

AUTOMATIC TRANSMISSION

GENERAL DESCRIPTION

AUTOMATIC TRANSMISSION

1. General Description

A: SPECIFICATIONS

1. TORQUE CONVERTER CLUTCH

Model	Non-turbo	Turbo
Type	Symmetric, 3 element, single stage, 2 phase torque converter	
Stall torque ratio	1.85 — 2.15	2.05 — 2.35
Nominal diameter	246 mm (9.69 in)	
Stall speed (at sea level)	2,100 — 2,600 rpm	2,600 — 3,400 rpm
One-way clutch	Sprague type one-way clutch	

2. OIL PUMP

Type	Paracoid constant-displacement pump	
Driving method	Driven by engine	
Number of teeth	Inner rotor	9
	Outer rotor	10

3. TRANSMISSION CONTROL ELEMENT

Type	4-forward, 1-reverse, double-row planetary gears
Multi-plate clutch	3 sets
Multi-plate brake	2 sets
One-way clutch (sprague type)	1 sets

4. TRANSMISSION GEAR RATIO

Model	Sedan (Non-turbo)	Except sedan (Non-turbo)
1st	3.027	2.785
2nd	1.619	1.545
3rd	1.000	
4th	0.694	
Rev	2.272	

5. PLANETARY GEAR AND PLATE

Model	Non-turbo		Turbo
	Sedan	Wagon	
Tooth number of front sun gear	33		
Tooth number of front pinion	21		
Tooth number of front internal gear	75		
Tooth number of rear sun gear	37	42	
Tooth number of rear pinion	19	17	
Tooth number of rear internal gear	75		
Drive plate number of high clutch	4		5
Drive plate number of low clutch	6		7
Drive plate number of reverse clutch	2		
Drive plate number of 2-4 brake	3		4
Drive plate number of low & reverse brake	6		7

6. SELECTOR POSITION

P (Park)	Transmission in neutral, output member immovable, and engine start possible
R (Reverse)	Transmission in reverse for backing
N (Neutral)	Transmission in neutral and engine start possible
D (Drive)	Automatic gear change 1st $\leftarrow$ 2nd $\leftarrow$ 3rd $\leftarrow$ 4th
3 (3rd)	Automatic gear change 1st $\leftarrow$ 2nd $\leftarrow$ 3rd $\leftarrow$ 4th
2 (2nd)	2nd gear locked (Deceleration possible 2nd $\leftarrow$ 3rd $\leftarrow$ 4th)
1 (1st)	1st gear locked (Deceleration possible 1st $\leftarrow$ 2nd $\leftarrow$ 3rd $\leftarrow$ 4th)
Control method	Hydraulic remote control

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7. HYDRAULIC CONTROL AND LUBRICATION

Type	Electronic/hydraulic control [Four forward speed changes by electrical signals of vehicle speed and accelerator (throttle) opening]
Fluid	Dexron III type
Fluid capacity	9.3 — 9.6 ℓ (9.8 — 10.1 US qt, 8.2 — 8.4 Imp qt)
Lubrication system	Forced feed lubrication with oil pump
Oil	Automatic transmission fluid (above mentioned)

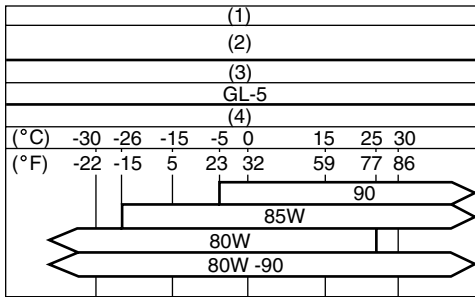
8. COOLING AND HARNESS

Cooling system	Liquid-cooled cooler incorporated in radiator
Inhibitor switch	12 poles
Transmission harness	20 poles

9. TRANSFER

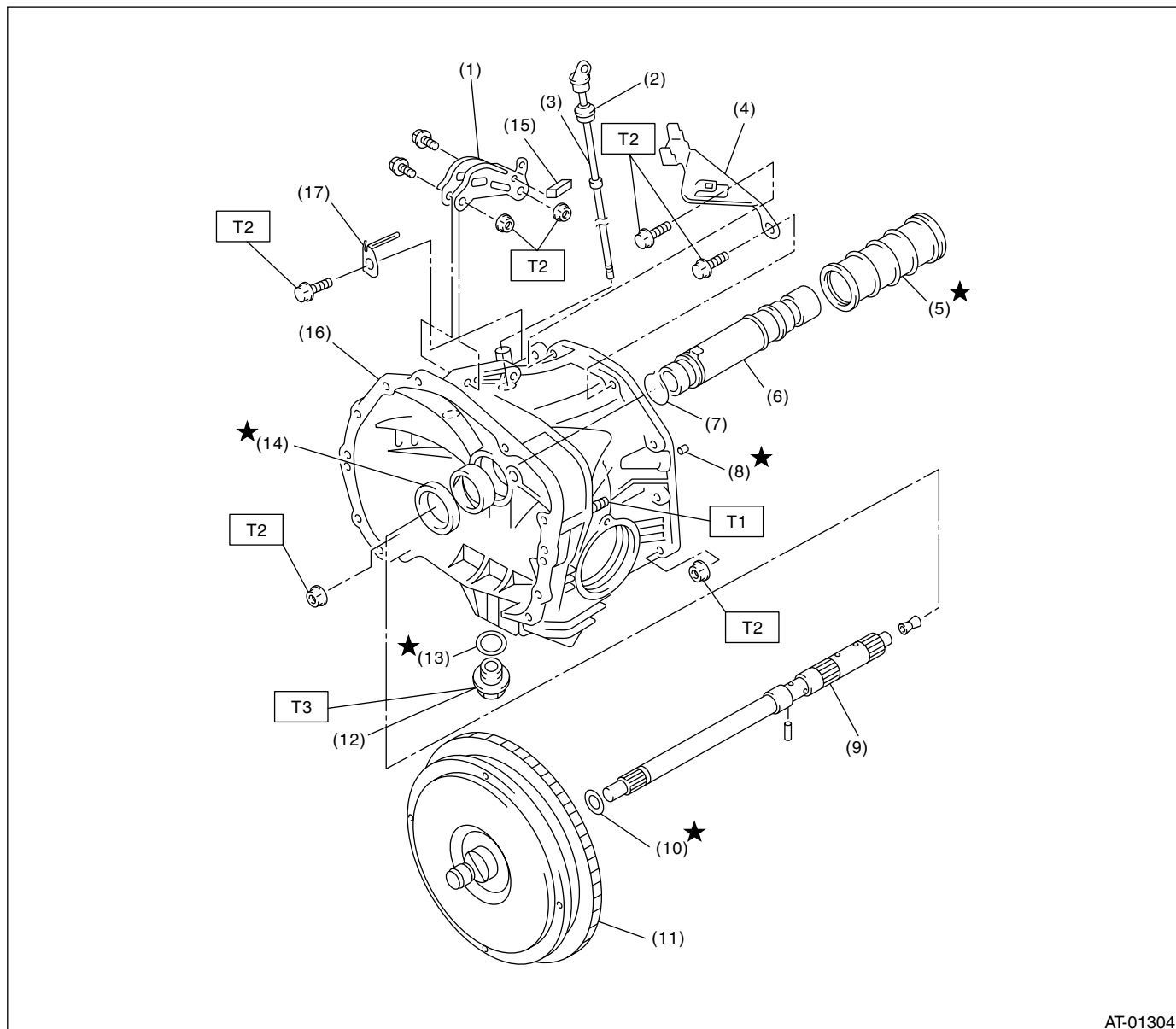
Model	Non-turbo	Turbo
Transfer type	Multi-plate transfer (MPT)	Variable torque distribution (VTD)
Drive & driven plate number of transfer clutch	5	3
Control method	Electronic, hydraulic type	
Lubricant	The same Automatic transmission fluid used in automatic transmission	
1st reduction gear ratio	1.000 (53/53)	

10.FINAL REDUCTION

Model	Except Sedan (Non-turbo)	Sedan (Non-turbo)
Front final gear ratio	4.111 (37/9)	4.444 (40/9)
Lubrication oil	 AT-00001 (1) Item (2) Front differential gear oil (3) API classification (4) SAE viscosity No. and applicable temperature	
Front differential oil capacity	1.1 — 1.3 ℓ (1.2 — 1.4 US qt, 1.0 — 1.1 Imp qt)	

B: COMPONENT

1. TORQUE CONVERTER CLUTCH AND CASE



AT-01304

(1) Pitching stopper bracket	(9) Input shaft
(2) O-ring	(10) O-ring
(3) Differential oil level gauge	(11) Torque converter clutch ASSY
(4) Stay	(12) Drain plug
(5) Seal pipe	(13) Gasket
(6) Oil pump shaft	(14) Oil seal
(7) Clip	(15) Clip (Turbo model)
(8) Oil drain pipe	(16) Torque converter clutch case

- (17) Harness stay (Non-turbo model)

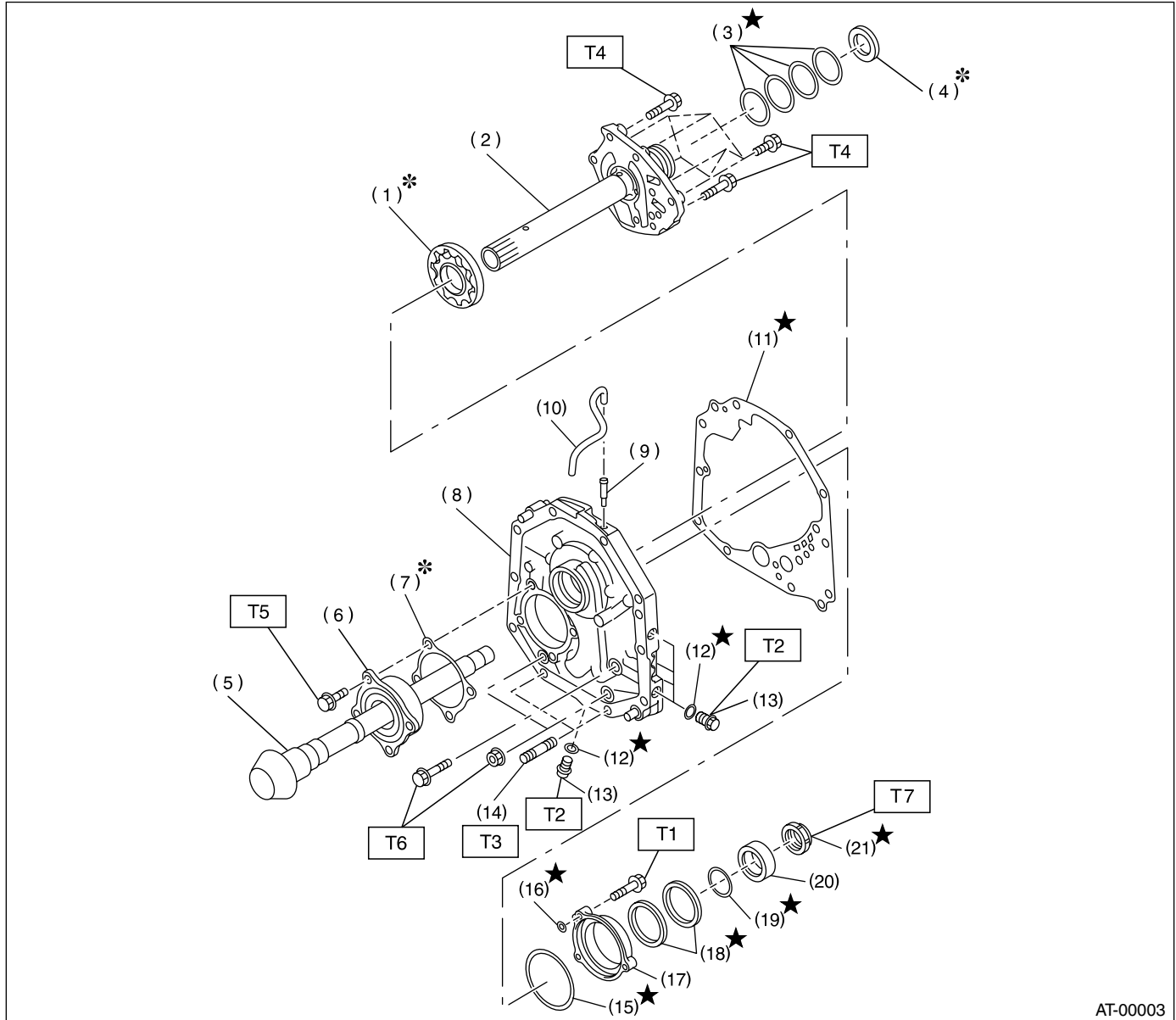
Tightening torque: N·m (kgf-m, ft-lb)

T1: 18 (1.8, 13.0)

T2: 41 (4.2, 30.4)

T3: 44 (4.5, 32.5)

2. OIL PUMP



AT-00003

- (1) Oil pump rotor
- (2) Oil pump cover
- (3) Seal ring
- (4) Thrust needle bearing
- (5) Drive pinion shaft
- (6) Roller bearing
- (7) Shim
- (8) Oil pump housing
- (9) Nipple
- (10) Air breather hose

- (11) Gasket
- (12) O-ring
- (13) Test plug
- (14) Stud bolt
- (15) O-ring
- (16) O-ring
- (17) Oil seal retainer
- (18) Oil seal
- (19) O-ring
- (20) Drive pinion collar

- (21) Lock nut

Tightening torque: N·m (kgf·m, ft·lb)

T1: 7 (0.7, 5.1)

T2: 13 (1.3, 9.4)

T3: 18 (1.8, 13.0)

T4: 25 (2.5, 18.1)

T5: 40 (4.1, 30)

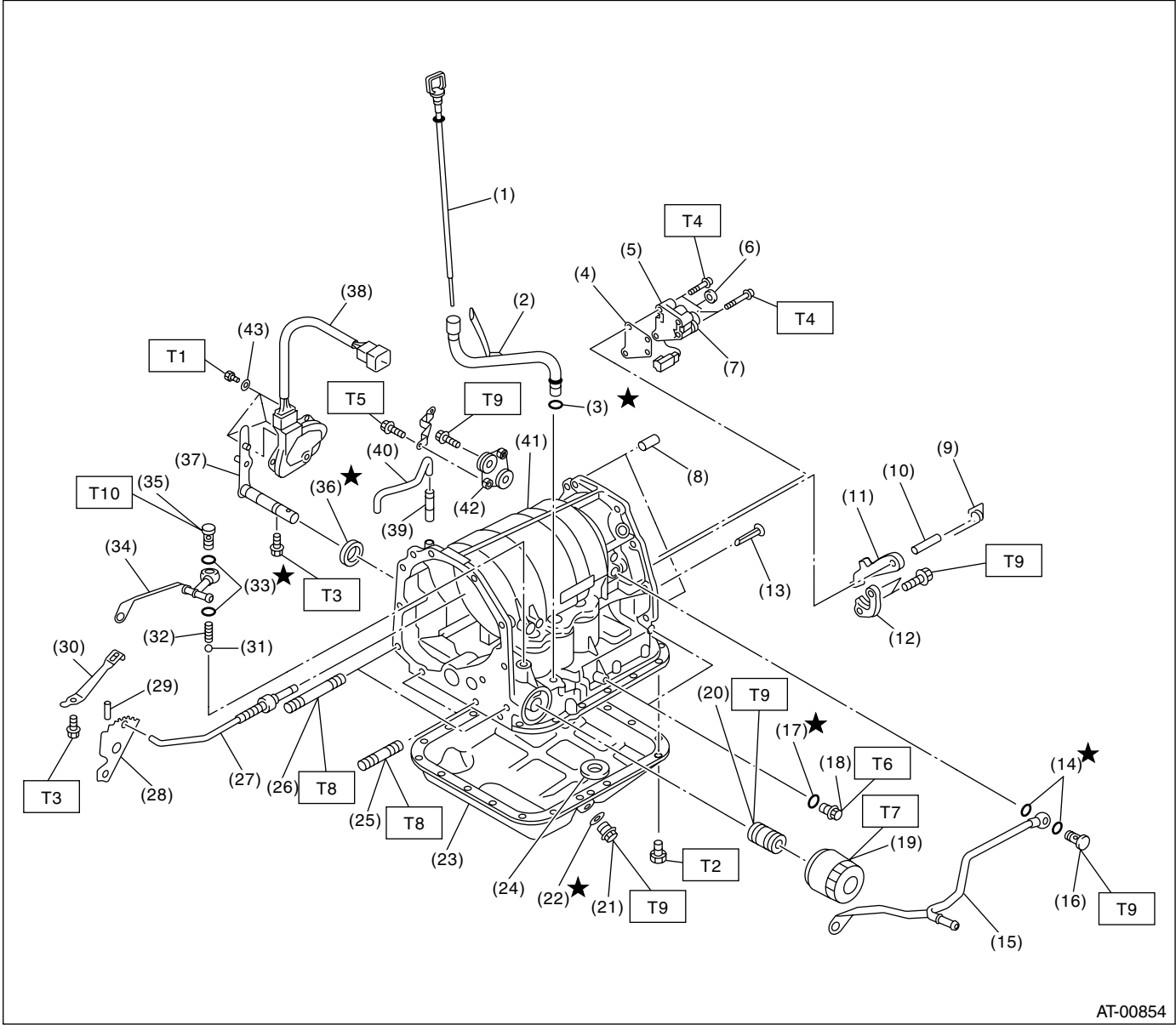
T6: 42 (4.3, 31)

T7: 116 (11.8, 85)

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3. TRANSMISSION CASE AND CONTROL DEVICE



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(1) ATF level gauge	(20) Oil filter stud bolt
(2) ATF charger pipe	(21) Drain plug
(3) O-ring	(22) Gasket
(4) Transfer valve plate	(23) Oil pan
(5) Transfer valve ASSY	(24) Magnet
(6) Transfer clutch seal	(25) Stud bolt (Short)
(7) Transfer duty solenoid	(26) Stud bolt (Long)
(8) Straight pin	(27) Parking rod
(9) Return spring	(28) Manual plate
(10) Shaft	(29) Spring pin
(11) Parking pawl	(30) Detention spring
(12) Parking support	(31) Ball
(13) Inlet filter	(32) Spring
(14) Gasket	(33) Gasket
(15) Inlet pipe	(34) Outlet pipe
(16) Union screw	(35) Union screw
(17) O-ring	(36) Oil seal
(18) Test plug	(37) Select lever
(19) Oil filter	(38) Inhibitor switch ASSY

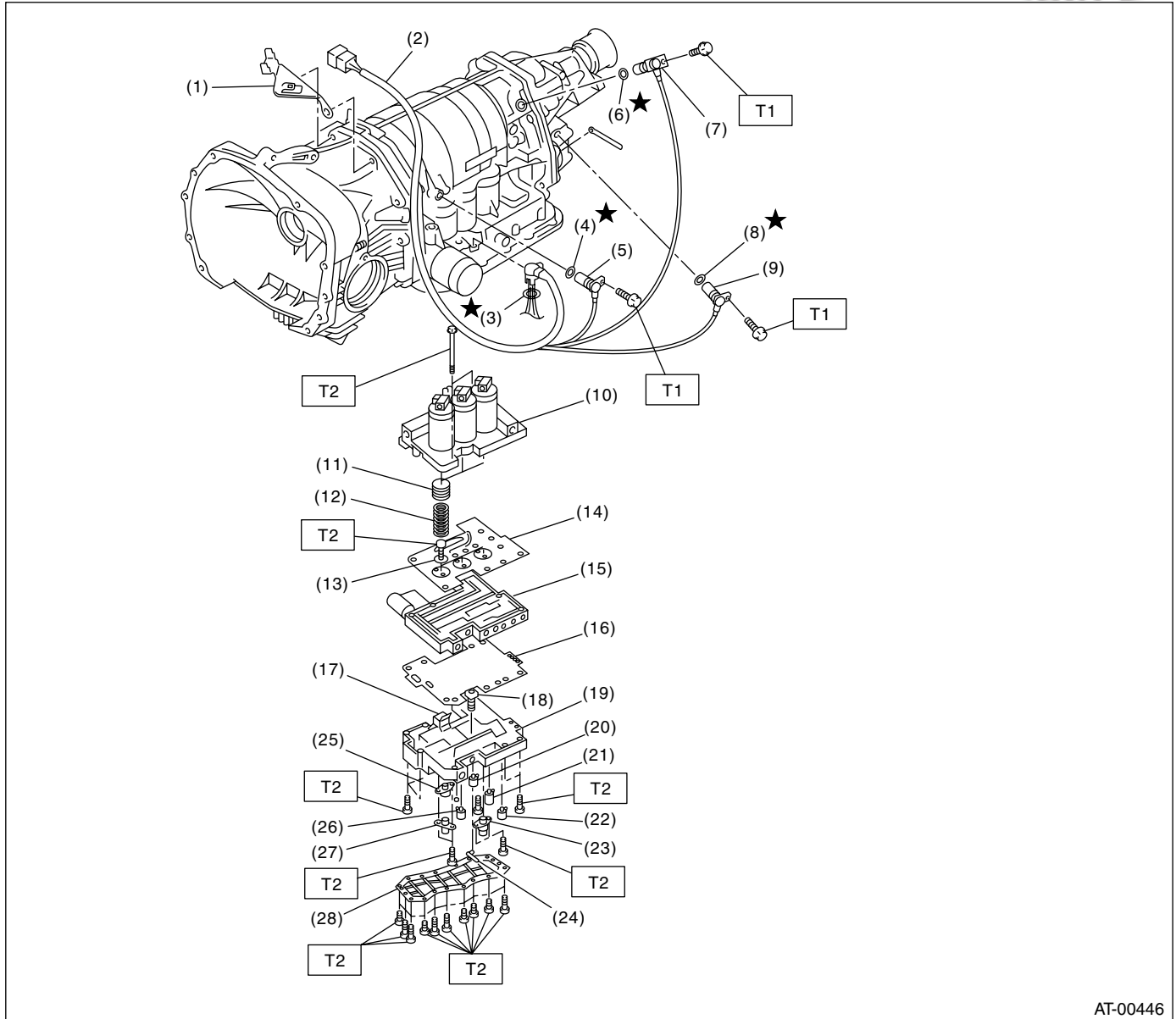
- | |
|------------------------|
| (39) Nipple |
| (40) Air breather hose |
| (41) Transmission case |
| (42) Plate ASSY |
| (43) Washer |

Tightening torque: N·m (kgf-m, ft-lb)**T1: 3.5 (0.36, 2.6)****T2: 5 (0.5, 3.6)****T3: 6 (0.6, 4)****T4: 8 (0.8, 6)****T5: 12 (1.2, 8.7)****T6: 13 (1.3, 10)****T7: 14 (1.4, 10)****T8: 18 (1.8, 13)****T9: 25 (2.6, 18)****T10: 44 (4.5, 32.5)**

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4. CONTROL VALVE AND HARNESS ROUTING



AT-00446

(1) Stay	(11) Accumulator piston	(22) 2-4 brake timing solenoid
(2) Transmission harness	(12) Accumulator spring	(23) 2-4 brake duty solenoid
(3) O-ring	(13) Side plate	(24) ATF temperature sensor
(4) O-ring	(14) Separate plate	(25) Line pressure duty solenoid
(5) Torque converter turbine speed sensor	(15) Middle valve body	(26) Low clutch timing solenoid
(6) O-ring	(16) Separate plate	(27) Lock-up duty solenoid
(7) Front vehicle speed sensor	(17) Fluid filter	(28) Oil strainer
(8) O-ring	(18) Fluid filter	
(9) Rear vehicle speed sensor	(19) Lower valve body	
(10) Upper valve body	(20) Shift solenoid 2	
	(21) Shift solenoid 1	

Tightening torque: N·m (kgf-m, ft-lb)

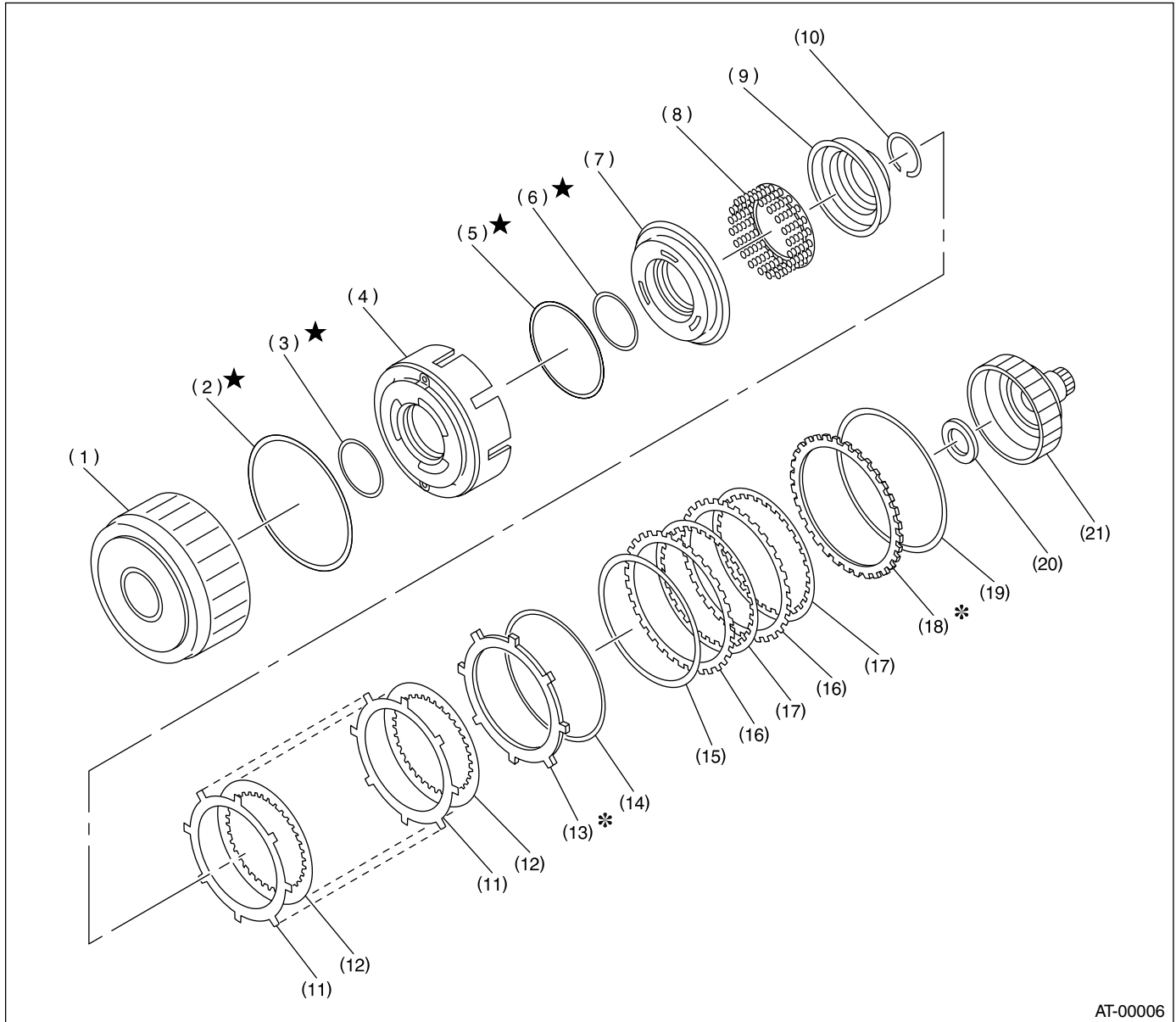
T1: 7 (0.7, 5.1)

T2: 8 (0.8, 5.8)

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5. HIGH CLUTCH AND REVERSE CLUTCH



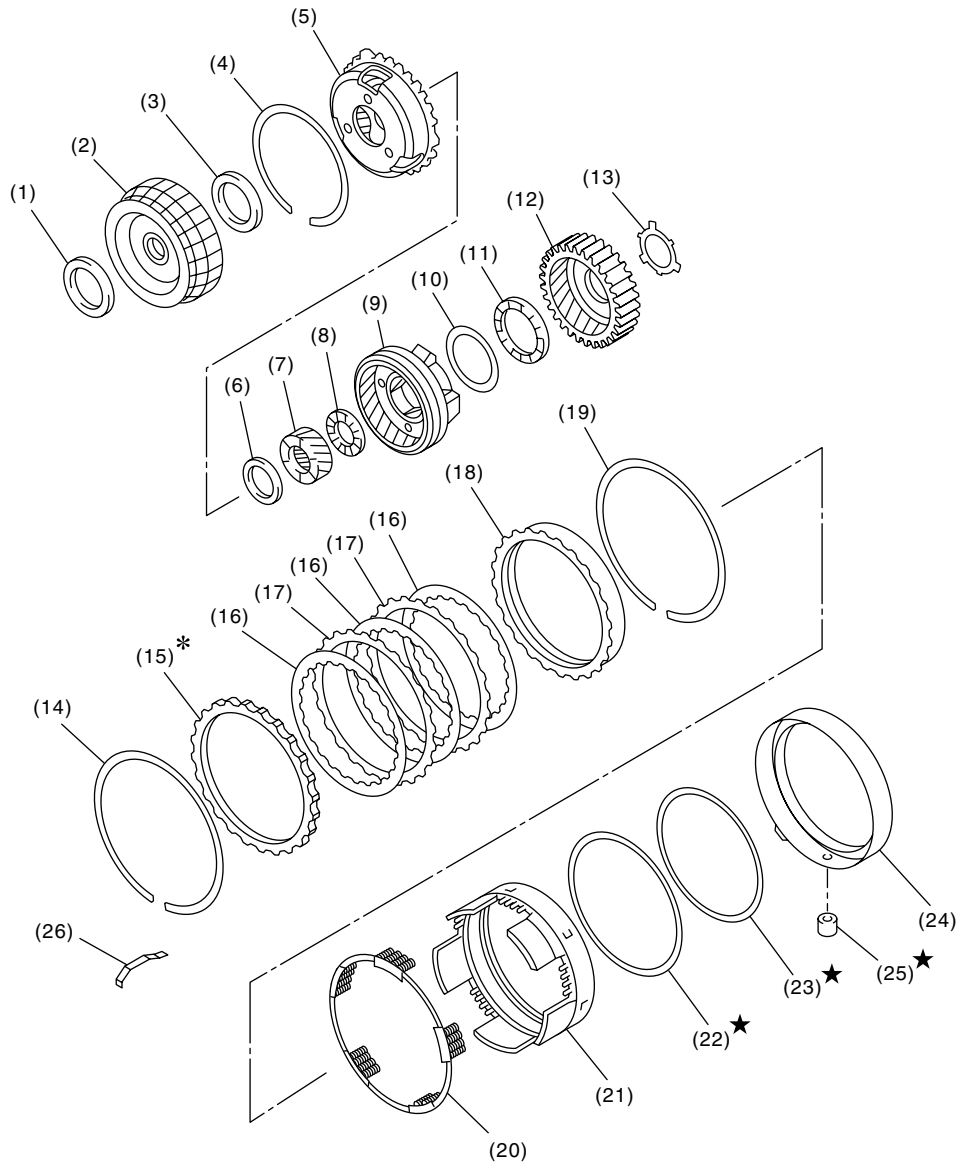
AT-00006

(1) High clutch drum	(8) Spring retainer	(15) Dish plate
(2) Lip seal	(9) Cover	(16) Driven plate
(3) D-ring	(10) Snap ring	(17) Drive plate
(4) Reverse clutch piston	(11) Driven plate	(18) Retaining plate
(5) D-ring	(12) Drive plate	(19) Snap ring
(6) D-ring	(13) Retaining plate	(20) Thrust needle bearing
(7) High clutch piston	(14) Snap ring	(21) High clutch hub

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6. PLANETARY GEAR AND 2-4 BRAKE



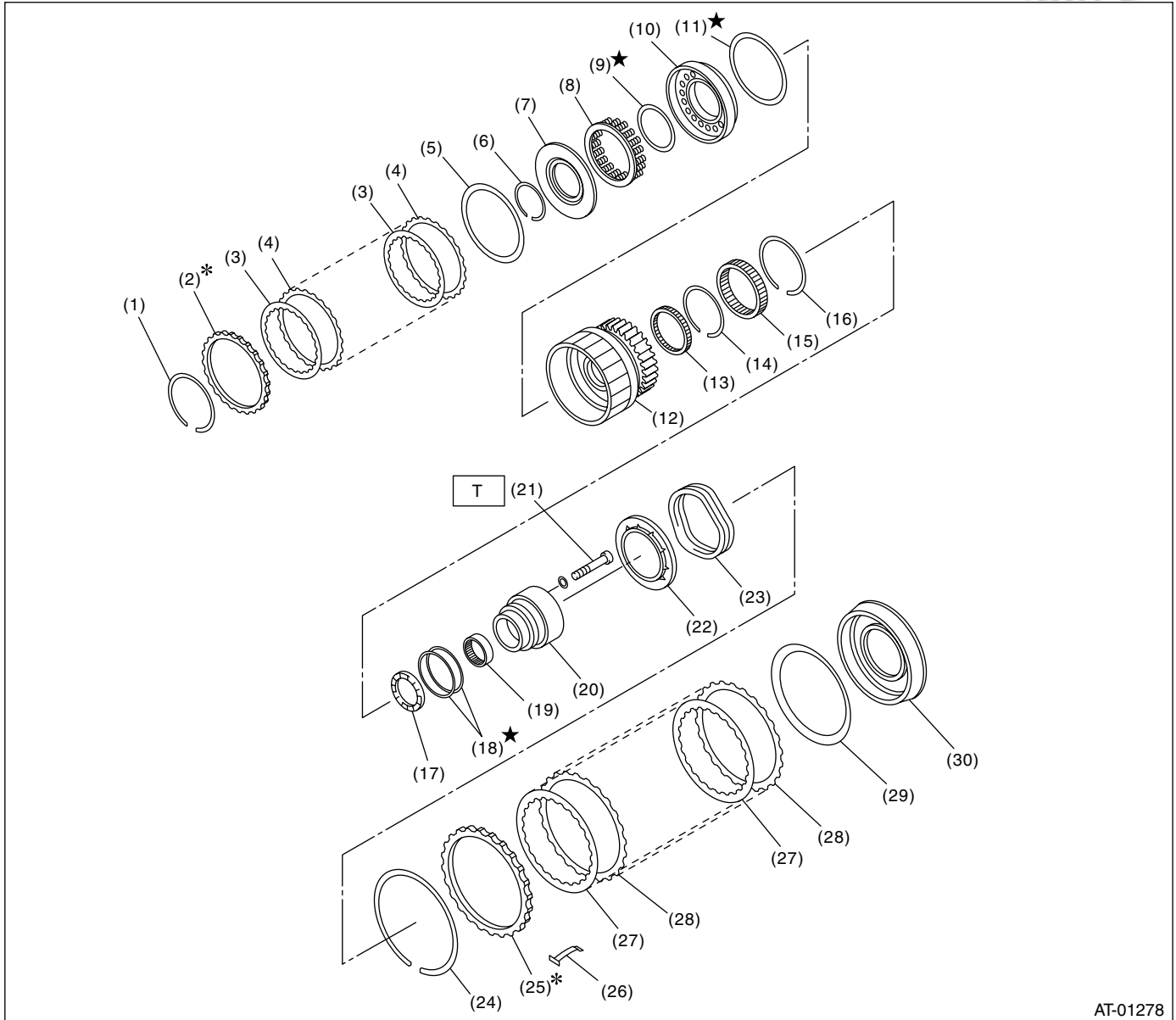
AT-00007

(1) Thrust needle bearing	(10) Washer	(19) Snap ring
(2) Front sun gear	(11) Thrust needle bearing	(20) Spring retainer
(3) Thrust needle bearing	(12) Rear internal gear	(21) 2-4 brake piston
(4) Snap ring	(13) Washer	(22) D-ring
(5) Front planetary carrier	(14) Snap ring	(23) D-ring
(6) Thrust needle bearing	(15) Retaining plate	(24) 2-4 brake piston retainer
(7) Rear sun gear	(16) Drive plate	(25) 2-4 brake seal
(8) Thrust needle bearing	(17) Driven plate	(26) Leaf spring
(9) Rear planetary carrier	(18) Pressure rear plate	

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7. LOW CLUTCH AND LOW & REVERSE BRAKE



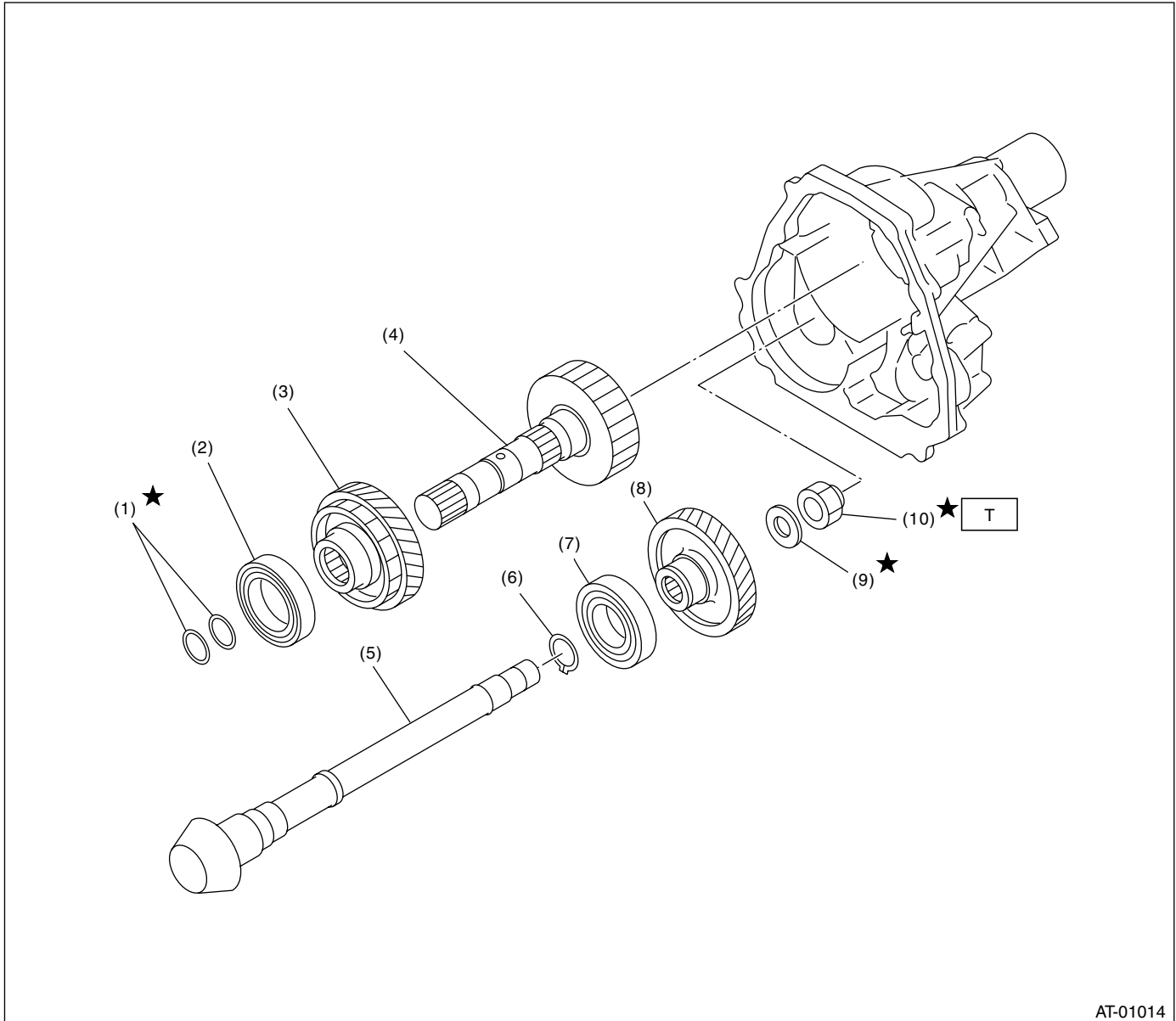
AT-01278

(1) Snap ring	(12) Low clutch drum	(23) Return spring
(2) Retaining plate	(13) Needle bearing	(24) Snap ring
(3) Drive plate	(14) Snap ring	(25) Retaining plate
(4) Driven plate	(15) One-way clutch	(26) Leaf spring
(5) Dish plate	(16) Snap ring	(27) Drive plate
(6) Snap ring	(17) Thrust needle bearing	(28) Driven plate
(7) Cover	(18) Seal ring	(29) Dish plate
(8) Spring retainer	(19) Needle bearing	(30) Low & reverse brake piston
(9) D-ring	(20) One-way clutch inner race	
(10) Low clutch piston	(21) Socket bolt	
(11) D-ring	(22) Spring retainer	

Tightening torque: N·m (kgf-m, ft-lb)

T: 25 (2.5, 18.1)

8. REDUCTION GEAR WITH MPT



(1) Seal ring	(6) Snap ring
(2) Ball bearing	(7) Ball bearing
(3) Reduction drive gear	(8) Reduction driven gear
(4) Reduction drive shaft	(9) Washer
(5) Drive pinion shaft	(10) Lock nut

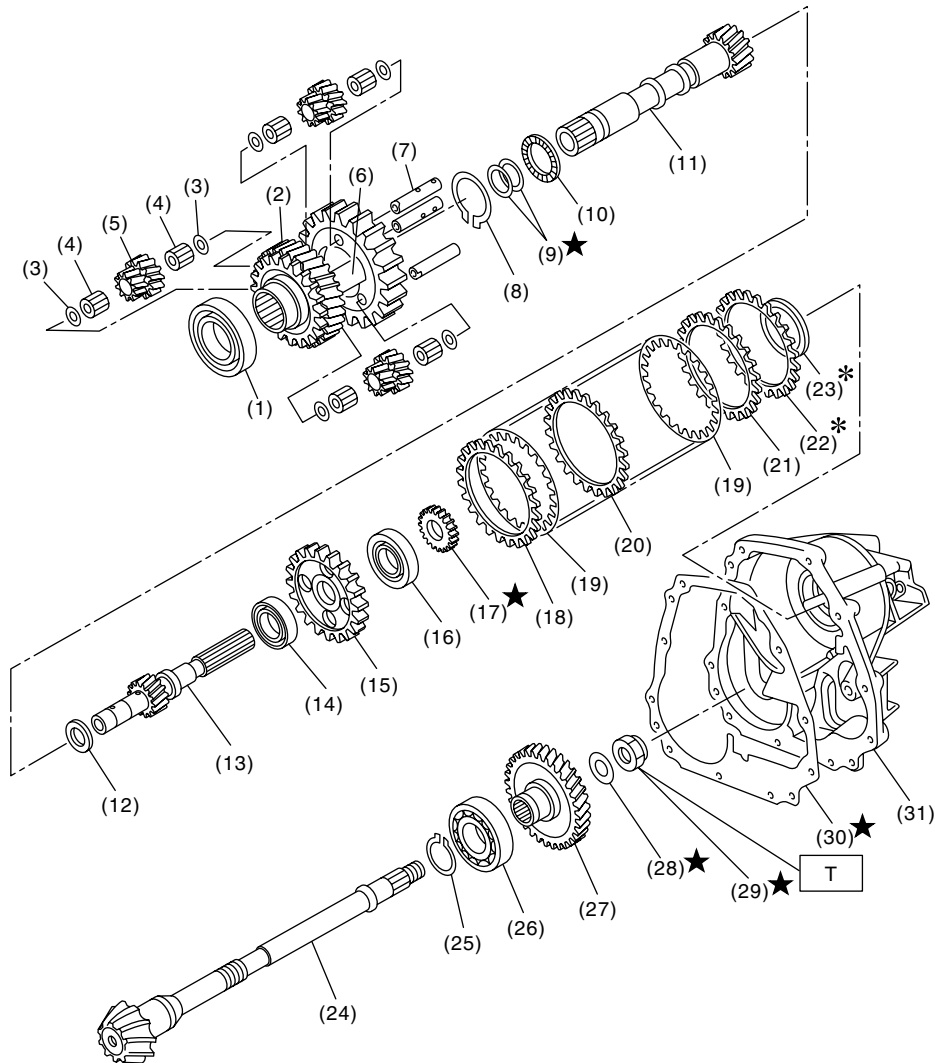
Tightening torque: N·m (kgf·m, ft·lb)

T: 100 (10.2, 73.8)

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9. REDUCTION GEAR WITH VTD



AT-00010

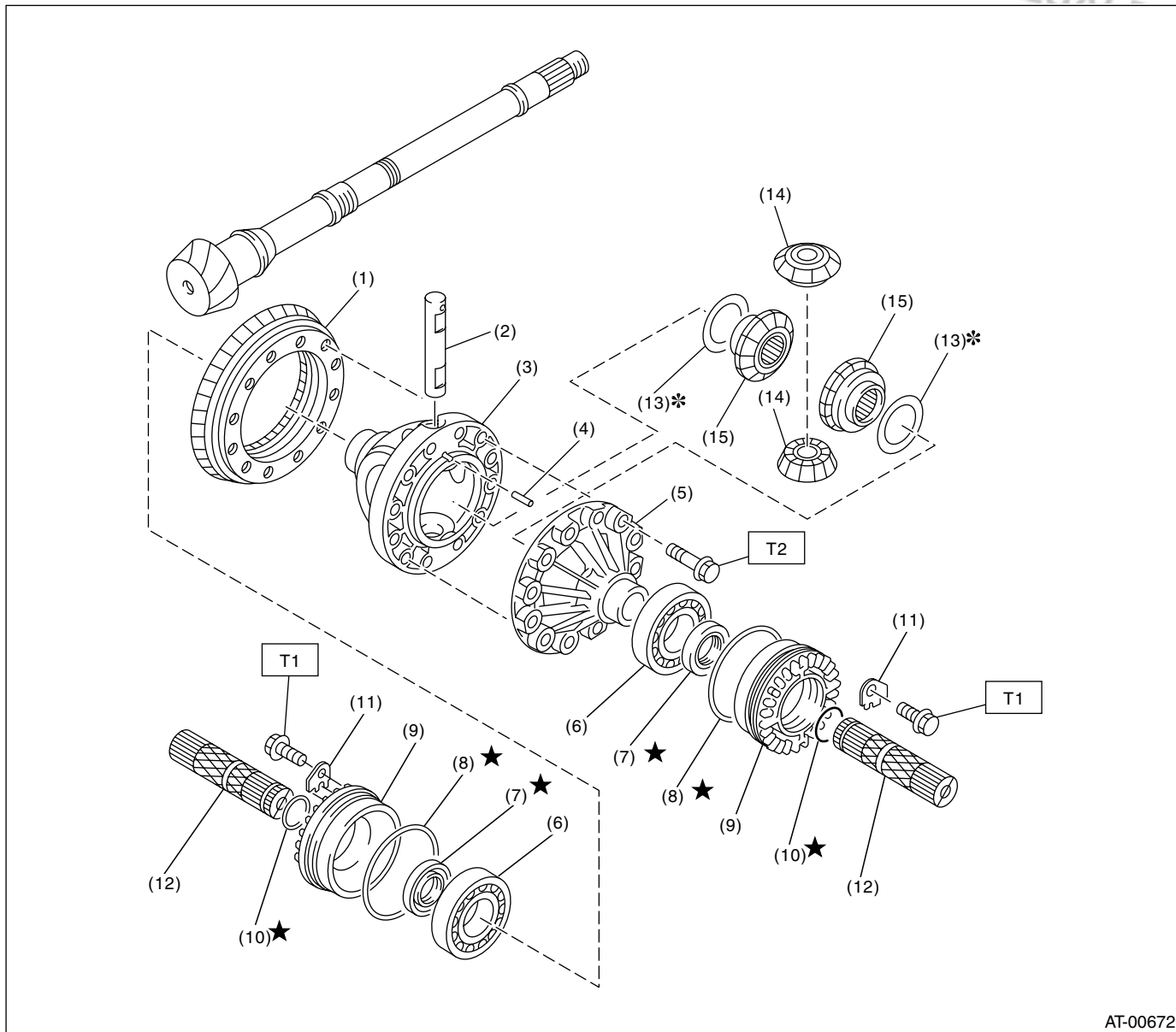
(1) Ball bearing	(13) Rear drive shaft	(25) Snap ring
(2) Reduction drive gear	(14) Ball bearing	(26) Ball bearing
(3) Washer	(15) Multi-plate clutch (LSD) hub	(27) Reduction driven gear
(4) Needle bearing	(16) Ball bearing	(28) Lock washer
(5) Pinion gear	(17) Revolution gear	(29) Lock nut
(6) Carrier	(18) Driven plate (Thick)	(30) Gasket
(7) Planetary pinion shaft	(19) Driven plate	(31) Extension case
(8) Snap ring	(20) Driven plate (Thin)	
(9) Seal ring	(21) Driven plate (Thick)	
(10) Thrust needle bearing	(22) Pressure plate	
(11) Intermediate shaft	(23) Rear drive shaft shim	
(12) Thrust washer	(24) Drive pinion shaft	

Tightening torque: N·m (kgf-m, ft-lb)
T: 100 (10.2, 73.8)

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10.DIFFERENTIAL GEAR



AT-00672

(1) Crown gear	(8) O-ring
(2) Pinion shaft	(9) Differential side retainer
(3) Differential case (RH)	(10) Circlip
(4) Straight pin	(11) Lock plate
(5) Differential case (LH)	(12) Axle shaft
(6) Taper roller bearing	(13) Washer
(7) Oil seal	(14) Differential bevel pinion

- (15) Differential bevel gear

Tightening torque: N·m (kgf-m, ft-lb)

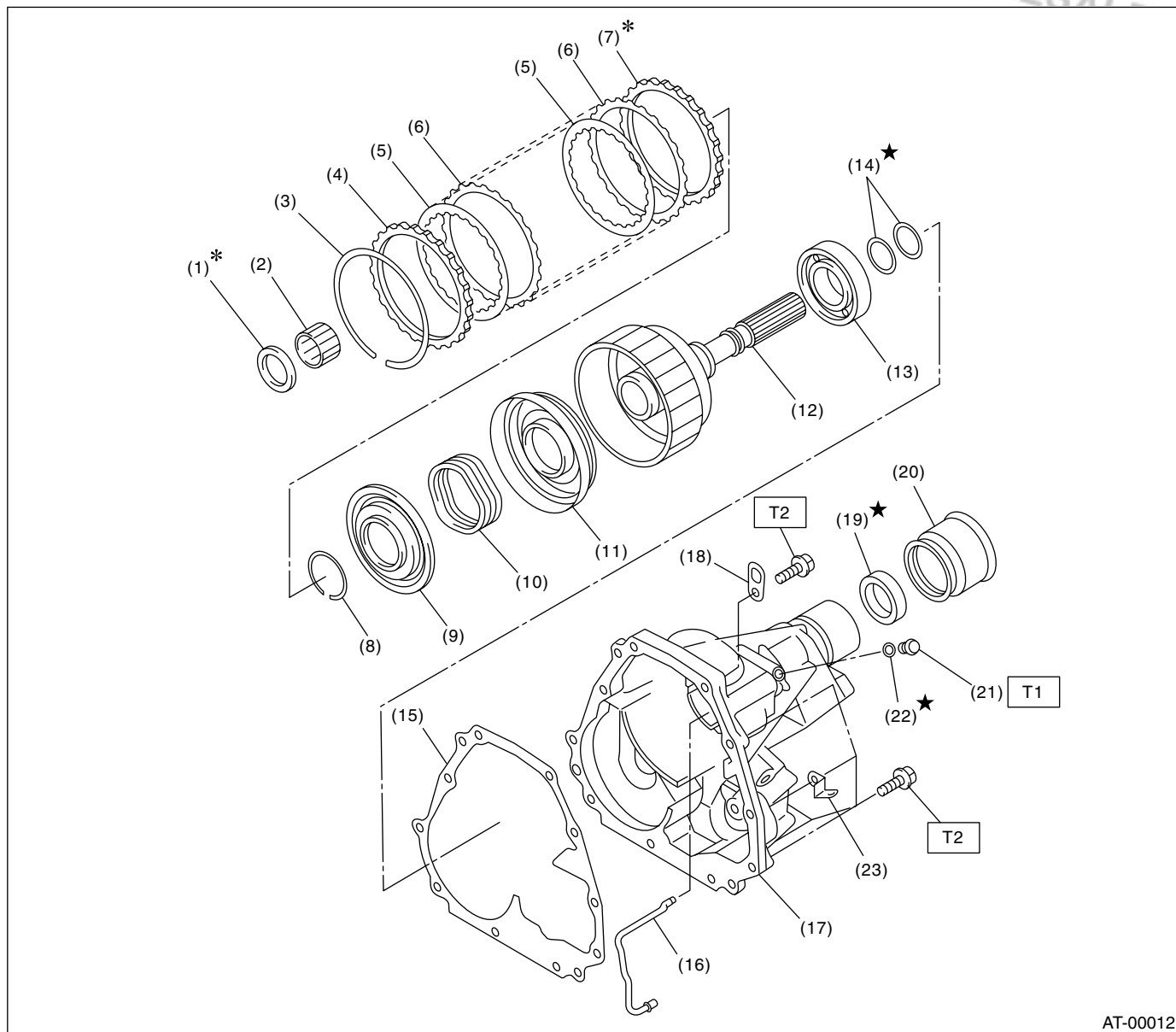
T1: 25 (2.5, 18.1)

T2: 62 (6.3, 45.6)

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11.TRANSFER AND EXTENSION CASE WITH MPT



AT-00012

- (1) Thrust needle bearing
- (2) Needle bearing
- (3) Snap ring
- (4) Pressure plate
- (5) Drive plate
- (6) Driven plate
- (7) Retaining plate
- (8) Snap ring
- (9) Transfer piston seal

- (10) Return spring
- (11) Transfer clutch piston
- (12) Rear drive shaft
- (13) Ball bearing
- (14) Seal ring
- (15) Gasket
- (16) Transfer clutch pipe
- (17) Extension case
- (18) Transmission hanger

- (19) Oil seal
- (20) Dust cover
- (21) Test plug
- (22) O-ring
- (23) Clip

Tightening torque: N·m (kgf-m, ft-lb)

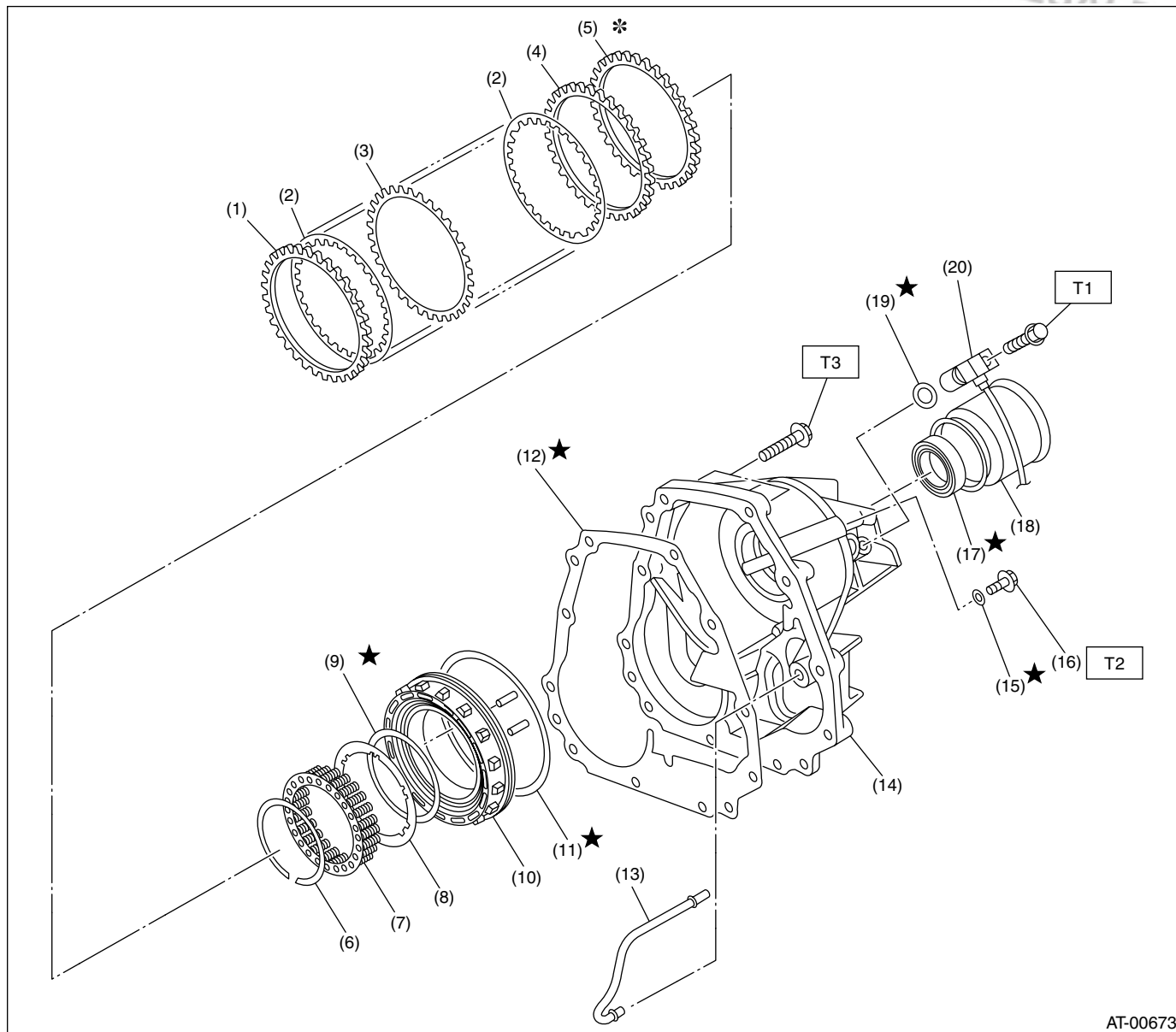
T1: 13 (1.3, 9.4)

T2: 25 (2.5, 18.1)

GENERAL DESCRIPTION

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12. TRANSFER AND EXTENSION CASE WITH VTD



AT-00673

- (1) Driven plate (Thick)
- (2) Driven plate
- (3) Driven plate (Thin)
- (4) Driven plate (Thick)
- (5) Retaining plate
- (6) Snap ring
- (7) Spring retainer
- (8) Plate
- (9) O-ring

- (10) Multi-plate clutch (LSD) piston
- (11) D-ring
- (12) Gasket
- (13) Multi-plate clutch (LSD) pipe
- (14) Extension case
- (15) O-ring
- (16) Test plug
- (17) Oil seal
- (18) Dust cover

- (19) O-ring
- (20) Rear wheel sensor

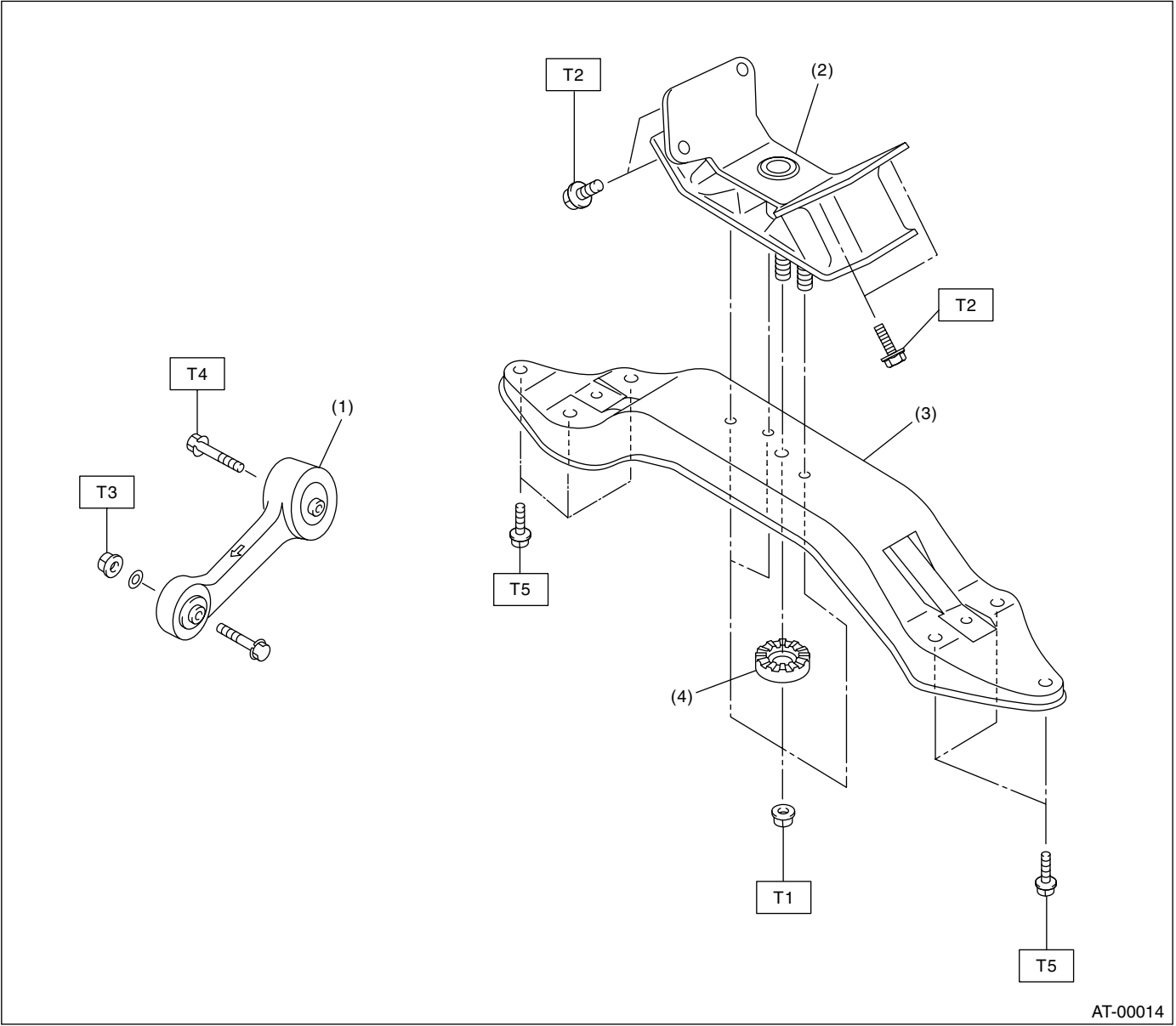
Tightening torque: N·m (kgf·m, ft·lb)

T1: 7 (0.7, 5.1)

T2: 13 (1.3, 9.4)

T3: 25 (2.5, 18.1)

13.TRANSMISSION MOUNTING



- (1) Pitching stopper
(2) Rear cushion rubber

- (3) Crossmember
(4) Stopper

Tightening torque: N·m (kgf·m, ft·lb)

- T1: 35 (3.6, 26)**
T2: 39 (4.0, 29)
T3: 50 (5.1, 37)
T4: 58 (5.9, 43)
T5: 70 (7.1, 51)

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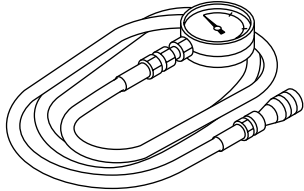
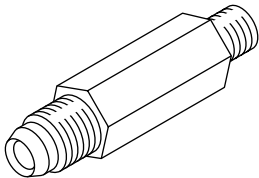
C: CAUTION

- Wear working clothing, including a cap, protective goggles, and protective shoes during operation.
- Remove contamination including dirt and corrosion before removal, installation, and disassembly.
- Keep the disassembled parts in order and protect them from dust or dirt.
- Until the oil pan is removed, do not place with the oil pan side facing up to prevent foreign matter from entering the valve body.
- Before removal, installation or disassembly, be sure to clarify the failure. Avoid unnecessary removal, installation, disassembly and replacement.
- When disassembling the case and other light alloy parts, use a plastic hammer to force it apart. Do not pry it apart with a screwdriver or other tool.
- Be careful not to burn your hands, because each part on the vehicle is hot after running.

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

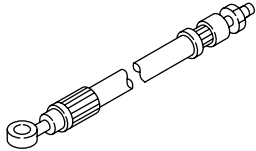
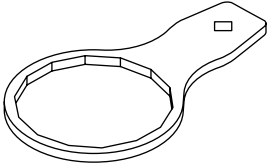
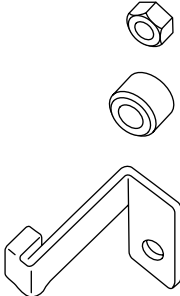
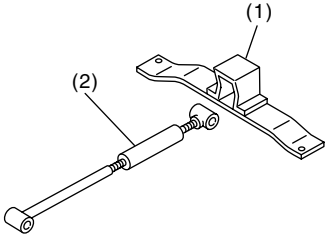
D: PREPARATION TOOL

1. SPECIAL TOOLS

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-498575400	498575400	OIL PRESSURE GAUGE ASSY	Used for measuring oil pressure.
 ST-498897200	498897200	ADAPTER	Used oil pump housing when measuring reverse clutch pressure and line pressure.

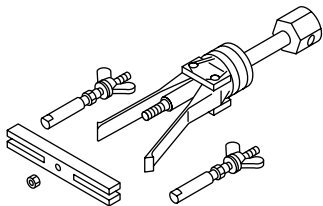
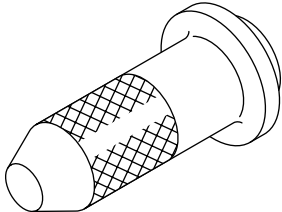
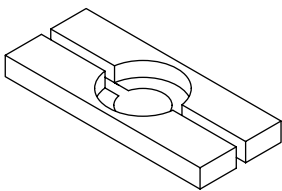
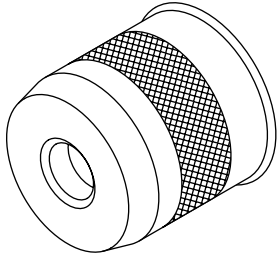
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 ST-498897700	498897700	ADAPTER SET	Used for measuring transfer clutch pressure.
 ST-498545400	498545400	FILTER WRENCH	Used for removing and installing ATF filter.
 ST-498277200	498277200	STOPPER SET	Used for removing and installing automatic transmission assembly to engine.
 ST41099AA000	41099AA000	ENGINE SUPPORT ASSY	Used for supporting engine. (1) ENGINE SUPPORT BRACKET (41099AA010) (2) ENGINE SUPPORT (41099AA020)

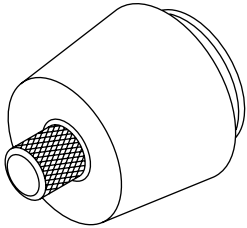
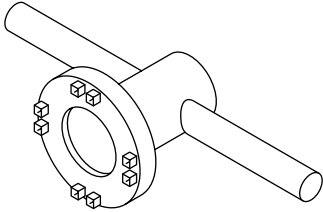
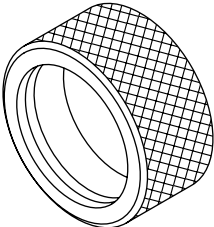
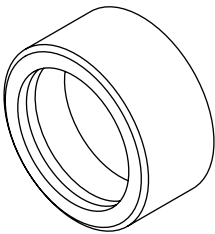
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ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-398527700	398527700	PULLER ASSY	- Used for removing extension case roller bearing. - Used for removing extension oil seal. - Used for removing front differential side retainer bearing outer race. - Used for removing front differential side retainer bearing outer ball race.
 ST-498057300	498057300	INSTALLER	Used for installing extension oil seal.
 ST-498077000	498077000	REMOVER	Used for removing differential taper roller bearing.
 ST-499247400	499247400	INSTALLER	- Used for installing transfer outer snap ring. - Used with GUIDE (499257300).

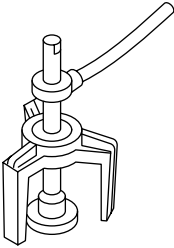
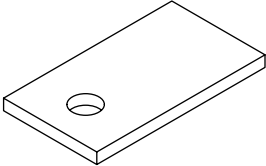
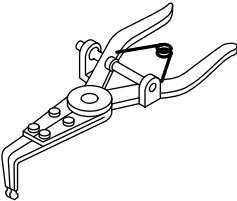
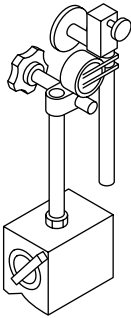
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ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-499257300	499257300	SNAP RING OUTER GUIDE	- Used for installing transfer outer snap ring. - Used with INSTALLER (499247400).
 ST-499787000	499787000	WRENCH ASSY	Used for removing and installing differential side retainer.
 ST-398437700	398437700	DRIFT	Used for installing converter case oil seal.
 ST-398487700	398487700	INSTALLER	Used for installing taper roller bearing of front differential.

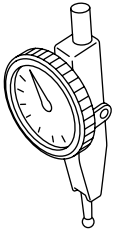
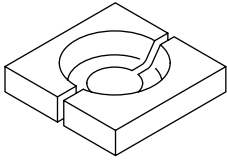
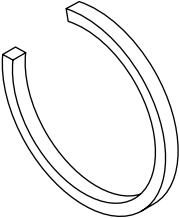
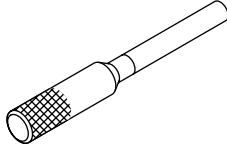
GENERAL DESCRIPTION

AUTOMATIC TRANSMISSION

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-398673600	398673600	COMPRESSOR	Used for removing and installing clutch spring.
 ST-498255400	498255400	PLATE	Used for measuring backlash of hypoid gear.
 ST-399893600	399893600	PLIERS	Used for removing and installing clutch spring.
 ST-498247001	498247001	MAGNET BASE	- Used for measuring gear backlash. - Used with DIAL GAUGE (498247100).

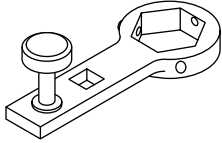
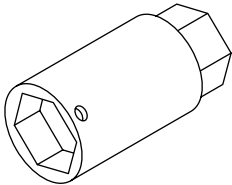
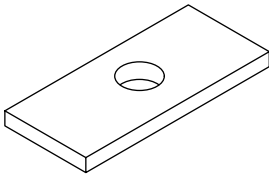
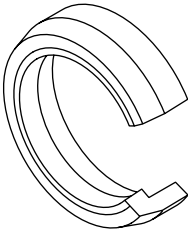
GENERAL DESCRIPTION

AUTOMATIC TRANSMISSION

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-498247100	498247100	DIAL GAUGE	- Used for measuring gear backlash. - Used with MAGNET BASE (498247001).
 ST-498517000	498517000	REPLACER	Used for removing front roller bearing.
 ST-398623600	398623600	SEAT	Used for removing spring of transfer clutch piston.
 ST-499267300	499267300	STOPPER PIN	Used for installing inhibitor switch.

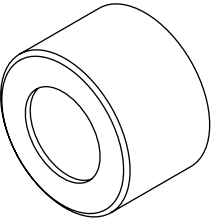
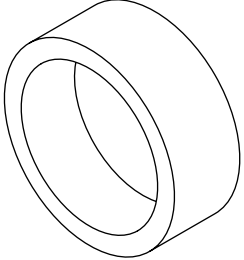
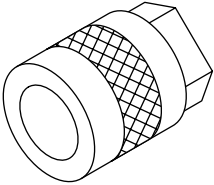
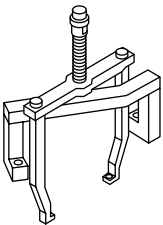
GENERAL DESCRIPTION

AUTOMATIC TRANSMISSION

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-499787700	499787700	WRENCH	Used for removing and installing drive pinion lock nut.
 ST-499787500	499787500	ADAPTER	Used for removing and installing drive pinion lock nut.
 ST-398643600	398643600	GAUGE	Used for measuring total end play, extension end play and drive pinion height.
 ST-498627100	498627100	SEAT	Used for holding low clutch piston retainer spring when installing snap ring.

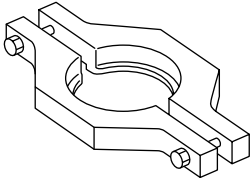
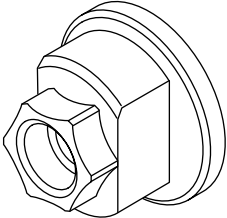
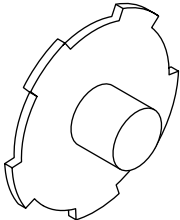
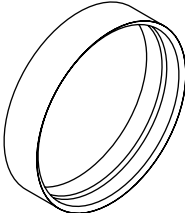
GENERAL DESCRIPTION

AUTOMATIC TRANSMISSION

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-499577000	499577000	GAUGE	- Used for measuring the transmission case mating surface to the reduction gear end surface. - For MPT model.
 ST-398744300	398744300	GAUGE	- Use for measuring contact face between multi-plate clutch end and transmission. - For VTD model.
 ST-499737000	499737000	PULLER	Used for removing reduction driven gear assembly.
 ST-499737100	499737100	PULLER SET	Used for removing reduction drive gear assembly.

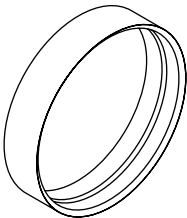
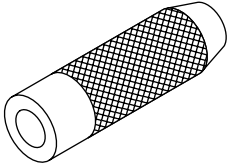
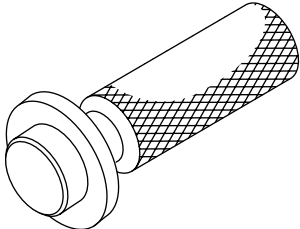
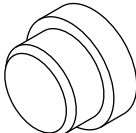
GENERAL DESCRIPTION

AUTOMATIC TRANSMISSION

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-498077600	498077600	REMOVER	Used for removing ball bearing.
 ST-498937110	498937110	HOLDER	Used for removing and installing drive pinion lock nut.
 ST-498677100	498677100	COMPRESSOR	Used for installing 2-4 brake snap ring.
 ST-498437000	498437000	HIGH CLUTCH PISTON GUIDE	Used for installing high clutch piston.

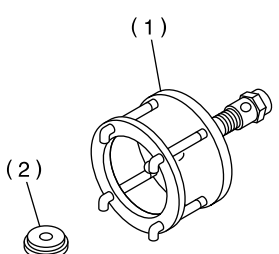
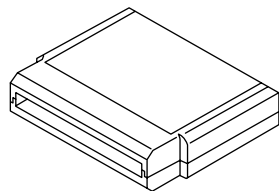
GENERAL DESCRIPTION

AUTOMATIC TRANSMISSION

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-498437100	498437100	LOW CLUTCH PISTON GUIDE	Used for installing low clutch piston.
 ST-899580100	899580100	INSTALLER	Used for press-fitting the ball bearing for transfer clutch.
 ST-499797000	499797000	INSTALLER	Used for installing differential side retainer oil seal.
 ST-398497701	398497701	SEAT	Used for installing needle bearing.

GENERAL DESCRIPTION

AUTOMATIC TRANSMISSION

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-899524100	899524100	PULLER SET	- Using the bolt only. (1) Bolt - Used with PULLER SET (499737100). - Used with PULLER (499737000). (1) Puller (2) Cap
 ST24082AA230	24082AA230 (Newly adapted tool)	CARTRIDGE	Troubleshooting for electrical systems.
 ST22771AA030	22771AA030	SUBARU SELECT MONITOR KIT	Troubleshooting for electrical systems.

2. GENERAL PURPOSE TOOLS

TOOL NAME	REMARKS
Depth gauge	Used for measuring transmission end play.
Thickness gauge	Used for measuring clearances of clutch, brake and oil pump.
Micro meter	Used for measuring thickness of drive pinion.
Spring balance	Used for measuring starting torque of drive pinion.
Circuit tester	Used for measuring resistance and voltage.
TORX® T70	Used for removing and installing differential gear oil drain plug.

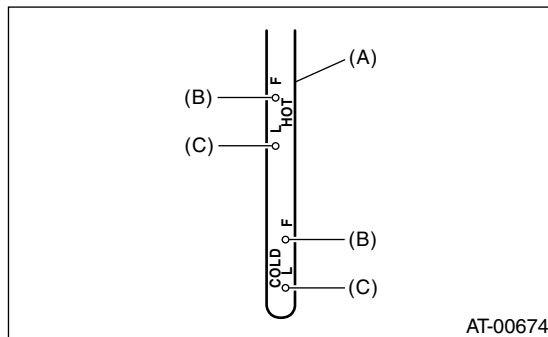
2. Automatic Transmission Fluid

A: INSPECTION

NOTE:

The level of ATF varies with fluid temperature. Pay attention to the fluid temperature when checking ATF level.

- 1) Raise the ATF temperature by driving a distance of 5 to 10 km (3 to 6 miles). Otherwise, idle the engine to raise ATF temperature to 70 — 80°C (158 — 176°F) on SUBARU Select Monitor. <Ref. to 4AT-21, READ CURRENT DATA, OPERATION, Subaru Select Monitor.>
- 2) Make sure the vehicle is level.
- 3) After selecting all positions (P, R, N, D, 3, 2, 1), set the select lever in “P” range. Measure the ATF level with the engine idling for one or two minutes.



- (A) ATF level gauge
- (B) Upper level
- (C) Lower level

- 4) Make sure that ATF level is above the center of upper and lower marks at HOT side.

NOTE:

When the transmission is hot, the level should be above the center of upper and lower marks, and when it is cold, the level should be found below the center of these two marks.

- 5) If the ATF level is below the center between upper and lower marks, add the recommended ATF until the ATF level is found above the center between upper and lower marks.

CAUTION:

- Use care not to exceed the upper limit level.
- Remember that the addition of ATF to the upper limit mark when the transmission is cold will result in overfilling of ATF, causing a transmission failure.

- 6) Check ATF level after raising ATF temperature to 70 — 80°C (158 — 176°F) by running the vehicle or by idling the engine again.

- 7) Check the ATF for leaks.

Check for leaks in the transmission. If there are leaks, it is necessary to repair or replace gasket, oil seals, plugs or other parts.

B: REPLACEMENT

- 1) Lift-up the vehicle.
- 2) Drain the ATF completely.

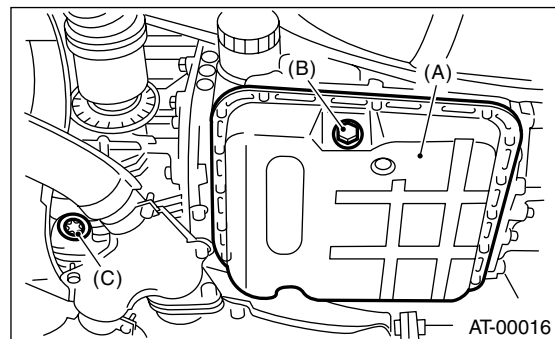
CAUTION:

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

- 3) Replace with a new gasket, and then tighten the ATF drain plug.

Tightening torque:

25 N·m (2.5 kgf-m, 18.1 ft-lb)



- (A) Oil pan
- (B) Drain plug (ATF)
- (C) Differential oil drain plug

- 4) Lower the vehicle.
- 5) Pour ATF into the oil charge pipe.

Recommended fluid:

Dexron III type automatic transmission fluid

Capacity:

Fill the same amount of ATF drained from drain plug hole.

Capacity when transmission is overhauled:

9.3 — 9.6 ℓ (9.8 — 10.1 US qt, 8.2 — 8.4 Imp qt)

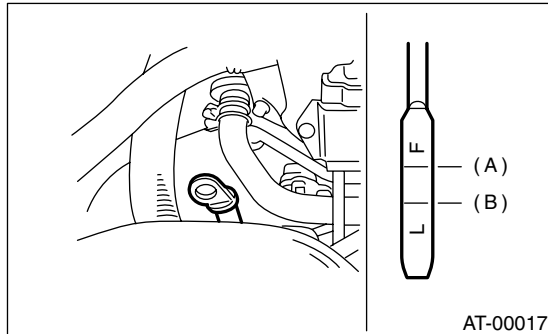
- 6) Check the level and leaks of ATF.

<Ref. to 4AT-29, INSPECTION, Automatic Transmission Fluid.>

3. Differential Gear Oil

A: INSPECTION

- 1) Park the vehicle on a level surface.
- 2) Remove the oil level gauge and wipe it clean.
- 3) Reinsert the level gauge all the way. Be sure that the level gauge is correctly inserted and in the proper orientation.
- 4) Remove it again and note the reading. If the differential gear oil level is below the "L" line, add oil to bring the level up to the "F" line.
- 5) To prevent overfilling the differential gear oil, do not add oil above the "F" line.



- (A) Upper level
(B) Lower level

B: REPLACEMENT

- 1) Lift-up the vehicle.
- 2) Remove the differential gear oil drain plug using TORX® T70, and then drain the differential gear oil completely.

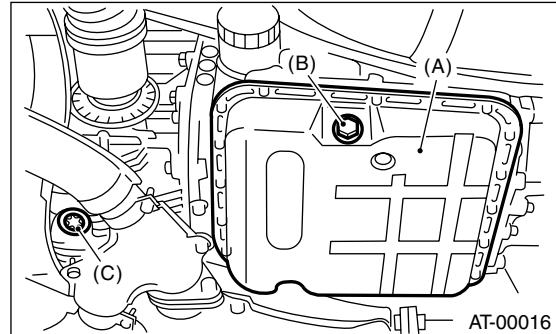
CAUTION:

- Directly after the engine has been running, the differential gear oil is hot. Be careful not to burn yourself.
- Be careful not to spill the differential gear oil on exhaust pipe to prevent it from emitting smoke or fire. When the differential gear oil is spilled on exhaust pipe, wipe it away completely.

- 3) Replace the gasket with a new one, and then tighten the differential gear oil drain plug using TORX® T70.

Tightening torque:

44 N·m (4.5 kgf-m, 32.5 ft-lb)



- (A) Oil pan
(B) Drain plug
(C) Differential oil drain plug

- 4) Lower the vehicle.
- 5) Pour gear oil into the gauge hole.

Recommended fluid:

Use GL-5 (SAE: 80W — 90) or equivalent.

Gear oil capacity:

1.1 — 1.3 ℓ (1.2 — 1.4 US qt, 1.0 — 1.1 Imp qt)

- 6) Check the level of differential gear oil.
<Ref. to 4AT-30, INSPECTION, Differential Gear Oil.>

4. Road Test

A: INSPECTION

1. GENERAL PRECAUTION

Road tests should be conducted to properly diagnose the condition of the automatic transmission.

NOTE:

When performing the test, do not exceed posted speed limit.

2. D RANGE SHIFT FUNCTION

Check shifting between 1st ⇔ 2nd ⇔ 3rd ⇔ 4th while driving on normal city streets.

3. D RANGE SHIFT SHOCK

Check the shock level when shifting up during normal driving.

4. KICK-DOWN FUNCTION

Check kick-down for each gear. Also check the kick-down shock level.

5. ENGINE BRAKE OPERATION

- Check the 3rd gear engine brake when shifting between D ⇔ 3rd range while driving in 4th gear of D range [50 to 60 km/h (31 to 37 MPH)].
- Check the 2nd gear engine brake when shifting between 3 ⇔ 2 range while driving in the 3 range 3rd gear [40 to 50 km/h (25 to 31 MPH)].
- Check the 1st gear engine brake when shifting between 2 ⇔ 1 range while driving in the 2 range 2nd gear [20 to 30 km/h (12 to 19 MPH)].

6. LOCK-UP FUNCTION

Check that engine speed does not change sharply when the accelerator pedal is lightly depressed when driving on flat roads at normal speed in the lock-up range.

7. P RANGE OPERATION

Stop the vehicle on an uphill grade of 5% or more and shift to "P" range. Check that the vehicle does not move when the parking brake is released.

8. UNUSUAL SOUNDS AND VIBRATION

Check for unusual sounds and vibration while driving and during shifting.

9. CLIMBING CONTROL FUNCTION

- Check that the gear remains in 3rd when going up a grade.
- Check that the gear remains in 3rd when applying the brakes while going down a grade.

10. TRANSFER CLUTCH

Check if the tight corner braking occurs when the vehicle is started with steering wheel held at fully turned position. (MPT model)

11. OIL LEAKS

After the driving test, inspect for oil leaks.

5. Stall Test

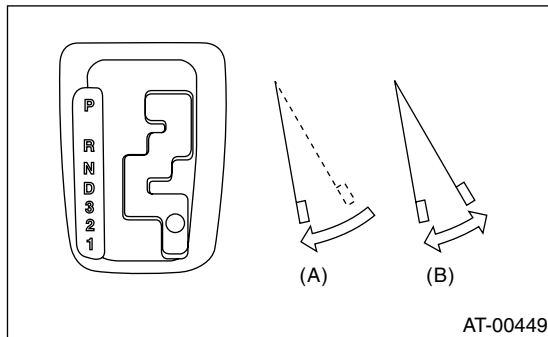
A: INSPECTION

NOTE:

The stall test is of extreme importance in diagnosing the condition of the automatic transmission and the engine. It should be conducted to measure the engine stall speeds in "R" and "2" ranges.

Purposes of the stall test:

- To check the operation of the automatic transmission clutch.
 - To check the operation of the torque converter clutch.
 - To check engine performance.
- 1) Check that throttle valve opens fully.
 - 2) Check that engine oil level is correct.
 - 3) Check that coolant level is correct.
 - 4) Check that ATF level is correct.
 - 5) Check that differential gear oil level is correct.
 - 6) Increase ATF temperature to 70 to 80°C (158 to 176°F) by idling the engine for approx. 30 minutes (with select lever set to "N" or "P").
 - 7) Place the wheel chocks at the front and rear of all wheels and engage the parking brake.
 - 8) Move the manual linkage to ensure it operates properly, and shift the select lever to the "2" range.
 - 9) While forcibly depressing the foot brake pedal, gradually depress the accelerator pedal until the engine operates at full throttle.



- (A) Brake pedal
(B) Accelerator pedal

10) When the engine speed is stabilized, record that speed quickly and release the accelerator pedal.

11) Shift the select lever to "N" range, and cool down the engine by idling it for more than one minute.

12) If the stall speed in "2" range is higher than specifications, low clutch slipping and 2-4 brake slipping may occur. To identify it, conduct the same test as above in "R" range.

13) Perform the stall tests with the select lever in "D" range.

NOTE:

- Do not continue the stall test for MORE THAN 5 SECONDS at a time (from closed throttle, fully open throttle to stall speed reading). Failure to follow this instruction causes the engine oil and ATF to deteriorate and the clutch and brake to be adversely affected.
- Be sure to cool down the engine for at least 1 minute after each stall test with the select lever set in the "P" or "N" range and with the idle speed lower than 1,200 rpm.
- If the stall speed is higher than the specified range, attempt to finish the stall test in as short a time as possible, in order to prevent the automatic transmission from sustaining damage.

Stall speed (at sea level):

2.0 L Turbo model: 2,600 — 3,400 rpm

2.5 L Non-turbo model: 2,100 — 2,600 rpm

Stall speed (at sea level)	Position	Cause
Less than specifications	2, R	• Throttle valve not fully open • Erroneous engine operation • Torque converter clutch's one-way clutch slipping
Greater than specifications	D	• Line pressure too low • Low clutch slipping • One-way clutch malfunction
	R	• Line pressure too low • Reverse clutch slipping • Low & reverse brake slipping
	2	• Line pressure too low • Low clutch slipping • 2-4 brake slipping

6. Time Lag Test

A: INSPECTION

NOTE:

If the select lever is shifted while the engine is idling, there will be a certain time elapse or lag before the shock can be felt. This is used for checking the condition of the low clutch, reverse clutch, low & reverse brake and one-way clutch.

- Perform the test at normal operating fluid temperature 70 to 80°C (158 to 176°F).
- Be sure to allow a 1 minute interval between tests.
- Make three measurements and take the average value.

1) Fully apply the parking brake.

2) Start the engine.

Check the idling speed (A/C OFF).

3) Shift the select lever from "N" to "D" range.

Using a stop watch, measure the time it takes from shifting the lever until the shock is felt.

Time lag: Less than 1.2 seconds

If "N" → "D" time lag is longer than specified:

- Line pressure too low
- Low clutch worn
- One-way clutch not operating properly

4) In the same manner, measure the time lag for "N" → "R".

Time lag: Less than 1.5 seconds

If "N" → "R" time lag is longer than specified:

- Line pressure too low
- Reverse clutch worn
- Low & reverse brake worn

LINE PRESSURE TEST

AUTOMATIC TRANSMISSION

7. Line Pressure Test

A: MEASUREMENT

NOTE:

If the clutch or the brake shows a sign of slippage or shifting sensation is not correct, the line pressure should be checked.

- Excessive shocks during upshifting or shifting takes place at a higher point than under normal circumstances, may be due to the line pressure being too high.
- Slippage or inability to operate the vehicle may, in most cases, be due to loss of oil pressure for the operation of the clutch, brake or control valve.

1) Line pressure measurement (under no load)

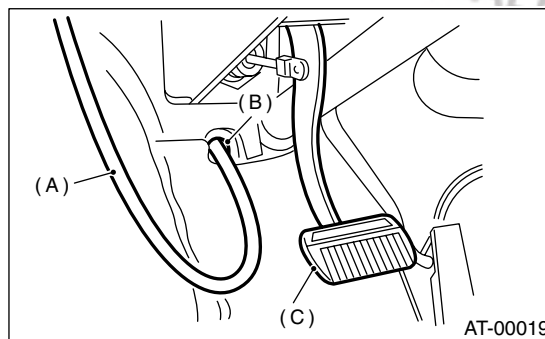
- (1) Before measuring the line pressure, jack-up all wheels.
- (2) Maintain the temperature of ATF at approx. 70 — 80°C (158 — 176°F) during measurement. (ATF will reach the above temperature after idling the engine for approx. 30 minutes with select lever in "N" or "P".)

2) Line pressure measurement (under heavy load)

- (1) Before measuring the line pressure, apply both foot and parking brakes with all wheels chocked (Same as for "stall" test conditions).
- (2) Measure the line pressure when select lever is in "R", "2" with engine under stall conditions.
- (3) Measure the line pressure within 5 seconds after shifting the select lever to each position. (If line pressure needs to be measured again, allow the engine to idle, and then stop it to cool down for at least one minute.)
- (4) Maintain the temperature of ATF at approx. 70 — 80°C (158 — 176°F) during measurement (ATF will reach the above temperature after idling the engine for approx. 30 minutes with the select lever in "N" or "P".)

3) Temporarily attach the ST to a suitable place in the driver's compartment, remove the blind plug located in front of the toe board and pass the hose of the ST to engine compartment.

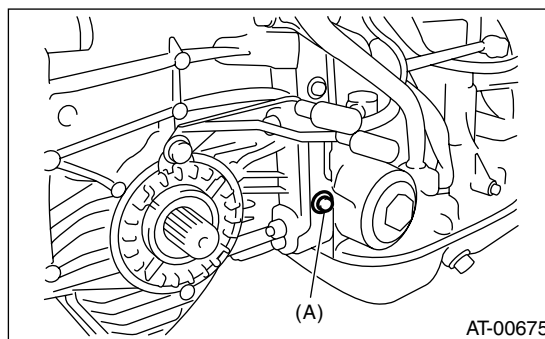
ST 498575400 OIL PRESSURE GAUGE ASSY



- (A) Pressure gauge hose
(B) Hole in toe board (blank cap hole)
(C) Brake pedal

4) Remove the test plug and install the ST instead.

ST 498897200 OIL PRESSURE GAUGE ADAPTER



- (A) Test plug

5) Connect the ST1 with ST2.

ST1 498897200 OIL PRESSURE GAUGE ADAPTER

ST2 498575400 OIL PRESSURE GAUGE ASSY

6) Check for duty ratio changes by opening and closing the throttle valve using SUBARU Select Monitor.

Standard line pressure			
Range position	Line pressure duty ratio (%)	Throttle position	Line pressure kPa (kg/cm ² , psi)
2	5	Full open	1,128 — 1,304 (11.5 — 13.3, 164 — 189)
R	5	Full open	1,520 — 1,716 (15.5 — 17.5, 220 — 249)
D	95	Full closed	304 — 412 (3.1 — 4.2, 44 — 60)

TRANSFER CLUTCH PRESSURE TEST

AUTOMATIC TRANSMISSION

8. Transfer Clutch Pressure Test

A: INSPECTION

• MPT MODEL

Check the transfer clutch pressure in accordance with the following chart in the same manner as with line pressure. <Ref. to 4AT-34, Line Pressure Test.>

ST 498897700 OIL PRESSURE ADAPTER SET

ST 498575400 OIL PRESSURE GAUGE ASSY

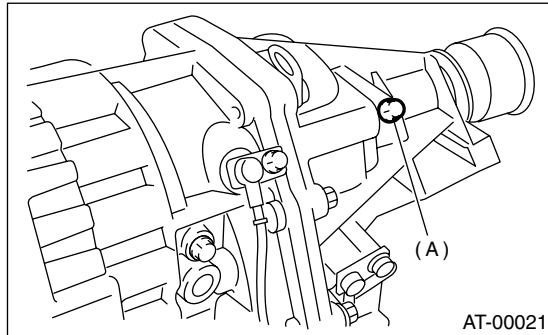
AWD mode: "D" range

FWD mode: "P" range, engine speed 2,000 rpm

If oil pressure is not produced or if it does not change in the AWD mode, the transfer duty solenoid or transfer valve assembly may be malfunctioning. If oil pressure is produced in the FWD mode, the problem is similar to that in the AWD mode.

NOTE:

Before setting in FWD mode, install the spare fuse on FWD mode switch.



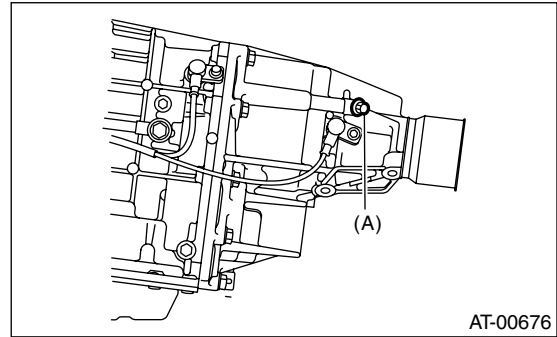
(A) Test plug

• VTD MODEL

Check transfer clutch pressure using the following chart. <Ref. to 4AT-34, Line Pressure Test.>

ST 498897700 OIL PRESSURE ADAPTER SET

ST 498575400 OIL PRESSURE GAUGE ASSY



(A) Test plug

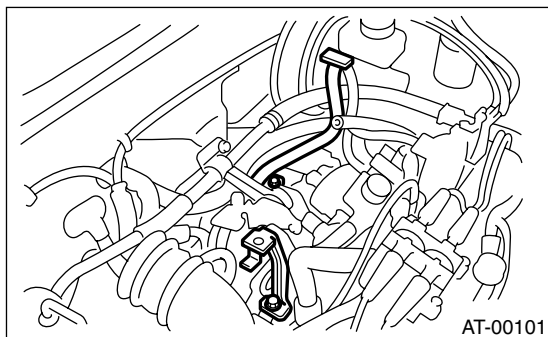
Duty ratio (%)	Throttle opening angle	Standard of transfer clutch pressure kPa (kg/cm ² , psi)
95	Fully open	932 — 1,089 (9.5 — 11.1, 135 — 158)
60	2/3 open	216 — 294 (2.2 — 3.0, 33 — 43)

Standard transfer clutch pressure kPa (kg/cm ² , psi)			
ON Duty ratio (%)	Throttle position	AWD mode	FWD mode
5	Full open	932 — 1,089 (9.5 — 11.1, 135 — 158)	—
60	2/3 throttle	216 — 294 (2.2 — 3.0, 31 — 43)	—
95	Full closed	—	0 (0, 0)

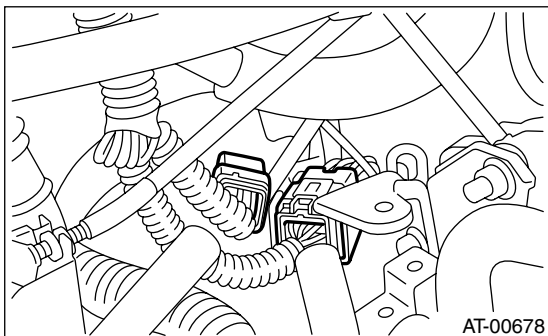
9. Automatic Transmission Assembly

A: REMOVAL

- 1) Set the vehicle on a lift.
- 2) Open the front hood fully, and support it with stay.
- 3) Disconnect the battery ground cable.
- 4) Remove the air intake duct. (Non-turbo model)
<Ref. to IN(H4SO)-6, REMOVAL, Air Intake Duct.>
- 5) Remove the air cleaner case or air intake chamber. (Non-turbo model)
<Ref. to IN(H4SO)-5, REMOVAL, Air Cleaner Case.>
- 6) Remove the intercooler. (Turbo model)
<Ref. to IN(H4DOTC)-10, REMOVAL, Intercooler.>
- 7) Remove the air cleaner case stay. (Non-turbo model)

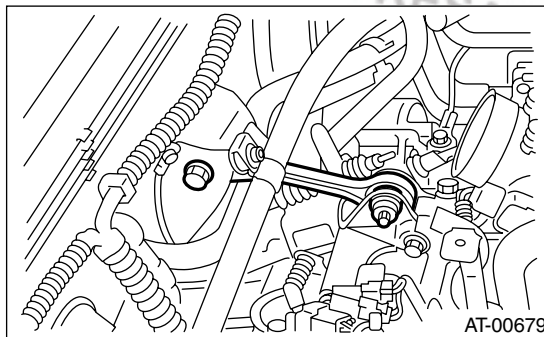


- 8) Disconnect the following connectors.
 - (1) Transmission harness connector



- (2) Transmission ground terminal
- 9) Remove the starter.
<Ref. to SC(H4SO)-7, REMOVAL, Starter.>

- 10) Remove the pitching stopper.

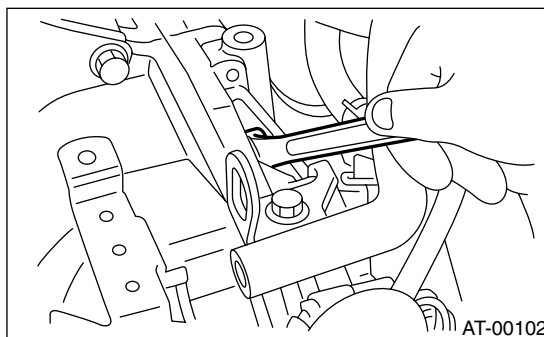


- 11) Separate the torque converter clutch from drive plate.

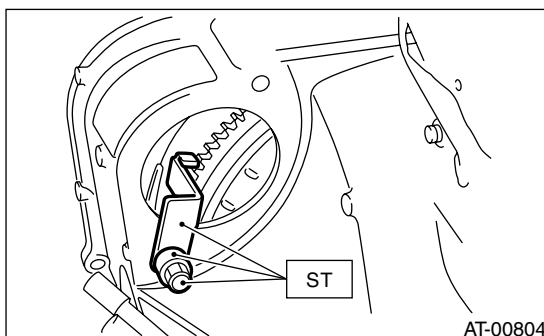
- (1) Remove the service hole plug.
- (2) Remove the bolts which hold torque converter clutch to drive plate.
- (3) Remove the V-belt cover.
- (4) Insert the wrench in the crankshaft pulley bolts, and remove all the bolts by slowly rotating the crankshaft pulley.

CAUTION:

Be careful not to drop the bolts into torque converter clutch housing.



- 12) Install the ST to torque converter clutch case.
ST 498277200 STOPPER SET



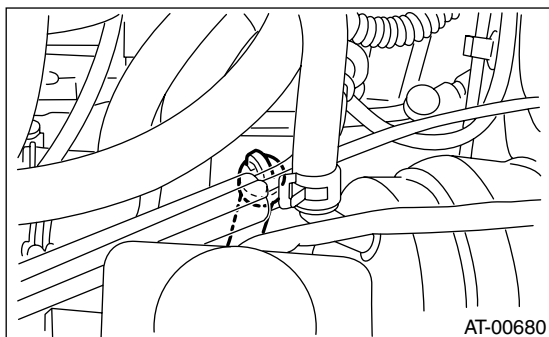
AUTOMATIC TRANSMISSION ASSEMBLY

AUTOMATIC TRANSMISSION

13) Remove the ATF level gauge.

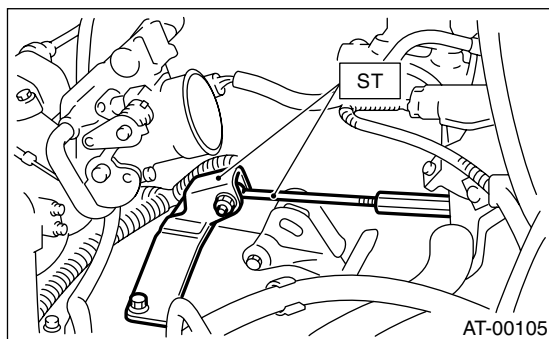
NOTE:

Plug the opening to prevent an entry of foreign particles into transmission fluid.

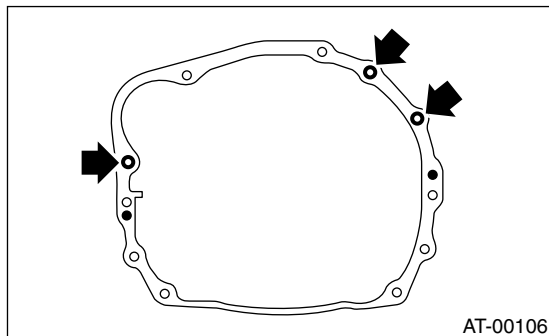


14) Set the ST.

ST 41099AA000 ENGINE SUPPORT ASSY



15) Remove the bolts which hold the right upper side of transmission to engine.



16) Lift-up the vehicle.

17) Remove the under cover.

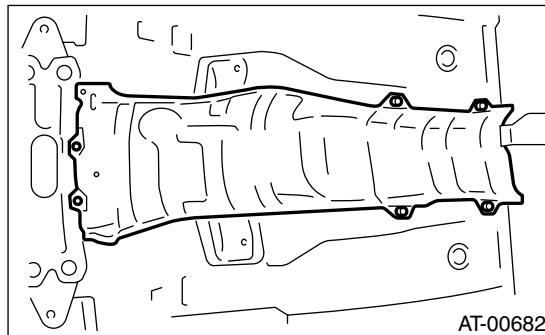
18) Remove the front, center and rear exhaust pipe, and muffler. (Non-turbo model)

<Ref. to EX(H4SO)-4, REMOVAL, Front Exhaust Pipe.>, <Ref. to EX(H4SO)-8, REMOVAL, Rear Exhaust Pipe.> and <Ref. to EX(H4SO)-9, REMOVAL, Muffler.>

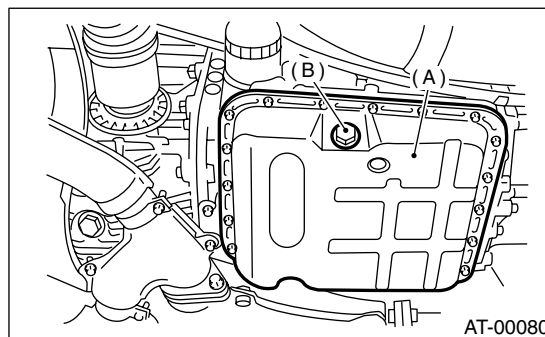
19) Remove the center and rear exhaust pipes, and muffler. (Turbo model)

<Ref. to EX(H4DOTC)-8, REMOVAL, Center Exhaust Pipe.>, <Ref. to EX(H4DOTC)-13, REMOVAL, Rear Exhaust Pipe.> and <Ref. to EX(H4DOTC)-14, REMOVAL, Muffler.>

20) Remove the heat shield cover. (If equipped)



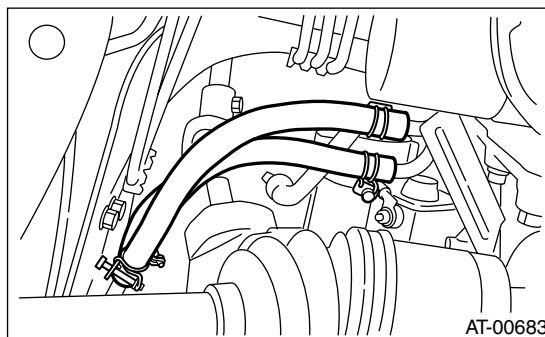
21) Drain ATF to remove the ATF drain plug.



(A) Oil pan

(B) Drain plug

22) Disconnect the ATF cooler hoses from pipes of transmission side, and remove the ATF level gauge guide.



23) Remove the propeller shaft.

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

24) Remove the shift select cable. <Ref. to CS-26, REMOVAL, Select Cable.>

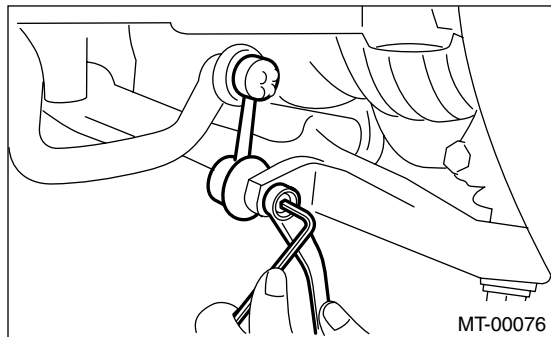
25) Disconnect the stabilizer link from transverse link.

26) Remove the bolt securing ball joint of transverse link to housing.

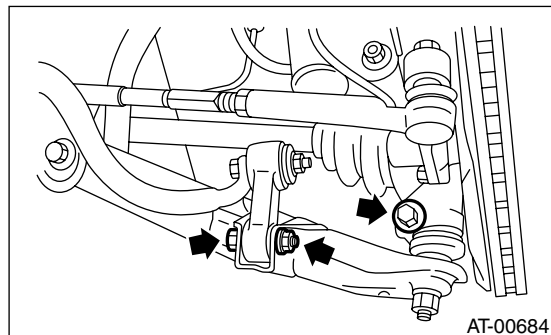
AUTOMATIC TRANSMISSION ASSEMBLY

AUTOMATIC TRANSMISSION

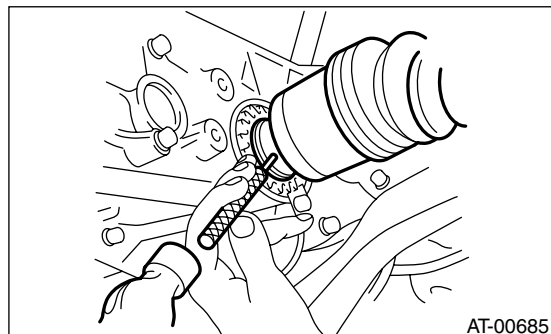
• SEDAN MODEL



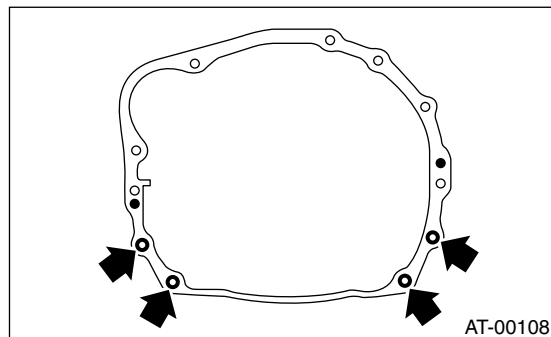
• WAGON MODEL



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



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

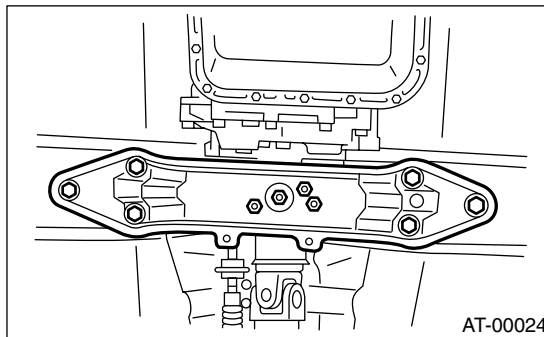


29) Place the transmission jack under transmission.

NOTE:

Make sure that the support plates of transmission jack don't touch the oil pan.

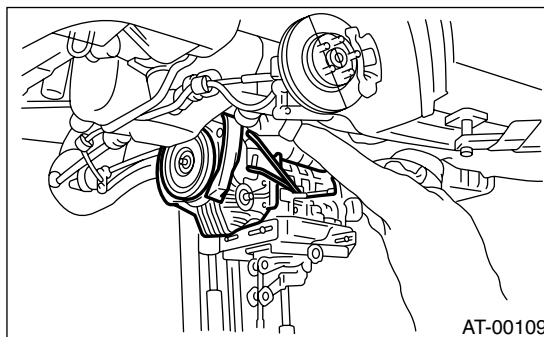
30) Remove the transmission rear crossmember from vehicle.



31) Remove the transmission.

CAUTION:

Move the transmission and torque converter as a unit away from engine.



32) Separate the transmission assembly and rear cushion rubber.

B: INSTALLATION

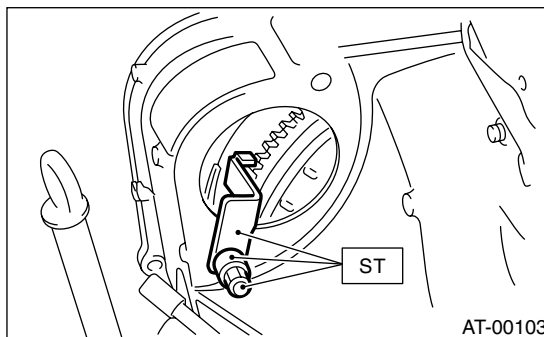
1) Install the rear cushion rubber to transmission assembly.

Tightening torque:

39 N·m (4.0 kgf-m, 29 ft-lb)

2) Install the ST to torque converter clutch case.

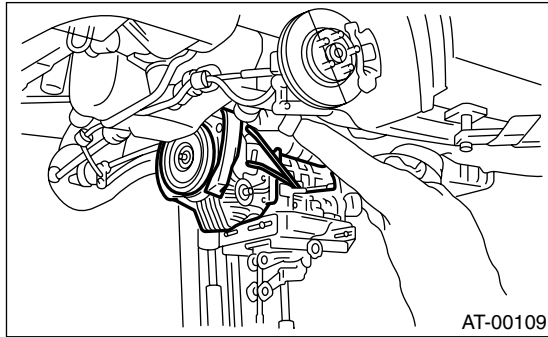
ST 498277200 STOPPER SET



AUTOMATIC TRANSMISSION ASSEMBLY

AUTOMATIC TRANSMISSION

- 3) Install the transmission onto engine.
(1) Gradually raise the transmission with transmission jack.

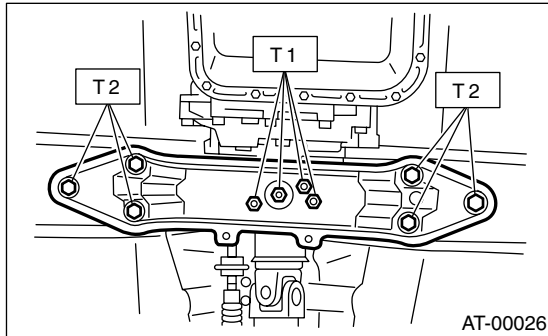


- (2) Engage them at splines.
4) Install the transmission rear crossmember.

Tightening torque:

T1: 35 N·m (3.6 kgf-m, 26 ft-lb)

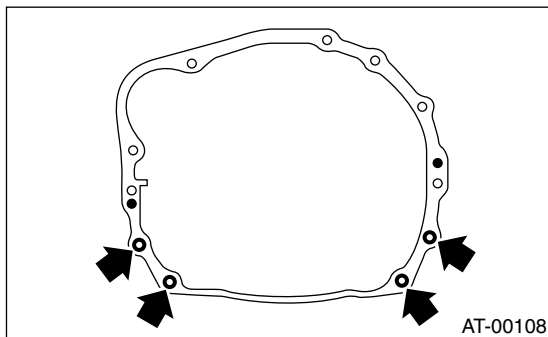
T2: 70 N·m (7.1 kgf-m, 51 ft-lb)



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

Tightening torque:

50 N·m (5.1 kgf-m, 36.9 ft-lb)



- 7) Lower the vehicle.
8) Connect the engine and transmission.
(1) Remove the ST from torque converter clutch case.

NOTE:

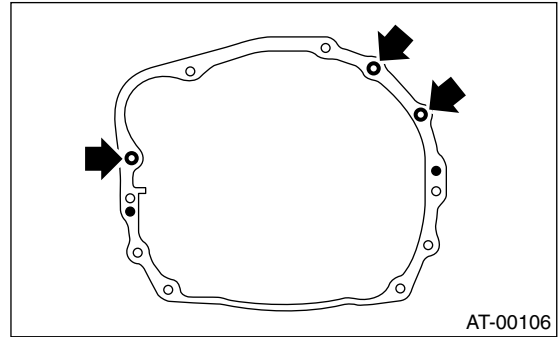
Be careful not to drop the ST into torque converter clutch case when removing ST.

ST 498277200 STOPPER SET

- (2) Install the starter.
<Ref. to SC(H4SO)-7, INSTALLATION, Starter.>
(3) Tighten the bolts which hold the right upper side of transmission to engine.

Tightening torque:

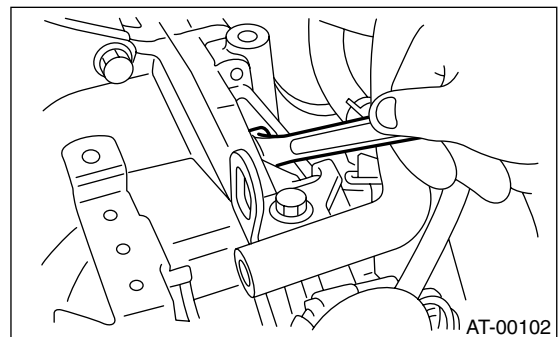
50 N·m (5.1 kgf-m, 36.9 ft-lb)



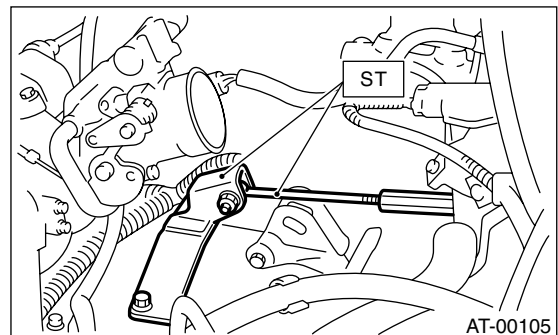
- 9) Install the torque converter clutch to drive plate.
(1) Tighten the bolts which hold the torque converter clutch to drive plate.
(2) Insert the wrench in the crankshaft pulley bolts, and tighten all the bolts by slowly rotating the crankshaft pulley.

Tightening torque:

25 N·m (2.5 kgf-m, 18.1 ft-lb)



- (3) Clog the plug onto service hole.
(4) Install the V-belt cover.
10) Remove the ST.



AUTOMATIC TRANSMISSION ASSEMBLY

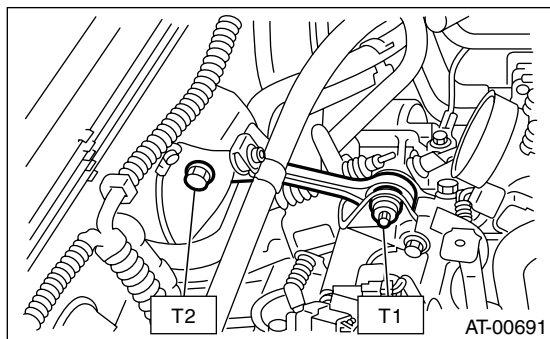
AUTOMATIC TRANSMISSION

11) Install the pitching stopper.

Tightening torque:

T1: 50 N·m (5.1 kgf-m, 37 ft-lb)

T2: 58 N·m (5.9 kgf-m, 43 ft-lb)



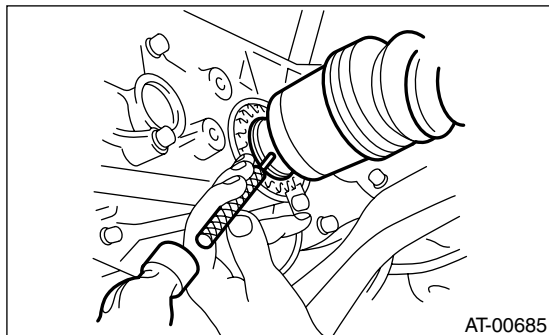
12) Lift-up the vehicle.

13) Install the front drive shaft into transmission.

(1) Lift-up the vehicle.

(2) Install the front drive shaft into transmission.

(3) Drive a new spring pin into chamfered hole of drive shaft.



14) Install the ball joint into housing.

15) Connect the stabilizer link to transverse link, and tighten the bolts. (Wagon model)

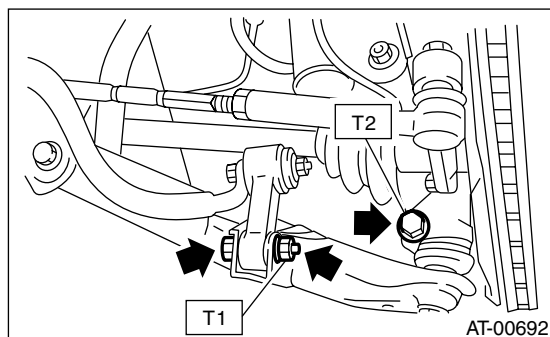
NOTE:

Discard the loosened self-locking nut and replace with a new one.

Tightening torque:

T1: 30 N·m (3.1 kgf-m, 22.4 ft-lb)

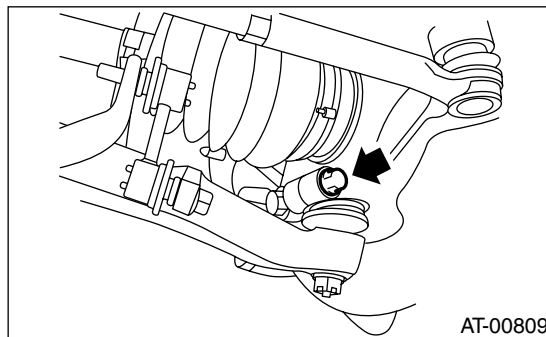
T2: 50 N·m (5.1 kgf-m, 37 ft-lb)



16) Tighten the installing bolts. (Wagon model)

Tightening torque:

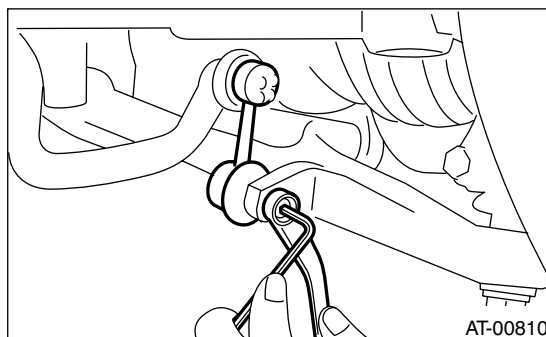
50 N·m (5.1 kgf-m, 36.9 ft-lb)



17) Install the stabilizer link to transverse link. (Sedan model)

Tightening torque:

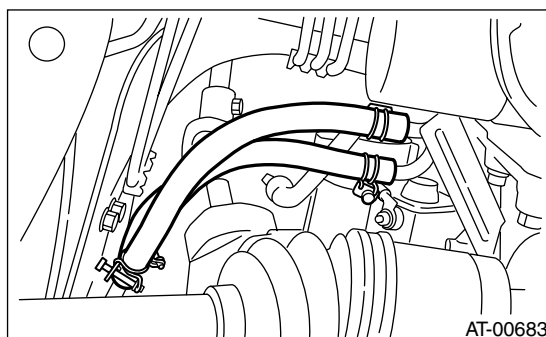
45 N·m (4.6 kgf-m, 33.2 ft-lb)



18) Install the shift select cable onto select lever.

<Ref. to CS-27, INSTALLATION, Select Cable.>

19) Install the ATF level gauge guide, and connect the ATF cooler hoses to pipe.



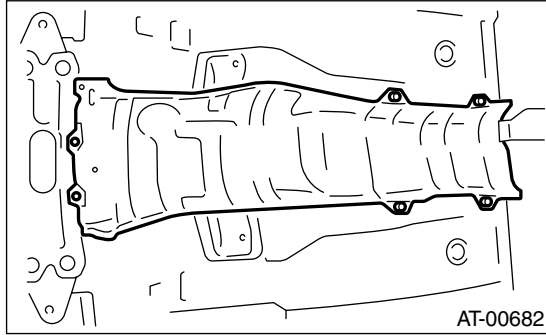
20) Install the propeller shaft.

<Ref. to DS-15, INSTALLATION, Propeller Shaft.>

AUTOMATIC TRANSMISSION ASSEMBLY

AUTOMATIC TRANSMISSION

21) Install the heat shield cover. (If equipped)



22) Install the rear exhaust pipe and muffler assembly.

Non-turbo model

<Ref. to EX(H4SO)-8, INSTALLATION, Rear Exhaust Pipe.> and <Ref. to EX(H4SO)-9, INSTALLATION, Muffler.>

Turbo model

<Ref. to EX(H4DOTC)-13, INSTALLATION, Rear Exhaust Pipe.> and <Ref. to EX(H4DOTC)-14, INSTALLATION, Muffler.>

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

<Ref. to EX(H4SO)-5, INSTALLATION, Front Exhaust Pipe.>

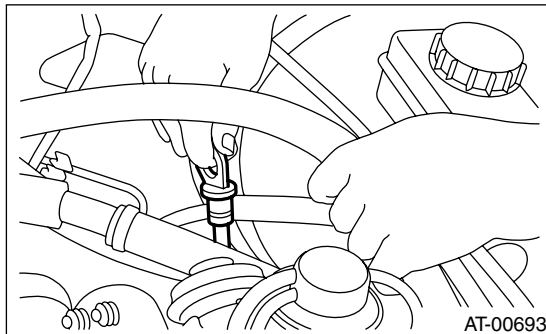
24) Install the center exhaust pipe. (Turbo model)

<Ref. to EX(H4DOTC)-9, INSTALLATION, Center Exhaust Pipe.>

25) Install the under cover.

26) Lower the vehicle.

27) Install the ATF level gauge.



28) Connect the following connectors.

(1) Transmission harness connectors

(2) Transmission ground terminal

29) Connect the cruise control cable.

30) Install the air cleaner case stay.

Tightening torque:

16 N·m (1.6 kgf-m, 11.6 ft-lb)

31) Install the air cleaner case or air intake chamber. (Non-turbo model)

<Ref. to IN(H4SO)-5, INSTALLATION, Air Cleaner Case.>

32) Install the air intake duct. (Non-turbo model)

<Ref. to IN(H4SO)-6, INSTALLATION, Air Intake Duct.>

33) Install the intercooler. (Turbo model)

<Ref. to IN(H4DOTC)-10, INSTALLATION, Intercooler.>

34) Connect the battery ground cable.

35) Fill ATF up to the middle of the "COLD" side on level gauge by using the gauge hole. <Ref. to 4AT-29, Automatic Transmission Fluid.>

36) Take off the vehicle from lift arms.

37) Check select lever operation.

<Ref. to 4AT-45, INSPECTION, Inhibitor Switch.>

38) Check the ATF level. <Ref. to 4AT-29, Automatic Transmission Fluid.>

39) Check the road test.

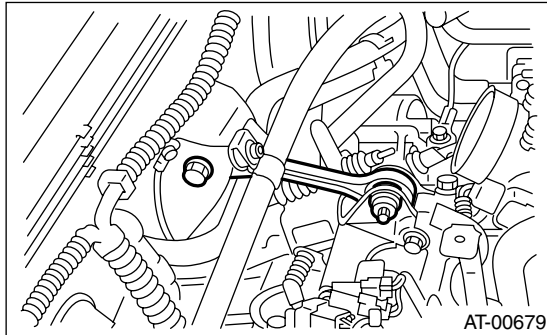
<Ref. to 4AT-31, Road Test.>

10. Transmission Mounting System

A: REMOVAL

1. PITCHING STOPPER

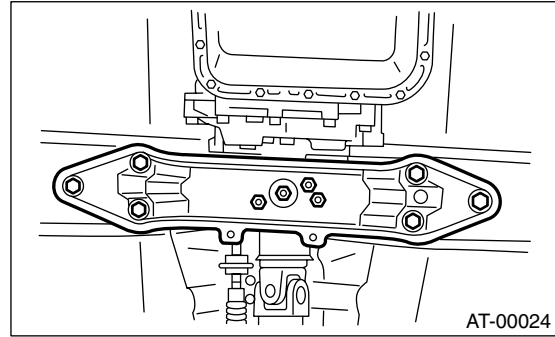
- 1) Disconnect the ground cable from battery.
- 2) Remove the air cleaner case. (Non-turbo model)
<Ref. to IN(H4SO)-5, REMOVAL, Air Cleaner Case.>
- 3) Remove the intercooler. (Turbo model)
<Ref. to IN(H4DOTC)-10, REMOVAL, Intercooler.>
- 4) Remove the pitching stopper.



2. TRANSMISSION REAR CROSSMEMBER AND REAR CUSHION RUBBER

- 1) Disconnect the ground cable from battery.
- 2) Jack-up the vehicle and support it with sturdy racks.
- 3) Remove the front, center, rear exhaust pipes and muffler. (Non-turbo model)
<Ref. to EX(H4SO)-4, REMOVAL, Front Exhaust Pipe.>, <Ref. to EX(H4SO)-8, REMOVAL, Rear Exhaust Pipe.> and <Ref. to EX(H4SO)-9, REMOVAL, Muffler.>
- 4) Remove the center and rear exhaust pipes, and muffler. (Turbo model)
<Ref. to EX(H4DOTC)-8, REMOVAL, Center Exhaust Pipe.>, <Ref. to EX(H4DOTC)-13, REMOVAL, Rear Exhaust Pipe.> and <Ref. to EX(H4DOTC)-14, REMOVAL, Muffler.>
- 5) Remove the heat shield cover. (If equipped)
- 6) Set the transmission jack under the transmission. Make sure that the support plates of transmission jack don't touch the oil pan.

- 7) Remove the transmission rear crossmember.



- 8) Remove the rear cushion rubber.

B: INSTALLATION

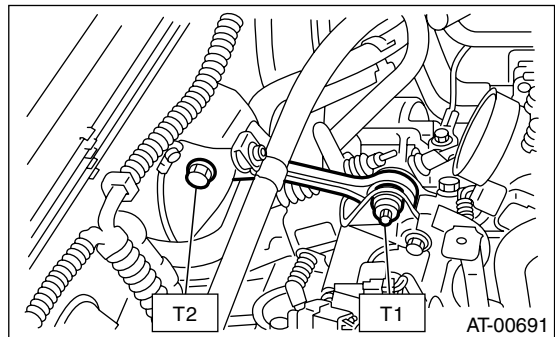
1. PITCHING STOPPER

- 1) Install the pitching stopper.

Tightening torque:

T1: 50 N·m (5.1 kgf-m, 37 ft-lb)

T2: 58 N·m (5.9 kgf-m, 43 ft-lb)



- 2) Install the air cleaner case. (Non-turbo model)
<Ref. to IN(H4SO)-5, INSTALLATION, Air Cleaner Case.>
- 3) Remove the intercooler. (Turbo model)
<Ref. to IN(H4DOTC)-10, INSTALLATION, Intercooler.>

2. TRANSMISSION REAR CROSSMEMBER AND REAR CUSHION RUBBER

1) Install the rear cushion rubber.

Tightening torque:

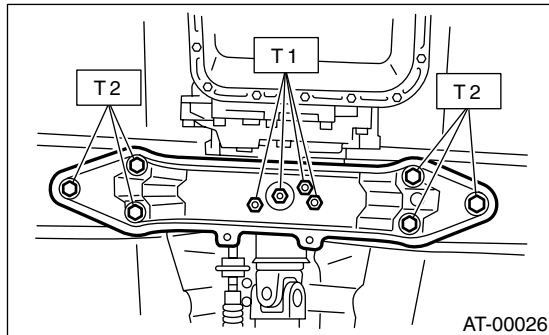
39 N·m (4.0 kgf-m, 29 ft-lb)

2) Install the crossmember.

Tightening torque:

T1: 35 N·m (3.6 kgf-m, 26 ft-lb)

T2: 70 N·m (7.1 kgf-m, 51 ft-lb)



3) Remove the transmission jack.

4) Install the heat shield cover. (If equipped)

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

<Ref. to EX(H4SO)-5, INSTALLATION, Front Exhaust Pipe.>, <Ref. to EX(H4SO)-8, INSTALLATION, Rear Exhaust Pipe.> and <Ref. to EX(H4SO)-9, INSTALLATION, Muffler.>

6) Install center and rear exhaust pipes, and muffler. (Turbo model)

<Ref. to EX(H4DOTC)-9, INSTALLATION, Center Exhaust Pipe.>, <Ref. to EX(H4DOTC)-13, INSTALLATION, Rear Exhaust Pipe.> and <Ref. to EX(H4DOTC)-14, INSTALLATION, Muffler.>

C: INSPECTION

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

1. PITCHING STOPPER

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

2. TRANSMISSION REAR CROSSMEMBER AND REAR CUSHION RUBBER

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

11.Extension Case Oil Seal

A: INSPECTION

Make sure the ATF does not leak from the joint of transmission and propeller shaft. If so, replace the oil seal. <Ref. to 4AT-44, REPLACEMENT, Extension Case Oil Seal.>

B: REPLACEMENT

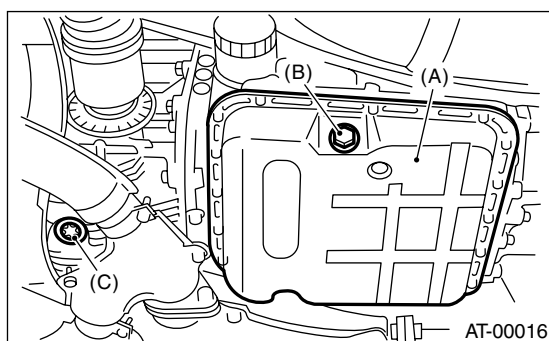
- 1) Clean the transmission exterior.
- 2) Drain the ATF completely.

NOTE:

Tighten the ATF drain plug after draining the ATF.

Tightening torque:

25 N·m (2.5 kgf-m, 18.1 ft-lb)



- (A) Oil pan
- (B) Drain plug
- (C) Differential oil drain plug

- 3) Remove the rear exhaust pipe and muffler.

Non-turbo model

<Ref. to EX(H4SO)-8, REMOVAL, Rear Exhaust Pipe.> and <Ref. to EX(H4SO)-9, REMOVAL, Muffler.>

Turbo model

<Ref. to EX(H4DOTC)-13, REMOVAL, Rear Exhaust Pipe.> and <Ref. to EX(H4DOTC)-14, REMOVAL, Muffler.>

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

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

- 6) Using the ST, remove the oil seal.

ST 398527700 PULLER ASSY

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

ST 498057300 INSTALLER

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

- 9) Install the heat shield cover. (If equipped)

- 10) Install the rear exhaust pipe and muffler.

Non-turbo model

<Ref. to EX(H4SO)-8, INSTALLATION, Rear Exhaust Pipe.> and <Ref. to EX(H4SO)-9, INSTALLATION, Muffler.>

Turbo model

<Ref. to EX(H4DOTC)-13, INSTALLATION, Rear Exhaust Pipe.> and <Ref. to EX(H4DOTC)-14, INSTALLATION, Muffler.>

- 11) Pour ATF and check the ATF level. <Ref. to 4AT-29, Automatic Transmission Fluid.>

12. Inhibitor Switch

A: INSPECTION

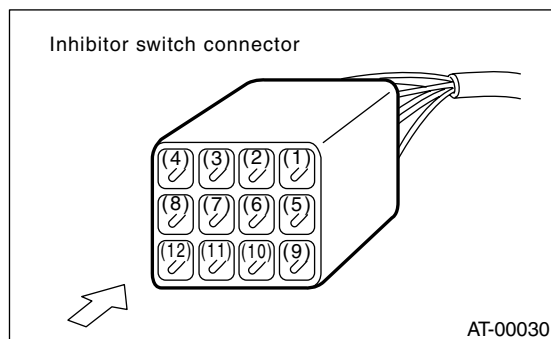
When the driving condition or starter motor operation is erroneous, first check the shift linkage for improper operation. If the shift linkage is functioning properly, check the inhibitor switch.

- 1) Disconnect the inhibitor switch connector.
- 2) Check continuity in inhibitor switch circuits with the select lever moved to each position.

NOTE:

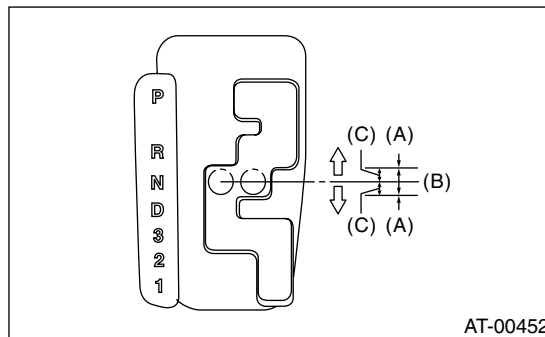
- Also check that continuity in ignition circuit does not exist when the select lever is in "R", "D", "3", "2" and "1" ranges.
- If the inhibitor switch is inoperative, check for poor contact of connector on transmission side.

	Position	Pin No.
Signal sent to TCM	P	4 — 3
	R	4 — 2
	N	4 — 1
	D	4 — 8
	3	4 — 7
	2	4 — 6
	1	4 — 5
Ignition circuit	P/N	12 — 11
Back-up light circuit	R	10 — 9



- 3) Check if there is continuity at equal points when the select lever is turned 1.5° in both directions from "N" range.

If there is continuity in one direction and the continuity in the other or if there is continuity at unequal points, adjust the inhibitor switch. <Ref. to 4AT-45, ADJUSTMENT, Inhibitor Switch.>

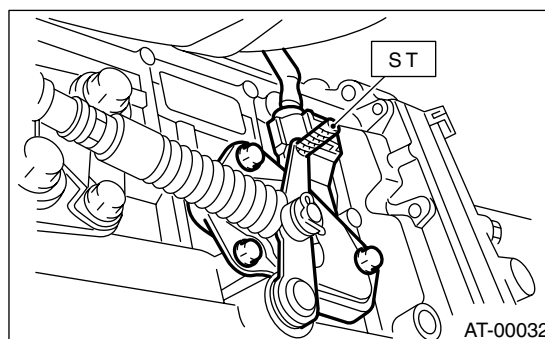


- (A) Continuity does not exist.
- (B) Continuity exists.
- (C) 1.5°

- 4) Repeat the above checks. If there are abnormalities, adjust the select cable. <Ref. to CS-28, ADJUSTMENT, Select Cable.>

B: ADJUSTMENT

- 1) Shift the select lever to "N" range.
 - 2) Loosen the three inhibitor switch securing bolts.
 - 3) Insert the ST as vertical as possible into the holes in inhibitor switch lever and switch body.
- ST 499267300 STOPPER PIN



- 4) Tighten the three inhibitor switch bolts.

Tightening torque:

3.5 N·m (0.35 kgf·m, 2.5 ft-lb)

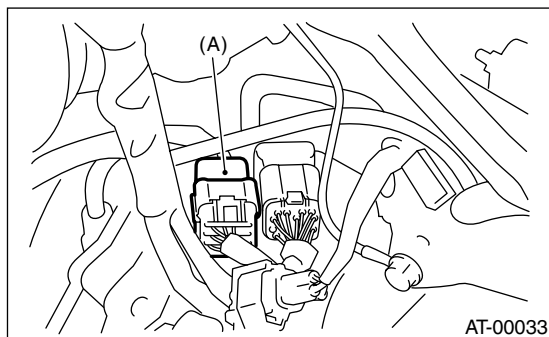
- 5) Repeat the above checks. If the inhibitor switch is determined to be "faulty", replace it.

INHIBITOR SWITCH

AUTOMATIC TRANSMISSION

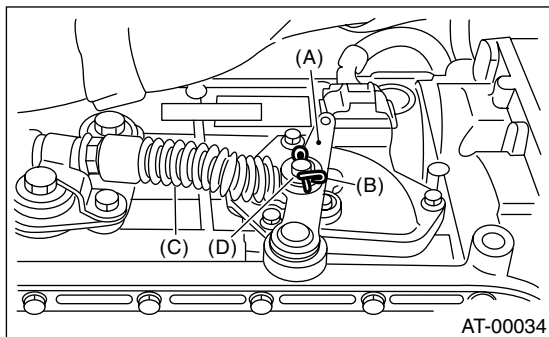
C: REMOVAL

- 1) Set up the vehicle on a lift.
- 2) Move the select lever to "N" range.
- 3) Remove the air cleaner case. (Non-turbo model)
<Ref. to IN(H4SO)-5, REMOVAL, Air Cleaner Case.>
- 4) Remove the intercooler. (Turbo model)
<Ref. to IN(H4DOTC)-10, REMOVAL, Intercooler.>
- 5) Disconnect the inhibitor switch connector.



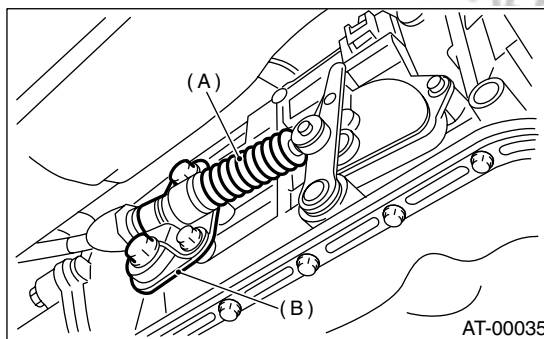
(A) Inhibitor switch connector

- 6) Remove the inhibitor switch connector from stay.
- 7) Lift-up the vehicle.
- 8) Remove the front and center exhaust pipes.
<Ref. to EX(H4SO)-4, REMOVAL, Front Exhaust Pipe.>
- 9) Remove the snap pin and washer from range select lever.



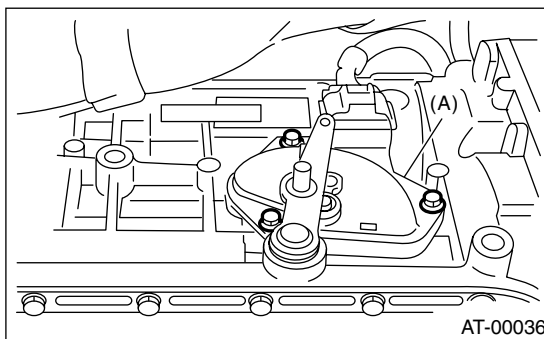
- (A) Range select lever
- (B) Snap pin
- (C) Select cable
- (D) Washer

- 10) Remove the plate assembly from transmission case.



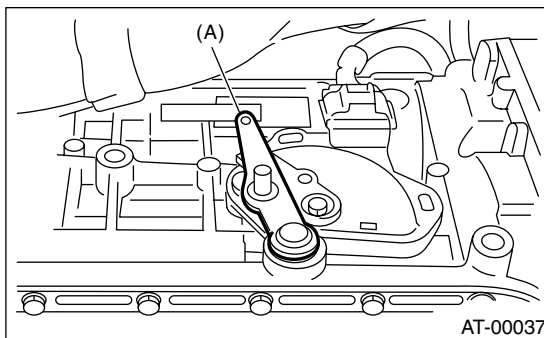
- (A) Select cable
- (B) Plate ASSY

- 11) Remove the bolts.



(A) Inhibitor switch

- 12) Move the range select lever to parking position (left side).

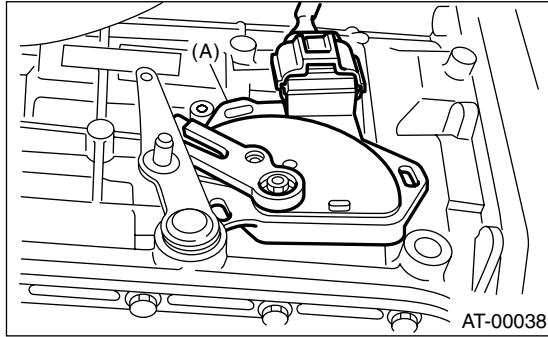


(A) Range select lever

INHIBITOR SWITCH

AUTOMATIC TRANSMISSION

13) Remove the inhibitor switch from transmission.



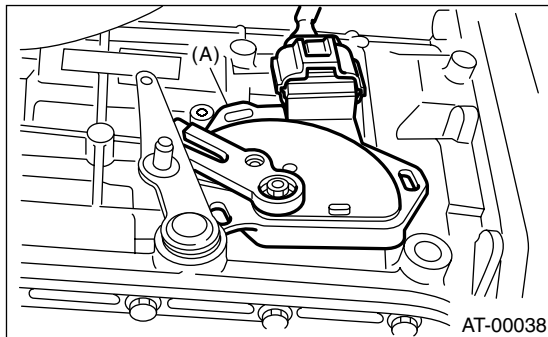
(A) Inhibitor switch

14) Disconnect the inhibitor switch harness connector from inhibitor switch.

D: INSTALLATION

1) Connect the inhibitor switch harness connector to inhibitor switch.

2) Install the inhibitor switch to transmission case.



(A) Inhibitor switch

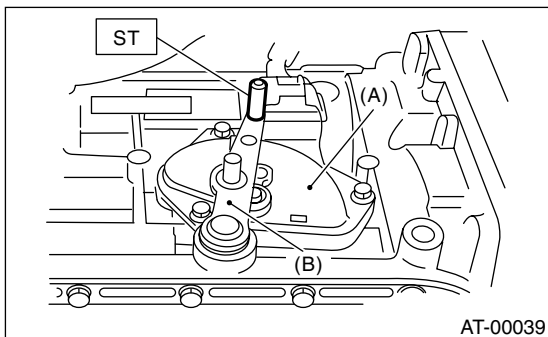
3) Move the range select lever to neutral position.

4) Using the ST, tighten the bolts of inhibitor switch.

ST 499267300 STOPPER PIN

Tightening torque:

3.5 N·m (0.36 kgf-m, 2.6 ft-lb)



(A) Inhibitor switch

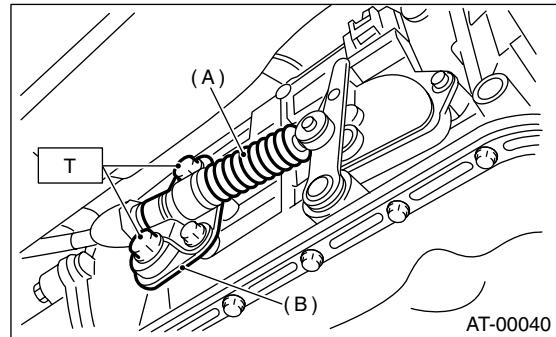
(B) Range select lever

5) Install the select cable to range select lever.

6) Install the plate assembly to transmission.

Tightening torque:

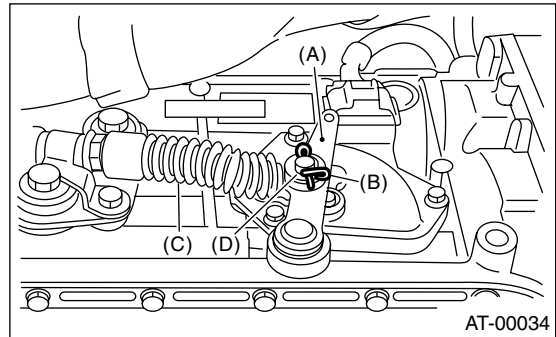
T: 25 N·m (2.5 kgf-m, 18.1 ft-lb)



(A) Select cable

(B) Plate ASSY

7) Install the washer and snap pin to range select lever.



(A) Range select lever

(B) Snap pin

(C) Select cable

(D) Washer

8) Install the front and center exhaust pipes. (Non-turbo model)

<Ref. to EX(H4SO)-5, INSTALLATION, Front Exhaust Pipe.>

9) Install the center exhaust pipe. (Turbo model)

<Ref. to EX(H4DOTC)-9, INSTALLATION, Center Exhaust Pipe.>

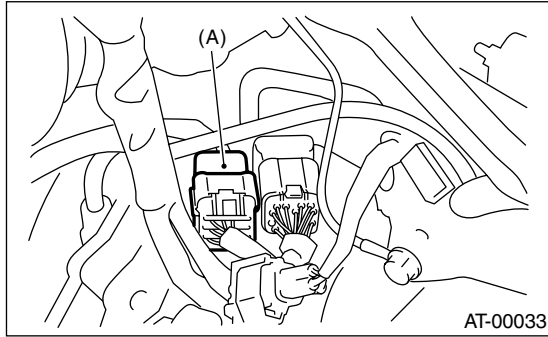
10) Lower the vehicle.

11) Install the inhibitor switch connector from stay.

INHIBITOR SWITCH

AUTOMATIC TRANSMISSION

12) Connect the inhibitor switch connector.



(A) Inhibitor switch connector

13) Install the air cleaner case. (Non-turbo model)
<Ref. to IN(H4SO)-5, INSTALLATION, Air Cleaner Case.>

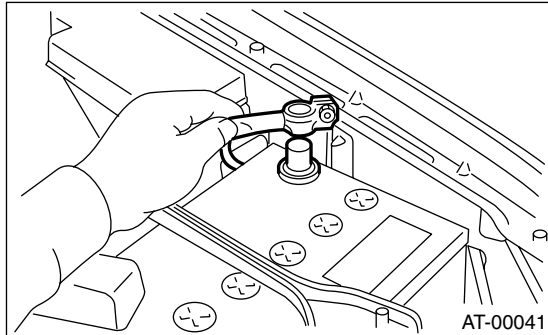
14) Install the intercooler. (Turbo model)
<Ref. to IN(H4DOTC)-10, INSTALLATION, Intercooler.>

15) Inspect the inhibitor switch. <Ref. to 4AT-45, INSPECTION, Inhibitor Switch.>

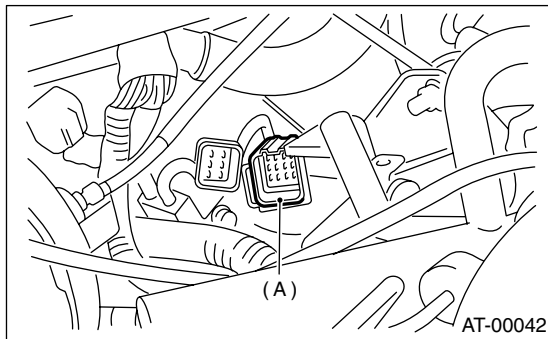
13. Front Vehicle Speed Sensor

A: REMOVAL

- 1) Set up the vehicle on a lift.
- 2) Disconnect the ground cable from battery.



- 3) Remove the air cleaner case. (Non-turbo model)
<Ref. to IN(H4SO)-5, REMOVAL, Air Cleaner Case.>
- 4) Remove the intercooler. (Turbo model)
<Ref. to IN(H4DOTC)-10, REMOVAL, Intercooler.>
- 5) Disconnect the transmission connector.



(A) Transmission connector

- 6) Remove the pitching stopper. <Ref. to 4AT-42, REMOVAL, Transmission Mounting System.>
- 7) Remove the transmission connector from stay.
- 8) Lift-up the vehicle.
- 9) Clean the transmission exterior.

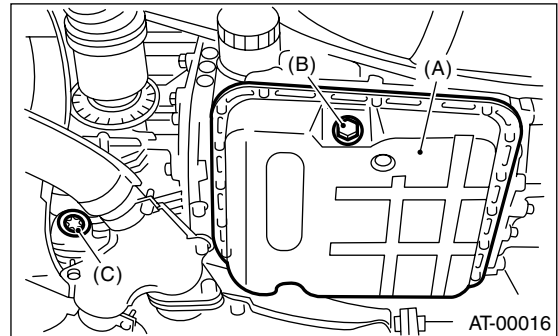
- 10) Drain the ATF completely.

NOTE:

Tighten the ATF drain plug after draining the ATF.

Tightening torque:

25 N·m (2.5 kgf-m, 18.1 ft-lb)



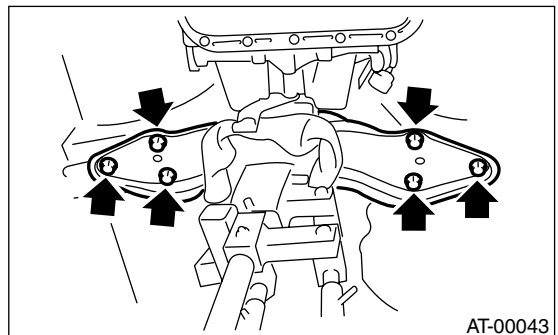
- (A) Oil pan
- (B) Drain plug
- (C) Differential oil drain plug

- 11) Remove the front, center, exhaust pipes and muffler. (Non-turbo model)
<Ref. to EX(H4SO)-4, REMOVAL, Front Exhaust Pipe.>, <Ref. to EX(H4SO)-8, REMOVAL, Rear Exhaust Pipe.> and <Ref. to EX(H4SO)-9, REMOVAL, Muffler.>
- 12) Remove the center, rear exhaust pipe and muffler. (Turbo model)
<Ref. to EX(H4DOTC)-8, REMOVAL, Center Exhaust Pipe.>, <Ref. to EX(H4DOTC)-13, REMOVAL, Rear Exhaust Pipe.> and <Ref. to EX(H4DOTC)-14, REMOVAL, Muffler.>
- 13) Remove the shield cover. (If equipped)
- 14) Remove the propeller shaft. <Ref. to DS-14, REMOVAL, Propeller Shaft.>
- 15) Place the transmission jack under transmission.

NOTE:

Make sure that the support plates of transmission jack don't touch the crossmember.

- 16) Remove the transmission rear crossmember bolts.



FRONT VEHICLE SPEED SENSOR

AUTOMATIC TRANSMISSION

17) Lower the AT jack.

NOTE:

Do not separate the AT jack and transmission.

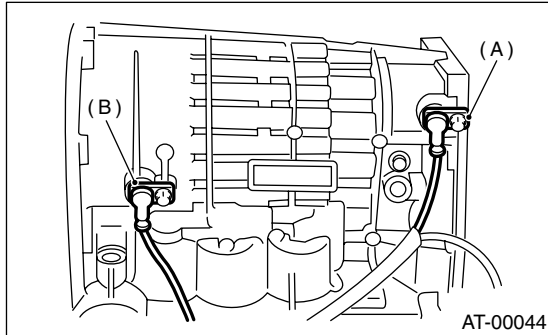
18) Remove the oil cooler inlet and outlet pipe.

NOTE:

When removing the outlet pipe, be careful not to lose balls and springs used with retaining screws.

19) Remove the front and rear vehicle speed sensor and torque converter turbine speed sensor.

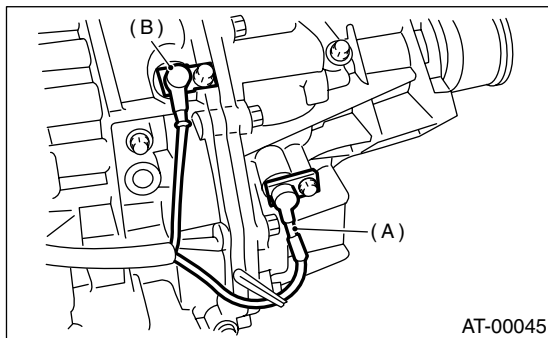
• Front vehicle speed sensor and torque converter turbine speed sensor



(A) Front vehicle speed sensor

(B) Torque converter turbine speed sensor

• Rear vehicle speed sensor

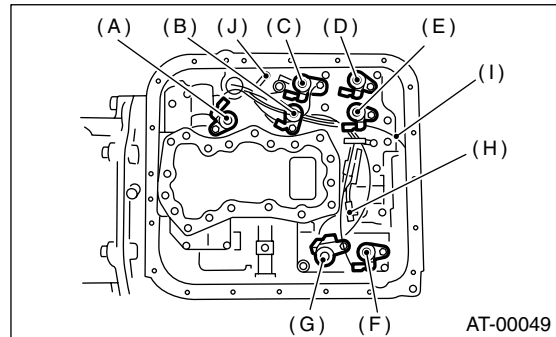


(A) Rear vehicle speed sensor

(B) Front vehicle speed sensor

20) Remove the oil pan.

21) Disconnect the duty solenoid connectors, and then disconnect the ATF temperature sensor from control valve body.

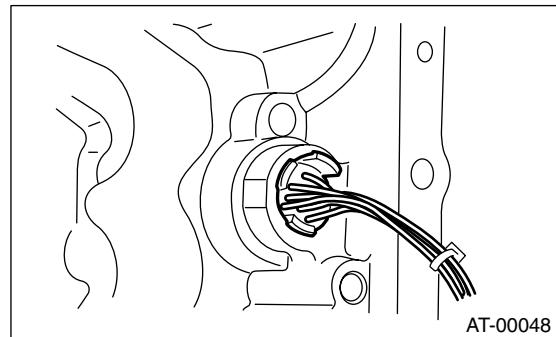


- (A) Lock-up duty solenoid (Blue)
- (B) Low clutch timing solenoid (Gray)
- (C) Line pressure duty solenoid (Red)
- (D) Shift solenoid 2 (Yellow)
- (E) Shift solenoid 1 (Green)
- (F) 2-4 brake timing solenoid (Black)
- (G) 2-4 brake duty solenoid (Red)
- (H) ATF temperature sensor
- (I) Transfer duty solenoid (Brown)
- (J) Transmission ground

22) Remove the harness assembly.

B: INSTALLATION

1) Pass the harness assembly through the hole in the transmission case.



FRONT VEHICLE SPEED SENSOR

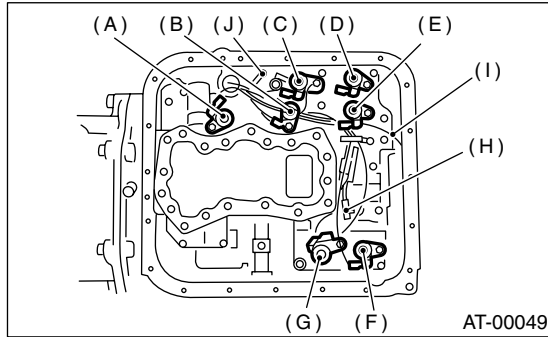
AUTOMATIC TRANSMISSION

2) Connect the harness connectors and ATF temperature sensor.

Connect the connectors of same color, and secure the harness to valve body using clips.

**Tightening torque (Transmission ground cable
ATF temperature sensor)**

8 N·m (0.8 kgf-m, 5.8 ft-lb)

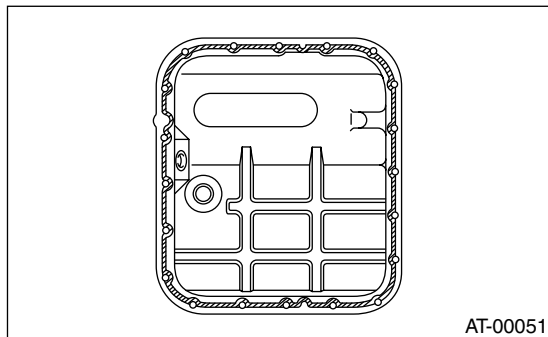


- (A) Lock-up duty solenoid (Blue)
- (B) Low clutch timing solenoid (Gray)
- (C) Line pressure duty solenoid (Red)
- (D) Shift solenoid 2 (Yellow)
- (E) Shift solenoid 1 (Green)
- (F) 2-4 brake timing solenoid (Black)
- (G) 2-4 brake duty solenoid (Red)
- (H) ATF temperature sensor
- (I) Transfer duty solenoid (Brown)
- (J) Transmission ground

3) Apply proper amount of liquid gasket to the entire oil pan mating surface.

Fluid packing:

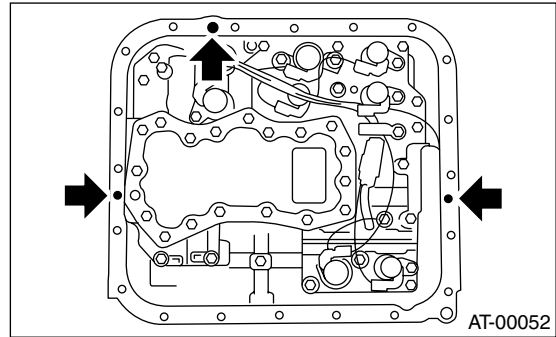
THREE BOND 1217B (Part No. K0877YA020)



4) Apply liquid gasket fully to three holes other than screw holes on transmission case.

Fluid packing:

THREE BOND 1217B (Part No. K0877YA020)



5) Install the oil pan.

Tightening torque:

5 N·m (0.5 kgf-m, 3.6 ft-lb)

6) Install the front and rear vehicle speed sensor, and also the torque converter turbine speed sensor, and then fasten the harness.

Tightening torque:

7 N·m (0.7 kgf-m, 5.1 ft-lb)

7) Install the oil cooler pipes.

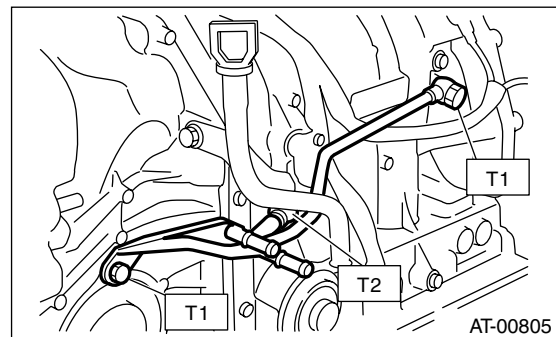
NOTE:

Be sure to use a new copper washer.

Tightening torque:

T1: 25 N·m (2.5 kgf-m, 18.1 ft-lb)

T2: 44 N·m (4.5 kgf-m, 32.5 ft-lb)



8) Install the transmission rear crossmember bolts.

Tightening torque:

70 N·m (7.1 kgf-m, 51 ft-lb)

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

10) Install the shield cover. (If equipped)

FRONT VEHICLE SPEED SENSOR

AUTOMATIC TRANSMISSION

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

<Ref. to EX(H4SO)-5, INSTALLATION, Front Exhaust Pipe.>, <Ref. to EX(H4SO)-8, INSTALLATION, Rear Exhaust Pipe.> and <Ref. to EX(H4SO)-9, INSTALLATION, Muffler.>

12) Install the center, rear exhaust pipes and muffler. (Turbo model)

<Ref. to EX(H4DOTC)-9, INSTALLATION, Center Exhaust Pipe.>, <Ref. to EX(H4DOTC)-13, INSTALLATION, Rear Exhaust Pipe.> and <Ref. to EX(H4DOTC)-14, INSTALLATION, Muffler.>

13) Lower the vehicle.

14) Install the transmission connector to the stay.

15) Install the pitching stopper. <Ref. to 4AT-42, INSTALLATION, Transmission Mounting System.>

16) Install the air cleaner case. (Non-turbo model)

<Ref. to IN(H4SO)-5, INSTALLATION, Air Cleaner Case.>

17) Install the intercooler. (Turbo model)

<Ref. to IN(H4DOTC)-10, INSTALLATION, Intercooler.>

14.Rear Vehicle Speed Sensor

A: REMOVAL

When removing the rear vehicle speed sensor, refer to "Front Vehicle Speed Sensor." <Ref. to 4AT-49, REMOVAL, Front Vehicle Speed Sensor.>

B: INSTALLATION

When installing the rear vehicle speed sensor, refer to "Front Vehicle Speed Sensor." <Ref. to 4AT-50, INSTALLATION, Front Vehicle Speed Sensor.>

TORQUE CONVERTER TURBINE SPEED SENSOR

AUTOMATIC TRANSMISSION

15. Torque Converter Turbine Speed Sensor

A: REMOVAL

When removing the torque converter turbine speed sensor, refer to "Front Vehicle Speed Sensor."
<Ref. to 4AT-49, REMOVAL, Front Vehicle Speed Sensor.>

B: INSTALLATION

When installing the torque converter turbine speed sensor, refer to "Front Vehicle Speed Sensor."
<Ref. to 4AT-50, INSTALLATION, Front Vehicle Speed Sensor.>

16. Control Valve Body

A: REMOVAL

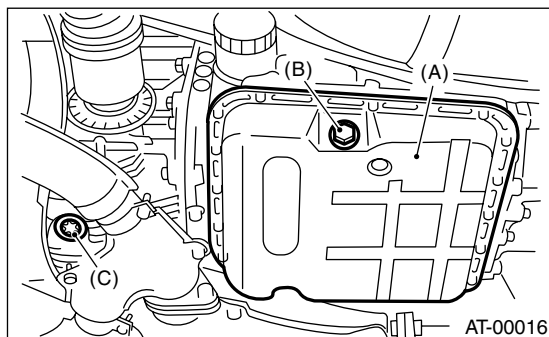
- 1) Lift-up the vehicle.
- 2) Clean the transmission exterior.
- 3) Drain the ATF completely.

NOTE:

- Tighten the ATF drain plug after draining the ATF.
- Replace the gasket with a new one.

Tightening torque:

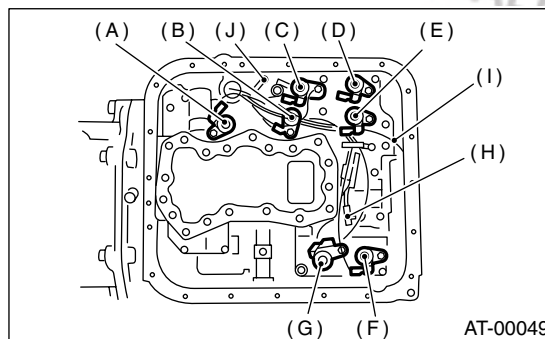
25 N·m (2.5 kgf-m, 18.1 ft-lb)



- (A) Oil pan
- (B) Drain plug
- (C) Differential oil drain plug

- 4) Remove the oil pan.
- 5) Remove and clean the magnet.
- 6) Remove the old gasket on the oil pan and transmission case completely.

- 7) Disconnect each solenoid connector and remove ATF temperature sensor from control valve.

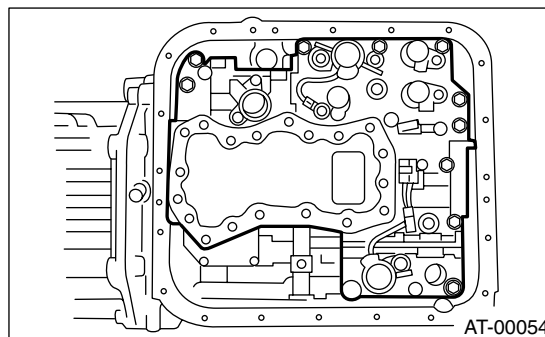


- (A) Lock-up duty solenoid (Blue)
- (B) Low clutch timing solenoid (Gray)
- (C) Line pressure duty solenoid (Red)
- (D) Shift solenoid 2 (Yellow)
- (E) Shift solenoid 1 (Green)
- (F) 2-4 brake timing solenoid (Black)
- (G) 2-4 brake duty solenoid (Red)
- (H) ATF temperature sensor
- (I) Transfer duty solenoid (Brown)
- (J) Transmission ground

- 8) Remove the control valve.

NOTE:

When removing the control valve body, be careful not to interfere with transfer duty solenoid wiring.



CONTROL VALVE BODY

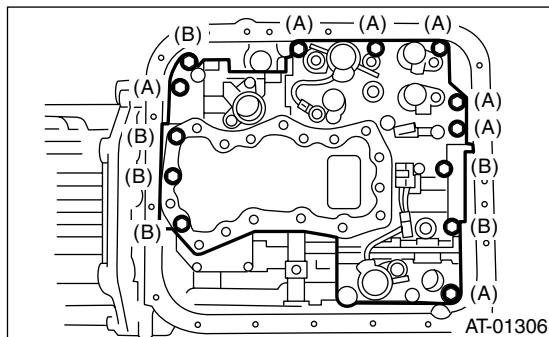
AUTOMATIC TRANSMISSION

B: INSTALLATION

- 1) Set the range select lever in "N" range.
- 2) Install the control valve, ATF temperature sensor and ground connectors.

Tightening torque:

8 N·m (0.8 kgf-m, 5.8 ft-lb)

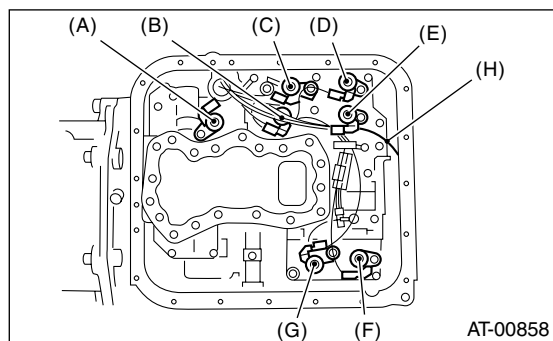


Bolt length mm (in)

(A) 30 (1.18)

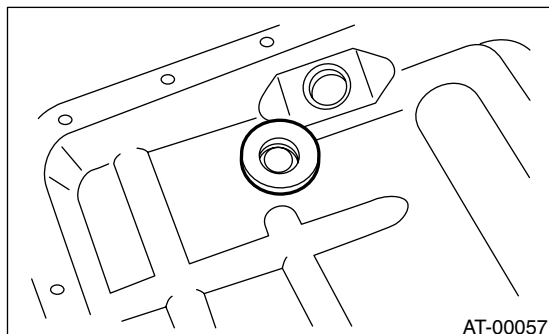
(B) 55 (2.17)

- 3) Connect all connectors.



- (A) Lock-up duty solenoid (Blue)
- (B) Low clutch timing solenoid (Gray)
- (C) Line pressure duty solenoid (Red)
- (D) Shift solenoid 2 (Yellow)
- (E) Shift solenoid 1 (Green)
- (F) 2-4 brake timing solenoid (Black)
- (G) 2-4 brake duty solenoid (Red)
- (H) Transfer duty solenoid (Brown)

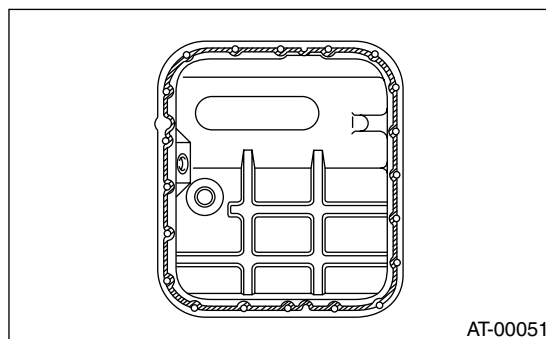
- 4) Attach the magnet at specified position.



- 5) Apply proper amount of liquid gasket to the entire oil pan mating surface.

Liquid gasket:

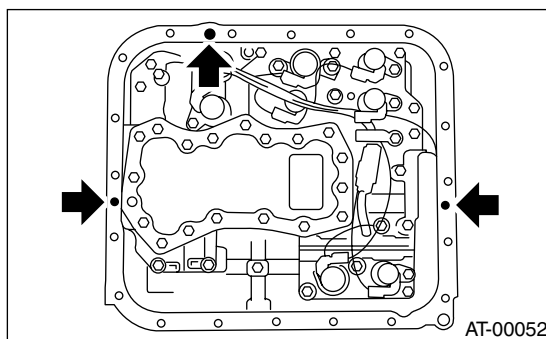
THREE BOND 1217B (Part No. K0877YA020)



- 6) Apply liquid gasket fully to three holes other than screw holes on transmission case.

Liquid gasket:

THREE BOND 1217B (Part No. K0877YA020)



- 7) Install the oil pan by equally tightening the bolts.

Tightening torque:

5 N·m (0.5 kgf-m, 3.6 ft-lb)

- 8) Pour ATF from the oil charge pipe.

Recommended fluid:

Dexron III

Fluid capacity:

Fill the same amount of fluid drained from drain plug hole.

- 9) Check the level of ATF.

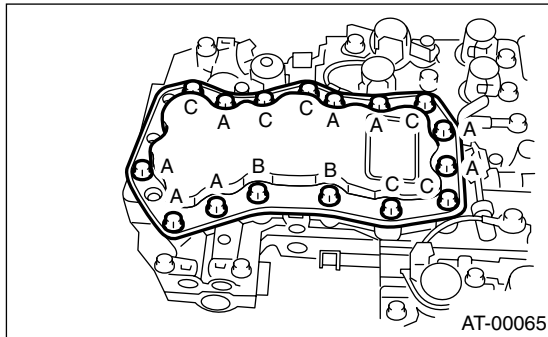
<Ref. to 4AT-29, Automatic Transmission Fluid.>

C: DISASSEMBLY

1) Remove oil strainer from lower control valve body.

NOTE:

Arrange the removed bolts in good order to assemble in the same place as disassembly, because the bolt lengths are different.

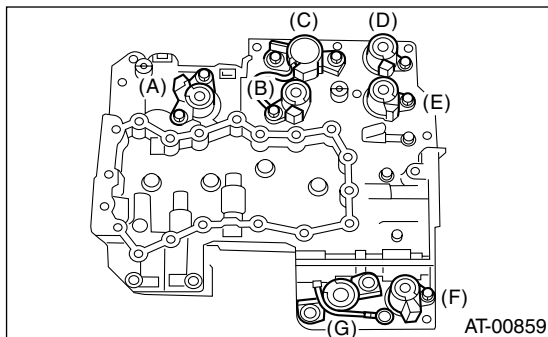


- (A) Short bolt
- (B) Middle bolt
- (C) Long bolt

2) Remove the duty solenoids, solenoids and sensor from the lower valve body.

NOTE:

Arrange the removed bolts in good order to assemble in the same place as disassembly, because the bolt lengths are different.

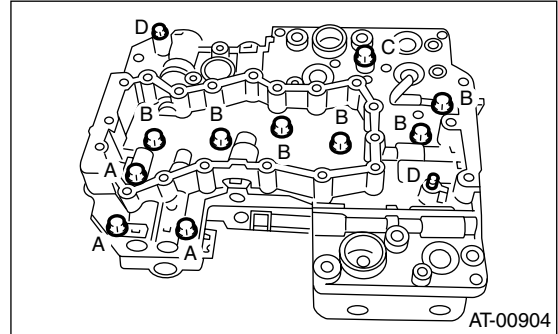


- (A) Lock-up duty solenoid (Blue)
- (B) Low clutch timing solenoid (Gray)
- (C) Line pressure duty solenoid (Red)
- (D) Shift solenoid 1 (Yellow)
- (E) Shift solenoid 2 (Green)
- (F) 2-4 brake timing solenoid (Black)
- (G) 2-4 brake duty solenoid (Red)

3) Remove the upper-lower valve body tightening bolts.

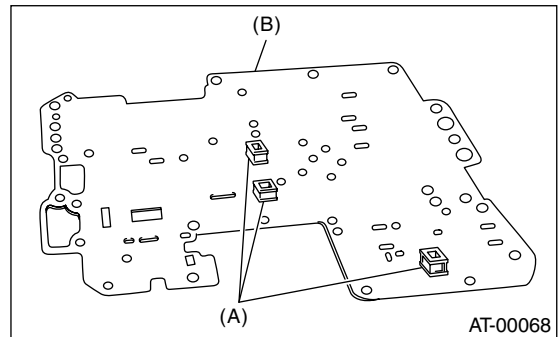
NOTE:

Arrange the removed bolts in good order to assemble in the same place as disassembly, because the bolt lengths are different.



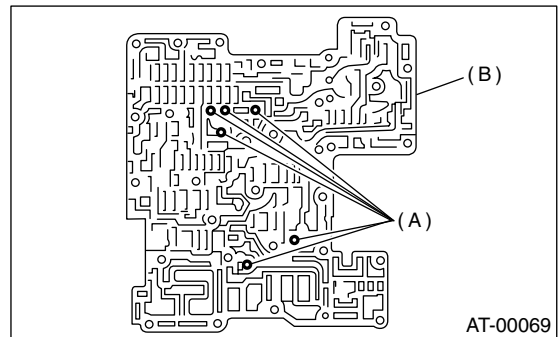
4) Remove the lower valve body.

5) Remove the oil filter and plate.



- (A) Oil filter
- (B) Plate

6) Remove six steel balls from middle valve body.



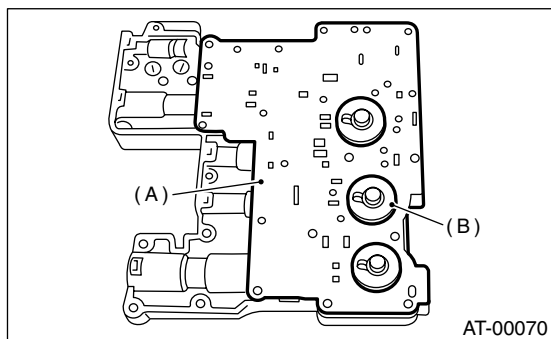
- (A) Steel ball
- (B) Middle valve body

7) Remove the middle valve body.

CONTROL VALVE BODY

AUTOMATIC TRANSMISSION

8) Remove upper separator plate from middle valve body.

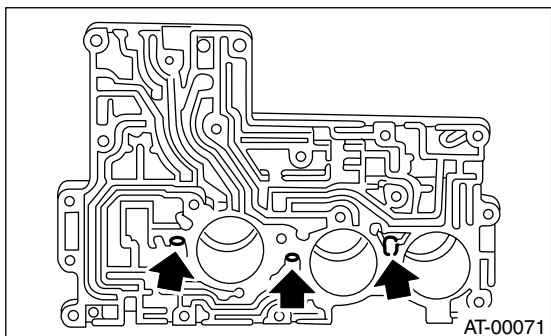


- (A) Upper separator plate
- (B) Side plate

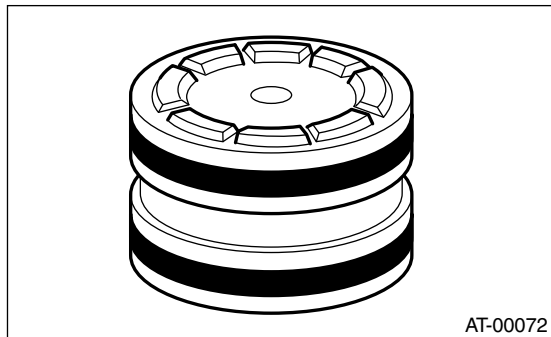
9) Remove valve springs and four steel balls from upper valve body.

10) Place a shop cloth to the piston removal hole.

11) Using an air compressor, apply air slowly to each piston hole and remove the pistons.

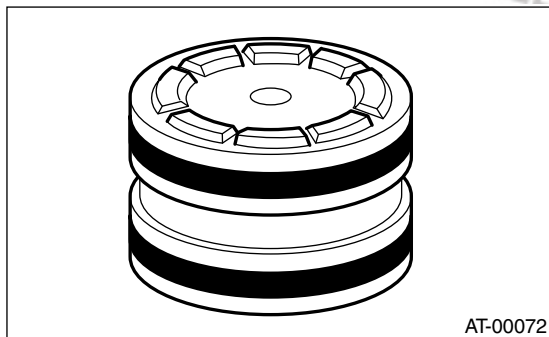


12) Remove the seal ring from piston.



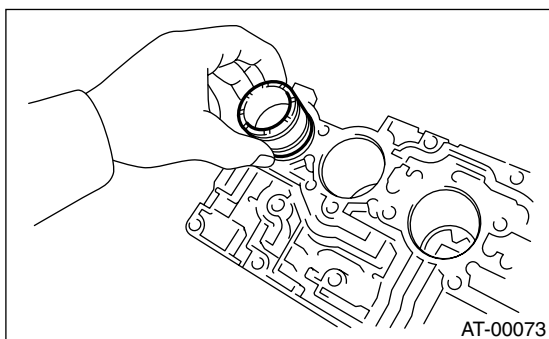
D: ASSEMBLY

1) Install a new seal ring to piston.

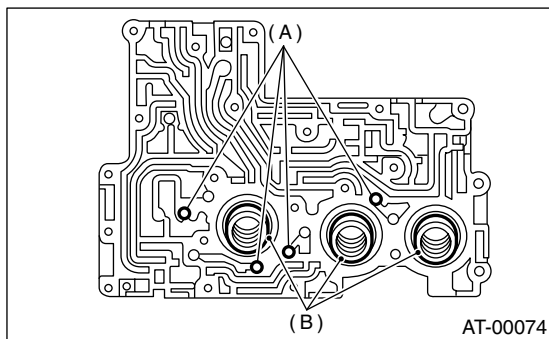


2) Apply ATF to the seal ring.

3) Insert the piston fully into upper valve body.



4) Install the spring and four steel balls to specified positions of upper valve body.



- (A) Steel ball
- (B) Spring

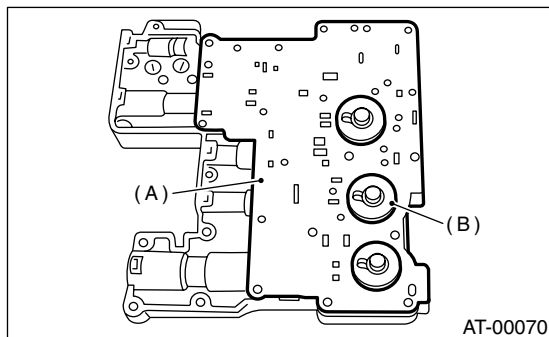
CONTROL VALVE BODY

AUTOMATIC TRANSMISSION

5) Align the hole in side plate with the hole in separator plate, and then install support plate and upper separator plate to middle valve body.

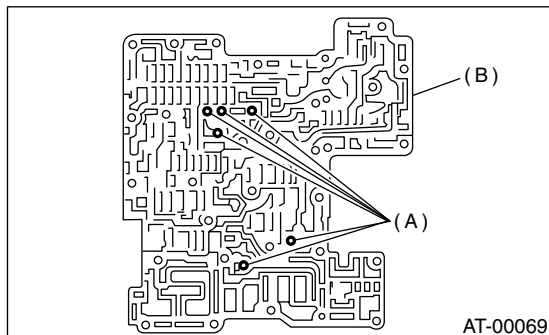
Tightening torque:

8 N·m (0.8 kgf-m, 5.8 ft-lb)



- (A) Upper separator plate
- (B) Side plate

6) Insert six steel balls in their proper positions to middle valve body.

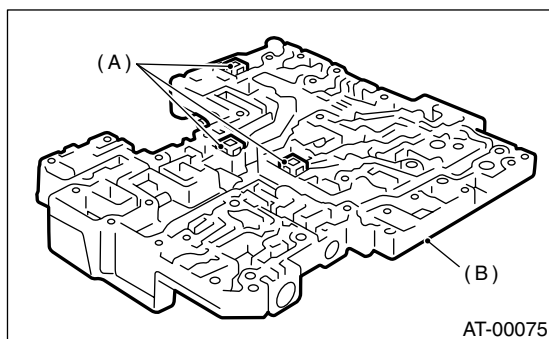


- (A) Steel ball
- (B) Middle valve body

7) Install three filters to lower valve body.

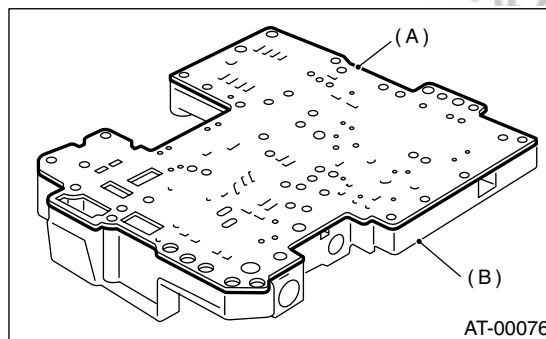
NOTE:

Pay attention to the location of filters.



- (A) Strainer
- (B) Lower valve body

8) Install the lower separator plate to lower valve body.

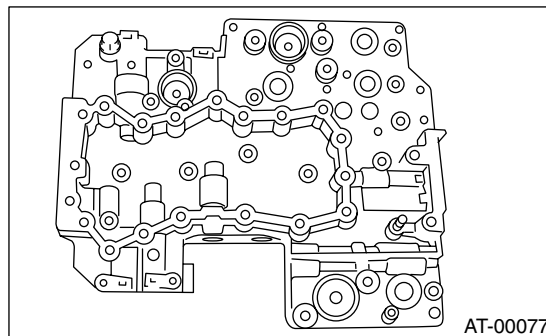


- (A) Lower separator plate
- (B) Lower valve body

9) Temporarily assemble the valve body.

NOTE:

Be careful not to drop the middle valve body and upper body interior steel ball, or the lower body filter.



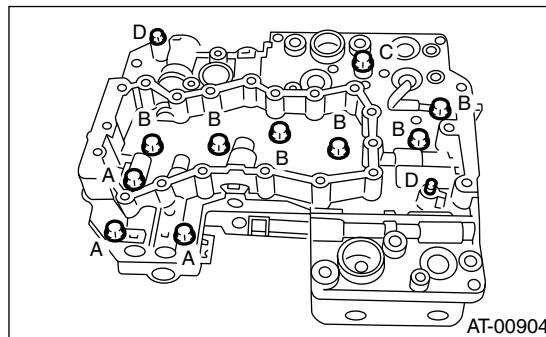
10) Tighten the bolts and nuts.

NOTE:

Install the bolts (D) from upper valve body side.

Tightening torque:

8 N·m (0.8 kgf-m, 5.8 ft-lb)



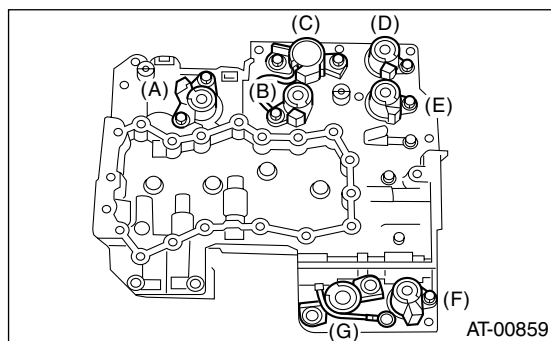
Bolt length mm (in)

- (A) 40 (1.57)
- (B) 62 (2.44)
- (C) 73 (2.87)
- (D) 79 (3.11)

CONTROL VALVE BODY

AUTOMATIC TRANSMISSION

11) Install the sensor, solenoids and duty solenoids to specified positions.

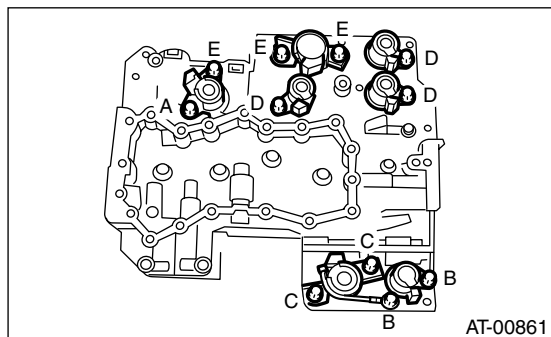


- (A) Lock-up duty solenoid (Blue)
- (B) Low clutch timing solenoid (Gray)
- (C) Line pressure duty solenoid (Red)
- (D) Shift solenoid 1 (Yellow)
- (E) Shift solenoid 2 (Green)
- (F) 2-4 brake timing solenoid (Black)
- (G) 2-4 brake duty solenoid (Red)

12) Tighten the bolts.

Tightening torque:

8 N·m (0.8 kgf-m, 5.8 ft-lb)



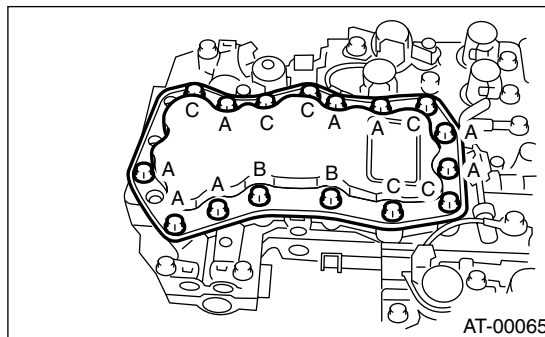
Bolt length mm (in)

- (A) 12 (0.47)
- (B) 40 (1.57)
- (C) 45 (1.77)
- (D) 62 (2.44)
- (E) 73 (2.87)

13) Install oil strainer to lower valve body.

Tightening torque:

8 N·m (0.8 kgf-m, 5.8 ft-lb)



Bolt length mm (in)

- (A) 12 (0.47)
- (B) 62 (2.44)
- (C) 81 (3.19)

E: INSPECTION

Make sure that each component is free of harmful gouges, cuts, or dust.

17. Shift Solenoids, Duty Solenoids and ATF Temperature Sensor

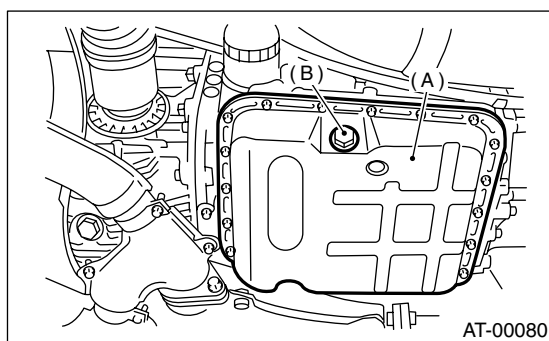
A: REMOVAL

1. SHIFT SOLENOIDS AND DUTY SOLENOIDS

- 1) Lift-up the vehicle.
- 2) Clean the transmission exterior.
- 3) Replace the gasket with a new one, and tighten the drain plug.
- 4) Drain the ATF completely.

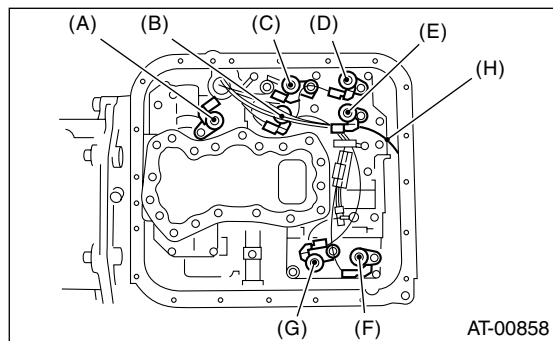
Tightening torque:

25 N·m (2.5 kgf-m, 18.1 ft-lb)



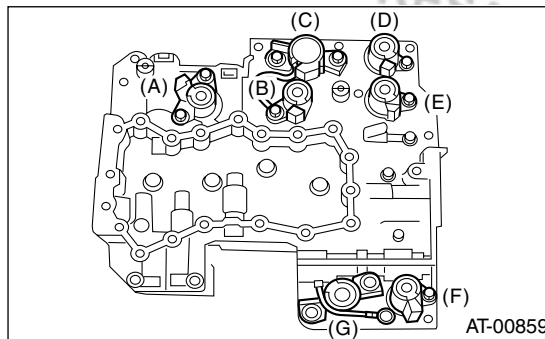
- (A) Oil pan
- (B) Drain plug

- 5) Remove the oil pan.
- 6) Disconnect the solenoid and duty solenoid connectors.



- (A) Lock-up duty solenoid (Blue)
- (B) Low clutch timing solenoid (Gray)
- (C) Line pressure duty solenoid (Red)
- (D) Shift solenoid 2 (Yellow)
- (E) Shift solenoid 1 (Green)
- (F) 2-4 brake timing solenoid (Black)
- (G) 2-4 brake duty solenoid (Red)
- (H) Transfer duty solenoid (Brown)

- 7) Remove the solenoids and duty solenoids.



- (A) Lock-up duty solenoid (Blue)
- (B) Low clutch timing solenoid (Gray)
- (C) Line pressure duty solenoid (Red)
- (D) Shift solenoid 2 (Yellow)
- (E) Shift solenoid 1 (Green)
- (F) 2-4 brake timing solenoid (Black)
- (G) 2-4 brake duty solenoid (Red)

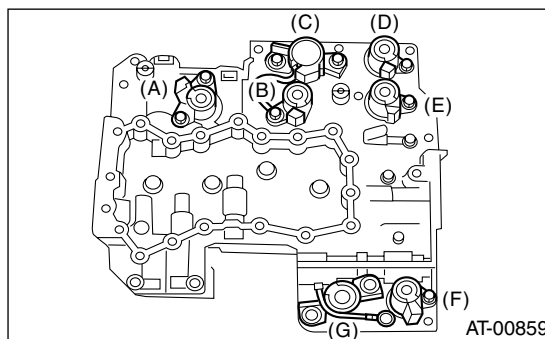
2. ATF TEMPERATURE SENSOR

For removal of ATF temperature sensor, refer to "Front Vehicle Speed Sensor." <Ref. to 4AT-49, REMOVAL, Front Vehicle Speed Sensor.>

B: INSTALLATION

1. SHIFT SOLENOIDS AND DUTY SOLENOIDS

- 1) Insert solenoid and duty solenoid to specified position.



- (A) Lock-up duty solenoid (Blue)
- (B) Low clutch timing solenoid (Gray)
- (C) Line pressure duty solenoid (Red)
- (D) Shift solenoid 2 (Yellow)
- (E) Shift solenoid 1 (Green)
- (F) 2-4 brake timing solenoid (Black)
- (G) 2-4 brake duty solenoid (Red)

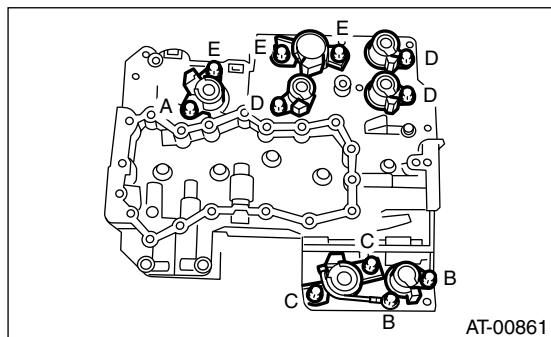
SHIFT SOLENOIDS, DUTY SOLENOIDS AND ATF TEMPERATURE SENSOR

AUTOMATIC TRANSMISSION

2) Tighten the bolts and nuts.

Tightening torque:

8 N·m (0.8 kgf-m, 5.8 ft-lb)

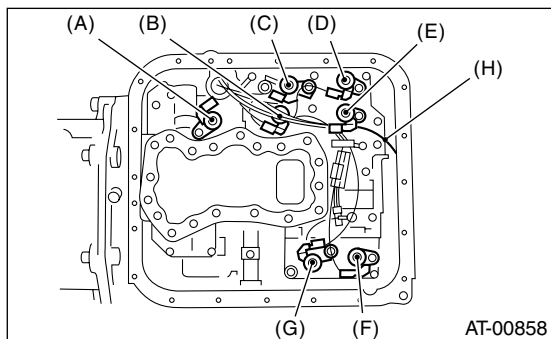


Bolt length mm (in)

- (A) 12 (0.47)
- (B) 40 (1.57)
- (C) 45 (1.77)
- (D) 62 (2.44)
- (E) 73 (2.87)

3) Connect the harness connectors.

Connect the connectors of same color, and secure the harness to valve body using clips.

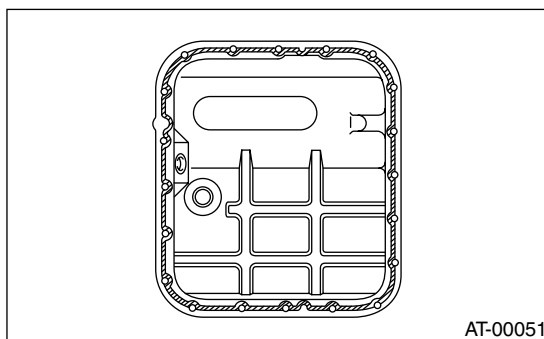


- (A) Lock-up duty solenoid (Blue)
- (B) Low clutch timing solenoid (Gray)
- (C) Line pressure duty solenoid (Red)
- (D) Shift solenoid 2 (Yellow)
- (E) Shift solenoid 1 (Green)
- (F) 2-4 brake timing solenoid (Black)
- (G) 2-4 brake duty solenoid (Red)
- (H) Transfer duty solenoid (Brown)

4) Apply proper amount of liquid gasket to the entire oil pan mating surface.

Fluid packing:

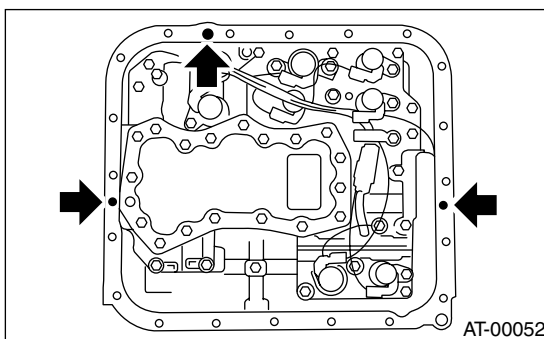
THREE BOND 1217B (Part No. K0877YA020)



5) Apply liquid gasket fully to three holes other than screw holes on transmission case.

Fluid packing:

THREE BOND 1217B (Part No. K0877YA020)



6) Install the oil pan.

Tightening torque:

5 N·m (0.5 kgf-m, 3.6 ft-lb)

7) Fill ATF up to the middle of the "COLD" side on level gauge by using the gauge hole. <Ref. to 4AT-29, Automatic Transmission Fluid.>

8) Check the ATF level. <Ref. to 4AT-29, Automatic Transmission Fluid.>

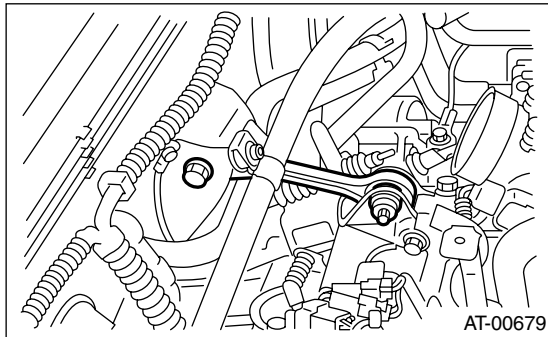
2. ATF TEMPERATURE SENSOR

For installation of ATF temperature sensor, refer to "Front Vehicle Speed Sensor." <Ref. to 4AT-50, INSTALLATION, Front Vehicle Speed Sensor.>

18. Transfer Duty Solenoid and Valve Body

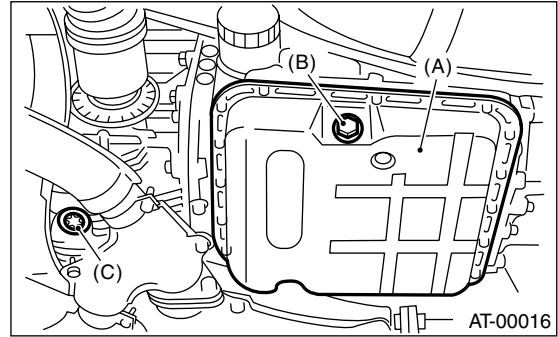
A: REMOVAL

- 1) Set the vehicle on a lift.
- 2) Disconnect the ground cable from battery.
- 3) Remove the air cleaner case. (Non-turbo model)
<Ref. to IN(H4SO)-5, REMOVAL, Air Cleaner Case.>
- 4) Remove the intercooler. (Turbo model)
<Ref. to IN(H4DOTC)-10, REMOVAL, Intercooler.>
- 5) Remove the pitching stopper.



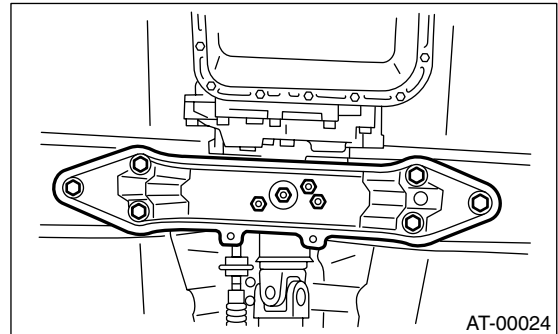
- 6) Remove the front exhaust pipe with center exhaust pipe. (Non-turbo model)
<Ref. to EX(H4SO)-4, REMOVAL, Front Exhaust Pipe.>
- 7) Remove the center exhaust pipe. (Turbo model)
<Ref. to EX(H4DOTC)-8, REMOVAL, Center Exhaust Pipe.>
- 8) Remove the rear exhaust pipe and muffler.
Non-turbo model
<Ref. to EX(H4SO)-8, REMOVAL, Rear Exhaust Pipe.> and <Ref. to EX(H4SO)-9, REMOVAL, Muffler.>
Turbo model
<Ref. to EX(H4DOTC)-13, REMOVAL, Rear Exhaust Pipe.> and <Ref. to EX(H4DOTC)-14, REMOVAL, Muffler.>

- 9) Raise the vehicle and drain the ATF.

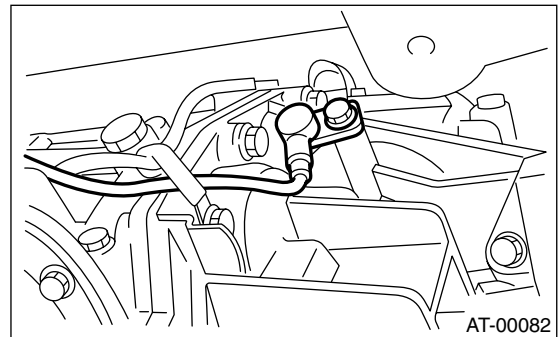


- (A) Oil pan
- (B) Drain plug
- (C) Differential oil drain plug

- 10) Remove the heat shield cover. (If equipped)
- 11) Remove the propeller shaft. <Ref. to DS-14, REMOVAL, Propeller Shaft.>
- 12) Remove the transmission rear crossmember.
 - (1) Support the transmission using a transmission jack and raise it slightly.
 - (2) Remove the bolts and nuts as shown in the figure.



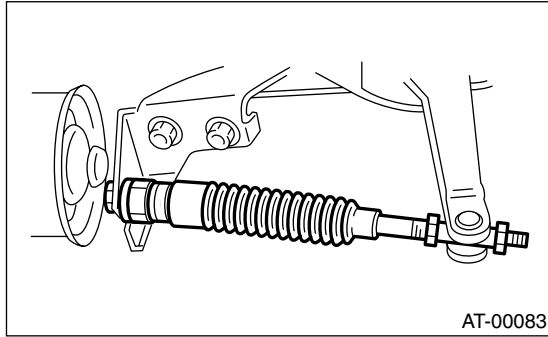
- 13) Remove the rear vehicle speed sensor.



TRANSFER DUTY SOLENOID AND VALVE BODY

AUTOMATIC TRANSMISSION

14) Remove the select cable nut.



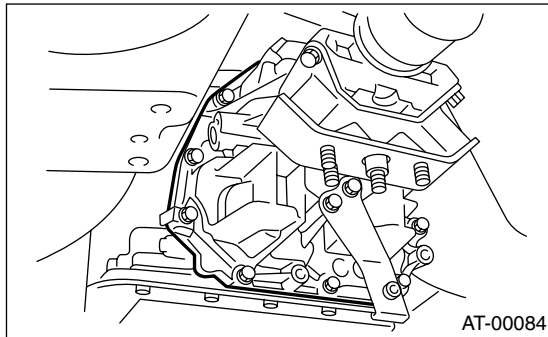
15) Move the gear select cable so that extension bolts can be removed.

16) Remove the bolts.

17) Remove the extension case.

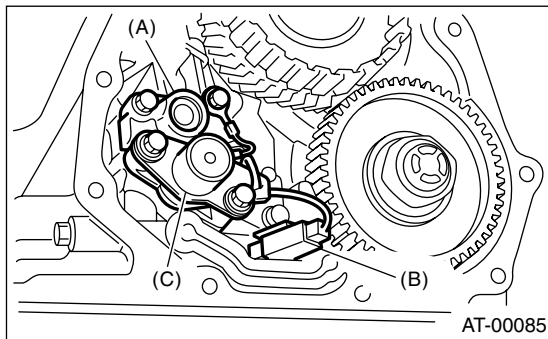
NOTE:

Use a container to catch oil flowing from extension.



18) Disconnect the transfer duty solenoid connector.

19) Remove the transfer duty solenoid and transfer valve body.



- (A) Transfer valve body
- (B) Transfer duty solenoid connector
- (C) Transfer duty solenoid

B: INSTALLATION

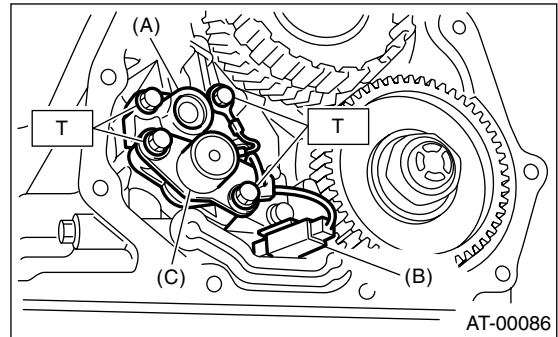
1) Install the transfer duty solenoid and transfer valve body.

(1) Install the transfer duty solenoid and transfer valve body.

Tightening torque:

T: 8 N·m (0.8 kgf-m, 5.8 ft-lb)

(2) Connect the transfer duty solenoid connector.



- (A) Transfer valve body
- (B) Transfer duty solenoid connector
- (C) Transfer duty solenoid

2) Install a new gasket and the extension case to transmission case.

(1) Tighten eleven bolts.

Tightening torque:

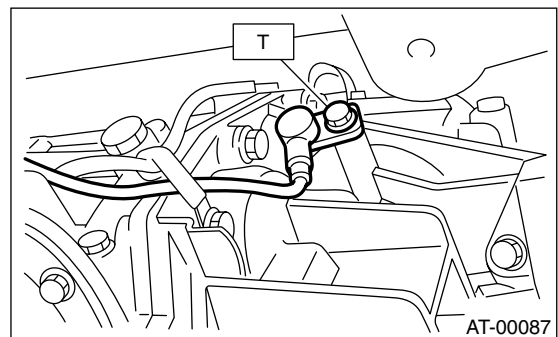
25 N·m (2.5 kgf-m, 18.1 ft-lb)

(2) Adjust the select cable. <Ref. to CS-28, ADJUSTMENT, Select Cable.>

3) Install the rear vehicle speed sensor.

Tightening torque:

T: 7 N·m (0.7 kgf-m, 5.1 ft-lb)



TRANSFER DUTY SOLENOID AND VALVE BODY

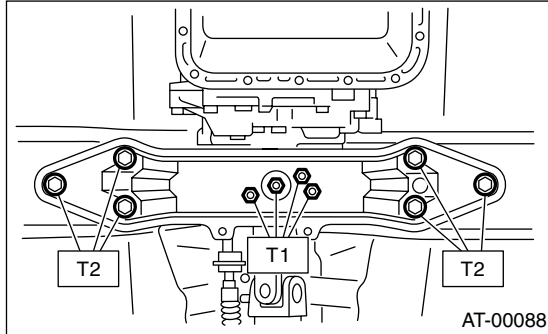
AUTOMATIC TRANSMISSION

- 4) Install the transmission rear crossmember.
(1) Tighten the bolts.

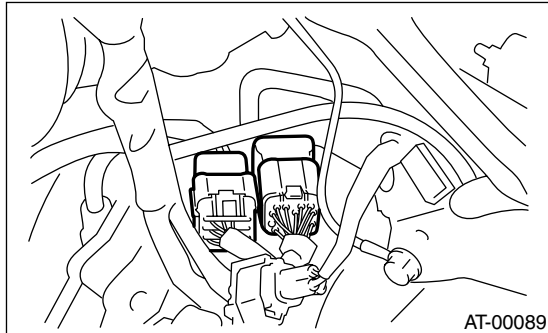
Tightening torque:

T1: 35 N·m (3.6 kgf-m, 26 ft-lb)

T2: 70 N·m (7.1 kgf-m, 51 ft-lb)



- (2) Remove the transmission jack.
5) Install the propeller shaft. <Ref. to DS-15, INSTALLATION, Propeller Shaft.>
6) Install the front, center rear exhaust pipe and muffler. (Non-turbo model)
<Ref. to EX(H4SO)-5, INSTALLATION, Front Exhaust Pipe.>, <Ref. to EX(H4SO)-8, INSTALLATION, Rear Exhaust Pipe.> and <Ref. to EX(H4SO)-9, INSTALLATION, Muffler.>
7) Install center and rear exhaust pipes, and muffler. (Turbo model)
<Ref. to EX(H4DOTC)-9, INSTALLATION, Center Exhaust Pipe.>, <Ref. to EX(H4DOTC)-13, INSTALLATION, Rear Exhaust Pipe.> and <Ref. to EX(H4DOTC)-14, INSTALLATION, Muffler.>
8) Connect the transmission harness connector.

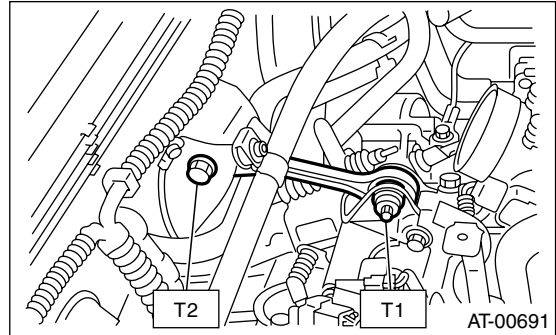


- 9) Install the pitching stopper.

Tightening torque:

T1: 50 N·m (5.1 kgf-m, 37 ft-lb)

T2: 58 N·m (5.9 kgf-m, 43 ft-lb)



- 10) Install the air cleaner case. (Non-turbo model)
<Ref. to IN(H4SO)-5, INSTALLATION, Air Cleaner Case.>
11) Install intercooler. (Turbo model)
<Ref. to IN(H4DOTC)-10, INSTALLATION, Intercooler.>
12) Fill ATF up to the middle of the "COLD" side on level gauge by using the gauge hole. <Ref. to 4AT-29, Automatic Transmission Fluid.>
13) Check the ATF level. <Ref. to 4AT-29, Automatic Transmission Fluid.>

19.ATF Filter

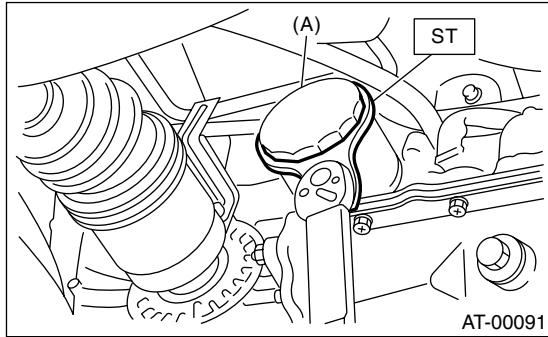
A: REMOVAL

NOTE:

ATF filter is maintenance free.

- 1) Lift-up the vehicle.
- 2) Using ST, remove the ATF filter.

ST 498545400 OIL FILTER WRENCH



(A) ATF filter

B: INSTALLATION

- 1) Get a new ATF filter and apply a thin coat of ATF to the oil seal.
- 2) Install the ATF filter. Turn it by hand, being careful not to damage the oil seal.
- 3) Using ST, tighten the ATF filter.

Calculate ATF filter torque specifications using the following formula.

$$T2 = L2 / (L1 + L2) \times T1$$

T1: 14 N·m (1.4 kgf·m, 10.1 ft·lb)

[Required torque setting]

T2: Tightening torque

L1: ST length 0.078 m (3.07 in)

L2: Torque wrench length

Example:

Torque wrench length mm (in)	Tightening torque N·m (kgf·m, ft·lb)
100 (3.94)	7.7 (0.79, 5.7)
150 (5.91)	9.0 (0.92, 6.7)
200 (7.87)	10 (1.0, 7.2)

NOTE:

Align the ST with torque wrench while tightening the ATF filter.

ST 498545400 OIL FILTER WRENCH

- 4) Add ATF.
- 5) Inspect the level of ATF. <Ref. to 4AT-29, Automatic Transmission Fluid.>

C: INSPECTION

Replace the part if any defect is found from the inspection.

Check for rust, hole, ATF leaks, and other damage.

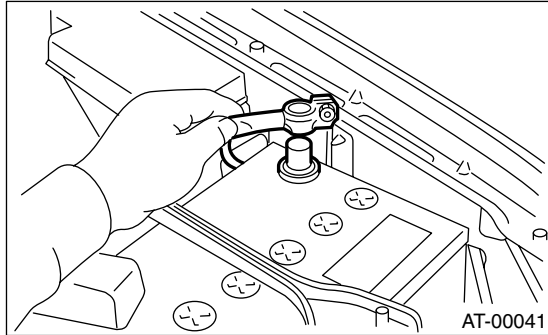
TRANSMISSION CONTROL MODULE (TCM)

AUTOMATIC TRANSMISSION

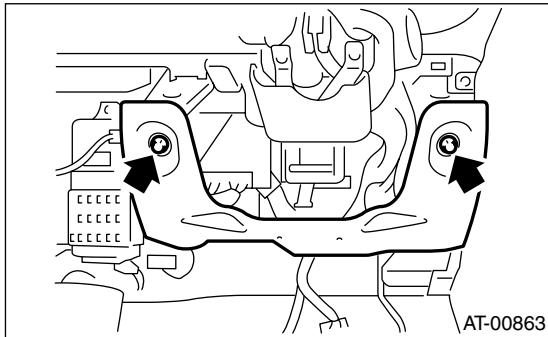
20. Transmission Control Module (TCM)

A: REMOVAL

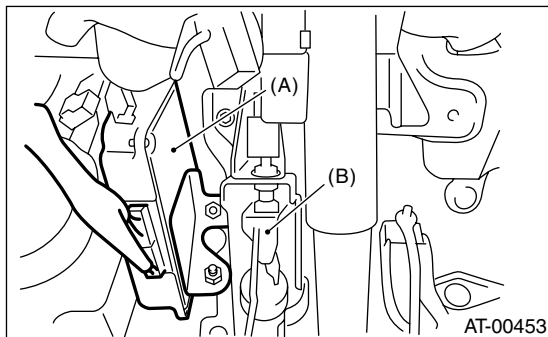
- 1) Disconnect the ground cable from battery.



- 2) Remove the lower cover and then disconnect the connector.
- 3) Remove the knee bolster.



- 4) Disconnect the connectors from TCM.



- (A) Transmission control module (TCM)
(B) Brake pedal

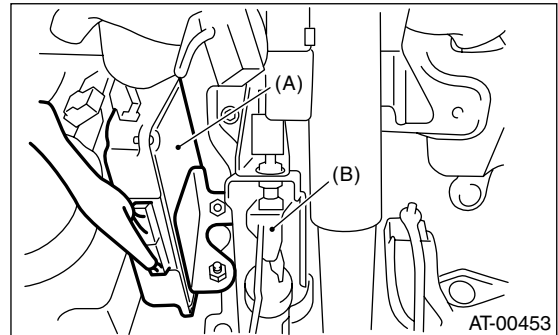
- 5) Remove the TCM.

B: INSTALLATION

- 1) Install the TCM.

Tightening torque:

7.5 N·m (0.76 kgf-m, 5.5 ft-lb)



- (A) Transmission control module (TCM)
(B) Brake pedal

- 2) Connect the connectors to TCM.
- 3) Install in the reverse order of removal.

DROPPING RESISTOR

AUTOMATIC TRANSMISSION

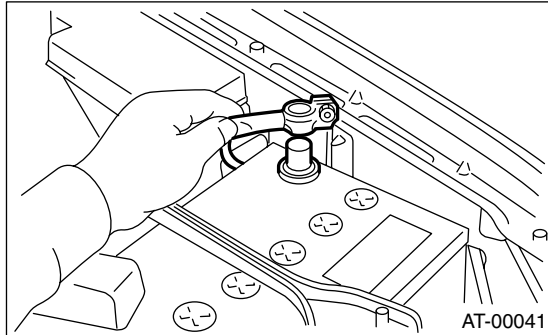
21. Dropping Resistor

A: REMOVAL

NOTE:

Dropping resistor is installed on non-turbo models only.

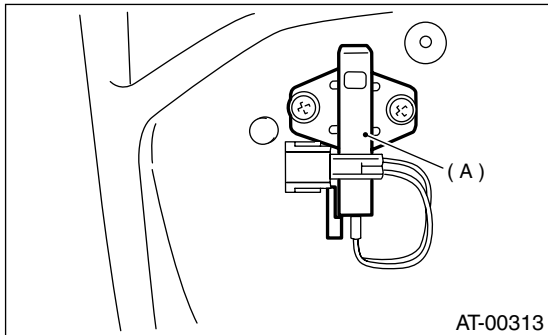
1) Disconnect the ground cable from battery.



2) Remove the air intake duct. <Ref. to IN(H4SO)-5, REMOVAL, Air Cleaner Case.>

3) Disconnect the connector from dropping resistor.

4) Remove the dropping resistor.



(A) Dropping resistor

C: INSPECTION

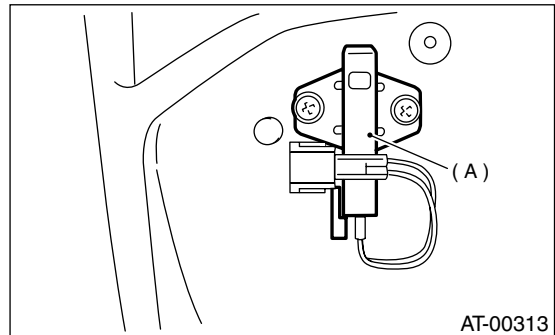
Step	Check	Yes	No
1 CHECK RESISTOR. 1) Turn ignition switch to OFF. 2) Disconnect the connector from dropping resistor. 3) Measure the resistance between dropping resistor terminals. Terminals No. 1 — No. 2:	Is the resistance 9 — 15 Ω?	Go to step 2.	Replace the dropping resistor. <Ref. to 4AT-68, Dropping Resistor.>
2 CHECK RESISTOR. Measure the resistance between dropping resistor terminals. Terminals No. 3 — No. 4:	Is the resistance 9 — 15 Ω?	Dropping resistor is normal.	Replace the dropping resistor. <Ref. to 4AT-68, Dropping Resistor.>

B: INSTALLATION

Install in the reverse order of removal.

Tightening torque:

7.5 N·m (0.76 kgf-m, 5.5 ft-lb)

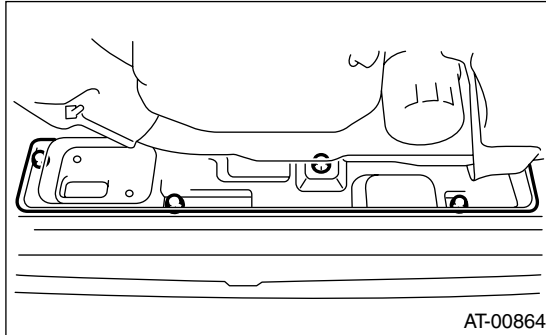


(A) Dropping resistor

22.ATF Cooler Pipe and Hose

A: REMOVAL

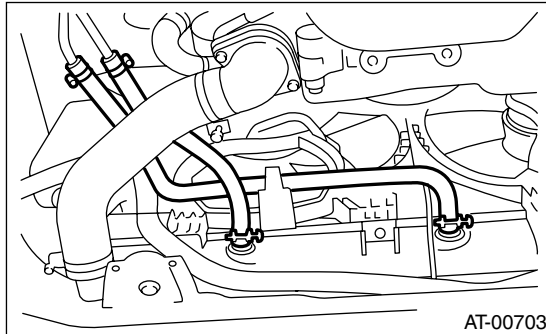
- 1) Set the vehicle on a lift.
- 2) Remove battery and washer tank.
- 3) Lift-up the vehicle.
- 4) Remove the under cover.
- 5) Remove the radiator under cover. (Turbo model)



- 6) Disconnect the ATF cooler hoses from radiator.

NOTE:

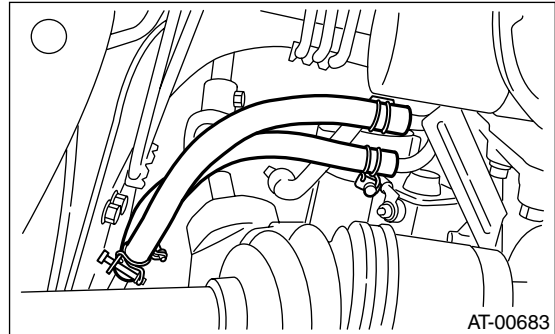
- Do not remove them with a screwdriver or other pointed tools.
- When the hose is difficult to remove, wrap the hose around with a shop cloth to protect. Turn it with pliers, and then pull it directly out with your hand.



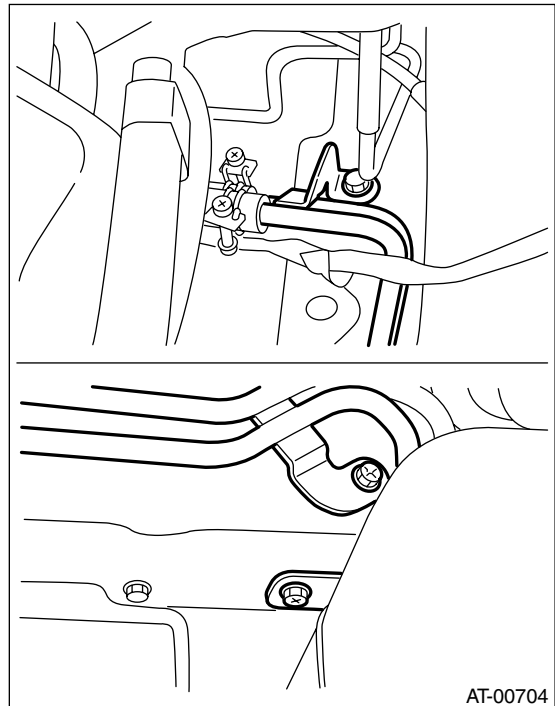
- 7) Disconnect the ATF cooler hoses from pipes.

NOTE:

- Do not remove them with a screwdriver or other pointed tools.
- When the hose is difficult to remove, wrap the hose around with a shop cloth to protect. Turn the hose with pliers, and then pull it directly out with your hand.



- 8) Remove the ATF cooler pipes from frame.



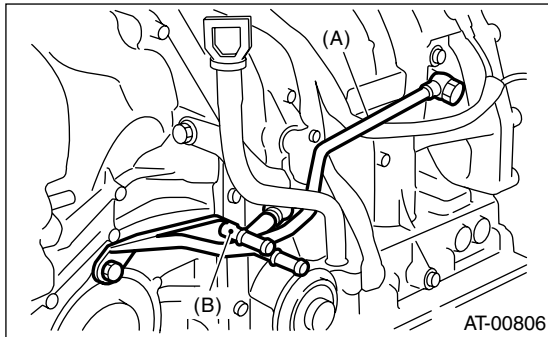
ATF COOLER PIPE AND HOSE

AUTOMATIC TRANSMISSION

9) Remove the oil cooler inlet and outlet pipes.

NOTE:

When removing the outlet pipe, be careful not to lose the ball and spring used with retaining screw.



- (A) Inlet pipe
(B) Outlet pipe

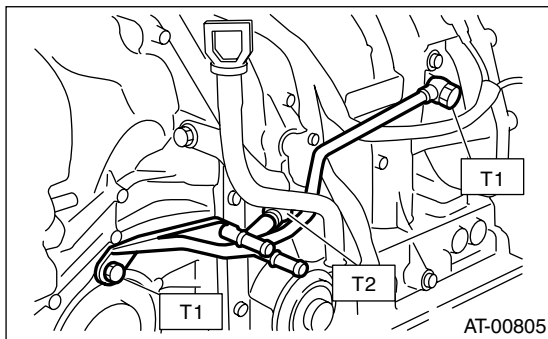
B: INSTALLATION

1) Install the oil cooler outlet and inlet pipes using new aluminum washers.

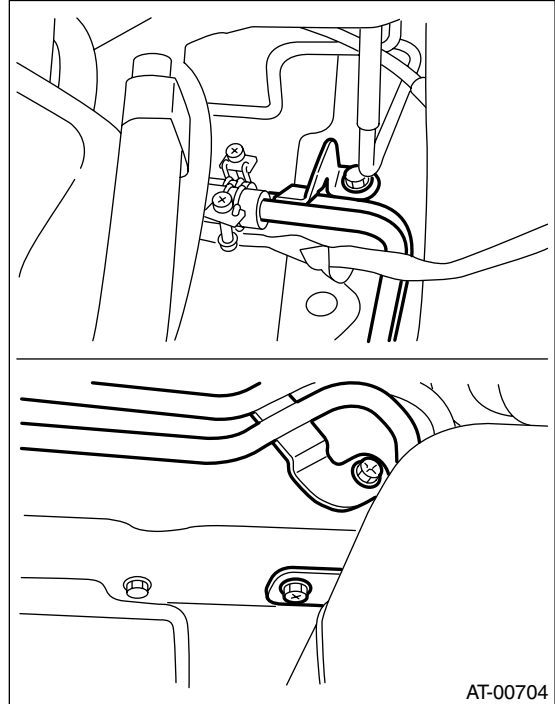
Tightening torque:

T1: 25 N·m (2.5 kgf-m, 18.1 ft-lb)

T2: 44 N·m (4.5 kgf-m, 32.5 ft-lb)



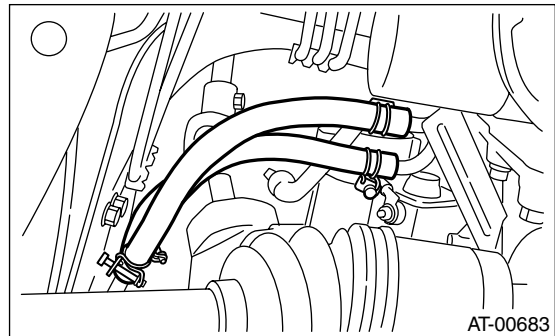
2) Install the ATF cooler pipes to frame.



3) Connect the ATF cooler hoses to pipe transmission side.

NOTE:

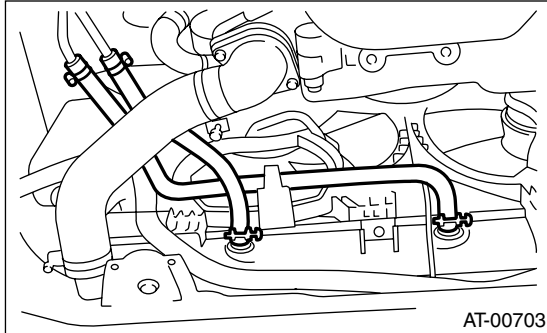
- Install the hoses so that they are not folded over, excessively bent, or twisted.
- Be careful to insert the hoses to the specified position.



4) Connect the ATF cooler hoses to pipes of radiator side.

NOTE:

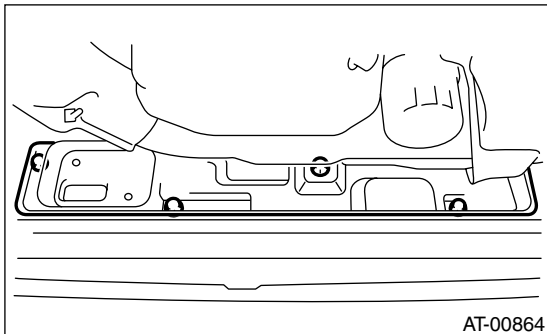
- Install the hoses so that they are not folded over, excessively bent, or twisted.
- Be careful to insert the hoses to the specified position.



5) Install the radiator under cover. (Turbo model)

Tightening torque:

4.9 N·m (0.5 kgf-m, 3.6 ft-lb)



6) Install the under cover.

7) Install the battery and washer tank.

8) Fill ATF. <Ref. to 4AT-29, Automatic Transmission Fluid.>

NOTE:

Make sure there are no ATF leaks in joints between the transmission, radiator, pipes, and hoses.

C: INSPECTION

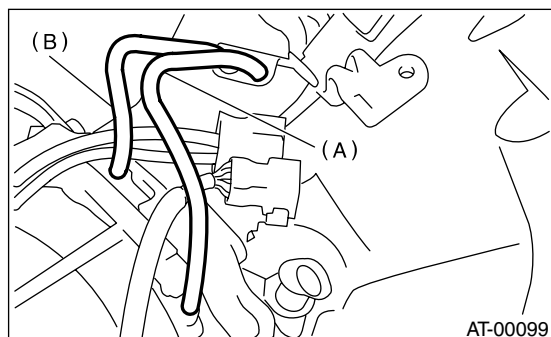
Repair or replace any defective hoses, pipes, clamps, and washers found from the inspection below.

- 1) Check for ATF leaks in joints between the transmission, radiator, pipes, and hoses.
- 2) Check for deformed clamps.
- 3) Lightly bend the hose and check for cracks in the surface and other damage.
- 4) Pinch the hose with your fingers and check for poor elasticity. Also check for poor elasticity in the parts where the clamp was by pressing with your fingernail.
- 5) Check for peeling, cracks, and deformation at the tip of the hose.

23. Air Breather Hose

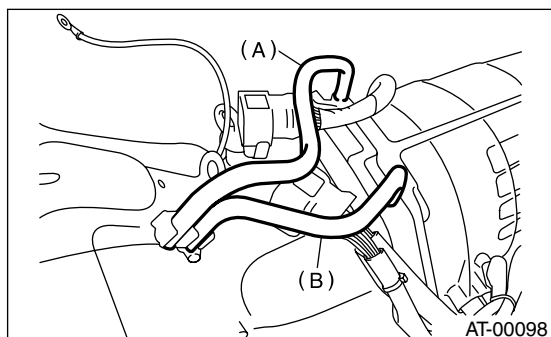
A: REMOVAL

- 1) Remove the air cleaner case. (Non-turbo model)
<Ref. to IN(H4SO)-5, REMOVAL, Air Cleaner Case.>
 - 2) Remove intercooler. (Turbo model)
<Ref. to IN(H4DOTC)-10, REMOVAL, Intercooler.>
 - 3) Disconnect the air breather hoses.
- NON-TURBO MODEL



- (A) Air breather hose (Transmission case)
- (B) Air breather hose (Oil pump housing)

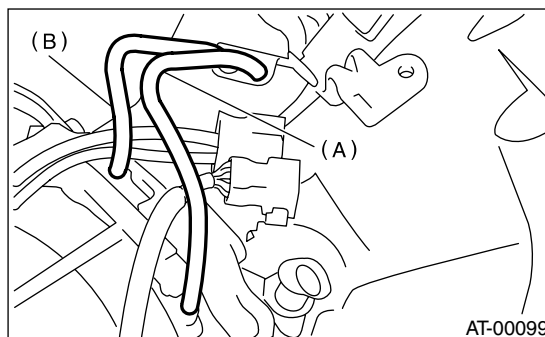
- TURBO MODEL



- (A) Air breather hose (Transmission case)
- (B) Air breather hose (Oil pump housing)

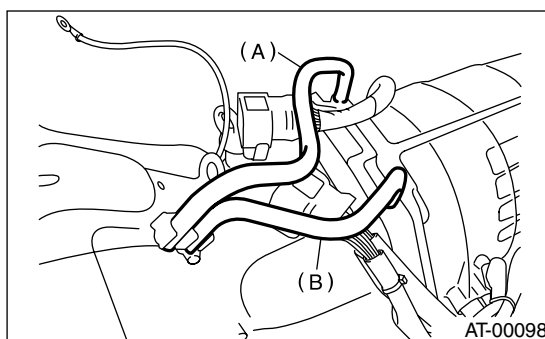
B: INSTALLATION

- 1) Install air breather hoses.
- NON-TURBO MODEL



- (A) Air breather hose (Transmission case)
- (B) Air breather hose (Oil pump housing)

- TURBO MODEL



- (A) Air breather hose (Transmission case)
- (B) Air breather hose (Oil pump housing)

- 2) Install the air cleaner case. (Non-turbo model)
<Ref. to IN(H4SO)-5, INSTALLATION, Air Cleaner Case.>
- 3) Install intercooler. (Turbo model)
<Ref. to IN(H4DOTC)-10, INSTALLATION, Intercooler.>

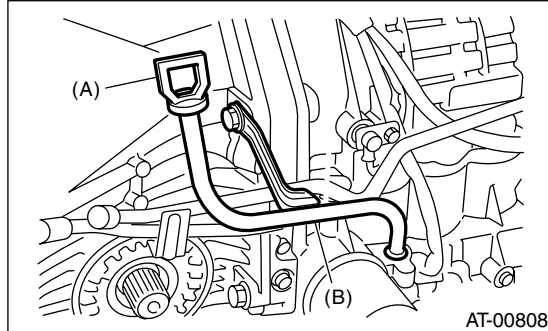
C: INSPECTION

Make sure the hose is not cracked or clogged.

24.Oil Charger Pipe

A: REMOVAL

- 1) Remove the air cleaner case. (Non-turbo model)
<Ref. to IN(H4SO)-5, REMOVAL, Air Cleaner Case.>
- 2) Remove intercooler. (Turbo model)
<Ref. to IN(H4DOTC)-10, REMOVAL, Intercooler.>
- 3) Remove the oil charger pipe, and remove the O-ring from the flange face.



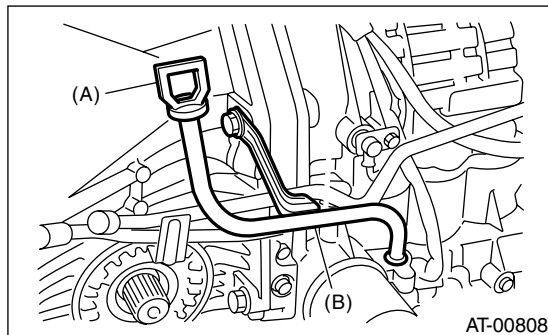
- (A) Oil level gauge
(B) Oil charger pipe

B: INSTALLATION

- 1) Install the oil charger pipe with new O-ring.

Tightening torque:

41 N·m (4.2 kgf-m, 30.4 ft-lb)



- (A) Oil level gauge
(B) Oil charger pipe

- 2) Install the air cleaner case. (Non-turbo model)
<Ref. to IN(H4SO)-5, INSTALLATION, Air Cleaner Case.>
- 3) Install intercooler. (Turbo model)
<Ref. to IN(H4DOTC)-10, INSTALLATION, Intercooler.>

C: INSPECTION

Make sure the oil charger pipe is not deformed or otherwise damaged.

TORQUE CONVERTER CLUTCH ASSEMBLY

AUTOMATIC TRANSMISSION

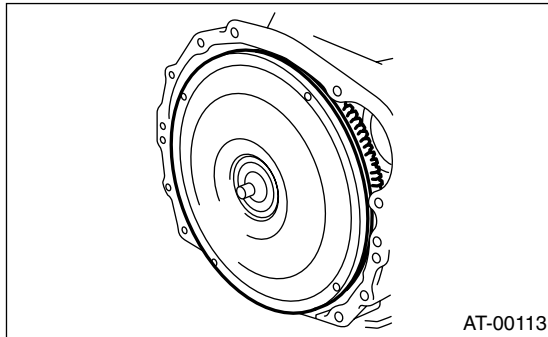
25. Torque Converter Clutch Assembly

A: REMOVAL

- 1) Remove the transmission assembly from the vehicle. <Ref. to 4AT-36, REMOVAL, Automatic Transmission Assembly.>
- 2) Extract the torque converter clutch and oil pump shaft horizontally.

NOTE:

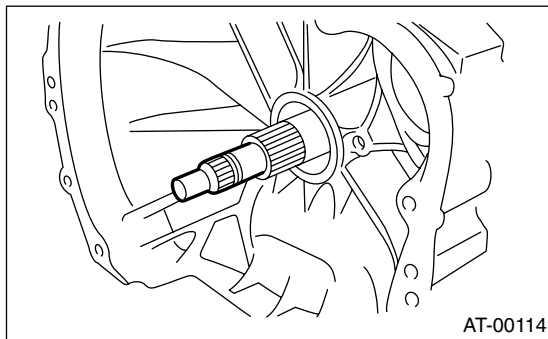
Be careful not to scratch the bushing inside the oil pump shaft.



- 3) Remove the input shaft.

NOTE:

When the torque converter clutch assembly is removed, the input shaft will come out.



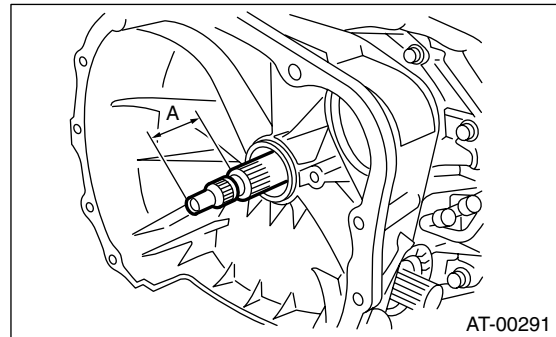
- 4) Remove the oil pump shaft from torque converter clutch as necessary.

B: INSTALLATION

- 1) Install the oil pump shaft to torque converter clutch if it is removed.
- 2) Install the oil pump shaft to the torque converter clutch, and then check the clip fits securely in its groove.
- 3) Insert the input shaft while turning lightly by hand.

Normal protrusion A:

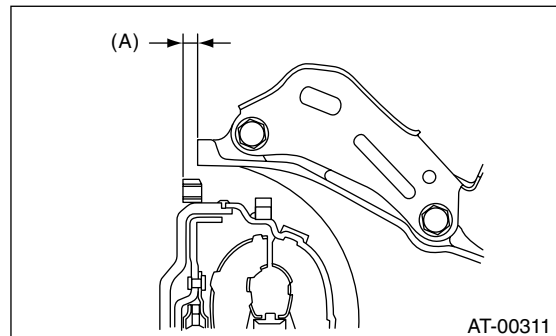
50 — 55 mm (1.97 — 2.17 in)



- 4) Holding the torque converter clutch assembly by hand, carefully install it to the torque converter clutch case. Be careful not to damage the bushing. Also avoid undue contact between the oil pump shaft bushing and stator shaft portion of the oil pump cover.
- 5) Rotate the shaft lightly by hand to engage the splines securely.

Dimension A:

2.7 — 2.9 mm (0.106 — 0.114 in)



(A) Dimension A

- 6) Install the transmission assembly to vehicle. <Ref. to 4AT-38, INSTALLATION, Automatic Transmission Assembly.>

C: INSPECTION

Make sure the ring gear is not damaged and that the protrusion on the edge of the torque converter clutch is not deformed or otherwise damaged.

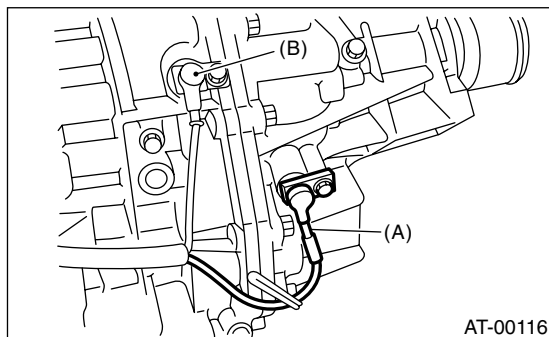
26.Extension Case

A: REMOVAL

1) Remove the transmission assembly. <Ref. to 4AT-36, REMOVAL, Automatic Transmission Assembly.>

2) Remove rear vehicle speed sensor.

