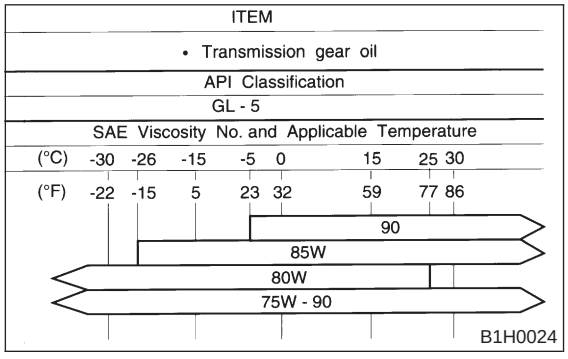
MANUAL TRANSMISSION AND DIFFERENTIAL 3-1

1. Manual Transmission and Differential

Item			Model	
			AWD	
			2200 cc	2500 cc
Type			5-forward speeds with synchromesh and 1-reverse	
Transmission gear ratio		1st	3.545	
		2nd	2.111	
		3rd	1.448	
		4th	1.088	
		5th	0.780	
		Reverse	3.333	
Front reduction gear	Final	Type of gear	Hypoid	
		Gear ratio	3.900	4.111
Rear reduction gear	Transfer	Type of gear	Helical	
		Gear ratio	1.000	
	Final	Type of gear	Hypoid	
		Gear ratio	3.900	4.111
Front differential	Type and number of gear		Straight bevel gear (Bevel pinion: 2, Bevel gear: 2)	
Center differential	Type and number of gear		Straight bevel gear (Bevel pinion: 2, Bevel gear: 2 and viscous coupling)	
Transmission gear oil			GL-5	
Transmission oil capacity			3.5 ℓ (3.7 US qt, 3.1 Imp qt)	

2. Transmission Gear Oil

Recommended oil



3. Transmission Case Assembly

Drive pinion shim adjustment

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)

Hypoid gear backlash
0.13 — 0.18 mm (0.0051 — 0.0071 in)
Selection of main shaft rear plate

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

4. Drive Pinion Assembly

Preload adjustment of thrust bearing
Starting torque
0.3 — 0.8 N·m
(0.03 — 0.08 kg-m, 0.2 — 0.6 ft-lb)

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

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

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

Driven shaft		1st driven gear
Part No.	Diameter A mm (in)	Part No.
32229AA150	49.959 — 49.966 (1.9669 — 1.9672)	32231AA730
32229AA140	49.967 — 49.975 (1.9672 — 1.9675)	32231AA720

5. Reverse Idler Gear

Adjustment of reverse idler gear position
Reverse idler gear to transmission case (LH) wall clearance
6.0 — 7.5 mm (0.236 — 0.295 in)

Reverse shifter lever		
Part No.	Mark	Remarks
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)		

6. Shifter Fork and Rod

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

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

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

5th shifter fork		
Part No.	Mark	Remarks
32812AA200	1	Approach to 5th gear by 0.2 mm (0.008 in)
32812AA210	No mark	Standard
32812AA220	3	Become distant from 5th gear by 0.2 mm (0.008 in)

Rod end clearance

A: 1st-2nd — 3rd-4th
0.5 — 1.5 mm (0.020 — 0.059 in)

B: 3rd-4th — 5th
0.6 — 1.4 mm (0.024 — 0.055 in)

7. Transfer Case

Neutral position adjustment

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

Reverse accent shaft		
Part No.	Mark	Remarks
32188AA090	X	Neutral position is closer to 1st.
32188AA100	Y	Standard
32188AA110	Z	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.

8. Extension Assembly

Thrust washer (52 × 61 × t) to ball bearing side clearance
0.05 — 0.30 mm (0.0020 — 0.0118 in)

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

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)

9. Front Differential

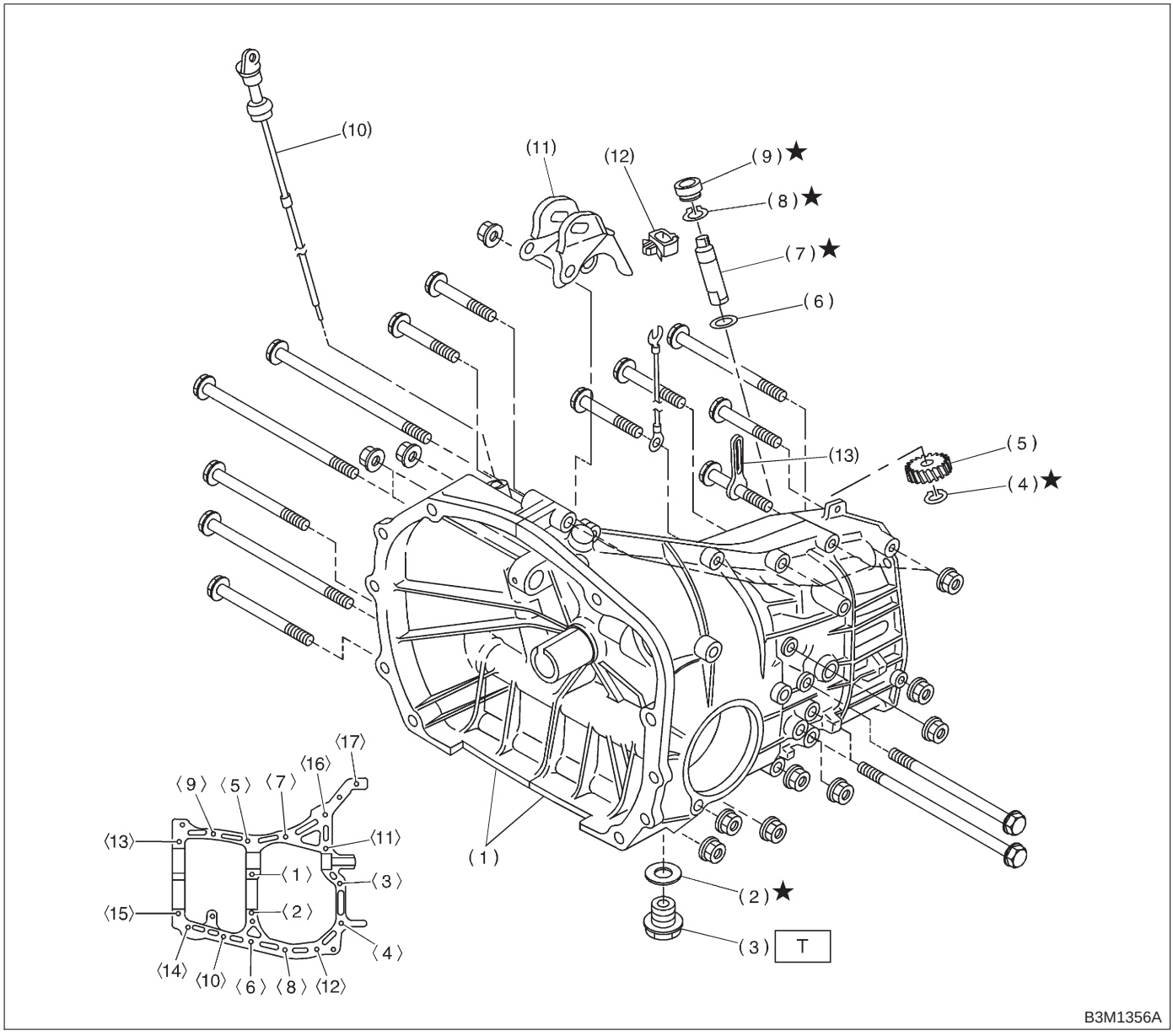
Bevel gear to pinion backlash
0.13 — 0.18 mm (0.0051 — 0.0071 in)

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)

1. Transmission Case



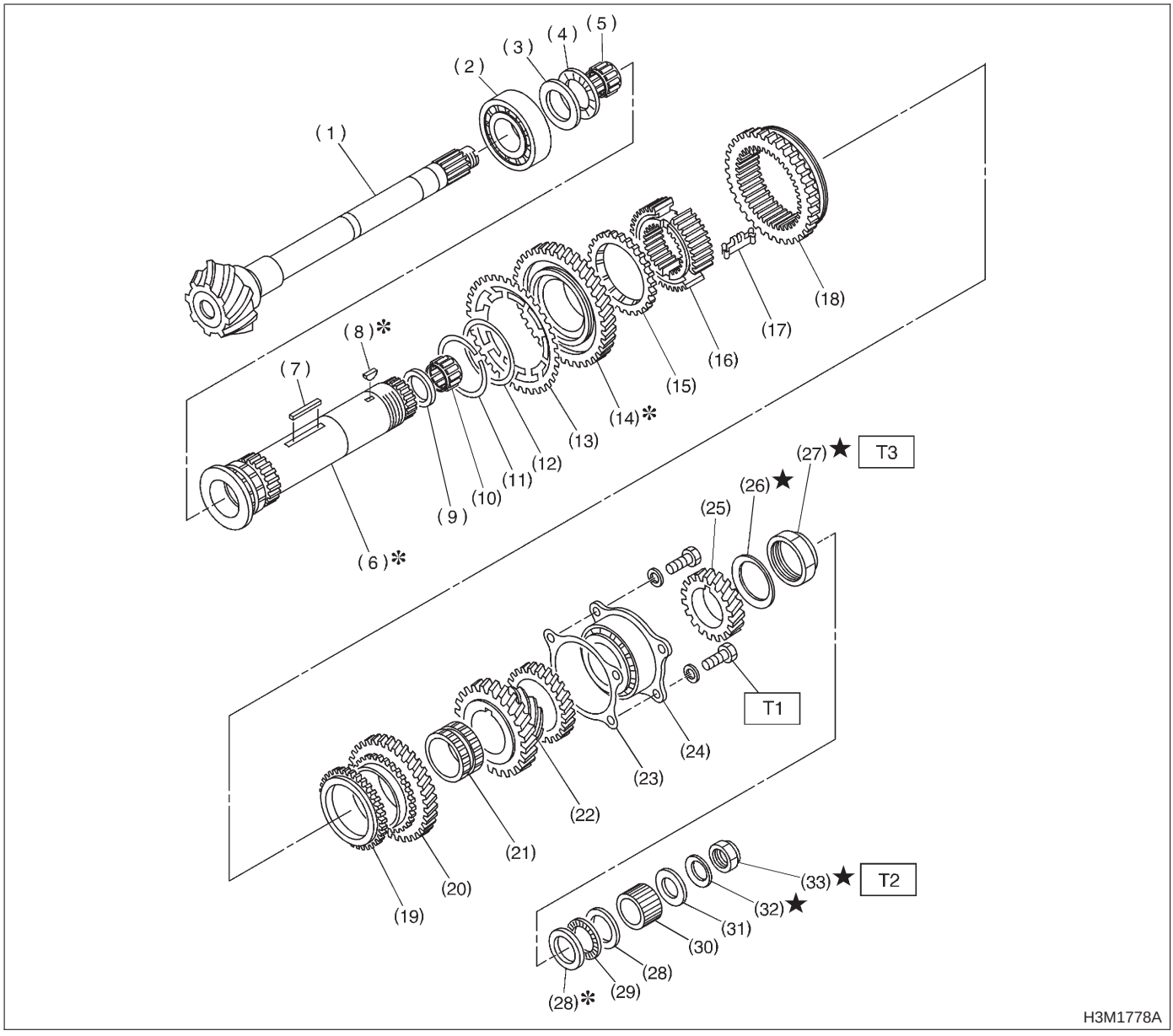
(1) Transmission case ASSY
(2) Gasket
(3) Drain plug
(4) Snap ring (Outer)
(5) Speedometer driven gear
(6) Washer
(7) Speedometer shaft
(8) Snap ring (Outer)
(9) Oil seal
(10) Oil level gauge
(11) Pitching stopper bracket
(12) Clamp
(13) Clip

Tightening torque: N·m (kg-m, ft-lb)
T: 44±3 (4.5±0.3, 32.5±2.2)

Size	All models	Torque
8 mm bolt	<5> — <15>	25±2 N·m (2.5±0.2 kg-m, 18.1±1.4 ft-lb)
10 mm bolt	<1> — <4> <16> — <17>	39±3 N·m (4.0±0.3 kg-m, 28.9±2.2 ft-lb)

2. Drive Pinion Assembly

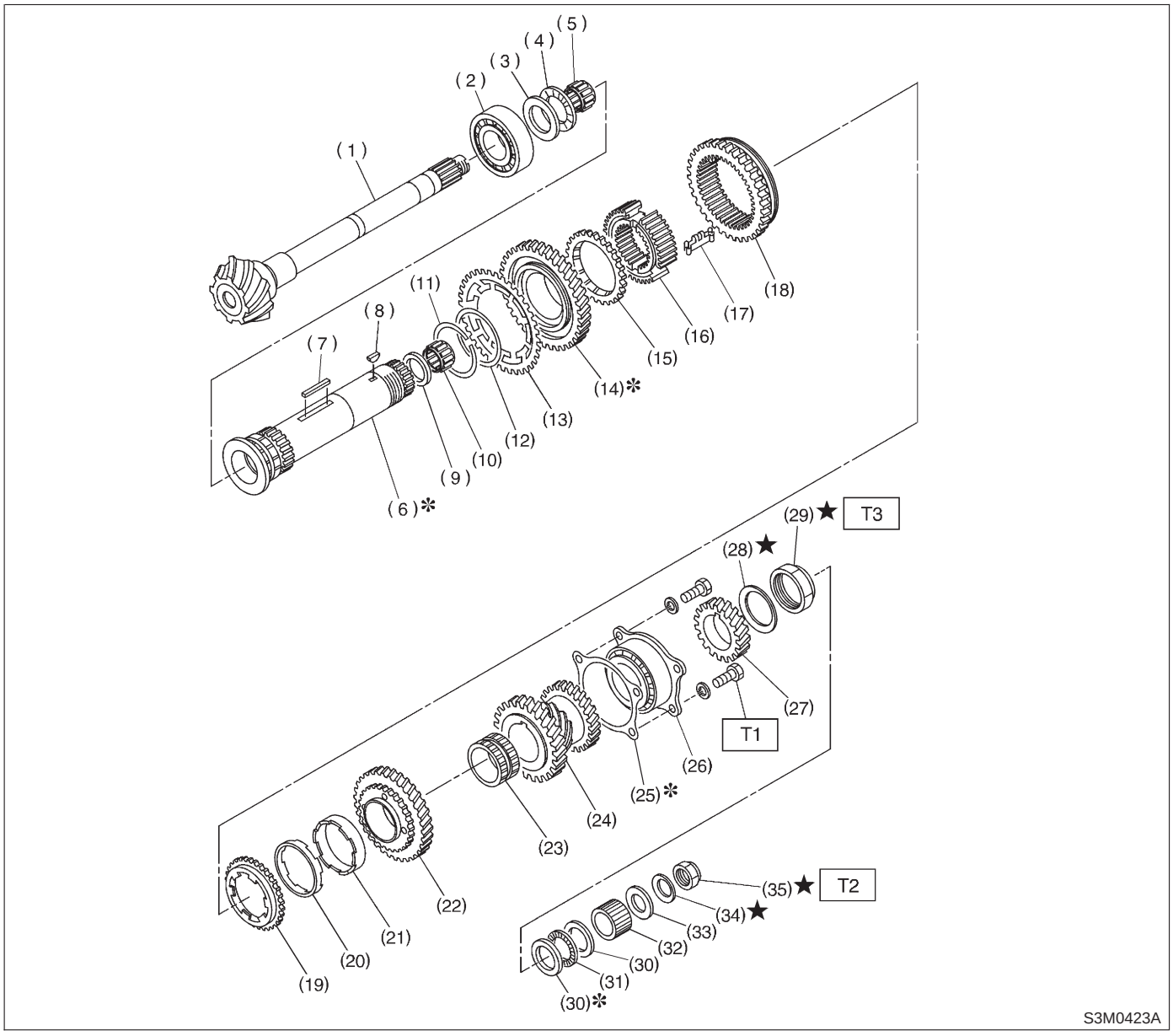
A: 2200 cc MODEL



(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) Baulk ring
(20) 2nd driven gear
(21) 2nd driven gear bush
(22) 3rd-4th driven gear
(23) Driven pinion shim
(24) Roller bearing
(25) 5th driven gear
(26) Lock washer
(27) Lock nut
(28) Washer
(29) Thrust bearing
(30) Differential bevel gear sleeve
(31) Washer
(32) Lock washer
(33) Lock nut

Tightening torque: N·m (kg-m, ft-lb)
T1: 29±3 (3.0±0.3, 21.7±2.2)
T2: 118±8 (12.0±0.8, 86.8±5.8)
T3: 265±10 (27±1, 195±7)

B: 2500 cc MODEL

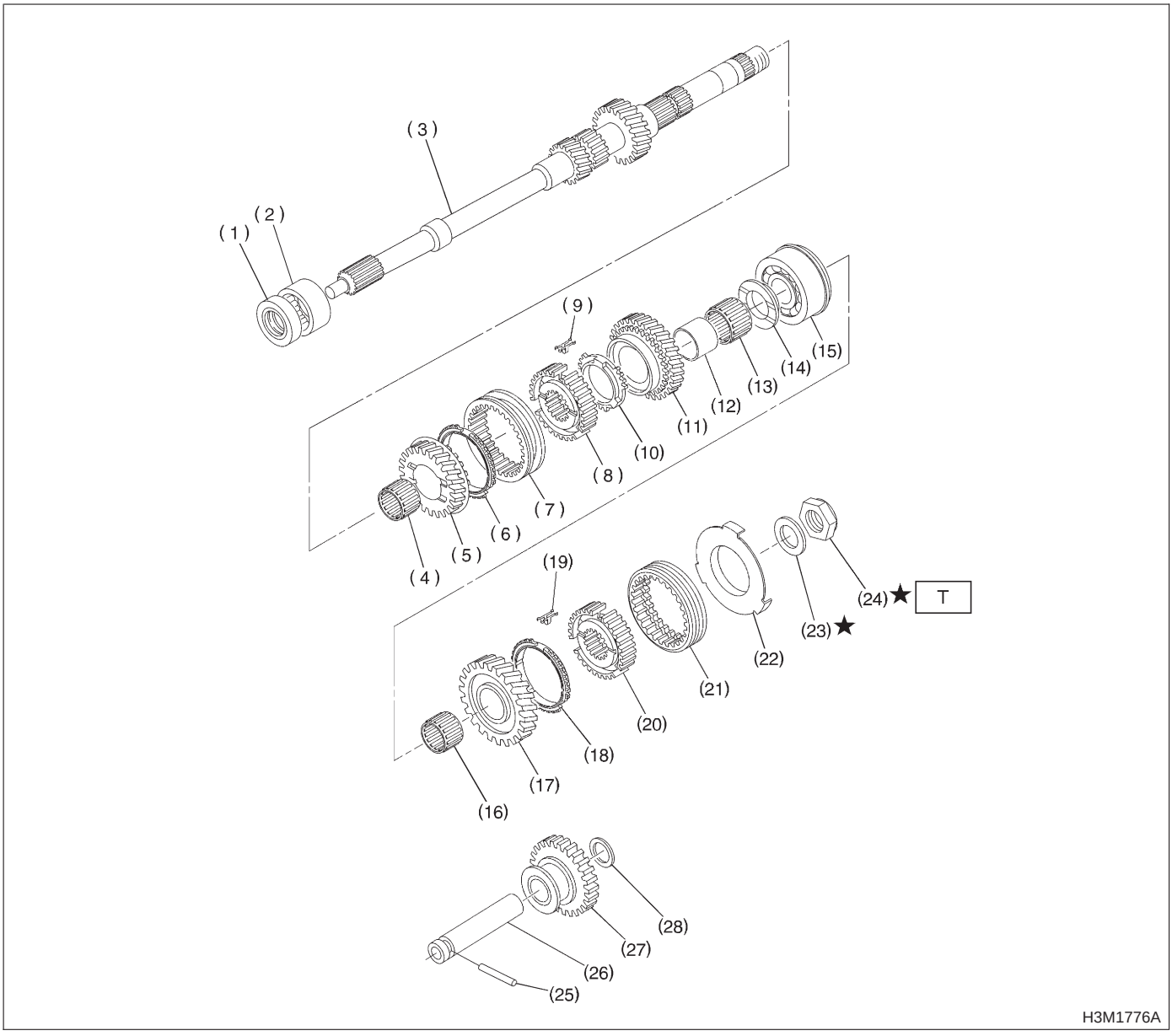


(1) Drive pinion shaft
(2) Roller bearing
(3) Washer
(4) Thrust bearing
(5) Needle bearing
(6) Driven shaft
(7) Key
(8) Woodruff key
(9) Drive pinion collar
(10) Needle bearing
(11) Snap ring (Outer)
(12) Washer
(13) Sub gear
(14) 1st driven gear
(15) Baulk ring
(16) 1st-2nd synchronizer hub
(17) Insert 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 (kg-m, ft-lb)
T1: 29±3 (3.0±0.3, 21.7±2.2)
T2: 118±8 (12.0±0.8, 86.8±5.8)
T3: 265±10 (27±1, 195±7)

