N·m (kg·m, ft·lb)

T: 118±6 (12.0±0.6, 86.8±4.3)

4. Shifter Fork and Shifter Rod



H3M1199B

- (1) Selector arm
- (2) Shifter arm
- (3) 5th shifter fork
- (4) Straight pin
- (5) Reverse fork rod
- (6) Checking ball plug
- (7) Gasket
- (8) Checking ball spring

- (9) Ball
- (10) 3rd-4th fork rod
- (11) Interlock plunger
- (12) 1st-2nd fork rod
- (13) 3rd-4th shifter fork
- (14) 1st-2nd shifter fork
- (15) Ball
- (16) Spring

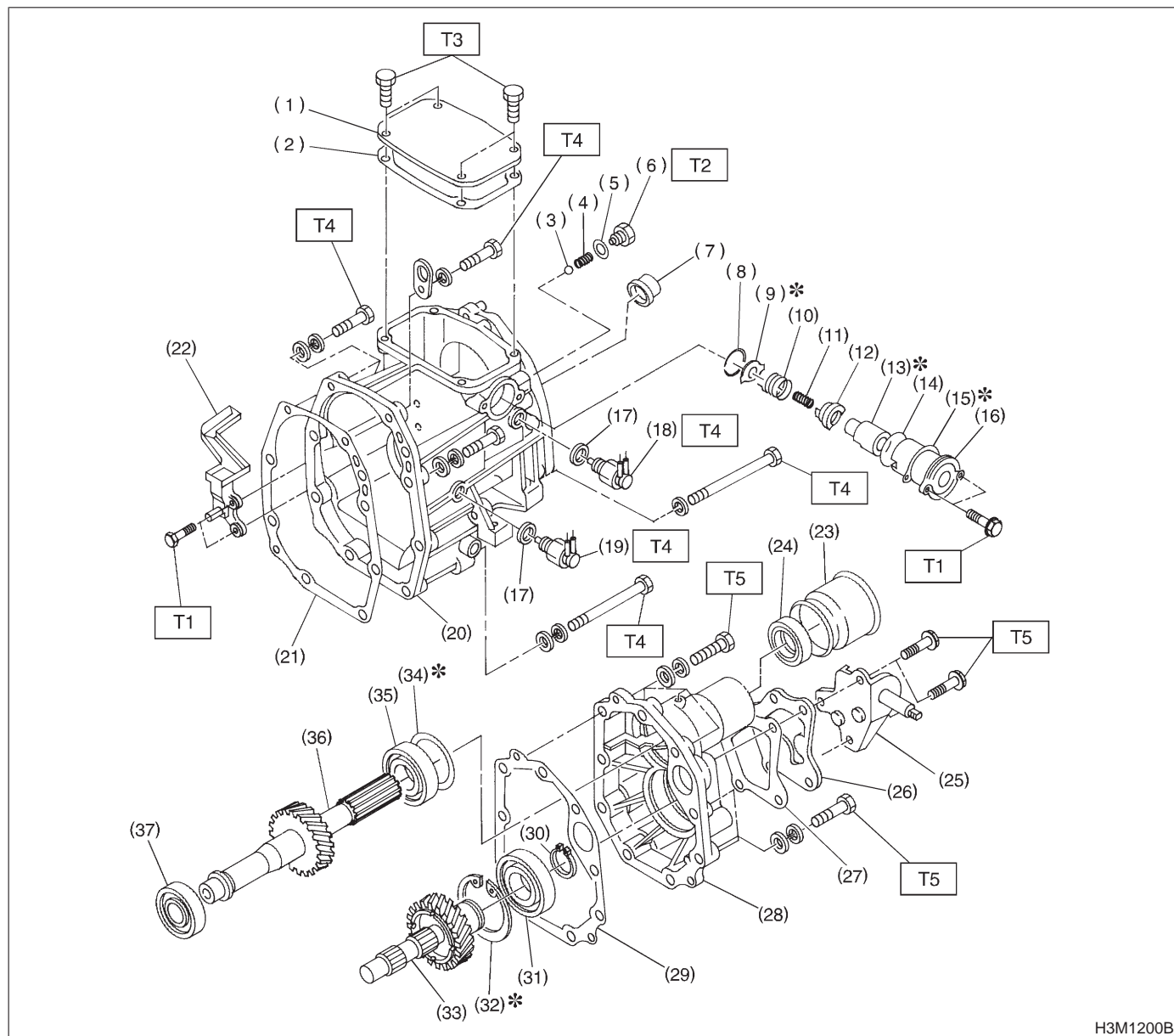
- (17) Snap ring (Outer)
- (18) Reverse fork rod arm
- (19) Reverse shifter lever

Tightening torque: N·m (kg·m, ft·lb)

T1: 10 ± 1 (1.0 ± 0.1 , 7.2 ± 0.7)

T2: 19.6 ± 1.5 (2.00 ± 0.15 , 14.5 ± 1.1)

5. Transfer Case and Extension



H3M1200B

- | | | |
|----------------------------|---------------------------|---------------------------|
| (1) Transfer cover | (17) Gasket | (33) Transfer drive gear |
| (2) Cover gasket | (18) Neutral switch | (34) Adjusting washer |
| (3) Ball | (19) Back-up light switch | (35) Ball bearing |
| (4) Reverse accent spring | (20) Transfer case | (36) Transfer driven gear |
| (5) Gasket | (21) Gasket | (37) Ball bearing |
| (6) Plug | (22) Oil guide | |
| (7) Oil seal | (23) Dust cover | |
| (8) Snap ring (Inner) | (24) Oil seal | |
| (9) Reverse check plate | (25) Shift bracket | |
| (10) Reverse check spring | (26) Extension cover | |
| (11) Reverse return spring | (27) Gasket | |
| (12) Reverse check cam | (28) Extension | |
| (13) Reverse accent shaft | (29) Gasket | |
| (14) O-ring | (30) Snap ring (Outer-30) | |
| (15) Adjusting select shim | (31) Ball bearing | |
| (16) Reverse check sleeve | (32) Snap ring (Inner-72) | |

Tightening torque: N·m (kg·m, ft·lb)

T1: 5±1 (0.5±0.1, 3.6±0.7)

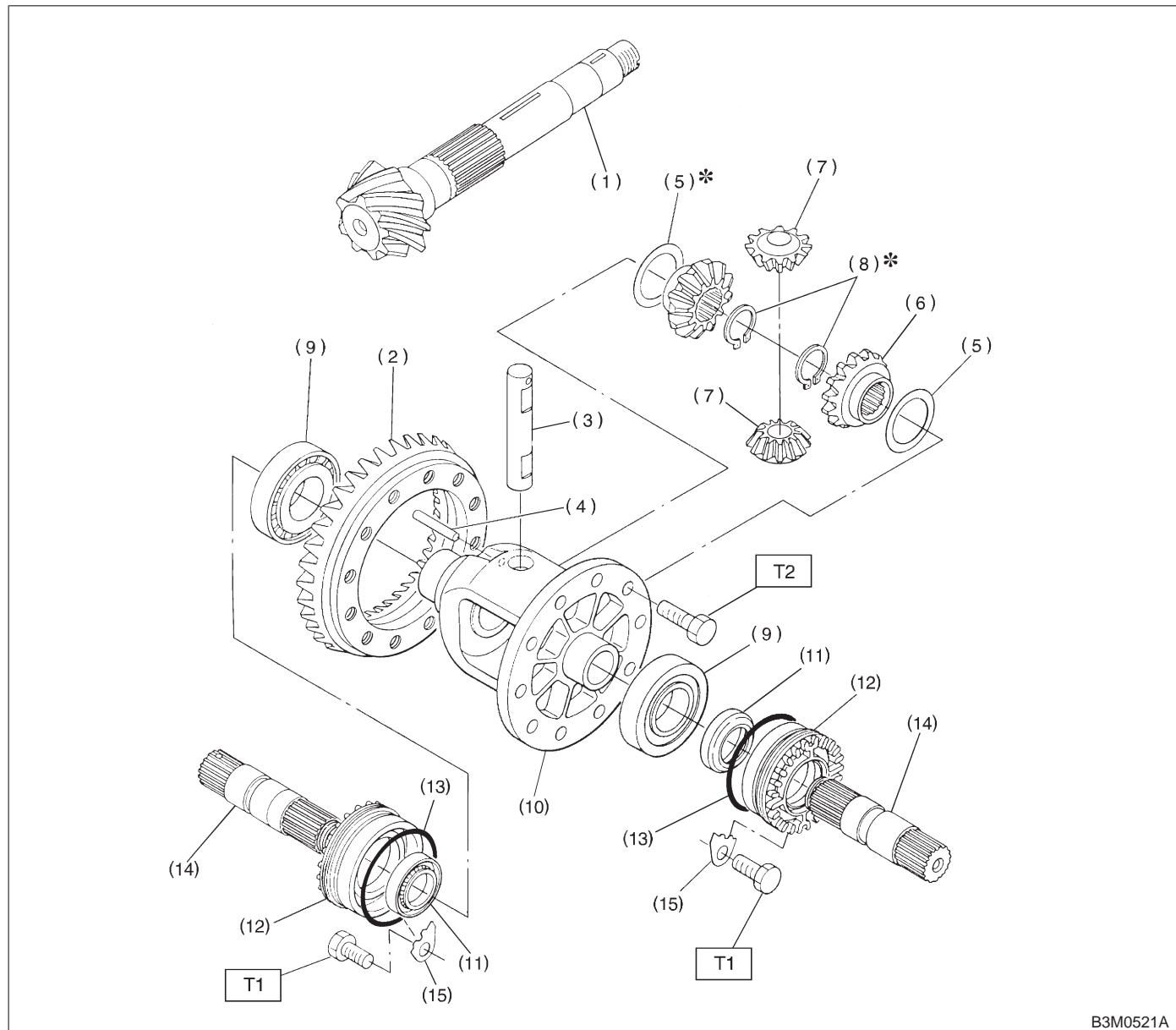
T2: 10±1 (1.0±0.1, 7.2±0.7)

**T3: 15.7±1.5
(1.6±0.15, 11.6±1.1)**

T4: 25±2 (2.5±0.2, 18.1±1.4)

T5: 37±3 (3.8±0.3, 27.5±2.2)

6. Front Differential



B3M0521A

- | | |
|-------------------------------|---------------------------------|
| (1) Drive pinion shaft | (8) Snap ring (Outer) |
| (2) Hypoid driven gear | (9) Roller bearing |
| (3) Pinion shaft | (10) Differential case |
| (4) Straight pin | (11) Oil seal |
| (5) Washer | (12) Differential side retainer |
| (6) Differential bevel gear | (13) O-ring |
| (7) Differential bevel pinion | (14) Axle drive shaft |

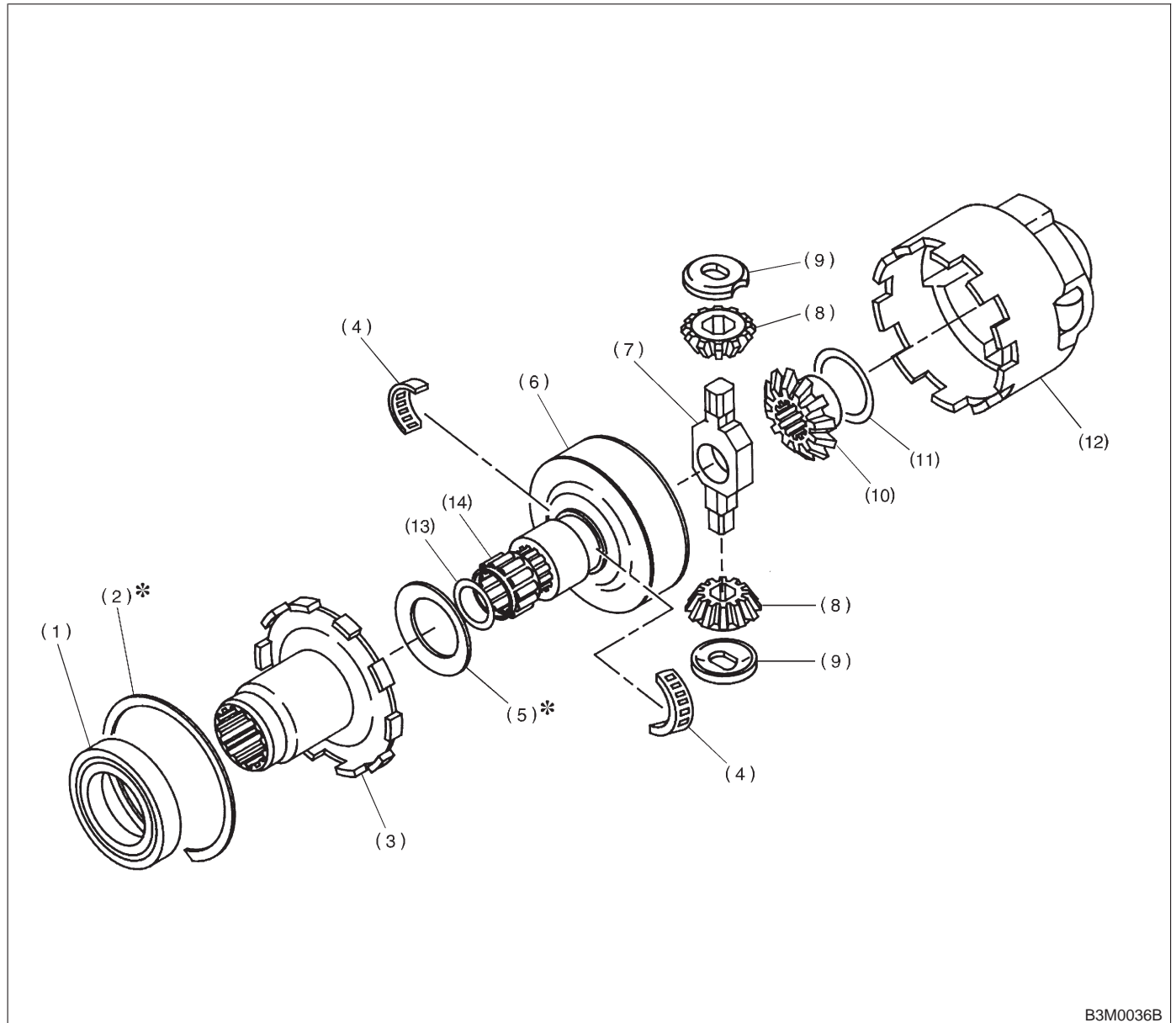
- (15) Retainer lock plate

Tightening torque: N·m (kg·m, ft·lb)

T1: 25±5 (2.5±0.5, 18.1±3.6)

T2: 62±5 (6.3±0.5, 45.6±3.6)

7. Center Differential



B3M0036B

- | | | |
|-------------------------------|-------------------------------|-------------------------------|
| (1) Ball bearing | (6) Viscous coupling | (11) Washer |
| (2) Snap ring (Inner-110) | (7) Pinion shaft | (12) Center differential case |
| (3) Center differential cover | (8) Differential bevel pinion | (13) Snap ring |
| (4) Needle bearing | (9) Retainer | (14) Roller bearing |
| (5) Adjusting washer | (10) Differential bevel gear | |

1. General

A: PRECAUTIONS

1) The following job should be followed before disassembly:

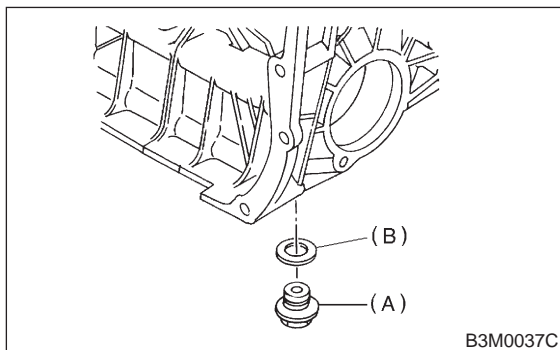
- (1) Clean oil, grease, dirt and dust from transmission.
- (2) Remove drain plug to drain oil. After draining, retighten it as before.

CAUTION:

Replace gasket with a new one.

Tightening torque:

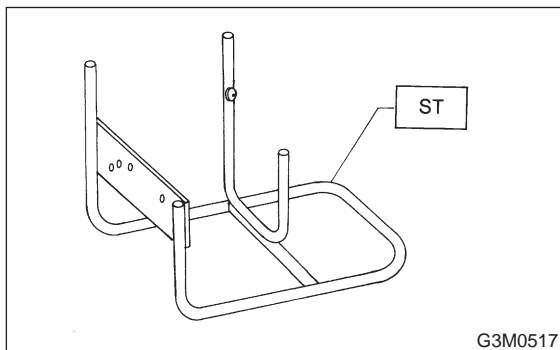
$44 \pm 3 \text{ N}\cdot\text{m}$ ($4.5 \pm 0.3 \text{ kg}\cdot\text{m}$, $32.5 \pm 2.2 \text{ ft}\cdot\text{lb}$)



- (A) Drain plug
(B) Washer

(3) Attach transmission to ST.

ST 499937100 TRANSMISSION STAND SET



2) Rotating parts should be coated with oil prior to assembly.

3) All disassembled parts, if to be reused, should be reinstalled in the original positions and directions.

4) Gaskets and lock washers must be replaced with new ones.

5) Liquid gasket should be used where specified to prevent leakage.

6) Fill transmission gear oil through the oil level gauge hole up to upper point level gauge. <Ref. to 1-5 [G9A1].>

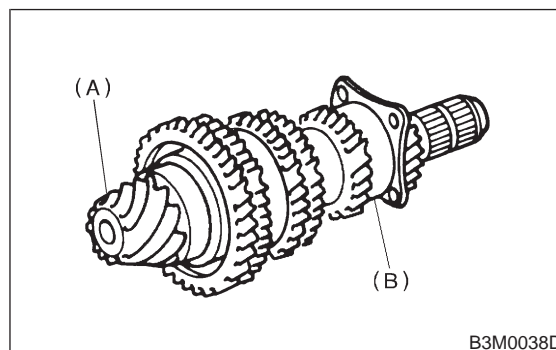
B: INSPECTION

Disassembled parts should be washed clean first and then inspected carefully.

1) Bearings

Replace bearings in the following cases:

- Bearings whose balls, outer races and inner races are broken or rusty.
- Worn bearings
- Bearings that fail to turn smoothly or make abnormal noise when turned after gear oil lubrication.
- The ball bearing on the rear side of the drive pinion shaft should be checked for smooth rotation before the drive pinion assembly is disassembled. In this case, because a preload is working on the bearing, its rotation feels like it is slightly dragging unlike the other bearings.



- (A) Drive pinion shaft
(B) Ball bearing

- Bearings having other defects

2) Bushing (each gear)

Replace the bushing in the following cases:

- When the sliding surface is damaged or abnormally worn.
- When the inner wall is abnormally worn.

3) Gears

- Replace gears with new ones if their tooth surfaces are broken, damaged, or excessively worn.
- Correct or replace if the cone that contacts the baulk ring is rough or damaged.
- Correct or replace if the inner surface or end face is damaged.

- Correct or replace if the inner surface or end face is damaged.

4) Baulk ring

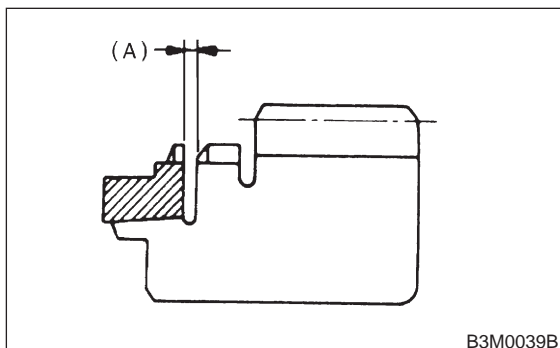
Replace the ring in the following cases:

- When the inner surface and end face are damaged.
- When the ring inner surface is abnormally or partially worn down.

- If the gap between the end faces of the ring and the gear splined part is excessively small when the ring is pressed against the cone.

Clearance (A):

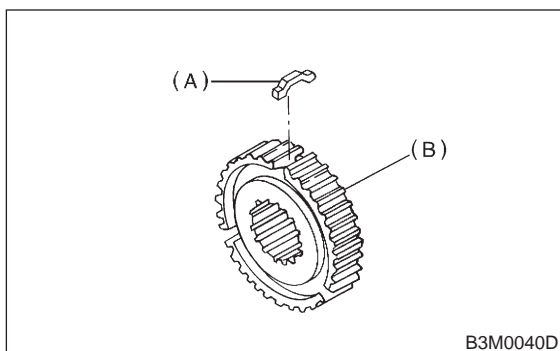
0.5 — 1.0 mm (0.020 — 0.040 in)



- When the contact surface of the synchronizer ring insert is scored or abnormally worn down.

5) Shifting insert

Replace the insert if deformed, excessively worn, or defective in any way.



- (A) Shifting insert
(B) Synchronizer hub

6) Oil seal

Replace the oil seal if the lip is deformed, hardened, damaged, worn, or defective in any way.

7) O-ring

Replace the O-ring if the sealing face is deformed, hardened, damaged, worn, or defective in any way.

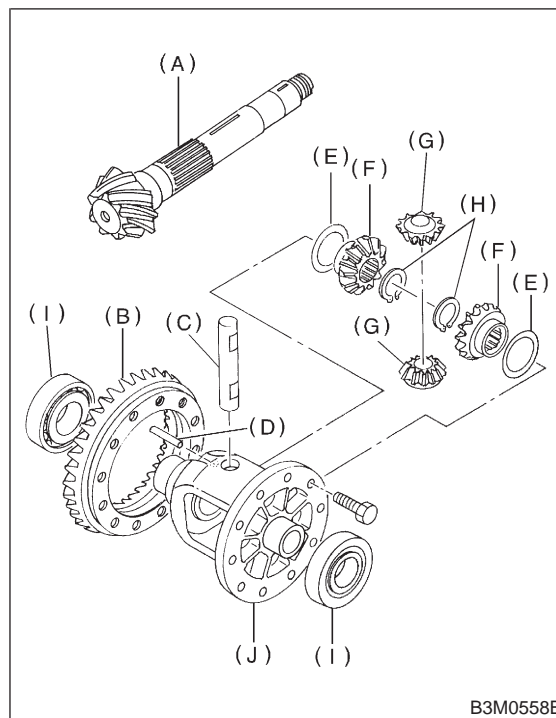
8) Gearshift mechanism

Repair or replace the gearshift mechanism if excessively worn, bent, or defective in any way.

9) Differential gear

Repair or replace the differential gear in the following cases:

- The hypoid drive gear and drive pinion shaft tooth surface are damaged, excessively worn, or seized.
- The roller bearing on the drive pinion shaft has a worn or damaged roller path.
- There is damage, wear, or seizure of the differential bevel pinion, differential bevel gear, washer, pinion shaft, and straight pin.
- The differential case has worn or damaged sliding surfaces.