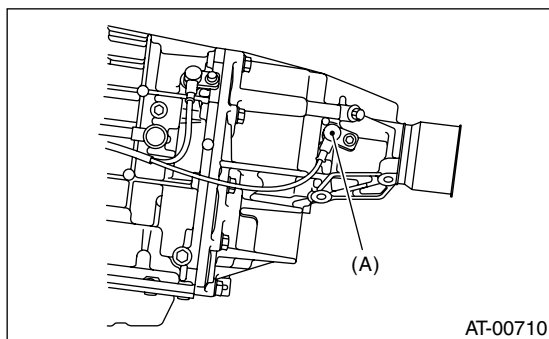
- MPT MODEL



(A) Rear vehicle speed sensor

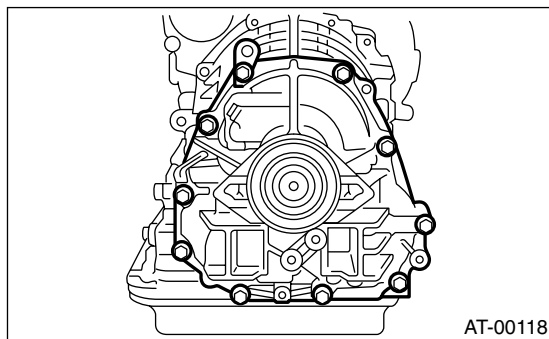
(B) Front vehicle speed sensor

- VTD MODEL



(A) Rear vehicle speed sensor

3) Separate transmission case and extension case sections.



B: INSTALLATION

1) Attach the selected thrust needle bearing to the end surface of reduction drive gear with vaseline.

NOTE:

Install thrust needle bearing in the correct direction.

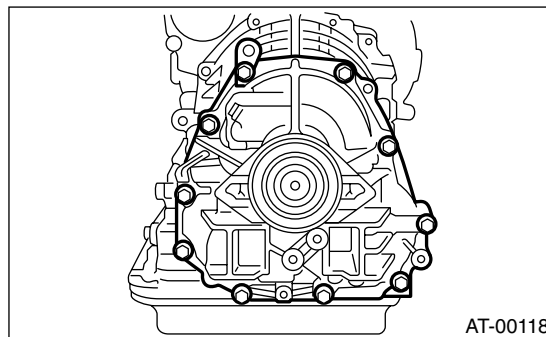
2) Install new gasket.

3) Install the extension case to the transmission case.

4) Tighten bolts to secure the case.

Tightening torque:

25 N·m (2.5 kgf-m, 18.1 ft-lb)

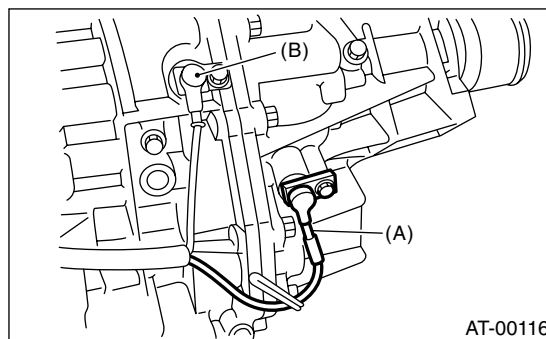


5) Install the rear vehicle speed sensor.

Tightening torque:

7 N·m (0.7 kgf-m, 5.1 ft-lb)

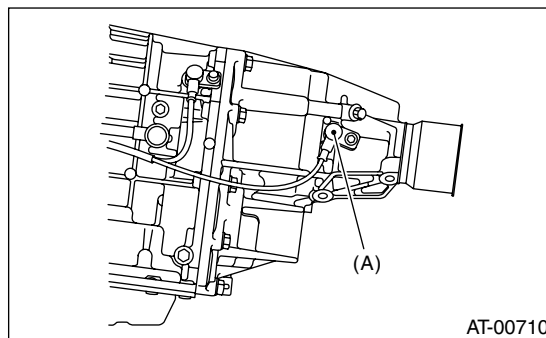
- MPT MODEL



(A) Rear vehicle speed sensor

(B) Front vehicle speed sensor

- VTD MODEL



(A) Rear vehicle speed sensor

6) Install the transmission assembly. <Ref. to 4AT-38, INSTALLATION, Automatic Transmission Assembly.>

EXTENSION CASE

AUTOMATIC TRANSMISSION

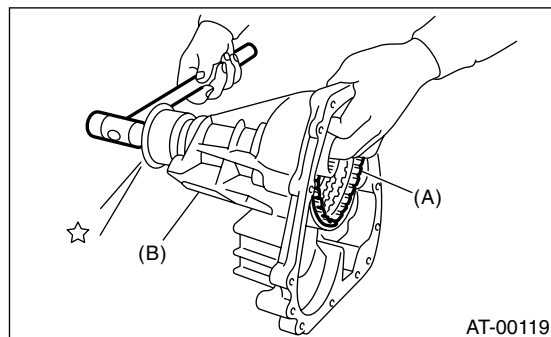
C: DISASSEMBLY

1. MPT MODEL

1) Take out the transfer clutch by lightly tapping the end of the rear drive shaft.

NOTE:

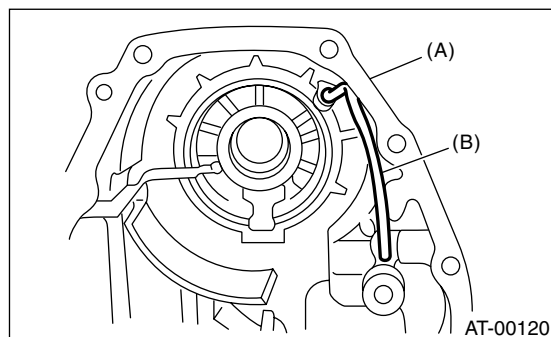
Be careful not to damage the oil seal in the extension.



(A) Extension case

(B) Transfer clutch

2) Remove the transmission clutch pipe without bending pipe.



(A) Extension case

(B) Transfer clutch pipe

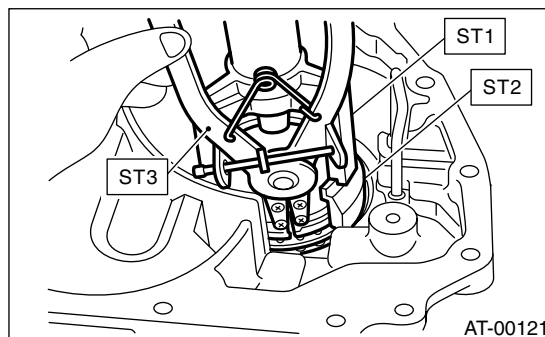
2. VTD MODEL

1) Remove snap ring using ST1, ST2, ST3 and a press.

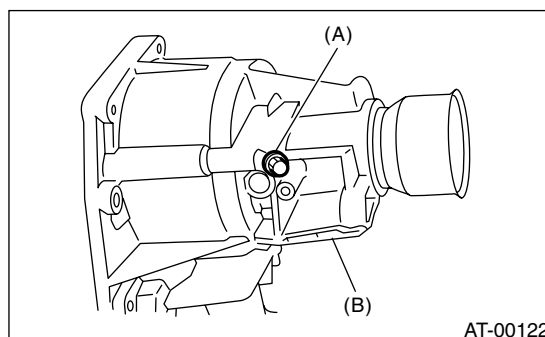
ST1 398673600 COMPRESSOR

ST2 498627100 SHEAT

ST3 398663600 PLIERS



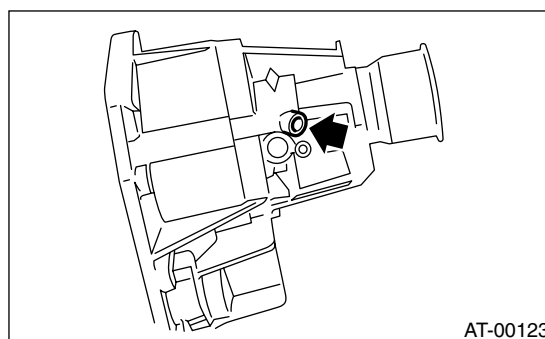
2) Remove test plug.



(A) Extension case

(B) Test plug

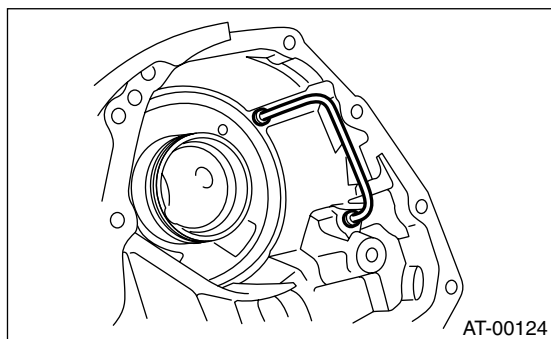
3) Remove clutch piston using compressed air.



EXTENSION CASE

AUTOMATIC TRANSMISSION

4) Pay attention, not to bend pipe, and remove transfer clutch pipe.



5) Remove the dust cover from the extension case.
6) Remove the oil seal from the extension case.

D: ASSEMBLY

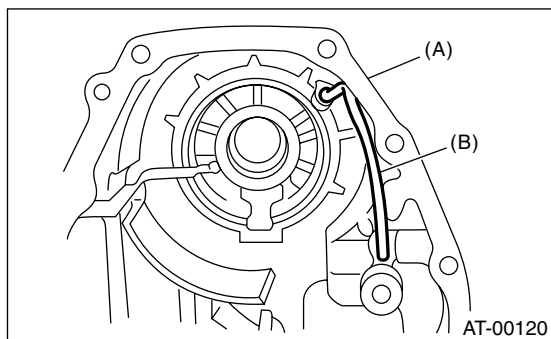
1. MPT MODEL

1) Using the ST and a press, press in a new oil seal.

ST 498057300 INSTALLER

2) Press in the dust cover.

3) Install the transfer clutch pipe to extension case without bending pipe.

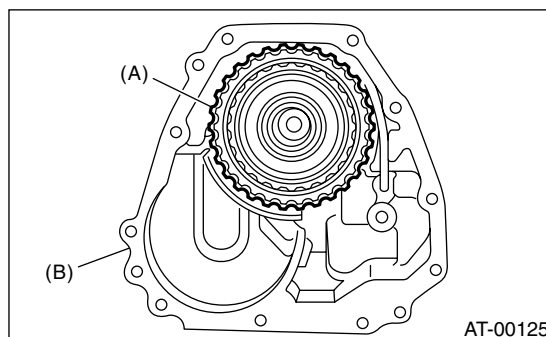


(A) Extension case
(B) Transfer clutch pipe

4) Install the transfer clutch assembly to the case.

NOTE:

- Be careful not to damage the seal rings.
- Insert the clutch assembly fully into position until the bearing shoulder bottoms.



(A) Transfer clutch
(B) Extension case

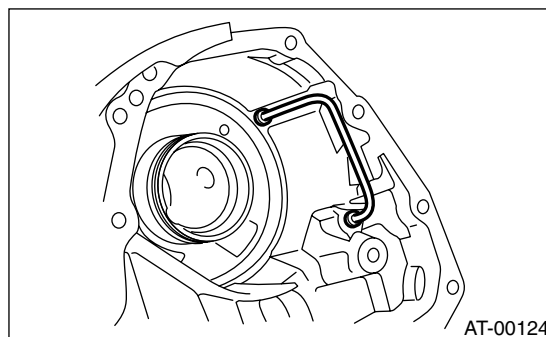
2. VTD MODEL

1) Press new oil seal using ST and a press.

ST 498057300 INSTALLER

2) Press dust cover.

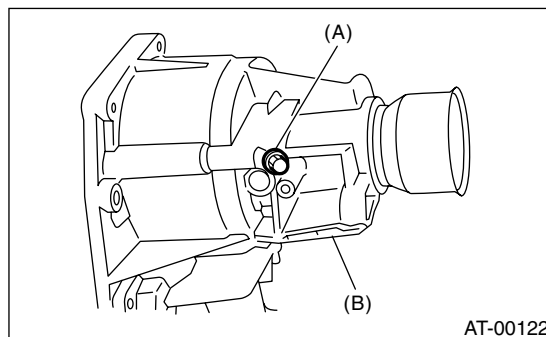
3) Install the transfer clutch pipe onto the extension case, taking care not to bend the pipe.



4) Install the test plug.

Tightening torque:

13 N·m (1.3 kgf-m, 9.4 ft-lb)

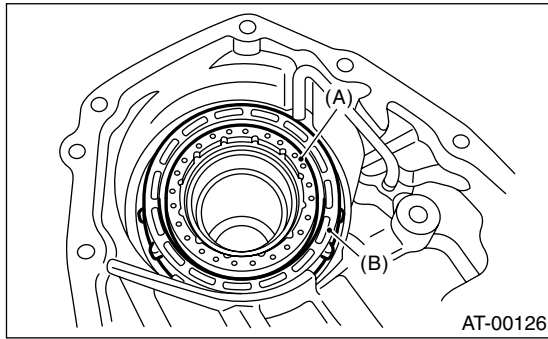


(A) Test plug
(B) Extension case

EXTENSION CASE

AUTOMATIC TRANSMISSION

5) Insert the multi-plate clutch, drive plates, driven plates, and spring retainer.



(A) Spring retainer

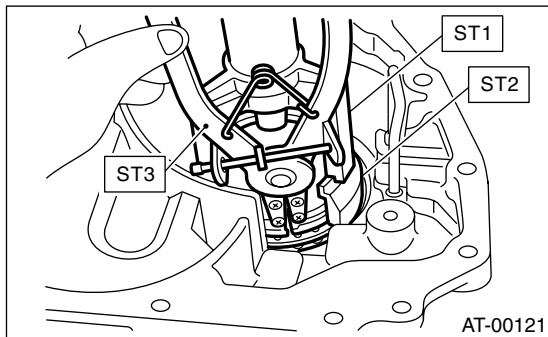
(B) Multi-plate clutch (LSD) piston assembly

6) Install the snap ring using special tools 1, 2, and 3.

ST1 398673600 COMPRESSOR

ST2 498627100 SEAT

ST3 398663600 PLIERS



E: INSPECTION

- Use forced air to make sure the transfer pipe and extension case routes are not clogged and do not leak.

- Measure the extension end play and adjust it to within specifications.

MPT model

<Ref. to 4AT-82, MPT MODEL, ADJUSTMENT, Transfer Clutch.>

VTD model

<Ref. to 4AT-83, VTD MODEL, ADJUSTMENT, Transfer Clutch.>

27. Transfer Clutch

A: REMOVAL

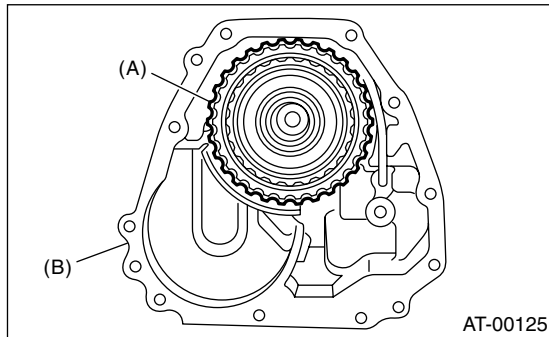
1) Remove the transmission assembly from vehicle. <Ref. to 4AT-36, REMOVAL, Automatic Transmission Assembly.>

2) Remove the extension case and remove the transfer clutch. <Ref. to 4AT-75, REMOVAL, Extension Case.> and <Ref. to 4AT-76, DISASSEMBLY, Extension Case.>

B: INSTALLATION

1) Select the thrust needle bearing. <Ref. to 4AT-82, ADJUSTMENT, Transfer Clutch.>

2) Install the transfer clutch assembly to the case.

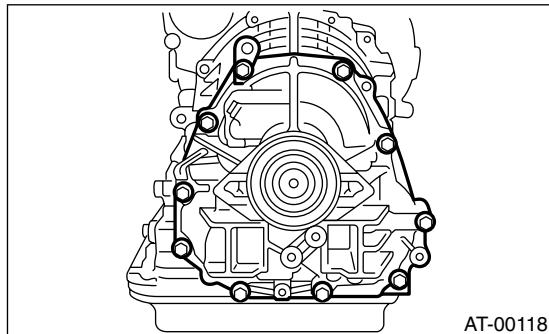


(A) Transfer clutch
(B) Extension case

3) Tighten bolts to secure the case.

Tightening torque:

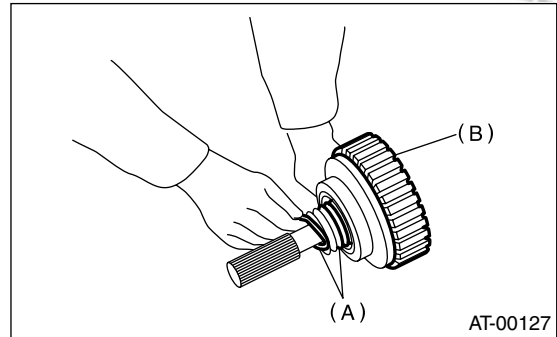
25 N·m (2.5 kgf-m, 18.1 ft-lb)



4) Install the transmission assembly to vehicle. <Ref. to 4AT-38, INSTALLATION, Automatic Transmission Assembly.>

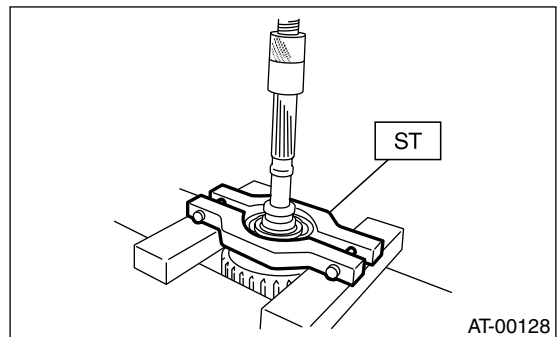
C: DISASSEMBLY

1) Remove the seal ring.

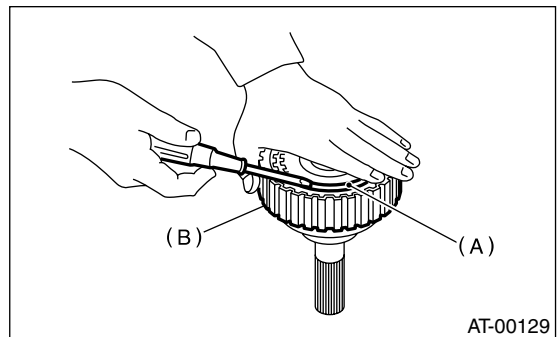


(A) Seal ring
(B) Transfer clutch

2) Using a press and ST, remove the ball bearing.
ST 498077600 REMOVER



3) Remove the snap ring, and take out the pressure plate, drive plates, and driven plates.



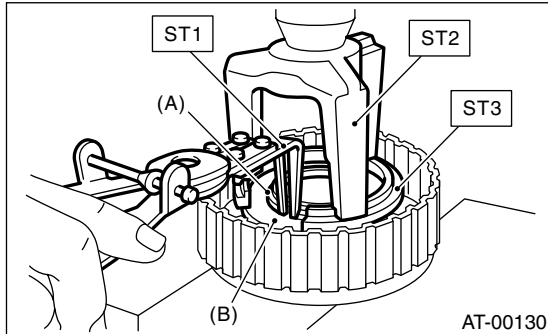
(A) Snap ring
(B) Transfer clutch

TRANSFER CLUTCH

AUTOMATIC TRANSMISSION

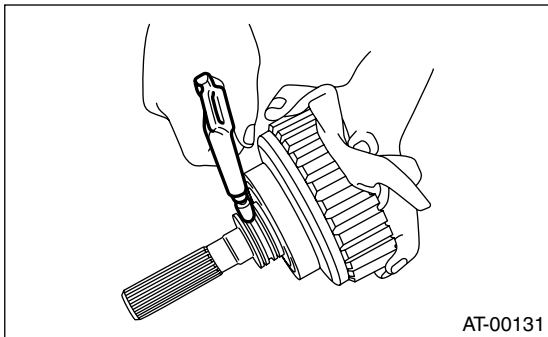
4) Remove the snap ring with ST1, ST2 and ST3, and take out the return spring and transfer clutch piston seal.

ST1 399893600 PLIERS
ST2 398673600 COMPRESSOR
ST3 398623600 SEAT



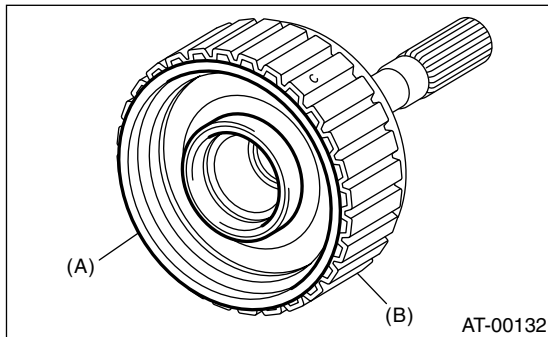
(A) Snap ring
(B) Transfer piston seal

5) Apply compressed air to the rear drive shaft to remove the piston.



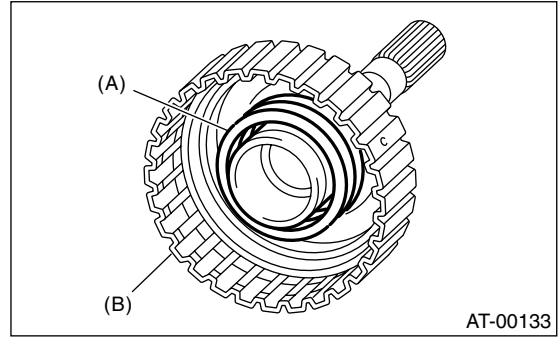
D: ASSEMBLY

1) Install the transfer clutch piston.



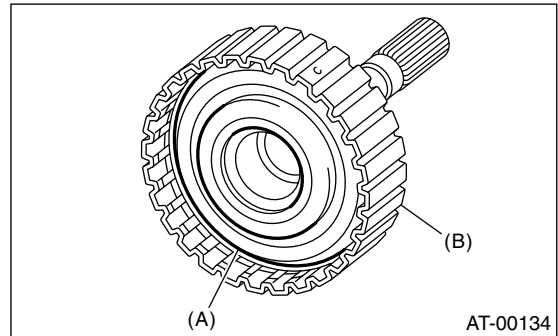
(A) Transfer clutch piston
(B) Rear drive shaft

2) Install return spring to transfer piston.



(A) Return spring
(B) Rear drive shaft

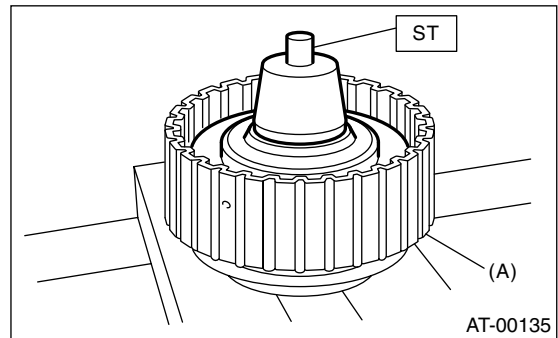
3) Install transfer clutch piston seal.



(A) Transfer clutch piston seal
(B) Rear drive shaft

4) Install ST to rear drive shaft.

ST 499257300 SNAP RING OUTER GUIDE



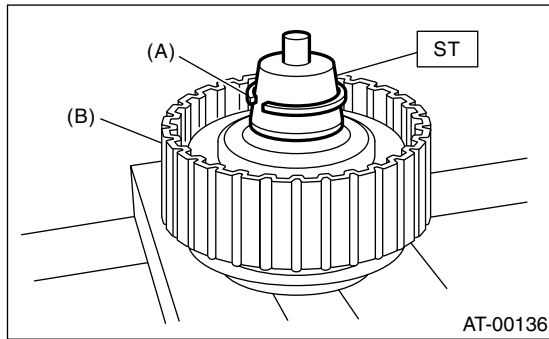
(A) Transfer clutch

TRANSFER CLUTCH

AUTOMATIC TRANSMISSION

5) Install snap ring to ST.

ST 499257300 SNAP RING OUTER GUIDE

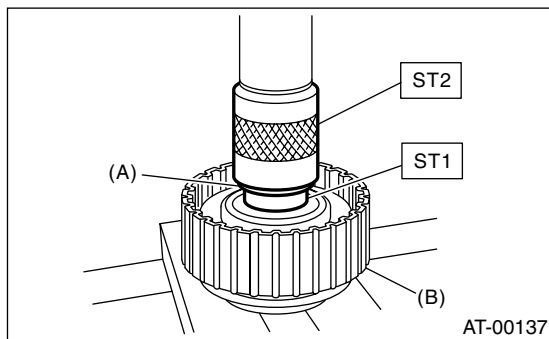


- (A) Snap ring
- (B) Transfer clutch

6) Using ST1 and ST2, install snap ring to rear drive shaft.

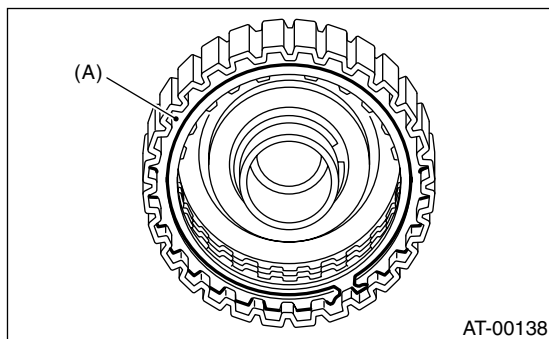
ST1 499257300 SNAP RING OUTER GUIDE

ST2 499247400 INSTALLER



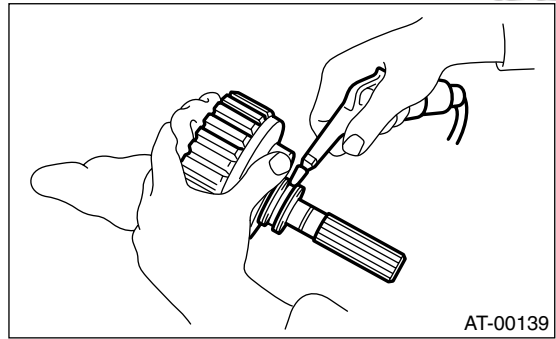
- (A) Snap ring
- (B) Transfer clutch

7) Install the driven plates, drive plates, pressure plate and snap ring.



- (A) Snap ring

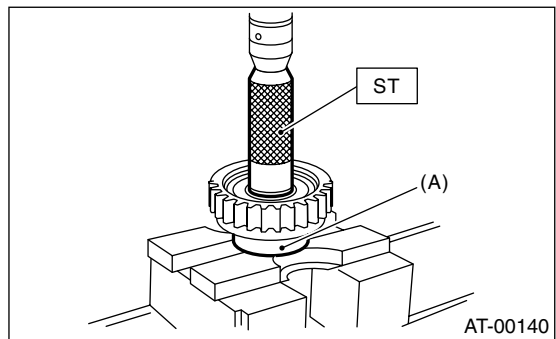
8) Apply compressed air to see if the assembled parts move smoothly.



9) Check clearance between snap ring and pressure plate. <Ref. to 4AT-82, INSPECTION, Transfer Clutch.>

10) Press-fit a new ball bearing with ST.

ST 899580100 INSTALLER

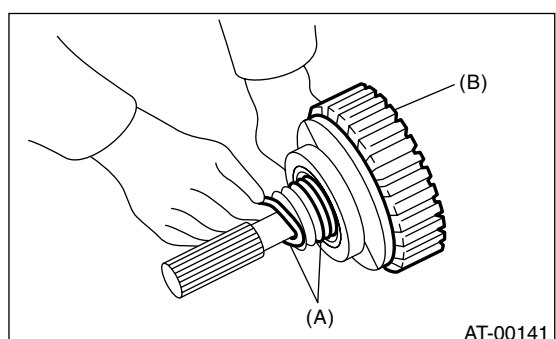


- (A) Ball bearing

11) Coat a new seal ring with vaseline, and install it in the seal ring groove of the shaft.

NOTE:

Do not expand the seal ring excessively when installing.

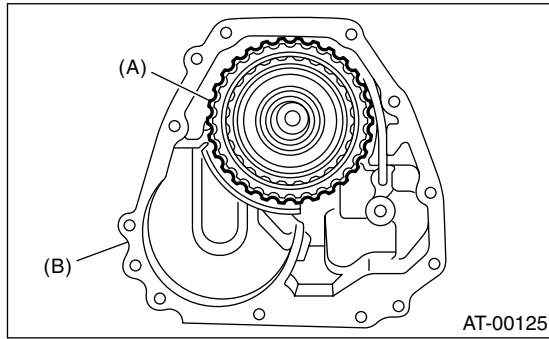


- (A) Snap ring
- (B) Transfer clutch

TRANSFER CLUTCH

AUTOMATIC TRANSMISSION

12) Install the transfer clutch assembly without damaging seal ring.



- (A) Transfer clutch
(B) Extension case

E: INSPECTION

- Check the drive plate facing for wear and damage.
- Check the snap ring for wear, return spring for permanent set and breakage, and return spring for deformation.
- Check the lathe cut seal ring for damage.
- Measure the extension end play and adjust it to within specifications.

<Ref. to 4AT-82, ADJUSTMENT, Transfer Clutch.>

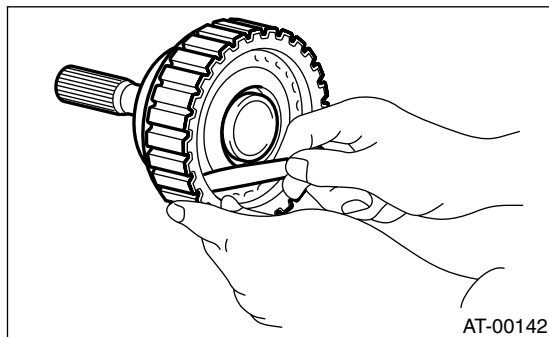
- 1) Inspect clearance between snap ring and pressure plate.
- 2) Before measuring clearance, place the same thickness of shim on both sides to prevent pressure plate from tilting.
- 3) If the clearance is not within specification, adjust it by selecting a suitable pressure plate on the transfer clutch piston side.

Standard value:

0.7 — 1.1 mm (0.028 — 0.043 in)

Allowable limit:

1.6 mm (0.063 in)



Pressure plates	
Part No.	Thickness mm (in)
31593AA151	3.3 (0.130)
31593AA161	3.7 (0.146)
31593AA171	4.1 (0.161)
31593AA181	4.5 (0.177)

4) Check if the tight corner braking does not occur when the vehicle is started with steering wheel held at fully turned position. If tight corner braking occurs, perform the following procedures.

- (1) With the steering wheel held at fully turned position, drive the vehicle in "D" range and with vehicle speed at approx. 5 km/h (3 MPH) in both clockwise and counterclockwise directions for approx. ten times each, while repeating acceleration and braking intermittently.

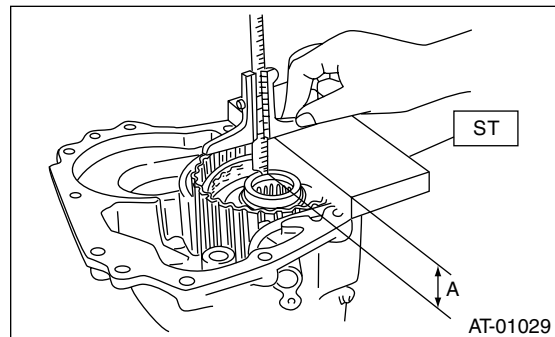
- (2) If the tight corner braking still persists, drive the vehicle again in a circle for several laps.

F: ADJUSTMENT

1. MPT MODEL

- 1) Measure distance "A" from end of extension case and rear drive shaft with ST.

ST 398643600 GAUGE



A: Measured value

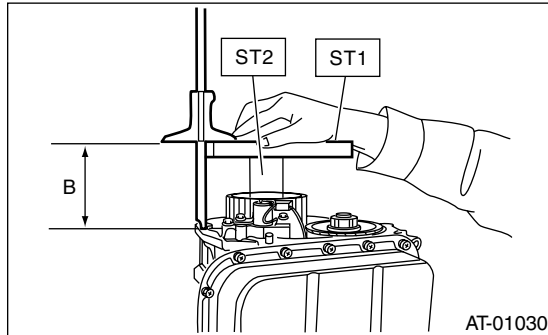
TRANSFER CLUTCH

AUTOMATIC TRANSMISSION

2) Measure the distance “B” from the transmission case mating surface to the reduction drive gear end surface with ST1 and ST2.

ST1 398643600 GAUGE

ST2 499577000 GAUGE



B: Measured value

3) Calculation formula:

NOTE:

• Calculate “T”:

$$T = A - B + 35.4 \text{ mm}$$

$$[T = A - B + 1.3937 \text{ in}]$$

T: Thrust needle bearing thickness

A: Distance from end of extension case to end of rear drive shaft

B: Distance from end of transmission case to end of reduction drive gear

Example:

When, A = 33.6 mm (1.3228 in), B = 65.05 mm (2.5610 in)

$$T = 33.6 - 65.05 + 35.4 = 3.95$$

$$[T = 1.3228 - 2.5610 + 1.3937 = 0.1555]$$

After calculation, the value of “H” becomes 3.95, therefore select bearing thickness of 3.8.

• Calculation formula for “T” is applied when measuring using ST (398643600 GAUGE, 499577000 GAUGE). When not using ST, apply

$$T = (A - \alpha + 0.45 \text{ mm}) - (B - \beta) - H$$

$$[T = (A - \alpha + 0.0177 \text{ in}) - (B - \beta) - H]$$

T: Thrust needle bearing thickness

A: Distance from end of extension case to end of reduction drive shaft

B: Distance from end of transmission case to end of rear drive shaft

α : Collar thickness used when measuring “A”

β : Collar thickness used when measuring “B”

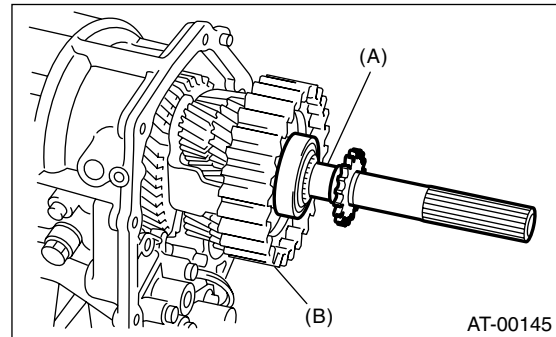
0.45: Gasket thickness (mm)

H: Shim clearance

Thrust needle bearing	
Part No.	Thickness mm (in)
806536020	3.8 (0.150)
806535030	4.0 (0.157)
806535040	4.2 (0.165)
806535050	4.4 (0.173)
806535060	4.6 (0.181)
806535070	4.8 (0.189)
806535090	5.0 (0.197)

2. VTD MODEL

1) Insert the rear driveshaft into the reduction drive gear and center differential assembly.

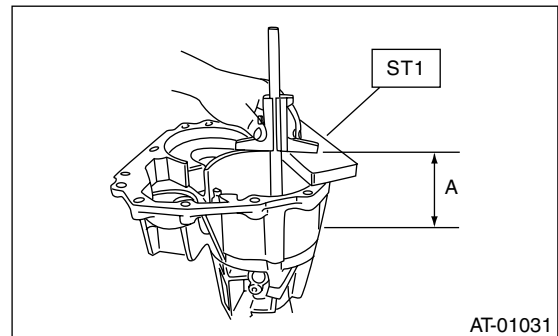


(A) Rear drive plate

(B) Center differential carrier

2) Using the special tool, measure the distance “A” between the mating surface of extension case and multi-plate clutch (LSD) piston.

ST 398643600 GAUGE



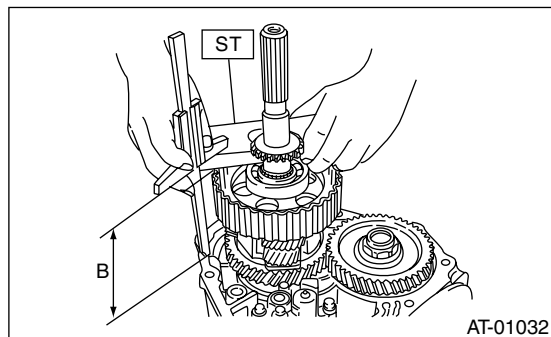
A: Measured value

TRANSFER CLUTCH

AUTOMATIC TRANSMISSION

3) Using the special tool, measure the distance “B” between the mating surface of transmission case and reduction drive gear edge.

ST 398643600 GAUGE



B: Measured value

4) Formula:

NOTE:

• Calculation of “T”:

When clearances are 0.05 mm (0.0020 in), select up to four adjusting shims from the table, suitable for clearance value.

When clearances are 0.05 mm (0.0020 in)

$$T = A - B + 0.40 \text{ mm}$$

$$[T = A - B + 0.0157 \text{ in}]$$

When clearances are 0.25 mm (0.0098 in)

$$T = A - B + 0.20 \text{ mm}$$

$$[T = A - B + 0.0079 \text{ in}]$$

T: Shim clearance

A: Distance between extension case edge and rear driveshaft edge

B: Distance between transmission case edge and reduction drive gear edge

T: Shim thickness

0.05 — 0.25 mm (0.0020 — 0.0098 in)

Example:

When, A = 90.50 mm (3.5630 in), B = 90.35 mm (3.5571 in)

Calculation for 0.05 mm (0.0020 in) of clearance

$$T = 90.50 - 90.35 + 0.4 = 0.55$$

$$[T = 3.5630 - 3.5571 + 0.0157 = 0.0216]$$

Calculation when clearance is 0.25 mm (0.0098 in)

$$T = 90.50 - 90.35 + 0.2 = 0.35$$

$$[T = 3.5630 - 3.5571 + 0.0079 = 0.0138]$$

• Calculation formula for “T” is applied when measuring using ST (398643600 GAUGE). When not using ST, apply

$$T = (A - \alpha + 0.45 \text{ mm}) - (B - \beta) - H$$

$$[T = (A - \alpha + 0.0177 \text{ in}) - (B - \beta) - H]$$

T: Thrust needle bearing thickness

A: Distance from end of extension case to end of reduction drive shaft

B: Distance from end of transmission case to end of rear drive shaft

α : Collar thickness used when measuring “A”

β : Collar thickness used when measuring “B”

0.45: Gasket thickness (mm)

H: Shim clearance

After calculation, the value of “T” becomes between 0.35 mm (0.0138 in) and 0.55 mm (0.0216 in), therefore select two shims with thickness of 0.2 mm (0.010 in) or one shim with thickness of 0.5 mm (0.020 in).

Adjusting shim	
Part No.	Thickness mm (in)
33281AA001	0.2 (0.008)
33281AA011	0.5 (0.020)

28.Multi-plate Clutch

A: REMOVAL

Remove multi-plate clutch following the same instructions as for the extension case. <Ref. to 4AT-75, REMOVAL, Extension Case.>

B: INSTALLATION

Install multi-plate clutch following the same instructions as for the extension case. <Ref. to 4AT-75, INSTALLATION, Extension Case.>

C: INSPECTION

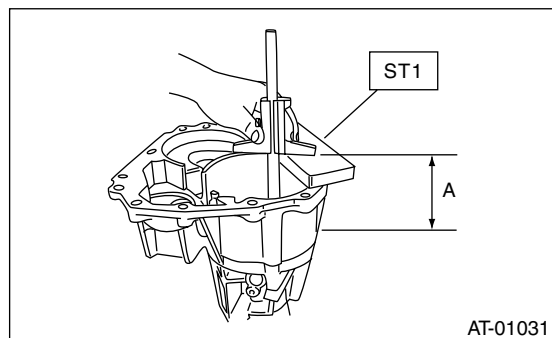
- Inspect drive plate facing for wear and damage.
- Make sure snap ring is not worn and return spring has no permanent distortion, damage, or deformation.
- Inspect lathe cut seal ring for damage.
- Measure multi-plate clutch clearance and adjust it to within the specification range. <Ref. to 4AT-85, ADJUSTMENT, Multi-plate Clutch.>

D: ADJUSTMENT

1) Remove drive plate and driven plate from center differential carrier.

2) Using the special tool, measure distance "A" from extension case joining surface to multi-plate clutch (LSD) piston.

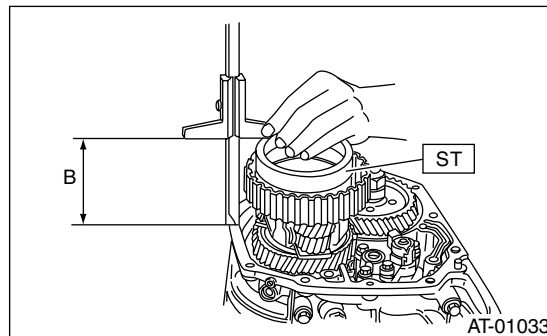
ST 398643600 GAUGE



A: Measured value

3) Using ST, measure height "B" from transmission case joining edge to center differential clutch drum edge.

ST 398744300 GAUGE



B: Measured value

4) Calculation formula

$$T = A - B + 0.45 \text{ mm}$$

$$[T = A - B + 0.0177 \text{ in}]$$

NOTE:

- Calculation formula for "T" is applied when measuring using ST (398643600 GAUGE, 398744300 GAUGE). When not using ST, apply

$$T = (A - \alpha + 0.45 \text{ mm}) - (B - \beta)$$

$$[T = (A - \alpha + 0.0177 \text{ in}) - (B - \beta)]$$

T: Thrust needle bearing thickness

A: Distance from end of extension case to end of reduction drive shaft

B: Distance from end of transmission case to end of rear drive shaft

α : Collar thickness used when measuring "A"

β : Collar thickness used when measuring "B"

0.45: Gasket thickness (mm)

- Measure multi-plate clutch (LSD) driven and drive plate thickness to find the clearance between measurement value and "T".

Standard value:

$$0.2 - 0.6 \text{ mm } (0.008 - 0.024 \text{ in})$$

Limit value:

$$1.6 \text{ mm } (0.063 \text{ in})$$

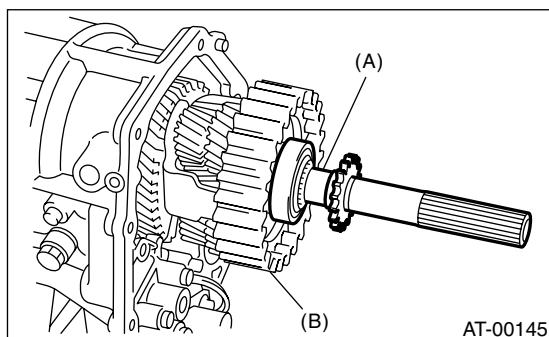
If outside the standard value, replace the plate set (drive and driven plate). Select a multi-plate clutch (LSD) piston side adjustment plate that will bring clearance within the standard value.

Obtainable driven plates	
Part No.	Thickness mm (in)
31589AA041	1.6 (0.063)
31589AA050	2.0 (0.079)
31589AA060	2.4 (0.094)
31589AA070	2.8 (0.110)

29. Rear Drive Shaft

A: REMOVAL

- 1) Remove transmission assembly. <Ref. to 4AT-36, REMOVAL, Automatic Transmission Assembly.>
- 2) Remove rear wheel speed sensor and separate extension case from transmission case. <Ref. to 4AT-75, REMOVAL, Extension Case.>
- 3) Pull out the rear driveshaft from the center differential assembly.



(A) Rear driveshaft
(B) Center differential carrier

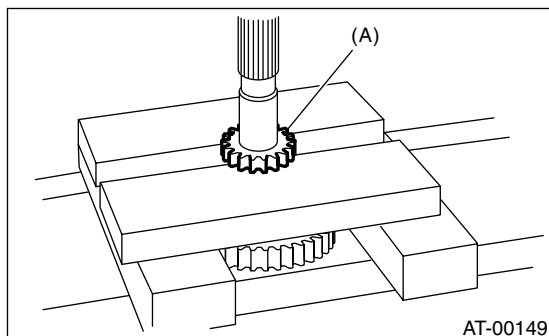
- 4) Remove drive plate and driven plate.

B: INSTALLATION

- 1) Select the appropriate shim. <Ref. to 4AT-83, VTD MODEL, ADJUSTMENT, Transfer Clutch.>
- 2) Install drive plate and driven plate.
- 3) Insert rear driveshaft into the center differential assembly.
- 4) Join transmission case and extension case. Install rear wheel speed sensor. <Ref. to 4AT-75, INSTALLATION, Extension Case.>
- 5) Install transmission assembly. <Ref. to 4AT-38, INSTALLATION, Automatic Transmission Assembly.>

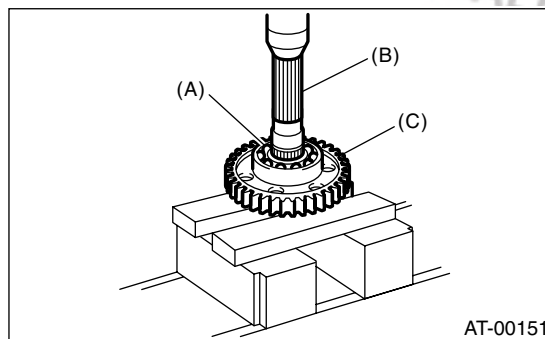
C: DISASSEMBLY

- 1) Using a press, remove revolution gear.



(A) Revolution gear

- 2) Using a press, remove the front and rear side ball bearings and clutch hub.



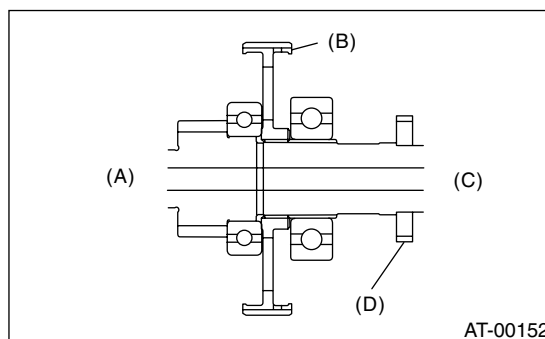
(A) Rear ball bearing
(B) Rear driveshaft
(C) Clutch hub

D: ASSEMBLY

Assemble in the reverse order of disassembly.

NOTE:

- Use a new revolution gear and ball bearings.
- Make sure the clutch hub is oriented in the correct direction.



(A) Front side
(B) Clutch hub
(C) Rear side
(D) Revolution gear

E: INSPECTION

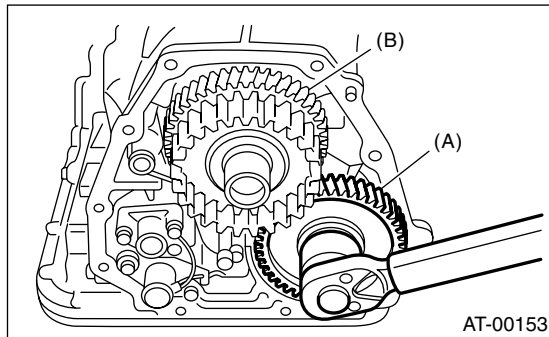
- Inspect parts to make sure there are no holes, cuts, and that they are not dusty.
- Inspect extension end play and adjust it to within the standard value. <Ref. to 4AT-83, VTD MODEL, ADJUSTMENT, Transfer Clutch.>

30.Reduction Driven Gear

A: REMOVAL

1. MPT MODEL

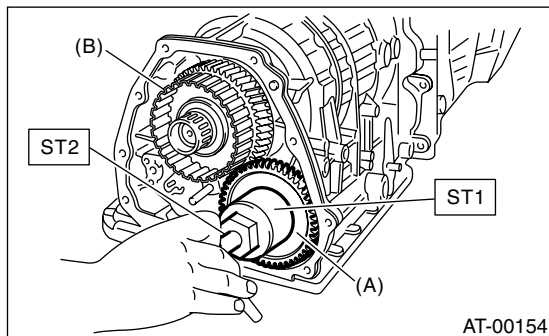
- 1) Remove the transmission assembly from the vehicle. <Ref. to 4AT-36, REMOVAL, Automatic Transmission Assembly.>
- 2) Remove rear vehicle speed sensor, and separate the transmission case and extension case. <Ref. to 4AT-75, REMOVAL, Extension Case.>
- 3) Set the range select lever to "P".
- 4) Straighten the staked portion, and remove the lock nut.



- (A) Reduction driven gear
(B) Reduction drive gear

- 5) Using the ST1 and ST2, extract the reduction driven gear.

ST1 499737000 PULLER
ST2 899524100 PULLER SET

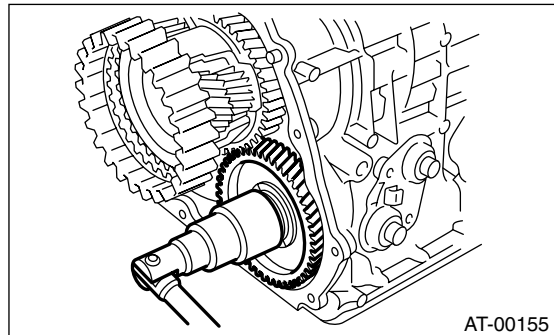


- (A) Reduction driven gear
(B) Reduction drive gear

2. VTD MODEL

- 1) Remove the transmission assembly from the vehicle. <Ref. to 4AT-36, REMOVAL, Automatic Transmission Assembly.>
- 2) Remove rear vehicle speed sensor, and separate the transmission case and extension case. <Ref. to 4AT-75, REMOVAL, Extension Case.>

- 3) Remove the rear drive shaft. <Ref. to 4AT-86, REMOVAL, Rear Drive Shaft.>
- 4) Set the range select lever to "P".
- 5) Straighten the staked portion, and remove the lock nut.



- 6) Using the ST1 and ST2, extract the reduction driven gear.

ST1 499737000 PULLER
ST2 899524100 PULLER SET

- 7) Pull out the center differential assembly. <Ref. to 4AT-91, REMOVAL, Center Differential Carrier.>

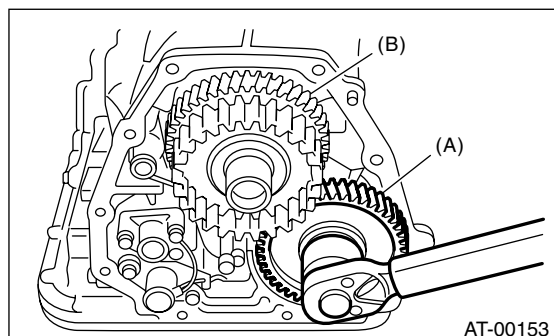
B: INSTALLATION

1. MPT MODEL

- 1) Set the select lever to "P" range.
- 2) Using a plastic hammer, install reduction driven gear assembly and new washer, and tighten new drive pinion lock nut.

Tightening torque:

100 N·m (10.2 kgf-m, 73.8 ft-lb)



- (A) Reduction driven gear
(B) Reduction drive gear

- 3) After tightening, stake the lock nut securely.
- 4) Combine the transmission case with the extension case, and install rear vehicle speed sensor. <Ref. to 4AT-75, INSTALLATION, Extension Case.>
- 5) Install the transmission assembly to vehicle. <Ref. to 4AT-38, INSTALLATION, Automatic Transmission Assembly.>

REDUCTION DRIVEN GEAR

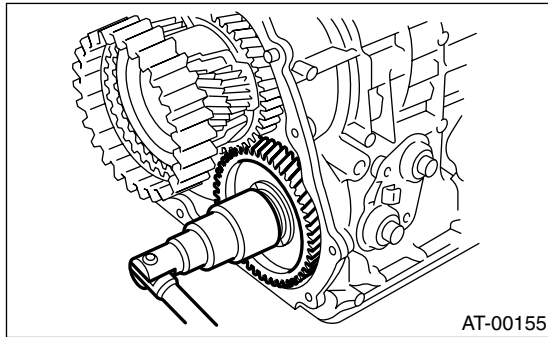
AUTOMATIC TRANSMISSION

2. VTD MODEL

- 1) Set the select lever to "P" range.
- 2) Using a plastic hammer, install reduction driven gear assembly.
- 3) Using a plastic hammer, install the center differential assembly.
- 4) Install a new self-lock nut and a washer.

Tightening torque:

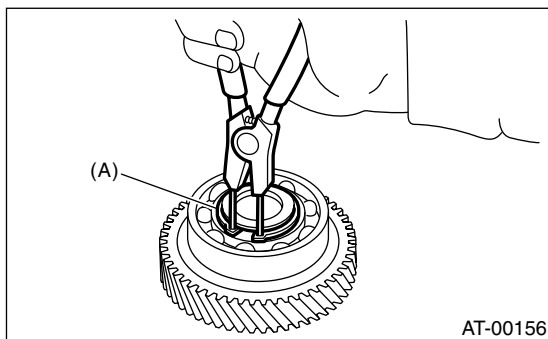
100 N·m (10.2 kgf-m, 73.8 ft-lb)



- 5) After tightening, stake the lock nut securely.
- 6) Insert the rear drive shaft assembly. <Ref. to 4AT-86, INSTALLATION, Rear Drive Shaft.>
- 7) Combine the transmission case with the extension case, and install rear vehicle speed sensor. <Ref. to 4AT-75, INSTALLATION, Extension Case.>
- 8) Install the transmission assembly to vehicle. <Ref. to 4AT-38, INSTALLATION, Automatic Transmission Assembly.>

C: DISASSEMBLY

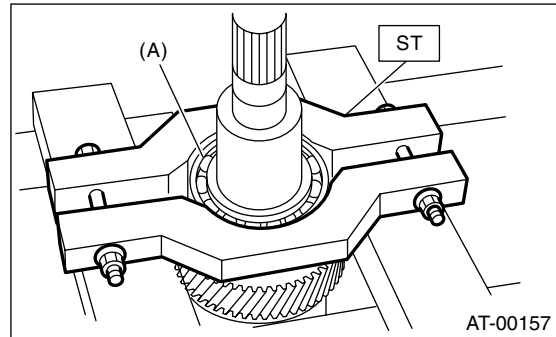
- 1) Remove snap ring from reduction driven gear.



(A) Snap ring

- 2) Using ST, remove ball bearing from reduction driven gear.

ST 498077600 REMOVER

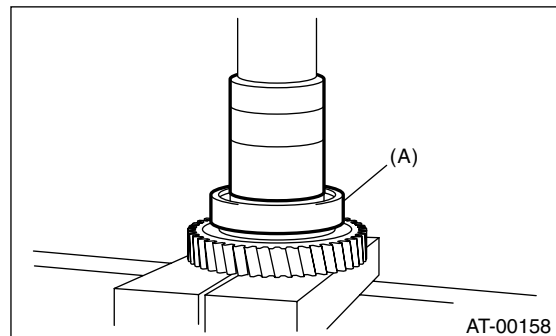


(A) Ball bearing

- 3) Remove snap ring reduction driven gear.

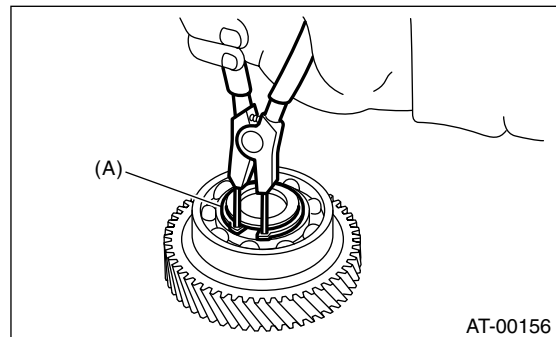
D: ASSEMBLY

- 1) Install snap ring to reduction driven gear.
- 2) Using a press, install a new ball bearing to reduction driven gear.



(A) Ball bearing

- 3) Install snap ring to reduction driven gear.



(A) Snap ring

E: INSPECTION

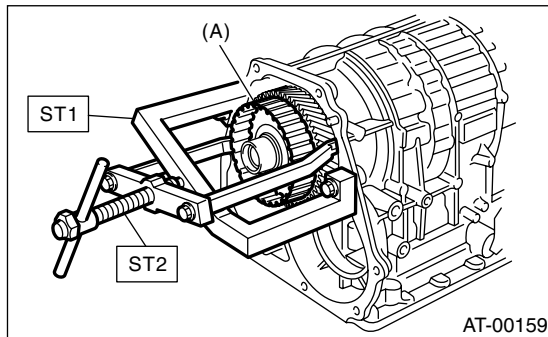
Check ball bearing and gear for dents or damage.

31.Reduction Drive Gear

A: REMOVAL

- 1) Remove the transmission assembly from the vehicle. <Ref. to 4AT-36, REMOVAL, Automatic Transmission Assembly.>
- 2) Remove rear vehicle speed sensor, and separate the transmission case and extension case. <Ref. to 4AT-75, REMOVAL, Extension Case.>
- 3) Remove the reduction driven gear. <Ref. to 4AT-87, REMOVAL, Reduction Driven Gear.>
- 4) Using ST, extract the reduction drive gear.

ST1 499737000 PULLER
ST2 899524100 PULLER SET



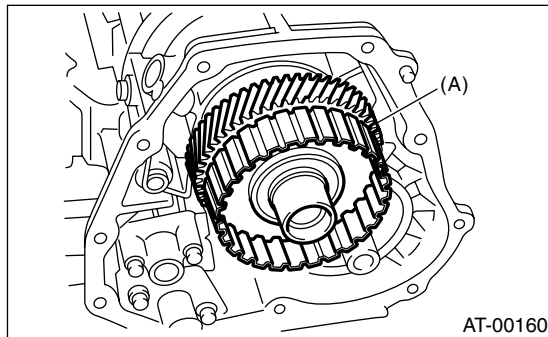
(A) Reduction drive gear

B: INSTALLATION

- 1) Install the reduction drive gear assembly.

NOTE:

Insert it fully into position until the bearing shoulder bottoms.

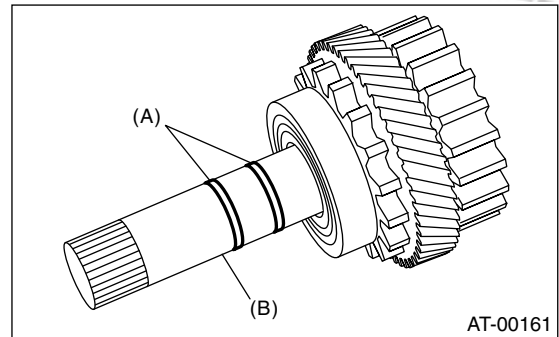


(A) Reduction drive gear

- 2) Install the reduction driven gear. <Ref. to 4AT-87, INSTALLATION, Reduction Driven Gear.>
- 3) Combine the transmission case with the extension case, and install rear vehicle speed sensor. <Ref. to 4AT-75, INSTALLATION, Extension Case.>
- 4) Install the transmission assembly to the vehicle. <Ref. to 4AT-38, INSTALLATION, Automatic Transmission Assembly.>

C: DISASSEMBLY

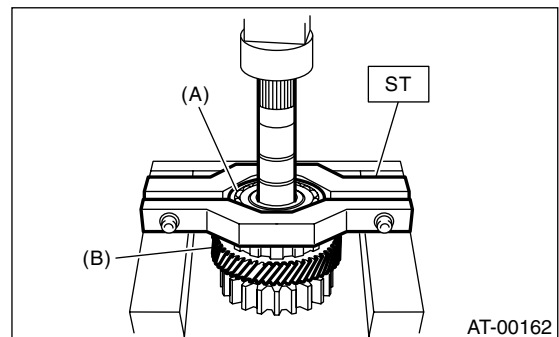
- 1) Take out the seal rings.



(A) Seal rings
(B) Reduction drive shaft

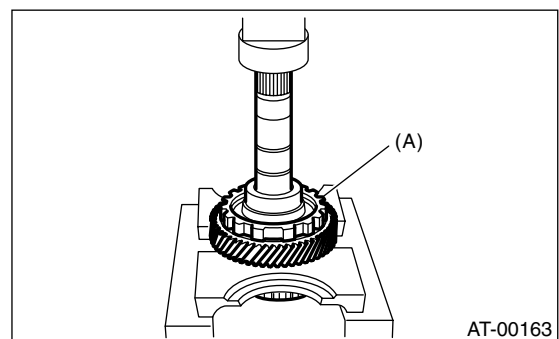
- 2) Using ST, remove the ball bearing.

ST 498077600 REMOVER



(A) Ball bearing
(B) Reduction drive gear

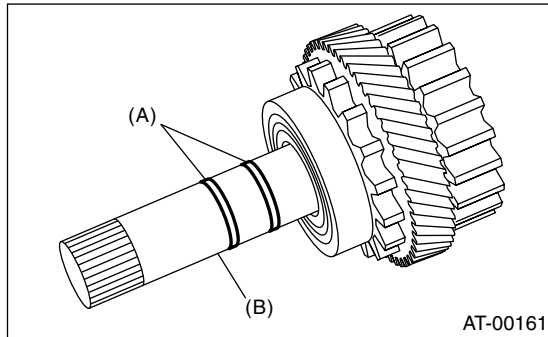
- 3) Using a press, remove the reduction drive gear.



(A) Reduction drive gear

D: ASSEMBLY

- 1) Press-fit the reduction drive gear to the shaft.
- 2) Press-fit a new ball bearing to the reduction drive gear.
- 3) Apply vaseline to the outer surface of seal ring and shaft groove.
- 4) Attach a new seal rings.



- (A) Seal rings
(B) Reduction drive shaft

E: INSPECTION

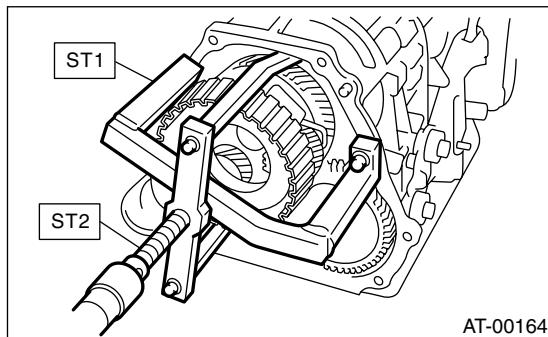
- Rotate the bearing by hand, make sure it rotates smoothly.
- Make sure that each component is free of harmful gouges, cuts, or dust.
- Measure the extension end play and adjust it to within specifications.<Ref. to 4AT-82, ADJUSTMENT, Transfer Clutch.>

32.Center Differential Carrier

A: REMOVAL

- 1) Remove the transmission assembly from vehicle. <Ref. to 4AT-36, REMOVAL, Automatic Transmission Assembly.>
- 2) Remove the rear wheel speed sensor, and separate the extension case from the transmission case. <Ref. to 4AT-75, REMOVAL, Extension Case.>
- 3) Pull out the rear driveshaft. <Ref. to 4AT-86, REMOVAL, Rear Drive Shaft.>
- 4) Using the special tools, pull out the center differential carrier assembly.

ST1 499737000 PULLER
ST2 899524100 PULLER SET



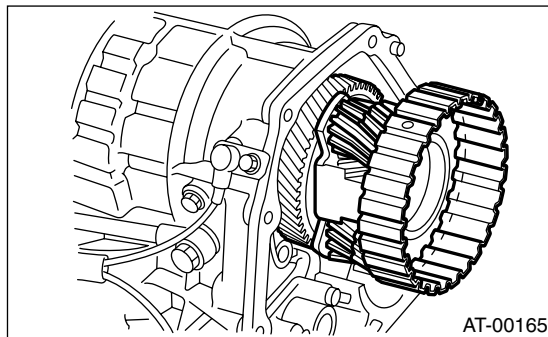
- 5) Pull out the shim(s) from transmission case.

B: INSTALLATION

- 1) Install the center differential assembly with the shim(s).

NOTE:

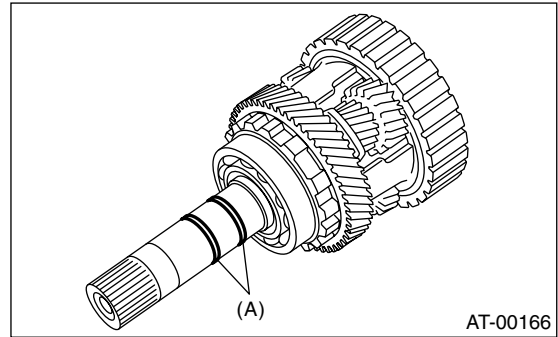
Insert the center differential assembly and shim(s) completely into the bearing shoulder bottom.



- 2) Insert the rear driveshaft. <Ref. to 4AT-86, INSTALLATION, Rear Drive Shaft.>
- 3) Connect the transmission case and extension case, and install the rear wheel speed sensor. <Ref. to 4AT-75, INSTALLATION, Extension Case.>
- 4) Install the transmission assembly onto vehicle. <Ref. to 4AT-38, INSTALLATION, Automatic Transmission Assembly.>

C: DISASSEMBLY

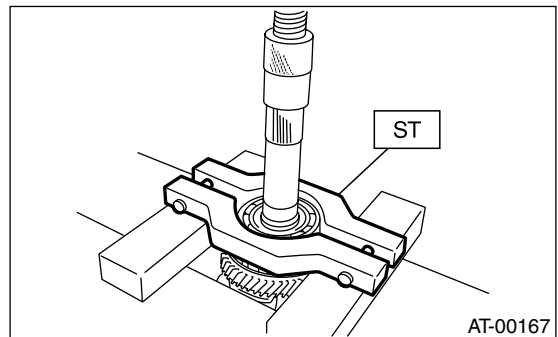
- 1) Remove the seal rings.



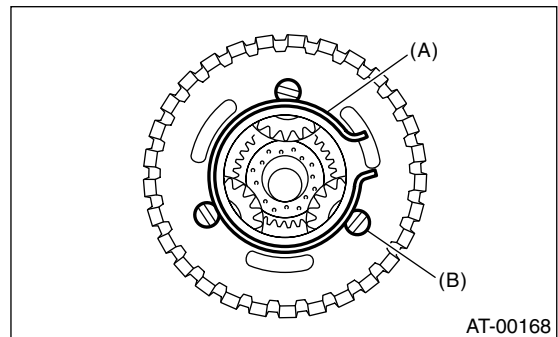
(A) Seal ring

- 2) Using a press and the ST, remove the ball bearing.

ST 498077600 REMOVER



- 3) Remove the snap ring, and pull out the shaft from the center differential assembly.



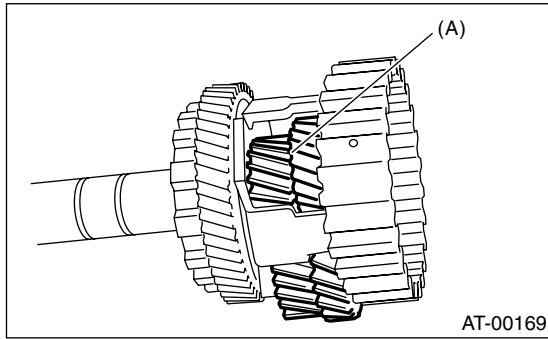
(A) Snap ring

(B) Shaft

CENTER DIFFERENTIAL CARRIER

AUTOMATIC TRANSMISSION

- 4) Remove the thrust washers, pinion gears, and washers from the center differential assembly.



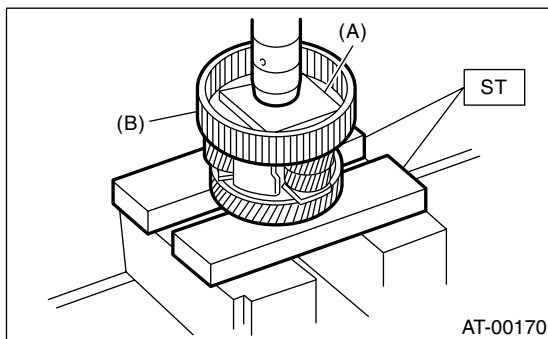
(A) Pinion gear

- 5) Pull out the intermediate shaft and thrust bearing.

D: ASSEMBLY

- 1) Install the thrust washer onto the intermediate shaft.
- 2) Install thrust bearing onto the intermediate shaft.
- 3) Install the pinion gears and washers.
- 4) Insert the shaft into the center differential assembly.
- 5) Install the snap ring.
- 6) Using a press, install a new ball bearing into the center differential assembly.

ST 498077000 REMOVER



(A) Plate

(B) Center differential carrier

- 7) Apply Vaseline onto the seal ring outer surface and shaft grooves.
- 8) Install new seal rings.

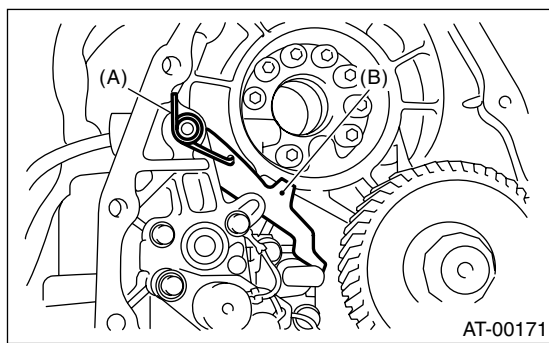
E: INSPECTION

- Check all parts for hole, score, or dirt.
- Check the play of the extension end, and if necessary, adjust it. <Ref. to 4AT-83, VTD MODEL, ADJUSTMENT, Transfer Clutch.>

33. Parking Pawl

A: REMOVAL

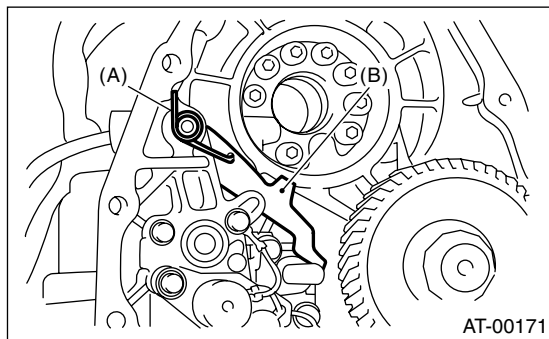
- 1) Remove the transmission assembly from the vehicle. <Ref. to 4AT-36, REMOVAL, Automatic Transmission Assembly.>
- 2) Remove rear vehicle speed sensor and separate transmission case and extension case sections. <Ref. to 4AT-75, REMOVAL, Extension Case.>
- 3) Remove the reduction drive gear. (MPT model) <Ref. to 4AT-89, REMOVAL, Reduction Drive Gear.>
- 4) Remove the center differential carrier. (VTD model) <Ref. to 4AT-91, REMOVAL, Center Differential Carrier.>
- 5) Remove the parking pawl, return spring and shaft.



- (A) Return spring
- (B) Parking pawl

B: INSTALLATION

- 1) Install the parking pawl, shaft and return spring.



- (A) Return spring
- (B) Parking pawl

- 2) Install the reduction drive gear. <Ref. to 4AT-89, INSTALLATION, Reduction Drive Gear.>
- 3) Install the center differential carrier. (VTD model) <Ref. to 4AT-91, INSTALLATION, Center Differential Carrier.>
- 4) Install the rear vehicle speed sensor and extension case. <Ref. to 4AT-75, INSTALLATION, Extension Case.>

- 5) Install the transmission assembly to the vehicle. <Ref. to 4AT-38, INSTALLATION, Automatic Transmission Assembly.>

C: INSPECTION

Make sure that the tab of the packing pole on the reduction gear is not worn or otherwise damaged.

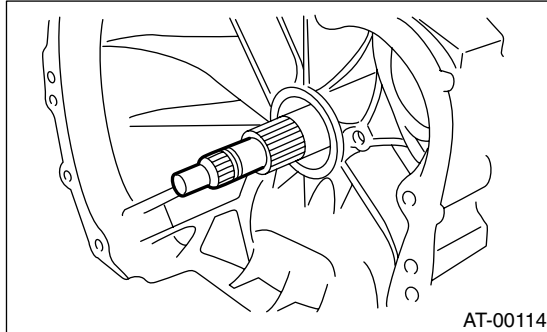
TORQUE CONVERTER CLUTCH CASE

AUTOMATIC TRANSMISSION

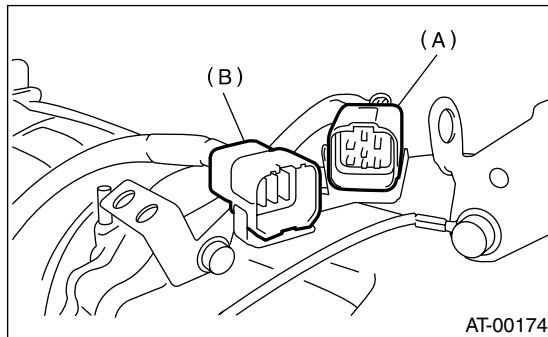
34. Torque Converter Clutch Case

A: REMOVAL

- 1) Remove the transmission assembly from the vehicle. <Ref. to 4AT-36, REMOVAL, Automatic Transmission Assembly.>
- 2) Extract the torque converter clutch assembly. <Ref. to 4AT-74, REMOVAL, Torque Converter Clutch Assembly.>
- 3) Remove the input shaft.



- 4) Lift-up lever behind the connector and disconnect it from stay.
- 5) Disconnect inhibitor switch connector from stay.



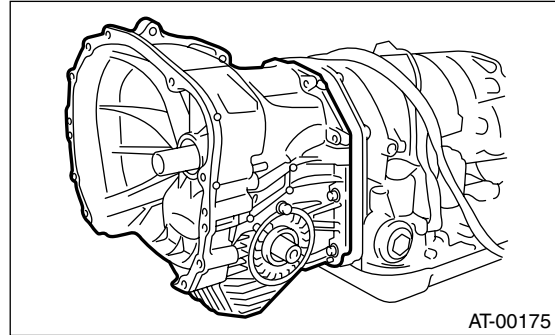
- (A) Transmission harness
(B) Inhibitor switch harness

- 6) Remove the oil charger pipe. <Ref. to 4AT-73, REMOVAL, Oil Charger Pipe.>
- 7) Remove the oil cooler inlet and outlet pipes. <Ref. to 4AT-69, REMOVAL, ATF Cooler Pipe and Hose.>
- 8) Lightly tapping the torque converter clutch case with plastic hammer, separate the transmission case and torque converter clutch case.

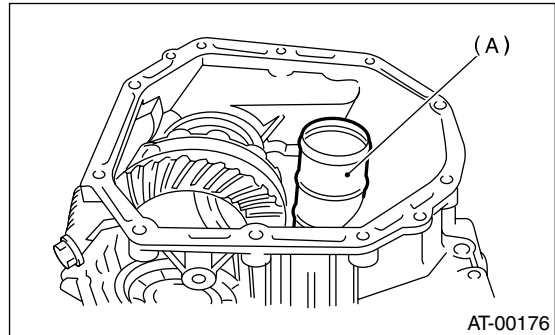
NOTE:

- Be careful not to damage the oil seal and bushing inside the torque converter clutch case by the oil pump cover.

- Be careful not to lose the rubber seal.



- 9) Remove the seal pipe if it is attached. (Reusing is not allowed.)

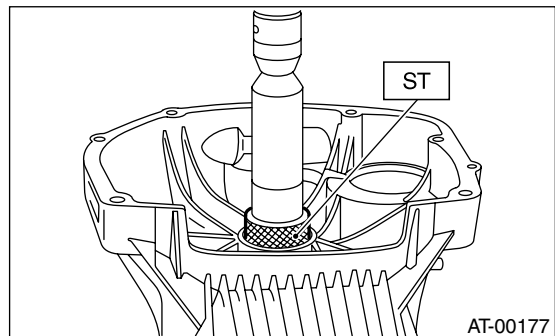


- (A) Seal pipe

- 10) Remove the differential assembly. <Ref. to 4AT-108, REMOVAL, Front Differential.>
- 11) Remove the oil seal from torque converter clutch case.

B: INSTALLATION

- 1) Check the appearance of each component and clean.
- 2) Force-fit the oil seal to the torque converter clutch case with ST.
ST 398437700 DRIFT

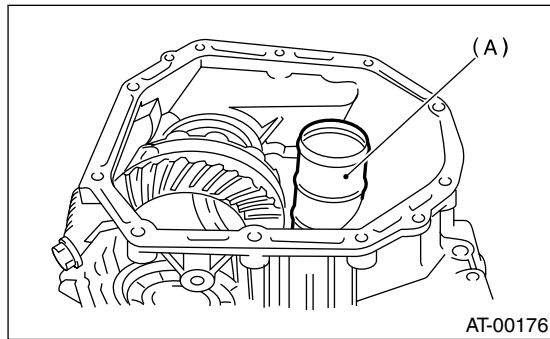


- 3) Install the differential assembly to the case. <Ref. to 4AT-108, INSTALLATION, Front Differential.>
- 4) Install the left and right side retainers. <Ref. to 4AT-112, ADJUSTMENT, Front Differential.>

TORQUE CONVERTER CLUTCH CASE

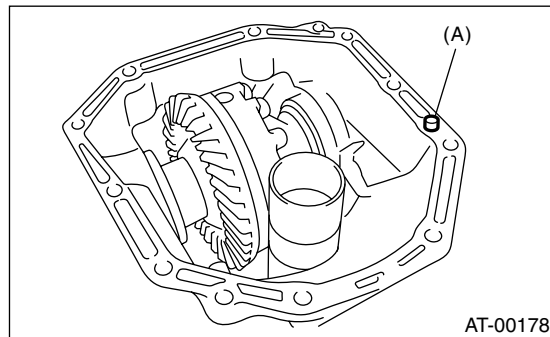
AUTOMATIC TRANSMISSION

5) Install the new seal pipe to the torque converter clutch case.



(A) Seal pipe

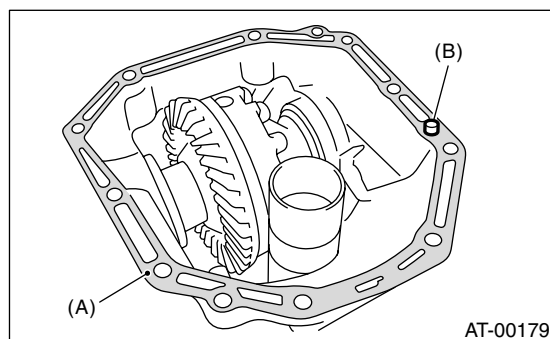
6) Install the rubber seal to the torque converter clutch case.



(A) Rubber seal

7) Apply proper amount of liquid gasket to the entire torque converter clutch case mating surface.

Liquid gasket:
THREE BOND 1215 (Part No. 004403007)



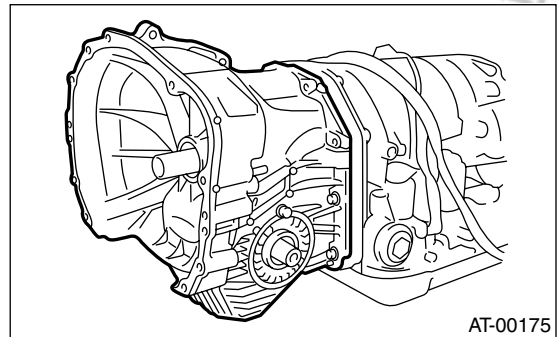
(A) THREE BOND 1215

(B) Rubber seal

8) Install the torque converter clutch case assembly without damaging bush and oil seal and secure with six bolts and four nuts.

Tightening torque:

41 N·m (4.2 kgf-m, 30.4 ft-lb)



9) Insert inhibitor switch and transmission connector into stay.

10) Install air breather hose. <Ref. to 4AT-72, INSTALLATION, Air Breather Hose.>

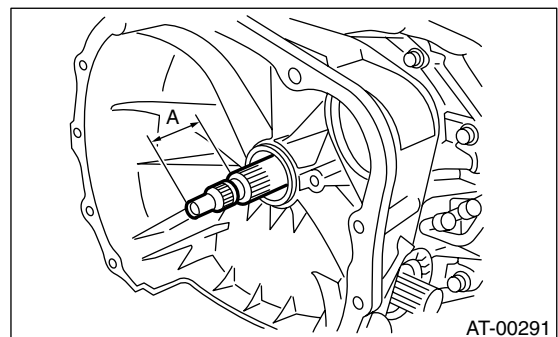
11) Install the oil cooler pipes. <Ref. to 4AT-70, INSTALLATION, ATF Cooler Pipe and Hose.>

12) Install the oil charger pipe with O-ring. <Ref. to 4AT-73, INSTALLATION, Oil Charger Pipe.>

13) Insert the input shaft while turning lightly by hand and verify the protrusion amount.

Normal protrusion A:

50 — 55 mm (1.97 — 2.17 in)



14) Install the torque converter clutch assembly. <Ref. to 4AT-74, INSTALLATION, Torque Converter Clutch Assembly.>

15) Install the transmission assembly to the vehicle. <Ref. to 4AT-38, INSTALLATION, Automatic Transmission Assembly.>

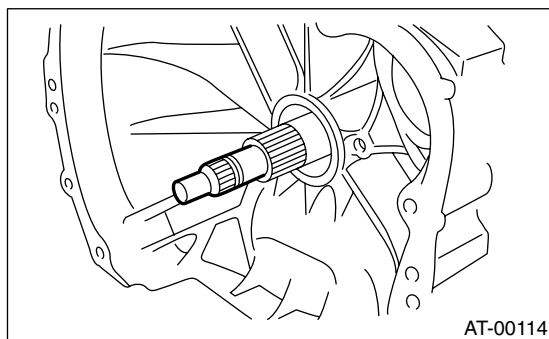
C: INSPECTION

Measure the backlash and adjust to within specifications. <Ref. to 4AT-105, ADJUSTMENT, Drive Pinion Shaft.>

35.Oil Pump Housing

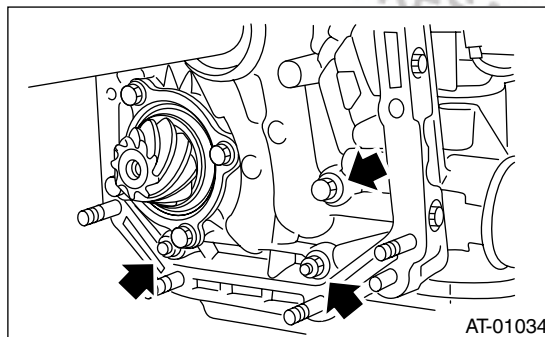
A: REMOVAL

- 1) Remove the transmission assembly from the vehicle. <Ref. to 4AT-36, REMOVAL, Automatic Transmission Assembly.>
- 2) Extract the torque converter clutch assembly. <Ref. to 4AT-74, REMOVAL, Torque Converter Clutch Assembly.>
- 3) Remove the input shaft.



- 4) Lift-up the lever behind the transmission harness connector and disconnect it from stay.
- 5) Disconnect the inhibitor switch connector from stay.
- 6) Remove the oil charger pipe. <Ref. to 4AT-73, REMOVAL, Oil Charger Pipe.>
- 7) Remove the oil cooler inlet and outlet pipes. <Ref. to 4AT-69, REMOVAL, ATF Cooler Pipe and Hose.>
- 8) Separate the torque converter clutch case and transmission case sections. <Ref. to 4AT-94, REMOVAL, Torque Converter Clutch Case.>
- 9) Separate the transmission case and extension case sections. <Ref. to 4AT-75, REMOVAL, Extension Case.>
- 10) Remove the reduction drive gear. (MPT model) <Ref. to 4AT-89, REMOVAL, Reduction Drive Gear.>
- 11) Remove the center differential carrier. (VTD model) <Ref. to 4AT-91, REMOVAL, Center Differential Carrier.>
- 12) Remove the reduction driven gear. <Ref. to 4AT-87, REMOVAL, REMOVAL, Reduction Driven Gear.>

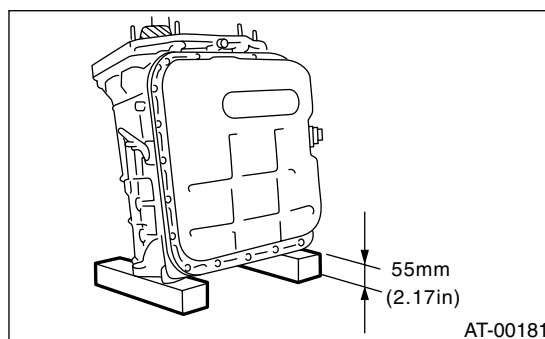
- 13) Loosen the oil pump housing mounting bolts.



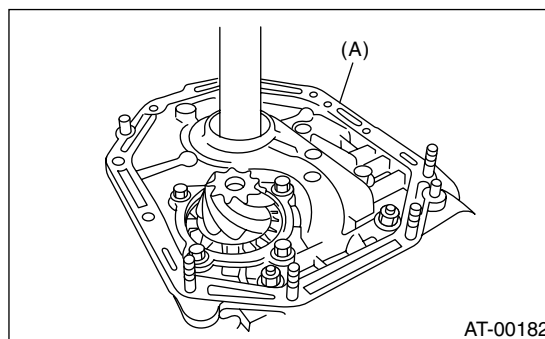
- 14) Place two wooden blocks on the workbench, and stand the transmission case with its rear end facing down.

NOTE:

- Be careful not to scratch the rear mating surface of the transmission case.
- Note that the parking rod and drive pinion protrude from the mating surface.



- 15) Remove the oil pump housing and adjusting thrust washer.



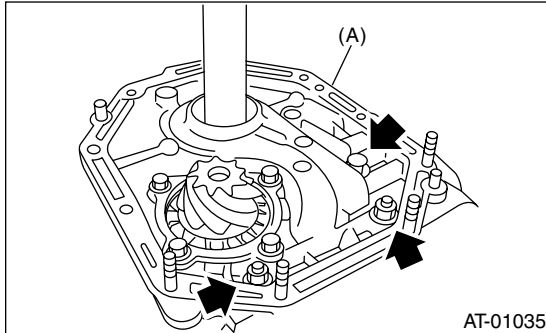
(A) Oil pump housing

B: INSTALLATION

1) Secure the oil pump housing with two nuts and the bolt.

Tightening torque:

42 N·m (4.3 kgf-m, 31 ft-lb)



(A) Oil pump housing

2) Install the torque converter clutch case assembly to the transmission case assembly. <Ref. to 4AT-74, INSTALLATION, Torque Converter Clutch Assembly.>

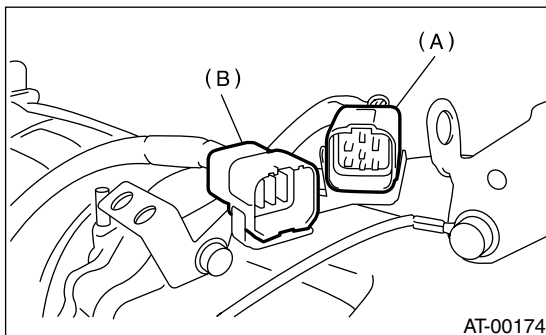
3) Install reduction driven gear. <Ref. to 4AT-87, INSTALLATION, Reduction Driven Gear.>

4) Install the reduction drive gear. (MPT model) <Ref. to 4AT-89, INSTALLATION, Reduction Drive Gear.>

5) Install the center differential carrier. (VTD model) <Ref. to 4AT-91, INSTALLATION, Center Differential Carrier.>

6) Combine the extension case with the transmission case, and install vehicle speed sensor 1 (rear). <Ref. to 4AT-75, INSTALLATION, Extension Case.>

7) Insert inhibitor switch and transmission connector into stay.



(A) Transmission harness

(B) Inhibitor switch harness

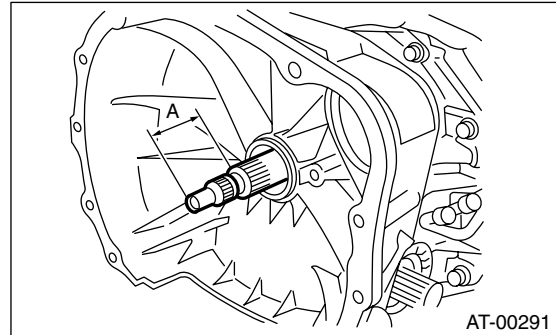
8) Install the oil cooler pipe. <Ref. to 4AT-70, INSTALLATION, ATF Cooler Pipe and Hose.>

9) Install the oil charger pipe with O-ring. <Ref. to 4AT-73, INSTALLATION, Oil Charger Pipe.>

10) Insert the input shaft while turning lightly by hand and verify the protrusion amount.

Normal protrusion A:

50 — 55 mm (1.97 — 2.17 in)



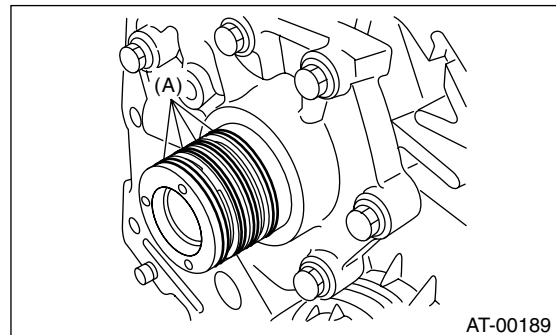
11) Install the torque converter clutch assembly. <Ref. to 4AT-74, INSTALLATION, Torque Converter Clutch Assembly.>

12) Install the transmission assembly to the vehicle. <Ref. to 4AT-38, INSTALLATION, Automatic Transmission Assembly.>

C: DISASSEMBLY

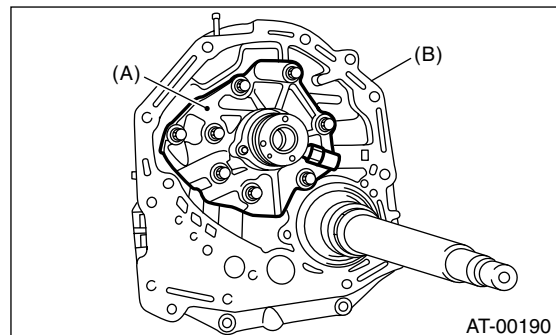
1. OIL PUMP COVER

1) Remove four seal rings.



(A) Seal rings

2) Lightly tap the end of the stator shaft to remove the cover.

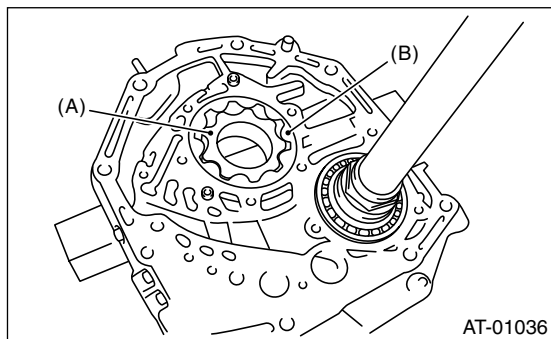


(A) Oil pump cover

(B) Oil pump housing

OIL PUMP HOUSING

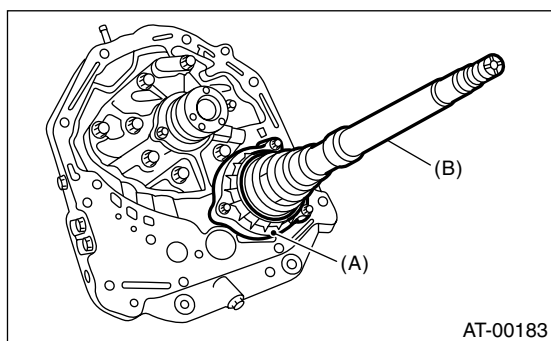
3) Remove the inner and outer rotor.



- (A) Inner rotor
- (B) Outer rotor

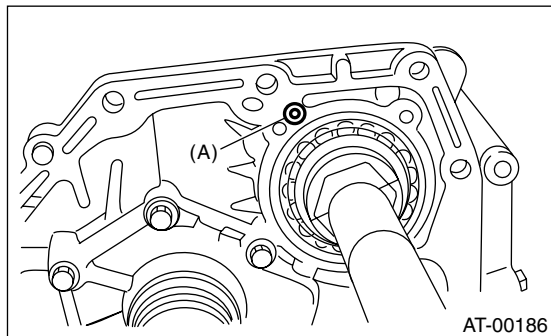
2. OIL SEAL RETAINER

1) Remove the oil seal retainer.



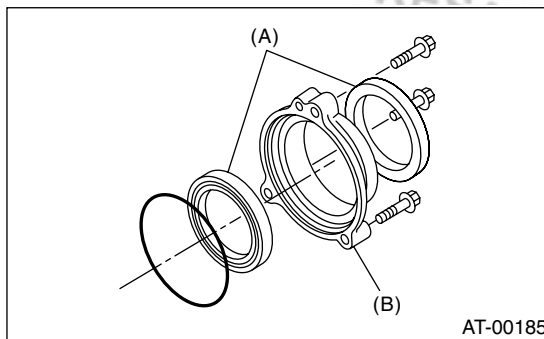
- (A) Oil seal retainer
- (B) Drive pinion shaft

2) Remove the O-ring.



- (A) O-ring

3) Remove the oil seal from oil seal retainer.

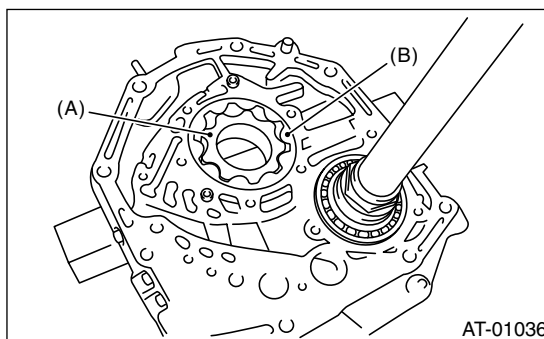


- (A) Oil seal
- (B) Oil seal retainer

D: ASSEMBLY

1. OIL PUMP COVER

1) Install oil pump rotor assembly to oil pump housing.

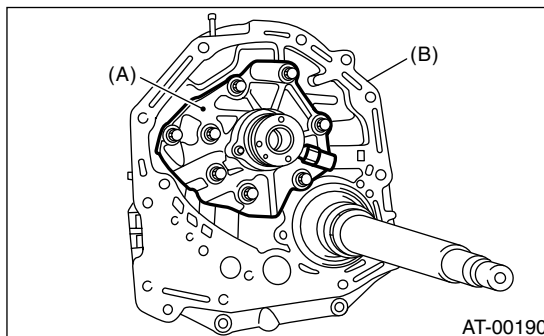


- (A) Inner rotor
- (B) Outer rotor

2) Align both pivots with the pivot holes of the cover, and install the oil pump cover being careful not to apply undue force to the pivots.

Tightening torque:

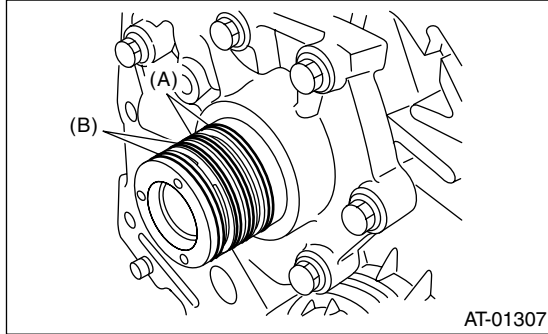
25 N·m (2.5 kgf-m, 18.1 ft-lb)



- (A) Oil pump cover
- (B) Oil pump housing

3) After assembling, turn the oil pump shaft to check for smooth rotation of the rotor.

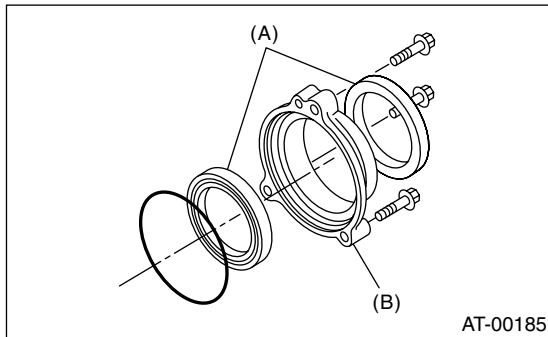
4) Install the oil seal retainer and new seal rings. After adjusting the drive pinion backlash and tooth contact. <Ref. to 4AT-100, ADJUSTMENT, Oil Pump Housing.>



- (A) Seal rings (Black)
- (B) Seal rings (Brown)

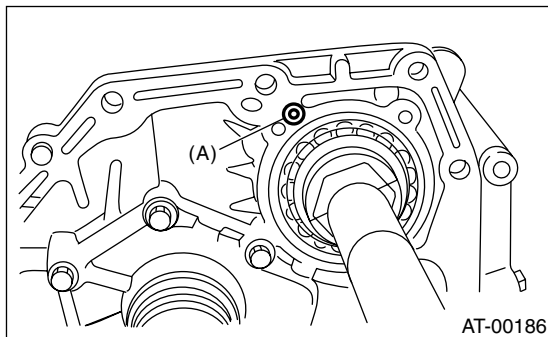
2. OIL SEAL RETAINER

1) Install two new oil seals to the oil seal retainer in proper position using ST.



- (A) Oil seal
- (B) Oil seal retainer

2) Install a new O-ring to the oil seal retainer using vaseline. Install the seal to oil pump housing bore.

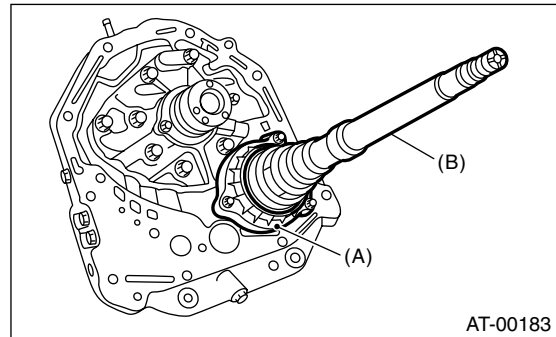


- (A) O-ring

3) Install the oil seal and secure it using three bolts being careful not to damage oil seal lip.

Tightening torque:

7 N·m (0.7 kgf-m, 5.1 ft-lb)



- (A) Oil seal retainer
- (B) Drive pinion shaft

E: INSPECTION

1) Check seal ring and O-ring oil seal for breaks or damage.

2) Check other parts for dents or abnormalities.

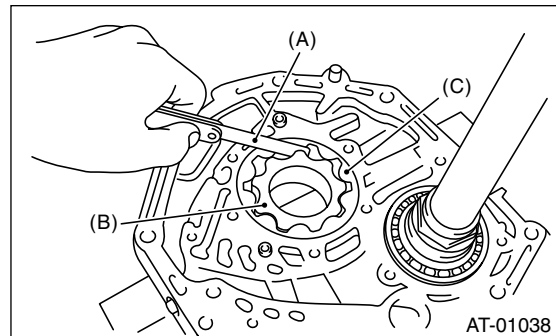
3) Selection of oil pump rotor assembly

(1) Tip clearance

Install inner rotor and outer rotor to oil pump. With rotor gears facing each other, measure crest-to-crest clearance.

Tip clearance:

0.02 — 0.15 mm (0.0008 — 0.0059 in)



- (A) Thickness gauge
- (B) Inner rotor
- (C) Outer rotor

OIL PUMP HOUSING

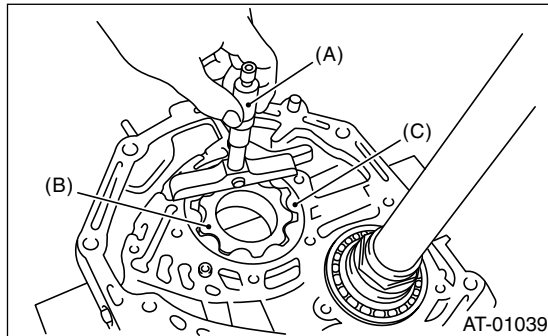
AUTOMATIC TRANSMISSION

(2) Side clearance

Set a depth gauge to oil pump housing, then measure oil pump housing-to-rotor clearances.

Side clearance:

0.02 — 0.04 mm (0.0008 — 0.0016 in)



- (A) Depth gauge
- (B) Inner rotor
- (C) Outer rotor

(3) If depth and/or side clearances are outside specifications, replace rotor assembly.

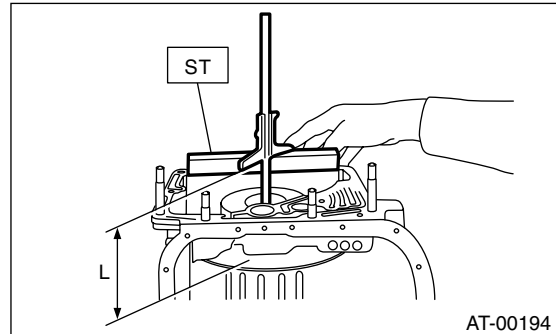
Oil pump rotor assembly	
Part No.	Thickness mm (in)
15008AA060	11.37 — 11.38 (0.4476 — 0.4480)
15008AA070	11.38 — 11.39 (0.4480 — 0.4484)
15008AA080	11.39 — 11.40 (0.4484 — 0.4488)

Measure the total end play and adjust to within specifications. <Ref. to 4AT-100, ADJUSTMENT, Oil Pump Housing.>

F: ADJUSTMENT

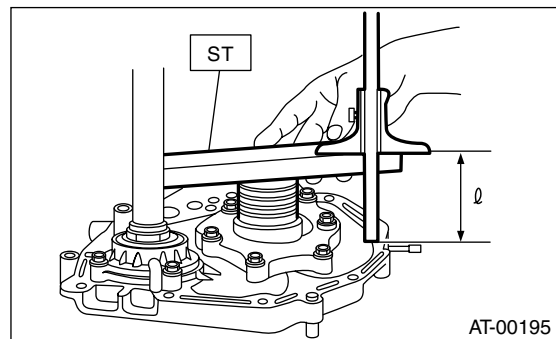
1) Using ST, measure the distance from the transmission case mating surface to the recessed portion of the high clutch drum "L".

ST 398643600 GAUGE



2) Using ST, measure the distance from the oil pump housing mating surface to the top surface of the oil pump cover with thrust needle bearing.

ST 398643600 GAUGE

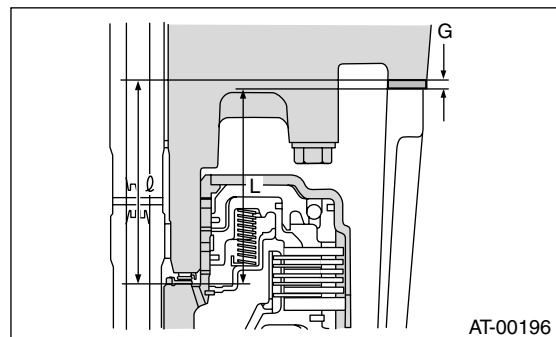


3) Calculation of total end play

Select suitable bearing race from among those listed in this table so that clearance C is in the 0.25 to 0.55 mm (0.0098 to 0.0217 in) range.

$$C = (L + G) - l$$

C	Clearance between concave portion of high clutch and end of clutch drum support
L	Length from case mating surface to concave portion of high clutch
G	Gasket thickness [0.28 mm (0.0110 in)]
l	Height from housing mating surface to upper surface of clutch drum support



OIL PUMP HOUSING

AUTOMATIC TRANSMISSION

Thrust needle bearing	
Part No.	Thickness mm (in)
806528050	4.1 (0.161)
806528060	4.3 (0.169)
806528070	4.5 (0.177)
806528080	4.7 (0.185)
806528090	4.9 (0.193)
806528100	5.1 (0.201)

4) After completing end play adjustment, insert the bearing race in the recess of the high clutch. Attach the thrust needle bearing to the oil pump cover with vaseline.

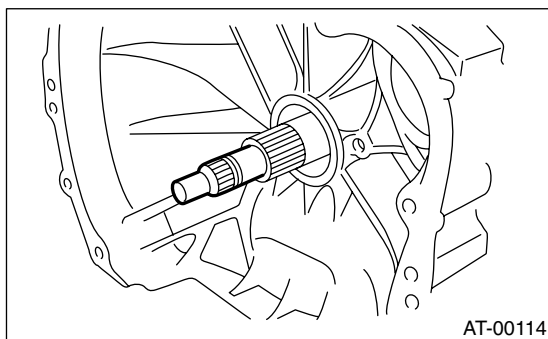
5) After correctly installing the new gasket to the case mating surface, carefully install the oil pump housing assembly. Be careful to avoid hitting the drive pinion against the inside of the case.

6) Install both parts with dowel pins aligned. Make sure no clearance exists at the mating surface.

36. Drive Pinion Shaft

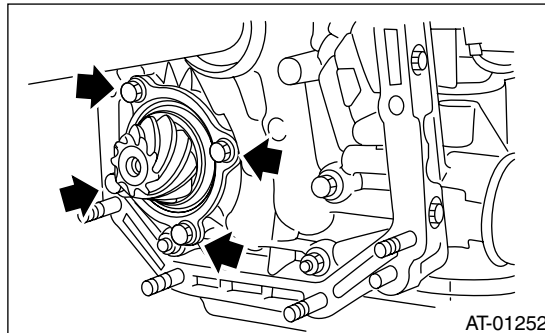
A: REMOVAL

- 1) Remove the transmission assembly from vehicle. <Ref. to 4AT-36, REMOVAL, Automatic Transmission Assembly.>
- 2) Extract the torque converter clutch assembly. <Ref. to 4AT-74, REMOVAL, Torque Converter Clutch Assembly.>
- 3) Remove the input shaft.



- 4) Lift-up the lever behind the transmission harness connector and disconnect it from stay.
- 5) Disconnect the inhibitor switch connector from stay.
- 6) Disconnect the air breather hose. <Ref. to 4AT-72, REMOVAL, Air Breather Hose.>
- 7) Remove the oil charger pipe. <Ref. to 4AT-73, REMOVAL, Oil Charger Pipe.>
- 8) Remove the oil cooler inlet and outlet pipes. <Ref. to 4AT-69, REMOVAL, ATF Cooler Pipe and Hose.>
- 9) Separate the torque converter clutch case and transmission case sections. <Ref. to 4AT-94, REMOVAL, Torque Converter Clutch Case.>
- 10) Separate the transmission case and extension case sections. <Ref. to 4AT-75, REMOVAL, Extension Case.>
- 11) Remove the reduction drive gear. (MPT model) <Ref. to 4AT-89, REMOVAL, Reduction Drive Gear.>
- 12) Remove the center differential carrier. (VTD model) <Ref. to 4AT-91, REMOVAL, Center Differential Carrier.>
- 13) Remove the reduction driven gear. <Ref. to 4AT-87, REMOVAL, Reduction Driven Gear.>

- 14) Remove the drive pinion shaft mounting bolt and remove the drive shaft assembly from oil pump housing.



B: INSTALLATION

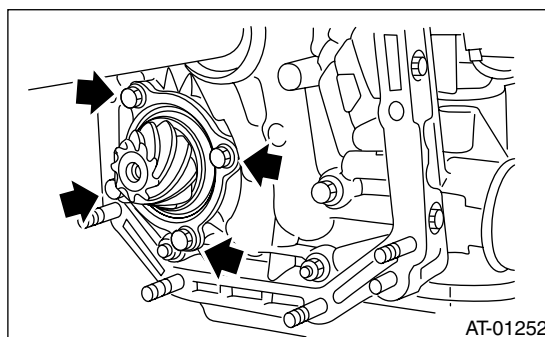
- 1) Assemble the drive pinion assembly to the oil pump housing.

NOTE:

- Pay attention not to bend the shim.
- Pay attention not to press the pinion into housing bore.

Tightening torque:

40 N·m (4.0 kgf-m, 30 ft-lb)



- 2) Combine the torque converter case with the transmission case. <Ref. to 4AT-94, INSTALLATION, Torque Converter Clutch Case.>
- 3) Install the reduction driven gear. <Ref. to 4AT-87, INSTALLATION, Reduction Driven Gear.>
- 4) Install the reduction drive gear. (MPT model) <Ref. to 4AT-89, INSTALLATION, Reduction Drive Gear.>
- 5) Install the center differential carrier. (VTD model) <Ref. to 4AT-91, INSTALLATION, Center Differential Carrier.>
- 6) Combine the extension case with the transmission case, and install vehicle speed sensor 1 (rear). <Ref. to 4AT-75, INSTALLATION, Extension Case.>
- 7) Insert inhibitor switch and transmission connector into stay.

DRIVE PINION SHAFT

AUTOMATIC TRANSMISSION

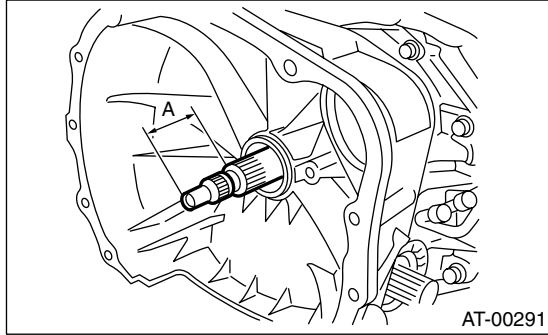
8) Install the oil cooler inlet and outlet pipes. <Ref. to 4AT-70, INSTALLATION, ATF Cooler Pipe and Hose.>

9) Install the oil charger pipe with O-ring.

10) Insert the input shaft while turning lightly by hand and verify the protrusion amount.

Normal protrusion A:

50 — 55 mm (1.97 — 2.17 in)



11) Install the torque converter clutch assembly. <Ref. to 4AT-74, INSTALLATION, Torque Converter Clutch Assembly.>

12) Install the transmission assembly to vehicle. <Ref. to 4AT-38, INSTALLATION, Automatic Transmission Assembly.>

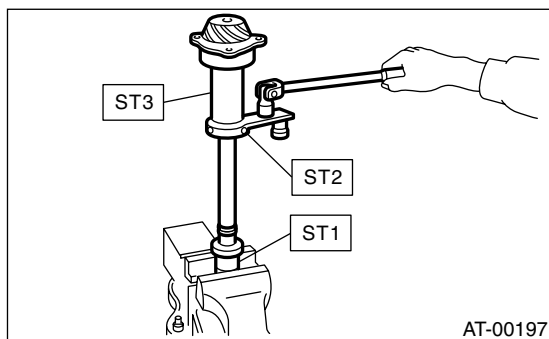
C: DISASSEMBLY

1) Straighten the staked portion of the lock nut, and remove the lock nut while locking the rear spline portion of the shaft with ST1 and ST2. Then pull off the drive pinion collar.

ST1 498937110 HOLDER

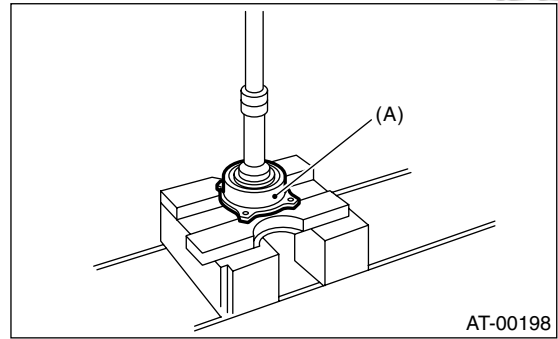
ST2 499787700 WRENCH

ST3 499787500 ADAPTER



2) Remove the O-ring.

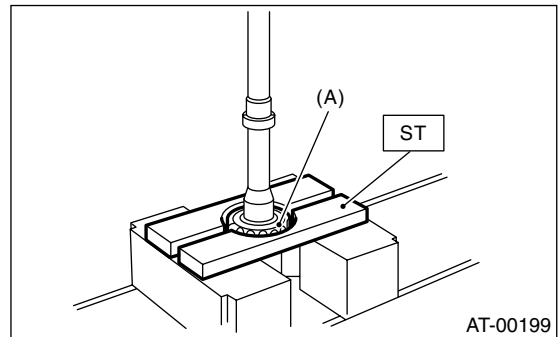
3) Using a press, separate the rear roller bearing and outer race from the shaft.



(A) Outer race

4) Using a press and ST, separate the front roller bearing from the shaft.

ST 498517000 REPLACER

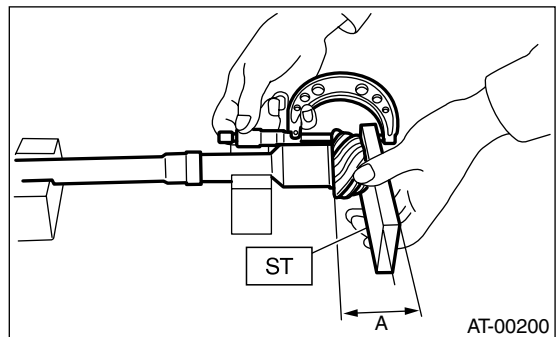


(A) Front roller bearing

D: ASSEMBLY

1) Measure dimension "A" of the drive pinion shaft.

ST 398643600 GAUGE



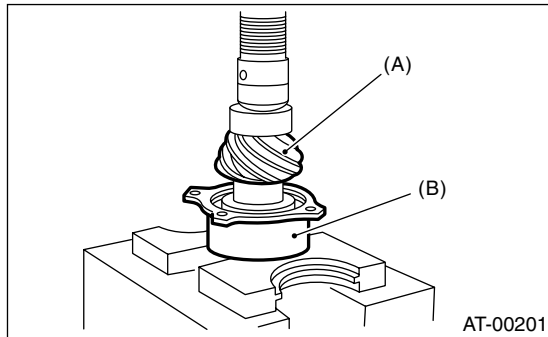
DRIVE PINION SHAFT

AUTOMATIC TRANSMISSION

2) Using a press, force-fit a new roller bearing in position.

NOTE:

If too much pressure is applied, the roller bearing will not turn easily.



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

3) After fitting a new O-ring to the shaft, attach the drive pinion collar to the shaft.

4) Install the lock washer to drive pinion shaft in proper direction.

5) Tighten a new lock nut with ST1, ST2 and ST3. Calculate lock washer and lock nut specifications using the following formula.

$$T2 = L2 / (L1 + L2) \times T1$$

T1: 116 N·m (11.8 kgf·m, 85.3 ft·lb)

[Required torque setting]

T2: Tightening torque

L1: ST2 length 0.072 m (2.83 in)

L2: Torque wrench length

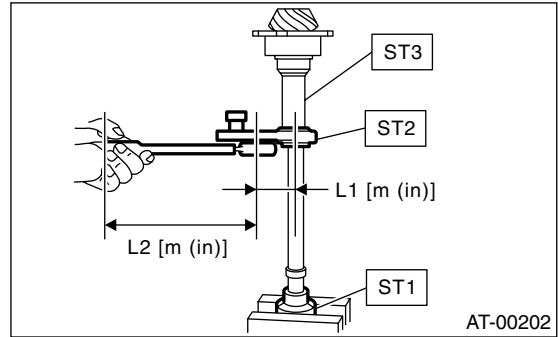
Example:

Torque wrench length m (in)	Tightening torque 2 (kgf·m, ft·lb)
0.4 (15.75)	98 (10.0, 72)
0.45 (17.72)	100 (10.2, 73.8)
0.5 (19.69)	101 (10.3, 74.5)
0.55 (21.65)	102 (10.4, 75)

ST1 498937110 HOLDER
ST2 499787700 WRENCH
ST3 499787500 ADAPTER

NOTE:

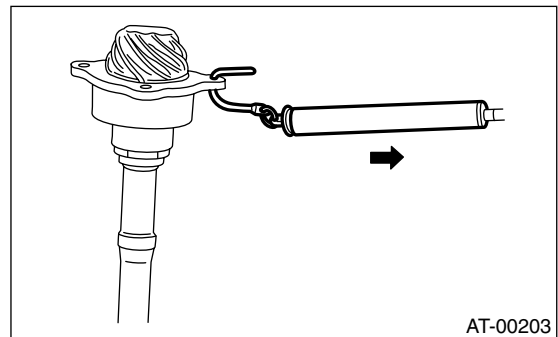
Install ST2 to torque wrench as straight as possible.



6) Measure the starting torque of the bearing. Make sure the starting torque is within the specified range. If out of the allowable range, replace the roller bearing.

Starting torque:

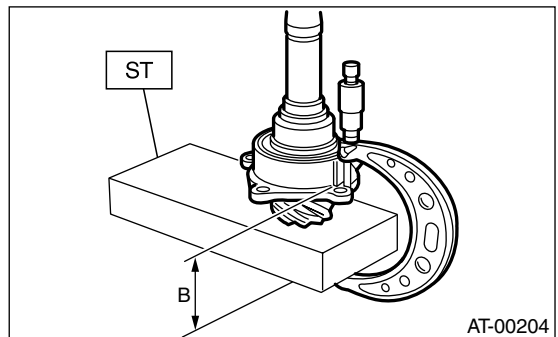
7.6 — 38.1 N (0.776 — 3.88 kgf, 1.7 — 8.6 lb)



7) Stake the lock nut securely at two places.

8) Measure dimension "B" of the drive pinion shaft.

ST 398643600 GAUGE



9) The thickness "t" (mm) of the drive pinion shim.

$$t = 6.5 \pm 0.0625 - (B - A)$$

DRIVE PINION SHAFT

AUTOMATIC TRANSMISSION

10) Select three or less shims from following table.

Available drive pinion shims	
Part No.	Thickness mm (in)
31451AA050	0.150 (0.0059)
31451AA060	0.175 (0.0069)
31451AA070	0.200 (0.0079)
31451AA080	0.225 (0.0089)
31451AA090	0.250 (0.0098)
31451AA100	0.275 (0.0108)

E: INSPECTION

- Make sure that all component parts are free of harmful cuts, gouges, and other faults.
- Adjust the teeth alignment. <Ref. to 4AT-105, ADJUSTMENT, Drive Pinion Shaft.>

F: ADJUSTMENT

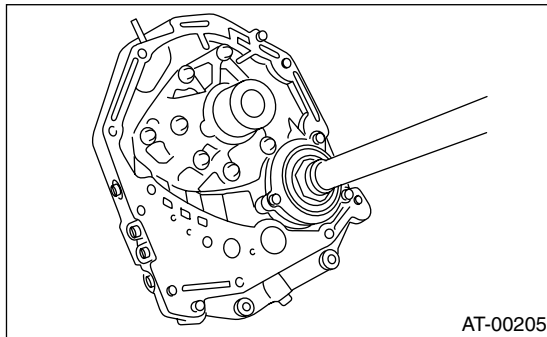
- 1) Thoroughly remove the liquid gasket from the case mating surface beforehand.
- 2) Install the oil pump housing assembly to the torque converter clutch case, and secure evenly by tightening four bolts.

NOTE:

Use an old gasket or an aluminum washer so as not to damage the mating surface of the housing.

Tightening torque:

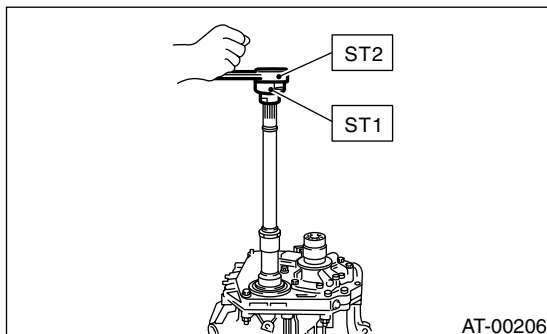
41 N·m (4.2 kgf-m, 30.4 ft-lb)



- 3) Rotate the drive pinion several times with ST1 and ST2.

ST1 498937110 HOLDER

ST2 499787700 WRENCH



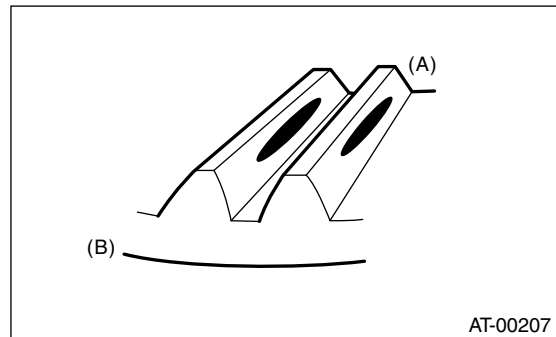
- 4) Adjust the backlash between drive pinion and crown gear. <Ref. to 4AT-112, ADJUSTMENT, Front Differential.>

- 5) Apply red lead evenly to the surfaces of three or four teeth of the crown gear. Rotate the drive pinion in the forward and reverse directions several times. Then remove the oil pump housing, and check the tooth contact pattern.

If tooth contact is improper, readjust the backlash or shim thickness.<Ref. to 4AT-112, ADJUSTMENT, Front Differential.>

- Tooth contact

Checking item: Tooth contact pattern is slightly shifted toward to toe side under no-load rotation. [When loaded, contact pattern moves toward heel.]



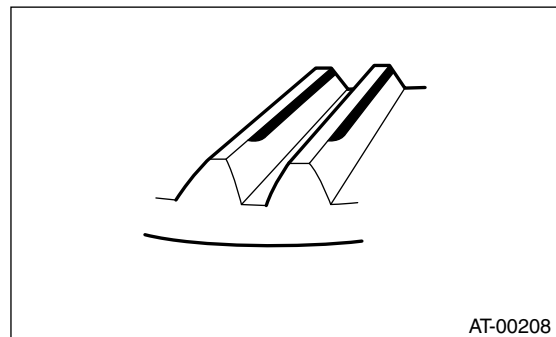
(A) Toe side

(B) Heel side

- Face contact

Checking item: Backlash is too large.

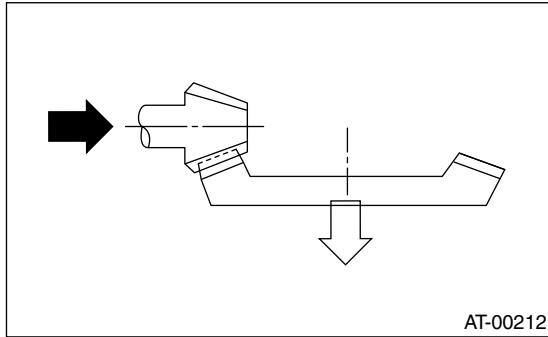
Contact pattern



DRIVE PINION SHAFT

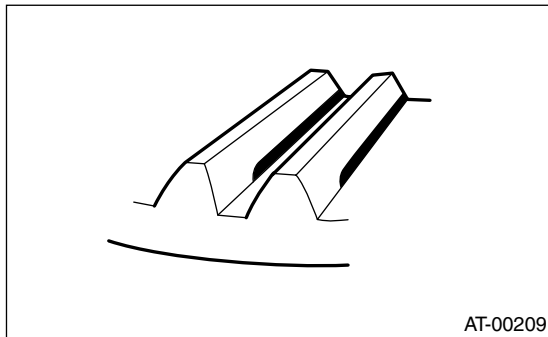
AUTOMATIC TRANSMISSION

Corrective action: Increase thickness of drive pinion height adjusting shim in order to bring drive pinion close to crown gear.

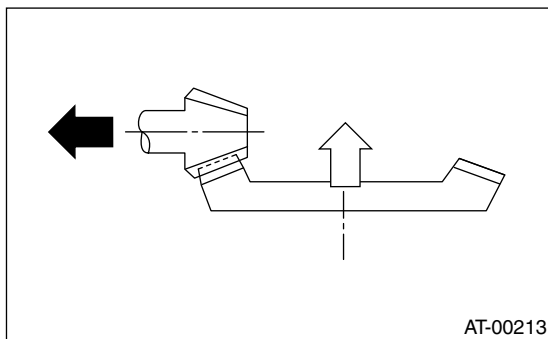


- Flank contact

Checking item: Backlash is too small.
Contact pattern

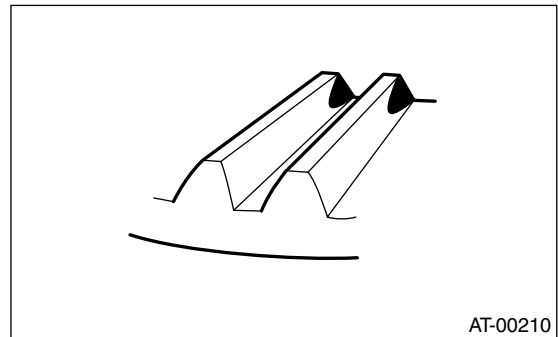


Corrective action: Reduce thickness of drive pinion height adjusting shim in order to move drive pinion away from crown gear.

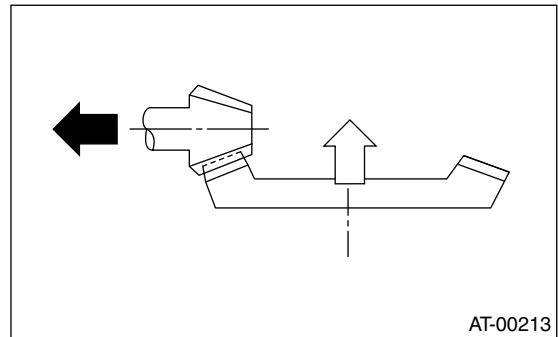


- Toe contact (Inside end contact)

Checking item: Contact areas is small.
Contact pattern

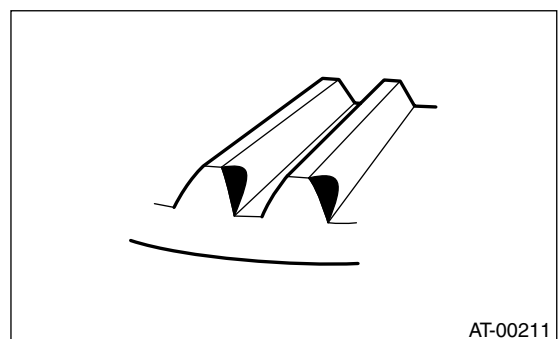


Corrective action: Decrease thickness of drive pinion height adjusting shim in order to move drive pinion away from crown gear.

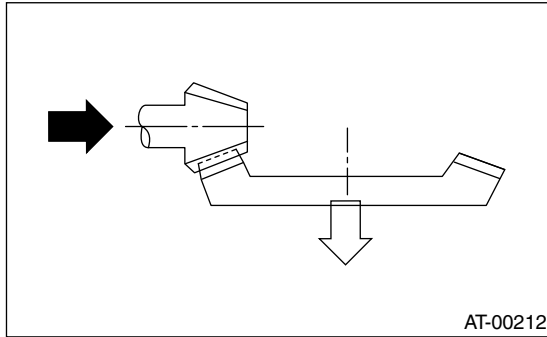


- Heel contact (Outside end contact)

Checking item: Contact areas is small.
Contact pattern



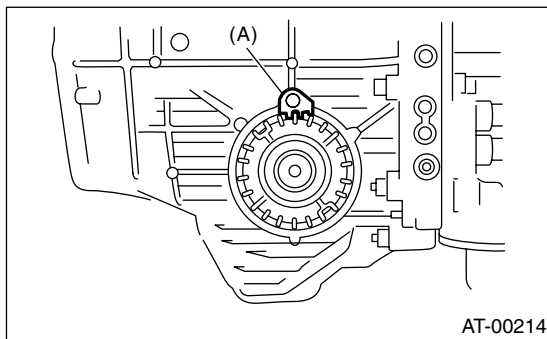
Corrective action: Increase thickness of drive pinion height adjusting shim in order to move drive pinion close to crown gear.



6) If tooth contact is correct, mark the retainer position and loosen it. After fitting a new O-ring and oil seal, screw in the retainer to the marked position. Then tighten the lock plate to the specified torque.

Tightening torque:

25 N·m (2.5 kgf-m, 18.1 ft-lb)

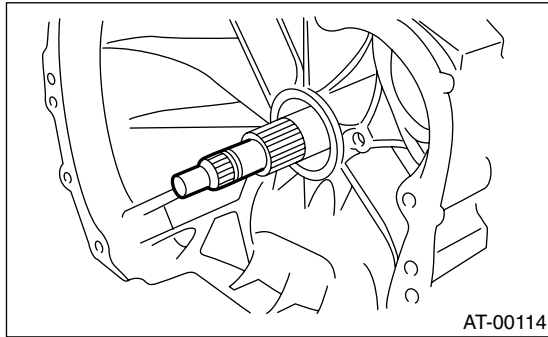


(A) Lock plate

37.Front Differential

A: REMOVAL

- 1) Remove the transmission assembly from the vehicle. <Ref. to 4AT-36, REMOVAL, Automatic Transmission Assembly.>
- 2) Extract the torque converter clutch assembly. <Ref. to 4AT-74, REMOVAL, Torque Converter Clutch Assembly.>
- 3) Remove the input shaft.



- 4) Lift-up the lever behind the transmission harness connector and disconnect it from stay.
- 5) Disconnect the inhibitor switch from stay.
- 6) Remove the oil charger pipe. <Ref. to 4AT-73, REMOVAL, Oil Charger Pipe.>
- 7) Remove the oil cooler inlet and outlet pipes. <Ref. to 4AT-69, REMOVAL, ATF Cooler Pipe and Hose.>
- 8) Separate the torque converter clutch case and transmission case. <Ref. to 4AT-94, REMOVAL, Torque Converter Clutch Case.>
- 9) Remove the seal pipe.
- 10) Remove the differential side retainer with ST.

NOTE:

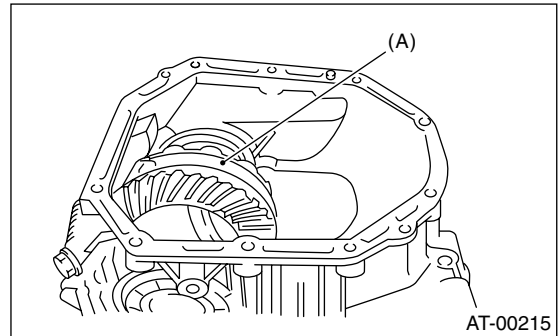
Hold the differential case assembly by hand to avoid damaging retainer mounting hole of the torque converter clutch case.

ST 499787000 WRENCH ASSY

- 11) Remove the differential assembly without damaging installation part of retainer.

B: INSTALLATION

- 1) Install the differential assembly to the case, paying special attention not to damage the inside of the case (particularly, the differential side retainer contact surface).

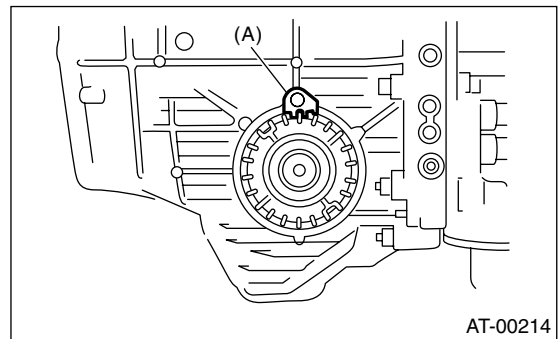


(A) Differential assembly

- 2) Install the O-rings from left and right side retainer.
- 3) Using ST, install the side retainers. <Ref. to 4AT-108, REMOVAL, Front Differential.>
- ST 499787000 WRENCH ASSY
- 4) Adjust the front differential backlash. <Ref. to 4AT-112, ADJUSTMENT, Front Differential.>
- 5) Install the lock plate.

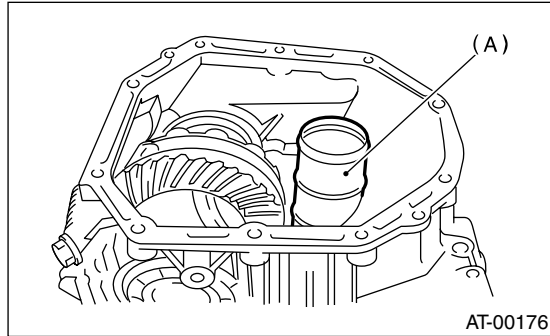
Tightening torque:

25 N·m (2.5 kgf-m, 18.1 ft-lb)



(A) Lock plate

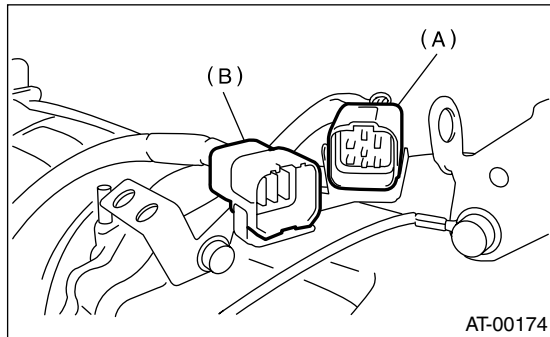
6) Install a new seal pipe to the torque converter clutch case.



(A) Seal pipe

7) Install the torque converter clutch case to transmission case. <Ref. to 4AT-94, INSTALLATION, Torque Converter Clutch Case.>

8) Insert the inhibitor switch and transmission connector into stay.



(A) Transmission harness
(B) Inhibitor switch harness

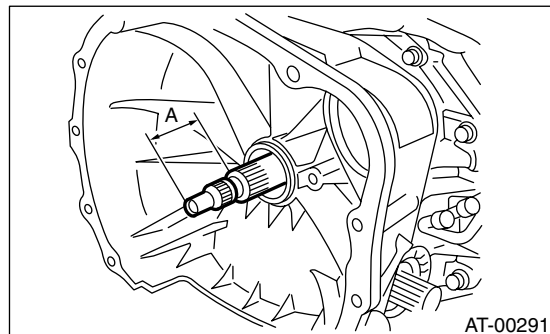
9) Install the oil cooler pipes. <Ref. to 4AT-70, INSTALLATION, ATF Cooler Pipe and Hose.>

10) Install the oil charger pipe with O-ring <Ref. to 4AT-73, INSTALLATION, Oil Charger Pipe.>

11) Insert the input shaft while turning it lightly by hand and verify the protrusion amount.

Normal protrusion A:

50 — 55 mm (1.97 — 2.17 in)



12) Install the torque converter clutch assembly. <Ref. to 4AT-74, INSTALLATION, Torque Converter Clutch Assembly.>

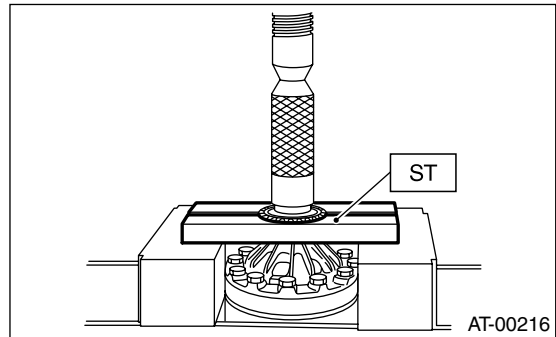
13) Install the transmission assembly to the vehicle. <Ref. to 4AT-38, INSTALLATION, Automatic Transmission Assembly.>

C: DISASSEMBLY

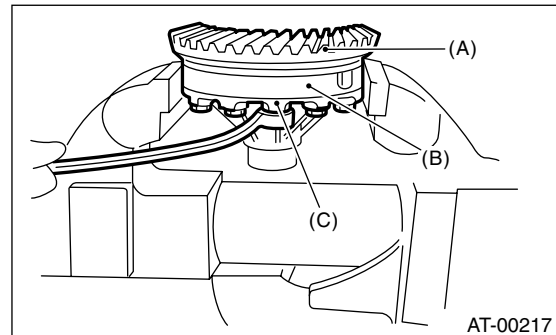
1. DIFFERENTIAL CASE ASSEMBLY

1) Using a press and ST, remove the taper roller bearing.

ST 498077000 REMOVER



2) Secure the case in a vise and remove the crown gear tightening bolts, then separate the crown gear, case (RH) and case (LH).

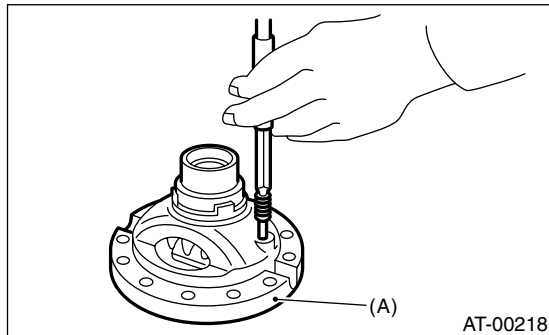


(A) Crown gear
(B) Differential case (RH)
(C) Differential case (LH)

FRONT DIFFERENTIAL

AUTOMATIC TRANSMISSION

3) Pull out the straight pin and shaft, and remove the differential bevel gear, washer, and differential bevel pinion.



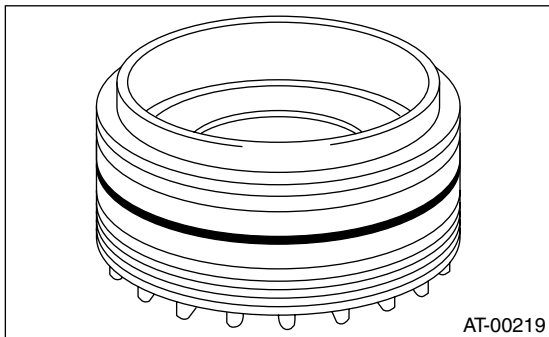
(A) Differential case (RH)

2. SIDE RETAINER

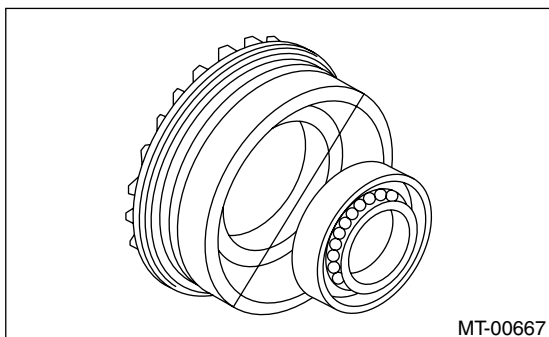
NOTE:

After adjusting the drive pinion backlash and tooth contact, remove and install the oil seal and O-ring.

1) Remove O-ring.

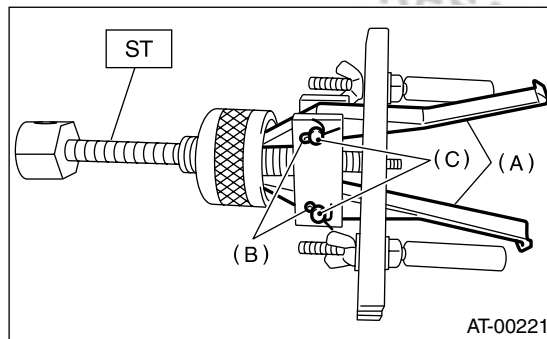


2) Remove oil seal.



3) Take out either split pin, remove claw.

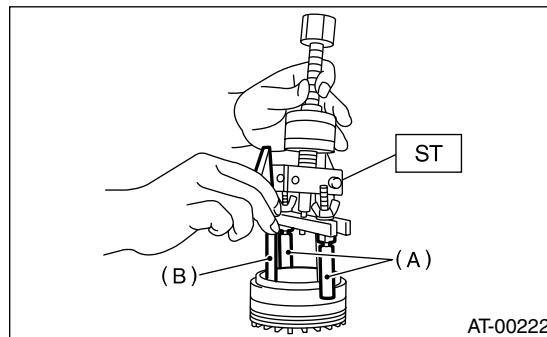
ST 398527700 PULLER ASSY



(A) Claw
(B) Split pin
(C) Pin

4) Securely attach two claws to outer race, set ST to side retainer.

ST 398527700 PULLER ASSY



(A) Shaft
(B) Claw

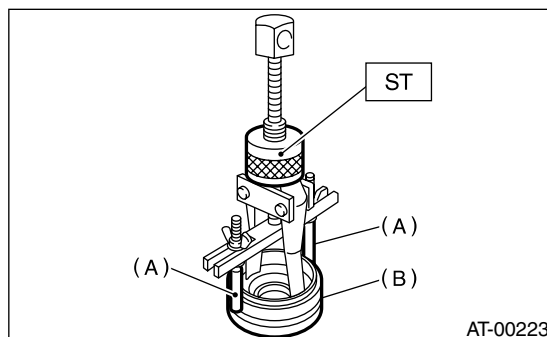
5) Return removed claw to the original position, and install pin and split pin.

6) Hold the shaft of ST to avoid removing from side retainer, and then remove the bearing outer race.

ST 398527700 PULLER ASSY

NOTE:

Replace bearing inner and outer races as a single unit.

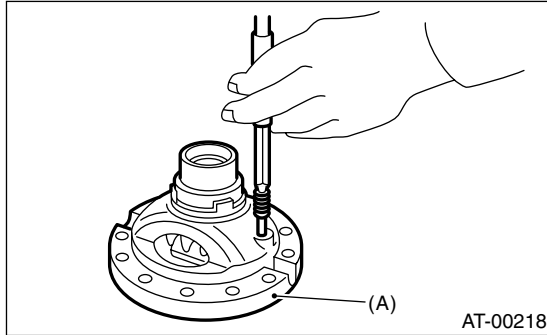


(A) Shaft
(B) Side retainer

D: ASSEMBLY

1. DIFFERENTIAL CASE ASSEMBLY

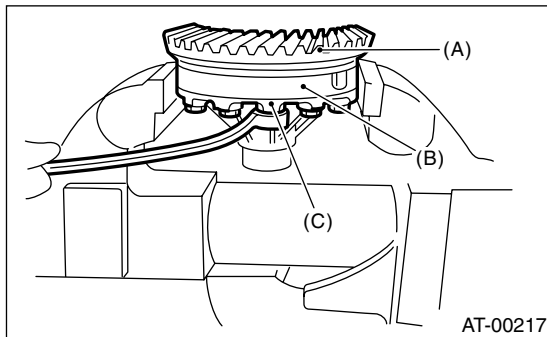
- 1) Install the washer, differential bevel gear and differential bevel pinion in the differential case (RH). Insert the pinion shaft.
- 2) Install straight pin from reverse direction.



(A) Differential case (RH)

- 3) Install the washer and differential bevel gear to the differential case (LH). Then put the case over the differential case (RH), and connect both cases.
- 4) Install the crown gear and secure by tightening the bolt.

Standard tightening torque:
62 N·m (6.3 kgf-m, 45.6 ft-lb)



- (A) Crown gear
 (B) Differential case (RH)
 (C) Differential case (LH)

- 5) Measurement of backlash (Selection of washer)
 - (1) Measure the gear backlash with ST1 and ST2, and insert ST2 through the access window of the case.

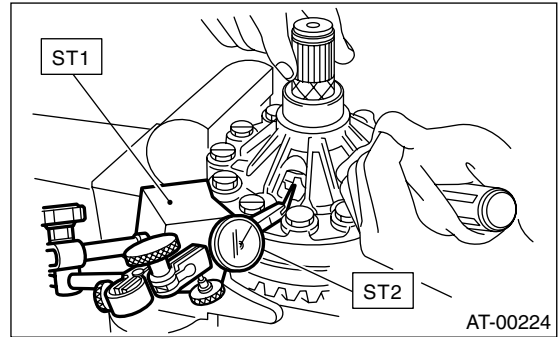
ST1 498247001 MAGNET BASE
 ST2 498247100 DIAL GAUGE

NOTE:

- Measure the backlash by applying a pinion tooth between two bevel gear teeth.
- Fix bevel pinion gear in place with a screwdriver or similar tool when measuring.

Standard value:

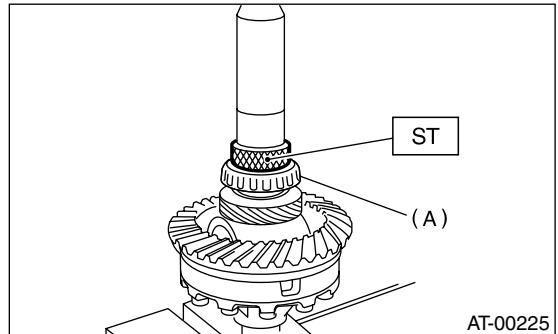
0.13 — 0.18 mm (0.0051 — 0.0071 in)



- (2) If backlash is not as specified, select a washer from the table below.

Washer	
Part No.	Thickness mm (in)
803038021	0.95 (0.037)
803038022	1.00 (0.039)
803038023	1.05 (0.041)

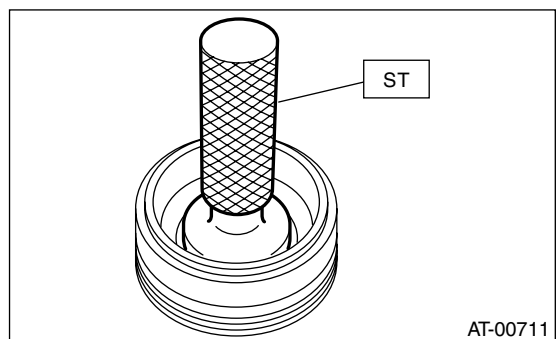
- 6) Using ST, install taper roller bearing.
 ST 398437700 DRIFT



(A) Taper roller bearing

2. SIDE RETAINER

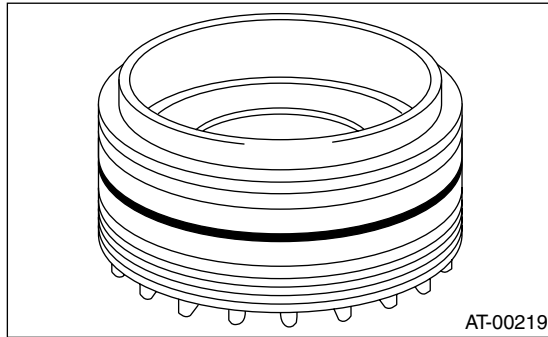
- 1) Install bearing outer race to side retainer.
 - 2) Install a new oil seal using the ST and hammer.
- ST 499797000 INSTALLER



FRONT DIFFERENTIAL

AUTOMATIC TRANSMISSION

3) Install new O-ring.



E: INSPECTION

- Check each component for harmful cuts, damage and other faults.
- Measure the backlash and adjust to within specifications.

<Ref. to 4AT-112, ADJUSTMENT, Front Differential.>

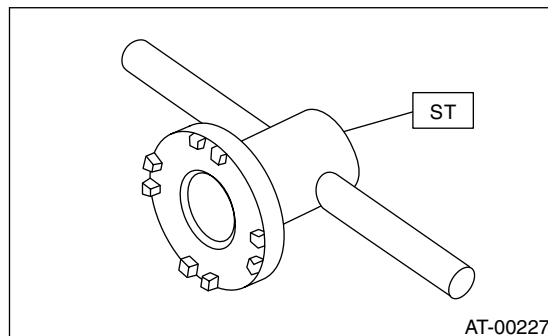
F: ADJUSTMENT

1) Using ST, screw in the retainer until light contact is felt.

NOTE:

Screw in the RH side slightly deeper than the LH side.

ST 499787000 WRENCH ASSY



2) Remove the oil pump housing.

3) Thoroughly remove the liquid gasket from the case mating surface beforehand.

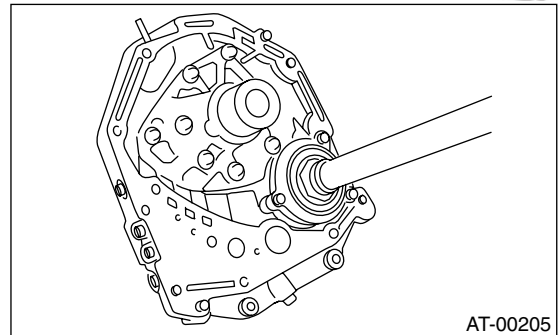
4) Install the oil pump housing assembly to the torque converter clutch case, and secure evenly by tightening four bolts.

NOTE:

Use an old gasket or an aluminum washer so as not to damage the mating surface of the housing.

Tightening torque:

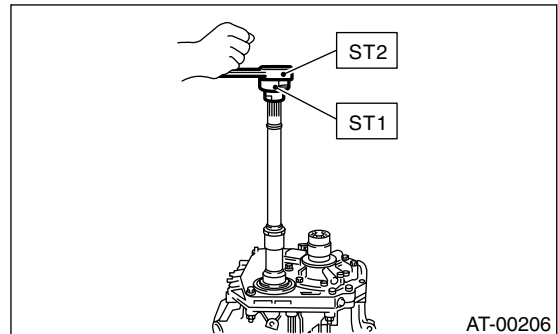
41 N·m (4.2 kgf-m, 30.4 ft-lb)



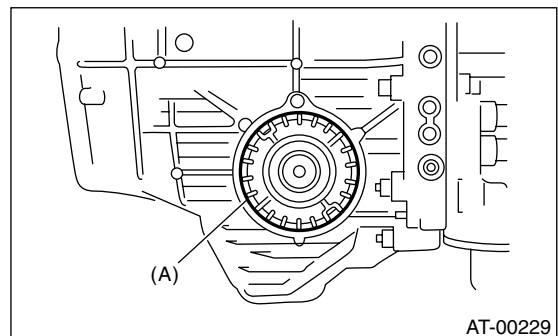
5) Rotate the drive pinion several times with ST1 and ST2.

ST1 498937110 HOLDER

ST2 499787700 WRENCH



6) Tighten the LH retainer until contact is felt while rotating the shaft. Then loosen the RH retainer. Keep tightening the LH retainer and loosening the RH retainer until the pinion shaft can no longer be turned. This is the "zero" state.

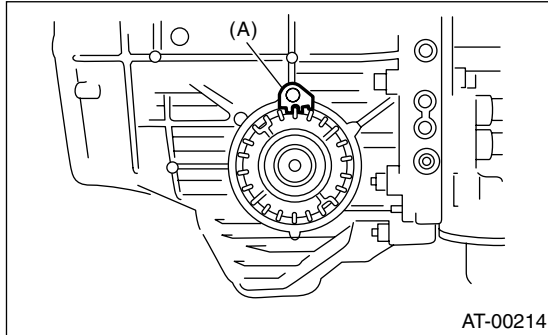


(A) Retainer

FRONT DIFFERENTIAL

AUTOMATIC TRANSMISSION

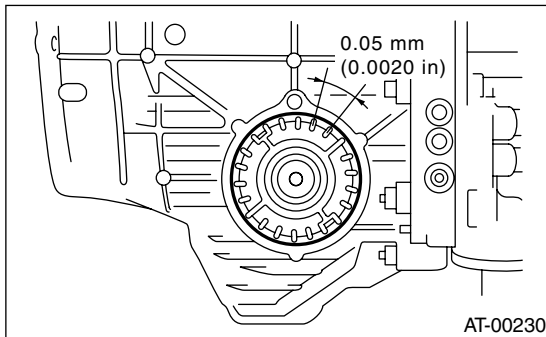
7) After the “zero” state is established, back off the LH retainer 3 notches and secure it with the lock plate. Then back off the RH retainer and retighten until it stops. Rotate drive pinion a few times. Tighten the RH retainer 1-3/4 notches further. This sets the preload. Finally, secure the retainer with its lock plate.



(A) Lock plate

NOTE:

Turning the retainer by one tooth changes the backlash about 0.05 mm (0.0020 in).

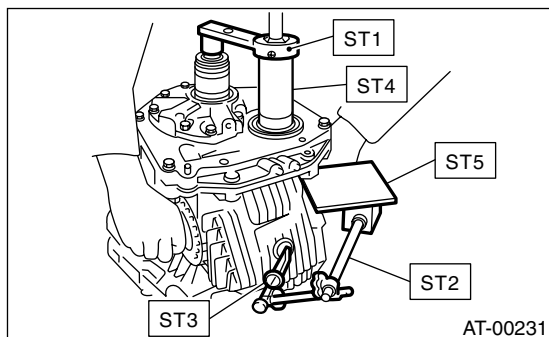


8) Turn the drive pinion several rotations with ST1 and check to see if the backlash is within the standard value with ST2, ST3, ST4 and ST5.

ST1	499787700	WRENCH
ST2	498247001	MAGNET BASE
ST3	498247100	DIAL GAUGE
ST4	499787500	ADAPTER
ST5	498255400	PLATE

Backlash:

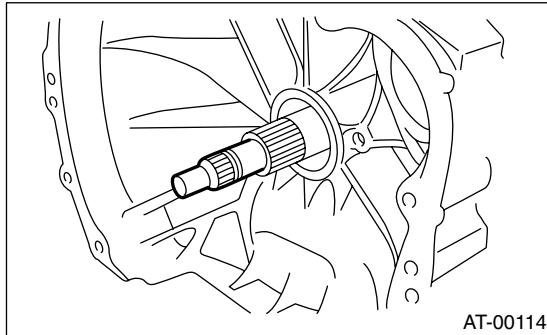
0.13 — 0.18 mm (0.0051 — 0.0071 in)



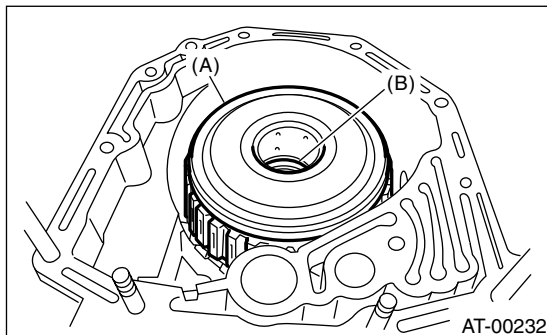
38.AT Main Case

A: REMOVAL

- 1) Remove the transmission assembly from the vehicle. <Ref. to 4AT-36, REMOVAL, Automatic Transmission Assembly.>
- 2) Extract the torque converter clutch assembly. <Ref. to 4AT-74, REMOVAL, Torque Converter Clutch Assembly.>
- 3) Remove the input shaft.

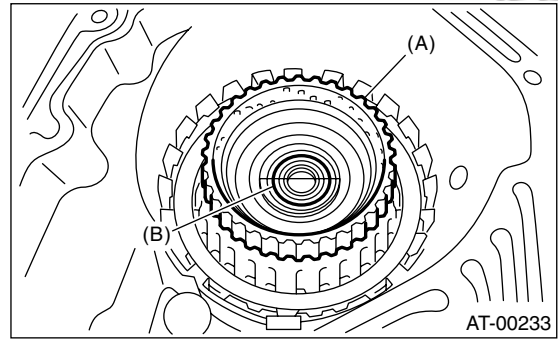


- 4) Lift-up the lever behind the transmission harness connector and disconnect it from stay.
- 5) Disconnect the inhibitor switch connector from stay.
- 6) Disconnect the air breather hose.
- 7) Remove the oil charger pipe. <Ref. to 4AT-73, REMOVAL, Oil Charger Pipe.>
- 8) Remove the oil cooler inlet and outlet pipes. <Ref. to 4AT-69, REMOVAL, ATF Cooler Pipe and Hose.>
- 9) Separate the torque converter clutch case and transmission case. <Ref. to 4AT-94, REMOVAL, Torque Converter Clutch Case.>
- 10) Remove the oil pump housing. <Ref. to 4AT-96, REMOVAL, Oil Pump Housing.>
- 11) Take out the high clutch, thrust needle bearing and reverse clutch assembly.



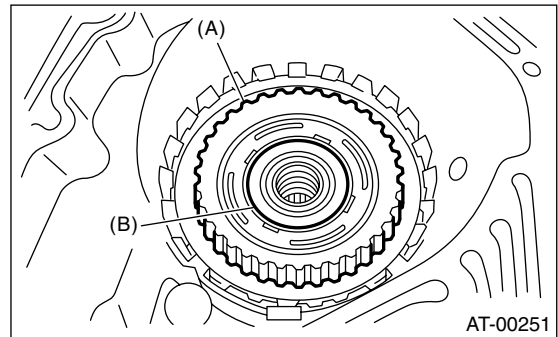
- (A) High clutch and reverse clutch assembly
- (B) Thrust needle bearing

- 12) Take out the high clutch hub and the thrust bearing.



- (A) High clutch hub
- (B) Thrust needle bearing

- 13) Take out the front sun gear and the thrust bearing.

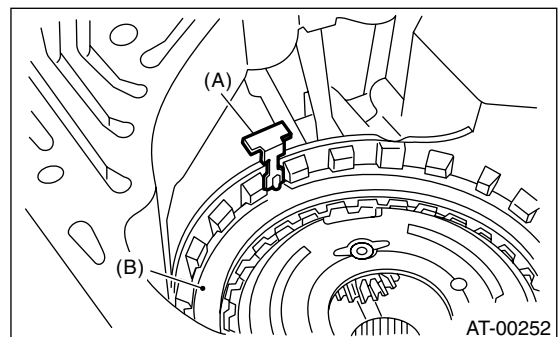


- (A) Front sun gear
- (B) Thrust needle bearing

- 14) Pull out the leaf spring without folding.

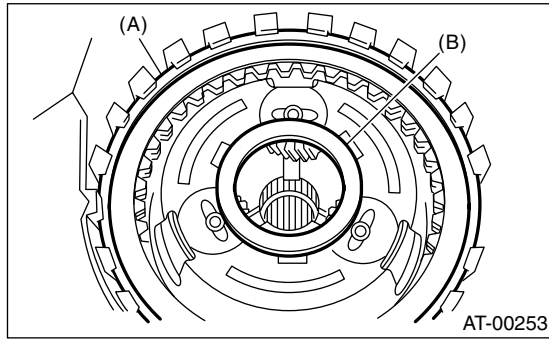
NOTE:

Remove it while pressing the lower leaf spring down.



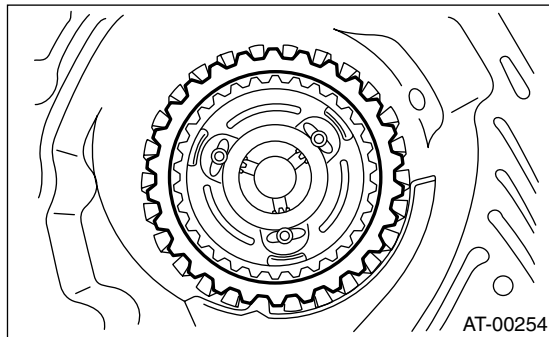
- (A) Leaf spring
- (B) Retaining plate

15) Remove the snap ring and thrust needle bearing.

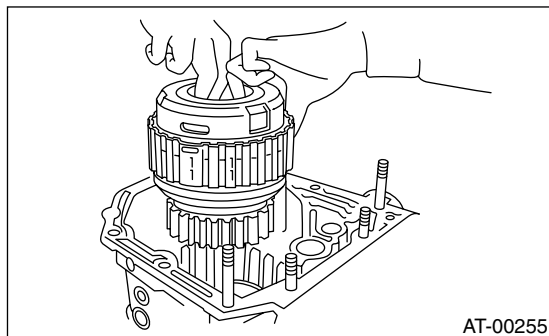


- (A) Snap ring
- (B) Thrust needle bearing

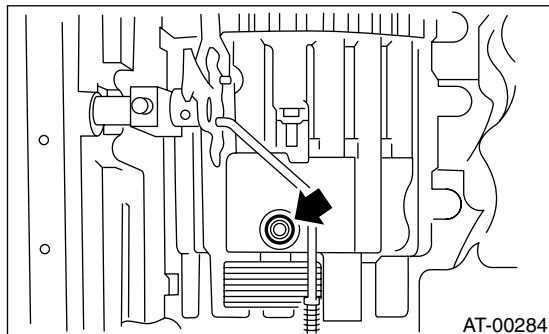
16) Take out the retaining plate, drive plate and driven plate of 2-4 brake.



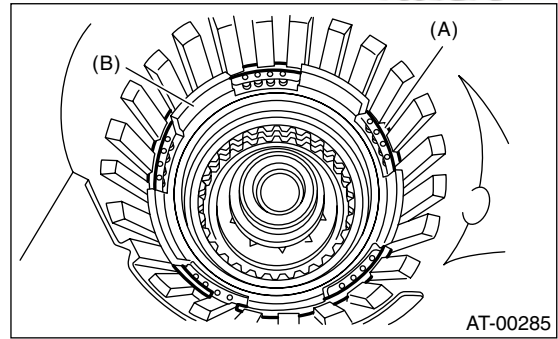
17) Take out the thrust needle bearing, planetary gear assembly and the low clutch assembly.



18) Remove the 2-4 brake seal.

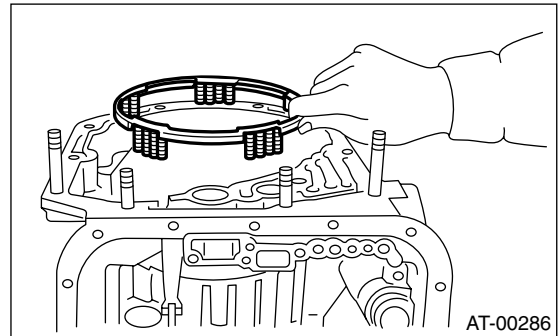


19) Remove the snap ring.

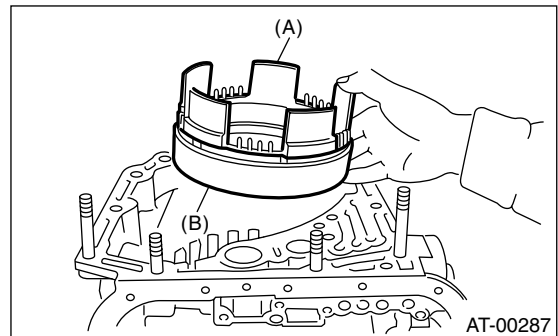


- (A) Snap ring
- (B) 2-4 brake piston

20) Take out the 2-4 brake return spring.



21) Remove the 2-4 brake piston and piston retainer without damaging.

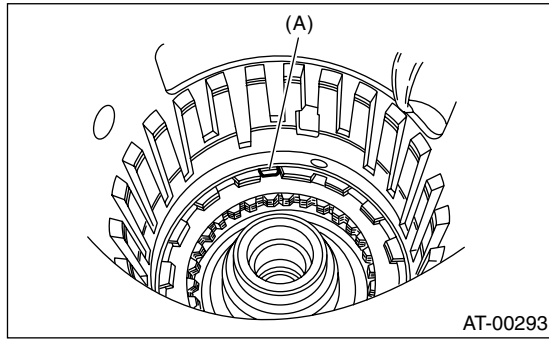


- (A) 2-4 brake piston
- (B) 2-4 brake piston retainer

AT MAIN CASE

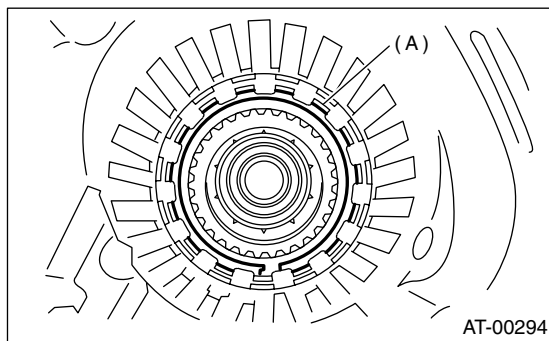
AUTOMATIC TRANSMISSION

22) Pull out the leaf spring without folding.



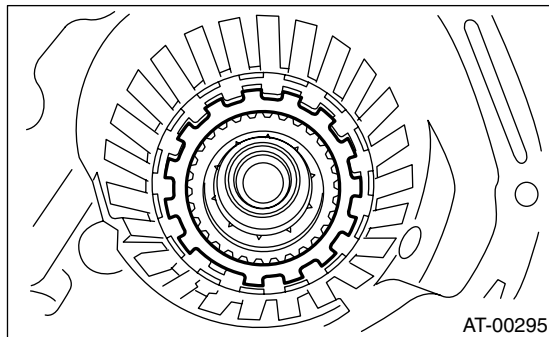
(A) Leaf spring

23) Remove the snap ring.

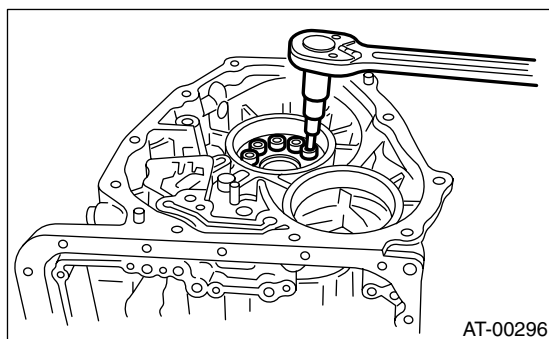


(A) Snap ring

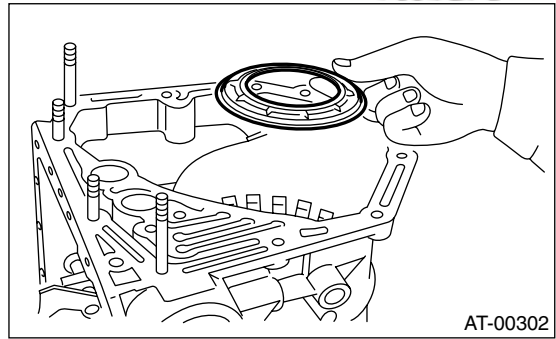
24) Take out the retaining plate, drive plate, driven plate and dish plate.



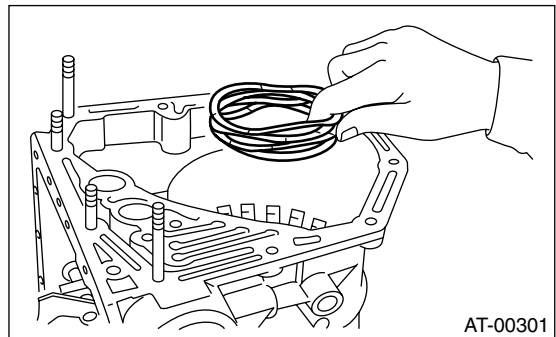
25) Turn the transmission case upside down, and then take out the socket bolts while holding the one-way clutch inner race with hand.



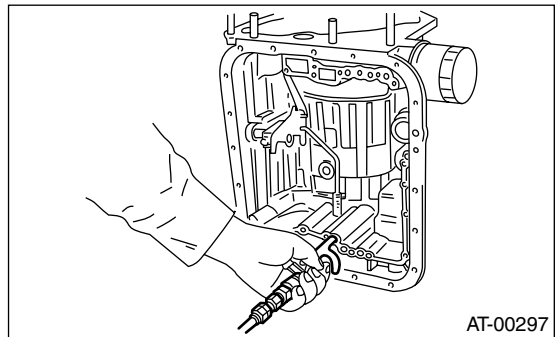
26) Take out the spring retainer.



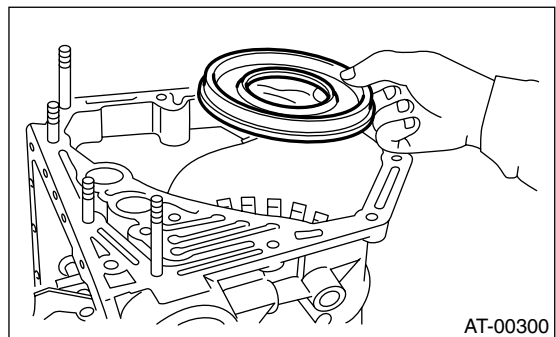
27) Take out the return spring.



28) Apply compressed air.



29) Take out the low & reverse piston.

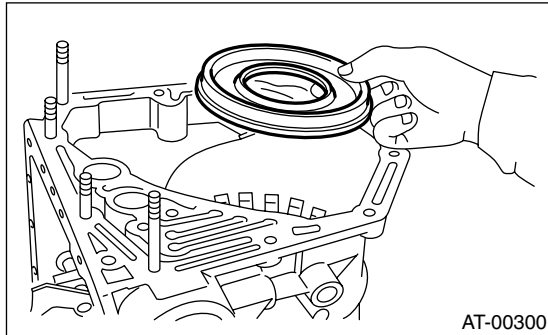


B: INSTALLATION

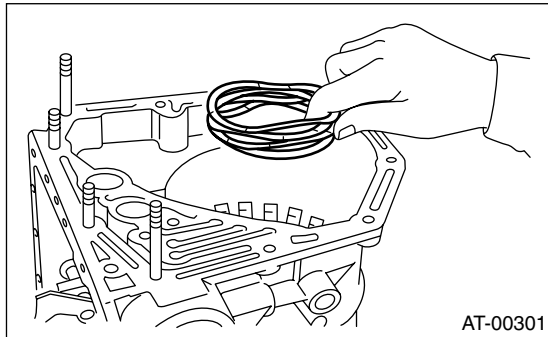
1) Install the low and reverse piston without tilting.

NOTE:

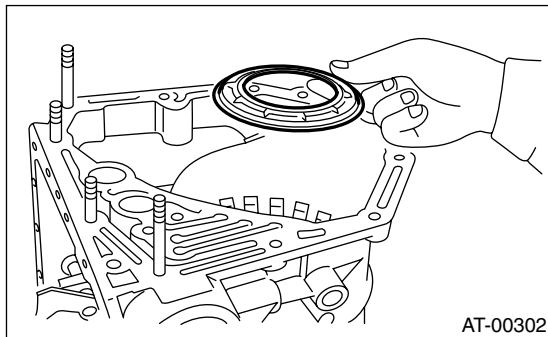
Be careful not to damage the lip seal.



2) Install the return spring.



3) Install the spring retainer.

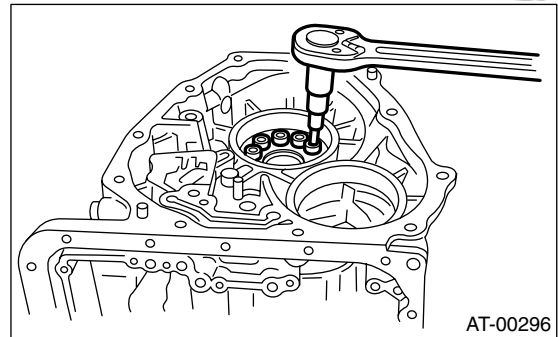


4) Install the one-way clutch inner race, spring retainer and return spring.

5) Tighten the socket head bolts evenly from the rear side of transmission case.

Tightening torque:

25 N·m (2.5 kgf-m, 18.1 ft-lb)



6) Place the front side of transmission body upward.

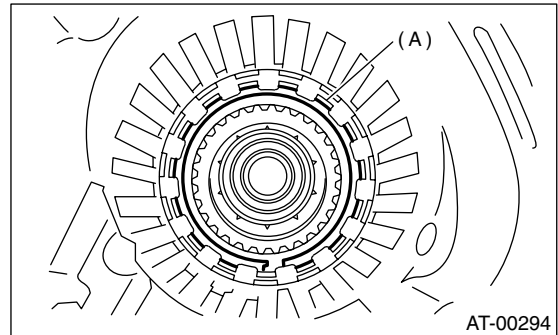
7) Install thrust needle bearing.

8) Installation of the low & reverse brake:

Install dish plate, driven plates, drive plates, and a retaining plate, and secure with a snap ring.

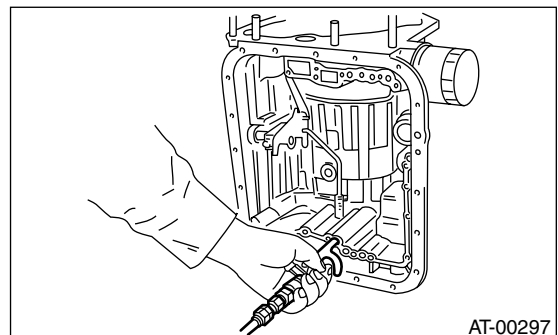
NOTE:

Pay attention to the orientation of the dish plate.



(A) Snap ring

9) Apply compressed air intermittently to check for operation.



10) Check the clearance and select the retaining plate. Place the same thickness of shim on both sides to prevent the retaining plate from tilting.

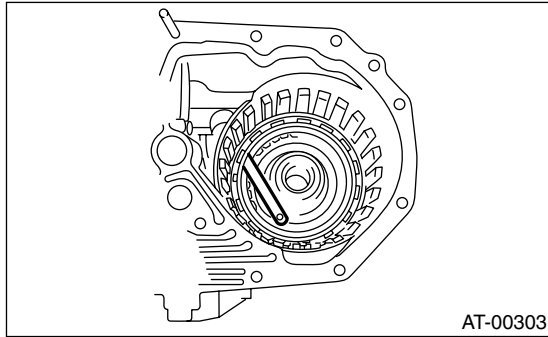
Standard value:

0.7 — 1.2 mm (0.028 — 0.047 in)

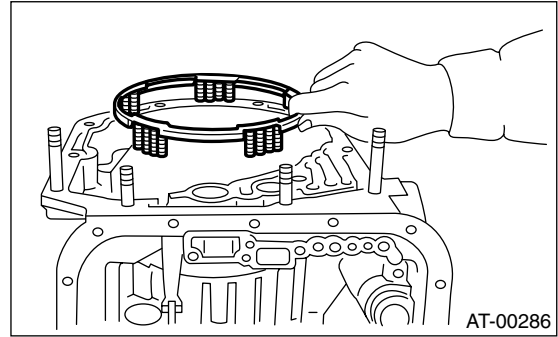
AT MAIN CASE

AUTOMATIC TRANSMISSION

Allowable limit:
2.2 mm (0.087 in)

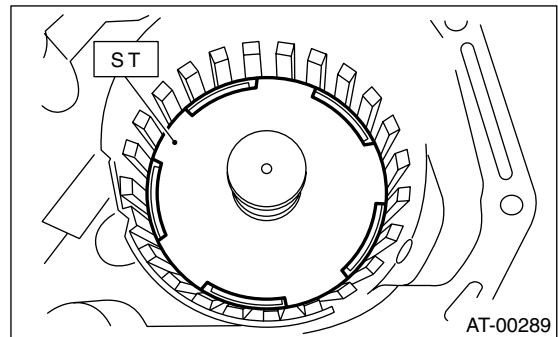


13) Install the 2-4 brake piston return spring to transmission case.

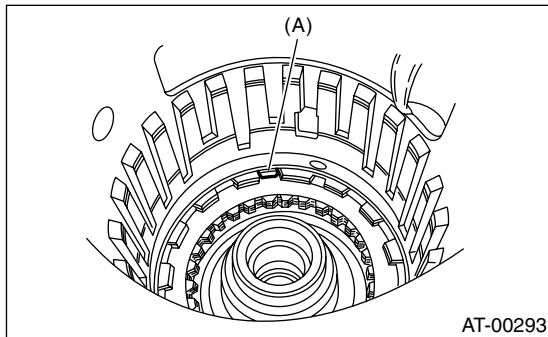


Retaining plates	
Part No.	Thickness mm (in)
31667AA320	4.1 (0.161)
31667AA330	4.4 (0.173)
31667AA340	4.7 (0.185)
31667AA350	5.0 (0.197)
31667AA360	5.3 (0.209)
31667AA370	5.6 (0.220)
31667AA380	5.9 (0.232)

14) Position the snap ring in transmission. Using ST, press the snap ring into place.
ST 498677100 COMPRESSOR

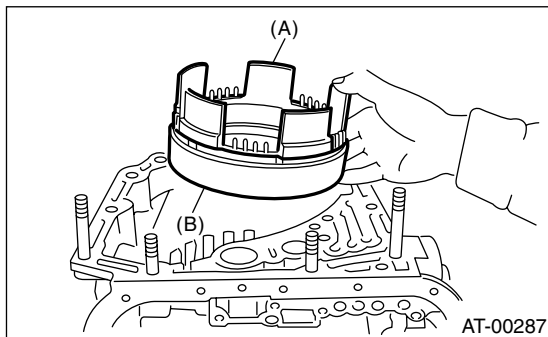


11) Install the low & reverse brake leaf spring.



(A) Snap ring

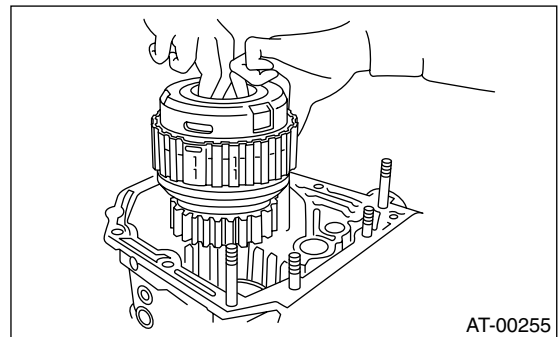
12) Install the 2-4 brake piston and 2-4 brake retainer by aligning the hole of 2-4 brake retainer and the hole of transmission case.



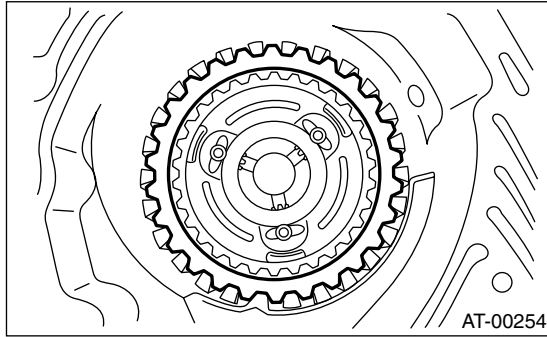
(A) 2-4 brake piston

(B) 2-4 brake piston retainer

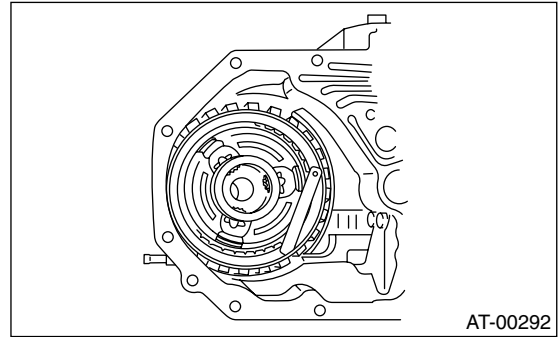
15) Install the planetary gear and low clutch assembly to transmission case. Install carefully while rotating the low clutch and planetary gear assembly slowly paying special attention not to damage the seal ring.



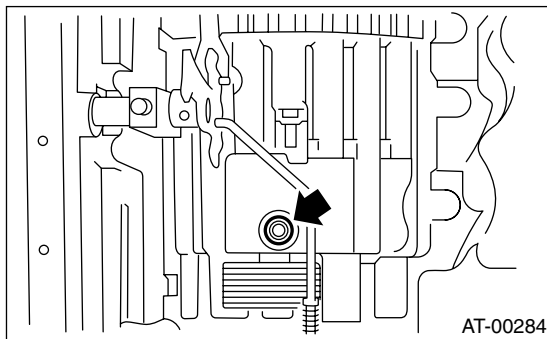
16) Install pressure plate, drive plate, driven plate, retaining plate and snap ring.



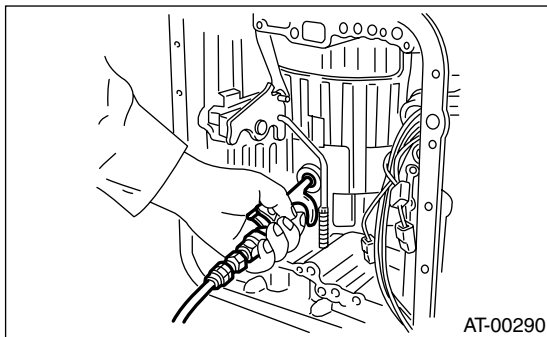
Allowable limit:
1.5 mm (0.059 in)



17) Install a new 2-4 brake oil seal to transmission case.



18) After all 2-4 brake component parts have been installed, blow in air intermittently and confirm the operation of the brake.



19) Check the clearance between the retaining plate and the snap ring.

NOTE:

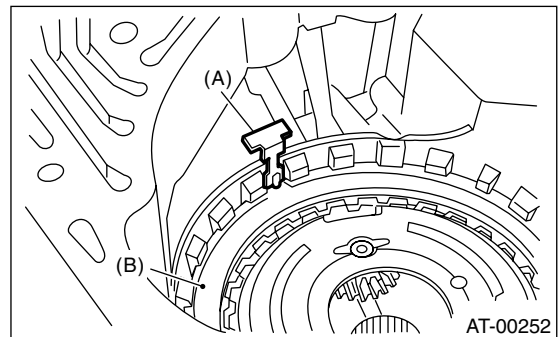
Select a retaining plate with a suitable value from the following table, so that the clearance becomes the standard value.

Standard value:

0.8 — 1.2 mm (0.031 — 0.047 in)

Retaining plates	
Part No.	Thickness mm (in)
31567AA612	5.6 (0.220)
31567AA622	5.8 (0.228)
31567AA632	6.0 (0.236)
31567AA642	6.2 (0.244)
31567AA652	6.4 (0.252)
31567AA662	6.6 (0.260)

20) Be careful not to mistake the location of the leaf spring to be inserted.

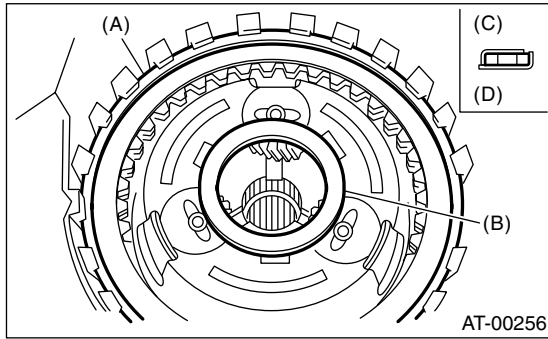


- (A) Leaf spring
- (B) Retaining plate

AT MAIN CASE

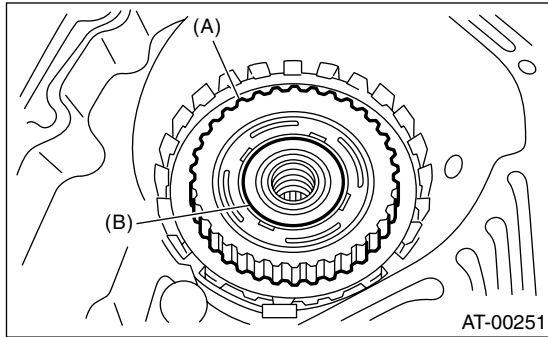
AUTOMATIC TRANSMISSION

21) Install thrust needle bearing in the correct direction.



- (A) Snap ring
- (B) Thrust needle bearing
- (C) Upside
- (D) Downside

22) Install front sun gear and thrust needle bearing.

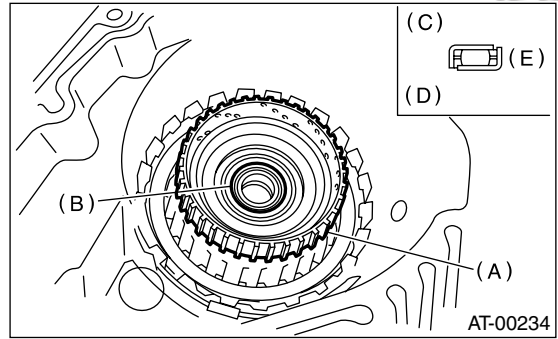


- (A) Front sun gear
- (B) Thrust needle bearing

23) Install the high clutch hub.

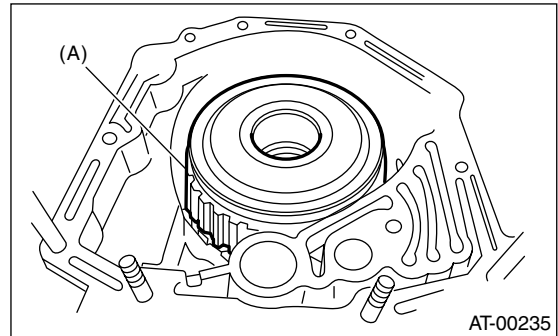
Attach the thrust needle bearing to the hub with vaseline and install the hub by correctly engaging the splines of the front planetary carrier.

24) Install the thrust needle bearing in proper direction.



- (A) High clutch hub
- (B) Thrust needle bearing
- (C) Upside
- (D) Downside
- (E) Outside

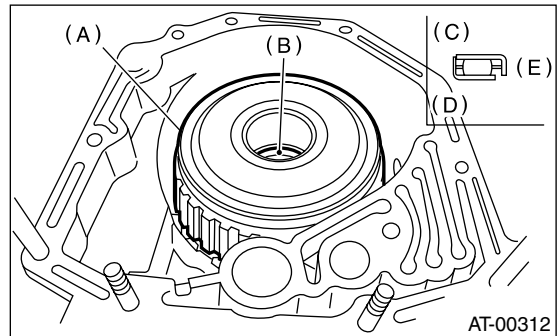
25) Install the high clutch assembly.



- (A) High clutch and reverse clutch assembly

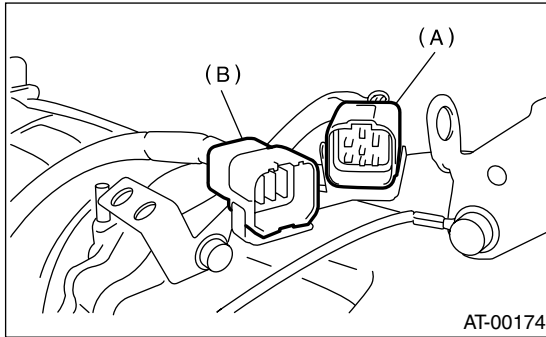
26) Adjust total end play. <Ref. to 4AT-100, ADJUSTMENT, Oil Pump Housing.>

27) Install the thrust needle bearing in proper direction.



- (A) High clutch and reverse clutch ASSY
- (B) Thrust needle bearing
- (C) Upside
- (D) Downside
- (E) Outside

- 28) Install the oil pump housing assembly.
- 29) Install the torque converter clutch case assembly to the transmission case assembly. <Ref. to 4AT-94, INSTALLATION, Torque Converter Clutch Case.>
- 30) Insert inhibitor switch and transmission connector into stay.
- 31) Install air breather hose. <Ref. to 4AT-72, INSTALLATION, Air Breather Hose.>

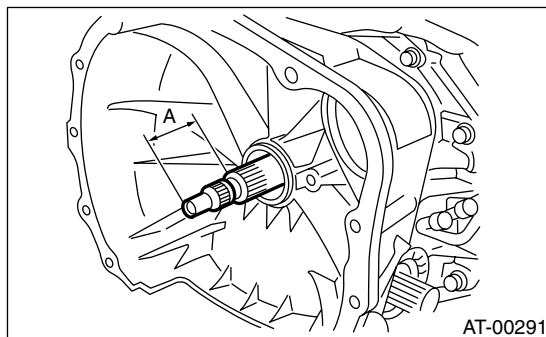


- (A) Transmission harness
(B) Inhibitor switch harness

- 32) Install oil cooler pipes. <Ref. to 4AT-70, INSTALLATION, ATF Cooler Pipe and Hose.>
- 33) Install the oil charger pipe with O-ring. <Ref. to 4AT-73, INSTALLATION, Oil Charger Pipe.>
- 34) Insert the input shaft while turning lightly by hand. At this time, not to damage the bushing.

Normal protrusion A:

50 — 55 mm (1.97 — 2.17 in)

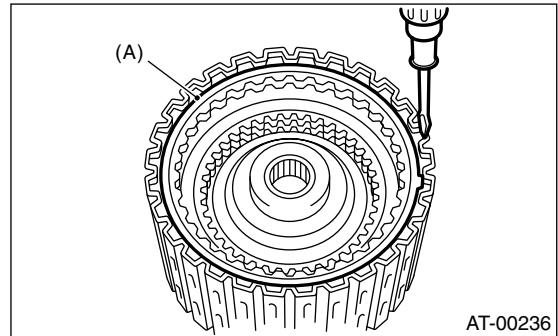


- 35) Install the torque converter clutch assembly. <Ref. to 4AT-74, INSTALLATION, Torque Converter Clutch Assembly.>
- 36) Install the transmission assembly to the vehicle. <Ref. to 4AT-38, INSTALLATION, Automatic Transmission Assembly.>

C: DISASSEMBLY

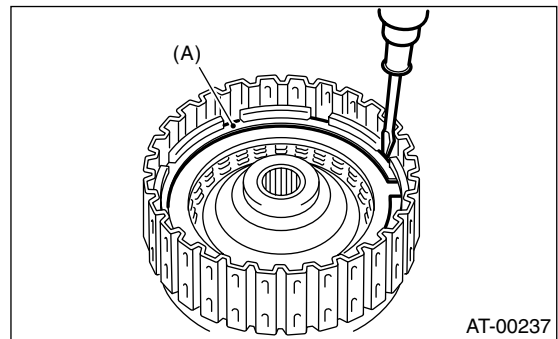
1. HIGH CLUTCH, REVERSE CLUTCH

- 1) Remove the snap ring, and take out the retaining plate, drive plates, driven plates.



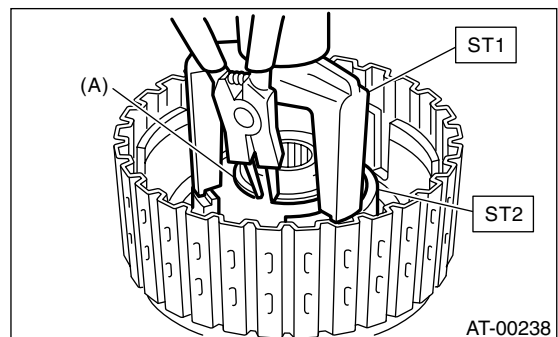
- (A) Snap ring

- 2) Remove snap ring, and take out the retaining plate, drive plates and driven plates.



- (A) Snap ring

- 3) Using ST1 and ST2, remove snap ring.
ST1 398673600 COMPRESSOR
ST2 498627100 SEAT

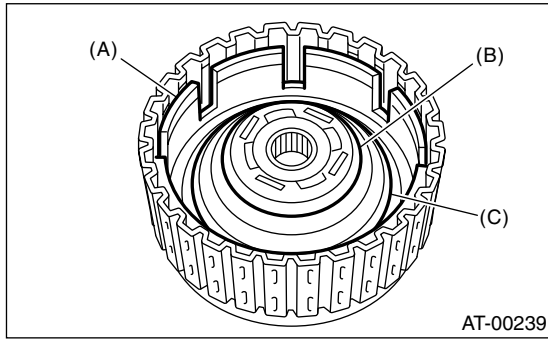


- (A) Snap ring

AT MAIN CASE

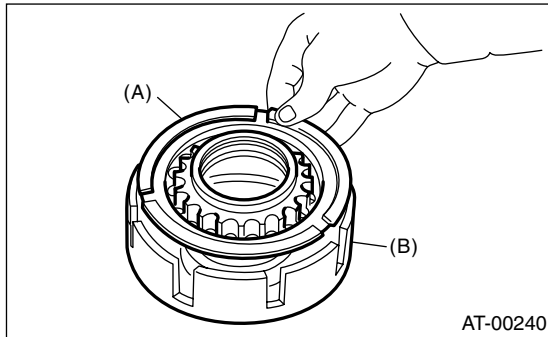
AUTOMATIC TRANSMISSION

4) Take out clutch cover, spring retainer, high clutch piston and reverse clutch piston.



- (A) Reverse clutch piston
- (B) Cover
- (C) Return spring

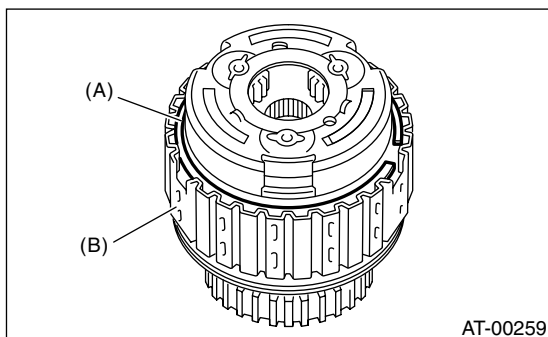
5) Remove seal rings and lip seal from high clutch piston and reverse clutch piston.



- (A) High clutch piston
- (B) Reverse clutch piston

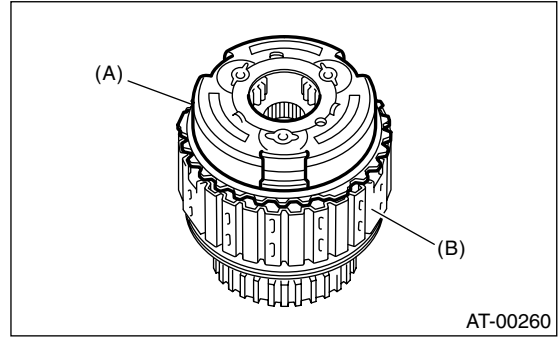
2. PLANETARY GEAR, LOW CLUTCH

1) Remove snap ring from the low clutch drum.



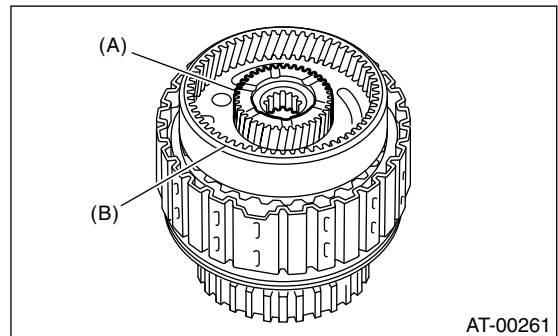
- (A) Snap ring
- (B) Low clutch drum

2) Take out front planetary carrier.



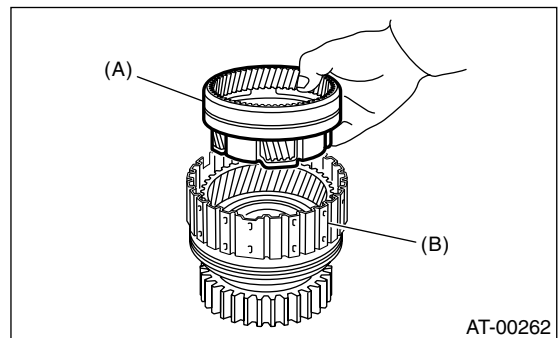
- (A) Front planetary carrier
- (B) Low clutch drum

3) Take out rear sun gear.



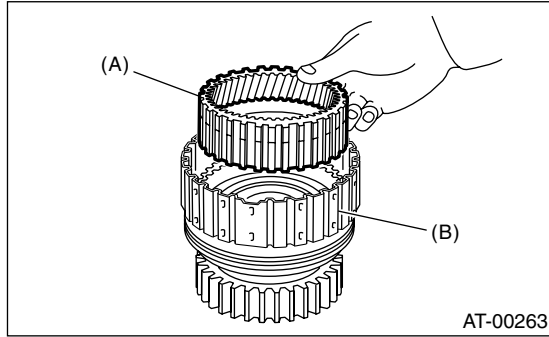
- (A) Rear sun gear
- (B) Rear planetary carrier

4) Take out rear planetary carrier, washer and thrust needle bearing.



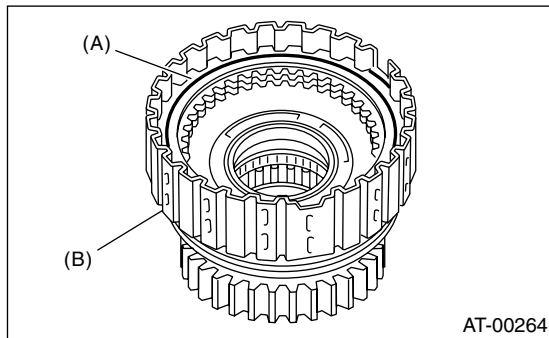
- (A) Rear planetary carrier
- (B) Low clutch drum

5) Take out rear internal gear.



- (A) Rear internal gear
- (B) Low clutch drum

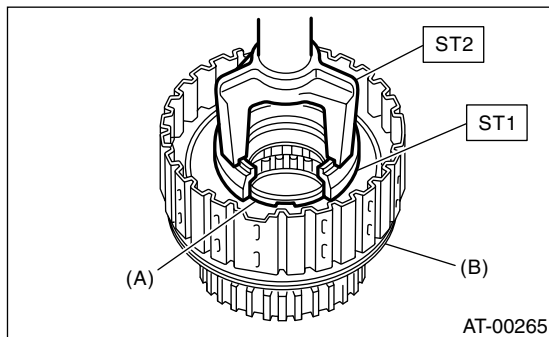
6) Remove the snap ring from the low clutch drum.



- (A) Snap ring
- (B) Low clutch drum

7) Compress the spring retainer, and remove the snap ring from the low clutch drum, by using ST1 and ST2.

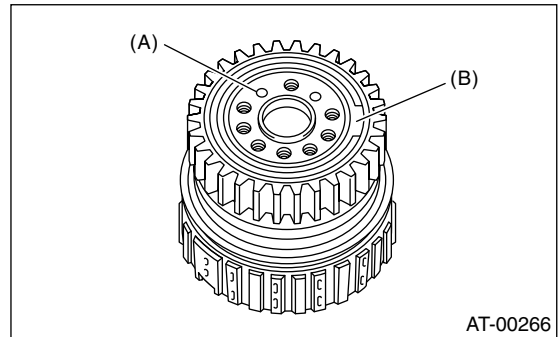
ST1 498627100 SEAT
ST2 398673600 COMPRESSOR



- (A) Snap ring
- (B) Low clutch drum

8) Remove one-way clutch. <Ref. to 4AT-114, REMOVAL, AT Main Case.>

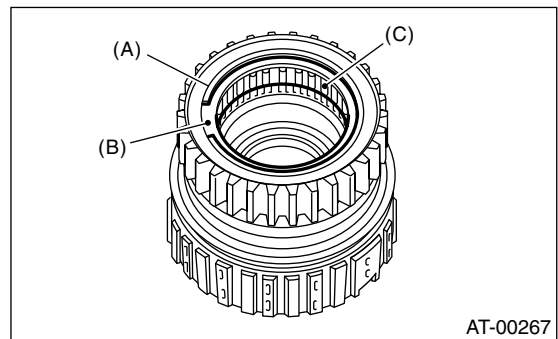
9) Install the one-way clutch inner race to the low clutch drum, and apply compressed air to remove the low clutch piston.



- (A) Apply compressed air
- (B) One-way clutch inner race

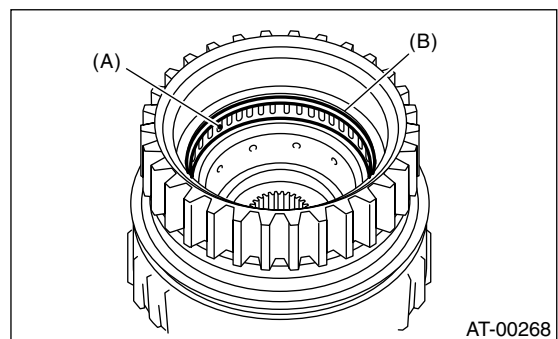
10) Remove the one-way clutch inner race.

11) Remove the one-way clutch after taking out the snap ring.



- (A) Snap ring
- (B) Plate
- (C) One-way clutch

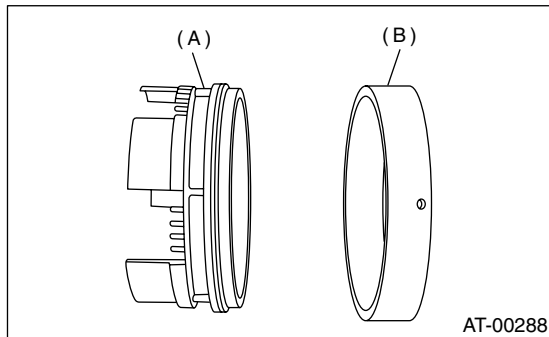
12) Remove the needle bearing after taking out the snap ring.



- (A) Needle bearing
- (B) Snap ring

3. 2-4 BRAKE

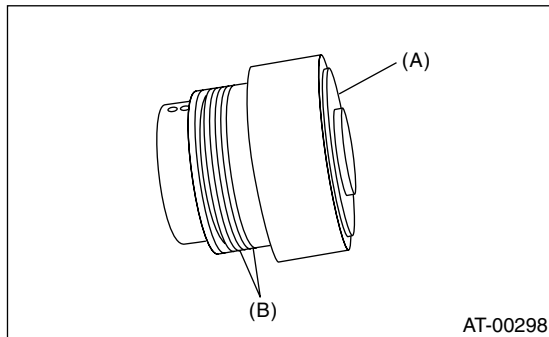
1) Separate 2-4 brake piston and piston retainer.



- (A) 2-4 brake piston
- (B) 2-4 brake piston retainer

4. ONE-WAY CLUTCH INNER RACE

1) Remove seal rings.

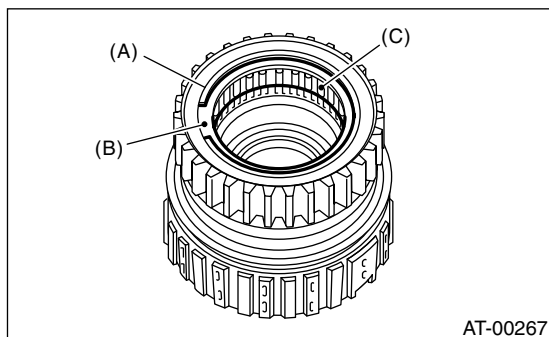


- (A) One way clutch inner race
- (B) Seal rings

2) Using ST, remove needle bearing.
ST 398527700 PULLER ASSY

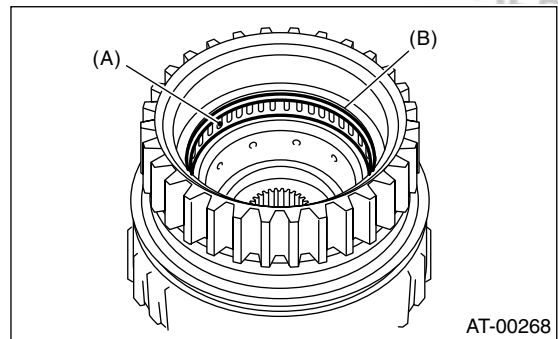
5. ONE-WAY CLUTCH OUTER RACE

1) Remove the one-way clutch after taking out the snap ring.



- (A) Snap ring
- (B) Plate
- (C) One-way clutch

2) Remove the needle bearing after taking out the snap ring.



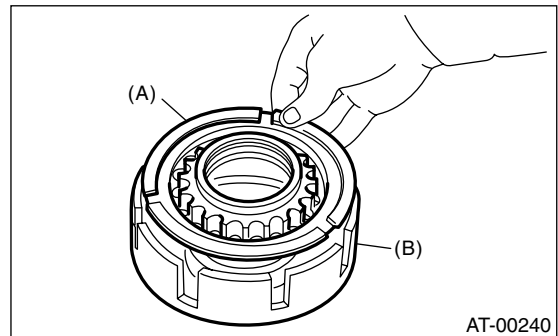
- (A) Needle bearing
- (B) Snap ring

D: ASSEMBLY

1. HIGH CLUTCH, REVERSE CLUTCH

1) Install seal rings and lip seal to high clutch piston and reverse clutch piston.

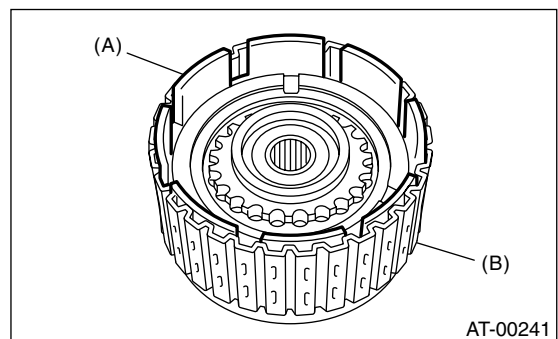
2) Install high clutch piston to reverse clutch piston.



- (A) High clutch piston
- (B) Reverse clutch piston

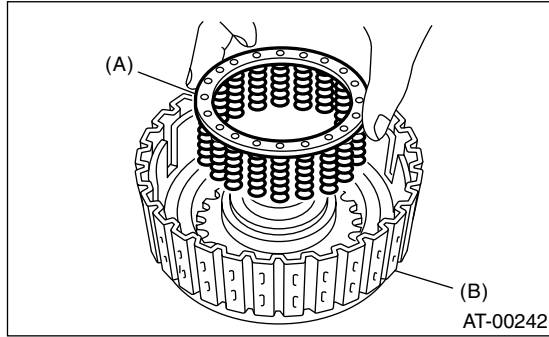
3) Install reverse clutch to high clutch drum.

Align the groove on the reverse clutch piston with the groove on the high clutch drum during installation.



- (A) Reverse clutch piston
- (B) High clutch drum

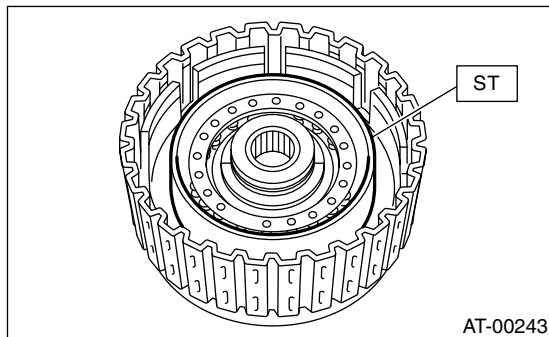
4) Install spring retainer to high clutch piston.



- (A) Return spring
(B) High clutch drum

5) Install ST to high clutch piston.

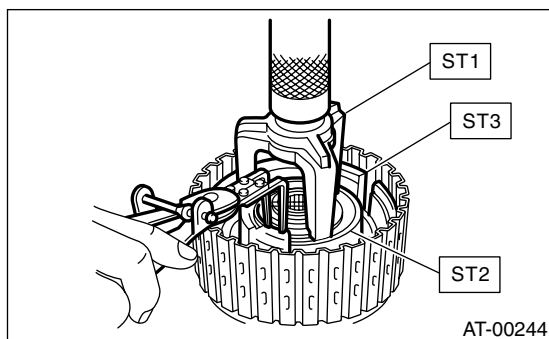
ST 498437000 HIGH CLUTCH PISTON GUIDE



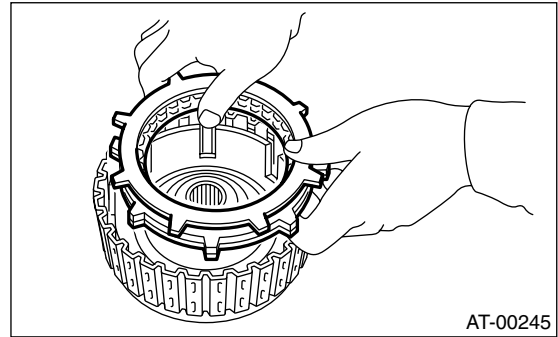
6) Avoid folding the high clutch piston seal, when installing the cover to high clutch piston.

7) Using ST1 and ST2, install snap ring.

ST1 398673600 COMPRESSOR
ST2 498627100 SEAT
ST3 498437000 HIGH CLUTCH PISTON GUIDE

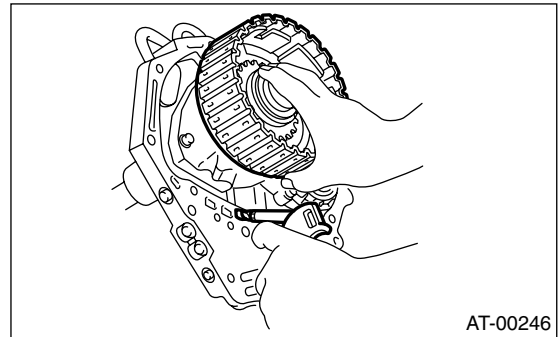


8) Install the thickest driven plate to piston side, and then install the driven plate, drive plate, retaining plate to high clutch drum.



9) Install snap ring to high clutch drum.

10) Apply compressed air intermittently to check for operation.



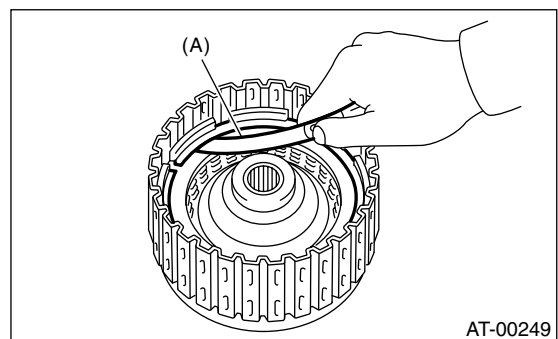
11) Measure the clearance between the retaining plate and snap ring (High clutch). At this time, do not press down retaining plate.

Standard value:

0.8 — 1.1 mm (0.031 — 0.043 in)

Allowable limit:

1.5 mm (0.059 in)

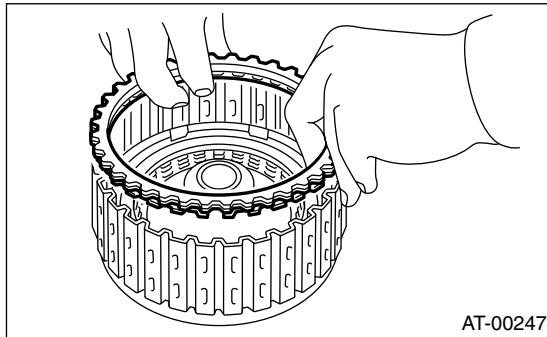


- (A) Thickness gauge

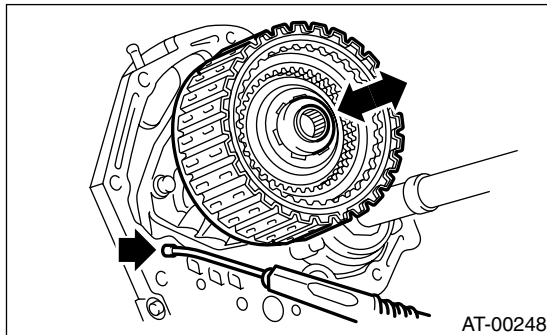
If specified tolerance limits are exceeded, select a suitable high clutch retaining plate.

High clutch retaining plate	
Part No.	Thickness mm (in)
31567AA710	4.7 (0.185)
31567AA720	4.8 (0.189)
31567AA730	4.9 (0.193)
31567AA740	5.0 (0.197)
31567AA670	5.1 (0.201)
31567AA680	5.2 (0.205)
31567AA690	5.3 (0.209)
31567AA700	5.4 (0.213)

12) Install driven plate, drive plate, retaining plate and snap ring.



13) Apply compressed air intermittently to check for operation.



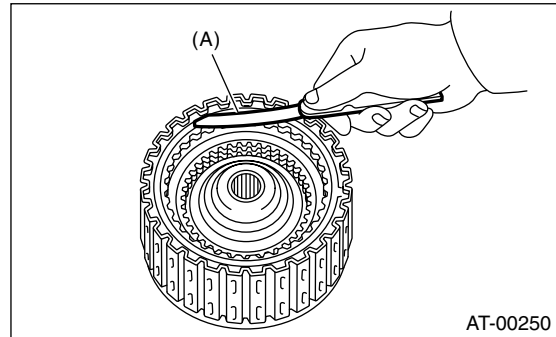
14) Measure the clearance between the retaining plate and snap ring (Reverse clutch). At this time, do not press down retaining plate.

Standard value:

0.5 — 0.8 mm (0.020 — 0.031 in)

Allowable limit:

1.2 mm (0.047 in)



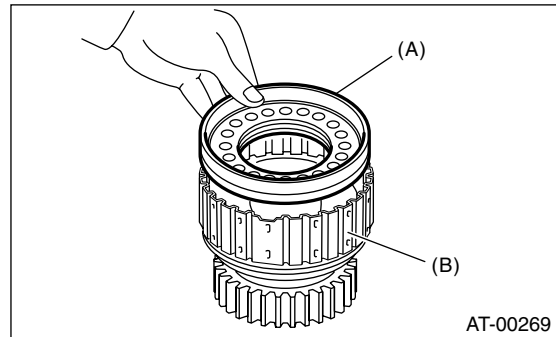
(A) Thickness gauge

If specified tolerance limits are exceeded, select a suitable high clutch retaining plate.

Reverse clutch retaining plates	
Part No.	Thickness mm (in)
31567AA910	4.0 (0.157)
31567AA920	4.2 (0.165)
31567AA930	4.4 (0.173)
31567AA940	4.6 (0.181)
31567AA950	4.8 (0.189)
31567AA960	5.0 (0.197)
31567AA970	5.2 (0.205)
31567AA980	5.4 (0.213)

2. PLANETARY GEAR, LOW CLUTCH

- 1) Install lathe cut seal ring to low clutch piston.
- 2) Fit the low clutch piston to the low clutch drum.



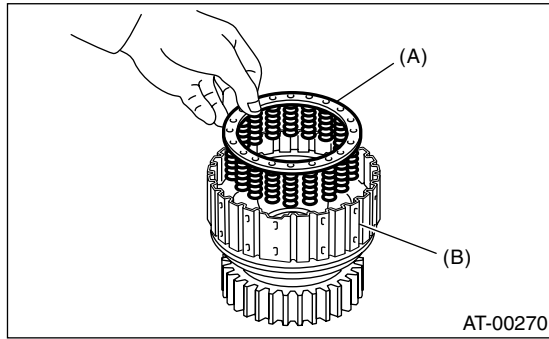
(A) Low clutch piston

(B) Low clutch drum

AT MAIN CASE

AUTOMATIC TRANSMISSION

3) Install spring retainer to low clutch piston.

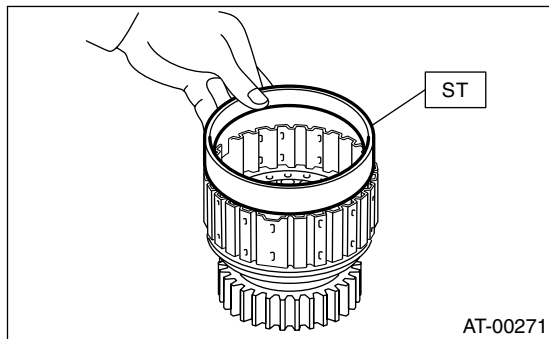


(A) Spring retainer

(B) Low clutch drum

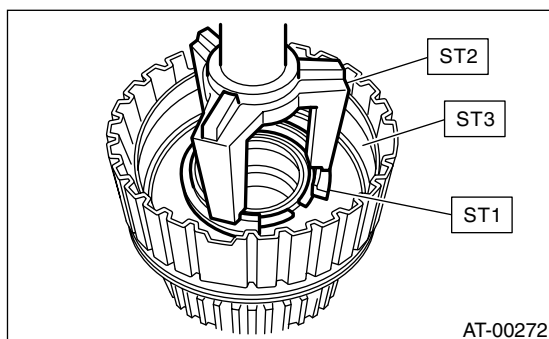
4) Install ST to low clutch drum.

ST 498437100 LOW CLUTCH PISTON
GUIDE

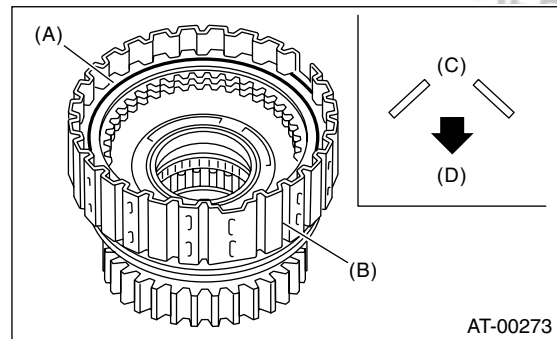


5) Set the cover on the piston with a press using ST1 and ST2, and attach the snap ring. At this time, be careful not to fold cover seal during installation.

ST1 498627100 SEAT
ST2 398673600 COMPRESSOR
ST3 498437100 LOW CLUTCH PISTON
GUIDE



6) Install the dish plate, driven plates, drive plates, and retaining plate, and secure with the snap ring.



(A) Snap ring

(B) Low clutch drum

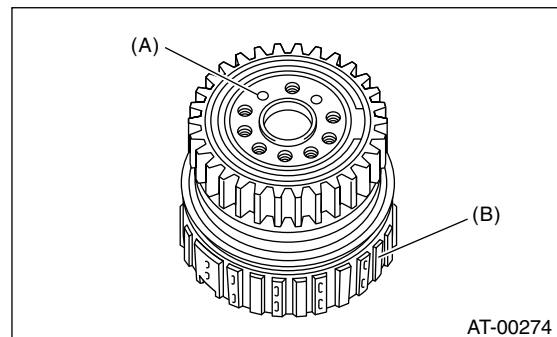
(C) Dish plate

(D) Low clutch piston side

7) Check the low clutch for operation.

(1) Remove one-way clutch. <Ref. to 4AT-114, REMOVAL, AT Main Case.>

(2) Set the one-way clutch inner race, and apply compressed air for checking.



(A) Apply compressed air

(B) Low clutch drum

8) Checking low clutch clearance.

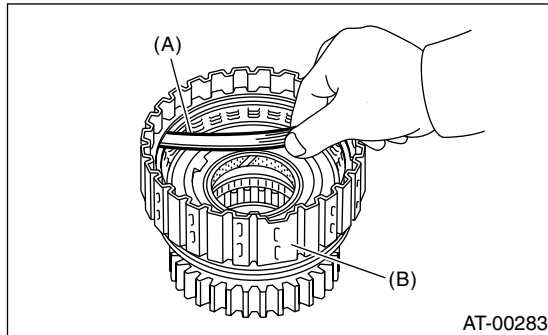
- (1) Place the same thickness of shim on both sides to prevent retaining plate from tilting.
- (2) Inspect clearance between retaining plate and operation of the low clutch.

Standard value:

0.7 — 1.1 mm (0.028 — 0.043 in)

Allowable limit:

1.6 mm (0.063 in)

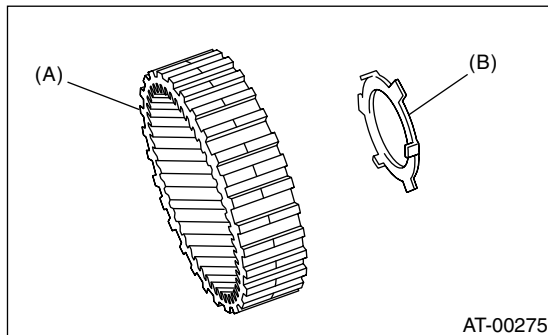


- (A) Thickness gauge
(B) Low clutch drum

If the clearance is out of the specified range, select a proper retaining plate so that the standard clearance can be obtained.

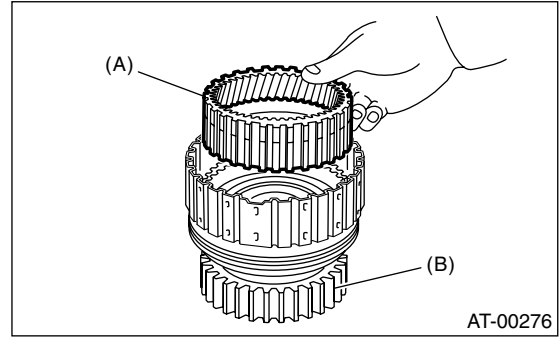
Available retaining plates	
Part No.	Thickness mm (in)
31567AA830	3.8 (0.150)
31567AA840	4.0 (0.157)
31567AA850	4.2 (0.165)
31567AA860	4.4 (0.173)
31567AA870	4.6 (0.181)

9) Install washer to rear internal gear.



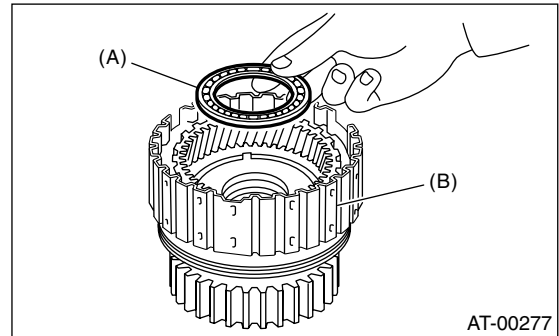
- (A) Rear internal gear
(B) Washer

10) Install rear internal gear.



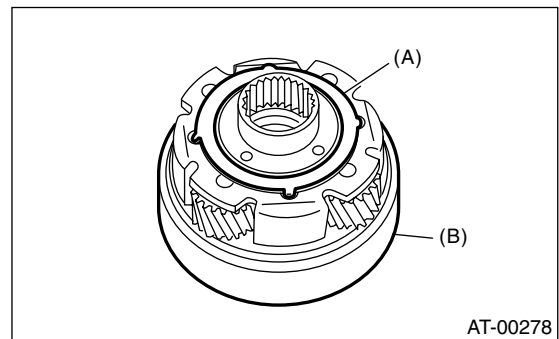
- (A) Rear internal gear
(B) Low clutch drum

11) Install thrust needle bearing in the correct direction.



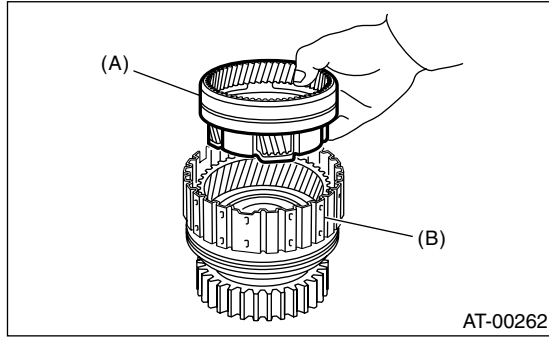
- (A) Thrust needle bearing
(B) Low clutch drum

12) Install the washer by aligning protrusion of washer and hole of rear planetary carrier.



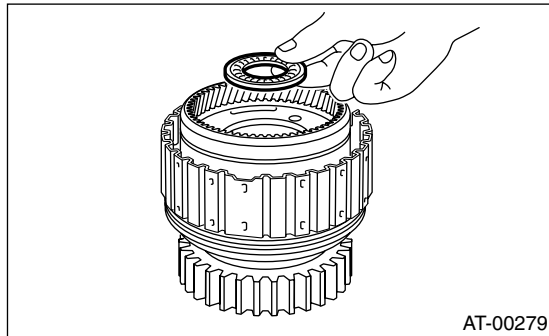
- (A) Washer
(B) Rear planetary carrier

13) Install rear planetary carrier to low clutch drum.

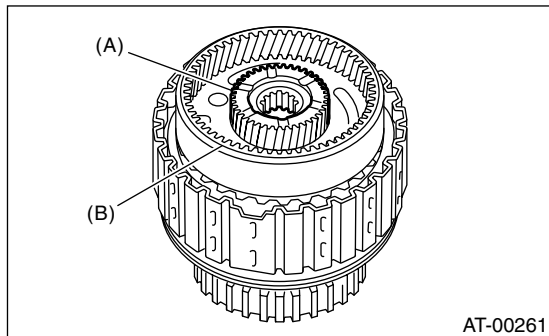


- (A) Rear planetary carrier
- (B) Low clutch drum

14) Install thrust needle bearing in the correct direction.

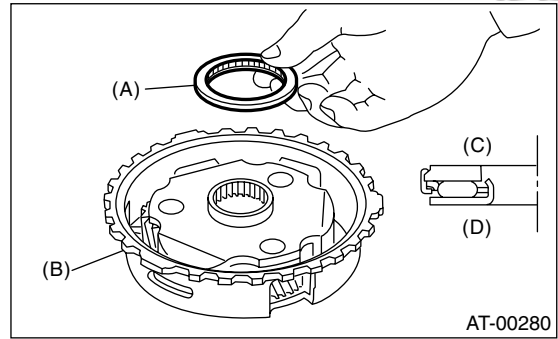


15) Install the rear sun gear in proper direction.



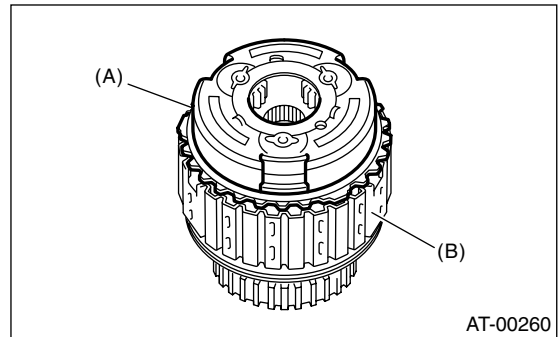
- (A) Rear sun gear
- (B) Rear planetary carrier

16) Install the thrust needle bearing in proper direction.



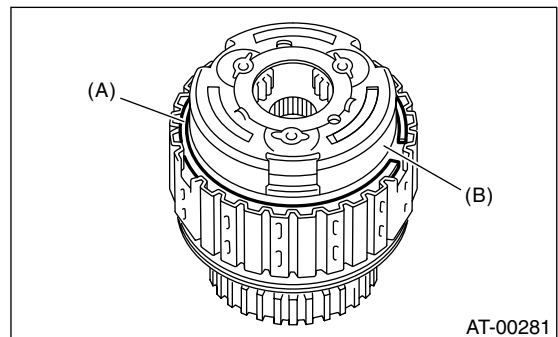
- (A) Thrust needle bearing
- (B) Front planetary carrier
- (C) Rear sun gear side
- (D) Front planetary carrier side

17) Install front planetary carrier to low clutch drum.



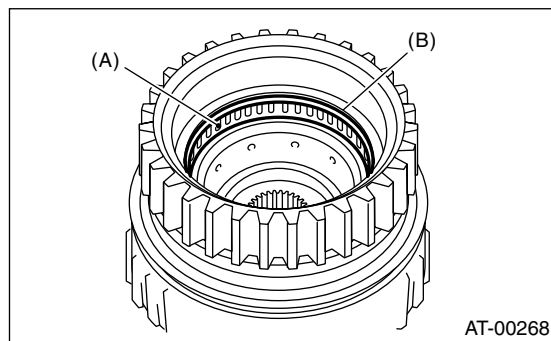
- (A) Front planetary carrier
- (B) Low clutch drum

18) Install snap ring to low clutch drum.



- (A) Snap ring
- (B) Front planetary carrier

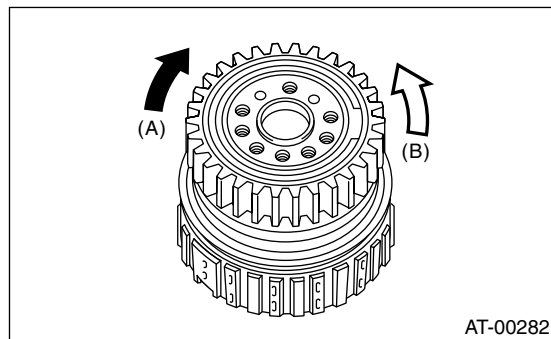
19) Install the needle bearing, and secure with the snap ring.



- (A) Needle bearing
- (B) Snap ring

20) Install the one-way clutch, one-way clutch inner race and plate, and secure with the snap ring.

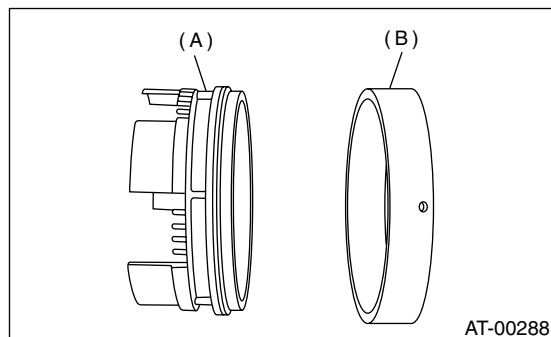
21) Set the inner race. Make sure that the forward clutch is free in the clockwise direction and locked in the counterclockwise direction, as viewed from the front of the vehicle.



- (A) Locked
- (B) Free

3. 2-4 BRAKE

1) Install 2-4 brake piston to 2-4 brake piston retainer.

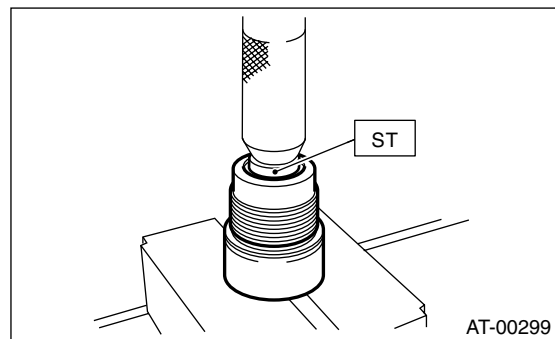


- (A) 2-4 brake piston
- (B) 2-4 brake piston retainer

4. ONE-WAY CLUTCH INNER RACE

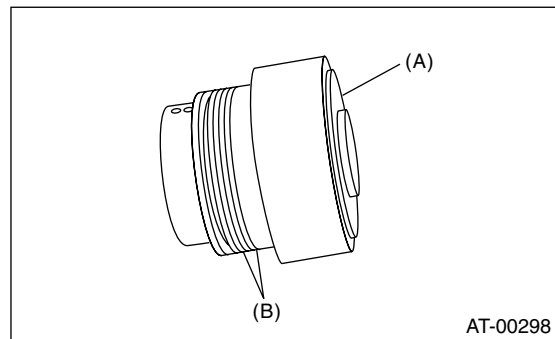
1) Using a press and ST, install the needle bearing to the inner race.

ST 398497701 SEAT



2) Apply vaseline to the groove of the inner race and to the seal ring.

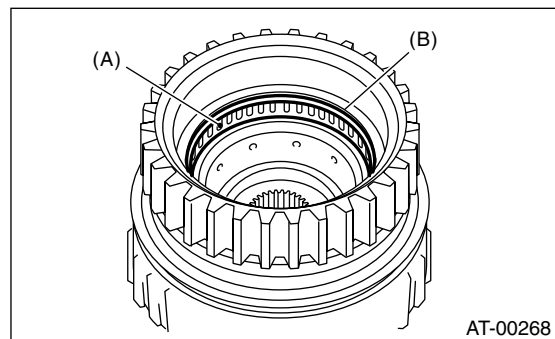
3) Install two seal rings to one-way clutch inner race.



- (A) One way clutch inner race
- (B) Seal rings

5. ONE-WAY CLUTCH OUTER RACE

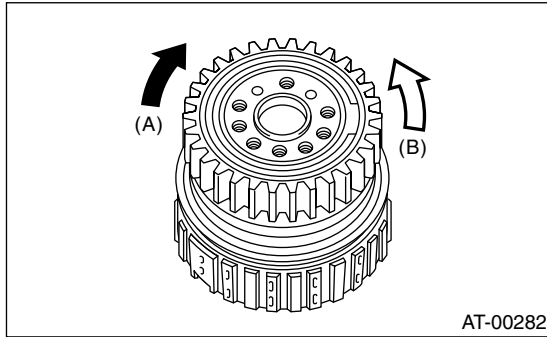
1) Install the needle bearing, and secure with the snap ring.



- (A) Needle bearing
- (B) Snap ring

2) Install the one-way clutch, one-way clutch inner race and plate, and secure with the snap ring.

3) Set the inner race. Make sure that the forward clutch is free in the clockwise direction and locked in the counterclockwise direction, as viewed from the front of the vehicle.



- (A) Locked
(B) Free

4. ONE-WAY CLUTCH

- Make sure the snap ring is not worn and the seal rings are not damaged.
- Measure the total end play and adjust to within specifications. <Ref. to 4AT-100, ADJUSTMENT, Oil Pump Housing.>

5. LOW AND REVERSE BRAKE

Check for the following.

- Drive plate facing for wear or damage
- Snap ring for wear and spring retainer for deformation

E: INSPECTION

1. HIGH CLUTCH AND REVERSE CLUTCH

Inspect the following items.

- Drive plate facing for wear and damage
- Snap ring for wear, return spring for setting and breakage, and snap ring retainer for deformation
- Lip seal and lathe cut seal ring for damage
- Piston and drum check ball for operation
- Adjust total end play. <Ref. to 4AT-100, ADJUSTMENT, Oil Pump Housing.>

2. PLANETARY GEAR AND LOW CLUTCH

Inspect the following items.

- Drive plate facing for wear and damage
 - Snap ring for wear, return spring for breakage or setting, and spring retainer for deformation
 - Lip seal and lathe cut seal ring for damage
 - Piston check ball for operation
 - Measure the total end play and adjust to within specifications.
- <Ref. to 4AT-100, ADJUSTMENT, Oil Pump Housing.>

3. 2-4 BRAKE

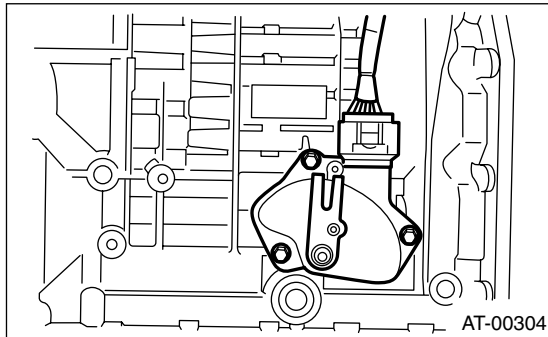
Inspect the following items.

- Drive plate facing for wear and damage
- Snap ring for wear and spring retainer for deformation
- Lip seal and lathe cut seal ring for damage
- Measure the total end play and adjust to within specifications.<Ref. to 4AT-100, ADJUSTMENT, Oil Pump Housing.>

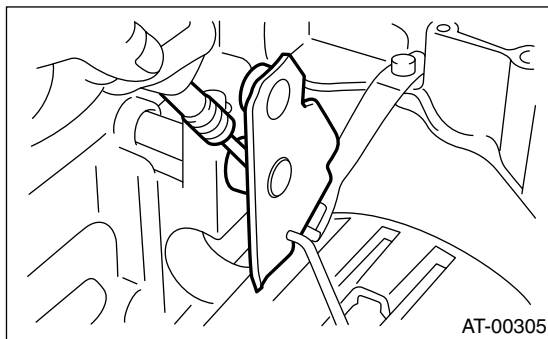
39. Transmission Control Device

A: REMOVAL

- 1) Remove the transmission assembly from the vehicle. <Ref. to 4AT-36, REMOVAL, Automatic Transmission Assembly.>
- 2) Extract the torque converter clutch assembly. <Ref. to 4AT-74, REMOVAL, Torque Converter Clutch Assembly.>
- 3) Remove the input shaft.
- 4) Lift-up the lever behind the transmission harness connector and disconnect it from stay.
- 5) Disconnect the air breather hoses. <Ref. to 4AT-72, REMOVAL, Air Breather Hose.>
- 6) Disconnect the inhibitor switch connector from stay.
- 7) Wrap the nipple attached to the air breather hose around with a vinyl tape.
- 8) Remove pitching stopper bracket.
- 9) Remove the inhibitor switch.



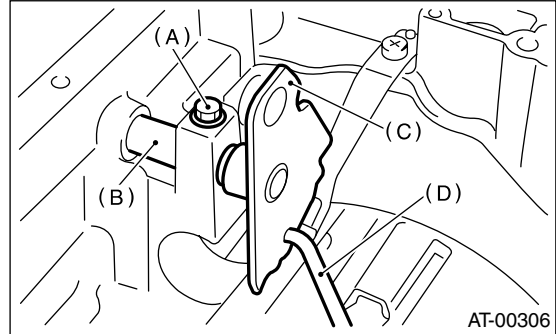
- 10) Remove the control valve body assembly. <Ref. to 4AT-55, REMOVAL, Control Valve Body.>
- 11) Pull off the straight pin of manual plate.



- 12) Remove the bolts securing select lever, then remove the select lever, manual plate and parking rod.

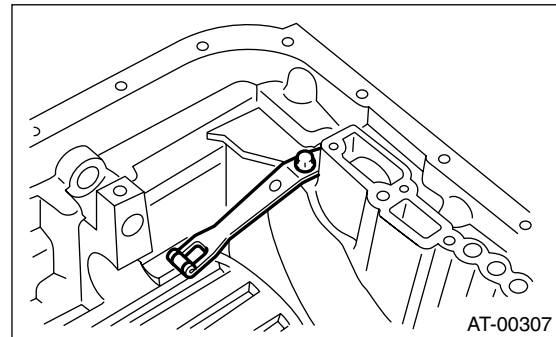
NOTE:

Be careful not to damage the lips of the press-fitted oil seal in the case.



- (A) Bolt
- (B) Range select lever
- (C) Manual plate
- (D) Parking rod

- 13) Remove the detention spring.

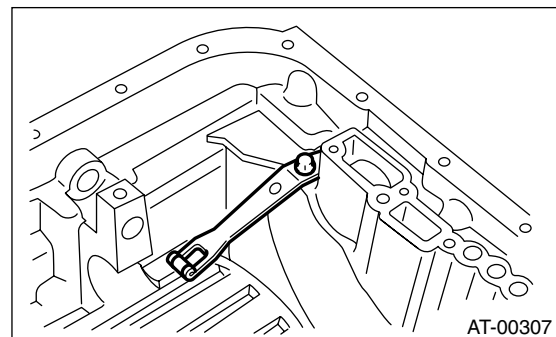


B: INSTALLATION

- 1) Install the detention spring to transmission case.