3. Main Shaft Assembly

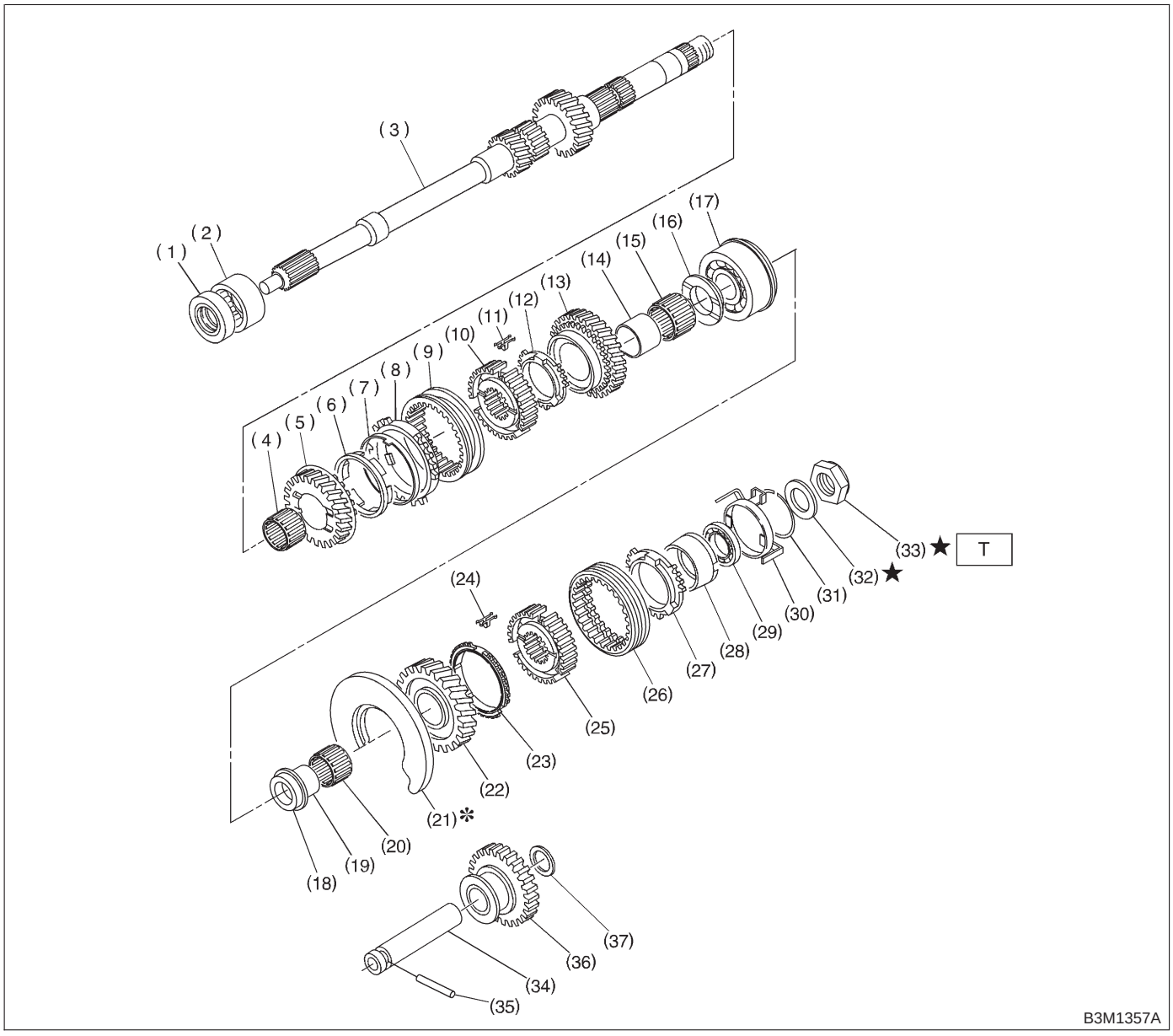
A: 2200 cc MODEL



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

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

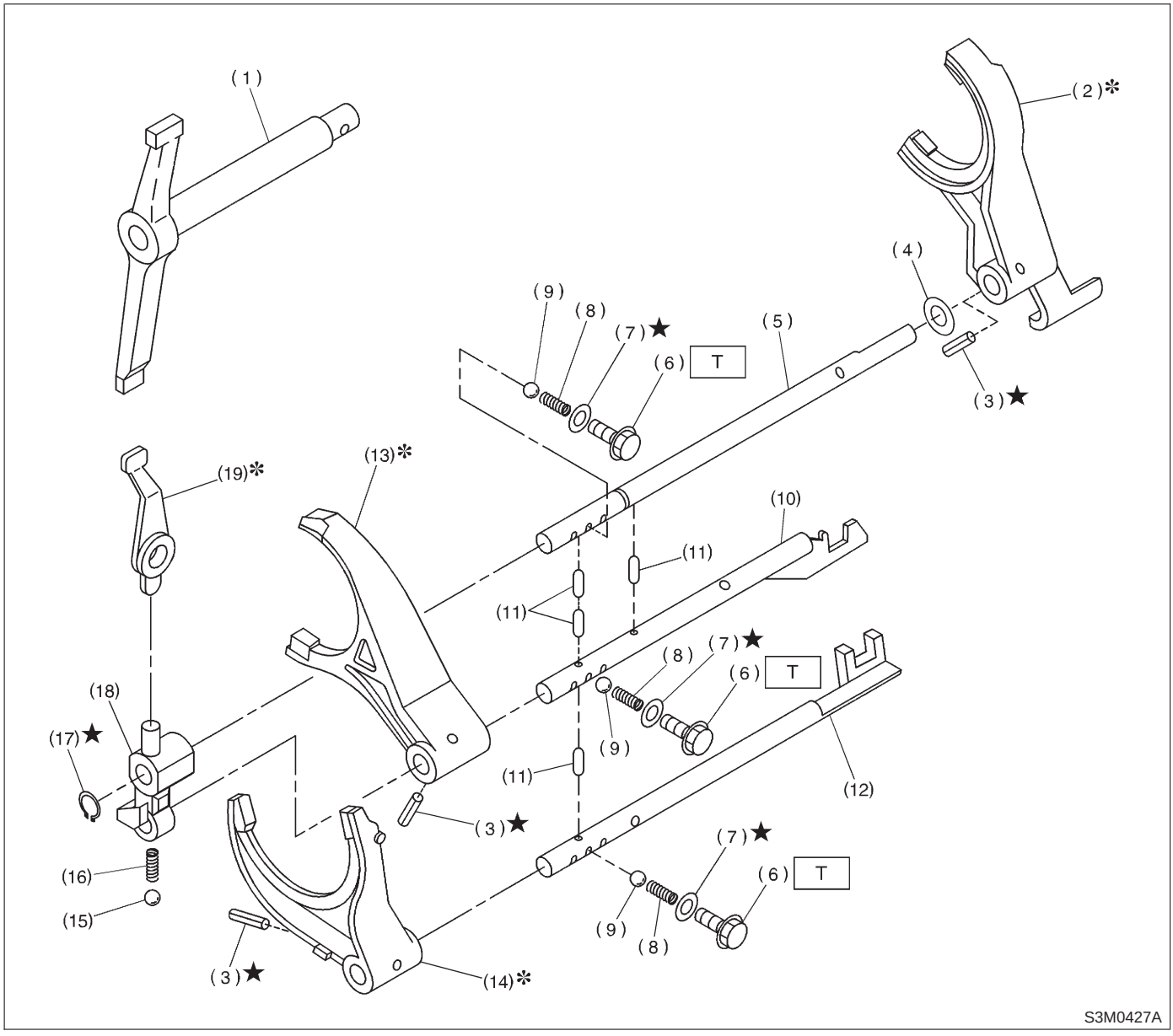
B: 2500 cc MODEL



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

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

4. Shifter Fork and Shifter Rod

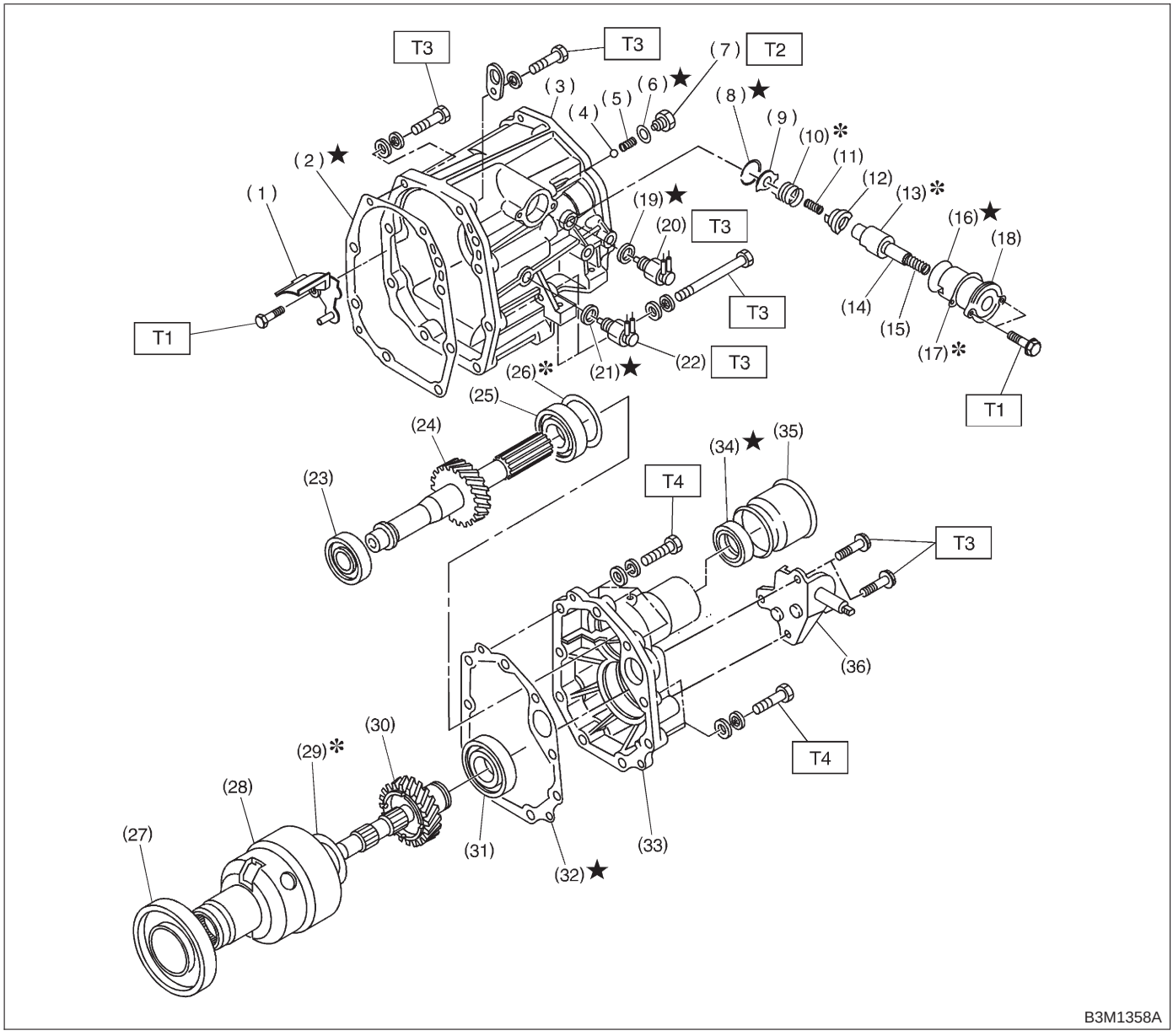


S3M0427A

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

Tightening torque: N·m (kg-m, ft-lb)
T: 19.6±1.5 (2.00±0.15, 14.5±1.1)

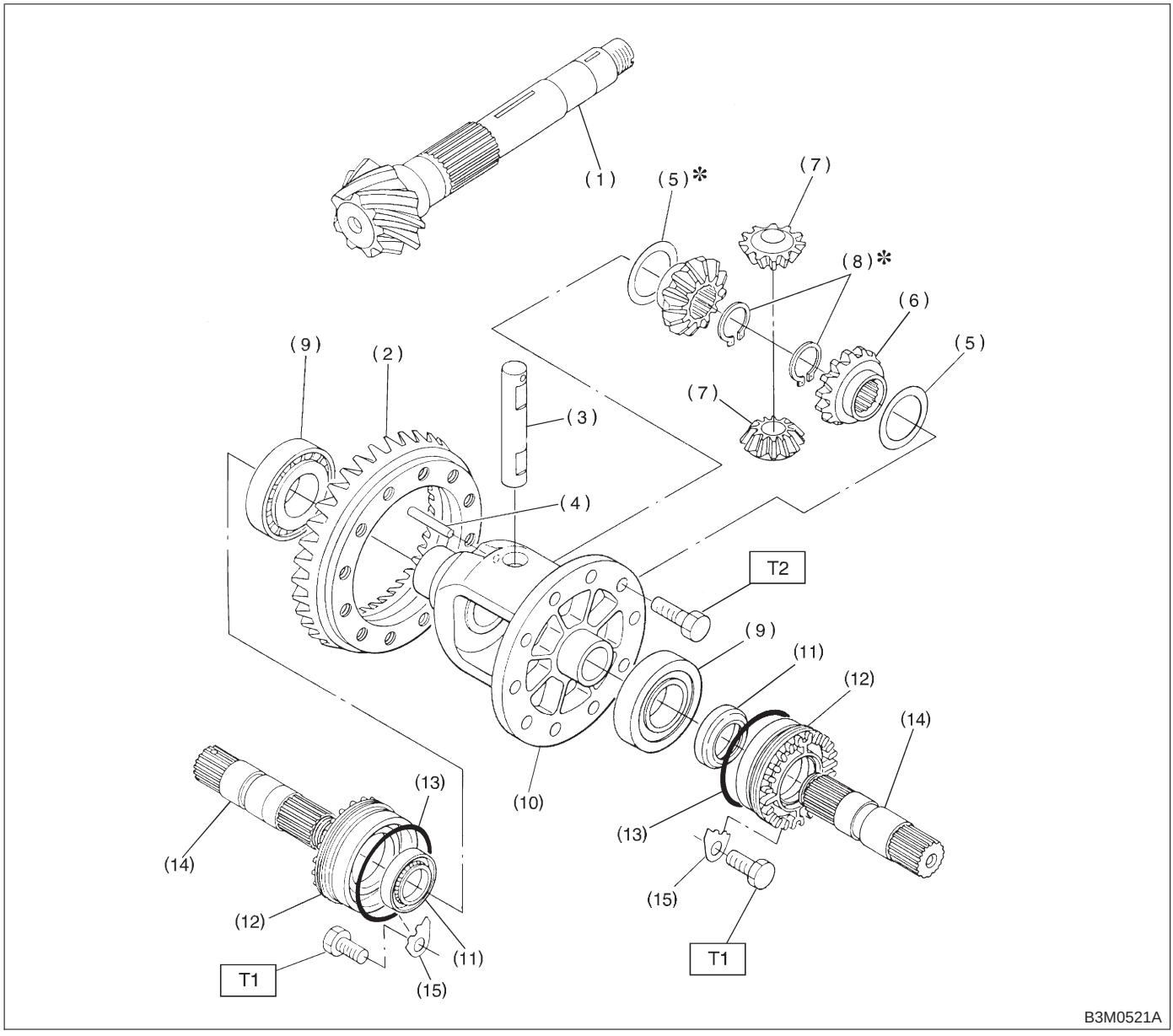
5. Transfer Case and Extension



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

Tightening torque: N·m (kg-m, ft-lb)
T1: 5±1 (0.5±0.1, 3.6±0.7)
T2: 10±1 (1.0±0.1, 7.2±0.7)
T3: 25±2 (2.5±0.2, 18.1±1.4)
T4: 37±3 (3.8±0.3, 27.5±2.2)

6. 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 (kg-m, ft-lb)
T1: 25±5 (2.5±0.5, 18.1±3.6)
T2: 62±5 (6.3±0.5, 45.6±3.6)

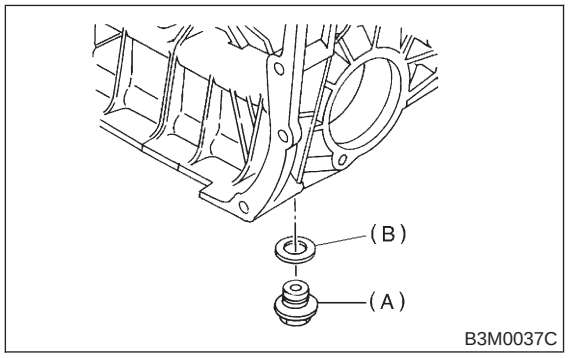
1. General

A: PRECAUTIONS

1) The following job should be followed before disassembly:
(1) Clean oil, grease, dirt and dust from transmission.
(2) Remove drain plug to drain oil. After draining, retighten it as before.

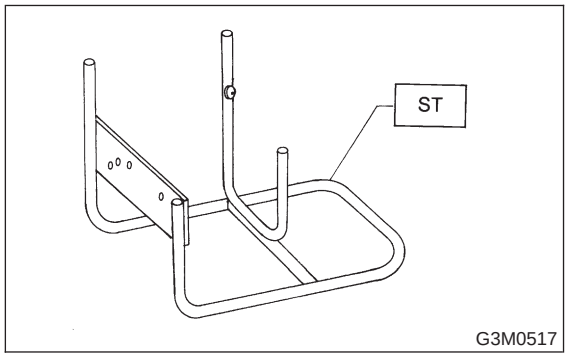
CAUTION:
Replace gasket with a new one.

Tightening torque:
44±3 N·m (4.5±0.3 kg-m, 32.5±2.2 ft-lb)



(A) Drain plug
(B) Washer

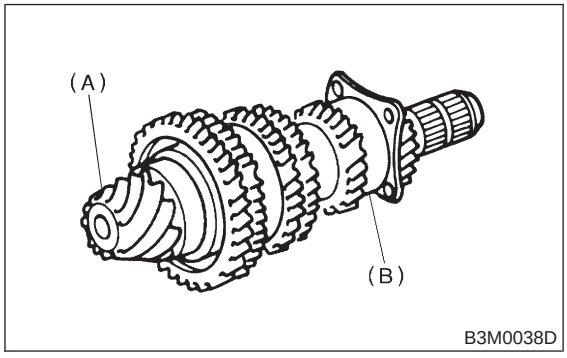
(3) Attach transmission to ST.
ST 499937100 TRANSMISSION STAND SET



2) Rotating parts should be coated with oil prior to assembly.
3) All disassembled parts, if to be reused, should be reinstalled in the original positions and directions.
4) Gaskets and lock washers must be replaced with new ones.
5) Liquid gasket should be used where specified to prevent leakage.
6) Fill transmission gear oil through the oil level gauge hole up to upper point level gauge. <Ref. to 1-5 [G10A1].>

B: INSPECTION

Disassembled parts should be washed clean first and then inspected carefully.
1) Bearings
Replace bearings in the following cases:
● Bearings whose balls, outer races and inner races are broken or rusty.
● Worn bearings
● Bearings that fail to turn smoothly or make abnormal noise when turned after gear oil lubrication.
● The ball bearing on the rear side of the drive pinion shaft should be checked for smooth rotation before the drive pinion assembly is disassembled. In this case, because a preload is working on the bearing, its rotation feels like it is slightly dragging unlike the other bearings.

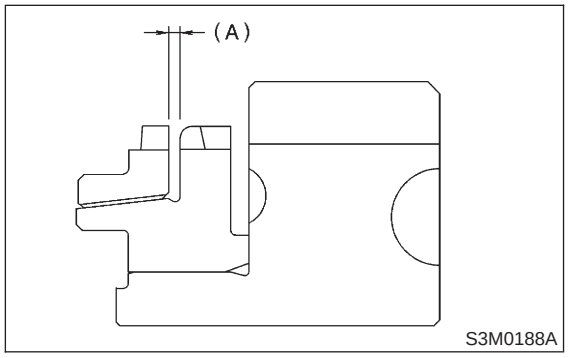


(A) Drive pinion shaft
(B) Ball bearing

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

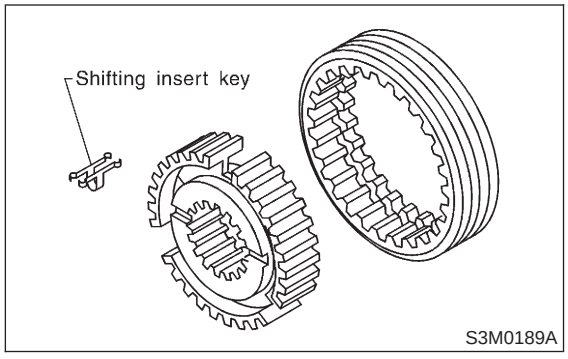
● If the gap between the end faces of the ring and the gear splined part is excessively small when the ring is pressed against the cone.

Clearance (A):
0.5 — 1.0 mm (0.020 — 0.040 in)



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

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



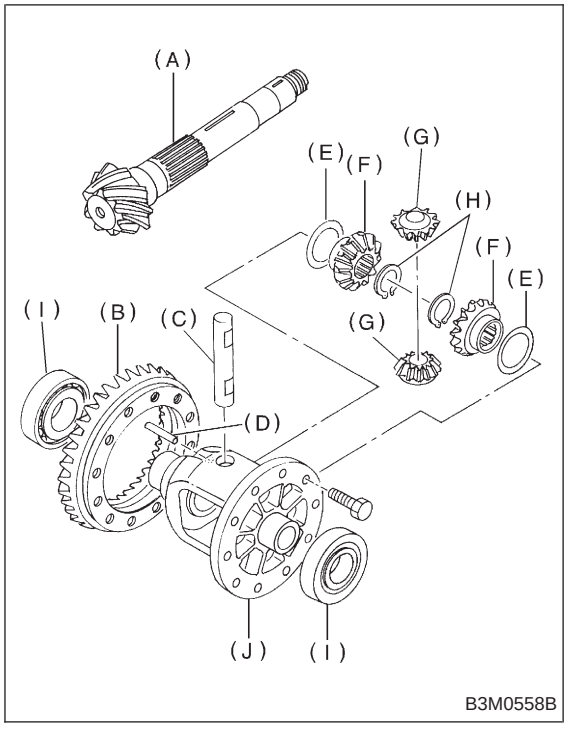
6) Oil seal
Replace the oil seal if the lip is deformed, hardened, damaged, worn, or defective in any way.

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

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

9) Differential gear
Repair or replace the differential gear in the following cases:

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

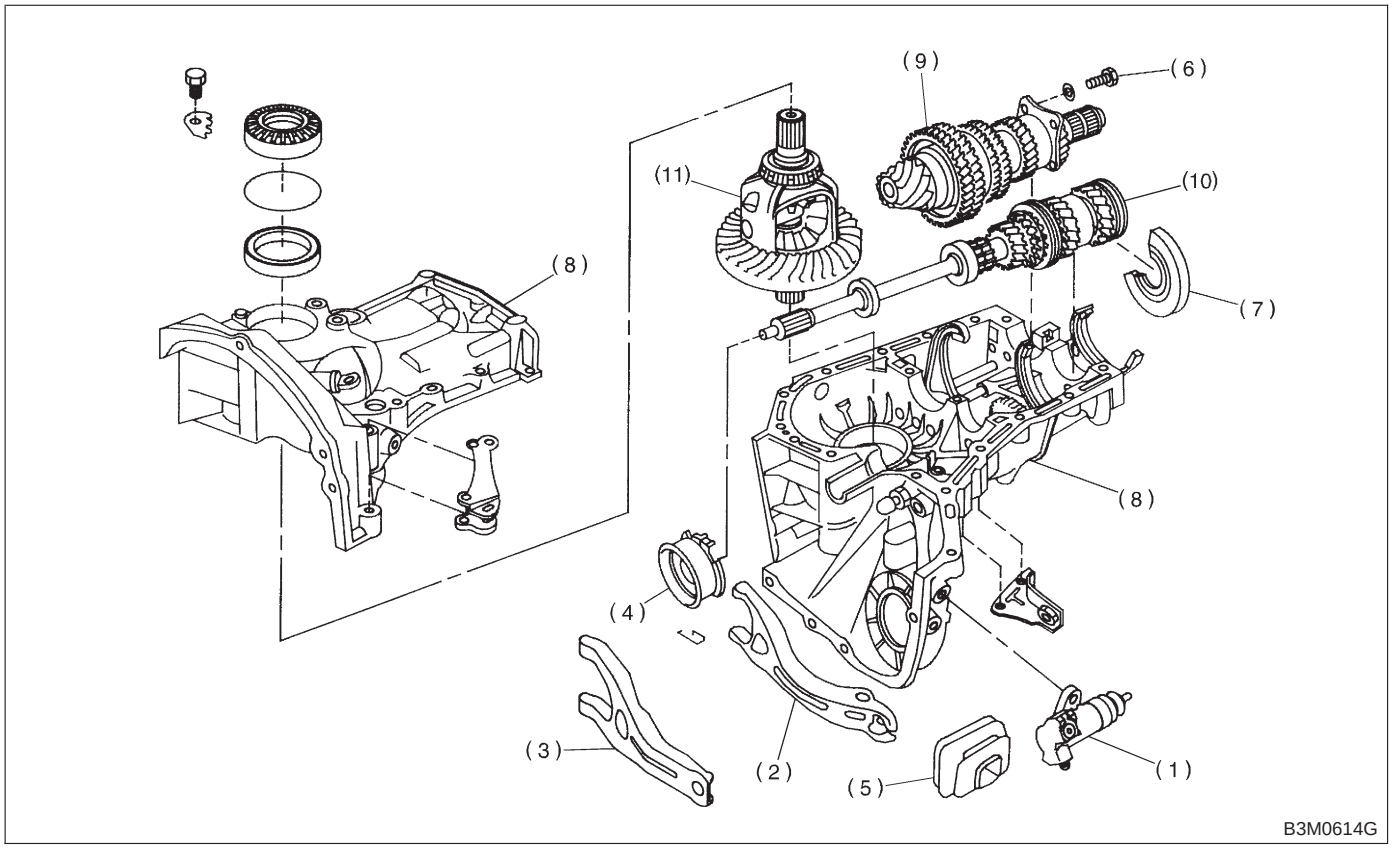


(A) Drive pinion shaft
(B) Hypoid driven gear
(C) Pinion shaft
(D) Straight pin
(E) Washer
(F) Differential bevel gear
(G) Differential bevel pinion
(H) Snap ring
(I) Roller bearing
(J) Differential case

2. Transmission Case

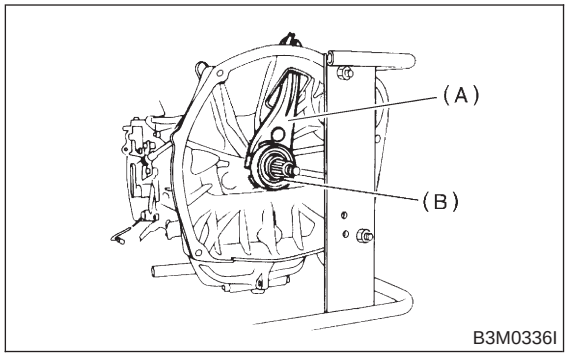
A: DISASSEMBLY

1. SEPARATION OF TRANSMISSION



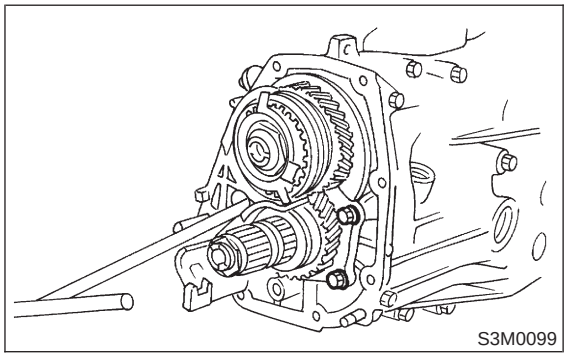
(1) Operating cylinder (2500 cc model)
(2) Release lever (2200 cc model)
(3) Release lever (2500 cc model)
(4) Release bearing
(5) Release lever sealing
(6) Bolt
(7) Main shaft rear plate
(8) Transmission case
(9) Drive pinion ASSY
(10) Main shaft ASSY
(11) Front differential

1) Remove clutch release lever. <Ref. to 2-10 [W3A0].>
2) Remove transfer case assembly. <Ref. to 3-1 [W5A0].>

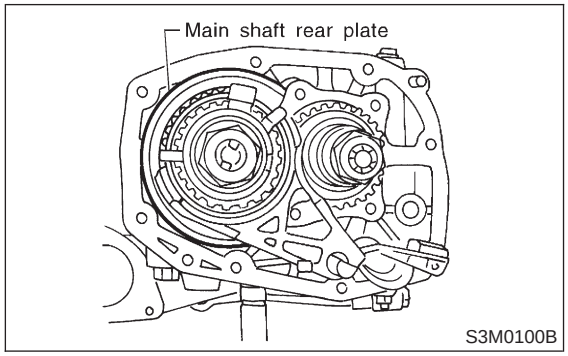


(A) Clutch release lever
(B) Release bearing

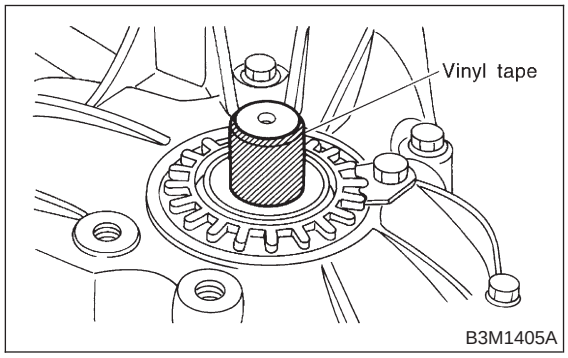
3) Remove bearing mounting bolts.