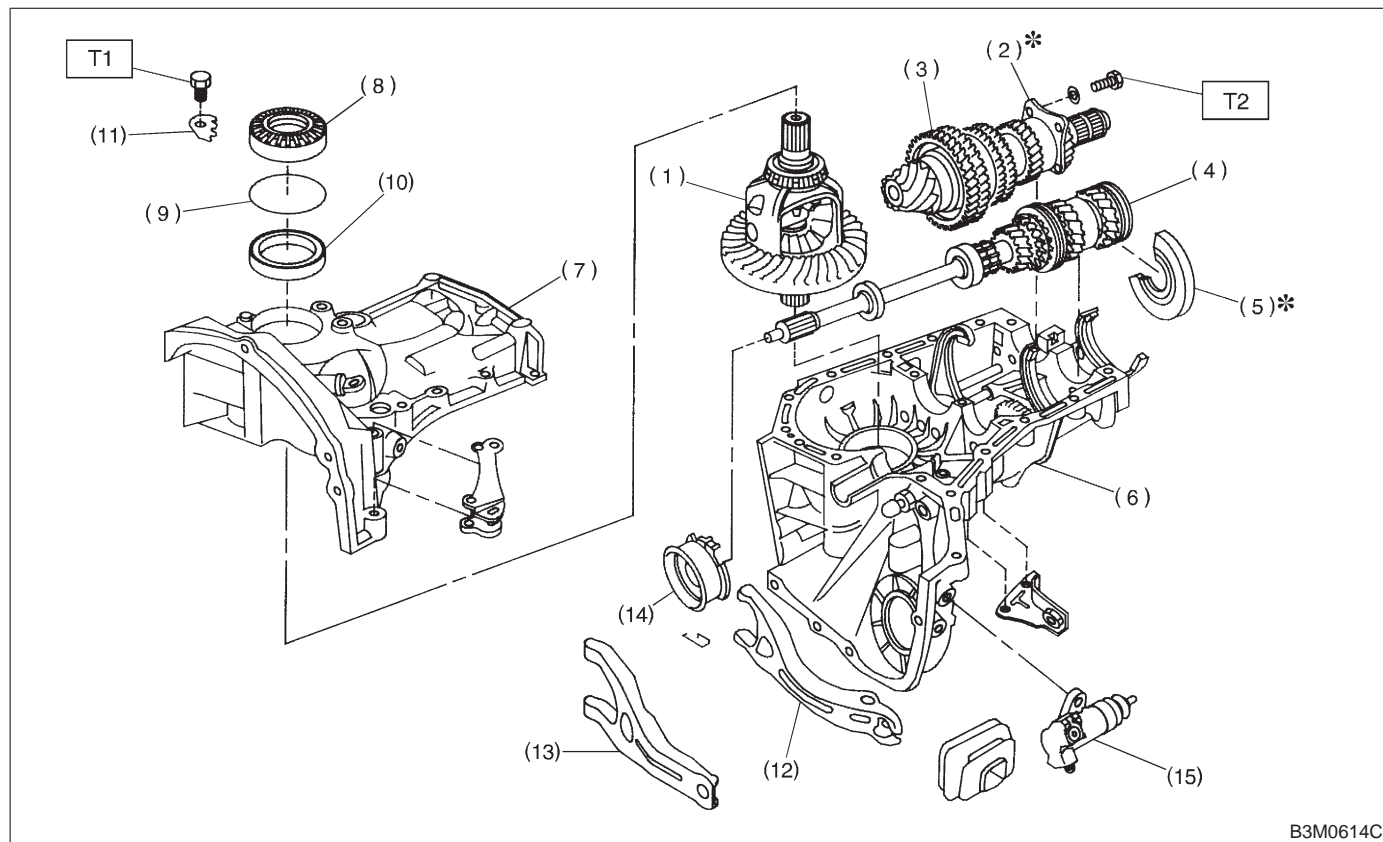


- (A) Drive pinion shaft
(B) Hypoid driven gear
(C) Pinion shaft
(D) Straight pin
(E) Washer
(F) Differential bevel gear
(G) Differential bevel pinion
(H) Snap ring
(I) Roller bearing
(J) Differential case

2. Transmission Case

A: DISASSEMBLY

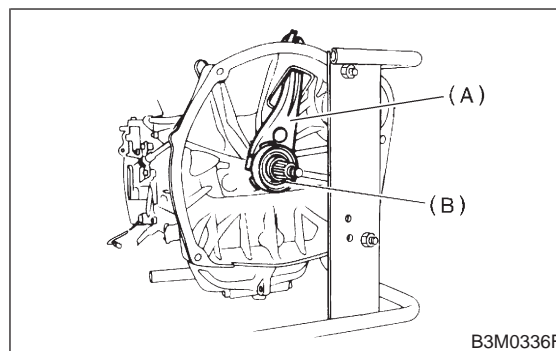
1. SEPARATION OF TRANSMISSION



- | | | |
|-----------------------------------|----------------------------|----------------------------|
| (1) Operating cylinder | (5) Release lever sealing | (9) Transmission case (RH) |
| (2) Release lever (2200 cc model) | (6) Bolt | (10) Main shaft ASSY |
| (3) Release lever (2500 cc model) | (7) Main shaft rear plate | (11) Drive pinion ASSY |
| (4) Release bearing | (8) Transmission case (LH) | (12) Front differential |

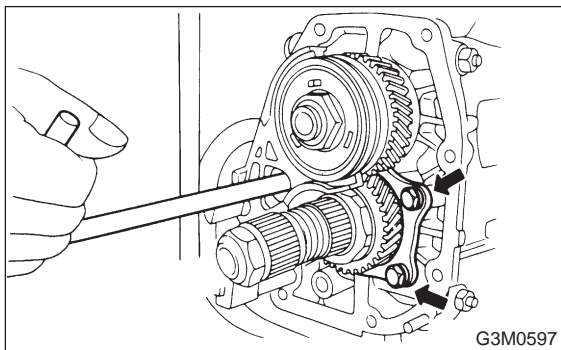
- 1) Remove transfer cover.
- 2) Remove shifter fork screw which secures selector arm to shifter arm.
- 3) Remove transfer case with extension assembly.

- 4) Remove clutch release lever and bearing. Mechanical application type; <Ref. to 2-10 [W3A1].> Hydraulic application type; <Ref. to 2-10 [W3A2].>

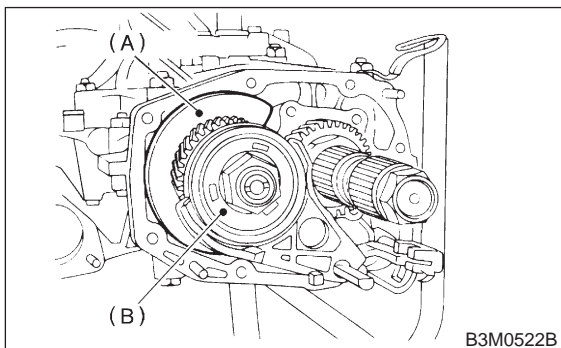


- (A) Clutch release lever
(B) Clutch release bearing

- 5) Remove bearing mounting bolts.



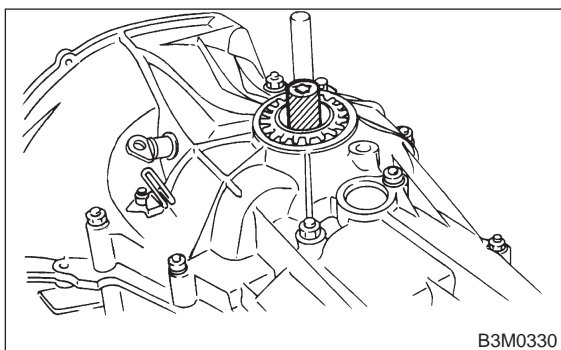
- 6) Remove main shaft rear plate.



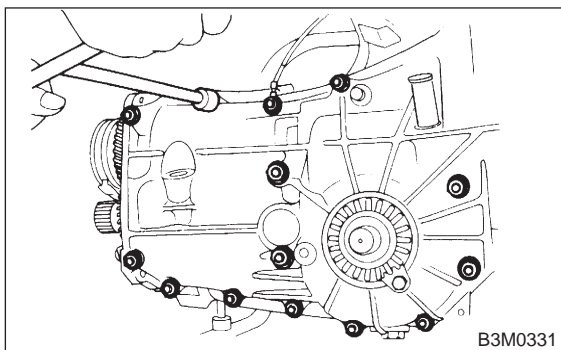
- (A) Main shaft rear plate
(B) Main shaft ASSY

- 7) Separating transmission case

- (1) Put vinyl tape around splines of right and left axle drive shafts to prevent damage to oil seals.



- (2) Separate transmission case into right and left cases by loosening seventeen coupling bolts and nuts.

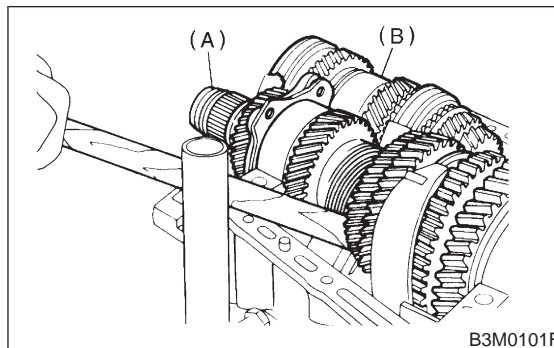


- 8) Remove drive pinion shaft assembly from left side transmission case.

NOTE:

Use a hammer handle, etc. to remove if too tight.

- 9) Remove main shaft assembly.

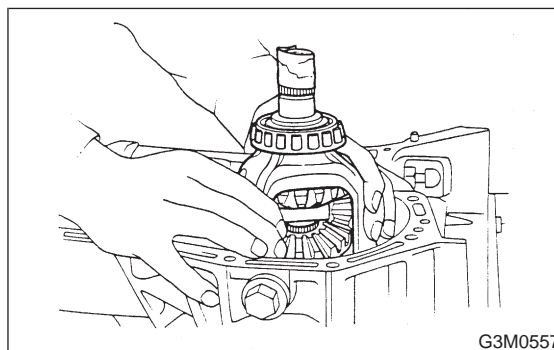


- (A) Drive pinion shaft ASSY
(B) Main shaft ASSY

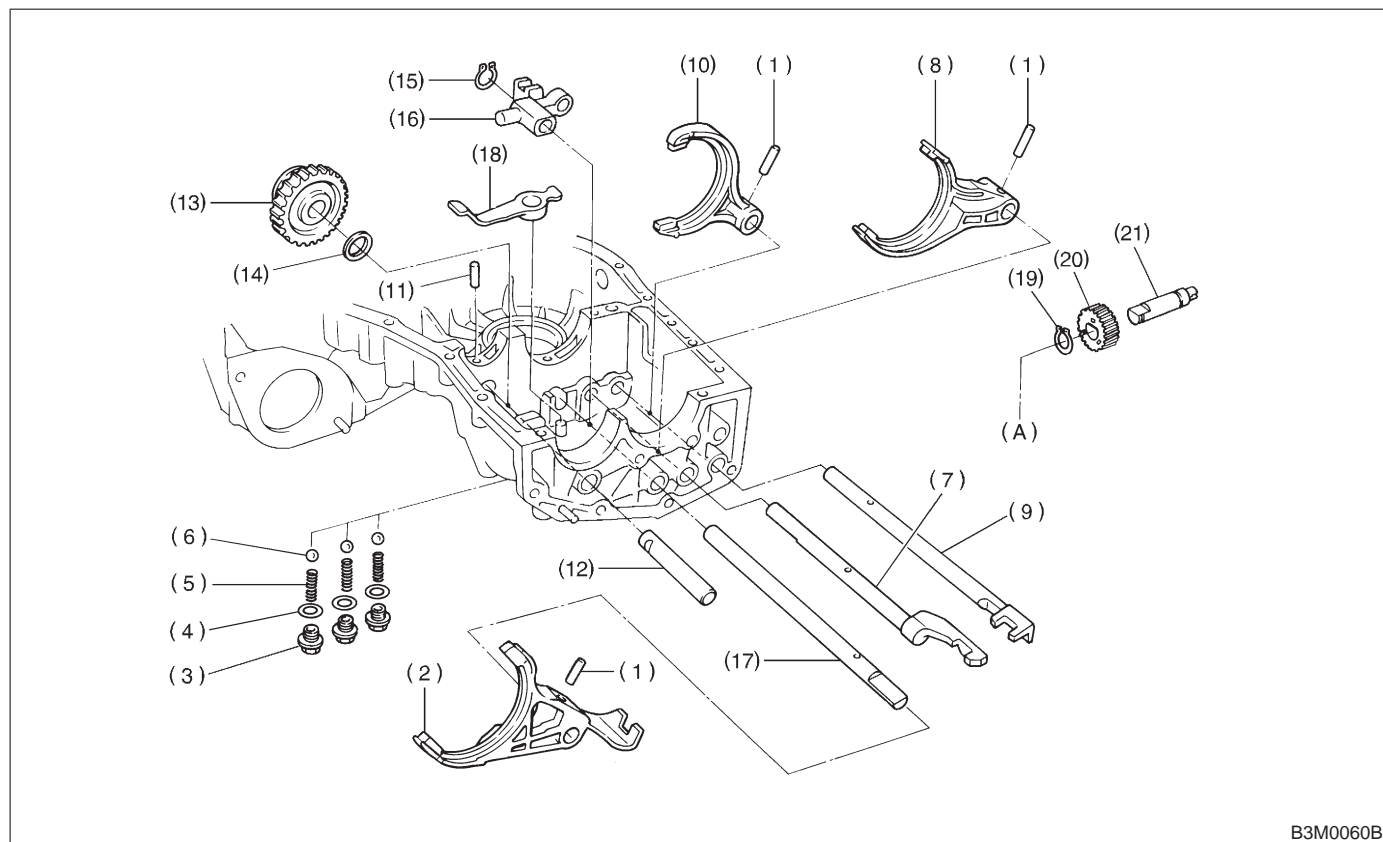
- 10) Remove differential assembly.

CAUTION:

- Be careful not to confuse right and left roller bearing outer races.
- Be careful not to damage retainer oil seal.



2. TRANSMISSION CASE

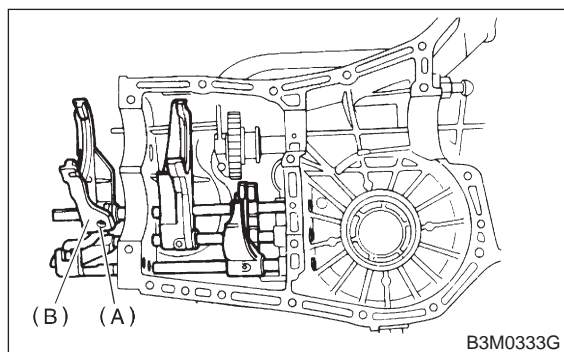


B3M0060B

- | | | |
|--------------------------|-------------------------------|--|
| (1) Straight pin | (9) 1st-2nd fork rod | (17) Reverse fork rod |
| (2) 5th shifter fork | (10) 1st-2nd shifter fork | (18) Reverse shifter lever |
| (3) Checking ball plug | (11) Straight pin | (19) Snap ring (RH side) |
| (4) Gasket | (12) Reverse idler gear shaft | (20) Speedmeter driven gear (RH side) |
| (5) Checking ball spring | (13) Reverse idler gear | (21) Speedmeter shaft (RH side) |
| (6) Ball | (14) Washer | (A) Front right hand transmission case |
| (7) 3rd-4th fork rod | (15) Snap ring | |
| (8) 3rd-4th shifter fork | (16) Reverse fork rod arm | |

1) Drive out straight pin with ST, and remove 5th shifter fork.

ST 398791700 STRAIGHT PIN REMOVER



B3M0333G

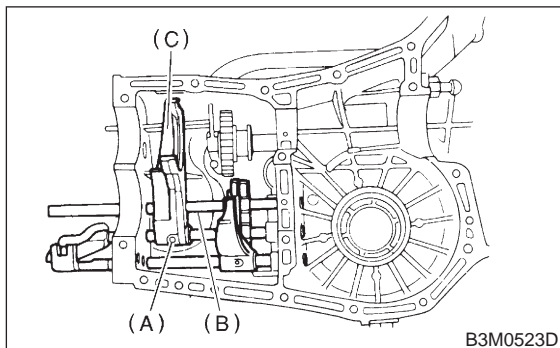
- (A) Straight pin
(B) 5th shifter fork

2) Remove plugs, springs and checking balls.

3) Drive out straight pin, and pull out 3-4 fork rod and shifter fork.

NOTE:

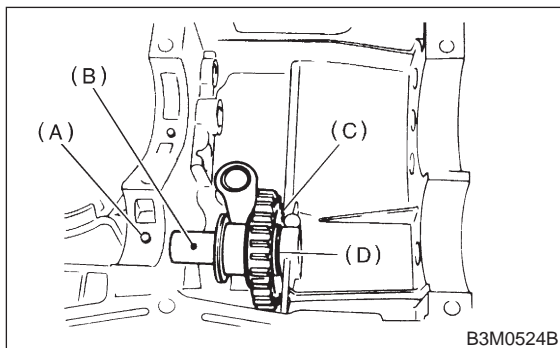
When removing rod, keep other rods in neutral. Also, when pulling out straight pin, remove it toward inside of case so that it may not hit against case.



- (A) Straight pin
- (B) 3-4 fork rod
- (C) Shifter fork

4) Drive out straight pin, and pull out 1-2 fork rod and shifter fork.

5) Pull out straight pin, and remove idler gear shaft, reverse idler gear and washer.



- (A) Straight pin
- (B) Idler gear shaft
- (C) Idler gear
- (D) Washer

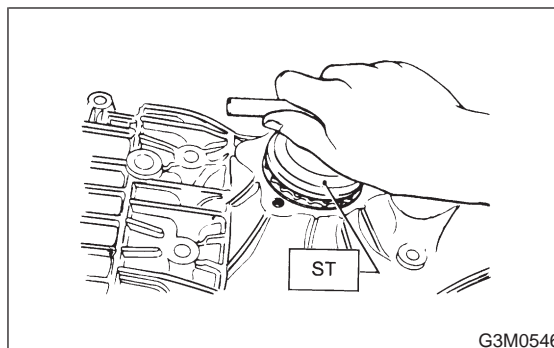
6) Remove outer snap ring, and pull out reverse shifter rod arm from reverse fork rod. Then take out ball, spring and interlock plunger from rod. And then remove rod.

NOTE:

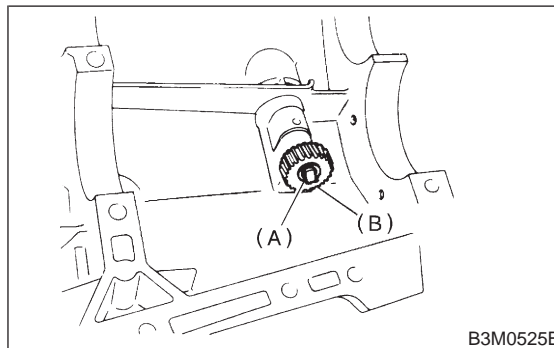
When pulling out reverse shifter rod arm, be careful not to let ball pop out of arm.

7) Remove reverse shifter lever.

8) Remove differential side retainers using ST. ST 499787000 WRENCH ASSY



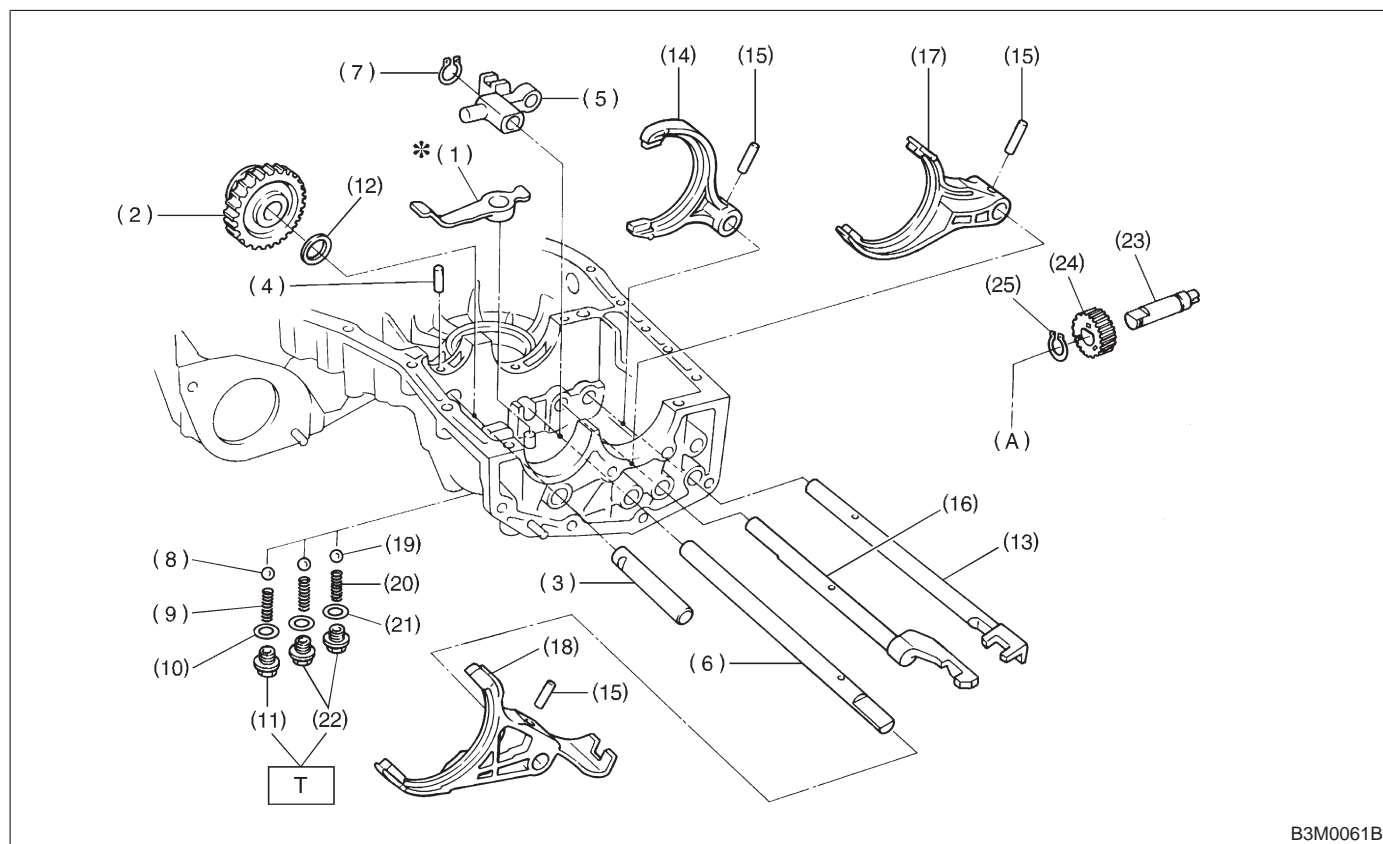
9) Remove outer snap ring and pull out speedometer driven gear. Next, remove vehicle speed sensor 2, oil seal, speedometer shaft and washer.



- (A) Snap ring
- (B) Speedometer shaft

B: ASSEMBLY

1. TRANSMISSION CASE



B3M0061B

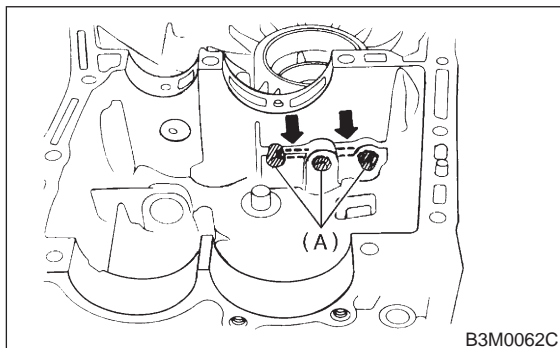
- | | | |
|------------------------------|---------------------------|-------------------------------------|
| (1) Reverse shifter lever | (11) Checking ball plug | (21) Washer |
| (2) Reverse idler gear | (12) Washer | (22) Checking ball plug |
| (3) Reverse idler gear shaft | (13) 1st-2nd fork rod | (23) Speedometer shaft |
| (4) Straight pin | (14) 1st-2nd shifter fork | (24) Speedometer driven gear |
| (5) Reverse fork rod arm | (15) Straight pin | (25) Snap ring |
| (6) Reverse fork rod | (16) 3rd-4th fork rod | (A) To right hand transmission case |
| (7) Snap ring | (17) 3rd-4th shifter fork | |
| (8) Ball | (18) 5th shifter fork | |
| (9) Checking ball spring | (19) Ball | |
| (10) Washer | (20) Checking ball spring | |

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

T: 19.6±0.1

(2.00±0.015, 14.5±0.1)

1) Position interlock plungers (5.56 × 19.6), one plunger in hole between 1-2 and 3-4 fork rod holes, and one plunger in hole between 3-4 and reverse fork rod holes.

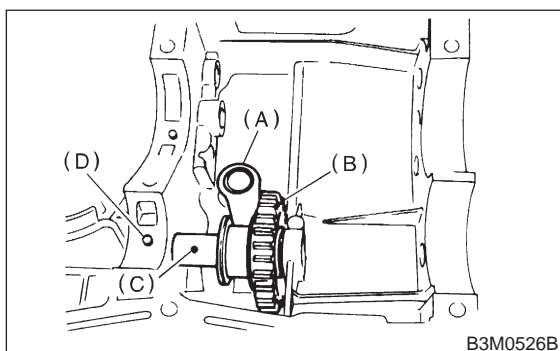


(A) Rod holes

2) Install reverse shifter lever, reverse idler gear and reverse idler gear shaft, and secure with straight pin.

NOTE:

Be sure to install reverse idler shaft from the rear side.



- (A) Reverse shifter lever
- (B) Reverse idler gear
- (C) Reverse idler gear shaft
- (D) Straight pin

3) Install reverse arm fork spring, ball and interlock plunger (5.56 × 19.6) to reverse fork rod arm. Insert reverse fork rod into hole in reverse fork rod arm, and hold it with outer snap ring using ST.

CAUTION:

Apply grease to plunger to prevent it from falling.

ST 399411700 ACCENT BALL INSTALLER

4) Position ball (7.1438), spring and gasket in reverse shifter rod hole, on left side transmission case, and tighten checking ball plug.

CAUTION:

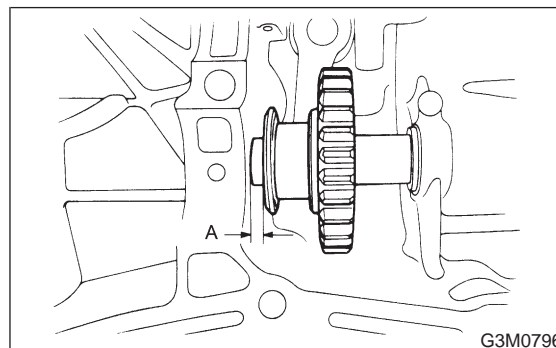
Replace gasket with a new one.

5) Adjustment of reverse idler gear position

(1) Move reverse shifter rod toward REV side. Adjust clearance between reverse idler gear and transmission case wall, using reverse shifter lever.

Clearance A:

6.0 — 7.5 mm (0.236 — 0.295 in)

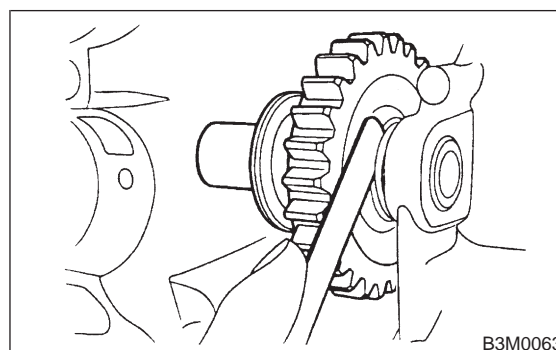


Reverse shifter lever		
Part No.	No.	Remarks
32820AA000	0	Further from case wall
32820AA010	No mark	Standard
32820AA020	2	Closer to case wall

(2) After installing a suitable reverse shifter lever, shift into neutral. Using a thickness gauge, measure clearance between reverse idler gear and transmission case wall and adjust with washer(s).

