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.

MANUAL TRANSMISSION AND DIFFERENTIAL

MT

1. General Description

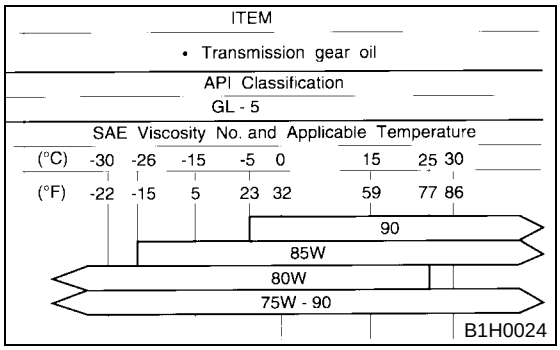
A: SPECIFICATIONS

1. MANUAL TRANSMISSION AND DIFFERENTIAL

Item			Model			
			FWD	AWD		
			1.6L	1.6L	2.0L	2.0L Turbo
Type			5-forward speeds with synchromesh and 1-reverse (5 x 2-forward speeds with synchromesh and 1-reverse) *1			
Transmission gear ratio		1st	3.454			3.454
		2nd	2.062			1.947
		3rd	1.448			1.366
		4th	1.088			0.972
		5th	0.825			0.738
		Reverse	3.333			
Auxiliary transmission gear ratio (Dual-range only)		High	—	1.000		—
		Low		1.447		
Front reduction gear	Final	Type of gear	Hypoid			
		Gear ratio	4.111		3.900	
Rear reduction gear	Transfer	Type of gear	—	Helical		
		Gear ratio	—	1.000		1.100
	Final	Type of gear	—	Hypoid		
		Gear ratio	—	4.111	3.900	3.545
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	FWD model		3.3 ℓ (3.5 US qt, 2.9 Imp qt)	—		
	AWD model	Single-range model	—	3.5 ℓ (3.7 US qt, 3.1 Imp qt)		
		Dual-range model	—	4.0 ℓ (4.2 US qt, 3.5 Imp qt)		—

2. TRANSMISSION GEAR OIL

Recommended oil



3. TRANSMISSION CASE ASSEMBLY

Drive pinion shim adjustment
Hypoid gear backlash
0.13 — 0.18 mm (0.0051 — 0.0071 in)

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

Selection of main shaft rear plate

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

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

• AWD model

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)

• FWD model

Selection of 1st driven gear

1st driven gear	
Outer diameter of bushing mm (in)	Part No.
42.019 — 42.033 (1.6543 — 1.6548)	32231AA840
42.005 — 42.018 (1.6537 — 1.6543)	32231AA850
41.990 — 42.004 (1.6531 — 1.6537)	32231AA860

5. INPUT SHAFT ASSEMBLY

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

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

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)	—	—

8. SHIFTER FORK AND ROD

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

5th shifter fork (Non-turbo)		
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)

5th shifter fork (Turbo)		
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 OR REAR CASE

Neutral position adjustment

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

Reverse accent shaft		
Part No.	Mark	Remarks
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.

10.EXTENSION ASSEMBLY

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

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)

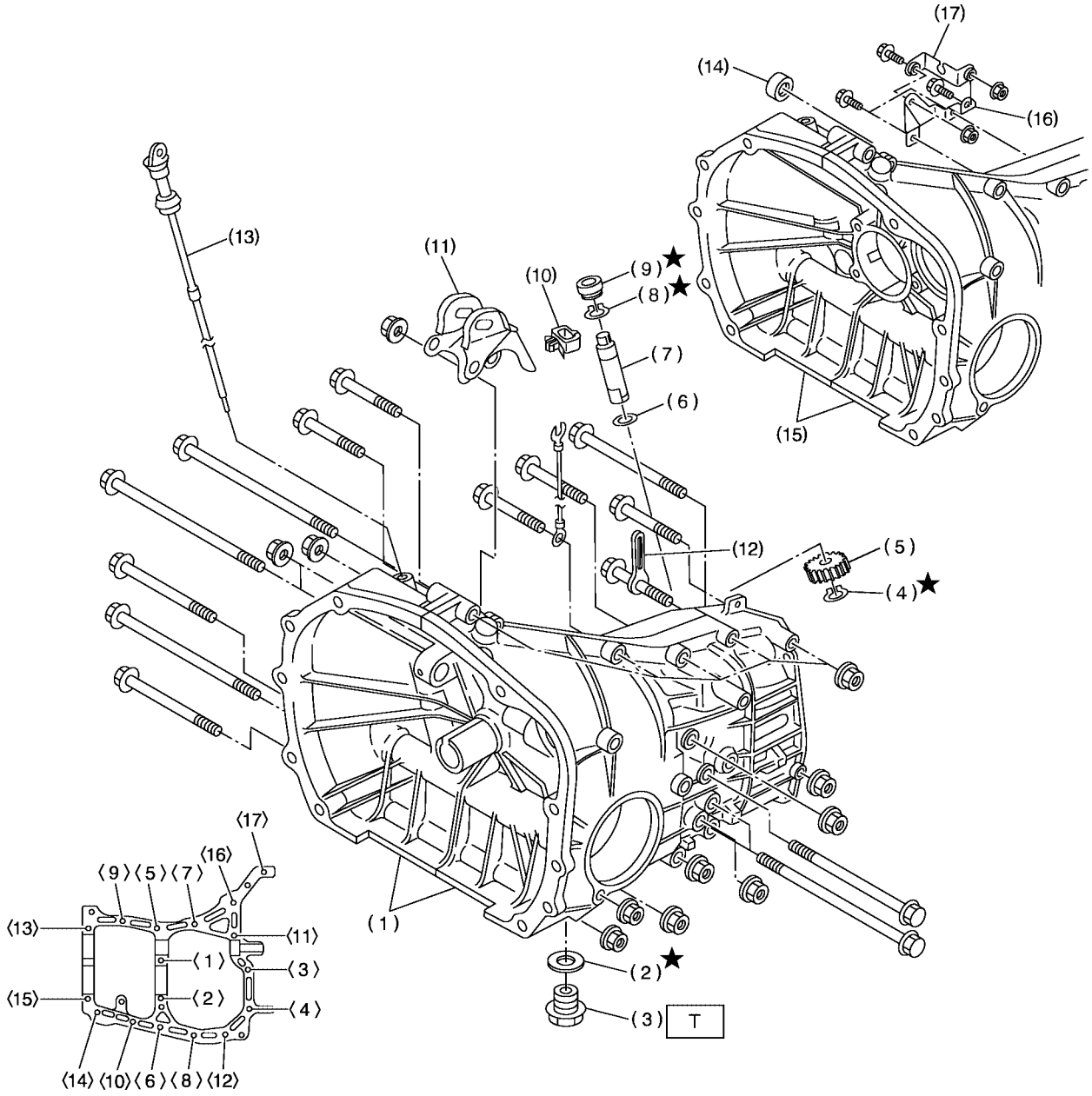
12.TRANSFER DRIVE GEAR

Snap ring (Outer-30) to ball bearing clearance
0.01 — 0.15 mm (0.0004 — 0.0059 in)

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

B: COMPONENT

1. TRANSMISSION CASE



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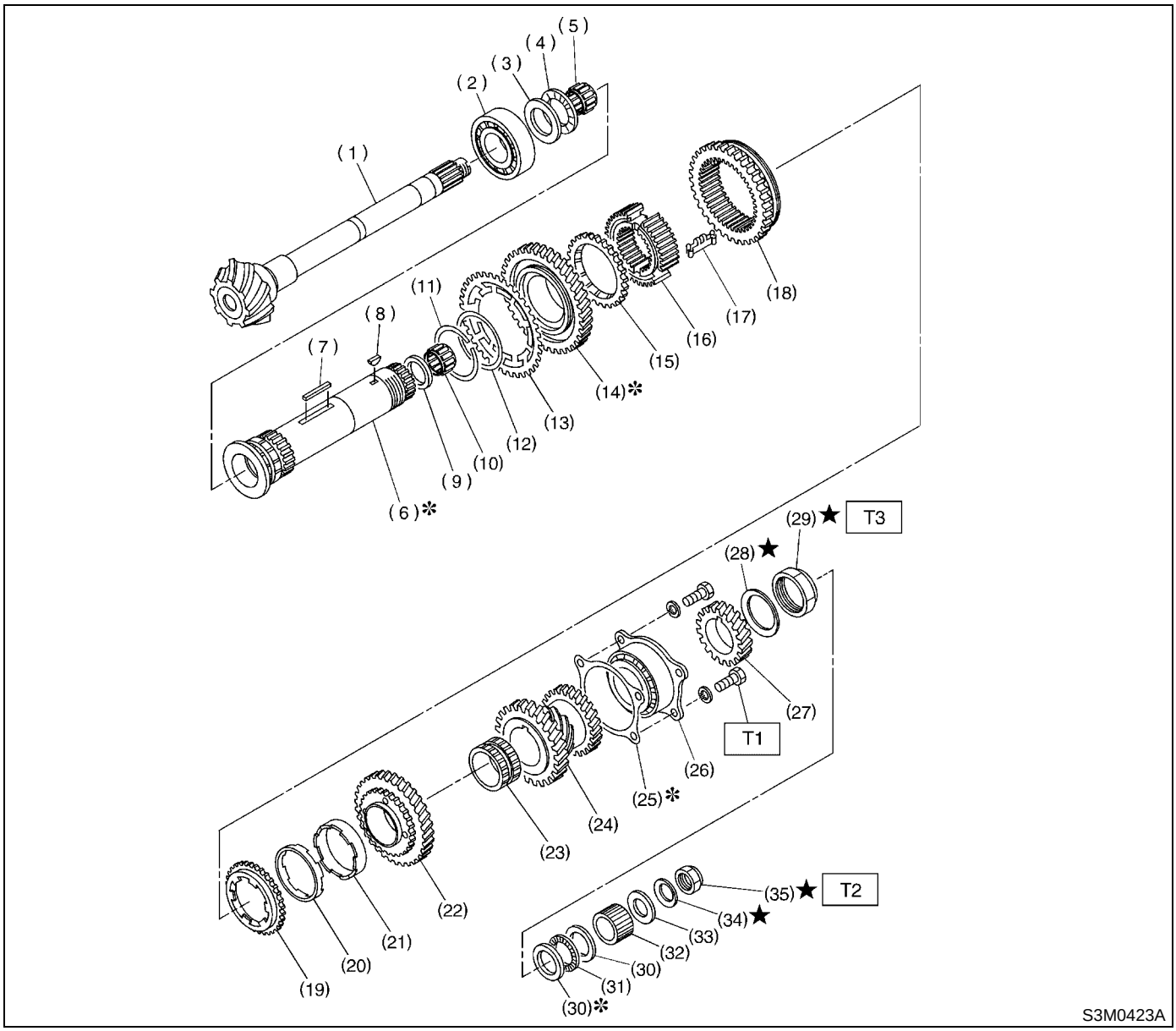
(1) Transmission case ASSY
(2) Gasket
(3) Drain plug
(4) Snap ring (Outer)
(5) Speedometer driven gear
(6) Washer
(7) Speedometer shaft
(8) Snap ring (Outer)
(9) Oil seal
(10) Clamp
(11) Pitching stopper bracket
(12) Clip
(13) Oil level gauge
(14) Oil seal (Dual-range)
(15) Transmission case ASSY (Dual-range)
(16) High-low cable bracket A (Dual-range)
(17) High-low cable bracket B (Dual-range)

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)

2. DRIVE PINION ASSEMBLY

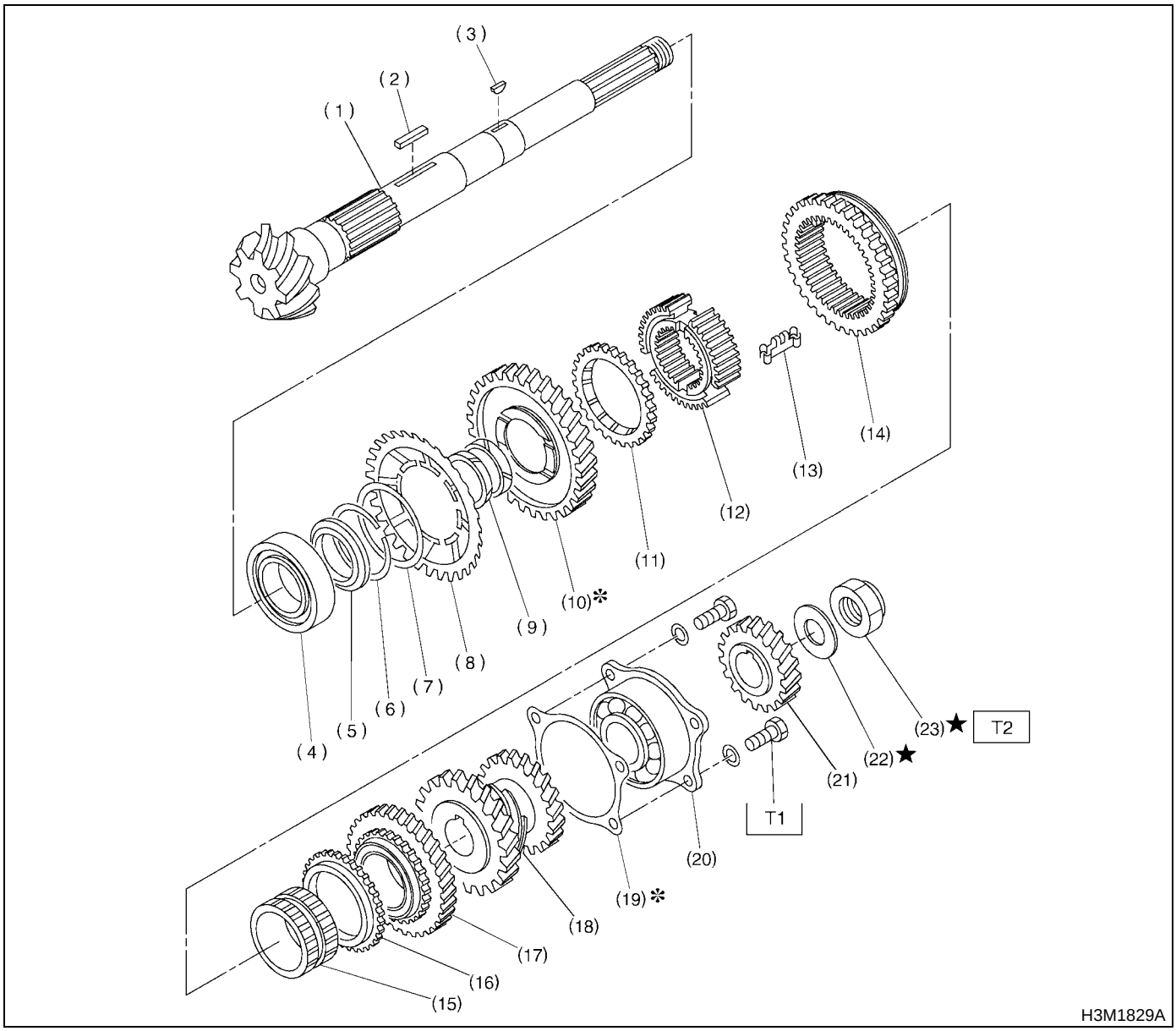
• AWD MODEL



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

Tightening torque: N·m (kgf-m, ft-lb)
T1: 29 (3.0, 21.7)
T2: 118 (12.0, 86.8)
T3: 265 (27, 195)

• FWD MODEL

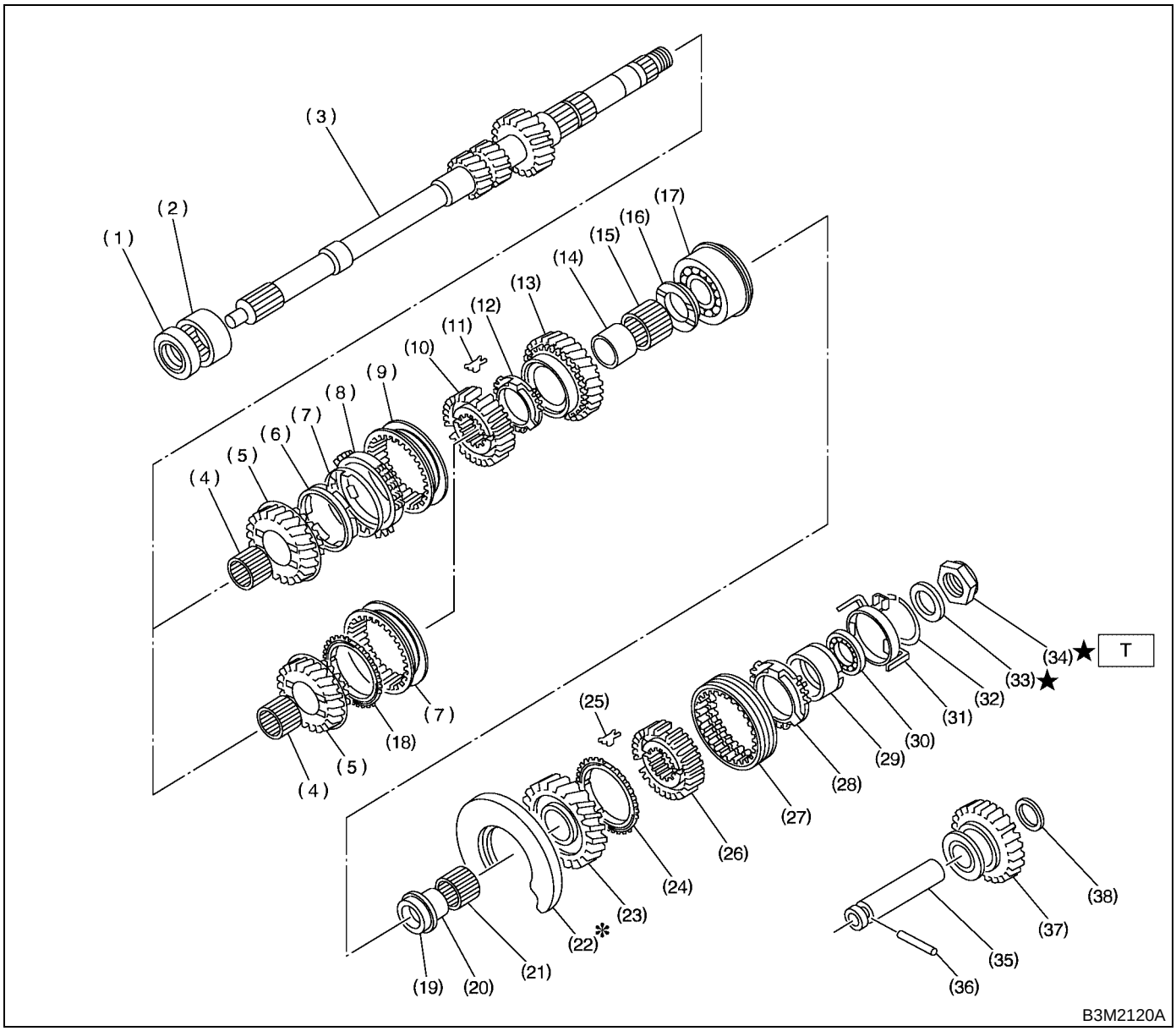


(1) Drive pinion shaft
(2) Key
(3) Woodruff key
(4) Roller bearing
(5) 1st gear thrust plate
(6) Outer snap ring
(7) Washer
(8) 1st sub gear
(9) 1st gear bushing
(10) 1st driven gear
(11) 1st baulk ring
(12) 1st-2nd synchronizer hub
(13) Insert key
(14) Reverse driven gear
(15) 2nd baulk ring
(16) 2nd driven gear
(17) 2nd gear bushing
(18) 3rd-4th driven gear
(19) Drive pinion shim
(20) Ball bearing
(21) 5th driven gear
(22) Lock washer
(23) Lock nut

Tightening torque: N·m (kgf-m, ft-lb)
T1: 29 (3.0, 21.7)
T2: 118 (12.0, 86.8)

3. MAIN SHAFT ASSEMBLY

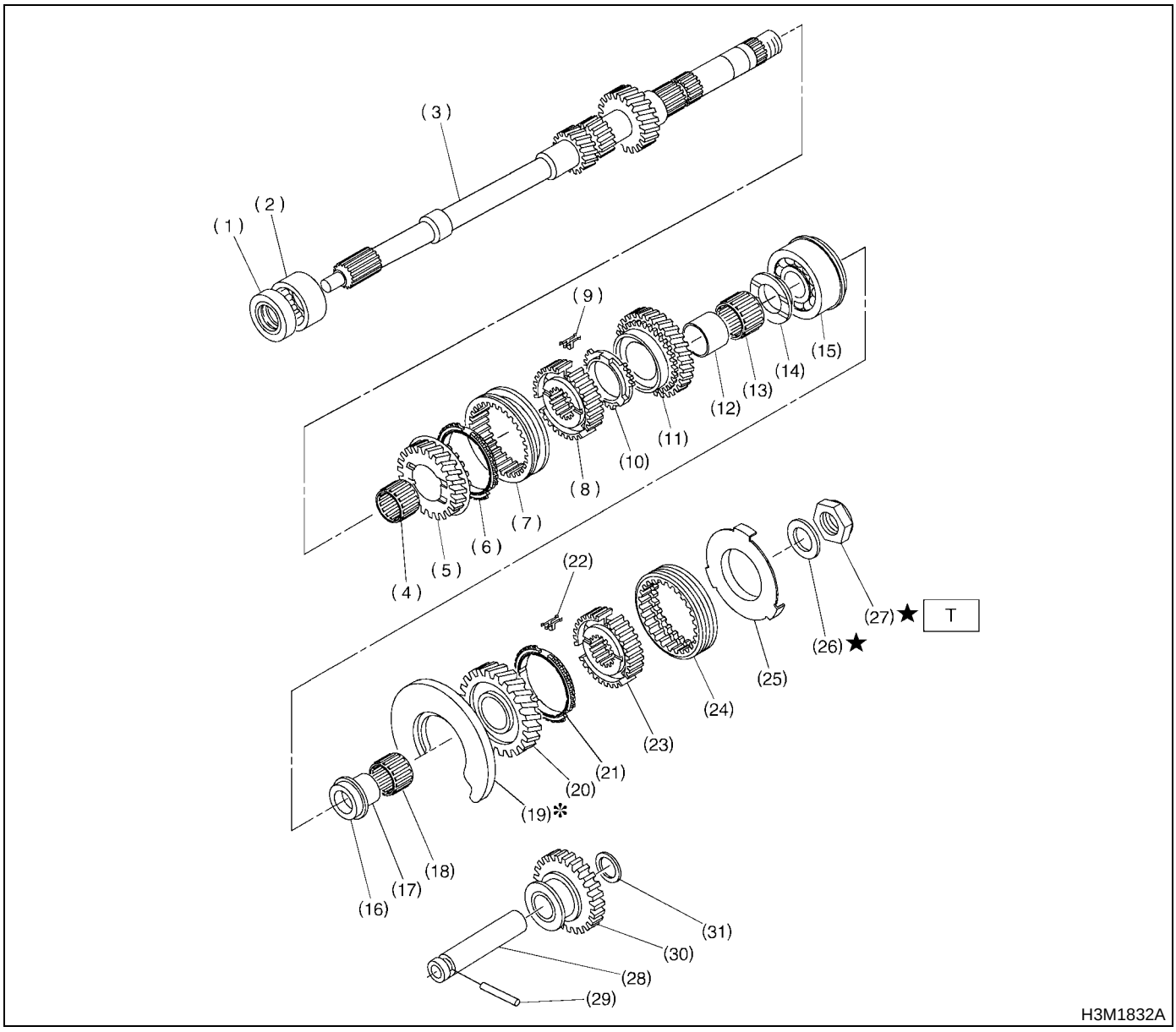
• AWD MODEL



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

Tightening torque: N·m (kgf-m, ft-lb)
T: 118 (12.0, 86.8)

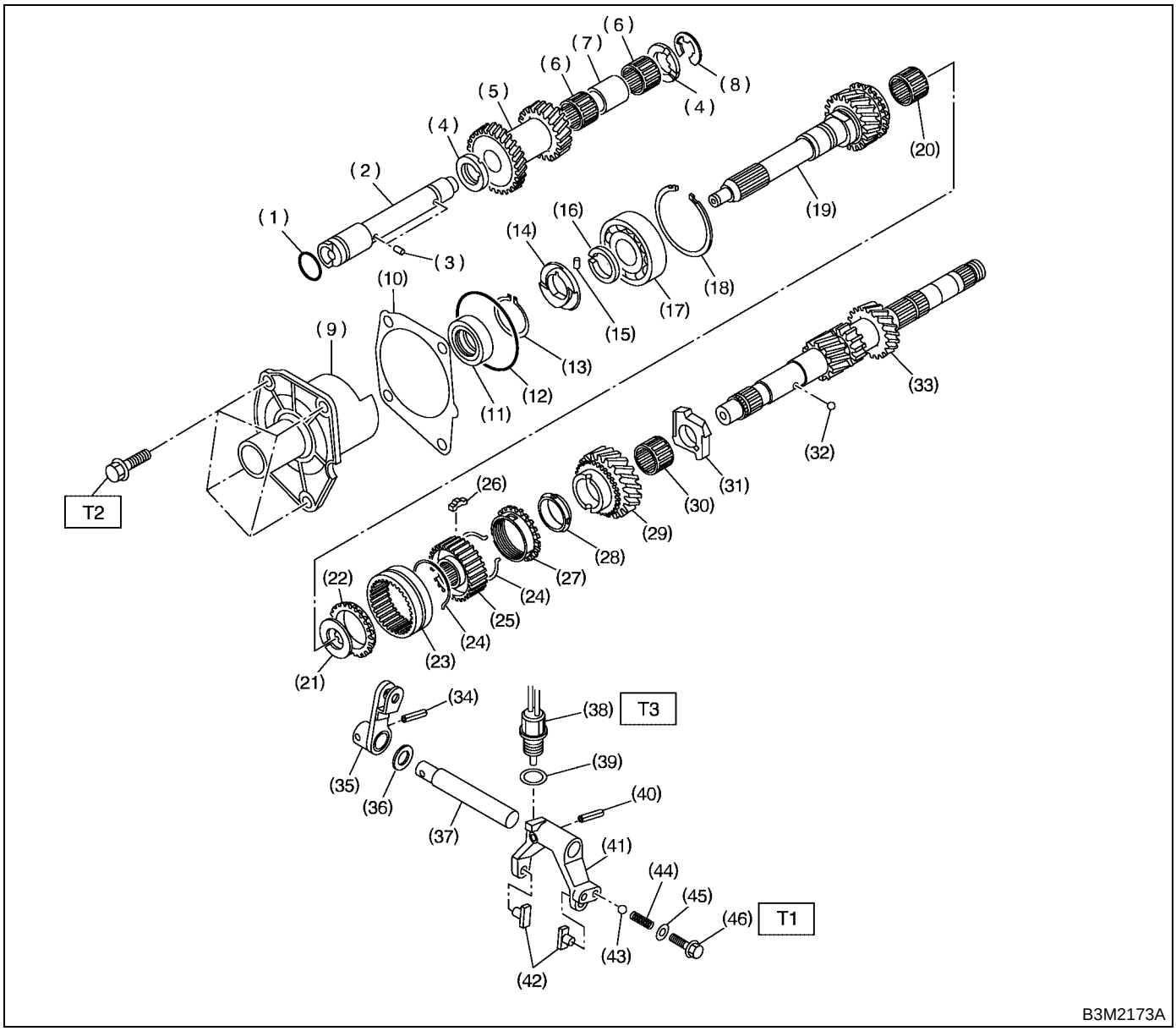
• FWD MODEL



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

Tightening torque: N·m (kgf-m, ft-lb)
T: 118 (12.0, 86.8)

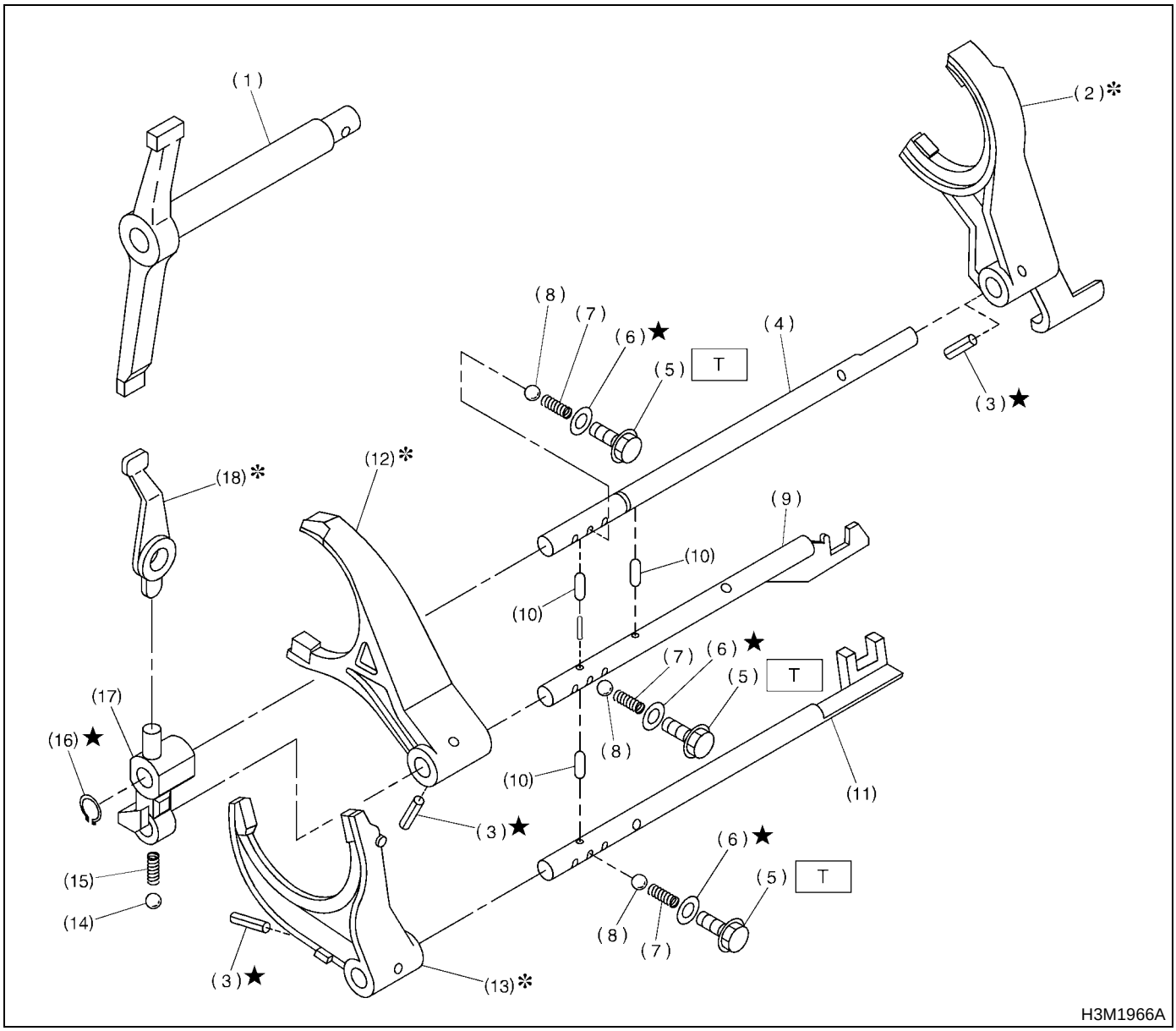
4. AUXILIARY TRANSMISSION GEARS



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

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)

5. SHIFTER FORK AND SHIFTER ROD



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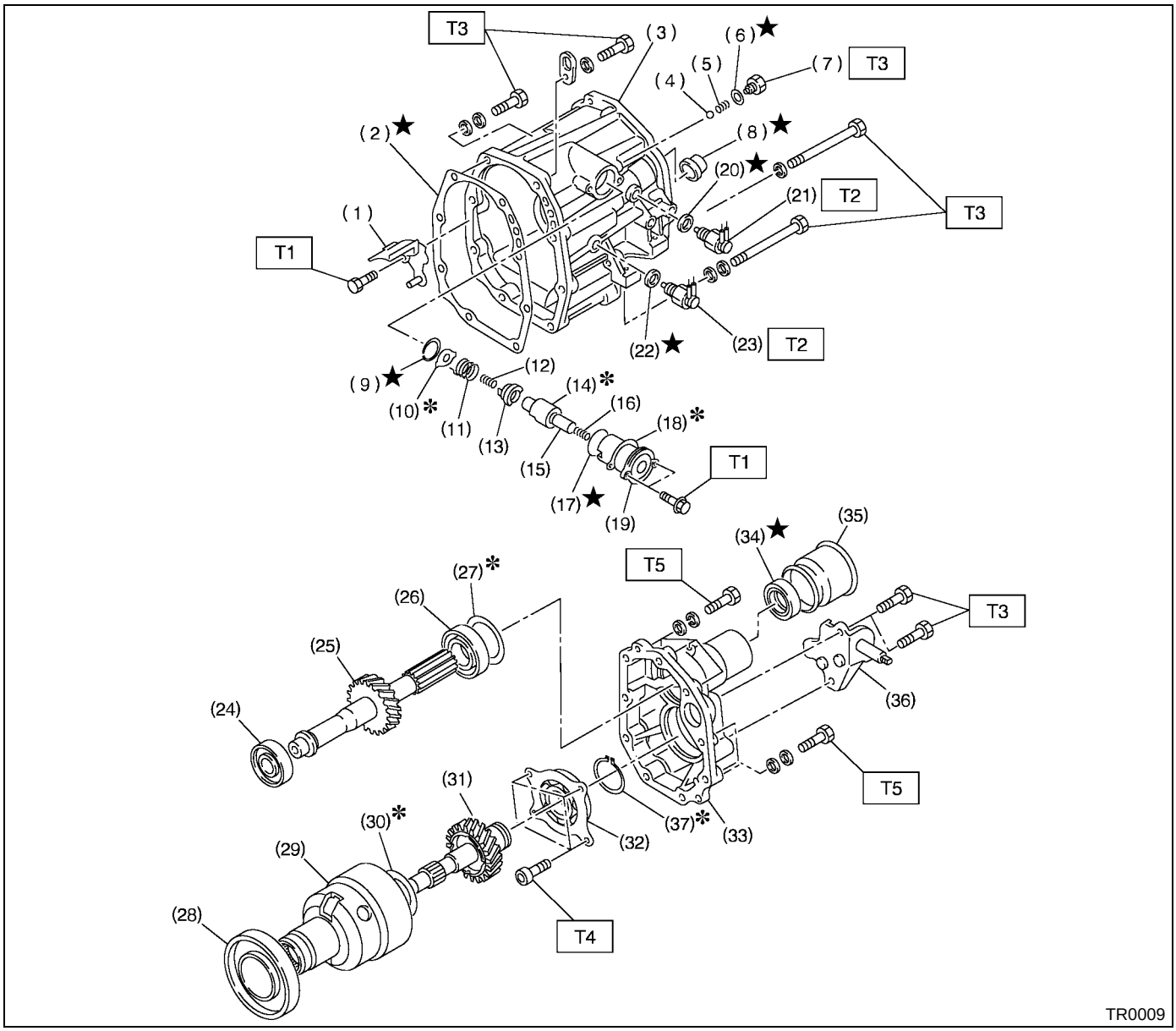
(1) Shifter arm
(2) 5th shifter fork
(3) Straight pin
(4) Reverse fork rod
(5) Checking ball plug
(6) Gasket
(7) Checking ball spring
(8) Ball
(9) 3rd-4th fork rod
(10) Interlock plunger
(11) 1st-2nd fork rod
(12) 3rd-4th shifter fork
(13) 1st-2nd shifter fork
(14) Ball
(15) Spring
(16) Snap ring (Outer)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

Tightening torque: N·m (kgf-m, ft-lb)
T: 19.6 (2.0, 14.5)

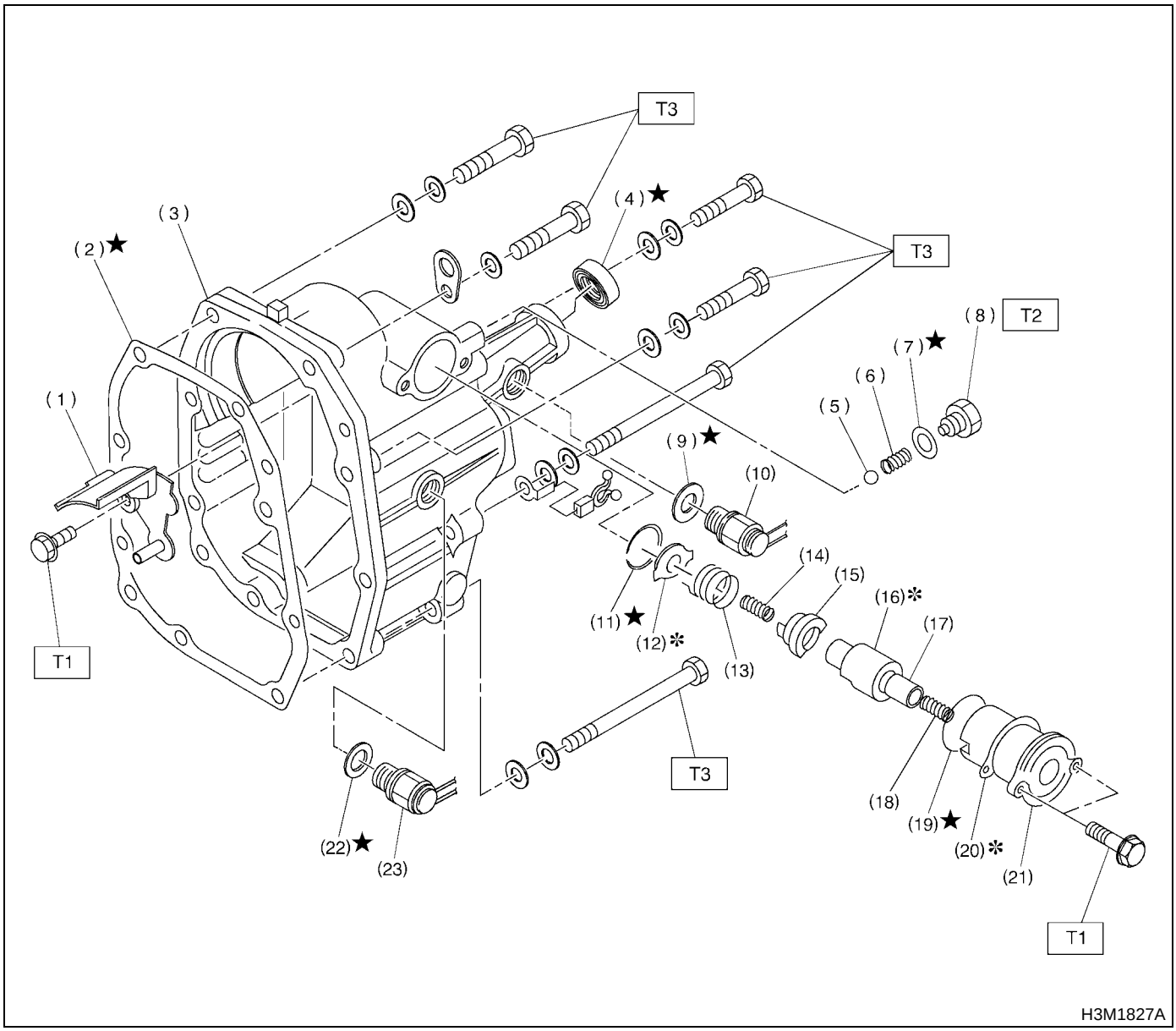
6. TRANSFER CASE AND EXTENSION



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

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)