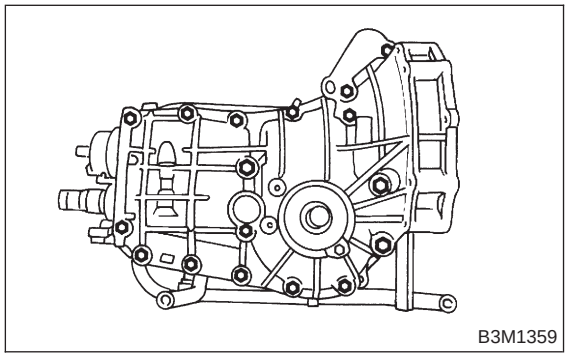
4) Remove main shaft rear plate.



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

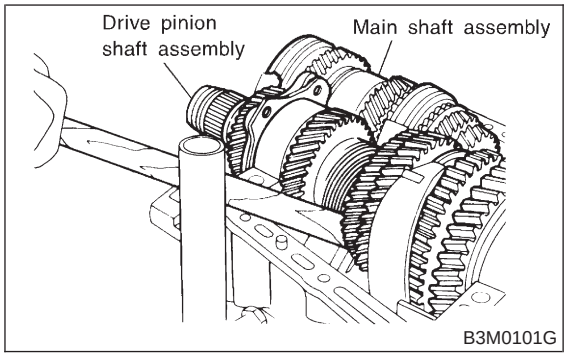


6) Separate transmission case into right and left cases by loosening seventeen coupling bolts and nuts.



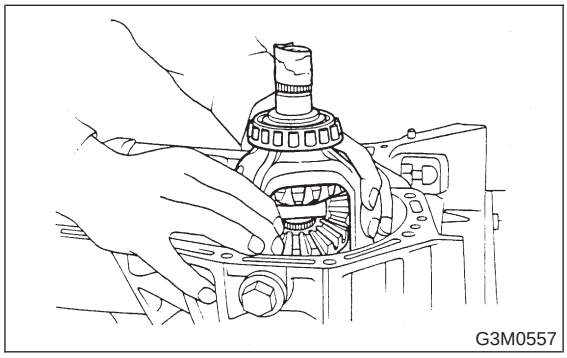
7) Remove drive pinion shaft assembly from left side transmission case.

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

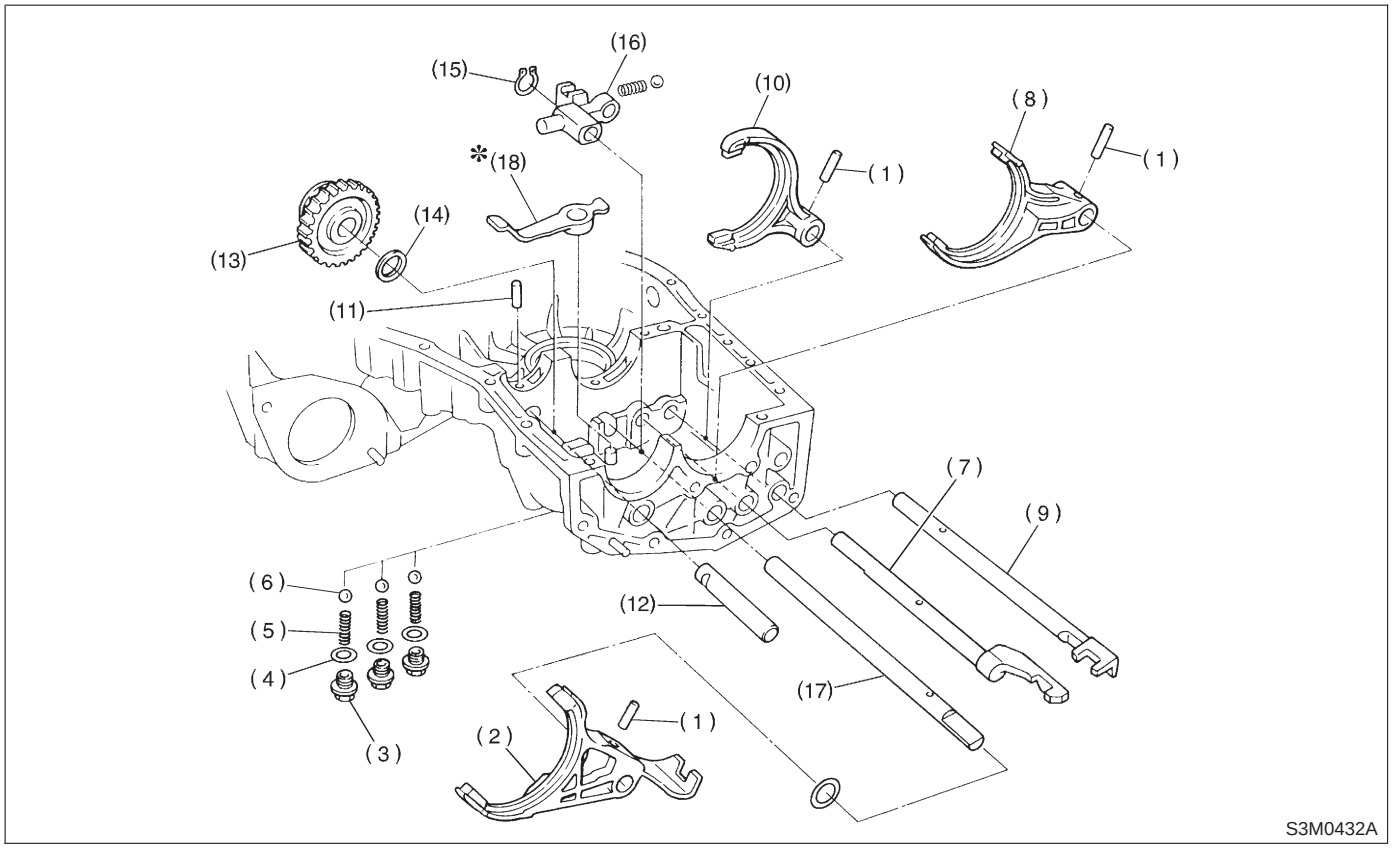


8) Remove main shaft assembly.
9) Remove differential assembly.

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

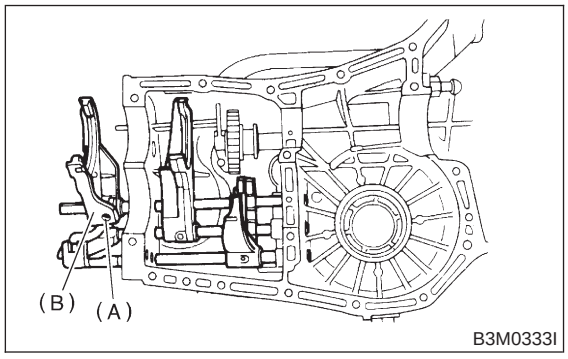


2. TRANSMISSION CASE



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

1) Drive out straight pin with ST, and remove 5th shifter fork.
ST 398791700 STRAIGHT PIN REMOVER

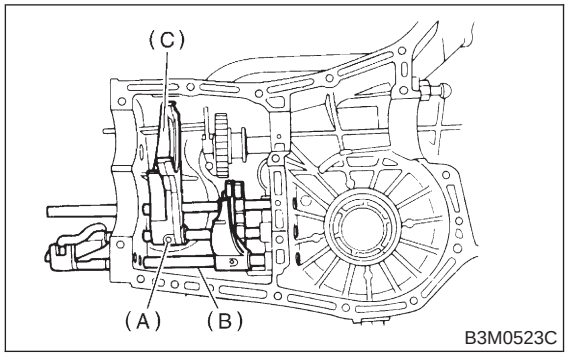


(A) Straight pin
(B) 5th shifter fork

2) Remove plugs, springs and checking balls.

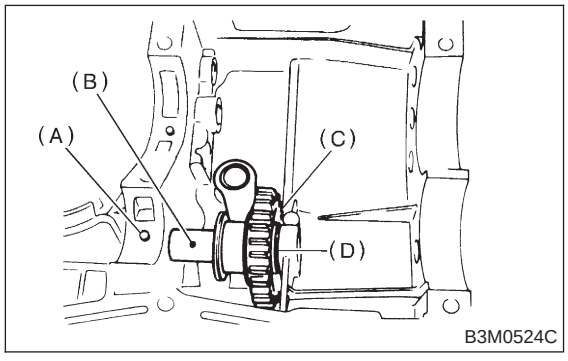
3) Drive out straight pin, and pull out 3-4 fork rod and shifter fork.

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



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

4) Drive out straight pin, and pull out 1-2 fork rod and shifter fork.
5) Pull out straight pin, and remove idler gear shaft, reverse idler gear and washer.

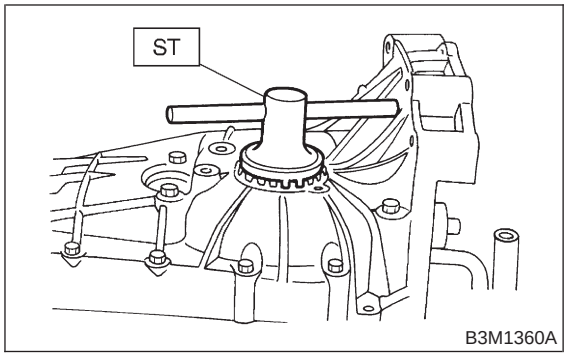


(A) Straight pin
(B) Idler gear shaft
(C) Idler gear
(D) Washer

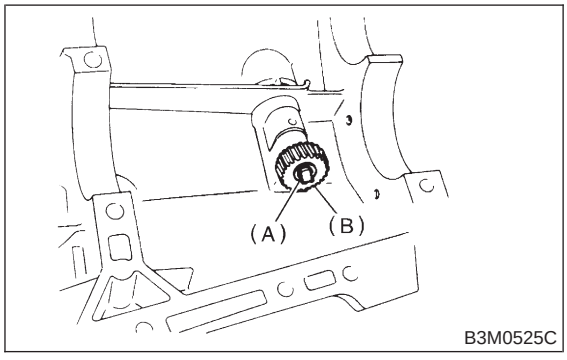
6) Remove outer snap ring, and pull out reverse shifter rod arm from reverse fork rod. Then take out ball, spring and interlock plunger from rod.
And then remove rod.

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

7) Remove reverse shifter lever.
8) Remove differential side retainers using ST.
ST 499787000 WRENCH ASSY



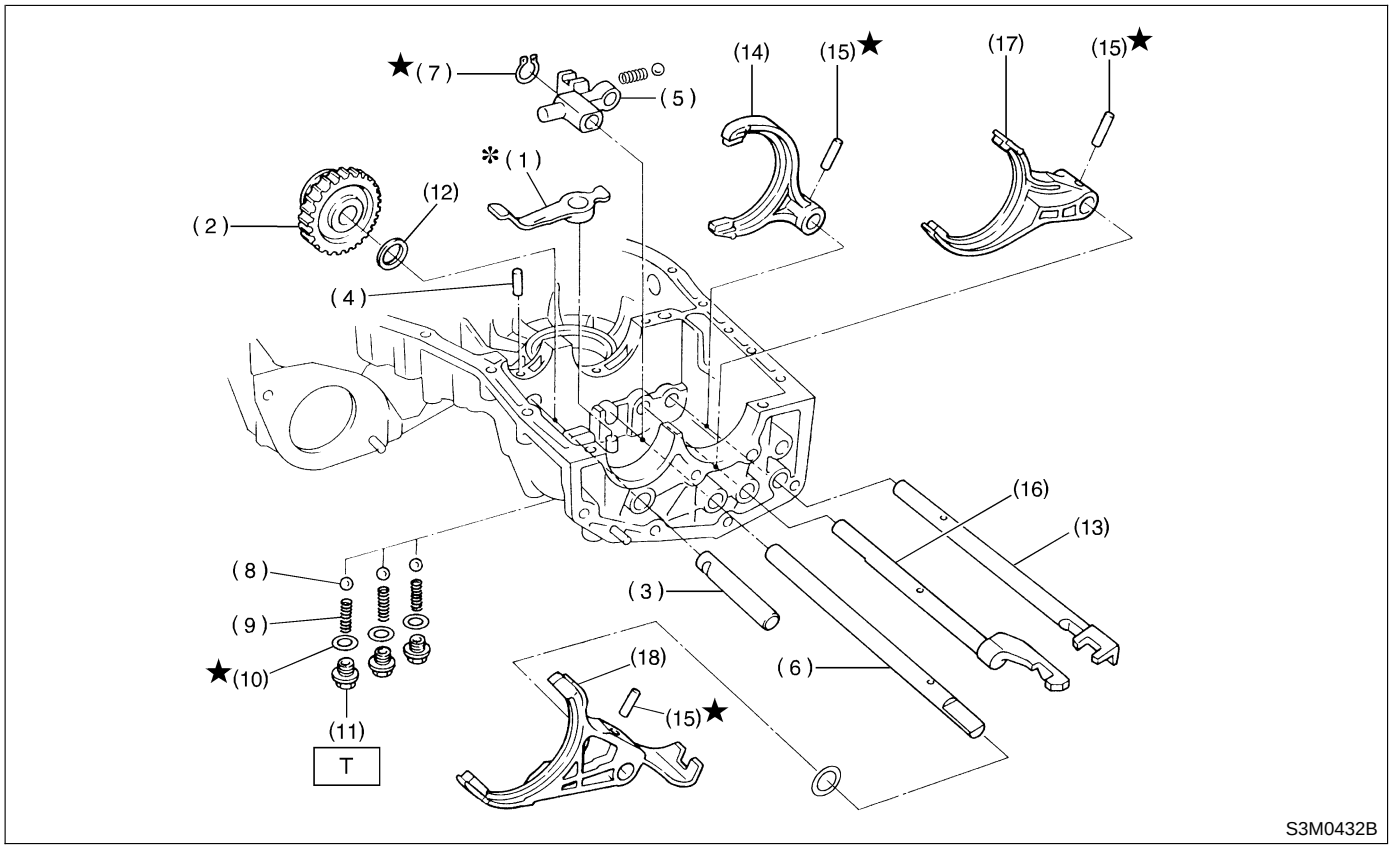
9) Remove outer snap ring and pull out speedometer driven gear. Next, remove vehicle speed sensor 2, oil seal, speedometer shaft and washer.



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

B: ASSEMBLY

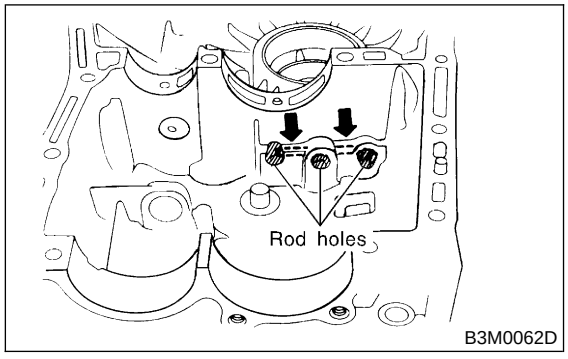
1. TRANSMISSION CASE



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

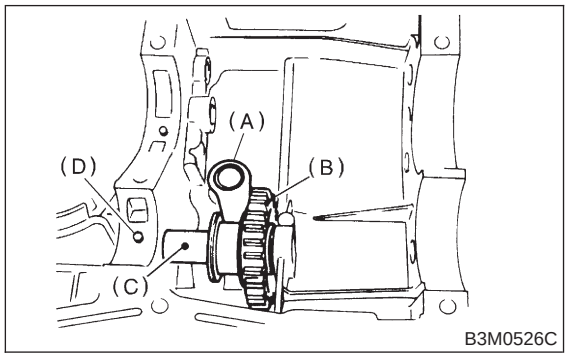
Tightening torque: N·m (kg-m, ft-lb)
T: 19.6±0.1 (2.00±0.015, 14.5±0.1)

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



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

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



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

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

CAUTION:
Apply grease to plunger to prevent it from falling.

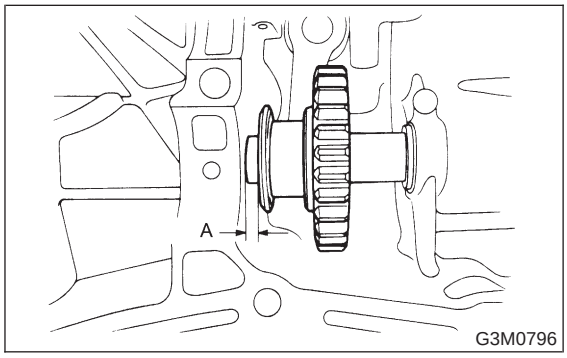
ST 399411700 ACCENT BALL INSTALLER

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

CAUTION:
Replace gasket with a new one.

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

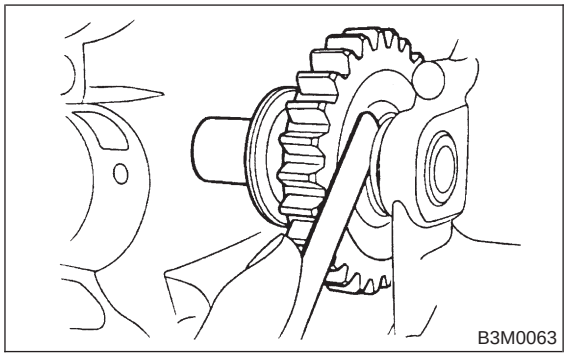
Clearance A:
6.0 — 7.5 mm (0.236 — 0.295 in)



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

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

Clearance:
0 — 0.5 mm (0 — 0.020 in)



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

7) Install 1-2 fork rod into 1-2 shifter fork via the hole on the rear of transmission case.
8) Align the holes in rod and fork, and drive straight pin (6 × 22) into these holes using ST.
ST 398791700 STRAIGHT PIN REMOVER

CAUTION:
Replace straight pin with a new one.

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

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

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

10) Install 3-4 fork rod into 3-4 shifter fork via the hole on the rear of transmission case.
11) Align the holes in rod and fork, and drive straight pin (6 × 22) into these holes.
ST 398791700 STRAIGHT PIN REMOVER

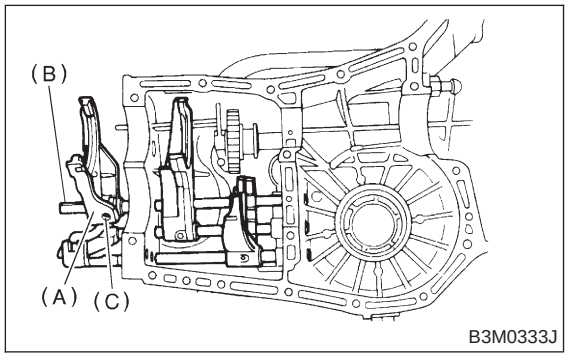
CAUTION:
Replace straight pin with a new one.

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

12) 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.

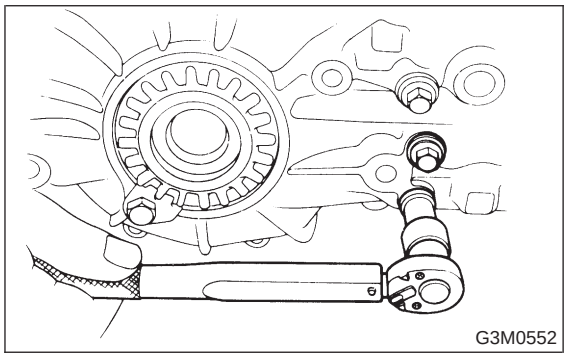
ST 398791700 STRAIGHT PIN REMOVER



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

13) 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.



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

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

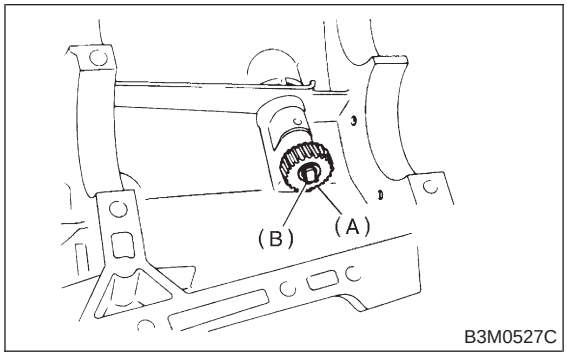
ST 899824100 or 499827000 PRESS
15) Install vehicle speed sensor 2.

CAUTION:
Use new vehicle speed sensor 2, if it has been removed.