Clearance:

0 — 0.5 mm (0 — 0.020 in)



Washer (20.5 × 26 × t)	
Part No.	Thickness mm (in)
803020151	0.4 (0.016)
803020152	1.1 (0.043)
803020153	1.5 (0.059)
803020154	1.9 (0.075)
803020155	2.3 (0.091)

6) Installation of 1-2 shifter fork and rod

(1) Install 1-2 fork rod into 1-2 shifter fork via the hole on the rear of transmission case.

(2) Align the holes in rod and fork, and drive straight pin (6 × 22) into these holes using ST.

NOTE:

- Set other rods to neutral.
- Make sure interlock plunger (5.56 × 19.6) is on the 3-4 fork rod side.

ST 398791700 STRAIGHT PIN REMOVER

7) Installation of 3-4 shifter fork and rod

(1) Install interlock plunger (3 × 11.9) onto 3-4 fork rod.

CAUTION:

Apply a coat of grease to plunger to prevent it from falling.

(2) Install 3-4 fork rod into 3-4 shifter fork via the hole on the rear of transmission case.

(3) Align the holes in rod and fork, and drive straight pin (6 × 22) into these holes.

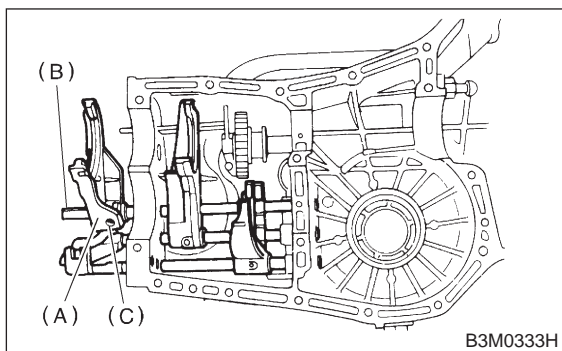
NOTE:

- Set reverse fork rod to neutral.
- Make sure interlock plunger (installed before) is on the reverse fork rod side.

ST 398791700 STRAIGHT PIN REMOVER

8) Install 5th shifter fork onto the rear of reverse fork rod. Align holes in the two parts and drive straight pin into place.

ST 398791700 STRAIGHT PIN REMOVER

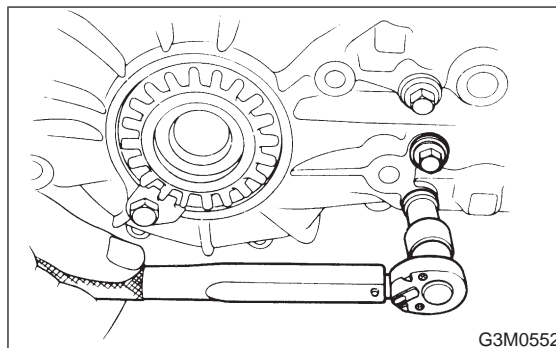


- (A) 5th shifter fork
- (B) Reverse fork rod
- (C) Straight pin

9) Position balls, checking ball springs and gas-kets into 3-4 and 1-2 rod holes, and install plugs.

CAUTION:

Replace gasket with a new one.



10) Installation of speedometer driven gear

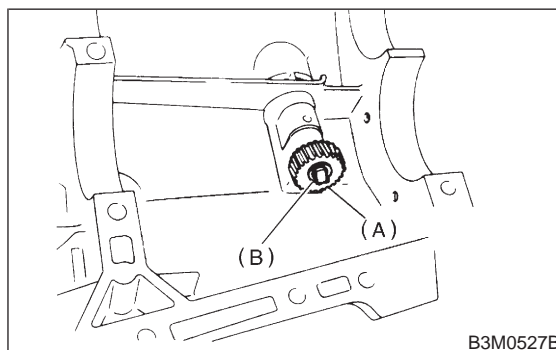
(1) Install washer and speedometer shaft, and press fit oil seal with ST.

CAUTION:

Use new oil seal, if it has been removed.

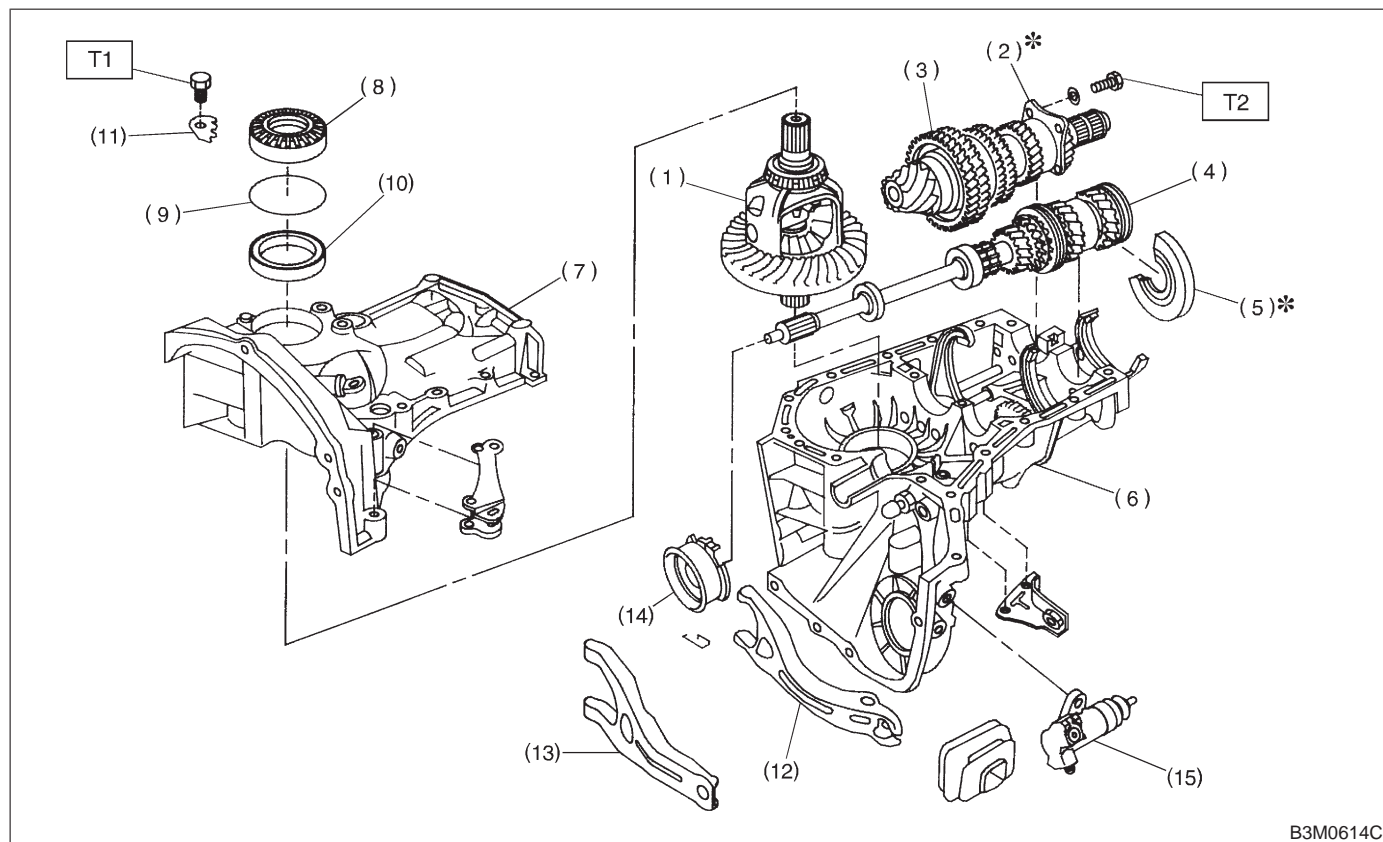
ST 899824100 or 499827000 PRESS

(2) Install speedometer driven gear and snap ring.



- (A) Speedometer driven gear
- (B) Snap ring

2. COMBINATION OF TRANSMISSION CASE



B3M0614C

- | | |
|----------------------------|------------------------------------|
| (1) Differential ASSY | (8) Differential side retainer |
| (2) Drive pinion shim | (9) O-ring |
| (3) Drive pinion ASSY | (10) Oil seal |
| (4) Main shaft ASSY | (11) Retainer lock plate |
| (5) Main shaft rear plate | (12) Release lever (2200 cc model) |
| (6) Transmission case (LH) | (13) Release lever (2500 cc model) |
| (7) Transmission case (RH) | (14) Release bearing |

- (15) Operating cylinder

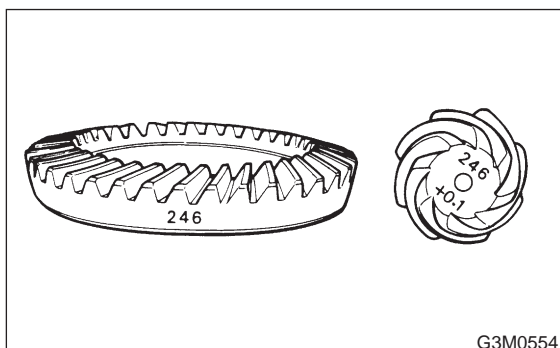
Tightening torque: N·m (kg·m, ft·lb)

T1: 25 (2.5, 18)

T2: 29±3 (3.0±0.3, 21.7±2.2)

1) Alignment marks/numbers on hypoid gear set
The upper number on driven pinion is the match number for combining it with hypoid driven gear. The lower number is for shim adjustment. If no lower number is shown, the value is zero. The number on hypoid driven gear indicates a number for combination with drive pinion.

(1) Place drive pinion shaft assembly on right hand transmission main case without shim and tighten bearing mounting bolts.



G3M0554

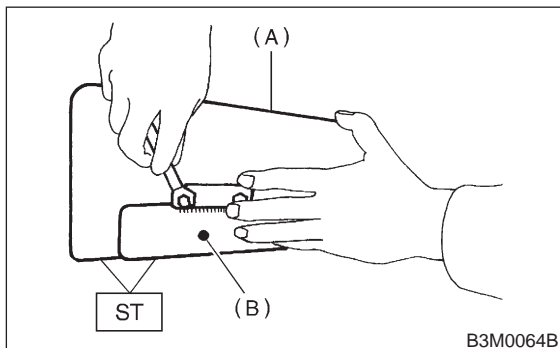
2) Adjustment of drive pinion shim

(2) Inspection and adjustment of ST

NOTE:

- Loosen the two bolts and adjust so that the scale indicates 0.5 correctly when the plate end and the scale end are on the same level.
- Tighten the two bolts.

ST 499917500 DRIVE PINION GAUGE ASSY



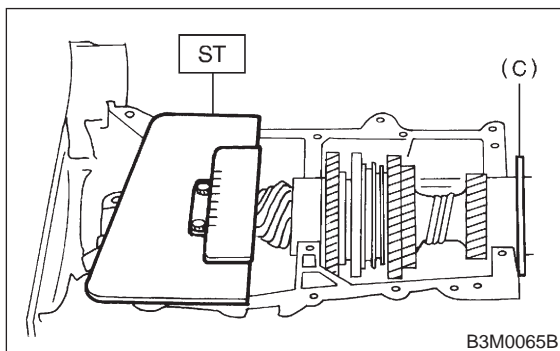
- (A) Plate
(B) Scale

(3) Position the ST by inserting the knock pin of ST into the knock hole in the transmission case.

ST 499917500 DRIVE PINION GAUGE ASSY

(4) Slide the drive pinion gauge scale with finger tip and read the value at the point where it matches with the end face of drive pinion.

ST 499917500 DRIVE PINION GAUGE ASSY



- (C) Adjust clearance to zero without shim.

(5) The thickness of shim shall be determined by adding the value indicated on drive pinion to the value indicated on the ST. (Add if the number on drive pinion is prefixed by + and subtract if the number is prefixed by -.)

ST 499917500 DRIVE PINION GAUGE ASSY

(6) Select one to three shims from the next table for the value determined as described above and take a shim thickness which is closest to the said value.

Drive pinion shim	
Part No.	Thickness mm (in)
32295AA031	0.150 (0.0059)
32295AA041	0.175 (0.0069)
32295AA051	0.200 (0.0079)
32295AA061	0.225 (0.0089)
32295AA071	0.250 (0.0098)
32295AA081	0.275 (0.0108)
32295AA091	0.300 (0.0118)
32295AA101	0.500 (0.0197)

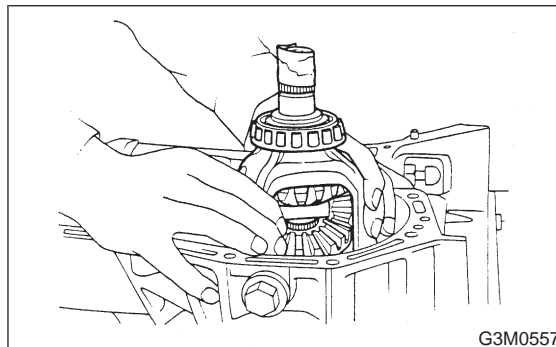
3) Install differential assembly on left hand transmission case.

CAUTION:

Be careful not to fold the sealing lip of oil seal.

NOTE:

Wrap the left and right splined sections of axle shaft with vinyl tape to prevent scratches.



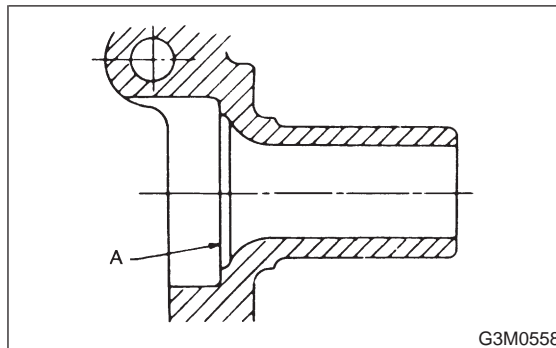
4) Install needle bearing and oil seal onto the front of transmission main shaft assembly, and position in left side transmission case.

CAUTION:

- Wrap clutch splined section with vinyl tape to prevent damage to oil seal.
- Apply grease (Unilube #2 or equivalent) to the sealing lip of oil seal.

NOTE:

● Align the end face of seal with surface "A" of left side transmission main case when installing oil seal.

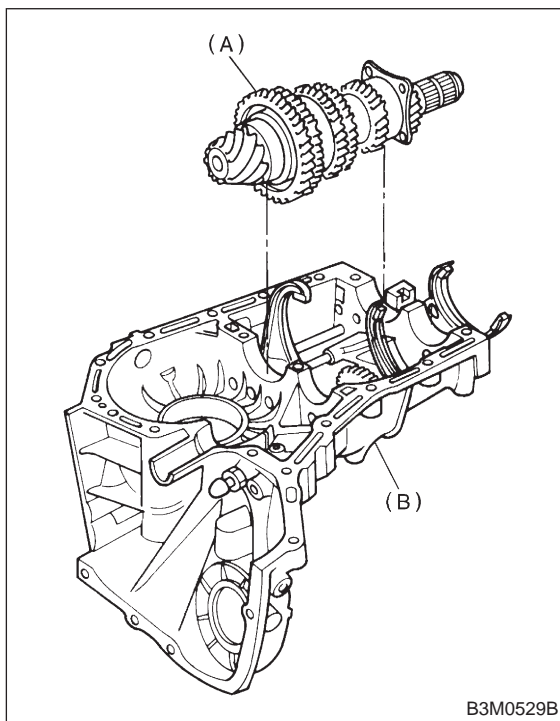


- Be careful not to drop oil seal when installing right side transmission main case.
- Make sure straight pin is positioned in hole in needle bearing's outer race.

5) Install drive pinion shaft assembly with shims selected before into transmission case.

NOTE:

Ensure that the knock pin of the case is fitted into the hole in the bearing outer race.



- (A) Drive pinion shaft ASSY
(B) Transmission case

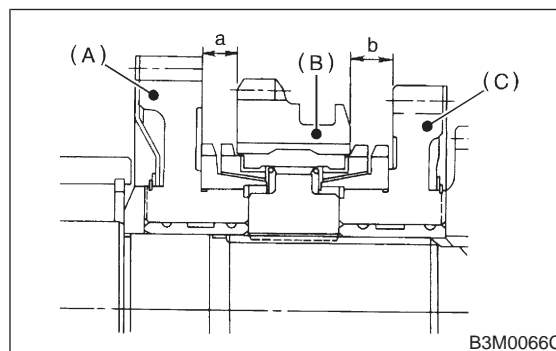
6) Selection of suitable 1st-2nd, 3rd-4th and 5th shifter fork

Set transmission main shaft assembly and drive pinion shaft assembly in position (so there is no clearance between the two when moved all the way to the front). Select suitable 1st-2nd, 3rd-4th and 5th shifter fork so that coupling sleeve and reverse driven gear are positioned in the center of their synchronizing mechanisms.

1st and 2nd clearance

a: 9.5 mm (0.374 in)

b: 9.5 mm (0.374 in)



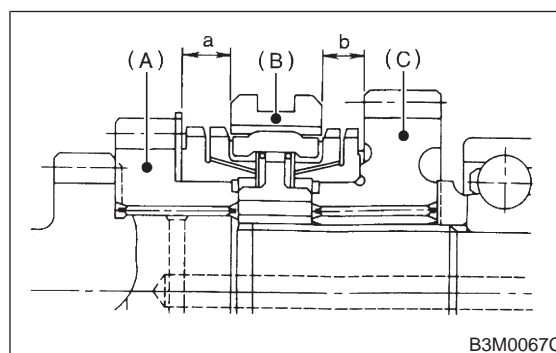
- (A) 1st driven gear
(B) Reverse driven gear
(C) 2nd driven gear

1st-2nd shifter fork		
Part No.	No.	Remarks
32804AA060	1	Approach to 1st gear by 0.2 mm (0.008 in)
32804AA070	No mark	Standard
32804AA080	3	Approach to 2nd gear by 0.2 mm (0.008 in)

3rd and 4th clearance

a: 9.3 mm (0.366 in)

b: 9.3 mm (0.366 in)

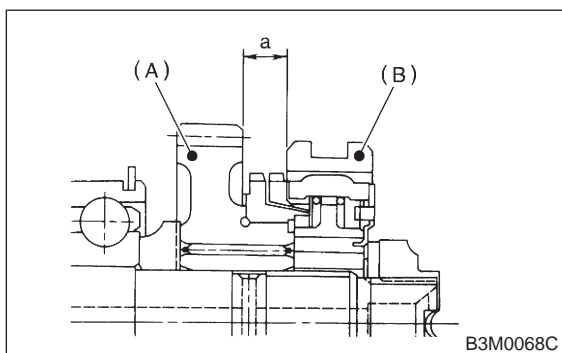


- (A) 3rd drive gear
(B) Coupling sleeve
(C) 4th drive gear

3rd-4th shifter fork		
Part No.	No.	Remarks
32810AA061	1	Approach to 4th gear by 0.2 mm (0.008 in)
32810AA071	No mark	Standard
32810AA101	3	Approach to 3rd gear by 0.2 mm (0.008 in)

5th clearance

a: 9.3 mm (0.366 in)



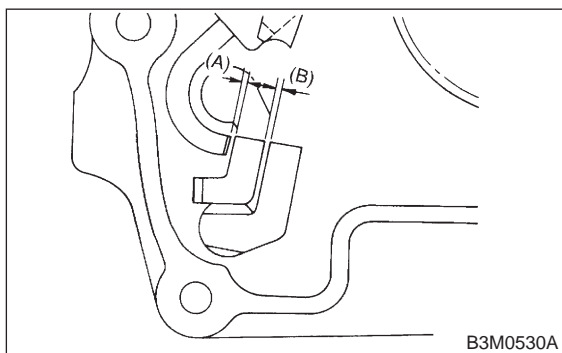
- (A) 5th drive gear
(B) Coupling sleeve

5th shifter fork		
Part No.	No.	Remarks
32812AA200	4	Approach to 5th gear by 0.2 mm (0.008 in)
32812AA210	No mark	Standard
32812AA220	6	Become distant from 5th gear by 0.2 mm (0.008 in)

7) Inspection of rod end clearance

Measure rod end clearances A and B. If any clearance is not within specifications, replace rod or fork as required.

(A): 1st-2nd to 3rd-4th	0.4 — 1.4 mm (0.016 — 0.055 in)
(B): 3rd-4th to 5th	0.5 — 1.3 mm (0.020 — 0.051 in)



8) Combination of transmission case

- (1) Wipe off grease, oil and dust on the mating surfaces of transmission cases with white gasoline, and apply liquid gasket, and then put case right side and left side together.

Liquid gasket:

THREE BOND 1215 or equivalent

- (2) Tighten 17 bolts with bracket, clip, etc. as shown in the figure.

NOTE:

- Insert bolts from the bottom and tighten nuts at the top.
- Put cases together so that drive pinion shim is not caught up in between.
- Confirm that speedometer gear is meshed.

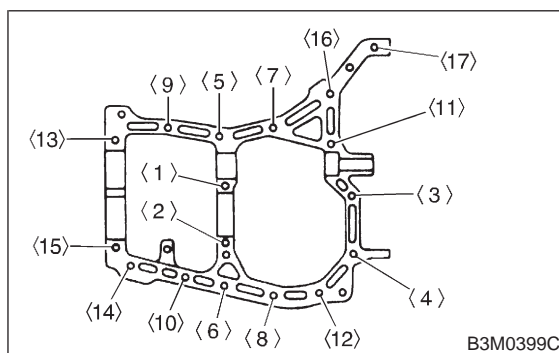
Tightening torque:

10 mm bolt (No. <1>—<4>, <16>, <17>)

39±3 N·m (4.0±0.3 kg-m, 28.9±2.2 ft-lb)

8 mm bolt (No. <5>—<15>)

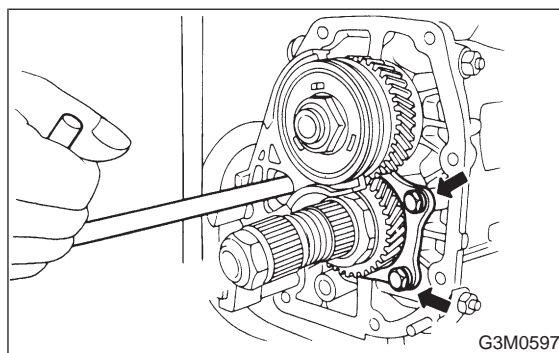
25±2 N·m (2.5±0.2 kg-m, 18.1±1.4 ft-lb)



- 9) Tighten ball bearing attachment bolts.

Tightening torque:

29±3 N·m (3.0±0.3 kg-m, 21.7±2.2 ft-lb)

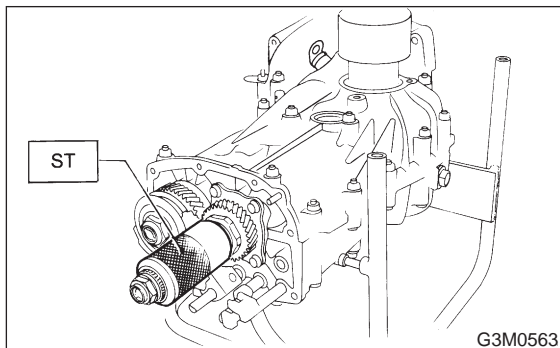


10) Backlash adjustment of hypoid gear and pre-load adjustment of roller bearing

NOTE:

Support drive pinion assembly with ST.

ST 498427100 STOPPER



(1) Place the transmission with case left side facing downward and put ST1 on bearing cup.

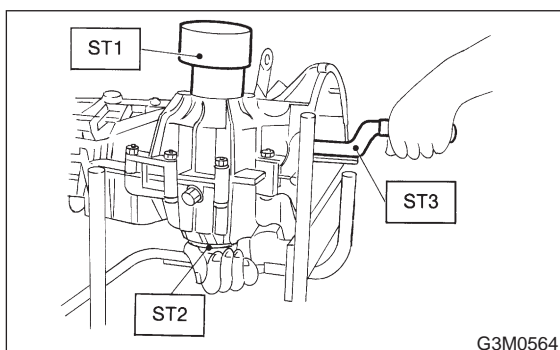
(2) Screw retainer assembly into left case from the bottom with ST2. Fit ST3 on the transmission main shaft. Shift gear into 4th or 5th and turn the shaft several times. Screw in the retainer while turning ST3 until a slight resistance is felt on ST2.

This is the contact point of hypoid gear and drive pinion shaft. Repeat the above sequence several times to ensure the contact point.

ST1 399780104 WEIGHT

ST2 499787000 WRENCH ASSY

ST3 499927100 HANDLE

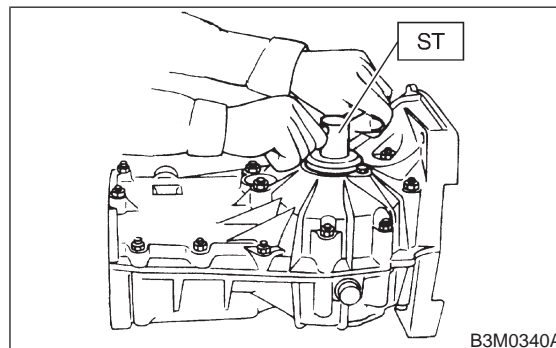


(3) Remove weight and screw in retainer without O-ring on the upper side and stop at the point where slight resistance is felt.

NOTE:

At this point, the backlash between the hypoid gear and drive pinion shaft is zero.

ST 499787000 WRENCH ASSY



(4) Fit lock plate. Loosen the retainer on the lower side by 1-1/2 teeth of lock plate and turn in the retainer on the upper side by the same amount in order to obtain the backlash.

