

TRANSMISSION SECTION

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

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

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

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

FUJI HEAVY INDUSTRIES LTD.

CONTROL SYSTEMS CS

AUTOMATIC TRANSMISSION AT

**MANUAL TRANSMISSION
AND DIFFERENTIAL** MT

CLUTCH SYSTEM CL

**AUTOMATIC TRANSMISSION
(DIAGNOSTICS)** AT

MANUAL TRANSMISSION AND DIFFERENTIAL

MT

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GENERAL DESCRIPTION

Manual Transmission and Differential

1. General Description S503001

A: SPECIFICATIONS S503001E49

1. MANUAL TRANSMISSION AND DIFFERENTIAL S503001E4901

Model		Non-Turbo	Turbo	
			Without oil pump	With oil pump
		Dual-range	Single-range	
Type		5 × 2-forward speeds and 1 × 2-reverse	5-forward speeds and 1-reverse	
Transmission gear ratio		1st	3.454	3.454
		2nd	2.062	1.947
		3rd	1.448	1.366
		4th	1.088	0.972
		5th	0.871	0.738
		Reverse	3.333	
Auxiliary transmission gear ratio		High	1.000	—
		Low	1.447	—
Front reduction gear	Final	Type of gear	Hypoid	
		Gear ratio	4.111	4.444
Rear reduction gear	Transfer	Type of gear	Helical	
		Gear ratio	1.000	1.081
	Final	Type of gear	Hypoid	
		Gear ratio	4.111	4.444
Front differential	Type and number of gear	Straight bevel gear (Bevel pinion: 2, Bevel gear: 2)		
Center differential	Type and number of gear	Straight bevel gear (Bevel pinion: 2, Bevel gear: 2 and viscous coupling)		
Transmission gear oil		GL-5		
Transmission gear oil capacity		4.0 ℓ (4.2 US qt, 3.5 Imp qt)	3.5 ℓ (3.7 US qt, 3.11 Imp qt)	4.4 ℓ (4.7 US qt, 3.9 Imp qt)

2. TRANSMISSION GEAR OIL S503001E4902

Recommended oil

ITEM								
• Transmission gear oil								
API Classification								
GL - 5								
SAE Viscosity No. and Applicable Temperature								
(°C)	-30	-26	-15	-5	0	15	25	30
(°F)	-22	-15	5	23	32	59	77	86
B1H0024								

3. TRANSMISSION CASE ASSEMBLY S503001E4903

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)

GENERAL DESCRIPTION

Manual Transmission and Differential

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

Snap ring to counter washer clearance
0.05 — 0.35 mm (0.0020 — 0.0138 in)

Snap ring (Outer-19)	
Part No.	Thickness mm (in)
031319000	1.50 (0.0591)
805019010	1.72 (0.0677)

Input shaft holder adjustment

Dimension "D" mm (in)	Number of shim
52.50 — 53.11 (2.0669 — 2.0909)	—
52.00 — 52.49 (2.0472 — 2.0665)	1
51.26 — 51.99 (2.0181 — 2.0468)	2

4. DRIVE PINION ASSEMBLY S503001E4904

Preload adjustment of thrust bearing

Starting torque

0.3 — 0.8 N·m (0.03 — 0.08 kgf·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)

5. INPUT SHAFT ASSEMBLY S503001E4910

Snap ring (Outer-28) to ball bearing clearance
0 — 0.12 mm (0 — 0.0047 in)

Snap ring (Outer-28)	
Part No.	Thickness mm (in)
805028050	2.48 (0.0976)
805028060	2.56 (0.1008)
805028070	2.64 (0.1039)

Snap ring (Inner-68) to bearing clearance
0 — 0.12 mm (0 — 0.0047 in)

Snap ring (Inner-68)	
Part No.	Thickness mm (in)
805168020	1.84 (0.0724)
805168030	1.92 (0.0756)
805168040	2.00 (0.0787)

6. MAIN SHAFT S503001E4911

Snap ring (Outer-25) to synchronizer hub clearance
0.060 — 0.100 mm (0.0024 — 0.0039 in)

Snap ring (Outer-25)			
Part No.	Thickness mm (in)	Part No.	Thickness mm (in)
805025051	2.42 (0.0953)	805025055	2.62 (0.1031)
805025052	2.47 (0.0972)	805025056	2.67 (0.1051)
805025053	2.52 (0.0992)	805025057	2.72 (0.1071)
805025054	2.57 (0.1012)	805025058	2.37 (0.0933)

7. REVERSE IDLER GEAR S503001E4905

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
32820AA070	7	Further from case wall
32820AA080	8	Standard
32820AA090	9	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)	—	—

GENERAL DESCRIPTION

Manual Transmission and Differential

8. SHIFTER FORK AND ROD S503001E4906

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

A: 1st-2nd — 3rd-4th

0.4 — 1.4 mm (0.016 — 0.055 in)

B: 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)

Non-Turbo model

5th shifter fork		
Part No.	Mark	Remarks
32812AA201	4	Approach to 5th gear by 0.2 mm (0.008 in)
32812AA211	5	Standard
32812AA221	6	Become distant from 5th gear by 0.2 mm (0.008 in)

Turbo model

5th shifter fork		
Part No.	Mark	Remarks
32812AA231	7	Approach to 5th gear by 0.2 mm (0.008 in)
32812AA241	No mark	Standard
32812AA251	9	Become distant from 5th gear by 0.2 mm (0.008 in)

9. TRANSFER CASE S503001E4907

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
32188AA090	3	Neutral position is closer to 1st.
32188AA100	0	Standard
32188AA110	1	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.
33189AA020	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.

GENERAL DESCRIPTION

Manual Transmission and Differential

10. EXTENSION ASSEMBLY S503001E4908

Thrust washer (50 × 61 × t) to taper roller bearing table outer race side clearance

0.2 — 0.3 mm T (0.0008 — 0.012 in T)

NOTE:

T: Tight

Thrust washer (50 × 61 × t)	
Part No.	Thickness mm (in)
803050060	0.50 (0.0197)
803050061	0.55 (0.0217)
803050062	0.60 (0.0236)
803050063	0.65 (0.0256)
803050064	0.70 (0.0276)
803050065	0.75 (0.0295)
803050066	0.80 (0.0315)
803050067	0.85 (0.0335)
803050068	0.90 (0.0354)
803050069	0.95 (0.0374)
803050070	1.00 (0.0394)
803050071	1.05 (0.0413)
803050072	1.10 (0.0433)
803050073	1.15 (0.0453)
803050074	1.20 (0.0472)
803050075	1.25 (0.0492)
803050076	1.30 (0.0512)
803050077	1.35 (0.0531)
803050078	1.40 (0.0551)
803050079	1.45 (0.0571)

Thrust washer to center differential side clearance

0.15 — 0.35 mm (0.0059 — 0.0138 in)

Thrust washer	
Part No.	Thickness mm (in)
803036050	0.9 (0.035)
803036054	1.0 (0.039)
803036051	1.1 (0.043)
803036055	1.2 (0.047)
803036052	1.3 (0.051)
803036056	1.4 (0.055)
803036053	1.5 (0.059)
803036057	1.6 (0.063)
803036058	1.7 (0.067)

11. FRONT DIFFERENTIAL S503001E4909

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)

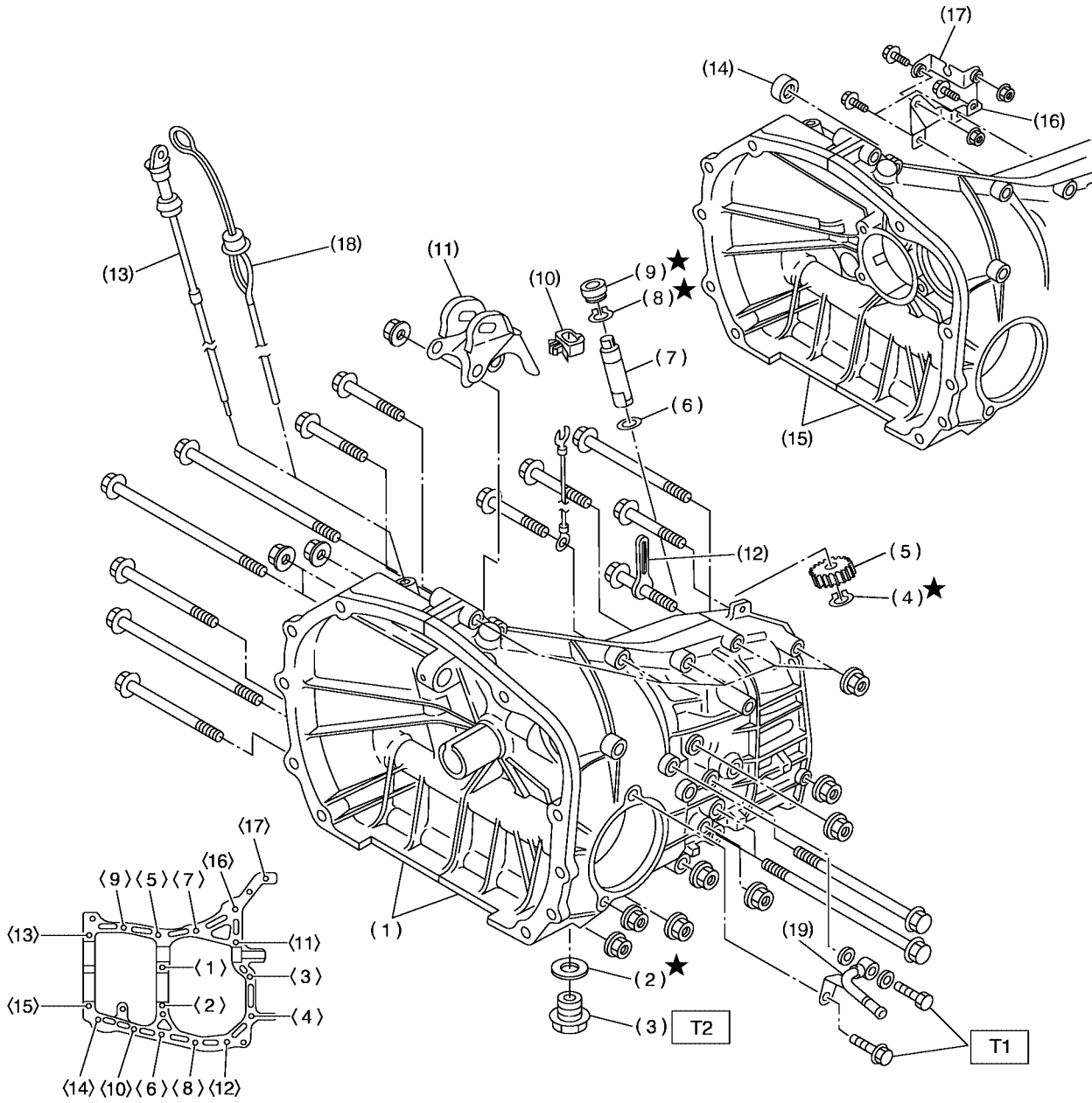
Snap ring (Outer-28)			
Part No.	Thickness mm (in)	Part No.	Thickness mm (in)
805028011	1.05 (0.0413)	805028012	1.20 (0.0472)

GENERAL DESCRIPTION

Manual Transmission and Differential

B: COMPONENT S503001A05

1. TRANSMISSION CASE S503001A0501



S3M0616A

GENERAL DESCRIPTION

Manual Transmission and Differential

- | | | |
|--|---|---|
| (1) Transmission case ASSY (Turbo model) | (9) Oil seal | (16) High-low cable bracket A (Non-turbo model) |
| (2) Gasket | (10) Clamp | (17) High-low cable bracket B (Non-turbo model) |
| (3) Drain plug | (11) Pitching stopper bracket | (18) Oil level gauge (Turbo model) |
| (4) Snap ring (Outer) | (12) Clip | (19) Inlet pipe (with oil pump) |
| (5) Speedometer driven gear | (13) Oil level gauge (Non-turbo model) | |
| (6) Washer | (14) Oil seal (Non-turbo model) | |
| (7) Speedometer shaft | (15) Transmission case ASSY (Non-turbo model) | |
| (8) Snap ring (Outer) | | |

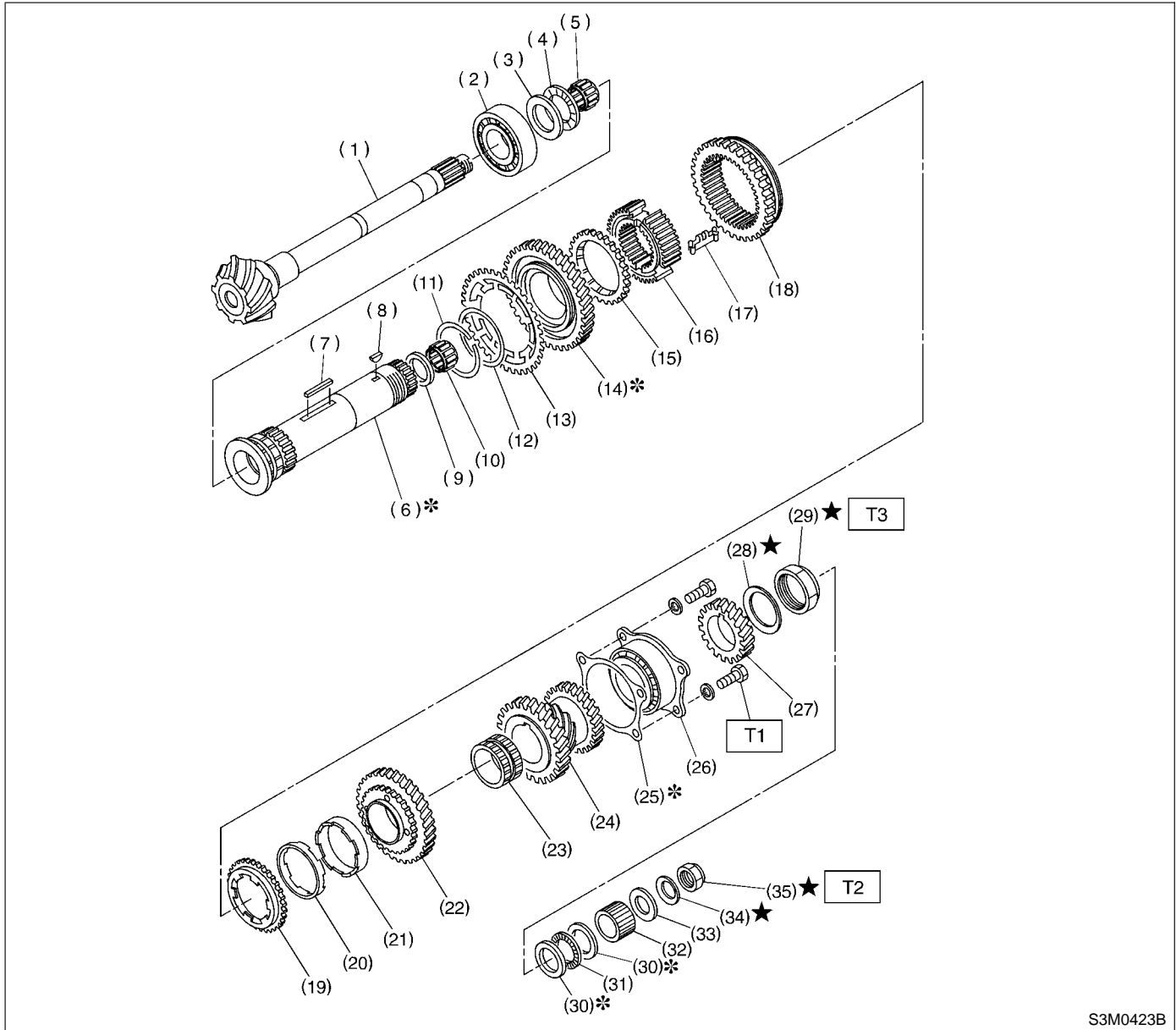
Tightening torque: N·m (kgf-m, ft-lb)
T: 44 (4.5, 32.5)

Size	All models	Tightening torque: N·m (kgf-m, ft-lb)
8 mm bolt	<5> — <15>	25 (2.5, 18.1)
10 mm bolt	<1> — <4> <16> — <17>	39 (4.0, 28.9)

GENERAL DESCRIPTION

Manual Transmission and Differential

2. DRIVE PINION ASSEMBLY S503001A0502



S3M0423B

- | | | |
|-------------------------|-------------------------------|-------------------------------------|
| (1) Drive pinion shaft | (15) Baulk ring | (29) Lock nut |
| (2) Roller bearing | (16) 1st-2nd synchronizer hub | (30) Washer |
| (3) Washer | (17) Insert key | (31) Thrust bearing |
| (4) Thrust bearing | (18) Reverse driven gear | (32) Differential bevel gear sleeve |
| (5) Needle bearing | (19) Outer baulk ring | (33) Washer |
| (6) Driven shaft | (20) Synchro cone | (34) Lock washer |
| (7) Key | (21) Inner baulk ring | (35) Lock nut |
| (8) Woodruff key | (22) 2nd driven gear | |
| (9) Drive pinion collar | (23) 2nd driven gear bush | |
| (10) Needle bearing | (24) 3rd-4th driven gear | |
| (11) Snap ring (Outer) | (25) Driven pinion shim | |
| (12) Washer | (26) Roller bearing | |
| (13) Sub gear | (27) 5th driven gear | |
| (14) 1st driven gear | (28) Lock washer | |

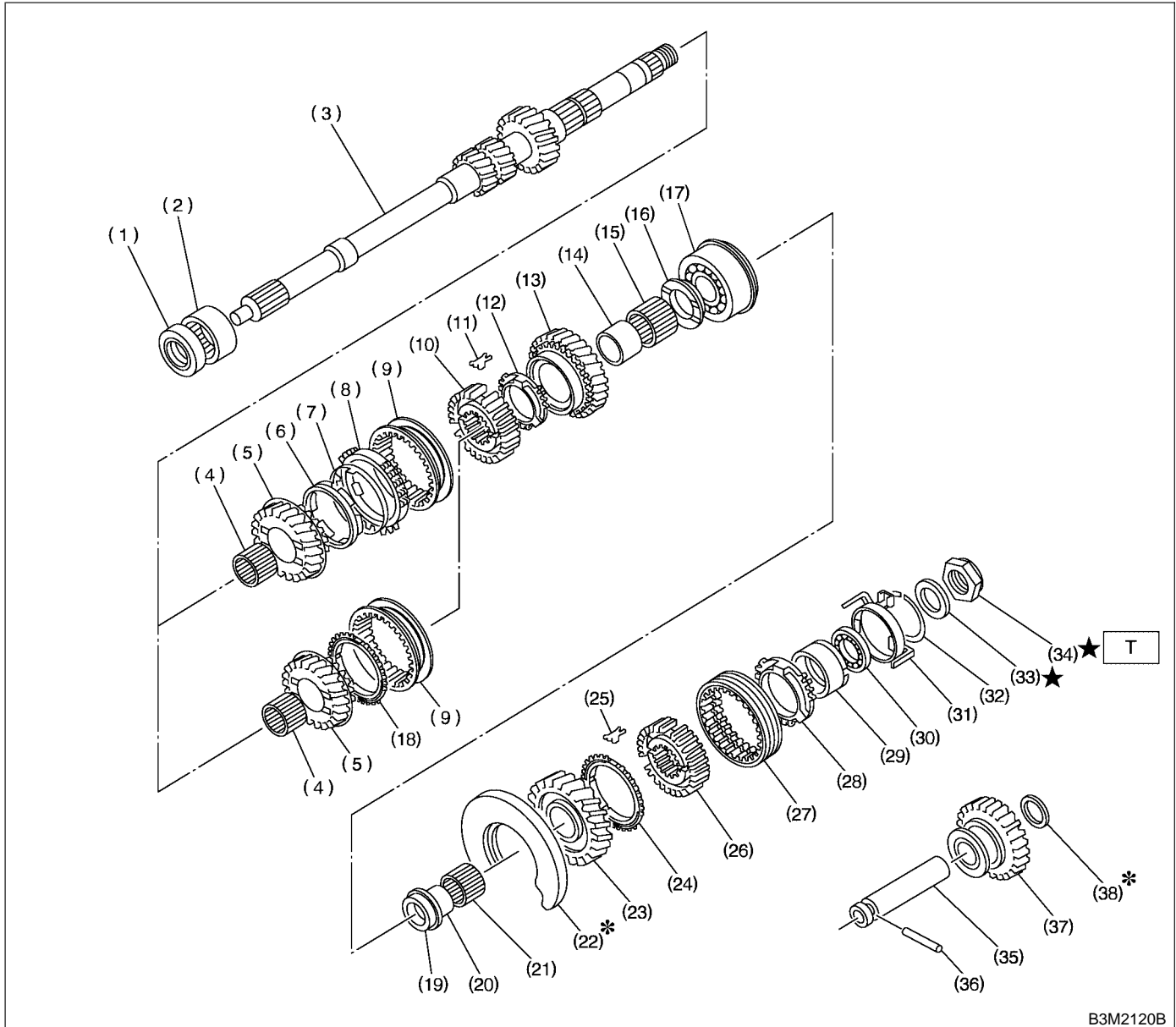
Tightening torque: N·m (kgf·m, ft·lb)

T1: 29 (3.0, 21.7)

T2: 118 (12.0, 86.8)

T3: 265 (27, 195)

3. MAIN SHAFT ASSEMBLY S503001A0503



- | | | |
|------------------------------------|-----------------------------------|-------------------------------|
| (1) Oil seal | (15) Needle bearing | (29) Rev synchro cone |
| (2) Needle bearing | (16) 4th gear thrust washer | (30) Ball bearing |
| (3) Transmission main shaft | (17) Ball bearing | (31) Synchro cone stopper |
| (4) Needle bearing | (18) Baulk ring (Non-turbo model) | (32) Snap ring |
| (5) 3rd drive gear | (19) 5th gear thrust washer | (33) Lock washer |
| (6) Inner baulk ring (Turbo model) | (20) 5th needle bearing race | (34) Lock nut |
| (7) 3rd synchro cone (Turbo model) | (21) Needle bearing | (35) Reverse idler gear shaft |
| (8) Outer baulk ring (Turbo model) | (22) Main shaft rear plate | (36) Straight pin |
| (9) 3rd-4th coupling sleeve | (23) 5th drive gear | (37) Reverse idler gear |
| (10) 3rd-4th synchronizer hub | (24) 5th baulk ring | (38) Washer |
| (11) 3rd-4th shifting insert key | (25) 5th-Rev shifting insert key | |
| (12) 4th baulk ring | (26) 5th-Rev synchronizer hub | |
| (13) 4th drive gear | (27) 5th-Rev coupling sleeve | |
| (14) 4th needle bearing race | (28) Rev baulk ring | |

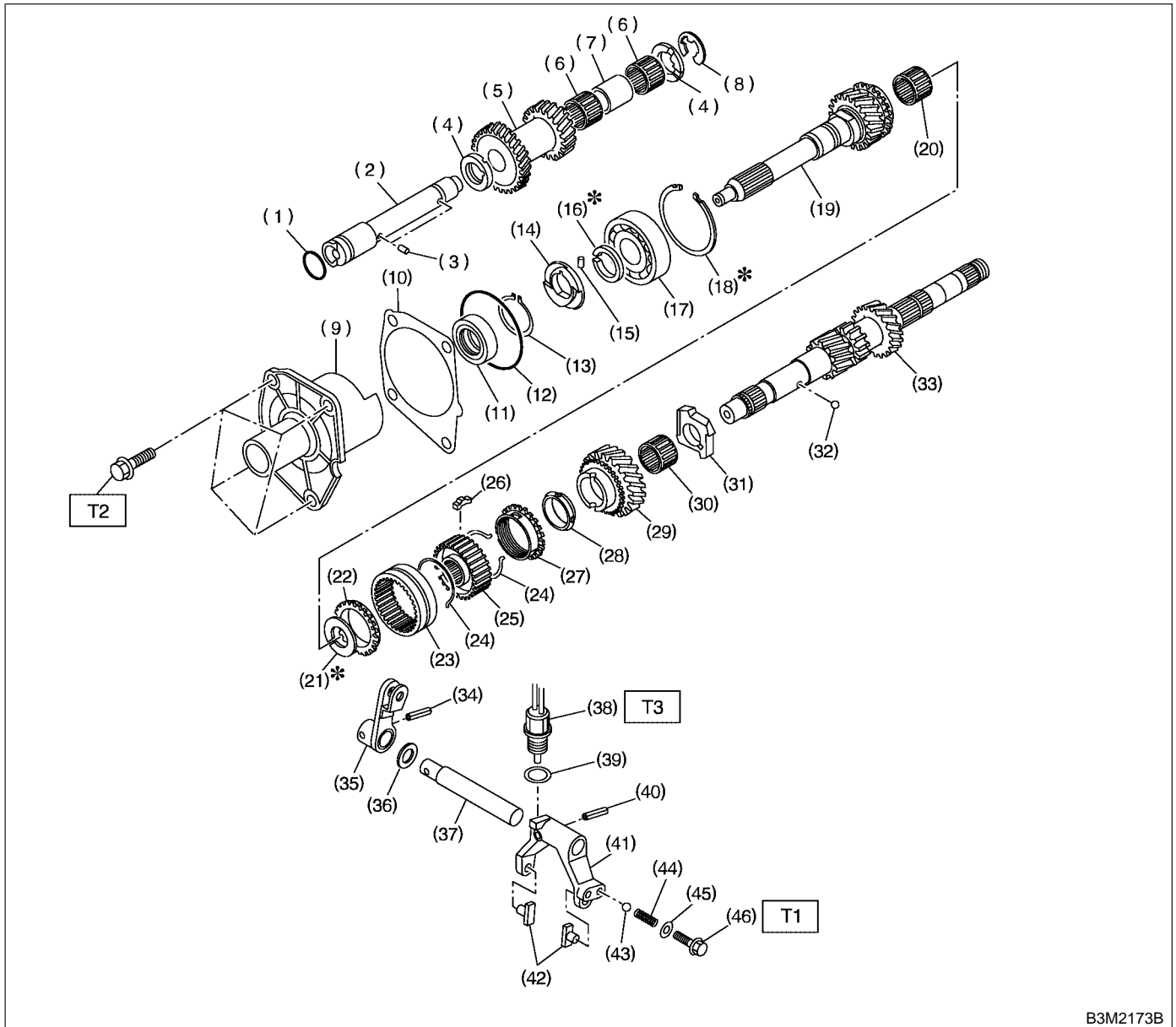
Tightening torque: N·m (kgf·m, ft·lb)

T: 118 (12.0, 86.8)

GENERAL DESCRIPTION

Manual Transmission and Differential

4. AUXILIARY TRANSMISSION GEARS S503001A0508



B3M2173B

GENERAL DESCRIPTION

Manual Transmission and Differential

-
- | | | |
|-----------------------------|-----------------------------------|-----------------------------|
| (1) O-ring | (19) Input shaft | (37) High-low shifter shaft |
| (2) High-low counter shaft | (20) Needle bearing | (38) Low switch |
| (3) Straight pin | (21) Snap ring (Outer-25) | (39) Gasket |
| (4) High-low counter washer | (22) High-low baulk ring | (40) Straight pin |
| (5) Counter gear | (23) High-low coupling sleeve | (41) High-low shifter fork |
| (6) Needle bearing | (24) High-low synchronizer spring | (42) High-low shifter piece |
| (7) Counter gear collar | (25) High-low synchronizer hub | (43) Ball |
| (8) Snap ring (Outer-19) | (26) Shifting insert | (44) Spring |
| (9) Input shaft holder | (27) High-low baulk ring | (45) Gasket |
| (10) Input shaft shim | (28) Friction damper | (46) Plug |
| (11) Oil seal | (29) Input low gear | |
| (12) O-ring | (30) Needle bearing | |
| (13) Snap ring (Outer-28) | (31) Input low gear spacer | |
| (14) Oil squeeze | (32) Ball | |
| (15) Straight pin | (33) Main shaft | |
| (16) Snap ring (Outer-28) | (34) Straight pin | |
| (17) Ball bearing | (35) High-low shifter lever | |
| (18) Snap ring (Inner-68) | (36) Washer | |

Tightening torque: N·m (kgf·m, ft·lb)

T1: 15.7 (1.6, 11.6)

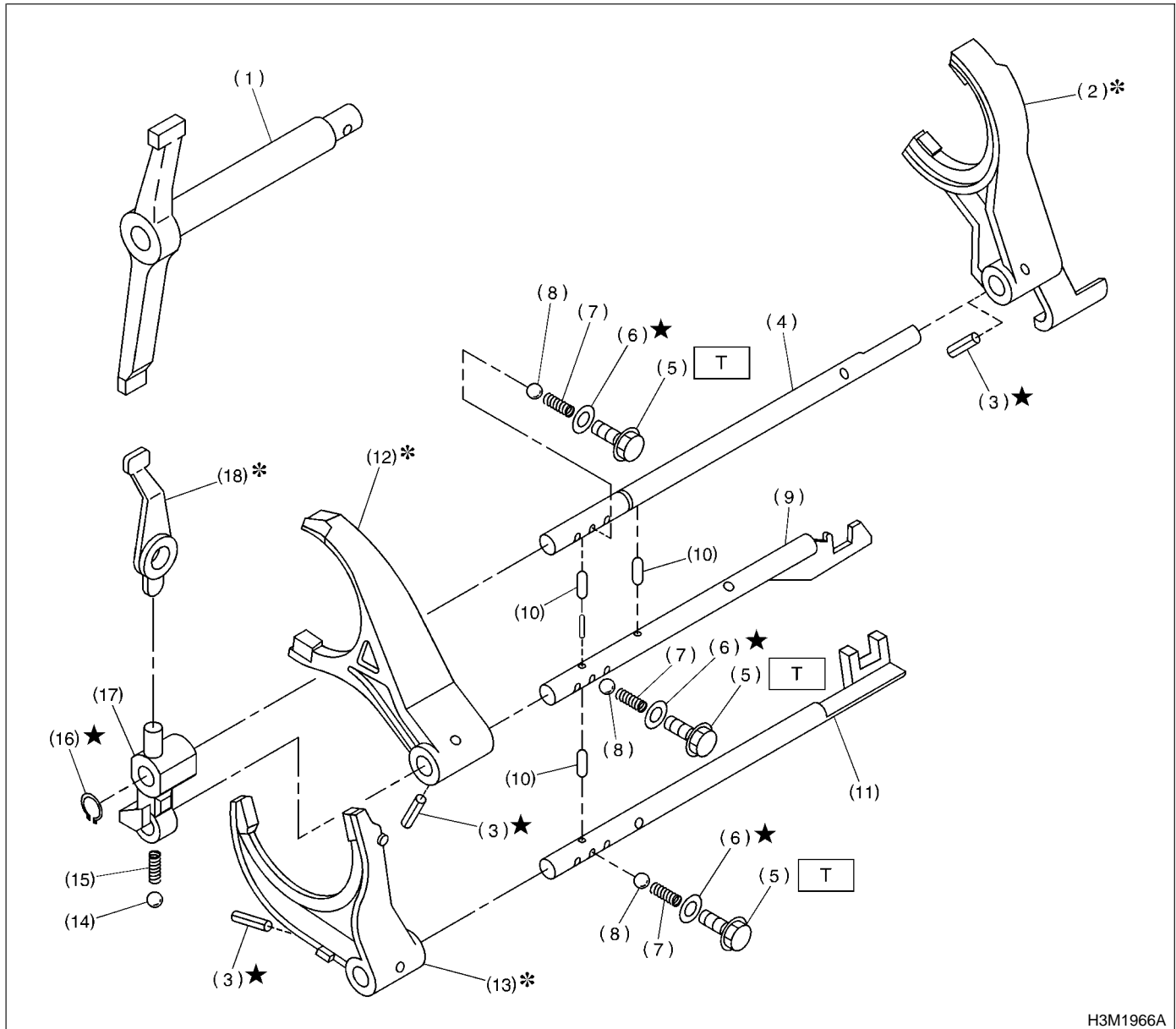
T2: 20 (2, 14.5)

T3: 25 (2.5, 18.1)

GENERAL DESCRIPTION

Manual Transmission and Differential

5. SHIFTER FORK AND SHIFTER ROD S503001A0504



- | | | |
|--------------------------|---------------------------|----------------------------|
| (1) Shifter arm | (9) 3rd-4th fork rod | (17) Reverse fork rod arm |
| (2) 5th shifter fork | (10) Interlock plunger | (18) Reverse shifter lever |
| (3) Straight pin | (11) 1st-2nd fork rod | |
| (4) Reverse fork rod | (12) 3rd-4th shifter fork | |
| (5) Checking ball plug | (13) 1st-2nd shifter fork | |
| (6) Gasket | (14) Ball | |
| (7) Checking ball spring | (15) Spring | |
| (8) Ball | (16) Snap ring (Outer) | |

Tightening torque: N·m (kgf·m, ft·lb)

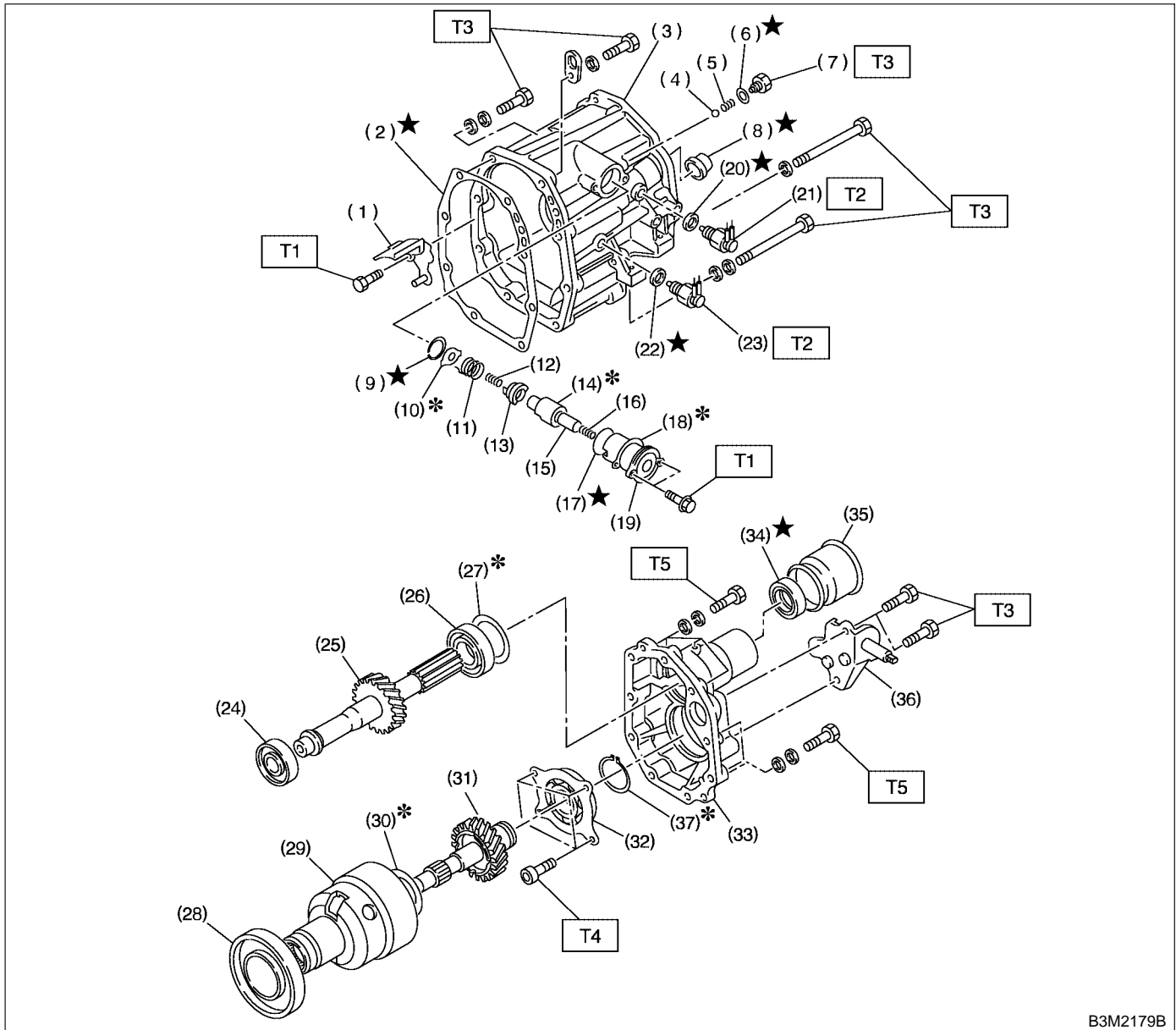
T: 19.6 (2.0, 14.5)

GENERAL DESCRIPTION

Manual Transmission and Differential

6. TRANSFER CASE AND EXTENSION CASE FOR MODEL WITHOUT OIL PUMP

S503001A0509



B3M2179B

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

Tightening torque: N·m (kgf·m, ft·lb)

T1: 6.4 (0.65, 4.7)

T2: 10 (1.0, 7.2)

T3: 25 (2.5, 18.1)

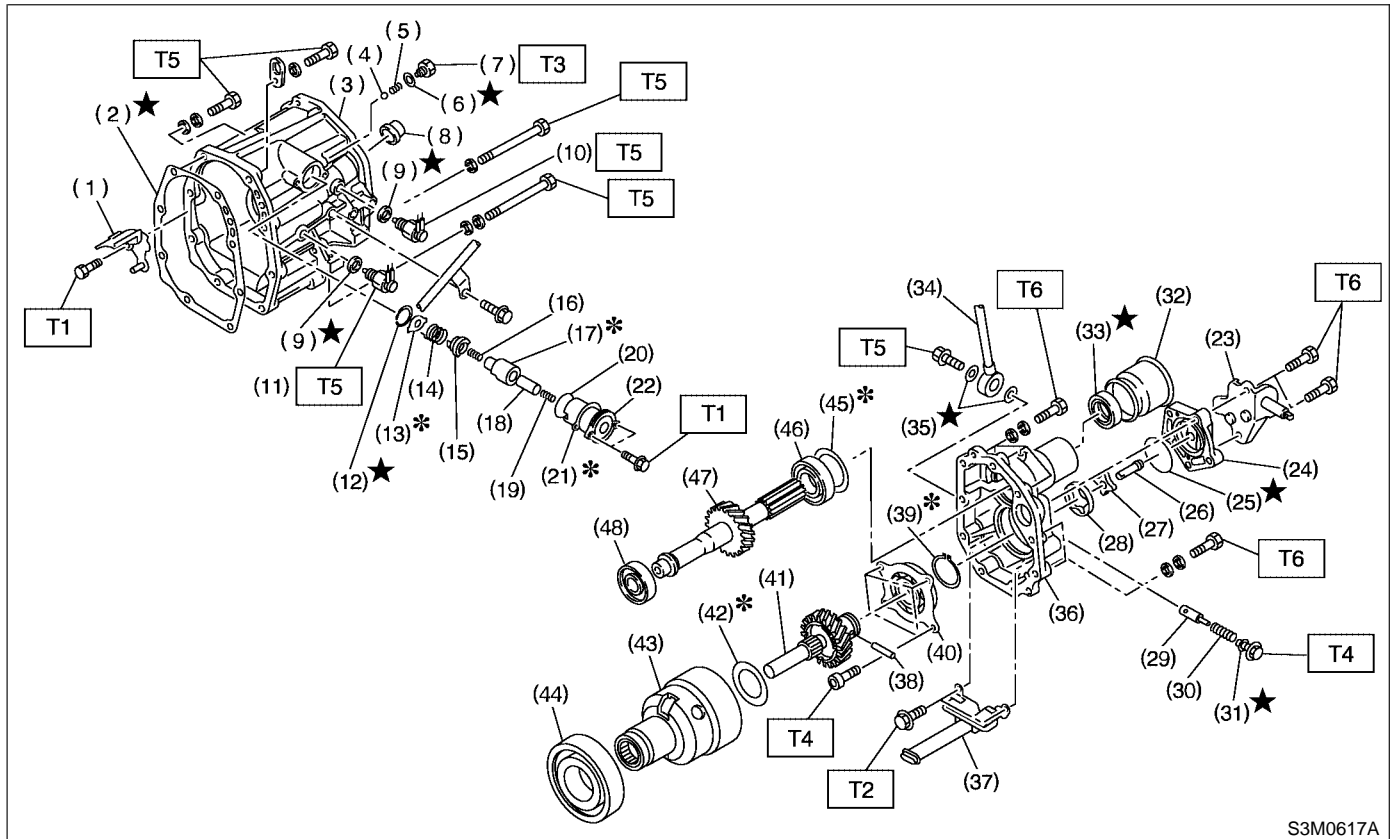
T4: 26 (2.7, 20)

T5: 40 (4.1, 29.7)