Tightening torque:
5.9±1.5 N·m (60±15 kg-cm, 52±13 in-lb)

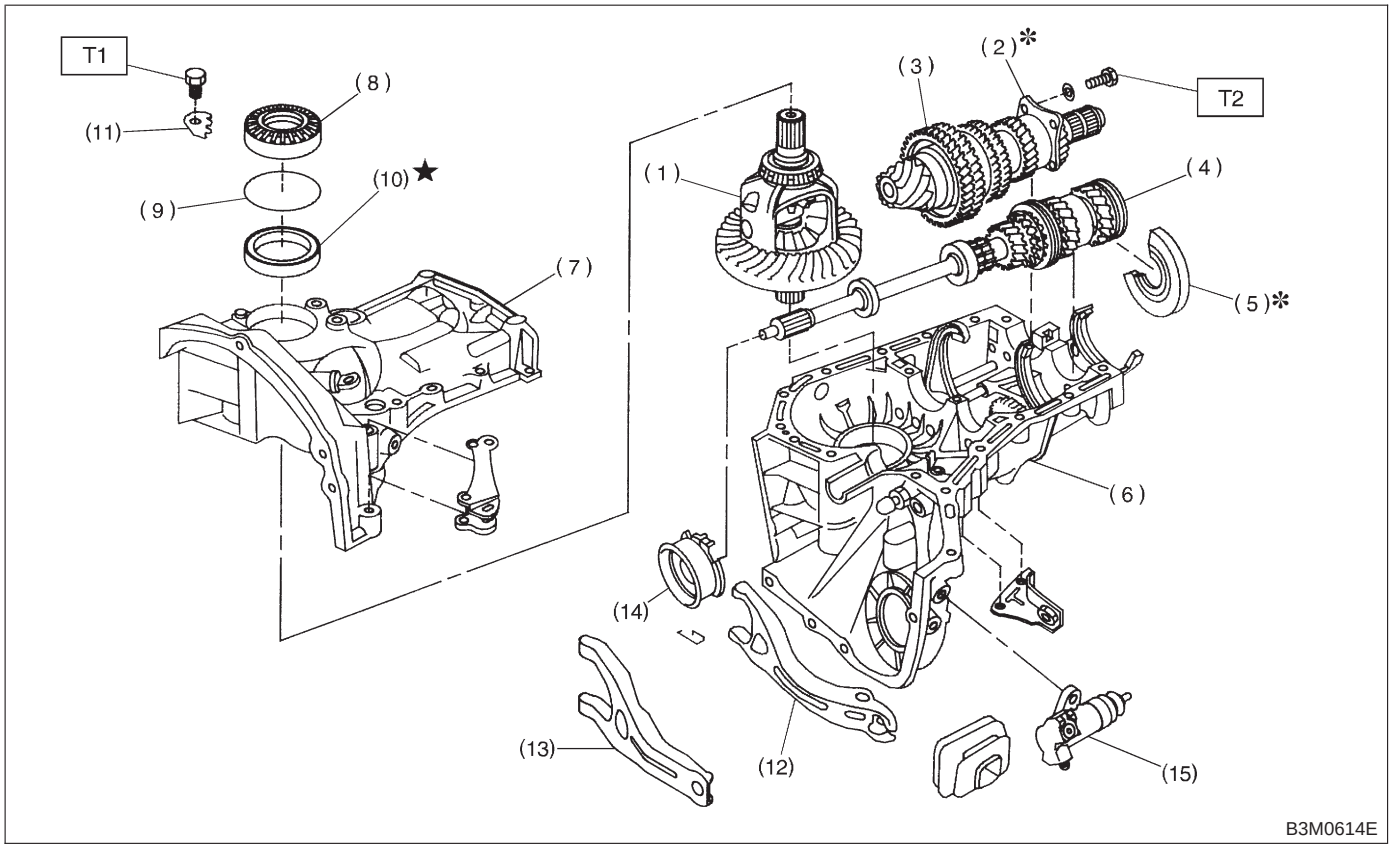
16) Install speedometer driven gear and snap ring.

CAUTION:
Use a new snap ring, if it has been removed.



(A) Speedometer driven gear
(B) Snap ring

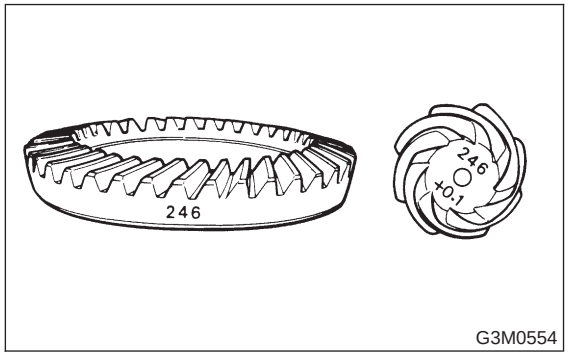
2. COMBINATION OF TRANSMISSION CASE



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

Tightening torque: N·m (kg-m, ft-lb)
T1: 25 (2.5, 18)
T2: 29±3 (3.0±0.3, 21.7±2.2)

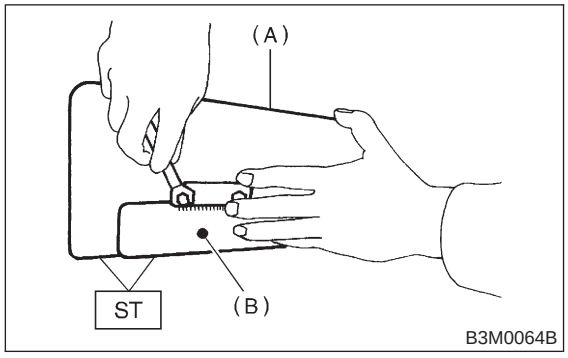
1) Alignment marks/numbers on hypoid gear set
The upper number on driven pinion is the match number for combining it with hypoid driven gear. The lower number is for shim adjustment. If no lower number is shown, the value is zero. The number on hypoid driven gear indicates a number for combination with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



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

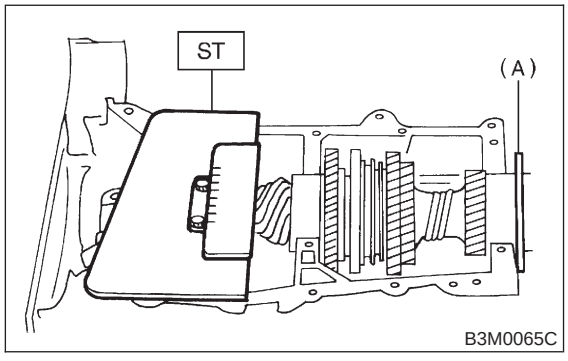
3) Inspection and adjustment of ST

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

4) Position the ST by inserting the knock pin of ST into the knock hole in the transmission case.
ST 499917500 DRIVE PINION GAUGE ASSY
5) 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.

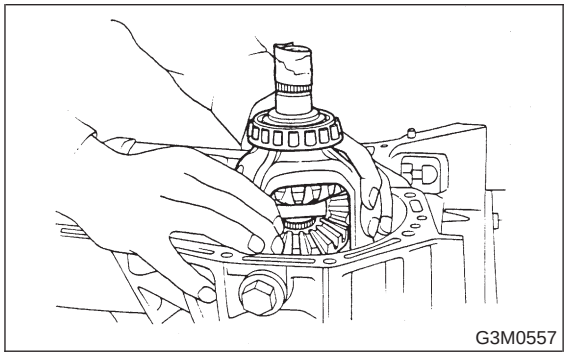
6) The thickness of shim shall be determined by adding the value indicated on drive pinion to the value indicated on the ST. (Add if the number on drive pinion is prefixed by + and subtract if the number is prefixed by −.)
ST 499917500 DRIVE PINION GAUGE ASSY
7) Select one to three shims from the next 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)

8) Install differential assembly on left hand transmission case.

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

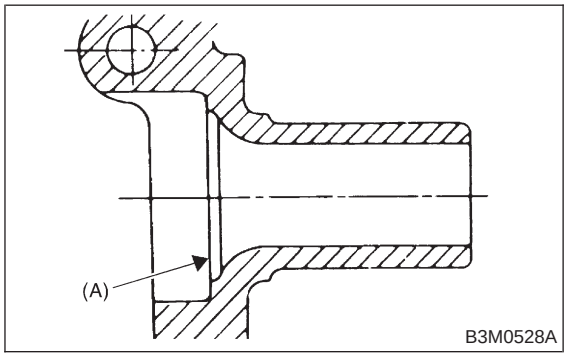
NOTE:
Wrap the left and right splined sections of axle shaft with vinyl tape to prevent scratches.



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

CAUTION:
● Wrap clutch splined section with vinyl tape to prevent damage to oil seal.
● Apply grease (Unilube #2 or equivalent) to the sealing lip of oil seal.
● Use a new oil seal.

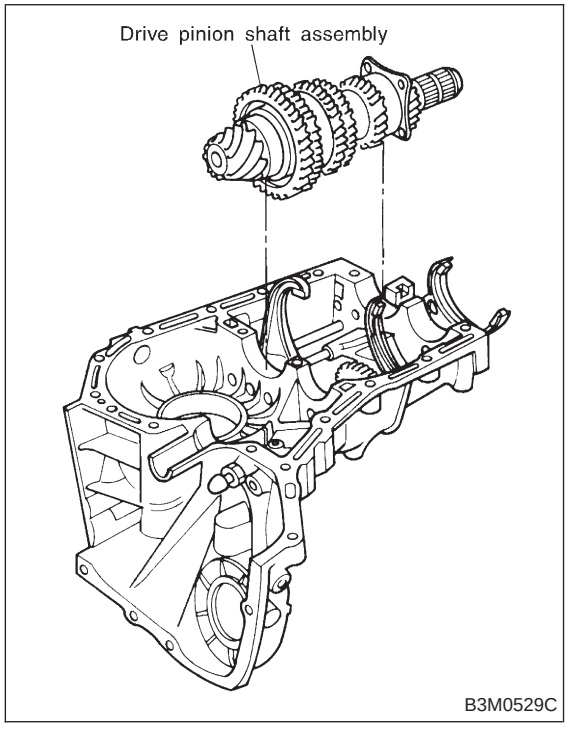
NOTE:
● Align the end face of seal with surface A of left side transmission main case when installing oil seal.



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

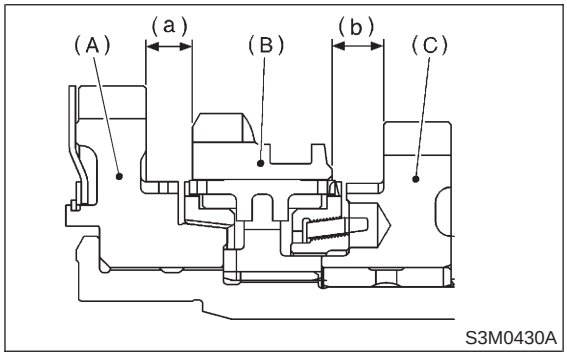
10) Install drive pinion shaft assembly with shims selected before into transmission case.

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



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

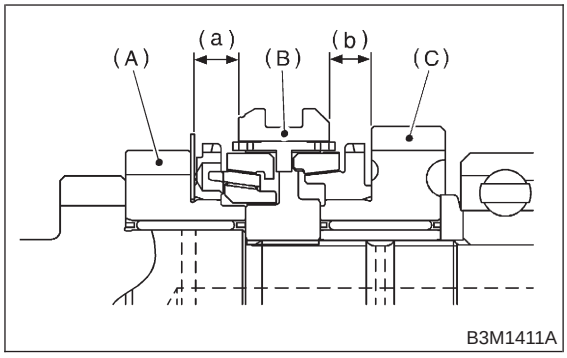
1st driven gear to reverse driven gear
Clearance (a): 9.5 mm (0.374 in)
Reverse driven gear to 2nd driven gear
Clearance (b): 9.5 mm (0.374 in)



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

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

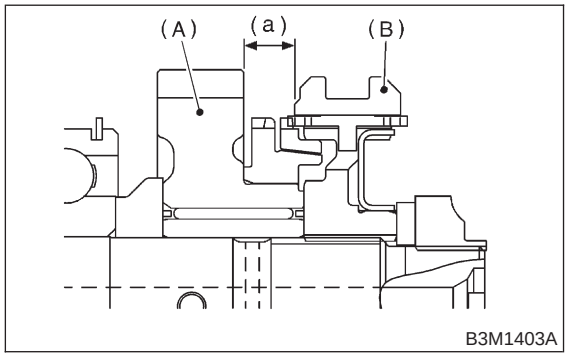
3rd-4th gear to coupling sleeve
Clearance (a): 9.3 mm (0.366 in)
Coupling sleeve to 4th driven gear
Clearance (b): 9.3 mm (0.366 in)



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

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

5th driven gear to coupling sleeve
Clearance (a): 9.3 mm (0.366 in)

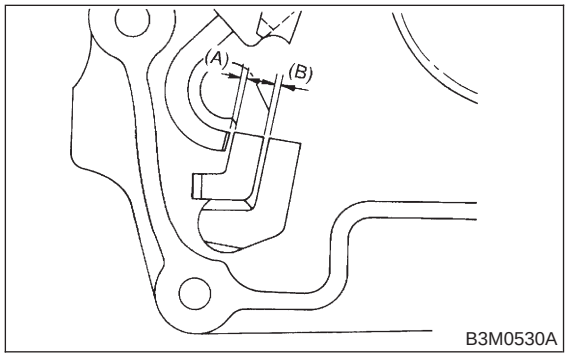


(A) 5th driven gear
(B) Coupling sleeve

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

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

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



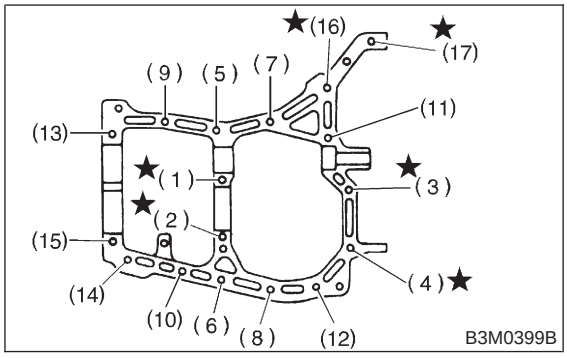
13) Wipe off grease, oil and dust on the mating surfaces of transmission cases with white gasoline, and apply liquid gasket, and then put case right side and left side together.

Liquid gasket:
THREE BOND 1215 or equivalent

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

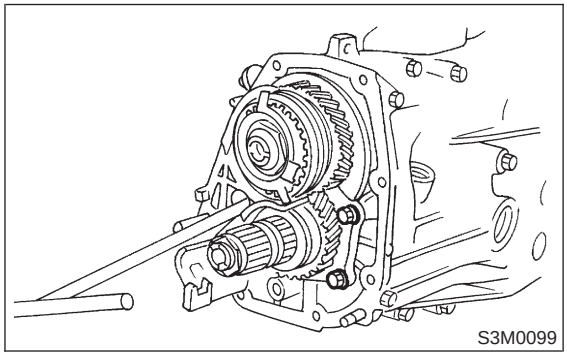
NOTE:
- Insert bolts from the bottom and tighten nuts at the top.
- Put cases together so that drive pinion shim and input shaft holder shim are not caught up in between.
- Confirm that speedometer gear is meshed.

Tightening torque:
8 mm bolt
25±2 N·m (2.5±0.2 kg-m, 18.1±1.4 ft-lb)
★ ***10 mm bolt***
39±3 N·m (4.0±0.3 kg-m, 28.9±2.2 ft-lb)



15) Tighten ball bearing attachment bolts.

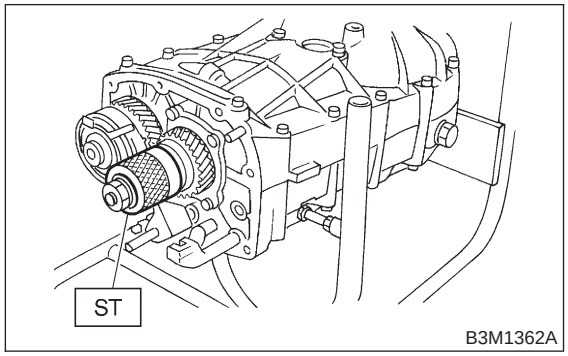
Tightening torque:
29±3 N·m (3.0±0.3 kg-m, 21.7±2.2 ft-lb)



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

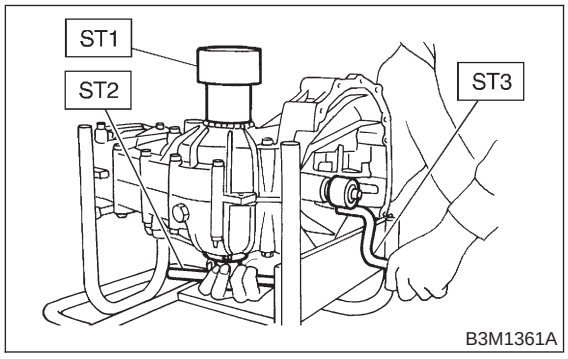
NOTE:
Support drive pinion assembly with ST.

ST 498427100 STOPPER



17) Place the transmission with case left side facing downward and put ST1 on bearing cup.
18) 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.

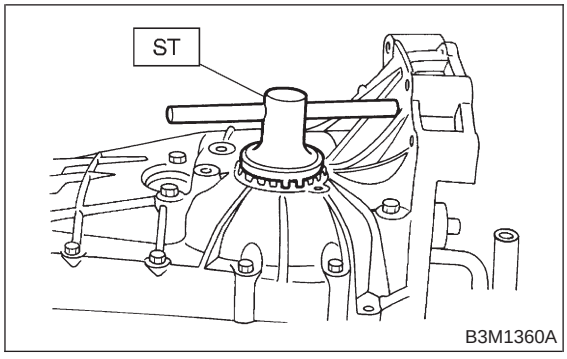
ST1 399780104 WEIGHT
ST2 499787000 WRENCH ASSY
ST3 499927100 HANDLE



19) 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



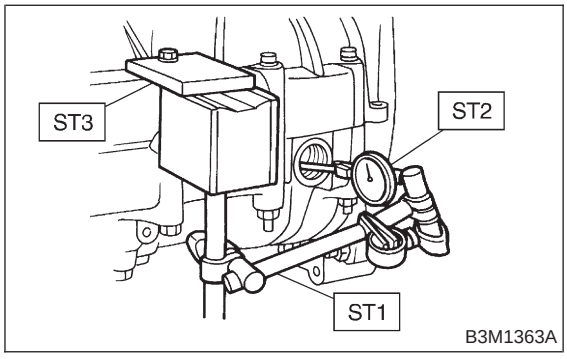
20) Fit lock plate. Loosen the retainer on the lower side by 1-1/2 notches of lock plate and turn in the retainer on the upper side by the same amount in order to obtain the backlash.

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

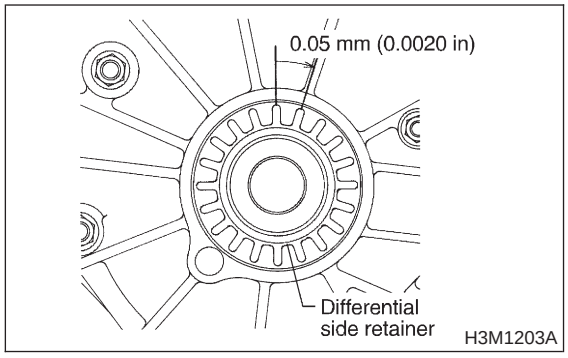
21) Turn in the retainer on the upper side additionally by 1 notch in order to apply preload on taper roller bearing.
22) Tighten temporarily both the upper and lower lock plates and mark both holder and lock plate for later readjustment.
23) Turn transmission main shaft several times while tapping around retainer lightly with plastic hammer.
24) Set ST1 and ST2. Insert the needle through transmission oil drain plug hole so that the needle comes in contact with the tooth surface at a right angle and check the backlash.

ST1 498247001 MAGNET BASE
ST2 498247100 DIAL GAUGE
ST3 498255400 PLATE

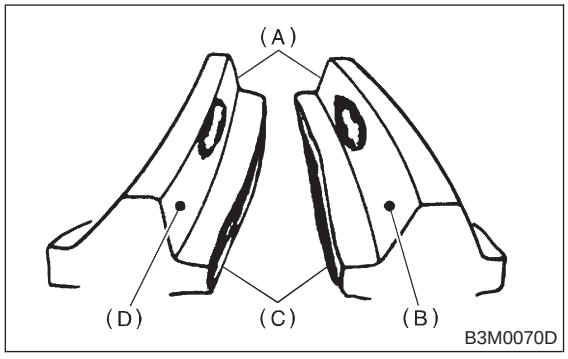
Backlash:
0.13 — 0.18 mm (0.0051 — 0.0071 in)



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

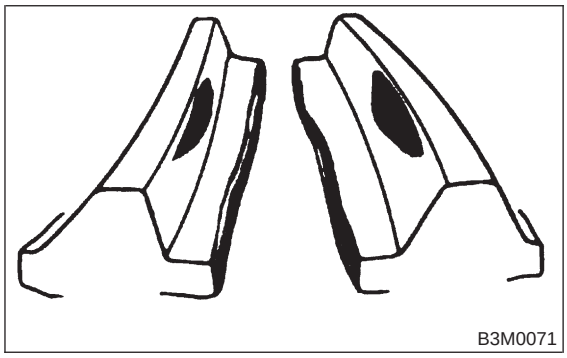


25) Check tooth contact of hypoid gear as follows: Apply a uniform thin coat of red lead on both tooth surfaces of 3 or 4 teeth of the hypoid gear. Move the hypoid gear back and forth by turning the transmission main shaft until a definite contact pattern is developed on hypoid gear, and judge whether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

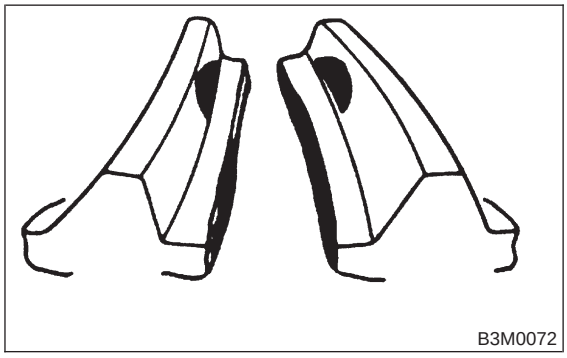


(A) Toe
(B) Coast side
(C) Heel
(D) Drive side

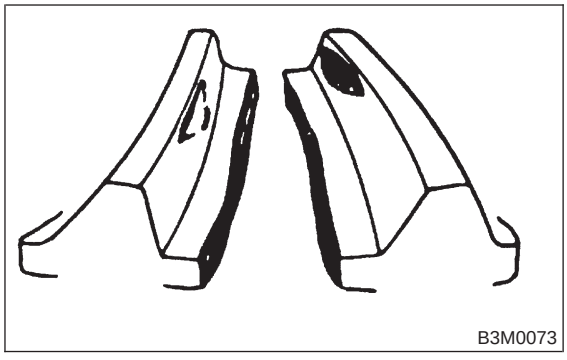
● Backlash is excessive.
To reduce backlash, loosen holder on the upper side (case right side) and turn in the holder on the lower side (case left side) by the same amount.



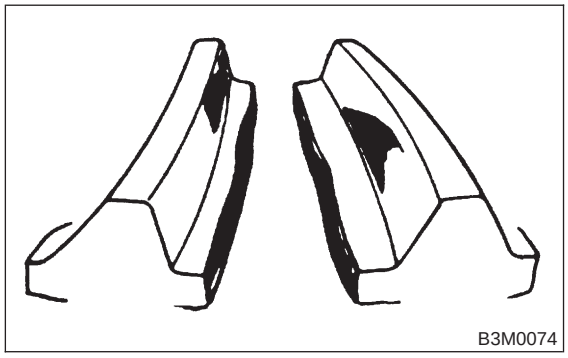
● Backlash is insufficient.
To increase backlash, loosen holder on the lower side (case left side) and turn in the holder on the upper side (case right side) by the same amount.



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



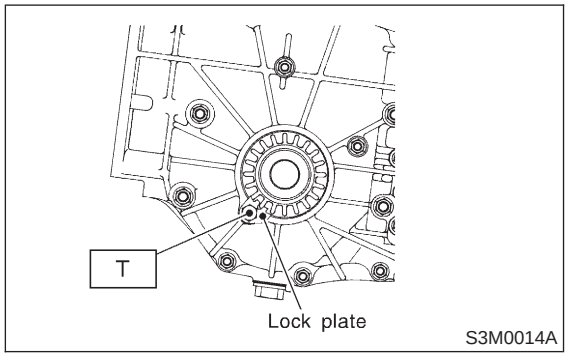
● The drive pinion shim selected before is too thin. Increase its thickness.