NOTE:

The notch on the lock plate moves by 1/2 tooth if the plate is turned upside down.

(5) Turn in the retainer on the upper side additionally by 1 tooth in order to apply preload on taper roller bearing.

(6) Tighten temporarily both the upper and lower lock plates and mark both holder and lock plate for later readjustment.

(7) Turn transmission main shaft several times while tapping around retainer lightly with plastic hammer.

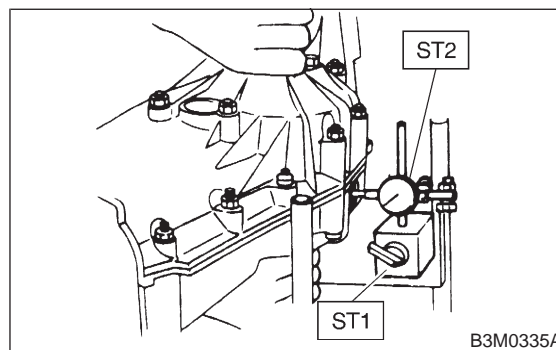
(8) Set ST1 and ST2. Insert the needle through transmission oil drain plug hole so that the needle comes in contact with the tooth surface at a right angle and check the backlash.

ST1 498247001 MAGNET BASE

ST2 498247100 DIAL GAUGE

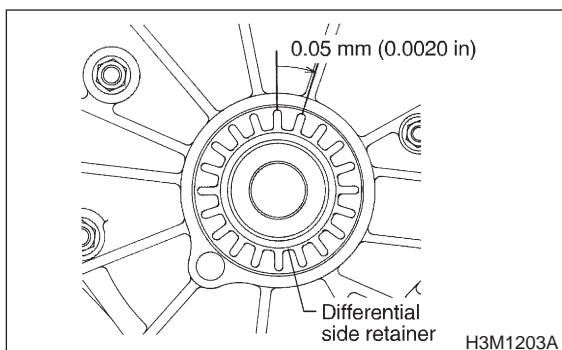
Backlash:

0.13 — 0.18 mm (0.0051 — 0.0071 in)



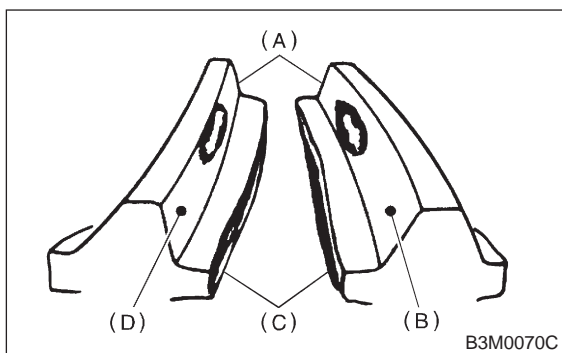
NOTE:

- If backlash is outside specified range, adjust it by turning holder in right side case.
- Each time holder rotates one tooth, backlash changes by 0.05 mm (0.0020 in).



(9) Check tooth contact of hypoid gear as follows: Apply a uniform thin coat of red lead on both tooth surfaces of 3 or 4 teeth of the hypoid gear. Move the hypoid gear back and forth by turning the transmission main shaft until a definite contact pattern is developed on hypoid gear, and judge whether face contact is correct. If it is incorrect, make the following correction.

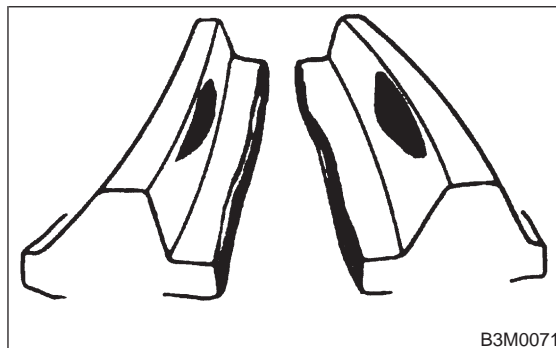
- Tooth contact is correct.



- (A) Toe
- (B) Coast side
- (C) Heel
- (D) Drive side

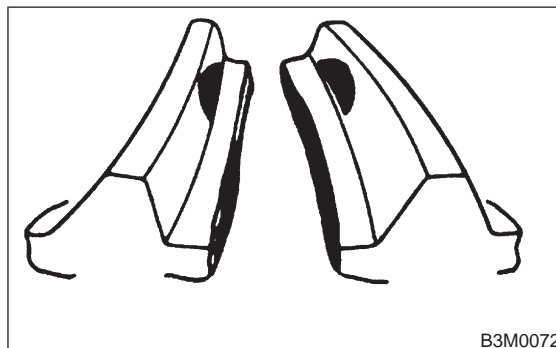
- Backlash is excessive.

To reduce backlash, loosen holder on the upper side (case right side) and turn in the holder on the lower side (case left side) by the same amount.

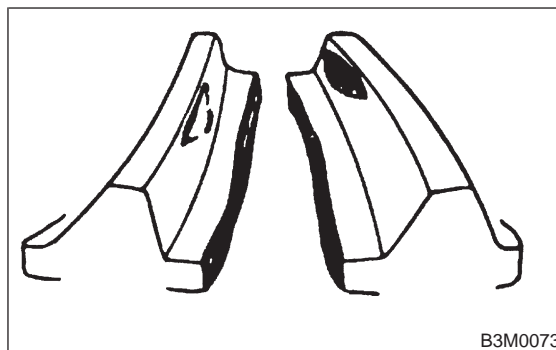


- Backlash is insufficient.

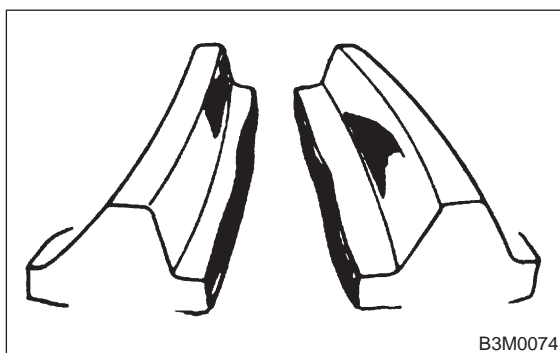
To increase backlash, loosen holder on the lower side (case left side) and turn in the holder on the upper side (case right side) by the same amount.



- The drive pinion shim selected before is too thick. Reduce its thickness.



- The drive pinion shim selected before is too thin. Increase its thickness.



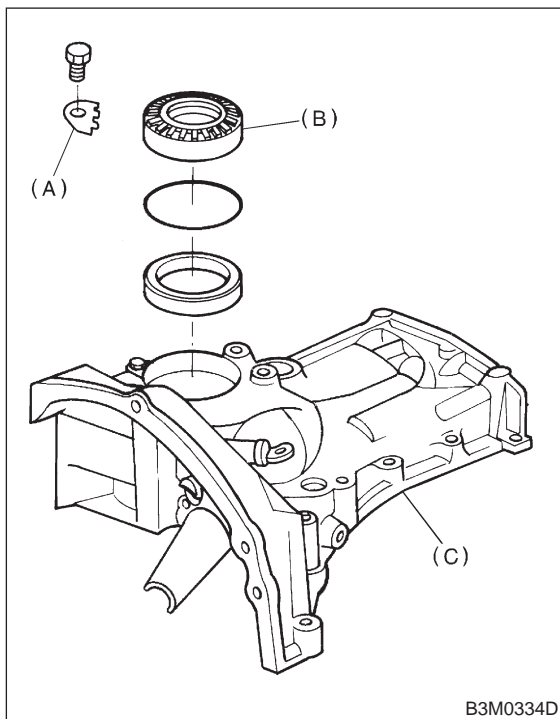
11) After checking the tooth contact of hypoid gears, remove the lock plate. Then loosen retainer until the O-ring groove appears. Fit O-ring into the groove and tighten retainer into the position where retainer has been tightened in. Tighten lock plate.

NOTE:

Carry out this job on both upper and lower retainers.

Tightening torque:

$25 \pm 3 \text{ N}\cdot\text{m}$ ($2.5 \pm 0.3 \text{ kg}\cdot\text{m}$, $18.1 \pm 2.2 \text{ ft}\cdot\text{lb}$)



- (A) Lock plate
- (B) Retainer
- (C) Transmission case

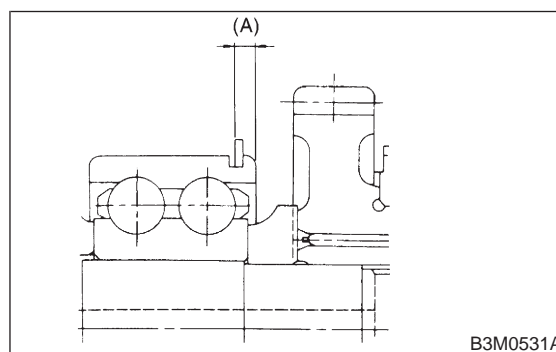
12) Selecting of main shaft rear plate
Using ST, measure the amount A of ball bearing protrusion from transmission main case surface and select the proper plate in the following table:

NOTE:

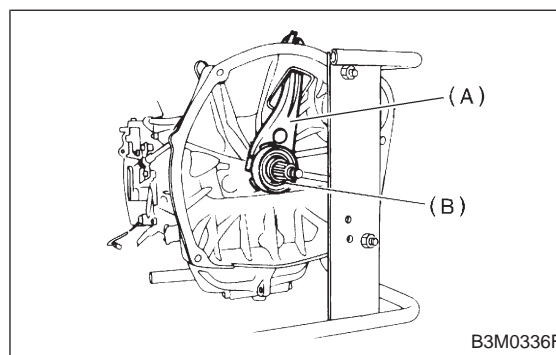
Before measuring, tap the end of main shaft with a plastic hammer lightly in order to make the clearance zero between the main case surface and the moving flange of bearing.

ST 498147000 DEPTH GAUGE

Dimension (A) mm (in)	Part No.	Mark
4.00 — 4.13 (0.1575 — 0.1626)	32294AA041	1
3.87 — 3.99 (0.1524 — 0.1571)	32294AA051	2



13) Install clutch release lever and bearing. Mechanical application type; <Ref. to 2-10 [W3C1].> Hydraulic application type; <Ref. to 2-10 [W3C2].>



- (A) Clutch release lever
- (B) Clutch release bearing

3. Drive Pinion Assembly

A: DISASSEMBLY

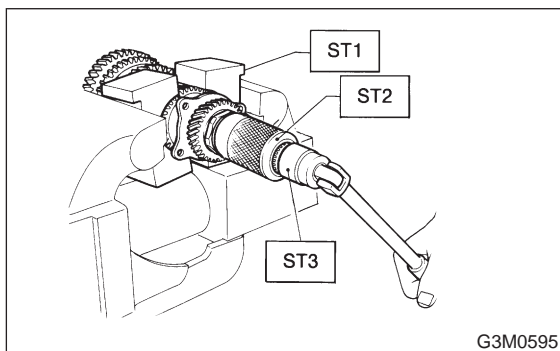
1. DRIVE PINION SHAFT

1) Straighten lock nut at staked portion. Remove the lock nut using ST1, ST2 and ST3.

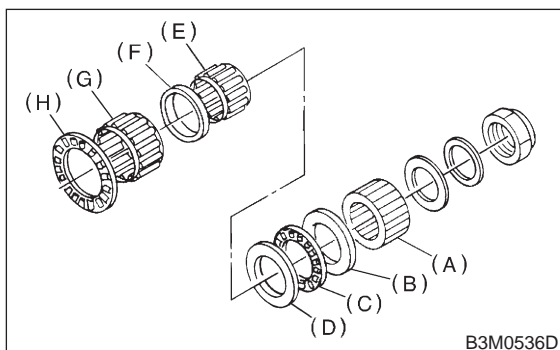
ST1 899884100 HOLDER

ST2 498427100 STOPPER

ST3 899988608 SOCKET WRENCH



2) Withdraw drive pinion from driven shaft. Remove differential bevel gear sleeve, adjusting washer No. 1, adjusting washer No. 2, thrust bearing, needle bearing, drive pinion collar, needle bearing and thrust bearing.



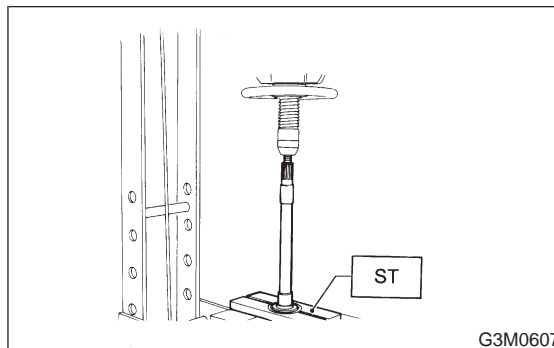
- (A) Differential bevel gear sleeve
- (B) Adjusting washer No. 1 (25 × 37.5 × t)
- (C) Thrust bearing (25 × 37.5 × 3)
- (D) Adjusting washer No. 2 (25 × 37.5 × 4)
- (E) Needle bearing (25 × 30 × 20)
- (F) Drive pinion collar
- (G) Needle bearing (30 × 37 × 23)
- (H) Thrust bearing (33 × 50 × 3)

3) Remove roller bearing and washer (33 x 50 x 5) using ST and press.

CAUTION:

Do not reuse roller bearing.

ST 498077000 REMOVER



2. DRIVEN GEAR ASSEMBLY (2200 cc MODEL)

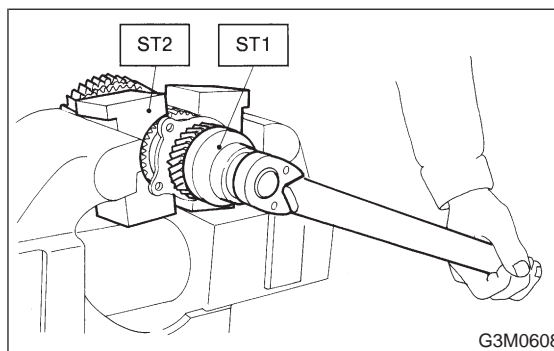
CAUTION:

Attach a cloth to the end of driven shaft (on the frictional side of thrust needle bearing) during disassembly or reassembly to prevent damage.

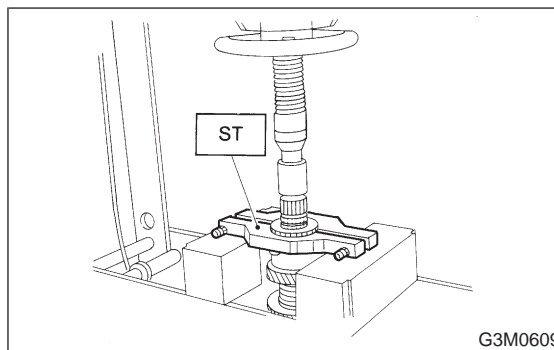
1) Straighten lock nut at staked portion. Remove the lock nut using ST1 and ST2.

ST1 499987300 SOCKET WRENCH (50)

ST2 899884100 HOLDER



2) Remove 5th driven gear using ST.
ST 499857000 5TH DRIVEN GEAR REMOVER

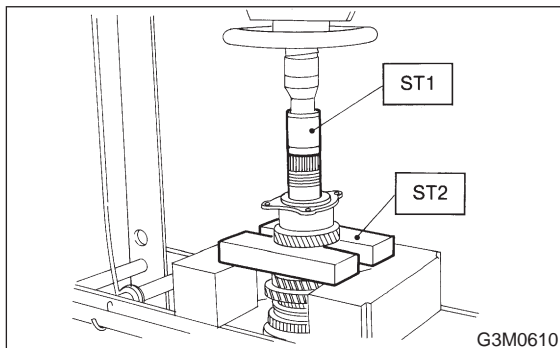


3) Remove woodruff key.

- 4) Remove roller bearing (42 x 74 x 40), 3rd and 4th driven gear using ST1 and ST2.

ST1 499757002 SNAP RING PRESS

ST2 899714110 REMOVER



- 5) Remove the key.

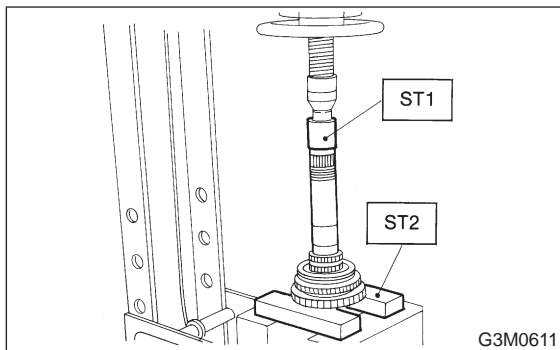
- 6) Remove 2nd driven gear assembly.

- 7) Remove 1st driven gear, 2nd gear bushing, gear and hub using ST1 and ST2.

Replace gear and hub if necessary. Do not attempt to disassemble if at all possible because they must engage at a specified point. If they have to be disassembled, mark the engaging point before-hand.

ST1 499757002 SNAP RING PRESS

ST2 899714110 REMOVER



- 8) Remove sub gears for 1st and 2nd driven gear.

3. DRIVEN GEAR ASSEMBLY (2500 cc MODEL)

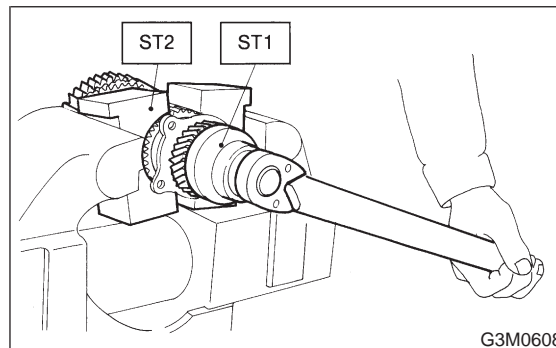
CAUTION:

Attach a cloth to the end of driven shaft (on the frictional side of thrust needle bearing) during disassembly or reassembly to prevent damage.

- 1) Straighten lock nut at staked portion. Remove the lock nut using ST1 and ST2.

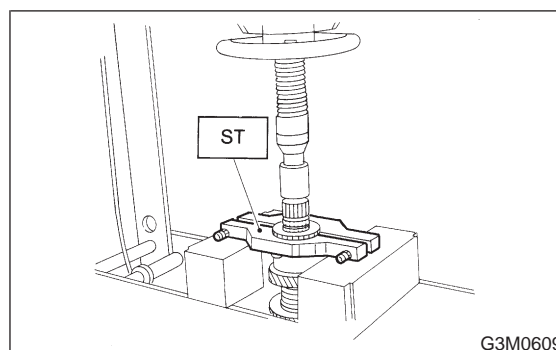
ST1 499987300 SOCKET WRENCH (50)

ST2 899884100 HOLDER



- 2) Remove 5th driven gear using ST.

ST 499857000 5TH DRIVEN GEAR REMOVER

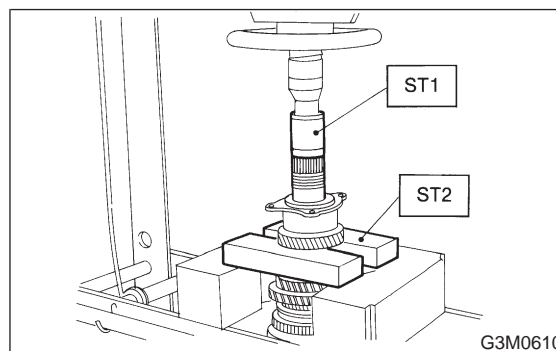


- 3) Remove woodruff key.

- 4) Remove roller bearing (42 x 74 x 40), 3rd-4th driven gear using ST1 and ST2.

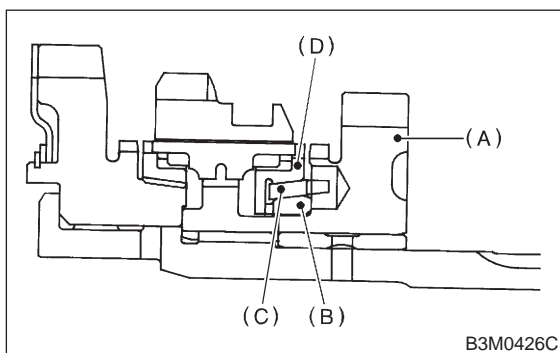
ST1 499757002 SNAP RING PRESS

ST2 899714110 REMOVER



- 5) Remove the key.

6) Remove 2nd driven gear, inner baulk ring, synchro cone and outer baulk ring.



- (A) 2nd driven gear
- (B) Inner baulk ring
- (C) Synchro cone
- (D) Outer baulk ring

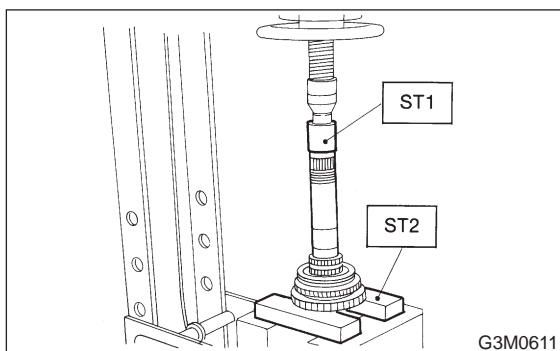
7) Remove 1st driven gear, 2nd gear bushing, gear and hub using ST1 and ST2.

NOTE:

Replace gear and hub if necessary. Do not attempt to disassemble if at all possible because they must engage at a specified point. If they have to be disassembled, mark the engaging point beforehand.

ST1 499757002 SNAP RING PRESS

ST2 899714110 REMOVER



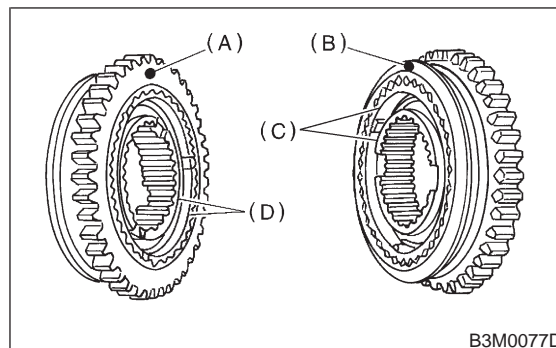
8) Remove sub gear for 1st driven gear.

B: ASSEMBLY

1. GEAR AND HUB ASSEMBLY (2200 cc MODEL)

NOTE:

Position open ends of springs 120° apart.



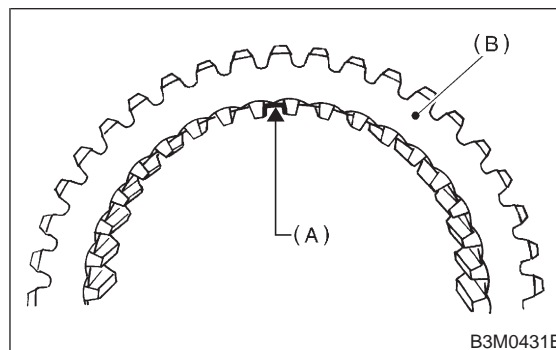
- (A) 1st gear side
- (B) 2nd gear side
- (C) Flush surface
- (D) Stepped surface

2. GEAR AND HUB ASSEMBLY (2500 cc MODEL)

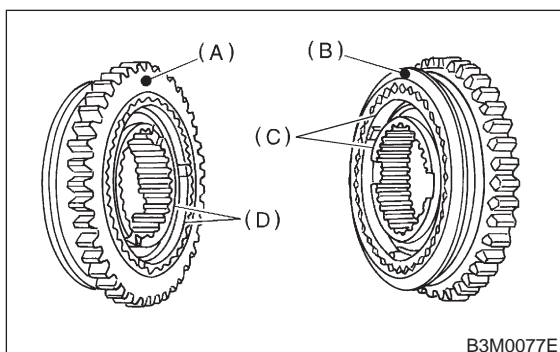
Assemble gear and hub assembly.

NOTE:

- Use new gear and hub assembly, if gear or hub have been replaced.
- Be sure the insert keys are correctly located in the insert key grooves inside the reverse driven gear.



- (A) Key grooves
- (B) Reverse driven gear

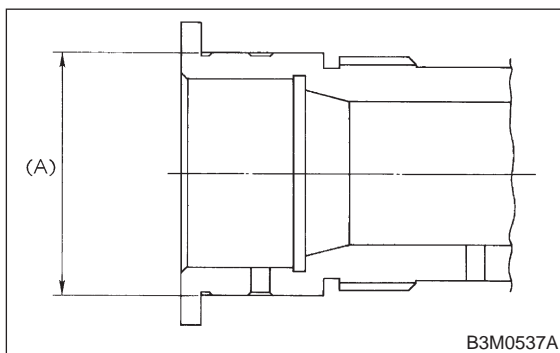


- (A) 1st gear side
- (B) 2nd gear side
- (C) Flush surface
- (D) Stepped surface

3. DRIVEN GEAR ASSEMBLY (2200 cc MODEL)

Assemble a driven shaft and 1st driven gear that select for adjustment the proper radial clearance.

Driven shaft		1st driven gear
Part No.	Diameter (A) mm (in)	Part No.
32229AA150	49.959 — 49.966 (1.9669 — 1.9672)	32231AA270
32229AA140	49.967 — 49.975 (1.9672 — 1.9675)	32231AA260



1) Install 1st driven gear, 1st-2nd baulk ring and gear and hub assembly onto driven shaft.

NOTE:

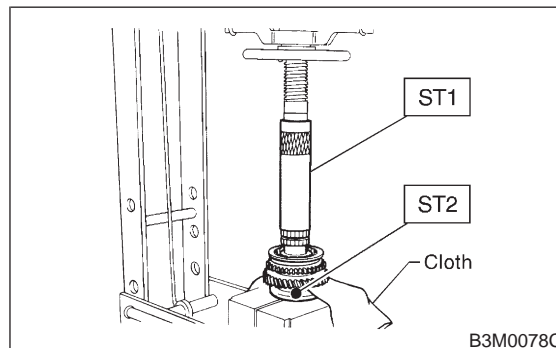
Take care to install gear hub in proper direction.