GENERAL DESCRIPTION

7. TRANSFER CASE AND EXTENSION CASE FOR MODEL WITH OIL PUMP

S503001A0510



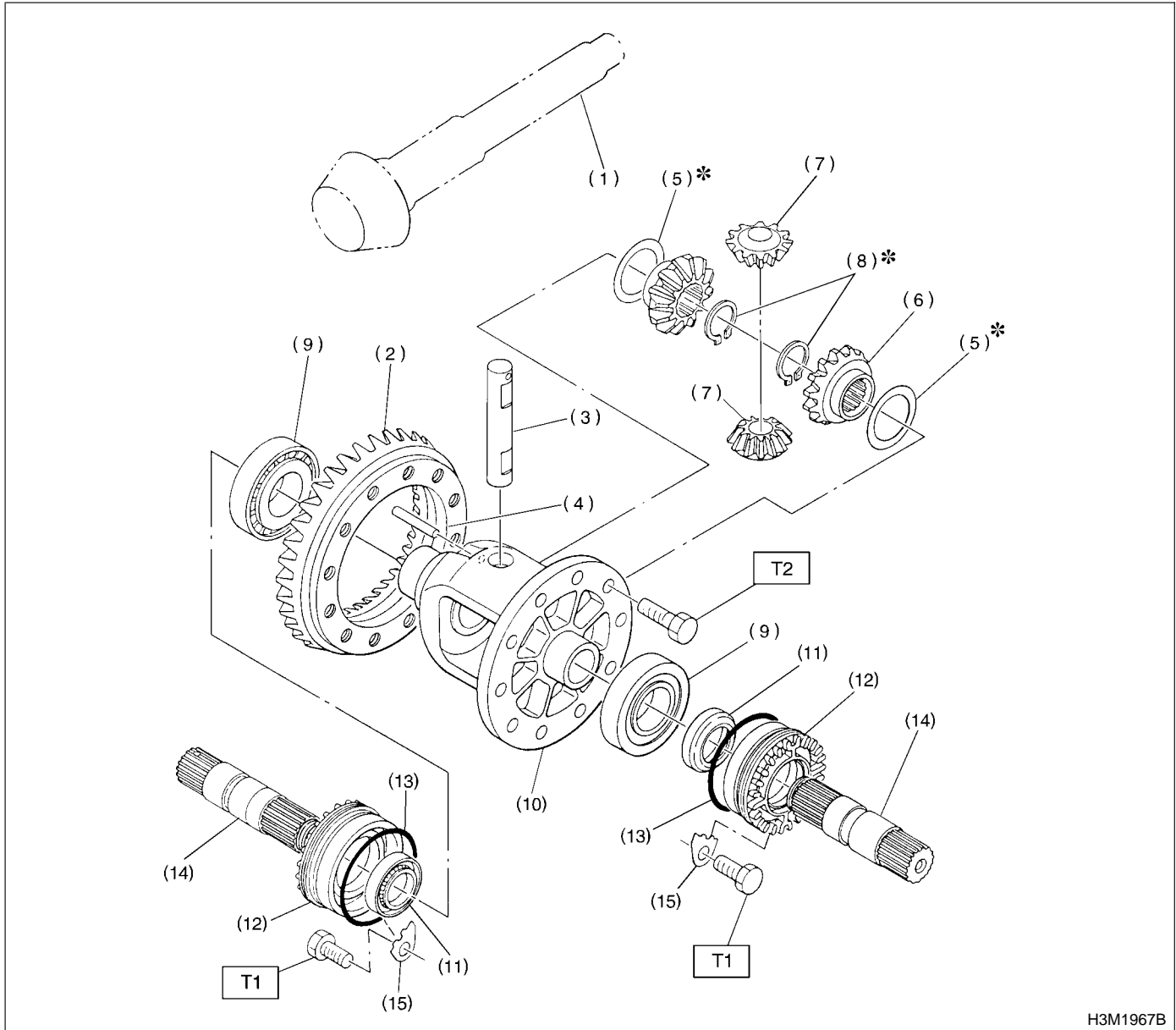
S3M0617A

- | | | |
|---------------------------|----------------------------|---------------------------|
| (1) Oil guide | (20) O-ring | (39) Snap ring |
| (2) Gasket | (21) Adjusting select shim | (40) Ball bearing |
| (3) Transfer case | (22) Reverse check sleeve | (41) Transfer drive gear |
| (4) Ball | (23) Shift bracket | (42) Washer |
| (5) Reverse accent spring | (24) Oil pump cover | (43) Center differential |
| (6) Gasket | (25) O-ring | (44) Ball bearing |
| (7) Plug | (26) Oil pump shaft | (45) Adjusting washer |
| (8) Oil seal | (27) Inner rotor | (46) Roller bearing |
| (9) Gasket | (28) Outer rotor | (47) Transfer driven gear |
| (10) Neutral switch | (29) Relief valve | (48) Roller bearing |
| (11) Back-up light switch | (30) Return spring | |
| (12) Snap ring (Inner) | (31) O-ring | |
| (13) Reverse check plate | (32) Dust cover | |
| (14) Reverse check spring | (33) Oil seal | |
| (15) Reverse check cam | (34) Outlet pipe | |
| (16) Return spring | (35) Washer | |
| (17) Reverse accent shaft | (36) Extension case | |
| (18) Return spring cap | (37) Oil strainer | |
| (19) Return spring | (38) Straight pin | |

Tightening torque: N·m (kgf·m, ft·lb)

- T1: 6.4 (0.65, 4.7)**
T2: 10 (1.0, 7.2)
T3: 13 (1.3, 9.4)
T4: 26 (2.7, 20)
T5: 40 (4.1, 30)

8. FRONT DIFFERENTIAL S503001A0506



H3M1967B

- | | | |
|-------------------------------|---------------------------------|--------------------------|
| (1) Drive pinion shaft | (8) Snap ring (Outer) | (15) Retainer lock plate |
| (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 | |

Tightening torque: N·m (kgf·m, ft·lb)

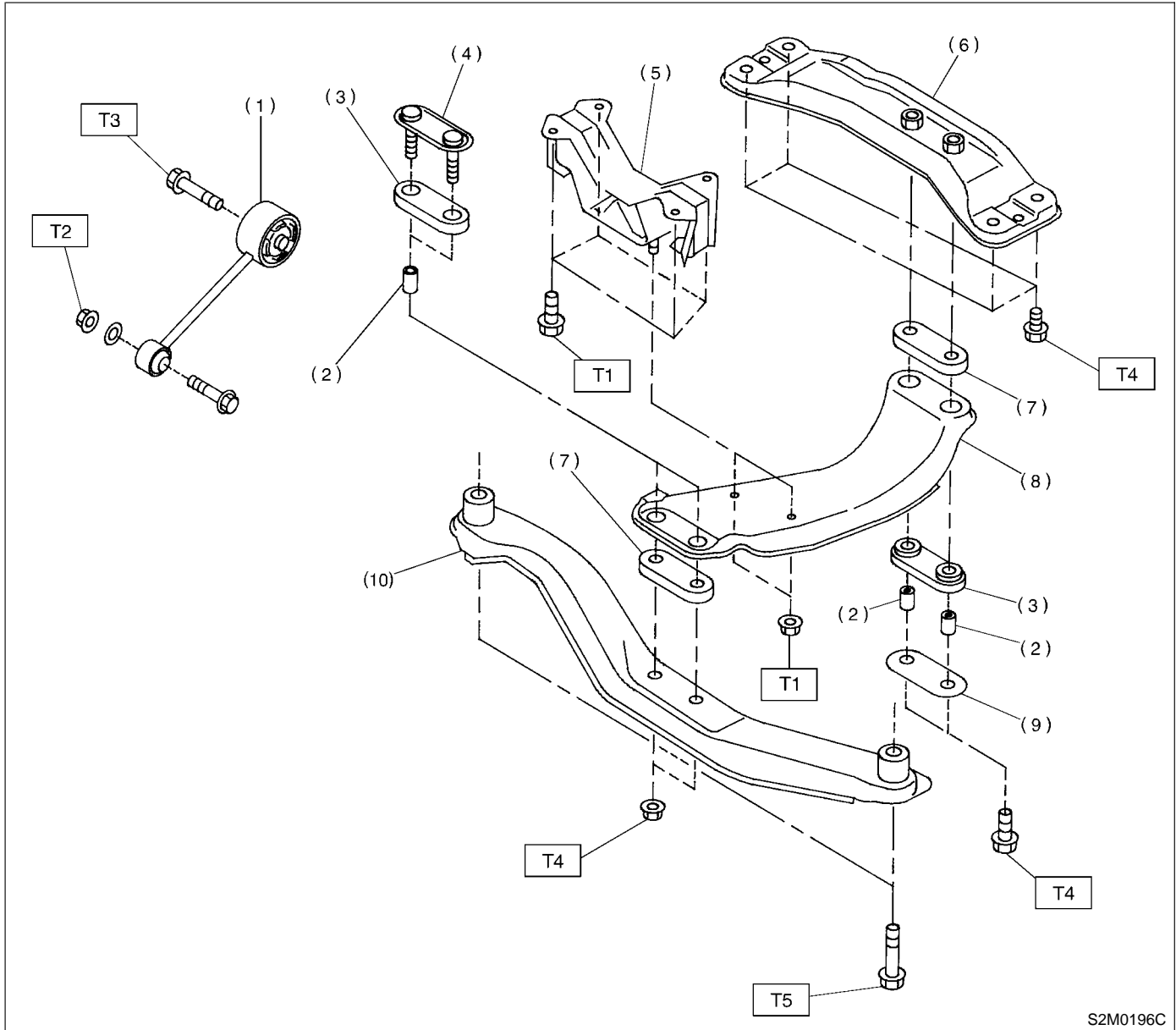
T1: 25 (2.5, 18.1)

T2: 62 (6.3, 45.6)

GENERAL DESCRIPTION

Manual Transmission and Differential

9. TRANSMISSION MOUNTING S503001A0507



- (1) Pitching stopper
- (2) Spacer
- (3) Cushion C
- (4) Front plate
- (5) Rear cushion rubber
- (6) Rear crossmember
- (7) Cushion D
- (8) Center crossmember
- (9) Rear plate
- (10) Front crossmember

Tightening torque: N·m (kgf·m, ft·lb)

T1: 35 (3.6, 26)

T2: 50 (5.1, 37)

T3: 58 (5.9, 43)

T4: 70 (7.1, 51)

T5: 140 (14.3, 103)

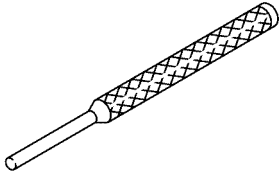
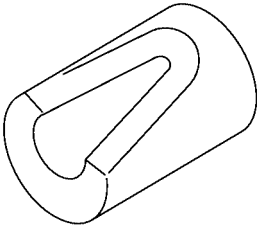
C: CAUTION S503001A03

- Wear working clothing, including a cap, protective goggles, and protective shoes during operation.
- Remove contamination including dirt and corrosion before removal, installation, and disassembly.
- Keep the disassembled parts in order and protect them from dust or dirt.
- Before removal, installation or disassembly, be sure to clarify the failure. Avoid unnecessary removal, installation, disassembly and replacement.
- When disassembling the case and other light alloy parts, use a plastic hammer to force it apart. Do not pry it apart with a screwdriver or other tool.
- Be careful not to burn your hands, because each part on the vehicle is hot after running.
- Use SUBARU genuine gear oil, grease etc. or the equivalent. Do not mix gear oil, grease etc. with that of another grade or from other manufacturers.

- Be sure to tighten fasteners including bolts and nuts to the specified torque.
- Place shop jacks or safety stands at the specified points.
- Apply gear oil onto sliding or revolution surfaces before installation.
- Replace deformed or otherwise damaged snap rings with new ones.
- Before installing O-rings or oil seals, apply sufficient amount of gear oil to avoid damage and deformation.
- Be careful not to incorrectly install or fail to install O-rings, snap rings and other such parts.
- Before securing a part on a vise, place cushioning material such as wood blocks, aluminum plate, or shop cloth between the part and the vise.
- Avoid damaging the mating surface of the case.
- Before applying sealant, completely remove the old seal.

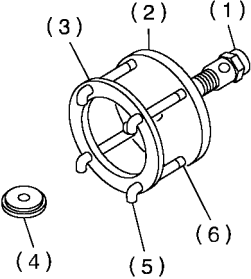
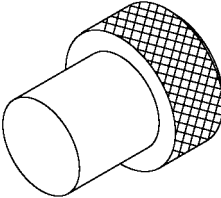
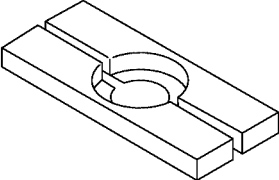
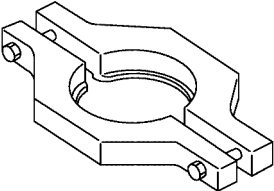
D: PREPARATION TOOL S503001A17

1. SPECIAL TOOLS S503001A1701

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 B3M1938	398791700	REMOVER II	Used for removing and installing spring pin (6 mm).
 B3M1939	399411700	ACCENT BALL INSTALLER	Used for installing reverse shifter rail arm.

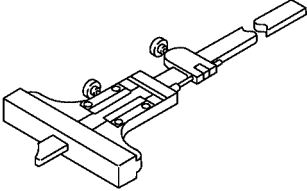
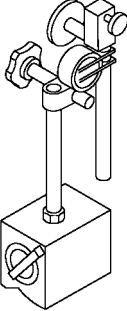
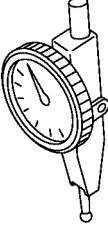
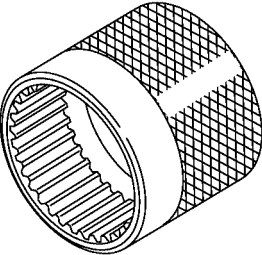
GENERAL DESCRIPTION

Manual Transmission and Differential

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p style="text-align: center;">B3M1940A</p>	399527700	PULLER SET	Used for removing and installing roller bearing (Differential). (1) BOLT (899521412) (2) PULLER (399527702) (3) HOLDER (399527703) (4) ADAPTER (398497701) (5) BOLT (899520107) (6) NUT (021008000)
 <p style="text-align: center;">B3M1941</p>	399780104	WEIGHT	Used for measuring preload on roller bearing.
 <p style="text-align: center;">B3M1942</p>	498077000	5TH DRIVEN GEAR REMOVER	Used for removing roller bearing of drive pinion shaft.
 <p style="text-align: center;">B3M1943</p>	498077300	CENTER DIFFERENTIAL BEARING REMOVER	Used for removing the center differential cover ball bearing.

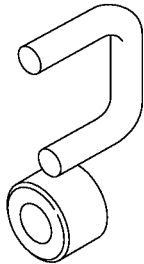
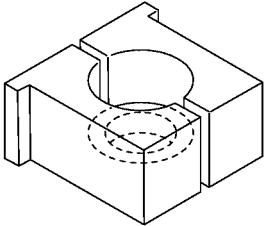
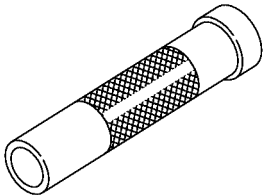
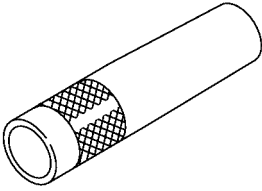
GENERAL DESCRIPTION

Manual Transmission and Differential

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p>B3M1944</p>	498147000	DEPTH GAUGE	Used for adjusting main shaft axial end play.
 <p>B3M1945</p>	498247001	MAGNET BASE	<ul style="list-style-type: none"> ● Used for measuring backlash between side gear and pinion, and hypoid gear. ● Used with DIAL GAUGE (498247100).
 <p>B3M1946</p>	498247100	DIAL GAUGE	<ul style="list-style-type: none"> ● Used for measuring backlash between side gear and pinion, and hypoid gear. ● Used with MAGNET BASE (498247001).
 <p>B3M1947</p>	498427100	STOPPER	Used for securing the drive pinion shaft assembly and driven gear assembly when removing the drive pinion shaft assembly lock nut.

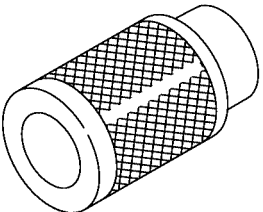
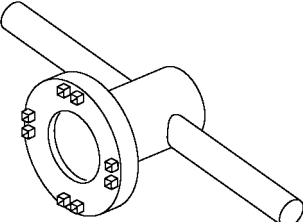
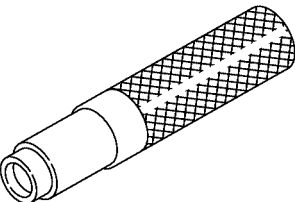
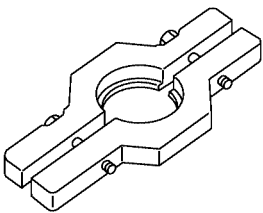
GENERAL DESCRIPTION

Manual Transmission and Differential

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p style="text-align: right;">B3M1948</p>	498787100	MAIN SHAFT STOP- PER	Used for removing and installing transmission main shaft lock nut.
 <p style="text-align: right;">B3M1949</p>	498937000	HOLDER	Used for removing and installing transmission main shaft lock nut.
 <p style="text-align: right;">B3M1950</p>	499277100	BUSH 1-2 INSTALLER	<ul style="list-style-type: none"> ● Used for installing 1st driven gear thrust plate and 1st-2nd driven gear bush. ● Used for installing roller bearing outer races to differential case.
 <p style="text-align: right;">B3M1951</p>	499277200	INSTALLER	Used for press-fitting the 2nd driven gear, roller bearings, and 5th driven gear onto the driven shaft.

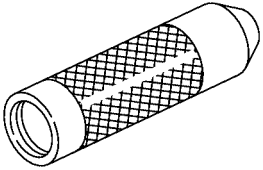
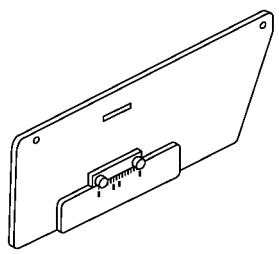
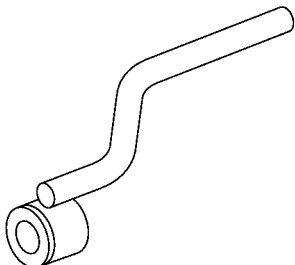
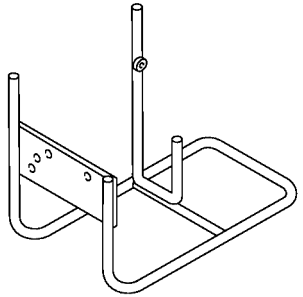
GENERAL DESCRIPTION

Manual Transmission and Differential

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p style="text-align: right;">B3M1952</p>	499757002	INSTALLER	<ul style="list-style-type: none"> ● Used for installing snap ring (OUT 25), and ball bearing (25 x 26 x 17). ● Used for installing bearing cone of transfer driven gear (extension core side).
 <p style="text-align: right;">B3M1953</p>	499787000	WRENCH ASSY	Used for removing and installing differential side retainer.
 <p style="text-align: right;">B3M1954</p>	499827000	PRESS	Used for installing speedometer oil seal when installing speedometer cable to transmission.
 <p style="text-align: right;">B3M1955</p>	499857000	5TH DRIVEN GEAR REMOVER	Used for removing 5th driven gear.

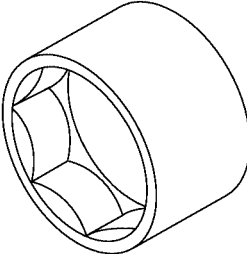
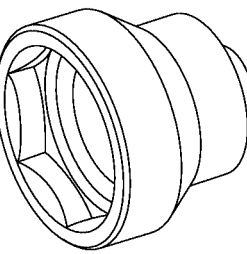
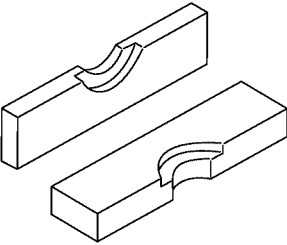
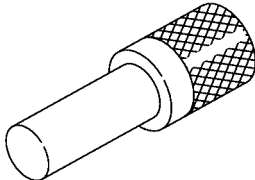
GENERAL DESCRIPTION

Manual Transmission and Differential

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p style="text-align: center;">B3M1956</p>	499877000	RACE 4-5 INSTALLER	<ul style="list-style-type: none"> ● Used for installing 4th needle bearing race and ball bearing onto transmission main shaft. ● Used with REMOVER (899714110).
 <p style="text-align: center;">B3M1957</p>	499917500	DRIVE PINION GAUGE ASSY	Used for adjusting drive pinion shim.
 <p style="text-align: center;">B3M1958</p>	499927100	HANDLE	Used for fitting transmission main shaft.
 <p style="text-align: center;">B3M1959</p>	499937100	TRANSMISSION STAND SET	Stand used for transmission disassembly and assembly.

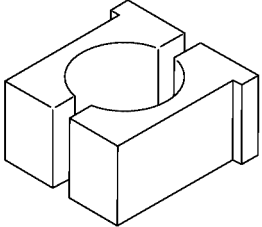
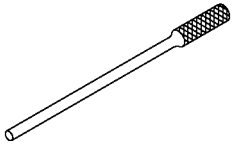
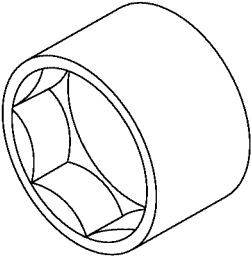
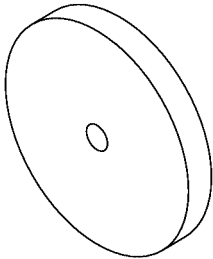
GENERAL DESCRIPTION

Manual Transmission and Differential

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p style="text-align: center;">B3M1960</p>	499987003	SOCKET WRENCH (35)	Used for removing and installing driven pinion lock nut and main shaft lock nut.
 <p style="text-align: center;">B3M1961</p>	499987300	SOCKET WRENCH (50)	Used for removing and installing driven gear assembly lock nut.
 <p style="text-align: center;">B3M1962</p>	899714110	REMOVER	Used for fixing transmission main shaft, drive pinion, rear drive shaft.
 <p style="text-align: center;">B3M1963</p>	899864100	REMOVER	Used for removing parts on transmission main shaft and drive pinion.

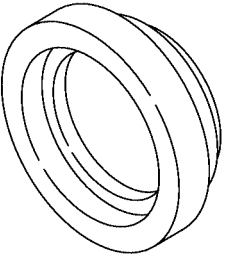
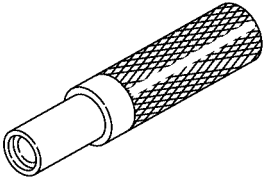
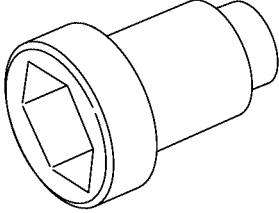
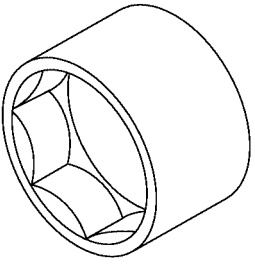
GENERAL DESCRIPTION

Manual Transmission and Differential

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p style="text-align: center;">B3M1964</p>	899884100	HOLDER	Used for tightening lock nut on sleeve.
 <p style="text-align: center;">B3M1965</p>	899904100	REMOVER	Used for removing and installing straight pin.
 <p style="text-align: center;">B3M1966</p>	899988608	SOCKET WRENCH (27)	Used for removing and installing drive pinion lock nut.
 <p style="text-align: center;">B3M1967</p>	398497701	ADAPTER	<ul style="list-style-type: none"> ● Used for installing roller bearing onto differential case. ● Used with INSTALLER (499277100).

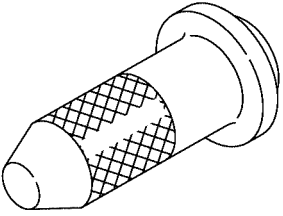
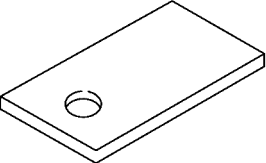
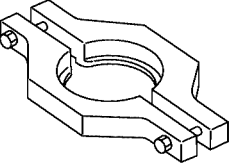
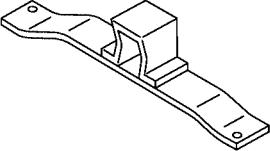
GENERAL DESCRIPTION

Manual Transmission and Differential

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 B3M1968	499587000	INSTALLER	Used for installing driven gears to driven shaft.
 B3M1969	899824100	PRESS	Used for installing speedometer shaft oil seal.
 B3M1970	499987100	SOCKET WRENCH (35)	Used for removing and installing drive pinion lock nut.
 B3M1971	899984103	SOCKET WRENCH (35)	Used for removing and installing drive pinion lock nut.

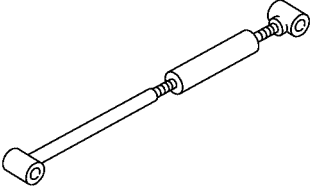
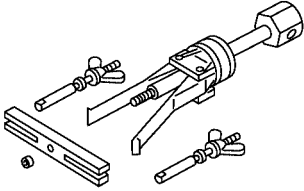
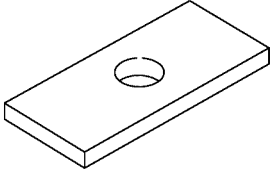
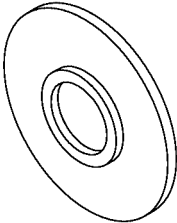
GENERAL DESCRIPTION

Manual Transmission and Differential

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p style="text-align: center;">B3M1972</p>	498057300	INSTALLER	Used for installing extension oil seal.
 <p style="text-align: center;">B3M1973</p>	498255400	PLATE	Used for measuring backlash.
 <p style="text-align: center;">B3M1974</p>	498077400	REMOVER	<ul style="list-style-type: none"> ● Used for removing synchronizer cone of main shaft. ● Used for removing 5th driven gear of drive pinion shaft.
 <p style="text-align: center;">B3M1975</p>	41099AA010	ENGINE SUPPORT BRACKET	Used for supporting engine.

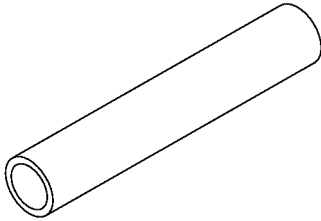
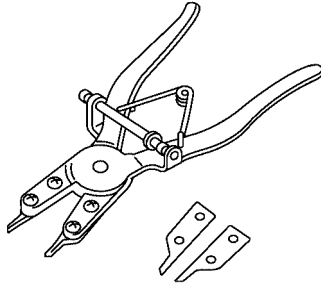
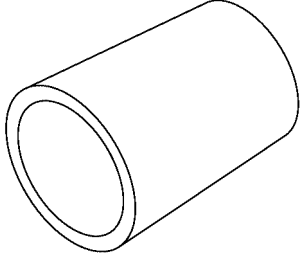
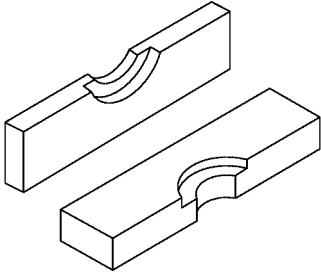
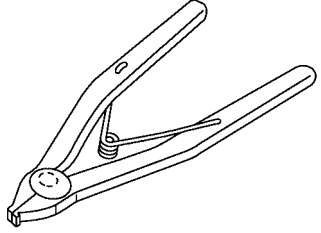
GENERAL DESCRIPTION

Manual Transmission and Differential

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p data-bbox="363 541 443 564">B3M1976</p>	41099AA020	ENGINE SUPPORT	Used for supporting engine.
 <p data-bbox="363 926 443 949">B3M1977</p>	398527700	PULLER ASSY	Used for removing and installing extension case roller bearing.
 <p data-bbox="363 1310 443 1333">B3M1978</p>	398643600	GAUGE	Used for measuring total end play, extension end play and drive pinion height.
 <p data-bbox="363 1696 443 1719">B3M1905</p>	38177700	INSTALLER	<ul style="list-style-type: none"> ● Used for installing bearing cone of transfer driven gear (transfer case side). ● Used for installing ball bearing of transfer drive gear.

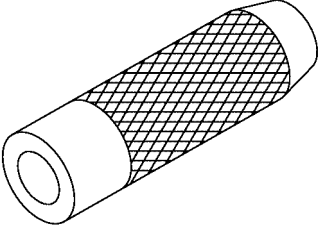
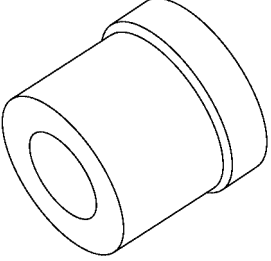
GENERAL DESCRIPTION

Manual Transmission and Differential

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p style="text-align: center;">B3M2122</p>	398507703	DUMMY COLLAR	<ul style="list-style-type: none"> ● Used for installing input shaft holder oil seal. ● For dual-range model.
 <p style="text-align: center;">B3M2123</p>	398663600	PLIERS	<ul style="list-style-type: none"> ● Used for removing and installing input shaft snap ring. ● For dual-range model.
 <p style="text-align: center;">B3M2124</p>	499757001	SNAP RING GUIDE	<ul style="list-style-type: none"> ● Used for installing snap ring (OUT 25). ● For dual-range model.
 <p style="text-align: center;">B3M2125</p>	899858600	RETAINER	<ul style="list-style-type: none"> ● Used for removing ball bearing. ● For dual-range model.
 <p style="text-align: center;">B3M2126</p>	899474100	EXPANDER	<ul style="list-style-type: none"> ● Used for removing and installing snap ring. ● For dual-range model.

GENERAL DESCRIPTION

Manual Transmission and Differential

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p>B3M2127</p>	899580100	INSTALLER	<ul style="list-style-type: none"> • Used when pressing ball bearings into input shaft. • For dual-range model.
 <p>B3M2129</p>	399513600	INSTALLER	<ul style="list-style-type: none"> • Used when pressing ball bearings into input shaft. • For dual-range model.

2. GENERAL PURPOSE TOOLS S503001A1702

TOOL NAME	REMARKS
Circuit Tester	Used for measuring resistance, voltage and ampere.

GENERAL DESCRIPTION

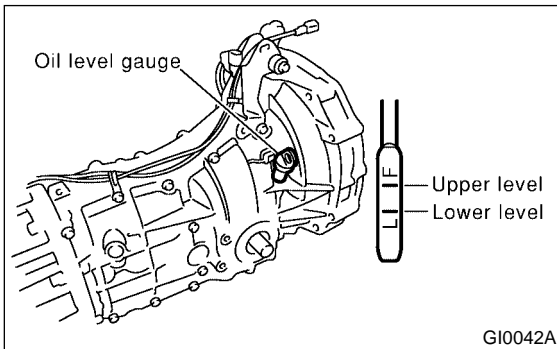
Manual Transmission and Differential

MEMO:

2. Transmission Gear Oil S503219

A: INSPECTION S503219A10

- 1) Park vehicle on a level surface.
- 2) Turn ignition switch to OFF, and wait until the engine cools.
- 3) Remove oil level gauge and wipe it clean.
- 4) Reinsert the level gauge all the way. Be sure that the level gauge is correctly inserted and in the proper direction.
- 5) Pull out the oil level gauge again and check the oil level on it. If it is below the lower level, add oil through the oil level gauge hole to bring the level up to the upper level.



B: REPLACEMENT S503219A20

- 1) Pull out oil level gauge.
- 2) Lift-up the vehicle.
- 3) Drain transmission gear oil completely.

CAUTION:

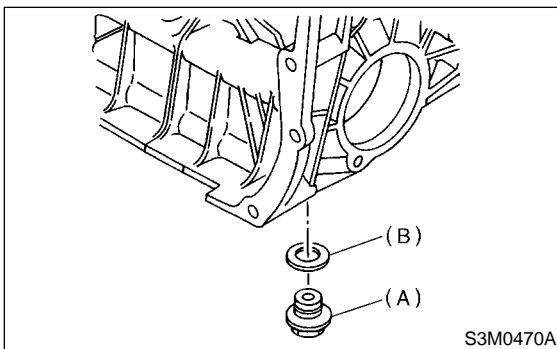
Directly after the engine has been running, the transmission gear oil is hot. Be careful not to burn yourself.

NOTE:

Tighten transmission gear oil drain plug after draining transmission gear oil.

Tightening torque:

44 N·m (4.5 kgf·m, 32.5 ft·lb)



- (A) Drain plug
- (B) Gasket

- 4) Lower the vehicle.

- 5) Pour gear oil into the gauge hole.

Recommended gear oil:

Use GL-5 or equivalent.

Gear oil capacity:

Turbo model without oil pump;

3.5 ℓ (3.7 US qt, 3.1 Imp qt)

Turbo model with oil pump;

4.4 ℓ (4.7 US qt, 3.9 Imp qt)

Non-turbo model;

4.0 ℓ (4.2 US qt, 3.5 Imp qt)

- 6) Check the level of the transmission gear oil.

CAUTION:

When inserting the level gauge into transmission gear, align the protrusion on the side of the top part of the level gauge with the notch in the gauge hole.

NOTE:

The level should be within the specified range marked on the gauge.

MANUAL TRANSMISSION ASSEMBLY

Manual Transmission and Differential

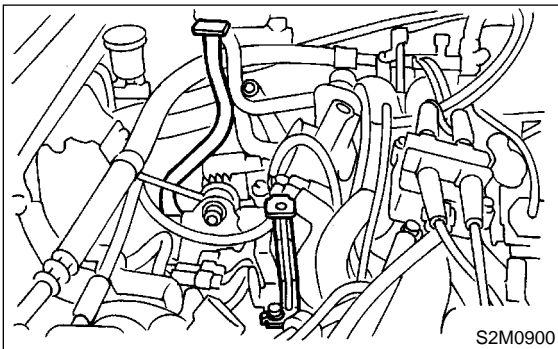
3. Manual Transmission Assembly

S503224

A: REMOVAL

S503224A18

- 1) Set vehicle on a lift.
- 2) Open front hood fully, and support with stay.
- 3) Disconnect battery ground terminal.
- 4) Move gear shift lever to "N", and release the parking brake.
- 5) Remove air intake duct and cleaner case. (Non-turbo model) <Ref. to IN(SOHC)-8, REMOVAL, Air Intake Duct.> and <Ref. to IN(SOHC)-7, REMOVAL, Air Cleaner Case.>
- 6) Remove air cleaner case stay. (Non-turbo model)

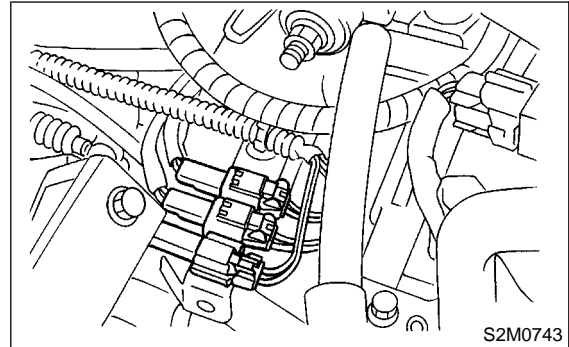


S2M0900

- 7) Remove intercooler (Turbo model) <Ref. to IN(DOHC TURBO)-10, REMOVAL, Intercooler.>
- 8) Disconnect the following connectors.
 - (1) Neutral position switch connector
 - (2) Back-up light switch connector

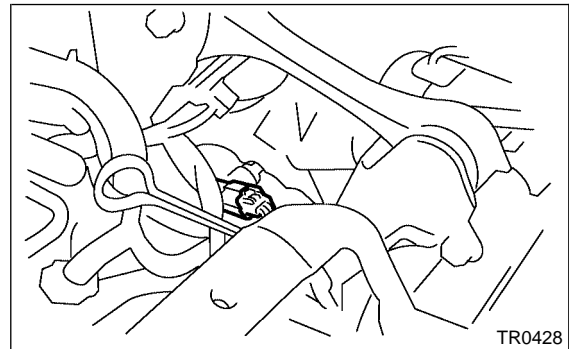
- (3) High-low switch connector (Non-turbo model)

Non-turbo model



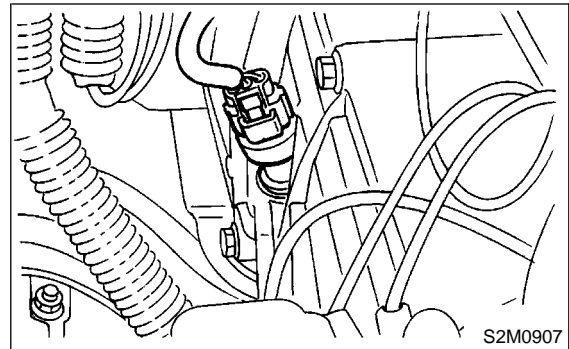
S2M0743

Turbo model



TR0428

- (4) Vehicle speed sensor



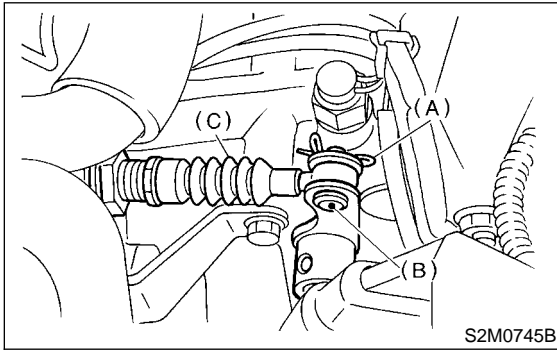
S2M0907

- (5) Transmission ground terminal.
- 9) Remove snap pin and pin from the drive select cable.

MANUAL TRANSMISSION ASSEMBLY

Manual Transmission and Differential

10) Remove the drive select cable on the transmission. (Non-turbo model)

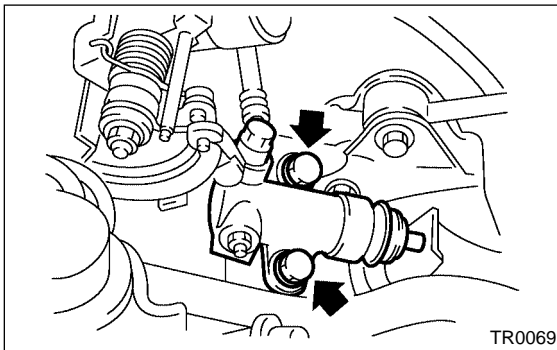


- (A) Snap pin
- (B) Pin
- (C) Drive select cable

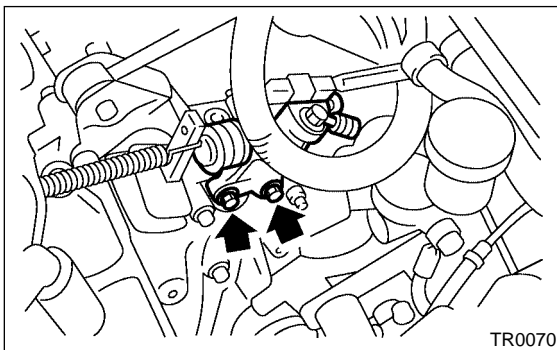
11) Remove starter. <Ref. to SC-5, REMOVAL, Starter.>

12) Remove operating cylinder from transmission.

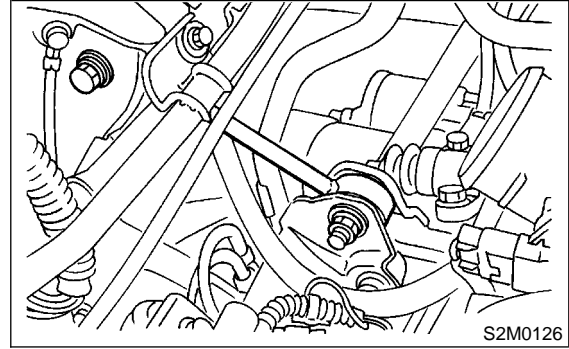
Non-turbo model



Turbo model



13) Remove pitching stopper.

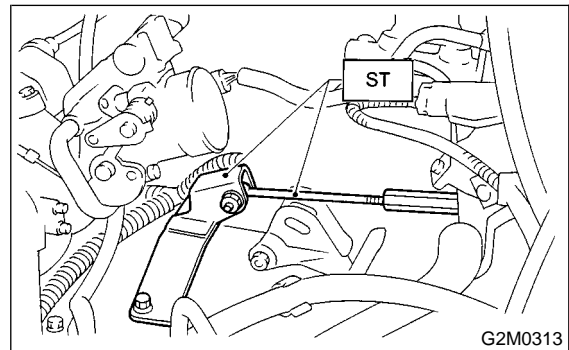


14) Set ST.

NOTE:

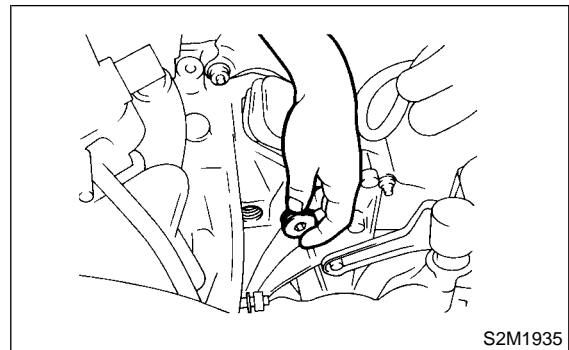
Also is available Part No. 41099AA010.

ST 41099AA020 ENGINE SUPPORT ASSY



15) Separate clutch release fork from release bearing. (Turbo model)

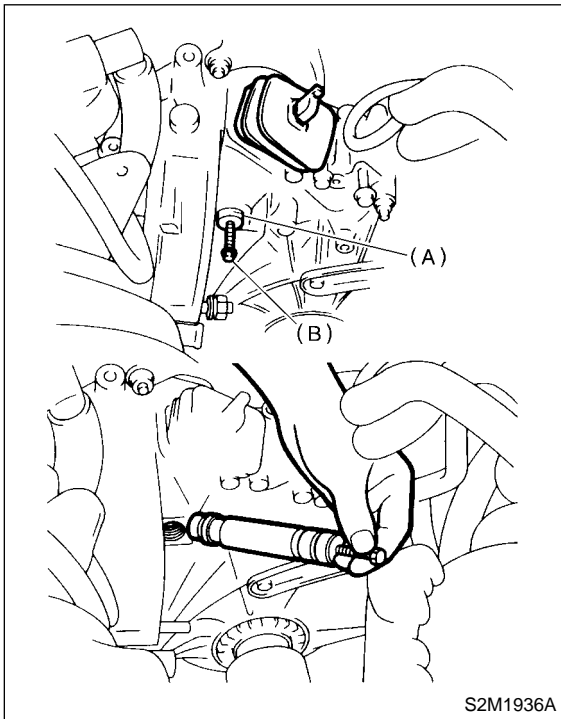
(1) Remove plug using 10 mm hexagon wrench.



MANUAL TRANSMISSION ASSEMBLY

Manual Transmission and Differential

- (2) Screw 6 mm dia. bolt into release fork shaft, and remove it.

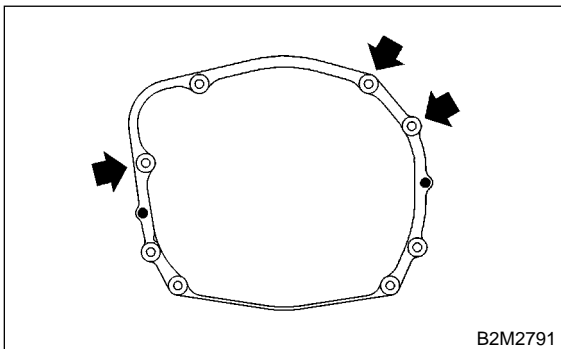


- (A) Shaft
(B) Bolt

- (3) Raise release fork and unfasten release bearing tabs to free release fork.