B3M0074

26) 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±3 N·m (2.5±0.3 kg-m, 18.1±2.2 ft-lb)

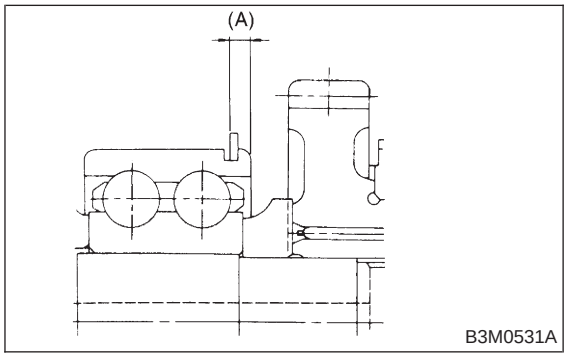


S3M0014A

27) Selecting of main shaft rear plate
Using ST, measure the amount (A) of ball bearing protrusion from transmission main case surface and select the proper plate in the following table:
ST 498147000 DEPTH GAUGE

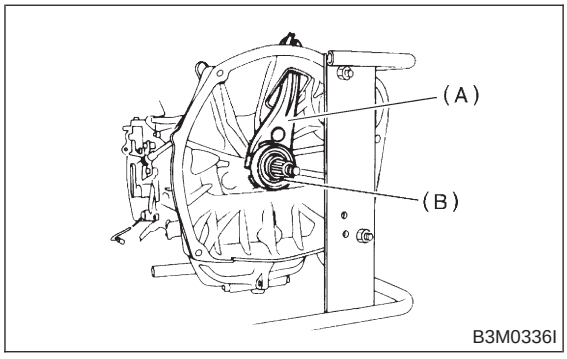
NOTE:
Before measuring, tap the end of main shaft with a plastic hammer lightly in order to make the clearance zero between the main case surface and the moving flange of bearing.

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

28) Install clutch release lever and bearing. <Ref. to 2-10 [W3C0].>



B3M0336I

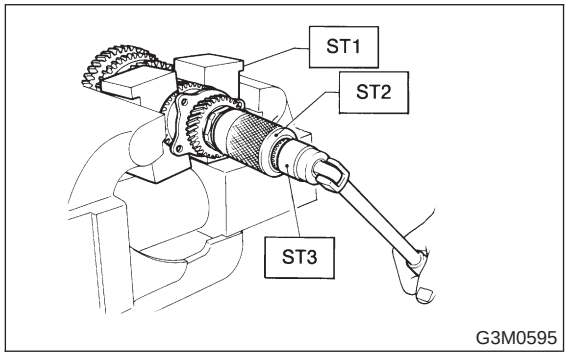
(A) Clutch release lever
(B) Release bearing

3. Drive Pinion Assembly

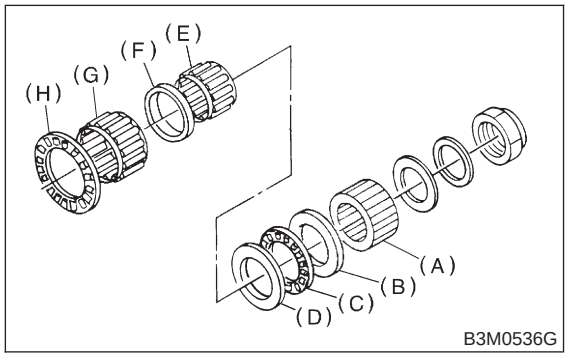
A: DISASSEMBLY

1. DRIVE PINION SHAFT

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



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

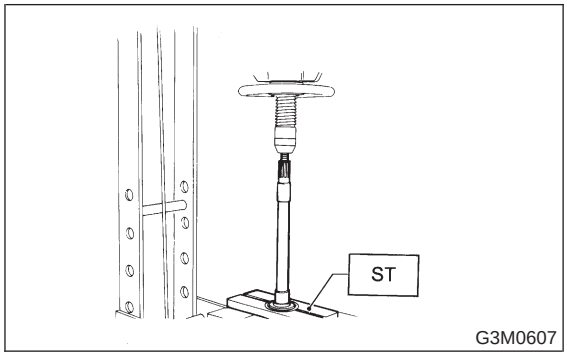


(A) Differential bevel gear sleeve
(B) Washer No. 1 (25 × 37.5 × t)
(C) Thrust bearing (25 × 37.5 × 3)
(D) Washer No. 2 (25 × 37.5 × 4)
(E) Needle bearing (25 × 30 × 20)
(F) Drive pinion collar
(G) Needle bearing (30 × 37 × 23)
(H) Thrust bearing (33 × 50 × 3)

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

CAUTION:
Do not reuse roller bearing.

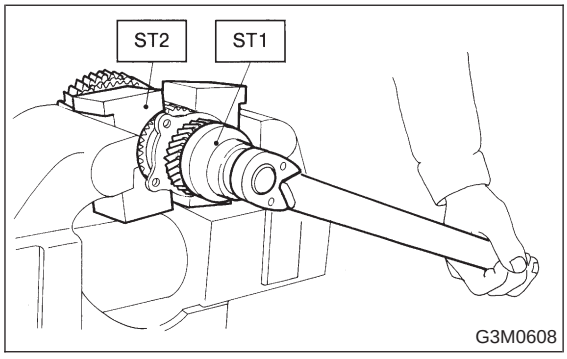
ST 498077000 REMOVER



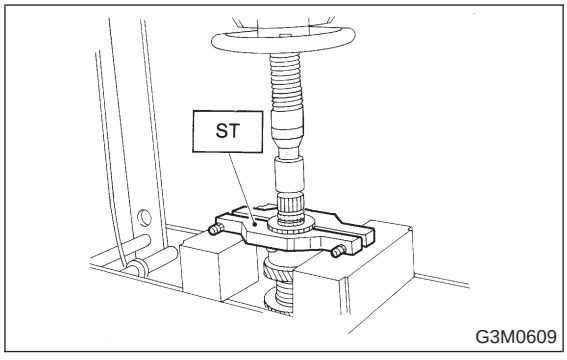
2. DRIVEN GEAR ASSEMBLY (2200 cc MODEL)

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

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

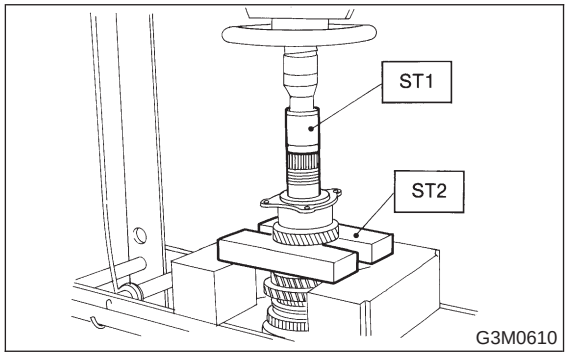


2) Remove 5th driven gear using ST.
ST 499857000 5TH DRIVEN GEAR REMOVER

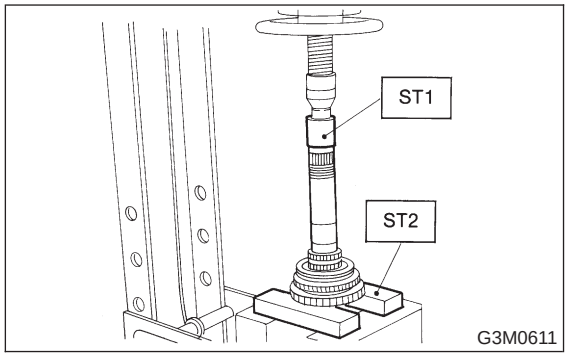


3) Remove woodruff key.

4) Remove roller bearing (42 × 74 × 40), 3rd and 4th driven gear using ST1 and ST2.
ST1 499757002 SNAP RING PRESS
ST2 899714110 REMOVER



5) Remove the key.
6) Remove 2nd driven gear assembly.
7) Remove 1st driven gear, 2nd gear bushing, gear and hub using ST1 and ST2.
Replace gear and hub if necessary. Do not attempt to disassemble if at all possible because they must engage at a specified point. If they have to be disassembled, mark the engaging point beforehand.
ST1 499757002 SNAP RING PRESS
ST2 899714110 REMOVER

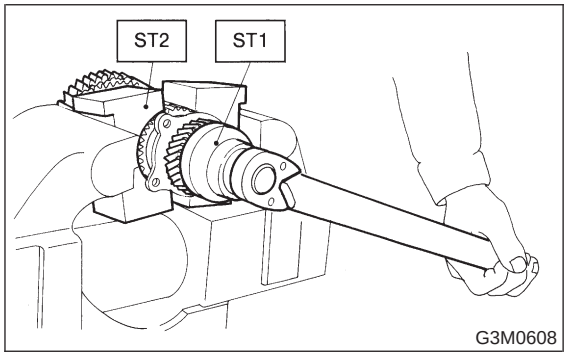


8) Remove sub gears for 1st and 2nd driven gear.

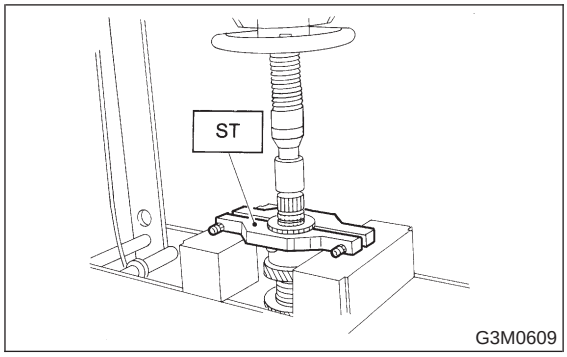
3. DRIVEN GEAR ASSEMBLY (2500 cc MODEL)

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

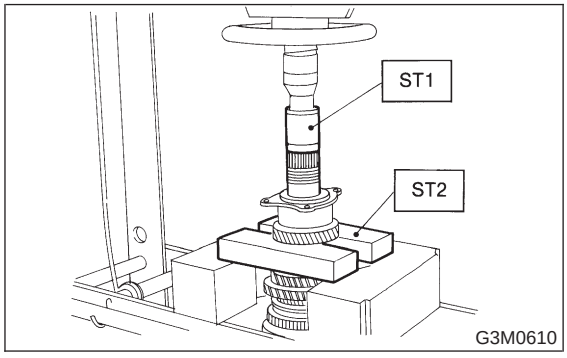
1) Straighten lock nut at staked portion. Remove the lock nut using ST1 and ST2.
ST1 499987300 SOCKET WRENCH (50)
ST2 899884100 HOLDER



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

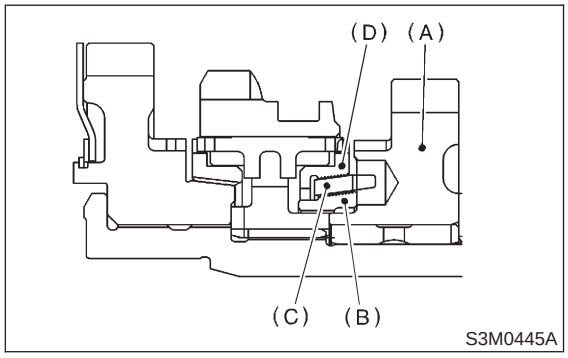


3) Remove woodruff key.
4) Remove roller bearing (42 × 74 × 40), 3rd-4th driven gear using ST1 and ST2.
ST1 499757002 SNAP RING PRESS
ST2 899714110 REMOVER



5) Remove the key.

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

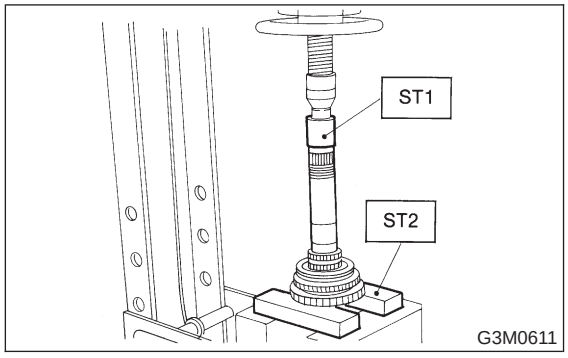


(A) 2nd driven gear
(B) Inner baulk ring
(C) Synchro cone
(D) Outer baulk ring

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

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

ST1 499757002 SNAP RING PRESS
ST2 899714110 REMOVER



8) Remove sub gear for 1st driven gear.

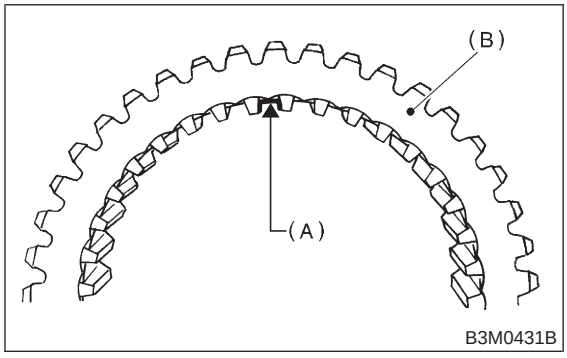
B: ASSEMBLY

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

1. GEAR AND HUB ASSEMBLY

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.

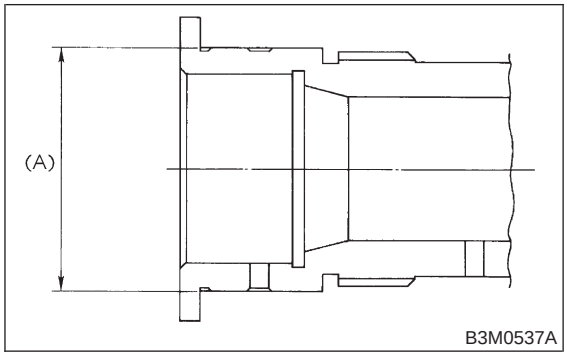


(A) Key grooves
(B) Reverse driven gear

2. DRIVEN GEAR ASSEMBLY (2200 cc MODEL)

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

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



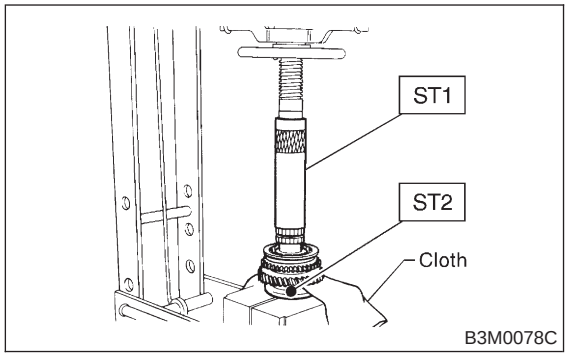
1) Install 1st driven gear, 1st-2nd baulk ring and gear and hub assembly onto driven shaft.

NOTE:
Take care to install gear hub in proper direction.

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

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

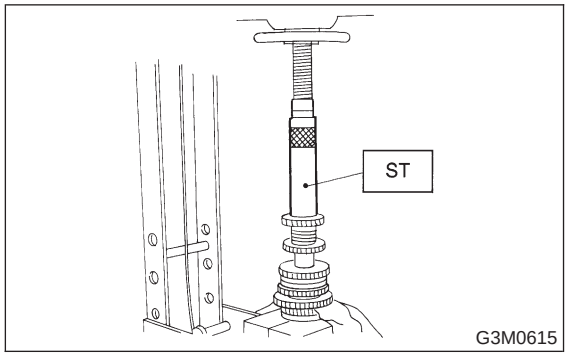
ST1 499277200 INSTALLER
ST2 499587000 INSTALLER



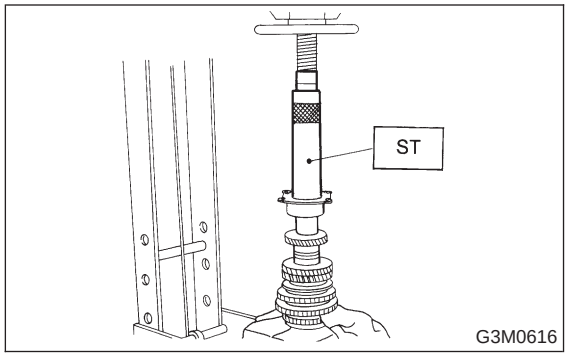
3) Install 2nd driven gear, 1st-2nd baulk ring and insert onto driven shaft. After installing key on driven shaft, install 3rd-4th driven gear using ST and press.

CAUTION:
Align groove in baulk ring with insert.

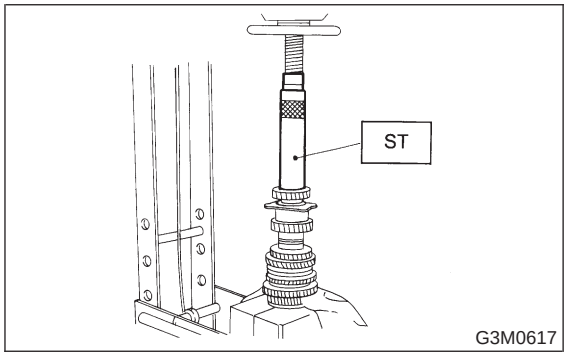
ST 499277200 INSTALLER



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

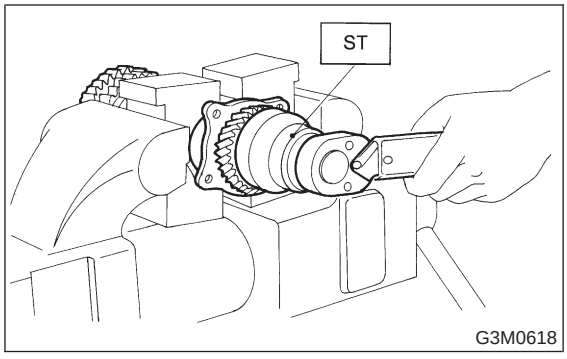


5) Position woodruff key in groove on the rear of driven shaft. Install 5th driven gear onto drive shaft using ST and press.
ST 499277200 INSTALLER

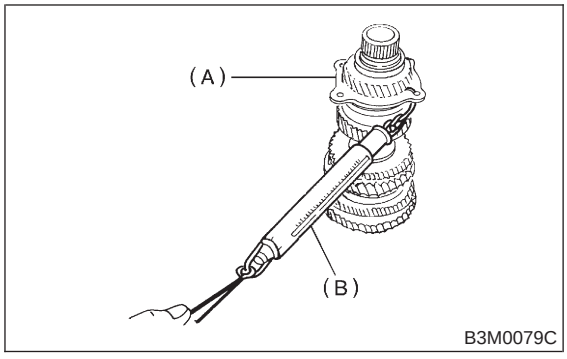


6) Install lock washer (42 × 53 × 2). Install lock nut (42 × 13) and tighten to the specified torque using ST.
ST 499987300 SOCKET WRENCH (50)

Tightening torque:
265±10 N·m (27±1 kg-m, 195±7 ft-lb)



NOTE:
- Stake lock nut at two points.
- Using spring balancer, check that starting load of roller bearing is 1.7 to 30.6 N (0.17 to 3.12 kg, 0.37 to 6.88 lb).

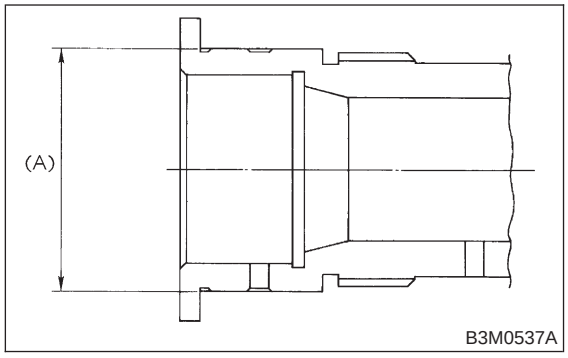


(A) Roller bearing
(B) Spring balancer

3. DRIVEN GEAR ASSEMBLY (2500 cc MODEL)

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

Driven shaft		1st driven gear
Part No.	Diameter A mm (in)	Part No.
32229AA150	49.959 — 49.966 (1.9669 — 1.9672)	32231AA730
32229AA140	49.967 — 49.975 (1.9672 — 1.9675)	32231AA720



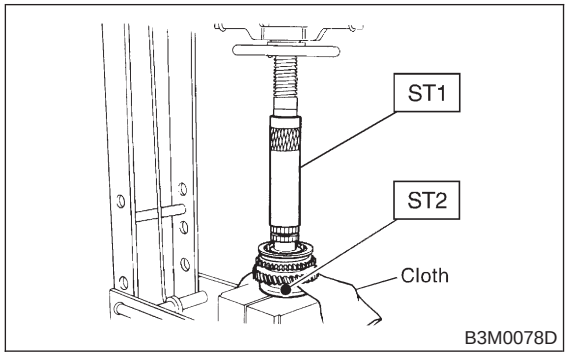
1) Install sub gear to 1st driven gear.
2) Install 1st driven gear, 1st baulk ring, gear and hub assembly onto driven shaft.

NOTE:
Take care to install gear hub in proper direction.

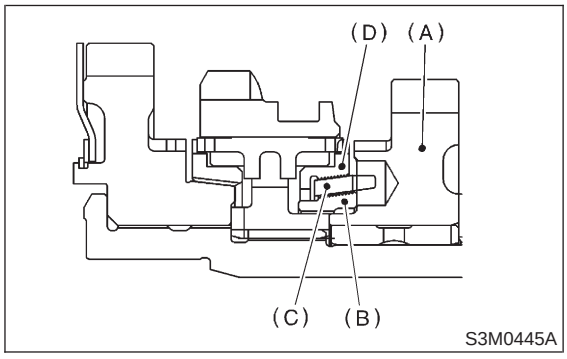
3) Install 2nd driven gear bushing onto driven shaft using ST1, ST2 and press.
ST1 499277200 INSTALLER
ST2 499587000 INSTALLER

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

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



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

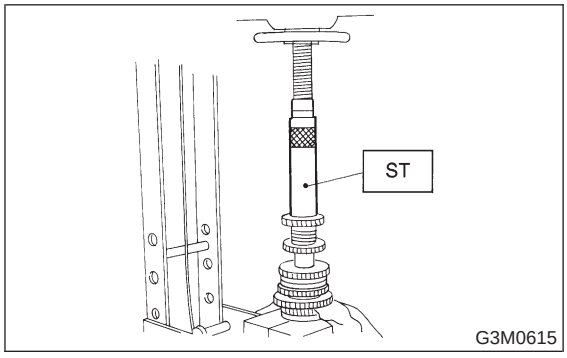


(A) 2nd driven gear
(B) Inner baulk ring
(C) Synchro cone
(D) Outer baulk ring

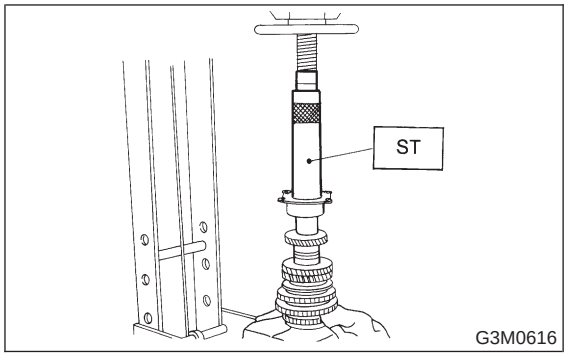
5) After installing key on driven shaft, install 3rd-4th driven gear using ST and press.

NOTE:
Align groove in baulk ring with insert.