Tightening torque:

6 N·m (0.6 kgf-m, 4.3 ft-lb)



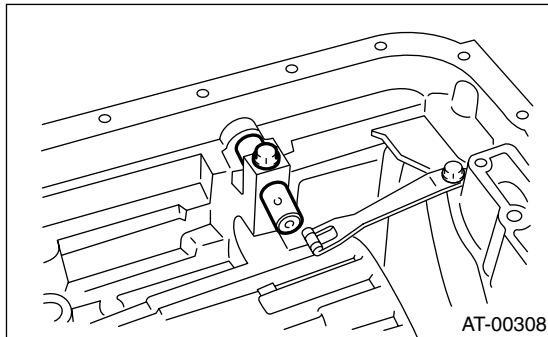
TRANSMISSION CONTROL DEVICE

AUTOMATIC TRANSMISSION

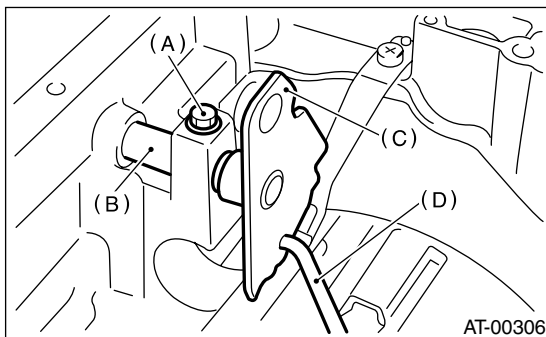
2) Insert the range select lever, and tighten the bolt.

Tightening torque:

6 N·m (0.6 kgf-m, 4.3 ft-lb)

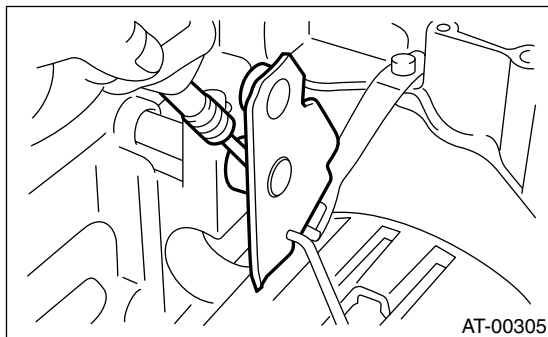


3) Insert the manual plate and parking rod.



- (A) Bolt
- (B) Range select lever
- (C) Manual plate
- (D) Parking rod

4) Insert the spring pin to manual plate.



5) Install the control valve assembly and oil pan. <Ref. to 4AT-56, INSTALLATION, Control Valve Body.>

6) Turn over the transmission case to its original position.

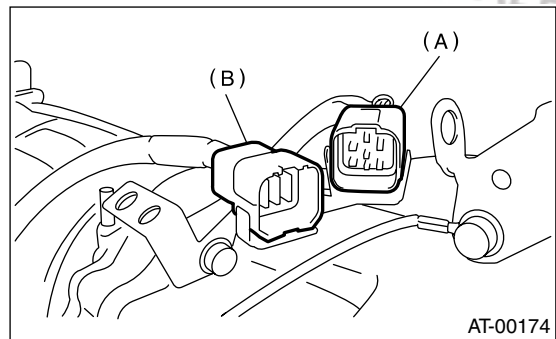
7) Install the pitching stopper bracket.

Tightening torque:

41 N·m (4.2 kgf-m, 30.4 ft-lb)

8) Install the inhibitor switch and adjust the inhibitor switch. <Ref. to 4AT-45, Inhibitor Switch.>

9) Insert the inhibitor switch and transmission connector into stay.



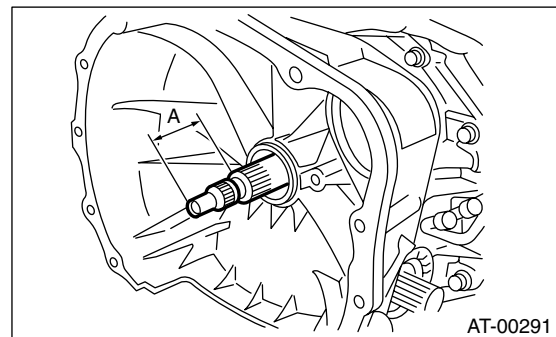
- (A) Transmission harness
- (B) Inhibitor switch harness

10) Install the air breather hose. <Ref. to 4AT-72, INSTALLATION, Air Breather Hose.>

11) Insert the input shaft while turning it lightly by hand and verify the protrusion amount.

Normal protrusion A:

50 — 55 mm (1.97 — 2.17 in)



12) Install the torque converter clutch assembly. <Ref. to 4AT-74, INSTALLATION, Torque Converter Clutch Assembly.>

13) Install the transmission assembly to the vehicle. <Ref. to 4AT-38, INSTALLATION, Automatic Transmission Assembly.>

C: INSPECTION

Make sure the manual lever and detention spring are not worn or otherwise damaged.

TRANSMISSION CONTROL DEVICE

AUTOMATIC TRANSMISSION

Brought to you by Eris Studios
NOT FOR RESALE

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

BASIC DIAGNOSTIC PROCEDURE

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

1. Basic Diagnostic Procedure

A: PROCEDURE

Step	Check	Yes	No
1 CHECK PRE-INSPECTION. 1) Ask the customer when and how trouble occurred using interview checklist. <Ref. to 4AT-4, Check List for Interview.> 2) Before performing the diagnosis, inspect following items which might influence the AT problems. • General inspection <Ref. to 4AT-5, INSPECTION, General Description.> • Oil leak • Stall speed test <Ref. to 4AT-32, Stall Test.> • Line pressure test <Ref. to 4AT-34, Line Pressure Test.> • Transfer clutch pressure test <Ref. to 4AT-35, Transfer Clutch Pressure Test.> • Time lag test <Ref. to 4AT-33, Time Lag Test.> • Road test <Ref. to 4AT-31, Road Test.> • Inhibitor switch <Ref. to 4AT-45, Inhibitor Switch.>	Is the unit that might influence AT problem normal?	Go to step 2.	Repair or replace each item.
2 CHECK AT OIL TEMP WARNING LIGHT. Turn the ignition switch to ON.	Does the AT OIL TEMP warning light illuminate?	Go to step 4.	Go to step 3.
3 CHECK AT OIL TEMP WARNING LIGHT. 1) Turn the ignition switch to OFF. 2) Repair the AT OIL TEMP warning light circuit or power supply and ground line circuit. <Ref. to 4AT-29, Diagnostic Procedure for AT OIL TEMP Warning Light.> 3) Turn the ignition switch to ON.	Is the AT OIL TEMP warning light illuminate?	Go to step 4.	Go to step 5.
4 CHECK INDICATION OF DTC. Calling up the DTC. Without Subaru Select Monitor <Ref. to 4AT-23, WITHOUT SUBARU SELECT MONITOR, Read Diagnostic Trouble Code (DTC).> With Subaru Select Monitor <Ref. to 4AT-24, WITH SUBARU SELECT MONITOR, Read Diagnostic Trouble Code (DTC).> NOTE: If the communication function of select monitor cannot be executed normally, check the communication circuit. <Ref. to 4AT-34, COMMUNICATION FOR INITIALIZING IMPOSSIBLE, Diagnostic Procedure for Select Monitor Communication.>	Is the DTC displayed?	Go to step 6. NOTE: Record all DTC.	Go to step 5.

BASIC DIAGNOSTIC PROCEDURE

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step	Check	Yes	No
5 PERFORM THE GENERAL DIAGNOSTICS. 1)Inspect using "Diagnostic Procedure without DTC".<Ref. to 4AT-96, Diagnostic Procedure without Diagnostic Trouble Code (DTC).> 2)Inspect using "Symptom Related Diagnostic". <Ref. to 4AT-111, Symptom Related Diagnostic.> 3)Perform the clear memory mode. Without Subaru Select Monitor <Ref. to 4AT-26, WITH SUBARU SELECT MONITOR, Clear Memory Mode.> With Subaru Select Monitor <Ref. to 4AT-26, WITHOUT SUBARU SELECT MONITOR, Clear Memory Mode.> 4)Perform the inspection mode. <Ref. to 4AT-25, Inspection Mode.> 5)Calling up the DTC. Without Subaru Select Monitor <Ref. to 4AT-23, WITHOUT SUBARU SELECT MONITOR, Read Diagnostic Trouble Code (DTC).> With Subaru Select Monitor <Ref. to 4AT-24, WITH SUBARU SELECT MONITOR, OPERATION, Read Diagnostic Trouble Code (DTC).>	Is the DTC displayed?	Complete the diagnosis.	Go to step 6.
6 PERFORM THE DIAGNOSIS. 1)Inspect using "Diagnostics Chart with DTC". <Ref. to 4AT-37, Diagnostic Procedure with Diagnostic Trouble Code (DTC).> NOTE: For DTC table, refer to "List of Diagnostic Trouble Code (DTC)". <Ref. to 4AT-28, List of Diagnostic Trouble Code (DTC).> 2)Repair the trouble cause. 3)Perform the clear memory mode. Without Subaru Select Monitor <Ref. to 4AT-26, WITH SUBARU SELECT MONITOR, OPERATION, Clear Memory Mode.> With Subaru Select Monitor <Ref. to 4AT-26, WITHOUT SUBARU SELECT MONITOR, Clear Memory Mode.> 4)Perform the inspection mode. <Ref. to 4AT-25, Inspection Mode.> 5)Calling up the DTC. Without Subaru Select Monitor <Ref. to 4AT-23, WITHOUT SUBARU SELECT MONITOR, OPERATION, Read Diagnostic Trouble Code (DTC).> With Subaru Select Monitor <Ref. to 4AT-24, WITH SUBARU SELECT MONITOR, OPERATION, Read Diagnostic Trouble Code (DTC).>	Is the DTC displayed?	Complete the diagnosis.	Inspect using "Diagnostics Procedure with Diagnostic Trouble Code (DTC)". <Ref. to 4AT-37, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

CHECK LIST FOR INTERVIEW

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

2. Check List for Interview

A: CHECK

Check the following items when problem has occurred.

NOTE:

Use copies of this page for interviewing customers.

Customer's name			
Date of purchase			
Date of repair			
Trans. model	TRANSMISSION	VIN	
Odometer reading	km/h or miles		
Frequency	☐ Continuous ☐ Intermittent (times a day)		
Weather	☐ Fine ☐ Cloudy ☐ Rainy ☐ Snowy ☐ Various/Others ()		
Place	☐ High ☐ Suburbs ☐ Inner city ☐ Uphill ☐ Rough road ☐ Others ()		
Outdoor temperature	☐ Hot ☐ Warm ☐ Cool ☐ Cold		
Vehicle speed	km/h (MPH)		
AT diagnostic indicator light (AT OIL TEMP warning light)	☐ Continuously lit		☐ Not lit
Select lever position	☐ P ☐ R ☐ N ☐ D ☐ 3 ☐ 2 ☐ 1		
Driving condition	☐ Not affected ☐ At racing ☐ While decelerating	☐ At starting ☐ While accelerating ☐ While turning (☐ RH/ ☐ LH)	☐ While idling ☐ While cruising
Symptoms	☐ No up-shift		
	☐ No down-shift		
	☐ No kick down		
	☐ Vehicle does not move (☐ Any position ☐ Particular position)		
	☐ Lock-up malfunction		
	☐ Noise or vibration		
	☐ Shift shock or slip		
	☐ Select lever does not move		
☐ Others ()			

3. General Description

A: CAUTION

• Supplemental Restraint System “Airbag”

The airbag system wiring harness is routed near the transmission control module (TCM).

CAUTION:

- All airbag system wiring harness and connectors are colored yellow. Do not use an electrical test equipment on these circuit.
- Be careful not to damage the airbag system wiring harness when performing diagnostics and servicing the TCM.
- Measurement

When measuring the voltage and resistance of ECM, TCM or each sensor, use a tapered pin with diameter of less than 0.64 mm (0.025 in) in order to avoid poor contact. Do not insert the pin more than 0.65 mm (0.256 in).

B: INSPECTION

1. BATTERY

Measure the battery voltage and specific gravity of electrolyte.

Standard voltage: 12 V or more

Specific gravity: Above 1.260

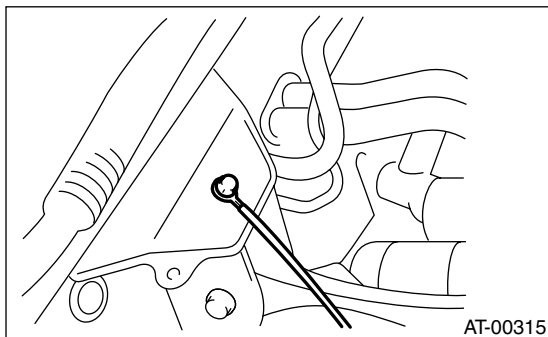
2. TRANSMISSION GROUND

Make sure that the ground terminal bolt is tightened securely.

• Chassis side

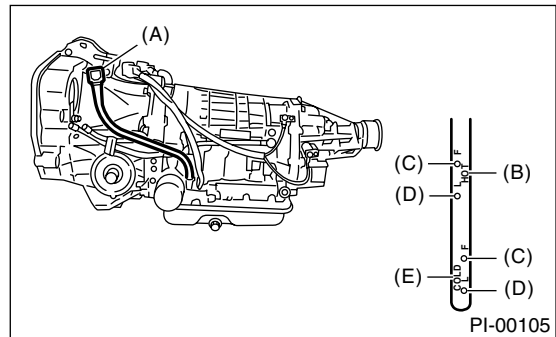
Tightening torque:

13 N·m (1.3 kgf-m, 9.4 ft-lb)



3. ATF LEVEL

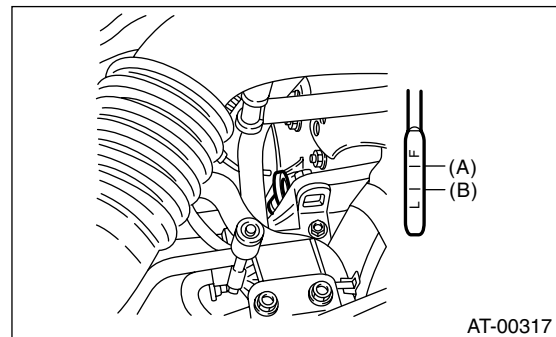
Make sure that ATF level is in the specification. <Ref. to 4AT-29, INSPECTION, Automatic Transmission Fluid.>



- (A) Level gauge
- (B) “HOT” side
- (C) Upper level
- (D) Lower level
- (E) “COLD” side

4. FRONT DIFFERENTIAL OIL LEVEL

Make sure that the front differential oil level is in specification. <Ref. to 4AT-30, INSPECTION, Differential Gear Oil.>



- (A) Upper level
- (B) Lower level

GENERAL DESCRIPTION

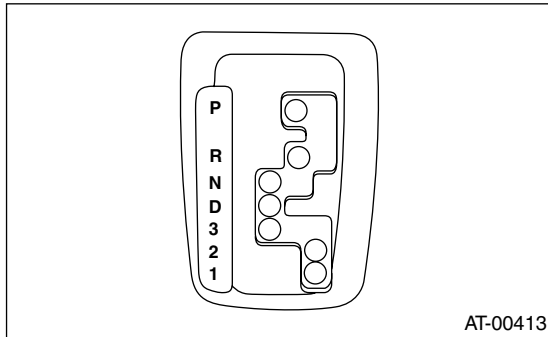
AUTOMATIC TRANSMISSION (DIAGNOSTICS)

5. OPERATION OF SHIFT SELECT LEVER

Make sure there is no abnormal noise, dragging or contact pattern in each select lever range.

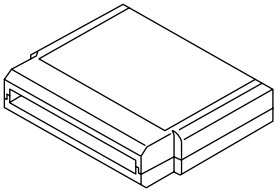
WARNING:

Stop the engine while checking operation of selector lever.



C: PREPARATION TOOL

1. SPECIAL TOOLS

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST24082AA230	24082AA230 (Newly adopted tool)	CARTRIDGE	Troubleshooting for electrical systems.
 ST22771AA030	22771AA030	SELECT MONITOR KIT	Troubleshooting for electrical systems.

2. GENERAL PURPOSE TOOLS

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

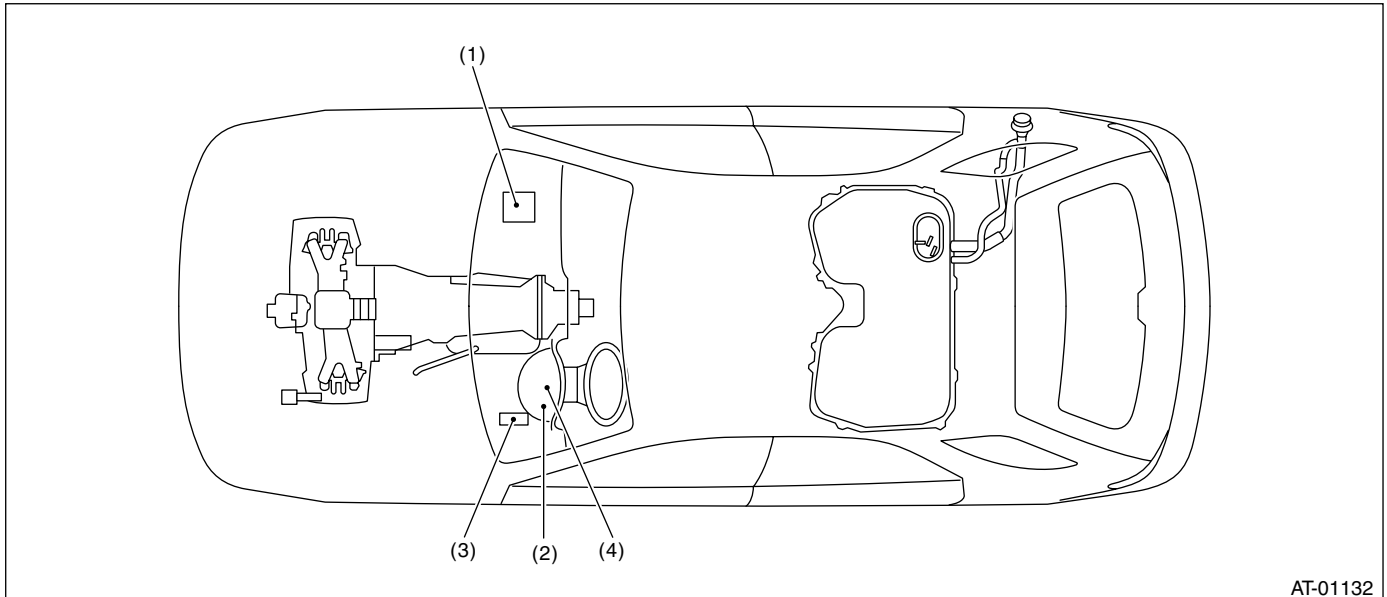
ELECTRICAL COMPONENTS LOCATION

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

4. Electrical Components Location

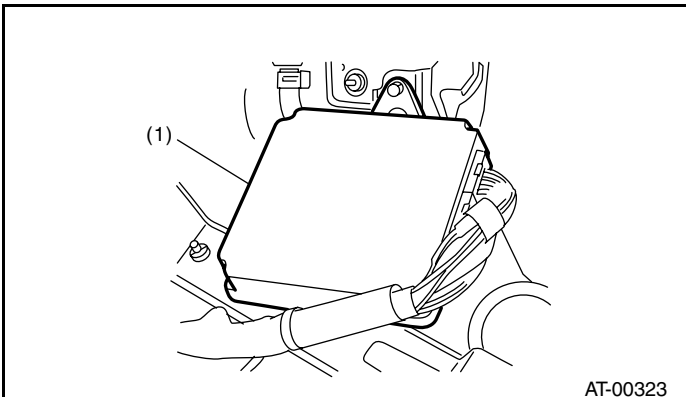
A: LOCATION

1. CONTROL MODULE

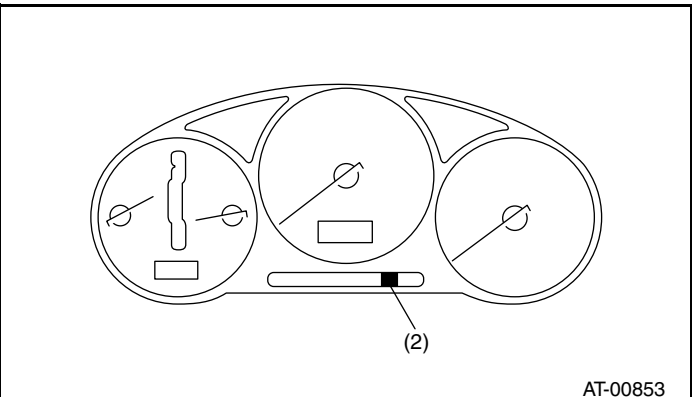


AT-01132

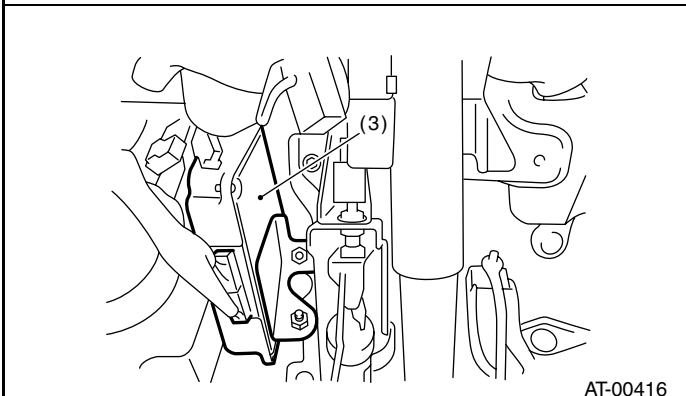
(1) Engine control module (ECM)	(3) Transmission control module (TCM)	(4) Data link connector
(2) AT OIL TEMP warning light (AT diagnostic indicator light)		



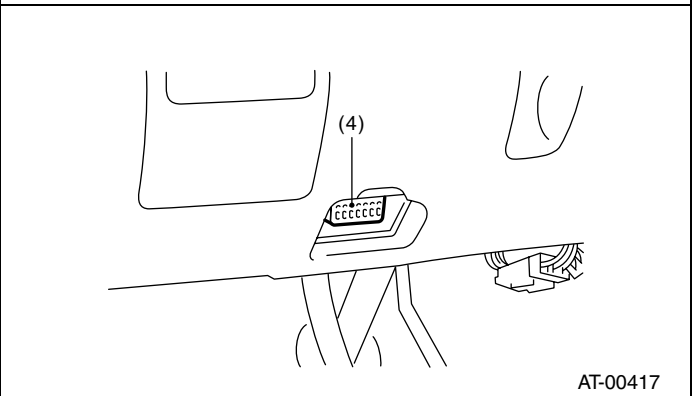
AT-00323



AT-00853



AT-00416

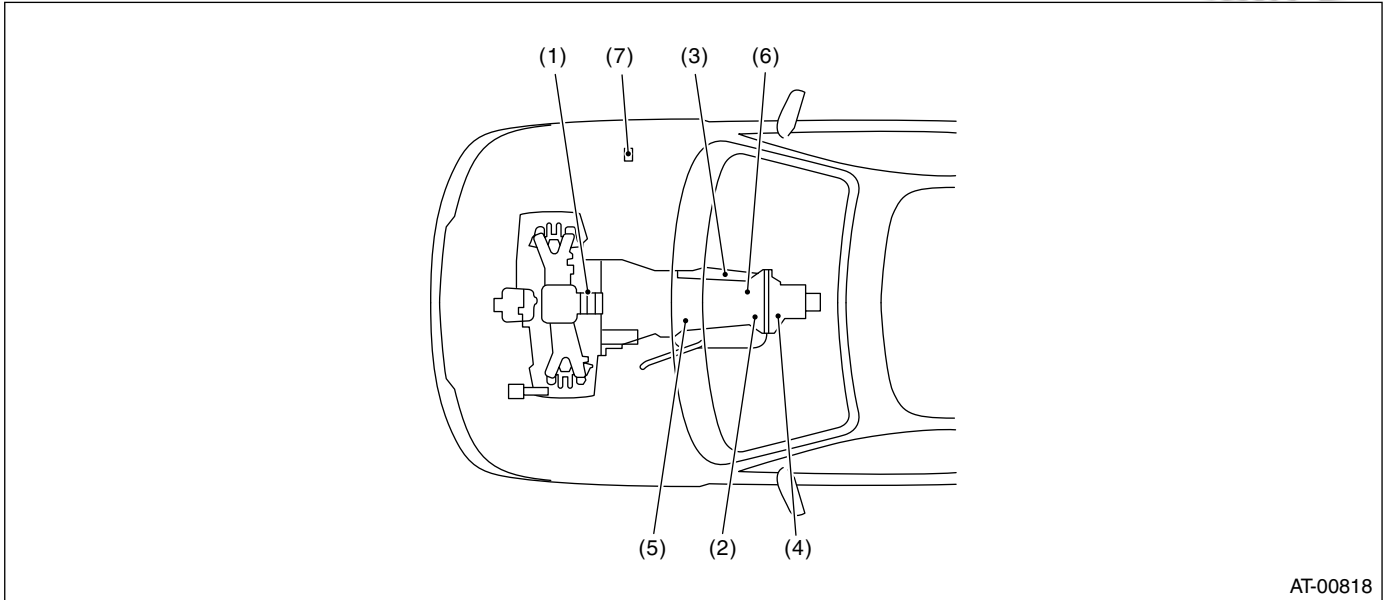


AT-00417

ELECTRICAL COMPONENTS LOCATION

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

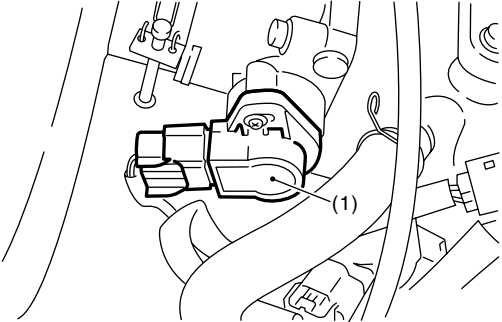
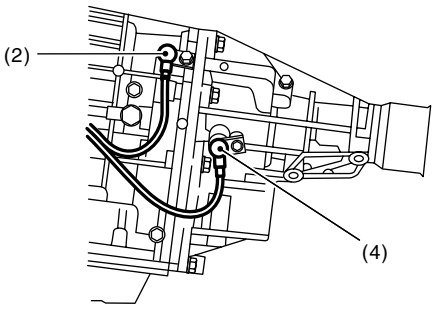
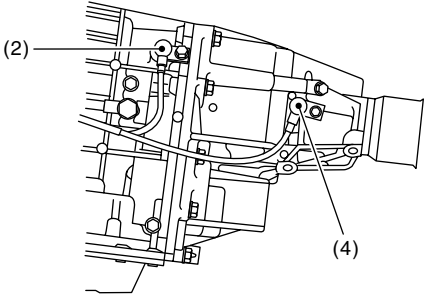
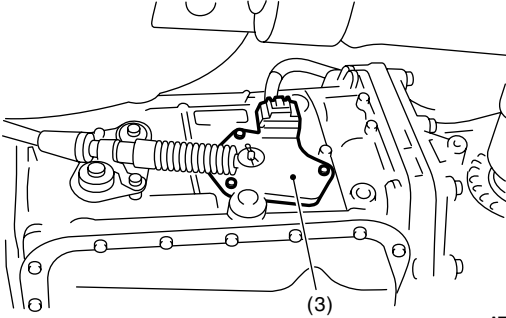
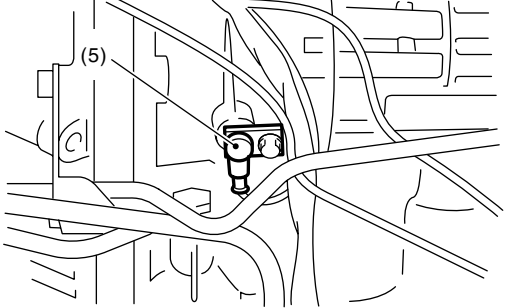
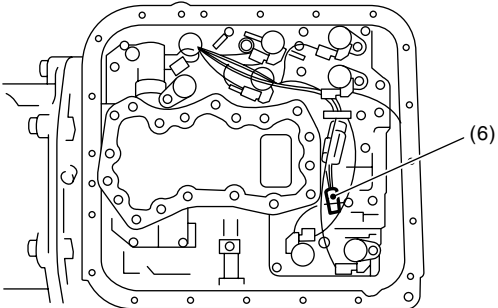
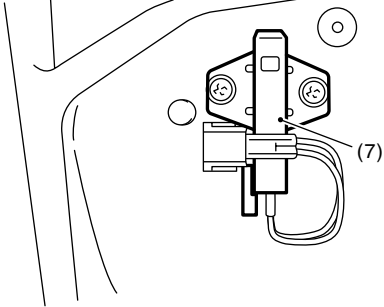
2. SENSOR



(1) Throttle position sensor	(4) Rear vehicle speed sensor	(6) ATF temperature sensor
(2) Front vehicle speed sensor	(5) Torque converter turbine speed sensor	(7) Dropping resistor (Non-turbo model)
(3) Inhibitor switch		

ELECTRICAL COMPONENTS LOCATION

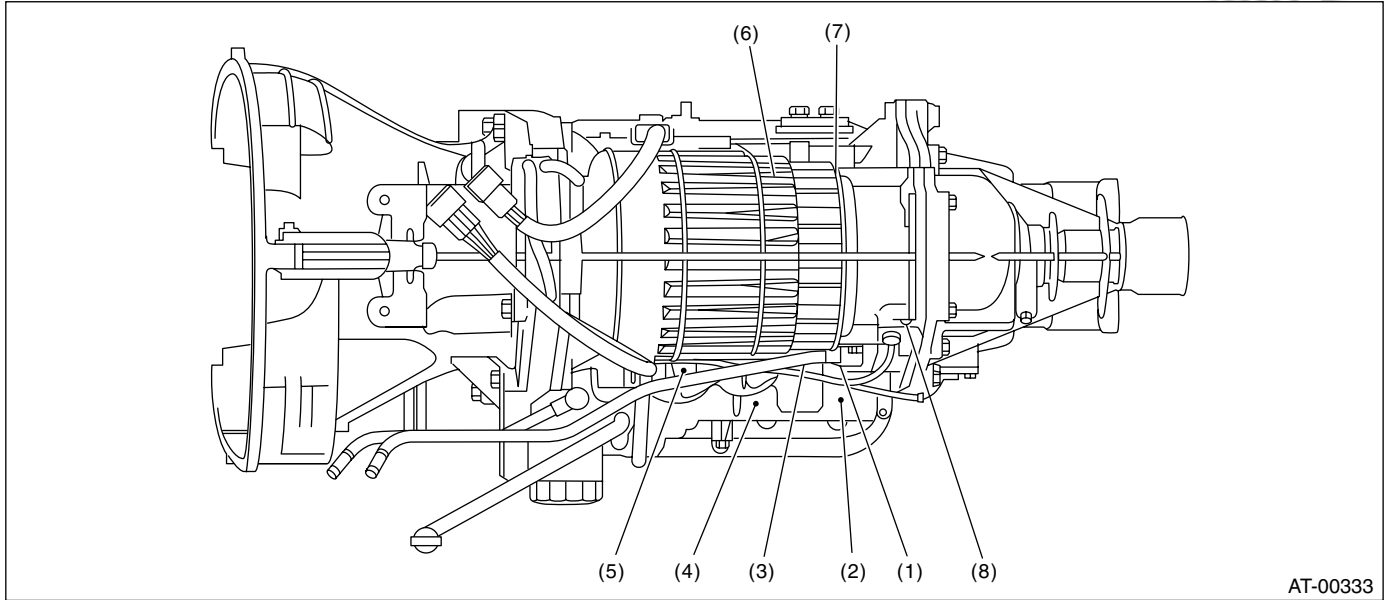
AUTOMATIC TRANSMISSION (DIAGNOSTICS)

 AT-00328	Non-turbo model  AT-00329
Turbo model  AT-01133	 AT-00330
 AT-00331	 AT-00332
 AT-00820	SUBARU.

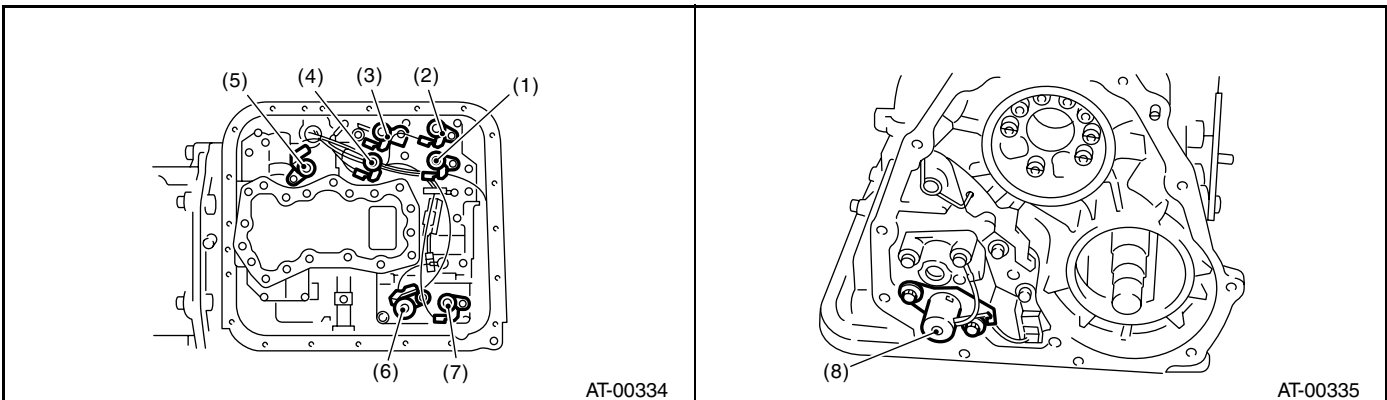
ELECTRICAL COMPONENTS LOCATION

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

3. SOLENOID



(1) Solenoid 1	(4) Low clutch timing solenoid	(7) 2-4 brake timing solenoid
(2) Solenoid 2	(5) Lock-up duty solenoid	(8) Transfer duty solenoid
(3) Line pressure duty solenoid	(6) 2-4 brake duty solenoid	



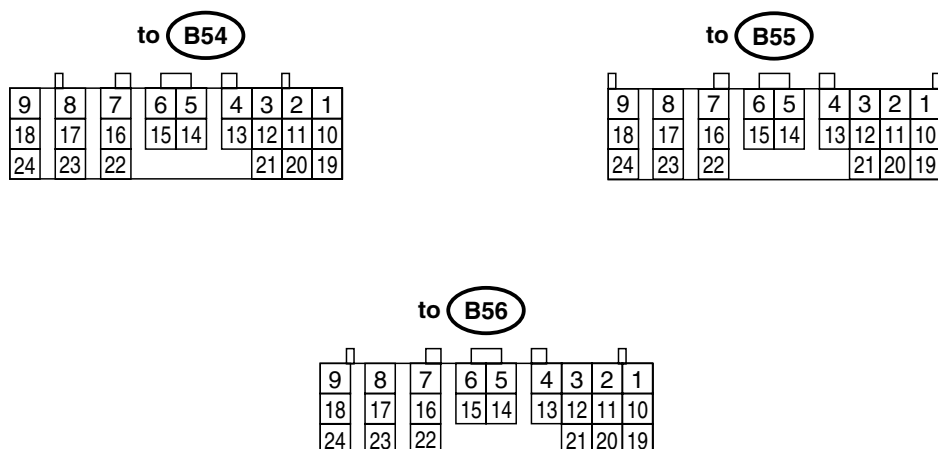
TRANSMISSION CONTROL MODULE (TCM) I/O SIGNAL

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

5. Transmission Control Module (TCM) I/O Signal

A: ELECTRICAL SPECIFICATION

1. TURBO MODEL



AT-00568

Check with ignition switch ON.

Content		Connector No.	Terminal No.	Measuring conditions	Voltage (V)	Resistance to body (ohms)
Back-up power supply		B56	1	Ignition switch OFF	10 — 13	—
Ignition power supply		B54	23	Ignition switch ON (with engine OFF)	10 — 13	—
		B54	24			
Inhibitor switch	“P” range switch	B55	1	Select lever in “P” range	Less than 1	—
				Select lever in any other than “P” range (except “N” range)	More than 8	
	“N” range switch	B55	14	Select lever in “N” range	Less than 1	—
				Select lever in any other than “N” range (except “P” range)	More than 8	
	“R” range switch	B55	3	Select lever in “R” range	Less than 1	—
				Select lever in any other than “R” range	More than 8	
	“D” range switch	B55	4	Select lever in “D” range	Less than 1	—
				Select lever in any other than “D” range	More than 8	
	“3” range switch	B55	5	Select lever in “3” range	Less than 1	—
				Select lever in any other than “3” range	More than 8	

TRANSMISSION CONTROL MODULE (TCM) I/O SIGNAL

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Check with ignition switch ON.						
Content		Connector No.	Terminal No.	Measuring conditions	Voltage (V)	Resistance to body (ohms)
Inhibitor switch	“2” range switch	B55	6	Select lever in “2” range	Less than 1	—
				Select lever in any other than “2” range	More than 8	
	“1” range switch	B55	7	Select lever in “1” range	Less than 1	—
				Select lever in any other than “1” range	More than 8	
Brake switch		B55	12	Brake pedal depressed.	More than 10.5	—
				Brake pedal released.	Less than 1	
AT OIL TEMP warning light		B56	10	Light ON	Less than 1	—
				Light OFF	More than 9	
Throttle position sensor		B54	3	Throttle fully closed.	0.2 — 1.0	—
				Throttle fully open.	4.2 — 4.7	
Throttle position sensor power supply		B54	2	Ignition switch ON (with engine OFF)	4.8 — 5.3	—
ATF temperature sensor		B54	11	ATF temperature 20°C (68°F)	1.6 — 2.0	2.1 k — 2.9 k
				ATF temperature 80°C (176°F)	0.4 — 0.9	275 — 375
Rear vehicle speed sensor		B55	24	Vehicle stopped.	0	450 — 650
				Vehicle speed at least 20 km/h (12 MPH)	More than 1 (AC range)	
Front vehicle speed sensor		B55	18	Vehicle stopped.	0	450 — 650
				Vehicle speed at least 20 km/h (12 MPH)	More than 1 (AC range)	
Torque converter turbine speed sensor		B55	8	Engine idling after warm-up. (D range)	0	450 — 650
				Engine idling after warm-up. (N range)	More than 1 (AC range)	
Vehicle speed output signal		B56	17	Vehicle speed at most 10 km/h (6 MPH)	Less than 1 ← → More than 4	—
Engine speed signal		B55	17	Ignition switch ON (with engine OFF)	More than 10.5	—
				Ignition switch ON (with engine ON)	8 — 11	
Cruise set signal		B55	22	When cruise control is set. (SET lamp ON)	Less than 1	—
				When cruise control is not set. (SET lamp OFF)	More than 6.5	
Torque control signal 1		B56	5	Ignition switch ON (with engine ON)	More than 4	—
Torque control signal 2		B56	14	Ignition switch ON (with engine ON)	More than 4	—
Torque control cut signal		B55	10	Ignition switch ON	8	—
Mass air flow signal		B54	1	Engine idling after warm-up.	0.9 — 1.4	—
Shift solenoid 1		B54	22	1st or 4th gear	More than 9	10 — 16
				2nd or 3rd gear	Less than 1	
Shift solenoid 2		B54	5	1st or 2nd gear	More than 9	10 — 16
				3rd or 4th gear	Less than 1	

TRANSMISSION CONTROL MODULE (TCM) I/O SIGNAL

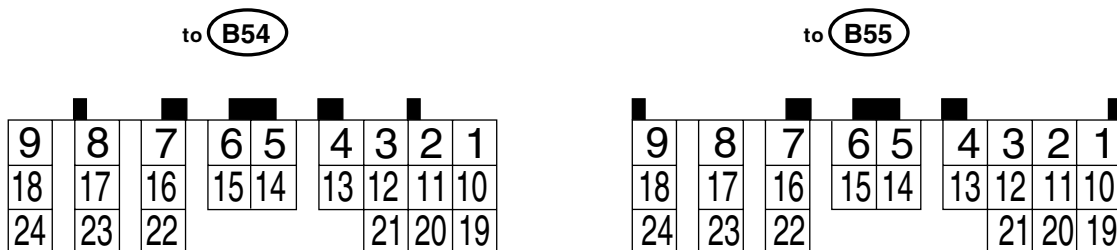
AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Check with ignition switch ON.					
Content	Connector No.	Terminal No.	Measuring conditions	Voltage (V)	Resistance to body (ohms)
Line pressure duty solenoid	B54	9	Ignition switch ON (with engine OFF). Throttle fully closed after warm-up.	1.5 — 4.0	2.0 — 4.5
			Ignition switch ON (with engine OFF). Throttle fully open after warm-up.	Less than 0.5	
Lock-up duty solenoid	B54	7	When lock up occurs.	More than 8.5	10 — 17
			When lock up is released.	Less than 0.5	
Transfer duty solenoid	B54	6	Throttle fully closed.	More than 8.5	10 — 17
			Throttle fully open.	Less than 0.5	
2-4 brake duty solenoid	B54	18	Throttle fully closed (with engine OFF) after warm-up.	1.5 — 5.0	2.0 — 4.5
			Throttle fully open (with engine OFF) after warm-up.	Less than 0.5	
2-4 brake timing solenoid	B54	16	1st gear	Less than 1	10 — 16
			3rd gear	More than 9	
Low clutch timing solenoid	B54	15	2nd gear	Less than 1	10 — 16
			4th gear	More than 9	
ABS signal	B55	21	ABS switch ON	Less than 1	—
			ABS switch OFF	6.5 — 15	—
Sensor ground line 1	B54	20	—	0	Less than 1
Sensor ground line 2	B55	9	—	0	Less than 1
System ground line	B56	19	—	0	Less than 1
	B54	21			
Sensor ground line 3	B54	10	—	0	Less than 1
Sensor ground line 4	B54	19	—	0	Less than 1
AT diagnosis signal	B56	21	Ignition switch ON	Less than 1 ← → More than 4	—
Data link signal (Subaru Select Monitor)	B56	15	—	—	—

TRANSMISSION CONTROL MODULE (TCM) I/O SIGNAL

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

2. NON-TURBO MODEL



AT-00641

Check with ignition switch ON.						
Content		Con- nector No.	Termi- nal No.	Measuring conditions	Voltage (V)	Resistance to body (ohms)
Back-up power supply		B55	6	Ignition switch OFF	10 — 13	—
Ignition power supply		B54	23	Ignition switch ON (with engine OFF)	10 — 13	—
		B54	24			
Inhibitor switch	“P” range switch	B55	23	Select lever in “P” range	Less than 1	—
				Select lever in any other than “P” range (except “N” range)	More than 8	
	“N” range switch	B55	22	Select lever in “N” range	Less than 1	—
				Select lever in any other than “N” range (except “P” range)	More than 8	
	“R” range switch	B55	17	Select lever in “R” range	Less than 1	—
				Select lever in any other than “R” range	More than 8	
	“D” range switch	B55	8	Select lever in “D” range	Less than 1	—
				Select lever in any other than “D” range	More than 8	
	“3” range switch	B55	18	Select lever in “3” range	Less than 1	—
				Select lever in any other than “3” range	More than 8	
	“2” range switch	B54	10	Select lever in “2” range	Less than 1	—
				Select lever in any other than “2” range	More than 8	
	“1” range switch	B54	1	Select lever in “1” range	Less than 1	—
				Select lever in any other than “1” range	More than 8	
Brake switch		B55	24	Brake pedal depressed.	More than 10.5	—
				Brake pedal released.	Less than 1	
ABS signal		B54	19	ABS switch ON	Less than 1	—
				ABS switch OFF	More than 6.5	

TRANSMISSION CONTROL MODULE (TCM) I/O SIGNAL

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Check with ignition switch ON.					
Content	Con- nector No.	Termi- nal No.	Measuring conditions	Voltage (V)	Resistance to body (ohms)
AT OIL TEMP warning light	B54	3	Light ON	Less than 1	—
			Light OFF	More than 9	
Throttle position sensor	B55	2	Throttle fully closed.	0.2 — 1.0	—
			Throttle fully open.	4.2 — 4.7	
Throttle position sensor power supply	B55	1	Ignition switch ON (With engine OFF)	4.8 — 5.3	—
ATF temperature sensor	B55	11	ATF temperature 20°C (68°F)	1.6 — 2.0	2.1 k — 2.9 k
			ATF temperature 80°C (176°F)	0.4 — 0.9	275 — 375
Rear vehicle speed sensor	B55	3	Vehicle stopped.	0	450 — 650
			Vehicle speed at least 20 km/h (12 MPH)	More than 1 (AC range)	
Front vehicle speed sensor	B55	5	Vehicle stopped	0	450 — 650
			Vehicle speed at least 20 km/h (12 MPH)	More than 1 (AC range)	
Torque converter turbine speed sensor	B55	12	Engine idling after warm-up ("D" range)	0	450 — 650
			Engine idling after warm-up ("N" range)	More than 1 (AC range)	
Vehicle speed output signal	B55	13	Vehicle speed at most 10 km/h (6 MPH)	Less than 1 ← → More than 4	—
Engine speed signal	B55	4	Ignition switch ON (with engine OFF)	0	—
			Ignition switch ON (with engine ON)	0 — 13 or more	
Cruise set signal	B54	11	When cruise control is set (SET light ON)	Less than 1	—
			When cruise control is not set (SET light OFF)	More than 6.5	
Torque control signal 1	B54	13	Ignition switch ON (with engine ON)	More than 4.0	—
Torque control signal 2	B54	21	Ignition switch ON (with engine ON)	More than 4.0	—
Torque control cut signal	B54	2	Ignition switch ON	8	—
Intake manifold pressure signal	B55	20	Engine idling after warm-up.	0.4 — 1.6	—
Shift solenoid 1	B54	7	1st or 4th gear	More than 9	10 — 16
			2nd or 3rd gear	Less than 1	
Shift solenoid 2	B54	6	1st or 2nd gear	More than 9	10 — 16
			3rd or 4th gear	Less than 1	
Line pressure duty solenoid	B54	9	Ignition switch ON (with engine OFF). Throttle fully closed after warm-up.	1.5 — 4.0	2.0 — 4.5
			Ignition switch ON (with engine OFF). Throttle fully open after warm-up.	Less than 1	

TRANSMISSION CONTROL MODULE (TCM) I/O SIGNAL

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

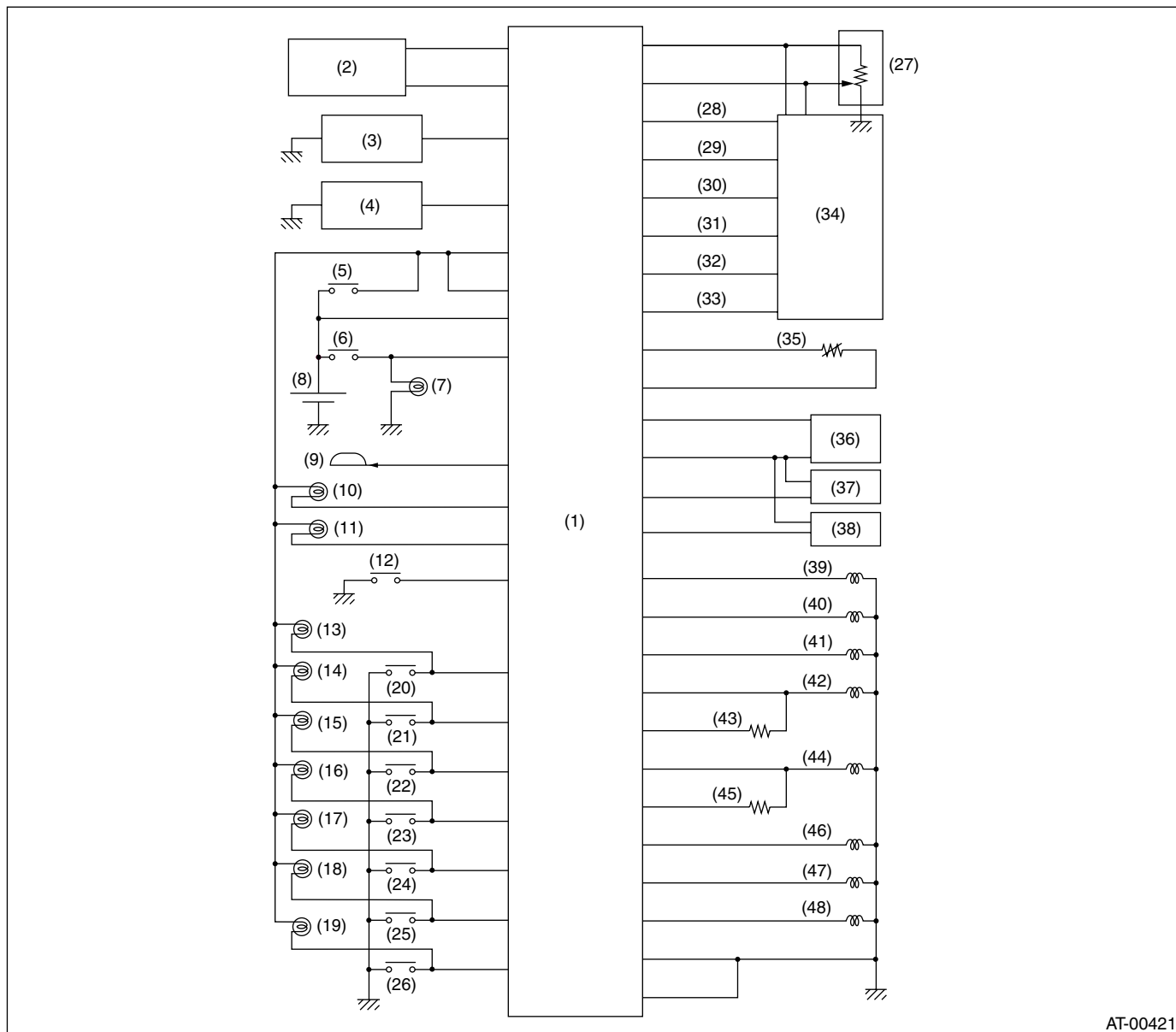
Check with ignition switch ON.					
Content	Con- nector No.	Termi- nal No.	Measuring conditions	Voltage (V)	Resistance to body (ohms)
Dropping resistor	B54	18	Throttle fully closed (with engine OFF) after warm-up.	More than 8.5	9 — 15
			Throttle fully open (with engine OFF) after warm-up.	Less than 0.5	
Lock-up duty solenoid	B54	16	When lock up occurs.	More than 8.5	10 — 17
			When lock up is released.	Less than 0.5	
Transfer duty solenoid	B54	15	Fuse on FWD switch	More than 8.5	10 — 17
			Fuse removed from FWD switch (with throttle fully open and with select lever in 1st gear).	Less than 0.5	
2-4 brake duty solenoid	B54	8	Throttle fully closed (with engine OFF) after warm-up.	1.5 — 5.0	2.0 — 4.5
			Throttle fully open (with engine OFF) after warm-up.	Less than 0.5	
2-4 brake dropping resistor	B54	17	Throttle fully closed (with engine OFF) after warm-up.	More than 8.5	9 — 15
			Throttle fully open (with engine OFF) after warm-up.	Less than 0.5	
2-4 brake timing solenoid	B54	5	1st gear	Less than 1	10 — 16
			3rd gear	More than 9	
Low clutch timing solenoid	B54	14	2nd gear	Less than 1	10 — 16
			4th gear	More than 9	
Sensor ground line 1	B55	10	—	0	Less than 1
Sensor ground line 2	B55	21	—	0	Less than 1
System ground line	B55	9	—	0	Less than 1
		19			
FWD switch	B55	14	Fuse removed.	More than 9	—
			Fuse installed.	Less than 1	
FWD indicator light	B54	12	Fuse ONFWD switch	Less than 1	—
			Fuse removed from FWD switch	More than 9	
AT diagnosis signal	B54	4	Ignition switch ON	Less than 1 ← → More than 4	—
Data link signal (Subaru Select Monitor)	B55	7	—	—	—

TRANSMISSION CONTROL MODULE (TCM) I/O SIGNAL

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

B: SCHEMATIC

1. NON-TURBO MODEL



AT-00421

TRANSMISSION CONTROL MODULE (TCM) I/O SIGNAL

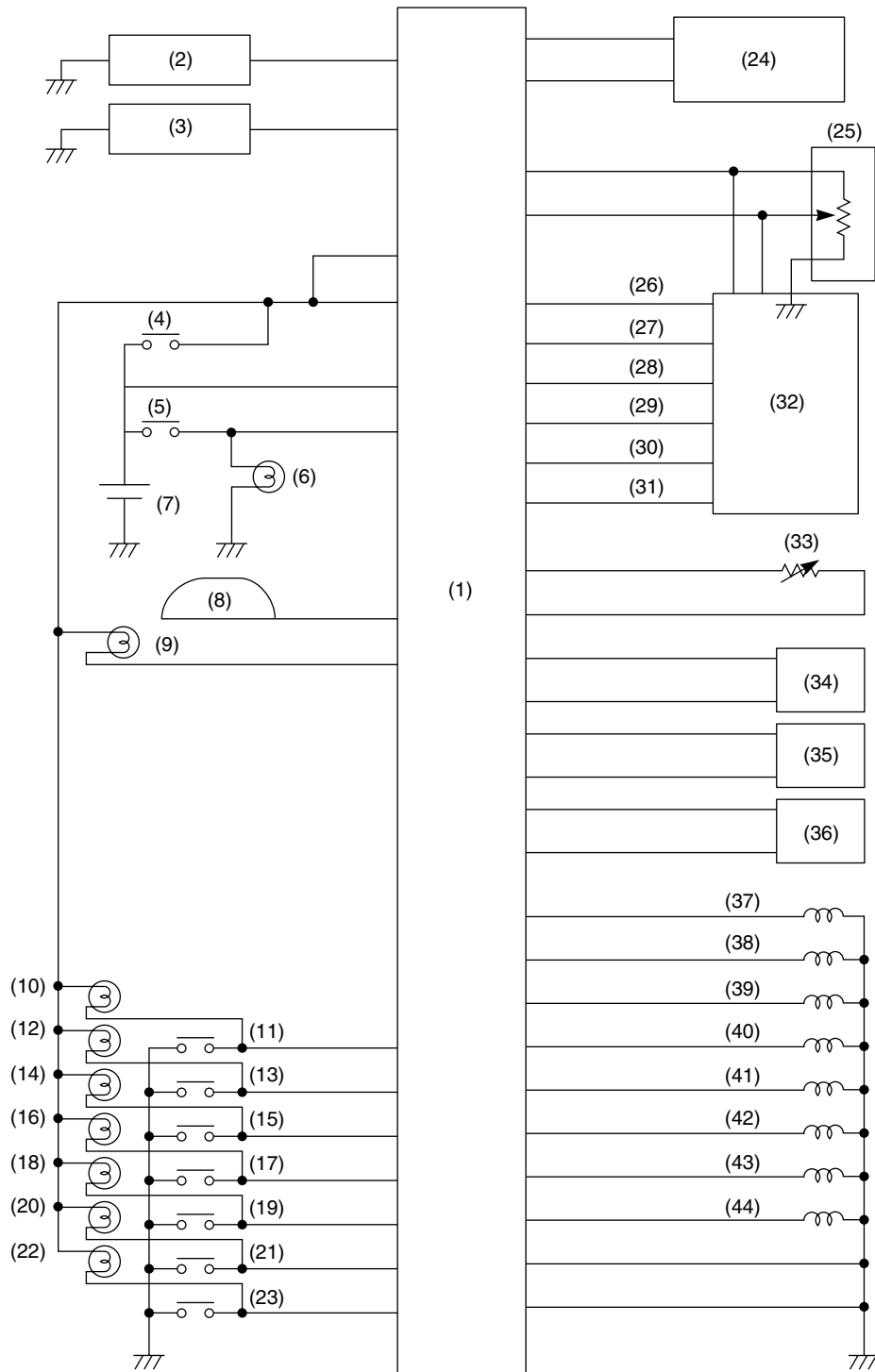
AUTOMATIC TRANSMISSION (DIAGNOSTICS)

(1) Transmission control module (TCM)	(17) "3" range indicator light	(34) Engine control module (ECM)
(2) Data link connector	(18) "2" range indicator light	(35) ATF temperature sensor
(3) Cruise control module	(19) "1" range indicator light	(36) Torque converter turbine speed sensor
(4) ABS control module	(20) "P" range switch	(37) Front vehicle speed sensor
(5) Ignition switch	(21) "R" range switch	(38) Rear vehicle speed sensor
(6) Brake switch	(22) "N" range switch	(39) Shift solenoid 1
(7) Brake light	(23) "D" range switch	(40) Shift solenoid 2
(8) Battery	(24) "3" range switch	(41) 2-4 brake timing solenoid
(9) Combination meter	(25) "2" range switch	(42) Line pressure duty solenoid
(10) AT OIL TEMP warning light	(26) "1" range switch	(43) Line pressure dropping resistor
(11) FWD indicator light	(27) Throttle position sensor	(44) 2-4 brake duty solenoid
(12) FWD switch	(28) Engine speed signal	(45) 2-4 brake dropping resistor
(13) "P" range indicator light	(29) Torque control cut signal	(46) Lock-up duty solenoid
(14) "R" range indicator light	(30) Torque control signal 2	(47) Low clutch timing solenoid
(15) "N" range indicator light	(31) Torque control signal 1	(48) Transfer duty solenoid
(16) "D" range indicator light	(32) Intake manifold pressure signal	
	(33) AT diagnostics signal	

TRANSMISSION CONTROL MODULE (TCM) I/O SIGNAL

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

2. TURBO MODEL



AT-00821

TRANSMISSION CONTROL MODULE (TCM) I/O SIGNAL

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

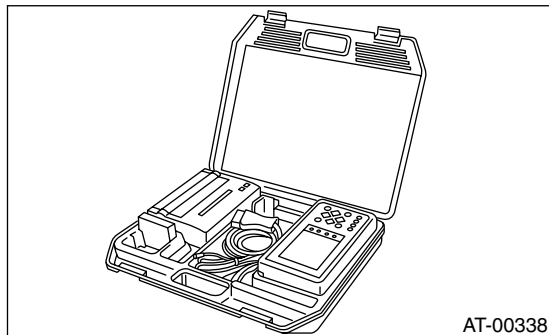
(1) Transmission control module (TCM)	(15) "N" range switch	(31) AT diagnostics signal
(2) Cruise control module	(16) "D" range indicator light	(32) Engine control module (ECM)
(3) ABS control module	(17) "D" range switch	(33) ATF temperature sensor
(4) Ignition switch	(18) "3" range indicator light	(34) Torque converter turbine speed sensor
(5) Brake switch	(19) "3" range switch	(35) Rear vehicle speed sensor
(6) Brake light	(20) "2" range indicator light	(36) Front vehicle speed sensor
(7) Battery	(21) "2" range switch	(37) Shift solenoid 1
(8) Combination meter (Speedometer circuit)	(22) "1" range indicator light	(38) Shift solenoid 2
(9) AT OIL TEMP warning light	(23) "1" range switch	(39) 2-4 brake timing solenoid
(10) "P" range indicator light	(24) Data link connector	(40) Line pressure duty solenoid
(11) "P" range switch	(25) Throttle position sensor	(41) 2-4 brake duty solenoid
(12) "R" range indicator light	(26) Engine speed signal	(42) Lock-up duty solenoid
(13) "R" range switch	(27) Torque control cut signal	(43) Low clutch timing solenoid
(14) "N" range indicator light	(28) Torque control signal 2	(44) Transfer duty solenoid
	(29) Torque control signal 1	
	(30) Mass air flow signal	

6. Subaru Select Monitor

A: OPERATION

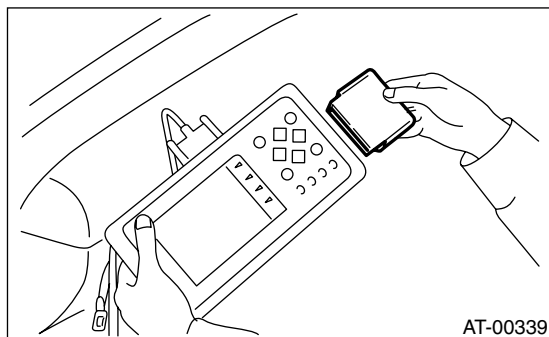
1. READ DIAGNOSTIC TROUBLE CODE (DTC)

1) Prepare the Subaru Select Monitor kit.



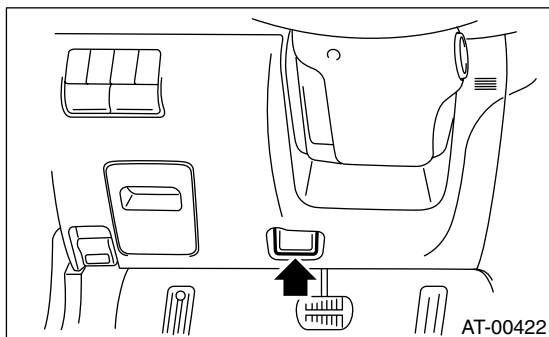
2) Connect the diagnosis cable to Subaru Select Monitor.

3) Insert the cartridge into Subaru Select Monitor.
<Ref. to 4AT-6, PREPARATION TOOL, General Description.>



4) Connect the Subaru Select Monitor to data link connector.

(1) Data link connector located in the lower portion of instrument panel (on driver's side).

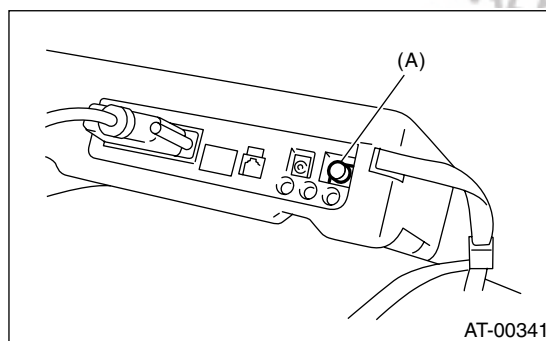


(2) Connect the diagnosis cable to data link connector.

NOTE:

Do not connect scan tools except for Subaru Select Monitor and OBD-II general scan tool.

5) Turn the ignition switch to ON (engine OFF) and Subaru Select Monitor switch to ON.



(A) POWER switch

6) On the «Main Menu» display screen, select the {Each System Check} and press the [YES] key.

7) On the «System Selection Menu» display screen, select the {Transmission Control System} and press the [YES] key.

8) Press the [YES] key after the information of transmission type is displayed.

9) On the «Transmission Diagnosis» display screen, select the {DTC Display} and press the [YES] key.

10) On the «DTC Display» display screen, select the {Memorized DTC} and press the [YES] key.

NOTE:

- For detailed operation procedure, refer to the Subaru Select Monitor OPERATION MANUAL.
- For details concerning the DTC, refer to the List of Diagnostic Trouble Code (DTC). <Ref. to 4AT-28, List of Diagnostic Trouble Code (DTC).>

2. READ CURRENT DATA

1) On the «Main Menu» display screen, select the {Each System Check} and press the [YES] key.

2) On the «System Selection Menu» display screen, select the {Transmission Control System} and press the [YES] key.

3) Press the [YES] key after the information of transmission type is displayed.

4) On the «Transmission Diagnosis» display screen, select the {Current Data Display & Save} and press the [YES] key.

5) On the «Data Display Menu» display screen, select the {Data Display} and press the [YES] key.

6) Using the scroll key, move the display screen up or down until desired data is shown.

- A list of the support data is shown in the following table.

SUBARU SELECT MONITOR

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Contents	Display	Unit of measure
Battery voltage	Battery Voltage	V
Rear vehicle speed sensor signal	Rear Wheel Speed	km/h or MPH
Front vehicle speed sensor signal	Front Wheel Speed	km/h or MPH
Engine speed signal	Engine Speed	rpm
Automatic transmission fluid temperature signal	ATF Temp.	°C or °F
Throttle position signal	Throttle Sensor Voltage	V
Gear position	Gear Position	—
Line pressure control duty ratio	Line Pressure Duty Ratio	%
Lock up clutch control duty ratio	Lock Up Duty Ratio	%
Transfer clutch control duty ratio (AWD model)	Transfer Duty Ratio	%
Power supply for throttle position sensor	Throttle Sensor Power	V
Torque converter turbine speed signal	Turbine Revolution Speed	rpm
2-4 brake timing pressure control duty ratio	Brake Clutch Duty Ratio	%
Mass air flow sensor signal (Turbo model)	Air Flow Sensor Voltage	V
Intake manifold pressure sensor voltage (Non-turbo model)	Mani. Pressure Voltage	V
2 wheel drive switch signal (Non-turbo model)	FWD Switch	ON or OFF
Stop light switch signal	Stop Light Switch	ON or OFF
Anti lock brake system signal	ABS Signal	ON or OFF
Cruise control system signal	Cruise Control Signal	ON or OFF
Parking range signal	P Range Signal	ON or OFF
Neutral range signal	N Range Signal	ON or OFF
Reverse range signal	R Range Signal	ON or OFF
Drive range signal	D Range Signal	ON or OFF
3rd range signal	3rd Range Signal	ON or OFF
2nd range signal	2nd Range Signal	ON or OFF
1st range signal	1st Range Signal	ON or OFF
Shift control solenoid 1	Shift Solenoid #1	ON or OFF
Shift control solenoid 2	Shift Solenoid #2	ON or OFF
Torque control output signal #1	Torque Control Signal 1	ON or OFF
Torque control output signal #2	Torque Control Signal 2	ON or OFF
Torque control cut signal	Torque Control Cut Sig.	ON or OFF
2-4 brake timing control solenoid valve	2-4 Brake Timing Sol.	ON or OFF
Low clutch timing control solenoid valve	Low Clutch Timing Sol.	ON or OFF
Automatic transmission diagnosis indicator lamp	Diagnosis Lamp	ON or OFF
Automatic transmission fluid temperature lamp	ATF Temperature Lamp	ON or OFF

NOTE:

For detailed operation procedure, refer to the Subaru Select Monitor OPERATION MANUAL.

3. CLEAR MEMORY MODE

- 1) On the «Main Menu» display screen, select the {2. Each System Check} and press the [YES] key.
- 2) On the «System Selection Menu» display screen, select the {Transmission Control System} and press the [YES] key.
- 3) Press the [YES] key after the information of transmission type is displayed.
- 4) On the «Transmission Diagnosis» display screen, select the {Clear Memory} and press the [YES] key.
- 5) When the “Done” and “Turn Ignition Switch OFF” are shown on display screen, turn the Subaru Select Monitor and ignition switch to OFF.

NOTE:

For detailed operation procedure, refer to the Subaru Select Monitor OPERATION MANUAL.

READ DIAGNOSTIC TROUBLE CODE (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

7. Read Diagnostic Trouble Code (DTC)

A: OPERATION

1. WITHOUT SUBARU SELECT MONITOR

Step	Check	Yes	No
1 PERFORM READ DTC. 1)Warm-up the engine. 2)Turn the ignition switch to OFF. 3)Turn the ignition switch to ON. 4)Start the engine. 5)Drive the vehicle at speeds greater than 20 km/h (12 MPH). 6)Stop the vehicle. 7)The brake pedal depressed and move select lever to 1 range. 8)Turn the ignition switch to OFF. 9)Turn the ignition switch to ON. 10)Move the select lever "2" range. 11)Move the select lever "1" range. 12)Move the select lever "2" range. 13)Move the select lever "3" range. 14)Move the select lever "D" range.	Does the AT OIL TEMP warning light blink at 4 Hz intervals? NOTE: Blinks every 0.125 (1/8) seconds (until the ignition switch is turned OFF).	Repair the power supply and ground circuit. <Ref. to 4AT-32, CHECK POWER SUPPLY AND GROUND LINE, Diagnostic Procedure for AT OIL TEMP Warning Light.>	Go to step 2.
2 CHECK AT OIL TEMP WARNING LIGHT.	Does the AT OIL TEMP warning light blink at 2 Hz intervals? NOTE: Blinks every 0.25 (1/4) seconds (until ignition switch is turned to OFF).	The AT system is normal.	Go to step 3.
3 CHECK AT OIL TEMP WARNING LIGHT.	Is the DTC outputted by the blink of AT OIL TEMP warning light?	Inspect the problem corresponding with DTC. NOTE: Record all DTCs.	Go to step 4.
4 CHECK AT OIL TEMP WARNING LIGHT.	Does the AT OIL TEMP warning light remain illuminated?	Repair the AT OIL TEMP warning light circuit <Ref. to 4AT-29, Diagnostic Procedure for AT OIL TEMP Warning Light.>, or Inspect inhibitor switch, wiring, TCM, etc.	Calling up the DTC again.

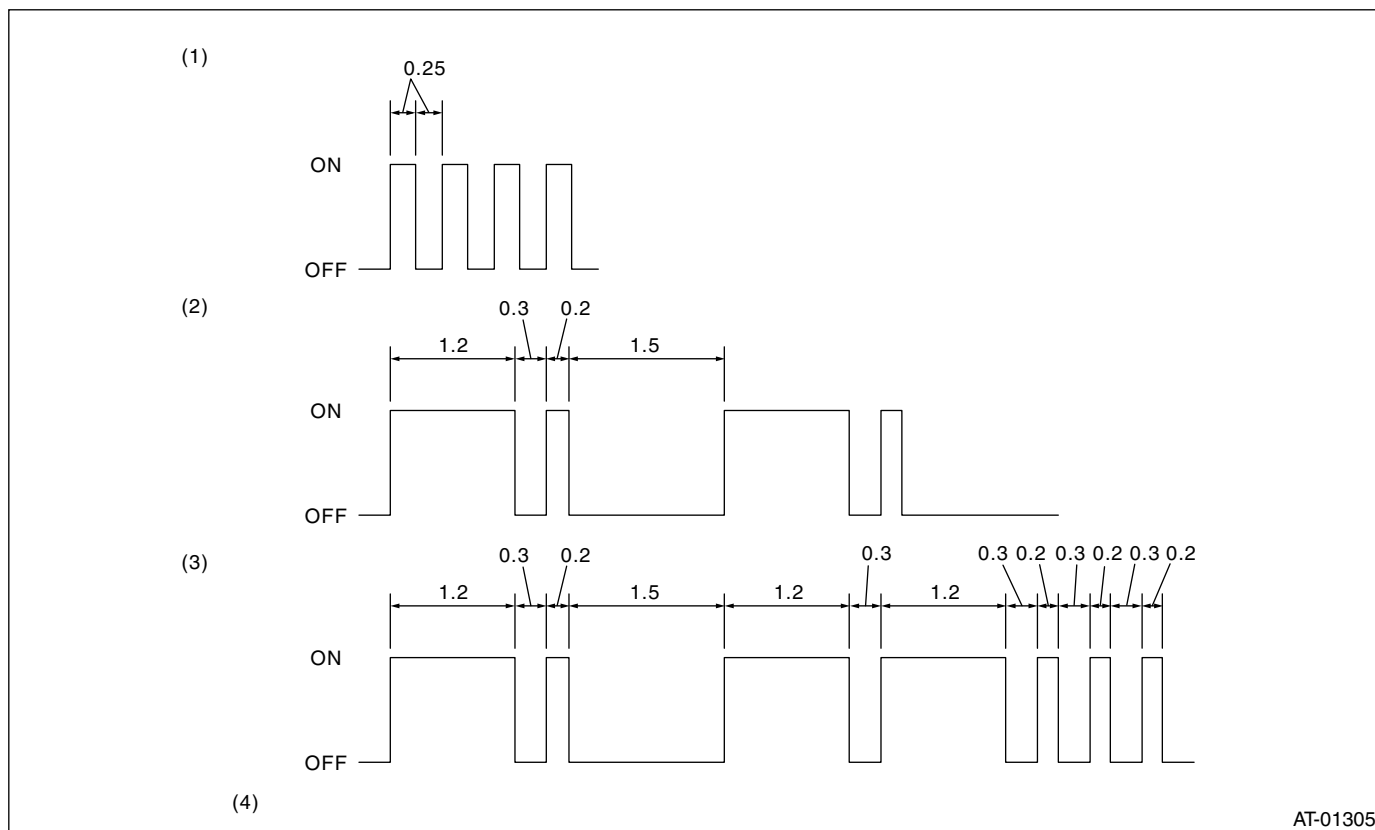
READ DIAGNOSTIC TROUBLE CODE (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

• The way of reading DTC

The AT OIL TEMP warning light flashes the code corresponding to faulty part.

The long segment (1.2 sec on) indicates a “ten”, and the short segment (0.2 sec on) signifies a “one”.



(1) Normal code

(3) DTC 11 and 23

(4) Unit: Seconds

(2) DTC 11

2. WITH SUBARU SELECT MONITOR

Refer to Subaru Select Monitor for information about how to obtain and understand DTC. <Ref. to 4AT-21, OPERATION, Subaru Select Monitor.>

8. Inspection Mode

A: OPERATION

Shift the select lever to D range, and drive continuously for 10 seconds or more at 60 km/h (37 MPH).

WARNING:

Observe the road traffic law.

9. Clear Memory Mode

A: OPERATION

1. WITHOUT SUBARU SELECT MONITOR

Current DTC shown on display are cleared by turning the ignition switch to OFF after conducting on-board diagnostics operation. Previous DTC, however, cannot be cleared since they are stored in the TCM memory which is operating on back-up power supply. These DTC can be cleared by removing the specified TCM connector for at least two minutes.

CLEAR MEMORY:

Non-turbo model

Remove the TCM connector (B55) for at least two minutes.

Turbo model

Remove the TCM connector (B56) for at least two minutes.

- TCM connector is located in the line to memory back-up power supply of TCM. Removal of this connector clears the previous DTC stored in TCM memory.
- Be sure to remove TCM connector for at least the specified length of time. Otherwise, the DTC may not be cleared.

2. WITH SUBARU SELECT MONITOR

Refer to Subaru Select Monitor for information about how to clear DTC.

<Ref. to 4AT-22, CLEAR MEMORY MODE, OPERATION, Subaru Select Monitor.>

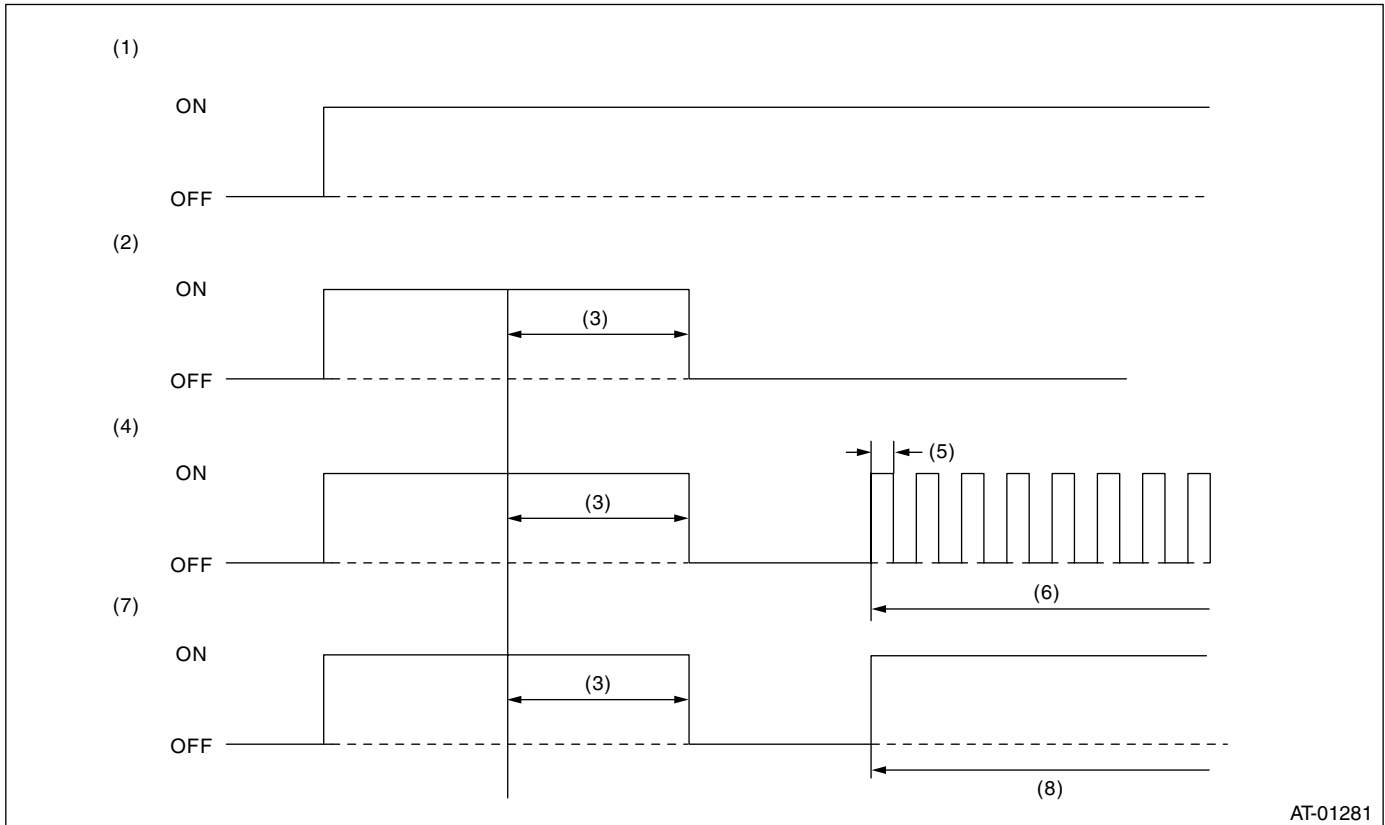
AT OIL TEMP WARNING LIGHT DISPLAY

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

10.AT OIL TEMP Warning Light Display

A: INSPECTION

When any on-board diagnostics item is malfunctioning, the display on AT OIL TEMP warning light blinks from the time malfunction is detected after starting the engine until ignition switch is turned to OFF. The malfunctioning part or unit can be determined by a DTC during on-board diagnostics operation. Problems which occurred previously can also be identified through the memory function. If the AT OIL TEMP warning light does not show a problem (although a problem is occurring), the problem can be determined by checking the performance characteristics of each sensor using select monitor. The AT OIL TEMP warning light signal is as shown in the figure.



(1) Ignition switch (engine OFF)

(2) Normal

(3) 2 secs

(4) Abnormal (Trouble occurs)

(5) 0.25 secs

(6) Blink

(7) Normal (ATF temperature is high)

(8) ATF temperature is high

LIST OF DIAGNOSTIC TROUBLE CODE (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

11.List of Diagnostic Trouble Code (DTC)

A: LIST

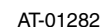
DTC	Item	Content of diagnosis	Index
11	Engine speed signal	Detects open or shorted input signal circuit.	<Ref. to 4AT-37, DTC 11 ENGINE SPEED SIGNAL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
23	Mass air flow signal (Turbo model)	Detects open or shorted input signal circuit.	<Ref. to 4AT-39, DTC 23 MASS AIR FLOW SIGNAL (TURBO MODEL), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
27	ATF temperature sensor	Detects open or shorted input signal circuit.	<Ref. to 4AT-41, DTC 27 ATF TEMPERATURE SENSOR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
31	Throttle position sensor	Detects open or shorted input signal circuit.	<Ref. to 4AT-44, DTC 31 THROTTLE POSITION SENSOR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
33	Front vehicle speed sensor	Detects open or shorted input signal circuit.	<Ref. to 4AT-49, DTC 33 FRONT VEHICLE SPEED SENSOR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
36	Torque converter turbine speed sensor	Detects open or shorted input signal circuit.	<Ref. to 4AT-54, DTC 36 TORQUE CONVERTER TURBINE SPEED SENSOR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
38	Torque control signal	Detects open or shorted input signal circuit.	<Ref. to 4AT-57, DTC 38 TORQUE CONTROL SIGNAL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
45	Intake manifold pressure signal (Non-turbo model)	Detects open or shorted input signal circuit.	<Ref. to 4AT-60, DTC 45 INTAKE MANIFOLD PRESSURE SIGNAL (NON-TURBO MODEL), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
71	Shift solenoid 1	Detects open or shorted output signal circuit.	<Ref. to 4AT-62, DTC 71 SHIFT SOLENOID 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
72	Shift solenoid 2	Detects open or shorted output signal circuit.	<Ref. to 4AT-65, DTC 72 SHIFT SOLENOID 2, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
73	Low clutch timing solenoid	Detects open or shorted output signal circuit.	<Ref. to 4AT-68, DTC 73 LOW CLUTCH TIMING SOLENOID, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
74	2-4 brake timing solenoid	Detects open or shorted output signal circuit.	<Ref. to 4AT-71, DTC 74 2-4 BRAKE TIMING SOLENOID, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
75	Line pressure duty solenoid	Detects open or shorted output signal circuit.	<Ref. to 4AT-75, DTC 75 LINE PRESSURE DUTY SOLENOID, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
76	2-4 brake duty solenoid	Detects open or shorted output signal circuit.	<Ref. to 4AT-79, DTC 76 2-4 BRAKE DUTY SOLENOID, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
77	Lock-up duty solenoid	Detects open or shorted output signal circuit.	<Ref. to 4AT-83, DTC 77 LOCK-UP DUTY SOLENOID, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
79	Transfer duty solenoid	Detects open or shorted output signal circuit.	<Ref. to 4AT-88, DTC 79 TRANSFER DUTY SOLENOID, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
93	Rear vehicle speed sensor	Detects open or shorted input signal circuit.	<Ref. to 4AT-92, DTC 93 REAR VEHICLE SPEED SENSOR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

A: AT OIL TEMP WARNING LIGHT DOES NOT COME ON OR GO OFF

The AT OIL TEMP warning light circuit is open or shorted.

- When the ignition switch is turned to ON (engine OFF), AT OIL TEMP warning light does not illuminate.
- When the on-board diagnostics is performed, AT OIL TEMP warning light remains illuminated.

[illegible]

DIAGNOSTIC PROCEDURE FOR AT OIL TEMP WARNING LIGHT

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK AT OIL TEMP WARNING LIGHT. Turn the ignition switch to ON (engine OFF).	Does the AT OIL TEMP warning light illuminate?	Go to step 3.	Go to step 2.
2 CHECK AT OIL TEMP WARNING LIGHT. 1) Turn the ignition switch to OFF. 2) Remove the combination meter.	Is the AT OIL TEMP warning light bulb OK?	Go to step 4.	Check the combination meter.
3 CHECK AT OIL TEMP WARNING LIGHT. Perform "Read Diagnostic Trouble Code (DTC)". <Ref. to 4AT-23, Read Diagnostic Trouble Code (DTC).>	Does the AT OIL TEMP warning light blink?	A temporary poor contact of the connector or harness may be the cause. Repair the harness or connector in TCM, inhibitor switch and combination meter.	Go to step 9.
4 CHECK FUSE (No. 13). Remove the fuse (No. 13).	Is the fuse (No. 13) blown out?	Replace the fuse (No. 13). If replaced fuse (No. 13) is blown out easily, repair short circuit in harness between fuse (No. 13) and combination meter.	Go to step 5.
5 CHECK HARNESS CONNECTOR BETWEEN COMBINATION METER AND IGNITION SWITCH. 1) Turn the ignition switch to ON (engine OFF). 2) Measure the voltage between combination meter connector and chassis ground. Connector & terminal (i11) No. 7 (+) — Chassis ground (-):	Is the voltage more than 9 V?	Go to step 6.	Repair the open circuit in harness between combination meter and battery.
6 CHECK COMBINATION METER. Measure the voltage between combination meter connector and chassis ground. Connector & terminal (i10) No. 5 (+) — Chassis ground (-):	Is the voltage less than 9 V?	Repair the combination meter. <Ref. to IDI-10, Combination Meter Assembly.>	Go to step 7.
7 CHECK OPEN CIRCUIT OF HARNESS. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from combination meter connector. 3) Measure the resistance of harness between combination meter. Connector & terminal NON-TURBO MODEL (B54) No. 3 — (i10) No. 5: TURBO MODEL (B56) No. 11 — (i10) No. 5:	Is the resistance less than 1 Ω ?	Go to step 8.	Repair the open circuit in harness between TCM and combination meter, and poor contact in coupling connector.
8 CHECK INPUT SIGNAL FOR TCM. 1) Connect the connector to TCM and combination meter. 2) Turn the ignition switch to ON (engine OFF). 3) Measure the voltage between TCM connector and chassis ground. Connector & terminal NON-TURBO MODEL (B54) No. 3 (+) — Chassis ground (-): TURBO MODEL (B56) No. 11 (+) — Chassis ground (-):	Is the voltage less than 1 V?	Even if the AT OIL TEMP warning light illuminates, the circuit has returned to a normal condition at this time. A temporary poor contact of the connector or harness may be the cause. Repair the harness or connector in TCM.	Replace the TCM. <Ref. to 4AT-67, Transmission Control Module (TCM).>

DIAGNOSTIC PROCEDURE FOR AT OIL TEMP WARNING LIGHT

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

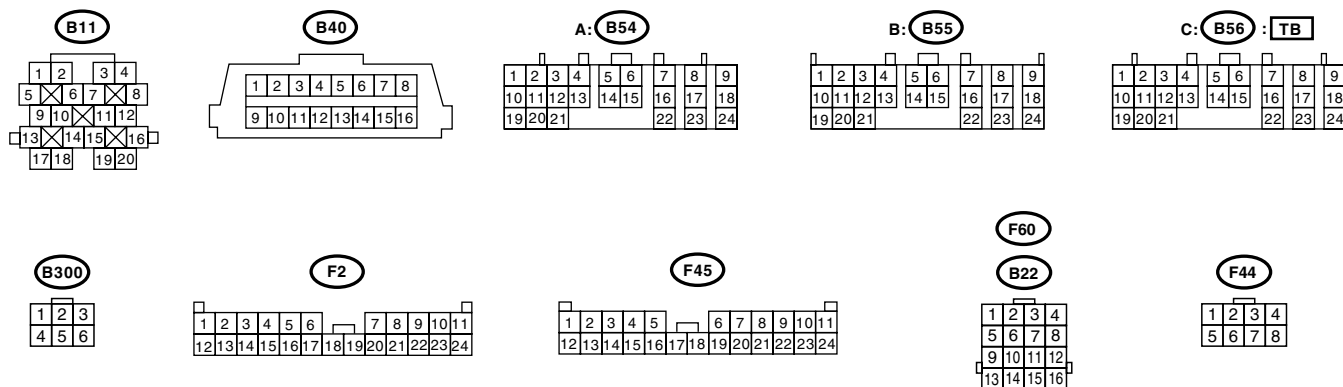
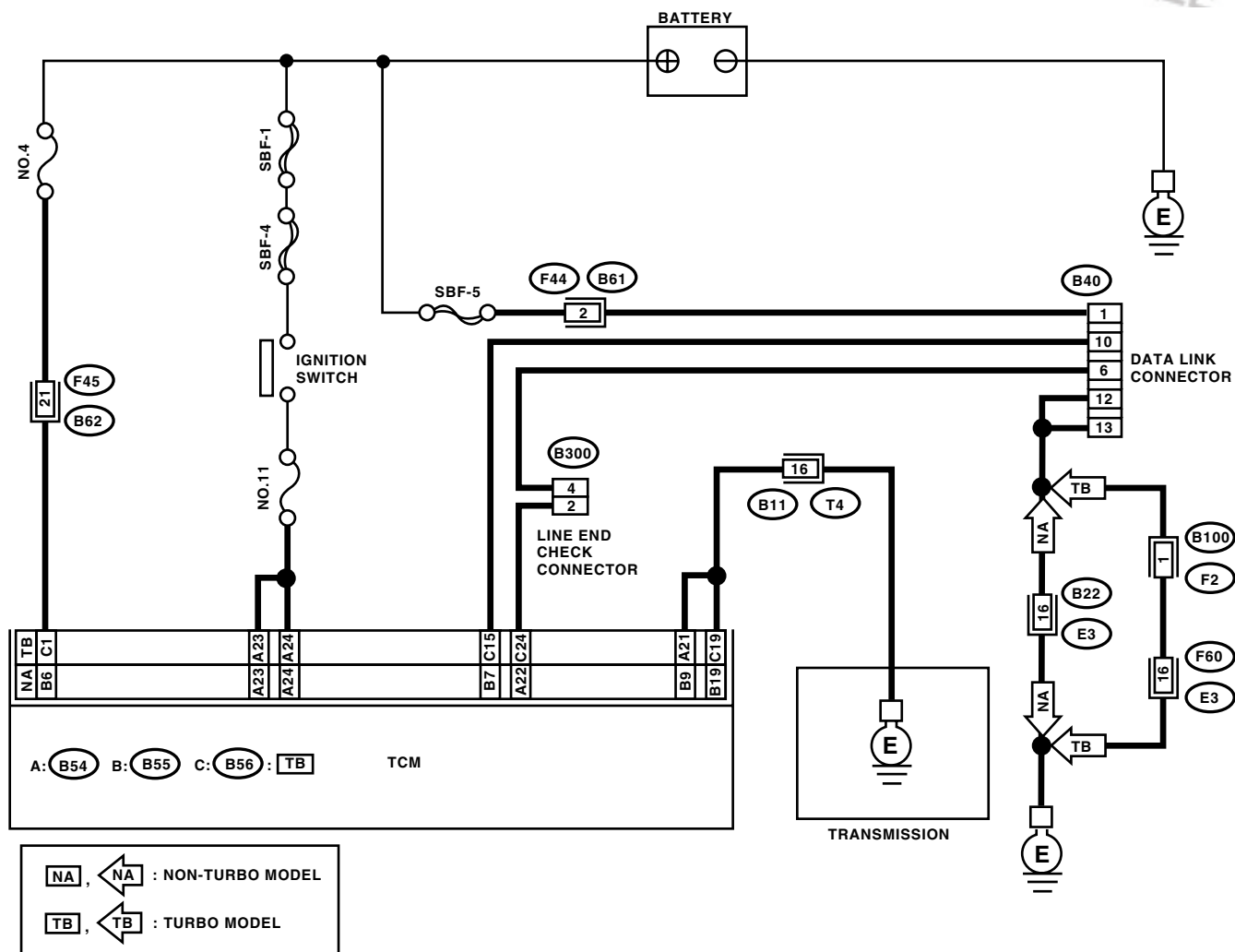
Step	Check	Yes	No
9 CHECK INHIBITOR SWITCH. 1)Connect the Subaru Select Monitor to data link connector. 2)Turn the ignition switch to ON. 3)Turn the Subaru Select Monitor to ON. 4)Read the data of range switch using Subaru Select Monitor. •Range switch is indicated in ON ⇔ OFF.	When each range is selected, does the LED of Subaru Select Monitor light up?	Go to step 10.	Check the inhibitor switch circuit. <Ref. to 4AT-100, CHECK INHIBITOR SWITCH, Diagnostic Procedure without Diagnostic Trouble Code (DTC).>
10 CHECK SHORT CIRCUIT OF HARNESS. 1)Disconnect the connector from TCM. 2)Remove the combination meter. 3)Disconnect the connector from combination meter. 4)Measure the resistance of harness connector between TCM and chassis ground. Connector & terminal NON-TURBO MODEL (B54) No. 11 — Chassis ground: TURBO MODEL (B56) No. 11 — Chassis ground:	Is the resistance less than 1 MΩ?	Check the TCM power supply and ground line. <Ref. to 4AT-32, CHECK POWER SUPPLY AND GROUND LINE, Diagnostic Procedure for AT OIL TEMP Warning Light.>	Repair the short circuit in harness between combination meter connector and TCM connector.

DIAGNOSTIC PROCEDURE FOR AT OIL TEMP WARNING LIGHT

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

B: CHECK POWER SUPPLY AND GROUND LINE

WIRING DIAGRAM:



AT-01283

Step	Check	Yes	No
1	CHECK BATTERY TERMINAL. Turn the ignition switch to OFF.	Is there poor contact at battery terminal?	Repair or tighten the battery terminal.

DIAGNOSTIC PROCEDURE FOR AT OIL TEMP WARNING LIGHT

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step	Check	Yes	No
2 CHECK POWER SUPPLY OF TCM. 1) Disconnect the connector from TCM. 2) Turn the ignition switch to ON. 3) Measure the voltage between TCM connector and chassis ground. Connector & terminal NON-TURBO MODEL (B55) No. 6 (+) — Chassis ground (-): TURBO MODEL (B56) No. 1 (+) — Chassis ground (-):	Is the voltage 10 — 13 V?	Go to step 4.	Go to step 3.
3 CHECK FUSE (NO. 4). Remove the fuse (No. 4).	Is the fuse (No. 4) blown out?	Replace the fuse (No. 4). If replaced fuse (No. 4) has blown out easily, repair short circuit in harness between fuse (No. 4) and TCM.	Repair the open circuit in harness between fuse (No. 4) and TCM, or fuse (No. 4) and battery, and poor contact in coupling connector.
4 CHECK IGNITION POWER SUPPLY CIRCUIT. 1) Turn the ignition switch to ON (engine OFF). 2) Measure the ignition power supply voltage between TCM connector and chassis ground. Connector & terminal (B54) No. 23 (+) — Chassis ground (-): (B54) No. 24 (+) — Chassis ground (-):	Is the voltage 10 — 13 V?	Go to step 6.	Go to step 5.
5 CHECK FUSE (NO. 11). Remove the fuse (No. 11).	Is the fuse (No. 11) blown out?	Replace the fuse (No. 11). If replaced fuse (No. 11) has blown out easily, repair short circuit in harness between fuse (No. 11) and TCM.	Repair the open circuit in harness between fuse (No. 4) and TCM, or fuse (No. 4) and battery, and poor contact in coupling connector.
6 CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from TCM and transmission. 3) Measure the resistance of harness between TCM and transmission connector. Connector & terminal NON-TURBO MODEL (B54) No. 21 — (B11) No. 16: (B56) No. 19 — (B11) No. 16: TURBO MODEL (B56) No. 19 — (B11) No. 16: (B54) No. 21 — (B11) No. 16:	Is the resistance less than 1 Ω ?	Go to step 7.	Repair the open circuit in harness between TCM, transmission harness connector, and poor contact in coupling connector.
7 CHECK HARNESS CONNECTOR BETWEEN TRANSMISSION AND TRANSMISSION GROUND. Measure the resistance of harness between transmission and transmission ground. Connector & terminal (T4) No. 16 — Transmission ground:	Is the resistance less than 1 Ω ?	Go to step 8.	Repair the open circuit in harness between transmission and transmission ground.
8 CHECK POOR CONTACT IN CONNECTORS.	Is there poor contact in control module power supply, ground line and data link connector?	Repair the connector.	Replace the TCM. <Ref. to 4AT-67, Transmission Control Module (TCM).>

13. Diagnostic Procedure for Select Monitor Communication

A: COMMUNICATION FOR INITIALIZING IMPOSSIBLE

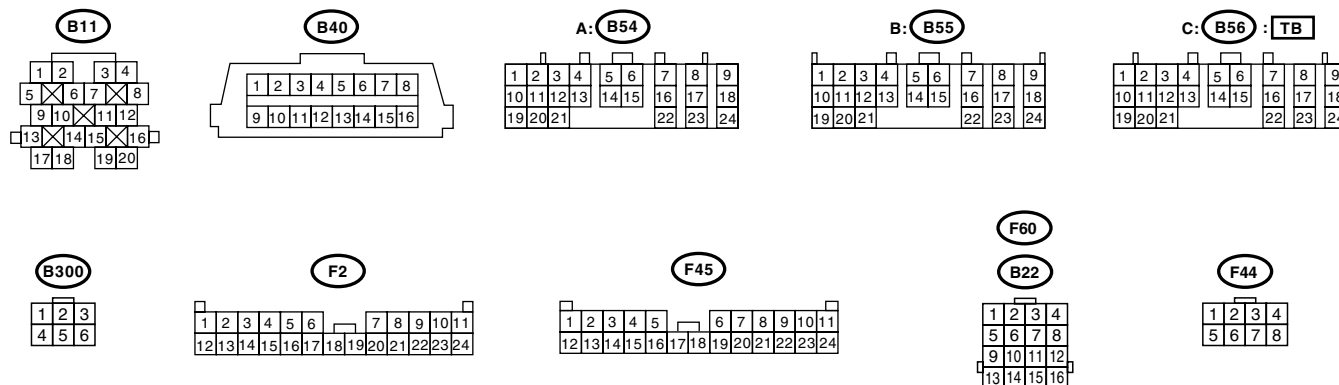
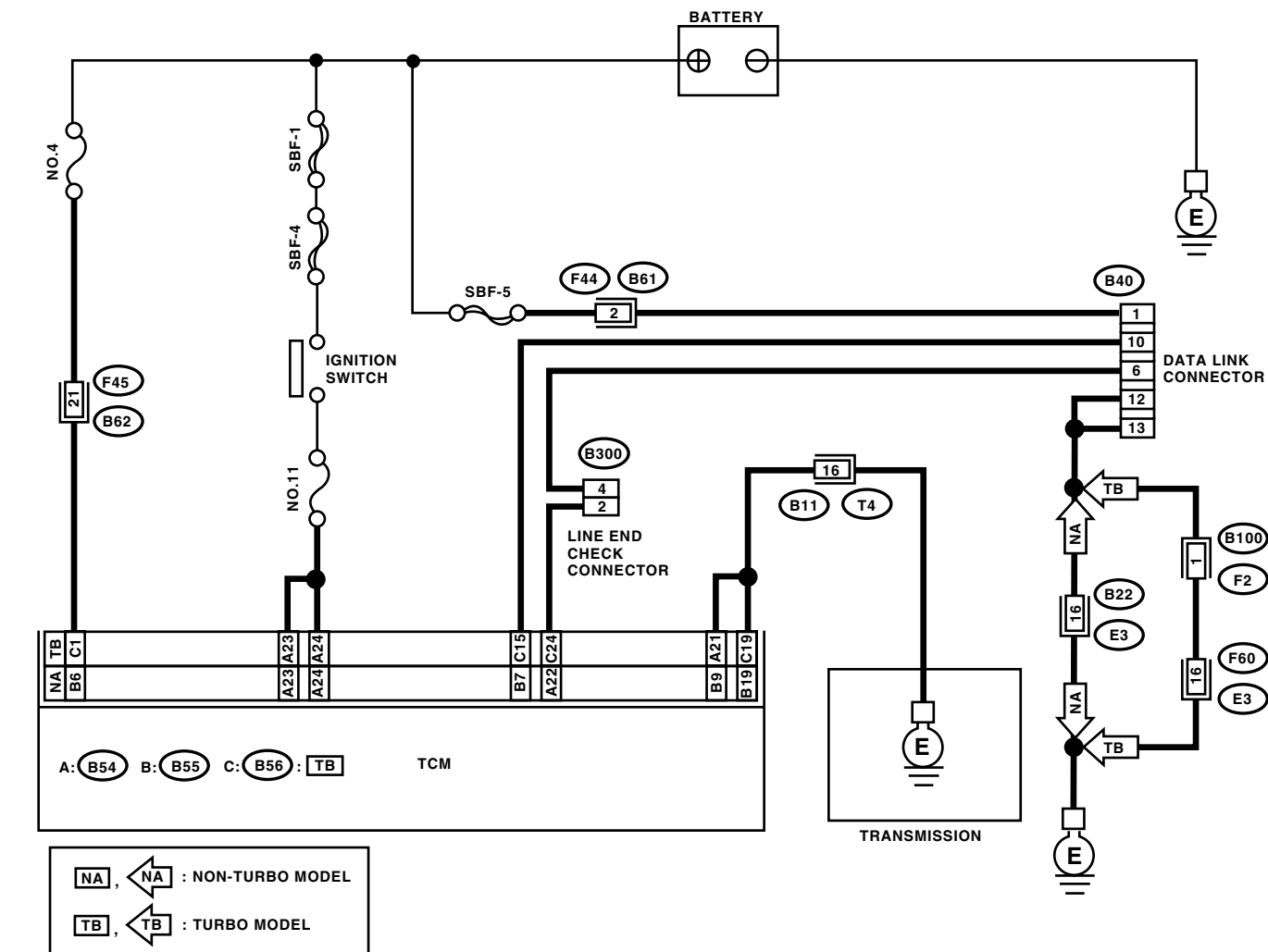
DIAGNOSIS:

- Faulty harness connector

TROUBLE SYMPTOM:

- Select monitor communication failure

WIRING DIAGRAM:



DIAGNOSTIC PROCEDURE FOR SELECT MONITOR COMMUNICATION

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK SUBARU SELECT MONITOR POWER SUPPLY CIRCUIT. Measure the voltage between data link connector and chassis ground. Connector & terminal (B40) No. 1 (+) — Chassis ground (-):	Is the voltage more than 10 V?	Go to step 2.	Repair the harness and connector between battery and data link connector, and poor contact in coupling connector.
2 CHECK SUBARU SELECT MONITOR GROUND CIRCUIT. Measure the resistance of harness between data link connector and chassis ground. Connector & terminal (B40) No. 12 — Chassis ground: (B40) No. 13 — Chassis ground:	Is the resistance less than 1 Ω ?	Go to step 3.	Repair the open circuit in harness between data link connector and ground terminal, and poor contact in coupling connector.
3 CHECK COMMUNICATION OF SELECT MONITOR. 1) Turn the ignition switch to ON. 2) Using the Subaru Select Monitor, check whether communication to engine systems can be executed normally.	Are the name and year of system displayed on Subaru Select Monitor?	Go to step 8.	Go to step 4.
4 CHECK COMMUNICATION OF SELECT MONITOR. 1) Turn the ignition switch to OFF. 2) Disconnect the TCM connector. 3) Check whether communication to engine systems can be executed normally.	Are the name and year of system displayed on Subaru Select Monitor?	Go to step 6.	Go to step 5.
5 CHECK COMMUNICATION OF SELECT MONITOR. 1) Turn the ignition switch to OFF. 2) Connect the TCM connector. 3) Disconnect the ECM connector. 4) Check whether communication to transmission systems can be executed normally.	Are the name and year of system displayed on Subaru Select Monitor?	Inspect the ECM.	Go to step 6.
6 CHECK HARNESS CONNECTOR BETWEEN EACH CONTROL MODULE AND DATA LINK CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the TCM, ECM, ABSCM&H/U, cruise control module and immobilizer control module connectors. 3) Measure the resistance between TCM connector and chassis ground. Connector & terminal (B40) No. 10 — Chassis ground: (B40) No. 6 — Chassis ground:	Is the resistance more than 1 M Ω ?	Go to step 7.	Repair the harness and connector between each control module and data link connector.
7 CHECK OUTPUT SIGNAL FOR TCM. 1) Turn the ignition switch to ON. 2) Measure the voltage between TCM and chassis ground. Connector & terminal (B40) No. 10 (+) — Chassis ground (-): (B40) No. 6 (+) — Chassis ground (-):	Is the voltage more than 1 V?	Repair the harness and connector between each control module and data link connector.	Go to step 8.

DIAGNOSTIC PROCEDURE FOR SELECT MONITOR COMMUNICATION

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step	Check	Yes	No
8 CHECK HARNESS/CONNECTOR BETWEEN TCM AND DATA LINK CONNECTOR. Measure the resistance between TCM connector and data link connector. Connector & terminal NON-TURBO MODEL (B55) No. 7 — (B40) No. 10: TURBO MODEL (B56) No. 15 — (B40) No. 10:	Is the resistance less than 0.5 Ω ?	Go to step 9.	Repair the harness and connector between TCM and data link connector.
9 CHECK HARNESS/CONNECTOR BETWEEN TCM AND DATA LINK CONNECTOR. Measure the resistance between TCM and data link connector. Connector & terminal NON-TURBO MODEL (B54) No. 22 — (B40) No. 6: TURBO MODEL (B56) No. 24 — (B40) No. 6:	Is the resistance more than 1 M Ω ?	Go to step 10.	Repair the harness and connector between TCM and data link connector.
10 CHECK INSTALLATION OF TCM CONNECTOR. Turn the ignition switch to OFF.	Is the TCM connector inserted into TCM?	Go to step 11.	Insert the TCM connector into TCM.
11 CHECK POOR CONTACT IN CONNECTORS.	Is there poor contact in control module and data link connector?	Repair the poor contact.	Replace the TCM. <Ref. to 4AT-67, Transmission Control Module (TCM).>

14. Diagnostic Procedure with Diagnostic Trouble Code (DTC)

A: DTC 11 ENGINE SPEED SIGNAL

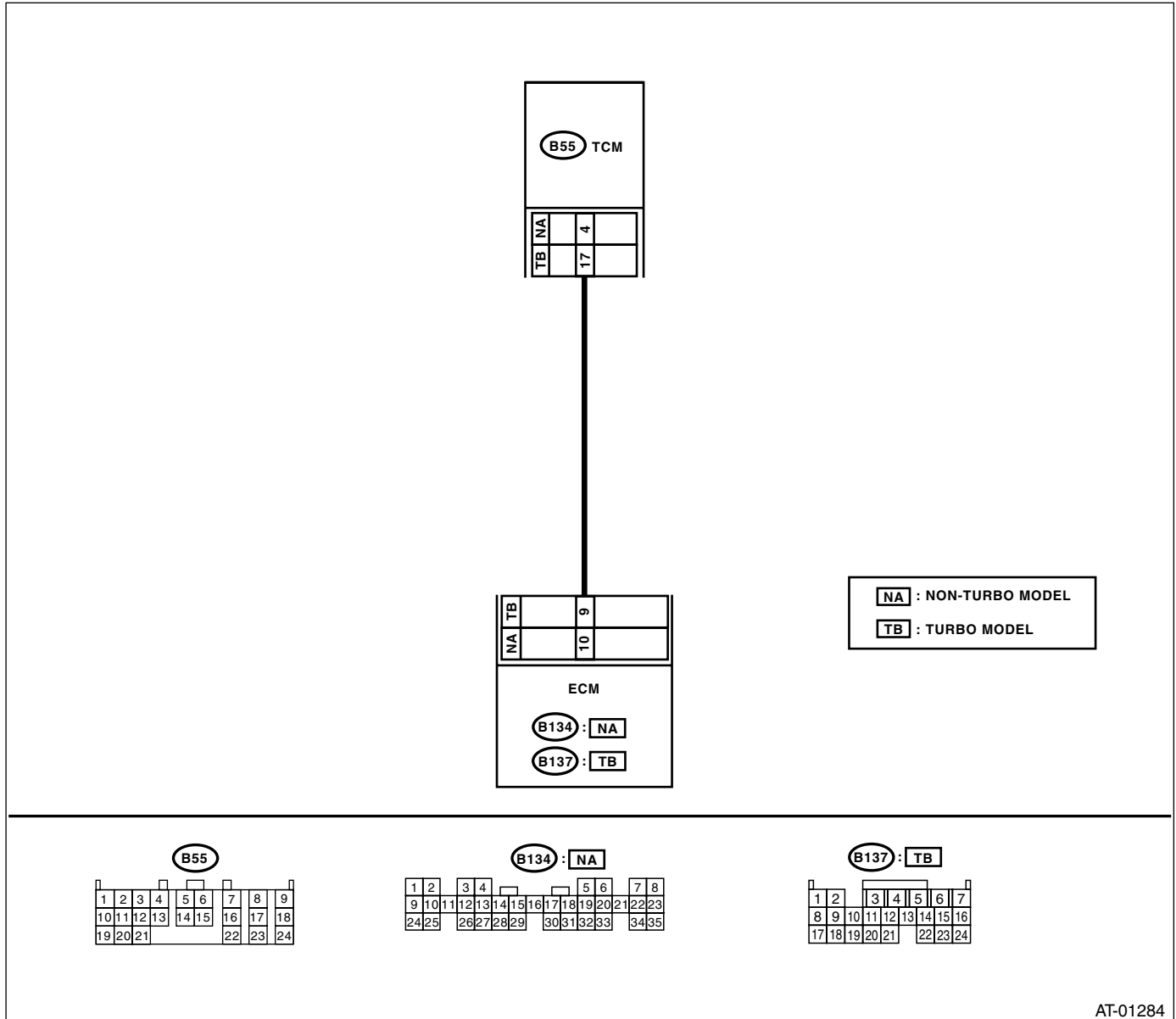
DIAGNOSIS:

The engine speed input signal circuit is open or shorted.

TROUBLE SYMPTOM:

- No lock-up (after engine warm-up).
- The AT OIL TEMP warning light remains on when vehicle speed is "0".

WIRING DIAGRAM:



AT-01284

DIAGNOSTIC PROCEDURE WITH DIAGNOSTIC TROUBLE CODE (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK HARNESS CONNECTOR BETWEEN TCM AND ECM. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from TCM and ECM. 3) Measure the resistance of harness between TCM and ECM connector. Connector & terminal NON-TURBO MODEL (B55) No. 4 — (B134) No. 10: TURBO MODEL (B55) No. 17 — (B137) No. 9:	Is the resistance less than 1 Ω ?	Go to step 2.	Repair the open circuit in harness between TCM and ECM connector.
2 CHECK HARNESS CONNECTOR BETWEEN TCM AND ECM. Measure the resistance of harness between TCM connector and chassis ground. Connector & terminal NON-TURBO MODEL (B55) No. 4 — Chassis ground: TURBO MODEL (B55) No. 17 — Chassis ground:	Is the resistance more than 1 M Ω ?	Go to step 3.	Repair the short circuit in harness between TCM and ECM connector.
3 PREPARE SUBARU SELECT MONITOR.	Do you have a Subaru Select Monitor?	Go to step 5.	Go to step 4.
4 CHECK INPUT SIGNAL FOR TCM. 1) Connect the connectors to TCM and ECM. 2) Turn the ignition switch to ON (engine OFF). 3) Measure the voltage between TCM connector and chassis ground. Connector & terminal NON-TURBO MODEL (B55) No. 4 (+) — Chassis ground (-): TURBO MODEL (B55) No. 17 (+) — Chassis ground (-):	Is the voltage more than 10.5 V?	Even if the AT OIL TEMP warning light illuminates, the circuit has returned to a normal condition at this time. A temporary poor contact of the connector or harness may be the cause. Repair the harness or connector in TCM and ECM.	Go to step 6.
5 CHECK INPUT SIGNAL FOR TCM USING SUBARU SELECT MONITOR. 1) Connect the connectors to TCM and ECM. 2) Connect the Subaru Select Monitor to data link connector. 3) Start the engine and turn Subaru Select Monitor switch to ON. 4) Warm-up the engine until engine coolant temperature is above 80°C (176°F). 5) Idle the engine. 6) Read the data of engine speed using Subaru Select Monitor. • Display shows the engine speed signal value sent from ECM.	Is the revolution value same as tachometer reading shown on combination meter?	Even if the AT OIL TEMP warning light illuminates, the circuit has returned to a normal condition at this time. A temporary poor contact of the connector or harness may be the cause. Repair the harness or connector in TCM and ECM.	Go to step 6.
6 CHECK POOR CONTACT.	Is there poor contact in engine speed signal circuit?	Repair the poor contact.	Go to step 7.
7 CONFIRM DTC 11.	Replace the ECM with a new one. Does the DTC appear again, after memory has been cleared?	Replace the TCM. <Ref. to 4AT-67, Transmission Control Module (TCM).>	Replace the ECM.

DIAGNOSTIC PROCEDURE WITH DIAGNOSTIC TROUBLE CODE (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

B: DTC 23 MASS AIR FLOW SIGNAL (TURBO MODEL)

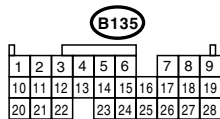
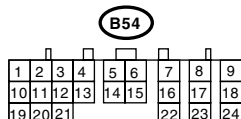
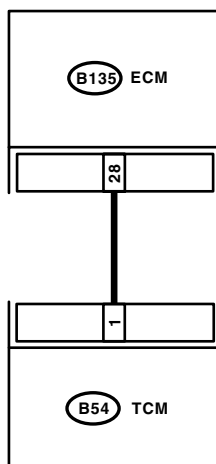
DIAGNOSIS:

The input signal circuit of TCM from ECM is open or shorted.

TROUBLE SYMPTOM:

Excessive shift shock.

WIRING DIAGRAM:



AT-01140

Step	Check	Yes	No
1 CHECK ENGINE GROUND TERMINALS AND GROUND CIRCUIT OF ECM. <Ref. to 4AT-44, DTC 31 THROTTLE POSITION SENSOR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>	Is there any trouble?	Repair the ground terminal and/or ground circuit of ECM.	Go to step 2.
2 CHECK HARNESS CONNECTOR BETWEEN TCM AND ECM. 1)Turn the ignition switch to OFF. 2)Disconnect the connectors from TCM and ECM. 3)Measure the resistance of harness between TCM and ECM connector. Connector & terminal (B54) No. 1 — (B135) No. 28:	Is the resistance less than 1 Ω?	Go to step 3.	Repair the open circuit in harness between TCM and ECM connector.
3 CHECK HARNESS CONNECTOR BETWEEN TCM AND ECM. Measure the resistance of harness between TCM connector and chassis ground. Connector & terminal (B54) No. 1 — Chassis ground:	Is the resistance more than 1 MΩ?	Go to step 4.	Repair the short circuit in harness between TCM and ECM connector.
4 PREPARE SUBARU SELECT MONITOR.	Do you have a Subaru Select Monitor?	Go to step 6.	Go to step 5.

DIAGNOSTIC PROCEDURE WITH DIAGNOSTIC TROUBLE CODE (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step		Check	Yes	No
5	CHECK INPUT SIGNAL FOR TCM. 1)Connect the connectors to TCM and ECM. 2)Start the engine and warm-up the transmission until ATF temperature is above 80°C (176°F). NOTE: If ambient temperature is below 0°C (32°F), drive the vehicle until ATF reaches its operating temperature. 3)Idle the engine. 4)Measure the voltage between TCM connector and chassis ground. Connector & terminal (B54) No. 1 (+) — Chassis ground (-):	Is the voltage 0.9 — 1.4 V?	Even if the AT OIL TEMP warning light illuminates, the circuit has returned to a normal condition at this time. A temporary poor contact of the connector or harness may be the cause. Repair harness or connector in the TCM and ECM.	Go to step 7.
	CHECK INPUT SIGNAL FOR TCM USING SUBARU SELECT MONITOR. 1)Connect the connectors to TCM and ECM. 2)Connect the Subaru Select Monitor to data link connector. 3)Start the engine and turn the Subaru Select Monitor switch to ON. 4)Warm-up the engine until engine coolant temperature is above 80°C (176°F). 5)Idle the engine. 6)Read the data of mass air flow sensor signal using Subaru Select Monitor. •Display shows the mass air flow sensor signal value sent from ECM.	Is the value voltage 0.9 — 1.4 V?	Even if the AT OIL TEMP warning light illuminates, the circuit has returned to a normal condition at this time. A temporary poor contact of the connector or harness may be the cause. Repair harness or connector in the TCM and ECM.	Go to step 7.
	CHECK POOR CONTACT.	Is there poor contact in intake manifold pressure signal circuit?	Repair the poor contact.	Replace the TCM. <Ref. to 4AT-67, Transmission Control Module (TCM).>

DIAGNOSTIC PROCEDURE WITH DIAGNOSTIC TROUBLE CODE (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

C: DTC 27 ATF TEMPERATURE SENSOR

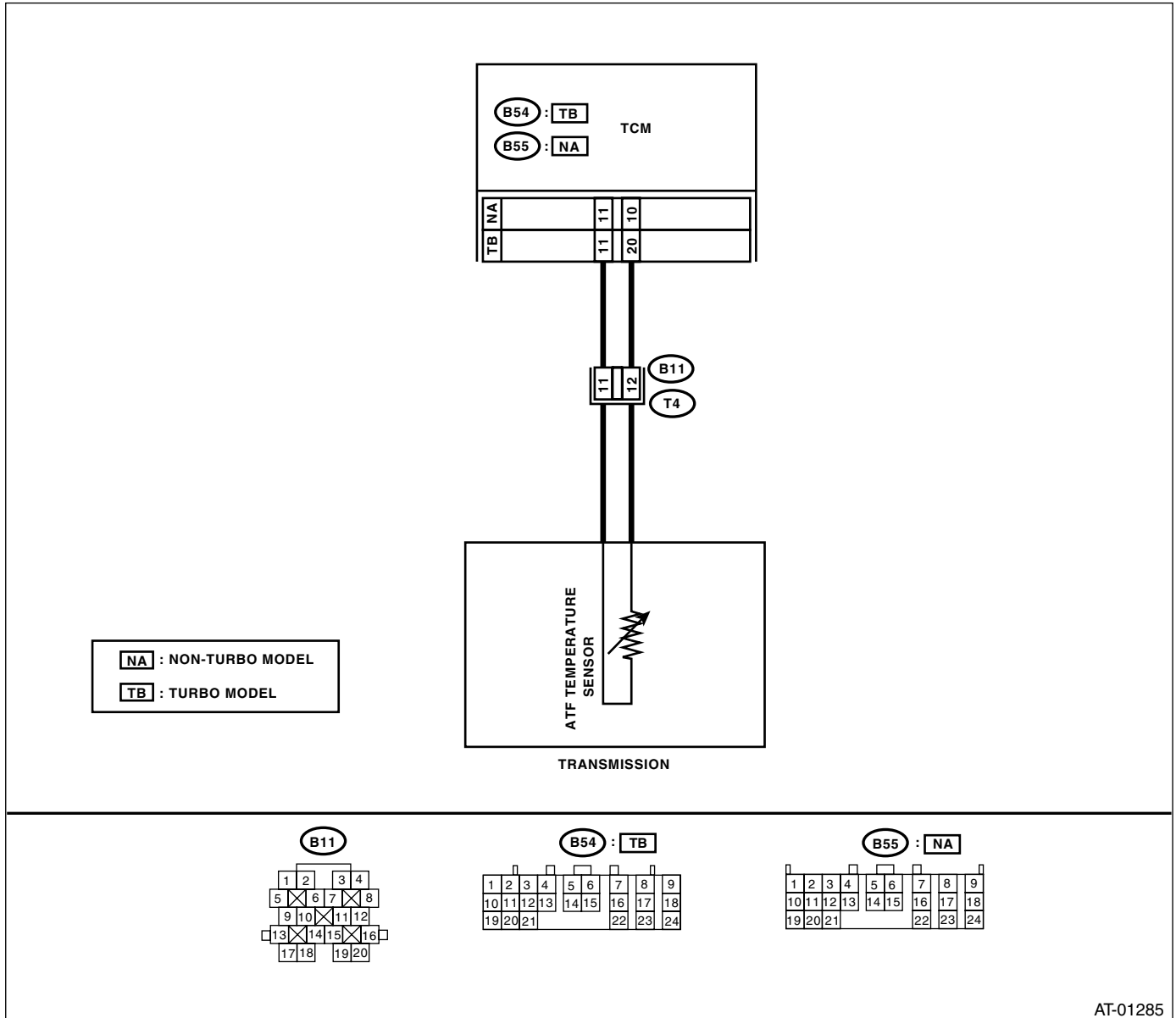
DIAGNOSIS:

The input signal circuit of TCM to ATF temperature sensor is open or shorted.

TROUBLE SYMPTOM:

Excessive shift shock.

WIRING DIAGRAM:



AT-01285

DIAGNOSTIC PROCEDURE WITH DIAGNOSTIC TROUBLE CODE (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK HARNESS CONNECTOR BETWEEN TCM AND ATF TEMPERATURE SENSOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from transmission and TCM. 3) Measure the resistance of harness between TCM and transmission connector. Connector & terminal NON-TURBO MODEL (B55) No. 10 — (B11) No. 12: TURBO MODEL (B54) No. 20 — (B11) No. 12:	Is the resistance less than 1 Ω ?	Go to step 2.	Repair the open circuit in harness between TCM and transmission connector.
2 CHECK HARNESS CONNECTOR BETWEEN TCM AND ATF TEMPERATURE SENSOR. Measure the resistance of harness between TCM and transmission connector. Connector & terminal NON-TURBO MODEL (B55) No. 11 — (B11) No. 11: TURBO MODEL (B54) No. 11 — (B11) No. 11:	Is the resistance less than 1 Ω ?	Go to step 3.	Repair the open circuit in harness between TCM and transmission connector.
3 CHECK HARNESS CONNECTOR BETWEEN TCM AND ATF TEMPERATURE SENSOR. Measure the resistance of harness between TCM connector and chassis ground. Connector & terminal NON-TURBO MODEL (B55) No. 10 — Chassis ground: TURBO MODEL (B54) No. 20 — Chassis ground:	Is the resistance more than 1 M Ω ?	Go to step 4.	Repair the short circuit in harness between TCM and transmission connector.
4 CHECK HARNESS CONNECTOR BETWEEN TCM AND ATF TEMPERATURE SENSOR. Measure the resistance of harness between TCM connector and chassis ground. Connector & terminal NON-TURBO MODEL (B55) No. 11 — Chassis ground: TURBO MODEL (B54) No. 11 — Chassis ground:	Is the resistance more than 1 M Ω ?	Go to step 5.	Repair the short circuit in harness between TCM and transmission connector.
5 CHECK ATF TEMPERATURE SENSOR. 1) Turn the ignition switch to OFF. 2) Connect the connectors to transmission and TCM. 3) Turn the ignition switch to ON and start engine. 4) Warm-up the transmission until ATF temperature reaches to 80°C (176°F). NOTE: If ambient temperature is below 0°C (32°F), drive the vehicle until ATF reaches its operating temperature. 5) Disconnect the connector from transmission. 6) Measure the resistance between transmission connector terminals. Connector & terminal (T4) No. 11 — No. 12:	Is the resistance 275 — 375 Ω ?	Go to step 6.	Replace the ATF temperature sensor. <Ref. to 4AT-61, Shift Solenoids, Duty Solenoids and ATF Temperature Sensor.>

DIAGNOSTIC PROCEDURE WITH DIAGNOSTIC TROUBLE CODE (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step		Check	Yes	No
6	CHECK ATF TEMPERATURE SENSOR. 1) Turn the ignition switch to ON (engine OFF). 2) Measure the resistance between transmission connector terminals. Connector & terminal (T4) No. 11 — No. 12:	Does the resistance value increase while ATF temperature decreases?	Go to step 7.	Replace the ATF temperature sensor. <Ref. to 4AT-61, Shift Solenoids, Duty Solenoids and ATF Temperature Sensor.>
7	PREPARE SUBARU SELECT MONITOR.	Do you have a Subaru Select Monitor?	Go to step 9.	Go to step 8.
8	CHECK INPUT SIGNAL FOR TCM. 1) Connect the connector to transmission. 2) Warm-up the transmission until ATF temperature is about 80°C (176°F). NOTE: If ambient temperature is below 0°C (32°F), drive the vehicle until ATF reaches its operating temperature. 3) Measure the voltage between TCM connector terminal. Connector & terminal NON-TURBO MODEL (B55) No. 11 (+) — No. 10 (-): TURBO MODEL (B54) No. 11 (+) — No. 20 (-):	Is the voltage 0.4 — 0.9 V?	Even if the AT OIL TEMP warning light illuminates, the circuit has returned to a normal condition at this time. Temporary poor contact of the connector or harness may be the cause. Repair the harness or contact in ATF temperature sensor and transmission connector.	Go to step 10.
9	CHECK INPUT SIGNAL FOR TCM USING SUBARU SELECT MONITOR. 1) Connect the connector to transmission. 2) Turn the ignition switch to ON (engine OFF).	Does the ATF temperature gradually decrease?	Even if the AT OIL TEMP warning light illuminates, the circuit has returned to a normal condition at this time. Temporary poor contact of the connector or harness may be the cause. Repair the harness or contact in ATF temperature sensor and transmission connector.	Go to step 10.
10	CHECK POOR CONTACT.	Is there poor contact in ATF temperature sensor circuit?	Repair the poor contact.	Replace the TCM. <Ref. to 4AT-67, Transmission Control Module (TCM).>

DIAGNOSTIC PROCEDURE WITH DIAGNOSTIC TROUBLE CODE (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

D: DTC 31 THROTTLE POSITION SENSOR

DIAGNOSIS:

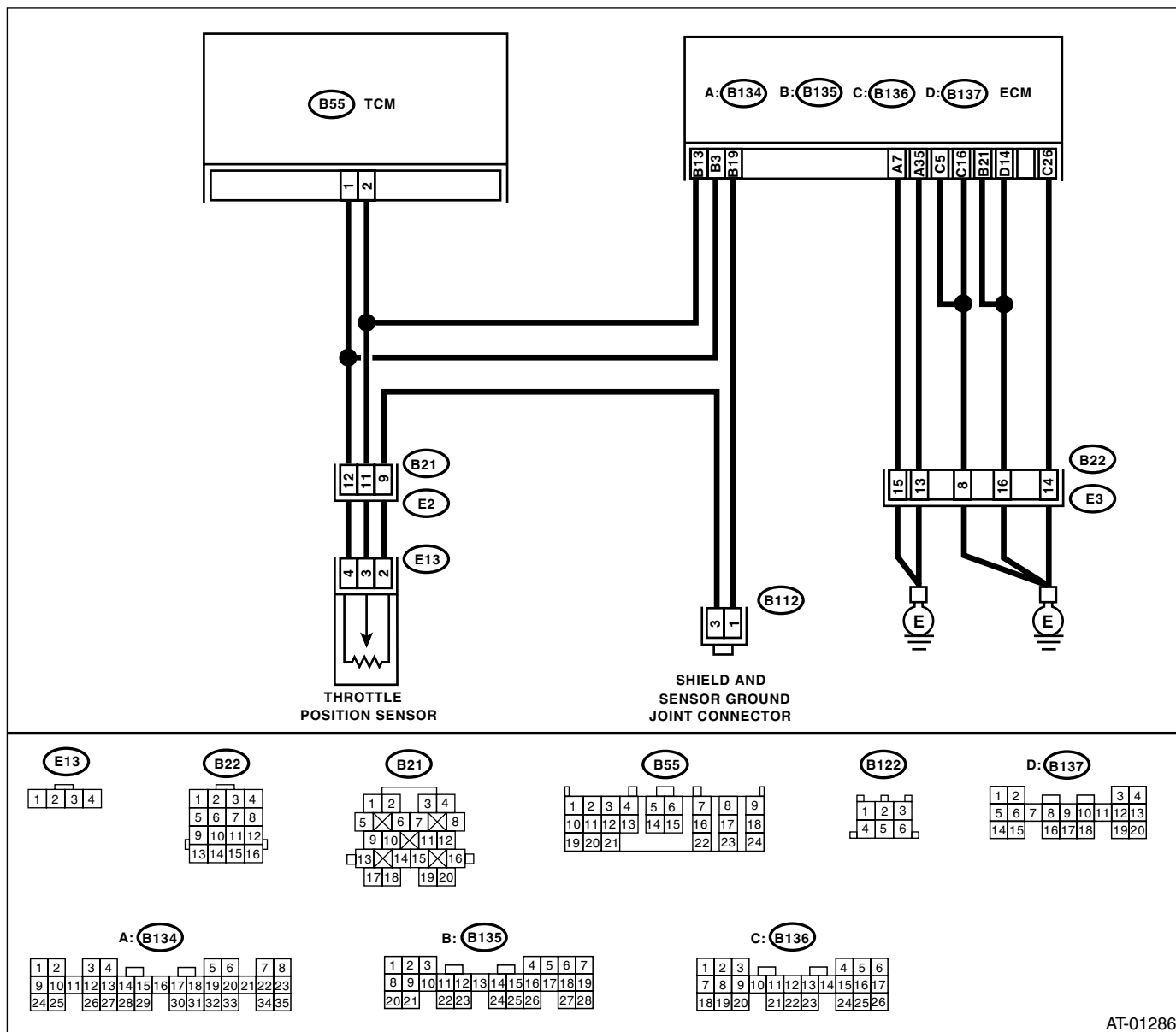
The input signal circuit of throttle position sensor is open or shorted.

TROUBLE SYMPTOM:

Shift point too high or too low; excessive shift shock; excessive tight corner "braking".

WIRING DIAGRAM:

NON-TURBO MODEL

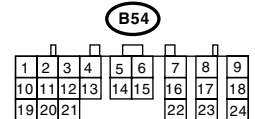
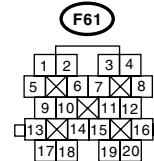
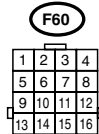
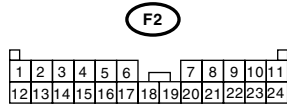
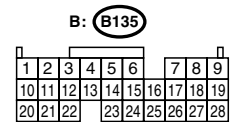
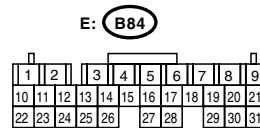
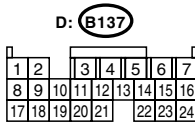
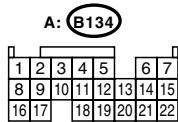
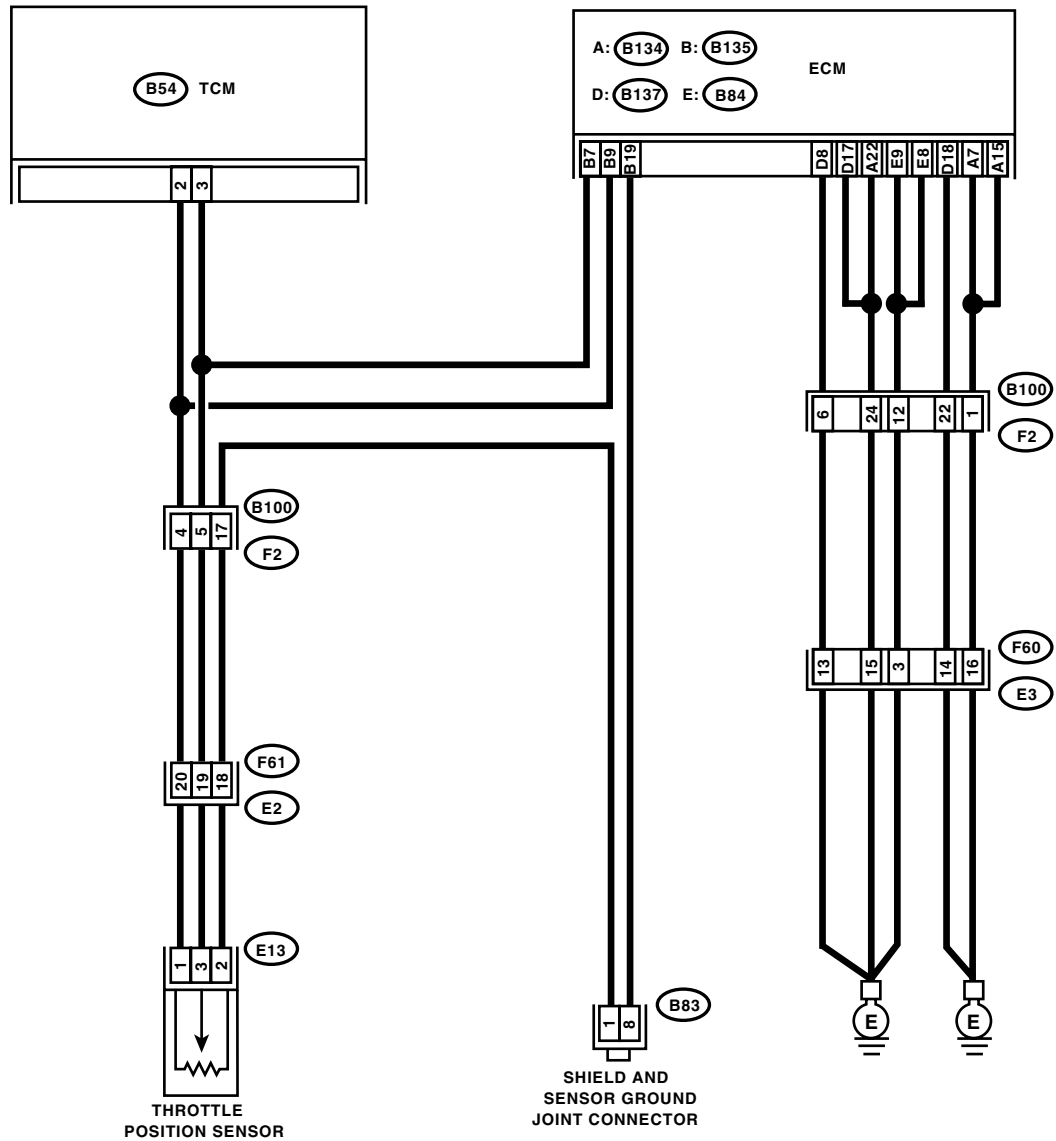


AT-01286

DIAGNOSTIC PROCEDURE WITH DIAGNOSTIC TROUBLE CODE (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

TURBO MODEL



AT-01287

DIAGNOSTIC PROCEDURE WITH DIAGNOSTIC TROUBLE CODE (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK ENGINE GROUND TERMINALS.	Have engine ground terminals been tightened?	Go to step 2.	Tighten the engine ground terminals.
2 CHECK GROUND CIRCUIT OF ECM. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Measure the resistance of harness between ECM and engine ground. Connector & terminal NON-TURBO MODEL (B134) No. 35 — Engine ground: (B135) No. 21 — Engine ground: (B136) No. 5 — Engine ground: (B136) No. 16 — Engine ground: (B136) No. 26 — Engine ground: (B137) No. 14 — Engine ground: (B134) No. 7 — Engine ground: TURBO MODEL (B134) No. 7 — Engine ground: (B134) No. 15 — Engine ground: (B134) No. 22 — Engine ground: (B137) No. 8 — Engine ground: (B137) No. 17 — Engine ground: (B137) No. 18 — Engine ground: (B84) No. 8 — Engine ground: (B84) No. 9 — Engine ground:	Is the resistance less than 5 Ω ?	Go to step 3.	Repair the open circuit in harness between ECM connector and engine grounding terminal.
3 CHECK THROTTLE POSITION SENSOR. 1) Disconnect the connector from throttle position sensor. 2) Measure the resistance between throttle position sensor connector receptacle's terminals. Terminals NON-TURBO MODEL No. 4 — No. 2: TURBO MODEL No. 1 — No. 2:	Is the resistance 3.0 — 4.2 k Ω ?	Go to step 4.	Replace the throttle position sensor.
4 CHECK THROTTLE POSITION SENSOR. Measure the resistance between throttle position sensor connector receptacle's terminals. Terminals No. 2 — No. 3:	Is the resistance 0.35 — 0.5 k Ω ?	Go to step 5.	Replace the throttle position sensor.
5 CHECK HARNESS CONNECTOR BETWEEN TCM AND THROTTLE POSITION SENSOR. 1) Disconnect the connector from TCM. 2) Measure the resistance of harness between TCM and throttle position sensor connector. Connector & terminal NON-TURBO MODEL (B55) No. 2 — (E13) No. 3: TURBO MODEL (B54) No. 3 — (E13) No. 3:	Is the resistance less than 1 Ω ?	Go to step 6.	Repair the open circuit in harness between TCM and throttle position sensor connector, and poor contact in coupling connector.
6 CHECK HARNESS CONNECTOR BETWEEN TCM AND THROTTLE POSITION SENSOR. Measure the resistance of harness between TCM and throttle position sensor connector. Connector & terminal NON-TURBO MODEL (B55) No. 1 — (E13) No. 4: TURBO MODEL (B54) No. 2 — (E13) No. 1:	Is the resistance less than 1 Ω ?	Go to step 7.	Repair the open circuit in harness between TCM and throttle position sensor connector, and poor contact in coupling connector.

DIAGNOSTIC PROCEDURE WITH DIAGNOSTIC TROUBLE CODE (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step	Check	Yes	No
7 CHECK HARNESS CONNECTOR BETWEEN TCM AND THROTTLE POSITION SENSOR. Measure the resistance of harness between TCM connector and chassis ground. Connector & terminal NON-TURBO MODEL (B55) No. 2 — Chassis ground: TURBO MODEL (B54) No. 3 — Chassis ground:	Is the resistance more than 1 MΩ?	Go to step 8.	Repair the short circuit in harness between TCM and throttle position sensor connector.
8 CHECK HARNESS CONNECTOR BETWEEN TCM AND THROTTLE POSITION SENSOR. Measure the resistance of harness between TCM connector and chassis ground. Connector & terminal (B54) No. 2 — Chassis ground:	Is the resistance more than 1 MΩ?	Go to step 9.	Repair the short circuit in harness between TCM and throttle position sensor connector.
9 CHECK HARNESS CONNECTOR BETWEEN TCM AND ECM. Measure the resistance of harness between TCM and ECM connector. Connector & terminal NON-TURBO MODEL (B55) No. 2 — (B135) No. 13: TURBO MODEL (B54) No. 3 — (B135) No. 7:	Is the resistance less than 1 Ω?	Go to step 10.	Repair the open circuit in harness between TCM and ECM connector.
10 CHECK HARNESS CONNECTOR BETWEEN TCM AND ECM. Measure the resistance of harness between TCM and ECM connector. Connector & terminal NON-TURBO MODEL (B55) No. 1 — (B135) No. 3: TURBO MODEL (B54) No. 2 — (B135) No. 9:	Is the resistance less than 1 Ω?	Go to step 11.	Repair the open circuit in harness between TCM and ECM connector.
11 PREPARE SUBARU SELECT MONITOR.	Do you have a Subaru Select Monitor?	Go to step 14.	Go to step 12.
12 CHECK INPUT SIGNAL FOR TCM. 1)Connect the connectors to TCM, throttle position sensor and ECM. 2)Turn the ignition switch to ON (engine OFF). 3)Close the throttle completely. 4)Measure the voltage between TCM connector and chassis ground. Connector & terminal NON-TURBO MODEL (B55) No. 2 (+) — Chassis ground (-): TURBO MODEL (B54) No. 3 (+) — Chassis ground (-):	Is the voltage 0.2 — 1.0 V?	Go to step 13.	Go to step 18.
13 CHECK INPUT SIGNAL FOR TCM. 1)Open the throttle completely and hold it. 2)Measure the voltage between TCM connector and chassis ground. Connector & terminal NON-TURBO MODEL (B55) No. 2 (+) — Chassis ground (-): TURBO MODEL (B54) No. 3 (+) — Chassis ground (-):	Is the voltage 4.2 — 4.7 V?	Go to step 16.	Go to step 18.

DIAGNOSTIC PROCEDURE WITH DIAGNOSTIC TROUBLE CODE (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step	Check	Yes	No
14 CHECK INPUT SIGNAL FOR TCM USING SUBARU SELECT MONITOR. 1)Connect the connectors to TCM, throttle position sensor and ECM. 2)Connect the Subaru Select Monitor to data link connector. 3)Turn the ignition switch to ON (engine OFF). 4)Turn the Subaru Select Monitor switch to ON. 5)Throttle fully closed. 6)Read the data of throttle position sensor using Subaru Select Monitor. •Throttle position sensor input signal is indicated.	Is the value voltage 0.2 — 1.0 V?	Go to step 15.	Go to step 18.
15 CHECK INPUT SIGNAL FOR TCM USING SUBARU SELECT MONITOR. Throttle fully open. NOTE: Must be changed correspondingly with the accelerator pedal operation (from “released” to “depressed” position).	Is the value voltage 4.2 — 4.7 V?	Go to step 18.	Go to step 17.
16 CHECK INPUT SIGNAL FOR TCM (THROTTLE POSITION SENSOR POWER SUPPLY). Measure the voltage between TCM connector and chassis ground. <i>Connector & terminal</i> NON-TURBO MODEL <i>(B55) No. 1 (+) — Chassis ground (-):</i> TURBO MODEL <i>(B54) No. 2 (+) — Chassis ground (-):</i>	Is the voltage 4.8 — 5.3 V?	Even if the AT OIL TEMP warning light illuminates, the circuit has returned to a normal condition at this time. A temporary poor contact of the connector or harness may be the cause. Repair the harness or connector in throttle position sensor circuit.	Go to step 18.
17 CHECK INPUT SIGNAL FOR TCM USING SUBARU SELECT MONITOR (THROTTLE POSITION SENSOR POWER SUPPLY). Read the data of throttle position sensor power supply using Subaru Select Monitor. •Throttle position sensor power supply voltage is indicated.	Is the value voltage 4.8 — 5.3 V?	Even if the AT OIL TEMP warning light illuminates, the circuit has returned to a normal condition at this time. A temporary poor contact of the connector or harness may be the cause. Repair the harness or connector in throttle position sensor circuit.	Go to step 18.
18 CHECK POOR CONTACT.	Is there poor contact in throttle position sensor circuit?	Repair the poor contact.	Replace the TCM. <Ref. to 4AT-67, Transmission Control Module (TCM).>

DIAGNOSTIC PROCEDURE WITH DIAGNOSTIC TROUBLE CODE (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

E: DTC 33 FRONT VEHICLE SPEED SENSOR

DIAGNOSIS:

- The vehicle speed signal is abnormal.
- The circuit in combination meter is faulty.
- The harness connector between TCM and vehicle speed sensor is in short or open.

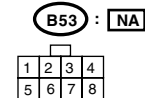
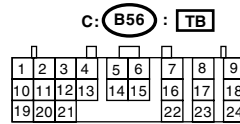
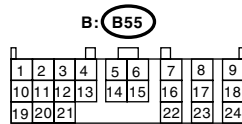
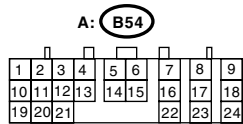
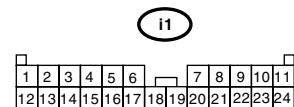
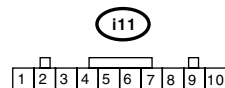
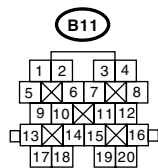
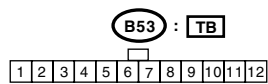
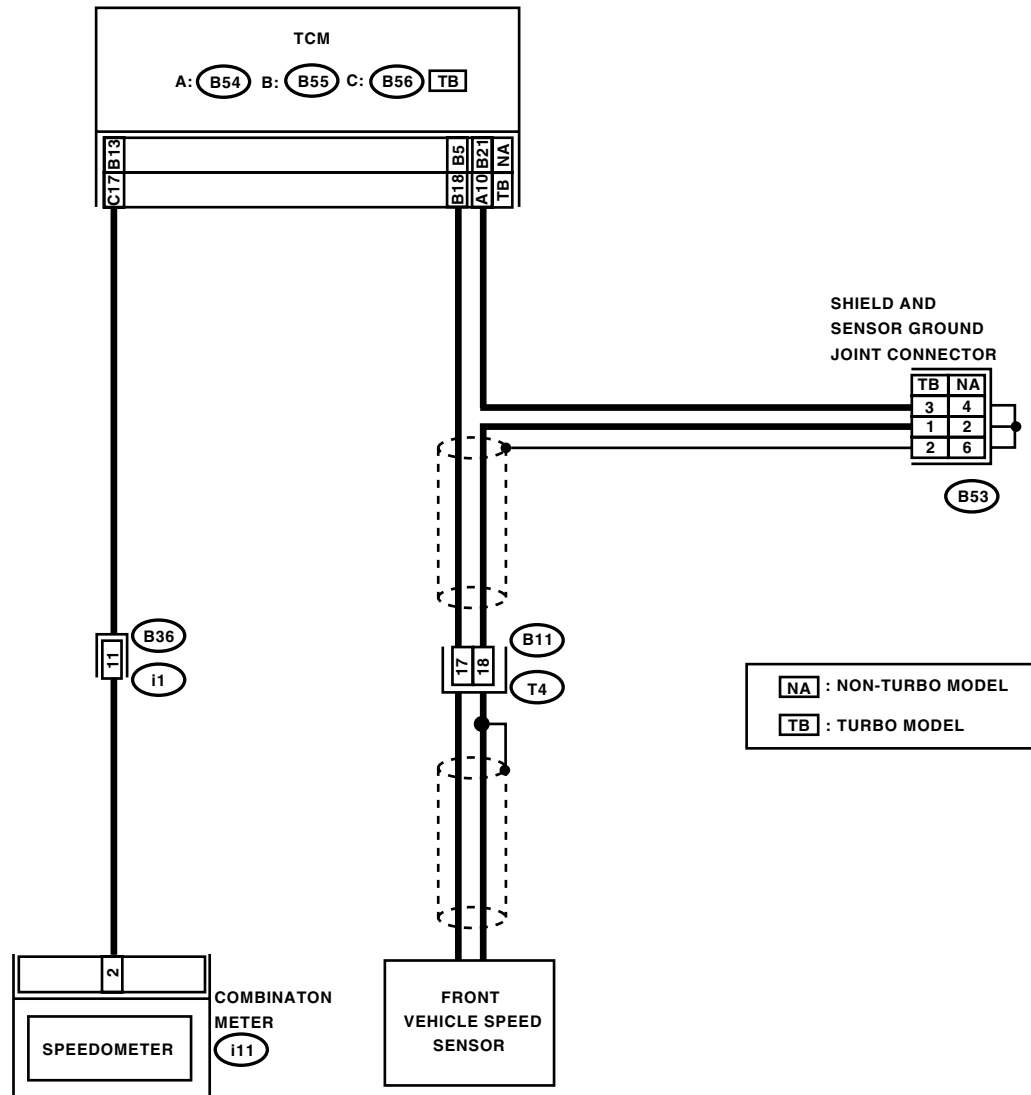
TROUBLE SYMPTOM:

- Erroneous idling.
- Engine stalls.
- Poor driving performance.

DIAGNOSTIC PROCEDURE WITH DIAGNOSTIC TROUBLE CODE (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

WIRING DIAGRAM:



AT-01288

DIAGNOSTIC PROCEDURE WITH DIAGNOSTIC TROUBLE CODE (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step		Check	Yes	No
1	CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from TCM and transmission. 3) Measure the resistance of harness between TCM and transmission connector. Connector & terminal NON-TURBO MODEL (B55) No. 5 — (B11) No. 17: TURBO MODEL (B55) No. 18 — (B11) No. 17:	Is the resistance less than 1 Ω ?	Go to step 2.	Repair the open circuit in harness between TCM and transmission connector.
2	CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION. Measure the resistance of harness between TCM and transmission connector. Connector & terminal NON-TURBO MODEL (B55) No. 21 — (B11) No. 18: TURBO MODEL (B54) No. 10 — (B11) No. 18:	Is the resistance less than 1 Ω ?	Go to step 3.	Repair the open circuit in harness between TCM and transmission connector, and poor contact in coupling connector.
3	CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION. Measure the resistance of harness between TCM and transmission connector. Connector & terminal NON-TURBO MODEL (B55) No. 21 — Chassis ground: TURBO MODEL (B54) No. 10 — Chassis ground:	Is the resistance more than 1 M Ω ?	Go to step 4.	Repair the short circuit in harness between TCM and transmission connector.
4	CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION. Measure the resistance of harness between TCM and transmission connector. Connector & terminal NON-TURBO MODEL (B55) No. 5 — Chassis ground: TURBO MODEL (B55) No. 18 — Chassis ground:	Is the resistance more than 1 M Ω ?	Go to step 5.	Repair the short circuit in harness between TCM and transmission connector, and poor contact in coupling connector.
5	CHECK FRONT VEHICLE SPEED SENSOR. Measure the resistance between transmission connector receptacle's terminals. Connector & terminal (T4) No. 17 — No. 18:	Is the resistance 450 — 650 Ω ?	Go to step 6.	Replace the front vehicle speed sensor. <Ref. to 4AT-49, Front Vehicle Speed Sensor.>
6	PREPARE OSCILLOSCOPE.	Do you have an oscilloscope?	Go to step 9.	Go to step 7.
7	PREPARE SUBARU SELECT MONITOR.	Do you have a Subaru Select Monitor?	Go to step 10.	Go to step 8.

DIAGNOSTIC PROCEDURE WITH DIAGNOSTIC TROUBLE CODE (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step		Check	Yes	No
8	CHECK INPUT SIGNAL FOR TCM. 1)Connect all connectors. 2)Lift-up or raise the vehicle and place safety stands. NOTE: Raise all wheels off floor. 3)Start the engine and set vehicle in 20 km/h (12 MPH) condition. NOTE: The speed difference between front and rear wheels may light the ABS warning light, but this indicates no malfunction. When AT control diagnosis is finished, perform the ABS memory clearance procedure of on-board diagnostics system. <Ref. to ABS-21, Clear Memory Mode.> 4)Measure the voltage between TCM connector terminals. Connector & terminal NON-TURBO MODEL (B55) No. 5 (+) — (B55) No. 21 (-): TURBO MODEL (B55) No. 18 (+) — (B54) No. 10 (-):	Is the voltage more than AC 1 V?	Even if the AT OIL TEMP warning light illuminates, the circuit has returned to a normal condition at this time. A temporary poor contact or harness may be the cause. Repair the harness or connector in the front vehicle speed sensor circuit.	Go to step 11.
	CHECK FRONT VEHICLE SPEED SENSOR USING OSCILLOSCOPE. 1)Connect all connectors. 2)Lift-up the vehicle and place safety stand. NOTE: Raise all wheels off ground. 3)Set the oscilloscope to TCM connector terminals. Connector & terminal NON-TURBO MODEL Positive probe; (B55) No. 5: Ground lead; (B55) No. 21: TURBO MODEL Positive probe; (B55) No. 18: Ground lead; (B54) No. 10: 4)Start the engine, and drive the wheels slowly. NOTE: The speed difference between front and rear wheels may light the ABS warning light, but this indicates no malfunctions. When AT control diagnosis is finished, perform the ABS memory clearance procedure of self-diagnosis system. <Ref. to ABS-21, Clear Memory Mode.> 5)Measure the signal voltage indicated on oscilloscope.	Is the voltage more than AC 4 V?	Even if the AT OIL TEMP warning light illuminates, the circuit has returned to a normal condition at this time. A temporary poor contact or harness may be the cause. Repair the harness or connector in front vehicle speed sensor circuit.	Go to step 11.

DIAGNOSTIC PROCEDURE WITH DIAGNOSTIC TROUBLE CODE (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step	Check	Yes	No
10 CHECK INPUT SIGNAL FOR TCM USING SUBARU SELECT MONITOR. 1)Connect all connectors. 2)Connect the Subaru Select Monitor to data link connector. 3)Lift-up or raise the vehicle and place safety stands. NOTE: Raise all wheels off floor. 4)Turn the ignition switch to ON and turn Subaru Select Monitor switch to ON. 5)Start the engine. 6)Read the data of vehicle speed using Subaru Select Monitor. •Compare the speedometer with Subaru Select Monitor indications. •Vehicle speed is indicated in “km/h” or “MPH”. 7)Slowly increase the vehicle speed to 60 km/h or 37 MPH. NOTE: The speed difference between front and rear wheels may light the ABS warning light, but this indicates no malfunction. When AT control diagnosis is finished, perform the ABS memory clearance procedure of on-board diagnostics system. <Ref. to ABS-21, Clear Memory Mode.>	Does the speedometer indication increase as Subaru Select Monitor data increases?	Even if the AT OIL TEMP warning light illuminates, the circuit has returned to a normal condition at this time. A temporary poor connector or harness may be the cause. Repair the harness or connector in front vehicle speed sensor circuit.	Go to step 11.
11 CHECK POOR CONTACT.	Is there poor contact in front vehicle speed sensor circuit?	Repair the poor contact.	Replace the TCM. <Ref. to 4AT-67, Transmission Control Module (TCM).>

DIAGNOSTIC PROCEDURE WITH DIAGNOSTIC TROUBLE CODE (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

F: DTC 36 TORQUE CONVERTER TURBINE SPEED SENSOR

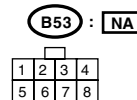
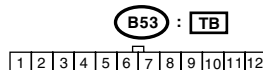
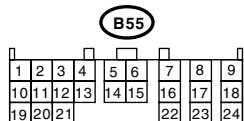
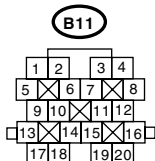
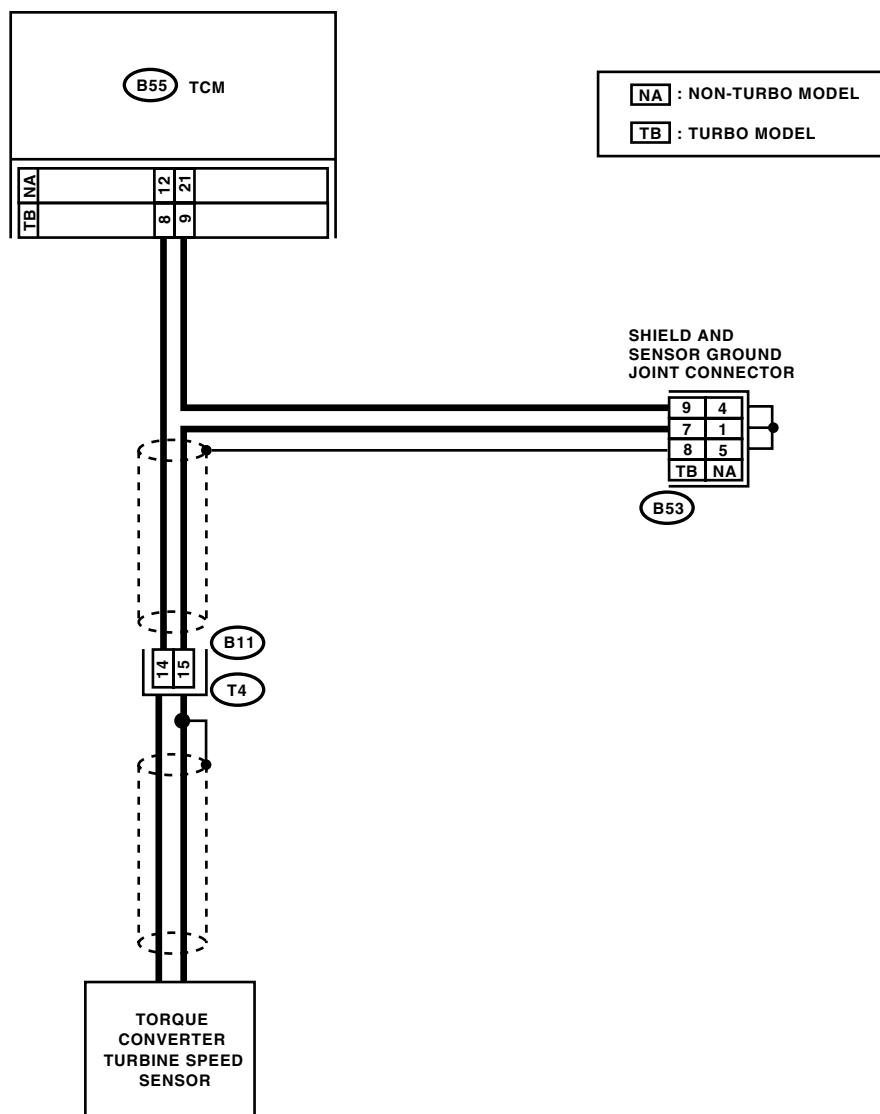
DIAGNOSIS:

The input signal circuit of TCM is open or shorted.

TROUBLE SYMPTOM:

Excessive shift shock.

WIRING DIAGRAM:



DIAGNOSTIC PROCEDURE WITH DIAGNOSTIC TROUBLE CODE (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step		Check	Yes	No
1	CHECK TORQUE CONVERTER TURBINE SPEED SENSOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from transmission. 3) Measure the resistance between transmission connector receptacle's terminals. Connector & terminal (T4) No. 14 — No. 15:	Is the resistance 450 — 650 Ω ?	Go to step 2.	Replace the turbine speed sensor. <Ref. to 4AT-54, Torque Converter Turbine Speed Sensor.>
2	CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION. 1) Disconnect the connector from TCM. 2) Measure the resistance of harness between TCM and transmission connector. Connector & terminal NON-TURBO MODEL (B55) No. 12 — (B11) No. 14: TURBO MODEL (B55) No. 8 — (B11) No. 14:	Is the resistance less than 1 Ω ?	Go to step 3.	Repair the open circuit in harness between TCM and transmission connector.
3	CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION. Measure the resistance of harness between TCM and transmission connector. Connector & terminal NON-TURBO MODEL (B55) No. 21 — (B11) No. 15: TURBO MODEL (B55) No. 9 — (B11) No. 15:	Is the resistance less than 1 Ω ?	Go to step 4.	Repair the open circuit in harness between TCM and transmission connector, and poor contact in coupling connector.
4	CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION. Measure the resistance of harness between TCM and chassis ground. Connector & terminal NON-TURBO MODEL (B55) No. 21 — Chassis ground: TURBO MODEL (B55) No. 9 — Chassis ground:	Is the resistance more than 1 M Ω ?	Go to step 5.	Repair the short circuit in harness between TCM and transmission connector.
5	CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION. Measure the resistance of harness between TCM and chassis ground. Connector & terminal NON-TURBO MODEL (B55) No. 12 — Chassis ground: TURBO MODEL (B55) No. 8 — Chassis ground:	Is the resistance more than 1 M Ω ?	Go to step 6.	Repair the short circuit in harness between TCM and transmission connector, and poor contact in coupling connector.
6	PREPARE OSCILLOSCOPE.	Do you have an oscilloscope?	Go to step 10.	Go to step 7.
7	PREPARE SUBARU SELECT MONITOR.	Do you have a Subaru Select Monitor?	Go to step 9.	Go to step 8.

DIAGNOSTIC PROCEDURE WITH DIAGNOSTIC TROUBLE CODE (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step		Check	Yes	No
8	CHECK INPUT SIGNAL FOR TCM. 1)Connect the connectors to TCM and transmission. 2)Start the engine and move select lever to "P" or "N" range. 3)Measure the voltage between TCM connector terminals. Connector & terminal NON-TURBO MODEL (B55) No. 12 (+) — No. 21 (-): TURBO MODEL (B55) No. 8 (+) — No. 9 (-):	Is the voltage more than AC 1 V?	Even if the AT OIL TEMP warning light illuminates, the circuit has returned to a normal condition at this time. A temporary poor contact of the connector or harness may be the cause. Repair the harness or connector in TCM and transmission.	Go to step 11.
9	CHECK INPUT SIGNAL FOR TCM USING SUBARU SELECT MONITOR. 1)Connect the connectors to TCM and transmission. 2)Connect the Subaru Select Monitor to data link connector. 3)Turn the ignition switch to ON and turn Subaru Select Monitor switch to ON. 4)Start the engine. 5)Move the select lever to "P" or "N" range. 6)Read the data of turbine speed using Subaru Select Monitor. •Compare the tachometer with Subaru Select Monitor indications.	Is the revolution value same as the tachometer reading shown on the combination meter?	Even if the AT OIL TEMP warning light illuminates, the circuit has returned to a normal condition at this time. A temporary poor contact of the connector or harness may be the cause. Repair the harness or connector in TCM and transmission.	Go to step 11.
10	CHECK INPUT SIGNAL FOR TCM USING OSCILLOSCOPE. 1)Connect the connectors to TCM and transmission. 2)Set the oscilloscope to TCM connector terminals. Connector & terminal NON-TURBO MODEL Positive probe; (B55) No. 12: Ground lead; (B55) No. 21: TURBO MODEL Positive probe; (B55) No. 8: Ground lead; (B55) No. 9: 3)Start the engine and move select lever to "P" or "N" range.	Is the signal voltage more than AC 1 V?	Even if the AT OIL TEMP warning light illuminates, the circuit has returned to a normal condition at this time. A temporary poor contact of the connector or harness may be the cause. Repair the harness or connector in TCM and transmission.	Go to step 11.
11	CHECK POOR CONTACT.	Is there poor contact in torque converter turbine speed sensor circuit?	Repair the poor contact.	Replace the TCM. <Ref. to 4AT-67, Transmission Control Module (TCM).>

DIAGNOSTIC PROCEDURE WITH DIAGNOSTIC TROUBLE CODE (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

G: DTC 38 TORQUE CONTROL SIGNAL

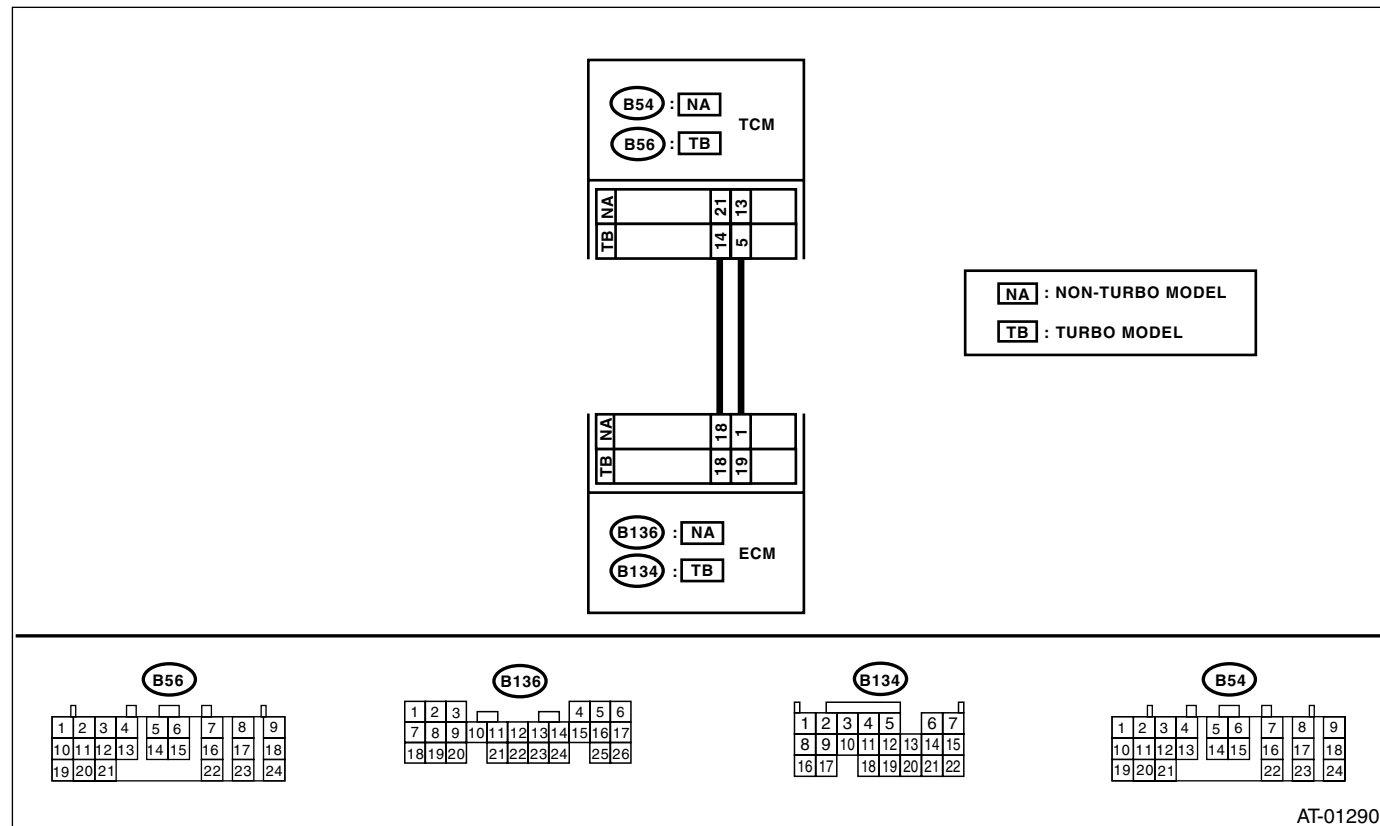
DIAGNOSIS:

- The signal circuit is open or shorted.

TROUBLE SYMPTOM:

Excessive shift shock.

WIRING DIAGRAM:



AT-01290

Step	Check	Yes	No
1 CHECK HARNESS CONNECTOR BETWEEN TCM AND ECM. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from TCM and ECM. 3) Measure the resistance of harness between TCM and ECM connector. Connector & terminal NON-TURBO MODEL (B54) No. 21 — (B136) No. 18: (B54) No. 13 — (B136) No. 1: TURBO MODEL (B56) No. 14 — (B134) No. 18: (B56) No. 5 — (B134) No. 19:	Is the resistance less than 1 Ω?	Go to step 2.	Repair the open circuit in harness between TCM and ECM connector.

DIAGNOSTIC PROCEDURE WITH DIAGNOSTIC TROUBLE CODE (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step	Check	Yes	No
2 CHECK HARNESS CONNECTOR BETWEEN TCM AND ECM. Measure the resistance of harness between TCM connector and chassis ground. Connector & terminal NON-TURBO MODEL (B54) No. 21 — Chassis ground: (B54) No. 13 — Chassis ground: TURBO MODEL (B56) No. 14 — Chassis ground: (B56) No. 5 — Chassis ground:	Is the resistance more than 1 MΩ?	Go to step 3.	Repair the short circuit in harness between TCM and ECM connector.
3 CHECK OUTPUT SIGNAL EMITTED FROM TCM. 1)Connect the connectors to TCM and ECM. 2)Turn the ignition switch to ON (engine OFF). 3)Measure the voltage between TCM connector terminals. Connector & terminal NON-TURBO MODEL (B54) No. 21 (+) — Chassis ground (-): (B54) No. 13 (+) — Chassis ground (-): TURBO MODEL (B56) No. 14 (+) — Chassis ground (-): (B56) No. 5 (+) — Chassis ground (-):	Is the voltage more than 4.8 V?	Even if the AT OIL TEMP warning light illuminates, the circuit has returned to a normal condition at this time. A temporary poor contact of the connector or harness may be the cause. Repair the harness or connector in TCM and ECM.	Go to step 4.
4 CHECK POOR CONTACT.	Is there poor contact in torque control signal circuit?	Repair the poor contact.	Go to step 5.
5 CHECK GROUND LINE BETWEEN TRANSMISSION AND BODY. Check installing condition of the ground line in transmission and body.	Is there any dirt or rust at the ground line installing point?	Remove dirt and rust.	Go to step 6.
6 CHECK GROUND LINE BETWEEN TRANSMISSION AND BODY. Check installing condition of the ground line in transmission and body. Tightening torque: 10 — 16 N·m (1.0 — 1.6 kgf-m, 7.2 — 11.6 ft-lb)	Is the tightening torque value within specification?	Go to step 7.	Tighten to the specified torque.
7 CHECK GROUND LINE INSIDE TRANSMISSION. 1)Drain the ATF and remove oil pan. 2)Check the tightening torque value of ground line installing bolt. Tightening torque: 7 — 9 N·m (0.7 — 0.9 kgf-m, 5.1 — 6.5 ft-lb)	Is the tightening torque value within specification?	Go to step 9.	Tighten to the specified torque.
8 CHECK GROUND CIRCUIT OF ECM. <Ref. to 4AT-44, DTC 31 THROTTLE POSITION SENSOR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>	Is there any trouble?	Repair the ground terminal and/or ground circuit of ECM.	Go to step 9.

DIAGNOSTIC PROCEDURE WITH DIAGNOSTIC TROUBLE CODE (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step	Check	Yes	No
9 RECHECK OUTPUT SIGNAL EMITTED FROM TCM. Measure the voltage between TCM connector and chassis ground. Connector & terminal NON-TURBO MODEL (B54) No. 21 (+) — Chassis ground (-): (B54) No. 13 (+) — Chassis ground (-): TURBO MODEL (B56) No. 14 (+) — Chassis ground (-): (B56) No. 5 (+) — Chassis ground (-):	Is each voltage more than 4 V?	Replace the TCM. <Ref. to 4AT-67, Transmission Control Module (TCM).>	Replace the ECM.

DIAGNOSTIC PROCEDURE WITH DIAGNOSTIC TROUBLE CODE (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

H: DTC 45 INTAKE MANIFOLD PRESSURE SIGNAL (NON-TURBO MODEL)

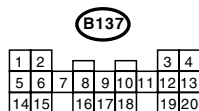
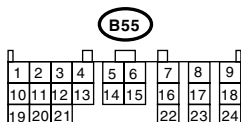
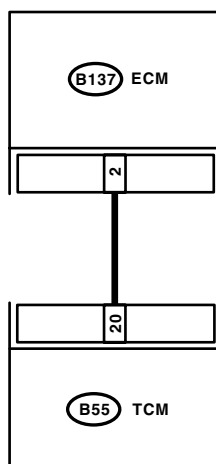
DIAGNOSIS:

The input signal circuit of TCM from ECM is open or shorted.

TROUBLE SYMPTOM:

Excessive shift shock.

WIRING DIAGRAM:



AT-01291

Step	Check	Yes	No
1 CHECK ENGINE GROUND TERMINALS AND GROUND CIRCUIT OF ECM <Ref. to 4AT-44, DTC 31 THROTTLE POSITION SENSOR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>	Is there any trouble?	Repair the ground terminal and/or ground circuit of ECM.	Go to step 2.
2 CHECK HARNESS CONNECTOR BETWEEN TCM AND ECM. 1)Turn the ignition switch to OFF. 2)Disconnect the connectors from TCM and ECM. 3)Measure the resistance of harness between TCM and ECM connector. Connector & terminal (B55) No. 20 — (B137) No. 2:	Is the resistance less than 1 Ω?	Go to step 3.	Repair the open circuit in harness between TCM and ECM connector.
3 CHECK HARNESS CONNECTOR BETWEEN TCM AND ECM. Measure the resistance of harness between TCM connector and chassis ground. Connector & terminal (B55) No. 20 — Chassis ground:	Is the resistance more than 1 MΩ?	Go to step 4.	Repair the short circuit in harness between TCM and ECM connector.
4 PREPARE SUBARU SELECT MONITOR.	Do you have a Subaru Select Monitor?	Go to step 6.	Go to step 5.

DIAGNOSTIC PROCEDURE WITH DIAGNOSTIC TROUBLE CODE (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step		Check	Yes	No
5	CHECK INPUT SIGNAL FOR TCM. 1)Connect the connectors to TCM and ECM. 2)Start the engine, and warm-up the transmission until ATF temperature is above 80°C (176°F). NOTE: If ambient temperature is below 0°C (32°F), drive the vehicle until ATF reaches its operating temperature. 3)Idle the engine. 4)Measure the voltage between TCM connector and chassis ground. Connector & terminal (B55) No. 20 (+) — Chassis ground (–):	Is the voltage 0.4 — 1.6 V?	Even if the AT OIL TEMP warning light illuminates, the circuit has returned to a normal condition at this time. A temporary poor contact of the connector or harness may be the cause. Repair the harness or connector in TCM and ECM.	Go to step 7.
6	CHECK INPUT SIGNAL FOR TCM USING SUBARU SELECT MONITOR. 1)Connect the connectors to TCM and ECM. 2)Connect the Subaru Select Monitor to data link connector. 3)Start the engine, and turn Subaru Select Monitor switch to ON. 4)Warm-up the engine until engine coolant temperature is above 80°C (176°F). 5)Idle the engine. 6)Read the data of intake manifold pressure signal using Subaru Select Monitor. •Display shows the intake manifold pressure signal value sent from ECM.	Is the value voltage 0.4 — 1.6 V?	Even if the AT OIL TEMP warning light illuminates, the circuit has returned to a normal condition at this time. A temporary poor contact of the connector or harness may be the cause. Repair the harness or connector in TCM and ECM.	Go to step 7.
7	CHECK POOR CONTACT.	Is there poor contact in intake manifold pressure signal circuit?	Repair the poor contact.	Replace the TCM. <Ref. to 4AT-67, Transmission Control Module (TCM).>

DIAGNOSTIC PROCEDURE WITH DIAGNOSTIC TROUBLE CODE (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

I: DTC 71 SHIFT SOLENOID 1

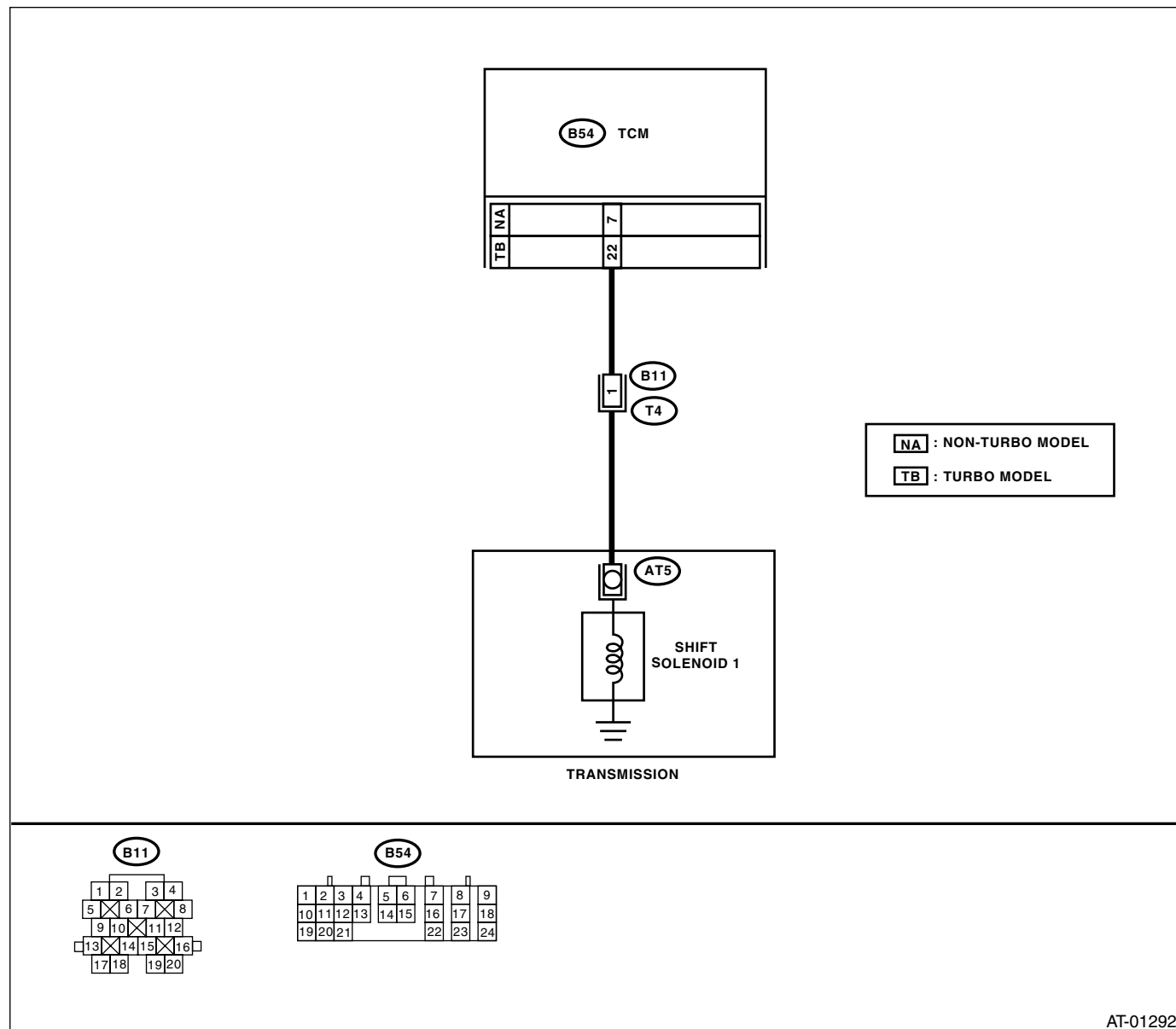
DIAGNOSIS:

The output signal circuit of shift solenoid 1 is open or shorted.

TROUBLE SYMPTOM:

Does not shift.

WIRING DIAGRAM:



AT-01292

DIAGNOSTIC PROCEDURE WITH DIAGNOSTIC TROUBLE CODE (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from TCM and transmission. 3) Measure the resistance of harness between TCM and shift solenoid 1 connector. Connector & terminal NON-TURBO MODEL (B54) No. 7 — (B11) No. 1: TURBO MODEL (B54) No. 22 — (B11) No. 1:	Is the resistance less than 1 Ω ?	Go to step 2.	Repair the open circuit in harness between TCM and transmission connector.
2 CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION. Measure the resistance of harness between TCM connector and chassis ground. Connector & terminal NON-TURBO MODEL (B54) No. 7 — Chassis ground: TURBO MODEL (B54) No. 22 — Chassis ground:	Is the resistance more than 1 M Ω ?	Go to step 3.	Repair the short circuit in harness between TCM and transmission connector.
3 CHECK SHIFT SOLENOID 1. Measure the resistance between transmission connector terminals. Connector & terminal (T4) No. 1 — No. 16:	Is the resistance 10 — 16 Ω ?	Go to step 4.	Go to step 7.
4 CHECK OUTPUT SIGNAL EMITTED FROM TCM. 1) Connect the connectors to TCM and transmission. 2) Turn the ignition switch to ON (engine OFF). 3) Move the select lever to "D" range. 4) Measure the voltage between TCM connector and chassis ground. Connector & terminal NON-TURBO MODEL (B54) No. 7 (+) — Chassis ground (-): TURBO MODEL (B54) No. 22 (+) — Chassis ground (-):	Is the voltage more than 9 V?	Go to step 5.	Go to step 6.
5 CHECK OUTPUT SIGNAL EMITTED FROM TCM. 1) Move the select lever to "2" range. 2) Measure the voltage between TCM connector and chassis ground. Connector & terminal NON-TURBO MODEL (B54) No. 7 (+) — Chassis ground (-): TURBO MODEL (B54) No. 22 (+) — Chassis ground (-):	Is the voltage less than 1 V?	Even if the AT OIL TEMP warning light illuminates, the circuit has returned to a normal condition at this time. A temporary poor contact of the connector or harness may be the cause. Repair the harness or contact in TCM.	Go to step 6.
6 CHECK POOR CONTACT.	Is there poor contact in shift solenoid 1 circuit?	Repair poor contact.	Replace the TCM. <Ref. to 4AT-67, Transmission Control Module (TCM).>

DIAGNOSTIC PROCEDURE WITH DIAGNOSTIC TROUBLE CODE (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step		Check	Yes	No
7	CHECK SHIFT SOLENOID 1 (IN TRANSMISSION). 1) Remove the transmission connector from bracket. 2) Lift-up or raise the vehicle and support with safety stand. NOTE: Raise all wheels off ground. 3) Drain the ATF. CAUTION: Do not drain the ATF until it cools down. 4) Remove the oil pan, and disconnect connector from shift solenoid 1. 5) Measure the resistance between shift solenoid 1 connector and transmission ground. Terminals No. 1 — Transmission ground:	Is the resistance 10 — 16 Ω ?	Go to step 8.	Replace the shift solenoid 1. <Ref. to 4AT-61, Shift Solenoids, Duty Solenoids and ATF Temperature Sensor.>
8	CHECK HARNESS CONNECTOR BETWEEN SHIFT SOLENOID 1 AND TRANSMISSION. Measure the resistance of harness between shift solenoid 1 and transmission connector. Connector & terminal (T4) No. 1 — (AT5) No. 1:	Is the resistance less than 1 Ω ?	Go to step 9.	Repair the open circuit in harness between shift solenoid 1 and transmission connector.
9	CHECK HARNESS CONNECTOR BETWEEN SHIFT SOLENOID 1 AND TRANSMISSION. Measure the resistance of harness between shift solenoid 1 connector and transmission ground. Connector & terminal (T4) No. 1 — Transmission ground:	Is the resistance more than 1 M Ω ?	Even if the AT OIL TEMP warning light illuminates, the circuit has returned to a normal condition at this time. A temporary poor contact of the connector or harness may be the cause. Repair the harness or connector in shift solenoid 1 and transmission.	Repair the short circuit harness between shift solenoid 1 and transmission connector.

DIAGNOSTIC PROCEDURE WITH DIAGNOSTIC TROUBLE CODE (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

J: DTC 72 SHIFT SOLENOID 2

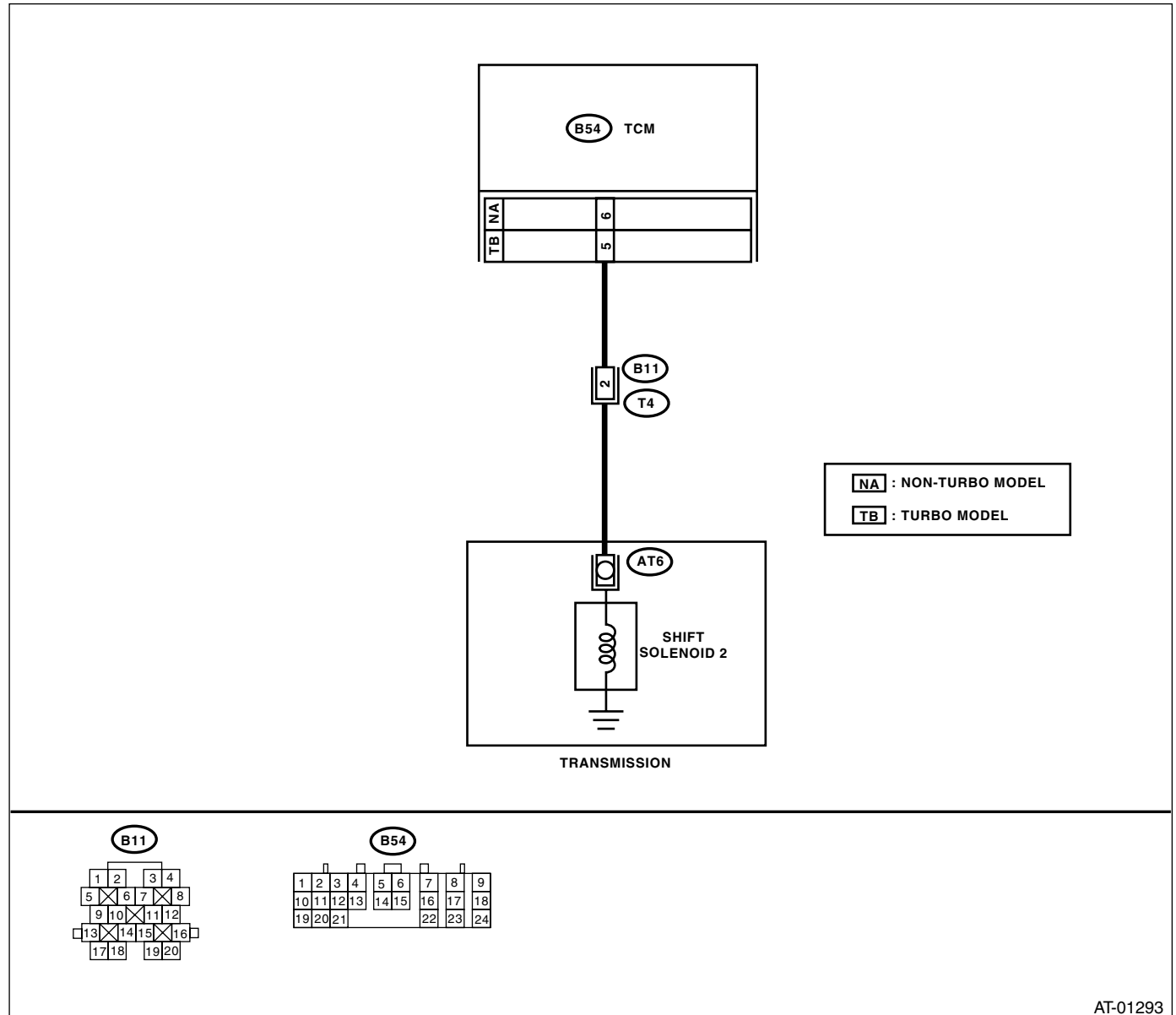
DIAGNOSIS:

The output signal circuit of shift solenoid 2 is open or shorted.

TROUBLE SYMPTOM:

Does not shift.

WIRING DIAGRAM:



DIAGNOSTIC PROCEDURE WITH DIAGNOSTIC TROUBLE CODE (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from TCM and transmission. 3) Measure the resistance of harness between TCM and shift solenoid 2 connector. Connector & terminal NON-TURBO MODEL (B54) No. 6 — (B11) No. 2: TURBO MODEL (B54) No. 5 — (B11) No. 2:	Is the resistance less than 1 Ω ?	Go to step 2.	Repair the open circuit in harness between TCM and transmission connector.
2 CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION. Measure the resistance of harness between TCM connector and transmission ground. Connector & terminal NON-TURBO MODEL (B54) No. 6 — Chassis ground: TURBO MODEL (B54) No. 5 — Chassis ground:	Is the resistance more than 1 M Ω ?	Go to step 3.	Repair the short circuit in harness between TCM and transmission connector.
3 CHECK SHIFT SOLENOID 2. Measure the resistance between transmission connector terminals. Connector & terminal (T4) No. 2 — No. 16:	Is the resistance 10 — 16 Ω ?	Go to step 4.	Go to step 6.
4 CHECK OUTPUT SIGNAL EMITTED FROM TCM. 1) Connect the connectors to TCM and transmission. 2) Lift-up or raise the vehicle and support with safety stand. NOTE: Raise all wheels off ground. 3) Start the engine and warm-up the transmission until ATF temperature is above 80°C (176°F). NOTE: If ambient temperature is below 0°C (32°F), drive the vehicle until ATF reaches its operating temperature. 4) Move the selector lever to "D" range, and slowly increase vehicle speed to 50 km/h (31 MPH). NOTE: The speed difference between front and rear wheels may light the ABS warning light, but this indicates no malfunction. When AT control diagnosis is finished, perform the ABS memory clearance procedure of on-board diagnostics system. <Ref. to ABS-21, Clear Memory Mode.> 5) Measure the voltage between TCM connector and chassis ground. Connector & terminal NON-TURBO MODEL (B54) No. 6 (+) — Chassis ground (-): TURBO MODEL (B54) No. 5 (+) — Chassis ground (-):	Is the voltage less than 1 V?	Even if the AT OIL TEMP warning light illuminates, the circuit has returned to a normal condition at this time. A temporary poor contact of the connector or harness may be the cause. Repair the harness or connector in TCM and transmission.	Go to step 5.

DIAGNOSTIC PROCEDURE WITH DIAGNOSTIC TROUBLE CODE (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

	Step	Check	Yes	No
5	CHECK POOR CONTACT.	Is there poor contact in shift solenoid 2 circuit?	Repair the poor contact.	Replace the TCM. <Ref. to 4AT-67, Transmission Control Module (TCM).>
6	CHECK SHIFT SOLENOID 2 (IN TRANSMISSION). 1)Remove the transmission connector from bracket. 2)Drain the ATF. CAUTION: Do not drain the ATF until it cools down. 3)Remove the oil pan, and disconnect connector from shift solenoid 2. 4)Measure the resistance between shift solenoid 2 connector and transmission ground. Terminals No. 1 — Transmission ground:	Is the resistance 10 — 16 Ω?	Go to step 7.	Replace the shift solenoid 2. <Ref. to 4AT-61, Shift Solenoids, Duty Solenoids and ATF Temperature Sensor.>
7	CHECK HARNESS CONNECTOR BETWEEN SHIFT SOLENOID 2 AND TRANSMISSION. Measure the resistance of harness between shift solenoid 2 and transmission connector. Connector & terminal (AT6) No. 1 — (T4) No. 2:	Is the resistance less than 1 Ω?	Go to step 8.	Repair the open circuit in harness between shift solenoid 2 and transmission connector.
8	CHECK HARNESS CONNECTOR BETWEEN SHIFT SOLENOID 2 AND TRANSMISSION. Measure the resistance of harness between shift solenoid 2 connector and transmission ground. Connector & terminal (T4) No. 2 — Transmission ground:	Is the resistance more than 1 MΩ?	Even if the AT OIL TEMP warning light illuminates, the circuit has returned to a normal condition at this time. A temporary poor contact of the connector or harness may be the cause. Repair the harness or connector in shift solenoid 2 and transmission.	Repair the short circuit harness between shift solenoid 2 and transmission connector.

DIAGNOSTIC PROCEDURE WITH DIAGNOSTIC TROUBLE CODE (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

K: DTC 73 LOW CLUTCH TIMING SOLENOID

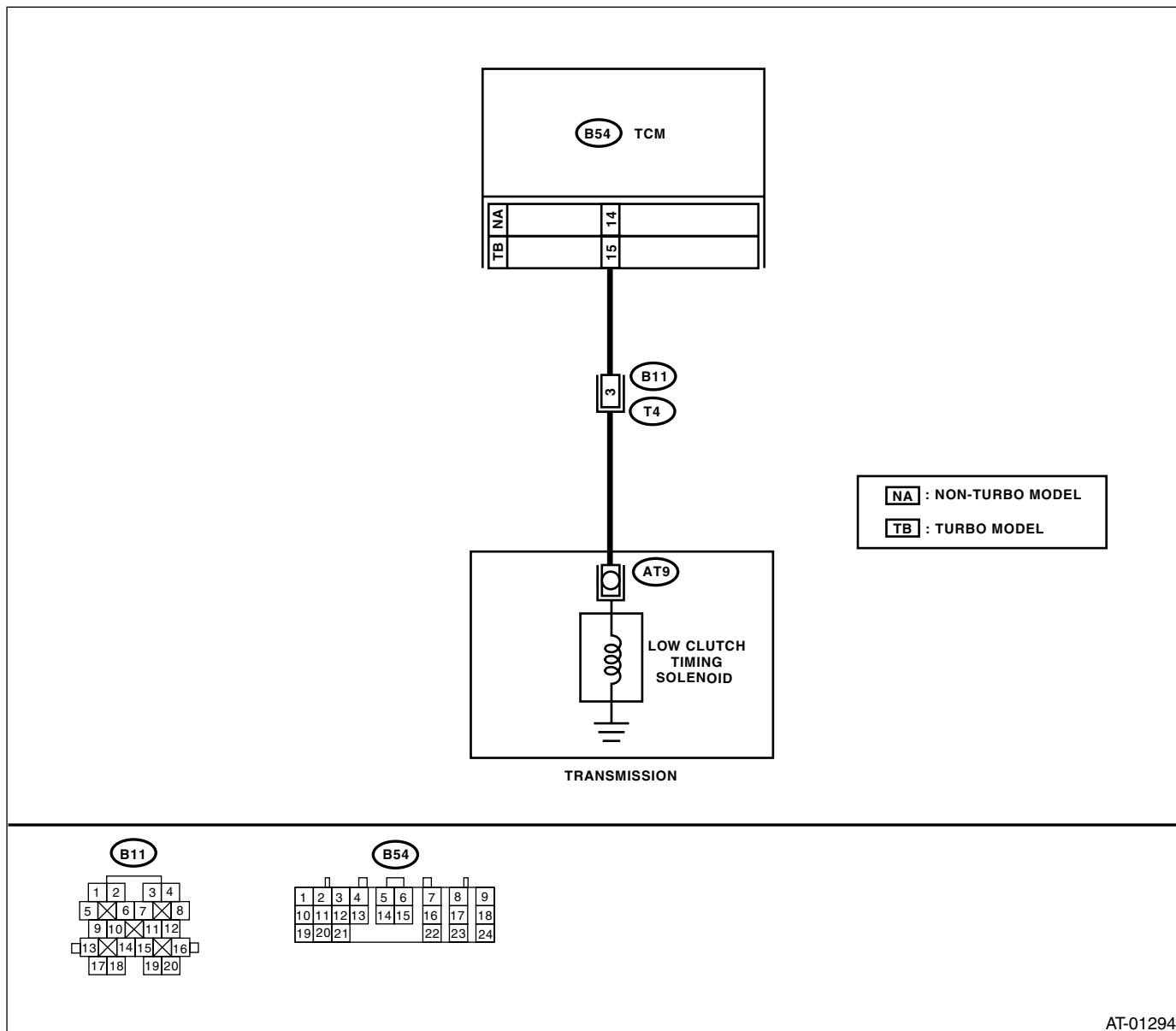
DIAGNOSIS:

The output signal circuit of low clutch timing solenoid is open or shorted.

TROUBLE SYMPTOM:

Excessive shift shock.

WIRING DIAGRAM:



AT-01294

DIAGNOSTIC PROCEDURE WITH DIAGNOSTIC TROUBLE CODE (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from TCM and transmission. 3) Measure the resistance of harness between TCM and transmission connector. Connector & terminal NON-TURBO MODEL (B54) No. 14 — (B11) No. 3: TURBO MODEL (B54) No. 15 — (B11) No. 3:	Is the resistance less than 1 Ω ?	Go to step 2.	Repair the open circuit in harness between TCM and transmission connector.
2 CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION. Measure the resistance of harness between TCM connector and transmission ground. Connector & terminal NON-TURBO MODEL (B54) No. 14 — Chassis ground: TURBO MODEL (B54) No. 15 — Chassis ground:	Is the resistance more than 1 M Ω ?	Go to step 3.	Repair the short circuit in harness between TCM and transmission connector.
3 CHECK LOW CLUTCH TIMING SOLENOID. Measure the resistance between transmission connector terminals. Connector & terminal (T4) No. 3 — No. 16:	Is the resistance 10 — 16 Ω ?	Go to step 4.	Go to step 7.
4 CHECK OUTPUT SIGNAL EMITTED FROM TCM. 1) Connect the connectors to TCM and transmission. 2) Turn the ignition switch to ON (engine OFF). 3) Move the select lever to "D" range. 4) Measure the voltage between TCM connector and chassis ground. Connector & terminal NON-TURBO MODEL (B54) No. 14 (+) — Chassis ground (-): TURBO MODEL (B54) No. 15 (+) — Chassis ground (-):	Is the voltage more than 9 V?	Go to step 5.	Go to step 6.
5 CHECK OUTPUT SIGNAL EMITTED FROM TCM. 1) Set the select lever to "2" range. 2) Measure the voltage between TCM connector and chassis ground. Connector & terminal NON-TURBO MODEL (B54) No. 14 (+) — Chassis ground (-): TURBO MODEL (B54) No. 15 (+) — Chassis ground (-):	Is the voltage less than 1 V?	Even if the AT OIL TEMP warning light illuminates, the circuit has returned to a normal condition at this time. A temporary poor contact of the connector or harness may be the cause. Repair the harness or contact in TCM and transmission.	Go to step 6.
6 CHECK POOR CONTACT.	Is there poor contact in low clutch timing solenoid circuit?	Repair the poor contact.	Replace the TCM. <Ref. to 4AT-67, Transmission Control Module (TCM).>

DIAGNOSTIC PROCEDURE WITH DIAGNOSTIC TROUBLE CODE (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step	Check	Yes	No
7 CHECK LOW CLUTCH TIMING SOLENOID (IN TRANSMISSION). 1)Remove the transmission connector from bracket. 2)Lift-up or raise the vehicle and support with safety stand. NOTE: Raise all wheels off ground. 3)Drain the ATF. CAUTION: Do not drain the ATF until it cools down. 4)Remove the oil pan, and disconnect connector from low clutch timing solenoid. 5)Measure the resistance between low clutch timing solenoid connector and transmission ground. Terminals No. 1 — Transmission ground:	Is the resistance 10 — 16 Ω ?	Go to step 8.	Replace the low clutch timing solenoid. <Ref. to 4AT-61, Shift Solenoids, Duty Solenoids and ATF Temperature Sensor.>
8 CHECK HARNESS CONNECTOR BETWEEN LOW CLUTCH TIMING SOLENOID AND TRANSMISSION. Measure the resistance of harness between low clutch timing solenoid and transmission connector. Connector & terminal (AT9) No. 1 — (T4) No. 3:	Is the resistance less than 1 Ω ?	Go to step 9.	Repair the open circuit in harness between low clutch timing solenoid and transmission connector.
9 CHECK HARNESS CONNECTOR BETWEEN LOW CLUTCH TIMING SOLENOID AND TRANSMISSION. Measure the resistance of harness between low clutch timing solenoid connector and transmission ground. Connector & terminal (T4) No. 3 — Transmission ground:	Is the resistance more than 1 M Ω ?	Even if the AT OIL TEMP warning light illuminates, the circuit has returned to a normal condition at this time. A temporary poor contact of the connector or harness may be the cause. Repair the harness or connector in low clutch timing solenoid and transmission.	Repair the short circuit harness between low clutch timing solenoid and transmission connector.

DIAGNOSTIC PROCEDURE WITH DIAGNOSTIC TROUBLE CODE (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

L: DTC 74 2-4 BRAKE TIMING SOLENOID

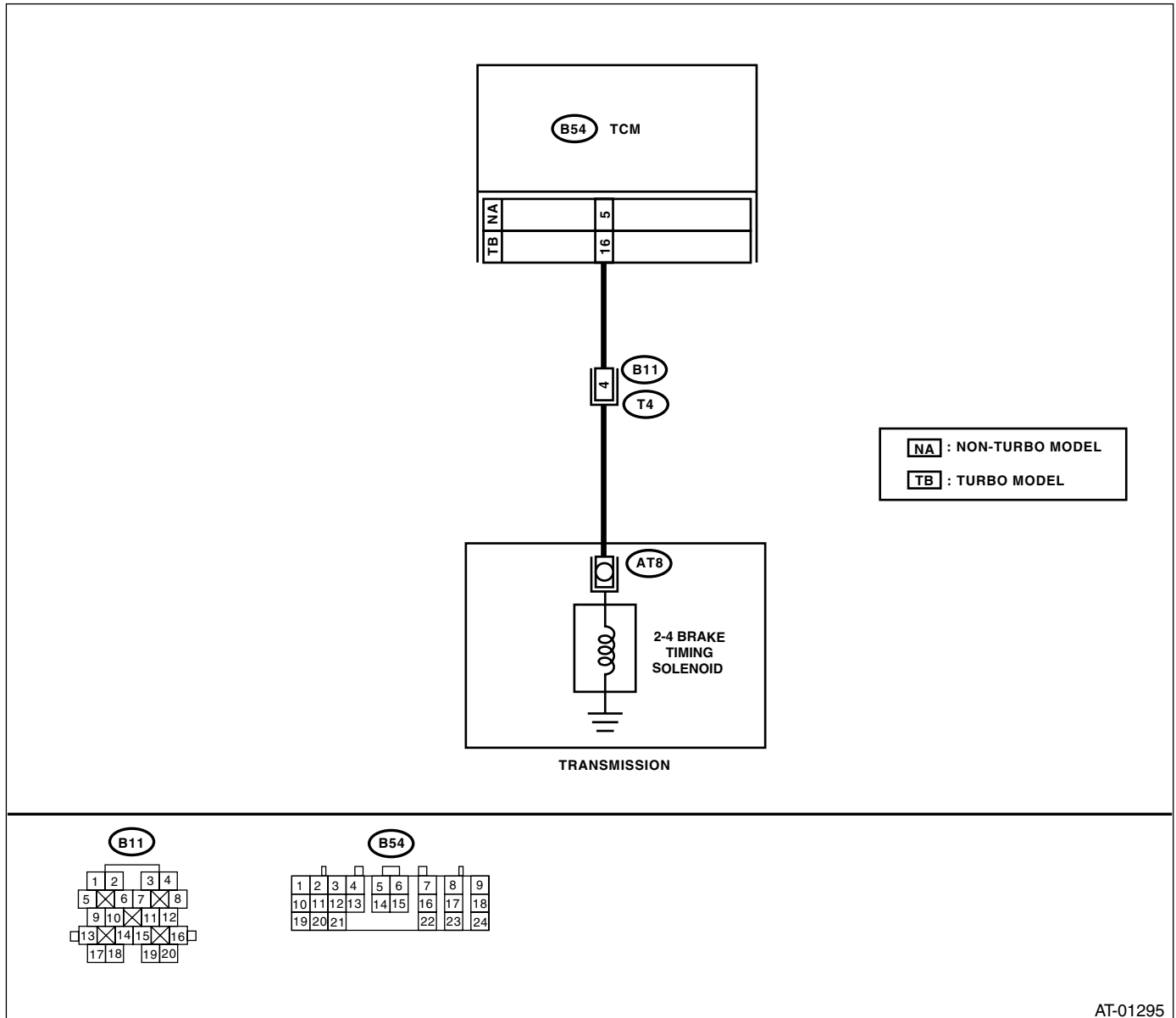
DIAGNOSIS:

The output signal circuit of 2-4 brake timing solenoid is open or shorted.

TROUBLE SYMPTOM:

Excessive shift shock.

WIRING DIAGRAM:



AT-01295

DIAGNOSTIC PROCEDURE WITH DIAGNOSTIC TROUBLE CODE (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from TCM and transmission. 3) Measure the resistance of harness between TCM and transmission connector. Connector & terminal NON-TURBO MODEL (B54) No. 5 — (B11) No. 4: TURBO MODEL (B54) No. 16 — (B11) No. 4:	Is the resistance less than 1 Ω ?	Go to step 2.	Repair the open circuit in harness between TCM and transmission connector.
2 CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION. Measure the resistance of harness between TCM connector and chassis ground. Connector & terminal NON-TURBO MODEL (B54) No. 5 — Chassis ground: TURBO MODEL (B54) No. 16 — Chassis ground:	Is the resistance more than 1 M Ω ?	Go to step 3.	Repair the short circuit in harness between TCM and transmission connector.
3 CHECK 2-4 BRAKE TIMING SOLENOID. Measure the resistance between transmission connector terminals. Connector & terminal (T4) No. 4 — No. 16:	Is the resistance 10 — 16 Ω ?	Go to step 4.	Go to step 7.
4 CHECK OUTPUT SIGNAL EMITTED FROM TCM. 1) Connect the connectors to TCM and transmission. 2) Lift-up or raise the vehicle and support with safety stand. NOTE: Raise all wheels off ground. 3) Start the engine and warm-up the transmission until ATF temperature is above 80°C (176°F). NOTE: If ambient temperature is below 0°C (32°F), drive the vehicle until ATF reaches its operating temperature. 4) Move the selector lever to "1" range, and slowly increase vehicle speed to 10 km/h (6 MPH). NOTE: The speed difference between front and rear wheels may light the ABS warning light, but this indicates no malfunction. When AT control diagnosis is finished, perform the ABS memory clearance procedure of on-board diagnostics system. <Ref. to ABS-21, Clear Memory Mode.> 5) Measure the voltage between TCM connector and chassis ground. Connector & terminal NON-TURBO MODEL (B54) No. 5 (+) — Chassis ground (-): TURBO MODEL (B54) No. 16 (+) — Chassis ground (-):	Is the voltage less than 1 V?	Go to step 5.	Go to step 6.

DIAGNOSTIC PROCEDURE WITH DIAGNOSTIC TROUBLE CODE (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step	Check	Yes	No
5 CHECK OUTPUT SIGNAL EMITTED FROM TCM. 1) Move the selector lever to "D" range, and slowly increase vehicle speed to 65 km/h (40 MPH). NOTE: The speed difference between front and rear wheels may light the ABS warning light, but this indicates no malfunction. When AT control diagnosis is finished, perform the ABS memory clearance procedure of on-board diagnostics system. <Ref. to ABS-21, Clear Memory Mode.> 2) Measure the voltage between TCM connector and chassis ground. Connector & terminal NON-TURBO MODEL (B54) No. 5 (+) — Chassis ground (-): TURBO MODEL (B54) No. 16 (+) — Chassis ground (-):	Is the voltage more than 9 V?	Even if the AT OIL TEMP warning light illuminates, the circuit has returned to a normal condition at this time. A temporary poor contact of the connector or harness may be the cause. Repair the harness or contact in transmission.	Go to step 6.
6 CHECK POOR CONTACT.	Is there poor contact in 2-4 brake timing solenoid circuit?	Repair the poor contact.	Replace the TCM. <Ref. to 4AT-67, Transmission Control Module (TCM).>
7 CHECK 2-4 BRAKE TIMING SOLENOID (IN TRANSMISSION). 1) Remove the transmission connector from bracket. 2) Lift-up or raise the vehicle and support with safety stand. NOTE: Raise all wheels off ground. 3) Drain the ATF. CAUTION: Do not drain the ATF until it cools down. 4) Remove the oil pan, and disconnect connector from 2-4 brake timing solenoid. 5) Measure the resistance between 2-4 brake timing solenoid connector and transmission ground. Terminals No. 1 — Transmission ground:	Is the resistance 10 — 16 Ω ?	Go to step 8.	Replace the 2-4 brake timing solenoid. <Ref. to 4AT-61, Shift Solenoids, Duty Solenoids and ATF Temperature Sensor.>
8 CHECK HARNESS CONNECTOR BETWEEN 2-4 BRAKE TIMING SOLENOID AND TRANSMISSION. Measure the resistance of harness between 2-4 brake timing solenoid and transmission connector. Connector & terminal (AT8) No. 1 — (T4) No. 4:	Is the resistance less than 1 Ω ?	Go to step 9.	Repair the open circuit in harness between 2-4 brake timing solenoid and transmission connector.

DIAGNOSTIC PROCEDURE WITH DIAGNOSTIC TROUBLE CODE (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step	Check	Yes	No
9 CHECK HARNESS CONNECTOR BETWEEN 2-4 BRAKE TIMING SOLENOID AND TRANSMISSION. Measure the resistance of harness between 2-4 brake timing solenoid connector and transmission ground. Connector & terminal (T4) No. 4 — Transmission ground:	Is the resistance more than 1 MΩ?	Even if the AT OIL TEMP warning light illuminates, the circuit has returned to a normal condition at this time. A temporary poor contact of the connector or harness may be the cause. Repair the harness or connector in 2-4 brake timing solenoid and transmission.	Repair the short circuit harness between 2-4 brake timing solenoid and transmission connector.

DIAGNOSTIC PROCEDURE WITH DIAGNOSTIC TROUBLE CODE (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

M: DTC 75 LINE PRESSURE DUTY SOLENOID

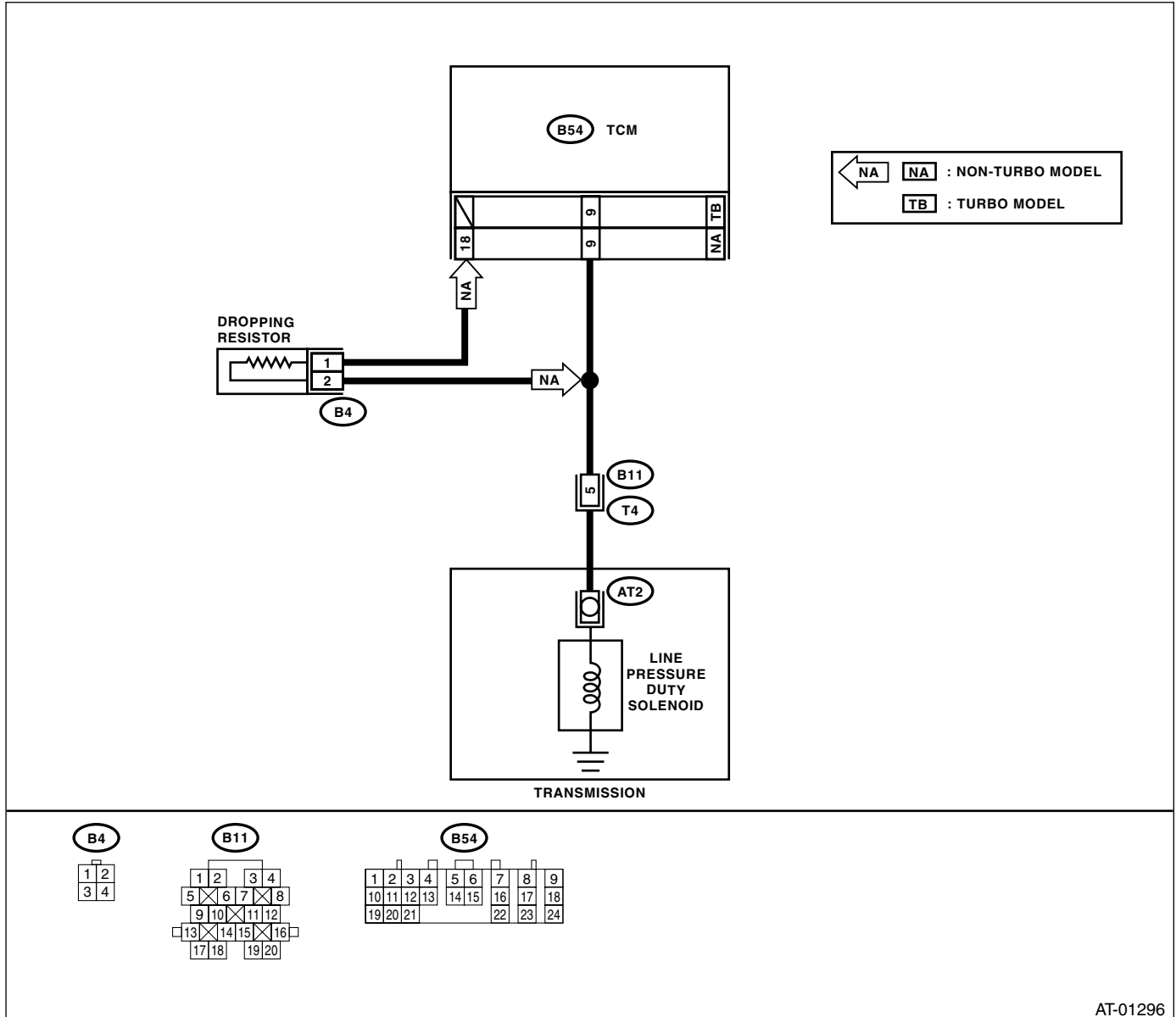
DIAGNOSIS:

Output signal circuit of line pressure duty solenoid is open or shorted.

TROUBLE SYMPTOM:

Excessive shift shock.

WIRING DIAGRAM:



AT-01296

Step	Check	Yes	No
1 CHECK VEHICLE.	Is the target non-turbo model?	Go to step 2.	Go to step 7.
2 CHECK RESISTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from dropping resistor. 3) Measure the resistance between dropping resistor terminal. Terminals No. 1 — No. 2:	Is the resistance 9 — 15 Ω?	Go to step 3.	Replace the dropping resistor. <Ref. to 4AT-68, Dropping Resistor.>

DIAGNOSTIC PROCEDURE WITH DIAGNOSTIC TROUBLE CODE (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step		Check	Yes	No
3	CHECK HARNESS CONNECTOR BETWEEN TCM AND DROPPING RESISTOR. 1) Disconnect the connector from TCM. 2) Measure the resistance of harness between TCM connector and dropping resistor connector. <i>Connector & terminal</i> <i>(B54) No. 18 — (B4) No. 1:</i>	Is the resistance less than 1 Ω ?	Go to step 4.	Repair open circuit in harness between TCM and dropping resistor connector.
4	CHECK HARNESS CONNECTOR BETWEEN TCM AND DROPPING RESISTOR. Measure the resistance of harness between dropping resistor connector and chassis ground. <i>Connector & terminal</i> <i>(B4) No. 1 — Chassis ground:</i>	Is the resistance more than 1 $M\Omega$?	Go to step 5.	Repair short circuit in harness between TCM and dropping resistor connector.
5	CHECK HARNESS CONNECTOR BETWEEN TRANSMISSION AND DROPPING RESISTOR. 1) Disconnect the connector from transmission. 2) Measure the resistance of harness between transmission and dropping resistor connector. <i>Connector & terminal</i> <i>(B4) No. 2 — (B11) No. 5:</i>	Is the resistance less than 1 Ω ?	Go to step 6.	Repair open circuit in harness between dropping resistor and transmission connector.
6	CHECK HARNESS CONNECTOR BETWEEN TRANSMISSION AND DROPPING RESISTOR. Measure the resistance of harness between dropping resistor connector and chassis ground. <i>Connector & terminal</i> <i>(B4) No. 2 — Chassis ground:</i>	Is the resistance more than 1 $M\Omega$?	Go to step 7.	Repair short circuit in harness between dropping resistor and transmission connector.
7	CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from transmission and TCM. 3) Measure the resistance of harness between TCM and transmission connector. <i>Connector & terminal</i> <i>(B54) No. 9 — (B11) No. 5:</i>	Is the resistance less than 1 Ω ?	Go to step 8.	Repair the open circuit in harness between TCM and transmission connector.
8	CHECK HARNESS CONNECTOR BETWEEN TCM AND CHASSIS GROUND. Measure the resistance of harness between TCM and chassis ground. <i>Connector & terminal</i> <i>(B54) No. 9 — Chassis ground:</i>	Is the resistance more than 1 $M\Omega$?	Go to step 9.	Repair the short circuit in harness between TCM and transmission connector.
9	CHECK LINE PRESSURE DUTY SOLENOID. Measure the resistance between transmission connector receptacle's terminals. <i>Terminals</i> <i>(T4) No. 5 — No. 16:</i>	Is the resistance between 2.0 and 4.5 Ω ?	Go to step 10.	Go to step 16.
10	PREPARE SUBARU SELECT MONITOR.	Do you have a Subaru Select Monitor?	Go to step 13.	Go to step 11.

DIAGNOSTIC PROCEDURE WITH DIAGNOSTIC TROUBLE CODE (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step	Check	Yes	No
11 CHECK OUTPUT SIGNAL EMITTED FROM TCM. 1)Connect all connectors. 2)Start the engine and warm-up the transmission until ATF temperature is above 80°C (176°F). NOTE: If ambient temperature is below 0°C (32°F), drive the vehicle until ATF reaches its operating temperature. 3)Turn the ignition switch to ON (engine OFF). 4)Move the select lever to "N" range. 5)Throttle fully closed. 6)Measure the voltage between TCM connector and chassis ground. Connector & terminal (B54) No. 9 (+) — Chassis ground (-):	Is the voltage 1.5 — 5.0 V?	Go to step 12.	Go to step 15.
12 CHECK OUTPUT SIGNAL EMITTED FROM TCM. 1)Throttle fully open and hold it. 2)Measure the voltage between TCM connector and chassis ground. Connector & terminal (B54) No. 9 (+) — Chassis ground (-):	Is the voltage less than 1 V?	Even if the AT OIL TEMP warning light illuminates, the circuit has returned to a normal condition at this time. A temporary poor contact of the connector or harness may be the cause. Repair the harness or connector in transmission.	Go to step 15.
13 CHECK OUTPUT SIGNAL EMITTED FROM TCM USING SUBARU SELECT MONITOR. 1)Connect the connectors to TCM and transmission. 2)Connect the Subaru Select Monitor to data link connector. 3)Start the engine and turn Subaru Select Monitor switch to ON. 4)Warm-up the transmission until ATF temperature is above 80°C (176°F). NOTE: If ambient temperature is below 0°C (32°F), drive the vehicle until ATF reaches its operating temperature. 5)Stop the engine and turn ignition switch to ON (engine OFF). 6)Move the select lever to "N" range. 7)Throttle is fully closed. •Line pressure duty solenoid is indicated in "%". 8)Read the data of line pressure duty solenoid using Subaru Select Monitor.	Is the value 100%?	Go to step 14.	Go to step 15.

DIAGNOSTIC PROCEDURE WITH DIAGNOSTIC TROUBLE CODE (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step	Check	Yes	No
14 CHECK OUTPUT SIGNAL EMITTED FROM TCM USING SUBARU SELECT MONITOR. 1) Turn the ignition switch to ON (engine OFF). 2) Throttle is fully open.	Is the value less than 25%?	Even if the AT OIL TEMP warning light illuminates, the circuit has returned to a normal condition at this time. A temporary poor contact of the connector or harness may be the cause. Repair the harness or connector in transmission.	Go to step 15.
15 CHECK POOR CONTACT.	Is there poor contact in line pressure duty solenoid circuit?	Repair the poor contact.	Replace the TCM. <Ref. to 4AT-67, Transmission Control Module (TCM).>
16 CHECK LINE PRESSURE DUTY SOLENOID (IN TRANSMISSION). 1) Remove the transmission connector from bracket. 2) Drain the ATF. CAUTION: Do not drain the ATF until it cools down. 3) Remove the oil pan, and disconnect connector from line pressure duty solenoid. 4) Measure the resistance between line pressure duty solenoid connector and transmission ground. Terminals No. 1 — Transmission ground:	Is the resistance 2.0 — 4.5 Ω ?	Go to step 17.	Replace the line pressure duty solenoid. <Ref. to 4AT-61, Shift Solenoids, Duty Solenoids and ATF Temperature Sensor.>
17 CHECK HARNESS CONNECTOR BETWEEN TRANSMISSION AND LINE PRESSURE DUTY SOLENOID. Measure the resistance of harness between line pressure duty solenoid and transmission connector. Connector & terminal (T4) No. 5 — (AT2) No. 1:	Is the resistance less than 1 Ω ?	Go to step 18.	Repair the open circuit in harness between line pressure duty solenoid and transmission connector.
18 CHECK HARNESS CONNECTOR BETWEEN TRANSMISSION AND LINE PRESSURE DUTY SOLENOID. Measure the resistance of harness between transmission connector and transmission ground. Connector & terminal (T4) No. 5 — Transmission ground:	Is the resistance more than 1 M Ω ?	Even if the AT OIL TEMP warning light illuminates, the circuit has returned to a normal condition at this time. A temporary poor contact of the connector or harness may be the cause. Repair the harness or connector in line pressure duty solenoid and transmission.	Repair the short circuit in harness between line pressure duty solenoid and transmission connector.

DIAGNOSTIC PROCEDURE WITH DIAGNOSTIC TROUBLE CODE (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

N: DTC 76 2-4 BRAKE DUTY SOLENOID

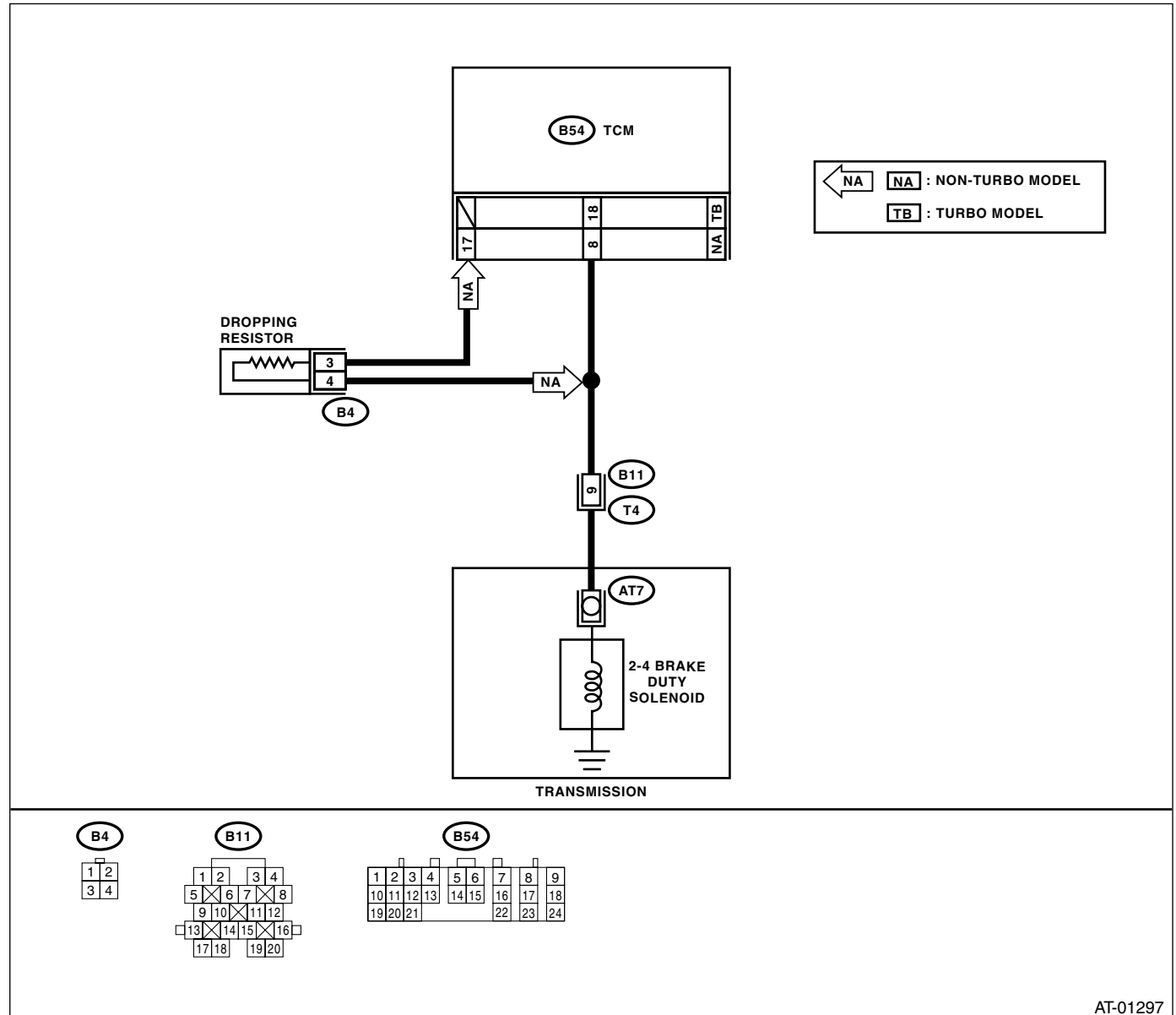
DIAGNOSIS:

Output signal circuit of 2-4 brake duty solenoid is open or shorted.

TROUBLE SYMPTOM:

Excessive shift shock.

WIRING DIAGRAM:



AT-01297

Step	Check	Yes	No
1 CHECK VEHICLE.	Is the target non-turbo model?	Go to step 2.	Go to step 7.
2 CHECK RESISTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from dropping resistor. 3) Measure the resistance between dropping resistor terminal. Terminals No. 3 — No. 4:	Is the resistance 9 — 15 Ω?	Go to step 3.	Replace the dropping resistor. <Ref. to 4AT-68, Dropping Resistor.>

DIAGNOSTIC PROCEDURE WITH DIAGNOSTIC TROUBLE CODE (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step		Check	Yes	No
3	CHECK HARNESS CONNECTOR BETWEEN TCM AND DROPPING RESISTOR. 1) Disconnect the connector from TCM. 2) Measure the resistance of harness between TCM connector and dropping resistor connector. <i>Connector & terminal</i> <i>(B54) No. 17 — (B4) No. 3:</i>	Is the resistance less than 1 Ω ?	Go to step 4.	Repair open circuit in harness between TCM and dropping resistor connector.
4	CHECK HARNESS CONNECTOR BETWEEN TCM AND DROPPING RESISTOR. Measure the resistance of harness between dropping resistor connector and chassis ground. <i>Connector & terminal</i> <i>(B4) No. 3 — Chassis ground:</i>	Is the resistance more than 1 $M\Omega$?	Go to step 5.	Repair short circuit in harness between TCM and dropping resistor connector.
5	CHECK HARNESS CONNECTOR BETWEEN TRANSMISSION AND DROPPING RESISTOR. 1) Disconnect the connector from transmission. 2) Measure the resistance of harness between transmission and dropping resistor connector. <i>Connector & terminal</i> <i>(B4) No. 4 — (B11) No. 9:</i>	Is the resistance less than 1 Ω ?	Go to step 6.	Repair open circuit in harness between dropping resistor and transmission connector.
6	CHECK HARNESS CONNECTOR BETWEEN TRANSMISSION AND DROPPING RESISTOR. Measure the resistance of harness between dropping resistor connector and chassis ground. <i>Connector & terminal</i> <i>(B4) No. 4 — Chassis ground:</i>	Is the resistance more than 1 $M\Omega$?	Go to step 7.	Repair short circuit in harness between dropping resistor and transmission connector.
7	CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from transmission and TCM. 3) Measure the resistance of harness between TCM and transmission connector. <i>Connector & terminal</i> NON-TURBO MODEL <i>(B54) No. 8 — (B11) No. 9:</i> TURBO MODEL <i>(B54) No. 18 — (B11) No. 9:</i>	Is the resistance less than 1 Ω ?	Go to step 8.	Repair the open circuit in harness between TCM and transmission connector.
8	CHECK HARNESS CONNECTOR BETWEEN TCM AND CHASSIS GROUND. Measure the resistance of harness between TCM and chassis ground. <i>Connector & terminal</i> NON-TURBO MODEL <i>(B54) No. 8 — Chassis ground:</i> TURBO MODEL <i>(B54) No. 18 — Chassis ground:</i>	Is the resistance more than 1 $M\Omega$?	Go to step 9.	Repair the short circuit in harness between TCM and transmission connector.
9	CHECK 2-4 BRAKE DUTY SOLENOID. Measure the resistance between transmission connector receptacle's terminals. <i>Terminals</i> <i>(T4) No. 16 — No. 9:</i>	Is the resistance 2.0 — 4.5 Ω ?	Go to step 10.	Go to step 16.
10	PREPARE SUBARU SELECT MONITOR.	Do you have a Subaru Select Monitor?	Go to step 13.	Go to step 11.

DIAGNOSTIC PROCEDURE WITH DIAGNOSTIC TROUBLE CODE (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step	Check	Yes	No
11 CHECK OUTPUT SIGNAL EMITTED FROM TCM. 1) Connect all connectors. 2) Start the engine and warm-up the transmission until ATF temperature is above 80°C (176°F). NOTE: If ambient temperature is below 0°C (32°F), drive the vehicle until ATF reaches its operating temperature. 3) Turn the ignition switch to ON (engine OFF). 4) Move the select lever to "N" range. 5) Throttle fully closed. 6) Measure the voltage between TCM connector and chassis ground. Connector & terminal (B54) No. 18 (+) — Chassis ground (-):	Is the voltage 1.5 — 5.0 V?	Go to step 12.	Go to step 15.
12 CHECK OUTPUT SIGNAL EMITTED FROM TCM. 1) Throttle fully open and hold it. 2) Measure the voltage between TCM connector and chassis ground. Connector & terminal (B54) No. 18 (+) — Chassis ground (-):	Is the voltage less than 1 V?	Even if the AT OIL TEMP warning light illuminates, the circuit has returned to a normal condition at this time. A temporary poor contact of the connector or harness may be the cause. Repair the harness or connector in TCM and transmission.	Go to step 15.
13 CHECK OUTPUT SIGNAL EMITTED FROM TCM USING SUBARU SELECT MONITOR. 1) Connect all connectors. 2) Connect the Subaru Select Monitor to data link connector. 3) Start the engine and turn Subaru Select Monitor switch to ON. 4) Warm-up the transmission until ATF temperature is above 80°C (176°F). NOTE: If ambient temperature is below 0°C (32°F), drive the vehicle until ATF reaches its operating temperature. 5) Stop the engine and turn ignition switch to ON (engine OFF). 6) Move the select lever to "N" range. 7) Throttle is fully closed. • 2-4 brake duty solenoid is indicated in "%". 8) Read the data of 2-4 brake duty solenoid using Subaru Select Monitor.	Is the value 100%?	Go to step 14.	Go to step 15.

DIAGNOSTIC PROCEDURE WITH DIAGNOSTIC TROUBLE CODE (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step	Check	Yes	No
14 CHECK OUTPUT SIGNAL EMITTED FROM TCM USING SUBARU SELECT MONITOR. 1) Turn the ignition switch to ON (engine OFF). 2) Throttle is fully open.	Is the value less than 25%?	Even if the AT OIL TEMP warning light illuminates, the circuit has returned to a normal condition at this time. A temporary poor contact of the connector or harness may be the cause. Repair the harness or connector in TCM and transmission.	Go to step 15.
15 CHECK POOR CONTACT.	Is there poor contact in 2-4 brake duty solenoid circuit?	Repair the poor contact.	Replace the TCM. <Ref. to 4AT-67, Transmission Control Module (TCM).>
16 CHECK 2-4 BRAKE DUTY SOLENOID (IN TRANSMISSION). 1) Remove the transmission connector from bracket. 2) Drain the ATF. CAUTION: Do not drain the ATF until it cools down. 3) Remove the oil pan, and disconnect connector from 2-4 brake duty solenoid. 4) Measure the resistance between 2-4 brake duty solenoid connector and transmission ground. Terminals No. 1 — Transmission ground:	Is the resistance 2.0 — 4.5 Ω ?	Go to step 17.	Replace the 2-4 brake duty solenoid. <Ref. to 4AT-61, Shift Solenoids, Duty Solenoids and ATF Temperature Sensor.>
17 CHECK HARNESS CONNECTOR BETWEEN TRANSMISSION AND 2-4 BRAKE DUTY SOLENOID. Measure the resistance of harness between 2-4 brake duty solenoid and transmission connector. Connector & terminal (T4) No. 9 — (AT7) No. 1:	Is the resistance less than 1 Ω ?	Go to step 18.	Repair the open circuit in harness between 2-4 brake duty solenoid and transmission connector.
18 CHECK HARNESS CONNECTOR BETWEEN TRANSMISSION AND 2-4 BRAKE DUTY SOLENOID. Measure the resistance of harness between transmission connector and transmission ground. Connector & terminal (T4) No. 9 — Transmission ground:	Is the resistance more than 1 M Ω ?	Even if the AT OIL TEMP warning light illuminates, the circuit has returned to a normal condition at this time. A temporary poor contact of the connector or harness may be the cause. Repair the harness or connector in line pressure duty solenoid and transmission.	Repair the short circuit in harness between 2-4 brake duty solenoid and transmission connector.

DIAGNOSTIC PROCEDURE WITH DIAGNOSTIC TROUBLE CODE (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

O: DTC 77 LOCK-UP DUTY SOLENOID

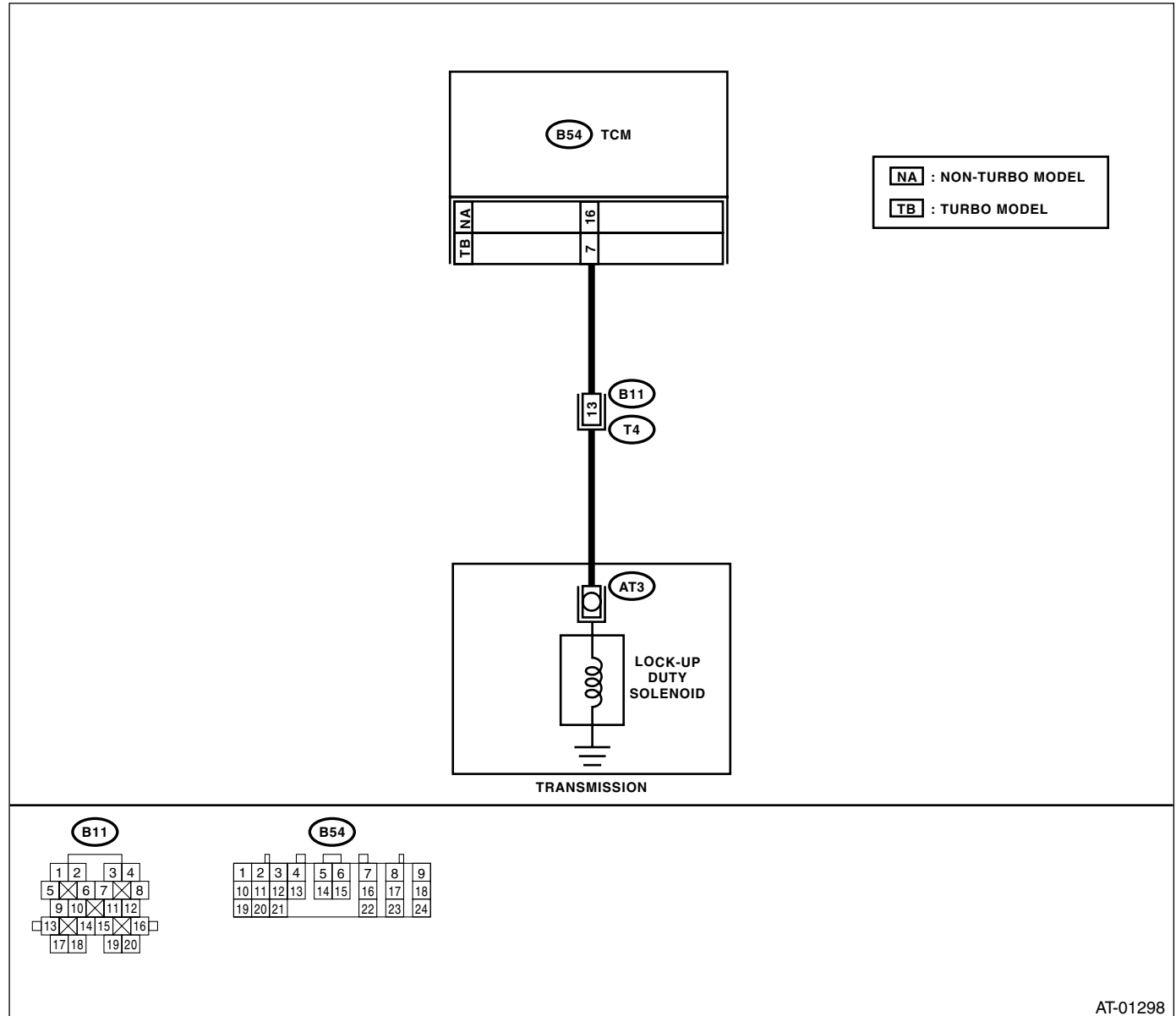
DIAGNOSIS:

The output signal circuit of lock-up duty solenoid is open or shorted.

TROUBLE SYMPTOM:

No "lock-up" (after engine warm-up).

WIRING DIAGRAM:



AT-01298

Step	Check	Yes	No
1	CHECK DTC.	Go to another DTC.	Go to step 2.
	Do multiple DTCs appear in the on-board diagnostics test mode?		

DIAGNOSTIC PROCEDURE WITH DIAGNOSTIC TROUBLE CODE (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step		Check	Yes	No
2	CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from TCM and transmission. 3) Measure the resistance of harness between TCM and transmission connector. Connector & terminal NON-TURBO MODEL (B54) No. 16 — (B11) No. 13: TURBO MODEL (B54) No. 7 — (B11) No. 13:	Is the resistance less than 1 Ω ?	Go to step 3.	Repair the open circuit in harness between TCM and transmission connector.
3	CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION. Measure the resistance of harness connector between TCM and chassis ground. Connector & terminal NON-TURBO MODEL (B54) No. 16 — Chassis ground: TURBO MODEL (B54) No. 7 — Chassis ground:	Is the resistance more than 1 M Ω ?	Go to step 4.	Repair the short circuit in harness between TCM and transmission connector.
4	CHECK LOCK-UP DUTY SOLENOID. Measure the resistance between transmission connector receptacle's terminals. Connector & terminal (T4) No. 13 — No. 16:	Is the resistance 10 — 17 Ω ?	Go to step 5.	Go to step 11.
5	PREPARE SUBARU SELECT MONITOR.	Do you have a Subaru Select Monitor?	Go to step 8.	Go to step 6.