CAUTION:
Step (4) is required to prevent interference with engine when removing engine from transmission.

- 16) Remove bolt which holds right upper side of transmission to engine.



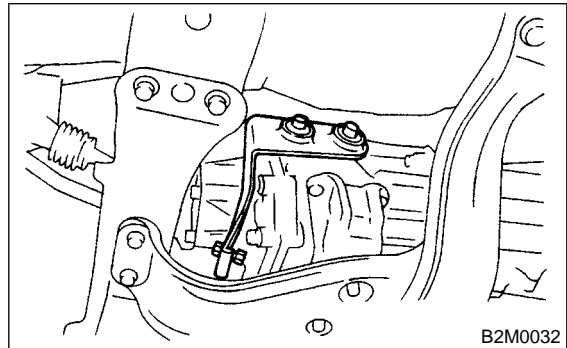
- 17) Remove front and center exhaust pipes. (Non-turbo model) with OBD <Ref. to EX(SOHC)-5, REMOVAL, Front Exhaust Pipe.> without OBD <Ref. to EX(SOHCw/oOBD)-6, REMOVAL, Front Exhaust Pipe.>

- 18) Remove center exhaust pipe. (Turbo model). <Ref. to EX(DOHC TURBO)-9, REMOVAL, Center Exhaust Pipe.>

- 19) Remove rear exhaust pipe and muffler.

CAUTION:
When removing exhaust pipes, be careful each exhaust pipe does not drop out.

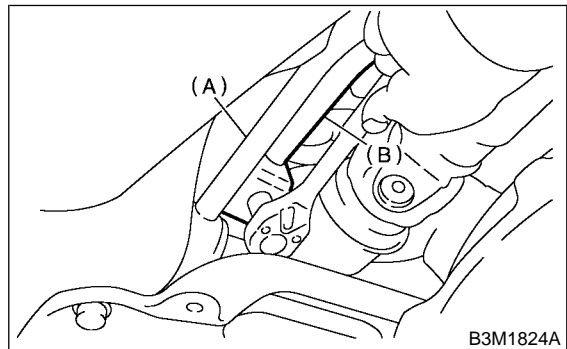
- 20) Remove heat shield cover. (If equipped)
21) Remove hanger bracket from right side of transmission.



- 22) Remove propeller shaft. <Ref. to DS-14, REMOVAL, Propeller Shaft.>

- 23) Remove gear shift rod and stay from transmission.

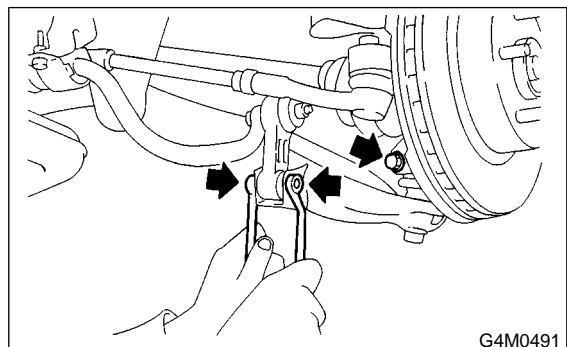
- (1) Disconnect stay from transmission.
(2) Disconnect rod from transmission.



- (A) Stay
(B) Rod

- 24) Disconnect stabilizer link from transverse link.

- 25) Remove bolt securing ball joint of transverse link to housing.



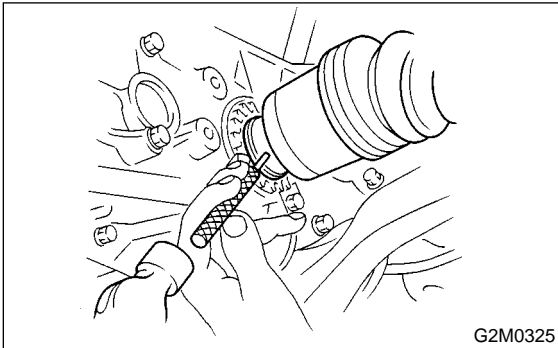
MANUAL TRANSMISSION ASSEMBLY

Manual Transmission and Differential

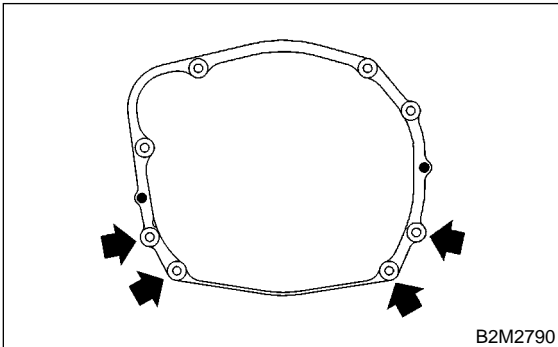
26) Remove spring pins and separate front drive shafts from each side of the transmission.

CAUTION:

Discard removing spring pin. Replace with a new one.



27) Remove nuts which hold lower side of transmission to engine.

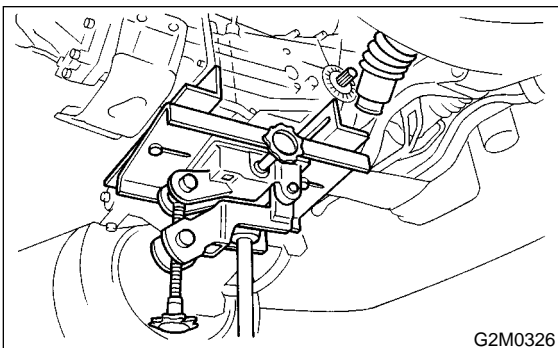


28) Disconnect oil cooler hoses to pipe. (Turbo model with oil pump)

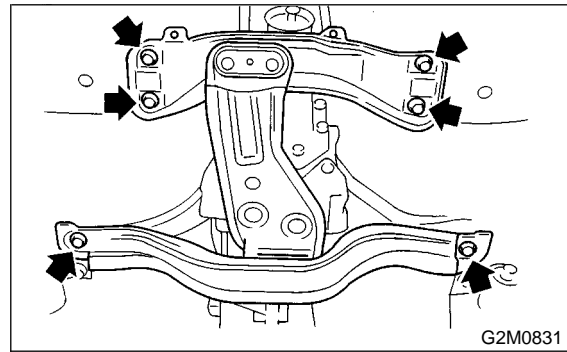
29) Place transmission jack under transmission.

CAUTION:

Always support transmission case with a transmission jack.



30) Remove transmission rear crossmember from vehicle.



31) Remove transmission.

CAUTION:

Move transmission jack toward rear until main shaft is withdrawn from clutch cover.

32) Separate transmission assembly and rear cushion rubber.

B: INSTALLATION

S503224A11

1) Install rear cushion rubber to transmission assembly.

Tightening torque:

34 N·m (3.5 kgf·m, 25.3 ft·lb)

2) Install clutch release lever and bearing onto transmission. (Turbo model) <Ref. to CL-21, INSTALLATION, Release Bearing and Lever.>

3) Install transmission onto engine.

(1) Gradually raise transmission with transmission jack.

(2) Engage them at splines.

CAUTION:

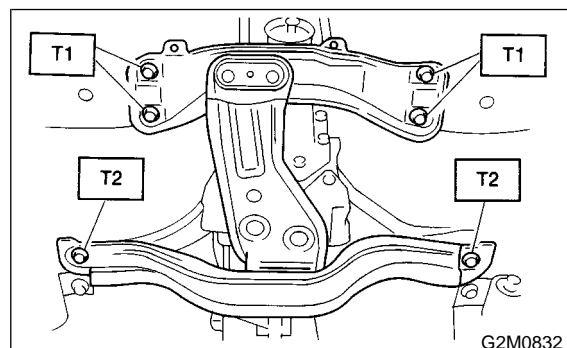
Be careful not to strike main shaft against clutch cover.

4) Install transmission rear crossmember.

Tightening torque:

T1: 70 N·m (7.1 kgf·m, 51 ft·lb)

T2: 140 N·m (14.3 kgf·m, 103 ft·lb)



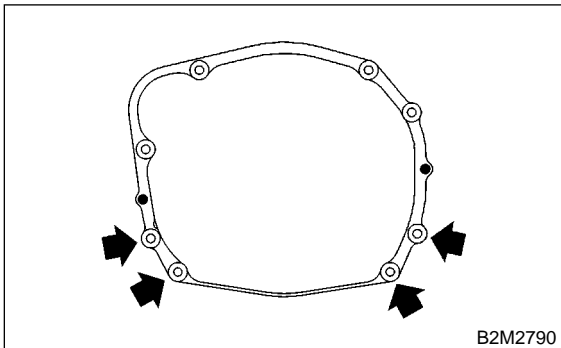
MANUAL TRANSMISSION ASSEMBLY

Manual Transmission and Differential

- 5) Take off transmission jack.
- 6) Tighten nuts which hold lower side of transmission to engine.

Tightening torque:

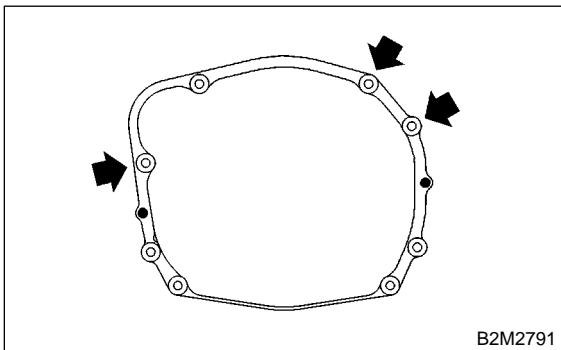
50 N·m (5.1 kgf-m, 36.9 ft-lb)



- 7) Connect engine and transmission.
 - (1) Install starter.
<Ref. to SC-6, INSTALLATION, Starter.>
 - (2) Tighten bolt which holds right upper side of transmission to engine.

Tightening torque:

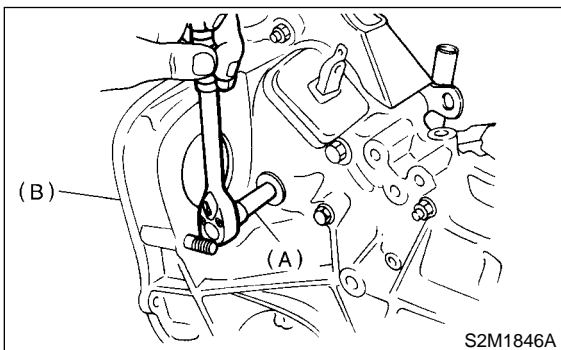
50 N·m (5.1 kgf-m, 36.9 ft-lb)



- 8) Install plug.

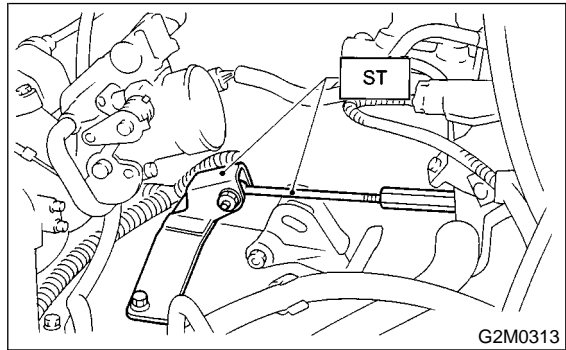
Tightening torque:

44 N·m (4.5 kgf-m, 32.5 ft-lb)

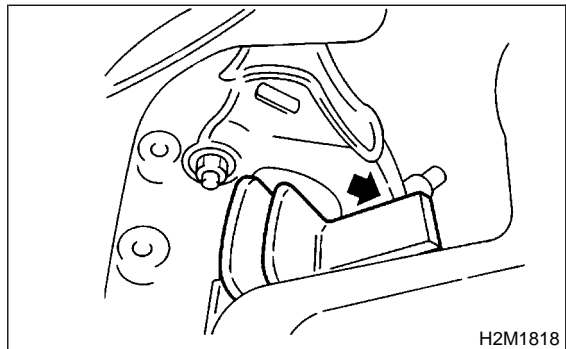


- (A) Plug
- (B) Transmission ASSY

- 9) Remove ST.



- 10) Push clutch release lever to fit bearing into clutch cover.

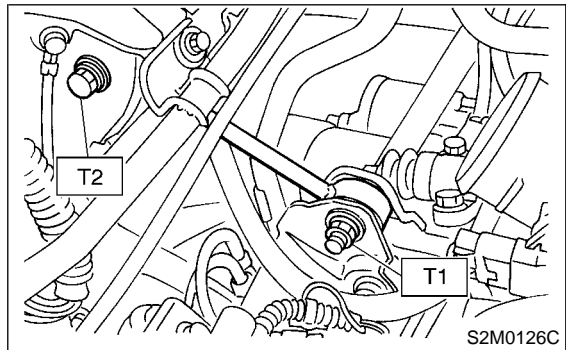


- 11) Install pitching stopper.

Tightening torque:

T1: 50 N·m (5.1 kgf-m, 37 ft-lb)

T2: 58 N·m (5.9 kgf-m, 43 ft-lb)



- 12) Lift-up the vehicle.
- 13) Connect oil cooler hoses to pipe. (Turbo model with oil pump)
- 14) Install front drive shaft into transmission.

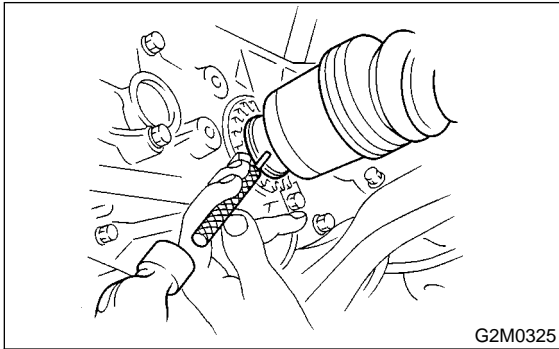
MANUAL TRANSMISSION ASSEMBLY

Manual Transmission and Differential

15) Drive spring pin into chamfered hole of drive shaft.

CAUTION:

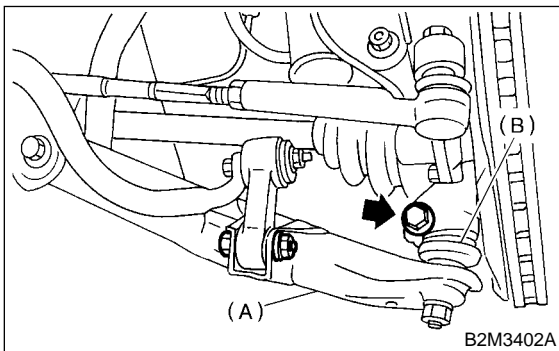
Always use a new spring pin.



16) Install ball joints of lower arm into knuckle arm of housing, and tighten installing bolts.

Tightening torque:

49 N·m (5.0 kgf·m, 36 ft·lb)

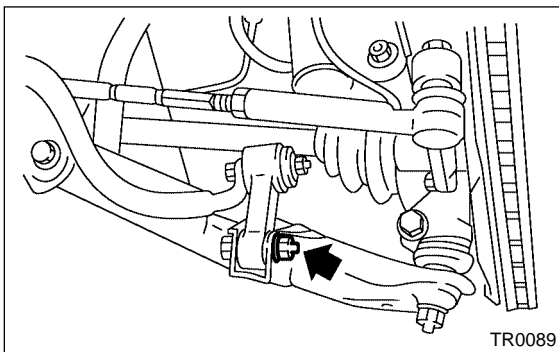


- (A) Transverse link
- (B) Ball joint

17) Install stabilizer link from transverse link.

Tightening torque:

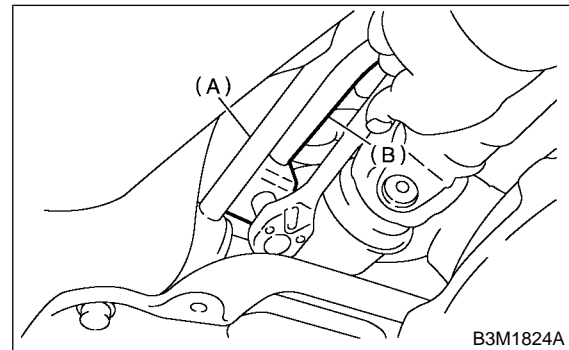
30 N·m (3.1 kgf·m, 22.1 ft·lb)



18) Connect rod to the joint.

Tightening torque:

18 N·m (1.8 kgf·m, 13.0 ft·lb)

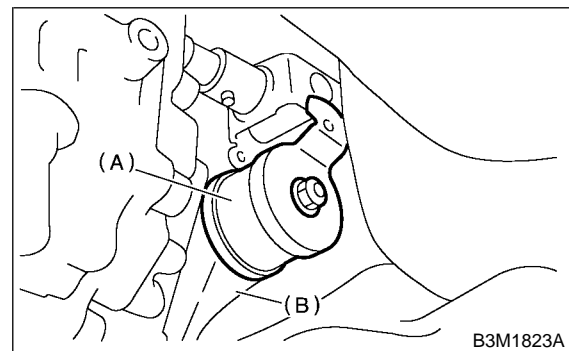


- (A) Joint
- (B) Rod

19) Connect stay to transmission bracket.

Tightening torque:

18 N·m (1.8 kgf·m, 13.0 ft·lb)

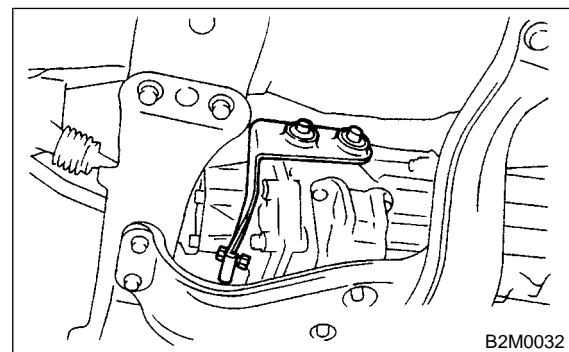


- (A) Stay
- (B) Transmission bracket

20) Install propeller shaft. <Ref. to DS-15, INSTALLATION, Propeller Shaft.>

21) Install heat shield cover. (if equipped)

22) Install hanger bracket on right side of transmission.



MANUAL TRANSMISSION ASSEMBLY

Manual Transmission and Differential

23) Install rear exhaust pipe and muffler.

Non-turbo model with OBD:

<Ref. to EX(SOHC)-11, INSTALLATION, Muffler.>
& <Ref. to EX(SOHC)-9, INSTALLATION, Rear Exhaust Pipe.>

Non-turbo model without OBD:

<Ref. to EX(SOHCw/oOBD)-12, INSTALLATION, Muffler.> & <Ref. to EX(SOHCw/oOBD)-10, INSTALLATION, Rear Exhaust Pipe.>

Turbo model:

<Ref. to EX(DOHC TURBO)-15, INSTALLATION, Muffler.> & <Ref. to EX(DOHC TURBO)-14, INSTALLATION, Rear Exhaust Pipe.>

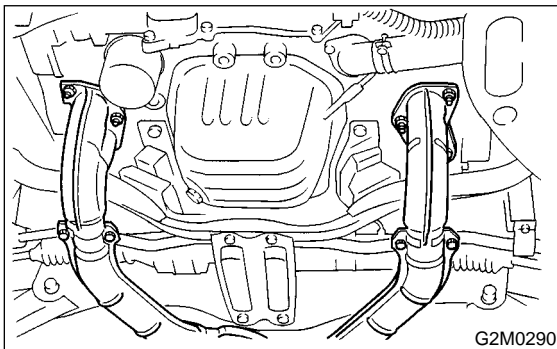
24) Install front exhaust pipe and center exhaust pipe. (Non-turbo model)

Without OBD:

<Ref. to EX(SOHCw/oOBD)-7, INSTALLATION, Front Exhaust Pipe.>

With OBD:

<Ref. to EX(SOHC)-6, INSTALLATION, Front Exhaust Pipe.>



25) Install center exhaust pipe. (Turbo model)
<Ref. to EX(DOHC TURBO)-10, INSTALLATION, Center Exhaust Pipe.>

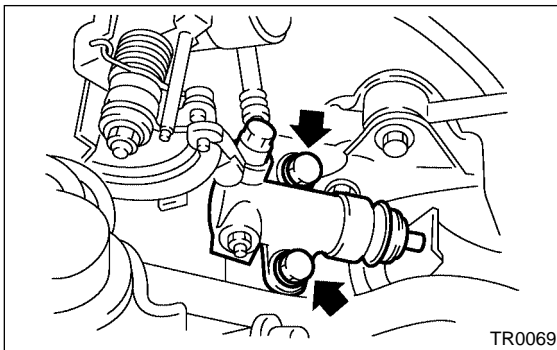
26) Install under cover.

27) Install operating cylinder.

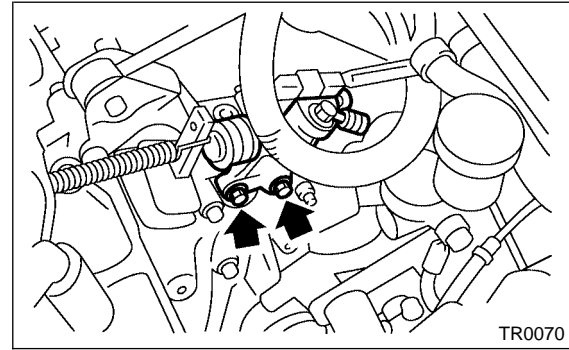
Tightening torque:

37 N·m (3.8 kgf-m, 27.5 ft-lb)

Non-turbo model



Turbo model



28) Connect the following connectors.

(1) Transmission ground terminal

Tightening torque:

13 N·m (1.3 kgf-m, 9.4 ft-lb)

(2) Vehicle speed sensor connector

(3) Neutral position switch connector

(4) Back-up light switch connector

(5) High-low switch connector (Non-turbo model)

29) Install air cleaner case stay.

Tightening torque:

16 N·m (1.6 kgf-m, 11.6 ft-lb)

30) Install air cleaner case and intake duct. (Non-turbo model) <Ref. to IN(SOHC)-7, INSTALLATION, Air Cleaner Case.>, <Ref. to IN(SOHC)-8, INSTALLATION, Air Intake Duct.>

31) Install intercooler. (Turbo model) <Ref. to IN(DOHC TURBO)-10, INSTALLATION, Intercooler.>

32) Connect battery ground terminal.

33) Pour gear oil and check the oil level. <Ref. to MT-31, Transmission Gear Oil.>

34) Take off vehicle from lift arms.

4. Transmission Mounting System

S503233

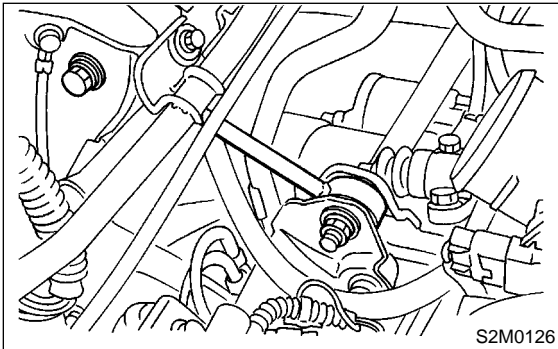
A: REMOVAL

S503233A18

1. PITCHING STOPPER

S503233A1801

- 1) Disconnect battery ground terminal.
- 2) Remove the cleaner case. (Non-turbo model) <Ref. to IN(SOHC)-7, REMOVAL, Air Cleaner Case.>
- 3) Remove intercooler. (Turbo model) <Ref. to IN(DOHC TURBO)-10, REMOVAL, Intercooler.>
- 4) Remove the pitching stopper.



2. CROSSMEMBER AND CUSHION RUBBER

S503233A1802

- 1) Disconnect battery ground terminal.
- 2) Jack-up vehicle and support it with sturdy racks.

3) Remove the front, center, rear exhaust pipes and muffler. (Non-turbo model)

With OBD:

<Ref. to EX(SOHC)-5, REMOVAL, Front Exhaust Pipe.>, <Ref. to EX(SOHC)-9, REMOVAL, Rear Exhaust Pipe.> and <Ref. to EX(SOHC)-11, REMOVAL, Muffler.>

Without OBD:

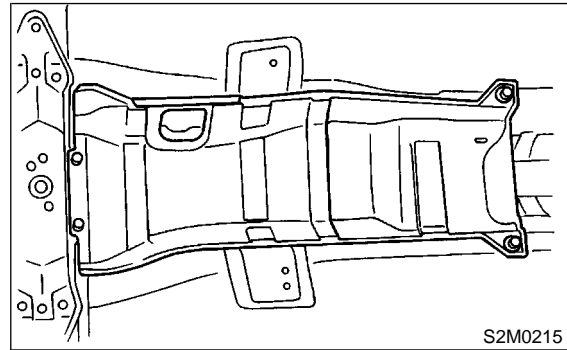
<Ref. to EX(SOHCw/oOBD)-6, REMOVAL, Front Exhaust Pipe.>, <Ref. to EX(SOHCw/oOBD)-10, REMOVAL, Rear Exhaust Pipe.> and <Ref. to EX(SOHCw/oOBD)-12, REMOVAL, Muffler.>

CAUTION:

When removing exhaust pipes, be careful each exhaust pipe does not drop out.

- 4) Remove center, rear exhaust pipes and muffler. <Ref. to EX(DOHC TURBO)-9, REMOVAL, Center Exhaust Pipe.>, <Ref. to EX(DOHC TURBO)-14, REMOVAL, Rear Exhaust Pipe.> and <Ref. to EX(DOHC TURBO)-15, REMOVAL, Muffler.>

- 5) Remove the heat shield cover. (If equipped)

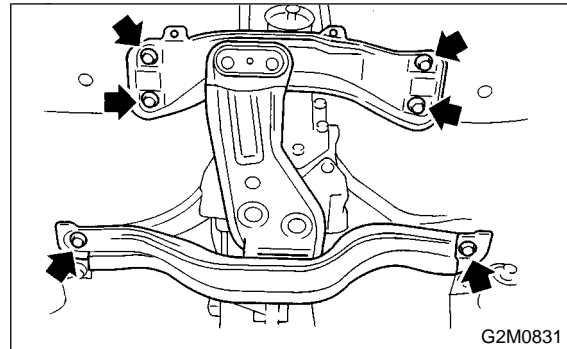


- 6) Set the transmission jack under the transmission body.

CAUTION:

Always support transmission case with a transmission jack.

- 7) Remove the rear crossmember.



- 8) Remove the rear cushion rubber.

B: INSTALLATION

S503233A11

1. PITCHING STOPPER

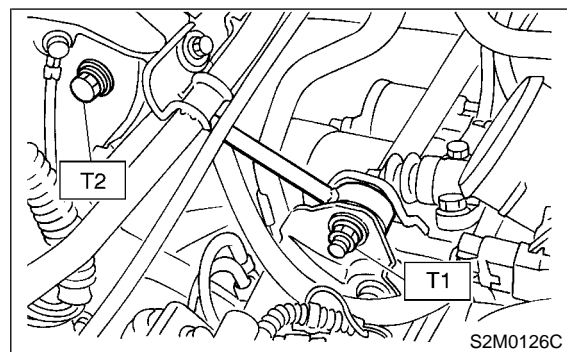
S503233A1101

- 1) Install the pitching stopper.

Tightening torque:

T1: 50 N·m (5.1 kgf-m, 37 ft-lb)

T2: 58 N·m (5.9 kgf-m, 43 ft-lb)



- 2) Install the cleaner case. (Non-turbo model) <Ref. to IN(SOHC)-7, INSTALLATION, Air Cleaner Case.>

TRANSMISSION MOUNTING SYSTEM

Manual Transmission and Differential

- 3) Install intercooler. <Ref. to IN(DOHC TURBO)-10, INSTALLATION, Intercooler.>
- 4) Connect battery ground terminal.

2. CROSSMEMBER AND CUSHION RUBBER S503233A1102

- 1) Install the rear cushion rubber.

Tightening torque:

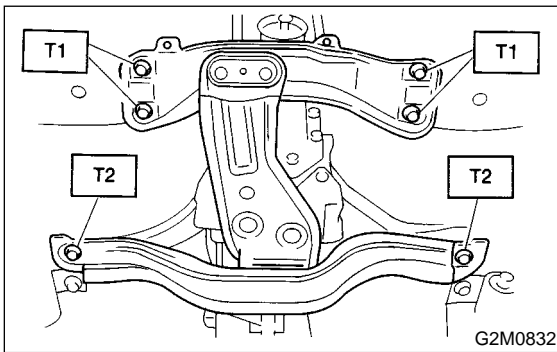
35 N·m (3.6 kgf-m, 26 ft-lb)

- 2) Install the crossmember.

Tightening torque:

T1: 70 N·m (7.1 kgf-m, 51 ft-lb)

T2: 140 N·m (14.3 kgf-m, 103 ft-lb)



- 3) Remove the transmission jack.
- 4) Install the heat shield cover. (If equipped)
- 5) Install the front, center, rear exhaust pipes and the muffler. (Non-turbo model)

With OBD:

<Ref. to EX(SOHC)-6, INSTALLATION, Front Exhaust Pipe.>, <Ref. to EX(SOHC)-9, INSTALLATION, Rear Exhaust Pipe.> and <Ref. to EX(SOHC)-11, INSTALLATION, Muffler.>

Without OBD:

<Ref. to EX(SOHCw/oOBD)-7, INSTALLATION, Front Exhaust Pipe.>, <Ref. to EX(SOHCw/oOBD)-10, INSTALLATION, Rear Exhaust Pipe.> and <Ref. to EX(SOHCw/oOBD)-12, INSTALLATION, Muffler.>

- 6) Install center, rear exhaust pipes and muffler. (Turbo model) <Ref. to EX(DOHC TURBO)-10, INSTALLATION, Center Exhaust Pipe.>, <Ref. to EX(DOHC TURBO)-14, INSTALLATION, Rear Exhaust Pipe.> and <Ref. to EX(DOHC TURBO)-15, INSTALLATION, Muffler.>

C: INSPECTION S503233A10

Repair or replace parts if the results of the inspection below are not satisfactory.

1. PITCHING STOPPER S503233A1001

Make sure that the pitching stopper is not bent or damaged. Make sure that the rubber is not stiff, cracked, or otherwise damaged.

2. CROSSMEMBER AND CUSHION RUBBER S503233A1002

Make sure that the crossmember is not bent or damaged. Make sure that the cushion rubber is not stiff, cracked, or otherwise damaged.

5. Oil Seal S503143

A: REPLACEMENT S503143A20

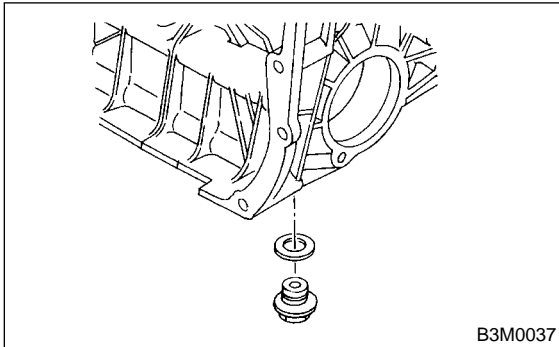
- 1) Clean transmission exterior.
- 2) Drain gear oil completely.

NOTE:

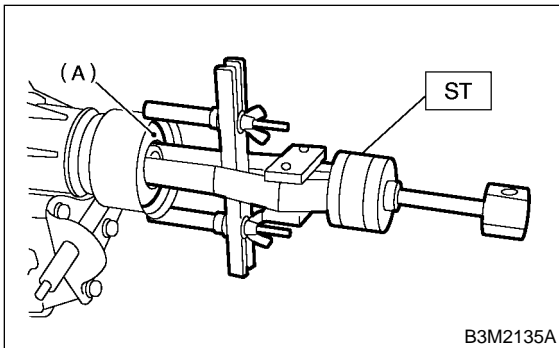
Tighten drain plug after draining gear oil.

Tightening torque:

44 N·m (4.5 kgf-m, 32.5 ft-lb)

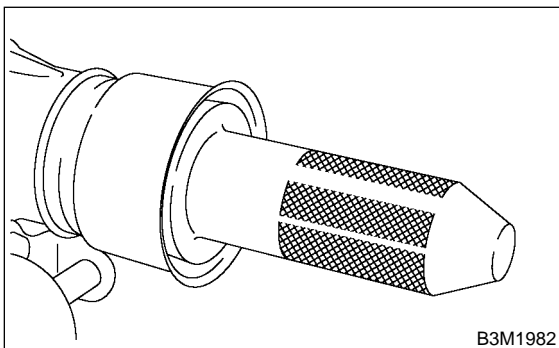


- 3) Remove rear exhaust pipe and muffler.
- 4) Remove heat shield cover. (If equipped)
- 5) Remove propeller shaft. <Ref. to DS-14, REMOVAL, Propeller Shaft.>
- 6) Using ST, remove the oil seal.
ST 398527700 PULLER ASSY



(A) Oil seal

- 7) Using ST, install the oil seal.
ST 498057300 INSTALLER



- 8) Install the propeller shaft. <Ref. to DS-15, INSTALLATION, Propeller Shaft.>

- 9) Install the heat shield cover.
- 10) Install the rear exhaust pipe and muffler.
- 11) Pour gear oil and check the oil level. <Ref. to MT-31, Transmission Gear Oil.>

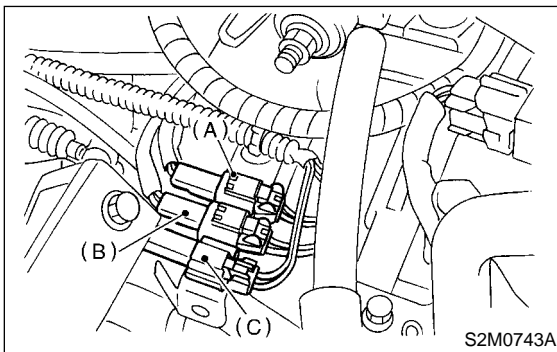
6. Switches and Harness S503232

A: REMOVAL S503232A18

1. BACK-UP LIGHT AND NEUTRAL POSITION SWITCH S503232A1801

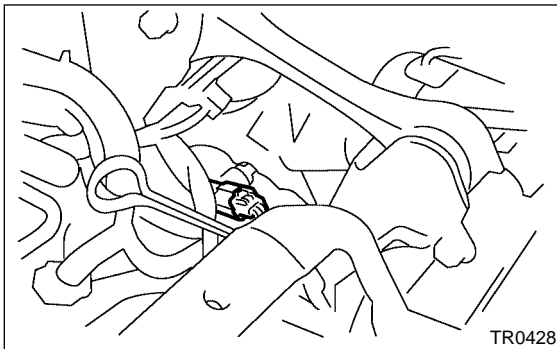
- 1) Disconnect connector battery ground terminal.
- 2) Remove air intake duct and cleaner case. (Non-Turbo model) <Ref. to IN(SOHC)-7, REMOVAL, Air Cleaner Case.> and <Ref. to IN(SOHC)-8, REMOVAL, Air Intake Duct.>
- 3) Remove intercooler. (Turbo model) <Ref. to IN(DOHC TURBO)-10, REMOVAL, Intercooler.>
- 4) Disconnect connector back-up light switch and neutral position switch.

Non-turbo model

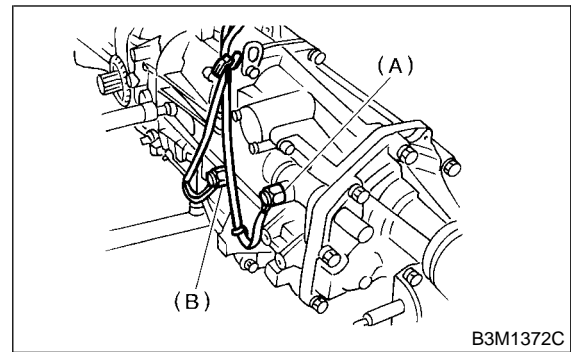


- (A) Neutral switch (Brown)
- (B) Back-up light switch (Gray)
- (C) High-low switch (Black)

Turbo model



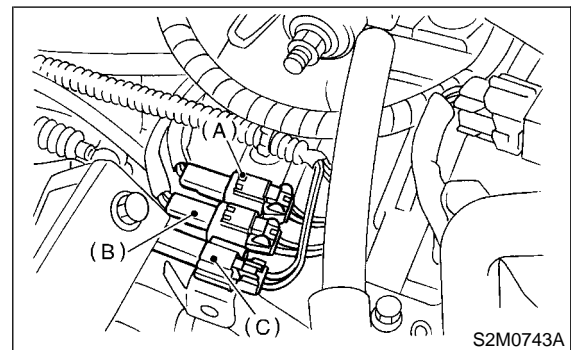
- 5) Lift-up the vehicle.
- 6) Remove back-up light switch and neutral position switch with harness.



- (A) Neutral switch (Brown connector)
- (B) Back-up light switch (Gray connector)

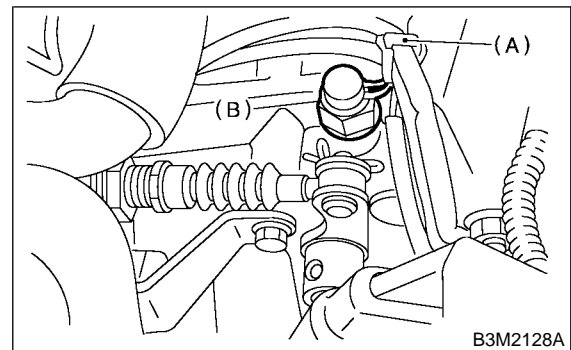
2. HIGH-LOW SWITCH S503232A1802

- 1) Disconnect connector battery ground terminal.
- 2) Remove air intake duct and cleaner case. <Ref. to IN (SOHC)-7, REMOVAL, Air Cleaner Case.> and <Ref. to IN (SOHC)-8, REMOVAL, Air Intake Duct.>
- 3) Disconnect connector high-low switch.



- (A) Neutral switch (Brown)
- (B) Back-up light switch (Gray)
- (C) High-low switch (Black)

- 4) Remove HI-LO switch cable from clamp.
- 5) Remove HI-LO switch.



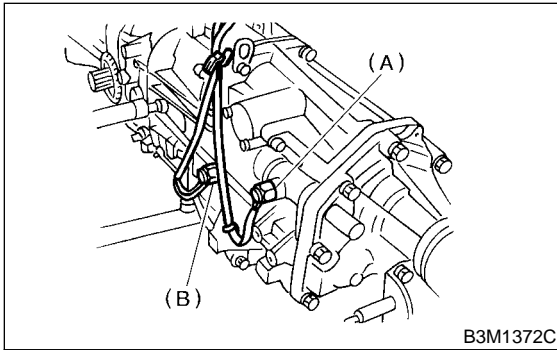
- (A) Clamp
- (B) High-low switch

B: INSTALLATION S503232A11

1. BACK-UP LIGHT SWITCH AND NEUTRAL POSITION SWITCH S503232A1101

- 1) Install back-up light switch and neutral position switch with harness.

Tightening torque:
24.5 N·m (2.5 kgf·m, 18.1 ft·lb)



- (A) Neutral switch
- (B) Back-up light switch

- 2) Connect connector of back-up light switch and neutral position switch.
- 3) Install air intake duct and cleaner case. (Non-turbo model) <Ref. to IN(SOHC)-7, INSTALLATION, Air Cleaner Case.> and <Ref. to IN(SOHC)-8, INSTALLATION, Air Intake Duct.>
- 4) Install intercooler (Turbo model) <Ref. to IN(DOHC TURBO)-10, INSTALLATION, Intercooler.>
- 5) Connect battery ground terminal.

2. HIGH-LOW SWITCH S503232A1102

- 1) Install high-low switch.

Tightening torque:
24.5 N·m (2.5 kgf·m, 18.1 ft·lb)

- 2) Install HI-LO switch cable to the clamp.
- 3) Connect connector high-low switch.
- 4) Install air intake duct and cleaner case. (Non-turbo model) <Ref. to IN(SOHC)-7, INSTALLATION, Air Cleaner Case.> and <Ref. to IN(SOHC)-8, INSTALLATION, Air Intake Duct.>
- 5) Connect battery ground terminal.

C: INSPECTION S503232A10

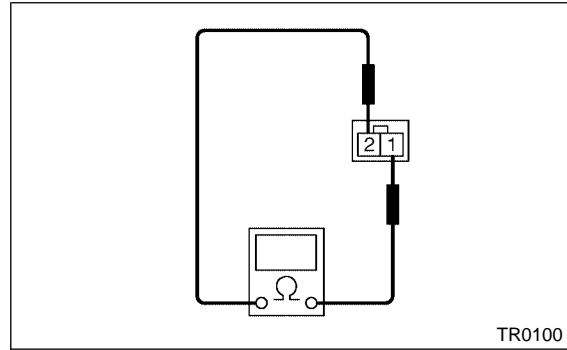
1. BACK-UP LIGHT SWITCH S503232A1001

Inspect the back-up light switch. <Ref. to LI-29 INSPECTION, Back-up Light System.>

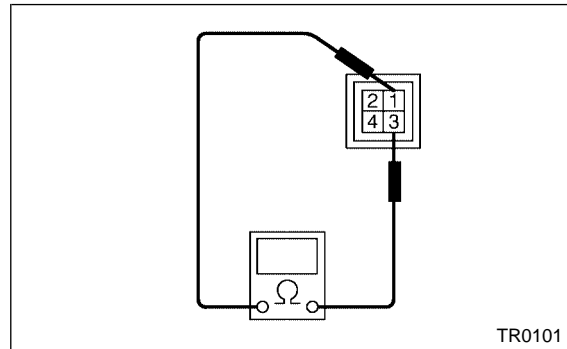
2. NEUTRAL POSITION SWITCH S503232A1002

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector neutral position switch.
- 3) Using the circuit tester, verify the current in neutral position. Also verify that there is no current in positions other than neutral.

Non-turbo model



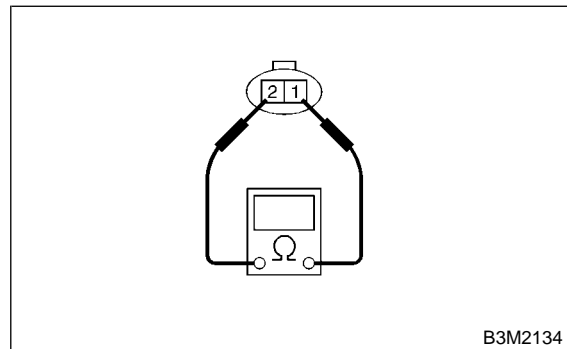
Turbo model



- 4) Replace defective parts.