2) Install 2nd driven gear bushing onto driven shaft using ST1, ST2 and press.

CAUTION:

Attach a cloth to the end of driven shaft to prevent damage.

ST1 499277200 INSTALLER
ST2 499587000 INSTALLER

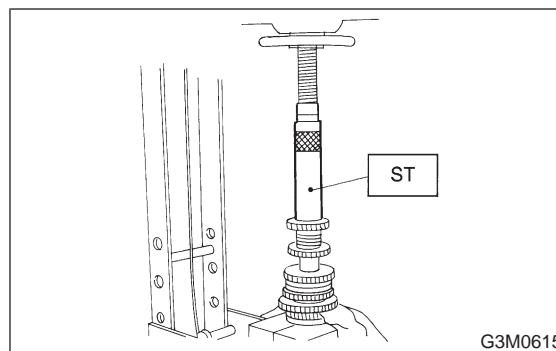


3) Install 2nd driven gear, 1st-2nd baulk ring and insert onto driven shaft. After installing key on driven shaft, install 3rd-4th driven gear using ST and press.

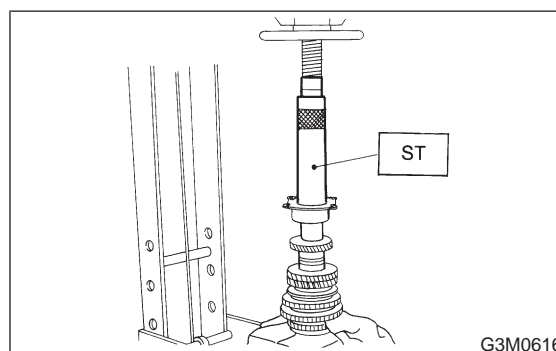
CAUTION:

Align groove in baulk ring with insert.

ST 499277200 INSTALLER

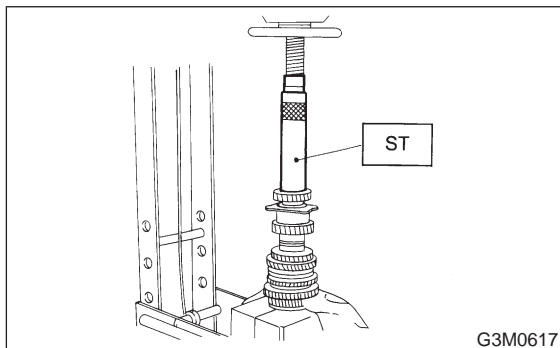


4) Install a set of roller bearings (42 × 74 × 40) onto the driven shaft using ST and press.
ST 499277200 INSTALLER



5) Position woodruff key in groove on the rear of driven shaft. Install 5th driven gear onto drive shaft using ST and press.

ST 499277200 INSTALLER

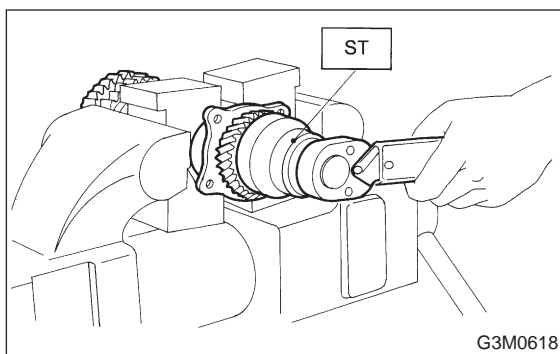


6) Install lock washer (42 × 53 × 2). Install lock nut (42 × 13) and tighten to the specified torque using ST.

ST 499987300 SOCKET WRENCH (50)

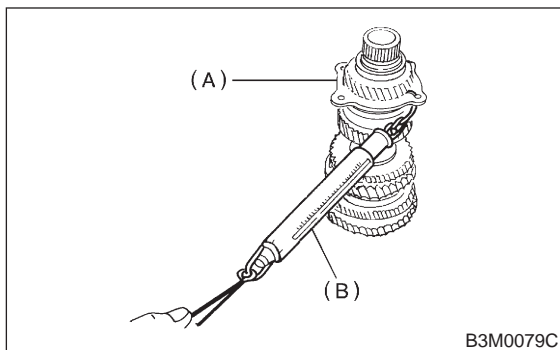
Tightening torque:

265±10 N·m (27±1 kg·m, 195±7 ft·lb)



NOTE:

- Stake lock nut at two points.
- Using spring balancer, check that starting torque of roller bearing is 0.1 to 1.5 N·m (0.01 to 0.15 kg·m, 0.07 to 1.1 ft·lb).

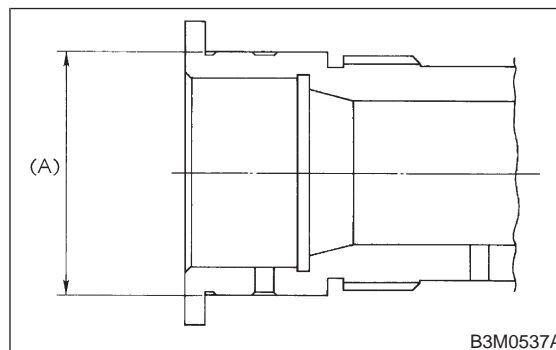


- (A) Roller bearing
(B) Spring balancer

4. DRIVEN GEAR ASSEMBLY (2500 cc MODEL)

Assemble a driven shaft and 1st driven gear that select for adjustment the proper radial clearance.

Driven shaft		1st driven gear
Part No.	Diameter A mm (in)	Part No.
32229AA150	49.959 — 49.966 (1.9669 — 1.9672)	32231AA290
32229AA140	49.967 — 49.975 (1.9672 — 1.9675)	32231AA280



- 1) Install sub gear to 1st driven gear.
- 2) Install 1st driven gear, 1st baulk ring, gear and hub assembly onto driven shaft.

NOTE:

Take care to install gear hub in proper direction.

- 3) Install 2nd driven gear bushing onto driven shaft using ST1, ST2 and press.

ST1 499277200 INSTALLER

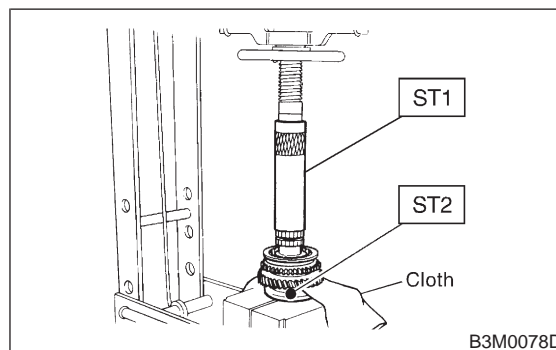
ST2 499587000 INSTALLER

CAUTION:

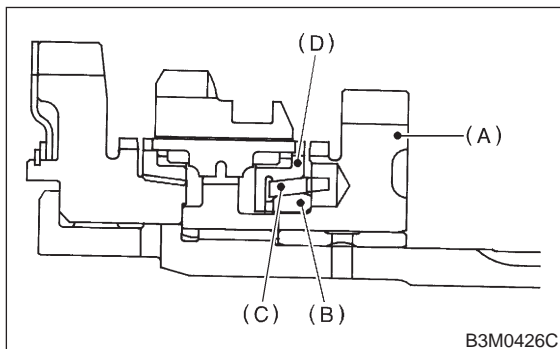
Attach a cloth to the end of driven shaft to prevent damage.

NOTE:

When press fitting, align oil holes of shaft and bush.



4) Install 2nd driven gear, inner baulk ring, synchro cone, outer baulk ring and insert onto driven shaft.



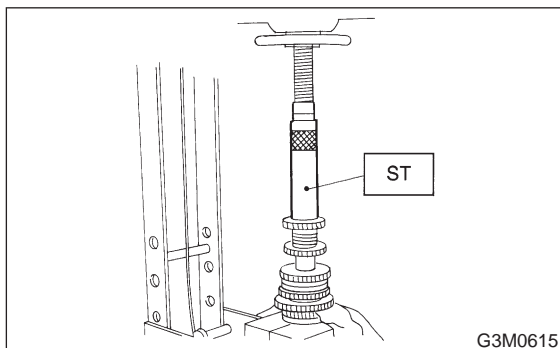
- (A) 2nd driven gear
- (B) Inner baulk ring
- (C) Synchro cone
- (D) Outer baulk ring

5) After installing key on driven shaft, install 3rd-4th driven gear using ST and press.

NOTE:

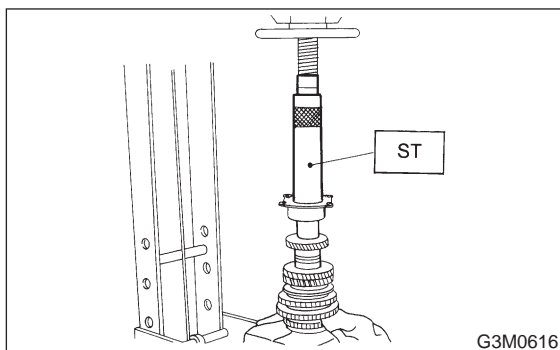
Align groove in baulk ring with insert.

ST 499277200 INSTALLER



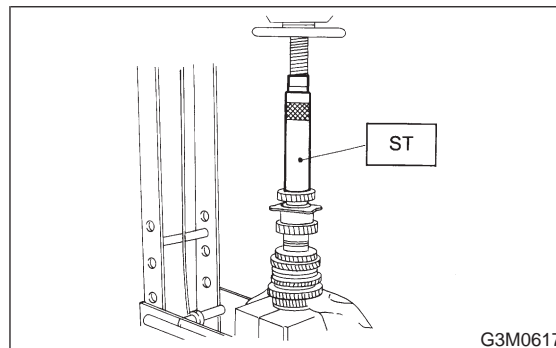
6) Install a set of roller bearings (42 × 74 × 40) onto the driven shaft using ST and press.

ST 499277200 INSTALLER



7) Position woodruff key in groove on the rear of driven shaft. Install 5th driven gear onto drive shaft using ST and press.

ST 499277200 INSTALLER

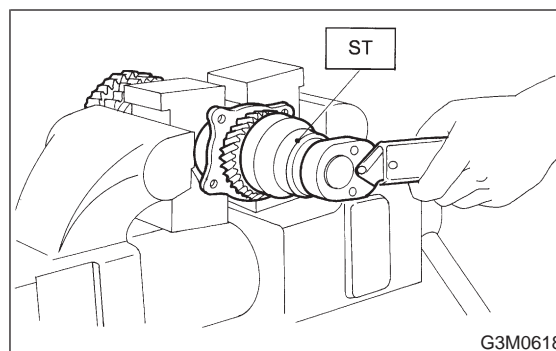


8) Install lock washer (42 × 53 × 2). Install lock nut (42 × 13) and tighten to the specified torque using ST.

ST 499987300 SOCKET WRENCH (50)

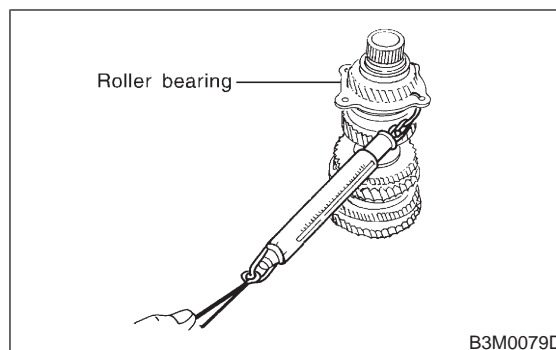
Tightening torque:

265±10 N·m (27±1 kg·m, 195±7 ft·lb)



NOTE:

- Stake lock nut at two points.
- Using spring balancer, check that starting torque of roller bearing is 0.1 to 1.5 N·m (0.01 to 0.15 kg·m, 0.07 to 1.1 ft·lb).

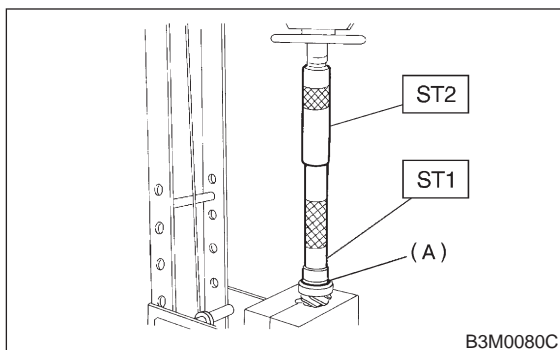


5. DRIVE PINION SHAFT

1) Install roller bearing onto drive pinion. Install washer (33 × 50 × 5) using ST1, ST2 and press.

ST1 499277100 BUSH 1-2 INSTALLER

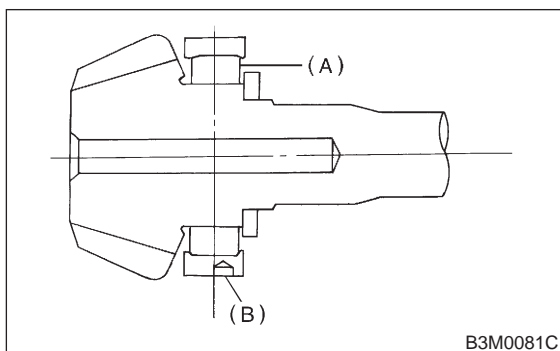
ST2 499277200 INSTALLER



(A) Roller bearing

NOTE:

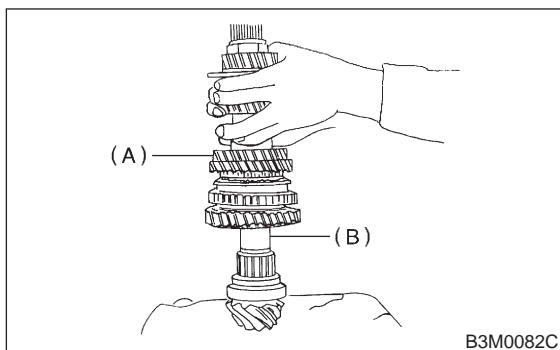
When installing roller bearing, note its directions (front and rear) because knock pin hole in outer race is offset.



(A) Roller bearing

(B) Knock pin hole

2) Install thrust bearing (33 × 50 × 3) and needle bearing (30 × 37 × 23). Install driven shaft assembly.



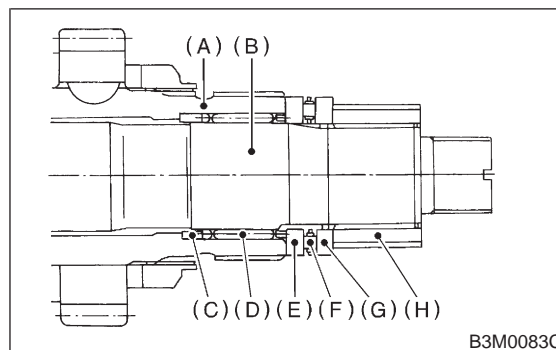
(A) Driven shaft

(B) Drive pinion shaft

3) Install drive pinion collar, needle bearing, adjusting washer No. 2, thrust bearing, adjusting washer No. 1 and differential bevel gear sleeve in that order.

NOTE:

Be careful because spacer must be installed in proper direction.



(A) Driven shaft

(B) Drive pinion shaft

(C) Drive pinion collar

(D) Needle bearing (25 × 30 × 20)

(E) Washer No. 2 (25 × 36 × 4)

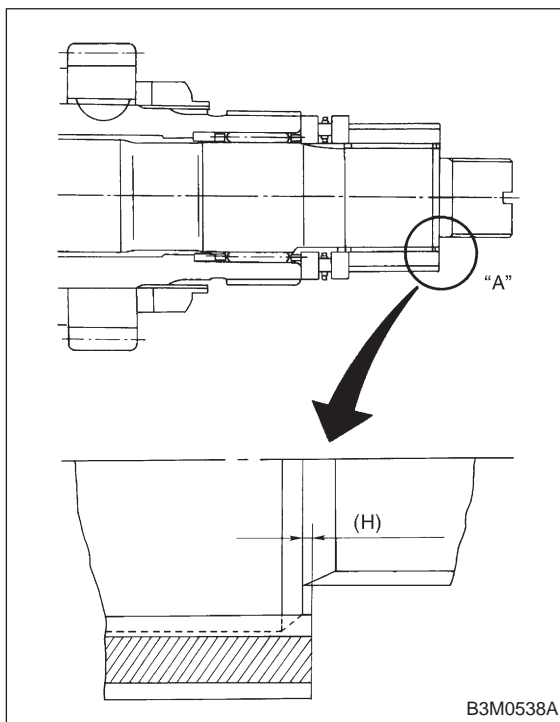
(F) Thrust bearing (25 × 37.5 × 3)

(G) Washer No. 1 (25 × 36 × t)

(H) Differential bevel gear sleeve

C: ADJUSTMENT**1. ADJUSTMENT OF THRUST BEARING PRELOAD**

1) After completing the preceding steps 1) through 3), select adjusting washer No. 2 so that dimension (H) is zero through visual check. Position washer (18.3 × 30 × 4) and lock washer (18 × 30 × 2) and install lock nut (18 × 13.5).

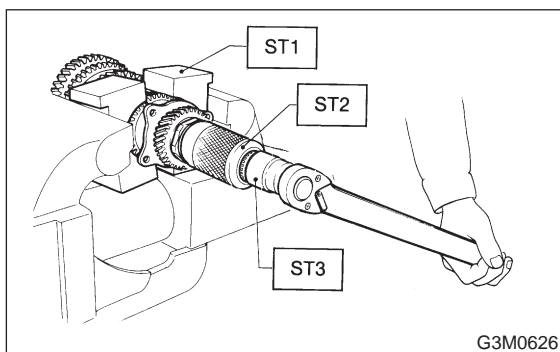


2) Using ST1, ST2 and ST3, tighten lock nut to the specified torque.

ST1 899884100 HOLDER
ST2 498427100 STOPPER
ST3 899988608 SOCKET WRENCH (27)

Tightening torque:

$118 \pm 8 \text{ N}\cdot\text{m}$ ($12 \pm 0.8 \text{ kg}\cdot\text{m}$, $86.8 \pm 5.8 \text{ ft}\cdot\text{lb}$)



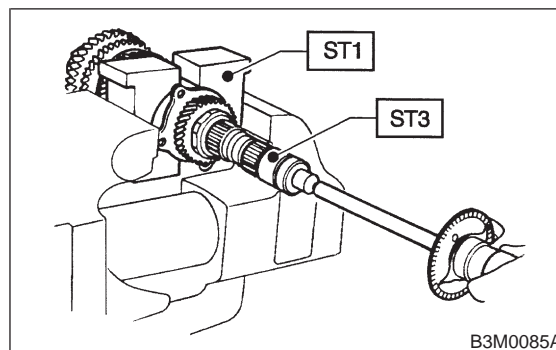
3) After removing ST2, measure starting torque using torque driver.

ST1 899884100 HOLDER

ST3 899988608 SOCKET WRENCH (27)

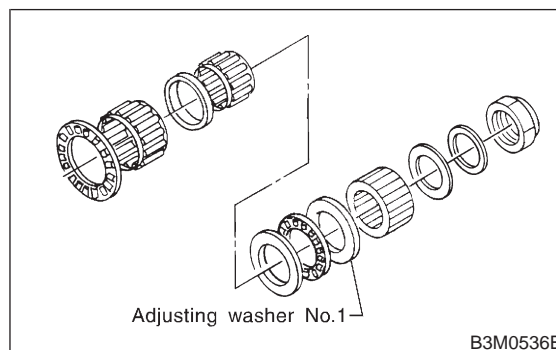
Starting torque:

$0.5 \pm 0.2 \text{ N}\cdot\text{m}$ ($0.055 \pm 0.025 \text{ kg}\cdot\text{m}$, $0.4 \pm 0.2 \text{ ft}\cdot\text{lb}$)



4) If starting torque is not within specified limit, select new adjusting washer No. 1 and recheck starting torque.

Adjusting washer No. 1	
Part No.	Thickness mm (in)
803025051	3.925 (0.1545)
803025052	3.950 (0.1555)
803025053	3.975 (0.1565)
803025054	4.000 (0.1575)
803025055	4.025 (0.1585)
803025056	4.050 (0.1594)
803025057	4.075 (0.1604)

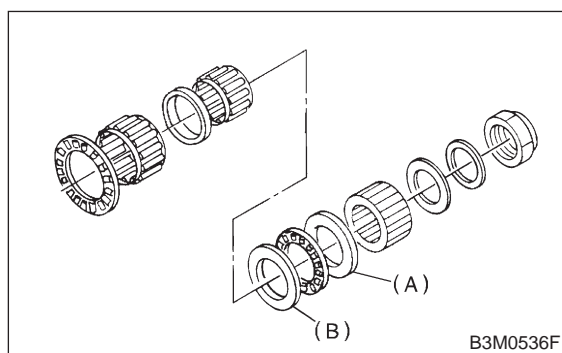


4. Main Shaft Assembly

5) If specified starting torque range cannot be obtained when a No. 1 adjusting washer is used, then select a suitable No. 2 adjusting washer from those listed in the following table. Repeat steps 1) through 4) to adjust starting torque.

Starting torque	Dimension H	Washer No. 2
Low	Small	Select thicker one.
High	Large	Select thinner one.

Adjusting washer No. 2	
Part No.	Thickness mm (in)
803025059	3.850 (0.1516)
803025054	4.000 (0.1575)
803025058	4.150 (0.1634)



- (A) Adjusting washer No. 1
(B) Adjusting washer No. 2

6) Recheck that starting torque is within specified range, then clinch lock nut at four positions.

4. Main Shaft Assembly

A: DISASSEMBLY

1. 2200 cc MODEL

1) Put vinyl tape around main shaft splines to protect oil seal from damage. Then pull out oil seal and needle bearing by hand.

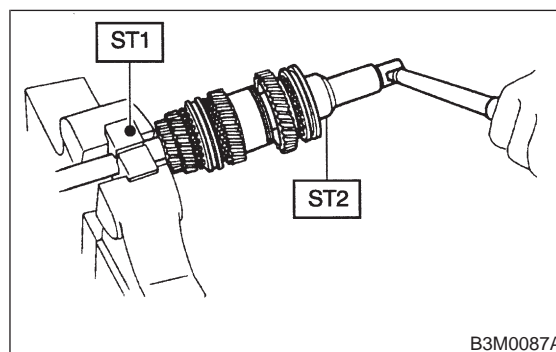
2) Remove lock nut from transmission main shaft assembly.

NOTE:

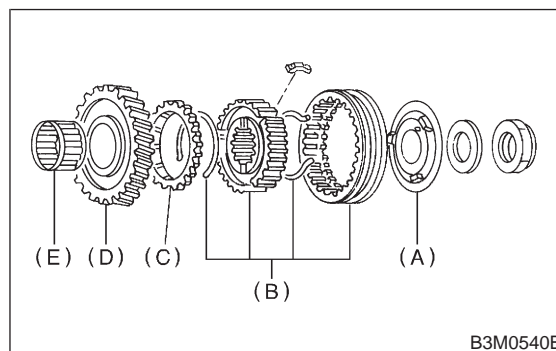
Remove caulking before taking off lock nut.

ST1 498937000 TRANSMISSION HOLDER

ST2 499987003 SOCKET WRENCH (35)



3) Remove insert stopper plate, sleeve and hub assembly No. 2, baulk ring, 5th drive gear, and needle bearing.



- (A) Insert stopper plate
(B) Sleeve and hub ASSY No. 2
(C) Baulk ring
(D) 5th drive gear
(E) Needle bearing (32 × 36 × 25.7)

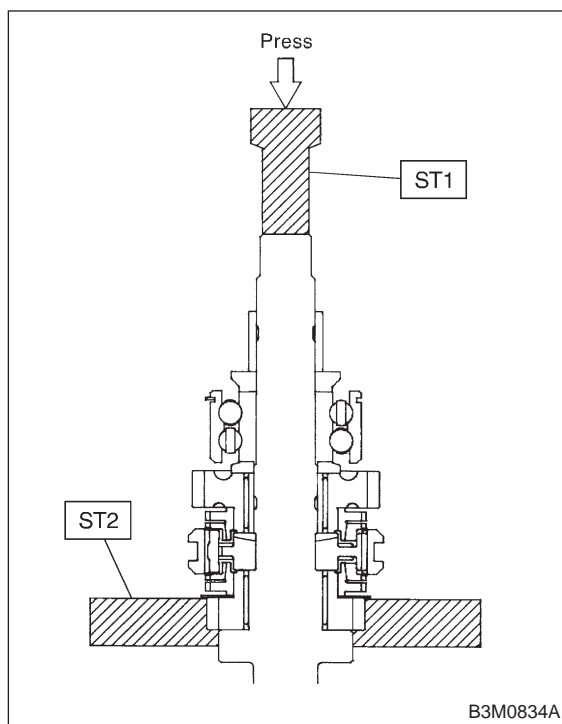
4) Using ST1, ST2 and a press, remove remaining parts.

NOTE:

Replace sleeve and hub with new ones. Do not attempt to disassemble because they must engage at a specified point. If they should be disassembled, mark engagement point on splines beforehand.

ST1 899864100 REMOVER

ST2 899714110 REMOVER



2. 2500 cc MODEL

1) Put vinyl tape around main shaft splines to protect oil seal from damage. Then pull out oil seal and needle bearing by hand.