DIAGNOSTIC PROCEDURE WITH DIAGNOSTIC TROUBLE CODE (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step	Check	Yes	No
6 CHECK OUTPUT SIGNAL EMITTED FROM TCM. 1)Connect the connectors to TCM and trans- mission. 2)Lift-up the vehicle and place safety stand. NOTE: Raise all wheels off ground. 3)Start the engine and warm-up the transmis- sion until ATF temperature is above 80°C (176°F). NOTE: If ambient temperature is below 0°C (32°F), drive the vehicle until ATF reaches its operating temperature. 4)Move the selector lever to "D" range and slowly increase vehicle speed to 75 km/h (47 MPH). Wheels will lock-up. NOTE: The speed difference between front and rear wheels may light the ABS warning light, but this indicates no malfunction. When AT control di- agnosis is finished, perform the ABS memory clearance procedure of on-board diagnostics system. <Ref. to ABS-21, Clear Memory Mode.> 5)Measure the voltage between TCM connec- tor and chassis ground. Connector & terminal NON-TURBO MODEL (B54) No. 16 (+) — Chassis ground (-): TURBO MODEL (B54) No. 7 (+) — Chassis ground (-):	Is the voltage more than 8.5 V?	Go to step 7.	Go to step 10.
7 CHECK OUTPUT SIGNAL EMITTED FROM TCM. 1)Return the engine to idling speed and move select lever to "N" range. 2)Measure the voltage between TCM connec- tor and chassis ground. Connector & terminal NON-TURBO MODEL (B54) No. 16 (+) — Chassis ground (-): TURBO MODEL (B54) No. 7 (+) — Chassis ground (-):	Is the voltage less than 0.5 V?	Even if the AT OIL TEMP warning light illuminates, the circuit has returned to a nor- mal condition at this time. A tempo- rary poor contact of the connector or harness may be the cause. Repair the harness or connector in TCM and transmission.	Go to step 10.

DIAGNOSTIC PROCEDURE WITH DIAGNOSTIC TROUBLE CODE (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step		Check	Yes	No
8	CHECK OUTPUT SIGNAL EMITTED FROM TCM USING SUBARU SELECT MONITOR. 1)Connect the connectors to TCM and transmission. 2)Lift-up the vehicle and place safety stand. NOTE: Raise all wheels off ground. 3)Connect the Subaru Select Monitor to data link connector. 4)Start the engine and turn Subaru Select Monitor switch to ON. 5)Start the engine and warm-up the transmission until ATF temperature is above 80°C (176°F). NOTE: If ambient temperature is below 0°C (32°F), drive the vehicle until ATF reaches its operating temperature. 6)Read the data of lock-up duty solenoid using Subaru Select Monitor. •Lock-up duty solenoid is indicated in “%”. 7)Move the selector lever to “D” range and slowly increase vehicle speed to 75 km/h (47 MPH). Wheels will lock-up. NOTE: The speed difference between front and rear wheels may light the ABS warning light, but this indicates no malfunction. When AT control diagnosis is finished, perform the ABS memory clearance procedure of on-board diagnostics system. <Ref. to ABS-21, Clear Memory Mode.>	Is the value 95%?	Go to step 9.	Go to step 10.
9	CHECK OUTPUT SIGNAL EMITTED FROM TCM USING SUBARU SELECT MONITOR. Return the engine to idling speed and move selector lever to “N” range. NOTE: The speed difference between front and rear wheels may light the ABS warning light, but this indicates no malfunction. When AT control diagnosis is finished, perform the ABS memory clearance procedure of on-board diagnostics system. <Ref. to ABS-21, Clear Memory Mode.>	Is the value 5%?	Even if the AT OIL TEMP warning light illuminates, the circuit has returned to a normal condition at this time. A temporary poor contact of the connector or harness may be the cause. Repair the harness or connector in TCM and transmission.	Go to step 10.
10	CHECK POOR CONTACT.	Is there poor contact in lock-up duty solenoid circuit?	Repair poor contact.	Replace the TCM. <Ref. to 4AT-67, Transmission Control Module (TCM).>

DIAGNOSTIC PROCEDURE WITH DIAGNOSTIC TROUBLE CODE (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step		Check	Yes	No
11	CHECK LOCK-UP DUTY SOLENOID (IN TRANSMISSION). 1) Remove the transmission connector from bracket. 2) Drain the ATF. CAUTION: Do not drain the ATF until it cools down. 3) Remove the oil pan and disconnect connector from lock-up duty solenoid. 4) Measure the resistance between lock-up duty solenoid connector and transmission ground. Terminals No. 1 — Transmission ground:	Is the resistance 10 — 17 Ω ?	Go to step 12.	Replace the lock-up duty solenoid. <Ref. to 4AT-61, Shift Solenoids, Duty Solenoids and ATF Temperature Sensor.>
12	CHECK HARNESS CONNECTOR BETWEEN LOCK-UP DUTY SOLENOID AND TRANSMISSION. Measure the resistance of harness between lock-up duty solenoid and transmission connector. Connector & terminal (T4) No. 13 — (AT3) No. 1:	Is the resistance less than 1 Ω ?	Go to step 13.	Repair the open circuit in harness between TCM and transmission connector.
13	CHECK HARNESS CONNECTOR BETWEEN LOCK-UP DUTY SOLENOID AND TRANSMISSION. Measure the resistance of harness between transmission connector and transmission ground. Connector & terminal (T4) No. 13 — Transmission ground:	Is the resistance more than 1 M Ω ?	Even if the AT OIL TEMP warning light illuminates, the circuit has returned to a normal condition at this time. A temporary poor contact of the connector or harness may be the cause. Repair the harness or connector in lock-up duty solenoid and transmission.	Repair the short circuit in harness between lock-up duty solenoid and transmission connector.

DIAGNOSTIC PROCEDURE WITH DIAGNOSTIC TROUBLE CODE (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

P: DTC 79 TRANSFER DUTY SOLENOID

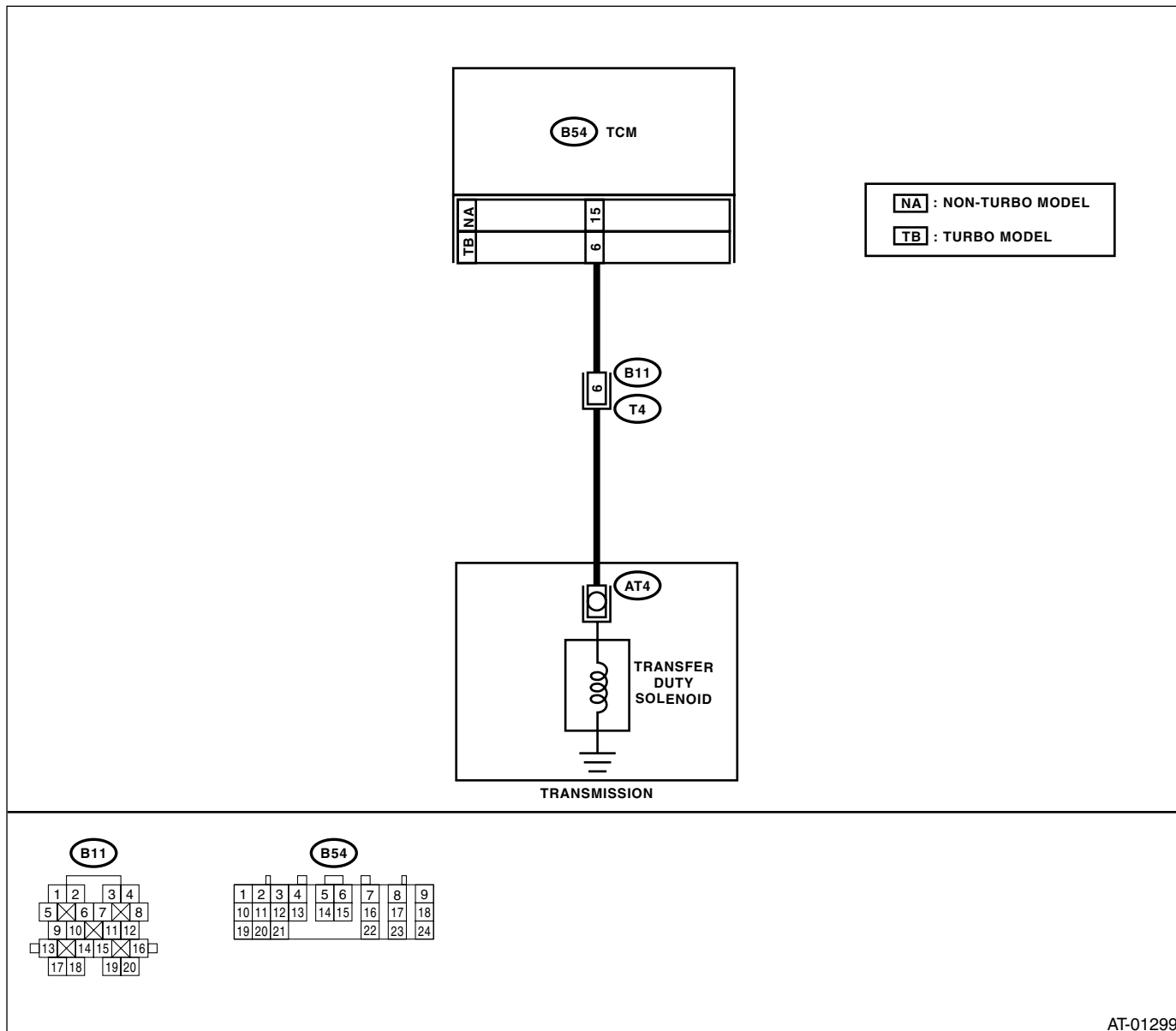
DIAGNOSIS:

The output signal circuit of transfer duty solenoid is open or shorted.

TROUBLE SYMPTOM:

Excessive "braking" in tight corners.

WIRING DIAGRAM:



AT-01299

DIAGNOSTIC PROCEDURE WITH DIAGNOSTIC TROUBLE CODE (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from TCM and transmission. 3) Measure the resistance of harness between TCM and transmission connector. Connector & terminal NON-TURBO MODEL (B54) No. 15 — (B11) No. 6: TURBO MODEL (B54) No. 6 — (B11) No. 6:	Is the resistance less than 1 Ω ?	Go to step 2.	Repair the open circuit in harness between TCM and transmission connector.
2 CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION. Measure the resistance harness connector between TCM and chassis ground. Connector & terminal NON-TURBO MODEL (B54) No. 15 — Chassis ground: TURBO MODEL (B54) No. 6 — Chassis ground:	Is the resistance more than 1 M Ω ?	Go to step 3.	Repair the short circuit in harness between TCM and transmission connector.
3 CHECK TRANSFER DUTY SOLENOID. Measure the resistance between transmission connector and transmission terminals. Connector & terminal (T4) No. 6 — No. 16:	Is the resistance 10 — 17 Ω ?	Go to step 4.	Go to step 13.
4 PREPARE SUBARU SELECT MONITOR.	Do you have a Subaru Select Monitor?	Go to step 8.	Go to step 5.
5 CHECK OUTPUT SIGNAL EMITTED FROM TCM. 1) Connect the connectors to TCM and transmission. 2) Turn the ignition switch to ON (engine OFF). 3) Throttle is fully closed. 4) Move the select lever to "P" range. 5) Measure the voltage between TCM connector and chassis ground. Connector & terminal NON-TURBO MODEL (B54) No. 15 (+) — Chassis ground (-): TURBO MODEL (B54) No. 6 (+) — Chassis ground (-):	Is the voltage less than 1 V?	Go to step 6.	Go to step 12.
6 CHECK OUTPUT SIGNAL EMITTED FROM TCM. 1) Move the select lever to "D" range. 2) Measure the voltage between TCM connector and chassis ground. Connector & terminal NON-TURBO MODEL (B54) No. 15 (+) — Chassis ground (-): TURBO MODEL (B54) No. 6 (+) — Chassis ground (-):	Is the voltage more than 8.5 V?	Even if the AT OIL TEMP warning light illuminates, the circuit has returned to a normal condition at this time. A temporary poor contact of the connector or harness may be the cause. Repair the harness or connector in TCM and transmission.	Go to step 12.
7 CHECK VEHICLE	Is the target non-turbo model?	Go to step 8.	Go to step 10.

DIAGNOSTIC PROCEDURE WITH DIAGNOSTIC TROUBLE CODE (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step		Check	Yes	No
8	CHECK OUTPUT SIGNAL EMITTED FROM TCM USING SUBARU SELECT MONITOR. 1)Connect the connectors to TCM and transmission. 2)Connect the Subaru Select Monitor to data link connector. 3)Turn the ignition switch to ON (engine OFF) and turn Subaru Select Monitor switch to ON. 4)Move the select lever to "D" range with throttle fully open (vehicle speed 0 km/h or 0 MPH). 5)Read data of transfer duty solenoid using Subaru Select Monitor. •Transfer duty solenoid is indicated in "%".	Is the value 5 — 10%?	Go to step 9.	Go to step 12.
9	CHECK OUTPUT SIGNAL EMITTED FROM TCM USING SUBARU SELECT MONITOR. 1)Move the select lever to "N" range with throttle fully closed (vehicle speed 0 km/h or 0 MPH). 2)Read the data of transfer duty solenoid using Subaru Select Monitor. •Transfer duty solenoid is indicated in "%".	Is the value approx. 60 — 70%?	Even if the AT OIL TEMP warning light illuminates, the circuit has returned to a normal condition at this time. A temporary poor contact of the connector or harness may be the cause. Repair the harness or connector in TCM and transmission.	Go to step 12.
10	CHECK OUTPUT SIGNAL EMITTED FROM TCM USING SUBARU SELECT MONITOR. 1)Connect the connectors to TCM and transmission. 2)Connect the Subaru Select Monitor to data link connector. 3)Turn the ignition switch to ON (engine OFF) and turn Subaru Select Monitor switch to ON. 4)Move the select lever to "D" range with throttle fully open (vehicle speed 0 km/h or 0 MPH). 5)Read the data of transfer duty solenoid using Subaru Select Monitor. •Transfer duty solenoid is indicated in "%".	Is the value 80 — 95%?	Go to step 11.	Go to step 12.
11	CHECK OUTPUT SIGNAL EMITTED FROM TCM USING SUBARU SELECT MONITOR. 1)Move the select lever to "N" range with throttle fully close (vehicle speed 0 km/h or 0 MPH). 2)Read the data of transfer duty solenoid using Subaru Select Monitor. •Transfer duty solenoid is indicated in "%".	Is the value approx. 40%?	Even if the AT OIL TEMP warning light illuminates, the circuit has returned to a normal condition at this time. A temporary poor contact of the connector or harness may be the cause. Repair the harness or connector in transfer duty solenoid and TCM connector.	Go to step 12.

DIAGNOSTIC PROCEDURE WITH DIAGNOSTIC TROUBLE CODE (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step	Check	Yes	No
12 CHECK POOR CONTACT.	Is there poor contact in transfer duty solenoid circuit?	Repair the poor contact.	Replace the TCM. <Ref. to 4AT-67, Transmission Control Module (TCM).>
13 CHECK TRANSFER DUTY SOLENOID (IN TRANSMISSION). 1)Lift-up the vehicle and place safety stand. NOTE: Raise all wheels off ground. 2)Drain the automatic transmission fluid. CAUTION: Do not drain the automatic transmission fluid until it cools down. 3)Remove the extension case and disconnect connector from transfer duty solenoid. 4)Measure the resistance between transfer duty solenoid connector and transmission ground. Connector & terminal (AT4) No. 1 — Transmission ground:	Is the resistance 10 — 17 Ω ?	Go to step 14.	Replace the transfer duty solenoid.
14 CHECK HARNESS CONNECTOR BETWEEN TRANSFER DUTY SOLENOID AND TRANSMISSION. Measure the resistance of harness between transfer duty solenoid and transmission connector. Connector & terminal (T4) No. 6 — (AT4) No. 1:	Is the resistance less than 1 Ω ?	Go to step 15.	Repair the open circuit in harness between transfer duty solenoid and transmission connector.
15 CHECK HARNESS CONNECTOR BETWEEN TRANSFER DUTY SOLENOID AND TRANSMISSION. Measure the resistance of harness between transmission connector and transmission ground. Connector & terminal (T4) No. 6 — Transmission ground:	Is the resistance more than 1 M Ω ?	Even if the AT OIL TEMP warning light illuminates, the circuit has returned to a normal condition at this time. A temporary poor contact of the connector or harness may be the cause. Repair the harness or contact in transfer duty solenoid and transmission.	Repair the short circuit in harness between transfer duty solenoid and transmission connector.

DIAGNOSTIC PROCEDURE WITH DIAGNOSTIC TROUBLE CODE (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Q: DTC 93 REAR VEHICLE SPEED SENSOR

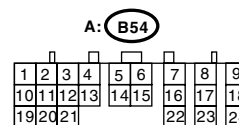
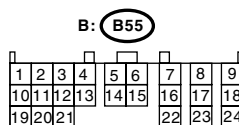
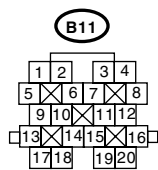
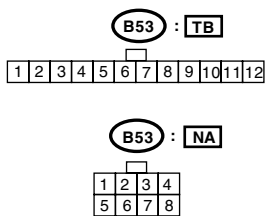
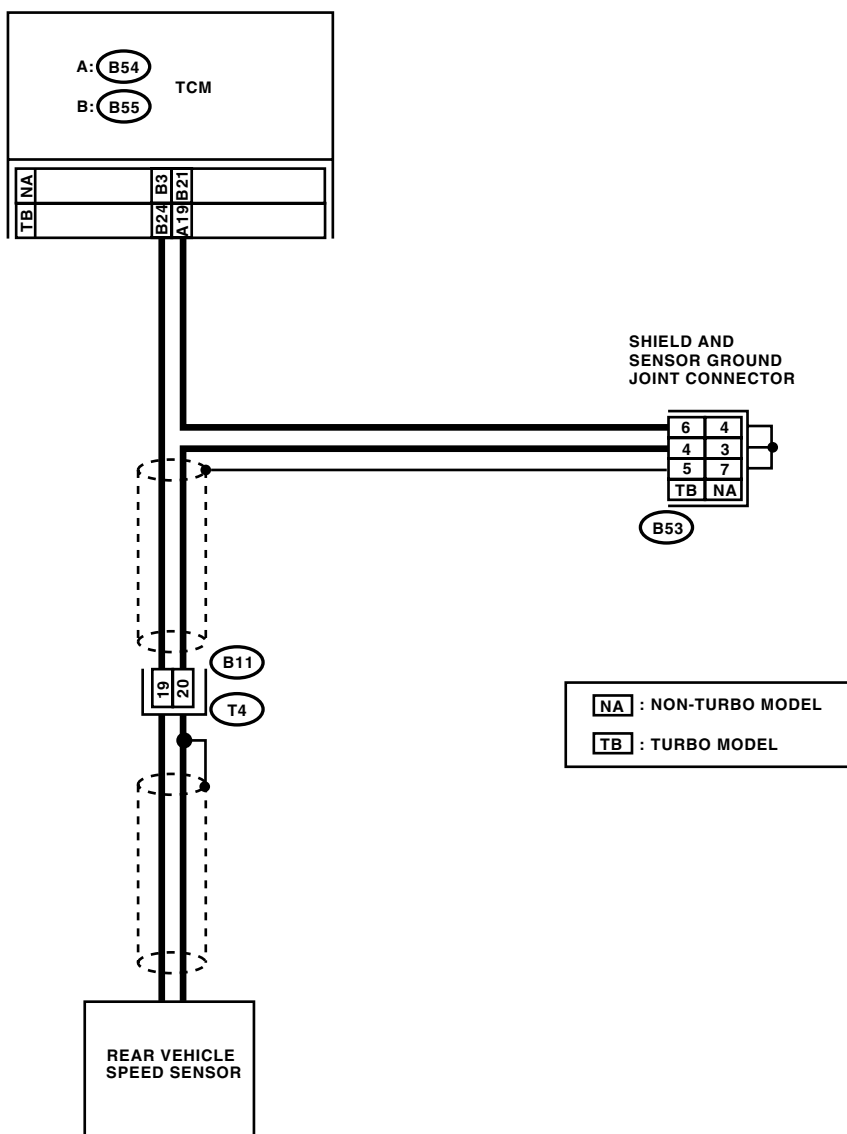
DIAGNOSIS:

The input signal circuit of TCM is open or shorted.

TROUBLE SYMPTOM:

No lock-up or excessive tight corner "braking".

WIRING DIAGRAM:



AT-01300

DIAGNOSTIC PROCEDURE WITH DIAGNOSTIC TROUBLE CODE (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step		Check	Yes	No
1	CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from TCM and transmission. 3) Measure the resistance of harness between TCM and transmission connector. Connector & terminal NON-TURBO MODEL (B55) No. 3 — (B11) No. 19: TURBO MODEL (B55) No. 24 — (B11) No. 19:	Is the resistance less than 1 Ω ?	Go to step 2.	Repair the open circuit in harness between TCM and transmission connector.
2	CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION. Measure the resistance of harness between TCM and transmission connector. Connector & terminal NON-TURBO MODEL (B55) No. 21 — (B11) No. 20: TURBO MODEL (B54) No. 19 — (B11) No. 20:	Is the resistance less than 1 Ω ?	Go to step 3.	Repair the open circuit in harness between TCM and transmission, and poor contact in coupling connector.
3	CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION. Measure the resistance of harness between TCM and chassis ground. Connector & terminal NON-TURBO MODEL (B55) No. 3 — Chassis ground: TURBO MODEL (B55) No. 24 — Chassis ground:	Is the resistance more than 1 M Ω ?	Go to step 4.	Repair the short circuit in harness between TCM and transmission connector.
4	CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION. Measure the resistance of harness between TCM and chassis ground. Connector & terminal NON-TURBO MODEL (B55) No. 21 — Chassis ground: TURBO MODEL (B54) No. 19 — Chassis ground:	Is the resistance more than 1 M Ω ?	Go to step 5.	Repair the short circuit in harness between TCM and transmission connector.
5	CHECK REAR VEHICLE SPEED SENSOR. Measure the resistance between transmission connector receptacle's terminals. Connector & terminal (T4) No. 19 — No. 20:	Is the resistance 450 — 650 Ω ?	Go to step 6.	Replace the rear vehicle speed sensor. <Ref. to 4AT-53, Rear Vehicle Speed Sensor.>
6	PREPARE OSCILLOSCOPE.	Do you have an oscilloscope?	Go to step 10.	Go to step 7.
7	PREPARE SUBARU SELECT MONITOR.	Do you have a Subaru Select Monitor?	Go to step 9.	Go to step 8.

DIAGNOSTIC PROCEDURE WITH DIAGNOSTIC TROUBLE CODE (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step		Check	Yes	No
8	CHECK INPUT SIGNAL FOR TCM. 1) Connect the connectors to TCM and transmission. 2) Lift-up or raise the vehicle and place safety stands. NOTE: Raise all wheels off floor. 3) Start the engine and set vehicle in 20 km/h (12 MPH) condition. NOTE: The speed difference between front and rear wheels may light the ABS warning light, but this indicates no malfunction. When AT control diagnosis is finished, perform the ABS memory clearance procedure of on-board diagnostics system. <Ref. to ABS-21, Clear Memory Mode.> 4) Measure the voltage between TCM connector terminals. Connector & terminal NON-TURBO MODEL (B55) No. 3 (+) — (B55) No. 21 (-): TURBO MODEL (B55) No. 24 (+) — (B54) No. 19 (-):	Is the voltage more than AC 1 V?	Even if the AT OIL TEMP warning light illuminates, the circuit has returned to a normal condition at this time. A temporary poor contact of the connector or harness may be the cause. Repair the harness or connector in TCM and transmission.	Go to step 11.
	CHECK INPUT SIGNAL FOR TCM USING SUBARU SELECT MONITOR. 1) Connect the connectors to TCM and transmission. 2) Connect the Subaru Select Monitor to data link connector. 3) Lift-up or raise the vehicle and place safety stands. NOTE: Raise all wheels off floor. 4) Turn the ignition switch to ON and turn Subaru Select Monitor switch to ON. 5) Start the engine. 6) Read the data of vehicle speed using Subaru Select Monitor. • Compare the speedometer with Subaru Select Monitor indications. • Vehicle speed is indicated in "km/h" or "MPH". 7) Slowly increase the vehicle speed to 60 km/h or 37 MPH. NOTE: The speed difference between front and rear wheels may light the ABS warning light, but this indicates no malfunction. When AT control diagnosis is finished, perform the ABS memory clearance procedure of on-board diagnostics system. <Ref. to ABS-21, Clear Memory Mode.>	Does the speedometer indication increase as the Subaru Select Monitor data increases?	Even if the AT OIL TEMP warning light illuminates, the circuit has returned to a normal condition at this time. A temporary poor contact of the connector or harness may be the cause. Repair the harness or connector in TCM and transmission.	Go to step 11.

DIAGNOSTIC PROCEDURE WITH DIAGNOSTIC TROUBLE CODE (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step	Check	Yes	No
10 CHECK INPUT SIGNAL FOR TCM USING OSCILLOSCOPE. 1)Connect the connectors to TCM and transmission. 2)Lift-up or raise the vehicle and place safety stands. NOTE: Raise all wheels off floor. 3)Set the oscilloscope to TCM connector terminals. <i>Connector & terminal</i> <i>NON-TURBO MODEL</i> <i>Positive probe; (B55) No. 3:</i> <i>Ground lead; (B55) No. 21:</i> <i>TURBO MODEL</i> <i>Positive probe; (B55) No. 24:</i> <i>Ground lead; (B54) No. 19:</i> 4)Start the engine and set vehicle in 20 km/h (12 MPH) condition. NOTE: The speed difference between front and rear wheels may light the ABS warning light, but this indicates no malfunction. When AT control diagnosis is finished, perform the ABS memory clearance procedure of on-board diagnostics system. <Ref. to ABS-21, Clear Memory Mode.> 5)Measure the signal voltage indicated on oscilloscope.	Is the signal voltage more than AC 1 V?	Even if the AT OIL TEMP warning light illuminates, the circuit has returned to a normal condition at this time. A temporary poor contact of the connector or harness may be the cause. Repair the harness or connector in TCM and transmission.	Go to step 11.
11 CHECK POOR CONTACT.	Is there poor contact in rear vehicle speed sensor circuit?	Repair the poor contact.	Replace the TCM. <Ref. to 4AT-67, Transmission Control Module (TCM).>

DIAGNOSTIC PROCEDURE WITHOUT DIAGNOSTIC TROUBLE CODE (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

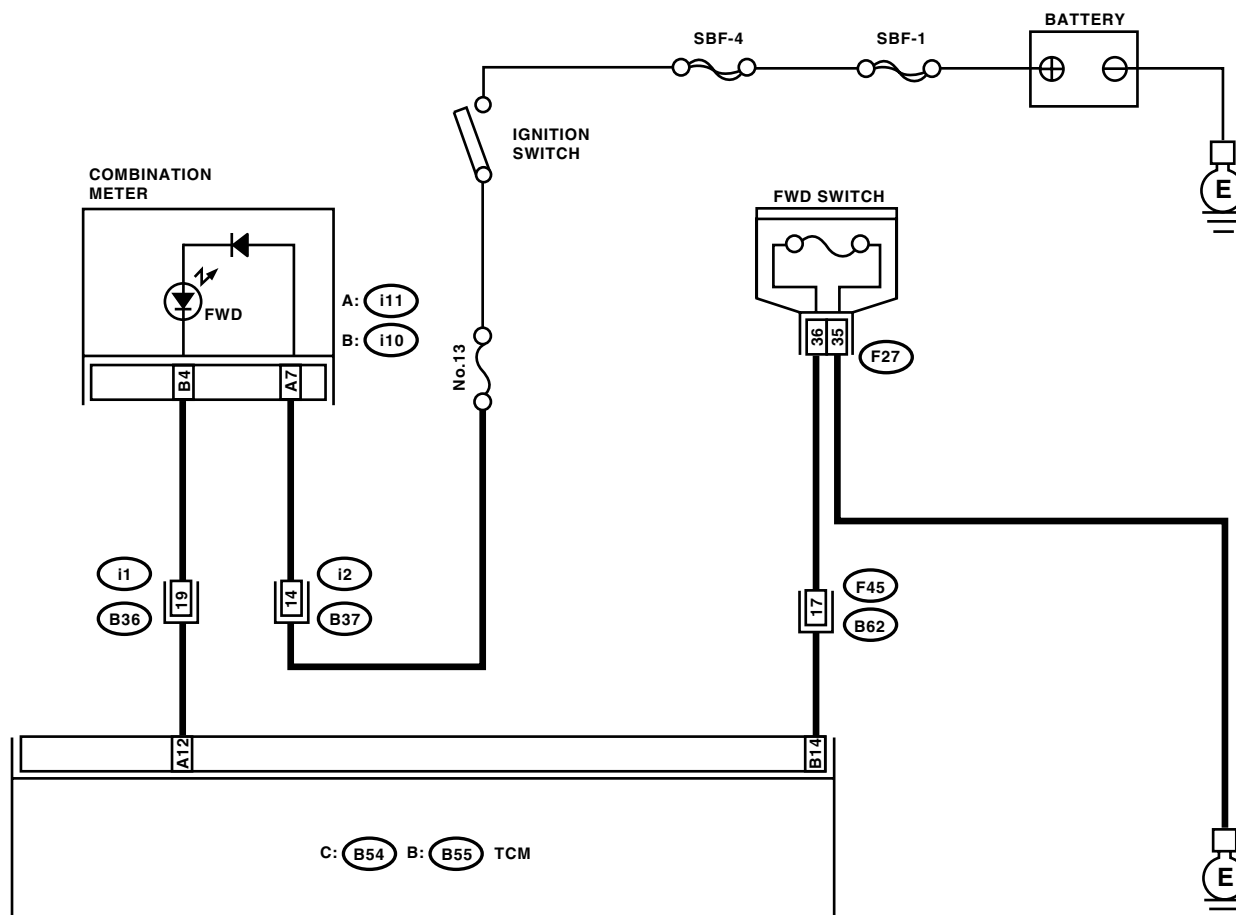
15. Diagnostic Procedure without Diagnostic Trouble Code (DTC)

A: CHECK FWD SWITCH

DIAGNOSIS:

- The LED does not come on even if FWD switch is ON.
- The FWD switch circuit is open or short.

WIRING DIAGRAM:



A: B54

1	2	3	4	5	6	7	8	9
10	11	12	13	14	15	16	17	18
19	20	21				22	23	24

B: B55

1	2	3	4	5	6	7	8	9
10	11	12	13	14	15	16	17	18
19	20	21				22	23	24

i2

1	2	3	4	5	6			7	8	9	10	11
12	13	14	15	16	17	18	19	20	21	22	23	24

B: i10

1	2	3	4	5	6	7	☒	8	9	10	11	12	13	14	
15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30

A: i11

1	2	3	4	5	6	7	8	9	10

F45 i1

1	2	3	4	5			6	7	8	9	10	11
12	13	14	15	16	17	18	19	20	21	22	23	24

F27

1	2		5	6	7	10	15	16	17	20	25	26	27	30	35
3	4		8		11	18	21	28	31						
			9	12	13	14	19	22	23	24	29	32	33	34	36

AT-01301

DIAGNOSTIC PROCEDURE WITHOUT DIAGNOSTIC TROUBLE CODE (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK VEHICLE.	Is the target non-turbo model?	Go to step 2.	Go to step CHECK BRAKE SWITCH. <Ref. to 4AT-99, CHECK BRAKE SWITCH, Diagnostic Procedure without Diagnostic Trouble Code (DTC).>
2 CHECK FWD SWITCH.	When the fuse is inserted to FWD switch, does LED light up?	Go to step CHECK BRAKE SWITCH.<Ref. to 4AT-99, CHECK BRAKE SWITCH, Diagnostic Procedure without Diagnostic Trouble Code (DTC).>	Go to step 3.
3 CHECK FWD INDICATOR LIGHT. 1)Turn the ignition switch to OFF. 2)Remove the combination meter.	Is the FWD indicator light bulb OK?	Go to step 4.	Check the FWD indicator light bulb. <Ref. to IDI-10, Combination Meter Assembly.>
4 CHECK HARNESS CONNECTOR BETWEEN TCM AND FWD SWITCH. 1)Turn the ignition switch to OFF. 2)Disconnect the connector from TCM. 3)Measure the resistance of harness between TCM and FWD switch connector. Connector & terminal (B55) No. 14 — (F27) No. 36:	Is the resistance less than 1 Ω ?	Go to step 5.	Repair the open circuit in harness between TCM and FWD switch connector.
5 CHECK HARNESS CONNECTOR BETWEEN FWD SWITCH AND CHASSIS GROUND. Measure the resistance of harness between FWD switch and chassis ground. Connector & terminal (F27) No. 35 — Chassis ground:	Is the resistance less than 1 Ω ?	Go to step 6.	Repair the open circuit in harness between FWD switch connector and chassis ground.
6 CHECK HARNESS CONNECTOR BETWEEN TCM AND FWD SWITCH. Measure the resistance of harness connector between TCM and body to make sure that circuit does not short. Connector & terminal (B55) No. 14 — Chassis ground:	Is the resistance more than 1 M Ω ?	Go to step 7.	Repair the short circuit in harness between TCM and FWD switch connector.
7 CHECK INPUT SIGNAL FOR TCM. 1)Turn the ignition switch to OFF. 2)Connect the connector to TCM. 3)Turn the ignition switch to ON. 4)Measure the signal voltage for TCM while installing the fuse to FWD switch connector. Connector & terminal (B55) No. 14 (+) — Chassis ground (-):	Is the voltage less than 1 V?	Go to step 8.	Go to step 12.
8 CHECK INPUT SIGNAL FOR TCM. Measure the signal voltage for TCM while removing the fuse from FWD switch connector. Connector & terminal (B55) No. 14 (+) — Chassis ground (-):	Is the voltage 6 — 9.1 V?	Go to step 9.	Replace the TCM. <Ref. to 4AT-67, Transmission Control Module (TCM).>

DIAGNOSTIC PROCEDURE WITHOUT DIAGNOSTIC TROUBLE CODE (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step	Check	Yes	No
9 CHECK HARNESS CONNECTOR BETWEEN TCM AND COMBINATION METER. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from TCM and combination meter. 3) Measure the resistance of harness between TCM and diagnosis connector. Connector & terminal (B54) No. 12 — (i10) No. 4:	Is the resistance less than 1 Ω ?	Go to step 10.	Repair the open circuit in harness between TCM and combination meter and poor contact in coupling connector.
10 CHECK HARNESS CONNECTOR BETWEEN TCM AND COMBINATION METER. Measure the resistance of harness connector between TCM and chassis ground to make sure that circuit does not short. Connector & terminal (B54) No. 12 — Chassis ground:	Is the resistance more than 1 M Ω ?	Go to step 11.	Repair the short circuit in harness between TCM and combination meter connector.
11 CHECK OUTPUT SIGNAL EMITTED FROM TCM. 1) Turn the ignition switch to OFF. 2) Connect the connector to TCM and combination meter. 3) Turn the ignition switch to ON. 4) Measure the signal voltage for TCM while installing the fuse to FWD switch connector. Connector & terminal (B54) No. 12 (+) — Chassis ground (-):	Is the voltage less than 1 V?	Go to step 12.	Go to step 13.
12 CHECK OUTPUT SIGNAL EMITTED FROM TCM. Measure the signal voltage for TCM while removing the fuse from FWD switch connector. Connector & terminal (B54) No. 12 (+) — Chassis ground (-):	Is the voltage 6 — 9.1 V?	Go to step 13.	Replace the TCM. <Ref. to 4AT-67, Transmission Control Module (TCM).>
13 CHECK POOR CONTACT.	Is there poor contact in FWD switch circuit?	Repair the poor contact.	Replace the TCM. <Ref. to 4AT-67, Transmission Control Module (TCM).>

DIAGNOSTIC PROCEDURE WITHOUT DIAGNOSTIC TROUBLE CODE (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

B: CHECK BRAKE SWITCH

Step	Check	Yes	No
1 CHECK BRAKE SWITCH.	When the brake pedal is depressed, does LED light up?	Go to step CHECK CRUISE CONTROL SWITCH. <Ref. to 4AT-99, CHECK CRUISE CONTROL SWITCH, Diagnostic Procedure without Diagnostic Trouble Code (DTC).>	Check the brake switch circuit.

C: CHECK CRUISE CONTROL SWITCH

Step	Check	Yes	No
1 CHECK CRUISE CONTROL SWITCH.	When the cruise control is set, does LED light up?	Go to step CHECK INHIBITOR SWITCH. <Ref. to 4AT-100, CHECK INHIBITOR SWITCH, Diagnostic Procedure without Diagnostic Trouble Code (DTC).>	Check the cruise control. <Ref. to CC-29, Diagnostic Procedure with DTC.>

DIAGNOSTIC PROCEDURE WITHOUT DIAGNOSTIC TROUBLE CODE (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

D: CHECK INHIBITOR SWITCH

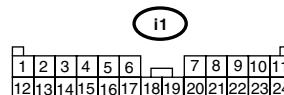
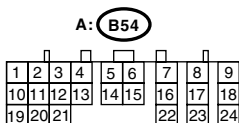
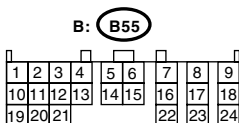
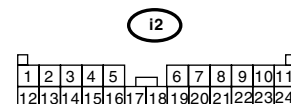
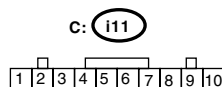
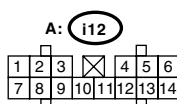
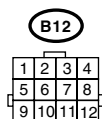
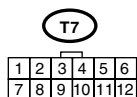
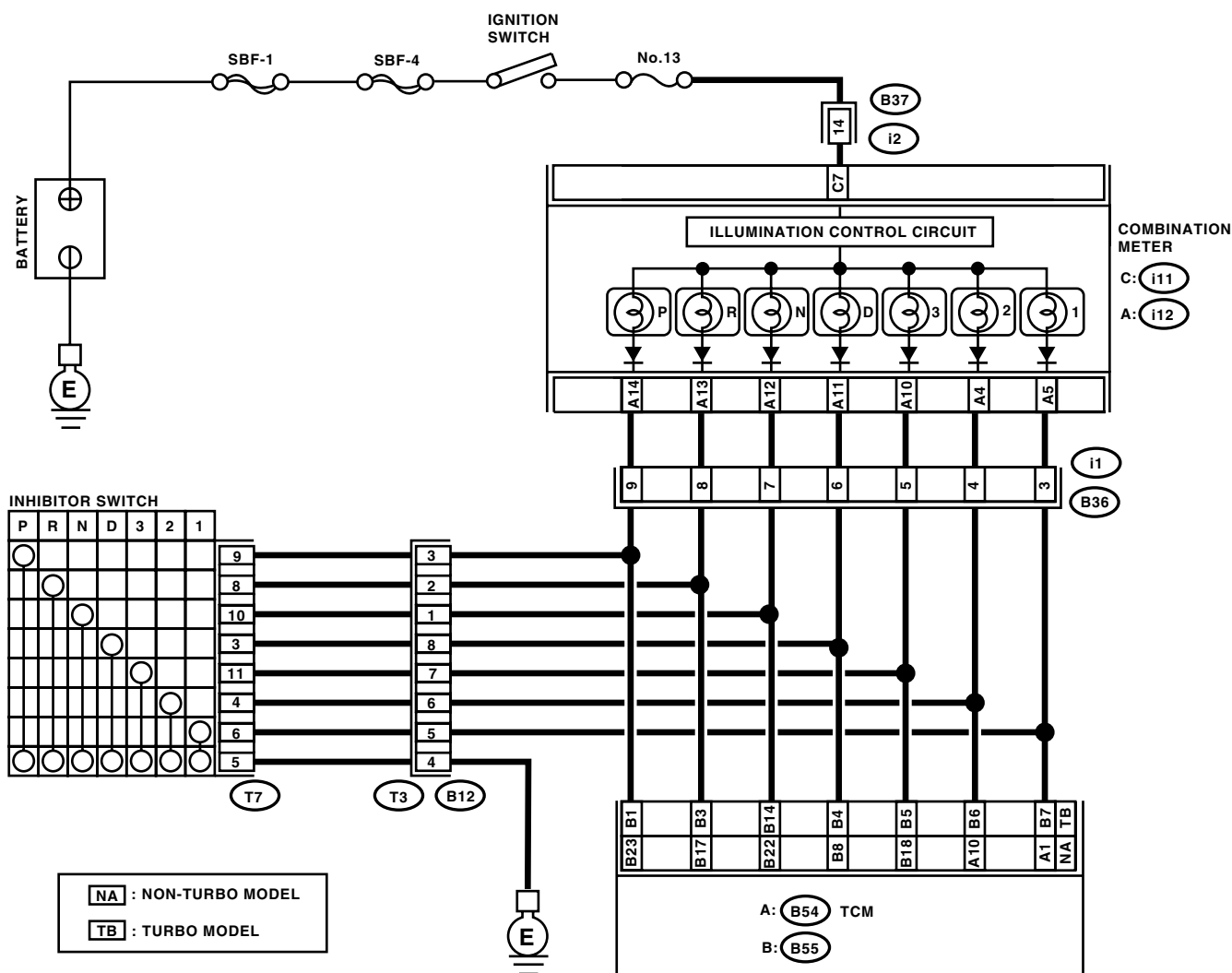
DIAGNOSIS:

The input signal circuit of inhibitor switch is open or shorted.

TROUBLE SYMPTOM:

- Shift characteristics are erroneous.
- Engine brake is not effected when selector lever is in "3" range.
- Engine brake is not effected when selector lever is in "2" range.
- Engine brake is not effected when selector lever is in "1" range.

WIRING DIAGRAM:



DIAGNOSTIC PROCEDURE WITHOUT DIAGNOSTIC TROUBLE CODE (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step		Check	Yes	No
1	CHECK "P" RANGE SWITCH.	When the "P" range is selected, does LED light up?	Go to step 2.	Go to step 22.
2	CHECK INDICATOR LIGHT.	Does the combination meter "P" range indicator illuminate?	Go to step 3.	Go to step 26.
3	CHECK "P" RANGE SWITCH.	When the "R" range is selected, does "P" range LED light up?	Go to step 28.	Go to step 4.
4	CHECK "R" RANGE SWITCH.	When the "R" range is selected, does LED light up?	Go to step 5.	Go to step 29.
5	CHECK INDICATOR LIGHT.	Does the combination meter "R" range indicator illuminate?	Go to step 6.	Go to step 32.
6	CHECK "R" RANGE SWITCH.	When the "N" range is selected, does "R" range LED light up?	Go to step 34.	Go to step 7.
7	CHECK "N" RANGE SWITCH.	When the "N" range is selected, does LED light up?	Go to step 8.	Go to step 35.
8	CHECK INDICATOR LIGHT.	Does the combination meter "N" range indicator illuminate?	Go to step 9.	Go to step 38.
9	CHECK "N" RANGE SWITCH.	When the "D" range is selected, does "N" range LED light up?	Go to step 40.	Go to step 10.
10	CHECK "D" RANGE SWITCH.	When the "D" range is selected, does LED light up?	Go to step 11.	Go to step 41.
11	CHECK INDICATOR LIGHT.	Does the combination meter "D" range indicator illuminate?	Go to step 12.	Go to step 44.
12	CHECK "D" RANGE SWITCH.	When the "3" range is selected, does "D" range LED light up?	Go to step 46.	Go to step 13.
13	CHECK "3" RANGE SWITCH.	When the "3" range is selected, does LED light up?	Go to step 14.	Go to step 47.
14	CHECK INDICATOR LIGHT.	Does the combination meter "3" range indicator illuminate?	Go to step 15.	Go to step 50.
15	CHECK "3" RANGE SWITCH.	When the "2" range is selected, does "3" range LED light up?	Go to step 52.	Go to step 16.
16	CHECK "2" RANGE SWITCH.	When the "2" range is selected, does LED light up?	Go to step 17.	Go to step 53.
17	CHECK INDICATOR LIGHT.	Does the combination meter "2" range indicator illuminate?	Go to step 18.	Go to step 56.
18	CHECK "2" RANGE SWITCH.	When the "1" range is selected, does "2" range LED light up?	Go to step 58.	Go to step 19.
19	CHECK "1" RANGE SWITCH.	When the "1" range is selected, does LED light up?	Go to step 20.	Go to step 59.
20	CHECK INDICATOR LIGHT.	Does the combination meter "1" range indicator illuminate?	Go to step 21.	Go to step 62.
21	CHECK "1" RANGE SWITCH.	When the "2" range is selected, does "1" range LED light UP?	Go to step 64.	Go to step Symptom Related Diagnostic. <Ref. to 4AT-111, Symptom Related Diagnostic.>

DIAGNOSTIC PROCEDURE WITHOUT DIAGNOSTIC TROUBLE CODE (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step	Check	Yes	No
22 CHECK HARNESS CONNECTOR BETWEEN INHIBITOR SWITCH AND CHASSIS GROUND. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from inhibitor switch. 3) Measure the resistance of harness between inhibitor switch and chassis ground. Connector & terminal (T7) No. 5 — Chassis ground:	Is the resistance less than 1 Ω ?	Go to step 23.	Repair the open circuit in harness between inhibitor switch connector and chassis ground, and poor contact in coupling connector.
23 CHECK HARNESS CONNECTOR BETWEEN TCM AND INHIBITOR SWITCH. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from TCM and inhibitor switch. 3) Measure the resistance of harness between TCM and inhibitor switch connector. Connector & terminal NON-TURBO MODEL (B55) No. 23 — (T7) No. 9: TURBO MODEL (B55) No. 1 — (T7) No. 9:	Is the resistance less than 1 Ω ?	Go to step 24.	Repair the open circuit in harness between TCM and inhibitor switch connector, and poor contact in coupling connector.
24 CHECK INPUT SIGNAL FOR TCM. 1) Turn the ignition switch to OFF. 2) Connect the connector to TCM and inhibitor switch. 3) Turn the ignition switch to ON. 4) Move the select lever to "P" range. 5) Measure the voltage between TCM and chassis ground. Connector & terminal NON-TURBO MODEL (B55) No. 23 (+) — Chassis ground (-): TURBO MODEL (B55) No. 1 (+) — Chassis ground (-):	Is the voltage less than 1 V?	Go to step 25.	Go to step 65.
25 CHECK INPUT SIGNAL FOR TCM. 1) Position the select lever to any other than "P" range. 2) Measure the voltage between TCM and chassis ground. Connector & terminal NON-TURBO MODEL (B55) No. 23 (+) — Chassis ground (-): TURBO MODEL (B55) No. 1 (+) — Chassis ground (-):	Is the voltage more than 8 V?	Go to step 65.	Replace the TCM. <Ref. to 4AT-67, Transmission Control Module (TCM).>
26 CHECK "P" RANGE INDICATOR LIGHT BULB. 1) Turn the ignition switch to OFF. 2) Remove the combination meter. 3) Remove the "P" range indicator light bulb from combination meter.	Is the "P" range indicator light bulb OK?	Go to step 27.	Replace the "P" range indicator light bulb. <Ref. to IDI-10, Combination Meter Assembly.>

DIAGNOSTIC PROCEDURE WITHOUT DIAGNOSTIC TROUBLE CODE (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step	Check	Yes	No
27 CHECK HARNESS CONNECTOR BETWEEN TCM AND COMBINATION METER. 1) Disconnect the connectors from TCM and combination meter. 2) Measure the resistance of harness between TCM and combination meter. Connector & terminal NON-TURBO MODEL (B55) No. 23 — (i12) No. 14: TURBO MODEL (B55) No. 1 — (i12) No. 14:	Is the resistance more than 1 Ω ?	Go to step 65.	Repair the open circuit in harness between TCM connector and combination meter, and poor contact in coupling connector.
28 CHECK HARNESS CONNECTOR BETWEEN TCM AND INHIBITOR SWITCH. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from TCM, inhibitor switch and combination meter. 3) Measure the resistance of harness between TCM and chassis ground. Connector & terminal NON-TURBO MODEL (B55) No. 23 — Chassis ground: TURBO MODEL (B55) No. 1 — Chassis ground:	Is the resistance less than 1 M Ω ?	Go to step 29.	Repair the ground short circuit in "P" range circuit.
29 CHECK HARNESS CONNECTOR BETWEEN TCM AND INHIBITOR SWITCH. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from TCM and inhibitor switch. 3) Measure the resistance of harness between TCM and inhibitor switch connector. Connector & terminal NON-TURBO MODEL (B55) No. 17 — (T7) No. 8: TURBO MODEL (B55) No. 3 — (T7) No. 8:	Is the resistance less than 1 Ω ?	Go to step 30.	Repair the open circuit in harness between TCM and inhibitor switch connector, and poor contact in coupling connector.
30 CHECK INPUT SIGNAL FOR TCM. 1) Turn the ignition switch to OFF. 2) Connect the connector to TCM and inhibitor switch. 3) Turn the ignition switch to ON. 4) Move the select lever to "R" range. 5) Measure the voltage between TCM and chassis ground. Connector & terminal NON-TURBO MODEL (B55) No. 17 (+) — Chassis ground (-): TURBO MODEL (B55) No. 3 (+) — Chassis ground (-):	Is the voltage less than 1 V?	Go to step 31.	Go to step 65.
31 CHECK INPUT SIGNAL FOR TCM. 1) Position the select lever to any other than "R" range. 2) Measure the voltage between TCM and chassis ground. Connector & terminal NON-TURBO MODEL (B55) No. 17 (+) — Chassis ground (-): TURBO MODEL (B55) No. 3 (+) — Chassis ground (-):	Is the voltage more than 8 V?	Go to step 65.	Replace the TCM. <Ref. to 4AT-67, Transmission Control Module (TCM).>

DIAGNOSTIC PROCEDURE WITHOUT DIAGNOSTIC TROUBLE CODE (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step	Check	Yes	No
32 CHECK "R" RANGE INDICATOR LIGHT BULB. 1) Turn the ignition switch to OFF. 2) Remove the combination meter. 3) Remove the "R" range indicator light bulb from combination meter.	Is "R" range indicator light bulb OK?	Go to step 33.	Replace the "R" range indicator light bulb. <Ref. to IDI-10, Combination Meter Assembly.>
33 CHECK HARNESS CONNECTOR BETWEEN TCM AND COMBINATION METER. 1) Disconnect the connectors from TCM and combination meter. 2) Measure the resistance of harness between TCM and combination meter. Connector & terminal NON-TURBO MODEL (B55) No. 17 — (i12) No. 13: TURBO MODEL (B55) No. 3 — (i12) No. 13:	Is the resistance less than 1 Ω ?	Go to step 65.	Repair the open circuit in harness between TCM connector and combination meter, and poor contact in TCM connector.
34 CHECK HARNESS CONNECTOR BETWEEN TCM AND INHIBITOR SWITCH. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from TCM, inhibitor switch and combination meter. 3) Measure the resistance of harness between TCM and chassis ground. Connector & terminal NON-TURBO MODEL (B55) No. 17 — Chassis ground: TURBO MODEL (B55) No. 3 — Chassis ground:	Is the resistance more than 1 M Ω ?	Go to step 35.	Repair the ground short circuit in "R" range circuit.
35 CHECK HARNESS CONNECTOR BETWEEN TCM AND INHIBITOR SWITCH. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from TCM and inhibitor switch. 3) Measure the resistance of harness between TCM and inhibitor switch connector. Connector & terminal NON-TURBO MODEL (B55) No. 22 — (T7) No. 10: TURBO MODEL (B55) No. 14 — (T7) No. 10:	Is the resistance less than 1 Ω ?	Go to step 36.	Repair the open circuit in harness between TCM and inhibitor switch connector, and poor contact in coupling connector.
36 CHECK INPUT SIGNAL FOR TCM. 1) Turn the ignition switch to OFF. 2) Connect the connector to TCM and inhibitor switch. 3) Turn the ignition switch to ON. 4) Move the select lever to "N" range. 5) Measure the voltage between TCM and chassis ground. Connector & terminal NON-TURBO MODEL (B55) No. 22 (+) — Chassis ground (-): TURBO MODEL (B55) No. 14 (+) — Chassis ground (-):	Is the voltage less than 1 V?	Go to step 37.	Go to step 65.

DIAGNOSTIC PROCEDURE WITHOUT DIAGNOSTIC TROUBLE CODE (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step	Check	Yes	No
37 CHECK INPUT SIGNAL FOR TCM. 1)Position the select lever to any other than "N" range. 2)Measure the voltage between TCM and chassis ground. <i>Connector & terminal</i> NON-TURBO MODEL (B55) No. 22 (+) — Chassis ground (-): TURBO MODEL (B55) No. 14 (+) — Chassis ground (-):	Is the voltage more than 8 V?	Go to step 65.	Replace the TCM. <Ref. to 4AT-67, Transmission Control Module (TCM).>
38 CHECK "N" RANGE INDICATOR LIGHT BULB. 1)Turn the ignition switch to OFF. 2)Remove the combination meter. 3)Remove the "N" range indicator light bulb from combination meter.	Is the "N" range indicator light bulb OK?	Go to step 39.	Replace the "N" range indicator light bulb. <Ref. to IDI-10, Combination Meter Assembly.>
39 CHECK HARNESS CONNECTOR BETWEEN TCM AND COMBINATION METER. 1)Disconnect the connectors from TCM and combination meter. 2)Measure the resistance of harness between TCM and combination meter. <i>Connector & terminal</i> NON-TURBO MODEL (B55) No. 22 — (i12) No. 12: TURBO MODEL (B55) No. 14 — (i12) No. 12:	Is the resistance less than 1 Ω ?	Go to step 65.	Repair the open circuit in harness between TCM connector and combination meter, and poor contact in TCM connector.
40 CHECK HARNESS CONNECTOR BETWEEN TCM AND INHIBITOR SWITCH. 1)Turn the ignition switch to OFF. 2)Disconnect the connectors from TCM, inhibitor switch and combination meter. 3)Measure the resistance of harness between TCM and chassis ground. <i>Connector & terminal</i> NON-TURBO MODEL (B55) No. 22 — Chassis ground: TURBO MODEL (B55) No. 14 — Chassis ground:	Is the resistance more than 1 M Ω ?	Go to step 41.	Repair the ground short circuit in "N" range circuit.
41 CHECK HARNESS CONNECTOR BETWEEN TCM AND INHIBITOR SWITCH. 1)Turn the ignition switch to OFF. 2)Disconnect the connectors from TCM and inhibitor switch. 3)Measure the resistance of harness between TCM and inhibitor switch connector. <i>Connector & terminal</i> NON-TURBO MODEL (B55) No. 8 — (T7) No. 3: TURBO MODEL (B55) No. 4 — (T7) No. 3:	Is the resistance less than 1 Ω ?	Go to step 42.	Repair the open circuit in harness between TCM and inhibitor switch connector, and poor contact in coupling connector.

DIAGNOSTIC PROCEDURE WITHOUT DIAGNOSTIC TROUBLE CODE (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step	Check	Yes	No
42 CHECK INPUT SIGNAL FOR TCM. 1) Turn the ignition switch to OFF. 2) Connect the connector to TCM and inhibitor switch. 3) Turn the ignition switch to ON. 4) Move the select lever to "D" range. 5) Measure the voltage between TCM and chassis ground. Connector & terminal NON-TURBO MODEL (B55) No. 8 (+) — Chassis ground (-): TURBO MODEL (B55) No. 4 (+) — Chassis ground (-):	Is the voltage less than 1 V?	Go to step 43.	Go to step 65.
43 CHECK INPUT SIGNAL FOR TCM. 1) Position select lever to any other than "D" range. 2) Measure the voltage between TCM and chassis ground. Connector & terminal NON-TURBO MODEL (B55) No. 8 (+) — Chassis ground (-): TURBO MODEL (B55) No. 4 (+) — Chassis ground (-):	Is the voltage more than 8 V?	Go to step 65.	Replace the TCM. <Ref. to 4AT-67, Transmission Control Module (TCM).>
44 CHECK "D" RANGE INDICATOR LIGHT BULB. 1) Turn the ignition switch to OFF. 2) Remove the combination meter. 3) Remove the "D" range indicator light bulb from combination meter.	Is the "D" range indicator light bulb OK?	Go to step 45.	Replace the "D" range indicator light bulb. <Ref. to IDI-10, Combination Meter Assembly.>
45 CHECK HARNESS CONNECTOR BETWEEN TCM AND COMBINATION METER. 1) Disconnect the connectors from TCM and combination meter. 2) Measure the resistance of harness between TCM and combination meter. Connector & terminal NON-TURBO MODEL (B55) No. 8 — (i12) No. 11: TURBO MODEL (B55) No. 4 — (i12) No. 11:	Is the resistance less than 1 Ω ?	Go to step 65.	Repair the open circuit in harness between TCM connector and combination meter, and TCM connector.
46 CHECK HARNESS CONNECTOR BETWEEN TCM AND INHIBITOR SWITCH. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from TCM, inhibitor switch and combination meter. 3) Measure the resistance of harness between TCM and chassis ground. Connector & terminal NON-TURBO MODEL (B55) No. 8 — Chassis ground: TURBO MODEL (B55) No. 4 — Chassis ground:	Is the resistance more than 1 M Ω ?	Go to step 47.	Repair the ground short circuit in "D" range circuit.

DIAGNOSTIC PROCEDURE WITHOUT DIAGNOSTIC TROUBLE CODE (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step	Check	Yes	No
47 CHECK HARNESS CONNECTOR BETWEEN TCM AND INHIBITOR SWITCH. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from TCM and inhibitor switch. 3) Measure the resistance of harness between TCM and inhibitor switch connector. Connector & terminal NON-TURBO MODEL (B55) No. 18 — (T7) No. 11: TURBO MODEL (B55) No. 5 — (T7) No. 11:	Is the resistance less than 1 Ω ?	Go to step 48.	Repair the open circuit in harness between TCM and inhibitor switch connector, and poor contact in coupling connector.
48 CHECK INPUT SIGNAL FOR TCM. 1) Turn the ignition switch to OFF. 2) Connect the connector to TCM and inhibitor switch. 3) Turn the ignition switch to ON. 4) Move the select lever to "3" range. 5) Measure the voltage between TCM and chassis ground. Connector & terminal NON-TURBO MODEL (B55) No. 18 (+) — Chassis ground (-): TURBO MODEL (B55) No. 5 (+) — Chassis ground (-):	Is the voltage less than 1 V?	Go to step 49.	Go to step 65.
49 CHECK INPUT SIGNAL FOR TCM. 1) Position the select lever to any other than "3" range. 2) Measure the voltage between TCM and chassis ground. Connector & terminal NON-TURBO MODEL (B55) No. 18 (+) — Chassis ground (-): TURBO MODEL (B55) No. 5 (+) — Chassis ground (-):	Is the voltage more than 8 V?	Go to step 65.	Replace the TCM. <Ref. to 4AT-67, Transmission Control Module (TCM).>
50 CHECK "3" RANGE INDICATOR LIGHT BULB. 1) Turn the ignition switch to OFF. 2) Remove the combination meter. 3) Remove the "3" range indicator light bulb from combination meter.	Is the "3" range indicator light bulb OK?	Go to step 51.	Replace the "3" range indicator light bulb. <Ref. to IDI-10, Combination Meter Assembly.>
51 CHECK HARNESS CONNECTOR BETWEEN TCM AND COMBINATION METER. 1) Disconnect the connectors from TCM and combination meter. 2) Measure the resistance of harness between TCM and combination meter. Connector & terminal NON-TURBO MODEL (B55) No. 18 — (i12) No. 10: TURBO MODEL (B55) No. 5 — (i12) No. 10:	Is the resistance more than 1 Ω ?	Go to step 65.	Repair the open circuit in harness between TCM connector and combination meter, and poor contact in TCM connector.

DIAGNOSTIC PROCEDURE WITHOUT DIAGNOSTIC TROUBLE CODE (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step	Check	Yes	No
52 CHECK HARNESS CONNECTOR BETWEEN TCM AND INHIBITOR SWITCH. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from TCM, inhibitor switch and combination meter. 3) Measure the resistance of harness between TCM and chassis ground. Connector & terminal NON-TURBO MODEL (B55) No. 18 — Chassis ground: TURBO MODEL (B55) No. 5 — Chassis ground:	Is the resistance more than 1 MΩ?	Go to step 53.	Repair the ground short circuit in "3" range circuit.
53 CHECK HARNESS CONNECTOR BETWEEN TCM AND INHIBITOR SWITCH. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from TCM and inhibitor switch. 3) Measure the resistance of harness between TCM and inhibitor switch connector. Connector & terminal NON-TURBO MODEL (B54) No. 10 — (T7) No. 4: TURBO MODEL (B55) No. 6 — (T7) No. 4:	Is the resistance less than 1 Ω?	Go to step 54.	Repair the open circuit in harness between TCM and inhibitor switch connector, and poor contact in coupling connector.
54 CHECK INPUT SIGNAL FOR TCM. 1) Turn the ignition switch to OFF. 2) Connect the connector to TCM and inhibitor switch. 3) Turn the ignition switch to ON. 4) Move the select lever to "2" range. 5) Measure the voltage between TCM and chassis ground. Connector & terminal NON-TURBO MODEL (B54) No. 10 (+) — Chassis ground (-): TURBO MODEL (B55) No. 6 (+) — Chassis ground (-):	Is the voltage less than 1 V?	Go to step 55.	Go to step 65.
55 CHECK INPUT SIGNAL FOR TCM. 1) Position the select lever to any other than "2" range. 2) Measure the voltage between TCM and chassis ground. Connector & terminal NON-TURBO MODEL (B54) No. 10 (+) — Chassis ground (-): TURBO MODEL (B55) No. 6 (+) — Chassis ground (-):	Is the voltage more than 8 V?	Go to step 65.	Replace the TCM. <Ref. to 4AT-67, Transmission Control Module (TCM).>
56 CHECK "2" RANGE INDICATOR LIGHT BULB. 1) Turn the ignition switch to OFF. 2) Remove the combination meter. 3) Remove the "2" range indicator light bulb from combination meter.	Is the "2" range indicator light bulb OK?	Go to step 57.	Replace the "2" range indicator light bulb. <Ref. to IDI-10, Combination Meter Assembly.>

DIAGNOSTIC PROCEDURE WITHOUT DIAGNOSTIC TROUBLE CODE (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step	Check	Yes	No
57 CHECK HARNESS CONNECTOR BETWEEN TCM AND COMBINATION METER. 1) Disconnect the connectors from TCM and combination meter. 2) Measure the resistance of harness between TCM and combination meter. Connector & terminal NON-TURBO MODEL (B54) No. 10 — (i12) No. 4: TURBO MODEL (B55) No. 6 — (i12) No. 4:	Is the resistance less than 1 Ω ?	Go to step 65.	Repair the open circuit in harness between TCM and combination meter, and poor contact in TCM connector.
58 CHECK HARNESS CONNECTOR BETWEEN TCM AND INHIBITOR SWITCH. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from TCM, inhibitor switch and combination meter. 3) Measure the resistance of harness between TCM and chassis ground. Connector & terminal NON-TURBO MODEL (B54) No. 10 — Chassis ground: TURBO MODEL (B55) No. 6 — Chassis ground:	Is the resistance more than 1 M Ω ?	Go to step 59.	Repair the ground short circuit in "2" range circuit.
59 CHECK HARNESS CONNECTOR BETWEEN TCM AND INHIBITOR SWITCH. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from TCM and inhibitor switch. 3) Measure the resistance of harness between TCM and inhibitor switch connector. Connector & terminal NON-TURBO MODEL (B54) No. 1 — (T7) No. 6: TURBO MODEL (B55) No. 7 — (T7) No. 6:	Is the resistance less than 1 Ω ?	Go to step 60.	Repair the open circuit in harness between TCM and inhibitor switch connector, and poor contact in coupling connector.
60 CHECK INPUT SIGNAL FOR TCM. 1) Turn the ignition switch to OFF. 2) Connect the connector to TCM and inhibitor switch. 3) Turn the ignition switch to ON. 4) Move the select lever to "1" range. 5) Measure the voltage between TCM and chassis ground. Connector & terminal NON-TURBO MODEL (B54) No. 1 (+) — Chassis ground (-): TURBO MODEL (B55) No. 7 (+) — Chassis ground (-):	Is the voltage less than 1 V?	Go to step 61.	Go to step 65.
61 CHECK INPUT SIGNAL FOR TCM. 1) Position the select lever to any other than "1" range. 2) Measure the voltage between TCM and chassis ground. Connector & terminal NON-TURBO MODEL (B54) No. 1 (+) — Chassis ground (-): TURBO MODEL (B55) No. 7 (+) — Chassis ground (-):	Is the voltage more than 8 V?	Go to step 65.	Replace the TCM. <Ref. to 4AT-67, Transmission Control Module (TCM).>

DIAGNOSTIC PROCEDURE WITHOUT DIAGNOSTIC TROUBLE CODE (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step	Check	Yes	No
62 CHECK "1" RANGE INDICATOR LIGHT BULB. 1) Turn the ignition switch to OFF. 2) Remove the combination meter. 3) Remove the "1" range indicator light bulb from combination meter.	Is the "1" range indicator light bulb OK?	Go to step 63.	Replace the "1" range indicator light bulb. <Ref. to IDI-10, Combination Meter Assembly.>
63 CHECK HARNESS CONNECTOR BETWEEN TCM AND COMBINATION METER. 1) Disconnect the connectors from TCM and combination meter. 2) Measure the resistance of harness between TCM and combination meter. Connector & terminal NON-TURBO MODEL (B54) No. 1 — (i12) No. 5: TURBO MODEL (B55) No. 7 — (i12) No. 5:	Is the resistance less than 1Ω?	Go to step 65.	Repair the open circuit in harness between TCM and combination meter, poor contact in TCM connector.
64 CHECK HARNESS CONNECTOR BETWEEN TCM AND INHIBITOR SWITCH. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from TCM, inhibitor switch and combination meter. 3) Measure the resistance of harness between TCM and chassis ground. Connector & terminal NON-TURBO MODEL (B54) No. 1 — Chassis ground: TURBO MODEL (B55) No. 7 — Chassis ground:	Is the resistance more than 1 MΩ?	Go to step 65.	Repair the ground short circuit in "1" range circuit.
65 CHECK POOR CONTACT.	Is there poor contact in inhibitor switch circuit?	Repair the poor contact.	Adjust the inhibitor switch and select cable. <Ref. to 4AT-45, ADJUSTMENT, Inhibitor Switch.> and <Ref. to CS-26, Select Cable.>

SYMPTOM RELATED DIAGNOSTIC

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

16.Symptom Related Diagnostic

A: INSPECTION

Symptom	Problem parts
Starter does not rotate when select lever is in "P" or "N" range; starter rotates when select lever is in "R", "D", "3" or "2" range.	• Inhibitor switch • Select cable • Select lever • Starter motor and harness
Abnormal noise when select lever is in "P" or "N" range.	• Strainer • Transfer duty solenoid • Oil pump • Drive plate • ATF level too high or too low
Hissing noise occurs during standing start.	• Strainer • ATF level too high or too low
Noise occurs while driving in "D1".	• Final gear • Planetary gear • Reduction gear • Differential gear oil level too high or too low
Noise occurs while driving in "D2".	
Noise occurs while driving in "D3".	• Final gear • Low & reverse brake • Reduction gear • Differential gear oil level too high or too low
Noise occurs while driving in "D4".	• Final gear • Low & reverse brake • Planetary gear • Reduction gear • Differential gear oil level too high or too low
Engine stalls while shifting from one range to another.	• Control valve • Lock-up damper • Engine performance • Input shaft
Vehicle moves when select lever is in "N" range.	• TCM • Low clutch
Shock occurs when select lever is moved from "N" to "D" range.	• TCM • Harness • Control valve • ATF deterioration
Excessive time lag occurs when select lever is moved from "N" to "D" range.	• Control valve • Low clutch • Line pressure duty solenoid • Seal ring • Front gasket transmission case
Shock occurs when select lever is moved from "N" to "R" range.	• TCM • Harness • Control valve • ATF deterioration
Excessive time lag occurs when select lever is moved from "N" to "R" range.	• Control valve • Low & reverse clutch • Reverse clutch • Line pressure duty solenoid • Seal ring • Front gasket transmission case
Vehicle does not start in any shift range (engine stalls).	• Parking brake mechanism • Planetary gear

SYMPTOM RELATED DIAGNOSTIC

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Symptom	Problem parts
Vehicle does not start in any shift range (engine revving up).	• Strainer • Line pressure duty solenoid • Control valve • Drive pinion • Hypoid gear • Axle shaft • Differential gear • Oil pump • Input shaft • Output shaft • Planetary gear • Drive plate • ATF level too low • Front gasket transmission case
Vehicle does not start in "R" range only (engine revving up).	• Select cable • Select lever • Control valve • Low & reverse clutch • Reverse clutch
Vehicle does not start in "R" range only (engine stalls).	• Low clutch • 2-4 brake • Planetary gear • Parking brake mechanism
Vehicle does not start in "D", "3" range only (engine revving up).	• Low clutch • One-way clutch
Vehicle does not start in "D", "3" or "2" range only (engine revving up).	• Low clutch
Vehicle does not start in "D", "3" or "2" range only (engine stalls).	• Reverse clutch
Vehicle starts in "R" range only (engine revving up).	• Control valve
Acceleration during standing starts is poor (high stall rpm).	• Control valve • Low clutch • Reverse clutch • ATF level too low • Front gasket transmission case • Differential gear oil level too high or too low
Acceleration during standing starts is poor (low stall rpm).	• Oil pump • Torque converter one-way clutch • Engine performance
Acceleration is poor when select lever is in "D", "3" or "2" range (normal stall rpm).	• TCM • Control valve • High clutch • 2-4 brake • Planetary gear
Acceleration is poor when select lever is in "R" (normal stall rpm).	• Control valve • High clutch • 2-4 brake • Planetary gear
No shift occurs from 1st to 2nd gear.	• TCM • Rear vehicle speed sensor • Front vehicle speed sensor • Throttle position sensor • Shift solenoid 1 • Control valve • 2-4 brake
No shift occurs from 2nd to 3rd gear.	• TCM • Control valve • High clutch • Shift solenoid 2

SYMPTOM RELATED DIAGNOSTIC

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Symptom	Problem parts
No shift occurs from 3rd to 4th gear.	• TCM • Shift solenoid 1 • ATF temperature sensor • Control valve • 2-4 brake
Engine brake is not effected when select lever is in "3" range.	• Inhibitor switch • TCM • Throttle position sensor • Control valve
Engine brake is not effected when select lever is in "3" or "2" range.	• Control valve
Engine brake is not effected when select lever is in "1" range.	• Control valve • Low & reverse brake
Shift characteristics are erroneous.	• Inhibitor switch • TCM • Front vehicle speed sensor • Rear vehicle speed sensor • Throttle position sensor • Control valve • Ground earth
No lock-up occurs.	• TCM • Throttle position sensor • ATF temperature sensor • Control valve • Lock-up facing • Engine speed signal
Parking brake is not effected.	• Select cable • Select lever • Parking mechanism
Shift lever cannot be moved or is hard to move from "P" range.	
ATF spurts out.	• ATF level too high
Differential oil spurts out.	• Differential gear oil too high
Differential oil level changes excessively.	• Seal pipe • Double oil seal
Odor is produced from ATF supply pipe.	• High clutch • 2-4 brake • Low & reverse clutch • Reverse clutch • Lock-up facing • ATF deterioration
Shock occurs from 1st to 2nd gear.	• TCM • Throttle position sensor • 2-4 brake duty solenoid • ATF temperature sensor • Line pressure duty solenoid • Control valve • 2-4 brake • ATF deterioration • Engine performance • 2-4 brake timing solenoid
Slippage occurs from 1st to 2nd gear.	• TCM • Throttle position sensor • 2-4 brake duty solenoid • ATF temperature sensor • Line pressure duty solenoid • Control valve • 2-4 brake • 2-4 brake timing solenoid • High clutch

SYMPTOM RELATED DIAGNOSTIC

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Symptom	Problem parts
Shock occurs from 2nd to 3rd gear.	• TCM • Throttle position sensor • 2-4 brake duty solenoid • ATF temperature sensor • Line pressure duty solenoid • Control valve • High clutch • 2-4 brake • ATF deterioration • Engine performance • 2-4 brake timing solenoid
Slippage occurs from 2nd to 3rd gear.	• TCM • Throttle position sensor • 2-4 brake duty solenoid • ATF temperature sensor • Line pressure duty solenoid • Control valve • High clutch • 2-4 brake • 2-4 brake timing solenoid
Shock occurs from 3rd to 4th gear.	• TCM • Throttle position sensor • 2-4 brake duty solenoid • ATF temperature sensor • Line pressure duty solenoid • Control valve • 2-4 brake timing solenoid • 2-4 brake • ATF deterioration • Engine performance • Low clutch timing solenoid • Low clutch
Slippage occurs from 3rd to 4th gear.	• TCM • Throttle position sensor • 2-4 brake duty solenoid • ATF temperature sensor • Line pressure duty solenoid • Control valve • 2-4 brake • 2-4 brake timing solenoid
Shock occurs when select lever is moved from "3" to "2" range.	• TCM • Throttle position sensor • ATF temperature sensor • Line pressure duty solenoid • Control valve • 2-4 brake duty solenoid • 2-4 brake • ATF deterioration • 2-4 brake timing solenoid
Shock occurs when select lever is moved from "D" to "1" range.	• TCM • Throttle position sensor • ATF temperature sensor • Line pressure duty solenoid • Control valve • ATF deterioration • 2-4 brake duty solenoid • 2-4 brake timing solenoid • Low clutch timing solenoid

SYMPTOM RELATED DIAGNOSTIC

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Symptom	Problem parts
Shock occurs when select lever is moved from "2" to "1" range.	• TCM • Throttle position sensor • ATF temperature sensor • Line pressure duty solenoid • Control valve • Low & reverse clutch • ATF deterioration • 2-4 brake duty solenoid • 2-4 brake timing solenoid • Low clutch timing solenoid
Shock occurs when accelerator pedal is released at medium speeds.	• TCM • Throttle position sensor • ATF temperature sensor • Line pressure duty solenoid • Control valve • Lock-up damper • Engine performance • 2-4 brake duty solenoid • 2-4 brake timing solenoid • Low clutch timing solenoid
Vibration occurs during straight-forward operation.	• TCM • Lock-up duty solenoid • Lock-up facing • Lock-up damper
Vibration occurs during turns (tight corner "braking" phenomenon).	• TCM • Front vehicle speed sensor • Rear vehicle speed sensor • Throttle position sensor • ATF temperature sensor • Transfer clutch • Transfer valve • Transfer duty solenoid • ATF deterioration • Harness
Front wheel slippage occurs during standing starts.	• TCM • Front vehicle speed sensor • FWD switch • Throttle position sensor • ATF temperature sensor • Control valve • Transfer clutch • Transfer valve • Transfer pipe • Transfer duty solenoid
Vehicle is not set in FWD mode.	• TCM • FWD switch • Transfer clutch • Transfer valve • Transfer duty solenoid
Select lever is hard to move.	• Select cable • Select lever • Detente spring • Manual plate
Select lever is too high to move (unreasonable resistance).	• Detente spring • Manual plate
Select lever slips out of operation during acceleration or while driving on rough terrain.	• Select cable • Select lever • Detente spring • Manual plate

SYMPTOM RELATED DIAGNOSTIC

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Brought to you by Eris Studios
NOT FOR RESALE

MANUAL TRANSMISSION AND DIFFERENTIAL 5-SPEED (5MT)

GENERAL DESCRIPTION

MANUAL TRANSMISSION AND DIFFERENTIAL

1. General Description

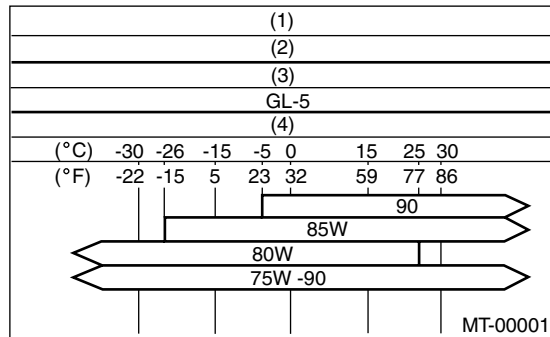
A: SPECIFICATIONS

1. MANUAL TRANSMISSION AND DIFFERENTIAL

Model			2.5 L		2.0 L Turbo
			Sedan	Wagon	
Type			5-forward speeds with synchromesh and 1-reverse		
Transmission gear ratio			1st	3.454	3.454
			2nd	2.062	1.947
			3rd	1.448	1.366
			4th	1.088	0.972
			5th	0.780	0.738
			Reverse	3.333	
Front reduction gear	Final	Type of gear	Hypoid		
		Gear ratio	4.111	3.900	
Rear reduction gear	Transfer	Type of gear	Helical		
		Gear ratio	1.000	1.100	
	Final	Type of gear	Hypoid		
		Gear ratio	4.111	3.900	3.545
Front differential	Type and number of gear		Straight bevel gear (Bevel pinion: 2, Bevel gear: 2)		
Center differential	Type and number of gear		Straight bevel gear (Bevel pinion: 2, Bevel gear: 2 and viscous coupling)		
Transmission gear oil			GL-5		
Transmission oil capacity			3.5 ℓ (3.7 US qt, 3.1 Imp qt)		

2. TRANSMISSION GEAR OIL

Recommended oil



- (1) Item
- (2) Transmission gear oil
- (3) API classification
- (4) SAE viscosity No. and applicable temperature

GENERAL DESCRIPTION

MANUAL TRANSMISSION AND DIFFERENTIAL

3. TRANSMISSION CASE ASSEMBLY

Drive pinion shim adjustment

Hypoid gear backlash

0.13 — 0.18 mm (0.0051 — 0.0071 in)

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

Selection of main shaft rear plate

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

4. DRIVE PINION ASSEMBLY

Preload adjustment of thrust bearing

Starting torque

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

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

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

5. MAIN SHAFT

Snap ring (Outer-25) to synchronizer hub clearance

0.060 — 0.100 mm (0.0024 — 0.0039 in)

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

6. 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 the reverse idler gear to transmission case wall clearance to within 0 to 0.5 mm (0 to 0.020 in) using washers.

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

GENERAL DESCRIPTION

MANUAL TRANSMISSION AND DIFFERENTIAL

7. SHIFTER FORK AND ROD

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

Rod end clearance

A: 1st-2nd — 3rd-4th

0.4 — 1.4 mm (0.016 — 0.055 in)

B: 3rd-4th — 5th

0.5 — 1.3 mm (0.020 — 0.051 in)

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

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

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

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

8. TRANSFER CASE OR REAR CASE

Neutral position adjustment

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

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

Reverse check plate adjustment

Reverse check plate			
Part No.	Mark	Angle θ	Remarks
32189AA000	0	28°	Arm stops closer to 5th gear.
32189AA010	1	31°	Arm stops closer to 5th gear.
33189AA020	2	34°	Arm stops in the center.
32189AA030	3	37°	Arm stops closer to reverse gear.
32189AA040	4	40°	Arm stops closer to reverse gear.

GENERAL DESCRIPTION

MANUAL TRANSMISSION AND DIFFERENTIAL

9. EXTENSION ASSEMBLY

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

0.2 — 0.3 mm (0.0008 — 0.012 in)

NOTE:

Be sure to keep the clearance within specifications.

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

Thrust washer to center differential side clearance

0.15 — 0.35 mm (0.0059 — 0.0138 in)

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

10.FRONT DIFFERENTIAL

Bevel gear to pinion backlash

0.13 — 0.18 mm (0.0051 — 0.0071 in)

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

Pinion shaft to axle drive shaft clearance

0 — 0.2 mm (0 — 0.008 in)

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

11.TRANSFER DRIVE GEAR

Snap ring (Outer-30) to ball bearing clearance

0.01 — 0.15 mm (0.0004 — 0.0059 in)

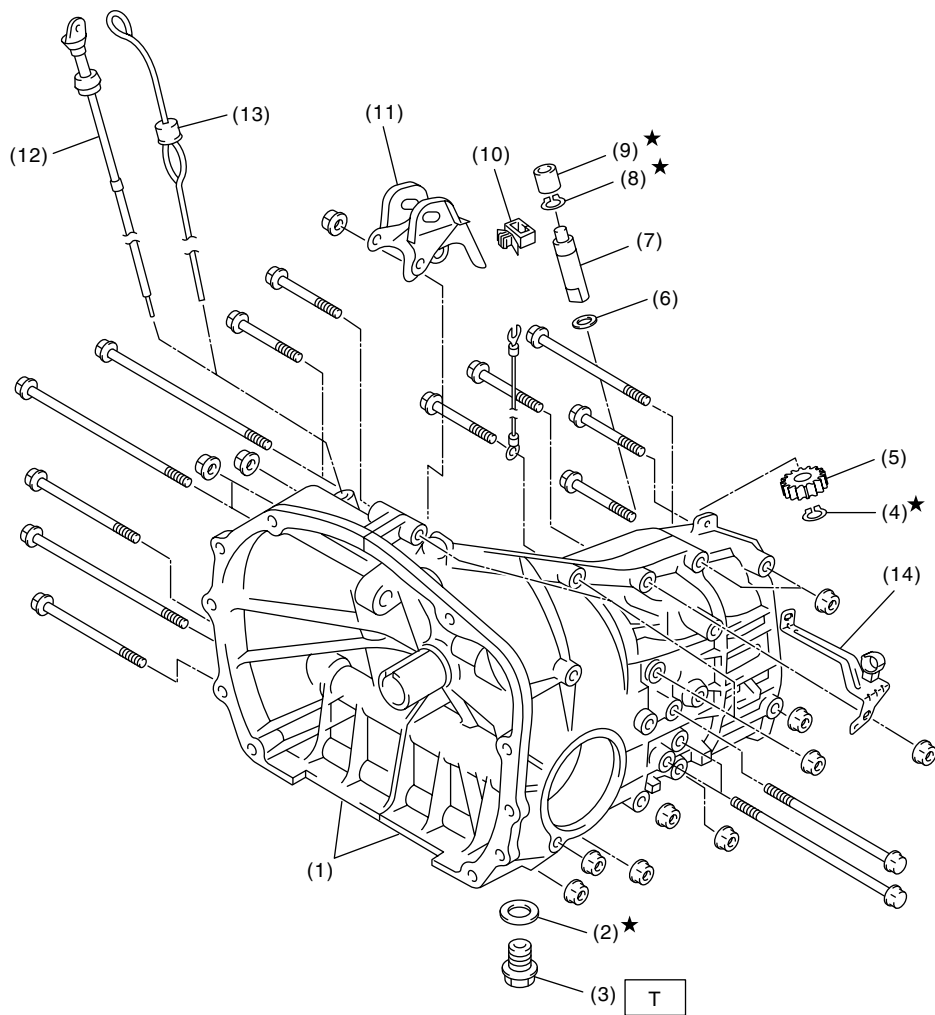
Snap ring (Outer-30)	
Part No.	Thickness mm (in)
805030041	1.53 (0.0602)
805030042	1.65 (0.0650)
805030043	1.77 (0.0697)

GENERAL DESCRIPTION

MANUAL TRANSMISSION AND DIFFERENTIAL

B: COMPONENT

1. TRANSMISSION CASE



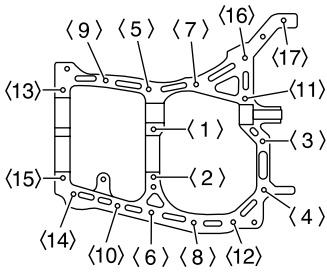
MT-00974

GENERAL DESCRIPTION

MANUAL TRANSMISSION AND DIFFERENTIAL

(1) Transmission case ASSY	(7) Speedometer shaft	(13) Oil level gauge (Turbo model)
(2) Gasket	(8) Snap ring (Outer)	(14) Harness bracket (Non-turbo model)
(3) Drain plug	(9) Oil seal	
(4) Snap ring (Outer)	(10) Clamp	
(5) Speedometer driven gear	(11) Pitching stopper bracket	Tightening torque: N·m (kgf-m, ft-lb)
(6) Washer	(12) Oil level gauge (Non-turbo model)	T: 69 (7.0, 50.6)

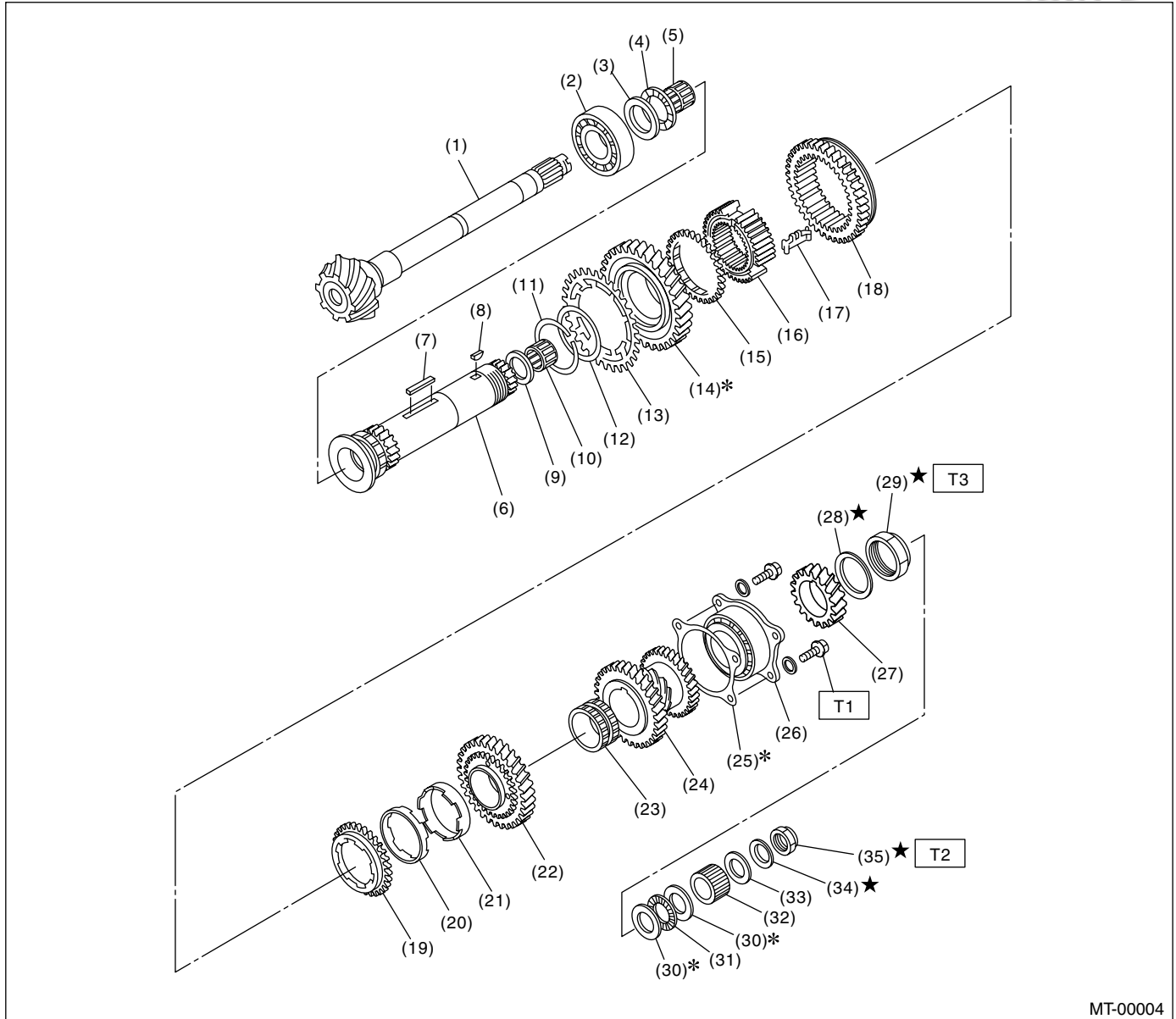
• Transmission case tightening torque

 MT-00003	Bolt No.	Bolt size	Tightening torque: N·m (kgf-m, ft-lb)
	<5> to <15>	8 mm	24.5 (2.5, 18.1)
	<1> to <4> <16>, <17>	10 mm	39 (4.0, 28.9)

GENERAL DESCRIPTION

MANUAL TRANSMISSION AND DIFFERENTIAL

2. DRIVE PINION ASSEMBLY



MT-00004

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

Tightening torque: N·m (kgf-m, ft-lb)

T1: 30.5 (3.1, 22.5)

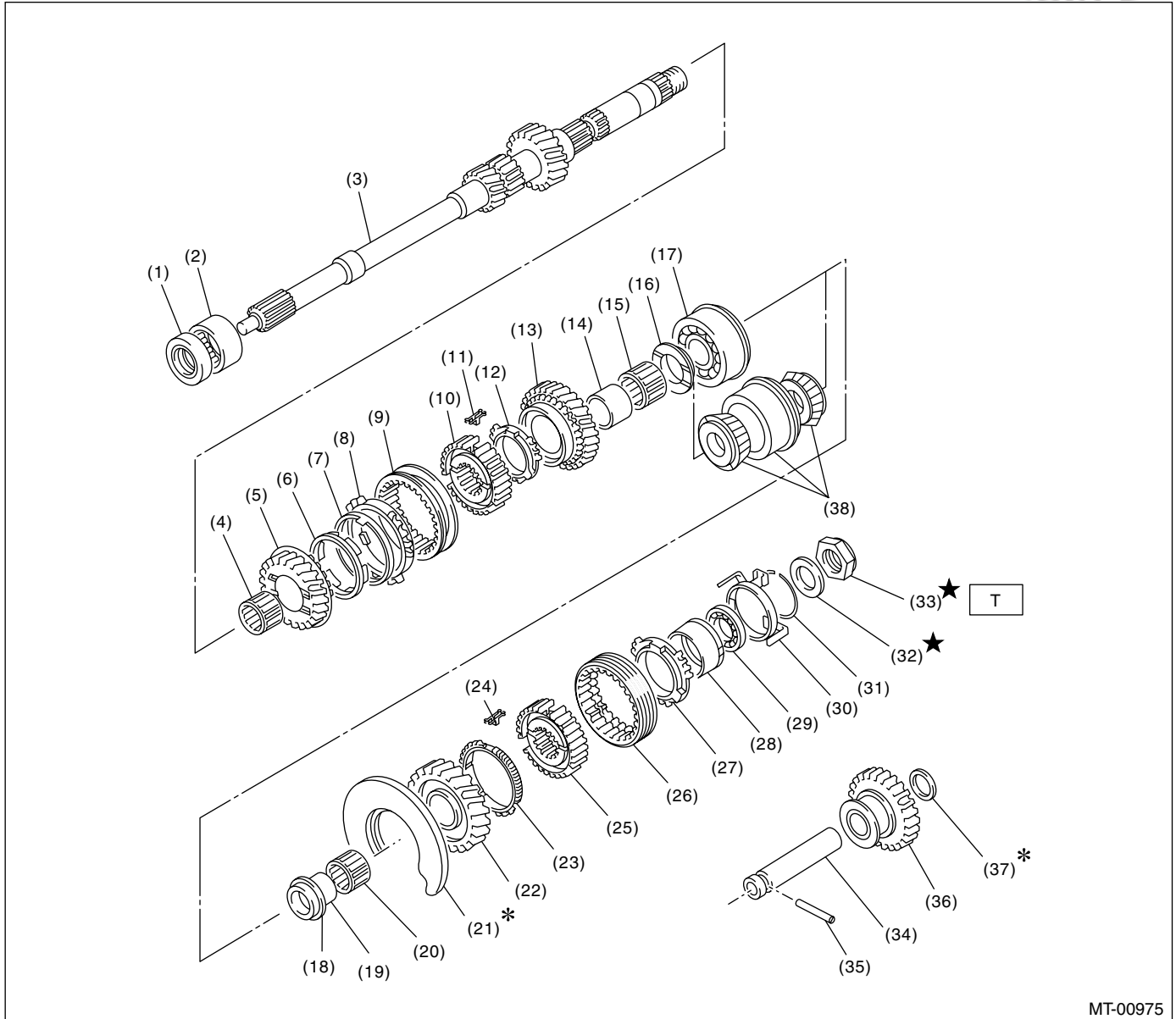
T2: 120 (12.2, 88.5)

T3: 260 (26.5, 191.7)

GENERAL DESCRIPTION

MANUAL TRANSMISSION AND DIFFERENTIAL

3. MAIN SHAFT ASSEMBLY



MT-00975

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

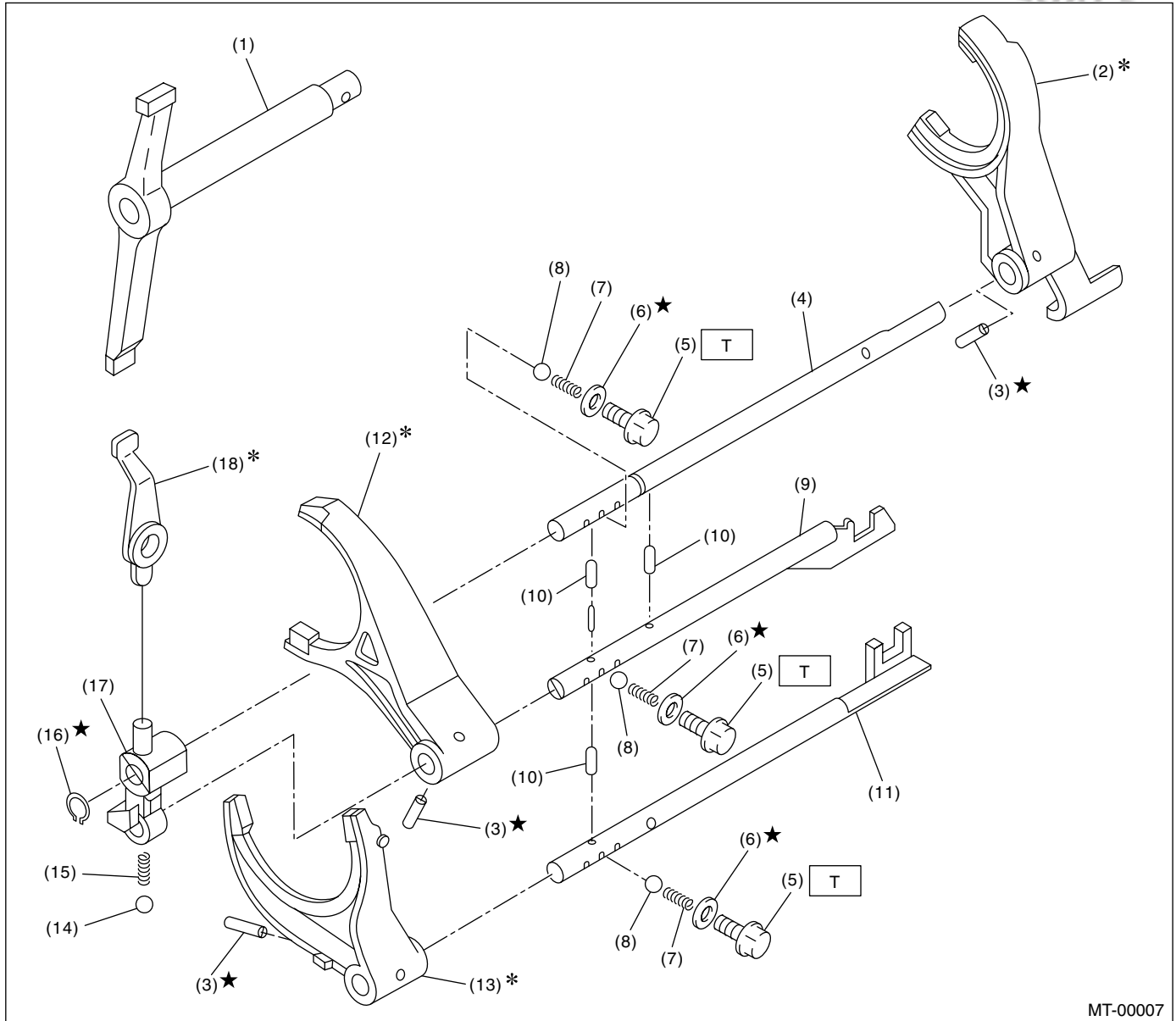
Tightening torque: N·m (kgf·m, ft·lb)

T: 120 (12.2, 88.5)

GENERAL DESCRIPTION

MANUAL TRANSMISSION AND DIFFERENTIAL

4. SHIFTER FORK AND SHIFTER ROD



MT-00007

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

- | |
|----------------------------|
| (17) Reverse fork rod arm |
| (18) Reverse shifter lever |

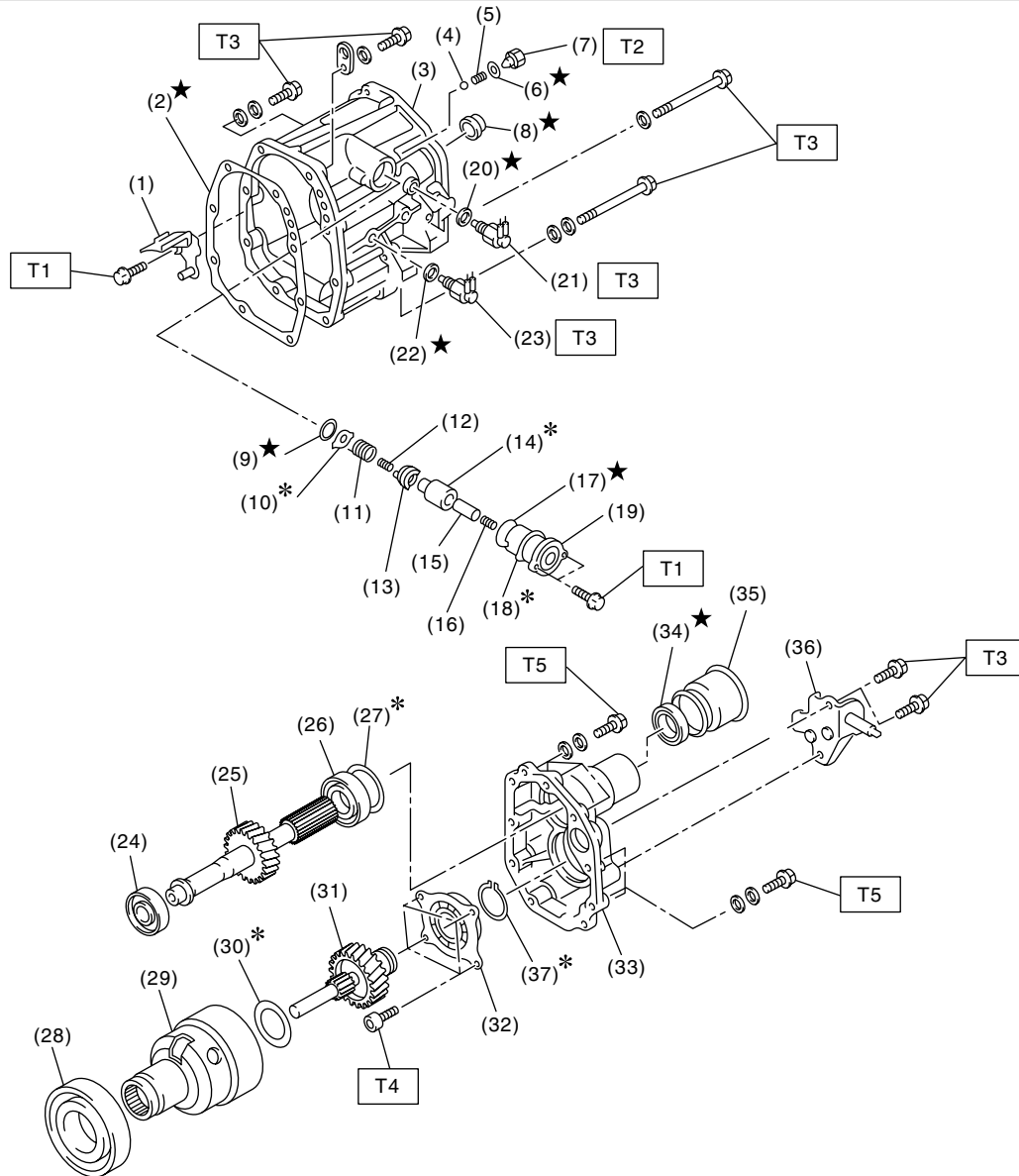
Tightening torque: N·m (kgf-m, ft-lb)

T: 19.5 (2.0, 14.4)

GENERAL DESCRIPTION

MANUAL TRANSMISSION AND DIFFERENTIAL

5. TRANSFER CASE AND EXTENSION



MT-00008

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

Tightening torque: N·m (kgf-m, ft-lb)

T1: 6.4 (0.65, 4.7)

T2: 9.75 (1.0, 7.2)

T3: 25 (2.5, 18.1)

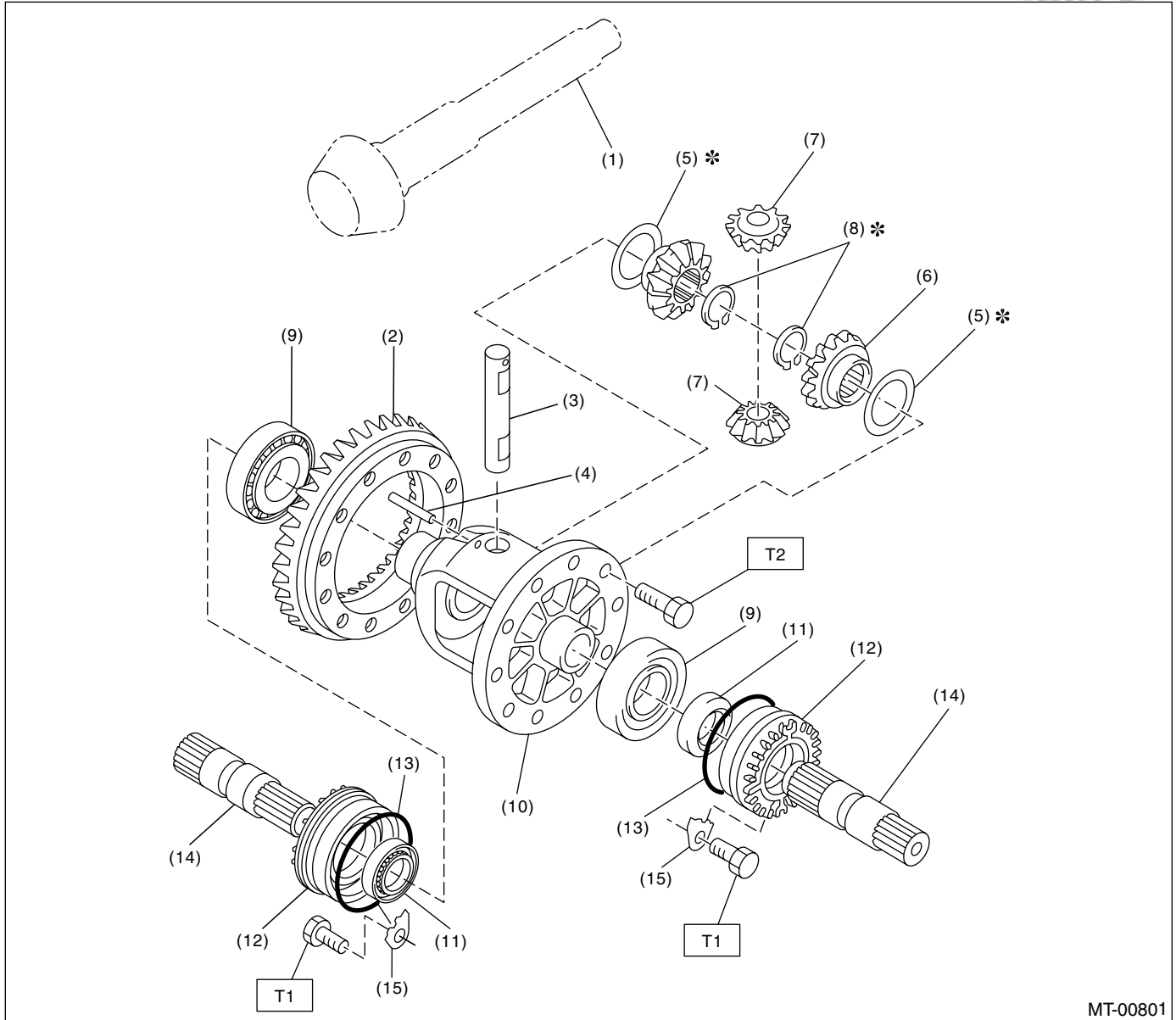
T4: 26 (2.7, 20)

T5: 40 (4.1, 29.7)

GENERAL DESCRIPTION

MANUAL TRANSMISSION AND DIFFERENTIAL

6. FRONT DIFFERENTIAL



MT-00801

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

- (15) Retainer lock plate

Tightening torque: N·m (kgf-m, ft-lb)

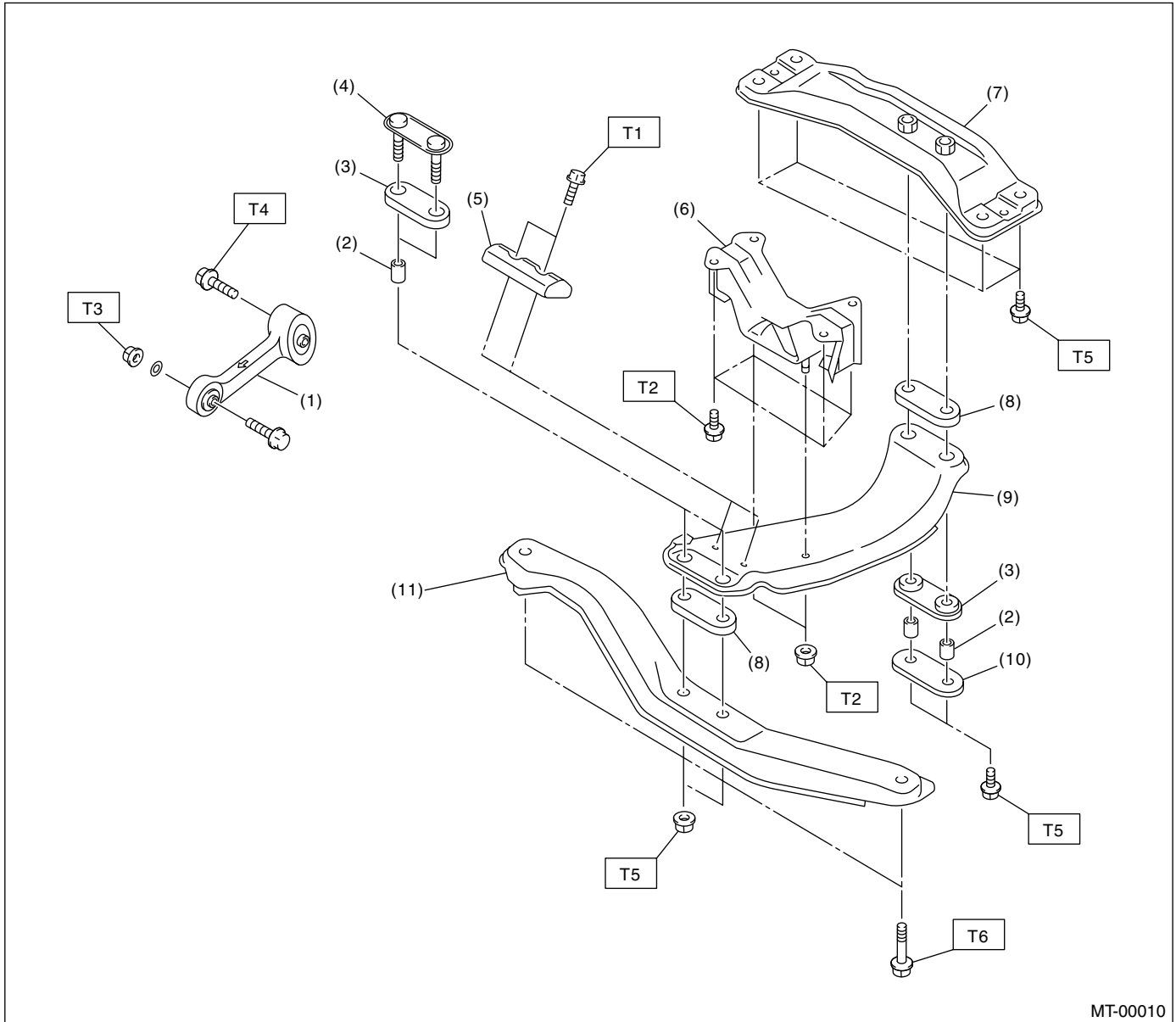
T1: 24.5 (2.5, 18.1)

T2: 62 (6.3, 45.6)

GENERAL DESCRIPTION

MANUAL TRANSMISSION AND DIFFERENTIAL

7. TRANSMISSION MOUNTING



MT-00010

(1) Pitching stopper	(8) Cushion D
(2) Spacer	(9) Center crossmember
(3) Cushion C	(10) Rear plate
(4) Front plate	(11) Front crossmember
(5) Dynamic damper	
(6) Rear cushion rubber	
(7) Rear crossmember	

Tightening torque: N·m (kgf·m, ft·lb)

T1: 7.5 (0.76, 5.5)

T2: 35 (3.6, 26)

T3: 50 (5.1, 37)

T4: 58 (5.9, 43)

T5: 70 (7.1, 51)

T6: 140 (14.3, 103)

GENERAL DESCRIPTION

MANUAL TRANSMISSION AND DIFFERENTIAL

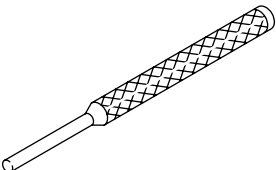
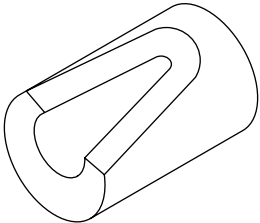
C: CAUTION

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

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

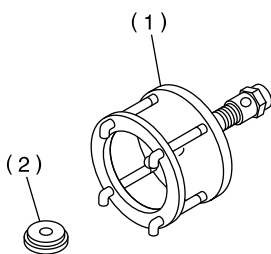
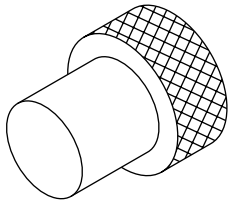
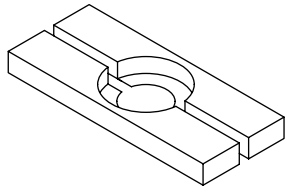
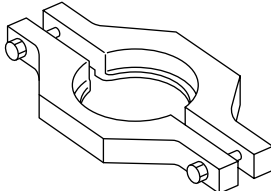
D: PREPARATION TOOL

1. SPECIAL TOOLS

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

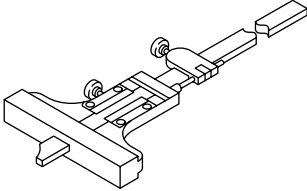
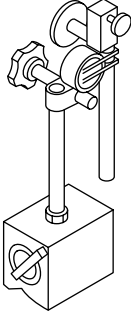
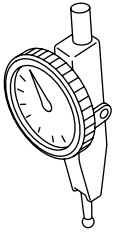
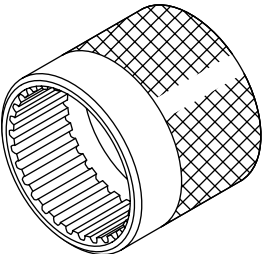
GENERAL DESCRIPTION

MANUAL TRANSMISSION AND DIFFERENTIAL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-899524100	899524100	PULLER SET	Used for removing and installing roller bearing (Differential). (1) PULLER (2) CAP
 ST-399780104	399780104	WEIGHT	Used for measuring preload on roller bearing.
 ST-498077000	498077000	REMOVER	Used for removing roller bearing of drive pinion shaft.
 ST-498077300	498077300	CENTER DIFFERENTIAL BEARING REMOVER	Used for removing the center differential cover ball bearing.

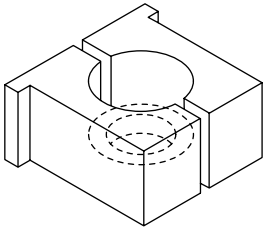
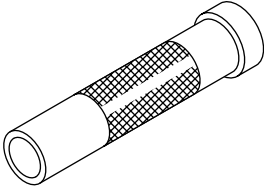
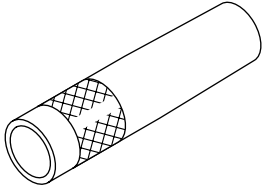
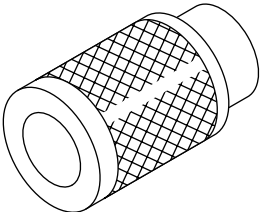
GENERAL DESCRIPTION

MANUAL TRANSMISSION AND DIFFERENTIAL

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

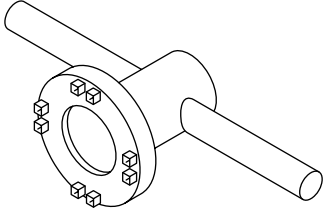
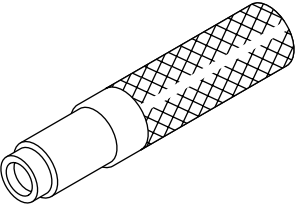
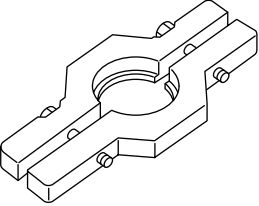
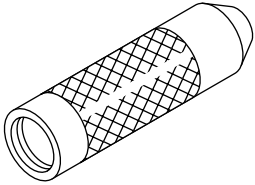
GENERAL DESCRIPTION

MANUAL TRANSMISSION AND DIFFERENTIAL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-498937000	498937000	TRANSMISSION HOLDER	Used for removing and installing transmission main shaft lock nut.
 ST-499277100	499277100	BUSH 1-2 INSTALLER	- Used for installing 1st driven gear thrust plate and 1st-2nd driven gear bush. - Used for installing roller bearing outer races to differential case.
 ST-499277200	499277200	INSTALLER	Used for press-fitting the 2nd driven gear, roller bearings and 5th driven gear onto the driven shaft.
 ST-499757002	499757002	INSTALLER	- Used for installing snap ring (OUT 25) and ball bearing (25 × 26 × 17). - Used for installing bearing cone of transfer driven gear (extension core side).

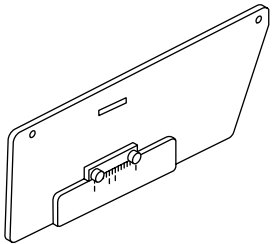
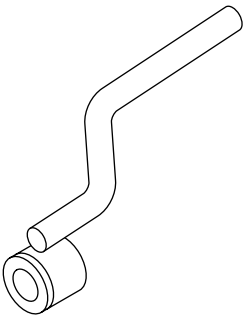
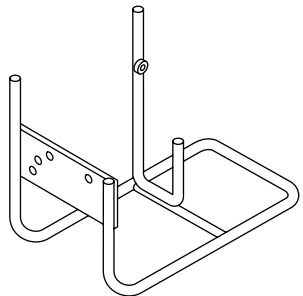
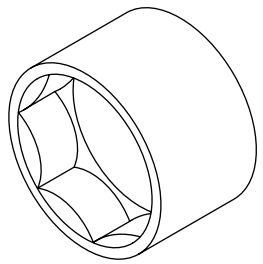
GENERAL DESCRIPTION

MANUAL TRANSMISSION AND DIFFERENTIAL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-499787000	499787000	WRENCH ASSY	Used for removing and installing differential side retainer.
 ST-499827000	499827000	PRESS	Used for installing speedometer oil seal when installing speedometer cable to transmission.
 ST-499857000	499857000	5TH DRIVEN GEAR REMOVER	Used for removing 5th driven gear.
 ST-499877000	499877000	RACE 4-5 INSTALLER	- Used for installing 4th needle bearing race and ball bearing onto transmission main shaft. - Used with REMOVER (899714110).

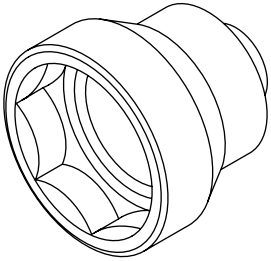
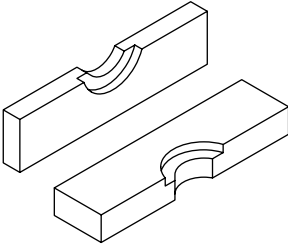
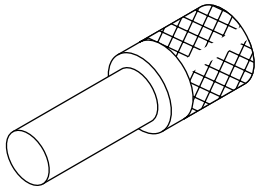
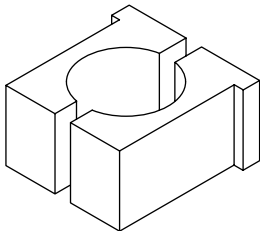
GENERAL DESCRIPTION

MANUAL TRANSMISSION AND DIFFERENTIAL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-499917500	499917500	DRIVE PINION GAUGE ASSY	Used for adjusting drive pinion shim.
 ST-499927100	499927100	HANDLE	Used for fitting transmission main shaft.
 ST-499937100	499937100	TRANSMISSION STAND SET	Stand used for transmission disassembly and assembly.
 ST-499987003	499987003	SOCKET WRENCH (35)	Used for removing and installing driven pinion lock nut and main shaft lock nut.

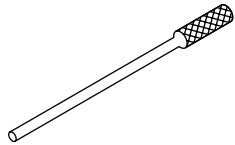
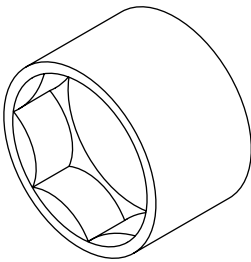
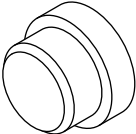
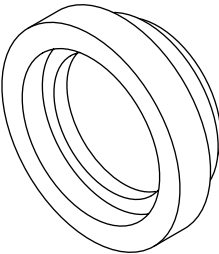
GENERAL DESCRIPTION

MANUAL TRANSMISSION AND DIFFERENTIAL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-499987300	499987300	SOCKET WRENCH (50)	Used for removing and installing driven gear assembly lock nut.
 ST-899714110	899714110	REMOVER	Used for fixing transmission main shaft, drive pinion and rear drive shaft.
 ST-899864100	899864100	REMOVER	Used for removing parts on transmission main shaft and drive pinion.
 ST-899884100	899884100	HOLDER	Used for tightening lock nut on sleeve.

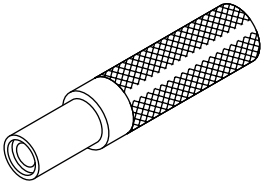
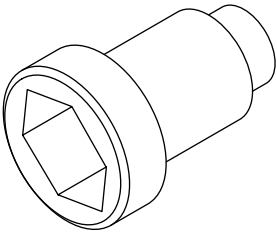
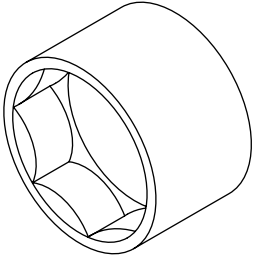
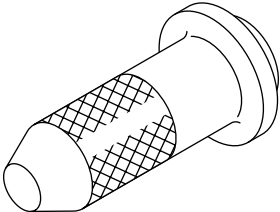
GENERAL DESCRIPTION

MANUAL TRANSMISSION AND DIFFERENTIAL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-899904100	899904100	REMOVER	Used for removing and installing straight pin.
 ST-899988608	899988608	SOCKET WRENCH (27)	Used for removing and installing drive pinion lock nut.
 ST-398497701	398497701	ADAPTER	- Used for installing roller bearing onto differential case. - Used with INSTALLER (499277100).
 ST-499587000	499587000	INSTALLER	Used for installing driven gears to driven shaft.

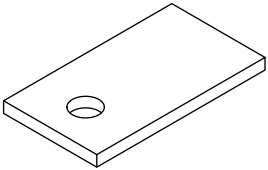
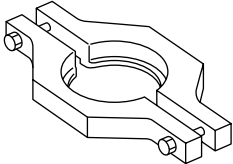
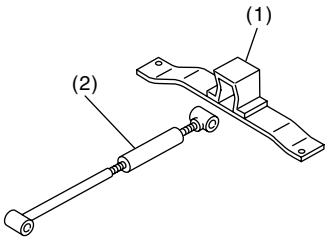
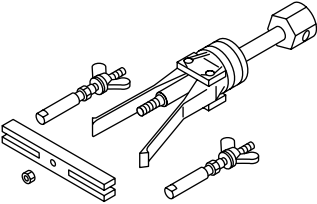
GENERAL DESCRIPTION

MANUAL TRANSMISSION AND DIFFERENTIAL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-899824100	899824100	PRESS	Used for installing speedometer shaft oil seal.
 ST-499987100	499987100	SOCKET WRENCH (35)	Used for removing and installing drive pinion lock nut.
 ST-899984103	899984103	SOCKET WRENCH (35)	Used for removing and installing drive pinion lock nut.
 ST-498057300	498057300	INSTALLER	Used for installing extension oil seal.

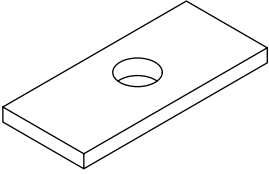
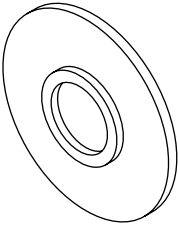
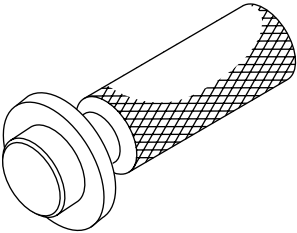
GENERAL DESCRIPTION

MANUAL TRANSMISSION AND DIFFERENTIAL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-498255400	498255400	PLATE	Used for measuring backlash.
 ST-498077400	498077400	SYNCHRONIZER CONE REMOVER	- Used for removing synchronizer cone of main shaft. - Used for removing 5th driven gear of drive pinion shaft.
 ST41099AA000	41099AA000	ENGINE SUPPORT BRACKET	Used for supporting engine. (1) Engine support bracket (41099AA010) (2) Engine support (41099AA020)
 ST-398527700	398527700	PULLER ASSY	Used for removing extension case roller bearing.

GENERAL DESCRIPTION

MANUAL TRANSMISSION AND DIFFERENTIAL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-398643600	398643600	GAUGE	Used for measuring total end play, extension end play and drive pinion height.
 ST-398177700	38177700	INSTALLER	- Used for installing bearing cone of transfer driven gear (transfer case side). - Used for installing ball bearing of transfer drive gear.
 ST-499797000	499797000	INSTALLER	Used for installing differential side retainer oil seal.

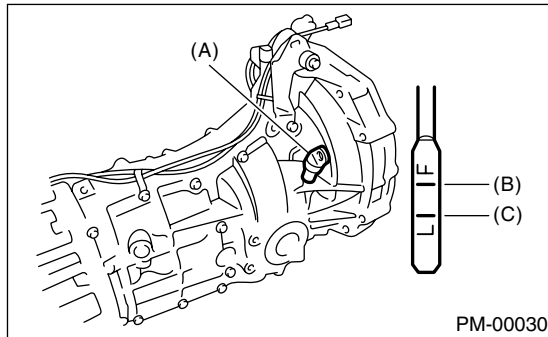
2. GENERAL PURPOSE TOOLS

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

2. Transmission Gear Oil

A: INSPECTION

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



- (A) Oil level gauge
- (B) Upper level
- (C) Lower level

B: REPLACEMENT

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

CAUTION:

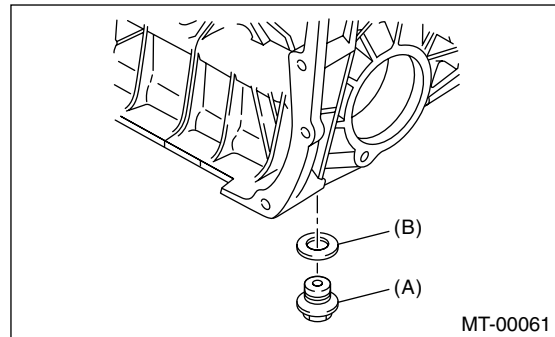
Directly after the engine has been running, the transmission gear oil is hot. Be careful not to burn yourself.

NOTE:

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

Tightening torque:

69 N·m (7.0 kgf-m, 50.6 ft-lb)



- (A) Drain plug
- (B) Gasket

- 4) Lower the vehicle.
- 5) Pour gear oil into the gauge hole.

Recommended gear oil:

Use GL-5 (75W-90) or equivalent.

Gear oil capacity:

3.5 ℓ (3.7 US qt, 3.1 Imp qt)

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

CAUTION:

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

NOTE:

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

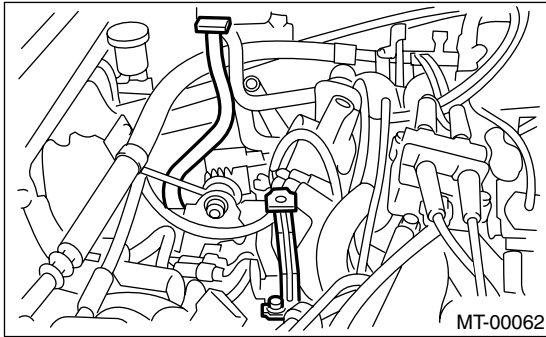
MANUAL TRANSMISSION ASSEMBLY

MANUAL TRANSMISSION AND DIFFERENTIAL

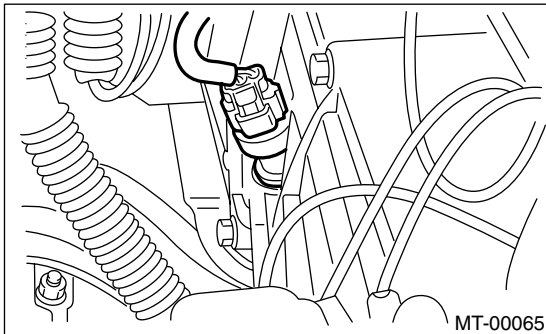
3. Manual Transmission Assembly

A: REMOVAL

- 1) Open the front hood fully, and support with stay.
- 2) Disconnect the ground cable from battery.
- 3) Remove the air intake duct and cleaner case. (Non-turbo model) <Ref. to IN(H4SO)-6, REMOVAL, Air Intake Duct.> and <Ref. to IN(H4SO)-5, REMOVAL, Air Cleaner Case.>
- 4) Remove the air cleaner case stay. (Non-turbo model)



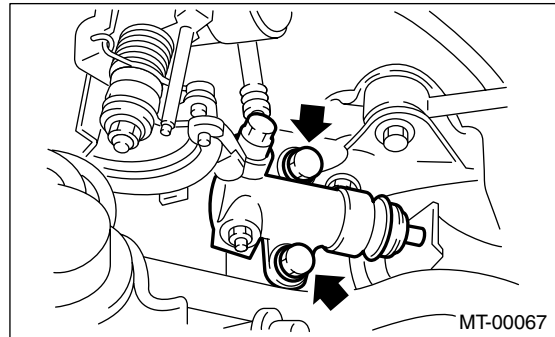
- 5) Remove the intercooler. (Turbo model) <Ref. to IN(H4DOTC)-10, REMOVAL, Intercooler.>
- 6) Disconnect the following connectors:
 - (1) Neutral position switch connector
 - (2) Back-up light switch connector
 - (3) Vehicle speed sensor



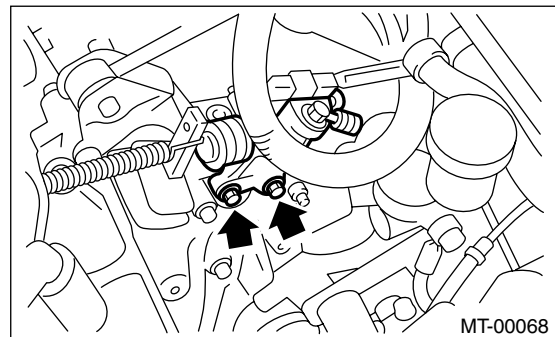
- 7) Remove the starter. <Ref. to SC(H4SO)-7, REMOVAL, Starter.>

- 8) Remove the operating cylinder from transmission.

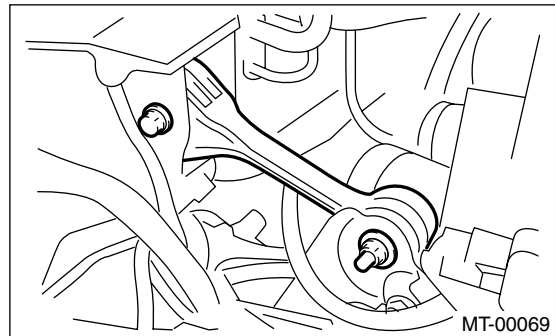
• NON-TURBO MODEL



• TURBO MODEL



- 9) Remove the pitching stopper.

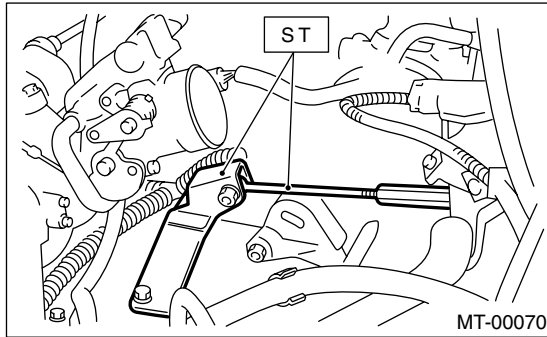


MANUAL TRANSMISSION ASSEMBLY

MANUAL TRANSMISSION AND DIFFERENTIAL

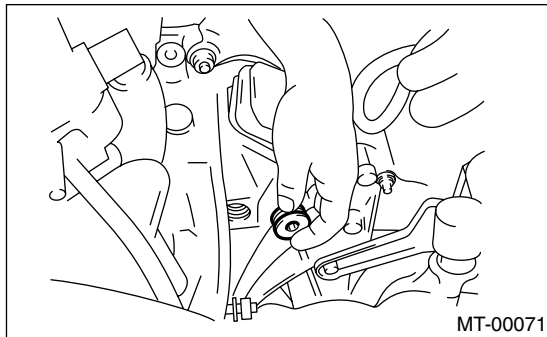
10) Set the ST.

ST 41099AA000 ENGINE SUPPORT ASSY

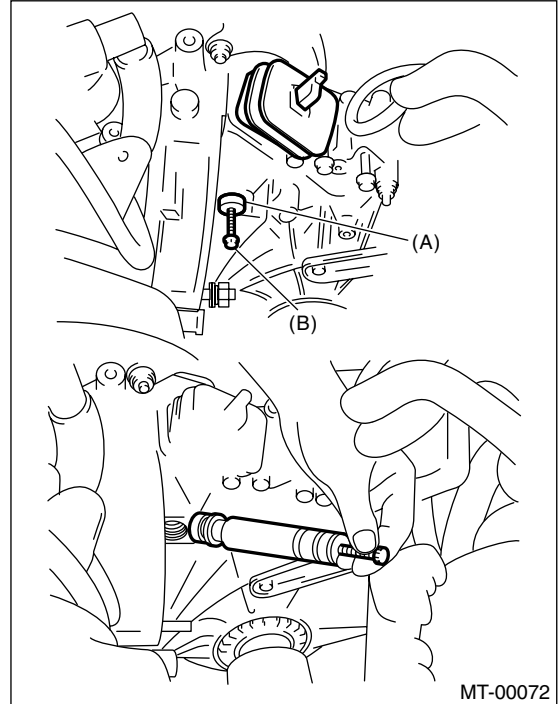


11) Separate the clutch release fork from release bearing. (Turbo model)

- (1) Remove the clutch operating cylinder from transmission.
- (2) Remove the plug using 10 mm hexagon wrench.



(3) Screw the 6 mm dia. bolt into release fork shaft, and then remove it.



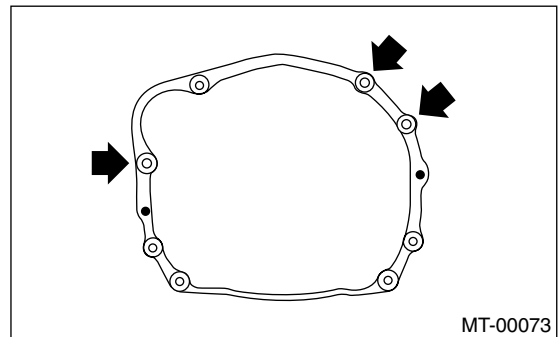
- (A) Shaft
(B) Bolt

(4) Raise the release fork and unfasten the release bearing tabs to free release fork.

NOTE:

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

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



13) Remove the front and center exhaust pipes. (Non-turbo model) <Ref. to EX(H4SO)-4, REMOVAL, Front Exhaust Pipe.>

14) Remove the center exhaust pipe. (Turbo model). <Ref. to EX(H4DOTC)-8, REMOVAL, Center Exhaust Pipe.>

MANUAL TRANSMISSION ASSEMBLY

MANUAL TRANSMISSION AND DIFFERENTIAL

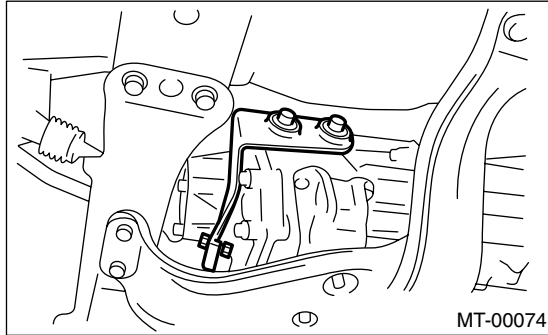
15) Remove the rear exhaust pipe and muffler.

CAUTION:

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

16) Remove the heat shield cover. (If equipped)

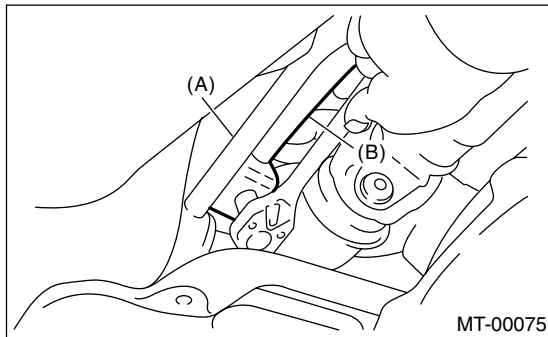
17) Remove the hanger bracket from right side of transmission.



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

19) Remove the gear shift rod and stay from transmission.

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

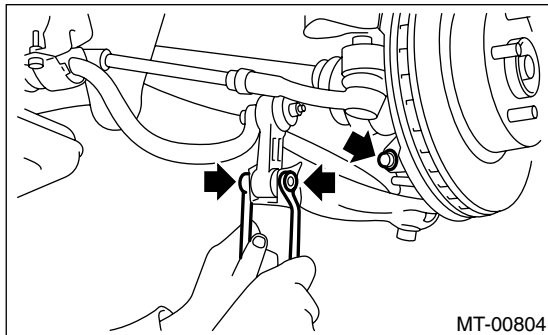


- (A) Stay
(B) Rod

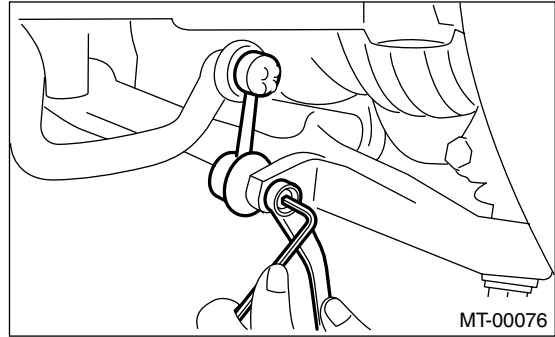
20) Disconnect the stabilizer link from transverse link.

21) Remove the bolt securing ball joint of transverse link to housing.

• WAGON MODEL



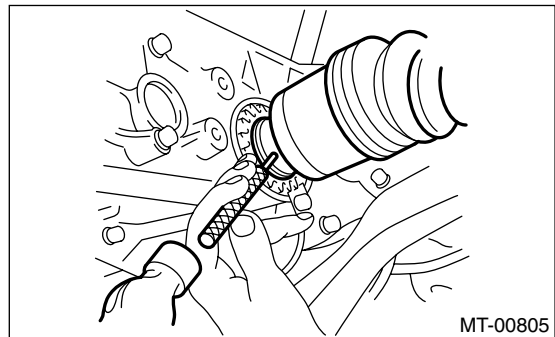
• SEDAN MODEL



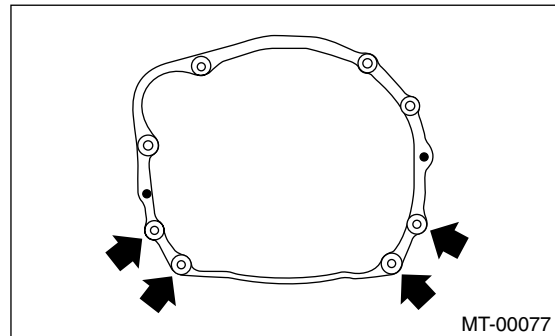
22) Remove the spring pins and separate the front drive shafts from each side of transmission.

NOTE:

Discard the removing spring pin. Replace with a new one.



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



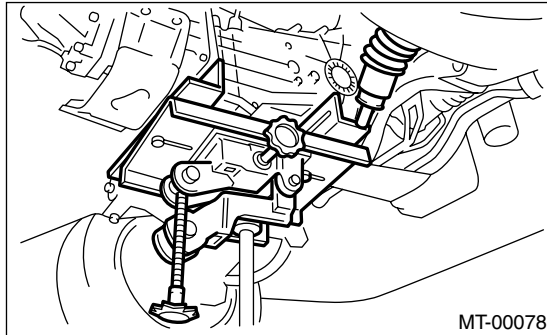
MANUAL TRANSMISSION ASSEMBLY

MANUAL TRANSMISSION AND DIFFERENTIAL

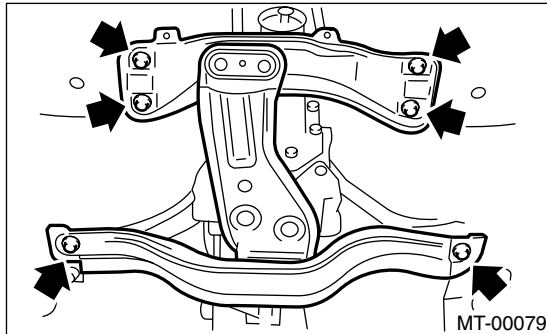
24) Place the transmission jack under transmission.

CAUTION:

Always support the transmission case with a transmission jack.



25) Remove the transmission rear crossmember from vehicle.



26) Remove the transmission.

NOTE:

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

27) Separate the transmission assembly and rear cushion rubber.

28) Remove the clutch release bearing from engine side. (Turbo model) <Ref. to CL-15, REMOVAL, Release Bearing and Lever.>

B: INSTALLATION

1) Install the rear cushion rubber to transmission assembly.

Tightening torque:

35 N·m (3.57 kgf-m, 25.8 ft-lb)

2) Install the clutch release lever and bearing onto transmission. (Turbo model) <Ref. to CL-16, INSTALLATION, Release Bearing and Lever.>

3) Install the transmission onto engine.

(1) Gradually raise the transmission with transmission jack.

(2) Engage them at splines.

NOTE:

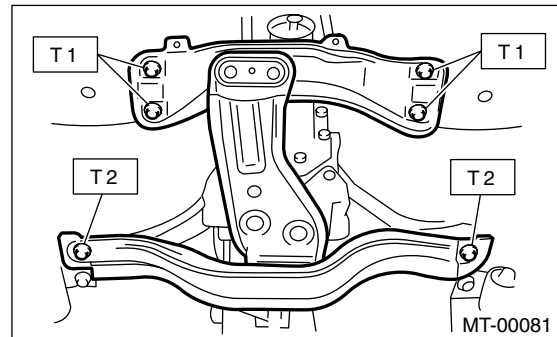
Be careful not to strike the main shaft against clutch cover.

4) Install the transmission rear crossmember.

Tightening torque:

T1: 70 N·m (7.1 kgf-m, 51 ft-lb)

T2: 140 N·m (14.3 kgf-m, 103 ft-lb)

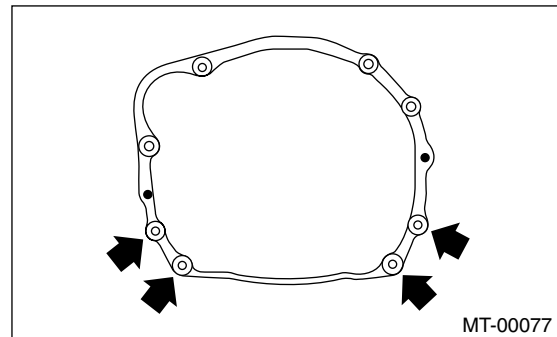


5) Take off the transmission jack.

6) Tighten the nuts which hold the lower side of transmission to engine.

Tightening torque:

50 N·m (5.1 kgf-m, 36.9 ft-lb)



7) Connect the engine and transmission.

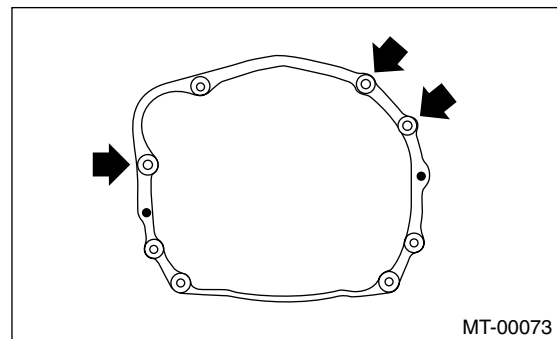
(1) Install the starter.

<Ref. to SC(H4SO)-7, INSTALLATION, Starter.>

(2) Tighten the bolt which holds right upper side of transmission to engine.

Tightening torque:

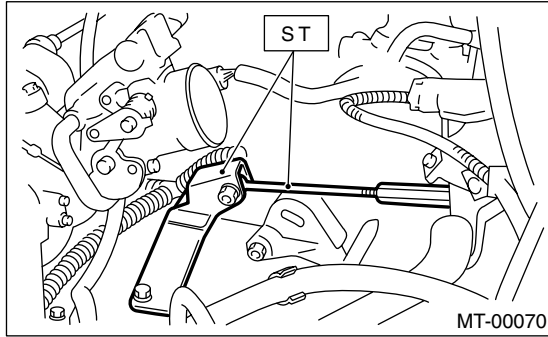
50 N·m (5.1 kgf-m, 36.9 ft-lb)



MANUAL TRANSMISSION ASSEMBLY

MANUAL TRANSMISSION AND DIFFERENTIAL

8) Remove the ST.

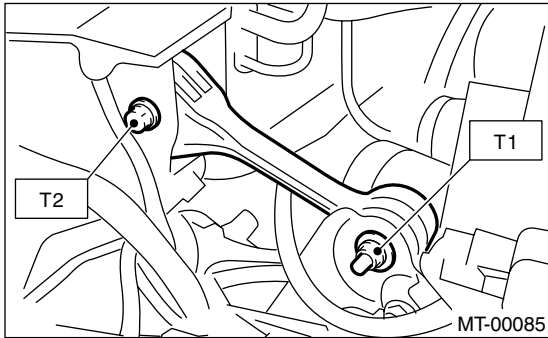


9) Install the pitching stopper.

Tightening torque:

T1: 50 N·m (5.1 kgf-m, 37 ft-lb)

T2: 58 N·m (5.9 kgf-m, 43 ft-lb)



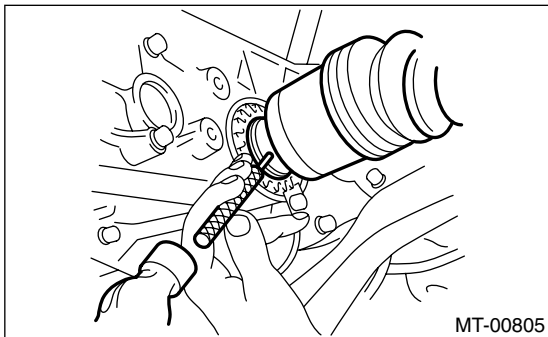
10) Lift-up the vehicle.

11) Install the front drive shaft into transmission.

12) Drive the spring pin into chamfered hole of drive shaft.

NOTE:

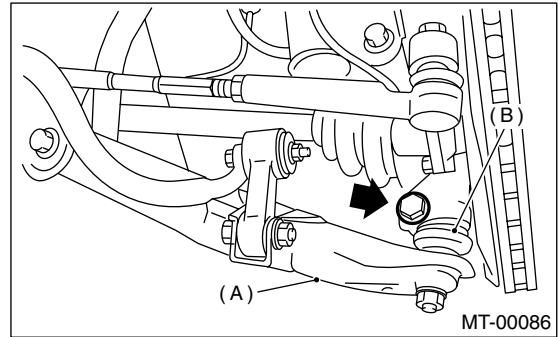
Always use a new spring pin.



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

Tightening torque:

49 N·m (5.0 kgf-m, 36 ft-lb)



(A) Transverse link

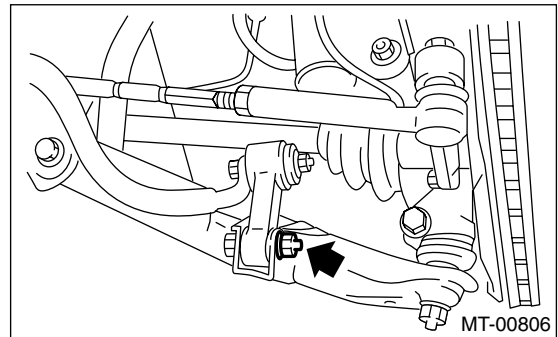
(B) Ball joint

14) Install the stabilizer link from transverse link.

• WAGON MODEL

Tightening torque:

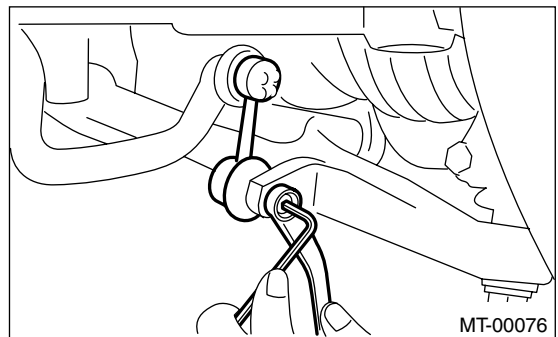
30 N·m (3.1 kgf-m, 22.1 ft-lb)



• SEDAN MODEL

Tightening torque:

45 N·m (4.6 kgf-m, 33.2 ft-lb)

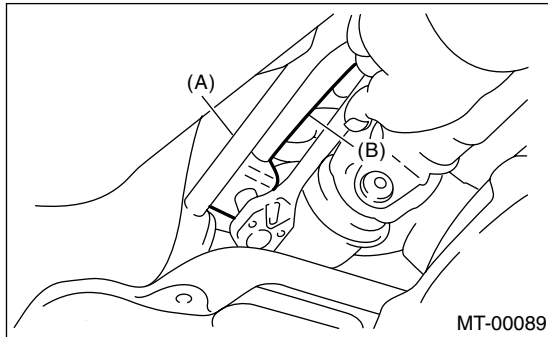


MANUAL TRANSMISSION ASSEMBLY

MANUAL TRANSMISSION AND DIFFERENTIAL

15) Install the gear shift rod and stay.

(1) Install the gear shift rod onto transmission.



(A) Stay

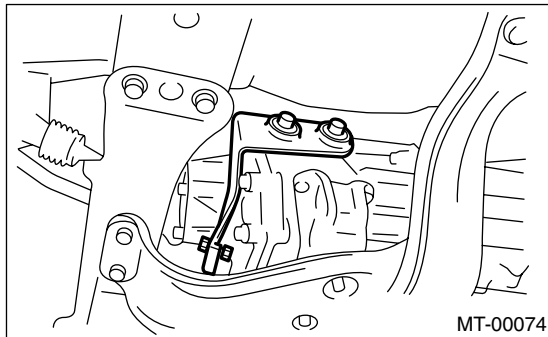
(B) Rod

(2) Install the stay onto transmission.

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

17) Install the heat shield cover. (If equipped)

18) Install the hanger bracket on right side of transmission.



19) Install the rear exhaust pipe and muffler.

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

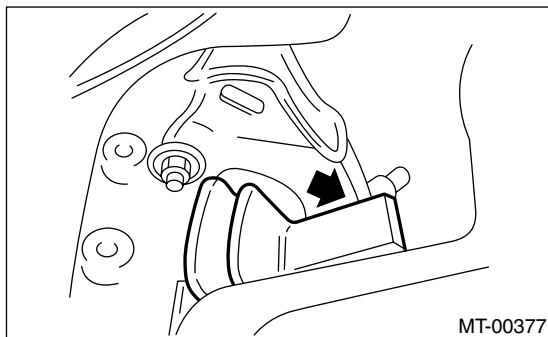
<Ref. to EX(H4SO)-5, INSTALLATION, Front Exhaust Pipe.>

21) Install the center exhaust pipe. (Turbo model)

<Ref. to EX(H4DOTC)-9, INSTALLATION, Center Exhaust Pipe.>

22) Install the under cover.

23) Push the clutch release lever to fit the bearing into clutch cover. (Turbo model)

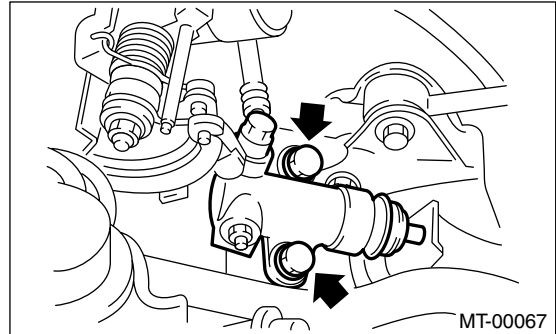


24) Install the operating cylinder.

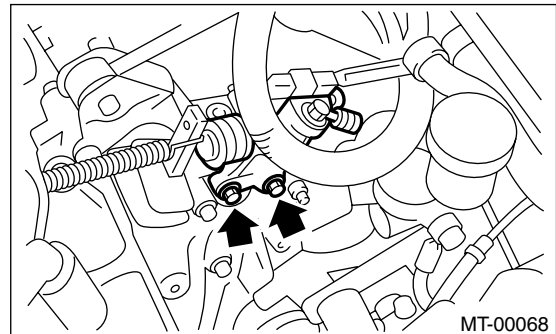
Tightening torque:

37 N·m (3.8 kgf-m, 27.5 ft-lb)

• NON-TURBO MODEL



• TURBO MODEL



25) Connect the following connectors:

(1) Transmission ground cable

Tightening torque:

13 N·m (1.3 kgf-m, 9.4 ft-lb)

(2) Vehicle speed sensor connector

(3) Neutral position switch connector

(4) Back-up light switch connector

26) Install the air cleaner case stay.

Tightening torque:

16 N·m (1.6 kgf-m, 11.6 ft-lb)

27) Install the air cleaner case and duct.

28) Connect the battery ground cable to battery.

29) Take off the vehicle from lift arms.

TRANSMISSION MOUNTING SYSTEM

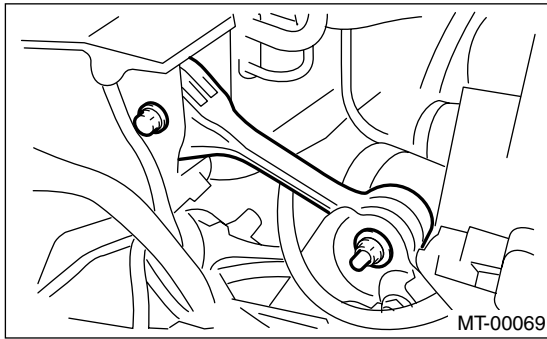
MANUAL TRANSMISSION AND DIFFERENTIAL

4. Transmission Mounting System

A: REMOVAL

1. PITCHING STOPPER

- 1) Disconnect the ground cable from battery.
- 2) Remove the air intake duct. (Non-turbo model)
<Ref. to IN(H4SO)-6, REMOVAL, Air Intake Duct.>
- 3) Remove the air cleaner case. (Non-turbo model)
<Ref. to IN(H4SO)-5, REMOVAL, Air Cleaner Case.>
- 4) Remove the intercooler. (Turbo model) <Ref. to IN(H4DOTC)-10, REMOVAL, Intercooler.>
- 5) Remove the pitching stopper.



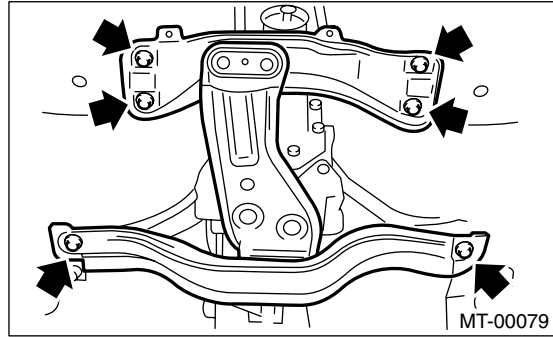
2. CROSSMEMBER AND CUSHION RUBBER

- 1) Disconnect the ground cable from battery.
- 2) Jack-up the vehicle and support it with sturdy racks.
- 3) Remove the front and center exhaust pipes. (Non-turbo model)
<Ref. to EX(H4SO)-4, REMOVAL, Front Exhaust Pipe.>
- 4) Remove the center exhaust pipe. (Turbo model)
<Ref. to EX(H4DOTC)-8, REMOVAL, Center Exhaust Pipe.>
- 5) Remove the rear exhaust pipe and muffler.
- 6) Remove the heat shield cover. (If equipped)
- 7) Set the transmission jack under the transmission body.

CAUTION:

Always support the transmission case with a transmission jack.

- 8) Remove the rear crossmember.



- 9) Remove the rear cushion rubber.

B: INSTALLATION

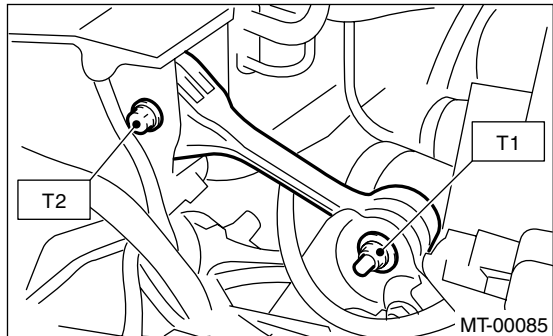
1. PITCHING STOPPER

- 1) Install the pitching stopper.

Tightening torque:

T1: 50 N·m (5.1 kgf-m, 37 ft-lb)

T2: 58 N·m (5.9 kgf-m, 43 ft-lb)



- 2) Install the air intake duct and cleaner case. (Non-turbo model)
<Ref. to IN(H4SO)-5, INSTALLATION, Air Cleaner Case.> and <Ref. to IN(H4SO)-6, INSTALLATION, Air Intake Duct.>
- 3) Install the intercooler. (Turbo model)
<Ref. to IN(H4DOTC)-10, INSTALLATION, Intercooler.>
- 4) Connect the battery ground cable to battery.

2. CROSSMEMBER AND CUSHION RUBBER

1) Install the rear cushion rubber.

Tightening torque:

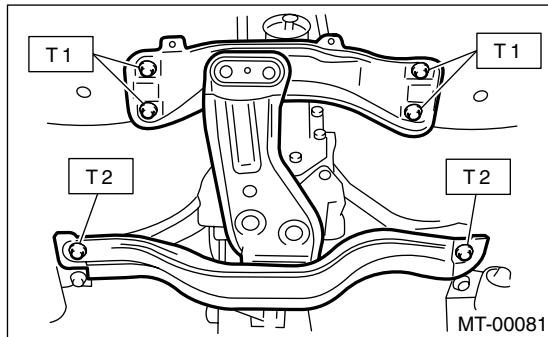
35 N·m (3.6 kgf-m, 26 ft-lb)

2) Install the rear crossmember.

Tightening torque:

T1: 70 N·m (7.1 kgf-m, 51 ft-lb)

T2: 140 N·m (14.3 kgf-m, 103 ft-lb)



3) Remove the transmission jack.

4) Install the heat shield cover. (If equipped)

5) Install the front and center exhaust pipes. (Non-turbo model)

<Ref. to EX(H4SO)-5, INSTALLATION, Front Exhaust Pipe.>

6) Install the center exhaust pipe. (Turbo model)

<Ref. to EX(H4DOTC)-9, INSTALLATION, Center Exhaust Pipe.>

7) Install the rear exhaust pipe and muffler.

C: INSPECTION

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

1. PITCHING STOPPER

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

2. CROSSMEMBER AND CUSHION RUBBER

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

5. Oil Seal

A: INSPECTION

Check the oil seal portion for leakage. If leakage is found, replace the oil seal with a new one.

B: REPLACEMENT

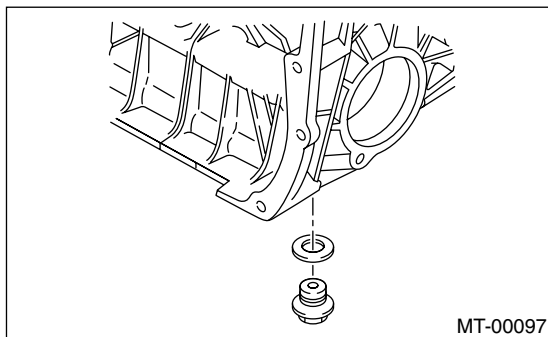
- 1) Clean the transmission exterior.
- 2) Drain the gear oil completely.

NOTE:

Tighten the drain plug after draining gear oil.

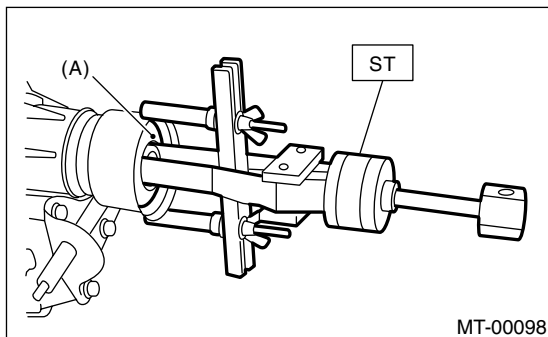
Tightening torque:

69 N·m (7.0 kgf-m, 50.6 ft-lb)



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

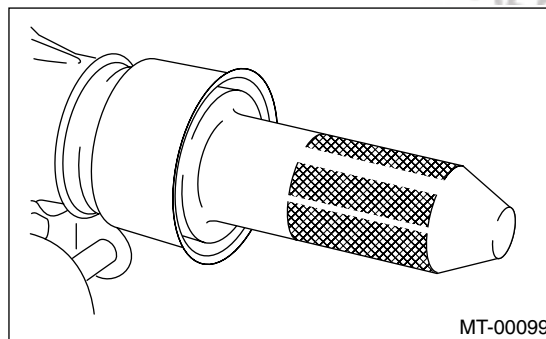
ST 398527700 PULLER ASSY



(A) Oil seal

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

ST 498057300 INSTALLER



- 8) Install the propeller shaft. <Ref. to DS-15, INSTALLATION, Propeller Shaft.>
- 9) Install the heat shield cover. (If equipped)
- 10) Install the rear exhaust pipe and muffler.
- 11) Pour gear oil and check the oil level. <Ref. to 5MT-25, REPLACEMENT, Transmission Gear Oil.>

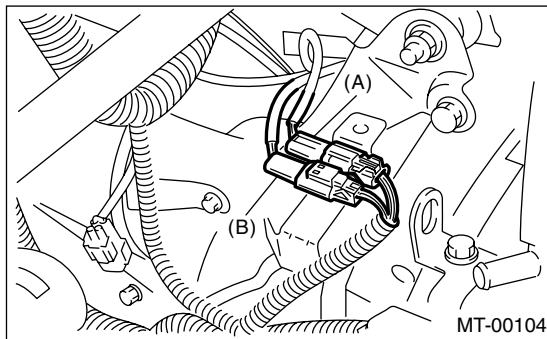
6. Switches and Harness

A: REMOVAL

1. BACK-UP LIGHT AND NEUTRAL POSITION SWITCH

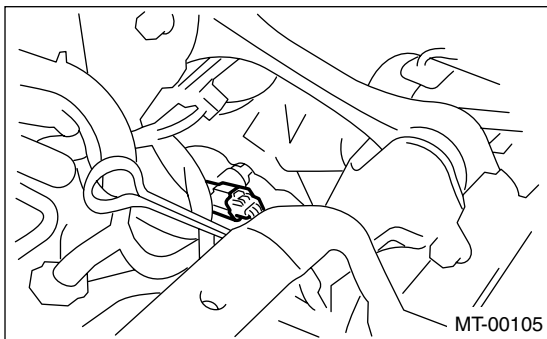
- 1) Disconnect the ground cable from battery.
- 2) Remove the air intake duct and cleaner case. (Non-turbo model) <Ref. to IN(H4SO)-5, REMOVAL, Air Cleaner Case.> and <Ref. to IN(H4SO)-6, REMOVAL, Air Intake Duct.>
- 3) Remove the intercooler. (Turbo model) <Ref. to IN(H4DOTC)-10, REMOVAL, Intercooler.>
- 4) Disconnect the connector of back-up light switch and neutral position switch.

• NON-TURBO MODEL



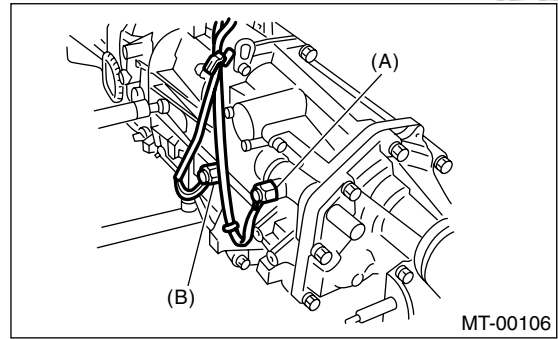
- (A) Neutral switch (Brown)
(B) Back-up light switch (Gray)

• TURBO MODEL



- 5) Lift-up the vehicle.

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



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

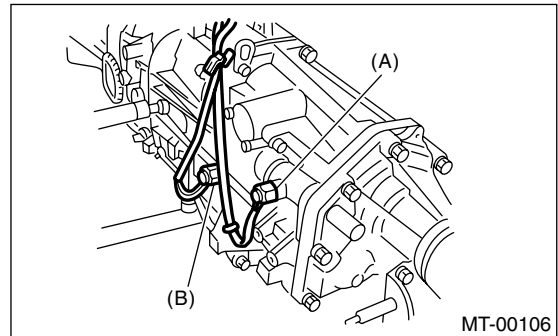
B: INSTALLATION

1. BACK-UP LIGHT SWITCH AND NEUTRAL POSITION SWITCH

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

Tightening torque:

24.5 N·m (2.5 kgf·m, 18.1 ft·lb)



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

- 2) Connect the connector of back-up light switch and neutral position switch.
- 3) Install the air intake duct and cleaner case. (Non-turbo model) <Ref. to IN(H4SO)-5, INSTALLATION, Air Cleaner Case.> and <Ref. to IN(H4SO)-6, INSTALLATION, Air Intake Duct.>
- 4) Install the intercooler. (Turbo model) <Ref. to IN(H4DOTC)-10, INSTALLATION, Intercooler.>
- 5) Connect the battery ground cable to battery.

C: INSPECTION

1. BACK-UP LIGHT SWITCH

Inspect the back-up light switch. <Ref. to LI-6, INSPECTION, Back-up Light System.>

2. NEUTRAL POSITION SWITCH

- 1) Turn the ignition switch to OFF.
- 2) Disconnect the connector of neutral position switch.
- 3) Measure the resistance between neutral position switch terminals.

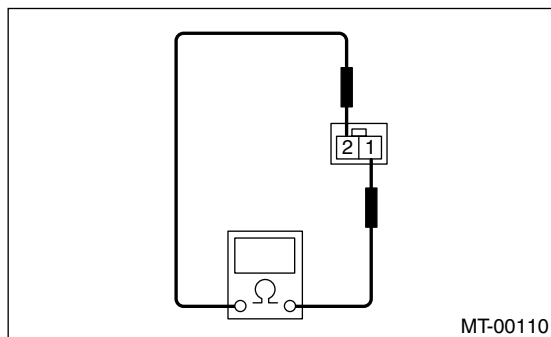
Non-turbo model:

Gear shift position	Terminal No.	Specified resistance
Neutral position	1 and 2	Less than 1 Ω
Other positions		More than 1 M Ω

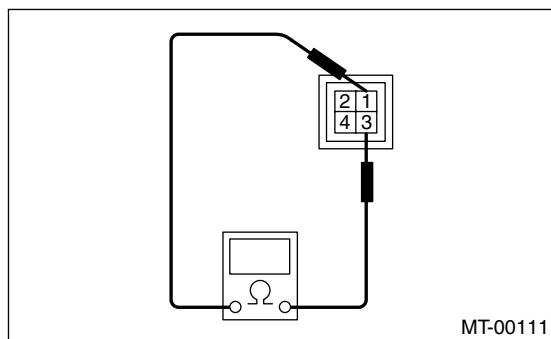
Turbo model:

Gear shift position	Terminal No.	Specified resistance
Neutral position	1 and 3	Less than 1 Ω
Other positions		More than 1 M Ω

• NON-TURBO MODEL



• TURBO MODEL

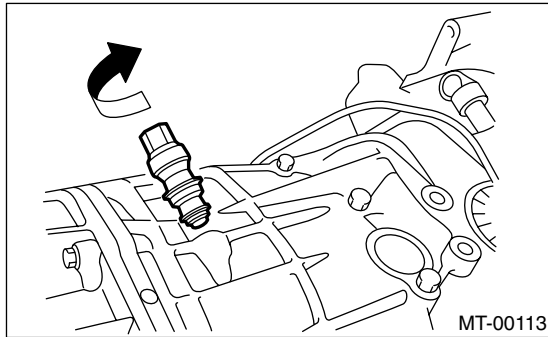


- 4) Replace defective parts.

7. Vehicle Speed Sensor

A: REMOVAL

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



B: INSTALLATION

NOTE:

- Discard the vehicle speed sensor and after removal, replace with a new one.
 - Ensure the sensor mounting hole is clean and free of foreign matter.
 - Align the tip end of key with key groove on end of speedometer shaft during installation.
- 1) Hand tighten the vehicle speed sensor.
 - 2) Tighten the vehicle speed sensor using suitable tool.

Tightening torque:

5.9 N·m (0.6 kgf-m, 4.3 ft-lb)

- 3) Connect the connector to vehicle speed sensor.
- 4) Install the front, center exhaust pipes and muffler.
- 5) Lower the vehicle.
- 6) Connect the battery ground cable to battery.

C: INSPECTION

The vehicle speed sensor can not be inspected as a single unit. Check if speedometer operates normally. If it does not operate normally, inspect the combination meter system. <Ref. to IDI-3, INSPECTION, Combination Meter System.>

PREPARATION FOR OVERHAUL

MANUAL TRANSMISSION AND DIFFERENTIAL

8. Preparation for Overhaul

A: PROCEDURE

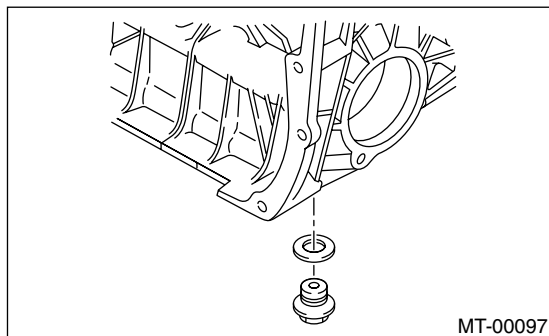
- 1) Clean oil, grease, dirt and dust from transmission.
- 2) Remove the drain plug to drain oil. After draining, retighten it as before.

NOTE:

Replace the gasket with a new one.

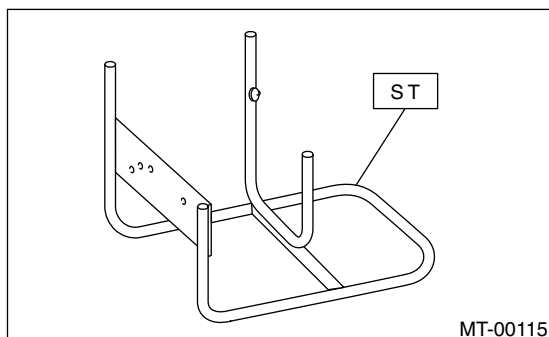
Tightening torque:

69 N·m (7.0 kgf-m, 50.6 ft-lb)



- 3) Attach the transmission to ST.

ST 499937100 TRANSMISSION STAND



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

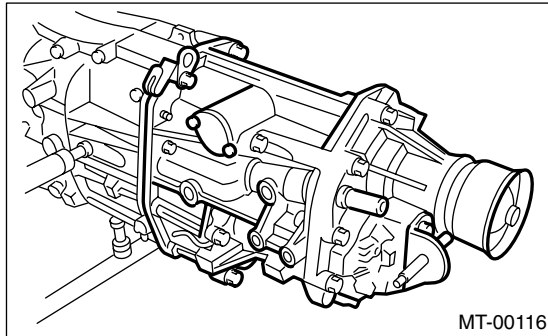
TRANSFER CASE AND EXTENSION CASE ASSEMBLY

MANUAL TRANSMISSION AND DIFFERENTIAL

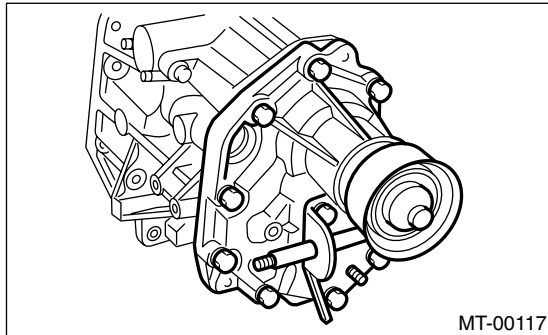
9. Transfer Case and Extension Case Assembly

A: REMOVAL

- 1) Remove the manual transmission assembly from vehicle. <Ref. to 5MT-26, REMOVAL, Manual Transmission Assembly.>
- 2) Remove the back-up light switch and neutral position switch. <Ref. to 5MT-35, REMOVAL, Switches and Harness.>
- 3) Remove the transfer case with extension case assembly.

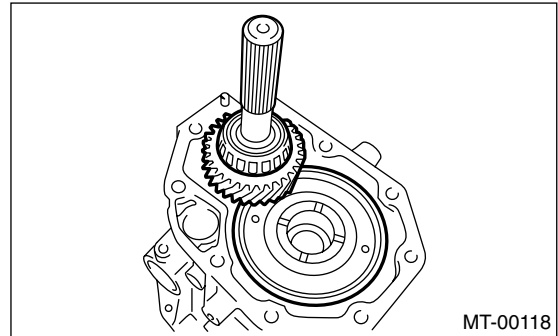


- 4) Remove the shifter arm.
- 5) Remove the extension case assembly.

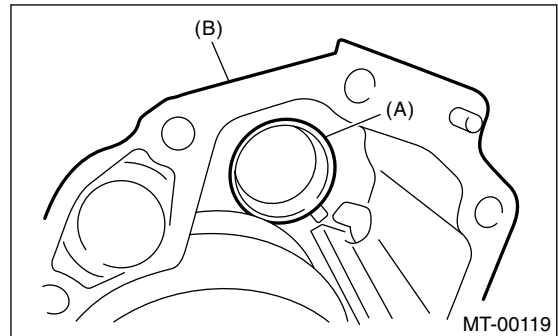


B: INSTALLATION

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

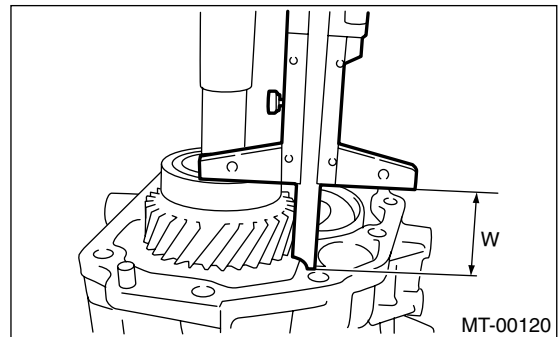


- 2) Remove the bearing outer race from the extension case.



- (A) Bearing outer race
(B) Extension case

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



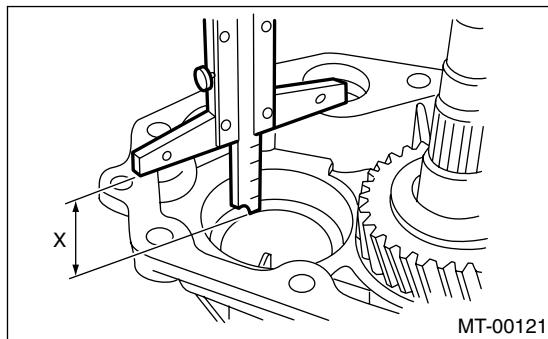
TRANSFER CASE AND EXTENSION CASE ASSEMBLY

MANUAL TRANSMISSION AND DIFFERENTIAL

5) Measure the depth "X".

NOTE:

Measure with bearing cone and thrust washer removed.



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

7) Select the nearest washer in the following table:

Standard clearance between thrust washer and taper roller bearing:

0.2 — 0.3 mm (0.008 — 0.012 in)

NOTE:

Be sure to keep the clearance within specifications.

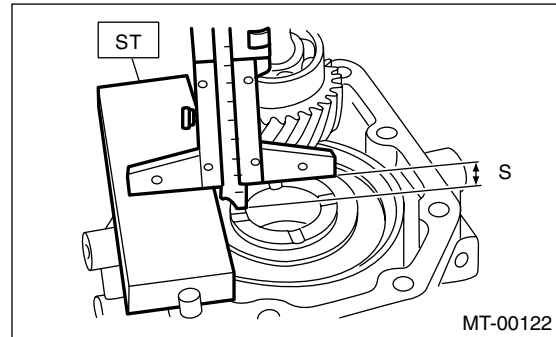
Thrust washer (50 × 61 × t)	
Part No.	Thickness mm (in)
803050060	0.50 (0.0197)
803050061	0.55 (0.0217)
803050062	0.60 (0.0236)
803050063	0.65 (0.0256)
803050064	0.70 (0.0276)
803050065	0.75 (0.0295)
803050066	0.80 (0.0315)
803050067	0.85 (0.0335)
803050068	0.90 (0.0354)
803050069	0.95 (0.0374)
803050070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

8) Fit the thrust washers on transfer drive shaft.

9) Install the bearing cone into extension case.

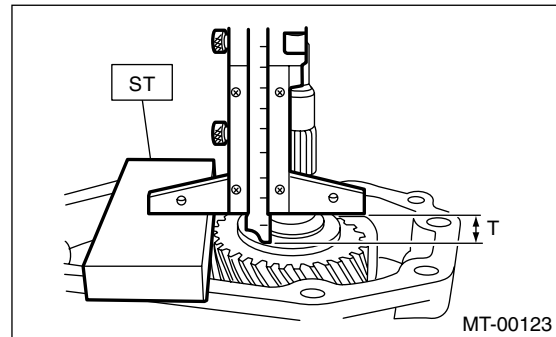
10) Measure the depth "S" between transfer case and center differential.

ST 398643600 GAUGE



11) Measure the depth "T" between extension case and transfer drive gear.

ST 398643600 GAUGE



12) Calculate the space "U" using the following equation: $U = S + T - 30$ mm (1.18 in) [Thickness of ST]

13) Select the 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)

14) Fit the thrust washer on center differential.

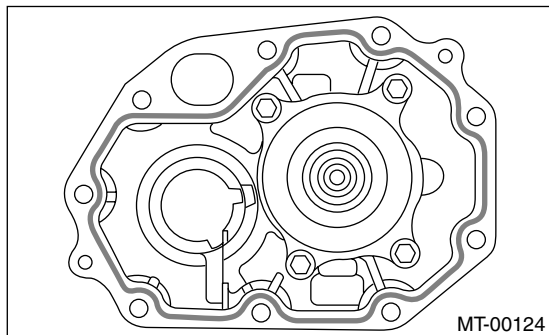
TRANSFER CASE AND EXTENSION CASE ASSEMBLY

MANUAL TRANSMISSION AND DIFFERENTIAL

15) Apply proper amount of liquid gasket to the transfer case mating surface.

Liquid gasket:

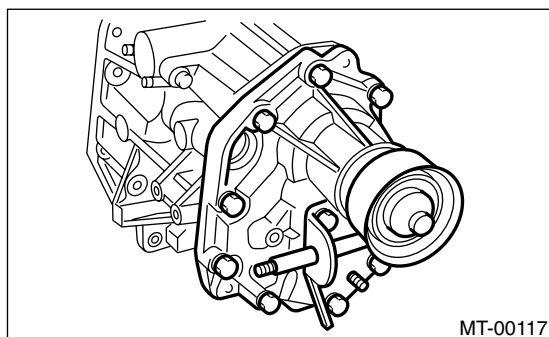
THREE BOND 1215 (Part No. 004403007) or equivalent



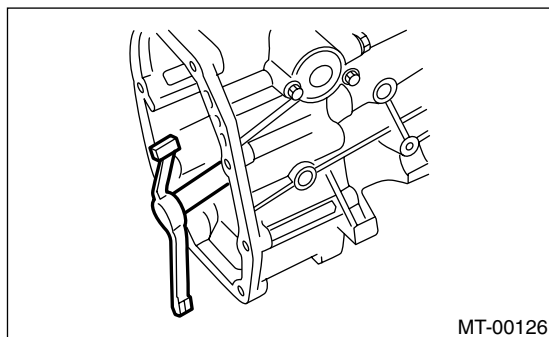
16) Install the extension assembly into transfer case.

Tightening torque:

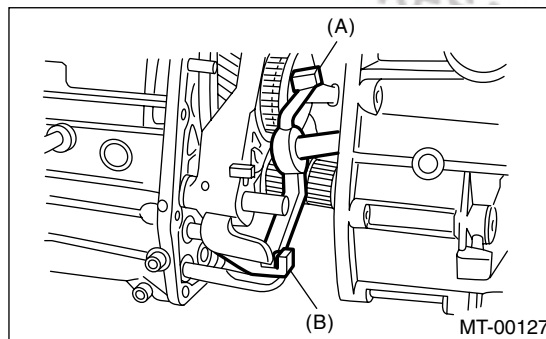
40 N·m (4.1 kgf-m, 29.7 ft-lb)



17) Install the shifter arm to transfer case.



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



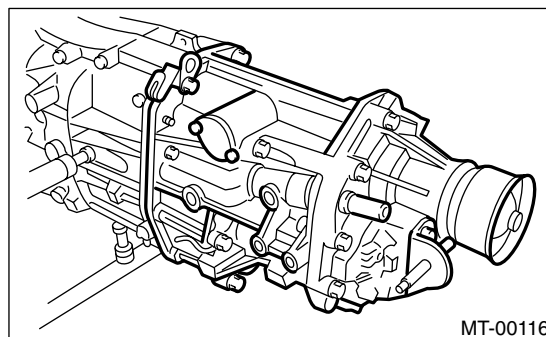
(A) Shifter arm

(B) 3rd-4th fork rod

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

Tightening torque:

24.5 N·m (2.5 kgf-m, 18.1 ft-lb)



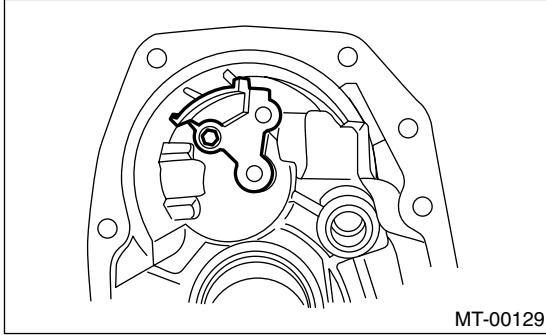
TRANSFER CASE AND EXTENSION CASE ASSEMBLY

MANUAL TRANSMISSION AND DIFFERENTIAL

C: DISASSEMBLY

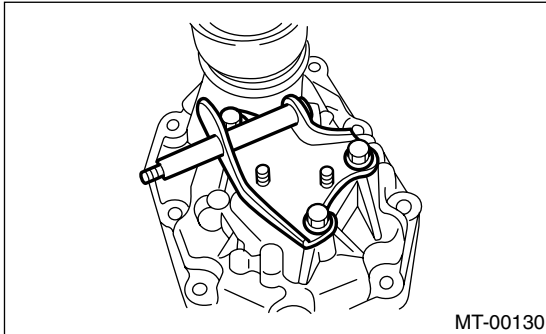
1. TRANSFER CASE

- 1) Remove the reverse check assembly. <Ref. to 5MT-48, REMOVAL, Reverse Check Sleeve.>
- 2) Remove the oil guide.



2. EXTENSION CASE

- 1) Remove the transfer drive gear assembly. <Ref. to 5MT-43, REMOVAL, Transfer Drive Gear.>
- 2) Remove the shift bracket.



- 3) Remove the oil seal from extension case. <Ref. to 5MT-34, Oil Seal.>

D: ASSEMBLY

1. EXTENSION CASE

- 1) Using the ST, install the oil seal to extension case. <Ref. to 5MT-34, Oil Seal.>

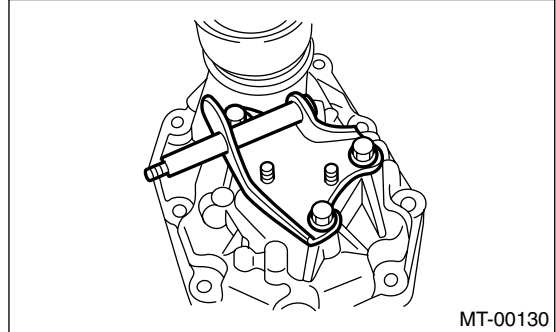
NOTE:

Use a new oil seal.

- 2) Install the shift bracket to extension case.

Tightening torque:

24.5 N·m (2.5 kgf-m, 18.1 ft-lb)



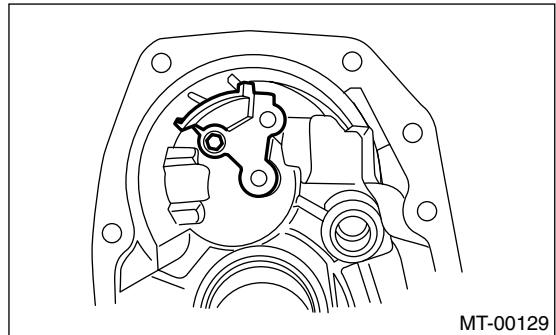
- 3) Install the transfer drive gear to extension case. <Ref. to 5MT-43, INSTALLATION, Transfer Drive Gear.>

2. TRANSFER CASE

- 1) Install the oil guide to transfer case.

Tightening torque:

6.4 N·m (0.65 kgf-m, 4.7 ft-lb)

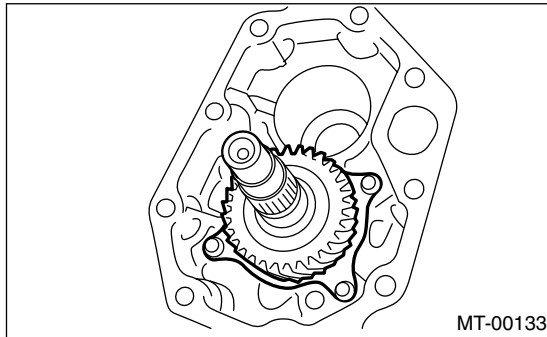


- 2) Install the reverse check sleeve assembly to transfer case. <Ref. to 5MT-48, INSTALLATION, Reverse Check Sleeve.>

10. Transfer Drive Gear

A: REMOVAL

- 1) Remove the manual transmission assembly from vehicle. <Ref. to 5MT-26, REMOVAL, Manual Transmission Assembly.>
- 2) Remove the back-up light switch and neutral position switch. <Ref. to 5MT-35, REMOVAL, Switches and Harness.>
- 3) Remove the transfer case with extension case assembly. <Ref. to 5MT-39, REMOVAL, Transfer Case and Extension Case Assembly.>
- 4) Remove the extension case assembly.
- 5) Remove the transfer driven gear.
- 6) Remove the transfer drive gear.

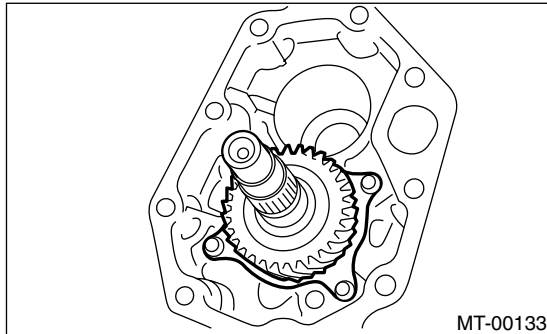


B: INSTALLATION

- 1) Install the transfer drive gear.

Tightening torque:

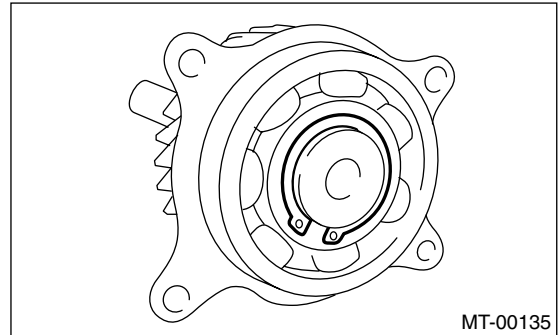
26 N·m (2.7 kgf-m, 20 ft-lb)



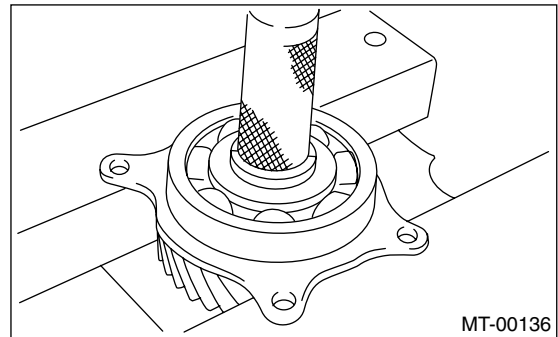
- 2) Install the transfer driven gear.
- 3) Install the extension case assembly.
- 4) Install the transfer case and extension case assembly. <Ref. to 5MT-39, INSTALLATION, Transfer Case and Extension Case Assembly.>
- 5) Install the back-up light switch and neutral position switch. <Ref. to 5MT-35, INSTALLATION, Switches and Harness.>
- 6) Install the manual transmission assembly from vehicle. <Ref. to 5MT-29, INSTALLATION, Manual Transmission Assembly.>

C: DISASSEMBLY

- 1) Remove the snap ring.



- 2) Remove the ball bearing.



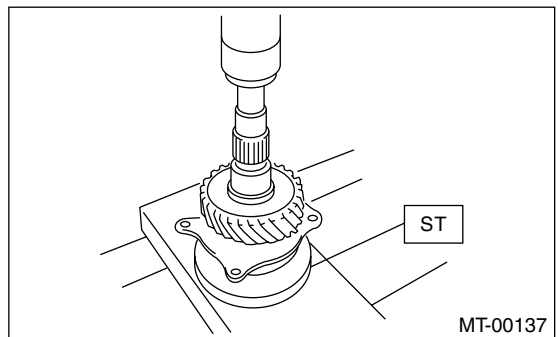
D: ASSEMBLY

- 1) Set the ST applying to inner race of bearing and install to drive shaft.

ST 398177700 INSTALLER

NOTE:

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



- 2) Install the snap ring on transfer drive shaft.
- 3) Check the clearance between snap ring and ball bearing. <Ref. to 5MT-44, INSPECTION, Transfer Drive Gear.>

TRANSFER DRIVE GEAR

MANUAL TRANSMISSION AND DIFFERENTIAL

E: INSPECTION

1) Bearings

Replace the bearings in the following cases:

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

2) Drive gear

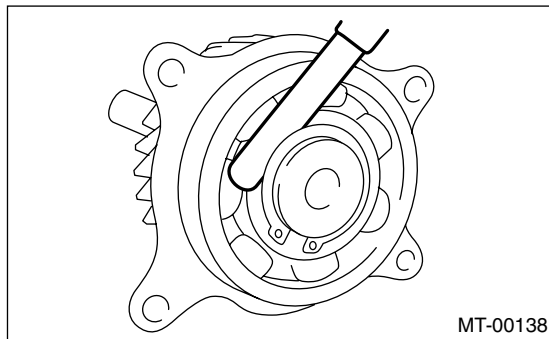
Replace the drive gear in the following cases:

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

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

Clearance:

0.01 — 0.15 mm (0.0004 — 0.0059 in)



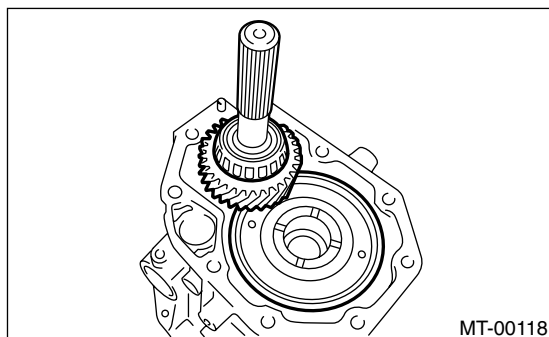
If the measurement is not within specification, select a suitable snap ring.

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

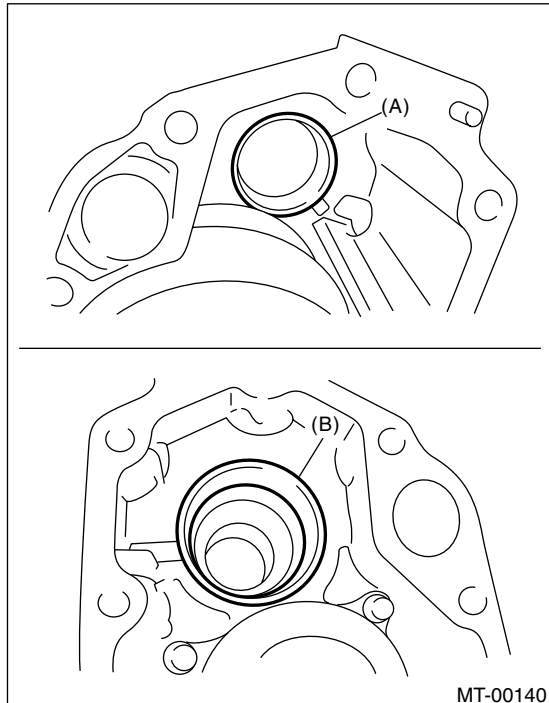
11. Transfer Driven Gear

A: REMOVAL

- 1) Remove the manual transmission assembly from vehicle. <Ref. to 5MT-26, REMOVAL, Manual Transmission Assembly.>
- 2) Remove the back-up light switch and neutral position switch. <Ref. to 5MT-35, REMOVAL, Switches and Harness.>
- 3) Remove the transfer case with extension case assembly. <Ref. to 5MT-39, REMOVAL, Transfer Case and Extension Case Assembly.>
- 4) Remove the extension case assembly.
- 5) Remove the transfer driven gear.



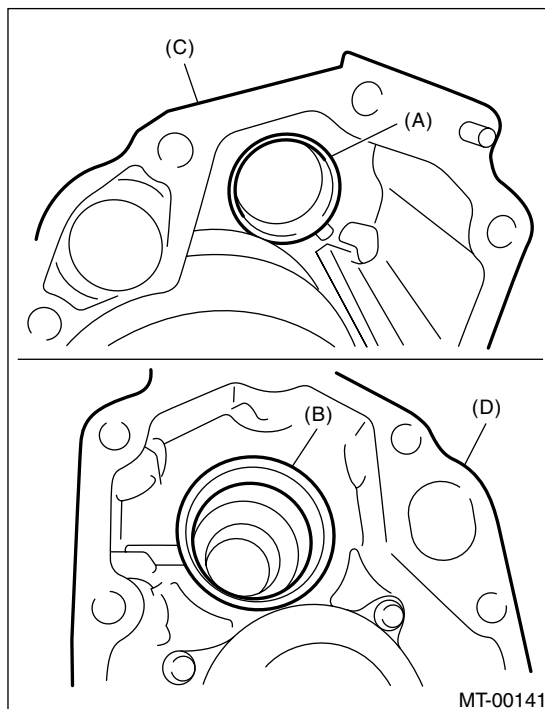
- 6) Remove the bearing outer race from extension case and transfer case.



- (A) Bearing outer race (transfer case)
(B) Bearing outer race (extension case)

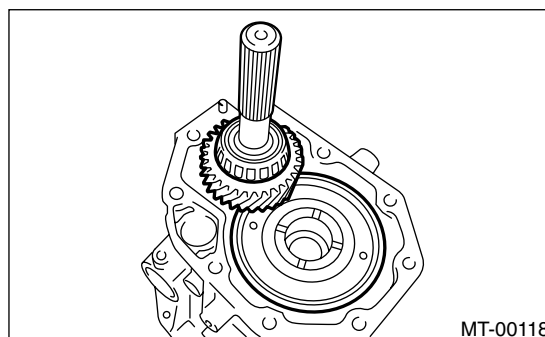
B: INSTALLATION

- 1) Install the bearing outer race to extension case and transfer case.



- (A) Bearing outer race
(B) Bearing outer race
(C) Transfer case
(D) Extension case

- 2) Install the transfer driven gear.



- 3) Install the transfer case and extension case assembly. <Ref. to 5MT-39, INSTALLATION, Transfer Case and Extension Case Assembly.>
- 4) Install the back-up light switch and neutral position switch. <Ref. to 5MT-35, INSTALLATION, Switches and Harness.>
- 5) Install the manual transmission assembly to vehicle. <Ref. to 5MT-29, INSTALLATION, Manual Transmission Assembly.>

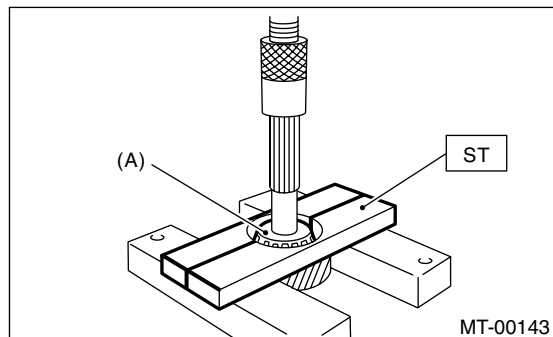
TRANSFER DRIVEN GEAR

MANUAL TRANSMISSION AND DIFFERENTIAL

C: DISASSEMBLY

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

ST 498077000 REMOVER

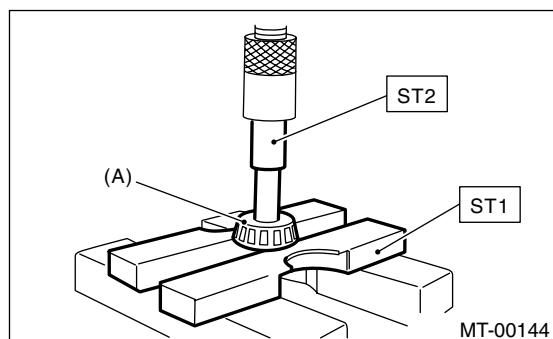


(A) Roller bearing

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

ST1 498077000 REMOVER

ST2 899864100 REMOVER



(A) Roller bearing

D: ASSEMBLY

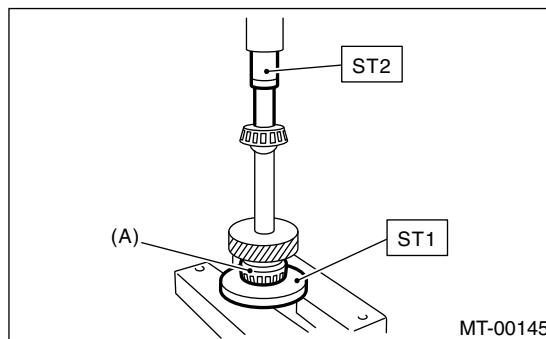
1) Using the ST, install the roller bearing (extension case side).

ST1 398177700 INSTALLER

ST2 899864100 REMOVER

NOTE:

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



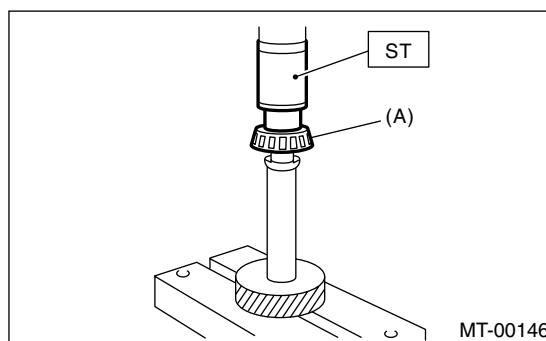
(A) Roller bearing

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

ST 499757002 INSTALLER

NOTE:

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



(A) Roller bearing

E: INSPECTION

1) Bearings

Replace the bearings in the following cases:

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

2) Driven gear

Replace the drive gear in the following cases:

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

12.Center Differential

A: REMOVAL

- 1) Remove the manual transmission assembly from vehicle. <Ref. to 5MT-26, REMOVAL, Manual Transmission Assembly.>
- 2) Remove the transfer case with extension case assembly. <Ref. to 5MT-39, REMOVAL, Transfer Case and Extension Case Assembly.>
- 3) Remove the extension case assembly. <Ref. to 5MT-39, REMOVAL, Transfer Case and Extension Case Assembly.>
- 4) Remove the transfer driven gear. <Ref. to 5MT-45, REMOVAL, Transfer Driven Gear.>
- 5) Remove the center differential.

B: INSTALLATION

- 1) Install the center differential into transfer case.
- 2) Install the transfer driven gear. <Ref. to 5MT-45, INSTALLATION, Transfer Driven Gear.>
- 3) Install the extension case assembly. <Ref. to 5MT-39, INSTALLATION, Transfer Case and Extension Case Assembly.>
- 4) Install the transfer case with extension case assembly. <Ref. to 5MT-39, REMOVAL, Transfer Case and Extension Case Assembly.>
- 5) Install the back-up light switch and neutral position switch. <Ref. to 5MT-35, REMOVAL, Switches and Harness.>
- 6) Install the manual transmission assembly to vehicle. <Ref. to 5MT-29, INSTALLATION, Manual Transmission Assembly.>

C: DISASSEMBLY

NOTE:

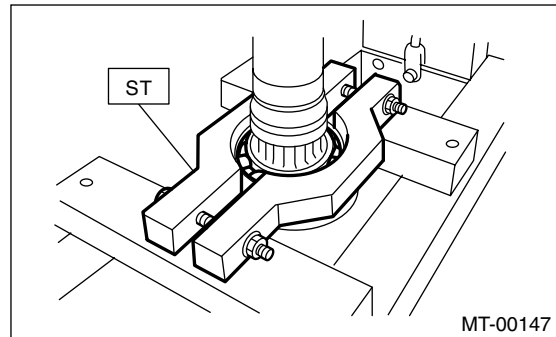
Do not disassemble the center differential because it is a non-disassemble part.

Remove the ball bearing using ST.

NOTE:

Do not reuse the ball bearing.

ST 498077300 CENTER DIFFERENTIAL BEARING REMOVER

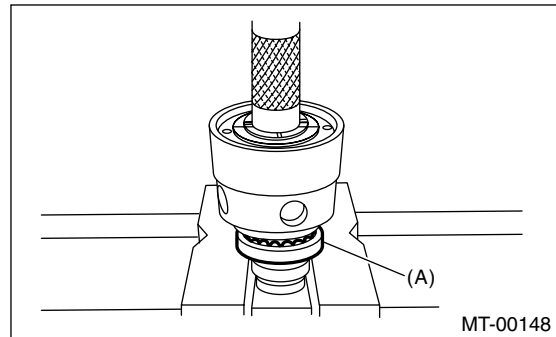


D: ASSEMBLY

Install the ball bearing to center differential assembly.

NOTE:

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



(A) Ball bearing

E: INSPECTION

1) Bearings

Replace the bearings in the following cases:

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

2) Center differential

Replace the center differential assembly in the following case:

- Worn or damaged

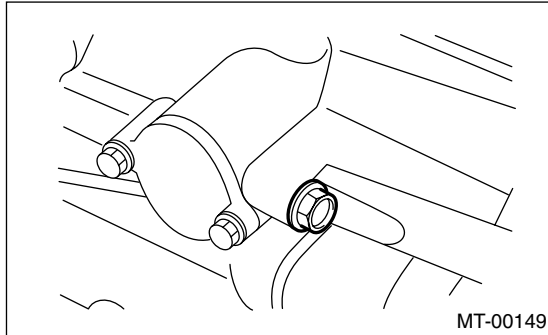
REVERSE CHECK SLEEVE

MANUAL TRANSMISSION AND DIFFERENTIAL

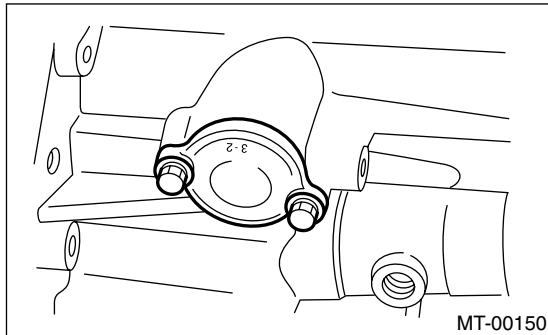
13.Reverse Check Sleeve

A: REMOVAL

- 1) Remove the manual transmission assembly from vehicle. <Ref. to 5MT-26, REMOVAL, Manual Transmission Assembly.>
- 2) Remove the transfer case with extension case assembly. <Ref. to 5MT-39, REMOVAL, Transfer Case and Extension Case Assembly.>
- 3) Remove the shifter arm.
- 4) Remove the plug, spring, washer and reverse check ball.



- 5) Remove the reverse check sleeve.

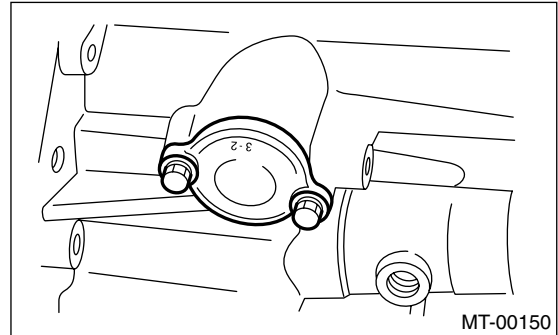


B: INSTALLATION

- 1) Install the reverse check sleeve.

Tightening torque:

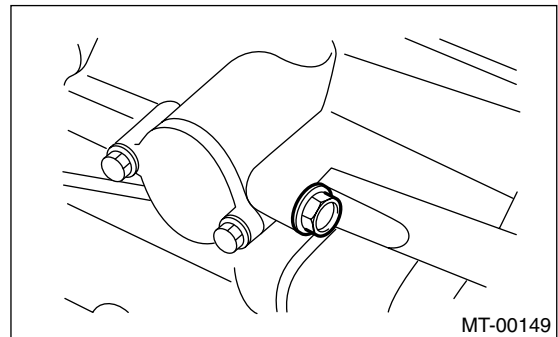
6.4 N·m (0.65 kgf-m, 4.7 ft-lb)



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

Tightening torque:

9.75 N·m (1.0 kgf-m, 7.2 ft-lb)



- 3) Install the shifter arm to transfer case assembly.
- 4) Install the transfer case with extension case assembly. <Ref. to 5MT-39, INSTALLATION, Transfer Case and Extension Case Assembly.>
- 5) Install the manual transmission assembly to vehicle. <Ref. to 5MT-29, INSTALLATION, Manual Transmission Assembly.>

REVERSE CHECK SLEEVE

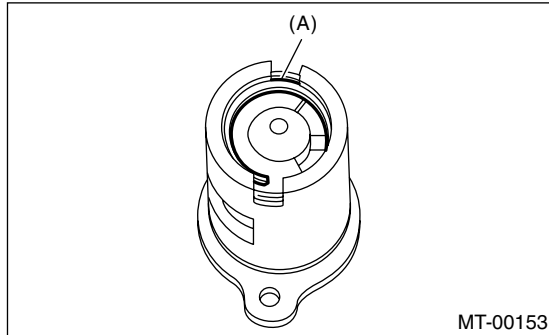
MANUAL TRANSMISSION AND DIFFERENTIAL

C: DISASSEMBLY

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

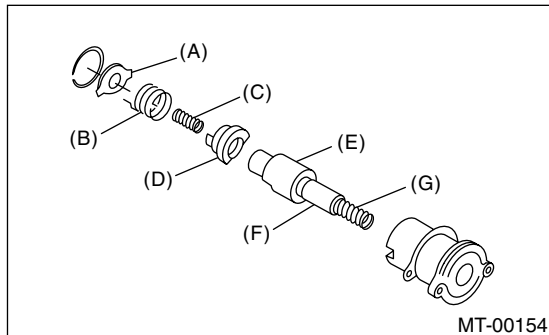
NOTE:

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



(A) Snap ring

2) Remove the 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 the O-ring.

NOTE:

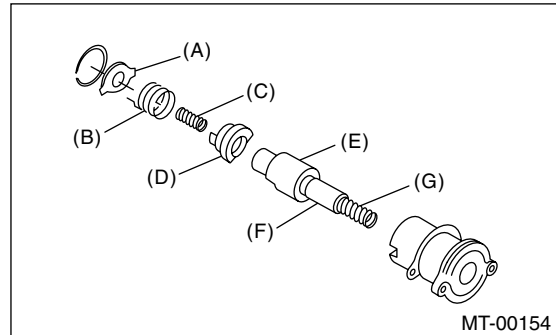
- Reverse check sleeve assembly uses an O-ring which should not be scratched.
- Be careful not to break the adjustment shim placed between reverse check sleeve assembly and case.

D: ASSEMBLY

1) Install the 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 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)

2) Hook the bent section of reverse check spring over reverse check plate.

3) Rotate the cam so that the protrusion of reverse check cam is at the opening in plate.

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

5) Position the O-ring in groove in sleeve.

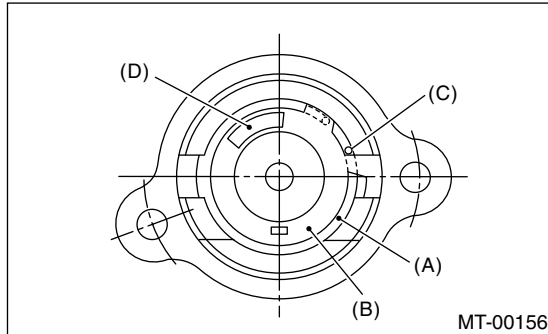
REVERSE CHECK SLEEVE

MANUAL TRANSMISSION AND DIFFERENTIAL

E: INSPECTION

- Make sure the cutout section of reverse accent shaft is aligned with the opening in reverse check sleeve.
- Spin the cam by hand for smooth rotation.
- Move the cam and shaft all the way toward plate and release.

If the cam does not return properly, replace the reverse check spring; if shaft does not, check for scratches on the inner surface of sleeve. If sleeve is in good order, replace the 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 5MT-50, ADJUSTMENT, Reverse Check Sleeve.>

F: ADJUSTMENT

1. NEUTRAL POSITION ADJUSTMENT

- 1) Shift the 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 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 the bolts holding reverse check sleeve assembly to the case, move the 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 the O-ring when placing shim(s).

NOTE:

- When the 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 the shims alone cannot adjust clearance, replace the reverse accent shaft and re-adjust.

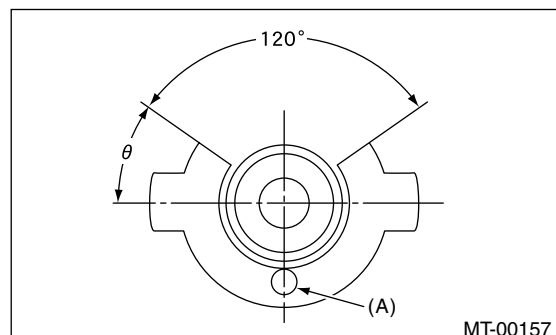
Adjustment shim	
Part No.	Thickness mm (in)
32190AA000	0.15 (0.0059)
32190AA010	0.30 (0.0118)

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

2. REVERSE CHECK PLATE ADJUSTMENT

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

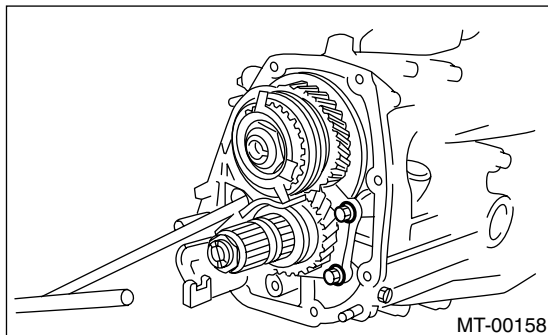
Reverse check plate			
Part No.	(A): No.	Angle θ	Remarks
32189AA000	0	28°	Arm stops closer to 5th gear.
32189AA010	1	31°	Arm stops closer to 5th gear.
32189AA020	2	34°	Arm stops in the center.
32189AA030	3	37°	Arm stops closer to reverse gear.
32189AA040	4	40°	Arm stops closer to reverse gear.



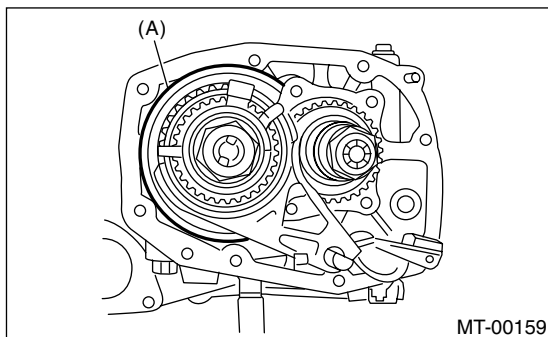
14. Transmission Case

A: REMOVAL

- 1) Remove the manual transmission assembly from vehicle. <Ref. to 5MT-26, REMOVAL, Manual Transmission Assembly.>
- 2) Remove the clutch release lever. <Ref. to CL-15, REMOVAL, Release Bearing and Lever.>
- 3) Remove the transfer case with extension case assembly. <Ref. to 5MT-39, REMOVAL, Transfer Case and Extension Case Assembly.>
- 4) Remove the bearing mounting bolts.

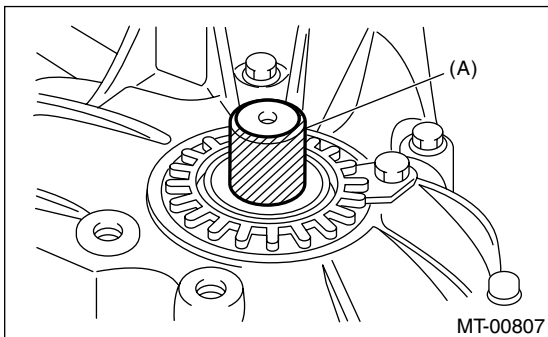


- 5) Remove the main shaft rear plate.



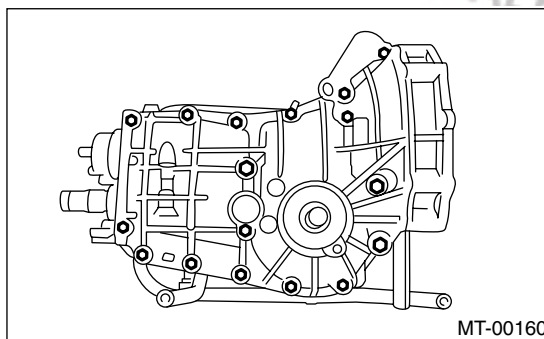
(A) Main shaft rear plate

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



(A) Vinyl tape

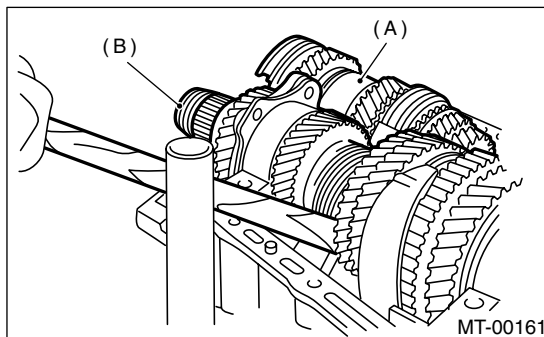
- 7) Separate the transmission case into right and left cases by loosening the coupling bolts and nuts.



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

NOTE:

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



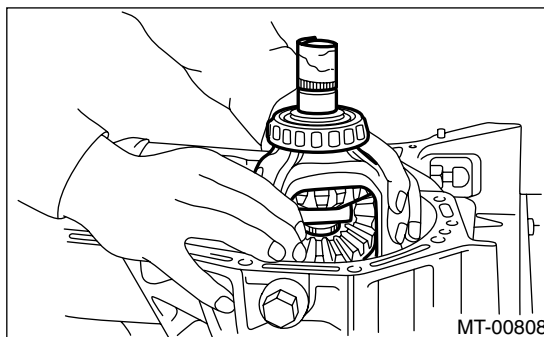
(A) Main shaft assembly

(B) Drive pinion shaft assembly

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

NOTE:

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



TRANSMISSION CASE

MANUAL TRANSMISSION AND DIFFERENTIAL

B: INSTALLATION

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

Liquid gasket:

THREE BOND 1215 (Part No. 004403007) or equivalent

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

NOTE:

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

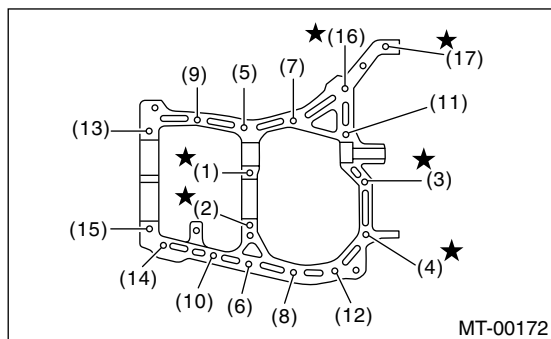
Tightening torque:

8 mm bolt

25 N·m (2.5 kgf·m, 18.1 ft·lb)

★ 10 mm bolt

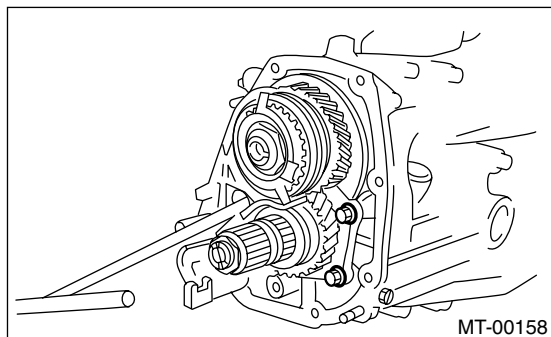
39 N·m (4.0 kgf·m, 28.9 ft·lb)



- 7) Tighten the ball bearing attachment bolts.

Tightening torque:

29 N·m (3.0 kgf·m, 21.7 ft·lb)

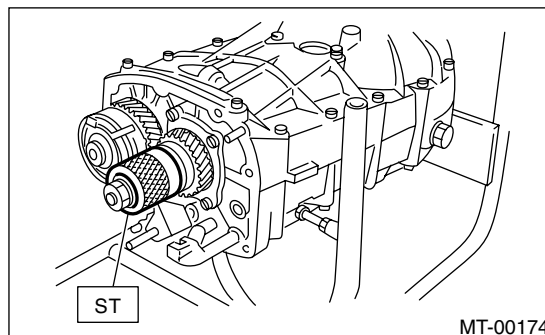


- 8) Backlash adjustment of hypoid gear and preload adjustment of roller bearing:

NOTE:

Support the drive pinion assembly with ST.

ST 498427100 STOPPER



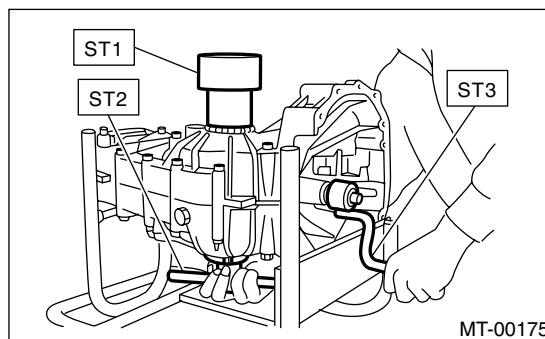
- 9) Place the transmission with case left side facing downward and put ST1 on bearing cup.

10) Screw the retainer assembly into left case from the bottom using ST2. Fit the ST3 on transmission main shaft. Shift the gear into 4th or 5th and turn the shaft several times. Screw in the retainer while turning ST3 until a slight resistance is felt on ST2. This is the contact point of hypoid gear and drive pinion shaft. Repeat the above sequence several times to ensure the contact point.

ST1 399780104 WEIGHT

ST2 499787000 WRENCH ASSY

ST3 499927100 HANDLE



TRANSMISSION CASE

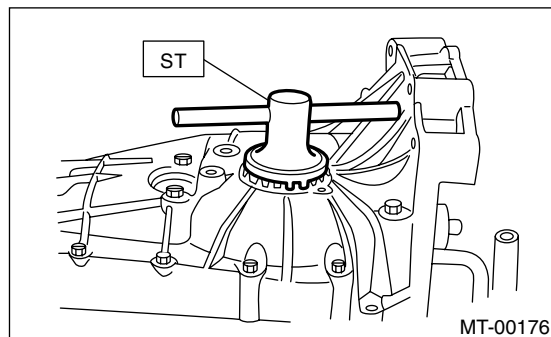
MANUAL TRANSMISSION AND DIFFERENTIAL

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

NOTE:

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

ST 499787000 WRENCH ASSY



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

NOTE:

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

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

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

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

16) Inspect and adjust the backlash and tooth contact of hypoid gear. <Ref. to 5MT-72, INSPECTION, Front Differential Assembly.>

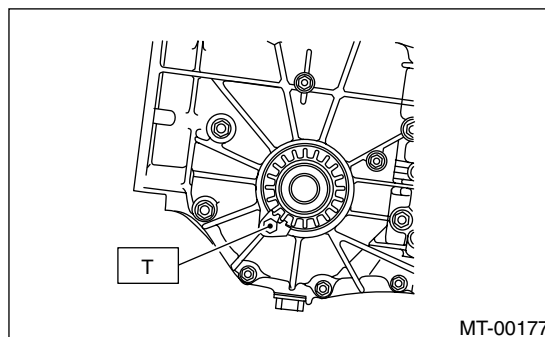
17) After checking the tooth contact of hypoid gears, remove the lock plate. Then loosen the retainer until the O-ring groove appears. Fit the O-ring into groove and tighten the retainer into the position where retainer has been tightened in. Tighten the lock plate.

NOTE:

Carry out this job on both upper and lower retainers.

Tightening torque:

T: 24.5 N·m (2.5 kgf-m, 18.1 ft-lb)



18) Selecting of main shaft rear plate. <Ref. to 5MT-59, ADJUSTMENT, Main Shaft Assembly.>

19) Install the clutch release lever and bearing. <Ref. to CL-16, INSTALLATION, Release Bearing and Lever.>

20) Install the transfer case with extension case assembly. <Ref. to 5MT-39, INSTALLATION, Transfer Case and Extension Case Assembly.>

21) Install the manual transmission assembly into the vehicle. <Ref. to 5MT-29, INSTALLATION, Manual Transmission Assembly.>

C: INSPECTION

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

15. Main Shaft Assembly

A: REMOVAL

- 1) Remove the manual transmission assembly from vehicle. <Ref. to 5MT-26, REMOVAL, Manual Transmission Assembly.>
- 2) Remove the transfer case with extension case assembly. <Ref. to 5MT-39, REMOVAL, Transfer Case and Extension Case Assembly.>
- 3) Remove the transmission case. <Ref. to 5MT-39, REMOVAL, Transfer Case and Extension Case Assembly.>
- 4) Remove the drive pinion shaft assembly. <Ref. to 5MT-60, REMOVAL, Drive Pinion Shaft Assembly.>
- 5) Remove the main shaft assembly.

B: INSTALLATION

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

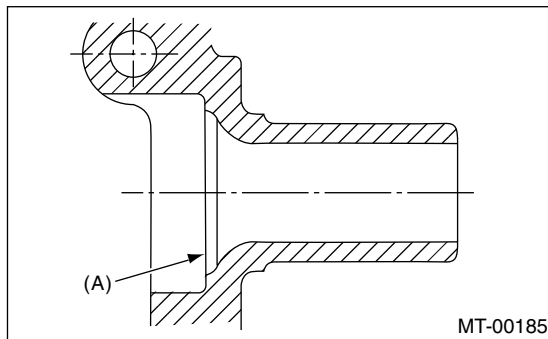
NOTE:

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

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

NOTE:

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



MT-00185

- 3) Install the drive pinion assembly. <Ref. to 5MT-60, INSTALLATION, Drive Pinion Shaft Assembly.>
- 4) Install the transmission case. <Ref. to 5MT-52, INSTALLATION, Transmission Case.>
- 5) Install the transfer case with extension case assembly. <Ref. to 5MT-39, INSTALLATION, Transfer Case and Extension Case Assembly.>

- 6) Install the manual transmission assembly to vehicle. <Ref. to 5MT-29, INSTALLATION, Manual Transmission Assembly.>

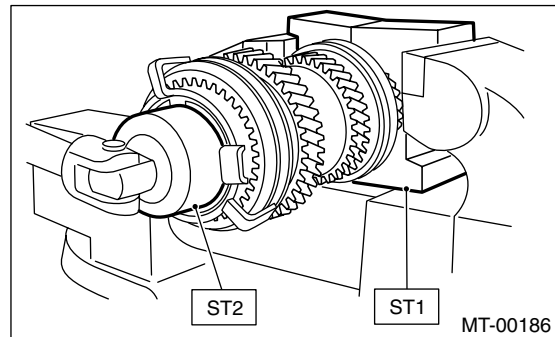
C: DISASSEMBLY

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

NOTE:

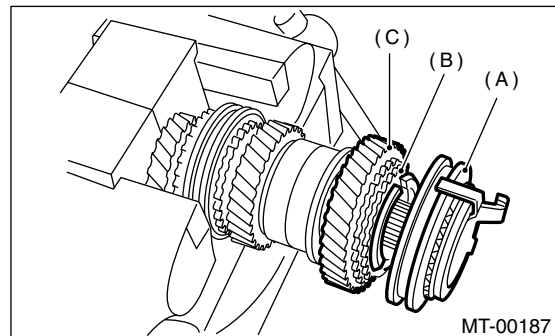
Remove the caulking before removing lock nut.

ST1	498937000	TRANSMISSION HOLDER
ST2	499987003	SOCKET WRENCH (35)



MT-00186

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



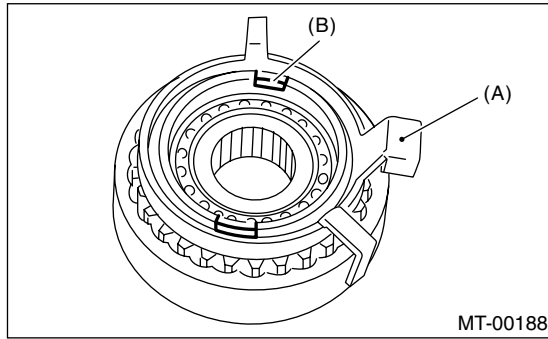
MT-00187

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

MAIN SHAFT ASSEMBLY

MANUAL TRANSMISSION AND DIFFERENTIAL

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



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

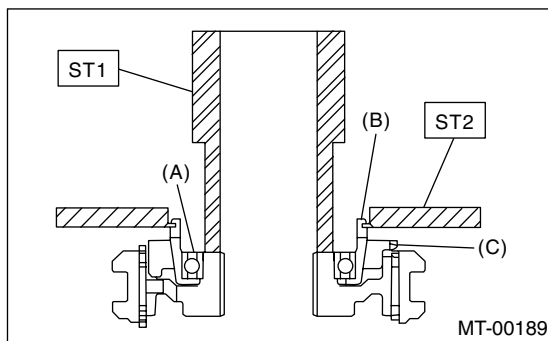
5) Using the ST1, ST2 and a press, remove the ball bearing, synchro cone and baulk ring (Rev).

NOTE:

- Replace the 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 the ball bearing.

ST1 499757002 INSTALLER

ST2 498077400 SYNCHRO CONE REMOVER



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

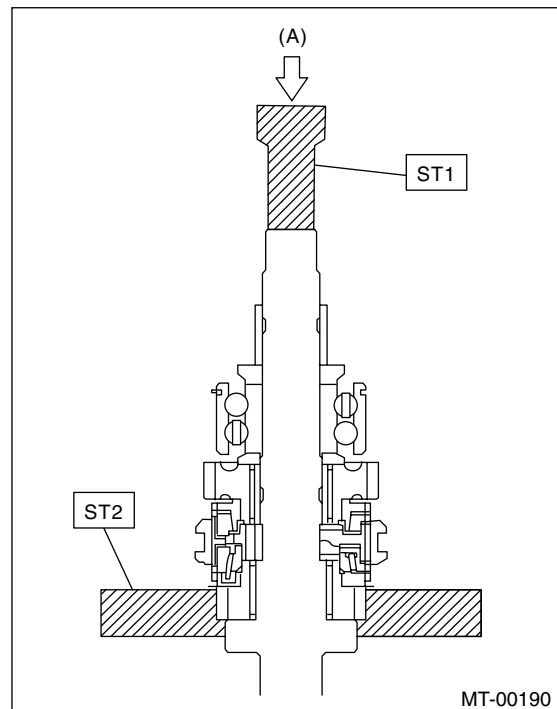
6) Using the ST1 and ST2, remove rest of the parts.

NOTE:

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

ST1 899864100 REMOVER

ST2 899714110 REMOVER



- (A) Press

MAIN SHAFT ASSEMBLY

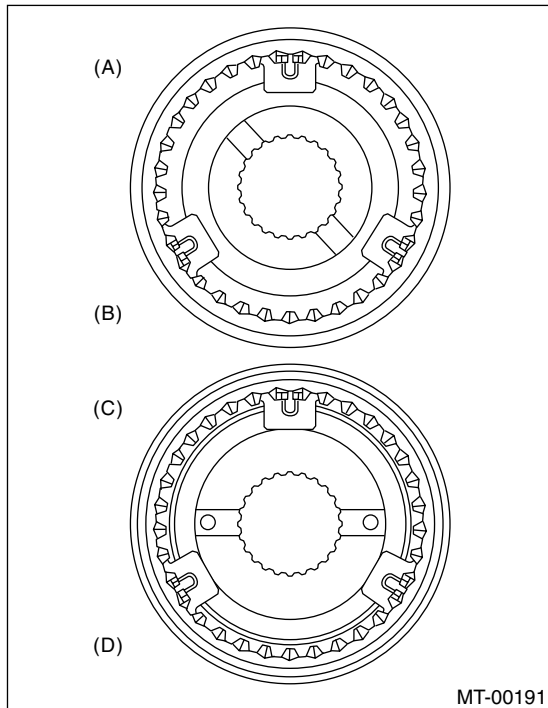
MANUAL TRANSMISSION AND DIFFERENTIAL

D: ASSEMBLY

1) Assemble each sleeve and hub assembly.

NOTE:

Position the open ends of spring 120° apart.

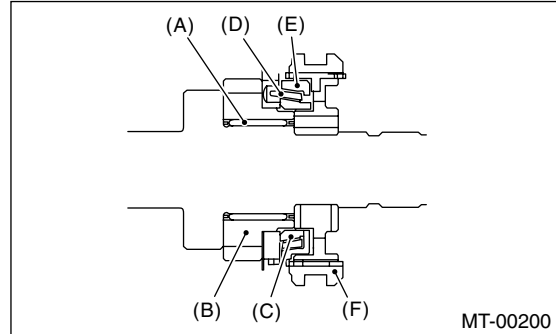


- (A) 3rd-4th hub ASSY
- (B) 3rd gear side
- (C) 5th-Rev hub ASSY
- (D) 5th gear side

2) Install the 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 the groove in baulk ring with shifting insert.



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

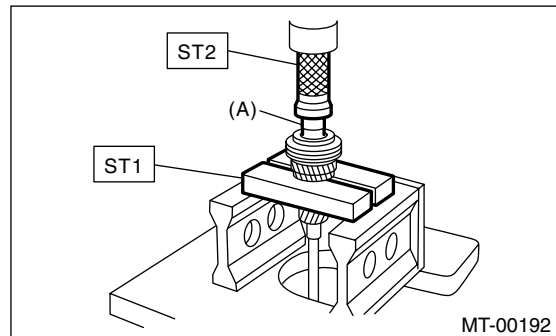
3) Install the 4th needle bearing race onto transmission main shaft using ST1, ST2 and a press.

NOTE:

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

ST1 899714110 REMOVER

ST2 499877000 RACE 4-5 INSTALLER



- (A) 4th needle bearing race

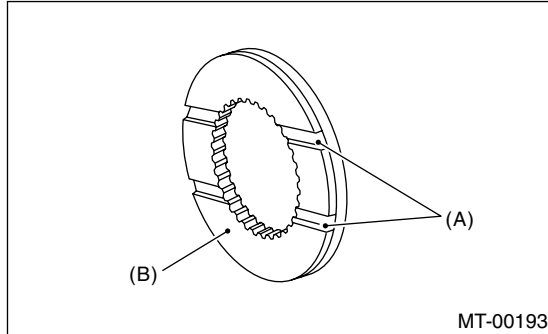
MAIN SHAFT ASSEMBLY

MANUAL TRANSMISSION AND DIFFERENTIAL

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

NOTE:

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



(A) Groove

(B) 4th gear side

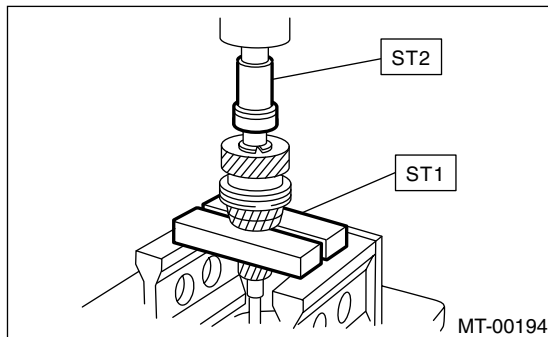
5) Drive the ball bearing onto the rear section of transmission main shaft using ST1, ST2 and a press.

NOTE:

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

ST1 899714110 REMOVER

ST2 499877000 RACE 4-5 INSTALLER



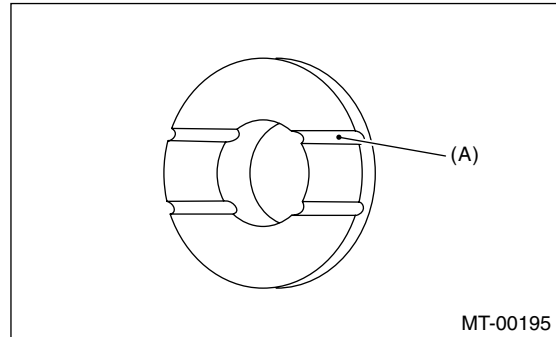
6) Using the ST1 and ST2, install the 5th gear thrust washer and 5th needle bearing race onto the rear section of transmission main shaft.

NOTE:

- Do not apply pressure in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).
- Face the thrust washer in correct direction.

ST1 899714110 REMOVER

ST2 499877000 RACE 4-5 INSTALLER



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

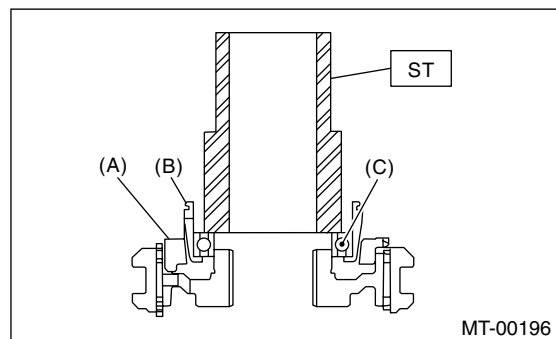
7) Install the bearing onto synchro cone.

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

NOTE:

- Do not apply pressure in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).
- Use a new ball bearing.
- After press fitting, make sure the synchro cone rotates freely.

ST 499757002 INSTALLER



(A) Baulk ring

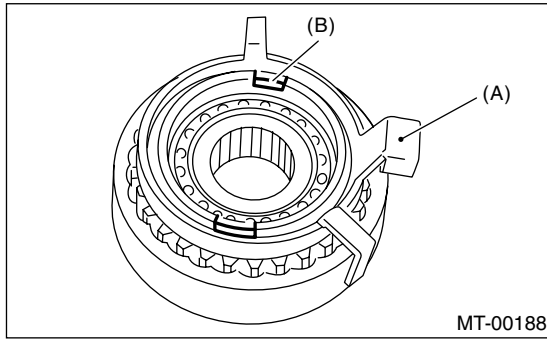
(B) Synchro cone

(C) Ball bearing

MAIN SHAFT ASSEMBLY

MANUAL TRANSMISSION AND DIFFERENTIAL

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

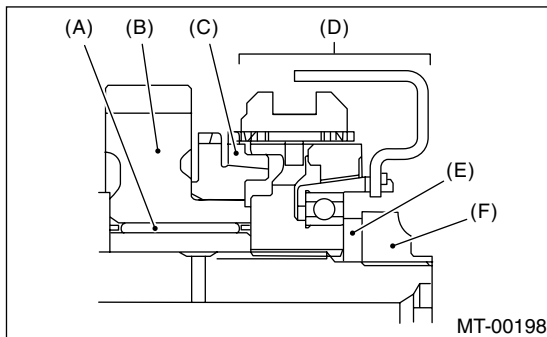


- (A) Synchro cone stopper
(B) Snap ring

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

NOTE:

Align the groove in baulk ring with shifting insert.



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

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

NOTE:

Secure the lock nuts in two places after tightening.

ST1 499987003 SOCKET WRENCH
ST2 498937000 TRANSMISSION HOLDER

Tightening torque:

120 N·m (12.2 kgf-m, 88.5 ft-lb)

E: INSPECTION

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

1) Bearings

Replace the bearings in the following cases:

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

2) Bushing (each gear)

Replace the bushing in the following cases:

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

3) Gears

• Replace the gears with new ones if their tooth surfaces are broken, damaged, or excessively worn.

• Correct or replace if the cone that contacts the baulk ring is rough or damaged.

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

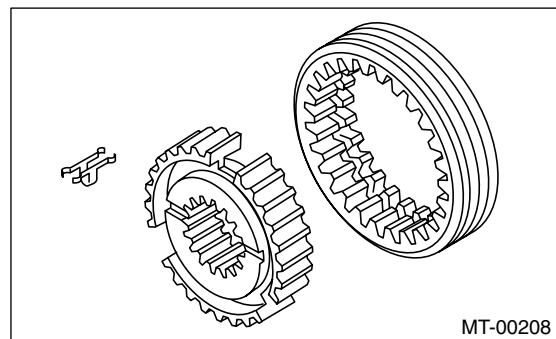
4) Baulk ring

Replace the ring in the following cases:

- When the inner surface and end face are damaged.
- When the ring inner surface is abnormally or partially worn down.
- When the contact surface of the synchronizer ring insert is scored or abnormally worn down.