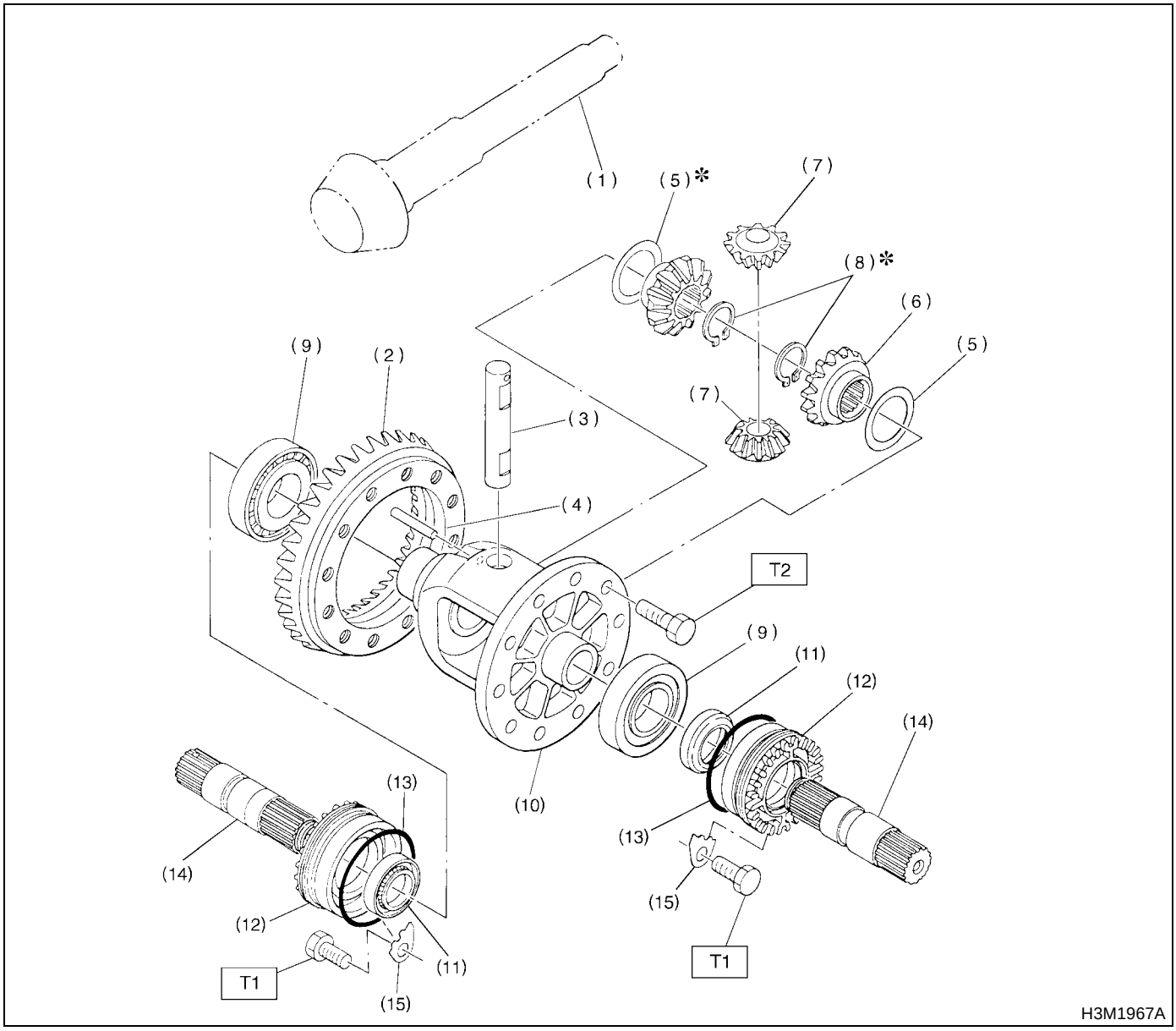
7. REAR CASE



(1) Oil guide
(2) Case gasket
(3) Rear case
(4) Oil seal
(5) Ball
(6) Reverse accent spring
(7) Washer
(8) Plug
(9) Gasket
(10) Neutral switch
(11) Snap ring (Inner)
(12) Reverse check plate
(13) Reverse check spring
(14) Reverse return spring
(15) Reverse check cam
(16) Reverse accent shaft
(17) Return spring cap
(18) Return spring
(19) O-ring
(20) Adjusting select shim
(21) Reverse check sleeve
(22) Gasket
(23) Back-up light switch

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)

8. FRONT DIFFERENTIAL

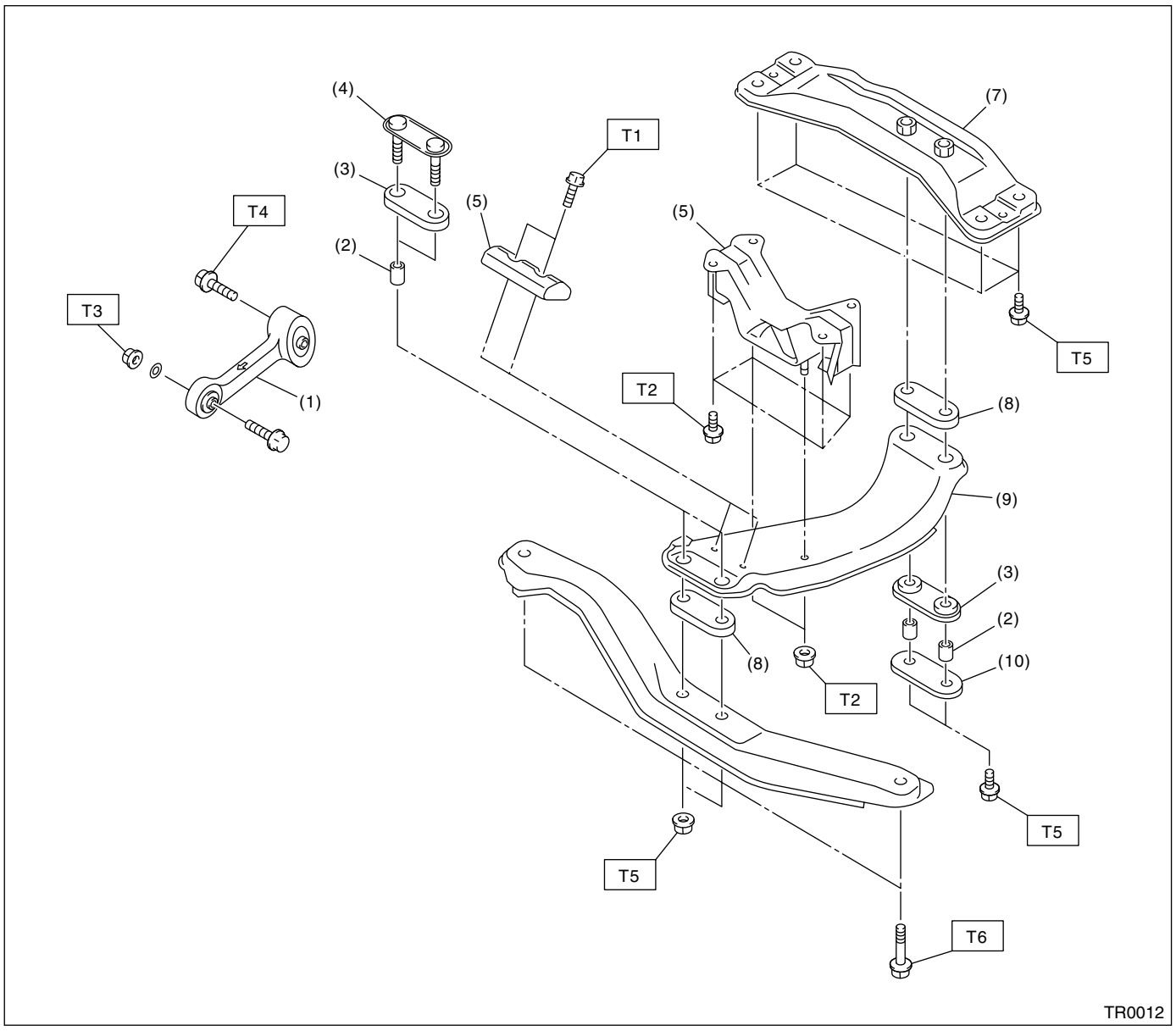


(1) Drive pinion shaft
(2) Hypoid driven gear
(3) Pinion shaft
(4) Straight pin
(5) Washer
(6) Differential bevel gear
(7) Differential bevel pinion
(8) Snap ring (Outer)
(9) Roller bearing
(10) Differential case
(11) Oil seal
(12) Differential side retainer
(13) O-ring
(14) Axle drive shaft
(15) Retainer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

Tightening torque: N·m (kgf-m, ft-lb)
T1: 25 (2.5, 18.1)
T2: 62 (6.3, 45.6)

9. TRANSMISSION MOUNTING

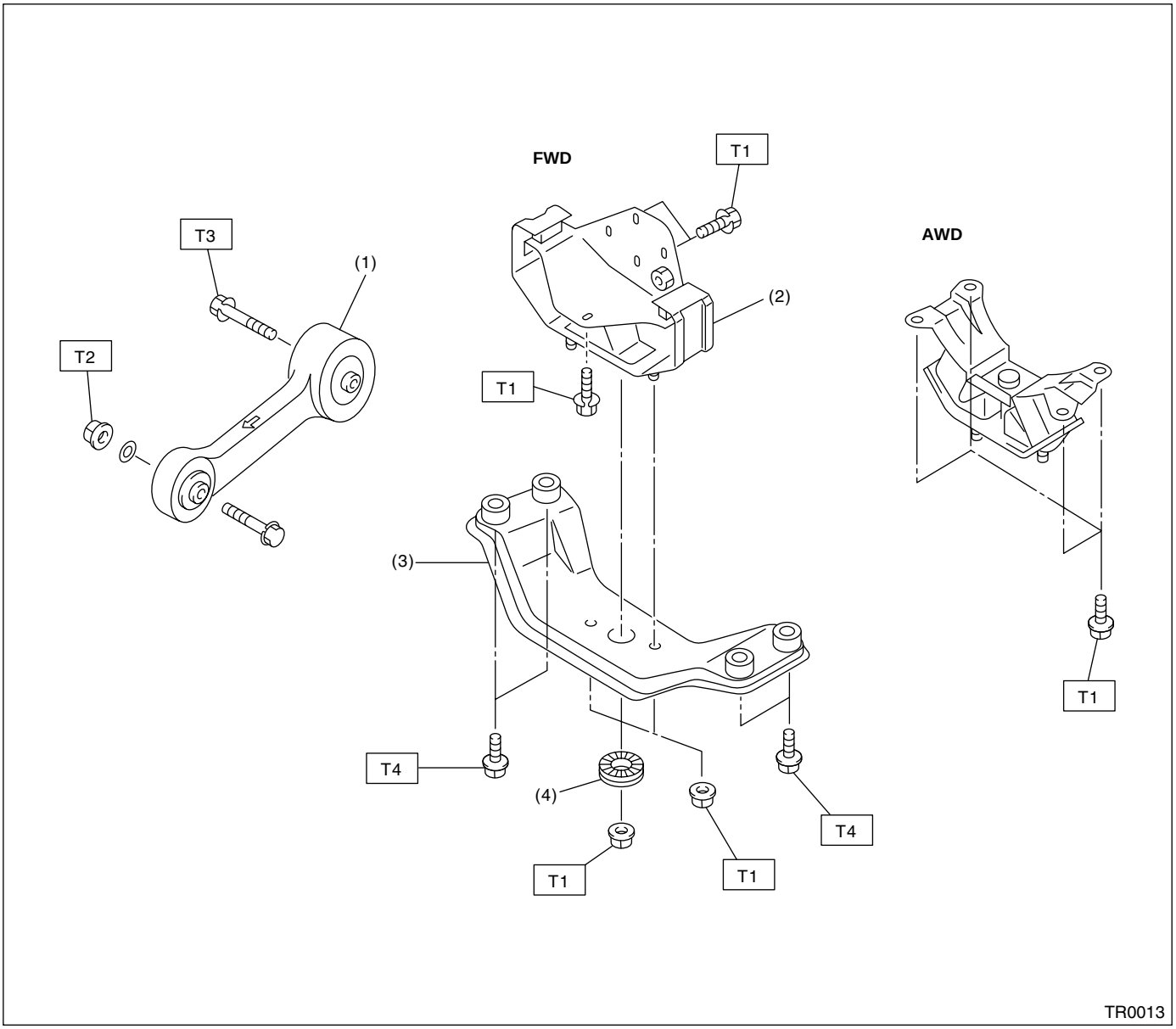
• 2.0L MODEL



(1) Pitching stopper (Resin type)
(2) Spacer
(3) Cushion C
(4) Front plate
(5) Damper (Turbo model)
(6) Rear cushion rubber
(7) Rear crossmember
(8) Cushion D
(9) Center crossmember
(10) Rear plate
(11) Front crossmember

Tightening torque: N·m (kgf-m, ft-lb)
T1: 7.5 (0.76, 5.5)
T2: 35 (3.6, 26)
T3: 50 (5.1, 37)
T4: 58 (5.9, 43)
T5: 70 (7.1, 51)
T6: 140 (14.3, 103)

• 1.6L MODEL



(1) Pitching stopper
(2) Rear cushion rubber
(3) Rear crossmember
(4) Rubber cushion

Tightening torque: N·m (kgf-m, ft-lb)
T1: 35 (3.57, 25.8)
T2: 50 (5.1, 36.9)
T3: 58 (5.9, 42.8)
T4: 70 (7.1, 51.6)

C: CAUTION

• Wear working clothing, including a cap, protective goggles, and protective shoes during operation.
• Remove contamination including dirt and corrosion before removal, installation, 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 vice, place cushioning material such as wood blocks, aluminum plate, or shop cloth between the part and the vice.
• Avoid damaging the mating surface of the case.
• Before applying sealant, completely remove the old seal.

D: PREPARATION TOOL

1. SPECIAL TOOLS

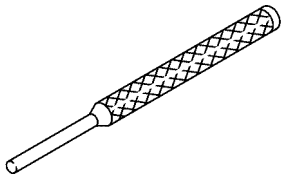
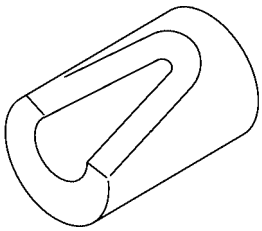
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 B3M1938	398791700	REMOVER	Used for removing and installing spring pin (6 mm).
 B3M1939	399411700	ACCENT BALL INSTALLER	Used for installing reverse shifter rail arm.

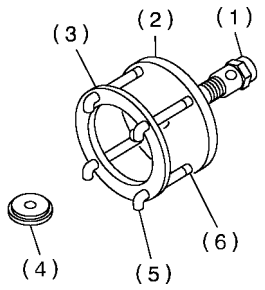
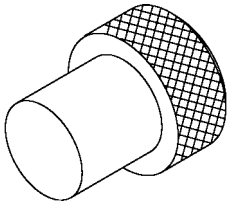
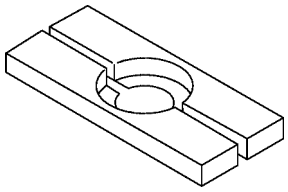
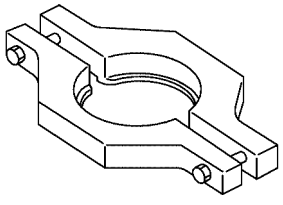
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 B3M1940A	399527700	PULLER SET	Used for removing and installing roller bearing (Differential). (1) BOLT (899521412) (2) PULLER (399527702) (3) HOLDER (399527703) (4) ADAPTER (398497701) (5) BOLT (899520107) (6) NUT (021008000)
 B3M1941	399780104	WEIGHT	Used for measuring preload on roller bearing.
 B3M1942	498077000	REMOVER	Used for removing roller bearing of drive pinion shaft.
 B3M1943	498077300	CENTER DIFFERENTIAL BEARING REMOVER	Used for removing the center differential cover ball bearing.

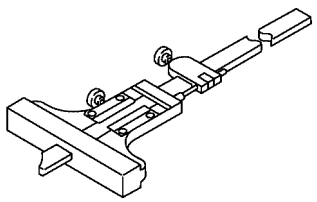
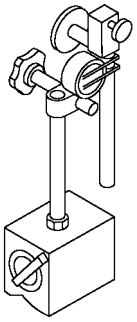
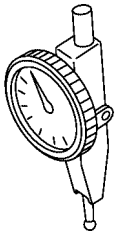
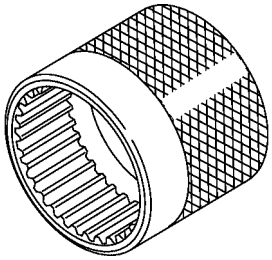
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 B3M1944	498147000	DEPTH GAUGE	Used for adjusting main shaft axial end play.
 B3M1945	498247001	MAGNET BASE	• Used for measuring backlash between side gear and pinion, and hypoid gear. • Used with DIAL GAUGE (498247100).
 B3M1946	498247100	DIAL GAUGE	• Used for measuring backlash between side gear and pinion, and hypoid gear. • Used with MAGNET BASE (498247001).
 B3M1947	498427100	STOPPER	Used for securing the drive pinion shaft assembly and driven gear assembly when removing the drive pinion shaft assembly lock nut.

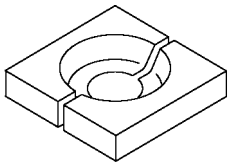
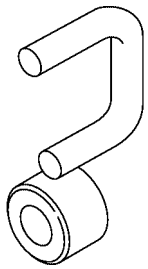
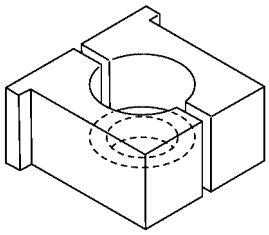
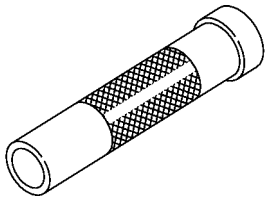
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 B3M1911	498517000	REPLACER	• Used for removing drive pinion thrust plate and roller bearing race. • For FWD.
 B3M1948	498787100	MAIN SHAFT STOPPER	Used for removing and installing transmission main shaft lock nut.
 B3M1949	498937000	TRANSMISSION HOLDER	Used for removing and installing transmission main shaft lock nut.
 B3M1950	499277100	BUSH 1-2 INSTALLER	Used for installing 1st driven gear thrust plate and 1st-2nd driven gear bush.

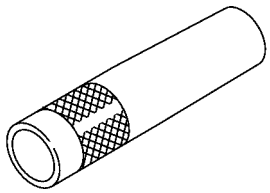
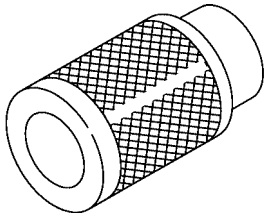
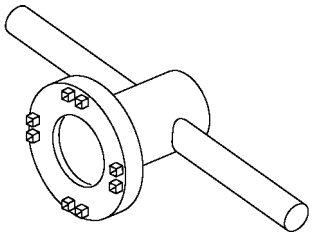
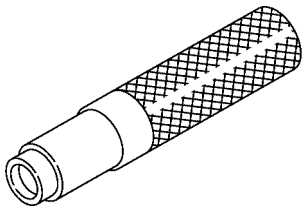
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 B3M1951	499277200	INSTALLER	Used for press-fitting the 2nd driven gear, roller bearings, and 5th driven gear onto the driven shaft.
 B3M1952	499757002	INSTALLER	• Used for installing snap ring (OUT 25), and ball bearing (25 x 26 x 17). • Used for installing bearing cone of transfer driven gear (extension core side).
 B3M1953	499787000	WRENCH ASSY	Used for removing and installing differential side retainer.
 B3M1954	499827000	PRESS	Used for installing speedometer oil seal when installing speedometer cable to transmission.

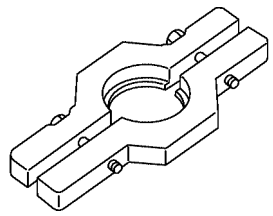
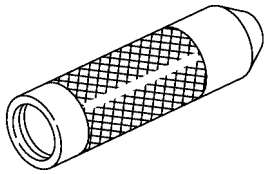
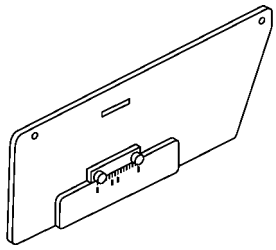
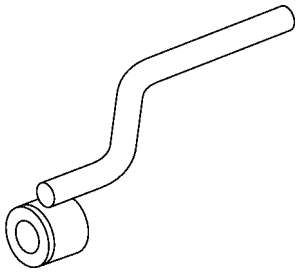
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 B3M1955	499857000	5TH DRIVEN GEAR REMOVER	Used for removing 5th driven gear.
 B3M1956	499877000	RACE 4-5 INSTALLER	• Used for installing 4th needle bearing race and ball bearing onto transmission main shaft. • Used with REMOVER (899714110).
 B3M1957	499917500	DRIVE PINION GAUGE ASSY	Used for adjusting drive pinion shim.
 B3M1958	499927100	HANDLE	Used for fitting transmission main shaft.

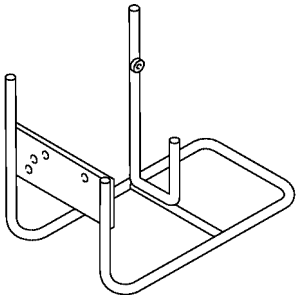
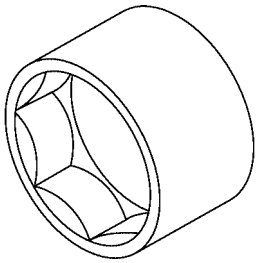
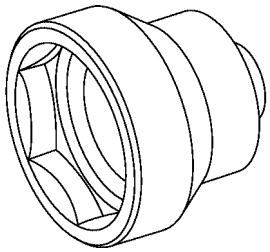
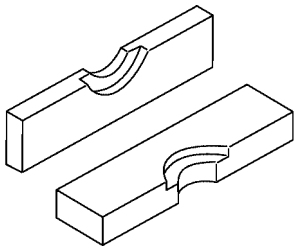
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 B3M1959	499937100	TRANSMISSION STAND	Stand used for transmission disassembly and assembly.
 B3M1960	499987003	SOCKET WRENCH (35)	Used for removing and installing driven pinion lock nut and main shaft lock nut.
 B3M1961	499987300	SOCKET WRENCH (50)	Used for removing and installing driven gear assembly lock nut.
 B3M1962	899714110	REMOVER	Used for fixing transmission main shaft, drive pinion, rear drive shaft.

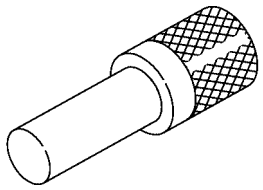
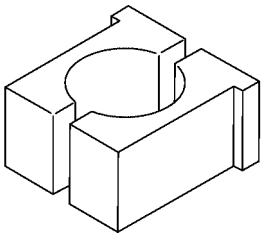
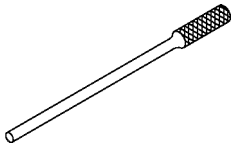
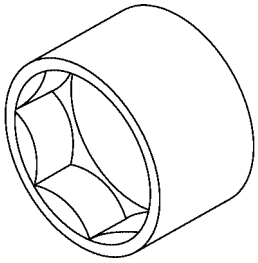
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 B3M1963	899864100	REMOVER	Used for removing parts on transmission main shaft and drive pinion.
 B3M1964	899884100	HOLDER	Used for tightening lock nut on sleeve.
 B3M1965	899904100	REMOVER	Used for removing and installing straight pin.
 B3M1966	899988608	SOCKET WRENCH (27)	Used for removing and installing drive pinion lock nut.

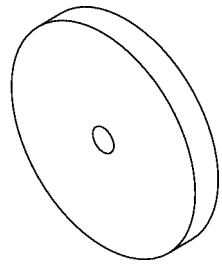
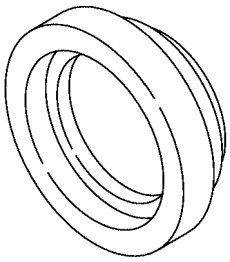
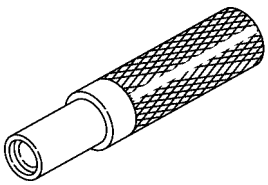
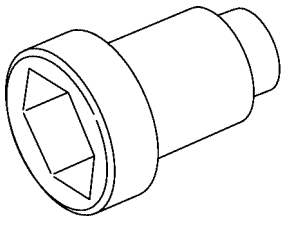
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 B3M1967	398497701	ADAPTER	• Used for installing roller bearing onto differential case. • Used with INSTALLER (499277100).
 B3M1968	499587000	INSTALLER	Used for installing driven gears to driven shaft.
 B3M1969	899824100	PRESS	Used for installing speedometer shaft oil seal.
 B3M1970	499987100	SOCKET WRENCH (35)	Used for removing and installing drive pinion lock nut.

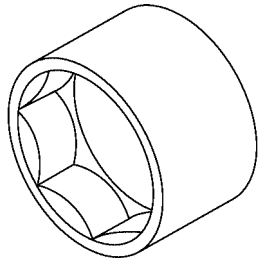
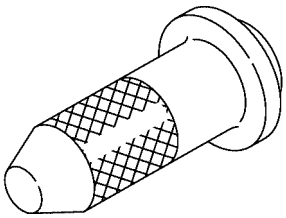
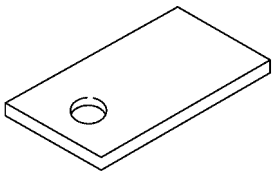
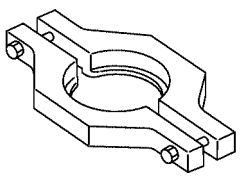
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 B3M1971	899984103	SOCKET WRENCH (35)	Used for removing and installing drive pinion lock nut.
 B3M1972	498057300	INSTALLER	Used for installing extension oil seal.
 B3M1973	498255400	PLATE	Used for measuring backlash.
 B3M1974	498077400	SYNCHRONIZER CONE REMOVER	Used for removing synchronizer cone of main shaft.

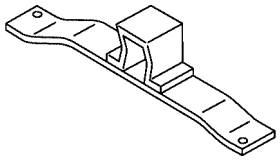
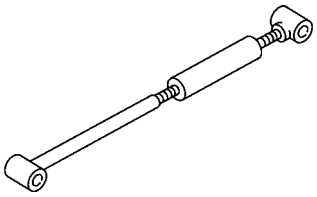
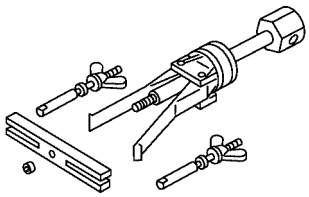
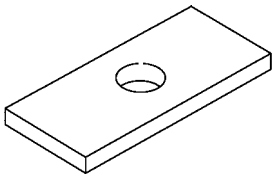
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 B3M1975	41099AA010	ENGINE SUPPORT BRACKET	Used for supporting engine.
 B3M1976	41099AA020	ENGINE SUPPORT	Used for supporting engine.
 B3M1977	398527700	PULLER ASSY	Used for removing and installing extension case roller bearing.
 B3M1978	398643600	GAUGE	Used for measuring total end play, extension end play and drive pinion height.

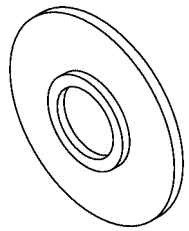
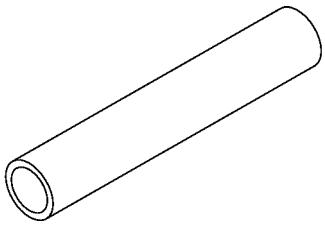
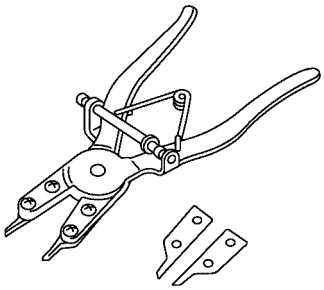
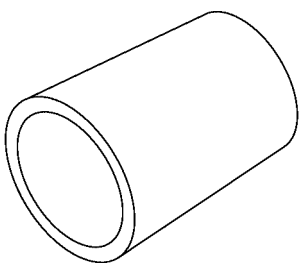
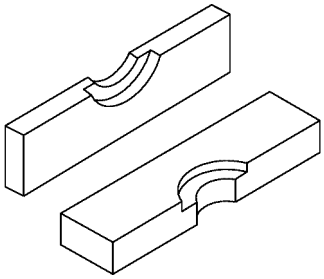
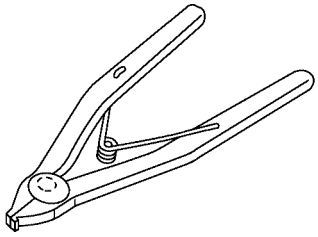
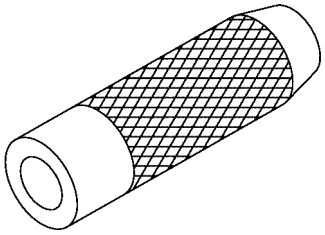
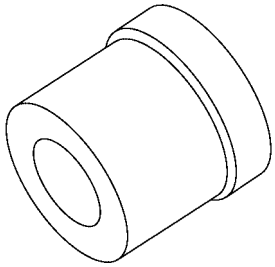
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 B3M1905	38177700	INSTALLER	• Used for installing bearing cone of transfer driven gear (transfer case side). • Used for installing ball bearing of transfer drive gear.
 B3M2122	398507703	DUMMY COLLAR	• Used for installing input shaft holder oil seal. • For dual-range model.
 B3M2123	398663600	PLIERS	• Used for removing and installing input shaft snap ring. • For dual-range model.
 B3M2124	499757001	SNAP RING GUIDE	• Used for installing snap ring (OUT 25). • For dual-range model.

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 B3M2125	899858600	RETAINER	• Used for removing ball bearing. • For dual-range model.
 B3M2126	899474100	EXPANDER	• Used for removing and installing snap ring. • For dual-range model.
 B3M2127	899580100	INSTALLER	• Used when pressing ball bearings into input shaft. • For dual-range model.
 B3M2129	399513600	INSTALLER	• Used when pressing ball bearings into input shaft. • For dual-range model.

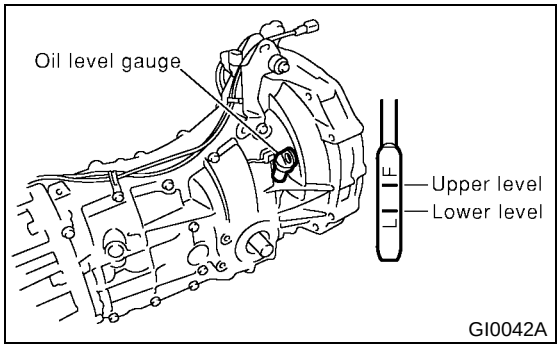
2. GENERAL PURPOSE TOOLS

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

2. Transmission Gear Oil

A: INSPECTION

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.



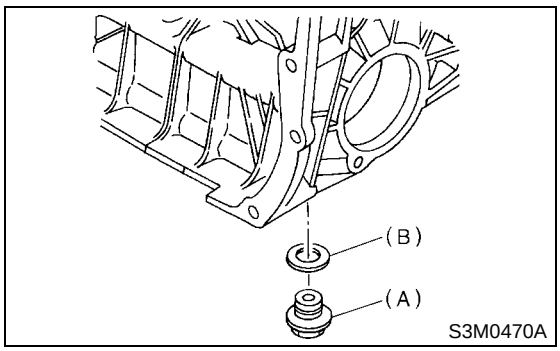
B: REPLACEMENT

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:
FWD model;
3.3 ℓ (3.5 US qt, 2.9 Imp qt)
AWD Single-range model;
3.5 ℓ (3.7 US qt, 3.1 Imp qt)
AWD Dual-range model;
4.0 ℓ (4.2 US qt, 3.5 Imp qt)

6) Check the level of the transmission gear oil.

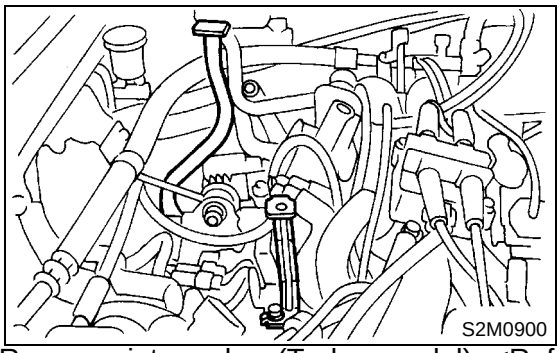
CAUTION:
When inserting the level gauge into transmission gear, align the protrusion on the side of the top part of the level gauge with the notch in the gauge hole.

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

3. Manual Transmission Assembly

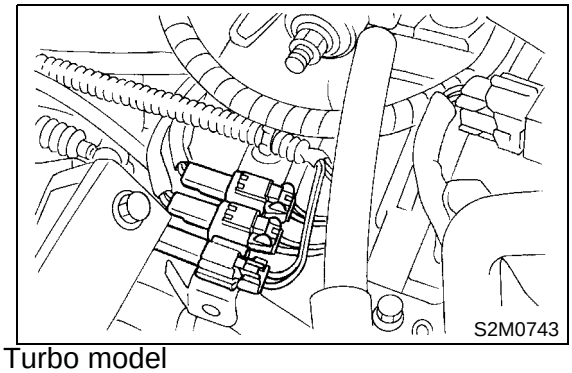
A: REMOVAL

1) Open front hood fully, and support with stay.
2) Disconnect battery ground terminal.
3) Remove air intake duct and cleaner case. (Non-turbo model) <Ref. to IN(SOHC)-7, REMOVAL, Air Intake Duct.> and <Ref. to IN(SOHC)-6, REMOVAL, Air Cleaner Case.>
4) Remove air cleaner case stay. (Non-turbo model)l

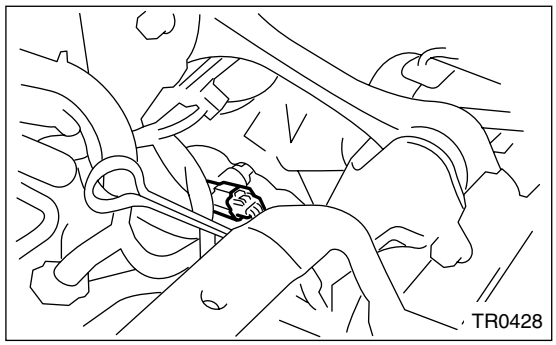


5) Remove intercoder (Turbo model) <Ref. to IN(DOHC TURBO)-10, REMOVAL, Intercooler.>
6) Disconnect the following connectors.
(1) Neutral position switch connector
(2) Back-up light switch connector
(3) High-low switch connector (Dual-range model)

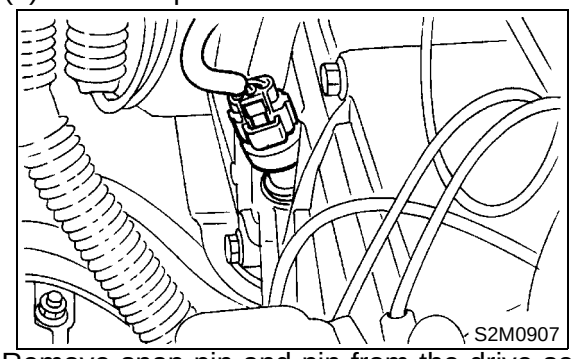
Non-turbo model



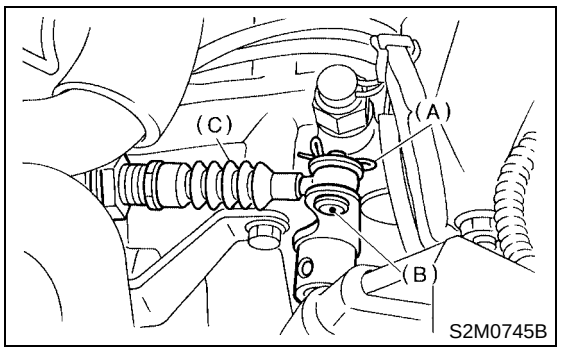
Turbo model



(4) Vehicle speed sensor

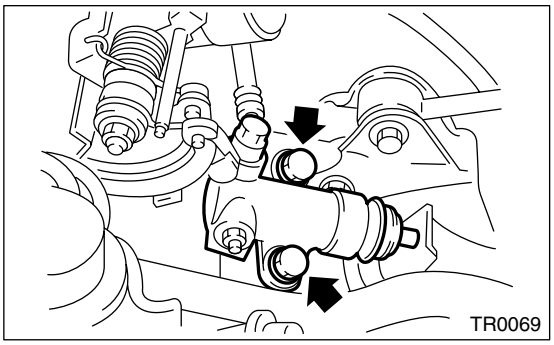


7) Remove snap pin and pin from the drive select cable.
8) Remove the drive select cable on the transmission. (Dual-range model)

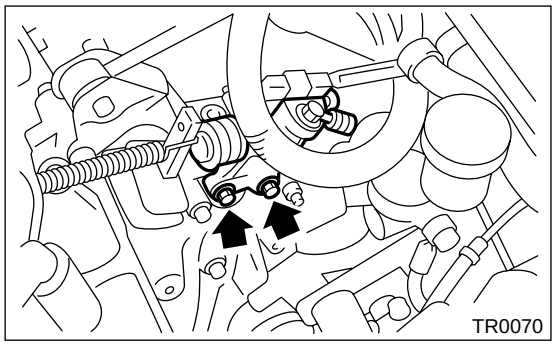


(A) Snap pin
(B) Pin
(C) Drive select cable

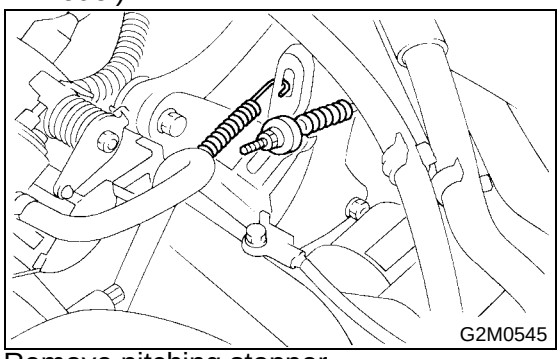
9) Remove starter. <Ref. to SC-5, REMOVAL, Starter.>
10) Remove operating cylinder from transmission. (2.0 L model)
• Non-turbo model



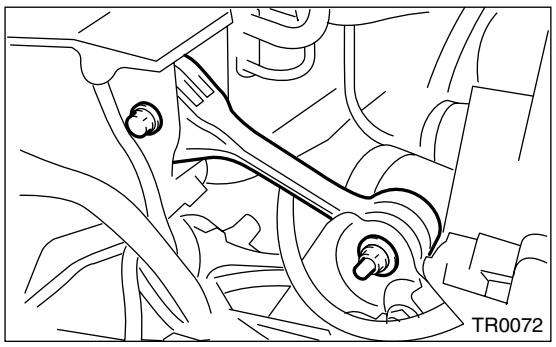
• Turbo model



11) Disconnect the return spring and clutch cable. (1.6 L model)



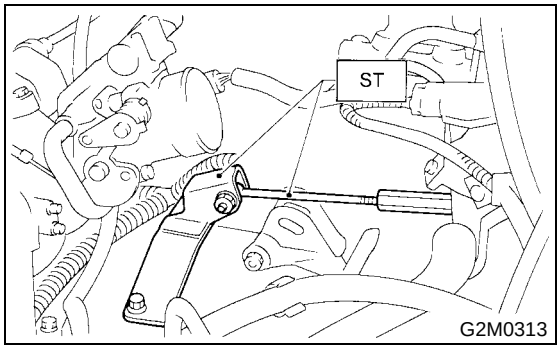
12) Remove pitching stopper.



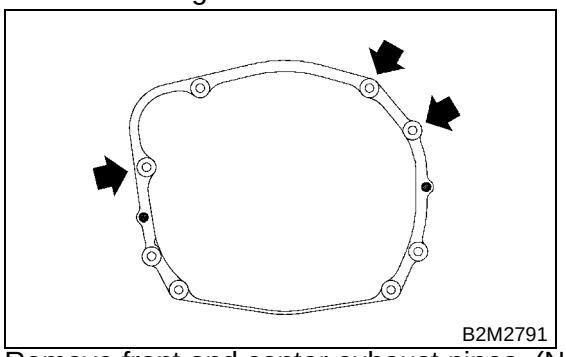
13) Set ST.

NOTE:
Also is available Part No. 927670000.

ST 41099AA020 ENGINE SUPPORT ASSY



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



15) Remove front and center exhaust pipes. (Non-turbo model) with OBD <Ref. to EX(SOHC)-7, REMOVAL, Front Exhaust Pipe.> without OBD <Ref. to EX(SOHCw/oOBD)-9, REMOVAL, Front Exhaust Pipe.>

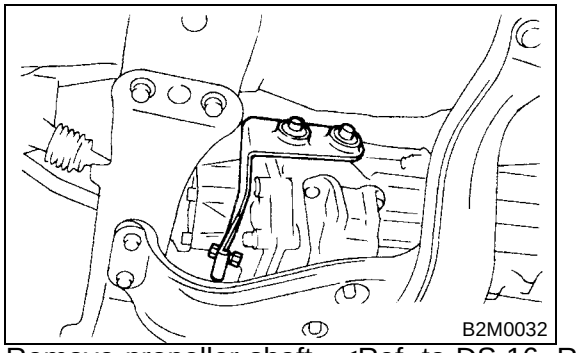
16) Remove center exhaust pipe. (Turbo model). <Ref. to EX(DOHC TURBO)-8, REMOVAL, Center Exhaust Pipe.>

17) Remove rear exhaust pipe and muffler.

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

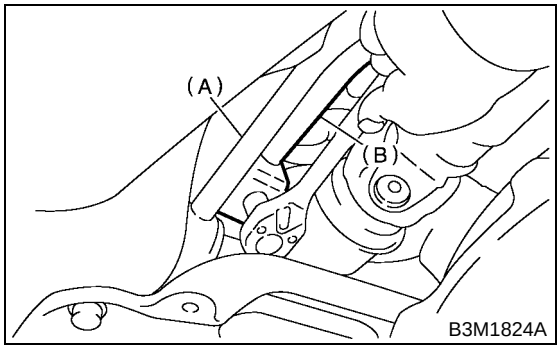
18) Remove heat shield cover.

19) Remove hanger bracket from right side of transmission.



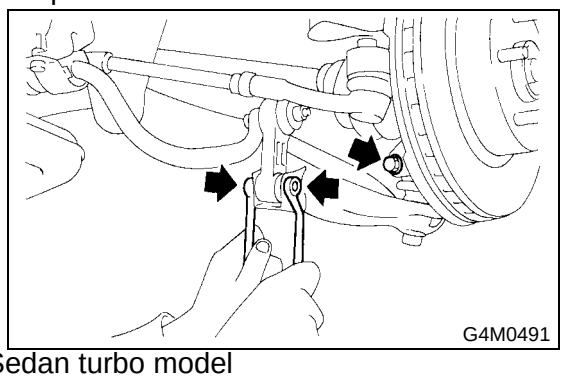
20) Remove propeller shaft. <Ref. to DS-16, REMOVAL, Propeller Shaft.>

21) Remove gear shift rod and stay from transmission.
(1) Disconnect stay from transmission.
(2) Disconnect rod from transmission.