3. HIGH-LOW SWITCH S503232A1003

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector high-low switch.
- 3) Set drive select lever in LO position, and make sure continuity exists using circuit tester.



- 4) Replace defective parts.

VEHICLE SPEED SENSOR

Manual Transmission and Differential

7. Vehicle Speed Sensor S503231

A: REMOVAL S503231A18

- 1) Disconnect ground terminal from battery.
- 2) Lift-up the vehicle.
- 3) Remove front and center exhaust pipes. (Non-turbo model)

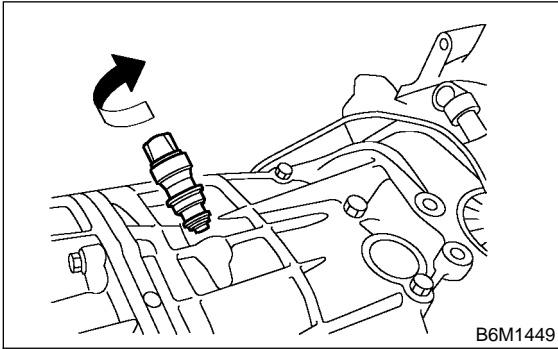
With OBD:

<Ref. to EX(SOHC)-5, REMOVAL, Front Exhaust Pipe.>

Without OBD:

<Ref. to EX(SOHCw/oOBD)-6, REMOVAL, Front Exhaust Pipe.>

- 4) Remove center exhaust pipe. (Turbo model)
<Ref. to EX(DOHC TURBO)-9, REMOVAL, Center Exhaust Pipe.>
- 5) Disconnect connector from vehicle speed sensor.
- 6) Turn and remove vehicle speed sensor.



B: INSTALLATION S503231A11

NOTE:

- Discard vehicle speed sensor and after removal, replace with a new one.
- Ensure sensor mounting hole is clean and free of foreign matter.
- Align tip end of key with key groove on end of speedometer shaft during installation.

- 1) Hand tighten vehicle speed sensor.
- 2) Tighten vehicle speed sensor using suitable tool.

Tightening torque:

5.9 N·m (0.6 kgf-m, 4.3 ft-lb)

- 3) Connect connector to vehicle speed sensor.
- 4) Install front and center exhaust pipes. (Non-turbo model)

With OBD:

<Ref. to EX(SOHC)-6, INSTALLATION, Front Exhaust Pipe.>

Without OBD:

<Ref. to EX(SOHCw/oOBD)-7, INSTALLATION, Front Exhaust Pipe.>

- 5) Install center exhaust pipe. (Turbo model)
<Ref. to EX(DOHC TURBO)-10, INSTALLATION, Center Exhaust Pipe.>
- 6) Lower the vehicle.
- 7) Connect battery ground terminal.

C: INSPECTION S503231A10

Inspect the vehicle speed sensor.

Non-turbo model with OBD:

<Ref. to EN(SOHC)-208, DTC P0500-VEHICLE SPEED SENSOR MALFUNCTION-, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

Non-turbo model without OBD:

<Ref. to EN(SOHCw/oOBD)-94, DTC 33 VEHICLE SPEED SIGNAL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

Turbo model:

<Ref. to EN(DOHC TURBO)-230, DTC P0500-VEHICLE SPEED SENSOR MALFUNCTION-, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

8. Preparation for Overhaul S503091

A: PROCEDURE S503091E45

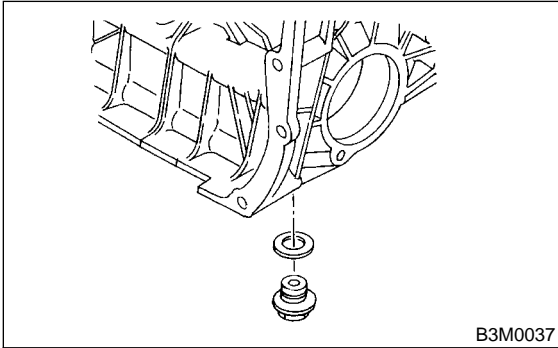
- 1) Clean oil, grease, dirt and dust from transmission.
- 2) Remove drain plug to drain oil. After draining, retighten it as before.

NOTE:

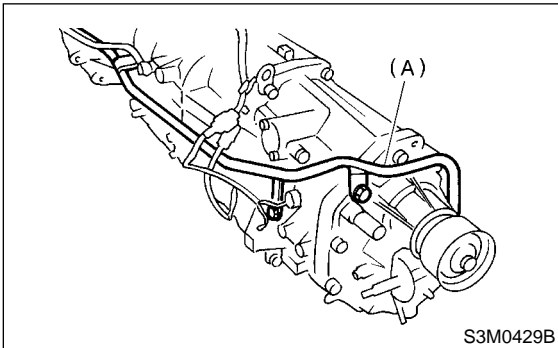
Replace gasket with a new one.

Tightening torque:

44 N·m (4.5 kgf·m, 32.5 ft·lb)



- 3) Remove outlet pipe. (With oil pump)



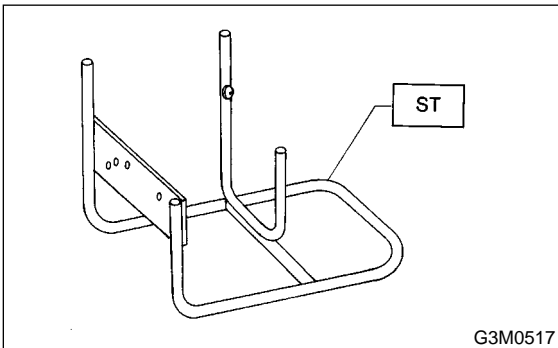
(A) Outlet pipe

- 4) Tighten union screw. (With oil pump)

Tightening torque:

25 N·m (2.5 kgf·m, 18.1 ft·lb)

- 5) Attach transmission to ST.
ST 499937100 TRANSMISSION STAND SET



- 6) Rotating parts should be coated with oil prior to assembly.
- 7) All disassembled parts, if to be reused, should be reinstalled in the original positions and directions.
- 8) Gaskets, lock washers and lock nut must be replaced with new ones.
- 9) Liquid gasket should be used where specified to prevent leakage.

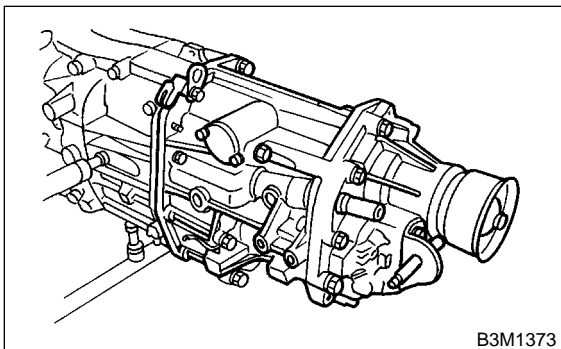
TRANSFER CASE AND EXTENSION CASE ASSEMBLY

Manual Transmission and Differential

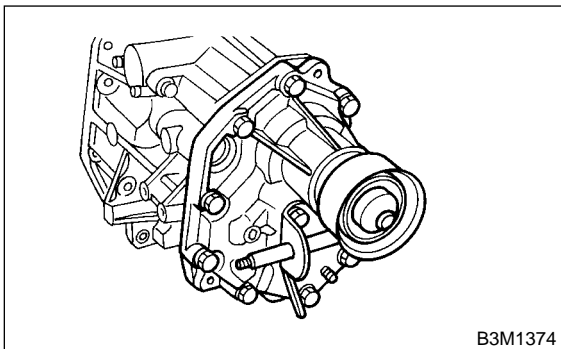
9. Transfer Case and Extension Case Assembly S503561

A: REMOVAL S503561A18

- 1) Remove the manual transmission assembly from vehicle. <Ref. to MT-32 REMOVAL, Manual Transmission Assembly.>
- 2) Remove back-up light switch and neutral position switch. <Ref. to MT-42 REMOVAL, Switches and Harness.>
- 3) Remove transfer case with extension case assembly.

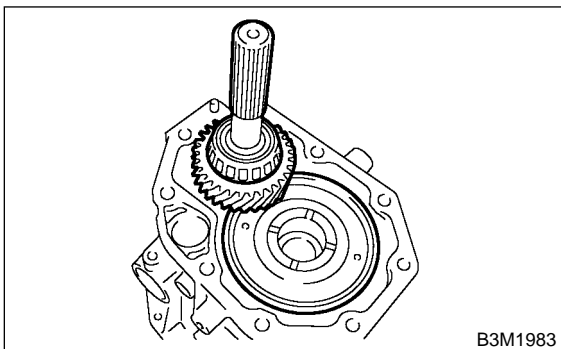


- 4) Remove shifter arm.
- 5) Remove extension case assembly.

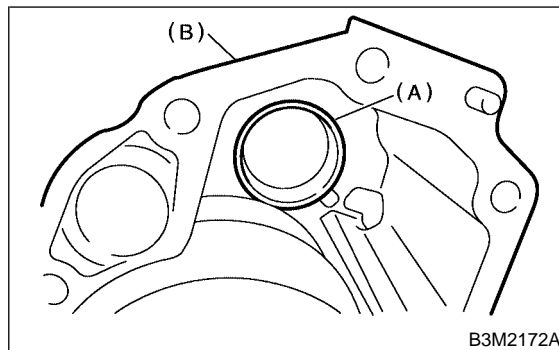


B: INSTALLATION S503561A11

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

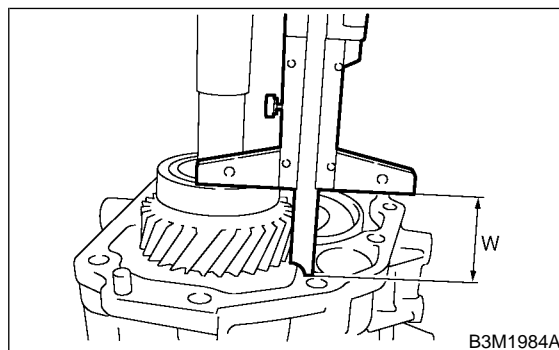


- 2) Remove bearing cone from the extension case assembly, and install to taper roller bearing of the transfer driven gear.



- (A) Bearing cone (Extension case)
(B) Extension case

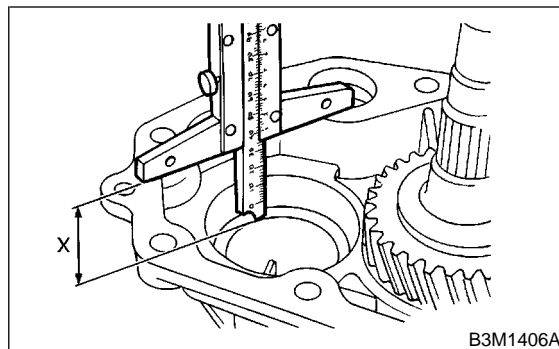
- 3) While pressing the bearing cone horizontally, turn the driven shaft ten rotations.
- 4) Measure height "W" between transfer case and taper roller bearing on the transfer driven gear.



- 5) Measure depth "X".

NOTE:

Measure with bearing cone and thrust washer removed.



- 6) Calculate space "t" using the following equation: $t = X - W + 0.2$ to 0.3 mm (0.008 to 0.012 in)
- 7) Select nearest washer in the following table:

Standard clearance between thrust washer and taper roller bearing:

0.2 — 0.3 mm T (0.008 — 0.012 in T)

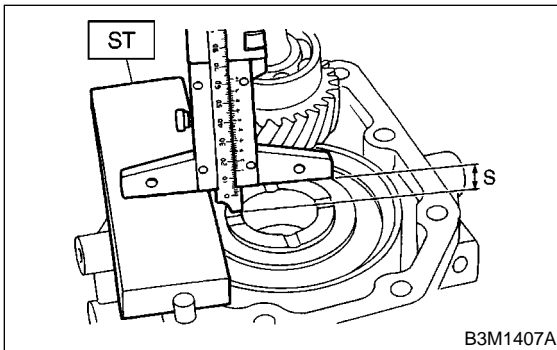
TRANSFER CASE AND EXTENSION CASE ASSEMBLY

Manual Transmission and Differential

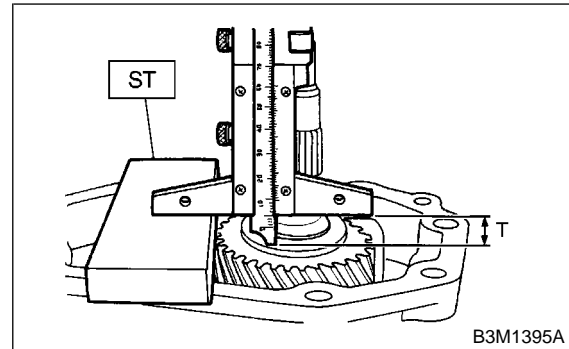
NOTE:
T: Tight

Thrust washer (50 × 61 × t)	
Part No.	Thickness mm (in)
803050060	0.50 (0.0197)
803050061	0.55 (0.0217)
803050062	0.60 (0.0236)
803050063	0.65 (0.0256)
803050064	0.70 (0.0276)
803050065	0.75 (0.0295)
803050066	0.80 (0.0315)
803050067	0.85 (0.0335)
803050068	0.90 (0.0354)
803050069	0.95 (0.0374)
803050070	1.00 (0.0394)
803050071	1.05 (0.0413)
803050072	1.10 (0.0433)
803050073	1.15 (0.0453)
803050074	1.20 (0.0472)
803050075	1.25 (0.0492)
803050076	1.30 (0.0512)
803050077	1.35 (0.0531)
803050078	1.40 (0.0551)
803050079	1.45 (0.0571)

- 8) Fit thrust washers on transfer drive shaft.
9) Measure depth "S" between transfer case and center differential.
ST 398643600 GAUGE



- 10) Measure depth "T" between extension case and transfer drive gear.
ST 398643600 GAUGE



- 11) Calculate space "U" using the following equation: $U = S - T$
12) Select suitable washer in the following table:

Standard clearance:

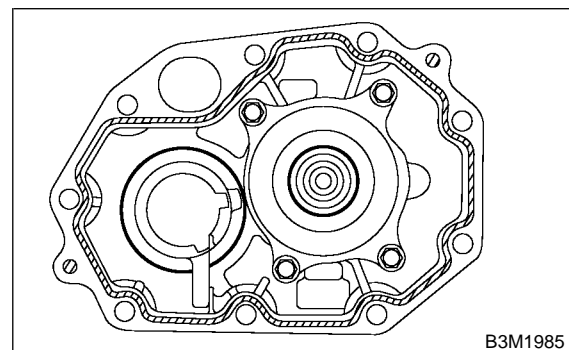
0.15 — 0.35 mm (0.0059 — 0.0138 in)

Thrust washer	
Part No.	Thickness mm (in)
803036050	0.9 (0.035)
803036054	1.0 (0.039)
803036051	1.1 (0.043)
803036055	1.2 (0.047)
803036052	1.3 (0.051)
803036056	1.4 (0.055)
803036053	1.5 (0.059)
803036057	1.6 (0.063)
803036058	1.7 (0.067)

- 13) Fit thrust washer on center differential.
14) Install bearing cone into extension case.
15) Apply proper amount of liquid gasket to the transfer case mating surface.

Liquid gasket:

THREE BOND 1215B



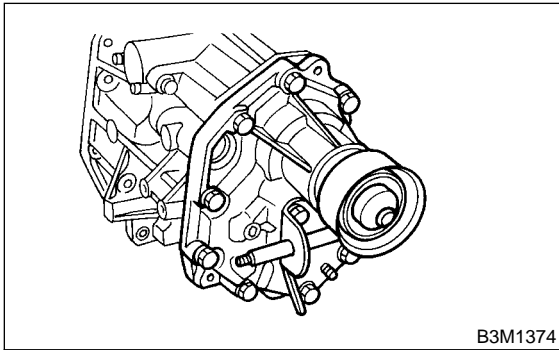
TRANSFER CASE AND EXTENSION CASE ASSEMBLY

Manual Transmission and Differential

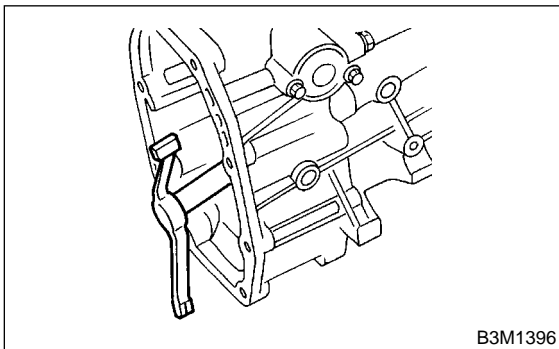
16) Install extension assembly into transfer case.

Tightening torque:

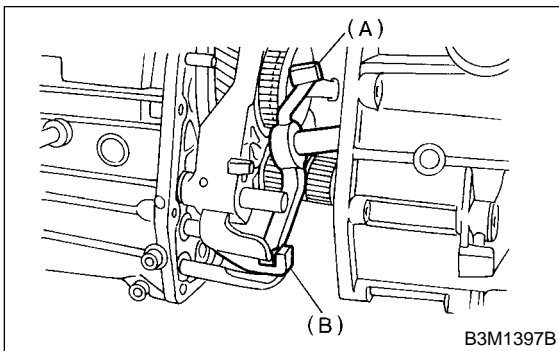
40N·m (4.1 kgf·m, 29.7 ft·lb)



17) Install shifter arm to transfer case.



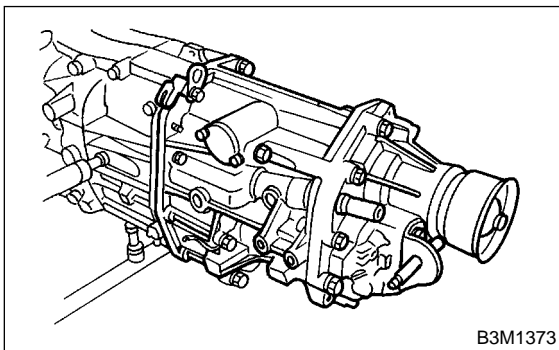
18) Hang the shifter arm on the 3rd-4th fork rod.



19) Install transfer case with extension case assembly to transmission case.

Tightening torque:

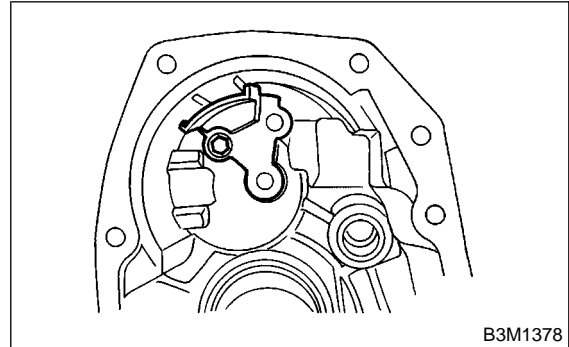
25N·m (2.5 kgf·m, 18.1 ft·lb)



C: DISASSEMBLY S503561A06

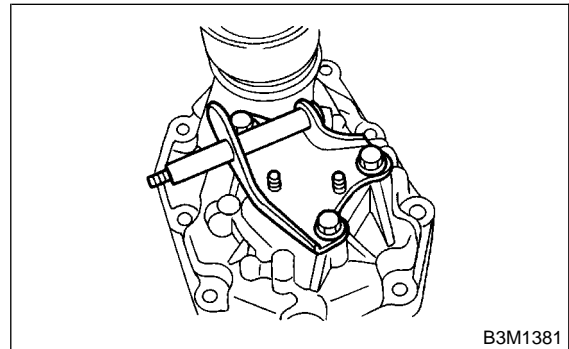
1. TRANSFER CASE S503561A0601

- 1) Remove reverse check assembly. <Ref. to MT-57 REMOVAL, Reverse Check Removal.>
- 2) Remove oil guide.



2. EXTENSION CASE S503561A0602

- 1) Remove transfer drive gear assembly. <Ref. to MT-52 REMOVAL, Transfer Drive Gear.>
- 2) Remove shift bracket.



- 3) Remove oil seal from extension case. <Ref. to MT-41 Oil Seal.>

D: ASSEMBLY S503561A02

1. EXTENSION CASE S503561A0201

- 1) Using ST, install oil seal to extension case.
<Ref. to MT-41, Oil Seal.>

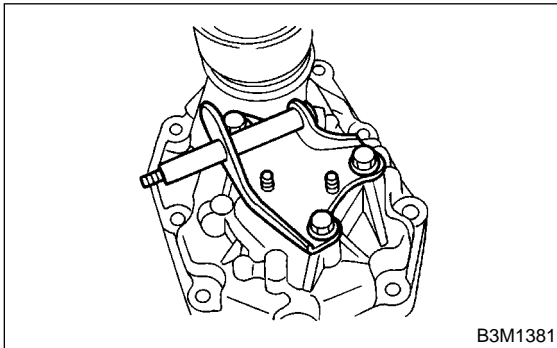
CAUTION:

Use new oil seal.

- 2) Install shift bracket to extension case.

Tightening torque:

25 N·m (2.5 kgf-m, 18.1 ft-lb)



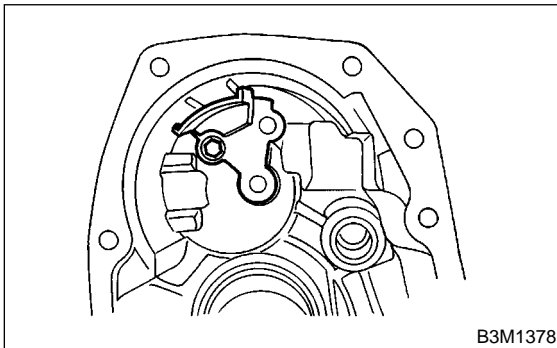
- 3) Install transfer drive gear to extension case.
<Ref. to MT52 INSTALLATION, Transfer Drive Gear.>

2. TRANSFER CASE S503561A0202

- 1) Install oil guide to transfer case.

Tightening torque:

6.4 N·m (0.65 kgf-m, 4.7 ft-lb)



- 2) Install reverse check sleeve assembly to transfer case. <Ref. to MT-57 INSTALLATION, Reverse Check Sleeve.>

OIL PUMP

10. Oil Pump S503070

A: REMOVAL S503070A18

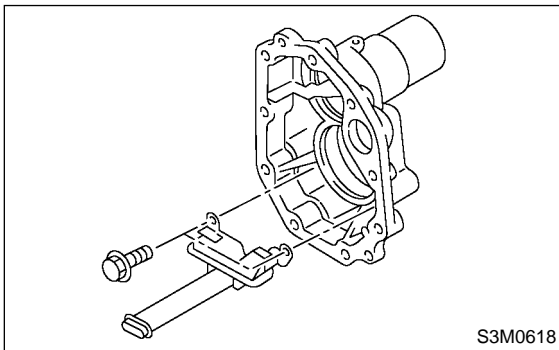
For extension case removal procedure, refer to "Transfer Case and Extension Case Assembly". <Ref. to MT-46, REMOVAL, Transfer Case and Extension Case Assembly.>

B: INSTALLATION S503070A11

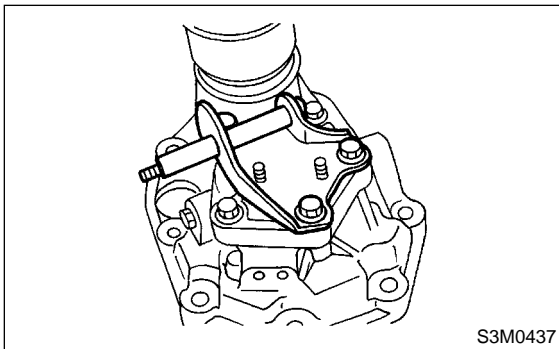
For extension case installation procedure, refer to "Transfer Case Pump and Extension Case Assembly". <Ref. to MT-46, INSTALLATION, Transfer Case and Extension Case Assembly.>

C: DISASSEMBLY S503070A06

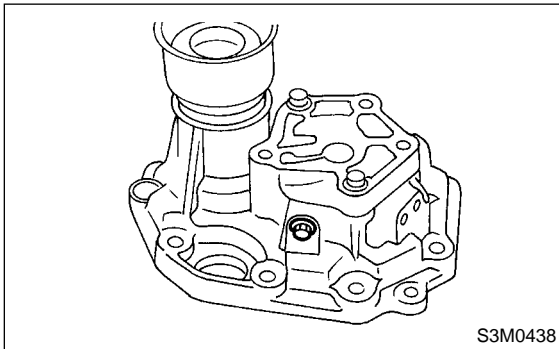
- 1) Remove transfer drive gear assembly. <Ref. to MT-52, REMOVAL, Transfer Drive Gear.>
- 2) Remove oil strainer from extension case.



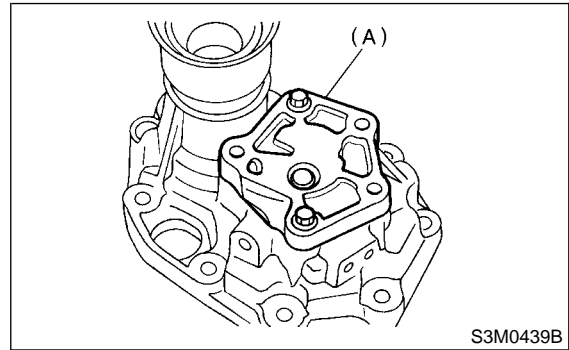
- 3) Remove shift bracket.



- 4) Remove relief valve from extension case.

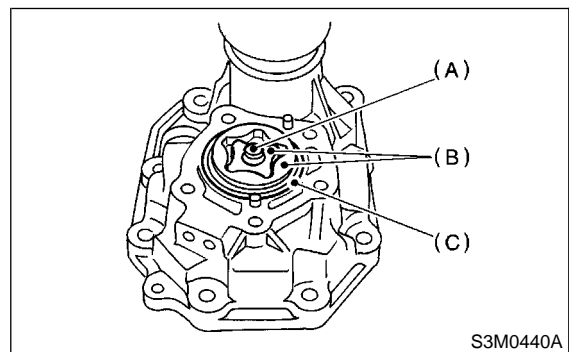


- 5) Remove oil pump cover from extension.



(A) Oil pump cover

- 6) Remove rotor assembly, oil pump shaft and O-ring.



(A) Oil pump shaft
(B) Rotor ASSY
(C) O-ring

D: ASSEMBLY S503070A02

- 1) Install rotor assembly and oil pump shaft to extension case.
- 2) Install O-ring to oil pump cover.

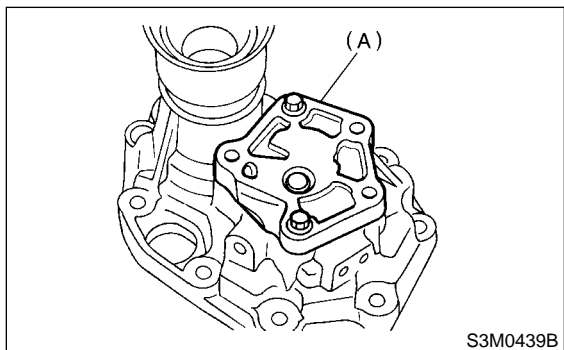
CAUTION:
Replace O-ring with a new one.

NOTE:
Apply a coat of gear oil to the O-ring.

3) Install oil pump cover to extension case.

Tightening torque:

25 N·m (2.5 kgf-m, 18.1 ft-lb)



(A) Oil pump cover

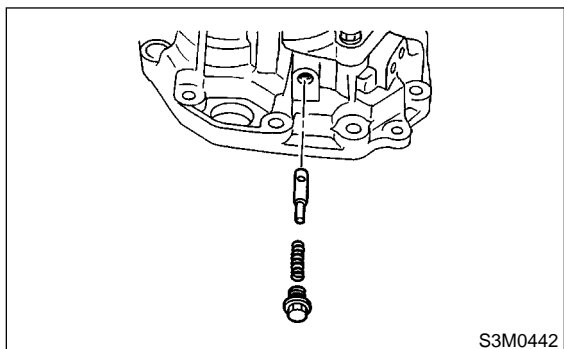
4) Install relief valve and return spring to extension case.

CAUTION:

Replace O-ring with a new one.

Tightening torque:

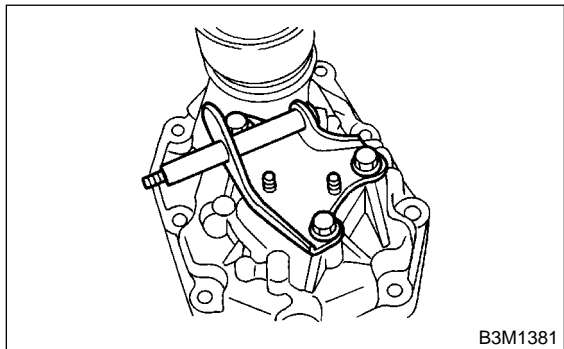
13 N·m (1.3 kgf-m, 9.4 ft-lb)



5) Install shift bracket to extension case.

Tightening torque:

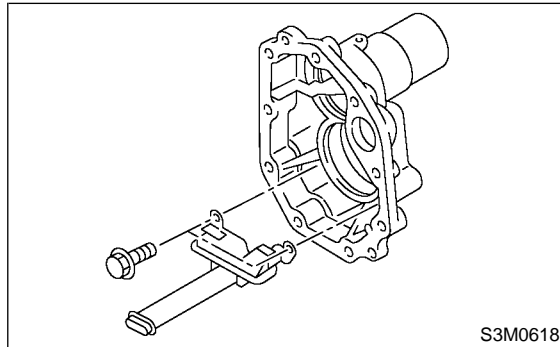
25 N·m (2.5 kgf-m, 18.1 ft-lb)



6) Install oil strainer to extension case.

Tightening torque:

6.4 N·m (0.65 kgf-m, 4.7 ft-lb)



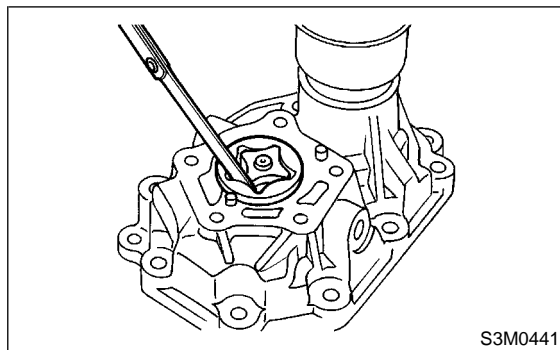
7) Install transfer drive gear. <Ref. to MT-52, INSTALLATION, Transfer Drive Gear.>

E: INSPECTION S503070A10

Use a thickness gauge to measure the chip clearance of the rotor assembly. If the value exceeds standard, replace the rotor as an assembly.

Chip clearance:

Less than 0.15 mm (0.0059 in)



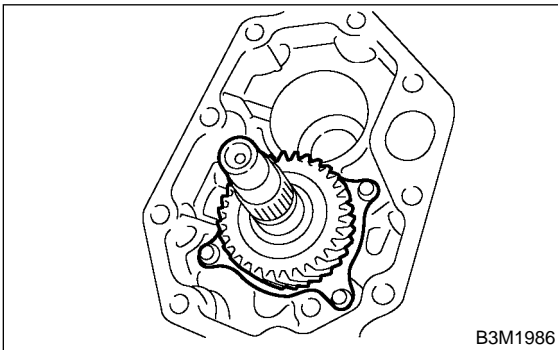
TRANSFER DRIVE GEAR

Manual Transmission and Differential

11. Transfer Drive Gear S503229

A: REMOVAL S503229A18

- 1) Remove the manual transmission assembly from vehicle. <Ref. to MT-32 REMOVAL, Manual Transmission Assembly.>
- 2) Remove back-up light switch and neutral position switch. <Ref. to MT-42 REMOVAL, Switches and Harness.>
- 3) Remove transfer case with extension case assembly. <Ref. to MT-46 REMOVAL, Transfer Case and Extension Case Assembly.>
- 4) Remove extension case assembly.
- 5) Remove transfer driven gear.
- 6) Remove transfer drive gear.

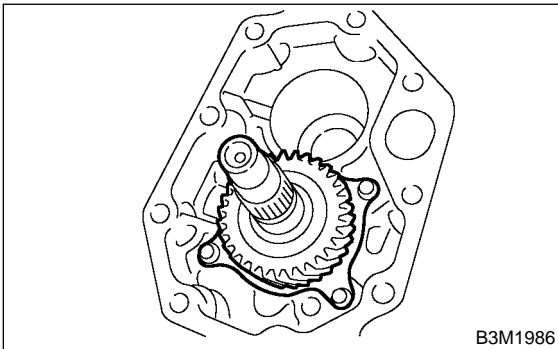


B: INSTALLATION S503229A11

- 1) Install transfer drive gear. (Without oil pump)

Tightening torque:

26 N·m (2.7 kgf·m, 20 ft·lb)



- 2) Install transfer drive gear to extension case. (With oil pump)

Tightening torque:

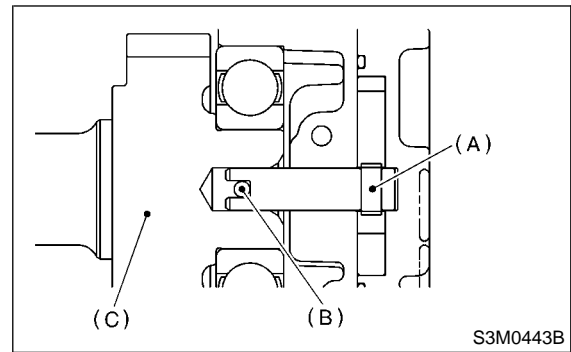
26 N·m (2.7 kgf·m, 20 ft·lb)

CAUTION:

Do not use a press machine. Always install the parts by hand.

NOTE:

Engage the transfer drive gear pin with the extension case pin.

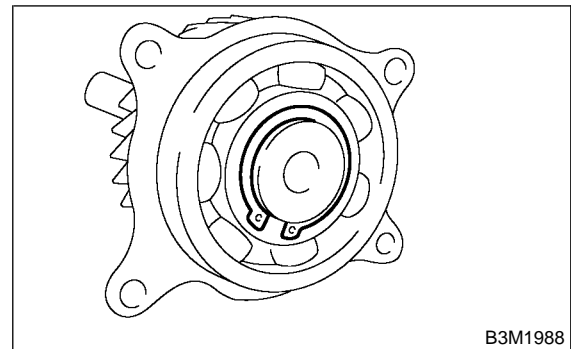


- (A) Oil pump shaft
- (B) Straight pin
- (C) Transfer drive gear

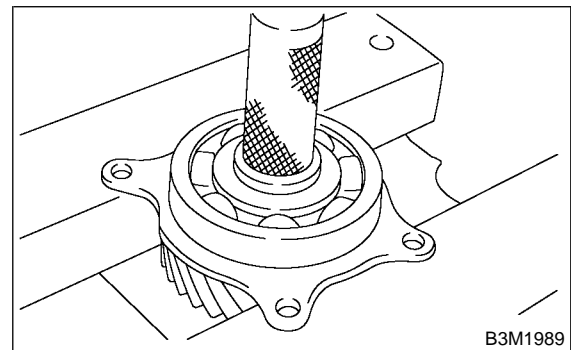
- 3) Install transfer driven gear.
- 4) Install the extension case assembly.
- 5) Install transfer case and extension case assembly. <Ref. to MT-46 INSTALLATION, Transfer Case and Extension Case Assembly.>
- 6) Install back-up light switch and neutral position switch. <Ref. to MT-43 INSTALLATION, Switches and Harness.>
- 7) Install the manual transmission assembly from vehicle. <Ref. to MT-35 INSTALLATION, Manual Transmission Assembly.>

C: DISASSEMBLY S503229A06

- 1) Remove snap ring.



- 2) Remove ball bearing.



- 3) Remove straight pin from transfer drive gear. (With oil pump)

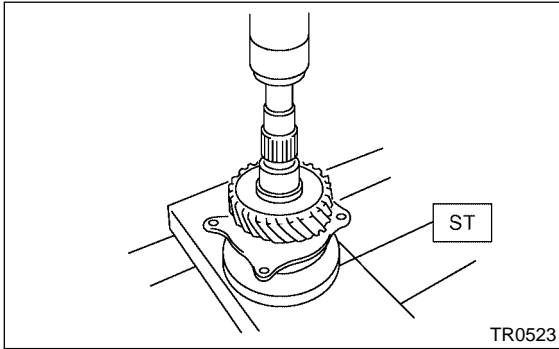
D: ASSEMBLY S503229A02

- 1) Install straight pin to transfer drive gear. (With pump)
- 2) Set the ST applying to inner race of bearing and instal to drive shaft.

ST 398177700 INSTALLER

CAUTION:

Do not apply pressure in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton)



- 3) Install snap ring on transfer drive shaft.
- 4) Inspect clearance between snap ring and inner race of ball bearing. <Ref. MT-53, INSPECTION, Transfer Drive Gear.>

E: INSPECTION S503229A10

1) Bearings

Replace bearings in the following cases:

- Broken or rusty bearings
- Worn or damaged
- Bearings that fail to turn smoothly or make abnormal noise when turned after gear oil lubrication.

2) Drive gear

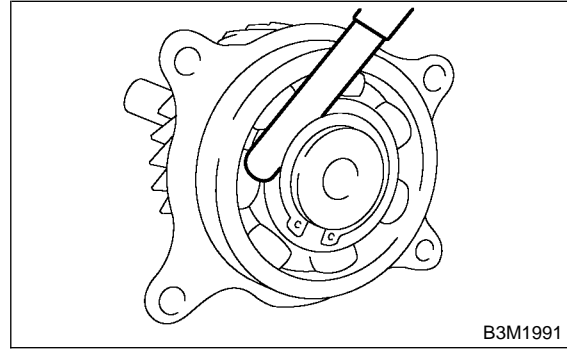
Replace drive gear in the following cases:

- If their tooth surfaces and shaft are excessively broken or damaged.

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

Clearance:

0.01 — 0.15 mm (0.0004 — 0.0059 in)



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

Snap ring	
Part No.	Thickness mm (in)
805030041	1.53 (0.0602)
805030042	1.65 (0.0650)
805030043	1.77 (0.697)

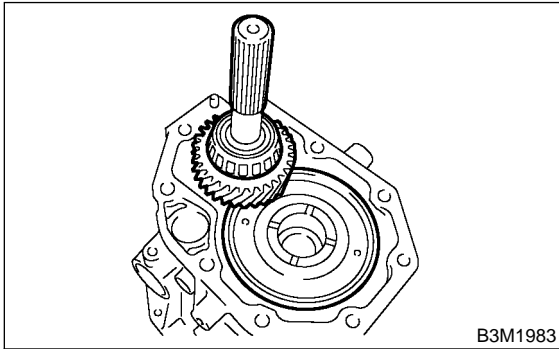
TRANSFER DRIVEN GEAR

Manual Transmission and Differential

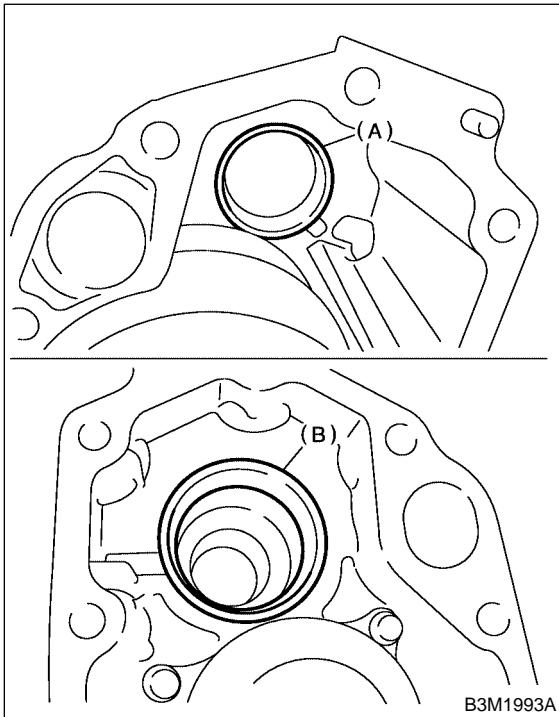
12. Transfer Driven Gear S503223

A: REMOVAL S503223A18

- 1) Remove the manual transmission assembly from vehicle. <Ref. to MT-32, REMOVAL, Manual Transmission Assembly.>
- 2) Remove back-up light switch and neutral position switch. <Ref. to MT-42, REMOVAL, Switches and Harness.>
- 3) Remove transfer case with extension case assembly. <Ref. to MT-46, REMOVAL, Transfer Case and Extension Case Assembly.>
- 4) Remove extension case assembly.
- 5) Remove transfer driven gear.



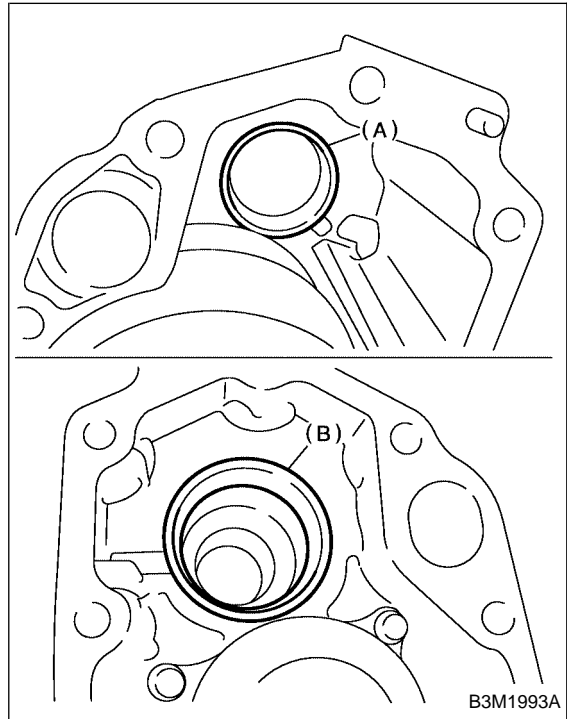
- 6) Remove bearing cup from extension case and transfer case.