5) Shifting insert key

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



6) Oil seal

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

7) O-ring

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

8) Gearshift mechanism

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

F: ADJUSTMENT

Selection of main shaft rear plate:

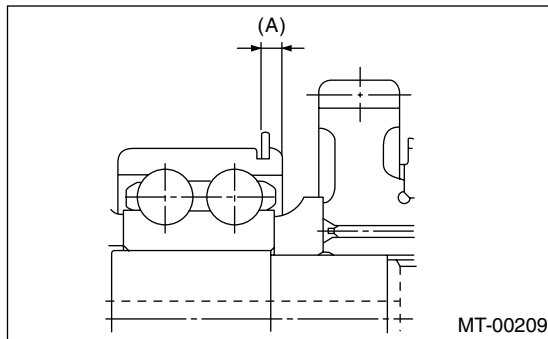
Using the ST, measure the amount (A) of ball bearing protrusion from transmission main case surface and select the proper plate in the following table:

NOTE:

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

ST 498147000 DEPTH GAUGE

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



DRIVE PINION SHAFT ASSEMBLY

MANUAL TRANSMISSION AND DIFFERENTIAL

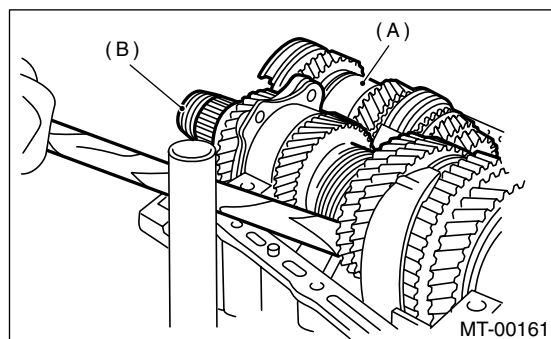
16. Drive Pinion Shaft Assembly

A: REMOVAL

- 1) Remove the manual transmission assembly from vehicle. <Ref. to 5MT-26, REMOVAL, Manual Transmission Assembly.>
- 2) Remove the transfer case with extension case assembly. <Ref. to 5MT-39, REMOVAL, Transfer Case and Extension Case Assembly.>
- 3) Remove the transmission case. <Ref. to 5MT-51, REMOVAL, Transmission Case.>
- 4) Remove the drive pinion shaft assembly.

NOTE:

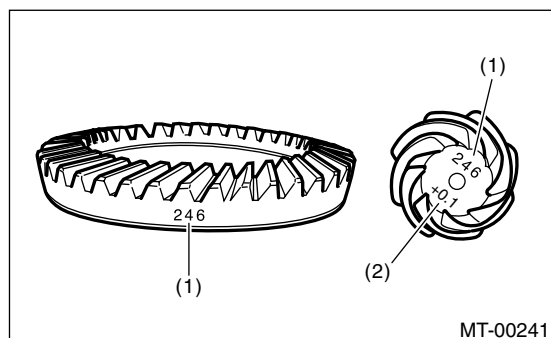
Use a hammer handle, etc. to remove if too tight.



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

B: INSTALLATION

- 1) Remove the differential assembly.
- 2) Alignment marks/numbers on hypoid gear set:
The upper number on drive 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.



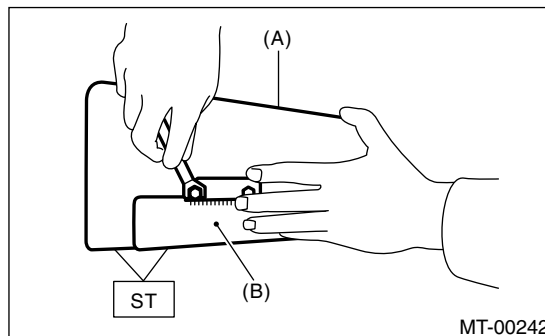
- (A) Match number
(B) Shim adjust number

- 3) Place the drive pinion shaft assembly on right hand transmission main case without shim and
- 4) Inspection and adjustment of ST:

NOTE:

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

ST 499917500 DRIVE PINION GAUGE ASSY



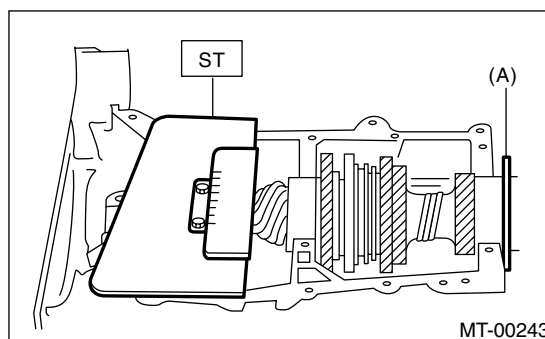
- (A) Plate
(B) Scale

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

ST 499917500 DRIVE PINION GAUGE ASSY

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

ST 499917500 DRIVE PINION GAUGE ASSY



- (A) Adjust clearance to zero without shim.

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

ST 499917500 DRIVE PINION GAUGE ASSY

DRIVE PINION SHAFT ASSEMBLY

MANUAL TRANSMISSION AND DIFFERENTIAL

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

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

9) Install the differential assembly. <Ref. to 5MT-68, INSTALLATION, Front Differential Assembly.>

10) Set the transmission main shaft assembly and drive pinion assembly in position. (So there is no clearance between the two when moved all the way to the front). Inspect the 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. <Ref. to 5MT-65, INSPECTION, Drive Pinion Shaft Assembly.>

11) Install the transmission case. <Ref. to 5MT-52, INSTALLATION, Transmission Case.>

12) Install the transfer case with extension case assembly. <Ref. to 5MT-39, INSTALLATION, Transfer Case and Extension Case Assembly.>

13) Install the manual transmission assembly to vehicle. <Ref. to 5MT-26, Manual Transmission Assembly.>

C: DISASSEMBLY

NOTE:

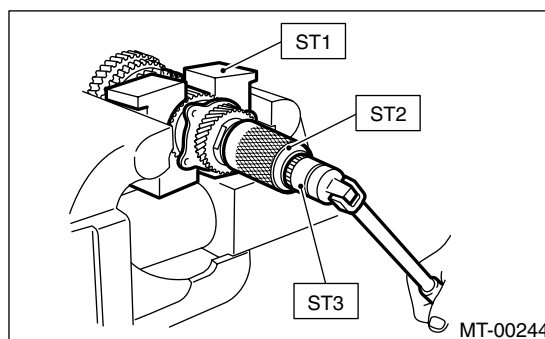
Attach a cloth to the end of driven shaft (on the frictional side of thrust needle bearing) to prevent damage during disassembly or reassembly.

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

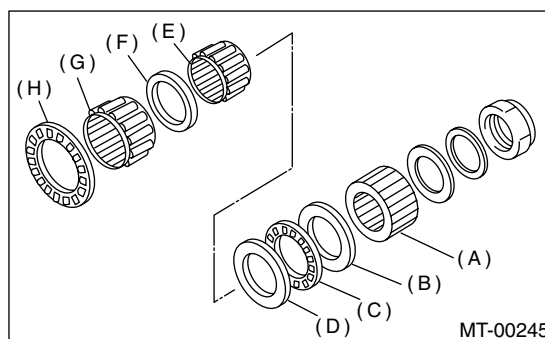
ST1 899884100 HOLDER

ST2 498427100 STOPPER

ST3 899988608 SOCKET WRENCH (27)



2) Withdraw the drive pinion from driven shaft. Remove the 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)

DRIVE PINION SHAFT ASSEMBLY

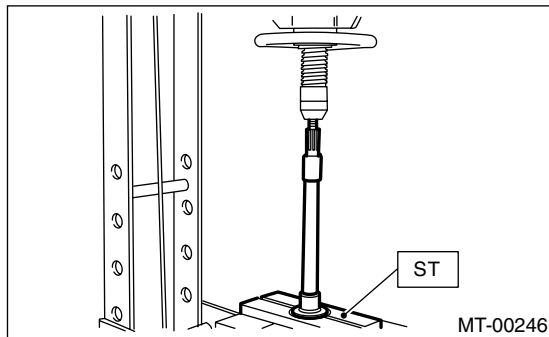
MANUAL TRANSMISSION AND DIFFERENTIAL

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

NOTE:

Do not reuse the roller bearing.

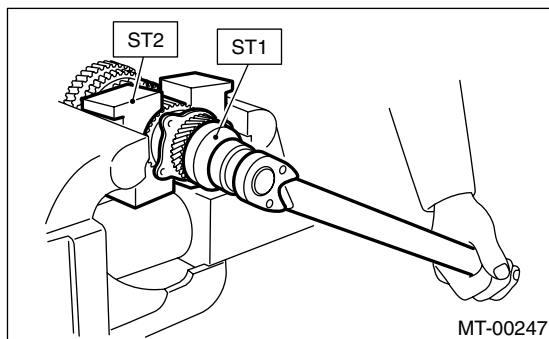
ST 498077000 REMOVER



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

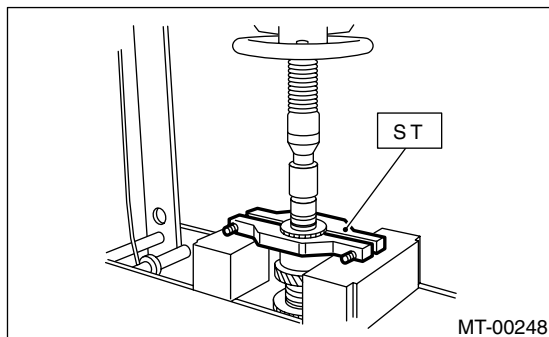
ST1 499987300 SOCKET WRENCH (50)

ST2 899884100 HOLDER



5) Remove the 5th driven gear using ST.

ST 499857000 5TH DRIVEN GEAR REMOVER

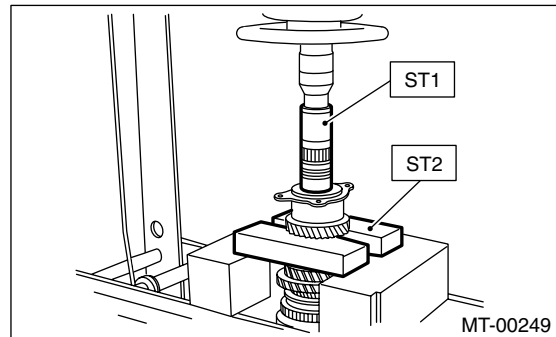


6) Remove the woodruff key.

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

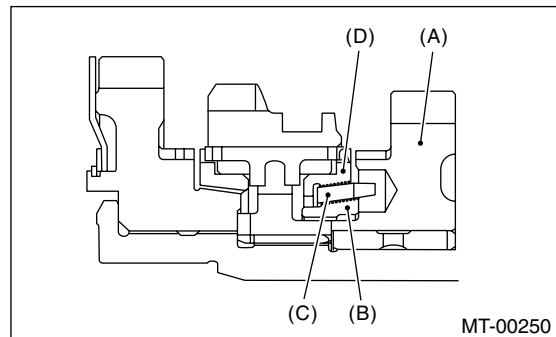
ST1 499757002 INSTALLER

ST2 899714110 REMOVER



8) Remove the key.

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



(A) 2nd driven gear

(B) Inner baulk ring

(C) Synchro cone

(D) Outer baulk ring

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

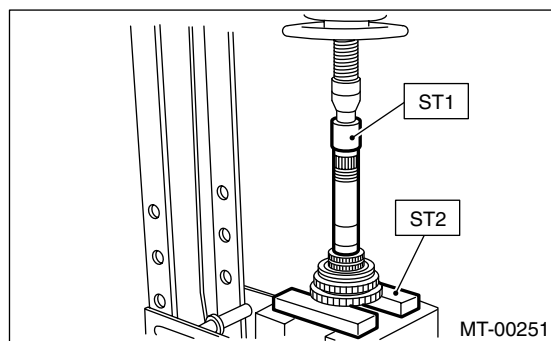
NOTE:

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

DRIVE PINION SHAFT ASSEMBLY

MANUAL TRANSMISSION AND DIFFERENTIAL

ST1 499757002 INSTALLER
ST2 899714110 REMOVER



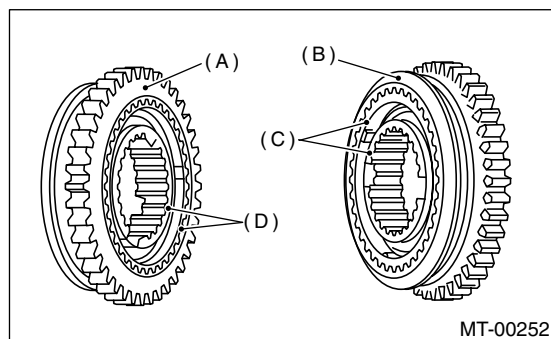
11) Remove the sub gear for 1st driven gear.

D: ASSEMBLY

1) Install the sleeve and hub assembly by matching alignment marks.

NOTE:

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



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

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

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

NOTE:

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

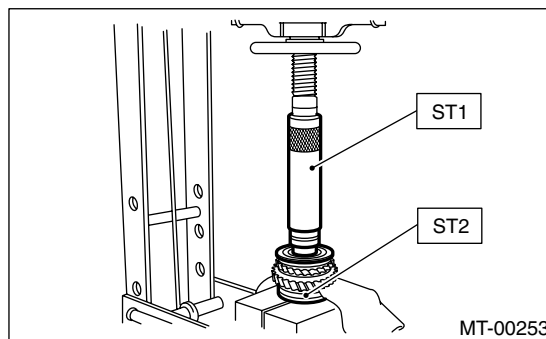
4) Install the 2nd driven gear bushing onto driven shaft using ST1, ST2 and press.

NOTE:

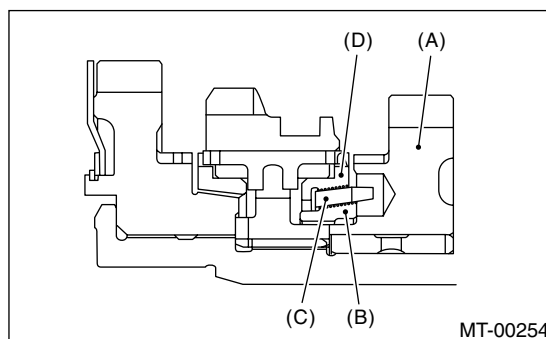
- Do not apply pressure in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).
- Attach a cloth to the end of driven shaft to prevent damage.

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

ST1 499277200 INSTALLER
ST2 499587000 INSTALLER



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



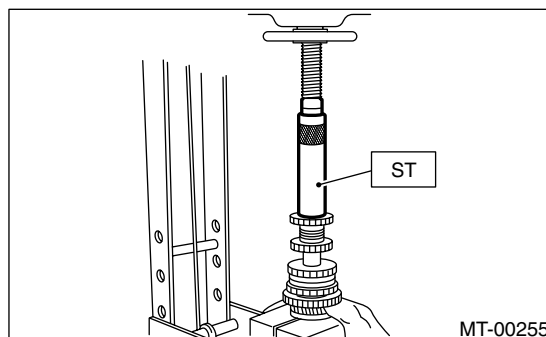
- (A) 2nd driven gear
- (B) Inner baulk ring
- (C) Synchro cone
- (D) Outer baulk ring

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

NOTE:

- Do not apply pressure in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).
- Align the groove in baulk ring with insert.

ST 499277200 INSTALLER



DRIVE PINION SHAFT ASSEMBLY

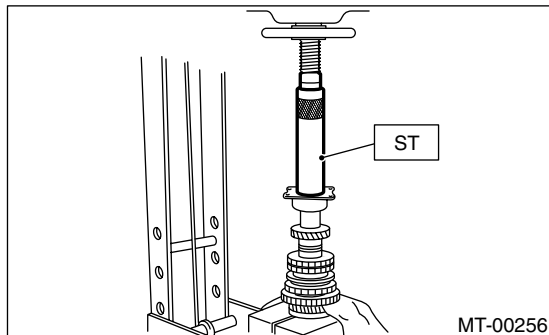
MANUAL TRANSMISSION AND DIFFERENTIAL

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

NOTE:

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

ST 499277200 INSTALLER

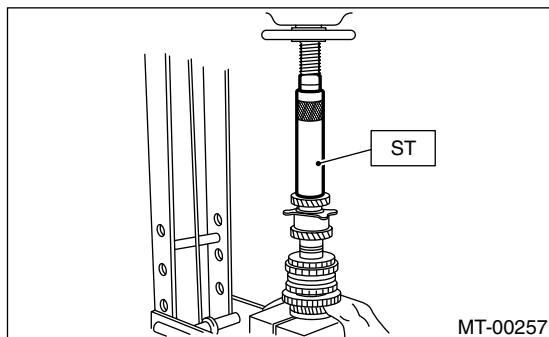


8) Position the woodruff key in groove on the rear of driven shaft. Install the 5th driven gear onto driven shaft using ST and press.

NOTE:

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

ST 499277200 INSTALLER

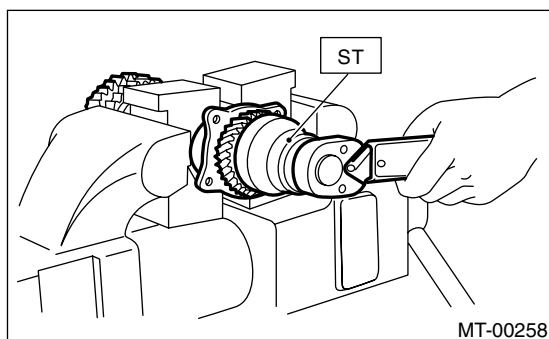


9) Install the lock washer. Install the lock nut and tighten to the specified torque using ST.

ST 499987300 SOCKET WRENCH (50)

Tightening torque:

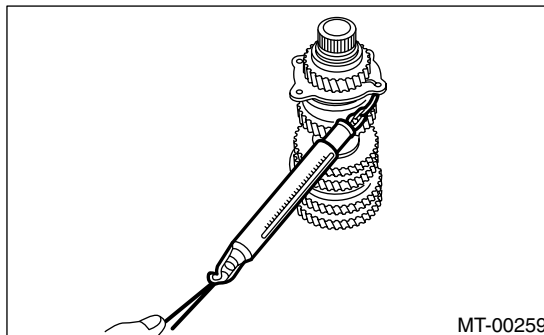
260 N·m (26.5 kgf-m, 191.7 ft-lb)



NOTE:

- Stake the lock nut at two points.

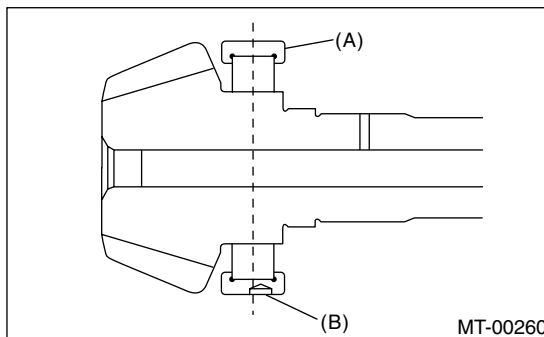
- Using the spring balancer, check that starting torque of roller bearing is 0.1 to 1.5 N (0.01 to 0.15 kgf, 0.02 to 0.33 ft).



10) Install the roller bearing onto drive pinion.

NOTE:

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

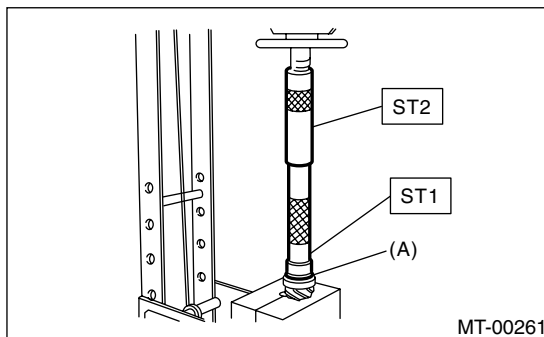


- (A) Roller bearing
- (B) Knock pin hole

11) Install the washer using ST1, ST2 and press.

ST1 499277100 BUSH 1-2 INSTALLER

ST2 499277200 INSTALLER

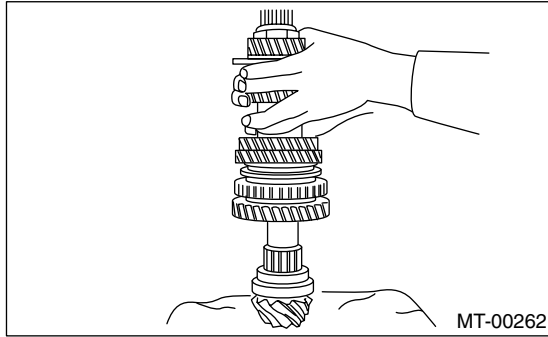


- (A) Washer

DRIVE PINION SHAFT ASSEMBLY

MANUAL TRANSMISSION AND DIFFERENTIAL

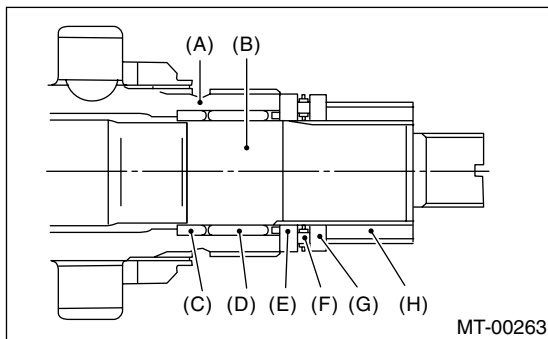
12) Install the thrust bearing and needle bearing.
Install the driven shaft assembly.



13) Install the 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 the 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

14) Adjust the thrust bearing preload. <Ref. to 5MT-66, ADJUSTMENT, Drive Pinion Shaft Assembly.>

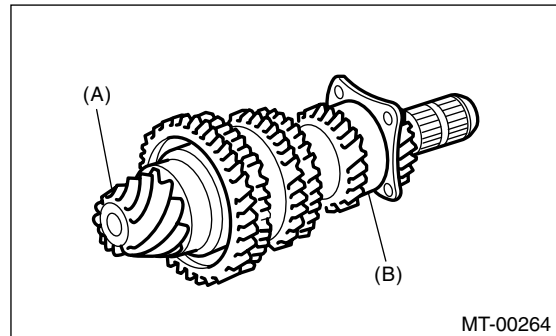
E: INSPECTION

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

1) Bearings

Replace the 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 the 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:

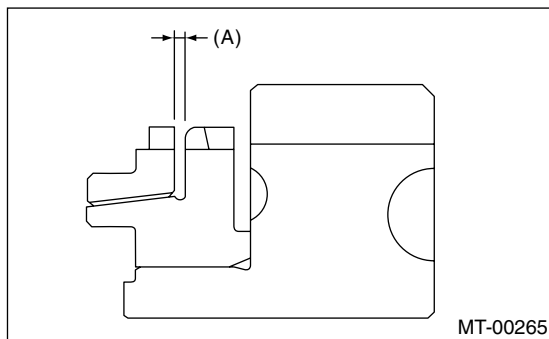
- When the inner surface and end face are damaged.
- When the ring inner surface is abnormally or partially worn down.
- If the gap between the end faces of the ring and the gear splined part is excessively small when the ring is pressed against the cone.

DRIVE PINION SHAFT ASSEMBLY

MANUAL TRANSMISSION AND DIFFERENTIAL

Clearance (A):

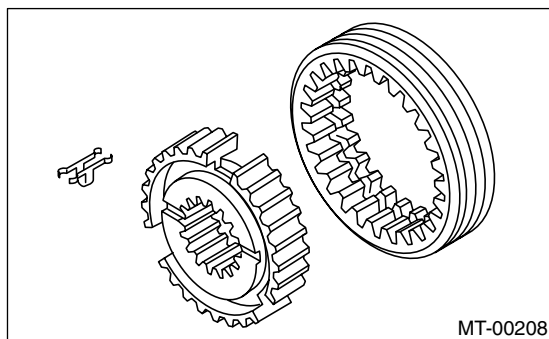
0.5 — 1.0 mm (0.020 — 0.040 in)



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

5) Shifting insert key

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



6) Oil seal

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

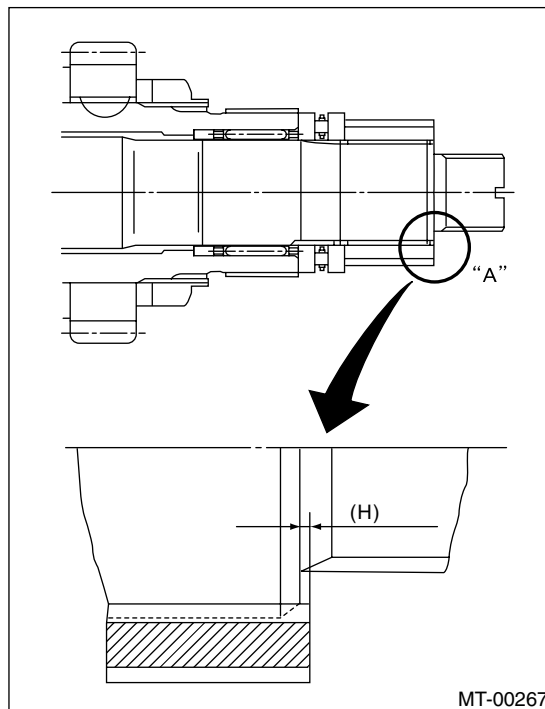
7) O-ring

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

F: ADJUSTMENT

1. THRUST BEARING PRELOAD

1) Select the adjusting washer No. 1 so that dimension (H) is zero through visual check. Position the washer (18.3 × 30 × 4) and lock washer (18 × 30 × 2) and install the lock nut (18 × 13.5).



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

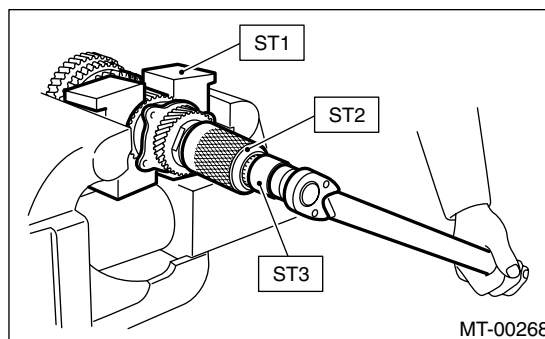
ST1 899884100 HOLDER

ST2 498427100 STOPPER

ST3 899988608 SOCKET WRENCH (27)

Tightening torque:

120 N·m (12.2 kgf·m, 88.5 ft·lb)



DRIVE PINION SHAFT ASSEMBLY

MANUAL TRANSMISSION AND DIFFERENTIAL

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

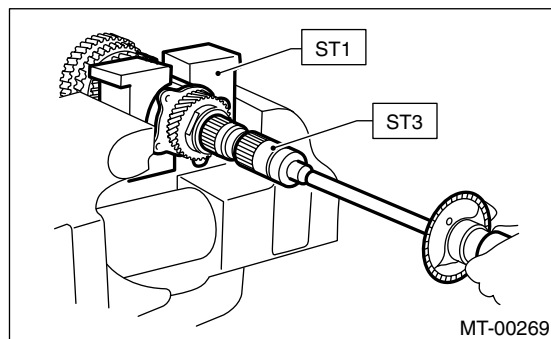
ST1 899884100 HOLDER

ST3 899988608 SOCKET WRENCH (27)

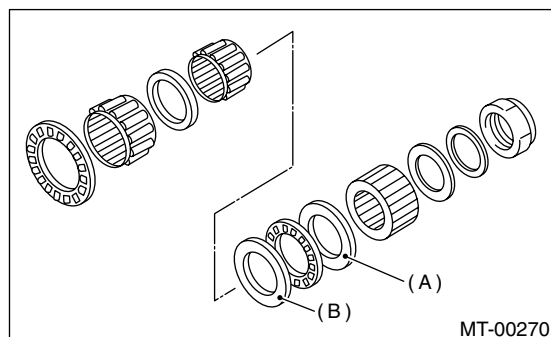
Starting torque:

0.3 — 0.8 N·m

(0.03 — 0.08 kgf-m, 0.2 — 0.6 ft-lb)



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

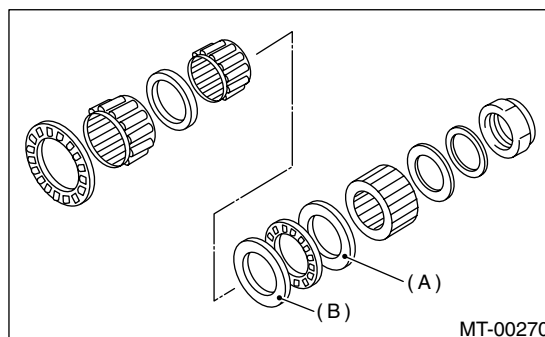


(A) Adjusting washer No. 1

(B) Adjusting washer No. 2

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

5) If the 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 the starting torque is within specified range, then clinch the lock nut at four positions.

FRONT DIFFERENTIAL ASSEMBLY

MANUAL TRANSMISSION AND DIFFERENTIAL

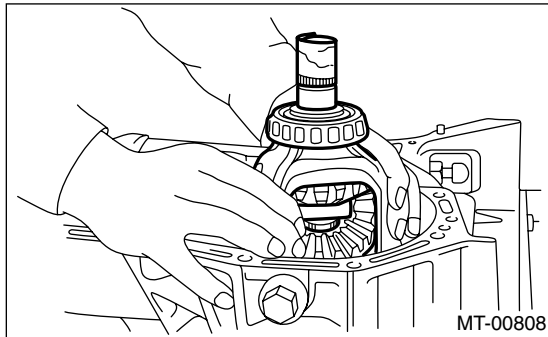
17. Front Differential Assembly

A: REMOVAL

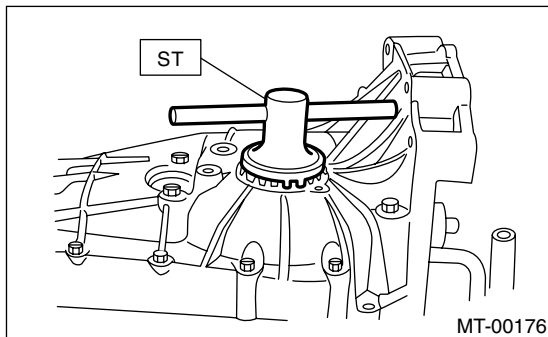
- 1) Remove the manual transmission assembly from vehicle. <Ref. to 5MT-26, REMOVAL, Manual Transmission Assembly.>
- 2) Remove the transfer case with extension case assembly. <Ref. to 5MT-39, REMOVAL, Transfer Case and Extension Case Assembly.>
- 3) Remove the transmission case. <Ref. to 5MT-51, REMOVAL, Transmission Case.>
- 4) Remove the drive pinion shaft assembly. <Ref. to 5MT-60, REMOVAL, Drive Pinion Shaft Assembly.>
- 5) Remove the main shaft assembly. <Ref. to 5MT-54, REMOVAL, Main Shaft Assembly.>
- 6) Remove the differential assembly.

NOTE:

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



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

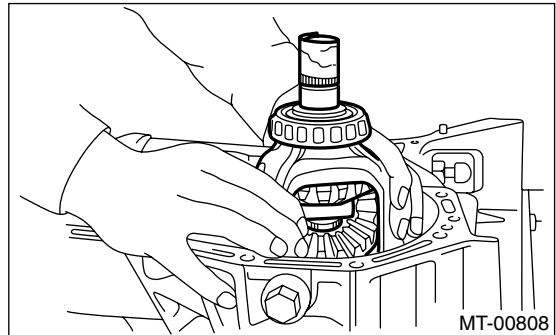


B: INSTALLATION

- 1) Install the differential side retainers using ST. ST 499787000 WRENCH ASSY
- 2) Install the bearing outer race to transmission case.
- 3) Install the differential assembly.

NOTE:

- Be careful not to fold the sealing lip of oil seal.
- Wrap the right and left spline sections of axle shaft with vinyl tape to prevent scratches.



- 4) Install the main shaft assembly. <Ref. to 5MT-54, INSTALLATION, Main Shaft Assembly.>
- 5) Install the drive pinion assembly. <Ref. to 5MT-60, INSTALLATION, Drive Pinion Shaft Assembly.>
- 6) Install the transmission case. <Ref. to 5MT-52, INSTALLATION, Transmission Case.>
- 7) Install the transfer case with extension case assembly. <Ref. to 5MT-39, INSTALLATION, Transfer Case and Extension Case Assembly.>
- 8) Install the manual transmission assembly to vehicle. <Ref. to 5MT-29, INSTALLATION, Manual Transmission Assembly.>

FRONT DIFFERENTIAL ASSEMBLY

MANUAL TRANSMISSION AND DIFFERENTIAL

C: DISASSEMBLY

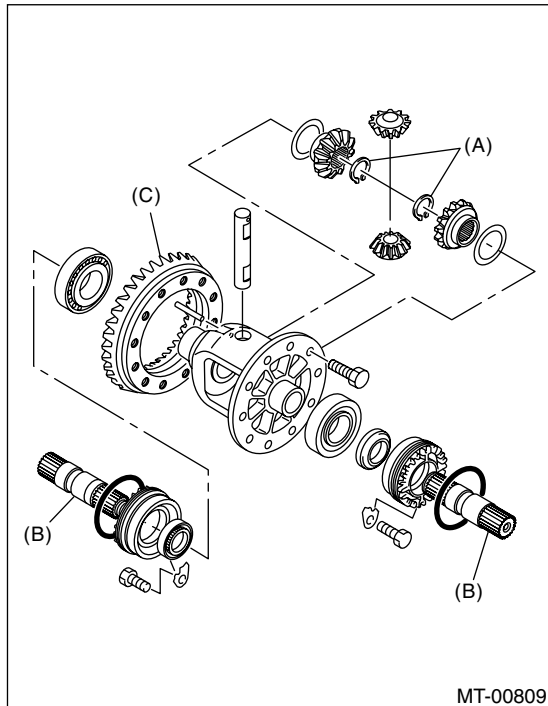
1. DIFFERENTIAL CASE ASSEMBLY

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

NOTE:

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

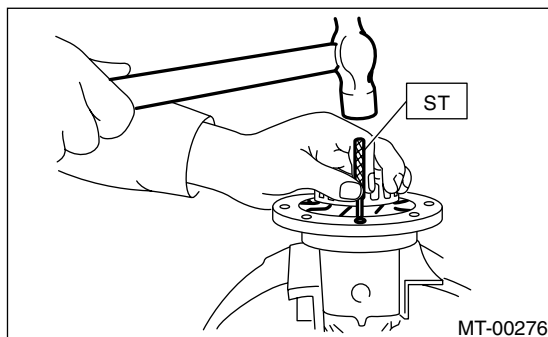
2) Loosen the twelve bolts and remove the hypoid driven gear.



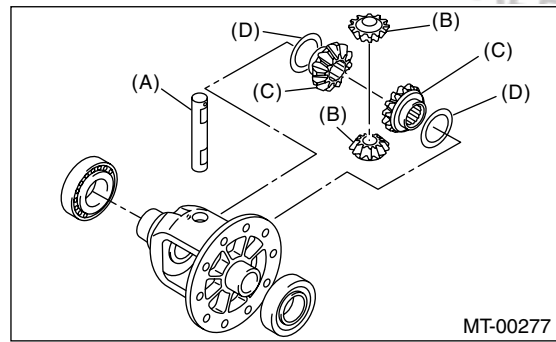
- (A) Snap ring
- (B) Axle drive shaft
- (C) Hypoid driven gear

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

ST 899904100 REMOVER

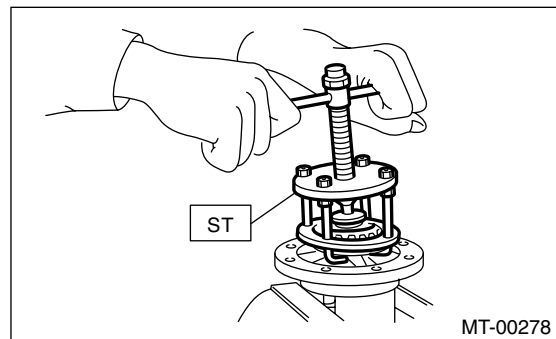


4) Pull out the pinion shaft, and remove the differential bevel pinion and gear and washer.



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

5) Remove the roller bearing using ST. ST 899524100 PULLER SET

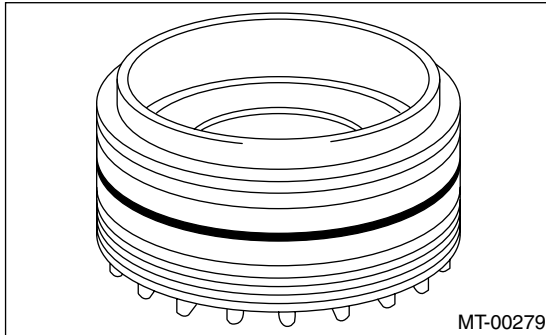


FRONT DIFFERENTIAL ASSEMBLY

MANUAL TRANSMISSION AND DIFFERENTIAL

2. SIDE RETAINER

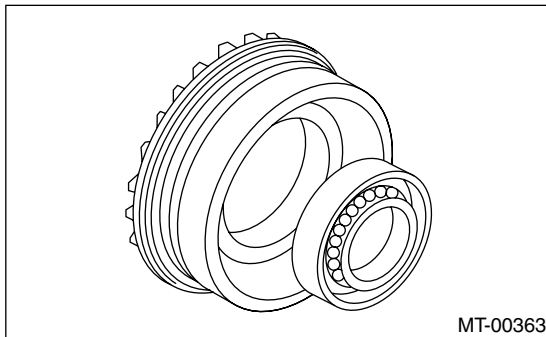
- 1) Remove the O-ring.



- 2) Remove the oil seal.

NOTE:

Do not reuse the oil seal. Prepare a new oil seal.



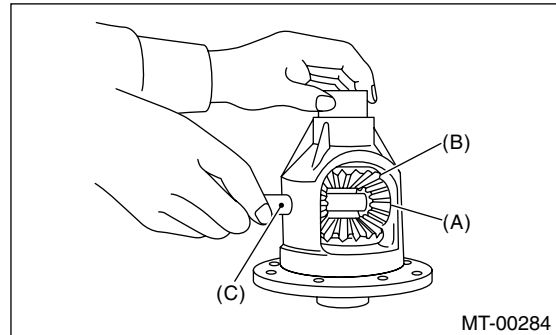
D: ASSEMBLY

1. DIFFERENTIAL CASE ASSEMBLY

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

NOTE:

Face the chamfered side of washer toward gear.



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

- 2) Measure the backlash between bevel gear and pinion. If it is not within specifications, install a suitable washer to adjust it. <Ref. to 5MT-74, ADJUSTMENT, Front Differential Assembly.>

NOTE:

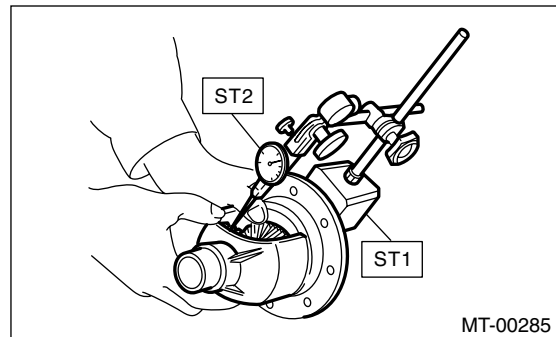
Be sure the pinion gear tooth contacts adjacent gear teeth during measurement.

ST1 498247001 MAGNET BASE

ST2 498247100 DIAL GAUGE

Standard backlash:

0.13 — 0.18 mm (0.0051 — 0.0071 in)



FRONT DIFFERENTIAL ASSEMBLY

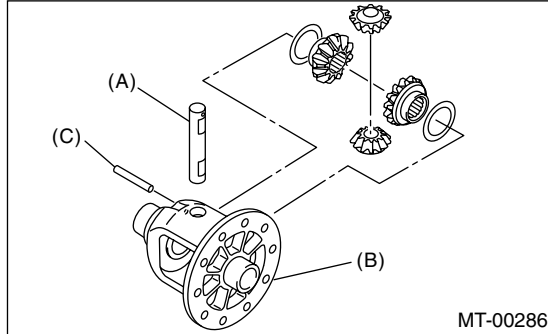
MANUAL TRANSMISSION AND DIFFERENTIAL

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

NOTE:

Lock the straight pin after installing.

ST 899904100 REMOVER



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

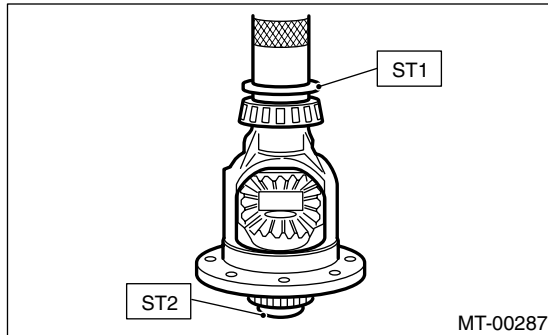
4) Install the roller bearing to differential case.

NOTE:

- Do not apply pressure in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).
- Be careful because the roller bearing outer races are used as a set.

ST1 499277100 BUSH 1-2 INSTALLER

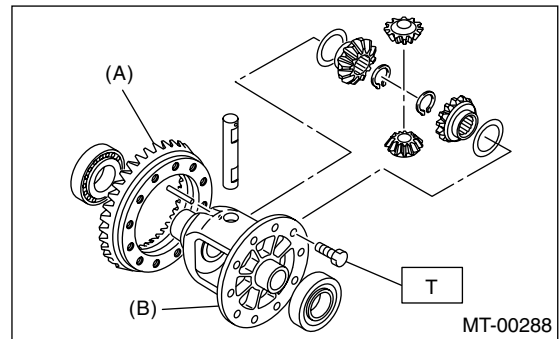
ST2 398497701 ADAPTER



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

Tightening torque:

T: 62 N·m (6.3 kgf-m, 45.6 ft-lb)



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

6) Set the drive axle shaft into differential case and hold it using outer spring. Measure the shaft to case clearance to check if it is within specifications using thickness gauge.

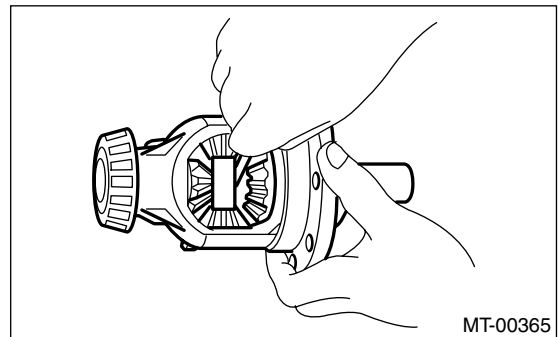
NOTE:

Replace the snap ring with suitable one, if the measurement is not within specifications.

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

Clearance

0 — 0.2 mm (0 — 0.008 in)



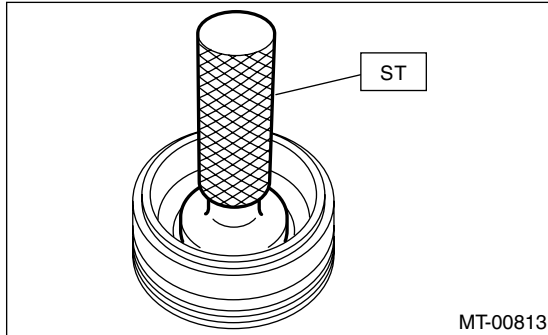
FRONT DIFFERENTIAL ASSEMBLY

MANUAL TRANSMISSION AND DIFFERENTIAL

2. SIDE RETAINER

1) Install a new oil seal.

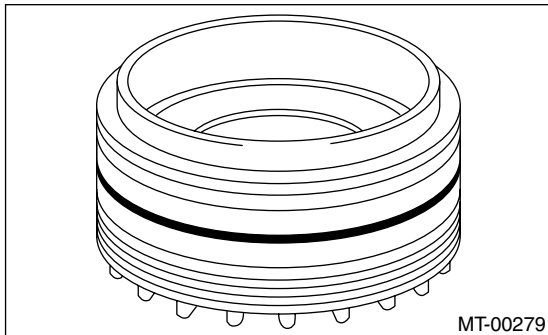
ST 49979700 INSTALLER



2) Install a new O-ring.

NOTE:

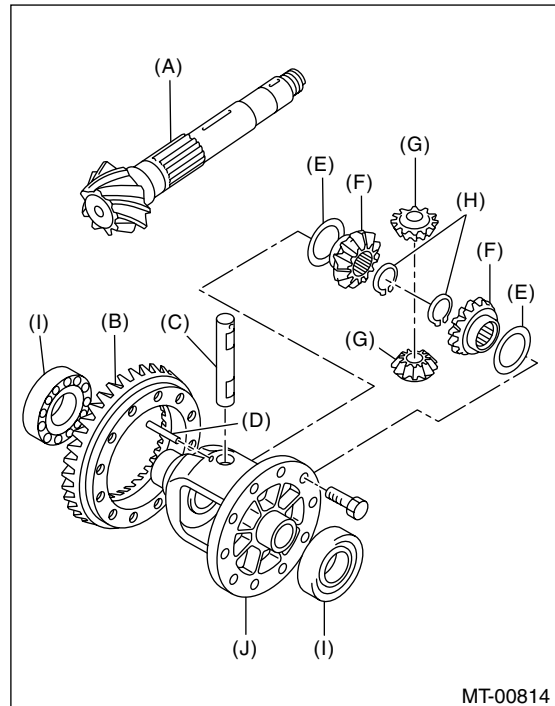
Do not stretch or damage the O-ring.



E: INSPECTION

Repair or replace the differential gear in the following cases:

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



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

FRONT DIFFERENTIAL ASSEMBLY

MANUAL TRANSMISSION AND DIFFERENTIAL

1. BEVEL PINION GEAR BACKLASH

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

NOTE:

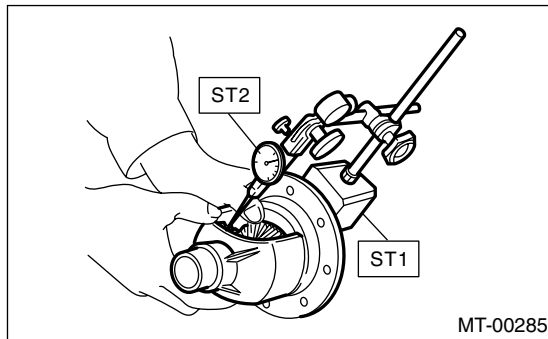
Be sure the pinion gear tooth contacts adjacent gear teeth during measurement.

ST1 498247001 MAGNET BASE

ST2 498247100 DIAL GAUGE

Standard backlash:

0.13 — 0.18 mm (0.0051 — 0.0071 in)



2. HYPOID GEAR BACKLASH

Set the ST1, ST2 and ST3. Insert the needle through transmission oil drain plug hole so that the needle comes in contact with the tooth surface at a right angle and check the backlash.

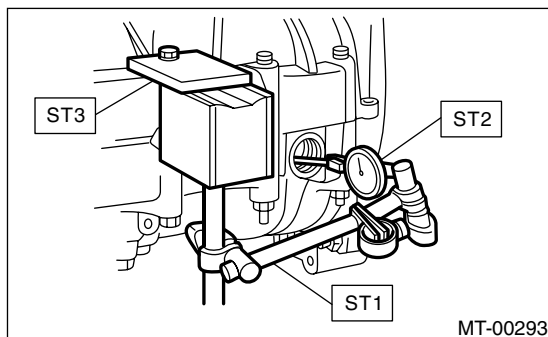
ST1 498247001 MAGNET BASE

ST2 498247100 DIAL GAUGE

ST3 498255400 PLATE

Backlash:

0.13 — 0.18 mm (0.0051 — 0.0071 in)



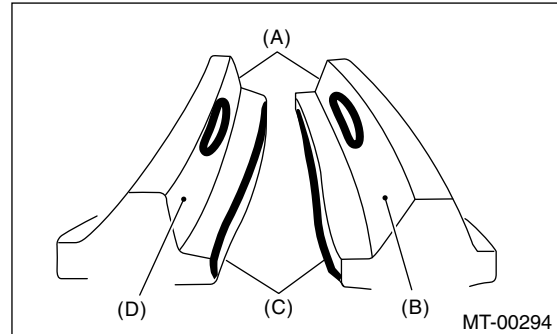
NOTE:

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

3. TOOTH CONTACT OF HYPOID GEAR

Check the tooth contact of hypoid gear as follows: Apply a uniform thin coat of red lead on both tooth surfaces of 3 or 4 teeth of the hypoid gear. Move the hypoid gear back and forth by turning the transmission main shaft until a definite contact pattern is developed on hypoid gear, and judge whether face contact is correct. If it is inaccurate, make adjustment. <Ref. to 5MT-74, ADJUSTMENT, Front Differential Assembly.>

- Tooth contact is correct.



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

FRONT DIFFERENTIAL ASSEMBLY

MANUAL TRANSMISSION AND DIFFERENTIAL

F: ADJUSTMENT

1. BEVEL PINION GEAR BACKLASH

- 1) Disassemble the front differential. <Ref. to 5MT-68, REMOVAL, Front Differential Assembly.>
- 2) Select a differential washer from the table and install.

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

- 3) Adjust until the specified value is obtained.

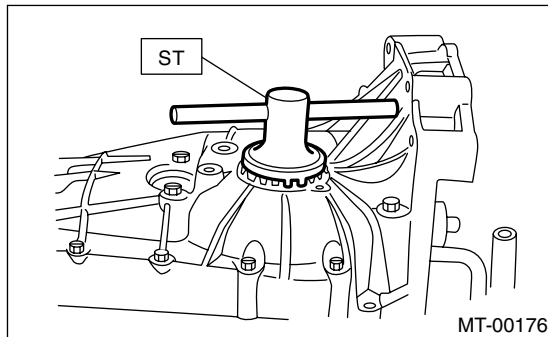
Standard backlash:

0.13 — 0.18 mm (0.0051 — 0.0071 in)

2. HYPOID GEAR BACKLASH

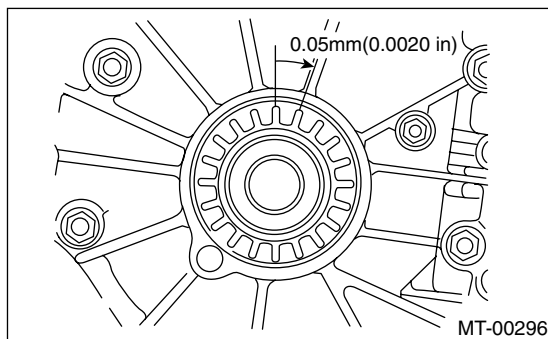
Adjust backlash by turning the holder in right side case.

ST 499787000 WRENCH ASSY



NOTE:

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

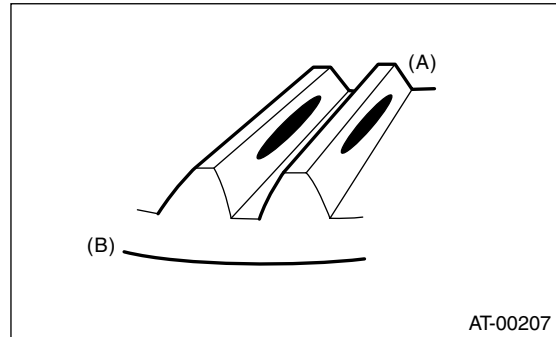


3. TOOTH CONTACT OF HYPOID GEAR

- 1) Adjust until the tooth contact is correct.
- 2) Check and adjust the tooth contact with following.

- Tooth contact

Checking item: Tooth contact pattern is slightly shifted toward to toe side under no-load rotation. [When loaded, contact pattern moves toward heel.]



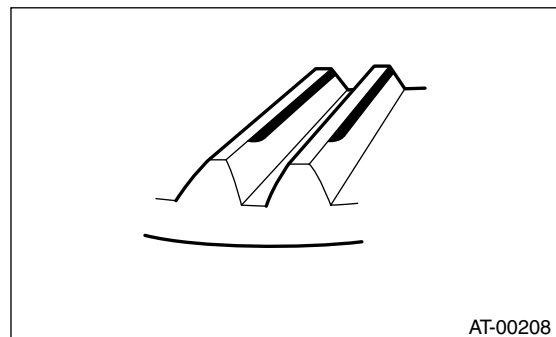
(A) Toe side

(B) Heel side

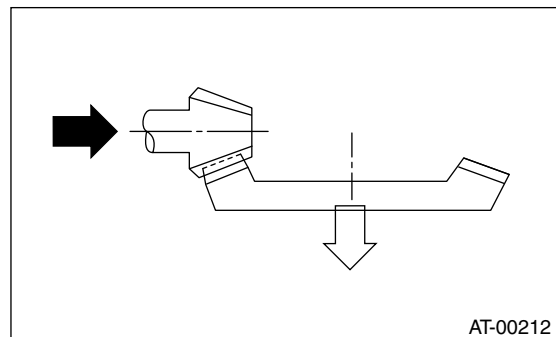
- Face contact

Checking item: Backlash is too large.

Contact pattern



Corrective action: Reduce thickness of drive pinion shim in order to bring drive pinion close to driven gear.



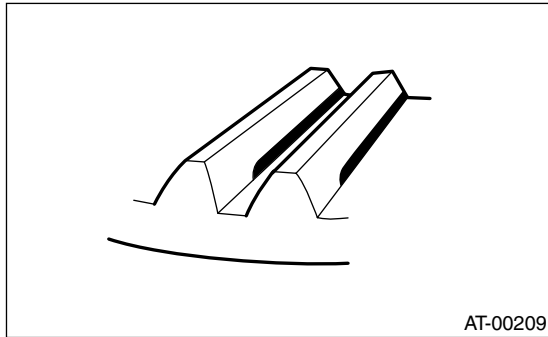
FRONT DIFFERENTIAL ASSEMBLY

MANUAL TRANSMISSION AND DIFFERENTIAL

- Flank contact

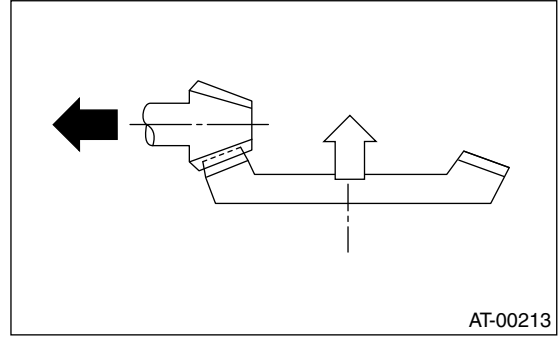
Checking item: Backlash is too small.

Contact pattern



Corrective action: Increase thickness of drive pinion shim in order to move drive pinion away from driven gear.

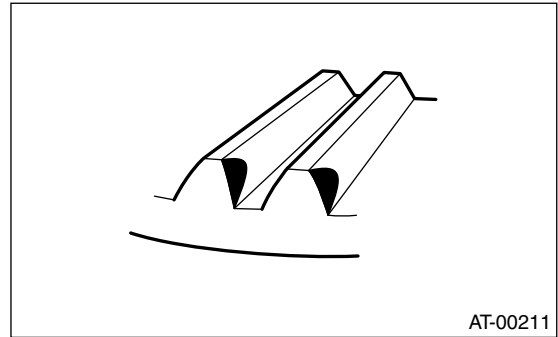
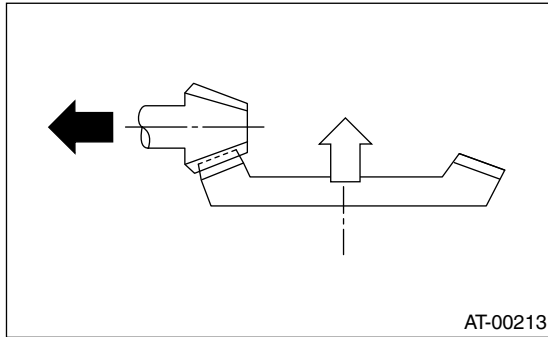
Corrective action: Increase thickness of drive pinion shim in order to bring drive pinion close to driven gear.



- Heel contact (Outside end contact)

Checking item: Contact area is small.

Contact pattern

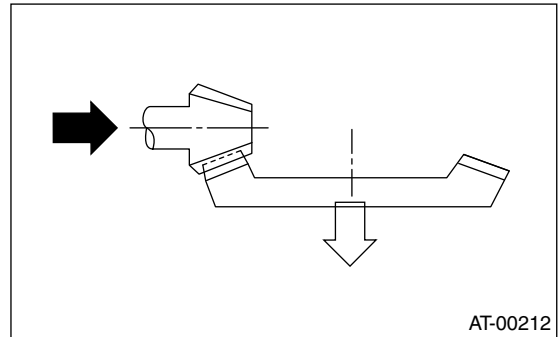
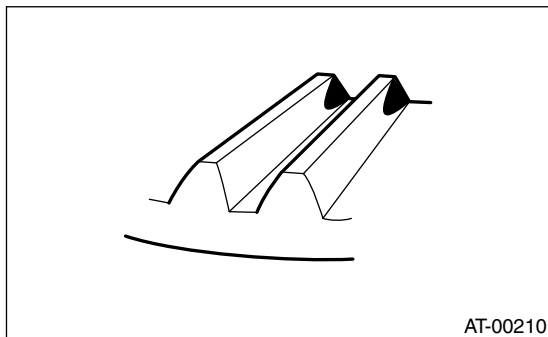


Corrective action: Reduce thickness of drive pinion shim in order to move drive pinion away from driven gear.

- Toe contact (Inside end contact)

Checking item: Contact area is small.

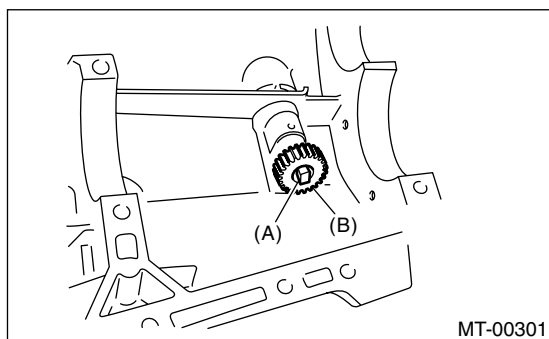
Contact pattern



18.Speedometer Gear

A: REMOVAL

- 1) Remove the manual transmission assembly from vehicle. <Ref. to 5MT-26, REMOVAL, Manual Transmission Assembly.>
- 2) Remove the back-up light switch and neutral position switch. <Ref. to 5MT-35, REMOVAL, Switches and Harness.>
- 3) Remove the transfer case with extension case assembly. <Ref. to 5MT-39, REMOVAL, Transfer Case and Extension Case Assembly.>
- 4) Remove the transmission case. <Ref. to 5MT-51, REMOVAL, Transmission Case.>
- 5) Remove the vehicle speed sensor. <Ref. to 5MT-37, REMOVAL, Vehicle Speed Sensor.>
- 6) Remove the outer snap ring and pull out speedometer driven gear. Next, remove the oil seal, speedometer shaft and washer.



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

B: INSTALLATION

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

NOTE:

Use a new oil seal, if it has been removed.

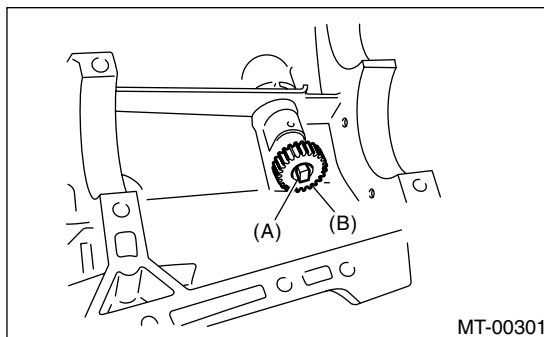
ST 899824100 or 499827000 PRESS

- 2) Install the vehicle speed sensor. <Ref. to 5MT-37, INSTALLATION, Vehicle Speed Sensor.>

- 3) Install the speedometer driven gear and snap ring.

NOTE:

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



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

- 4) Install the transmission case. <Ref. to 5MT-52, INSTALLATION, Transmission Case.>

- 5) Install the transfer case with extension case assembly. <Ref. to 5MT-39, INSTALLATION, Transfer Case and Extension Case Assembly.>

- 6) Install the back-up light switch and neutral position switch. <Ref. to 5MT-35, INSTALLATION, Switches and Harness.>

- 7) Install the manual transmission assembly to vehicle. <Ref. to 5MT-29, INSTALLATION, Manual Transmission Assembly.>

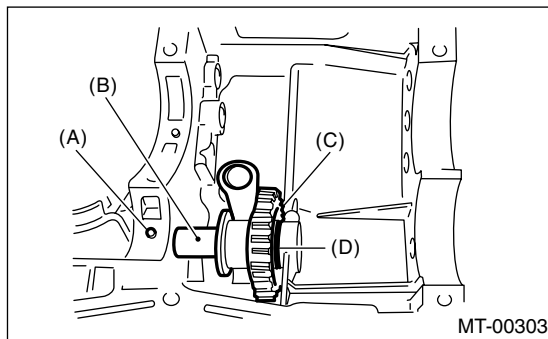
C: INSPECTION

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

19.Reverse Idler Gear

A: REMOVAL

- 1) Remove the manual transmission assembly from vehicle. <Ref. to 5MT-26, REMOVAL, Manual Transmission Assembly.>
- 2) Remove the back-up light switch and neutral position switch. <Ref. to 5MT-35, REMOVAL, Switches and Harness.>
- 3) Remove the transfer case with extension case assembly. <Ref. to 5MT-39, REMOVAL, Transfer Case and Extension Case Assembly.>
- 4) Remove the transmission case. <Ref. to 5MT-60, REMOVAL, Drive Pinion Shaft Assembly.>
- 5) Remove the drive pinion shaft assembly. <Ref. to 5MT-60, REMOVAL, Drive Pinion Shaft Assembly.>
- 6) Remove the main shaft assembly. <Ref. to 5MT-54, REMOVAL, Main Shaft Assembly.>
- 7) Remove the differential assembly. <Ref. to 5MT-68, REMOVAL, Front Differential Assembly.>
- 8) Remove the shifter forks and rods. <Ref. to 5MT-79, REMOVAL, Shifter Fork and Rod.>
- 9) Pull out the straight pin, and remove the idler gear shaft, reverse idler gear and washer.



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

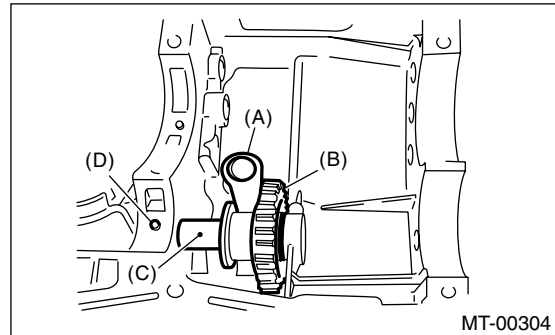
- 10) Remove the reverse shifter lever.

B: INSTALLATION

- 1) Install the reverse shifter lever, reverse idler gear and reverse idler gear shaft, and secure with straight pin.

NOTE:

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



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

- 2) Inspect and adjust the clearance between reverse idler gear and transmission case wall. <Ref. to 5MT-77, INSTALLATION, Reverse Idler Gear.> and <Ref. to 5MT-78, ADJUSTMENT, Reverse Idler Gear.>
- 3) Install the shifter forks and rods. <Ref. to 5MT-80, INSTALLATION, Shifter Fork and Rod.>
- 4) Install the differential assembly. <Ref. to 5MT-68, INSTALLATION, Front Differential Assembly.>
- 5) Install the main shaft assembly. <Ref. to 5MT-54, INSTALLATION, Main Shaft Assembly.>
- 6) Install the drive pinion shaft assembly. <Ref. to 5MT-60, INSTALLATION, Drive Pinion Shaft Assembly.>
- 7) Install the transmission case. <Ref. to 5MT-52, INSTALLATION, Transmission Case.>
- 8) Install the transfer case with extension case assembly. <Ref. to 5MT-39, INSTALLATION, Transfer Case and Extension Case Assembly.>
- 9) Install the back-up light switch and neutral position switch. <Ref. to 5MT-35, INSTALLATION, Switches and Harness.>
- 10) Install the manual transmission assembly to vehicle. <Ref. to 5MT-29, INSTALLATION, Manual Transmission Assembly.>

REVERSE IDLER GEAR

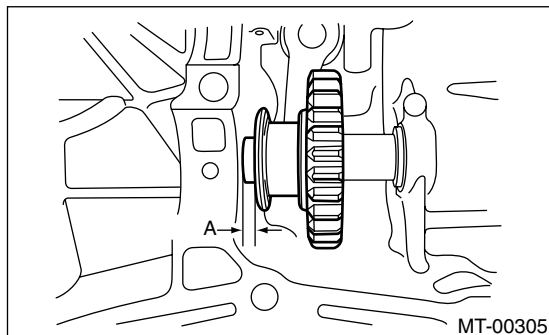
MANUAL TRANSMISSION AND DIFFERENTIAL

C: INSPECTION

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

Clearance A:

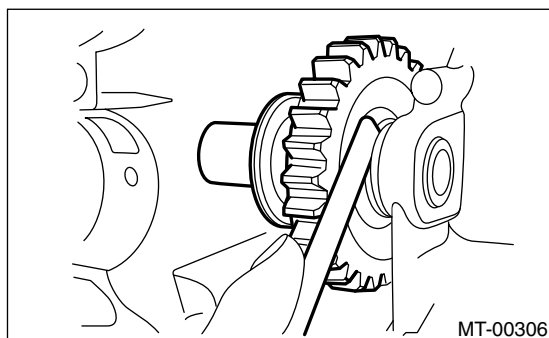
6.0 — 7.5 mm (0.236 — 0.295 in)



2) After installing a suitable reverse shifter lever, shift into neutral. Inspect the clearance between reverse idler gear and transmission case wall. If out of specification, select the appropriate washer and adjust.

Clearance:

0 — 0.5 mm (0 — 0.020 in)



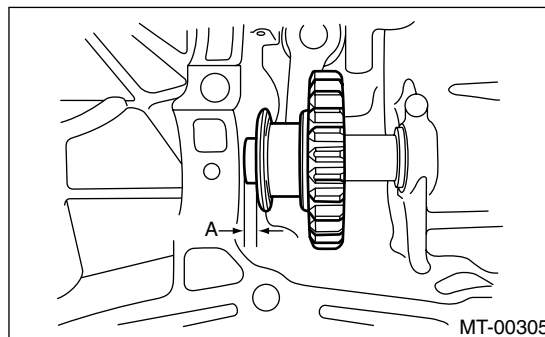
3) Check the reverse idler gear and shaft for damage. Replace if damaged.

D: ADJUSTMENT

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

Clearance A:

6.0 — 7.5 mm (0.236 — 0.295 in)

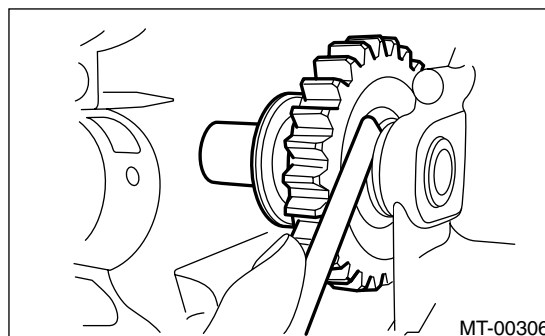


Reverse shifter lever		
Part No.	Mark	Remarks
32820AA070	7	Further from case wall
32820AA080	8	Standard
32820AA090	9	Closer to case wall

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

Clearance:

0 — 0.5 mm (0 — 0.020 in)



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

SHIFTER FORK AND ROD

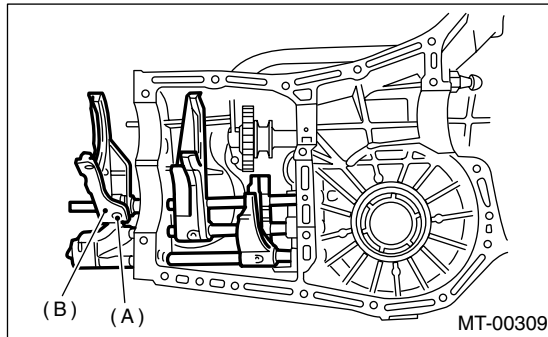
MANUAL TRANSMISSION AND DIFFERENTIAL

20.Shifter Fork and Rod

A: REMOVAL

- 1) Remove the manual transmission assembly from vehicle. <Ref. to 5MT-26, REMOVAL, Manual Transmission Assembly.>
- 2) Remove the back-up light switch and neutral position switch. <Ref. to 5MT-35, REMOVAL, Switches and Harness.>
- 3) Remove the transfer case with extension case assembly. <Ref. to 5MT-39, REMOVAL, Transfer Case and Extension Case Assembly.>
- 4) Remove the transmission case. <Ref. to 5MT-51, REMOVAL, Transmission Case.>
- 5) Remove the drive pinion shaft assembly. <Ref. to 5MT-60, REMOVAL, Drive Pinion Shaft Assembly.>
- 6) Remove the main shaft assembly. <Ref. to 5MT-54, REMOVAL, Main Shaft Assembly.>
- 7) Remove the differential assembly. <Ref. to 5MT-68, REMOVAL, Front Differential Assembly.>
- 8) Drive out the straight pin with ST, and 5th shifter fork.

ST 398791700 STRAIGHT PIN REMOVER



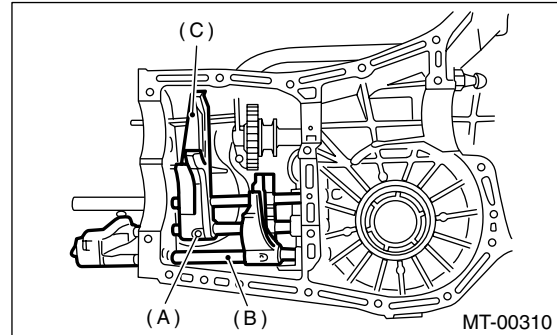
- (A) Straight pin
(B) 5th shifter fork

- 9) Remove the plugs, springs and checking balls.

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

NOTE:

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



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

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

- 12) Remove the outer snap ring, and pull out the reverse shifter rod arm from reverse fork rod. Then take out the ball, spring and interlock plunger from rod.

And then remove the rod.

NOTE:

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

- 13) Remove the reverse shifter lever.

SHIFTER FORK AND ROD

MANUAL TRANSMISSION AND DIFFERENTIAL

B: INSTALLATION

1) Install the reverse arm fork spring, ball and interlock plunger to reverse fork rod arm. Insert the reverse fork rod into hole in reverse fork rod arm, and hold it with outer snap ring using ST.

NOTE:

Apply grease to plunger to prevent it from falling.

ST 399411700 ACCENT BALL INSTALLER

2) Position the ball, spring and new gasket in reverse shifter rod hole, on left side transmission case, and tighten the checking ball plug.

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

4) Align the holes in rod and fork, and new drive straight pin into these holes using ST.

NOTE:

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

ST 398791700 STRAIGHT PIN REMOVER

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

NOTE:

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

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

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

NOTE:

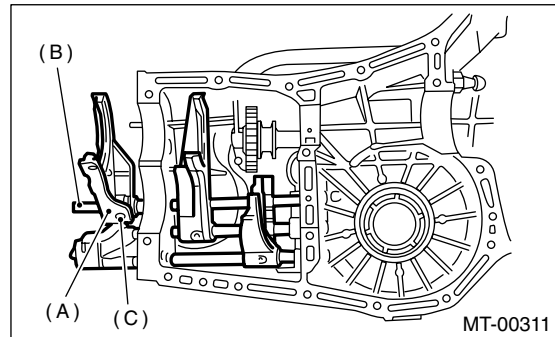
- Set the reverse fork rod to neutral.
- Make sure the interlock plunger (installing before) is on the reverse fork rod side.

ST 398791700 STRAIGHT PIN REMOVER

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

ST 398791700 STRAIGHT PIN REMOVER

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



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

10) Install the differential assembly. <Ref. to 5MT-68, INSTALLATION, Front Differential Assembly.>

11) Install the main shaft assembly.

<Ref. to 5MT-54, INSTALLATION, Main Shaft Assembly.>

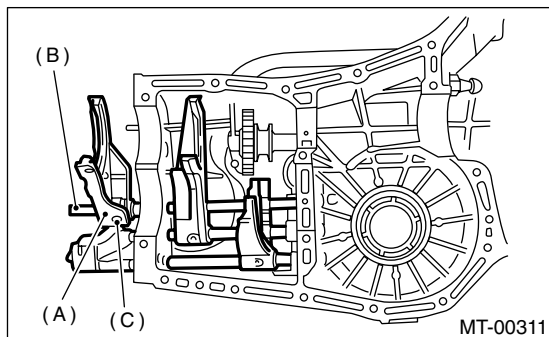
12) Install the drive pinion shaft assembly. <Ref. to 5MT-60, INSTALLATION, Drive Pinion Shaft Assembly.>

13) Install the transmission case. <Ref. to 5MT-52, INSTALLATION, Transmission Case.>

14) Install the transfer case with extension case assembly. <Ref. to 5MT-39, INSTALLATION, Transfer Case and Extension Case Assembly.>

15) Install the back-up light switch and neutral position switch. <Ref. to 5MT-35, INSTALLATION, Switches and Harness.>

16) Install the manual transmission assembly to vehicle. <Ref. to 5MT-29, INSTALLATION, Manual Transmission Assembly.>



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

SHIFTER FORK AND ROD

MANUAL TRANSMISSION AND DIFFERENTIAL

C: INSPECTION

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

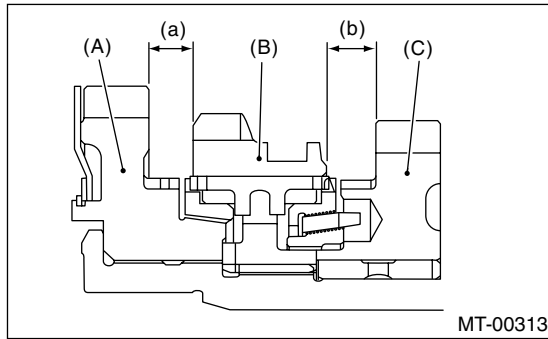
2) Gearshift mechanism:

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

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

Clearance (a) and (b):

9.5 mm (0.374 in)



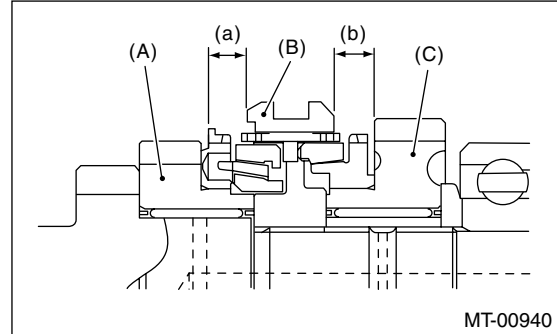
- (A) 1st driven gear
- (B) Reverse driven gear
- (C) 2nd driven gear

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

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

Clearance (a) and (b):

7.3 mm (0.287 in)



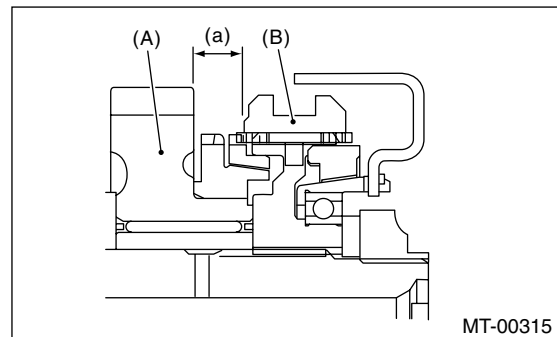
- (A) 3rd drive gear
- (B) Coupling sleeve
- (C) 4th drive gear

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

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

Clearance (a):

9.3 mm (0.366 in)



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

SHIFTER FORK AND ROD

MANUAL TRANSMISSION AND DIFFERENTIAL

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

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

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

Clearance (A):

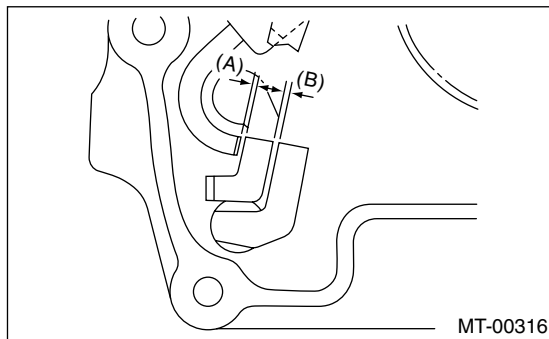
1st-2nd to 3rd-4th:

0.4 — 1.4 mm (0.016 — 0.055 in)

Clearance (B):

3rd-4th to 5th:

0.5 — 1.3 mm (0.020 — 0.051 in)



21. General Diagnostic

A: INSPECTION

1. MANUAL TRANSMISSION

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

GENERAL DIAGNOSTIC

MANUAL TRANSMISSION AND DIFFERENTIAL

2. DIFFERENTIAL

Symptom	Possible cause	Remedy
1. Broken differential (case, gear, bearing, etc.) NOTE: Abnormal noise will develop and finally it will become impossible to continue to run due to broken pieces obstructing the gear revolution.	(a) Insufficient or improper oil	Disassemble the 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 the bearing preload and backlash and face contact of gears.
	(c) Improper adjustment of taper roller bearing	Adjust.
	(d) Improper adjustment of drive pinion and hypoid driven gear	Adjust.
	(e) Excessive backlash due to worn differential side gear, washer or differential pinion vehicle under severe operating conditions.	Add recommended oil to specified level. Do not use the vehicle under severe operating conditions.
	(f) Loose hypoid driven gear clamping bolts	Tighten.
2. Differential and hypoid gear noises Troubles of the differential and hypoid gear always appear as noise problems. Therefore noise is the first indication of the trouble. However noises from the engine, muffler, tire, exhaust gas, bearing, body, etc. are easily mistaken for the differential noise. Pay special attention to the hypoid gear noise because it is easily confused with other gear noises. There are the following four kinds of noises. • Gear noise when driving: If noise increases as vehicle speed increases it may be due to insufficient gear oil, incorrect gear engagement, damaged gears, etc. • Gear noise when coasting: Damaged gears due to maladjusted bearings and incorrect shim adjustment • Bearing noise when driving or when coasting: Cracked, broken or damaged bearings • Noise which mainly occurs when turning: Unusual noise from differential side gear, differential pinion, differential pinion shaft, etc.	(a) Insufficient oil	Lubricate.
	(b) Improper adjustment of hypoid driven gear and drive pinion	Check tooth contact.
	(c) Worn teeth of hypoid driven gear and drive pinion	Replace as a set. Readjust the bearing preload.
	(d) Loose roller bearing	Readjust the 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.

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MANUAL TRANSMISSION AND DIFFERENTIAL 6-SPEED (6MT)

GENERAL DESCRIPTION

MANUAL TRANSMISSION AND DIFFERENTIAL

1. General Description

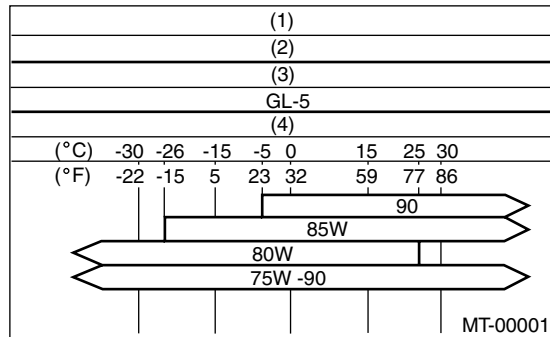
A: SPECIFICATION

1. MANUAL TRANSMISSION AND FRONT DIFFERENTIAL

Type			6-forward speeds and 1-reverse
Transmission gear ratio		1st	3.636
		2nd	2.375
		3rd	1.761
		4th	1.346
		5th	0.971
		6th	0.756
		Reverse	3.545
Front reduction gear	Final	Type of gear	Hypoid
		Gear ratio	3.900
Rear reduction gear	Transfer	Type of gear	Helical
		Gear ratio	1.000
	Final	Type of gear	Hypoid
		Gear ratio	3.900
Front differential	Type and number of gear		AP TRAC
Center differential	Type and number of gear		Planetary gear (Internal gear: 1, Pinion gear: 6, Sun gear: 1 and Electromagnetic floating variable control multiple clutch)
Transmission gear oil			GL-5
Transmission gear oil capacity			4.1 ℓ (4.3 US qt, 3.6 Imp qt)

2. TRANSMISSION GEAR OIL

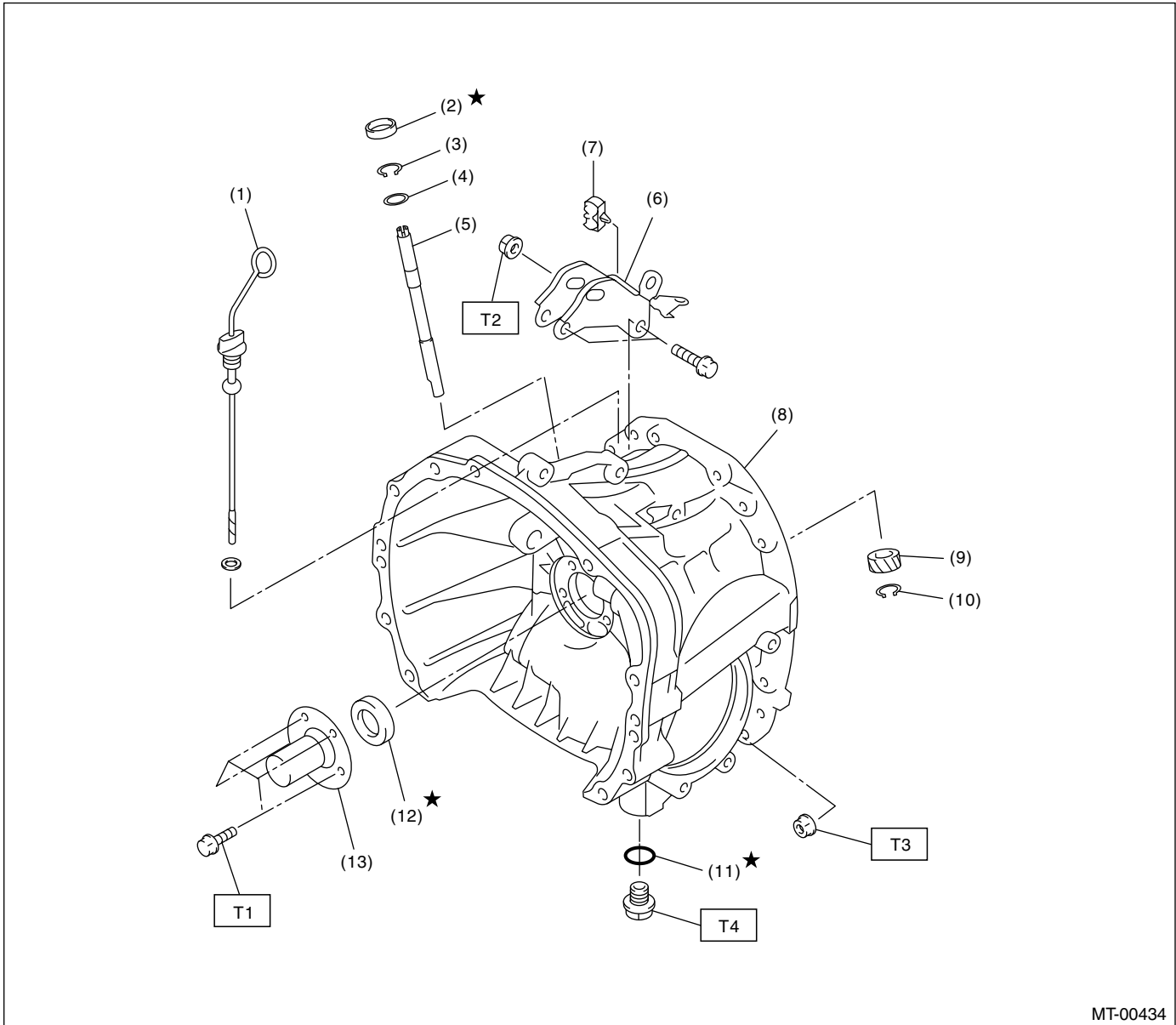
Recommended oil



- (1) Item
- (2) Transmission gear oil
- (3) API classification
- (4) SAE viscosity No. and applicable temperature

B: COMPONENT

1. CLUTCH HOUSING



- (1) Oil level gauge
- (2) Oil seal
- (3) Snap ring
- (4) Washer
- (5) Speedometer gear shaft
- (6) Pitching stopper bracket
- (7) Clip

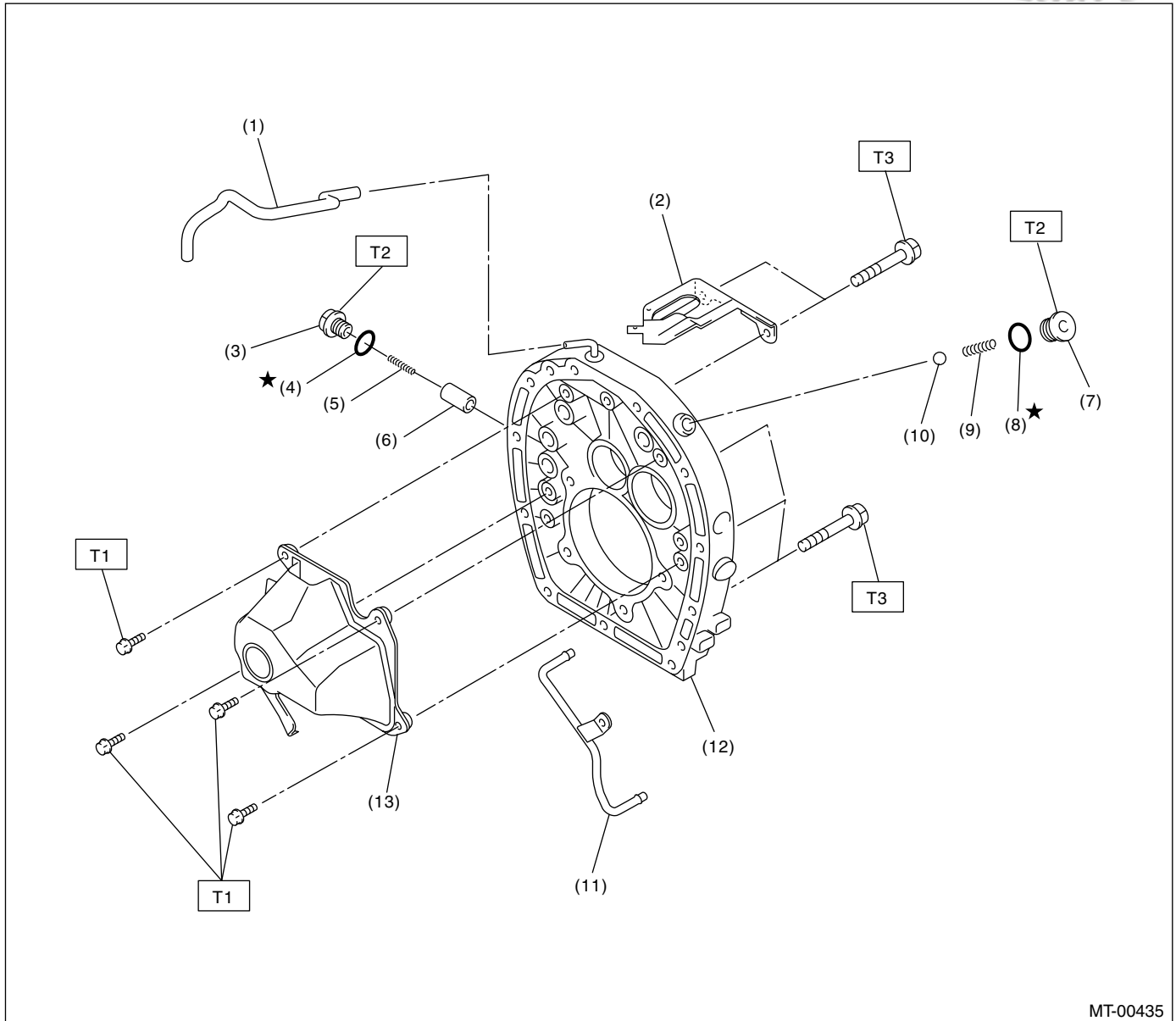
- (8) Clutch housing
- (9) Speedometer driven gear
- (10) Snap ring
- (11) Gasket
- (12) Oil seal
- (13) Clutch release bearing guide

Tightening torque: N·m (kgf-m, ft-lb)	
T1:	6.4 (0.65, 4.7)
T2:	41 (4.2, 30.2)
T3:	50 (5.1, 36.9)
T4:	70 (7.1, 51.6)

GENERAL DESCRIPTION

MANUAL TRANSMISSION AND DIFFERENTIAL

2. ADAPTER PLATE



MT-00435

- (1) Breather hose
- (2) Transmission harness stay
- (3) Plug
- (4) Gasket
- (5) Spring
- (6) Plunger

- (7) Plug
- (8) Gasket
- (9) Spring
- (10) Ball
- (11) Lubrication pipe
- (12) Adapter plate

- (13) Oil chamber

Tightening torque: N·m (kgf-m, ft-lb)

T1: 6.4 (0.65, 4.7)

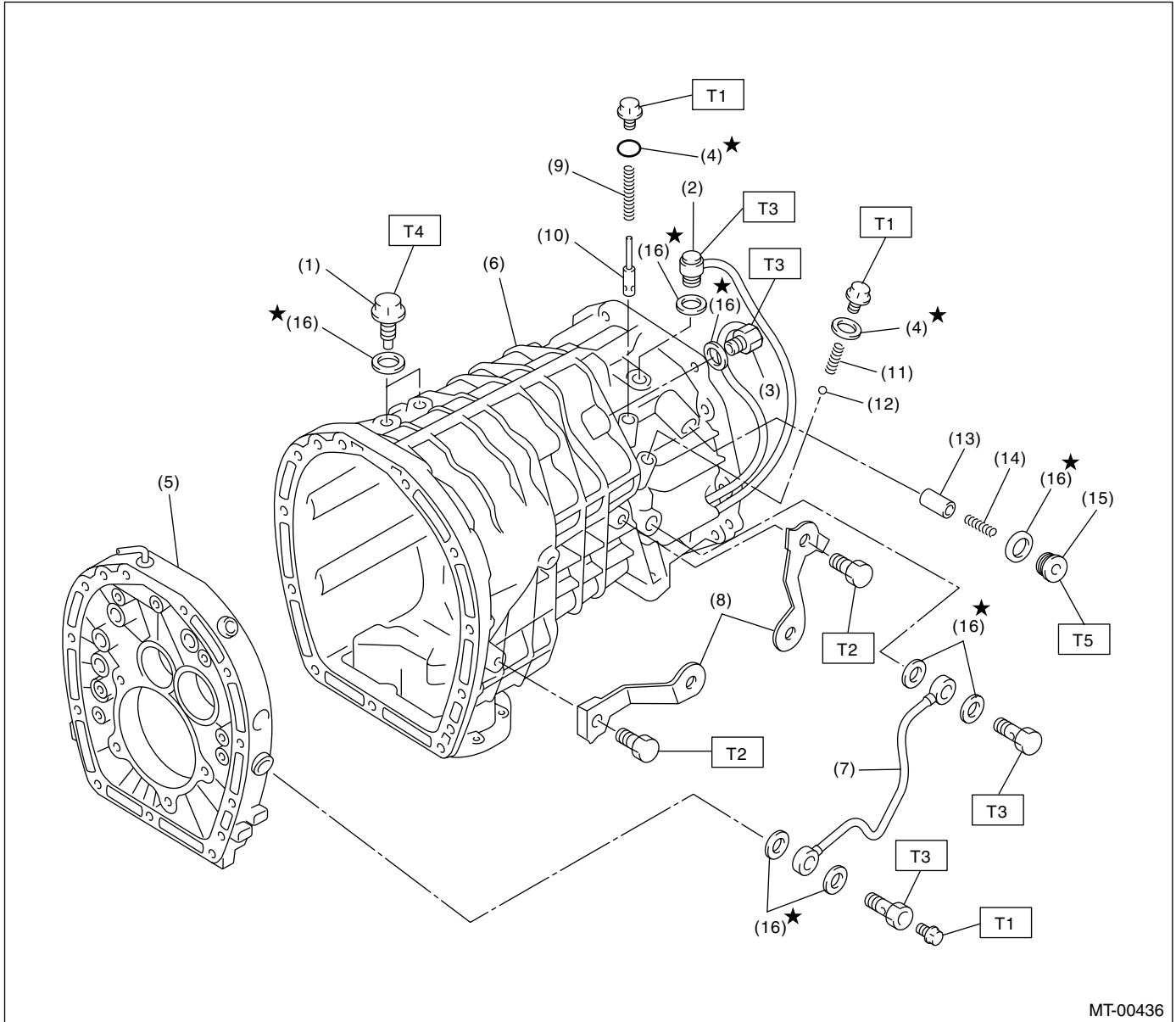
T2: 37 (3.8, 27.3)

T3: 50 (5.1, 36.9)

GENERAL DESCRIPTION

MANUAL TRANSMISSION AND DIFFERENTIAL

3. TRANSMISSION CASE



MT-00436

(1) Pilot bolt	(9) Return spring
(2) Neutral switch	(10) Pressure relief valve
(3) Back-up light switch	(11) Return spring
(4) O-ring	(12) Ball
(5) Adapter plate	(13) Plunger
(6) Transmission case	(14) Spring
(7) Oil pipe	(15) Plug
(8) Harness bracket	(16) Gasket

Tightening torque: N·m (kgf·m, ft·lb)

T1: 13 (1.3, 9.6)

T2: 16 (1.6, 11.8)

T3: 32 (3.3, 23.6)

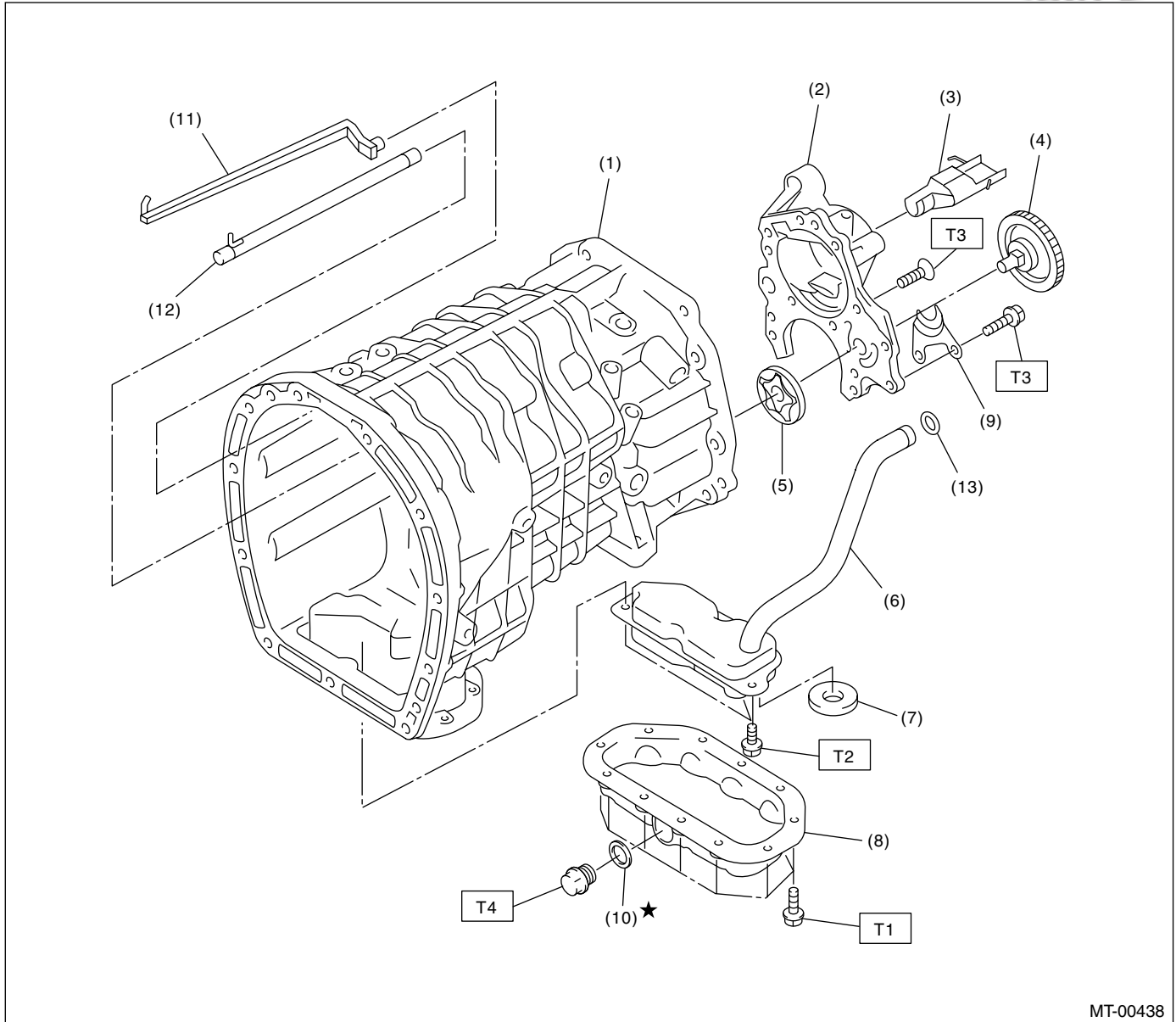
T4: 34 (3.5, 25.1)

T5: 41 (4.2, 30.2)

GENERAL DESCRIPTION

MANUAL TRANSMISSION AND DIFFERENTIAL

4. OIL PAN AND OIL PUMP



(1) Main case	(8) Oil pan
(2) Oil pump cover	(9) Plate
(3) Oil guide	(10) Gasket
(4) Oil pump driven gear ASSY	(11) Oil guide
(5) Oil pump rotor ASSY	(12) Oil pipe
(6) Strainer ASSY	(13) O-ring
(7) Magnet	

Tightening torque: N·m (kgf·m, ft·lb)

T1: 6.4 (0.65, 4.7)

T2: 10 (1.0, 7.4)

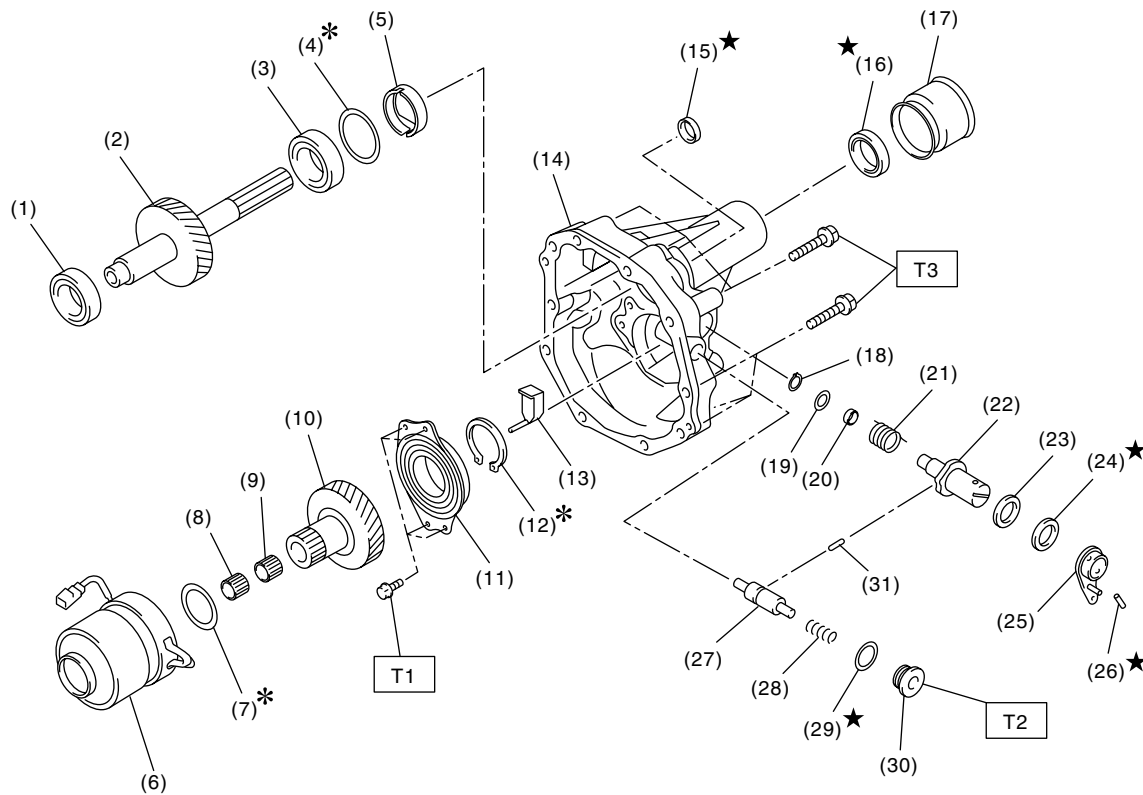
T3: 25 (2.5, 18.1)

T4: 44 (4.5, 32.5)

GENERAL DESCRIPTION

MANUAL TRANSMISSION AND DIFFERENTIAL

5. EXTENSION CASE AND CENTER DIFFERENTIAL



MT-00945

(1) Taper roller bearing	(13) Extension guide	(25) Reverse check lever COMPL
(2) Transfer driven gear	(14) Extension case	(26) Straight pin
(3) Taper roller bearing	(15) Oil seal	(27) Reverse check plug
(4) Shim	(16) Oil seal	(28) Spring
(5) Oil plate	(17) Dust cover	(29) Gasket
(6) Center differential	(18) Snap ring	(30) Plug
(7) Shim	(19) Washer	(31) Plunger
(8) Needle bearing	(20) Bush	
(9) Needle bearing	(21) Spring	
(10) Transfer drive gear	(22) Reverse check shaft	
(11) Ball bearing (with flange)	(23) Ball bearing	
(12) Snap ring	(24) Oil seal	

Tightening torque: N·m (kgf-m, ft-lb)

T1: 25 (2.5, 18.1)

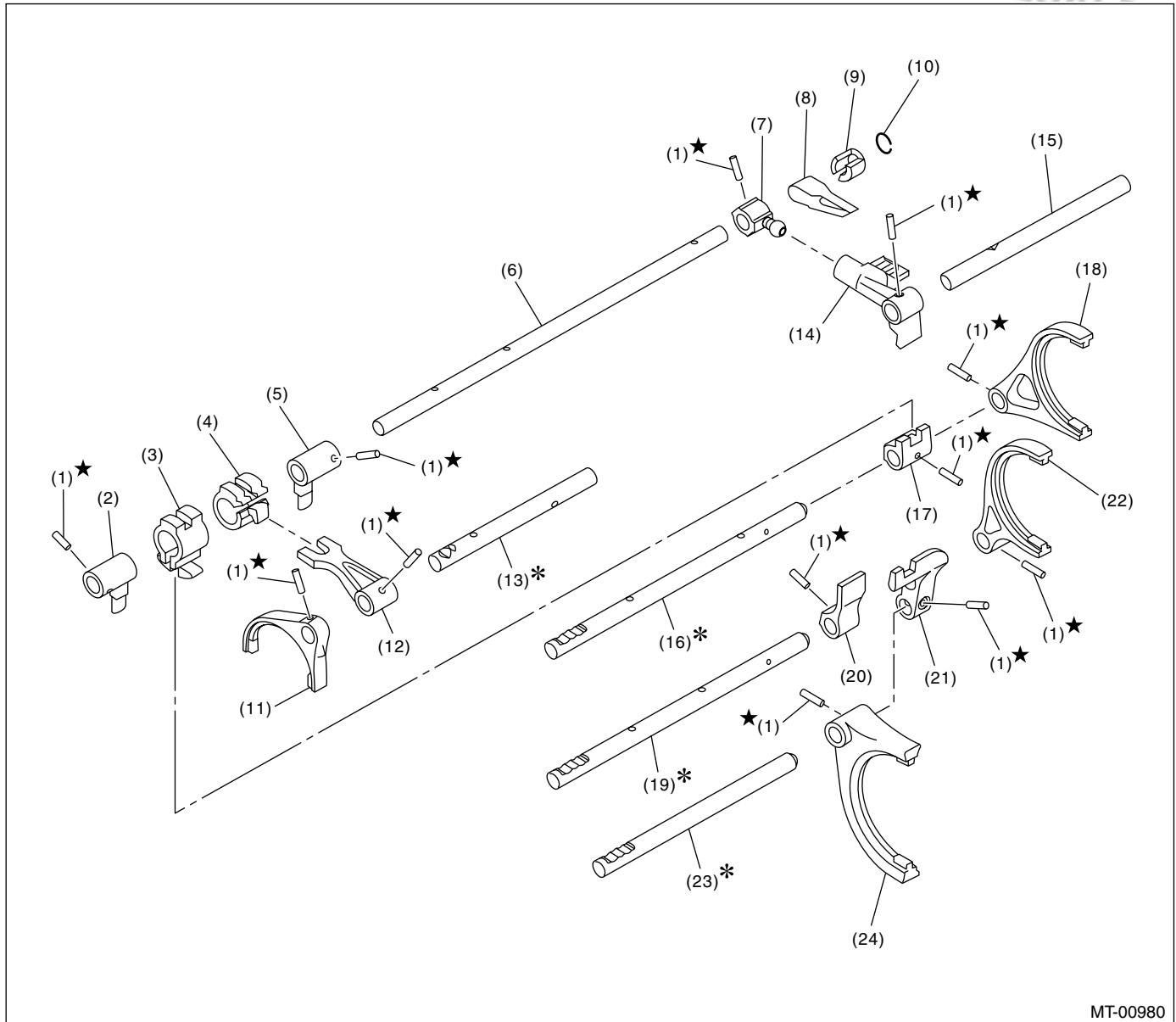
T2: 41 (4.2, 30.2)

T3: 48 (4.9, 35.4)

GENERAL DESCRIPTION

MANUAL TRANSMISSION AND DIFFERENTIAL

6. SHIFTER FORK AND FORK ROD



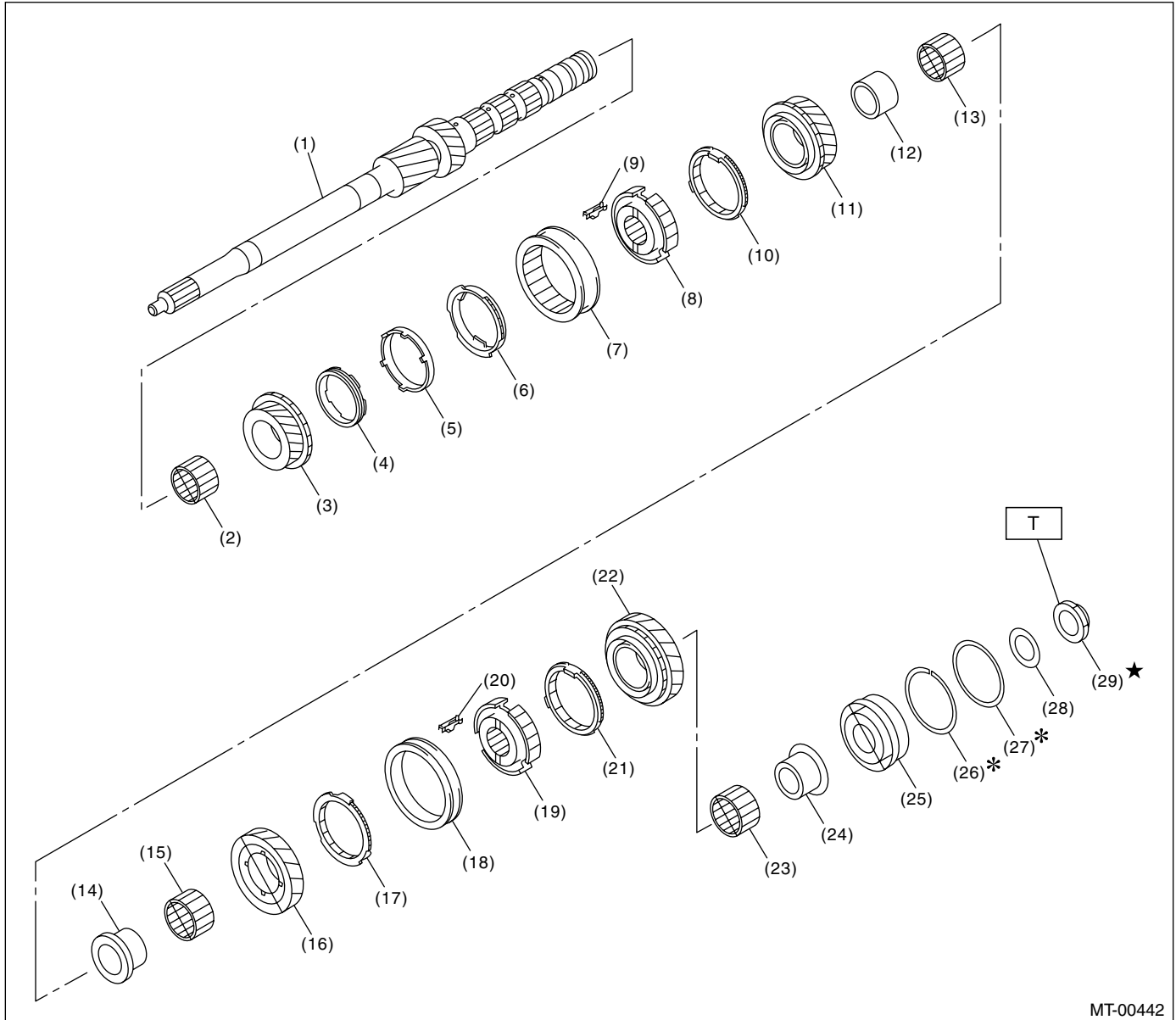
MT-00980

(1) Spring pin	(9) Support	(17) 5th-6th shifter arm
(2) Interlock arm	(10) Snap ring	(18) 5th-6th fork COMPL
(3) Interlock block	(11) Reverse fork COMPL	(19) 3rd-4th fork rod
(4) Reverse interlock block	(12) Reverse shifter arm	(20) 3rd-4th shifter arm
(5) Interlock arm	(13) Reverse fork rod	(21) 1st-2nd shifter arm
(6) Striking rod	(14) Selector arm COMPL	(22) 3rd-4th fork COMPL
(7) Selector arm No. 2	(15) Shifter arm shaft	(23) 1st-2nd fork rod
(8) Neutral set spring	(16) 5th-6th fork rod	(24) 1st-2nd fork COMPL

GENERAL DESCRIPTION

MANUAL TRANSMISSION AND DIFFERENTIAL

7. MAIN SHAFT ASSY



MT-00442

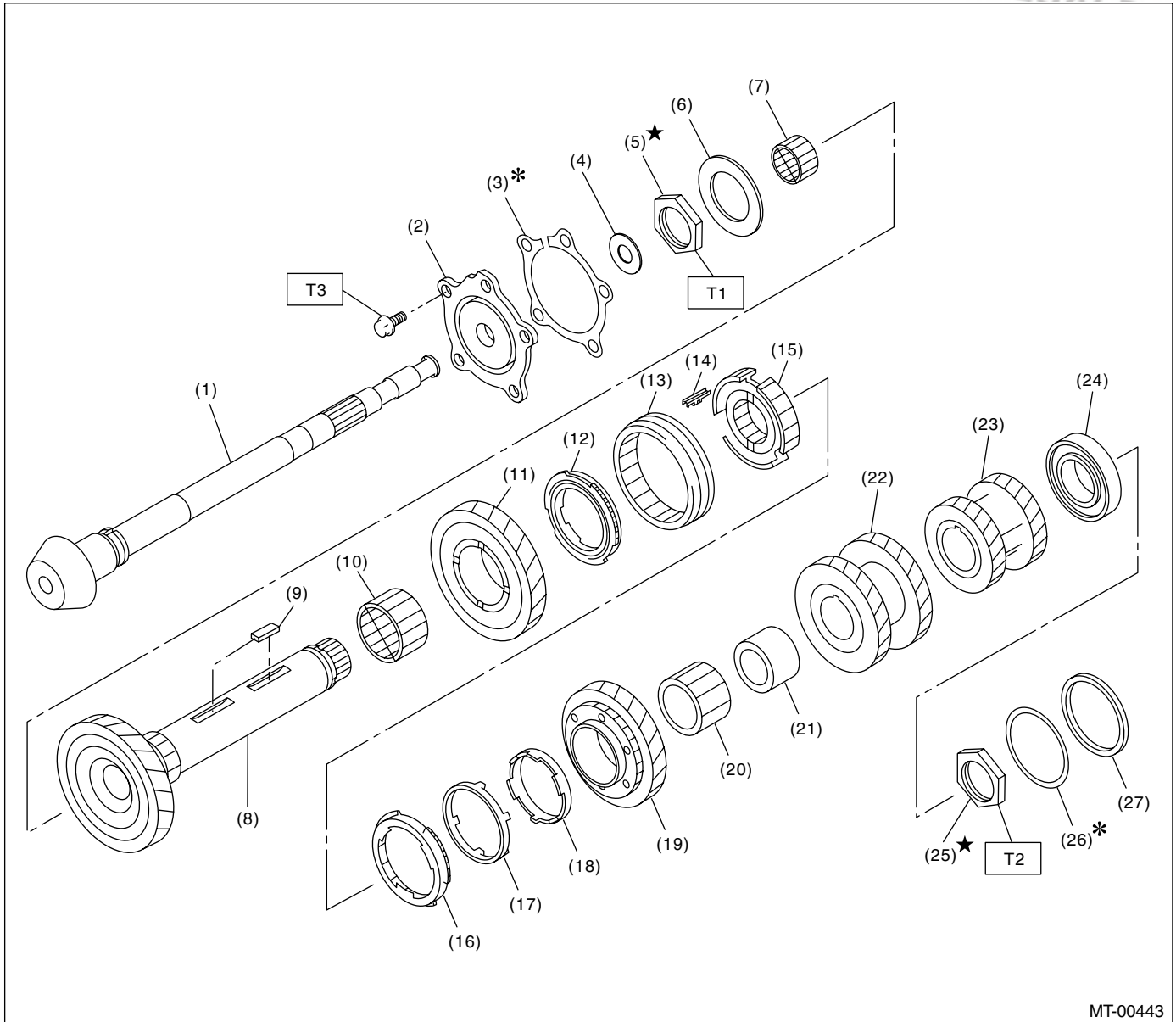
(1) Main shaft	(12) 4th bush	(23) Needle bearing
(2) Needle bearing	(13) Needle bearing	(24) 6th bush
(3) 3rd drive gear	(14) 5th bush	(25) Taper roller bearing
(4) Inner baulk ring	(15) Needle bearing	(26) Snap ring
(5) Synchro cone	(16) 5th drive gear	(27) Washer
(6) Outer baulk ring	(17) 5th baulk ring	(28) Washer
(7) 3rd-4th sleeve	(18) 5th-6th sleeve	(29) Lock nut
(8) 3rd-4th hub	(19) 5th-6th hub	
(9) Shifting insert	(20) Shifting sleeve	
(10) 4th baulk ring	(21) 6th baulk ring	
(11) 4th gear	(22) 6th drive gear	

Tightening torque: N·m (kgf-m, ft-lb)
T: 392 (40.0, 289)

GENERAL DESCRIPTION

MANUAL TRANSMISSION AND DIFFERENTIAL

8. DRIVE PINION AND DRIVEN SHAFT ASSY



- (1) Drive pinion shaft
- (2) Taper roller bearing
- (3) Shim
- (4) Washer
- (5) Lock nut
- (6) Thrust bearing
- (7) Needle bearing
- (8) Driven shaft
- (9) Key
- (10) Needle bearing
- (11) 1st driven gear
- (12) 1st synchro ring ASSY

- (13) 1st-2nd sleeve
- (14) Shifting insert
- (15) 1st-2nd hub
- (16) Outer baulk ring
- (17) Synchro cone
- (18) Inner baulk ring
- (19) 2nd driven gear
- (20) Needle bearing
- (21) 2nd bush
- (22) 3rd-4th driven gear
- (23) 5th-6th driven gear
- (24) Ball bearing

- (25) Lock nut
- (26) Shim
- (27) Collar

Tightening torque: N·m (kgf·m, ft·lb)

T1: 285 (29.1, 210)

*** 265 (27.0, 195)**

T2: 570 (58.1, 420)

*** 530 (54.0, 391)**

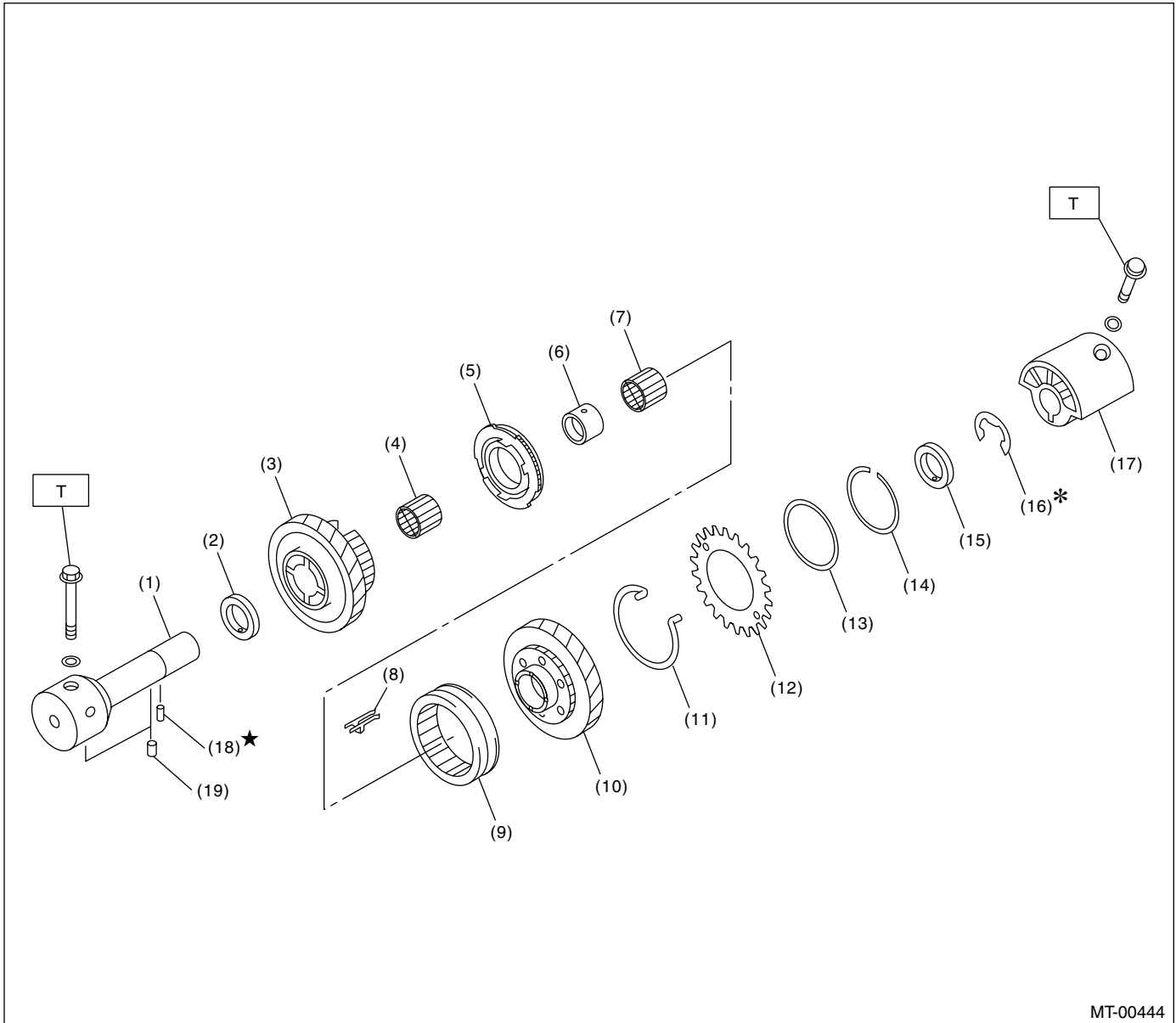
T3: 54 (5.5, 39.8)

* Tightening torque when using ST.

GENERAL DESCRIPTION

MANUAL TRANSMISSION AND DIFFERENTIAL

9. REVERSE IDLER GEAR ASSY



MT-00444

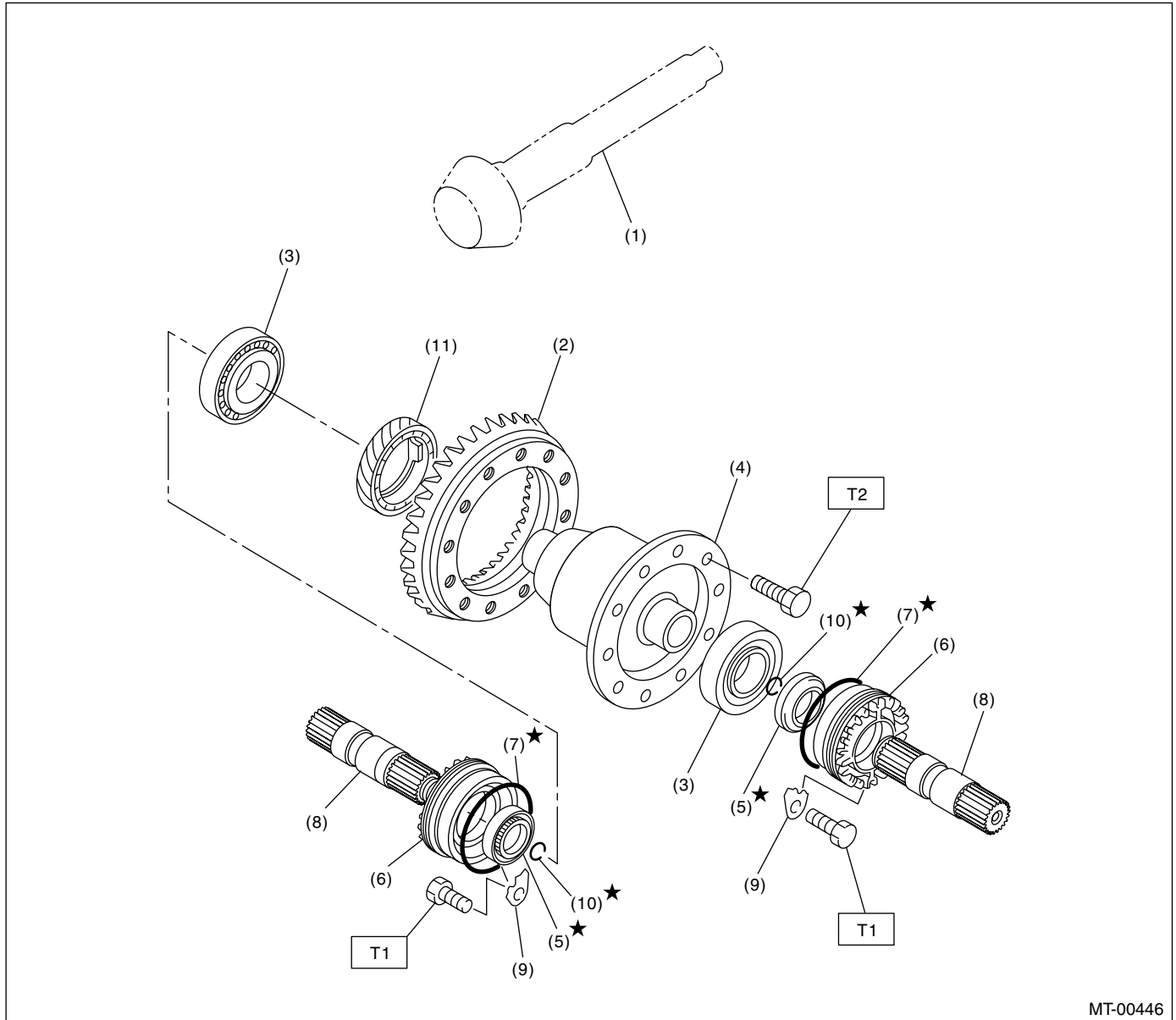
(1) Base	(9) Reverse coupling sleeve	(17) Reverse idler holder
(2) Washer	(10) Reverse idler gear	(18) Spring pin
(3) Reverse idler gear No. 2	(11) Spring	(19) Knock pin
(4) Needle bearing	(12) Sub gear	
(5) Reverse idler synchro set	(13) Friction plate	
(6) Reverse idler gear bush	(14) Snap ring	
(7) Needle bearing	(15) Washer	
(8) Shifting insert	(16) Snap ring	

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

GENERAL DESCRIPTION

MANUAL TRANSMISSION AND DIFFERENTIAL

10.FRONT DIFFERENTIAL



MT-00446

(1) Drive pinion shaft	(6) Differential side retainer	(11) Speedometer drive gear
(2) Hypoid driven gear	(7) O-ring	
(3) Roller bearing	(8) Axle drive shaft	
(4) Differential ASSY	(9) Retainer lock plate	
(5) Oil seal	(10) Circlip	

Tightening torque: N·m (kgf-m, ft-lb)

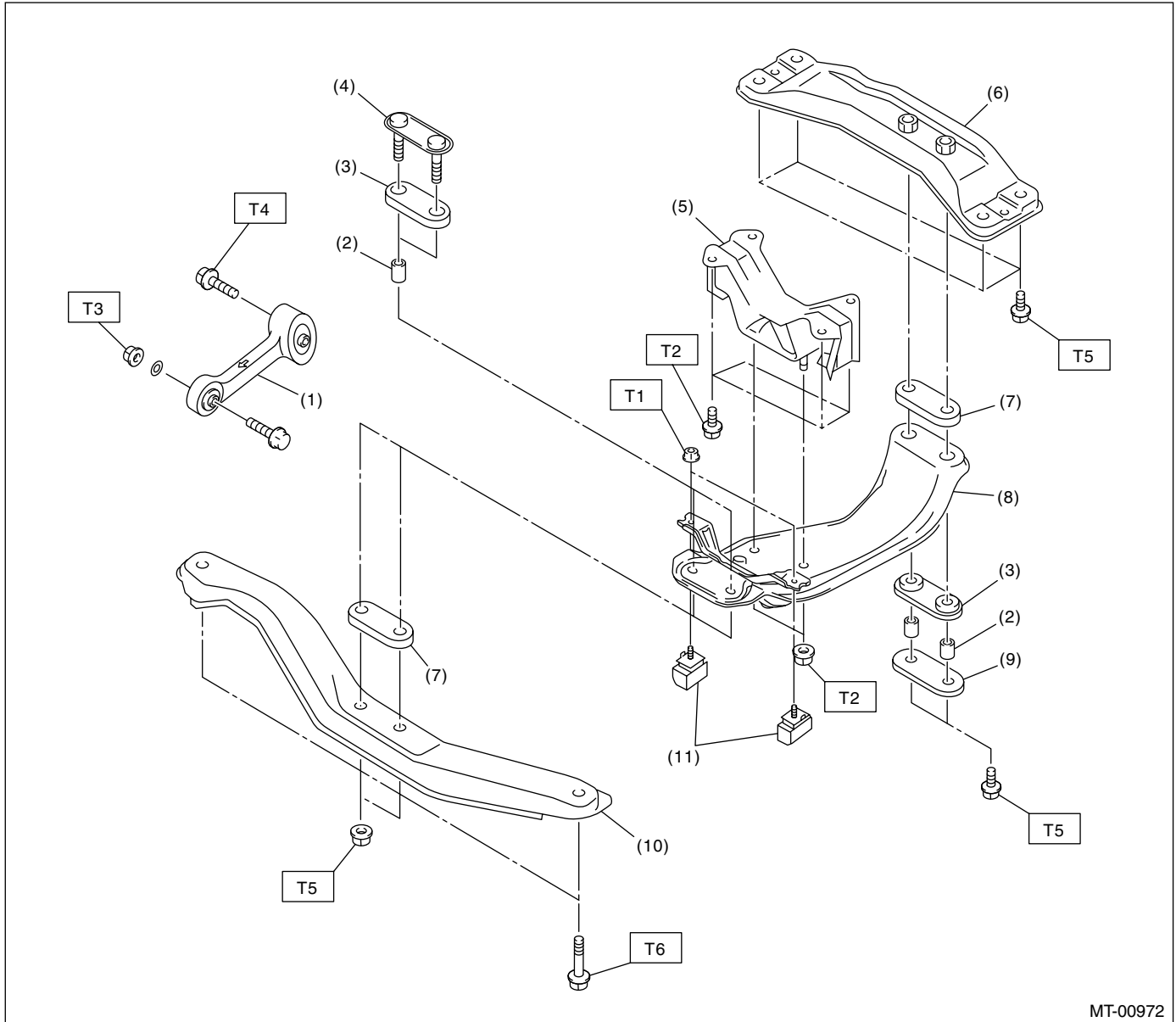
T1: 25 (2.5, 18.1)

T2: 69 (7.0, 50.9)

GENERAL DESCRIPTION

MANUAL TRANSMISSION AND DIFFERENTIAL

11.TRANSMISSION MOUNTING



MT-00972

(1) Pitching stopper	(7) Cushion D
(2) Spacer	(8) Center crossmember
(3) Cushion C	(9) Rear plate
(4) Front plate	(10) Front crossmember
(5) Rear cushion rubber	(11) Dynamic dumper
(6) Rear crossmember	

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

T1: 7.5 (0.76, 5.5)

T2: 35 (3.6, 25.8)

T3: 50 (5.1, 36.9)

T4: 58 (5.9, 42.8)

T5: 70 (7.1, 51.6)

T6: 140 (14.3, 103)

GENERAL DESCRIPTION

MANUAL TRANSMISSION AND DIFFERENTIAL

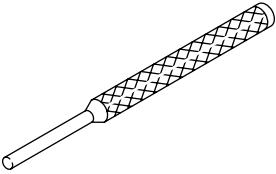
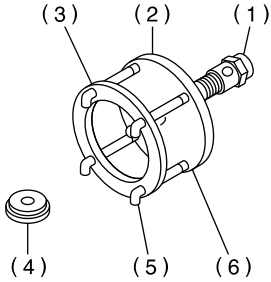
C: CAUTION

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

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

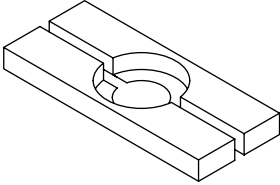
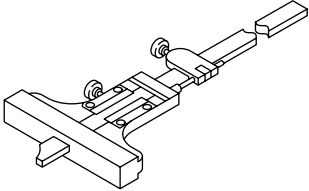
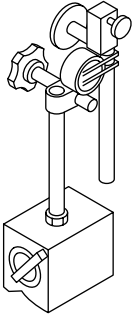
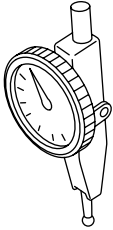
D: PREPARATION TOOL

1. SPECIAL TOOLS

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-398791700	398791700	REMOVER	Used for removing and installing spring pin (6 mm).
 ST-399527700	399527700	PULLER SET	Used for removing and installing roller bearing (Differential). (1) BOLT (2) PULLER (3) HOLDER (4) ADAPTER (5) BOLT (6) NUT

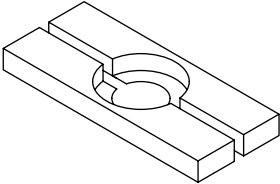
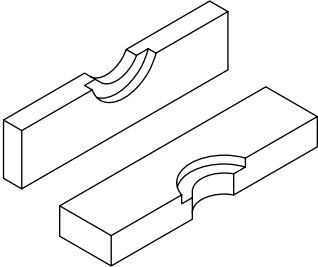
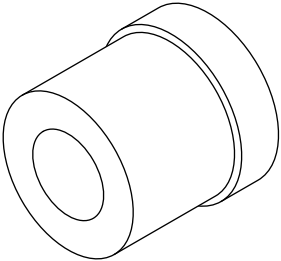
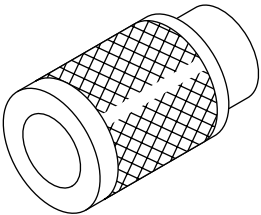
GENERAL DESCRIPTION

MANUAL TRANSMISSION AND DIFFERENTIAL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-498515700	498515700	REMOVER	Used for removing roller bearing of drive pinion shaft.
 ST-49814700	498147000	DEPTH GAUGE	Used for adjusting main shaft axial end play.
 ST-498247001	498247001	MAGNET BASE	- Used for measuring backlash between side gear and pinion, and hypoid gear. - Used with DIAL GAUGE (498247100).
 ST-498247100	498247100	DIAL GAUGE	- Used for measuring backlash between side gear and pinion, and hypoid gear. - Used with MAGNET BASE (498247001).

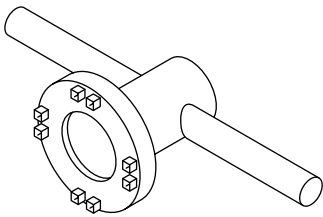
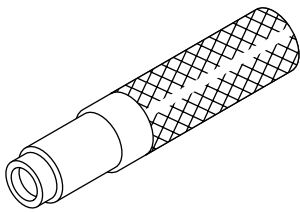
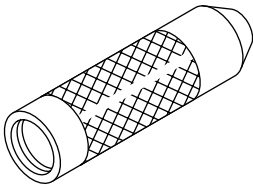
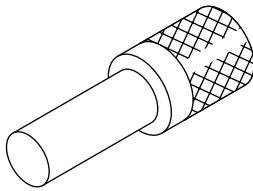
GENERAL DESCRIPTION

MANUAL TRANSMISSION AND DIFFERENTIAL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-498077000	498077000	REMOVER	Used for removing differential taper roller bearing.
 ST-899858600	899858600	REMOVER	Used for removing roller bearing.
 ST-399513600	399513600	INSTALLER	Used for installing oil seal.
 ST-499757002	499757002	INSTALLER	Used for installing bearing cone of transfer driven gear (extension core side).

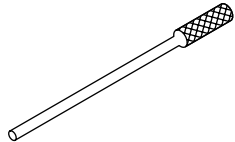
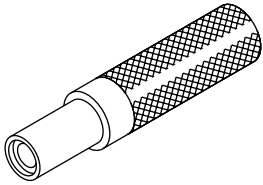
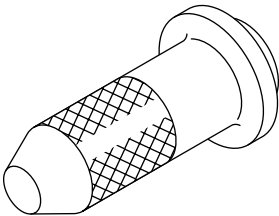
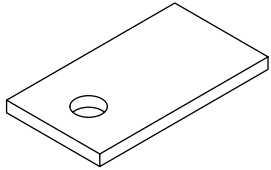
GENERAL DESCRIPTION

MANUAL TRANSMISSION AND DIFFERENTIAL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-499787000	499787000	WRENCH ASSY	Used for removing and installing differential side retainer.
 ST-499827000	499827000	PRESS	Used for installing speedometer oil seal when installing speedometer cable to transmission.
 ST-499877000	499877000	RACE 4-5 INSTALLER	Used for disassembling driven shaft and transfer driven gear.
 ST-899864100	899864100	REMOVER	Used for removing parts on transmission main shaft and drive pinion.

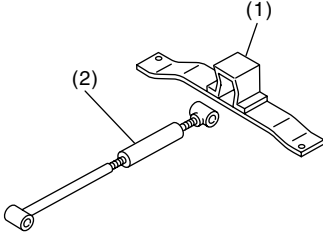
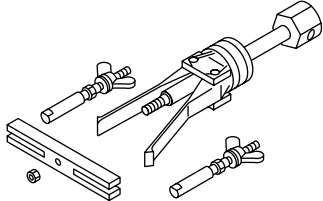
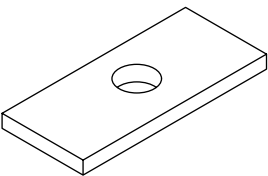
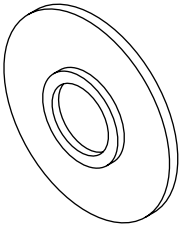
GENERAL DESCRIPTION

MANUAL TRANSMISSION AND DIFFERENTIAL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-899904100	899904100	REMOVER	Used for removing and installing straight pin.
 ST-899824100	899824100	PRESS	Used for installing speedometer shaft oil seal.
 ST-498057300	498057300	INSTALLER	Used for installing extension oil seal.
 ST-498255400	498255400	PLATE	Used for measuring backlash.

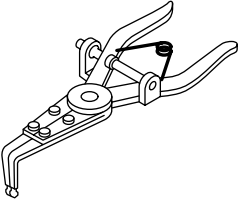
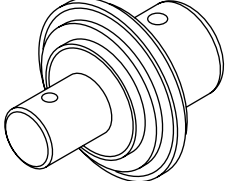
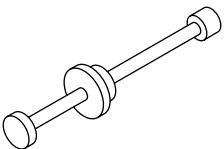
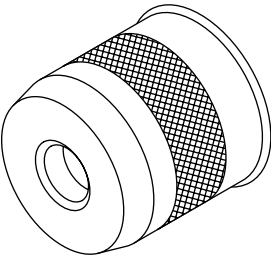
GENERAL DESCRIPTION

MANUAL TRANSMISSION AND DIFFERENTIAL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST41099AA000	41099AA000	ENGINE SUPPORT BRACKET	Used for supporting engine. (1) ENGINE SUPPORT BRACKET (41099AA010) (2) ENGINE SUPPORT (41099AA020)
 ST-398527700	398527700	PULLER ASSY	Used for removing extension case oil seal and clutch housing oil seal.
 ST-499575500	499575500	GAUGE	Used for measuring total end play, extension end play and drive pinion height.
 ST-398177700	398177700	INSTALLER	Used for assembling main shaft.

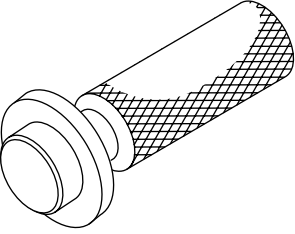
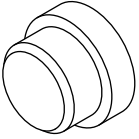
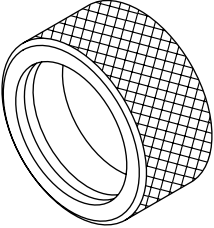
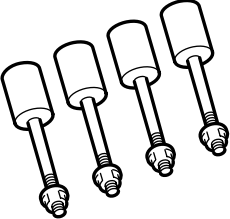
GENERAL DESCRIPTION

MANUAL TRANSMISSION AND DIFFERENTIAL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-399893600	399893600	PLIERS	- Used for removing and installing neutral set spring. - Used with CLAW (18756AA000).
 ST-499247300	499247300	INSTALLER	- Used for removing axle shaft. - Used with REMOVER ASSY (499095500).
 ST-499095500	499095500	REMOVER ASSY	- Used for removing axle shaft. - Used with INSTALLER (499247300).
 ST-499247400	499247400	INSTALLER	Used for installing transfer drive gear ball bearing.

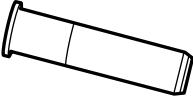
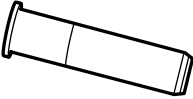
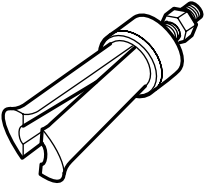
GENERAL DESCRIPTION

MANUAL TRANSMISSION AND DIFFERENTIAL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-499797000	499797000	OIL SEAL INSTALLER	Used for installing differential side retainer oil seal.
 ST-398497701	398497701	SEAT	Used for installing transfer drive gear ball bearing.
 ST-398437700	398437700	INSTALLER	Used for installing front differential side bearing.
 ST18632AA000	18632AA000 (Newly adopted tool)	STAND ASSY	Used for disassembling and assembling transmission.

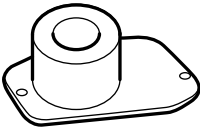
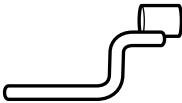
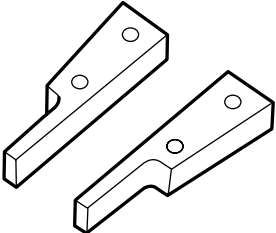
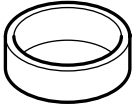
GENERAL DESCRIPTION

MANUAL TRANSMISSION AND DIFFERENTIAL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST18671AA000	18671AA000 (Newly adopted tool)	OIL SEAL GUIDE	- Used for installing oil seal to reverse check. - Used with INSTALLER (18657AA010).
 ST18657AA010	18657AA010 (Newly adopted tool)	INSTALLER	- Used for installing oil seal to reverse check. - Used with OIL SEAL GUIDE (18671AA000).
 ST18657AA000	18657AA000 (Newly adopted tool)	INSTALLER	Used for installing oil seal to shift rod.
 ST18758AA000	18758AA000 (Newly adopted tool)	PULLER	Used for removing extension taper roller bearing outer race.

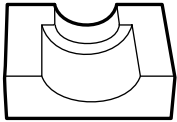
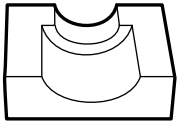
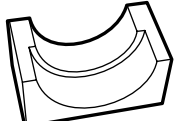
GENERAL DESCRIPTION

MANUAL TRANSMISSION AND DIFFERENTIAL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST18831AA000	18831AA000 (Newly adopted tool)	GAUGE	Used for measuring extension taper roller bearing.
 ST18631AA000	18631AA000 (Newly adopted tool)	HANDLE	Used for measuring front differential backlash.
 ST18756AA000	18756AA000 (Newly adopted tool)	CLAW	- Used for installing and removing neutral set spring. - Used with PLIERS (399893600).
 ST18754AA000	18754AA000 (Newly adopted tool)	REMOVER	Used for removing each parts of driven gear.

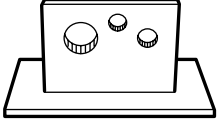
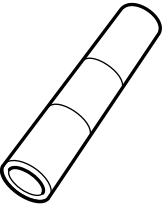
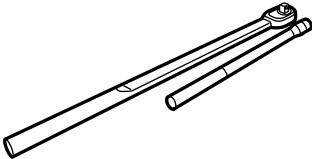
GENERAL DESCRIPTION

MANUAL TRANSMISSION AND DIFFERENTIAL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST18757AA000	18757AA000 (Newly adopted tool)	STRAIGHT PIN REMOVER	Used for installing reverse idler gear.
 ST18665AA000	18665AA000 (Newly adopted tool)	HOLDER	- Used for installing and removing main shaft lock nut. - Used with BASE (18664AA000).
 ST18666AA000	18666AA000 (Newly adopted tool)	HOLDER	- Used for installing and removing driven shaft lock nut. - Used with BASE (18664AA000).
 ST18667AA000	18667AA000 (Newly adopted tool)	HOLDER	- Used for installing and removing drive pinion shaft lock nut. - Used with BASE (18664AA000).

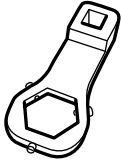
GENERAL DESCRIPTION

MANUAL TRANSMISSION AND DIFFERENTIAL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST18664AA000	18664AA000 (Newly adopted tool)	BASE	- Used for installing and removing main shaft lock nut. - Used for installing and removing drive pinion shaft lock nut. - Used for installing and removing driven shaft lock nut.
 ST18722AA010	18722AA010 (Newly adopted tool)	REMOVER	Used for disassembling main shaft.
 ST18651AA000	18651AA000 (Newly adopted tool)	INSTALLER	Used for assembling main shaft.
 ST18852AA000	18852AA000 (Newly adopted tool)	TORQUE WRENCH	- Used for tightening main shaft lock nut. - Used for tightening drive pinion shaft lock nut. - Used for tightening driven shaft lock nut.

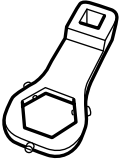
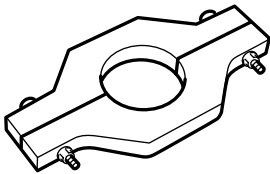
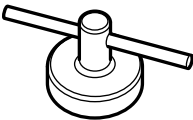
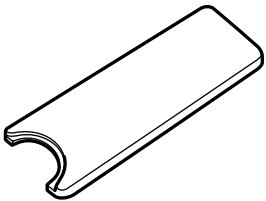
GENERAL DESCRIPTION

MANUAL TRANSMISSION AND DIFFERENTIAL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST18668AA000	18668AA000 (Newly adopted tool)	PUNCH	Used for caulking main shaft lock nut.
 ST18669AA000	18669AA000 (Newly adopted tool)	PUNCH	Used for caulking driven shaft lock nut.
 ST18670AA000	18670AA000 (Newly adopted tool)	PUNCH	Used for caulking drive pinion shaft lock nut.
 ST18620AA000	18620AA000 (Newly adopted tool)	ADAPTER WRENCH	Used for installing and removing driven gear shaft lock nut.

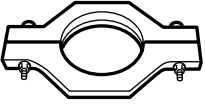
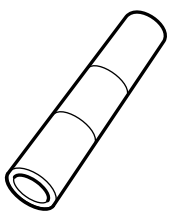
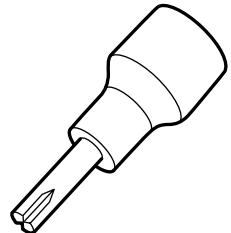
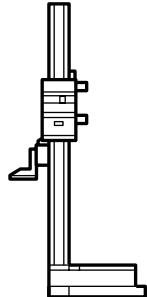
GENERAL DESCRIPTION

MANUAL TRANSMISSION AND DIFFERENTIAL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST18621AA000	18621AA000 (Newly adopted tool)	ADAPTER WRENCH	Used for installing and removing drive pinion shaft lock nut.
 ST18723AA000	18723AA000 (Newly adopted tool)	REMOVER	Used for disassembling the driven shaft.
 ST18630AA000	18630AA000 (Newly adopted tool)	WRENCH ASSY	Used for removing and installing differential side retainer (left side).
 ST18672AA000	18672AA000 (Newly adopted tool)	GUIDE CLIP	Used for installing reverse idler gear snap ring.

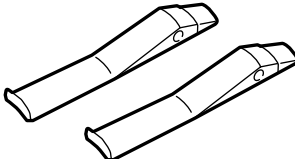
GENERAL DESCRIPTION

MANUAL TRANSMISSION AND DIFFERENTIAL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST18720AA000	18720AA000 (Newly adopted tool)	REMOVER	Used for disassembling main shaft.
 ST18654AA000	18654AA000 (Newly adopted tool)	INSTALLER	Used for assembling driven shaft.
 ST18663AA000	18663AA000 (Newly adopted tool)	SOCKET	Used for installing and removing oil pump cover.
 ST18853AA000	18853AA000 (Newly adopted tool)	HEIGHT GAUGE	Used for selecting shift rod.

GENERAL DESCRIPTION

MANUAL TRANSMISSION AND DIFFERENTIAL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST18760AA000	18760AA000 (Newly adopted tool)	CLAW	• Used for removing front side retainer bearing outer race. • Used with PULLER ASSEMBLY (398527700).

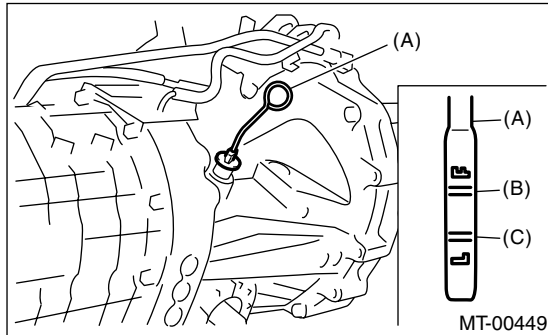
2. GENERAL PURPOSE TOOLS

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

2. Transmission Gear Oil

A: INSPECTION

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



- (A) Oil level gauge
(B) Upper level
(C) Lower level

B: REPLACEMENT

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

CAUTION:

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

NOTE:

- Tighten the transmission gear oil drain plug after draining transmission gear oil.
- Always use a new gasket.

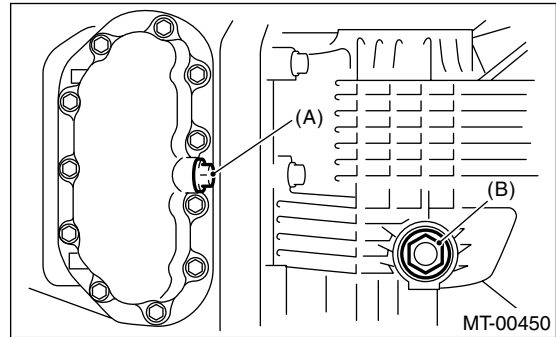
Tightening torque:

Oil pan side

44 N·m (4.5 kgf-m, 32.5 ft-lb)

Clutch housing side

70 N·m (7.1 kgf-m, 51.6 ft-lb)



- (A) Drain plug (Oil pan side)
(B) Drain plug (Clutch housing side)

- 5) Lower the vehicle.
- 6) Pour gear oil into the gauge hole.

Recommended gear oil:

Use GL-5 or equivalent.

Gear oil capacity:

4.1 ℓ (4.3 US qt, 3.6 Imp qt)

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

NOTE:

- When inserting the level gauge into transmission gear, align the protrusion on the side of the top part of the level gauge with the notch in the gauge hole.
- The gear oil level should be within the specified range marked on the level gauge.

3. Oil Seal

A: INSPECTION

Inspect for oil leakage from the oil seal. Replace the oil seal if the lips is deformed, hardened, damaged, worn or defective if any.

B: REPLACEMENT

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

NOTE:

- Tighten the drain plug after draining gear oil.
- Always use a new gasket.

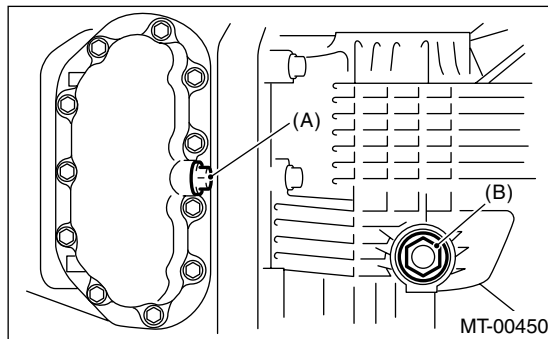
Tightening torque:

Oil pan side

44 N·m (4.5 kgf-m, 32.5 ft-lb)

Clutch housing side

70 N·m (7.1 kgf-m, 51.6 ft-lb)

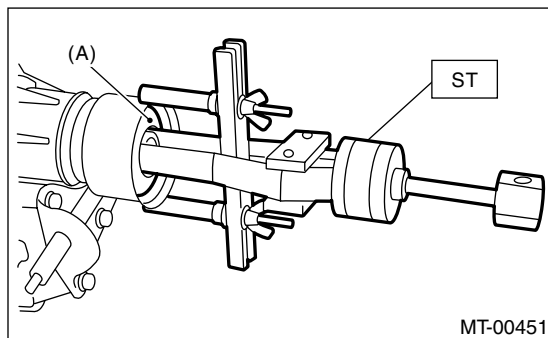


(A) Drain plug (Oil pan side)

(B) Drain plug (Clutch housing side)

- 3) Remove the rear exhaust pipe and muffler.
- 4) Remove the propeller shaft. <Ref. to DS-14, REMOVAL, Propeller Shaft.>
- 5) Using the ST, remove the oil seal.

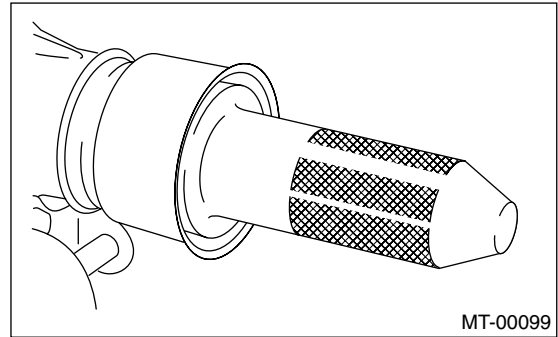
ST 398527700 PULLER ASSY



(A) Oil seal

- 6) Using the ST, install the oil seal.

ST 498057300 INSTALLER



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

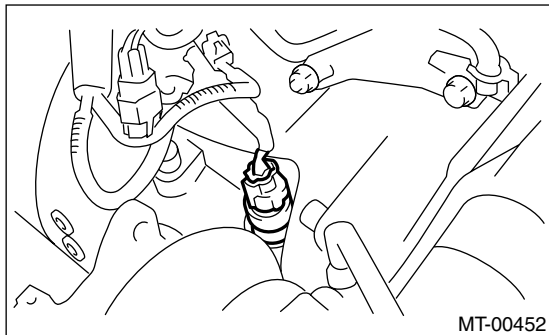
- 8) Install the rear exhaust pipe and muffler.

- 9) Pour gear oil and check the oil level. <Ref. to 6MT-30, REPLACEMENT, Transmission Gear Oil.>

4. Vehicle Speed Sensor

A: REMOVAL

- 1) Disconnect the ground cable from battery.
- 2) Remove the intercooler. <Ref. to IN(H4DOTC)-10, REMOVAL, Intercooler.>
- 3) Disconnect the vehicle speed sensor connector.



- 4) Remove the vehicle speed sensor.

B: INSTALLATION

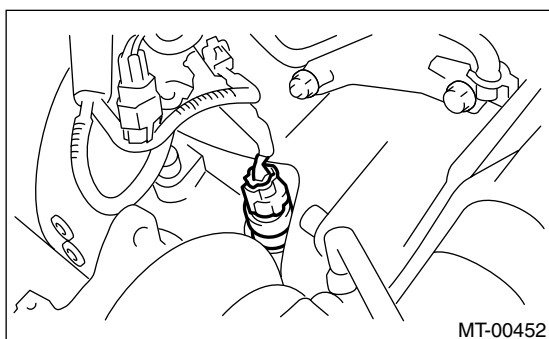
- 1) Align the tip end of vehicle speed sensor key with key groove on the end of speedometer shaft, and then install it.

Tightening torque:

5.9 N·m (0.6 kgf-m, 4.4 ft-lb)

NOTE:

- Ensure the sensor mounting hole is clean and free of foreign matter.
- Discard the vehicle speed sensor after removal, and replace it with a new one.



- 2) Connect the connector to vehicle speed sensor.
- 3) Install the intercooler. <Ref. to IN(H4DOTC)-10, INSTALLATION, Intercooler.>

C: INSPECTION

Inspect that the speedometer is normally operated, because vehicle speed sensor cannot be inspected as a single part. If it is not normally operated, inspect the combination meter system. <Ref. to IDI-3, INSPECTION, Combination Meter System.>

TRANSMISSION MOUNTING SYSTEM

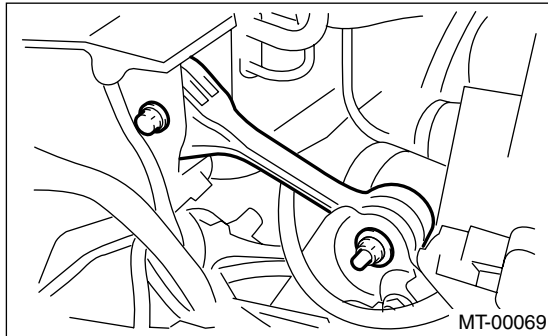
MANUAL TRANSMISSION AND DIFFERENTIAL

5. Transmission Mounting System

A: REMOVAL

1. PITCHING STOPPER

- 1) Disconnect the ground cable from battery.
- 2) Remove the intercooler. <Ref. to IN(H4DOTC)-10, REMOVAL, Intercooler.>
- 3) Remove the pitching stopper.



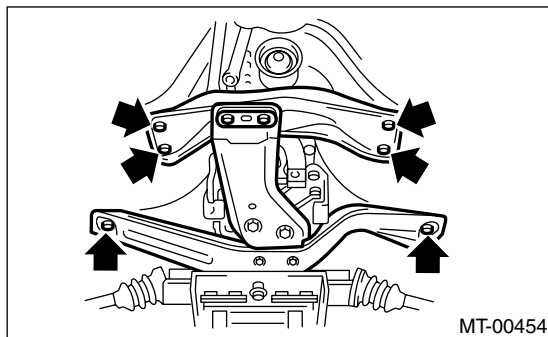
2. CROSSMEMBER AND CUSHION RUBBER

- 1) Disconnect the ground cable from battery.
- 2) Jack-up the vehicle and support it with sturdy racks.
- 3) Remove the center exhaust pipe. <Ref. to EX(H4DOTC)-8, REMOVAL, Center Exhaust Pipe.>
- 4) Remove the rear exhaust pipe and muffler.
- 5) Set the transmission jack under the transmission body.

CAUTION:

Always support the transmission case with a transmission jack.

- 6) Remove the rear crossmember.



- 7) Remove the rear cushion rubber.

B: INSTALLATION

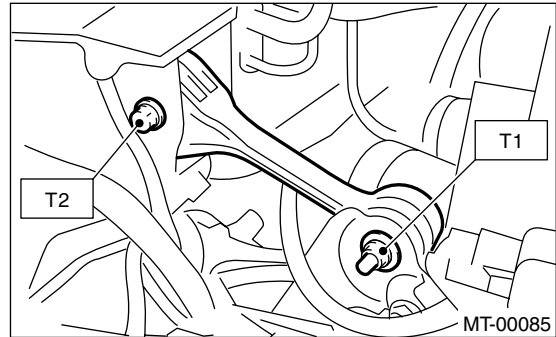
1. PITCHING STOPPER

- 1) Install the pitching stopper.

Tightening torque:

T1: 50 N·m (5.1 kgf-m, 36.9 ft-lb)

T2: 58 N·m (5.9 kgf-m, 42.8 ft-lb)



- 2) Install the intercooler.
<Ref. to IN(H4DOTC)-10, INSTALLATION, Intercooler.>
- 3) Connect the battery ground cable to battery.

2. CROSSMEMBER AND CUSHION RUBBER

- 1) Install the rear cushion rubber.

Tightening torque:

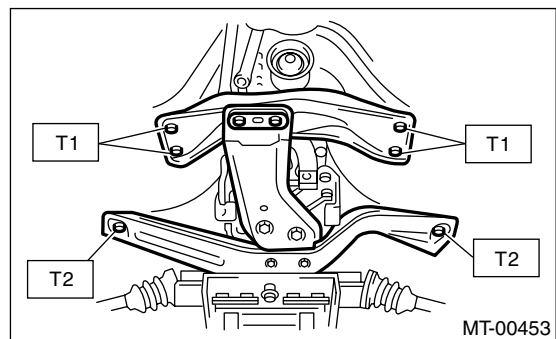
35 N·m (3.6 kgf-m, 25.8 ft-lb)

- 2) Install the crossmember.

Tightening torque:

T1: 70 N·m (7.1 kgf-m, 51.6 ft-lb)

T2: 140 N·m (14.3 kgf-m, 103 ft-lb)



- 3) Remove the transmission jack.
- 4) Install the center exhaust pipe. <Ref. to EX(H4DOTC)-9, INSTALLATION, Center Exhaust Pipe.>
- 5) Install the rear exhaust pipe and muffler.

TRANSMISSION MOUNTING SYSTEM

MANUAL TRANSMISSION AND DIFFERENTIAL

C: INSPECTION

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

1. PITCHING STOPPER

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

2. CROSSMEMBER AND CUSHION RUBBER

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

6. Manual Transmission Assembly

A: REMOVAL

1) Set the vehicle on a lift, and then open the front hood and support it with hood stay.

NOTE:

Set the hood stay to its specified hole.

2) Remove the front wheel.

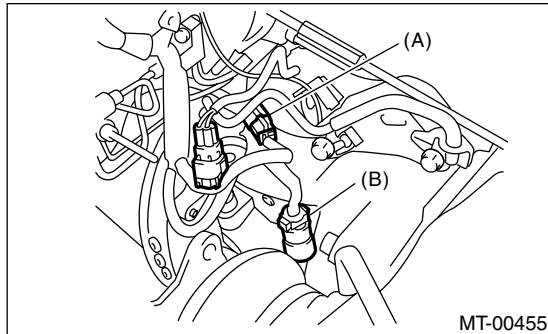
3) Disconnect the ground cable from battery.

4) Remove the intercooler assembly. <Ref. to IN(H4DOTC)-10, REMOVAL, Intercooler.>

5) Lift-up the vehicle, and then remove the under cover.

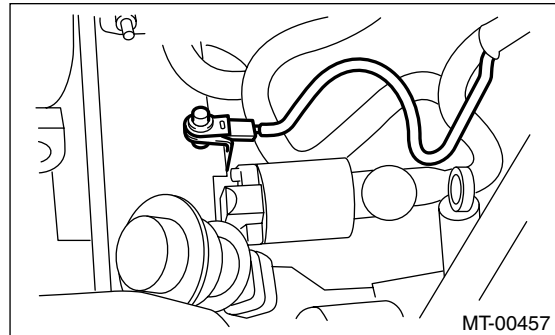
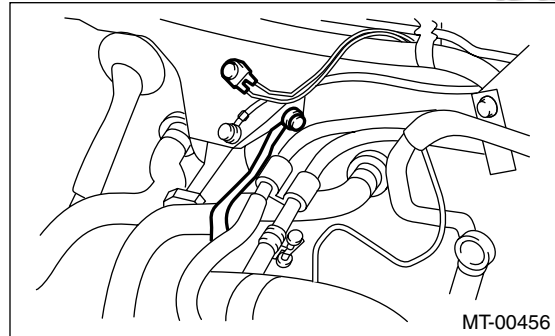
6) Remove the steering universal joint. <Ref. to PS-18, REMOVAL, Universal Joint.>

7) Lower the vehicle and disconnect the connector located on upper side of transmission.



- (A) Transmission connector
- (B) Vehicle speed sensor connector

8) Disconnect the ground cable at upper side of transmission case and body.

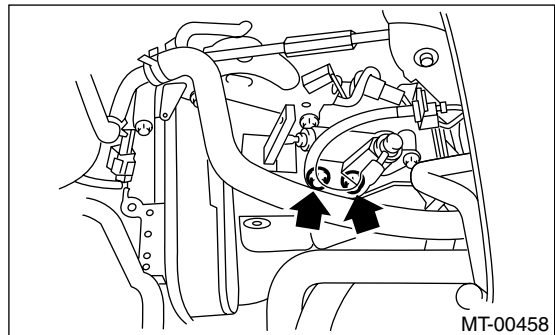


9) Remove the starter assembly. <Ref. to SC(H4SO)-7, REMOVAL, Starter.>

10) Remove the clutch operating cylinder.

NOTE:

Hang the removed operating cylinder with a wire, etc.



11) Remove the clutch release shaft.

(1) Remove the plug with hexagon wrench.

(2) Install a 6 mm (0.24 in) bolt to the release shaft, then pull out the release shaft.

(3) Lift up the release fork, and then remove it from the release bearing claw. Pull it to the engine side and set it free.

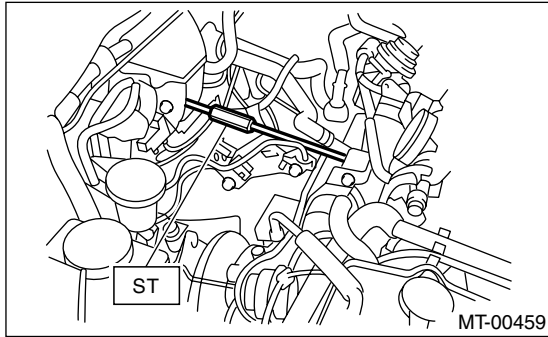
12) Remove the pitching stopper, and then remove the pitching stopper bracket.

MANUAL TRANSMISSION ASSEMBLY

MANUAL TRANSMISSION AND DIFFERENTIAL

13) Set the ST.

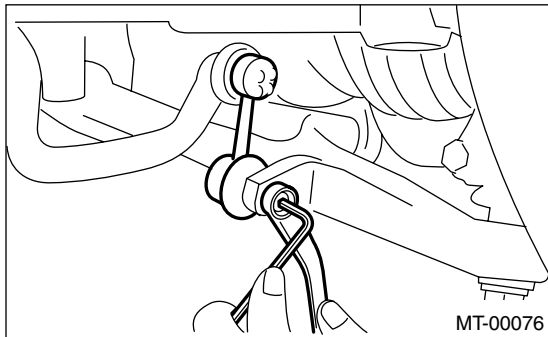
ST 41099AA000 ENGINE SUPPORT



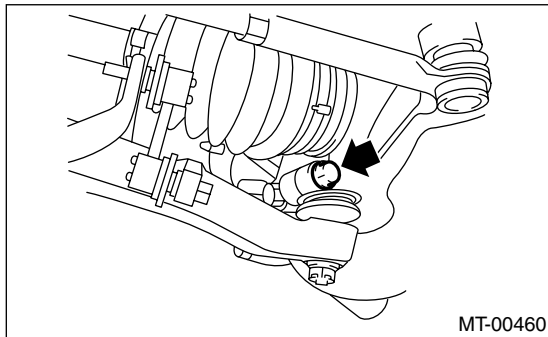
14) Remove the center and rear exhaust pipe and muffler. <Ref. to EX(H4DOTC)-8, REMOVAL, Center Exhaust Pipe.>, <Ref. to EX(H4DOTC)-13, REMOVAL, Rear Exhaust Pipe.>, <Ref. to EX(H4DOTC)-12, REMOVAL, Joint Pipe.>

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

16) Remove the front stabilizer bolt.



17) Remove the ball joint of transverse link from housing.

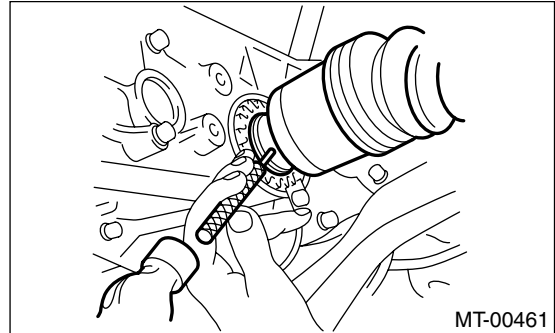


18) Using the ST, remove the spring pin of front drive shaft.

ST 398791700 REMOVER

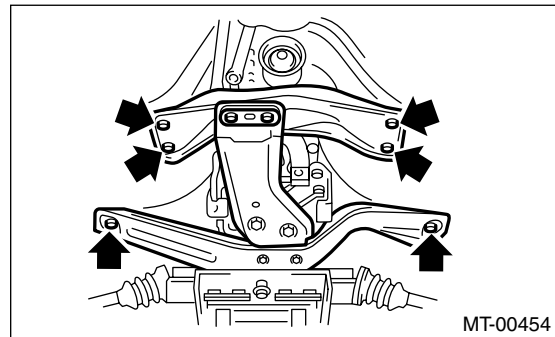
NOTE:

Do not reuse the spring pin.



19) Remove the front drive shaft.

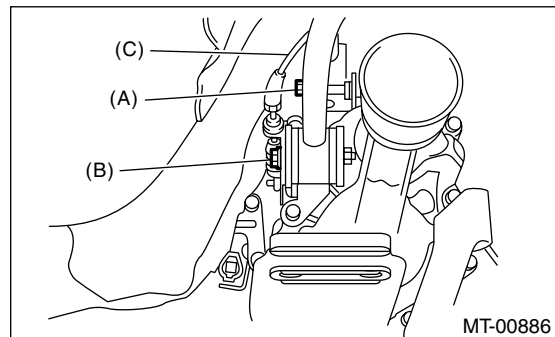
20) Set the transmission jack under the transmission, then remove the front crossmember and rear crossmember.



21) Move the transmission to right side, then remove the joint COMPL, stay bolt and reverse check cable.

NOTE:

If the transmission is not moved, the joint COMPL and stay bolt will contact body and damage may occur.



- (A) Joint COMPL bolt
- (B) Stay bolt
- (C) Reverse check cable

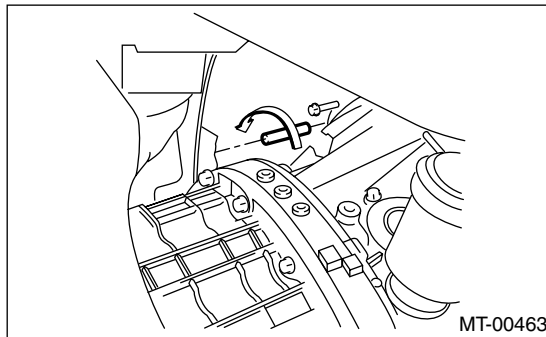
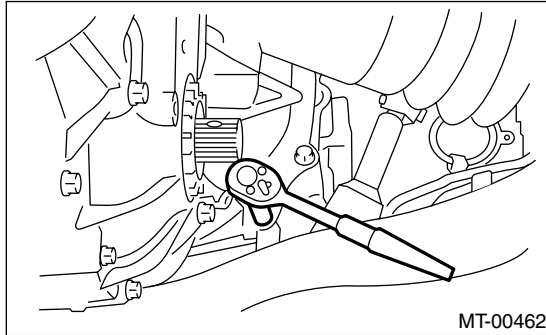
MANUAL TRANSMISSION ASSEMBLY

MANUAL TRANSMISSION AND DIFFERENTIAL

22) Remove the fixing bolt of engine and transmission, then remove the transmission from vehicle.

NOTE:

- Rotate the ST (ENGINE SUPPORT ASSY) counterclockwise (to shorten the ST) and lower the rear side of engine to facilitate removal.
- Take care not to contact the transmission with body when pulling backward to remove.
- Remove the clutch pipe and breather pipe carefully which may interfere each other.



B: INSTALLATION

1) Set the release fork, release bearing and release shaft to transmission. <Ref. to CL-16, INSTALLATION, Release Bearing and Lever.>

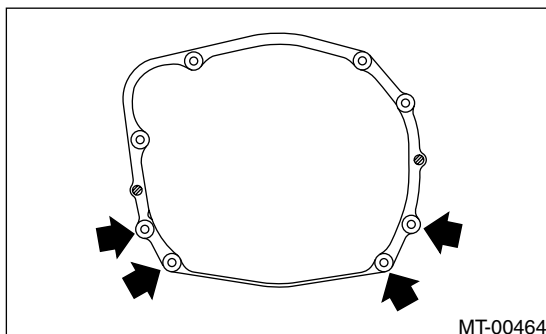
2) Install the transmission.

NOTE:

- Make sure the main shaft spline part is inserted completely.
- Make sure the rear side of engine is lowered.

Tightening torque:

50 N·m (5.1 kgf-m, 36.9 ft-lb)

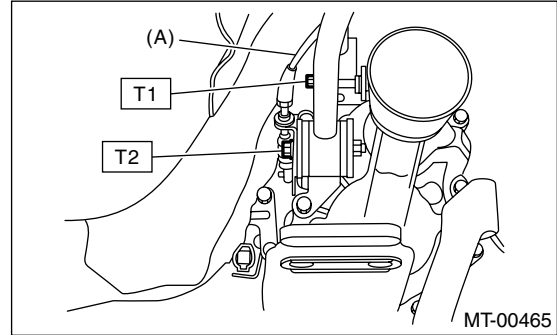


3) Move the transmission to the right side, then install the joint COMPL bolt, stay bolt and reverse check cable.

Tightening torque:

T1: 11.8 N·m (1.2 kgf-m, 8.7 ft-lb)

T2: 32 N·m (3.3 kgf-m, 23.6 ft-lb)



(A) Reverse check cable

4) Install the front crossmember and rear crossmember.

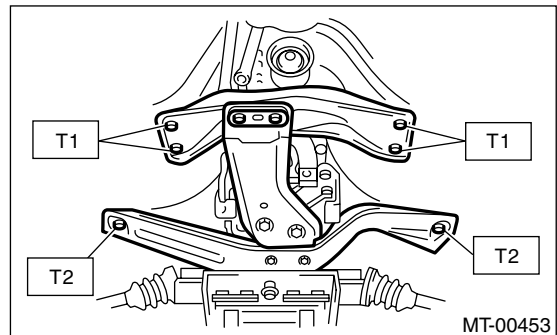
NOTE:

Rotate the ST (ENGINE SUPPORT ASSY) turn buckle clockwise (to make longer the ST) and lift up the rear side of engine to facilitate installation.

Tightening torque:

T1: 70 N·m (7.1 kgf-m, 51.6 ft-lb)

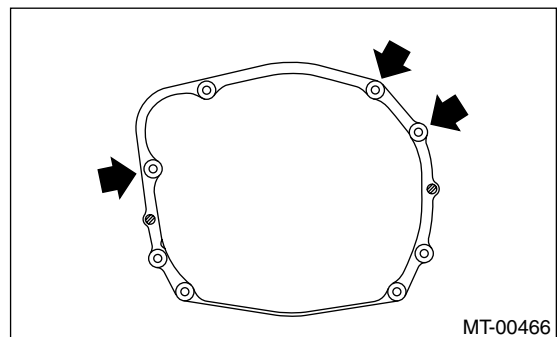
T2: 140 N·m (14.3 kgf-m, 103 ft-lb)



5) Lower the vehicle and install the fixing bolt.

Tightening torque:

50 N·m (5.1 kgf-m, 36.9 ft-lb)



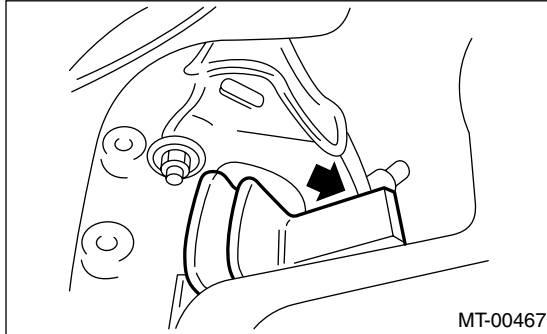
MANUAL TRANSMISSION ASSEMBLY

MANUAL TRANSMISSION AND DIFFERENTIAL

6) Make sure the release bearing is installed completely.

NOTE:

- Push the release fork to operating cylinder side until you hear a “click” sound. Pull the release fork to engine side. Setting is completed if the release fork does not contact the case.
- Make sure the boot cover is firmly set.



7) Install the pitching stopper bracket.

Tightening torque:

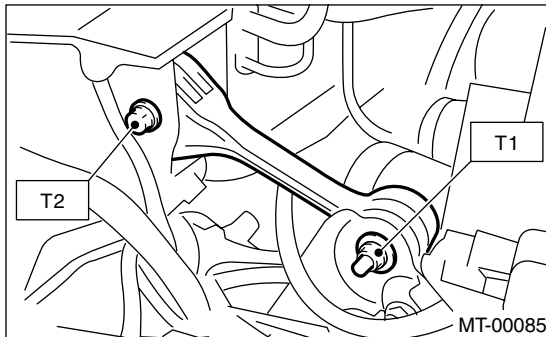
41 N·m (4.2 kgf-m, 30.2 ft-lb)

8) Install the pitching stopper.

Tightening torque:

T1: 50 N·m (5.1 kgf-m, 36.9 ft-lb)

T2: 58 N·m (5.9 kgf-m, 42.8 ft-lb)



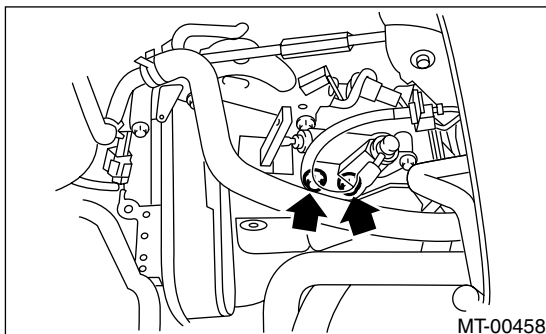
9) Install the clutch operating cylinder.

Tightening torque:

41 N·m (4.2 kgf-m, 30.2 ft-lb)

NOTE:

Check that the clutch hose is routed properly.

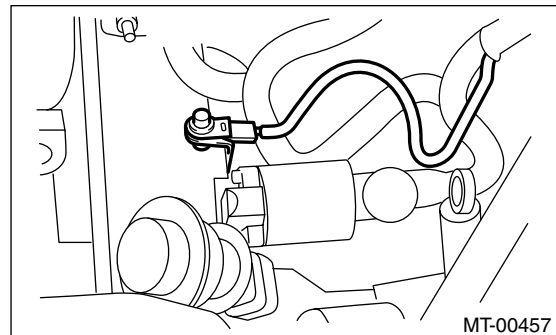
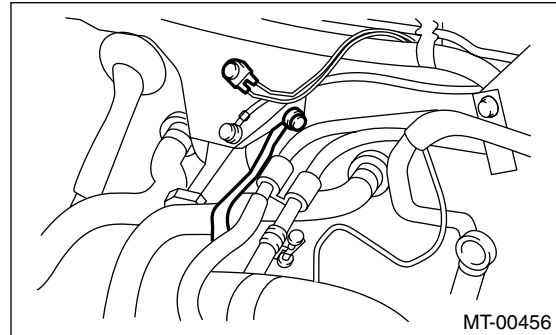


10) Install the starter assembly.

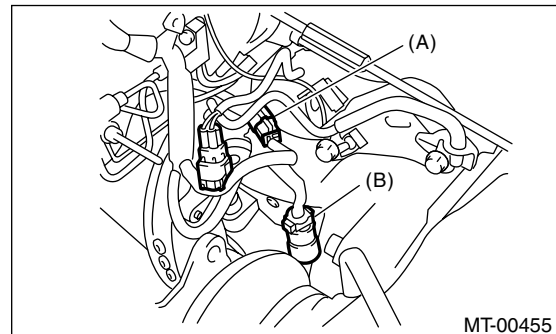
Tightening torque:

50 N·m (5.1 kgf-m, 36.9 ft-lb)

11) Install the transmission and body ground cable.



12) Connect the connector located on the upper side of transmission.



(A) Vehicle speed sensor connector

(B) Transmission connector

13) Lift-up the vehicle, and then install the drive shaft.

14) Using the ST, install the spring pin of front drive shaft.

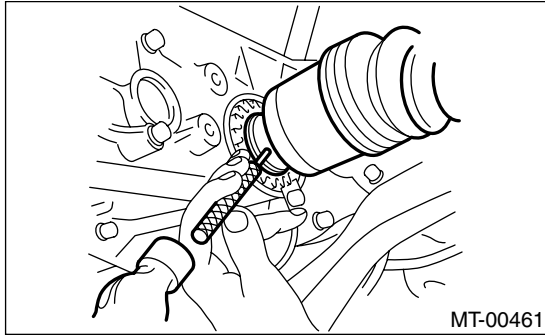
ST 398791700 REMOVER

MANUAL TRANSMISSION ASSEMBLY

MANUAL TRANSMISSION AND DIFFERENTIAL

NOTE:

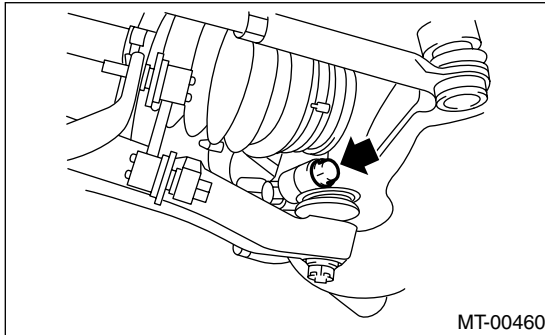
Align each chamfered part of front drive shaft and axle drive shaft spring pin hole, and assemble them. Then insert the spring pin.



15) Install the ball joint of transverse link to housing.

Tightening torque:

50 N·m (5.1 kgf-m, 36.9 ft-lb)



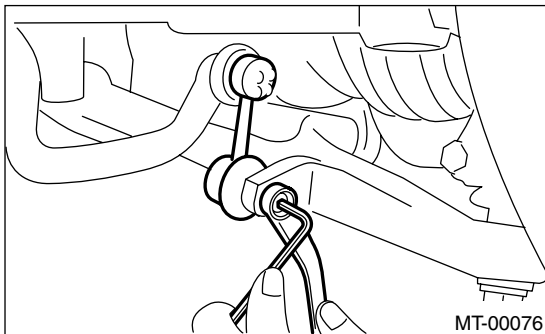
16) Install the stabilizer nut.

Tightening torque:

45 N·m (4.6 kgf-m, 33.2 ft-lb)

NOTE:

Discard the loosened self-locking nut and replace with a new one.



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

18) Install the center exhaust pipe. <Ref. to EX(H4DOTC)-9, INSTALLATION, Center Exhaust Pipe.>

19) Install the rear exhaust pipe and muffler. <Ref. to EX(H4DOTC)-13, INSTALLATION, Rear Exhaust Pipe.>, <Ref. to EX(H4DOTC)-12, INSTALLATION, Joint Pipe.>

20) Install the universal joint. <Ref. to PS-18, INSTALLATION, Universal Joint.>

21) Install the under cover.

22) Install the intercooler assembly. <Ref. to IN(H4DOTC)-10, INSTALLATION, Intercooler.>

23) Connect the battery ground cable to battery.

PREPARATION FOR OVERHAUL

MANUAL TRANSMISSION AND DIFFERENTIAL

7. Preparation for Overhaul

A: PROCEDURE

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

NOTE:

Replace the gasket with a new one.

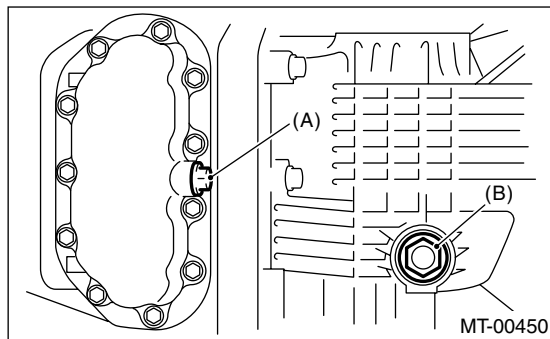
Tightening torque:

Oil pan side

44 N·m (4.5 kgf-m, 32.5 ft-lb)

Clutch housing side

70 N·m (7.1 kgf-m, 51.6 ft-lb)

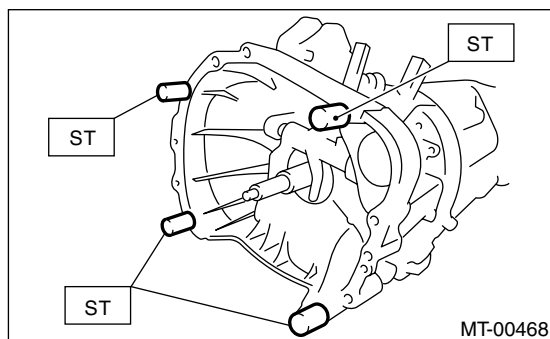


(A) Drain plug (Oil pan side)

(B) Drain plug (Clutch housing side)

- 3) Attach the transmission to ST.

ST 18632AA000 STAND ASSY



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

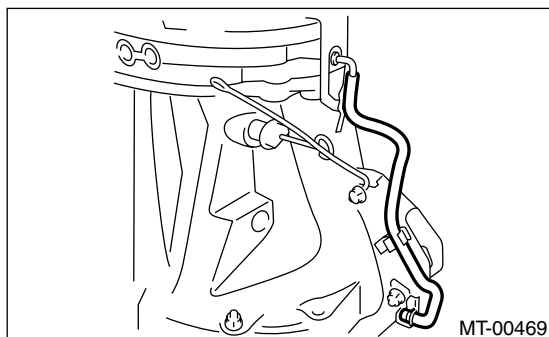
AIR BREATHER HOSE

MANUAL TRANSMISSION AND DIFFERENTIAL

8. Air Breather Hose

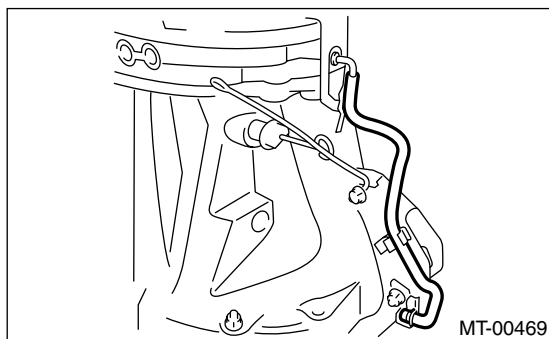
A: REMOVAL

Disconnect the air breather hose.



B: INSTALLATION

Install the air breather hose.



C: INSPECTION

Make sure the hose is not cracked or clogged.

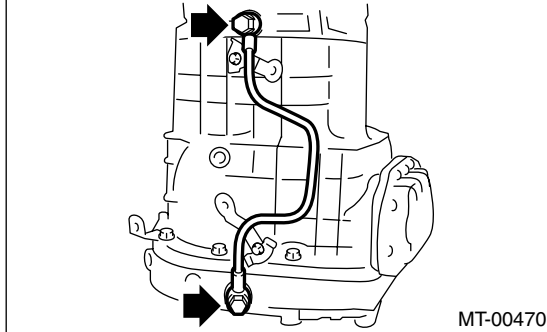
9. Oil Pipe

A: REMOVAL

Remove the oil pipe.

NOTE:

Always use a new gasket.



B: INSTALLATION

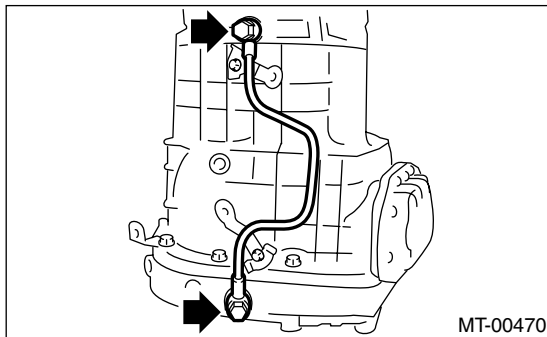
Install in the reverse order of removal.

NOTE:

Always use a new gasket.

Tightening torque:

32 N·m (3.3 kgf-m, 23.6 ft-lb)



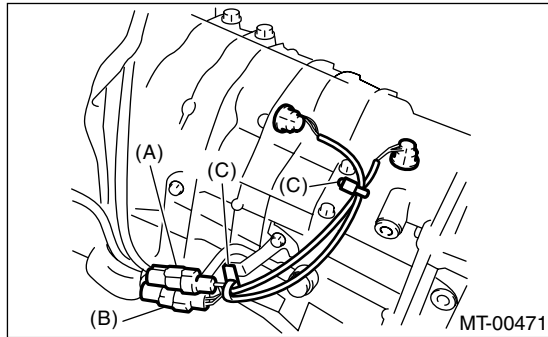
C: INSPECTION

- 1) Make sure there is no damage on pipe. If there is damage, replace the pipe.
- 2) Check the joint parts of pipe for oil leakage. If there is oil leakage, replace the gasket.

10.Back-up Light Switch

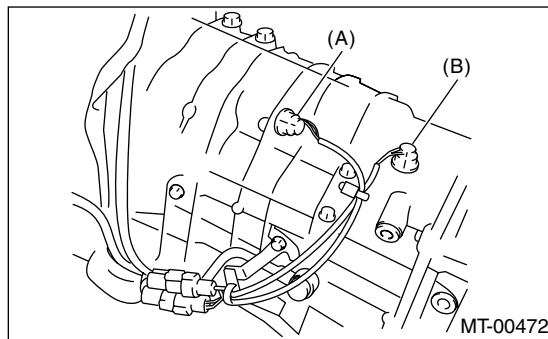
A: REMOVAL

- 1) Remove the manual transmission assembly from vehicle. <Ref. to 6MT-35, REMOVAL, Manual Transmission Assembly.>
- 2) Disconnect the back-up light switch connector.



- (A) Back-up light switch connector (White)
- (B) Neutral position switch connector (Black)
- (C) Clip

- 3) Remove the back-up light switch.



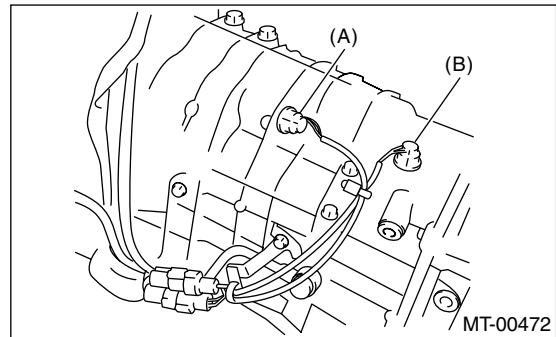
- (A) Back-up light switch
- (B) Neutral position switch

B: INSTALLATION

- 1) Install the back-up light switch.

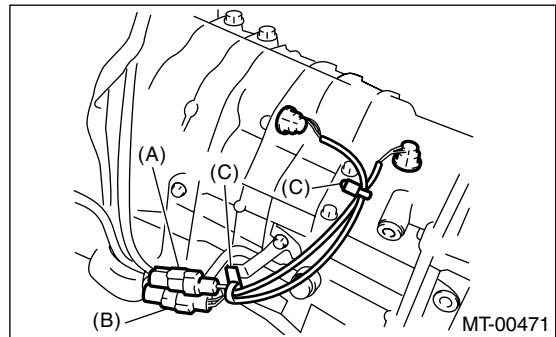
Tightening torque:

32 N·m (3.3 kgf-m, 23.6 ft-lb)



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

- 2) Connect the back-up light switch connector.



- (A) Back-up light switch connector (White)
- (B) Neutral position switch connector (Black)
- (C) Clip

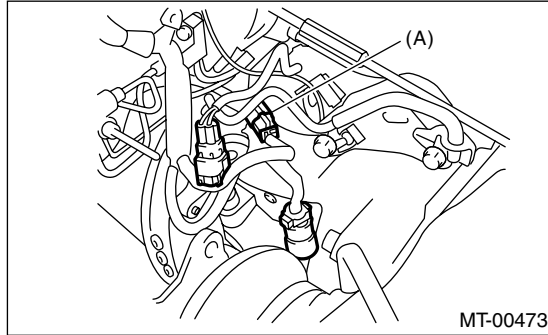
- 3) Install the manual transmission assembly to vehicle. <Ref. to 6MT-37, INSTALLATION, Manual Transmission Assembly.>

BACK-UP LIGHT SWITCH

MANUAL TRANSMISSION AND DIFFERENTIAL

C: INSPECTION

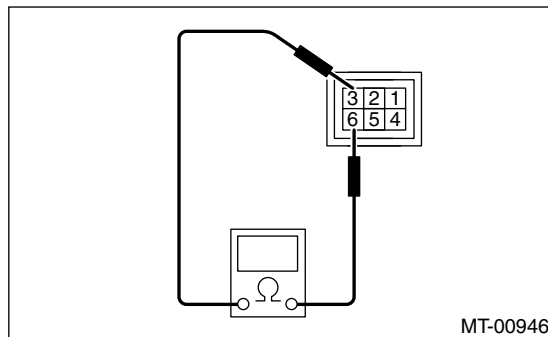
- 1) Disconnect the ground cable from battery.
- 2) Remove the intercooler. <Ref. to IN(H4DOTC)-10, REMOVAL, Intercooler.>
- 3) Disconnect the transmission harness and chassis harness.



(A) Transmission connector

- 4) Measure the resistance between back-up light switch terminals. If it is not within specifications, replace the back-up light switch.

Gear shift position	Terminal No.	Specified resistance
Back-up position	3 and 6	Less than 1 Ω
Other positions		More than 1 M Ω



NEUTRAL POSITION SWITCH

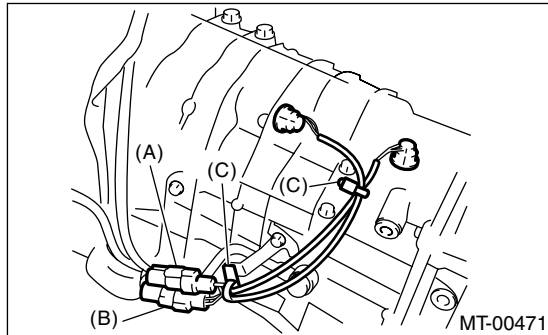
MANUAL TRANSMISSION AND DIFFERENTIAL

11. Neutral Position Switch

A: REMOVAL

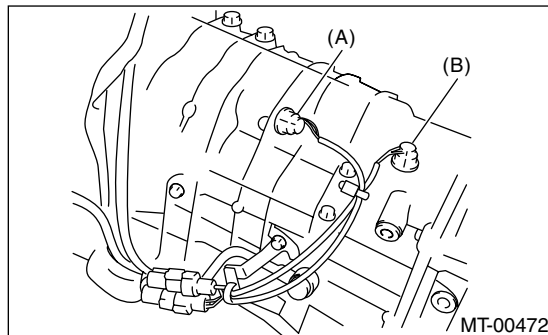
1) Remove the manual transmission assembly from vehicle. <Ref. to 6MT-35, REMOVAL, Manual Transmission Assembly.>

2) Disconnect the neutral position switch connector and clip.



- (A) Back-up light switch connector (White)
- (B) Neutral position switch connector (Black)
- (C) Clip

3) Remove the neutral position switch.



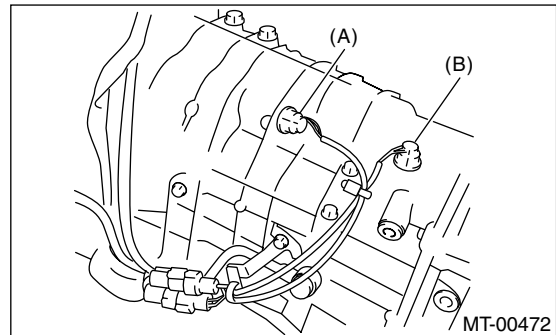
- (A) Back-up light switch
- (B) Neutral position switch

B: INSTALLATION

1) Install the neutral position switch.

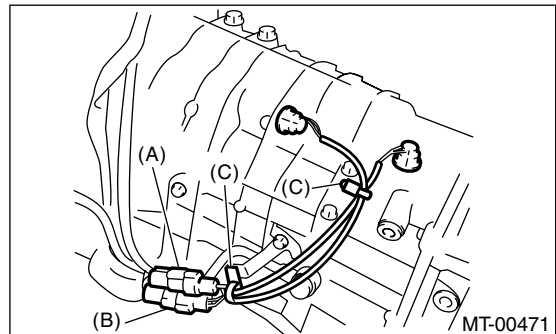
Tightening torque:

32 N·m (3.3 kgf-m, 23.6 ft-lb)



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

2) Connect the neutral position switch connector and clip.



- (A) Back-up light switch connector (White)
- (B) Neutral position switch connector (Black)
- (C) Clip

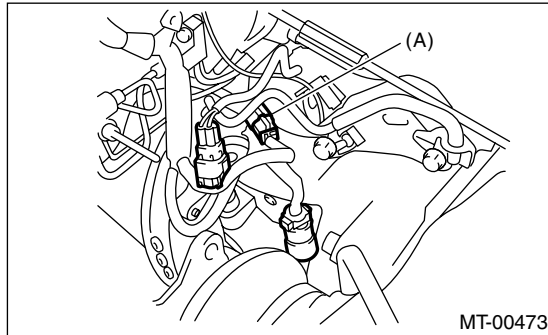
3) Install the manual transmission assembly to vehicle. <Ref. to 6MT-37, INSTALLATION, Manual Transmission Assembly.>

NEUTRAL POSITION SWITCH

MANUAL TRANSMISSION AND DIFFERENTIAL

C: INSPECTION

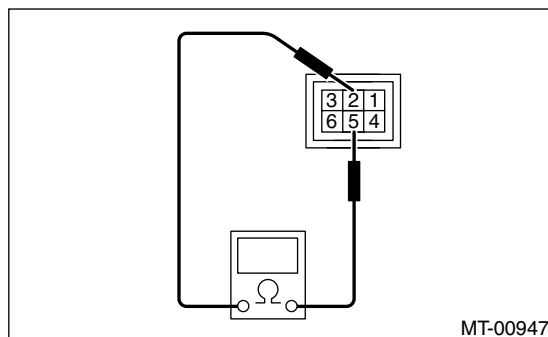
- 1) Disconnect the ground cable from battery.
- 2) Remove the intercooler. <Ref. to IN(H4DOTC)-10, REMOVAL, Intercooler.>
- 3) Disconnect the transmission harness and chassis harness.



(A) Transmission connector

- 4) Measure the resistance between neutral position switch terminals. If it is not within specifications, replace the neutral position switch.

Gear shift position	Terminal No.	Specified resistance
Neutral position	2 and 5	Less than 1 Ω
Other positions		More than 1 M Ω



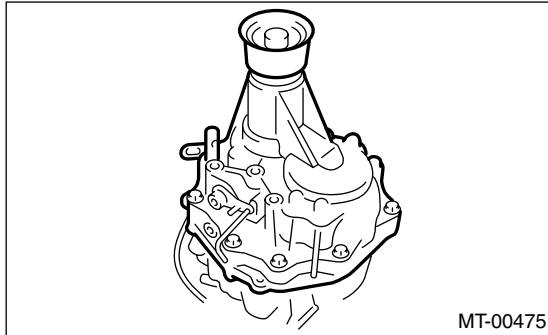
EXTENSION CASE

MANUAL TRANSMISSION AND DIFFERENTIAL

12.Extension Case

A: REMOVAL

- 1) Remove the manual transmission assembly from vehicle. <Ref. to 6MT-35, REMOVAL, Manual Transmission Assembly.>
- 2) Prepare the transmission for overhaul. <Ref. to 6MT-40, Preparation for Overhaul.>
- 3) Remove the extension case.



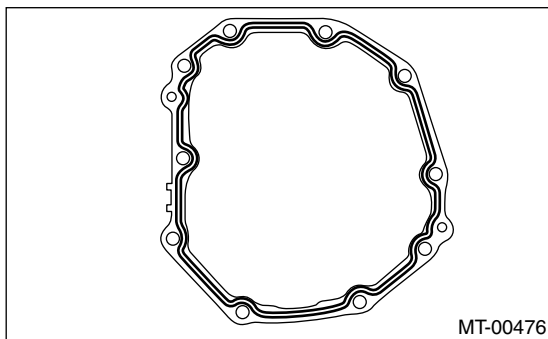
- 4) Completely remove the remaining liquid gasket from the extension case and transmission case.

B: INSTALLATION

- 1) Select the transfer driven gear thrust washer, and then install it to extension case. <Ref. to 6MT-49, ADJUSTMENT, Extension Case.>
- 2) Apply oil lightly to the outer periphery of bearing cone, and then install it to extension case.
- 3) Select the thrust washer of transfer drive gear, and then install it to center differential.
- 4) Apply liquid gasket to the transmission case.

Liquid gasket:

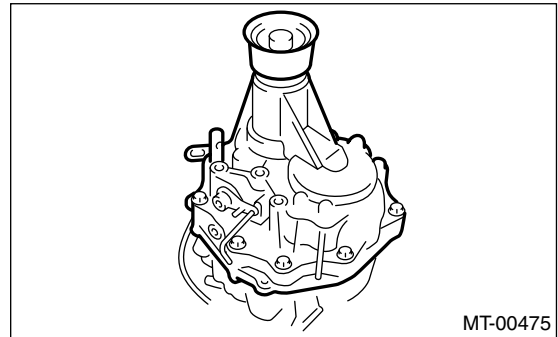
THREE BOND 1215 (Part No. 004403007)



- 5) Install the extension case.

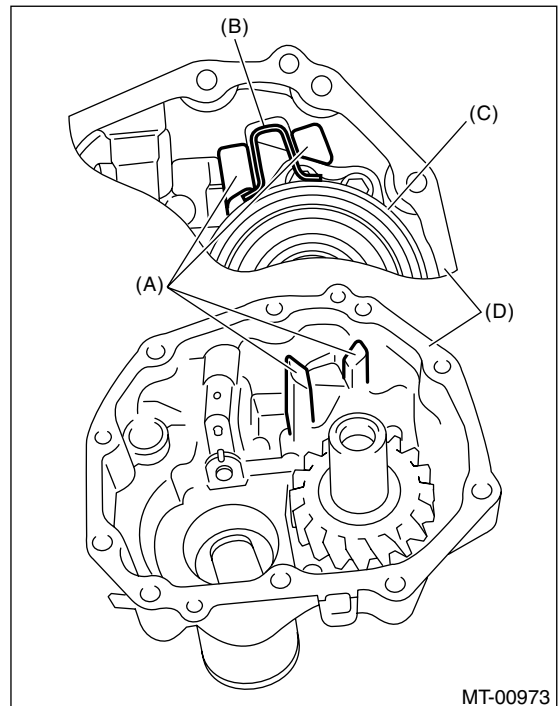
Tightening torque:

48 N·m (4.9 kgf-m, 35.4 ft-lb)



NOTE:

Insert the stopper portion of center differential between extension guides.



- (A) Extension guides
- (B) Stopper
- (C) Center differential
- (D) Extension case

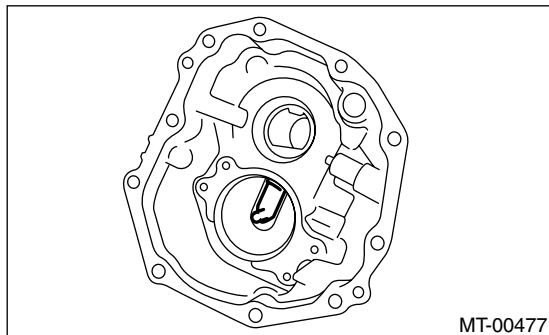
- 6) Install the manual transmission assembly to vehicle. <Ref. to 6MT-37, INSTALLATION, Manual Transmission Assembly.>

EXTENSION CASE

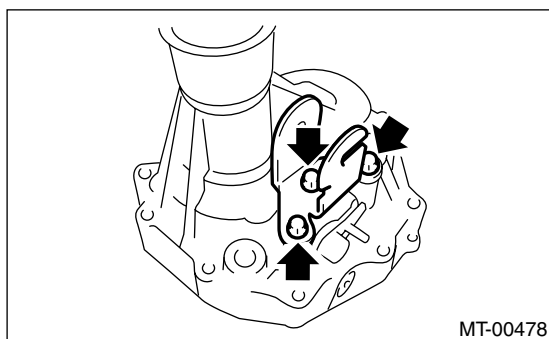
MANUAL TRANSMISSION AND DIFFERENTIAL

C: DISASSEMBLY

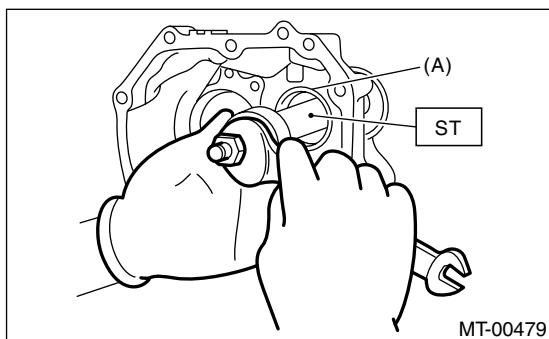
- 1) Remove the transfer drive gear. <Ref. to 6MT-56, REMOVAL, Transfer Drive Gear.>
- 2) Remove the extension guide.



- 3) Remove the shift bracket.

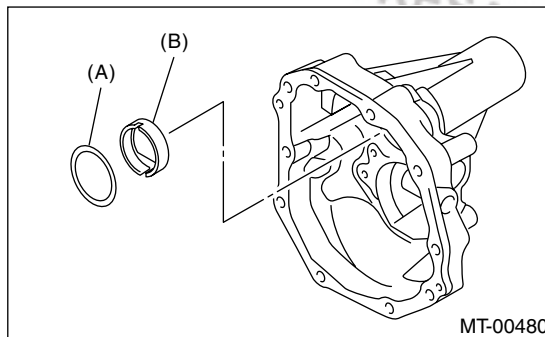


- 4) Using the ST, remove the bearing cone.
ST 18758AA000 PULLER



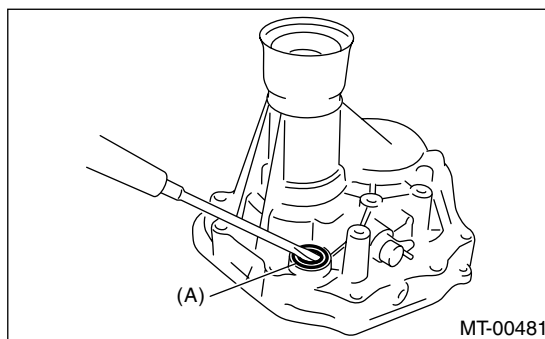
(A) Bearing cone

- 5) Remove the thrust washer and oil plate.



(A) Thrust washer
(B) Oil plate

- 6) Remove the shifter arm oil seal.



(A) Oil seal

- 7) Remove the reverse checking system. <Ref. to 6MT-53, REMOVAL, Reverse Checking System.>
- 8) Remove the extension oil seal. <Ref. to 6MT-31, REPLACEMENT, Oil Seal.>

EXTENSION CASE

MANUAL TRANSMISSION AND DIFFERENTIAL

D: ASSEMBLY

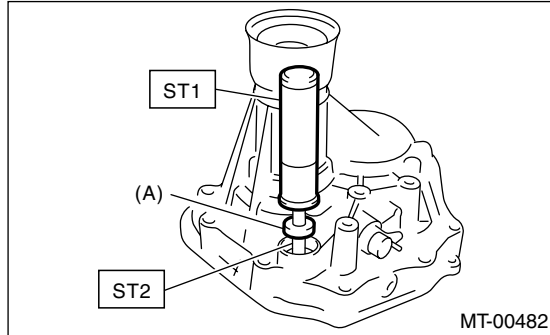
1) Install the reverse checking system. <Ref. to 6MT-54, INSTALLATION, Reverse Checking System.>

2) Install the extension case oil seal. <Ref. to 6MT-31, REPLACEMENT, Oil Seal.>

3) Using the ST, install the shifter arm oil seal.

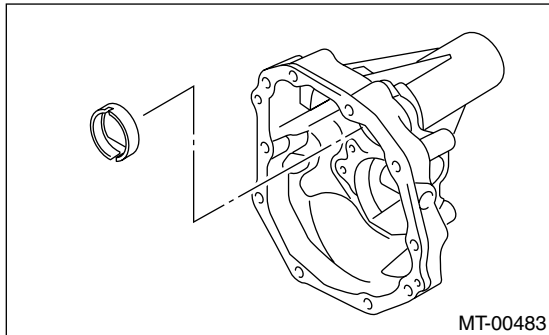
ST1 18657AA000 INSTALLER

ST2 18671AA000 OIL SEAL GUIDE



(A) Oil seal

4) Install the oil plate.



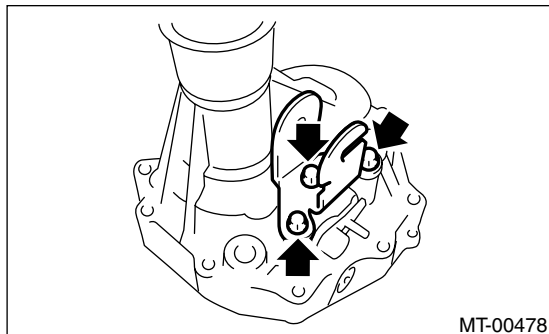
5) Select the bearing thrust washer, and then install it to extension case. <Ref. to 6MT-49, ADJUSTMENT, Extension Case.>

6) Apply oil lightly to the outer periphery of bearing cone, and then install it to extension case.

7) Install the shift bracket.

Tightening torque:

25 N·m (2.5 kgf·m, 18.1 ft·lb)



8) Install the extension guide, and then install the transfer driven gear. <Ref. to 6MT-56, INSTALLATION, Transfer Drive Gear.>

E: INSPECTION

1) Make sure there is no damage or crack on extension case. If there is damage or crack, replace the extension case.

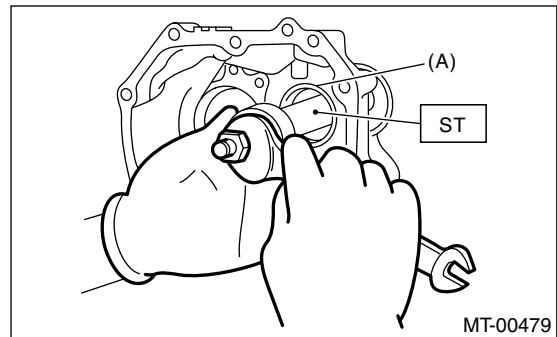
2) Check each oil seal and joint part of extension case and transmission case for oil leakage. If there is oil leakage, replace the oil seal and liquid gasket.

F: ADJUSTMENT

1. TRANSFER DRIVEN GEAR BEARING THRUST WASHER ADJUSTMENT

1) Using the ST, remove the bearing cone from extension case.

ST 18758AA000 PULLER



(A) Bearing cone

2) Remove the thrust washer.

EXTENSION CASE

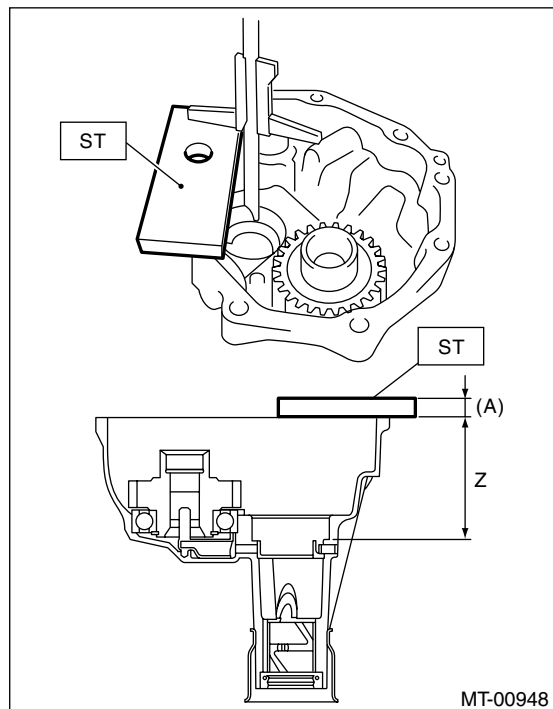
MANUAL TRANSMISSION AND DIFFERENTIAL

3) Measure the depth "Z" between end of extension case and contact point of bearing cone.

ST 499575500 GAUGE

NOTE:

To measure the depth "Z", subtract the thickness of ST [15 mm (0.59 in)] from the measured value.

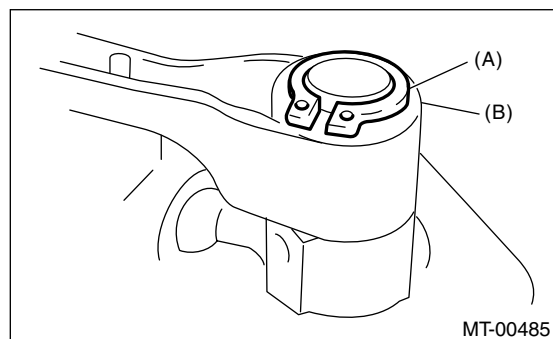


(A) 15 mm (0.59 in)

4) Remove the transfer driven gear. <Ref. to 6MT-58, REMOVAL, Transfer Driven Gear.>

5) Remove the center differential. <Ref. to 6MT-60, REMOVAL, Center Differential.>

6) Remove the snap ring and support from selector arm part.



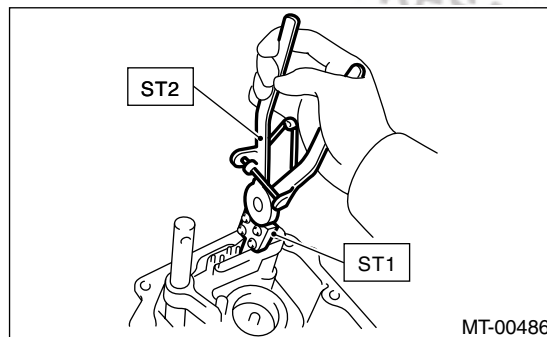
(A) Snap ring

(B) Support

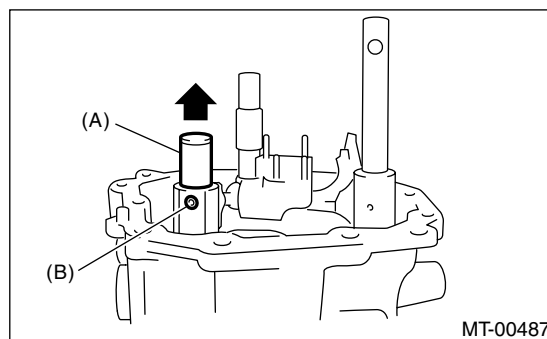
7) Using the ST, remove the neutral set spring and support.

ST1 18756AA000 CLAW

ST2 399863600 PLIERS



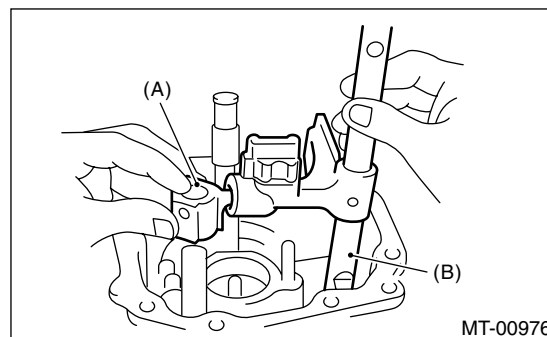
8) Lift-up the striking rod and remove the spring pin.



(A) Striking rod

(B) Spring pin

9) Remove the selector arm No. 2 and shifter arm.



(A) Selector arm No. 2

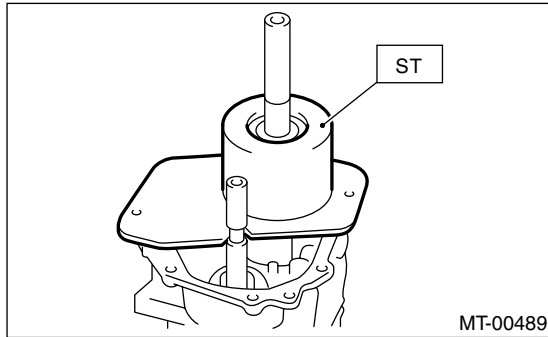
(B) Shifter arm

10) Install the bearing cone to transfer driven gear.

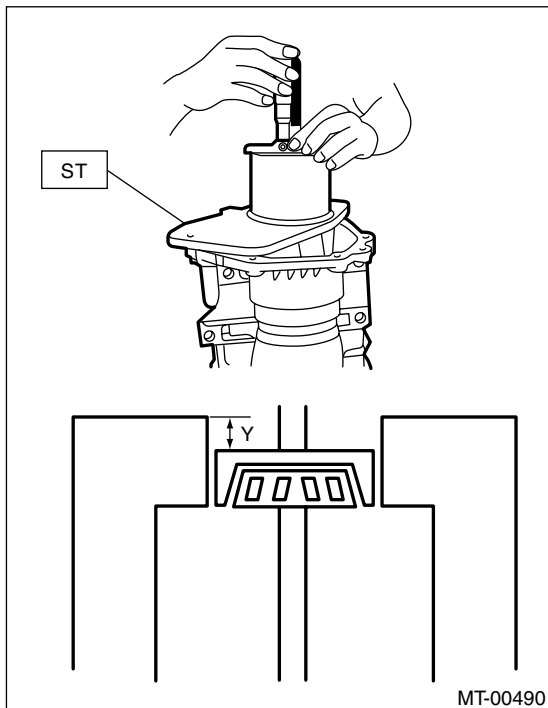
EXTENSION CASE

MANUAL TRANSMISSION AND DIFFERENTIAL

- 11) Set the ST.
ST 18831AA000 GAUGE



- 12) Rotate the transfer driven gear approx. ten times to get the bearing accustomed.
13) Measure the depth "Y" between end of ST and bearing cone.
ST 18831AA000 GAUGE



- 14) Calculate the value "t" of transfer driven gear bearing thrust washer using the following equation.
 $t = Z - (100 - Y) - \{-0.04 \text{ to } 0.11 \text{ mm } (-0.0016 \text{ to } 0.0043 \text{ in})\}$

t mm (in)	Thickness of transfer driven gear bearing thrust washer.
Y mm (in)	Depth from end of ST to bearing cone.
Z mm (in)	Depth from end of extension case to contact point of bearing cone.
-0.04 — 0.11 mm (-0.0016 — 0.0043 in)	Standard clearance between thrust washer and taper roller bearing.
100 mm (3.94 in)	Height of ST.

- 15) Select the nearest thrust washer from the following table, according to the calculated value "t".

Standard clearance between thrust washer and taper roller bearing:

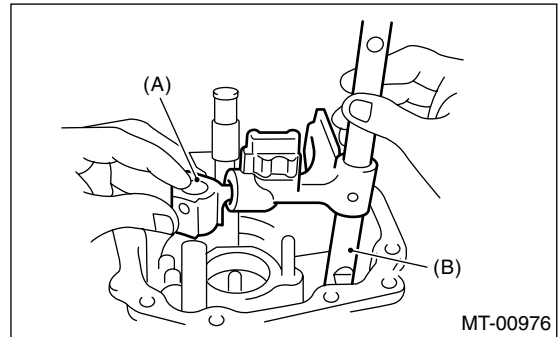
-0.04 — 0.11 mm (-0.0016 — 0.0043 in)

NOTE:

Make clearance within standard.

Thrust washer (50 × 61 × t)	
Part No.	Thickness mm (in)
803050060	0.50 (0.0197)
803050062	0.60 (0.0236)
803050064	0.70 (0.0276)
803050066	0.80 (0.0315)
803050068	0.90 (0.0354)
803050070	1.00 (0.0394)
803050072	1.10 (0.0433)
803050074	1.20 (0.0472)
803050076	1.30 (0.0512)
803050078	1.40 (0.0551)

- 16) Install the selector arm No. 2 and shifter arm.

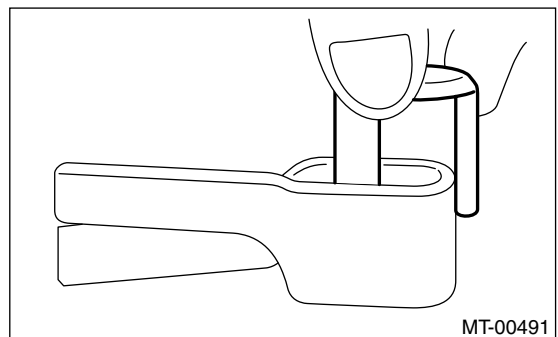


- (A) Selector arm No. 2
(B) Shifter arm

- 17) Install a new spring pin.
18) Install the support to neutral set spring.

NOTE:

Make sure to install the support in proper direction.



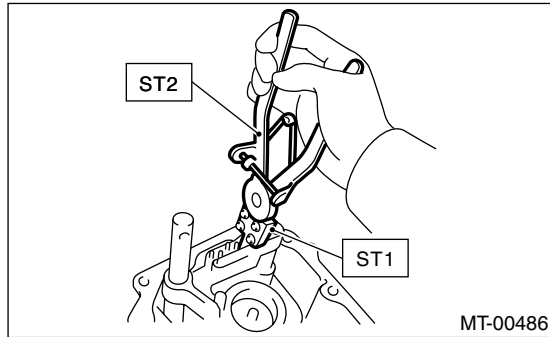
EXTENSION CASE

MANUAL TRANSMISSION AND DIFFERENTIAL

19) Using the ST, install the neutral set spring and support.

ST1 18756AA000 CLAW

ST2 399863600 PLIERS



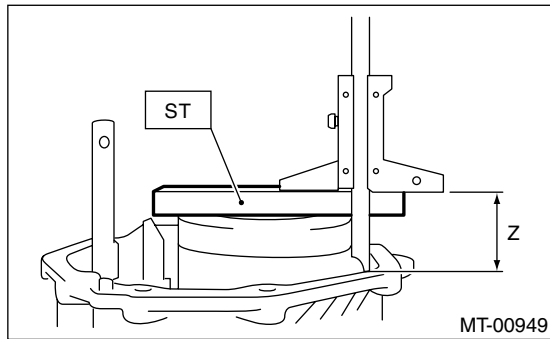
20) Install the snap ring.

21) Install the center differential.

2. SELECTING THE TRANSFER DRIVE GEAR THRUST WASHER

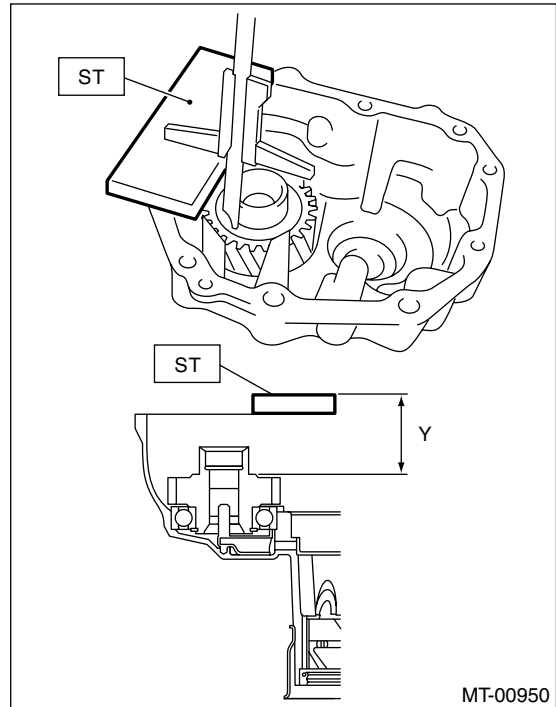
1) Measure the height “Z” between end of transmission case and end of ST.

ST 499575500 GAUGE



2) Measure the depth “Y” between end of ST and transfer drive gear.

ST 499575500 GAUGE



3) Calculate the value “t” of transfer drive gear thrust washer using the following equation.

$$t = \{Y - 15 \text{ mm (1.18 in)}\} - \{Z - 15 \text{ mm (1.18 in)}\} - 0.45 \text{ to } 0.65 \text{ mm (0.018 to 0.026 in)}$$

t mm (in)	Thickness of transfer drive gear thrust washer
Y mm (in)	Depth from end of ST to transfer drive gear
Z mm (in)	Height from end of transmission case to the end of ST
0.45 — 0.65 mm (0.018 — 0.026 in)	Standard clearance between thrust washer and transfer drive gear.
15 mm (1.18 in)	Thickness of ST

4) Select the nearest thrust washer from the following table, according to the calculated value “t”.

Standard clearance between thrust washer and transfer drive gear:

0.45 — 0.65 mm (0.018 — 0.026 in)

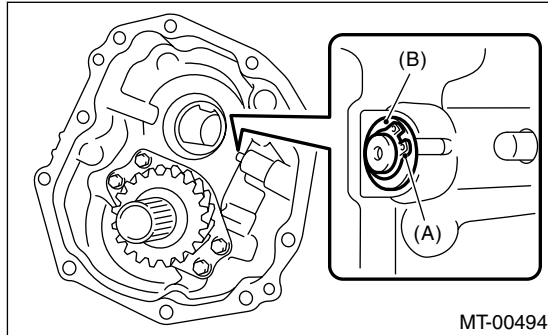
Thrust washer (36.3 × 52 × t)	
Part No.	Thickness mm (in)
803036070	0.80 (0.0315)
803036071	0.95 (0.0374)
803036072	1.10 (0.0433)
803036073	1.25 (0.0492)
803036074	1.40 (0.0551)
803036075	0.65 (0.0256)

5) Install the selected thrust washer.

13.Reverse Checking System

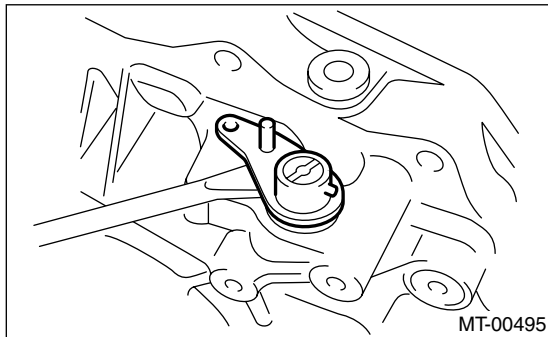
A: REMOVAL

- 1) Remove the manual transmission assembly from vehicle. <Ref. to 6MT-35, REMOVAL, Manual Transmission Assembly.>
- 2) Prepare the transmission for overhaul. <Ref. to 6MT-40, Preparation for Overhaul.>
- 3) Remove the extension case. <Ref. to 6MT-47, REMOVAL, Extension Case.>
- 4) Remove the snap ring and washer from reverse check shaft.



- (A) Snap ring
(B) Washer

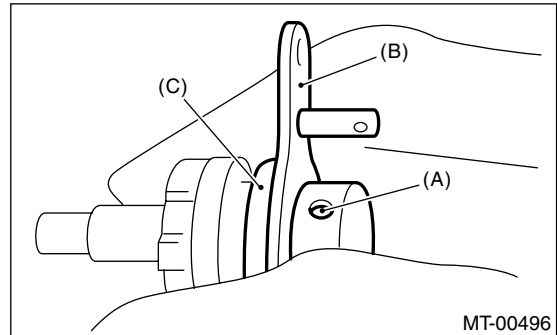
- 5) Remove the reverse check shaft and spring from extension case.



- 6) Remove the spring pin, and then remove the reverse check lever and oil seal from reverse check shaft.

NOTE:

Do not reuse the oil seal.

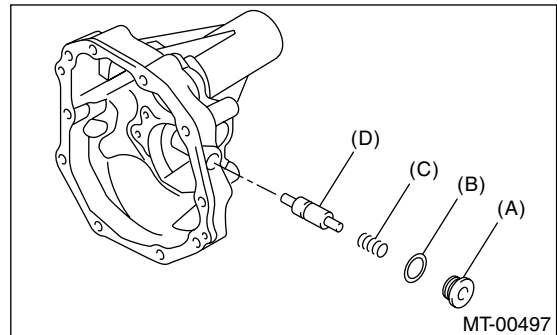


- (A) Spring pin
(B) Reverse check lever
(C) Oil seal

- 7) Remove the plug from extension case, then remove the gasket, spring and plunger.

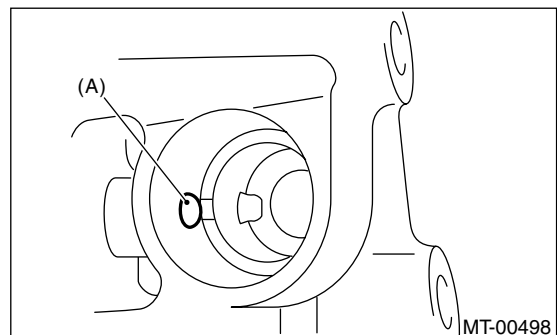
NOTE:

Do not reuse the gasket.



- (A) Plug
(B) Gasket
(C) Spring
(D) Plunger

- 8) Remove the reverse lock plunger.



- (A) Reverse lock plunger

REVERSE CHECKING SYSTEM

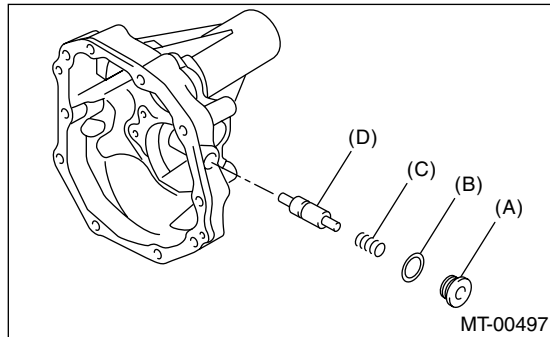
MANUAL TRANSMISSION AND DIFFERENTIAL

B: INSTALLATION

- 1) Insert the reverse lock plunger.
- 2) Install in the order of reverse check plug, spring, gasket and plug.

Tightening torque:

41 N·m (4.2 kgf-m, 30.2 ft-lb)

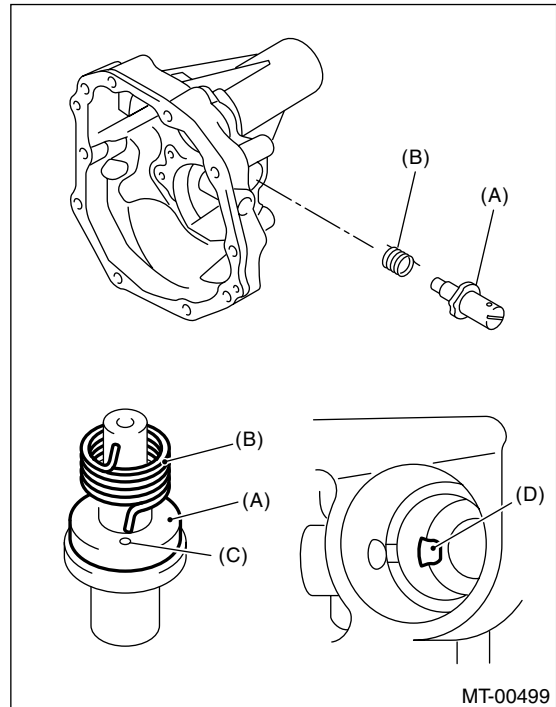


- (A) Plug
- (B) Gasket
- (C) Spring
- (D) Reverse check plug

- 3) Install the spring and reverse check shaft to extension case.

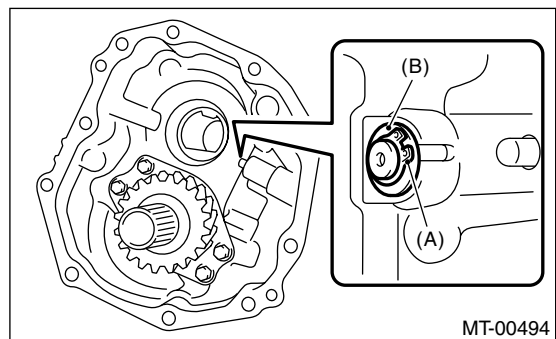
NOTE:

Be sure the spring end aligns with the hole of reverse check shaft and cutout portion of extension case.



- (A) Reverse check shaft
- (B) Spring
- (C) Hole
- (D) Cutout portion

- 4) Install the washer and snap ring.



- (A) Snap ring
- (B) Washer

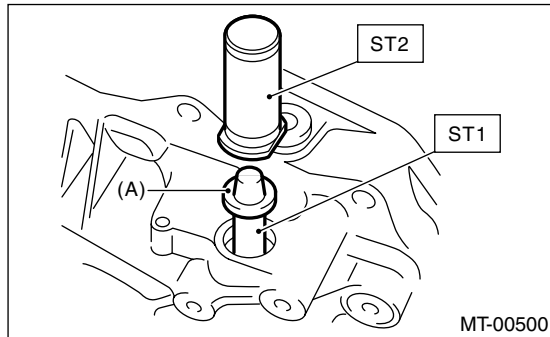
REVERSE CHECKING SYSTEM

MANUAL TRANSMISSION AND DIFFERENTIAL

5) Set the ST1 to reverse check shaft. Install a new oil seal, then press with ST2.

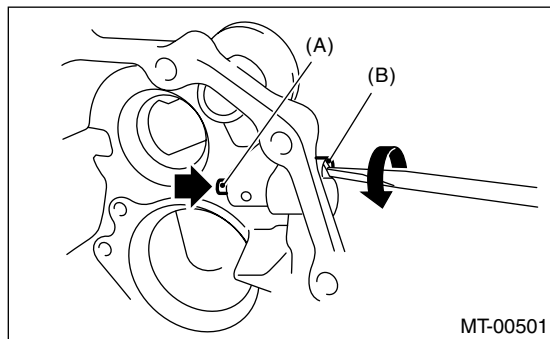
ST1 18671AA000 OIL SEAL GUIDE

ST2 18657AA010 INSTALLER



(A) Oil seal

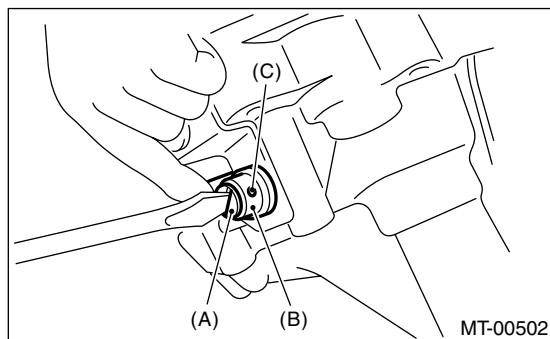
6) Insert the reverse check lever, then rotate the reverse check shaft until the plunger can be pushed in first.



(A) Plunger

(B) Reverse check shaft

7) Align the hole of reverse check lever and reverse check shaft, then install the spring pin.



(A) Reverse check shaft

(B) Reverse check lever

(C) Hole

8) Make sure the reverse check operates correctly. <Ref. to 6MT-55, INSPECTION, Reverse Checking System.>

9) Install the extension case. <Ref. to 6MT-47, INSTALLATION, Extension Case.>

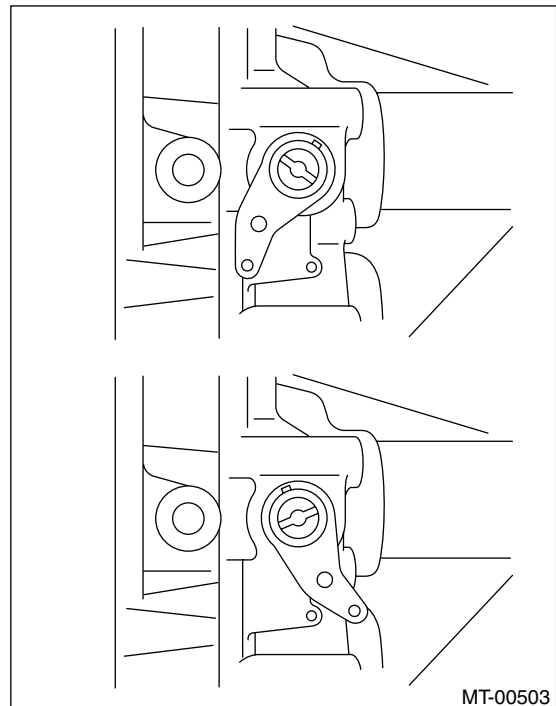
10) Install the manual transmission assembly to vehicle. <Ref. to 6MT-37, INSTALLATION, Manual Transmission Assembly.>

C: INSPECTION

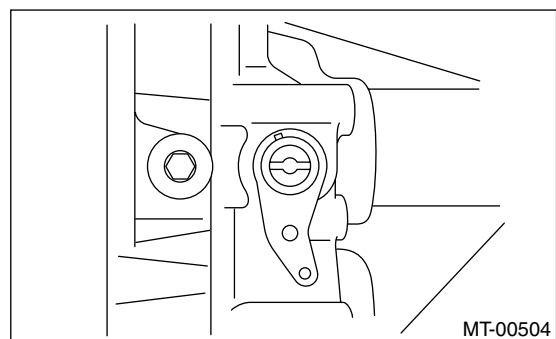
- 1) Make sure there is no damage on each parts.
- 2) Make sure the reverse check lever operates smoothly.
- 3) Make sure there is no oil leakage on oil seal part of reverse check shaft. If there is oil leakage, replace the oil seal.

4) Inspect the reverse check operation.

- (1) The plunger can be pushed or the gear can be shifted to reverse, when reverse check lever is in the following position.



- (2) The plunger cannot be pushed or the gear cannot be shifted to reverse, when reverse check lever is in the following position.

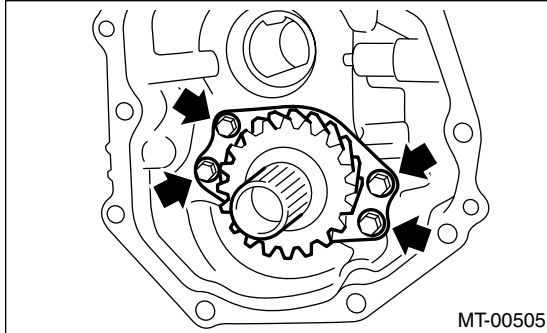


5) If not as specified, reassemble the reverse check system.

14. Transfer Drive Gear

A: REMOVAL

- 1) Remove the manual transmission assembly from vehicle. <Ref. to 6MT-35, REMOVAL, Manual Transmission Assembly.>
- 2) Prepare the transmission for overhaul. <Ref. to 6MT-40, Preparation for Overhaul.>
- 3) Remove the extension case. <Ref. to 6MT-47, REMOVAL, Extension Case.>
- 4) Remove the transfer drive gear.

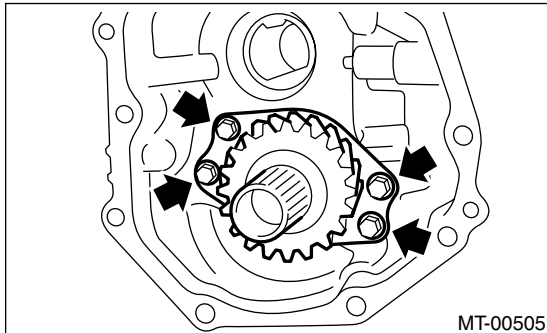


B: INSTALLATION

- 1) Install the transfer drive gear.

Tightening torque:

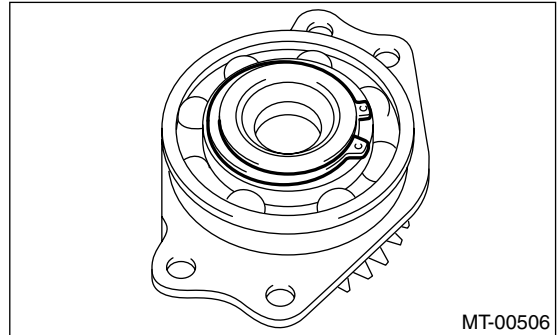
25 N·m (2.5 kgf-m, 18.1 ft-lb)



- 2) If the ball bearing, transfer drive gear or snap ring is replaced, select the transfer drive gear thrust washer. <Ref. to 6MT-49, ASSEMBLY, Extension Case.>
- 3) Install the extension case. <Ref. to 6MT-47, INSTALLATION, Extension Case.>
- 4) Install the manual transmission assembly to vehicle. <Ref. to 6MT-37, INSTALLATION, Manual Transmission Assembly.>

C: DISASSEMBLY

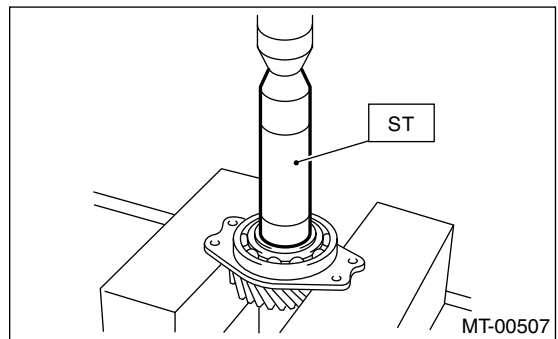
- 1) Remove the snap ring.



- 2) Using the ST, remove the ball bearing.
ST 499877000 RACE 4-5 INSTALLER

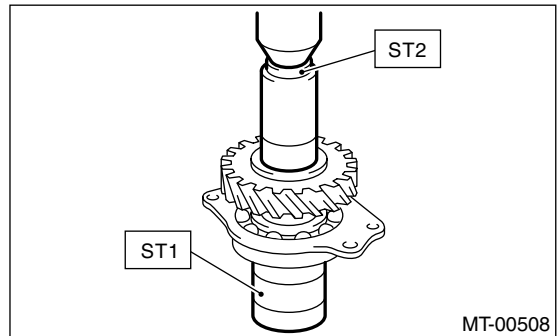
NOTE:

Do not reuse the ball bearing.

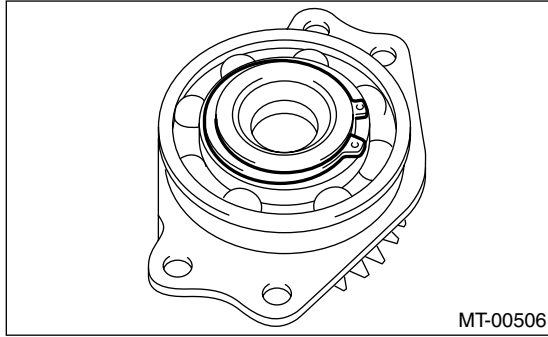


D: ASSEMBLY

- 1) Using the ST, install the ball bearing.
ST1 499247400 INSTALLER
ST2 398497701 SEAT



2) Install the snap ring.



3) Inspect the clearance between snap ring and ball bearing. <Ref. to 6MT-57, INSPECTION, Transfer Drive Gear.>

E: INSPECTION

1) Bearings

Replace the bearings in the following cases.

- Broken or rusty bearings
- Worn or damaged
- Bearings that fail to turn smoothly or make abnormal noise.

2) Drive gear

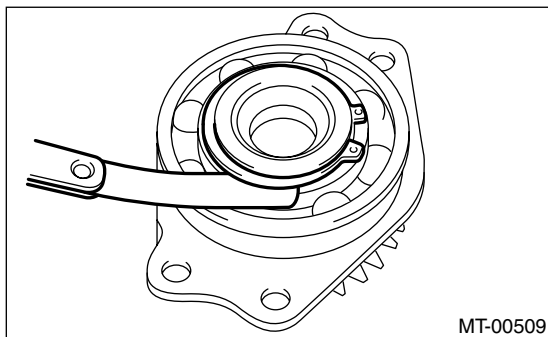
Replace the drive gear in the following cases.

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

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

Standard clearance between snap ring and inner race:

0 — 0.15 mm (0 — 0.0059 in)



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

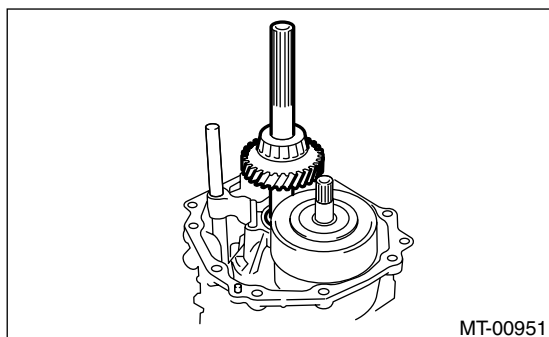
Thrust washer		
Part No.	Thickness	mm (in)
805045050	1.76	(0.069)
805045060	1.88	(0.074)
805045070	2.00	(0.079)

After replacement of the snap ring, inspect the clearance again.

15. Transfer Driven Gear

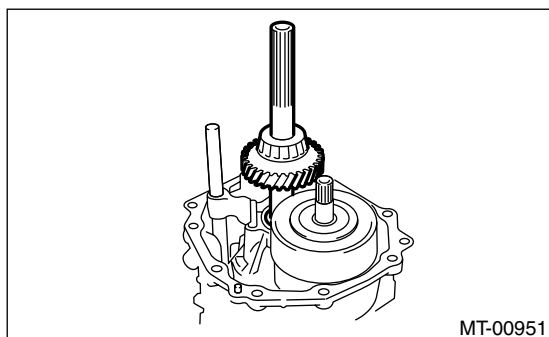
A: REMOVAL

- 1) Remove the manual transmission assembly from vehicle. <Ref. to 6MT-35, REMOVAL, Manual Transmission Assembly.>
- 2) Prepare the transmission for overhaul. <Ref. to 6MT-40, Preparation for Overhaul.>
- 3) Remove the extension case. <Ref. to 6MT-47, REMOVAL, Extension Case.>
- 4) Remove the transfer driven gear.



B: INSTALLATION

- 1) Install the transfer driven gear.

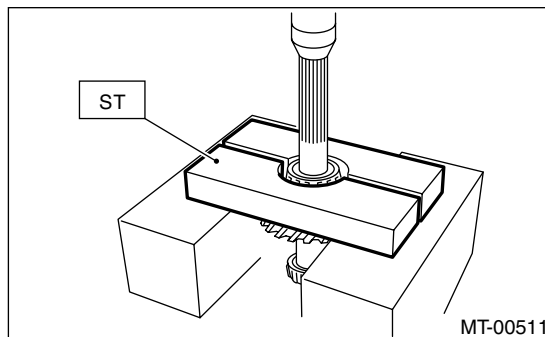


- 2) If the bearing or transfer driven gear is replaced, select the transfer driven thrust washer. <Ref. to 6MT-49, ADJUSTMENT, Extension Case.>
- 3) Install the extension case. <Ref. to 6MT-47, INSTALLATION, Extension Case.>
- 4) Install the manual transmission assembly to vehicle. <Ref. to 6MT-37, INSTALLATION, Manual Transmission Assembly.>

C: DISASSEMBLY

- 1) Using the ST, remove the roller bearing of extension case side.

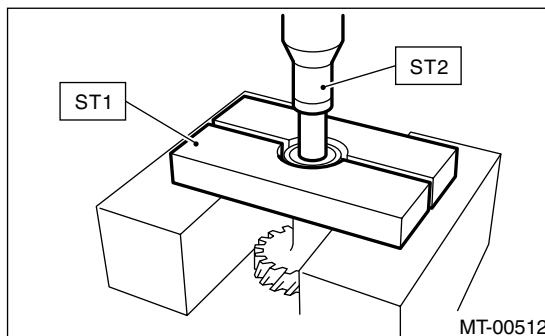
ST 498515700 REMOVER



- 2) Using the ST, remove the roller bearing of transmission case side.

ST1 899858600 REMOVER

ST2 899864100 REMOVER



D: ASSEMBLY

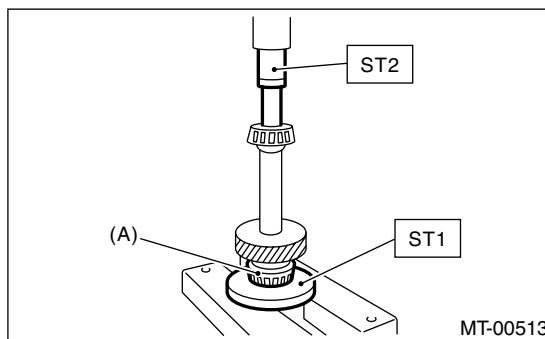
- 1) Using the ST, install the roller bearing of extension case side.

ST1 398177700 INSTALLER

ST2 899864100 REMOVER

CAUTION:

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



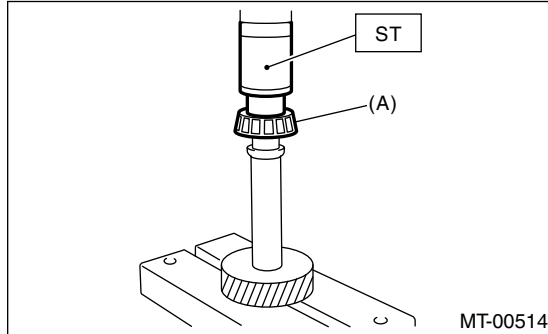
(A) Roller bearing

2) Using the ST, install the roller bearing of transmission case side.

ST 499757002 INSTALLER

CAUTION:

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



(A) Roller bearing

E: INSPECTION

1) Bearings

Replace the bearing in following cases.

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

2) Driven gear

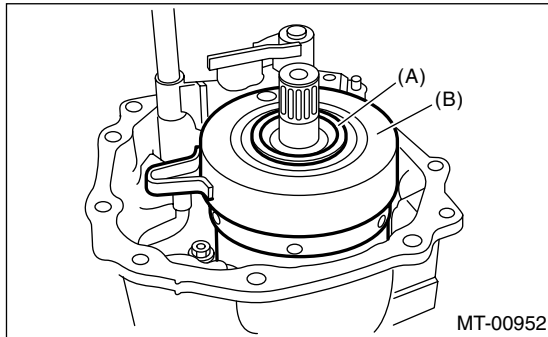
Replace the driven gear in following case.

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

16.Center Differential

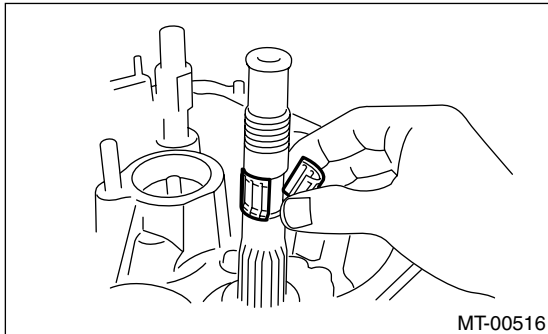
A: REMOVAL

- 1) Remove the manual transmission case assembly from vehicle. <Ref. to 6MT-35, REMOVAL, Manual Transmission Assembly.>
- 2) Prepare the transmission for overhaul. <Ref. to 6MT-40, Preparation for Overhaul.>
- 3) Remove the extension case. <Ref. to 6MT-47, REMOVAL, Extension Case.>
- 4) Remove the transfer driven gear. <Ref. to 6MT-58, REMOVAL, Transfer Driven Gear.>
- 5) Disconnect the center differential connector.
- 6) Remove the thrust washer and center differential.



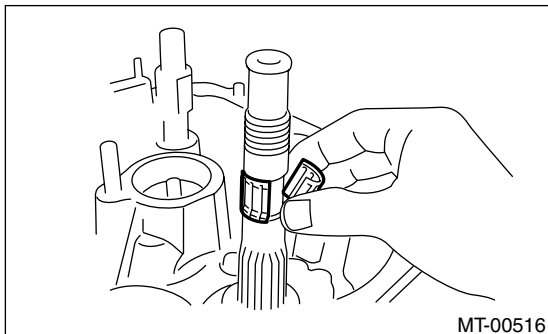
(A) Thrust washer
(B) Center differential

- 7) Remove the needle bearing.

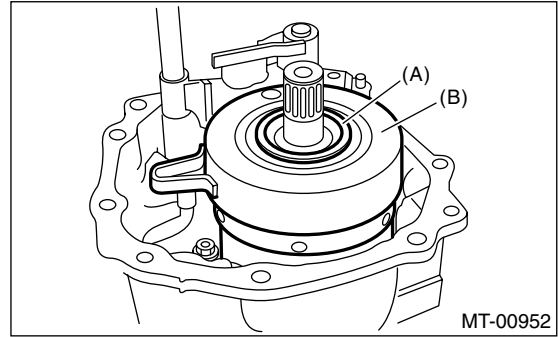


B: INSTALLATION

- 1) Install the needle bearing.



- 2) Install the thrust washer and center differential.



(A) Thrust washer
(B) Center differential

- 3) If replacing the center differential, select the transfer drive gear and thrust washer and install. <Ref. to 6MT-49, ADJUSTMENT, Extension Case.>
- 4) Connect the center differential connector, and secure it to oil guide.
- 5) Install the transfer driven gear. <Ref. to 6MT-58, INSTALLATION, Transfer Driven Gear.>
- 6) Install the extension case. <Ref. to 6MT-47, INSTALLATION, Extension Case.>
- 7) Install the manual transmission case assembly to vehicle. <Ref. to 6MT-37, INSTALLATION, Manual Transmission Assembly.>

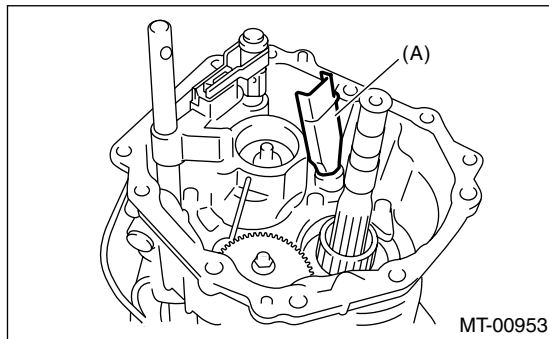
C: INSPECTION

Make sure there is no damage on the center differential, ball bearing and oil pump drive gear. Replace the center differential assembly if damaged.

17.Oil Pump

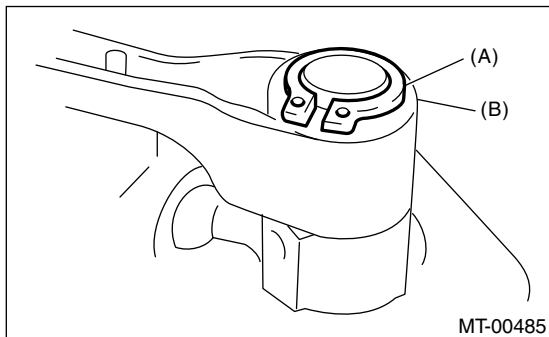
A: REMOVAL

- 1) Remove the manual transmission assembly from vehicle. <Ref. to 6MT-35, REMOVAL, Manual Transmission Assembly.>
- 2) Prepare the transmission for overhaul. <Ref. to 6MT-40, Preparation for Overhaul.>
- 3) Remove the extension case. <Ref. to 6MT-47, REMOVAL, Extension Case.>
- 4) Remove the transfer driven gear. <Ref. to 6MT-58, REMOVAL, Transfer Driven Gear.>
- 5) Remove the center differential. <Ref. to 6MT-60, REMOVAL, Center Differential.>
- 6) Remove the oil guide.



(A) Oil guide

- 7) Remove the snap ring.

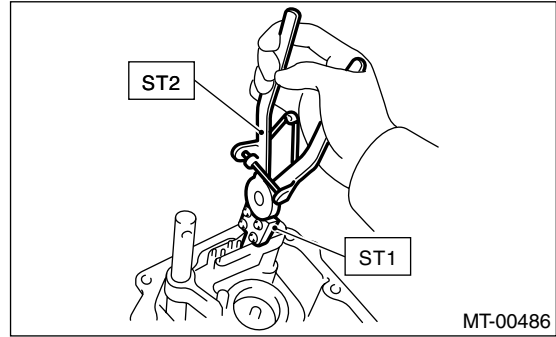


(A) Snap ring
(B) Support

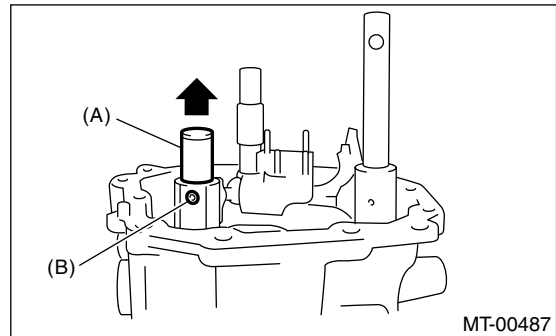
- 8) Using the ST, remove the neutral set spring and support.

ST1 18756AA000 CLAW

ST2 399863600 PLIERS

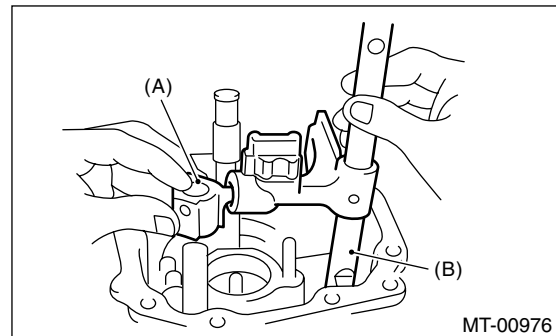


- 9) Raise the striking rod up, and then remove the spring pin.



(A) Striking rod
(B) Spring pin

- 10) Remove the selector arm No. 2 and shifter arm.



(A) Selector arm No. 2
(B) Shifter arm

OIL PUMP

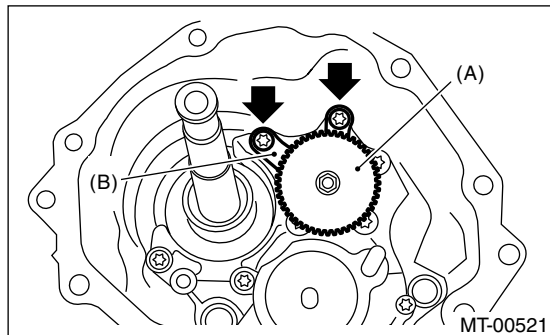
MANUAL TRANSMISSION AND DIFFERENTIAL

11) Remove the oil pump shaft assembly and plate.

NOTE:

Remove the bolts using ST, because tool may break if general tool is used.

ST 18663AA000 SOCKET



(A) Oil pump shaft assembly

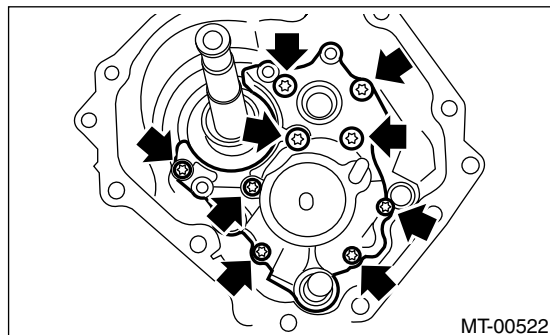
(B) Plate

12) Remove the oil pump cover assembly.

NOTE:

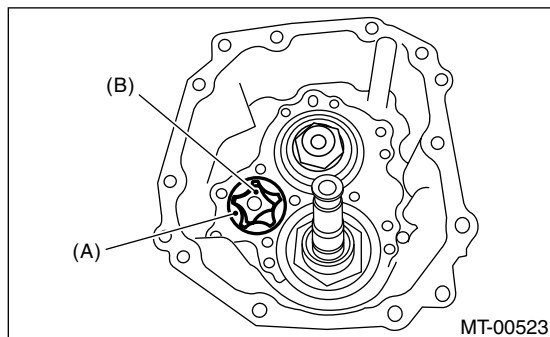
Remove the bolts using ST, because tool may break if general tool is used.

ST 18663AA000 SOCKET



13) Remove the thrust washer on main shaft part.

14) Remove the oil pump rotor.

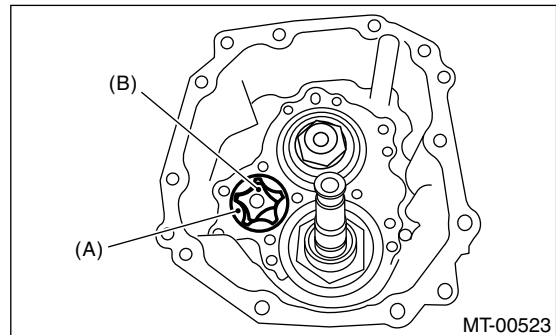


(A) Outer rotor

(B) Inner rotor

B: INSTALLATION

1) Apply oil to the outer periphery of outer rotor, then install to transmission case.



(A) Outer rotor

(B) Inner rotor

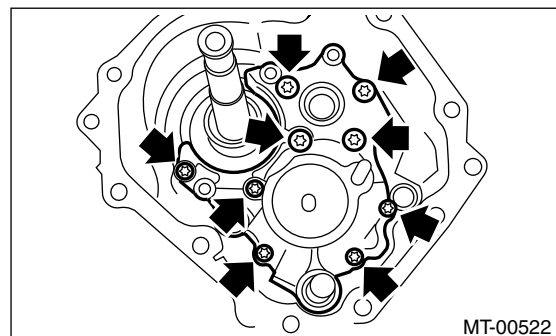
2) Install the thrust washer to main shaft part.

3) Install the oil pump cover assembly.

Tightening torque:

25 N·m (2.5 kgf-m, 18.1 ft-lb)

ST 18663AA000 SOCKET

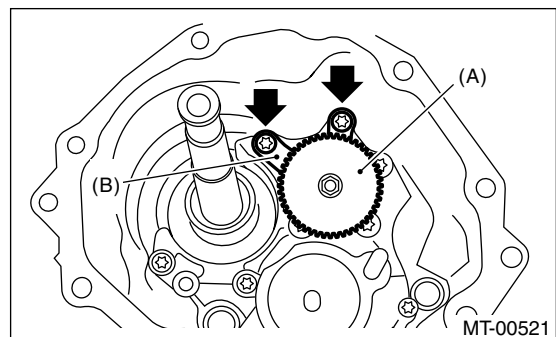


4) Install the oil pump shaft assembly and plate.

Tightening torque:

25 N·m (2.5 kgf-m, 18.1 ft-lb)

ST 18663AA000 SOCKET



(A) Oil pump shaft assembly

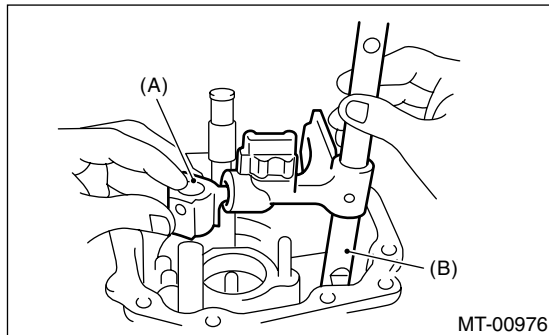
(B) Plate

OIL PUMP

MANUAL TRANSMISSION AND DIFFERENTIAL

5) If replacing the oil pump cover assembly, select the transfer driven gear and thrust washer, then install them to the extension case. <Ref. to 6MT-49, ADJUSTMENT, Extension Case.>

6) Install the selector arm No. 2 and shifter arm.



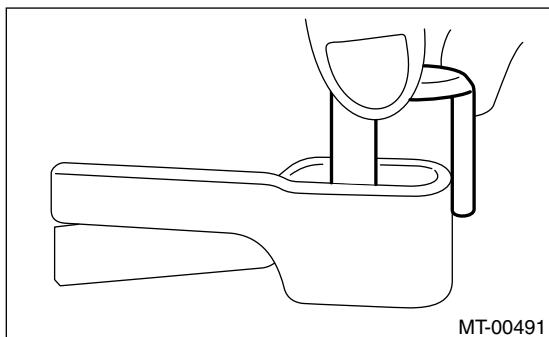
- (A) Selector arm No. 2
(B) Shift arm

7) Install a new spring pin.

8) Install the support to neutral set spring.

NOTE:

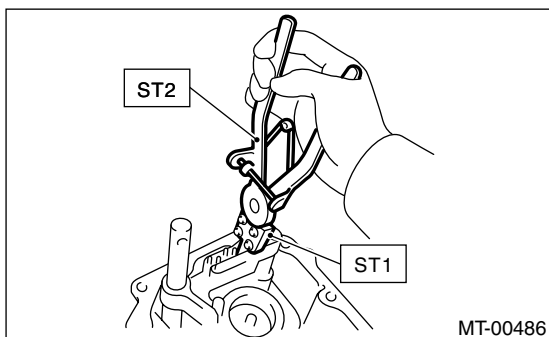
Make sure to install the support in proper direction.



9) Using the ST, install the neutral set spring and support.

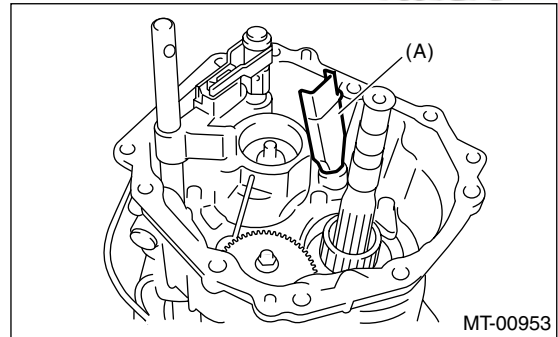
ST1 18756AA000 CLAW

ST2 399863600 PLIERS



10) Install the snap ring.

11) Install the oil guide.



- (A) Oil guide

12) Install the center differential. <Ref. to 6MT-60, INSTALLATION, Center Differential.>

13) Install the transfer driven gear. <Ref. to 6MT-58, INSTALLATION, Transfer Driven Gear.>

14) Install the extension case. <Ref. to 6MT-47, INSTALLATION, Extension Case.>

15) Install the manual transmission assembly to vehicle. <Ref. to 6MT-37, INSTALLATION, Manual Transmission Assembly.>

C: INSPECTION

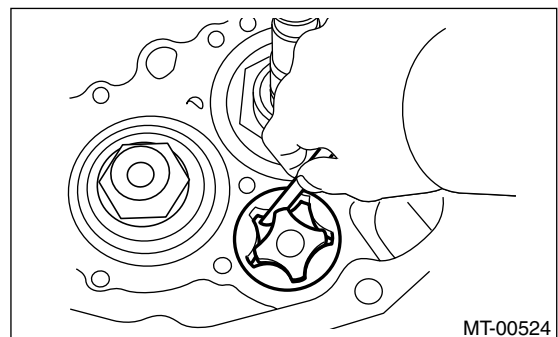
1) Make sure there is no damage on the inner rotor and outer rotor. Replace the inner rotor and outer rotor as assembly if damaged.

2) Clearance at tip

Install the inner rotor and outer rotor to transmission case. Align tip of the inner rotor and outer rotor, then measure the clearance. Replace the inner rotor and outer rotor as a set if clearance exceeds specification.

Specification of clearance at tip:

Less than 0.15 mm (0.0059 in)

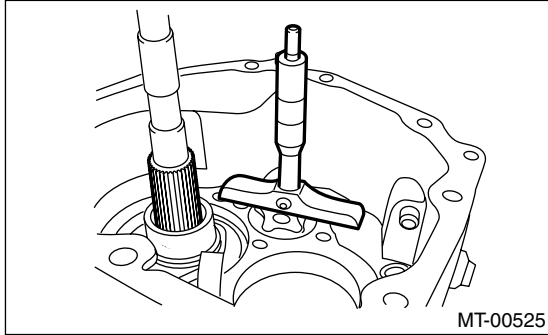


3) Side clearance

Measure to the transmission case and rotor. Replace the inner rotor and outer rotor as a set if clearance exceeds specification.

Specification of side clearance:

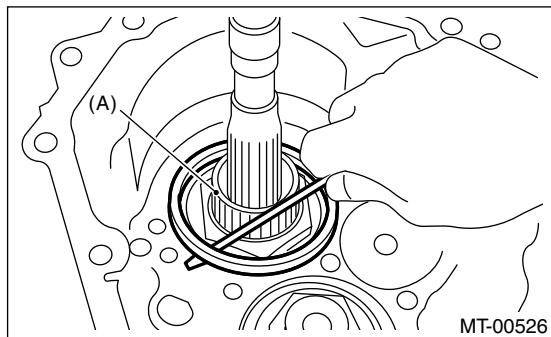
0.03 — 0.10 mm (0.0012 — 0.0039 in)



18. Transmission Case

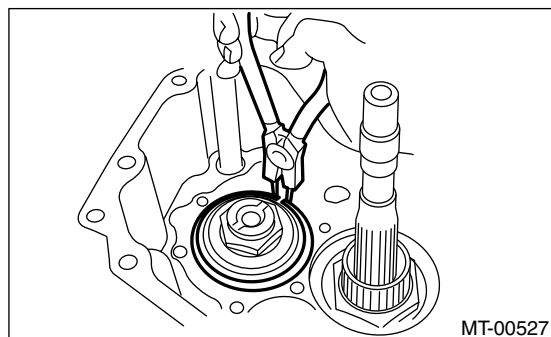
A: REMOVAL

- 1) Remove the manual transmission assembly from vehicle. <Ref. to 6MT-35, REMOVAL, Manual Transmission Assembly.>
- 2) Prepare the transmission for overhaul. <Ref. to 6MT-40, Preparation for Overhaul.>
- 3) Remove the oil pipe, neutral position switch, back-up light switch and harness. <Ref. to 6MT-42, REMOVAL, Oil Pipe.>, <Ref. to 6MT-45, REMOVAL, Neutral Position Switch.>, <Ref. to 6MT-43, REMOVAL, Back-up Light Switch.>
- 4) Remove the extension case. <Ref. to 6MT-47, REMOVAL, Extension Case.>
- 5) Remove the transfer driven gear. <Ref. to 6MT-58, REMOVAL, Transfer Driven Gear.>
- 6) Remove the center differential. <Ref. to 6MT-60, REMOVAL, Center Differential.>
- 7) Remove the oil pump. <Ref. to 6MT-61, REMOVAL, Oil Pump.>
- 8) Remove the shim and spacer of driven gear assembly.

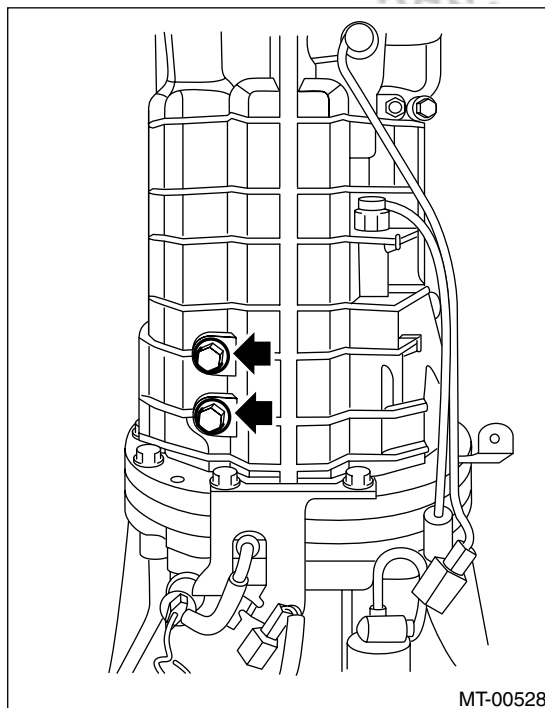


(A) Driven gear assembly

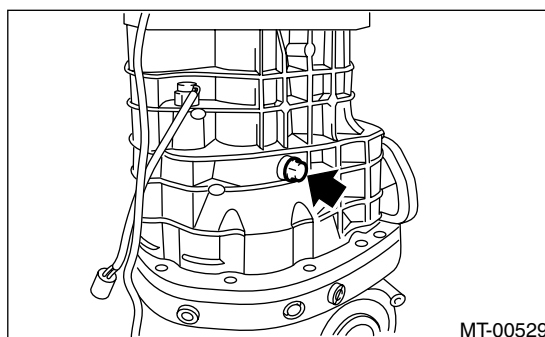
- 9) Remove the snap ring.



- 10) Remove the pilot bolt.



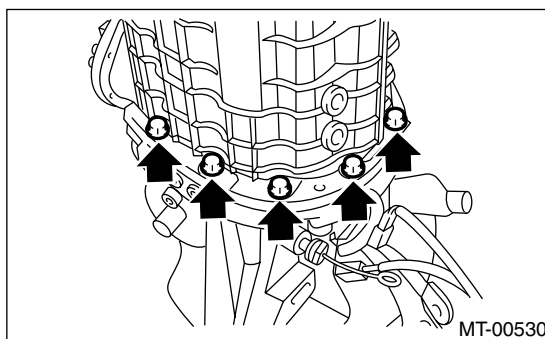
- 11) Remove the holder reverse bolt.



- 12) Remove the transmission case.

NOTE:

If the oil guide catches on shift fork, the transmission case may be difficult to be removed. Move the oil guide right and left to remove. Do not pull the transmission case by force.



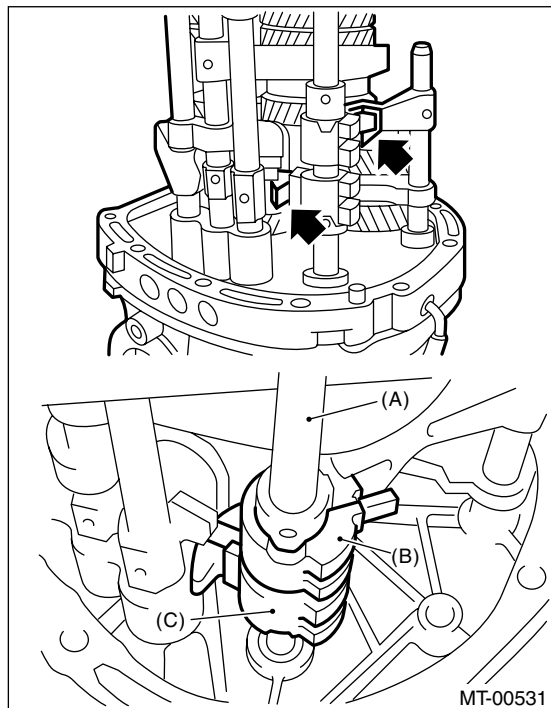
- 13) Completely remove the remaining liquid gasket on transmission case and adapter plate.

TRANSMISSION CASE

MANUAL TRANSMISSION AND DIFFERENTIAL

B: INSTALLATION

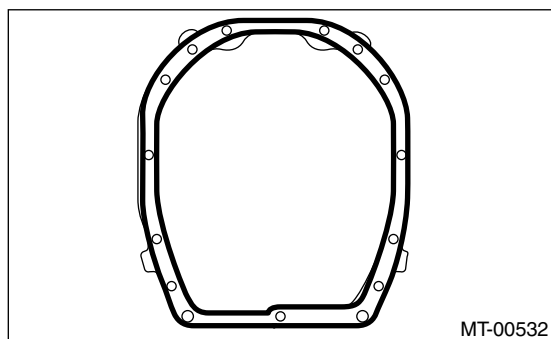
1) Make sure that each shifter fork and interlock block is shifted to neutral position. If not, shift to neutral position.



- (A) Striking rod
- (B) Reverse interlock block
- (C) Interlock block

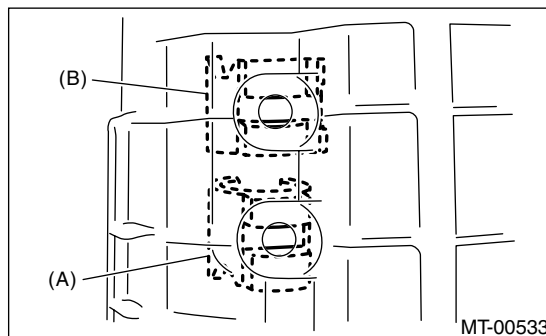
2) Apply liquid gasket to the adapter plate.

Liquid gasket:
THREE BOND 1215 (Part No. 004403007)



3) Install the transmission case.

4) Make sure the interlock block and reverse interlock block are aligned in neutral position by inspecting through the pilot bolt installation hole. If not aligned, remove the transmission case, then shift each shifter fork and interlock block to neutral position.



- (A) Interlock block
- (B) Reverse interlock block

5) Using a new gasket, install the pilot bolts temporarily.

6) Tighten the transmission case with bolts and nuts.

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

7) Tighten the pilot bolts.

Tightening torque:
34 N·m (3.5 kgf-m, 25.1 ft-lb)

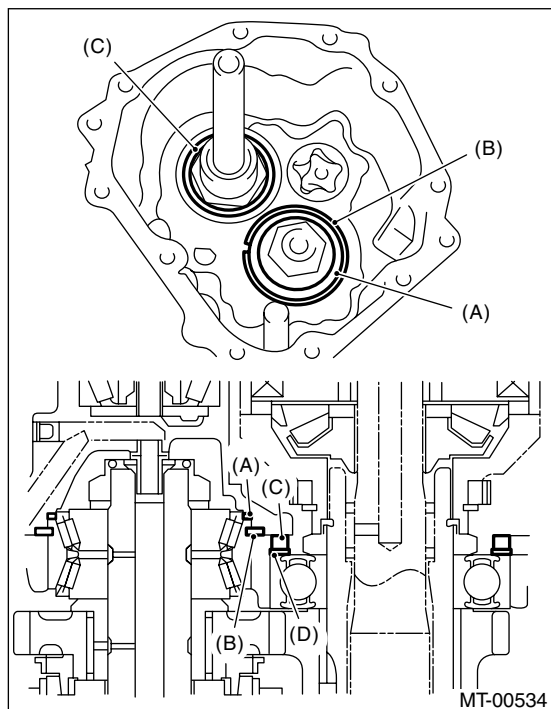
8) Tighten the holder reverse bolt.

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

TRANSMISSION CASE

MANUAL TRANSMISSION AND DIFFERENTIAL

9) Install the snap ring, washer and collar of driven gear assembly.



- (A) Washer
- (B) Snap ring
- (C) Collar
- (D) Washer

10) Install the oil pump. <Ref. to 6MT-62, INSTALLATION, Oil Pump.>

11) Install the center differential. <Ref. to 6MT-60, INSTALLATION, Center Differential.>

12) Install the transfer driven gear. <Ref. to 6MT-58, INSTALLATION, Transfer Driven Gear.>

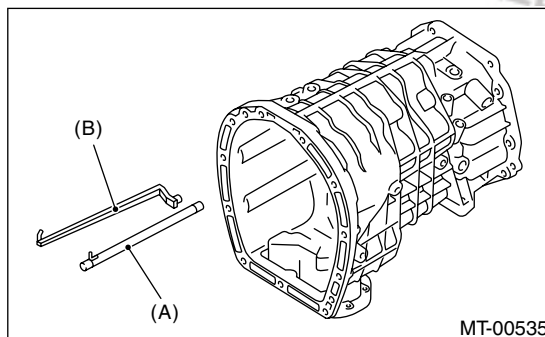
13) Install the extension case. <Ref. to 6MT-47, INSTALLATION, Extension Case.>

14) Install the oil pipe, neutral position switch, back-up light switch and harness. <Ref. to 6MT-42, INSTALLATION, Oil Pipe.>, <Ref. to 6MT-45, INSTALLATION, Neutral Position Switch.>, <Ref. to 6MT-43, INSTALLATION, Back-up Light Switch.>

15) Install the manual transmission assembly to vehicle. <Ref. to 6MT-37, INSTALLATION, Manual Transmission Assembly.>

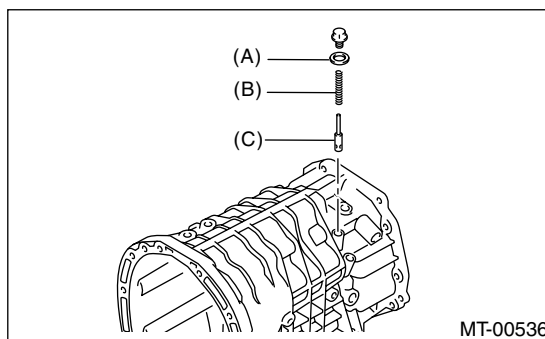
C: DISASSEMBLY

1) Remove the oil pipe and oil guide.



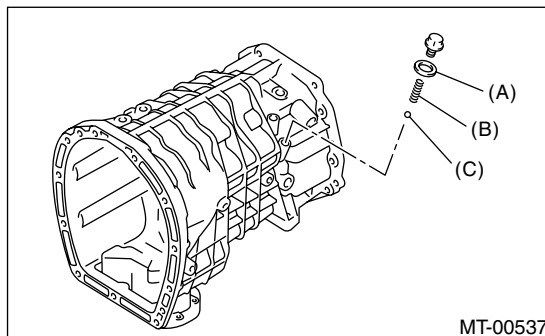
- (A) Oil pipe
- (B) Oil guide

2) Remove the bolt, and then remove the O-ring, relief spring and relief valve.



- (A) O-ring
- (B) Relief valve spring
- (C) Relief valve

3) Remove the bolt, and then remove the O-ring, valve spring and ball.

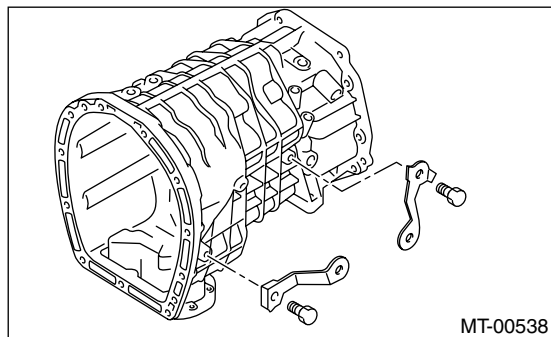


- (A) O-ring
- (B) Valve spring
- (C) Ball

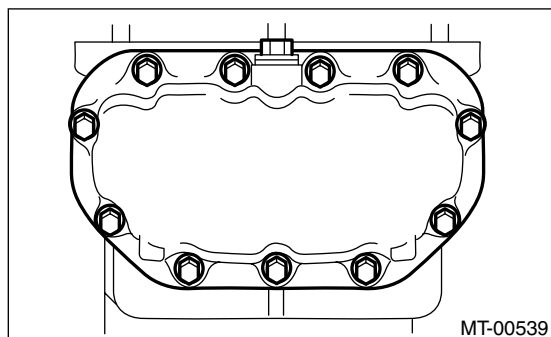
TRANSMISSION CASE

MANUAL TRANSMISSION AND DIFFERENTIAL

4) Remove the harness bracket.

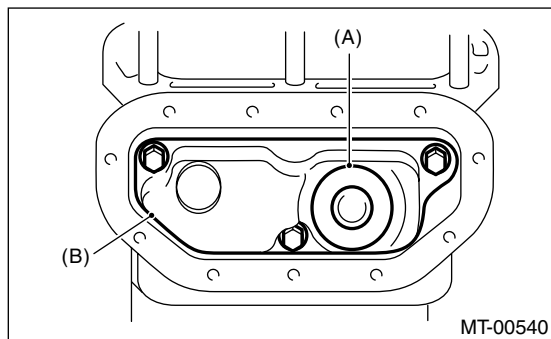


5) Remove the oil pan.



6) Completely remove the remaining liquid gasket on transmission case and oil pan.

7) Remove the oil pan magnet, and then remove the oil strainer.



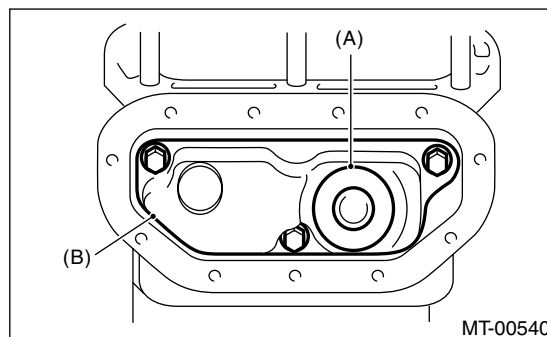
- (A) Oil pan magnet
- (B) Oil strainer

D: ASSEMBLY

1) Install the oil strainer and magnet.

Tightening torque:

10 N·m (1.0 kgf-m, 7.4 ft-lb)

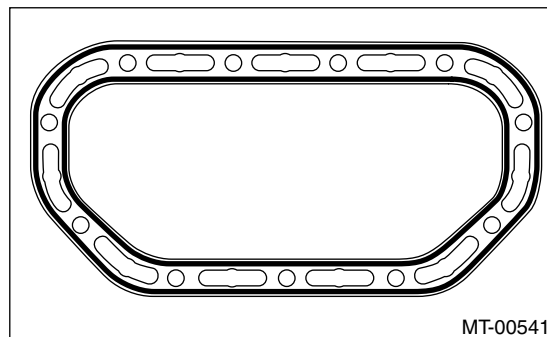


- (A) Oil pan magnet
- (B) Oil strainer

2) Apply liquid gasket to the oil pan.

Liquid gasket:

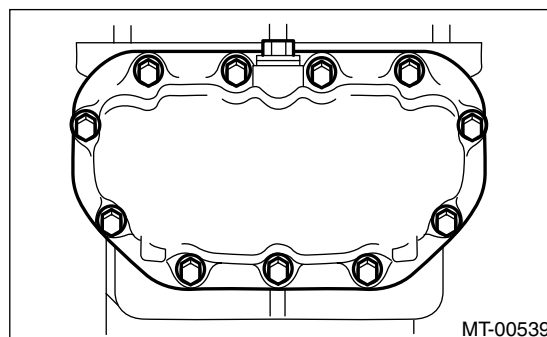
THREE BOND 1215 (Part No. 004403007)



3) Install the oil pan.

Tightening torque:

6.4 N·m (0.65 kgf-m, 4.7 ft-lb)



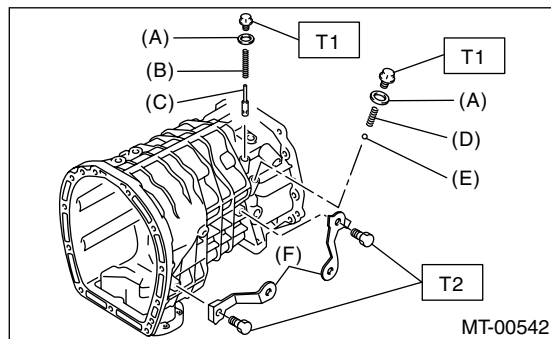
4) Install the relief valve, relief valve spring and new O-ring.

5) Install the ball, valve spring and new O-ring.

Tightening torque:

T1: 13 N·m (1.3 kgf-m, 9.6 ft-lb)

T2: 16 N·m (1.6 kgf-m, 11.8 ft-lb)



- (A) O-ring
- (B) Relief valve spring
- (C) Relief valve
- (D) Valve spring
- (E) Ball
- (F) Harness bracket

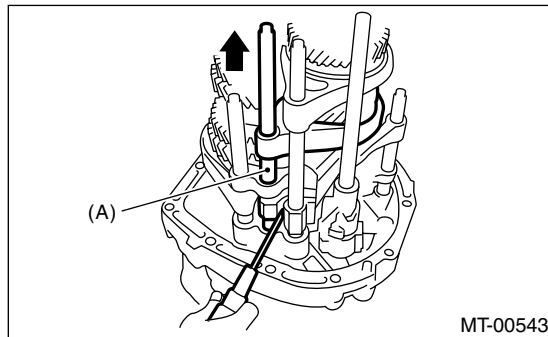
E: INSPECTION

- 1) Completely remove with shop cloth if sludge is adhered to the oil pan magnet.
- 2) Make sure there is no clog on the oil strainer. If clogged, remove clog or replace the oil strainer.
- 3) Make sure there is no damage on each parts. Replace damaged parts with new parts.

19. Main Shaft Assembly

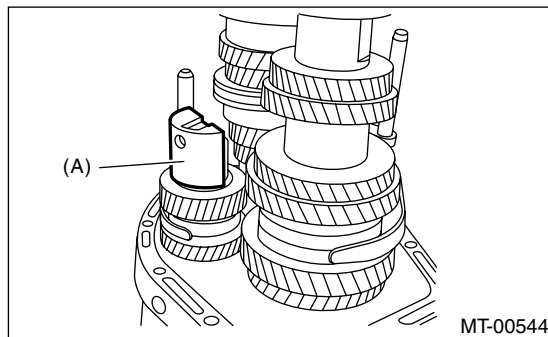
A: REMOVAL

- 1) Remove the manual transmission assembly from vehicle. <Ref. to 6MT-35, REMOVAL, Manual Transmission Assembly.>
- 2) Prepare the transmission for overhaul. <Ref. to 6MT-40, Preparation for Overhaul.>
- 3) Remove the oil pipe, neutral position switch, back-up light switch and harness. <Ref. to 6MT-42, REMOVAL, Oil Pipe.>, <Ref. to 6MT-45, REMOVAL, Neutral Position Switch.>, <Ref. to 6MT-43, REMOVAL, Back-up Light Switch.>
- 4) Remove the extension case. <Ref. to 6MT-47, REMOVAL, Extension Case.>
- 5) Remove the transfer driven gear. <Ref. to 6MT-58, REMOVAL, Transfer Driven Gear.>
- 6) Remove the center differential. <Ref. to 6MT-60, REMOVAL, Center Differential.>
- 7) Remove the oil pump. <Ref. to 6MT-61, REMOVAL, Oil Pump.>
- 8) Remove the transmission case. <Ref. to 6MT-65, REMOVAL, Transmission Case.>
- 9) Remove the striking rod.
- 10) Using a screwdriver, shift to 4th gear position.



(A) 3rd-4th shift rod

- 11) Remove the reverse idler holder.

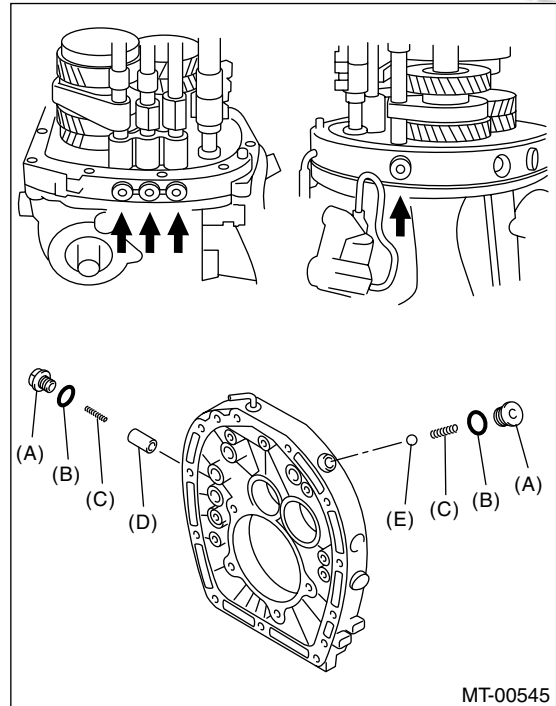


(A) Reverse idler holder

- 12) Remove all checking plug, gasket, checking spring, plunger and checking ball from adapter plate.

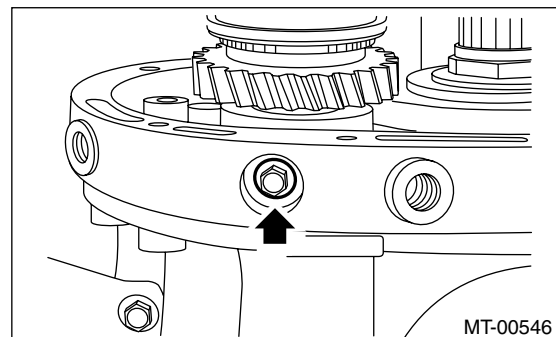
NOTE:

Do not reuse the gasket.



- (A) Checking plug
- (B) Gasket
- (C) Checking spring
- (D) Plunger
- (E) Checking ball

- 13) Remove the bolt and gasket installing reverse idler shaft.



- 14) Press the main shaft assembly, driven gear assembly, reverse idler gear and each shifter fork, then remove from the adapter plate at once.

NOTE:

Two people should do the work.

MAIN SHAFT ASSEMBLY

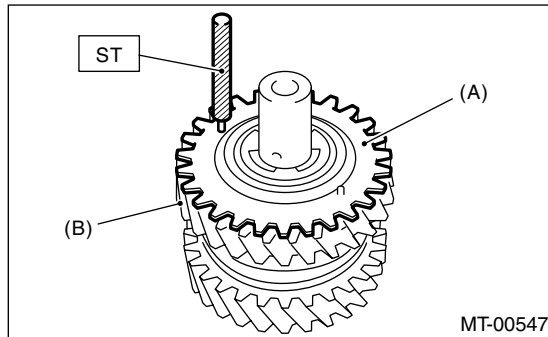
MANUAL TRANSMISSION AND DIFFERENTIAL

B: INSTALLATION

1) Adjust the 3rd-4th, and 5th-6th shifter fork rod.
<Ref. to 6MT-117, ADJUSTMENT, Shifter Fork and Rod.>

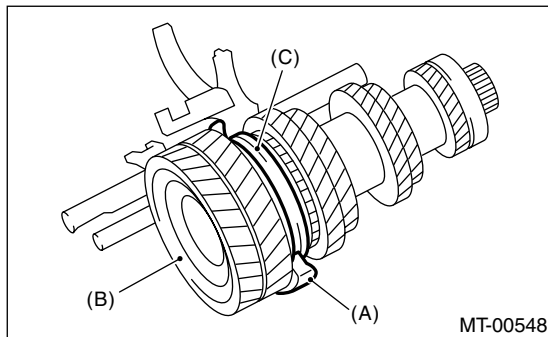
2) Turn the sub gear counterclockwise for approx. three teeth. Align the sub gear and reverse idler gear hole, then insert the ST.

ST 18757AA000 STRAIGHT PIN



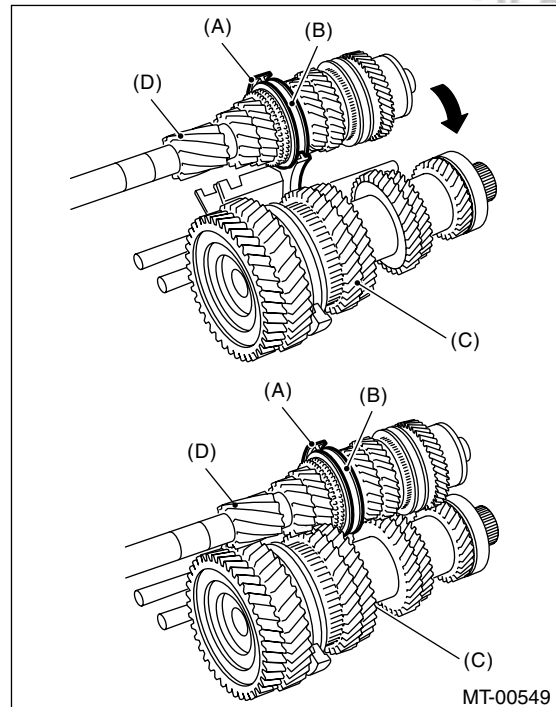
- (A) Sub gear
- (B) Reverse idler gear

3) Install the driven gear assembly to 1st-2nd shifter fork assembly.



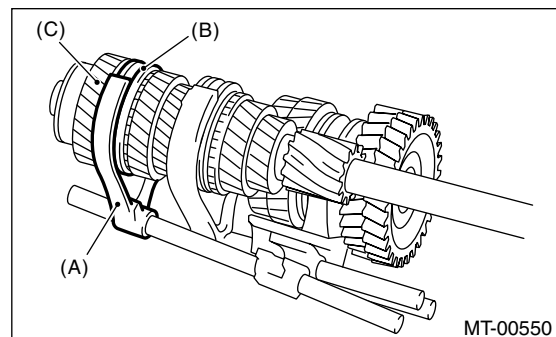
- (A) 1st-2nd shifter fork
- (B) Driven gear assembly
- (C) 1st-2nd sleeve

4) Install the main shaft assembly to 3rd-4th shifter fork, and then assemble to driven gear assembly.



- (A) 3rd-4th shifter fork
- (B) 3rd-4th sleeve
- (C) Driven gear assembly
- (D) Main shaft assembly

5) Install the 5th-6th shifter fork assembly to main shaft assembly.



- (A) 5th-6th shifter fork
- (B) 5th-6th sleeve
- (C) Main shaft assembly

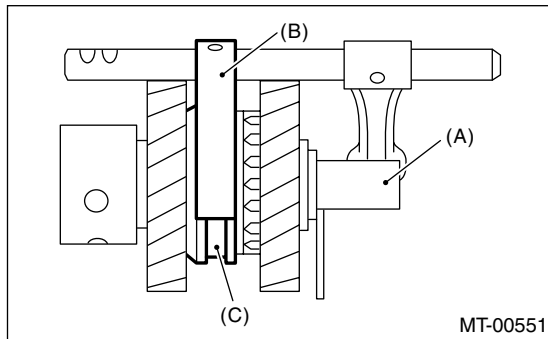
MAIN SHAFT ASSEMBLY

MANUAL TRANSMISSION AND DIFFERENTIAL

6) Install the reverse shifter fork assembly to reverse idler gear assembly.

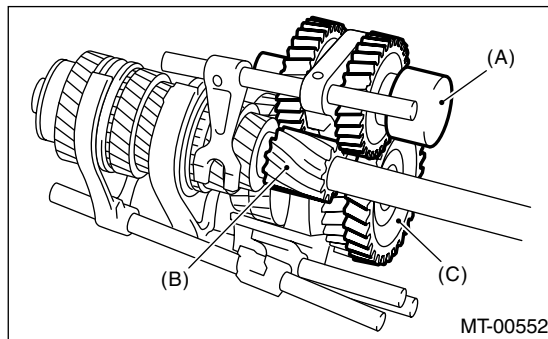
Tightening torque:

37 N·m (3.8 kgf-m, 27.3 ft-lb)



- (A) Reverse idler gear assembly
- (B) Reverse shifter fork
- (C) Reverse sleeve

7) Install the reverse idler gear assembly.



- (A) Reverse idler gear assembly
- (B) 1st drive gear
- (C) Reverse gear

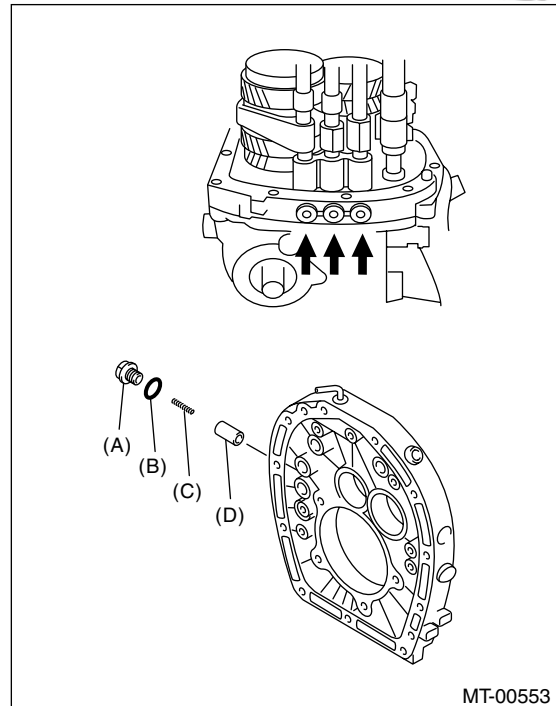
8) Install the thrust bearing of driven gear assembly.

9) Press each shifter fork, main shaft assembly, driven gear assembly and reverse idler gear assembly, then install them to the adapter plate at once.

NOTE:

Two people should do the work.

10) Install the plunger, checking spring, new gasket and checking plug.



- (A) Checking plug
- (B) Gasket
- (C) Checking spring
- (D) Plunger

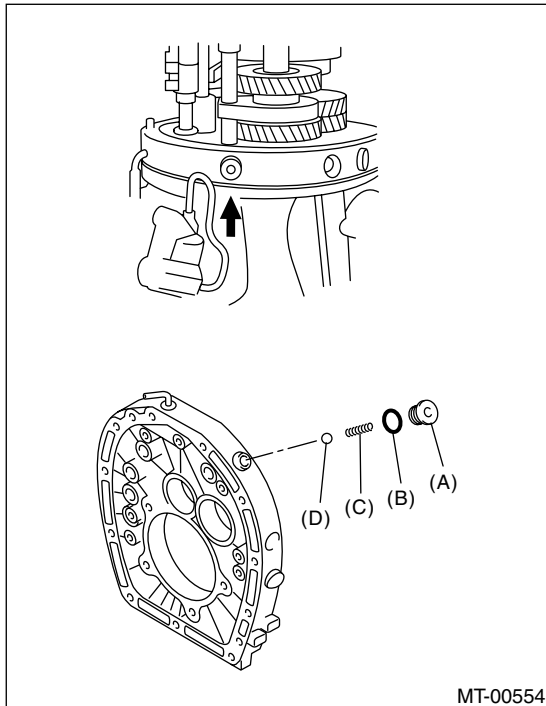
MAIN SHAFT ASSEMBLY

MANUAL TRANSMISSION AND DIFFERENTIAL

11) Install the checking ball, checking spring, new gasket and checking plug.

Tightening torque:

37 N·m (3.8 kgf-m, 27.3 ft-lb)

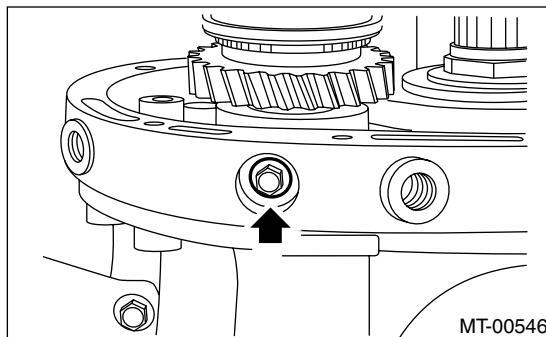


- (A) Checking plug
- (B) Gasket
- (C) Checking spring
- (D) Checking ball

12) Install the bolt and a new gasket.

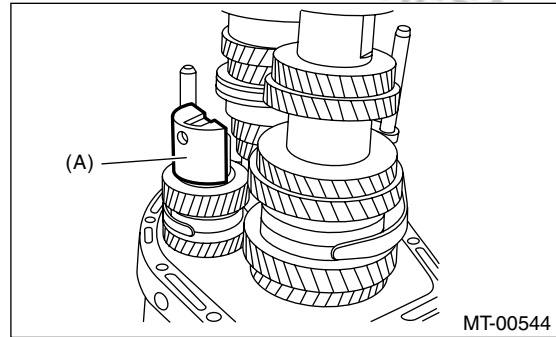
Tightening torque:

25 N·m (2.5 kgf-m, 18.1 ft-lb)



13) Using a screwdriver, shift to 4th gear position.

14) Install the reverse idler holder



- (A) Reverse idler holder

15) Install the striking rod.

16) Install the transmission case. <Ref. to 6MT-66, INSTALLATION, Transmission Case.>

17) Install the selected main shaft snap ring and washer.

18) Install the oil pump. <Ref. to 6MT-62, INSTALLATION, Oil Pump.>

19) Install the center differential. <Ref. to 6MT-60, INSTALLATION, Center Differential.>

20) Install the transfer driven gear. <Ref. to 6MT-58, INSTALLATION, Transfer Driven Gear.>

21) Install the extension case. <Ref. to 6MT-47, INSTALLATION, Extension Case.>

22) Install the oil pipe, neutral position switch, back-up light switch and harness. <Ref. to 6MT-42, INSTALLATION, Oil Pipe.>, <Ref. to 6MT-45, INSTALLATION, Neutral Position Switch.>, <Ref. to 6MT-43, INSTALLATION, Back-up Light Switch.>

23) Install the manual transmission assembly to vehicle. <Ref. to 6MT-37, INSTALLATION, Manual Transmission Assembly.>

C: DISASSEMBLY

NOTE:

Each sleeve and hub engage at a specified point. Mark an engagement point on the sleeve and hub before disassembly.

1) Secure the ST on workbench.

ST 18664AA000 BASE

2) Lift the caulking of lock nut.

MAIN SHAFT ASSEMBLY

MANUAL TRANSMISSION AND DIFFERENTIAL

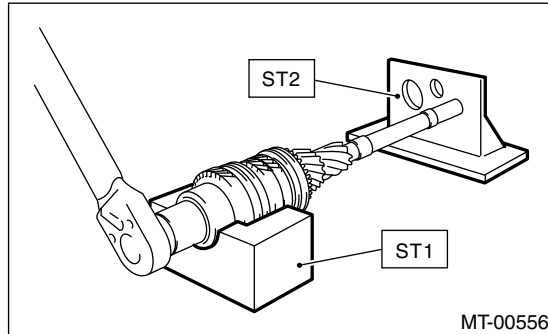
3) Set the main shaft assembly on ST, then remove the lock nut and washer.

ST1 18665AA000 HOLDER

ST2 18664AA000 BASE

NOTE:

Use a 38 mm (1.50 in) socket wrench.

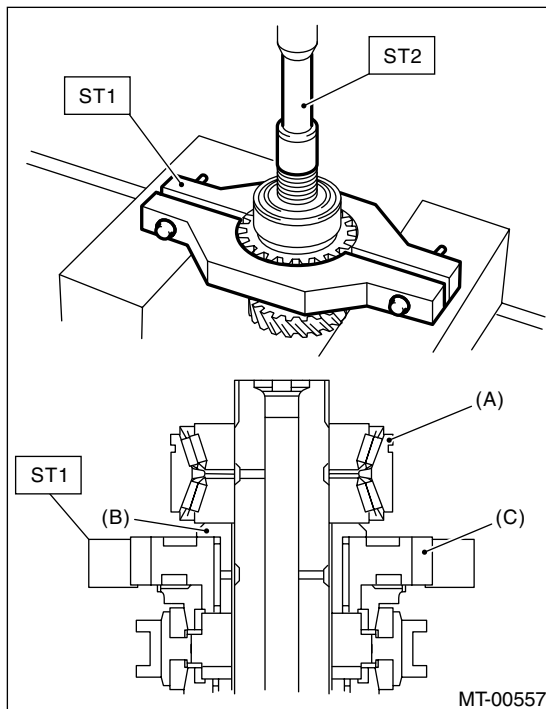


4) Remove the main shaft assembly from ST.

5) Set the ST1 on 6th drive gear, then remove the taper roller bearing, bush and 6th drive gear using press.

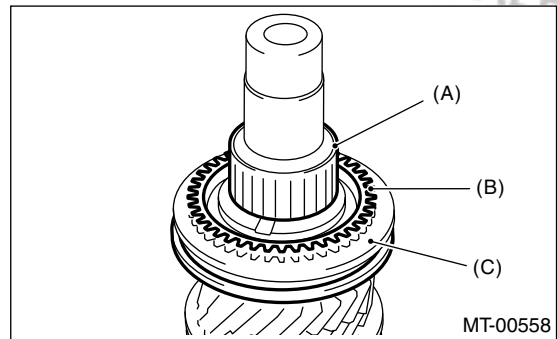
ST1 18722AA010 REMOVER

ST2 899864100 REMOVER



- (A) Taper roller bearing
- (B) Bush
- (C) 6th drive gear

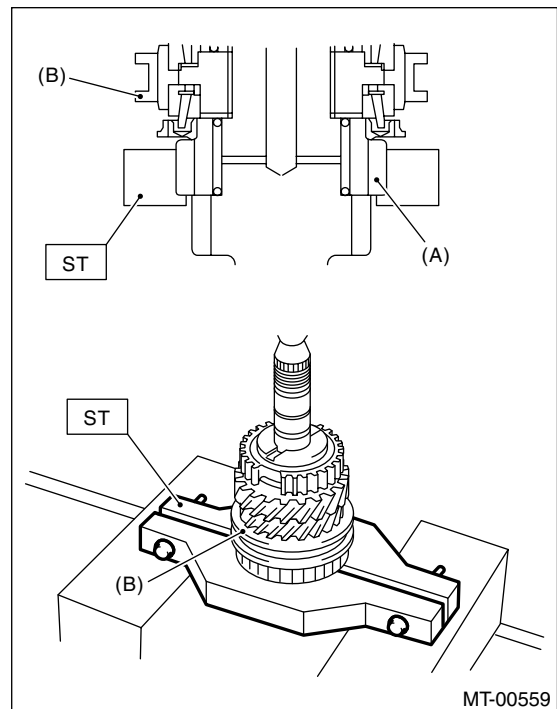
6) Remove the 5th-6th sleeve, 6th needle bearing and 6th baulk ring.



- (A) Needle bearing
- (B) 6th baulk ring
- (C) 5th-6th sleeve

7) Set the ST on 3rd drive gear, then remove each part using press.

ST 18720AA000 REMOVER



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

MAIN SHAFT ASSEMBLY

MANUAL TRANSMISSION AND DIFFERENTIAL

D: ASSEMBLY

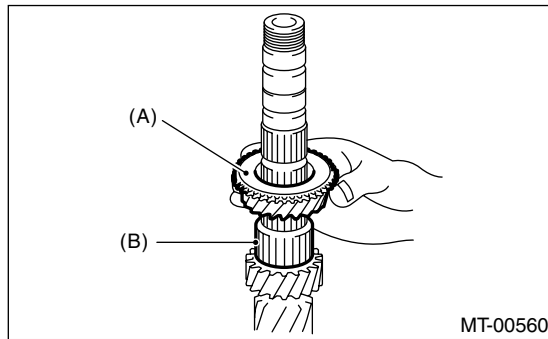
NOTE:

Replace the following parts as a set.

- Sleeve and hub
- Outer baulk ring, 3rd synchro cone and inner baulk ring
- Taper roller bearing

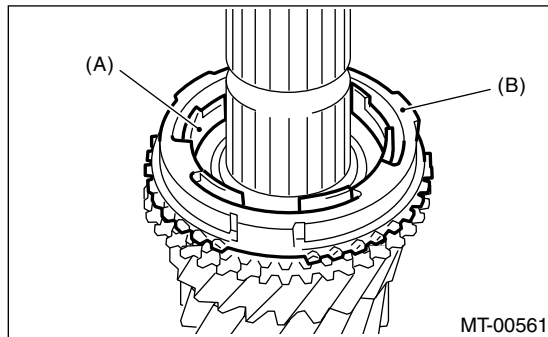
1) Sufficiently apply gear oil to the main shaft, 3rd needle bearing and inner periphery of 3rd drive gear.

2) Install the 3rd needle bearing and 3rd drive gear to main shaft.



- (A) 3rd needle bearing
(B) 3rd drive gear

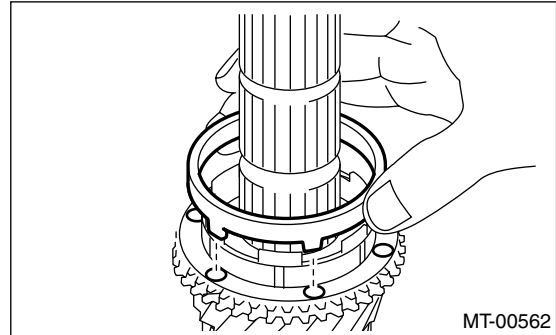
3) Install the inner baulk ring, 3rd synchro cone and outer baulk ring.



- (A) Inner baulk ring
(B) Outer baulk ring

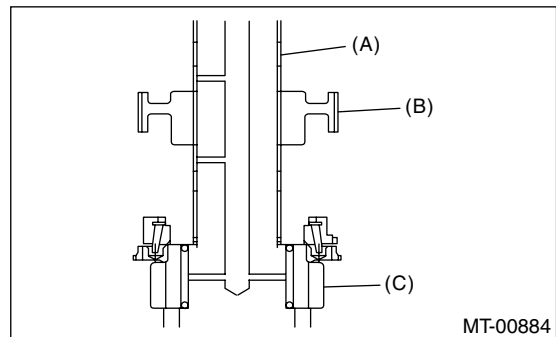
NOTE:

Install the 3rd synchro cone, by aligning protrusion portions of the 3rd synchro cone with 3rd drive gear hole portion.



4) Install the 3rd-4th hub and 4th bush.

(1) Set them to the main shaft, taking care of 3rd-4th hub installing direction.

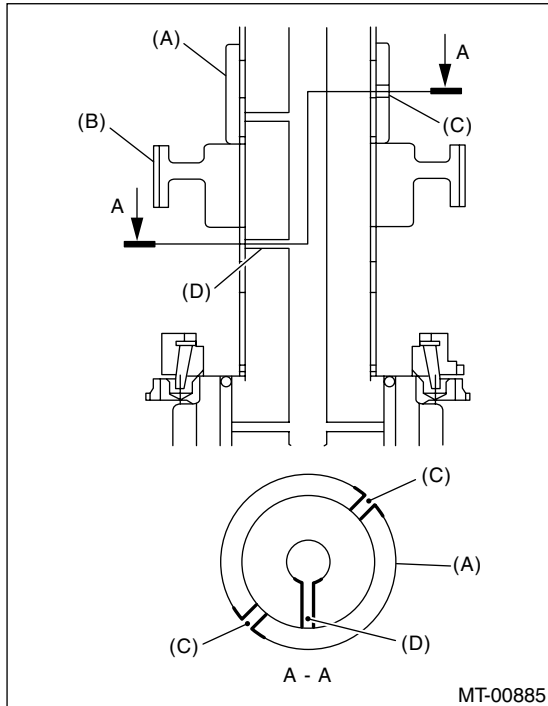


- (A) Main shaft
(B) 3rd-4th hub
(C) 3rd drive gear

MAIN SHAFT ASSEMBLY

MANUAL TRANSMISSION AND DIFFERENTIAL

(2) Set them to the main shaft, taking care not to overlap the main shaft oil hole and 4th bush oil hole.



- (A) 4th bush
- (B) 3rd-4th hub
- (C) 4th bush oil hole
- (D) Main shaft oil hole

(3) Using the ST, press in the 3rd-4th hub and 4th bush at once.

ST1 18651AA000 INSTALLER

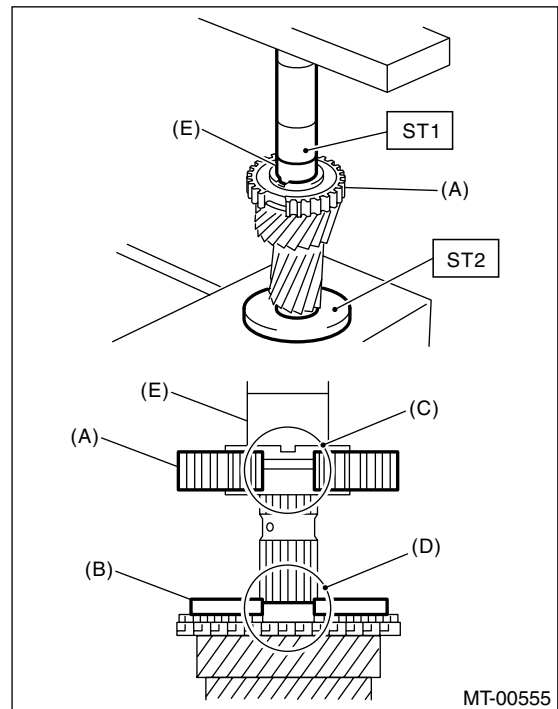
ST2 398177700 INSTALLER

CAUTION:

Do not apply pressure in excess of 40 kN (4.0 ton, 4.4 US ton, 3.9 Imp ton).

NOTE:

When pressing in 3rd-4th hub and 4th bush, align the protrusion portion of outer baulk ring and cutout portion of 3rd-4th bush by moving the outer baulk ring.



- (A) 3rd-4th hub
- (B) Outer baulk ring
- (C) Cutout portion of 3rd-4th hub
- (D) Protrusion portion of outer baulk ring
- (E) 4th bush

5) Make sure the 3rd drive gear is smoothly turned by hand. If not, reassemble.

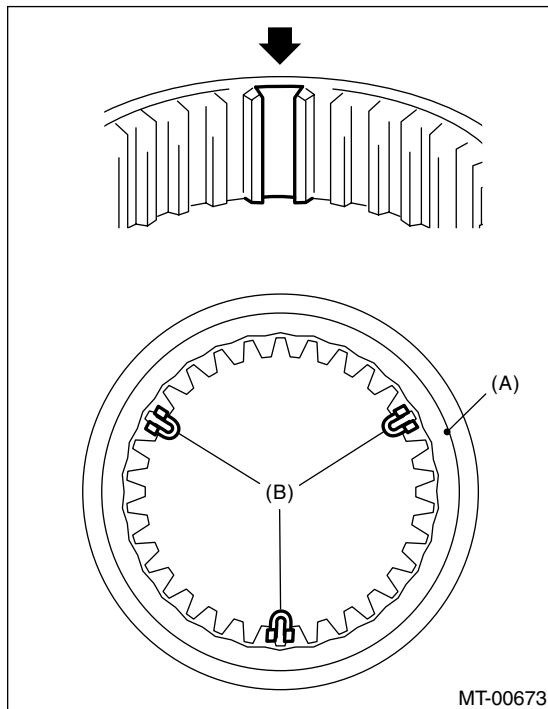
MAIN SHAFT ASSEMBLY

MANUAL TRANSMISSION AND DIFFERENTIAL

6) Install the 3rd-4th shifting insert key in proper place of 3rd-4th sleeve.

NOTE:

Angle of each shifting insert key is 120° apart.



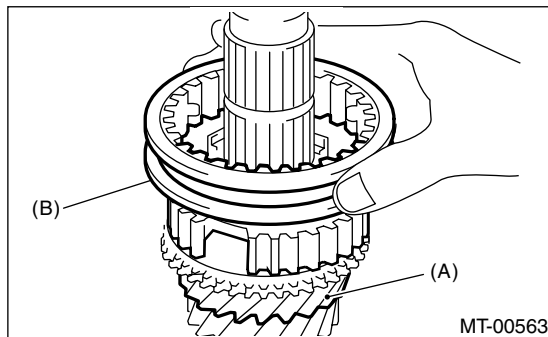
(A) 3rd-4th sleeve

(B) 3rd-4th shifting insert key

7) Install the 3rd-4th sleeve to 3rd-4th hub.

NOTE:

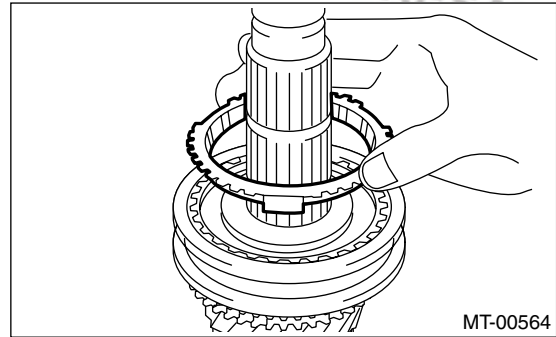
- 3rd-4th sleeve has a groove for identification.
- Install the 3rd-4th sleeve with groove facing to 3rd drive gear side.



(A) 3rd drive gear

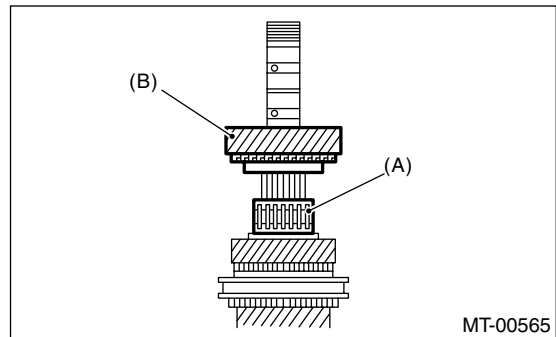
(B) Groove (1) for identification of 3rd-4th sleeve

8) Install the 4th baulk ring.



9) Sufficiently apply gear oil to the main shaft, 4th needle bearing and inner periphery of 4th drive gear.

10) Install the 4th needle bearing and 4th drive gear.



(A) 4th needle bearing

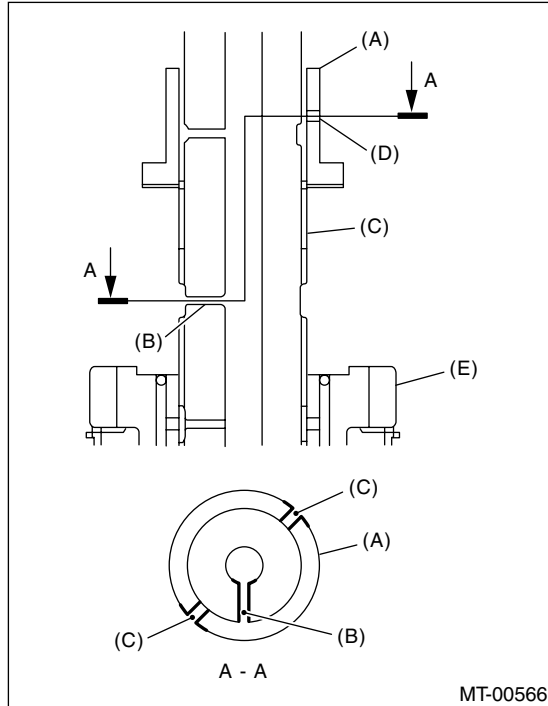
(B) 4th drive gear

MAIN SHAFT ASSEMBLY

MANUAL TRANSMISSION AND DIFFERENTIAL

11) Install the 5th bush.

- (1) Set it to the main shaft, taking care not to overlap the main shaft oil hole and 5th bush oil hole.



- (A) 5th bush
(B) Main shaft oil hole
(C) Main shaft
(D) 5th bush oil hole
(E) 4th drive gear

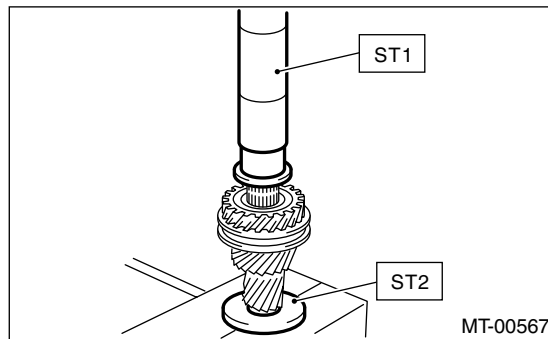
- (2) Using the ST, press in the 5th bush.

ST1 18651AA000 INSTALLER

ST2 398177700 INSTALLER

CAUTION:

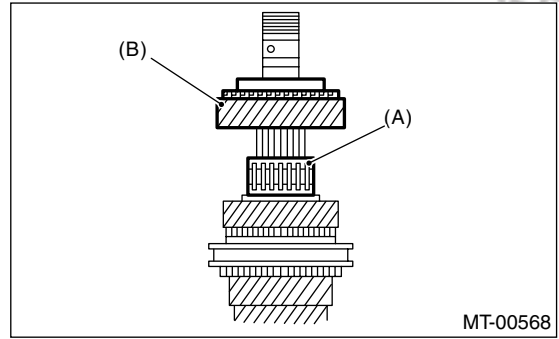
Do not apply pressure in excess of 40 kN (4.0 ton, 4.4 US ton, 3.9 Imp ton).



- 12) Make sure the 4th drive gear is smoothly turned by hand. If not, reassemble.

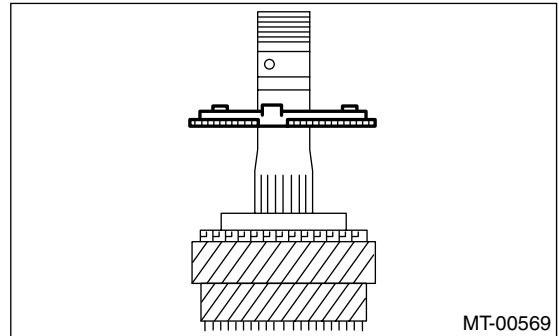
- 13) Sufficiently apply gear oil to the main shaft, 5th needle bearing and inner periphery of 5th drive gear.

- 14) Install the 5th needle bearing and 5th drive gear.



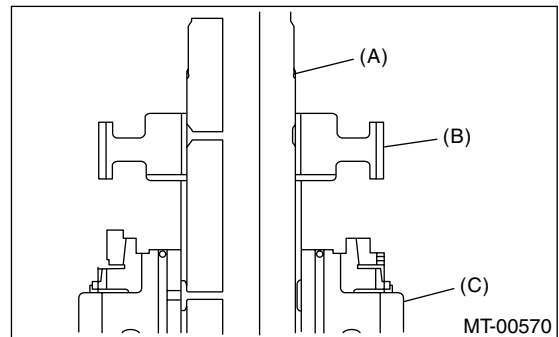
- (A) 5th needle bearing
(B) 5th drive gear

- 15) Install the 5th baulk ring.



- 16) Install the 5th-6th hub.

- (1) Set it to the main shaft, taking care of 5th-6th hub installing direction.



- (A) Main shaft
(B) 5th-6th hub
(C) 5th drive gear

MAIN SHAFT ASSEMBLY

MANUAL TRANSMISSION AND DIFFERENTIAL

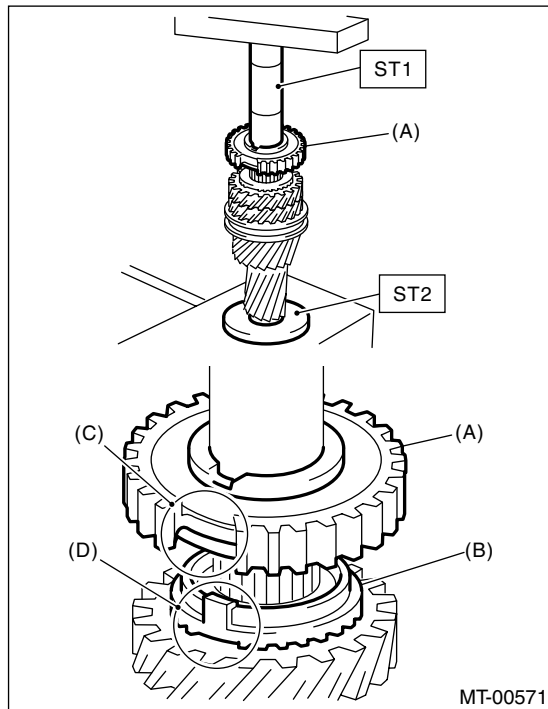
(2) Using the ST, press in the 5th-6th hub.
ST1 18651AA000 INSTALLER
ST2 398177700 INSTALLER

CAUTION:

Do not apply pressure in excess of 40 kN (4.0 ton, 4.4 US ton, 3.9 Imp ton).

NOTE:

When pressing in 5th-6th hub, align the protrusion portion of outer baulk ring and cutout portion of 5th-6th bush by moving the outer baulk ring.



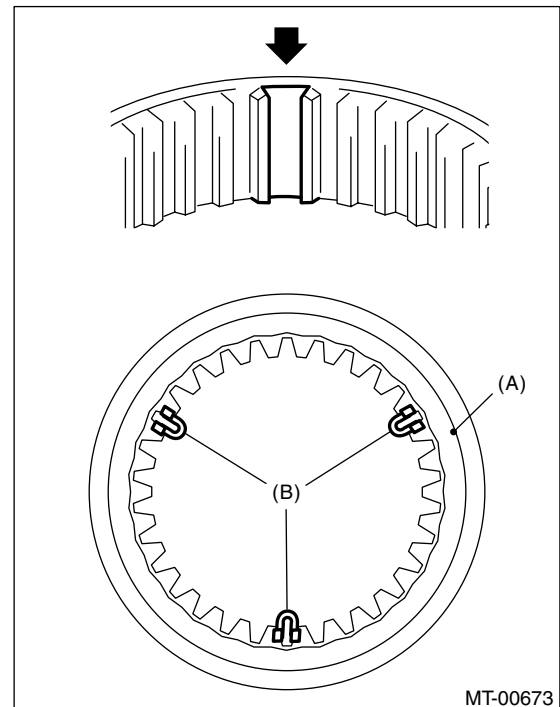
- (A) 5th-6th hub
- (B) Outer baulk ring
- (C) Cutout portion of 5th-6th hub
- (D) Protrusion portion of outer baulk ring

17) Make sure the 5th drive gear is smoothly turned by hand. If not, reassemble.

18) Install the 5th-6th shifting insert key in proper place of 5th-6th sleeve.

NOTE:

Angle of each shifting insert key is 120° apart.

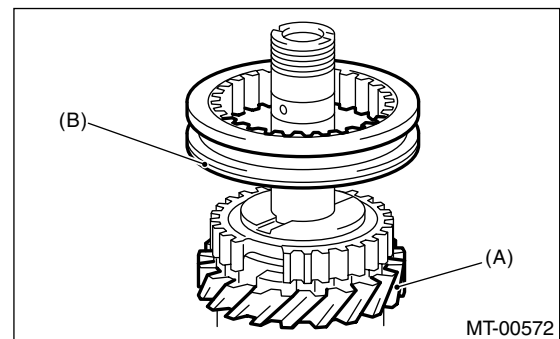


- (A) 5th-6th sleeve
- (B) Shifting insert key

19) Install the 5th-6th sleeve to 5th-6th hub.

NOTE:

- 5th-6th sleeve has two grooves for identification.
- Install the 5th-6th sleeve with the groove facing to 5th drive gear side.

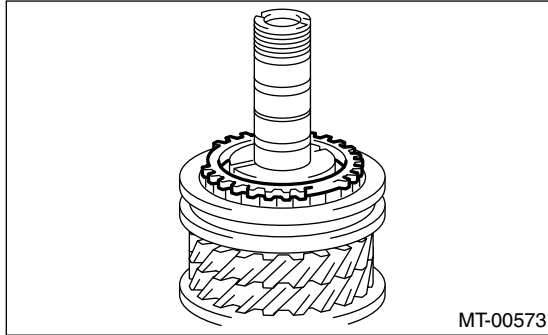


- (A) 5th drive gear
- (B) Groove (2) for identification of 5th-6th sleeve

MAIN SHAFT ASSEMBLY

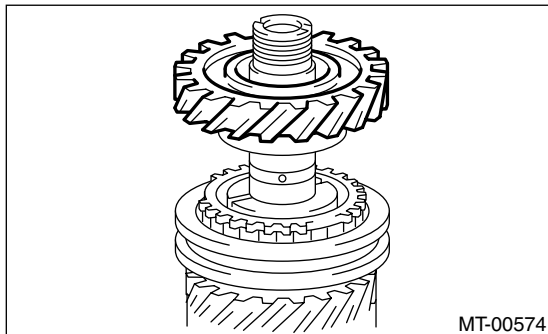
MANUAL TRANSMISSION AND DIFFERENTIAL

20) Install the 6th baulk ring.

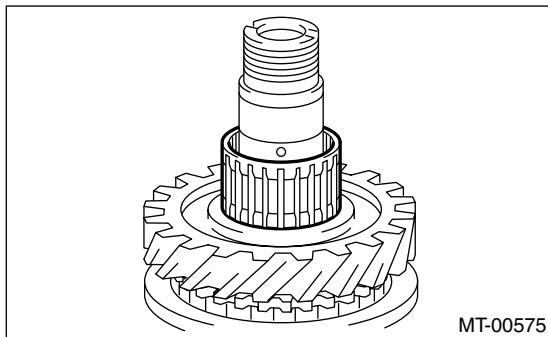


21) Sufficiently apply gear oil to the main shaft, 6th needle bearing and inner periphery of 6th drive gear.

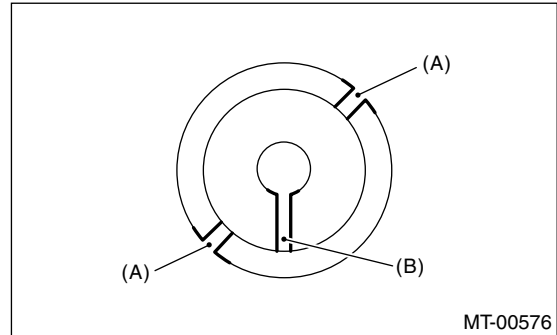
22) Install the 6th drive gear.



23) Install the 6th needle bearing.



24) Set the 6th bush to main shaft, taking care not to overlap the 6th bush oil hole and main shaft oil hole.



(A) 6th bush oil hole

(B) Main shaft oil hole

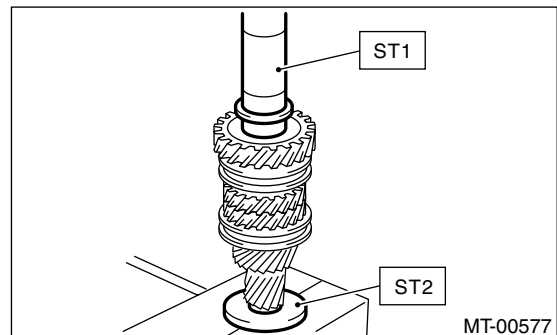
25) Using the ST, install the 6th bush.

ST1 18651AA000 INSTALLER

ST2 398177700 INSTALLER

CAUTION:

Do not apply pressure in excess of 40 kN (4.0 ton, 4.4 US ton, 3.9 Imp ton).



26) Make sure the 6th drive gear is smoothly turned by hand. If not, reassemble.

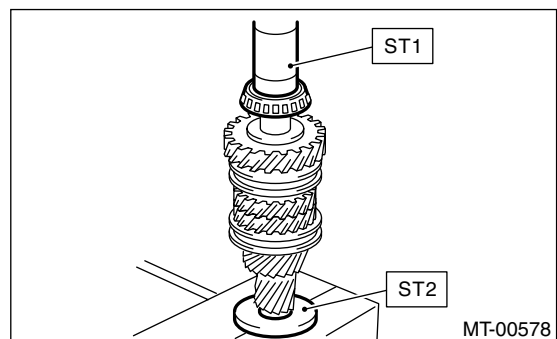
27) Using the ST, install the inner bearing inner race.

ST1 18651AA000 INSTALLER

ST2 398177700 INSTALLER

CAUTION:

Do not apply pressure in excess of 40 kN (4.0 ton, 4.4 US ton, 3.9 Imp ton).



MAIN SHAFT ASSEMBLY

MANUAL TRANSMISSION AND DIFFERENTIAL

28) Using the ST, install the retainer and outer bearing inner race.

ST1 18651AA000 INSTALLER

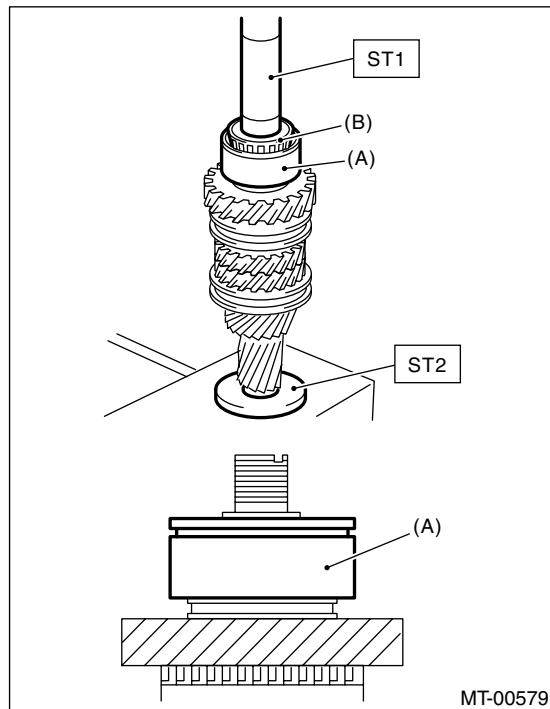
ST2 398177700 INSTALLER

CAUTION:

Do not apply pressure in excess of 40 kN (4.0 ton, 4.4 US ton, 3.9 Imp ton).

NOTE:

- Make sure to install the retainer in proper direction.
- Press in until there is no backlash in retainer and where bearing is smoothly turned by hand.



(A) Retainer

(B) Outer bearing inner race

29) Make sure the taper roller bearing is smoothly turned by hand. If not, replace the taper roller bearing as a set and reassemble.

30) Install the lock washer and new lock nut.

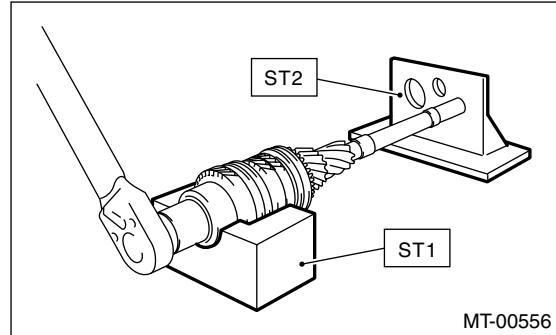
31) Set the main shaft assembly to ST, then tighten the lock nut.

ST1 18665AA000 HOLDER

ST2 18664AA000 BASE

Tightening torque:

392 N·m (40.0 kgf·m, 289 ft·lb)

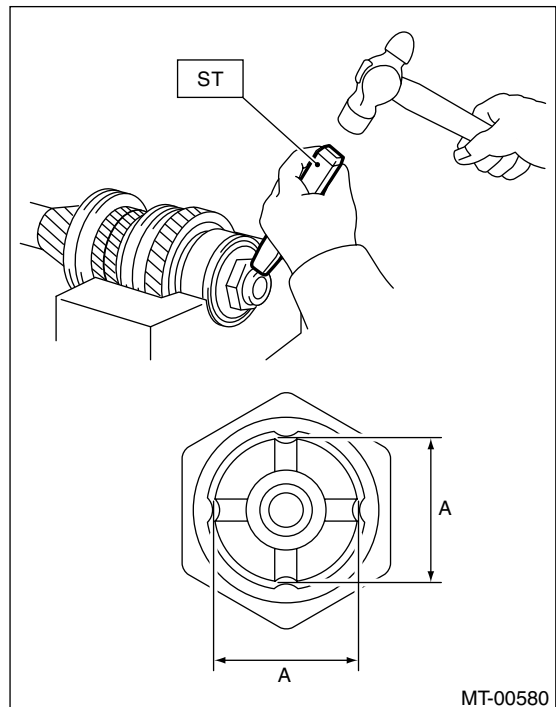


32) Using the ST, caulk four portions on the lock nut to obtain dimension A 27 ± 0.3 mm (1.06 ± 0.01 in).

ST 18668AA000 PUNCH

NOTE:

Do not crack the caulking part of lock nut.



MAIN SHAFT ASSEMBLY

MANUAL TRANSMISSION AND DIFFERENTIAL

E: INSPECTION

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

1) Bearing

Replace the bearings in the following cases.

- Worn, rusted and damaged bearing
- Bearings that fail to turn smoothly or make abnormal noise when turned
- Bearings having other defects

2) Bushing (each gear)

Replace the bushings in the following case.

- When the sliding surface is damaged or abnormally worn.

3) Gears

Replace the gears in the following cases.

- Gear teeth surfaces are broken or excessively worn.
- Parts that contact the baulk ring is damaged.
- The inner surface of gear is damaged.

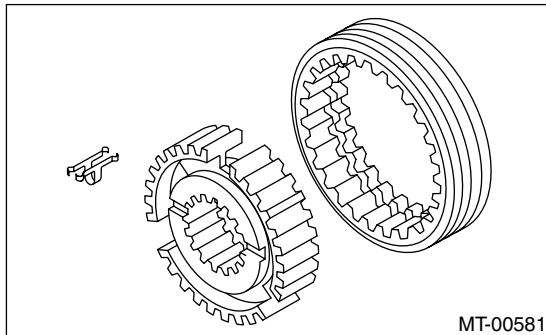
4) Baulk ring, synchro cone

Replace the baulk ring and synchro cone in the following case.

- Worn, rusted and damaged baulk ring

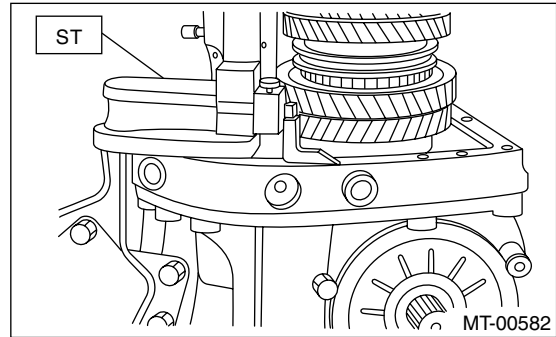
5) Shifting insert key

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



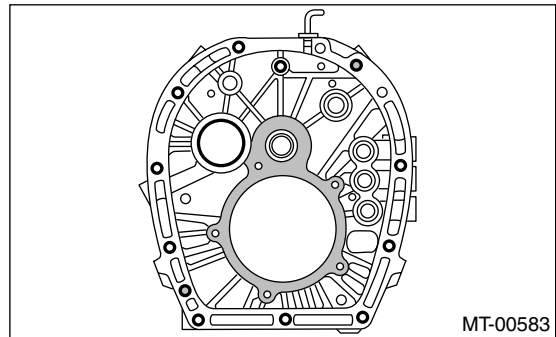
2) Set the height gauge to adapter plate. Lower the indicator of height gauge to mating surface of adapter plate and case, then set to zero point.

ST 18853AA000 HEIGHT GAUGE



NOTE:

- Remove the remaining gasket on edge surface with scraper, since the adapter plate is base point of measurement.
- Do not place the height gauge on shaded area in the figure during measurement.



F: ADJUSTMENT

1. SELECTION OF MAIN SHAFT SNAP RING AND WASHER

NOTE:

Perform the following procedures when:

- Replacing the 1st to 6th driven gear.
- Replacing the 1st and 2nd synchro ring assembly.
- Replacing the ball bearing.
- Replacing the adapter plate.
- Replacing the driven shaft.

1) Insert the drive pinion assembly in adapter plate.

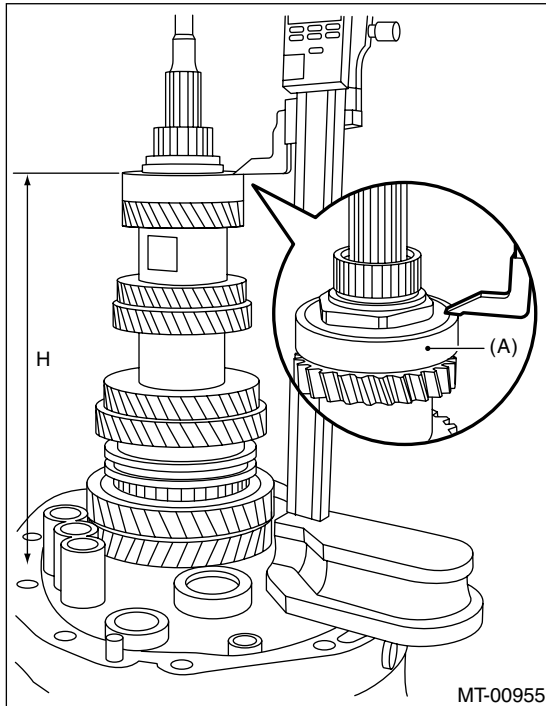
NOTE:

Make sure the thrust bearing outer race is not removed and drive pinion is not lift-up.

MAIN SHAFT ASSEMBLY

MANUAL TRANSMISSION AND DIFFERENTIAL

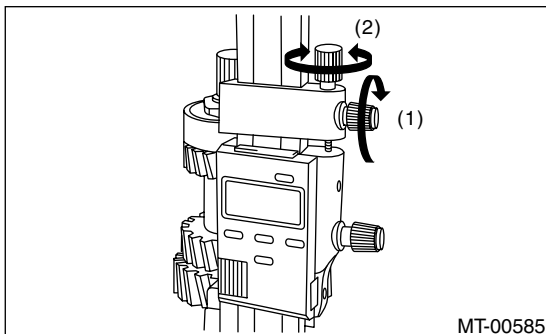
3) Measure the height to edge surface of ball bearing (height H).



(A) Ball bearing

NOTE:

Set the indicator of height gauge near measuring object, then lock the dial (1) as shown in the figure. Turn dial (2) to set the indicator to edge surface of bearing.



Measure the five points of ball bearing by turning every approx. 120°. Round off each two upper and lower measurement value. Use the remaining center value as measurement value.

4) According to measurement value, select the snap ring and washer from the following table.

Snap ring

H: mm (in)	Part No.	Thickness: mm (in)
270.83 — 271.40 (10.66 — 10.69)	805072010	1.65 (0.065)
271.41 — 271.98 (10.69 — 10.71)	805072011	1.95 (0.077)
271.99 — 272.56 (10.71 — 10.73)	805072012	2.25 (0.089)

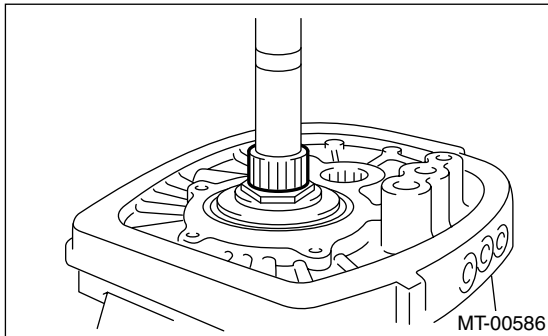
Washer

H: mm (in)	Part No.	Thickness: mm (in)
270.83 — 271.40 (10.66 — 10.69)	803067012	1.6 (0.063)
271.41 — 271.98 (10.69 — 10.71)	803067011	1.3 (0.051)
271.99 — 272.56 (10.71 — 10.73)	803067010	1.0 (0.039)

20. Driven Gear Assembly

A: REMOVAL

- 1) Remove the manual transmission assembly from vehicle. <Ref. to 6MT-35, REMOVAL, Manual Transmission Assembly.>
- 2) Prepare the transmission for overhaul. <Ref. to 6MT-40, Preparation for Overhaul.>
- 3) Remove the oil pipe, neutral position switch, back-up light switch and harness. <Ref. to 6MT-42, REMOVAL, Oil Pipe.>, <Ref. to 6MT-45, REMOVAL, Neutral Position Switch.>, <Ref. to 6MT-43, REMOVAL, Back-up Light Switch.>
- 4) Remove the extension case. <Ref. to 6MT-47, REMOVAL, Extension Case.>
- 5) Remove the transfer driven gear. <Ref. to 6MT-58, REMOVAL, Transfer Driven Gear.>
- 6) Remove the center differential. <Ref. to 6MT-60, REMOVAL, Center Differential.>
- 7) Remove the oil pump. <Ref. to 6MT-61, REMOVAL, Oil Pump.>
- 8) Remove the transmission case. <Ref. to 6MT-65, REMOVAL, Transmission Case.>
- 9) Remove the driven gear assembly. <Ref. to 6MT-70, REMOVAL, Main Shaft Assembly.>
- 10) Remove the needle bearing.



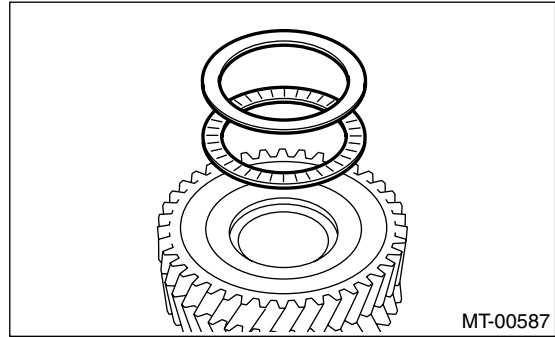
- 11) Remove the thrust needle bearing.

B: INSTALLATION

- 1) Adjust the main shaft snap ring. <Ref. to 6MT-82, ADJUSTMENT, Main Shaft Assembly.>
- 2) Adjust the 1st-2nd shifter rod. <Ref. to 6MT-117, ADJUSTMENT, Shifter Fork and Rod.>
- 3) Install the thrust needle bearing.

NOTE:

Make sure to install the thrust needle bearing in proper direction.



- 4) Install the 1st needle bearing.
- 5) Install the driven gear assembly. <Ref. to 6MT-71, INSTALLATION, Main Shaft Assembly.>
- 6) Install the transmission case. <Ref. to 6MT-66, INSTALLATION, Transmission Case.>
- 7) Adjust backlash at axial direction of driven gear assembly. <Ref. to 6MT-91, ADJUSTMENT, Driven Gear Assembly.>
- 8) Install the oil pump. <Ref. to 6MT-62, INSTALLATION, Oil Pump.>
- 9) Install the center differential. <Ref. to 6MT-60, INSTALLATION, Center Differential.>
- 10) Install the transfer driven gear. <Ref. to 6MT-58, INSTALLATION, Transfer Driven Gear.>
- 11) Install the extension case. <Ref. to 6MT-47, INSTALLATION, Extension Case.>
- 12) Install the oil pipe, neutral position switch, back-up light switch and harness. <Ref. to 6MT-42, INSTALLATION, Oil Pipe.>, <Ref. to 6MT-45, INSTALLATION, Neutral Position Switch.>, <Ref. to 6MT-43, INSTALLATION, Back-up Light Switch.>
- 13) Install the manual transmission assembly to vehicle. <Ref. to 6MT-37, INSTALLATION, Manual Transmission Assembly.>

C: DISASSEMBLY

NOTE:

Each sleeve and hub engage at a specified point. Mark an engagement point on the sleeve and hub before disassembly.

- 1) Secure the ST on workbench.
ST 18664AA000 BASE
- 2) Lift the caulking of lock nut.

DRIVEN GEAR ASSEMBLY

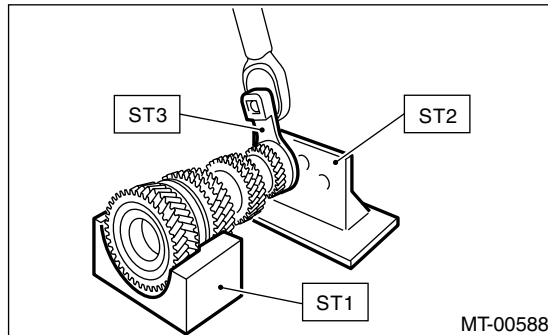
MANUAL TRANSMISSION AND DIFFERENTIAL

3) Install the ST3 to lock nut, set the driven gear assembly on ST, then remove the lock nut.

ST1 18666AA000 HOLDER

ST2 18664AA000 BASE

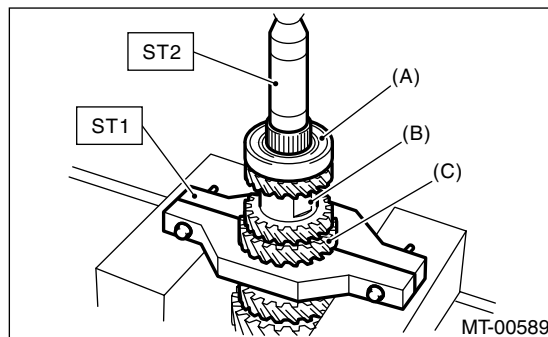
ST3 18620AA000 ADAPTER WRENCH



4) Install the ST1 to 4th gear, then remove the ball bearing, 5th-6th driven gear and 3rd-4th driven gear.

ST1 18723AA000 REMOVER

ST2 499877000 REMOVER

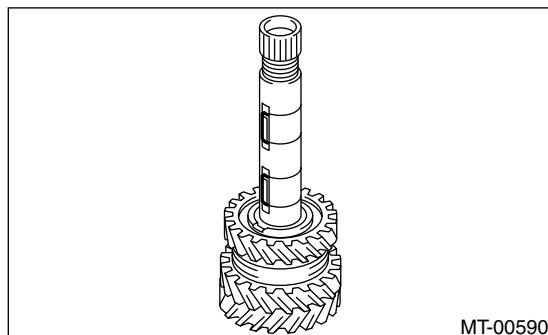


(A) Ball bearing

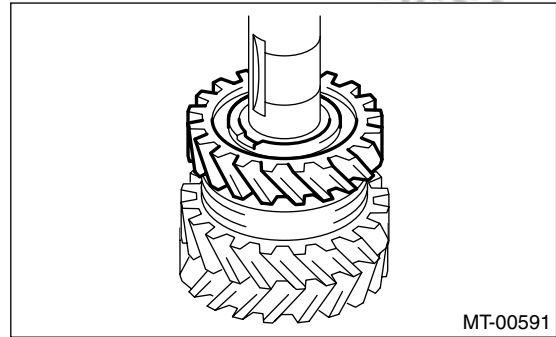
(B) 5th-6th driven gear

(C) 3rd-4th driven gear

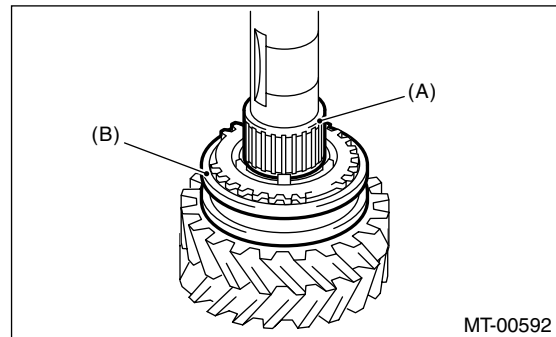
5) Remove the driven gear key.



6) Remove the 2nd gear.



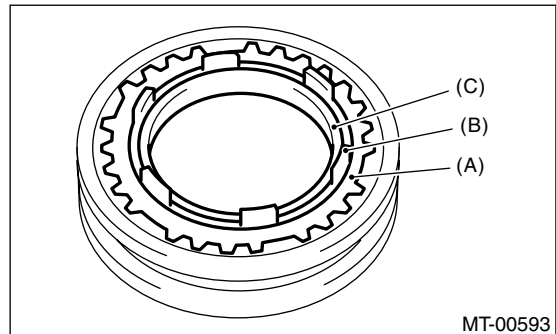
7) Remove the needle bearing and 1st-2nd sleeve.



(A) Needle bearing

(B) 1st-2nd sleeve

8) Remove the outer baulk ring, 2nd synchro cone and inner baulk ring.



(A) Outer baulk ring

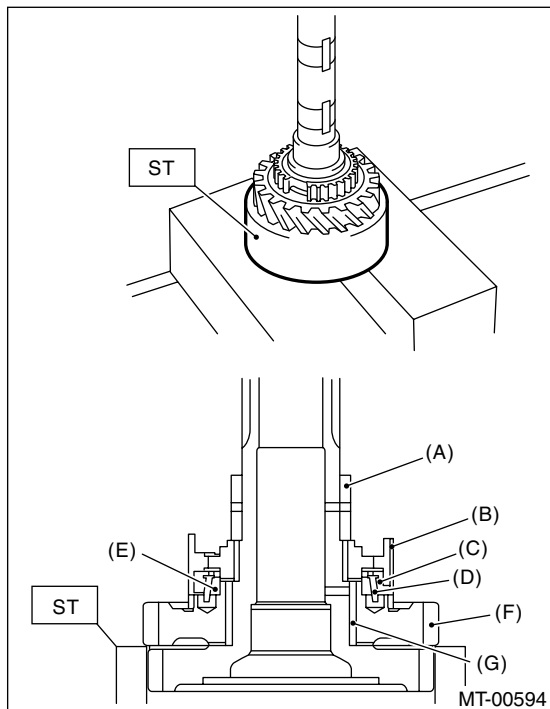
(B) 2nd synchro cone

(C) Inner baulk ring

DRIVEN GEAR ASSEMBLY

MANUAL TRANSMISSION AND DIFFERENTIAL

9) Using the ST, remove each part.
ST 18754AA000 REMOVER



- (A) 2nd bush
- (B) 1st-2nd hub
- (C) Outer baulk ring
- (D) 1st synchro cone
- (E) Inner baulk ring
- (F) 1st driven gear
- (G) 1st needle bearing

D: ASSEMBLY

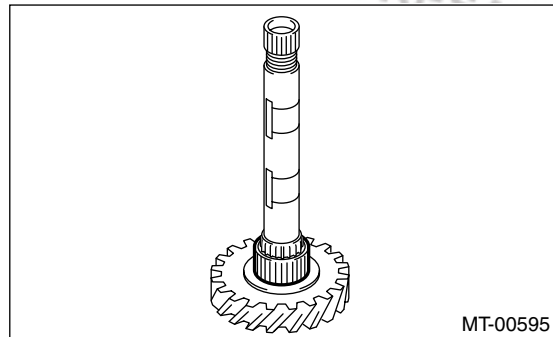
NOTE:

Replace the following parts as a set.

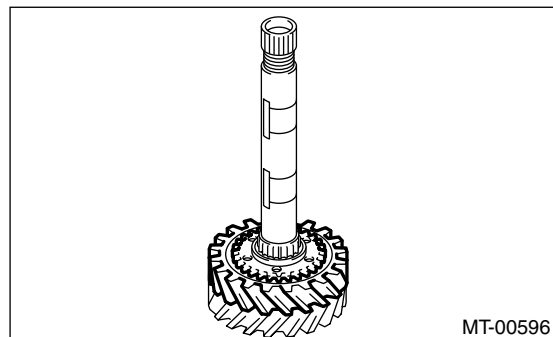
- Sleeve and hub
- Outer baulk ring, 1st synchro cone, inner baulk ring
- Outer baulk ring, 2nd synchro cone, inner baulk ring

1) Sufficiently apply gear oil to the drive shaft, 1st needle bearing and inner periphery of 1st driven gear.

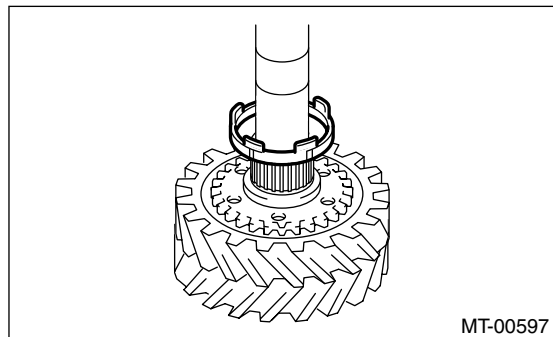
2) Install the 1st needle bearing.



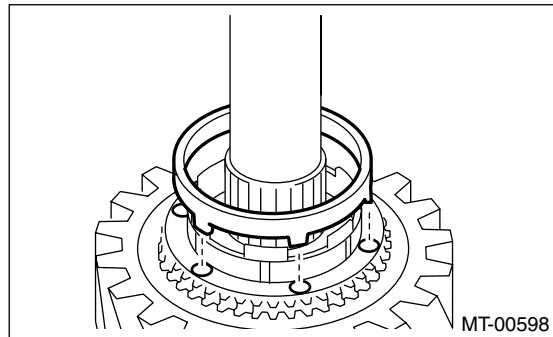
3) Install the 1st driven gear to driven shaft.



4) Install the inner baulk ring.



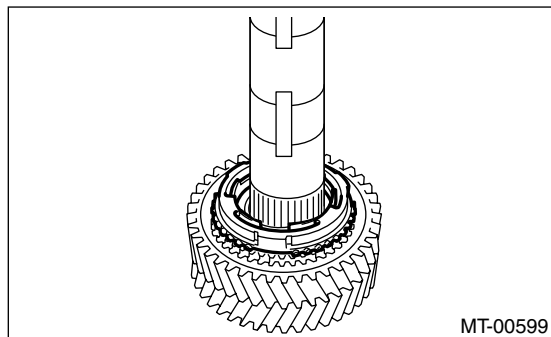
5) Align protrusion portions of the 1st synchro cone to the holes of 1st drive gear to install.



DRIVEN GEAR ASSEMBLY

MANUAL TRANSMISSION AND DIFFERENTIAL

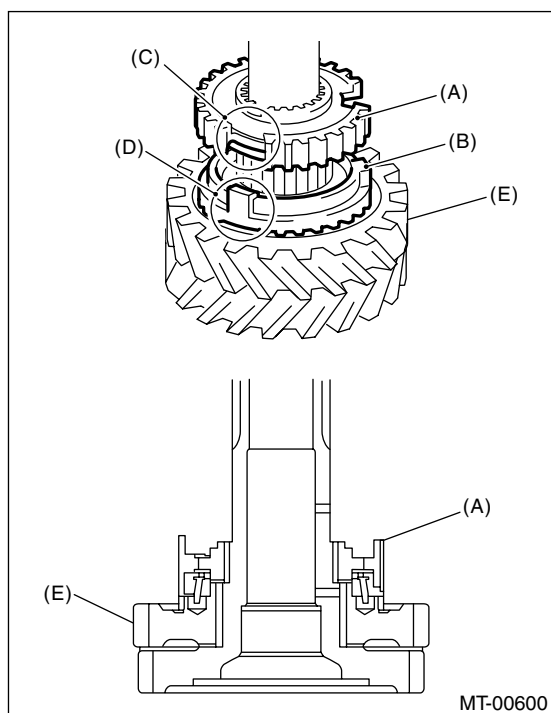
6) Install the outer baulk ring.



7) Install the 1st-2nd hub.

NOTE:

- Align the protrusion portion of outer baulk ring and cutout portion of 1st-2nd hub, then install.
- Make sure to install the 1st-2nd hub in proper direction.



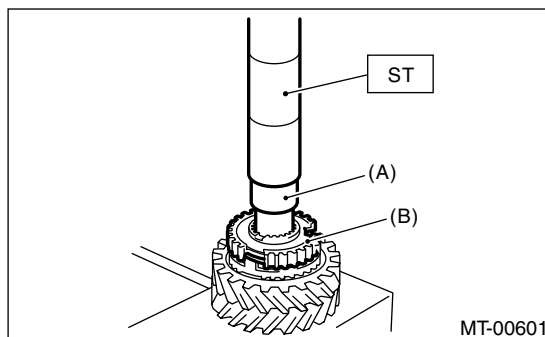
- (A) 1st-2nd hub
- (B) Outer baulk ring
- (C) Cutout portion of 1st-2nd hub
- (D) Protrusion portion of outer baulk ring
- (E) 1st driven gear

8) Using the ST, install the 2nd hub.

ST 18654AA000 INSTALLER

CAUTION:

Do not apply pressure in excess of 40 kN (4.0 ton, 4.4 US ton, 3.9 Imp ton).



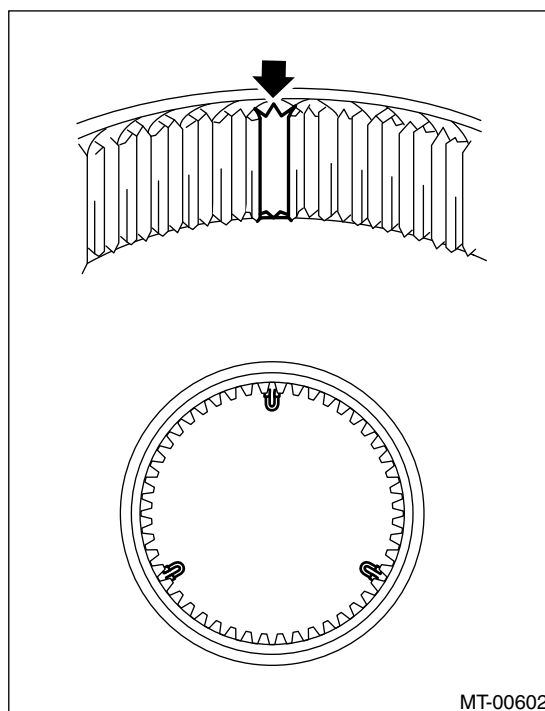
- (A) 2nd bush
- (B) 1st-2nd hub

9) Make sure the 1st drive gear is smoothly turned by hand. If not, reassemble.

10) Install the shifting insert key in proper place of 1st-2nd sleeve.

NOTE:

Angle of each shifting insert key is 120° apart.



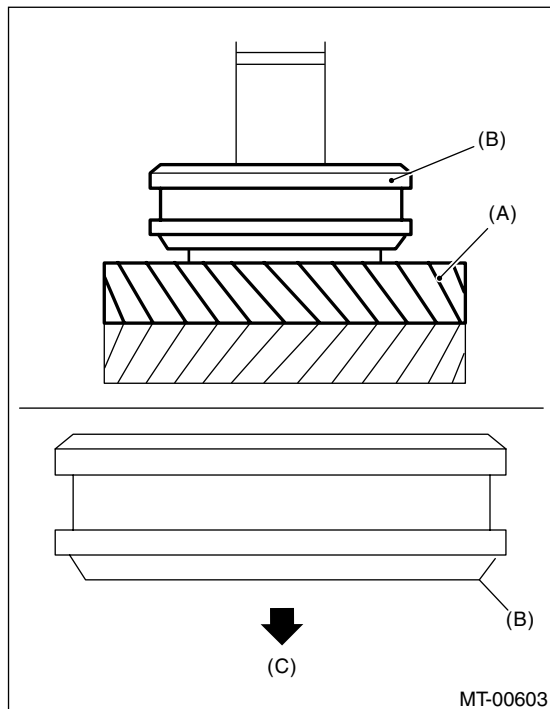
DRIVEN GEAR ASSEMBLY

MANUAL TRANSMISSION AND DIFFERENTIAL

11) Install the 1st-2nd sleeve to 1st-2nd hub.

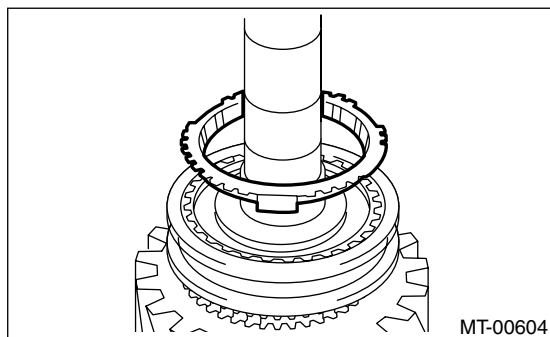
NOTE:

Make sure to install the 1st-2nd sleeve in proper direction.

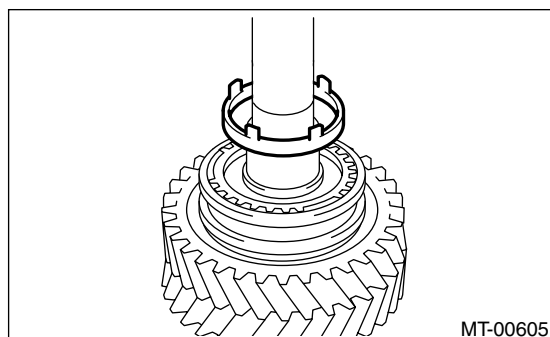


- (A) 1st driven gear
- (B) 1st-2nd sleeve
- (C) 1st driven gear side

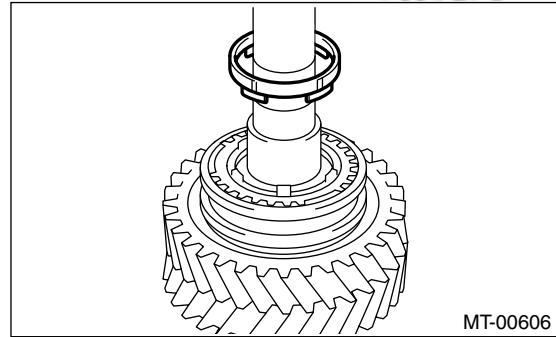
12) Install the outer baulk ring.



13) Install the 2nd synchro cone.



14) Install the inner baulk ring.

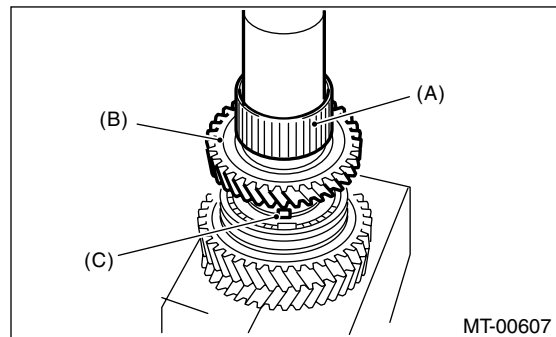


15) Sufficiently apply gear oil to the bush, 2nd needle bearing and inner periphery of 2nd drive gear.

16) Install the 2nd needle bearing and 2nd driven gear.

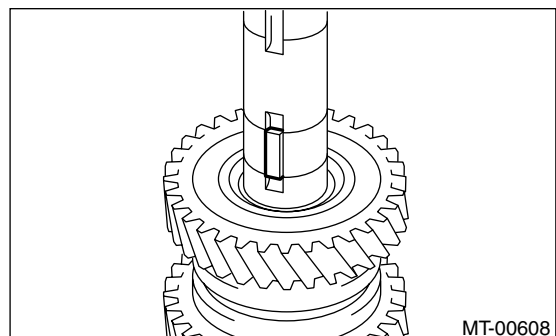
NOTE:

Align the protrusion portion of 2nd synchro cone with 2nd driven gear hole, then install them.



- (A) 2nd needle bearing
- (B) 2nd driven gear
- (C) Protrusion portion of 2nd synchro cone

17) Install the key.



DRIVEN GEAR ASSEMBLY

MANUAL TRANSMISSION AND DIFFERENTIAL

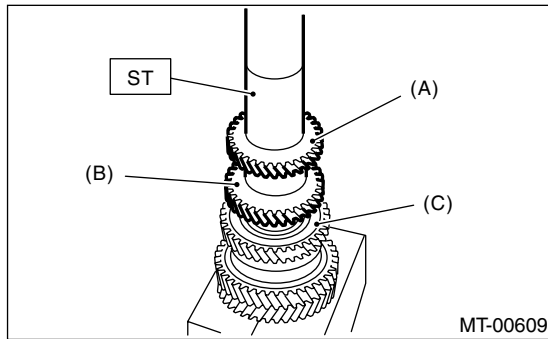
18) Using the ST, install the 3rd-4th driven gear.
ST 18654AA000 INSTALLER

CAUTION:

Do not apply pressure in excess of 40 kN (4.0 ton, 4.4 US ton, 3.9 Imp ton).

NOTE:

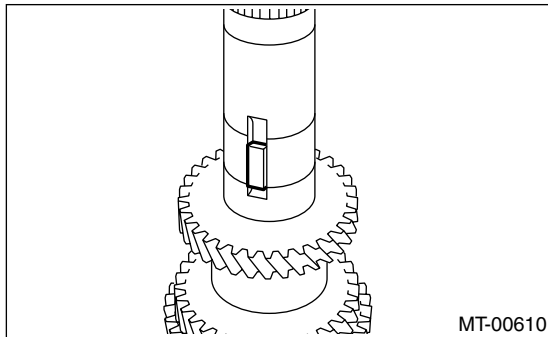
- Make sure to install the 3rd-4th driven gear in proper direction.
- Align the groove of 3rd-4th driven gear with key.



- (A) 4th gear
- (B) 3rd gear
- (C) 2nd gear

19) Make sure the 2nd driven gear is smoothly turned by hand. If not, reassemble.

20) Install the key.



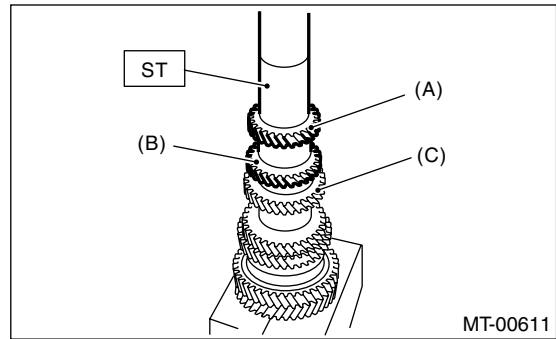
21) Using the ST, install the 5th-6th driven gear.
ST 18654AA000 INSTALLER

CAUTION:

Do not apply pressure in excess of 40 kN (4.0 ton, 4.4 US ton, 3.9 Imp ton).

NOTE:

- Make sure to install the 5th-6th driven gear in proper direction.
- Align the groove of 5th-6th driven gear with key.



- (A) 6th gear
- (B) 5th gear
- (C) 4th gear

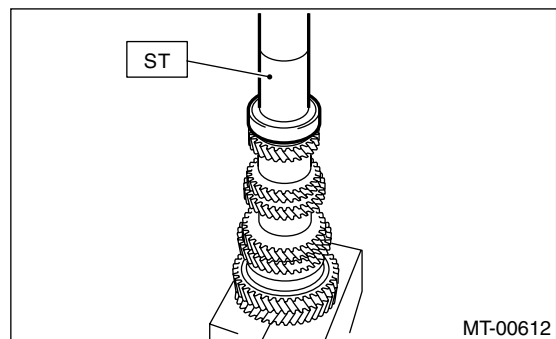
22) Using the ST, install the ball bearing.
ST 18654AA000 INSTALLER

CAUTION:

Do not apply pressure in excess of 40 kN (4.0 ton, 4.4 US ton, 3.9 Imp ton).

NOTE:

Make sure to install the ball bearing in proper direction.



23) Make sure the ball bearing is smoothly turned by hand. If not, reassemble.

24) Install a new lock nut.

DRIVEN GEAR ASSEMBLY

MANUAL TRANSMISSION AND DIFFERENTIAL

25) Install the ST3 to lock nut, then install the ST to driven gear assembly and tighten lock nut.

ST1 18666AA000 HOLDER

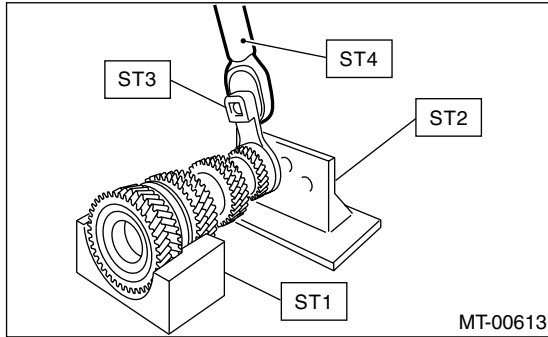
ST2 18664AA000 BASE

ST3 18620AA000 ADAPTER WRENCH

ST4 18852AA000 TORQUE WRENCH

Tightening torque:

530 N·m (54.0 kgf-m, 391 ft-lb)

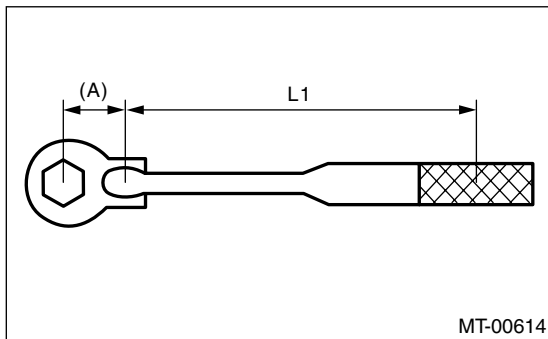


NOTE:

If torque wrench except ST4 is used, calculate the following equation, then tighten the lock nut.

$$T = L1 / (0.1 + L1) \times 570$$

T	N·m (kgf-m, ft-lb)	Setting value of torque wrench
L1	m (in)	Torque wrench length
0.1 m (3.94 in)		ST length
570 N·m (58.1 kgf-m, 420 ft-lb)		Tightening torque of lock nut



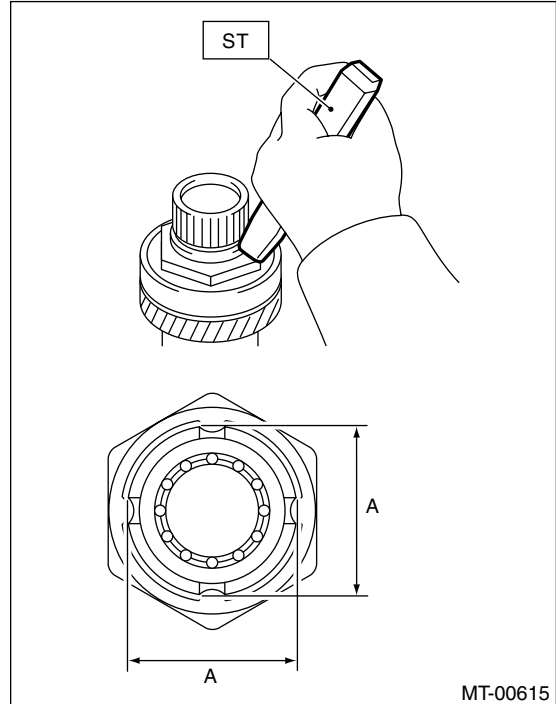
(A) 0.1 m (3.94 in)

26) Using the ST, caulk four portions on the lock nut to obtain dimension A 44 ± 0.5 mm (1.73 ± 0.02 in).

ST1 18669AA000 PUNCH DRIVEN SHAFT

NOTE:

Do not crack the caulking part of lock nut.



DRIVEN GEAR ASSEMBLY

MANUAL TRANSMISSION AND DIFFERENTIAL

E: INSPECTION

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

1) Bearing

Replace the bearings in the following cases.

- Worn, rusted and damaged bearing
- Bearings that fail to turn smoothly or make abnormal noise when turned
- Bearings having other defects

2) Bushing (each gear)

Replace the bushings in the following case.

- When the sliding surface is damaged or abnormally worn.

3) Gears

Replace the gears in the following cases.

- Gear teeth surfaces are broken or excessively worn.
- Parts that contact the baulk ring is damaged.
- The inner surface of gear is damaged.

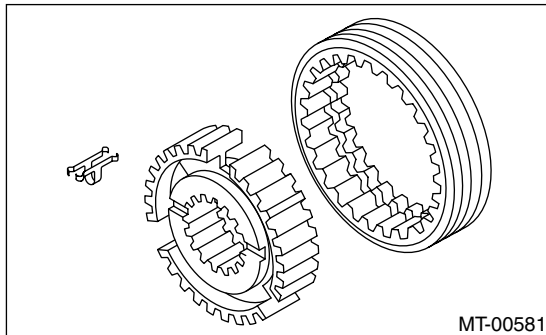
4) Baulk ring, synchro cone

Replace the baulk ring and synchro cone in the following case:

- Worn, rusted and damaged baulk ring

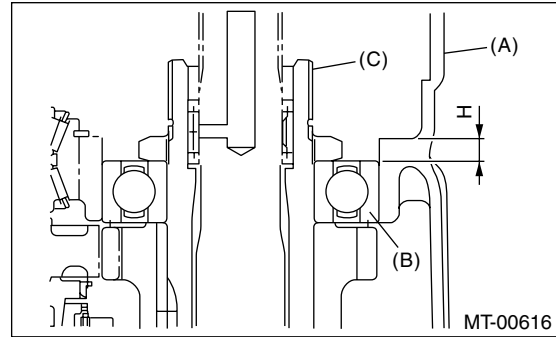
5) Shifting insert key

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



F: ADJUSTMENT

1) Measure length "H", which is from transmission case and oil pump cover mating surface to ball bearing edge.



(A) Transmission case

(B) Ball bearing

(C) Driven gear assembly

2) Using the following equation, calculate the washer thickness of driven gear assembly.

$$T = H - \{5.8 \pm 0.05 \text{ mm (0.23} \pm 0.002 \text{ in)}\} - \{0.1 \text{ to } 0.3 \text{ mm (0.0039 to 0.0118 in)}\}$$

t	Thickness of washer
H	Length from transmission case and oil pump cover mating surface to ball bearing edge
5.8±0.05 mm (0.23±0.002 in)	Thickness of collar
0.1 to 0.3 mm (0.0039 to 0.0118 in)	Backlash specification at axial direction of driven gear assembly

3) Select 0 to 3 washers from the following table to adjust backlash closest to specification.

Backlash specification at axial direction of driven gear assembly:

0.1 — 0.3 mm (0.0039 — 0.0118 in)

Washer	
Part No.	Thickness t mm (in)
803072030	0.15 (0.0059)
803072031	0.30 (0.0118)
803072032	0.45 (0.0177)
803072033	0.60 (0.0236)

REVERSE IDLER GEAR ASSEMBLY

MANUAL TRANSMISSION AND DIFFERENTIAL

21. Reverse Idler Gear Assembly

A: REMOVAL

- 1) Remove the manual transmission assembly from vehicle. <Ref. to 6MT-35, REMOVAL, Manual Transmission Assembly.>
- 2) Prepare the transmission for overhaul. <Ref. to 6MT-40, Preparation for Overhaul.>
- 3) Remove the oil pipe, neutral position switch, back-up light switch and harness. <Ref. to 6MT-42, REMOVAL, Oil Pipe.>, <Ref. to 6MT-45, REMOVAL, Neutral Position Switch.>, <Ref. to 6MT-43, REMOVAL, Back-up Light Switch.>
- 4) Remove the extension case. <Ref. to 6MT-47, REMOVAL, Extension Case.>
- 5) Remove the transfer driven gear. <Ref. to 6MT-58, REMOVAL, Transfer Driven Gear.>
- 6) Remove the center differential. <Ref. to 6MT-60, REMOVAL, Center Differential.>
- 7) Remove the oil pump. <Ref. to 6MT-61, REMOVAL, Oil Pump.>
- 8) Remove the transmission case. <Ref. to 6MT-65, REMOVAL, Transmission Case.>
- 9) Remove the reverse idler gear assembly. <Ref. to 6MT-70, REMOVAL, Main Shaft Assembly.>

B: INSTALLATION

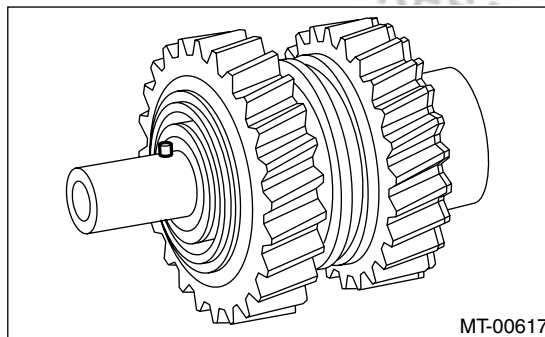
- 1) Select the reverse fork rod. <Ref. to 6MT-117, ADJUSTMENT, Shifter Fork and Rod.>
- 2) Install the reverse idler gear assembly. <Ref. to 6MT-71, INSTALLATION, Main Shaft Assembly.>
- 3) Install the transmission case. <Ref. to 6MT-66, INSTALLATION, Transmission Case.>
- 4) Install the oil pump. <Ref. to 6MT-62, INSTALLATION, Oil Pump.>
- 5) Install the center differential. <Ref. to 6MT-60, INSTALLATION, Center Differential.>
- 6) Install the transfer driven gear. <Ref. to 6MT-58, INSTALLATION, Transfer Driven Gear.>
- 7) Install the extension case. <Ref. to 6MT-47, INSTALLATION, Extension Case.>
- 8) Install the oil pipe, neutral position switch, back-up light switch and harness. <Ref. to 6MT-42, INSTALLATION, Oil Pipe.>, <Ref. to 6MT-45, INSTALLATION, Neutral Position Switch.>, <Ref. to 6MT-43, INSTALLATION, Back-up Light Switch.>
- 9) Install the manual transmission assembly to vehicle. <Ref. to 6MT-37, INSTALLATION, Manual Transmission Assembly.>

C: DISASSEMBLY

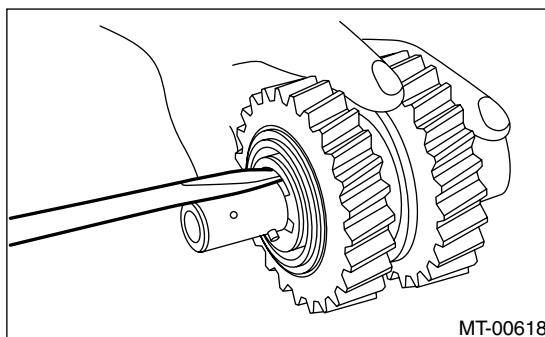
NOTE:

Sleeve and reverse gear engage at a specified point. Mark an engagement point on the sleeve and hub before disassembly.

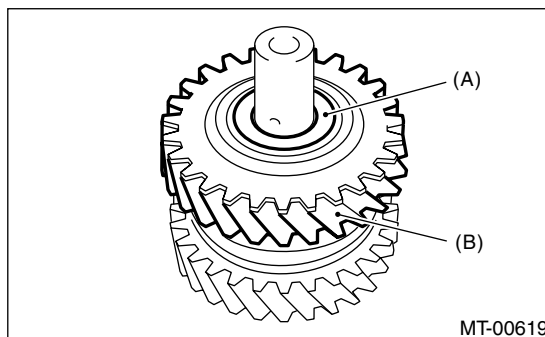
- 1) Remove the spring pin.



- 2) Remove the snap ring.

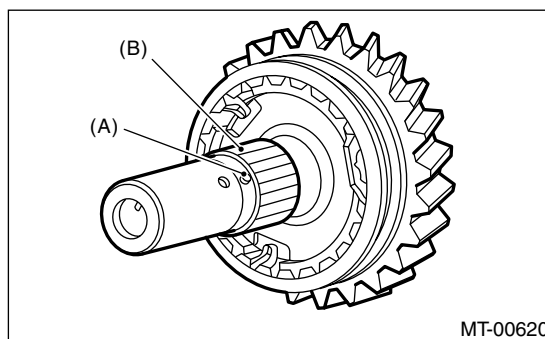


- 3) Remove the washer and reverse idler gear.



- (A) Washer
(B) Reverse idler gear

- 4) Remove the knock pin and reverse idler gear needle bearing.



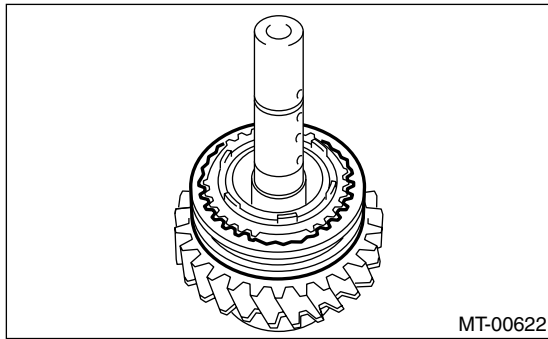
- (A) Knock pin
(B) Reverse idler gear needle bearing

REVERSE IDLER GEAR ASSEMBLY

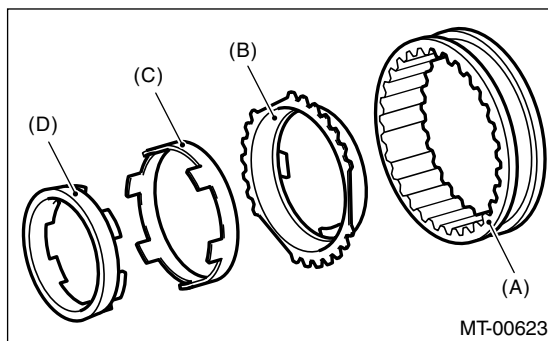
MANUAL TRANSMISSION AND DIFFERENTIAL

5) Remove the collar.

6) Remove the reverse sleeve.

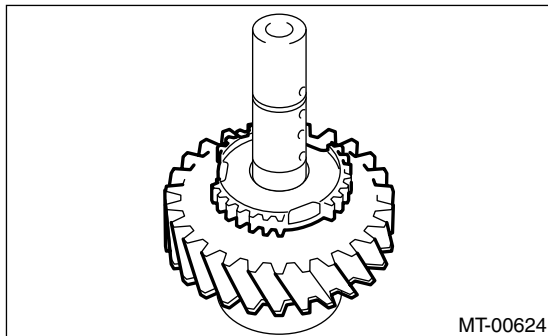


7) Remove the outer baulk ring, reverse synchro cone and inner baulk ring from reverse sleeve.

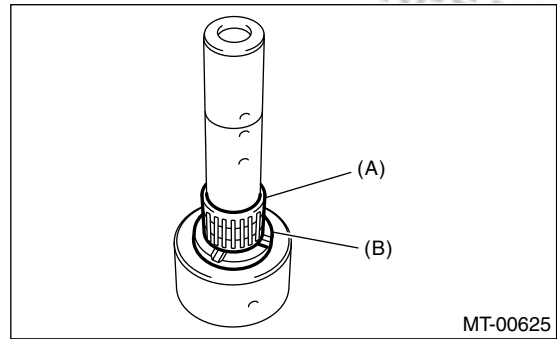


- (A) Reverse sleeve
- (B) Outer baulk ring
- (C) Reverse synchro cone
- (D) Inner baulk ring

8) Remove the reverse idler gear No. 2.

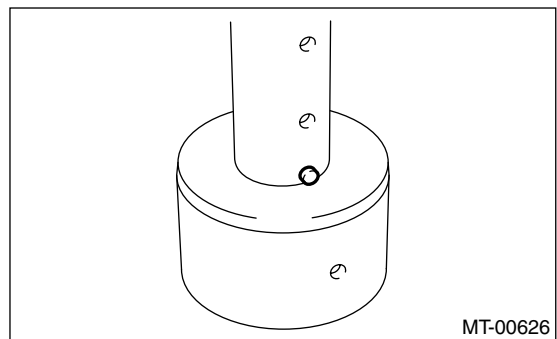


9) Remove the washer and needle bearing.

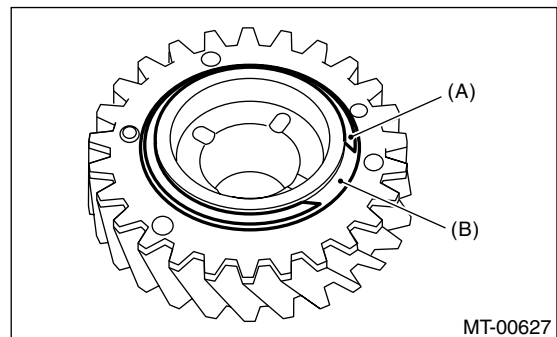


- (A) Needle bearing
- (B) Washer

10) Remove the knock pin.



11) Remove the snap ring and friction plate from reverse gear.

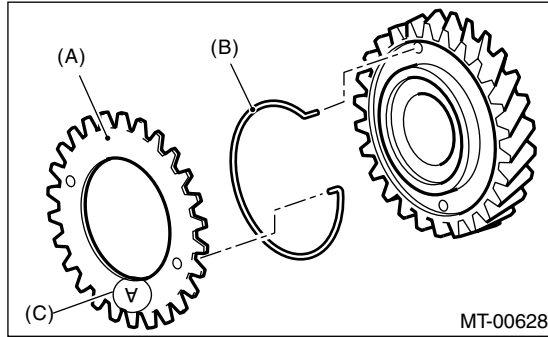


- (A) Snap ring
- (B) Friction plate

REVERSE IDLER GEAR ASSEMBLY

MANUAL TRANSMISSION AND DIFFERENTIAL

12) Remove the sub gear and spring.



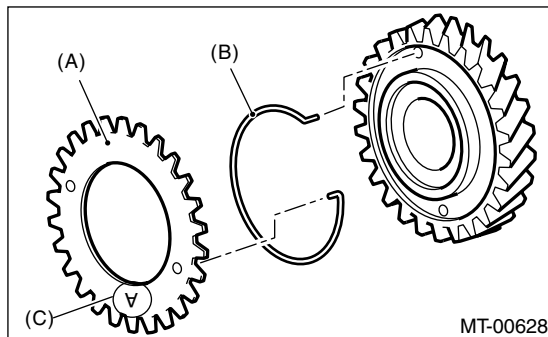
- (A) Sub gear
- (B) Spring
- (C) Punch mark (mark A)

D: ASSEMBLY

1) Install the sub gear and spring.

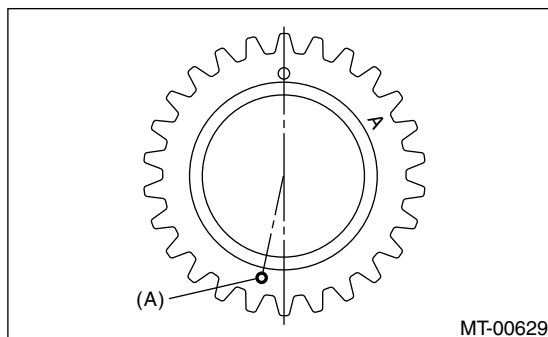
NOTE:

- Install the spring with white marking on hook part facing to sub gear side.
- Install the sub gear with punch mark (mark A) facing outside.



- (A) Sub gear
- (B) Spring
- (C) Punch mark (mark A)

- Install the spring and sub gear, taking care to install the sub gear installation hole in proper direction.

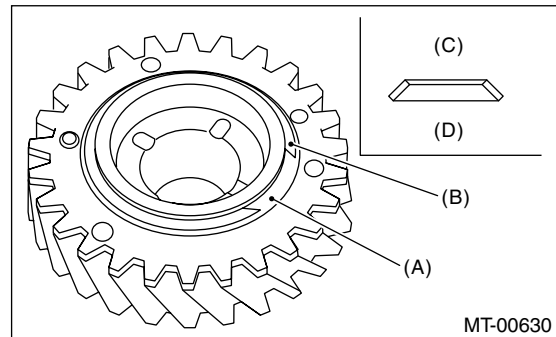


- (A) Installation hole

2) Install the friction plate and snap ring.

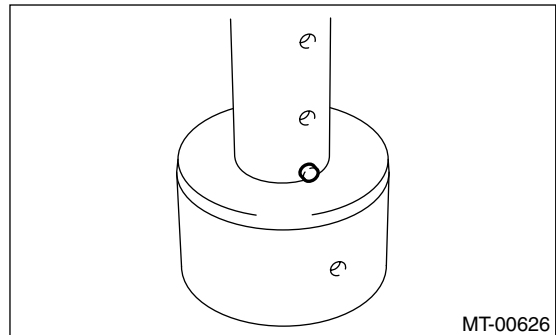
NOTE:

Make sure to install the friction plate in proper direction.



- (A) Friction plate
- (B) Snap ring
- (C) Snap ring side
- (D) Sub gear side

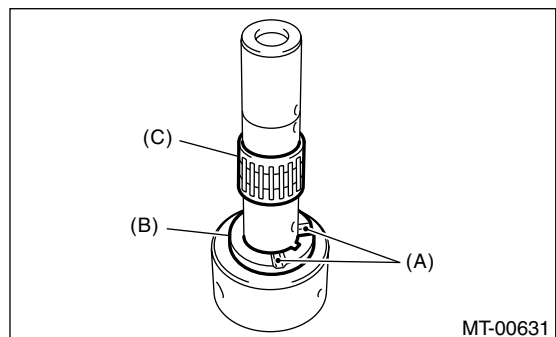
3) Sufficiently apply gear oil to the shaft, needle bearing and inner periphery of reverse drive gear.
4) Install the knock pin.



5) Install the washer and needle bearing.

NOTE:

Install the washer with groove facing to reverse idler gear.

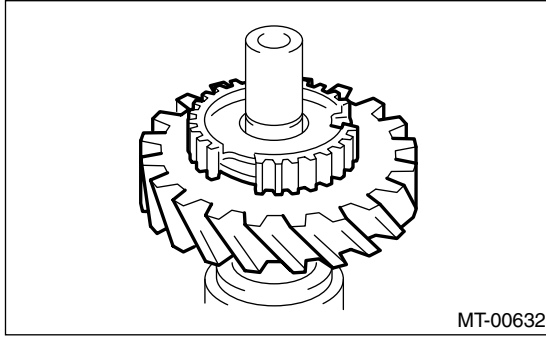


- (A) Groove
- (B) Washer
- (C) Needle bearing

REVERSE IDLER GEAR ASSEMBLY

MANUAL TRANSMISSION AND DIFFERENTIAL

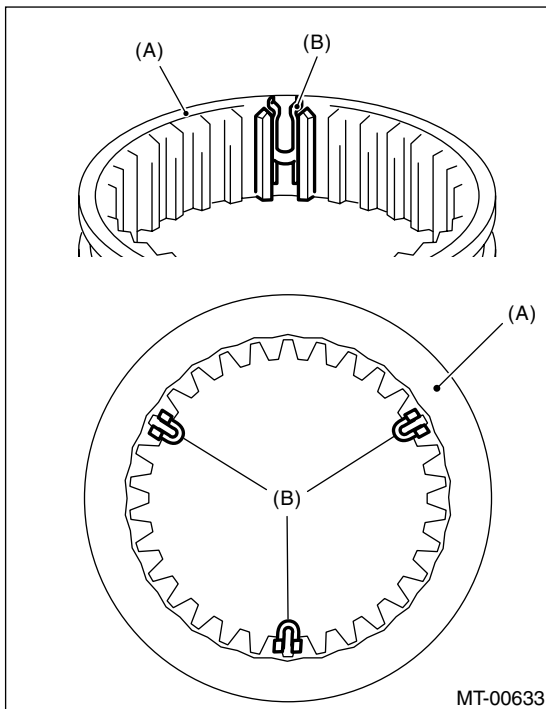
6) Install the reverse idler gear No. 2.



7) Install the shifting insert key in proper place of reverse sleeve.

NOTE:

Angle of each shifting insert key is 120° apart.

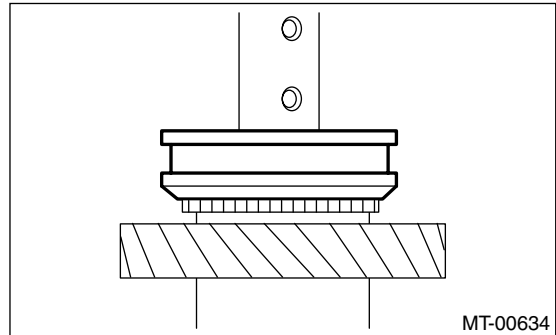


- (A) Reverse sleeve
- (B) Shifting insert key

8) Install the reverse sleeve to reverse idler gear No. 2.

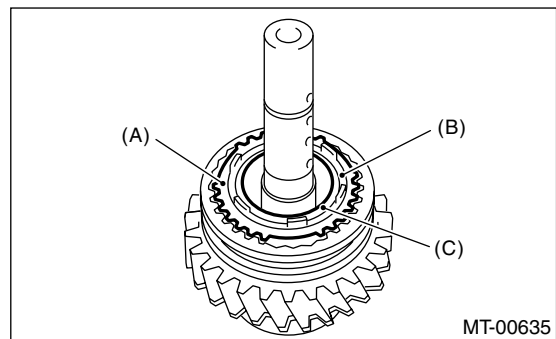
NOTE:

Make sure to install the reverse sleeve in proper direction.



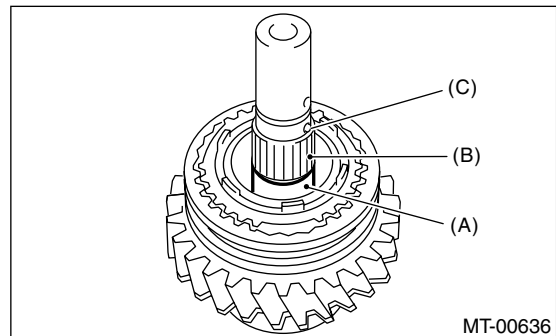
9) Sufficiently apply gear oil to the collar, needle bearing and inner periphery of reverse drive gear.

10) Install the outer baulk ring, reverse synchro cone and inner baulk ring.



- (A) Outer baulk ring
- (B) Reverse synchro cone
- (C) Inner baulk ring

11) Install the collar and needle bearing, then install the knock pin.

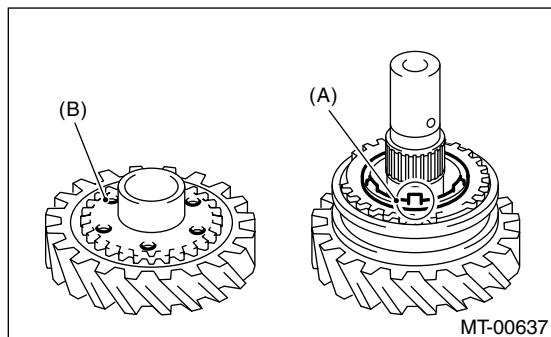


- (A) Collar
- (B) Needle bearing
- (C) Knock pin

REVERSE IDLER GEAR ASSEMBLY

MANUAL TRANSMISSION AND DIFFERENTIAL

12) Align the protrusion portion of reverse synchro cone with reverse idler gear hole, then install the reverse idler gear.



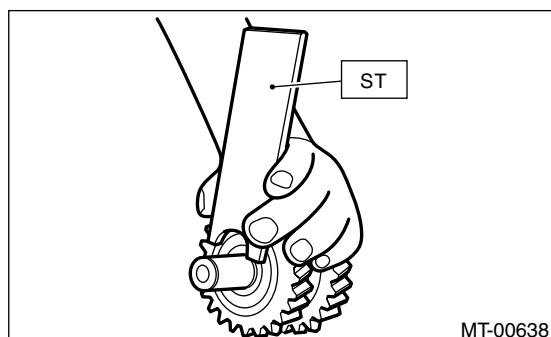
(A) Protrusion portion of reverse synchro cone

(B) Reverse idler gear hole

13) Install the washer with groove facing to reverse idler gear.

14) Using the ST, install the snap ring.

ST 18672AA000 GUIDE CLIP



15) Inspect and adjust the clearance between snap ring and washer. <Ref. to 6MT-96, INSPECTION, Reverse Idler Gear Assembly.>

16) Install a new spring pin.

E: INSPECTION

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

1) Bearings

Replace the bearings in the following cases.

- Worn, rusted and damaged bearing
- Bearings that fail to turn smoothly or make abnormal noise when turned
- Bearings having other defects

2) Bushing (each gear)

Replace the bushings in the following case:

- When the sliding surface is damaged or abnormally worn.

3) Gears

Replace the gears in the following cases:

- The gear teeth surfaces are broken or excessively worn.
- The parts that contact the baulk ring is damaged.
- The inner surface of gear is damaged.

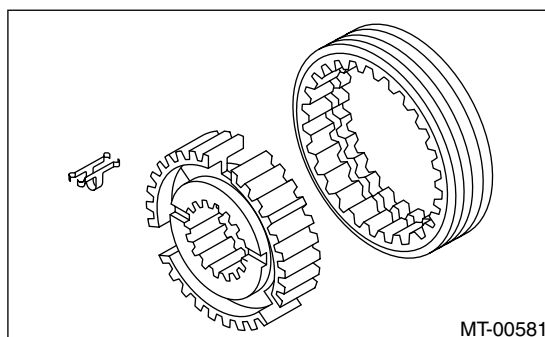
4) Baulk ring, synchro cone

Replace the baulk ring and synchro cone in the following case:

- Worn, rusted and damaged baulk ring

5) Shifting insert key

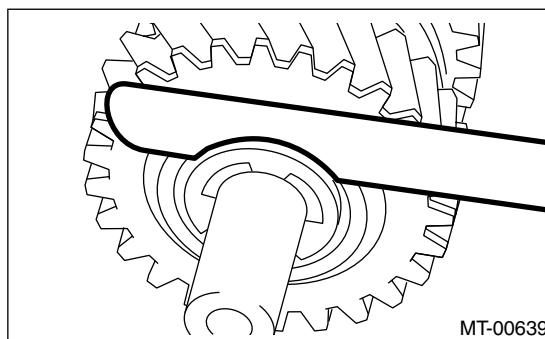
Replace the shifting insert key if deformed, excessively worn or defective in any way.



6) Inspect the clearance between snap ring and washer.

Specification of clearance:

0.1 — 0.3 mm (0.0039 — 0.0118 in)



Select and replace the snap ring from the following table if clearance is out of specification.

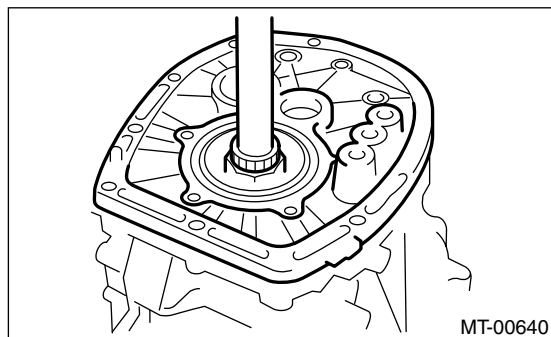
Snap ring		
Parts No.	Thickness	mm (in)
031319000	1.50	(0.059)
805019030	1.60	(0.062)
805019010	1.72	(0.068)

Inspect the clearance again after replacing snap ring.

22. Drive Pinion Shaft Assembly

A: REMOVAL

- 1) Remove the manual transmission assembly from vehicle. <Ref. to 6MT-35, REMOVAL, Manual Transmission Assembly.>
- 2) Prepare the transmission for overhaul. <Ref. to 6MT-40, Preparation for Overhaul.>
- 3) Remove the oil pipe, neutral position switch, back-up light switch and harness. <Ref. to 6MT-42, REMOVAL, Oil Pipe.>, <Ref. to 6MT-45, REMOVAL, Neutral Position Switch.>, <Ref. to 6MT-43, REMOVAL, Back-up Light Switch.>
- 4) Remove the extension case. <Ref. to 6MT-47, REMOVAL, Extension Case.>
- 5) Remove the transfer driven gear. <Ref. to 6MT-58, REMOVAL, Transfer Driven Gear.>
- 6) Remove the center differential. <Ref. to 6MT-60, REMOVAL, Center Differential.>
- 7) Remove the oil pump. <Ref. to 6MT-61, REMOVAL, Oil Pump.>
- 8) Remove the transmission case. <Ref. to 6MT-65, REMOVAL, Transmission Case.>
- 9) Remove each gear assembly. <Ref. to 6MT-70, REMOVAL, Main Shaft Assembly.>
- 10) Remove the drive pinion shaft assembly.

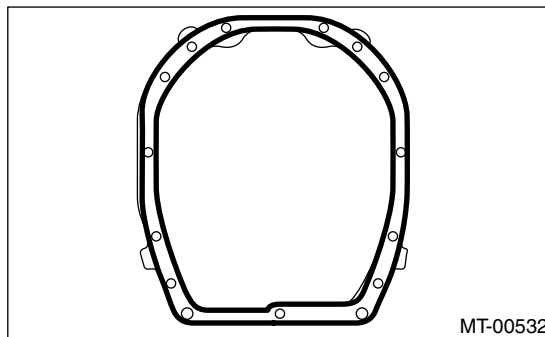


B: INSTALLATION

- 1) Completely remove the remaining gasket on drive plate and clutch housing.
- 2) Apply liquid gasket to the clutch housing.

Liquid gasket:

THREE BOND 1215 (Part No. 004403007)



- 3) Install each gear assembly. <Ref. to 6MT-71, INSTALLATION, Main Shaft Assembly.>
- 4) Install the transmission case. <Ref. to 6MT-66, INSTALLATION, Transmission Case.>
- 5) Install the oil pump. <Ref. to 6MT-62, INSTALLATION, Oil Pump.>
- 6) Install the center differential. <Ref. to 6MT-60, INSTALLATION, Center Differential.>
- 7) Install the transfer driven gear. <Ref. to 6MT-58, INSTALLATION, Transfer Driven Gear.>
- 8) Install the extension case. <Ref. to 6MT-47, INSTALLATION, Extension Case.>
- 9) Install the oil pipe, neutral position switch, back-up light switch and harness. <Ref. to 6MT-42, INSTALLATION, Oil Pipe.>, <Ref. to 6MT-45, INSTALLATION, Neutral Position Switch.>, <Ref. to 6MT-43, INSTALLATION, Back-up Light Switch.>
- 10) Install the manual transmission assembly to vehicle. <Ref. to 6MT-37, INSTALLATION, Manual Transmission Assembly.>

DRIVE PINION SHAFT ASSEMBLY

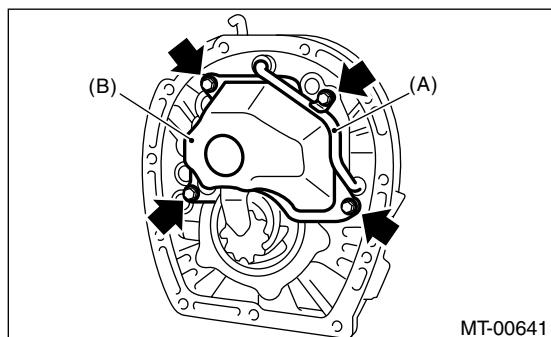
MANUAL TRANSMISSION AND DIFFERENTIAL

C: DISASSEMBLY

NOTE:

Replace the drive pinion shaft as a set with hypoid driven gear.

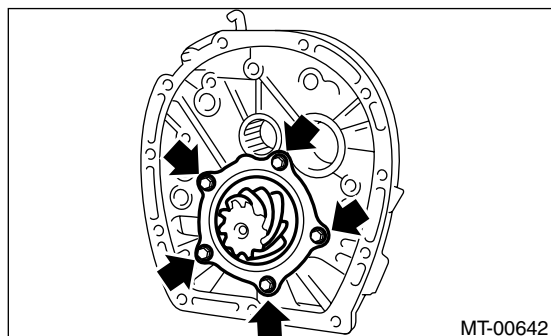
1) Remove the pipe and oil chamber.



(A) Pipe

(B) Oil chamber

2) Remove the drive pinion shaft and shim from adapter plate.



3) Secure the ST on workbench.

ST 18664AA000 BASE

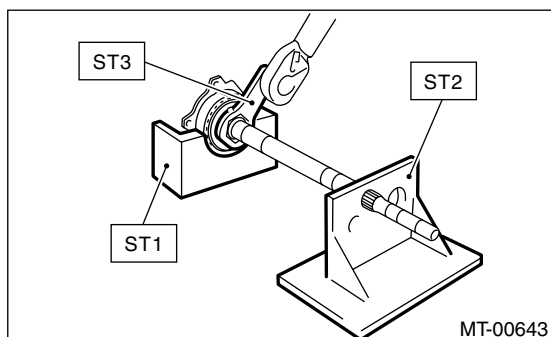
4) Lift the caulking of lock nut.

5) Install the ST3 to lock nut, then set drive pinion shaft to ST. Remove the lock nut and washer.

ST1 18667AA000 HOLDER

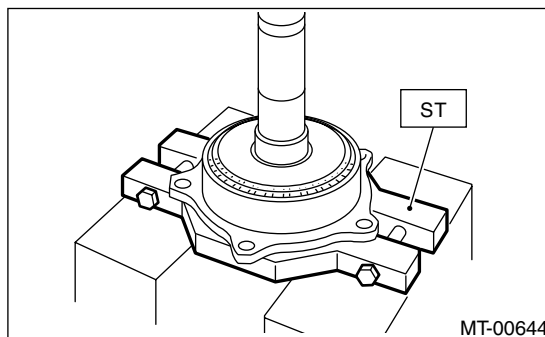
ST2 18664AA000 BASE

ST3 18621AA000 ADAPTER WRENCH



6) Using the ST, remove the taper roller bearing assembly.

ST 18723AA000 REMOVER



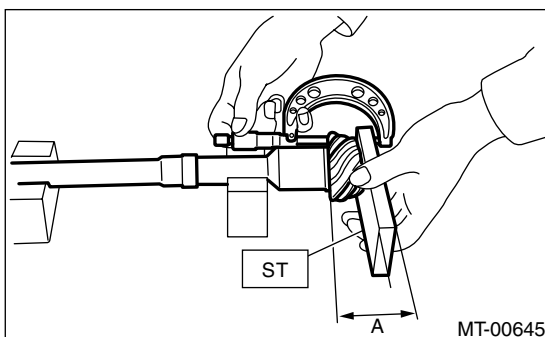
D: ASSEMBLY

1) Using the ST, measure dimension A of drive pinion.

NOTE:

Note dimension A for selection of drive pinion shim.

ST 398643600 GAUGE

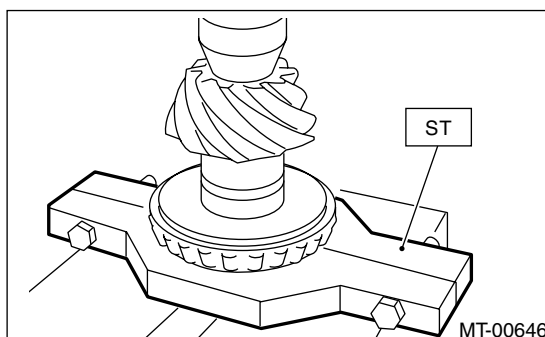


2) Install the inner bearing inner race to drive pinion shaft using ST and press.

ST 18723AA000 REMOVER

CAUTION:

Do not apply pressure in excess of 40 kN (4.0 ton, 4.4 US ton, 3.9 Imp ton).



DRIVE PINION SHAFT ASSEMBLY

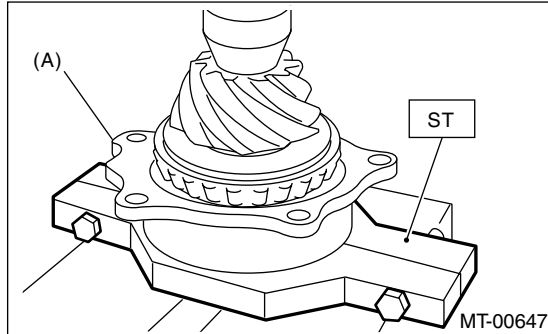
MANUAL TRANSMISSION AND DIFFERENTIAL

3) Install the retainer and outer bearing inner race to drive pinion shaft using ST and press.

ST 18723AA000 REMOVER

NOTE:

Press to the point where bearing is turned smoothly without slack.



(A) Retainer

4) Install the washer and a new lock nut.

5) Set the ST to drive pinion, then tighten the lock nut.

ST1 18667AA000 HOLDER

ST2 18664AA000 BASE

ST3 18621AA000 ADAPTER WRENCH

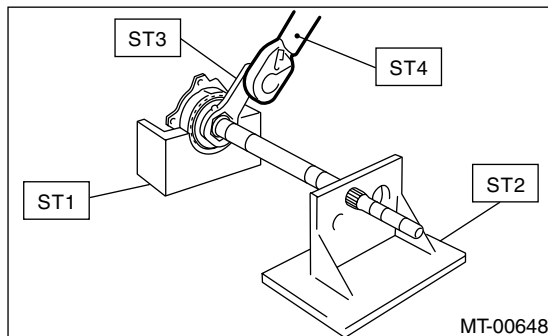
ST4 18852AA000 TORQUE WRENCH

NOTE:

Tighten with the ST and torque wrench straight-lined.

Tightening torque:

265 N·m (27.0 kgf-m, 195 ft-lb)

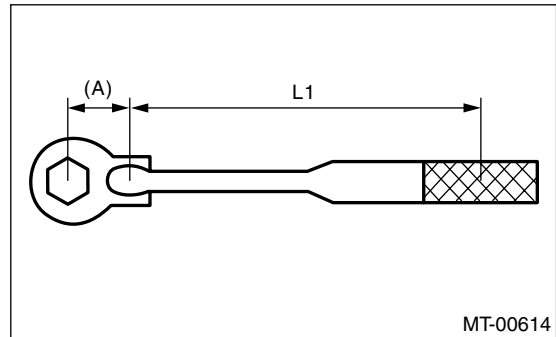


NOTE:

• If torque wrench except ST4 is used, calculate the following equation, then tighten the lock nut. Tighten with the ST and torque wrench straight-lined.

$$T = L1 / (0.1 + L1) \times 285$$

T	N·m (kgf-m, ft-lb)	Setting value of torque wrench
L1	m (in)	Torque wrench length
	0.1 m (3.94 in)	ST length
285 N·m (29.0 kgf-m, 210 ft-lb)		Tightening torque of lock nut



(A) 0.1 m (3.94 in)

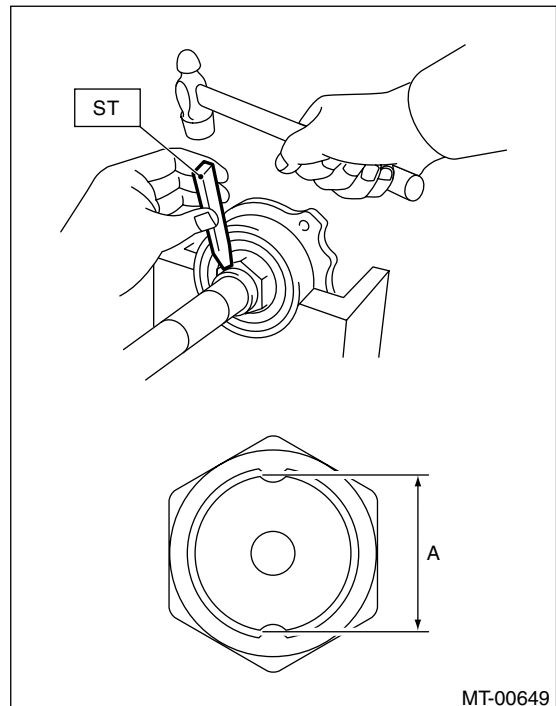
6) Measure the starting torque. <Ref. to 6MT-100, INSPECTION, Drive Pinion Shaft Assembly.>

7) Using the ST, caulk two portions on the lock nut to obtain dimension A 37 ± 0.5 mm (1.46 ± 0.02 in).

ST 18670AA000 PUNCH

NOTE:

Do not crack the caulking part of lock nut.

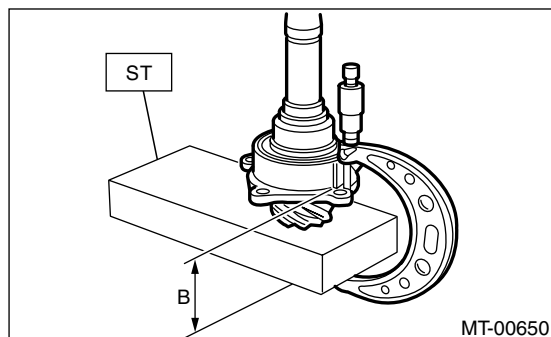


DRIVE PINION SHAFT ASSEMBLY

MANUAL TRANSMISSION AND DIFFERENTIAL

8) Using the ST, measure dimension B of the drive pinion.

ST 398643600 GAUGE



9) Calculate the following formula, then select one or two pieces of drive pinion shim from the table below.

$$6.5 \pm 0.0625 \text{ mm} - (B - A) [0.26 \pm 0.0025 \text{ in} - (B - A)]$$

NOTE:

A: Measured value from step 1).

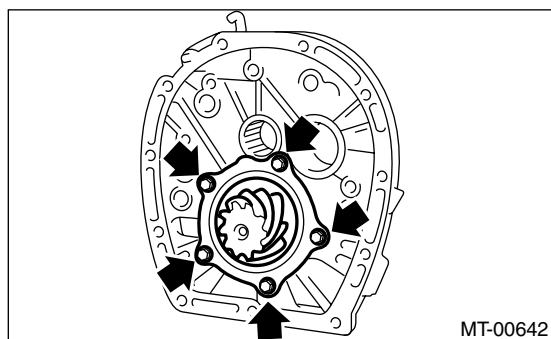
B: Measured value from step 8).

Drive pinion shim	
Part No.	Thickness mm (in)
32295AA270	0.15 (0.0059)
32295AA280	0.175 (0.0069)
32295AA290	0.20 (0.0079)
32295AA300	0.225 (0.0089)
32295AA310	0.25 (0.0098)
32295AA320	0.275 (0.0108)

10) Apply gear oil to the side face of taper roller bearing, then install the drive pinion shaft and selected shim to adapter plate.

Tightening torque:

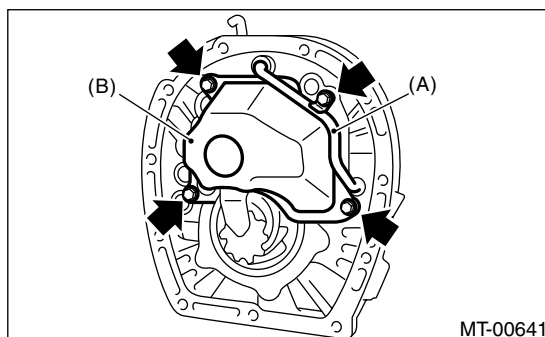
54 N·m (5.5 kgf·m, 40 ft·lb)



11) Install the oil chamber and pipe.

Tightening torque:

6.4 N·m (0.65 kgf·m, 4.7 ft·lb)



(A) Pipe

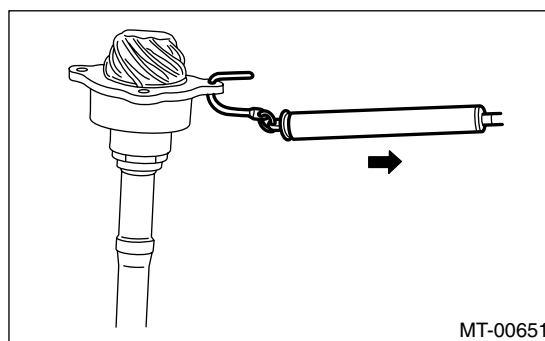
(B) Oil chamber

E: INSPECTION

1) Using the spring balancer, measure the starting torque. If the starting torque is out of specification, replace the taper roller bearing.

Starting torque:

0 — 0.95 N (0 — 0.097 kgf, 0 — 0.21 lb)



2) Gears

Replace the gears in the following case.

- Gear teeth surfaces are broken or excessively worn.

3) Bearings

Replace the bearings in the following cases.

- Worn, rusted and damaged bearing
- Bearings that fail to turn smoothly or make abnormal noise when turned

4) Adapter plate

Replace the adapter plate in the following cases.

- Worn, rusted and damaged bearing
- Damaged adapter plate

5) Make sure the pipe and pipe chamber is not damaged or clogged. Repair or replace if damaged or clogged.

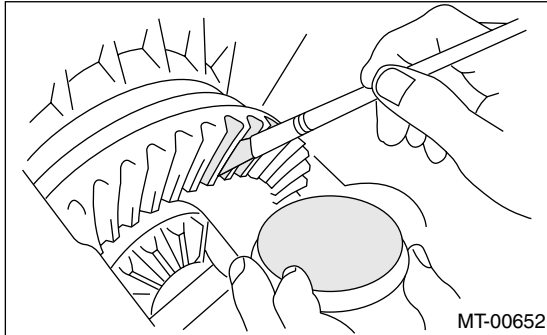
DRIVE PINION SHAFT ASSEMBLY

MANUAL TRANSMISSION AND DIFFERENTIAL

F: ADJUSTMENT

1) Inspect and adjust the backlash between hypoid driven gear and drive pinion. <Ref. to 6MT-108, HYPOID GEAR BACKLASH, ADJUSTMENT, Front Differential Assembly.>

2) Apply a uniform thin coat of red lead on both teeth surfaces of three or four teeth of the hypoid driven gear.



3) Install the drive pinion shaft assembly to clutch housing, then tighten it with at least four bolts.

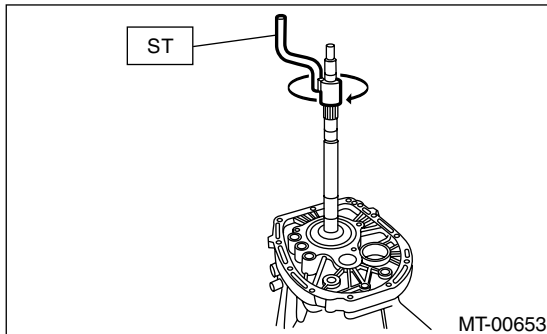
NOTE:

Install it with the remaining liquid gasket to prevent the mating surface of clutch housing and adapter plate from damaging.

Tightening torque:

50 N·m (5.1 kgf-m, 36.9 ft-lb)

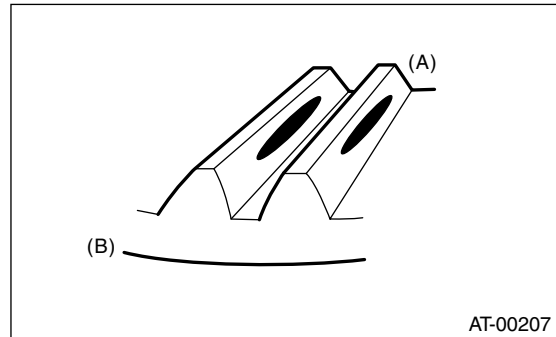
4) Using the ST, rotate several times.
ST 18631AA000 HANDLE



5) Remove the drive pinion shaft assembly, and then check tooth contact. If it is inaccurate, adjust the backlash or thickness of shim.

• Tooth contact

Checking item: Tooth contact pattern is slightly shifted toward to toe side under no-load rotation. [When loaded, contact pattern moves toward heel.]



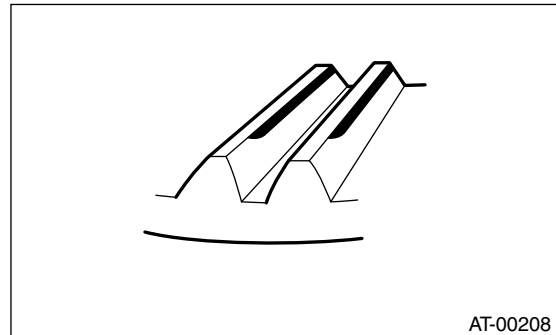
(A) Toe side

(B) Heel side

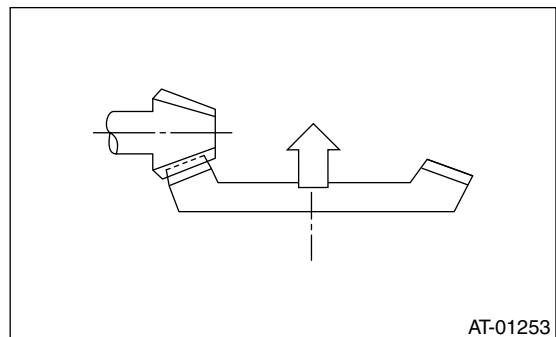
• Face contact

Checking item: Backlash is too large.

Contact pattern



Corrective action: Verify the backlash again, and then adjust it.



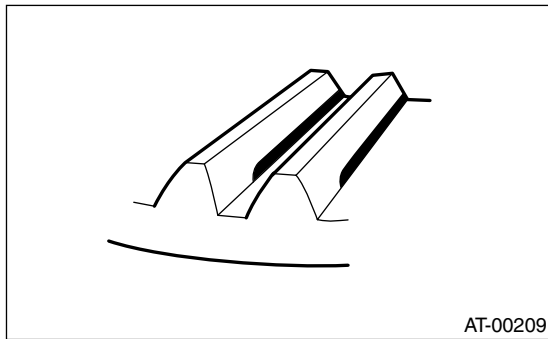
DRIVE PINION SHAFT ASSEMBLY

MANUAL TRANSMISSION AND DIFFERENTIAL

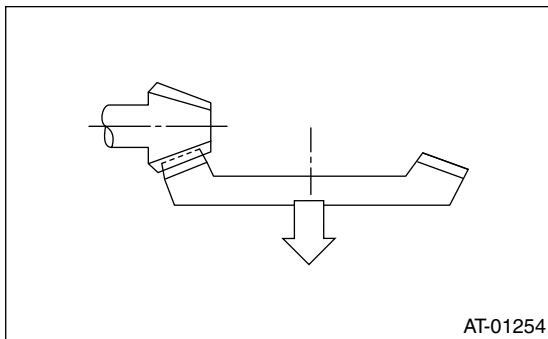
- Flank contact

Checking item: Backlash is too small.

Contact pattern



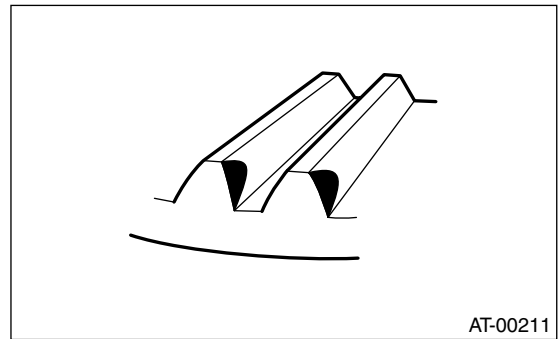
Corrective action: Verify the backlash again, and then adjust it.



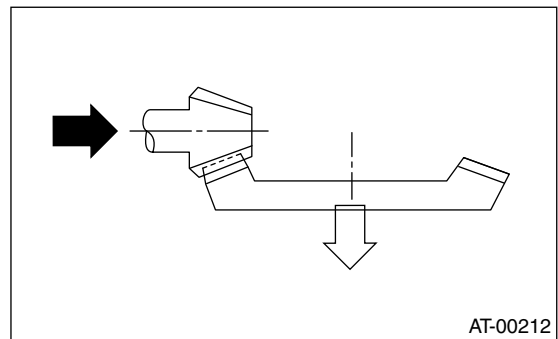
- Heel contact (Outside end contact)

Checking item: Contact areas is small.

Contact pattern



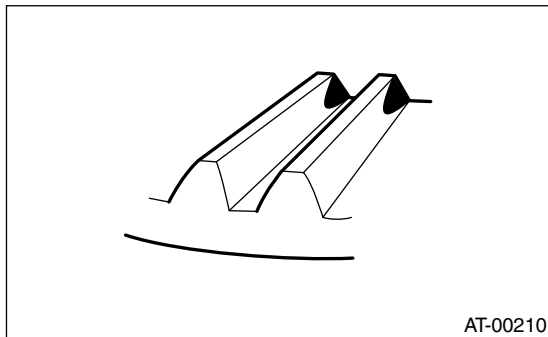
Corrective action: Increase thickness of drive pinion shim in order to bring drive pinion close to crown gear.



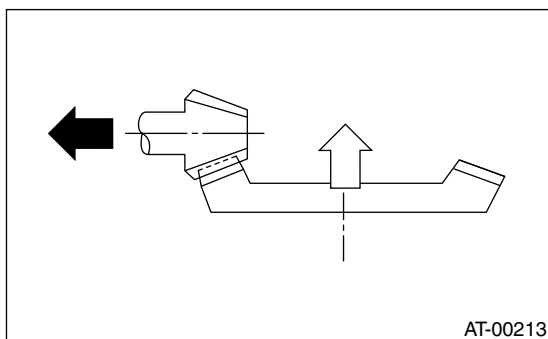
- Toe contact (Inside end contact)

Checking item: Contact areas is small.

Contact pattern



Corrective action: Reduce thickness of drive pinion shim in order to move drive pinion away from crown gear.



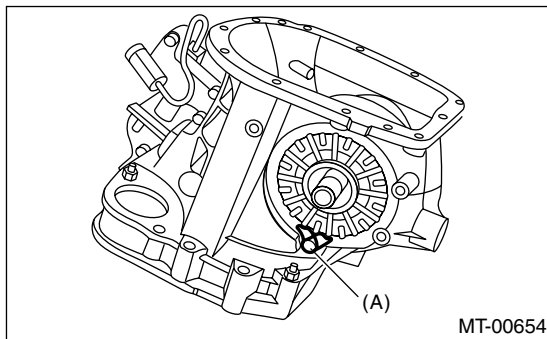
FRONT DIFFERENTIAL ASSEMBLY

MANUAL TRANSMISSION AND DIFFERENTIAL

23. Front Differential Assembly

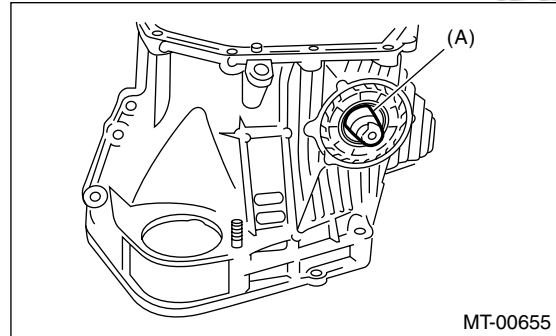
A: REMOVAL

- 1) Remove the manual transmission assembly. <Ref. to 6MT-35, REMOVAL, Manual Transmission Assembly.>
- 2) Prepare the transmission for overhaul. <Ref. to 6MT-40, Preparation for Overhaul.>
- 3) Remove the oil pipe, neutral position switch, back-up light switch and harness. <Ref. to 6MT-42, REMOVAL, Oil Pipe.>, <Ref. to 6MT-45, REMOVAL, Neutral Position Switch.>, <Ref. to 6MT-43, REMOVAL, Back-up Light Switch.>
- 4) Remove the extension case. <Ref. to 6MT-47, REMOVAL, Extension Case.>
- 5) Remove the transfer driven gear. <Ref. to 6MT-58, REMOVAL, Transfer Driven Gear.>
- 6) Remove the center differential. <Ref. to 6MT-60, REMOVAL, Center Differential.>
- 7) Remove the oil pump. <Ref. to 6MT-61, REMOVAL, Oil Pump.>
- 8) Remove the transmission case. <Ref. to 6MT-65, REMOVAL, Transmission Case.>
- 9) Remove each gear assembly. <Ref. to 6MT-70, REMOVAL, Main Shaft Assembly.>
- 10) Remove the drive pinion shaft assembly. <Ref. to 6MT-97, REMOVAL, Drive Pinion Shaft Assembly.>
- 11) Remove the lock plates on both side.



(A) Lock plate

- 12) Wrap the spline part of axle shaft around with vinyl tape.

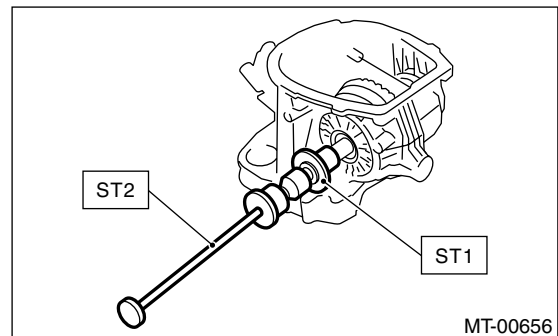


(A) Vinyl tape

- 13) Using the ST, remove the axle shaft.
ST1 499247300 INSTALLER
ST2 499095500 REMOVER ASSY

NOTE:

- Do not reuse the circlip.
- Mark to identify the right and left axle shaft.



FRONT DIFFERENTIAL ASSEMBLY

MANUAL TRANSMISSION AND DIFFERENTIAL

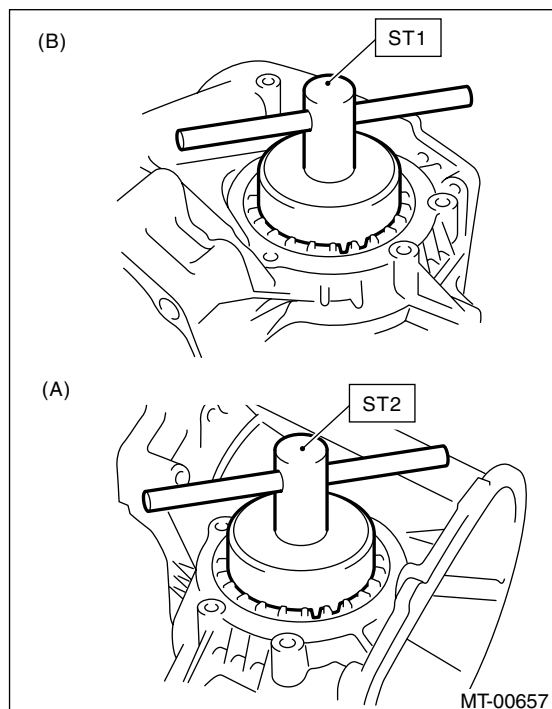
14) Using the ST, remove the differential side retainer on both sides.

ST1 499787000 WRENCH ASSY (RIGHT SIDE)

ST2 18630AA000 WRENCH ASSY (LEFT SIDE)

NOTE:

Be careful not to damage the part of clutch case where the retainer is to be installed.



(A) Left side
(B) Right side

15) Remove the front differential.

B: INSTALLATION

1) Install the differential assembly into clutch housing.

2) Apply oil to the threaded portion part of side retainer.

3) Remove the O-ring from side retainer of both sides.

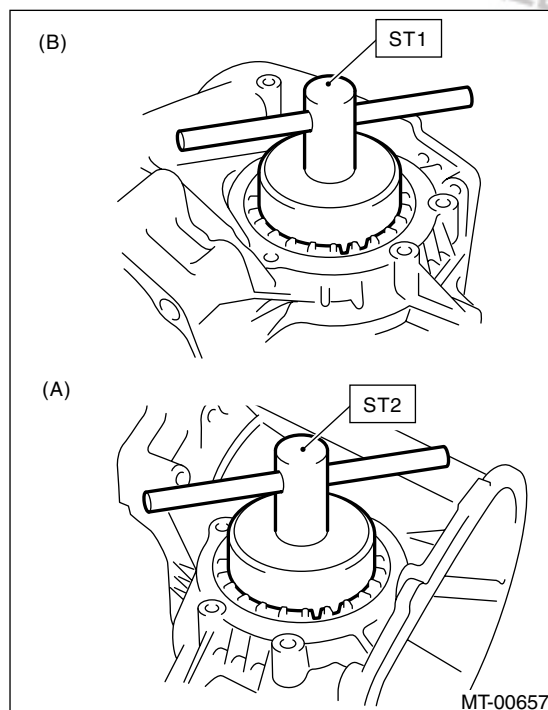
4) Using the ST, install the differential side retainer to both sides.

ST1 499787000 WRENCH ASSY (RIGHT SIDE)

ST2 18630AA000 WRENCH ASSY (LEFT SIDE)

NOTE:

Be careful not to damage the oil seal.



(A) Left side
(B) Right side

5) Install the axle shaft.

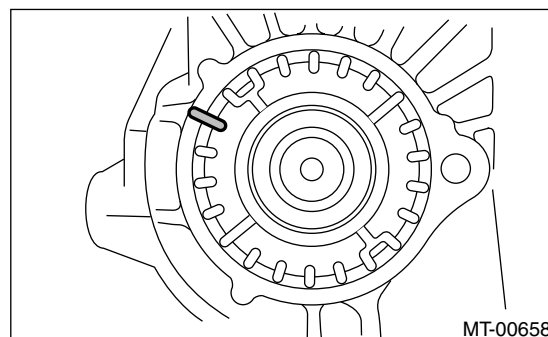
NOTE:

- Replace the circlip with a new one.
- Be careful not to confuse right and left axle shaft.
- Wrap vinyl tape around the spline part of axle shaft.

6) Check and adjust the hypoid gear backlash. <Ref. to 6MT-107, HYPOID GEAR BACKLASH, INSPECTION, Front Differential Assembly.>

7) Check and adjust the tooth contact. <Ref. to 6MT-101, ADJUSTMENT, Drive Pinion Shaft Assembly.>

8) Mark an engagement point on the right and left side retainer and clutch housing.



9) Remove the differential side retainer from both sides.

FRONT DIFFERENTIAL ASSEMBLY

MANUAL TRANSMISSION AND DIFFERENTIAL

NOTE:

Note the rotating number of time till removal, when removing the side retainer.

10) Install a new O-ring to side retainer of both sides.

11) Install the differential side retainer to both sides.

NOTE:

Install the side retainer by screwing in the same rotating number of time till removal, and then align the mark.

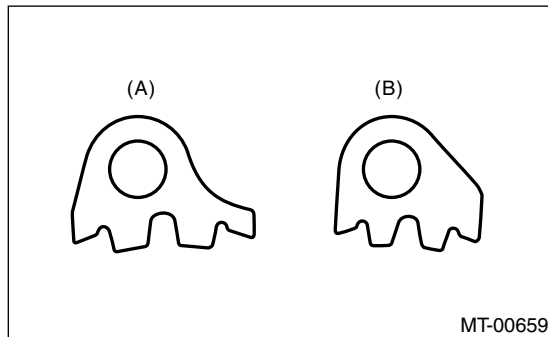
12) Install the lock plate.

Tightening torque:

25 N·m (2.5 kgf-m, 18.1 ft-lb)

NOTE:

Be careful not to confuse right and left lock plates.



(A) Left

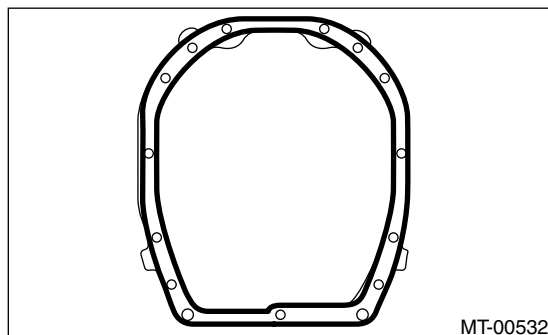
(B) Right

13) Completely remove the remaining gasket from the clutch housing and adapter plate.

14) Apply liquid gasket to the clutch housing.

Liquid gasket:

THREE BOND 1215 (Part No. 004403007)



15) Install the drive pinion shaft assembly. <Ref. to 6MT-97, INSTALLATION, Drive Pinion Shaft Assembly.>

16) Install each gear assembly at once. <Ref. to 6MT-71, INSTALLATION, Main Shaft Assembly.>

17) Install the transmission case. <Ref. to 6MT-66, INSTALLATION, Transmission Case.>

18) Install the oil pump. <Ref. to 6MT-62, INSTALLATION, Oil Pump.>

19) Install the center differential. <Ref. to 6MT-60, INSTALLATION, Center Differential.>

20) Install the transfer driven gear. <Ref. to 6MT-58, INSTALLATION, Transfer Driven Gear.>

21) Install the extension case. <Ref. to 6MT-47, INSTALLATION, Extension Case.>

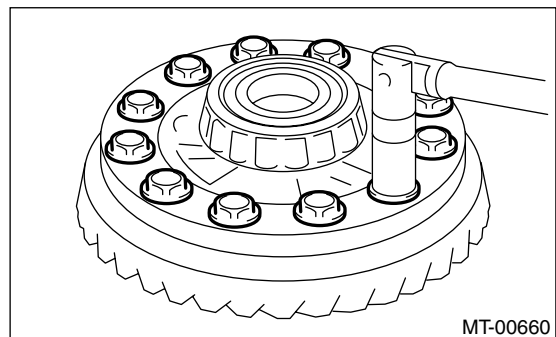
22) Install the oil pipe, neutral position switch, back-up light switch and harness. <Ref. to 6MT-42, INSTALLATION, Oil Pipe.>, <Ref. to 6MT-45, INSTALLATION, Neutral Position Switch.>, <Ref. to 6MT-43, INSTALLATION, Back-up Light Switch.>

23) Install the manual transmission assembly to vehicle. <Ref. to 6MT-37, INSTALLATION, Manual Transmission Assembly.>

C: DISASSEMBLY

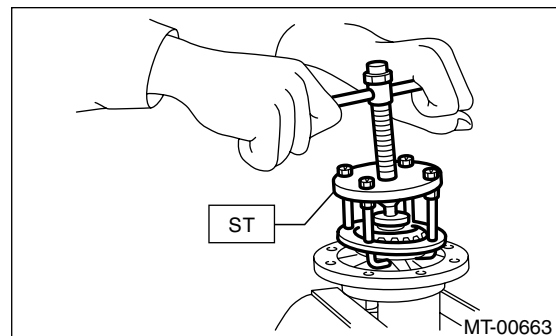
1. DIFFERENTIAL CASE

1) Secure the differential assembly on a vise, and then remove the hypoid driven gear.



2) Using the ST, remove the hypoid driven gear side bearing.

ST 399527700 PULLER SET



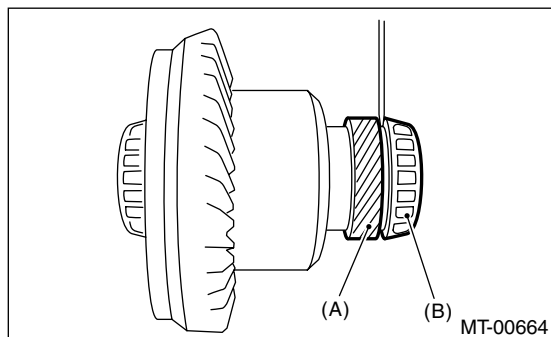
3) Using a screw driver, make clearance of 2 — 3 mm (0.079 — 0.118 in) between the speedometer drive gear and roller bearing.

FRONT DIFFERENTIAL ASSEMBLY

MANUAL TRANSMISSION AND DIFFERENTIAL

NOTE:

Be careful not to damage the differential case.

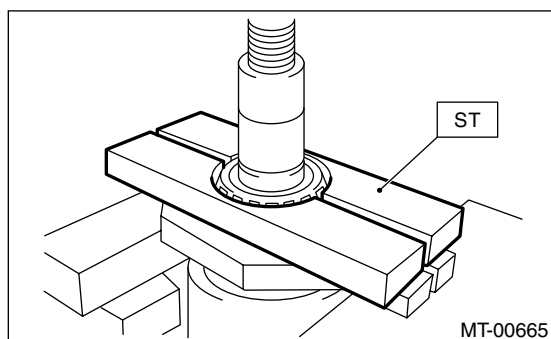


(A) Speedometer drive gear

(B) Roller bearing

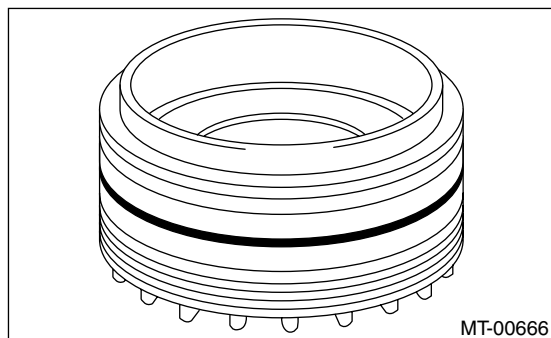
4) Using the ST, remove the roller bearing.

ST 498077000 REMOVER

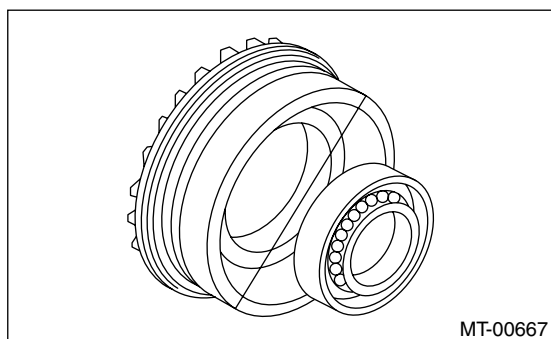


2. SIDE RETAINER

1) Remove the O-ring from side retainer.



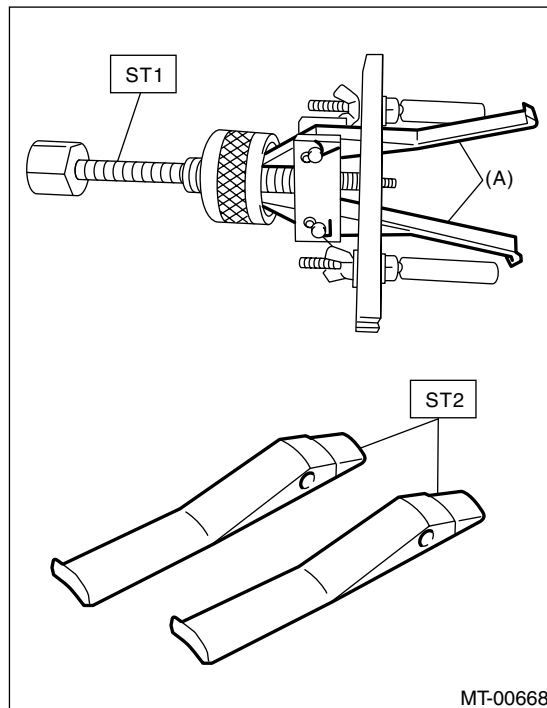
2) Remove the oil seal from side retainer.



3) Remove the claw of ST1, and then install the claw of ST2.

ST1 398527700 PULLER ASSY

ST2 18760AA000 CLAW

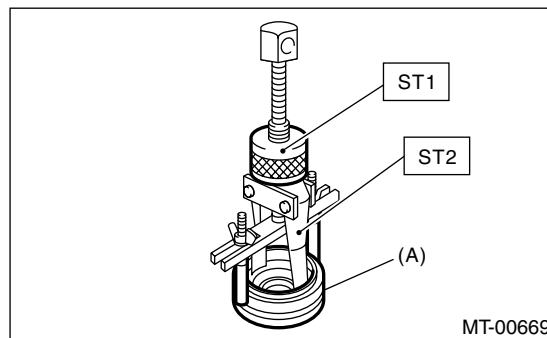


(A) Claw

4) Remove the bearing outer race from side retainer.

ST1 398527700 PULLER ASSY

ST2 18760AA000 CLAW



(A) Side retainer

D: ASSEMBLY

1. DIFFERENTIAL CASE

1) Using the ST, install a new speedometer drive gear and right and left side bearing inner race to differential case.

ST1 398437700 INSTALLER

ST2 398497701 SEAT

FRONT DIFFERENTIAL ASSEMBLY

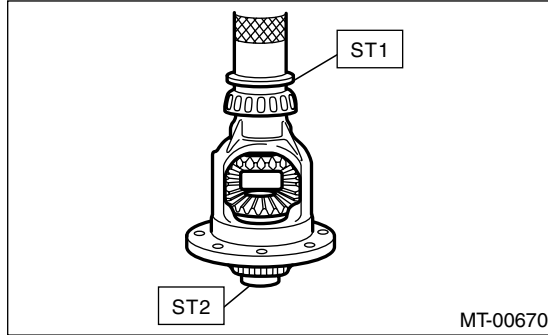
MANUAL TRANSMISSION AND DIFFERENTIAL

CAUTION:

Do not apply pressure in excess of 20 kN (2.0 ton, 2.2 US ton, 2.0 Imp ton).

NOTE:

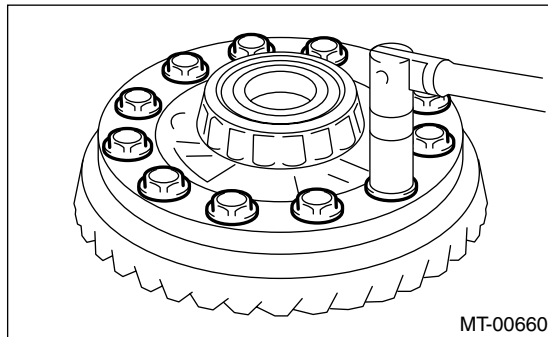
Always replace the inner race and outer race as a set.



2) Install the hypoid driven gear to differential case.

Tightening torque:

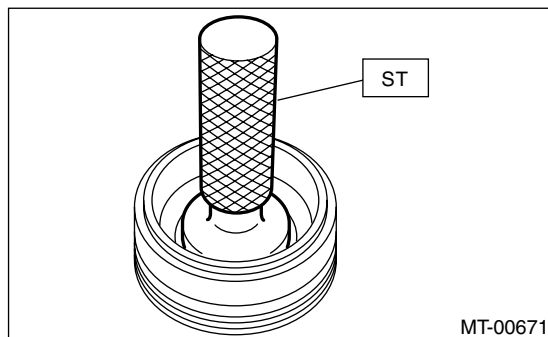
69 N·m (7.0 kgf-m, 50.9 ft-lb)



2. SIDE RETAINER

1) Using the ST, install the oil seal.

ST 499797000 OIL SEAL INSTALLER



2) Install the bearing outer race to retainer on both sides.

3) Install the O-ring to retainer on both sides.

NOTE:

Be careful not to damage the O-ring.

E: INSPECTION

Repair or replace the front differential in following cases.

- Each gear is damaged, seized, or excessively worn.
- Sliding surface of the differential case is damaged, seized or excessively worn.
- Bearings and bearings part are damaged, rusted or worn.
- Bearings fail to turn smoothly or make abnormal noise when turned.

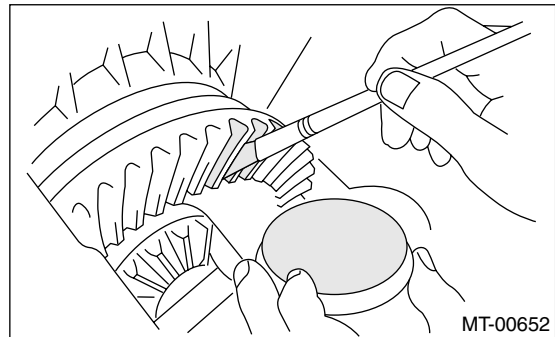
1. HYPOID GEAR BACKLASH

Check the hypoid gear backlash. If it is not within specifications, adjust it. <Ref. to 6MT-108, HYPOID GEAR BACKLASH, Front Differential Assembly.>

2. TOOTH CONTACT OF HYPOID GEAR

1) Be sure the hypoid gear backlash is within specifications. If it is not within specifications, adjust it. <Ref. to 6MT-108, HYPOID GEAR BACKLASH, Front Differential Assembly.>

2) Apply a uniform thin coat of red lead on both tooth surfaces of three or four teeth of the hypoid driven gear.



3) Install the drive pinion shaft assembly, and then secure it with four bolts.

NOTE:

Use the old gasket and washer to prevent the mating surface of housing from damaging.

Tightening torque:

50 N·m (5.0 kgf-m, 36.9 ft-lb)

4) Rotate the drive pinion shaft to right and left for several times.

5) Remove the drive pinion shaft assembly, and then check tooth contact. If tooth contact is inaccurate, adjust it. <Ref. to 6MT-101, ADJUSTMENT, Drive Pinion Shaft Assembly.>

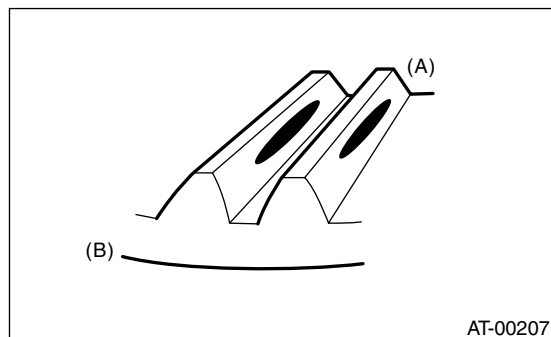
FRONT DIFFERENTIAL ASSEMBLY

MANUAL TRANSMISSION AND DIFFERENTIAL

- Correct tooth contact.

NOTE:

Under no load, tooth contacts 50 — 60% from center to toe side (tooth contact shifts to heel side when driving).



- (A) Toe side
(B) Heel side

F: ADJUSTMENT

1. HYPOID GEAR BACKLASH

- 1) Install the right and left side retainer.

ST1 499787000 WRENCH ASSY (RIGHT SIDE)

ST2 18630AA000 WRENCH ASSY (LEFT SIDE)

NOTE:

Screw in the right side retainer a bit further than left side.

- 2) Install the drive pinion shaft assembly, and then secure it with four bolts.

NOTE:

Use the old gasket and washer to prevent the mating surface of housing from damaging.

Tightening torque:

50 N·m (5.0 kgf-m, 36.9 ft-lb)

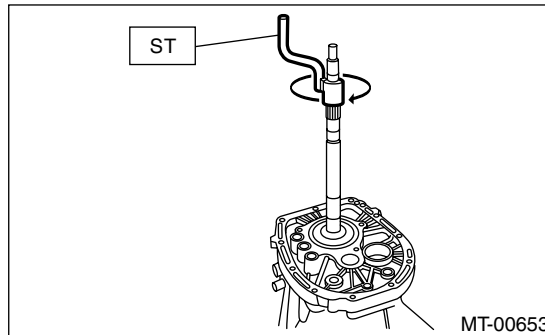
- 3) Using the ST, screw in the left side retainer until the drive pinion and hypoid driven gear contacts lightly. Then loosen the right side retainer.

ST1 499787000 WRENCH ASSY (RIGHT SIDE)

ST2 18630AA000 WRENCH ASSY (LEFT SIDE)

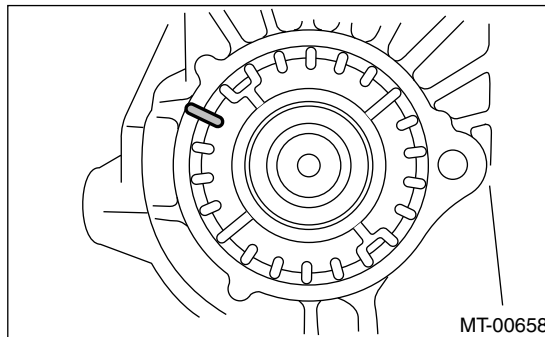
- 4) Using the ST, rotate the drive pinion shaft several times.

ST 18631AA000 HANDLE



- 5) Repeat step 3) and 4) until the left side retainer can not be rotated. For the right side retainer, screw it in until the inner race and outer race contacts lightly. This condition is "0" backlash.

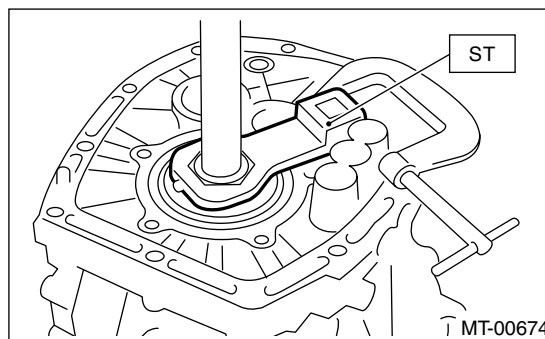
- 6) Mark an engagement point on the right and left side retainer and clutch housing.



- 7) Return the left side retainer for three teeth, and screw in the right side retainer for three teeth.

- 8) Using the ST, secure the drive pinion shaft.

ST 18621AA000 ADAPTER WRENCH



FRONT DIFFERENTIAL ASSEMBLY

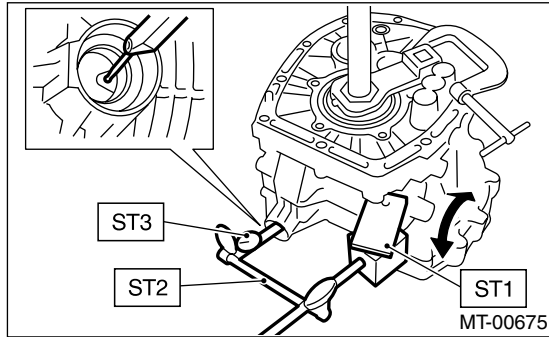
MANUAL TRANSMISSION AND DIFFERENTIAL

9) After rotating the drive pinion shaft several times, measure the hypoid gear backlash using the ST.

ST1 498255400 PLATE
ST2 498247001 MAGNET BASE
ST3 498247100 DIAL GAUGE

Hypoid gear backlash:

0.13 — 0.18 mm (0.0051 — 0.0071 in)



10) If the backlash is out of specification, adjust it by turning the right and left side retainers.

11) Screw in the right side retainer for further 1.75 teeth.

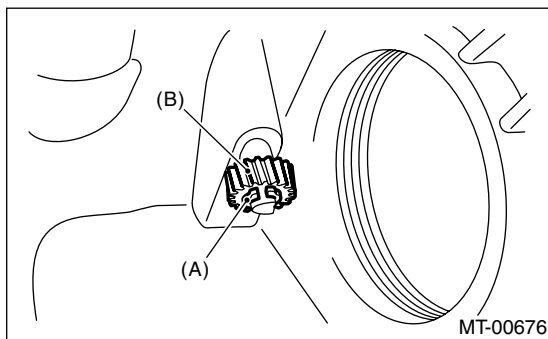
2. TOOTH CONTACT OF HYPOID GEAR

Refer to the section of drive pinion shaft for checking of tooth contact. <Ref. to 6MT-107, TOOTH CONTACT OF HYPOID GEAR, INSPECTION, Front Differential Assembly.>

24.Speedometer Gear

A: REMOVAL

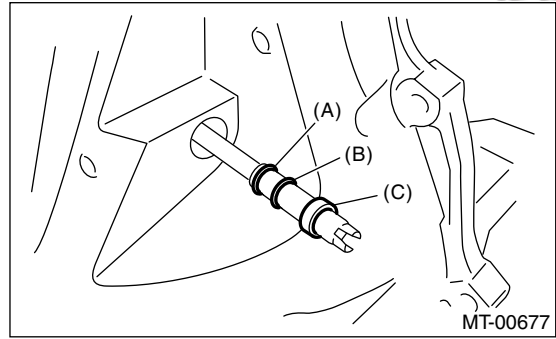
- 1) Remove the manual transmission assembly from vehicle. <Ref. to 6MT-35, REMOVAL, Manual Transmission Assembly.>
- 2) Prepare the transmission for overhaul. <Ref. to 6MT-40, Preparation for Overhaul.>
- 3) Remove the oil pipe, neutral position switch, back-up light switch and harness. <Ref. to 6MT-42, REMOVAL, Oil Pipe.>, <Ref. to 6MT-45, REMOVAL, Neutral Position Switch.>, <Ref. to 6MT-43, REMOVAL, Back-up Light Switch.>
- 4) Remove the extension case. <Ref. to 6MT-47, REMOVAL, Extension Case.>
- 5) Remove the transfer driven gear. <Ref. to 6MT-58, REMOVAL, Transfer Driven Gear.>
- 6) Remove the center differential. <Ref. to 6MT-60, REMOVAL, Center Differential.>
- 7) Remove the oil pump. <Ref. to 6MT-61, REMOVAL, Oil Pump.>
- 8) Remove the transmission case. <Ref. to 6MT-65, REMOVAL, Transmission Case.>
- 9) Remove each gear assembly. <Ref. to 6MT-70, REMOVAL, Main Shaft Assembly.>
- 10) Remove the drive pinion shaft assembly. <Ref. to 6MT-97, REMOVAL, Drive Pinion Shaft Assembly.>
- 11) Remove the front differential assembly. <Ref. to 6MT-103, REMOVAL, Front Differential Assembly.>
- 12) Remove the vehicle speed sensor. <Ref. to 6MT-32, REMOVAL, Vehicle Speed Sensor.>
- 13) Remove the snap ring, and then remove the speedometer driven gear.



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

- 14) Remove the speedometer shaft from clutch housing.

- 15) Remove the oil seal, speedometer shaft and washer.



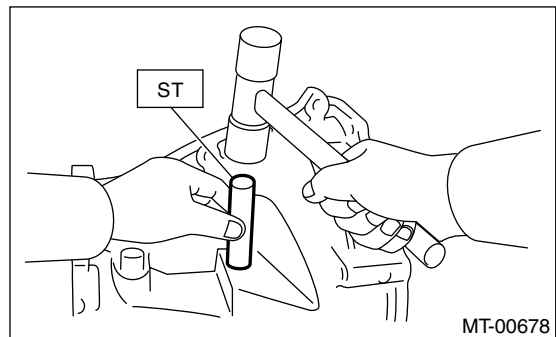
- (A) Washer
(B) Snap ring
(C) Oil seal

- 16) Remove the snap ring from speedometer shaft.

B: INSTALLATION

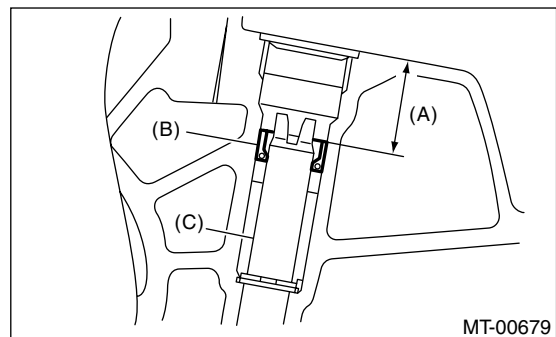
- 1) Install the oil seal, washer and snap ring to speedometer shaft.
- 2) Insert the speedometer shaft. Using the ST, press the oil seal.

ST 899824100 or 499827000PRESS



NOTE:

- Replace the oil seal with a new one.
- Insert the oil seal approx. 24 mm (0.94 in) from the edge of clutch case.

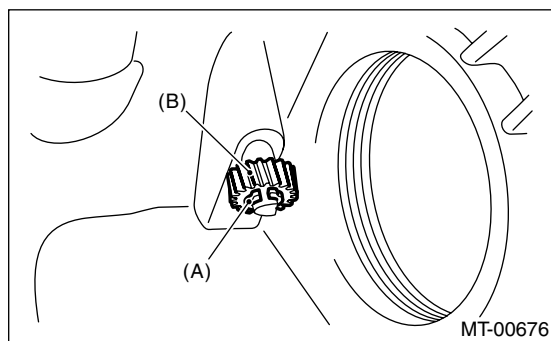


- (A) Approx. 24 mm (0.94 in)
(B) Oil seal
(C) Speedometer shaft

SPEEDOMETER GEAR

MANUAL TRANSMISSION AND DIFFERENTIAL

3) Install the speedometer driven gear and snap ring.



(A) Snap ring

(B) Speedometer driven gear

4) Install the vehicle speed sensor. <Ref. to 6MT-32, INSTALLATION, Vehicle Speed Sensor.>

5) Install the front differential assembly. <Ref. to 6MT-104, INSTALLATION, Front Differential Assembly.>

6) Install the drive pinion shaft assembly. <Ref. to 6MT-97, INSTALLATION, Drive Pinion Shaft Assembly.>

7) Install each gear assembly at once. <Ref. to 6MT-71, INSTALLATION, Main Shaft Assembly.>

8) Install the transmission case. <Ref. to 6MT-66, INSTALLATION, Transmission Case.>

9) Install the oil pump. <Ref. to 6MT-62, INSTALLATION, Oil Pump.>

10) Install the center differential. <Ref. to 6MT-60, INSTALLATION, Center Differential.>

11) Install the transfer driven gear. <Ref. to 6MT-58, INSTALLATION, Transfer Driven Gear.>

12) Install the extension case. <Ref. to 6MT-47, INSTALLATION, Extension Case.>

13) Install the oil pipe, neutral position switch, back-up light switch and harness. <Ref. to 6MT-42, INSTALLATION, Oil Pipe.>, <Ref. to 6MT-45, INSTALLATION, Neutral Position Switch.>, <Ref. to 6MT-43, INSTALLATION, Back-up Light Switch.>

14) Install the manual transmission assembly to vehicle. <Ref. to 6MT-37, INSTALLATION, Manual Transmission Assembly.>

SHIFTER FORK AND ROD

MANUAL TRANSMISSION AND DIFFERENTIAL

25. Shifter Fork and Rod

A: REMOVAL

- 1) Remove the manual transmission assembly from vehicle. <Ref. to 6MT-35, REMOVAL, Manual Transmission Assembly.>
- 2) Prepare the transmission for overhaul. <Ref. to 6MT-40, Preparation for Overhaul.>
- 3) Remove the oil pipe, neutral position switch, back-up light switch and harness. <Ref. to 6MT-42, REMOVAL, Oil Pipe.>, <Ref. to 6MT-45, REMOVAL, Neutral Position Switch.>, <Ref. to 6MT-43, REMOVAL, Back-up Light Switch.>
- 4) Remove the extension case. <Ref. to 6MT-47, REMOVAL, Extension Case.>
- 5) Remove the transfer driven gear. <Ref. to 6MT-58, REMOVAL, Transfer Driven Gear.>
- 6) Remove the center differential. <Ref. to 6MT-60, REMOVAL, Center Differential.>
- 7) Remove the oil pump. <Ref. to 6MT-61, REMOVAL, Oil Pump.>
- 8) Remove the transmission case. <Ref. to 6MT-65, REMOVAL, Transmission Case.>
- 9) Remove each gear assembly. <Ref. to 6MT-70, REMOVAL, Main Shaft Assembly.>

B: INSTALLATION

- 1) Install each gear assembly at once. <Ref. to 6MT-71, INSTALLATION, Main Shaft Assembly.>
- 2) Install the transmission case. <Ref. to 6MT-66, INSTALLATION, Transmission Case.>
- 3) Install the oil pump. <Ref. to 6MT-62, INSTALLATION, Oil Pump.>
- 4) Install the center differential. <Ref. to 6MT-60, INSTALLATION, Center Differential.>
- 5) Install the transfer driven gear. <Ref. to 6MT-58, INSTALLATION, Transfer Driven Gear.>
- 6) Install the extension case. <Ref. to 6MT-47, INSTALLATION, Extension Case.>
- 7) Install the oil pipe, neutral position switch, back-up light switch and harness. <Ref. to 6MT-42, INSTALLATION, Oil Pipe.>, <Ref. to 6MT-45, INSTALLATION, Neutral Position Switch.>, <Ref. to 6MT-43, INSTALLATION, Back-up Light Switch.>
- 8) Install the manual transmission assembly to vehicle. <Ref. to 6MT-37, INSTALLATION, Manual Transmission Assembly.>

C: DISASSEMBLY

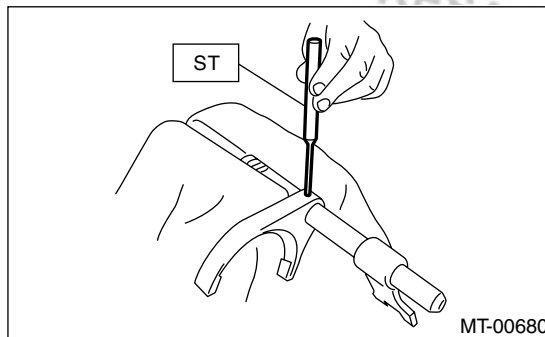
NOTE:

Discard the removed spring pin and replace it with a new one.

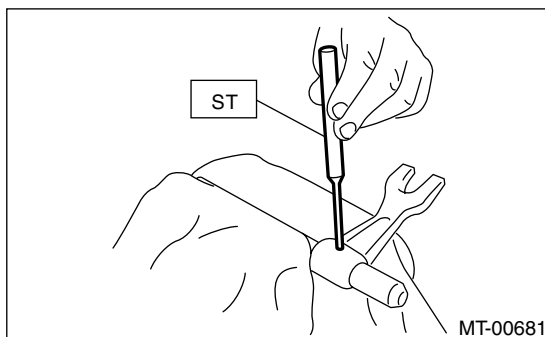
1. REVERSE SHIFTER FORK

- 1) Using the ST, remove the reverse fork.

ST 398791700 REMOVER

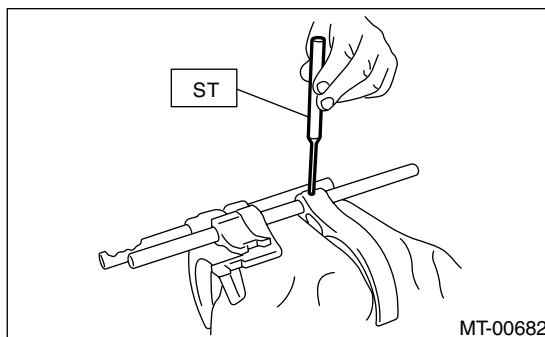


- 2) Using the ST, remove the reverse shifter arm.
ST 398791700 REMOVER

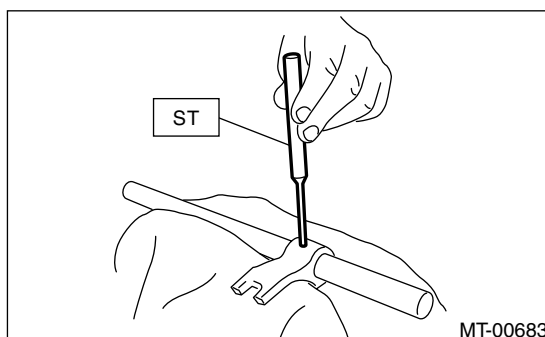


2. 1st-2nd, 3rd-4th SHIFTER FORK

- 1) Using the ST, remove the 3rd-4th shifter fork.
ST 398791700 REMOVER



- 2) Using the ST, remove the 3rd-4th shifter arm.
ST 398791700 REMOVER

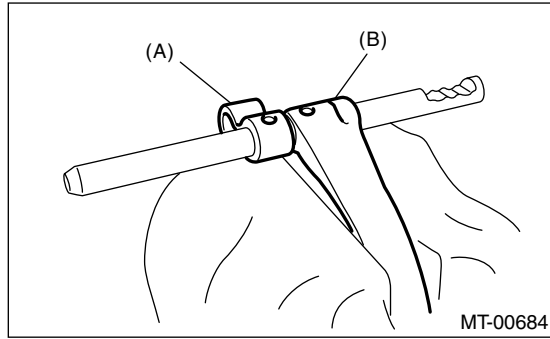


- 3) Using the ST, remove the 1st-2nd shifter arm and 1st-2nd shifter fork.

SHIFTER FORK AND ROD

MANUAL TRANSMISSION AND DIFFERENTIAL

ST 398791700 REMOVER

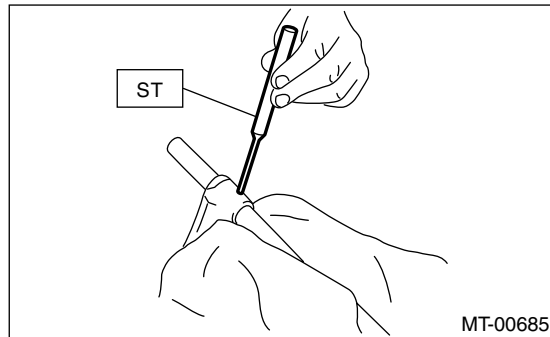


- (A) 1st-2nd shifter arm
- (B) 1st-2nd shifter fork

3. 5th-6th SHIFTER FORK

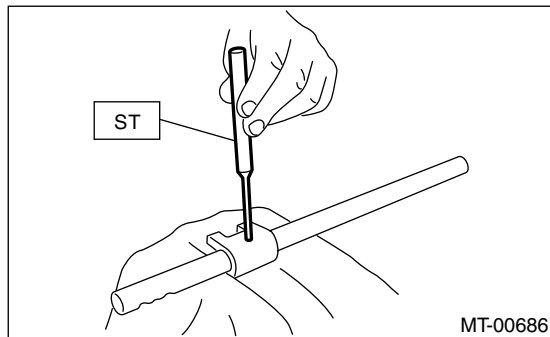
1) Using the ST, remove the 5th-6th shifter fork.

ST 398791700 REMOVER



2) Using the ST, remove the 5th-6th shifter arm.

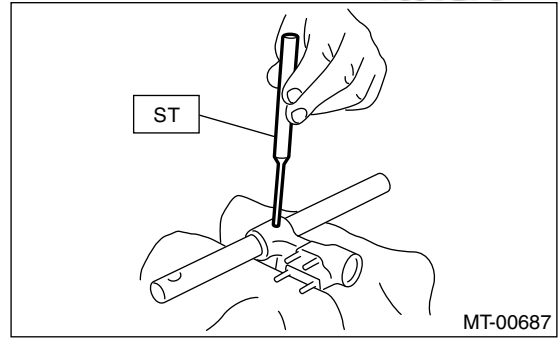
ST 398791700 REMOVER



4. SHIFT ARM SHAFT

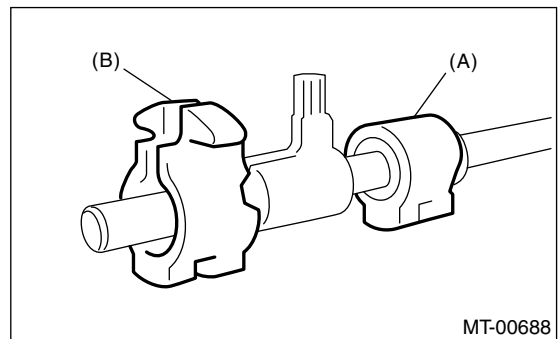
Using the ST, remove the selector arm.

ST 398791700 REMOVER



5. STRIKING ROD

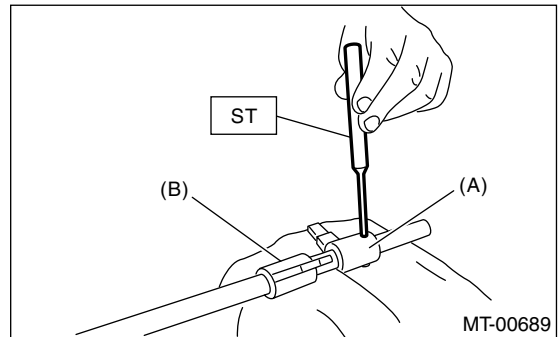
1) Remove the reverse interlock block and interlock block from striking rod.



- (A) Reverse interlock block
- (B) Interlock block

2) Using the ST, remove the reverse interlock arm.

ST 398791700 REMOVER



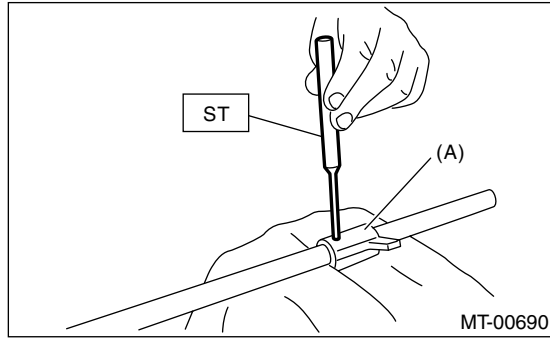
- (A) Reverse interlock arm
- (B) Interlock arm

3) Using the ST, remove the interlock arm.

SHIFTER FORK AND ROD

MANUAL TRANSMISSION AND DIFFERENTIAL

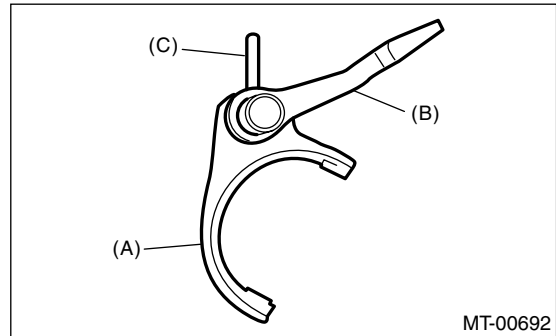
ST 398791700 REMOVER



(A) Interlock arm

NOTE:

Make sure to install the reverse arm and rod in proper direction.



- (A) Reverse arm
- (B) Reverse rod
- (C) Spring pin

D: ASSEMBLY

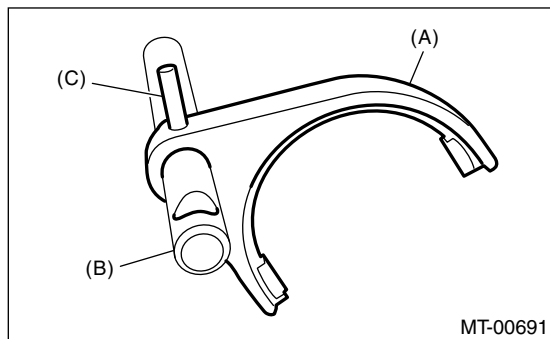
1. REVERSE SHIFTER FORK

1) Using the ST, install the reverse fork.

ST 398791700 REMOVER

NOTE:

Make sure to install the reverse fork and rod in proper direction.



- (A) Reverse fork
- (B) Reverse rod
- (C) Spring pin

2) Using the ST, install the reverse arm.

ST 398791700 REMOVER

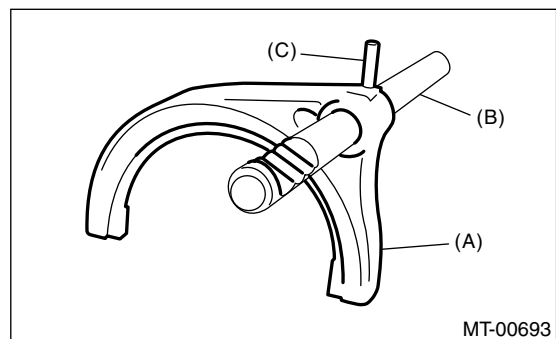
2. 1st-2nd, 3rd-4th SHIFTER FORK

1) Using the ST, install the 1st-2nd shifter fork.

ST 398791700 REMOVER

NOTE:

Make sure to install the 1st-2nd shifter fork and rod in proper direction.



- (A) 1st-2nd shifter fork
- (B) 1st-2nd shifter rod
- (C) Spring pin

2) Using the ST, install the 1st-2nd shifter arm.

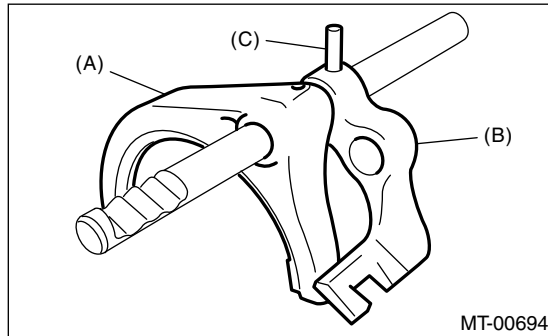
ST 398791700 REMOVER

SHIFTER FORK AND ROD

MANUAL TRANSMISSION AND DIFFERENTIAL

NOTE:

Make sure to install the 1st-2nd shifter arm and fork in proper direction.

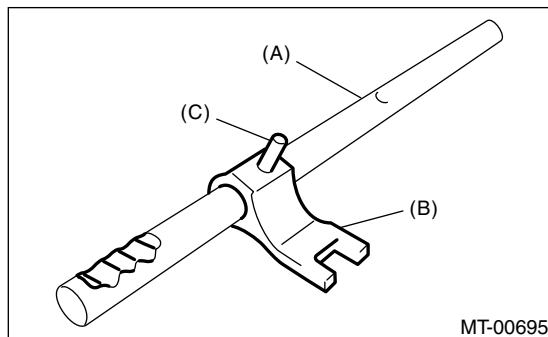


- (A) 1st-2nd shifter fork
- (B) 1st-2nd shifter arm
- (C) Spring pin

3) Using the ST, install the 3rd-4th shifter arm.
ST 398791700 REMOVER

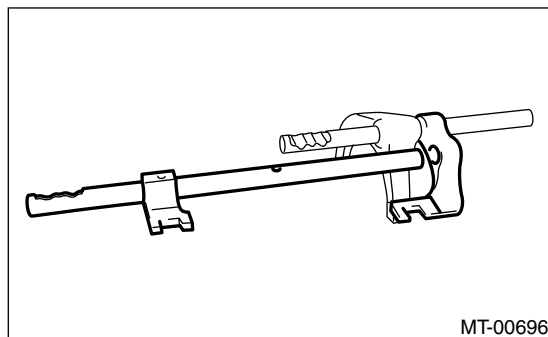
NOTE:

Make sure to install the 3rd-4th shifter arm and rod in proper direction.



- (A) 3rd-4th shifter rod
- (B) 3rd-4th shifter arm
- (C) Spring pin

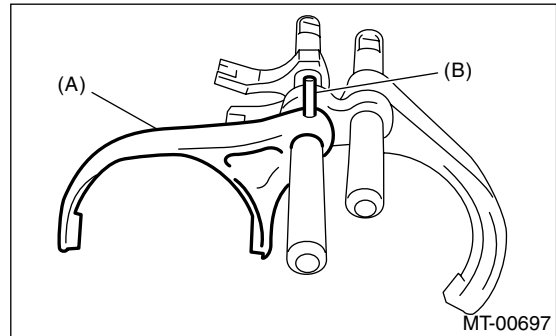
4) Install the 3rd-4th fork rod into 1st-2nd shifter arm.



5) Using the ST, install the 3rd-4th shifter fork.
ST 398791700 REMOVER

NOTE:

Make sure to install the 3rd-4th shifter fork in proper direction.



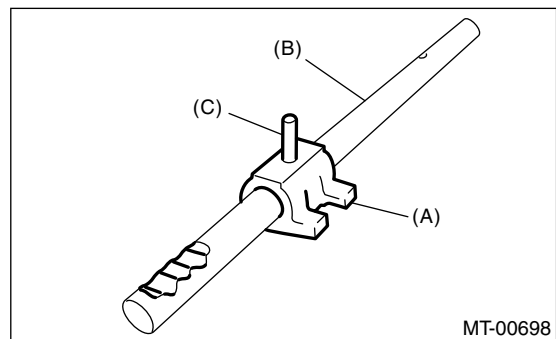
- (A) 3rd-4th shifter fork
- (B) Spring pin

3. 5th-6th SHIFTER FORK

1) Using ST, install the 5th-6th shifter arm.
ST 398791700 REMOVER

NOTE:

Make sure to install the 5th-6th shifter arm and rod in proper direction.



- (A) 5th-6th shifter arm
- (B) 5th-6th shifter rod
- (C) Spring pin

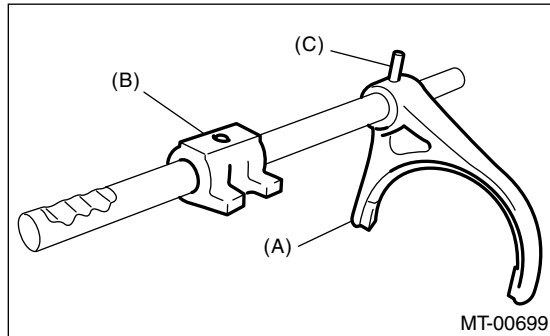
2) Using the ST, install the 5th-6th shifter fork.
ST 398791700 REMOVER

SHIFTER FORK AND ROD

MANUAL TRANSMISSION AND DIFFERENTIAL

NOTE:

Make sure to install the 5th-6th shifter fork and arm in proper direction.



- (A) 5th-6th shifter fork
- (B) 5th-6th shifter arm
- (C) Spring pin

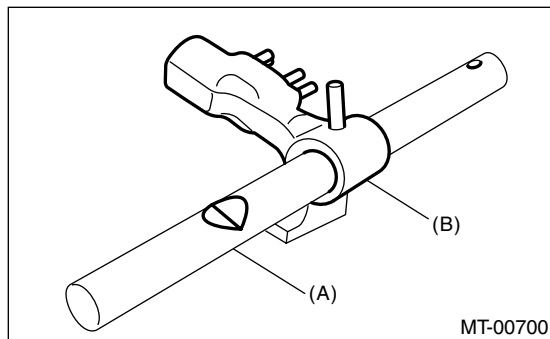
4. SHIFT ARM SHAFT

Using the ST, install the selector arm.

ST 398791700 REMOVER

NOTE:

Make sure to install the selector arm and rod in proper direction.



- (A) Selector rod
- (B) Selector arm

5. STRIKING ROD

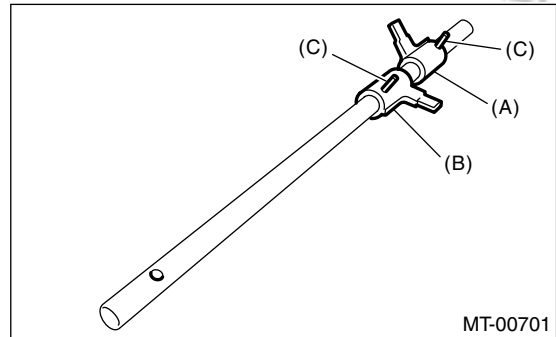
1) Using the ST, install the reverse interlock arm and interlock arm.

ST 398791700 REMOVER

NOTE:

- Make sure to install the reverse interlock arm and rod in proper direction.

- Make sure to install the interlock arm and rod in proper direction.

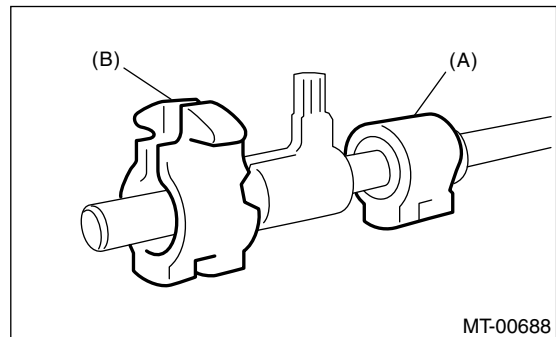


- (A) Reverse interlock arm
- (B) Interlock arm
- (C) Spring pin

2) Install the reverse interlock block and interlock block to striking rod.

NOTE:

Make sure to install the reverse interlock block and interlock block in proper direction.



- (A) Reverse interlock block
- (B) Interlock block

E: INSPECTION

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

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

F: ADJUSTMENT

1. SELECTION OF 1st-2nd FORK ROD

NOTE:

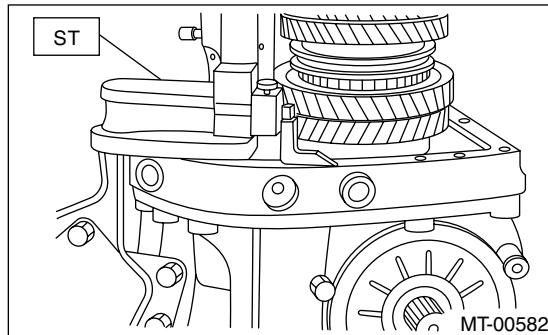
- Perform the following procedures when.
Replacing the 1st, 2nd driven gear.
 - Replacing the 1st, 2nd synchro ring assembly.
 - Replacing the adapter plate.
 - Replacing the driven shaft.
 - Replacing the 1st-2nd hub, sleeve assembly.
- 1) Insert the drive pinion assembly in adapter plate.

NOTE:

Make sure the thrust bearing outer race is not removed and drive pinion is not lift-up.

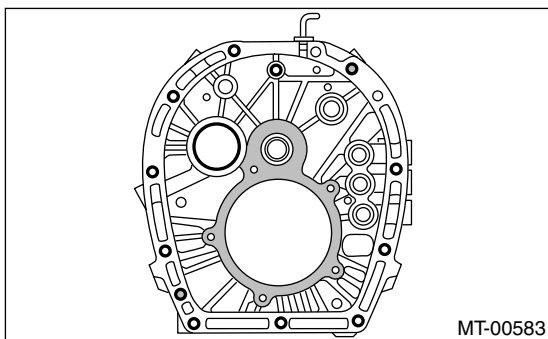
2) Set the height gauge to adapter plate. Lower the indicator of height gauge to mating surface of adapter plate and case, then set to zero point.

ST 18853AA000 HEIGHT GAUGE



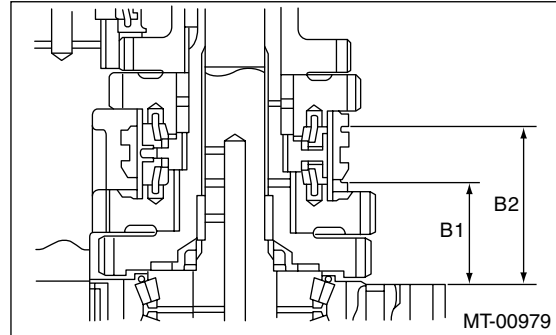
NOTE:

- Remove the remaining gasket on edge surface with scraper, since the adapter plate is base point of measurement.
- Do not place the height gauge on shaded area in the figure during measurement.

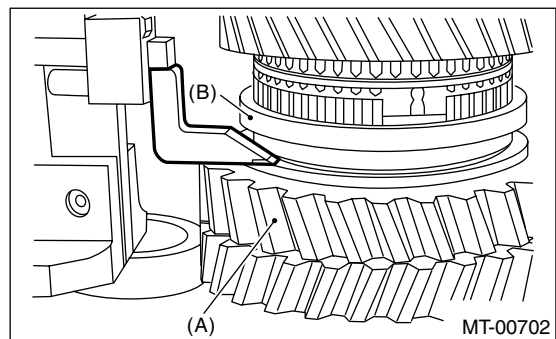


3) Select the main shaft snap ring. <Ref. to 6MT-82, ADJUSTMENT, Main Shaft Assembly.>

4) Measure "B1" and "B2" as shown in the figure.



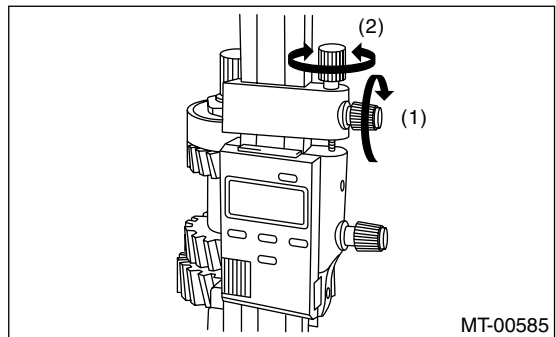
(1) Shift the 1st-2nd sleeve to 1st driven gear side, then press down to the stopper and measure "B1".



- (A) 1st driven gear
(B) 1st-2nd sleeve

NOTE:

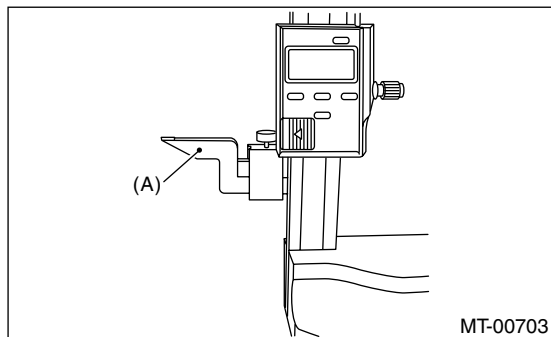
- Set the indicator of height gauge near measuring object, then lock the dial (1) as shown in the figure. Turn dial (2) to set the indicator to edge surface of sleeve 1st side.
- Measure five points of the sleeve turning every approx. 72°. Round off each two upper and lower measurement value. Use the remaining center value as measurement value.



SHIFTER FORK AND ROD

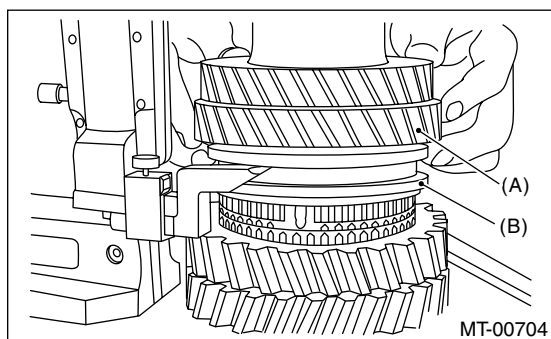
MANUAL TRANSMISSION AND DIFFERENTIAL

(2) Set the height gauge indicator upside down.



(A) Indicator

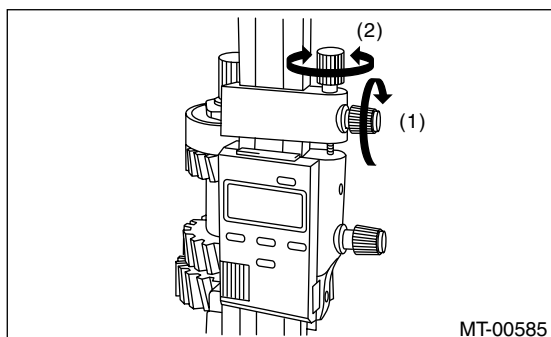
(3) Shift the 1st-2nd sleeve to 2nd driven gear side, then press up to the stopper and measure "B2".



(A) 2nd driven gear
(B) 1st-2nd sleeve

NOTE:

- Set the indicator of height gauge near measuring object, then lock the dial (1) as shown in the figure. Turn dial (2) to set the indicator to edge surface of sleeve 2nd side.
- Perform the measuring procedure with two people, and measure the sleeve lifted up straight.
- Measure five points of the sleeve turning every approx. 72° apart. Round off each two upper and lower measurement value. Use the remaining center value as measurement value.



(4) According to both measurements, calculate the 1st-2nd sleeve neutral position. Select the fork rod which applies to the calculated value from following equation.

Equation: $T = (B1 + B2) / 2$

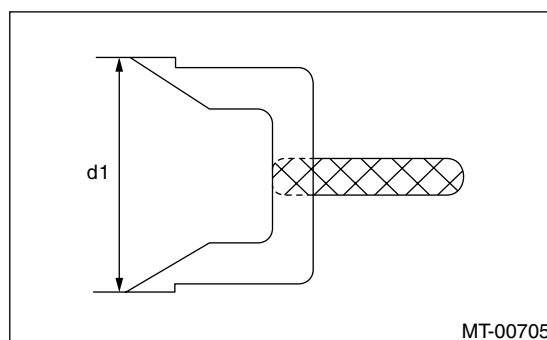
T: 1st-2nd sleeve center position

B1: Height from adapter plate edge to sleeve edge when shifted to 1st gear.

B2: Height from adapter plate edge to sleeve edge when shifted to 2nd gear. [measurement value + 55 mm (2.17 in)]

NOTE:

The indicator is installed upside down compared to the setting procedure of zero point. Add d1 [fixing value: 55 mm (2.17 in)] from the following figure to "B2", to obtain measurement value of "B2".



T	mm (in)	Lot No. (Mark)
62.93 — 63.23 (2.4776 — 2.4894)		32801AA111 (1)
63.23 — 63.53 (2.4894 — 2.5012)		32801AA131 (None)
63.53 — 63.83 (2.5012 — 2.5130)		32801AA141 (2)

SHIFTER FORK AND ROD

MANUAL TRANSMISSION AND DIFFERENTIAL

2. SELECTION OF 3rd-4th FORK ROD

NOTE:

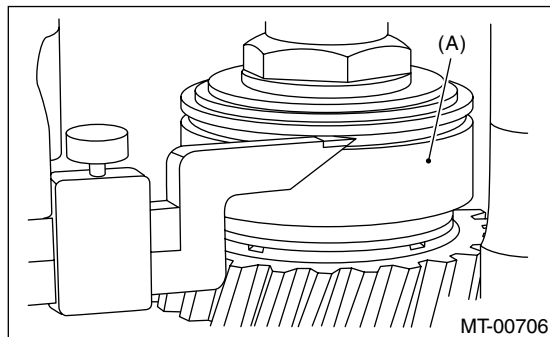
Perform the following procedures when.

- Replacing the main shaft.
- Replacing the 3rd, 3rd to 6th drive gear and bush.
- Replacing the 3rd, 3rd to 6th synchro assembly.
- Replacing the 3rd-4th hub, sleeve assembly.

1) Insert the main shaft assembly in adapter plate.

2) Set the height gauge to adapter plate. Lower the indicator of height gauge to upper surface of snap ring groove, on the upper side of main rear bearing, then set to zero point.

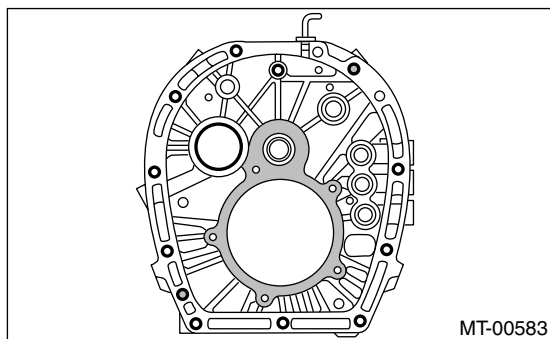
ST 18853AA000 HEIGHT GAUGE



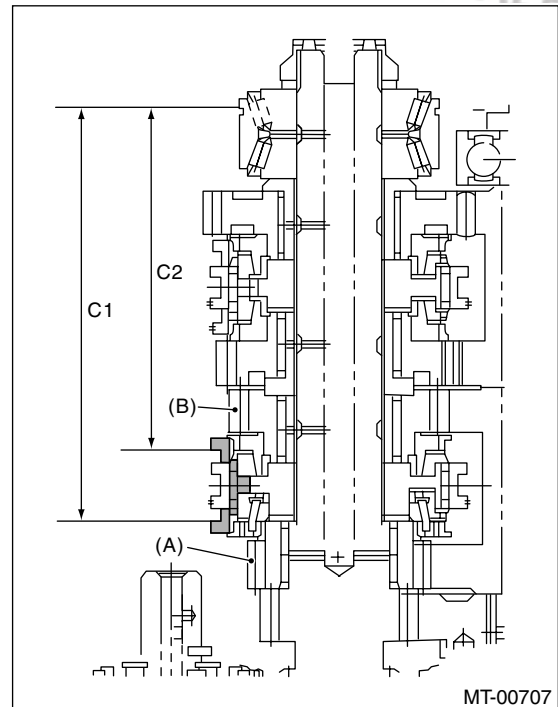
(A) Roller bearing

NOTE:

- Remove the remaining gasket on edge surface with scraper, since the height gauge is set on adapter plate during measurement.
- Do not put the height gauge on shaded area in the figure during the measurement.



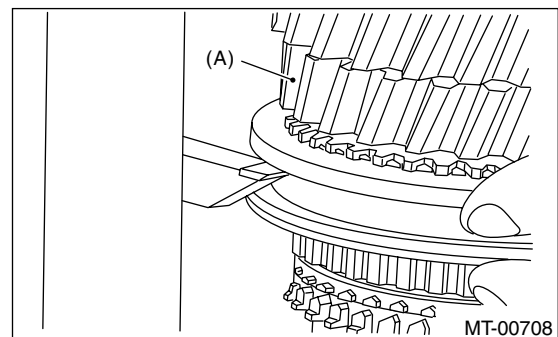
3) Using the height gauge, measure "C1" and "C2" shown in the figure.



(A) 3rd drive gear

(B) 4th drive gear

(1) Shift the 3rd-4th sleeve to 4th gear side, then press up to the stopper and measure "C2".



(A) 4th drive gear

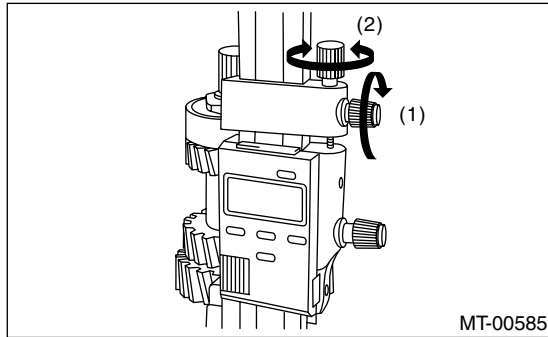
NOTE:

- Set the indicator of height gauge near measuring object, then lock the dial (1) as shown in the figure.
- Turn dial (2) to set the indicator to edge surface of sleeve 4th side.
- Perform the measuring procedure with two people, and measure the sleeve lifted up straight.

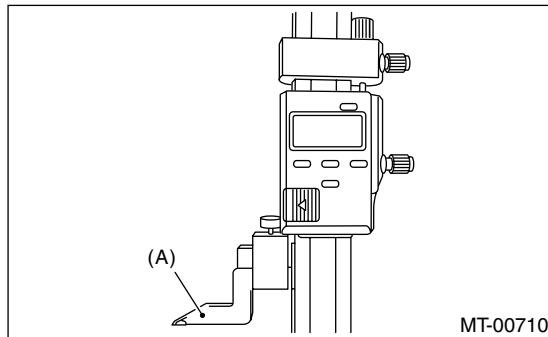
SHIFTER FORK AND ROD

MANUAL TRANSMISSION AND DIFFERENTIAL

- Measure five points of the sleeve turning every approx. 72°. Round off each two upper and lower measurement value. Use the remaining center value as measurement value.

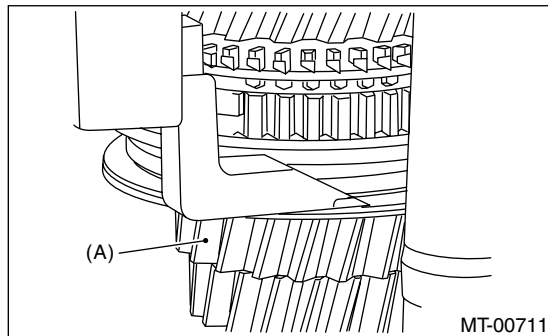


(2) Set the height gauge indicator upside down.



(A) Indicator

(3) Shift the 3rd-4th sleeve to 3rd drive gear side, then press down to the stopper and measure "C1".

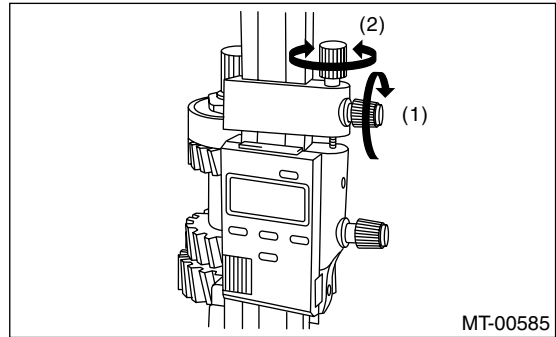


(A) 3rd drive gear

NOTE:

- Set the indicator of height gauge near measuring object, then lock the dial (1) as shown in the figure. Turn dial (2) to set the indicator to edge surface of sleeve 3rd side.

- Measure five points of the sleeve turning every approx. 72°. Round off each two upper and lower measurement value. Use the remaining center value as measurement value.



4) According to both measurements, calculate the 3rd-4th sleeve neutral position. Select the fork rod which applies to the calculated value from following equation.

Equation: $T = (C1 + C2) / 2$

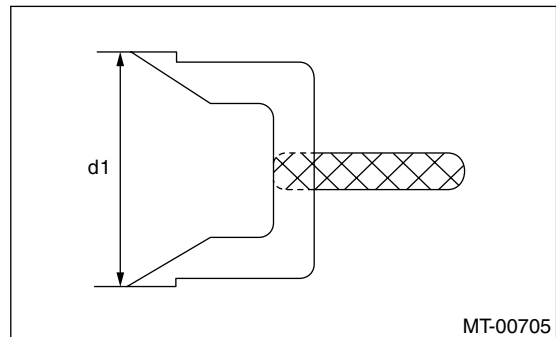
T: 3rd-4th sleeve center position

C1: Length from main shaft rear bearing snap ring groove to sleeve edge when shifted to 3rd gear. [measurement value +55 mm (2.17 in)]

C2: Length from main shaft rear bearing snap ring groove to sleeve edge when shifted to 4th gear.

NOTE:

The indicator is installed upside down compared to the setting procedure of zero point. Add d1 [fixing value: 55 mm (2.17 in)] from the following figure to "C1", to obtain measurement value of "C1".



SHIFTER FORK AND ROD

MANUAL TRANSMISSION AND DIFFERENTIAL

T mm (in)	Lot No. (Mark)		
	M.SFT Snap ring 805072010 [t=1.65 mm (0.065 in)]	M.SFT Snap ring 805072011 [t=1.95 mm (0.077 in)]	M.SFT Snap ring 805072012 [t=2.25 mm (0.089 in)]
137.22 — 137.52 (5.4024 — 5.4142)	32809AA171 (None)	32809AA181 (2)	32809AA191 (4)
137.52 — 137.82 (5.4142 — 5.4260)	32809AA161 (1)	32809AA171 (None)	32809AA181 (2)
137.82 — 138.12 (5.4260 — 5.4379)	32809AA141 (3)	32809AA161 (1)	32809AA171 (None)

T = Thickness

3. SELECTION OF 5th-6th FORK ROD

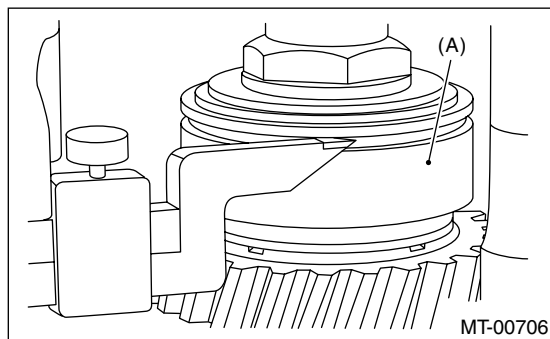
NOTE:

Perform the following procedures when.

- Replacing the main shaft.
- Replacing the 3rd to 6th drive gear and bush.
- Replacing the 3rd to 6th synchro ring assembly.
- Replacing the 3rd-4th hub, sleeve assembly.
- Replacing the 5th-6th hub, sleeve assembly.

- 1) Insert the main shaft assembly in adapter plate.
- 2) Set the height gauge to adapter plate. Lower the indicator of height gauge to upper surface of snap ring groove, or the upper side of main rear bearing. Then set to zero point.

ST 18853AA000 HEIGHT GAUGE

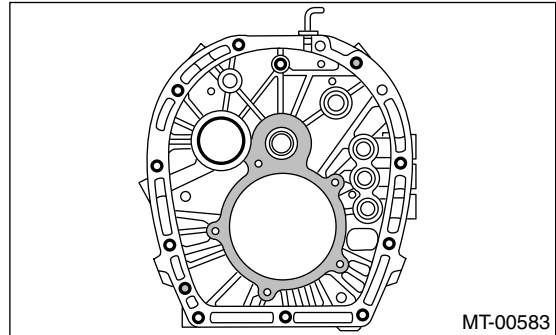


(A) Ball bearing

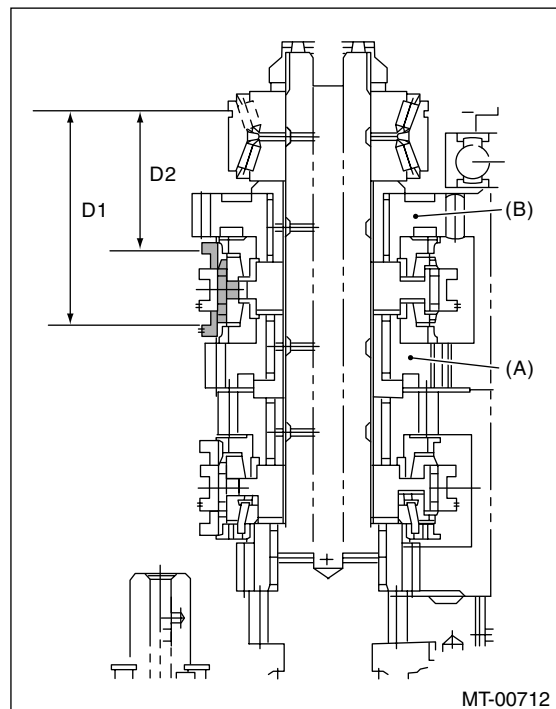
NOTE:

- Remove the remaining gasket on edge surface with scraper, since the height gauge is set on adapter plate during measurement.

- Do not place the height gauge on shaded area in the figure during the measurement.



- 3) Using the height gauge, measure "D1" and "D2" shown in the figure.



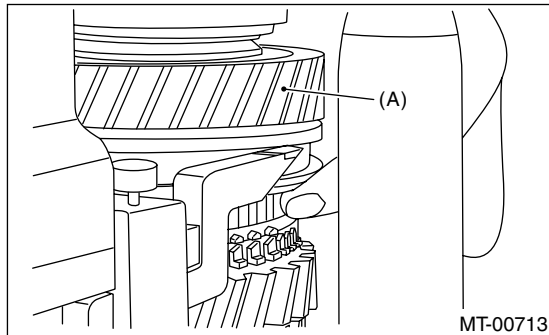
(A) 5th main gear

(B) 6th main gear

SHIFTER FORK AND ROD

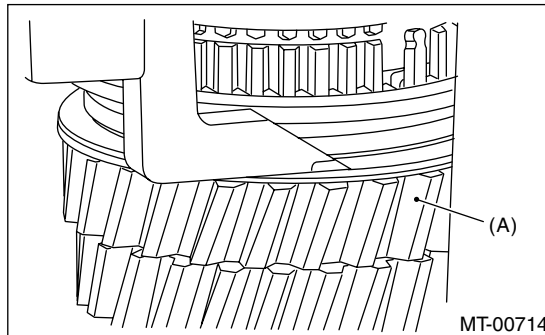
MANUAL TRANSMISSION AND DIFFERENTIAL

(1) Shift the 5th-6th sleeve to 6th main gear side, then press up to the stopper and measure "D2".



(A) 6th main gear

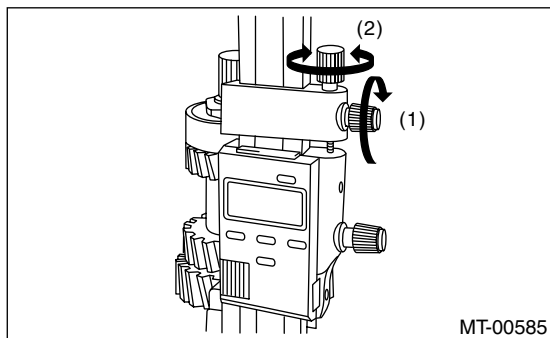
(3) Shift the 5th-6th sleeve to 5th main gear side, then press down to the stopper and measure "D1".



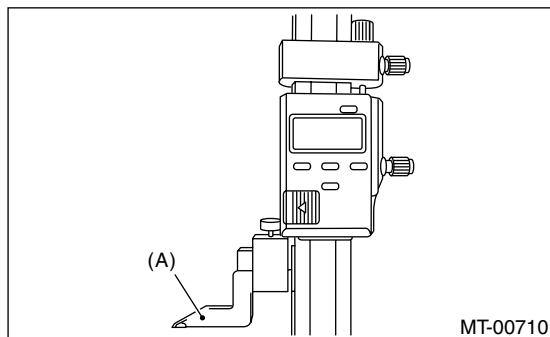
(A) 5th main gear

NOTE:

- Set the indicator of height gauge near measuring object, then lock the dial (1) as shown in the figure. Turn dial (2) to set the indicator to edge surface of sleeve 6th side.
- Perform the measuring procedure with two people, and measure the sleeve lifted up straight.
- Measure five points of the sleeve turning every approx. 72°. Round off each two upper and lower measurement value. Use the remaining center value as measurement value.



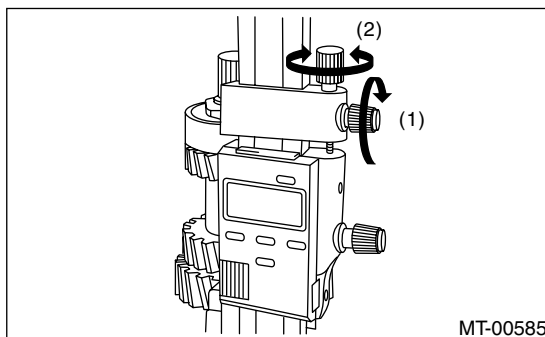
(2) Set the height gauge indicator upside down.



(A) Indicator

NOTE:

- Set the indicator of height gauge near measuring object, then lock the dial (1) as shown in the figure. Turn dial (2) to set the indicator to edge surface of sleeve 5th side.
- Measure five points of the sleeve turning every approx. 72°. Round off each two upper and lower measurement value. Use the remaining center value as measurement value.



4) According to both measurements, calculate the 5th-6th sleeve neutral position. Select the fork rod, which applies to the calculated value from following equation.

Equation: $T = (D1 + D2) / 2$

T: 5th-6th sleeve center position

D1: Length from the shaft rear bearing snap ring groove to sleeve groove edge when shifted to 5th gear. [measurement value + 55 mm (2.17 in)]

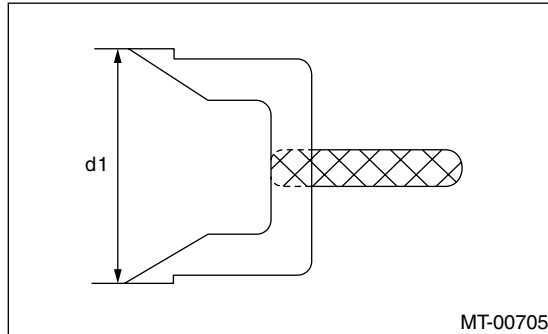
D2: Length from main shaft rear bearing snap ring groove to sleeve groove edge when shifted to 6th gear.

SHIFTER FORK AND ROD

MANUAL TRANSMISSION AND DIFFERENTIAL

NOTE:

The indicator is installed upside down compared to the setting procedure of zero point. Add d1 [fixing value: 55 mm (2.17 in)] from the following figure to "D1", to obtain measurement value of "D1".



MT-00705

T mm (in)	Lot No. (Mark)		
	M.SFT Snap ring 805072010 [t=1.65 mm (0.065 in)]	M.SFT Snap ring 805072011 [t=1.95 mm (0.077 in)]	M.SFT Snap ring 805072012 [t=2.25 mm (0.089 in)]
64.12 — 64.42 (2.5244 — 2.5362)	32945AA021 (None)	32945AA031 (2)	32945AA041 (4)
64.42 — 64.72 (2.5362 — 2.5480)	32945AA011 (1)	32945AA021 (None)	32945AA031 (2)
64.72 — 65.02 (2.5480 — 2.5598)	32945AA001 (3)	32945AA011 (1)	32945AA021 (None)

T = Thickness

4. SELECTION OF REVERSE FORK ROD

NOTE:

Perform the following procedures when.

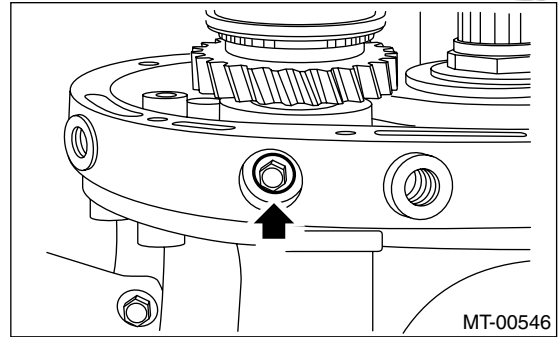
- Replacing the reverse idler gear.
- Replacing the reverse idler gear No. 2.
- Replacing the adapter plate.
- Replacing the base.

1) Insert the reverse idler gear assembly in adapter plate.

2) Tighten the base COMPL fixing bolt.

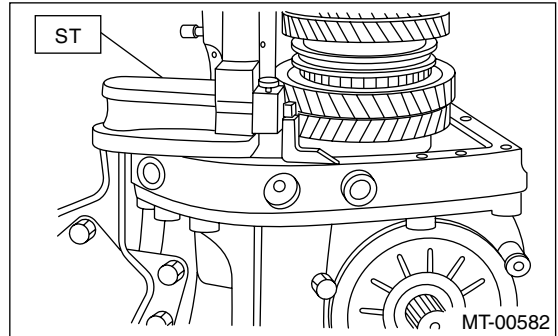
Tightening torque:

25 N·m (2.5 kgf-m, 18.1 ft-lb)



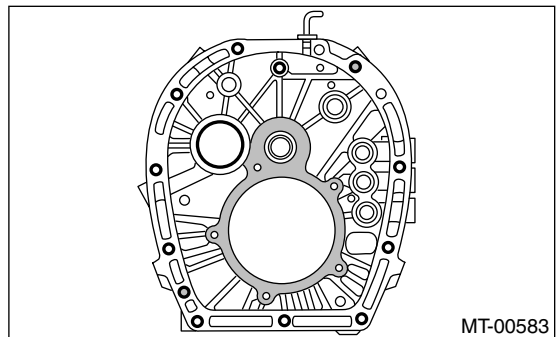
3) Set the height gauge to adapter plate. Lower the indicator of height gauge to mating surface of adapter plate and case, then set to zero point.

ST 18853AA000 HEIGHT GAUGE



NOTE:

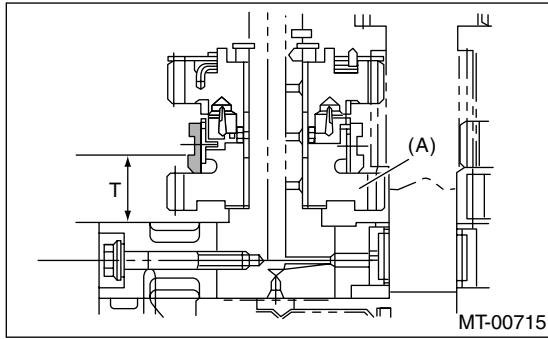
- Remove the remaining gasket on edge surface with scraper, since the adapter plate is base point of measurement.
- Do not place the height gauge on shaded area in the figure during measurement.



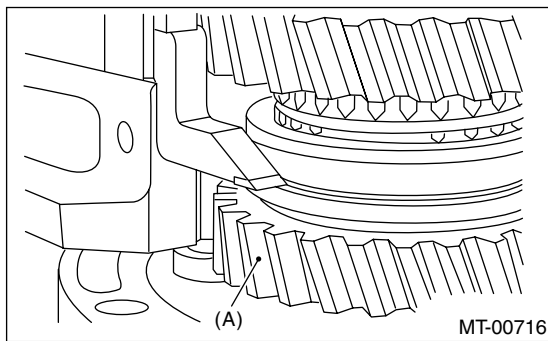
SHIFTER FORK AND ROD

MANUAL TRANSMISSION AND DIFFERENTIAL

4) Press the reverse sleeve to reverse side idler gear No. 2, then measure "T".



(A) Reverse idler gear No. 2



(A) Reverse idler gear No. 2

5) According to measurement, calculate the reverse sleeve neutral position. Select the fork rod which applies to the calculated value from following equation.

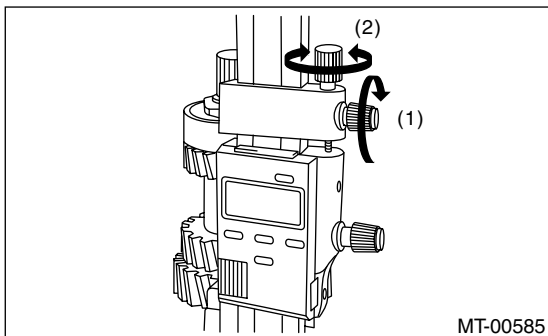
Equation: $T + 4.8 \text{ mm (0.189 in)}$

$T + 4.8 \text{ mm (0.189 in)}$	Lot No. (Mark)
33.50 — 33.80 (1.3189 — 1.3307)	32816AA110 (1)
33.80 — 34.10 (1.3307 — 1.3425)	32816AA130 (None)
34.10 — 34.40 (1.3425 — 1.3543)	32816AA140 (2)

T = Thickness

NOTE:

- Set the indicator of height gauge near measuring object, then lock the dial (1) as shown in the figure. Turn dial (2) to set the indicator to edge surface of reverse sleeve side.
- Measure five points of the sleeve turning every approx. 72° . Round off each two upper and lower measurement value. Use the remaining center value as measurement value.



26.Clutch Housing

A: REMOVAL

- 1) Remove the manual transmission assembly from vehicle. <Ref. to 6MT-35, REMOVAL, Manual Transmission Assembly.>
- 2) Prepare the transmission for overhaul. <Ref. to 6MT-40, Preparation for Overhaul.>
- 3) Remove the oil pipe, neutral position switch, back-up light switch and harness. <Ref. to 6MT-42, REMOVAL, Oil Pipe.>, <Ref. to 6MT-45, REMOVAL, Neutral Position Switch.>, <Ref. to 6MT-43, REMOVAL, Back-up Light Switch.>
- 4) Remove the extension case. <Ref. to 6MT-47, REMOVAL, Extension Case.>
- 5) Remove the transfer driven gear. <Ref. to 6MT-58, REMOVAL, Transfer Driven Gear.>
- 6) Remove the center differential. <Ref. to 6MT-60, REMOVAL, Center Differential.>
- 7) Remove the oil pump. <Ref. to 6MT-61, REMOVAL, Oil Pump.>
- 8) Remove the transmission case. <Ref. to 6MT-65, REMOVAL, Transmission Case.>
- 9) Remove each gear assembly. <Ref. to 6MT-70, REMOVAL, Main Shaft Assembly.>
- 10) Remove the drive pinion shaft assembly. <Ref. to 6MT-97, REMOVAL, Drive Pinion Shaft Assembly.>
- 11) Remove the front differential assembly. <Ref. to 6MT-103, REMOVAL, Front Differential Assembly.>
- 12) Remove the vehicle speed sensor. <Ref. to 6MT-32, REMOVAL, Vehicle Speed Sensor.>
- 13) Remove the speedometer gear. <Ref. to 6MT-110, REMOVAL, Speedometer Gear.>

B: INSTALLATION

- 1) Install the pitching stopper bracket.

Tightening torque:

41 N·m (4.2 kgf-m, 30.2 ft-lb)

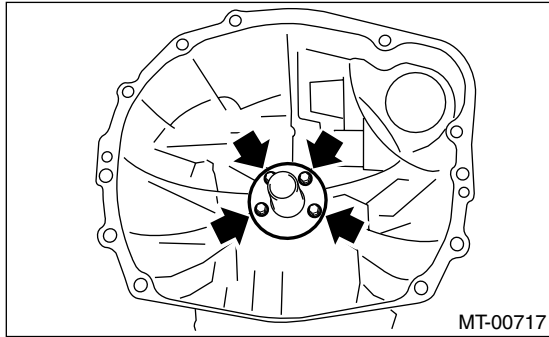
- 2) Install the speedometer gear. <Ref. to 6MT-110, INSTALLATION, Speedometer Gear.>
- 3) Install the vehicle speed sensor. <Ref. to 6MT-32, INSTALLATION, Vehicle Speed Sensor.>
- 4) Install the front differential assembly. <Ref. to 6MT-104, INSTALLATION, Front Differential Assembly.>
- 5) Install the drive pinion shaft assembly. <Ref. to 6MT-97, INSTALLATION, Drive Pinion Shaft Assembly.>
- 6) Install each gear assembly at once. <Ref. to 6MT-71, INSTALLATION, Main Shaft Assembly.>
- 7) Install the transmission case. <Ref. to 6MT-66, INSTALLATION, Transmission Case.>
- 8) Install the oil pump. <Ref. to 6MT-62, INSTALLATION, Oil Pump.>
- 9) Install the center differential. <Ref. to 6MT-60, INSTALLATION, Center Differential.>
- 10) Install the transfer driven gear. <Ref. to 6MT-58, INSTALLATION, Transfer Driven Gear.>
- 11) Install the extension case. <Ref. to 6MT-47, INSTALLATION, Extension Case.>
- 12) Install the oil pipe, neutral position switch, back-up light switch and harness. <Ref. to 6MT-42, INSTALLATION, Oil Pipe.>, <Ref. to 6MT-45, INSTALLATION, Neutral Position Switch.>, <Ref. to 6MT-43, INSTALLATION, Back-up Light Switch.>
- 13) Install the manual transmission assembly to vehicle. <Ref. to 6MT-37, INSTALLATION, Manual Transmission Assembly.>

CLUTCH HOUSING

MANUAL TRANSMISSION AND DIFFERENTIAL

C: DISASSEMBLY

1) Remove the clutch release bearing guide.

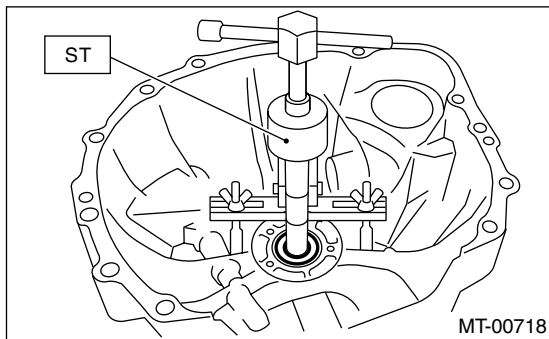


2) Remove the oil seal.

ST 398527700 PULLER ASSY

NOTE:

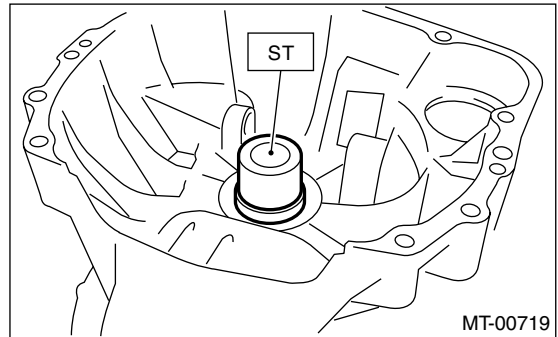
Do not reuse the oil seal.



D: ASSEMBLY

1) Install the oil seal into clutch housing without damaging.

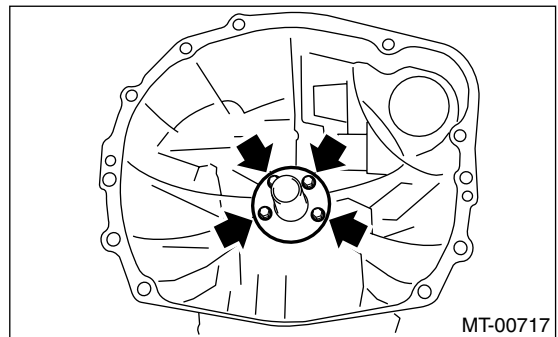
ST 399513600 INSTALLER



2) Install the clutch release bearing guide.

Tightening torque:

6.4 N·m (0.65 kgf-m, 4.7 ft-lb)



E: INSPECTION

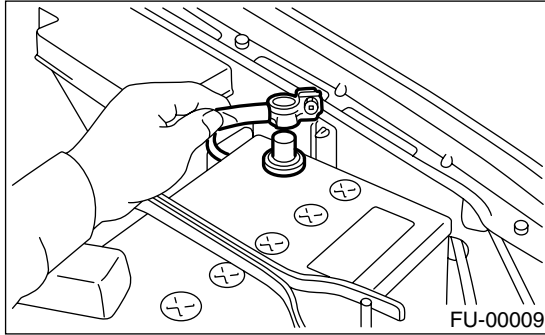
1) Make sure there is no damage or crack on the clutch housing. Replace the clutch housing with a new one if there is excessive damage.

2) Check the clutch housing for gear oil leakage. If there is oil leakage, repair or replace the leakage part.

27.G Sensor

A: REMOVAL

1) Disconnect the ground cable from battery.



2) Remove the console cover.

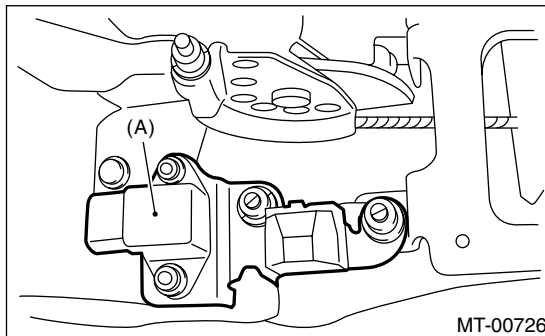
<Ref. to EI-43, Console Box.>

3) Disconnect the connector from G sensor.

4) Remove the G sensor from body.

CAUTION:

Do not drop or bump the G sensor.



(A) G sensor

B: INSTALLATION

Install in the reverse order of removal.

CAUTION:

Do not drop or bump the G sensor.

Tightening torque:

18 N·m (1.8 kgf-m, 13.0 ft-lb)

G SENSOR

MANUAL TRANSMISSION AND DIFFERENTIAL

C: INSPECTION

	Step	Check	Yes	No
1	CHECK G SENSOR. 1) Turn the ignition switch to OFF. 2) Remove the G sensor from vehicle. 3) Connect the connector to G sensor. 4) Turn the ignition switch to ON. 5) Measure the voltage between G sensor connector terminals. Connector & terminal (B338) No. 2 (+) — No. 3 (-):	Is the voltage 2.3 ± 0.2 V when G sensor is horizontal?	Go to step 2.	Replace the G sensor.
2	CHECK G SENSOR. Measure the voltage between G sensor connector terminals. Connector & terminal (B338) No. 2 (+) — No. 3 (-):	Is the voltage 3.9 ± 0.2 V when G sensor is inclined forwards to 90° ?	Go to step 3.	Replace the G sensor.
3	CHECK G SENSOR. Measure the voltage between G sensor connector terminals. Connector & terminal (B338) No. 2 (+) — No. 3 (-):	Is the voltage 0.7 ± 0.2 V when G sensor is inclined backwards to 90° ?	G sensor is normal.	Replace the G sensor.

28.Driver's Control Center Differential Control Module

A: REMOVAL

- 1) Remove the ground cable from battery.
- 2) Remove the glove box.
<Ref. to EI-40, REMOVAL, Glove Box.>
- 3) Disconnect the connector after removing the bolt from the inside of glove box, and then remove the control module.

B: INSTALLATION

Install in the reverse order of removal.

Tightening torque:

44 N·m (4.5 kgf-m, 32.5 ft-lb)

GENERAL DIAGNOSTIC TABLE

MANUAL TRANSMISSION AND DIFFERENTIAL

29. General Diagnostic Table

A: INSPECTION

1. MANUAL TRANSMISSION

Symptom	Possible cause	Remedy
1. Gears are difficult to intermesh. NOTE: The cause for difficulty in shifting gears can be classified into two kinds: one is malfunction of the gear shift system and the other is malfunction of the transmission. However, if the operation is heavy and engagement of the gears is difficult, defective clutch disengagement may also be responsible. Check whether the clutch is correctly functioning, before checking the gear shift system and transmission.	(a) Worn, damaged or burred chamfer of internal spline of sleeve and reverse driven gear	Replace.
	(b) Worn, damaged or burred chamfer of spline of gears	Replace.
	(c) Worn or scratched bushings	Replace.
	(d) Incorrect contact between synchronizer ring and gear cone or wear	Correct or replace.
2. Gear slips out. • Gear slips out when coasting on rough road. • Gear slips out during acceleration.	(a) Defective pitching stopper adjustment	Adjust.
	(b) Loose engine mounting bolts	Tighten or replace.
	(c) Worn fork shifter, broken shifter fork rail spring	Replace.
	(d) Worn or damaged ball bearing	Replace.
	(e) Excessive clearance between splines of synchronizer hub and synchronizer sleeve	Replace.
	(f) Worn tooth step of synchronizer hub (responsible for slip-out of 3rd gear)	Replace.
	(g) Worn 1st driven gear, needle bearing and race	Replace.
	(h) Worn 2nd driven gear, needle bearing and race	Replace.
	(i) Worn 3rd drive gear and bushing	Replace.
	(j) Worn 4th drive gear and bushing	Replace.
	(k) Worn 5th drive gear and bushing	Replace.
	(l) Worn 6th drive gear and bushing	Replace.
3. Unusual noise comes from transmission. NOTE: If an unusual noise is heard when the vehicle is parked with its engine idling and if the noise ceases when the clutch is disengaged, it may be considered that the noise comes from the transmission.	(a) Insufficient or improper lubrication	Lubricate or replace with specified oil.
	(b) Worn or damaged gears and bearings NOTE: If the trouble is only wear of the tooth surfaces, merely a high roaring noise will occur at high speeds, but if any part is broken, rhythmical knocking sound will be heard even at low speeds.	Replace.

GENERAL DIAGNOSTIC TABLE

MANUAL TRANSMISSION AND DIFFERENTIAL

2. DIFFERENTIAL

Symptom	Possible cause	Remedy
1. Broken differential (case, gear, bearing, etc.) NOTE: Abnormal noise will develop and finally it will become impossible to continue to run due to broken pieces obstructing the gear revolution.	(a) Insufficient or improper oil	Replace.
	(b) Use of vehicle under severe conditions such as excessive load and improper use of clutch	Replace.
	(c) Improper adjustment of taper roller bearing	Adjust.
	(d) Improper adjustment of drive pinion and hypoid driven gear	Adjust.
	(e) Loose hypoid driven gear clamping bolts	Tighten.
2. Differential and hypoid gear noises Troubles of the differential and hypoid gear always appear as noise problems. Therefore noise is the first indication of the trouble. However noises from the engine, muffler, tire, exhaust gas, bearing, body, etc. are easily mistaken for the differential noise. Pay special attention to the hypoid gear noise because it is easily confused with other gear noises. There are the following four kinds of noises. • Gear noise when driving: If noise increases as the vehicle speed increases it may be due to insufficient gear oil, incorrect gear engagement, damaged gears, etc. • Gear noise when coasting: Damaged gears due to maladjusted bearings and incorrect shim adjustment • Bearing noise when driving or when coasting: Cracked, broken or damaged bearings • Noise which mainly occurs when turning: Unusual noise from the 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) Broken or damaged LSD.	Replace.

GENERAL DIAGNOSTIC TABLE

MANUAL TRANSMISSION AND DIFFERENTIAL

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MANUAL TRANSMISSION AND DIFFERENTIAL (DIAGNOSTICS)

BASIC DIAGNOSTICS PROCEDURE

MANUAL TRANSMISSION AND DIFFERENTIAL (DIAGNOSTICS)

1. Basic Diagnostics Procedure

A: PROCEDURE

Step	Check	Yes	No
1 CHECK PRE-INSPECTION. 1)Ask the customer when and how trouble occurred using the check list for interview. <Ref. to 6MT-3, Check List for Interview.> 2)Before performing diagnosis, inspect the unit which might influence the driver's control center differential. <Ref. to 6MT-4, INSPECTION, General Information.>	Is unit that might influence the driver's control center differential problem normal?	Go to step 2.	Repair the faulty unit.
2 CALLING UP THE DTC. Check the DTC. <Ref. to 6MT-12, STORED DIAGNOSTIC TROUBLE CODE (DTC), OPERATION, Read Diagnostic Trouble Code (DTC).> NOTE: For DTC, refer to "List of Diagnostic Trouble Code (DTC)". <Ref. to 6MT-17, List of Diagnostic Trouble Code (DTC).>	Is the DTC called up?	Go to step 3. NOTE: Record all DTC (Include: normal code).	Inspect using "Can not calling up DTC". NOTE: After the inspection, read the DTC again. <Ref. to 6MT-12, STORED DIAGNOSTIC TROUBLE CODE (DTC), OPERATION, Read Diagnostic Trouble Code (DTC).>
3 PERFORM THE DIAGNOSIS. 1)Inspect and repair the all DTC using "Diagnostic Procedure with Diagnostic Trouble Code (DTC)". <Ref. to 6MT-18, Diagnostic Procedure with Diagnostic Trouble Code (DTC).> NOTE: For DTC, refer to "List of Diagnostic Trouble Code (DTC)". <Ref. to 6MT-17, List of Diagnostic Trouble Code (DTC).> 2)Perform the inspection mode. <Ref. to 6MT-14, Inspection Mode.>	Is the DTC displayed?	Record all DTC, and inspect using "Diagnostic Procedure with Diagnostic Trouble Code (DTC)" <Ref. to 6MT-18, Diagnostic Procedure with Diagnostic Trouble Code (DTC).> Repeat "PERFORM THE DIAGNOSIS" until normal code called up.	Inspect using "General Diagnostic Table".

CHECK LIST FOR INTERVIEW

MANUAL TRANSMISSION AND DIFFERENTIAL (DIAGNOSTICS)

2. Check List for Interview

A: INSPECTION

Check the following items when problem has occurred.

NOTE:

Use copies of this page for interviewing customers.

Customer's name			
Date of purchase			
Date of repair			
Trans. model	TRANSMISSION	VIN	
Odometer reading	km or miles		
Frequency	☐ Continuous ☐ Intermittent (times a day)		
Weather	☐ Fine ☐ Cloudy ☐ Rainy ☐ Snowy ☐ Various/Others ()		
Place	☐ High ☐ Suburbs ☐ Inner city ☐ Uphill ☐ Rough road ☐ Others ()		
Outdoor temperature	☐ Hot ☐ Warm ☐ Cool ☐ Cold		
Vehicle speed	km/h (MPH)		
Driver's control center differential indicator light	☐ Flashing		☐ Except flashing
Driving condition	☐ Not affected ☐ While decelerating	☐ At starting ☐ While accelerating	☐ While turning (☐ RH/ ☐ LH) ☐ While cruising
Symptoms	☐ No change to AUTO or MANUAL		
	☐ No change of front and rear torque distribution		
	☐ No change to differential free		
	☐ No change to differential lock		
	☐ Tight cornering condition is occurred in AUTO or MANUAL mode with differential free		
	☐ Noise or vibration		
☐ Others ()			

GENERAL INFORMATION

MANUAL TRANSMISSION AND DIFFERENTIAL (DIAGNOSTICS)

3. General Information

A: CAUTION

Supplemental restraint system airbag wiring harness is routed near the driver's control center differential control module.

CAUTION:

- All airbag system wiring harness and connectors are colored yellow. Do not use the electrical test equipment on these circuits.
- Be careful not to damage the airbag system wiring harness when performing diagnostics and servicing the driver's control center differential control module.
- When measuring the voltage or resistance of ECM or each sensor, use a tapered pin with diameter of less than 0.64 mm (0.025 in) in order to avoid poor contact. Do not insert the pin with diameter of more than 0.65 mm (0.026 in).

C: PREPARATION TOOL

1. GENERAL PURPOSE TOOL

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

B: INSPECTION

1. POWER SUPPLY

- 1) Measure battery voltage and specific gravity of electrolyte.

Standard of voltage: More than 12 V

Standard of gravity: More than 1.260

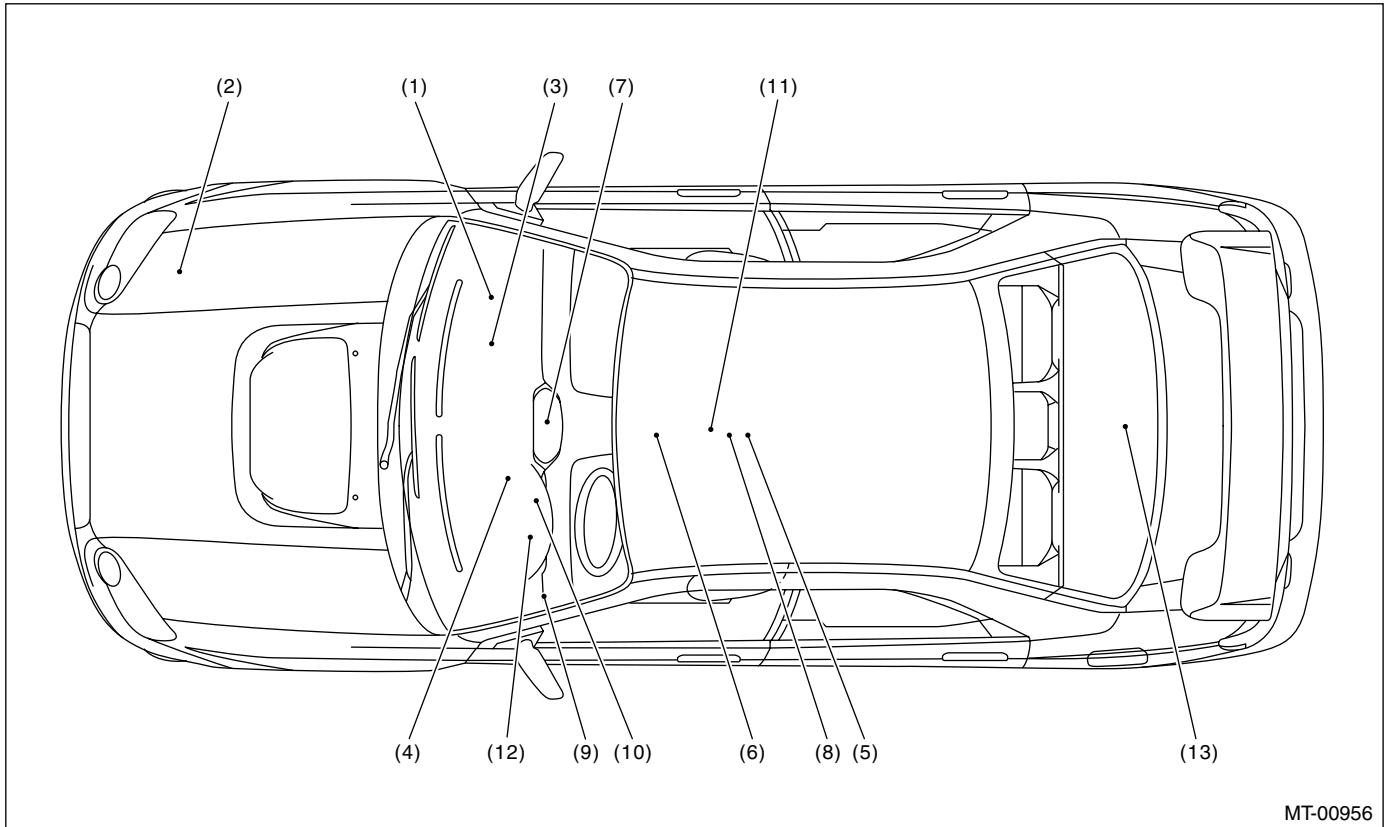
- 2) Check the condition of fuse.
- 3) Check the condition of harness and harness connector.

ELECTRICAL COMPONENT LOCATION

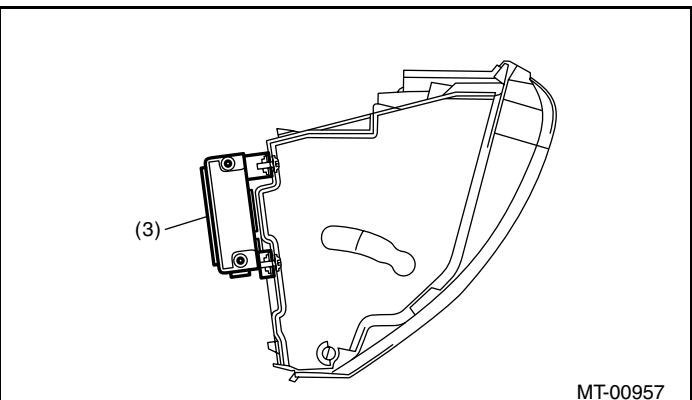
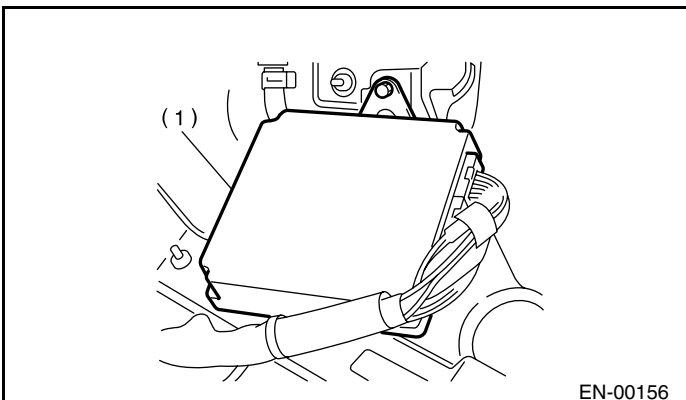
MANUAL TRANSMISSION AND DIFFERENTIAL (DIAGNOSTICS)

4. Electrical Component Location

A: POSITION

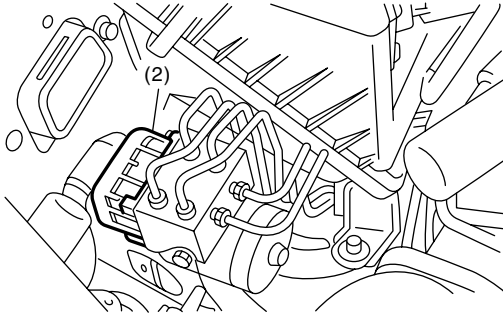


(1) Engine control module (ECM)	(7) Center differential	(12) Brake light switch
(2) ABS control module & hydraulic control unit (ABSCM&H/U)	(8) Manual mode switch	(13) Rear differential oil temperature switch
(3) Driver's control center differential control module	(9) Driver's control center differential relay	
(4) Accelerator position sensor	(10) Driver's control center differential indicator (driver's control center differential diagnostic indicator)	
(5) Lateral G sensor	(11) Parking brake switch	
(6) Center differential control dial		

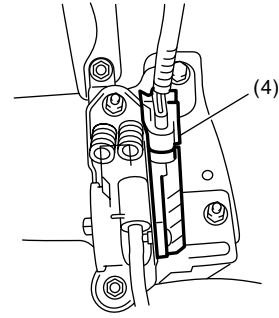


ELECTRICAL COMPONENT LOCATION

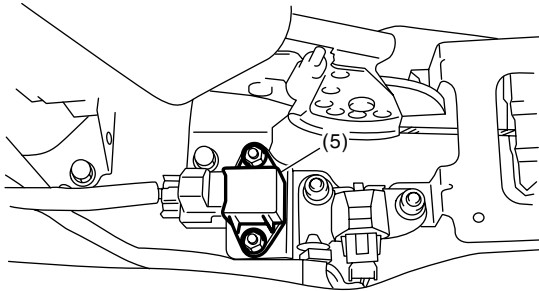
MANUAL TRANSMISSION AND DIFFERENTIAL (DIAGNOSTICS)



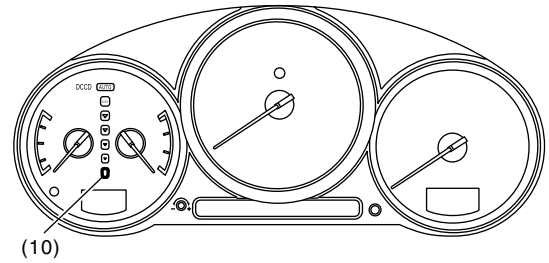
MT-00852



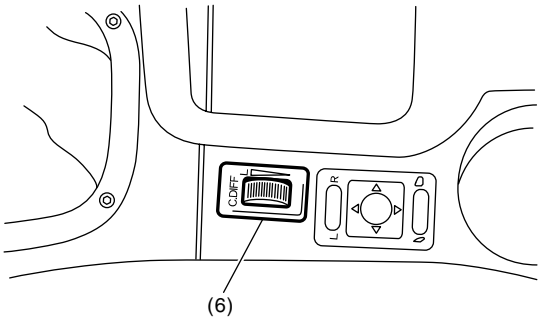
MT-00958



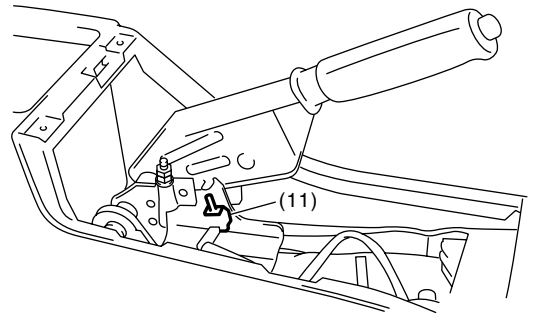
MT-00855



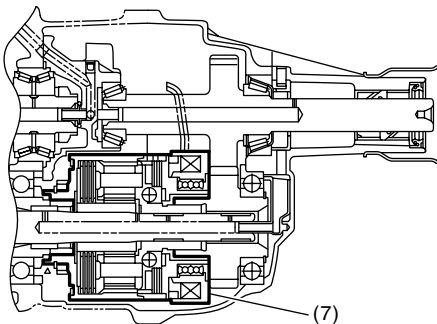
MT-00860



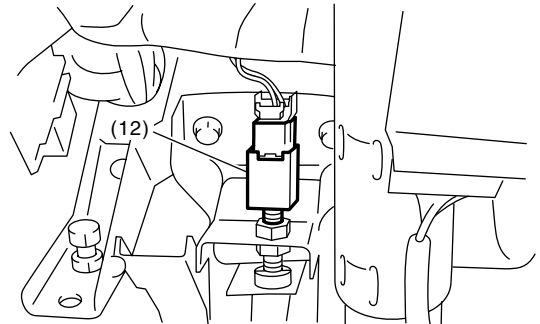
MT-00856



MT-00861



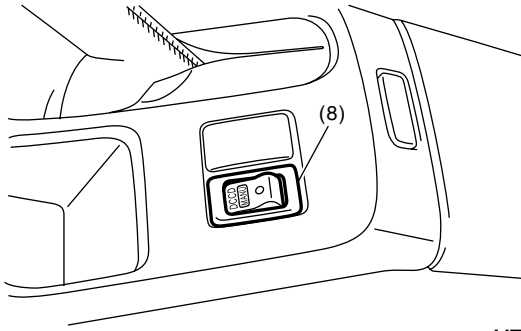
MT-00857



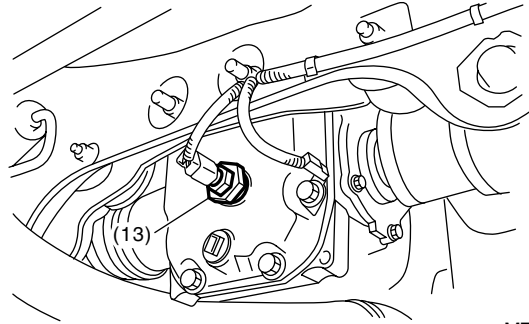
MT-00959

ELECTRICAL COMPONENT LOCATION

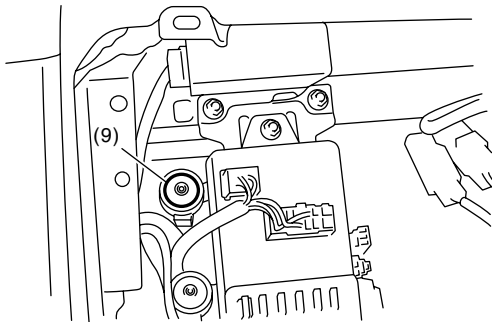
MANUAL TRANSMISSION AND DIFFERENTIAL (DIAGNOSTICS)



MT-00858



MT-00863

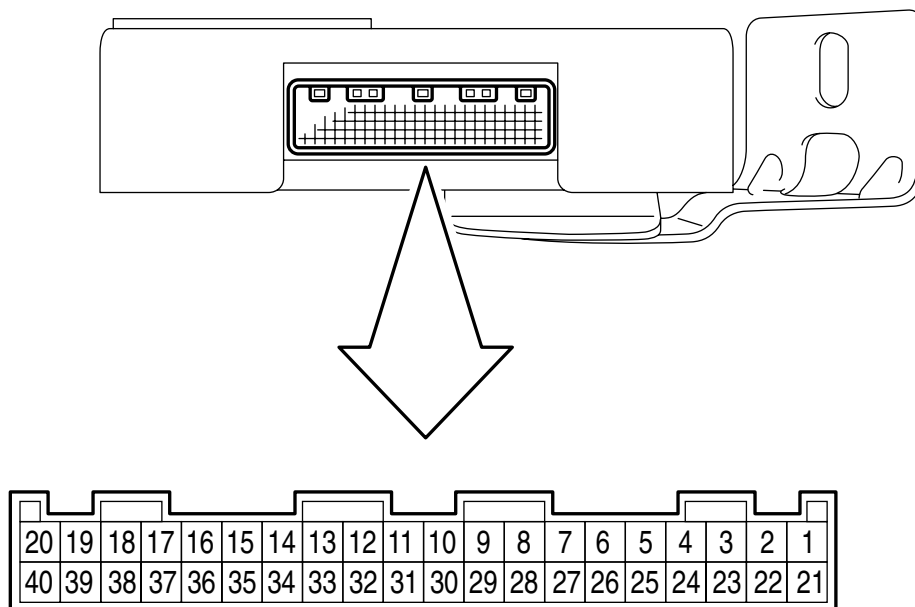


MT-00960

SUBARU.

5. Driver's Control Center Differential Control Module I/O Signal

A: ELECTRICAL SPECIFICATION



MT-00864

Check with ignition switch ON.				
Content	Terminal No.	Measuring conditions	Voltage (V)	To body resistance (ohm)
Back-up power supply	17	Ignition switch ON or OFF	10 — 13	—
Ignition power supply	15	Ignition switch ON (engine OFF)	10 — 13	—
	16			—
Driver's control center differential power supply	18			—
	19			—
Driver's control relay	21	Ignition switch ON	Less than 1	—
Accelerator position sensor	32	Accelerator pedal is released.	0.3 — 1.8	—
		Accelerator pedal is fully depressed.	2.8 — 4.7	
Center differential control dial power supply	13	Ignition switch ON	Approx. 5	—
Center differential control dial ground line	34	Ignition switch ON	0	—
Center differential control dial input signal	12	When differential is locked	Approx. 5	—
		When differential is free	Less than 0.5	
Lateral G sensor	33	Ignition switch ON (When lateral G sensor is horizontal)	2.3 — 2.7	—
Driver's control center differential output	20	When differential is locked (When driver's control center differential indicator light is in differential lock)	6.0 — 7.0	1.0 — 2.0 (between connector terminals)
		When differential is free (When parking brake is applied)	Less than 0.5	
Driver's control center differential ground line	40	When differential is free	Less than 0.5	

DRIVER'S CONTROL CENTER DIFFERENTIAL CONTROL MODULE I/O SIGNAL

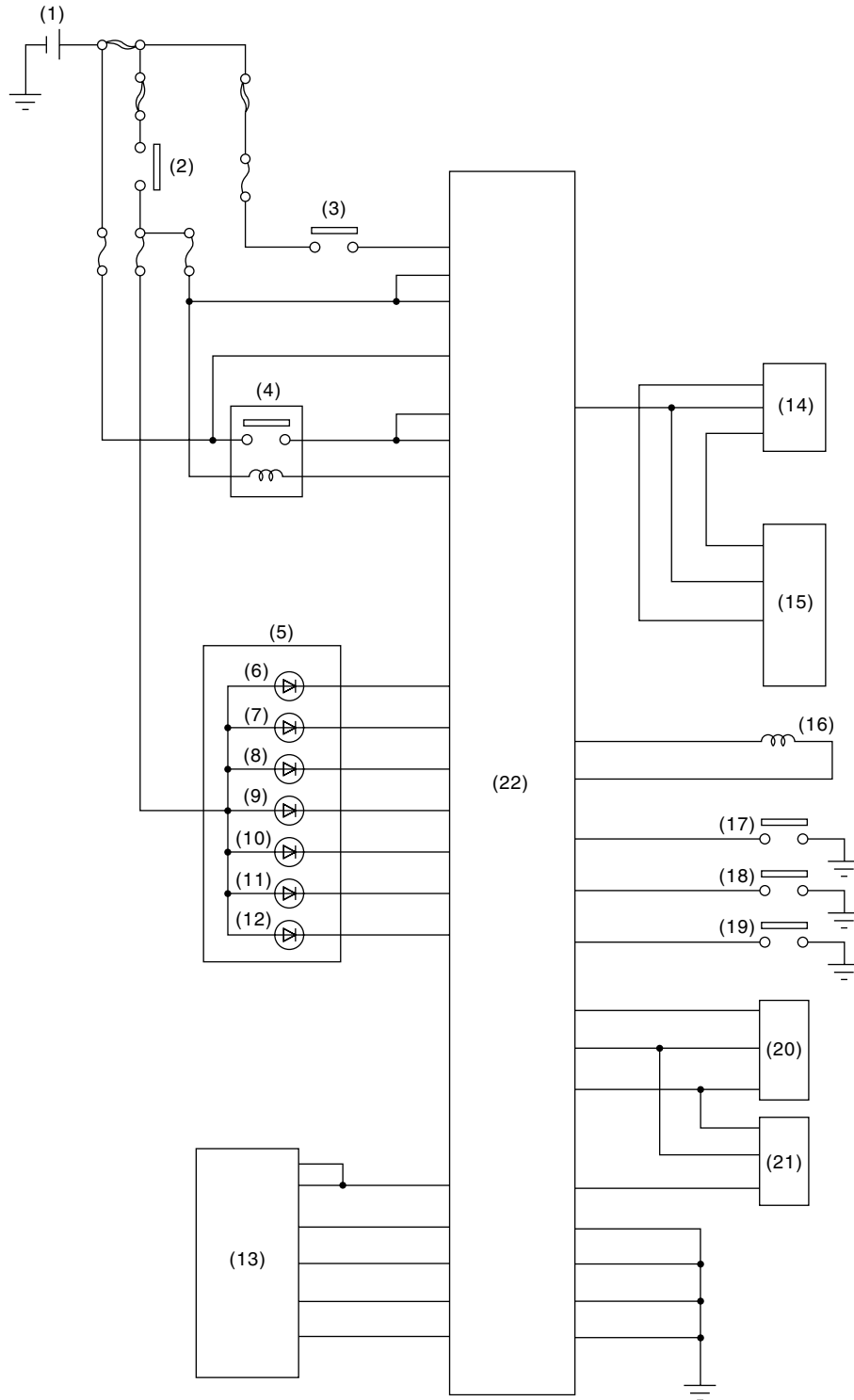
MANUAL TRANSMISSION AND DIFFERENTIAL (DIAGNOSTICS)

Check with ignition switch ON.				
Content	Terminal No.	Measuring conditions	Voltage (V)	To body resistance (ohm)
Parking brake switch	11	When parking brake is applied	Less than 0.4	—
		When parking brake is released	More than 8	
Driver's control center differential indicator light (Lock ratio 0%)	4	When illuminates	Less than 1	—
		When turned off	More than 8	
Driver's control center differential indicator light (Lock ratio 15%)	3	When illuminates	Less than 1	—
		When turned off	More than 8	
Driver's control center differential indicator light (Lock ratio 35%)	2	When illuminates	Less than 1	—
		When turned off	More than 8	
Driver's control center differential indicator light (Lock ratio 65%)	1	When illuminates	Less than 1	—
		When turned off	More than 8	
Driver's control center differential indicator light (Lock ratio 85%)	24	When illuminates	Less than 1	—
		When turned off	More than 8	
Driver's control center differential indicator light (Lock ratio 100%)	23	When illuminates	Less than 1	—
		When turned off	More than 8	
AUTO indicator light	22	When illuminates	Less than 1	—
		When turned off	More than 8	
ABSCM&H/U	10	When ABS control operates	Less than 1	—
		When ABS control does not operate	More than 8	
Rear LH ABS wheel speed sensor signal	26	When stopped	Less than 1	—
		When driving	Less than 1 $\longleftrightarrow$ More than 8	
Rear RH ABS wheel speed sensor signal	27	When stopped	Less than 1	—
		When driving	Less than 1 $\longleftrightarrow$ More than 8	
Front LH ABS wheel speed sensor signal	28	When stopped	Less than 1	—
		When driving	Less than 1 $\longleftrightarrow$ More than 8	
Front RH ABS wheel speed sensor signal	29	When stopped	Less than 1	—
		When driving	Less than 1 $\longleftrightarrow$ More than 8	
Stop light switch	9	Brake pedal depressed.	More than 8	—
		Brake pedal released.	Less than 1	
Rear differential oil temperature switch	7	Rear differential oil temperature switch OFF	More than 8	—
		Rear differential oil temperature switch ON	Less than 0.4	
Manual mode switch	8	Switch is released	More than 4.3	—
		Switch is depressed	Less than 0.1	
Data link signal (Subaru Select Monitor)	5	—	—	—
	6			—
Driver's control center differential control module ground line	36	—	0	—
	37			—
	38			—
	39			—

DRIVER'S CONTROL CENTER DIFFERENTIAL CONTROL MODULE I/O SIGNAL

MANUAL TRANSMISSION AND DIFFERENTIAL (DIAGNOSTICS)

B: SCHEMATIC



MT-00865

DRIVER'S CONTROL CENTER DIFFERENTIAL CONTROL MODULE I/O SIGNAL

MANUAL TRANSMISSION AND DIFFERENTIAL (DIAGNOSTICS)

(1) Battery	(9) Driver's control center differential indicator light (Lock ratio 65%)	(17) Parking brake switch
(2) Ignition relay		(18) Manual mode switch
(3) Stop light switch	(10) Driver's control center differential indicator light (Lock ratio 85%)	(19) Rear differential oil temperature switch
(4) Driver's control center differential relay	(11) Driver's control center differential indicator light (Lock ratio 100%)	(20) Center differential control dial
(5) Combination Meter	(12) AUTO indicator light	(21) Lateral G sensor
(6) Driver's control center differential indicator light (Lock ratio 0%)	(13) ABS control module & hydraulic control unit (ABSCM&H/U)	(22) Driver's control center differential control module
(7) Driver's control center differential indicator light (Lock ratio 15%)	(14) Accelerator position sensor	
(8) Driver's control center differential indicator light (Lock ratio 35%)	(15) Engine control module (ECM)	
	(16) Driver's control center differential	

READ DIAGNOSTIC TROUBLE CODE (DTC)

MANUAL TRANSMISSION AND DIFFERENTIAL (DIAGNOSTICS)

6. Read Diagnostic Trouble Code (DTC)

A: OPERATION

1. STORED DIAGNOSTIC TROUBLE CODE (DTC)

- 1) Securely apply the parking brake.
- 2) Turn the ignition switch to ON.
- 3) Set the driver's control dial to differential lock or differential free.
- 4) Hold the accelerator pedal depressed fully.

NOTE:

Hold the accelerator pedal depressed fully until reading of DTC is completed.

- 5) Set the driver's control dial to differential lock and differential free for ten times each.

NOTE:

- Repeat the step from the beginning when DTC is not displayed or diagnostic indicator light does not blink.
- Refer to "HOW TO READ DIAGNOSTIC TROUBLE CODE (DTC)" for reading DTC. <Ref. to 6MT-13, HOW TO READ DIAGNOSTIC TROUBLE CODE (DTC), OPERATION, Read Diagnostic Trouble Code (DTC).>

2. SELF-DIAGNOSIS DIAGNOSTIC TROUBLE CODE (DTC)

NOTE:

Perform the following step 4) to 8) within 30 sec.

- 1) Securely apply the parking brake.
- 2) Set the center differential control dial to differential free.
- 3) Start the engine.
- 4) Set the center differential control dial to differential lock.
- 5) Release the parking brake.
- 6) Set the center differential control dial to differential free.
- 7) Securely apply the parking brake.
- 8) Repeat the step 4) to 7) for twice.

NOTE:

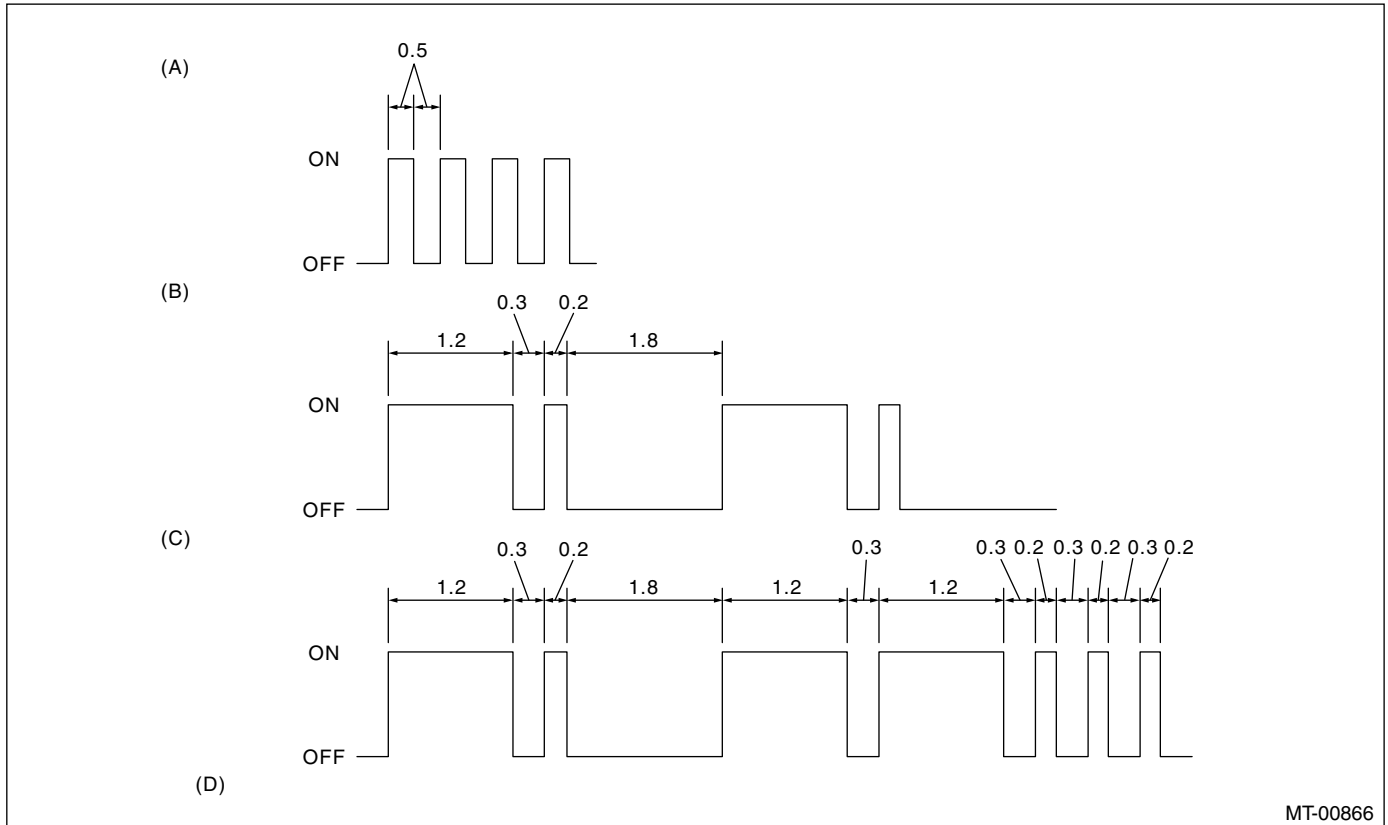
- ABS wheel speed sensor DTC is displayed. Do not judge it as a problem. Perform the inspection mode.
- Repeat the step from the beginning when DTC is not displayed or diagnostic indicator light does not blink.
- Refer to "HOW TO READ DIAGNOSTIC TROUBLE CODE (DTC)" for reading DTC. <Ref. to 6MT-13, HOW TO READ DIAGNOSTIC TROUBLE CODE (DTC), OPERATION, Read Diagnostic Trouble Code (DTC).>

READ DIAGNOSTIC TROUBLE CODE (DTC)

MANUAL TRANSMISSION AND DIFFERENTIAL (DIAGNOSTICS)

3. HOW TO READ DIAGNOSTIC TROUBLE CODE (DTC)

DTC for faulty part is indicated by blinking of driver's control center differential indicator. Long blink (1.2 sec.) means ten's place, short blink (0.2 sec.) means one's place.



(A) Normal code
(B) DTC 11

(C) DTC 11 and 23

(D) Unit: Seconds

NOTE:

- The codes which are memorized in control module as previous DTC by occurring the trouble in the past, and the codes which are appeared to inform the trouble to driver in normal driving condition; are only "11", "12", "13", "14", "21", "22" and "23".
- For details of DTC, refer to "List of Diagnostic Trouble Code (DTC)". <Ref. to 6MT-17, List of Diagnostic Trouble Code (DTC).>

7. Inspection Mode

A: OPERATION

WARNING:

Observe the road traffic law.

- 1) Call up the Self-diagnosis diagnostic trouble code (DTC). <Ref. to 6MT-12, SELF-DIAGNOSIS DIAGNOSTIC TROUBLE CODE (DTC), OPERATION, Read Diagnostic Trouble Code (DTC).>
- 2) Apply the parking brake.
- 3) Depress the brake pedal.
- 4) Operate the Manual mode switch once or more, and then set to Manual mode.
- 5) Turn the center differential control dial to differential lock and differential free for once, and turn it to differential lock, and then wait three seconds.
- 6) Drive the vehicle in 15 km/h (9 MPH) for more than 5 sec.

CLEAR MEMORY MODE

MANUAL TRANSMISSION AND DIFFERENTIAL (DIAGNOSTICS)

8. Clear Memory Mode

A: OPERATION

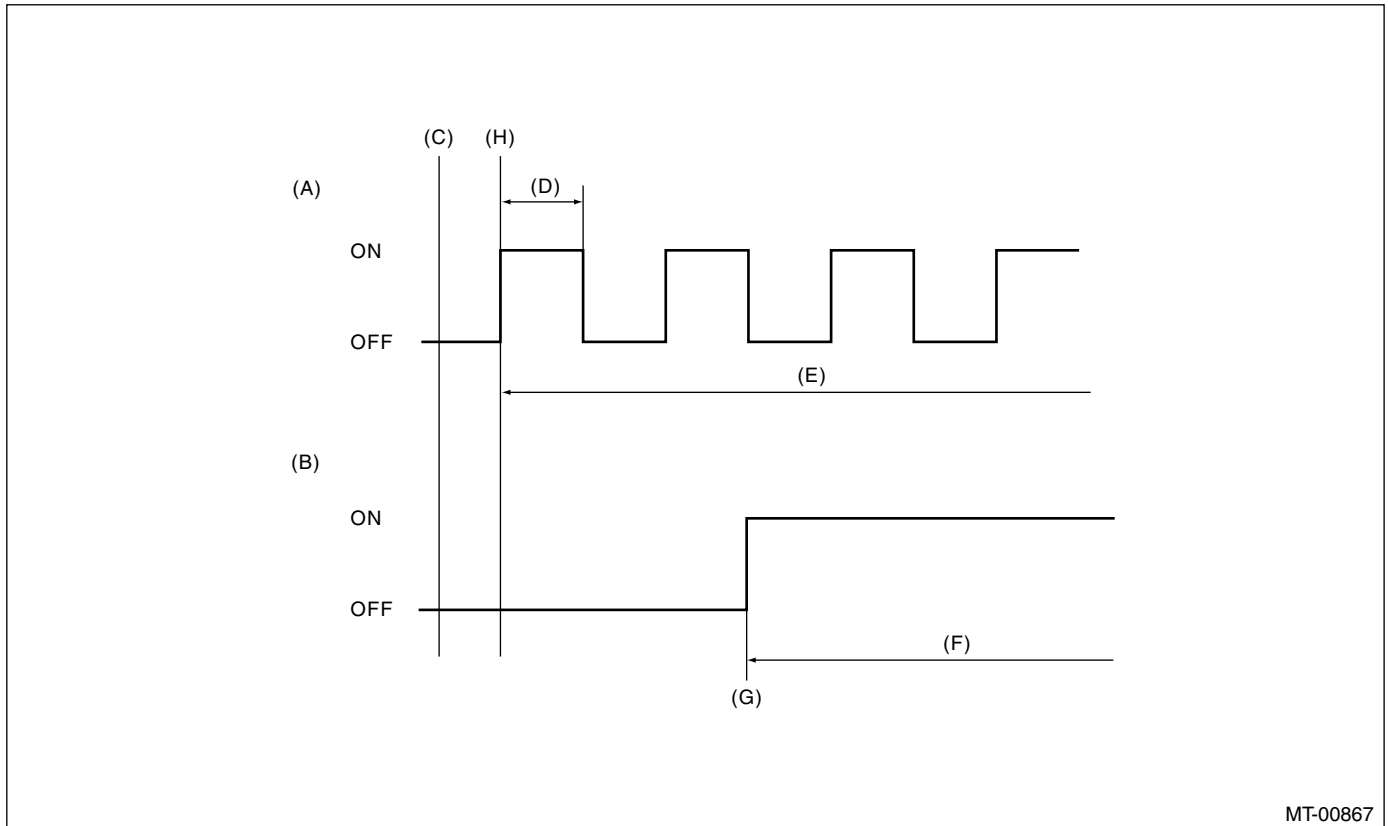
Stored DTC is cleared when ignition switch turns on next time, if there is no malfunction on each I/O signal at the time when finishing inspection mode after calling up the Self-diagnosis DTC (all Self-diagnosis DTC is cleared).

9. Driver's Control Center Differential Indicator Light Display

A: INSPECTION

When the malfunction occurs on part or unit, the control module performs self diagnosis and driver's control center differential indicator light (at the bottom differential free light) keep blinking until detect the malfunction and the ignition switch is turned to OFF. Faulty part or unit can be identified by calling up DTC.

Indicator display is as shown in the figure.



- (A) Faulty
- (B) Normal
- (C) Ignition switch ON
- (D) 1 sec.

- (E) Blink
- (F) Driver's control center differential indicator light illuminates

- (G) Set manual mode dial to differential free position
- (H) Malfunction is detected

LIST OF DIAGNOSTIC TROUBLE CODE (DTC)

MANUAL TRANSMISSION AND DIFFERENTIAL (DIAGNOSTICS)

10.List of Diagnostic Trouble Code (DTC)

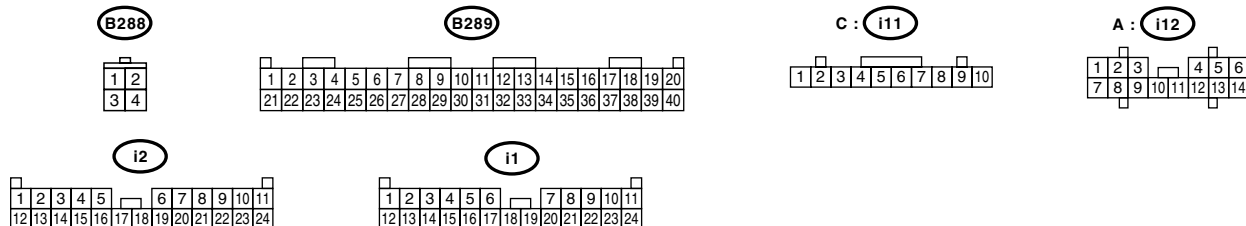
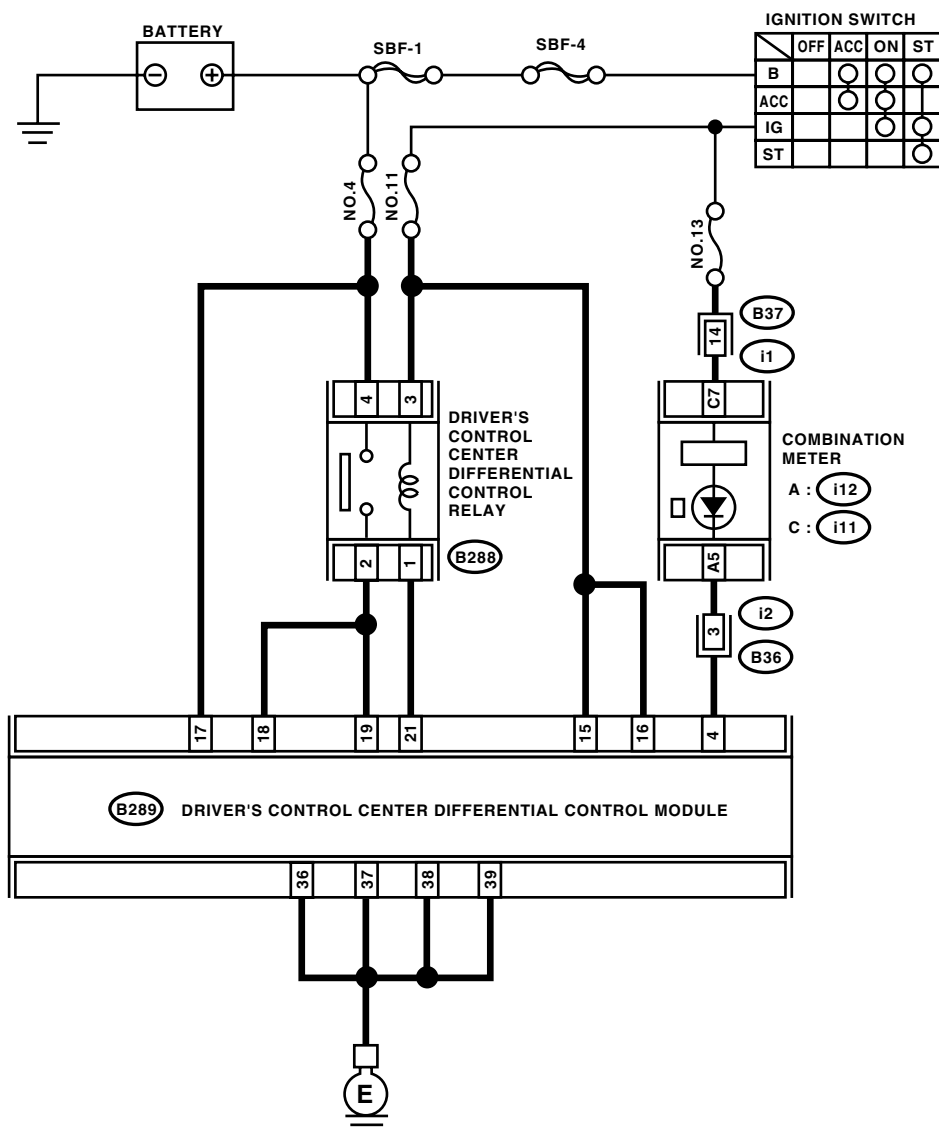
A: LIST

DTC	Item	Content of diagnosis	Index
—	Diagnosis indicator light, Center differential control dial, Parking brake switch, accelerator position sensor	Diagnosis indicator light does not illuminate. Can not calling up the DTC.	<Ref. to 6MT-18, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
—	Rear differential gear oil temperature switch	Diagnosis indicator light blinks at 2 Hz, but driver's control center differential does not operate.	<Ref. to 6MT-23, CHECK REAR DIFFERENTIAL OIL TEMPERATURE SWITCH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
11	Front ABS wheel speed sensor RH	Open or short circuit in front ABS wheel speed sensor RH circuit	<Ref. to 6MT-26, DTC 11 FRONT ABS WHEEL SPEED SENSOR RH SIGNAL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
12	Front ABS wheel speed sensor LH	Open or short circuit in front ABS wheel speed sensor LH circuit	<Ref. to 6MT-29, DTC 12 FRONT ABS WHEEL SPEED SENSOR LH SIGNAL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
13	Rear ABS wheel speed sensor RH	Open or short circuit in rear ABS wheel speed sensor RH circuit	<Ref. to 6MT-32, DTC 13 REAR ABS WHEEL SPEED SENSOR RH SIGNAL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
14	Rear ABS wheel speed sensor LH	Open or short circuit in rear ABS wheel speed sensor LH circuit	<Ref. to 6MT-35, DTC 14 REAR ABS WHEEL SPEED SENSOR LH SIGNAL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
21	Accelerator position sensor	Open or short circuit in accelerator position sensor circuit	<Ref. to 6MT-38, DTC 21 ACCELERATOR POSITION SENSOR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
22	Lateral G sensor	Open or short circuit in lateral G sensor circuit	<Ref. to 6MT-41, DTC 22 LATERAL G SENSOR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
23	Driver's control center differential output	Open or short circuit in driver's control center differential output circuit	<Ref. to 6MT-43, DTC 23 CHECK CENTER DIFFERENTIAL., Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
24	Center differential control dial	Open or short circuit in center differential control dial circuit	<Ref. to 6MT-45, DTC 24 CHECK CENTER DIFFERENTIAL CONTROL DIAL., Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
31	Manual mode switch	Open or short circuit in manual mode switch circuit	<Ref. to 6MT-47, DTC 31 MANUAL MODE SWITCH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
32	Parking brake switch	Open or short circuit in parking brake switch circuit	<Ref. to 6MT-51, DTC 32 CHECK PARKING BRAKE SWITCH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
33	Brake switch	Open or short circuit in brake switch circuit	<Ref. to 6MT-53, DTC 33 STOP LIGHT SWITCH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
34	ABS switch	Open or short circuit in ABS switch circuit	<Ref. to 6MT-55, DTC 34 ABS SWITCH SIGNAL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

11. Diagnostic Procedure with Diagnostic Trouble Code (DTC)

A: DTC CANNOT BE CALLED UP

WIRING DIAGRAM:



DIAGNOSTIC PROCEDURE WITH DIAGNOSTIC TROUBLE CODE (DTC)

MANUAL TRANSMISSION AND DIFFERENTIAL (DIAGNOSTICS)

Step		Check	Yes	No
1	CHECK THE AUTO INDICATOR LIGHT. Turn the ignition switch to ON.	Does the AUTO indicator light illuminate?	Go to step 14.	Go to step 2.
2	CHECK THE GROUND CIRCUIT OF DRIVER'S CONTROL CENTER DIFFERENTIAL CONTROL MODULE. 1) Turn the ignition switch to OFF. 2) Disconnect the connector of driver's control center differential control module. 3) Measure the resistance between driver's control center differential control module harness connector and chassis ground. Connector & terminal (B289) No. 36 — Chassis ground: (B289) No. 37 — Chassis ground: (B289) No. 38 — Chassis ground: (B289) No. 39 — Chassis ground:	Is the resistance less than 1 Ω ?	Go to step 3.	Repair the open circuit of driver's control center differential control module ground circuit.
3	CHECK FUSE (No. 4). Remove the fuse (No. 4).	Is the fuse (No. 4) is blown out?	Replace fuse (No.4). If the replaced fuse (No.4) is blown out easily, repair short circuit in harness between fuse (No.4) and driver's control center differential control module.	Go to step 4.
4	CHECK FUSE (No. 11). Remove the fuse (No. 11).	Is the fuse (No. 11) is blown out?	Replace fuse (No.11). If the replaced fuse (No.11) is blown out easily, repair short circuit in harness between fuse (No.11) and driver's control center differential control module.	Go to step 5.
5	CHECK POWER SUPPLY CIRCUIT OF DRIVER'S CONTROL CENTER DIFFERENTIAL CONTROL MODULE. Measure the voltage between driver's control center differential control module harness connector and chassis ground. Connector & terminal (B289) No. 17 (+) — Chassis ground (-):	Is the voltage more than 10 V?	Go to step 6.	Repair the open circuit in harness between fuse (No. 4) and driver's control center differential control module, or fuse (No. 4) and battery.
6	CHECK POWER SUPPLY CIRCUIT OF DRIVER'S CONTROL CENTER DIFFERENTIAL RELAY. 1) Disconnect the harness connector of driver's control center differential relay. 2) Measure the voltage between driver's control center differential relay harness connector and chassis ground. Connector & terminal (B288) No. 4 (+) — Chassis ground (-):	Is the voltage more than 10 V?	Go to step 7.	Repair the open circuit between fuse (No. 4) and driver's control center differential relay.

DIAGNOSTIC PROCEDURE WITH DIAGNOSTIC TROUBLE CODE (DTC)

MANUAL TRANSMISSION AND DIFFERENTIAL (DIAGNOSTICS)

Step	Check	Yes	No
7 CHECK IGNITION POWER SUPPLY CIRCUIT OF DRIVER'S CONTROL CENTER DIFFERENTIAL CONTROL MODULE. 1) Turn the ignition switch to ON. (engine OFF) 2) Measure the voltage between driver's control center differential control module and chassis ground. Connector & terminal (B289) No. 15 (+) — Chassis ground (-): (B289) No. 16 (+) — Chassis ground (-):	Is the voltage more than 10 V?	Go to step 8.	Repair the open circuit in harness between fuse (No. 11) and driver's control center differential control module, or fuse (No. 11) and battery.
8 CHECK IGNITION POWER SUPPLY CIRCUIT OF DRIVER'S CONTROL CENTER DIFFERENTIAL RELAY. Measure the voltage between driver's control center differential relay and chassis ground. Connector & terminal (B288) No. 3 (+) — Chassis ground (-):	Is the voltage more than 10 V?	Go to step 9.	Repair the open circuit between fuse (No. 11) and driver's control center differential control module.
9 CHECK HARNESS BETWEEN DRIVER'S CONTROL CENTER DIFFERENTIAL CONTROL MODULE AND DRIVER'S CONTROL RELAY. Measure the resistance of harness between driver's control center differential control module harness connector and driver's control relay harness connector. Connector & terminal (B289) No. 18 — (B288) No. 2: (B289) No. 19 — (B288) No. 2: (B289) No. 21 — (B288) No. 1:	Is the resistance less than 1 Ω ?	Go to step 10.	Repair the open circuit between driver's control center differential control module harness connector and driver's control relay harness connector.
10 CHECK HARNESS BETWEEN DRIVER'S CONTROL CENTER DIFFERENTIAL CONTROL MODULE AND DRIVER'S CONTROL RELAY. Measure the resistance of harness between driver's control center differential control module harness connector and chassis ground. Connector & terminal (B289) No. 18 — Chassis ground: (B289) No. 19 — Chassis ground: (B289) No. 21 — Chassis ground:	Is the resistance more than 1 M Ω ?	Go to step 11.	Repair the short circuit between driver's control center differential control module harness connector and driver's control relay harness connector.
11 CHECK DRIVER'S CONTROL RELAY. Measure the resistance between driver's control relay terminals. Terminals No. 4 — No. 2:	Is the resistance more than 1 M Ω ?	Go to step 12.	Replace the driver's control relay.
12 CHECK DRIVER'S CONTROL RELAY. Connect the terminal No. 3 to battery positive side, and terminal No. 1 to battery negative side, and then measure the resistance between driver's control relay terminals. Terminals No. 4 — No. 2:	Is the resistance less than 1 Ω ?	Go to step 13.	Replace the driver's control relay.

DIAGNOSTIC PROCEDURE WITH DIAGNOSTIC TROUBLE CODE (DTC)

MANUAL TRANSMISSION AND DIFFERENTIAL (DIAGNOSTICS)

Step	Check	Yes	No
13 CHECK IGNITION POWER SUPPLY CIRCUIT OF DRIVER'S CONTROL CENTER DIFFERENTIAL CONTROL MODULE. 1) Connect all connectors. 2) Turn the ignition switch to ON. (engine OFF) 3) Measure the voltage between driver's control center differential control module and chassis ground. Connector & terminal (B289) No. 18 (+) — Chassis ground (-): (B289) No. 19 (+) — Chassis ground (-): (B289) No. 21 (+) — Chassis ground (-):	Is the voltage less than 1 V?	Go to step 14.	Go to step 23.
14 CHECK MANUAL MODE SWITCH. Push the manual mode switch to enter the manual mode.	Is the manual mode obtained?	Go to step 15.	Repair the switch. <Ref. to 6MT-47, DTC 31 MANUAL MODE SWITCH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
15 CHECK DRIVER'S CONTROL CENTER DIFFERENTIAL INDICATOR LIGHT. Operate the center differential control dial.	Does the center differential indicator light illuminate according to center differential control dial?	Go to step 17.	Go to step 16.
16 CHECK THE CENTER DIFFERENTIAL CONTROL DIAL <Ref. to 6MT-45, DTC 24 CHECK CENTER DIFFERENTIAL CONTROL DIAL., Diagnostic Procedure with Diagnostic Trouble Code (DTC).>	Is the center differential control dial circuit normal?	Go to step 17.	Repair it.
17 CHECK THE PARKING BRAKE SWITCH <Ref. to 6MT-51, DTC 32 CHECK PARKING BRAKE SWITCH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>	Is the parking brake switch circuit normal?	Go to step 18.	Repair it.
18 CHECK THE ACCELERATOR POSITION SENSOR <Ref. to 6MT-38, DTC 21 ACCELERATOR POSITION SENSOR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>	Is the accelerator position sensor circuit normal?	Go to step 19.	Repair it.
19 READ THE DTC Read the DTC. <Ref. to 6MT-12, OPERATION, Read Diagnostic Trouble Code (DTC).>	Is the DTC called up?	Go back to the Basic Diagnostic Procedure. <Ref. to 6MT-2, PROCEDURE, Basic Diagnostics Procedure.>	Go to step 20.
20 CHECK THE DRIVER'S CONTROL CENTER DIFFERENTIAL INDICATOR LIGHT. 1) Turn the ignition switch to OFF. 2) Disconnect harness connector from combination meter. 3) Turn the ignition switch to ON. (engine OFF) 4) Short between the combination meter harness connector and chassis ground. Connector & terminal (i12) No. 5 — Chassis ground:	Does the lowest light of driver's control center differential indicator illuminate?	Go to step 21.	Check the combination meter.

DIAGNOSTIC PROCEDURE WITH DIAGNOSTIC TROUBLE CODE (DTC)

MANUAL TRANSMISSION AND DIFFERENTIAL (DIAGNOSTICS)

Step	Check	Yes	No
21 CHECK THE HARNESS BETWEEN COMBINATION METER AND DRIVER'S CONTROL CENTER DIFFERENTIAL CONTROL MODULE. 1) Turn the ignition switch to OFF. 2) Disconnect the harness connector from driver's control center differential control module. 3) Measure the resistance of harness between combination meter harness connector and driver's control center differential control module harness connector. Connector & terminal (i12) No. 5 — (B289) No. 4:	Is the resistance less than 1 Ω ?	Go to step 22.	Repair the open circuit and connector of harness between combination meter harness connector and driver's control center differential control module harness connector.
22 CHECK THE HARNESS BETWEEN COMBINATION METER AND DRIVER'S CONTROL CENTER DIFFERENTIAL CONTROL MODULE. Measure the resistance of harness between driver's control center differential control module harness connector and chassis ground. Connector & terminal (B289) No. 4 — Chassis ground:	Is the resistance more than 1 M Ω ?	Go to step 23.	Repair the open circuit and connector of harness between combination meter harness connector and driver's control center differential control module harness connector.
23 CHECK THE POOR CONTACT IN HARNESS CONNECTOR	Is there any poor contact in harness connectors of each circuit?	Repair the poor contact.	Replace the driver's control center differential control module.

DIAGNOSTIC PROCEDURE WITH DIAGNOSTIC TROUBLE CODE (DTC)

MANUAL TRANSMISSION AND DIFFERENTIAL (DIAGNOSTICS)

B: CHECK REAR DIFFERENTIAL OIL TEMPERATURE SWITCH

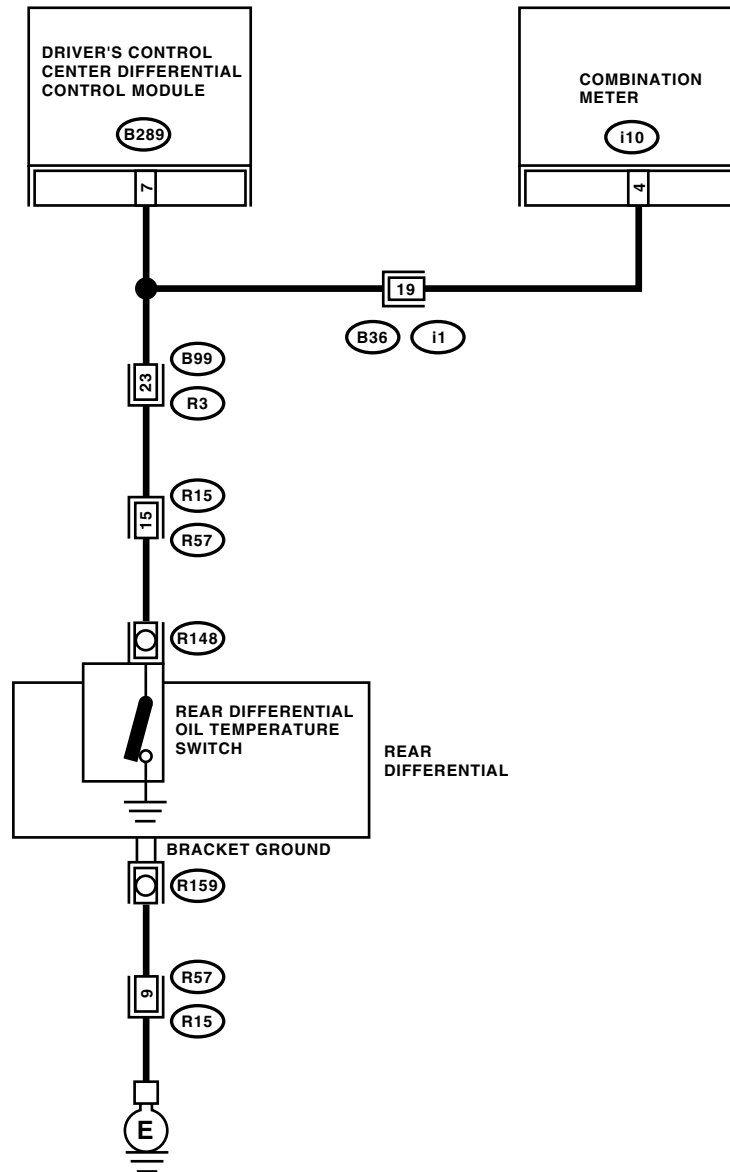
DIAGNOSIS:

Input signal circuit of rear differential oil temperature switch is open or shorted.

TROUBLE SYMPTOM:

- Center differential stays free.
- Handling tends to oversteer.
- Rear differential oil temperature switch warning light illuminates.

WIRING DIAGRAM:



B289																																							
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40

B99																							
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24

i10																													
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30

R57															
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

i1																							
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24

MT-00962

DIAGNOSTIC PROCEDURE WITH DIAGNOSTIC TROUBLE CODE (DTC)

MANUAL TRANSMISSION AND DIFFERENTIAL (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK REAR DIFFERENTIAL OIL TEMPERATURE SWITCH WARNING LIGHT CIRCUIT. 1) Turn the ignition switch to OFF. 2) Disconnect the connector of driver's control center differential control module harness connector. 3) Turn the ignition switch to ON. (engine OFF) 4) Measure the power supply voltage of rear differential oil temperature switch. Connector & terminal (B289) No. 7 (+) — Chassis ground (-):	Is the voltage less than 0.4 V?	Go to step 7.	Go to step 2.
2 CHECK THE HARNESS BETWEEN DRIVER'S CONTROL CENTER DIFFERENTIAL CONTROL MODULE AND COMBINATION METER. 1) Turn the ignition switch to OFF. 2) Disconnect the harness connector from the combination meter. 3) Measure the resistance between combination meter and driver's control center differential control module harness connector. Connector & terminal (B289) No. 7 — (i10) No. 4:	Is the resistance less than 1 Ω ?	Go to step 3.	Repair the open circuit between driver's control center differential control module and combination meter.
3 CHECK THE HARNESS BETWEEN DRIVER'S CONTROL CENTER DIFFERENTIAL CONTROL MODULE AND REAR DIFFERENTIAL OIL TEMPERATURE SWITCH. 1) Disconnect the connector from the rear differential oil temperature switch. 2) Measure the resistance between driver's control center differential control module harness connector and rear differential oil temperature switch harness connector. Connector & terminal (B289) No. 7 — (R148) No. 1:	Is the resistance less than 1 Ω ?	Go to step 4.	Repair the open circuit between driver's control center differential control module and rear differential oil temperature switch.
4 CHECK REAR DIFFERENTIAL OIL TEMPERATURE SWITCH GROUND CIRCUIT. 1) Disconnect the harness connector from bracket ground of rear differential. 2) Measure the resistance between the rear differential oil temperature switch ground harness connector and chassis ground. Connector & terminal (R159) No. 1 — Chassis ground:	Is the resistance more than 1 M Ω ?	Repair the open circuit of rear differential oil temperature switch ground circuit and poor contact of harness connector.	Go to step 5.
5 CHECK REAR DIFFERENTIAL OIL TEMPERATURE SWITCH. Measure the resistance between rear differential oil temperature switch terminal and rear differential oil temperature switch body. Terminals No. 1 — Rear differential oil temperature switch body:	Is the resistance less than 1 Ω ?	Go to step 6.	Replace the rear differential oil temperature switch.
6 CHECK REAR DIFFERENTIAL OIL TEMPERATURE SWITCH WARNING LIGHT. 1) Turn the ignition switch to ON. 2) Short between the combination meter harness connector and chassis ground. Terminals No. 4 (+) — Chassis ground (-):	Does the rear differential oil temperature switch warning light turn OFF?	Go to step 7.	Replace the combination meter.

DIAGNOSTIC PROCEDURE WITH DIAGNOSTIC TROUBLE CODE (DTC)

MANUAL TRANSMISSION AND DIFFERENTIAL (DIAGNOSTICS)

Step	Check	Yes	No
7 CHECK POOR CONTACT.	Is there any poor contact in the circuit of rear differential oil temperature switch?	Repair the poor contact.	Replace the driver's control center differential control module.

DIAGNOSTIC PROCEDURE WITH DIAGNOSTIC TROUBLE CODE (DTC)

MANUAL TRANSMISSION AND DIFFERENTIAL (DIAGNOSTICS)

C: DTC 11 FRONT ABS WHEEL SPEED SENSOR RH SIGNAL

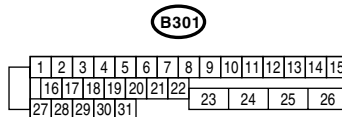
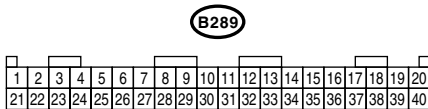
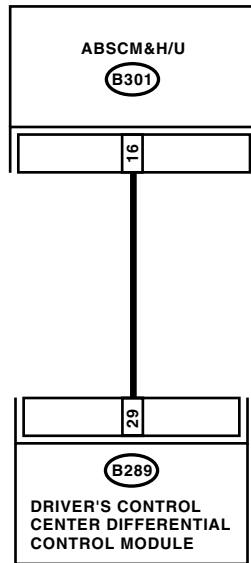
DIAGNOSIS:

Front ABS wheel speed sensor RH signal circuit is open or shorted.

TROUBLE SYMPTOM:

Tight corner braking condition occurs.

WIRING DIAGRAM:



MT-00963

Step	Check	Yes	No
1 CHECK ABSCM&H/U.	Is the DTC of front ABS wheel speed sensor RH displayed on ABS self diagnosis test mode?	Check with referring to DTC section of ABS. <Ref. to ABS-23, LIST, List of Diagnostic Trouble Code (DTC).>	Go to step 2.

DIAGNOSTIC PROCEDURE WITH DIAGNOSTIC TROUBLE CODE (DTC)

MANUAL TRANSMISSION AND DIFFERENTIAL (DIAGNOSTICS)

Step	Check	Yes	No
2 CHECK HARNESS BETWEEN DRIVER'S CONTROL CENTER DIFFERENTIAL CONTROL MODULE AND ABSCM&H/U. 1) Turn the ignition switch to OFF. 2) Disconnect the harness connector of driver's control center differential control module and ABSCM&H/U. 3) Measure the resistance of harness between driver's control center differential control module and ABSCM&H/U harness connector. Connector & terminal (B289) No. 29 — (B301) No. 16:	Is the resistance less than 1 Ω ?	Go to step 3.	Repair the open harness between driver's control center differential control module and ABSCM&H/U.
3 CHECK HARNESS BETWEEN DRIVER'S CONTROL CENTER DIFFERENTIAL CONTROL MODULE AND ABSCM&H/U. Measure the resistance of harness between harness connector of driver's control center differential control module and chassis ground. Connector & terminal (B289) No. 29 — Chassis ground:	Is the resistance more than 1 M Ω ?	Go to step 4.	Repair the short of harness between driver's control center differential control module and ABSCM&H/U.
4 CHECK BATTERY SHORT OF HARNESS BETWEEN DRIVER'S CONTROL CENTER DIFFERENTIAL CONTROL MODULE AND ABSCM&H/U. 1) Connect all the harness connectors. 2) Turn the ignition switch to ON. 3) Measure the voltage of harness between harness connector of driver's control center differential control module and chassis ground. Connector & terminal (B289) No. 29 (+) — Chassis ground (-):	Is the voltage less than 1 V?	Go to step 5.	Repair the short of harness between driver's control center differential control module and ABSCM&H/U.
5 CHECK ABS WHEEL SPEED SENSOR SIGNAL. 1) Turn the ignition switch to OFF. 2) Disconnect the harness connector of driver's control center differential control module. 3) Lift-up the vehicle and place safety stands. NOTE: Raise all wheels off floor. 4) Connect the oscilloscope to terminal of driver's control center differential control module connector. Connector & terminal Positive probe; (B289) No. 29: Ground lead; (B289) No. 36: 5) Start the engine, and drive the wheels slowly. NOTE: The speed difference between front and rear wheels may light the ABS warning light, but this indicates no malfunction. When AT control diagnosis is finished, perform the ABS memory clearance procedure of on-board diagnostics system. <Ref. to ABS-21, Clear Memory Mode.> 6) Measure the signal voltage indicated on oscilloscope.	Is the voltage less than 1 V ←→ more than 8 V?	Go to step 6.	Check the ABSCM&H/U.

DIAGNOSTIC PROCEDURE WITH DIAGNOSTIC TROUBLE CODE (DTC)

MANUAL TRANSMISSION AND DIFFERENTIAL (DIAGNOSTICS)

Step		Check	Yes	No
6	CHECK POOR CONTACT IN HARNESS CONNECTORS.	Is there any poor contact in harness connector?	Repair the poor contact.	Replace the driver's control center differential control module.

DIAGNOSTIC PROCEDURE WITH DIAGNOSTIC TROUBLE CODE (DTC)

MANUAL TRANSMISSION AND DIFFERENTIAL (DIAGNOSTICS)

D: DTC 12 FRONT ABS WHEEL SPEED SENSOR LH SIGNAL

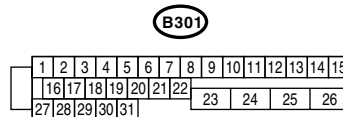
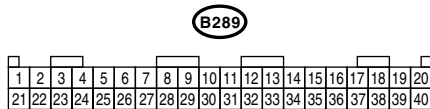
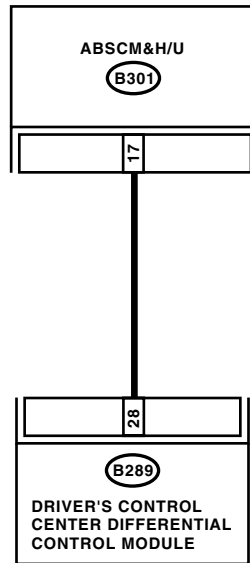
DIAGNOSIS:

Front ABS wheel speed sensor LH signal circuit is open or shorted.

TROUBLE SYMPTOM:

Tight corner braking condition occurs.

WIRING DIAGRAM:



MT-00964

Step	Check	Yes	No
1 CHECK ABSCM&H/U.	Is the DTC of front ABS wheel speed sensor LH displayed on ABS self diagnosis test mode?	Check with referring to DTC section of ABS. <Ref. to ABS-23, LIST, List of Diagnostic Trouble Code (DTC).>	Go to step 2.

DIAGNOSTIC PROCEDURE WITH DIAGNOSTIC TROUBLE CODE (DTC)

MANUAL TRANSMISSION AND DIFFERENTIAL (DIAGNOSTICS)

Step	Check	Yes	No
2 CHECK HARNESS BETWEEN DRIVER'S CONTROL CENTER DIFFERENTIAL CONTROL MODULE AND ABSCM&H/U. 1) Turn the ignition switch to OFF. 2) Disconnect the harness connector of driver's control center differential control module and ABSCM&H/U. 3) Measure the resistance of harness between driver's control center differential control module and ABSCM&H/U harness connector. Connector & terminal (B289) No. 28 — (B301) No. 17:	Is the resistance less than 1 Ω ?	Go to step 3.	Repair the open harness between driver's control center differential control module and ABSCM&H/U.
3 CHECK HARNESS BETWEEN DRIVER'S CONTROL CENTER DIFFERENTIAL CONTROL MODULE AND ABSCM&H/U. Measure the resistance of harness between harness connector of driver's control center differential control module and chassis ground. Connector & terminal (B289) No. 28 — Chassis ground:	Is the resistance more than 1 M Ω ?	Go to step 4.	Repair the short of harness between driver's control center differential control module and ABSCM&H/U.
4 CHECK BATTERY SHORT OF HARNESS BETWEEN DRIVER'S CONTROL CENTER DIFFERENTIAL CONTROL MODULE AND ABSCM&H/U. 1) Connect all the harness connectors. 2) Turn the ignition switch to ON. 3) Measure the voltage of harness between harness connector of driver's control center differential control module and chassis ground. Connector & terminal (B289) No. 28 (+) — Chassis ground (-):	Is the voltage less than 1 V?	Go to step 5.	Repair the short of harness between driver's control center differential control module and ABSCM&H/U.
5 CHECK ABS WHEEL SPEED SENSOR SIGNAL. 1) Turn the ignition switch to OFF. 2) Disconnect the harness connector of driver's control center differential control module. 3) Lift-up the vehicle and place safety stands. NOTE: Raise all wheels off floor. 4) Connect the oscilloscope to terminal of driver's control center differential control module connector. Connector & terminal Positive probe; (B289) No. 28: Ground lead; (B289) No. 36: 5) Start the engine, and drive the wheels slowly. NOTE: The speed difference between front and rear wheels may light the ABS warning light, but this indicates no malfunction. When AT control diagnosis is finished, perform the ABS memory clearance procedure of on-board diagnostics system. <Ref. to ABS-21, Clear Memory Mode.> 6) Measure the signal voltage indicated on oscilloscope.	Is the voltage less than 1 V ←→ more than 8 V?	Go to step 6.	Check the ABSCM&H/U.

DIAGNOSTIC PROCEDURE WITH DIAGNOSTIC TROUBLE CODE (DTC)

MANUAL TRANSMISSION AND DIFFERENTIAL (DIAGNOSTICS)

Step		Check	Yes	No
6	CHECK POOR CONTACT IN HARNESS CONNECTORS.	Is there any poor contact in harness connector?	Repair the poor contact.	Replace the driver's control center differential control module.

DIAGNOSTIC PROCEDURE WITH DIAGNOSTIC TROUBLE CODE (DTC)

MANUAL TRANSMISSION AND DIFFERENTIAL (DIAGNOSTICS)

E: DTC 13 REAR ABS WHEEL SPEED SENSOR RH SIGNAL

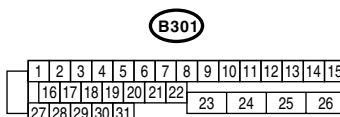
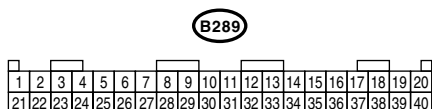
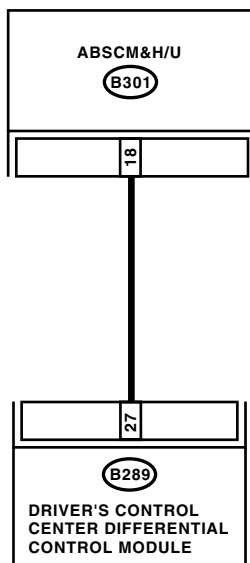
DIAGNOSIS:

Rear ABS wheel speed sensor RH signal circuit is open or shorted.

TROUBLE SYMPTOM:

Tight corner braking condition occurs.

WIRING DIAGRAM:



MT-00965

Step	Check	Yes	No
1 CHECK ABSCM&H/U.	Is the DTC of rear ABS wheel speed sensor RH displayed on ABS self diagnosis test mode?	Check with referring to DTC section of ABS. <Ref. to ABS-23, LIST, List of Diagnostic Trouble Code (DTC).>	Go to step 2.

DIAGNOSTIC PROCEDURE WITH DIAGNOSTIC TROUBLE CODE (DTC)

MANUAL TRANSMISSION AND DIFFERENTIAL (DIAGNOSTICS)

Step	Check	Yes	No
2 CHECK HARNESS BETWEEN DRIVER'S CONTROL CENTER DIFFERENTIAL CONTROL MODULE AND ABSCM&H/U. 1) Turn the ignition switch to OFF. 2) Disconnect the harness connector of driver's control center differential control module and ABSCM&H/U. 3) Measure the resistance of harness between driver's control center differential control module and ABSCM&H/U harness connector. Connector & terminal (B289) No. 27 — (B301) No. 18:	Is the resistance less than 1 Ω ?	Go to step 3.	Repair the open harness between driver's control center differential control module and ABSCM&H/U.
3 CHECK HARNESS BETWEEN DRIVER'S CONTROL CENTER DIFFERENTIAL CONTROL MODULE AND ABSCM&H/U. Measure the resistance of harness between harness connector of driver's control center differential control module and chassis ground. Connector & terminal (B289) No. 27 — Chassis ground:	Is the resistance more than 1 M Ω ?	Go to step 4.	Repair the short of harness between driver's control center differential control module and ABSCM&H/U.
4 CHECK BATTERY SHORT OF HARNESS BETWEEN DRIVER'S CONTROL CENTER DIFFERENTIAL CONTROL MODULE AND ABSCM&H/U. 1) Connect all the harness connectors. 2) Turn the ignition switch to ON. 3) Measure the voltage of harness between harness connector of driver's control center differential control module and chassis ground. Connector & terminal (B289) No. 27 (+) — Chassis ground (-):	Is the voltage less than 1 V?	Go to step 5.	Repair the short of harness between driver's control center differential control module and ABSCM&H/U.
5 CHECK ABS WHEEL SPEED SENSOR SIGNAL. 1) Turn the ignition switch to OFF. 2) Disconnect the harness connector of driver's control center differential control module. 3) Lift-up the vehicle and place safety stands. NOTE: Raise all wheels off floor. 4) Connect the oscilloscope to terminal of driver's control center differential control module connector. Connector & terminal Positive probe; (B289) No. 27: Ground lead; (B289) No. 36: 5) Start the engine, and drive the wheels slowly. NOTE: The speed difference between front and rear wheels may light the ABS warning light, but this indicates no malfunction. When AT control diagnosis is finished, perform the ABS memory clearance procedure of on-board diagnostics system. <Ref. to ABS-21, Clear Memory Mode.> 6) Measure the signal voltage indicated on oscilloscope.	Is the voltage less than 1 V ←→ more than 8 V?	Go to step 6.	Check the ABSCM&H/U.

DIAGNOSTIC PROCEDURE WITH DIAGNOSTIC TROUBLE CODE (DTC)

MANUAL TRANSMISSION AND DIFFERENTIAL (DIAGNOSTICS)

Step		Check	Yes	No
6	CHECK POOR CONTACT IN HARNESS CONNECTORS.	Is there any poor contact in harness connector?	Repair the poor contact.	Replace the driver's control center differential control module.

DIAGNOSTIC PROCEDURE WITH DIAGNOSTIC TROUBLE CODE (DTC)

MANUAL TRANSMISSION AND DIFFERENTIAL (DIAGNOSTICS)

F: DTC 14 REAR ABS WHEEL SPEED SENSOR LH SIGNAL

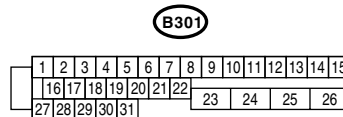
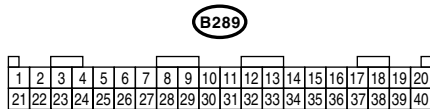
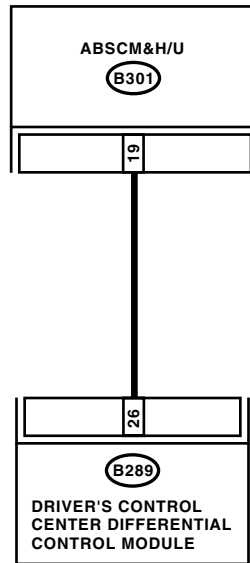
DIAGNOSIS:

Rear ABS wheel speed sensor LH signal circuit is open or shorted.

TROUBLE SYMPTOM:

Tight corner braking condition occurs.

WIRING DIAGRAM:



MT-00966

Step	Check	Yes	No
1 CHECK ABSCM&H/U.	Is the DTC of rear ABS wheel speed sensor LH displayed on ABS self diagnosis test mode?	Check with referring to DTC section of ABS. <Ref. to ABS-23, LIST, List of Diagnostic Trouble Code (DTC).>	Go to step 2.

DIAGNOSTIC PROCEDURE WITH DIAGNOSTIC TROUBLE CODE (DTC)

MANUAL TRANSMISSION AND DIFFERENTIAL (DIAGNOSTICS)

Step		Check	Yes	No
2	CHECK HARNESS BETWEEN DRIVER'S CONTROL CENTER DIFFERENTIAL CONTROL MODULE AND ABSCM&H/U. 1) Turn the ignition switch to OFF. 2) Disconnect the harness connector of driver's control center differential control module and ABSCM&H/U. 3) Measure the resistance of harness between driver's control center differential control module and ABSCM&H/U harness connector. Connector & terminal (B289) No. 26 — (B301) No. 19:	Is the resistance less than 1 Ω ?	Go to step 3.	Repair the open harness between driver's control center differential control module and ABSCM&H/U.
3	CHECK HARNESS BETWEEN DRIVER'S CONTROL CENTER DIFFERENTIAL CONTROL MODULE AND ABSCM&H/U. Measure the resistance of harness between harness connector of driver's control center differential control module and chassis ground. Connector & terminal (B289) No. 26 — Chassis ground:	Is the resistance more than 1 M Ω ?	Go to step 4.	Repair the short of harness between driver's control center differential control module and ABSCM&H/U.
4	CHECK BATTERY SHORT OF HARNESS BETWEEN DRIVER'S CONTROL CENTER DIFFERENTIAL CONTROL MODULE AND ABSCM&H/U. 1) Connect all the harness connectors. 2) Turn the ignition switch to ON. 3) Measure the voltage of harness between harness connector of driver's control center differential control module and chassis ground. Connector & terminal (B289) No. 26 (+) — Chassis ground (-):	Is the voltage less than 1 V?	Go to step 5.	Repair the short of harness between driver's control center differential control module and ABSCM&H/U.
5	CHECK ABS WHEEL SPEED SENSOR SIGNAL. 1) Turn the ignition switch to OFF. 2) Disconnect the harness connector of driver's control center differential control module. 3) Lift-up the vehicle and place safety stands. NOTE: Raise all wheels off floor. 4) Connect the oscilloscope to terminal of driver's control center differential control module connector. Connector & terminal Positive probe; (B289) No. 26: Ground lead; (B289) No. 36: 5) Start the engine, and drive the wheels slowly. NOTE: The speed difference between front and rear wheels may light the ABS warning light, but this indicates no malfunction. When AT control diagnosis is finished, perform the ABS memory clearance procedure of on-board diagnostics system. <Ref. to ABS-21, Clear Memory Mode.> 6) Measure the signal voltage indicated on oscilloscope.	Is the voltage less than 1 V ←→ more than 8 V?	Go to step 6.	Check the ABSCM&H/U.

DIAGNOSTIC PROCEDURE WITH DIAGNOSTIC TROUBLE CODE (DTC)

MANUAL TRANSMISSION AND DIFFERENTIAL (DIAGNOSTICS)

Step		Check	Yes	No
6	CHECK POOR CONTACT IN HARNESS CONNECTORS.	Is there any poor contact in harness connector?	Repair the poor contact.	Replace the driver's control center differential control module.

DIAGNOSTIC PROCEDURE WITH DIAGNOSTIC TROUBLE CODE (DTC)

MANUAL TRANSMISSION AND DIFFERENTIAL (DIAGNOSTICS)

G: DTC 21 ACCELERATOR POSITION SENSOR

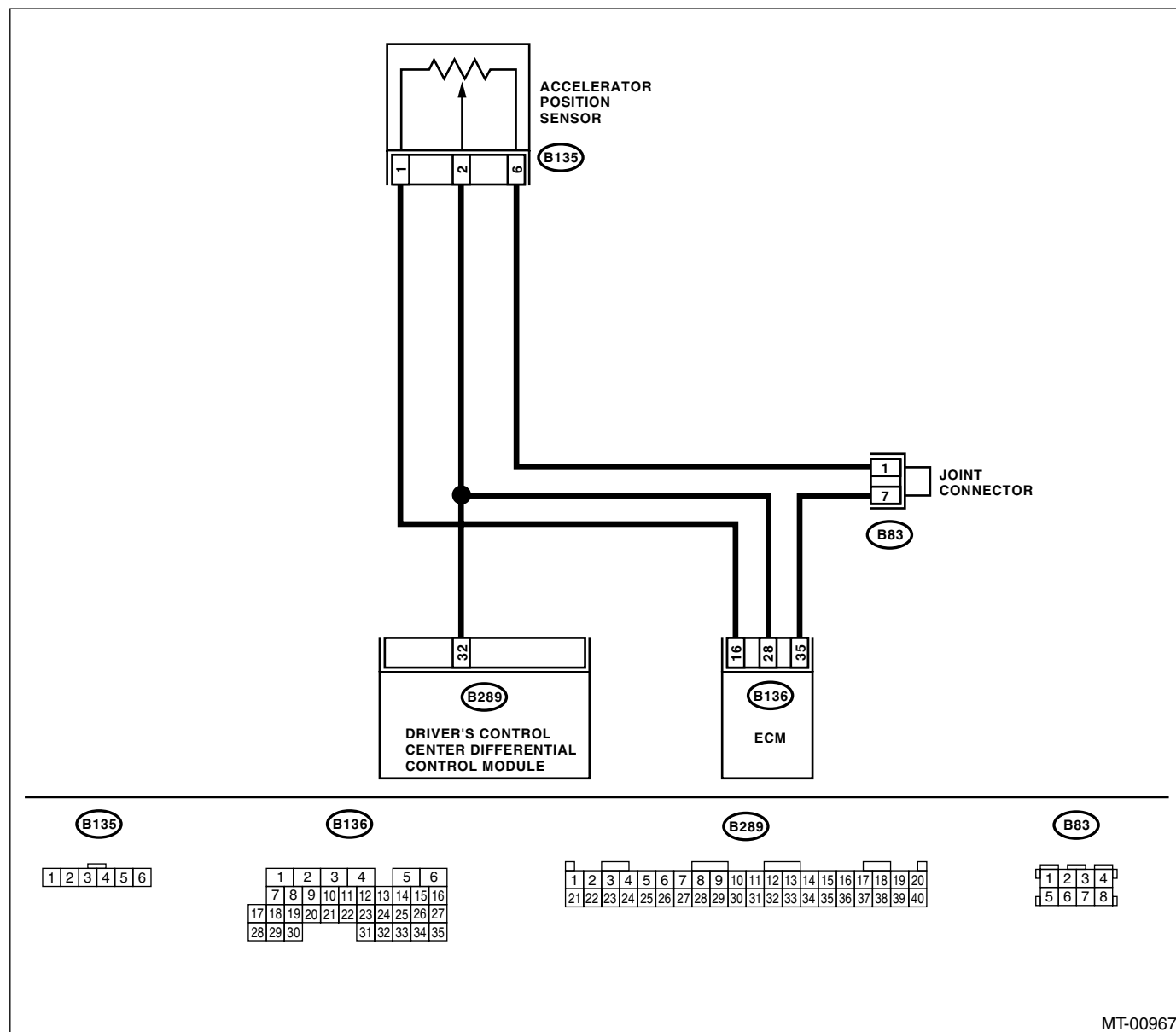
DIAGNOSIS:

The accelerator position sensor input signal circuit is open or shorted.

TROUBLE SYMPTOM:

- Tight corner braking condition occurs.
- Handling tends to oversteer.

WIRING DIAGRAM:



MT-00967

Step	Check	Yes	No
1 CHECK DTC.	Is the DTC displayed on engine self diagnosis test mode?	Check with referring to DTC section of engine. <Ref. to EN(H4DOTC)-71, LIST, List of Diagnostic Trouble Code (DTC).>	Go to step 2.

DIAGNOSTIC PROCEDURE WITH DIAGNOSTIC TROUBLE CODE (DTC)

MANUAL TRANSMISSION AND DIFFERENTIAL (DIAGNOSTICS)

Step	Check	Yes	No
2 CHECK THE HARNESS BETWEEN DRIVER'S CONTROL CENTER DIFFERENTIAL CONTROL MODULE AND ACCELERATOR POSITION SENSOR. 1) Turn the ignition switch to OFF. 2) Disconnect the harness connector of driver's control center differential control module and accelerator position sensor. 3) Measure the resistance of harness between driver's control center differential control module harness connector and accelerator position sensor. Connector & terminal (B289) No. 32 — (B135) No. 2:	Is the resistance less than 1 Ω ?	Go to step 3.	Repair the open circuit of harness between driver's control center differential control module and accelerator position sensor.
3 CHECK THE HARNESS BETWEEN DRIVER'S CONTROL CENTER DIFFERENTIAL CONTROL MODULE AND ECM. 1) Disconnect the harness connector of ECM. 2) Measure the resistance of harness between driver's control center differential control module harness connector and ECM harness connector. Connector & terminal (B289) No. 32 — (B136) No. 28:	Is the resistance less than 1 Ω ?	Go to step 4.	Repair the open circuit of harness between driver's control center differential control module and ECM.
4 CHECK THE HARNESS BETWEEN DRIVER'S CONTROL CENTER DIFFERENTIAL CONTROL MODULE AND ACCELERATOR POSITION SENSOR. Measure the resistance of harness between driver's control center differential control module harness connector and chassis ground. Connector & terminal (B289) No. 32 — Chassis ground:	Is the resistance more than 1 M Ω ?	Go to step 5.	Repair the short circuit of harness between driver's control center differential control module and accelerator position sensor and ECM.
5 CHECK INPUT SIGNAL OF DRIVER'S CONTROL CENTER DIFFERENTIAL CONTROL MODULE. 1) Connect the connectors to driver's control center differential control module and accelerator position sensor. 2) Turn the ignition switch to ON (engine OFF). 3) Release the accelerator pedal. 4) Measure the voltage between driver's control center differential control module harness connector and chassis ground. Connector & terminal (B289) No. 32 (+) — Chassis ground (-):	Is the voltage 0.3 — 1.8 V?	Go to step 6.	Go to step 7.
6 CHECK INPUT SIGNAL OF DRIVER'S CONTROL CENTER DIFFERENTIAL CONTROL MODULE. 1) Fully depress the accelerator pedal. 2) Measure the voltage between driver's control center differential control module harness connector and chassis ground. Connector & terminal (B289) No. 32 (+) — Chassis ground (-):	Is the voltage 2.8 — 4.7 V?	Go to step 8.	Go to step 7.
7 CHECK THE POOR CONTACT.	Is there any poor contact in accelerator position sensor circuit?	Repair the poor contact.	Replace the driver's control center differential control module.

DIAGNOSTIC PROCEDURE WITH DIAGNOSTIC TROUBLE CODE (DTC)

MANUAL TRANSMISSION AND DIFFERENTIAL (DIAGNOSTICS)

Step		Check	Yes	No
8	CHECK THE POOR CONTACT.	Is there any poor contact in accelerator position sensor circuit?	Repair the poor contact.	Check the ECM.

DIAGNOSTIC PROCEDURE WITH DIAGNOSTIC TROUBLE CODE (DTC)

MANUAL TRANSMISSION AND DIFFERENTIAL (DIAGNOSTICS)

H: DTC 22 LATERAL G SENSOR

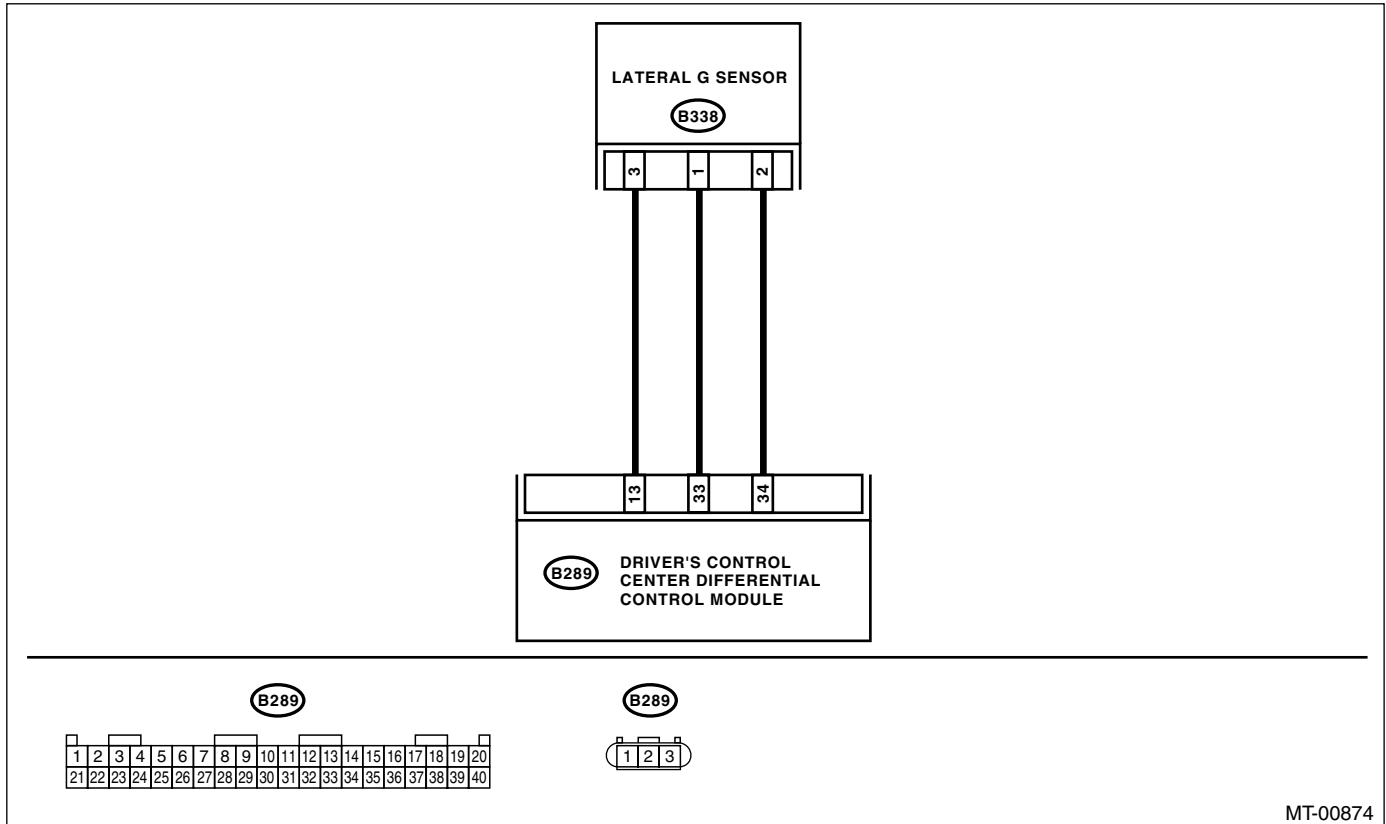
DIAGNOSIS:

The lateral G sensor input signal circuit is open or shorted.

TROUBLE SYMPTOM:

Handling tends to understeer at high speed cornering.

WIRING DIAGRAM:



Step	Check	Yes	No
1 CHECK HARNESS BETWEEN DRIVER'S CONTROL CENTER DIFFERENTIAL CONTROL MODULE CONNECTOR AND LATERAL G SENSOR CONNECTOR. 1)Turn the ignition switch to OFF. 2)Disconnect the connector from driver's control center differential control module and lateral G sensor. 3)Measure the resistance of harness between driver's control center differential control module connector and lateral G sensor connector. Connector & terminal (B289) No. 33 — (B338) No. 1: (B289) No. 34 — (B338) No. 2: (B289) No. 13 — (B338) No. 3:	Is the resistance less than 1 Ω?	Go to step 2.	Repair the open harness between driver's control center differential control module connector and lateral G sensor connector.

DIAGNOSTIC PROCEDURE WITH DIAGNOSTIC TROUBLE CODE (DTC)

MANUAL TRANSMISSION AND DIFFERENTIAL (DIAGNOSTICS)

Step	Check	Yes	No
2 CHECK THE HARNESS BETWEEN DRIVER'S CONTROL CENTER DIFFERENTIAL CONTROL MODULE CONNECTOR AND LATERAL G SENSOR CONNECTOR. Measure the resistance between driver's control center differential control module harness connector and chassis ground. Connector & terminal (B289) No. 33 — Chassis ground: (B289) No. 34 — Chassis ground: (B289) No. 13 — Chassis ground:	Is the resistance more than 1 MΩ?	Go to step 3.	Repair the short of harness between driver's control center differential control module connector and lateral G sensor connector.
3 CHECK THE LATERAL G SENSOR. 1)Remove the lateral G sensor from body. 2)Connect the connector to lateral G sensor. 3)Connect the connector to driver's control center differential control module. 4)Turn the ignition switch to ON. 5)Measure the voltage between lateral G sensor terminals when the lateral G sensor is horizontal. Connector & terminal (B338) No. 1 (+) — No. 2 (-):	Is the voltage 2.3 — 2.7 V?	Go to step 4.	Replace the lateral G sensor.
4 CHECK THE G SENSOR. Measure the voltage between lateral G sensor terminals when the lateral G sensor connector is tilted 90° to right. Connector & terminal (B338) No. 1 (+) — No. 2 (-):	Is the voltage 3.5 — 4.1 V?	Go to step 5.	Replace the lateral G sensor.
5 CHECK THE G SENSOR. Measure the voltage between lateral G sensor terminals when lateral G sensor connector is tilted 90° to left. Connector & terminal (B338) No. 1 (+) — No. 2 (-):	Is the voltage 0.8 — 1.5 V?	Go to step 6.	Replace the lateral G sensor.
6 CHECK THE POOR CONTACT OF CONNECTOR.	Is there any poor contact in connector between driver's control center differential control module and lateral G sensor.	Repair the poor contact.	Replace the driver's control center differential control module.

DIAGNOSTIC PROCEDURE WITH DIAGNOSTIC TROUBLE CODE (DTC)

MANUAL TRANSMISSION AND DIFFERENTIAL (DIAGNOSTICS)

I: DTC 23 CHECK CENTER DIFFERENTIAL.

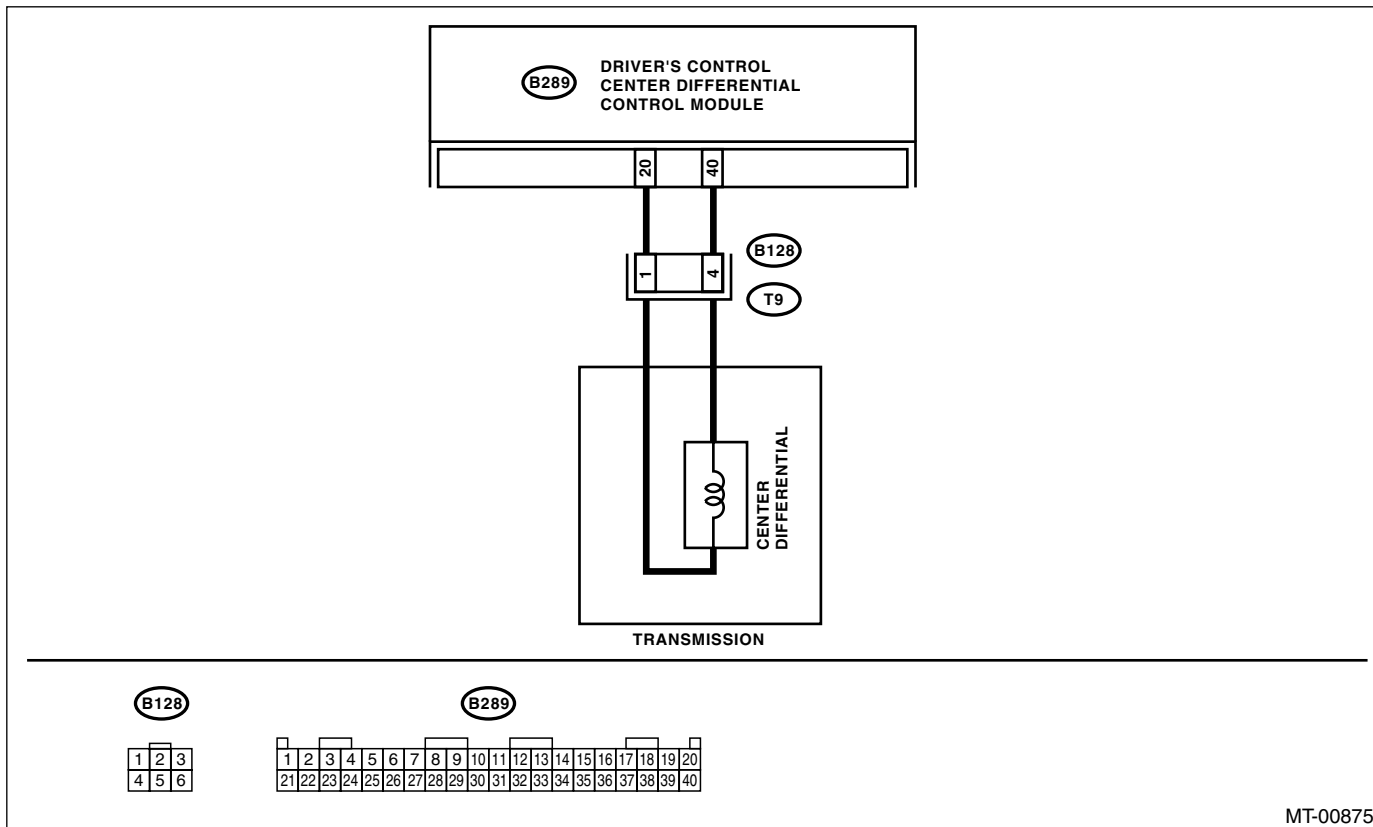
DIAGNOSIS:

Output signal circuit of center differential is open or shorted.

TROUBLE SYMPTOM:

- Center differential does not operate.
- Lock ratio of center differential does not operate, or malfunction occurs.
- Tight corner braking condition occurs.
- Handling tends to oversteer.

WIRING DIAGRAM:



MT-00875

Step	Check	Yes	No
1 CHECK THE HARNESS BETWEEN DRIVER'S CONTROL CENTER DIFFERENTIAL CONTROL MODULE AND TRANSMISSION HARNESS. 1) Turn the ignition switch to OFF. 2) Disconnect the harness connector of driver's control center differential control module. 3) Disconnect the transmission harness connector and bulk harness connector. 4) Measure the resistance of harness between driver's control center differential control module harness connector and transmission harness connector. Connector & terminal (B289) No. 20 — (B128) No. 1: (B289) No. 40 — (B128) No. 4:	Is the resistance less than 1 Ω?	Go to step 2.	Repair the open circuit of bulk harness between driver's control center differential control module and transmission harness.

DIAGNOSTIC PROCEDURE WITH DIAGNOSTIC TROUBLE CODE (DTC)

MANUAL TRANSMISSION AND DIFFERENTIAL (DIAGNOSTICS)

Step	Check	Yes	No
2 CHECK THE HARNESS BETWEEN DRIVER'S CONTROL CENTER DIFFERENTIAL CONTROL MODULE AND TRANSMISSION HARNESS. Measure the resistance between driver's control center differential control module harness connector and chassis ground. Connector & terminal (B289) No. 20 — Chassis ground: (B289) No. 40 — Chassis ground:	Is the resistance more than 1 MΩ?	Go to step 3.	Repair the short circuit of bulk harness between driver's control center differential control module and transmission harness.
3 CHECK THE CENTER DIFFERENTIAL. Measure the resistance between transmission harness connector terminals. Connector & terminal (T9) No. 1 — No. 4:	Is the resistance 1.0 — 2.0 Ω?	Go to step 4.	Replace the center differential.
4 CHECK THE OUTPUT SIGNAL OF DRIVER'S CONTROL CENTER DIFFERENTIAL CONTROL MODULE. 1)Connect all the harness connectors. 2)Turn the ignition switch to ON. (engine OFF) 3)Release the parking brake. 4)Set the center differential control dial to differential lock. 5)Measure the voltage between driver's control center differential control module and harness connector. Connector & terminal (B289) No. 20 (+) — (B289) No. 40 (-):	Is the voltage 6.0 — 7.0 V?	Go to step 5.	Check the power supply circuit. <Ref. to 6MT-18, DTC CANNOT BE CALLED UP, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
5 CHECK THE OUTPUT SIGNAL OF DRIVER'S CONTROL CENTER DIFFERENTIAL CONTROL MODULE. 1)Turn the center differential control dial from differential lock to differential free position. 2)Measure the voltage between driver's control center differential control module and harness connector. Connector & terminal (B289) No. 20 (+) — (B289) No. 40 (-):	Does the voltage change smoothly?	Circuit is already returned to normal condition this time though the indicator light illuminates. A temporary poor connector or harness may be the case. Repair the poor contact in connector or harness of driver's control center differential control module and transmission harness. Check the poor contact in power supply circuit, too.	Repair the power supply circuit. <Ref. to 6MT-18, DTC CANNOT BE CALLED UP, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

DIAGNOSTIC PROCEDURE WITH DIAGNOSTIC TROUBLE CODE (DTC)

MANUAL TRANSMISSION AND DIFFERENTIAL (DIAGNOSTICS)

J: DTC 24 CHECK CENTER DIFFERENTIAL CONTROL DIAL.

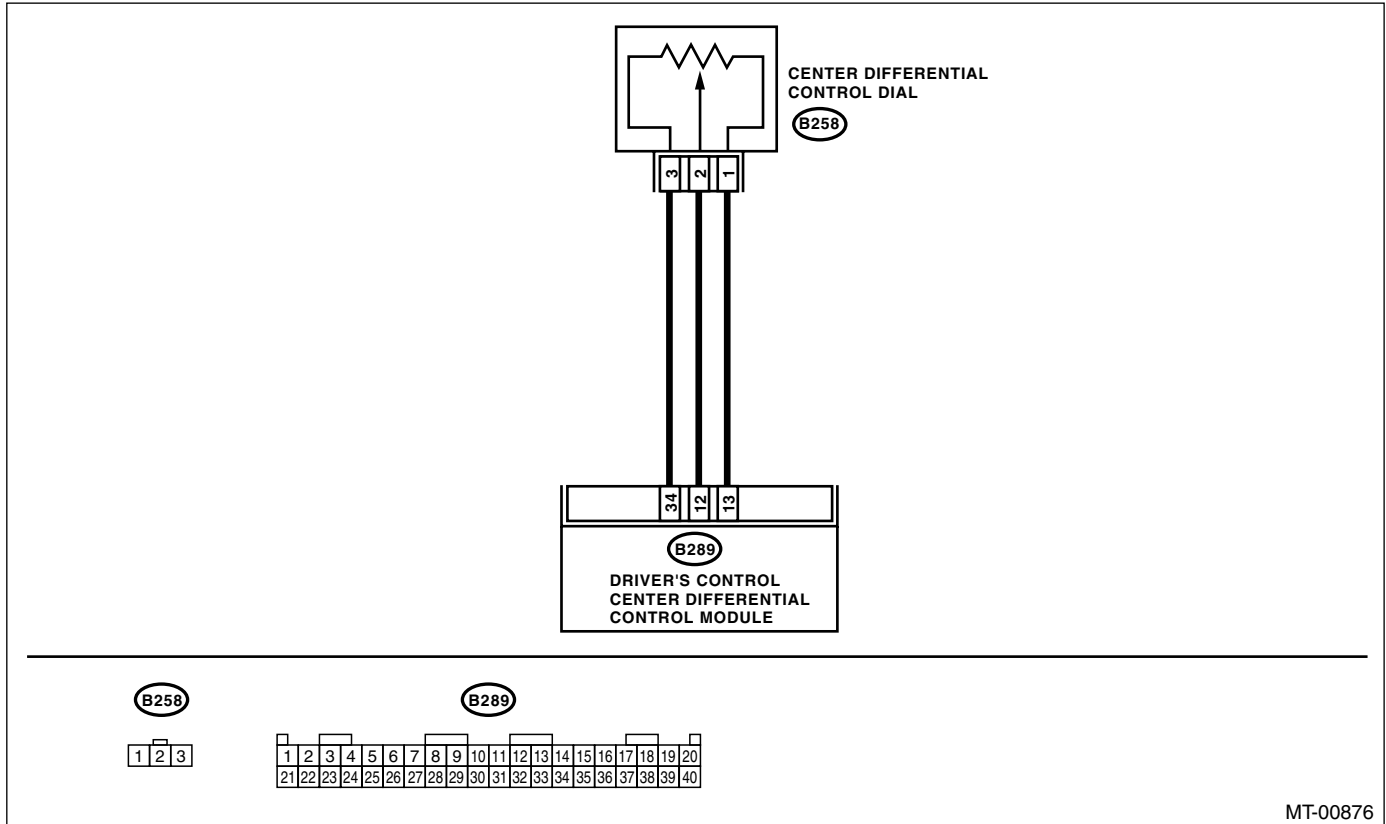
DIAGNOSIS:

Input signal circuit of center differential control dial is open or shorted.

TROUBLE SYMPTOM:

- Indicator light does not operate though setting the center differential control dial.
- Torque characteristics do not change.

WIRING DIAGRAM:



MT-00876

	Step	Check	Yes	No
1	CHECK THE HARNESS BETWEEN DRIVER'S CONTROL CENTER DIFFERENTIAL CONTROL MODULE AND CENTER DIFFERENTIAL CONTROL DIAL. 1)Turn the ignition switch to OFF. 2)Disconnect the connector of driver's control center differential control module and center differential control dial. 3)Measure the resistance of harness between driver's control center differential control module and center differential control dial harness connector. Connector & terminal (B258) No. 1 — (B289) No. 13: (B258) No. 2 — (B289) No. 12: (B258) No. 3 — (B289) No. 34:	Is the resistance less than 1 Ω?	Go to step 2.	Repair the open circuit between driver's control center differential control module and center differential control dial.

DIAGNOSTIC PROCEDURE WITH DIAGNOSTIC TROUBLE CODE (DTC)

MANUAL TRANSMISSION AND DIFFERENTIAL (DIAGNOSTICS)

Step		Check	Yes	No
2	CHECK THE HARNESS BETWEEN DRIVER'S CONTROL CENTER DIFFERENTIAL CONTROL MODULE AND CENTER DIFFERENTIAL CONTROL DIAL. Measure the resistance between driver's control center differential control module harness connector and chassis ground. Connector & terminal (B289) No. 13 — Chassis ground: (B289) No. 12 — Chassis ground: (B289) No. 34 — Chassis ground:	Is the resistance more than 1 MΩ?	Go to step 3.	Repair the short circuit between driver's control center differential control module and center differential control dial.
3	CHECK THE CENTER DIFFERENTIAL CONTROL DIAL. 1) Remove the center differential control dial. 2) Measure the resistance between center differential control dial connectors. Terminals No. 1 — No. 3:	Is the resistance 7.5 — 12.5 kΩ?	Go to step 4.	Replace the driver's control dial.
4	CHECK THE CENTER DIFFERENTIAL CONTROL DIAL. Measure the resistance between center differential control dial connectors. Terminals No. 1 — No. 2:	Does the resistance change smoothly when setting the dial from differential lock to differential free?	Go to step 5.	Replace the center differential control dial.
5	CHECK THE OUTPUT POWER SUPPLY OF DRIVER'S CONTROL CENTER DIFFERENTIAL CONTROL MODULE. 1) Connect all the harness connectors. 2) Turn the ignition switch to ON. (engine OFF) 3) Set the manual mode switch to manual mode. 4) Measure the voltage between driver's control center differential control module harness connector and chassis ground. Connector & terminal (B289) No. 13 (+) — (B289) No. 34 (-):	Is the voltage approx. 5 V?	Go to step 6.	Replace the driver's control center differential control module.
6	CHECK POOR CONTACT IN HARNESS CONNECTORS.	Is there any poor contact in harness connector of center differential control dial circuit?	Repair the poor contact of harness connector.	Replace the driver's control center differential control module.

DIAGNOSTIC PROCEDURE WITH DIAGNOSTIC TROUBLE CODE (DTC)

MANUAL TRANSMISSION AND DIFFERENTIAL (DIAGNOSTICS)

K: DTC 31 MANUAL MODE SWITCH

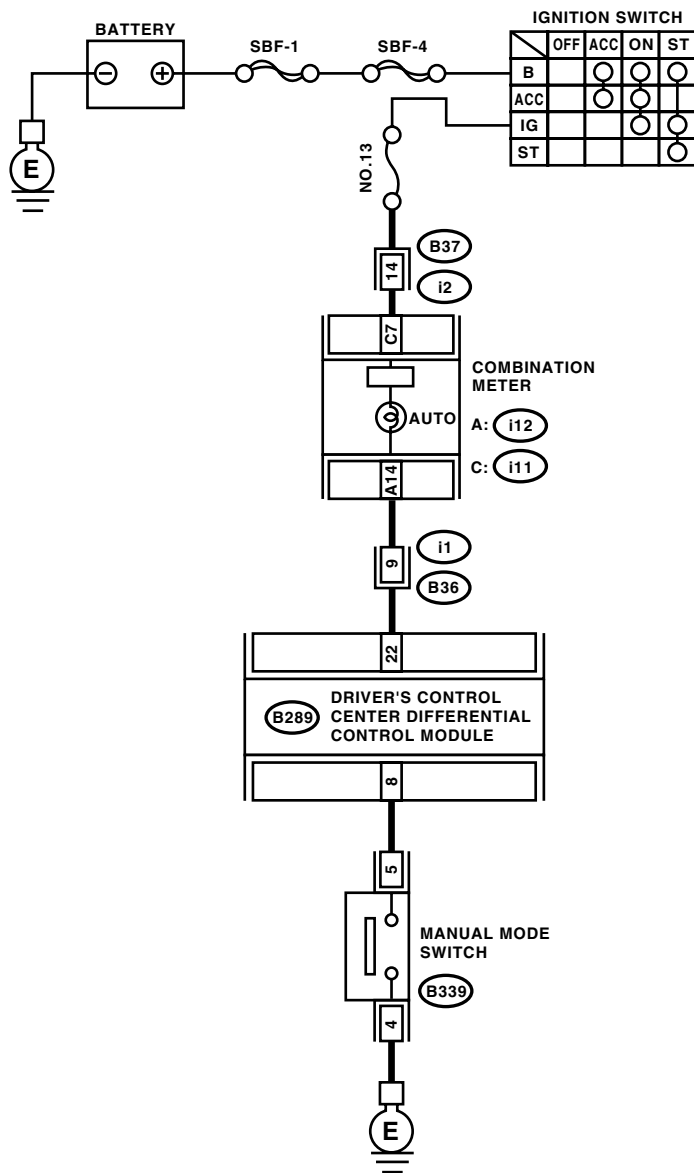
DIAGNOSIS:

Input signal circuit of manual mode switch circuit is open or shorted.

TROUBLE SYMPTOM:

- Driver's control center differential can not be manual mode. Or can not be auto mode.
- AUTO indicator does not illuminate, or does not go off.

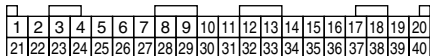
WIRING DIAGRAM:



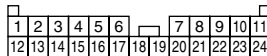
B339



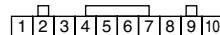
B289



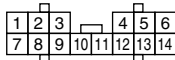
i1



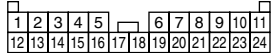
c: i11



A: i12



i2



MT-00968

DIAGNOSTIC PROCEDURE WITH DIAGNOSTIC TROUBLE CODE (DTC)

MANUAL TRANSMISSION AND DIFFERENTIAL (DIAGNOSTICS)

Step		Check	Yes	No
1	CHECK OPERATION OF MANUAL MODE SWITCH. Set the manual mode switch to auto mode.	Does the AUTO indicator light in combination meter illuminate?	Go to step 8.	Go to step 2.
2	CHECK AUTO INDICATOR LIGHT. 1) Turn the ignition switch to OFF. 2) Disconnect the harness connector of driver's control center differential control module. 3) Turn the ignition switch to ON. (Engine OFF) 4) Short between the driver's control center differential control module and chassis ground. Connector & terminal (B289) No. 22 — Chassis ground:	Does the AUTO indicator light in combination meter illuminate?	Go to step 8.	Go to step 3.
3	CHECK POWER SUPPLY OF COMBINATION METER. 1) Turn the ignition switch to OFF. 2) Disconnect the harness connector of combination meter. 3) Turn the ignition switch to ON. (Engine OFF) 4) Measure the voltage between combination meter harness connector and chassis ground. Connector & terminal (i11) No. 7 (+) — Chassis ground (-):	Is the voltage more than 10 V?	Go to step 4.	Check and repair the open and short of harness between battery and combination meter, and poor contact of harness connector.
4	CHECK THE HARNESS BETWEEN COMBINATION METER AND DRIVER'S CONTROL CENTER DIFFERENTIAL CONTROL MODULE. 1) Turn the ignition switch to OFF. 2) Disconnect the harness connector of combination meter. 3) Measure the resistance between combination meter harness connector and driver's control center differential control module harness connector. Connector & terminal (i12) No. 14 — (B289) No. 22:	Is the resistance less than 1 Ω ?	Go to step 5.	Repair the open circuit of harness between combination meter harness connector and driver's control center differential control module harness connector, and poor contact of harness connector.
5	CHECK THE HARNESS BETWEEN COMBINATION METER AND DRIVER'S CONTROL CENTER DIFFERENTIAL CONTROL MODULE. Measure the resistance between driver's control center differential control module harness connector and chassis ground. Connector & terminal (B289) No. 22 — Chassis ground:	Is the resistance more than 1 M Ω ?	Go to step 6.	Repair the short circuit of harness between combination meter harness connector and driver's control center differential control module harness connector.
6	CHECK HARNESS CONNECTOR POOR CONTACT.	Is there any poor contact in the circuit between combination meter and driver's control module?	Repair the poor contact.	Go to step 7.
7	CHECK AUTO INDICATOR LIGHT. 1) Connect the harness connector of combination meter. 2) Short between the driver's control center differential control module harness connector and chassis ground. Connector & terminal (B289) No. 22 — Chassis ground:	Does the AUTO indicator light light up?	Replace the driver's control center differential control module.	Replace the combination meter.

DIAGNOSTIC PROCEDURE WITH DIAGNOSTIC TROUBLE CODE (DTC)

MANUAL TRANSMISSION AND DIFFERENTIAL (DIAGNOSTICS)

Step		Check	Yes	No
8	CHECK GROUND CIRCUIT OF MANUAL MODE SWITCH. 1) Turn the ignition switch to OFF. 2) Disconnect the manual mode switch connector. 3) Measure the resistance between manual mode switch harness connector and chassis ground. Connector & terminal (B339) No. 4 — Chassis ground:	Is the resistance more than 1 MΩ?	Repair the open circuit of harness between manual mode switch harness connector and chassis ground.	Go to step 9.
9	CHECK THE HARNESS BETWEEN DRIVER'S CONTROL CENTER DIFFERENTIAL CONTROL MODULE AND MANUAL MODE SWITCH. 1) Disconnect the driver's control center differential control module harness connector. 2) Measure the resistance of harness between driver's control center differential control module and manual mode switch. Connector & terminal (B289) No. 8 — (B339) No. 5:	Is the resistance less than 1 Ω?	Go to step 10.	Repair the open circuit of harness between driver's control center differential control module and manual mode switch.
10	CHECK THE HARNESS BETWEEN DRIVER'S CONTROL CENTER DIFFERENTIAL CONTROL MODULE AND MANUAL MODE SWITCH. Measure the resistance of harness between driver's control center differential control module and chassis ground. Connector & terminal (B289) No. 8 — Chassis ground:	Is the resistance more than 1 MΩ?	Go to step 11.	Repair the short circuit of harness between driver's control center differential control module and manual mode switch.
11	CHECK THE MANUAL MODE SWITCH. 1) Remove the manual mode switch. 2) Measure the resistance of between manual mode switch connectors. Terminals No. 4 — No. 5:	Is the resistance more than 1 MΩ?	Go to step 12.	Replace the manual mode switch.
12	CHECK THE MANUAL MODE SWITCH. 1) Keep depressing the manual mode switch. 2) Measure the resistance of between manual mode switch connectors. Terminals No. 4 — No. 5:	Is the resistance less than 1 Ω?	Go to step 13.	Replace the manual mode switch.
13	CHECK THE INPUT SIGNAL OF DRIVER'S CONTROL CENTER DIFFERENTIAL CONTROL MODULE. 1) Install the manual mode switch. 2) Connect the harness connector of driver's control center differential control module. 3) Turn the ignition switch to ON. (engine OFF) 4) Measure the voltage between driver's control center differential control module and chassis ground. Connector & terminal (B289) No. 8 (+) — Chassis ground (-):	Is the voltage more than 4.3 V?	Go to step 14.	Replace the driver's control center differential control module.

DIAGNOSTIC PROCEDURE WITH DIAGNOSTIC TROUBLE CODE (DTC)

MANUAL TRANSMISSION AND DIFFERENTIAL (DIAGNOSTICS)

Step	Check	Yes	No
14 CHECK THE INPUT SIGNAL OF DRIVER'S CONTROL CENTER DIFFERENTIAL CONTROL MODULE. 1)Keep depressing the manual mode switch. 2)Measure the voltage between driver's control center differential control module and chassis ground. Connector & terminal (B289) No. 8 (+) — Chassis ground (-):	Is the voltage less than 0.1 V?	Go to step 15.	Replace the driver's control center differential control module.
15 CHECK POOR CONTACT IN HARNESS CONNECTOR.	Is there any poor contact in manual mode switch circuit?	Repair the poor contact.	Replace the driver's control center differential control module.

DIAGNOSTIC PROCEDURE WITH DIAGNOSTIC TROUBLE CODE (DTC)

MANUAL TRANSMISSION AND DIFFERENTIAL (DIAGNOSTICS)

L: DTC 32 CHECK PARKING BRAKE SWITCH

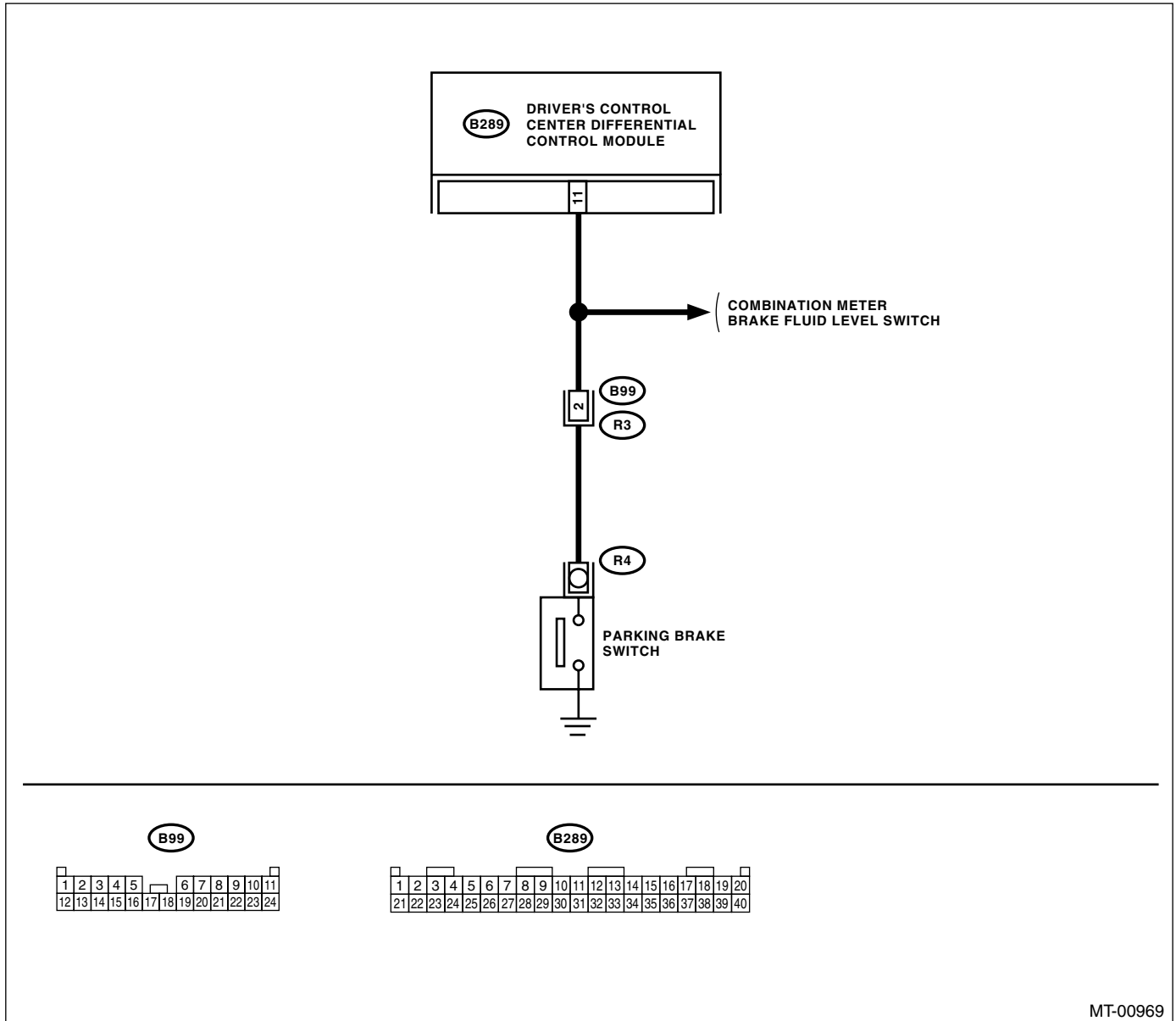
DIAGNOSIS:

Input signal circuit of parking brake switch is open or shorted.

TROUBLE SYMPTOM:

- Differential does not tend to be free though apply the parking brake.
- Differential stays free by releasing the parking brake.

WIRING DIAGRAM:



Step	Check	Yes	No
1 CHECK THE PARKING BRAKE SWITCH CIRCUIT. 1)Turn the ignition switch to ON. 2)Start the engine. 3)Apply the parking brake.	Does the parking brake warning light illuminate?	Go to step 2.	Check the parking pilot & brake fluid warning light circuit.
2 CHECK THE PARKING BRAKE SWITCH CIRCUIT. Release the parking brake.	Does the parking brake warning light turn OFF?	Go to step 3.	Check the brake fluid level and ABS circuit.

DIAGNOSTIC PROCEDURE WITH DIAGNOSTIC TROUBLE CODE (DTC)

MANUAL TRANSMISSION AND DIFFERENTIAL (DIAGNOSTICS)

Step		Check	Yes	No
3	CHECK THE HARNESS BETWEEN DRIVER'S CONTROL CENTER DIFFERENTIAL CONTROL MODULE AND PARKING BRAKE SWITCH. 1) Turn the ignition switch to OFF. 2) Disconnect the harness connector of driver's control center differential control module and parking brake switch. 3) Measure the resistance of harness between driver's control center differential control module and parking brake switch. Connector & terminal (B289) No. 11 — (R4) No. 1:	Is the resistance less than 1 Ω ?	Go to step 4.	Repair the open circuit of harness and poor contact of connector.
4	CHECK THE HARNESS BETWEEN DRIVER'S CONTROL CENTER DIFFERENTIAL CONTROL MODULE AND PARKING BRAKE SWITCH. Measure the resistance between driver's control center differential control module harness connector and chassis ground. Connector & terminal (B289) No. 11 — Chassis ground:	Is the resistance more than 1 M Ω ?	Go to step 5.	Repair the short circuit of harness.
5	CHECK THE INPUT SIGNAL OF DRIVER'S CONTROL CENTER DIFFERENTIAL CONTROL MODULE. 1) Connect all the harness connectors. 2) Disconnect the harness connector of combination meter. 3) Turn the ignition switch to ON. 4) Release the parking brake. 5) Measure the voltage between driver's control center differential control module harness connector and chassis ground. Connector & terminal (B289) No. 11 (+) — Chassis ground (-):	Is the voltage more than 8 V?	Go to step 6.	Replace the driver's control center differential control module.
6	CHECK THE INPUT SIGNAL OF DRIVER'S CONTROL CENTER DIFFERENTIAL CONTROL MODULE. 1) Apply the parking brake. 2) Measure the voltage between driver's control center differential control module harness connector and chassis ground. Connector & terminal (B289) No. 11 (+) — Chassis ground (-):	Is the voltage less than 0.4 V?	Go to step 7.	Replace the driver's control center differential control module.
7	CHECK POOR CONTACT IN HARNESS CONNECTOR.	Is there any poor contact in harness connector of parking brake circuit?	Repair the poor contact of harness connector.	Replace the driver's control center differential control module.

DIAGNOSTIC PROCEDURE WITH DIAGNOSTIC TROUBLE CODE (DTC)

MANUAL TRANSMISSION AND DIFFERENTIAL (DIAGNOSTICS)

M: DTC 33 STOP LIGHT SWITCH

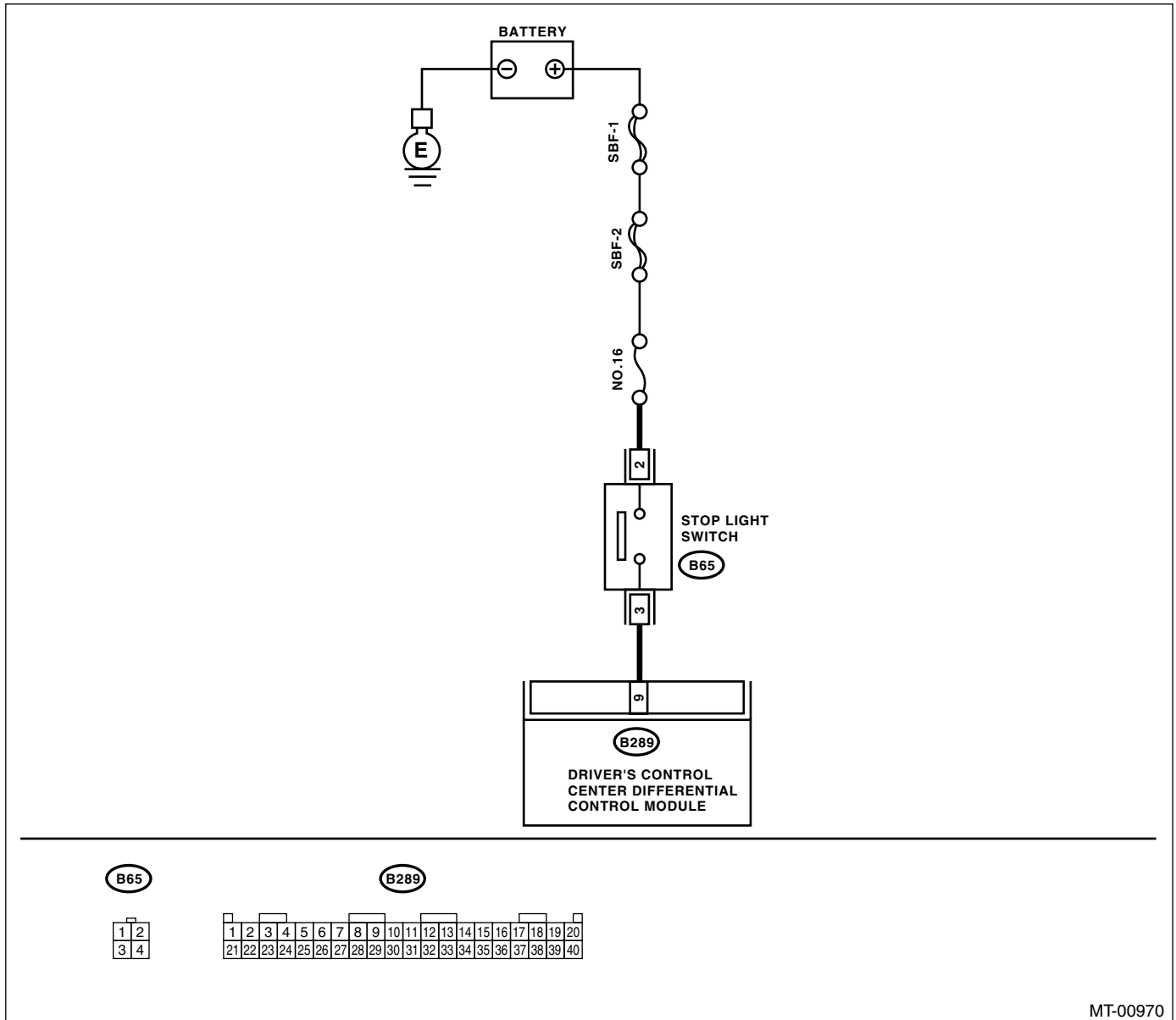
DIAGNOSIS:

Open or short circuit in stop light switch circuit.

TROUBLE SYMPTOM:

Wheels are locked while the ABS operates.

WIRING DIAGRAM:



Step	Check	Yes	No	
1	CHECK DTC.	Is the stop light switch related DTC displayed during ABS self-diagnosis test mode?	Check according to ABS DTC.	Go to step 2.

DIAGNOSTIC PROCEDURE WITH DIAGNOSTIC TROUBLE CODE (DTC)

MANUAL TRANSMISSION AND DIFFERENTIAL (DIAGNOSTICS)

Step	Check	Yes	No
2 CHECK INPUT SIGNAL OF STOP LIGHT SWITCH AND DRIVER'S CONTROL CENTER DIFFERENTIAL CONTROL MODULE. 1) Turn the ignition switch to OFF. 2) Disconnect the connector of driver's control center differential control module. 3) Set the brake pedal depressed. 4) Measure the voltage between driver's control center differential control module and chassis ground. Connector & terminal (B289) No. 9 (+) — Chassis ground (-):	Is the voltage more than 8 V?	Go to step 3.	Repair the open or short circuit of harness between driver's control center differential control module and stop light switch.
3 CHECK POOR CONTACT.	Is there any poor contact?	Repair the poor contact.	Replace the driver's control center differential control module.

DIAGNOSTIC PROCEDURE WITH DIAGNOSTIC TROUBLE CODE (DTC)

MANUAL TRANSMISSION AND DIFFERENTIAL (DIAGNOSTICS)

N: DTC 34 ABS SWITCH SIGNAL

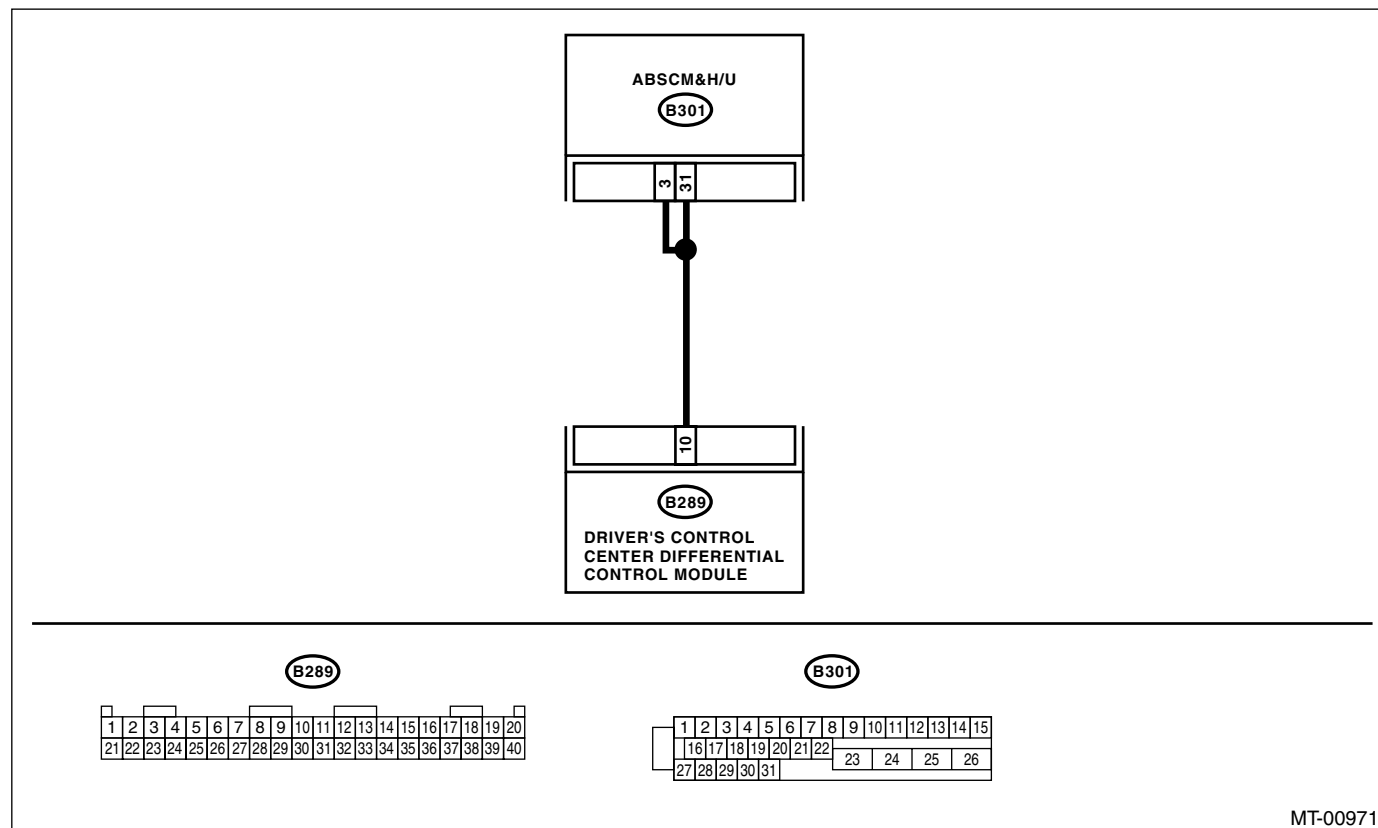
DIAGNOSIS:

Open or short in combination signal circuit of driver's control center differential control.

TROUBLE SYMPTOM:

- ABS warning light illuminates.
- Wheels are locked while the ABS operates.

WIRING DIAGRAM:



MT-00971

Step	Check	Yes	No
1 CHECK DTC.	Is DTC code displayed during ABS self-diagnosis test mode?	Check according to ABS DTC.	Go to step 2.
2 CHECK HARNESS BETWEEN DRIVER'S CONTROL CENTER DIFFERENTIAL CONTROL MODULE AND ABSCM&H/U. 1)Turn the ignition switch to OFF. 2)Disconnect the harness connector of driver's control center differential control module and ABSCM&H/U. 3)Measure the resistance of harness between driver's control center differential control module and ABSCM&H/U harness connector. Connector & terminal (B289) No. 10 — (B301) No. 31: (B289) No. 10 — (B301) No. 3:	Is the resistance less than 1 Ω?	Go to step 3.	Repair the open circuit of harness connector between driver's control center differential control module and ABSCM&H/U, and poor contact of harness connector.
3 CHECK HARNESS BETWEEN DRIVER'S CONTROL CENTER DIFFERENTIAL CONTROL MODULE AND ABSCM&H/U. Measure the resistance between driver's control center differential control module and chassis ground. Connector & terminal (B289) No. 10 — Chassis ground:	Is the resistance more than 1 MΩ?	Go to step 4.	Repair the short of harness between driver's control center differential control module and ABSCM&H/U.

DIAGNOSTIC PROCEDURE WITH DIAGNOSTIC TROUBLE CODE (DTC)

MANUAL TRANSMISSION AND DIFFERENTIAL (DIAGNOSTICS)

Step	Check	Yes	No
4 CHECK THE DRIVER'S CONTROL CENTER DIFFERENTIAL CONTROL MODULE. 1)Connect driver's control center differential control module connector. 2)Turn the ignition switch to ON. 3)Measure the voltage between driver's control center differential control module harness connector and chassis ground. Connector & terminal (B289) No. 10 (+) — Chassis ground (-):	Is the voltage more than 8 V?	Go to step 5.	Replace the driver's control center differential control module.
5 CHECK POOR CONTACT IN HARNESS CONNECTOR.	Is there any poor contact in combination circuit of driver's control center differential control?	Repair the poor contact.	Check the ABSCM&H/U.

GENERAL DIAGNOSTIC TABLE

MANUAL TRANSMISSION AND DIFFERENTIAL (DIAGNOSTICS)

12.General Diagnostic Table

A: INSPECTION

Symptom	Abnormal units/parts
Tight cornering condition	• ABSCM&H/U • ABS wheel speed sensor • Accelerator position sensor • ECM • Center differential • Center differential control dial • Manual mode switch • Tire/Wheel • Driver's control center differential control module
Tendency to oversteer	• Accelerator position sensor • ECM • Center differential control dial • Manual mode switch • Tire/Wheel • Driver's control center differential control module • Center differential • Driver's control center differential relay • Rear differential oil temperature switch
Tendency to understeer at high speed cornering	• Lateral G sensor • Center differential
No change in the center differential torque character	• Center differential control dial • Driver's control center differential relay • Center differential • Driver's control center differential control module
Driver's control center differential indicator does not operate	• Combination meter • Driver's control center differential control module
Driver's control center differential indicator does not operate though setting the center differential control dial	• Center differential control dial • Combination meter • Driver's control center differential control module
No change to AUTO or MANUAL	• Manual mode switch • Combination meter • Driver's control center differential control module
AUTO indicator light does not illuminate	• Manual mode switch • Combination meter • Driver's control center differential control module
Differential does not become free, or stays free	• Parking brake switch • Center differential • Manual mode switch • Center differential control dial • Rear differential • Tire/Wheel • Driver's control center differential relay • Rear differential oil temperature switch • Driver's control center differential control module

GENERAL DIAGNOSTIC TABLE

MANUAL TRANSMISSION AND DIFFERENTIAL (DIAGNOSTICS)

Symptom	Abnormal units/parts
Wheel lock at ABS operation	• ABSCM&H/U • Stop light switch • Driver's control center differential control module
Differential does not become lock, or stays lock	• ABSCM&H/U • ABS wheel speed sensor • Accelerator position sensor • ECM • Center differential • Center differential control dial • Manual mode switch • Tire/Wheel • Driver's control center differential control module • Driver's control center differential relay

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CLUTCH SYSTEM

GENERAL DESCRIPTION

CLUTCH SYSTEM

1. General Description

A: SPECIFICATIONS

Model			2.0 L TURBO	2.5 L
Clutch cover	Type		Pull type	
	Diaphragm set load kgf (lb)		800 (1,764)	
Clutch disc	Facing material		Woven (Non asbestos)	
	O.D. × I.D. × thickness	mm (in)	230 × 150 × 3.5 (9.06 × 5.91 × 0.138)	225 × 150 × 3.5 (8.86 × 5.91 × 0.138)
	Spline O.D.	mm (in)	25.2 (0.992), (No. of teeth: 24)	
Clutch release lever ratio			1.7	1.6
Release bearing			Grease-packed self-aligning	
Clutch pedal	Full stroke	mm (in)	130 — 135 (5.12 — 5.31)	
	Free play	mm (in)	4 — 11 (0.16 — 0.43)	
Release lever	Stroke	mm (in)	13.3 — 14.7 (0.524 — 0.579)	24 — 26 (0.94 — 1.02)
	Play at release lever center	mm (in)	—	3 — 4 (0.12 — 0.16)
Clutch disc	Depth of rivet head mm (in)	Standard	1.35 — 1.95 (0.053 — 0.076)	
		Limit of sinking	0.3 (0.012)	
	Limit for deflection	mm (in)	0.7 (0.028) at R = 110 (4.33)	

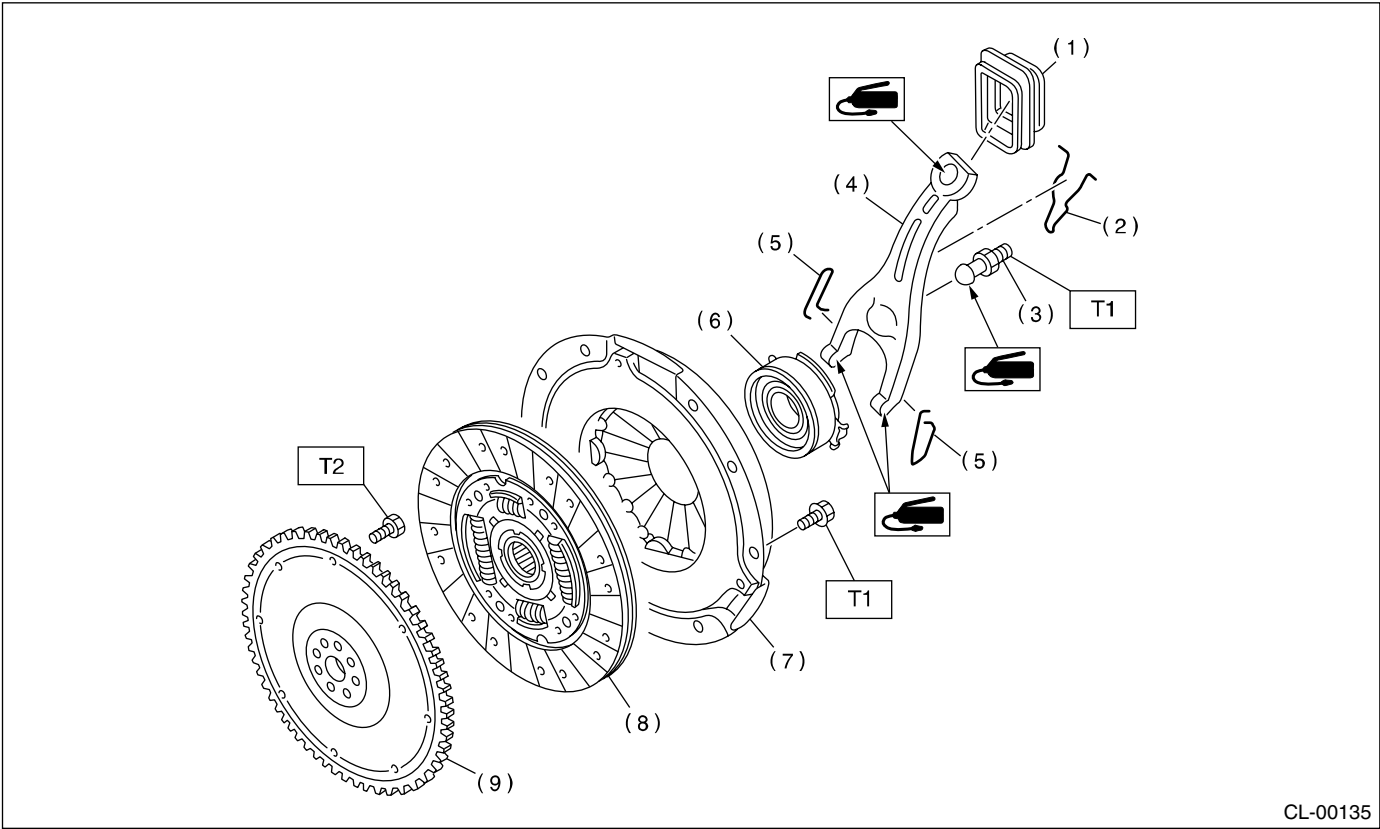
Model			2.5 L TURBO STi
Clutch cover	Type		Pull type
	Diaphragm set load kgf (lb)		930 (2,050)
Clutch disc	Facing material		Woven (Non asbestos)
	O.D. × I.D. × thickness	mm (in)	Flywheel side: 240 × 160 × 3.2 (9.45 × 6.30 × 0.126) Clutch cover side: 240 × 160 × 3.5 (9.45 × 6.30 × 0.138)
	Spline O.D.	mm (in)	25.2 (0.992), (No. of teeth: 24)
Clutch release lever ratio			1.7
Release bearing			Grease-packed self-aligning
Clutch pedal	Full stroke	mm (in)	130 — 135 (5.12 — 5.31)
	Free play	mm (in)	3 — 13 (0.12 — 0.51)
Release lever	Stroke	mm (in)	13.3 — 14.7 (0.524 — 0.579)
	Play at release lever center	mm (in)	—
Clutch disc	Depth of rivet head mm (in)	Standard	Flywheel side: 1.35 — 1.95 (0.053 — 0.077) Clutch cover side: 1.65 — 2.25 (0.065 — 0.089)
		Limit of sinking	0.3 (0.012)
	Limit for deflection	mm (in)	0.7 (0.028) at R = 115 (4.53)

I.D.: Inner diameter O.D.: Outer diameter

B: COMPONENT

1. CLUTCH ASSEMBLY

• NON-TURBO MODEL



(1) Clutch release lever sealing	(6) Clutch release bearing
(2) Retainer spring	(7) Clutch cover
(3) Pivot	(8) Clutch disc
(4) Clutch release lever	(9) Flywheel
(5) Clip	

Tightening torque: N·m (kgf-m, ft-lb)

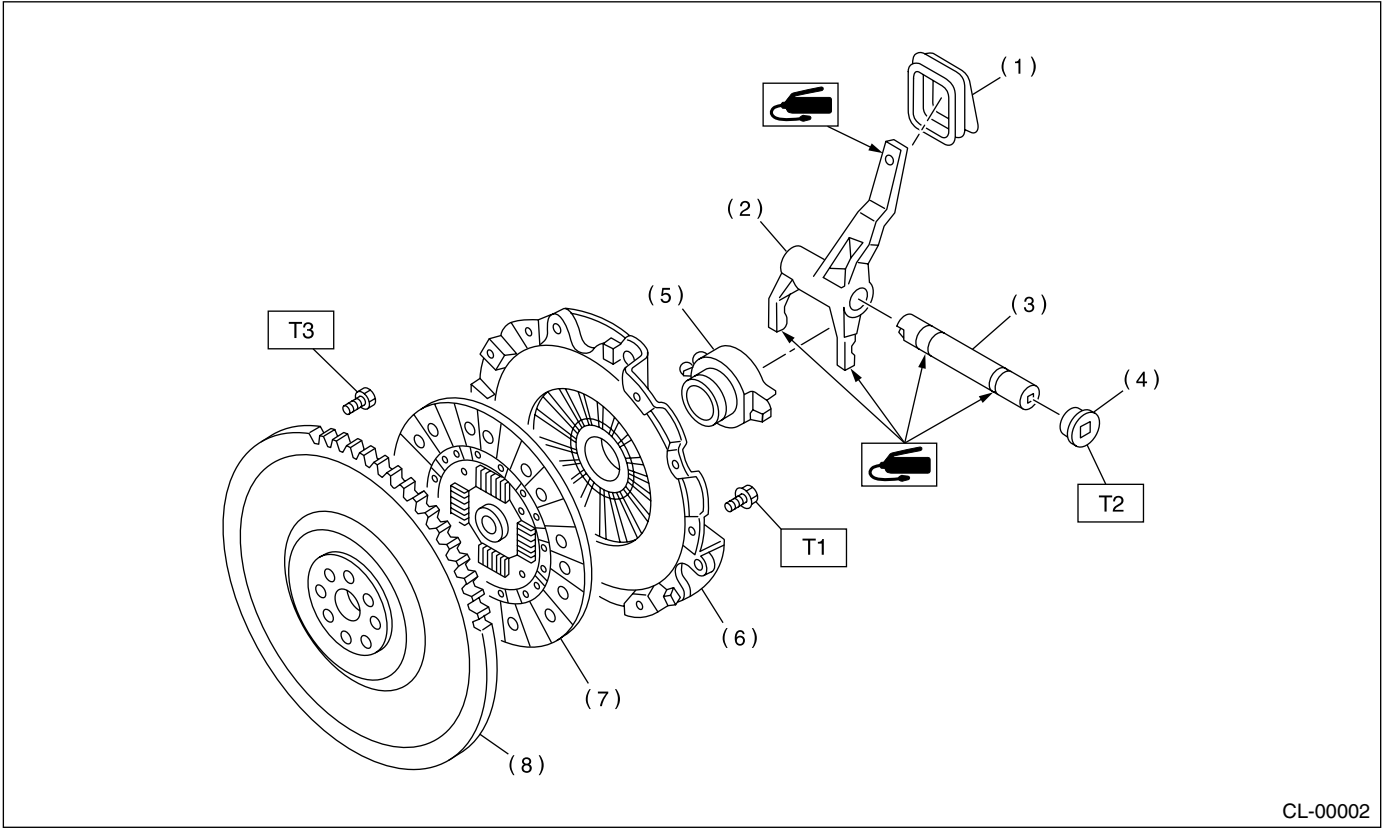
T1: 16 (1.6, 11.8)

T2: 72 (7.3, 52.8)

GENERAL DESCRIPTION

CLUTCH SYSTEM

• TURBO MODEL



(1) Clutch release lever sealing	(5) Clutch release bearing
(2) Clutch release lever	(6) Clutch cover
(3) Clutch release lever shaft	(7) Clutch disc
(4) Plug	(8) Flywheel

Tightening torque: N·m (kgf-m, ft-lb)

T1: 16 (1.6, 11.8)

T2: 44 (4.5, 32.5)

T3: Except STi model

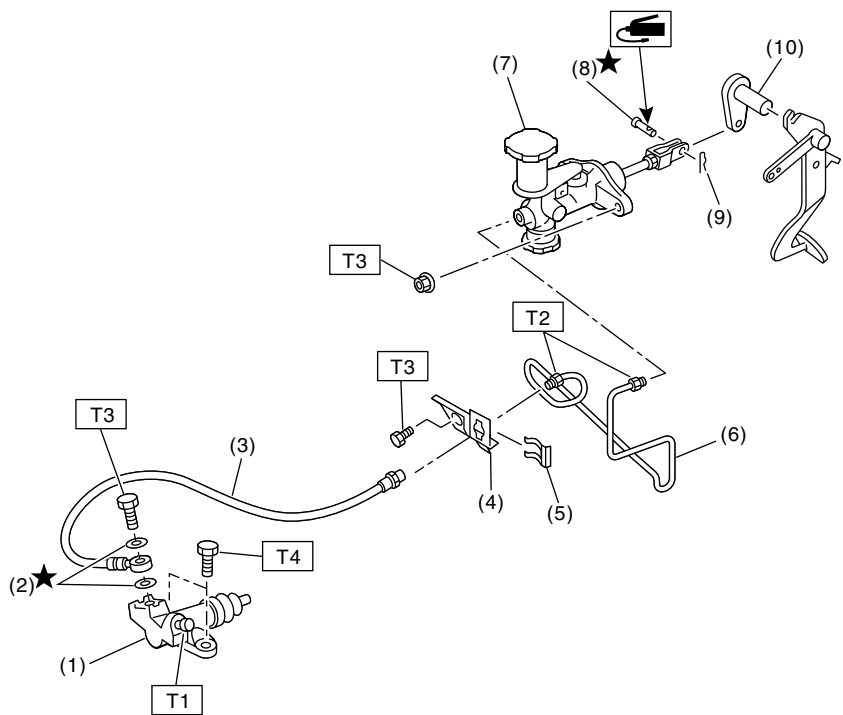
72 (7.3, 52.8)

STi model

75 (7.6, 55.3)

2. CLUTCH PIPE AND HOSE

• NON-TURBO MODEL



CL-00107

(1) Operating cylinder	(6) Pipe
(2) Washer	(7) Master cylinder ASSY
(3) Clutch hose	(8) Clevis pin
(4) Bracket	(9) Snap pin
(5) Clip	(10) Lever

Tightening torque: N·m (kgf-m, ft-lb)

T1: 8 (0.8, 5.8)

T2: 15 (1.5, 10.8)

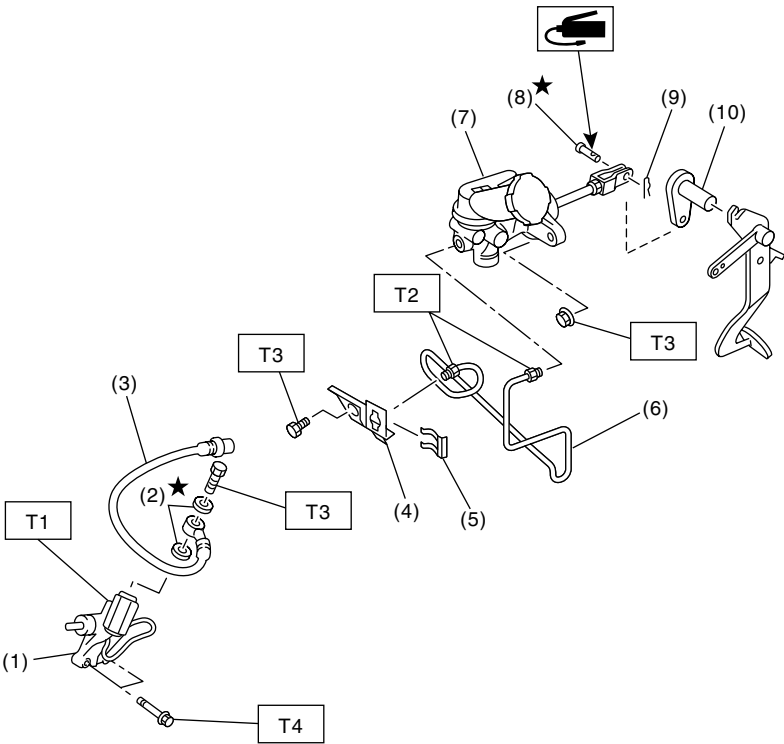
T3: 18 (1.8, 13.0)

T4: 37 (3.8, 27.5)

GENERAL DESCRIPTION

CLUTCH SYSTEM

• TURBO MODEL



CL-00246

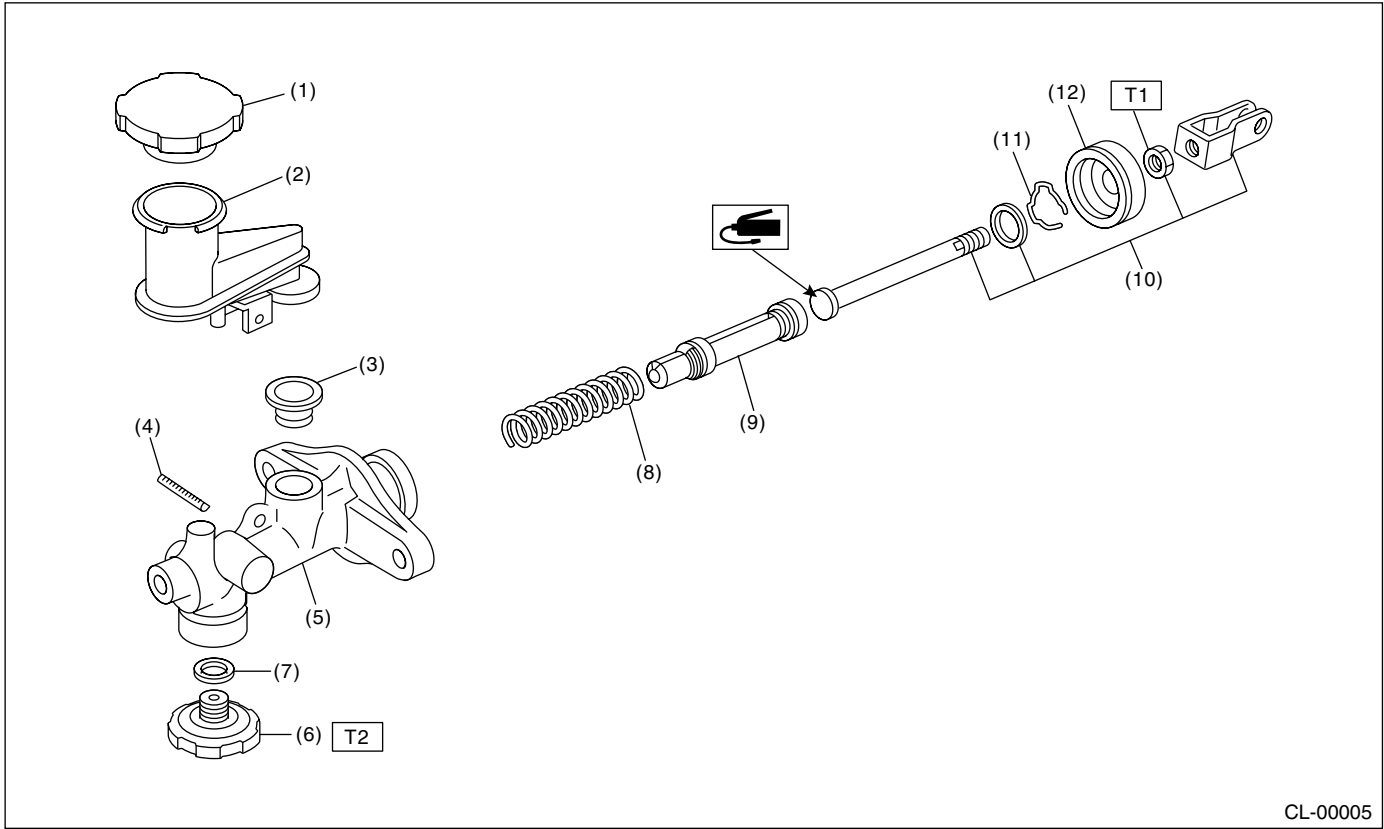
(1) Operating cylinder	(6) Pipe
(2) Washer	(7) Master cylinder ASSY
(3) Clutch hose	(8) Clevis pin
(4) Bracket	(9) Snap pin
(5) Clip	(10) Lever

Tightening torque: N·m (kgf-m, ft-lb)

- T1: 8 (0.8, 5.8)**
T2: 15 (1.5, 10.8)
T3: 18 (1.8, 13.0)
T4: Except STi model
37 (3.8, 27.5)
STi model
41 (4.2, 30.2)

3. MASTER CYLINDER

• NON-TURBO MODEL



(1) Reservoir cap	(7) Gasket
(2) Reservoir tank	(8) Return spring
(3) Oil seal	(9) Piston
(4) Straight pin	(10) Push rod
(5) Master cylinder	(11) Piston stop ring
(6) Clutch damper	(12) Cylinder boot

Tightening torque: N·m (kgf-m, ft-lb)

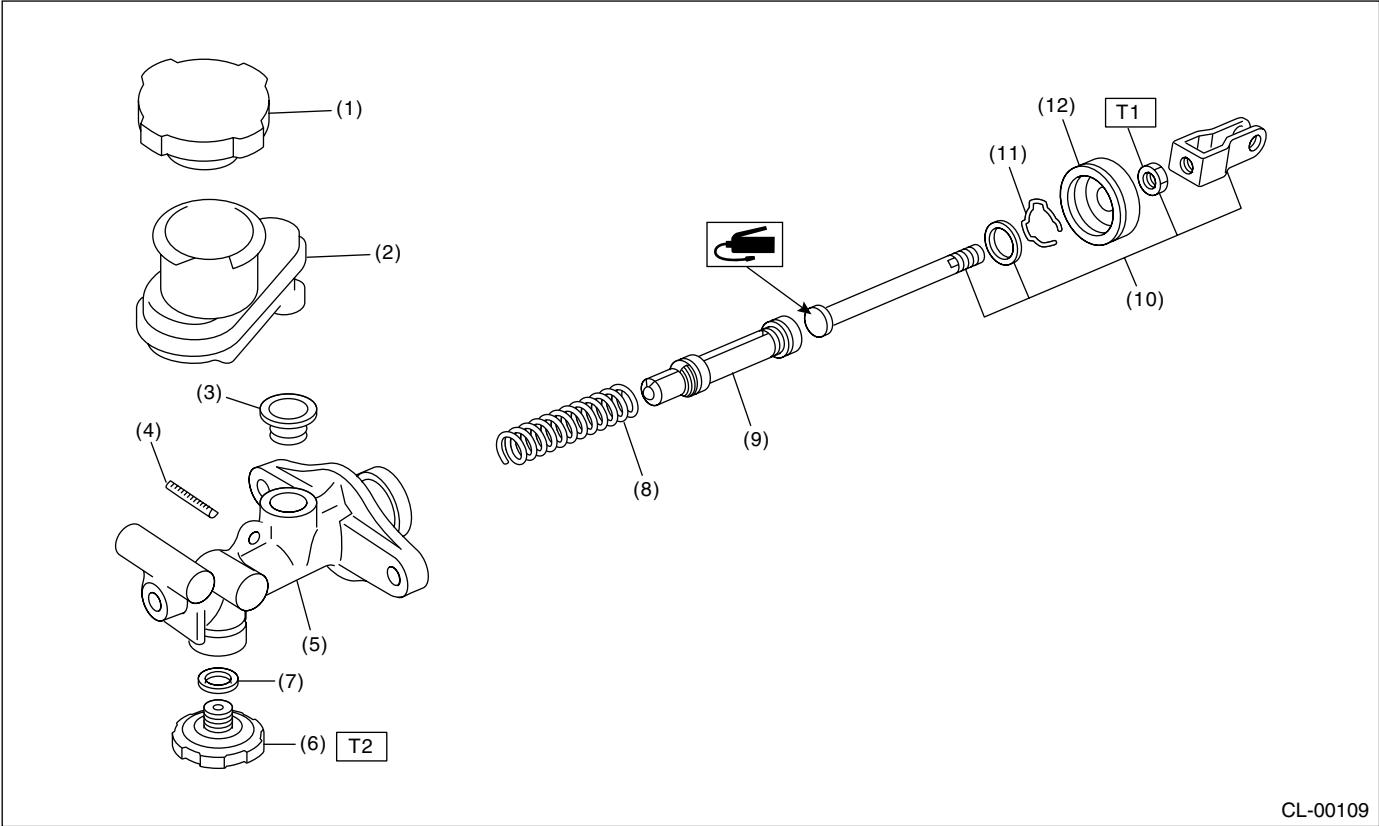
T1: 10 (1.0, 7)

T2: 46.6 (4.75, 34.4)

GENERAL DESCRIPTION

CLUTCH SYSTEM

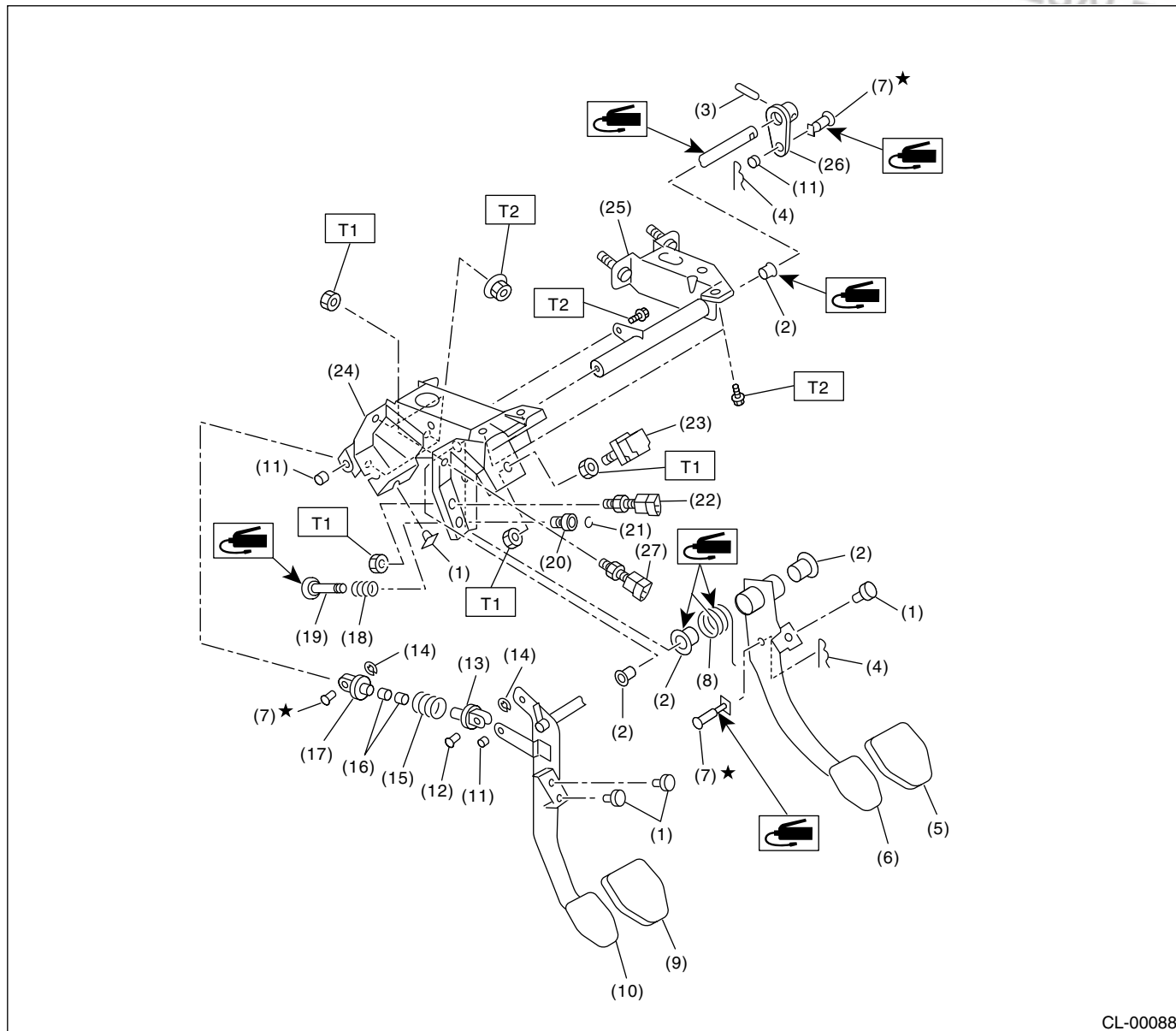
• TURBO MODEL



(1) Reservoir cap	(7) Gasket
(2) Reservoir tank	(8) Return spring
(3) Oil seal	(9) Piston
(4) Straight pin	(10) Push rod
(5) Master cylinder	(11) Piston stop ring
(6) Clutch damper	(12) Cylinder boot

Tightening torque: N·m (kgf-m, ft-lb)
T1: 10 (1.0, 7)
T2: 46.6 (4.75, 34.4)

4. CLUTCH PEDAL



CL-00088

(1) Stopper	(12) Clutch clevis pin	(23) Stop light switch
(2) Bushing	(13) Assist rod A	(24) Pedal bracket
(3) Spring pin	(14) Clip	(25) Clutch master cylinder bracket
(4) Snap pin	(15) Assist spring	(26) Lever
(5) Brake pedal pad	(16) Assist bushing	(27) Clutch switch (Starter interlock)
(6) Brake pedal	(17) Assist rod B	
(7) Clevis pin	(18) Spring S	
(8) Brake pedal spring	(19) Rod S	
(9) Clutch pedal pad	(20) Bushing S	
(10) Clutch pedal	(21) Clip	
(11) Bushing C	(22) Clutch switch (Cruise control)	

Tightening torque: N·m (kgf·m, ft·lb)

T1: 8 (0.8, 5.8)

T2: 18 (1.8, 13.0)

GENERAL DESCRIPTION

CLUTCH SYSTEM

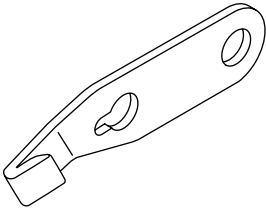
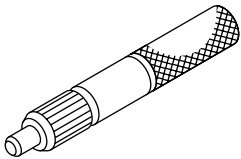
C: CAUTION

- Wear working clothing, including a cap, protective goggles, and protective shoes during operation.
- Remove contamination including dirt and corrosion before removal, installation or disassembly.
- Keep the disassembled parts in order and protect them from dust or dirt.
- Before removal, installation or disassembly, be sure to clarify the failure. Avoid unnecessary removal, installation, disassembly, and replacement.
- Be careful not to burn your hands, because each part on the vehicle is hot after running.
- Use Subaru genuine fluid, grease etc. or the equivalent. Do not mix fluid, grease etc. with that of another grade or from other manufacturers.

- Be sure to tighten fasteners including bolts and nuts to the specified torque.
- Place shop jacks or safety stands at the specified points.
- Apply grease onto sliding or revolution surfaces before installation.
- Before installing O-rings or snap rings, apply sufficient amount of fluid to avoid damage and deformation.
- Before securing a part on a vise, place cushioning material such as wood blocks, aluminum plate, or shop cloth between the part and the vise.
- Keep fluid away from the vehicle body. If any fluid contacts the vehicle body, immediately flush the area with water.

D: PREPARATION TOOL

1. SPECIAL TOOLS

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-498497100	498497100	CRANKSHAFT STOPPER	Used for stopping rotation of flywheel when loosening tightening bolt, etc.
 ST-499747100	499747100	CLUTCH DISC GUIDE	Used when installing clutch disc to flywheel.

2. GENERAL PURPOSE TOOLS

TOOL NAME	REMARKS
Circuit Tester	Used for measuring resistance, voltage and ampere.
Dial Gauge	Used for measuring clutch disk run-out.

2. Clutch Disc and Cover

A: REMOVAL

1) Remove the transmission assembly from vehicle body.

5MT:

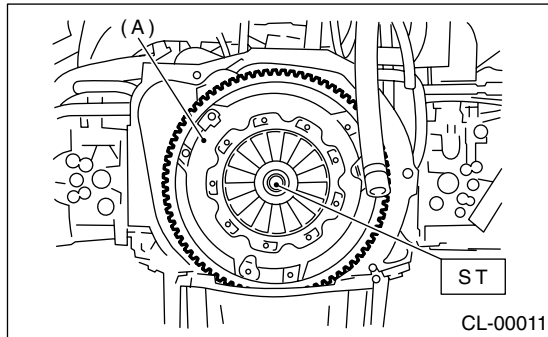
<Ref. to 5MT-26, REMOVAL, Manual Transmission Assembly.>

6MT:

<Ref. to 6MT-35, REMOVAL, Manual Transmission Assembly.>

2) Install the ST on flywheel.

ST 499747100 CRANKSHAFT STOPPER



(A) Clutch cover

3) Remove the clutch cover and clutch disc.

NOTE:

- Take care not to allow oil on the clutch disc facing.
- Do not disassemble either the clutch cover or clutch disc.

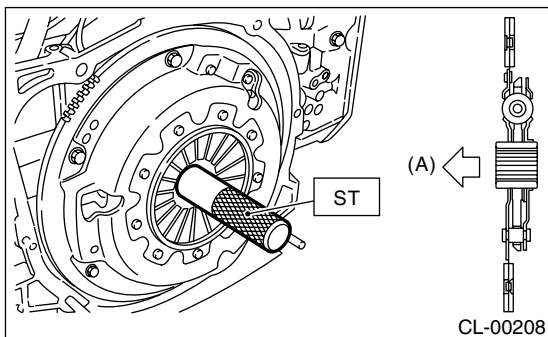
B: INSTALLATION

1) Insert the ST into clutch disc and install them on the flywheel by inserting the ST end into pilot bearing.

NOTE:

When installing the clutch disc, be careful to its direction.

ST 499747100 CLUTCH DISC GUIDE



(A) Flywheel side

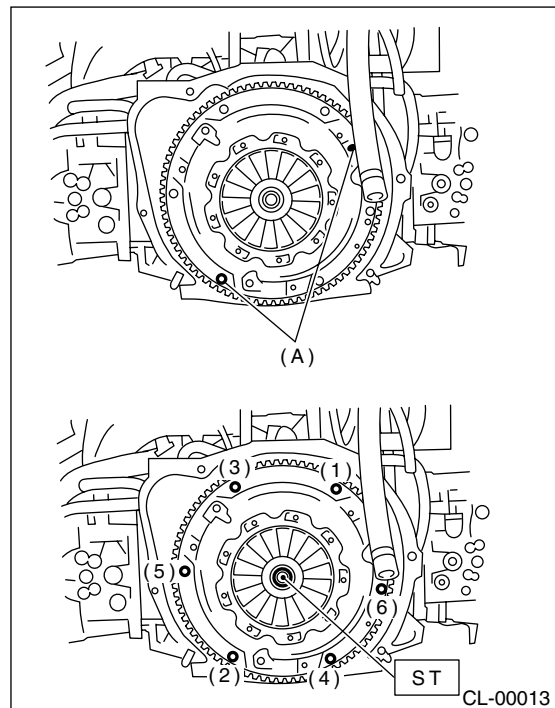
2) Install the clutch cover on flywheel and tighten the bolts to specified torque.

NOTE:

- When installing the clutch cover on flywheel, position the clutch cover so that there is a gap of 120° or more between "0" marks on the flywheel and clutch cover. ("0" marks indicate the directions of residual unbalance.)
- Note the front and rear of the clutch disc when installing.
- Temporarily tighten the bolts by hand. Each bolt should be tightened to the specified torque in a crisscross fashion.

Tightening torque:

16 N·m (1.6 kgf-m, 11.8 ft-lb)



(A) "0" marks

3) Remove the ST.

ST 499747100 CLUTCH DISC GUIDE

4) Install the transmission assembly.

5MT:

<Ref. to 5MT-29, INSTALLATION, Manual Transmission Assembly.>

6MT:

<Ref. to 6MT-37, INSTALLATION, Manual Transmission Assembly.>

CLUTCH DISC AND COVER

CLUTCH SYSTEM

C: INSPECTION

1. CLUTCH DISC

1) Facing wear

Measure the depth of rivet head from the surface of facing. Replace if facings are worn locally or worn down to less than the specified value.

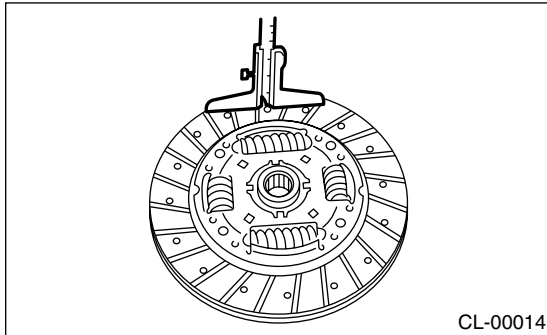
Depth of rivet head:

Limit of sinking

0.3 mm (0.012 in)

NOTE:

Do not wash the clutch disc with any cleaning fluid.

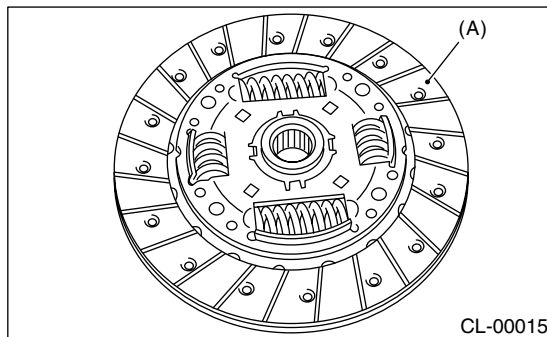


2) Hardened facing

Correct by using emery paper or replace.

3) Oil soakage on facing

Replace the clutch disc and inspect the transmission front oil seal, transmission case mating surface, engine rear oil seal and other points for oil leakage.



(A) Clutch facing

4) Deflection on facing

If deflection exceeds the specified value at the outer circumference of facing, repair or replace.

ST 499747100 CLUTCH DISC GUIDE

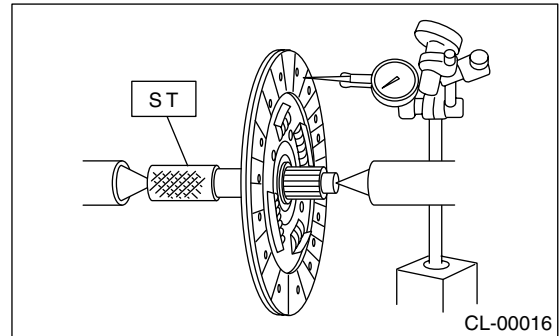
Limit for deflection:

Except STi model

0.7 mm (0.028 in) at R = 110 mm (4.33 in)

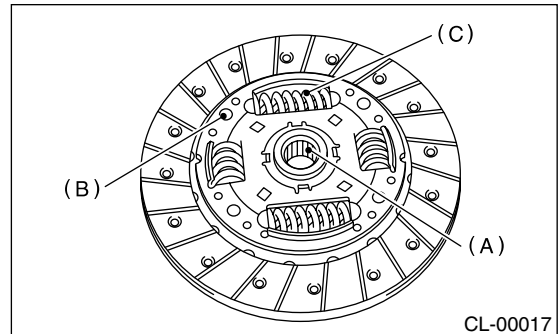
STi model

0.7 mm (0.028 in) at R = 115 mm (4.53 in)



5) Worn spline, loose rivets and torsion spring failure

Replace defective parts.



(A) Spline

(B) Rivet

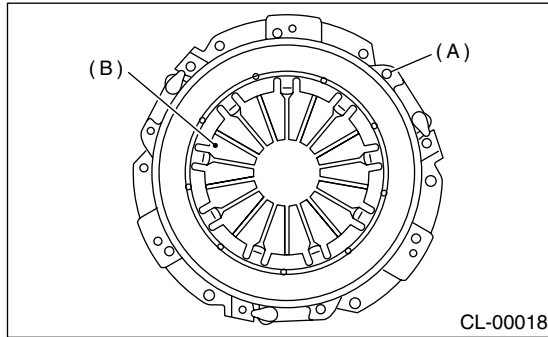
(C) Torsion spring

2. CLUTCH COVER

NOTE:

Visually check for the following items without disassembling, and replace or repair if defective.

- Loose thrust rivet
- Damaged or worn bearing contact area at center of diaphragm spring



- (A) Thrust rivet
(B) Diaphragm spring

3. Flywheel

A: REMOVAL

1) Remove the transmission assembly.

5MT:

<Ref. to 5MT-26, REMOVAL, Manual Transmission Assembly.>

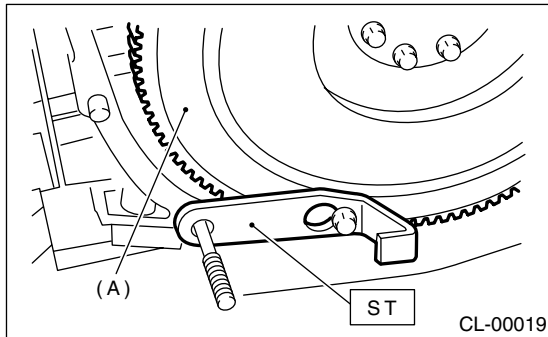
6MT:

<Ref. to 6MT-35, REMOVAL, Manual Transmission Assembly.>

2) Remove the clutch cover and clutch disc. <Ref. to CL-11, REMOVAL, Clutch Disc and Cover.>

3) Using the ST, remove the flywheel.

ST 498497100 CRANKSHAFT STOPPER

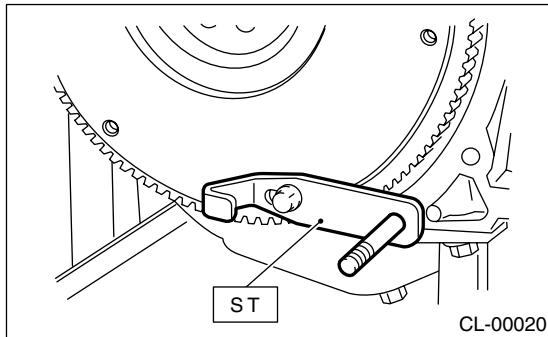


(A) Flywheel

B: INSTALLATION

1) Install the flywheel and ST.

ST 498497100 CRANKSHAFT STOPPER



2) Tighten the flywheel attaching bolts to the specified torque.

NOTE:

Tighten the flywheel installing bolts gradually. Each bolt should be tightened to the specified torque in a crisscross fashion.

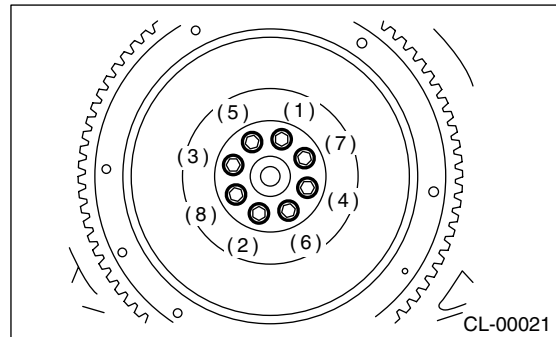
Tightening torque:

Except STi model

72 N·m (7.3 kgf-m, 52.8 ft-lb)

STi model

75 N·m (7.6 kgf-m, 55.3 ft-lb)



3) Install the clutch disc and cover. <Ref. to CL-11, INSTALLATION, Clutch Disc and Cover.>

4) Install the transmission assembly.

5MT:

<Ref. to 5MT-29, INSTALLATION, Manual Transmission Assembly.>

6MT:

<Ref. to 6MT-37, INSTALLATION, Manual Transmission Assembly.>

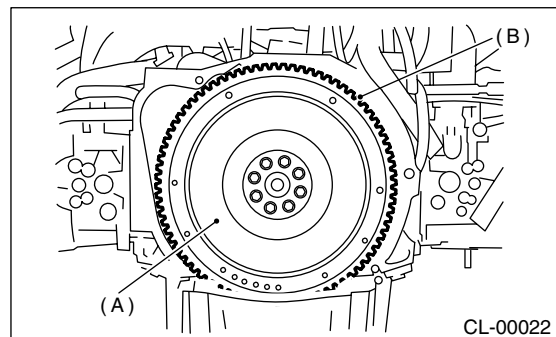
C: INSPECTION

CAUTION:

Since this bearing is grease sealed and is of a non-lubrication type, do not wash with gasoline or any solvent.

1) Damage of facing and ring gear

If defective, replace the flywheel.



(A) Flywheel

(B) Ring gear

2) Smoothness of rotation

Rotate the ball bearing applying pressure in thrust direction.

3) If noise or excessive play is noted, replace the flywheel.

4. Release Bearing and Lever

A: REMOVAL

1. NON-TURBO MODEL

1) Remove the transmission assembly from vehicle body.

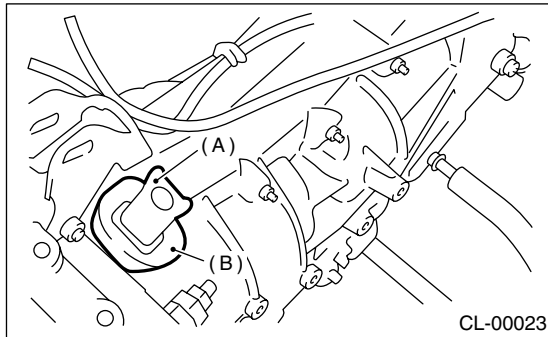
<Ref. to 5MT-26, REMOVAL, Manual Transmission Assembly.>

2) Remove the two clips from clutch release lever and remove the release bearing.

CAUTION:

Be careful not to deform clips.

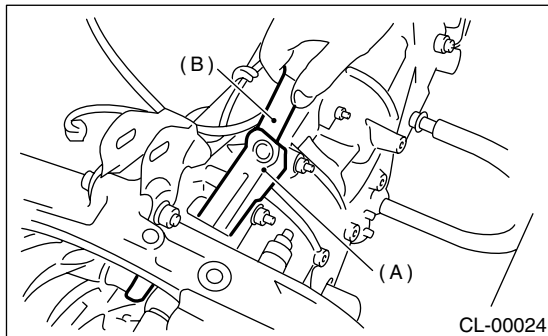
3) Remove the release lever seal.



(A) Clutch release lever

(B) Release lever seal

4) Remove the release lever retainer spring from release lever pivot with a screwdriver by accessing it through clutch housing release lever hole. Then remove the release lever.



(A) Clutch release lever

(B) Screwdriver

2. TURBO MODEL

1) Remove the transmission assembly from vehicle body.

5MT:

<Ref. to 5MT-26, REMOVAL, Manual Transmission Assembly.>

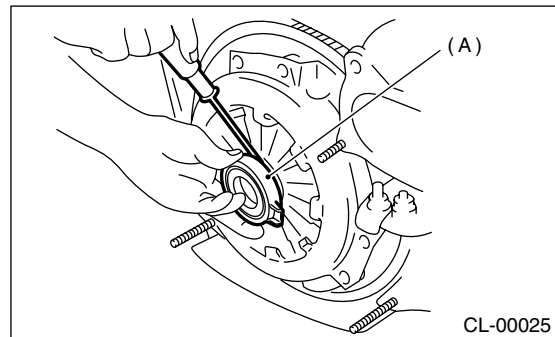
6MT:

<Ref. to 6MT-35, REMOVAL, Manual Transmission Assembly.>

2) Remove the clutch release lever from transmission.

3) Put the clutch release bearing in engine side.

4) Remove the clutch release bearing from the clutch cover using flat-type screwdriver.



(A) Clutch release bearing

RELEASE BEARING AND LEVER

CLUTCH SYSTEM

B: INSTALLATION

1. NON-TURBO MODEL

NOTE:

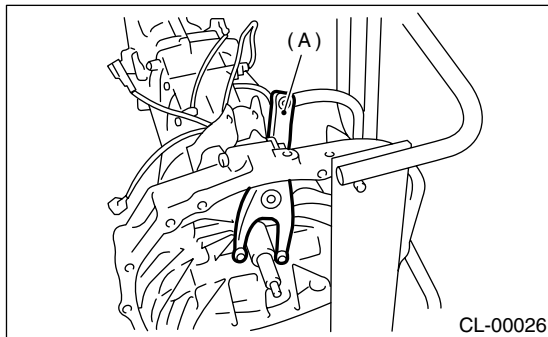
Before or during assembling, lubricate the following points with a light coat of grease.

- Contact surface of lever and pivot
- Contact surface of lever and bearing
- Transmission main shaft spline (Use grease containing molybdenum disulphide.)

1) While pushing the release lever to pivot and twisting it to both sides, fit the retainer spring onto the constricted portion of pivot.

NOTE:

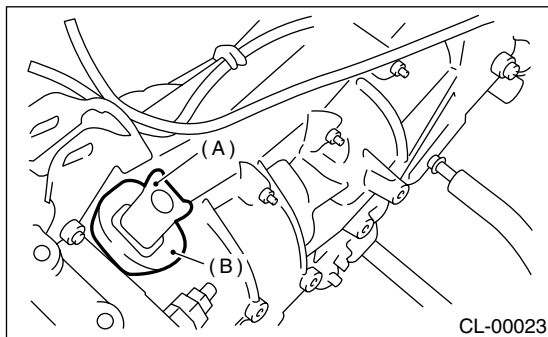
- Apply grease (SUNLIGHT 2: Part No. 003602010) to the contact point of release lever and operating cylinder.
- Confirm that the retainer spring is securely fitted by observing it through the main case hole.



(A) Release lever

2) Install the release bearing and fasten it with two clips.

3) Install the release lever seal.



(A) Release lever

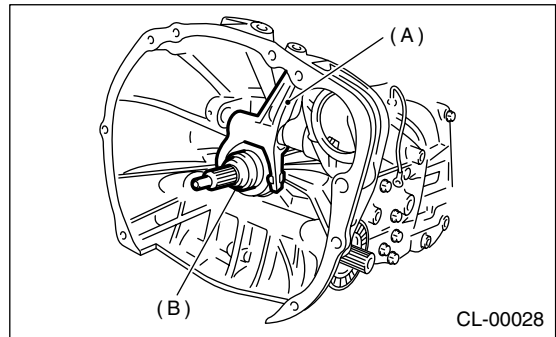
(B) Release lever seal

4) Install the transmission assembly.

<Ref. to 5MT-29, INSTALLATION, Manual Transmission Assembly.>

2. TURBO MODEL

- 1) Install the release bearing on transmission.
- 2) Insert the release fork into release bearing tab.

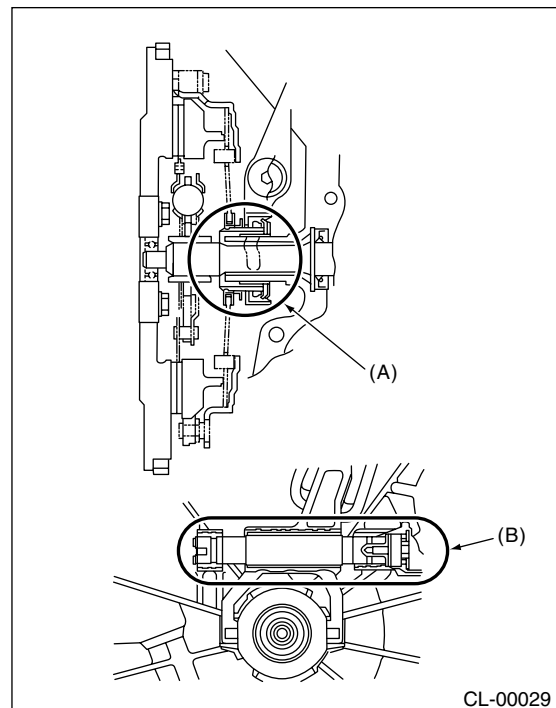


(A) Release fork

(B) Release bearing

3) Apply grease to the specified points:

- Spline FX2200 (Part No. 000040901)
- Shaft SUNLIGHT 2 (Part No. 003602010)



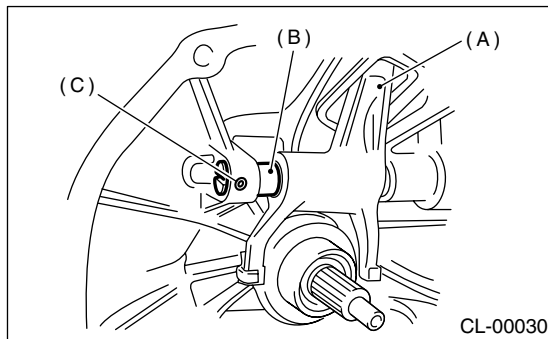
(A) Spline (FX2200)

(B) Shaft (SUNLIGHT 2)

4) Insert the release fork shaft into release fork.

NOTE:

Make sure the cutout portion of release fork shaft contacts spring pin.

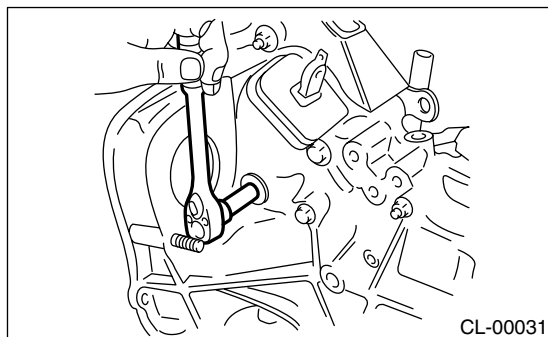


- (A) Release fork
- (B) Release shaft
- (C) Spring pin

5) Tighten the plug.

Tightening torque:

44 N·m (4.5 kgf-m, 32.5 ft-lb)



6) Install the transmission assembly.

5MT:

<Ref. to 5MT-29, INSTALLATION, Manual Transmission Assembly.>

6MT:

<Ref. to 6MT-37, INSTALLATION, Manual Transmission Assembly.>

C: INSPECTION

1. RELEASE BEARING

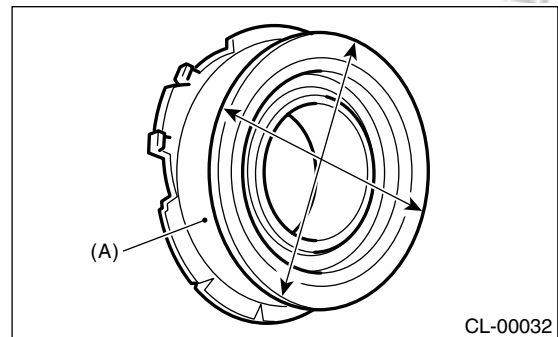
NOTE:

Since this bearing is grease sealed and is of a non-lubrication type, do not wash with gasoline or any solvent when servicing the clutch.

1) Check the bearing for smooth movement by applying force in the radial direction.

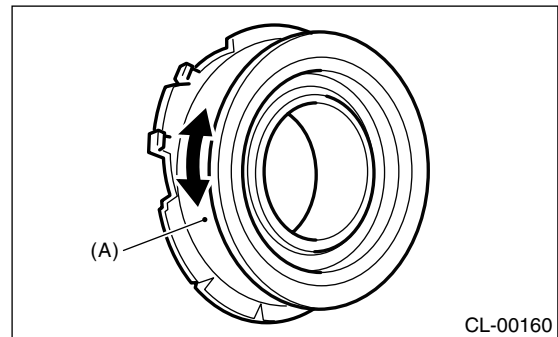
Radial direction stroke:

1.4 mm (0.055 in)



(A) Bearing case

2) Check the bearing for smooth rotation by applying pressure in the thrust direction.

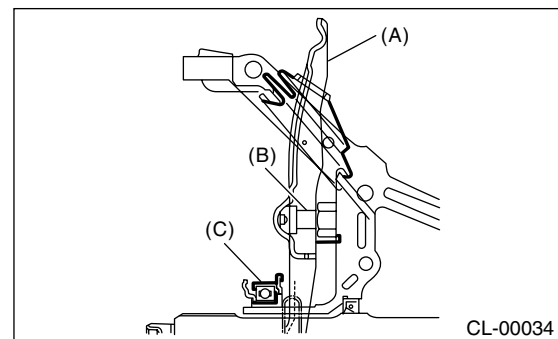


(A) Bearing case

3) Check wear and damage of the bearing case surface contacting with lever.

2. RELEASE LEVER

Check the lever pivot portion and the point of contact with release bearing case for wear.



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

5. Operating Cylinder

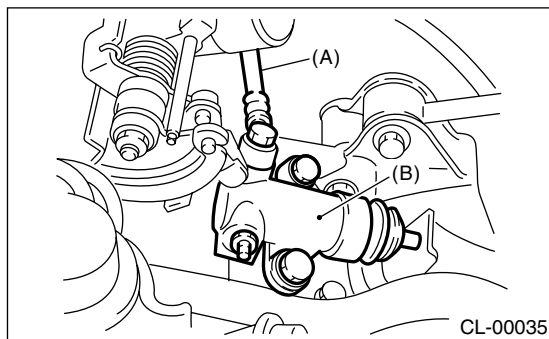
A: REMOVAL

- 1) Remove the air cleaner case and air intake duct (Non-turbo model). <Ref. to IN(H4SO)-5, REMOVAL, Air Cleaner Case.> and <Ref. to IN(H4SO)-6, REMOVAL, Air Intake Duct.>
- 2) Remove the intercooler (Turbo model). <Ref. to IN(H4DOTC)-10, REMOVAL, Intercooler.>
- 3) Remove the clutch hose from operating cylinder.

CAUTION:

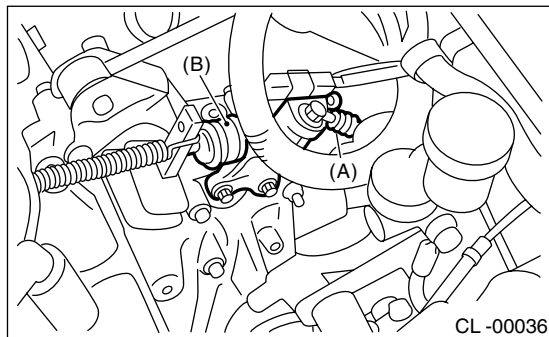
Cover the hose joint to prevent clutch fluid from flowing out.

• NON-TURBO MODEL



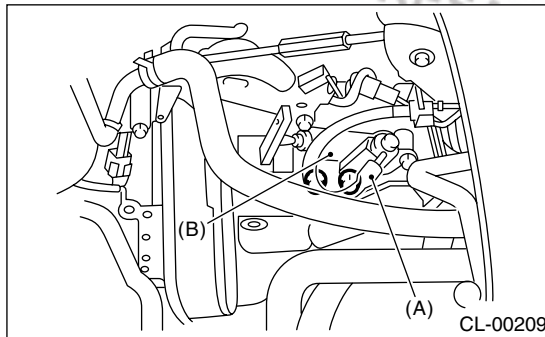
- (A) Clutch hose
(B) Operating cylinder

• TURBO MODEL (5MT)



- (A) Clutch hose
(B) Operating cylinder

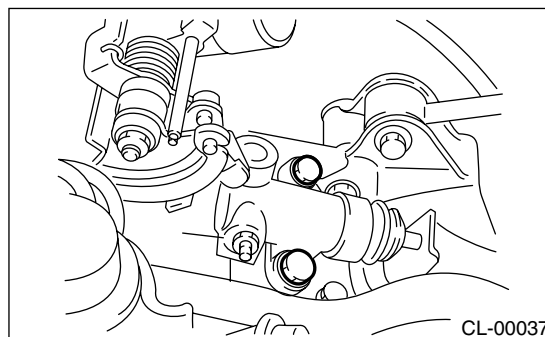
• TURBO MODEL (6MT)



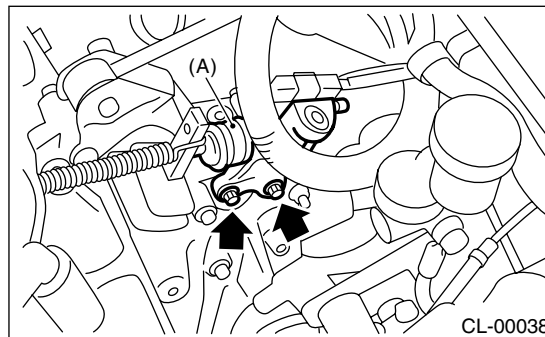
- (A) Clutch hose
(B) Operating cylinder

- 4) Remove the operating cylinder from transmission.

• NON-TURBO MODEL

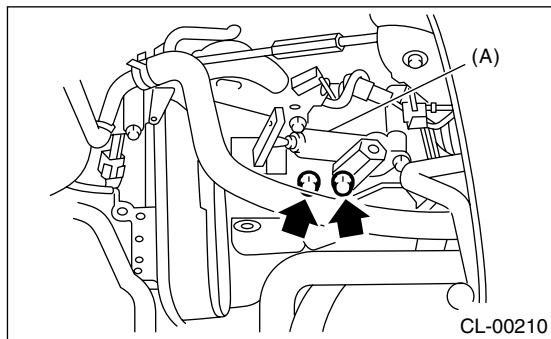


• TURBO MODEL (5MT)



- (A) Operating cylinder

• TURBO MODEL (6MT)



(A) Operating cylinder

B: INSTALLATION

1) Install in the reverse order of removal.

NOTE:

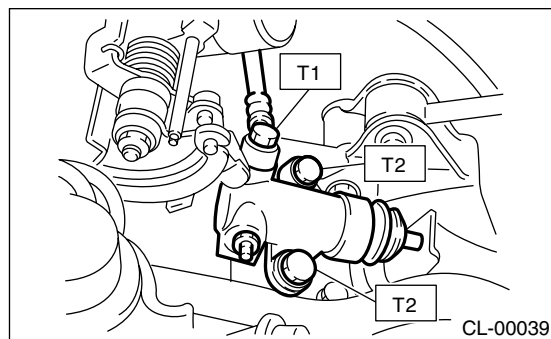
Before installing the operating cylinder, apply grease (SUNLIGHT 2: Part No. 003602010) to contact point of the release lever and operating cylinder.

• NON-TURBO MODEL

Tightening torque:

T1: 18 N·m (1.8 kgf-m, 13.0 ft-lb)

T2: 37 N·m (3.8 kgf-m, 27.5 ft-lb)

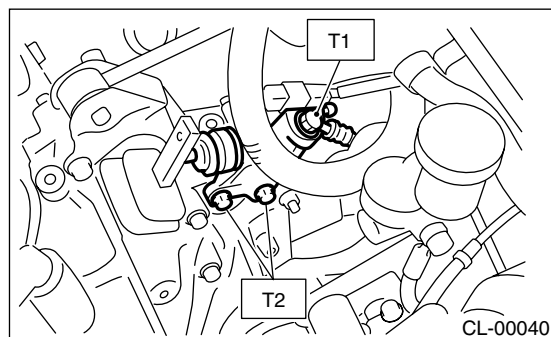


• TURBO MODEL (5MT)

Tightening torque:

T1: 18 N·m (1.8 kgf-m, 13.0 ft-lb)

T2: 37 N·m (3.8 kgf-m, 27.5 ft-lb)

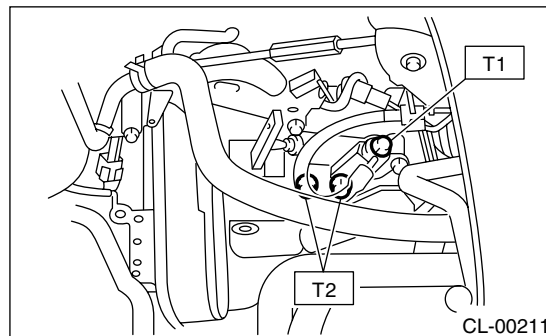


• TURBO MODEL (6MT)

Tightening torque:

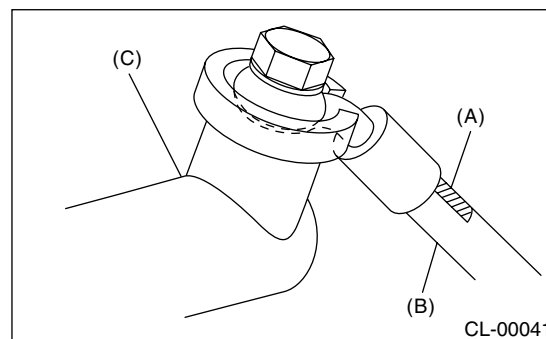
T1: 18 N·m (1.8 kgf-m, 13.0 ft-lb)

T2: 41 N·m (4.2 kgf-m, 30.2 ft-lb)



NOTE:

- Be sure to install the clutch hose with the mark side facing upward.
- Be careful not to twist the clutch hose during installation.



- (A) Marking
- (B) Clutch hose
- (C) Operating cylinder

2) After bleeding air from the operating cylinder, ensure that clutch operates properly.
<Ref. to CL-24, Clutch Fluid Air Bleeding.>

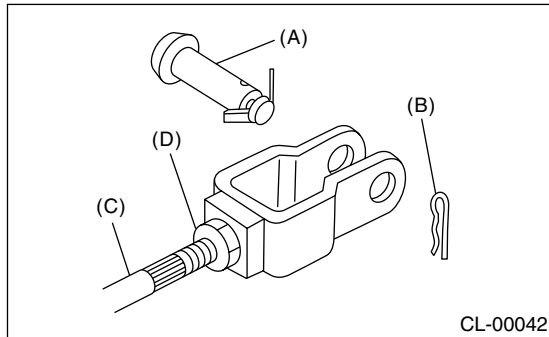
C: INSPECTION

- 1) Check the operating cylinder for damage. If operating cylinder is damaged, replace it.
- 2) Check the operating cylinder for fluid leakage or damage on boot. If any leakage or damage is found, replace the operating cylinder.

6. Master Cylinder

A: REMOVAL

- 1) Thoroughly drain the brake fluid from reservoir tank.
- 2) Remove the snap pin, clevis pin and separate the push rod of master cylinder from clutch pedal.

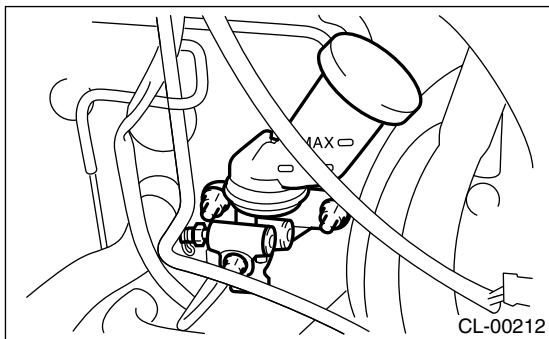


- (A) Clevis pin
- (B) Snap pin
- (C) Push rod
- (D) Lock nut

- 3) Remove the air cleaner case and air intake duct (Non-turbo model). <Ref. to IN(H4SO)-5, REMOVAL, Air Cleaner Case.> and <Ref. to IN(H4SO)-6, REMOVAL, Air Intake Duct.>
- 4) Remove the intercooler (Turbo model). <Ref. to IN(H4DOTC)-10, REMOVAL, Intercooler.>
- 5) Remove the clutch pipe from master cylinder.
- 6) Remove the master cylinder with reservoir tank.

CAUTION:

Be extremely careful not to spill brake fluid. Brake fluid spilt on the vehicle body will harm the paint surface; wipe it off quickly if spilt.



B: INSTALLATION

- 1) Install the master cylinder to body, and install the clutch pipe to master cylinder.

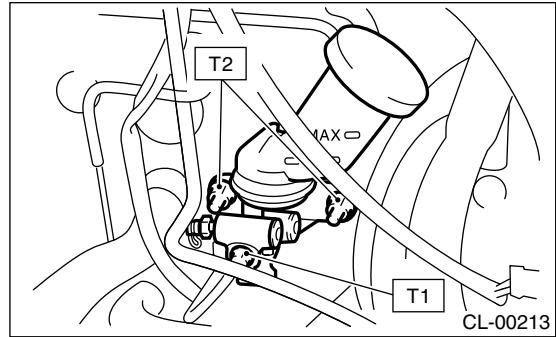
NOTE:

Check that the pipe is routed properly.

Tightening torque:

T1: 15 N·m (1.5 kgf-m, 10.8 ft-lb)

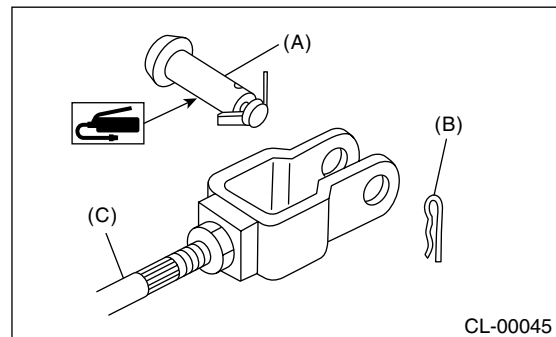
T2: 18 N·m (1.8 kgf-m, 13.0 ft-lb)



- 2) Connect the push rod of master cylinder to clutch pedal, and install the clevis pin and snap pin.

NOTE:

Apply grease to the clevis pin.



- (A) Clevis pin
- (B) Snap pin
- (C) Push rod

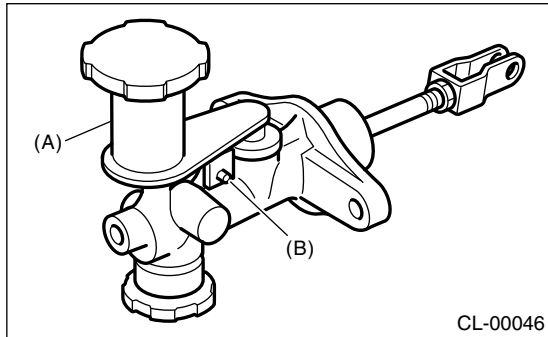
- 3) After bleeding air from the system, ensure that clutch operates properly.

<Ref. to CL-24, Clutch Fluid Air Bleeding.>

- 4) Install the air cleaner case and air intake duct (Non-turbo model). <Ref. to IN(H4SO)-5, INSTALLATION, Air Cleaner Case.> and <Ref. to IN(H4SO)-6, INSTALLATION, Air Intake Duct.>
- 5) Install the intercooler (Turbo model). <Ref. to IN(H4DOTC)-10, INSTALLATION, Intercooler.>

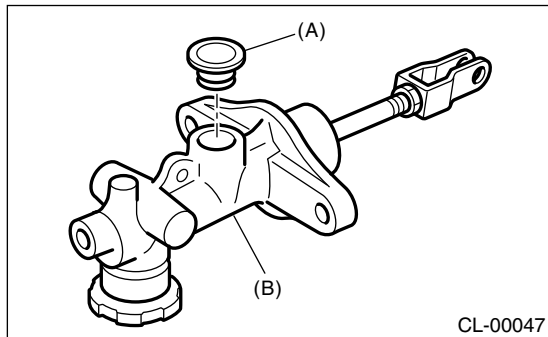
C: DISASSEMBLY

1) Remove the straight pin and reservoir tank.



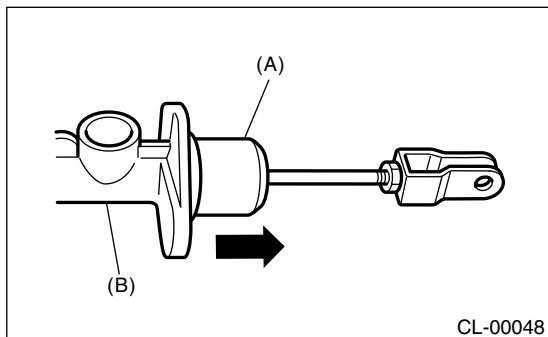
- (A) Reservoir tank
- (B) Straight pin

2) Remove the oil seal.



- (A) Oil seal
- (B) Master cylinder

3) Move the cylinder boot backward.



- (A) Cylinder boot
- (B) Master cylinder

4) Remove the stop ring.

CAUTION:

Be careful when removing the snap ring to prevent the rod, washer, piston and return spring from flying out.

5) Remove the clutch damper.

D: ASSEMBLY

1) Install the clutch damper.

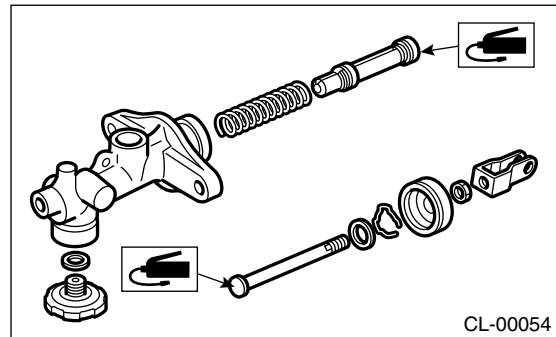
Tightening torque:

46.6 N·m (4.75 kgf-m, 34.4 ft-lb)

2) Apply a coat of grease to the contacting surfaces of the push rod and piston before installation.

Grease:

SILICONE GREASE G40M (Part No. 004404003)



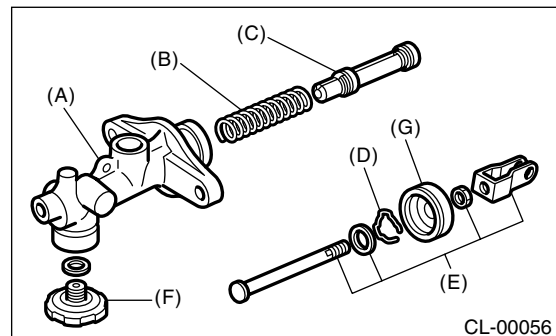
3) To assemble the master cylinder, reverse the sequence of disassembly procedure.

Tightening torque:

10 N·m (1.0 kgf-m, 7 ft-lb)

E: INSPECTION

If any damage, deformation, wear, swelling, rust or other faults are found on the cylinder, piston, push rod, fluid reservoir, return spring, gasket, clutch damper, cylinder boot and hose replace the faulty part.

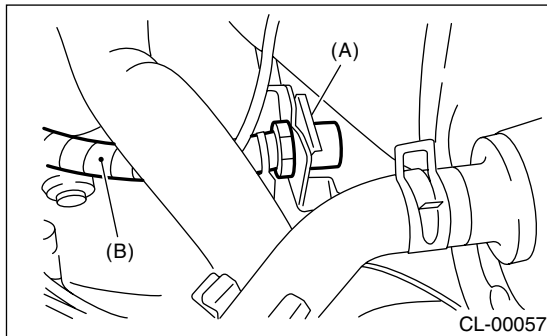


- (A) Master cylinder body
- (B) Return spring
- (C) Piston
- (D) Stop ring
- (E) Rod ASSY
- (F) Clutch damper
- (G) Cylinder boot

7. Clutch Pipe and Hose

A: REMOVAL

- 1) Remove the air cleaner case and air intake duct. (Non-turbo model)
<Ref. to IN(H4SO)-5, REMOVAL, Air Cleaner Case.> and <Ref. to IN(H4SO)-6, REMOVAL, Air Intake Duct.>
- 2) Remove the intercooler. (Turbo model)
<Ref. to IN(H4DOTC)-10, REMOVAL, Intercooler.>
- 3) Drain the clutch fluid. <Ref. to CL-23, Clutch Fluid.>
- 4) Remove the clutch pipe from the clutch hose and master cylinder.
- 5) Pull out the clamp, then remove the clutch hose from bracket.



- (A) Clamp
(B) Clutch hose

- 6) Remove the hose from operating cylinder.
- 7) Remove the bracket.

B: INSTALLATION

Install in the reverse order of removal.

NOTE:

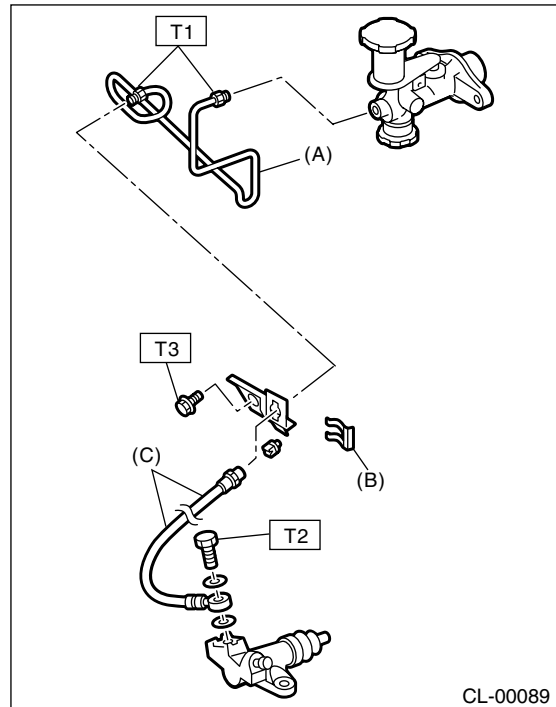
Bleed the clutch fluid. <Ref. to CL-24, Clutch Fluid Air Bleeding.>

Tightening torque:

T1: 15 N·m (1.5 kgf-m, 10.8 ft-lb)

T2: 18 N·m (1.8 kgf-m, 13.0 ft-lb)

T3: 25 N·m (2.5 kgf-m, 18.1 ft-lb)



- (A) Clutch pipe
(B) Clip
(C) Clutch hose

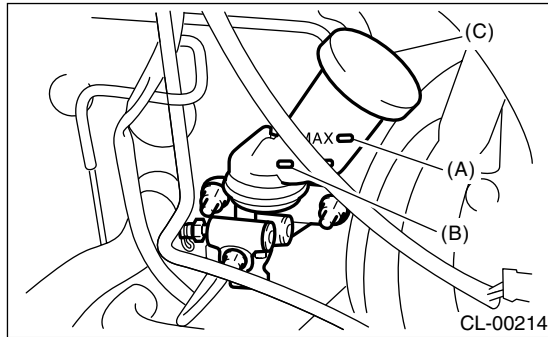
C: INSPECTION

Check the pipes and hoses for cracks, breakage, or damage. Check the joints for fluid leakage. If any cracks, breakage, damage, or leakage is found, repair or replace the applicable pipe or hose.

8. Clutch Fluid

A: INSPECTION

- 1) Park the vehicle on a level surface.
- 2) Inspect the fluid level using scale on the outside of the reservoir tank. If the level is below "MIN", add fluid to bring it up to "MAX", and also inspect for leakage.



- (A) Max. level
(B) Min. level
(C) Reservoir tank

- 6) Refill the brake fluid before reservoir tank becomes empty, and drain contaminated fluid again.
- 7) Repeat the above procedure until the contaminated fluid is completely drained.

B: REPLACEMENT

CAUTION:

- The FMVSS No. 116, fresh DOT3 or 4 brake fluid must be used.
- Cover the bleeder with waste cloth, when loosening it, to prevent brake fluid from being splashed over surrounding parts.
- Avoid mixing different brands of brake fluid to prevent degrading the quality of the fluid.
- Be careful not to allow dirt or dust to get into the reservoir tank.

NOTE:

- During bleeding operation, keep the clutch reservoir tank filled with brake fluid to eliminate entry of air.
- Clutch pedal operating must be very slow.
- For convenience and safety, it is advisable to have two men working.
- The amount of brake fluid required is approx. 70 mℓ (2.4 US fl oz, 2.5 Imp fl oz) for total clutch system.

- 1) Remove the air cleaner case and air duct.
- 2) Either jack-up the vehicle and place a safety stand under it, or lift-up the vehicle.
- 3) Draw out the brake fluid from reservoir tank with syringe.
- 4) Refill the reservoir tank with recommended brake fluid.

Recommended brake fluid:

FMVSS No. 116, fresh DOT3 or 4 brake fluid

- 5) Drain fluid in the same method as air bleeding.

9. Clutch Fluid Air Bleeding

A: PROCEDURE

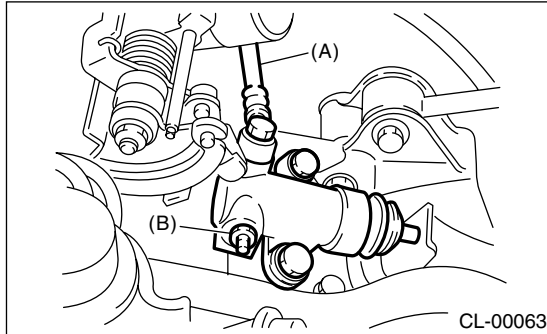
1. NON-TURBO MODEL

NOTE:

Bleed air from the oil line with help of a co-worker.

1) Remove the air cleaner case and air intake duct.
<Ref. to IN(H4SO)-5, REMOVAL, Air Cleaner Case.> and <Ref. to IN(H4SO)-6, REMOVAL, Air Intake Duct.>

2) Fit one end of a vinyl tube into the air bleeder of operating cylinder and put the other end into a brake fluid container.

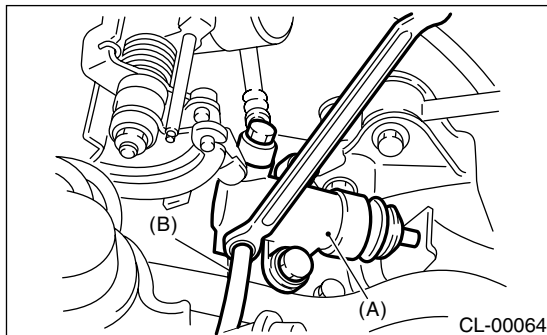


(A) Clutch hose

(B) Air bleeder

3) Slowly depress the clutch pedal and keep it depressed. Then open the air bleeder to discharge air together with the fluid.

Release the air bleeder for 1 or 2 seconds. Next, with the bleeder closed, slowly release the clutch pedal.



(A) Operating cylinder

(B) Vinyl tube

4) Repeat these steps until there are no more air bubbles in the vinyl tube.

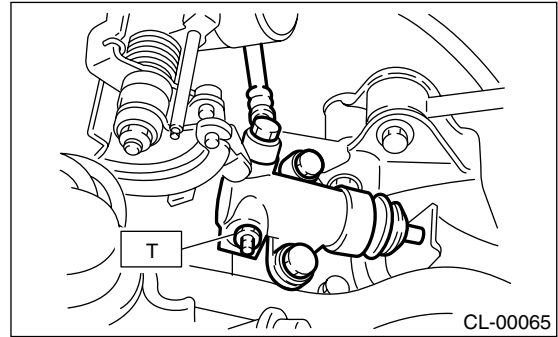
CAUTION:

Cover the bleeder with waste cloth when loosening it, to prevent brake fluid from being splashed over surrounding parts.

5) Tighten the air bleeder.

Tightening torque:

T: 8 N·m (0.8 kgf-m, 5.8 ft-lb)



6) After depressing the clutch pedal, make sure that there are no leaks evident in the entire system.

7) After bleeding air from the system, ensure that clutch operates properly.

2. TURBO MODEL

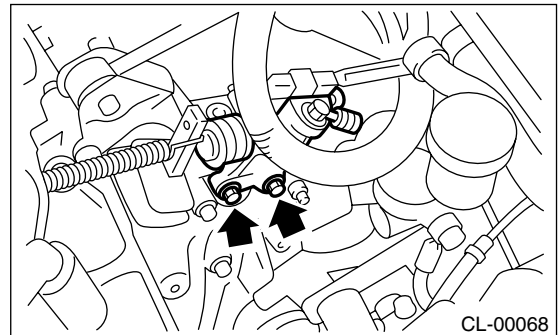
NOTE:

Bleed air from the oil line with help of a co-worker.

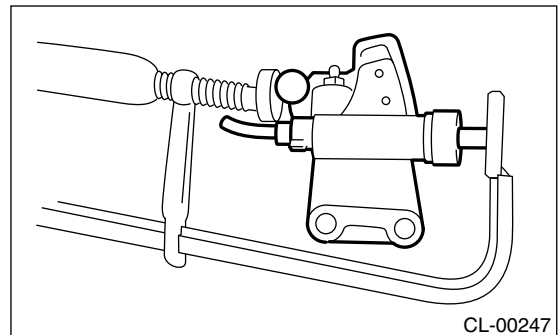
1) Remove the operating cylinder.

NOTE:

Do not remove the clutch hose.



2) Fix the piston with clamp to avoid the piston from jumping out.



3) Fit one end of a vinyl tube into the air bleeder of operating cylinder and put the other end into a brake fluid container.

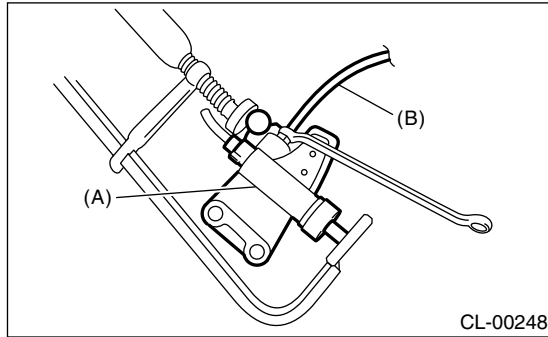
4) Slowly depress the clutch pedal and keep it depressed. Then open the air bleeder to discharge air together with the fluid.

Release the air bleeder for 1 or 2 seconds. Next, with the bleeder closed, slowly release the clutch pedal.

NOTE:

Set the air breather screw part higher than tip of operating cylinder when performing this procedure.

10) Install the intercooler. <Ref. to IN(H4DOTC)-10, INSTALLATION, Intercooler.>



(A) Operating cylinder

(B) Vinyl tube

5) Repeat these steps until there are no more air bubbles in the vinyl tube.

CAUTION:

Cover the bleeder with waste cloth when loosening it, to prevent brake fluid from being splashed over surrounding parts.

6) Tighten the air bleeder.

Tightening torque:

8 N·m (0.8 kgf-m, 5.8 ft-lb)

7) Install the operating cylinder.

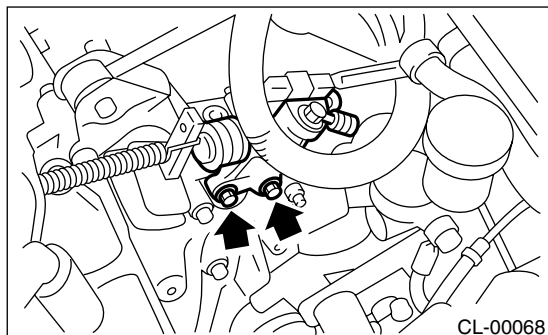
Tightening torque:

5MT model:

37 N·m (3.8 kgf-m, 27.5 ft-lb)

6MT model:

41 N·m (4.2 kgf-m, 30.2 ft-lb)



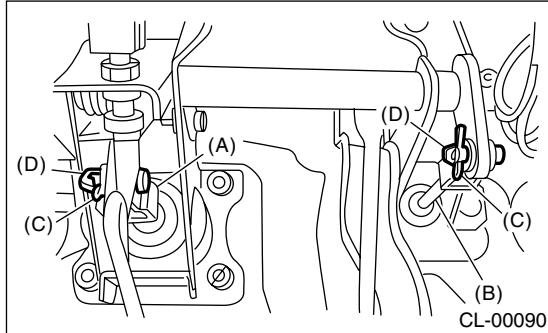
8) After depressing the clutch pedal, make sure that there are no leaks evident in the entire system.

9) After bleeding air from the system, ensure that clutch operates properly.

10. Clutch Pedal

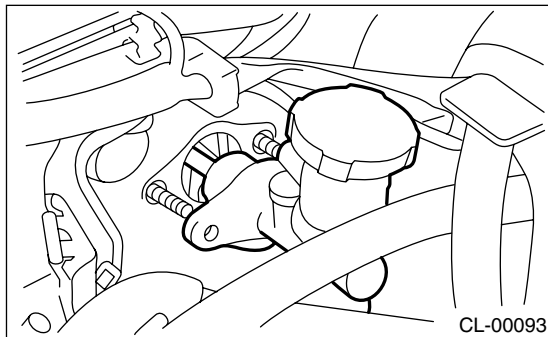
A: REMOVAL

- 1) Remove the steering column. <Ref. to PS-20, REMOVAL, Tilt Steering Column.>
- 2) Disconnect the connectors from stop light and clutch switches.
- 3) Remove the snap pins which secure lever to push rod and operating rod.
- 4) Remove the clevis pins which secure lever to push rod and operating rod.



- (A) Operating rod
- (B) Push rod
- (C) Snap pin
- (D) Clevis pin

- 5) Remove the air cleaner case and intake duct. (Non-turbo model) <Ref. to IN(H4SO)-5, REMOVAL, Air Cleaner Case.> and <Ref. to IN(H4SO)-6, REMOVAL, Air Intake Duct.>
- 6) Remove the intercooler. (Turbo model) <Ref. to IN(H4DOTC)-10, REMOVAL, Intercooler.>
- 7) Remove the nut which secures clutch master cylinder.



- 8) Remove the bolts and nuts which secure brake and clutch pedals, and remove the pedal assembly.

B: INSTALLATION

- 1) Install in the reverse order of removal.

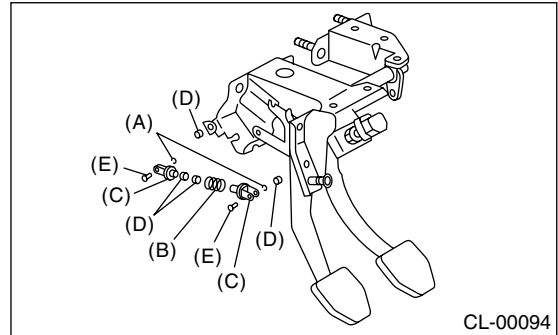
CAUTION:

- Be careful not to kink the accelerator cable.
- Always use new clevis pins.

- 2) Adjust the clutch pedal after installation. <Ref. to CL-28, ADJUSTMENT, Clutch Pedal.>

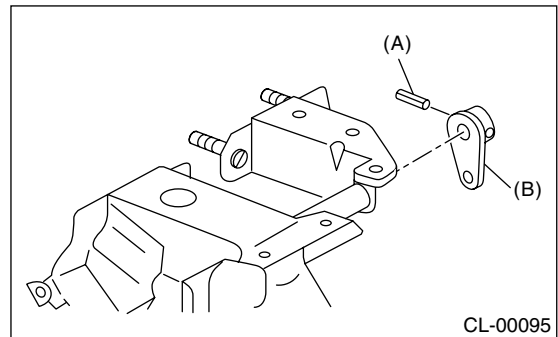
C: DISASSEMBLY

- 1) Remove the clips, assist spring, rod and bushing.



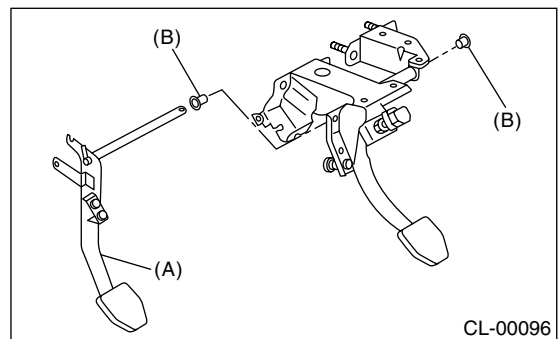
- (A) Clip
- (B) Assist spring
- (C) Assist rod
- (D) Bushing
- (E) Clevis pin

- 2) Remove the spring pin and lever.



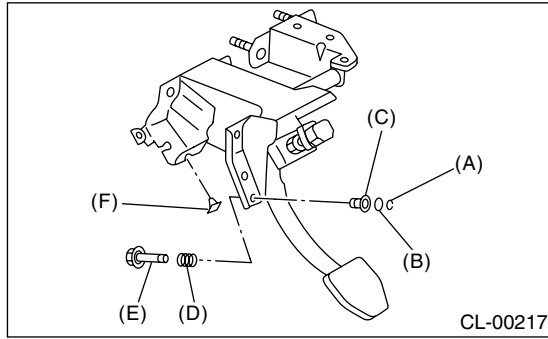
- (A) Pin
- (B) Lever

- 3) Remove the clutch pedal and bushings.



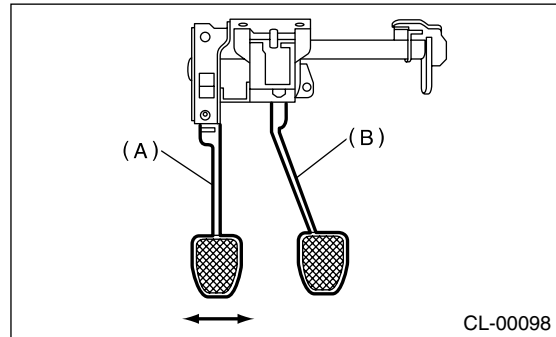
- (A) Clutch pedal
- (B) Bushing

4) Remove the stopper, clip, O-ring, rod S, and then remove the spring and bushing S.



- (A) Clip
- (B) O-ring
- (C) Bushing S
- (D) Spring S
- (E) Rod S
- (F) Stopper

Play of clutch pedal:
Service limit
5.0 mm (0.197 in) or less



- (A) Clutch pedal
- (B) Brake pedal

5) Remove the stoppers from clutch pedal.

6) Remove the clutch pedal pad. (Non-turbo model)

D: ASSEMBLY

- 1) Attach the stopper, etc. to pedal bracket temporarily.
- 2) Clean inside of bores of clutch pedal and brake pedal, apply grease, and set bushings into bores.
- 3) Align bores of pedal bracket, clutch pedal and brake pedal, attach the brake pedal return spring, assist rods, spring, and bushing.

NOTE:

Clean up inside of bushings and apply grease before installing the spacer.

E: INSPECTION

1. CLUTCH PEDAL

Move the clutch pedal pads in the lateral direction with a force of approximately 10 N (1 kgf, 2 lb) to ensure pedal play is in specified range.

CAUTION:

If excessive movement is noted, replace the bushings with new ones.

F: ADJUSTMENT

1. CLUTCH PEDAL

1) Turn the lock nuts until clutch pedal full stroke length is within specifications.

CAUTION:

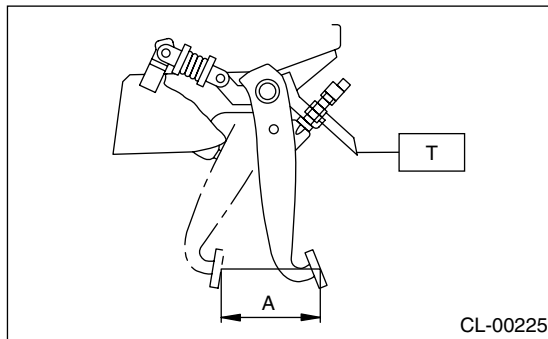
Do not attempt to turn the clutch switch to adjust clutch pedal full stroke length.

NOTE:

If lock nuts cannot adjust the clutch pedal full stroke length to specifications, turn the master cylinder push rod to adjust it.

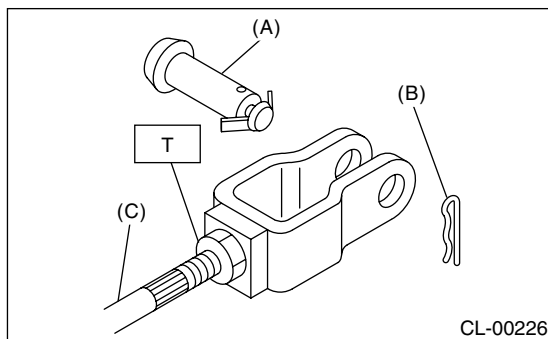
Specified clutch pedal full stroke: A
130 — 135 mm (5.12 — 5.31 in)

Tightening torque (Clutch switch lock nut):
T: 8 N·m (0.8 kgf-m, 5.8 ft-lb)



2) Turn the master cylinder push rod so that clevis pin moves to the left and then to the right. Clevis pin must move without resistance while it is rattling.

Tightening torque (Push rod lock nut):
T: 10 N·m (1.0 kgf-m, 7 ft-lb)



- (A) Clevis pin
- (B) Snap pin
- (C) Push rod

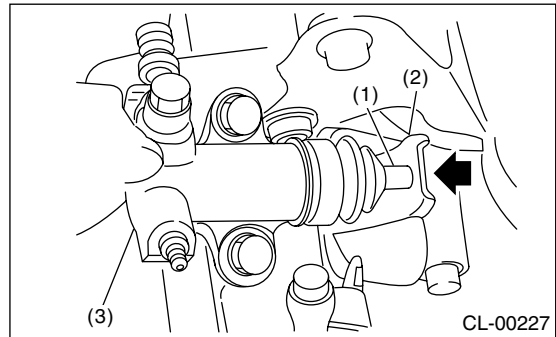
3) Depress and release the clutch pedal two to three times to ensure that clutch pedal and release fork operates smoothly. If the clutch pedal and release fork do not operate smoothly, bleed air from the clutch hydraulic system. <Ref. to CL-24, Clutch Fluid Air Bleeding.>

4) Measure the clutch pedal full stroke length again to ensure that it is within specifications. If it is not, repeat adjustment procedures again from the beginning.

Specified clutch pedal full stroke:
130 — 135 mm (5.12 — 5.31 in)

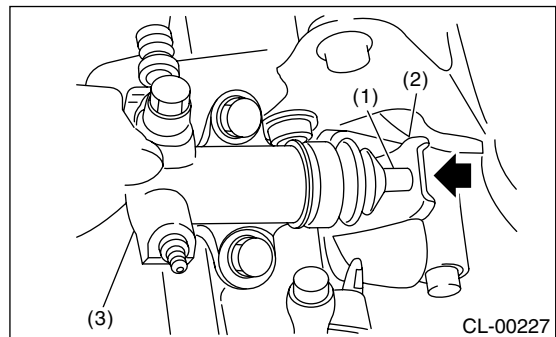
5) Move the clevis pin to the left and then to the right. It should move without resistance while it is rattling. If resistance is felt, repeat adjustment procedures again from the beginning.

6) Push the release lever until operating cylinder push rod retracts. Ensure that clutch fluid level in reservoir tank increases. If the clutch fluid level increases, the hydraulic clutch is properly adjusted; if fluid level does not increase or push rod does not retract, replace the master cylinder with a new one. <Ref. to CL-20, Master Cylinder.>



- (1) Push rod
- (2) Release lever
- (3) Operating cylinder

7) Push the release lever until operating cylinder push rod retracts. Check that the clutch fluid level in reservoir tank increases.



- (1) Push rod
- (2) Release lever
- (3) Operating cylinder

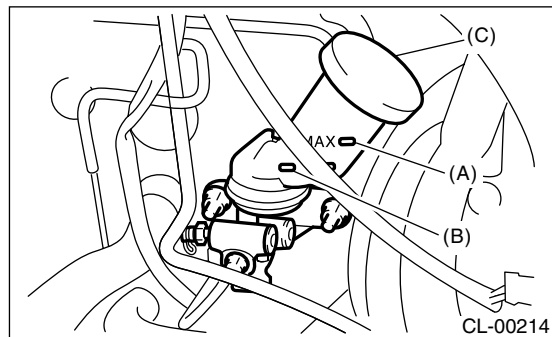
8) If the clutch fluid level increases, hydraulic clutch play is correct.

9) If the clutch fluid level does not increase or push rod does not retract, clutch pedal must be readjusted.

10) Check the fluid level on the outside of the reservoir tank. If the level is below "MIN", add clutch fluid to bring it up to "MAX".

Recommended clutch fluid:

FMVSS No. 116, fresh DOT 3 or DOT 4 brake fluid



- (A) Max. level
- (B) Min. level
- (C) Reservoir tank

11. Clutch Switch

A: REMOVAL

- 1) Disconnect the ground cable from battery.
- 2) Remove the instrument panel lower cover.
- 3) Disconnect the connector from clutch switch.
- 4) Remove the clutch switch.

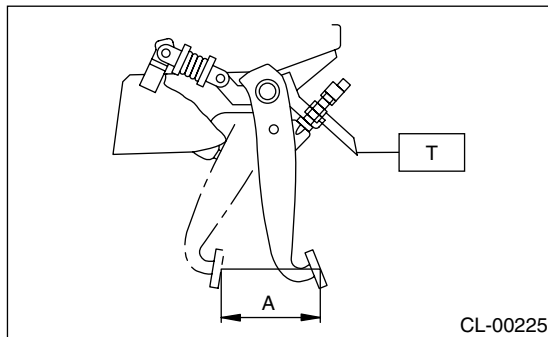
B: INSTALLATION

1. CLUTCH SWITCH (CRUISE CONTROL)

- 1) Move the clevis pin of the push rod right and left and hold where it moves smoothly, then measure stroke of clutch pedal.

Specified clutch pedal full stroke: A
130 — 135 mm (5.12 — 5.31 in)

Tightening torque:
T: 8 N·m (0.8 kgf-m, 5.8 ft-lb)

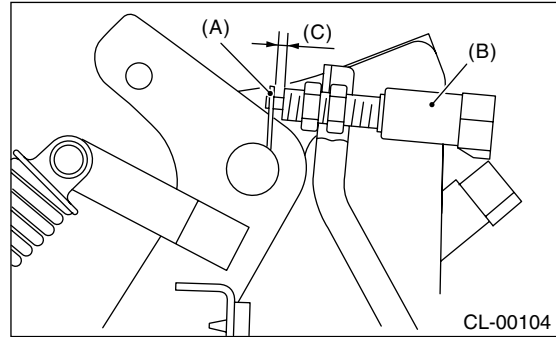


- 2) If the clutch pedal stroke is out of specification, adjust the stroke. <Ref. to CL-28, ADJUSTMENT, Clutch Pedal.>
- 3) Connect clutch switch connector.

2. CLUTCH SWITCH (STARTER INTER-LOCK)

- 1) Fully depress the clutch pedal.
- 2) Install the clutch pedal plate and clutch pedal so that the gap between them is 3 — 3.5 mm (0.12 — 0.14 in), and then tighten the lock nut.

Tightening torque:
8 N·m (0.8 kgf-m, 13.0 ft-lb)



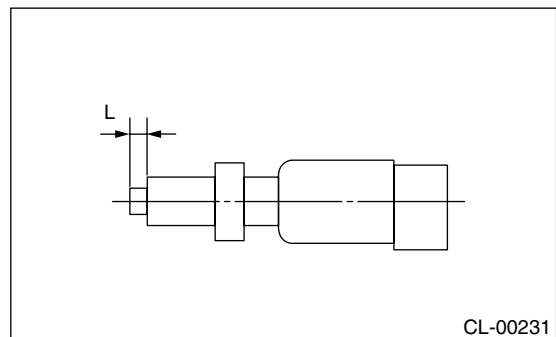
- (A) Plate
- (B) Clutch pedal
- (C) 3 — 3.5 mm (0.12 — 0.14 in)

- 3) Connect the clutch switch connector.
- 4) Confirm that the engine does not start when the clutch pedal is released.
- 5) Confirm that the engine starts when the clutch pedal is fully depressed.

C: INSPECTION

- 1) If the clutch switch (cruise control) does not operate properly (or if it does not stop at the specified position), replace with a new one.

Specified position: L
 $2^{+1.5}_{-0} \text{ mm } (0.079^{+0.059}_{-0} \text{ in})$



- 2) Check the clutch switch continuity. If continuity is not as specified, replace the switch.
 - (1) Disconnect the clutch switch connector.
 - (2) Measure the resistance between 1 and 2 of switch terminal.

Terminals/Specified resistance

When clutch pedal depressed:

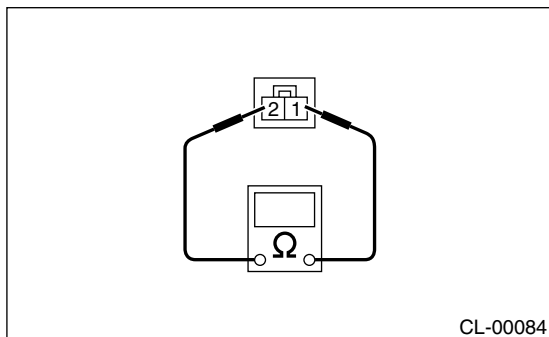
1 — 2/Less than 1 Ω

Terminals/Specified resistance

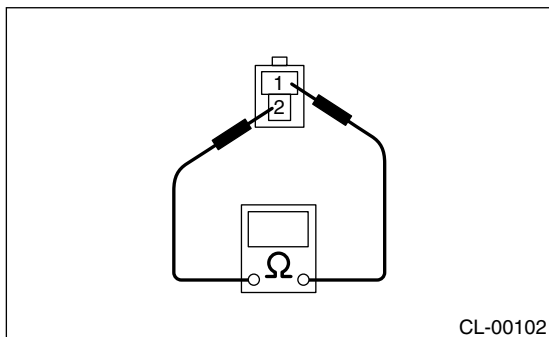
When clutch pedal not depressed:

1 — 2/More than 1 M Ω

Clutch switch (Cruise control)



Clutch switch (Starter interlock)

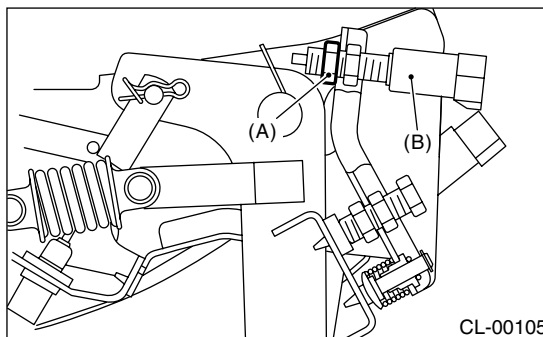


3) Confirm that the engine does not start when the clutch pedal is not depressed. If the engine starts, adjust the clutch switch, and inspect the starter interlock circuit.

4) Confirm that the engine starts when the clutch pedal is fully depressed. If the engine does not start, adjust the clutch switch, and inspect the starter interlock circuit.

D: ADJUSTMENT

1) Loosen the clutch switch mounting lock nut (Starter interlock).

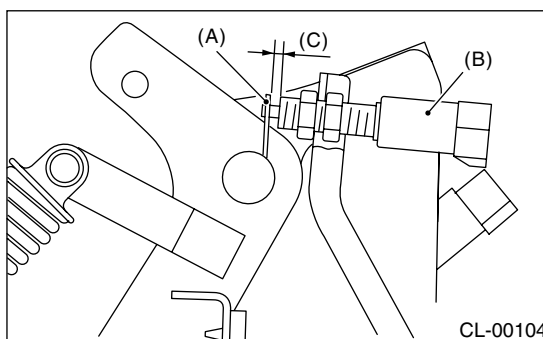


(A) Lock nut

(B) Clutch switch (Starter interlock)

2) Fully depress the clutch pedal.

3) Adjust the clutch pedal plate and clutch switch so that the gap between them is 3 — 3.5 mm (0.12 — 0.14 in).



(A) Plate

(B) Clutch switch (Starter interlock)

(C) 3 — 3.5 mm (0.12 — 0.14 in)

4) Tighten the lock nut.

Tightening torque:

8 N·m (0.8 kgf·m, 13.0 ft·lb)

12.General Diagnostic Table

A: INSPECTION

1. CLUTCH

Symptom	Possible cause	Corrective
1. Clutch slippage. It is hard to perceive clutch slippage in the early stage, but pay attention to the following symptoms • Engine speed up when shifting. • High speed driving is impossible; especially rapid acceleration impossible and vehicle speed does not increase in proportion to an increase in engine speed. • Power falls, particularly when ascending a slope, and there is a smell of burning of the clutch facing. • Method of testing: Put the vehicle in stationary condition with parking brake fully applied. Disengage the clutch and shift the transmission gear into the first. Gradually allow the clutch to engage while gradually increasing the engine speed. The clutch function is satisfactory if the engine stalls. However, the clutch is slipping if the vehicle does not start off and the engine does not stall.	(a) Clutch facing smeared by oil	Replace.
	(b) Worn clutch facing	Replace.
	(c) Deteriorated diaphragm spring	Replace.
	(d) Distorted pressure plate or flywheel	Correct or replace.
	(e) Defective release bearing holder	Correct or replace.
2. Clutch drags. As a symptom of this trouble, a harsh scratching noise develops and control becomes quite difficult when shifting gears. The symptom becomes more apparent when shifting into the first gear. However, because much trouble of this sort is due to defective synchronization mechanism, carry out the test as described after. • Method of testing: <Ref. to CL-32, CLUTCH, INSPECTION, General Diagnostic Table.> It may be judged as insufficient disengagement of clutch if any noise occurs during this test.	(a) Worn or rusty clutch disc hub spline	Replace the clutch disc.
	(b) Excessive deflection of clutch disc facing	Correct or replace.
	(c) Seized crankshaft pilot needle bearing	Replace.
	(d) Cracked clutch disc facing	Replace.
	(e) Stuck clutch disc (smeared by oil or water)	Replace.
3. Clutch chatters. Clutch chattering is an unpleasant vibration to the whole body when the vehicle is just started with clutch partially engaged.	(a) Adhesion of oil on the facing	Replace the clutch disc.
	(b) Weak or broken torsion spring	Replace the clutch disc.
	(c) Defective facing contact or excessive disc wear	Replace the defective clutch disc.
	(d) Warped pressure plate or flywheel	Correct or replace.
	(e) Loose disc rivets	Replace the clutch disc.
	(f) Loose engine mounting	Retighten or replace the mounting.
	(g) Improper adjustment of pitching stopper	Adjustment.
4. Noisy clutch Examine whether the noise is generated when the clutch is disengaged, engaged, or partially engaged.	(a) Broken, worn or unlubricated release bearing	Replace the release bearing.
	(b) Insufficient lubrication of pilot bearing	Apply grease.
	(c) Loose clutch disc hub	Replace the clutch disc.
	(d) Loose torsion spring retainer	Replace the clutch disc.
	(e) Deteriorated or broken torsion spring	Replace the clutch disc.

GENERAL DIAGNOSTIC TABLE

CLUTCH SYSTEM

Symptom	Possible cause	Corrective
5. Clutch grabs. When starting the vehicle with the clutch partially engaged, the clutch engages suddenly and the vehicle jumps instead of making a smooth start.	(a) Grease or oil on facing	Replace the clutch disc.
	(b) Deteriorated cushioning spring	Replace the clutch disc.
	(c) Worn or rusted spline of clutch disc or main shaft	Take off rust, apply grease or replace the clutch disc or main shaft.
	(d) Deteriorated or broken torsion spring	Replace the clutch disc.
	(e) Loose engine mounting	Retighten or replace the mounting.
	(f) Deteriorated diaphragm spring	Replace.

2. CLUTCH PEDAL

Trouble	Corrective action
Insufficient pedal play	Adjust pedal play.
Clutch pedal free play insufficient	Adjust pedal free play.
Excessively worn and damaged pedal shaft and/or bushing	Replace the bushing and/or shaft with a new one.

3. DIAGNOSTIC DIAGRAM OF CLUTCH DRAG

Step	Check	Yes	No
1 CHECK GEAR NOISE. 1)Start the engine. 2)Disengage the clutch and shift quickly from neutral to reverse in idling condition.	Is there any abnormal noise from the transmission gear?	Go to step 2.	Clutch is normal.
2 CHECK GEAR NOISE. Disengage the clutch at idle and shift from neutral to reverse within 0.5 — 1.0 seconds.	Is there any abnormal noise from the transmission gear?	Go to step 3.	Defective transmission or excessive clutch drag torque. Inspect the pilot bearing, clutch disc, transmission and clutch disc hub spline.
3 CHECK GEAR NOISE. 1)Disengage the clutch at idle and shift from neutral to reverse within 0.5 — 1.0 seconds. 2)With the clutch disengaged, shift from N to R, R to N several times.	Is there any abnormal noise from the transmission gear?	Defect in clutch disengaging. Inspect the clutch disc, clutch cover, clutch release, and clutch pedal free play.	Clutch and fly-wheel seizure. Inspect the clutch disc, spline of clutch disc hub.

GENERAL DIAGNOSTIC TABLE

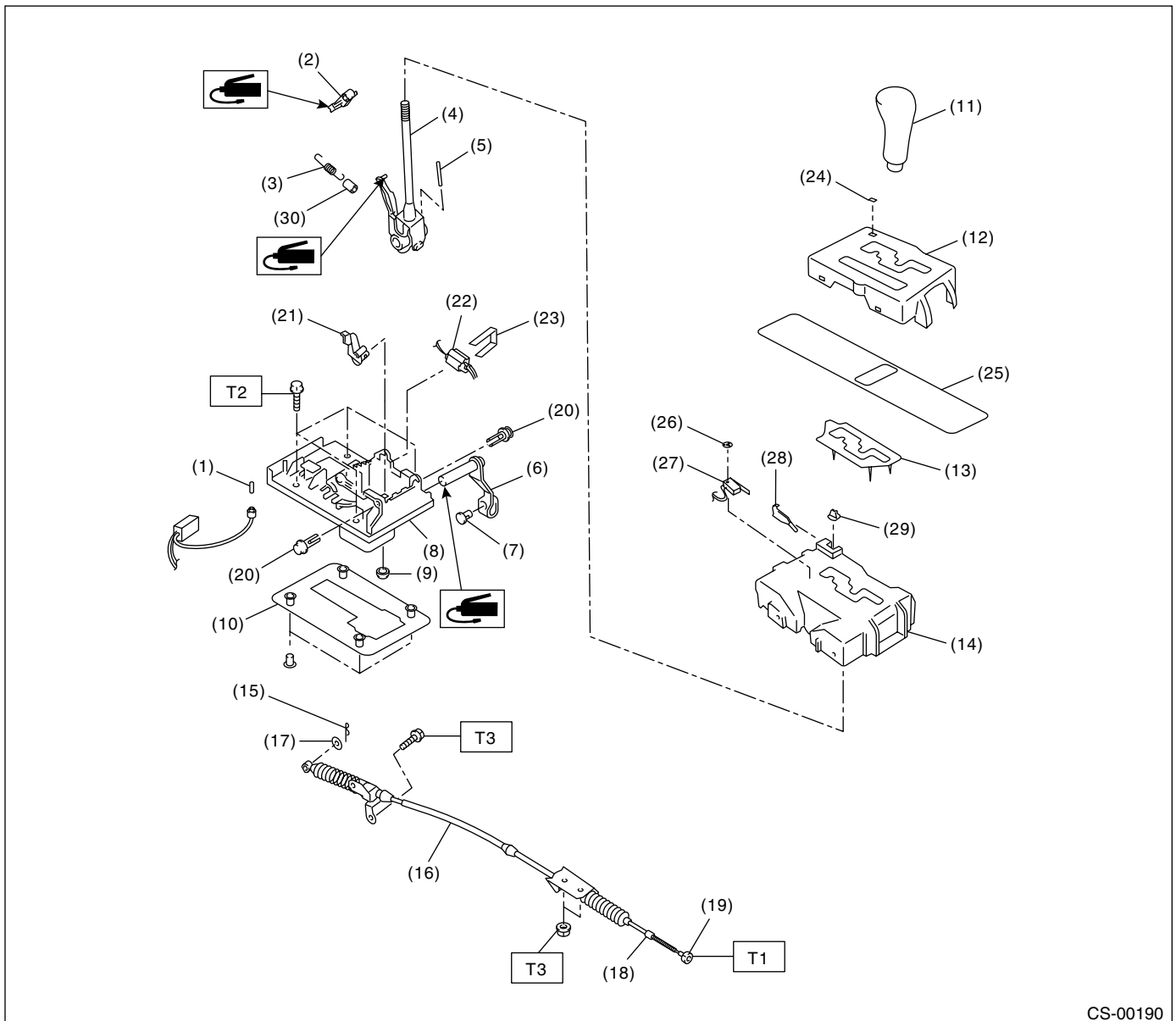
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CONTROL SYSTEMS

1. General Description
A: SPECIFICATIONS

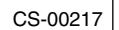
Item		Specification
Swing torque of rod against lever	N (kgf, lb)	3.7 (0.38, 0.84) or less

B: COMPONENT**1. AT SELECT LEVER**

CS-00190

(1) Indicator bulb	(13) Cushion plate	(25) Blind
(2) Detent arm	(14) Guide plate	(26) Clamp
(3) Detent spring	(15) Snap pin	(27) Parking switch
(4) Select lever ASSY	(16) Select cable	(28) Spring
(5) Spring pin	(17) Washer	(29) Button
(6) Arm	(18) Nut B	(30) Tube
(7) Bush	(19) Nut A	
(8) Plate	(20) Clamp	
(9) Grommet	(21) Lock plate	
(10) Packing	(22) Shift lock solenoid	
(11) Grip	(23) Clamp	
(12) Indicator cover	(24) Cover	

Tightening torque: N·m (kgf-m, ft-lb)**T1: 7.5 (0.76, 5.5)****T2: 13 (1.3, 9.4)****T3: 18 (1.8, 13.0)**



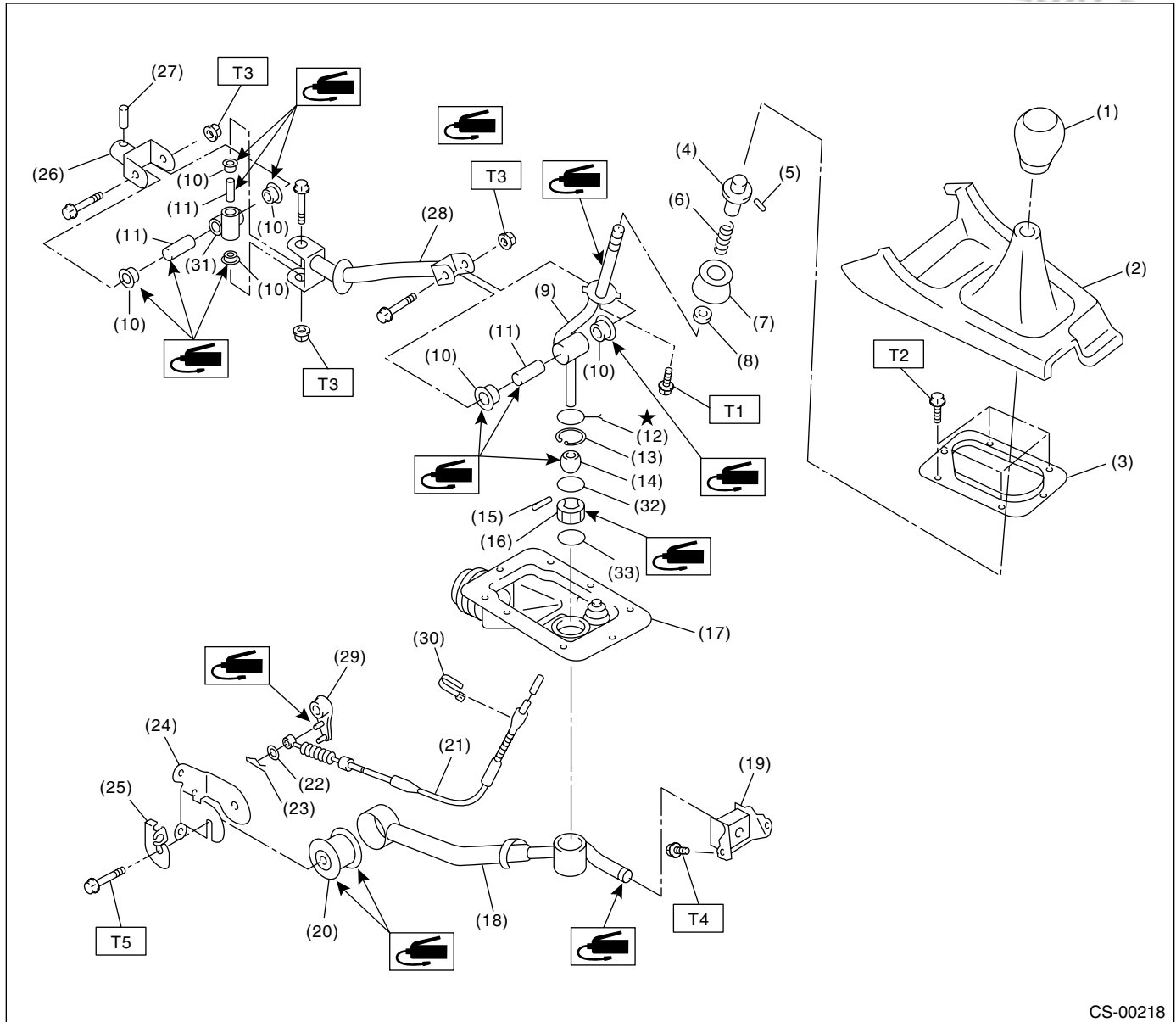
- Tightening torque: N·m (kgf-m, ft-lb)**

T1: 7.5 (0.76, 5.5)

T2: 12 (1.2, 8.7)

T3: 18 (1.8, 13.0)

3. 6MT GEAR SHIFT LEVER



CS-00218

(1) Gear shift knob	(15) Spring pin	(29) Reverse check lever
(2) Console box front	(16) Bush	(30) Band clip
(3) Plate	(17) Boot	(31) Boss
(4) Slider	(18) Stay	(32) O-ring
(5) Spring pin	(19) Cushion rubber	(33) O-ring
(6) Spring	(20) Bush	
(7) Holder	(21) Reverse check cable	
(8) Seat cushion	(22) Washer	
(9) Lever	(23) Snap pin	
(10) Bush	(24) Bracket	
(11) Spacer	(25) Cable plate	
(12) Lock wire	(26) Joint	
(13) Snap ring	(27) Spring pin	
(14) Bush	(28) Rod	

Tightening torque: N·m (kgf·m, ft·lb)

T1: 1.3 (0.13, 0.96)

T2: 7.5 (0.76, 5.5)

T3: 11.8 (1.2, 8.7)

T4: 18 (1.8, 13.0)

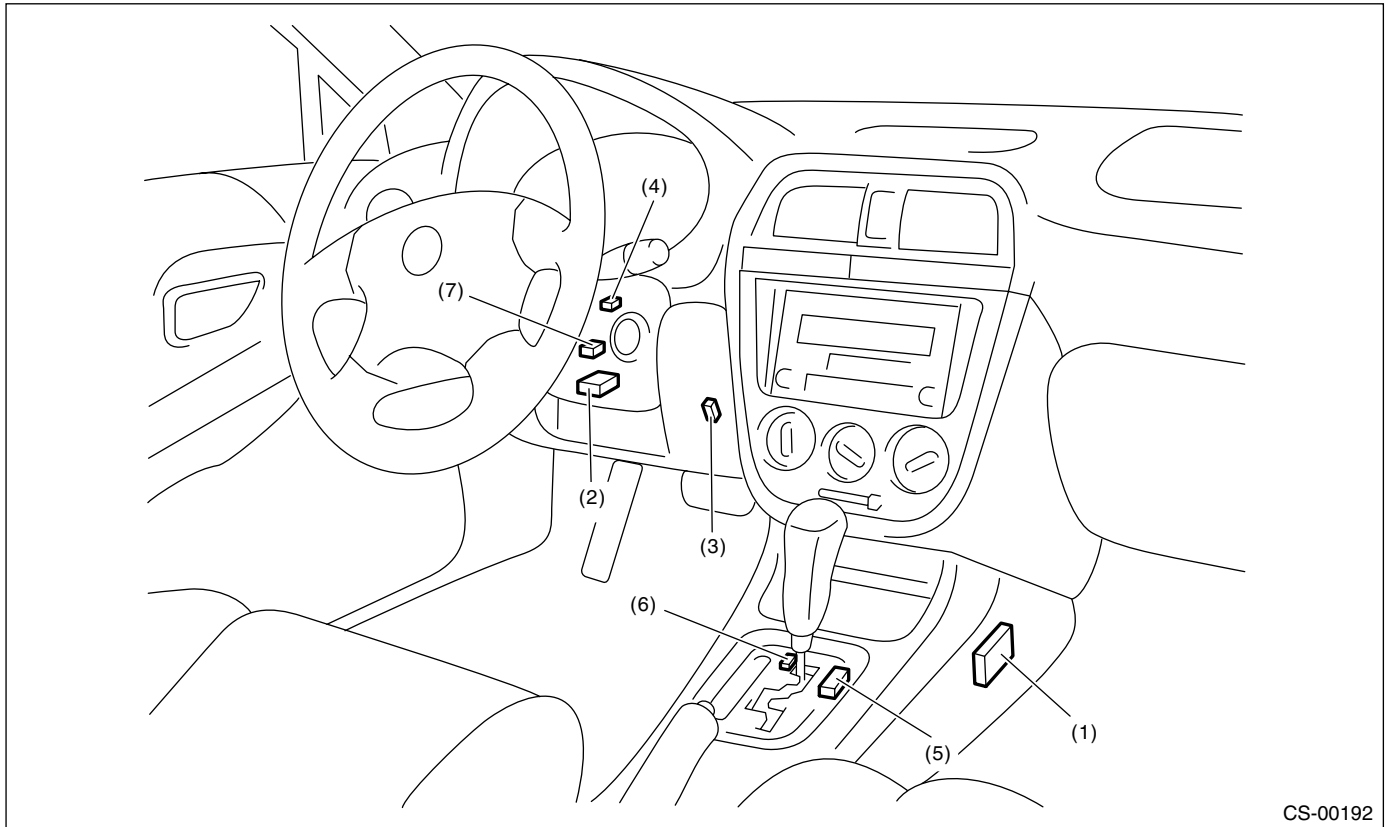
T5: 32 (3.3, 23.6)

C: CAUTION

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

2. AT Shift Lock System

A: LOCATION

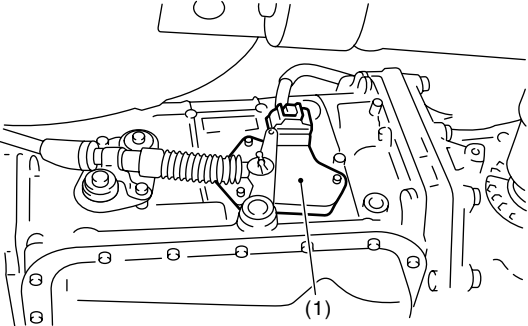
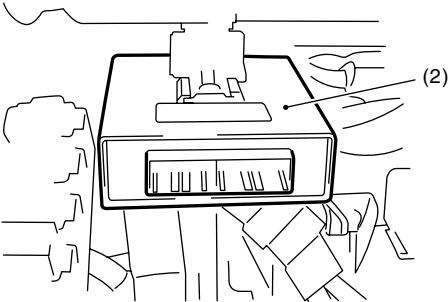
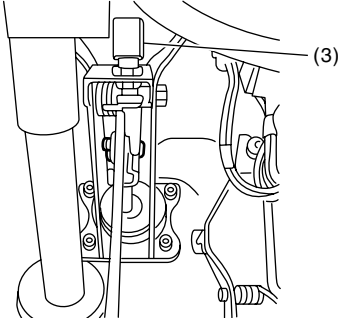
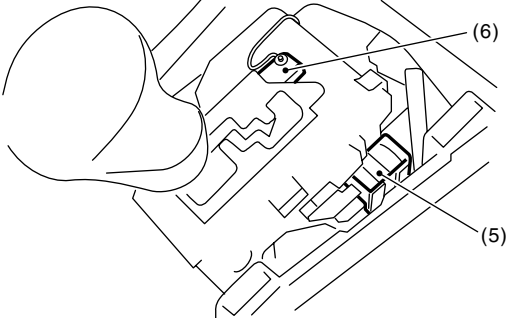
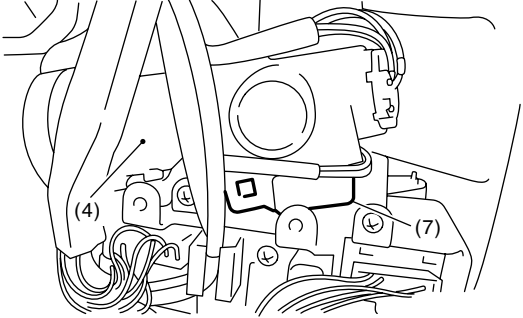


CS-00192

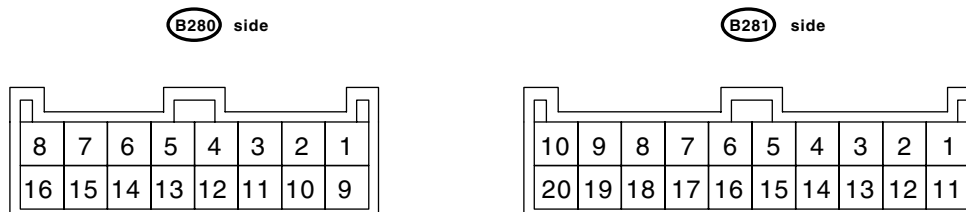
(1) Inhibitor switch	(4) Key warning switch	(7) Key lock solenoid
(2) Body integrated unit	(5) Shift lock solenoid	
(3) Stop light switch	(6) "P" range switch	

AT SHIFT LOCK SYSTEM

CONTROL SYSTEMS

 CS-00006	 CS-00194
 CS-00193	 CS-00085
 CS-00008	SUBARU.

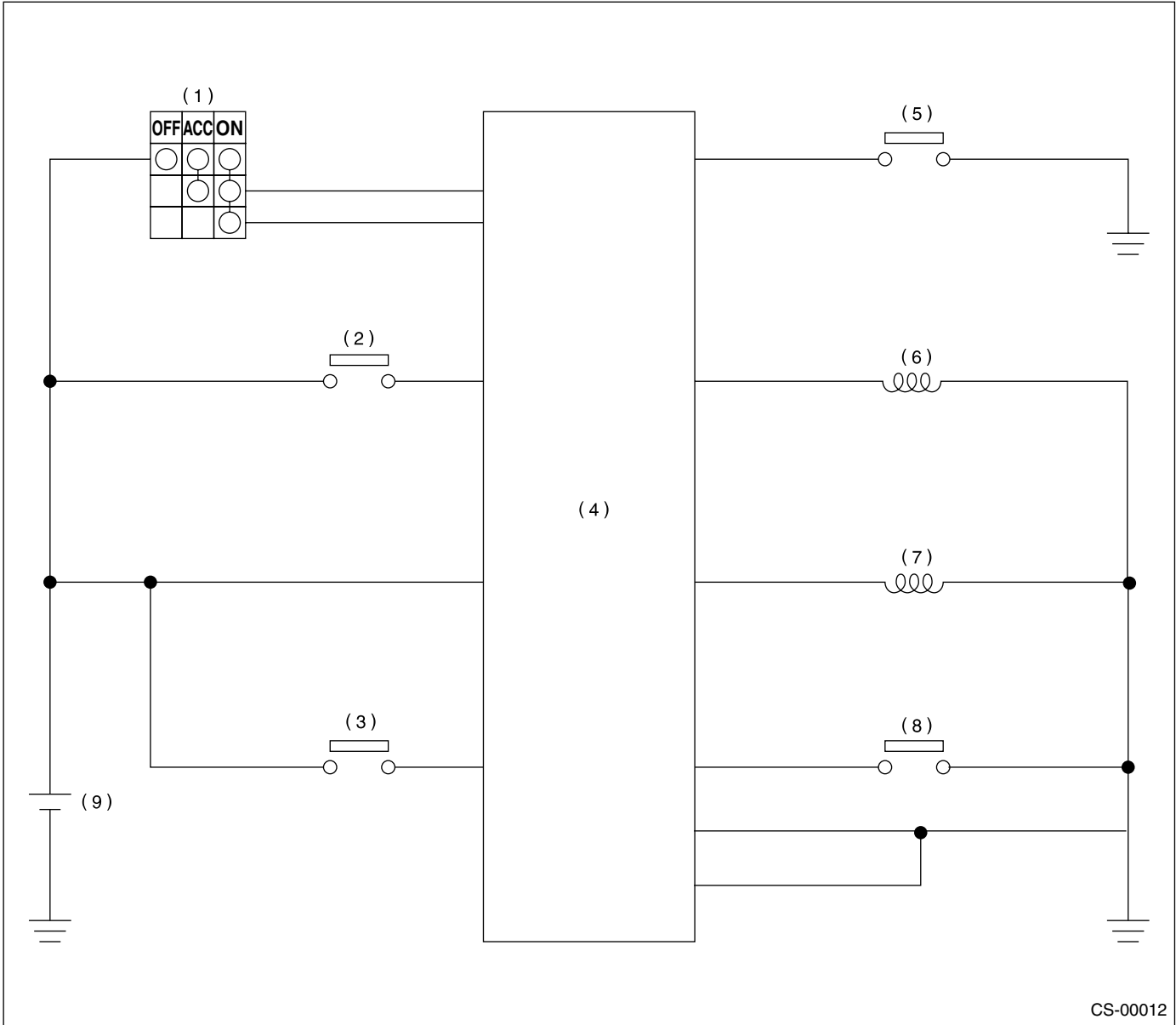
B: ELECTRICAL SPECIFICATION



CS-00011

Contents	To Connector No.	Terminal No.	Input/Output signal
			Measured value and measuring conditions
Battery power supply	B280	2	9 — 16 V
Ignition power supply	B281	19	10 — 15 V when ignition switch is at ON or START.
Ignition power supply	B281	10	10 — 15 V when ignition switch is at ACC.
Inhibitor Switch ("P" range)	B281	5	0 V when select lever is in "P" range. 9 — 16 V when select lever is in other ranges than "P" range.
Stop light switch	B281	9	9 — 16 V when stop light switch is ON. 0 V when stop light switch is OFF.
"P" range switch	B281	6	0 V when select lever is in "P" range. 9 — 16 V when select lever is in other ranges than "P" range.
Shift lock solenoid signal	B280	9	8.5 — 16 V when shift lock is released. 0 V when shift lock is operating.
Key warning switch signal	B281	20	9 — 16 V when key is inserted. 0 V when key is removed.
Key lock solenoid signal	B280	3	7.5 — 16 V when turning ignition switch to ON, select lever is in "P" range and brake switch is ON. 0 V at other conditions than above.
Ground	B280	4	—
Ground	B280	13	—

C: SCHEMATIC



D: INSPECTION

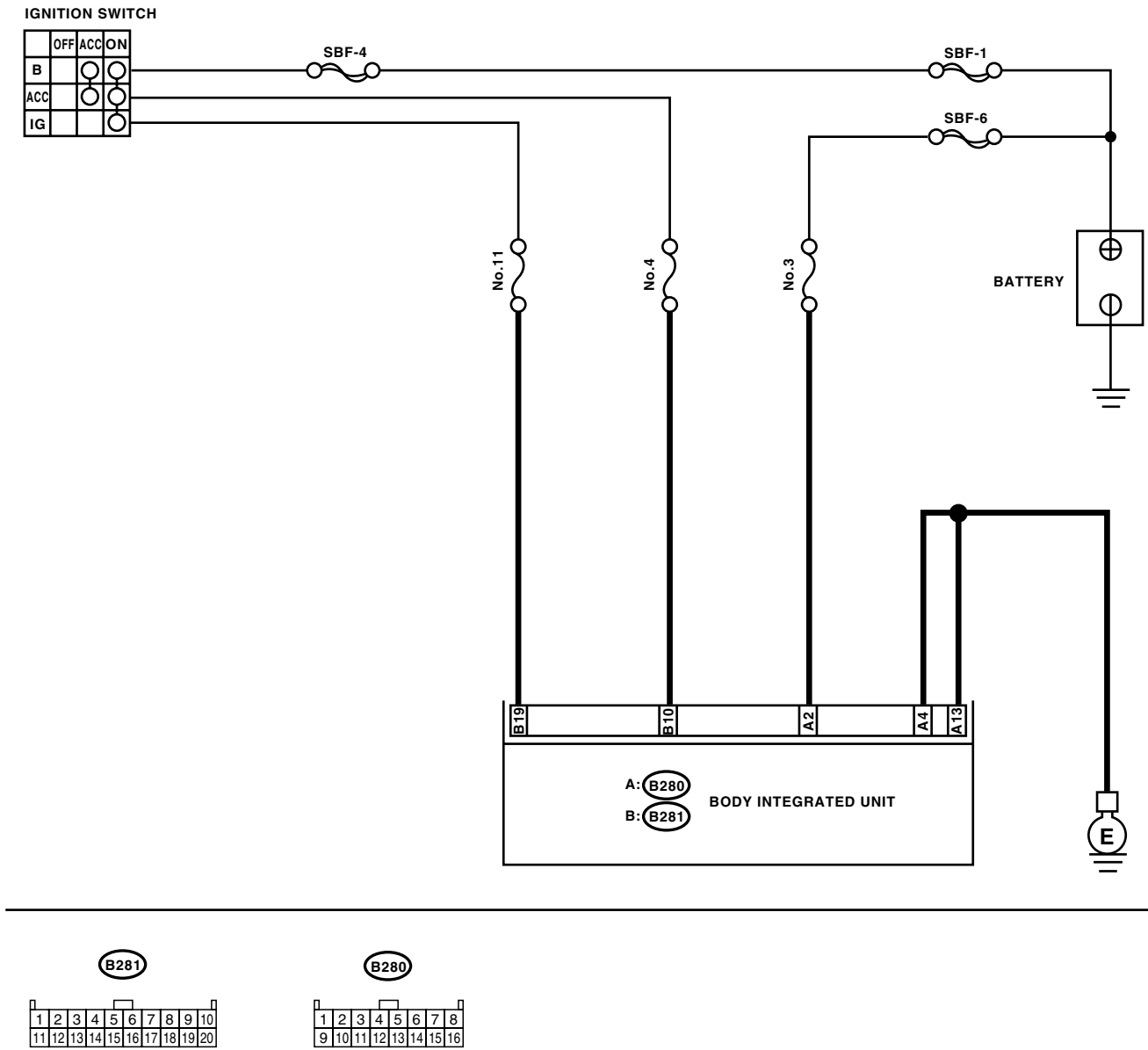
1. SHIFT LOCK OPERATION

Step	Check	Yes	No
1 CHECK SHIFT LOCK. 1)Turn the ignition switch ON. 2)Move the select lever to "P" range.	While the brake pedal is not depressed, can select lever move from "P" range to other ranges?	Inspect "SELECT LEVER SHIFT LOCK CANNOT BE RELEASED". <Ref. to CS-16, SELECT LEVER SHIFT LOCK CANNOT BE RELEASED, INSPECTION, AT Shift Lock Sys-tem.>	Go to step 2.
2 CHECK SHIFT LOCK.	While the brake pedal is depressed, can select lever move from "P" range to other ranges?	Go to step 3.	Inspect "SELECT LEVER CANNOT BE SHIFT LOCKED". <Ref. to CS-14, SELECT LEVER CANNOT BE SHIFT LOCKED, INSPECTION, AT Shift Lock Sys-tem.>
3 CHECK KEY INTERLOCK.	When the select lever is in other than "P" range, does ignition switch turn to "LOCK" position?	Inspect "KEY INTERLOCK DOES NOT BE LOCKED OR RELEASED. <Ref. to CS-19, KEY INTERLOCK DOES NOT LOCK OR RELEASE, INSPECTION, AT Shift Lock Sys-tem.>	Go to step 4.
4 CHECK KEY INTERLOCK.	When the select lever is in "P" range, does ignition switch turn to "LOCK" position?	AT shift lock system is normal.	Inspect "KEY INTERLOCK DOES NOT BE LOCKED OR RELEASED. <Ref. to CS-19, KEY INTERLOCK DOES NOT LOCK OR RELEASE, INSPECTION, AT Shift Lock Sys-tem.>

AT SHIFT LOCK SYSTEM

CONTROL SYSTEMS

2. BODY INTEGRATED UNIT POWER SUPPLY AND GROUND LINE



CS-00258

AT SHIFT LOCK SYSTEM

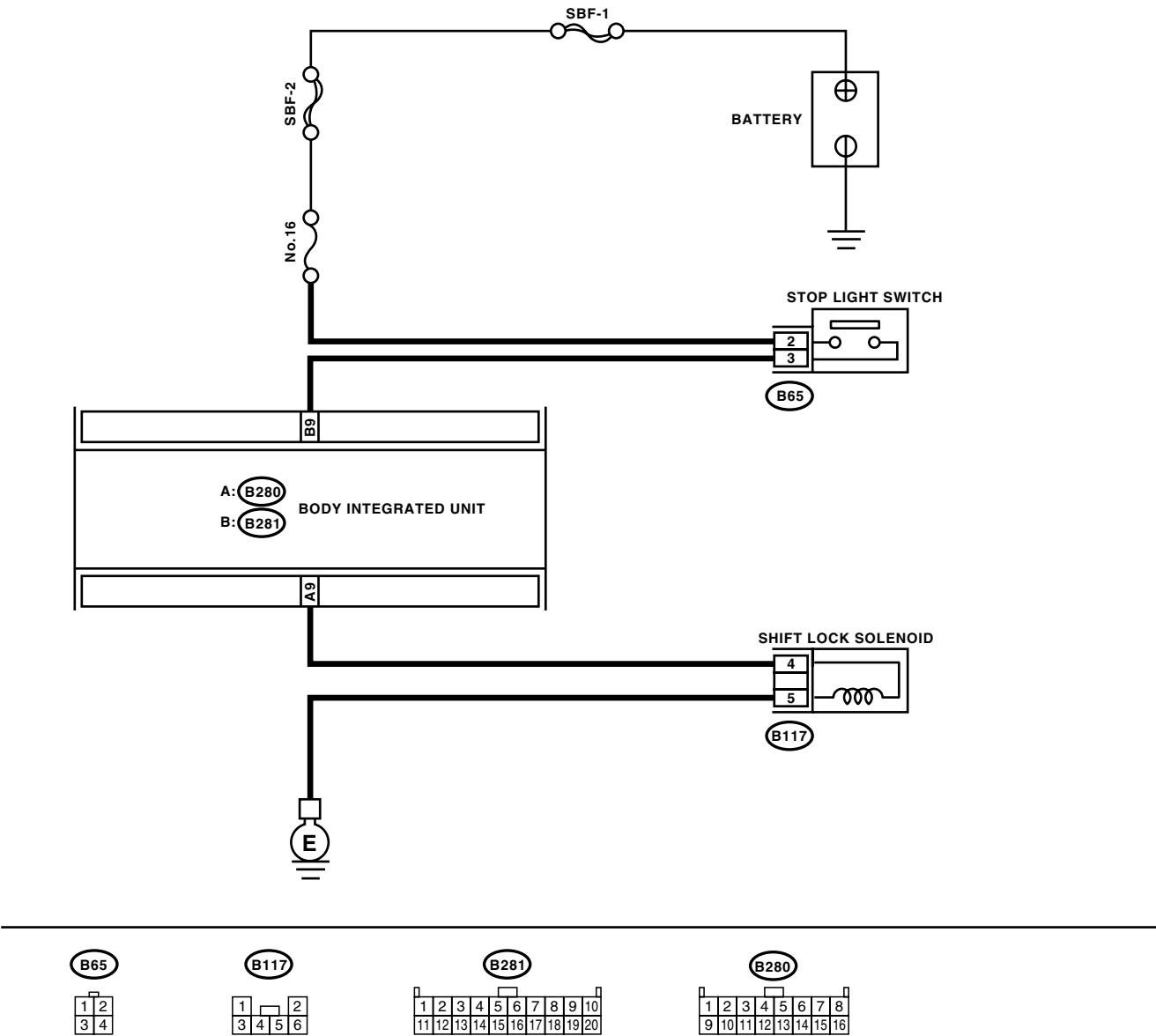
CONTROL SYSTEMS

Step		Check	Yes	No
1	CHECK FUSE. Remove the fuse (No. 3, 4 and 11).	Is the fuse (No. 3, 4 or 11) blown out?	Replace the fuse (No. 3, 4 or 11). If the replaced fuse (No. 3, 4 or 11) has blown out easily, repair short circuit in harness between fuse and body integrated unit.	Go to step 2.
2	CHECK HARNESS CONNECTOR BETWEEN BODY INTEGRATED UNIT AND BODY GROUND. 1) Turn the ignition switch to OFF. 2) Measure the resistance of harness between body integrated unit and chassis ground. Connector & terminal (B280) No. 4 — Chassis ground: (B280) No. 13 — Chassis ground:	Is the resistance less than 1 Ω ?	Go to step 3.	Repair the open circuit in harness between body integrated unit and body ground.
3	CHECK BATTERY POWER SUPPLY. 1) Turn the ignition switch to ON (engine OFF). 2) Measure the voltages between body integrated unit and chassis ground. Connector & terminal (B280) No. 2 (+) — Chassis ground (-):	Is the voltage more than 9 V?	Go to step 4.	Repair the open circuit harness between battery and body integrated unit, and poor contact in coupling connector.
4	CHECK IGNITION POWER SUPPLY CIRCUIT. 1) Turn the ignition switch to ACC. 2) Measure the voltage between body integrated unit and chassis ground. Connector & terminal (B281) No. 10 (+) — Chassis ground (-):	Is the voltage more than 9 V?	Go to step 5.	Repair the open circuit harness between battery and body integrated unit, and poor contact in coupling connector.
5	CHECK IGNITION POWER SUPPLY CIRCUIT. 1) Turn the ignition switch to ON (engine OFF). 2) Measure the voltage between body integrated unit and chassis ground. Connector & terminal (B281) No. 19 (+) — Chassis ground (-):	Is the voltage more than 9 V?	Go to step 6.	Repair the open circuit harness between battery and body integrated unit, and poor contact in coupling connector.
6	CHECK POOR CONTACT.	Is there poor contact in connector?	Repair the poor contact.	Replace the body integrated unit.

AT SHIFT LOCK SYSTEM

CONTROL SYSTEMS

3. SELECT LEVER CANNOT BE SHIFT LOCKED



CS-00259

AT SHIFT LOCK SYSTEM

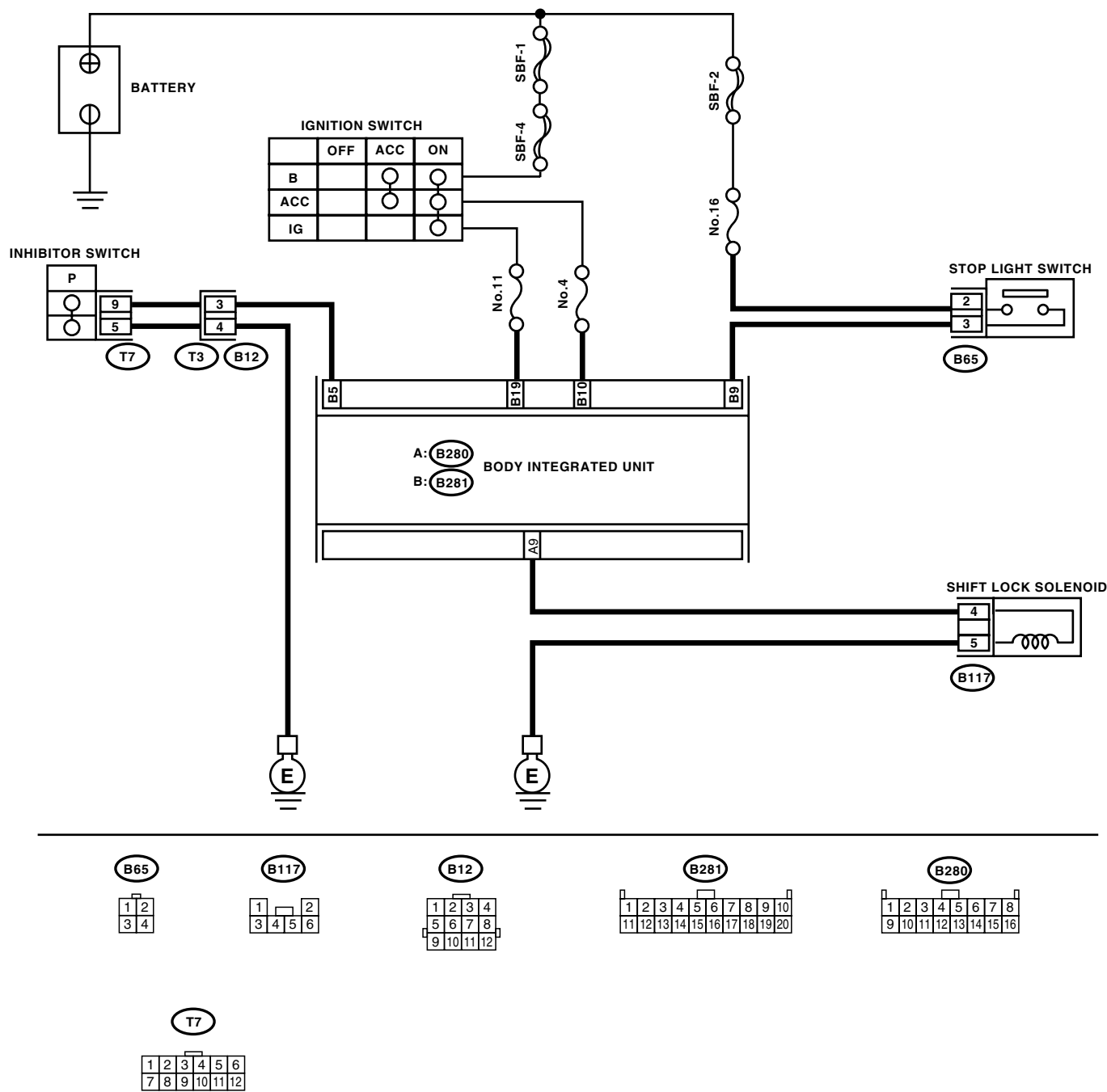
CONTROL SYSTEMS

Step		Check	Yes	No
1	CHECK STOP LIGHT SWITCH. Depress the brake pedal.	Does the stop light turn on?	Go to step 2.	Inspect the stop light system.
2	CHECK HARNESS BETWEEN STOP LIGHT SWITCH AND BODY INTEGRATED UNIT. 1) Turn the ignition switch to OFF. 2) Disconnect the body integrated unit and stoplight switch connector. 3) Measure the resistance of harness between stop light switch and body integrated unit. Connector & terminal (B65) No. 3 — (B281) No. 9:	Is the resistance more than 1 MΩ?	Repair the open circuit in harness between body integrated unit and stop light switch.	Go to step 3.
3	CHECK HARNESS BETWEEN STOP LIGHT SWITCH AND BODY INTEGRATED UNIT. Measure the resistance of harness between stop light switch and chassis ground. Connector & terminal (B65) No. 3 — Chassis ground:	Is the resistance less than 1 Ω?	Repair the short circuit in harness between body integrated unit and stop light switch.	Go to step 4.
4	CHECK HARNESS BETWEEN BODY INTEGRATED UNIT AND SHIFT LOCK SOLENOID. 1) Disconnect the shift lock solenoid connector. 2) Measure the resistance of harness between body integrated unit and shift lock solenoid. Connector & terminal (B117) No. 4 — (B280) No. 9:	Is the resistance more than 1 MΩ?	Repair the open circuit in harness between body integrated unit and shift lock solenoid.	Go to step 5.
5	CHECK HARNESS BETWEEN BODY INTEGRATED UNIT AND SHIFT LOCK SOLENOID. Measure the resistance of harness between shift lock solenoid and chassis ground. Connector & terminal (B117) No. 4 — Chassis ground:	Is the resistance less than 1 Ω?	Repair the short circuit in harness between body integrated unit and shift lock solenoid.	Go to step 6.
6	CHECK HARNESS BETWEEN SHIFT LOCK SOLENOID AND CHASSIS GROUND. Measure the resistance of harness between shift lock solenoid and chassis ground. Connector & terminal (B117) No. 5 — Chassis ground:	Is the resistance more than 1 MΩ?	Repair the open circuit in harness between shift lock solenoid and body ground.	Go to step 7.
7	CHECK SHIFT LOCK SOLENOID. Measure the resistance of shift lock solenoid connector terminals. Terminals No. 4 — No. 5:	Is the resistance 20 — 40 Ω?	Go to step 8.	Replace the shift lock solenoid.
8	CHECK SHIFT LOCK SOLENOID. Connect the battery with shift lock solenoid connector terminal and operate solenoid. Terminals No. 4 (+) — No. 5 (-):	Does the shift lock solenoid operate properly?	Go to step 9.	Replace the shift lock solenoid.
9	CHECK POOR CONTACT.	Is there poor contact in connector?	Repair the poor contact.	Replace the body integrated unit.

AT SHIFT LOCK SYSTEM

CONTROL SYSTEMS

4. SELECT LEVER SHIFT LOCK CANNOT BE RELEASED



CS-00260

AT SHIFT LOCK SYSTEM

CONTROL SYSTEMS

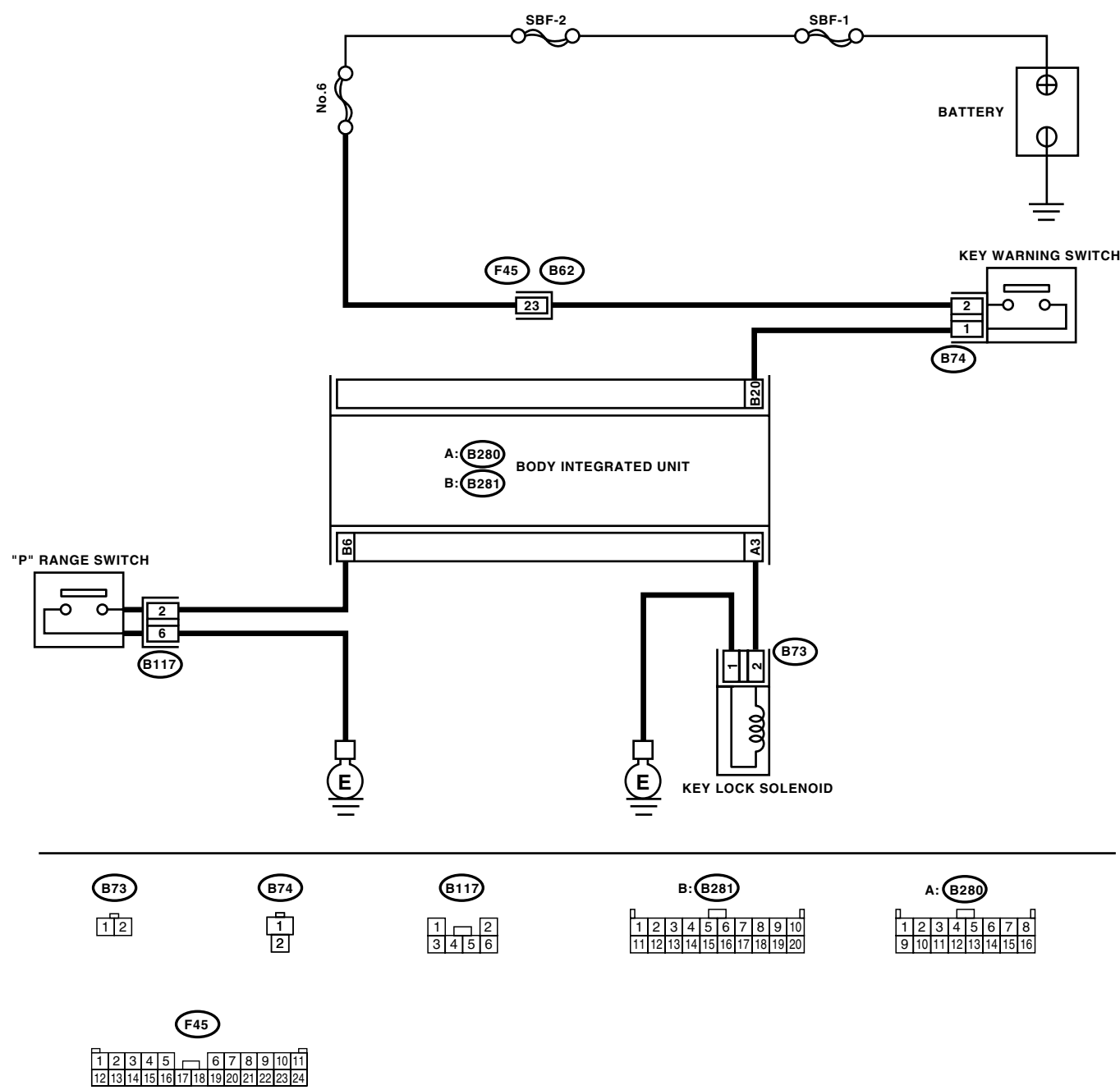
Step	Check	Yes	No
1	CHECK INHIBITOR SWITCH. 1) Turn the ignition switch to ON (engine OFF). 2) Move the select lever from "P" to "1" range.	Go to step 2.	Adjust the inhibitor switch and select cable.
2	CHECK HARNESS BETWEEN INHIBITOR SWITCH AND BODY INTEGRATED UNIT. 1) Turn the ignition switch to OFF. 2) Disconnect the connector of transmission harness and body integrated unit. 3) Measure the resistance of harness between body integrated unit and chassis ground. Connector & terminal (B281) No. 5 — Chassis ground:	Is the resistance less than 1 Ω ? Repair the short circuit in harness between body integrated unit and transmission connector.	Go to step 3.
3	CHECK HARNESS BETWEEN INHIBITOR SWITCH AND BODY INTEGRATED UNIT. Measure the resistance of harness between body integrated unit and inhibitor switch. Connector & terminal (B12) No. 3 — (B281) No. 5:	Is the resistance more than 1 $M\Omega$? Repair the open circuit in harness between body integrated unit and transmission connector	Go to step 4.
4	CHECK HARNESS BETWEEN INHIBITOR SWITCH AND CHASSIS GROUND. Measure the resistance of harness between body integrated unit and chassis ground. Connector & terminal (B12) No. 4 — Chassis ground:	Is the resistance less than 1 Ω ? Go to step 5.	Repair the open circuit in harness between body integrated unit and chassis ground.
5	CHECK INHIBITOR SWITCH. 1) Move the select lever to "P" range. 2) Measure the resistance of transmission harness connector terminals. Connector & terminal (T3) No. 3 — No. 4:	Is the resistance more than 1 $M\Omega$? Repair or replace the inhibitor switch.	Go to step 6.
6	CHECK OUTPUT SIGNAL FOR BODY INTEGRATED UNIT. 1) Connect all connectors. 2) Turn the ignition switch to ON. 3) Measure the voltage between body integrated unit and chassis ground. Connector & terminal (B281) No. 5 (+) — Chassis ground (-):	Is the voltage 9 — 16 V? Go to step 7.	Go to step 15.
7	CHECK STOP LIGHT SWITCH. Depress the brake pedal.	Does the stop light turn on? Go to step 8.	Inspect the stop light system.
8	CHECK HARNESS BETWEEN STOP LIGHT SWITCH AND AT SHIFT LOCK CONTROL MODULE. 1) Depress the brake pedal. 2) Measure the voltage between body integrated unit and chassis ground. Connector & terminal (B281) No. 9 (+) — Chassis ground (-):	Is the voltage more than 9 V? Go to step 9.	Repair the open or short circuit in harness between body integrated unit and stop light switch.
9	CHECK HARNESS BETWEEN BODY INTEGRATED UNIT AND SHIFT LOCK SOLENOID. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from shift lock solenoid and body integrated unit. 3) Measure the resistance of harness between body integrated unit and shift lock solenoid. Connector & terminal (B280) No. 9 — (B117) No. 4:	Is the resistance more than 1 $M\Omega$? Repair the open circuit in harness between body integrated unit and shift lock solenoid.	Go to step 10.

AT SHIFT LOCK SYSTEM

CONTROL SYSTEMS

Step	Check	Yes	No
10 CHECK HARNESS BETWEEN BODY INTEGRATED UNIT AND SHIFT LOCK SOLENOID. Measure the resistance of harness between shift lock solenoid and chassis ground. Connector & terminal (B280) No. 9 — Chassis ground:	Is the resistance less than 10 Ω ?	Go to step 11.	Repair the short circuit in harness between body integrated unit and shift lock solenoid.
11 CHECK HARNESS BETWEEN SHIFT LOCK SOLENOID AND CHASSIS GROUND. Measure the resistance of harness between shift lock solenoid and chassis ground. Connector & terminal (B117) No. 5 — Chassis ground:	Is the resistance less than 1 Ω ?	Go to step 12.	Repair the open circuit in harness between shift lock solenoid and chassis ground.
12 CHECK SHIFT LOCK SOLENOID. Measure the resistance of shift lock solenoid connector terminals. Terminals No. 4 — No. 5:	Is the resistance 20 — 40 Ω ?	Go to step 13.	Replace the shift lock solenoid.
13 CHECK SHIFT LOCK SOLENOID. Connect the battery with shift lock solenoid connector terminal and operate solenoid. Terminals No. 4 (+) — No. 5 (-):	Is the shift lock solenoid operating properly?	Go to step 14.	Replace the shift lock solenoid.
14 CHECK OUTPUT SIGNAL FOR AT SHIFT LOCK CONTROL MODULE. 1) Turn the ignition switch to ON (engine OFF). 2) Measure the voltage between body integrated unit and chassis ground. Connector & terminal (B280) No. 9 (+) — Chassis ground (-):	Is the voltage more than 8.5 V?	Go to step 15.	Replace the body integrated unit.
15 CHECK POOR CONTACT.	Is there poor contact in connector?	Repair the poor contact.	Replace the body integrated unit.

5. KEY INTERLOCK DOES NOT LOCK OR RELEASE



AT SHIFT LOCK SYSTEM

CONTROL SYSTEMS

Step		Check	Yes	No
1	CHECK HARNESS BETWEEN BATTERY AND KEY WARNING SWITCH. 1) Disconnect the connector key warning switch. 2) Measure the voltage of harness between key warning switch and chassis ground. Connector & terminal (B74) No. 2 (+) — Chassis ground (-):	Is the voltage 9 — 16 V?	Go to step 2.	Repair the open or short circuit in harness between battery and key warning switch.
2	CHECK KEY WARNING SWITCH. Measure the resistance of key warning switch connector terminals. Terminals No. 1 — No. 2:	Is the resistance more than 1 MΩ?	Replace the key warning switch.	Go to step 3.
3	CHECK KEY WARNING SWITCH. 1) Remove the key. 2) Measure the resistance of key warning switch connector terminals. Terminals No. 1 — No. 2:	Is the resistance more than 1 MΩ?	Go to step 4.	Replace the key warning switch.
4	CHECK HARNESS BETWEEN AT SHIFT LOCK CONTROL MODULE AND KEY WARNING SWITCH. 1) Disconnect the body integrated unit connector. 2) Measure the voltage of harness body integrated unit and chassis ground. Connector & terminal (B281) No. 20 (+) — Chassis ground (-):	Is the voltage more than 9 V?	Go to step 5.	Repair the open circuit in harness between body integrated unit and key warning switch.
5	CHECK HARNESS BETWEEN BODY INTEGRATED UNIT AND KEY LOCK SOLENOID. 1) Disconnect the connector of key lock solenoid. 2) Measure the resistance of harness between body integrated unit and key lock solenoid. Connector & terminal (B73) No. 2 — (B280) No. 3:	Is the resistance more than 1 MΩ?	Repair the open circuit in harness between body integrated unit and key lock solenoid.	Go to step 6.
6	CHECK HARNESS BETWEEN BODY INTEGRATED UNIT AND KEY LOCK SOLENOID. Measure the resistance of harness between body integrated unit and chassis ground. Connector & terminal (B280) No. 3 — Chassis ground:	Is the resistance more than 1 Ω?	Go to step 7.	Repair the short circuit in harness between body integrated unit and key lock solenoid.
7	CHECK HARNESS BETWEEN KEY LOCK SOLENOID AND CHASSIS GROUND. Measure the resistance of harness between key lock solenoid and chassis ground. Connector & terminal (B73) No. 1 — Chassis ground:	Is the resistance less than 10 Ω?	Go to step 8.	Repair the open circuit in harness between key lock solenoid and chassis ground.
8	CHECK KEY LOCK SOLENOID. Measure the resistance of key lock solenoid connector terminals. Terminals No. 1 — No. 2:	Is the resistance 4 — 8 Ω?	Go to step 14.	Replace the key lock solenoid.
9	CHECK HARNESS BETWEEN “P” RANGE SWITCH AND CHASSIS GROUND. Measure the resistance of harness between “P” range switch and chassis ground. Connector & terminal (B117) No. 2 — Chassis ground:	Is the resistance less than 1 Ω?	Go to step 10.	Repair the short circuit in harness between “P” range switch and body integrated unit.

AT SHIFT LOCK SYSTEM

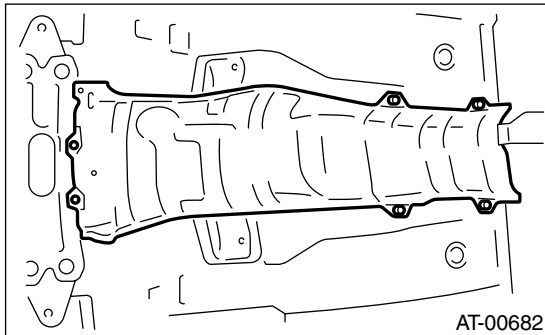
CONTROL SYSTEMS

Step	Check	Yes	No
10 CHECK HARNESS BETWEEN AT SHIFT LOCK CONTROL MODULE AND “P” RANGE SWITCH. 1) Disconnect the connector from “P” range switch. 2) Measure the resistance of harness between body integrated unit and “P” range switch. Connector & terminal (B117) No. 2 — (B281) No. 6:	Is the resistance more than 1 MΩ?	Repair the open circuit in harness between body integrated unit and “P” range switch.	Go to step 11.
11 CHECK HARNESS BETWEEN “P” RANGE SWITCH AND CHASSIS GROUND. Measure the resistance of harness “P” range switch and chassis ground. Connector & terminal (B117) No. 6 — Chassis ground:	Is the resistance more than 1 MΩ?	Repair the open circuit in harness between “P” range switch and chassis ground.	Go to step 12.
12 CHECK “P” RANGE SWITCH. 1) Move the select lever to “P” range. 2) Measure resistance between “P” range switch connector terminals. Terminals No. 2 — No. 6:	Is the resistance less than 1 Ω?	Go to step 13.	Replace the “P” range switch.
13 CHECK “P” RANGE SWITCH. 1) Move the select lever to other than “P” range. 2) Measure resistance between “P” range switch connector terminals. Terminals No. 2 — No. 6:	Is the resistance more than 1 MΩ?	Go to step 14.	Replace the “P” range switch.
14 CHECK OUTPUT SIGNAL FOR BODY INTEGRATED UNIT. 1) Connect all connectors. 2) Turn the ignition switch to ON (engine OFF). 3) Move the select lever to “P” range. 4) Press the brake pedal. 5) Measure the voltage between body integrated unit connector and chassis ground. Connector & terminal (B280) No. 3 (+) — Chassis ground (-):	Is the voltage 7.5 — 16 V?	Go to step 15.	Replace the body integrated unit.
15 CHECK POOR CONTACT.	Is there poor contact in connector?	Repair the poor contact.	Replace the body integrated unit.

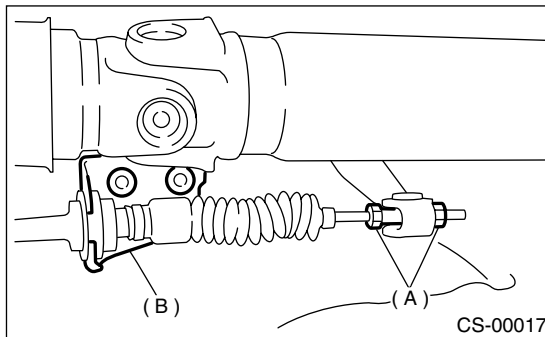
3. Select Lever

A: REMOVAL

- 1) Set the vehicle on a lift.
- 2) Disconnect negative cable from battery.
- 3) Set the select lever to the "N" range.
- 4) Lift-up the vehicle.
- 5) Remove the rear exhaust pipe and muffler.
SOHC model
<Ref. to EX(H4SO)-8, REMOVAL, Rear Exhaust Pipe.> and <Ref. to EX(H4SO)-9, REMOVAL, Muffler.>
DOHC turbo model
<Ref. to EX(H4DOTC)-13, REMOVAL, Rear Exhaust Pipe.> and <Ref. to EX(H4DOTC)-14, REMOVAL, Muffler.>
- 6) Remove the heat shield cover. (If equipped)



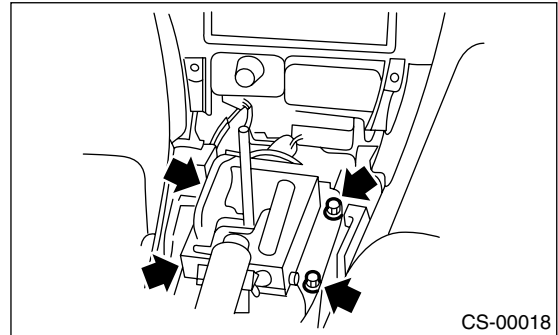
- 7) Disconnect the cable from select lever, and then remove the cable bracket.



- (A) Adjusting nuts
(B) Cable bracket

- 8) Lower the vehicle.
- 9) Remove the console box. <Ref. to EI-43, REMOVAL, Console Box.>

- 10) Disconnect the connectors, then remove the four bolts to take out the select lever assembly from the body.

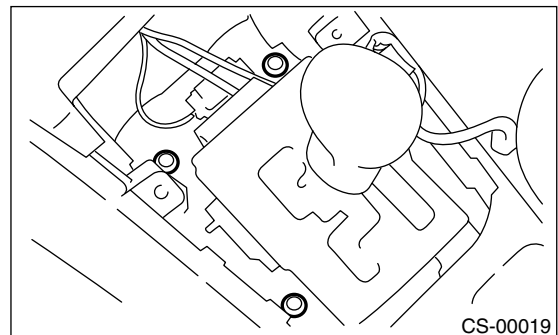


B: INSTALLATION

- 1) Mount the select lever onto the vehicle body.
- 2) Tighten the four bolts to install the select lever to the vehicle body, then connect connector.

Tightening torque:

13 N·m (1.3 kgf-m, 9.4 ft-lb)



- 3) Install the console box. <Ref. to EI-43, INSTALLATION, Console Box.>
- 4) Set location of the select lever at "N" range.
- 5) Lift-up the vehicle.
- 6) Set location of the range select lever to "N" range.
- 7) Insert the thread portion of the other inner cable and into the connector hole of the select lever, and fix the other outer cable end to the bracket.

Tightening torque:

18 N·m (1.8 kgf-m, 13.0 ft-lb)

- 8) Adjust the select cable position. <Ref. to CS-28, ADJUSTMENT, Select Cable.>
- 9) After completion of fitting, make sure that the select lever operates smoothly all across the operating range.
- 10) Install the heat shield cover. (If equipped)

11) Install the rear exhaust pipe and muffler.

SOHC model

<Ref. to EX(H4SO)-8, INSTALLATION, Rear Exhaust Pipe.> and <Ref. to EX(H4SO)-9, INSTALLATION, Muffler.>

DOHC turbo model

<Ref. to EX(H4DOTC)-13, INSTALLATION, Rear Exhaust Pipe.> and <Ref. to EX(H4DOTC)-14, INSTALLATION, Muffler.>

12) Inspect the following items. If the following inspection reveals problems, adjust the select cable and inhibitor switch. <Ref. to CS-28, ADJUSTMENT, Select Cable.> and <Ref. to 4AT-45, ADJUSTMENT, Inhibitor Switch.>

(1) The engine starts operating when select lever is in range "P" and "N", but not in other ranges.

(2) The back-up light is lit when the select lever is in range "R", but not in other ranges.

(3) Select lever and indicator ranges are matched.

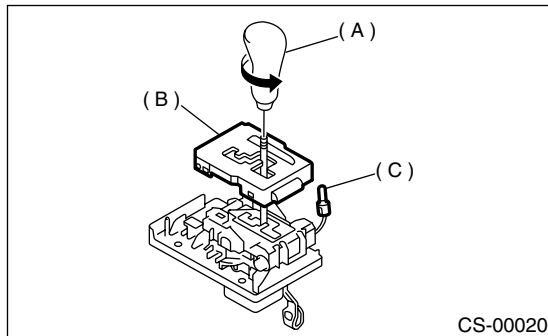
C: DISASSEMBLY

1) Remove the packing.

2) Remove the grip.

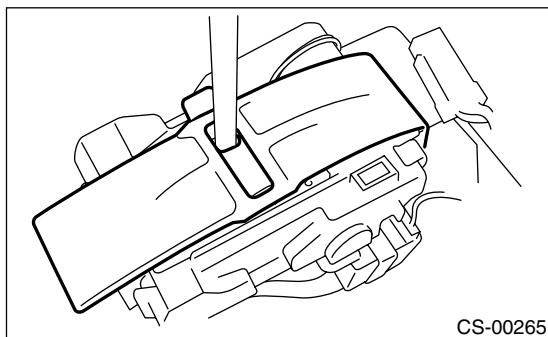
3) Remove the indicator bulb from indicator cover.

4) Remove the indicator cover.

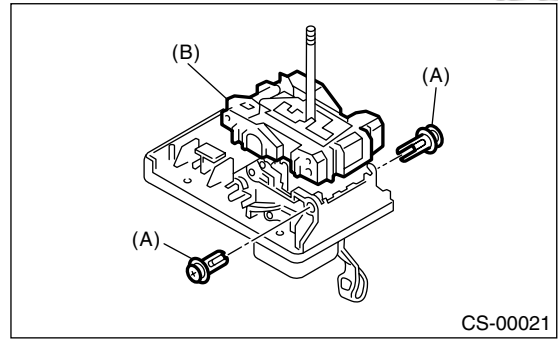


- (A) Grip
- (B) Indicator cover
- (C) Indicator bulb

5) Remove the blind.

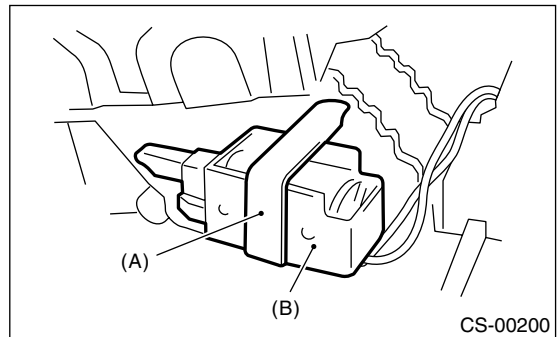


6) Remove the clip, and then remove the guide plate.



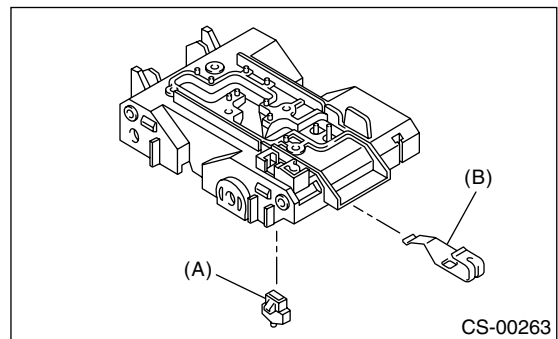
- (A) Clip
- (B) Guide plate

7) Remove the clamp, and then remove the shift lock solenoid.



- (A) Clamp
- (B) Shift lock solenoid

8) Remove the spring, and button.

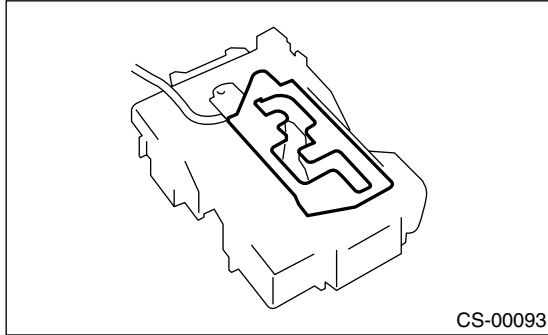


- (A) Button
- (B) Spring

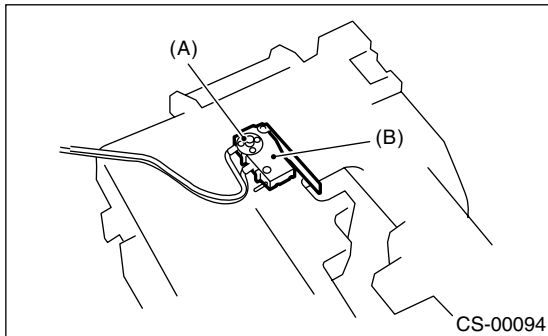
SELECT LEVER

CONTROL SYSTEMS

9) Remove the cushion plate.

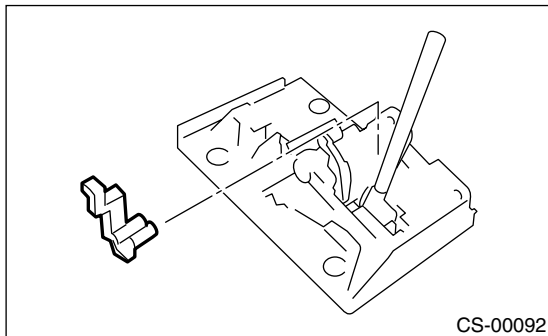


10) Remove the clip, and then remove the “P” range switch.

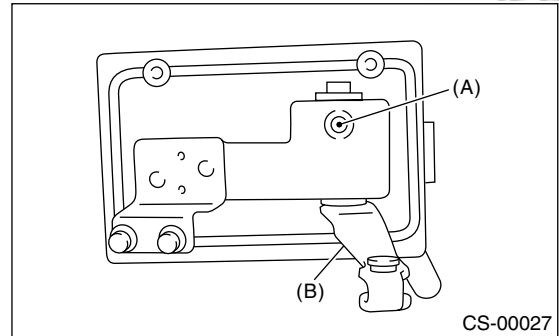


- (A) Clip
- (B) “P” range switch

11) Remove the lock plate.

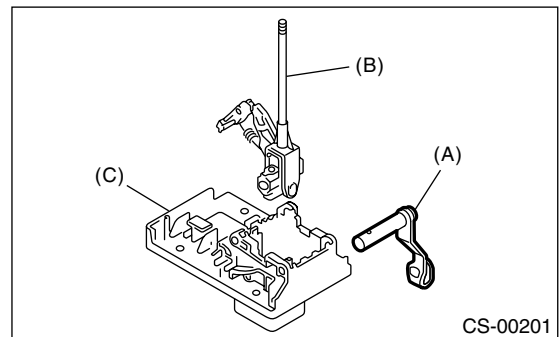


12) Remove the grommet, and then remove the spring pin.



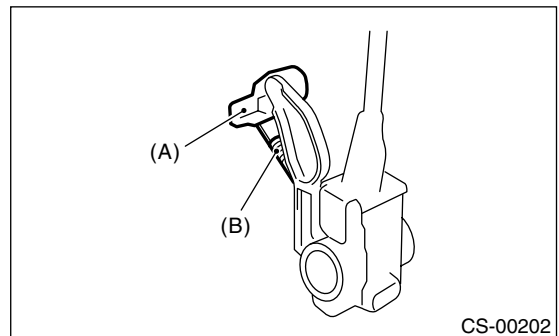
- (A) Spring pin
- (B) Select lever lower

13) Remove the arm, and then remove the select lever assembly from guide plate.



- (A) Arm
- (B) Select lever ASSY
- (C) Plate

14) Remove the spring and detent arm.



- (A) Detent arm
- (B) Spring

D: ASSEMBLY

- 1) Clean all parts before assembly.
- 2) Apply grease [SUNLIGHT 2 (Part No. 003602010) or equivalent] to each parts. <Ref. to CS-3, AT SELECT LEVER, General Description.>
- 3) Assembly is in the reverse order of disassembly.
- 4) After completion of fitting, transfer the select lever to range "P" — "1", then check whether the indicator and select lever agree, whether the pointer and position mark agree and what the operating force is.

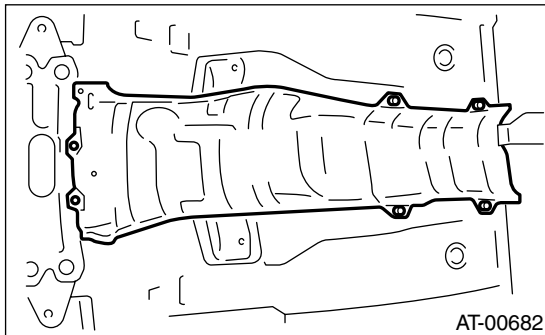
E: INSPECTION

- 1) Inspect the removed parts by comparing with new ones for deformation, damage and wear. Correct or replace if defective.
- 2) Confirm the following parts for operating condition before assembly. Moving condition of the select lever assembly, it should move smoothly.

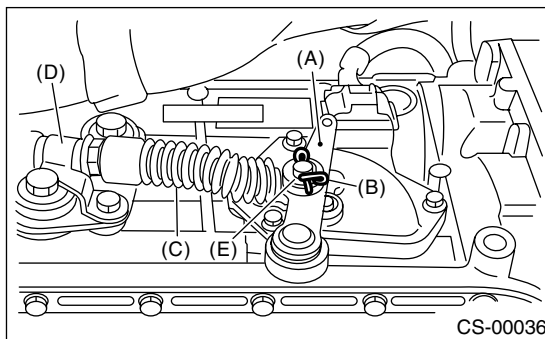
4. Select Cable

A: REMOVAL

- 1) Set the vehicle on a lift.
- 2) Set the select lever to "N" range.
- 3) Disconnect negative cable from battery.
- 4) Lift-up the vehicle.
- 5) Remove front, center, rear exhaust pipe and muffler. (SOHC model)
<Ref. to EX(H4SO)-4, REMOVAL, Front Exhaust Pipe.>, <Ref. to EX(H4SO)-7, REMOVAL, Center Exhaust Pipe.>, <Ref. to EX(H4SO)-8, REMOVAL, Rear Exhaust Pipe.> and <Ref. to EX(H4SO)-9, REMOVAL, Muffler.>
- 6) Remove the center and rear exhaust pipes and muffler. (DOHC turbo model)
<Ref. to EX(H4DOTC)-8, REMOVAL, Center Exhaust Pipe.>, <Ref. to EX(H4DOTC)-13, REMOVAL, Rear Exhaust Pipe.> and <Ref. to EX(H4DOTC)-14, REMOVAL, Muffler.>
- 7) Remove the heat shield cover. (If equipped)

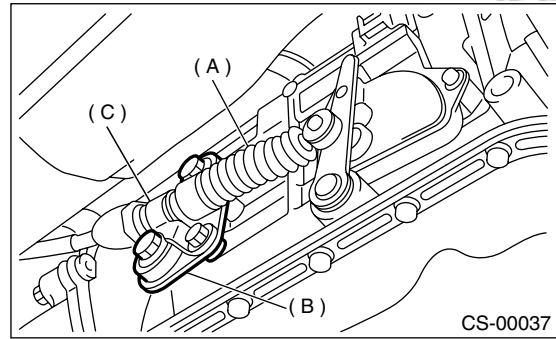


- 8) Remove the snap pin and washer from range select lever.



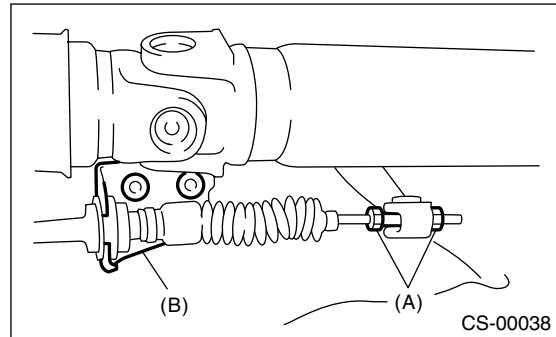
- (A) Range select lever
- (B) Snap pin
- (C) Select cable
- (D) Clamp
- (E) Washer

- 9) Remove the plate assembly from transmission case.



- (A) Select cable
- (B) Plate ASSY
- (C) Clamp

- 10) Disconnect the cable from select lever, and then remove the cable bracket.



- (A) Adjusting nuts
- (B) Cable bracket

- 11) Remove the select cable from plate assembly.

B: INSTALLATION

1) Install the select cable to plate assembly.

Tightening torque:

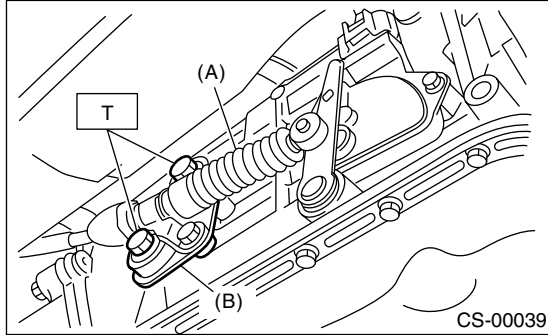
18 N·m (1.8 kgf-m, 13.0 ft-lb)

2) Install the select cable to range select lever.

3) Install the plate assembly to transmission.

Tightening torque:

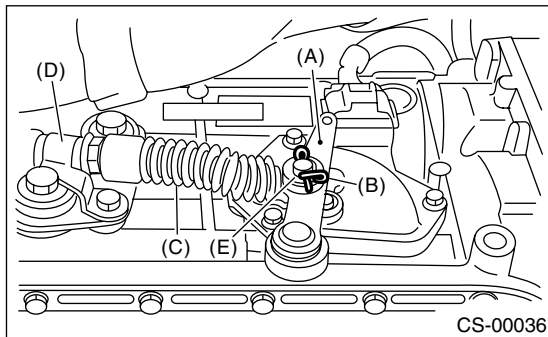
T: 24.5 N·m (2.5 kgf-m, 18.1 ft-lb)



(A) Select cable

(B) Plate ASSY

4) Install the washer and snap pin to range select lever.



(A) Range select lever

(B) Snap pin

(C) Select cable

(D) Clamp

(E) Washer

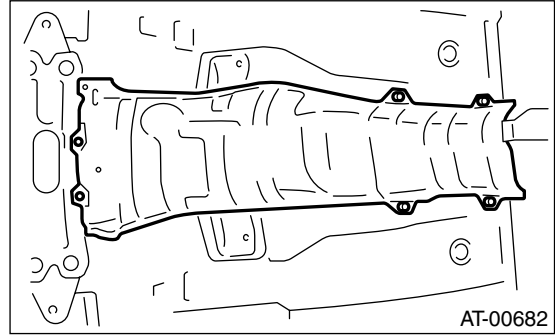
5) Insert the thread portion of other inner cable and into connector hole of select lever, and fix the other outer cable end to the bracket.

Tightening torque:

18 N·m (1.8 kgf-m, 13 ft-lb)

6) Move the select lever to "N" range, and then adjust the select cable position. <Ref. to CS-28, ADJUSTMENT, Select Cable.>

7) Install the heat shield cover.



8) Install the front, center, rear exhaust pipe and muffler. (SOHC model)

<Ref. to EX(H4SO)-5, INSTALLATION, Front Exhaust Pipe.>, <Ref. to EX(H4SO)-7, INSTALLATION, Center Exhaust Pipe.>, <Ref. to EX(H4SO)-8, INSTALLATION, Rear Exhaust Pipe.> and <Ref. to EX(H4SO)-9, INSTALLATION, Muffler.>

9) Install center and rear exhaust pipes and muffler. (DOHC turbo model)

<Ref. to EX(H4DOTC)-9, INSTALLATION, Center Exhaust Pipe.>, <Ref. to EX(H4DOTC)-13, INSTALLATION, Rear Exhaust Pipe.> and <Ref. to EX(H4DOTC)-14, INSTALLATION, Muffler.>

C: INSPECTION

Check the removed cable and replace if damaged, rusty, or malfunctioning.

1) Check for smooth operation of the cable.

2) Check the inner cable for damage and rust.

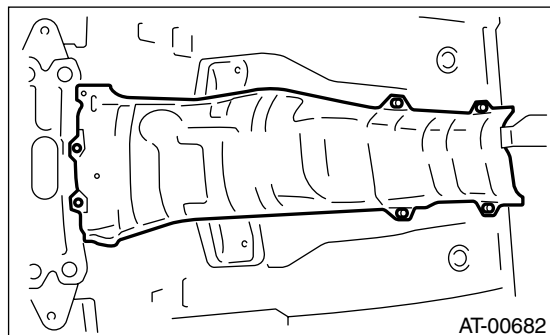
3) Check the outer cable for damage, bends, and cracks.

4) Check the boot for damage, cracks, and deterioration.

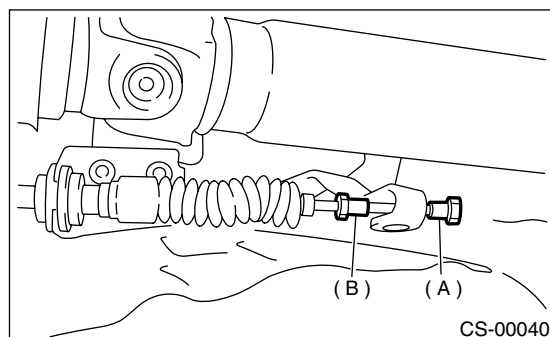
5) Move the select lever from "P" range to "1" range. You should be able to feel the detents in each range. If the detents cannot be felt or the range pointer is improperly aligned, adjust the cable.

D: ADJUSTMENT

- 1) Set the select lever to "N" range.
- 2) Remove the rear exhaust pipe and muffler.
SOHC model
<Ref. to EX(H4SO)-8, REMOVAL, Rear Exhaust Pipe.> and <Ref. to EX(H4SO)-9, REMOVAL, Muffler.>
DOHC turbo model
<Ref. to EX(H4DOTC)-13, REMOVAL, Rear Exhaust Pipe.> and <Ref. to EX(H4DOTC)-14, REMOVAL, Muffler.>
- 3) Remove the heat shield cover. (If equipped)

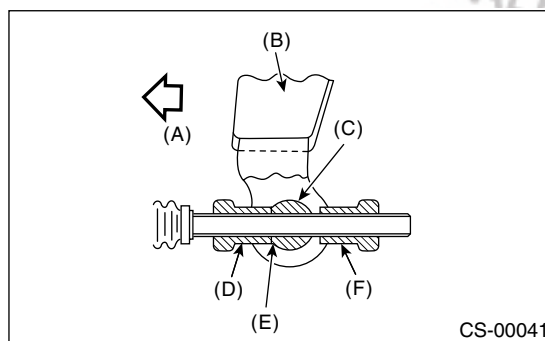


- 4) Loosen the adjusting nut on each side.



- (A) Adjusting nut A
- (B) Adjusting nut B

- 5) Turn the adjusting nut B until it lightly touches the connector.

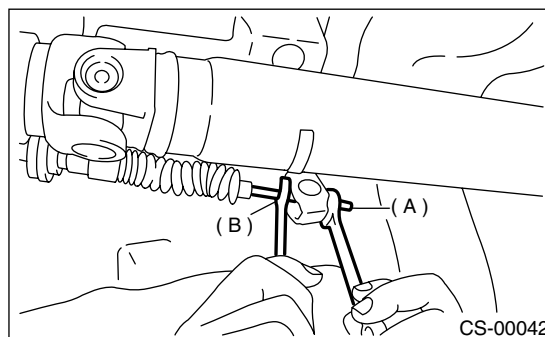


- (A) Front side
- (B) Select lever
- (C) Connector
- (D) Adjusting nut B
- (E) Contact point
- (F) Adjusting nut A

- 6) While preventing the adjusting nut B from moving with a wrench, tighten the adjusting nut A.

Tightening torque:

7.5 N·m (0.76 kgf-m, 5.5 ft-lb)



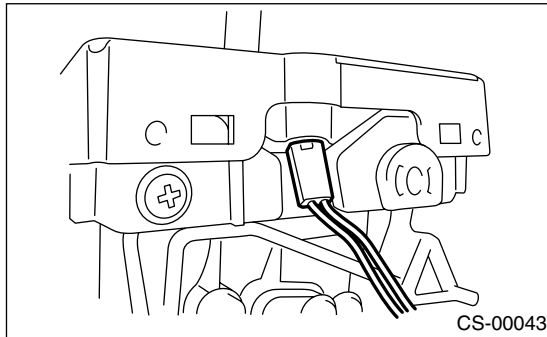
- (A) Adjusting nut A
- (B) Adjusting nut B

- 7) After completion of fitting, make sure that the select lever operates smoothly all across the operating range.
- 8) Install in the reverse order of removal.

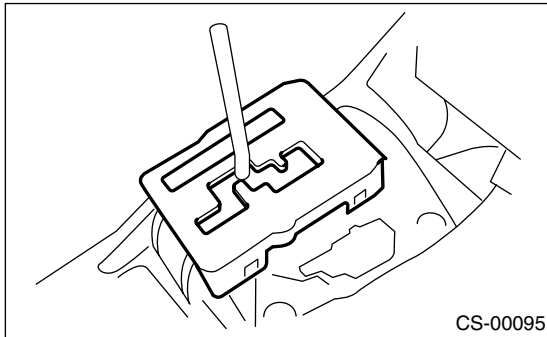
5. AT Shift Lock Solenoid and “P” Range Switch

A: REMOVAL

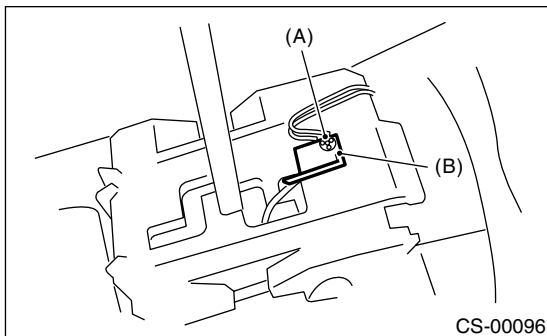
- 1) Disconnect the ground cable from battery.
- 2) Remove the console box. <Ref. to EI-43, REMOVAL, Console Box.>
- 3) Disconnect the connector.
- 4) Remove the grip.
- 5) Remove the indicator bulb from indicator cover.



- 6) Remove the indicator cover.

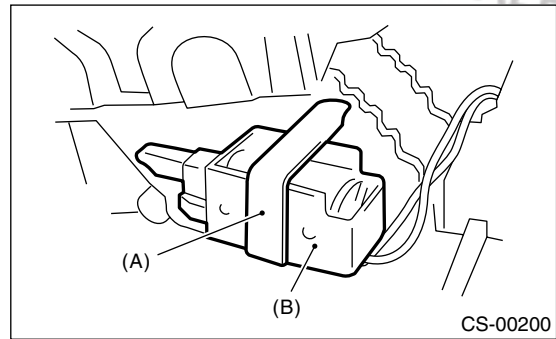


- 7) Remove the blind.
- 8) Remove the cushion.
- 9) Remove the clip, and then remove the “P” range switch.



- (A) Clip
(B) “P” range switch

- 10) Remove the clamp, and then remove the shift lock solenoid.



- (A) Clamp
(B) Shift lock solenoid

B: INSTALLATION

Install in the reverse order of removal.

AT SHIFT LOCK SOLENOID AND "P" RANGE SWITCH

CONTROL SYSTEMS

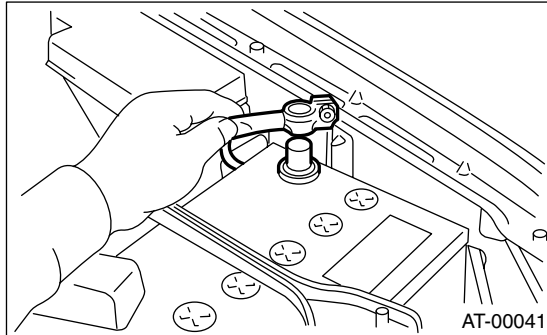
C: INSPECTION

	Step	Check	Yes	No
1	CHECK SHIFT LOCK SOLENOID. Measure the resistance of shift lock solenoid connector terminals. Terminals No. 4 — No. 5:	Is the resistance between 20 and 40 Ω ?	Go to step 2.	Replace the shift lock solenoid and "P" range switch assembly.
2	CHECK SHIFT LOCK SOLENOID. Connect the battery with shift lock solenoid connector terminal, operate solenoid. Terminals No. 4 (+) — No. 5 (-):	Is the shift lock solenoid operating properly?	Go to step 3.	Replace the shift lock solenoid and "P" range switch assembly.
3	CHECK "P" RANGE SWITCH. 1)Move the select lever to "P" range. 2)Measure the resistance between "P" range switch connector terminals.	Is the resistance less than 1 Ω ?	Go to step 4.	Replace the "P" range switch.
4	CHECK "P" RANGE SWITCH. 1)Move the select lever to other than "P" range. 2)Measure the resistance between "P" range switch connector terminals.	Is the resistance more than 1 M Ω ?	Normal	Replace the "P" range switch.

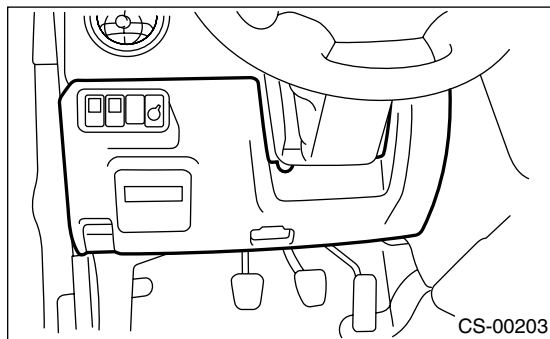
6. Body Integrated Unit

A: REMOVAL

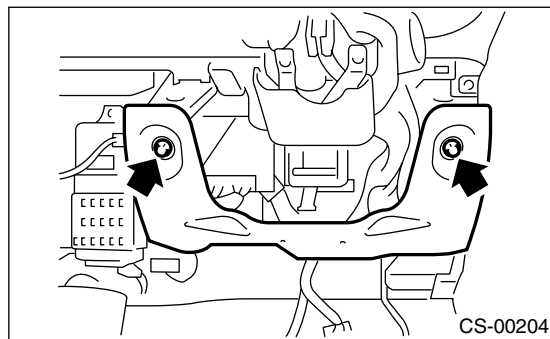
1) Disconnect the ground cable from battery.



2) Remove the lower cover.

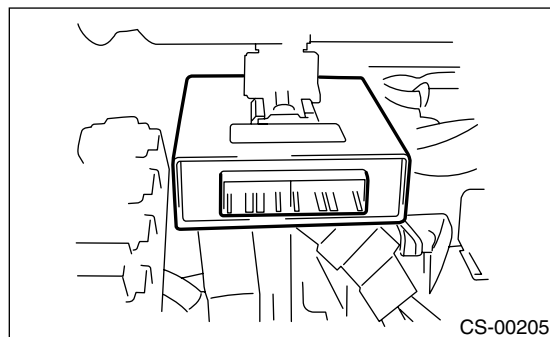


3) Remove the knee bolster.



4) Disconnect the connector from body integrated unit.

5) Remove the body integrated unit.



B: INSTALLATION

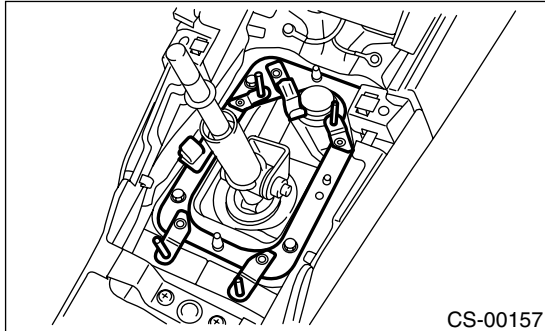
Install in the reverse order of removal.

7. MT Gear Shift Lever

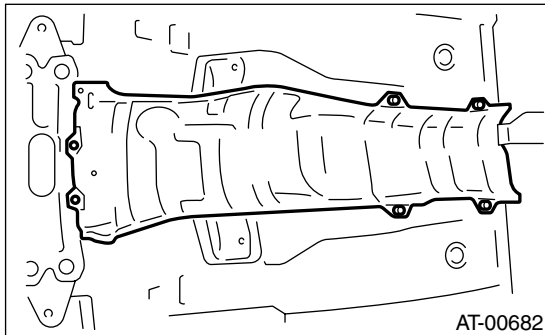
A: REMOVAL

1. 5MT

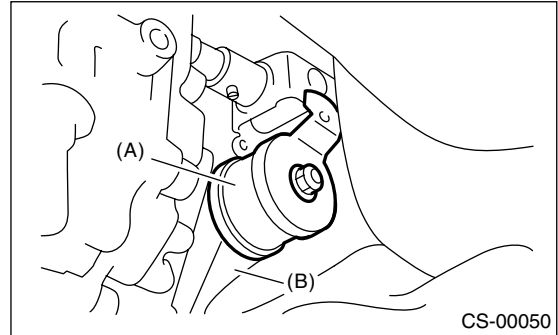
- 1) Set the vehicle on a lift.
- 2) Disconnect the negative cable from battery.
- 3) Remove the gear shift knob.
- 4) Remove the console box. <Ref. to EI-43, REMOVAL, Console Box.>
- 5) Remove the plate assembly from body.



- 6) Lift-up the vehicle.
- 7) Remove the rear exhaust pipe and muffler.
SOHC model
<Ref. to EX(H4SO)-8, REMOVAL, Rear Exhaust Pipe.> and <Ref. to EX(H4SO)-9, REMOVAL, Muffler.>
DOHC turbo model
<Ref. to EX(H4DOTC)-13, REMOVAL, Rear Exhaust Pipe.> and <Ref. to EX(H4DOTC)-14, REMOVAL, Muffler.>
- 8) Remove the heat shield cover. (If equipped)

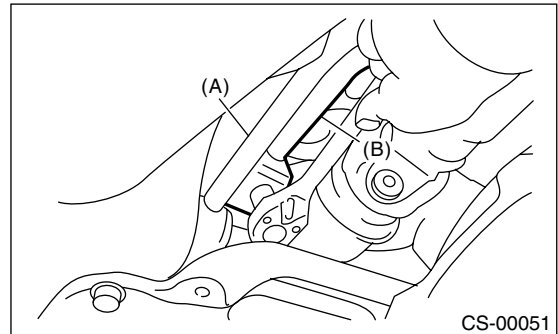


- 9) Remove the stay from transmission bracket.



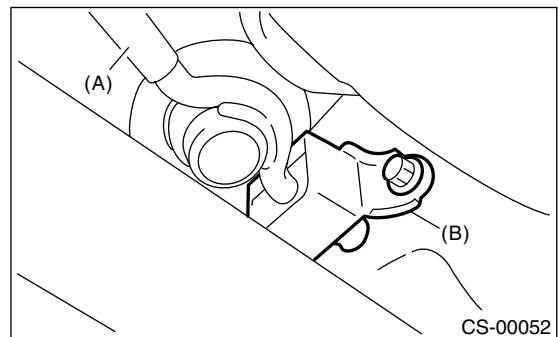
- (A) Stay
(B) Transmission bracket

- 10) Remove the rod from joint.



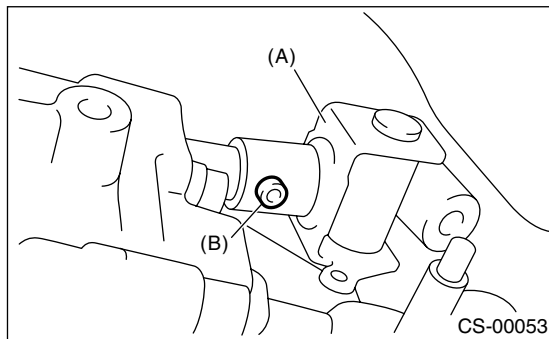
- (A) Stay
(B) Rod

- 11) Remove the cushion rubber from body.



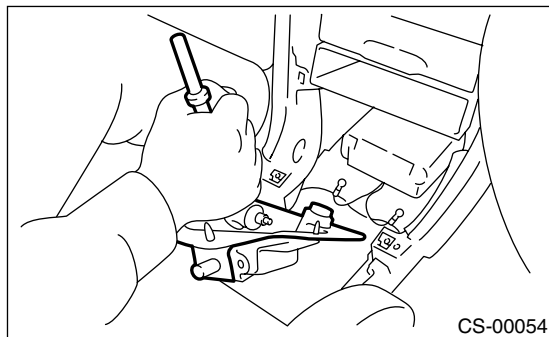
- (A) Stay
(B) Cushion rubber

12) Extract the spring pin, and then remove the joint.



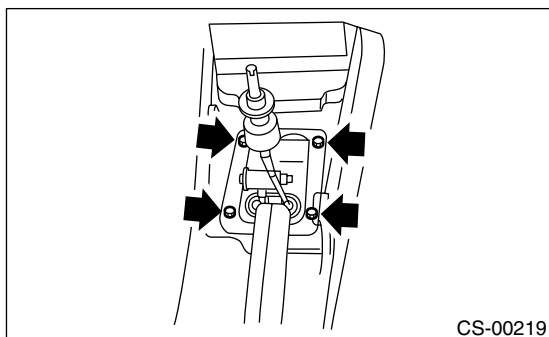
- (A) Joint
- (B) Spring pin

13) Lower the vehicle.
14) Remove the gear shift lever.



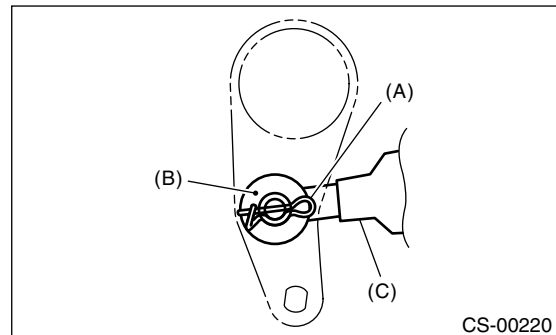
2. 6MT

- 1) Set the vehicle on a lift.
- 2) Disconnect the ground cable from battery.
- 3) Remove the gear shift knob.
- 4) Remove the console box front. <Ref. to EI-43, REMOVAL, Console Box.>
- 5) Remove the boot plate from body.



- 6) Lift-up the vehicle.
- 7) Remove the under cover.
- 8) Remove the rear exhaust pipe and muffler. <Ref. to EX(H4DOTC)-13, REMOVAL, Rear Exhaust Pipe.>, <Ref. to EX(H4DOTC)-14, REMOVAL, Muffler.>

- 9) Remove the crossmember. <Ref. to 6MT-33, REMOVAL, Transmission Mounting System.>
- 10) Remove the snap pin and washer, and then remove the reverse check cable from reverse check lever.

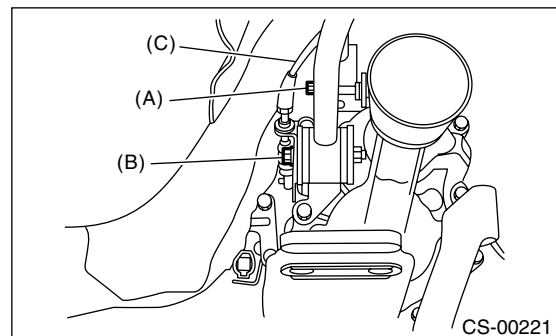


- (A) Snap pin
- (B) Washer
- (C) Reverse check cable

11) Move the transmission to right side, and then remove the joint COMPL, stay bolt and reverse check cable.

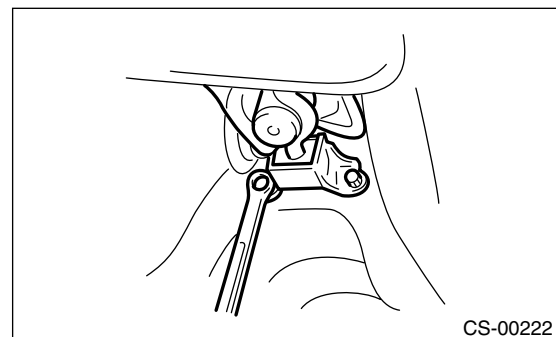
NOTE:

If the transmission is not moved, the joint COMPL and stay bolt will contact body and damage may occur.



- (A) Joint COMPL bolt
- (B) Stay bolt
- (C) Reverse check cable

12) Remove the cushion rubber from body.



- 13) Lower the vehicle.
- 14) Remove the gear shift lever.

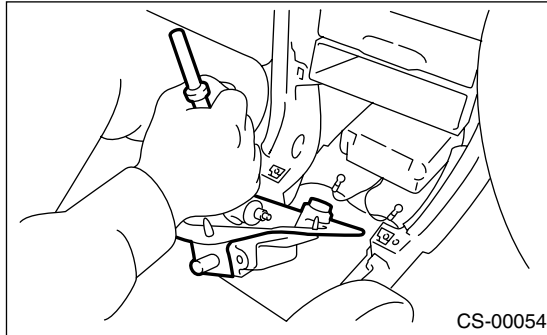
B: INSTALLATION

1. 5MT

- 1) Install the joint to the transmission and secure with the spring pin.
- 2) Insert gear shift lever from room side.

NOTE:

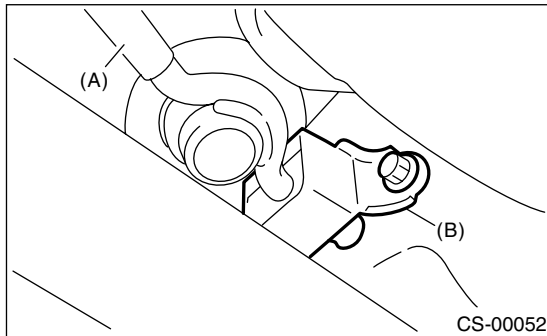
After inserting rod and stay, temporarily put them onto transmission mount.



- 3) Lift-up the vehicle.
- 4) Mount the cushion rubber on body.

Tightening torque:

18 N·m (1.8 kgf-m, 13.0 ft-lb)

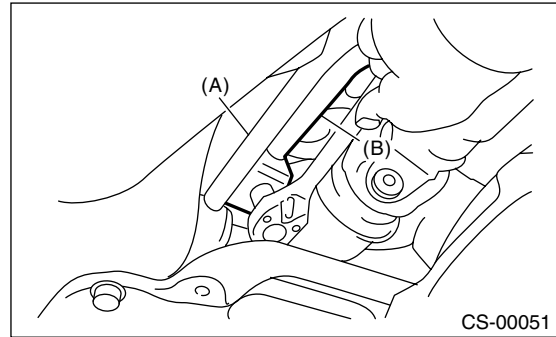


- (A) Stay
- (B) Cushion rubber

- 5) Connect the rod to the joint.

Tightening torque:

18 N·m (1.8 kgf-m, 13.0 ft-lb)

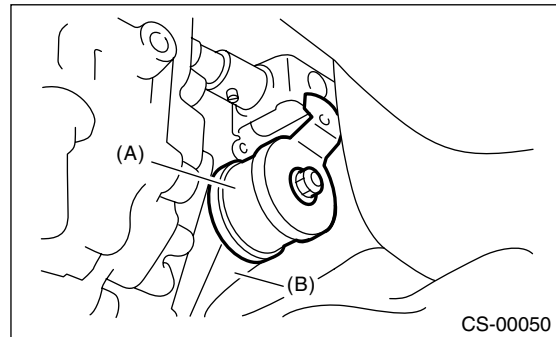


- (A) Stay
- (B) Rod

- 6) Connect the stay to transmission bracket.

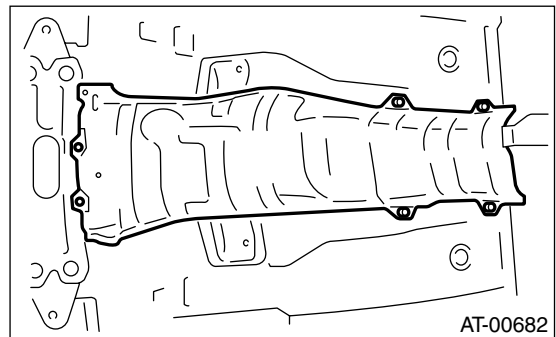
Tightening torque:

18 N·m (1.8 kgf-m, 13.0 ft-lb)



- (A) Stay
- (B) Transmission bracket

- 7) Install the heat shield cover. (If equipped)



8) Install the rear exhaust pipe and muffler.

SOHC model

<Ref. to EX(H4SO)-8, INSTALLATION, Rear Exhaust Pipe.> and <Ref. to EX(H4SO)-9, INSTALLATION, Muffler.>

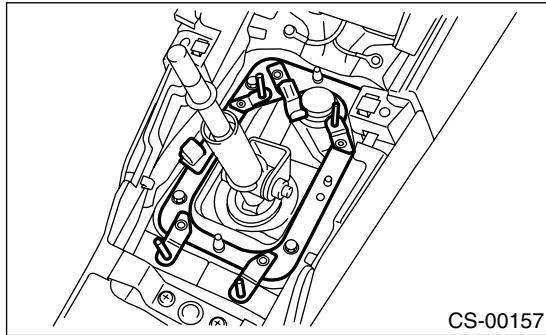
DOHC turbo model

<Ref. to EX(H4DOTC)-13, INSTALLATION, Rear Exhaust Pipe.> and <Ref. to EX(H4DOTC)-14, INSTALLATION, Muffler.>

9) Install the plate assembly to body.

Tightening torque:

7.5 N·m (0.76 kgf-m, 5.5 ft-lb)



10) Install console box. <Ref. to EI-43, INSTALLATION, Console Box.>

2. 6MT

1) Insert the gear shift lever from room side.

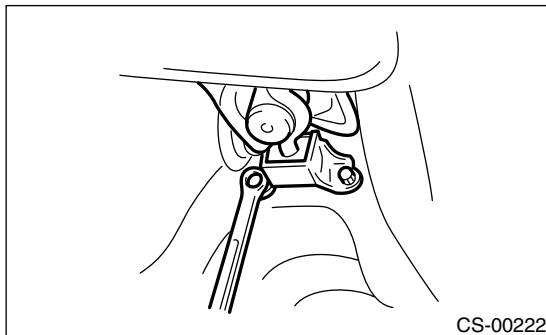
NOTE:

After inserting the rod and stay, temporarily put them onto transmission mount.

2) Mount the cushion rubber on body.

Tightening torque:

18 N·m (1.8 kgf-m, 13.0 ft-lb)

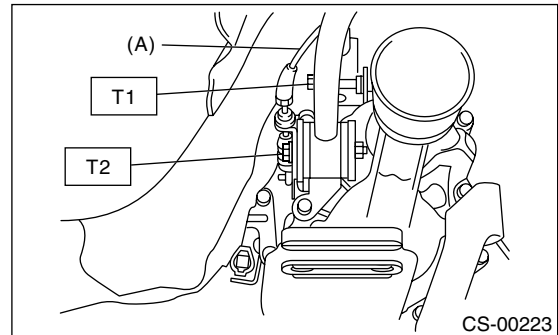


3) Move the transmission to right side, and then install the joint COMPL and stay.

Tightening torque:

T1: 11.8 N·m (1.2 kgf-m, 8.7 ft-lb)

T2: 32 N·m (3.3 kgf-m, 23.6 ft-lb)



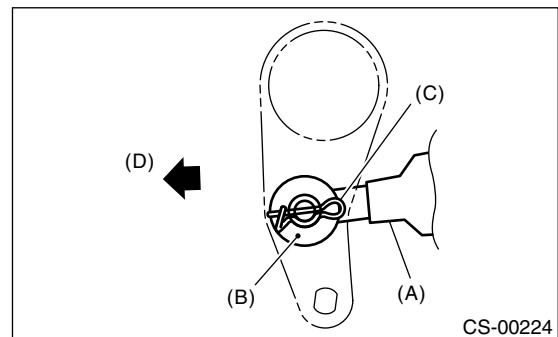
(A) Reverse check cable

4) Install the crossmember. <Ref. to 6MT-33, INSTALLATION, Transmission Mounting System.>

5) Install the reverse check cable end, washer and snap pin to reverse check lever.

NOTE:

- Take care to install the snap pin in proper direction.
- Conduct the adjustment of reverse check cable before installation. <Ref. to CS-48, ADJUSTMENT, Reverse Check Cable.>



(A) Reverse check cable

(B) Washer

(C) Snap pin

(D) Front side

6) Install the rear exhaust pipe and muffler. <Ref. to EX(H4DOTC)-13, INSTALLATION, Rear Exhaust Pipe.>, <Ref. to EX(H4DOTC)-14, INSTALLATION, Muffler.>

7) Install the under cover.

MT GEAR SHIFT LEVER

CONTROL SYSTEMS

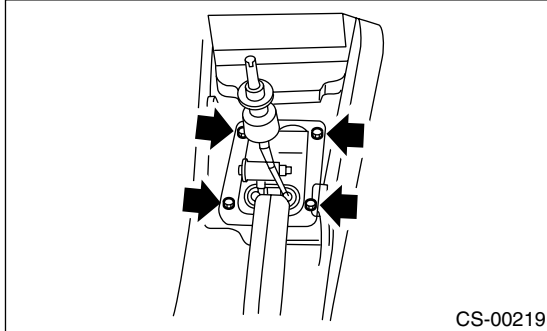
8) Install the boot plate.

NOTE:

Install the inner boot without any twist.

Tightening torque:

7.5 N·m (0.76 kgf-m, 5.5 ft-lb)



CS-00219

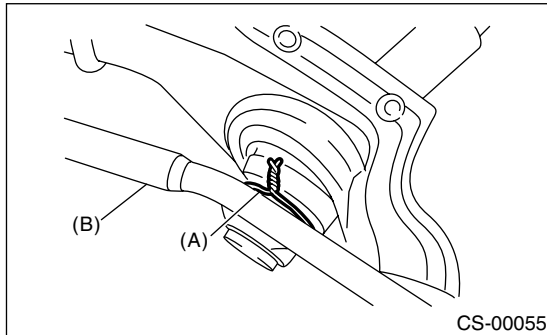
9) Install the console box. <Ref. to EI-43, INSTALLATION, Console Box.>

10) Check that the gear shift is correctly shifted to each gear.

C: DISASSEMBLY

1. 5MT

1) Disassemble the lock wire.

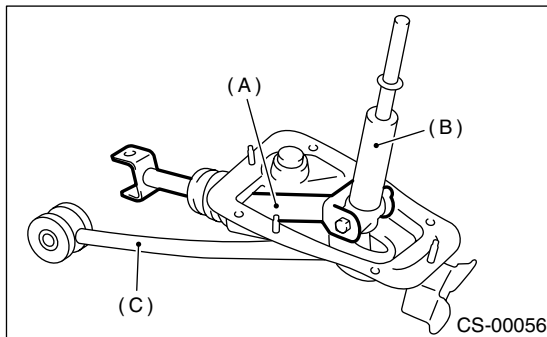


CS-00055

(A) Lock wire

(B) Stay

2) Remove the rod from lever.



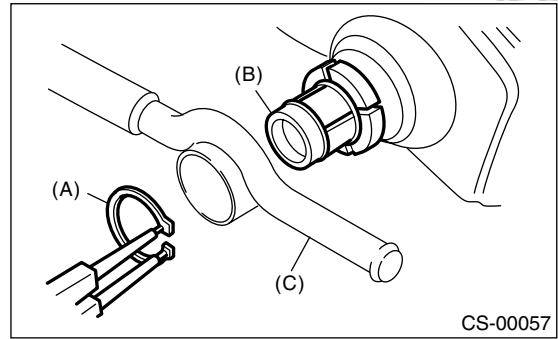
CS-00056

(A) Rod

(B) Lever

(C) Stay

3) Remove the snap ring from bushing B, and then disconnect the stay.



CS-00057

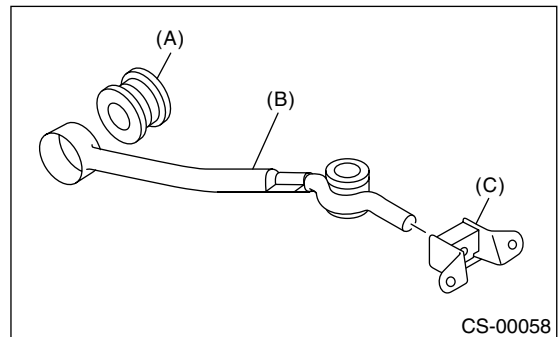
(A) Snap ring

(B) Bushing B

(C) Stay

4) Remove the boot from gear shift lever.

5) Remove the bushing and cushion rubber from stay.



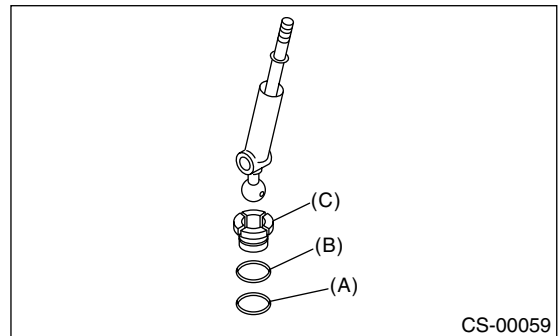
CS-00058

(A) Bushing

(B) Stay

(C) Cushion rubber

6) Remove O-ring, and then disconnect the bushing B.



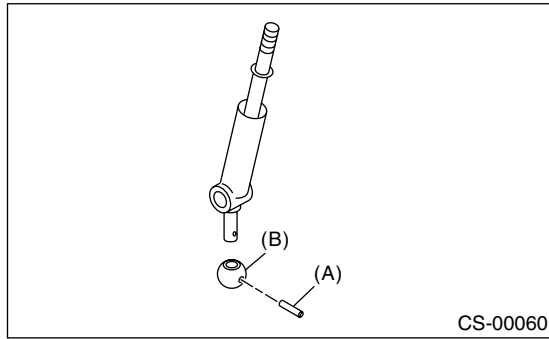
CS-00059

(A) O-ring

(B) O-ring

(C) Bushing B

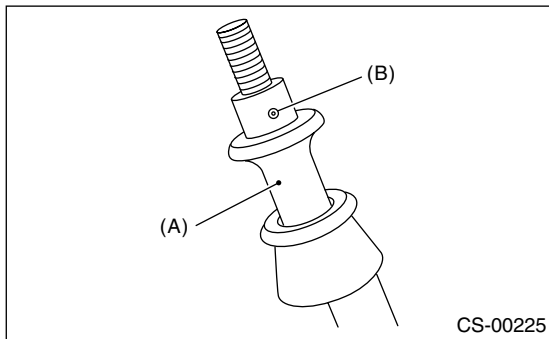
7) Draw out the spring pin, and then remove the bushing A from gear shift lever.



- (A) Spring pin
- (B) Bushing A

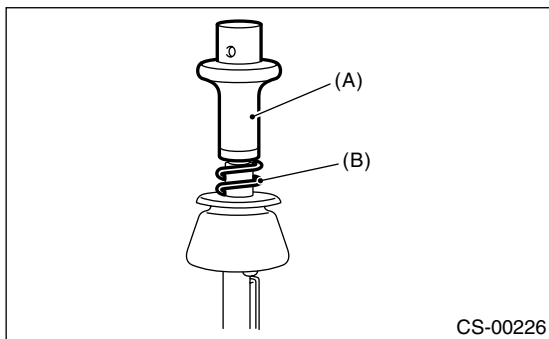
2. 6MT

1) Remove the spring pin from slider.



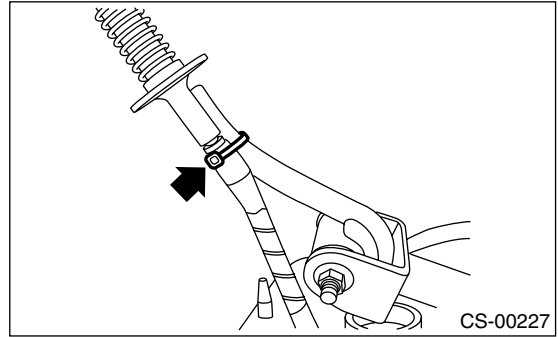
- (A) Slider
- (B) Spring pin

2) Remove the slider and spring.

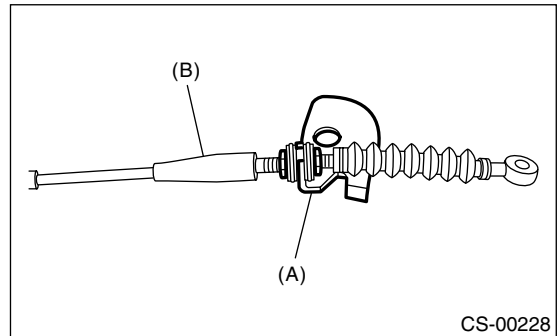


- (A) Slider
- (B) Spring

3) Cut the band clip.

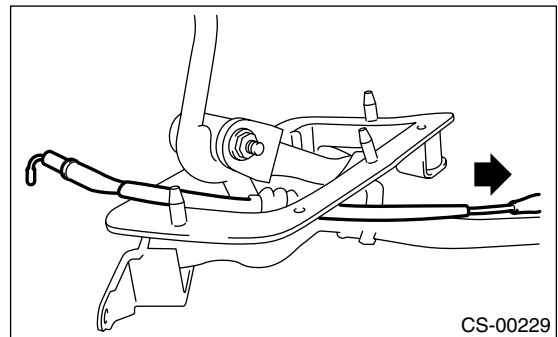


4) Remove the reverse check cable from cable plate.

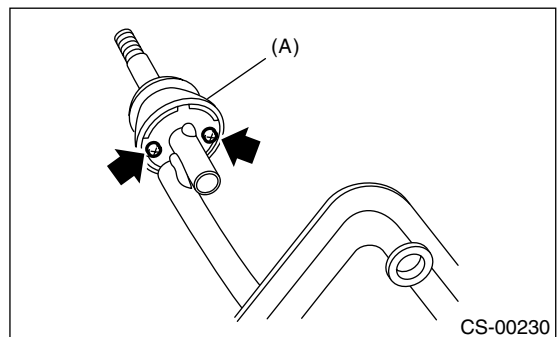


- (A) Cable plate
- (B) Reverse check cable

5) Remove the reverse check cable from gear shift assembly.



6) Remove the holder and spring seat.



- (A) Holder

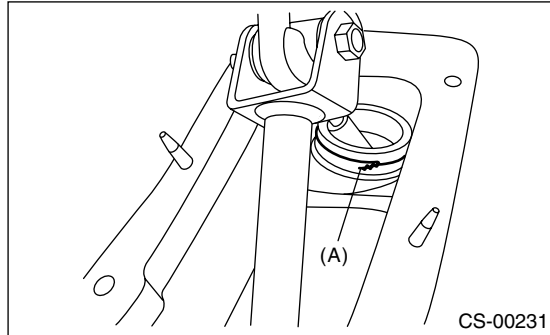
MT GEAR SHIFT LEVER

CONTROL SYSTEMS

7) Disassemble the lock wire.

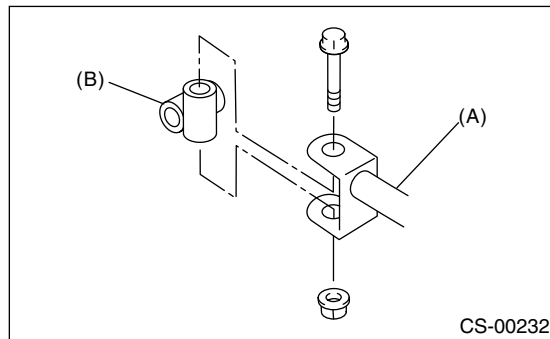
NOTE:

Do not reuse the lock wire.



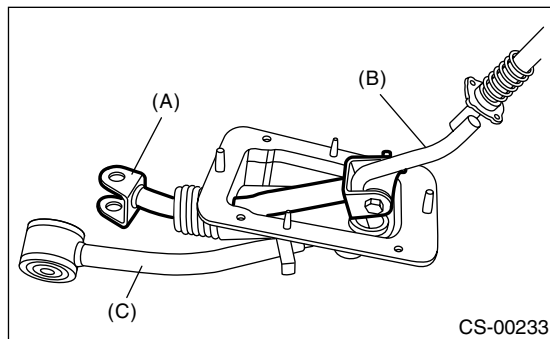
(A) Lock wire

8) Remove the boss from rod.



(A) Rod
(B) Boss

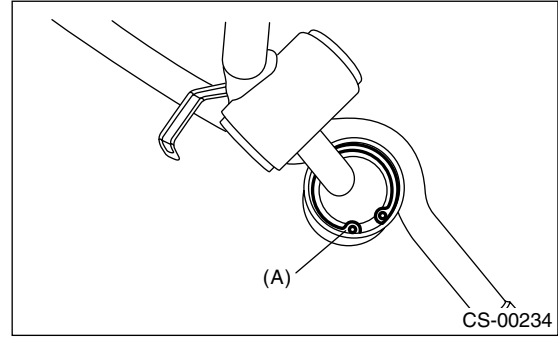
9) Remove the rod from lever.



(A) Rod
(B) Lever
(C) Stay

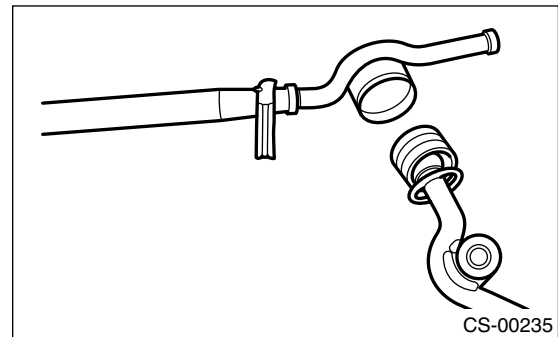
10) Separate the rod and inner boot.

11) Remove the snap ring from stay.

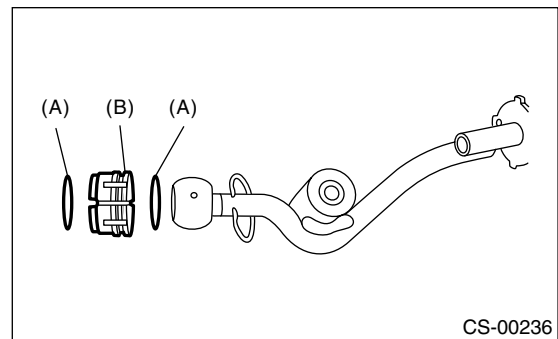


(A) Snap ring

12) Separate the gear shift lever and stay.

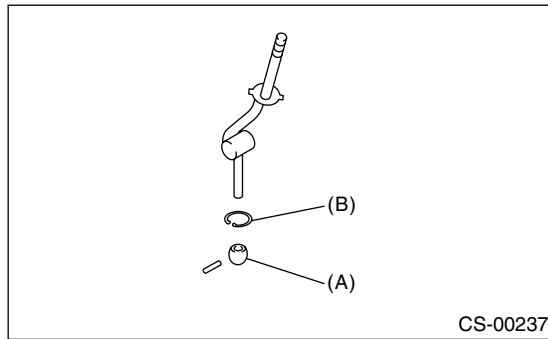


13) Remove the boot and bush from gear shift lever.



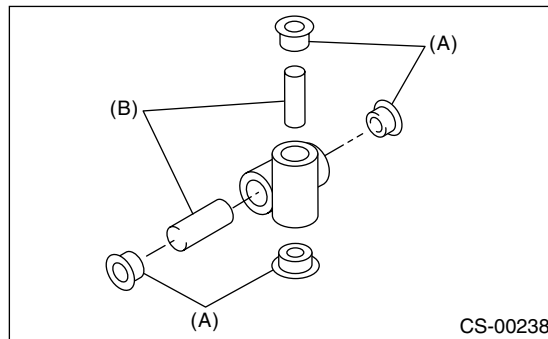
(A) O-ring
(B) Bush

14) Remove the spring pin, and then remove the bush and snap ring.



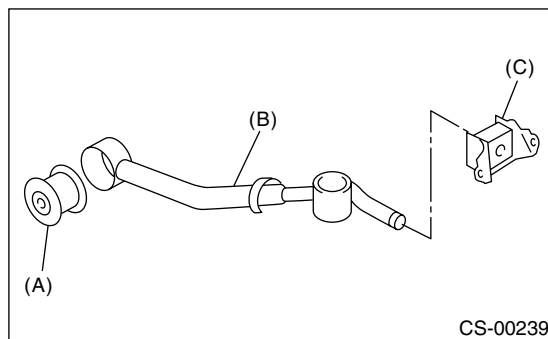
- (A) Bush
- (B) Snap ring

15) Remove the bush and spacer from boss.



- (A) Bush
- (B) Spacer

16) Remove the bush and cushion rubber from stay.

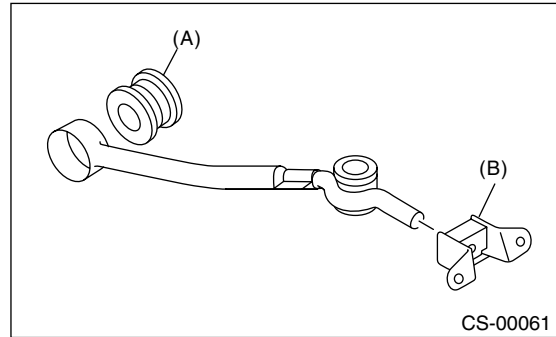


- (A) Bush
- (B) Stay
- (C) Cushion rubber

D: ASSEMBLY

1. 5MT

- 1) Clean all parts before assembly.
- 2) Mount the bushing and cushion rubber on the stay.

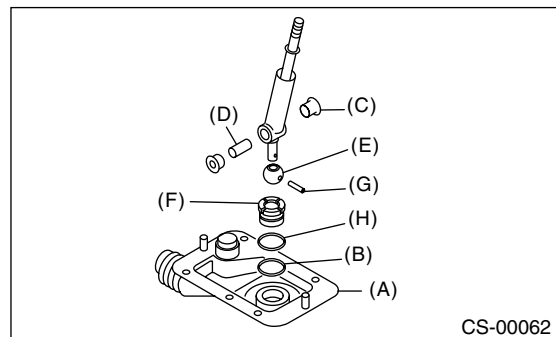


- (A) Bushing
- (B) Cushion rubber

3) Mount each part; boot, O-ring, bushing A, spacer, bushing B, bushing and spring pin on the gear shift lever.

NOTE:

- Always use new O-rings.
- Apply grease [SUNLIGHT 2 (Part No. 003602010 or equivalent)] to the inner and side surfaces of the bushing when installing the spacer.



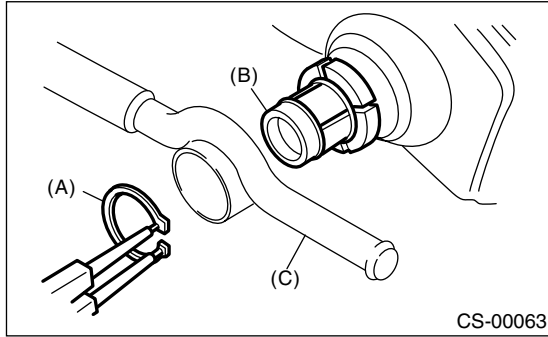
- (A) Boot
- (B) O-ring
- (C) Bushing
- (D) Spacer
- (E) Bushing A
- (F) Bushing B
- (G) Spring pin
- (H) O-ring

4) Insert the gear shift lever into the boot hole.

MT GEAR SHIFT LEVER

CONTROL SYSTEMS

5) Install the snap ring and stay to bushing B.

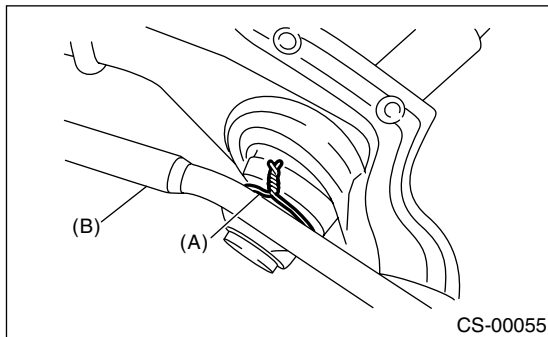


- (A) Snap ring
- (B) Bushing B
- (C) Stay

6) Tighten with lock wire to the extent that the boot will not come off.

NOTE:

Always use new lock wire.



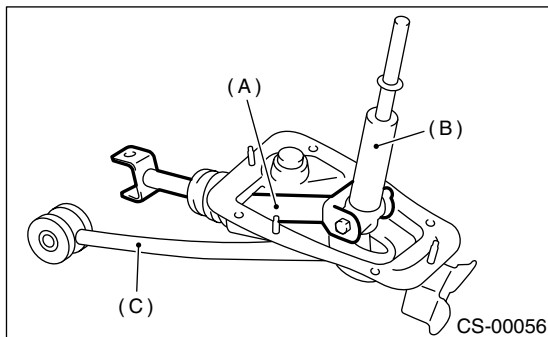
- (A) Lock wire
- (B) Stay

7) Insert the rod into the boot hole.

8) Connect rod to lever.

Tightening torque:

11.8 N·m (1.2 kgf-m, 8.7 ft-lb)



- (A) Rod
- (B) Lever
- (C) Stay

9) Check the swing torque of rod in relation to the gear shift lever.

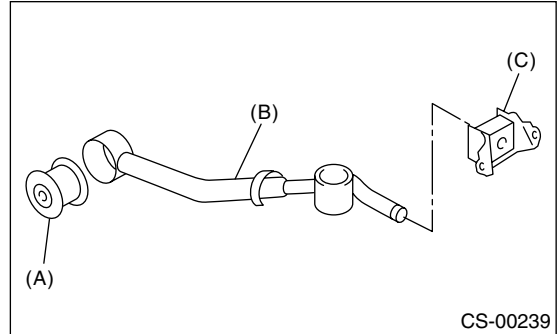
10) Check that there is no excessive play and that parts move smoothly.

2. 6MT

NOTE:

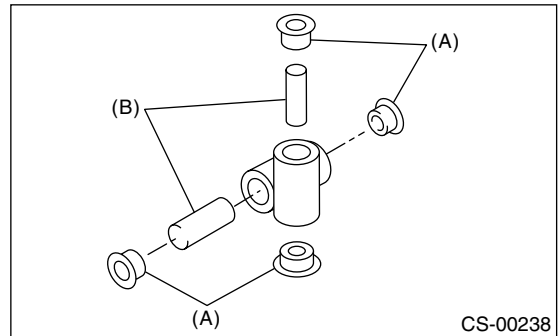
- Clean all parts before assembly.
- Apply NIGTIGHT LYW No.2 grease or equivalent to each parts.

1) Mount the bush and cushion rubber on the stay.



- (A) Bush
- (B) Stay
- (C) Cushion rubber

2) Install the bush and spacer to boss.

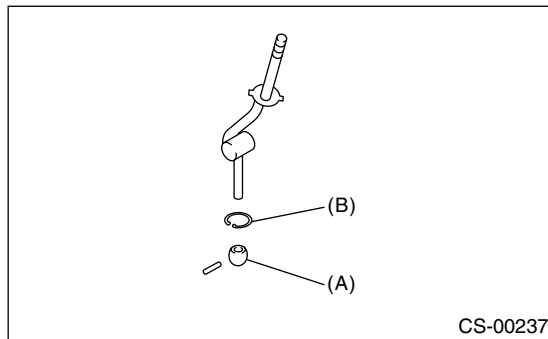


- (A) Bush
- (B) Spacer

3) Install the snap ring to gear shift lever, and then install the bush.

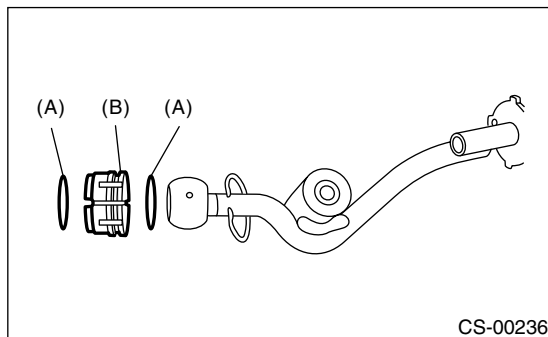
NOTE:

Apply grease to the bush.



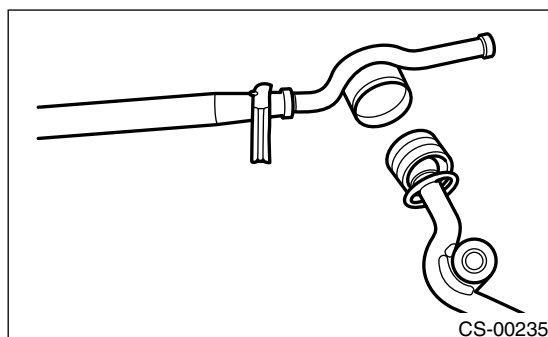
- (A) Bush
- (B) Snap ring

4) Apply grease to the bush and O-ring, and then install to the gear shift lever.

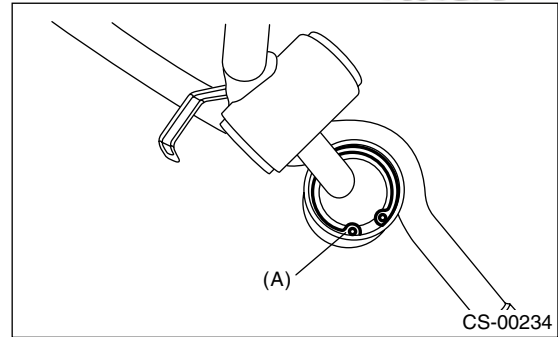


- (A) O-ring
- (B) Bush

5) Apply sufficient grease into the boss, and then install the gear shift lever to stay.



6) Install the washer and snap ring.

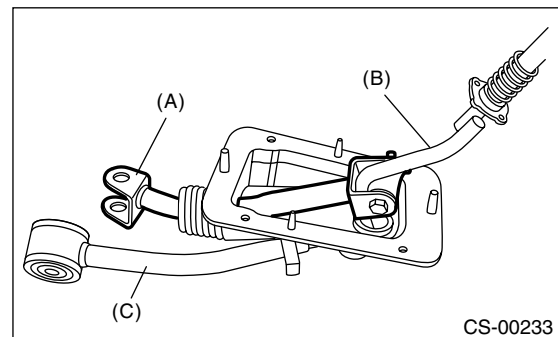


- (A) Snap ring

7) Insert the gear shift lever and rod into boot hole.
8) Install the rod.

Tightening torque:

11.8 N·m (1.2 kgf-m, 8.7 ft-lb)

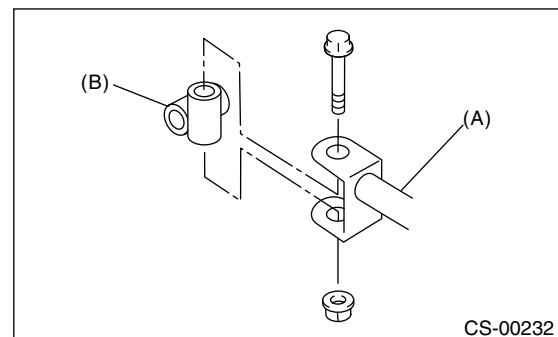


- (A) Rod
- (B) Lever
- (C) Stay

9) Install the boss to rod.

Tightening torque:

11.8 N·m (1.2 kgf-m, 8.7 ft-lb)

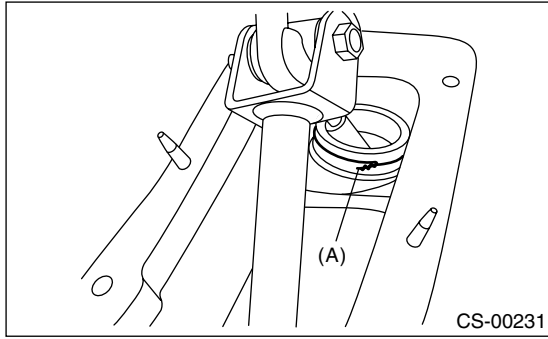


- (A) Rod
- (B) Boss

MT GEAR SHIFT LEVER

CONTROL SYSTEMS

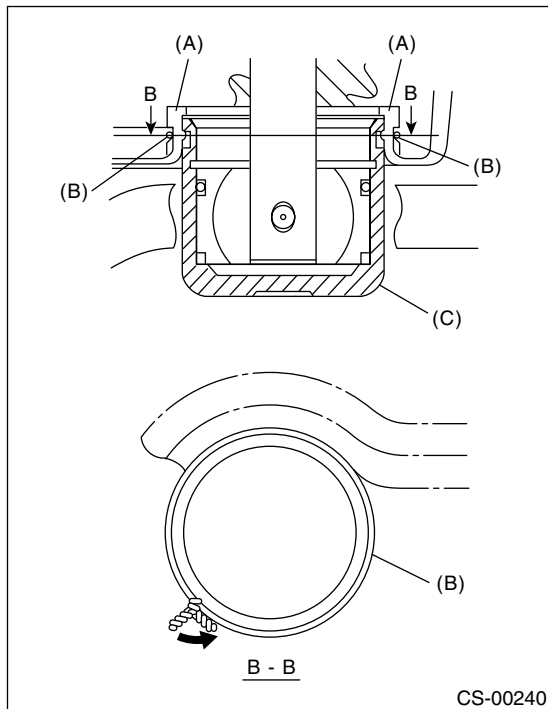
10) Install a new lock wire.



(A) Lock wire

NOTE:

- Install the lock wire to the stay groove.
- Bend the extra wire to same direction of lock wire winding.

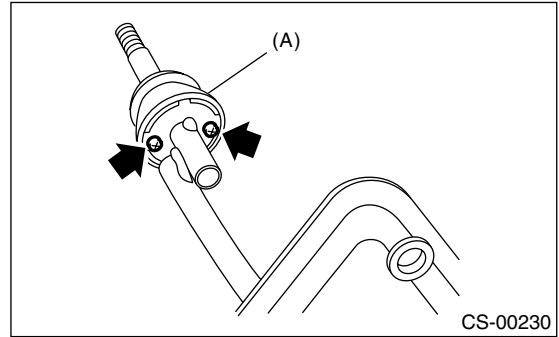


(A) Inner boot
(B) Lock wire
(C) Stay

11) Install the holder.

Tightening torque:

1.3 N·m (0.13 kgf-m, 0.96 ft-lb)



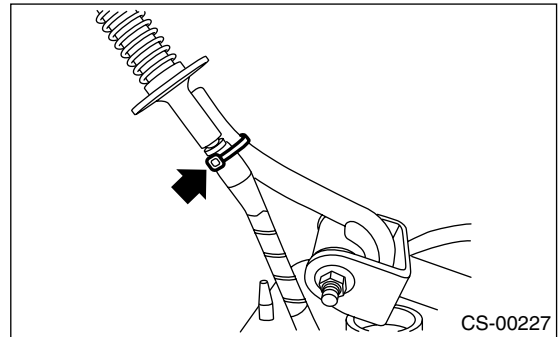
(A) Holder

12) Insert the reverse check cable into boot hole.

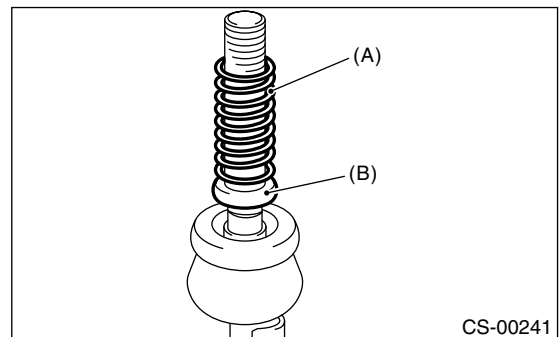
13) Insert the reverse check cable into gear shift assembly, and fix with band clip.

NOTE:

- Cut off the extra band clip.
- Make sure that the reverse check cable is inserted into gear shift lever assembly without any clearance.



14) Install the seat cushion and spring.

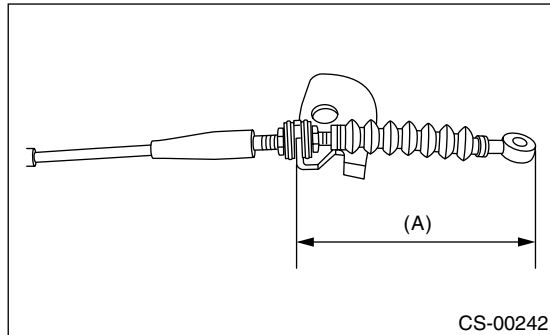


(A) Spring
(B) Seat cushion

15) Adjust the length between end of cable plate and reverse check cable to 84 mm (3.31 in), and then tighten the lock nut.

Tightening torque:

6 N·m (0.6 kgf-m, 4.4 ft-lb)

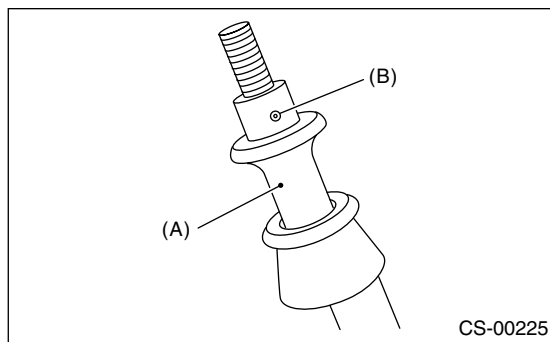


(A) 84 mm (3.31 in)

16) Fix the slider and reverse check cable end with spring pin.

NOTE:

Apply grease to the sliding part of slider.



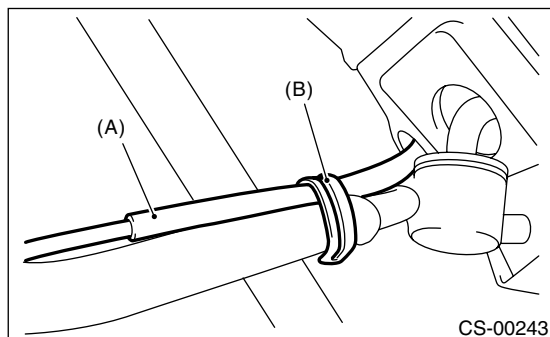
(A) Slider

(B) Spring pin

17) Fix the reverse check cable to clip of stay.

NOTE:

Install the reverse check cable to upper side of stay.



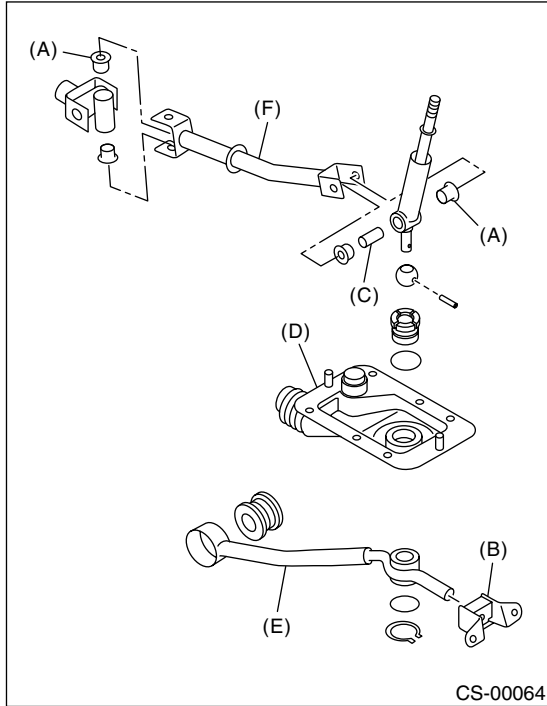
(A) Reverse check cable

(B) Clip

E: INSPECTION

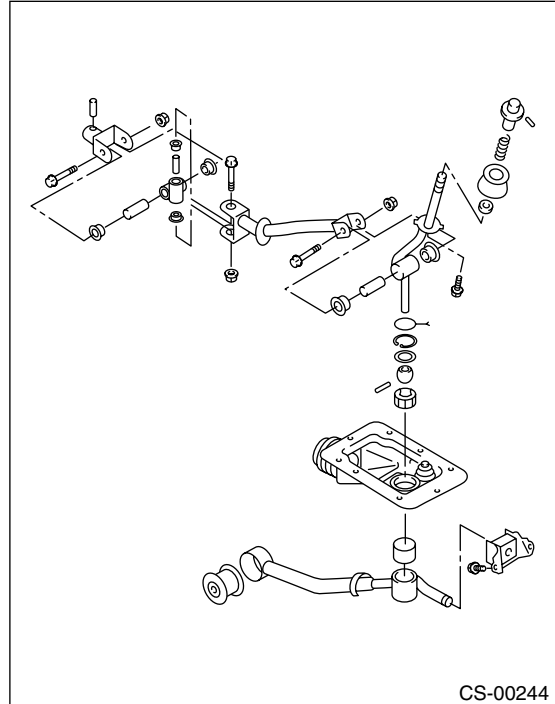
1) Check each part (bushing, cushion rubber, spacer, boot, stay and rod, etc.) for deformation, damage and wear. Repair or replace any defective part. Determine defective parts by comparing with new parts.

• 5MT



- (A) Bushing
- (B) Cushion rubber
- (C) Spacer
- (D) Boot
- (E) Stay
- (F) Rod

• 6MT

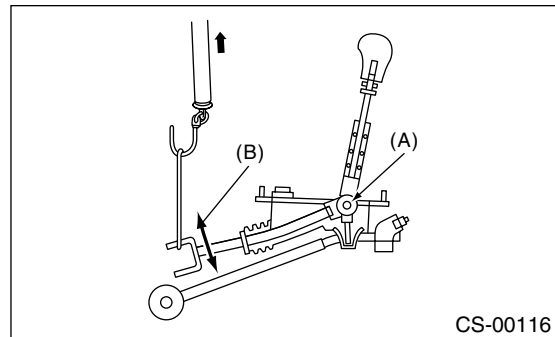


2) Check the swing torque of the rod in relation of the gear shift lever.

If the torque exceeds the specification, replace the bushing or retighten the nuts.

Swing torque:

3.7 N (0.38 kgf, 0.84 lb) or less

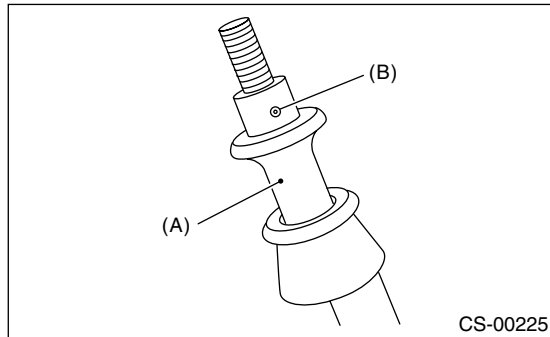


- (A) Center of rotation
- (B) Swing torque

8. Reverse Check Cable

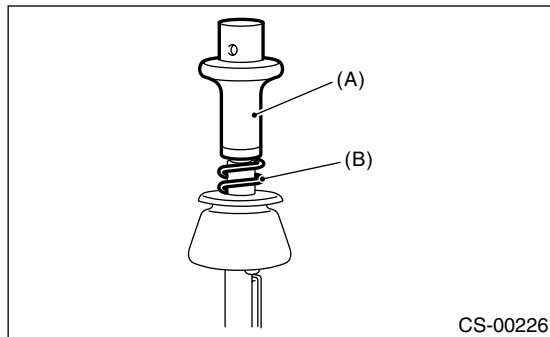
A: REMOVAL

- 1) Set the vehicle on a lift.
- 2) Remove the gear shift knob.
- 3) Remove the console box front. <Ref. to EI-43, REMOVAL, Console Box.>
- 4) Remove the spring pin from slider.



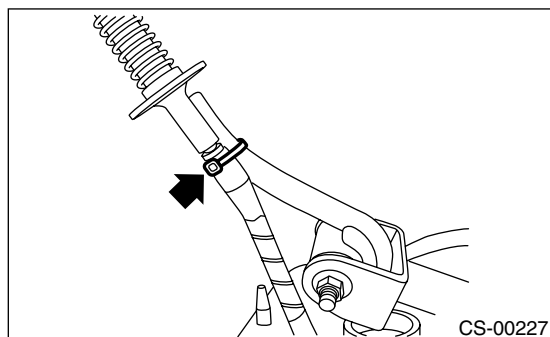
- (A) Slider
- (B) Spring pin

- 5) Remove the slider and spring.



- (A) Slider
- (B) Spring

- 6) Cut the band clip, and then separate the reverse check cable from gear shift lever.

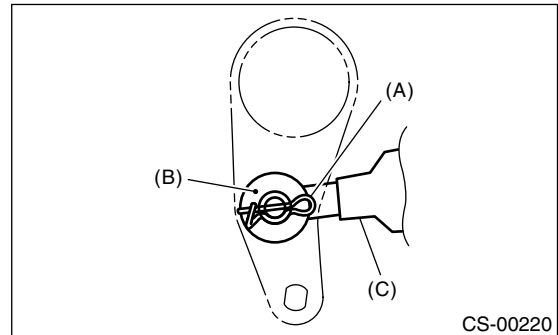


- 7) Lift-up the vehicle.
- 8) Remove the under cover.

- 9) Remove the rear exhaust pipe and muffler. <Ref. to EX(H4DOTC)-13, REMOVAL, Rear Exhaust Pipe.>, <Ref. to EX(H4DOTC)-14, REMOVAL, Muffler.>

- 10) Remove the crossmember. <Ref. to 6MT-33, REMOVAL, Transmission Mounting System.>

- 11) Remove the snap pin and washer, and then separate the reverse check cable from reverse check lever.

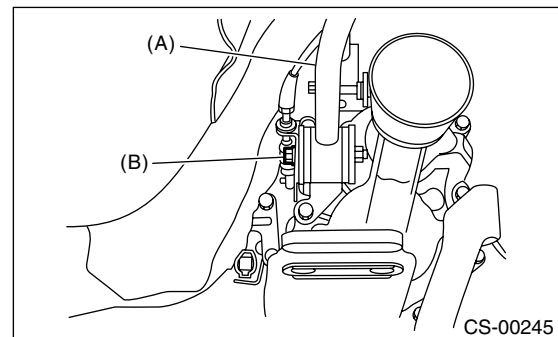


- (A) Snap pin
- (B) Washer
- (C) Reverse check cable

- 12) Move the transmission to right side, and then remove the stay bolt and reverse check cable.

NOTE:

If the transmission is not moved, the stay bolt will contact body and damage may occur.

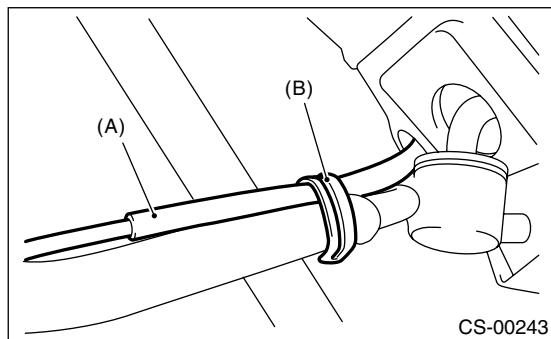


- (A) Stay
- (B) Stay bolt

REVERSE CHECK CABLE

CONTROL SYSTEMS

13) Raise the clip of stay, and then separate the stay and reverse check cable.



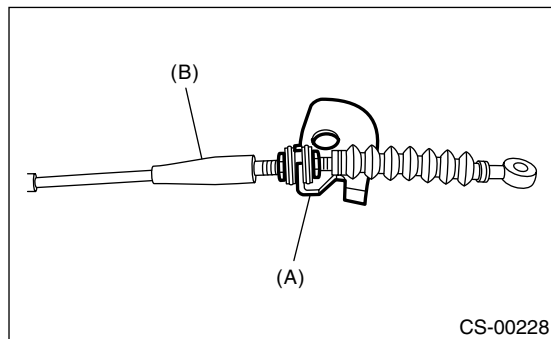
- (A) Reverse check cable
(B) Clip

14) Remove the reverse check cable by pulling from underneath the vehicle.

NOTE:

Take care not to damage the inner boot.

15) Loosen the lock nut, then remove the reverse check cable from cable plate.



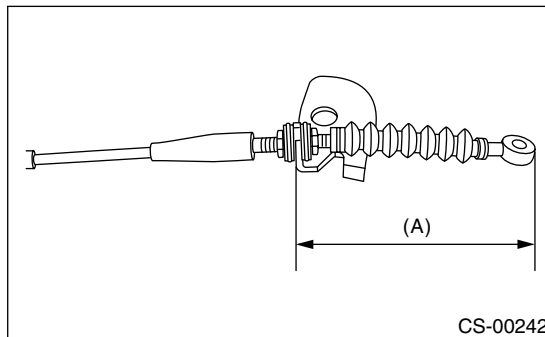
- (A) Cable plate
(B) Reverse check cable

B: INSTALLATION

1) Adjust the length between end of cable plate and reverse check cable to 84 mm (3.31 in), and then tighten the lock nut.

Tightening torque:

6 N·m (0.6 kgf-m, 4.4 ft-lb)



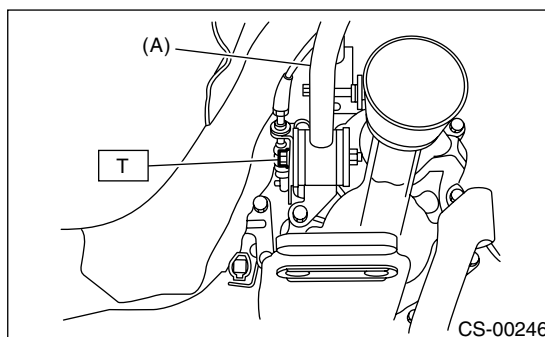
- (A) 84 mm (3.31 in)

2) Insert the reverse check cable to the hole of inner boots from underneath the vehicle.

3) Move the transmission to right side, and then install the stay.

Tightening torque:

T: 32 N·m (3.3 kgf-m, 23.6 ft-lb)



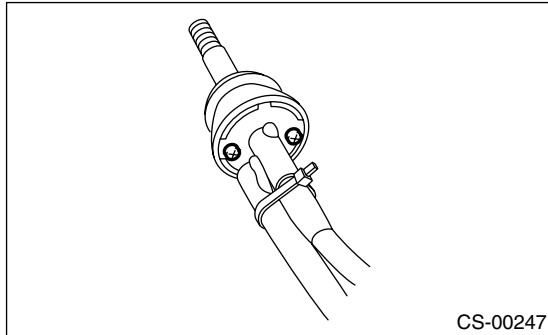
- (A) Stay

4) Lower the vehicle.

5) Insert the reverse check cable to the gear shift lever assembly, then fix with the band clip.

NOTE:

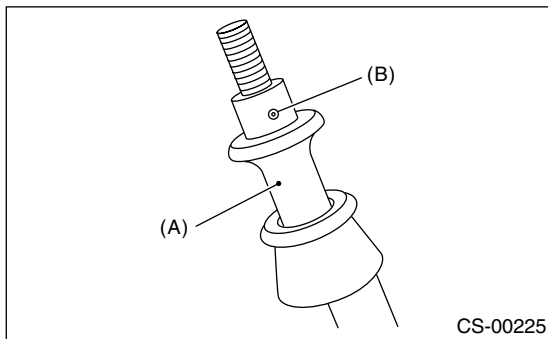
- Cut off the extra band clip.
- Make sure that the reverse check cable is inserted into gear shift lever assembly without any clearance.



6) Fix the slider and reverse check cable end with spring pin.

NOTE:

Apply grease to the sliding part of slider.



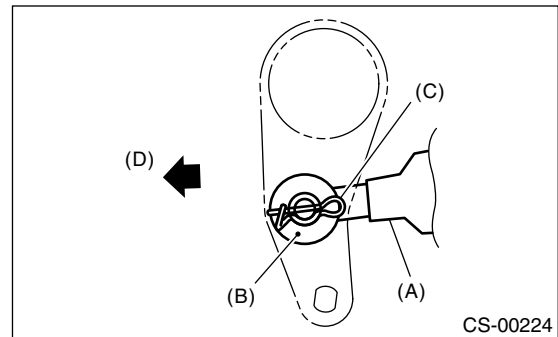
- (A) Slider
(B) Spring pin

7) Lift-up the vehicle.

8) Install the reverse check cable end, washer and snap pin to reverse check lever.

NOTE:

Take care to install the snap pin in proper direction.

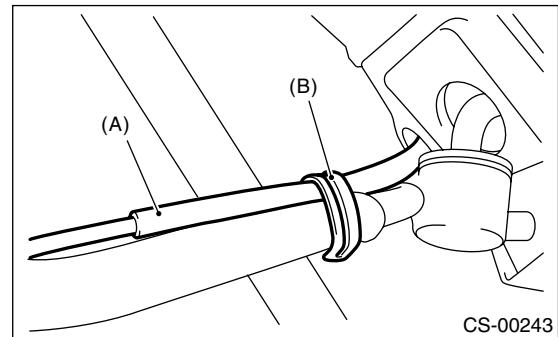


- (A) Reverse check cable
(B) Washer
(C) Snap pin
(D) Front side

9) Fix the reverse check cable to clip of stay.

NOTE:

Install the reverse check cable to upper side of stay.



- (A) Reverse check cable
(B) Clip

10) Install the rear exhaust pipe and muffler. <Ref. to EX(H4DOTC)-13, INSTALLATION, Rear Exhaust Pipe.>, <Ref. to EX(H4DOTC)-14, INSTALLATION, Muffler.>

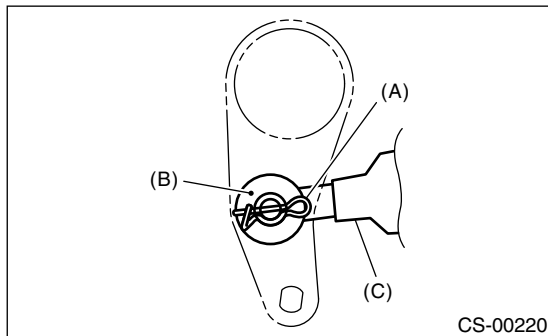
11) Install the console box. <Ref. to EI-43, INSTALLATION, Console Box.>

C: INSPECTION

- 1) Verify whether the slider moves smoothly. If not, adjust the reverse check cable or check damage of slider. <Ref. to CS-48, ADJUSTMENT, Reverse Check Cable.>
- 2) Check that the gear can be shift to reverse, when the slider is pulled up. If the gear can not be shift to reverse, adjust the reverse check cable. <Ref. to CS-48, ADJUSTMENT, Reverse Check Cable.>
- 3) Check that the gear can not be shift to reverse, when the slider is not pulled up. If the gear can be shift to reverse, adjust or replace the reverse check cable. <Ref. to CS-48, ADJUSTMENT, Reverse Check Cable.>

D: ADJUSTMENT

- 1) Set the vehicle on a lift.
- 2) Remove the under cover.
- 3) Remove the rear exhaust pipe and muffler. <Ref. to EX(H4DOTC)-13, REMOVAL, Rear Exhaust Pipe.>, <Ref. to EX(H4DOTC)-14, REMOVAL, Muffler.>
- 4) Remove the crossmember. <Ref. to 6MT-33, REMOVAL, Transmission Mounting System.>
- 5) Remove the snap pin and washer, and then separate the reverse check cable from reverse check lever.

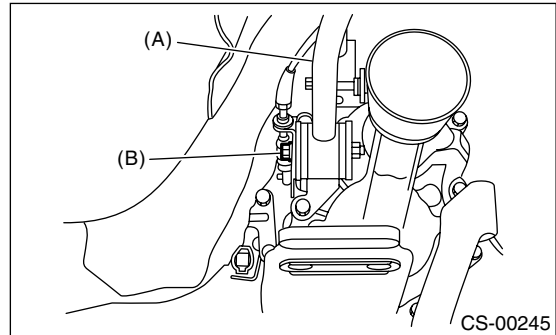


- (A) Snap pin
- (B) Washer
- (C) Reverse check cable

- 6) Move the transmission to right side, and then remove the stay bolt and reverse check cable.

NOTE:

If the transmission is not moved, the stay bolt will contact body and damage may occur.

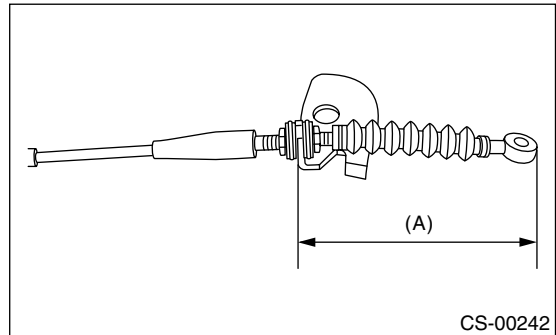


- (A) Stay
- (B) Stay bolt

- 7) Adjust the length between end of cable plate and reverse check cable to 84 mm (3.31 in), and then tighten the lock nut.

Tightening torque:

6 N·m (0.6 kgf-m, 4.4 ft-lb)

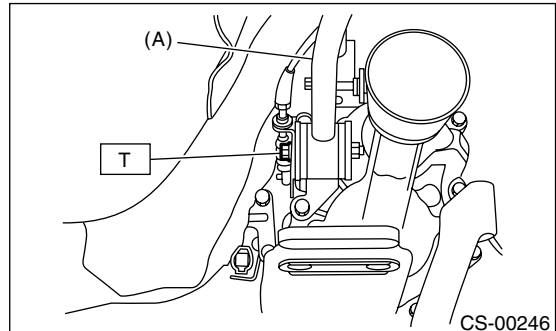


- (A) 84 mm (3.31 in)

- 8) Move the transmission to right side, and then install the stay.

Tightening torque:

T: 32 N·m (3.3 kgf-m, 23.6 ft-lb)



- (A) Stay

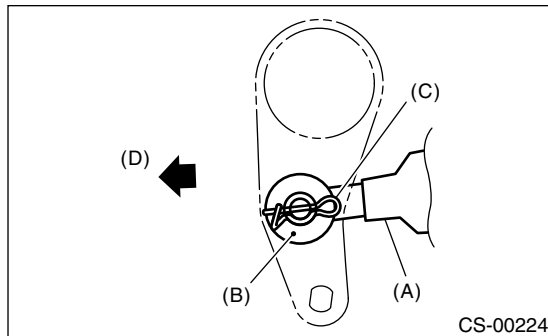
9) Install the crossmember. <Ref. to 6MT-33, INSTALLATION, Transmission Mounting System.>

10) Install the rear exhaust pipe and muffler. <Ref. to EX(H4DOTC)-13, INSTALLATION, Rear Exhaust Pipe.>, <Ref. to EX(H4DOTC)-14, INSTALLATION, Muffler.>

11) Install the reverse check cable end, washer and snap pin to reverse check lever.

NOTE:

Take care to install the snap pin in proper direction.



- (A) Reverse check cable
- (B) Washer
- (C) Snap pin
- (D) Front side

12) Install the under cover.

9. General Diagnostic Table

A: INSPECTION

Symptom	Possible cause	Remedy
1. Select lever	Starter does not run.	Adjust select cable and inhibitor switch, or inspect circuit.
	Back-up light does not light up.	Adjust select cable and inhibitor switch, or inspect circuit.
	AT shift lock system does not operate normally.	Adjust select cable and inhibitor switch, or inspect circuit.
2. MT gear shift lever (6MT)	Shift into reverse is impossible.	Adjust reverse check cable.
	Shift into reverse is possible without pulling up slider.	Adjust or replace reverse check cable.
	Slider cannot be pulled up. Or slider is pulled up being stucked.	- Inspect reverse check system of transmission. - Adjust or replace reverse check cable.

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SECTION 5

TRANSMISSION