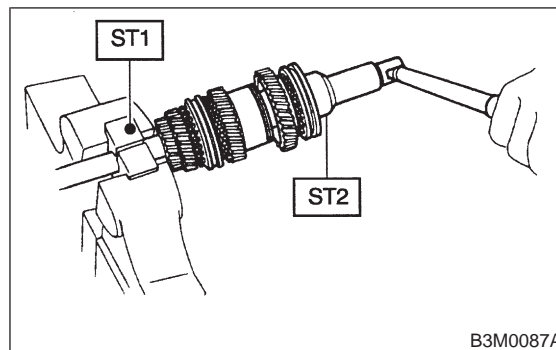
2) Remove lock nut from transmission main shaft assembly.

NOTE:

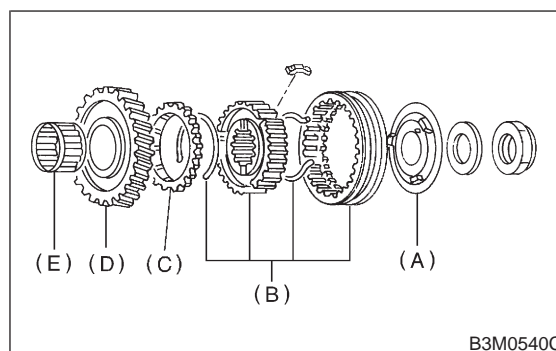
Remove caulking before taking off lock nut.

ST1 498937000 TRANSMISSION HOLDER

ST2 499987003 SOCKET WRENCH (35)



3) Remove insert stopper plate, sleeve and hub assembly No. 2, baulk ring, 5th drive gear, and needle bearing.



- (A) Insert stopper plate
- (B) Sleeve and hub assembly No. 2
- (C) Baulk ring
- (D) 5th drive gear
- (E) Needle bearing (32 x 36 x 25.7)

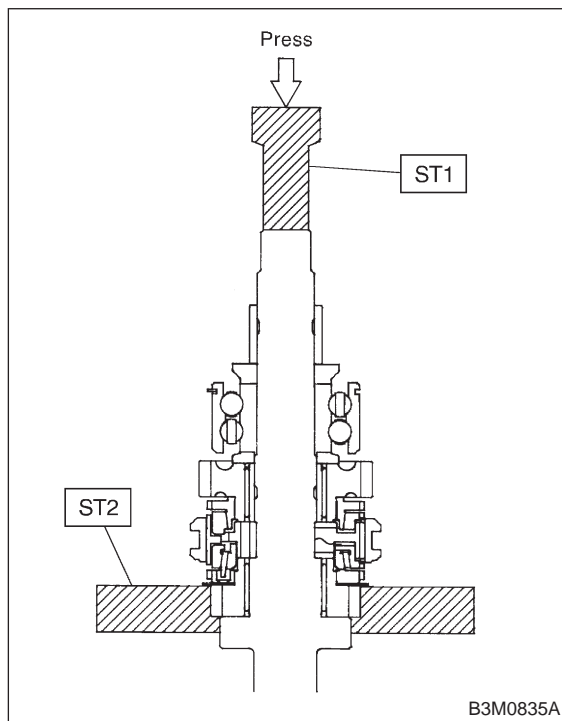
4) Using ST1 and ST2, remove the rest of parts.

NOTE:

Replace sleeve and hub with new ones. Do not attempt to disassemble because they must engage at a specified point. If they should be disassembled, marking engagement point on splines beforehand.

ST1 899864100 REMOVER

ST2 899714110 REMOVER



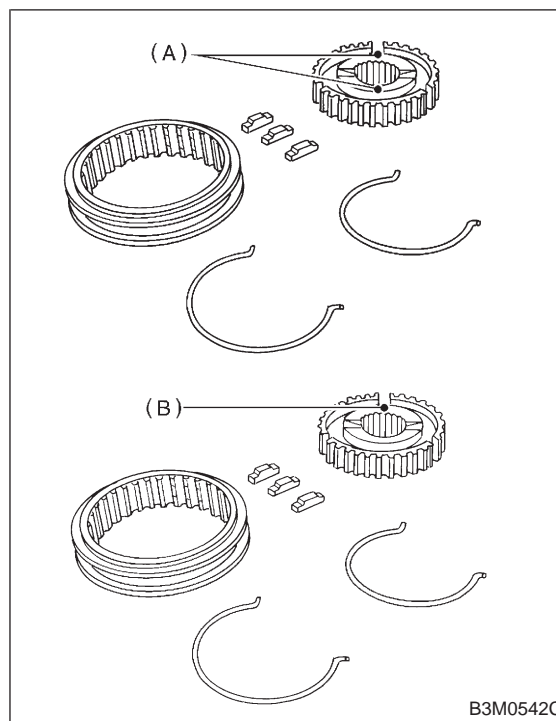
B: ASSEMBLY

1. 2200 cc MODEL

1) Assemble sleeve and hub assembly for 3rd-4th and, 5th and high-low synchronizing.

NOTE:

Position open ends of spring 120° apart.



(A) Two holes for discrimination (3rd-4th hub)

(B) One hole for discrimination (5th hub)

2) Install 3rd drive gear, baulk ring, and sleeve and hub assembly for 3rd-4th needle bearing (32 × 36 × 25.7) on transmission main shaft.

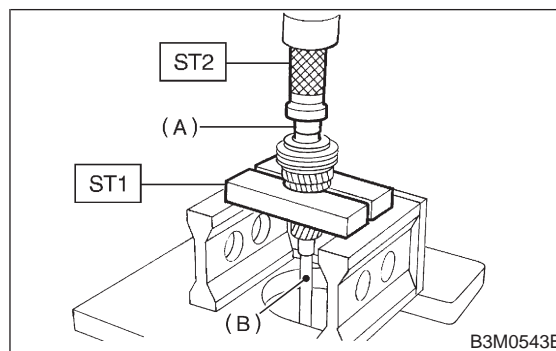
NOTE:

Align groove in baulk ring with shifting insert.

3) Install 4th needle bearing race onto transmission main shaft using ST1, ST2 and a press.

ST1 899714110 REMOVER

ST2 499877000 RACE 4-5 INSTALLER



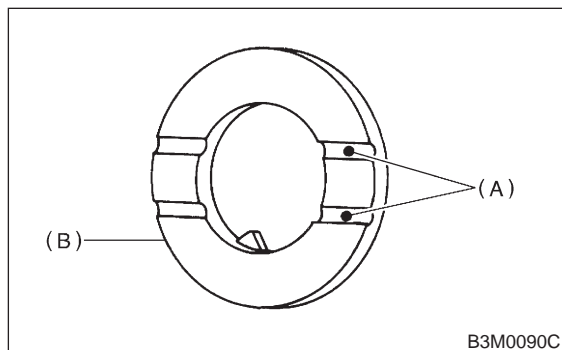
(A) 4th needle bearing race

(B) Transmission main shaft

4) Install baulk ring, needle bearing (32 × 30 × 25.7), 4th drive gear and 4th gear thrust washer to transmission main shaft.

NOTE:

Face thrust washer in the correct direction.

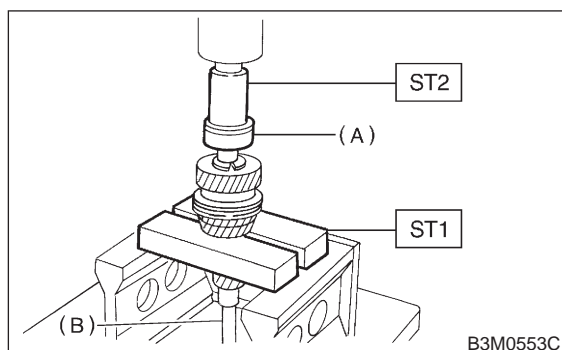


- (A) Groove
- (B) 4th gear side

5) Drive ball bearing onto the rear section of transmission main shaft using ST1, ST2 and a press.

ST1 899714110 REMOVER

ST2 499877000 RACE 4-5 INSTALLER



- (A) Ball bearing
- (B) Transmission main shaft

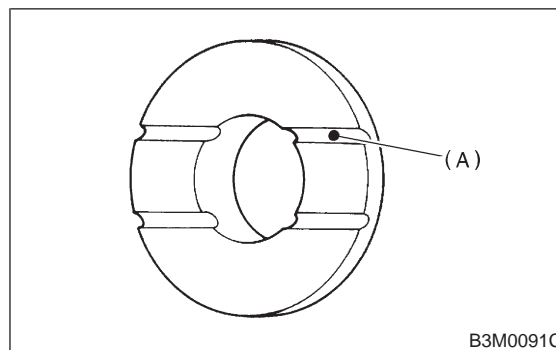
6) Using ST1 and ST2, install the 5th gear thrust washer and 5th needle bearing race onto the rear section of transmission main shaft.

NOTE:

Face thrust washer in the correct direction.

ST1 899714110 REMOVER

ST2 499877000 RACE 4-5 INSTALLER



- (A) Face this surface to 5th gear side.

7) Install remaining parts to the rear section of transmission main shaft.

NOTE:

- Align groove in baulk ring with shifting insert.
- Be sure to fit pawl of insert stopper plate into 4 mm (0.16 in) dia. hole in the boss section of synchronizer hub.

8) Tighten lock nut (22 × 13) to the specified torque using ST1 and ST2.

NOTE:

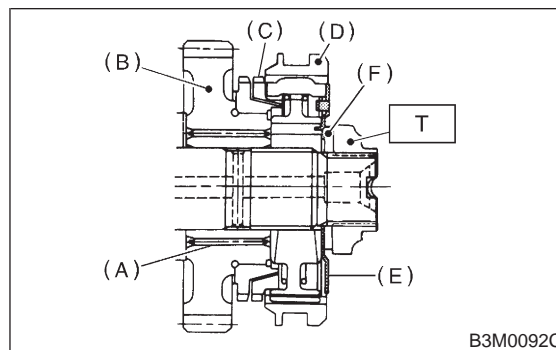
Secure lock nuts in two places after tightening.

ST1 499987003 SOCKET WRENCH (35)

ST2 498937000 TRANSMISSION HOLDER

Tightening torque:

T: 118±6 N·m (12.0±0.6 kg-m, 86.8±4.3 ft-lb)



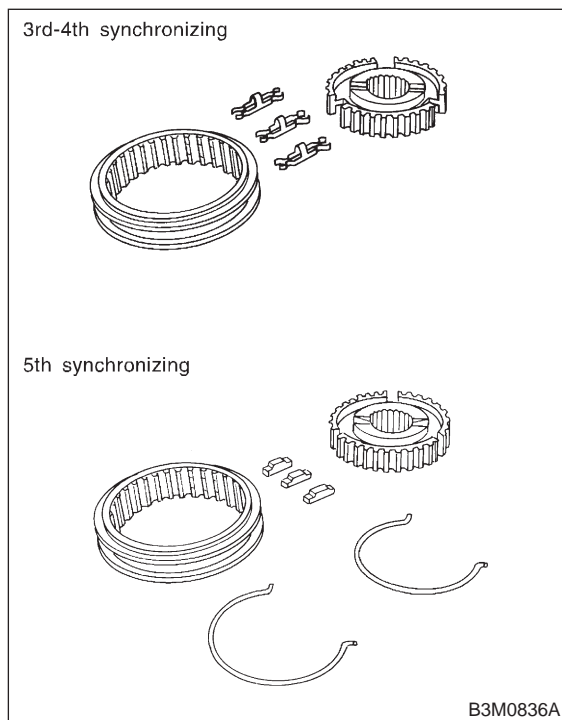
- (A) Needle bearing (32 × 36 × 25.7)
- (B) 5th drive gear
- (C) Baulk ring
- (D) Sleeve and hub ASSY
- (E) Insert stopper plate
- (F) Lock washer (22 × 38 × 2)

2. 2500 cc MODEL

1) Assemble sleeve and hub assembly for 3rd-4th and, 5th synchronizing.

NOTE:

Position open ends of spring 120° apart.

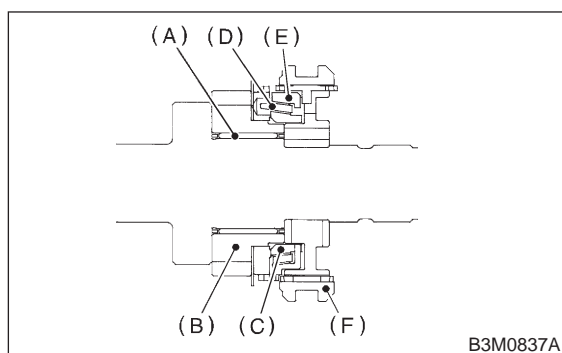


- (A) Two holes for discrimination (3rd-4th hub)
- (B) One hole for discrimination (5th hub)

2) Install 3rd drive gear, outer baulk ring, synchro cone, inner baulk ring, sleeve and hub assembly for 3rd needle bearing on transmission main shaft.

NOTE:

Align groove in baulk ring with insert key.

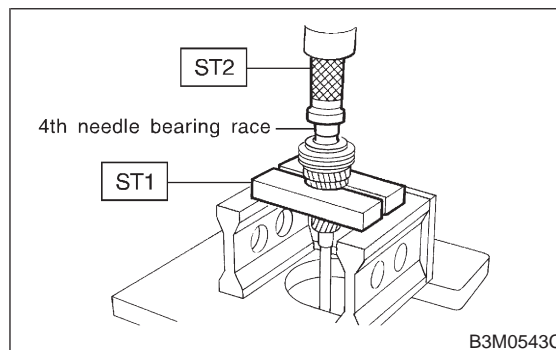


- (A) 3rd needle bearing (32 × 36 × 25.7)
- (B) 3rd drive gear
- (C) Inner baulk ring
- (D) Synchro cone
- (E) Outer baulk ring
- (F) Sleeve and hub ASSY

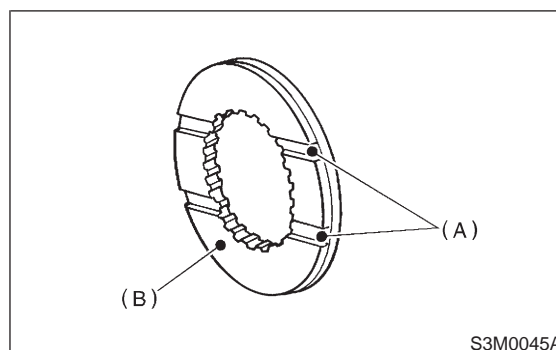
3) Install 4th needle bearing race onto transmission main shaft using ST1, ST2 and a press.

ST1 899714110 REMOVER

ST2 499877000 RACE 4-5 INSTALLER



4) Install baulk ring, needle bearing (32 × 30 × 25.7), 4th drive gear and 4th gear thrust washer to transmission main shaft.

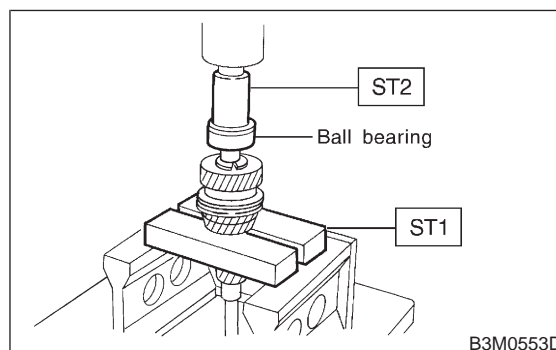


- (A) Groove
- (B) 4th gear side

5) Drive ball bearing onto the rear section of transmission main shaft using ST1, ST2 and a press.

ST1 899714110 REMOVER

ST2 499877000 RACE 4-5 INSTALLER



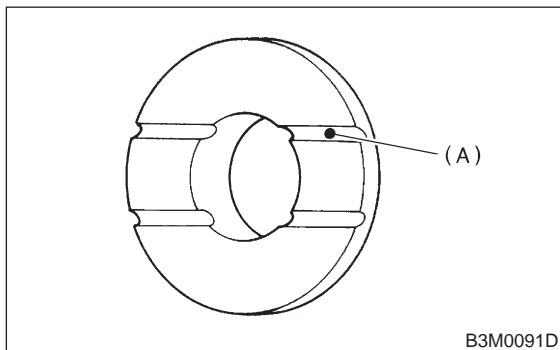
6) Using ST1 and ST2, install the 5th gear thrust washer and 5th needle bearing race onto the rear section of transmission main shaft.

NOTE:

Face thrust washer in the correct direction.

ST1 899714110 REMOVER

ST2 499877000 RACE 4-5 INSTALLER

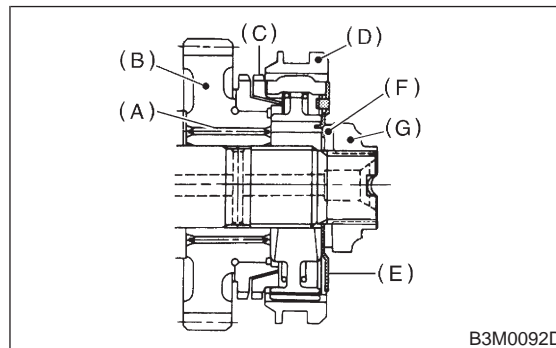


(A) Face this surface to 5th gear side.

7) Install the following parts to the rear section of transmission main shaft.

NOTE:

- Align groove in baulk ring with shifting insert.
- Be sure to fit pawl of insert stopper plate into 4 mm (0.16 in) dia. hole in the boss section of synchronizer hub.



- (A) Needle bearing (32 × 36 × 25.7)
- (B) 5th drive gear
- (C) Baulk ring
- (D) Sleeve and hub assembly
- (E) Insert stopper plate
- (F) Lock washer (22 × 38 × 2)
- (G) Lock nut

8) Tighten lock nuts (22 × 13) to the specified torque using ST1 and ST2.

NOTE:

Secure lock nuts in two places after tightening.

ST1 499987003 SOCKET WRENCH (35)

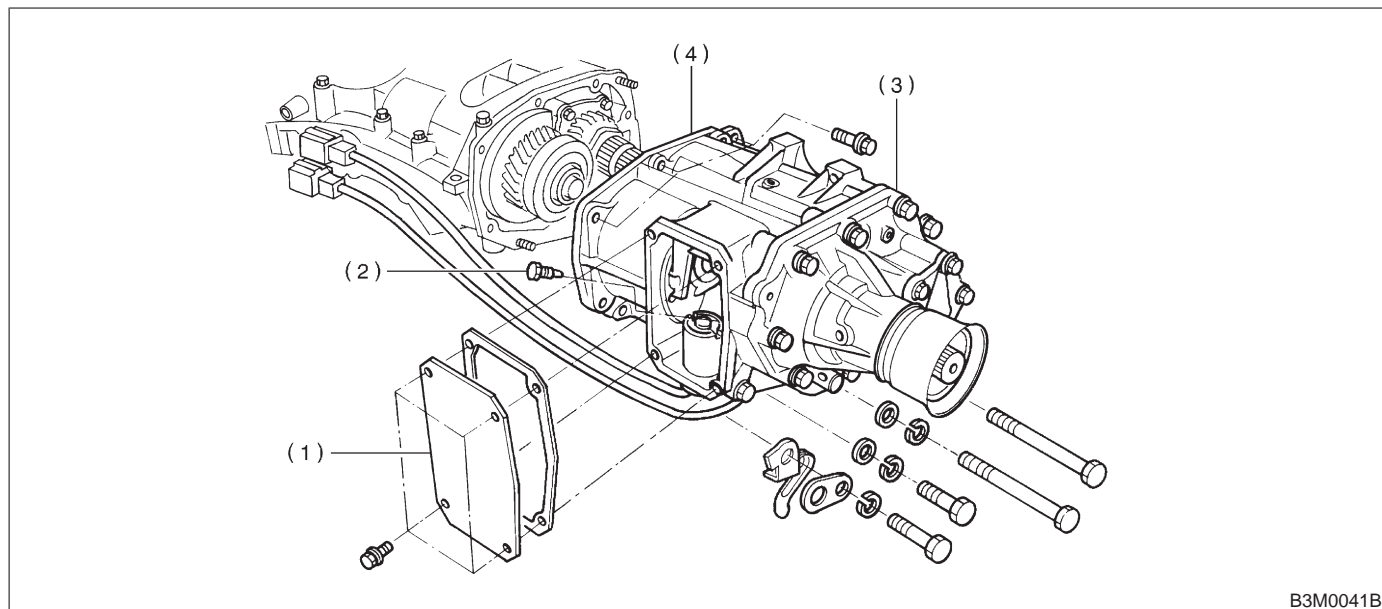
ST2 498937000 TRANSMISSION HOLDER

Tightening torque:

118±6 N·m (12.0±0.6 kg-m, 86.8±4.3 ft-lb)

5. Transfer Case and Extension

A: REMOVAL



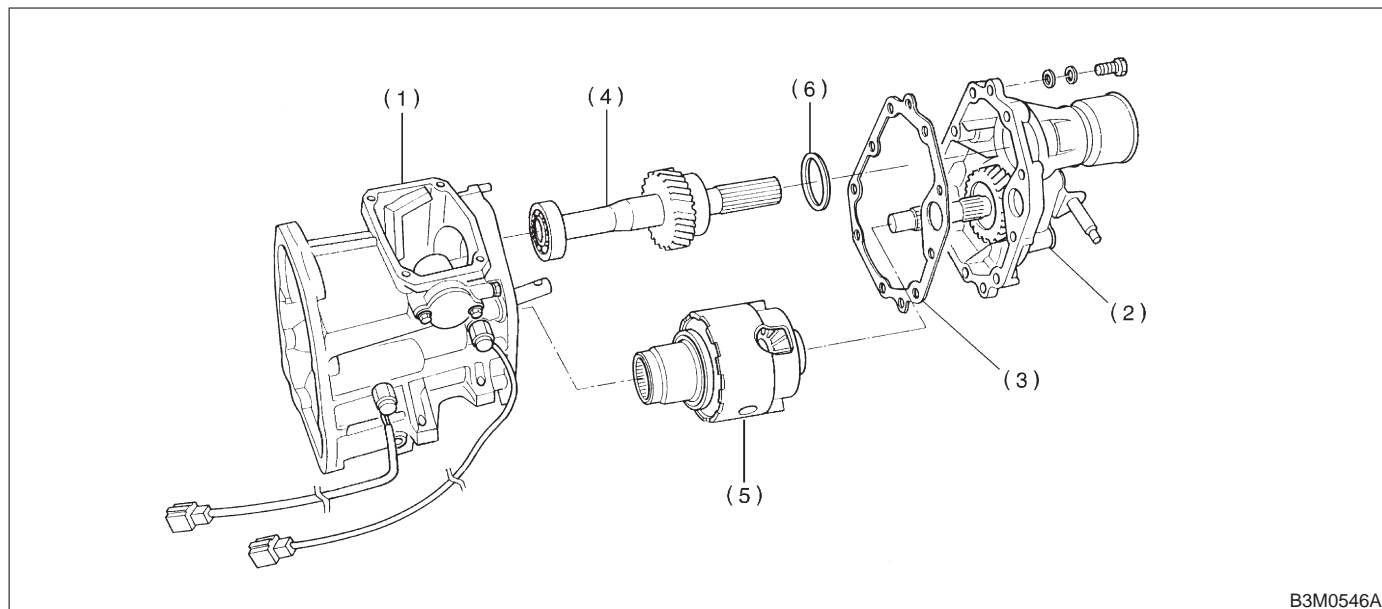
B3M0041B

- | | |
|------------------------|------------------------|
| (1) Transfer cover | (3) Transfer case ASSY |
| (2) Shifter fork screw | (4) Extension ASSY |

- 1) Remove transfer cover.
- 2) Remove shifter fork screw which secures selector arm to shifter arm.
- 3) Remove transfer case with extension assembly.

B: DISASSEMBLY

1. SEPARATION OF TRANSFER CASE AND EXTENSION ASSEMBLY



B3M0546A

- | | | |
|------------------------|--------------------------|-------------------------|
| (1) Transfer case ASSY | (3) Gasket | (5) Center differential |
| (2) Extension ASSY | (4) Transfer driven gear | (6) Thrust washer |

- 1) Separate transfer case and extension assembly.
- 2) Remove transfer driven gear and center differential as a set.
- 3) Remove thrust washer (52 × 61 × t).

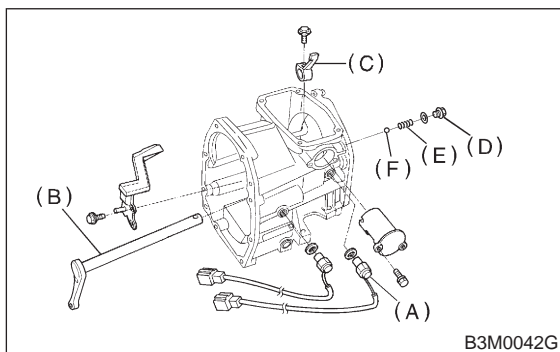
2. TRANSFER CASE

- 1) Remove neutral switch.

NOTE:

Before removing shifter arm, disconnect neutral switch.

- 2) Draw out shifter arm and remove selector arm.
- 3) Remove plug, spring and reverse check ball.



- (A) Neutral switch
- (B) Shifter arm
- (C) Selector arm
- (D) Plug
- (E) Spring
- (F) Reverse check ball

- 4) Remove reverse check sleeve.
- Disassembly procedure is as follows:

- (1) Using a standard screwdriver, remove snap ring (Inner-28).