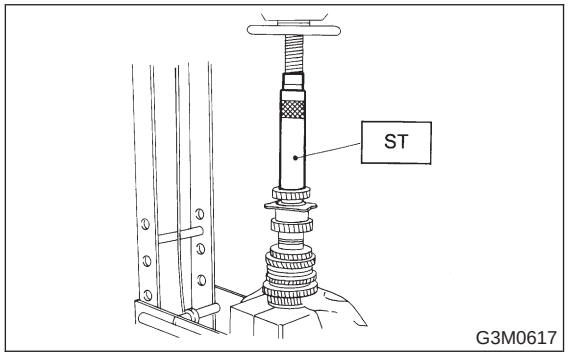
ST 499277200 INSTALLER



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

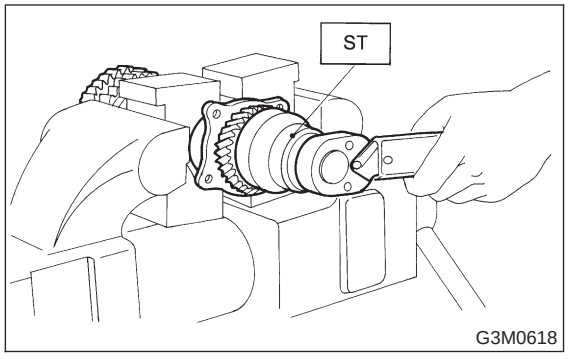


7) Position woodruff key in groove on the rear of driven shaft. Install 5th driven gear onto drive shaft using ST and press.
ST 499277200 INSTALLER

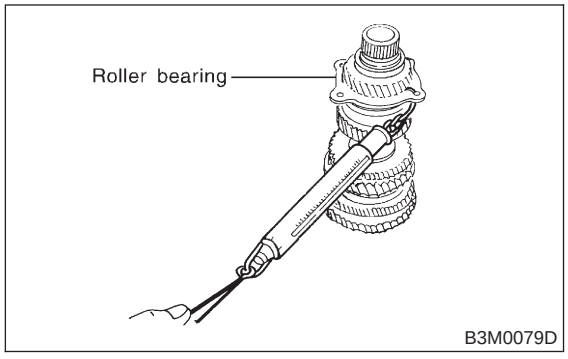


8) Install lock washer (42 × 53 × 2). Install lock nut (42 × 13) and tighten to the specified torque using ST.
ST 499987300 SOCKET WRENCH (50)

Tightening torque:
265±10 N·m (27±1 kg-m, 195±7 ft-lb)

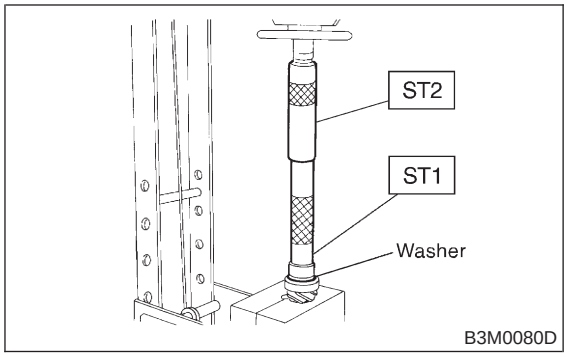


NOTE:
- Stake lock nut at two points.
- Using spring balancer, check that starting load of roller bearing is 1.7 to 30.6 N (0.17 to 3.12 kg, 0.37 to 6.88 lb).

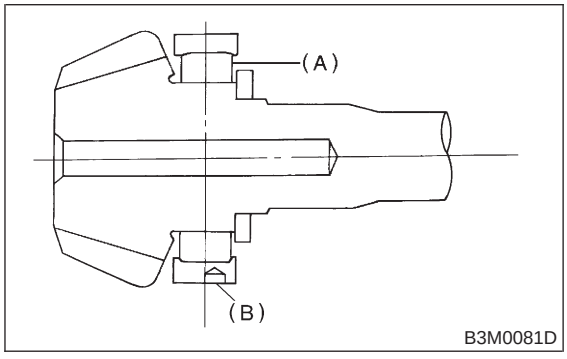


4. DRIVE PINION SHAFT

1) Install roller bearing onto drive pinion. Install washer (33 × 50 × 5) using ST1, ST2 and press.
ST1 499277100 BUSH 1-2 INSTALLER
ST2 499277200 INSTALLER

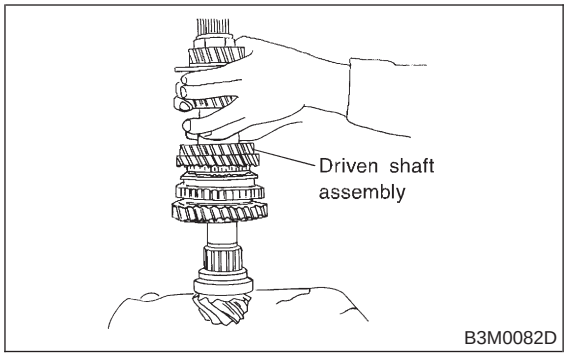


NOTE:
When installing roller bearing, note its directions (front and rear) because knock pin hole in outer race is offset.



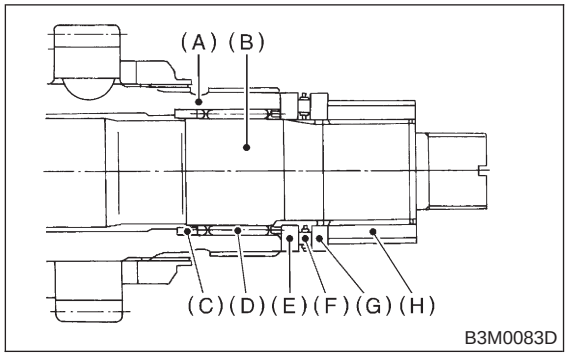
(A) Roller bearing
(B) Knock pin hole

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



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

NOTE:
Be careful because spacer must be installed in proper direction.

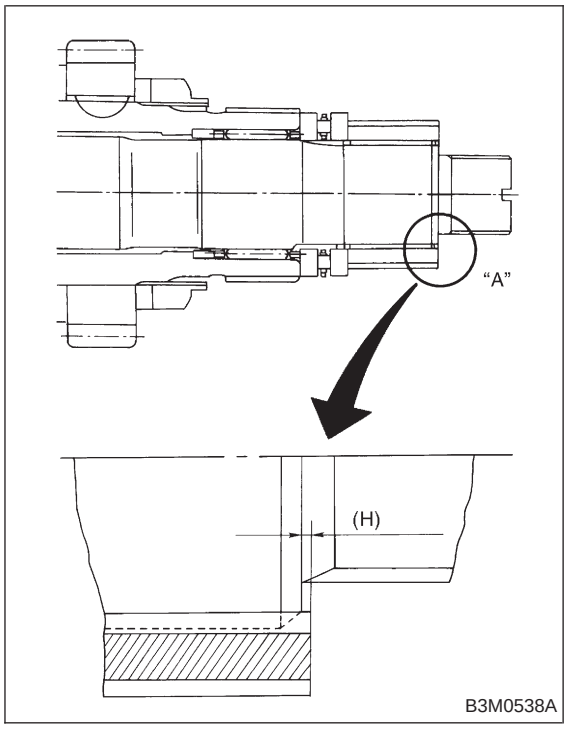


(A) Driven shaft
(B) Drive shaft
(C) Drive pinion collar
(D) Needle bearing (25 × 30 × 20)
(E) Washer No. 2 (25 × 36 × 4)
(F) Thrust bearing (25 × 37.5 × 3)
(G) Washer No. 1 (25 × 36 × t)
(H) Differential bevel gear sleeve

C: ADJUSTMENT

1. THRUST BEARING PRELOAD

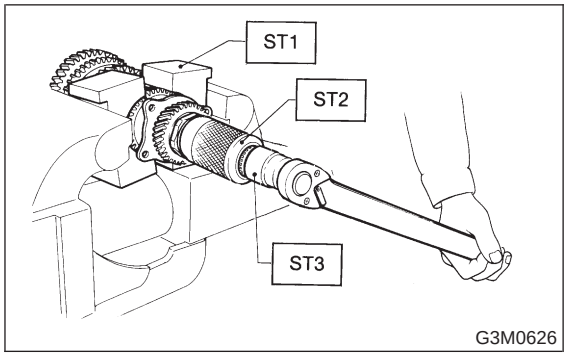
1) After completing the preceding steps 1) through 3), select adjusting washer No. 2 so that dimension (H) is zero through visual check. Position washer (18.3 × 30 × 4) and lock washer (18 × 30 × 2) and install lock nut (18 × 13.5).



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

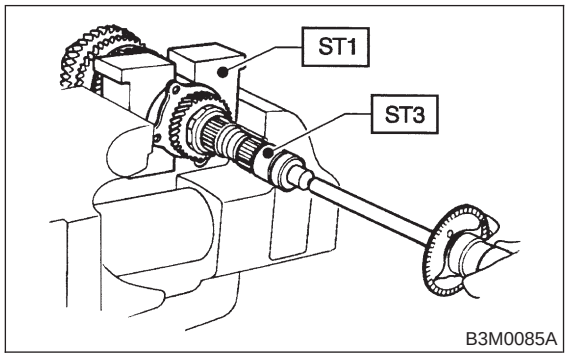
ST1	899884100	HOLDER
ST2	498427100	STOPPER
ST3	899988608	SOCKET WRENCH (27)

Tightening torque:
118±8 N·m (12±0.8 kg-m, 86.8±5.8 ft-lb)

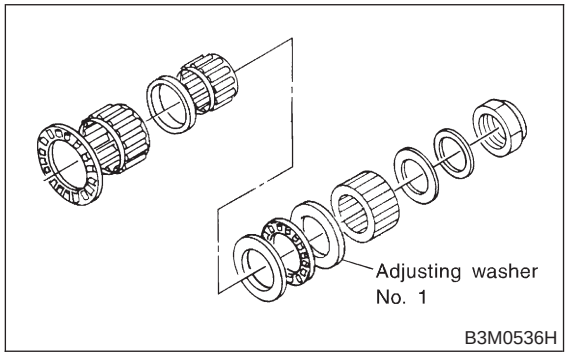


3) After removing ST2, measure starting torque using torque driver.
ST1 899884100 HOLDER
ST3 899988608 SOCKET WRENCH (27)

Starting torque:
54±25 N·m (5.5±2.5 kg-m, 40±18 ft-lb)

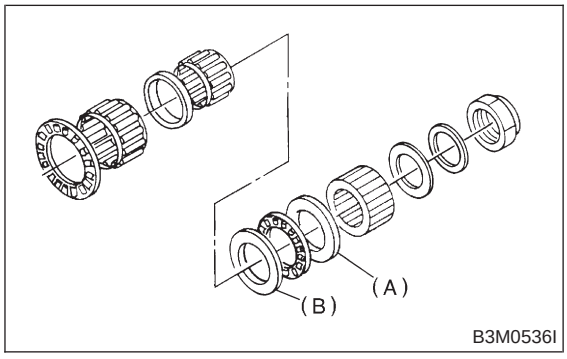


4) If starting torque is not within specified limit, select new adjusting washer No. 1 and recheck starting torque.



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

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.

4. Main Shaft Assembly

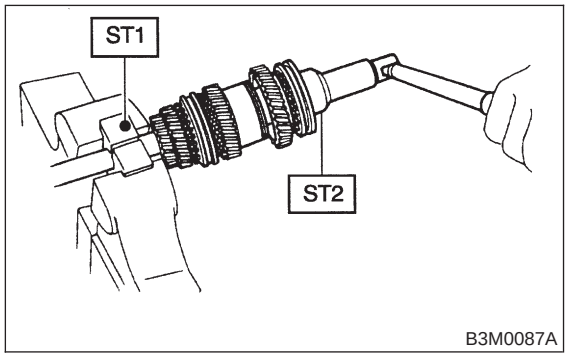
A: DISASSEMBLY

1. 2200 cc MODEL

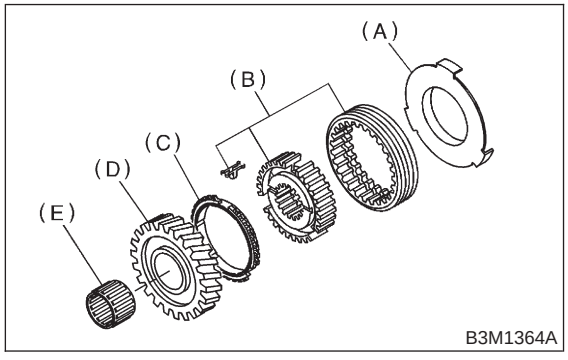
1) Put vinyl tape around main shaft splines to protect oil seal from damage. Then pull out oil seal and needle bearing by hand.
2) Remove lock nut from transmission main shaft assembly.

NOTE:
Remove caulking before taking off lock nut.

ST1 498937000 TRANSMISSION HOLDER
ST2 499987003 SOCKET WRENCH (35)



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

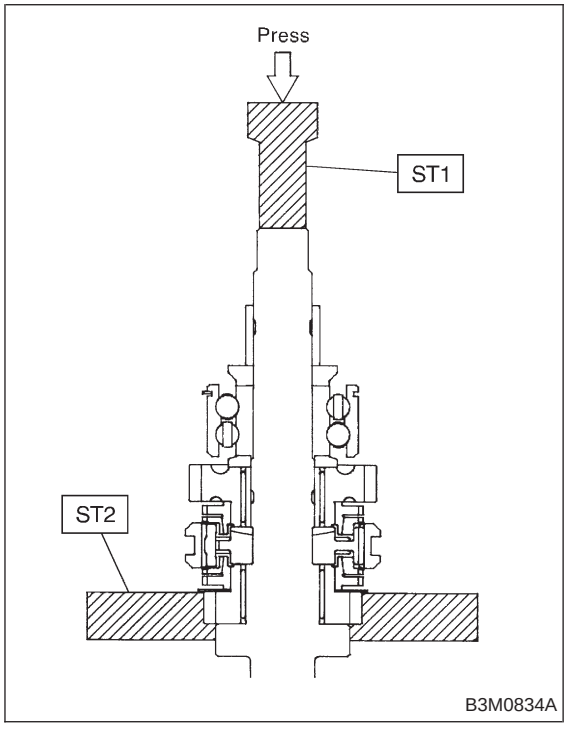


(A) Insert stopper plate
(B) Sleeve and hub assembly No. 2
(C) Baulk ring
(D) 5th drive gear
(E) Needle bearing (32 × 36 × 25.7)

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

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

ST1 899864100 REMOVER
ST2 899714110 REMOVER

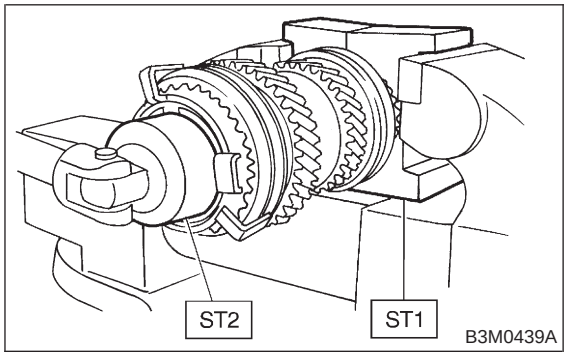


2. 2500 cc MODEL

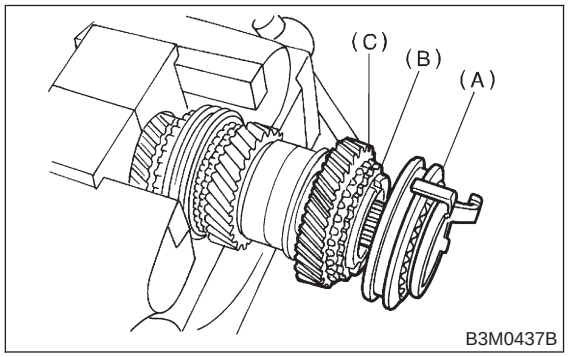
1) Put vinyl tape around main shaft splines to protect oil seal from damage. Then pull out oil seal and needle bearing by hand.
2) Remove lock nut from transmission main shaft assembly.

NOTE:
Remove caulking before taking off lock nut.

ST1 498937000 TRANSMISSION HOLDER
ST2 499987003 SOCKET WRENCH (35)

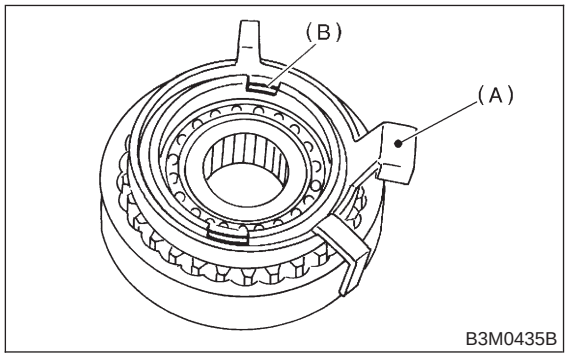


3) Remove 5th-Rev sleeve and hub assembly, baulk ring, 5th drive gear and needle bearing (32 × 36 × 25.7).



(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.

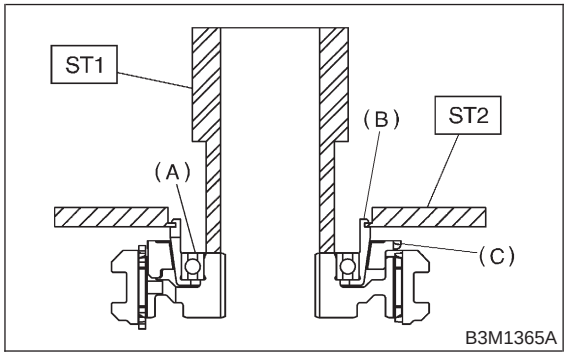


(A) Synchro cone stopper
(B) Snap ring

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	SNAP RING PRESS
ST2	498077400	SYNCHRO CONE REMOVER

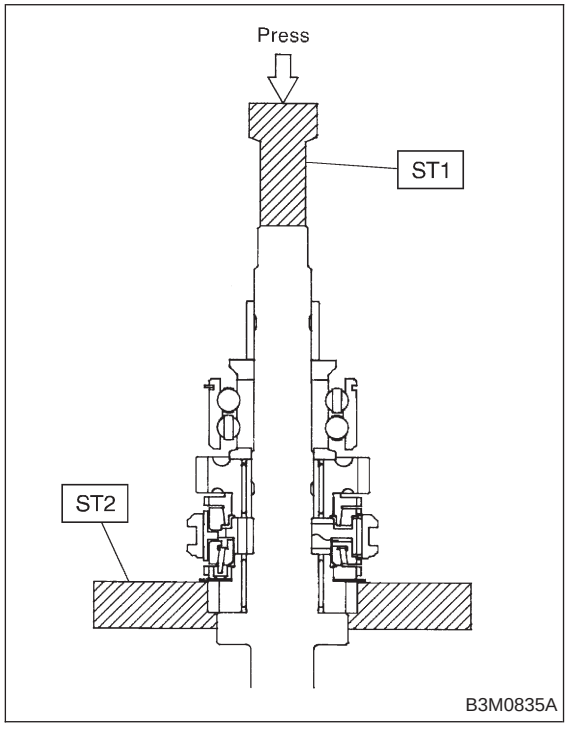


(A) Ball bearing
(B) Synchro cone
(C) Baulk ring

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



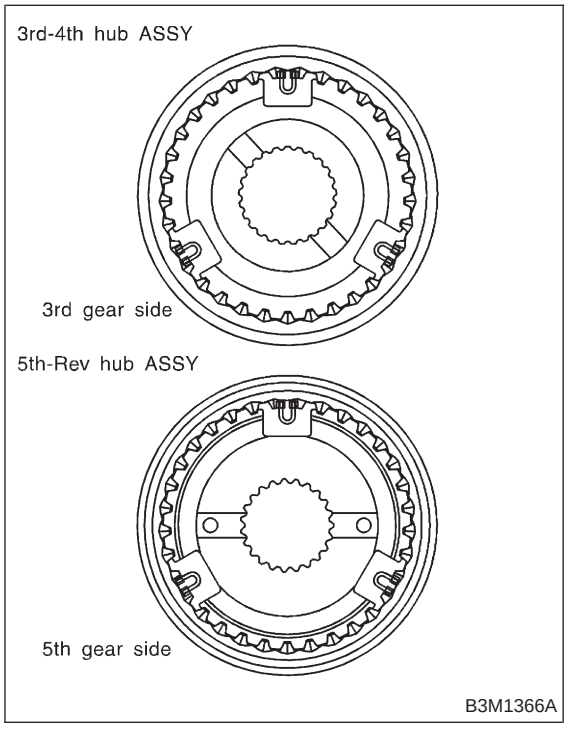
B: ASSEMBLY

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

1. 2200 cc MODEL

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

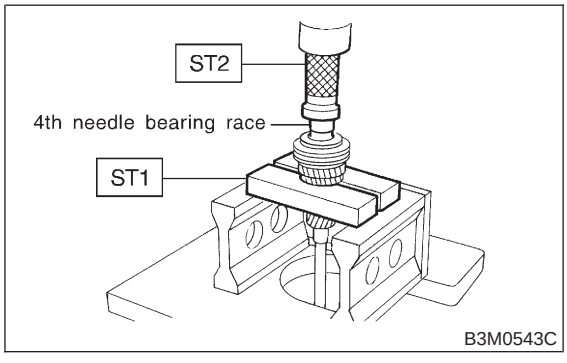
NOTE:
Position open ends of spring 120° apart.



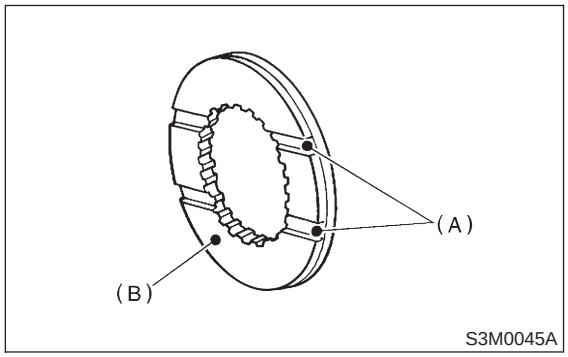
2) nstall 3rd drive gear, baulk ring, and sleeve and hub assembly for 3rd-4th needle bearing (32 × 36 × 25.7) on transmission main shaft.

NOTE:
Align groove in baulk ring with shifting insert.

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

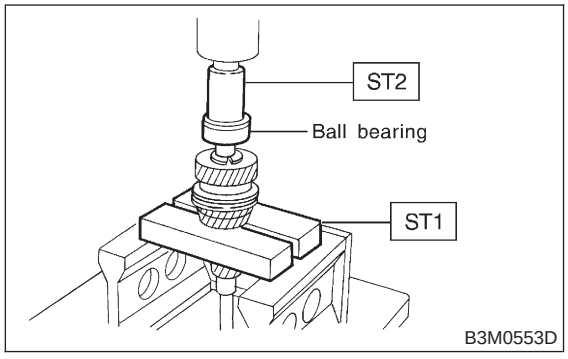


4) Install baulk ring, needle bearing (32 × 30 × 25.7), 4th drive gear and 4th gear thrust washer to transmission main shaft.



(A) Groove
(B) 4th gear side

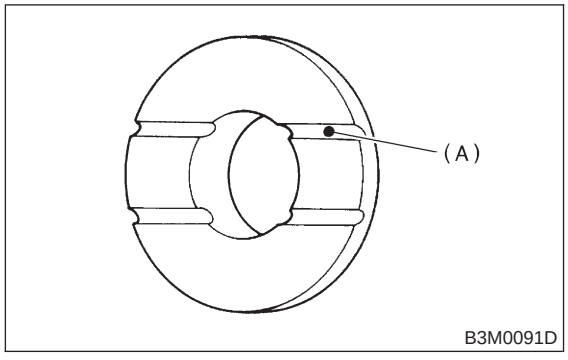
5) Drive ball bearing onto the rear section of transmission main shaft using ST1, ST2 and a press.
ST1 899714110 REMOVER
ST2 499877000 RACE 4-5 INSTALLER



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

NOTE:
Face thrust washer in the correct direction.

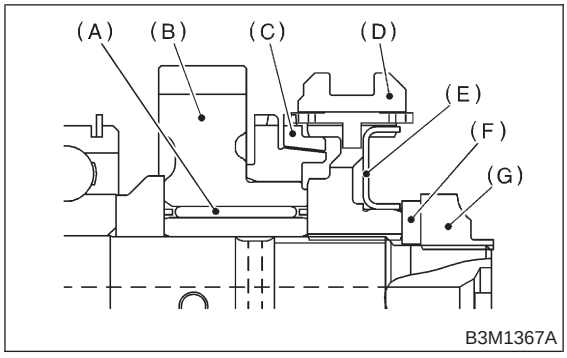
ST1 899714110 REMOVER
ST2 499877000 RACE 4-5 INSTALLER



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

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

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



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

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

NOTE:
Secure lock nuts in two places after tightening.