- (A) Bearing cup (transfer case)
(B) Bearing cup (extension case)

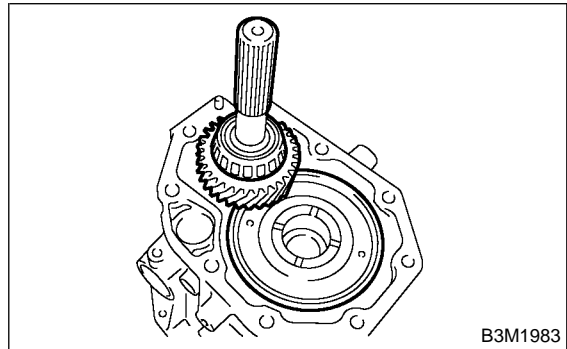
B: INSTALLATION S503223A11

- 1) Install bearing cup to extension case and transfer case.



- (A) Bearing cup (transfer case)
(B) Bearing cup (extension case)

- 2) Install transfer driven gear.

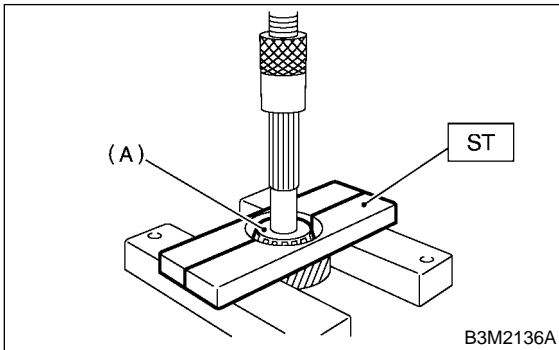


- 3) Install transfer case and extension case assembly. <Ref. to MT-46 INSTALLATION, Transfer Case and Extension Case Assembly.>
- 4) Install back-up light switch and neutral position switch. <Ref. to MT-43 INSTALLATION, Switches and Harness.>
- 5) Install the manual transmission assembly to vehicle. <Ref. to MT-35 INSTALLATION, Manual Transmission Assembly.>

C: DISASSEMBLY S503223A06

1) Using ST, remove roller bearing (extension case side).

ST 498077000 REMOVER

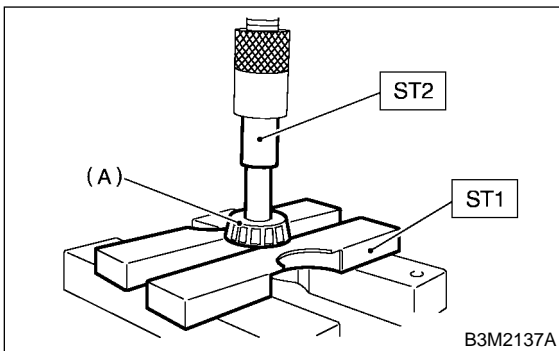


(A) Roller bearing

2) Using ST1 and ST2, remove roller bearing (transfer case side).

ST1 498077000 REMOVER

ST2 899864100 REMOVER



(A) Roller bearing

D: ASSEMBLY S503223A02

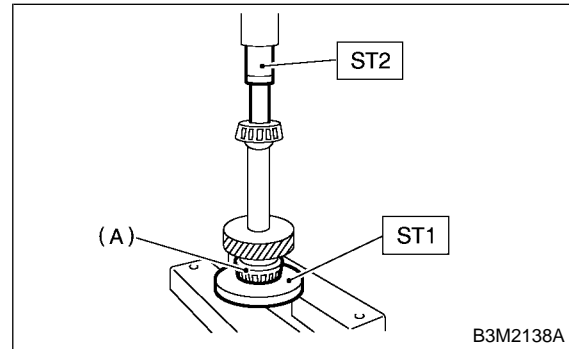
1) Using ST, install roller bearing (extension case side).

ST1 398177700 INSTALLER

ST2 899864100 REMOVER

CAUTION:

Do not apply pressure in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton)



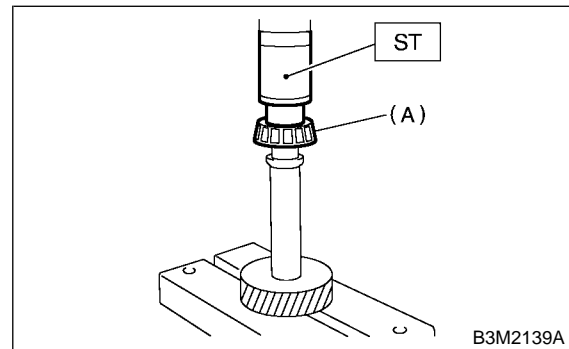
(A) Roller bearing

2) Using ST, install roller bearing (transfer case side).

ST 499757002 INSTALLER

CAUTION:

Do not apply pressure in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton)



(A) Roller bearing

E: INSPECTION S503223A10

1) Bearings

Replace bearings in the following cases:

- Broken or rusty bearings
- Worn or damaged
- Bearings that fail to turn smoothly or make abnormal noise when turned after gear oil lubrication.

2) Driven gear

Replace drive gear in the following cases:

- If their tooth surfaces and shaft are excessively broken or damaged.

CENTER DIFFERENTIAL

Manual Transmission and Differential

13. Center Differential S503158

A: REMOVAL S503158A18

- 1) Remove the manual transmission assembly from vehicle. <Ref. to MT-32 REMOVAL, Manual Transmission Assembly.>
- 2) Remove the transfer case with extension case assembly. <Ref. to MT-46 REMOVAL, Transfer Case and Extension Case Assembly.>
- 3) Remove the extension case assembly. <Ref. to MT-46 REMOVAL, Transfer Case and Extension Case Assembly.>
- 4) Remove the transfer driven gear. <Ref. to MT-54 REMOVAL, Transfer Driven Gear.>
- 5) Remove the center differential.

B: INSTALLATION S503158A11

- 1) Install the center differential into transfer case.
- 2) Install the transfer driven gear. <Ref. to MT-54 INSTALLATION, Transfer Driven Gear.>
- 3) Install the extension case assembly. <Ref. to MT-46 INSTALLATION, Extension Case Assembly.>
- 4) Install the transfer case with extension case assembly. <Ref. to MT-46 REMOVAL, Transfer Case and Extension Case Assembly.>
- 5) Install the back-up light switch and neutral position switch. <Ref. to MT-42 REMOVAL, Switches and Harness.>
- 6) Install the manual transmission assembly to vehicle. <Ref. to MT-35 INSTALLATION, Manual Transmission Assembly.>

C: DISASSEMBLY S503158A06

NOTE:

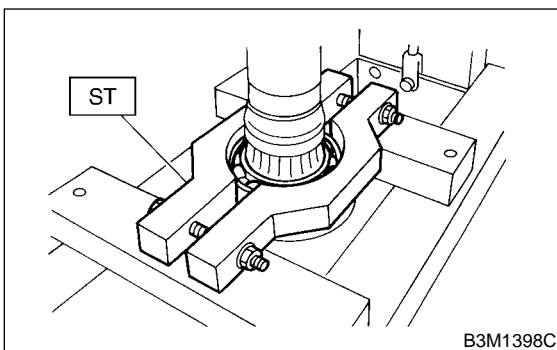
Do not disassemble center differential because it is a non-disassemble part.

Remove ball bearing using ST.

CAUTION:

Do not reuse ball bearing.

ST 498077300 CENTER DIFFERENTIAL BEARING REMOVER

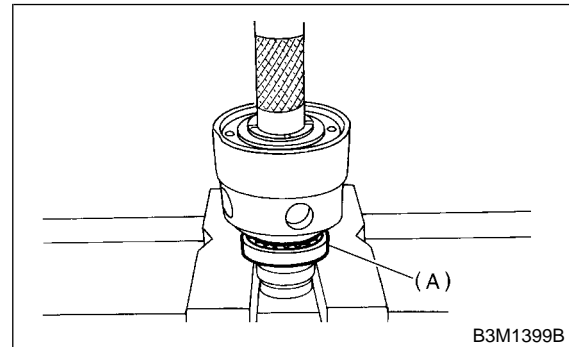


D: ASSEMBLY S503158A02

Install ball bearing to center differential assembly.

CAUTION:

Do not apply pressure in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).



(A) Ball bearing

E: INSPECTION S503158A10

1) Bearings

Replace bearings in the following cases:

- Broken or rusty bearings
- Worn or damaged
- Bearings that fail to turn smoothly or make abnormal noise when turned after gear oil lubrication.
- Bearings having other defects

2) Center differential

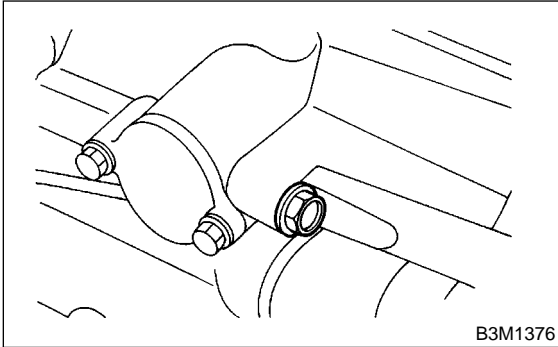
Replace center differential assembly in the following case:

- Worn or damaged

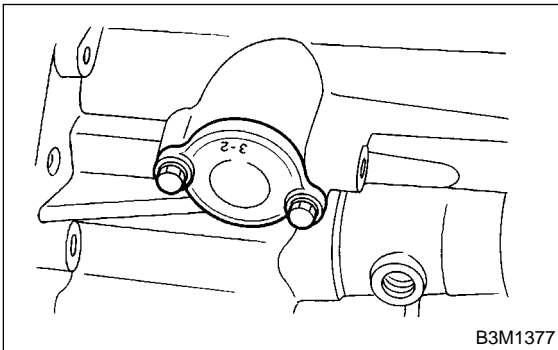
14. Reverse Check Sleeve S503267

A: REMOVAL S503267A18

- 1) Remove the manual transmission assembly from vehicle. <Ref. to MT-32 REMOVAL, Manual Transmission Assembly.>
- 2) Remove the transfer case with extension case assembly. <Ref. to MT-46 REMOVAL, Transfer Case and Extension Case Assembly.>
- 3) Remove shifter arm.
- 4) Remove plug, spring washer and reverse check ball.



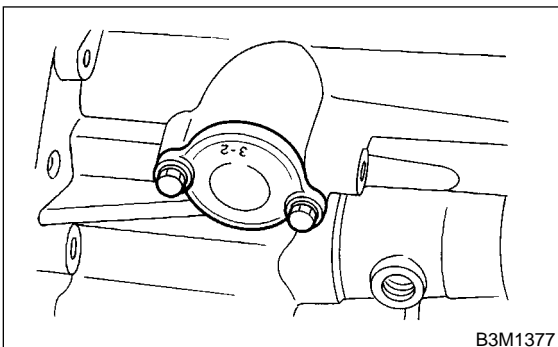
- 5) Remove the reverse check sleeve.



B: INSTALLATION S503267A11

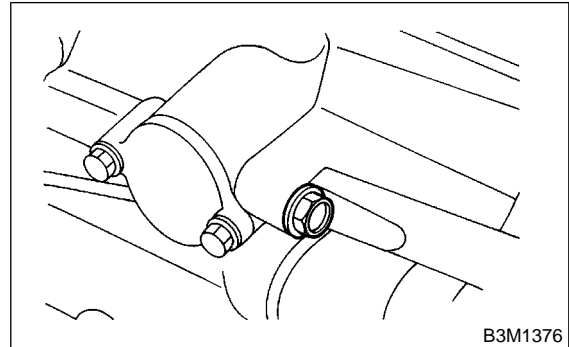
- 1) Install the reverse check sleeve.

Tightening torque:
6.4 N·m (0.65 kgf-m, 4.7 ft-lb)



- 2) Install ball, spring, washer and plug to transfer case.

Tightening torque:
10 N·m (1.0 kgf-m, 7.2 ft-lb)

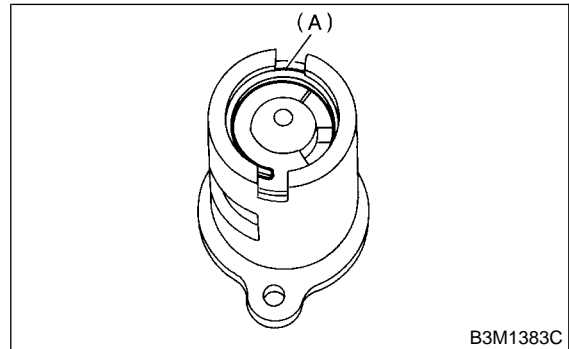


- 3) Install the shifter arm to transfer case assembly.
- 4) Install the transfer case with extension case assembly. <Ref. to MT-46 INSTALLATION, Transfer Case and Extension Case Assembly.>
- 5) Install the manual transmission assembly to vehicle. <Ref. to MT-35 INSTALLATION, Manual Transmission Assembly.>

C: DISASSEMBLY S503267A06

- 1) Cover the reverse check sleeve with a rag, and remove snap ring using a screwdriver.

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

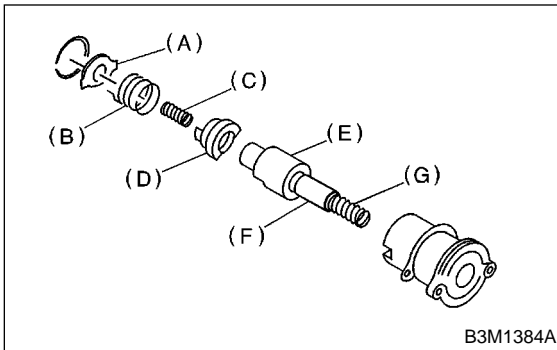


(A) Snap ring

REVERSE CHECK SLEEVE

Manual Transmission and Differential

2) Remove reverse check plate, reverse check spring, reverse check cam, return spring (5th-Rev), reverse accent shaft, return spring cap and return spring (1st-2nd).



- (A) Reverse check plate
- (B) Reverse check spring
- (C) Return spring (5th-Rev)
- (D) Reverse check cam
- (E) Reverse accent shaft
- (F) Return spring cap
- (G) Return spring (1st-2nd)

3) Remove O-ring.

NOTE:

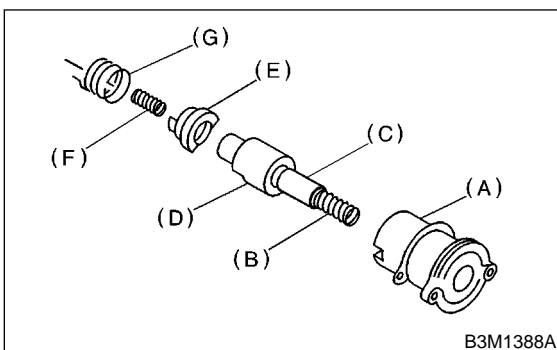
- Reverse check sleeve assembly uses an O-ring which should not be scratched.
- Be careful not to break adjustment shim placed between reverse check sleeve assembly and case.

D: ASSEMBLY S503267A02

1) Install return spring (1st-2nd), return spring cap, 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.



- (A) Reverse check sleeve
- (B) Return spring (1st-2nd)
- (C) Return spring cap
- (D) Reverse accent shaft
- (E) Return spring (5th-Rev)
- (F) Reverse check cam
- (G) Reverse check spring

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.

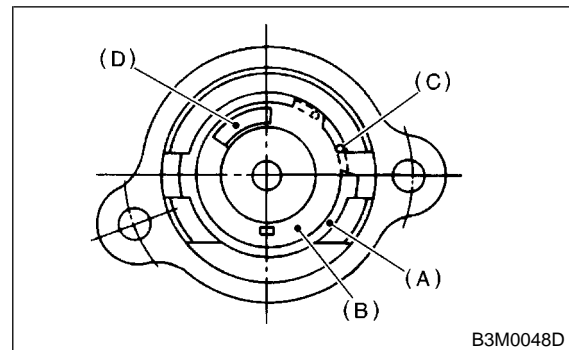
4) With cam held in that position, install plate onto reverse check sleeve and hold with snap ring.

5) Position O-ring in groove in sleeve.

E: INSPECTION S503267A10

- 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.
- 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) Check spring
- (D) Check cam

● Select a suitable reverse accent shaft and reverse check plate. <Ref. to MT-59 ADJUSTMENT, Reverse Check Sleeve.>

F: ADJUSTMENT S503267A01

1. NEUTRAL POSITION ADJUSTMENT

BB30109201

- 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).

NOTE:

- 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.

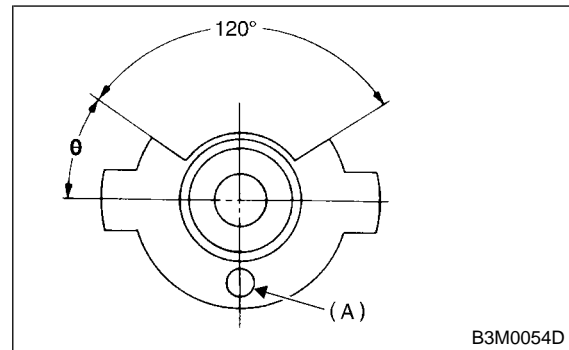
Adjustment shim	
Part No.	Thickness mm (in)
32190AA000	0.15 (0.0059)
32190AA010	0.30 (0.0118)

Reverse accent shaft		
Part No.	Mark	Remarks
32188AA090	3	Neutral position is closer to 1st gear.
32188AA100	0	Standard
32188AA110	1	Neutral position is closer to reverse gear.

2. REVERSE CHECK PLATE ADJUSTMENT S503267A0102

- 1) Shift shifter arm to "5th" and then to reverse to see if reverse check mechanism operates properly.
- 2) 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.



TRANSMISSION CASE

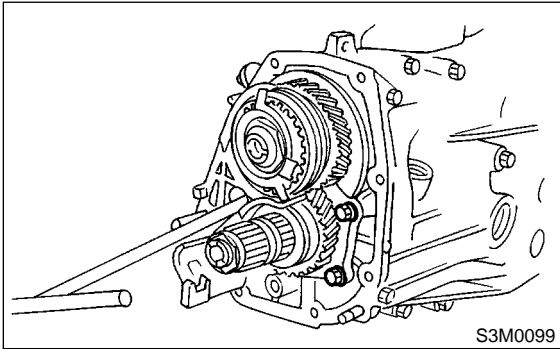
Manual Transmission and Differential

15. Transmission Case S503266

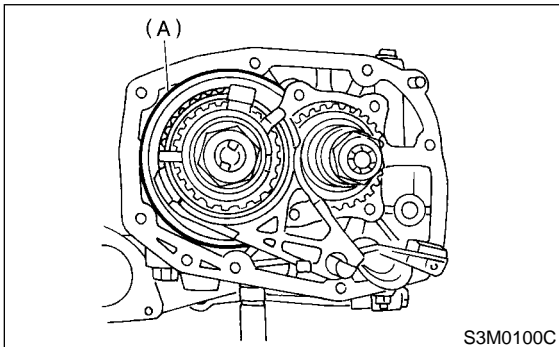
A: REMOVAL S503266A18

1. SINGLE-RANGE S503266A1801

- 1) Remove the manual transmission assembly from vehicle. <Ref. to MT-32, REMOVAL, Manual Transmission Assembly.>
- 2) Remove clutch release lever. <Ref. to CL-20, REMOVAL, Release Bearing and Lever.>
- 3) Remove transfer case with extension case assembly. <Ref. to MT-46, REMOVAL, Transfer Case and Extension Case Assembly.>
- 4) Remove bearing mounting bolts.

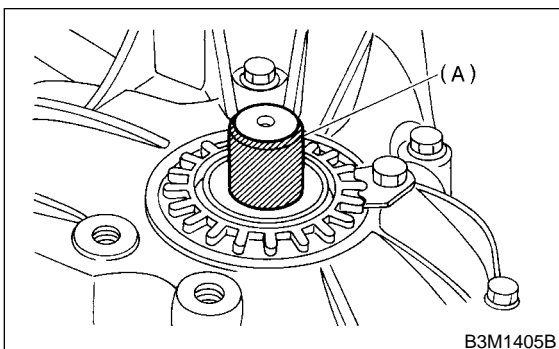


- 5) Remove main shaft rear plate.



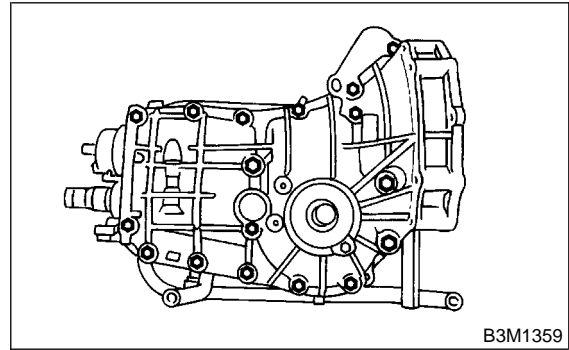
(A) Main shaft rear plate

- 6) Put vinyl tape around splines of right and left axle drive shafts to prevent damage to oil seal.



(A) Vinyl tape

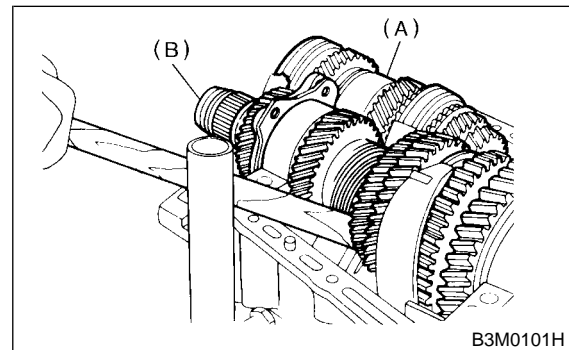
- 7) Separate transmission case into right and left cases by loosening coupling bolts and nuts.



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

NOTE:

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

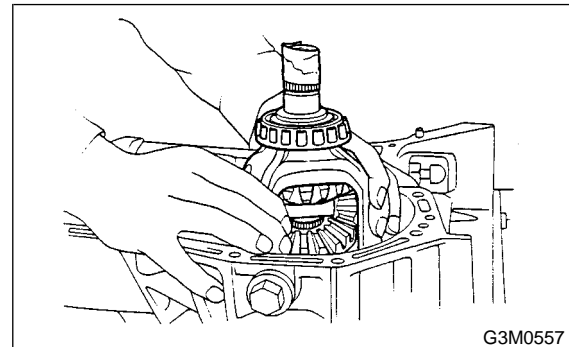


- (A) Main shaft assembly
(B) Drive pinion shaft assembly

- 9) Remove main shaft assembly.
- 10) Remove differential assembly.

CAUTION:

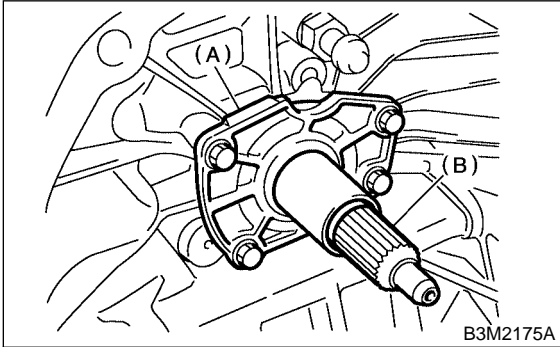
- Be careful not to confuse right and left roller bearing outer races.
- Be careful not to damage retainer oil seal.



2. DUAL-RANGE S503266A1802

- 1) Remove the manual transmission assembly from vehicle. <Ref. to MT-32, REMOVAL, Manual Transmission Assembly.>

- 2) Remove clutch release lever. <Ref. to CL-20, REMOVAL, Release Bearing and Lever.>
- 3) Remove transfer case with extension case assembly. <Ref. to MT-46, REMOVAL, Transfer Case and Extension Case Assembly.>
- 4) Remove the input shaft holder.

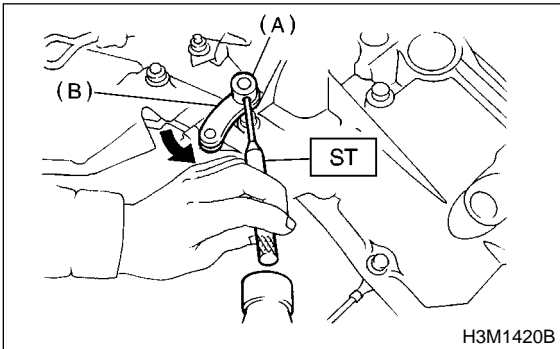


- (A) Input shaft holder
- (B) Input shaft

- 5) Remove the high-low switch. <Ref. to MT-42 REMOVAL, Switches and Harness.>
 - 6) Using ST, drive out straight pin, and remove high-low shifter lever.
- ST 398791700 REMOVER II

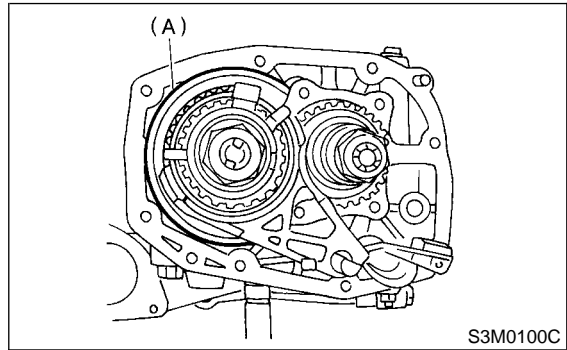
NOTE:

When driving out straight pin, remove it in the direction that it does not butt against transmission case.



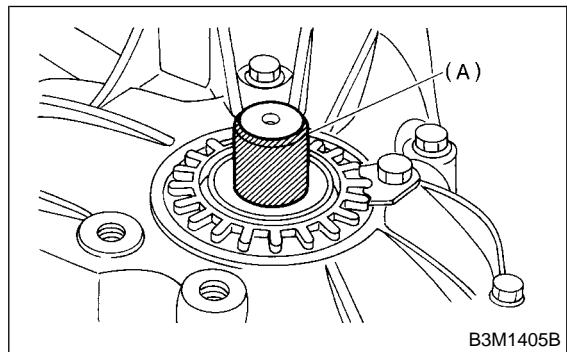
- (A) Straight pin
- (B) High-low shifter lever

- 7) Remove main shaft rear plate.



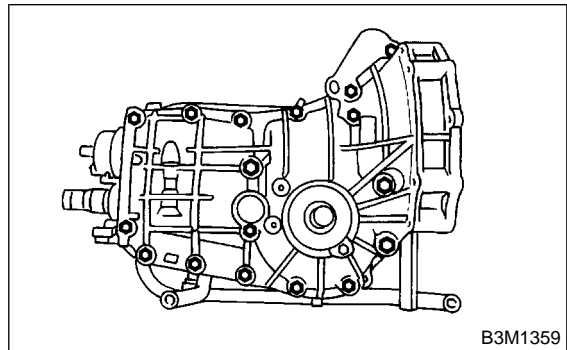
- (A) Main shaft rear plate

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



- (A) Vinyl tape

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



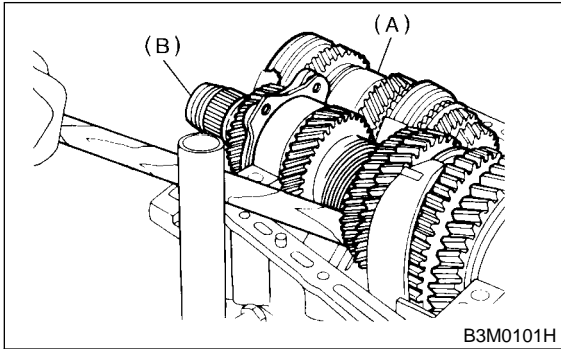
TRANSMISSION CASE

Manual Transmission and Differential

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

NOTE:

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

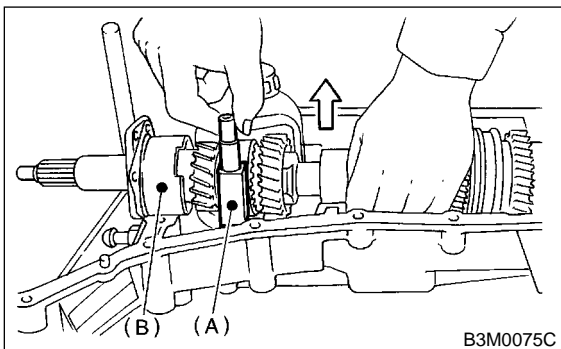


- (A) Main shaft assembly
- (B) Drive pinion shaft assembly

11) Removing high-low shifter fork
Raise main shaft assembly slightly, and remove high-low shifter fork together with high-low shifter shaft and washer.

CAUTION:

Be careful not to drop the two high-low shifter pieces.

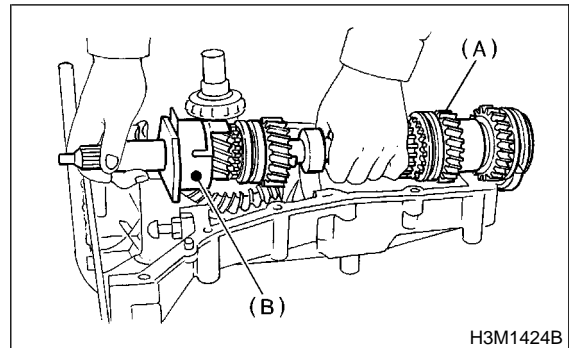


- (A) High-low shifter fork
- (B) Input shaft ASSY

12) Remove main shaft assembly and input shaft assembly.

CAUTION:

Be careful not to drop input shaft and main shaft as they are separable.

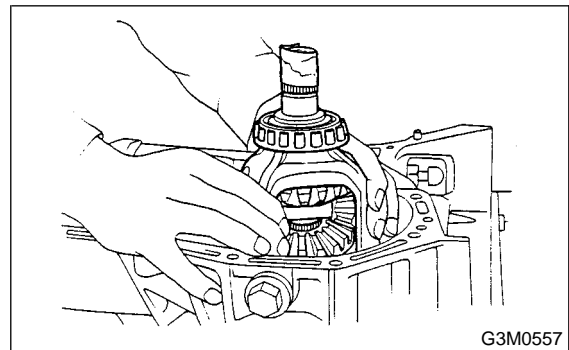


- (A) Main shaft ASSY
- (B) Input shaft ASSY

13) Remove differential assembly.

CAUTION:

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



B: INSTALLATION S503266A11

1. SINGLE-RANGE S503266A1101

- 1) Wipe off grease, oil and dust on the mating surfaces of transmission cases with white gasoline.
- 2) Install the front differential assembly.
- 3) Install the main shaft assembly.
Install needle bearing knock pin hole into transmission case knock pin.
- 4) Install the drive pinion shaft assembly.
Install roller bearing knock pin hole into transmission case knock pin.
- 5) Apply liquid gasket, and then put case right side and left side together.

Liquid gasket:

THREE BOND 1215 or equivalent

TRANSMISSION CASE

Manual Transmission and Differential

6) 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 and input shaft holder shim are not caught up in between.
- Confirm that speedometer gear is meshed.

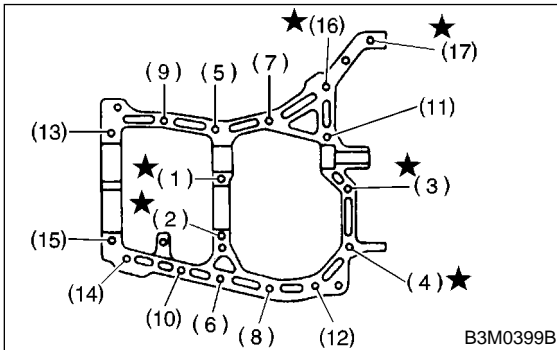
Tightening torque:

8 mm bolt

25 N·m (2.5 kgf-m, 18.1 ft-lb)

★ 10 mm bolt

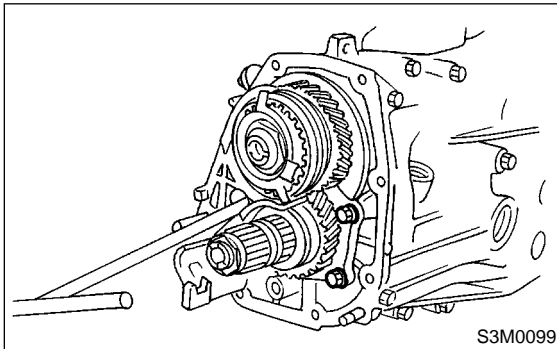
39 N·m (4.0 kgf-m, 28.9 ft-lb)



7) Tighten ball bearing attachment bolts.

Tightening torque:

29 N·m (3.0 kgf-m, 21.7 ft-lb)

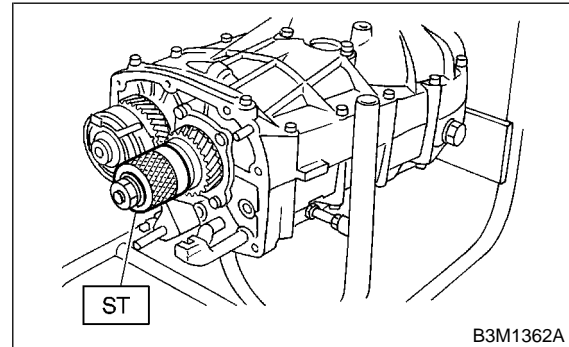


8) Backlash adjustment of hypoid gear and pre-load adjustment of roller bearing

NOTE:

Support drive pinion assembly with ST.

ST 498427100 STOPPER



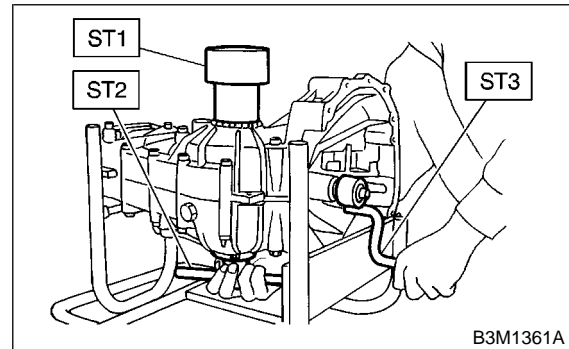
9) Place the transmission with case left side facing downward and put ST1 on bearing cup.

10) 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



TRANSMISSION CASE

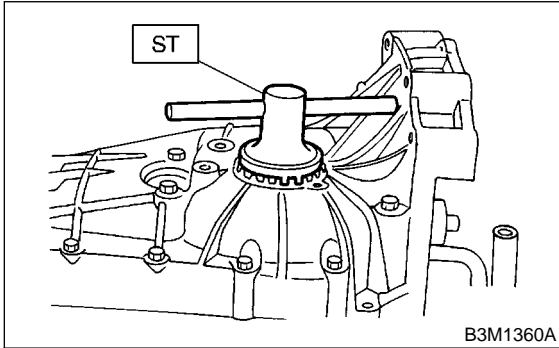
Manual Transmission and Differential

11) 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



12) Fit lock plate. Loosen the retainer on the lower side by 1-1/2 notches 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 notch if the plate is turned upside down.

13) Turn in the retainer on the upper side additionally by 1 notch in order to apply preload on taper roller bearing.

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

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

16) Inspect and adjust backlash and tooth contact of hypoid gear. <Ref. to MT-94 INSPECTION, Front Differential Assembly.>

17) 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.

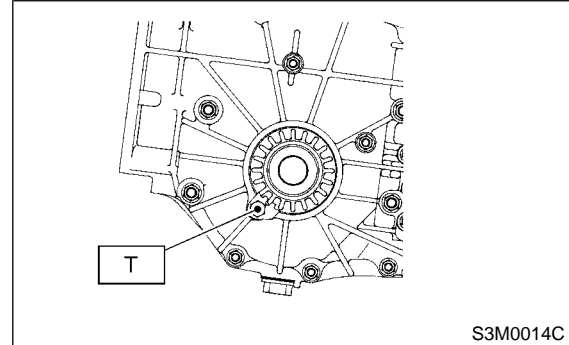
Tighten lock plate.

NOTE:

Carry out this job on both upper and lower retainers.

Tightening torque:

T: 25 N·m (2.5 kgf-m, 18.1 ft-lb)



18) Selecting of main shaft rear plate <Ref. to MT-72 ADJUSTMENT, Main Shaft Assembly for Single-Range.>

19) Install clutch release lever and bearing. <Ref. to CL21 INSTALLATION, Release Bearing and Lever.>

20) Install transfer case with extension case assembly. <Ref. to MT-46 INSTALLATION, Transfer Case and Extension Case Assembly.>

21) Install the manual transmission assembly into the vehicle. <Ref. to MT-35 INSTALLATION, Manual Transmission Assembly.>

2. DUAL-RANGE S503266A1102

1) Wipe off grease, oil and dust on the mating surfaces of transmission cases with white gasoline.

2) Install the front differential assembly.

3) Install the main shaft assembly and input shaft assembly.

Connect main shaft assembly and input shaft assembly, and install needle bearing knock pin hole into transmission case knock pin.

4) Install the drive pinion shaft assembly.

Install roller bearing knock pin hole into transmission case knock pin.

5) Apply liquid gasket, and then put case right side and left side together.

Liquid gasket:

THREE BOND 1215 or equivalent

6) 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 and input shaft holder shim are not caught up in between.
- Confirm that speedometer gear is meshed.

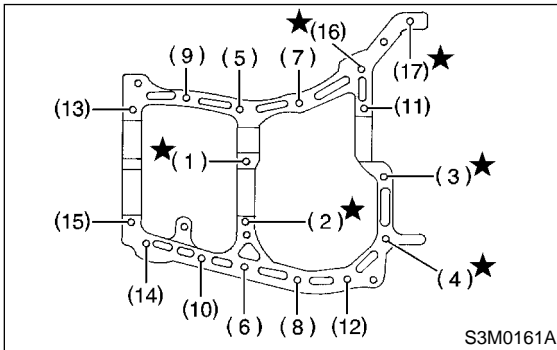
Tightening torque:

8 mm bolt

25 N·m (2.5 kgf-m, 18.1 ft-lb)

★ 10 mm bolt

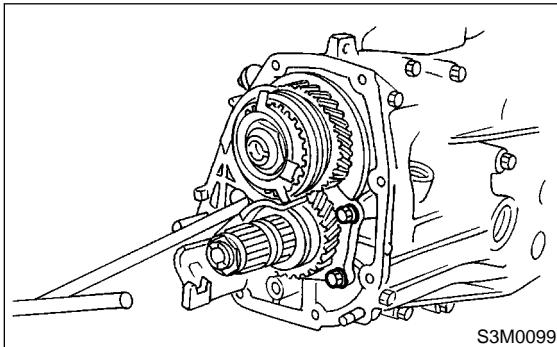
39 N·m (4.0 kgf-m, 28.9 ft-lb)



7) Tighten ball bearing attachment bolts.

Tightening torque:

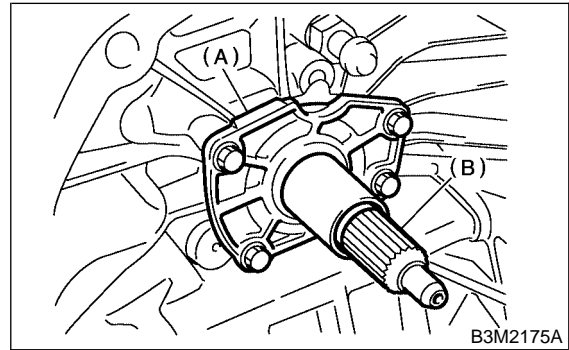
29 N·m (3.0 kgf-m, 21.7 ft-lb)



8) Tighten input shaft holder attaching bolts.

Tightening torque:

20 N·m (2.0 kgf-m, 14.5 ft-lb)



(A) Input shaft holder

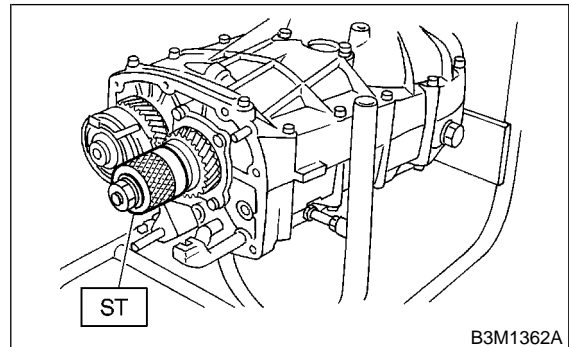
(B) Input shaft

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

NOTE:

Support drive pinion assembly with ST.

ST 498427100 STOPPER



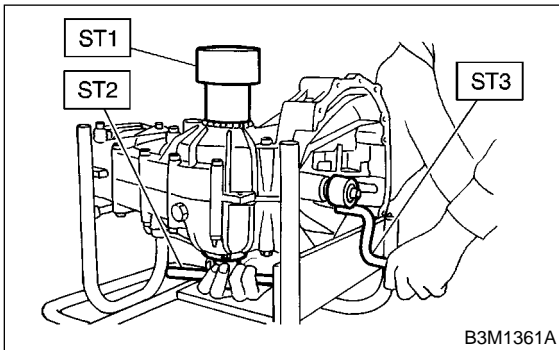
10) Place the transmission with case left side facing downward and put ST1 on bearing cup.

TRANSMISSION CASE

Manual Transmission and Differential

11) 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

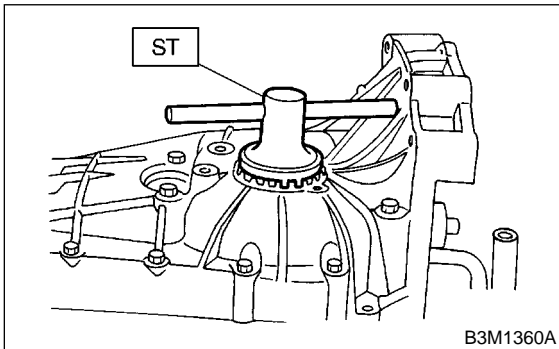


12) Remove weight and screw in retainer without O-ring on the upper side and stop at the point where slight resistance is felt.

NOTE:

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

ST 499787000 WRENCH ASSY



13) Fit lock plate. Loosen the retainer on the lower side by 1-1/2 notches 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 notch if the plate is turned upside down.

14) Turn in the retainer on the upper side additionally by 1 notch in order to apply preload on taper roller bearing.

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

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

17) Inspect and adjust backlash and tooth contact of hypoid gear. <Ref. to MT-94 INSPECTION, Front Differential Assembly.>

18) 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.