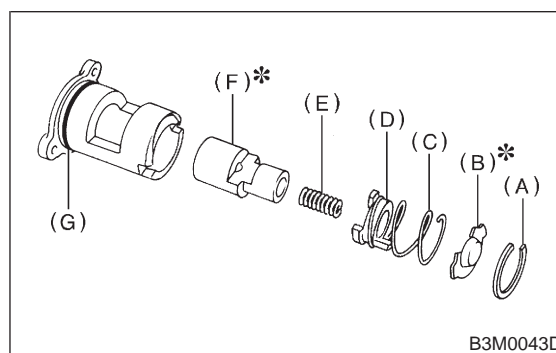
NOTE:

Replace snap ring with a new one if deformed or weakened.

- (2) Remove reverse check plate.
- (3) Remove reverse check spring with cam.
- (4) Remove reverse return spring.
- (5) Remove reverse accent shaft.
- (6) Remove O-ring.

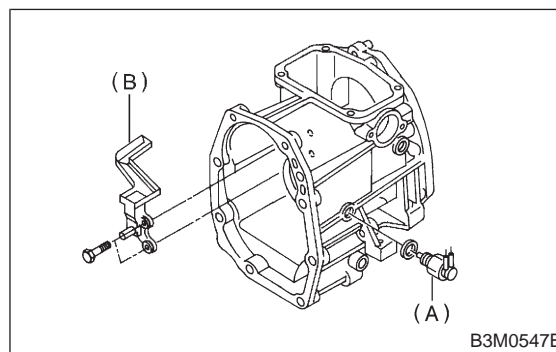
NOTE:

- Reverse check sleeve assembly uses an O-ring which should not be scratched.
- Be careful not to break adjustment shim placed between reverse check sleeve assembly and case.



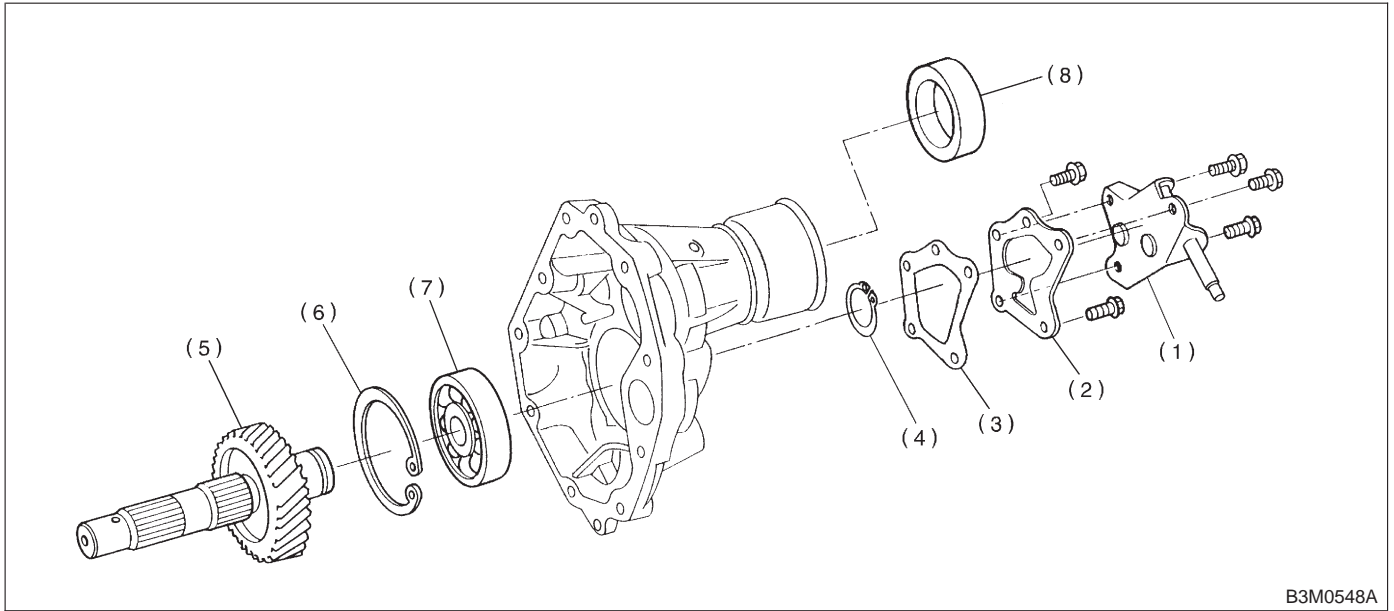
- (A) Snap ring
- (B) Reverse check plate
- (C) Reverse check spring
- (D) Reverse check cam
- (E) Reverse return spring
- (F) Reverse accent shaft
- (G) O-ring

- 5) Remove back-up light switch.
- 6) Remove oil guide.



- (A) Back-up light switch
- (B) Oil guide

3. EXTENSION



B3M0548A

- | | | |
|-------------------|--------------------------|------------------|
| (1) Shift bracket | (4) Snap ring | (7) Ball bearing |
| (2) Extension | (5) Transfer driven gear | (8) Oil seal |
| (3) Gasket | (6) Snap ring | |

- 1) Remove extension cover and shift bracket.
- 2) Remove snap ring (Outer-30).
- 3) Remove transfer drive gear.

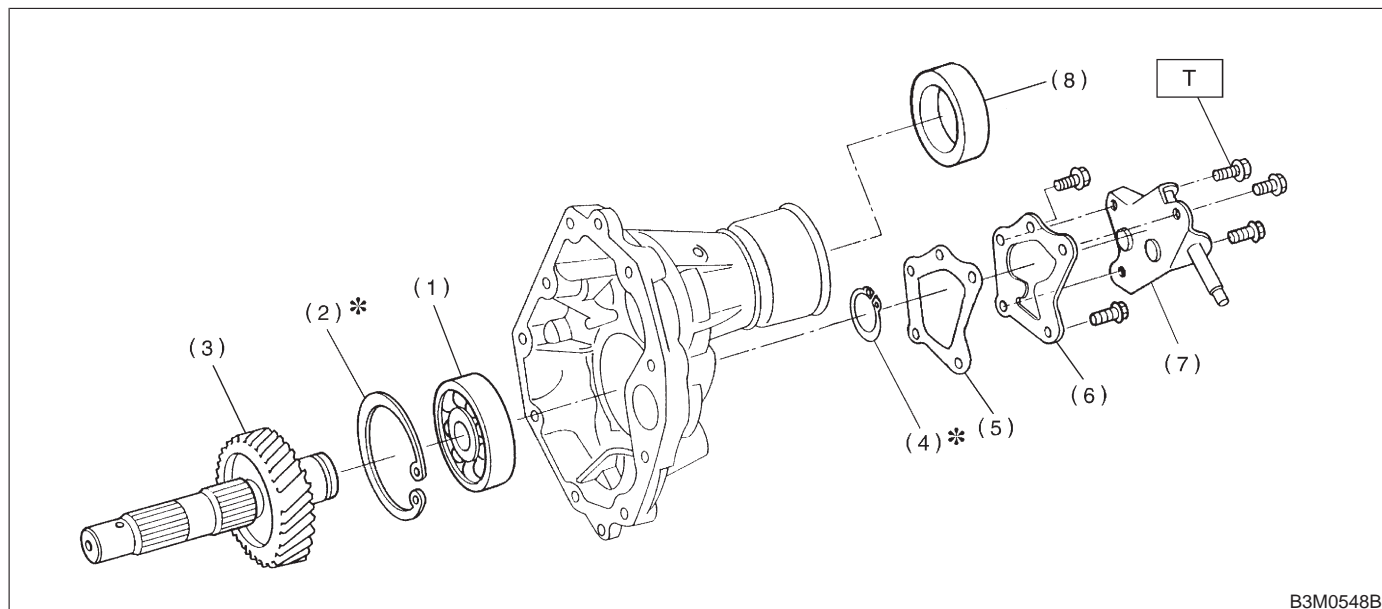
CAUTION:**Do not remove ball bearing unless replacing.**

- 4) Remove snap ring (Inner-72).
- 5) Remove ball bearing.

CAUTION:**Do not reuse ball bearing.**

- 6) Remove oil seal.

CAUTION:**Do not reuse oil seal.**

C: ASSEMBLY**1. EXTENSION**

B3M0548B

- | | |
|---------------------------|---------------------|
| (1) Ball bearing | (5) Gasket |
| (2) Snap ring | (6) Extension cover |
| (3) Transfer driven shaft | (7) Shift bracket |
| (4) Snap ring | (8) Oil seal |

Tightening torque: N·m (kg·m, ft·lb)
T: 25±2 (2.5±0.2, 18.1±1.4)
1) Installation of ball bearing and selection of snap ring (Inner-72)

(1) Attach ball bearing (30 × 72 × 17) to extension and install snap ring.

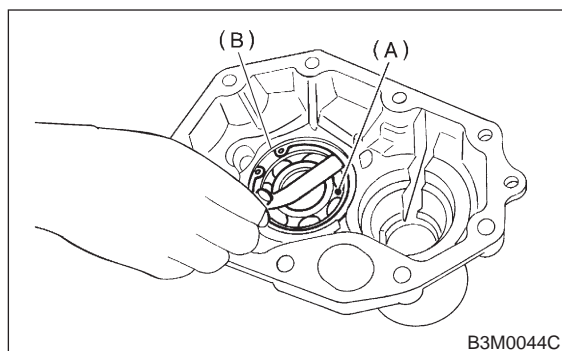
(2) Measure clearance between snap ring and outer race of ball bearing with a thickness gauge.

CAUTION:

Replace ball bearing with a new one.

Clearance:

0 — 0.15 mm (0 — 0.0059 in)



B3M0044C

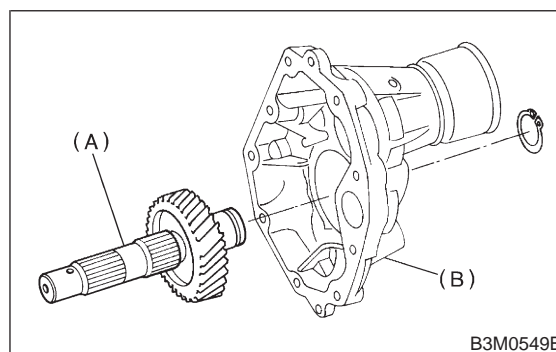
- (A) Snap ring
(B) Ball bearing

(3) If the measurement is not within the specification, select suitable snap ring.

Snap ring (Inner-72)	
Part No.	Thickness mm (in)
805172071	1.78 (0.0701)
805172072	1.90 (0.0748)
805172073	2.02 (0.0795)

2) Installation of transfer drive gear

Press transfer drive gear into inner race of ball bearing.



B3M0549B

- (A) Transfer drive gear
(B) Extension

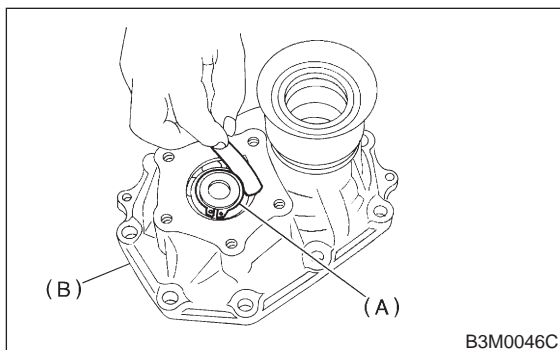
3) Selection of snap ring (Outer-30)

(1) Install snap ring on transfer drive shaft.

- (2) Measure clearance between snap ring and inner race of ball bearing with a thickness gauge.

Clearance:

0 — 0.15 mm (0 — 0.0059 in)



- (A) Snap ring
(B) Extension

- (3) If the measurement is not within the specification, select suitable snap ring.

Snap ring (Outer-30)	
Part No.	Thickness mm (in)
805030041	1.53 (0.0602)
805030042	1.65 (0.0650)
805030043	1.77 (0.0697)

- 4) Install extension cover, gasket and shift bracket.

CAUTION:

Use new gasket.

Tightening torque:

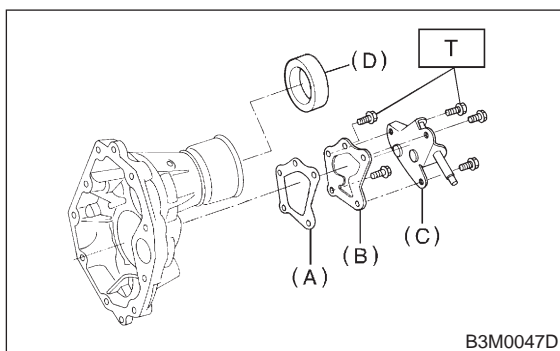
T: 25±2 N·m (2.5±0.2 kg·m, 18.1±1.4 ft·lb)

- 5) Install oil seal with ST.

CAUTION:

Use new oil seal.

ST 498057300 INSTALLER



- (A) Gasket
(B) Extension cover
(C) Shift bracket
(D) Oil seal

2. TRANSFER CASE

Assembly of transfer case is in the reverse order of disassembly. Do the following:

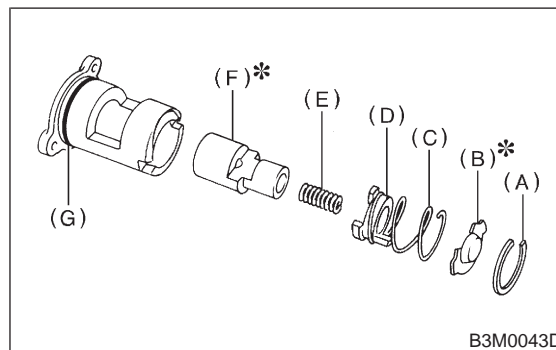
- 1) Assembly of reverse check sleeve

- (1) Install reverse accent shaft, check cam, return spring and check spring onto reverse check sleeve.

NOTE:

Be sure the bent section of reverse check spring is positioned in the groove in check cam.

- (2) Hook the bent section of reverse check spring over reverse check plate.
(3) Rotate cam so that the protrusion of reverse check cam is at the opening in plate.
(4) With cam held in that position, install plate onto reverse check sleeve and hold with snap ring (Inner-28).
(5) Position O-ring in groove in sleeve.



- (A) Snap ring
(B) Reverse check plate
(C) Reverse check spring
(D) Reverse return cam
(E) Reverse return spring
(F) Reverse accent shaft
(G) O-ring (35.4 × 1.5)

CAUTION:

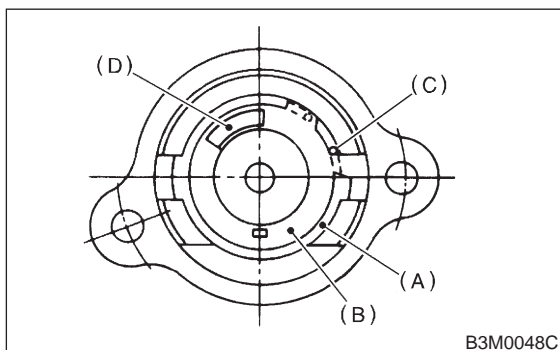
- Make sure the cutout section of reverse accent shaft is aligned with the opening in reverse check sleeve.

- Spin cam by hand for smooth rotation.

If it does not return properly, replace reverse check spring.

- Move cam and shaft all the way toward plate and release.

If cam does not return properly, replace reverse check spring; if shaft does not, check for scratches on the inner surface of sleeve. If sleeve is in good order, replace spring.



- (A) Snap ring
- (B) Reverse check plate
- (C) Reverse check spring
- (D) Reverse check cam

- Select a suitable reverse accent shaft and reverse check plate. <Ref. to 3-1 [W5E0].>

2) Installation of shifter arm and selector arm
Install shifter arm into the partition from the front while inserting selector arm into the opening in reverse check sleeve. Pass shaft through hole in selector arm until its end comes out of the rear of transfer case.

NOTE:

Apply a coat of gear oil to shifter arm. Also make sure oil seal is positioned properly.

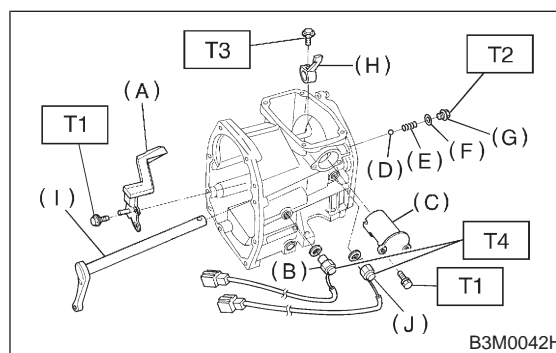
Tightening torque:

T1: 6.4 ± 0.5 N·m (0.65 ± 0.05 kg·m, 4.7 ± 0.4 ft·lb)

T2: 10 ± 1 N·m (1.0 ± 0.1 kg·m, 7.2 ± 0.7 ft·lb)

T3: 19.6 ± 1.5 N·m (2.00 ± 0.15 kg·m, 14.5 ± 1.1 ft·lb)

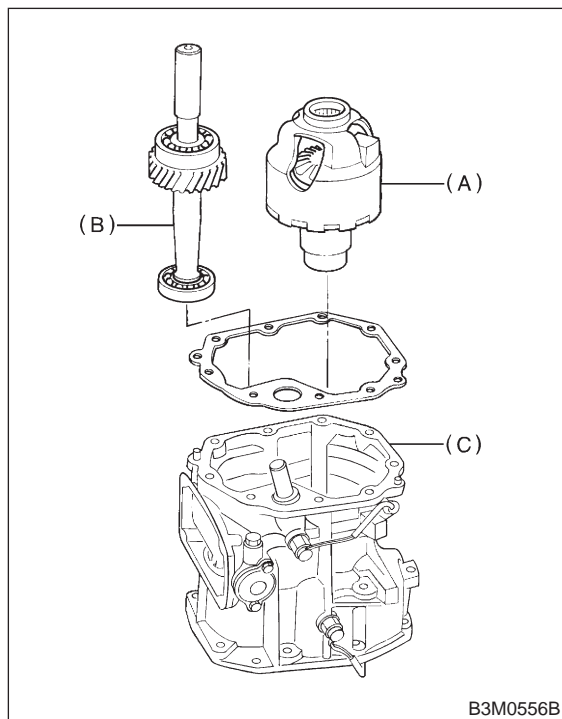
T4: 25 ± 2 N·m (2.5 ± 0.2 kg·m, 18.1 ± 1.4 ft·lb)



- (A) Oil guide
- (B) Back-up light switch
- (C) Reverse check sleeve
- (D) Ball
- (E) Reverse accent spring
- (F) Washer
- (G) Plug
- (H) Selector arm
- (I) Shifter arm
- (J) Neutral switch

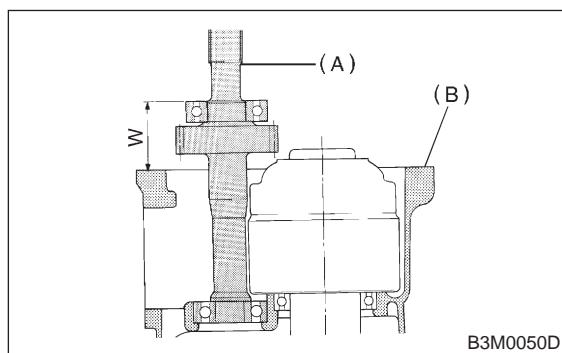
3. COMBINATION OF TRANSFER CASE AND EXTENSION ASSEMBLY

1) Install center differential and transfer driven gear into transfer case.



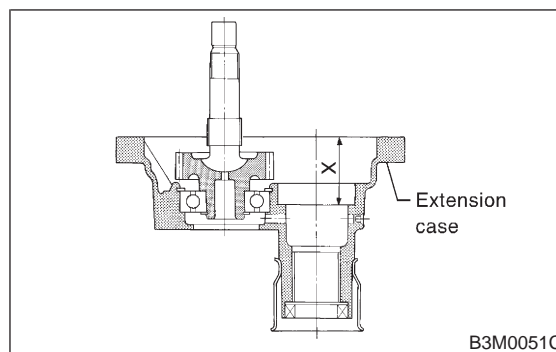
- (A) Center differential
(B) Transfer driven gear
(C) Transfer case

2) Selection of thrust washer (52 × 61 × t)
(1) Measure height "W" between transfer case and ball bearing on the transfer driven gear.



- (A) Transfer driven gear
(B) Transfer case

(2) Measure depth "X" as shown in figure.



(3) Calculate space "Y" using the following equation: $Y = X - W + 0.24 \text{ mm (0.0094 in)}$ [Thickness of gasket]

(4) Select suitable washer in the following table:

Space "Y" mm (in)	Thrust washer (52 × 61 × t)	
	Part No.	Thickness mm (in)
0.55 — 0.79 (0.0217 — 0.0311)	803052021	0.50 (0.0197)
0.80 — 1.04 (0.0315 — 0.0409)	803052022	0.75 (0.0295)
1.05 — 1.30 (0.0413 — 0.0512)	803052023	1.00 (0.0394)

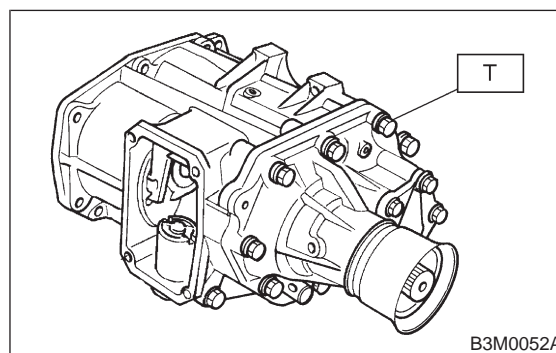
Standard clearance between thrust washer and ball bearing:

0.05 — 0.30 mm (0.0020 — 0.0118 in)

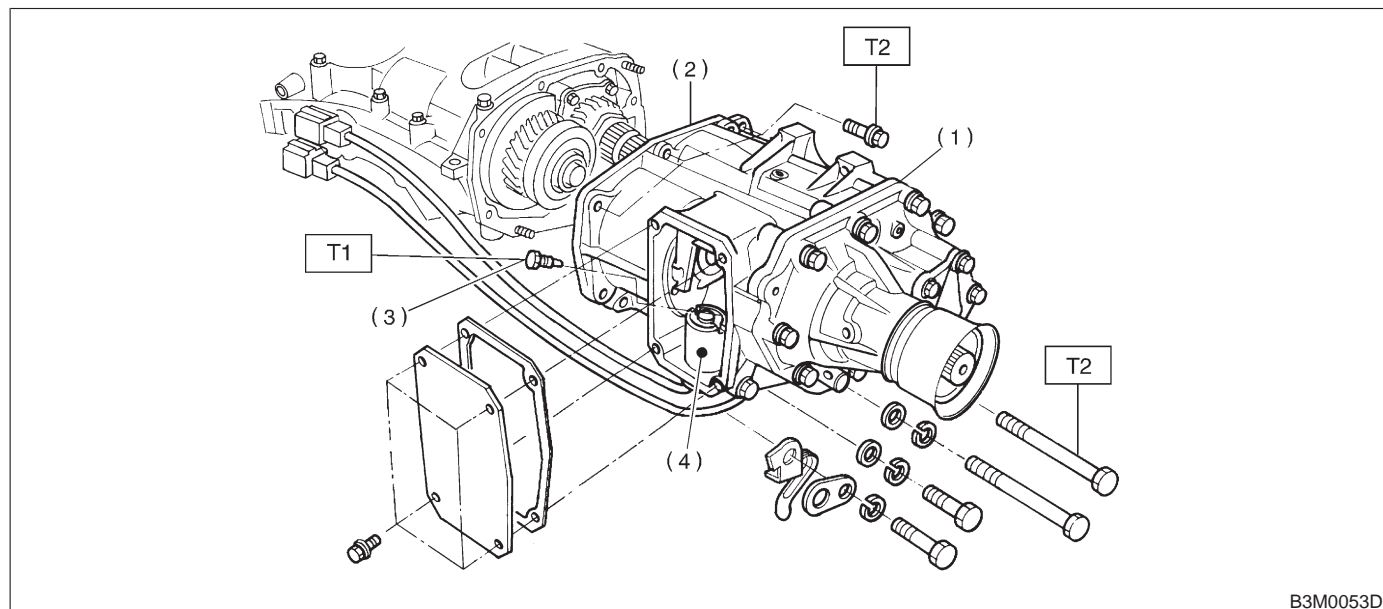
(5) Fit thrust washers on transfer drive shaft.
3) Install extension assembly into transfer case.

Tightening torque:

T: 37±3 N·m (3.8±0.3 kg·m, 27.5±2.2 ft·lb)



D: INSTALLATION



- (1) Extension case
 (2) Transfer case
 (3) Shifter fork screw
 (4) Reverse check sleeve

Tightening torque: N·m (kg·m, ft·lb)

T1: 19.6±1.5 (2.00±0.15, 14.5±1.1)

T2: 24.5±2.0 (2.50±0.20, 18.1±1.4)

- 1) Install transfer case with extension assembly.
- 2) Secure selector arm to shifter arm with shifter fork screw. Shifter arm should be caught by pawl of rod. Selector arm must be engaged with reverse check sleeve assembly.

- When shim is removed, the neutral position will move closer to reverse; when shim is added, the neutral position will move closer to 1st gear.
- If shims alone cannot adjust the clearance, replace reverse accent shaft and re-adjust.

E: ADJUSTMENT

- 1) Shift gear into 3rd gear position.
- 2) Shifter arm turns lightly toward the 1st/2nd gear side but heavily toward the reverse gear side because of the function of the return spring, until arm contacts the stopper.
- 3) Make adjustment so that the heavy stroke (reverse side) is a little more than the light stroke (1st/2nd side).
- 4) To adjust, remove bolts holding reverse check sleeve assembly to the case, move sleeve assembly outward, and place adjustment shim (0 to 1 ea.) between sleeve assembly and case to adjust the clearance.