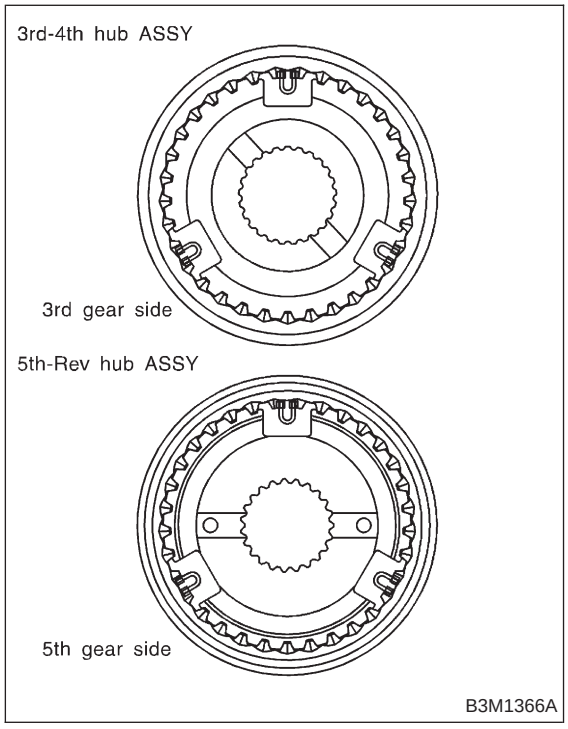
ST1 499987003 SOCKET WRENCH (35)
ST2 498937000 TRANSMISSION HOLDER

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

2. 2500 cc MODEL

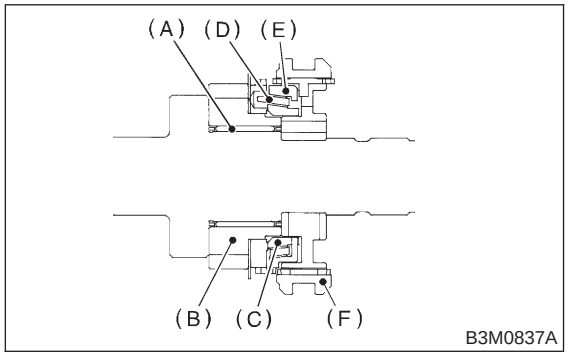
1) Assemble sleeve and hub assembly for 3rd-4th and, 5th synchronizing.

NOTE:
Position open ends of spring 120° apart.



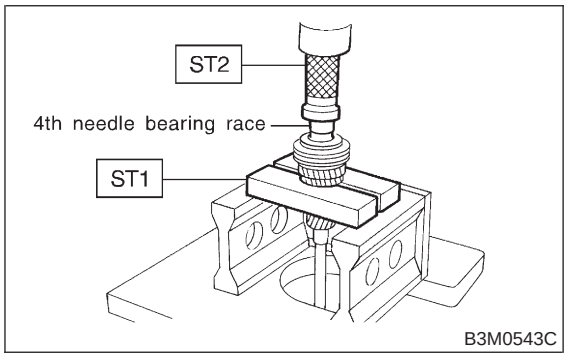
2) Install 3rd drive gear, outer baulk ring, synchro cone, inner baulk ring, sleeve and hub assembly for 3rd needle bearing on transmission main shaft.

NOTE:
Align groove in baulk ring with insert key.

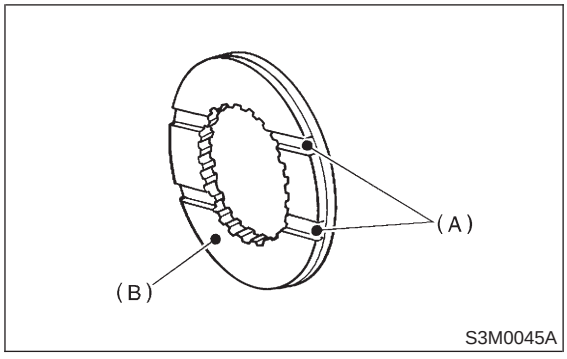


(A) 3rd needle bearing (32 × 36 × 25.7)
(B) 3rd drive gear
(C) Inner baulk ring
(D) Synchro cone
(E) Outer baulk ring
(F) Sleeve and hub ASSY

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

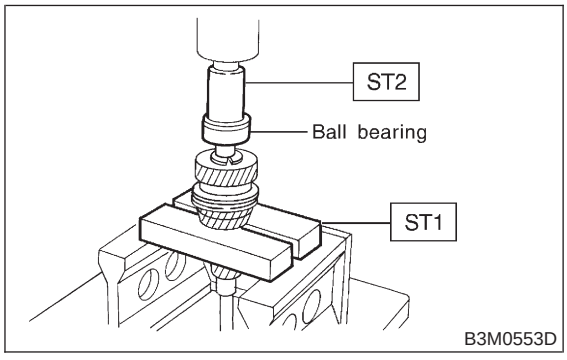


4) Install baulk ring, needle bearing (32 × 30 × 25.7), 4th drive gear and 4th gear thrust washer to transmission main shaft.



(A) Groove
(B) 4th gear side

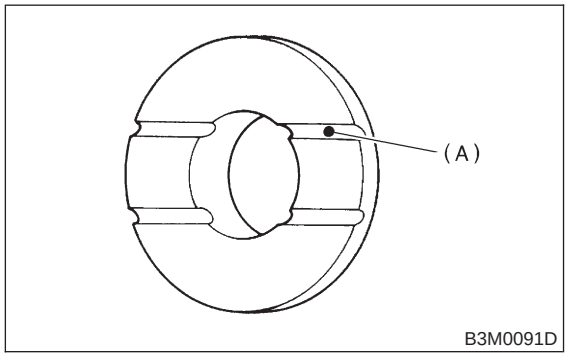
5) Drive ball bearing onto the rear section of transmission main shaft using ST1, ST2 and a press.
ST1 899714110 REMOVER
ST2 499877000 RACE 4-5 INSTALLER



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

NOTE:
Face thrust washer in the correct direction.

ST1 899714110 REMOVER
ST2 499877000 RACE 4-5 INSTALLER

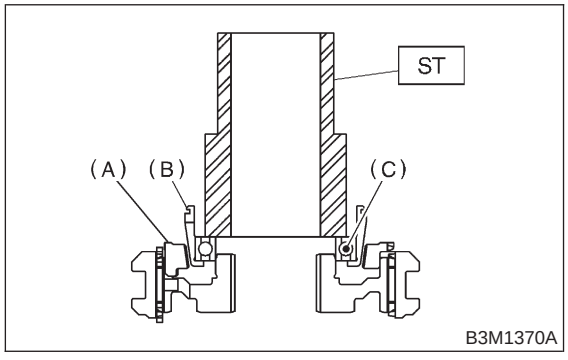


(A) Face this surface to 5th gear side.

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

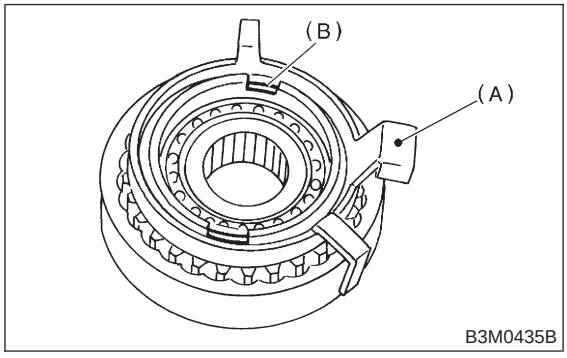
NOTE:
- Use new ball bearing.
- After press fitting, make sure synchro cone rotates freely.

ST 499757002 SNAP RING PRESS



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

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

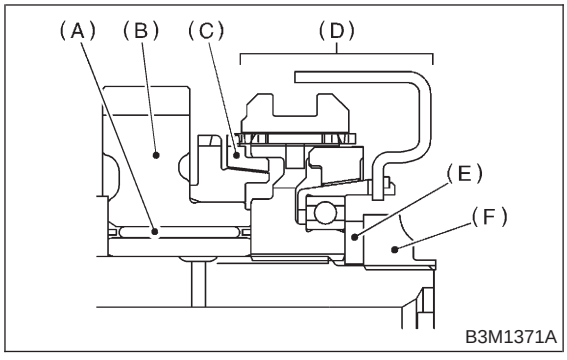


(A) Synchro cone stopper
(B) Snap ring

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

NOTE:
Align groove in baulk ring with shifting insert.

ST1 499987003 SOCKET WRENCH
ST2 498937000 TRANSMISSION HOLDER



(A) Needle bearing (32 × 36 × 25.7)
(B) 5th drive gear
(C) Baulk ring
(D) 5th-Rev sleeve and hub ASSY
(E) Lock washer (22 × 38 × 2)
(F) Lock nuts (22 × 13)

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

NOTE:
Secure lock nuts in two places after tightening.

ST1 499987000 SOCKET WRENCH
ST2 498937000 TRANSMISSION HOLDER

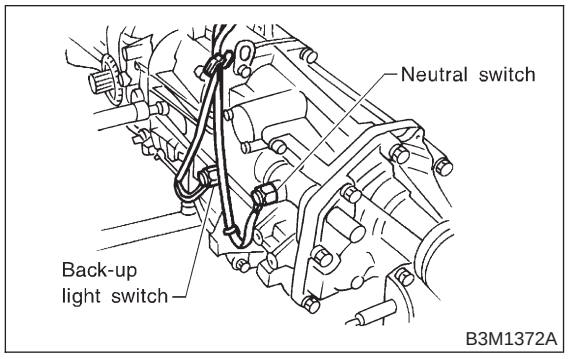
Tightening torque:

18±6 N·m (12.0±0.6 kg-m, 86.8±4.3 ft-lb)

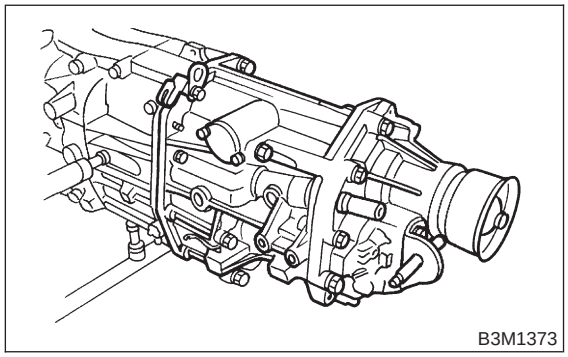
5. Transfer Case and Extension

A: REMOVAL

1) Remove back-up light switch and neutral switch.



2) Remove transfer case with extension assembly.

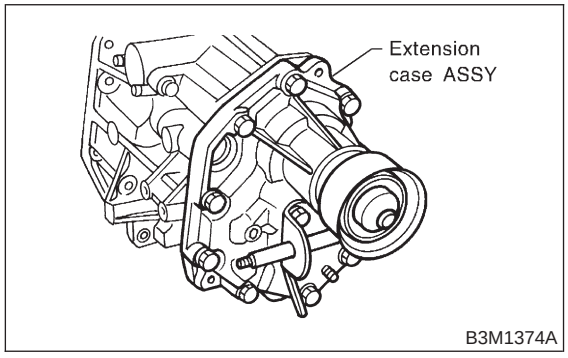


3) Remove shifter arm.

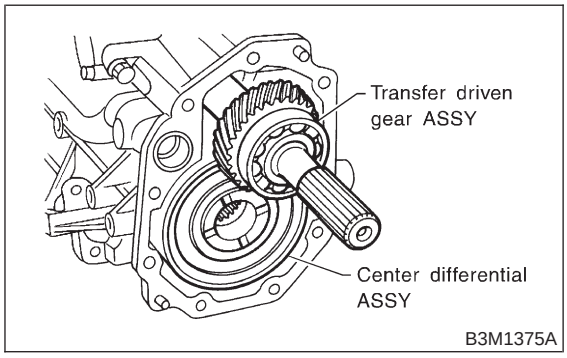
B: DISASSEMBLY

1. SEPARATION OF TRANSFER CASE AND EXTENSION ASSEMBLY

1) Separate transfer case and extension assembly.



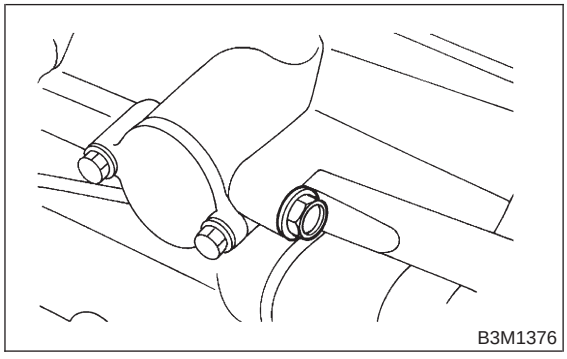
2) Remove transfer driven gear and center differential as a set.



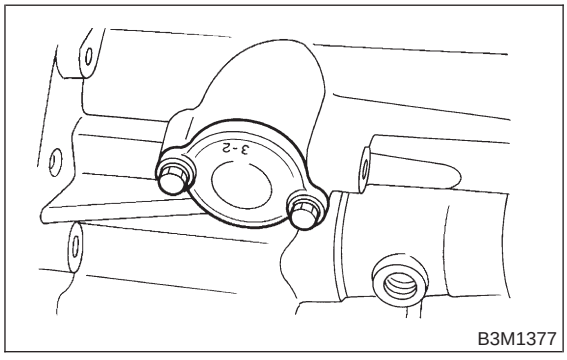
3) Remove thrust washer.

2. TRANSFER CASE

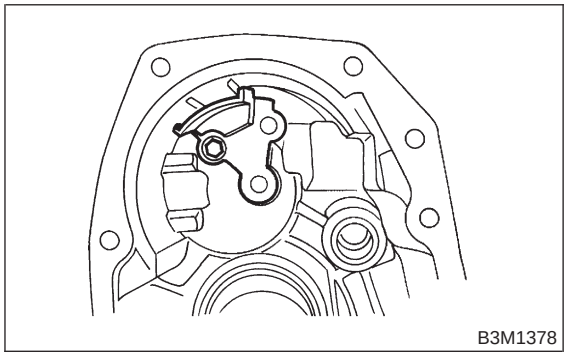
1) Remove plug, spring and reverse check ball.



2) Remove reverse check assembly.

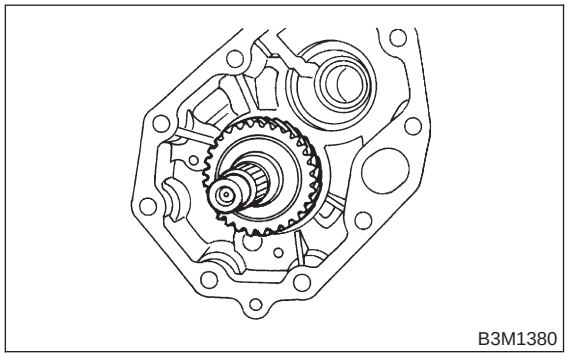


3) Remove oil guide.

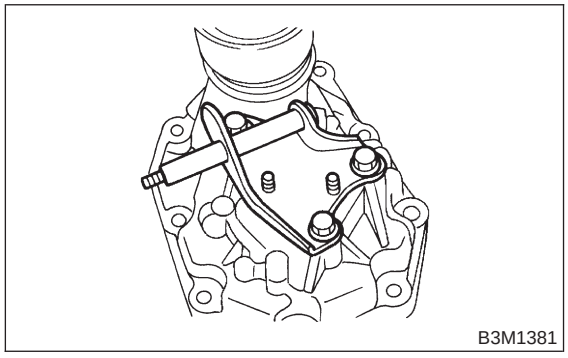


3. EXTENSION

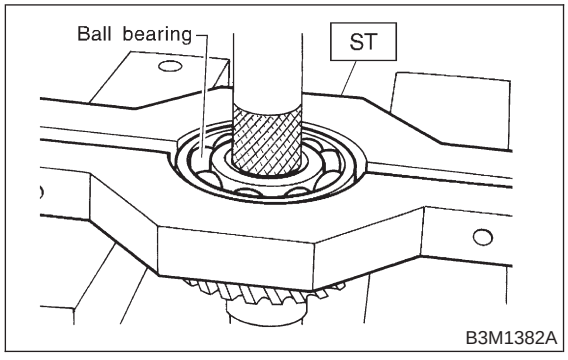
1) Remove transfer drive gear assembly.



2) Remove shift bracket.



3) Using ST, remove ball bearing from transfer drive gear.
ST 498077100 REMOVER

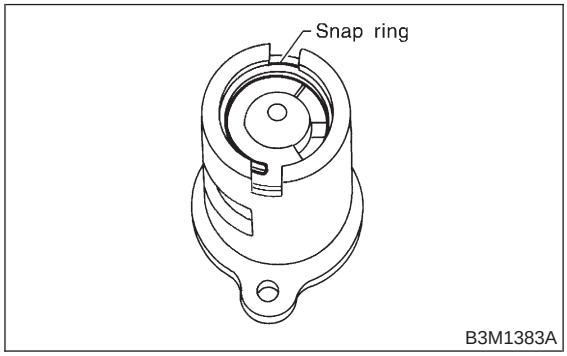


4) Remove oil seal from extension case.

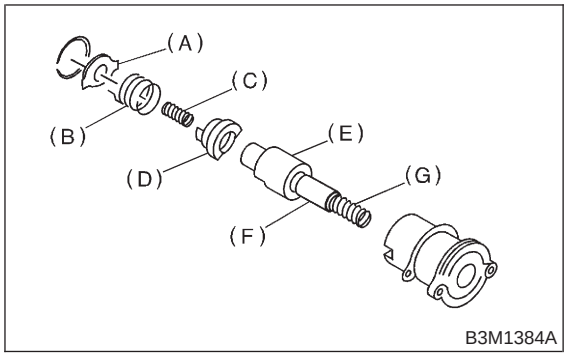
4. REVERSE CHECK SLEEVE

1) Using a standard screwdriver, remove snap ring.

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



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).



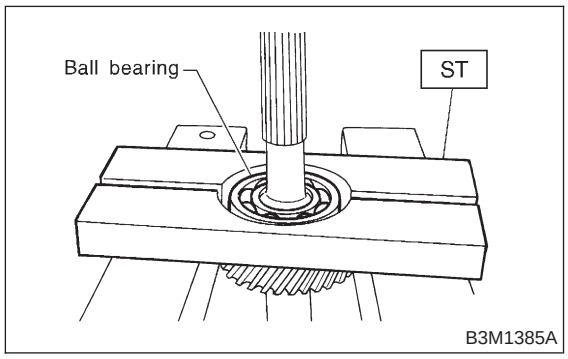
(A) Reverse check plate
(B) Reverse check spring
(C) Return spring (5th-Rev)
(D) Reverse check cam
(E) Reverse accent shaft
(F) Return spring cap
(G) Return spring (1st-2nd)

3) Remove O-ring.

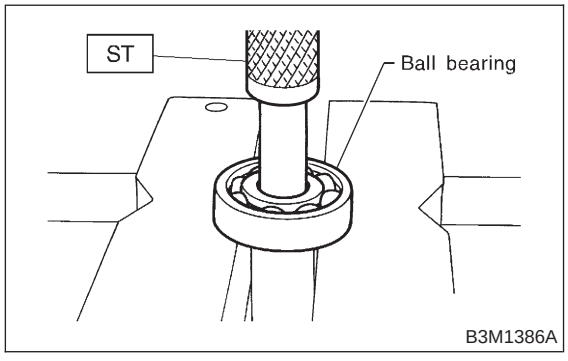
NOTE:
● Reverse check sleeve assembly uses an O-ring which should not be scratched.
● Be careful not to break adjustment shim placed between reverse check sleeve assembly and case.

5. TRANSFER DRIVEN GEAR

1) Using ST, remove ball bearing from transfer driven gear.
ST 498077000 REMOVER



2) Using ST, remove ball bearing from transfer driven gear.
ST 899864100 REMOVER

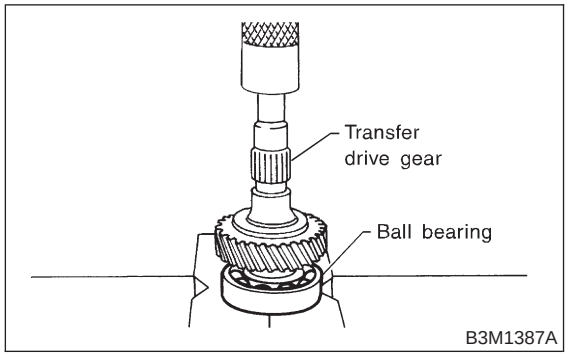


C: ASSEMBLY

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

1. EXTENSION

1) Install ball bearing to transfer drive gear.



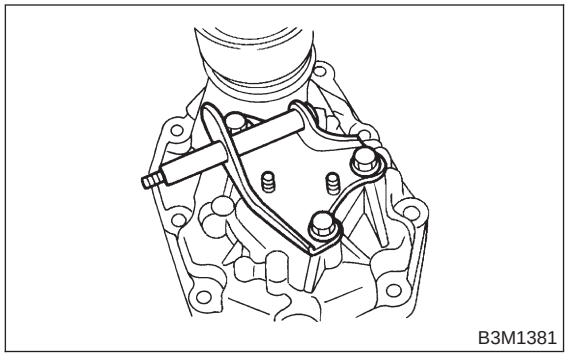
2) Using ST, install oil seal to extension case.

CAUTION:
Use new oil seal.

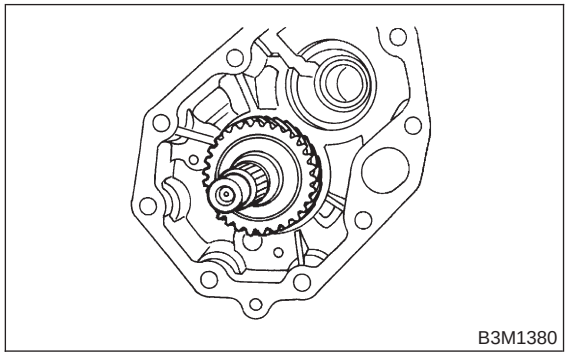
ST 498057300 INSTALLER

3) Install shift bracket to extension case.

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



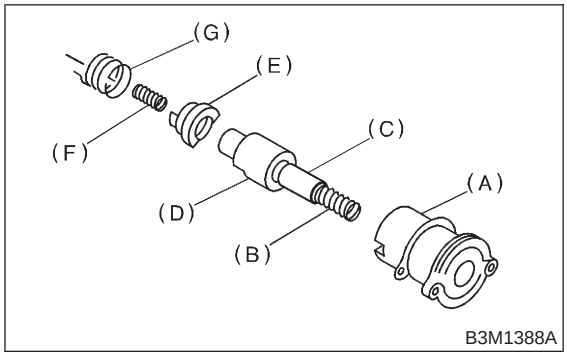
4) Install transfer drive gear to extension case.



2. REVERSE CHECK SLEEVE

1) Install return spring (1st-2nd), return spring cap, reverse accent shaft, check cam, return spring and check spring onto reverse check sleeve.

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

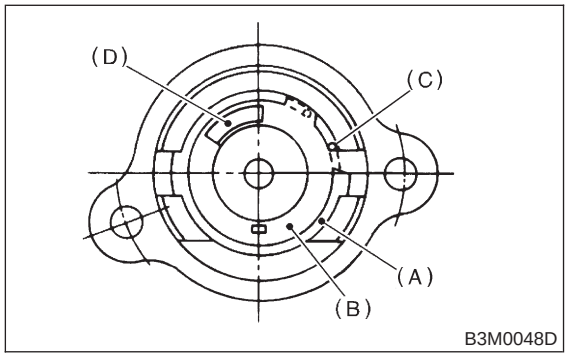


(A) Reverse check sleeve
(B) Return spring (1st-2nd)
(C) Return spring cap
(D) Reverse accent shaft
(E) Return spring (5th-Rev)
(F) Reverse check cam
(G) Reverse check spring

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

CAUTION:
- **Make sure the cutout section of reverse accent shaft is aligned with the opening in reverse check sleeve.**
- **Spin cam by hand for smooth rotation.**

● 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.



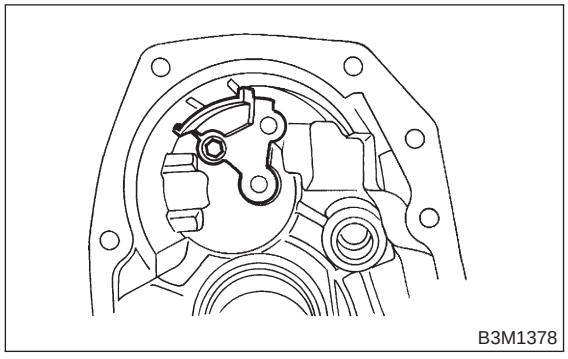
(A) Snap ring
(B) Reverse check plate
(C) Check spring
(D) Check cam

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

3. TRANSFER CASE

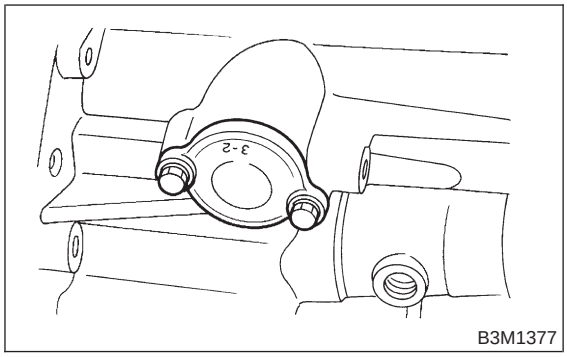
1) Install oil guide to transfer case.

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



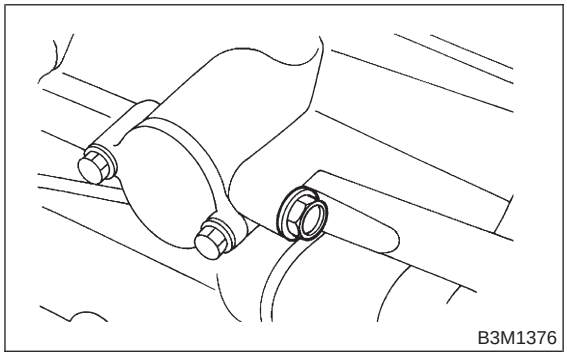
2) Install reverse check sleeve assembly to transfer case.

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



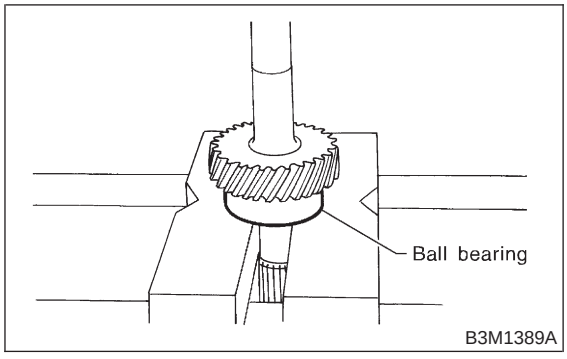
3) Install ball, reverse accent spring, washer and plug to transfer case.

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

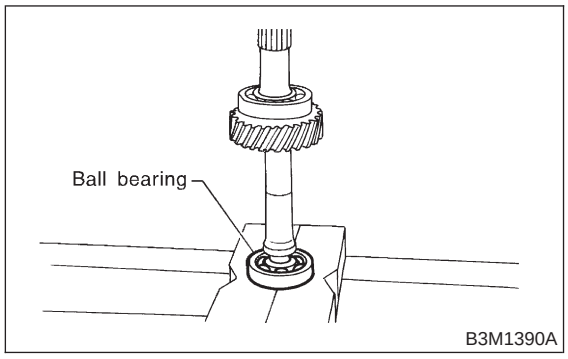


4. TRANSFER DRIVEN GEAR

1) Install ball bearing to transfer driven gear.

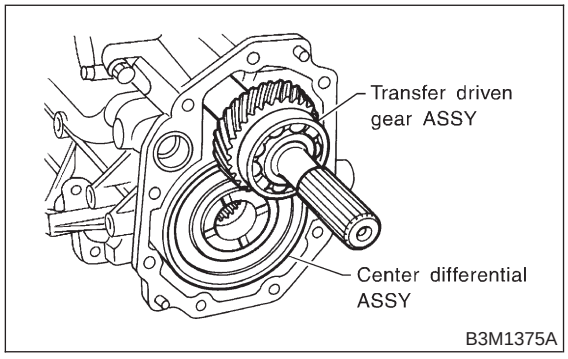


2) Install ball bearing to transfer driven gear.

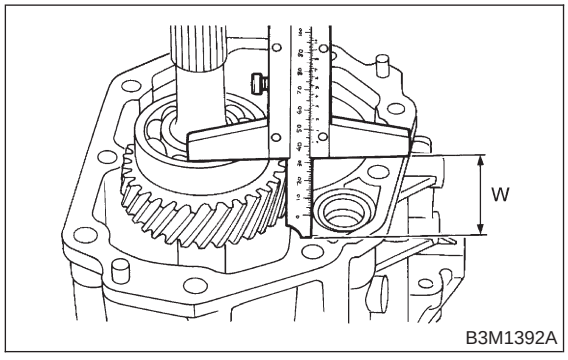


5. COMBINATION OF TRANSFER CASE AND EXTENSION ASSEMBLY

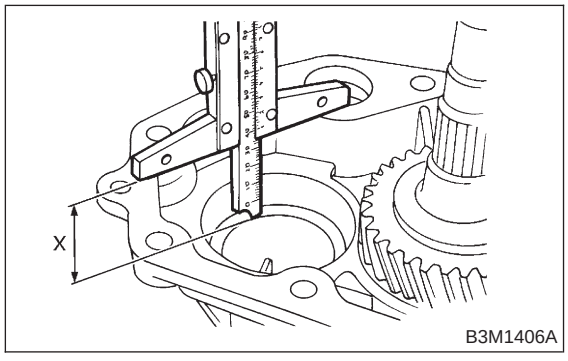
1) Install center differential and transfer driven gear into transfer case.



2) Measure height “W” between transfer case and ball bearing on the transfer driven gear.



3) Measure depth “X”.



4) Calculate space “Y” using the following equation: Y = X − W + 0.24 mm (0.0094 in) [Thickness of gasket]

5) Select suitable washer in the following table:

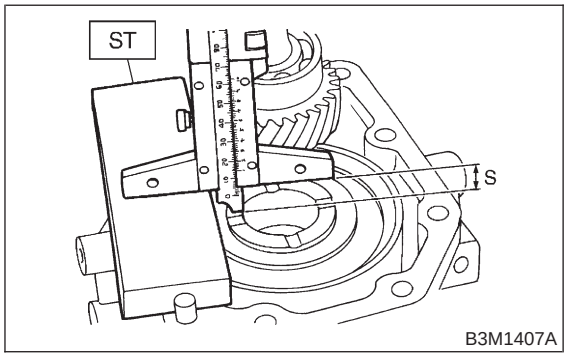
Standard clearance between thrust washer and ball bearing:
0.05 — 0.30 mm (0.0020 — 0.0118 in)

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

6) Fit thrust washers on transfer drive shaft.

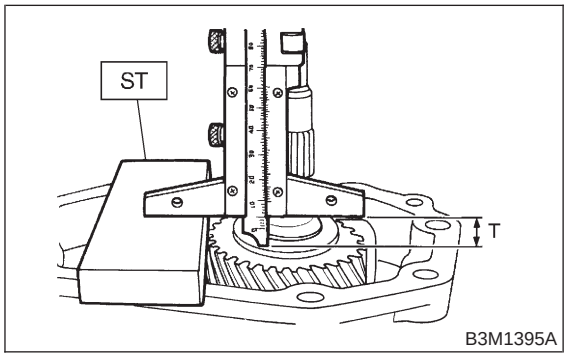
7) Measure depth “T” between extension case and transfer drive gear.

ST 398643600 GAUGE



8) Measure depth “T” between extension case and transfer drive gear.

ST 398643600 GAUGE



9) Calculate space “U” using the following equation: U = S + T − 0.24 mm (0.0094 in) [Thickness of gasket]

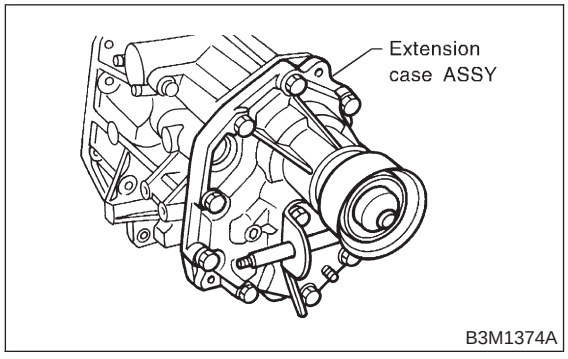
10) Select suitable washer in the following table:

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)

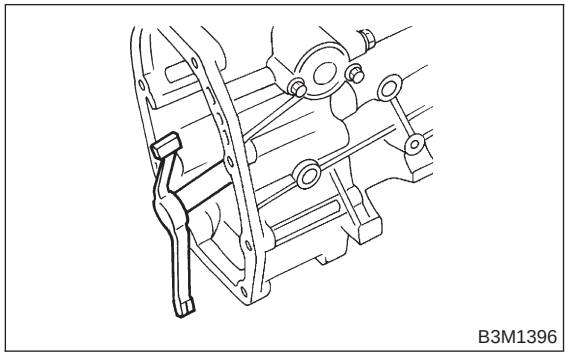
11) Fit thrust washer on center differential.
12) Install extension assembly into transfer case.

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

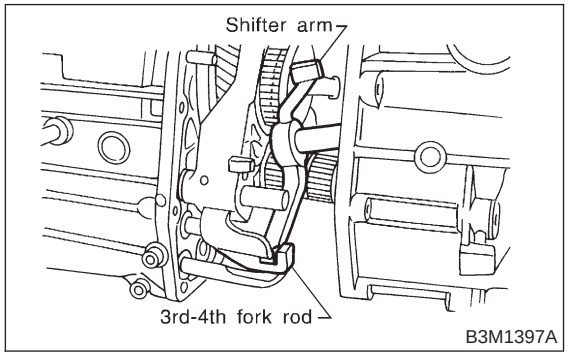


D: INSTALLATION

1) Install shifter arm to transfer case.

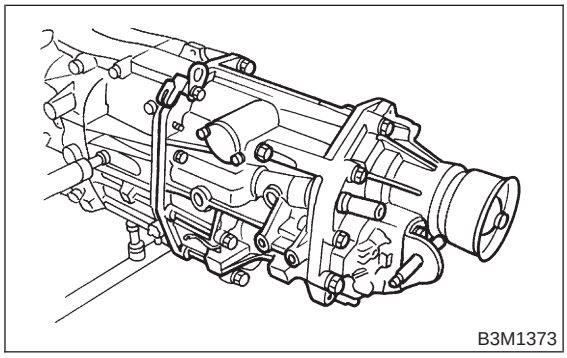


2) Hang the shifter arm on the 3rd-4th fork rod.



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

Tightening torque:
24.5±2.0 N·m (2.50±0.20 kg-m, 18.1±1.4 ft-lb)



E: 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.

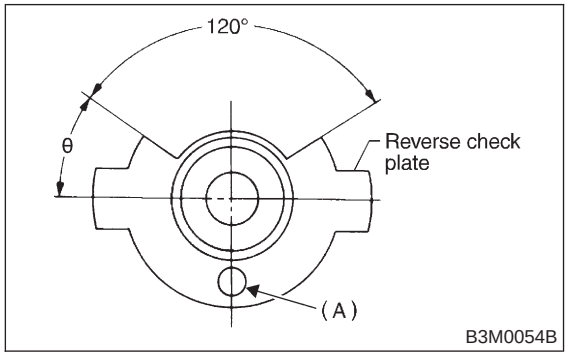
Adjustment shim	
Part No.	Thickness mm (in)
32190AA000	0.15 (0.0059)
32190AA010	0.30 (0.0118)

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

2. REVERSE CHECK PLATE ADJUSTMENT

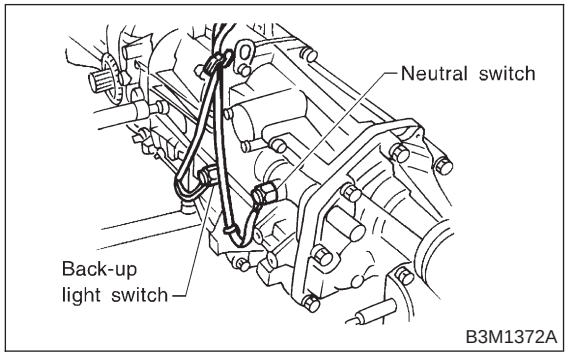
1) Shift shifter arm to “5th” and then to reverse to see if reverse check mechanism operates properly.
2) Also check to see if arm returns to neutral when released from the reverse position. If arm does not return properly, replace reverse check plate.

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.



3) Install neutral position switch and back-up light switch to transfer case.

Tightening torque:
24.5±2.0 N·m (2.50±0.20 kg-m, 18.1±1.4 ft-lb)



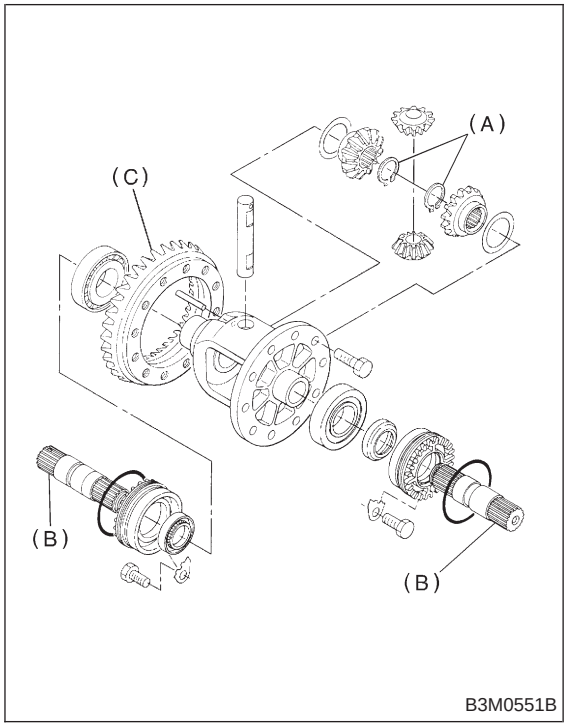
6. Front Differential

A: DISASSEMBLY

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

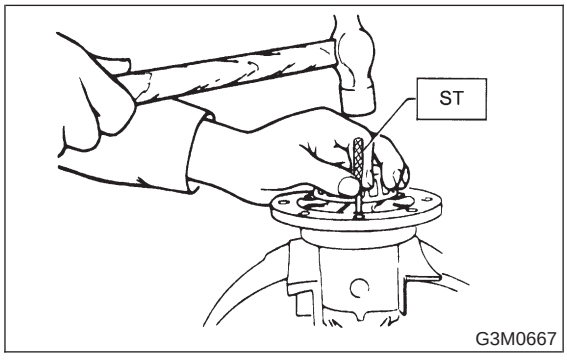
NOTE:
During reassembly, reinstall each axle drive shaft in the same place from which it was removed.

2) Loosen twelve bolts and remove hypoid drive gear.

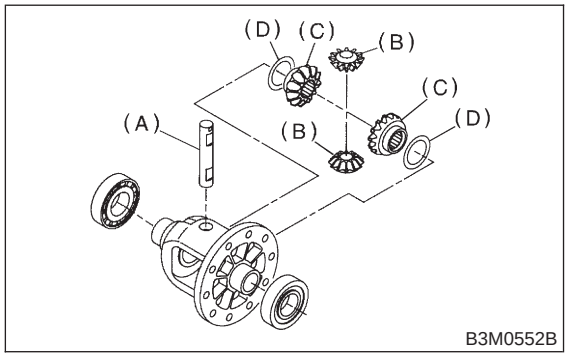


(A) Snap ring
(B) Axle drive shaft
(C) Hypoid drive gear

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

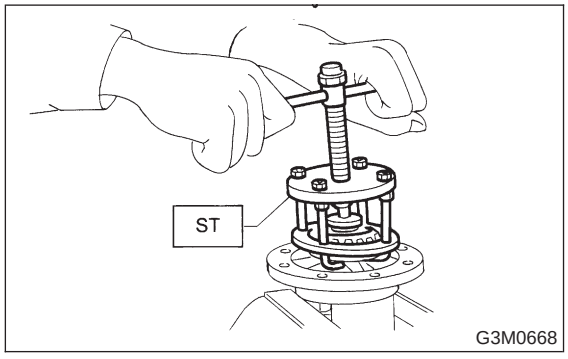


4) Pull out pinion shaft, and remove differential bevel pinion and gear and washer.



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

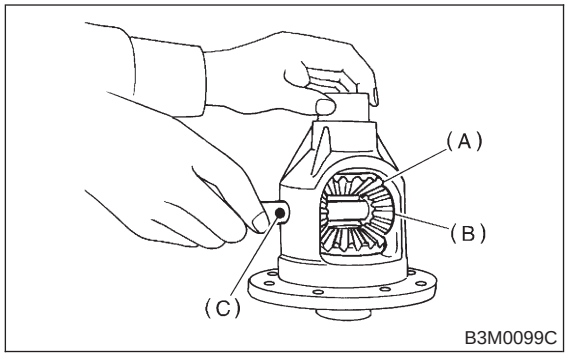
5) Remove roller bearing using ST.
ST 399527700 PULLER SET



B: ASSEMBLY

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

NOTE:
Face the chamfered side of washer toward gear.



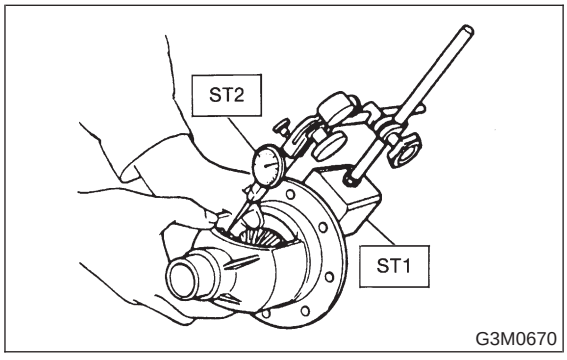
(A) Differential bevel gear
(B) Differential bevel pinion
(C) Pinion shaft

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

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

ST1 498247001 MAGNET BASE
ST2 498247100 DIAL GAUGE

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

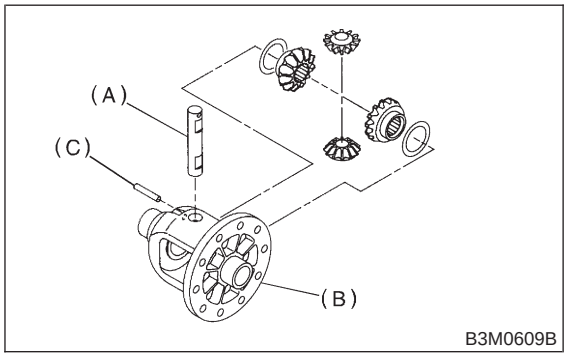


Washer (38.1 × 50 × t)	
Part No.	Thickness mm (in)
803038021	0.925 — 0.95 (0.0364 — 0.0374)
803038022	0.975 — 1.000 (0.0384 — 0.0394)
803038023	1.025 — 1.050 (0.0404 — 0.0413)

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

NOTE:
Lock straight pin after installing.

ST 899904100 REMOVER

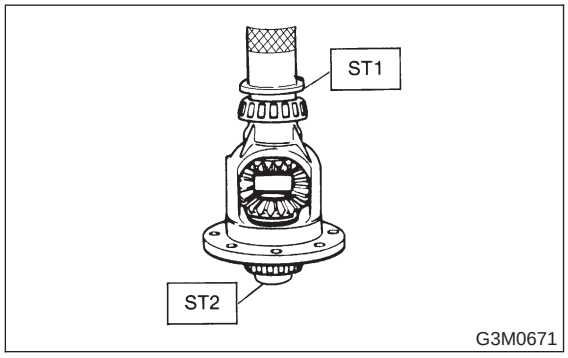


(A) Pinion shaft
(B) Differential case
(C) Straight pin

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

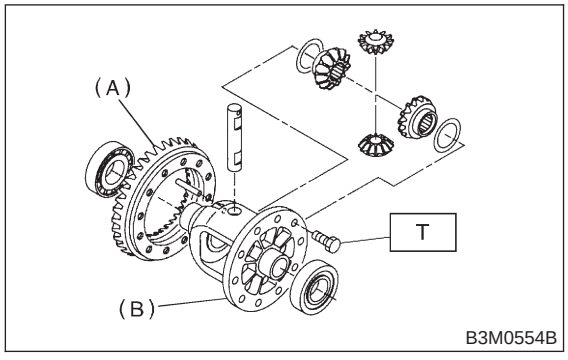
NOTE:
Be careful because roller bearing outer races are used as a set.

ST1 499277100 BUSH 1-2 INSTALLER
ST2 398497701 ADAPTER



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

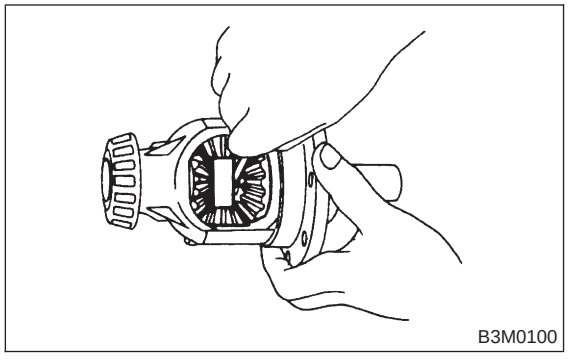
Tightening torque:
T: 62±5 N·m (6.3±0.5 kg-m, 45.6±3.6 ft-lb)



(A) Hypoid driven gear
(B) Differential case

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

Clearance:
0 — 0.2 mm (0 — 0.008 in)



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

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

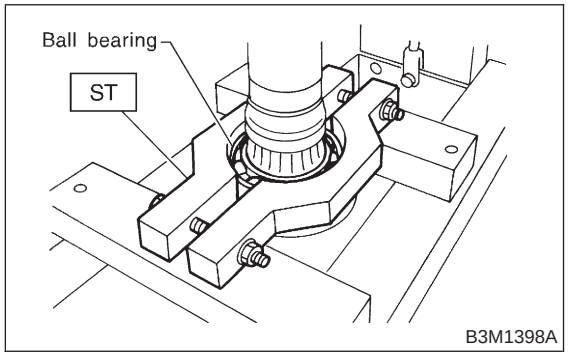
7. Center Differential

A: DISASSEMBLY AND ASSEMBLY

1) Remove ball bearing using ST.

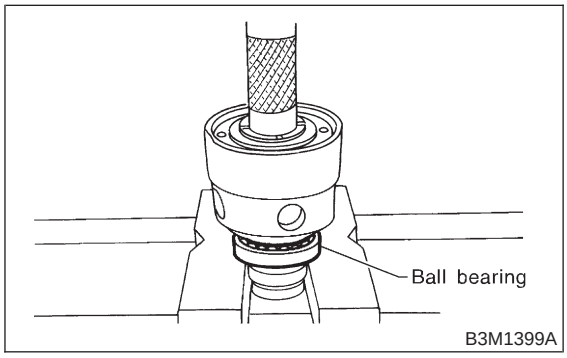
CAUTION:
Do not reuse ball bearing.

ST 498077300 CENTER DIFFERENTIAL BEARING REMOVER



2) Install ball bearing to center differential assembly.

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



1. Manual Transmission

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

2. Differential

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

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