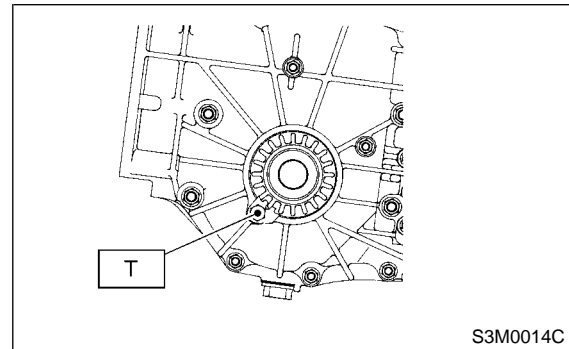
Tighten lock plate.

NOTE:

Carry out this job on both upper and lower retainers.

Tightening torque:

T: 25 N·m (2.5 kgf·m, 18.1 ft·lb)



19) Selection of main shaft rear plate <Ref. to MT-72 ADJUSTMENT, Main Shaft Assembly for Signal-Range.>

20) Install transfer case with extension case assembly. <Ref. to MT-46 INSTALLATION, Transfer Case and Extension Case Assembly.>

21) Install clutch release lever and bearing. <Ref. to CL21 INSTALLATION, Release Bearing and Lever.>

22) Install the manual transmission assembly into the vehicle. <Ref. to MT-35 INSTALLATION, Manual Transmission Assembly.>

C: INSPECTION

S503266A10

Check the transmission case for cracks, damage, and oil leaks.

MAIN SHAFT ASSEMBLY FOR SINGLE-RANGE

Manual Transmission and Differential

16. Main Shaft Assembly for Single-Range

S503713

A: REMOVAL

S503713A18

- 1) Remove the manual transmission assembly from vehicle. <Ref. to MT-32 REMOVAL, Manual Transmission Assembly.>
- 2) Remove transfer case with extension case assembly. <Ref. to MT-46 REMOVAL, Transfer Case and Extension Case Assembly.>
- 3) Remove transmission case. <Ref. to MT-46 REMOVAL, Transmission Case.>
- 4) Remove drive pinion shaft assembly. <Ref. to MT-83 REMOVAL, Drive Pinion Shaft Assembly.>
- 5) Remove main shaft assembly.

B: INSTALLATION

S503713A11

- 1) Install the needle bearing and oil seal onto the front of transmission main shaft assembly.

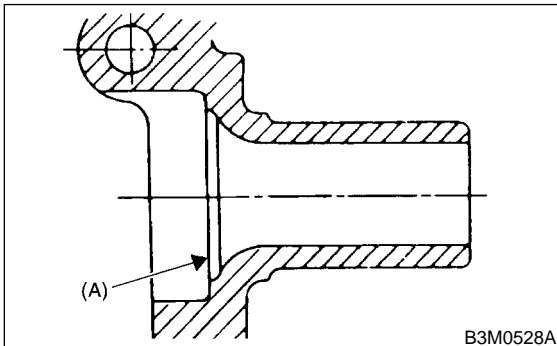
CAUTION:

- 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.
- Use a new one.

- 2) Install needle bearing outer race knock pin hole into transmission case knock pin.

NOTE:

Align the end face of seal with surface (A) when installing oil seal.



- 3) Install the drive pinion assembly. <Ref. to MT-83 INSTALLATION, Drive Pinion Shaft Assembly.>
- 4) Install transmission case. <Ref. to MT-62 INSTALLATION, Transmission Case.>
- 5) Install transfer case with extension case assembly. <Ref. to MT-46 INSTALLATION, Transfer Case and Extension Case Assembly.>
- 6) Install the manual transmission assembly to vehicle. <Ref. to MT-35 INSTALLATION, Manual Transmission Assembly.>

C: DISASSEMBLY

S503713A06

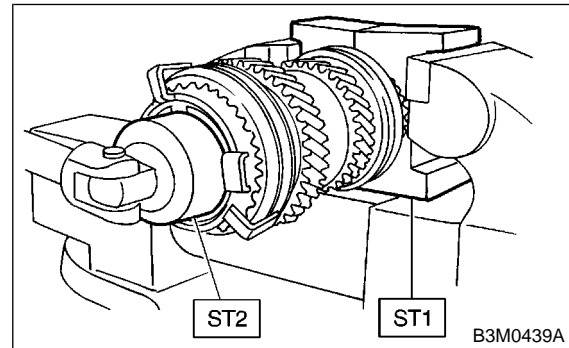
- 1) Put vinyl tape around main shaft splines to protect oil seal from damage. Then pull out oil seal and needle bearing by hand.
- 2) Remove lock nut from transmission main shaft assembly.

NOTE:

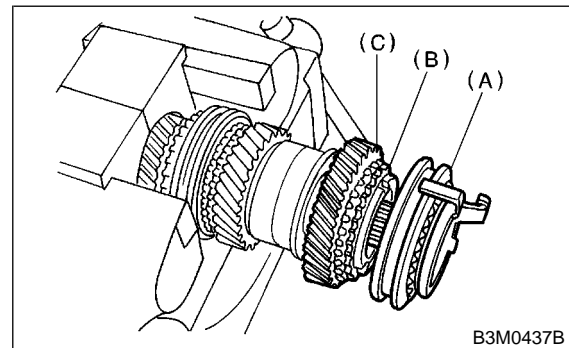
Remove caulking before taking off lock nut.

ST1 498937000 HOLDER

ST2 499987003 SOCKET WRENCH (35)



- 3) Remove 5th-Rev sleeve and hub assembly, baulk ring, 5th drive gear and needle bearing.

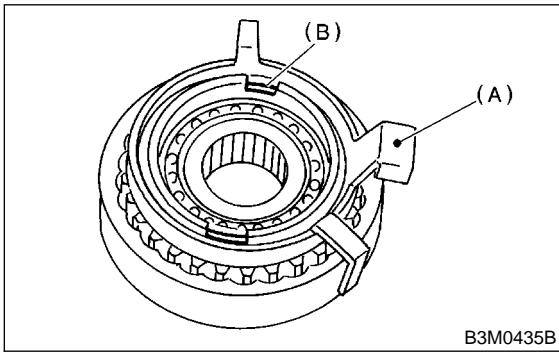


- (A) 5th-Rev sleeve and hub ASSY
- (B) Baulk ring
- (C) 5th drive gear

MAIN SHAFT ASSEMBLY FOR SINGLE-RANGE

Manual Transmission and Differential

4) Remove snap ring and synchro cone stopper from 5th-Rev sleeve and hub assembly.



- (A) Synchro cone stopper
- (B) Snap ring

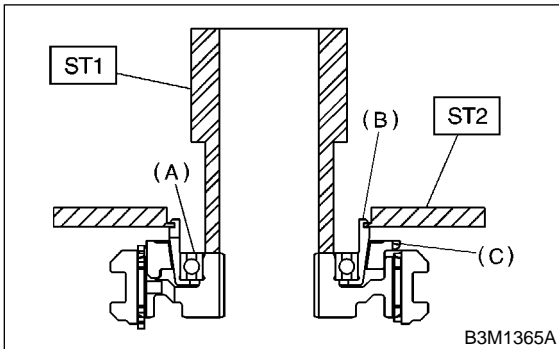
5) Using ST1, ST2 and a press, remove ball bearing, synchro cone and baulk ring (Rev).

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.

- Do not reuse ball bearing.

ST1 499757002 INSTALLER
ST2 498077400 SYNCHRO CONE
REMOVER



- (A) Ball bearing
- (B) Synchro cone
- (C) Baulk ring

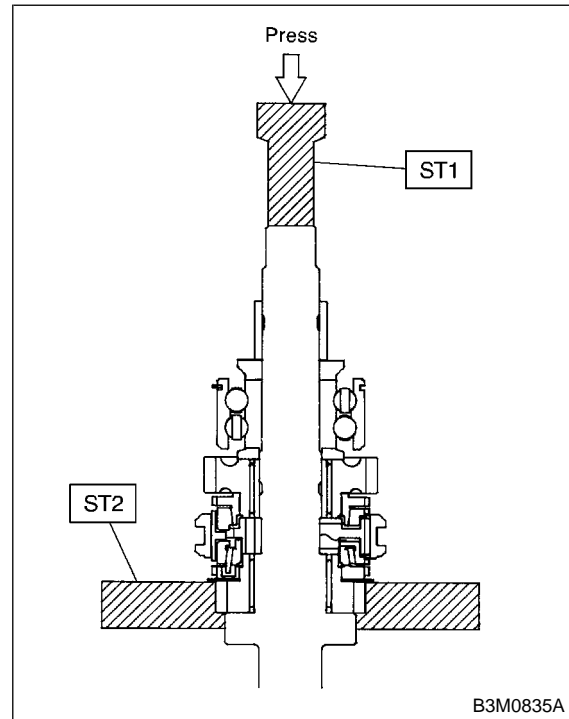
6) Using ST1 and ST2, remove the rest of parts.

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



MAIN SHAFT ASSEMBLY FOR SINGLE-RANGE

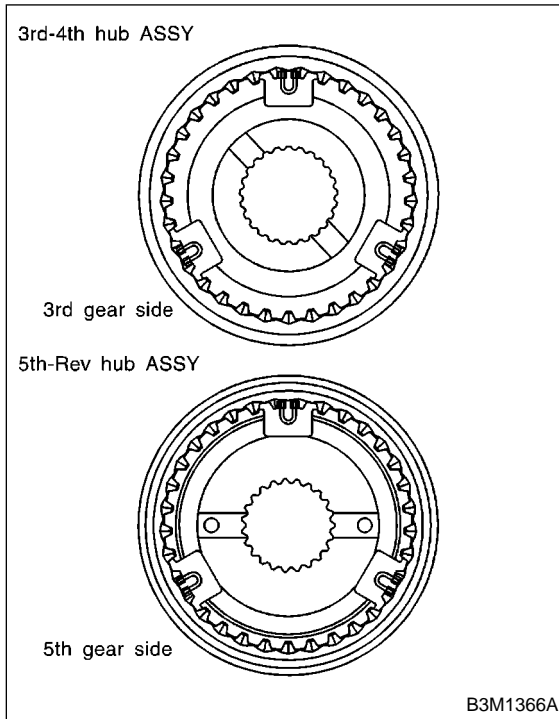
Manual Transmission and Differential

D: ASSEMBLY S503713A02

1) Assemble each sleeve and hub assembly.

NOTE:

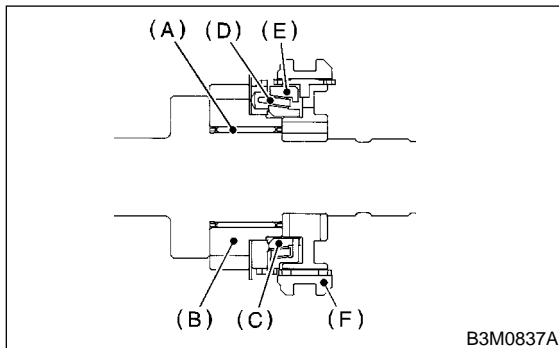
Position open ends of spring 120° apart.



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 shifting insert.



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

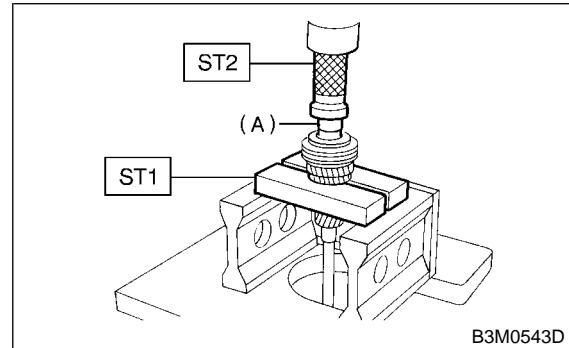
3) Install 4th needle bearing race onto transmission main shaft using ST1, ST2 and a press.

CAUTION:

Do not apply pressure in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).

ST1 899714110 REMOVER

ST2 499877000 RACE 4-5 INSTALLER

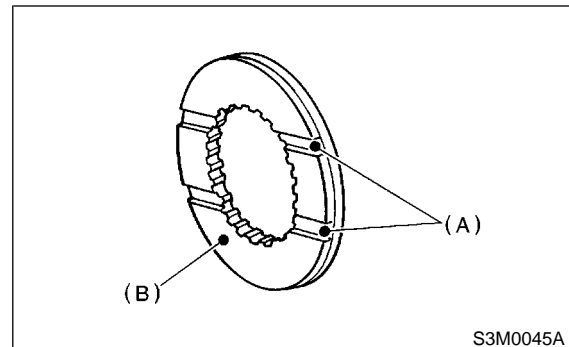


(A) 4th needle bearing race

4) Install baulk ring, needle bearing, 4th drive gear and 4th gear thrust washer to transmission main shaft.

NOTE:

Align baulk ring and gear & hub assembly with key groove.



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

MAIN SHAFT ASSEMBLY FOR SINGLE-RANGE

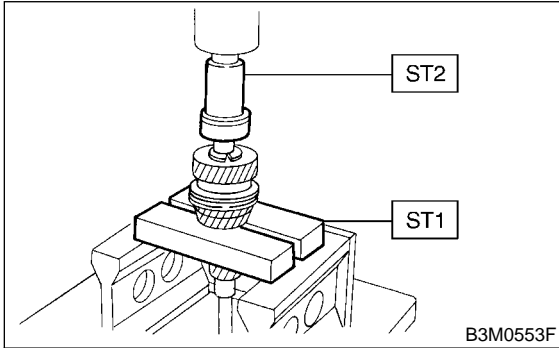
Manual Transmission and Differential

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

CAUTION:

Do not apply pressure in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).

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.

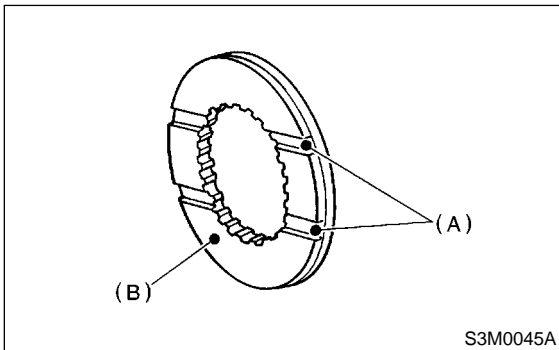
CAUTION:

Do not apply pressure in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).

NOTE:

Face thrust washer in the correct direction.

ST1 899714110 REMOVER
ST2 499877000 RACE 4-5 INSTALLER



- (A) Groove
- (B) 4th gear thrust washer

7) Install bearing onto synchro cone.

8) Install baulk ring and synchro cone onto 5th-Rev sleeve and hub assembly using ST and a press.

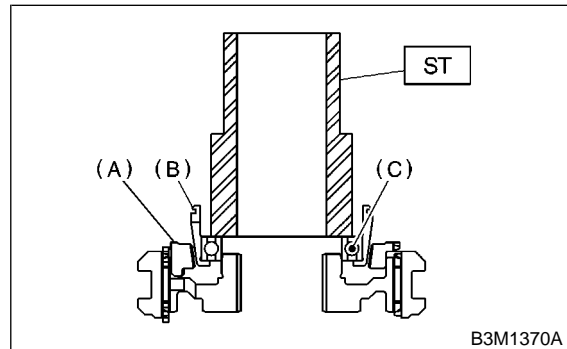
CAUTION:

Do not apply pressure in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).

NOTE:

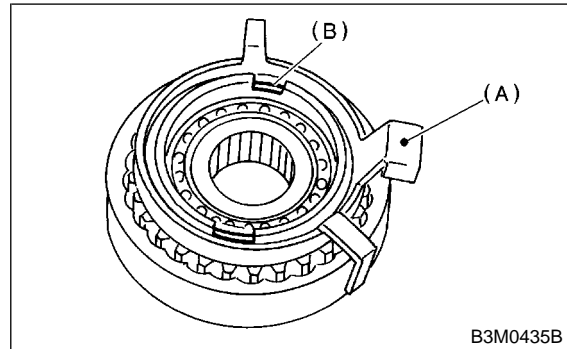
- Use new ball bearing.
- After press fitting, make sure synchro cone rotates freely.

ST 499757002 INSTALLER



- (A) Baulk ring
- (B) Synchro cone
- (C) Ball bearing

9) Install synchro cone stopper and snap ring to 5th-Rev sleeve and hub assembly.



- (A) Synchro cone stopper
- (B) Snap ring

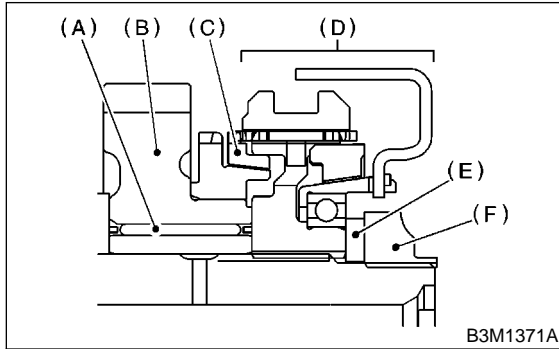
MAIN SHAFT ASSEMBLY FOR SINGLE-RANGE

Manual Transmission and Differential

10) Install the rest parts to the rear section of transmission main shaft.

NOTE:

Align groove in baulk ring with shifting insert.



- (A) Needle bearing
- (B) 5th drive gear
- (C) Baulk ring
- (D) 5th-Rev sleeve and hub ASSY
- (E) Lock washer
- (F) Lock nuts

11) Tighten lock nuts to the specified torque using ST1 and ST2.

NOTE:

Secure lock nuts in two places after tightening.

- ST1 499987003 SOCKET WRENCH
- ST2 498937000 TRANSMISSION HOLDER

Tightening torque:

118 N·m (12.0 kgf·m, 86.8 ft·lb)

E: INSPECTION

S503713A10

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.
- 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.

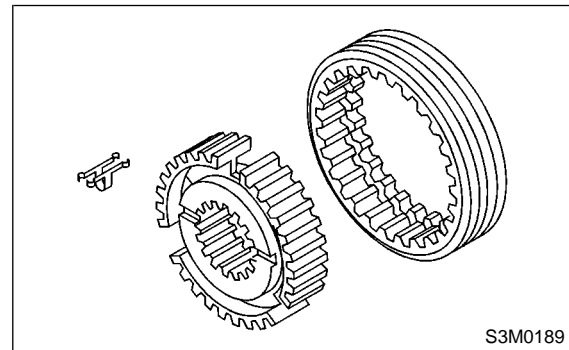
4) Baulk ring

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

5) Shifting insert key

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



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.

MAIN SHAFT ASSEMBLY FOR SINGLE-RANGE

Manual Transmission and Differential

F: ADJUSTMENT S503713A01

Selection of main shaft rear plate

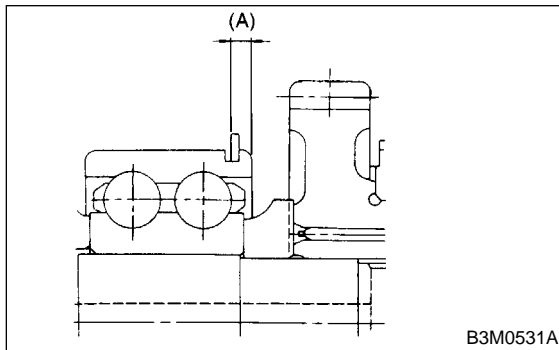
Using ST, measure the amount (A) of ball bearing protrusion from transmission main case surface and select the proper plate in the following table:

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



MAIN SHAFT ASSEMBLY FOR DUAL-RANGE

Manual Transmission and Differential

17. Main Shaft Assembly for Dual-Range

S503714

A: REMOVAL

S503714A18

- 1) Remove the manual transmission assembly from vehicle. <Ref. to MT-32 REMOVAL, Manual Transmission Assembly.>
- 2) Remove transfer case with extension case assembly. <Ref. to MT-46 REMOVAL, Transfer Case and Extension Case Assembly.>
- 3) Remove transmission case. <Ref. to MT-46 REMOVAL, Transmission Case.>
- 4) Remove drive pinion shaft assembly. <Ref. to MT-83 REMOVAL, Drive Pinion Shaft Assembly.>
- 5) Remove main shaft assembly and input shaft assembly.

B: INSTALLATION

S503714A11

- 1) Install the needle bearing onto the front of transmission main shaft assembly.
- 2) Connect main shaft assembly and input shaft assembly.
- 3) Install needle bearing outer race knock pin hole into transmission case knock pin.
- 4) Install the drive pinion assembly. <Ref. to MT-83 INSTALLATION, Drive Pinion Shaft Assembly.>
- 5) Install transmission case. <Ref. to MT-62 INSTALLATION, Transmission Case.>
- 6) Install transfer case with extension case assembly. <Ref. to MT-46 INSTALLATION, Transfer Case and Extension Case Assembly.>
- 7) Install the manual transmission assembly to vehicle. <Ref. to MT-35 INSTALLATION, Manual Transmission Assembly.>

C: DISASSEMBLY

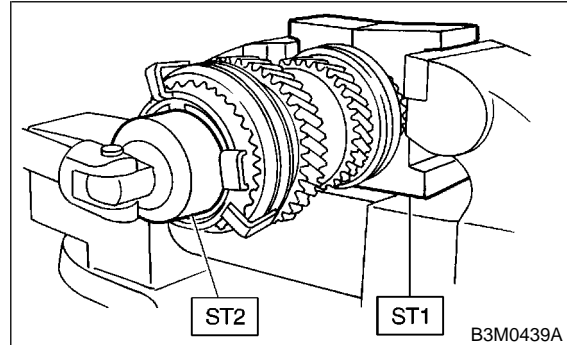
S503714A06

- 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.

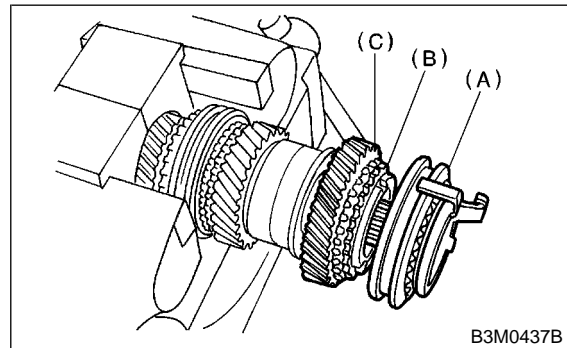
NOTE:

Remove caulking before taking off lock nut.

- ST1 498937000 TRANSMISSION HOLDER
ST2 499987003 SOCKET WRENCH (35)

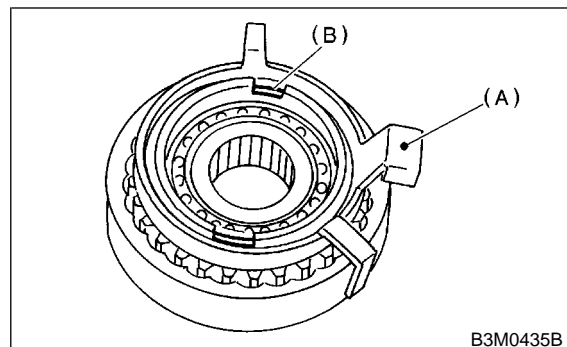


- 3) Remove 5th-Rev sleeve and hub assembly, baulk ring, 5th drive gear and needle bearing.



- (A) 5th-Rev sleeve and hub ASSY
(B) Baulk ring
(C) 5th drive gear

- 4) Remove snap ring and synchro cone stopper from 5th-Rev sleeve and hub assembly.



- (A) Synchro cone stopper
(B) Snap ring

MAIN SHAFT ASSEMBLY FOR DUAL-RANGE

Manual Transmission and Differential

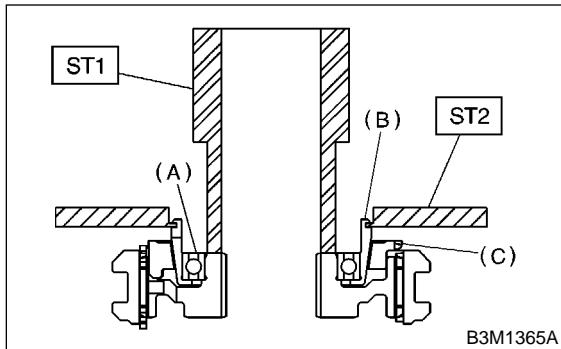
5) Using ST1, ST2 and a press, remove ball bearing, synchro cone and baulk ring (Rev).

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.

- Do not reuse ball bearing.

ST1 499757002 INSTALLER
ST2 498077400 SYNCHRO CONE
REMOVER



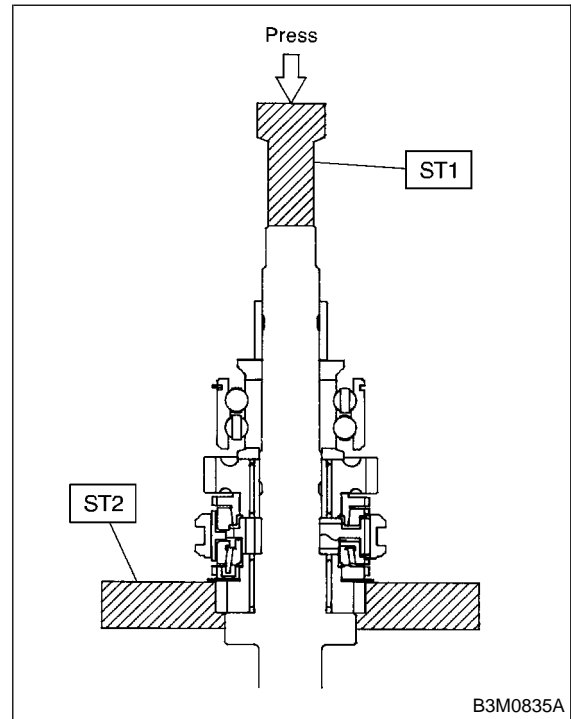
- (A) Ball bearing
- (B) Synchro cone
- (C) Baulk ring

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

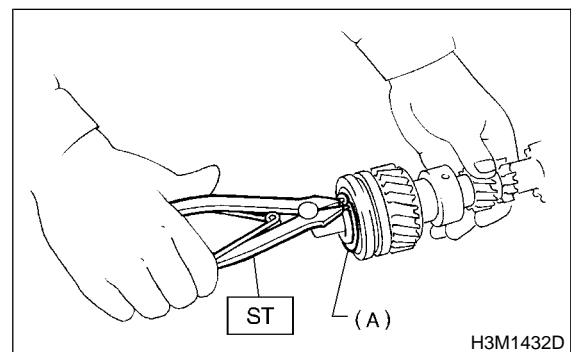
NOTE:

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



7) Remove snap ring from main shaft.
ST 899474100 EXPANDER

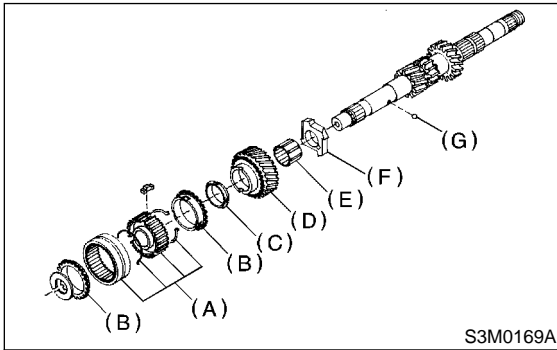


- (A) Snap ring

MAIN SHAFT ASSEMBLY FOR DUAL-RANGE

Manual Transmission and Differential

8) Remove the rest of parts.



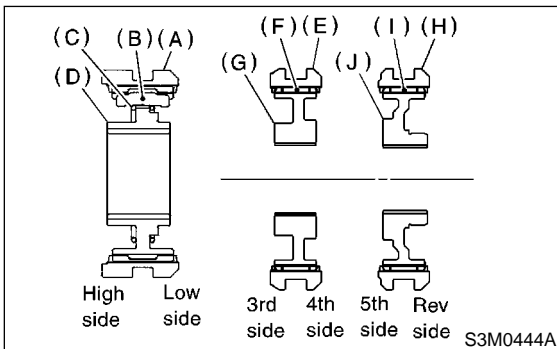
- (A) Sleeve and hub ASSY
- (B) High-low baulk ring
- (C) Friction damper
- (D) Low input gear
- (E) Needle bearing
- (F) Input low gear spacer
- (G) Ball

D: ASSEMBLY S503714A02

1) Assemble when each sleeve and hub assembly are disassembled.

NOTE:

Position open ends of spring 120° apart.



- (A) High-low coupling sleeve
- (B) Shifting insert
- (C) High-low synchronizer spring
- (D) High-low synchronizer hub
- (E) Sleeve
- (F) Insert key
- (G) 3rd-4th synchronizer hub
- (H) Sleeve
- (I) Insert key
- (J) 5th-Rev synchronizer hub

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

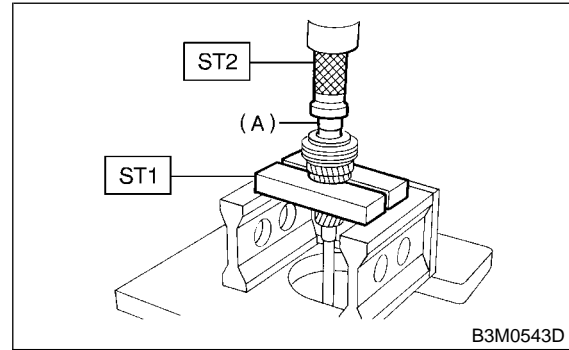
NOTE:

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

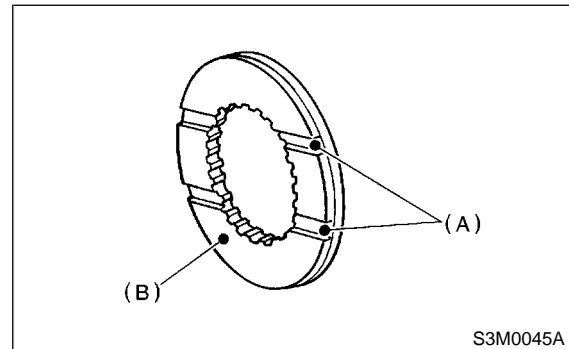


- (A) 4th needle bearing race

4) Install baulk ring, needle bearing, 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

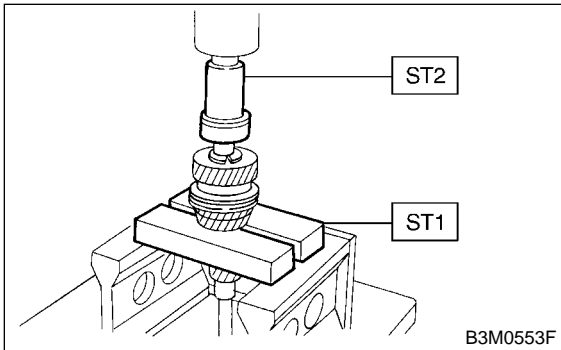
MAIN SHAFT ASSEMBLY FOR DUAL-RANGE

Manual Transmission and Differential

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



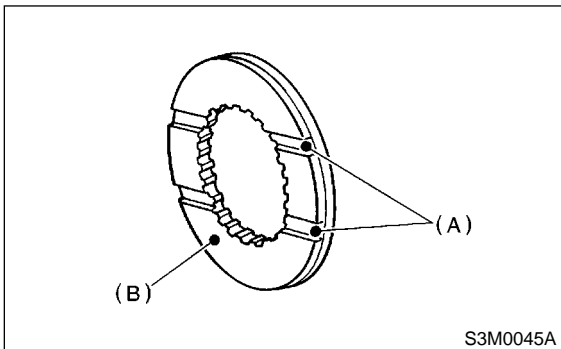
6) Using ST1 and ST2, install the 5th gear thrust washer and 5th needle bearing race onto the rear section of transmission main shaft.

NOTE:

Face thrust washer in the correct direction.

ST1 899714110 REMOVER

ST2 499877000 RACE 4-5 INSTALLER



(A) Groove

(B) 4th gear thrust washer

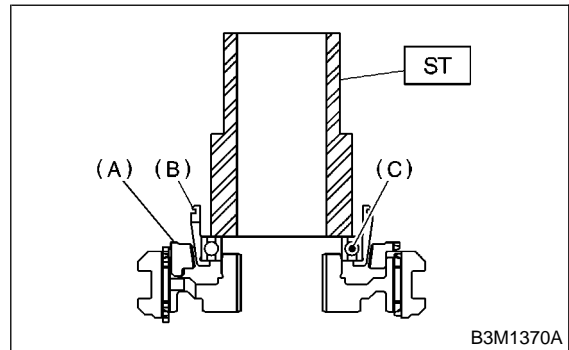
7) Install bearing onto synchro cone.

8) Install baulk ring and synchro cone onto 5th-Rev sleeve and hub assembly using ST and a press.

NOTE:

- Use new ball bearing.
- After press fitting, make sure synchro cone rotates freely.

ST 499757002 INSTALLER

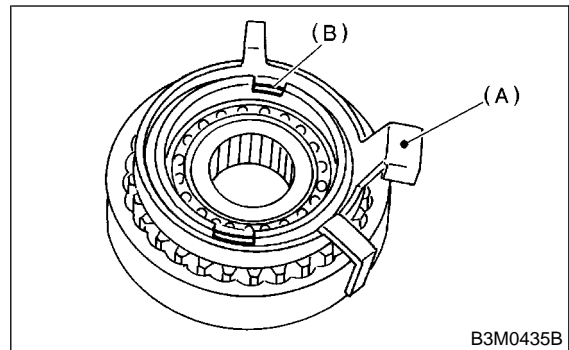


(A) Baulk ring

(B) Synchro cone

(C) Ball bearing

9) Install synchro cone stopper and snap ring to 5th-Rev sleeve and hub assembly.



(A) Synchro cone stopper

(B) Snap ring

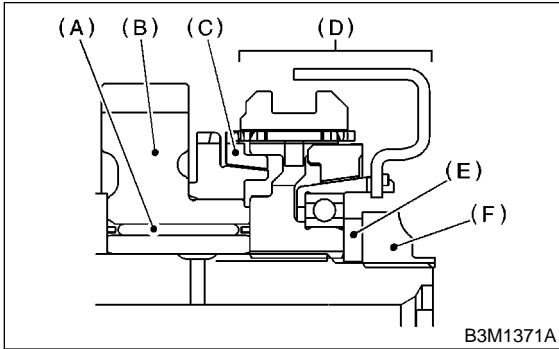
MAIN SHAFT ASSEMBLY FOR DUAL-RANGE

Manual Transmission and Differential

10) Install the rest parts to the rear section of transmission main shaft.

NOTE:

Align groove in baulk ring with shifting insert.



- (A) Needle bearing
- (B) 5th drive gear
- (C) Baulk ring
- (D) 5th-Rev sleeve and hub ASSY
- (E) Lock washer
- (F) Lock nuts

11) Tighten lock nuts 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 N·m (12.0 kgf-m, 86.8 ft-lb)

12) Install needle bearing on main shaft.

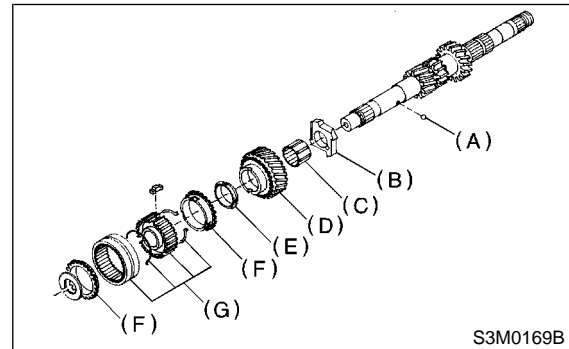
13) Install the parts to the front section of transmission main shaft.

CAUTION:

Be careful not to damage the graded section of transmission main shaft when installing needle bearing.

NOTE:

- Face the grooved side toward input gear.
- Align high-low baulk ring's groove with shifting insert.



- (A) Ball
- (B) Input low gear spacer
- (C) Needle bearing
- (D) Low input gear
- (E) Friction damper
- (F) High-low baulk ring
- (G) Sleeve and hub ASSY

14) Install snap ring to the rod section of transmission main shaft using ST1 and ST2.

CAUTION:

Use only new snap ring.

NOTE:

Select a suitable outer snap ring so that axial clearance between snap ring and hub is held within 0.060 to 0.100 mm (0.0024 to 0.0039 in).

- ST1 499757002 INSTALLER
- ST2 499757001 SNAP RING GUIDE

Snap ring	
Part No.	Thickness mm (in)
805025051	2.42 (0.0953)
805025052	2.47 (0.0972)
805025053	2.52 (0.0992)
805025054	2.57 (0.1012)
805025055	2.62 (0.1031)
805025056	2.67 (0.1051)
805025057	2.72 (0.1071)
805025058	2.37 (0.0933)

MAIN SHAFT ASSEMBLY FOR DUAL-RANGE

Manual Transmission and Differential

E: INSPECTION S503714A10

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.
- 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.

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

5) Shifting insert key

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

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.

F: ADJUSTMENT S503714A01

Choose main shaft rear plate. <Ref. to MT-72 ADJUSTMENT, Main Shaft Assembly for Single-Range.>

18. Input Shaft Assembly S503715

A: REMOVAL S503715A18

- 1) Remove the manual transmission assembly from vehicle. <Ref. to MT-32 REMOVAL, Manual Transmission Assembly.>
- 2) Remove the transfer case with extension case assembly. <Ref. to MT-46 REMOVAL, Transfer Case and Extension Case Assembly.>
- 3) Remove transmission case. <Ref. to MT-60 REMOVAL, Transmission Case.>
- 4) Remove drive pinion shaft assembly. <Ref. to MT-83 REMOVAL, Drive Pinion Shaft Assembly.>
- 5) Remove main shaft assembly and input shaft assembly.

B: INSTALLATION S503715A11

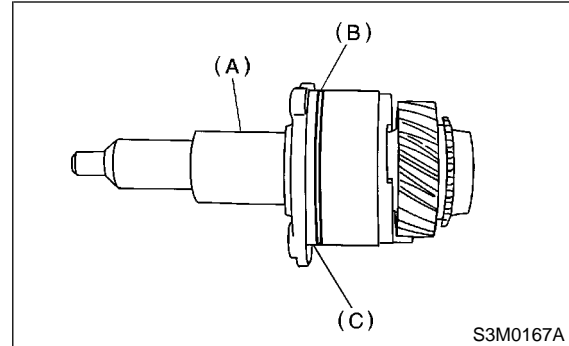
- 1) Install the needle bearing onto the front of the transmission main shaft assembly.
- 2) Connect main shaft assembly and input shaft assembly.
- 3) Install needle bearing outer race knock pin hole into transmission case knock pin.
- 4) Install the drive pinion assembly. <Ref. to MT-83 INSTALLATION, Drive Pinion Shaft.>
- 5) Install the transmission case. <Ref. to MT-62 INSTALLATION, Transmission Case.>
- 6) Install the transfer case with extension case assembly. <Ref. to MT-46 INSTALLATION, Transfer Case and Extension Case Assembly.>
- 7) Install manual transmission assembly on vehicle. <Ref. to MT-35 INSTALLATION, Manual Transmission Assembly.>

C: DISASSEMBLY S503715A06

- 1) Remove O-ring from input shaft holder. Also, remove input shaft holder shim.

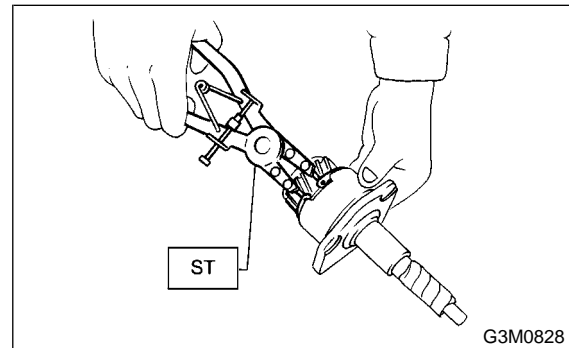
CAUTION:
Use new O-ring.

NOTE:
Number of shims used varies from none to two.

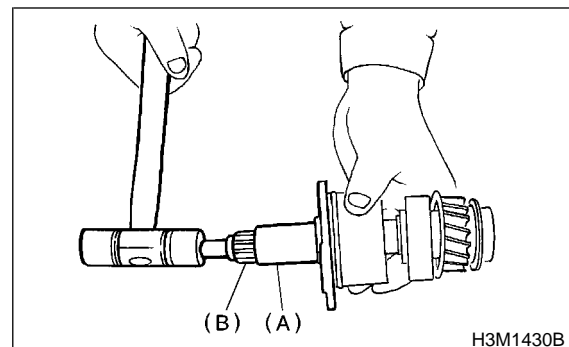


- (A) Input shaft holder
- (B) O-ring
- (C) Input shaft holder shim

- 2) Put vinyl tape around input shaft splines to protect oil seal from damage.
- 3) Remove inner snap ring.
ST 398663600 PLIERS



- 4) Hold input shaft holder stationary and remove input shaft by tapping its end with a plastic hammer.

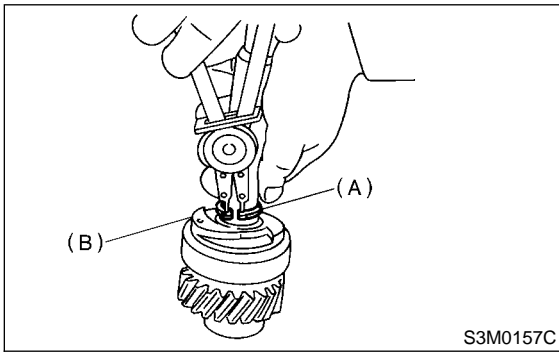


- (A) Input shaft holder
- (B) Input shaft

INPUT SHAFT ASSEMBLY

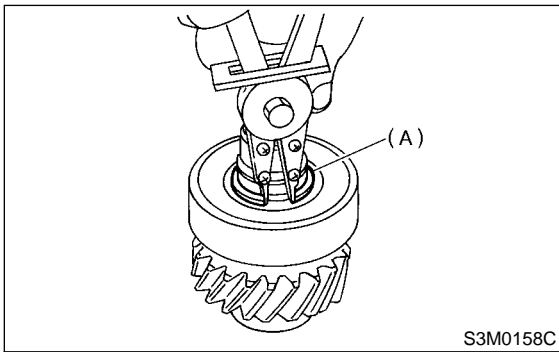
Manual Transmission and Differential

5) Remove outer snap ring. Then remove oil squeeze plate and straight pin.