CAUTION:

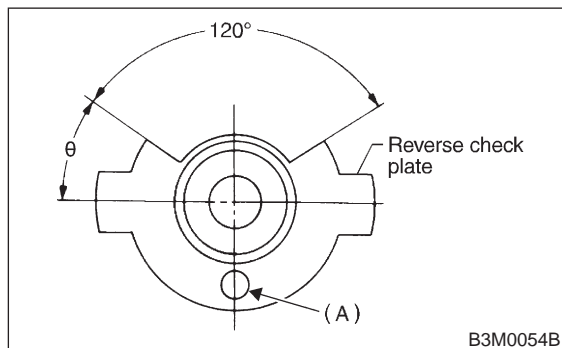
Be careful not to break O-ring when placing shim(s).

Adjustment shim	
Part No.	Thickness mm (in)
32190AA000	0.15 (0.0059)
32190AA010	0.30 (0.0118)

Reverse accent shaft		
Part No.	Mark	Remarks
32188AA040	1	Neutral position is closer to 1st gear.
32188AA011	No mark or 2	Standard
32188AA050	3	Neutral position is closer to reverse gear.

- 5) Reverse check plate adjustment
 Shift shifter arm to "5th" and then to reverse to see if reverse check mechanism operates properly. Also check to see if arm returns to neutral when released from the reverse position. If arm does not return properly, replace reverse check plate.

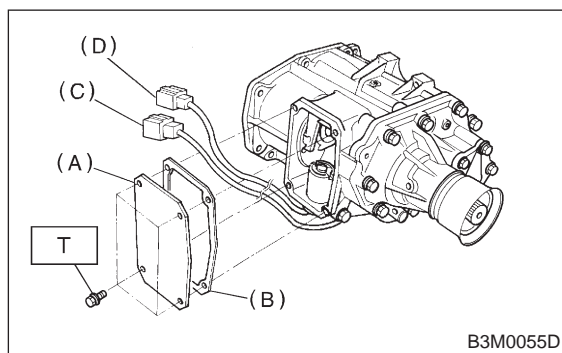
Reverse check plate			
Part No.	(A): No.	Angle θ	Remarks
32189AA000	0	28°	Arm stops closer to 5th gear.
32189AA010	1	31°	Arm stops closer to 5th gear.
32189AA020	2	34°	Arm stops in the center.
32189AA030	3	37°	Arm stops closer to reverse gear.
32189AA040	4	40°	Arm stops closer to reverse gear.



6) Install transfer cover and gasket, and connect each connector.

Tightening torque:

T: 15.7 ± 1.5 N·m (1.6 ± 0.15 kg·m, 11.6 ± 1.1 ft·lb)



- (A) Transfer cover
- (B) Gasket
- (C) Neutral position switch connector
- (D) Back-up light switch connector

6. Front Differential

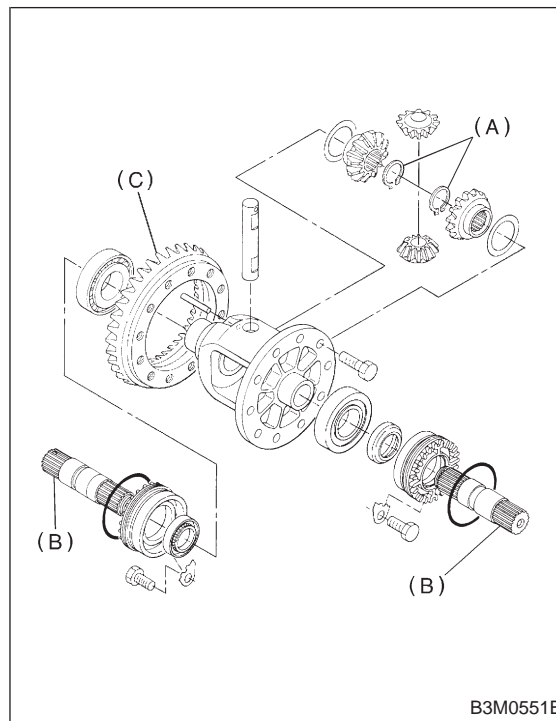
A: DISASSEMBLY

1) Remove right and left snap rings from differential, and then remove two axle drive shafts.

NOTE:

During reassembly, reinstall each axle drive shaft in the same place from which it was removed.

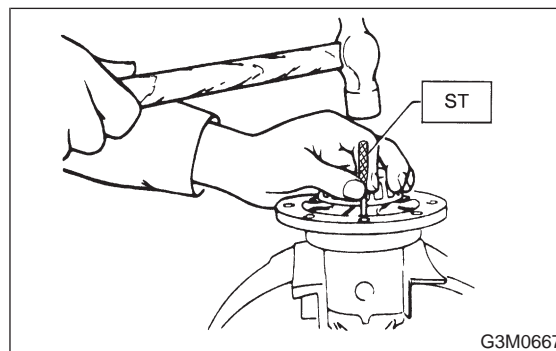
2) Loosen twelve bolts and remove hypoid drive gear.



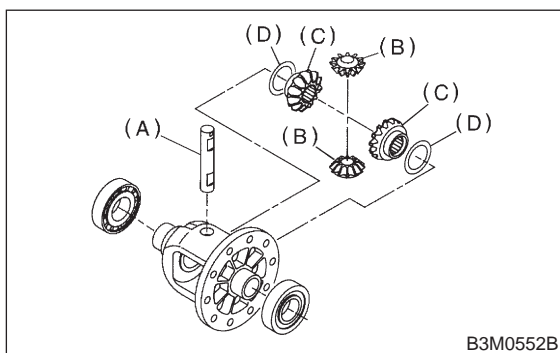
- (A) Snap ring
- (B) Axle drive shaft
- (C) Hypoid drive gear

3) Drive out straight pin from differential assembly toward hypoid driven gear.

ST 899904100 REMOVER

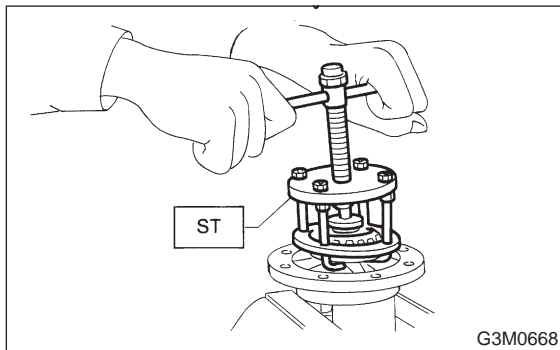


- 4) Pull out pinion shaft, and remove differential bevel pinion and gear and washer.



- (A) Pinion shaft
(B) Differential bevel pinion
(C) Differential bevel gear
(D) Washer

- 5) Remove roller bearing using ST.
ST 399527700 PULLER SET

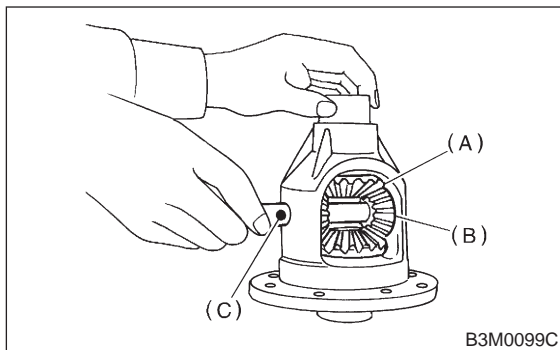


B: ASSEMBLY

- 1) Install bevel gear and bevel pinion together with washers, and insert pinion shaft.

NOTE:

Face the chamfered side of washer toward gear.



- (A) Differential bevel gear
(B) Differential bevel pinion
(C) Pinion shaft

- 2) Measure backlash between bevel gear and pinion. If it is not within specifications, install a suitable washer to adjust it.

NOTE:

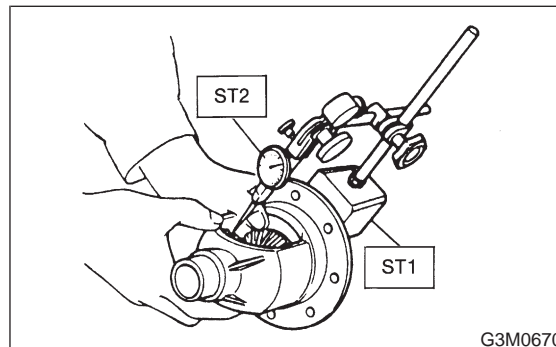
Be sure the pinion gear tooth contacts adjacent gear teeth during measurement.

ST1 498247001 MAGNET BASE

ST2 498247100 DIAL GAUGE

Standard backlash:

0.13 — 0.18 mm (0.0051 — 0.0071 in)



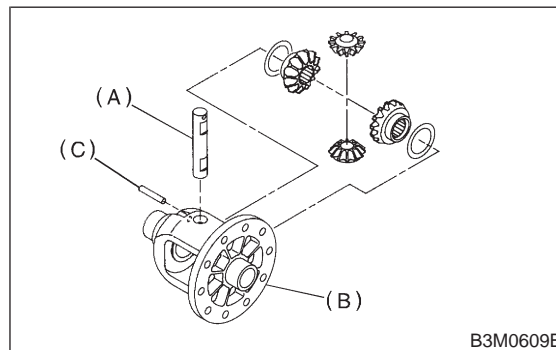
Washer (38.1 × 50 × t)	
Part No.	Thickness mm (in)
803038021	0.925 — 0.95 (0.0364 — 0.0374)
803038022	0.975 — 1.000 (0.0384 — 0.0394)
803038023	1.025 — 1.050 (0.0404 — 0.0413)

- 3) Align pinion shaft and differential case at their holes, and drive straight pin into holes from the hypoid driven gear side, using ST.

NOTE:

Lock straight pin after installing.

ST 899904100 REMOVER



- (A) Pinion shaft
(B) Differential case
(C) Straight pin

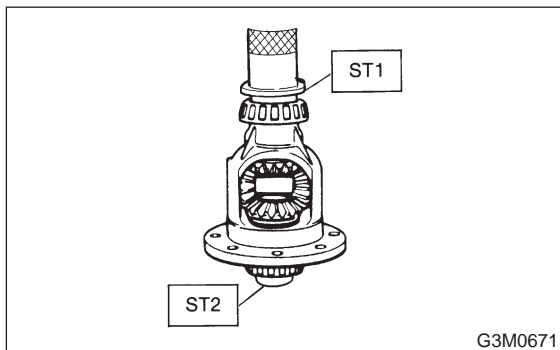
4) Install roller bearing (40 × 80 × 19.75) to differential case.

NOTE:

Be careful because roller bearing outer races are used as a set.

ST1 499277100 BUSH 1-2 INSTALLER

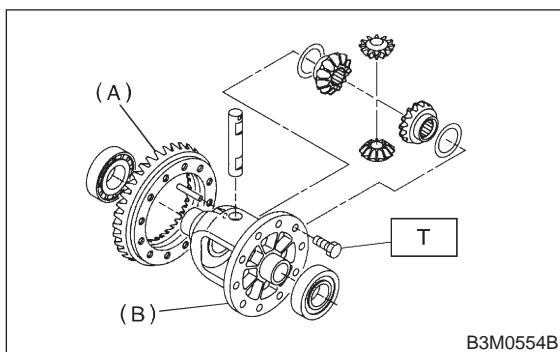
ST2 398497701 ADAPTER



5) Install hypoid driven gear to differential case using twelve bolts.

Tightening torque:

T: 62±5 N·m (6.3±0.5 kg·m, 45.6±3.6 ft·lb)

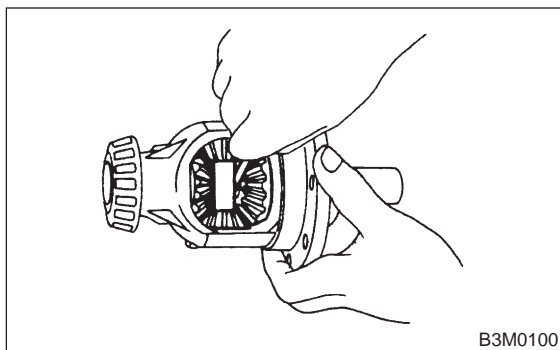


- (A) Hypoid driven gear
(B) Differential case

6) Position drive axle shaft in differential case and hold it with outer snap ring (Outer-28). Using a thickness gauge, measure clearance between the shaft and case is within specifications.

Clearance:

0 — 0.2 mm (0 — 0.008 in)

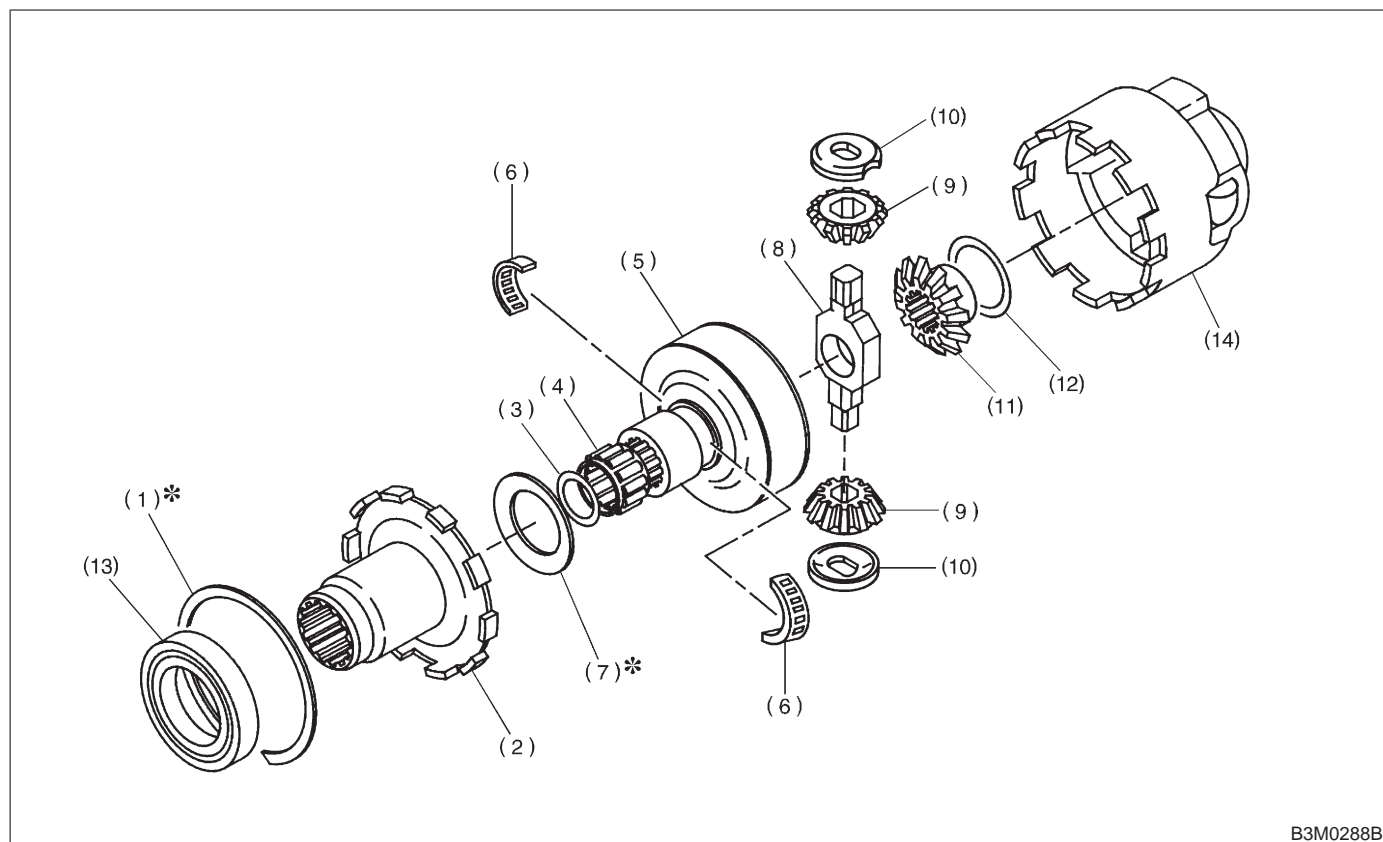


7) If it is not within specifications, replace snap ring with a suitable one.

Snap ring (Outer-28)	
Part No.	Thickness mm (in)
805028011	1.05 (0.0413)
805028012	1.20 (0.0472)

7. Center Differential

A: DISASSEMBLY



B3M0288B

- | | | |
|-------------------------------|----------------------|-------------------------------|
| (1) Snap ring | (6) Needle bearing | (11) Side gear |
| (2) Center differential cover | (7) Adjusting washer | (12) Thrust washer |
| (3) Roller bearing | (8) Pinion shaft | (13) Ball bearing |
| (4) Snap ring | (9) Bevel pinion | (14) Center differential case |
| (5) Viscous coupling | (10) Retainer | |

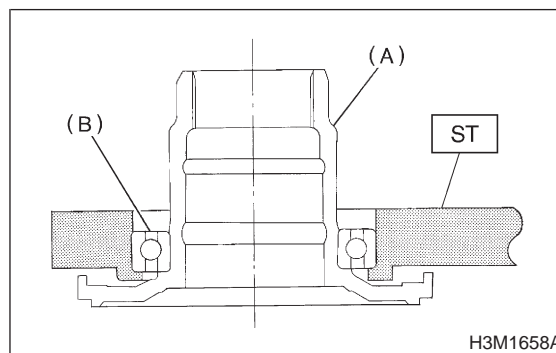
- 1) Remove snap ring (Inner-110) using flat bladed screwdriver.
- 2) Remove center differential cover.
- 3) Remove snap ring and roller bearing.
- 4) Remove viscous coupling.
- 5) Remove needle bearings.
- 6) Remove adjusting washer ($45 \times 62 \times t$).
- 7) Remove pinion shaft, bevel pinions and retainers.
- 8) Remove side gear.
- 9) Remove thrust washer.

- 10) Remove ball bearing using ST.

CAUTION:

Do not reuse ball bearing.

ST 498077300 CENTER DIFFERENTIAL BEARING REMOVER



H3M1658A

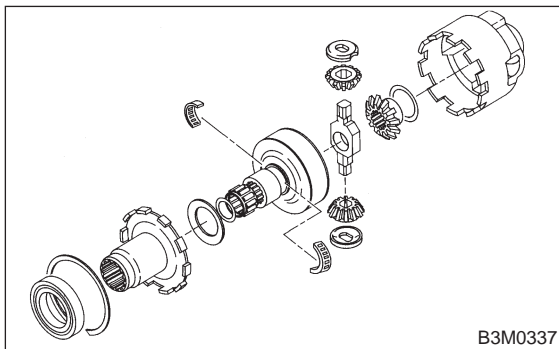
- (A) Center differential cover
(B) Ball bearing

B: ASSEMBLY

Assembly is in the reverse order of disassembly.
Do the following:

- Install thrust washer with chamfered side of inner perimeter facing the side gear.
- Install adjusting washer with chamfered side of inner perimeter facing the viscous coupling using ST.

ST 499547300 INSTALLER SET

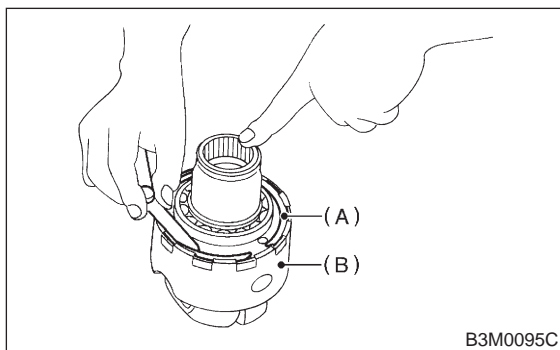


1) Selection of snap ring (Inner-110)

- (1) After assembling, using a thickness gauge measure clearance between snap ring and center differential case.

Clearance:

0 — 0.15 mm (0 — 0.0059 in)



- (A) Snap ring
(B) Center differential case

- (2) If the measurement is not within the specification, select suitable snap ring.

Snap ring (Inner-110)	
Part No.	Thickness mm (in)
805100061	2.10 (0.0827)
805100062	2.21 (0.0870)
805100063	2.32 (0.0913)

2) Selection of adjusting washer (Backlash adjustment)

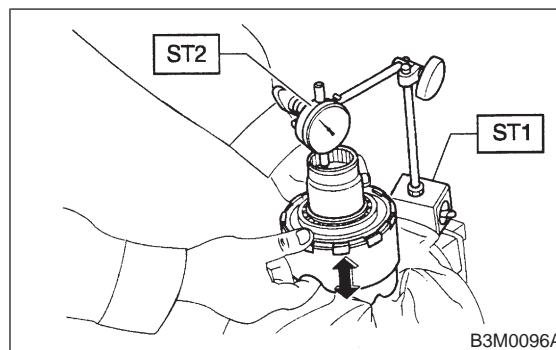
- (1) After assembling, set up a ST1 and ST2 to end of viscous coupling shaft. Move viscous coupling up and down, and measure backlash in the axial direction.

ST1 498247001 MAGNET BASE

ST2 498247100 DIAL GAUGE

Backlash:

0.62 — 0.86 mm (0.0244 — 0.0339 in)



- (2) If the measurement is not within the specification, select suitable washer.

Adjusting washer (45 × 62 × t)	
Part No.	Thickness mm (in)
803045041	1.60 (0.0630)
803045042	1.80 (0.0709)
803045043	2.00 (0.0787)
803045044	2.20 (0.0866)
803045045	2.40 (0.0945)

1. Manual Transmission

Symptom and possible cause	Remedy
1. Gears are difficult to intermesh. The cause for difficulty in shifting gears can be classified into two kinds: one is malfunction of the gear shift system and the other is malfunction of the transmission. However, if the operation is heavy and engagement of the gears is difficult, defective clutch disengagement may also be responsible. Check whether the clutch is correctly functioning, before checking the gear shift system and transmission.	
(a) Worn, damaged or burred chamfer of internal spline of sleeve and reverse driven gear	Replace.
(b) Worn, damaged or burred chamfer of spline of gears	Replace.
(c) Worn or scratched bushings	Replace.
(d) Incorrect contact between synchronizer ring and gear cone or wear	Correct or replace.
2. Gear slips out.	
(1) Gear slips out when coasting on rough road.	
(2) Gear slips out during acceleration.	
(a) Defective pitching stopper adjustment	Adjust.
(b) Loose engine mounting bolts	Tighten or replace.
(c) Worn fork shifter, broken shifter fork rail spring	Replace.
(d) Worn or damaged ball bearing	Replace.
(e) Excessive clearance between splines of synchronizer hub and synchronizer sleeve	Replace.
(f) Worn tooth step of synchronizer hub (responsible for slip-out of 3rd gear)	Replace.
(g) Worn 1st driven gear, needle bearing and race	Replace.
(h) Worn 2nd driven gear, needle bearing and race	Replace.
(i) Worn 3rd drive gear and bushing	Replace.
(j) Worn 4th drive gear and bushing	Replace.
(k) Worn reverse idler gear and bushing	Replace.
3. Unusual noise comes from transmission. If an unusual noise is heard when the vehicle is parked with its engine idling and if the noise ceases when the clutch is disengaged, it may be considered that the noise comes from the transmission.	
(a) Insufficient or improper lubrication	Lubricate or replace with specified oil.
(b) Worn or damaged gears and bearings	Replace.
NOTE: If the trouble is only wear of the tooth surfaces, merely a high roaring noise will occur at high speeds, but if any part is broken, rhythmical knocking sound will be heard even at low speeds.	

2. Differential

Symptom and possible cause	Remedy
4. Broken differential (case, gear, bearing, etc.) Abnormal noise will develop and finally it will become impossible to continue to run due to broken pieces obstructing the gear revolution.	
(a) Insufficient or improper oil	Disassemble differential and replace broken components and at the same time check other components for any trouble, and replace if necessary.
(b) Use of vehicle under severe conditions such as excessive load and improper use of clutch	Readjust bearing preload and backlash and face contact of gears.
(c) Improper adjustment of taper roller bearing	Adjust.
(d) Improper adjustment of drive pinion and hypoid driven gear	Adjust.
(e) Excessive backlash due to worn differential side gear, washer or differential pinion	Add recommended oil to specified level. Do not use vehicle under severe operating conditions.

Symptom and possible cause	Remedy
(f) Loose hypoid driven gear clamping bolts	Tighten.
5. Differential and hypoid gear noises Troubles of the differential and hypoid gear always appear as noise problems. Therefore noise is the first indication of the trouble. However noises from the engine, muffler, tire, exhaust gas, bearing, body, etc. are easily mistaken for the differential noise. Pay special attention to the hypoid gear noise because it is easily confused with other gear noises. There are the following four kinds of noises.	
(1) Gear noise when driving: If noise increases as vehicle speed increases it may be due to insufficient gear oil, incorrect gear engagement, damaged gears, etc.	
(2) Gear noise when coasting: Damaged gears due to maladjusted bearings and incorrect shim adjustment	
(3) Bearing noise when driving or when coasting: Cracked, broken or damaged bearings	
(4) Noise which mainly occurs when turning: Unusual noise from differential side gear, differential pinion, differential pinion shaft, etc.	
(a) Insufficient oil	Lubricate.
(b) Improper adjustment of hypoid driven gear and drive pinion	Check tooth contact.
(c) Worn teeth of hypoid driven gear and drive pinion	Replace as a set. Readjust bearing preload.
(d) Loose roller bearing	Readjust hypoid driven gear to drive pinion backlash and check tooth contact.
(e) Distorted hypoid driven gear or differential case	Replace.
(f) Worn washer and differential pinion shaft	Replace.