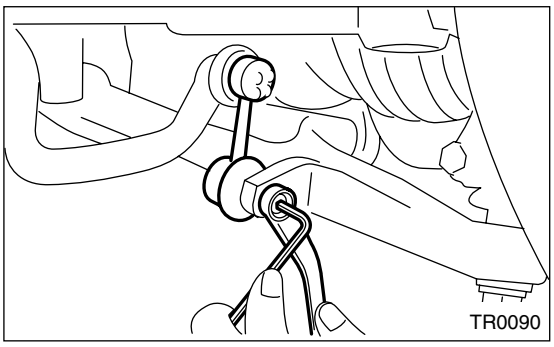


(A) Stay
(B) Rod

22) Disconnect stabilizer link from transverse link.
23) Remove bolt securing ball joint of transverse link to housing.
• Except sedan turbo model

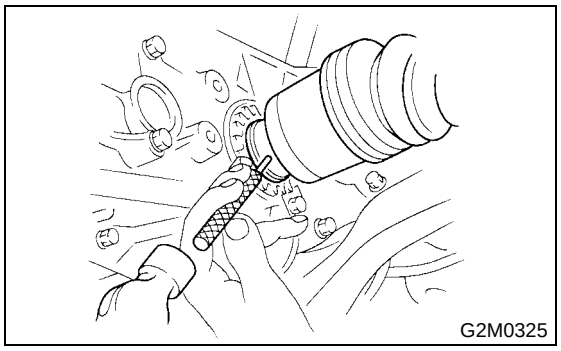


• Sedan turbo model

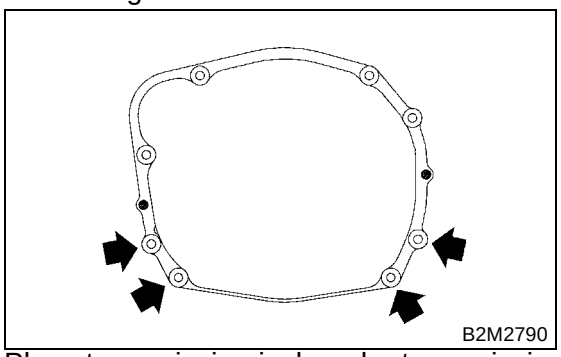


24) Remove spring pins and separate front drive shafts from each side of the transmission.

CAUTION:
Discard removing spring pin. Replace with a new one.

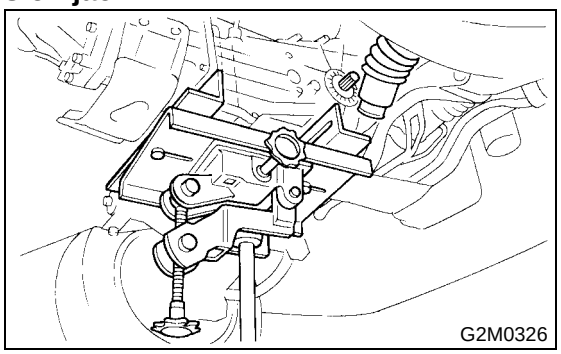


25) Remove nuts which hold lower side of transmission to engine.

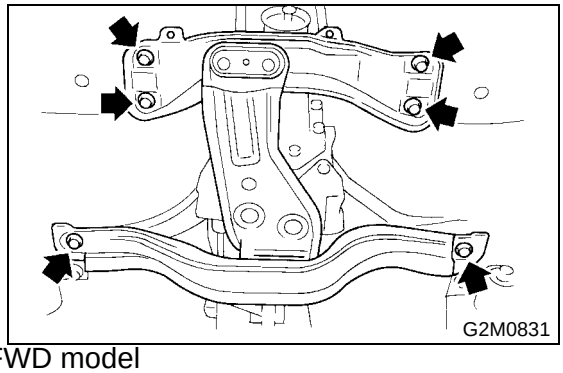


26) Place transmission jack under transmission.

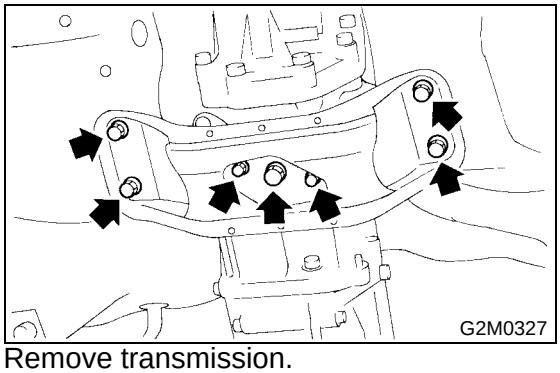
CAUTION:
Always support transmission case with a transmission jack.



27) Remove transmission rear crossmember from vehicle.
• AWD model



• FWD model



28) Remove transmission.

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

29) Separate transmission assembly and rear cushion rubber.

B: INSTALLATION

1) Install rear cushion rubber to transmission assembly.

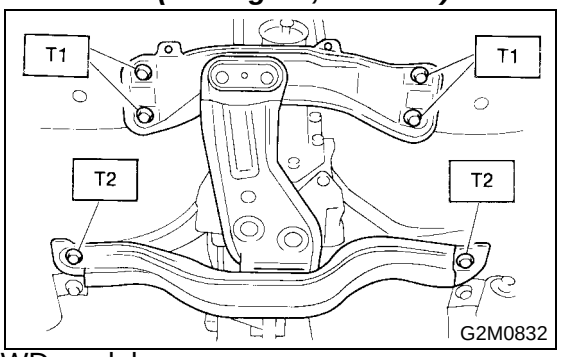
Tightening torque:
34 N·m (3.5 kgf-m, 25.3 ft-lb)

2) Install clutch release lever and bearing onto transmission. (Turbo model) <Ref. to CL-19, 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.

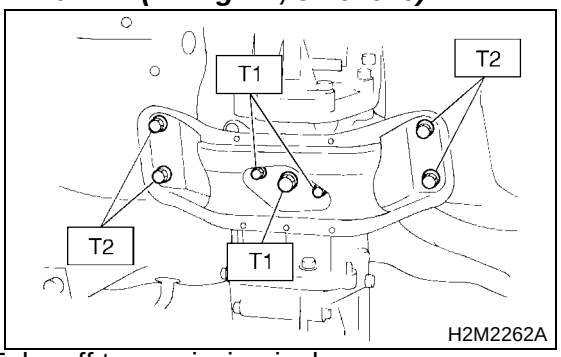
4) Install transmission rear crossmember.
• AWD model

Tightening torque:
T1: 70 N·m (7.1 kgf-m, 51 ft-lb)
T2: 140 N·m (14.3 kgf-m, 103 ft-lb)



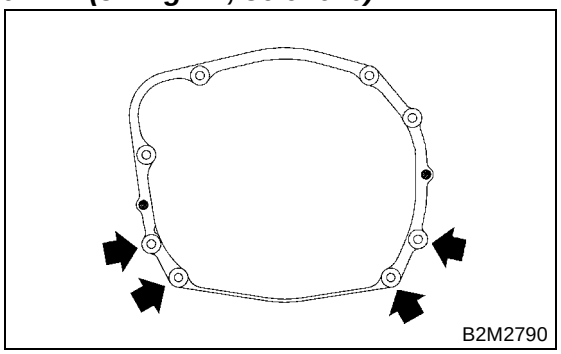
• FWD model

Tightening torque:
T1: 35 N·m (3.6 kgf-m, 26 ft-lb)
T2: 70 N·m (7.1 kgf-m, 51.6 ft-lb)



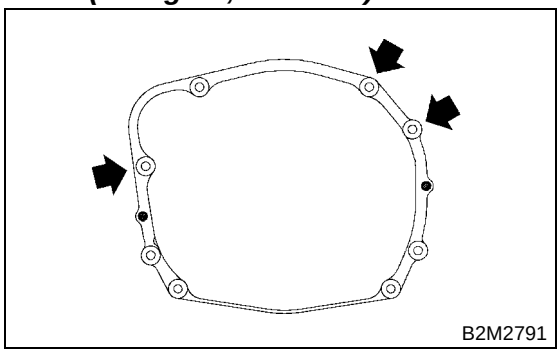
5) Take off transmission jack.
6) Tighten nuts which hold lower side of transmission to engine.

Tightening torque:
50 N·m (5.1 kgf-m, 36.9 ft-lb)

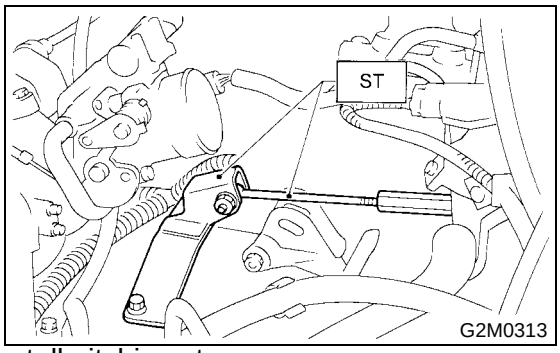


7) Connect engine and transmission.
(1) Install starter.
<Ref. to SC-6, INSTALLATION, Starter.>
(2) Tighten bolt which holds right upper side of transmission to engine.

Tightening torque:
50 N·m (5.1 kgf-m, 36.9 ft-lb)

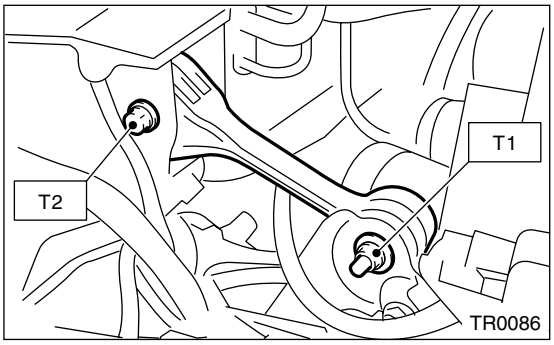


8) Remove ST.



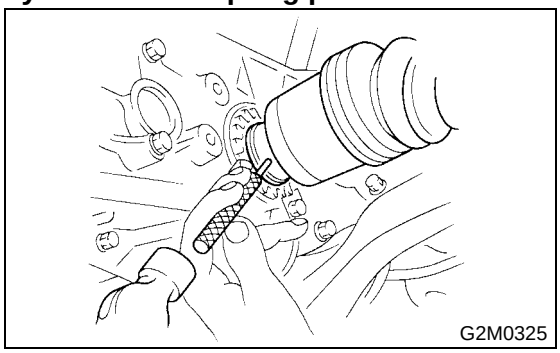
9) Install pitching stopper.

Tightening torque:
T1: 50 N·m (5.1 kgf-m, 37 ft-lb)
T2: 58 N·m (5.9 kgf-m, 43 ft-lb)



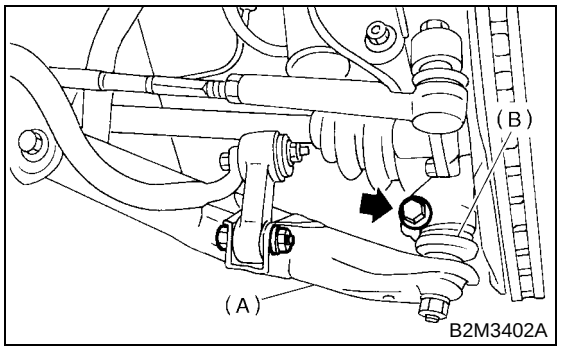
10) Lift-up the vehicle.
11) Install front drive shaft into transmission.
12) Drive spring pin into chamfered hole of drive shaft.

CAUTION:
Always use a new spring pin.



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

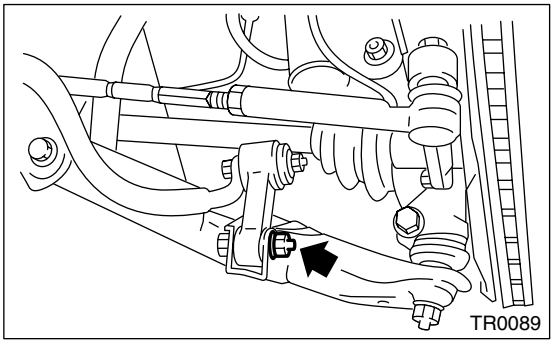
Tightening torque:
49 N·m (5.0 kgf-m, 36 ft-lb)



(A) Transverse link
(B) Ball joint

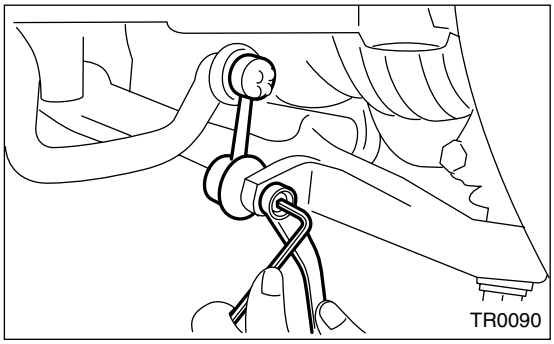
14) Install stabilizer link from transverse link.
• Except sedan turbo model

Tightening torque:
30 N·m (3.1 kgf-m, 22.1 ft-lb)

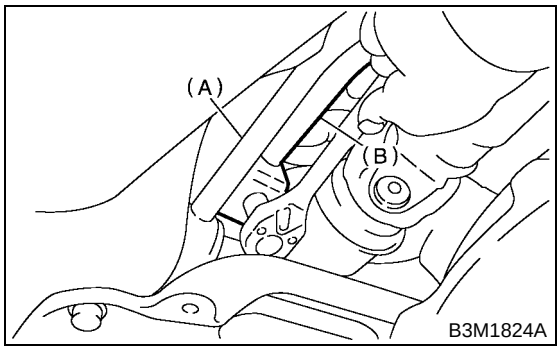


• Sedan turbo model

Tightening torque:
45 N·m (4.6 kgf-m, 33.2 ft-lb)

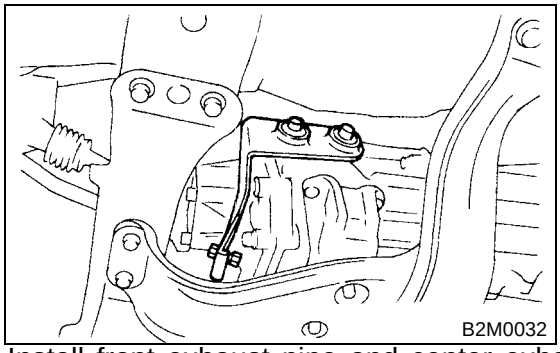


15) Install gear shift rod and stay.
(1) Install gear shift rod onto transmission.

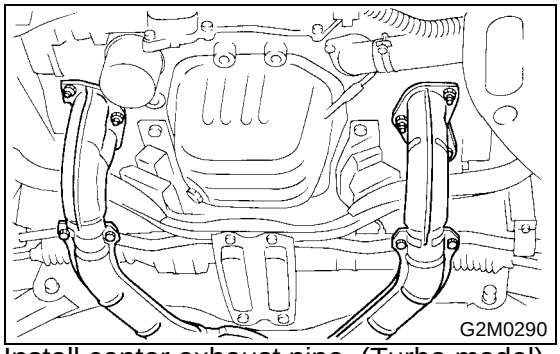


(A) Stay
(B) Rod

(2) Install stay onto transmission.
16) Install propeller shaft. <Ref. to DS-17, INSTALLATION, Propeller Shaft.>
17) Install heat shield cover.
18) Install rear exhaust pipe and muffler.
19) Install hanger bracket on right side of transmission.



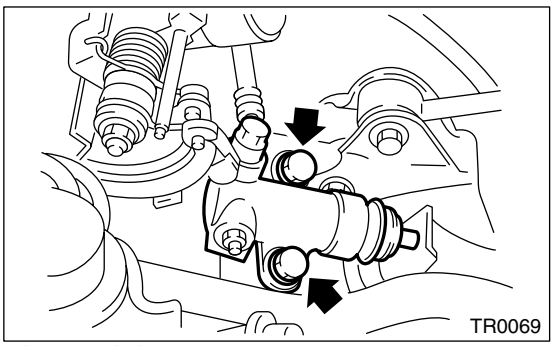
20) Install front exhaust pipe and center exhaust pipe. (Non-turbo model)
Without OBD
<Ref. to EX(SOHCw/oOBD)-10, INSTALLATION, Front Exhaust Pipe.>
With OBD
<Ref. to EX(SOHC)-8, INSTALLATION, Front Exhaust Pipe.>



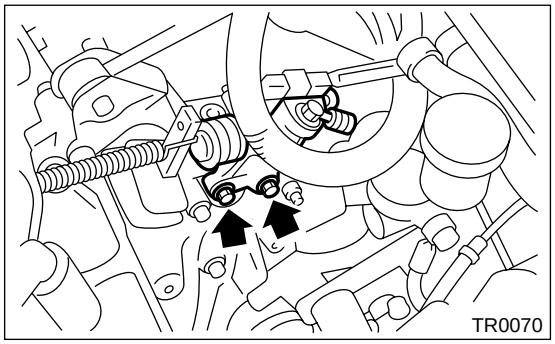
21) Install center exhaust pipe. (Turbo model)
<Ref. to EX(DOHC TURBO)-9, INSTALLATION, Center Exhaust Pipe.>
22) Install under cover.
23) Install operating cylinder. (2.0 L model)

Tightening torque:
37 N·m (3.8 kgf-m, 27.5 ft-lb)

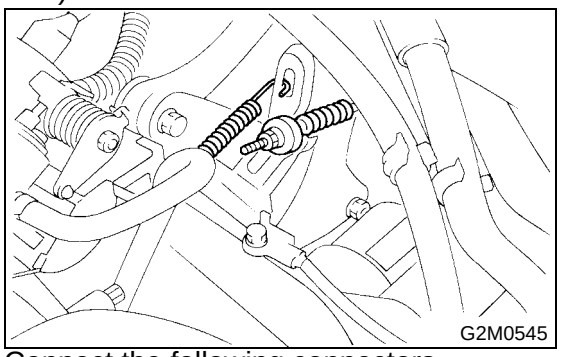
- Non-turbo model



- Turbo model



24) Connect the return spring and clutch cable. (1.6 L model)



25) 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 (Dual-range model)

26) Install air cleaner case stay.

Tightening torque:
16 N·m (1.6 kgf-m, 11.6 ft-lb)

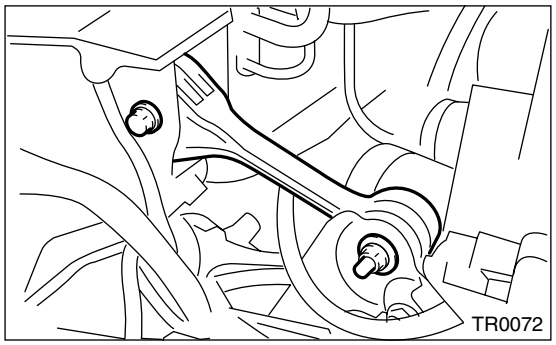
27) Install air cleaner case.
28) Connect battery ground cable.
29) Take off vehicle from lift arms.

4. Transmission Mounting System

A: REMOVAL

1. PITCHING STOPPER

1) Disconnect battery ground terminal.
2) Remove the air intake duct and cleaner case.
3) Remove the air intake duct (Non-turbo model). <Ref. to IN(SOHC)-7, REMOVAL, Air Intake Duct.>
4) Remove the air cleaner case (Non-turbo model). <Ref. to IN(SOHC)-6, REMOVAL, Air Cleaner Case.>
5) Remove the inter cooler (Turbo model). <Ref. to IN(DOHC TURBO)-10, REMOVAL, Intercooler.>
6) Remove the pitching stopper.



2. CROSSMEMBER AND CUSHION RUBBER

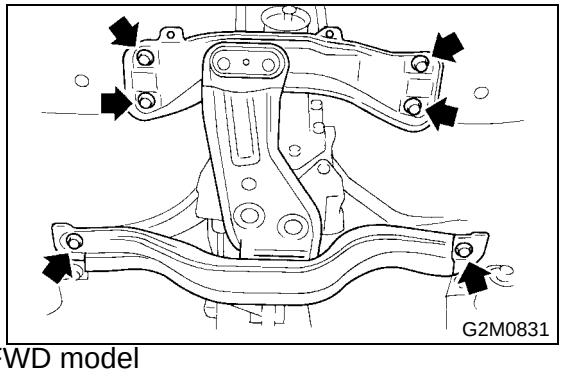
1) Disconnect battery ground terminal.
2) Jack-up vehicle and support it with sturdy racks.
3) Remove the front, center exhaust pipes. (Non-turbo model)
Without OBD
<Ref. to EX(SOHCw/oOBD)-9, REMOVAL, Front Exhaust Pipe.>
With OBD
<Ref. to EX(SOHC)-7, REMOVAL, Front Exhaust Pipe.>

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

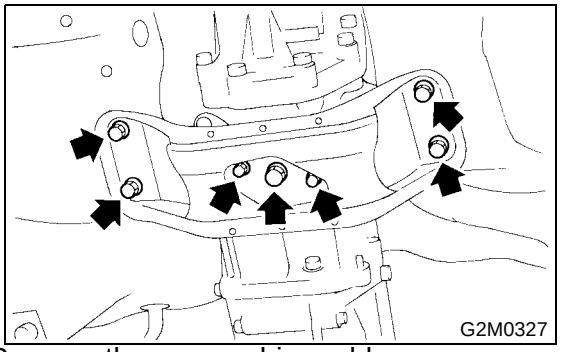
4) Remove center exhaust pipe. (Turbo model) <Ref. to EX(DOHC TURBO)-8, REMOVAL, Center Exhaust Pipe.>
5) Remove rear exhaust pipe and muffler.
6) Remove the heat shield cover.
7) Set the transmission jack under the transmission body.

CAUTION:
Always support transmission case with a transmission jack.

8) Remove the rear crossmember.
- AWD model



- FWD model



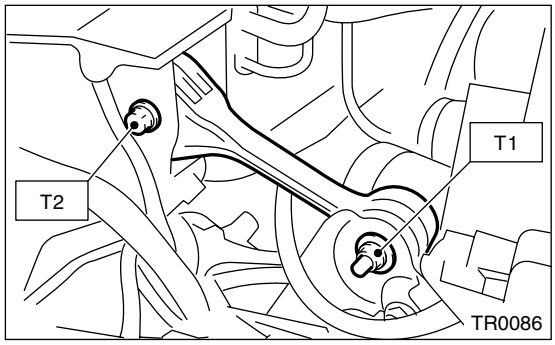
9) Remove the rear cushion rubber.

B: INSTALLATION

1. PITCHING STOPPER

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 air intake duct and cleaner case. (Non-turbo model)
<Ref. to IN(SOHC)-6, INSTALLATION, Air Cleaner Case.> and <Ref. to IN(SOHC)-7, INSTALLATION, Air Intake Duct.>
3) Install the intercooler. (Turbo model)
<Ref. to IN(DOHC TURBO)-11, INSTALLATION, Intercooler.>
4) Connect battery ground terminal.

2. CROSSMEMBER AND CUSHION RUBBER

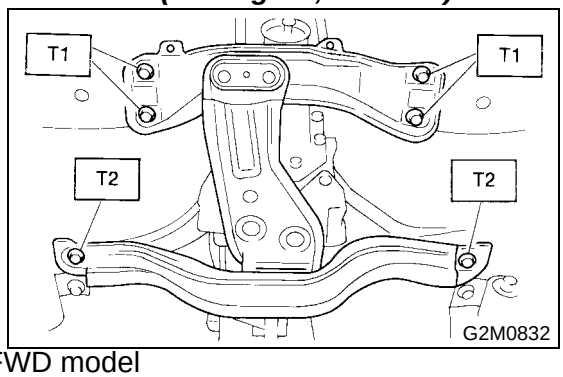
1) Install the rear cushion rubber.

Tightening torque:
35 N·m (3.6 kgf-m, 26 ft-lb)

2) Install the crossmember.

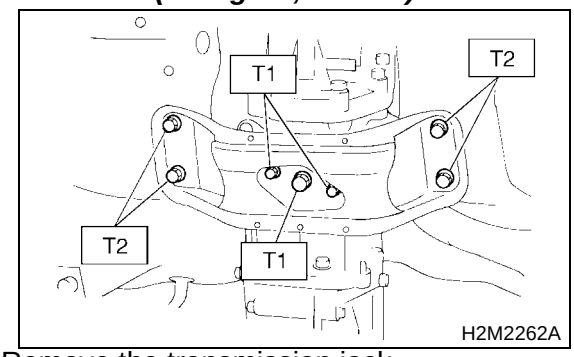
- AWD model

Tightening torque:
T1: 70 N·m (7.1 kgf-m, 51 ft-lb)
T2: 140 N·m (14.3 kgf-m, 103 ft-lb)



- FWD model

Tightening torque:
T1: 3.5 N·m (3.6 kgf-m, 26 ft-lb)
T2: 70 N·m (7.1 kgf-m, 51 ft-lb)



3) Remove the transmission jack.
4) Install the heat shield cover.
5) Install the front and center exhaust pipes. (Non-turbo model)
Without OBD
<Ref. to EX(SOHCw/oOBD)-10, INSTALLATION, Front Exhaust Pipe.>
With OBD
<Ref. to EX(SOHC)-8, INSTALLATION, Front Exhaust Pipe.>
6) Install center exhaust pipe. (Turbo model) <Ref. to EX(DOHC TURBO)-9, INSTALLATION, Center Exhaust Pipe.>
7) Install rear exhaust pipe and muffler.

C: INSPECTION

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

1. PITCHING STOPPER

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

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

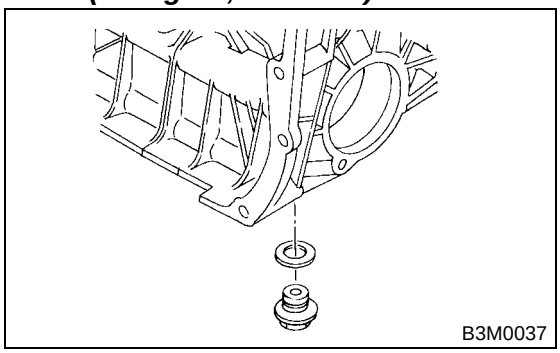
5. Oil Seal

A: REPLACEMENT

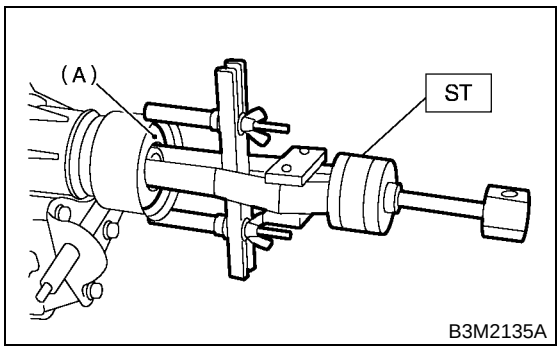
1) Clean transmission exterior.
2) Drain gear oil completely.

NOTE:
Tighten drain plug after draining gear oil.

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

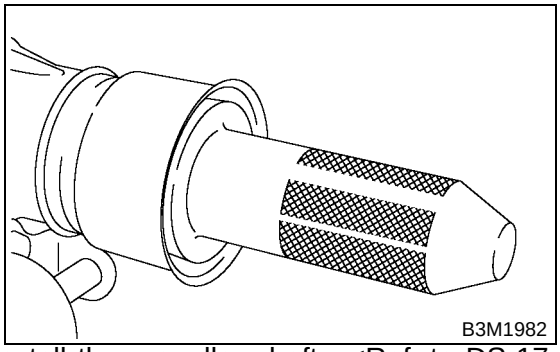


3) Remove rear exhaust pipe and muffler.
4) Remove heat shield cover.
5) Remove propeller shaft. <Ref. to DS-16, REMOVAL, Propeller Shaft.>
6) Using ST, remove the oil seal.
ST 398527700 PULLER ASSY



(A) Oil seal

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



8) Install the propeller shaft. <Ref. to DS-17, 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-36, REPLACEMENT, Transmission Gear Oil.>

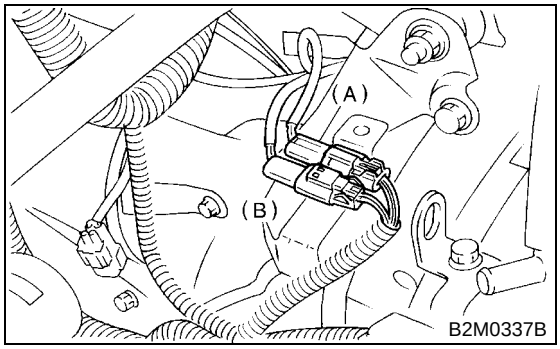
6. Switches and Harness

A: REMOVAL

1. BACK-UP LIGHT AND NEUTRAL POSITION SWITCH

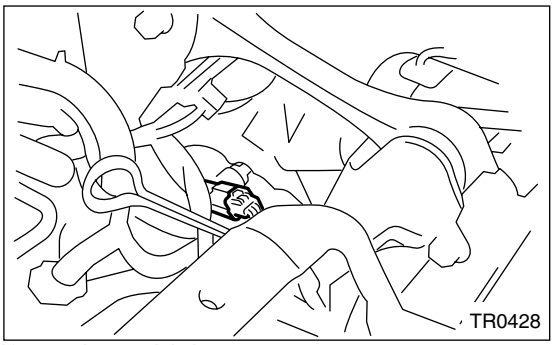
1) Disconnect connector battery ground terminal.
2) Remove air intake duct and cleaner case. (Non-turbo model) <Ref. to IN(SOHC)-6, REMOVAL, Air Cleaner Case.> and <Ref. to IN(SOHC)-7, REMOVAL, Air Intake Duct.>
3) Remove intercooler (Turbo model). <Ref. to IN(DOHC TURBO)-10, REMOVAL, Intercooler.>
4) Disconnect connector back-up light switch and neutral position switch.

- Non-turbo model

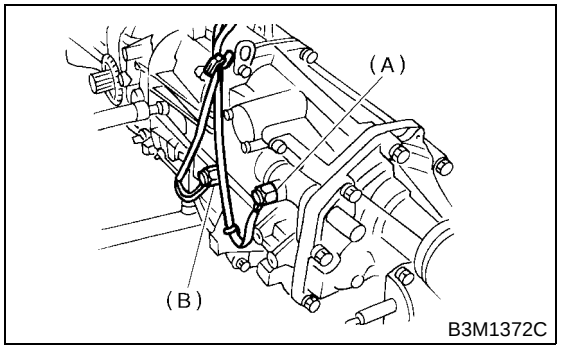


(A) Neutral switch (Brown)
(B) Back-up light switch (Gray)

- Turbo model



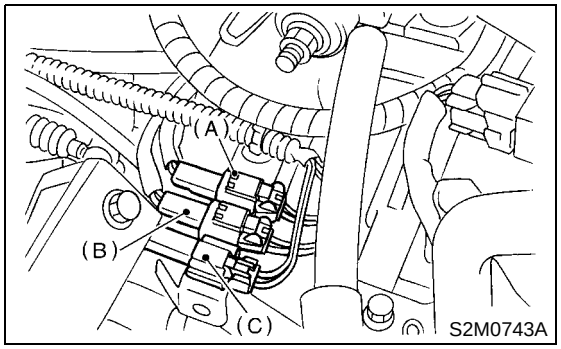
5) Lift-up the vehicle.
6) Remove back-up light switch and neutral position switch with harness.



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

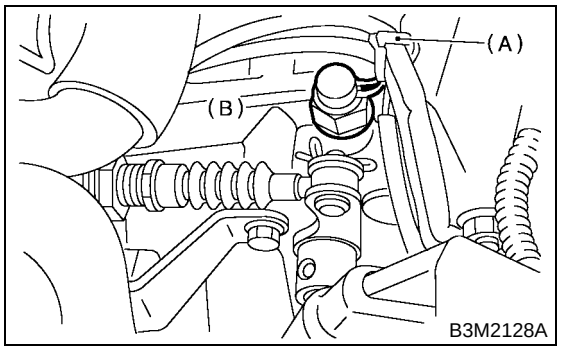
2. HIGH-LOW SWITCH

1) Disconnect connector battery ground terminal.
2) Remove air intake duct and cleaner case. <Ref. to IN(SOHC)-6, REMOVAL, Air Cleaner Case.> and <Ref. to IN(SOHC)-7, 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.



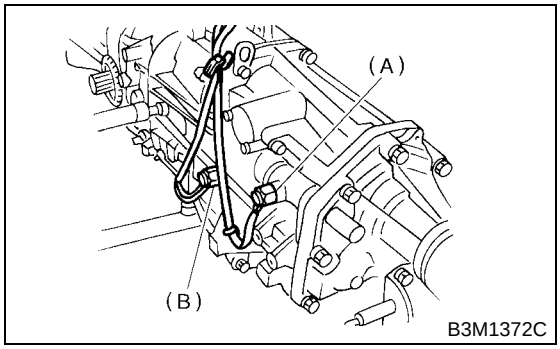
(A) Clamp
(B) High-low switch

B: INSTALLATION

1. BACK-UP LIGHT SWITCH AND NEUTRAL POSITION SWITCH

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)-6, INSTALLATION, Air Cleaner Case.> and <Ref. to IN(SOHC)-7, INSTALLATION, Air Intake Duct.>
4) Install intercooler. (Turbo model)
<Ref. to IN(DOHC TURBO)-11, INSTALLATION, Intercooler.>
5) Connect battery ground terminal.

2. HIGH-LOW SWITCH

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. <Ref. to IN(SOHC)-6, INSTALLATION, Air Cleaner Case.> and <Ref. to IN(SOHC)-7, INSTALLATION, Air Intake Duct.>
5) Connect battery ground terminal.

C: INSPECTION

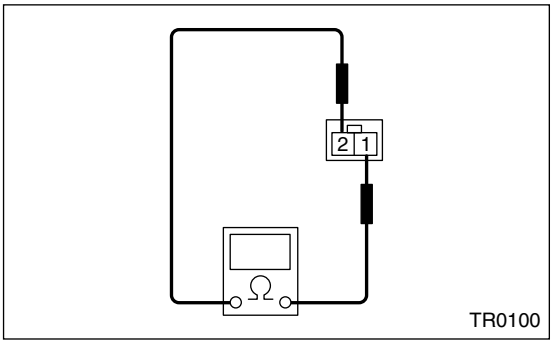
1. BACK-UP LIGHT SWITCH

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

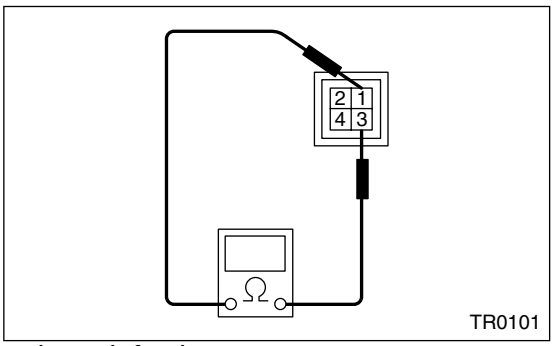
2. NEUTRAL POSITION SWITCH

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



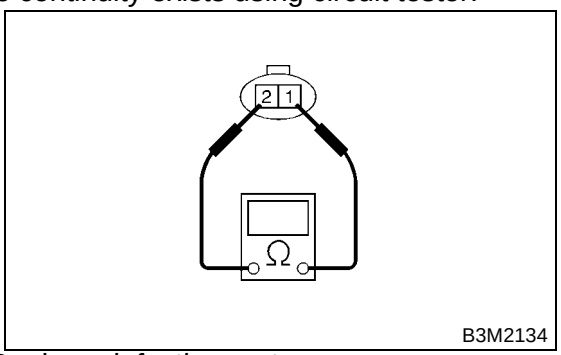
- Turbo model



4) Replace defective parts.

3. HIGH-LOW SWITCH

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.

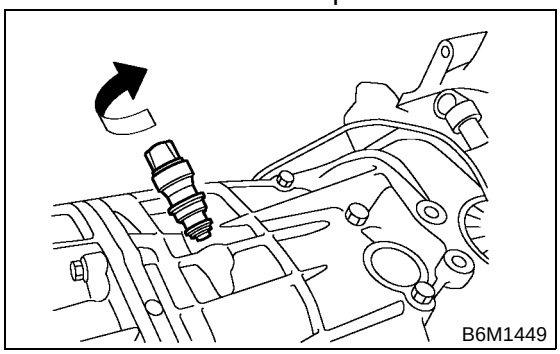


4) Replace defective parts.

7. Vehicle Speed Sensor

A: REMOVAL

1) Disconnect ground terminal from battery.
2) Lift-up the vehicle.
3) Remove front, center rear exhaust pipes and muffler.
4) Disconnect connector from vehicle speed sensor.
5) Turn and remove vehicle speed sensor.



B: INSTALLATION

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, center exhaust pipes and muffler.
5) Lower the vehicle.
6) Connect battery ground terminal.

C: INSPECTION

Inspect the vehicle speed sensor.
Without OBD
<Ref. to EN(SOHCw/oOBD)-96, DTC 33 VEHICLE SPEED SIGNAL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
With OBD Non-Turbo model
<Ref. to EN(SOHC)-204, DTC P0500 — VEHICLE SPEED SENSOR MALFUNCTION —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
Turbo model
<Ref. to EN(DOHC TURBO)-208, DTC P0500 — VEHICLE SPEED SENSOR MALFUNCTION —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

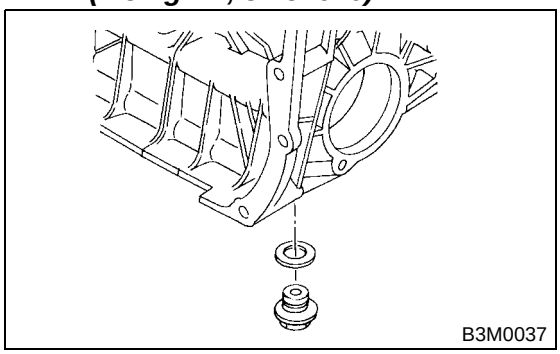
8. Preparation for Overhaul

A: PROCEDURE

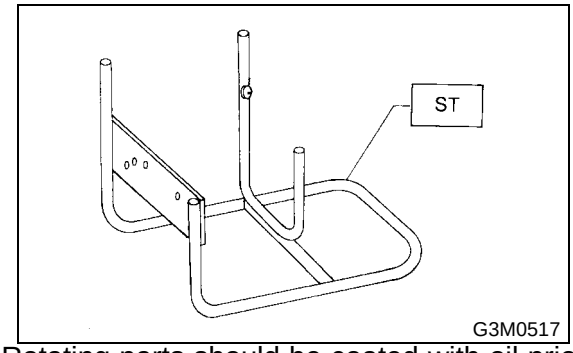
1) Clean oil, grease, dirt and dust from transmission.
2) Remove drain plug to drain oil. After draining, retighten it as before.

CAUTION:
Replace gasket with a new one.

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


B3M0037

3) Attach transmission to ST.
ST 499937100 TRANSMISSION STAND



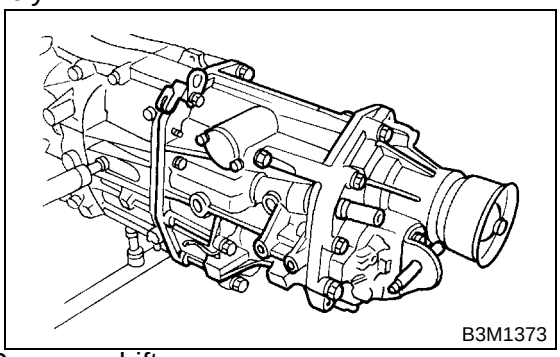
G3M0517

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

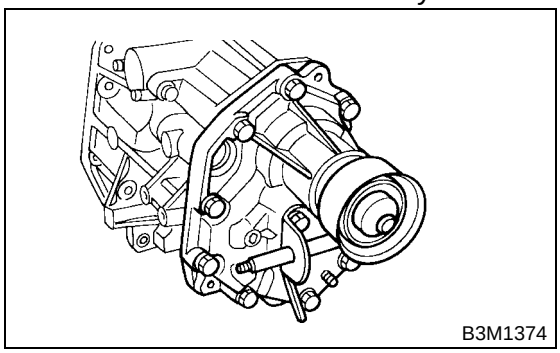
9. Transfer Case and Extension Case Assembly

A: REMOVAL

1) Remove the manual transmission assembly from vehicle. <Ref. to MT-37, REMOVAL, Manual Transmission Assembly.>
2) Remove back-up light switch and neutral position switch. <Ref. to MT-46, REMOVAL, Switches and Harness.>
3) Remove transfer case with extension case assembly.