- (A) Snap ring
- (B) Oil squeeze plate

6) Remove snap ring.

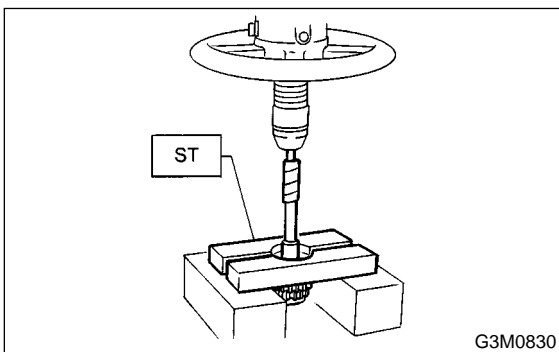


- (A) Snap ring

7) Using a press and ST, remove ball bearing.

NOTE:
Remove inner snap ring before pressing.

ST 498077000 RETAINER



8) Remove oil seal from input shaft holder.

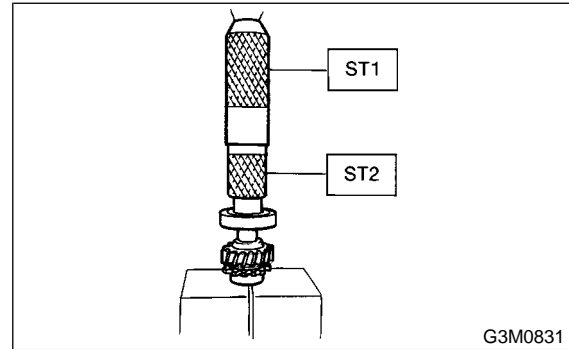
D: ASSEMBLY S503715A02

1) Install ball bearing onto input shaft.

NOTE:

Place snap ring between input shaft gear and ball bearing beforehand. Use the table at 5) as a guide in selecting a suitable snap ring.

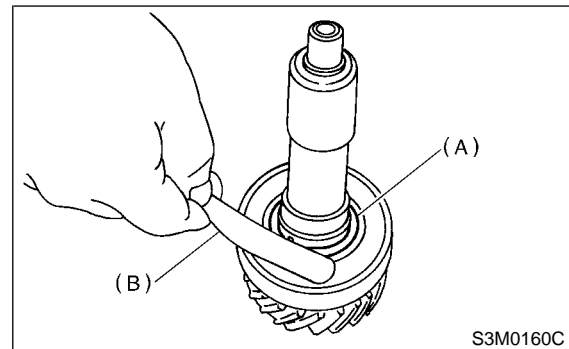
ST1 899580100 INSTALLER
ST2 399513600 INSTALLER



2) Install snap ring on input shaft.

NOTE:

Select a suitable snap ring so that the axial play of ball bearing is held within 0 to 0.12 mm (0 to 0.0047 in).



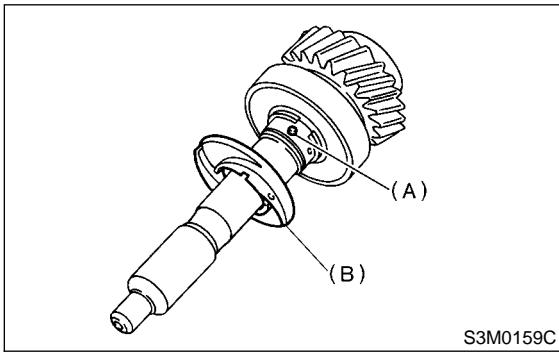
- (A) Snap ring
- (B) Thickness gauge

Snap ring	
Part No.	Thickness mm (in)
805028050	2.48 (0.0976)
805028060	2.56 (0.1008)
805028070	2.64 (0.1039)

INPUT SHAFT ASSEMBLY

Manual Transmission and Differential

3) Install straight pin and oil squeeze plate to input shaft.



- (A) Straight pin
- (B) Oil squeeze plate

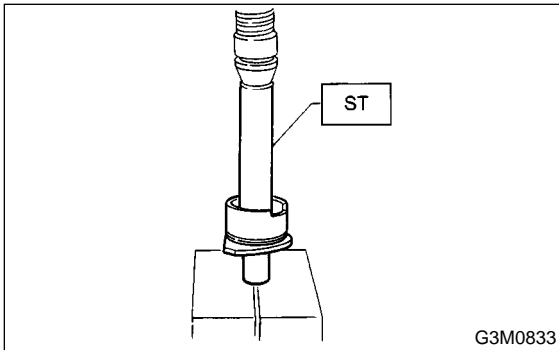
4) Install snap ring.

5) Drive oil seal into input shaft holder.

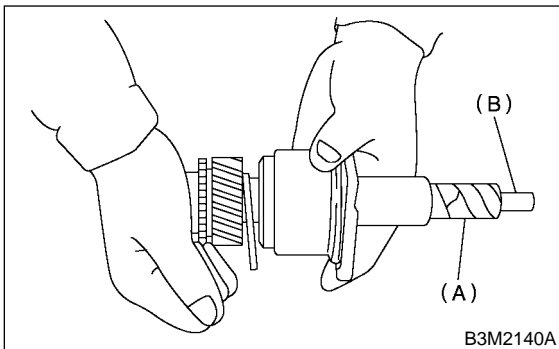
NOTE:

Apply a coat of grease to sealing lips before installing oil seal.

ST 398507703 DUMMY COLLAR



6) Wind vinyl tape around shaft splines and insert input shaft into holder by lightly tapping it by hand.



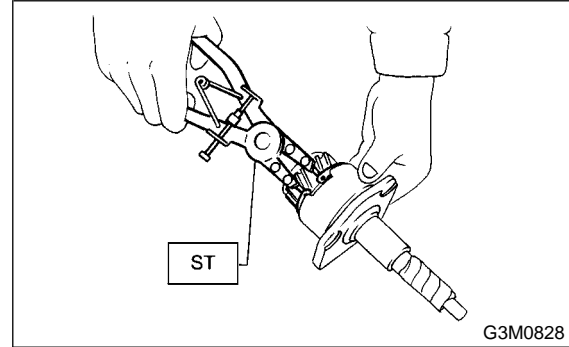
- (A) Vinyl tape
- (B) Input shaft

7) Install snap ring to input shaft holder.

NOTE:

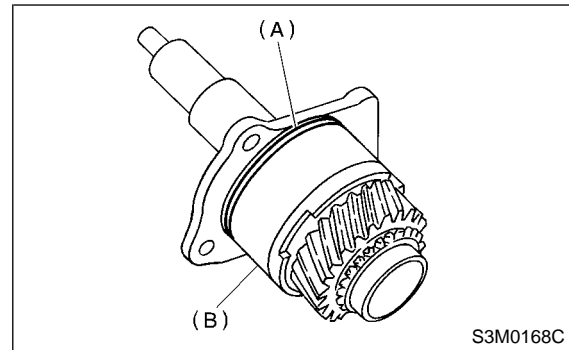
Select a suitable snap ring so that clearance between snap ring and bearing is held within 0 to 0.12 mm (0 to 0.0047 in).

ST 398663600 PLIERS



Snap ring	
Part No.	Thickness mm (in)
805168020	1.84 (0.0724)
805168030	1.92 (0.0756)
805168040	2.00 (0.0787)

8) Install O-ring on input shaft holder.



- (A) O-ring
- (B) Input shaft holder

E: INSPECTION SS03715A10

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.
- Bearings having other defects

2) Bushing (each gear)

Replace the bushing in the following cases:

- When the sliding surface is damaged or abnormally worn.

INPUT SHAFT ASSEMBLY

Manual Transmission and Differential

- 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.

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

5) Shifting insert key

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

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.

19. Drive Pinion Shaft Assembly

S503269

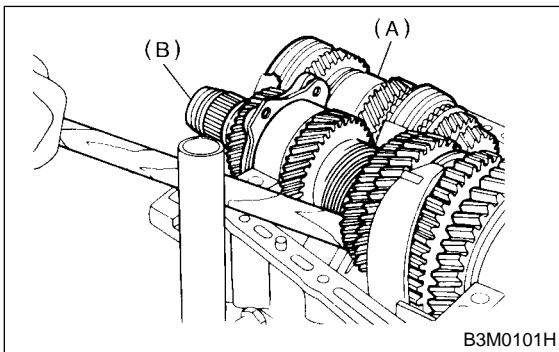
A: REMOVAL

S503269A18

- 1) Remove the manual transmission assembly from vehicle. <Ref. to MT-32 REMOVAL, Manual Transmission Assembly.>
- 2) Remove transfer case with extension case assembly. <Ref. to MT-46 REMOVAL, Transfer Case and Extension Case Assembly.>
- 3) Remove transmission case. <Ref. to MT-60 REMOVAL, Transmission Case.>
- 4) Remove drive pinion shaft assembly.

NOTE:

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



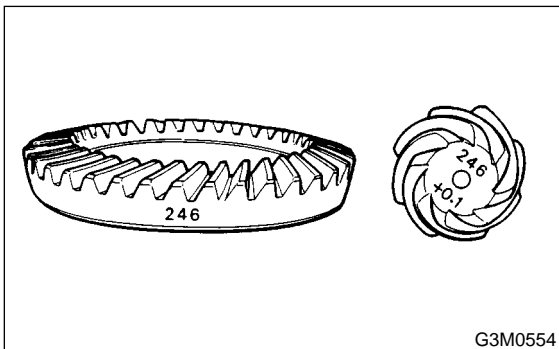
B3M0101H

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

B: INSTALLATION

S503269A11

- 1) Remove differential assembly.
- 2) 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.



G3M0554

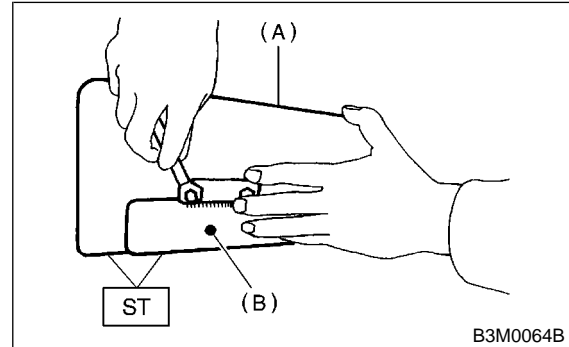
- 3) Place drive pinion shaft assembly on right hand transmission main case without shim and tighten bearing mounting bolts.

- 4) 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



B3M0064B

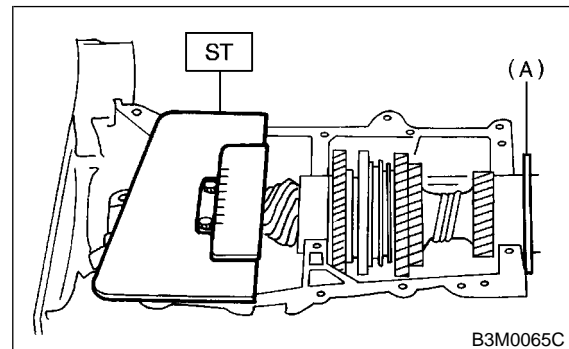
- (A) Plate
(B) Scale

- 5) Position the ST by inserting the knock pin of ST into the knock hole in the transmission case.

ST 499917500 DRIVE PINION GAUGE ASSY

- 6) 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



B3M0065C

- (A) Adjust clearance to zero without shim.

- 7) 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

DRIVE PINION SHAFT ASSEMBLY

Manual Transmission and Differential

8) 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)

9) Install differential assembly. <Ref. to MT-92 INSTALLATION, Front Differential Assembly.>

10) Set transmission main shaft assembly and drive pinion assembly in position. (So there is no clearance between the two when moved all the way to the front). Inspect suitable 1st — 2nd, 3rd — 4th and 5th shifter fork so that coupling sleeve and reverse driven gear are positioned in the center of their cynchronizing mechanisms. <Ref. to MT-88 INSPECTION, Drive Shaft Assembly.>

11) Install transmission case. <Ref. to MT-62 INSTALLATION, Transmission Case.>

12) Install transfer case with extension case assembly. <Ref. to MT-46 INSTALLATION, Transfer Case and Extension Case Assembly.>

13) Install the manual transmission assembly to vehicle. <Ref. to MT-32 INSTALLATION, Manual Transmission Assembly.>

C: DISASSEMBLY

S503269A06

CAUTION:

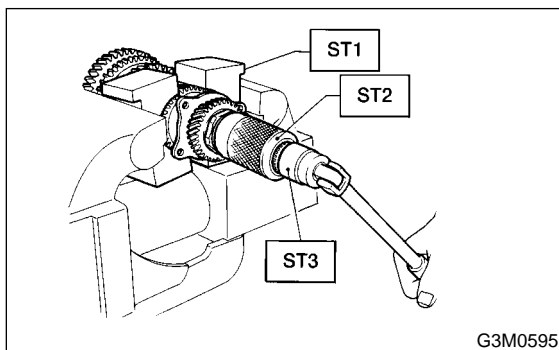
Attach a cloth to the end of driven shaft (on the frictional side of thrust needle bearing) during disassembly or reassembly to prevent damage.

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

ST1 899884100 HOLDER

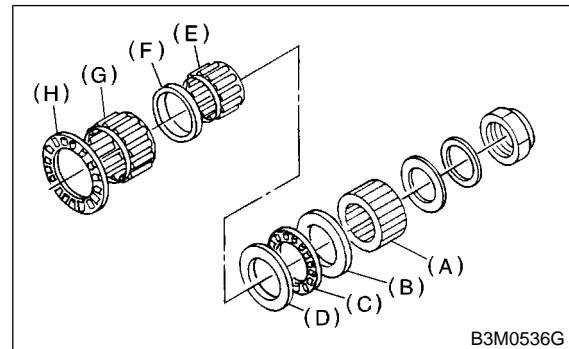
ST2 498427100 STOPPER

ST3 899988608 SOCKET WRENCH (27)



G3M0595

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.



B3M0536G

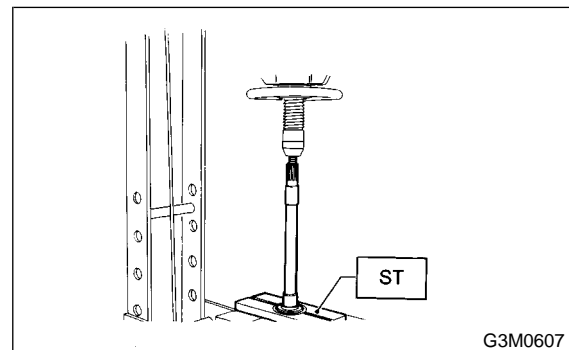
- (A) Differential bevel gear sleeve
- (B) Washer No. 1 (25 × 37.5 × t)
- (C) Thrust bearing (25 × 37.5 × 3)
- (D) Washer No. 2 (25 × 37.5 × 4)
- (E) Needle bearing (25 × 30 × 20)
- (F) Drive pinion collar
- (G) Needle bearing (30 × 37 × 23)
- (H) Thrust bearing (33 × 50 × 3)

3) Remove roller bearing and washer using ST and press.

CAUTION:

Do not reuse roller bearing.

ST 498077000 REMOVER



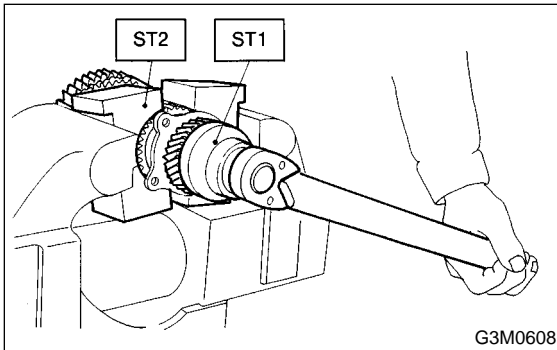
G3M0607

DRIVE PINION SHAFT ASSEMBLY

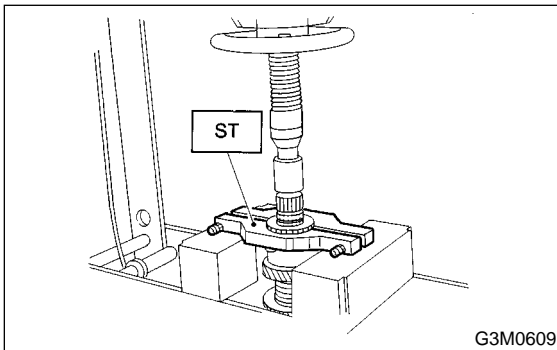
Manual Transmission and Differential

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

ST1 499987300 SOCKET WRENCH (50)
ST2 899884100 HOLDER



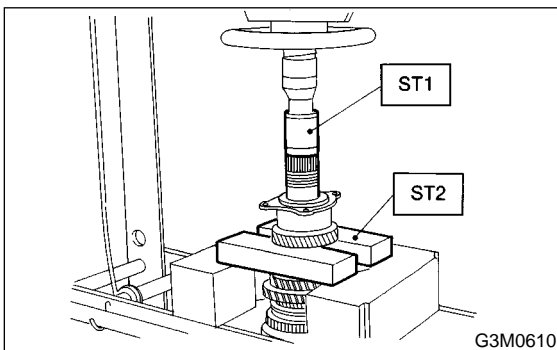
5) Remove 5th driven gear using ST.
ST 499857000 5TH DRIVEN GEAR
REMOVER



6) Remove woodruff key.

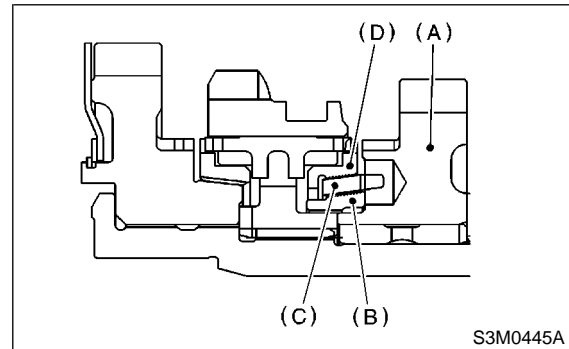
7) Remove roller bearing, 3rd-4th driven gear using ST1 and ST2.

ST1 499757002 INSTALLER
ST2 899714110 REMOVER



8) Remove the key.

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



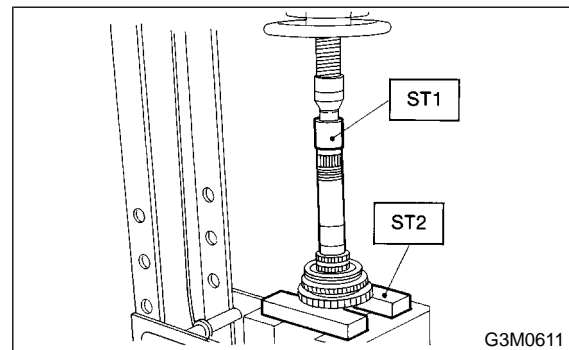
(A) 2nd driven gear
(B) Inner baulk ring
(C) Synchro cone
(D) Outer baulk ring

10) 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 INSTALLER
ST2 899714110 REMOVER



11) Remove sub gear for 1st driven gear.

DRIVE PINION SHAFT ASSEMBLY

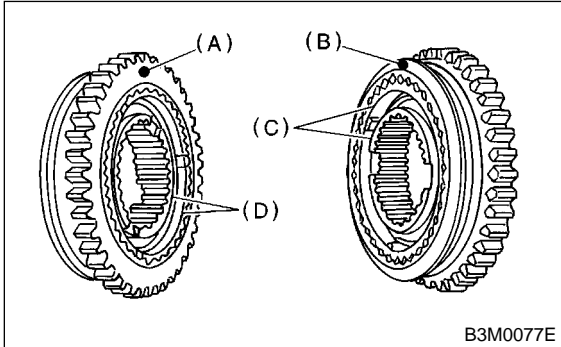
Manual Transmission and Differential

D: ASSEMBLY S503269A02

1) Install sleeve and assembly by matching alignment marks.

NOTE:

- Use new gear and hub assembly, if gear or hub have been replaced.



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

2) Install washer, snap ring and sub gear to 1st driven gear.

3) Install 1st driven gear, 1st baulk ring, gear and hub assembly onto driven shaft.

NOTE:

- Take care to install gear and hub assembly in proper direction.
- Align baulk ring and gear & hub assembly with key groove.

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

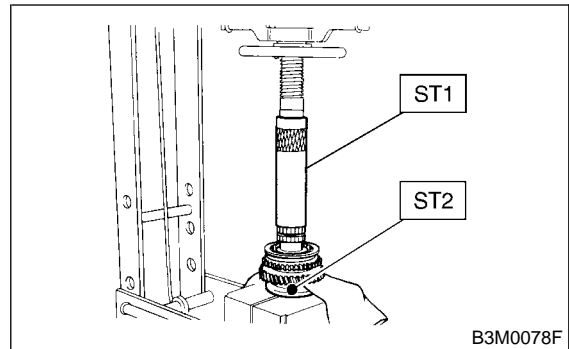
CAUTION:

- Attach a cloth to the end of driven shaft to prevent damage.
- Do not apply pressure in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).

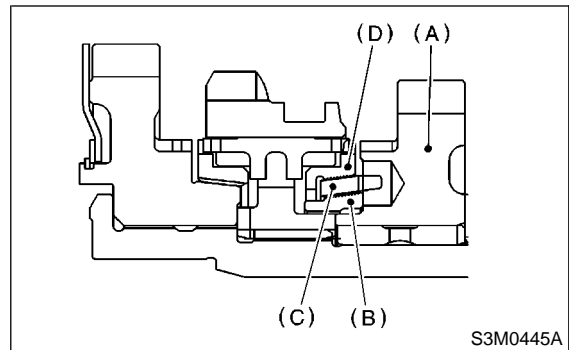
NOTE:

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

ST1 499277200 INSTALLER
ST2 499587000 INSTALLER



5) 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

DRIVE PINION SHAFT ASSEMBLY

Manual Transmission and Differential

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

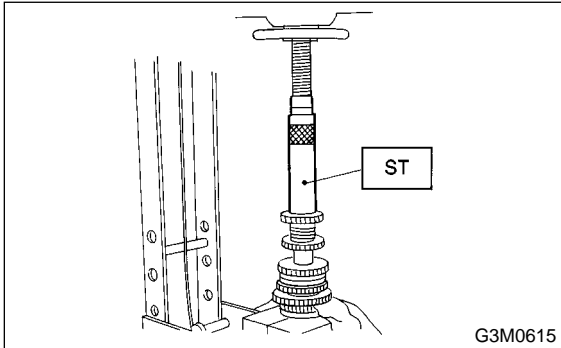
CAUTION:

Do not apply pressure in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).

NOTE:

Align groove in baulk ring with insert.

ST 499277200 INSTALLER

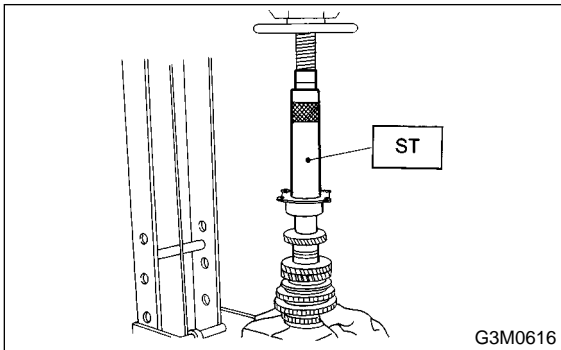


7) Install a set of roller bearings onto the driven shaft using ST and press.

CAUTION:

Do not apply pressure in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).

ST 499277200 INSTALLER

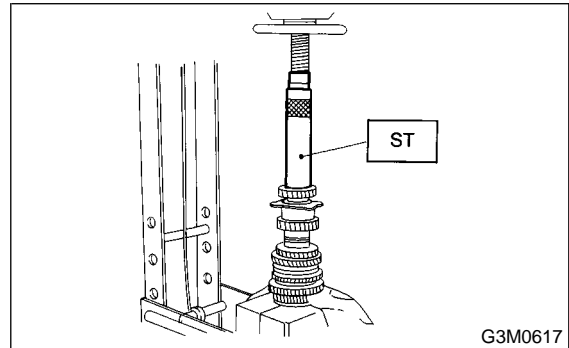


8) Position woodruff key in groove on the rear of driven shaft. Install 5th driven gear onto drive shaft using ST and press.

CAUTION:

Do not apply pressure in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).

ST 499277200 INSTALLER

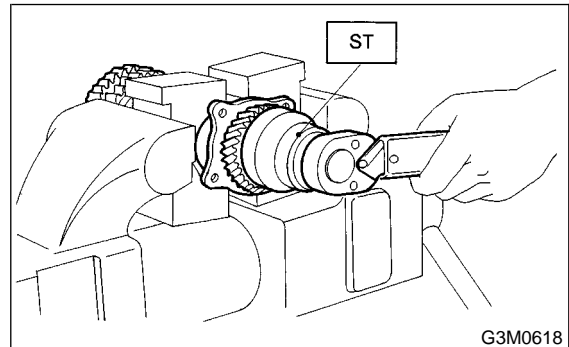


9) Install lock washer. Install lock nut and tighten to the specified torque using ST.

ST 499987300 SOCKET WRENCH (50)

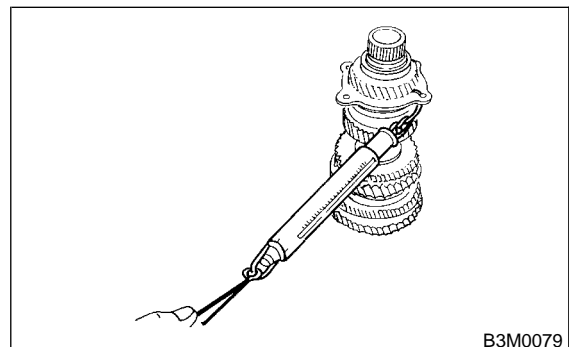
Tightening torque:

265 N·m (27 kgf·m, 195 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 (0.01 to 0.15 kgf, 0.02 to 0.33ft).



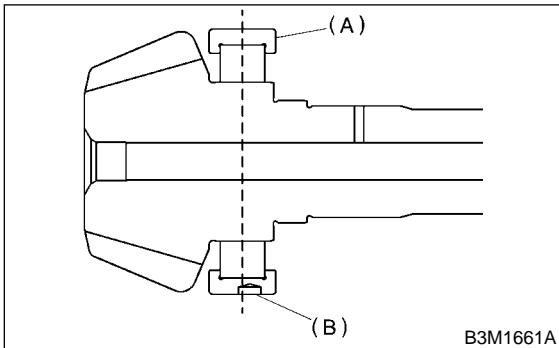
DRIVE PINION SHAFT ASSEMBLY

Manual Transmission and Differential

10) Install roller bearing onto drive pinion.

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

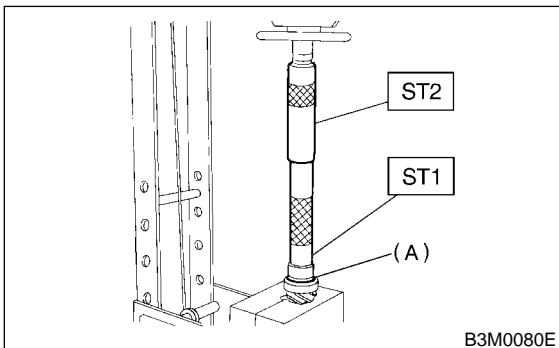
11) Install washer using ST1, ST2 and press.

CAUTION:

Do not apply pressure in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).

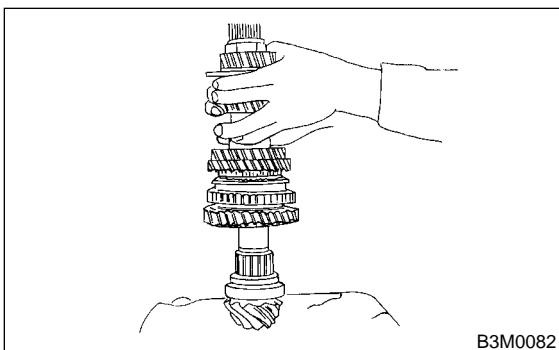
ST1 499277100 BUSH 1-2 INSTALLER

ST2 499277200 INSTALLER



- (A) Washer

12) Install thrust bearing and needle bearing. Install driven shaft assembly.

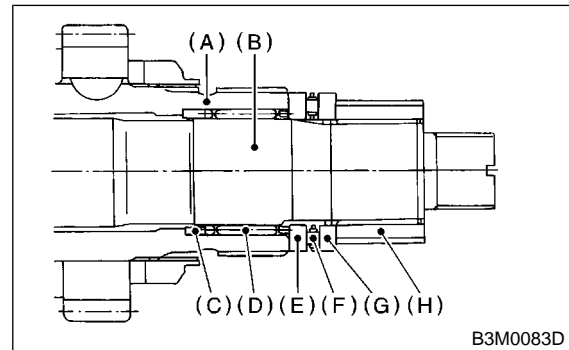


B3M0082

13) 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 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

E: INSPECTION S503269A10

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

1) Bearings

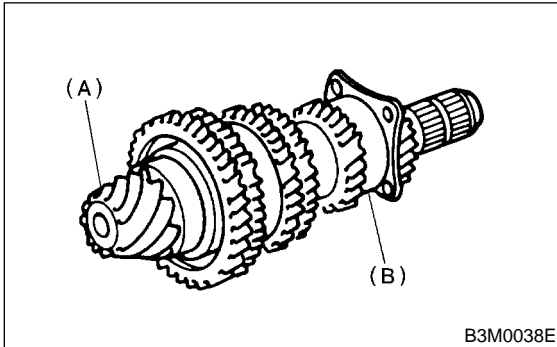
Replace bearings in the following cases:

- 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.

DRIVE PINION SHAFT ASSEMBLY

Manual Transmission and Differential

- 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.

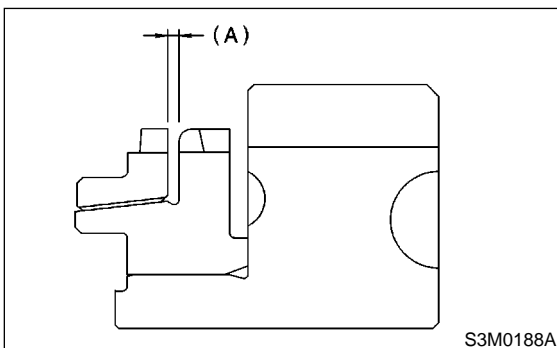


(A) Drive pinion shaft
(B) Ball bearing

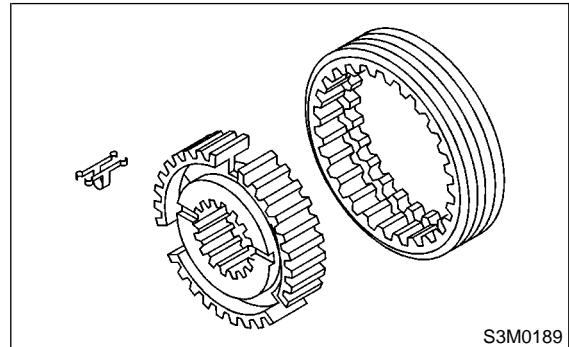
- Bearings having other defects
- 2) Bushing (each gear)
Replace the bushing in the following cases:
 - When the sliding surface is damaged or abnormally worn.
 - When the inner wall is abnormally worn.
 - 3) Gears
 - Replace gears with new ones if their tooth surfaces are broken, damaged, or excessively 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.
 - 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 key
Replace the insert if deformed, excessively worn, or defective in any way.



- 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.

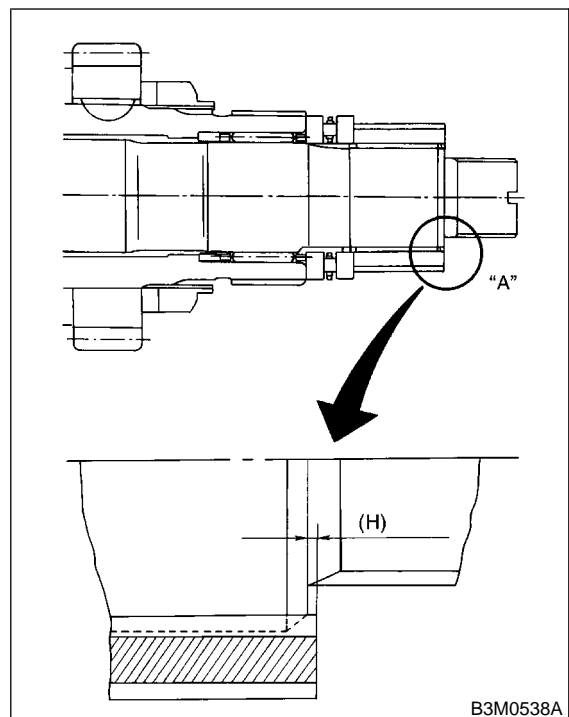
F: ADJUSTMENT

S503269A01

1. THRUST BEARING PRELOAD

S503269A0101

- 1) After completing the preceding steps 1) through 3), select adjusting washer No. 1 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).



DRIVE PINION SHAFT ASSEMBLY

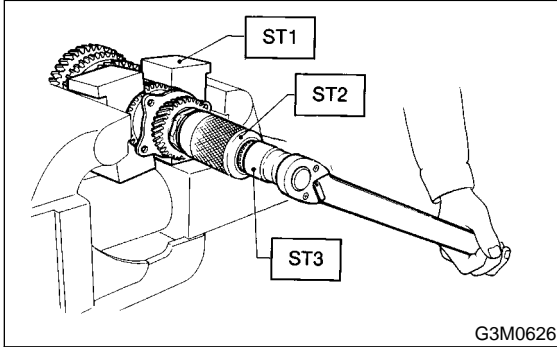
Manual Transmission and Differential

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 N·m (12 kgf-m, 86.8 ft-lb)

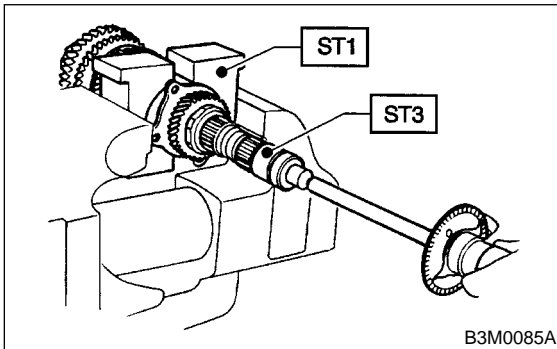


3) After removing ST2, measure starting torque using torque driver.

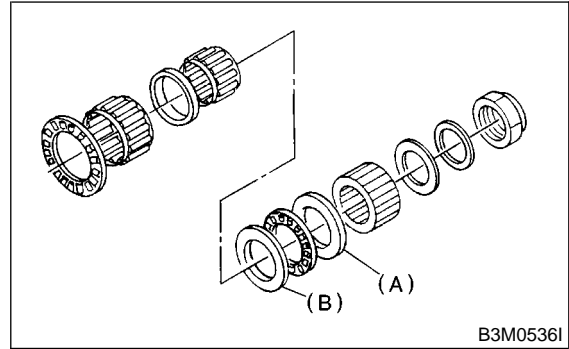
ST1 899884100 HOLDER
 ST3 899988608 SOCKET WRENCH (27)

Starting torque:

0.3–0.8 N·m (0.03–0.08 kgf-m, 0.2–0.6 ft-lb)



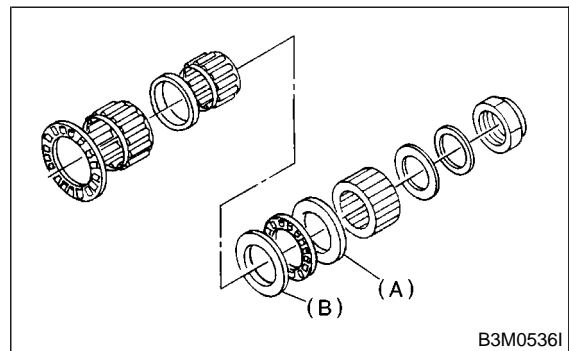
4) If starting torque is not within specified limit, select new adjusting washer No. 1 and recheck starting torque.



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

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)

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.



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

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)

DRIVE PINION SHAFT ASSEMBLY

Manual Transmission and Differential

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

FRONT DIFFERENTIAL ASSEMBLY

Manual Transmission and Differential

20. Front Differential Assembly

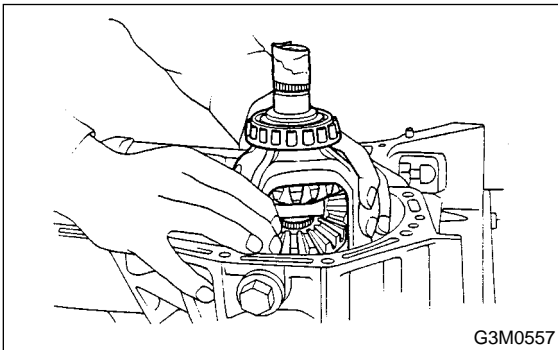
S503152

A: REMOVAL S503152A18

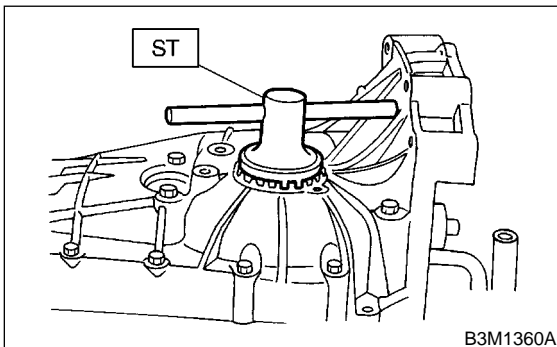
- 1) Remove the manual transmission assembly from vehicle. <Ref. to MT-32 REMOVAL, Manual Transmission Assembly.>
- 2) Remove transfer case with extension case assembly. <Ref. to MT-46 REMOVAL, Transfer Case and Extension Case Assembly.>
- 3) Remove transmission case. <Ref. to MT-60 REMOVAL, Transmission Case.>
- 4) Removes drive pinion shaft assembly. Remove transfer case with extension case assembly. <Ref. to MT-83 REMOVAL, Drive Pinion Shaft Assembly.>
- 5) Remove main shaft assembly.
Single-range model:
<Ref. to MT-67 REMOVAL, Main Shaft Assembly for Single-Range.>
Dual-range model:
<Ref. to MT-73 REMOVAL, Main Shaft Assembly for Dual-Range.>
- 6) Remove differential assembly.

CAUTION:

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



- 7) Remove differential side retainers using ST. ST 499787000 WRENCH ASSY



B: INSTALLATION S503152A11

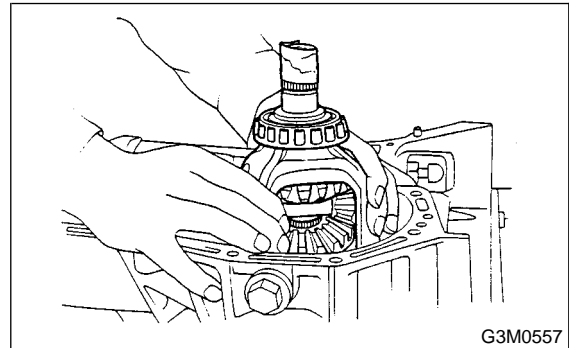
- 1) Install differential side retainers using ST. ST 499787000 WRENCH ASSY
- 2) Install differential assembly.

CAUTION:

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

NOTE:

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



- 3) Install main shaft assembly.
Single-range model:
<Ref. to MT-67 INSTALLATION, Main Shaft Assembly for Single-Range.>
Dual-range:
<Ref. to MT-73 INSTALLATION, Main Shaft Assembly for Dual-Range.>
- 4) Install drive pinion assembly. <Ref. to MT-83 INSTALLATION, Drive Pinion Shaft Assembly.>
- 5) Install transmission case. <Ref. to MT-62 INSTALLATION, Transmission Case.>
- 6) Install transfer case with extension case assembly. <Ref. to MT-46 INSTALLATION, Transfer Case and Extension Case Assembly.>
- 7) Install the manual transmission assembly to vehicle. <Ref. to MT-35 INSTALLATION, Manual Transmission Assembly.>

C: DISASSEMBLY S503152A06

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

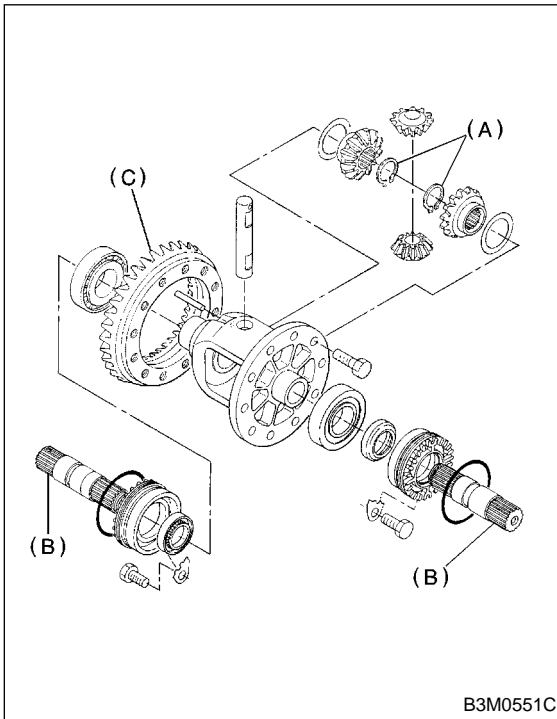
NOTE:

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

FRONT DIFFERENTIAL ASSEMBLY

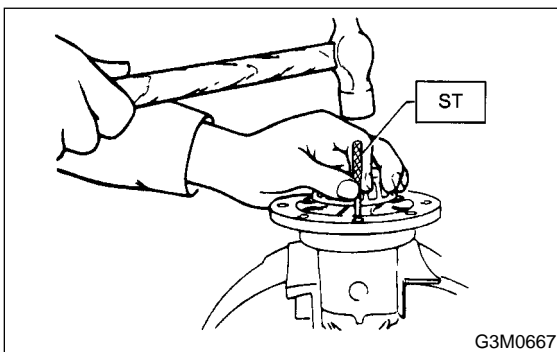
Manual Transmission and Differential

2) Loosen twelve bolts and remove hypoid driven gear.