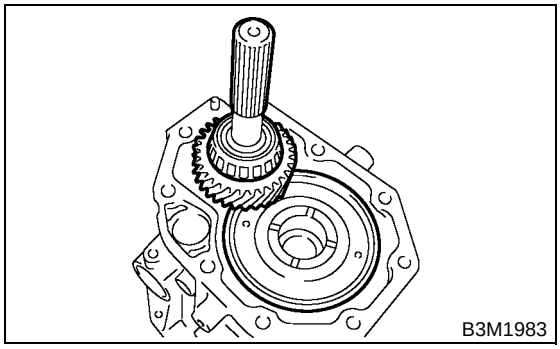

B3M1373

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

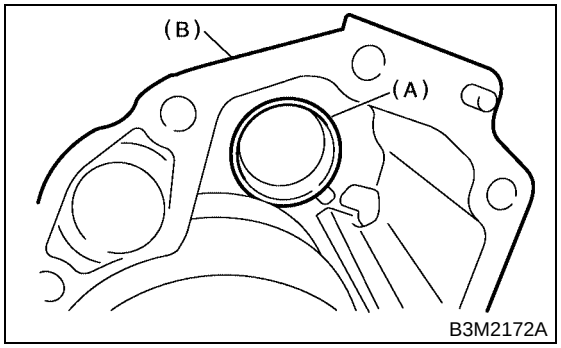

B3M1374

B: INSTALLATION

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


B3M1983

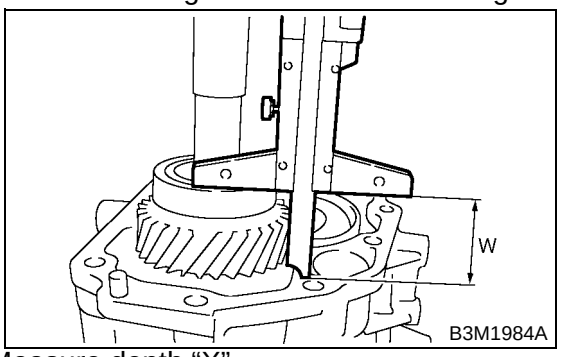
2) Remove bearing cone from the extension case assembly, and install to taper roller bearing of the transfer driven gear.



B3M2172A

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

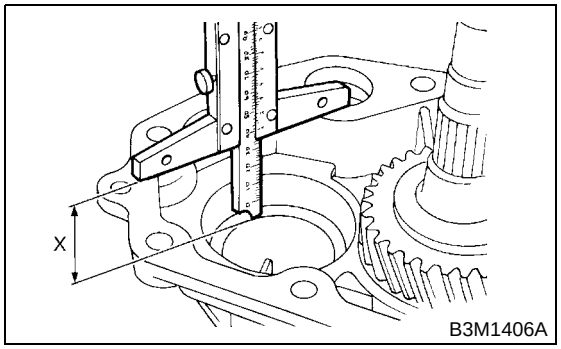
3) While pressing the bearing cone horizontally, turn the driven shaft ten rotations.
4) Measure height “W” between transfer case and taper roller bearing on the transfer driven gear.



B3M1984A

5) Measure depth “X”.

NOTE:
Measure with bearing cone and thrust washer removed.



B3M1406A

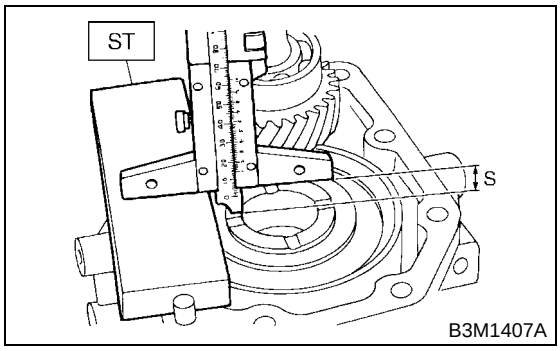
6) Calculate space “t” using the following equation:
t = X – W + 0.2 to 0.3 mm (0.008 to 0.012 in)
7) Select nearest washer in the following table:

Standard clearance between thrust washer and taper roller bearing:
0.2 — 0.3 mm T (0.008 — 0.012 in T)

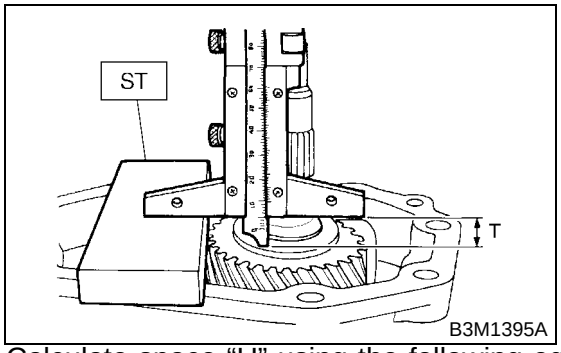
NOTE:
T: Tight

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



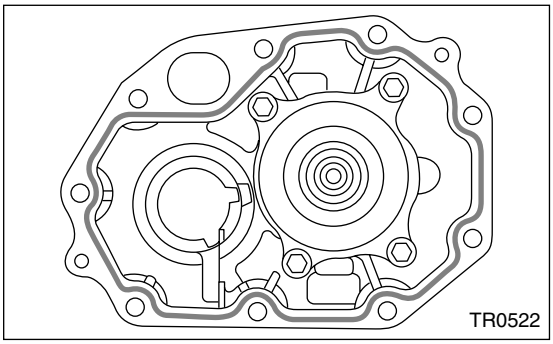
11) Calculate space “U” using the following equation: U = S – T
12) Select suitable washer in the following table:

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)

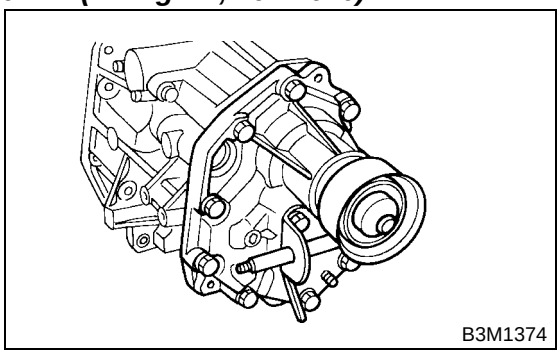
13) Fit thrust washer on center differential.
14) Install bearing cone into extention case.
15) Apply proper amount of liquid gasket to the transfer case mating surace.

Liquid gasket:
THREE BOND 1215B

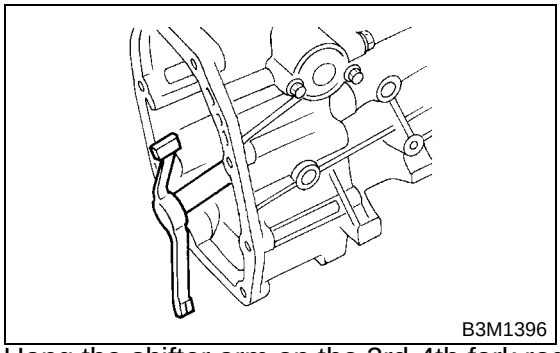


16) Install extension assembly into transfer case.

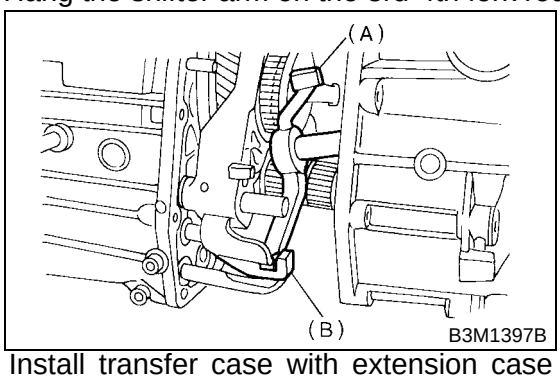
Tightening torque:
40N·m (4.1 kgf-m, 29.7 ft-lb)


B3M1374

17) Install shifter arm to transfer case.


B3M1396

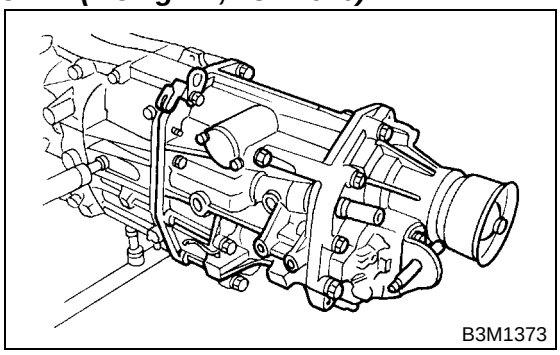
18) Hang the shifter arm on the 3rd-4th fork rod.



B3M1397B

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

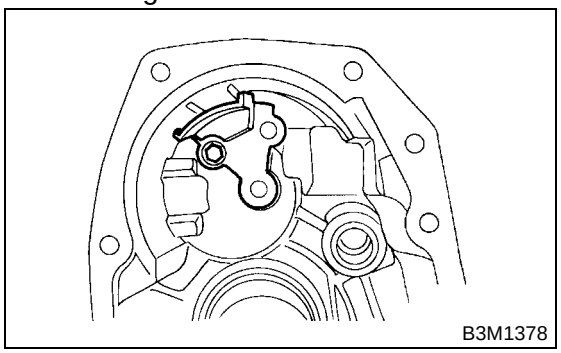
Tightening torque:
25N·m (2.5 kgf-m, 18.1 ft-lb)


B3M1373

C: DISASSEMBLY

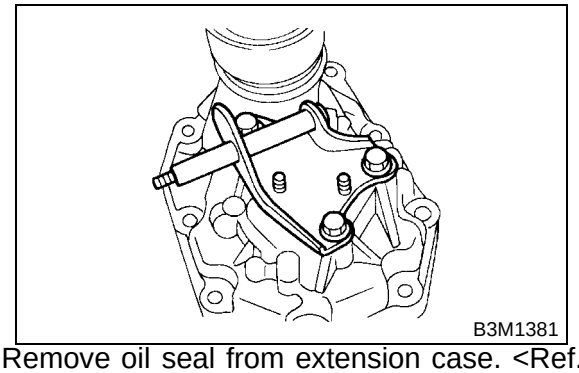
1. TRANSFER CASE

1) Remove reverse check assembly. <Ref. to MT-60, REMOVAL, Reverse Check Sleeve.>
2) Remove oil guide.


B3M1378

2. EXTENSION CASE

1) Remove transfer drive gear assembly. <Ref. to MT-55, REMOVAL, Transfer Drive Gear.>
2) Remove shift bracket.


B3M1381

3) Remove oil seal from extension case. <Ref. to MT-45, OIL SEAL, .>

D: ASSEMBLY

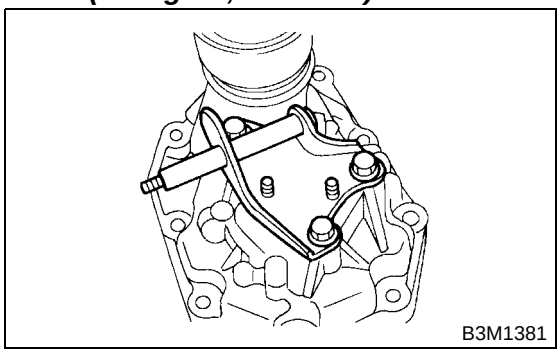
1. EXTENSION CASE

1) Using ST, install oil seal to extension case. <Ref. to MT-45, 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)

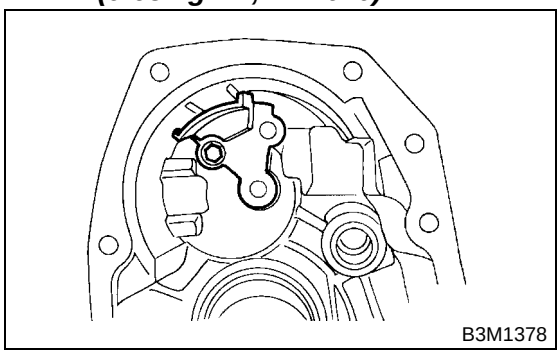

B3M1381

3) Install transfer drive gear to extension case. <Ref. to MT-55, INSTALLATION, Transfer Drive Gear.>

2. TRANSFER CASE

1) Install oil guide to transfer case.

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


B3M1378

2) Install reverse check sleeve assembly to transfer case. <Ref. to MT-60, INSTALLATION, Reverse Check Sleeve.>

10.Rear Case

A: REMOVAL

1) Remove the manual transmission assembly from vehicle.<Ref. to MT-37, REMOVAL, Manual Transmission Assembly.>
2) Remove back-up light switch and neutral position switch. <Ref. to MT-46, REMOVAL, Switches and Harness.>
3) Remove rear case.

B: INSTALLATION

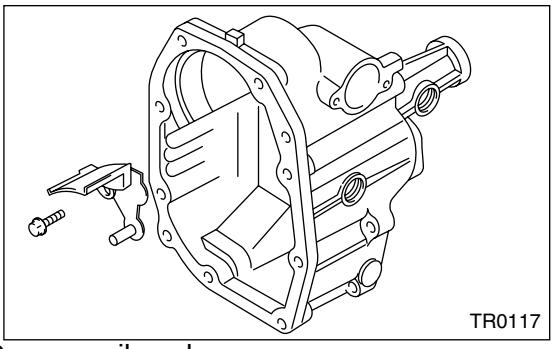
1) Install rear case.

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

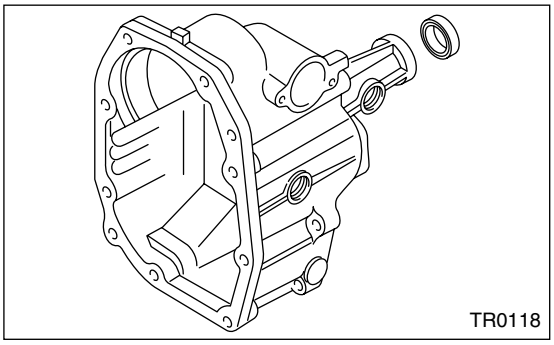
2) Install back-up light switch and neutral position switch.<Ref. to MT-47, INSTALLATION, Switches and Harness.>
3) Install the manual transmission assembly from vehicle.<Ref. to MT-40, INSTALLATION, Manual Transmission Assembly.>

C: DISASSEMBLY

1) Remove the reverse check assembly.<Ref. to MT-60, REMOVAL, Reverse Check Sleeve.>
2) Remove oil guide.


TR0117

3) Remove oil seal.


TR0118

D: ASSEMBLY

1) Install oil seal.
2) Install oil guide.

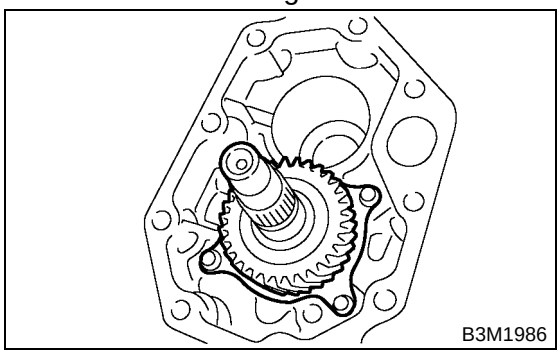
Tightening torque:
6.4 N·m (0.65 kgf-m, 4.7 ft-lb)

3) Install the reverse check assembly.<Ref. to MT-60, INSTALLATION, Reverse Check Sleeve.>

11.Transfer Drive Gear

A: REMOVAL

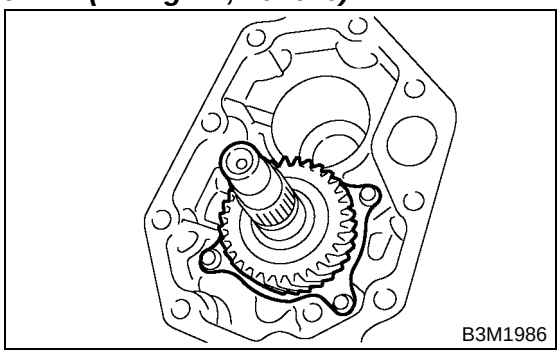
1) Remove the manual transmission assembly from vehicle. <Ref. to MT-37, REMOVAL, Manual Transmission Assembly.>
2) Remove back-up light switch and neutral position switch. <Ref. to MT-46, REMOVAL, Switches and Harness.>
3) Remove transfer case with extension case assembly. <Ref. to MT-50, REMOVAL, Transfer Case and Extension Case Assembly.>
4) Remove extension case assembly.
5) Remove transfer driven gear.
6) Remove transfer drive gear.



B: INSTALLATION

1) Install transfer drive gear.

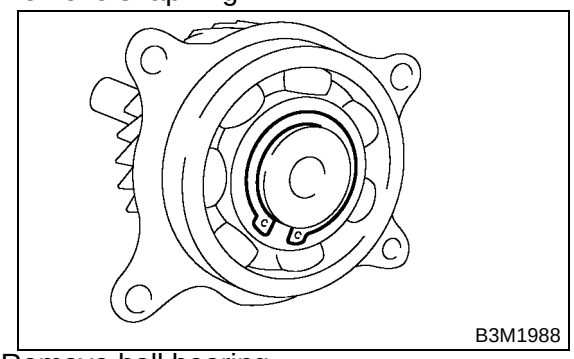
Tightening torque:
26 N·m (2.7 kgf-m, 20 ft-lb)



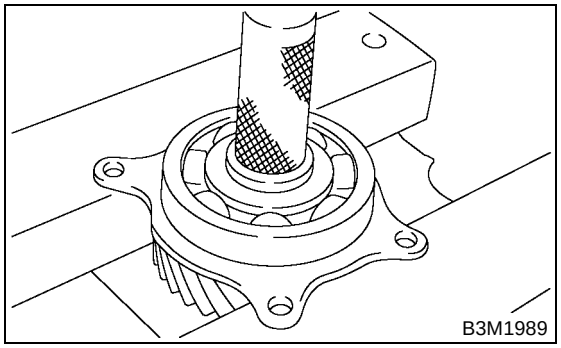
2) Install transfer driven gear.
3) Install the extension case assembly.
4) Install transfer case and extension case assembly. <Ref. to MT-50, INSTALLATION, Transfer Case and Extension Case Assembly.>
5) Install back-up light switch and neutral position switch. <Ref. to MT-47, INSTALLATION, Switches and Harness.>
6) Install the manual transmission assembly from vehicle. <Ref. to MT-40, INSTALLATION, Manual Transmission Assembly.>

C: DISASSEMBLY

1) Remove snap ring.



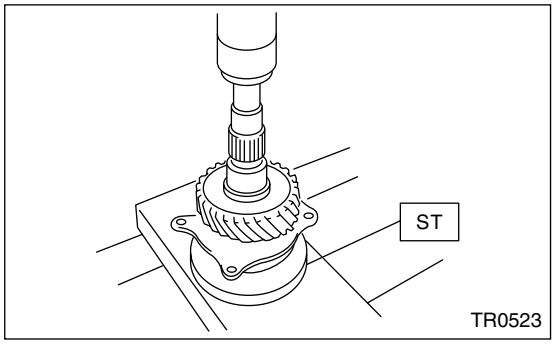
2) Remove ball bearing.



D: ASSEMBLY

1) Set the ST applying to inner race of bearing and instal to drive shaft.
ST 398177700 INSTALLER

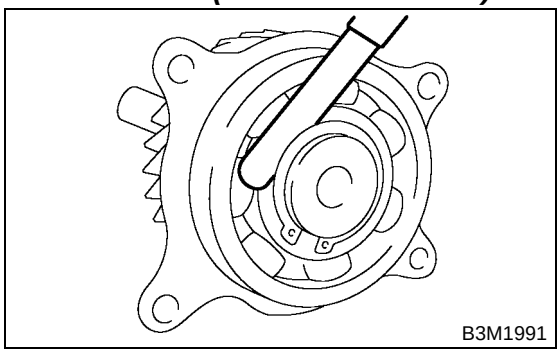
CAUTION:
Do not apply pressure in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton)



2) Install snap ring on transfer drive shaft.

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)



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

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

E: INSPECTION

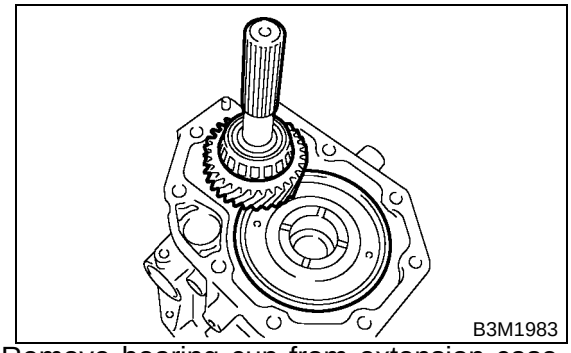
1) Bearings
Replace bearings in the following cases:
- Broken or rusty bearings
- Worn or damaged
- Bearings that fail to turn smoothly or make abnormal noise when turned after gear oil lubrication.

2) Drive gear
Replace drive gear in the following cases:
- If their tooth surfaces and shaft are excessively broken or damaged.

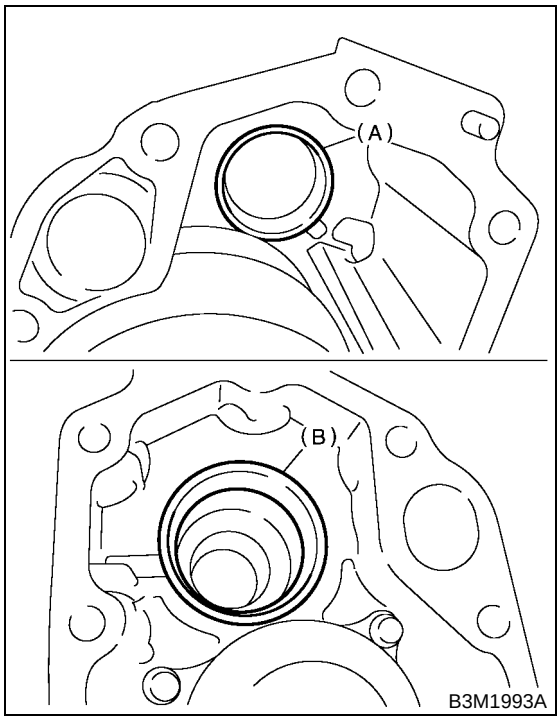
12.Transfer Driven Gear

A: REMOVAL

1) Remove the manual transmission assembly from vehicle. <Ref. to MT-37, REMOVAL, Manual Transmission Assembly.>
2) Remove back-up light switch and neutral position switch. <Ref. to MT-46, REMOVAL, Switches and Harness.>
3) Remove transfer case with extension case assembly. <Ref. to MT-50, REMOVAL, Transfer Case and Extension Case Assembly.>
4) Remove extension case assembly.
5) Remove transfer driven gear.



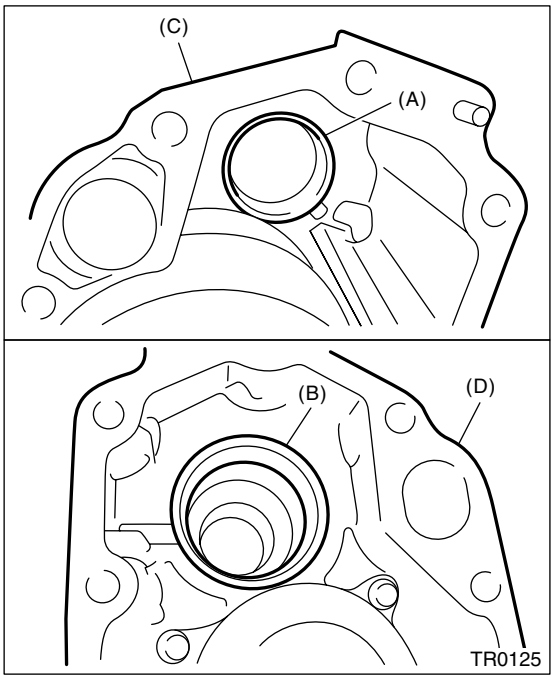
6) Remove bearing cup from extension case and transfer case.



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

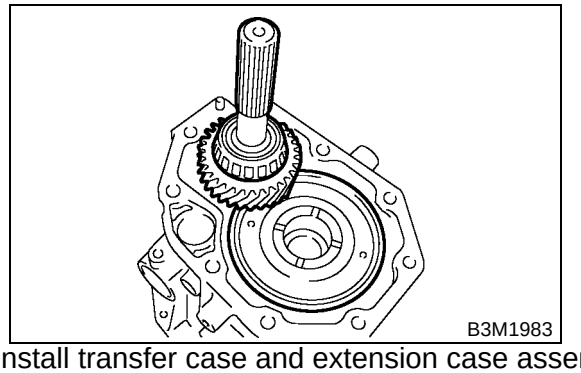
B: INSTALLATION

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



(A) Bearing cup
(B) Bearing cup
(C) Transfer case
(D) Extension case

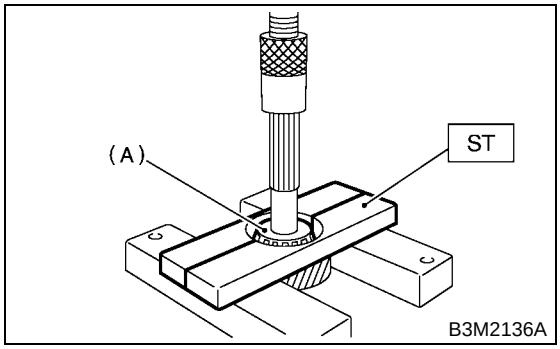
2) Install transfer driven gear.



3) Install transfer case and extension case assembly.<Ref. to MT-50, INSTALLATION, Transfer Case and Extension Case Assembly.>
4) Install back-up light switch and neutral position switch. <Ref. to MT-47, INSTALLATION, Switches and Harness.>
5) Install the manual transmission assembly to vehicle. <Ref. to MT-40, INSTALLATION, Manual Transmission Assembly.>

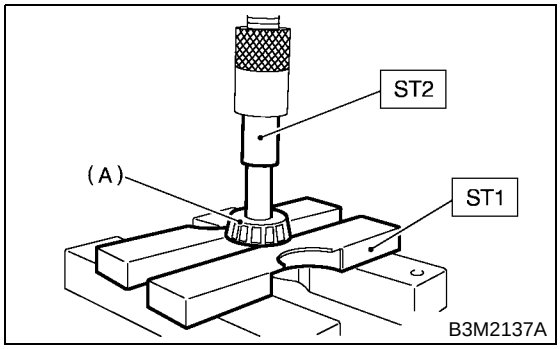
C: DISASSEMBLY

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

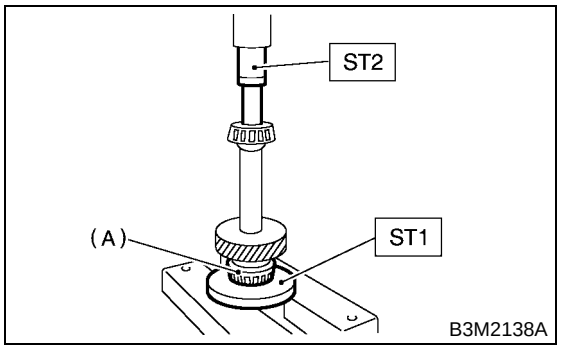


(A) Roller bearing

D: ASSEMBLY

1) Using ST, install roller bearing (extension case side).
ST1 398177700 INSTALLER
ST2 899864100 REMOVER

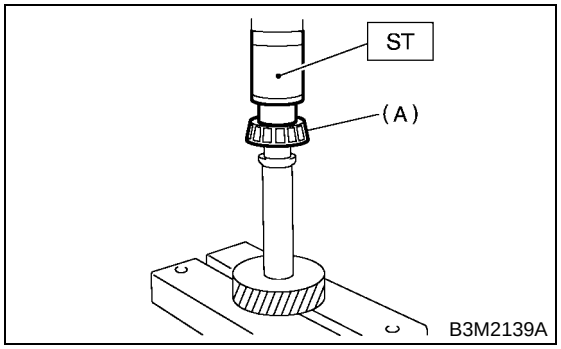
CAUTION:
Do not apply pressure in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton)



(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

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.

13.Center Differential

A: REMOVAL

1) Remove the manual transmission assembly from vehicle. <Ref. to MT-37, REMOVAL, Manual Transmission Assembly.>
2) Remove the transfer case with extension case assembly.<Ref. to MT-50, REMOVAL, Transfer Case and Extension Case Assembly.>
3) Remove the extension case assembly. <Ref. to MT-50, REMOVAL, Transfer Case and Extension Case Assembly.>
4) Remove the transfer driven gear. <Ref. to MT-57, REMOVAL, Transfer Driven Gear.>
5) Remove the center differential.

B: INSTALLATION

1) Install the center differential into transfer case.
2) Install the transfer driven gear. <Ref. to MT-57, INSTALLATION, Transfer Driven Gear.>
3) Install the extension case assembly. <Ref. to MT-50, INSTALLATION, Transfer Case and Extension Case Assembly.>
4) Install the transfer case with extension case assembly. <Ref. to MT-50, REMOVAL, Transfer Case and Extension Case Assembly.>
5) Install the back-up light switch and neutral position switch. <Ref. to MT-46, REMOVAL, Switches and Harness.>
6) Install the manual transmission assembly to vehicle. <Ref. to MT-40, INSTALLATION, Manual Transmission Assembly.>

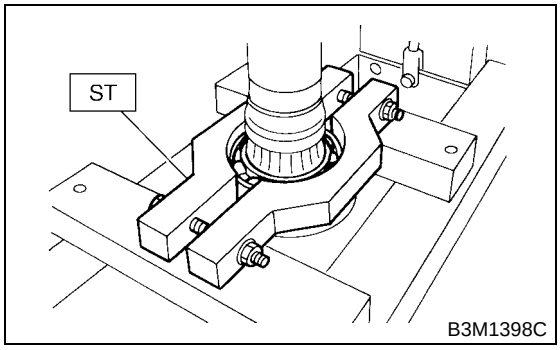
C: DISASSEMBLY

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

Remove ball bearing using ST.

CAUTION:
Do not reuse ball bearing.

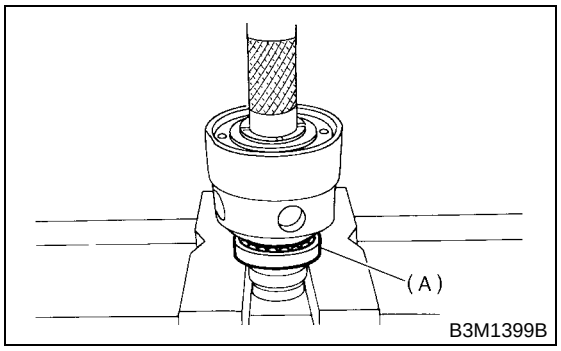
ST 498077300 CENTER DIFFERENTIAL BEARING REMOVER



D: ASSEMBLY

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

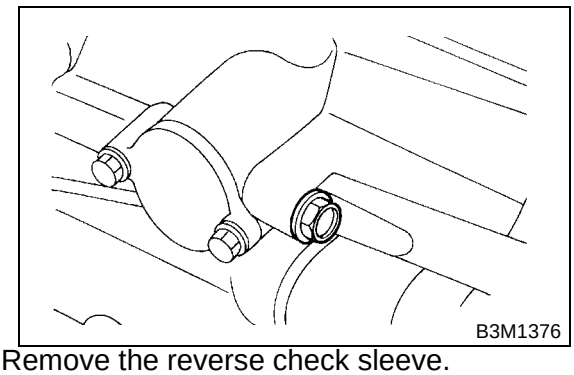
1) Bearings
Replace bearings in the following cases:
- Broken or rusty bearings
- Worn or damaged
- Bearings that fail to turn smoothly or make abnormal noise when turned after gear oil lubrication.
- Bearings having other defects

2) Center differential
Replace center differential assembly in the following case:
- Worn or damaged

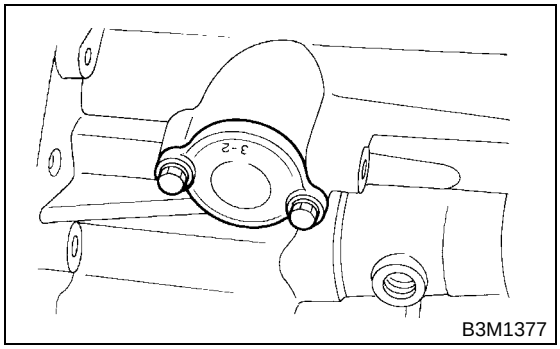
14.Reverse Check Sleeve

A: REMOVAL

1) Remove the manual transmission assembly from vehicle. <Ref. to MT-37, REMOVAL, Manual Transmission Assembly.>
2) Remove the transfer case with extension case assembly. <Ref. to MT-50, REMOVAL, Transfer Case and Extension Case Assembly.>
3) Remove shifter arm.
4) Remove plug, spring washer and reverse check ball.


B3M1376

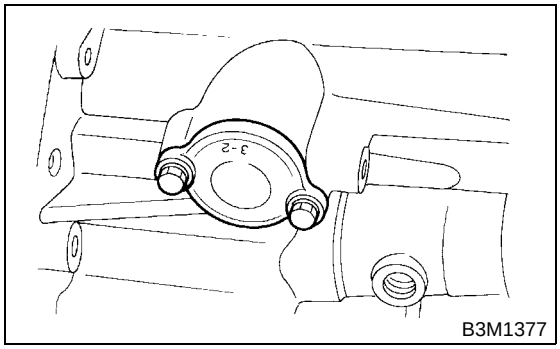
5) Remove the reverse check sleeve.


B3M1377

B: INSTALLATION

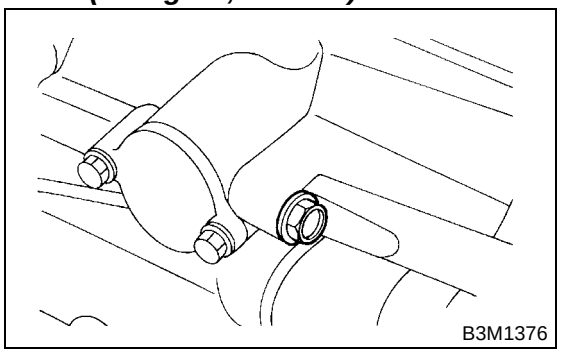
1) Install the reverse check sleeve.

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


B3M1377

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

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

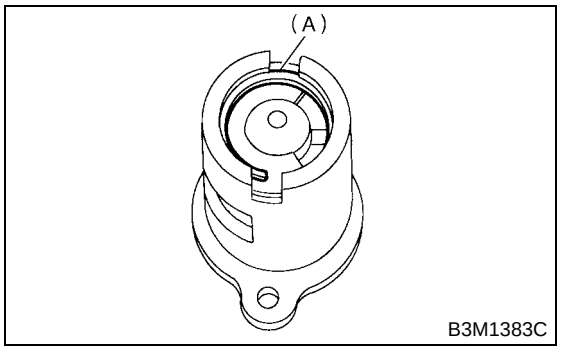

B3M1376

3) Install the shifter arm to transfer case assembly.
4) Install the transfer case with extension case assembly. <Ref. to MT-50, INSTALLATION, Transfer Case and Extension Case Assembly.>
5) Install the manual transmission assembly to vehicle. <Ref. to MT-40, INSTALLATION, Manual Transmission Assembly.>

C: DISASSEMBLY

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

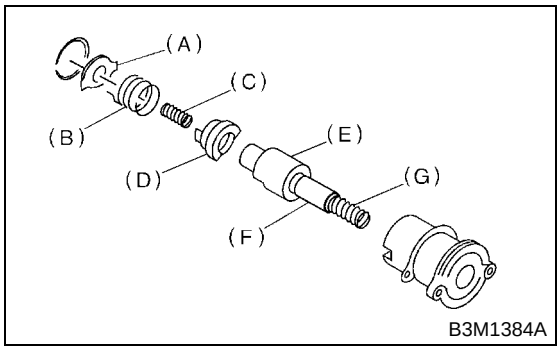
NOTE:
Replace snap ring with a new one if deformed or weakened.



B3M1383C

(A) Snap ring

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)

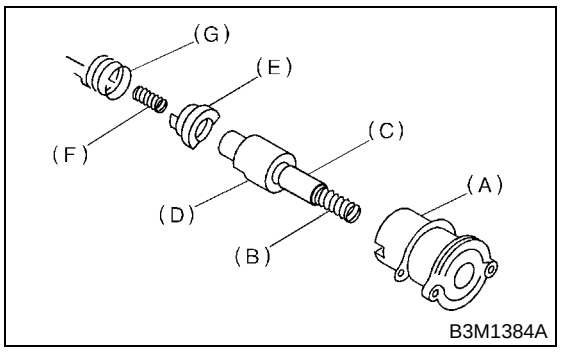
3) Remove O-ring.

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

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.

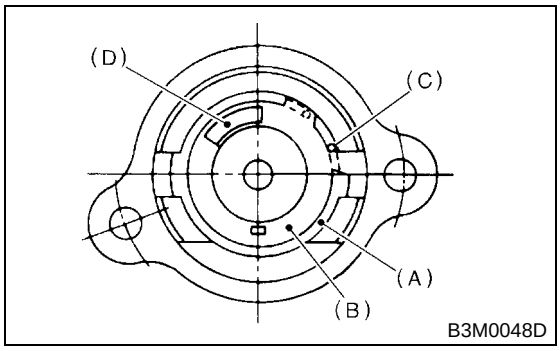


(A) Reverse check spring
(B) Reverse check cam
(C) Return spring (5th-Rev)
(D) Reverse accent shaft
(E) Return spring cap
(F) Return spring (1st-2nd)
(G) Reverse check sleeve

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

• 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-62, ADJUSTMENT, Reverse Check Sleeve.>

F: ADJUSTMENT

1. NEUTRAL POSITION ADJUSTMENT

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

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

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.

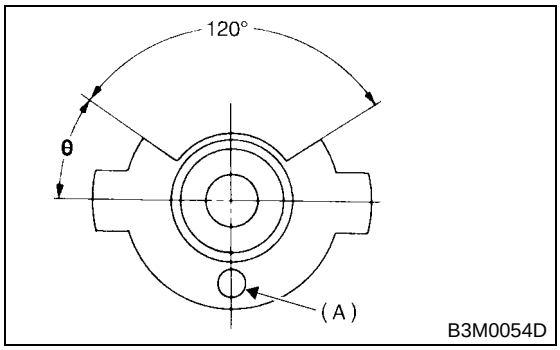
Adjustment shim	
Part No.	Thickness mm (in)
32190AA000	0.15 (0.0059)
32190AA010	0.30 (0.0118)

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

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.

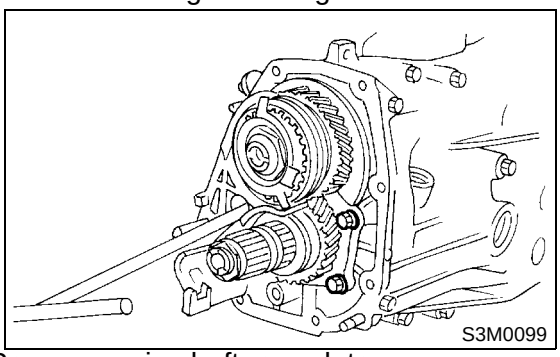


15.Transmission Case

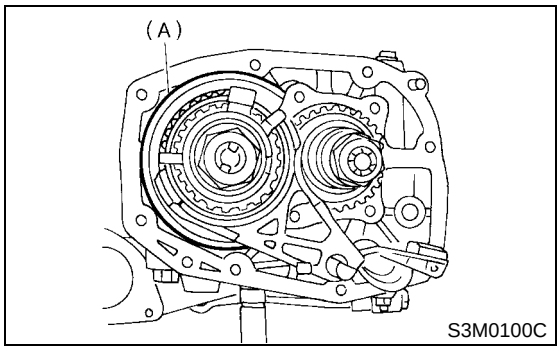
A: REMOVAL

1. SINGLE-RANGE AND FWD MODEL

1) Remove the manual transmission assembly from vehicle. <Ref. to MT-37, REMOVAL, Manual Transmission Assembly.>
2) Remove clutch release lever. <Ref. to CL-19, REMOVAL, Release Bearing and Lever.>
3) Remove transfer case with extension case assembly. (AWD model) <Ref. to MT-50, REMOVAL, Transfer Case and Extension Case Assembly.>
4) Remove rear case. (FWD model) <Ref. to MT-54, REMOVAL, Rear Case.>
5) Remove bearing mounting bolts.


S3M0099

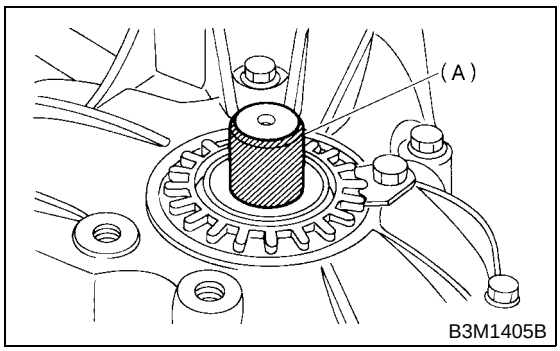
6) Remove main shaft rear plate.



S3M0100C

(A) Main shaft rear plate

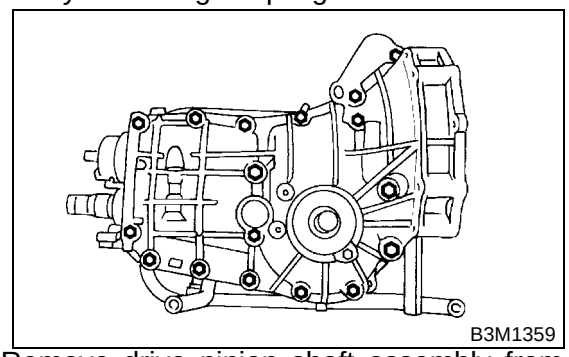
7) Put vinyl tape around splines of right and left axle drive shafts to prevent damage to oil seal.



B3M1405B

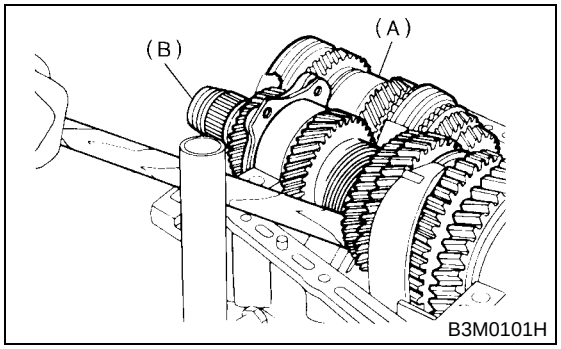
(A) Vinyl tape

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


B3M1359

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

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



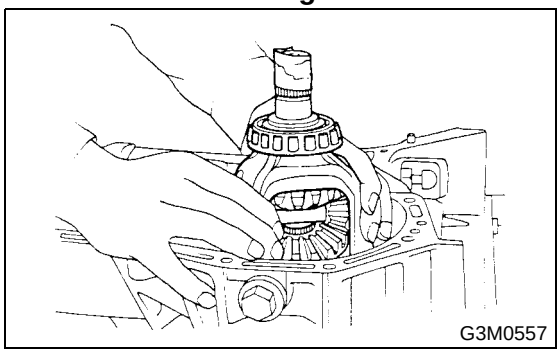
B3M0101H

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

10) Remove main shaft assembly.

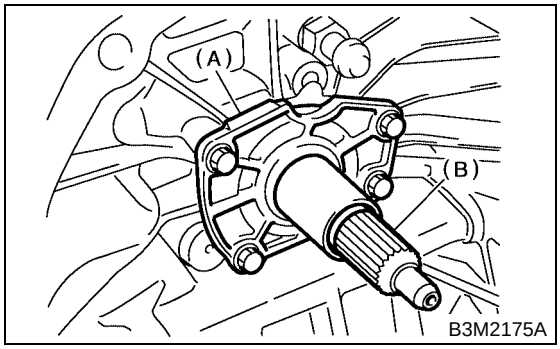
11) Remove differential assembly.

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


G3M0557

2. DUAL-RANGE

1) Remove the manual transmission assembly from vehicle. <Ref. to MT-37, REMOVAL, Manual Transmission Assembly.>
2) Remove clutch release lever. <Ref. to CL-19, REMOVAL, Release Bearing and Lever.>
3) Remove transfer case with extension case assembly. <Ref. to MT-50, REMOVAL, Transfer Case and Extension Case Assembly.>
4) Remove the input shaft holder.

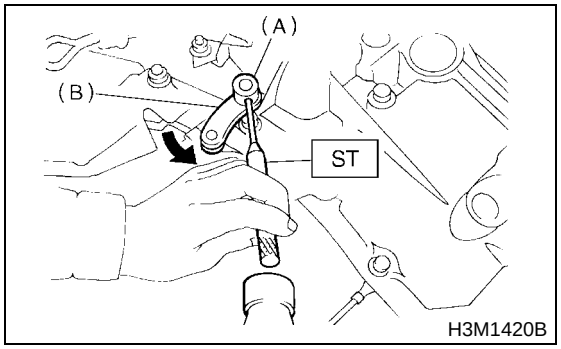


B3M2175A

(A) Input shaft holder
(B) Input shaft

5) Remove the high-low switch. <Ref. to MT-46, REMOVAL, Switches and Harness.>
6) Using ST, drive out straight pin, and remove high-low shifter lever.
ST 398791700 STRAIGHT PIN REMOVER 2

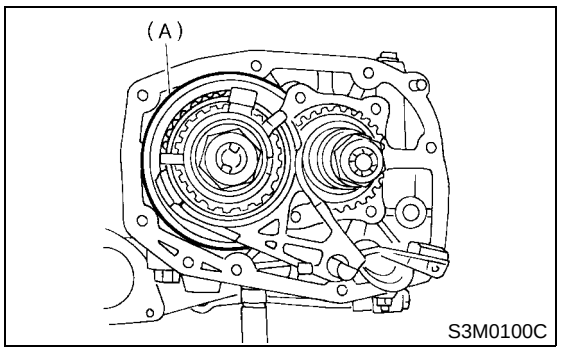
NOTE:
When driving out straight pin, remove it in the direction that it does not butt against transmission case.



H3M1420B

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

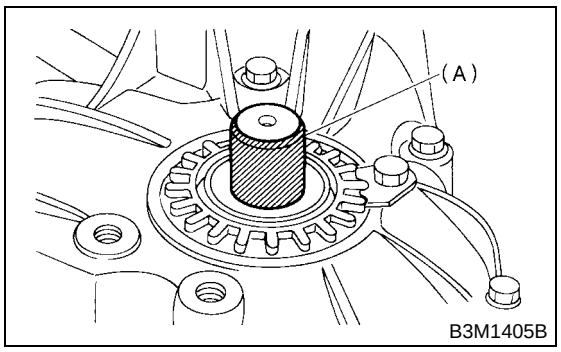
7) Remove main shaft rear plate.



S3M0100C

(A) Main shaft rear plate

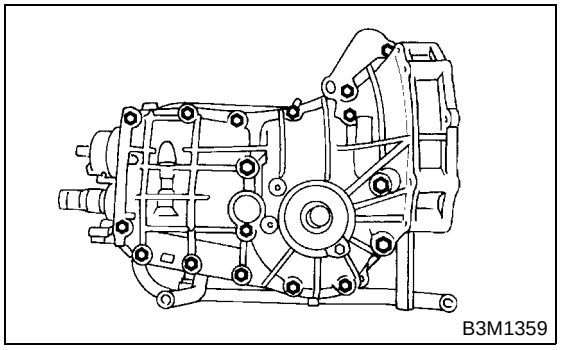
8) Put vinyl tape around splines of right and left axle drive shafts to prevent damage to oil seals.



B3M1405B

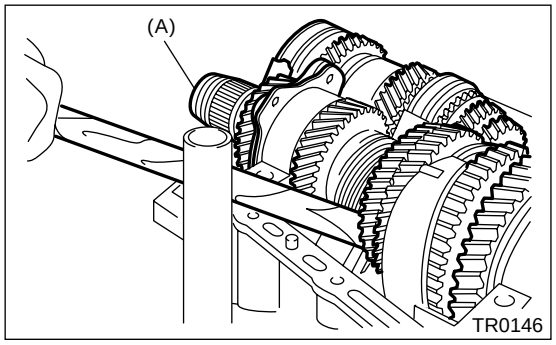
(A) Vinyl tape

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


B3M1359

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

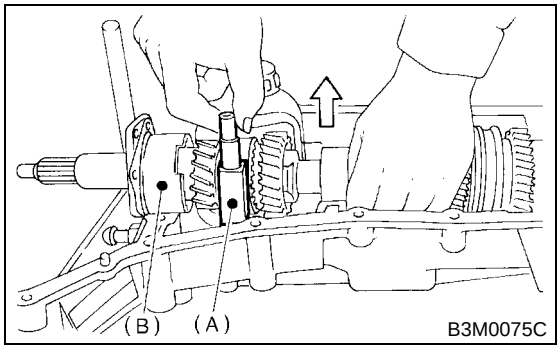
NOTE:
Use a hammer handle, etc. to remove if too tight.



(A) 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.

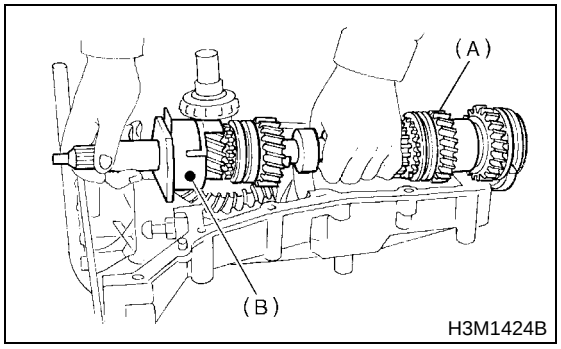
CAUTION:
Be careful not to drop the two high-low shifter pieces.



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

12) Remove main shaft assembly and input shaft assembly.

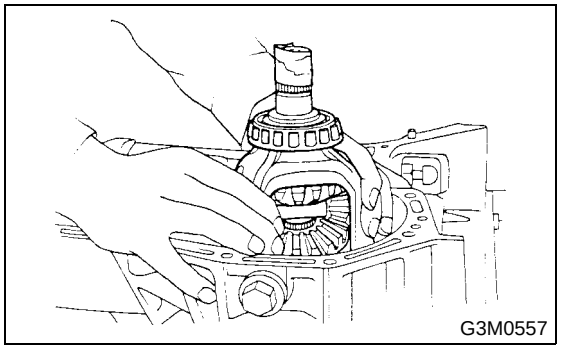
CAUTION:
Be careful not to drop input shaft and main shaft as they are separable.



(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

1. SINGLE-RANGE AND FWD MODEL

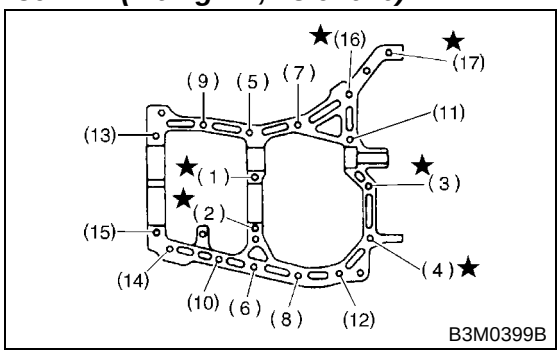
1) Wipe off grease, oil and dust on the mating surfaces of transmission cases with white gasoline.
2) Install the front differential assembly.
3) Install the main shaft assembly.
Install needle bearing knock pin hole into transmission case knock pin.
4) Install the drive pinion shaft assembly.
Install 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

6) Tighten 17 bolts with bracket, clip, etc. as shown in the figure.

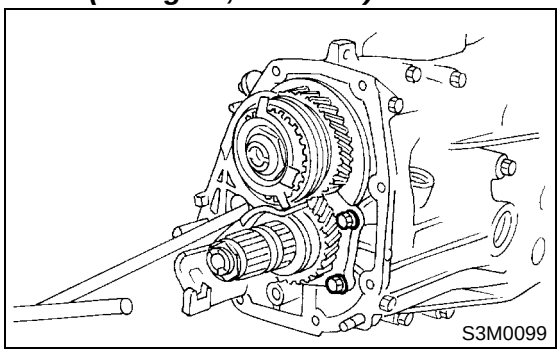
NOTE:
• Insert bolts from the bottom and tighten nuts at the top.
• Put cases together so that drive pinion shim and input shaft holder shim are not caught up in between.
• Confirm that speedometer gear is meshed.

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)



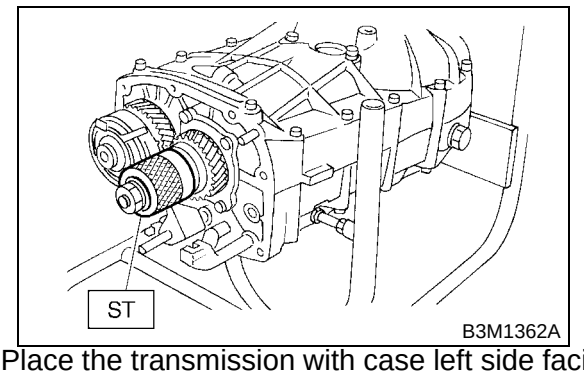
7) Tighten ball bearing attachment bolts.

Tightening torque:
29 N·m (3.0 kgf-m, 21.7 ft-lb)

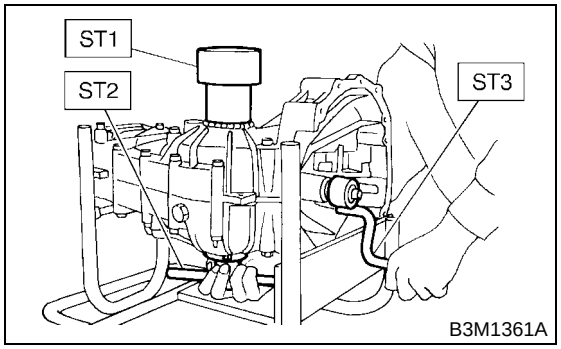


8) Backlash adjustment of hypoid gear and preload adjustment of roller bearing

NOTE:
Support drive pinion assembly with ST. (AWD model)
ST 498427100 STOPPER



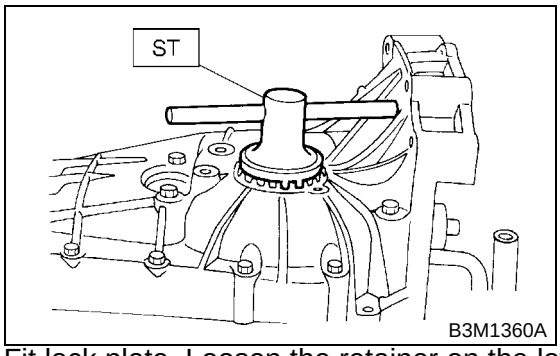
9) Place the transmission with case left side facing downward and put ST1 on bearing cup.
10) Screw retainer assembly into left case from the bottom with ST2. Fit ST3 on the transmission main shaft. Shift gear into 4th or 5th and turn the shaft several times. Screw in the retainer while turning ST3 until 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



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



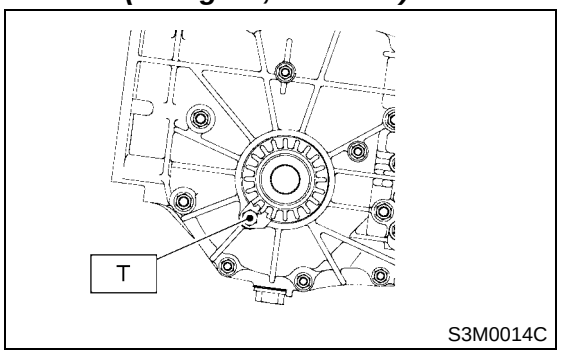
12) Fit lock plate. Loosen the retainer on the lower side by 1-1/2 notches of lock plate and turn in the retainer on the upper side by the same amount in order to obtain the backlash.

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-104, 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-80, ADJUSTMENT, Main Shaft Assembly for Single-Range.>
19) Install clutch release lever and bearing. <Ref. to CL-19, INSTALLATION, Release Bearing and Lever.>
20) Install transfer case with extension case assembly. <Ref. to MT-50, INSTALLATION, Transfer Case and Extension Case Assembly.>
21) Install the manual transmission assembly into the vehicle.<Ref. to MT-40, INSTALLATION, Manual Transmission Assembly.>

2. DUAL-RANGE

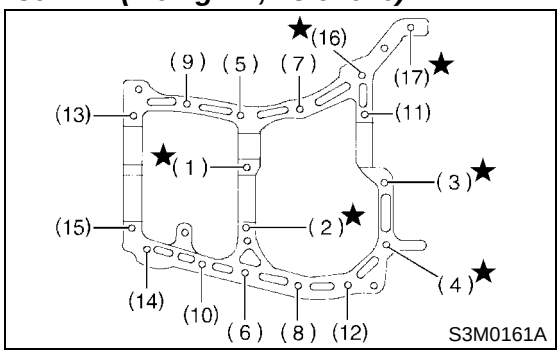
1) Wipe off grease, oil and dust on the mating surfaces of transmission cases with white gasoline.
2) Install the front differential assembly.
3) Install the main shaft assembly and input shaft assembly.
Connect main shaft assembly and input shaft assembly, and install needle bearing knock pin hole into 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.

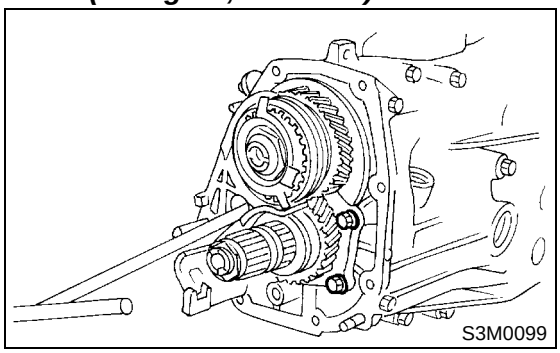
NOTE:
• Insert bolts from the bottom and tighten nuts at the top.
• Put cases together so that drive pinion shim and input shaft holder shim are not caught up in between.
• Confirm that speedometer gear is meshed.

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)



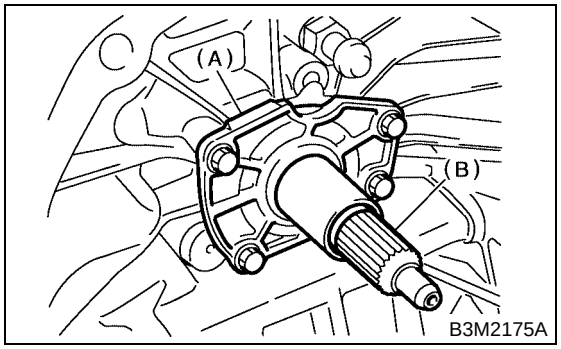
7) Tighten ball bearing attachment bolts.

Tightening torque:
29 N·m (3.0 kgf-m, 21.7 ft-lb)



8) Tighten input shaft holder attaching bolts.

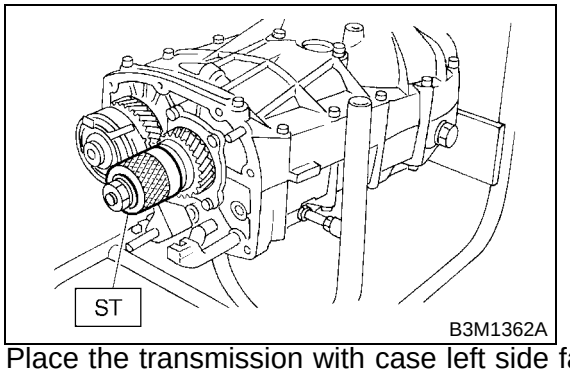
Tightening torque:
20 N·m (2.0 kgf-m, 14.5 ft-lb)



(A) Input shaft holder
(B) Input shaft

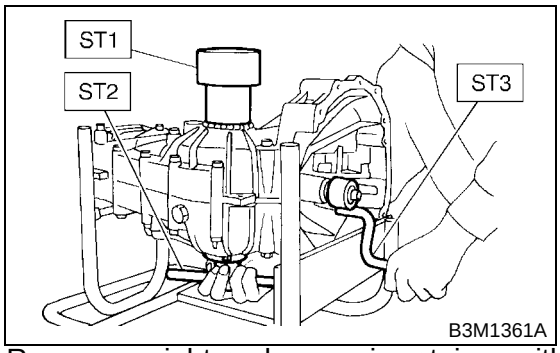
9) Backlash adjustment of hypoid gear and preload adjustment of roller bearing

NOTE:
Support drive pinion assembly with ST. (AWD model)
ST 498427100 STOPPER



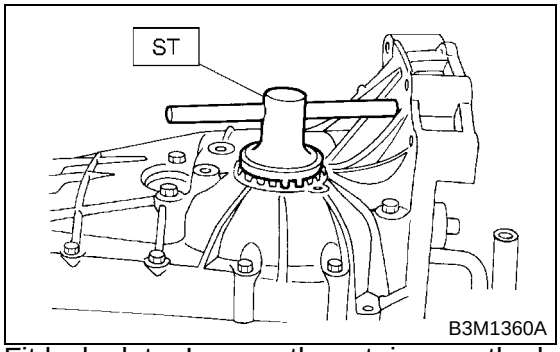
10) Place the transmission with case left side facing downward and put ST1 on bearing cup.

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



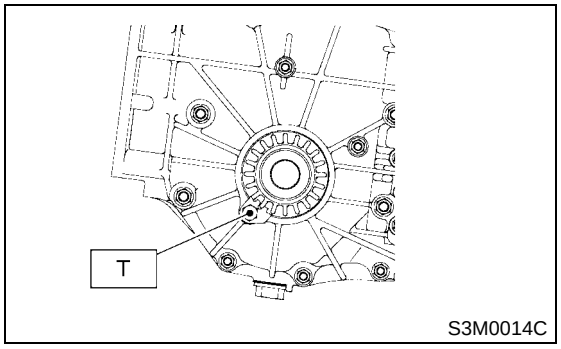
13) Fit lock plate. Loosen the retainer on the lower side by 1-1/2 notches of lock plate and turn in the retainer on the upper side by the same amount in order to obtain the backlash.

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-104, 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-80, ADJUSTMENT, Main Shaft Assembly for Single-Range.>
20) Install transfer case with extension case assembly. <Ref. to MT-50, INSTALLATION, Transfer Case and Extension Case Assembly.>
21) Install clutch release lever and bearing. <Ref. to CL-19, INSTALLATION, Release Bearing and Lever.>
22) Install the manual transmission assembly into the vehicle.<Ref. to MT-40, INSTALLATION, Manual Transmission Assembly.>

C: INSPECTION

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

16.Main Shaft Assembly for Single-Range

A: REMOVAL

1) Remove the manual transmission assembly from vehicle. <Ref. to MT-37, REMOVAL, Manual Transmission Assembly.>
2) Remove transfer case with extension case assembly. (AWD model) <Ref. to MT-50, REMOVAL, Transfer Case and Extension Case Assembly.>
3) Remove rear case (FWD model) <Ref. to MT-54, REMOVAL, Rear Case.>
4) Remove transmission case. <Ref. to MT-50, REMOVAL, Transfer Case and Extension Case Assembly.>
5) Removes drive pinion shaft assembly. <Ref. to MT-91, REMOVAL, Drive Pinion Shaft Assembly.>
6) Remove main shaft assembly.

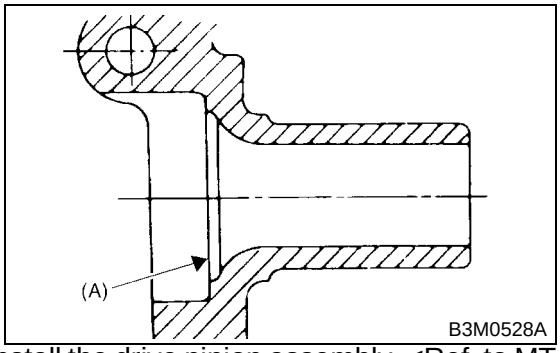
B: INSTALLATION

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-91, INSTALLATION, Drive Pinion Shaft Assembly.>
4) Install transmission case. <Ref. to MT-66, INSTALLATION, Transmission Case.>
5) Install transfer case with extension case assembly (AWD model). <Ref. to MT-50, INSTALLATION, Transfer Case and Extension Case Assembly.>
6) Install Rear case. (FWD model) <Ref. to MT-54, INSTALLATION, Rear Case.>
7) Install the manual transmission assembly to vehicle. <Ref. to MT-40, INSTALLATION, Manual Transmission Assembly.>

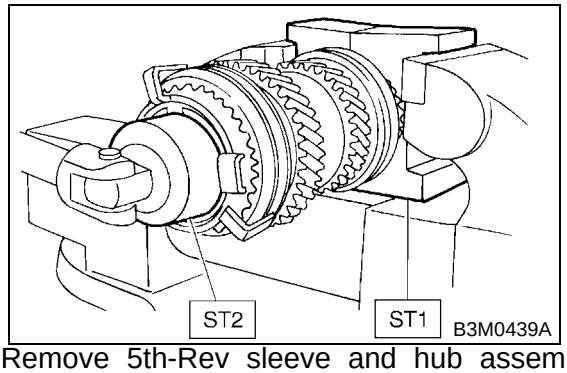
C: DISASSEMBLY

1. AWD MODEL

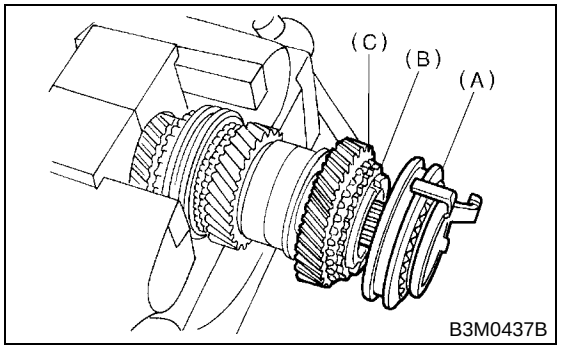
1) Put vinyl tape around main shaft splines to protet oil seal from damage. Then pull out oil seal and needle bearing by hand.
2) Remove lock nut from transmission main shaft assembly.

NOTE:
Remove caulking before off lock nut.

ST1 499987000 TRANSMISSION HOLDER
ST2 498937003 SOCKET WRENCH (35)

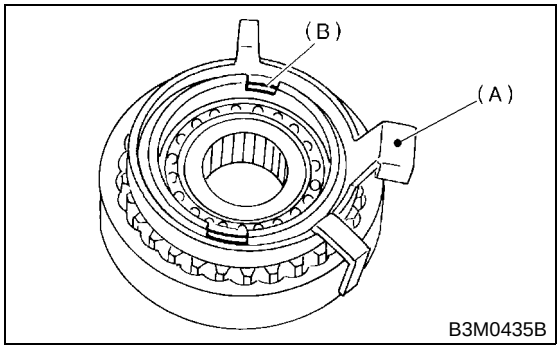


3) Remove 5th-Rev sleeve and hub assembly, baulk ring, 5th drive gear and needle bearing.



(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.

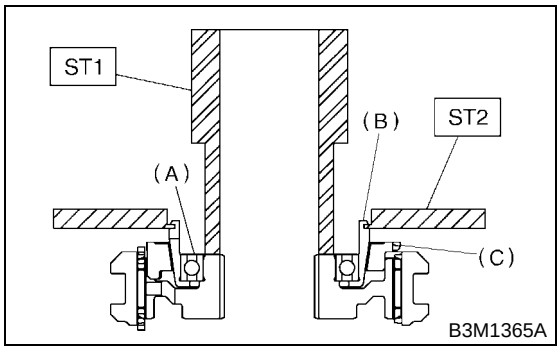


(A) Synchro cone stopper
(B) Snap ring

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

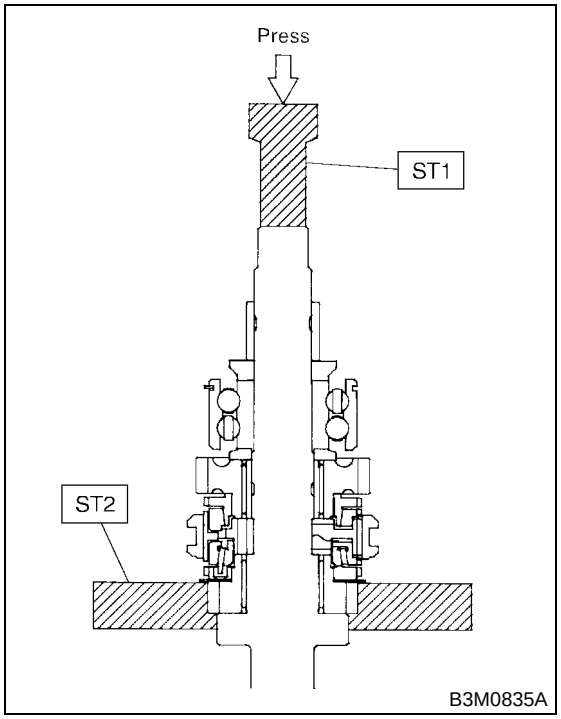


(A) Ball bearing
(B) Synchro cone
(C) Baulk ring

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

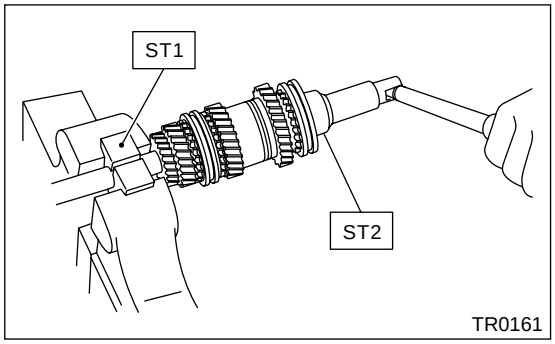


2. FWD MODEL

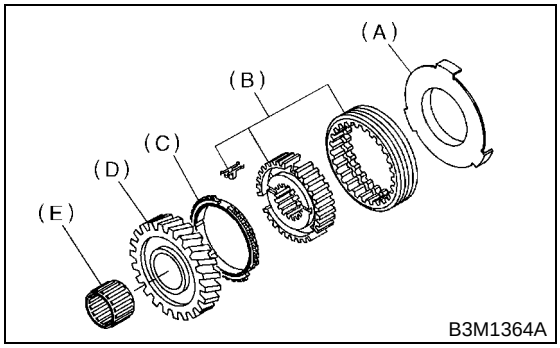
1) Put vinyl tape around main shaft splines to protect oil seal from damage. Then pull out oil seal and needle bearing by hand.
2) Remove lock nut.

NOTE:
Remove caulking before taking off lock nut.

ST1 498937000 TRANSMISSION HOLDER
ST2 499987003 SOCKET WRENCH (35)



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

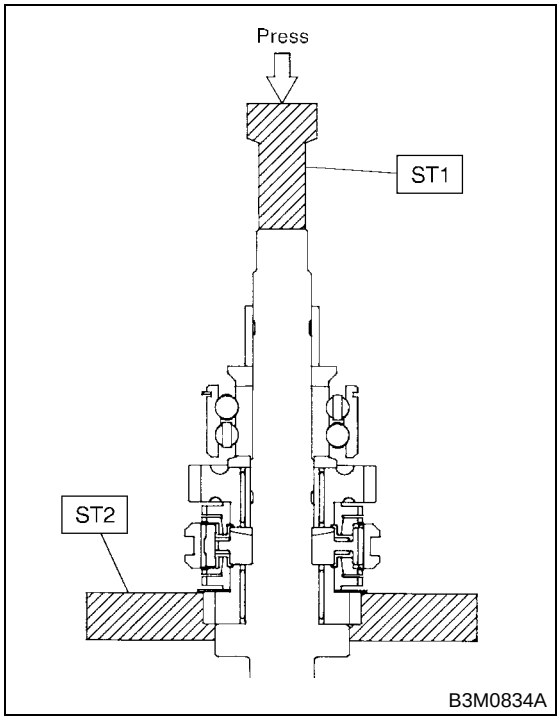


(A) Insert stopper plate
(B) Sleeve and hub ASSY No. 2
(C) Baulk ring
(D) 5th drive gear
(E) Needle bearing

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

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

ST1 899864100 REMOVER
ST2 899714110 REMOVER

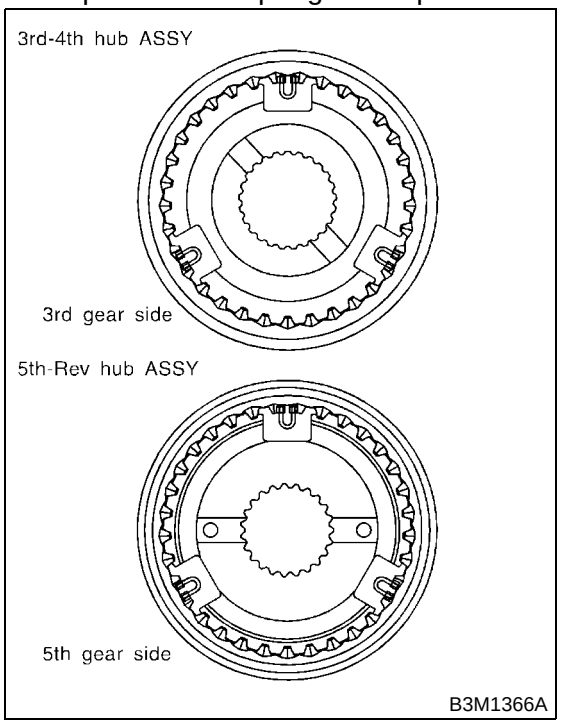


D: ASSEMBLY

1. AWD NON-TURBO MODEL

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

NOTE:
Position open ends of spring 120° apart.



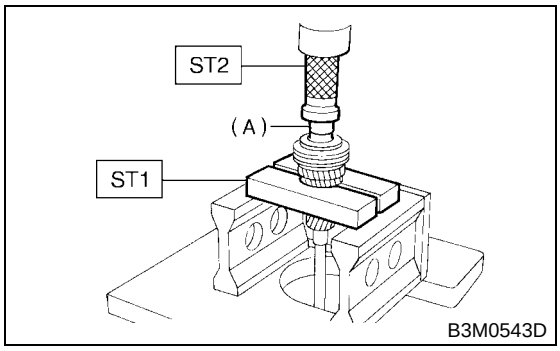
2) Install 3rd drive gear, baulk ring, sleeve and hub assembly for 3rd needle bearing on transmission main shaft.

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.

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

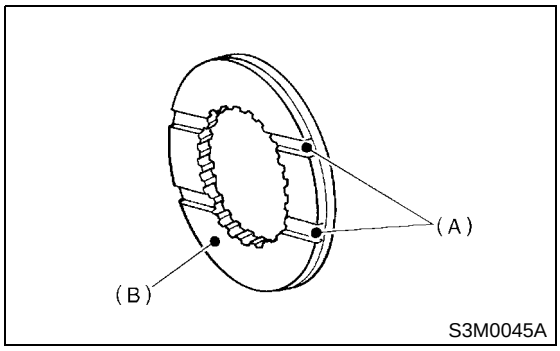
ST1 899714110 REMOVER
ST2 499877000 RACE 4-5 INSTALLER



(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.

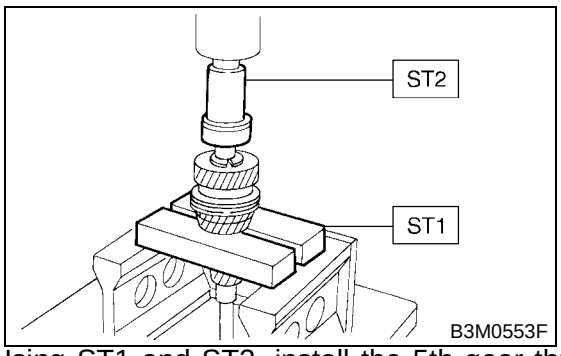


(A) Groove
(B) 4th gear side

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

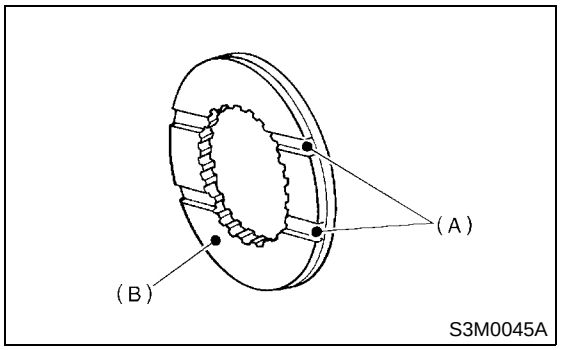


6) Using ST1 and ST2, install the 5th gear thrust washer and 5th needle bearing race onto the rear section of transmission main shaft.

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



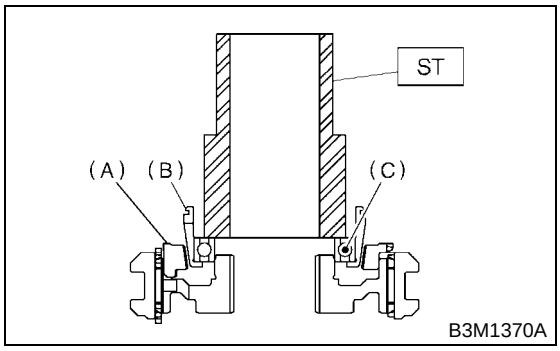
(A) Groove
(B) 4th gear thrust washer

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).

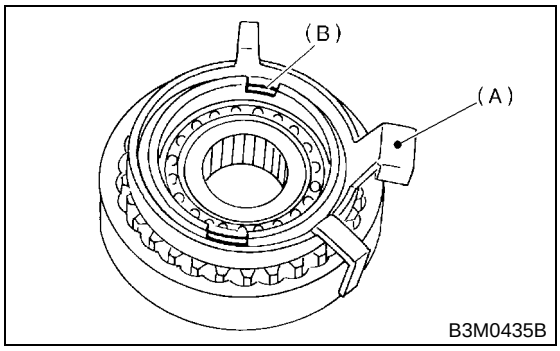
NOTE:
• Use new ball bearing.
• After press fitting, make sure synchro cone rotates freely.

ST 499757002 INSTALLER



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

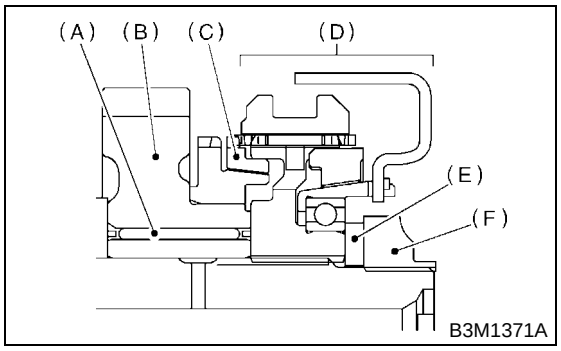
9) Install synchro cone stopper and snap ring to 5th-Rev sleeve and hub assembly.



(A) Synchro cone stopper
(B) Snap ring

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.

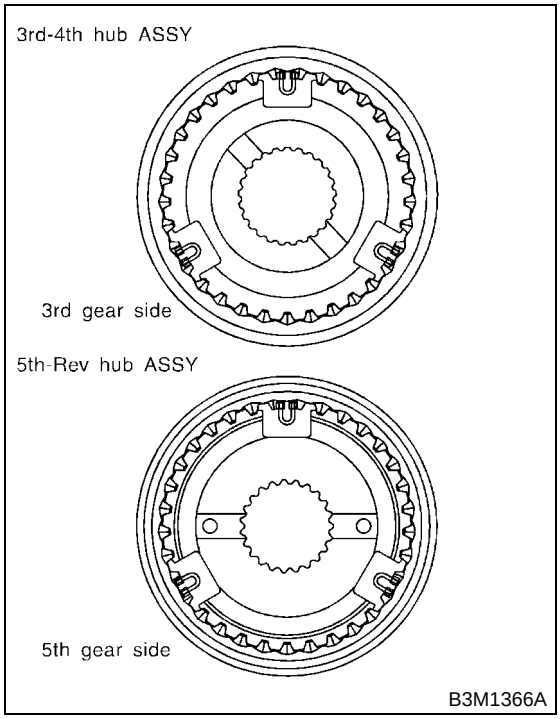
ST1 499987003 SOCKET WRENCH
ST2 498937000 TRANSMISSION HOLDER

Tightening torque:
118 N·m (12.0 kgf-m, 86.8 ft-lb)

2. AWD TURBO MODEL

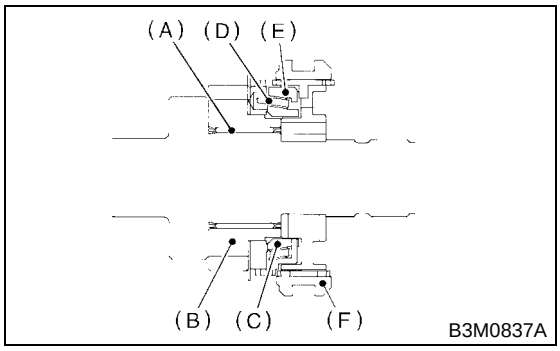
1) Assemble each sleeve and hub assembly.

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.

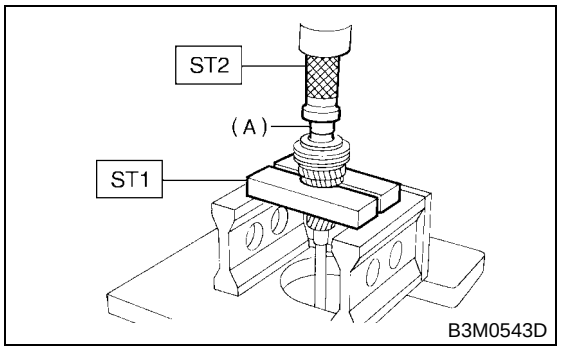


(A) 3rd needle bearing
(B) 3rd drive gear
(C) Inner baulk ring
(D) Synchro cone
(E) Outer baulk ring
(F) Sleeve and hub ASSY

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).

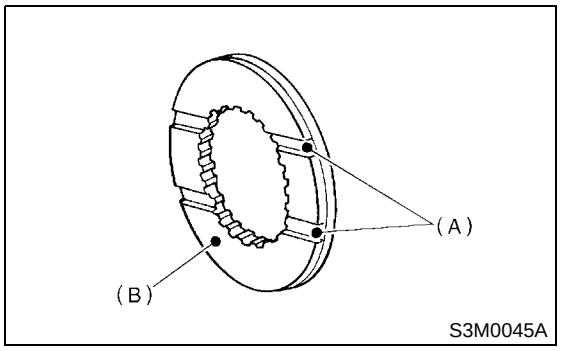
ST1 899714110 REMOVER
ST2 499877000 RACE 4-5 INSTALLER



(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.

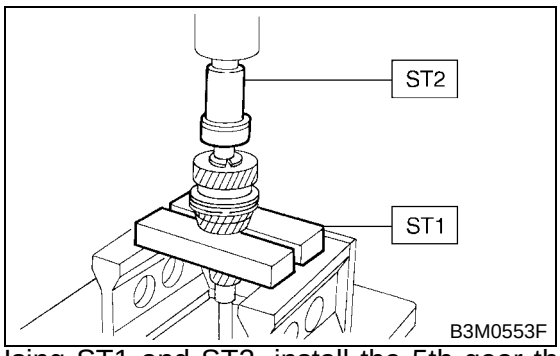


(A) Groove
(B) 4th gear side

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

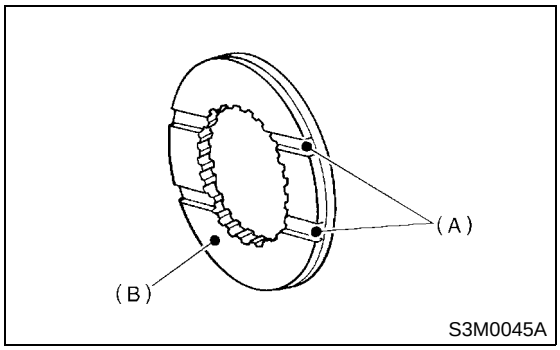


6) Using ST1 and ST2, install the 5th gear thrust washer and 5th needle bearing race onto the rear section of transmission main shaft.

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



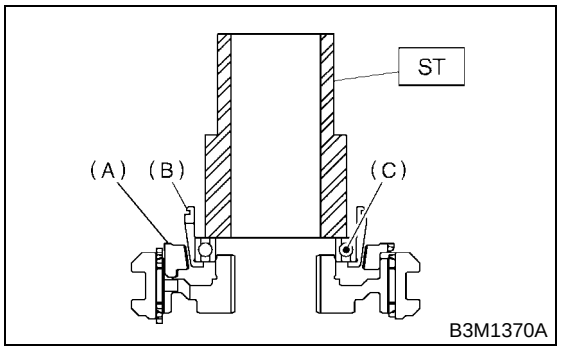
(A) Groove
(B) 4th gear thrust washer

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).

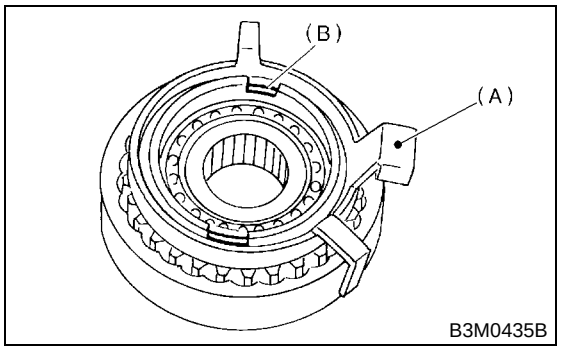
NOTE:
- Use new ball bearing.
- After press fitting, make sure synchro cone rotates freely.

ST 499757002 INSTALLER



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

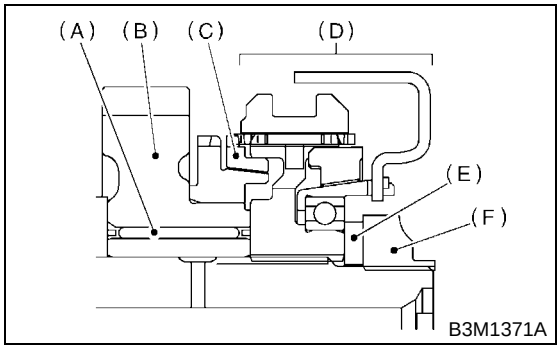
9) Install synchro cone stopper and snap ring to 5th-Rev sleeve and hub assembly.



(A) Synchro cone stopper
(B) Snap ring

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.

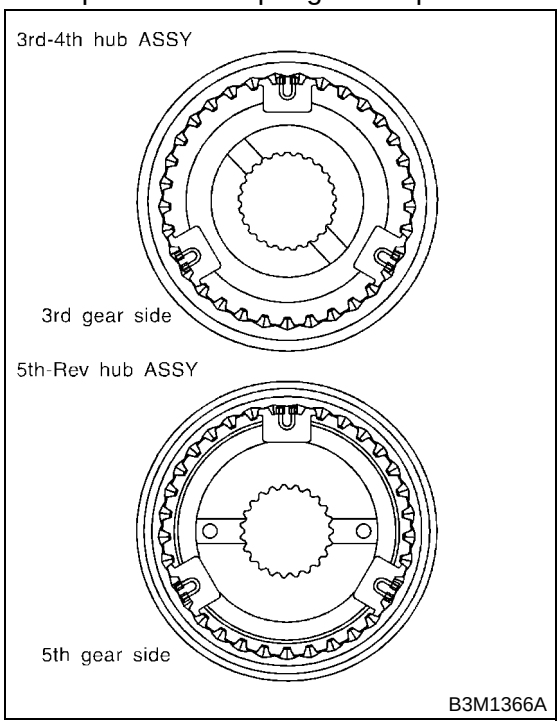
ST1 499987003 SOCKET WRENCH
ST2 498937000 TRANSMISSION HOLDER

Tightening torque:
118 N·m (12.0 kgf-m, 86.8 ft-lb)

3. FWD MODEL

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

NOTE:
Position open ends of spring 120° apart.

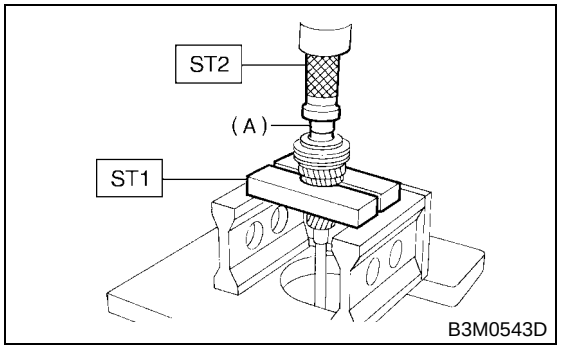


2) Install 3rd drive gear, baulk ring, and sleeve and hub assembly for 3rd-4th needle bearing (32 x 36 x 25.7) on transmission main shaft.

NOTE:
Aligh groove in baulk ring with shifting insert.

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

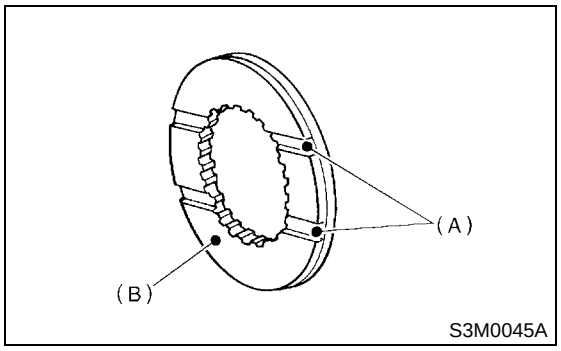
ST1 899714110 REMOVER
ST2 499877000 RACE 4-5 INSTALLER



(A) 4th needle bearing

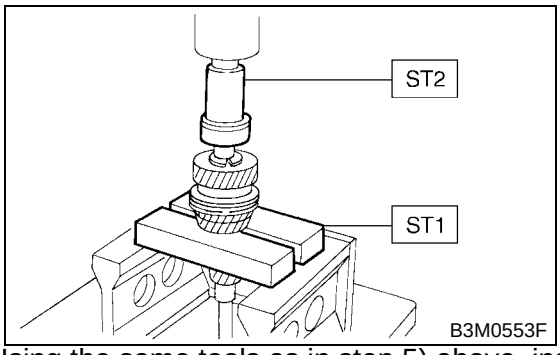
4) Install baulk ring, needle bearing (32 x 30 x 25.7), 4th drive gear and 4th gear thrust washer to transmission main shaft.

NOTE:
Face thrust washer in the correct direction.



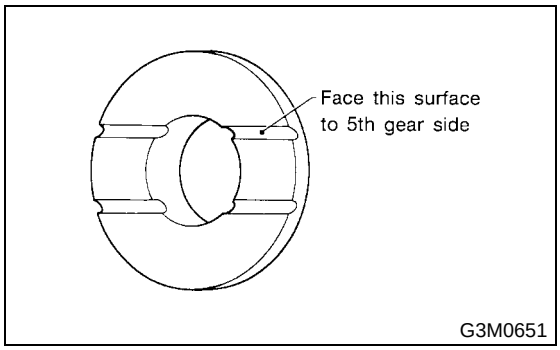
(A) Groove
(B) 4th gear side

5) Drive ball bearing onto the rear section of transmission main shaft using ST1, ST2 and a press.
ST1 899714110 REMOVER
ST2 499877000 RACE 4-5 INSTALLER



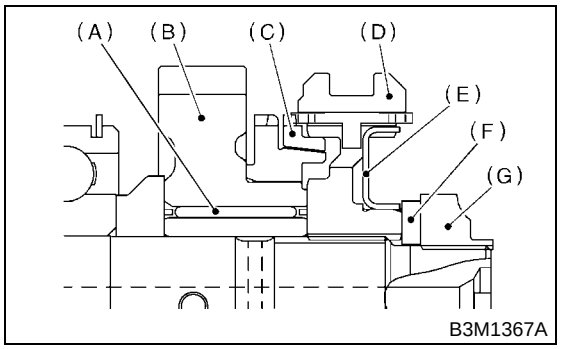
6) Using the same tools as in step 5) above, install the following parts onto the rear section of transmission main shaft.

NOTE:
Face thrust washer in the correct direction.
ST1 899714110 REMOVER
ST2 499877000 RACE 4-5 INSTALLER



7) Install the following parts to the rear section transmission main shaft.
ST1 499987003 SOCKET WRENCH
ST2 498937000 TRANSMISSION HOLDER

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



(A) Needle bearing
(B) 5th drive gear
(C) Baulk ring
(D) Sleeve and hub ASSY
(E) Insert stopper plate
(F) Lock washer
(G) Lock nut

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

NOTE:
Secure lock nuts in two places after tightening.

Tightening torque:
118 N·m (12.0 kgf-m, 86.8 ft-lb)

E: INSPECTION

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

1) Bearings

Replace bearings in the following cases:

• Bearings whose balls, outer races and inner races are broken or rusty.

• Worn bearings

• Bearings that fail to turn smoothly or make abnormal noise when turned after gear oil lubrication.

• 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:

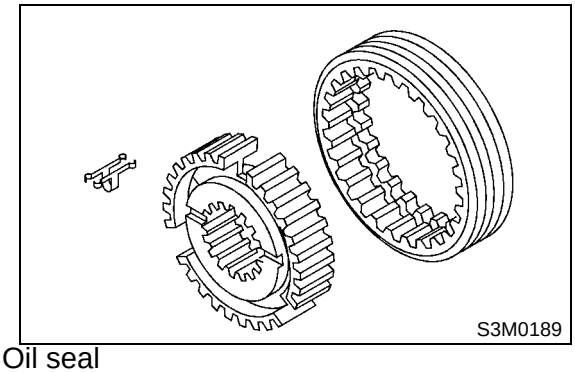
• When the inner surface and end face are damaged.

• 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.


S3M0189

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

Selection of main shaft rear plate

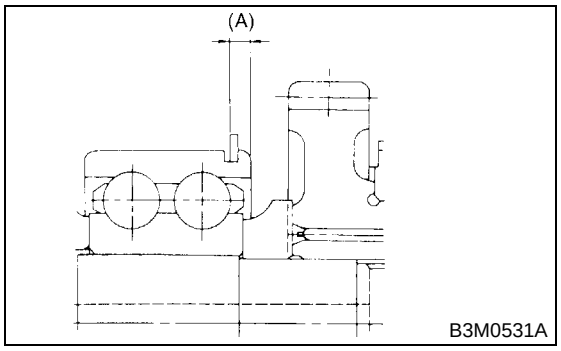
Using ST, measure the amount (A) of ball bearing protrusion from transmission main case surface and select the proper plate in the following table:

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



B3M0531A

17.Main Shaft Assembly for Dual-Range

A: REMOVAL

1) Remove the manual transmission assembly from vehicle. <Ref. to MT-37, REMOVAL, Manual Transmission Assembly.>
2) Remove transfer case with extension case assembly. <Ref. to MT-50, REMOVAL, Transfer Case and Extension Case Assembly.>
3) Remove transmission case. <Ref. to MT-64, REMOVAL, Transmission Case.>
4) Removes drive pinion shaft assembly. <Ref. to MT-91, REMOVAL, Drive Pinion Shaft Assembly.>
5) Remove main shaft assembly and input shaft assembly.

B: INSTALLATION

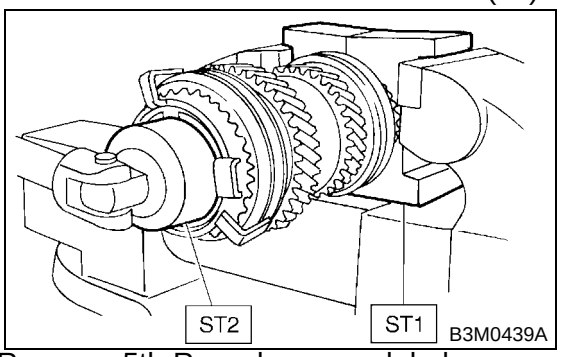
1) Install the needle bearing onto the front of transmission main shaft assembly.
2) Connect main shaft assembly and input shaft assembly.
3) Install needle bearing outer race knock pin hole into transmission case knock pin.
4) Install the drive pinion assembly. <Ref. to MT-91, INSTALLATION, Drive Pinion Shaft Assembly.>
5) Install transmission case. <Ref. to MT-66, INSTALLATION, Transmission Case.>
6) Install transfer case with extension case assembly. <Ref. to MT-50, INSTALLATION, Transfer Case and Extension Case Assembly.>
7) Install the manual transmission assembly to vehicle. <Ref. to MT-40, INSTALLATION, Manual Transmission Assembly.>

C: DISASSEMBLY

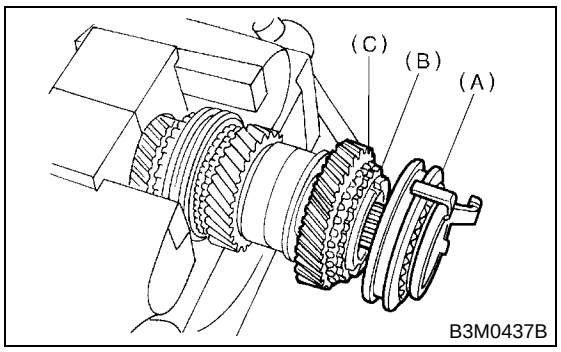
1) Put vinyl tape around main shaft splines to protect oil seal from damage. Then pull out oil seal and needle bearing by hand.
2) Remove lock nut from transmission main shaft assembly.

NOTE:
Remove caulking before taking off lock nut.

ST1 498937000 TRANSMISSION HOLDER
ST2 499987003 SOCKET WRENCH (35)

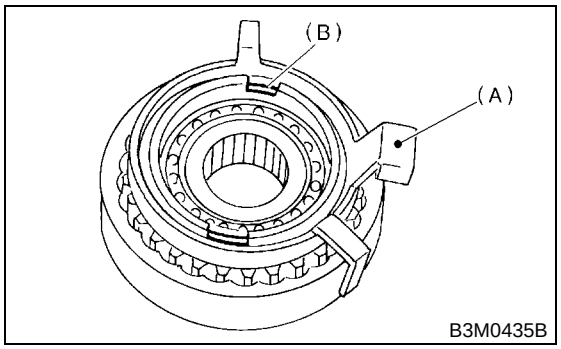


3) Remove 5th-Rev sleeve and hub assembly, baulk ring, 5th drive gear and needle bearing.



(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.

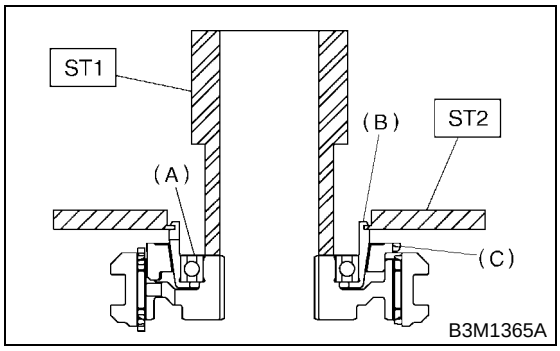


(A) Synchro cone stopper
(B) Snap ring

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

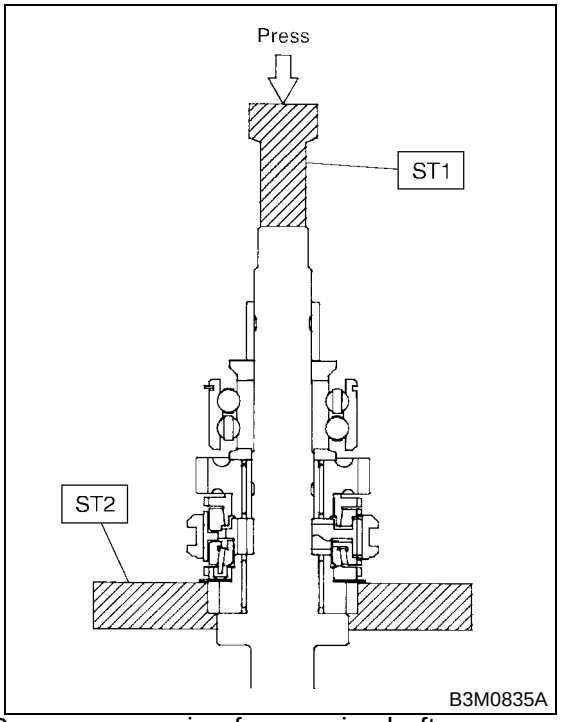


(A) Ball bearing
(B) Synchro cone
(C) Baulk ring

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

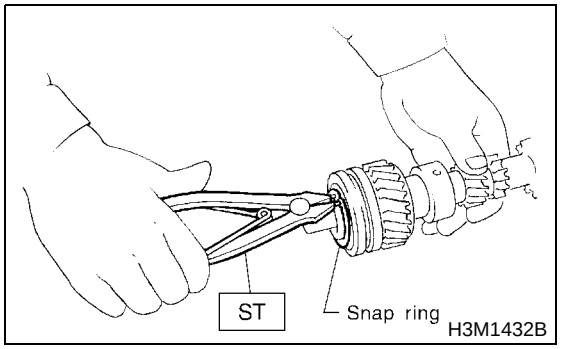
NOTE:
Replace sleeve and hub with new ones. Do not attempt to disassemble because they must engage at a specified point. If they should be disassembled, marking engagement point on splines beforehand.

ST1 899864100 REMOVER
ST2 899714110 REMOVER

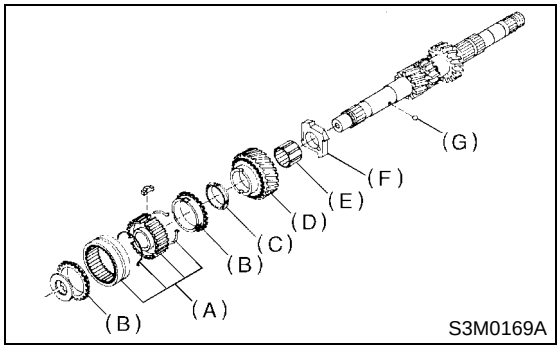


7) Remove snap ring from main shaft.

ST 899474100 EXPANDER



8) Remove the rest of parts.

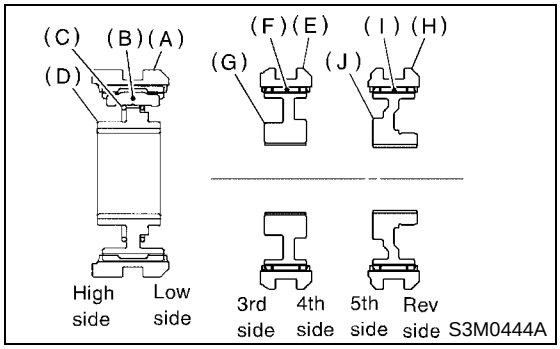


(A) Sleeve and hub ASSY
(B) High-low baulk ring
(C) Friction damper
(D) Low input gear
(E) Needle bearing
(F) Input low gear spacer
(G) Ball

D: ASSEMBLY

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

NOTE:
Position open ends of spring 120° apart.

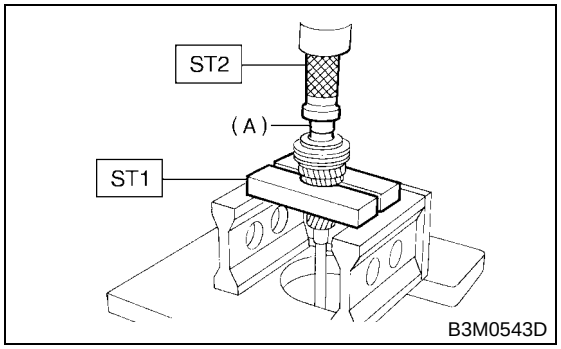


(A) High-low coupling sleeve
(B) Shifting insert
(C) High-low synchronizer spring
(D) High-low synchronizer hub
(E) Sleeve
(F) Insert key
(G) 3rd-4th synchronizer hub
(H) Sleeve
(I) Insert key
(J) 5th-Rev synchronizer hub

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.

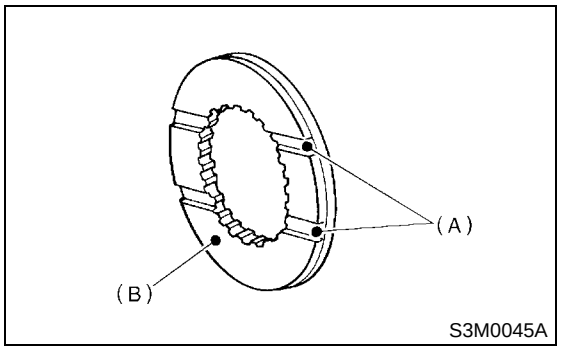
3) Install 4th needle bearing race onto transmission main shaft using ST1, ST2 and a press.
ST1 899714110 REMOVER
ST2 499877000 RACE 4-5 INSTALLER



(A) 4th needle bearing race

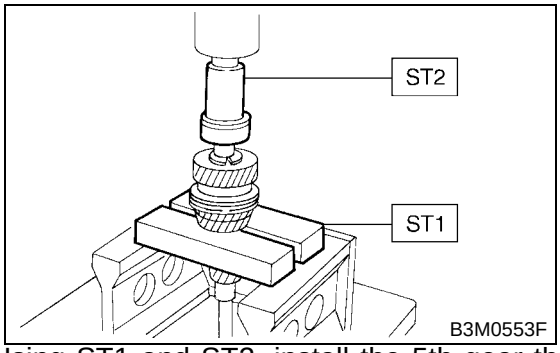
4) Install baulk ring, needle bearing, 4th drive gear and 4th gear thrust washer to transmission main shaft.

NOTE:
Face thrust washer in the correct direction.



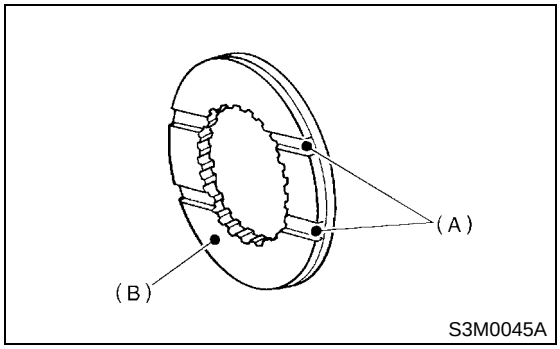
(A) Groove
(B) 4th gear side

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.

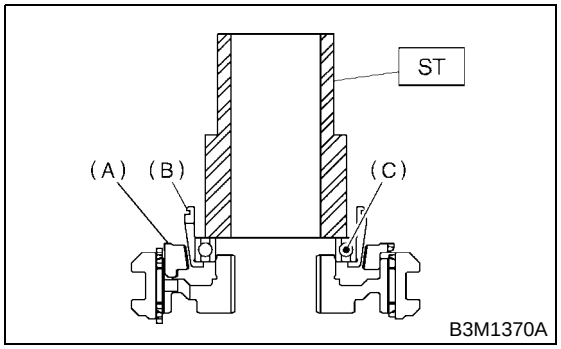
NOTE:
Face thrust washer in the correct direction.
ST1 899714110 REMOVER
ST2 499877000 RACE 4-5 INSTALLER



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

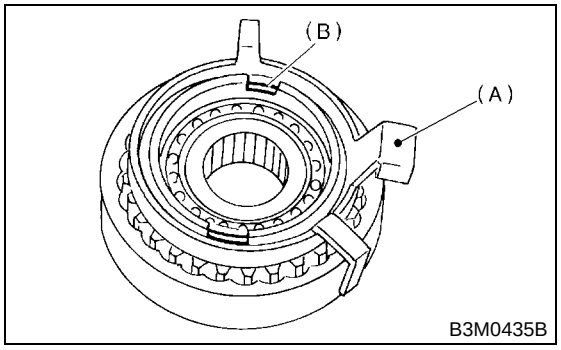
7) Install bearing onto synchro cone.
8) Install baulk ring and synchro cone onto 5th-Rev sleeve and hub assembly using ST and a press.

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

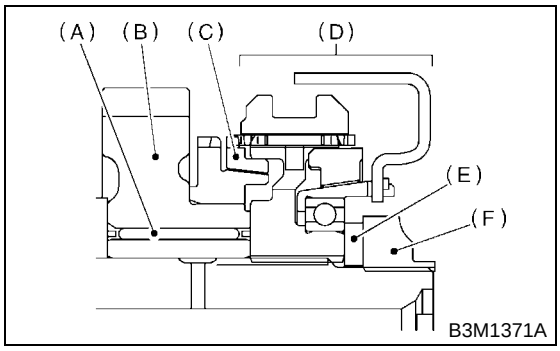
9) Install synchro cone stopper and snap ring to 5th-Rev sleeve and hub assembly.



(A) Synchro cone stopper
(B) Snap ring

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

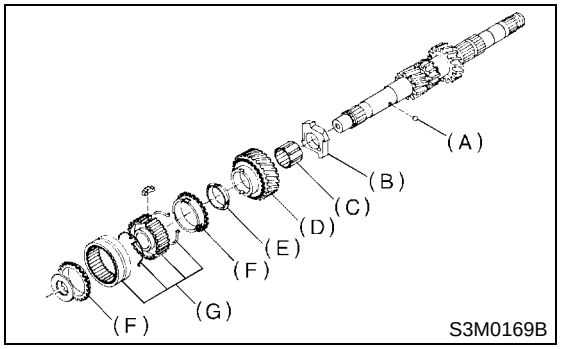
Tightening torque:
118 N·m (12.0 kgf-m, 86.8 ft-lb)

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)

E: INSPECTION

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

1) Bearings

Replace bearings in the following cases:

- Bearings whose balls, outer races and inner races are broken or rusty.
- Worn bearings
- Bearings that fail to turn smoothly or make abnormal noise when turned after gear oil lubrication.
- 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

Choose main shaft rear plate. <Ref. to MT-80, ADJUSTMENT, Main Shaft Assembly for Single-Range.>

18.Input Shaft Assembly

A: REMOVAL

1) Remove the manual transmission assembly from vehicle. <Ref. to MT-37, REMOVAL, Manual Transmission Assembly.>
2) Remove the transfer case with extension case assembly. <Ref. to MT-50, REMOVAL, Transfer Case and Extension Case Assembly.>
3) Remove transmission case. <Ref. to MT-64, REMOVAL, Transmission Case.>
4) Remove drive pinion shaft assembly. <Ref. to MT-91, REMOVAL, Drive Pinion Shaft Assembly.>
5) Remove main shaft assembly and input shaft assembly.

B: INSTALLATION

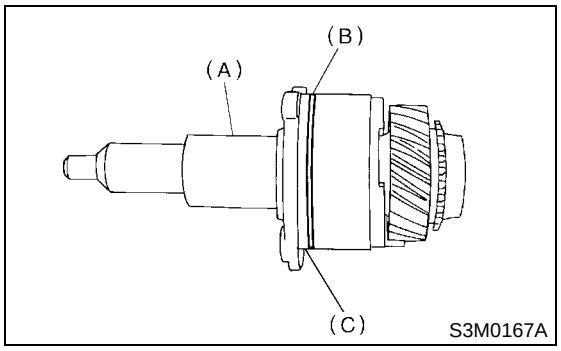
1) Install the needle bearing onto the front of the transmission main shaft assembly.
2) Connect main shaft assembly and input shaft assembly.
3) Install needle bearing outer race knock pin hole into transmission case knock pin.
4) Install the drive pinion assembly. <Ref. to MT-91, INSTALLATION, Drive Pinion Shaft Assembly.>
5) Install the transmission case. <Ref. to MT-66, INSTALLATION, Transmission Case.>
6) Install the transfer case with extension case assembly. <Ref. to MT-50, INSTALLATION, Transfer Case and Extension Case Assembly.>
7) Install manual transmission assembly on vehicle. <Ref. to MT-40, INSTALLATION, Manual Transmission Assembly.>

C: DISASSEMBLY

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

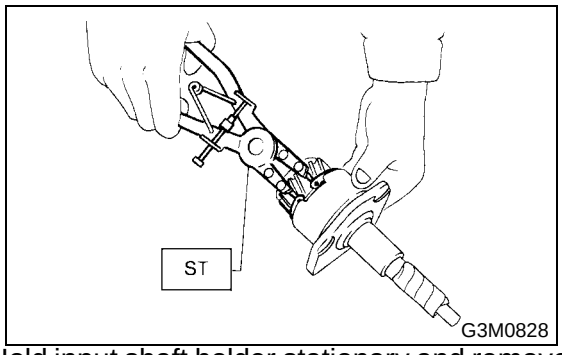
CAUTION:
Use new O-ring.

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

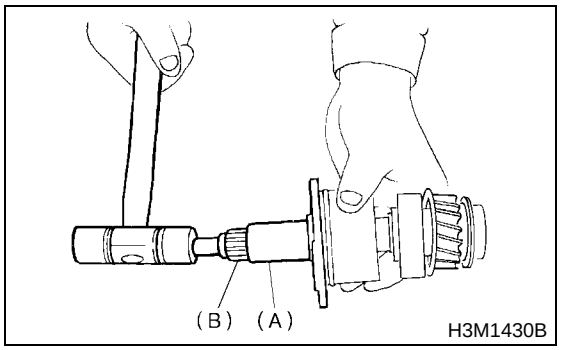


(A) Input shaft holder
(B) O-ring
(C) Input shaft holder shim

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

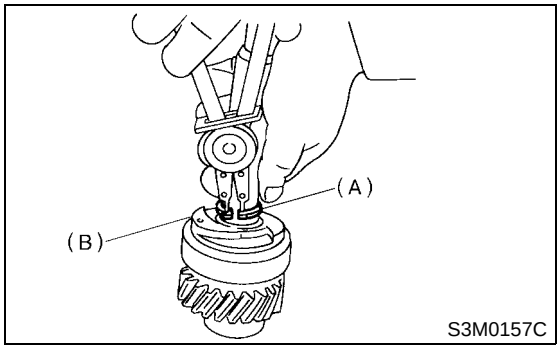


4) Hold input shaft holder stationary and remove input shaft by tapping its end with a plastic hammer.



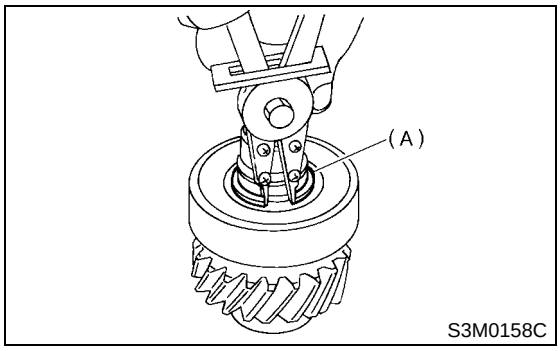
(A) Input shaft holder
(B) Input shaft

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



(A) Snap ring
(B) Oil squeeze plate

6) Remove snap ring.

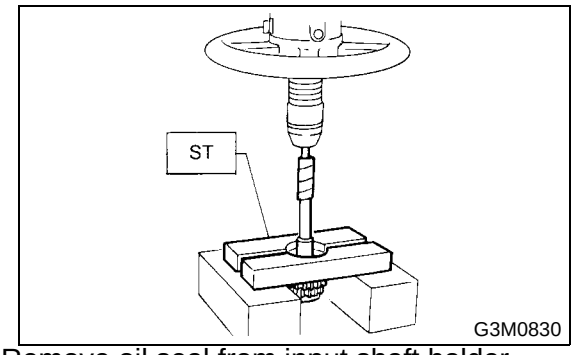


(A) Snap ring

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

NOTE:
Remove inner snap ring before pressing.

ST 498077000 REMOVER



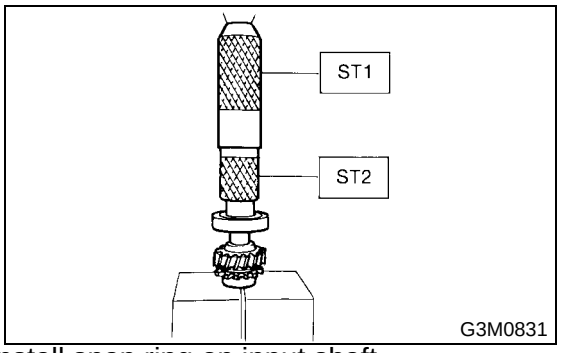
8) Remove oil seal from input shaft holder.

D: ASSEMBLY

1) Install ball bearing onto input shaft.

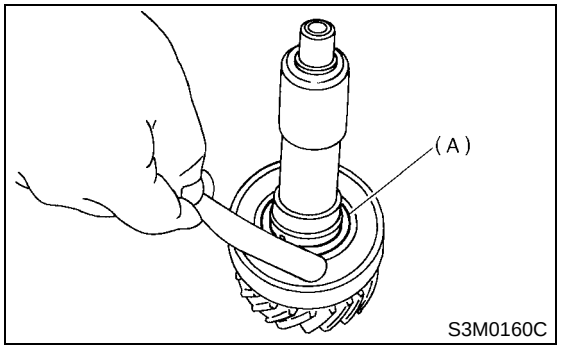
NOTE:
Place snap ring between input shaft gear and ball bearing beforehand. Use the table at 5) as a guide in selecting a suitable snap ring.

ST1 899580100 INSTALLER
ST2 399513600 INSTALLER



2) Install snap ring on input shaft.

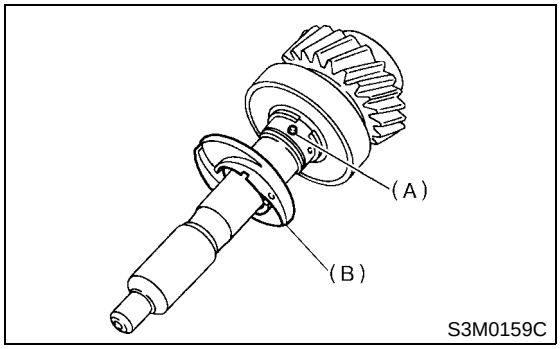
NOTE:
Select a suitable snap ring so that the axial play of ball bearing is held within 0 to 0.12 mm (0 to 0.0047 in).



(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)

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

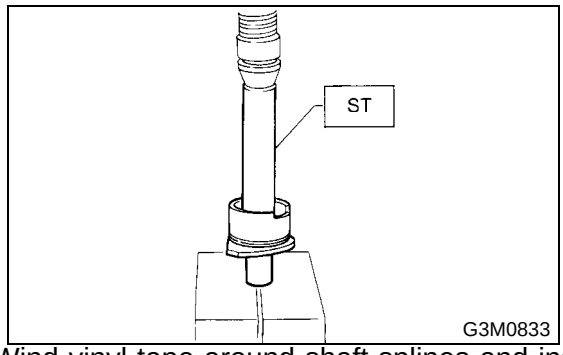


(A) Straight pin
(B) Oil squeeze plate

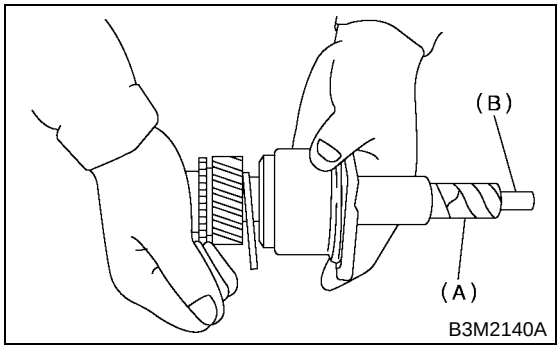
4) Install snap ring.
5) Drive oil seal into input shaft holder.

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.

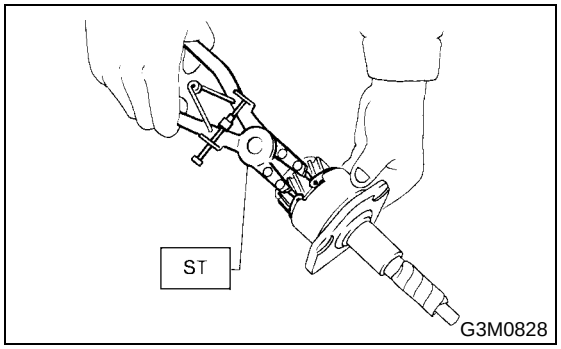


(A) Vinyl tape
(B) Input shaft

7) Install snap ring to input shaft holder.

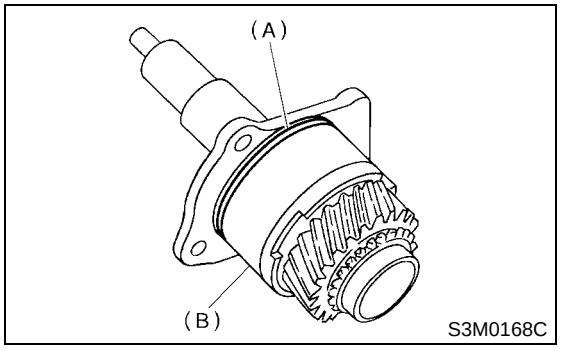
NOTE:
Select a suitable snap ring so that clearance between snap ring and bearing is held within 0 to 0.12 mm (0 to 0.0047 in).

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

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.

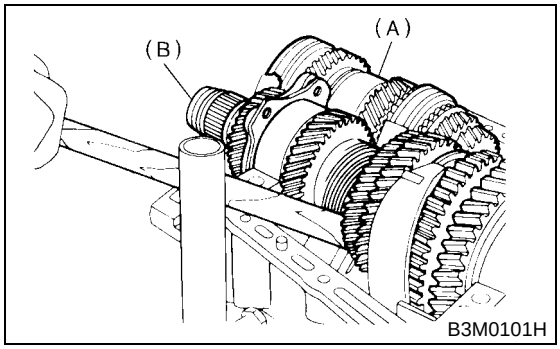
3) Gears
• Replace gears with new ones if their tooth surfaces are broken, damaged, or excessively worn.
• Correct or replace if the cone that contacts the baulk ring is rough or damaged.
• Correct or replace if the inner surface or end face is damaged.
4) Baulk ring
Replace the ring in the following 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.

19.Drive Pinion Shaft Assembly

A: REMOVAL

1) Remove the manual transmission assembly from vehicle. <Ref. to MT-37, REMOVAL, Manual Transmission Assembly.>
2) Remove transfer case with extension case assembly. (AWD model) <Ref. to MT-50, REMOVAL, Transfer Case and Extension Case Assembly.>
3) Remove rear case. (FWD model) <Ref. to MT-54, REMOVAL, Rear Case.>
4) Remove transmission case. (FWD model) <Ref. to MT-64, REMOVAL, Transmission Case.>
5) Remove drive pinion shaft assembly.

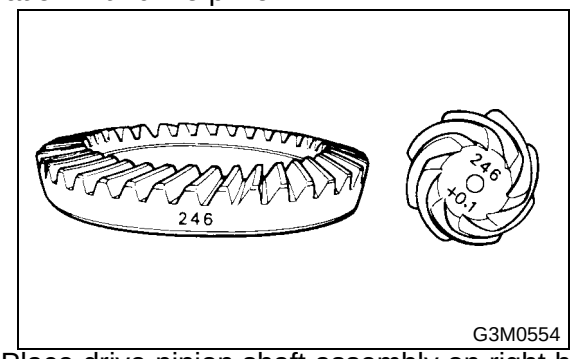
NOTE:
Use a hammer handle, etc. to remove if too tight.



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

B: INSTALLATION

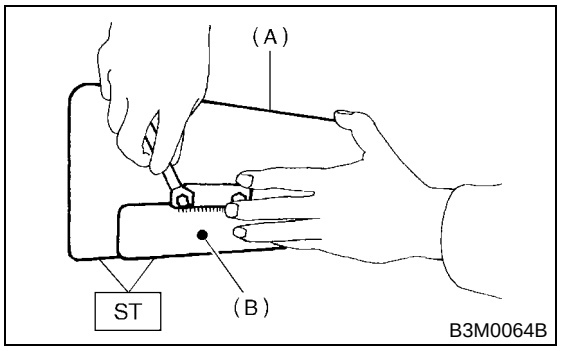
1) Remove differential assembly.
2) Alignment marks/numbers on hypoid gear set
The upper number on driven pinion is the match number for combining it with hypoid driven gear. The lower number is for shim adjustment. If no lower number is shown, the value is zero. The number on hypoid driven gear indicates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



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



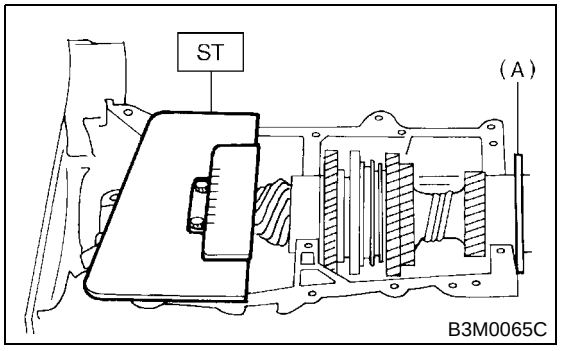
(A) Plate
(B) Scale

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



(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

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)

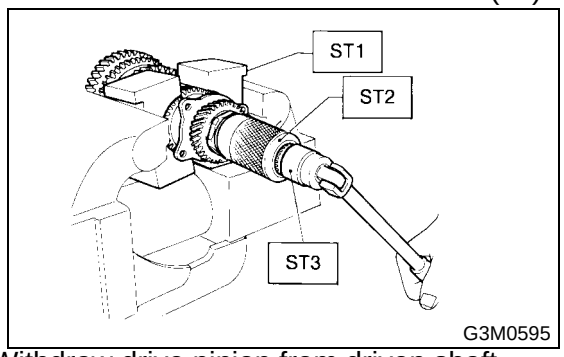
9) Install differential assembly. <Ref. to MT-102, INSTALLATION, Front Differential Assembly.>
10) Set transmission main shaft assembly and drive pinion assembly in position. (So there is no clearance between the two when moved all the way to the front). Inspect suitable 1st — 2nd, 3rd — 4th and 5th shifter fork so that coupling sleeve and reverse driven gear are positioned in the center of their cynchronizing mechanisms. <Ref. to MT-98, INSPECTION, Drive Pinion Shaft Assembly.>
11) Install transmission case. <Ref. to MT-66, INSTALLATION, Transmission Case.>
12) Install transfer case with extension case assembly. (AWD model) <Ref. to MT-50, INSTALLATION, Transfer Case and Extension Case Assembly.>
13) Install rear case. (FWD model) <Ref. to MT-54, INSTALLATION, Rear Case.>
14) Install the manual transmission assembly to vehicle.<Ref. to MT-37, Manual Transmission Assembly.>

C: DISASSEMBLY

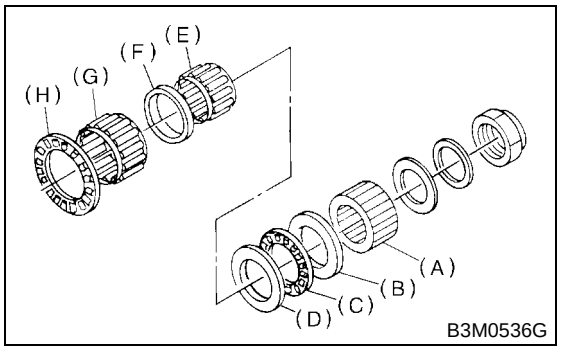
1. AWD MODEL

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

1) Straighten lock nut at staked portion. Remove the lock nut using ST1, ST2 and ST3.
ST1 899884100 HOLDER
ST2 498427100 STOPPER
ST3 899988608 SOCKET WRENCH (27)



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

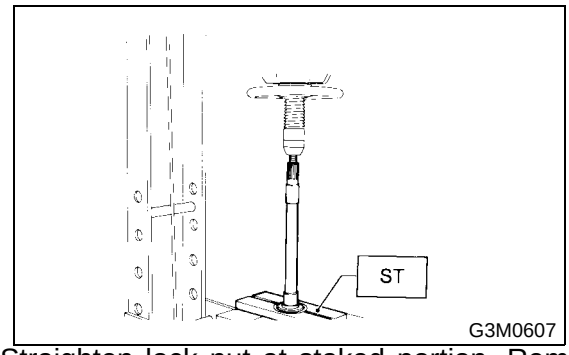


(A) Differential bevel gear sleeve
(B) Washer No. 1 (25 × 37.5 × t)
(C) Thrust bearing (25 × 37.5 × 3)
(D) Washer No. 2 (25 × 37.5 × 4)
(E) Needle bearing (25 × 30 × 20)
(F) Drive pinion collar
(G) Needle bearing (30 × 37 × 23)
(H) Thrust bearing (33 × 50 × 3)

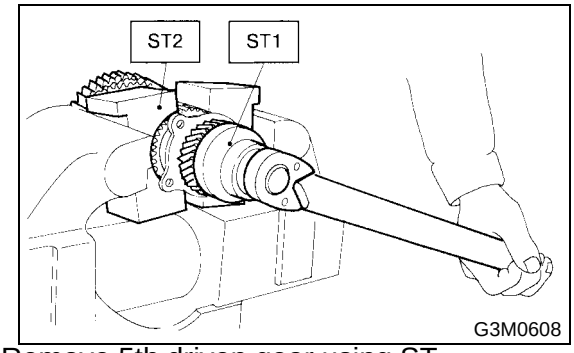
3) Remove roller bearing and washer using ST and press.

CAUTION:
Do not reuse roller bearing.

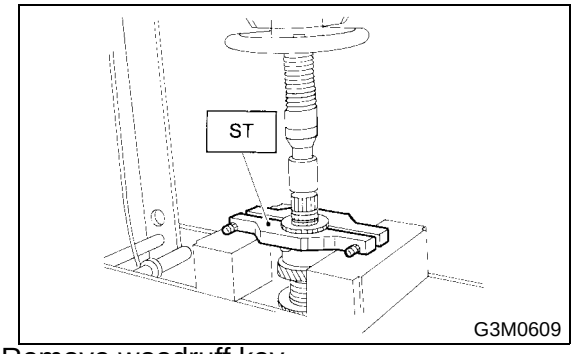
ST 498077000 REMOVER



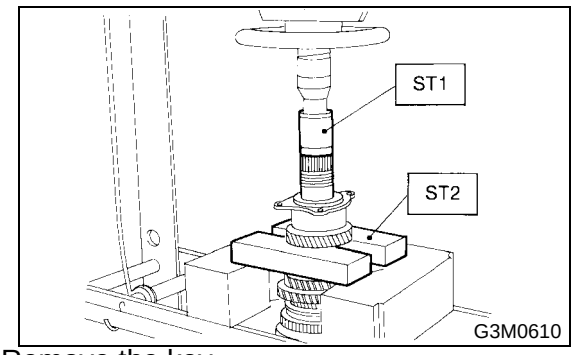
4) Straighten lock nut at staked portion. Remove the lock nut using ST1 and ST2.
ST1 499987300 SOCKET WRENCH (50)
ST2 899884100 HOLDER



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

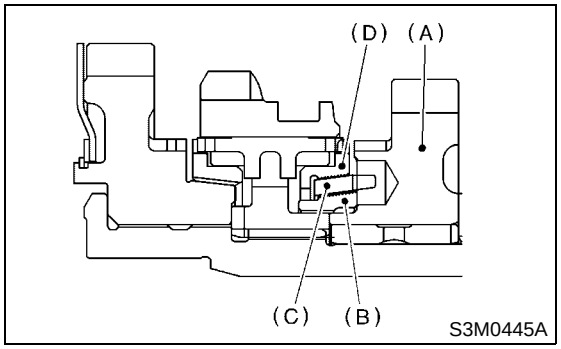


6) Remove woodruff key.
7) Remove roller bearing, 3rd-4th driven gear using ST1 and ST2.
ST1 499757002 INSTALLER
ST2 899714110 REMOVER



8) Remove the key.

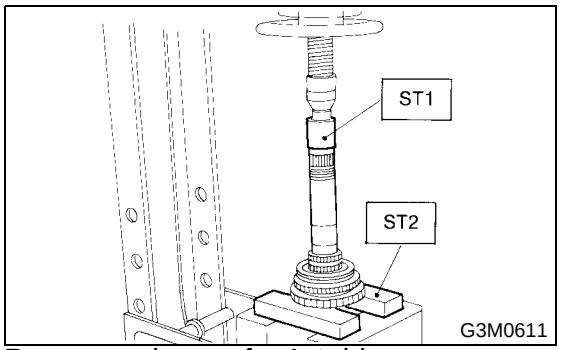
9) Remove 2nd driven gear, inner baulk ring, synchro cone and outer baulk ring.



(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

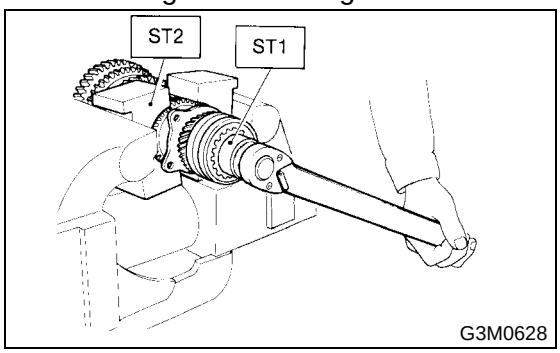


11) Remove sub gear for 1st driven gear.

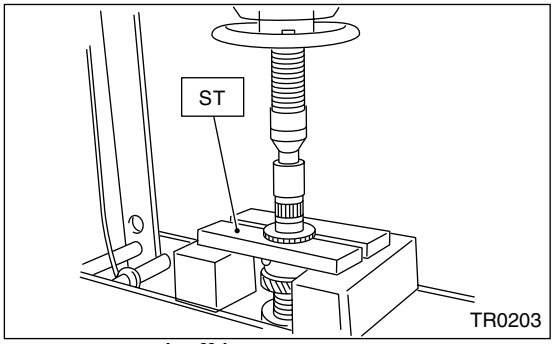
2. FWD MODEL

1) Loosen lock nut using ST1 and ST2.
ST1 49987100 or 499987003 or 899984103 SOCKETWRENCH (35)
ST2 899884100 HOLDER

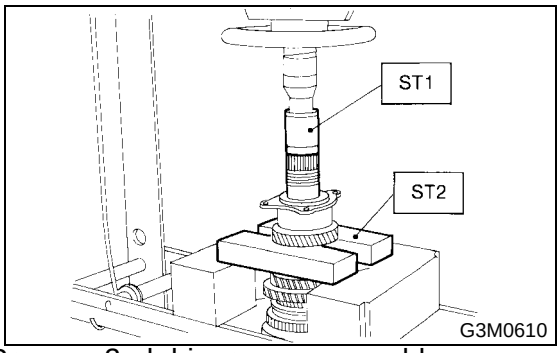
NOTE:
Remove caulking before taking off lock nut.



2) Remove 5th driven gear using a press.
ST 498077000 5TH DRIVEN GEAR REMOVER

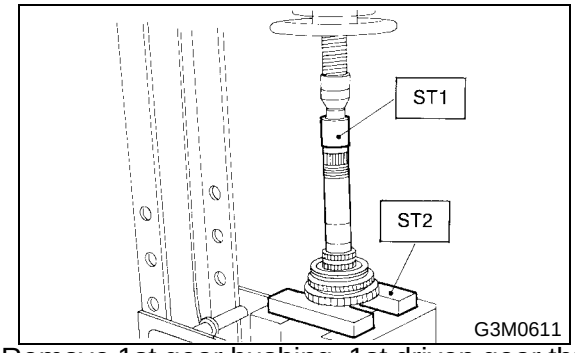


3) Remove woodruff key.
4) Remove roller bearing and 3rd-4th driven gear using ST1 and ST2.
ST1 499757002 SNAP RING GUIDE
ST2 899714110 REMOVER



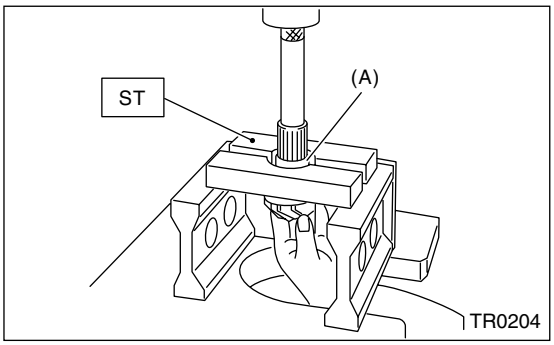
5) Remove 2nd driven gear assembly.
6) Remove 3re-4th driven gear key.
7) Remove 1st driven gear, 2nd gear bushing, and gear & hub assembly using ST1 and ST2.
Replace gear and hub if necessary. Do not attempt to disassemble if at all possible because they must engage at a specified point. If they have to be disassembled, mark the engaging point beforehand.

ST1 499757002 SNAP RING GUIDE
ST2 899714110 REMOVER



8) Remove 1st gear bushing, 1st driven gear thrust plate, and roller bearing using ST and press.
ST 498517000 REPLACER

CAUTION:
Replace roller bearing (41 x 71 x 23) with a new one if this disassembly is performed.



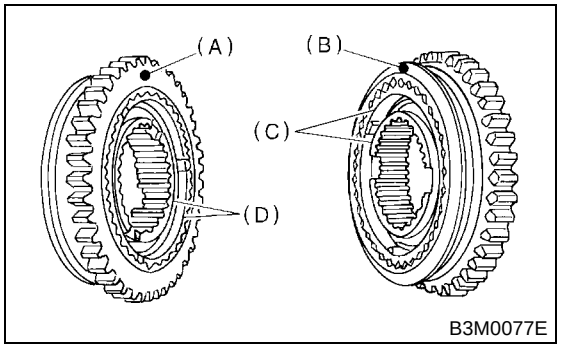
(A) 1st gear bushing

D: ASSEMBLY

1. AWD MODEL

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

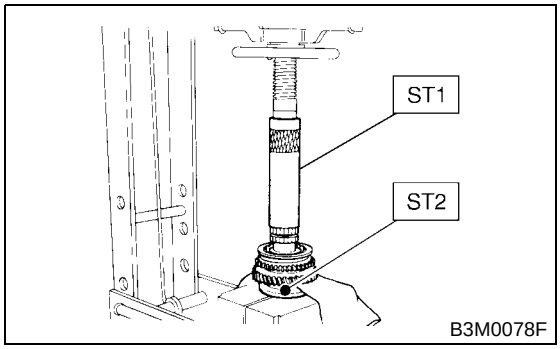
2) Install washer, snap ring and sub gear to 1st driven gear.
3) Install 1st driven gear, 1st baulk ring, gear and hub assembly onto driven shaft.

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

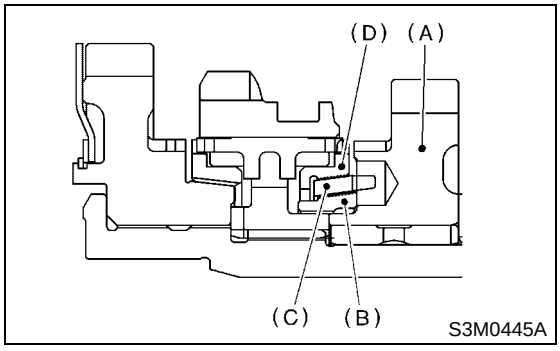
4) Install 2nd driven gear bushing onto driven shaft using ST1, ST2 and press.

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 bush.
ST1 499277200 INSTALLER
ST2 499587000 INSTALLER



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

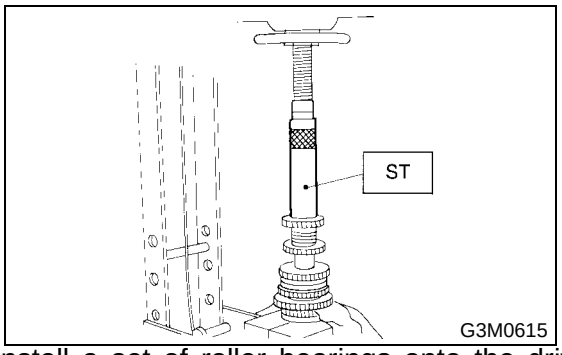


(A) 2nd driven gear
(B) Inner baulk ring
(C) Synchro cone
(D) Outer baulk ring

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

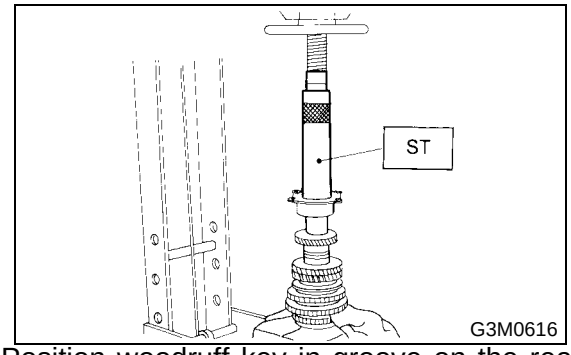
CAUTION:
Do not apply pressure in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).

NOTE:
Align groove in baulk ring with insert.
ST 499277200 INSTALLER



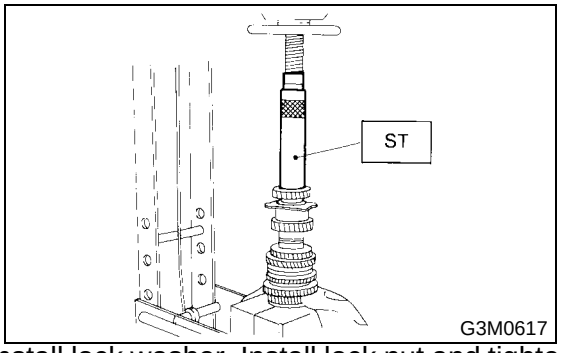
7) Install a set of roller bearings onto the driven shaft using ST and press.

CAUTION:
Do not apply pressure in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).
ST 499277200 INSTALLER



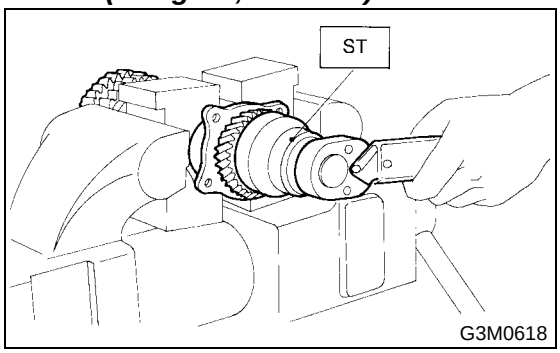
8) Position woodruff key in groove on the rear of driven shaft. Install 5th driven gear onto drive shaft using ST and press.

CAUTION:
Do not apply pressure in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).
ST 499277200 INSTALLER

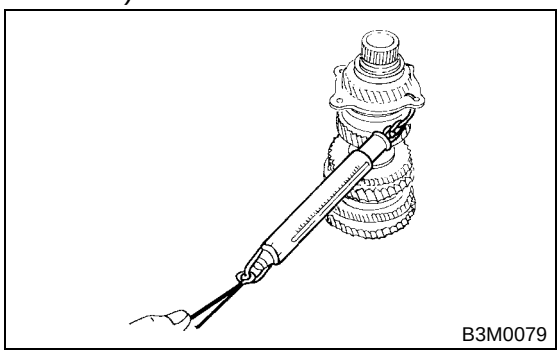


9) Install lock washer. Install lock nut and tighten to the specified torque using ST.
ST 499987300 SOCKET WRENCH (50)

Tightening torque:
265 N·m (27 kgf-m, 195 ft-lb)

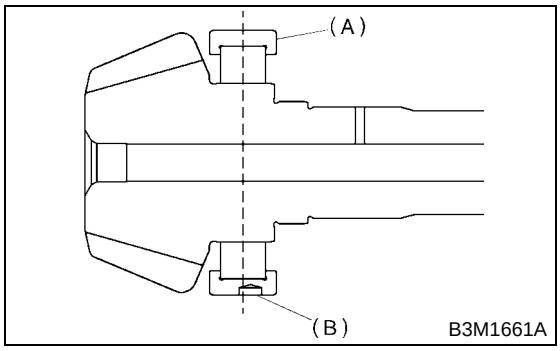


NOTE:
- Stake lock nut at two points.
- Using spring balancer, check that starting torque of roller bearing is 0.1 to 1.5 N (0.01 to 0.15 kgf, 0.02 to 0.33ft).



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.

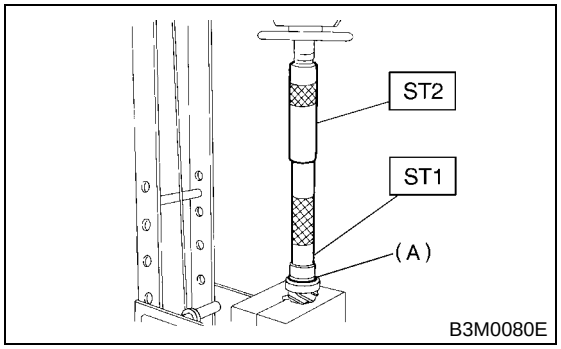


(A) Roller bearing
(B) Knock pin hole

11) Install washer using ST1, ST2 and press.

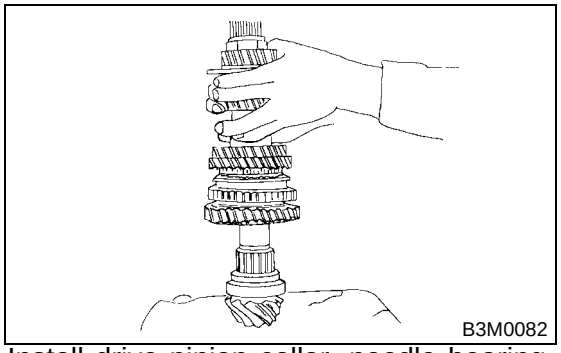
CAUTION:
- **Discard old lock nuts, replace with new ones.**
- **Secure lock nut in four places.**

ST1 499277100 BUSH 1-2 INSTALLER
ST2 499277200 INSTALLER



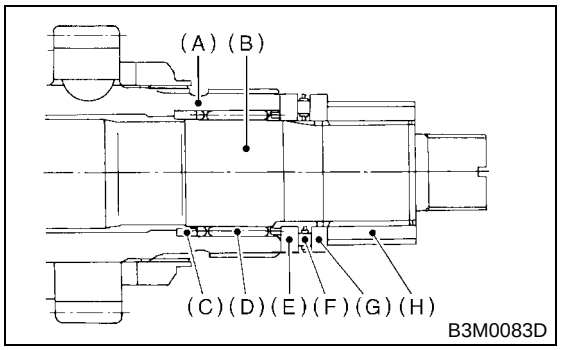
(A) Washer

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



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.

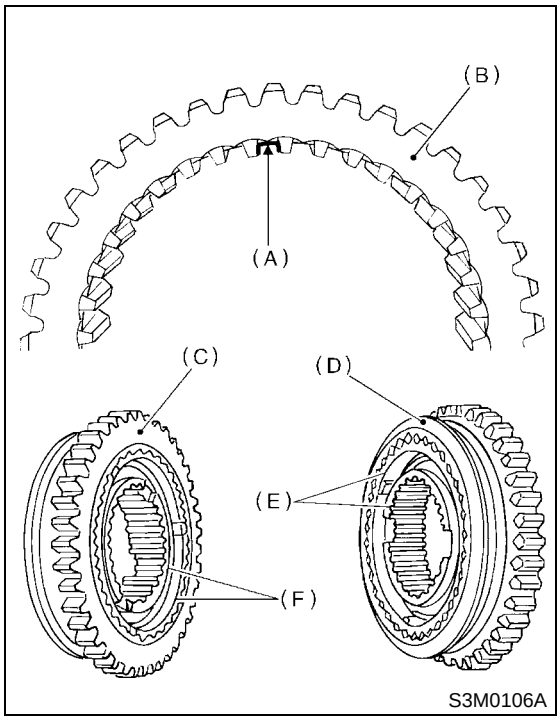


(A) Driven shaft
(B) Drive shaft
(C) Drive pinion collar
(D) Needle bearing (25 × 30 × 20)
(E) Washer No. 2 (25 × 36 × 4)
(F) Thrust bearing (25 × 37.5 × 3)
(G) Washer No. 1 (25 × 36 × t)
(H) Differential bevel gear sleeve

2. FWD MODEL

1) Assemble gear and hub assembly.

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

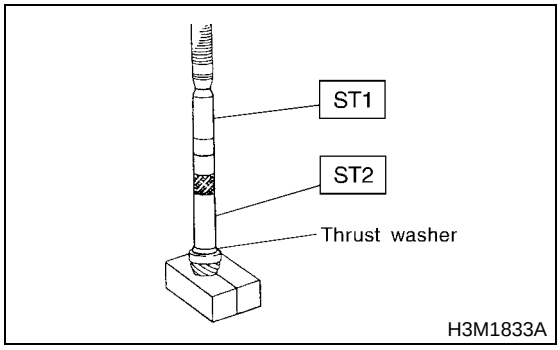


(A) Key grooves
(B) Reverse driven gear
(C) 1st driven gear side
(D) 2nd driven gear side
(E) Flush surface
(F) Stepped surface

2) Drive roller bearing onto drive pinion shaft and 1st driven gear thrust washer using ST1 and ST2.

ST1 499277000 RACE 4-5 INSTALLER
ST2 499277100 BUSH 1-2 INSTALLER

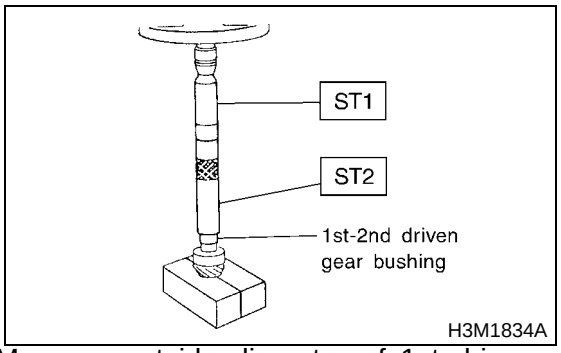
CAUTION:
Use new roller bearing, 1st gear thrust washer.



3) Install 1st-2nd driven gear bushing onto drive pinion shaft.

NOTE:
Bushing may be installed with either side up.

ST1 499877000 RACE 4-5 INSTALLER
ST2 499277100 BUSH 1-2 INSTALLER

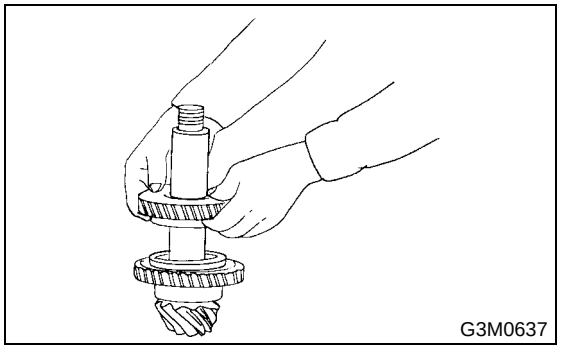


4) Measure outside diameter of 1st driven gear bushing to determine suitable 1st driven gear.

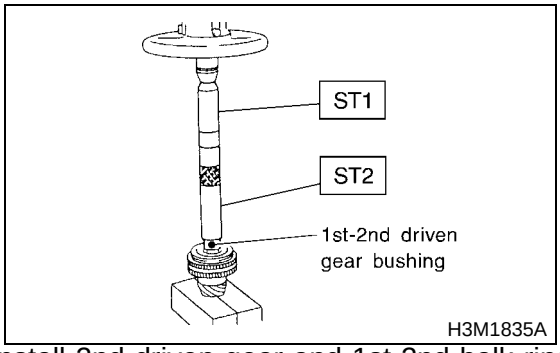
Bushing outside diameter mm (in)	1st driven gear
42.019 — 42.033 (1.6543 — 1.6548)	32231AA840
42.005 — 42.018 (1.6537 — 1.6543)	32231AA850
41.990 — 42.004 (1.6531 — 1.6537)	32231AA860

5) Install 1st driven gear, 1st-2nd balk ring and gear and hub assembly (already assembled in previous step) to drive pinion shaft by hand.

NOTE:
Aligh ring groove with insert.

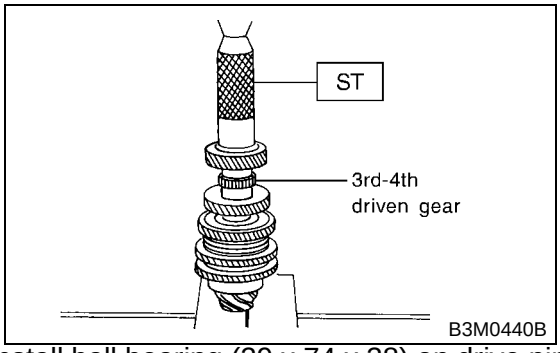


6) Install 1st-2nd driven gear bushing to drive pinion shaft using ST1 and ST2.
ST1 499877000 RACE 4-5 INSTALLER
ST2 499277100 BUSH 1-2 INSTALLER

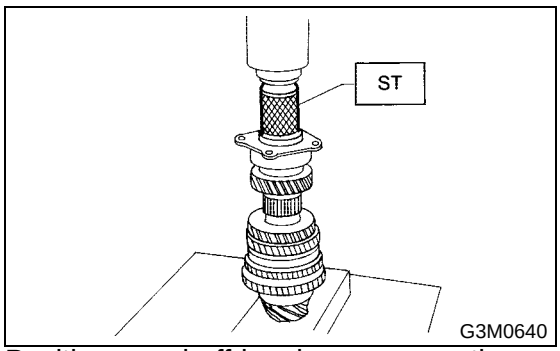


7) Install 2nd driven gear and 1st-2nd balk ring to drive pinion shaft by hand.
8) Install key into the groove on drive pinion shaft and install 3rd-4th driven gear.

NOTE:
Ball bearing may be installed without using the tool. There should be no problem.
ST 499877000 RACE 4-5 INSTALLER

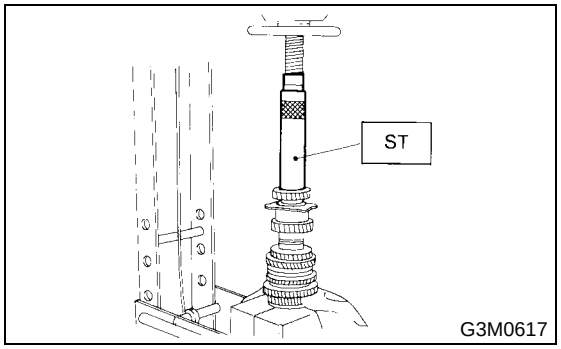


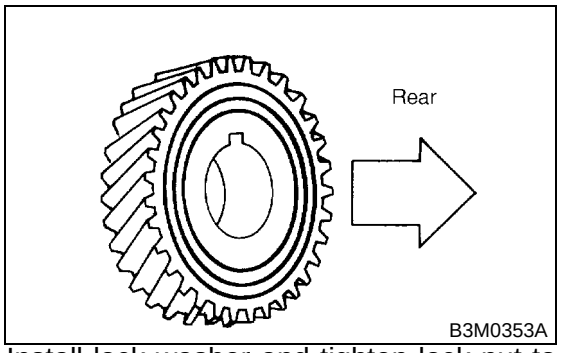
9) Install ball bearing (29 x 74 x 38) on drive pinion shaft with ST.
ST 499277100 BUSH 1-2 INSTALLER



10) Position woodruff key in groove on the rear of drive pinion shaft. Install 5th driven gear onto drive shaft using ST and press.
ST 499277100 INSTALLER

CAUTION:
- **Face 5th driven gear in the correct direction.**
- **Be careful not to dislocate woodruff key while installing 5th gear.**

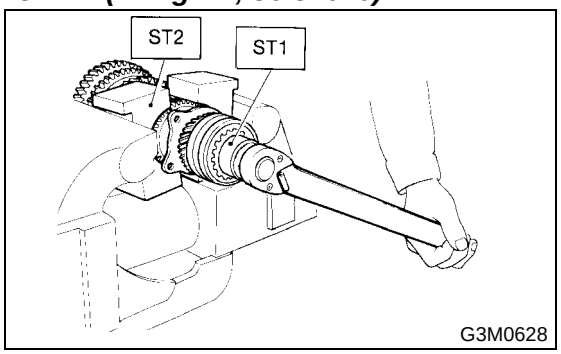




11) Install lock washer and tighten lock nut to the specified torque using ST1 and ST2.
ST1 49987100 or 499987003 or 899984103 SOCKETWRENCH (35)
ST2 899884100 HOLDER

CAUTION:
- **Discard old lock nuts, replace with new ones.**
- **Secure lock nut in four places.**

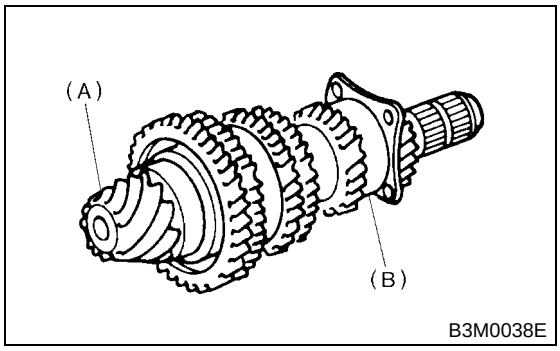
Tightening torque:
118 N·m (12 kgf-m, 86.8 ft-lb)



E: INSPECTION

Disassembled parts should be washed clean first and then inspected carefully.
1) Bearings
Replace bearings in the following cases:
- Bearings whose balls, outer races and inner races are broken or rusty.
- Worn bearings

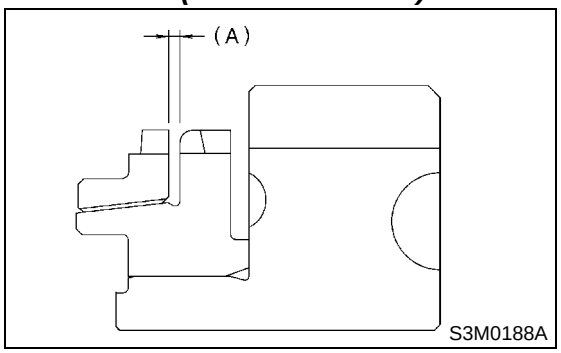
• Bearings that fail to turn smoothly or make abnormal noise when turned after gear oil lubrication.
• The ball bearing on the rear side of the drive pinion shaft should be checked for smooth rotation before the drive pinion assembly is disassembled. In this case, because a preload is working on the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



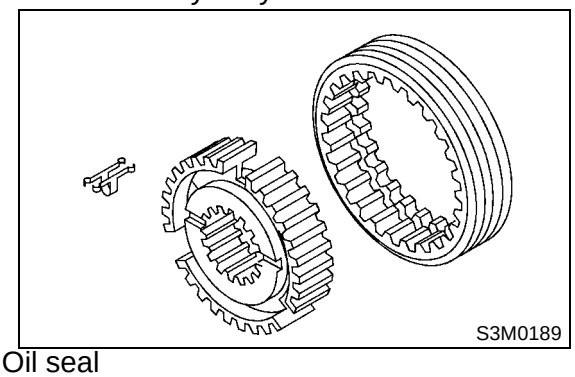
(A) Drive pinion shaft
(B) Ball bearing

• Bearings having other defects
2) Bushing (each gear)
Replace the bushing in the following cases:
• When the sliding surface is damaged or abnormally worn.
• When the inner wall is abnormally worn.
3) Gears
• Replace gears with new ones if their tooth surfaces are broken, damaged, or excessively worn.
• Correct or replace if the cone that contacts the baulk ring is rough or damaged.
• Correct or replace if the inner surface or end face is damaged.
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.

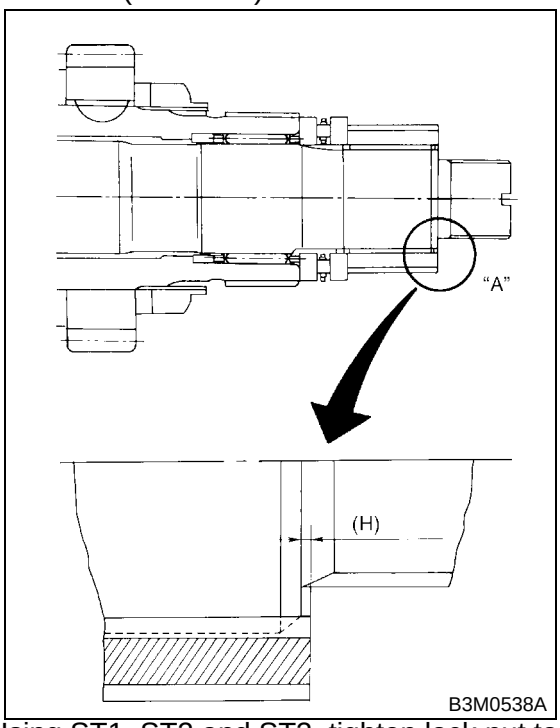


6) Oil seal
Replace the oil seal if the lip is deformed, hardened, damaged, worn, or defective in any way.
7) O-ring
Replace the O-ring if the sealing face is deformed, hardened, damaged, worn, or defective in any way.

F: ADJUSTMENT

1. THRUST BEARING PRELOAD

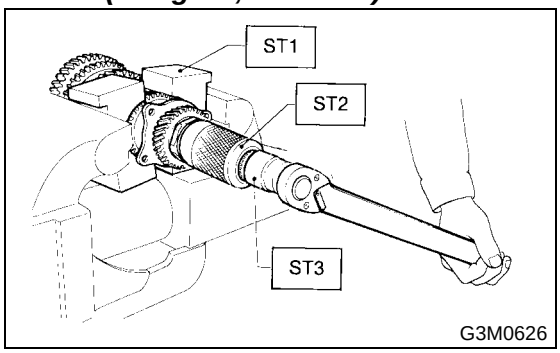
1) After completing the preceding steps 1) through 3), select adjusting washer No. 1 so that dimension (H) is zero through visual check. Position washer ($18.3 \times 30 \times 4$) and lock washer ($18 \times 30 \times 2$) and install lock nut (18×13.5).



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

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

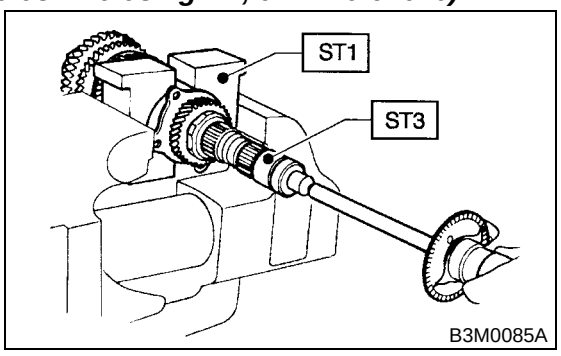
Tightening torque:
118 N·m (12 kgf-m, 86.8 ft-lb)



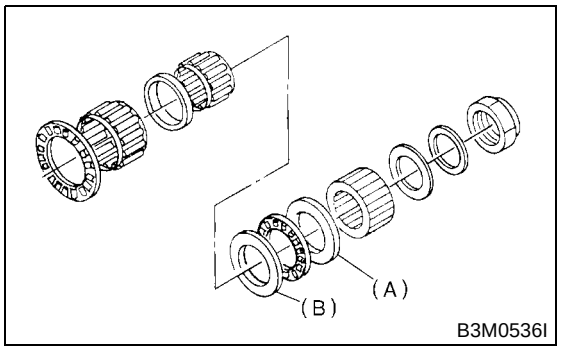
3) After removing ST2, measure starting torque using torque driver.

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)



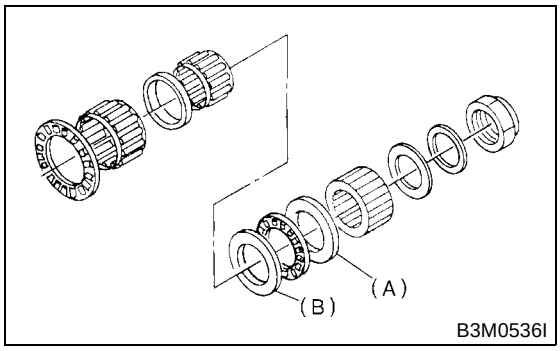
4) If starting torque is not within specified limit, select new adjusting washer No. 1 and recheck starting torque.



(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)

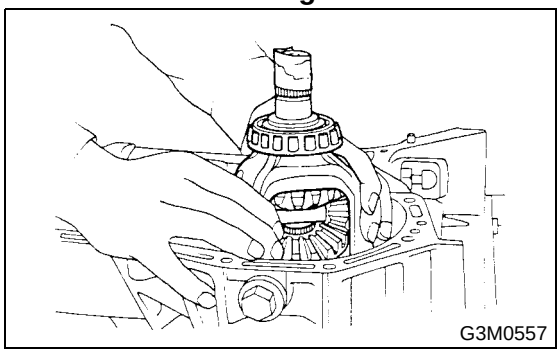
6) Recheck that starting torque is within specified range, then clinch lock nut at four positions.

20.Front Differential Assembly

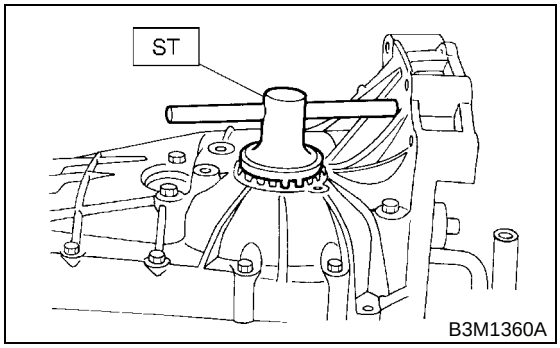
A: REMOVAL

1) Remove the manual transmission assembly from vehicle. <Ref. to MT-37, REMOVAL, Manual Transmission Assembly.>
2) Remove transfer case with extension case assembly (AWD model). <Ref. to MT-50, REMOVAL, Transfer Case and Extension Case Assembly.>
3) Remove rear case (FWD model) <Ref. to MT-50, REMOVAL, Transfer Case and Extension Case Assembly.>
4) Remove transmission case. <Ref. to MT-64, REMOVAL, Transmission Case.>
5) Removes drive pinion shaft assembly. <Ref. to MT-91, REMOVAL, Drive Pinion Shaft Assembly.>
6) Remove main shaft assembly.
Single-range model:
<Ref. to MT-71, REMOVAL, Main Shaft Assembly for Single-Range.>
Dual-range model:
<Ref. to MT-81, REMOVAL, Main Shaft Assembly for Dual-Range.>
7) Remove differential assembly.

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


G3M0557

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



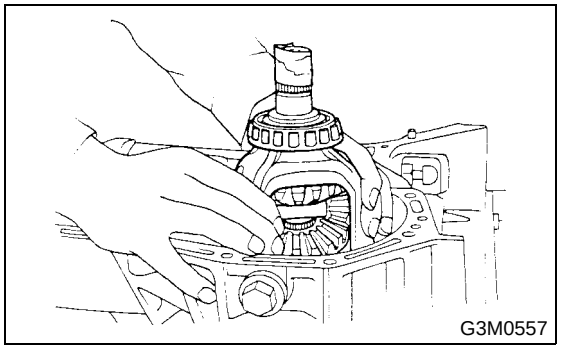
B3M1360A

B: INSTALLATION

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.


G3M0557

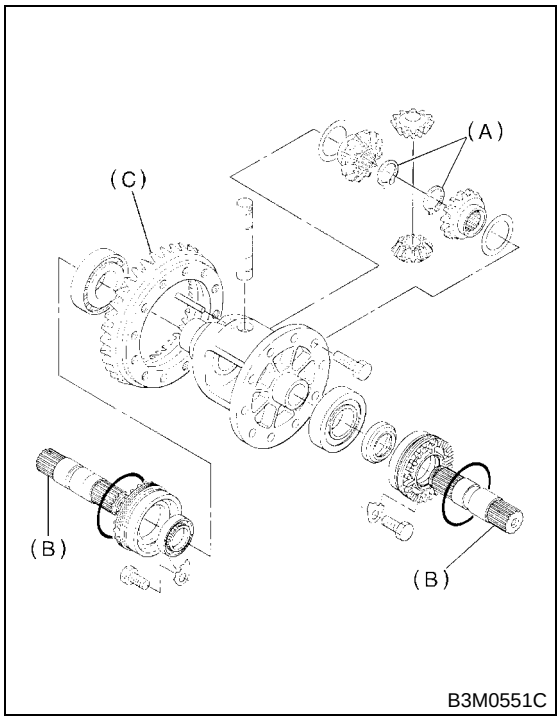
3) Install main shaft assembly. <Ref. to MT-81, INSTALLATION, Main Shaft Assembly for Dual-Range.>
4) Install drive pinion assembly. <Ref. to MT-91, INSTALLATION, Drive Pinion Shaft Assembly.>
5) Install transmission case. <Ref. to MT-66, INSTALLATION, Transmission Case.>
6) Install transfer case with extension case assembly (AWD model). <Ref. to MT-50, INSTALLATION, Transfer Case and Extension Case Assembly.>
7) Install rear case (FWD model) <Ref. to MT-54, INSTALLATION, Rear Case.>
8) Install the manual transmission assembly to vehicle. <Ref. to MT-40, INSTALLATION, Manual Transmission Assembly.>

C: DISASSEMBLY

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

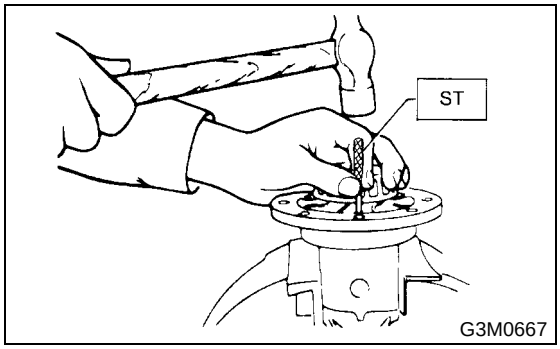
NOTE:
During reassembly, reinstall each axle drive shaft in the same place from which it was removed.

2) Loosen twelve bolts and remove hypoid driven gear.

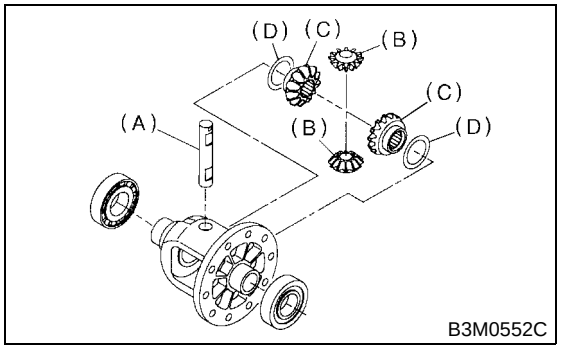


(A) Snap ring
(B) Axle drive shaft
(C) Hypoid driven gear

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

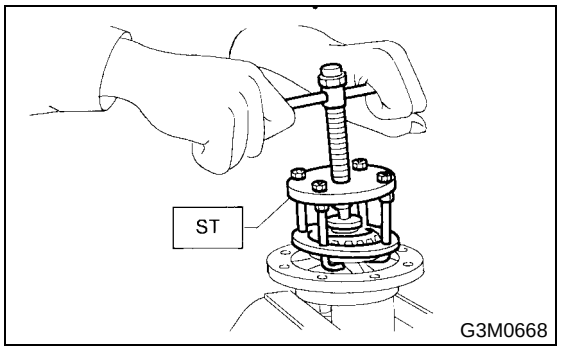


4) Pull out pinion shaft, and remove differential bevel pinion and gear and washer.



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

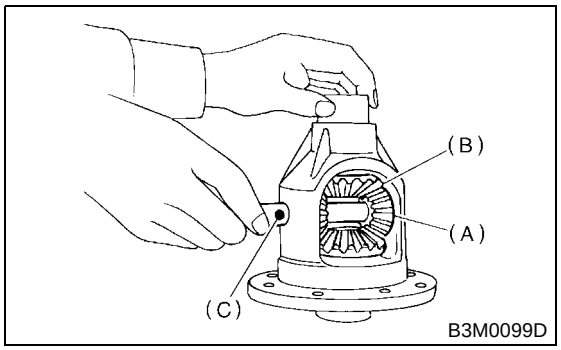
5) Remove roller bearing using ST.
ST 399527700 PULLER SET



D: ASSEMBLY

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

NOTE:
Face the chamfered side of washer toward gear.



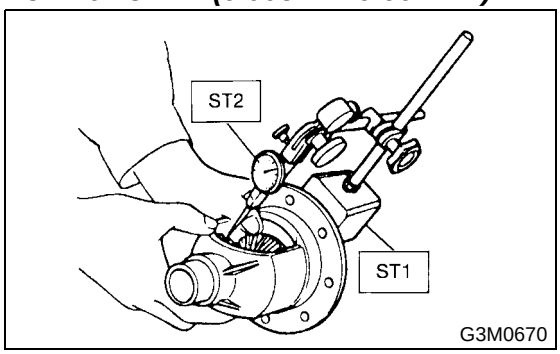
(A) Bevel pinion
(B) Bevel gear
(C) Pinion shaft

2) Measure backlash between bevel gear and pinion. If it is not within specifications, install a suitable washer to adjust it. <Ref. to MT-106, 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

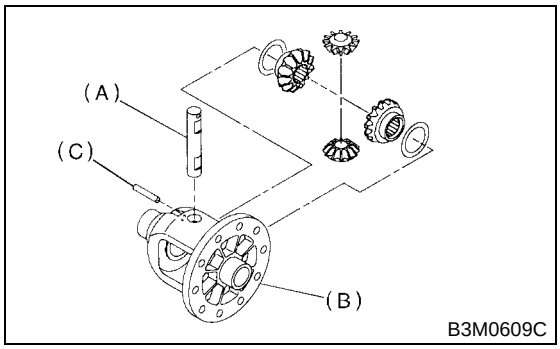
Standard backlash:
0.13 — 0.18 mm (0.0051 — 0.0071 in)



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



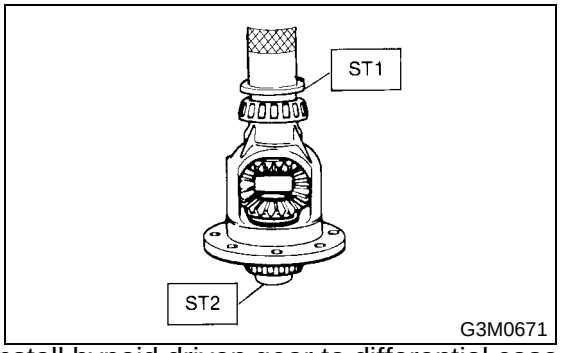
(A) Pinion shaft
(B) Differential case
(C) Straight pin

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).

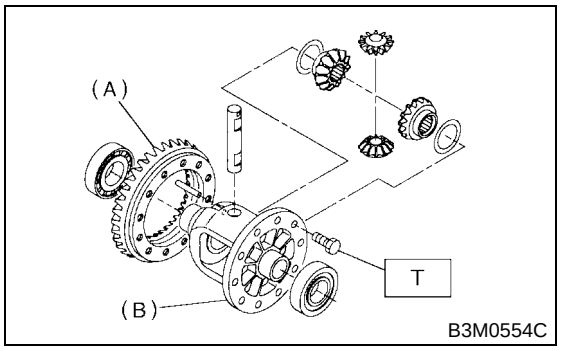
NOTE:
Be careful because roller bearing outer races are used as a set.

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)

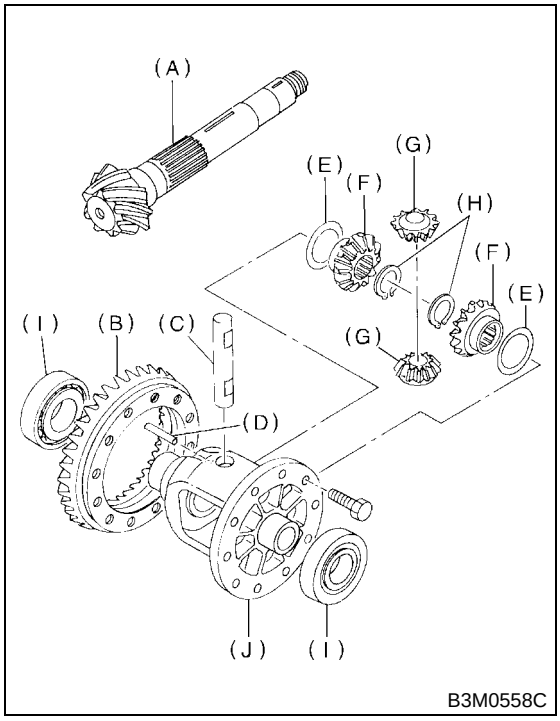


(A) Hypoid driven gear
(B) Differential case

E: INSPECTION

Repair or replace the differential gear in the following cases:

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



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

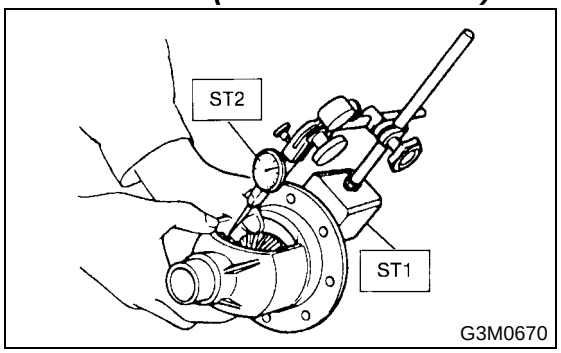
1. BEVEL PINION GEAR BACKLASH

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)

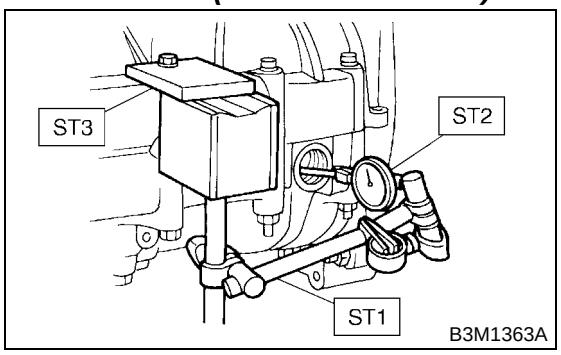


2. HYPOID GEAR BACKLASH

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)

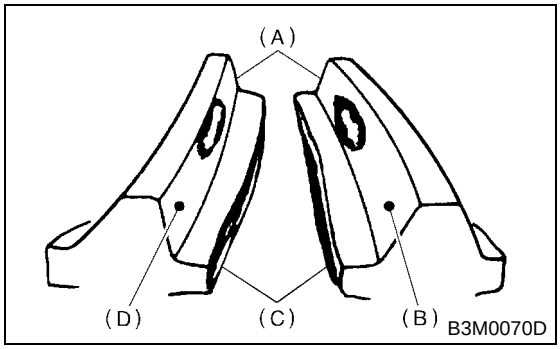


NOTE:
If backlash is outside specified range, adjust it by turning holder in right side case.

3. TOOTH CONTACT OF HYPOID GEAR

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-106, ADJUSTMENT, Front Differential Assembly.>

• Tooth contact is correct.



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

F: ADJUSTMENT

1. BEVEL PINION GEAR BACKLASH

1) Disassemble the front differential. <Ref. to MT-102, REMOVAL, Front Differential Assembly.>
2) Select a different washer from the table and install.

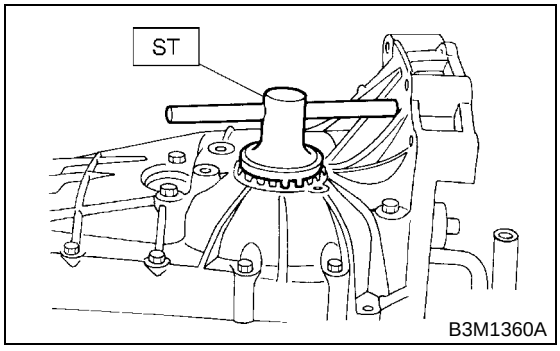
Washer	
Part No.	Thickness mm (in)
803038021	0.925 — 0.950 (0.0364 — 0.0374)
803038022	0.975 — 1.000 (0.0384 — 0.0394)
803038023	1.025 — 1.050 (0.0404 — 0.0413)

3) Adjust until the specified value is obtained.

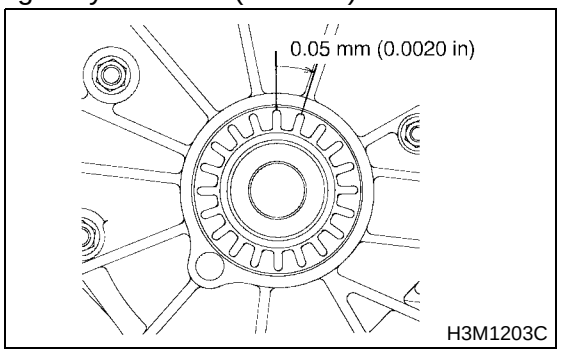
Standard backlash:
0.13 — 0.18 mm (0.0051 — 0.0071 in)

2. HYPOID GEAR BACKLASH

Adjust backlash by turning holder in right side case.
ST 499787000 WRENCH ASSY

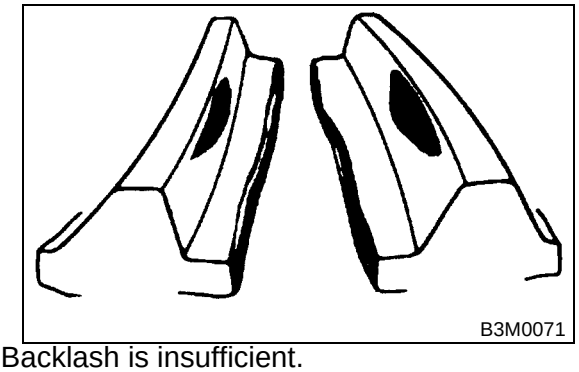


NOTE:
Each time holder rotates one tooth, backlash changes by 0.05 mm (0.020 in).

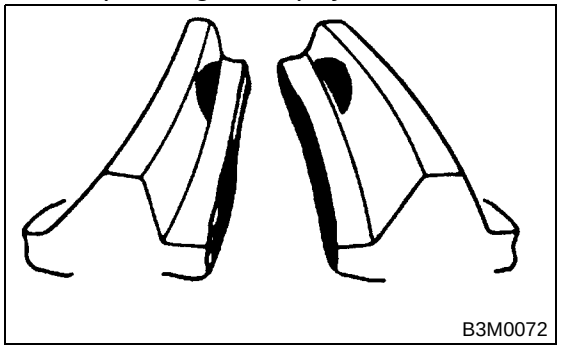


3. TOOTH CONTACT OF HYPOID GEAR

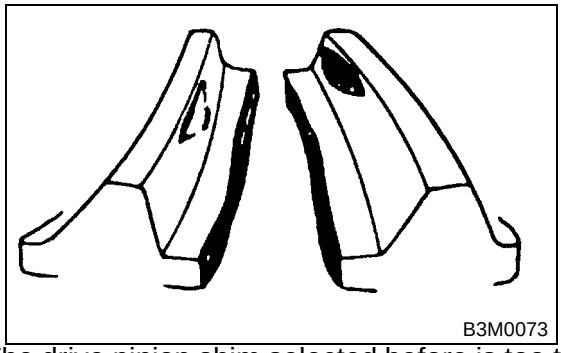
Adjust until the teeth contact is correct.
• Backlash is excessive.
To reduce backlash, loosen holder on the upper side (case right side) and turn in the holder on the lower side (case left side) by the same amount.



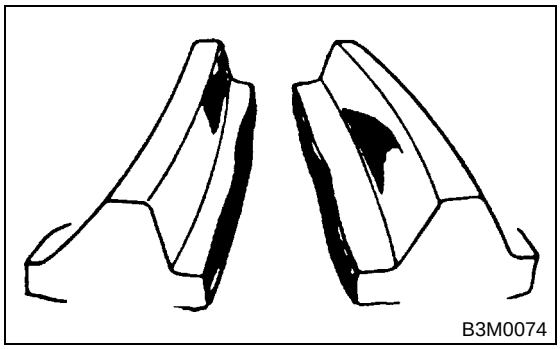
• Backlash is insufficient.
To increase backlash, loosen holder on the lower side (case left side) and turn in the holder on the upper side (case right side) by the same amount.



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


B3M0073

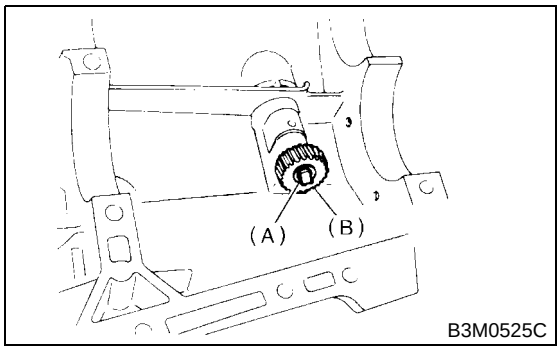
• The drive pinion shim selected before is too thin.
Increase its thickness.


B3M0074

21.Speedometer Gear

A: REMOVAL

1) Remove the manual transmission assembly from vehicle. <Ref. to MT-37, REMOVAL, Manual Transmission Assembly.>
2) Remove back-up light switch and neutral position switch. <Ref. to MT-46, REMOVAL, Switches and Harness.>
3) Remove transfer case with extension case assembly (AWD model). <Ref. to MT-50, REMOVAL, Transfer Case and Extension Case Assembly.>
4) Remove rear case (FWD model) <Ref. to MT-54, REMOVAL, Rear Case.>
5) Remove transmission case. <Ref. to MT-64, REMOVAL, Transmission Case.>
6) Remove vehicle speed sensor. <Ref. to MT-48, REMOVAL, Vehicle Speed Sensor.>
7) 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

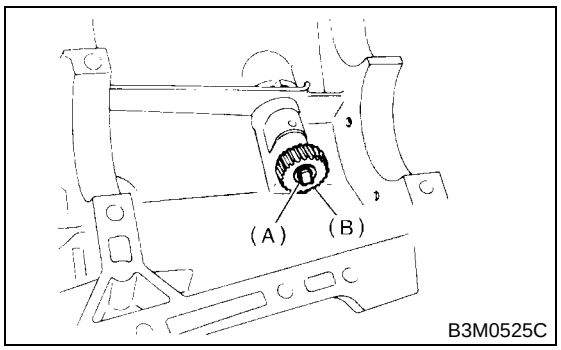
1) Install washer and speedometer shaft, and press fit oil seal with ST.

CAUTION:
Use new oil seal, if it has been removed.

ST 899824100 or 499827000PRESS

2) Install vehicle speed sensor. <Ref. to MT-48, 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-66, INSTALLATION, Transmission Case.>
5) Install transfer case with extension case assembly (AWD model).<Ref. to MT-50, INSTALLATION, Transfer Case and Extension Case Assembly.>
6) Install rear case (FWD model). <Ref. to MT-54, INSTALLATION, Rear Case.>
7) Install back-up light switch and neutral position switch. <Ref. to MT-47, INSTALLATION, Switches and Harness.>
8) Install the manual transmission assembly to vehicle.<Ref. to MT-40, INSTALLATION, Manual Transmission Assembly.>

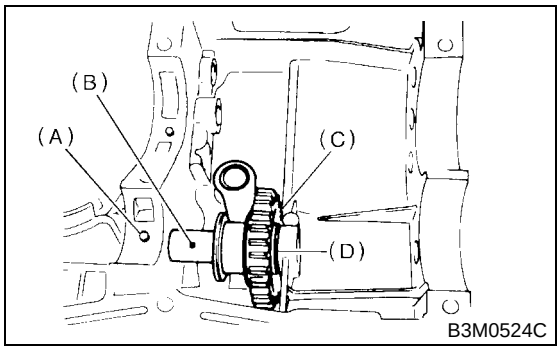
C: INSPECTION

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

22.Reverse Idler Gear

A: REMOVAL

1) Remove the manual transmission assembly from vehicle. <Ref. to MT-37, REMOVAL, Manual Transmission Assembly.>
2) Remove back-up light switch and neutral position switch. <Ref. to MT-46, REMOVAL, Switches and Harness.>
3) Remove transfer case with extension case assembly (AWD model). <Ref. to MT-50, REMOVAL, Transfer Case and Extension Case Assembly.>
4) Remove rear case (FWD model). <Ref. to MT-54, REMOVAL, Rear Case.>
5) Remove transmission case. <Ref. to MT-91, REMOVAL, Drive Pinion Shaft Assembly.>
6) Remove drive pinion shaft assembly. <Ref. to MT-91, REMOVAL, Drive Pinion Shaft Assembly.>
7) Remove main shaft assembly.
Single-range model:
<Ref. to MT-71, REMOVAL, Main Shaft Assembly for Single-Range.>
Dual-range model:
<Ref. to MT-81, REMOVAL, Main Shaft Assembly for Dual-Range.>
8) Remove differential assembly. <Ref. to MT-102, REMOVAL, Front Differential Assembly.>
9) Remove shifter forks and rods. <Ref. to MT-111, REMOVAL, Shifter Fork and Rod.>
10) Pull out straight pin, and remove idler gear shaft, reverse idler gear and washer.



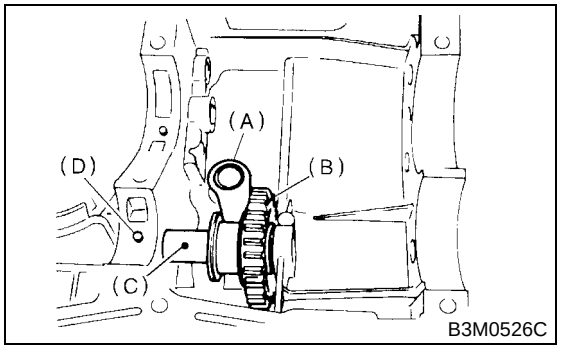
(A) Straight pin
(B) Idler gear shaft
(C) Idler gear
(D) Washer

11) Remove reverse shifter lever.

B: INSTALLATION

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.



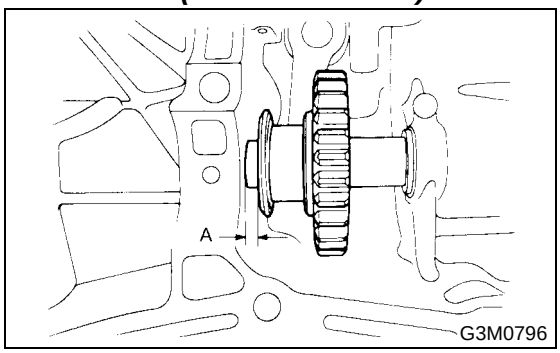
(A) Reverse shifter lever
(B) Reverse idler gear
(C) Reverse idler gear shaft
(D) Straight pin

2) Inspect and adjust clearance between reverse idler gear and transmission case wall. <Ref. to MT-109, INSTALLATION, Reverse Idler Gear.> and <Ref. to MT-110, ADJUSTMENT, Reverse Idler Gear.>
3) Install shifter forks and rods. <Ref. to MT-111, INSTALLATION, Shifter Fork and Rod.>
4) Install differential assembly. <Ref. to MT-102, INSTALLATION, Front Differential Assembly.>
5) Install main shaft assembly.
Single-range model:
<Ref. to MT-71, INSTALLATION, Main Shaft Assembly for Single-Range.>
Dual-range model:
<Ref. to MT-81, INSTALLATION, Main Shaft Assembly for Dual-Range.>
6) Install drive pinion shaft assembly. <Ref. to MT-91, INSTALLATION, Drive Pinion Shaft Assembly.>
7) Install transmission case. <Ref. to MT-66, INSTALLATION, Transmission Case.>
8) Install transfer case with extension case assembly (AWD model). <Ref. to MT-50, INSTALLATION, Transfer Case and Extension Case Assembly.>
9) Install rear case (FWD model). <Ref. to MT-66, INSTALLATION, Transmission Case.>
10) Install back-up light switch and neutral position switch. <Ref. to MT-47, INSTALLATION, Switches and Harness.>
11) Install the manual transmission assembly to vehicle. <Ref. to MT-40, INSTALLATION, Manual Transmission Assembly.>

C: INSPECTION

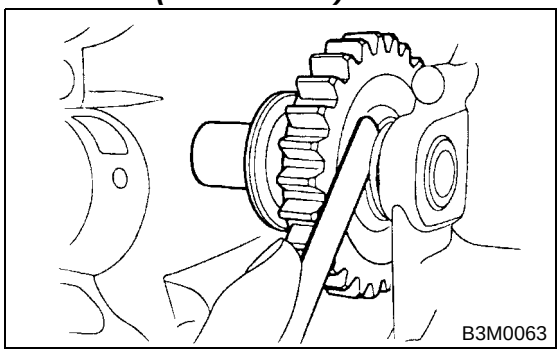
1) Move the reverse shifter rod toward the reverse side. Inspect clearance between reverse idler gear and transmission case wall.
If out of specification, select the appropriate reverse shifter lever and adjust.

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)

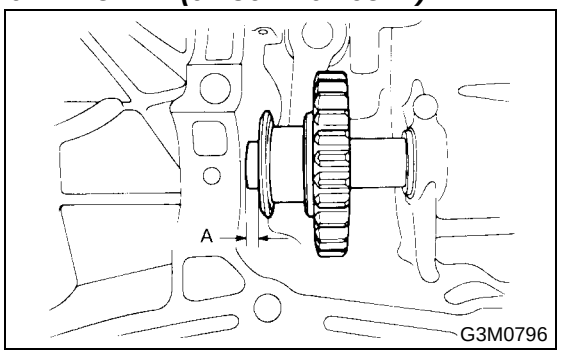


3) Check the reverse idler gear and shaft for damage. Replace if damaged.

D: ADJUSTMENT

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.

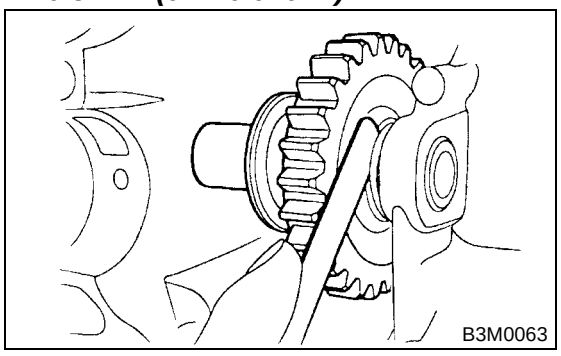
Clearance A:
6.0 — 7.5 mm (0.236 — 0.295 in)



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)

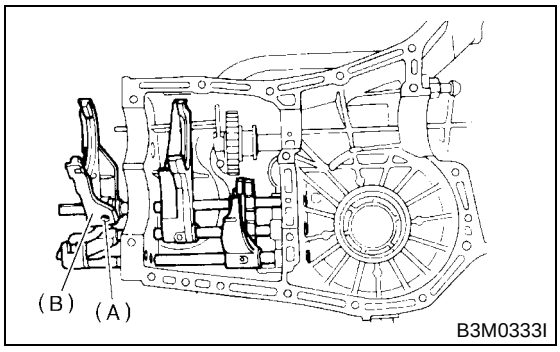


Washer	
Part No.	Thickness mm (in)
803020151	0.4 (0.016)
803020152	1.1 (0.043)
803020153	1.5 (0.059)
803020154	1.9 (0.075)
803020155	2.3 (0.091)

23.Shifter Fork and Rod

A: REMOVAL

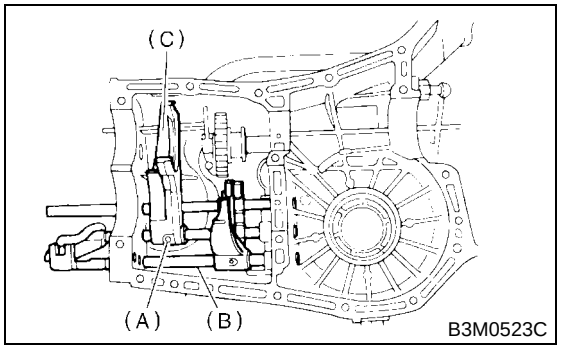
1) Remove the manual transmission assembly from vehicle. <Ref. to MT-37, REMOVAL, Manual Transmission Assembly.>
2) Remove back-up light switch and neutral position switch. <Ref. to MT-46, REMOVAL, Switches and Harness.>
3) Remove transfer case with extension case assembly (AWD model). <Ref. to MT-50, REMOVAL, Transfer Case and Extension Case Assembly.>
4) Remove rear case (FWD model). <Ref. to MT-54, REMOVAL, Rear Case.>
5) Remove transmission case. <Ref. to MT-64, REMOVAL, Transmission Case.>
6) Removes drive pinion shaft assembly. <Ref. to MT-91, REMOVAL, Drive Pinion Shaft Assembly.>
7) Remove main shaft assembly.
Single-range model:
<Ref. to MT-71, REMOVAL, Main Shaft Assembly for Single-Range.>
Dual-range model:
<Ref. to MT-81, REMOVAL, Main Shaft Assembly for Dual-Range.>
8) Remove differential assembly. <Ref. to MT-102, REMOVAL, Front Differential Assembly.>
9) Drive out straight pin with ST, and 5th shifter fork.
ST 398791700 STRAIGHT PIN REMOVER



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

10) Remove plugs, springs and checking balls.
11) 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

12) Drive out straight pin, and pull out 1-2 fork rod and shifter fork.
13) 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.

14) Remove reverse shifter lever.

B: INSTALLATION

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.

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.

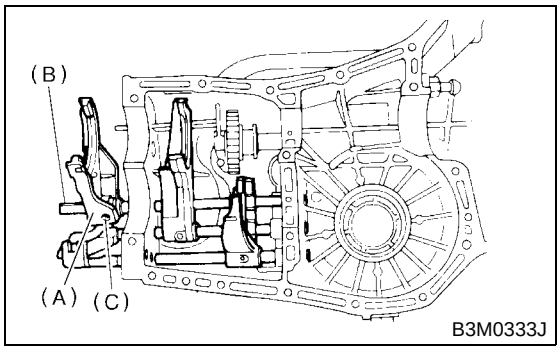
NOTE:
• Set reverse fork rod to neutral.
• Make sure interlock plunger (installing before) is on the reverse fork rod side.

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.

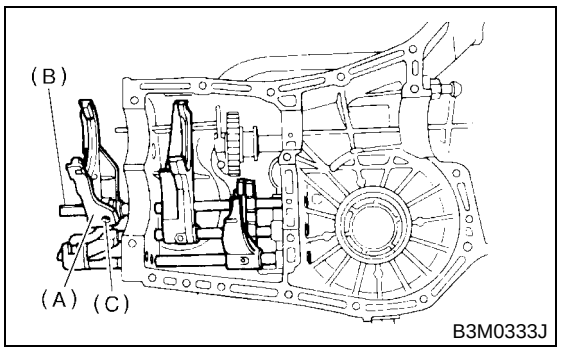
ST 398791700 STRAIGHT PIN REMOVER



(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.



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

10) Install differential assembly. <Ref. to MT-102, INSTALLATION, Front Differential Assembly.>

11) Install main shaft assembly.
Single-range model:
<Ref. to MT-71, INSTALLATION, Main Shaft Assembly for Single-Range.>
Dual-range model:
<Ref. to MT-81, INSTALLATION, Main Shaft Assembly for Dual-Range.>

12) Install drive pinion shaft assembly. <Ref. to MT-91, INSTALLATION, Drive Pinion Shaft Assembly.>

13) Install transmission case. <Ref. to MT-66, INSTALLATION, Transmission Case.>

14) Install transfer case with extension case assembly (AWD model). <Ref. to MT-50, INSTALLATION, Transfer Case and Extension Case Assembly.>

15) Install rear case (FWD model). <Ref. to MT-54, INSTALLATION, Rear Case.>

16) Install back-up light switch and neutral position switch. <Ref. to MT-47, INSTALLATION, Switches and Harness.>

17) Install the manual transmission assembly to vehicle. <Ref. to MT-40, INSTALLATION, Manual Transmission Assembly.>

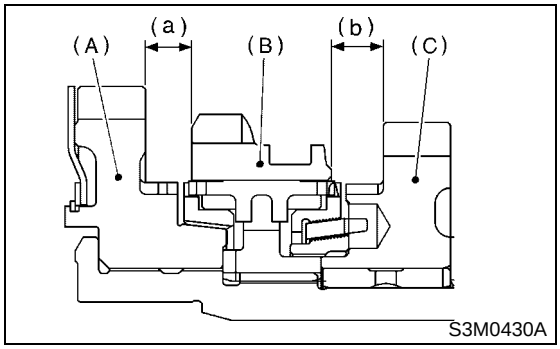
C: INSPECTION

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)

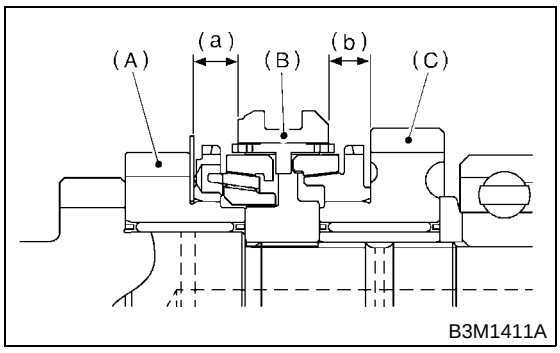


(A) 1st driven gear
(B) Reverse driven gear
(C) 2nd driven gear

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).

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)

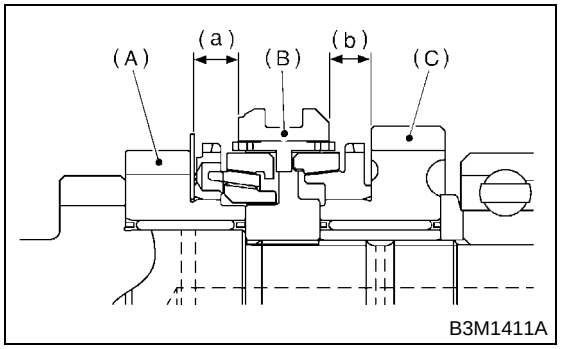


(A) 3rd drive gear
(B) Coupling sleeve
(C) 4th drive gear

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

5th shifter fork (Non-turbo)		
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).

5th shifter fork (Turbo)		
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).

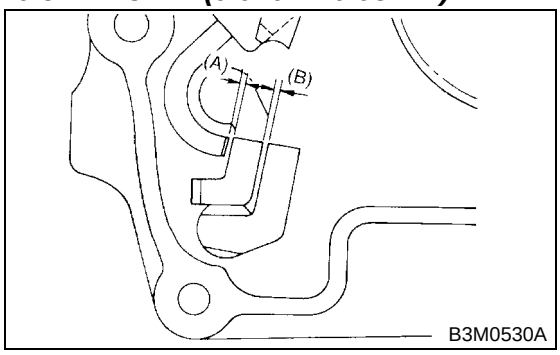
6) Inspect rod end clearances (A) and (B). If any clearance is not within specifications, replace rod or fork as required.

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

Clearance (B):

3rd — 4th to 5th:

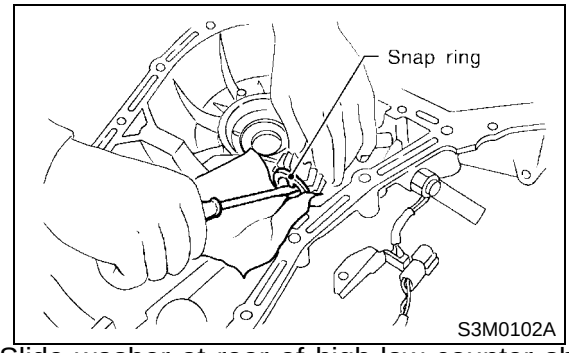
0.5 — 1.3 mm(0.020 — 0.051 in)



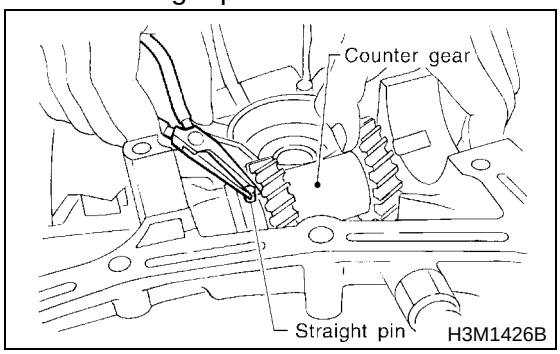
24.Counter Gear

A: REMOVAL

1) Remove the manual transmission assembly from the vehicle. <Ref. to MT-37, REMOVAL, Manual Transmission Assembly.>
2) Remove the transfer case with extension case assembly. <Ref. to MT-50, REMOVAL, Transfer Case and Extension Case Assembly.>
3) Remove transmission case. <Ref. to MT-64, REMOVAL, Transmission Case.>
4) Move counter gear shaft until it touches transmission case, and remove snap ring with a suitable tool.

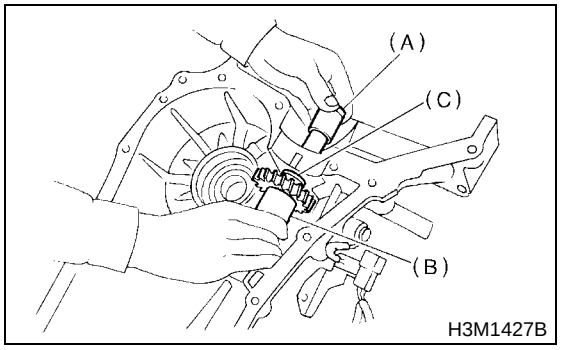


5) Slide washer at rear of high-low counter shaft, and remove straight pin from counter shaft.



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

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-66, INSTALLATION, Transmission Case.>
4) Install the transfer case with extension case assembly. <Ref. to MT-50, INSTALLATION, Transfer Case and Extension Case Assembly.>
5) Install the manual transmission assembly on vehicle. <Ref. to MT-40, 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

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-116, ADJUSTMENT, Counter Gear.>

D: ADJUSTMENT

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)

25.General Diagnostic

A: INSPECTION

1. MANUAL TRANSMISSION

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

Symptom	Possible cause	Remedy
1. Broken differential (case, gear, bearing, etc.) NOTE: Abnormal noise will develop and finally it will become impossible to continue to run due to broken pieces obstructing the gear revolution.	(a) Insufficient or improper oil	Disassemble differential and replace broken components and at the same time check other components for any trouble, and replace if necessary.
	(b) Use of vehicle under severe conditions such as excessive load and improper use of clutch	Readjust bearing preload and backlash and face contact of gears.
	(c) Improper adjustment of taper roller bearing	Adjust.
	(d) Improper adjustment of drive pinion and hypoid driven gear	Adjust.
	(e) Excessive backlash due to worn differential side gear, washer or differential pinion 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.
2. Differential and hypoid gear noises Troubles of the differential and hypoid gear always appear as noise problems. Therefore noise is the first indication of the trouble. However noises from the engine, muffler, tire, exhaust gas, bearing, body, etc. are easily mistaken for the differential noise. Pay special attention to the hypoid gear noise because it is easily confused with other gear noises. There are the following four kinds of noises. • 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.