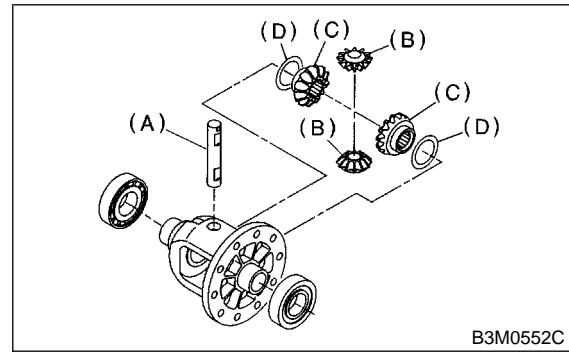


- (A) Snap ring
- (B) Axle drive shaft
- (C) Hypoid driven gear

3) Drive out straight pin from differential assembly toward hypoid driven gear.
ST 899904100 REMOVER

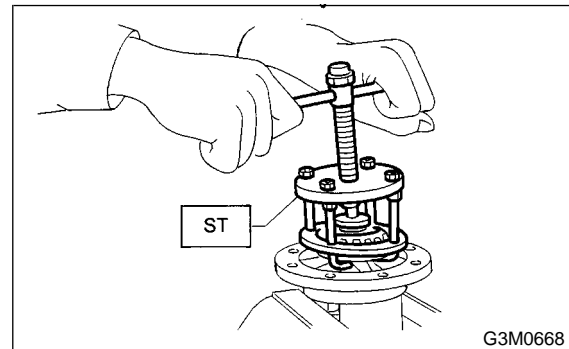


4) Pull out pinion shaft, and remove differential bevel pinion and gear and washer.



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

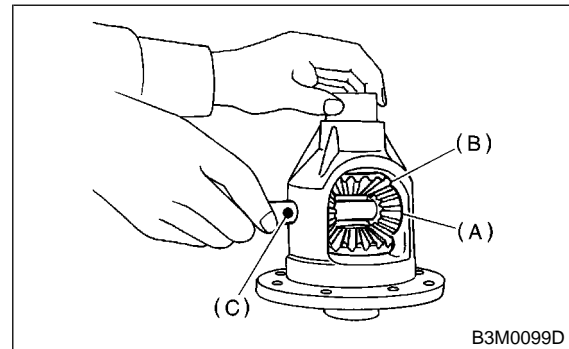
5) Remove roller bearing using ST.
ST 399527700 PULLER SET



D: ASSEMBLY S503152A02

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

NOTE:
Face the chamfered side of washer toward gear.



- (A) Bevel pinion
- (B) Bevel gear
- (C) Pinion shaft

FRONT DIFFERENTIAL ASSEMBLY

Manual Transmission and Differential

2) Measure backlash between bevel gear and pinion. If it is not within specifications, install a suitable washer to adjust it. <Ref. to MT-96 ADJUSTMENT, Front Differential Assembly.>

NOTE:

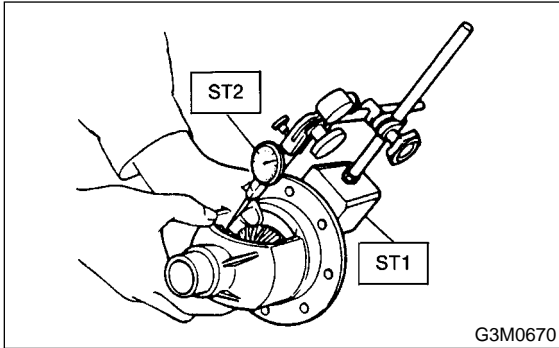
Be sure the pinion gear tooth contacts adjacent gear teeth during measurement.

ST1 498247001 MAGNET BASE

ST2 498247100 DIAL GAUGE

Standard backlash:

0.13 — 0.18 mm (0.0051 — 0.0071 in)

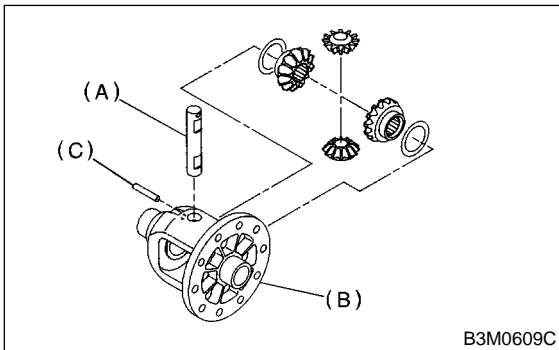


3) Align pinion shaft and differential case at their holes, and drive straight pin into holes from the hypoid driven gear side, using ST.

NOTE:

Lock straight pin after installing.

ST 899904100 REMOVER



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

4) Install roller bearing to differential case.

CAUTION:

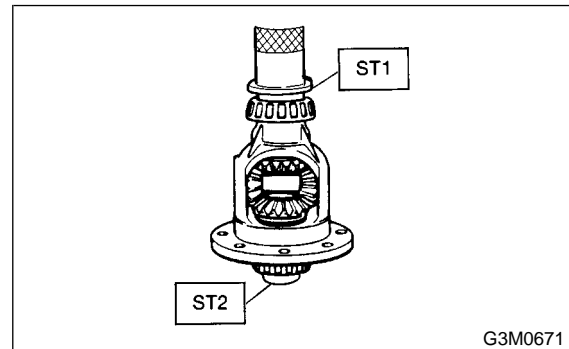
Do not apply pressure in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).

NOTE:

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

ST1 499277100 BUSH 1-2 INSTALLER

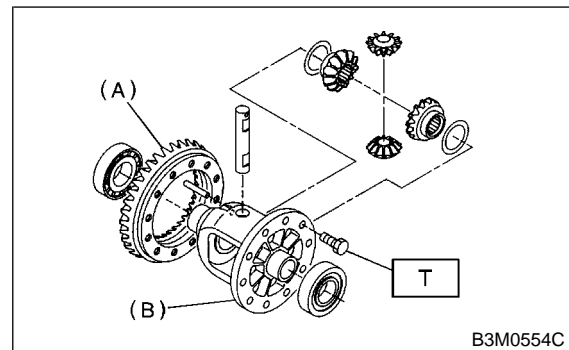
ST2 398497701 ADAPTER



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

Tightening torque:

T: 62 N·m (6.3 kgf·m, 45.6 ft·lb)



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

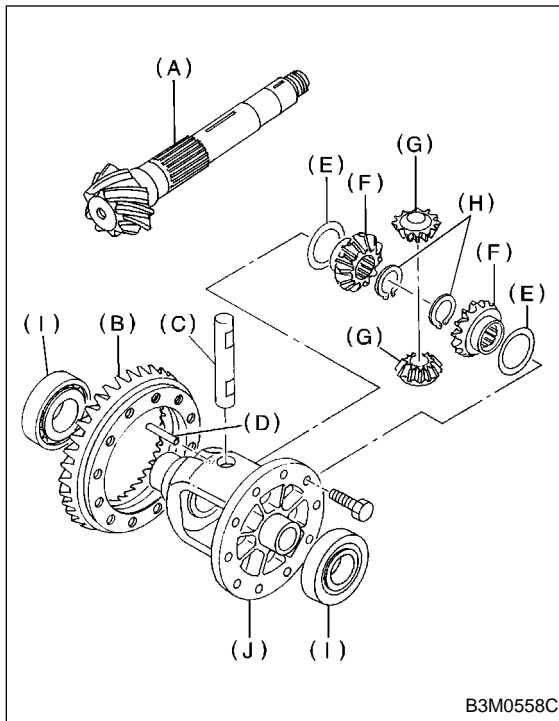
E: INSPECTION S503152A10

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.

FRONT DIFFERENTIAL ASSEMBLY

Manual Transmission and Differential



B3M0558C

- (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

1. BEVEL PINION GEAR BACKLASH

S503152A1001

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

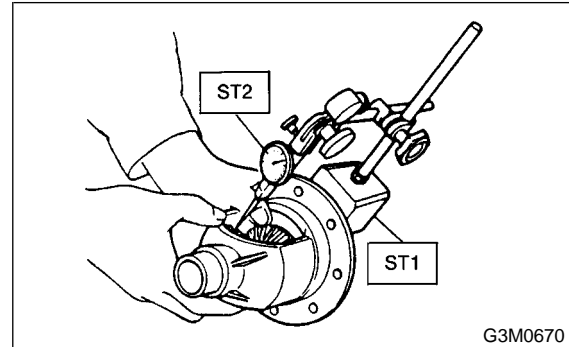
NOTE:

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)



G3M0670

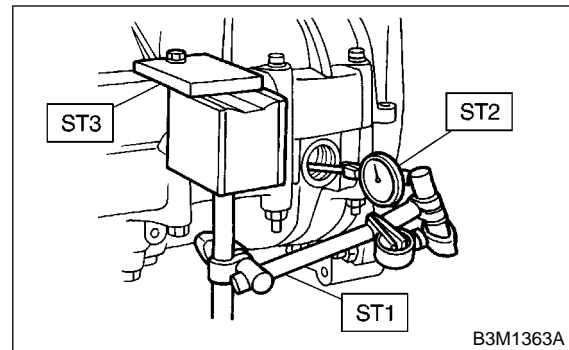
2. HYPOID GEAR BACKLASH S503152A1002

Set ST1, ST2 and ST3. 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
- ST3 498255400 PLATE

Backlash:

0.13 — 0.18 mm (0.0051 — 0.0071 in)



B3M1363A

NOTE:

If backlash is outside specified range, adjust it by turning holder in right side case.

3. TOOTH CONTACT OF HYPOID GEAR

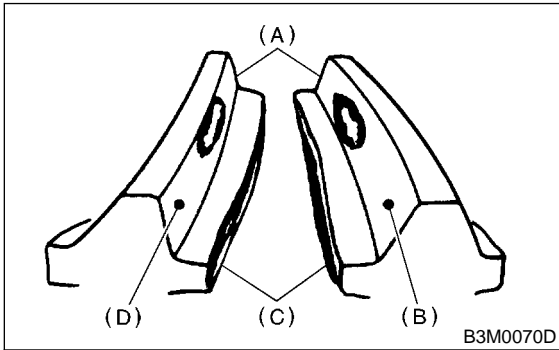
S503152A1003

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 inaccurate, make adjustment. <Ref. to MT-96 ADJUSTMENT, Front Differential Assembly.>

FRONT DIFFERENTIAL ASSEMBLY

Manual Transmission and Differential

- Tooth contact is correct.



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

F: ADJUSTMENT

S503152A01

1. BEVEL PINION GEAR BACKLASH

S503152A0101

- 1) Disassemble the front differential. <Ref. to MT-92 REMOVAL, Front Differential Assembly.>
- 2) Select a different washer from the table and install.

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

- 3) Adjust until the specified value is obtained.

Standard backlash:

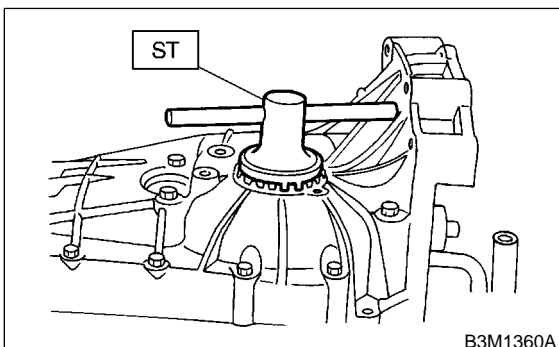
0.13 — 0.18 mm (0.0051 — 0.0071 in)

2. HYPOID GEAR BACKLASH

S503152A0102

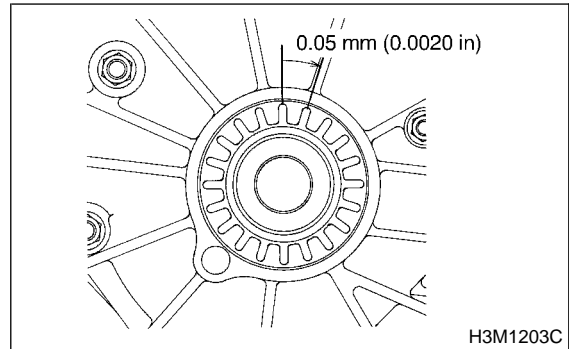
Adjust backlash by turning holder in right side case.

ST 499787000 WRENCH ASSY



NOTE:

Each time holder rotates one tooth, backlash changes by 0.05 mm (0.020 in).

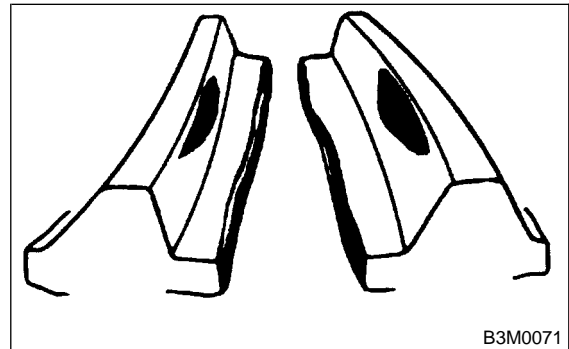


3. TOOTH CONTACT OF HYPOID GEAR

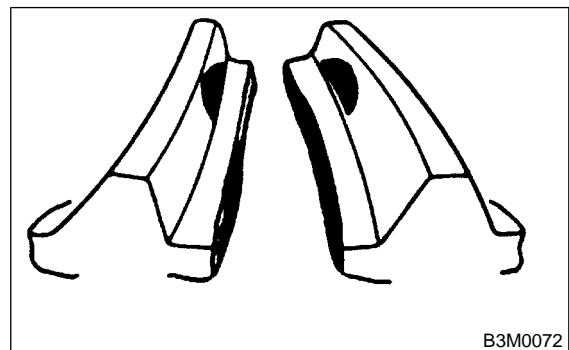
S503152A0103

Adjust until the teeth contact is correct.

- 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.

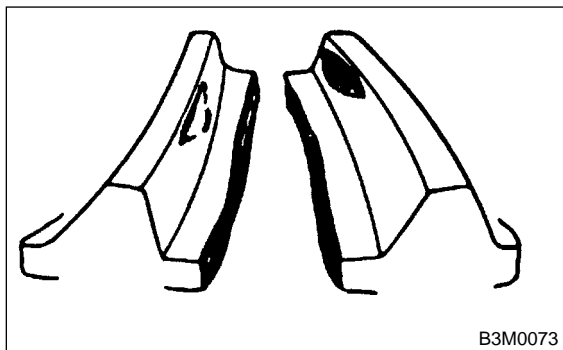


- Backlash is insufficient.
To increase backlash, loosen holder on the lower side (case left side) and turn in the holder on the upper side (case right side) by the same amount.

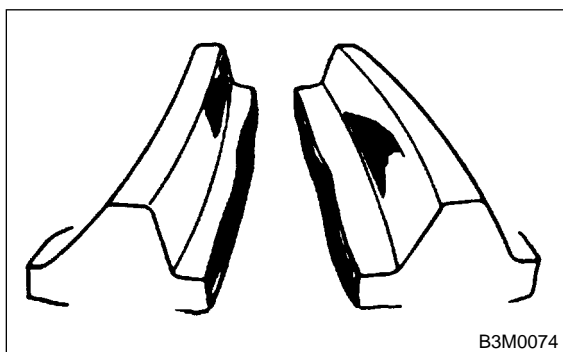


FRONT DIFFERENTIAL ASSEMBLY

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



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



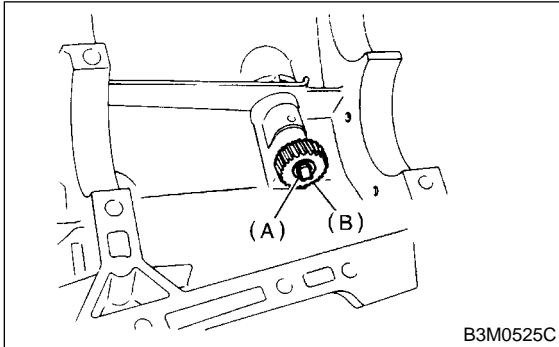
SPEEDOMETER GEAR

Manual Transmission and Differential

21. Speedometer Gear S503268

A: REMOVAL S503268A18

- 1) Remove the manual transmission assembly from vehicle. <Ref. to MT-32 REMOVAL, Manual Transmission Assembly.>
- 2) Remove back-up light switch and neutral position switch. <Ref. to MT-42 REMOVAL, Switches and Harness.>
- 3) Remove transfer case with extension case assembly. <Ref. to MT-46 REMOVAL, Transfer Case and Extension Case Assembly.>
- 4) Remove transmission case. <Ref. to MT-60 REMOVAL, Transmission Case.>
- 5) Remove vehicle speed sensor. <Ref. to MT-44 REMOVAL, Vehicle Speed Sensor.>
- 6) Remove outer snap ring and pull out speedometer driven gear. Next, remove oil seal, speedometer shaft and washer.



- (A) Outer snap ring
(B) Speedometer driven gear

B: INSTALLATION S503268A11

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

CAUTION:

Use new oil seal, if it has been removed.

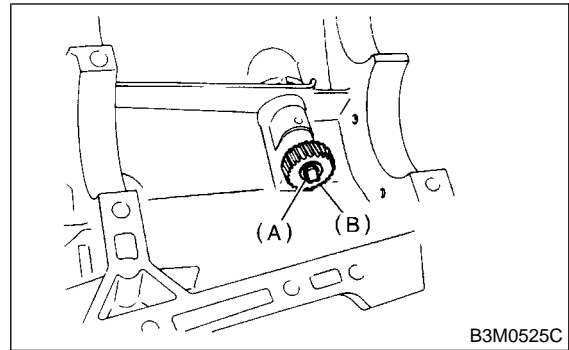
ST 899824100 or 499827000 PRESS

- 2) Install vehicle speed sensor. <Ref. to MT-44 INSTALLATION, Vehicle Speed Sensor.>

- 3) Install speedometer driven gear and snap ring.

CAUTION:

Use new snap ring, if it has been removed.



- (A) Outer snap ring
(B) Speedometer driven gear

- 4) Install transmission case. <Ref. to MT-62 INSTALLATION, Transmission Case.>
- 5) Install transfer case with extension case assembly. <Ref. to MT-46 INSTALLATION, Transfer Case and Extension Case Assembly.>
- 6) Install back-up light switch and neutral position switch. <Ref. to MT-43 INSTALLATION, Switches and Harness.>
- 7) Install the manual transmission assembly to vehicle. <Ref. to MT-35 INSTALLATION, Manual Transmission Assembly.>

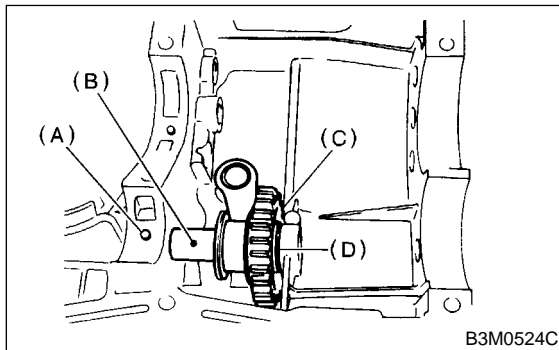
C: INSPECTION S503268A10

Check the speedometer gear, oil seal and speedometer shaft for damage. Replace if damaged.

22. Reverse Idler Gear S503263

A: REMOVAL S503263A18

- 1) Remove the manual transmission assembly from vehicle. <Ref. to MT-32 REMOVAL, Manual Transmission Assembly.>
- 2) Remove back-up light switch and neutral position switch. <Ref. to MT-42 REMOVAL, Switches and Harness.>
- 3) Remove transfer case with extension case assembly. <Ref. to MT-46 REMOVAL, Transfer Case and Extension Case Assembly.>
- 4) Remove transmission case. <Ref. to MT-83 REMOVAL, Transmission Case.>
- 5) Remove drive pinion shaft assembly. <Ref. to MT-83 REMOVAL, Drive Pinion Shaft Assembly.>
- 6) Remove main shaft assembly.
Single-range model:
<Ref. to MT-67 REMOVAL, Main Shaft Assembly for Single-Range.>
Dual-range model:
<Ref. to MT-73 REMOVAL, Main Shaft Assembly for Dual-Range.>
- 7) Remove differential assembly. <Ref. to MT-92 REMOVAL, Front Differential Assembly.>
- 8) Remove shifter forks and rods. <Ref. to MT-101 REMOVAL, Shifter Fork and Rod.>
- 9) 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

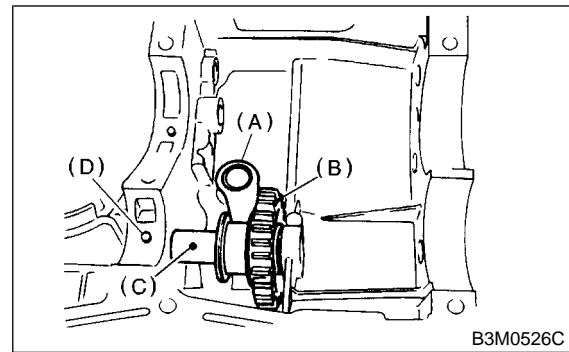
- 10) Remove reverse shifter lever.

B: INSTALLATION S503263A11

- 1) 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

- 2) Inspect and adjust clearance between reverse idler gear and transmission case wall. <Ref. to MT-99 INSTALLATION, Reverse Idler Gear.> and <Ref. to MT-100 ADJUSTMENT, Reverse Idler Gear.>
- 3) Install shifter forks and rods. <Ref. to MT-101 INSTALLATION, Shifter Fork and Rod.>
- 4) Install differential assembly. <Ref. to MT-92 INSTALLATION, Front Differential Assembly.>
- 5) Install main shaft assembly.
Single-range model:
<Ref. to MT-67 INSTALLATION, Main Shaft Assembly for Single-Range.>
Dual-range:
<Ref. to MT-73 INSTALLATION, Main Shaft Assembly for Dual-Range.>
- 6) Install drive pinion shaft assembly. <Ref. to MT-83 INSTALLATION, Drive Pinion Shaft Assembly.>
- 7) Install transmission case. <Ref. to MT-62 INSTALLATION, Transmission Case.>
- 8) Install transfer case with extension case assembly. <Ref. to MT-46 INSTALLATION, Transfer Case and Extension Case Assembly.>
- 9) Install back-up light switch and neutral position switch. <Ref. to MT-43 INSTALLATION, Switches and Harness.>
- 10) Install the manual transmission assembly to vehicle. <Ref. to MT-35 INSTALLATION, Manual Transmission Assembly.>

REVERSE IDLER GEAR

Manual Transmission and Differential

C: INSPECTION

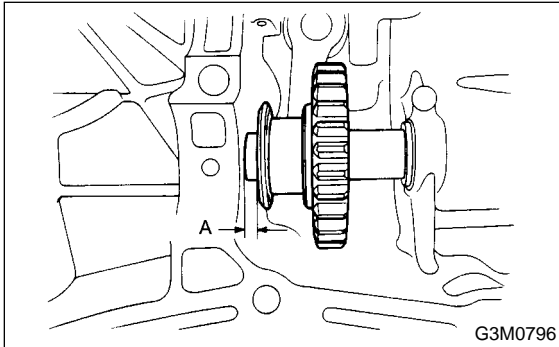
S503263A10

1) Move the reverse shifter rod toward the reverse side. Inspect clearance between reverse idler gear and transmission case wall.

If out of specification, select the appropriate reverse shifter lever and adjust.

Clearance A:

6.0 — 7.5 mm (0.236 — 0.295 in)

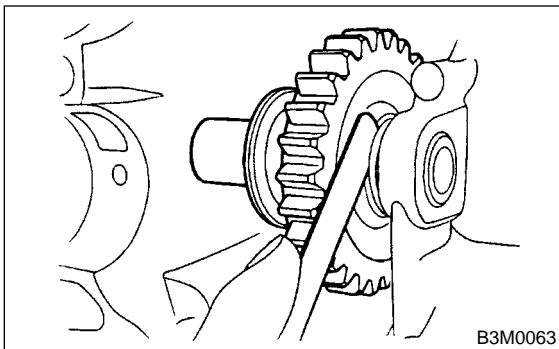


2) After installing a suitable reverse shifter lever, shift into neutral. Inspect clearance between reverse idler gear and transmission case wall.

If out of specification, select the appropriate washer and adjust.

Clearance:

0 — 0.5 mm (0 — 0.020 in)



3) Check the reverse idler gear and shaft for damage. Replace if damaged.

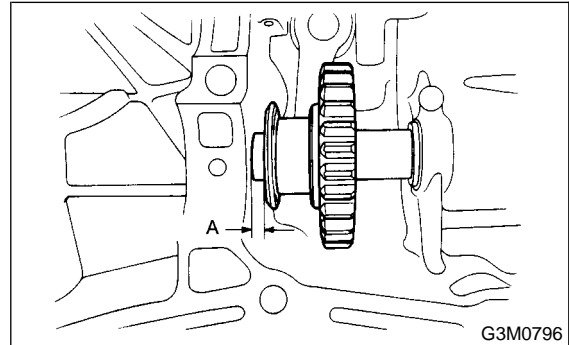
D: ADJUSTMENT

S503263A01

1) Select the appropriate reverse shifter lever from the table below, and adjust until the gap between the reverse idler gear and transmission case wall is within specification.

Clearance A:

6.0 — 7.5 mm (0.236 — 0.295 in)

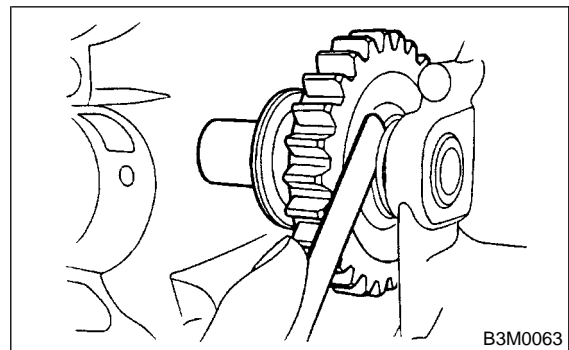


Reverse shifter lever		
Part No.	Mark	Remarks
32820AA070	7	Further from case wall
32820AA080	8	Standard
32820AA090	9	Closer to case wall

2) Select the appropriate washer from the table below, and adjust until the gap between the reverse idler gear and transmission case wall is within specification.

Clearance:

0 — 0.5 mm (0 — 0.020 in)



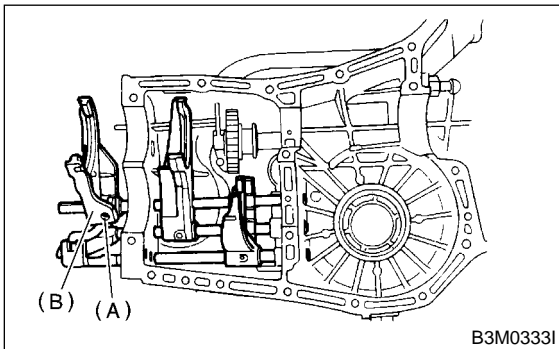
Washer	
Part No.	Thickness mm (in)
803020151	0.4 (0.016)
803020152	1.1 (0.043)
803020153	1.5 (0.059)
803020154	1.9 (0.075)
803020155	2.3 (0.091)

23. Shifter Fork and Rod S503255

A: REMOVAL S503255A18

- 1) Remove the manual transmission assembly from vehicle. <Ref. to MT-32 REMOVAL, Manual Transmission Assembly.>
- 2) Remove back-up light switch and neutral position switch. <Ref. to MT-42 REMOVAL, Switches and Harness.>
- 3) Remove transfer case with extension case assembly. <Ref. to MT-46 REMOVAL, Transfer Case and Extension Case Assembly.>
- 4) Remove transmission case. <Ref. to MT-60 REMOVAL, Transmission Case.>
- 5) Remove drive pinion shaft assembly. <Ref. to MT-83 REMOVAL, Drive Pinion Shaft Assembly.>
- 6) Remove main shaft assembly.
Single-range model:
<Ref. to MT-67 REMOVAL, Main Shaft Assembly for Single-Range.>
Dual-range model:
<Ref. to MT-73 REMOVAL, Main Shaft Assembly for Dual-Range.>
- 7) Remove differential assembly. <Ref. to MT-92 REMOVAL, Front Differential Assembly.>
- 8) Drive out straight pin with ST, and 5th shifter fork.

ST 398791700 STRAIGHT PIN REMOVER

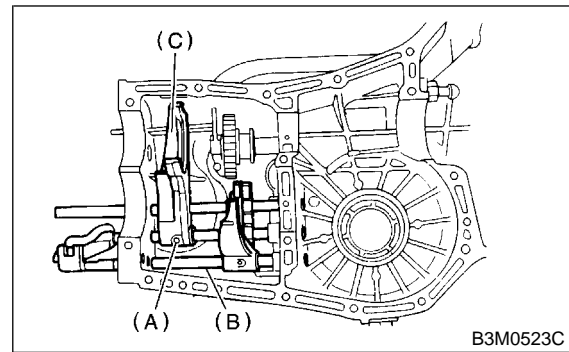


- (A) Straight pin
- (B) 5th shifter fork

- 9) Remove plugs, springs and checking balls.
- 10) 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 the inside of the case so that it does not hit against the case.



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

- 11) Drive out straight pin, and pull out 1-2 fork rod and shifter fork.
- 12) 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.

- 13) Remove reverse shifter lever.

B: INSTALLATION S503255A11

- 1) Install reverse arm fork spring, ball and interlock plunger 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

- 2) Position ball, 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.

- 3) Install 1-2 fork rod into 1-2 shifter fork via the hole on the rear of the transmission case.
- 4) Align the holes in rod and fork, and drive straight pin into these holes using ST.

CAUTION:

Replace straight pin with a new one.

NOTE:

- Set other rods to neutral.
- Make sure interlock plunger is on the 3-4 fork rod side.

ST 398791700 STRAIGHT PIN REMOVER

- 5) Install interlock plunger onto 3-4 fork rod.

SHIFTER FORK AND ROD

CAUTION:

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

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

7) Align the holes in rod and fork, and drive straight pin into these holes.

CAUTION:

Replace straight pin with a new one.

NOTE:

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

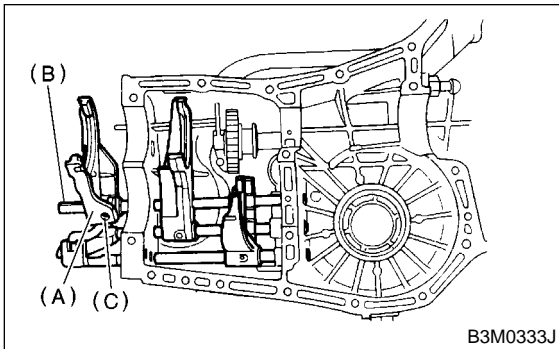
ST 398791700 STRAIGHT PIN REMOVER

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

CAUTION:

Replace straight pin with a new one.

ST 398791700 STRAIGHT PIN REMOVER

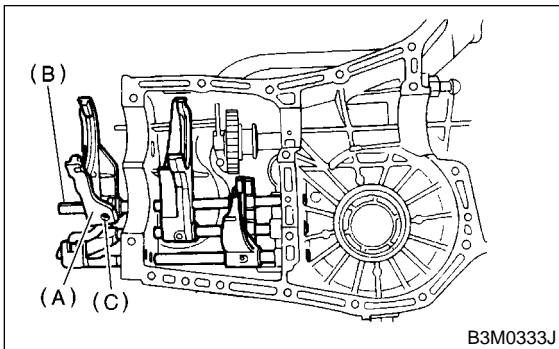


- (A) 5th shifter fork
- (B) Reverse fork rod
- (C) Straight pin

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

CAUTION:

Replace gasket with a new one.



12) Install drive pinion shaft assembly. <Ref. to MT-83 INSTALLATION, Drive Pinon Shaft Assembly.>

13) Install transmission case. <Ref. to MT-62 INSTALLATION, Transmission Case.>

14) Install transfer case with extension case assembly. <Ref. to MT-46 INSTALLATION, Transfer Case and Extension Case Assembly.>

15) Install back-up light switch and neutral position switch. <Ref. to MT-43 INSTALLATION, Switches and Harness.>

16) Install the manual transmission assembly to vehicle. <Ref. to MT-35 INSTALLATION, Manual Transmission Assembly.>

C: INSPECTION S503255A10

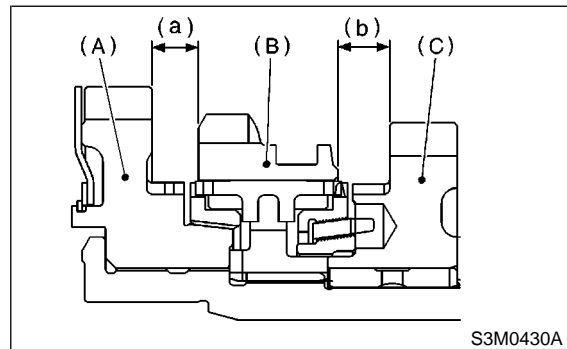
1) Check the shift shaft and shift rod for damage. Replace if damaged.

2) Gearshift mechanism

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

3) Inspect clearance between 1st, 2nd driven gear and reverse driven gear. If any clearance is not within specifications, replace shifter fork as required.

Clearance (a) and (b):
9.5 mm (0.374 in)



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

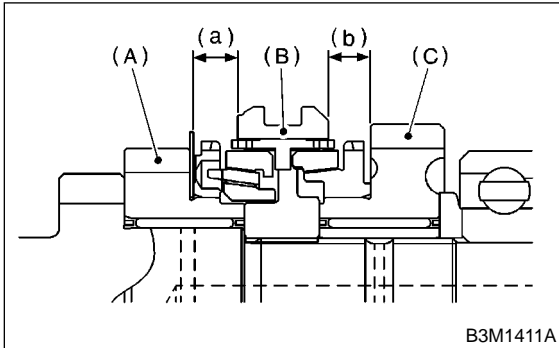
1st-2nd shifter fork		
Part No.	Mark	Remarks
32804AA060	1	Approach to 1st gear by 0.2 mm (0.008 in).
32804AA070	—	Standard
32804AA080	3	Become distant from 2nd gear by 0.2 mm (0.008 in).

10) Install differential assembly. <Ref. to MT-92 INSTALLATION, Front Differential Assembly.>

11) Install main shaft assembly.

4) Inspect clearance between 3rd, 4th drive gear and coupling sleeve. If any clearance is not within specifications, replace shifter fork as required.

Clearance (a) and (b):
9.3 mm (0.366 in)

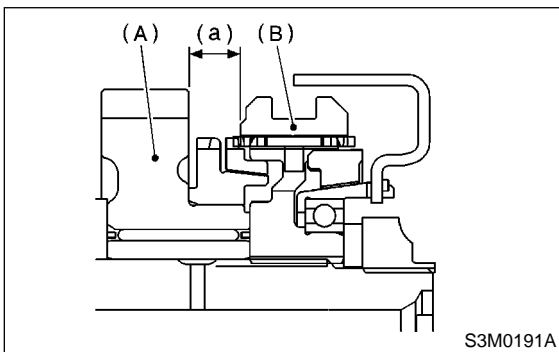


- (A) 3rd drive gear
- (B) Coupling sleeve
- (C) 4th drive gear

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

5) Inspect clearance between 5th drive gear and coupling sleeve. If any clearance is not within specifications, replace shifter fork as required.

Clearance (a):
9.3 mm (0.366 in)



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

Non-turbo model

5th shifter fork		
Part No.	Mark	Remarks
32812AA201	4	Approach to 5th gear by 0.2 mm (0.008 in).
32812AA211	5	Standard
32812AA221	6	Become distant from 5th gear by 0.2 mm (0.008 in).

Turbo model

5th shifter fork		
Part No.	Mark	Remarks
32812AA231	7	Approach to 5th gear by 0.2 mm (0.008 in).
32812AA241	—	Standard
32812AA251	9	Become distant from 5th gear by 0.2 mm (0.008 in).

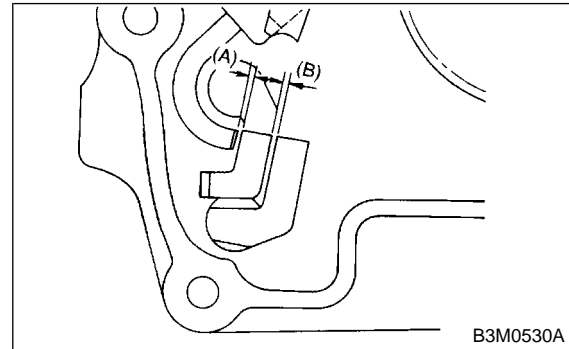
6) Inspect rod end clearances (A) and (B). If any clearance is not within specifications, replace rod or fork as required.

Clearance (A):

1st — 2nd to 3rd — 4th:
0.4 — 1.4 mm (0.016 — 0.055 in)

Clearance (B):

3rd — 4th to 5th:
0.5 — 1.3 mm (0.020 — 0.051 in)

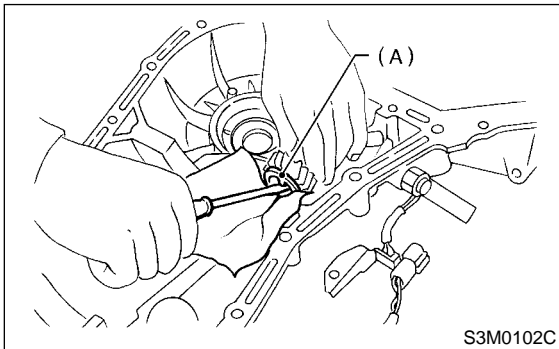


COUNTER GEAR

24. Counter Gear S503716

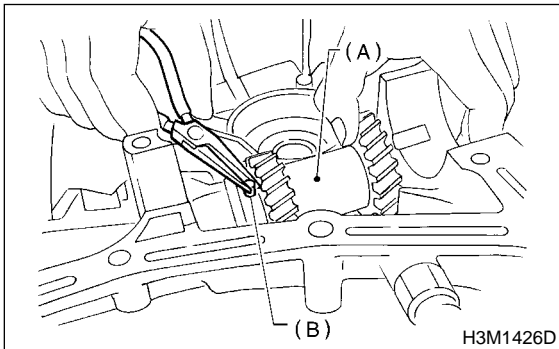
A: REMOVAL S503716A18

- 1) Remove the manual transmission assembly from the vehicle. <Ref. to MT-32 REMOVAL, Manual Transmission Assembly.>
- 2) Remove the transfer case with extension case assembly. <Ref. to MT-46 REMOVAL, Transfer Case and Extension Case Assembly.>
- 3) Remove transmission case. <Ref. to MT-60 REMOVAL, Transmission Case.>
- 4) Move counter gear shaft until it touches transmission case, and remove snap ring with a suitable tool.



(A) Snap ring

- 5) Slide washer at rear of high-low counter shaft, and remove straight pin from counter shaft.

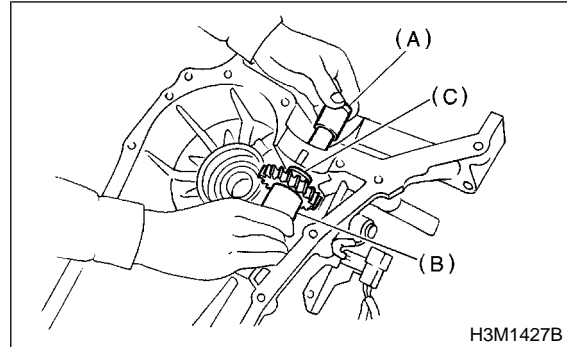


(A) Counter gear
(B) Straight pin

- 6) Remove counter shaft from transmission case, taking care not to drop counter gear and the two washers.

CAUTION:

- Be careful not to damage O-ring.
- Be careful not to drop straight pin on front side.
- Be careful not to drop two needle bearings and collar contained in counter gear.



(A) Counter shaft
(B) Counter gear
(C) Washers

B: INSTALLATION S503716A11

- 1) Install O-ring and straight pin onto counter gear shaft.
- 2) Install the following parts in main case (Right-side), and push the shaft perfectly into case.
 - Counter gear shaft
 - Two counter gear washers
 - Two needle bearings
 - Counter gear collar
 - Counter gear
 - Straight pin
 - Snap ring
- 3) Install the transmission case. <Ref. to MT-62 INSTALLATION, Transmission Case.>
- 4) Install the transfer case with extension case assembly. <Ref. to MT-46 INSTALLATION, Transfer Case and Extension Case Assembly.>
- 5) Install the manual transmission assembly on vehicle. <Ref. to MT-35 INSTALLATION, Manual Transmission Assembly.>

NOTE:

- Make sure that cut-out end surface of counter gear shaft does not protrude above the end surface of the case.
- Position the cut-out portion of counter gear shaft as shown in the figure.

C: INSPECTION S503716A10

1) After installing snap ring, measure clearance between snap ring and counter washer.

Clearance:

0.05 — 0.35 mm (0.0020 — 0.0138 in)

2) If the clearance is out of measured value, select a snap ring and install to put clearance within measured value. <Ref. to MT-104 ADJUSTMENT, Counter Gear.>

D: ADJUSTMENT S503716A01

Selection of snap ring

If the measurement is not with in the specification, select suitable snap ring.

Snap ring	
Part No.	Thickness mm (in)
031319000	1.50 (0.0591)
805019010	1.72 (0.0677)

GENERAL DIAGNOSTIC

Manual Transmission and Differential

25. General Diagnostic S503278

A: INSPECTION S503278A10

1. MANUAL TRANSMISSION S503278A1001

Symptom	Possible cause	Remedy
1. Gears are difficult to intermesh. NOTE: 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. ● Gear slips out when coasting on rough road. ● 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. NOTE: 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 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.	Replace.

2. DIFFERENTIAL S503278A1002

Symptom	Possible cause	Remedy
<p>1. Broken differential (case, gear, bearing, etc.)</p> <p>NOTE: Abnormal noise will develop and finally it will become impossible to continue to run due to broken pieces obstructing the gear revolution.</p>	(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 vehicle under severe operating conditions.	Add recommended oil to specified level. Do not use vehicle under severe operating conditions.
	(f) Loose hypoid driven gear clamping bolts	Tighten.
<p>2. Differential and hypoid gear noises</p> <p>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.</p> <ul style="list-style-type: none"> ● 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. ● Gear noise when coasting: Damaged gears due to maladjusted bearings and incorrect shim adjustment ● Bearing noise when driving or when coasting: Cracked, broken or damaged bearings ● 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.

GENERAL DIAGNOSTIC

Manual Transmission and Differential

MEMO: