1. General Description

A: SPECIFICATIONS

1. TORQUE CONVERTER CLUTCH

Model	2.5 L Non-TURBO model	2.5 L TURBO model
Type	Symmetric, 3 element, single stage, 2 phase torque converter	
Stall torque ratio	2.1 — 2.3	
Nominal diameter	246 mm (9.69 in)	
Stall speed (at sea level)	2,200 — 2,700 rpm	2,900 — 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	TURBO model	NON-TURBO model
1st	2.785	3.027
2nd	1.545	1.619
3rd	1.000	
4th	0.694	
Rev	2.272	

5. PLANETARY GEAR AND PLATE

	NON-TURBO model	TURBO model
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 ←→ 2nd ←→ 3rd ←→ 4th
3 (3rd)	Automatic gear change 1st ←→ 2nd ←→ 3rd ← 4th
2 (2nd)	2nd gear locked (Deceleration possible 2nd ← 3rd ← 4th)
1 (1st)	1st gear locked (Deceleration possible 1st ← 2nd ← 3rd ← 4th)
Control method	Select cable

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)

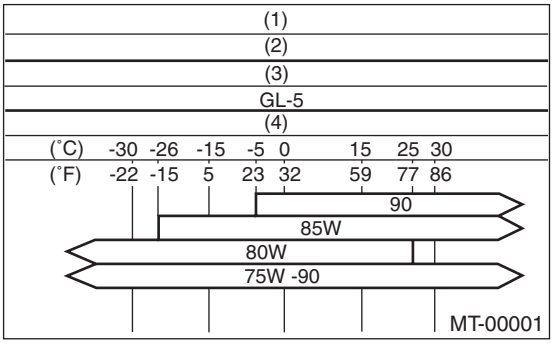
8. COOLING AND HARNESS

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

9. TRANSFER

Model	MPT model	Turbo VTD model
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)	

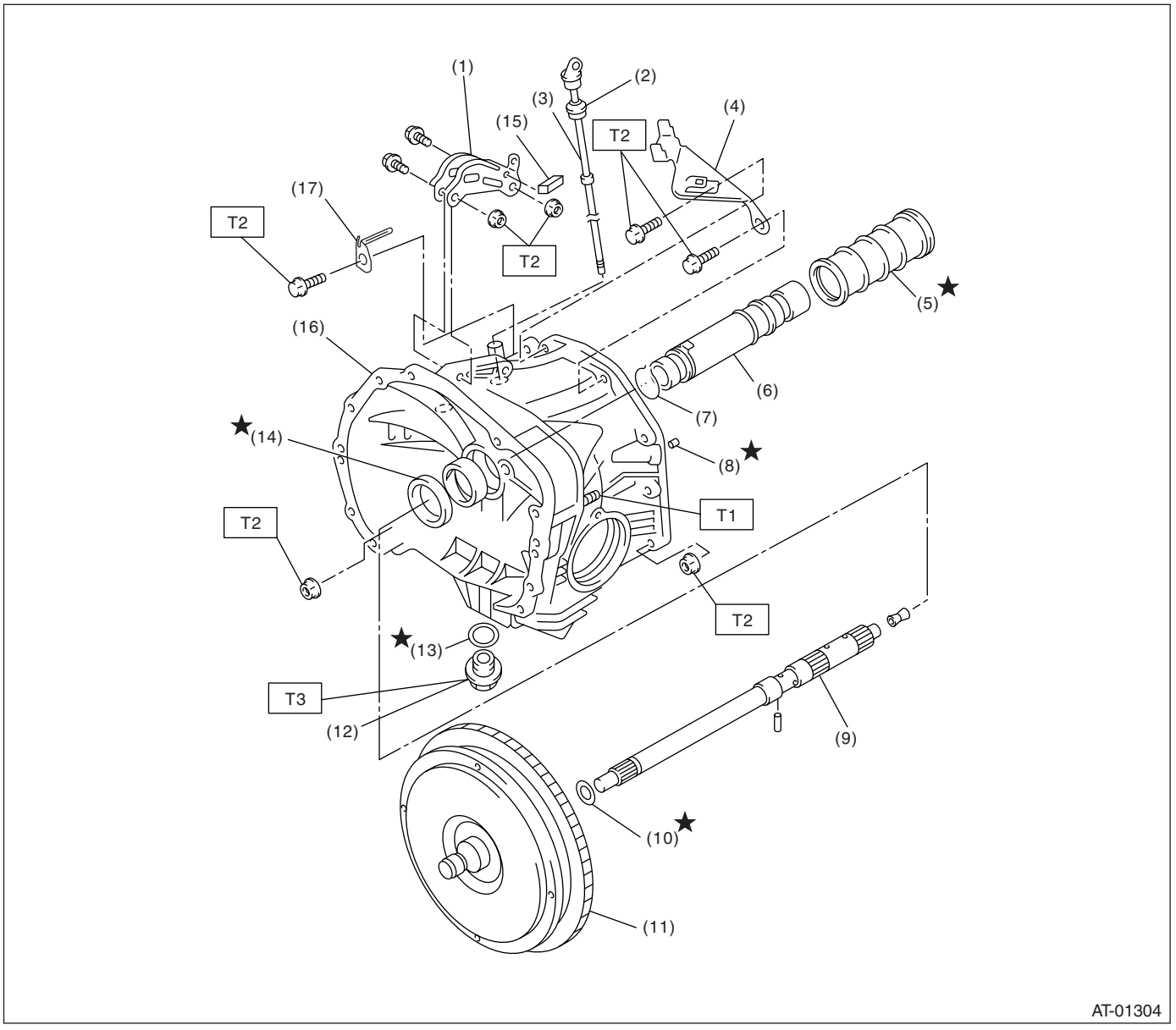
10.FINAL REDUCTION

Model	TURBO model	NON-TURBO model
Front final gear ratio	4.444 (40/9)	4.444 (40/9)
Lubrication oil		
Front differential oil capacity	1.1 — 1.3 ℓ (1.2 — 1.4 US qt, 1.0 — 1.1 Imp qt)	

(1) Item
(2) Front differential gear oil
(3) API classification
(4) SAE viscosity No. and applicable temperature

B: COMPONENT

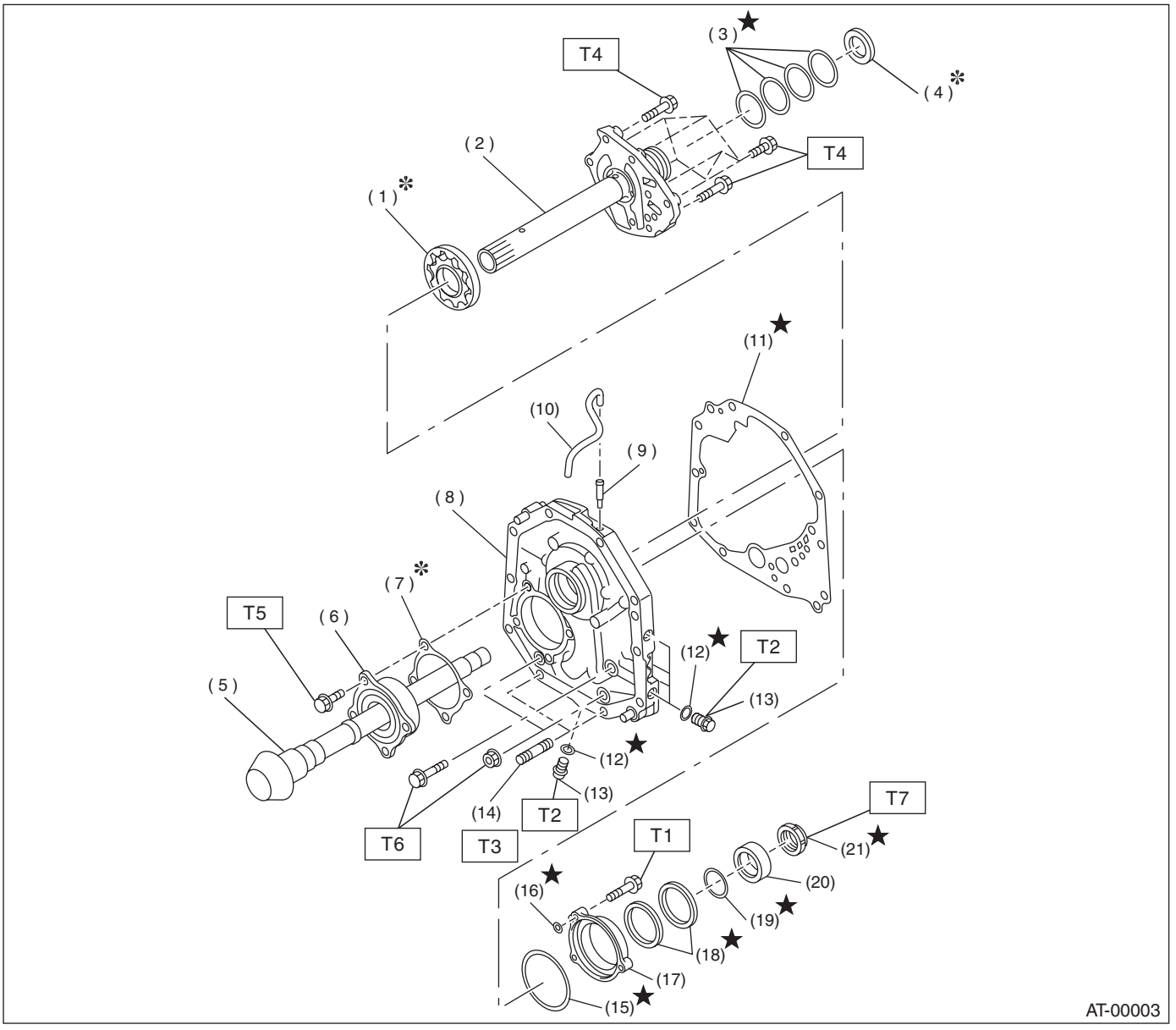
1. TORQUE CONVERTER CLUTCH AND CASE



(1) Pitching stopper bracket
(2) O-ring
(3) Differential oil level gauge
(4) Stay
(5) Seal pipe
(6) Oil pump shaft
(7) Clip
(8) Oil drain pipe
(9) Input shaft
(10) O-ring
(11) Torque converter clutch ASSY
(12) Drain plug
(13) Gasket
(14) Oil seal
(15) Clip (TURBO model)
(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: Copper gasket
70 (7.1, 51.4)
Aluminum gasket
44 (4.5, 32.5)

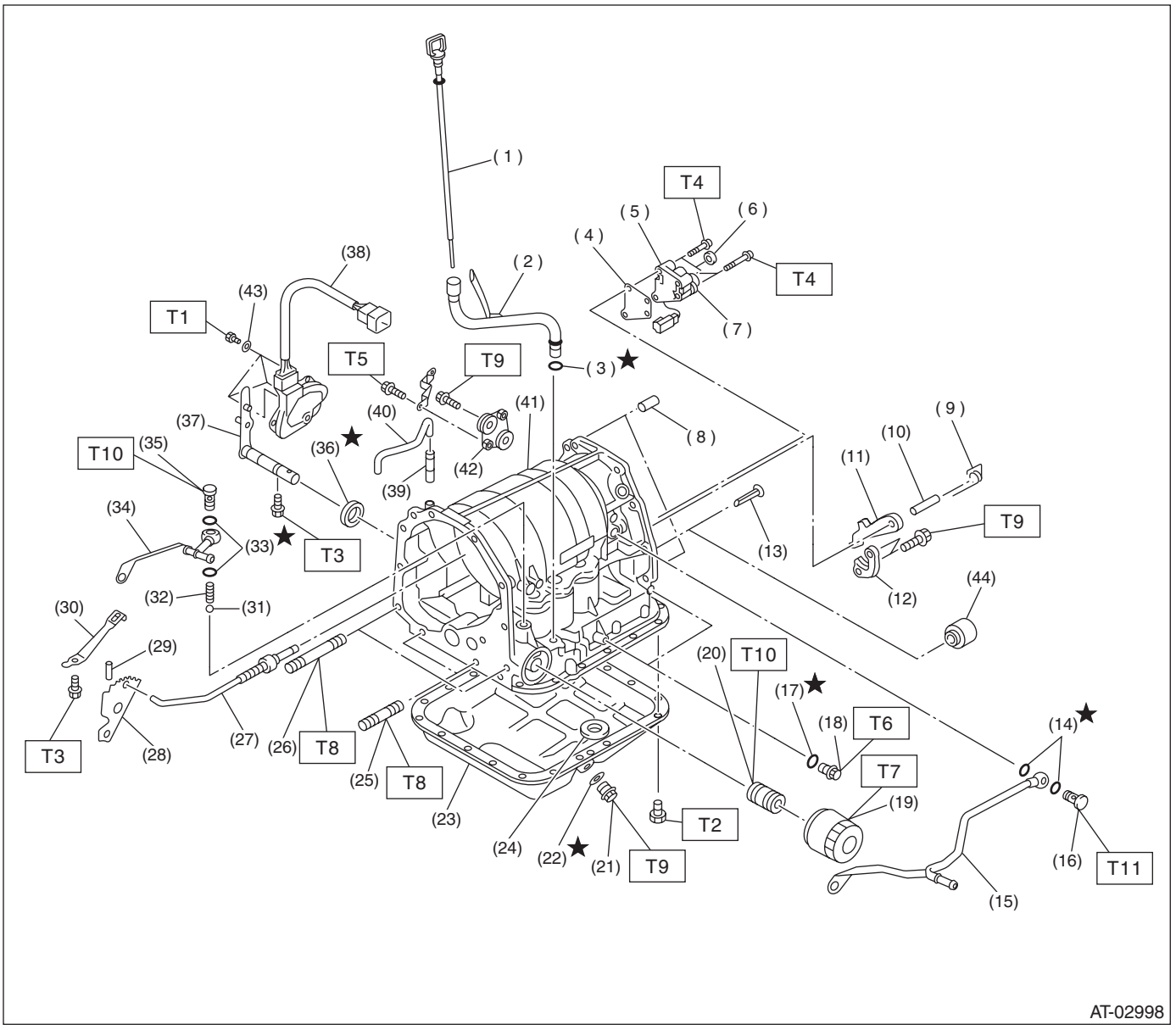
2. OIL PUMP



(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)

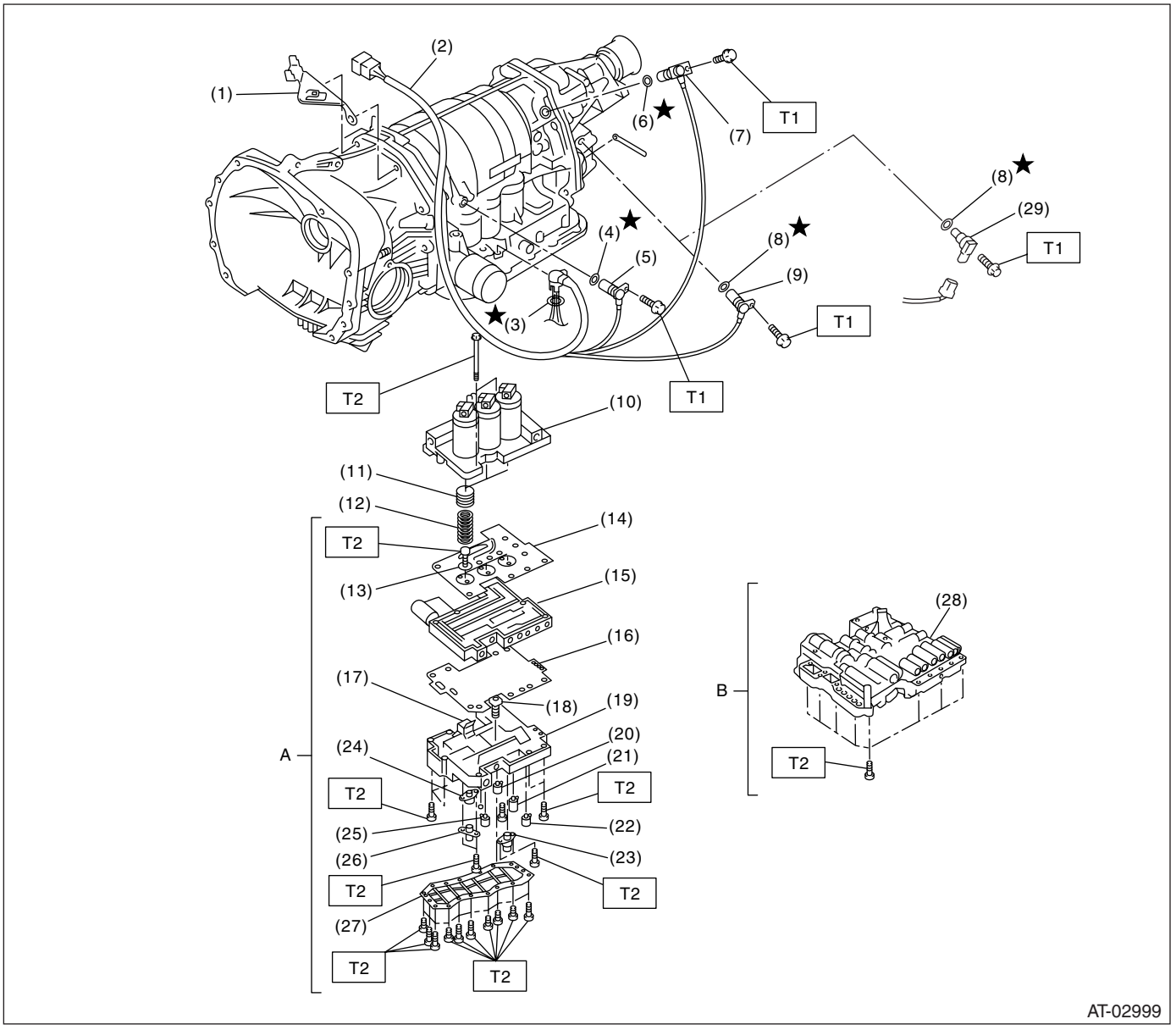
3. TRANSMISSION CASE AND CONTROL DEVICE



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

Tightening torque: N·m (kgf-m, ft-lb)	
T1:	***3.4 (0.35, 2.5)***
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)***
T11:	***40 (4.1, 30)***

4. CONTROL VALVE AND HARNESS ROUTING



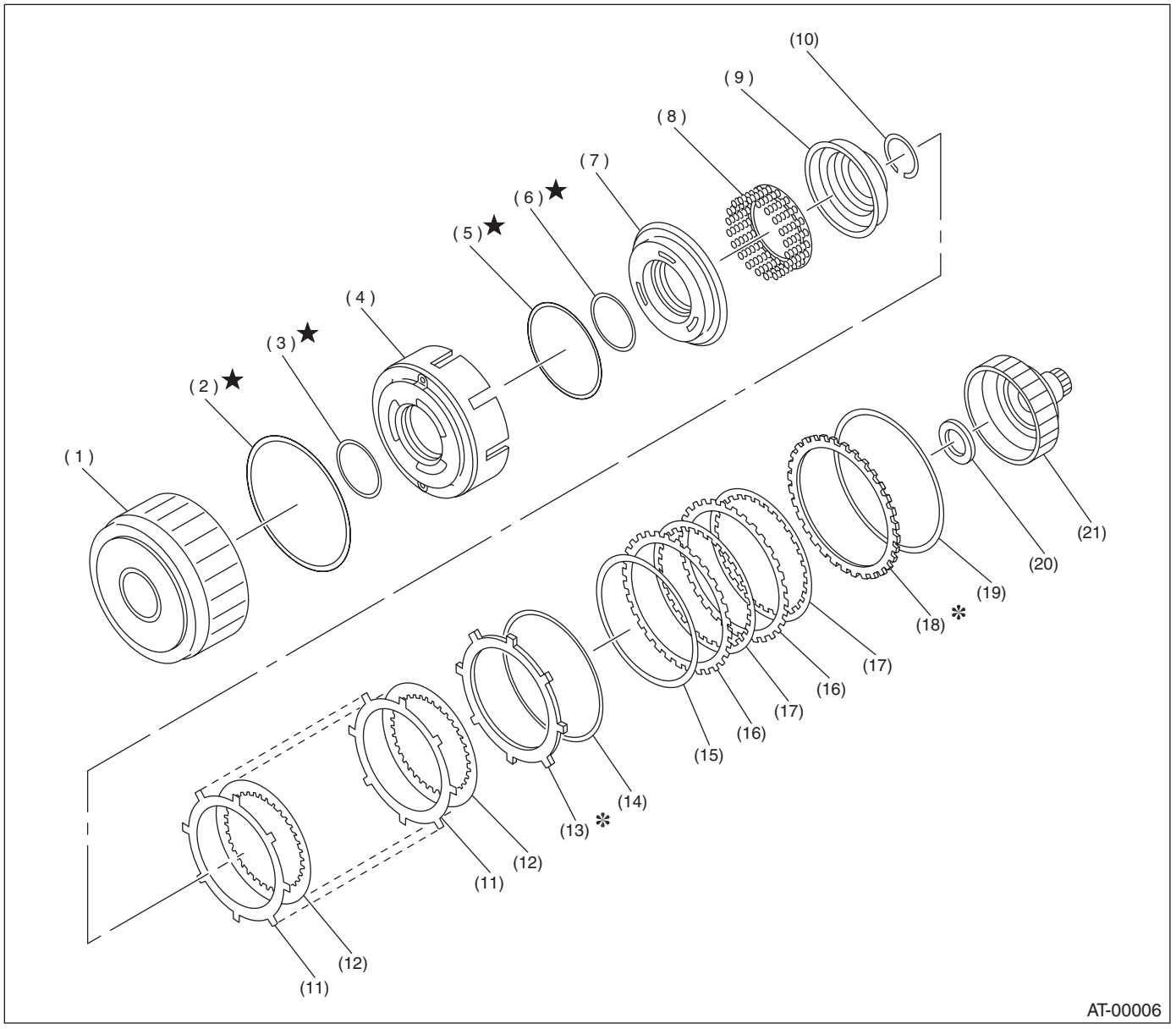
A: Non-TURBO model

B: TURBO model

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

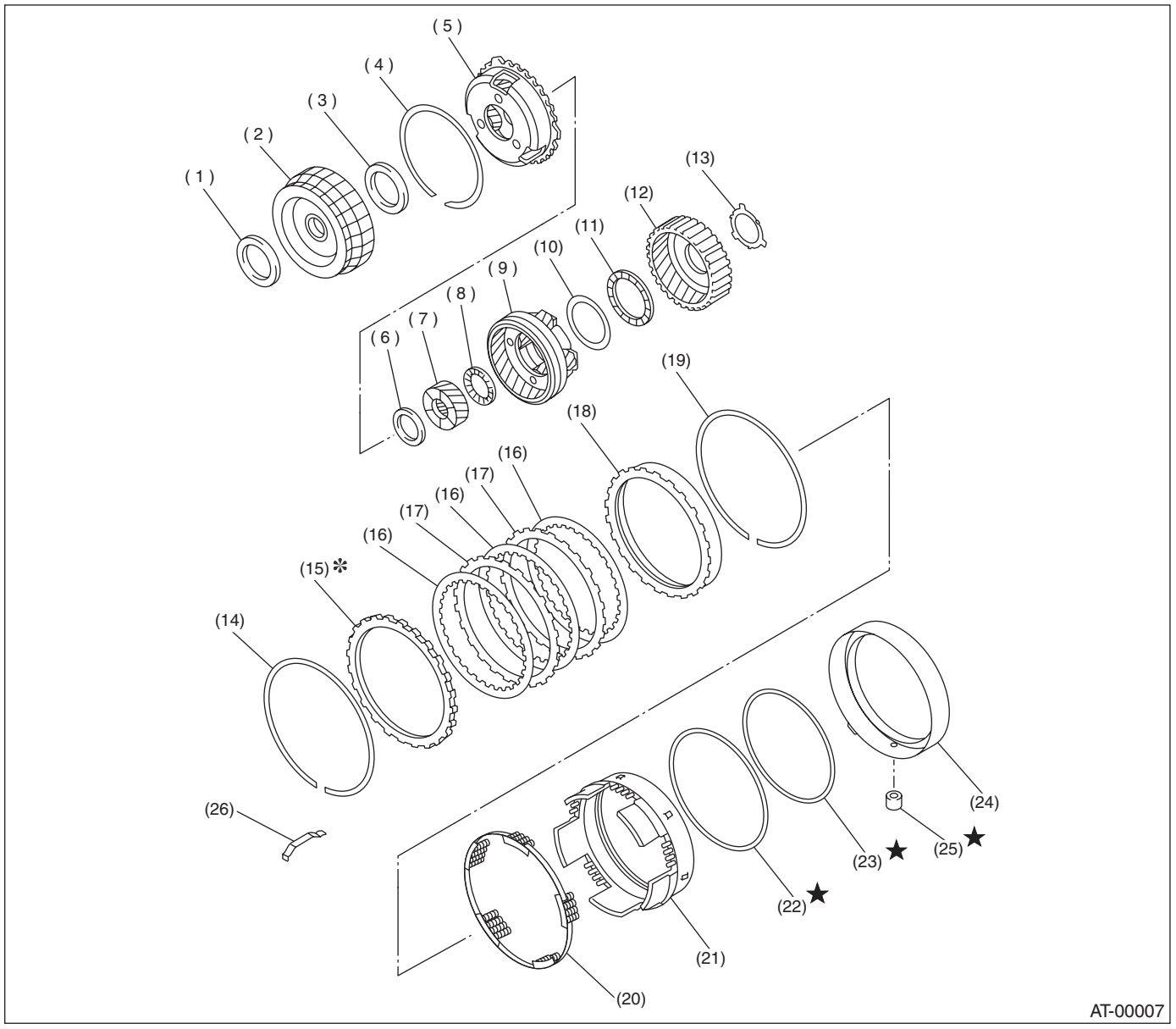
Tightening torque: N·m (kgf-m, ft-lb)
T1: 7 (0.7, 5.1)
T2: 8 (0.8, 5.8)

5. HIGH CLUTCH AND REVERSE CLUTCH



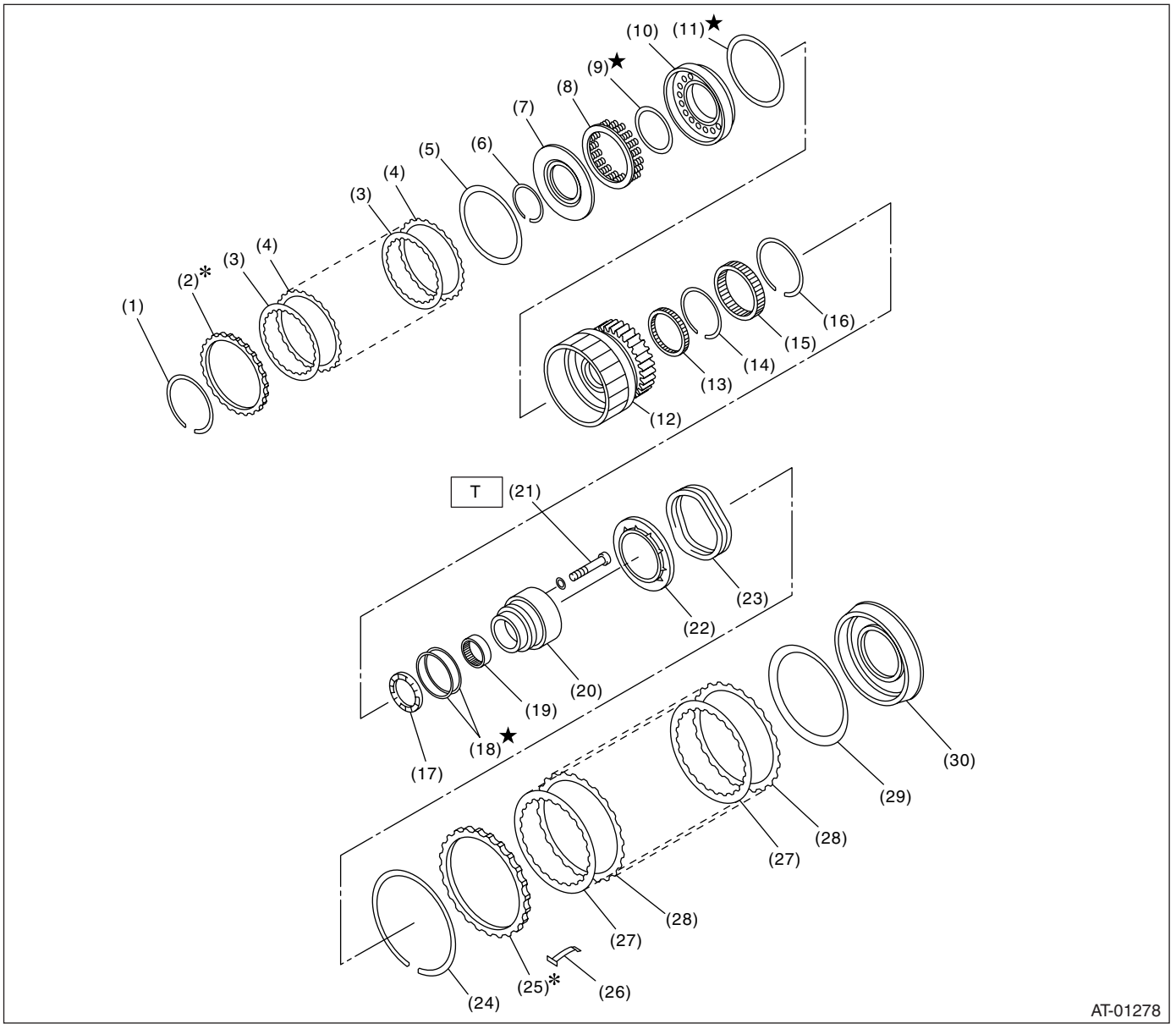
(1) High clutch drum
(2) Lip seal
(3) D-ring
(4) Reverse clutch piston
(5) D-ring
(6) D-ring
(7) High clutch piston
(8) Spring retainer
(9) Cover
(10) Snap ring
(11) Driven plate
(12) Drive plate
(13) Retaining plate
(14) Snap ring
(15) Dish plate
(16) Driven plate
(17) Drive plate
(18) Retaining plate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

6. PLANETARY GEAR AND 2-4 BRAKE



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

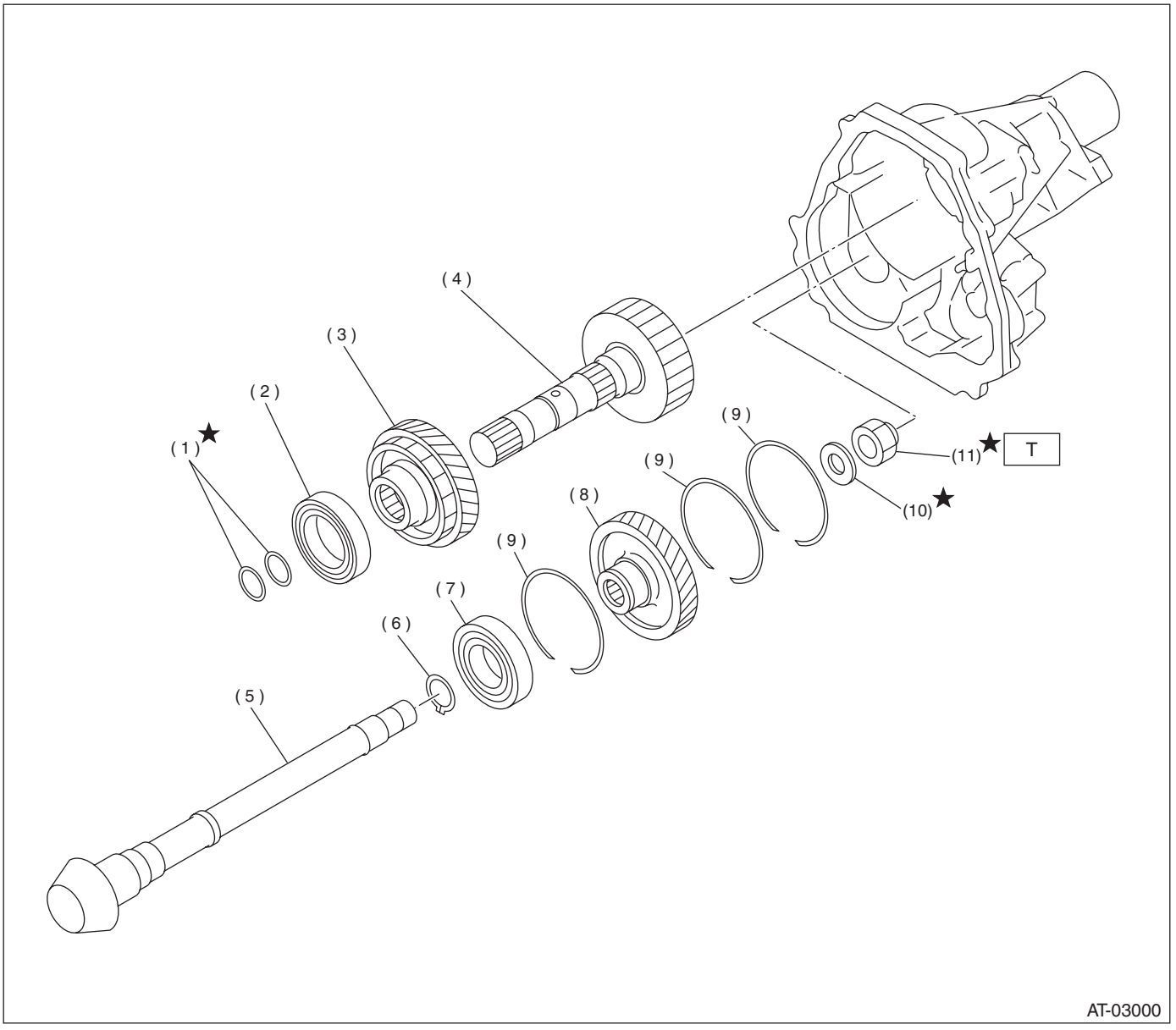
7. LOW CLUTCH AND LOW & REVERSE BRAKE



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

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

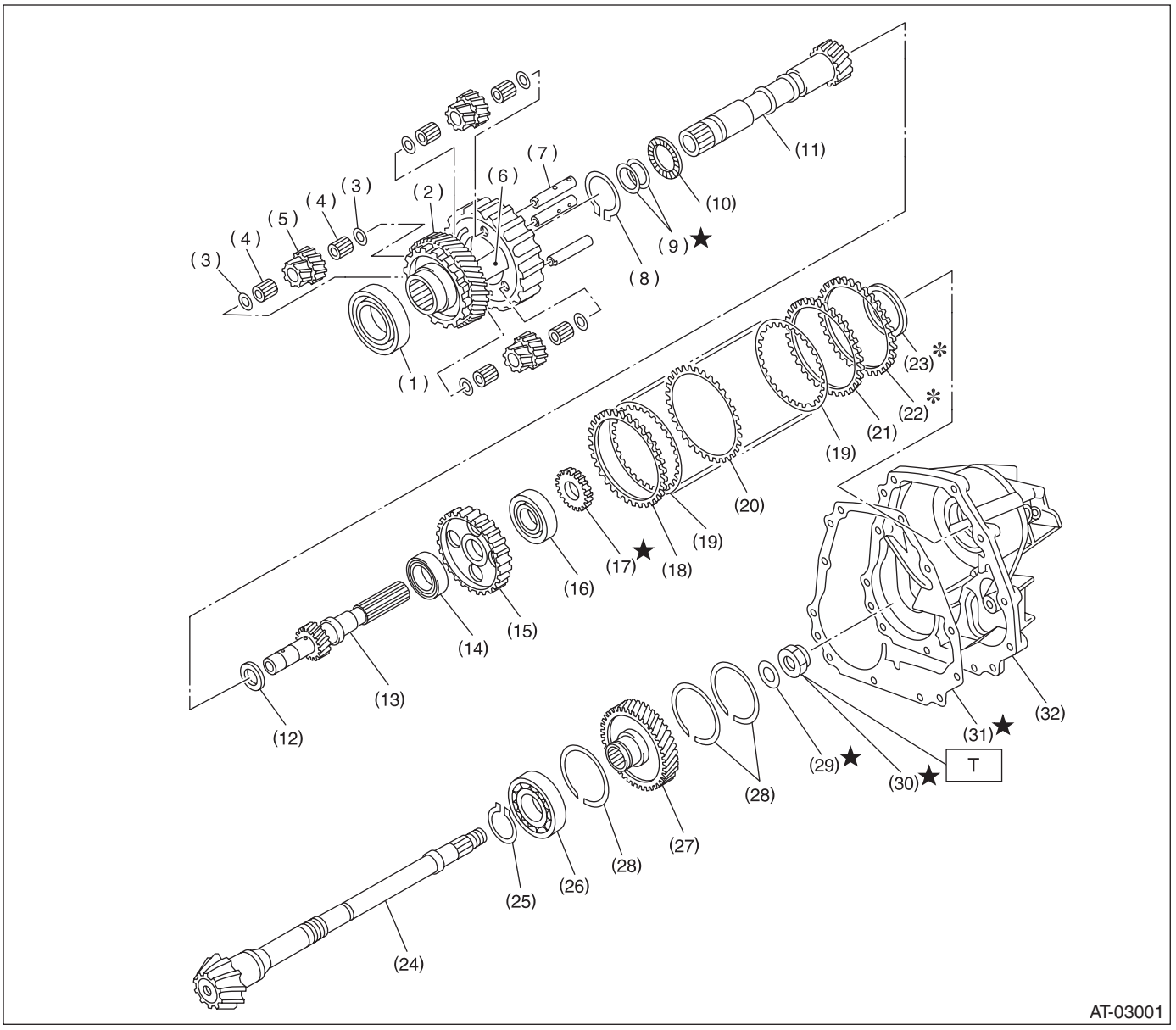
8. REDUCTION GEAR WITH MPT



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

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

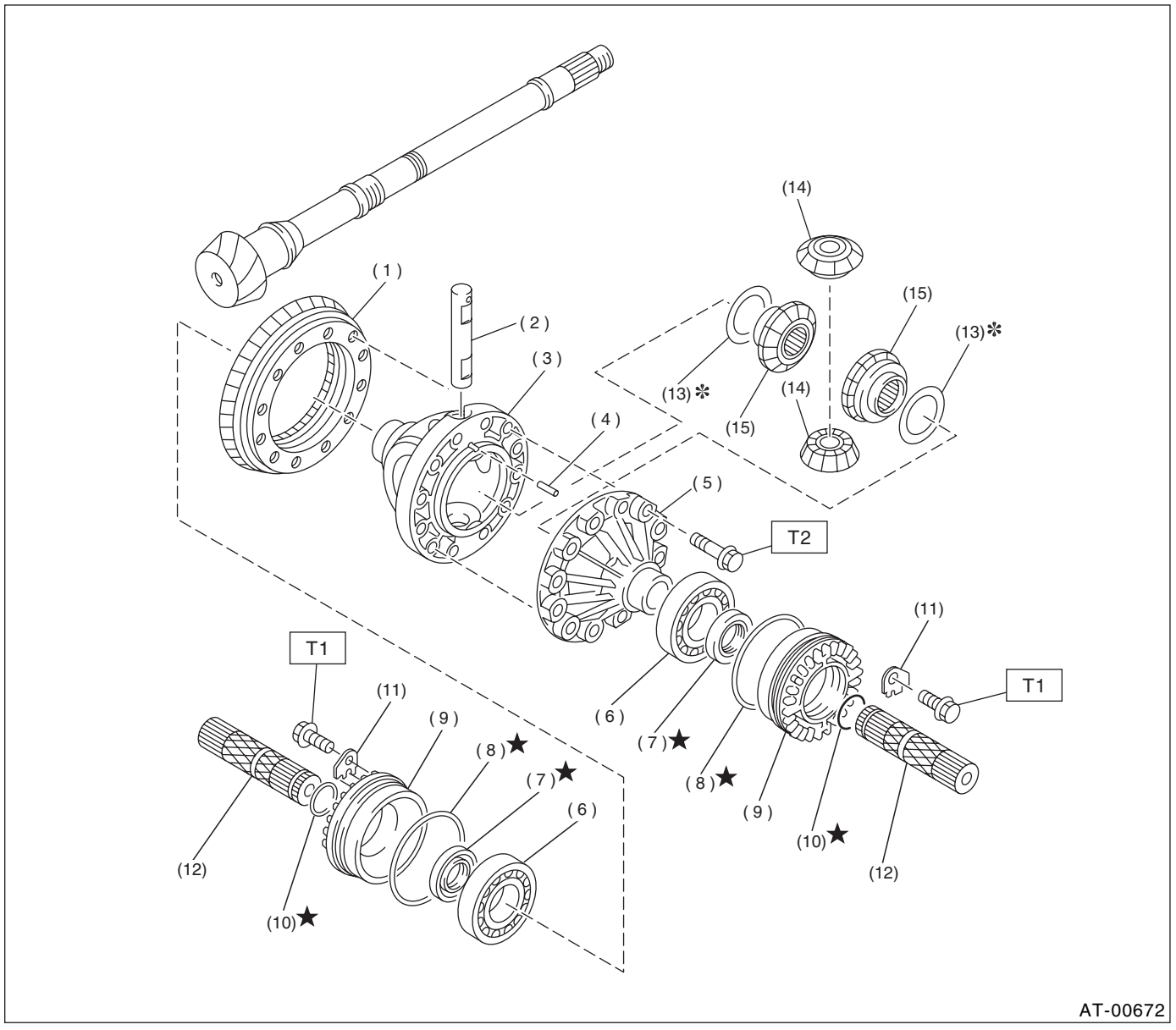
9. REDUCTION GEAR WITH VTD



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

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

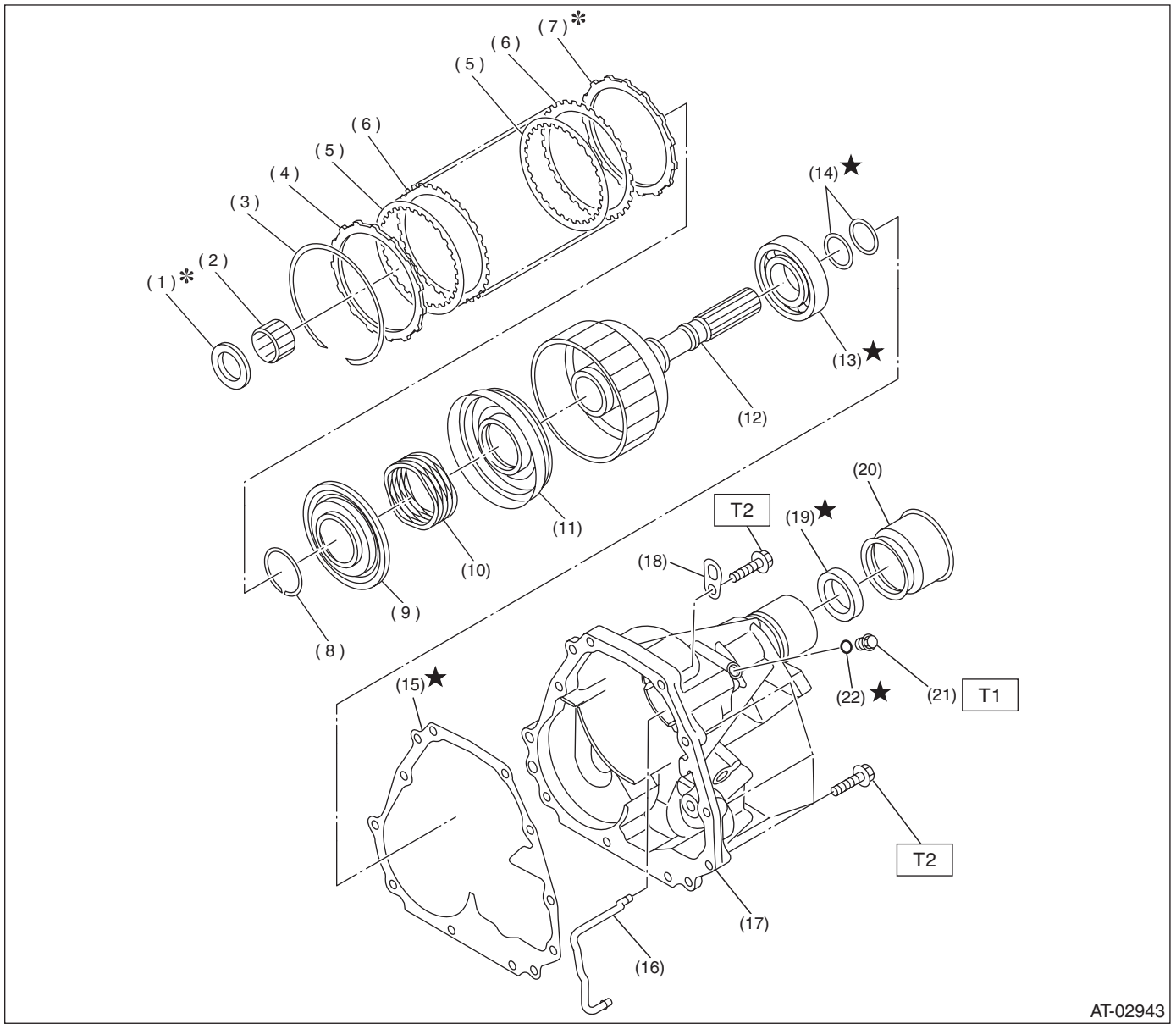
10.DIFFERENTIAL GEAR



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

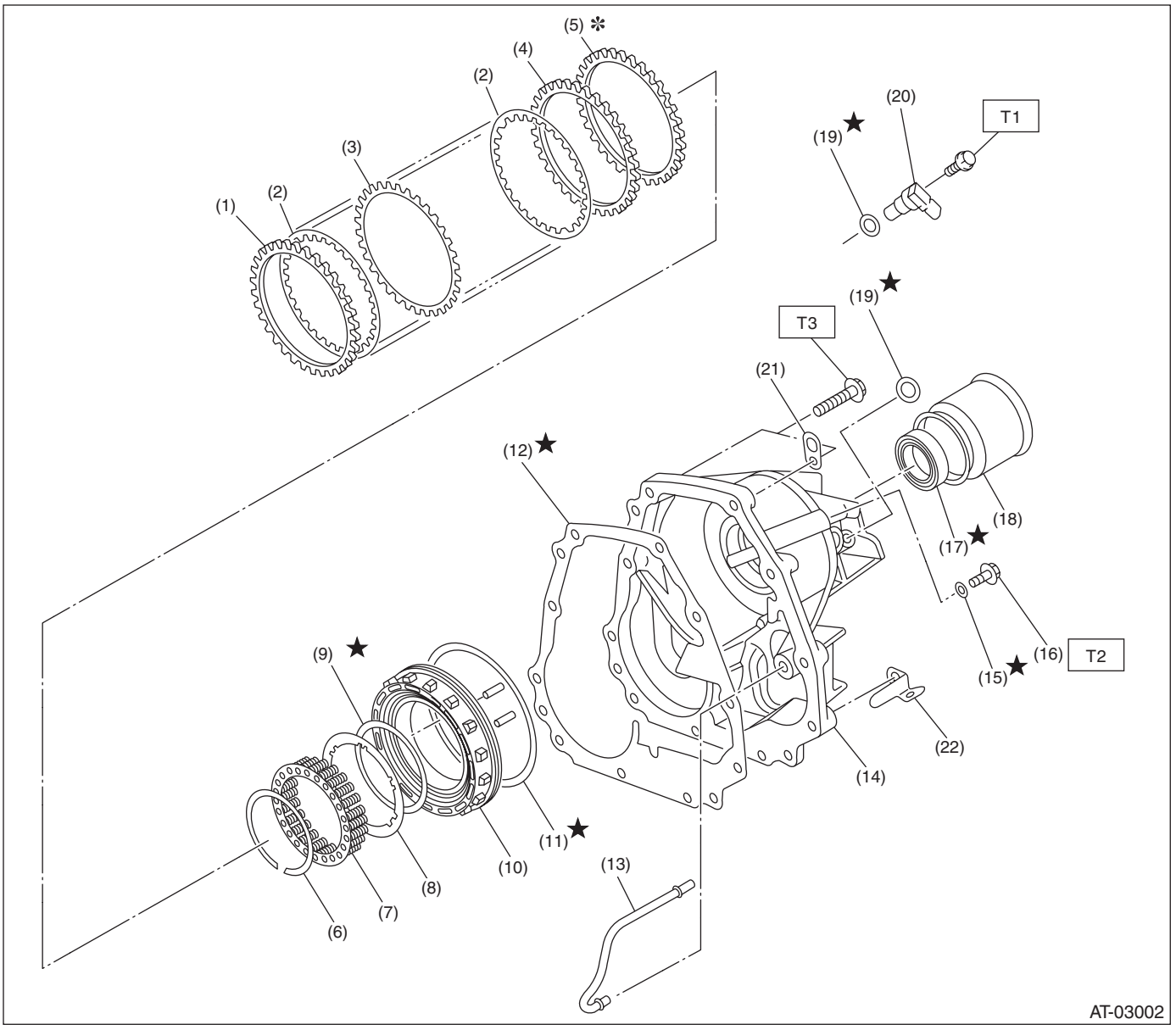
11.TRANSFER AND EXTENSION CASE WITH MPT



(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

Tightening torque: N·m (kgf-m, ft-lb)
T1: 13 (1.3, 9.4)
T2: 25 (2.5, 18.1)

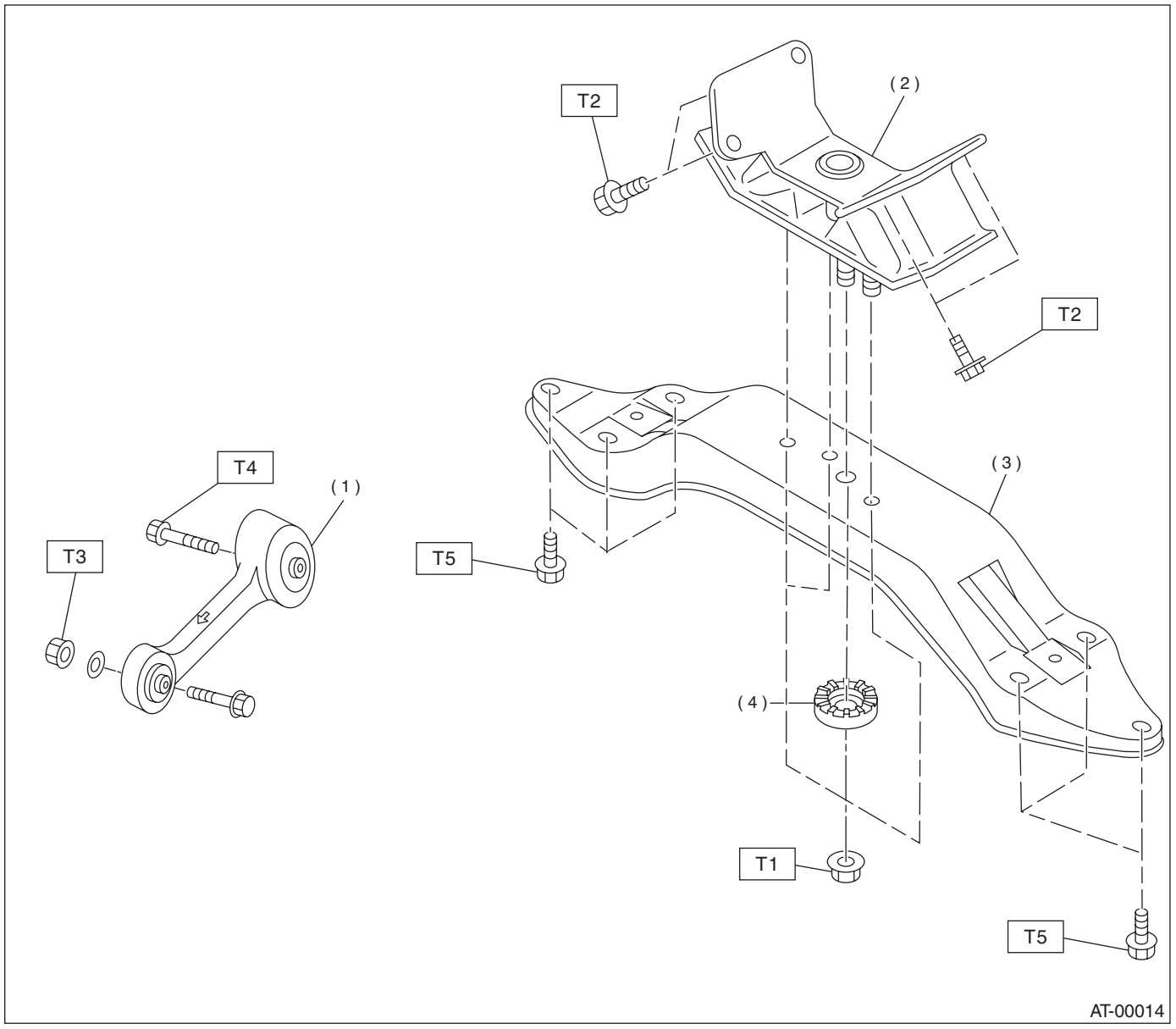
12.TRANSFER AND EXTENSION CASE WITH VTD



(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 vehicle speed sensor (TURBO model)
(21) Transmission hanger
(22) Clip (TURBO model)

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: 75 (7.7, 55)

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 installed, do not place with the oil pan inside 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 open the case. 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 bolts and nuts to the specified torque.
• Place shop jacks or safety stands at the specified points.
• Apply appropriate gear oil or ATF onto sliding or revolving 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

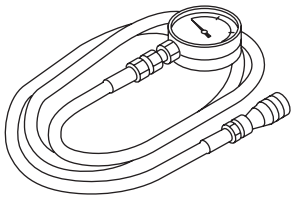
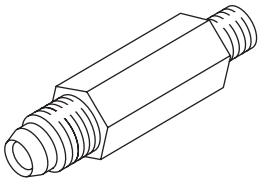
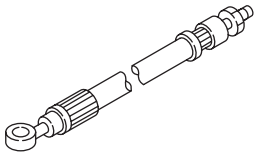
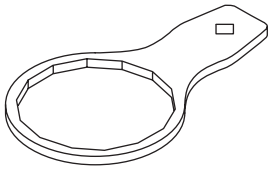
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-498575400	498575400	OIL PRESSURE GAUGE ASSY	Used for measuring oil pressure.
 ST-498897200	498897200	ADAPTER	Used oil pump housing when measuring reverse clutch pressure and line pressure.
 ST-498897700	498897700	ADAPTER SET	Used for measuring transfer clutch pressure.
 ST-498545400	498545400	FILTER WRENCH	Used for removing and installing ATF filter.

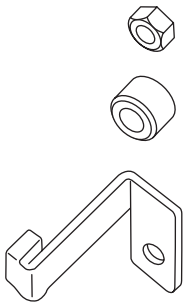
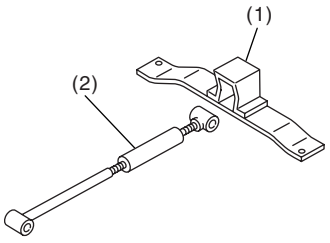
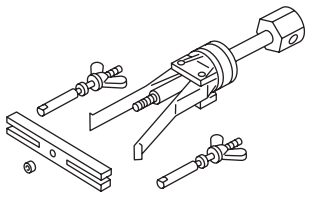
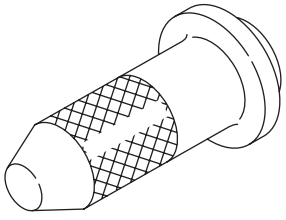
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-498277200	498277200	STOPPER SET	Used for removing and installing automatic transmission assembly to engine.
 ST41099AA000	41099AA000	ENGINE SUPPORT ASSY	Used for supporting engine. (1) ENGINE SUPPORT BRACKET (41099AA010) (2) ENGINE SUPPORT (41099AA020)
 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.

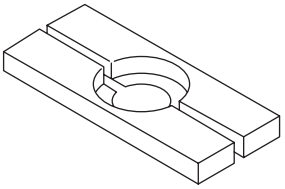
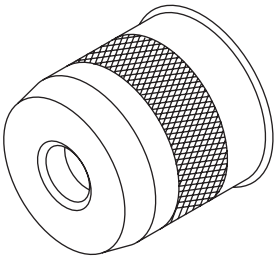
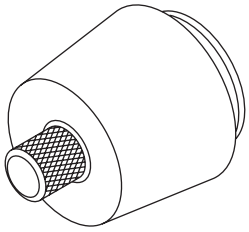
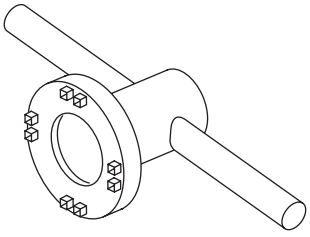
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-498077000	498077000	REMOVER	Used for removing differential taper roller bearing.
 ST-499247400	499247400	INSTALLER	• Used for installing transfer outer snap ring. • Used with GUIDE (499257300).
 ST-499257300	499257300	SNAP RING OUTER GUIDE	• Used for installing transfer outer snap ring. • Used with INSTALLER (499247400).
 ST-499787000	499787000	WRENCH ASSY	Used for removing and installing differential side retainer.

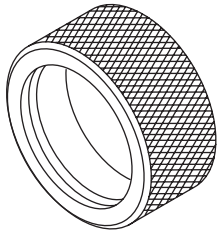
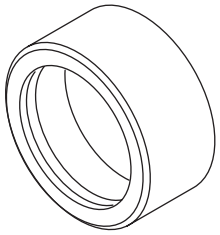
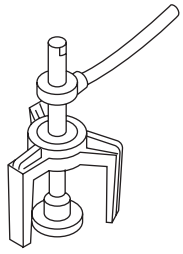
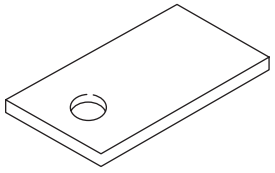
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-398437700	398437700	DRIFT	Used for installing converter case oil seal.
 ST-398487700	398487700	INSTALLER	Used for installing taper roller bearing of front differential.
 ST-398673600	398673600	COMPRESSOR	Used for removing and installing clutch spring.
 ST-498255400	498255400	PLATE	Used for measuring backlash of hypoid gear.

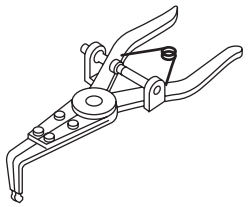
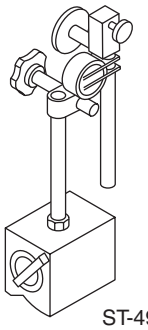
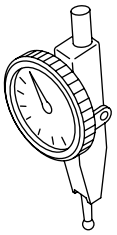
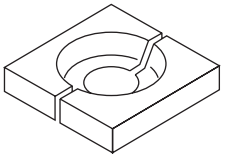
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-399893600	399893600	PLIERS	Used for removing and installing clutch spring.
 ST-498247001	498247001	MAGNET BASE	• Used for measuring gear backlash. • Used with DIAL GAUGE (498247100).
 ST-498247100	498247100	DIAL GAUGE	• Used for measuring gear backlash. • Used with MAGNET BASE (498247001).
 ST-498517000	498517000	REPLACER	Used for removing front roller bearing.

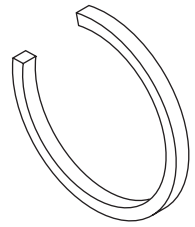
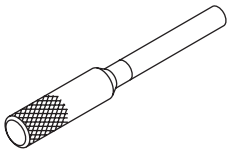
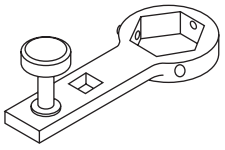
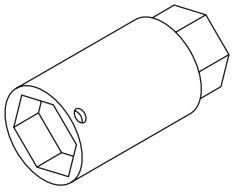
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-398623600	398623600	SEAT	Used for removing spring of transfer clutch piston.
 ST-499267300	499267300	STOPPER PIN	Used for installing inhibitor switch.
 ST-499787700	499787700	WRENCH	Used for removing and installing drive pinion lock nut.
 ST-499787500	499787500	ADAPTER	Used for removing and installing drive pinion lock nut.

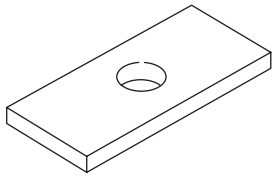
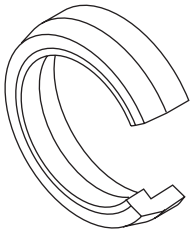
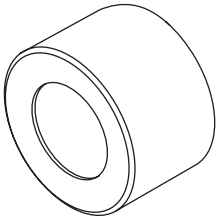
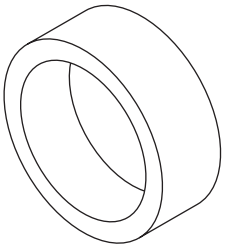
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-398643600	398643600	GAUGE	Used for measuring total end play, extension end play and drive pinion height.
 ST-498627100	498627100	SEAT	Used for holding low clutch piston retainer spring when installing snap ring.
 ST-499577000	499577000	GAUGE	• Used for 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.

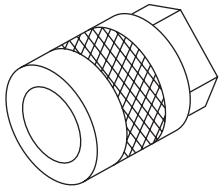
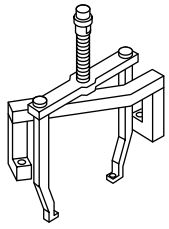
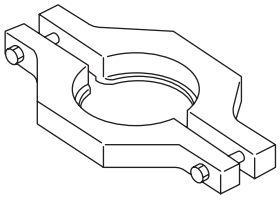
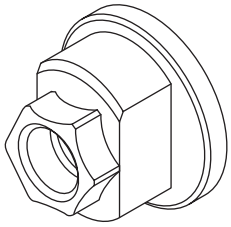
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-499737000	499737000	PULLER	Used for removing reduction driven gear assembly.
 ST-499737100	499737100	PULLER SET	Used for removing reduction drive gear assembly.
 ST-498077600	498077600	REMOVER	Used for removing ball bearing.
 ST-498937110	498937110	HOLDER	Used for removing and installing drive pinion lock nut.

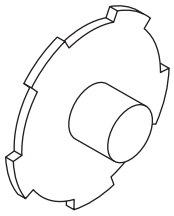
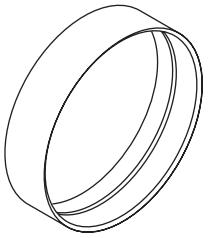
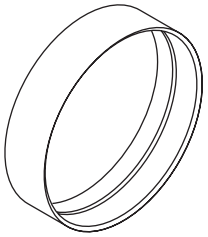
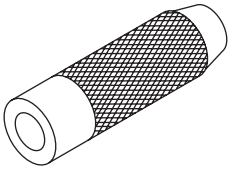
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-498677100	498677100	COMPRESSOR	Used for installing 2-4 brake snap ring.
 ST-498437000	498437000	HIGH CLUTCH PISTON GUIDE	Used for installing high clutch piston.
 ST-498437100	498437100	LOW CLUTCH PISTON GUIDE	Used for installing low clutch piston.
 ST-899580100	899580100	INSTALLER	Used for press-fitting the ball bearing for transfer clutch.

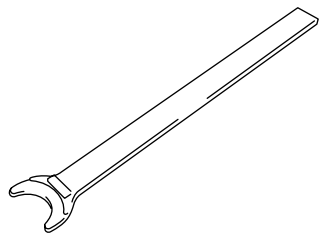
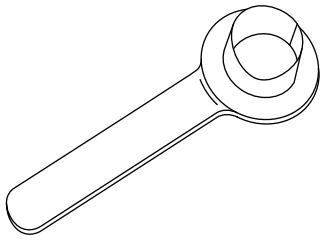
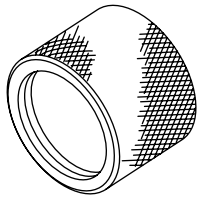
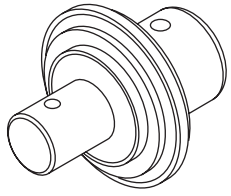
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST28399SA000	28399SA000	REMOVER	• Used for removing axle shaft. • TURBO model
 ST28399SA010	28399SA010	PROTECTOR	• Used for installing axle shaft. • TURBO model
 ST18675AA000	18675AA000	DIFFERENTIAL OIL SEAL INSTALLER	• Used for installing differential side retainer oil seal. • TURBO model
 ST-499247300	499247300	INSTALLER	• Used for removing axle shaft. • Used with REMOVER (499095500). • Non-TURBO model

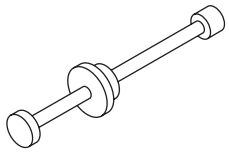
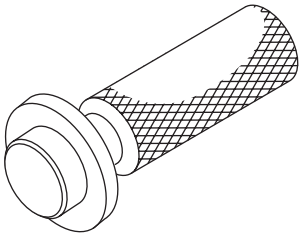
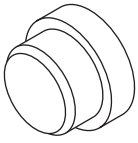
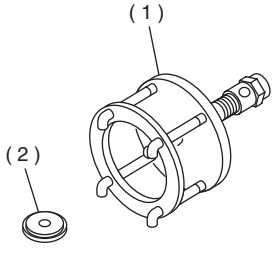
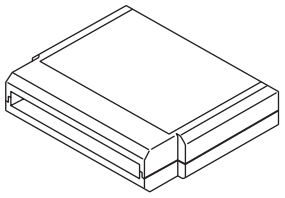
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-499095500	499095500	REMOVER	• Used for removing axle shaft. • Non-TURBO model
 ST-499797000	499797000	INSTALLER	• Used for installing differential side retainer oil seal. • Non-TURBO model
 ST-398497701	398497701	SEAT	Used for installing needle bearing.
 ST-899524100	899524100	PULLER SET	• Using the bolt only. (1) Bolt • Used with PULLER SET (499737100). • Used with PULLER (499737000). (1) Puller (2) Cap

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST24082AA260	24082AA260	CARTRIDGE	Troubleshooting for electrical systems.
ST22771AA030	22771AA030	SUBARU SELECT MONITOR KIT	Troubleshooting for electrical systems.

2. GENERAL PURPOSE TOOLS

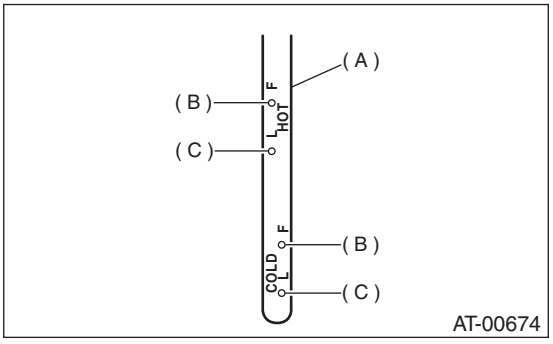
TOOL NAME	REMARKS
Depth gauge	Used for measuring transmission end play.
Thickness gauge	Used for measuring clearances of clutch, brake and oil pump.
Micro meter	Used for measuring thickness of drive pinion.
Spring balance	Used for measuring starting torque of drive pinion.
Circuit tester	Used for measuring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

2. Automatic Transmission Fluid

A: INSPECTION

CAUTION:
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-18, 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.
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.**
- **When ATF temperature is 70°C (158°F) or less, remember that the addition of ATF to the upper limit mark of "HOT" side 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) If the ATF level is below the halfway point between upper and lower mark, check for leaks of the transmission. If there are leaks, it is necessary to repair or replace gasket, oil seals, plugs or other parts.

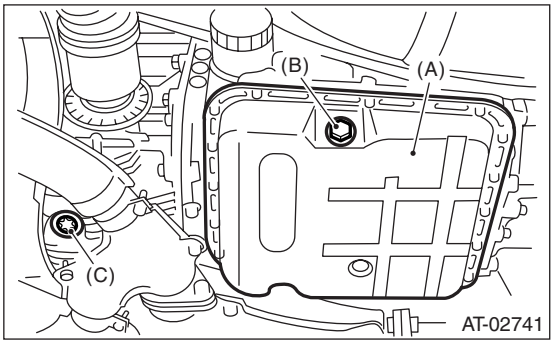
B: REPLACEMENT

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.

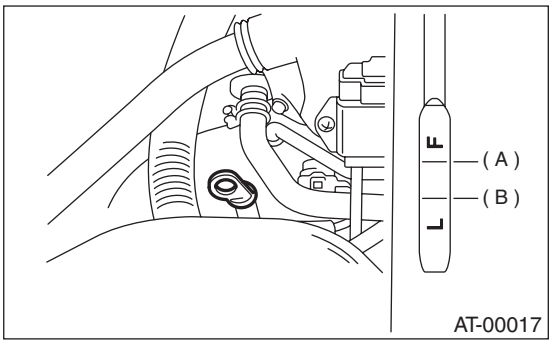
Capacity when transmission is overhauled:
9.3 — 9.6 ℓ (9.8 — 10.1 US qt, 8.2 — 8.4 Imp qt)

6) Check the level and leaks of ATF.
<Ref. to 4AT-31, INSPECTION.>

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

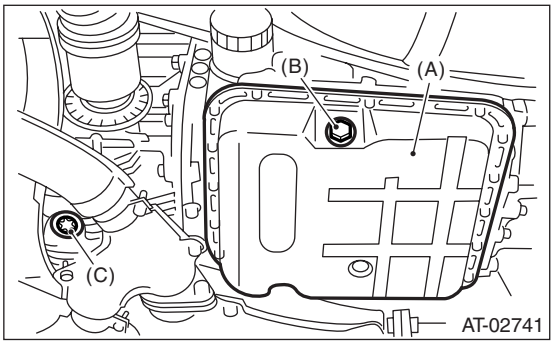
B: REPLACEMENT

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:
Copper gasket
70 N·m (7.1 kgf-m, 51.4 ft-lb)
Aluminum gasket
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: 75W — 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-32, INSPECTION.>

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.

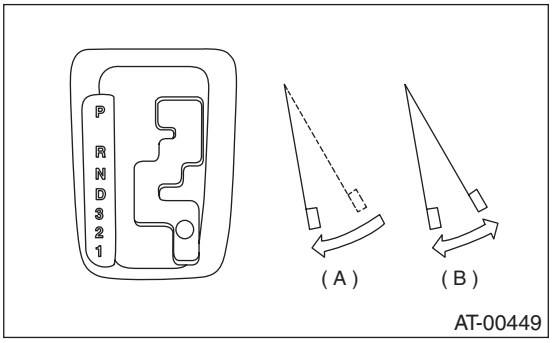
5. Stall Test

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):
NON-TURBO model:
2,200 — 2,700 rpm
TURBO model:
2,600 — 3,200 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
- Wear of D-ring

7. Line Pressure Test

A: MEASUREMENT

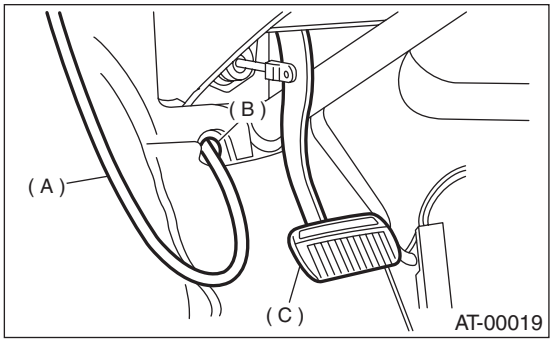
NOTE:
If the clutch or the brake shows a sign of slippage or shifting sensation is not correct, the line pressure should be checked.

• 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.

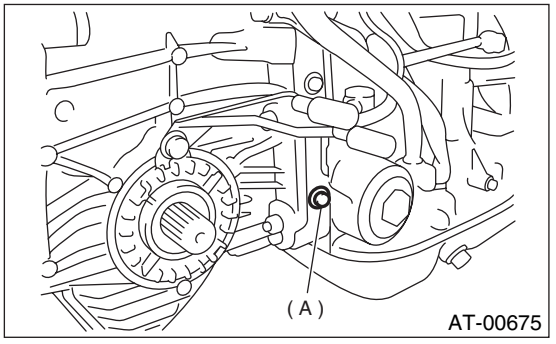
ST 498575400 OIL PRESSURE GAUGE ASSY



(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.

- Non-TURBO model

Standard line pressure			
Range position	Line pressure duty ratio (%)	Throttle position	Line pressure kPa (kg/cm^2, psi)
2	5	Fully open	1,130 — 1,275 (11.53 — 13.01, 163.9 — 184.9)
R	5	Fully open	1,520 — 1,716 (15.5 — 17.5, 220 — 249)
D	9 5	Fully closed	300 — 410 (3.06 — 4.18, 43.5 — 59.5)

- TURBO model

Standard line pressure			
Range position	Line pressure duty ratio (%)	Accelerator pedal opening	Line pressure kPa (kg/cm^2, psi)
2	25 — 35	Fully open	1,000 — 1,300 (10.20 — 13.26, 145.0 — 188.5)
R	15 — 25	Fully open	1,500 — 1,850 (15.30 — 18.87, 217.5 — 268.3)
D	35 — 43	Fully closed	500 — 800 (5.10 — 8.16, 72.5 — 116.0)

8. Transfer Clutch Pressure Test

A: INSPECTION

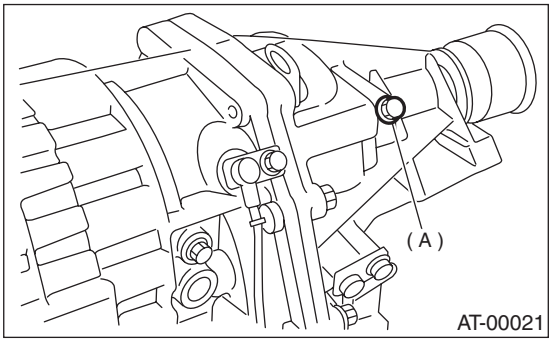
• MPT MODEL

Check the transfer clutch pressure in accordance with the following chart in the same manner as with line pressure. <Ref. to 4AT-36, 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

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



(A) Test plug

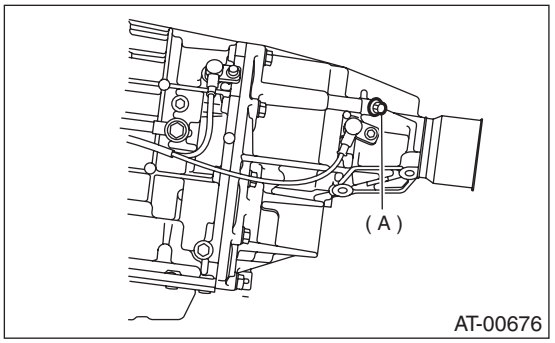
NOTE:
If oil pressure is not produced or if it does not change in the AWD mode, the transfer duty solenoid or transfer valve assembly may be malfunctioning. If oil pressure is produced in the FWD mode, the problem is similar to that in the AWD mode.

Standard transfer clutch pressure kPa (kg/cm^2, psi)				
Range position	ON Duty ratio (%)	Throttle position	AWD mode	FWD mode
2	95	Fully open	910 — 1,070 (9.28 — 10.91, 132.0 — 155.2)	—
2	60	Adjusts so that an ON duty ratio may become 60%.	410 — 490 (4.18 — 5.00, 59.5 — 71.1)	—
2	5	Fully closed	—	0 (0, 0)
N or P	5	Fully closed	0 (0, 0)	—

• VTD MODEL

Check transfer clutch pressure using the following chart. <Ref. to 4AT-36, Line Pressure Test.>

ST 498897700 OIL PRESSURE ADAPTER SET
ST 498575400 OIL PRESSURE GAUGE ASSY



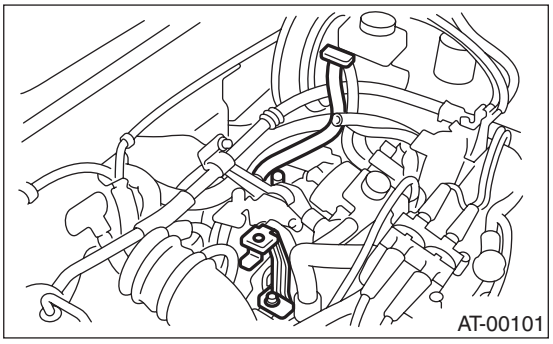
(A) Test plug

Range position	ON Duty ratio (%)	Accelerator pedal opening	Standard of transfer clutch pressure kPa (kg/cm^2, psi)
2	95	Fully open	1,000 — 1,200 (10.20 — 13.26, 145.0 — 188.5)
2	60	Adjusts so that an ON duty ratio may become 60%.	500 — 700 (5.10 — 7.14, 72.5 — 101.5)
N or P	5	Fully closed	0 (0, 0)

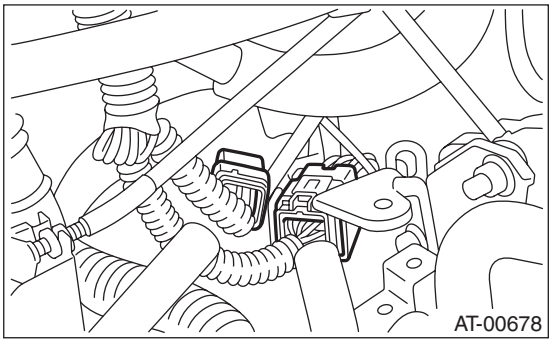
9. Automatic Transmission Assembly

A: REMOVAL

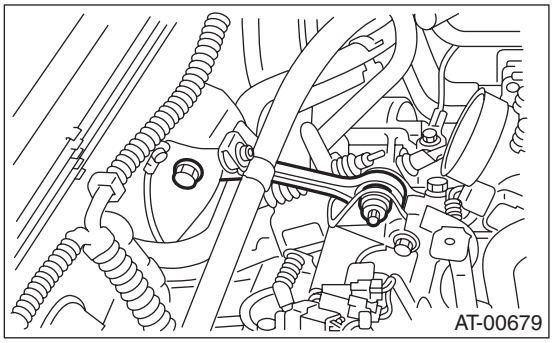
1) Set the vehicle on a lift.
2) Open the front hood fully, and support it with stay.
3) Disconnect the battery ground cable.
4) Remove the air intake duct. (Non-TURBO model)
<Ref. to IN(H4SO)-7, REMOVAL, Air Intake Duct.>
5) Remove the air cleaner case or air intake chamber. (Non-TURBO model)
<Ref.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


AT-00101

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

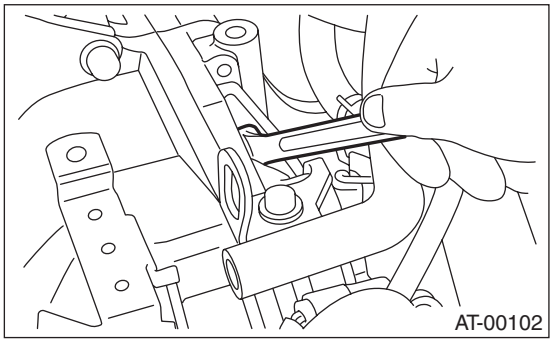

AT-00678

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

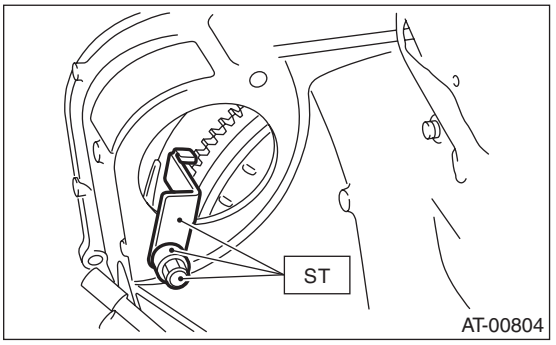

AT-00679

11) Separate the torque converter clutch from drive plate.
(1) Remove the V-belt cover.
(2) Remove the service hole plug.
(3) Remove the bolts which hold torque converter clutch to drive plate.
(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.


AT-00102

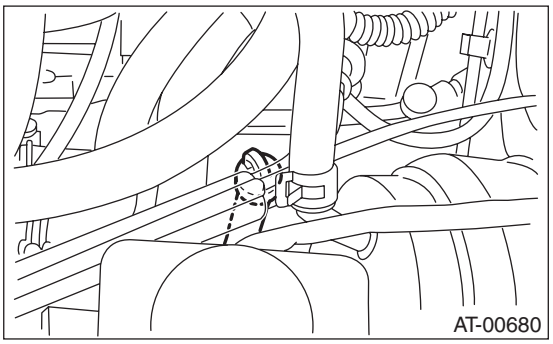
12) Install the ST to torque converter clutch case.
ST 498277200 STOPPER SET



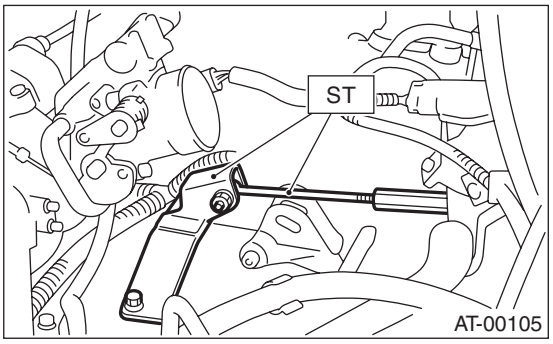
AT-00804

13) Remove the ATF level gauge.

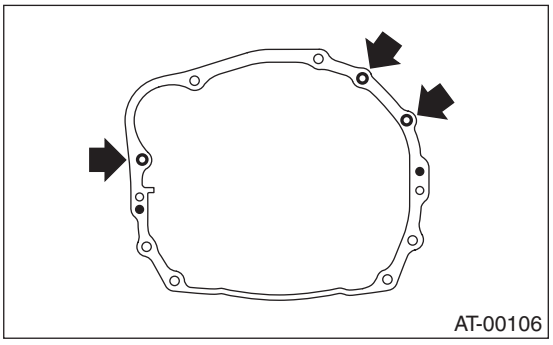
NOTE:
Plug the opening to prevent an entry of foreign particles into transmission fluid.



14) Set the ST.
ST 41099AA000 ENGINE SUPPORT ASSY

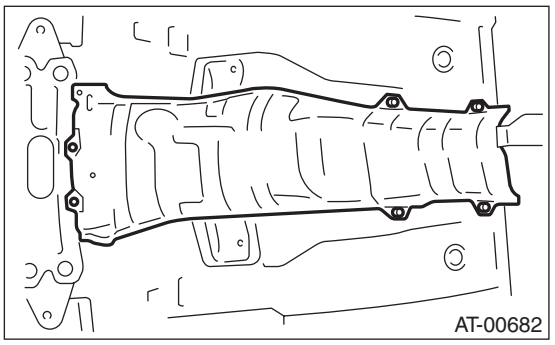


15) Remove the bolts which hold the right upper side of transmission to engine.

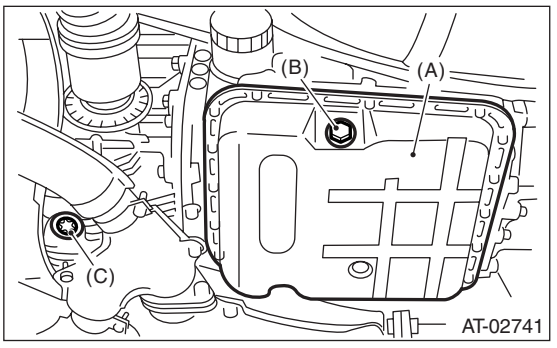


16) Lift-up the vehicle.
17) Remove the under cover.
18) Remove the front, center and rear exhaust pipe, and muffler. (Non-TURBO model)
<Ref. to EX(H4SO)-5, REMOVAL, Front Exhaust Pipe.>, <Ref. to EX(H4SO)-9, REMOVAL, Rear Exhaust Pipe.> and <Ref. to EX(H4SO)-10, REMOVAL, Muffler.>
19) Remove the center and rear exhaust pipes, and muffler. (TURBO model)
<Ref. to EX(H4DOTC)-9, REMOVAL, Center Exhaust Pipe.>, <Ref. to EX(H4DOTC)-14, REMOVAL, Rear Exhaust Pipe.> and <Ref. to EX(H4DOTC)-15, REMOVAL, Muffler.>

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

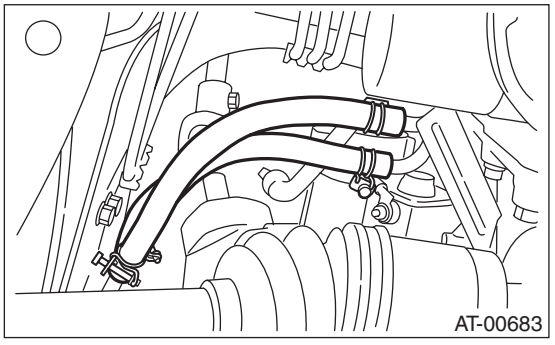


21) Drain ATF to remove the ATF drain plug.



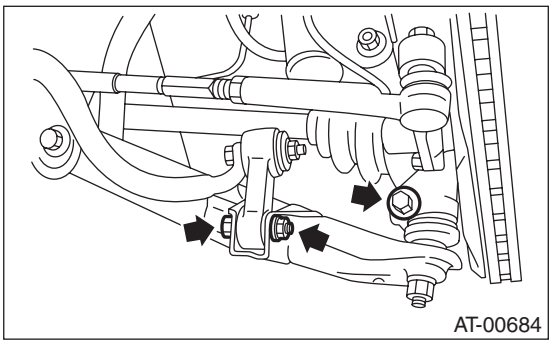
(A) Oil pan
(B) Drain plug (ATF)
(C) Differential oil drain plug

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

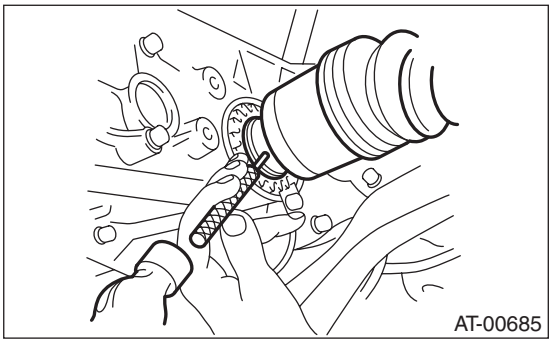


23) Remove the propeller shaft.
<Ref. to DS-15, REMOVAL, Propeller Shaft.>
24) Remove the shift select cable.<Ref. to CS-31, REMOVAL, Select Cable.>
25) Disconnect the stabilizer link from transverse link.

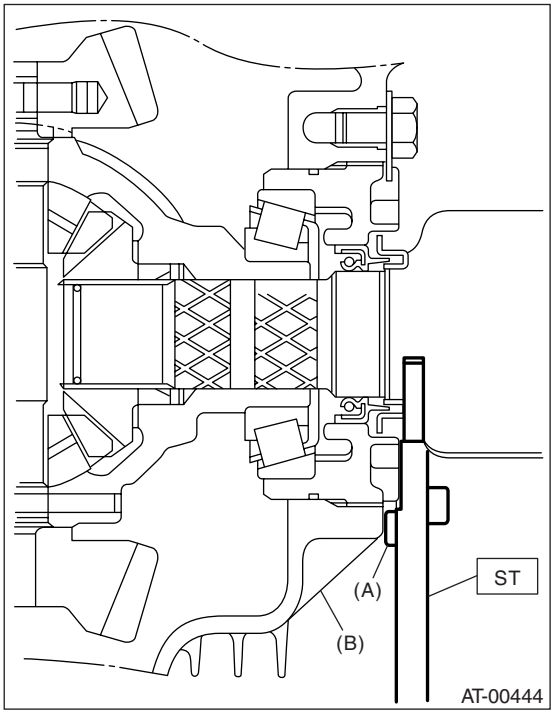
26) Remove the bolt securing ball joint of transverse link to housing.



27) Remove the spring pins and separate the front drive shafts from each side of transmission. (Non-TURBO model)



28) Pull the front drive shaft out of transmission. <Ref. to DS-29, REMOVAL, Front Drive Shaft.>
ST 28399SA000 DRIVE SHAFT REMOVER

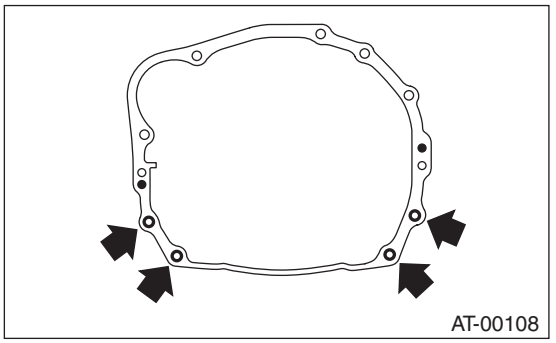


(A) ST projection
(B) Torque converter clutch housing

(1) While holding the joint portion of front drive shaft with your hand, push the housing outside to prevent AAR side of boot from stretching, and then remove the front drive shaft from transmission.

29) Remove the securing bolt of clutch housing cover.

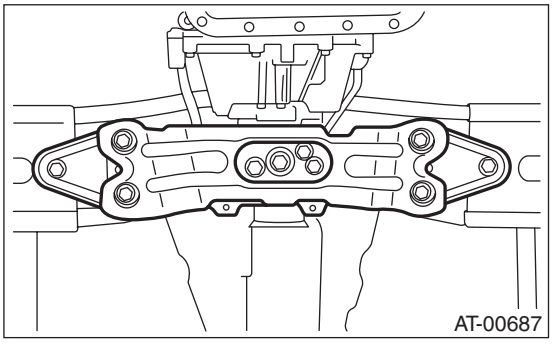
30) Remove the nuts which hold the lower side of transmission to engine.



31) Place the transmission jack under transmission.

NOTE:
Put cloth between the support plates of transmission jack and the oil pan.

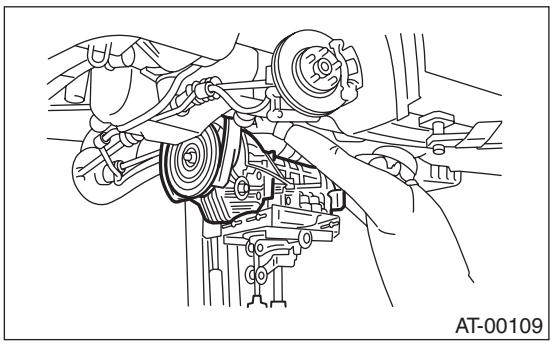
32) Remove the transmission rear crossmember from vehicle.



33) While lowering transmission gradually, tighten engine support fully and tilt the engine backward.

34) Remove the transmission.

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



35) Separate the transmission assembly and rear cushion rubber.

B: INSTALLATION

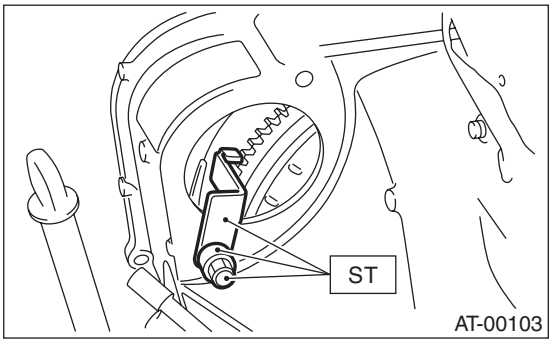
1) Replace rear differential side oil seal with new one. (TURBO model)
<Ref. to 4AT-49, REPLACEMENT, Differential Side Retainer Oil Seal.>

NOTE:
If new oil seal is installed, it is not necessary to replace it.

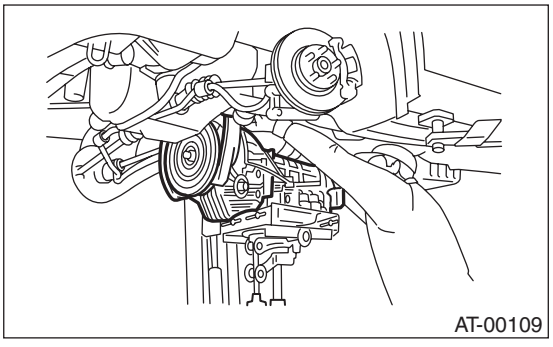
2) Install the rear cushion rubber to transmission assembly.

Tightening torque:
39 N·m (4.0 kgf-m, 29 ft-lb)

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



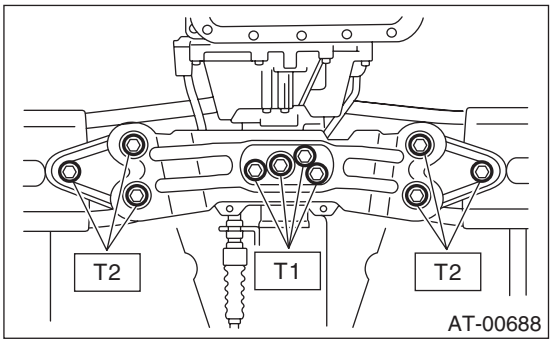
4) Install the transmission onto engine.
(1) Gradually raise the transmission with transmission jack.



(2) Engage transmission.
(3) While lifting transmission gradually, turn the screw of engine support and tilt the engine forward.

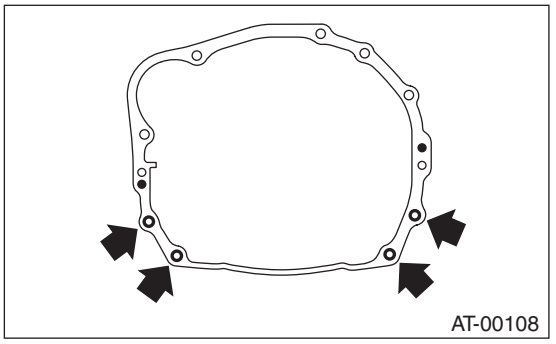
5) Install the transmission rear crossmember.

Tightening torque:
T1: 35 N·m (3.6 kgf-m, 26 ft-lb)
T2: 75 N·m (7.7 kgf-m, 55 ft-lb)



6) Take off the transmission jack.
7) 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)

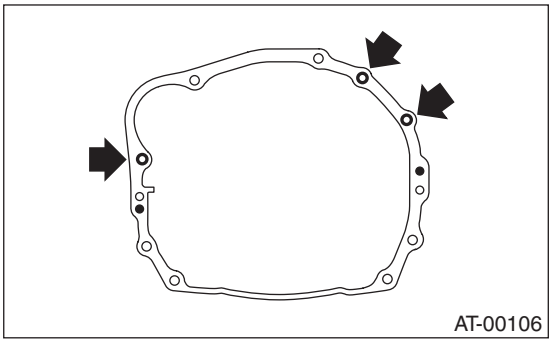


8) Install clutch housing cover.
9) Lower the vehicle.
10) Connect the engine and transmission.
(1) Remove the ST from torque converter clutch case.

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

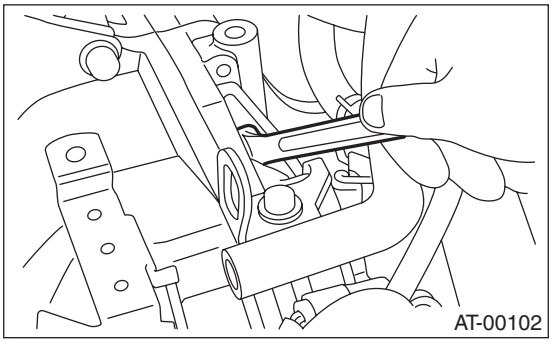
ST 498277200 STOPPER SET
(2) Install the starter.
<Ref. to SC(H4SO)-7, INSTALLATION, Starter.>
(3) Tighten the bolts which hold the right upper side of transmission to engine.

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

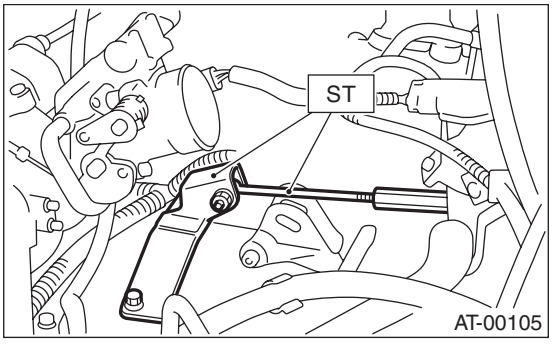


11) Install the torque converter clutch to drive plate.
(1) Tighten the bolts which hold the torque converter clutch to drive plate.
(2) Insert the wrench in the crankshaft pulley bolts, and tighten all the bolts by slowly rotating the crankshaft pulley.

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

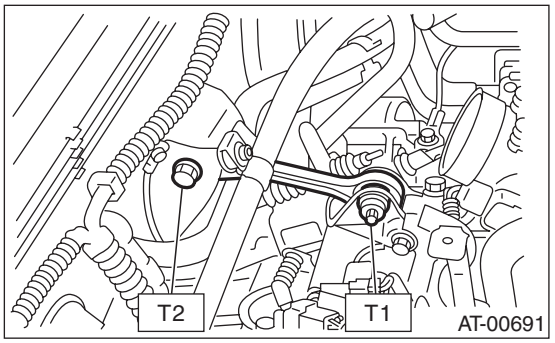


(3) Clog the plug onto service hole.
(4) Install the V-belt cover.
12) Remove the ST.

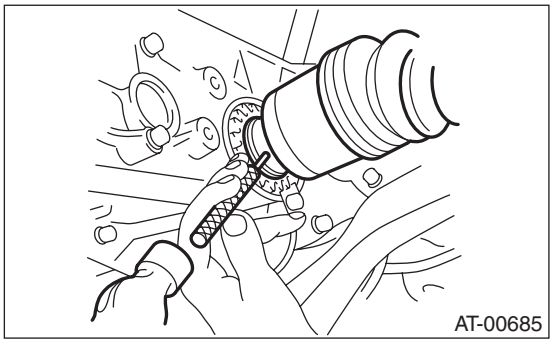


13) Install the pitching stopper.

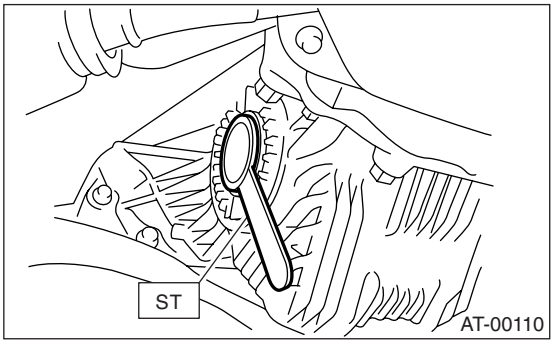
Tightening torque:
T1: 50 N·m (5.1 kgf-m, 37 ft-lb)
T2: 58 N·m (5.9 kgf-m, 43 ft-lb)



14) Lift-up the vehicle.
15) Install the front drive shaft into transmission. (Non-TURBO model)
(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.

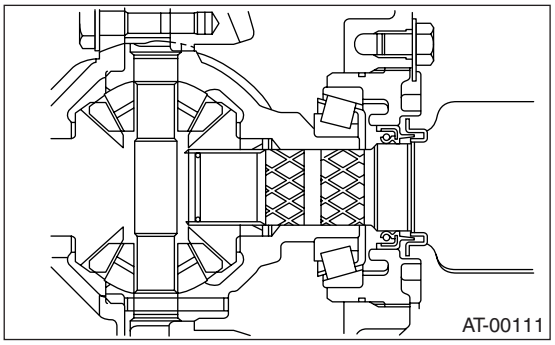


16) Set ST to side retainer. (TURBO model)
ST 28399SA010 OIL SEAL PROTECTOR



17) Align front drive shaft splines with differential bevel gear splines, insert drive shaft, and remove the ST. (TURBO model)
ST 28399SA010 OIL SEAL PROTECTOR

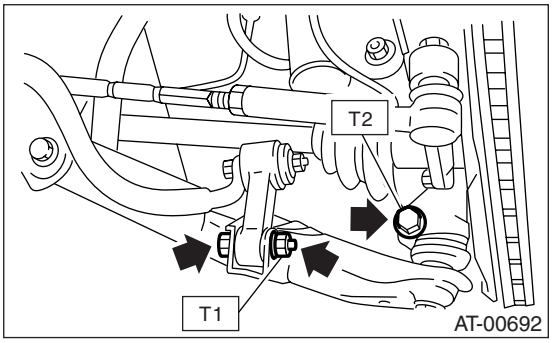
18) Push the front housing to securely insert the front drive shaft into the transmission. (TURBO model)



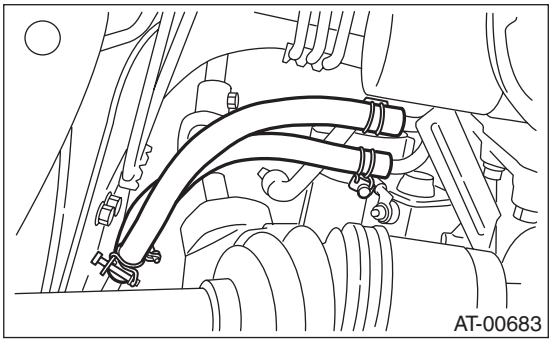
19) Insert the ball joint into housing.
20) Connect the stabilizer link to transverse link, and tighten the bolts.

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)

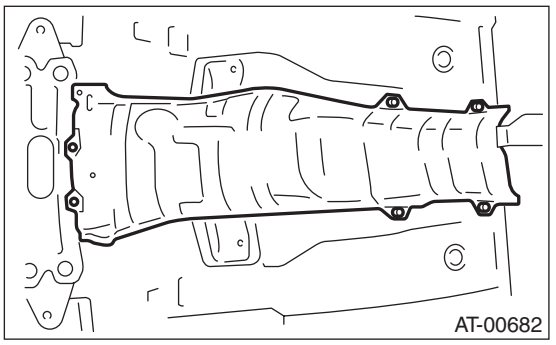


21) Install the shift select cable onto select lever.
<Ref. to CS-31, INSTALLATION, Select Cable.>
22) Install the ATF level gauge guide, and connect the ATF cooler hoses to pipe.

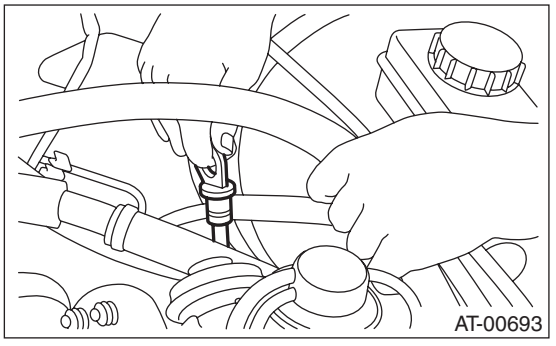


23) Install the propeller shaft.
<Ref. to DS-16, INSTALLATION, Propeller Shaft.>

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



25) Install the rear exhaust pipe and muffler assembly.
NON-TURBO model
<Ref. to EX(H4SO)-9, INSTALLATION, Rear Exhaust Pipe.> and <Ref. to EX(H4SO)-10, INSTALLATION, Muffler.>
TURBO model
<Ref. to EX(H4DOTC)-14, INSTALLATION, Rear Exhaust Pipe.> and <Ref. to EX(H4DOTC)-15, INSTALLATION, Muffler.>
26) Install the front and center exhaust pipe. (Non-TURBO model)
<Ref. to EX(H4SO)-6, INSTALLATION, Front Exhaust Pipe.>
27) Install the center exhaust pipe. (TURBO model)
<Ref. to EX(H4DOTC)-10, INSTALLATION, Center Exhaust Pipe.>
28) Install the under cover.
29) Lower the vehicle.
30) Install the ATF level gauge.



31) Connect the following connectors.
(1) Transmission harness connectors
(2) Transmission ground terminal
32) Connect the cruise control cable.
33) Install the air cleaner case stay.

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

34) Install the air cleaner case or air intake chamber. (Non-TURBO model)
<Ref. to IN(H4SO)-6, INSTALLATION, Air Cleaner Case.>

35) Install the air intake duct. (Non-TURBO model) <Ref. to IN(H4SO)-7, INSTALLATION, Air Intake Duct.>
36) Install the intercooler. (TURBO model) <Ref. to IN(H4DOTC)-11, INSTALLATION, Intercooler.>
37) Connect the battery ground cable.
38) Fill ATF by using the gauge hole. <Ref. to 4AT-31, Automatic Transmission Fluid.>
39) Take off the vehicle from lift arms.
40) Check select lever operation. <Ref. to 4AT-50, INSPECTION.>
41) Check the ATF level. <Ref. to 4AT-31, Automatic Transmission Fluid.>
42) Perform the advance operation of learning control. (TURBO model)
(1) Set select lever to “P” range and apply parking brake, then lift up the vehicle.
(2) Connect Subaru Select Monitor to vehicle and turn on the switch.
(3) Select “Clear Memory — 2” on the SUBARU Select Monitor. <Ref. to 4AT(D)-16, CLEAR MEMORY MODE, OPERATION, Subaru Select Monitor.>
(4) Using Subaru Select Monitor, check that the DTC is not output. <Ref. to 4AT(D)-14, READ DIAGNOSTIC TROUBLE CODE, OPERATION, Subaru Select Monitor.>
(5) Using Subaru Select Monitor, warm up the engine until the ATF temperature becomes within 60 to 90°C (140 to 194°F). <Ref. to 4AT(D)-15, READ CURRENT DATA, OPERATION, Subaru Select Monitor.>
(6) Shift the select lever to the “R” range.
(7) Set the switches for headlights, air conditioner, rear defogger, etc. to OFF.
(8) Turn the ignition switch OFF and then wait for more than 30 seconds.
(9) If the message “communication impossible” is displayed on SUBARU Select Monitor, depress the brake pedal deeply with left foot until the learning promotion task is completed, and then turn the ignition switch to ON.
(10)Check that Subaru Select Monitor is operating properly now.
(11)Set the select lever to “P” range, and then wait for more than three seconds.
(12)Set the select lever to “R” range, and then wait for more than three seconds.
(13)Set the select lever to “N” range, and then wait for more than three seconds.
(14)Set the select lever to “D” range, and then wait for more than three seconds.
(15)Set the select lever to “N” range, and then wait for more than three seconds.
(16)Slowly depress the accelerator pedal to the fully open position.
(17)Slowly release the accelerator pedal to the fully closed position.
(18)Start and idle the engine.
(19)Set the select lever to “D” range.
(20)Learning promotion task starts. ATF temperature warning light in the combination meter blinks at 2 Hz. If ATF temperature does not blink, turn the ignition switch OFF and repeat the procedure from step (4).
Learning promotion task is completed when blinking of ATF temperature warning light in the combination meter changes from 2 to 0.5 Hz.

NOTE:
Repeat the procedure from step (4) if blinking of AFT temperature warning light changes from 2 to 4 Hz.

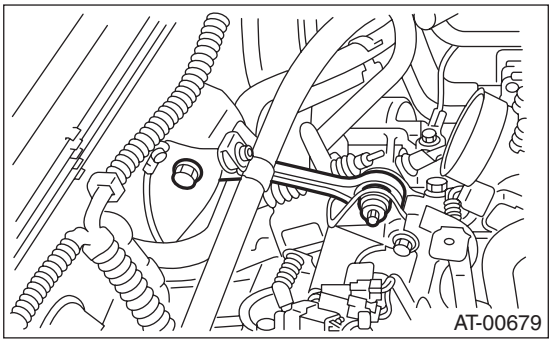
(21)Set the select lever to “N” range, and turn the ignition switch to OFF.

10.Transmission Mounting System

A: REMOVAL

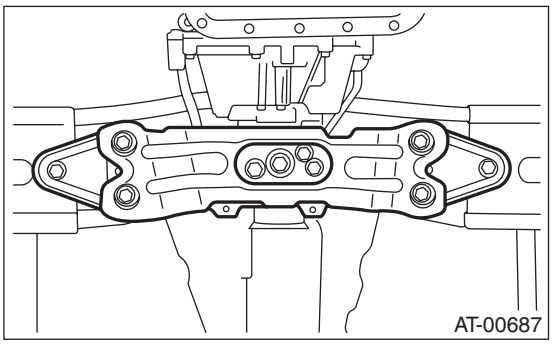
1. PITCHING STOPPER

1) Remove the air cleaner case or intake chamber. (Non-TURBO model)
<Ref. to IN(H4SO)-6, REMOVAL, Air Cleaner Case.>
2) Remove the intercooler. (TURBO model)
<Ref. to IN(H4DOTC)-10, REMOVAL, Intercooler.>
3) 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)-5, REMOVAL, Front Exhaust Pipe.> , <Ref. to EX(H4SO)-9, REMOVAL, Rear Exhaust Pipe.> and <Ref. to EX(H4SO)-10, REMOVAL, Muffler.>
4) Remove the center and rear exhaust pipes, and muffler. (TURBO model)
<Ref. to EX(H4DOTC)-9, REMOVAL, Center Exhaust Pipe.>, <Ref. to EX(H4DOTC)-14, REMOVAL, Rear Exhaust Pipe.> and <Ref. to EX(H4DOTC)-15, 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.



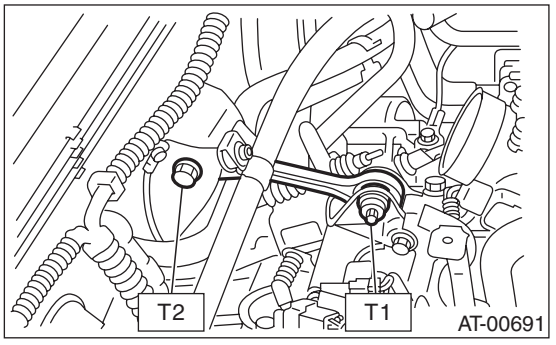
8) Remove the rear cushion rubber.

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 or air intake chamber. (Non-TURBO model)
<Ref. to IN(H4SO)-6, INSTALLATION, Air Cleaner Case.>
3) Remove the intercooler. (TURBO model)
<Ref. to IN(H4DOTC)-11, INSTALLATION, Intercooler.>

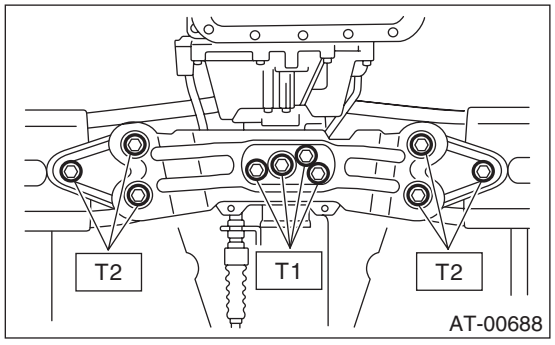
2. TRANSMISSION REAR CROSSMEMBER AND REAR CUSHION RUBBER

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: 75 N·m (7.7 kgf-m, 55 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)-6, INSTALLATION, Front Exhaust Pipe.>, <Ref. to EX(H4SO)-9, INSTALLATION, Rear Exhaust Pipe.> and <Ref. to EX(H4SO)-10, INSTALLATION, Muffler.>
6) Install center and rear exhaust pipes, and muffler. (TURBO model)
<Ref. to EX(H4DOTC)-10, INSTALLATION, Center Exhaust Pipe.>, <Ref. to EX(H4DOTC)-14, INSTALLATION, Rear Exhaust Pipe.> and <Ref. to EX(H4DOTC)-15, 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

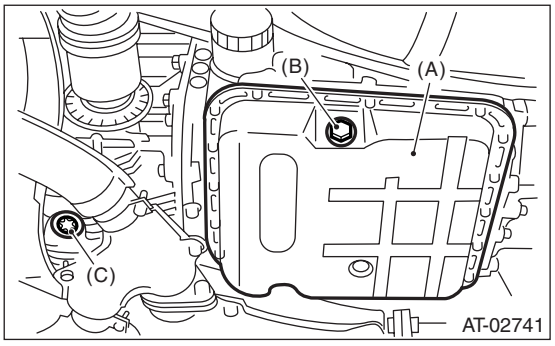
Make sure the ATF does not leak from the joint of transmission and propeller shaft. If so, replace the oil seal. <Ref. to 4AT-48, REPLACEMENT.>

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)-9, REMOVAL, Rear Exhaust Pipe.> and <Ref. to EX(H4SO)-10, REMOVAL, Muffler.>
TURBO model
<Ref. to EX(H4DOTC)-14, REMOVAL, Rear Exhaust Pipe.> and <Ref. to EX(H4DOTC)-15, REMOVAL, Muffler.>
4) Remove the heat shield cover. (If equipped)
5) Remove the propeller shaft. <Ref. to DS-15, 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-16, 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)-9, INSTALLATION, Rear Exhaust Pipe.> and <Ref. to EX(H4SO)-10, INSTALLATION, Muffler.>
TURBO model
<Ref. to EX(H4DOTC)-14, INSTALLATION, Rear Exhaust Pipe.> and <Ref. to EX(H4DOTC)-15, INSTALLATION, Muffler.>
11) Pour ATF and check the ATF level. <Ref. to 4AT-31, Automatic Transmission Fluid.>

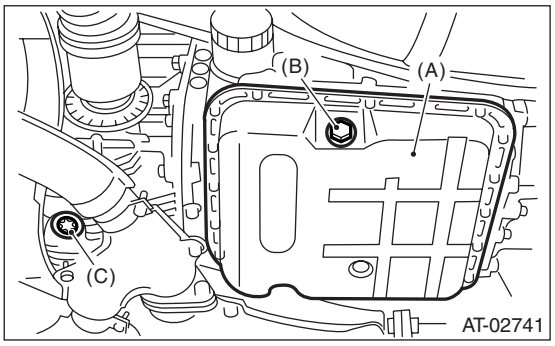
12.Differential Side Retainer Oil Seal

A: INSPECTION

Inspect if gear oil leaks from differential side retainer oil seal. Replace oil seal if leakage is detected.

B: REPLACEMENT

1) Lift up the vehicle.
2) Remove front exhaust pipe and center exhaust pipe. <Ref. to EX(H4DOTC)-9, REMOVAL, Center Exhaust Pipe.>
3) Remove the differential oil drain plug, and drain the differential gear oil.

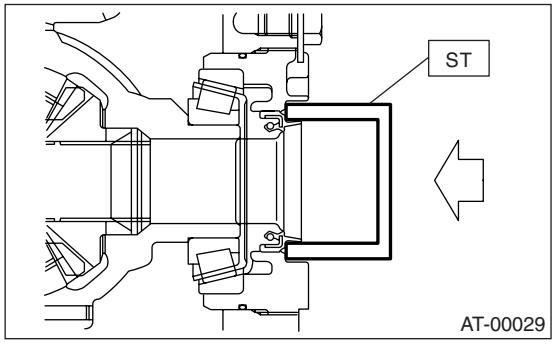


(A) Oil pan
(B) ATF drain plug
(C) Differential gear oil drain plug

4) Replace with a new gasket, and then tighten the differential oil drain plug.

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

5) Separate the front drive shaft from the transmission.<Ref. to DS-29, REMOVAL, Front Drive Shaft.>
6) Remove the differential side retainer oil seal using a screwdriver wrapped with vinyl tape.
7) Install differential side retainer oil seal using the ST by tapping with a hammer little by little.
ST 18675AA000 DIFFERENTIAL SIDE OIL SEAL INSTALLER



8) Apply oil to the sealing lip of oil seal.
9) Install the front drive shaft.<Ref. to DS-30, INSTALLATION, Front Drive Shaft.>
10) Install the front exhaust pipe and the center exhaust pipe. <Ref. to EX(H4DOTC)-10, INSTALLATION, Center Exhaust Pipe.>
11) Lower the vehicle.
12) Fill gear oil from gauge hole.

Recommended gear oil:
GL-5 (SAE: 75W — 90) or equivalent

Gear oil capacity:
1.1 — 1.3 ℓ (1.3 — 1.4 US qt, 1.0 — 1.1 Imp qt)

13) Check for the amount of gear oil. <Ref. to 4AT-32, INSPECTION, Differential Gear Oil.>

13.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.

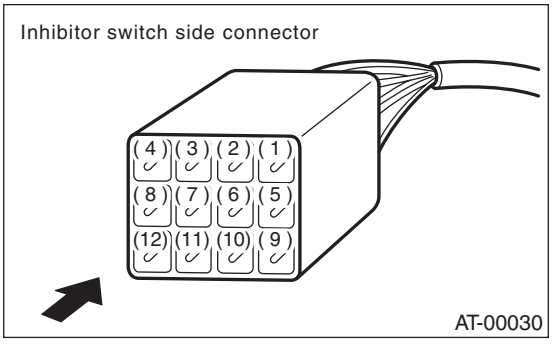
2) Check continuity in inhibitor switch circuits with the select lever moved to each position.

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.

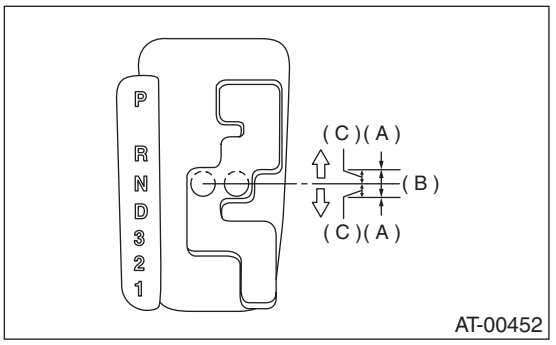
	Position	Pin No.
Signal sent to TCM	P	4 — 3
	R	4 — 2
	N	4 — 1
	D	4 — 8
	3	4 — 7
	2	4 — 6
	1	4 — 5
Ignition circuit	P/N	12 — 11
Back-up light circuit	R	10 — 9



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

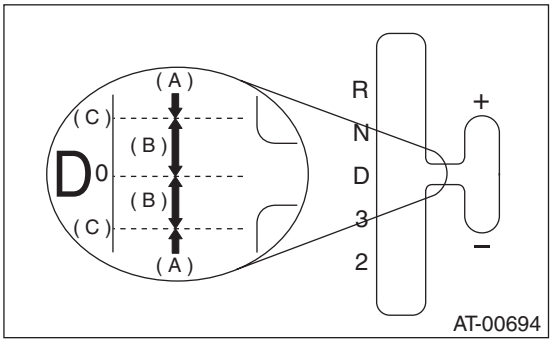
If there is continuity in one direction and the continuity in the other or if there is continuity at unequal points, adjust the inhibitor switch. <Ref. to 4AT-50, ADJUSTMENT.>

Except model with SPORTS shift



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

Model with SPORT shift



(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-32, ADJUSTMENT, Select Cable.>

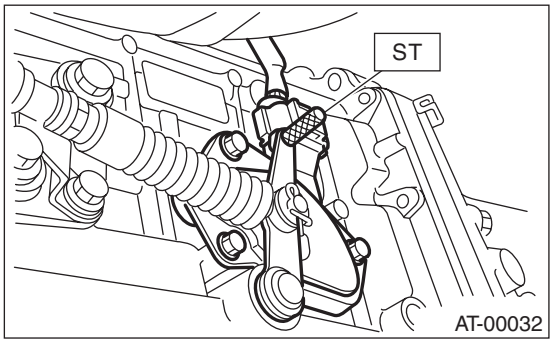
B: ADJUSTMENT

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



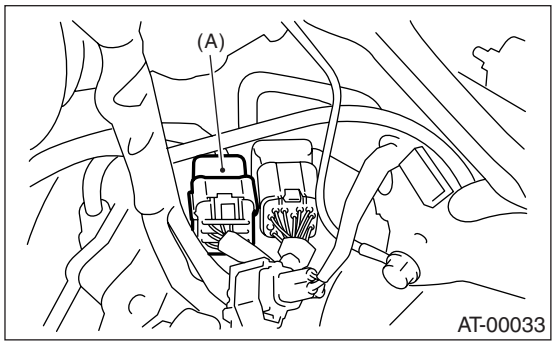
4) Tighten the three inhibitor switch bolts.

Tightening torque:
3.5 N·m (0.36 kgf-m, 2.6 ft-lb)

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

C: REMOVAL

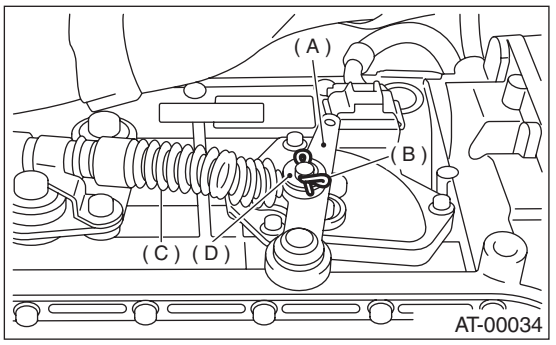
1) Set up the vehicle on a lift.
2) Move the select lever to “N” range.
3) Remove the air cleaner case or air intake chamber. (Non-TURBO model)
<Ref. to IN(H4SO)-6, REMOVAL, Air Cleaner Case.>
4) Remove the intercooler. (TURBO model)
<Ref. to IN(H4DOTC)-10, REMOVAL, Intercooler.>
5) Disconnect the inhibitor switch connector.



(A) Inhibitor switch connector

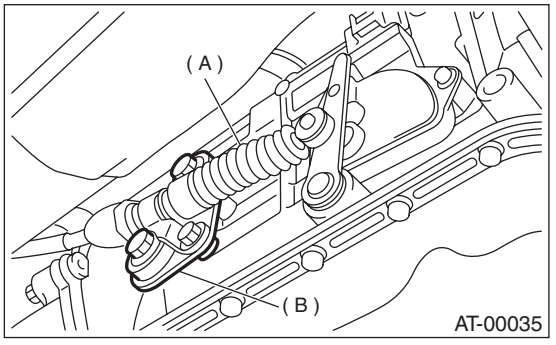
6) Remove the inhibitor switch connector from stay.
7) Lift-up the vehicle.
8) Remove the front and center exhaust pipes.
NON-TURBO model
<Ref. to EX(H4SO)-5, REMOVAL, Front Exhaust Pipe.>
TURBO model
<Ref. to EX(H4DOTC)-9, REMOVAL, Center Exhaust Pipe.>

9) Remove the snap pin and washer from range select lever.



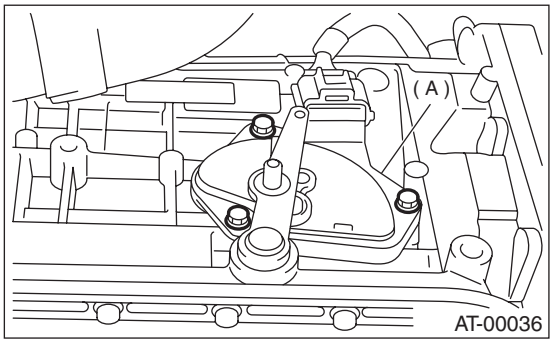
(A) Range select lever
(B) Snap pin
(C) Select cable
(D) Washer

10) Remove the plate assembly from transmission case.



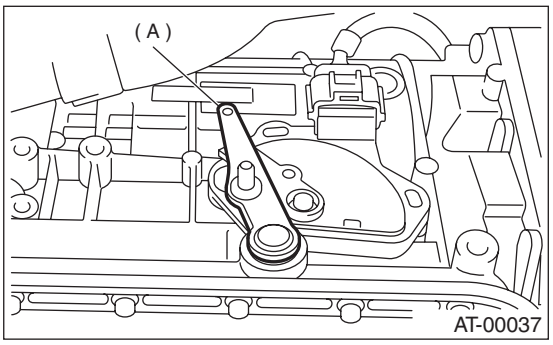
(A) Select cable
(B) Plate ASSY

11) Remove the bolts.



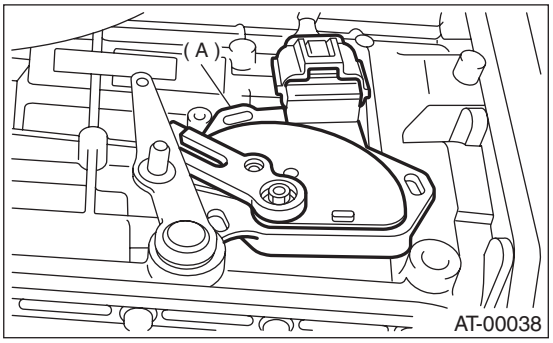
(A) Inhibitor switch

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



(A) Range select lever

13) Remove the inhibitor switch from transmission.

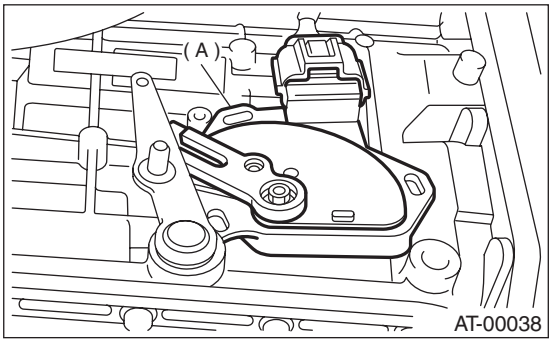


(A) Inhibitor switch

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.

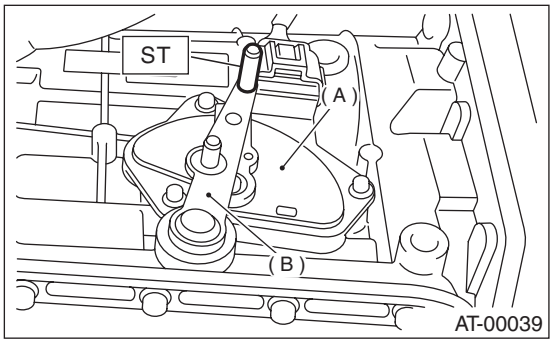


(A) Inhibitor switch

3) Move the range select lever to neutral position.

4) Using the ST, tighten the bolts of inhibitor switch.
ST 499267300 STOPPER PIN

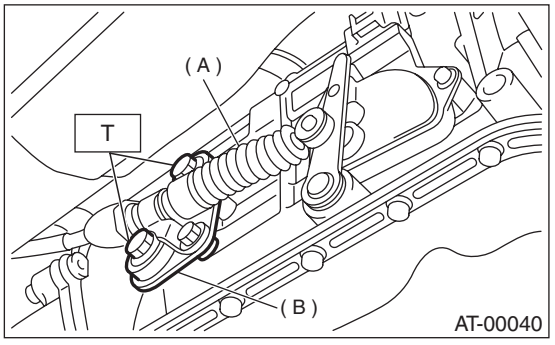
Tightening torque:
3.5 N·m (0.36 kgf-m, 2.6 ft-lb)



(A) Inhibitor switch
(B) Range select lever

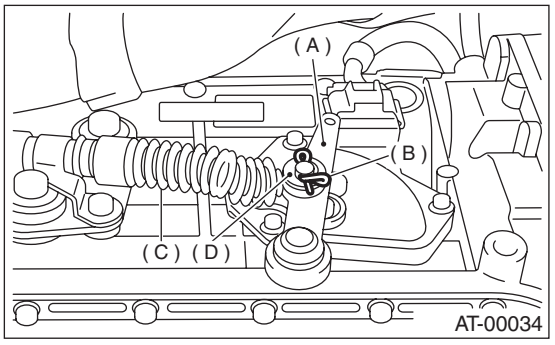
5) Install the select cable to range select lever.
6) Install the plate assembly to transmission.

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



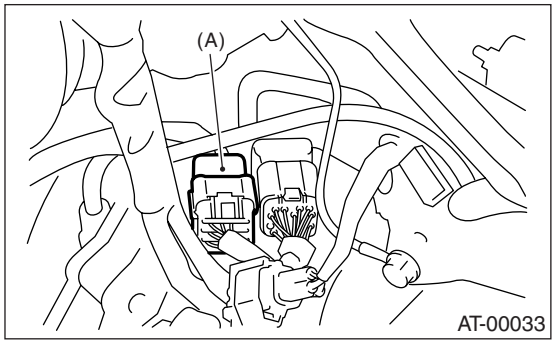
(A) Select cable
(B) Plate ASSY

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)-6, INSTALLATION, Front Exhaust Pipe.>
9) Install the center exhaust pipe. (TURBO model)
<Ref. to EX(H4DOTC)-10, INSTALLATION, Center Exhaust Pipe.>
10) Lower the vehicle.
11) Install the inhibitor switch connector from stay.
12) Connect the inhibitor switch connector.



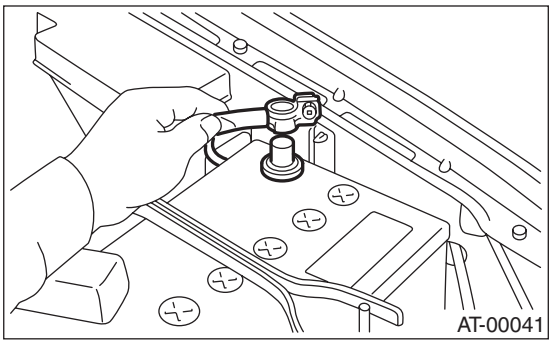
(A) Inhibitor switch connector

13) Install the air cleaner case or air intake chamber. (Non-TURBO model)
<Ref. to IN(H4SO)-6, INSTALLATION, Air Cleaner Case.>
14) Install the intercooler. (TURBO model)
<Ref. to IN(H4DOTC)-11, INSTALLATION, Intercooler.>
15) Inspect the inhibitor switch. <Ref. to 4AT-50, INSPECTION.>

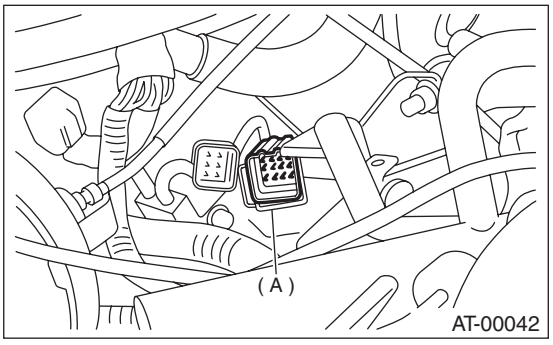
14.Front Vehicle Speed Sensor

A: REMOVAL

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



3) Remove the air cleaner case or air intake chamber. (Non-TURBO model)
<Ref. to IN(H4SO)-6, REMOVAL, Air Cleaner Case.>
4) Remove the intercooler. (TURBO model)
<Ref. to IN(H4DOTC)-10, REMOVAL, Intercooler.>
5) Disconnect the transmission connector.

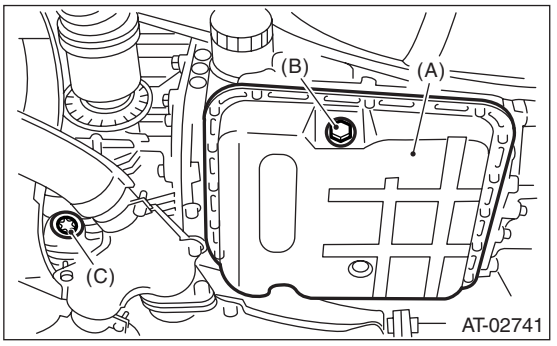


(A) Transmission connector

6) Remove the pitching stopper. <Ref. to 4AT-46, REMOVAL.>
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)

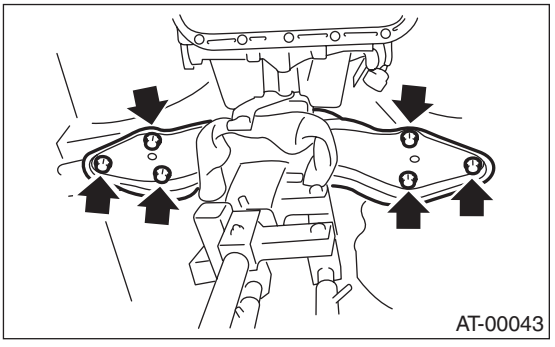


(A) Oil pan
(B) Drain plug
(C) Differential oil drain plug

11) Remove the front, center, exhaust pipes and muffler. (Non-TURBO model)
<Ref. to EX(H4SO)-5, REMOVAL, Front Exhaust Pipe.>, <Ref. to EX(H4SO)-9, REMOVAL, Rear Exhaust Pipe.> and <Ref. to EX(H4SO)-10, REMOVAL, Muffler.>
12) Remove the center, rear exhaust pipe and muffler. (TURBO model)
<Ref. to EX(H4DOTC)-9, REMOVAL, Center Exhaust Pipe.>, <Ref. to EX(H4DOTC)-14, REMOVAL, Rear Exhaust Pipe.> and <Ref. to EX(H4DOTC)-15, REMOVAL, Muffler.>
13) Remove the shield cover. (If equipped)
14) Remove the propeller shaft. <Ref. to DS-15, 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.



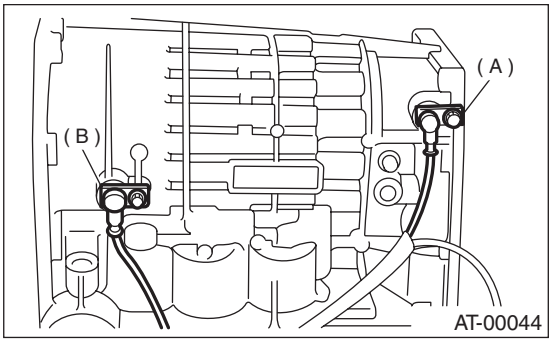
17) Lower the AT jack.

NOTE:
Do not separate the AT jack and transmission.

18) Remove the oil cooler inlet and outlet pipe.

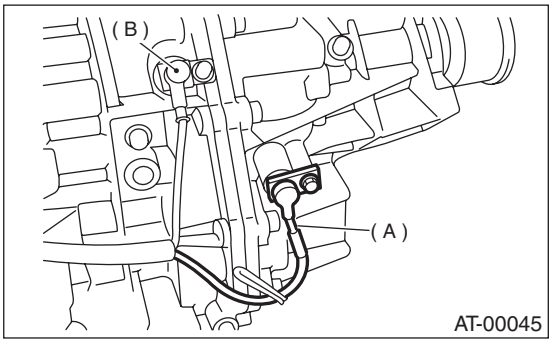
NOTE:
When removing the outlet pipe, be careful not to lose balls and springs used with retaining screws.

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



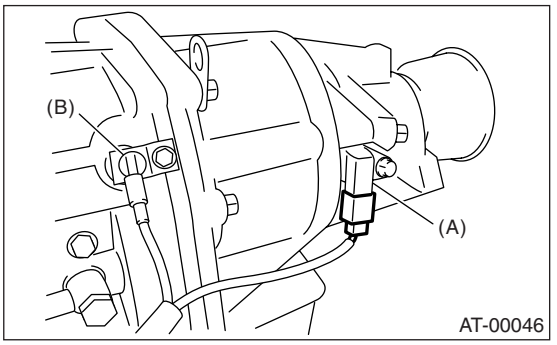
(A) Front vehicle speed sensor
(B) Torque converter turbine speed sensor

20) Remove the rear vehicle speed sensor. (Non-TURBO model)



(A) Rear vehicle speed sensor
(B) Front vehicle speed sensor

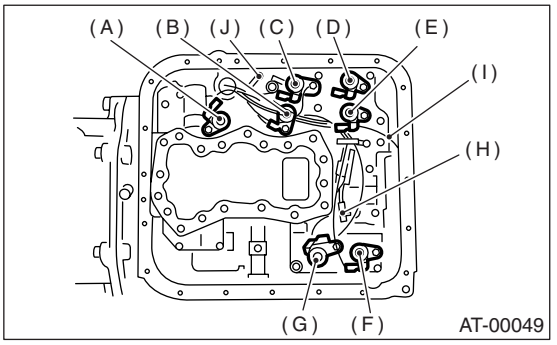
21) Disconnect rear vehicle speed sensor connector. (TURBO model)



(A) Rear vehicle speed sensor
(B) Front vehicle speed sensor

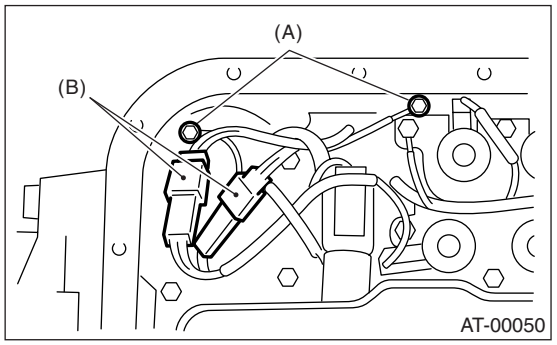
22) Remove the oil pan.

23) Disconnect the duty solenoid connectors, and then disconnect the ATF temperature sensor from control valve body. (Non-TURBO model)



(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

24) Disconnect control valve connector and transmission ground. (TURBO model)

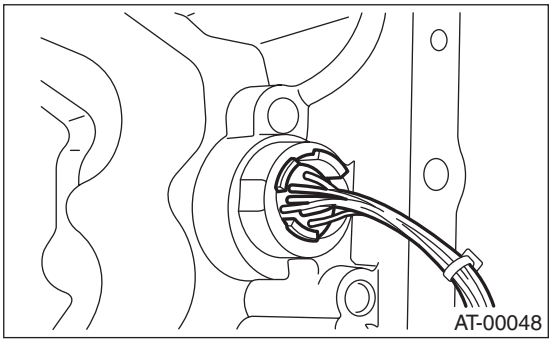


(A) Transmission ground cable
(B) Connector

25) Remove the harness assembly.

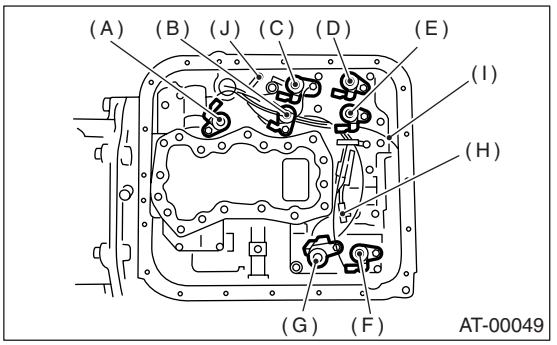
B: INSTALLATION

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



2) Connect the harness connectors and ATF temperature sensor. (Non-TURBO model)
Connect the connectors of same color, and secure the harness to valve body using clips.

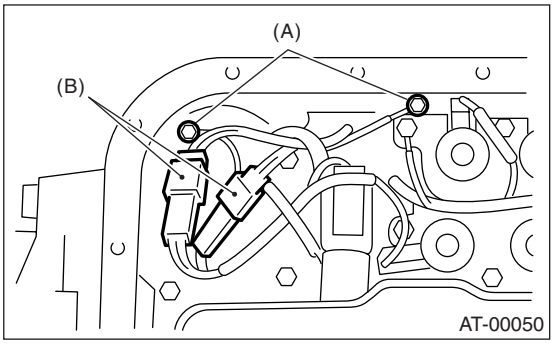
Tightening torque (Transmission ground cable ATF temperature sensor)
8 N·m (0.8 kgf-m, 5.8 ft-lb)



(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

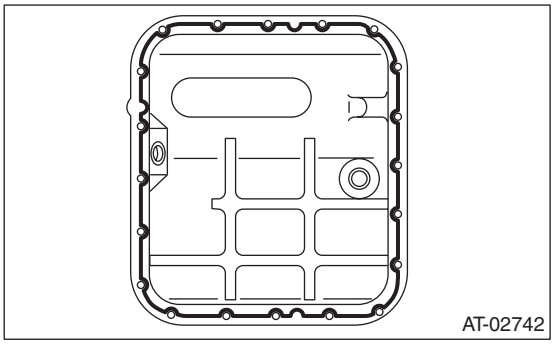
3) Connect control valve connector, and install transmission ground. (TURBO model)

Tightening torque Transmission ground cable:
8 N·m (0.8 kgf-m, 5.8 ft-lb)



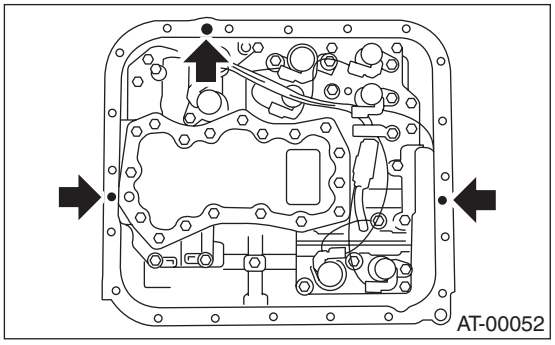
4) Apply proper amount of liquid gasket to the entire oil pan mating surface.

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)

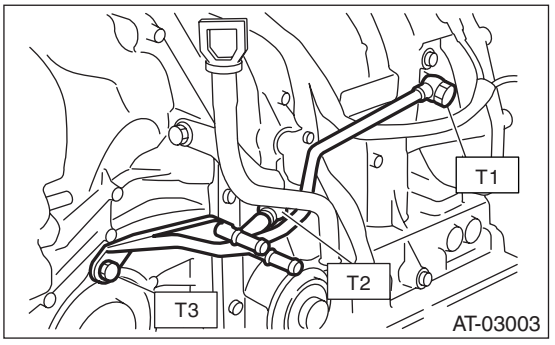
7) Install the front and rear vehicle speed sensor, and also the torque converter turbine speed sensor, and then fasten the harness.

Tightening torque:
7 N·m (0.7 kgf-m, 5.1 ft-lb)

8) Install the oil cooler pipes.

NOTE:
Be sure to use a new copper washer.

Tightening torque:
T1: 40 N·m (4.1 kgf-m, 30 ft-lb)
T2: 44 N·m (4.5 kgf-m, 32.5 ft-lb)
T3: 25 N·m (2.5 kgf-m, 18.1 ft-lb)



9) Install the transmission rear crossmember bolts.

Tightening torque:
70 N·m (7.1 kgf-m, 51 ft-lb)

10) Install the propeller shaft. <Ref. to DS-16, INSTALLATION, Propeller Shaft.>
11) Install the shield cover. (If equipped)
12) Install the front, center, rear exhaust pipes and muffler. (Non-TURBO model)
<Ref. to EX(H4SO)-6, INSTALLATION, Front Exhaust Pipe.>, <Ref. to EX(H4SO)-9, INSTALLATION, Rear Exhaust Pipe.> and <Ref. to EX(H4SO)-10, INSTALLATION, Muffler.>
13) Install the center, rear exhaust pipes and muffler. (TURBO model)
<Ref. to EX(H4DOTC)-10, INSTALLATION, Center Exhaust Pipe.>, <Ref. to EX(H4DOTC)-14, INSTALLATION, Rear Exhaust Pipe.> and <Ref. to EX(H4DOTC)-15, INSTALLATION, Muffler.>
14) Lower the vehicle.
15) Install the transmission connector to the stay.
16) Install the pitching stopper. <Ref. to 4AT-46, INSTALLATION.>
17) Install the air cleaner case. (Non-TURBO model)
<Ref. to IN(H4SO)-6, INSTALLATION, Air Cleaner Case.>
18) Install the intercooler. (TURBO model)
<Ref. to IN(H4DOTC)-11, INSTALLATION, Intercooler.>
19) Bleeding air from control valve body. (TURBO model) <Ref. to 4AT-70, Air Bleeding of Control Valve.>
20) Perform the advance operation of learning control. (TURBO model)
(1) Set select lever to “P” range and apply parking brake, then lift up the vehicle.

(2) Connect Subaru Select Monitor to vehicle and turn on the switch.
(3) Select “Clear Memory — 2” on the SUBARU Select Monitor. <Ref. to 4AT(D)-16, CLEAR MEMORY MODE, OPERATION, Subaru Select Monitor.>
(4) Using Subaru Select Monitor, check that the DTC is not output. <Ref. to 4AT(D)-14, READ DIAGNOSTIC TROUBLE CODE, OPERATION, Subaru Select Monitor.>
(5) Using Subaru Select Monitor, warm up the engine until the ATF temperature becomes within 60 to 90°C (140 to 194°F). <Ref. to 4AT(D)-15, READ CURRENT DATA, OPERATION, Subaru Select Monitor.>
(6) Shift the select lever to the “R” range.
(7) Set the switches for headlights, air conditioner, rear defogger, etc. to OFF.
(8) Turn the ignition switch OFF and then wait for more than 30 seconds.
(9) If the message “communication impossible” is displayed on SUBARU Select Monitor, depress the brake pedal deeply with left foot until the learning promotion task is completed, and then turn the ignition switch to ON.
(10)Check that Subaru Select Monitor is operating properly now.
(11)Set the select lever to “P” range, and then wait for more than three seconds.
(12)Set the select lever to “R” range, and then wait for more than three seconds.
(13)Set the select lever to “N” range, and then wait for more than three seconds.
(14)Set the select lever to “D” range, and then wait for more than three seconds.
(15)Set the select lever to “N” range, and then wait for more than three seconds.
(16)Slowly depress the accelerator pedal to the fully open position.
(17)Slowly release the accelerator pedal to the fully closed position.
(18)Start and idle the engine.
(19)Set the select lever to “D” range.
(20)Learning promotion task starts. ATF temperature warning light in the combination meter blinks at 2 Hz. If ATF temperature does not blink, turn the ignition switch OFF and repeat the procedure from step (4).
Learning promotion task is completed when blinking of ATF temperature warning light in the combination meter changes from 2 to 0.5 Hz.

NOTE:
Repeat the procedure from step (4) if blinking of AFT temperature warning light changes from 2 to 4 Hz.

(21)Set the select lever to “N” range, and turn the ignition switch to OFF.

15.Rear Vehicle Speed Sensor

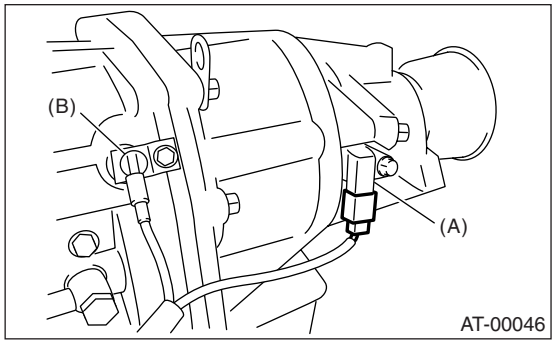
A: REMOVAL

1. NON-TURBO MODEL

When removing the rear vehicle speed sensor, refer to “Front Vehicle Speed Sensor”.<Ref. to 4AT-54, REMOVAL, Front Vehicle Speed Sensor.>

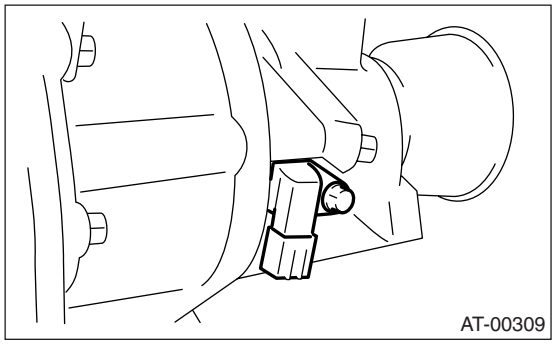
2. TURBO MODEL

1) Set vehicle on a lift.
2) Disconnect ground cable from battery.
3) Lift up the vehicle.
4) Disconnect rear vehicle speed sensor connector.



(A) Rear vehicle speed sensor
(B) Front vehicle speed sensor

5) Remove rear vehicle speed sensor.



B: INSTALLATION

1. NON-TURBO MODEL

When installing the rear vehicle speed sensor, refer to “Front Vehicle Speed Sensor”. <Ref. to 4AT-56, INSTALLATION, Front Vehicle Speed Sensor.>

2. TURBO MODEL

Install in the reverse order of removal.

NOTE:
Replace O-ring with a new one.

Tightening torque:
7 N·m (0.7 kgf-m, 5.1 ft-lb)

16.Torque Converter Turbine Speed Sensor

A: REMOVAL

When removing the torque converter turbine speed sensor, refer to “Front Vehicle Speed Sensor.” <Ref. to 4AT-54, REMOVAL.>

B: INSTALLATION

When installing the torque converter turbine speed sensor, refer to “Front Vehicle Speed Sensor.” <Ref. to 4AT-56, INSTALLATION.>

17.Control Valve Body

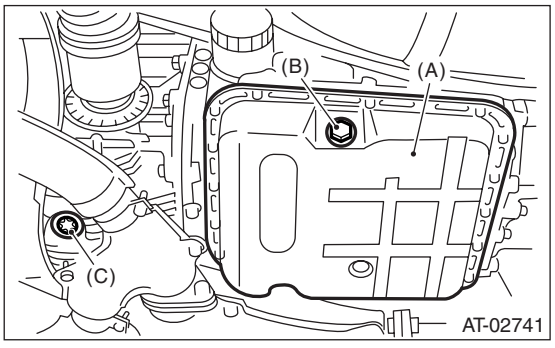
A: REMOVAL

1. NON-TURBO MODEL

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.

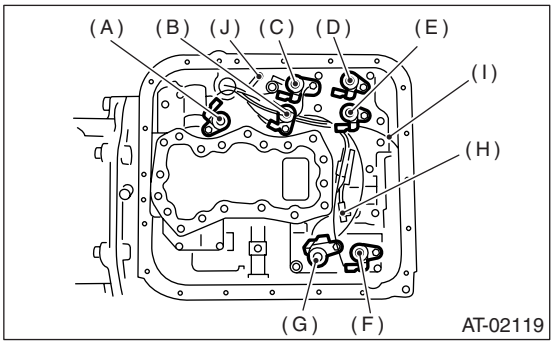
Tightening torque:
25 N·m (2.5 kgf-m, 18.1 ft-lb)



(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.

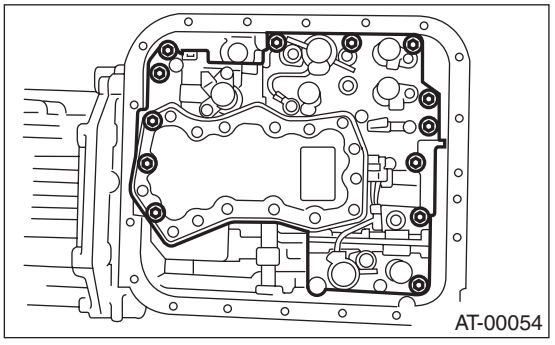
7) Disconnect each solenoid connector and remove ATF temperature sensor from control valve.



(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

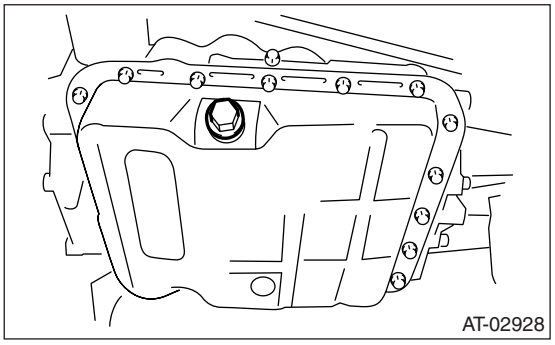
8) Remove the control valve.

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



2. TURBO MODEL

1) Set the vehicle on a lift.
2) Disconnect the ground cable from battery.
3) Lift-up the vehicle.
4) Clean the transmission exterior.
5) Remove the drain plug and gasket, and then drain ATF.

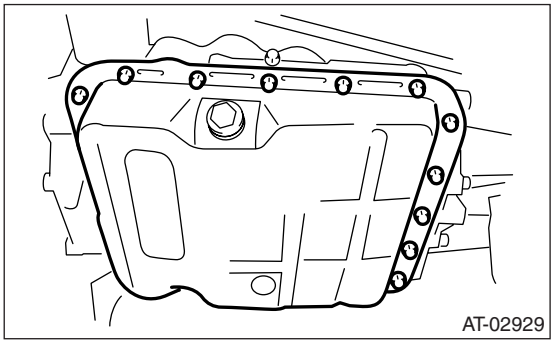


6) Replace the gasket with a new one, and then tighten the drain plug.

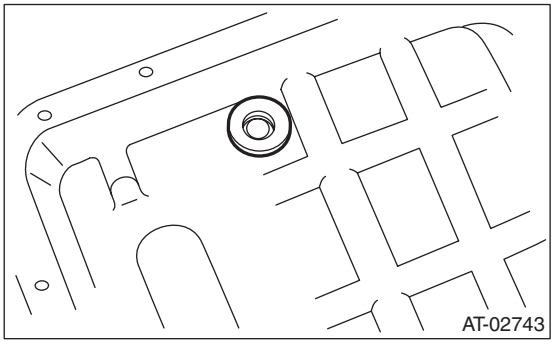
Tightening torque:
25 N·m (2.5 kgf-m, 18.1 ft-lb)

7) Remove the oil pan.

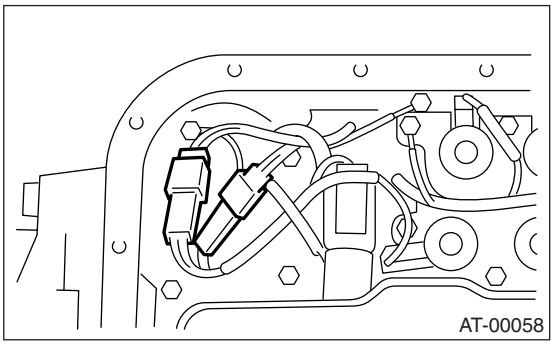
CAUTION:
Be careful not to allow dirt or dust to get into the oil pan.



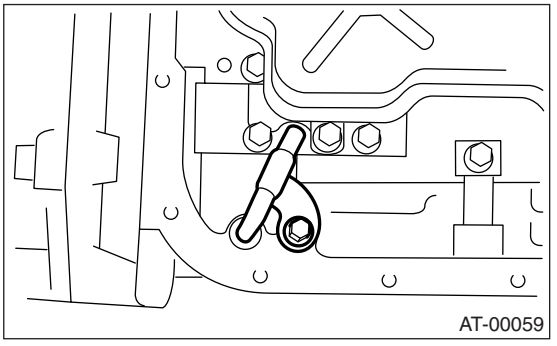
8) Remove the magnet.



9) Clean the magnet.
10) Remove the liquid gasket completely from oil pan and transmission case.
11) Remove the control valve connector.

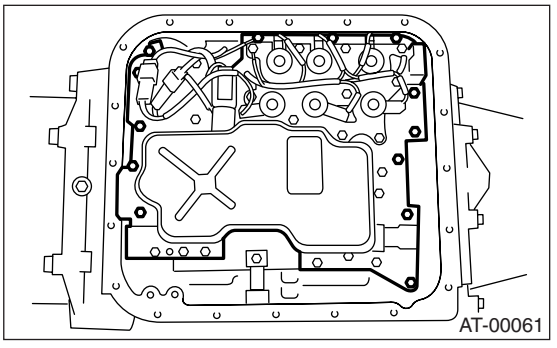


12) Remove the oil cooler pipe.



13) Remove the control valve body.

NOTE:
Replace the control valve body as assembly, because the control valve body can not be disassembled.

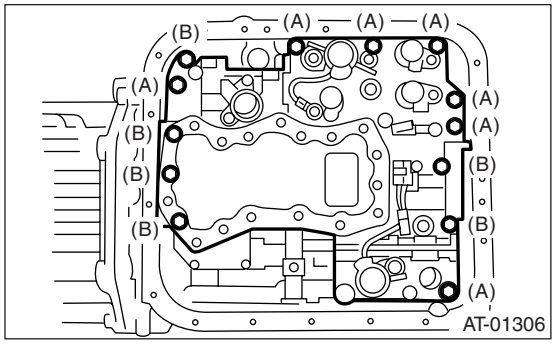


B: INSTALLATION

1. NON-TURBO MODEL

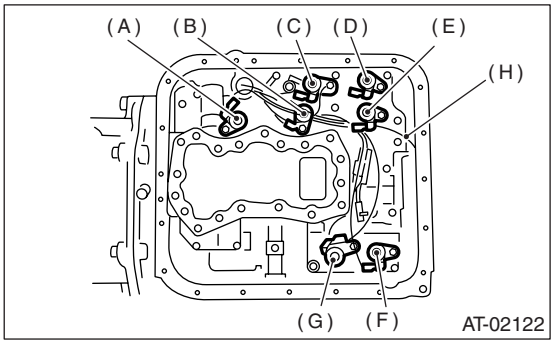
1) Set the range select lever in “N” range.
2) Install the control valve, ATF temperature sensor and ground connectors.

Tightening torque:
8 N·m (0.8 kgf-m, 5.8 ft-lb)



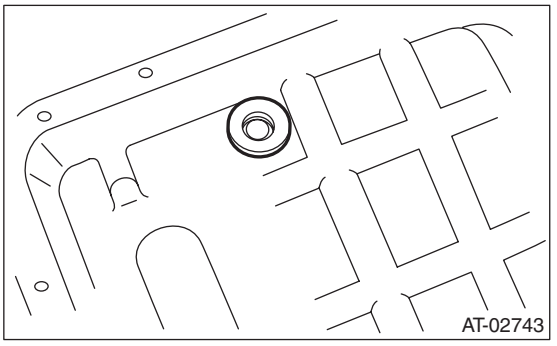
Bolt length mm (in)
(A) 30 (1.18)
(B) 55 (2.17)

3) Connect all connectors.



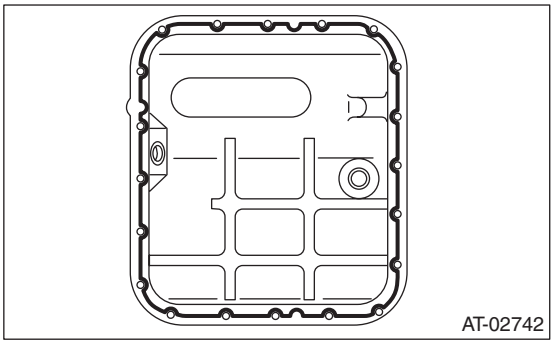
(A) Lock-up duty solenoid (Blue)
(B) Low clutch timing solenoid (Gray)
(C) Line pressure duty solenoid (Red)
(D) Shift solenoid 2 (Yellow)
(E) Shift solenoid 1 (Green)
(F) 2-4 brake timing solenoid (Black)
(G) 2-4 brake duty solenoid (Red)
(H) Transfer duty solenoid (Brown)

4) Attach the magnet at specified position.



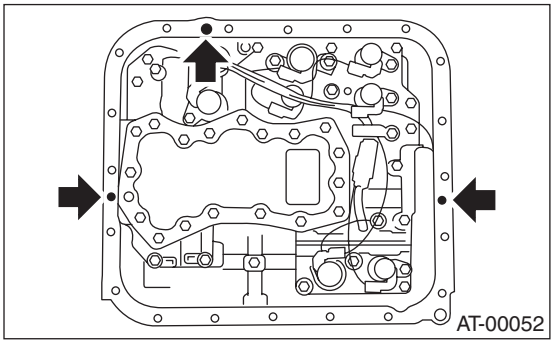
5) Apply proper amount of liquid gasket to the entire oil pan mating surface.

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

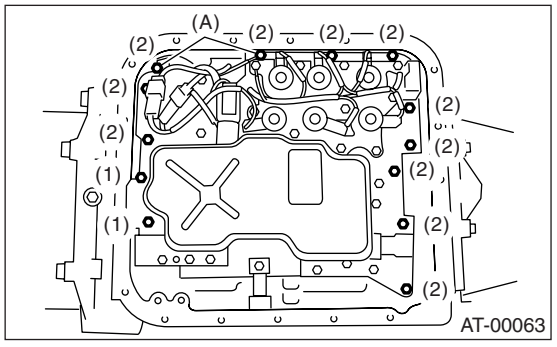
Fluid capacity:
Fill the same amount of fluid drained from drain plug hole.

9) Check the level of ATF.
<Ref. to 4AT-31, Automatic Transmission Fluid.>

2. TURBO MODEL

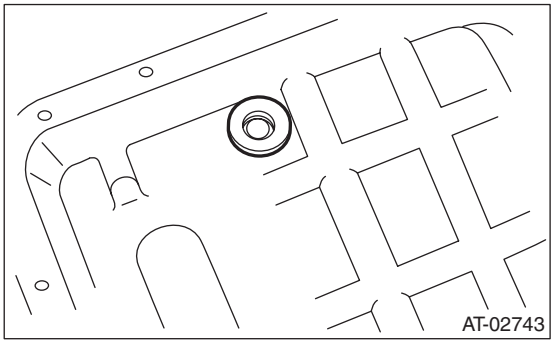
1) Check the control valve body for dirt and dust.
2) Install the control valve body and ground cable to transmission by tightening bolts evenly.

Tightening torque:
8 N·m (0.8 kgf-m, 5.8 ft-lb)



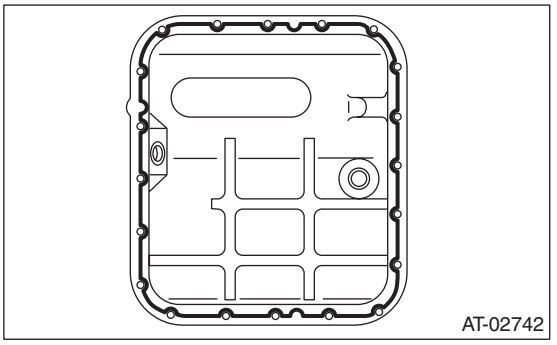
(A) Transmission ground
Bolt length mm (in)
(1) 30 (1.18)
(2) 35 (1.38)

3) Attach the magnet at specified position of oil pan.



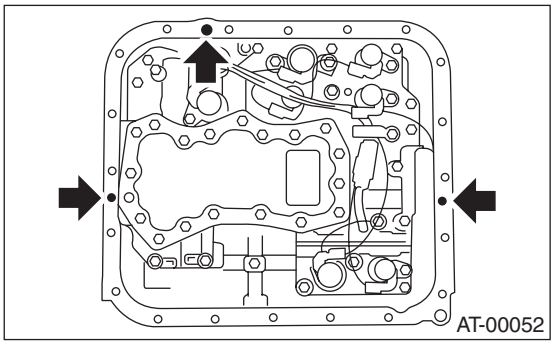
4) Apply proper amount of liquid gasket to the entire oil pan mating surface.

Liquid gasket:
THREE BOND 1217B (Part No. K0877YA020)



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

Liquid gasket:
THREE BOND 1217B (Part No. K0877YA020)



6) Install the oil pan with tightening bolts evenly.

Tightening torque:
5 N·m (0.5 kgf-m, 3.6 ft-lb)

7) Pour ATF into the oil charge pipe.

Recommended fluid:
DEXRON III TYPE AUTOMATIC TRANSMISSION FLUID

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

8) Bleed the air from control valve. <Ref. to 4AT-70, Air Bleeding of Control Valve.>
9) Check the level of ATF. <Ref. to 4AT-31, Automatic Transmission Fluid.>
10) Perform the advance operation of learning control. (TURBO model)
(1) Set the select lever to “P” range and apply parking brake, then lift-up the vehicle.
(2) Connect the SUBARU Select Monitor to vehicle.

(3) Using SUBARU Select Monitor, check that the DTC is not output.
(4) Select “Clear Memory - 2” on the Select Monitor. <Ref. to 4AT(D)-14, OPERATION, Subaru Select Monitor.>
(5) Using SUBARU Select Monitor, warm up the engine until the ATF temperature becomes within 60 to 90°C (140 to 194° F). <Ref. to 4AT(D)-14, OPERATION, Subaru Select Monitor.>
(6) Set the select lever to “R” range.
(7) Set the switches for headlights, air conditioner, rear defogger, etc. to OFF.
(8) Turn ignition switch to OFF, and wait for 30 seconds or more.
(9) Depress the brake pedal fully with left foot until learning promotion task is completed.
(10)Turn the ignition switch to ON.
(11)Confirm that the Select Monitor screen returns to normal.
(12)Set the select lever to “P” range, and then wait for more than three seconds.
(13)Set the select lever to “R” range, and then wait for more than three seconds.
(14)Set the select lever to “N” range, and then wait for more than three seconds.
(15)Set the select lever to “D” range, and then wait for more than three seconds.
(16)Set the select lever to “N” range, and then wait for more than three seconds.
(17)Slightly depress the accelerator pedal to full open.
(18)Slightly release the accelerator pedal to close.
(19)Start the engine.
(20)Set the select lever to “D” range.
(21)ATF temperature warning light in the combination meter blinks at 2 Hz. If ATF temperature warning light does not blink, repeat the procedure from step (4).
(22)Learning promotion task is completed when blinking of ATF temperature warning light in the combination meter changes from 2 to 0.5 Hz.

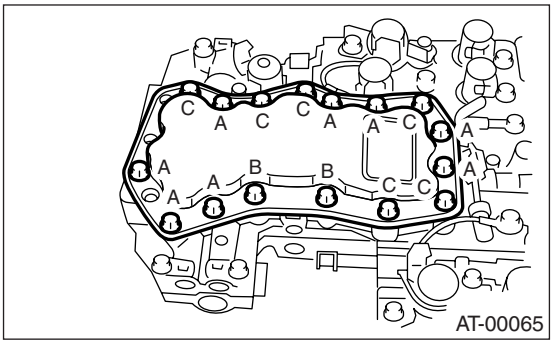
NOTE:
Repeat the procedure from step (4) if blinking of ATF temperature warning light changes from 2 Hz to 4 Hz.

(23)Set the select lever to “N” range, and turn the ignition switch to OFF.

C: DISASSEMBLY

1) Remove oil strainer from lower control valve body.

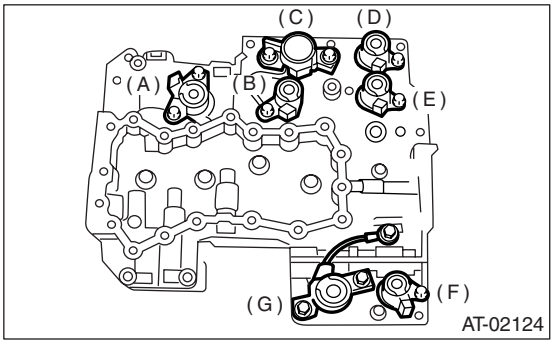
NOTE:
Arrange the removed bolts in good order to assemble in the same place as disassembly, because the bolt lengths are different.



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

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

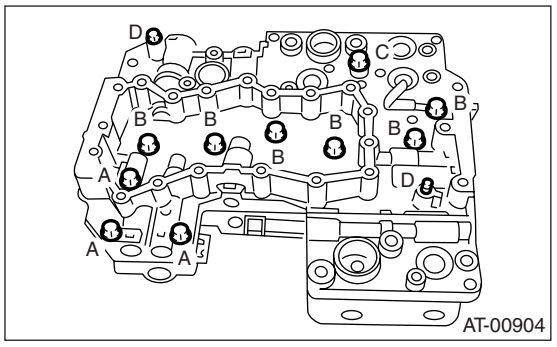
NOTE:
Arrange the removed bolts in good order to assemble in the same place as disassembly, because the bolt lengths are different.



(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)

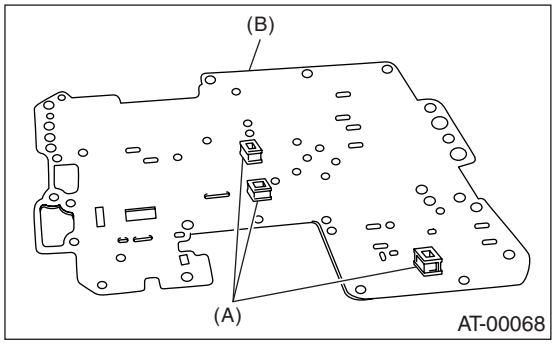
3) Remove the upper-lower valve body tightening bolts.

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



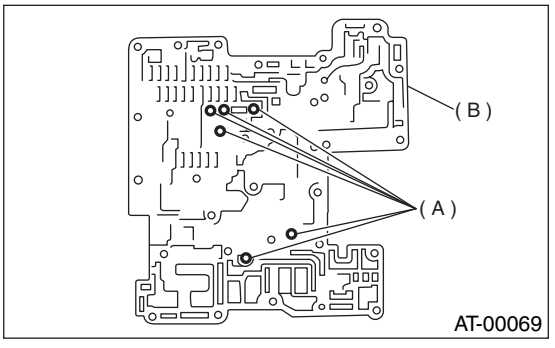
Bolt length mm (in)
(A) 40 (1.57)
(B) 62 (2.44)
(C) 73 (2.87)
(D) 79 (3.11)

4) Remove the lower valve body.
5) Remove the oil filter and plate.



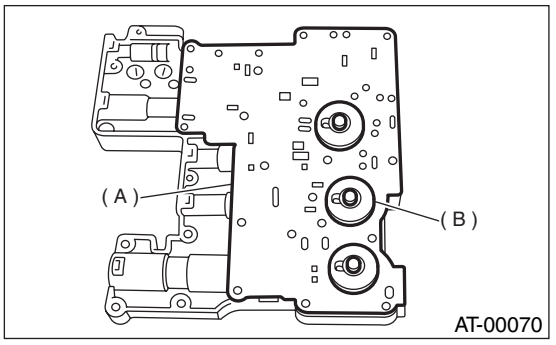
(A) Oil filter
(B) Plate

6) Remove six steel balls from middle valve body.



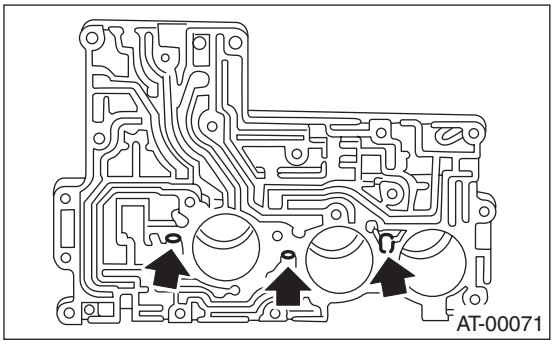
(A) Steel ball
(B) Middle valve body

7) Remove the middle valve body.
8) Remove upper separator plate from middle valve body.

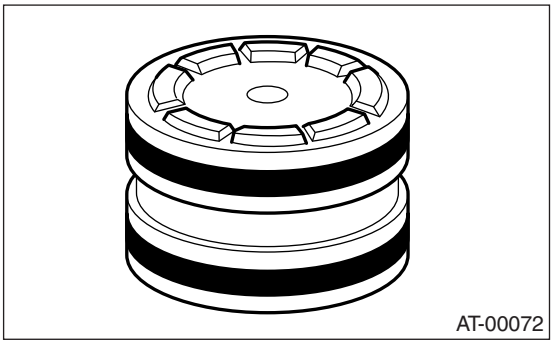


(A) Upper separator plate
(B) Side plate

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.

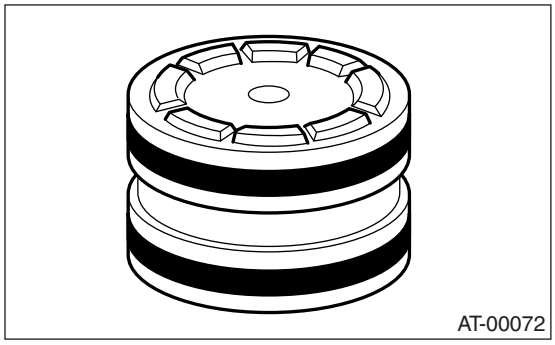


12) Remove the seal ring from piston.

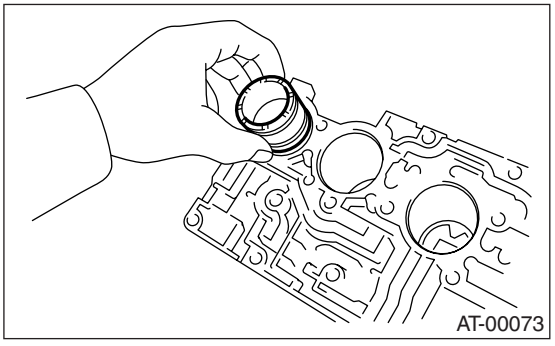


D: ASSEMBLY

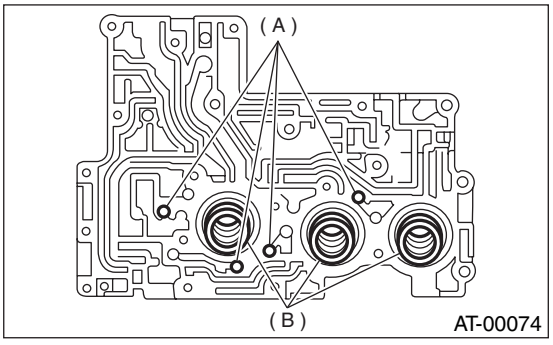
1) Install a new seal ring to piston.



2) Apply ATF to the seal ring.
3) Insert the piston fully into upper valve body.



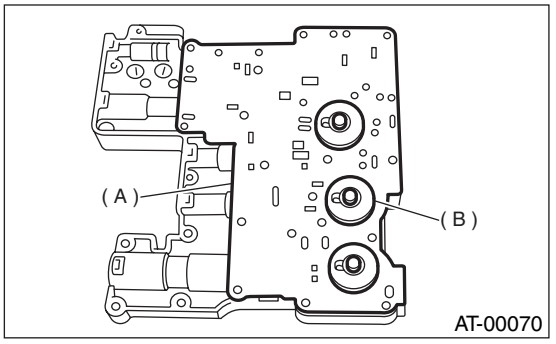
4) Install the spring and four steel balls to specified positions of upper valve body.



(A) Steel ball
(B) Spring

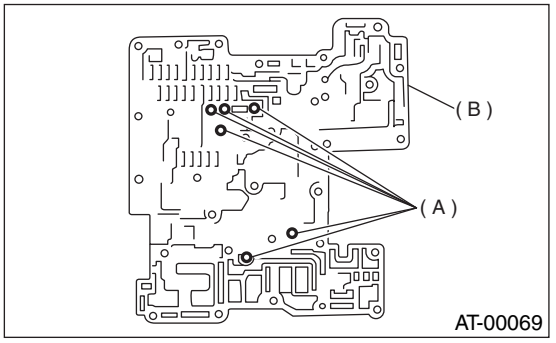
5) Align the hole in side plate with the hole in separator plate, and then install support plate and upper separator plate to middle valve body.

Tightening torque:
8 N·m (0.8 kgf-m, 5.8 ft-lb)



(A) Upper separator plate
(B) Side plate

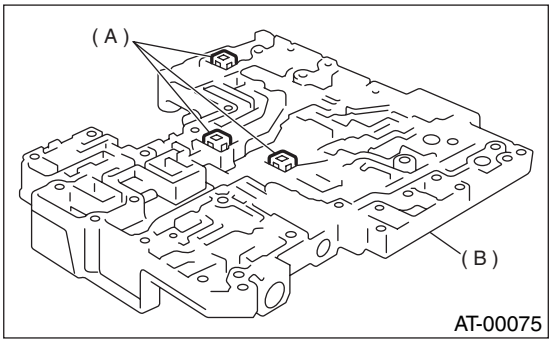
6) Insert six steel balls in their proper positions to middle valve body.



(A) Steel ball
(B) Middle valve body

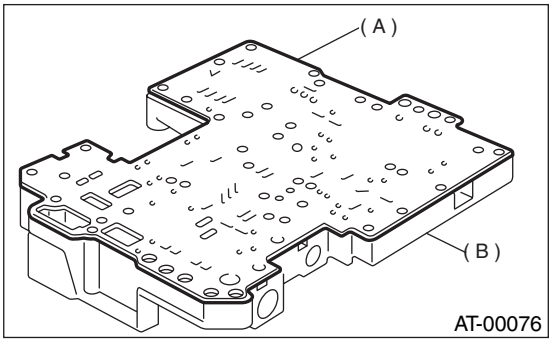
7) Install three filters to lower valve body.

NOTE:
Pay attention to the location of filters.



(A) Strainer
(B) Lower valve body

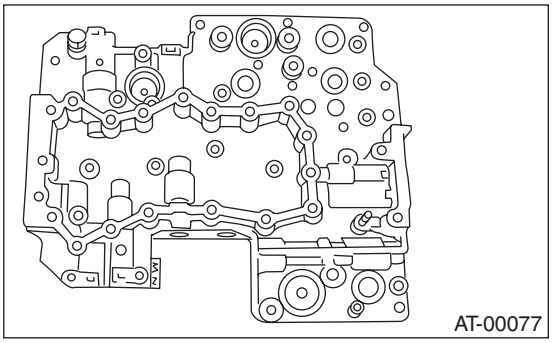
8) Install the lower separate plate to lower valve body.



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

9) Temporarily assemble the valve body.

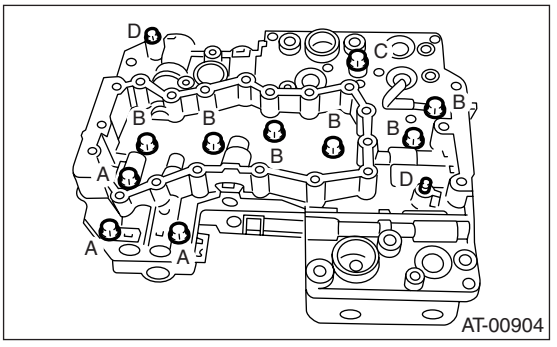
NOTE:
Be careful not to drop the middle valve body and upper body interior steel ball, or the lower body filter.



10) Tighten the bolts and nuts.

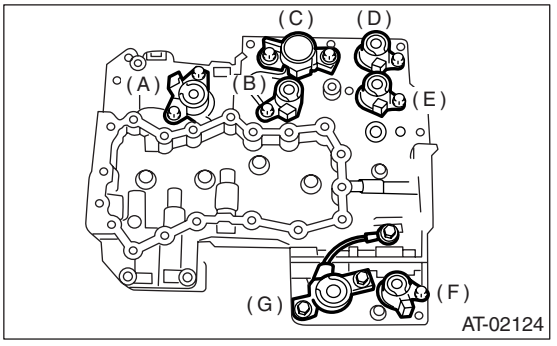
NOTE:
Install the bolts (D) from upper valve body side.

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)

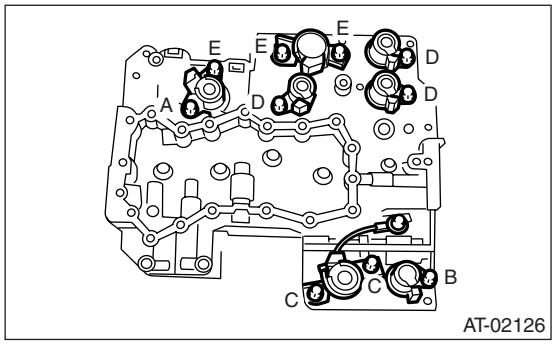
11) Install the sensor, solenoids and duty solenoids to specified positions.



(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.

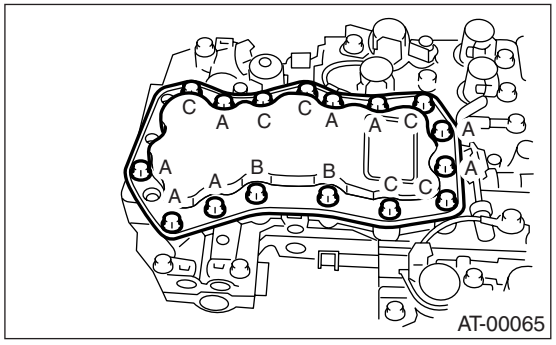
Tightening torque:
8 N·m (0.8 kgf-m, 5.8 ft-lb)



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.

18.Air Bleeding of Control Valve

A: PROCEDURE

1) Set the select lever to “P” range and apply parking brake, then lift-up the vehicle.
2) Connect the SUBARU Select Monitor to vehicle.
3) Using SUBARU Select Monitor, check that the DTC is not output.<Ref. to 4AT(D)-14, OPERATION, Subaru Select Monitor.>
4) Using SUBARU Select Monitor, check that ATF temperature is less than 60°C (140° F). <Ref. to 4AT(D)-14, OPERATION, Subaru Select Monitor.>
5) Set the SUBARU Select Monitor to OFF.
6) Set the ignition switch to OFF.
7) With pressing shift lock release button, set the select lever to “R” range.
8) Depress the brake pedal fully with left foot until air bleeding is complete.
9) Turn the ignition switch to ON.
10) Set the select lever to “P” range, and then wait for more than three seconds.
11) Set the select lever to “R” range, and then wait for more than three seconds.
12) Set the select lever to “N” range, and then wait for more than three seconds.
13) Set the select lever to “D” range, and then wait for more than three seconds.
14) Set the select lever to “N” range, and then wait for more than three seconds.
15) Slightly depress the accelerator pedal to full open.
16) Slightly release the accelerator pedal to close.
17) Start the engine.
18) Set the select lever to “D” range.
19) Turn the SUBARU Select Monitor power to ON.
20) On the SUBARU Select Monitor, select the “individual system inspection” of main menu.
21) On the “individual system inspection” selection menu, select the “individual system inspection” and air bleeding of control valve will start in transmission. At this time, ATF temperature warning light in the combination meter blinks at 2Hz. If ATF temperature warning light does not blink, repeat the procedure from step 4).
22) Air bleeding of control valve is completed when blinking of ATF temperature warning light in the combination meter changes from 2Hz to 0.5Hz.

NOTE:
Repeat the procedure from step 4) if blinking of ATF temperature warning light changes from 2Hz to 4Hz during air bleeding.

23) Set the select lever to “N” range, and turn the ignition switch to OFF.
24) Set the select lever to “P” range to finish air bleeding.

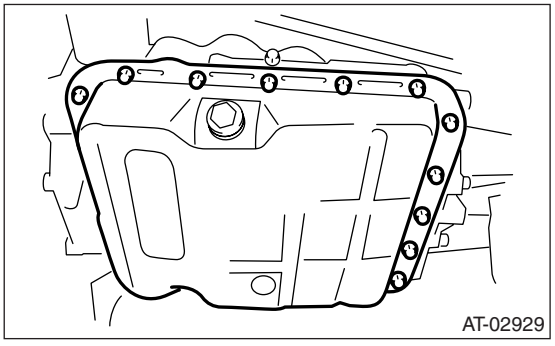
19.Shift Solenoids, Duty Solenoids and ATF Temperature Sensor

A: REMOVAL

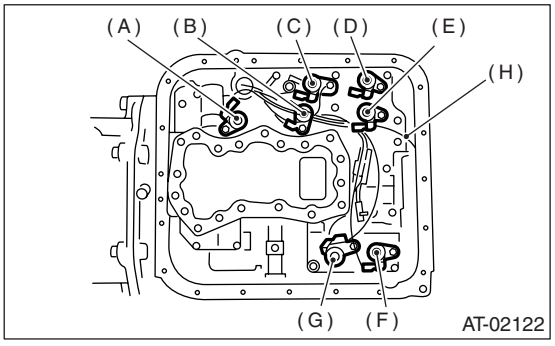
1. SHIFT SOLENOIDS AND DUTY SOLENOIDS

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)

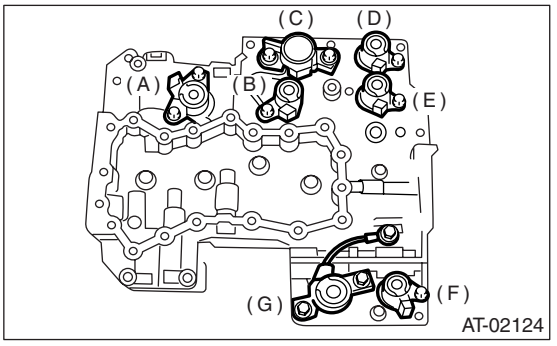


5) Remove the oil pan.
6) Disconnect the solenoid and duty solenoid connectors.



(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)

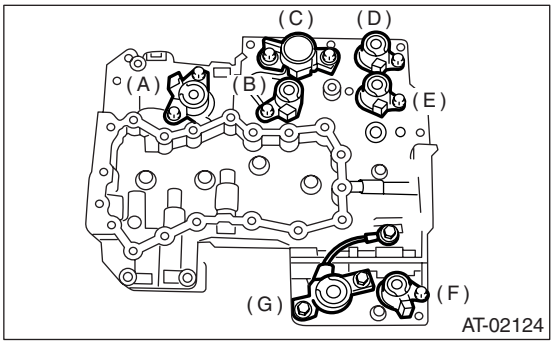
2. ATF TEMPERATURE SENSOR

For removal of ATF temperature sensor, refer to “Front Vehicle Speed Sensor.” <Ref. to 4AT-54, REMOVAL.>

B: INSTALLATION

1. SHIFT SOLENOIDS AND DUTY SOLENOIDS

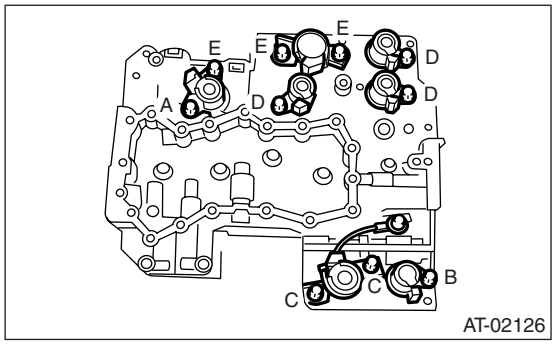
1) Insert solenoid and duty solenoid to specified position.



(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)

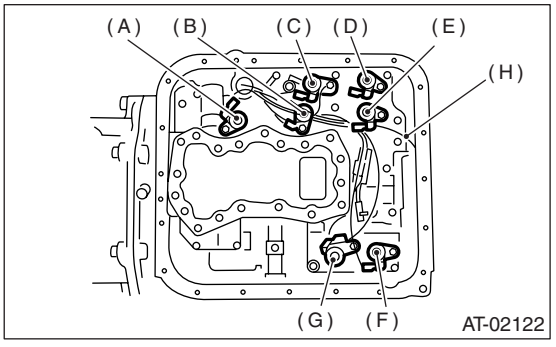
2) Tighten the bolts and nuts.

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)

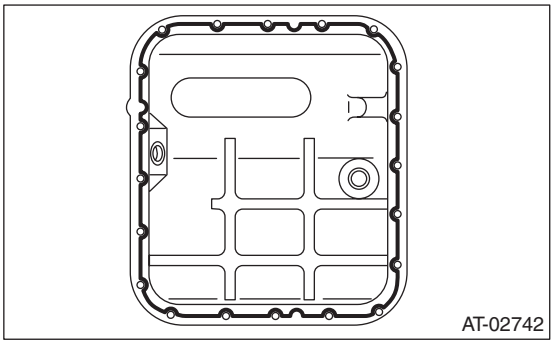
3) Connect the harness connectors.
Connect the connectors of same color, and secure the harness to valve body using clips.



(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)

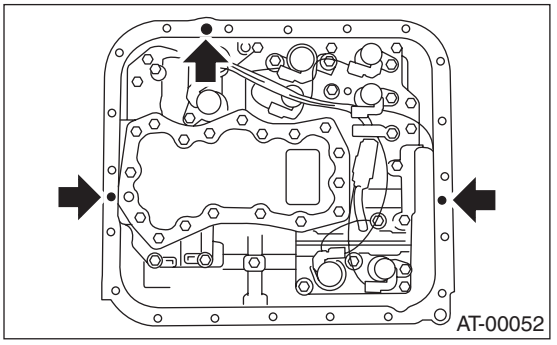
4) Apply proper amount of liquid gasket to the entire oil pan mating surface.

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) Tighten bolts evenly and install the oil pan.

Tightening torque:
5 N·m (0.5 kgf-m, 3.6 ft-lb)

7) Refill with the same amount of ATF that was drained.
8) Check the ATF level. <Ref. to 4AT-31, Automatic Transmission Fluid.>

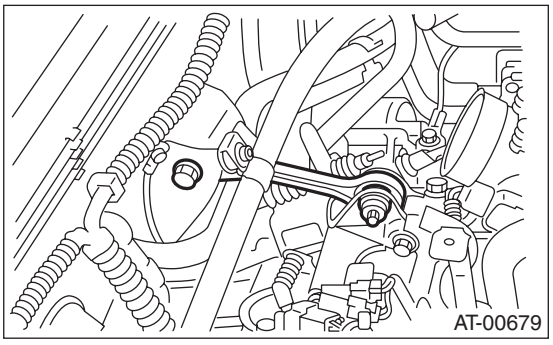
2. ATF TEMPERATURE SENSOR

For installation of ATF temperature sensor, refer to “Front Vehicle Speed Sensor.” <Ref. to 4AT-56, INSTALLATION.>

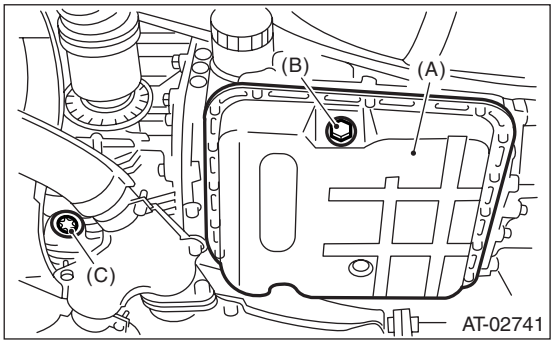
20.Transfer Duty Solenoid and Valve Body

A: REMOVAL

1) Set the vehicle on a lift.
2) Disconnect the ground cable from battery.
3) Remove the air cleaner case or air intake chamber.
<Ref. to IN(H4SO)-6, REMOVAL, Air Cleaner Case.>
4) Remove the pitching stopper.

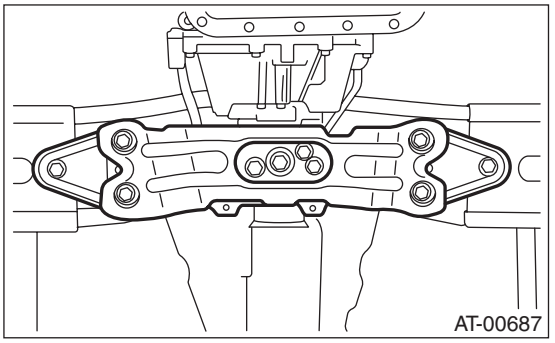


5) Remove the front exhaust pipe with center exhaust pipe. (Non-TURBO model)
<Ref. to EX(H4SO)-5, REMOVAL, Front Exhaust Pipe.>
6) Remove the rear exhaust pipe and muffler.
<Ref. to EX(H4SO)-9, REMOVAL, Rear Exhaust Pipe.> and <Ref. to EX(H4SO)-10, REMOVAL, Muffler.>
7) Raise the vehicle and drain the ATF.

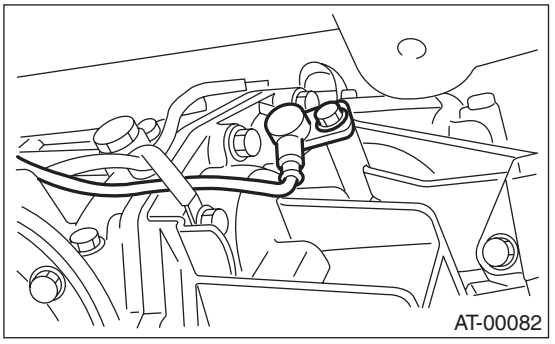


(A) Oil pan
(B) Drain plug
(C) Deferential oil drain plug

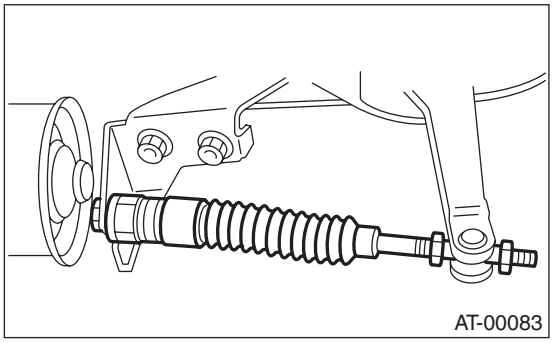
8) Remove the heat shield cover. (If equipped)
9) Remove the propeller shaft. <Ref. to DS-15, REMOVAL, Propeller Shaft.>
10) Remove the transmission rear crossmember.
(1) Support the transmission using a transmission jack and raise it slightly.
(2) Remove the bolts and nuts as shown in the figure.



11) Remove the rear vehicle speed sensor.

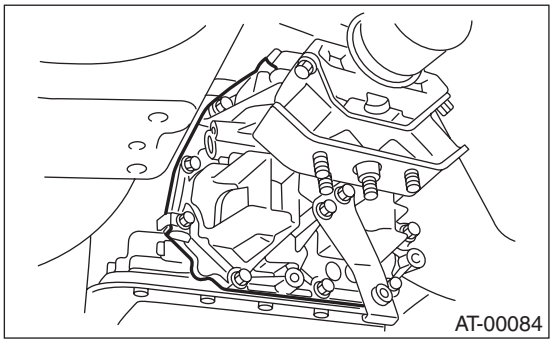


12) Remove the select cable nut.

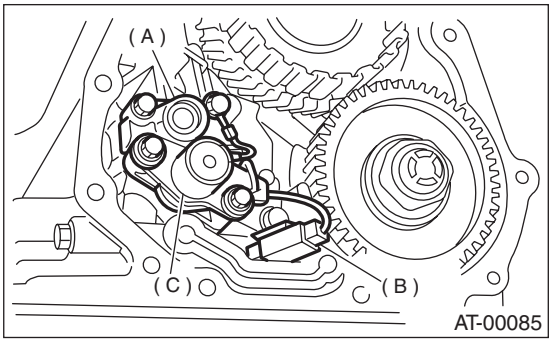


13) Move the gear select cable so that extension bolts can be removed.
14) Remove the bolts.
15) Remove the extension case.

NOTE:
Use a container to catch oil flowing from extension.



16) Disconnect the transfer duty solenoid connector.
17) Remove the transfer duty solenoid and transfer valve body.



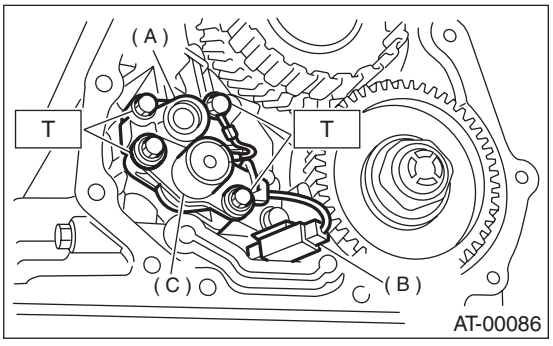
(A) Transfer valve body
(B) Transfer duty solenoid connector
(C) Transfer duty solenoid

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

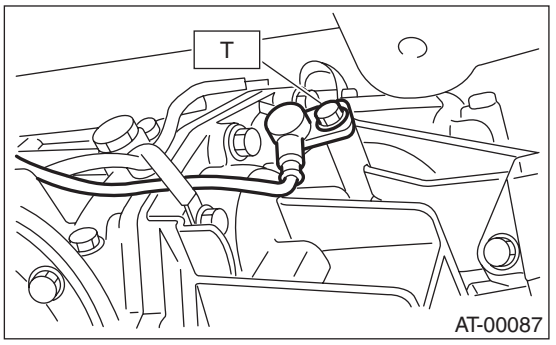
2) Install a new gasket and the extension case to transmission case.
(1) Tighten eleven bolts.

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

(2) Adjust the select cable. <Ref. to CS-32, ADJUSTMENT, Select Cable.>

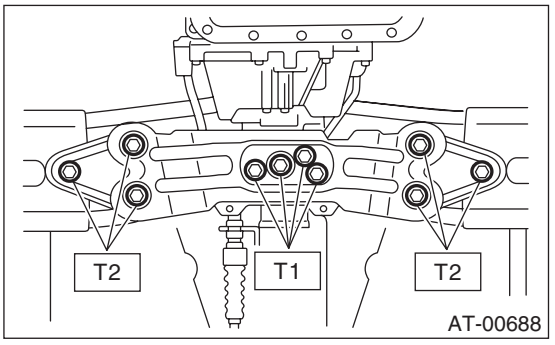
3) Install the rear vehicle speed sensor.

Tightening torque:
T: 7 N·m (0.7 kgf-m, 5.1 ft-lb)

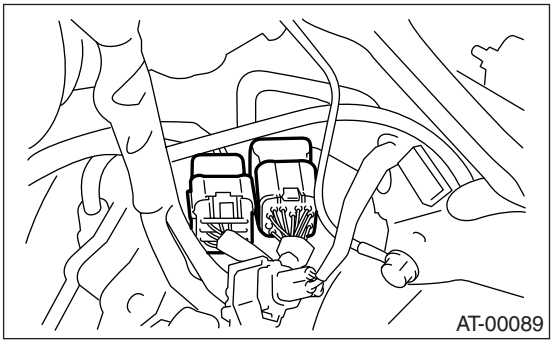


4) Install the transmission rear crossmember.
(1) Tighten the bolts.

Tightening torque:
T1: 35 N·m (3.6 kgf-m, 26 ft-lb)
T2: 75 N·m (7.7 kgf-m, 55 ft-lb)

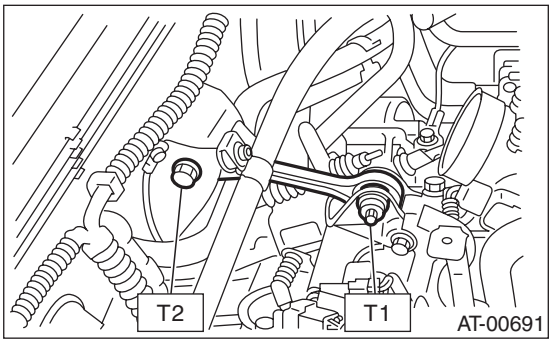


(2) Remove the transmission jack.
5) Install the propeller shaft. <Ref. to DS-16, INSTALLATION, Propeller Shaft.>
6) Install the front, center rear exhaust pipe and muffler.
<Ref. to EX(H4SO)-6, INSTALLATION, Front Exhaust Pipe.>, <Ref. to EX(H4SO)-9, INSTALLATION, Rear Exhaust Pipe.> and <Ref. to EX(H4SO)-10, INSTALLATION, Muffler.>
7) Connect the transmission harness connector.



8) 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)



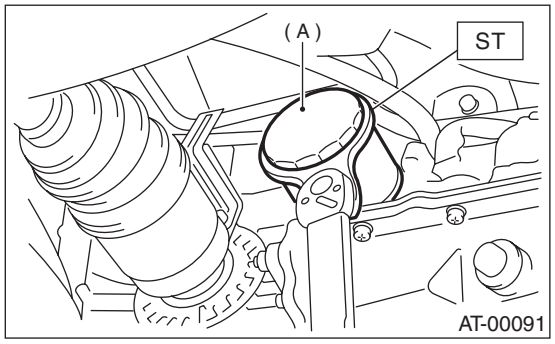
9) Install the air cleaner case or air intake chamber. (Non-TURBO model)
<Ref. to IN(H4SO)-6, INSTALLATION, Air Cleaner Case.>
10) Fill with the same amount of ATF that was drained.
11) Check the ATF level. <Ref. to 4AT-31, Automatic Transmission Fluid.>

21.ATF Filter

A: REMOVAL

NOTE:
The ATF filter is maintenance free.

1) Lift-up the vehicle.
2) Using ST, remove ATF filter.
ST 498545400 OIL FILTER WRENCH



(A) ATF filter

B: INSTALLATION

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

ST 498545400 OIL FILTER WRENCH
4) Add ATF.
5) Inspect level of ATF. <Ref. to 4AT-31, Automatic Transmission Fluid.>

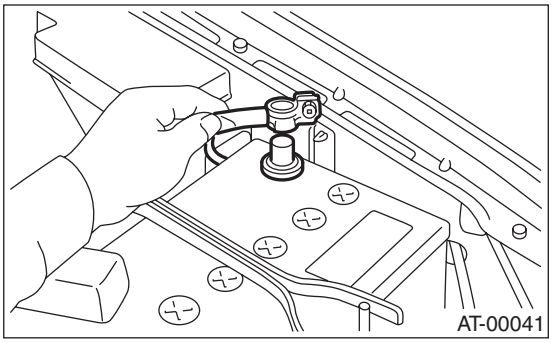
C: INSPECTION

Replace the part if any defect is found from the inspection.
Check for rust, hole, ATF leaks, and other damage.

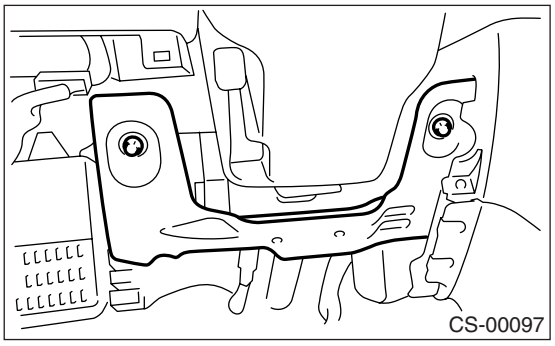
22.Transmission Control Module (TCM)

A: REMOVAL

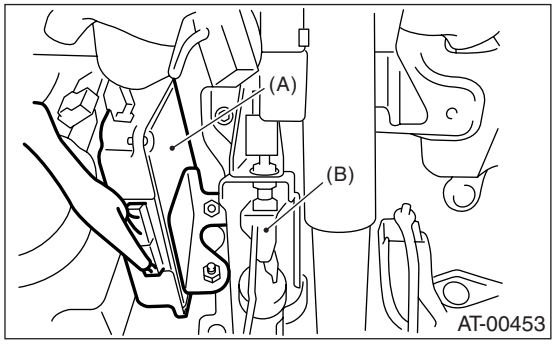
1) Disconnect the ground cable from battery.



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



4) Disconnect the connectors from TCM.



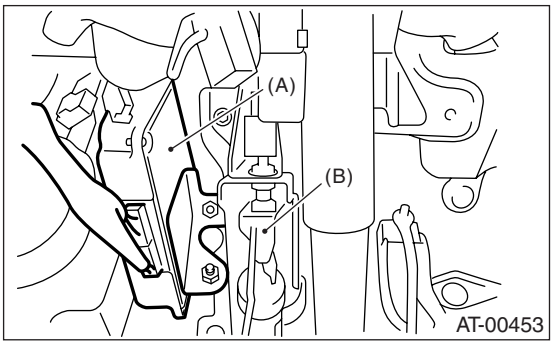
(A) Transmission control module (TCM)
(B) Brake pedal

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.
4) Perform learning control promotion task. (TURBO model)
(1) Set select lever to “P” range and apply parking brake, then lift up the vehicle.
(2) Connect Subaru Select Monitor to vehicle and turn on the switch.
(3) Select “Clear Memory — 2” on the SUBARU Select Monitor. <Ref. to 4AT(D)-16, CLEAR MEMORY MODE, OPERATION, Subaru Select Monitor.>
(4) Using Subaru Select Monitor, check that the DTC is not output. <Ref. to 4AT(D)-14, READ DIAGNOSTIC TROUBLE CODE, OPERATION, Subaru Select Monitor.>
(5) Using Subaru Select Monitor, warm up the engine until the ATF temperature becomes within 60 to 90°C (140 to 194°F). <Ref. to 4AT(D)-15, READ CURRENT DATA, OPERATION, Subaru Select Monitor.>
(6) Shift the select lever to the “R” range.
(7) Set the switches for headlights, air conditioner, rear defogger, etc. to OFF.
(8) Turn the ignition switch OFF and then wait for more than 30 seconds.
(9) If the message “communication impossible” is displayed on SUBARU Select Monitor, depress the brake pedal deeply with left foot until the learning promotion task is completed, and then turn the ignition switch to ON.
(10)Check that Subaru Select Monitor is operating properly now.
(11)Set the select lever to “P” range, and then wait for more than three seconds.
(12)Set the select lever to “R” range, and then wait for more than three seconds.

(13)Set the select lever to “N” range, and then wait for more than three seconds.
(14)Set the select lever to “D” range, and then wait for more than three seconds.
(15)Set the select lever to “N” range, and then wait for more than three seconds.
(16)Slowly depress the accelerator pedal to the fully open position.
(17)Slowly release the accelerator pedal to the fully closed position.
(18)Start and idle the engine.
(19)Set the select lever to “D” range.
(20)Learning promotion task starts. ATF temperature warning light in the combination meter blinks at 2 Hz. If ATF temperature does not blink, turn the ignition switch OFF and repeat the procedure from step (4).
Learning promotion task is completed when blinking of ATF temperature warning light in the combination meter changes from 2 to 0.5 Hz.

NOTE:
Repeat the procedure from step (4) if blinking of AFT temperature warning light changes from 2 to 4 Hz.

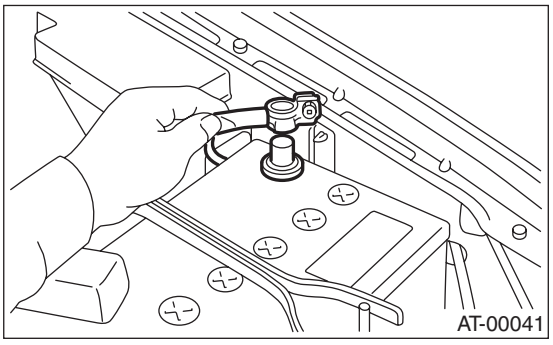
(21)Set the select lever to “N” range, and turn the ignition switch to OFF.

23.Dropping Resistor

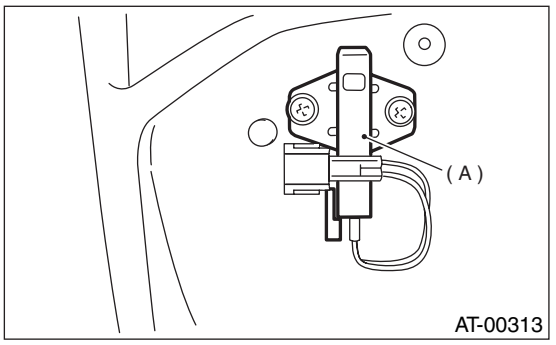
A: REMOVAL

NOTE:
Dropping resistor is installed only for NON-TURBO model.

1) Disconnect the ground cable from battery.



2) Remove the air intake duct.
<Ref. to IN(H4SO)-6, REMOVAL, Air Cleaner Case.>
3) Disconnect the connector from dropping resistor.
4) Remove the dropping resistor.

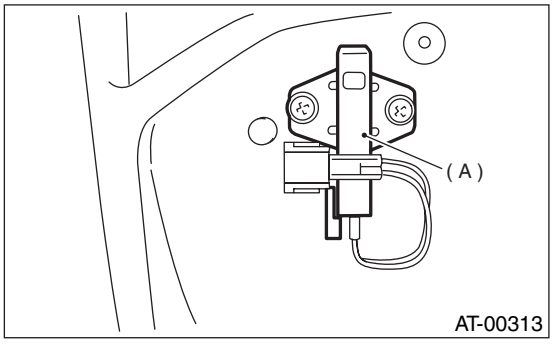


(A) Dropping resistor

B: INSTALLATION

Install in the reverse order of removal.

Tightening torque:
13 N·m (1.3 kgf-m, 10 ft-lb)



(A) Dropping resistor

C: INSPECTION

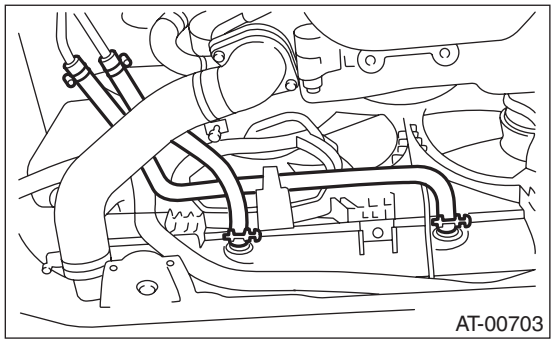
	Step	Check	Yes	No
1	**CHECK RESISTOR.** 1) Turn ignition switch to OFF. 2) Disconnect the connector from dropping resistor. 3) Measure the resistance between dropping resistor terminals. ***Terminals*** ***No. 1 — No. 2:***	Is the resistance 9 — 15 Ω?	Go to step **2.**	Replace the dropping resistor. <Ref. to 4AT-79, 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-79, Dropping Resistor.>

24.ATF Cooler Pipe and Hose

A: REMOVAL

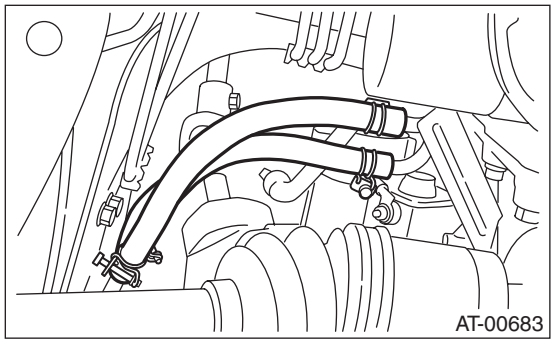
1) Set the vehicle on a lift.
2) Remove battery and washer tank.
3) Lift-up the vehicle.
4) Remove the under cover.
5) Disconnect ATF cooler hose from radiator.

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

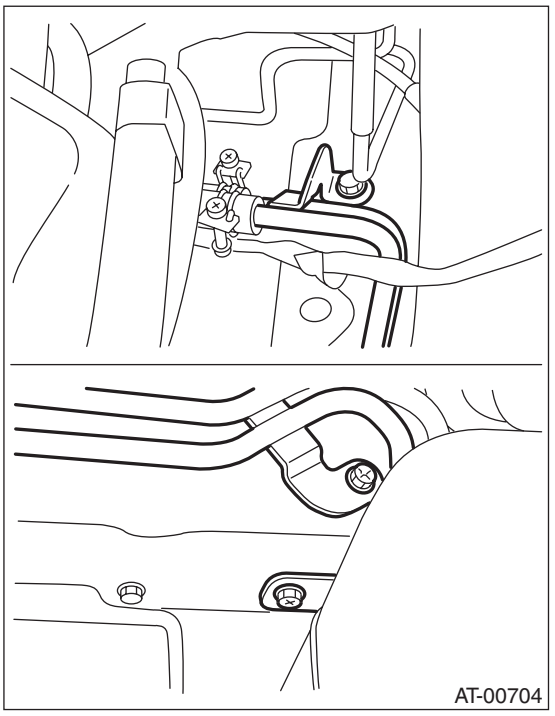


6) Disconnect ATF cooler hoses from pipes.

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

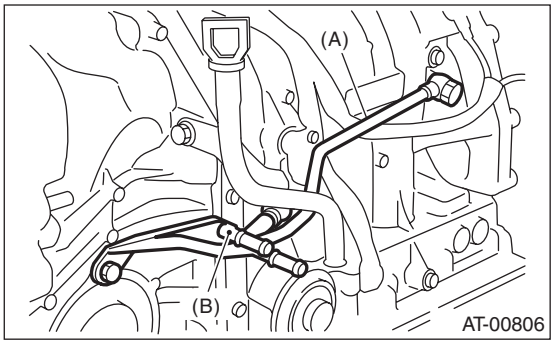


7) Remove ATF cooler pipe from frame.



8) Remove the oil cooler inlet and outlet pipes.

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



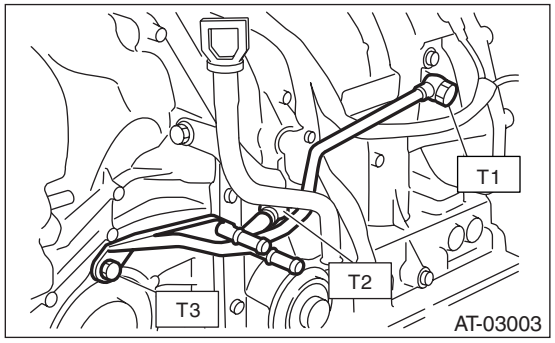
(A) Inlet pipe
(B) Outlet pipe

B: INSTALLATION

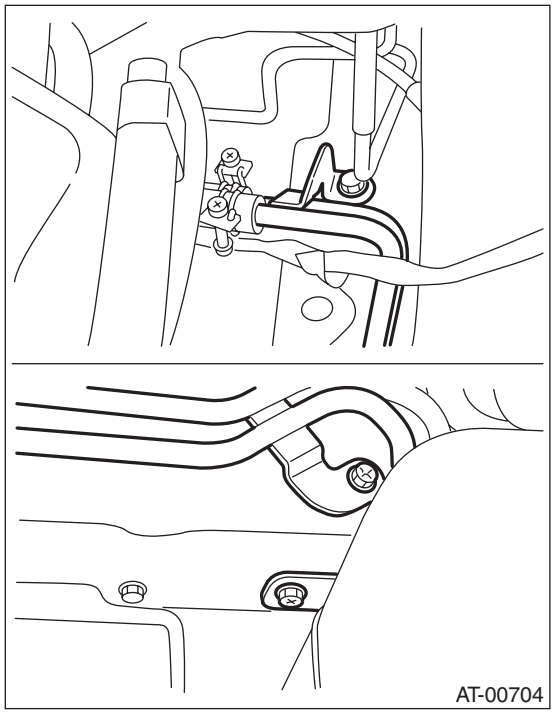
1) Install the oil cooler outlet and inlet pipes.

NOTE:
Be sure to use a new aluminum washer.

Tightening torque:
T1: 40 N·m (4.1 kgf-m, 30 ft-lb)
T2: 44 N·m (4.5 kgf-m, 32.5 ft-lb)
T3: 25 N·m (2.5 kgf-m, 18.1 ft-lb)

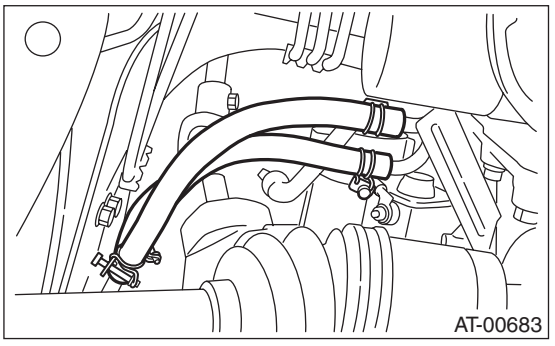


2) Install ATF cooler pipe to frame.



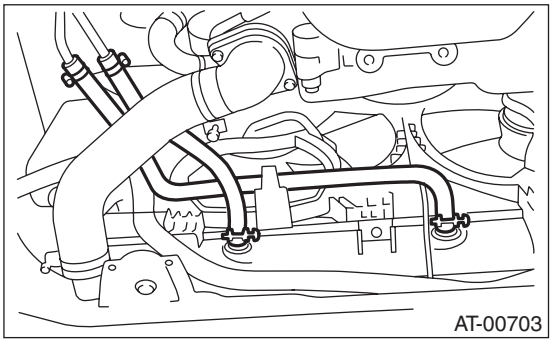
3) Connect ATF cooler hose to pipe transmission side.

NOTE:
• Install so that the hose is not folded over, excessively bent, or twisted.
• Be careful to insert the hose to the specified position.



4) Connect ATF cooler hose to pipe of radiator side.

NOTE:
• Install so that the hose is not folded over, excessively bent, or twisted.
• Be careful to insert the hose to the specified position.



5) Install the under cover.
6) Install battery and washer tank.
7) Fill ATF. <Ref. to 4AT-31, Automatic Transmission Fluid.>

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

C: INSPECTION

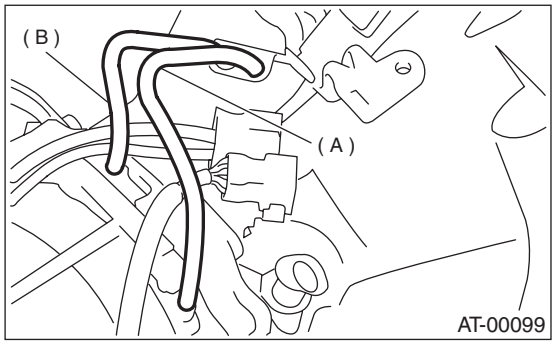
Repair or replace any defective hoses, pipes, clamps, and washers found from the inspection below.
1) Check for ATF leaks in joints between the transmission, radiator, pipes, and hoses.
2) Check for deformed clamps.
3) Lightly bend the hose and check for cracks in the surface and other damage.
4) Pinch 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.

25.Air Breather Hose

A: REMOVAL

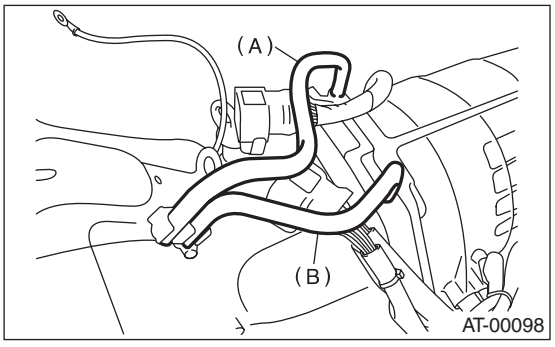
1) Remove the air cleaner case or air intake chamber. (Non-TURBO model)
<Ref. to IN(H4SO)-6, REMOVAL, Air Cleaner Case.>
2) Remove intercooler. (TURBO model)
<Ref. to IN(H4DOTC)-10, REMOVAL, Intercooler.>
3) Disconnect the air breather hoses.

- NON-TURBO MODEL



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

- TURBO MODEL



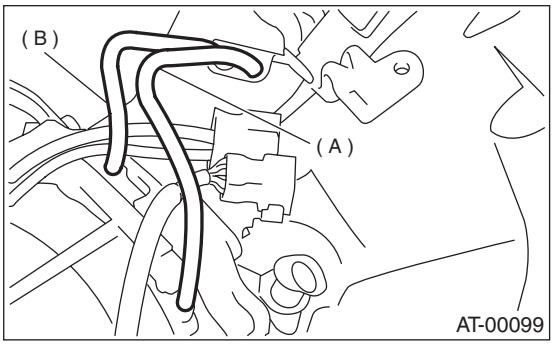
(A) Air breather hose (Transmission case)
(B) Air breather hose (Oil pump housing)

B: INSTALLATION

1) Install air breather hoses.

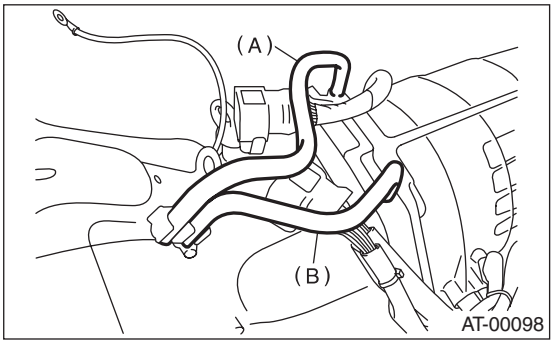
NOTE:
Be careful not to twist and bend hose.

- 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 or air intake chamber. (Non-TURBO model)
<Ref. to IN(H4SO)-6, INSTALLATION, Air Cleaner Case.>
3) Install intercooler. (TURBO model)
<Ref. to IN(H4DOTC)-11, INSTALLATION, Intercooler.>

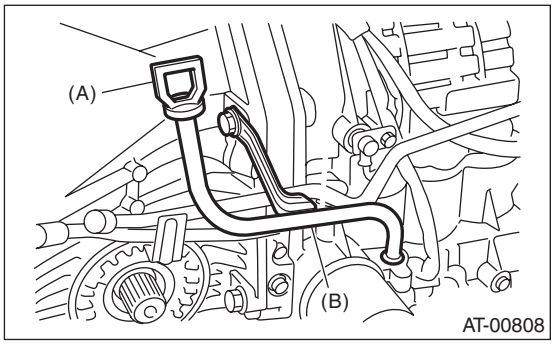
C: INSPECTION

Make sure the hose is not cracked or clogged.

26.Oil Charger Pipe

A: REMOVAL

1) Remove the air cleaner case or air intake chamber. (Non-TURBO model)
<Ref. to IN(H4SO)-6, REMOVAL, Air Cleaner Case.>
2) Remove intercooler. (TURBO model)
<Ref. to IN(H4DOTC)-10, REMOVAL, Intercooler.>
3) Remove starter motor.
<Ref. to SC(H4SO)-7, REMOVAL, Starter.>
4) Remove the oil charger pipe, and remove the O-ring from the flange face.

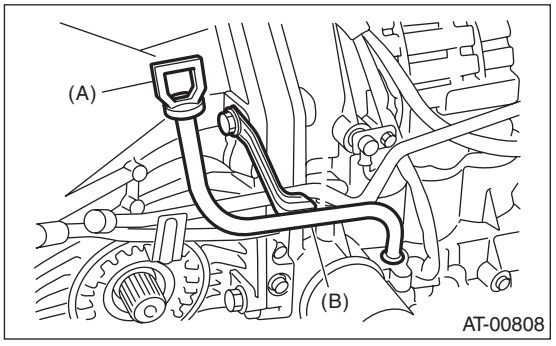


(A) Oil level gauge
(B) Oil charger pipe

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 starter motor.
<Ref. to SC(H4SO)-7, INSTALLATION, Starter.>
3) Install the air cleaner case or air intake chamber. (Non-TURBO model)
<Ref. to IN(H4SO)-6, INSTALLATION, Air Cleaner Case.>
4) Install intercooler. (TURBO model)
<Ref. to IN(H4DOTC)-11, INSTALLATION, Intercooler.>

C: INSPECTION

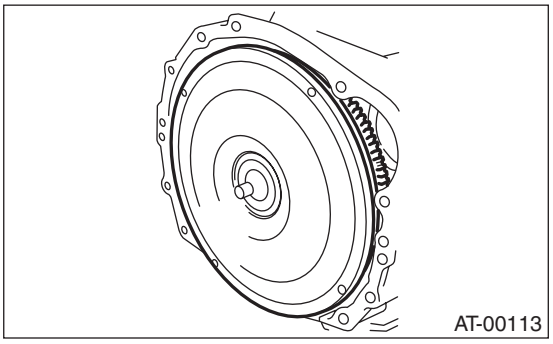
Make sure the oil charger pipe is not deformed or otherwise damaged.

27.Torque Converter Clutch Assembly

A: REMOVAL

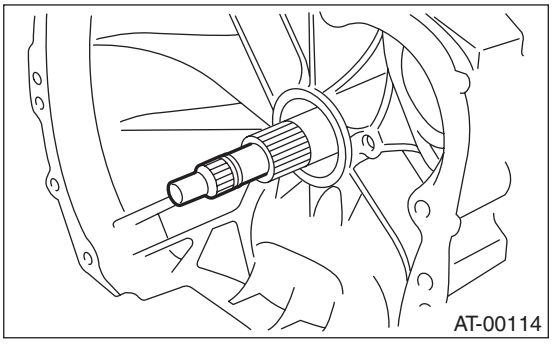
1) Remove the transmission assembly from the vehicle. <Ref. to 4AT-39, REMOVAL.>
2) Extract the torque converter clutch and oil pump shaft horizontally.

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.

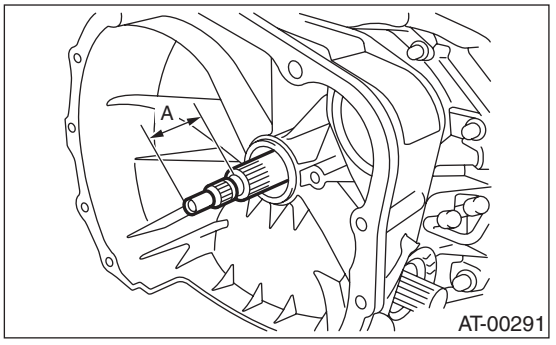


4) Remove the oil pump shaft from torque converter clutch as necessary.

B: INSTALLATION

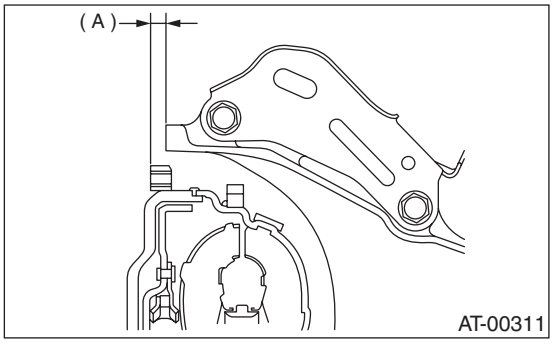
1) Install the oil pump shaft to torque converter clutch if it is removed.
2) Install the oil pump shaft to the torque converter clutch, and then check the clip fits securely in its groove.
3) Insert the input shaft while turning lightly by hand.

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-42, INSTALLATION.>

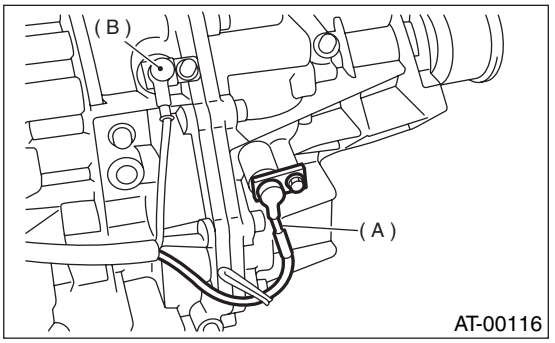
C: INSPECTION

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.

28.Extension Case

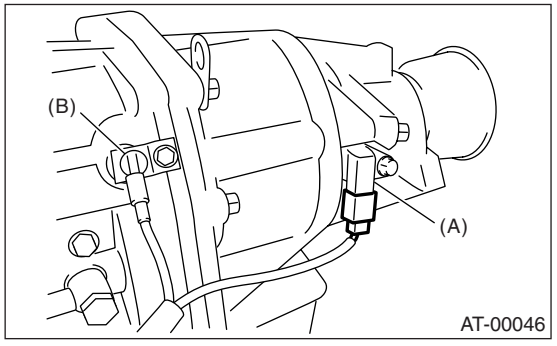
A: REMOVAL

1) Remove the transmission assembly. <Ref. to 4AT-39, REMOVAL.>
2) Remove rear vehicle speed sensor.
• MPT MODEL



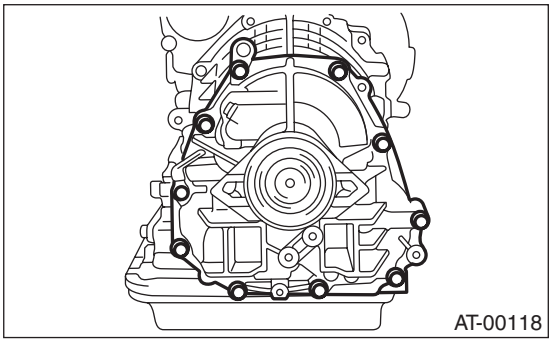
(A) Rear vehicle speed sensor
(B) Front vehicle speed sensor

3) Remove rear vehicle speed sensor connector.
• VTD MODEL



(A) Rear vehicle speed sensor
(B) Front vehicle speed sensor

4) Separate transmission case and extension case sections.

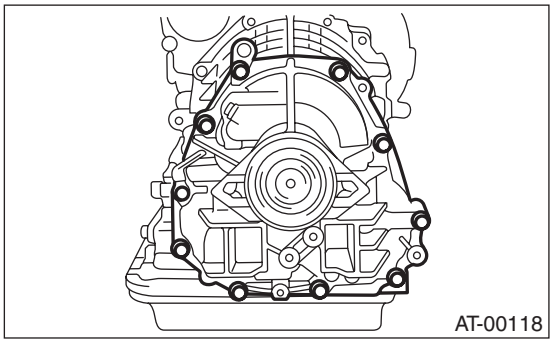


B: INSTALLATION

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.

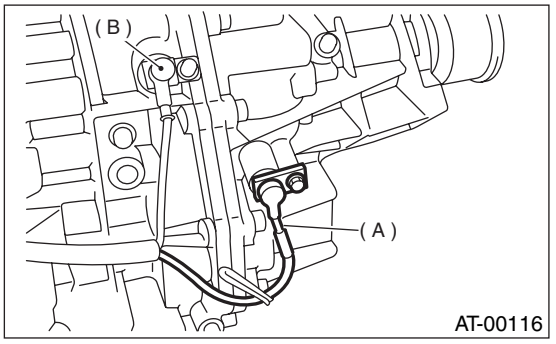
Tightening torque:
25 N·m (2.5 kgf-m, 18.1 ft-lb)



5) Install the rear vehicle speed sensor.

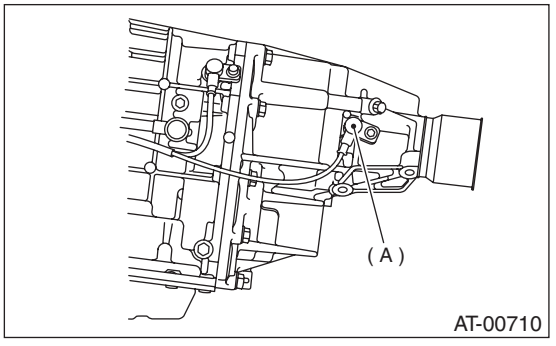
Tightening torque:
7 N·m (0.7 kgf-m, 5.1 ft-lb)

• MPT MODEL



(A) Rear vehicle speed sensor
(B) Front vehicle speed sensor

• VTD MODEL



(A) Rear vehicle speed sensor

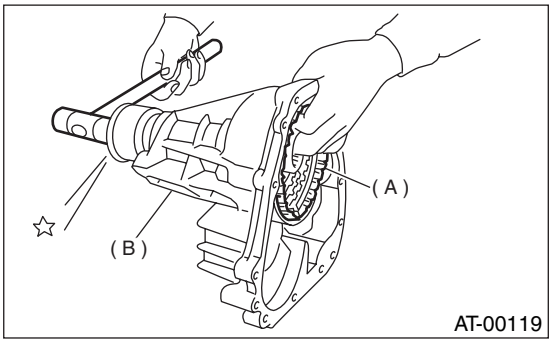
6) Install the transmission assembly. <Ref. to 4AT-42, INSTALLATION.>

C: DISASSEMBLY

1. MPT MODEL

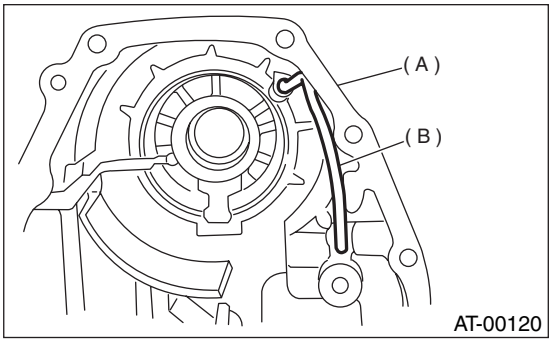
1) Take out the transfer clutch by lightly tapping the end of the rear drive shaft.

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



(A) Transfer clutch
(B) Extension case

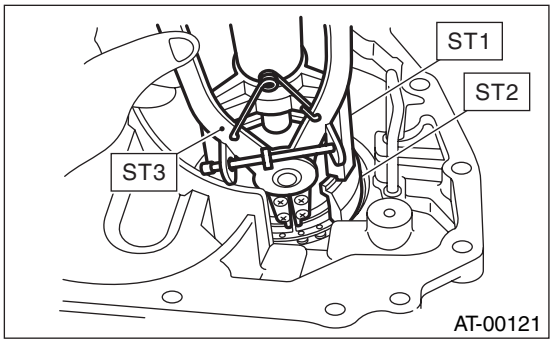
2) Remove the transmission clutch pipe without bending pipe.



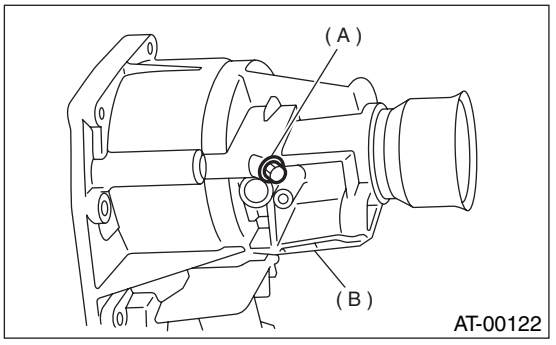
(A) Transfer clutch pipe
(B) Extension case

2. VTD MODEL

1) Remove snap ring using ST1, ST2, ST3 and a press.
ST1 398673600 COMPRESSOR
ST2 498627100 SHEAT
ST3 398663600 PLIERS

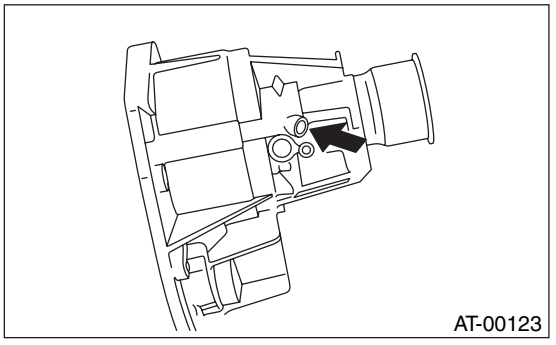


2) Remove test plug.

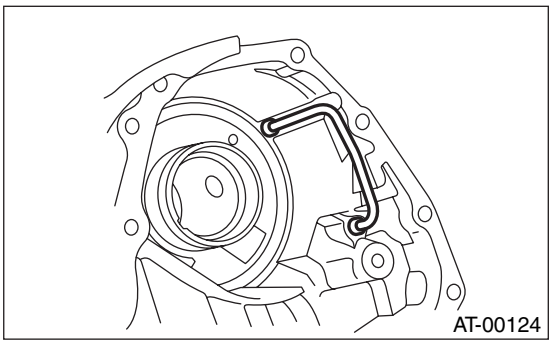


(A) Extension case
(B) Test plug

3) Remove clutch piston using compressed air.



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

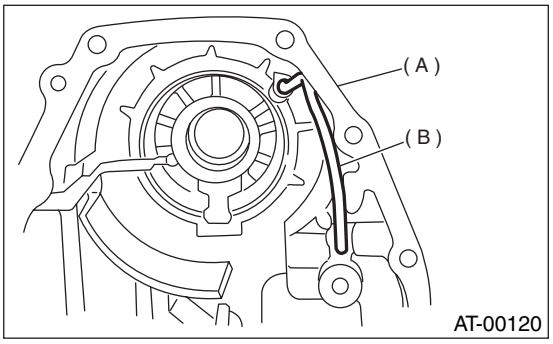


5) Remove the dust cover from the extension case.
6) Remove the oil seal from the extension case.

D: ASSEMBLY

1. MPT MODEL

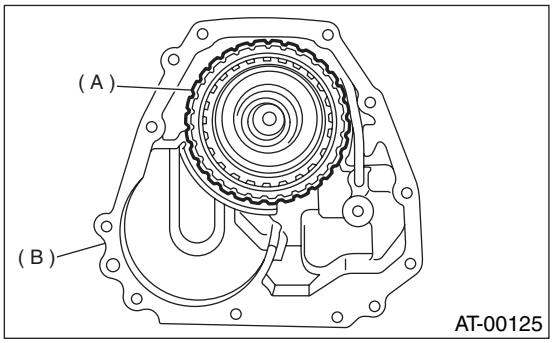
1) Using the ST and a press, press in a new oil seal.
ST 498057300 INSTALLER
2) Press in the dust cover.
3) Install the transfer clutch pipe to extension case without bending pipe.



(A) Extension case
(B) Transfer clutch pipe

4) Install the transfer clutch assembly to the case.

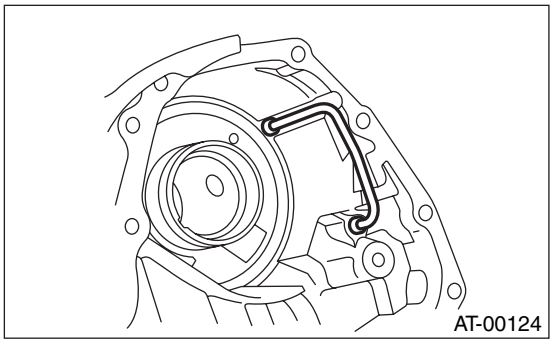
NOTE:
- Be careful not to damage the seal rings.
- Insert the clutch assembly fully into position until the bearing shoulder bottoms.



(A) Transfer clutch
(B) Extension case

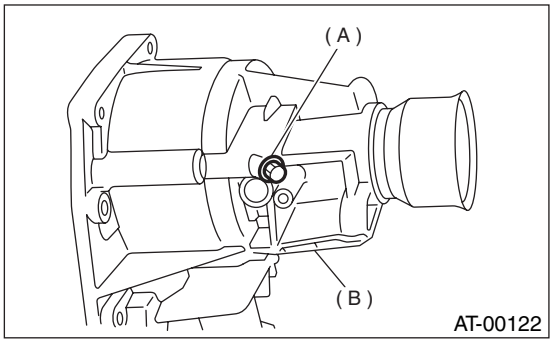
2. VTD MODEL

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.



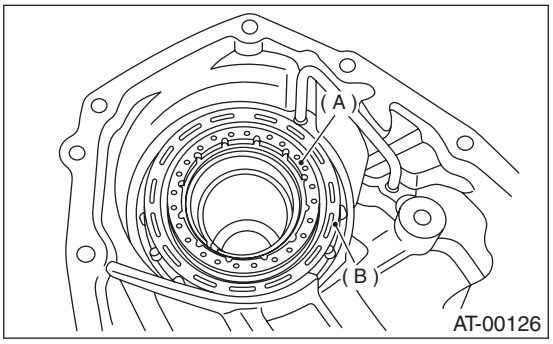
4) Install the test plug.

Tightening torque:
13 N·m (1.3 kgf-m, 9.4 ft-lb)



(A) Test plug
(B) Extension case

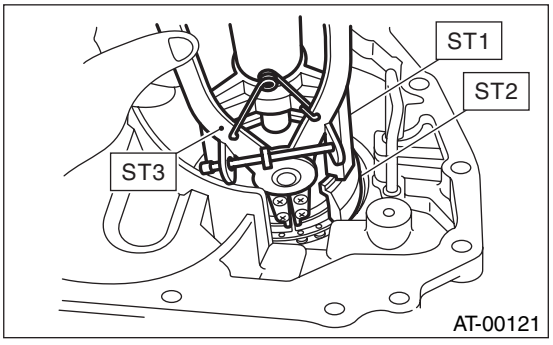
5) Insert the multi-plate clutch, drive plates, driven plates, and spring retainer.



(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-92, MPT MODEL.>
VTD model
<Ref. to 4AT-93, VTD MODEL.>

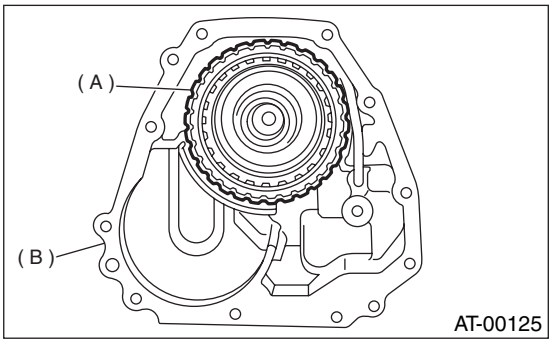
29.Transfer Clutch

A: REMOVAL

1) Remove the transmission assembly from vehicle. <Ref. to 4AT-39, REMOVAL.>
2) Remove the extension case and remove the transfer clutch. <Ref. to 4AT-85, REMOVAL.> and <Ref. to 4AT-85, REMOVAL.>

B: INSTALLATION

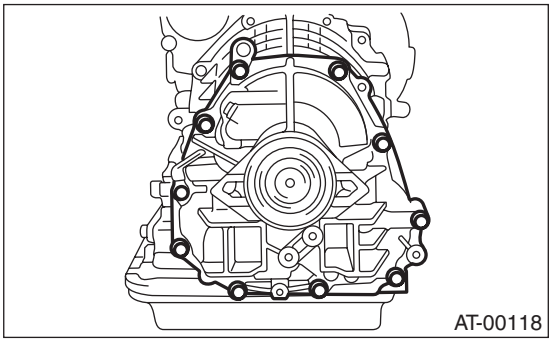
1) Select the thrust needle bearing. <Ref. to 4AT-92, ADJUSTMENT.>
2) Install the transfer clutch assembly to the case.



(A) Transfer clutch
(B) Extension case

3) Tighten bolts to secure the case.

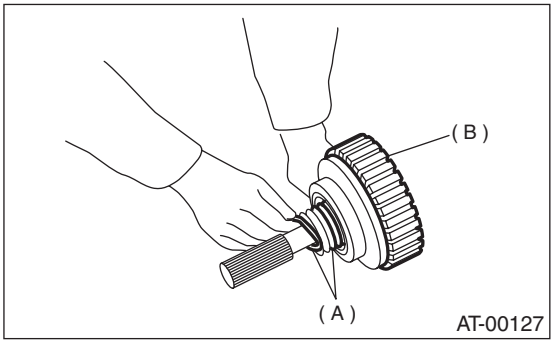
Tightening torque:
25 N·m (2.5 kgf-m, 18.1 ft-lb)



4) Install the transmission assembly to vehicle. <Ref. to 4AT-42, INSTALLATION.>

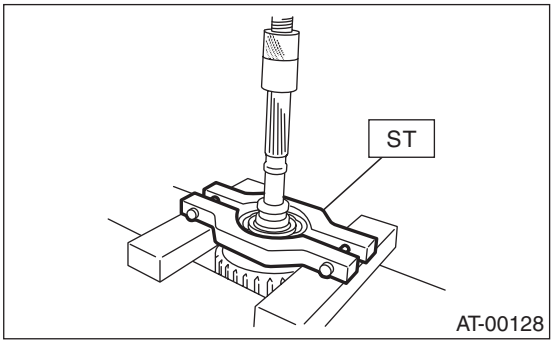
C: DISASSEMBLY

1) Remove the seal ring.

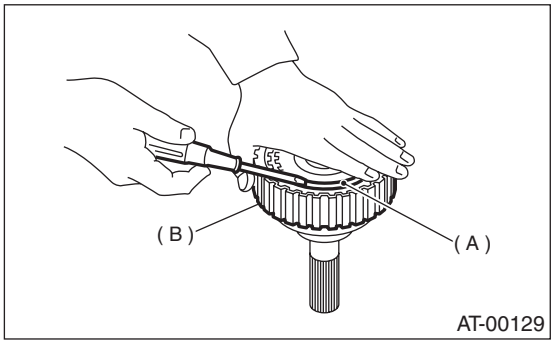


(A) Seal ring
(B) Transfer clutch

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

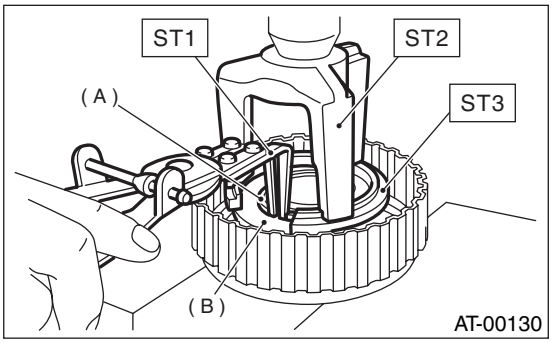


3) Remove the snap ring, and take out the pressure plate, drive plates, and driven plates.



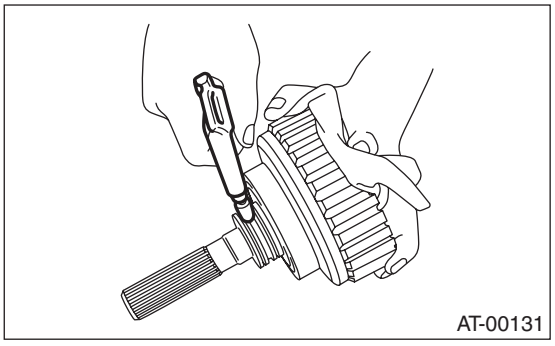
(A) Snap ring
(B) Transfer clutch

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



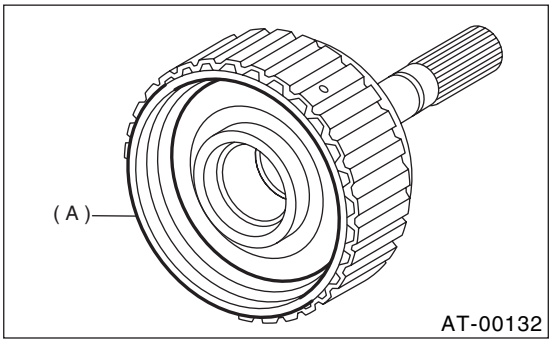
(A) Snap ring
(B) Transfer piston seal

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



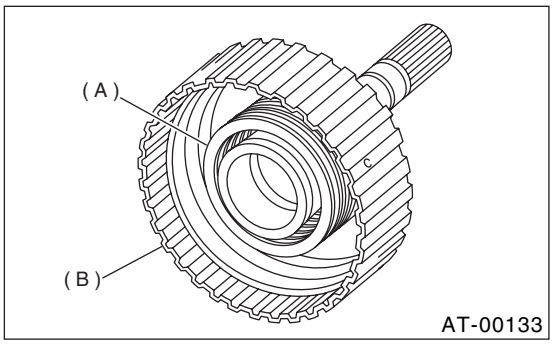
D: ASSEMBLY

1) Install the transfer clutch piston.



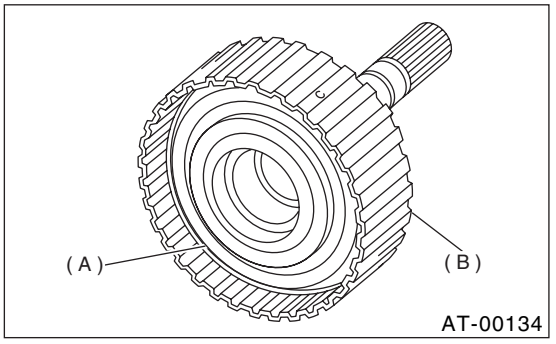
(A) Transfer clutch piston
(B) Rear drive shaft

2) Install return spring to transfer piston.



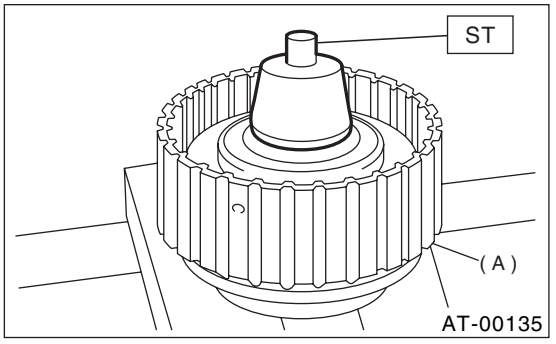
(A) Return spring
(B) Rear drive shaft

3) Install transfer clutch piston seal.



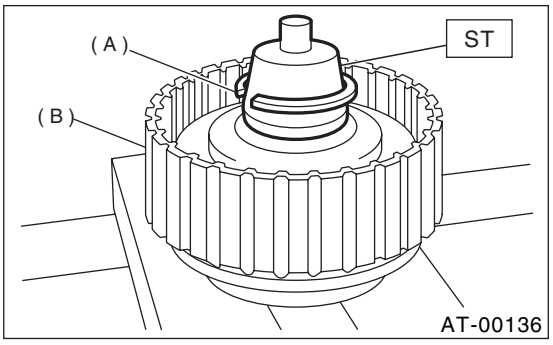
(A) Transfer clutch piston seal
(B) Rear drive shaft

4) Install ST to rear drive shaft.
ST 499257300 SNAP RING OUTER GUIDE



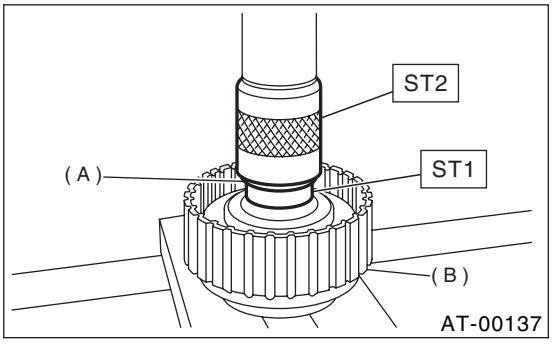
(A) Transfer clutch

5) Install snap ring to ST.
ST 499257300 SNAP RING OUTER GUIDE



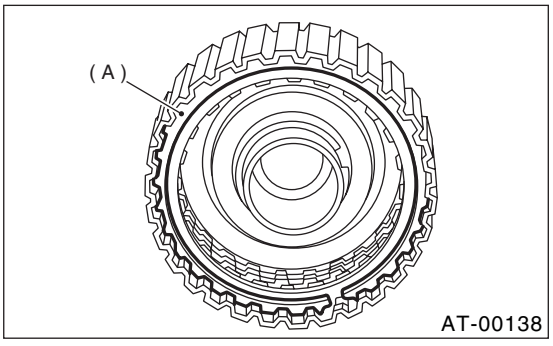
(A) Snap ring
(B) Transfer clutch

6) Using ST1 and ST2, install snap ring to rear drive shaft.
ST1 499257300 SNAP RING OUTER GUIDE
ST2 499247400 INSTALLER



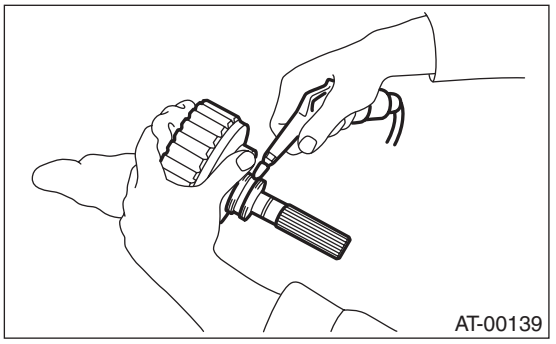
(A) Snap ring
(B) Transfer clutch

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

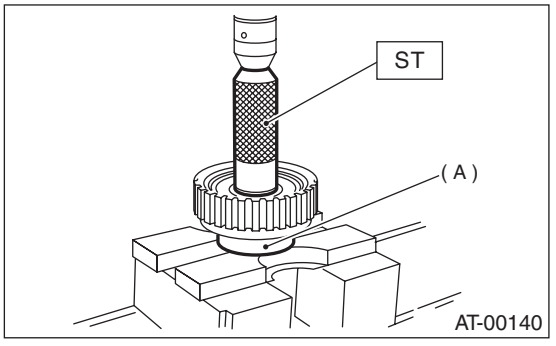


(A) Snap ring

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



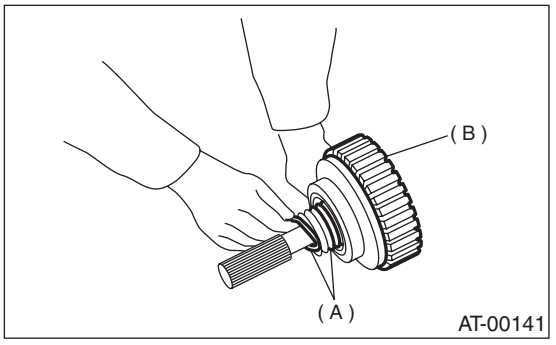
9) Check clearance between snap ring and pressure plate. <Ref. to 4AT-92, INSPECTION.>
10) Press-fit a new ball bearing with ST.
ST 899580100 INSTALLER



(A) Ball bearing

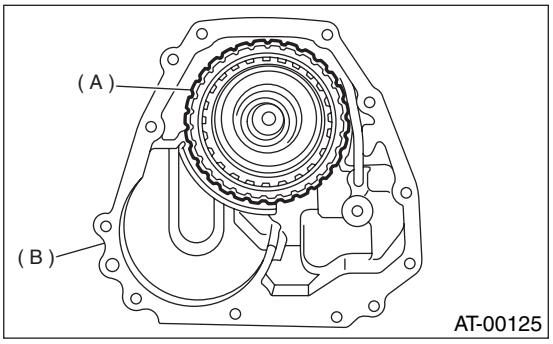
11) Coat a new seal ring with vaseline, and install it in the seal ring groove of the shaft.

NOTE:
Do not expand the seal ring excessively when installing.



(A) Snap ring
(B) Transfer clutch

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



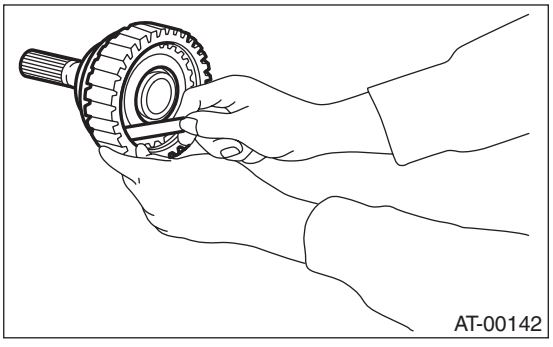
(A) Transfer clutch
(B) Extension case

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-92, ADJUSTMENT.>
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.
If the clearance is above the limit, replace the drive plate with new one and adjust so that the clearance is within specification.

Standard value:
0.7 — 1.1 mm (0.028 — 0.043 in)

Allowable limit:
1.6 mm (0.063 in)



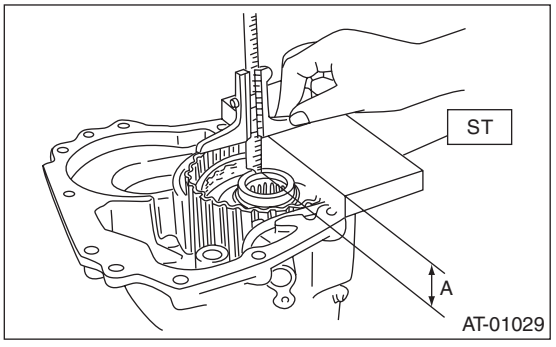
Pressure plates	
Part No.	Thickness mm (in)
31593AA151	3.3 (0.130)
31593AA161	3.7 (0.146)
31593AA171	4.1 (0.161)
31593AA181	4.5 (0.177)

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

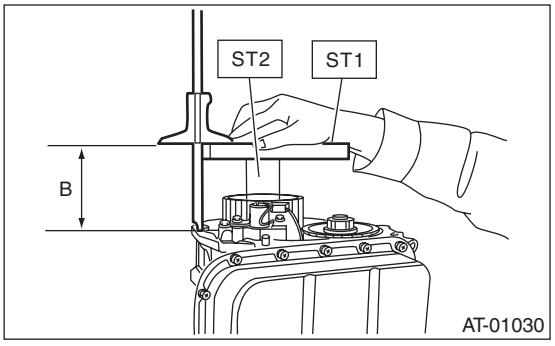
1. MPT MODEL

1) Measure distance “A” from end of extension case and rear drive shaft with ST.
ST 398643600 GAUGE



A: Measured value

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

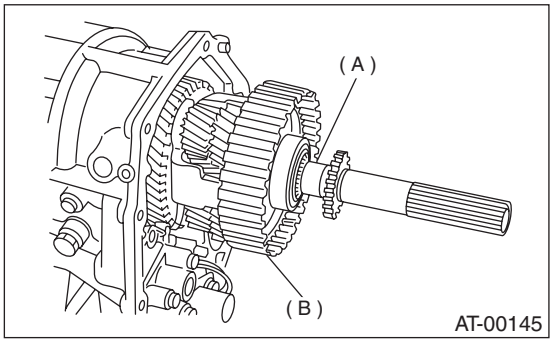
3) Calculation formula:

NOTE:
• Calculate “T”:
T = A – B + 35.4 mm
[T = A – B + 1.3937 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 GUAGE, 499577000 GUAGE). When not using ST, apply
T = (A – α + 0.45 mm) – (B – β) – H
[T = (A – α + 0.0177 in) – (B – β) – 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)

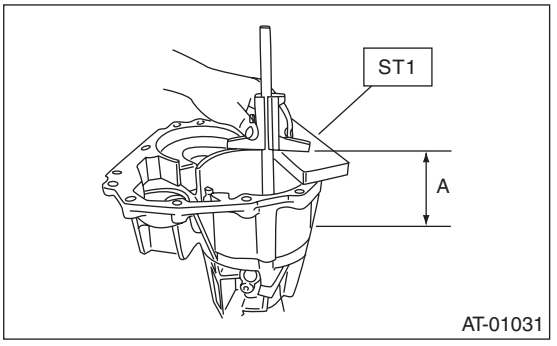
2. VTD MODEL

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



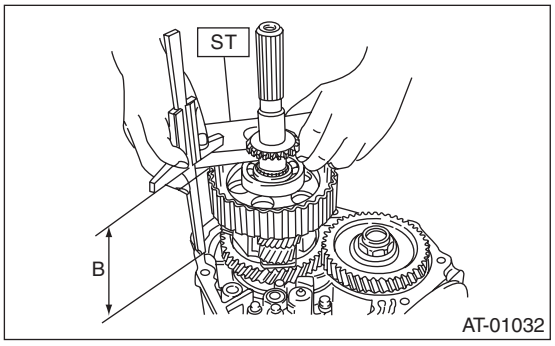
(A) Rear drive plate
(B) Center differential carrier

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

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 mm
[T = A – B + 0.0157 in]
When clearances are 0.25 mm (0.0098 in)
T = A – B + 0.20 mm
[T = A – B + 0.0079 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 GUAGE). When not using ST, apply
T = (A – α + 0.45 mm) – (B – β) – H
[T = (A – α + 0.0177 in) – (B – β) – 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)

30.Multi-plate Clutch

A: REMOVAL

Remove multi-plate clutch following the same instructions as for the extension case. <Ref. to 4AT-85, REMOVAL.>

B: INSTALLATION

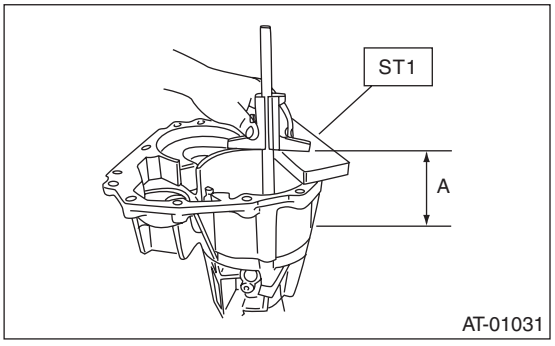
Install multi-plate clutch following the same instructions as for the extension case. <Ref. to 4AT-85, INSTALLATION.>

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 D-ring for damage.
- Measure multi-plate clutch clearance and adjust it to within the specification range. <Ref. to 4AT-95, ADJUSTMENT.>

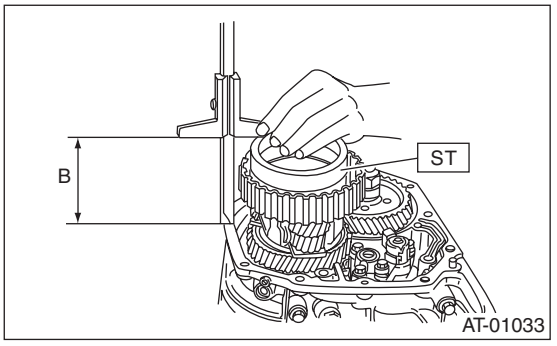
D: ADJUSTMENT

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
$T = A - B + 0.45$ mm
[$T = A - B + 0.0177$ in]

NOTE:
- Calculation formula for “T” is applied when measuring using ST (398643600 GUAGE, 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 mm (0.008 — 0.024 in)

Limit value:
0.9 mm (0.035 in)

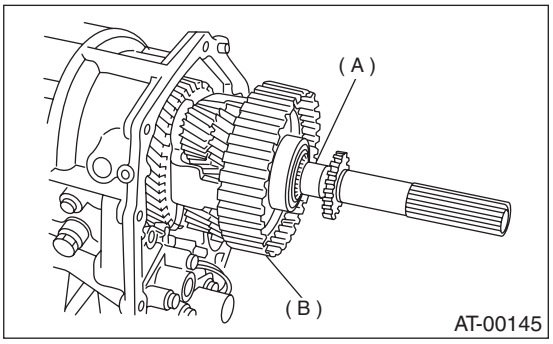
If outside the standard value, select a pressure plate that will bring clearance within the standard value.
If the clearance is above the limit, replace the drive plate with new one and adjust so that the clearance becomes within the standard value.

Pressure 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)

31.Rear Drive Shaft

A: REMOVAL

1) Remove transmission assembly. <Ref. to 4AT-39, REMOVAL.>
2) Remove rear wheel speed sensor and separate extension case from transmission case. <Ref. to 4AT-85, REMOVAL.>
3) Pull out the rear driveshaft from the center differential assembly.



(A) Rear driveshaft
(B) Center differential carrier

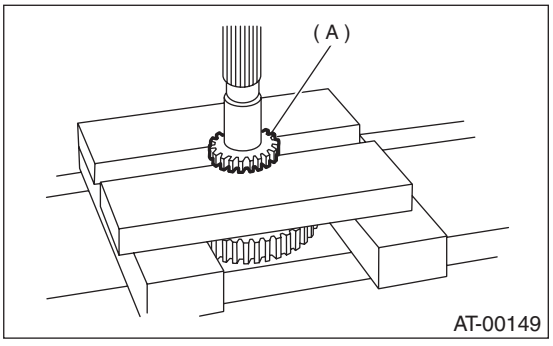
4) Remove drive plate and driven plate.

B: INSTALLATION

1) Select the appropriate shim. <Ref. to 4AT-93, VTD MODEL.>
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-85, INSTALLATION.>
5) Install transmission assembly. <Ref. to 4AT-42, INSTALLATION.>

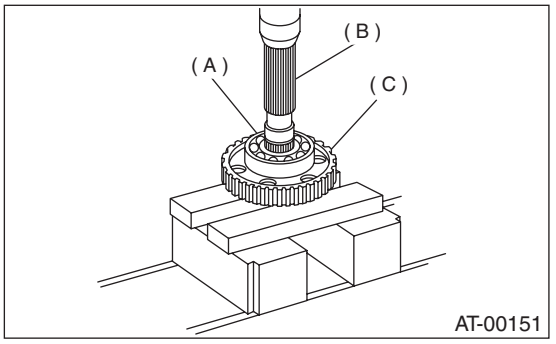
C: DISASSEMBLY

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.

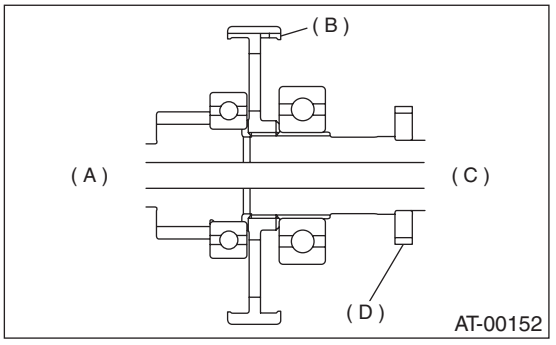


(A) Rear ball bearing
(B) Rear driveshaft
(C) Clutch hub

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

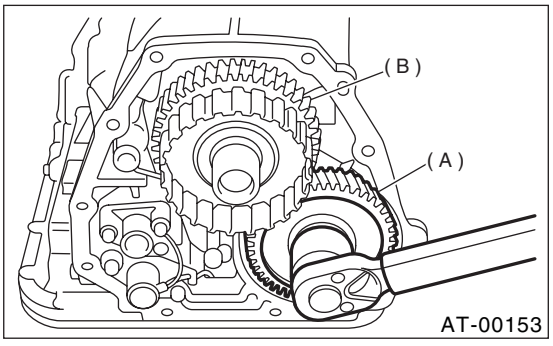
• Inspect parts to make sure there are no holes, cuts, and that they are not dusty.
• Inspect extension end play and adjust it to within the standard value. <Ref. to 4AT-93, VTD MODEL.>

32.Reduction Driven Gear

A: REMOVAL

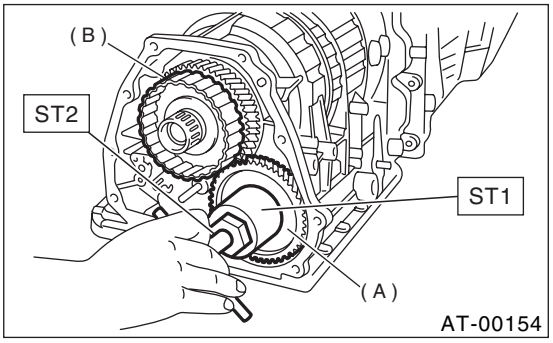
1. MPT MODEL

1) Remove the transmission assembly from the vehicle. <Ref. to 4AT-39, REMOVAL.>
2) Remove rear vehicle speed sensor, and separate the transmission case and extension case. <Ref. to 4AT-85, REMOVAL.>
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

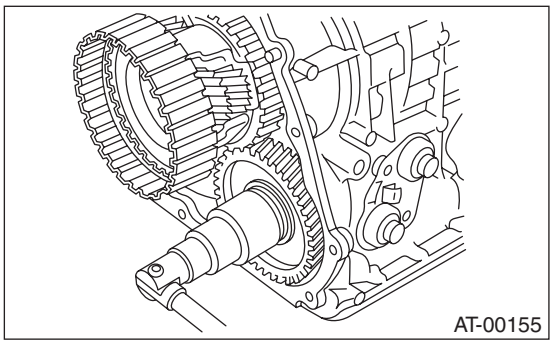
5) Using the ST1 and ST2, extract the reduction driven gear.
ST1 499737000 PULLER
ST2 899524100 PULLER SET



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

2. VTD MODEL

1) Remove the transmission assembly from the vehicle. <Ref. to 4AT-39, REMOVAL.>
2) Remove rear vehicle speed sensor, and separate the transmission case and extension case. <Ref. to 4AT-85, REMOVAL.>
3) Remove the rear drive shaft. <Ref. to 4AT-96, REMOVAL.>
4) Set the range select lever to “P”.
5) Straighten the staked portion, and remove the lock nut.



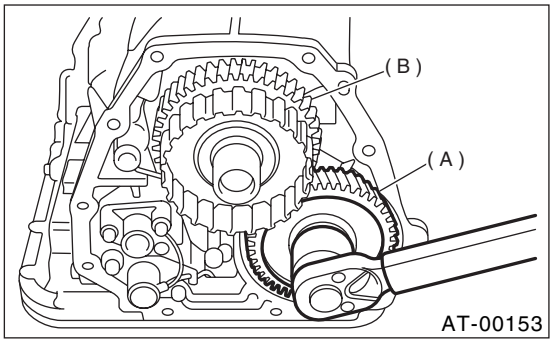
6) Using the ST1 and ST2, extract the reduction driven gear.
ST1 499737000 PULLER
ST2 899524100 PULLER SET
7) Pull out the center differential assembly. <Ref. to 4AT-101, REMOVAL.>

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)



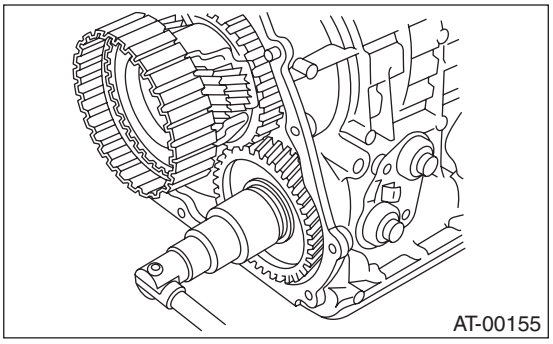
(A) Reduction driven gear
(B) Reduction drive gear

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-85, INSTALLATION.>
5) Install the transmission assembly to vehicle. <Ref. to 4AT-42, INSTALLATION.>

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.

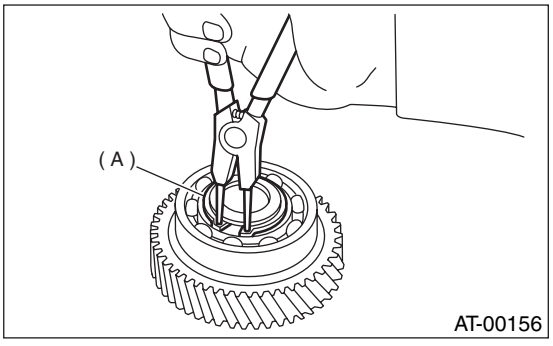
Tightening torque:
100 N·m (10.2 kgf-m, 73.8 ft-lb)



5) After tightening, stake the lock nut securely.
6) Insert the rear drive shaft assembly. <Ref. to 4AT-96, INSTALLATION.>
7) Combine the transmission case with the extension case, and install rear vehicle speed sensor. <Ref. to 4AT-85, INSTALLATION.>
8) Install the transmission assembly to vehicle. <Ref. to 4AT-42, INSTALLATION.>

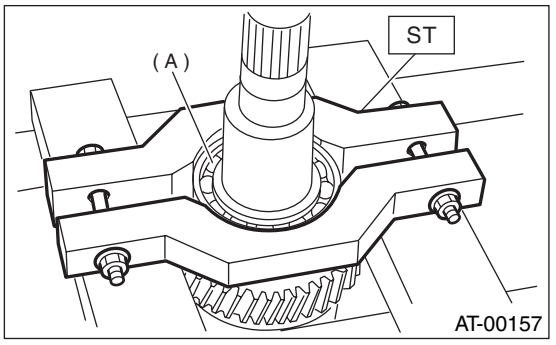
C: DISASSEMBLY

1) Remove snap ring from reduction driven gear.



(A) Snap ring

2) Using ST, remove ball bearing from reduction driven gear.
ST 498077600 REMOVER

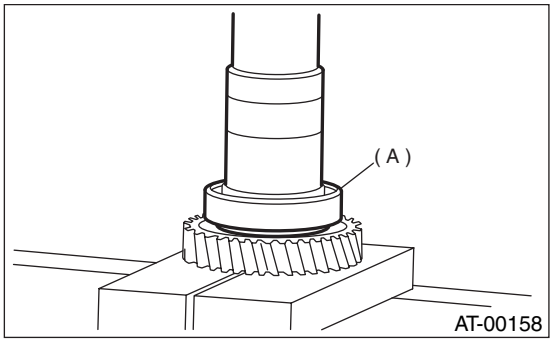


(A) Ball bearing

3) Remove snap ring reduction driven gear.

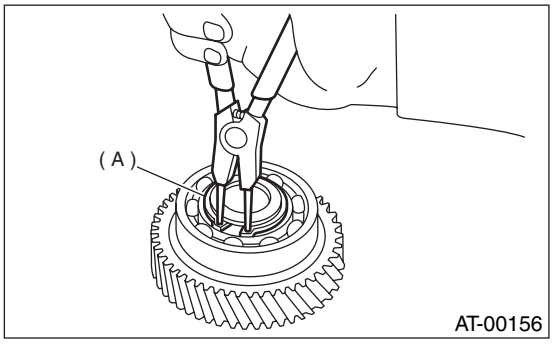
D: ASSEMBLY

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

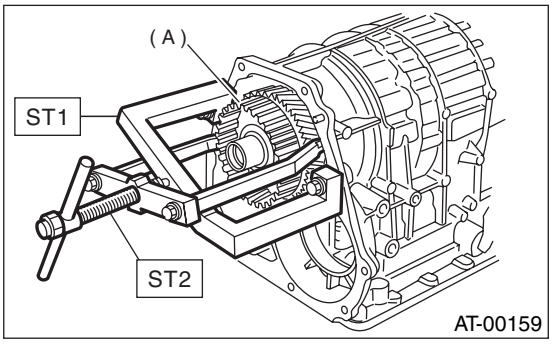
E: INSPECTION

Check ball bearing and gear for dents or damage.

33.Reduction Drive Gear

A: REMOVAL

1) Remove the transmission assembly from the vehicle. <Ref. to 4AT-39, REMOVAL.>
2) Remove rear vehicle speed sensor, and separate the transmission case and extension case. <Ref. to 4AT-85, REMOVAL.>
3) Remove the reduction driven gear. <Ref. to 4AT-97, REMOVAL.>
4) Using ST, extract the reduction drive gear.
ST1 499737000 PULLER
ST2 899524100 PULLER SET

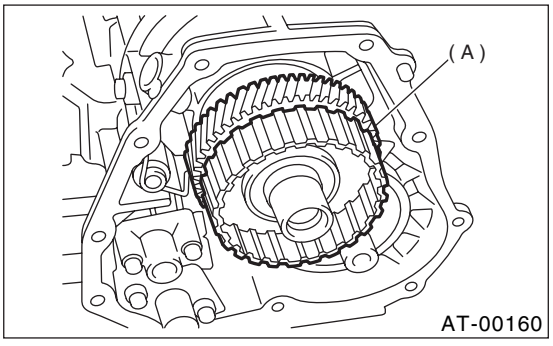


(A) Reduction drive gear

B: INSTALLATION

1) Install the reduction drive gear assembly.

NOTE:
Insert it fully into position until the bearing shoulder bottoms.

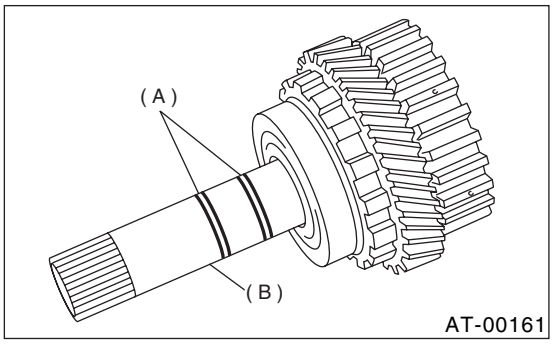


(A) Reduction drive gear

2) Install the reduction driven gear. <Ref. to 4AT-97, INSTALLATION.>
3) Combine the transmission case with the extension case, and install rear vehicle speed sensor. <Ref. to 4AT-85, INSTALLATION.>
4) Install the transmission assembly to the vehicle. <Ref. to 4AT-42, INSTALLATION.>

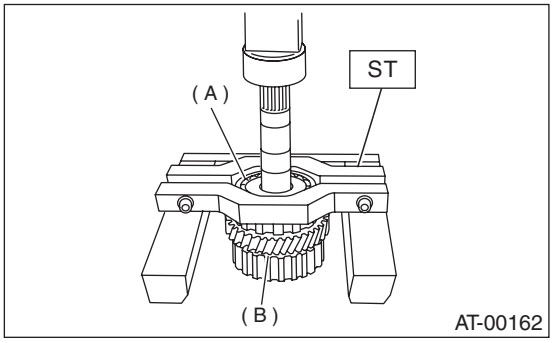
C: DISASSEMBLY

1) Take out the seal rings.



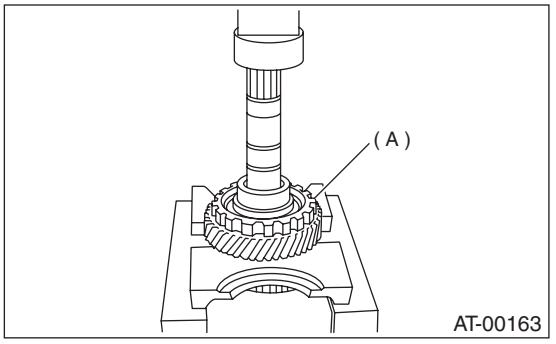
(A) Seal rings
(B) Reduction drive shaft

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



(A) Ball bearing
(B) Reduction drive gear

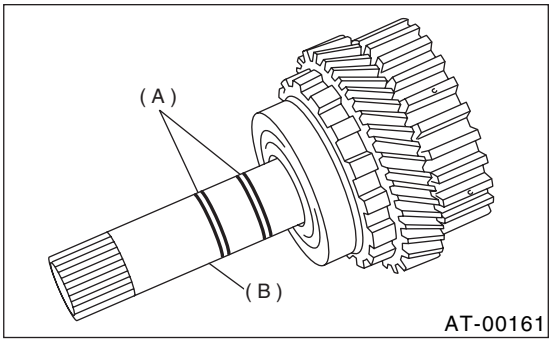
3) Using a press, remove the reduction drive gear.



(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

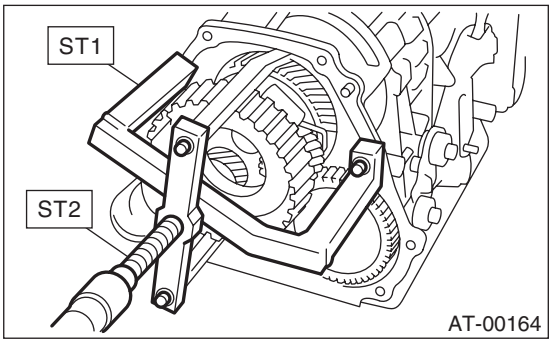
E: INSPECTION

- 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-92, ADJUSTMENT.>

34.Center Differential Carrier

A: REMOVAL

1) Remove the transmission assembly from vehicle. <Ref. to 4AT-39, REMOVAL.>
2) Remove the rear wheel speed sensor, and separate the extension case from the transmission case. <Ref. to 4AT-85, REMOVAL.>
3) Pull out the rear driveshaft. <Ref. to 4AT-96, REMOVAL.>
4) Using the special tools, pull out the center differential carrier assembly.
ST1 499737000 PULLER
ST2 899524100 PULLER SET

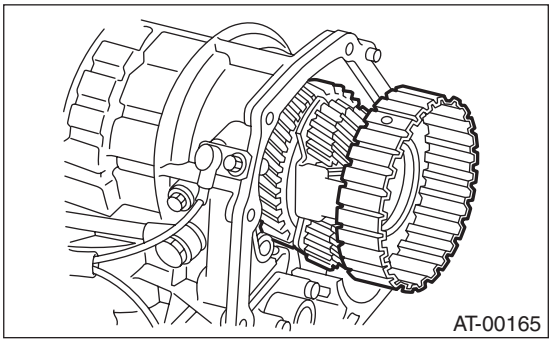


5) Pull out the shim(s) from transmission case.

B: INSTALLATION

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

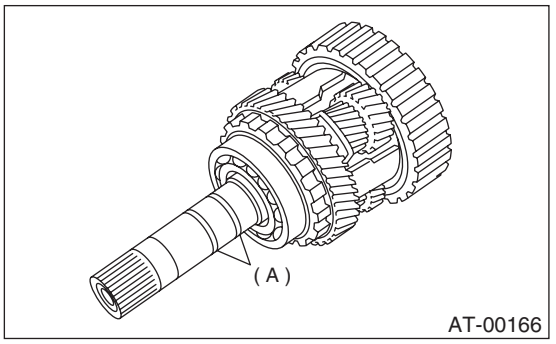
NOTE:
Insert the center differential assembly and shim(s) completely into the bearing shoulder bottom.



2) Insert the rear driveshaft. <Ref. to 4AT-96, INSTALLATION.>
3) Connect the transmission case and extension case, and install the rear wheel speed sensor. <Ref. to 4AT-85, INSTALLATION.>
4) Install the transmission assembly onto vehicle. <Ref. to 4AT-42, INSTALLATION.>

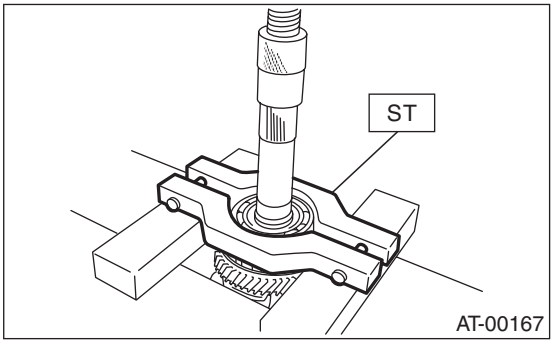
C: DISASSEMBLY

1) Remove the seal rings.

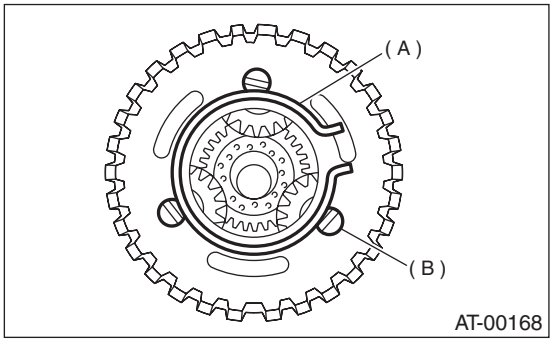


(A) Seal ring

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

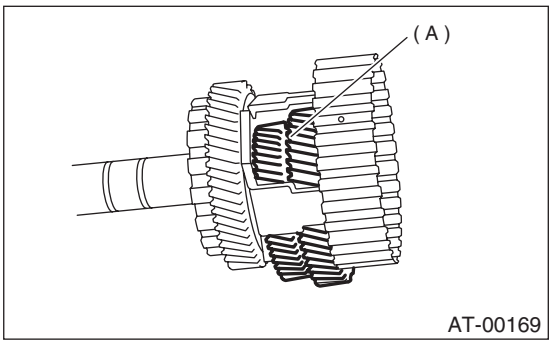


3) Remove the snap ring, and pull out the shaft from the center differential assembly.



(A) Snap ring
(B) Shaft

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

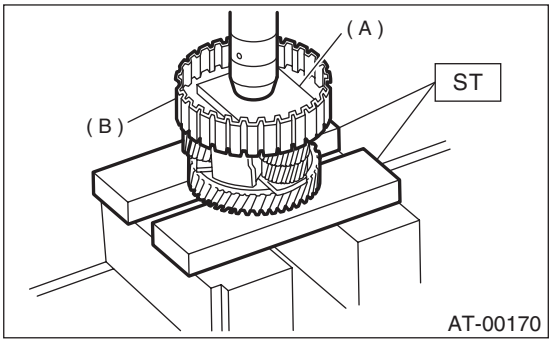


(A) Pinion gear

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.

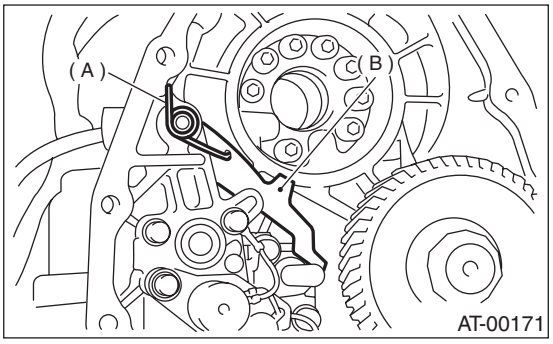
E: INSPECTION

- Check all parts for hole, score, or dirt.
- Check the play of the extension end, and if necessary, adjust it. <Ref. to 4AT-93, VTD MODEL.>

35.Parking Pawl

A: REMOVAL

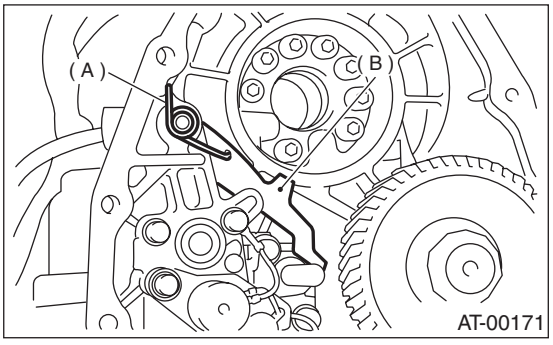
1) Remove the transmission assembly from the vehicle. <Ref. to 4AT-39, REMOVAL.>
2) Remove rear vehicle speed sensor and separate transmission case and extension case sections. <Ref. to 4AT-85, REMOVAL.>
3) Remove the reduction drive gear. (MPT model) <Ref. to 4AT-99, REMOVAL.>
4) Remove the center differential carrier. (VTD model) <Ref. to 4AT-101, REMOVAL.>
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-99, INSTALLATION.>
3) Install the center differential carrier. (VTD model) <Ref. to 4AT-101, INSTALLATION.>
4) Install the rear vehicle speed sensor and extension case. <Ref. to 4AT-85, INSTALLATION.>
5) Install the transmission assembly to the vehicle. <Ref. to 4AT-42, INSTALLATION.>

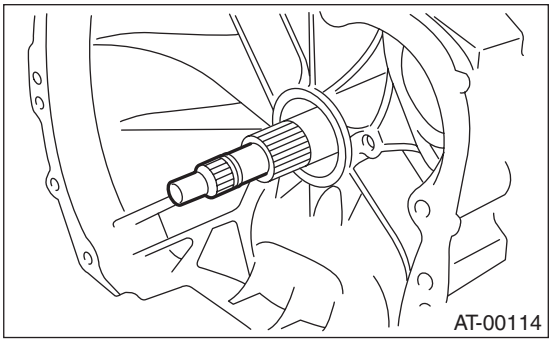
C: INSPECTION

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

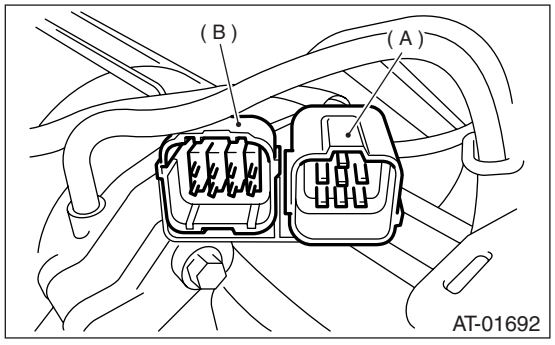
36.Torque Converter Clutch Case

A: REMOVAL

1) Remove the transmission assembly from the vehicle. <Ref. to 4AT-39, REMOVAL.>
2) Extract the torque converter clutch assembly. <Ref. to 4AT-84, REMOVAL.>
3) Remove the input shaft.



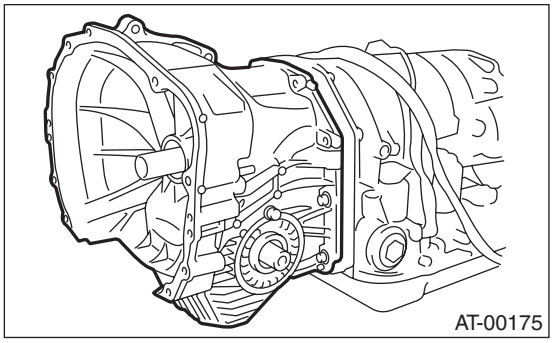
4) Lift-up lever behind the connector and disconnect it from stay.
5) Disconnect inhibitor switch connector from stay.



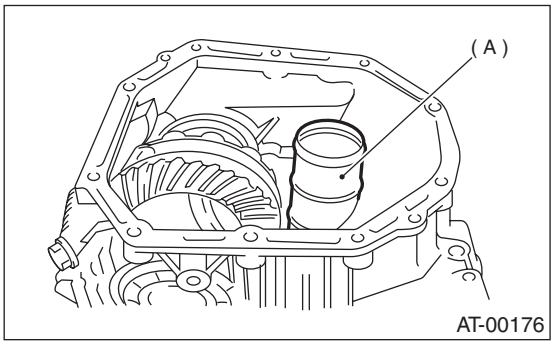
(A) Transmission harness
(B) Inhibitor switch harness

6) Remove the oil charger pipe. <Ref. to 4AT-83, REMOVAL.>
7) Remove the oil cooler inlet and outlet pipes. <Ref. to 4AT-80, REMOVAL.>
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.)

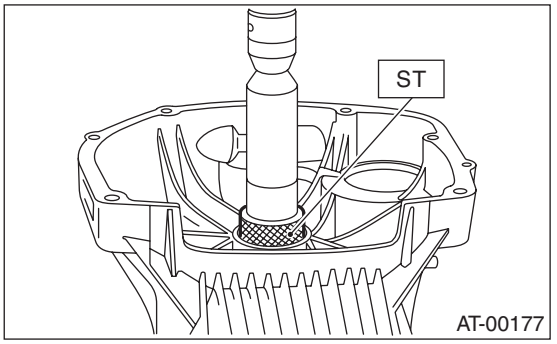


(A) Seal pipe

10) Remove the differential assembly. <Ref. to 4AT-116, REMOVAL.>
11) Remove the oil seal from torque converter clutch case.

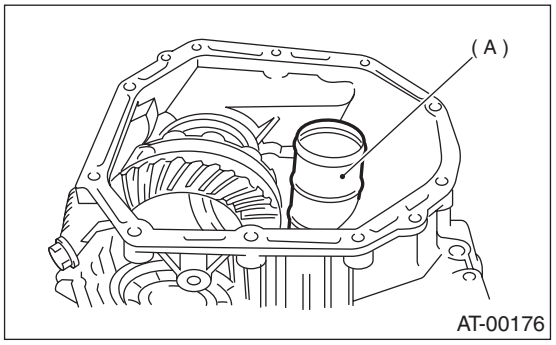
B: INSTALLATION

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



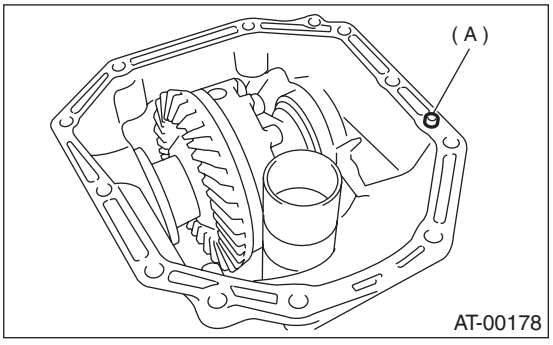
3) Install the differential assembly to the case. <Ref. to 4AT-116, INSTALLATION.>
4) Install the left and right side retainers. <Ref. to 4AT-120, ADJUSTMENT.>

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



(A) Seal pipe

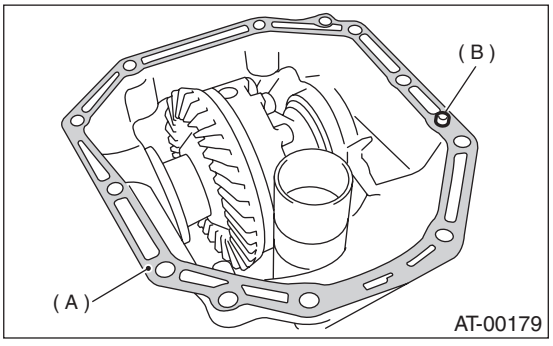
6) Install the rubber seal to the torque converter clutch case.



(A) Rubber seal

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

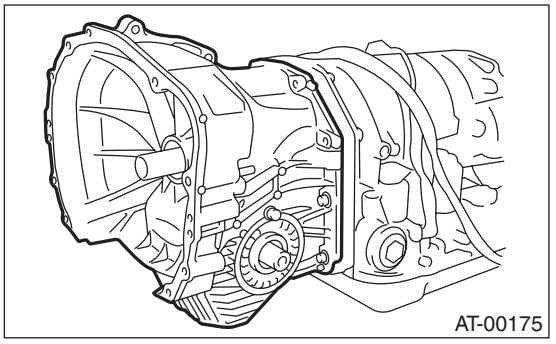
Liquid gasket:
THREE BOND 1215 (Part No. 004403007)



(A) THREE BOND 1215
(B) Rubber seal

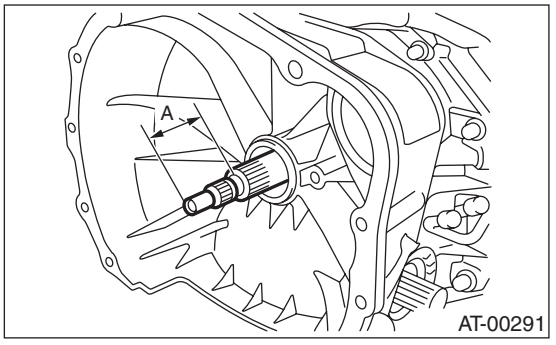
8) Install the torque converter clutch case assembly without damaging bush and oil seal and secure with six bolts and four nuts.

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-82, INSTALLATION.>
11) Install the oil cooler pipes. <Ref. to 4AT-81, INSTALLATION.>
12) Install the oil charger pipe with O-ring. <Ref. to 4AT-83, INSTALLATION.>
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-84, INSTALLATION.>
15) Install the transmission assembly to the vehicle. <Ref. to 4AT-42, INSTALLATION.>

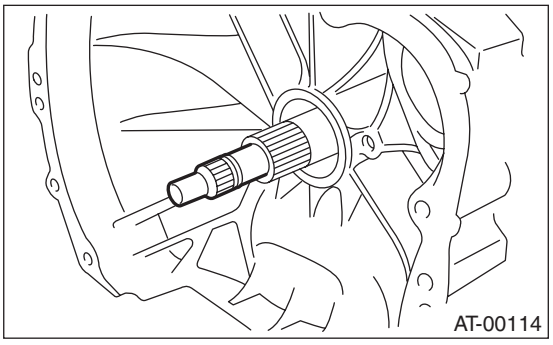
C: INSPECTION

Measure the backlash and adjust to within specifications. <Ref. to 4AT-113, ADJUSTMENT.>

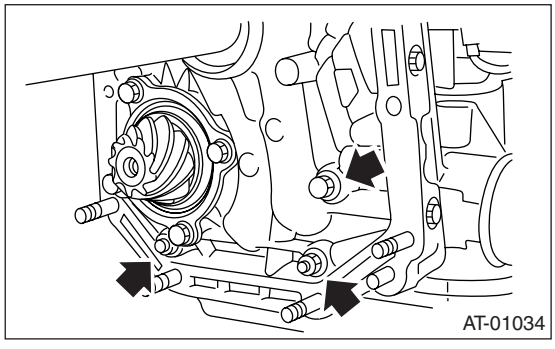
37.Oil Pump Housing

A: REMOVAL

1) Remove the transmission assembly from the vehicle. <Ref. to 4AT-39, REMOVAL.>
2) Extract the torque converter clutch assembly. <Ref. to 4AT-84, REMOVAL.>
3) Remove the input shaft.

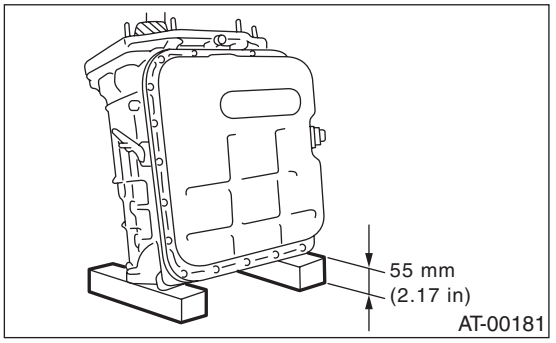


4) Lift-up the lever behind the transmission harness connector and disconnect it from stay.
5) Disconnect the inhibitor switch connector from stay.
6) Remove the oil charger pipe. <Ref. to 4AT-83, REMOVAL.>
7) Remove the oil cooler inlet and outlet pipes. <Ref. to 4AT-80, REMOVAL.>
8) Separate the torque converter clutch case and transmission case sections. <Ref. to 4AT-104, REMOVAL.>
9) Separate the transmission case and extension case sections. <Ref. to 4AT-85, REMOVAL.>
10) Remove the reduction drive gear. (MPT model) <Ref. to 4AT-99, REMOVAL.>
11) Remove the center differential carrier. (VTD model) <Ref. to 4AT-101, REMOVAL.>
12) Remove the reduction driven gear. <Ref. to 4AT-97, REMOVAL.>
13) Loosen the oil pump housing mounting bolts.

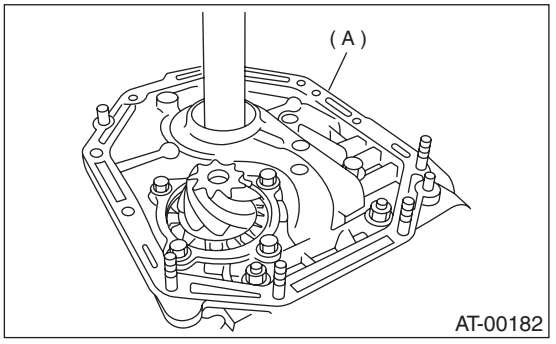


14) Place two wooden blocks on the workbench, and stand the transmission case with its rear end facing down.

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.

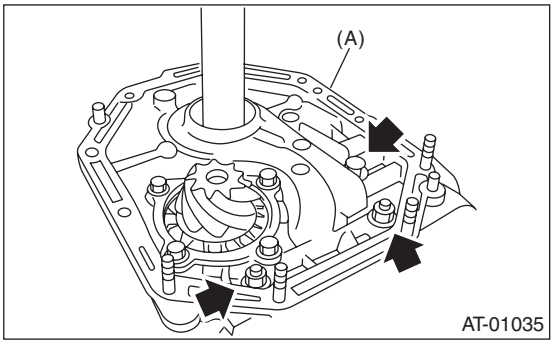


(A) Oil pump housing

B: INSTALLATION

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

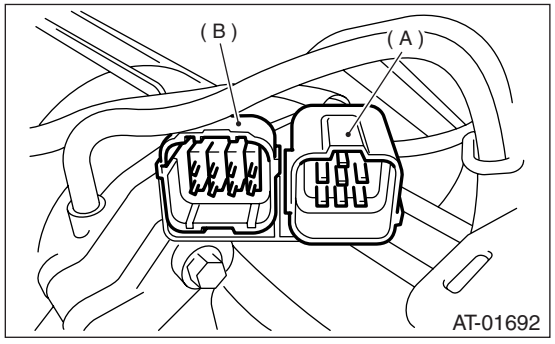
Tightening torque:
42 N·m (4.3 kgf-m, 31 ft-lb)



(A) Oil pump housing

2) Install the torque converter clutch case assembly to the transmission case assembly. <Ref. to 4AT-84, INSTALLATION.>
3) Install reduction driven gear. <Ref. to 4AT-97, INSTALLATION.>

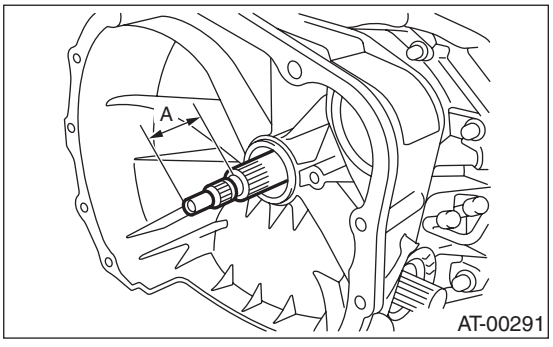
4) Install the reduction drive gear. (MPT model) <Ref. to 4AT-99, INSTALLATION.>
5) Install the center differential carrier. (VTD model) <Ref. to 4AT-101, INSTALLATION.>
6) Combine the extension case with the transmission case, and install vehicle speed sensor 1 (rear). <Ref. to 4AT-85, INSTALLATION.>
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-81, INSTALLATION.>
9) Install the oil charger pipe with O-ring. <Ref. to 4AT-83, INSTALLATION.>
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)

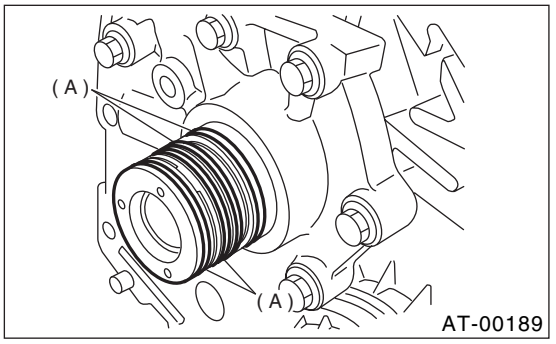


11) Install the torque converter clutch assembly. <Ref. to 4AT-84, INSTALLATION.>
12) Install the transmission assembly to the vehicle. <Ref. to 4AT-42, INSTALLATION.>

C: DISASSEMBLY

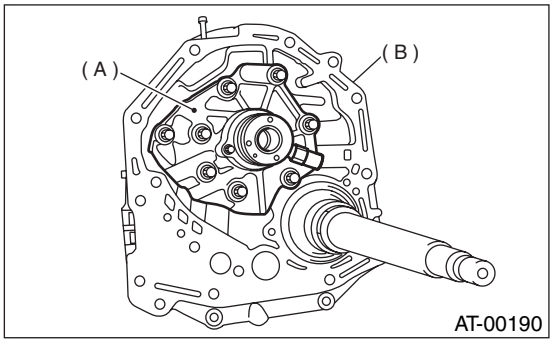
1. OIL PUMP COVER

1) Remove four seal rings.



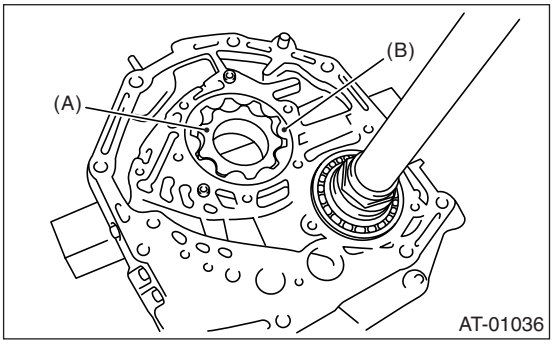
(A) Seal rings

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



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

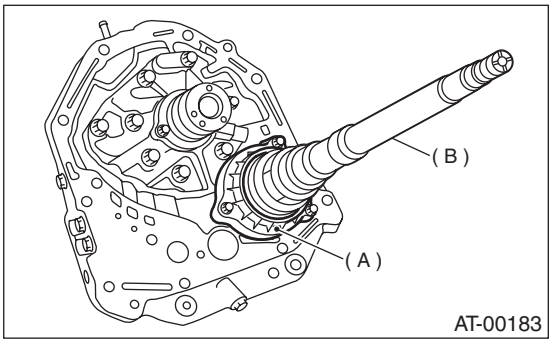
3) Remove the inner and outer rotor.



(A) Inner rotor
(B) Outer rotor

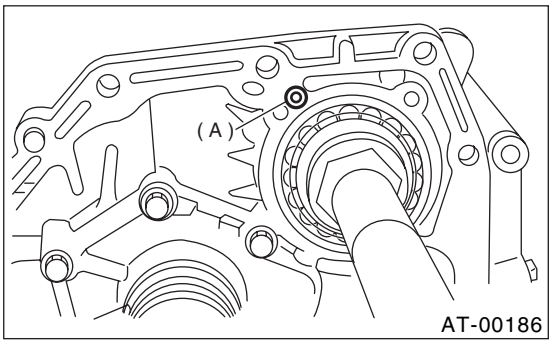
2. OIL SEAL RETAINER

1) Remove the oil seal retainer.



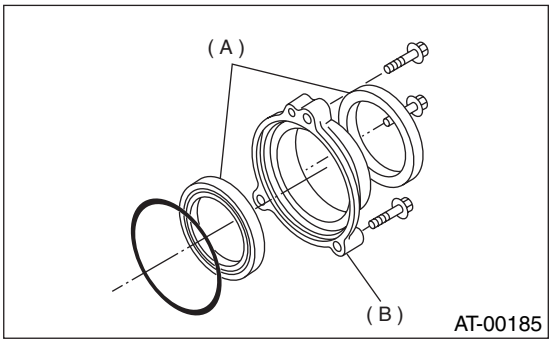
(A) Oil seal retainer
(B) Drive pinion shaft

2) Remove the O-ring.



(A) O-ring

3) Remove the oil seal from oil seal retainer.

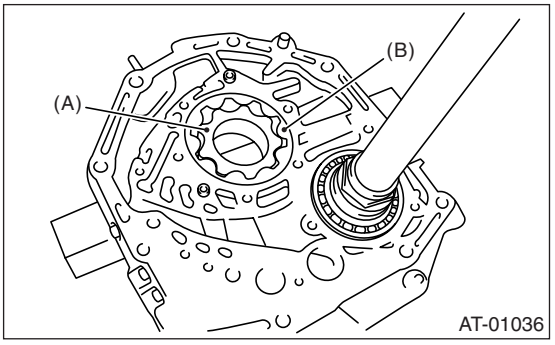


(A) Oil seal
(B) Oil seal retainer

D: ASSEMBLY

1. OIL PUMP COVER

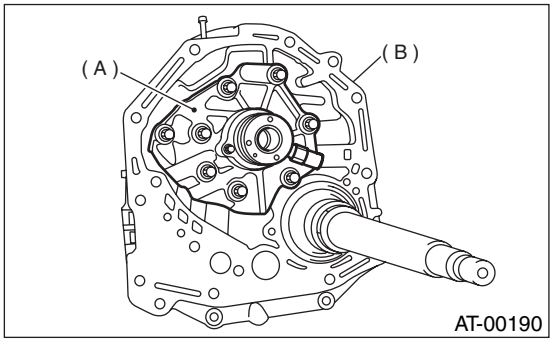
1) Install oil pump rotor assembly to oil pump housing.



(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.

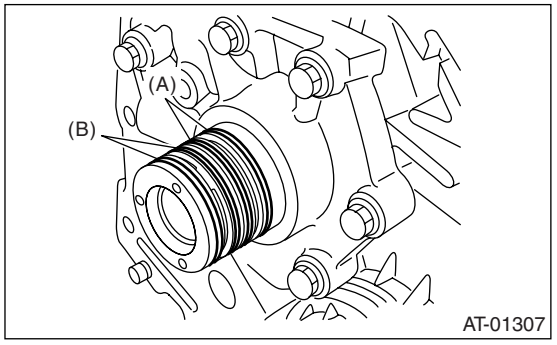
Tightening torque:
25 N·m (2.5 kgf-m, 18.1 ft-lb)



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

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

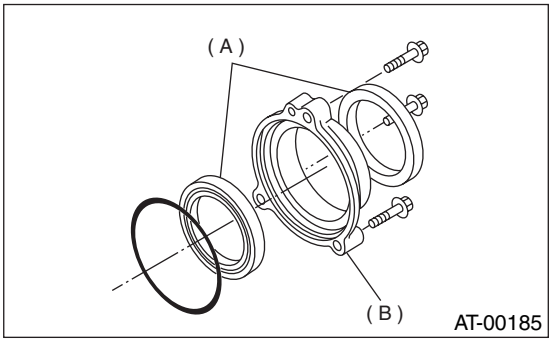
4) Install the oil seal retainer and new seal rings. After adjusting the drive pinion backlash and tooth contact.



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

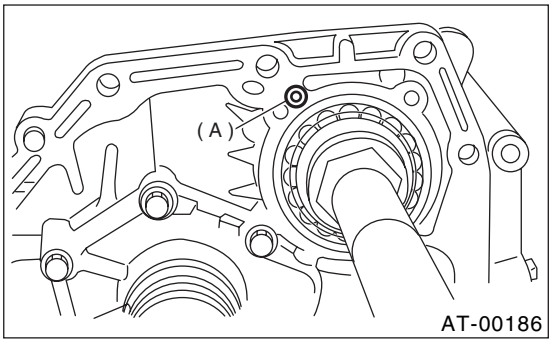
2. OIL SEAL RETAINER

1) Install two new oil seals to the oil seal retainer in proper position using ST.
ST 499247300 INSTALLER



(A) Oil seal
(B) Oil seal retainer

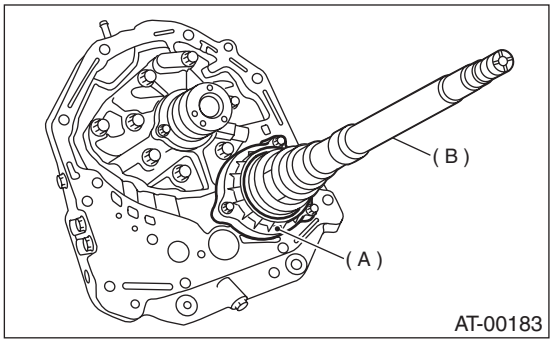
2) Install a new O-ring to the oil seal retainer using vaseline. Install the seal to oil pump housing bore.



(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)

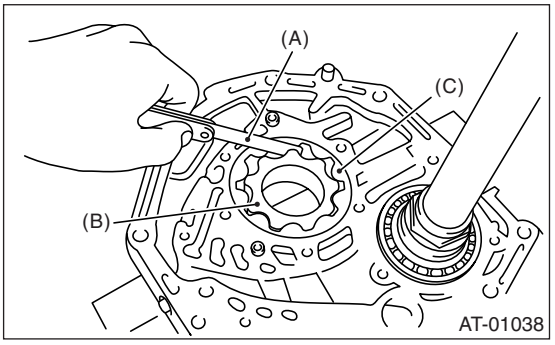


(A) Oil seal retainer
(B) Drive pinion shaft

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.

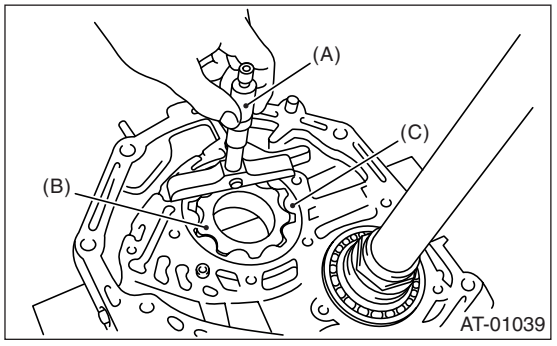
Tip clearance:
0.02 — 0.15 mm (0.0008 — 0.0059 in)



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

(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

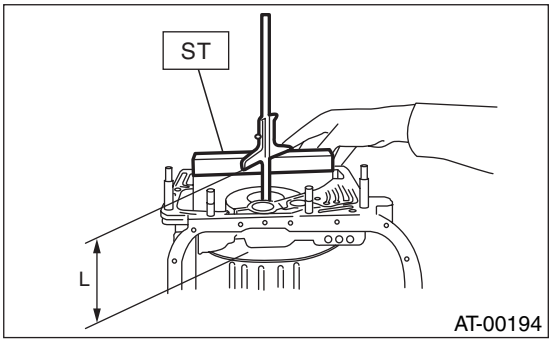
(3) If depth and/or side clearances are outside specifications, replace rotor assembly.

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)

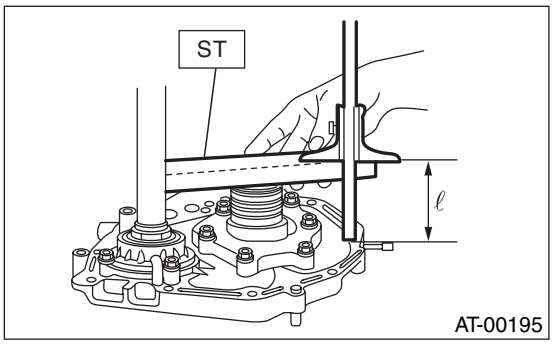
Measure the total end play and adjust to within specifications. <Ref. to 4AT-110, ADJUSTMENT, Oil Pump Housing.>

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

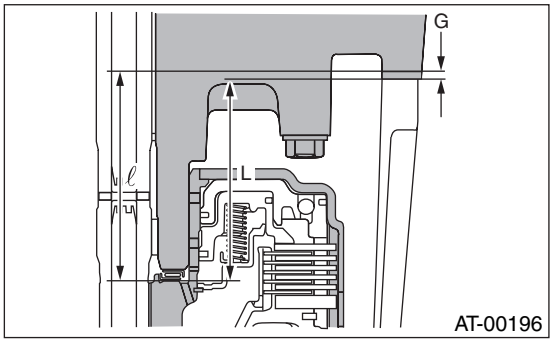


2) Using ST, measure the distance from the oil pump housing mating surface to the top surface of the oil pump cover with thrust needle bearing.
ST 398643600 GAUGE



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



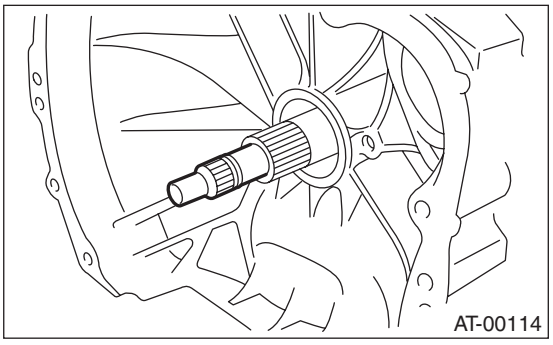
Thrust needle bearing	
Part No.	Thickness mm (in)
806528050	4.1 (0.161)
806528060	4.3 (0.169)
806528070	4.5 (0.177)
806528080	4.7 (0.185)
806528090	4.9 (0.193)
806528100	5.1 (0.201)

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.

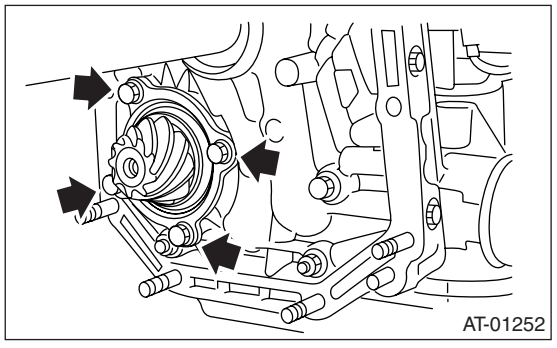
38.Drive Pinion Shaft

A: REMOVAL

1) Remove the transmission assembly from vehicle. <Ref. to 4AT-39, REMOVAL.>
2) Extract the torque converter clutch assembly. <Ref. to 4AT-84, REMOVAL.>
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-82, REMOVAL.>
7) Remove the oil charger pipe. <Ref. to 4AT-83, REMOVAL.>
8) Remove the oil cooler inlet and outlet pipes. <Ref. to 4AT-80, REMOVAL.>
9) Separate the torque converter clutch case and transmission case sections. <Ref. to 4AT-104, REMOVAL.>
10) Separate the transmission case and extension case sections. <Ref. to 4AT-85, REMOVAL.>
11) Remove the reduction drive gear. (MPT model) <Ref. to 4AT-99, REMOVAL.>
12) Remove the center differential carrier. (VTD model) <Ref. to 4AT-101, REMOVAL.>
13) Remove the reduction driven gear.
<Ref. to 4AT-97, REMOVAL.>
14) Remove the drive pinion shaft mounting bolt and remove the drive shaft assembly from oil pump housing.

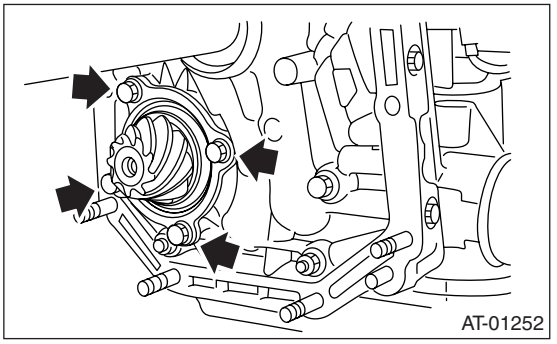


B: INSTALLATION

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

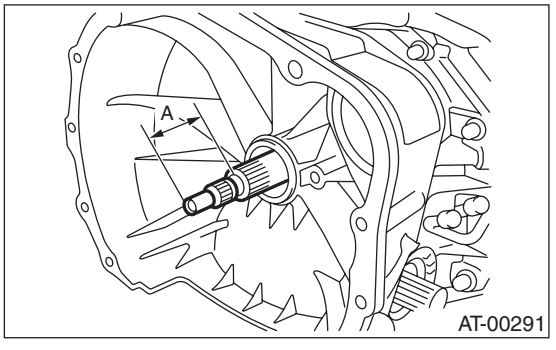
NOTE:
- Pay attention not to bend the shim.
- Pay attention not to press the pinion into housing bore.

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-104, INSTALLATION.>
3) Install the reduction driven gear.
<Ref. to 4AT-97, INSTALLATION.>
4) Install the reduction drive gear. (MPT model) <Ref. to 4AT-99, INSTALLATION.>
5) Install the center differential carrier. (VTD model) <Ref. to 4AT-101, INSTALLATION.>
6) Combine the extension case with the transmission case, and install vehicle speed sensor 1 (rear). <Ref. to 4AT-85, INSTALLATION.>
7) Insert inhibitor switch and transmission connector into stay.
8) Install the oil cooler inlet and outlet pipes. <Ref. to 4AT-81, INSTALLATION.>
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)

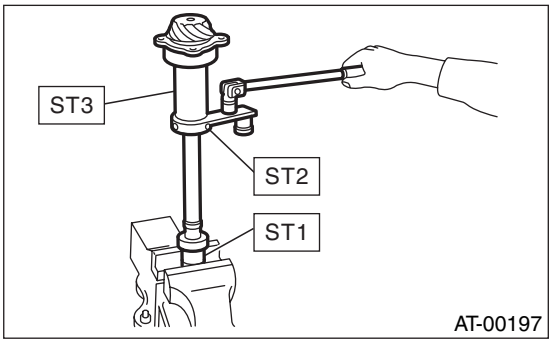


11) Install the torque converter clutch assembly. <Ref. to 4AT-84, INSTALLATION.>

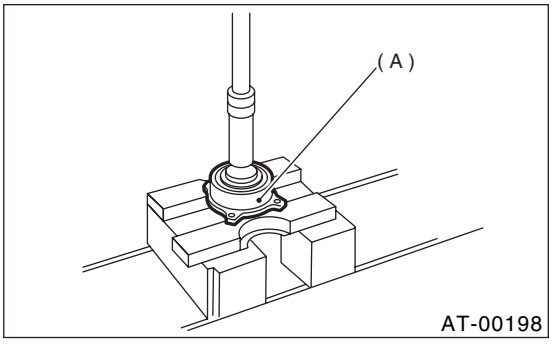
12) Install the transmission assembly to vehicle. <Ref. to 4AT-42, INSTALLATION.>

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

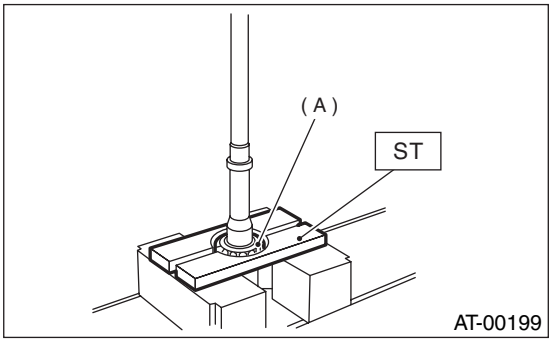


2) Remove the O-ring.
3) Using a press, separate the rear roller bearing and outer race from the shaft.



(A) Outer race

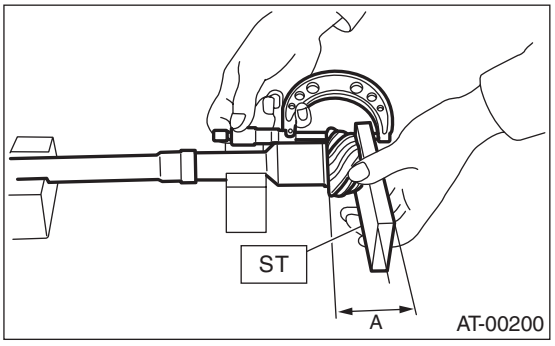
4) Using a press and ST, separate the front roller bearing from the shaft.
ST 498517000 REPLACER



(A) Front roller bearing

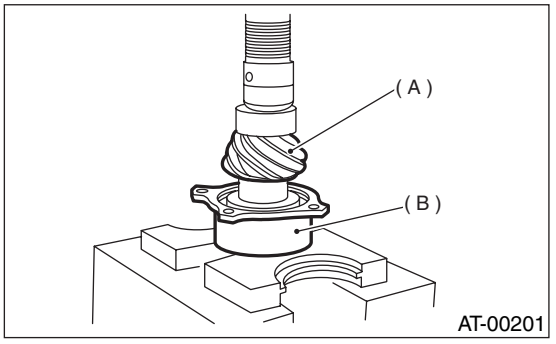
D: ASSEMBLY

1) Measure dimension “A” of the drive pinion shaft.
ST 398643600 GAUGE



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.



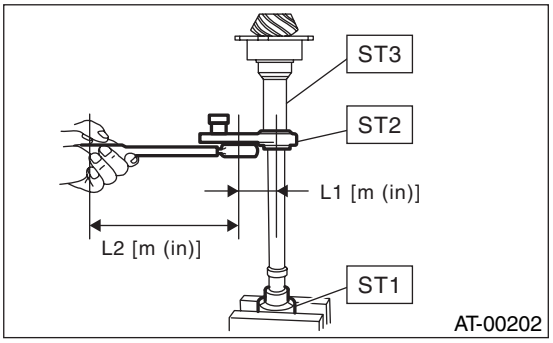
(A) Drive pinion shaft
(B) Roller bearing

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)

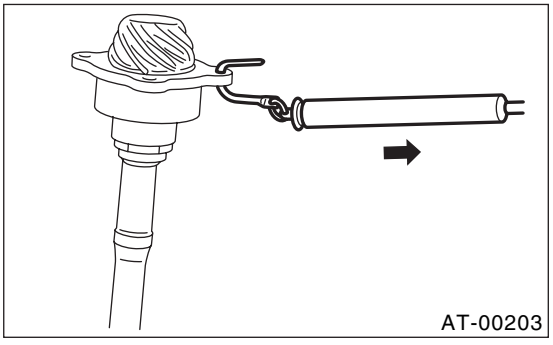
ST1 498937110 HOLDER
ST2 499787700 WRENCH
ST3 499787500 ADAPTER

NOTE:
Install ST2 and torque wrench as straight as possible.

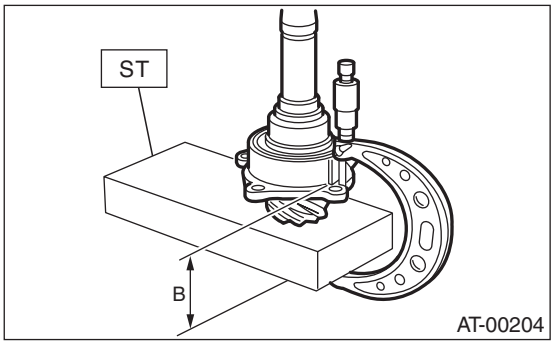


6) Measure the starting torque of the bearing. Make sure the starting torque is within the specified range. If out of the allowable range, replace the roller bearing.

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±0.0625 – (B – A)

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

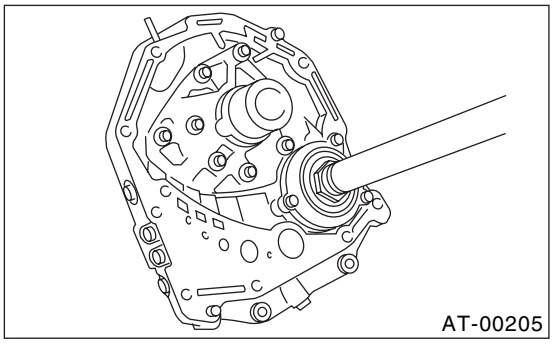
• Make sure that all component parts are free of harmful cuts, gouges, and other faults.
• Adjust the teeth alignment. <Ref. to 4AT-113, ADJUSTMENT.>

F: ADJUSTMENT

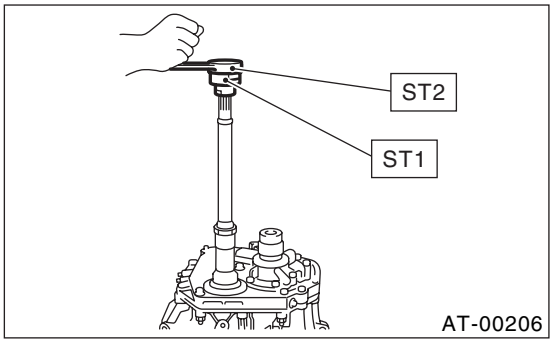
1) Thoroughly remove the liquid gasket from the case mating surface beforehand.
2) Install the oil pump housing assembly to the torque converter clutch case, and secure evenly by tightening four bolts.

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)



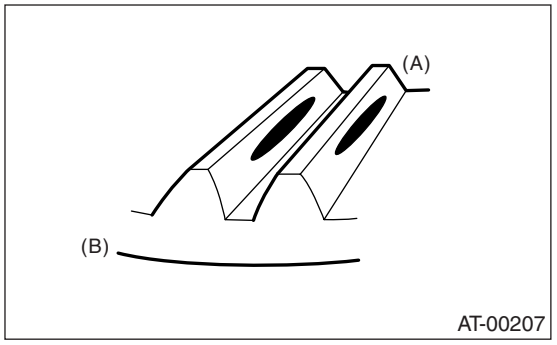
3) Rotate the drive pinion several times with ST1 and ST2.
ST1 498937110 HOLDER
ST2 499787700 WRENCH



4) Adjust the backlash between drive pinion and crown gear. <Ref. to 4AT-120, ADJUSTMENT.>
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-120, ADJUSTMENT.>

- Tooth contact

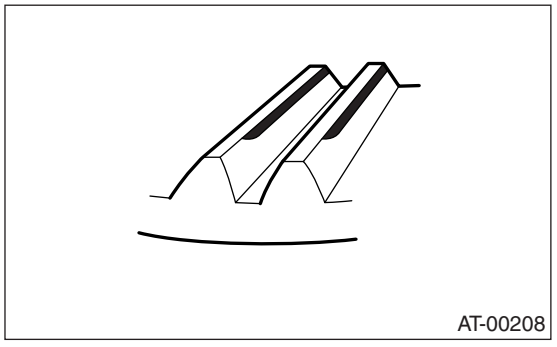
Checking item:Tooth contact pattern is slightly shifted toward to toe side under no-load rotation. [When loaded, contact pattern moves toward heel.]



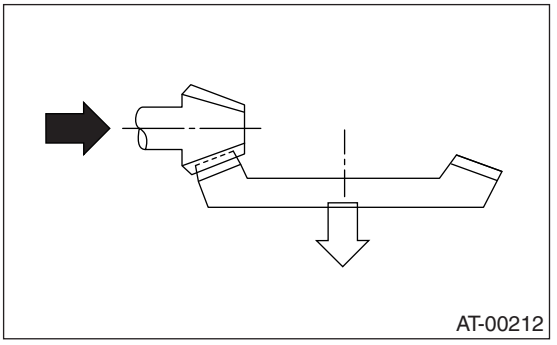
(A) Toe side
(B) Heel side

- Face contact

Checking item: Backlash is too large.
Contact pattern

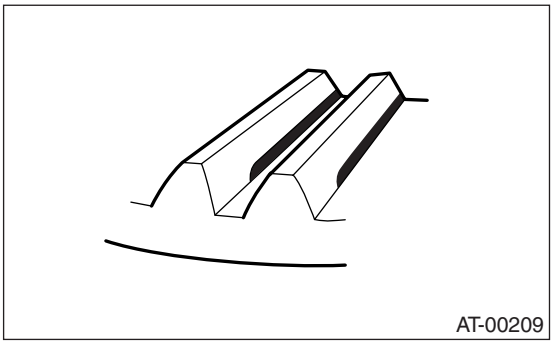


Corrective action: Increase thickness of drive pinion height adjusting shim in order to bring drive pinion close to crown gear.

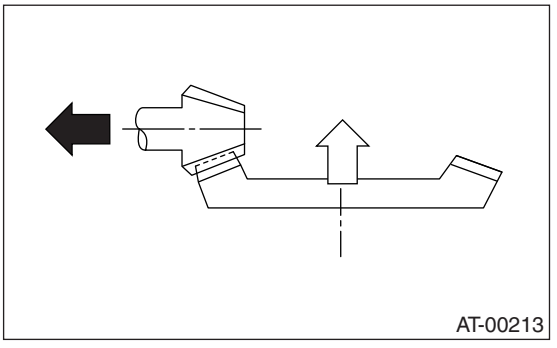


- Flank contact

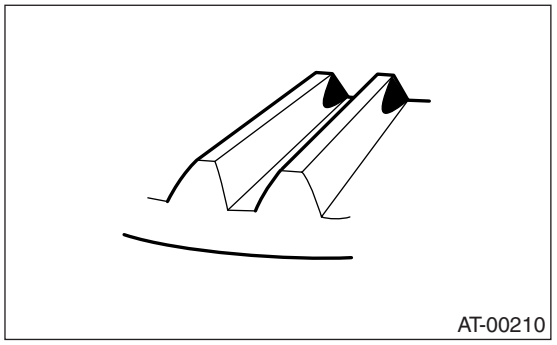
Checking item: Backlash is too small.
Contact pattern



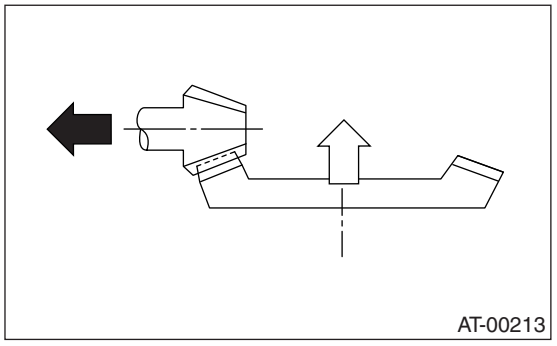
Corrective action: Reduce thickness of drive pinion height adjusting shim in order to move drive pinion away from crown gear.



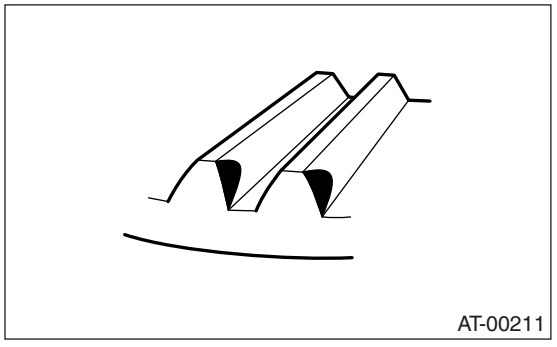
• Toe contact (Inside end contact)
Checking item: Contact areas is small.
Contact pattern



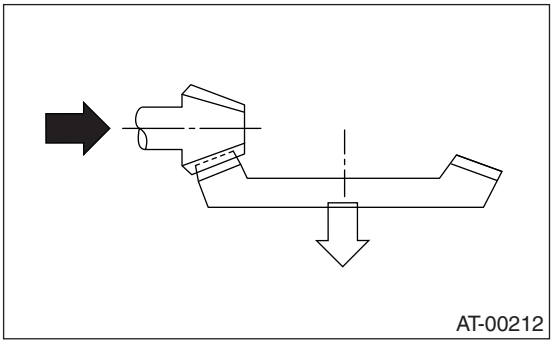
Corrective action: Decrease thickness of drive pinion height adjusting shim in order to move drive pinion away from crown gear.



• Heel contact (Outside end contact)
Checking item: Contact areas is small.
Contact pattern

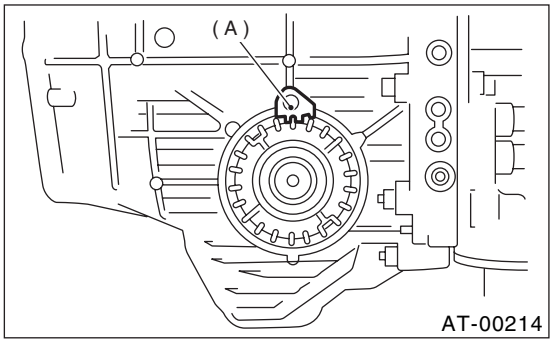


Corrective action: Increase thickness of drive pinion height adjusting shim in order to move drive pinion close to crown gear.



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)

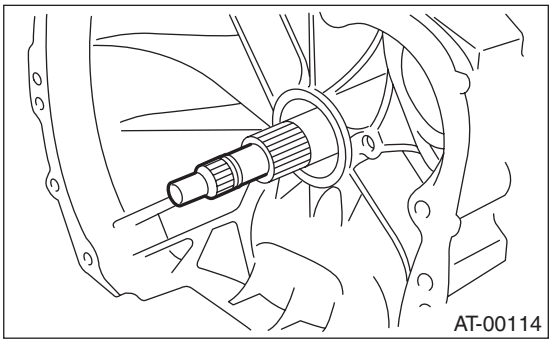


(A) Lock plate

39.Front Differential

A: REMOVAL

1) Remove the transmission assembly from the vehicle. <Ref. to 4AT-39, REMOVAL.>
2) Extract the torque converter clutch assembly. <Ref. to 4AT-84, REMOVAL.>
3) Remove the input shaft.



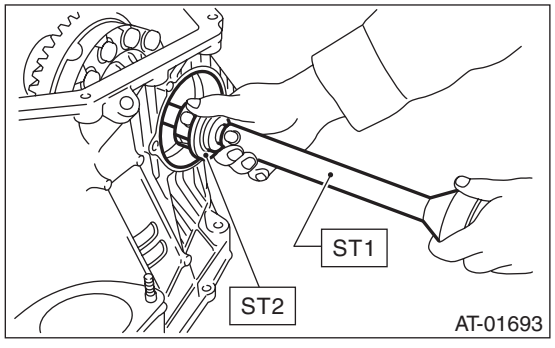
4) Lift-up the lever behind the transmission harness connector and disconnect it from stay.
5) Disconnect the inhibitor switch from stay.
6) Remove the oil charger pipe. <Ref. to 4AT-83, REMOVAL.>
7) Remove the oil cooler inlet and outlet pipes. <Ref. to 4AT-80, REMOVAL.>
8) Separate the torque converter clutch case and transmission case.<Ref. to 4AT-104, REMOVAL.>
9) Remove the seal pipe.
10) Wrap axle shaft with vinyl tape. (Except TURBO model)
11) 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

12) Remove axle shaft using ST1 and ST2.

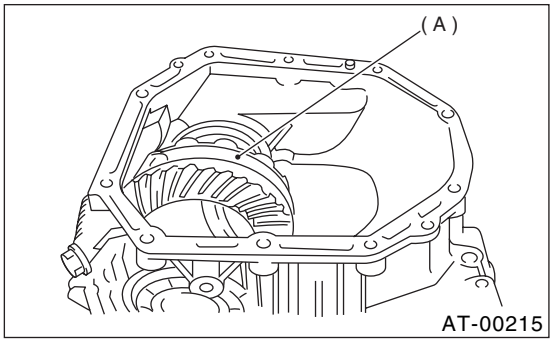
ST 499095500 REMOVER
ST 499247300 INSTALLER



13) 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 new circlip to the axle shaft, insert the shaft into the differential assembly, and tap it into position with a plastic hammer. (Except TURBO model)

NOTE:
If no play is felt, check whether the shaft is fully inserted. If shaft insertion is correct, replace the axle shaft.

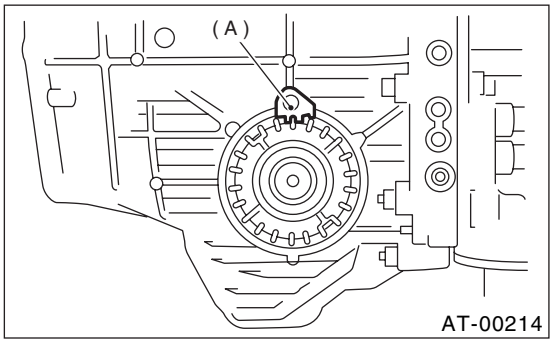
Thrust play:
0.3 — 0.5 mm (0.012 — 0.020 in)

3) Wrap vinyl tape around the splined portion of the axle shaft. (Except TURBO model)
4) Install the O-rings from left and right side retainer.
5) Using ST, install the side retainers. <Ref. to 4AT-116, REMOVAL.>

ST 499787000 WRENCH ASSY

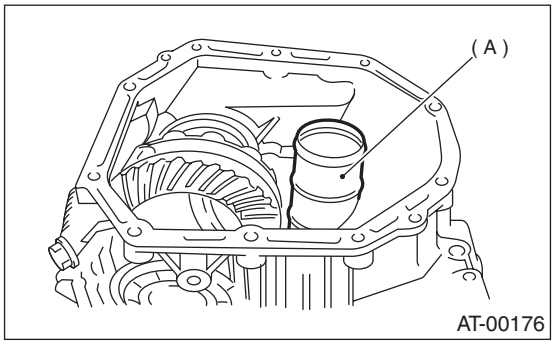
6) Adjust the front differential backlash. <Ref. to 4AT-120, ADJUSTMENT.>
7) Install the lock plate.

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



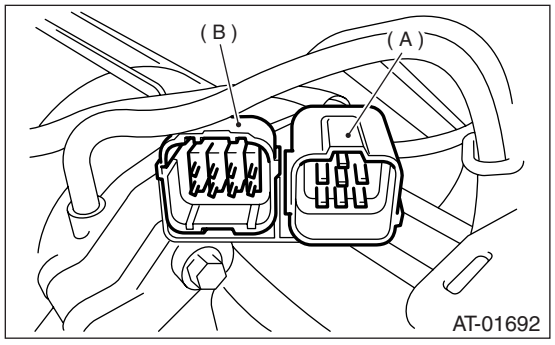
(A) Lock plate

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



(A) Seal pipe

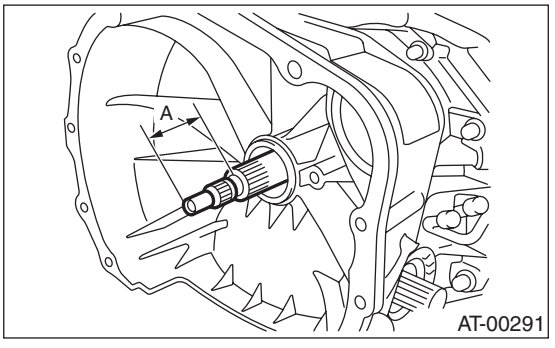
9) Install the torque converter clutch case to transmission case. <Ref. to 4AT-104, INSTALLATION.>
10) Insert the inhibitor switch and transmission connector into stay.



(A) Transmission harness
(B) Inhibitor switch harness

11) Install the oil cooler pipes. <Ref. to 4AT-81, INSTALLATION.>
12) Install the oil charger pipe with O-ring <Ref. to 4AT-83, INSTALLATION.>
13) 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)

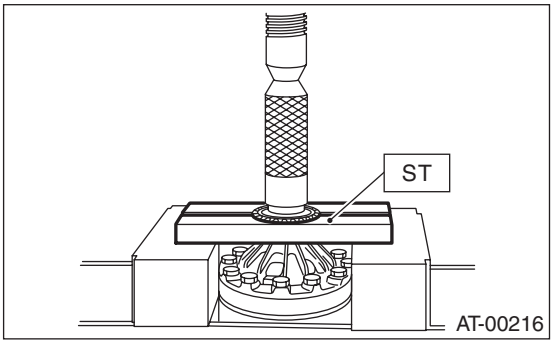


14) Install the torque converter clutch assembly. <Ref. to 4AT-84, INSTALLATION.>
15) Install the transmission assembly to the vehicle. <Ref. to 4AT-42, INSTALLATION.>

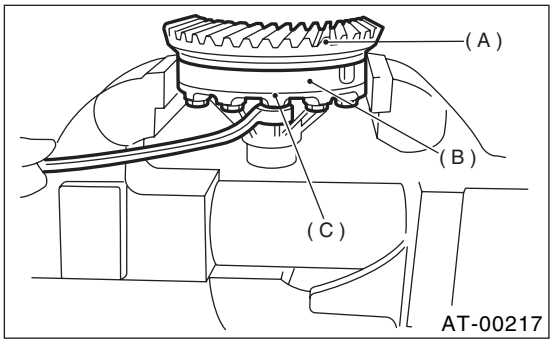
C: DISASSEMBLY

1. DIFFERENTIAL CASE ASSEMBLY

1) Using a press and ST, remove the taper roller bearing.
ST 498077000 REMOVER

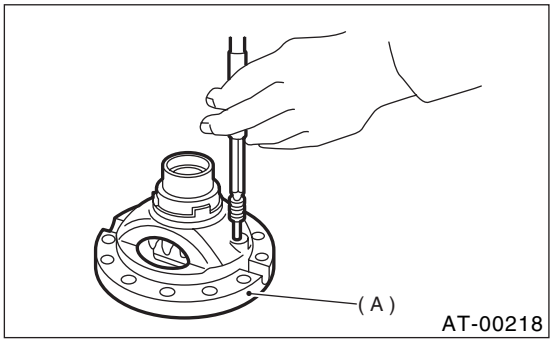


2) Secure the case in a vise and remove the crown gear tightening bolts, then separate the crown gear, case (RH) and case (LH).



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

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

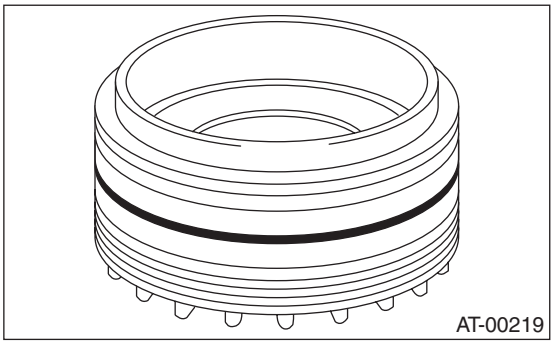


(A) Differential case (RH)

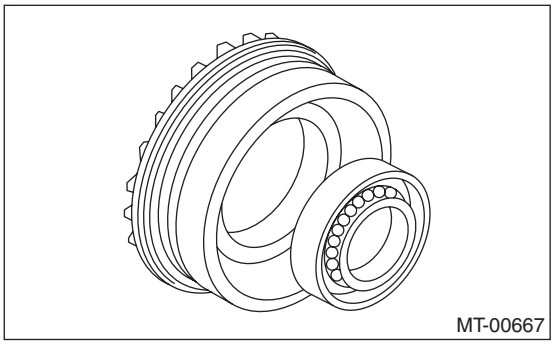
2. SIDE RETAINER

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

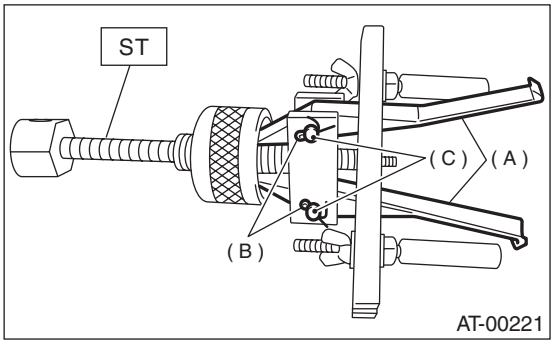
1) Remove O-ring.



2) Remove oil seal.

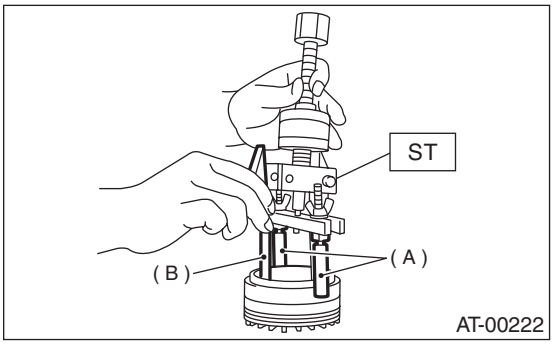


3) Take out either split pin, remove claw.
ST 398527700 PULLER ASSY



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

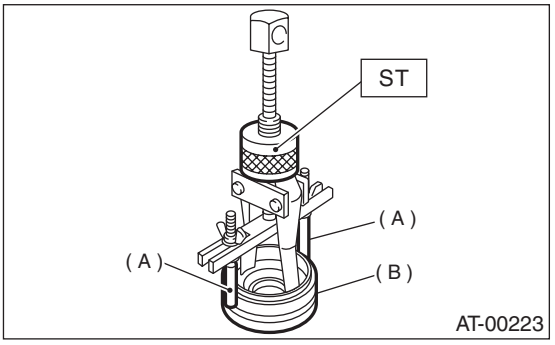
4) Securely attach two claws to outer race, set ST to side retainer.
ST 398527700 PULLER ASSY



(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.



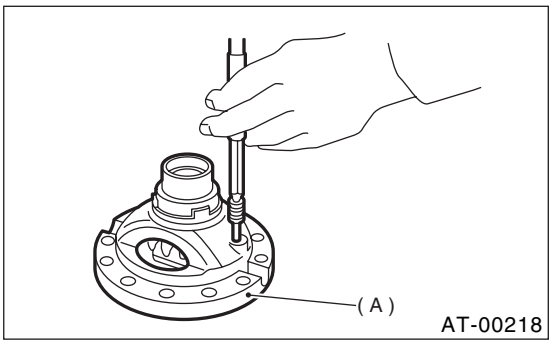
(A) Shaft
(B) Side retainer

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.

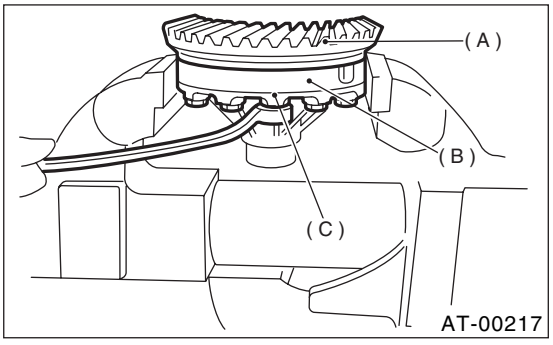
2) Install straight pin from reverse direction.



(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)



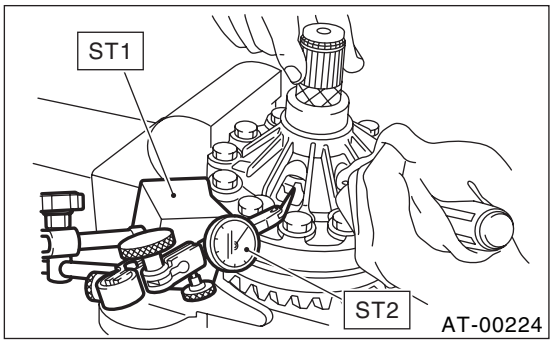
(A) Crown gear
(B) Differential case (RH)
(C) Differential case (LH)

5) Measurement of backlash (Selection of washer)
(1) Install SUBARU genuine axle shaft to differential case. (TURBO model)
(2) 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.

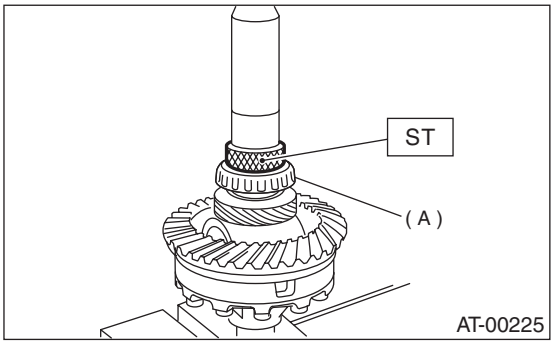
Standard value:
0.13 — 0.18 mm (0.0051 — 0.0071 in)



(3) 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)

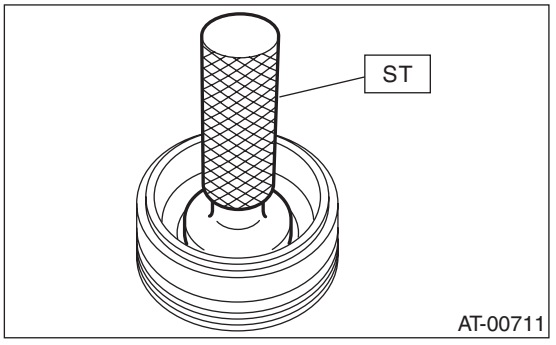
6) Using ST, install taper roller bearing.
ST 398437700 DRIFT



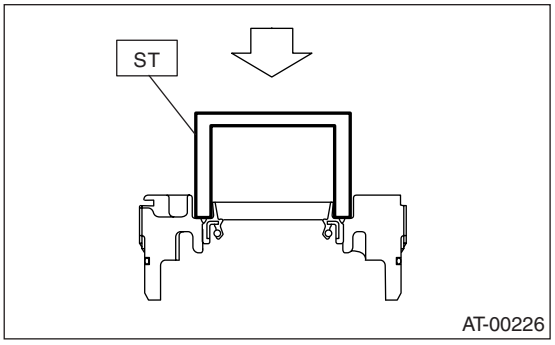
(A) Taper roller bearing

2. SIDE RETAINER

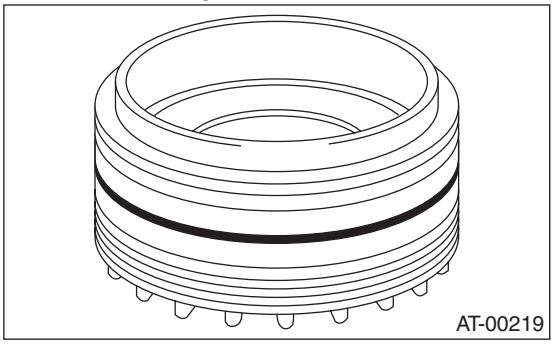
1) Install bearing outer race to side retainer.
2) Install a new oil seal using the ST and hammer.
ST 499797000 INSTALLER



3) Using the ST and hammer, install a new oil seal. (TURBO model)
ST 18675AA000 INSTALLER



4) Install new O-ring.



E: INSPECTION

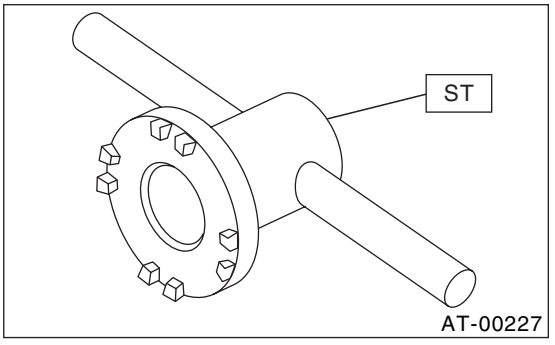
- Check each component for harmful cuts, damage and other faults.
- Measure the backlash and adjust to within specifications.

<Ref. to 4AT-120, ADJUSTMENT.>

F: ADJUSTMENT

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

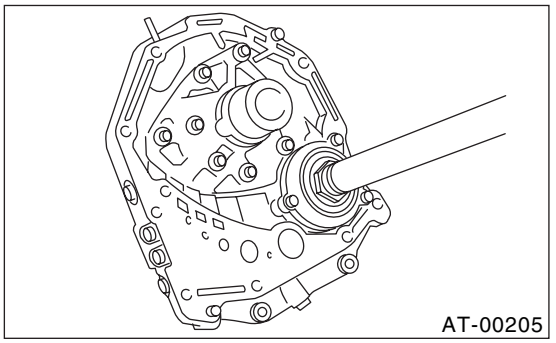
NOTE:
Screw in the RH side slightly deeper than the LH side.
ST 499787000 WRENCH ASSY



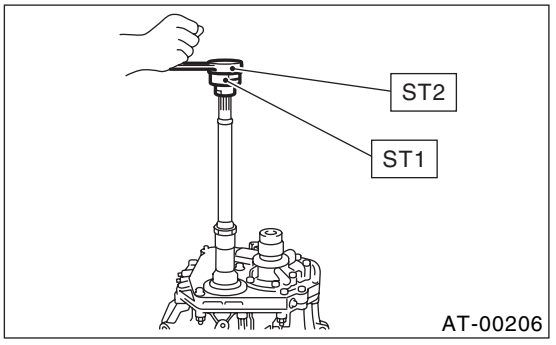
2) Remove the oil pump housing.
3) Thoroughly remove the liquid gasket from the case mating surface beforehand.
4) Install the oil pump housing assembly to the torque converter clutch case, and secure evenly by tightening four bolts.

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

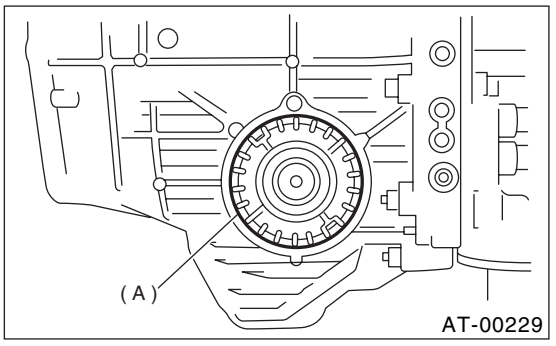
Tightening torque:
41 N·m (4.2 kgf-m, 30.4 ft-lb)



5) Rotate the drive pinion several times with ST1 and ST2.
ST1 498937110 HOLDER
ST2 499787700 WRENCH

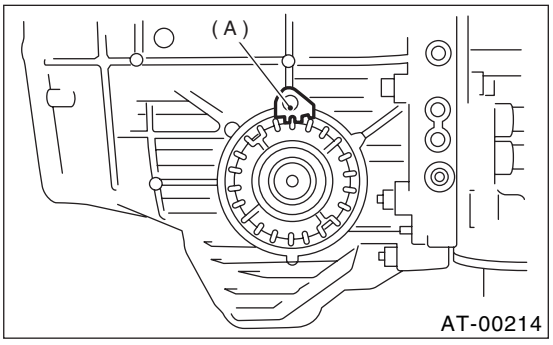


6) Tighten the LH retainer until contact is felt while rotating the shaft. Then loosen the RH retainer. Keep tightening the LH retainer and loosening the RH retainer until the pinion shaft can no longer be turned. This is the “zero” state.



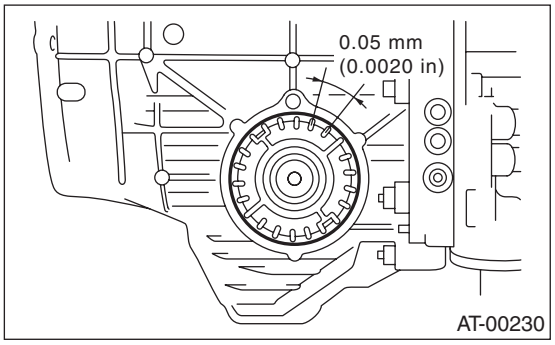
(A) Retainer

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).

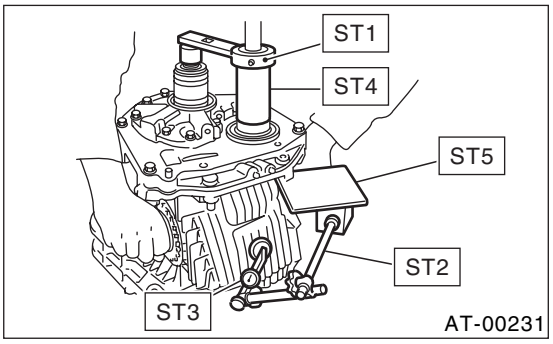


8) Turn the drive pinion several rotations with ST1 and check to see if the backlash is within the standard value with ST2, ST3, ST4 and ST5.

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)

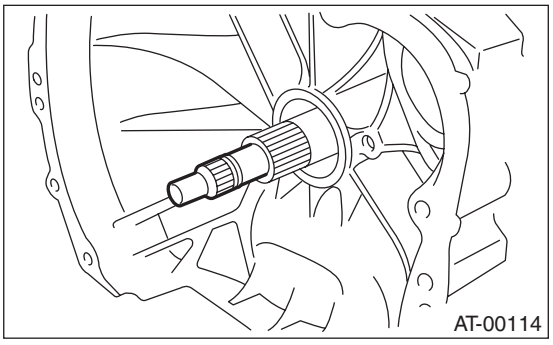


9) Adjust the tooth contact between front differential and drive shaft. <Ref. to 4AT-113, ADJUSTMENT.>

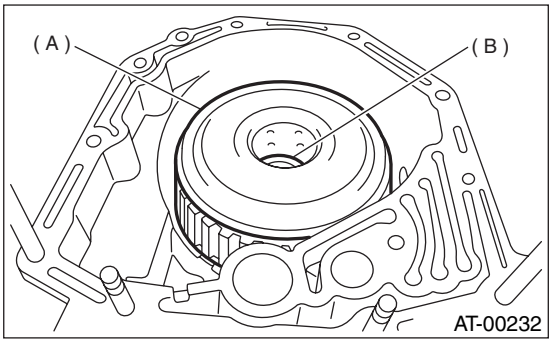
40.AT Main Case

A: REMOVAL

1) Remove the transmission assembly from the vehicle. <Ref. to 4AT-39, REMOVAL.>
2) Extract the torque converter clutch assembly. <Ref. to 4AT-84, REMOVAL.>
3) Remove the input shaft.

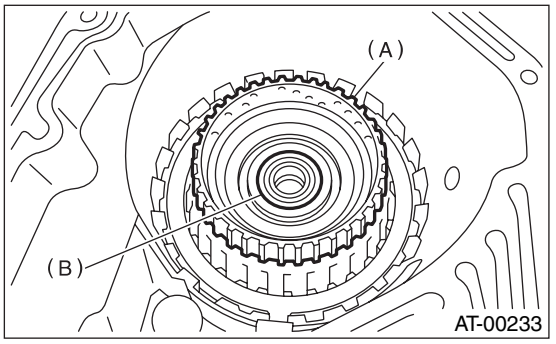


4) Lift-up the lever behind the transmission harness connector and disconnect it from stay.
5) Disconnect the inhibitor switch connector from stay.
6) Disconnect the air breather hose.
7) Remove the oil charger pipe. <Ref. to 4AT-83, REMOVAL.>
8) Remove the oil cooler inlet and outlet pipes. <Ref. to 4AT-80, REMOVAL.>
9) Separate the torque converter clutch case and transmission case.<Ref. to 4AT-104, REMOVAL.>
10) Remove the oil pump housing.
<Ref. to 4AT-106, REMOVAL, Oil Pump Housing.>
11) Take out the high clutch, thrust needle bearing and reverse clutch assembly.



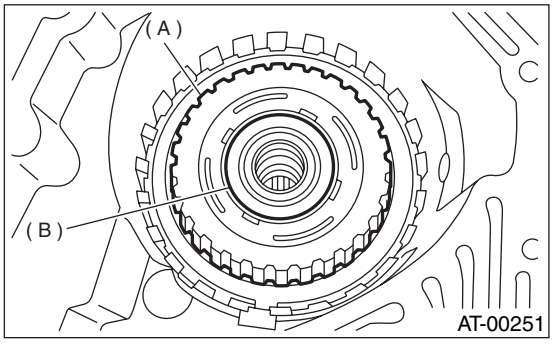
(A) High clutch and reverse clutch assembly
(B) Thrust needle bearing

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



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

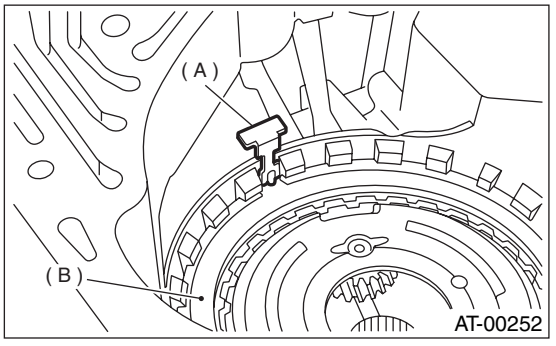
13) Take out the front sun gear and the thrust bearing.



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

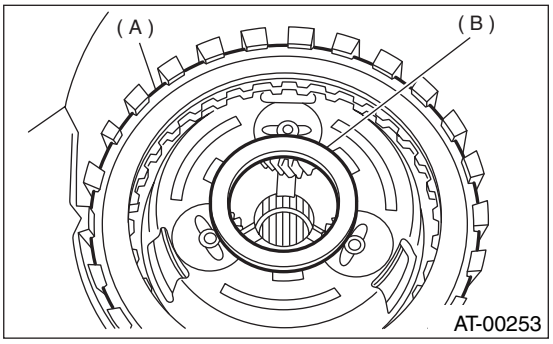
14) Pull out the leaf spring without folding.

NOTE:
Remove it while pressing the lower leaf spring down.



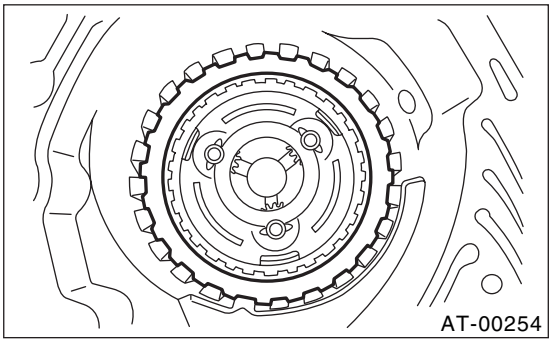
(A) Leaf spring
(B) Retaining plate

15) Remove the snap ring and thrust needle bearing.

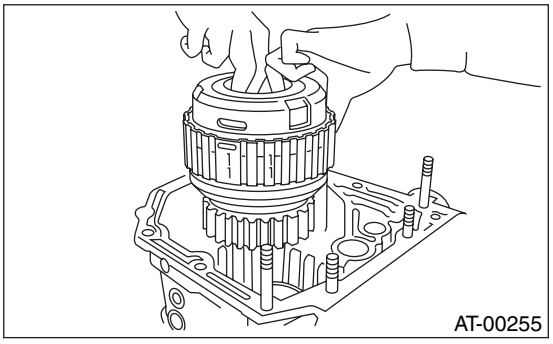


(A) Snap ring
(B) Thrust needle bearing

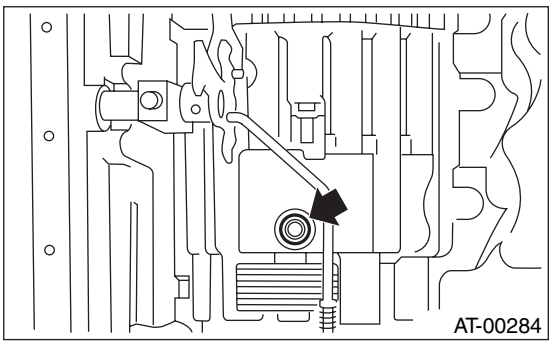
16) Take out the retaining plate, drive plate and driven plate of 2-4 brake.



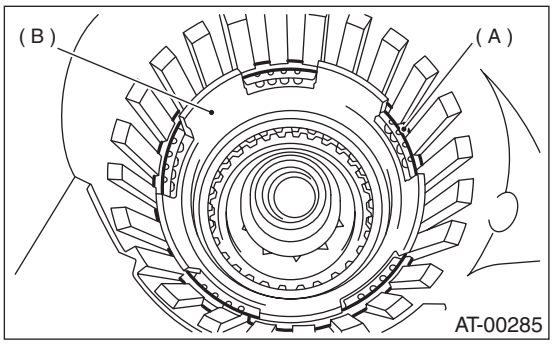
17) Take out the thrust needle bearing, planetary gear assembly and the low clutch assembly.



18) Remove the 2-4 brake seal.

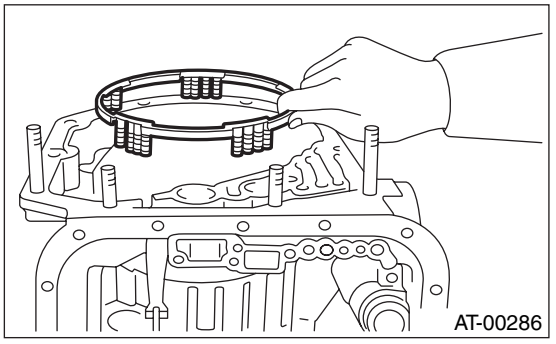


19) Remove the snap ring.

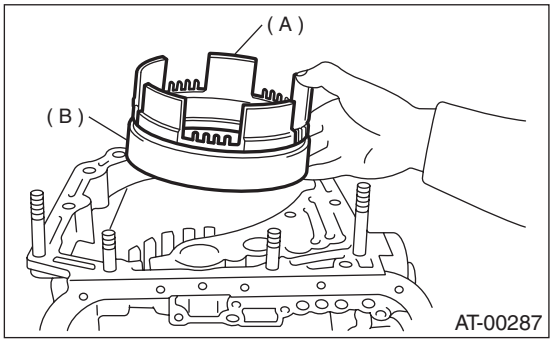


(A) Snap ring
(B) 2-4 brake piston

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

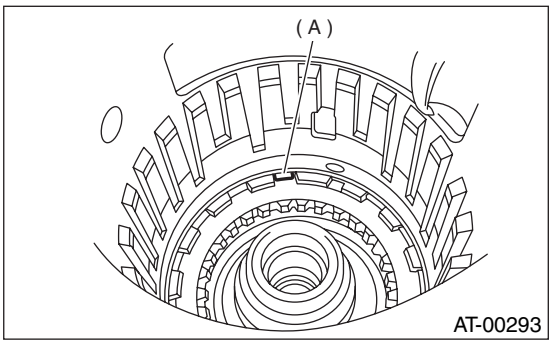


21) Remove the 2-4 brake piston and piston retainer without damaging.



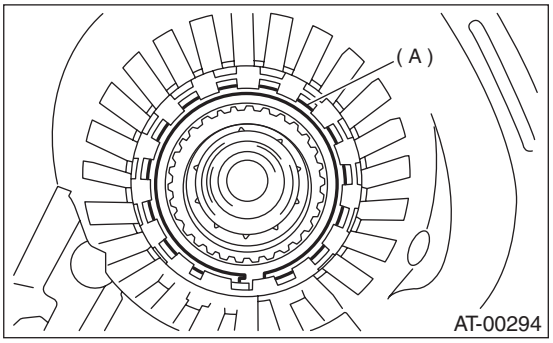
(A) 2-4 brake piston
(B) 2-4 brake piston retainer

22) Pull out the leaf spring without folding.



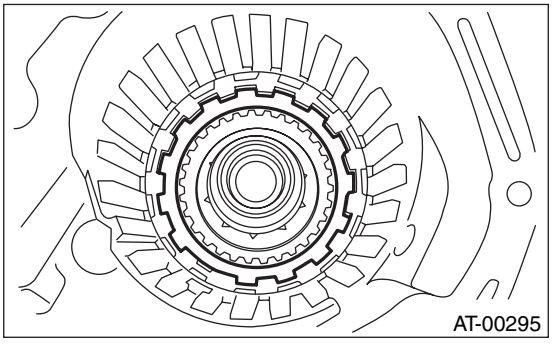
(A) Leaf spring

23) Remove the snap ring.

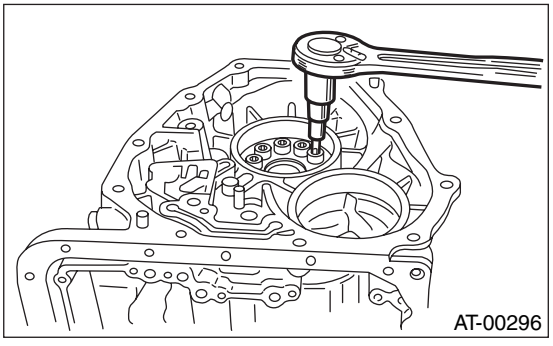


(A) Snap ring

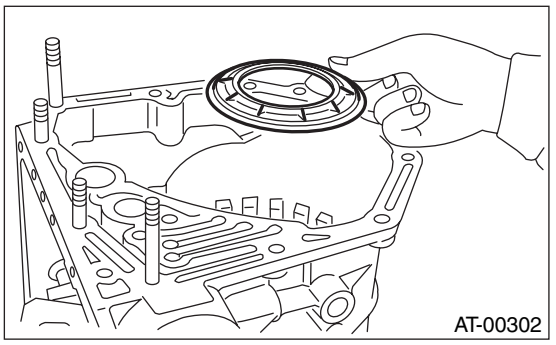
24) Take out the retaining plate, drive plate, driven plate and dish plate.



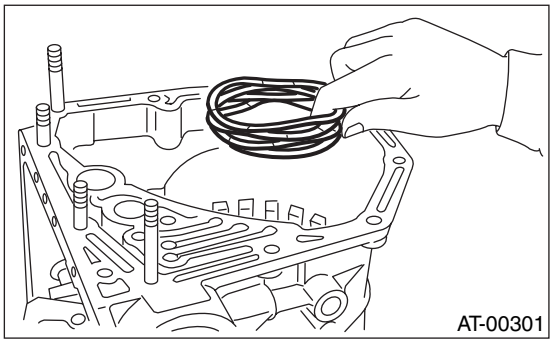
25) Turn the transmission case upside down, and then take out the socket bolts while holding the one-way clutch inner race with hand.



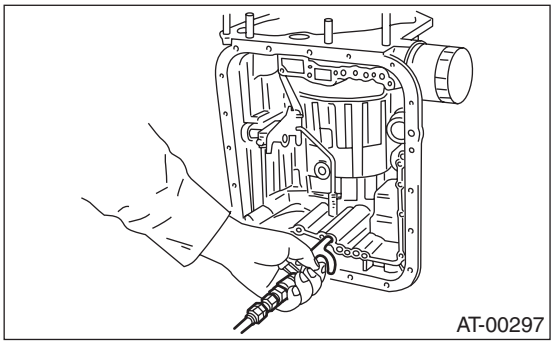
26) Take out the spring retainer.



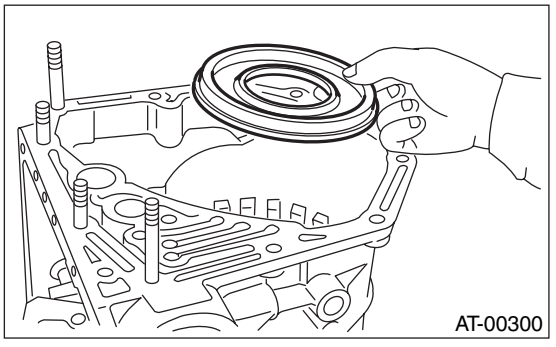
27) Take out the return spring.



28) Apply compressed air.



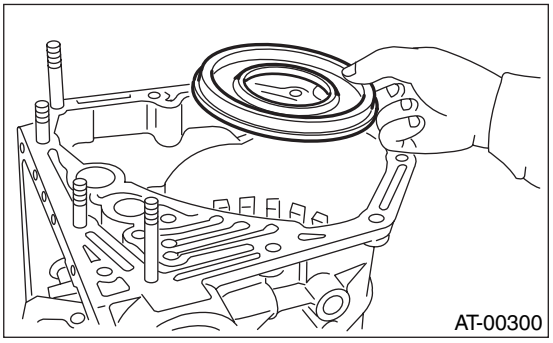
29) Take out the low & reverse piston.



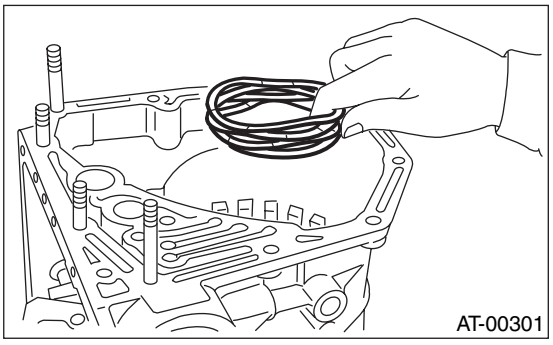
B: INSTALLATION

1) Install the low and reverse piston without tilting.

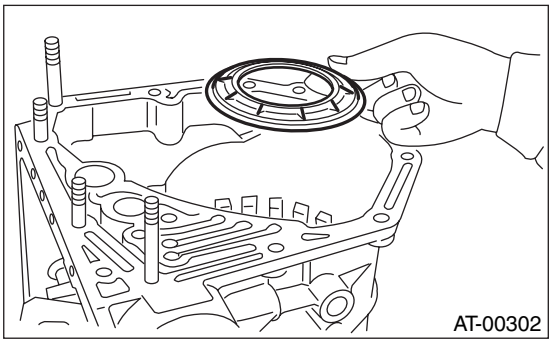
NOTE:
Be careful not to damage the lip seal.



2) Install the return spring.



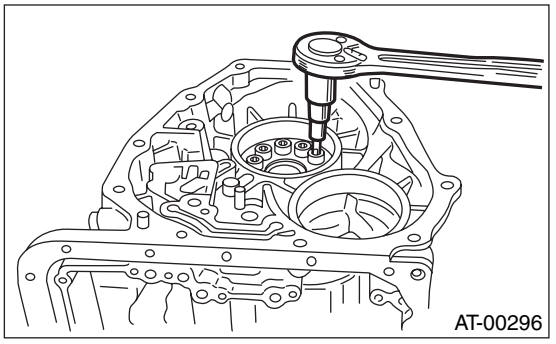
3) Install the spring retainer.



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)



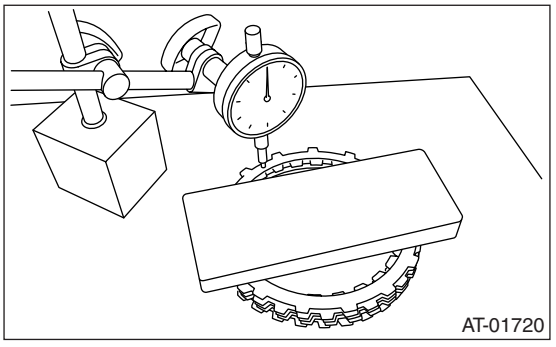
6) Place the front side of transmission body upward.
7) Install thrust needle bearing.
8) Place dish plate, driven plate, and retaining plate on a surface plate in order.
9) Set the micro gauge to clutch, and read its scale.

NOTE:
The value, which is read in the gauge at this time, is zero point.

10) Scale and record the weight “Z” of a flat board which will be put on plates.

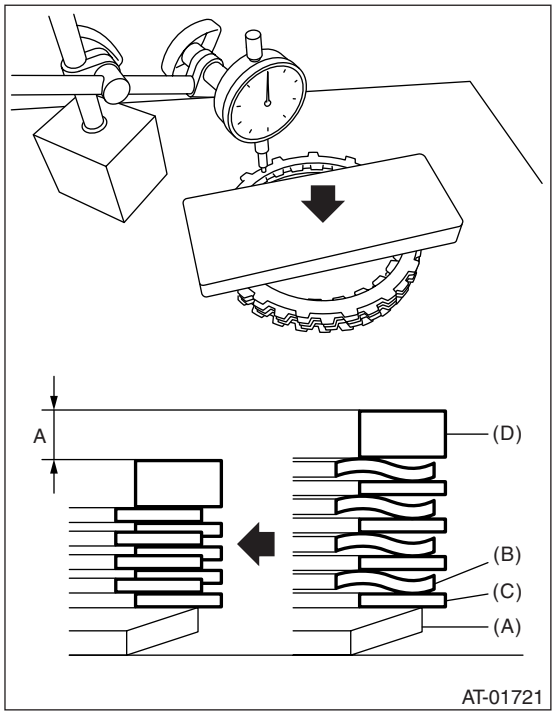
NOTE:
• Use a stiff flat board which does not bend against load.
• Use a flat board of its weight less than 83 N (8.5 kgf, 18.7 lb).

11) Put the flat board on retaining plate.



12) Using the following formula, calculate “N” indicated on the push/pull gauge.
N = 83 N (8.5 kgf, 18.7 lb) − Z
N: Value indicated on push/pull gauge
83 N (8.5 kgf, 18.7 lb): Load applied to clutch plate
Z: Flat board weight
13) Press the center of retaining plate applying force of N with push/pull gauge, and then measure and record the height A. Make more than three measurements at even distance and take the average value.

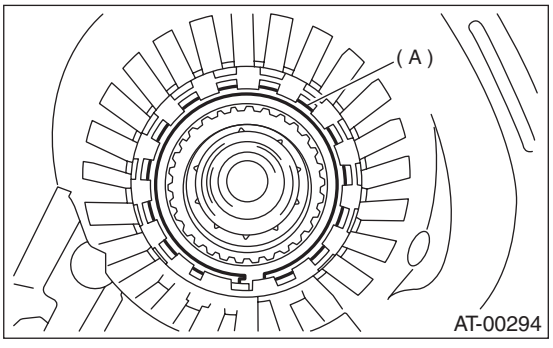
NOTE:
If three points, measure the height every 120°. If four points, measure the height every 90°.



(A) Dish plate
(B) Driven plate
(C) Drive plate
(D) Retaining plate

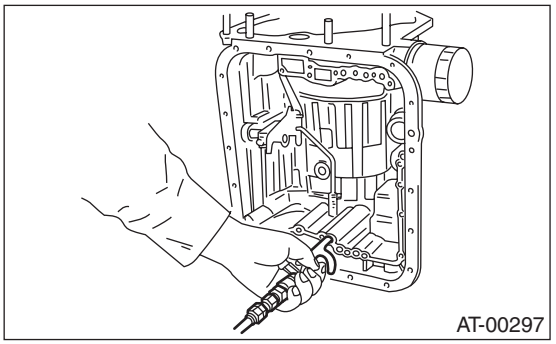
14) Installation of the low & reverse brake:
Install dish plate, driven plates, drive plates, and a retaining plate, and secure with a snap ring.

NOTE:
Pay attention to the orientation of the dish plate.

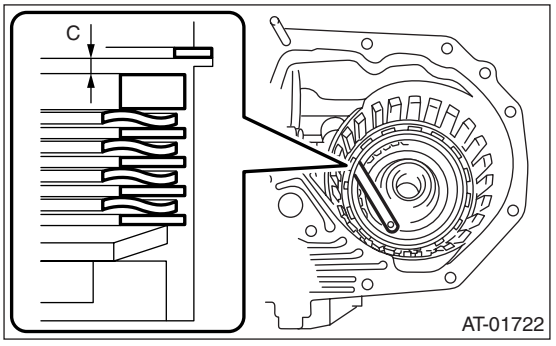


(A) Snap ring

15) Apply compressed air intermittently to check for operation.



16) Measure the clearance. Place the same thickness of shim on both sides to prevent the retaining plate from tilting.



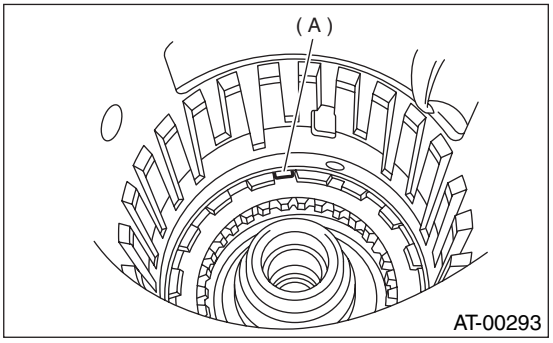
17) Calculation of piston stroke
Calculate piston stroke from the recorded measurement A and B, and select the retaining plate so that the piston stroke is within the standard value.
If the value from the equation exceeds the service limit, replace the drive plate with new one and adjust it to be within the standard.
T = A + C
T: Piston stroke
A: Amount of the flattened drive plate
B: Clearance between the retaining plate and the snap ring

TURBO model
Standard value:
2.7 — 3.2 mm (0.106 — 0.126 in)
Limit value:
3.9 mm (0.154 in)

NON-TURBO model
Standard value:
2.4 — 2.9 mm (0.094 — 0.114 in)
Limit value:
3.6 mm (0.142 in)

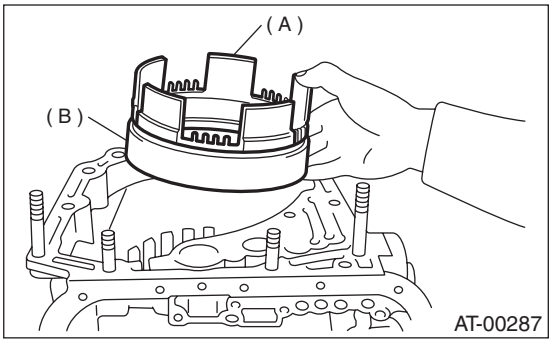
Retaining plates	
Part No.	Thickness mm (in)
31667AA320	4.1 (0.161)
31667AA330	4.4 (0.173)
31667AA340	4.7 (0.185)
31667AA350	5.0 (0.197)
31667AA360	5.3 (0.209)
31667AA370	5.6 (0.220)
31667AA380	5.9 (0.232)

18) Install the low & reverse brake leaf spring.



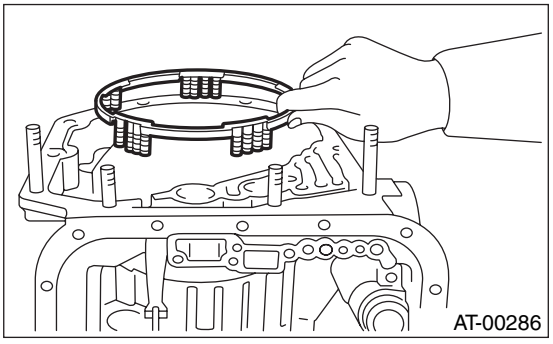
(A) Leaf spring

19) 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.

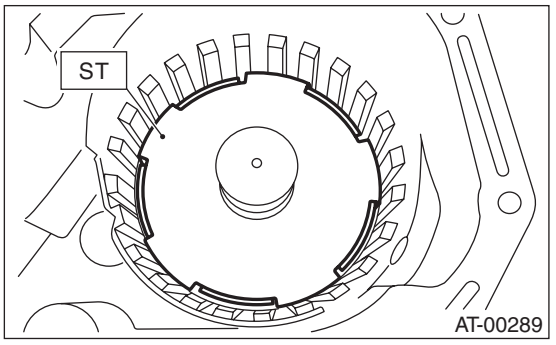


(A) 2-4 brake piston
(B) 2-4 brake piston retainer

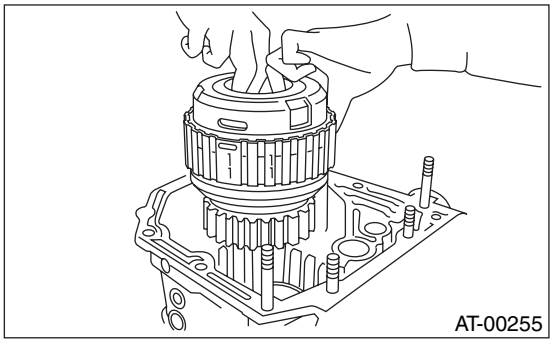
20) Install the 2-4 brake piston return spring to transmission case.



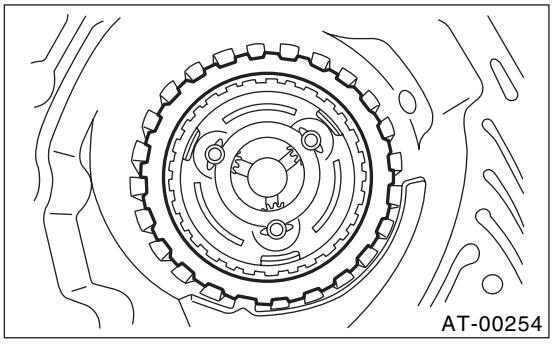
21) Position the snap ring in transmission. Using ST, press the snap ring into place.
ST 498677100 COMPRESSOR



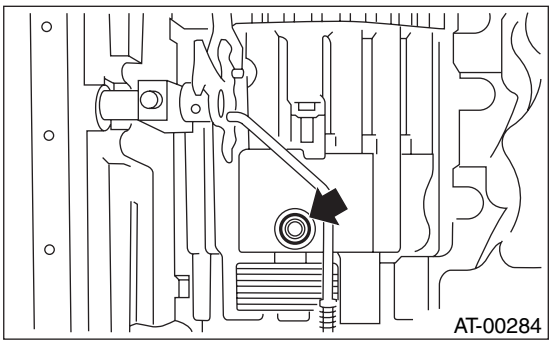
22) Install the planetary gear and low clutch assembly to transmission case.
Install carefully while rotating the low clutch and planetary gear assembly slowly paying special attention not to damage the seal ring.



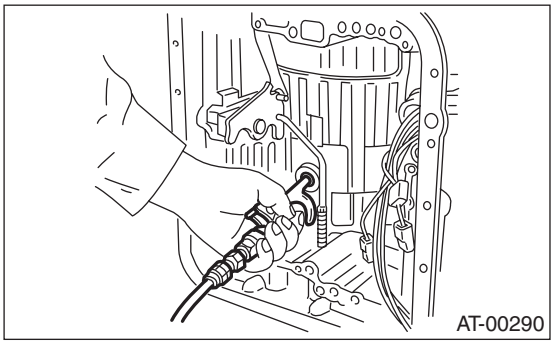
23) Install pressure plate, drive plate, driven plate, retaining plate and snap ring.



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



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



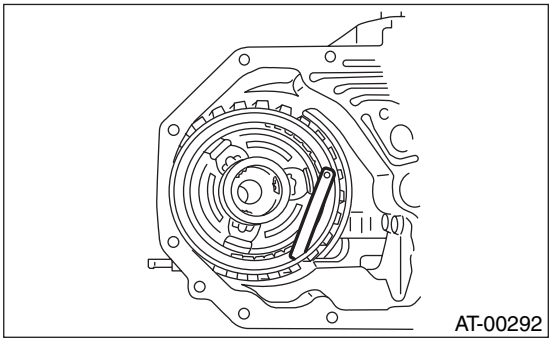
26) Check the clearance between the retaining plate and the snap ring.

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

If the clearance is above the limit, replace the drive plate with new one and adjust so that the clearance becomes the standard value.

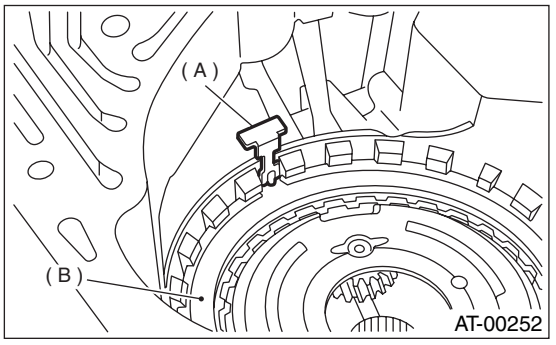
Standard value:
0.8 — 1.2 mm (0.031 — 0.047 in)

Allowable limit:
1.5 mm (0.059 in)



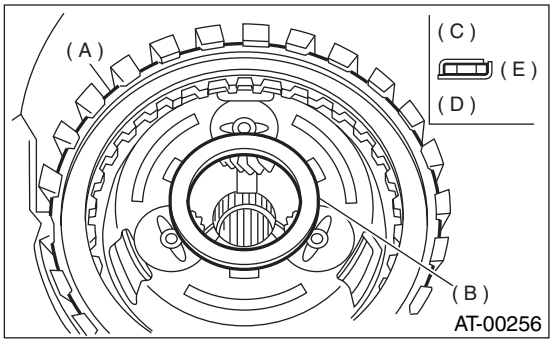
Retaining plates	
Part No.	Thickness mm (in)
31567AA991	5.6 (0.220)
31567AB001	5.8 (0.228)
31567AB011	6.0 (0.236)
31567AB021	6.2 (0.244)
31567AB031	6.4 (0.252)
31567AB041	6.6 (0.260)

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



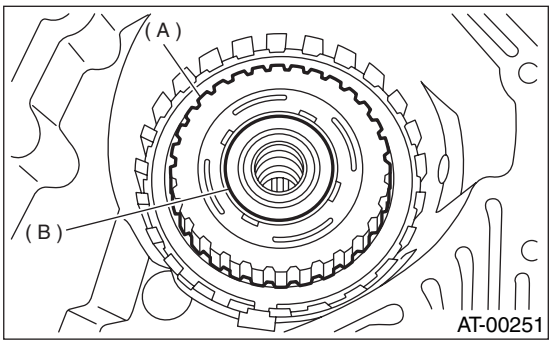
(A) Leaf spring
(B) Retaining plate

28) Install thrust needle bearing in the correct direction.



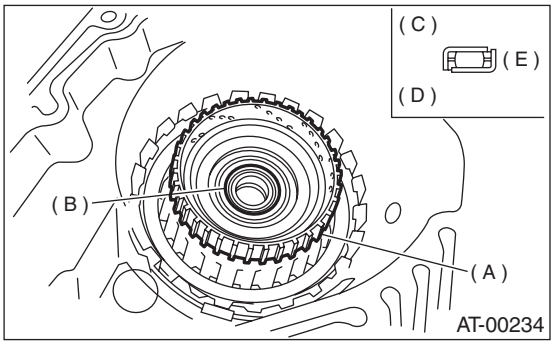
(A) Snap ring
(B) Thrust needle bearing
(C) Upside
(D) Downside
(E) Outside

29) Install front sun gear and thrust needle bearing.



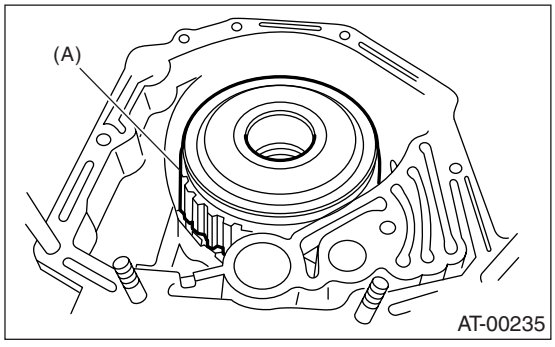
(A) Front sun gear
(B) Thrust needle bearing

30) 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.
31) Install the thrust needle bearing in proper direction.



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

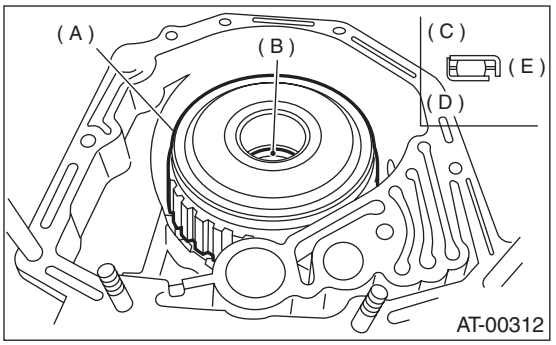
32) Install the high clutch assembly.



(A) High clutch and reverse clutch assembly

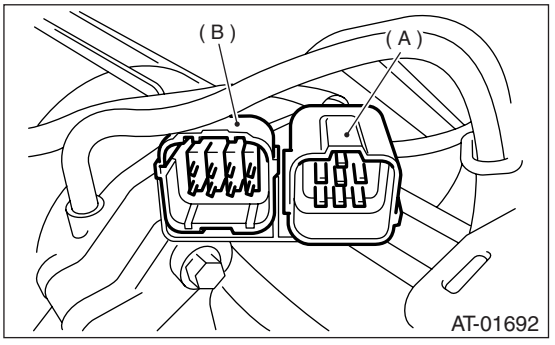
33) Adjust total end play. <Ref. to 4AT-110, ADJUSTMENT, Oil Pump Housing.>

34) 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

35) Install the oil pump housing assembly.
36) Install the torque converter clutch case assembly to the transmission case assembly. <Ref. to 4AT-104, INSTALLATION.>
37) Insert inhibitor switch and transmission connector into stay.
38) Install air breather hose. <Ref. to 4AT-82, INSTALLATION.>

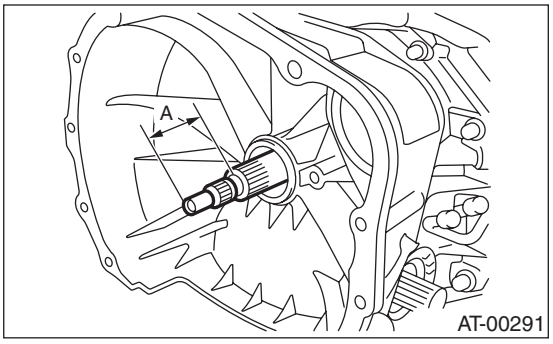


(A) Transmission harness
(B) Inhibitor switch harness

39) Install oil cooler pipes. <Ref. to 4AT-81, INSTALLATION.>
40) Install the oil charger pipe with O-ring. <Ref. to 4AT-83, INSTALLATION.>

41) 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)

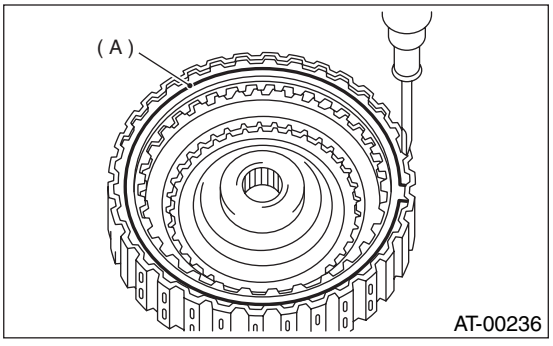


42) Install the torque converter clutch assembly. <Ref. to 4AT-84, INSTALLATION.>
43) Install the transmission assembly to the vehicle. <Ref. to 4AT-42, INSTALLATION.>

C: DISASSEMBLY

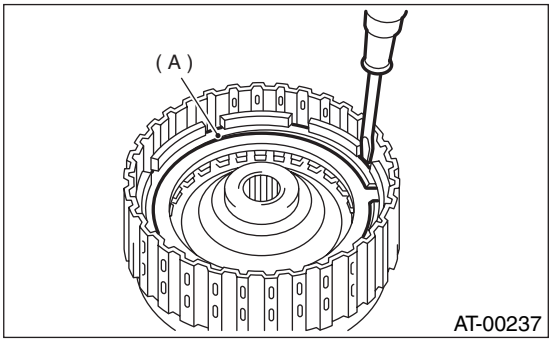
1. HIGH CLUTCH, REVERSE CLUTCH

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



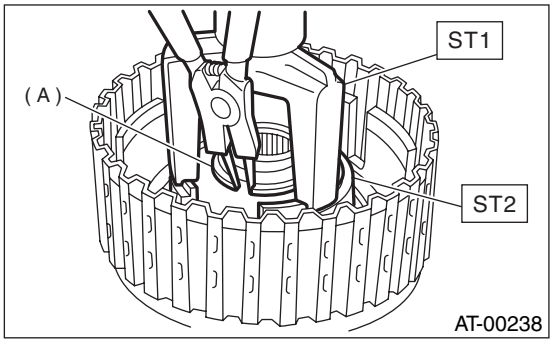
(A) Snap ring

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



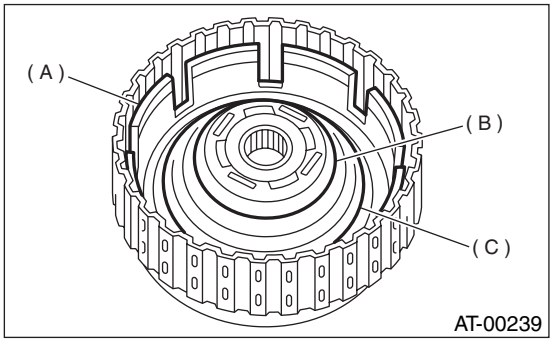
(A) Snap ring

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



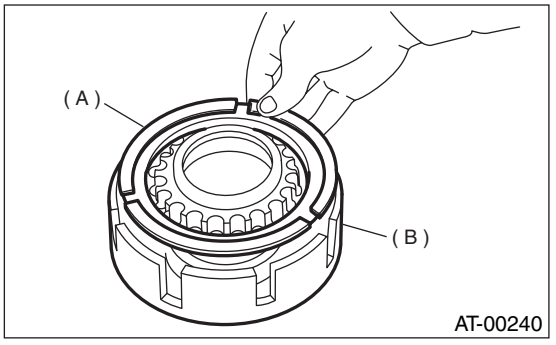
(A) Snap ring

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



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

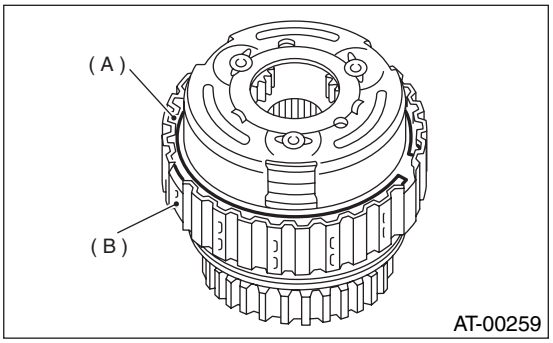
5) Remove seal rings and lip seal from high clutch piston and reverse clutch piston.



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

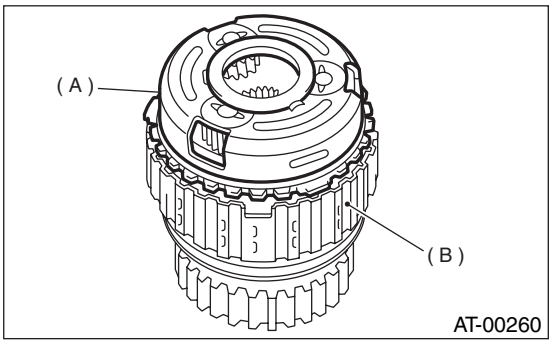
2. PLANETARY GEAR, LOW CLUTCH

1) Remove snap ring from the low clutch drum.



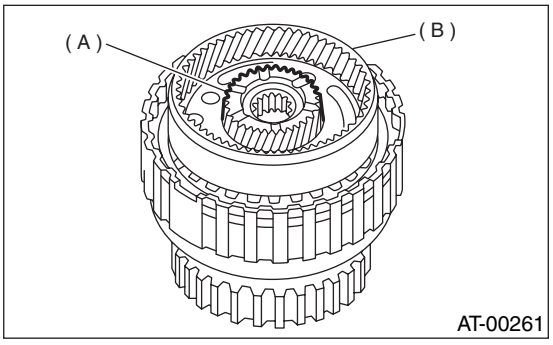
(A) Snap ring
(B) Low clutch drum

2) Take out front planetary carrier.



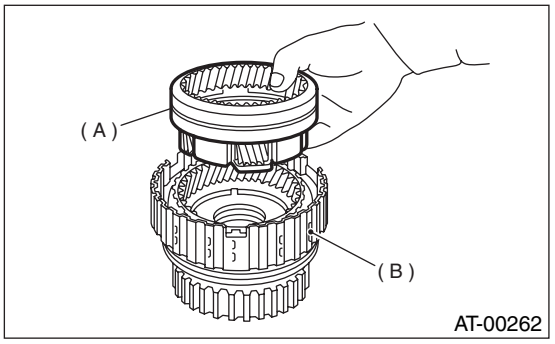
(A) Front planetary carrier
(B) Low clutch drum

3) Take out rear sun gear.



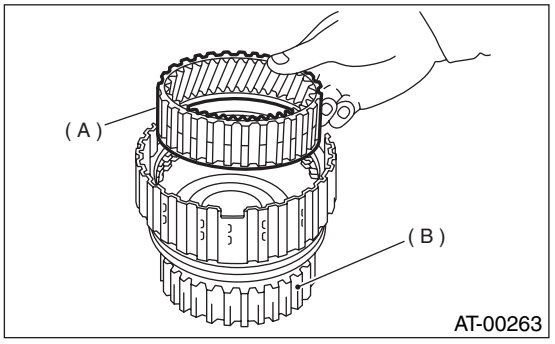
(A) Rear sun gear
(B) Rear planetary carrier

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



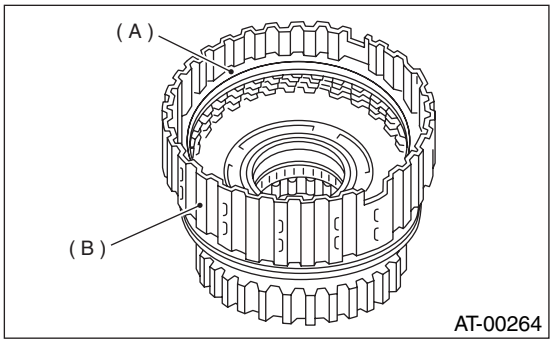
(A) Rear planetary carrier
(B) Low clutch drum

5) Take out rear internal gear.



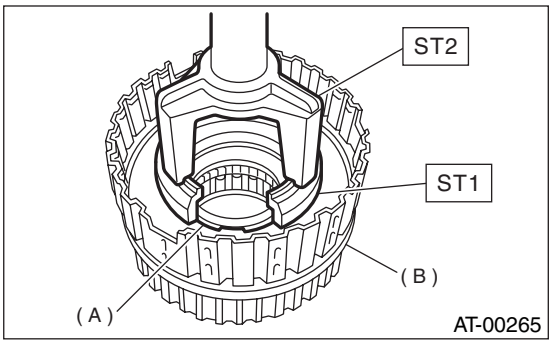
(A) Rear internal gear
(B) Low clutch drum

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



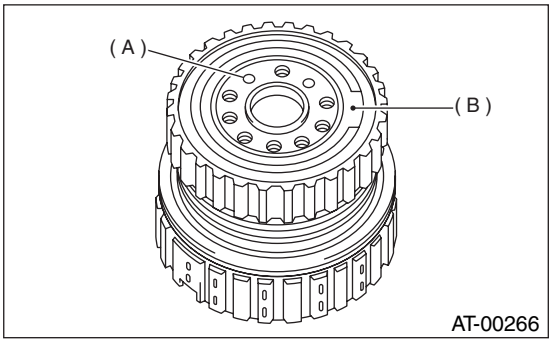
(A) Snap ring
(B) Low clutch drum

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

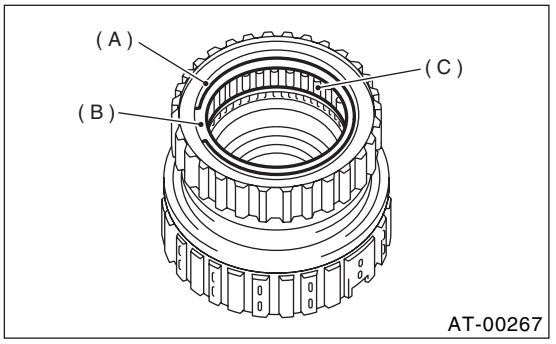
8) Remove one-way clutch. <Ref. to 4AT-122, REMOVAL, AT Main Case.>
9) Install the one-way clutch inner race to the low clutch drum, and apply compressed air to remove the low clutch piston.



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

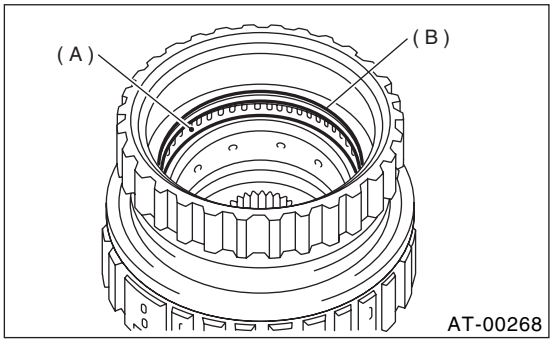
10) Remove the one-way clutch inner race.

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



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

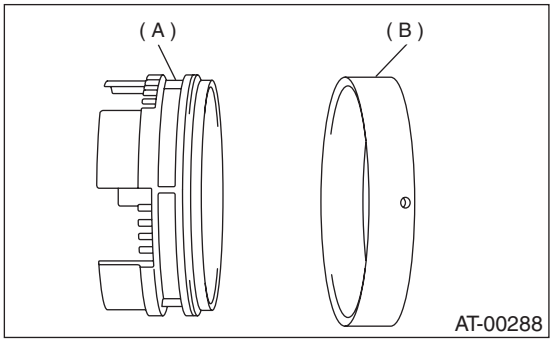
12) Remove the needle bearing after taking out the snap ring.



(A) Needle bearing
(B) Snap ring

3. 2-4 BRAKE

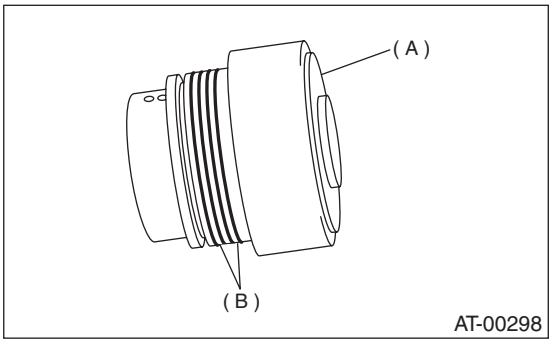
1) Separate 2-4 brake piston and piston retainer.



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

4. ONE-WAY CLUTCH INNER RACE

1) Remove seal rings.

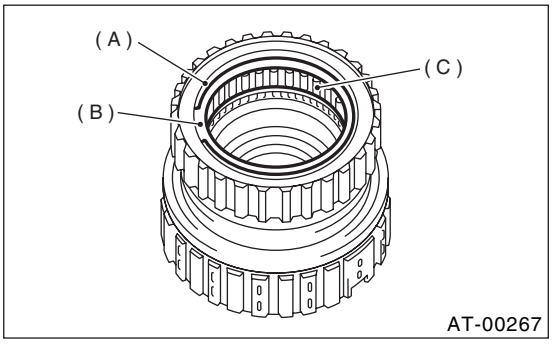


(A) One way clutch inner race
(B) Seal rings

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

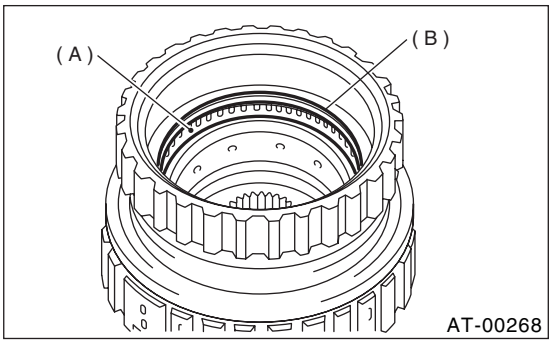
5. ONE-WAY CLUTCH OUTER RACE

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.



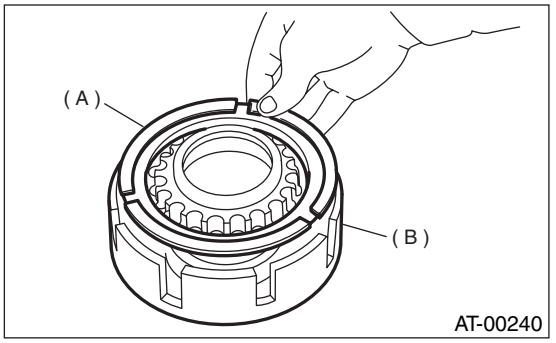
(A) Needle bearing
(B) Snap ring

D: ASSEMBLY

1. HIGH CLUTCH, REVERSE CLUTCH

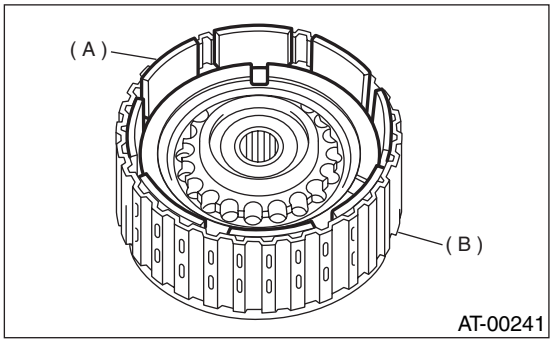
• NON-TURBO MODEL

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



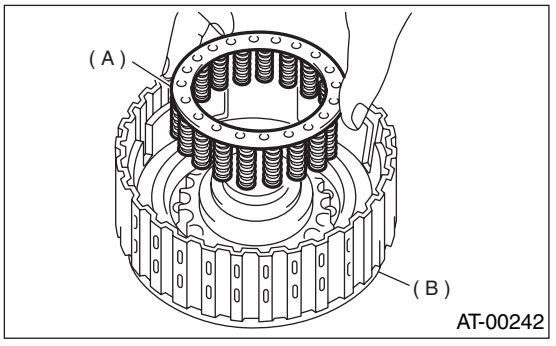
(A) High clutch piston
(B) Reverse clutch piston

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.



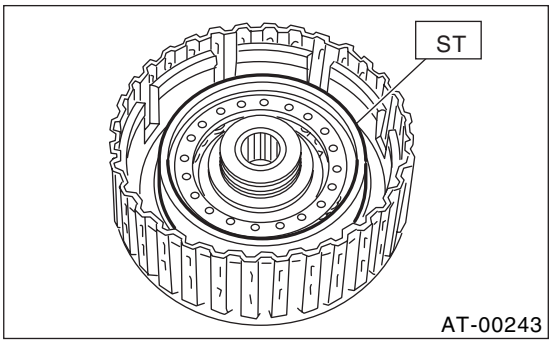
(A) Reverse clutch piston
(B) High clutch drum

4) Install spring retainer to high clutch piston.

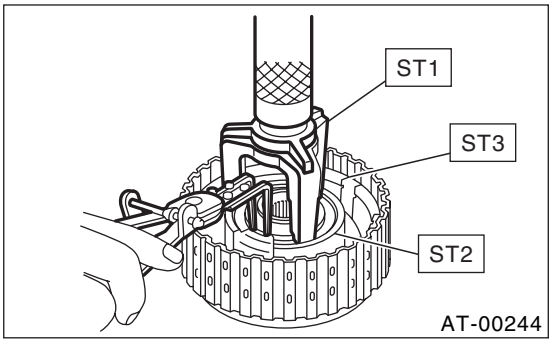


(A) Return spring
(B) High clutch drum

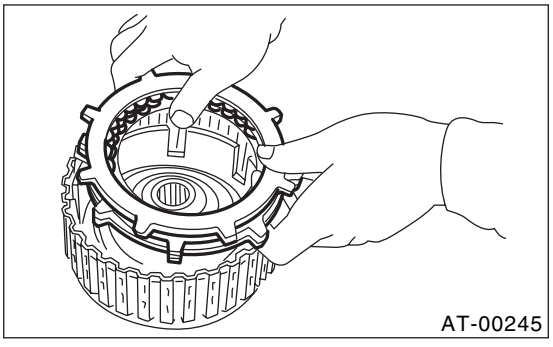
5) Install ST to high clutch piston.
ST 498437000 HIGH CLUTCH PISTON GUIDE



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

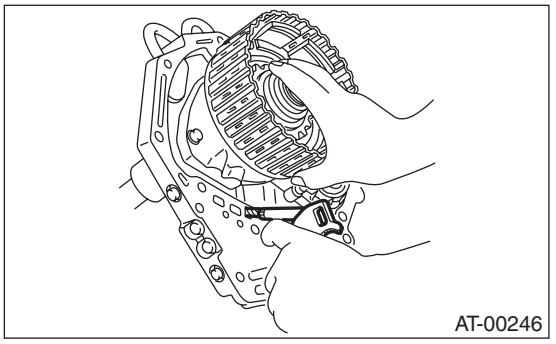


8) Install the thickest driven plate to piston side, and then install the driven plate, drive plate, retaining plate to high clutch drum.



9) Install snap ring to high clutch drum.

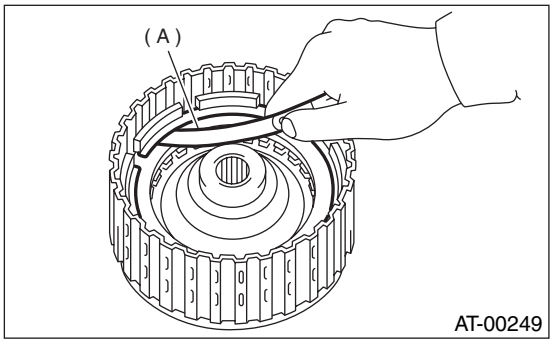
10) Apply compressed air intermittently to check for operation.



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)

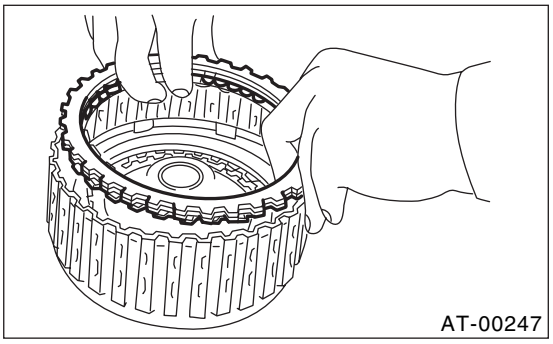


(A) Thickness gauge

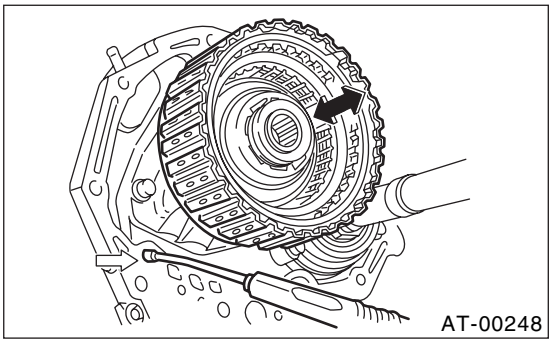
If specified tolerance limits are exceeded, select a suitable high clutch retaining plate.
If the clearance is above the limit, replace the drive plate with new one and adjust so that the clearance becomes within the specified value.

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.



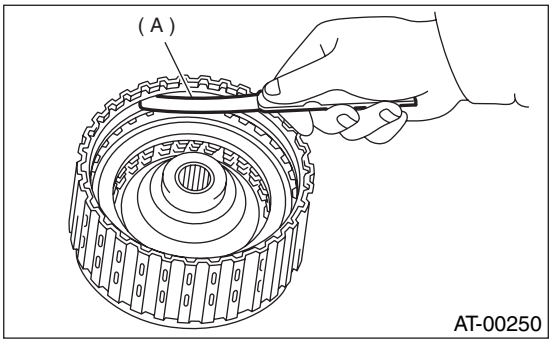
13) Apply compressed air intermittently to check for operation.



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)



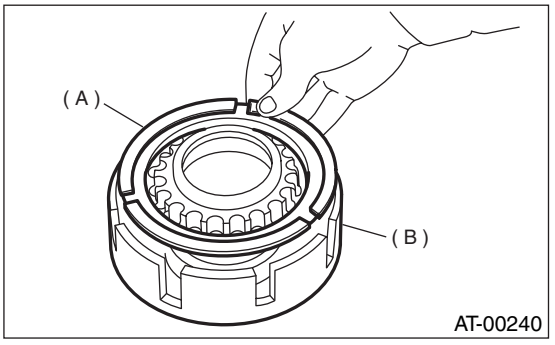
(A) Thickness gauge

If specified tolerance limits are exceeded, select a suitable reverse clutch retaining plate.
If the clearance is above the limit, replace the retaining plate with new one, so that the clearance becomes within the specified value.

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)

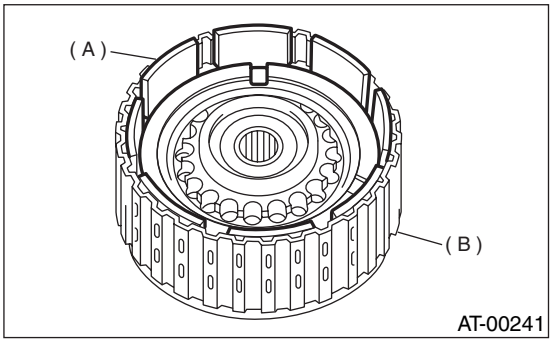
• TURBO MODEL

1) Install the seal ring and lip seal to the high clutch-piston and reverse clutch piston.
2) Install the high clutch piston to reverse clutch piston.



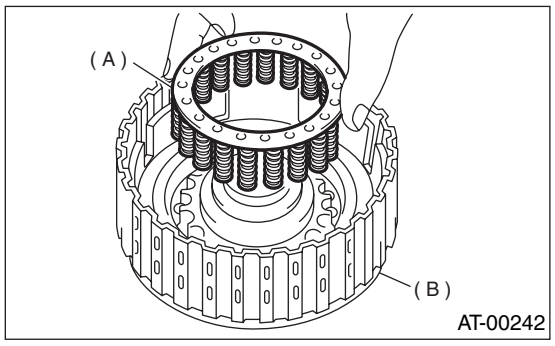
(A) High clutch piston
(B) Reverse clutch piston

3) Install the reverse clutch piston to high clutch drum. Align the groove on reverse clutch piston with the groove on high clutch drum during installation.



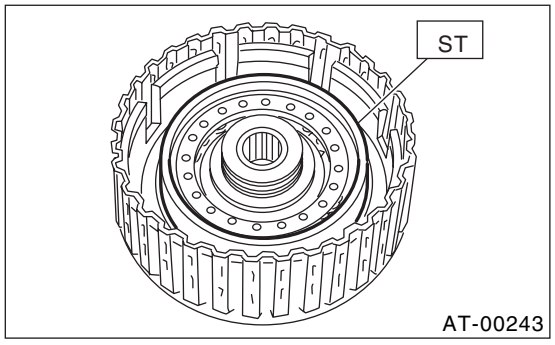
(A) Reverse clutch piston
(B) High clutch drum

4) Install the spring retainer to high clutch piston.

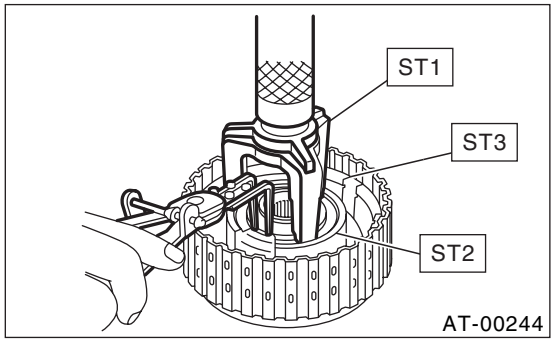


(A) Spring retainer
(B) High clutch drum

5) Install the ST to high clutch piston.
ST 498437000 HIGH CLUTCH PISTON GUIDE



6) Install the cover to high clutch piston without folding the high clutch piston seal.
7) Install the snap ring using ST1 and ST2.
ST1 398673600 COMPRESSOR
ST2 498627100 SEAT
ST3 498437000 HIGH CLUTCH PISTON GUIDE



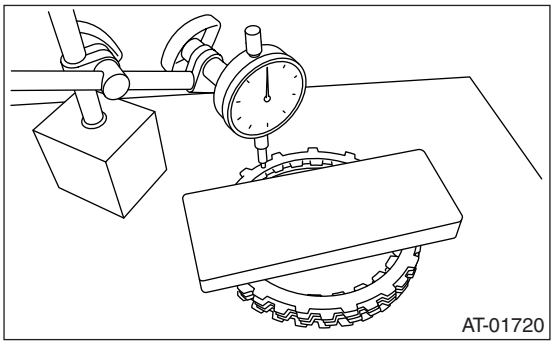
8) Place the dish plate, driven plate, drive plate and retaining plate neatly in this order on surface table.
9) Set the micro gauge to clutch, and read its scale.

NOTE:
The value, which is read in the gauge at this time, is zero point.

10) Scale and record the weight “Z” of a flat board which will be put on plates.

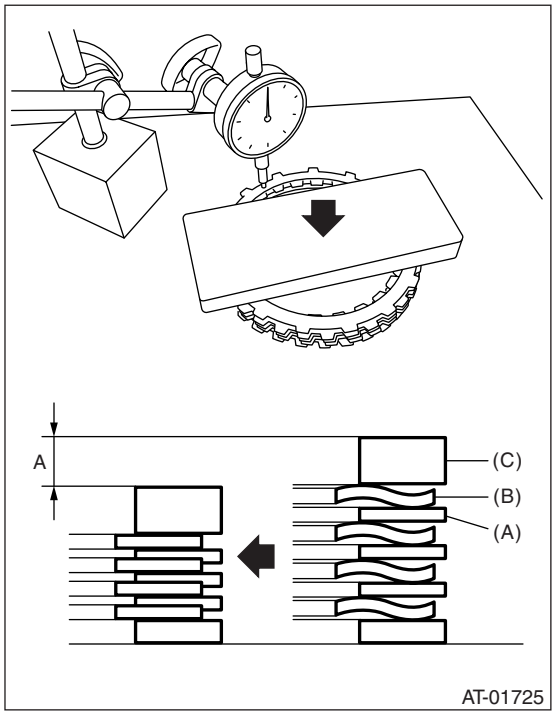
NOTE:
• Use a stiff flat board which does not bend against load.
• Use a flat board of its weight less than 250 N (25.5 kgf, 56.2 lb).

11) Put the flat board on retaining plate.



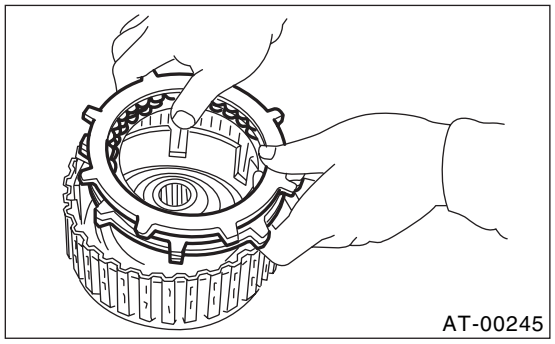
12) Using the following formula, calculate “N” indicated on the push/pull gauge.
N = 250 N (25.5 kgf, 56.2 lb) – Z
N: Value indicated on push/pull gauge
250 N (25.5 kgf, 56.2 lb): Load applied to clutch plate
Z: Flat board weight
13) Press the center of retaining plate applying force of N with push/pull gauge, and then measure and record the height A. Make more than three measurements at even distance and take the average value.

NOTE:
If three points, measure the height every 120°. If four points, measure the height every 90°.



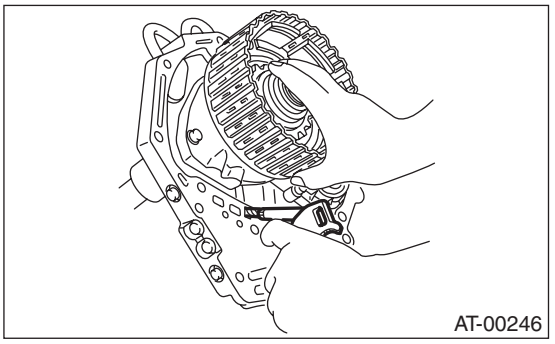
(A) Driven plate
(B) Drive plate
(C) Retaining plate

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

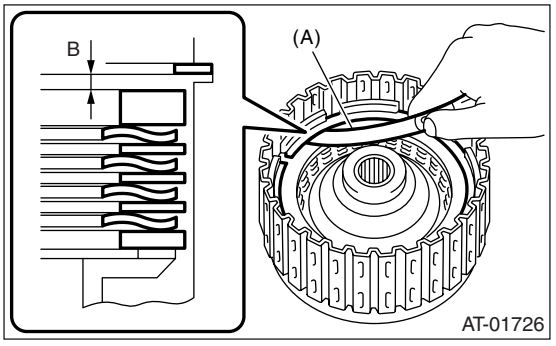


15) Install the snap ring to high clutch drum.

16) Apply compressed air intermittently to check for operation.



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



(A) Thickness gauge

18) Piston stroke calculation
Select the retaining plate within the specification by calculating with A and B dimensions which have been recorded before. If the calculated value exceeds the usage limit, replace the drive plate with a new one and adjust it within the specitication.
T = A + B
T: Piston stroke
A: Collapse amount of drive plate
B: Clearance between retaining plate and snap ring

Initial standard:
2.0 — 2.3 mm (0.079 — 0.091 in)

Limit thickness:
2.6 mm (0.102 in)

High clutch retaining plate	
Part number	Thickness mm (in)
31567AA670	5.1 (0.201)
31567AA680	5.2 (0.205)
31567AA690	5.3 (0.209)
31567AA700	5.4 (0.213)
31567AA710	5.5 (0.217)
31567AA720	5.6 (0.220)
31567AA730	5.7 (0.224)
31567AA740	5.8 (0.228)

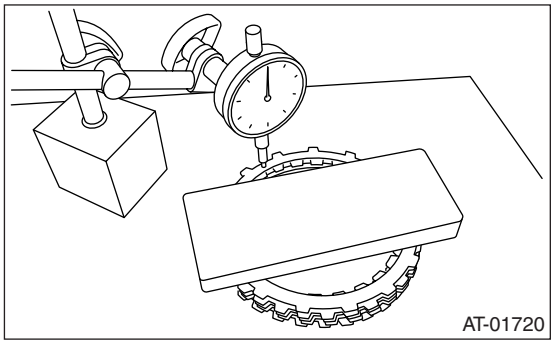
19) Place the dish plate, driven plate, drive plate and retaining plate neatly in this order on surface table.
20) Set the micro gauge to clutch, and read its scale.

NOTE:
The value, which is read in the gauge at this time, is zero point.

21) Scale and record the weight "Z" of a flat board which will be put on plates.

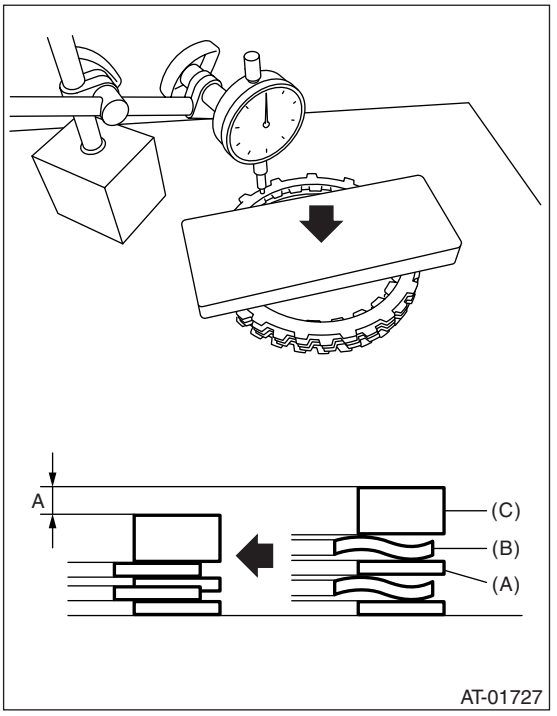
NOTE:
• Use a stiff flat board which does not bend against load.
• Use a flat board of its weight less than 150 N (15.3 kgf, 33.7 lb).

22) Put the flat board on retaining plate.



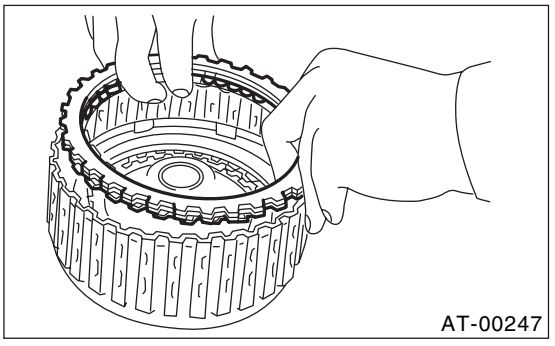
23) Using the following formula, calculate "N" indicated on the push/pull gauge.
N = 150 N (15.3 kgf, 33.7 lb) – Z
N: Value indicated on push/pull gauge
150 N (15.3 kgf, 33.7 lb): Load applied to clutch plate
Z: Flat board weight
24) Press the center of retaining plate applying force of N with push/pull gauge, and then measure and record the height A. Make more than three measurements at even distance and take the average value.

NOTE:
If three points, measure the height every 120°. If four points, measure the height every 90°.

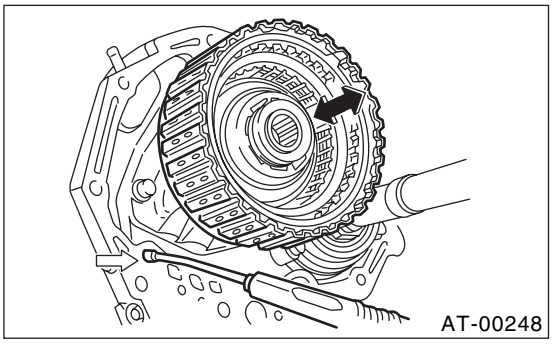


(A) Driven plate
(B) Drive plate
(C) Retaining plate

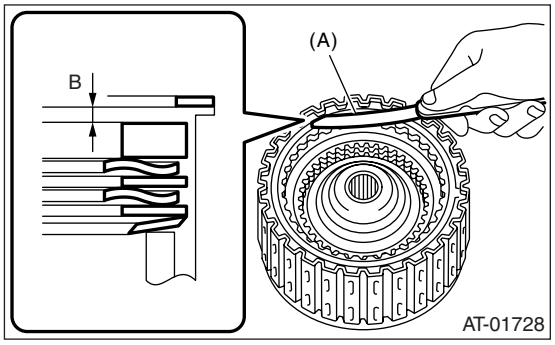
25) Install the driven plate, drive plate, retaining plate and snap ring.



26) Apply compressed air intermittently to check for operation.



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



(A) Thickness gauge

28) Piston stroke calculation
Select the retaining plate within the specification by calculating with A and B dimensions which have been recorded before. If the calculated value exceeds the usage limit, replace the drive plate with a new one and adjust it within the specitication.
T = A + B
T: Piston stroke
A: Collapse amount of drive plate
B: Clearance between retaining plate and snap ring

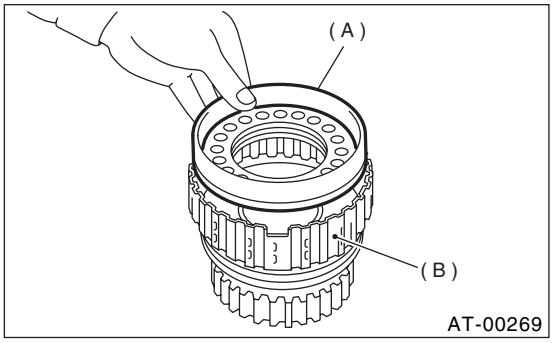
Initial standard:
1.1 — 1.4 mm (0.043 — 0.055 in)

Limit thickness:
1.6 mm (0.063 in)

Reverse clutch retaining plate	
Part number	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)

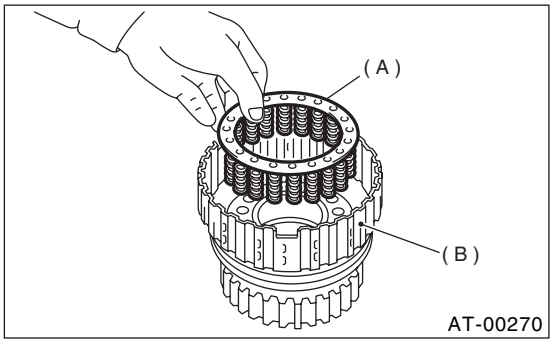
2. PLANETARY GEAR, LOW CLUTCH

1) Install new D-ring to low clutch piston.
2) Fit the low clutch piston to the low clutch drum.



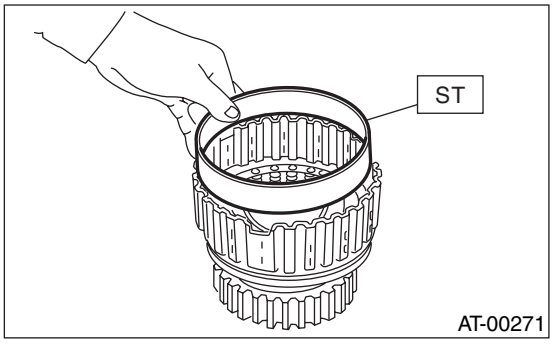
(A) Low clutch piston
(B) Low clutch drum

3) Install spring retainer to low clutch piston.



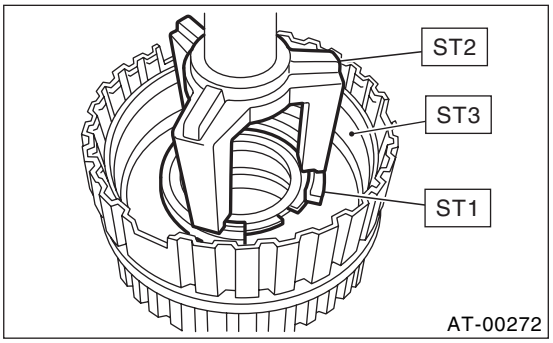
(A) Spring retainer
(B) Low clutch drum

4) Install ST to low clutch drum.
ST 498437100 LOW CLUTCH PISTON GUIDE

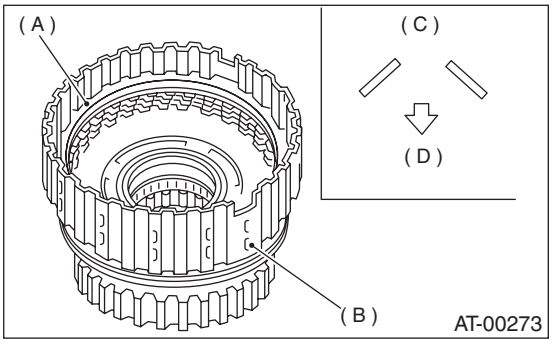


5) Set the cover on the piston with a press using ST1 and ST2, and attach the snap ring. At this time, be careful not to fold cover seal during installation.

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

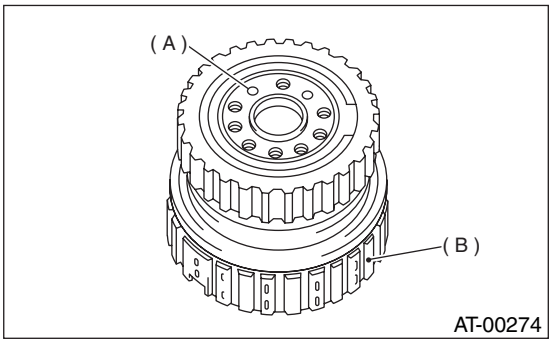


6) Install the dish plate, driven plates, drive plates, and retaining plate, and secure with the snap ring.



(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-122, REMOVAL, AT Main Case.>
(2) Set the one-way clutch inner race, and apply compressed air for checking.

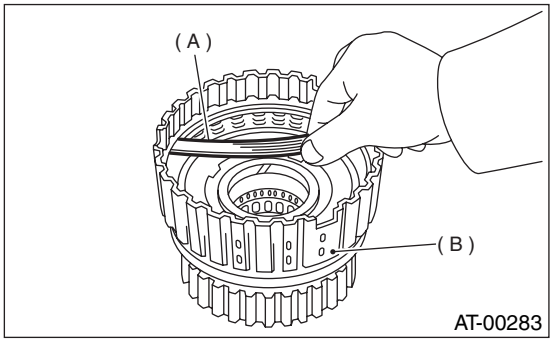


(A) Apply compressed air
(B) Low clutch drum

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)

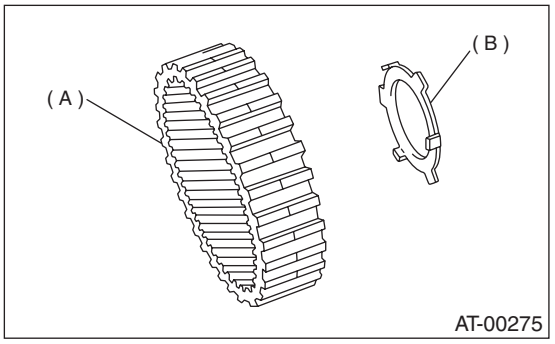


(A) Thickness gauge
(B) Low clutch drum

If the clearance is out of the specified range, select a proper retaining plate so that the standard clearance can be obtained.
If the clearance is above the limit, replace the drive plate with new one, so that the clearance becomes within the specified value.

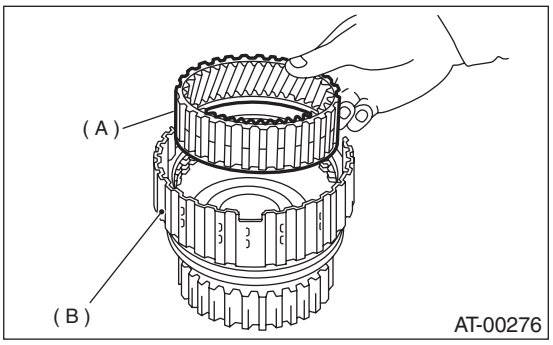
Available retaining plates	
Part No.	Thickness mm (in)
31567AA830	3.8 (0.150)
31567AA840	4.0 (0.157)
31567AA850	4.2 (0.165)
31567AA860	4.4 (0.173)
31567AA870	4.6 (0.181)

9) Install washer to rear internal gear.



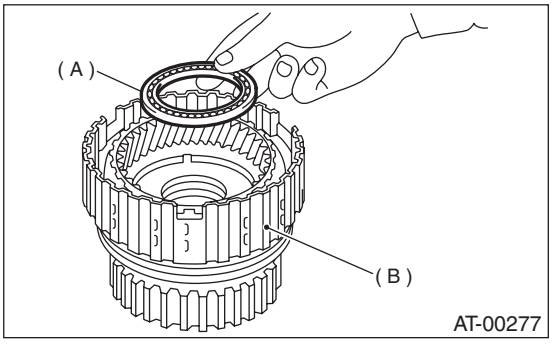
(A) Rear internal gear
(B) Washer

10) Install rear internal gear.



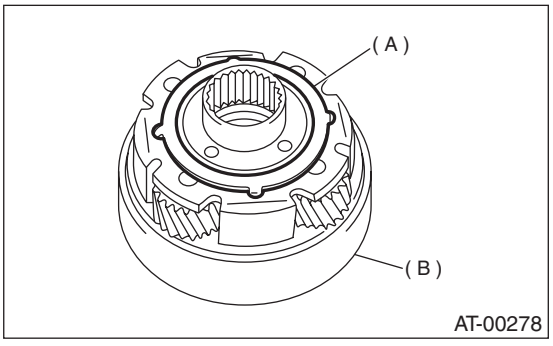
(A) Rear internal gear
(B) Low clutch drum

11) Install thrust needle bearing in the correct direction.



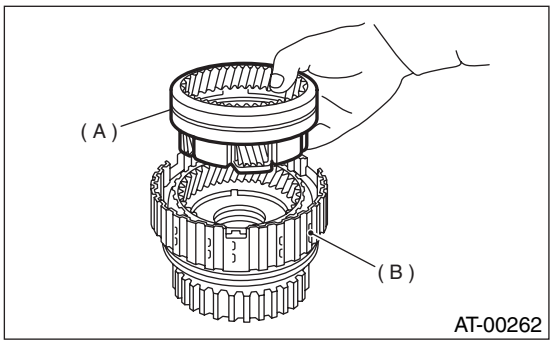
(A) Thrust needle bearing
(B) Low clutch drum

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



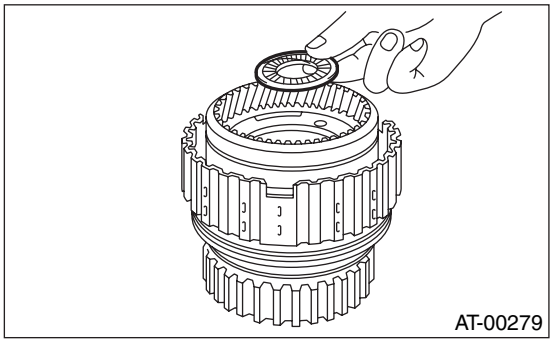
(A) Washer
(B) Rear planetary carrier

13) Install rear planetary carrier to low clutch drum.

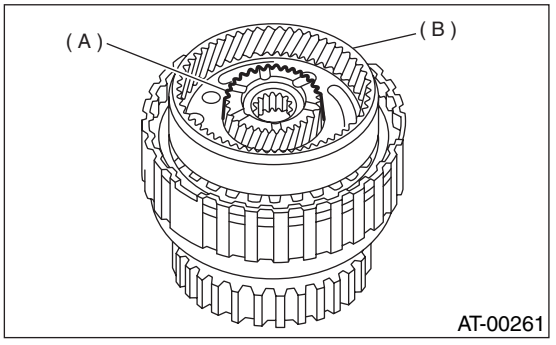


(A) Rear planetary carrier
(B) Low clutch drum

14) Install thrust needle bearing in the correct direction.

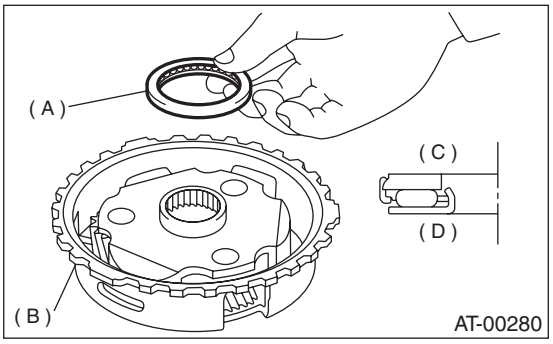


15) Install the rear sun gear in proper direction.



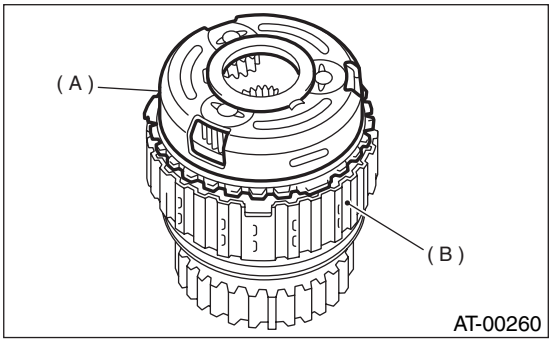
(A) Rear sun gear
(B) Rear planetary carrier

16) Install the thrust needle bearing in proper direction.



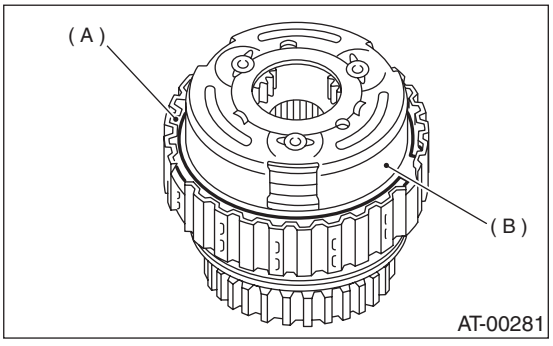
(A) Thrust needle bearing
(B) Front planetary carrier
(C) Rear sun gear side
(D) Front planetary carrier side

17) Install front planetary carrier to low clutch drum.



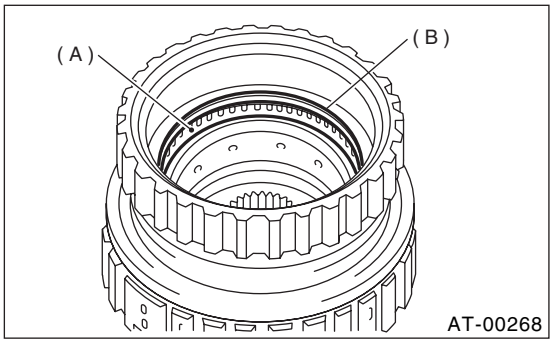
(A) Front planetary carrier
(B) Low clutch drum

18) Install snap ring to low clutch drum.



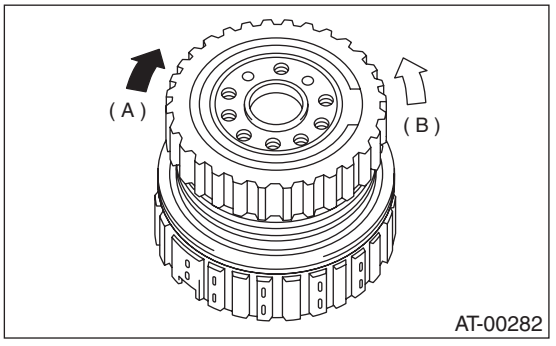
(A) Snap ring
(B) Front planetary carrier

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



(A) Needle bearing
(B) Snap ring

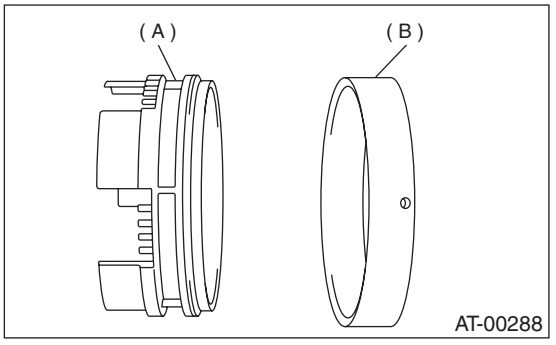
20) Install the one-way clutch, one-way clutch inner race and plate, and secure with the snap ring.
21) Set the inner race. Make sure that the forward clutch is free in the clockwise direction and locked in the counterclockwise direction, as viewed from the front of the vehicle.



(A) Locked
(B) Free

3. 2-4 BRAKE

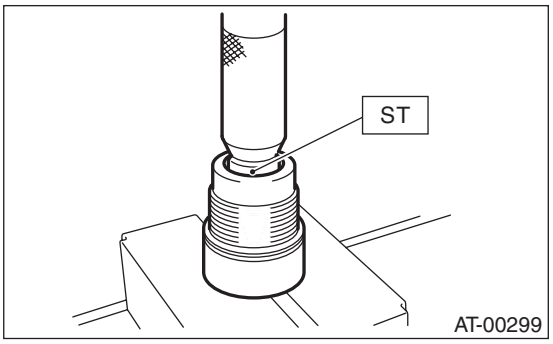
1) Install 2-4 brake piston to 2-4 brake piston retainer.



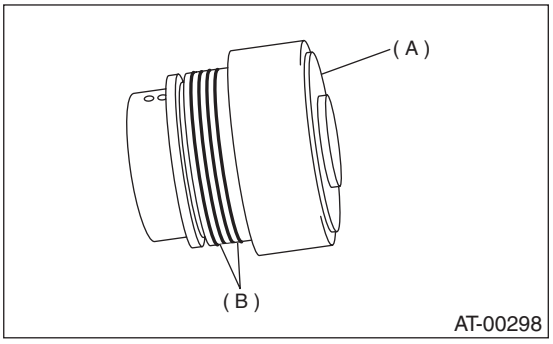
(A) 2-4 brake piston
(B) 2-4 brake piston retainer

4. ONE-WAY CLUTCH INNER RACE

1) Using a press and ST, install the needle bearing to the inner race.
ST 398497701 SEAT



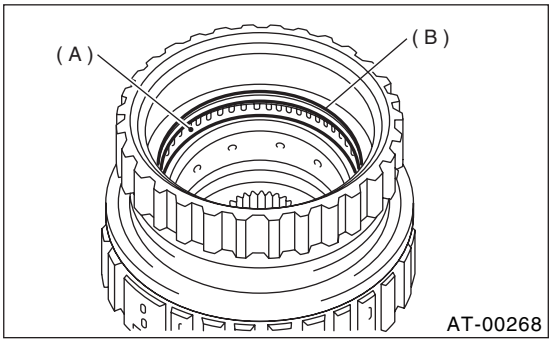
2) Apply vaseline to the groove of the inner race and to the seal ring.
3) Install two seal rings to one-way clutch inner race.



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

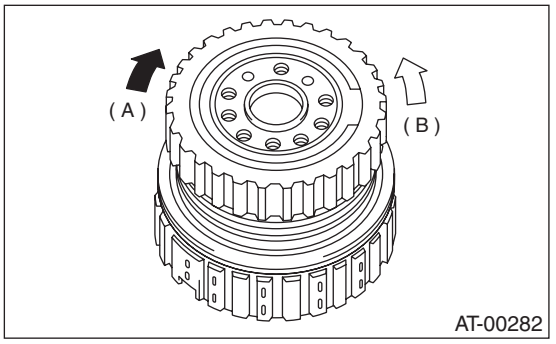
5. ONE-WAY CLUTCH OUTER RACE

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

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 D-ring for damage
- Piston and drum check ball for operation
- Adjust total end play. <Ref. to 4AT-110, 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 D-ring for damage
- Piston check ball for operation
- Measure the total end play and adjust to within specifications.

<Ref. to 4AT-110, 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 D-ring for damage
- Measure the total end play and adjust to within specifications.<Ref. to 4AT-110, ADJUSTMENT, Oil Pump Housing.>

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-110, ADJUSTMENT, Oil Pump Housing.>

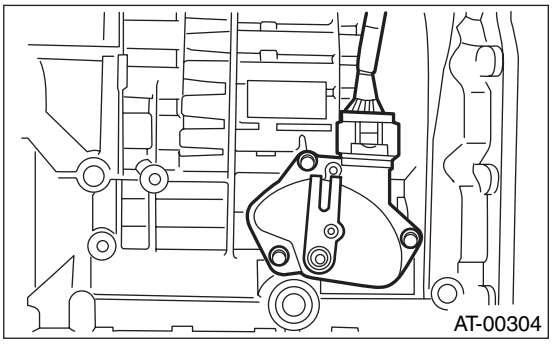
5. LOW AND REVERSE BRAKE

Check for the following.
- Drive plate facing for wear or damage
- Snap ring for wear and spring retainer for deformation

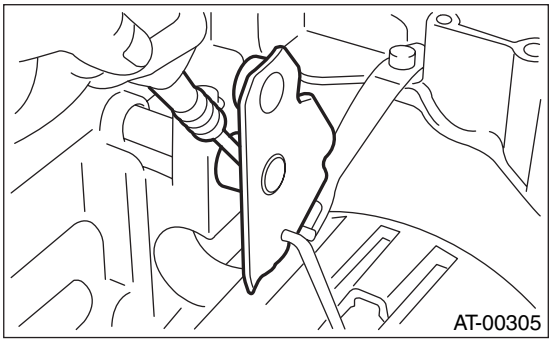
41.Transmission Control Device

A: REMOVAL

1) Remove the transmission assembly from the vehicle. <Ref. to 4AT-39, REMOVAL.>
2) Extract the torque converter clutch assembly. <Ref. to 4AT-84, REMOVAL.>
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-82, REMOVAL.>
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.

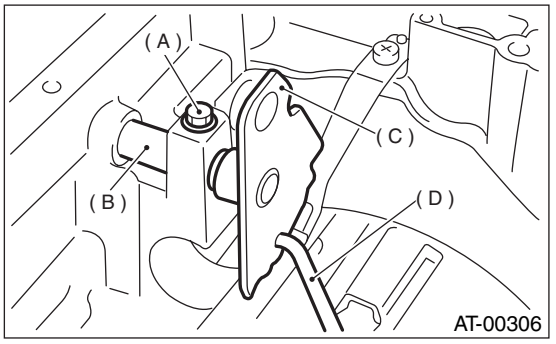


10) Remove the control valve body assembly. <Ref. to 4AT-61, REMOVAL.>
11) Pull off the straight pin of manual plate.



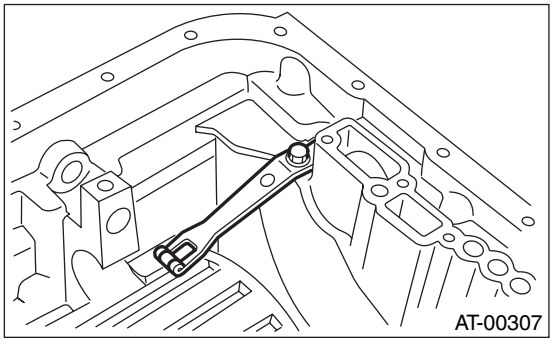
12) Remove the bolts securing select lever, then remove the select lever, manual plate and parking rod.

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

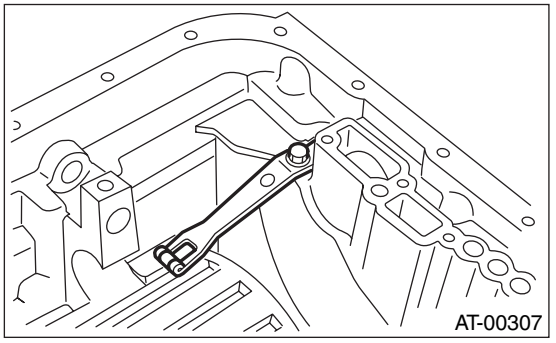
13) Remove the detention spring.



B: INSTALLATION

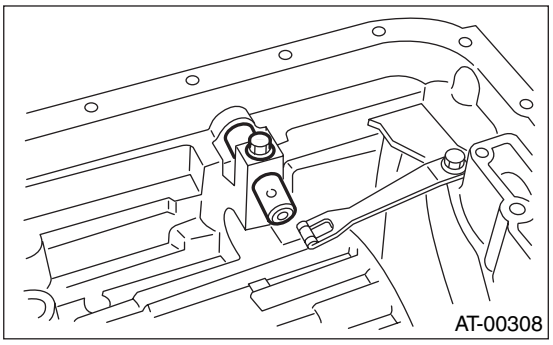
1) Install the detention spring to transmission case.

Tightening torque:
6 N·m (0.6 kgf-m, 4.3 ft-lb)

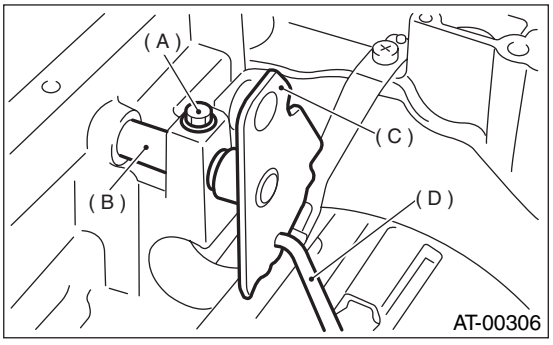


2) Insert the range select lever, and tighten the bolt.

Tightening torque:
6 N·m (0.6 kgf-m, 4.3 ft-lb)

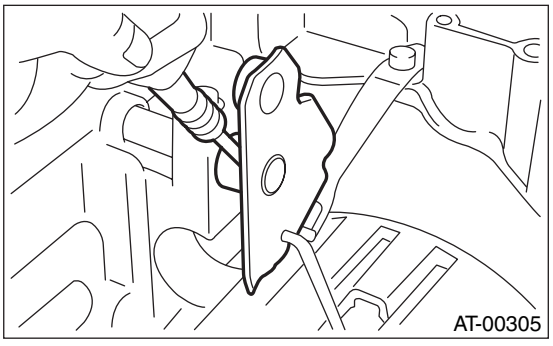


3) Insert the manual plate and parking rod.



(A) Bolt
(B) Range select lever
(C) Manual plate
(D) Parking rod

4) Insert the spring pin to manual plate.

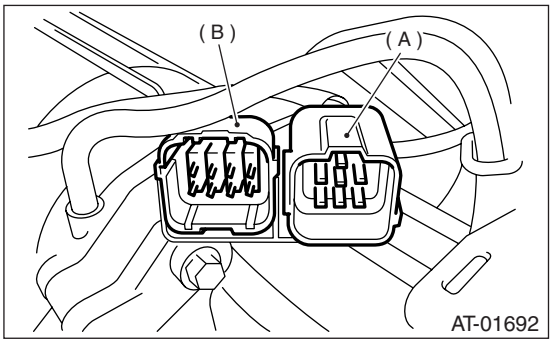


5) Install the control valve assembly and oil pan. <Ref. to 4AT-63, INSTALLATION.>
6) Turn over the transmission case to its original position.
7) Install the pitching stopper bracket.

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-50, Inhibitor Switch.>

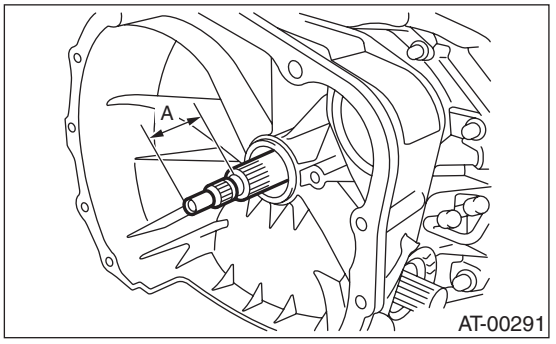
9) Insert the inhibitor switch and transmission connector into stay.



(A) Transmission harness
(B) Inhibitor switch harness

10) Install the air breather hose. <Ref. to 4AT-82, INSTALLATION.>
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-84, INSTALLATION.>
13) Install the transmission assembly to the vehicle. <Ref. to 4AT-42, INSTALLATION.>

C: INSPECTION

Make sure the manual lever and detention spring are not worn or otherwise damaged.

1. Basic Diagnostic Procedure

A: PROCEDURE

NOTE:
This section is specified for H4SO model.

	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.> •Make sure that each harness connector connections are tight. •Visually inspect the harness and check for any damage. •Oil leak •Stall speed test <Ref. to 4AT-34, Stall Test.> •Line pressure test <Ref. to 4AT-36, Line Pressure Test.> •Transfer clutch pressure test <Ref. to 4AT-38, Transfer Clutch Pressure Test.> •Time lag test <Ref. to 4AT-35, Time Lag Test.> •Road test <Ref. to 4AT-33, Road Test.> •Inhibitor switch <Ref. to 4AT-50, 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 blink?	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-28, Diagnostic Procedure for AT OIL TEMP Warning Light.> 3) Turn the ignition switch to ON.	Does the AT OIL TEMP warning light blink?	Go to step **4.**	Go to step **5.**
4	**CHECK INDICATION OF DTC.** Calling up the DTC. Without Subaru Select Monitor <Ref. to 4AT-21, WITHOUT SUBARU SELECT MONITOR, OPERATION, Read Diagnostic Trouble Code (DTC).> With Subaru Select Monitor <Ref. to 4AT-22, WITH SUBARU SELECT MONITOR, OPERATION, 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.**

	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-24, WITHOUT SUBARU SELECT MONITOR, OPERATION, Clear Memory Mode.> With Subaru Select Monitor <Ref. to 4AT-24, WITH SUBARU SELECT MONITOR, OPERATION, Clear Memory Mode.> 4) Perform the inspection mode. <Ref. to 4AT-23, Inspection Mode.> 5) Calling up the DTC. Without Subaru Select Monitor <Ref. to 4AT-21, WITHOUT SUBARU SELECT MONITOR, OPERATION, Read Diagnostic Trouble Code (DTC).> With Subaru Select Monitor <Ref. to 4AT-22, WITH SUBARU SELECT MONITOR, OPERATION, Read Diagnostic Trouble Code (DTC).>	Is the DTC displayed?	Go to step **6.**	Complete the diagnosis.
6	**PERFORM THE DIAGNOSIS.** 1) Inspect using “Diagnostics Chart with DTC”. <Ref. to 4AT-38, Diagnostic Procedure with Diagnostic Trouble Code (DTC).> NOTE: For DTC table, refer to “List of Diagnostic Trouble Code (DTC)”. <Ref. to 4AT-26, List of Diagnostic Trouble Code (DTC).> 2) Repair the trouble cause. 3) Perform the clear memory mode. Without Subaru Select Monitor <Ref. to 4AT-24, WITHOUT SUBARU SELECT MONITOR, OPERATION, Clear Memory Mode.> With Subaru Select Monitor <Ref. to 4AT-24, WITH SUBARU SELECT MONITOR, OPERATION, Clear Memory Mode.> 4) Perform the inspection mode. <Ref. to 4AT-23, Inspection Mode.> 5) Calling up the DTC. Without Subaru Select Monitor <Ref. to 4AT-21, WITHOUT SUBARU SELECT MONITOR, OPERATION, Read Diagnostic Trouble Code (DTC).> With Subaru Select Monitor <Ref. to 4AT-22, WITH SUBARU SELECT MONITOR, OPERATION, Read Diagnostic Trouble Code (DTC).>	Is the DTC displayed?	Inspect using “Diagnostics Procedure with Diagnostic Trouble Code (DTC)”. <Ref. to 4AT-38, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>	Complete the diagnosis.

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 ❑ Sport shift mode		
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

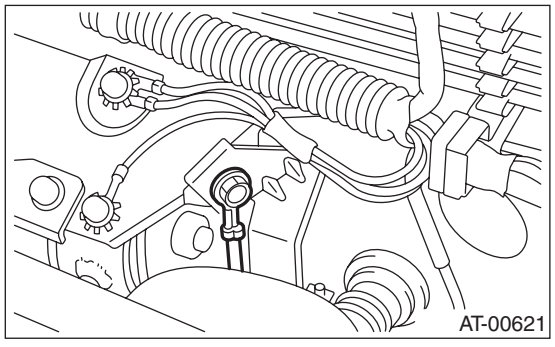
Specific gravity: Above 1.260

2. TRANSMISSION GROUND

Make sure that the ground terminal bolt is tightened securely.

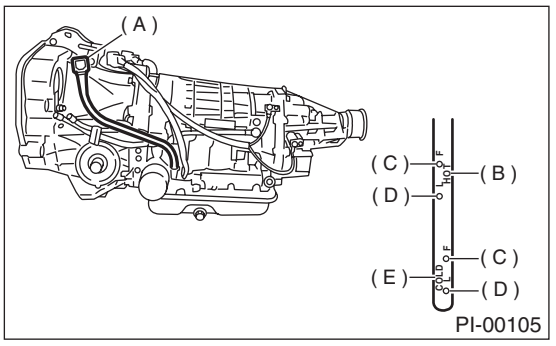
• Chassis side

Tightening torque:
13 N·m (1.3 kgf-m, 9.4 ft-lb)



3. ATF LEVEL

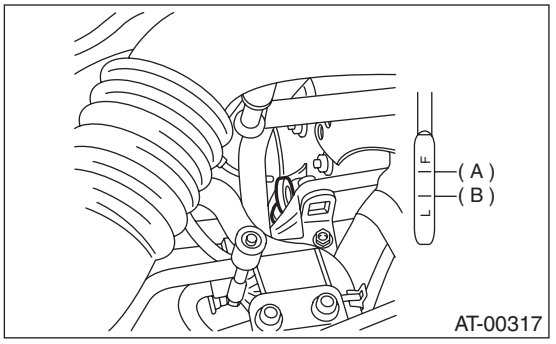
Make sure that ATF level is in the specification. <Ref. to 4AT-31, INSPECTION, Automatic Transmission Fluid.>



(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-32, INSPECTION, Differential Gear Oil.>



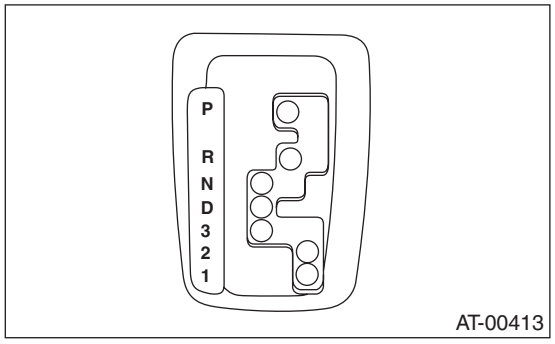
(A) Upper level
(B) Lower level

5. OPERATION OF SHIFT SELECT LEVER

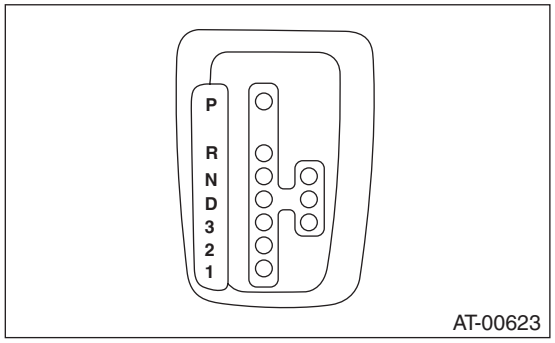
Make sure there is no abnormal noise, dragging or contact pattern in each select lever range.

WARNING:
Stop the engine while checking operation of selector lever.

- Without SPORT shift

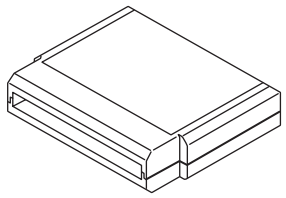


- With SPORT shift



C: PREPARATION TOOL

1. SPECIAL TOOLS

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST24082AA260	24082AA260	CARTRIDGE	Troubleshooting for electrical systems.
ST22771AA030	22771AA030	SELECT MONITOR KIT	Troubleshooting for electrical systems.

2. GENERAL PURPOSE TOOLS

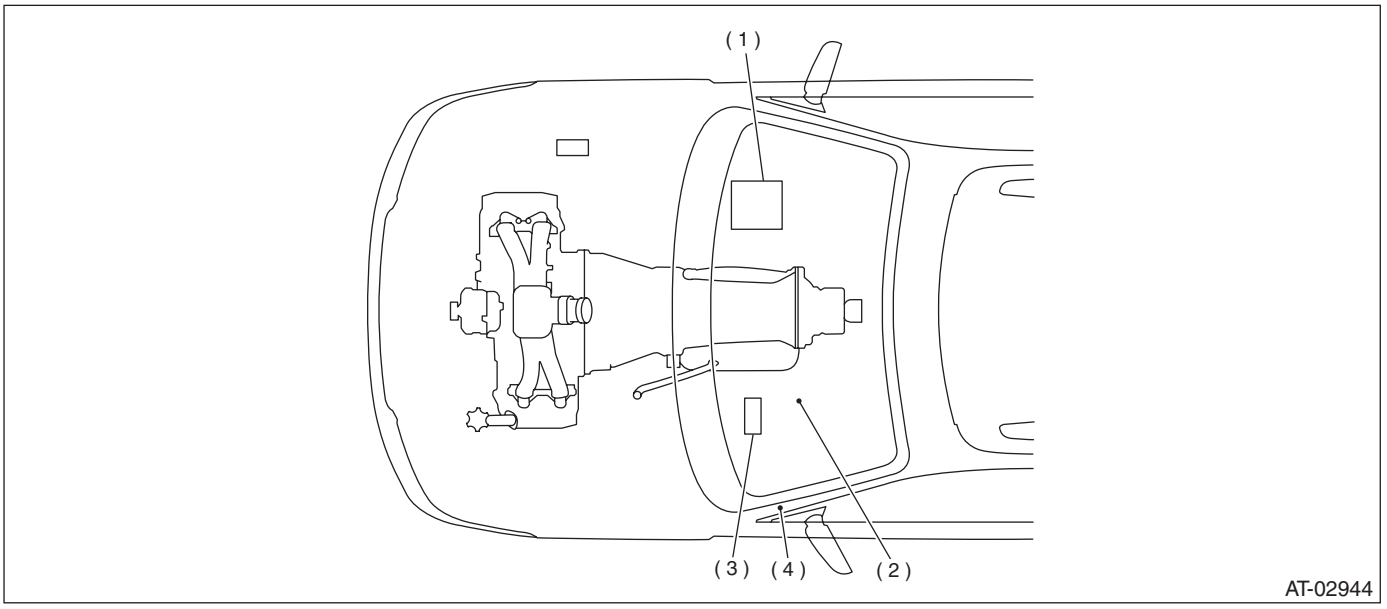
TOOL NAME	REMARKS
Circuit Tester	Used for measuring resistance, voltage and ampere.
Oscilloscope	Used for measuring sensor.

MEMO:

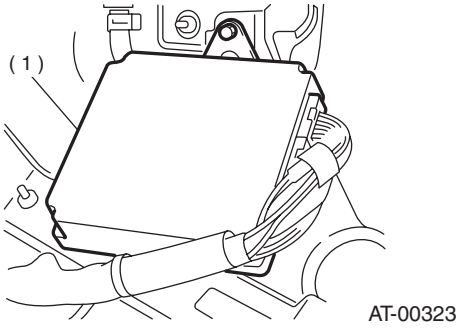
4. Electrical Components Location

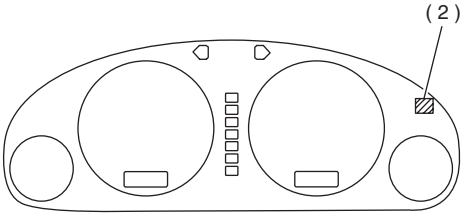
A: LOCATION

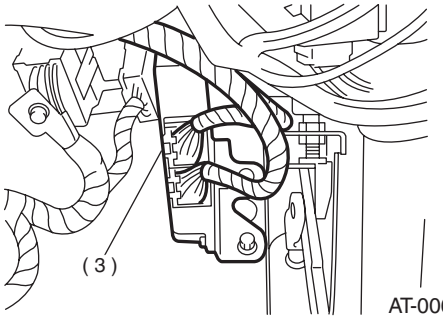
1. CONTROL MODULE

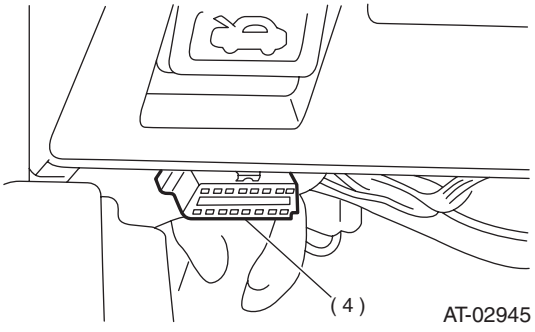


(1) Engine control module (ECM)
(2) AT OIL TEMP warning light (AT diagnostic indicator light)
(3) Transmission control module (TCM)
(4) Data link connector

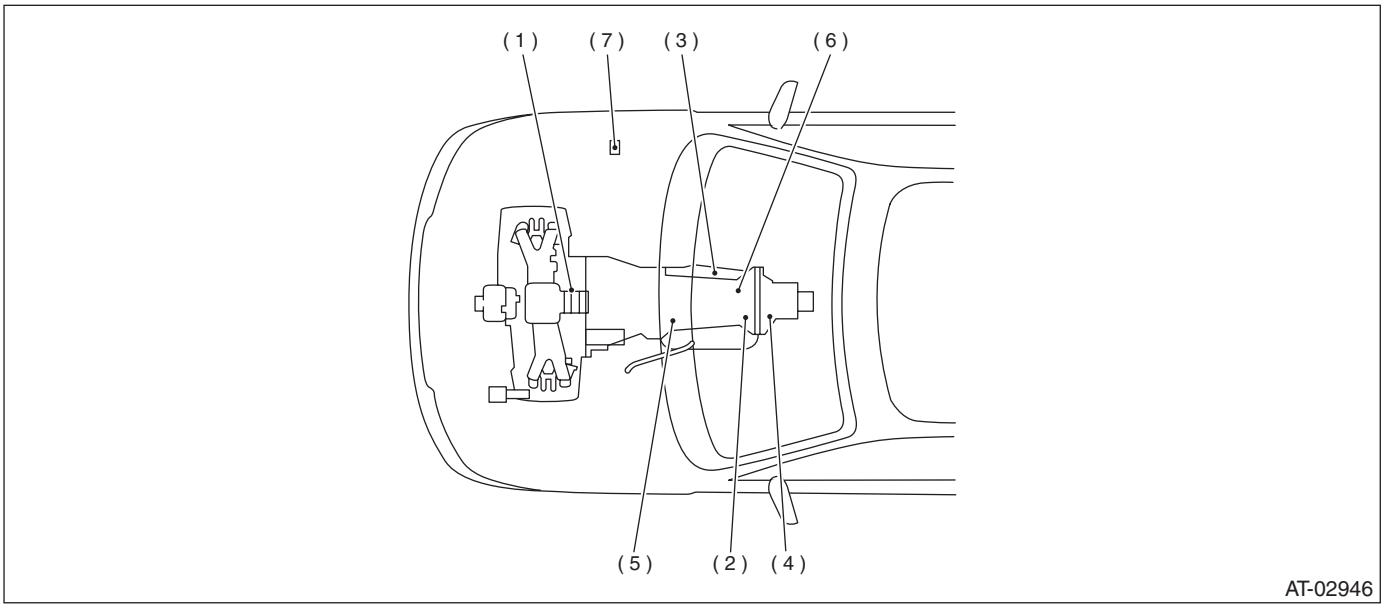




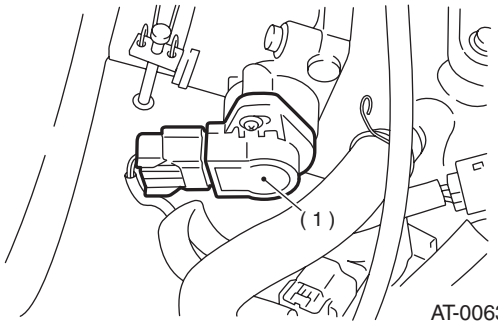


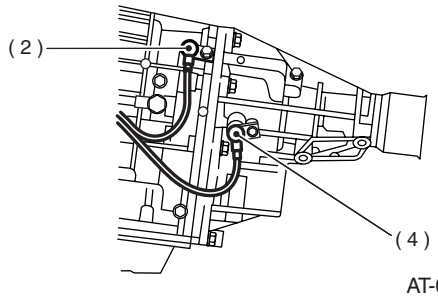


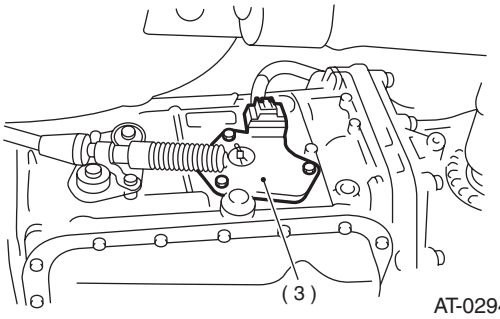
2. SENSOR

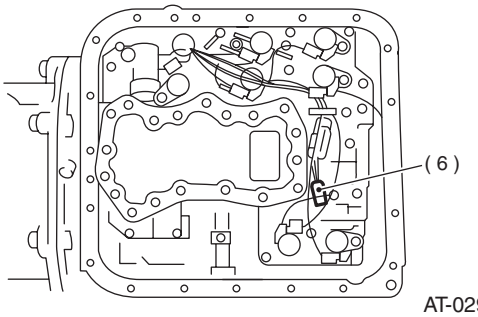


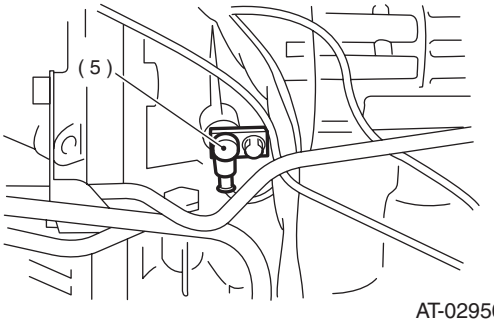
(1) Throttle position sensor
(2) Front vehicle speed sensor
(3) Inhibitor switch
(4) Rear vehicle speed sensor
(5) Torque converter turbine speed signal
(6) ATF temperature sensor (Non-TURBO model)
(7) Dropping resistor



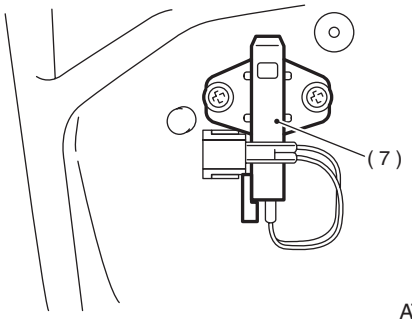






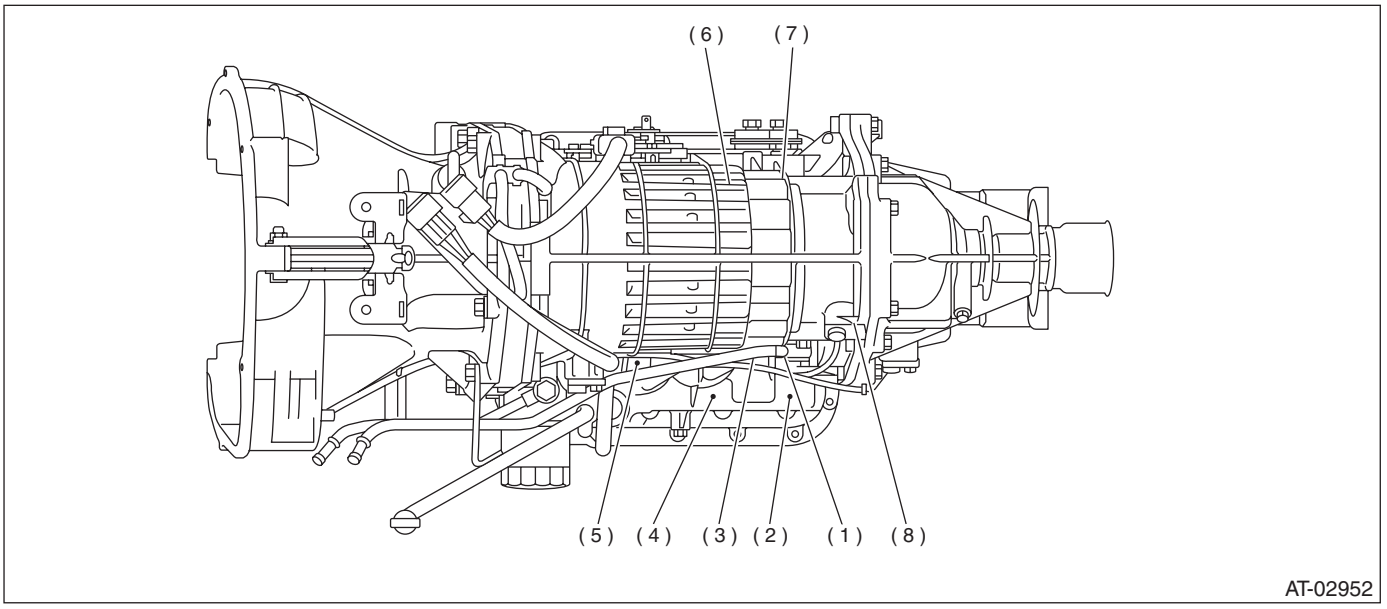


AT-02950

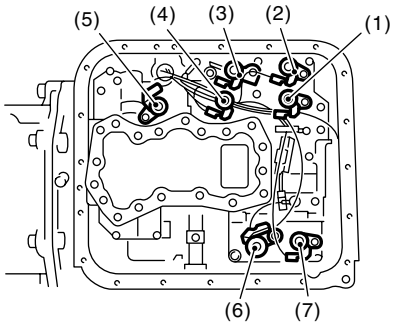


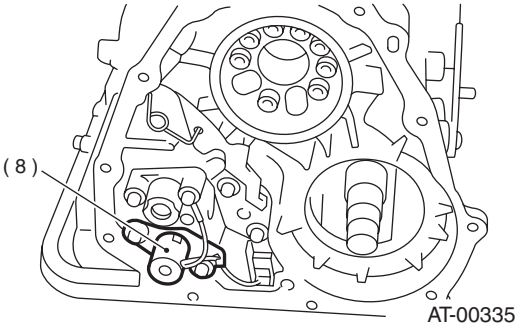
AT-02951

3. SOLENOID



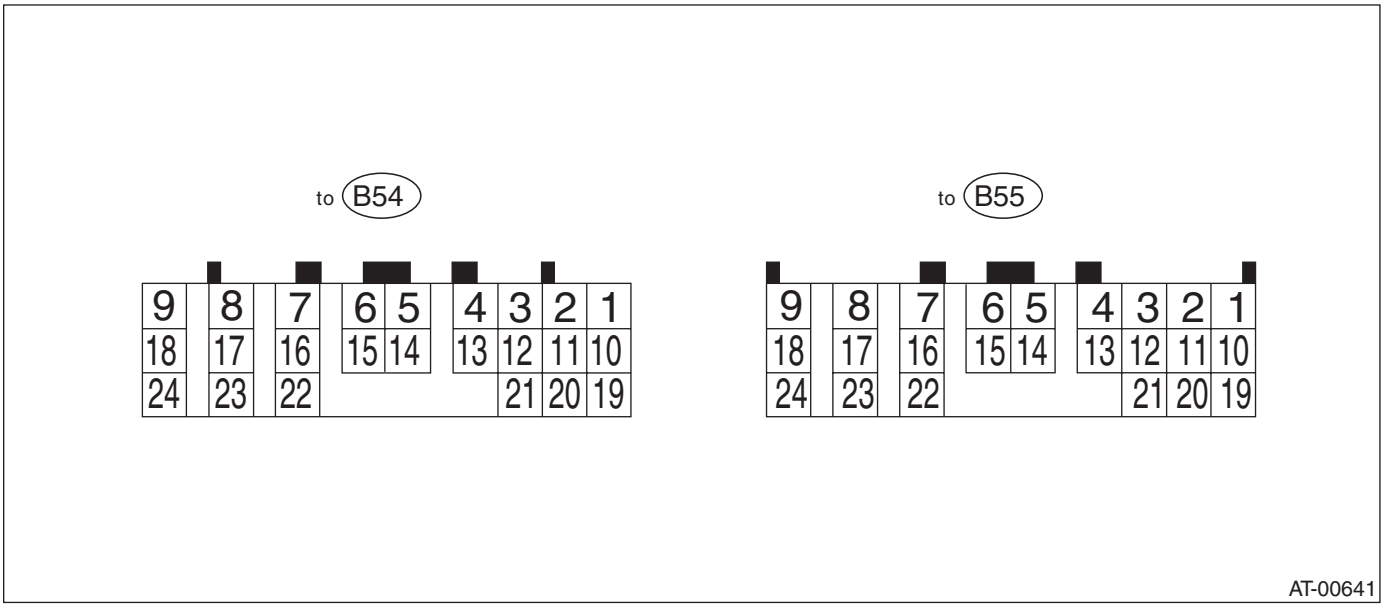
(1) Solenoid 1
(2) Solenoid 2
(3) Line pressure duty solenoid
(4) Low clutch timing solenoid
(5) Lock-up duty solenoid
(6) 2-4 brake duty solenoid
(7) 2-4 brake timing solenoid
(8) Transfer duty solenoid





5. Transmission Control Module (TCM) I/O Signal

A: ELECTRICAL SPECIFICATION

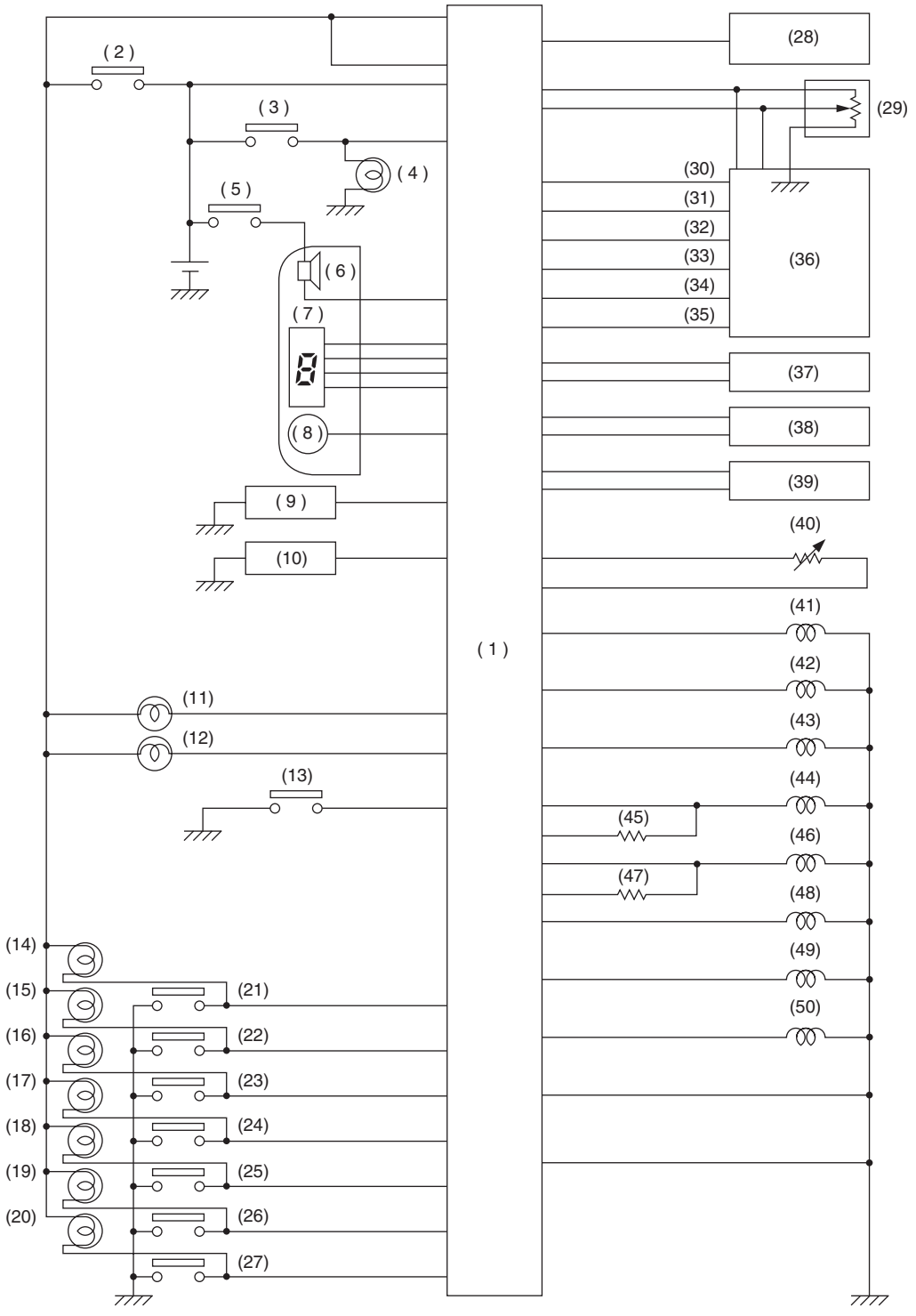


Check with ignition switch ON.						
Content		Connector No.	Terminal No.	Measuring conditions	Voltage (V)	Resistance to body (ohms)
Back-up power supply		B55	6	Ignition switch OFF	10 — 13	—
Ignition power supply		B54	23	Ignition switch ON (with engine OFF)	10 — 13	—
		B54	24			
Inhibitor switch	"P" range 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	
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	—

Check with ignition switch ON.					
Content	Connector No.	Terminal No.	Measuring conditions	Voltage (V)	Resistance to body (ohms)
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	
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	

Check with ignition switch ON.					
Content	Connector No.	Terminal No.	Measuring conditions	Voltage (V)	Resistance to body (ohms)
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	
AWD warning light	B54	12	Fuse ONFWD switch	Less than 1	—
			Fuse removed from FWD switch	More than 9	
AT diagnosis signal (Pulse signal)	B54	4	Ignition switch ON	Less than 1 ← → More than 4	—
Data link signal (Subaru Select Monitor)	B55	7	—	—	—

B: SCHEMATIC



AT-02953

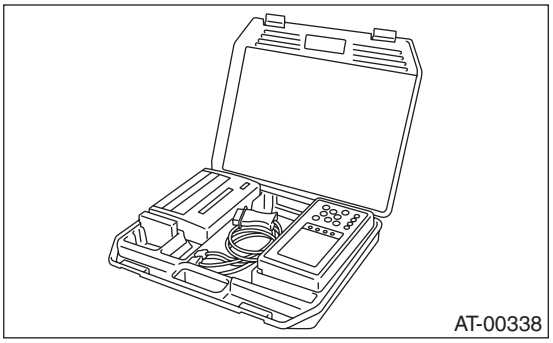
(1) Transmission control module
(2) Ignition switch
(3) Brake switch
(4) Brake light
(5) Ignition relay
(6) Buzzer (with SPORT shift)
(7) SPORT shift indicator (with SPORT shift)
(8) Speedometer
(9) Cruise control module
(10) ABS control module
(11) AWD warning light
(12) "AT OIL TEMP" warning light
(13) FWD switch
(14) "P" range indicator light
(15) "R" range indicator light
(16) "N" range indicator light
(17) "D" range indicator light
(18) "3" range indicator light
(19) "2" range indicator light
(20) "1" range indicator light
(21) "P" range switch
(22) "R" range switch
(23) "N" range switch
(24) "D" range switch
(25) "3" range switch
(26) "2" range switch
(27) "1" range switch
(28) Data link connector
(29) Throttle position sensor
(30) Engine speed signal
(31) Torque control cut signal
(32) Torque control signal 2
(33) Torque control signal 1
(34) Intake manifold pressure signal
(35) AT diagnosis signal
(36) Engine control module
(37) Front vehicle speed sensor
(38) Rear vehicle speed sensor
(39) Torque converter turbine speed sensor
(40) ATF temperature sensor
(41) Shift solenoid 1
(42) Shift solenoid 2
(43) 2-4 brake timing solenoid
(44) 2-4 brake duty solenoid
(45) 2-4 brake dropping resistor
(46) Line pressure duty solenoid
(47) Line pressure dropping resistor
(48) Lock-up duty solenoid
(49) Low clutch timing solenoid
(50) Transfer duty solenoid

6. Subaru Select Monitor

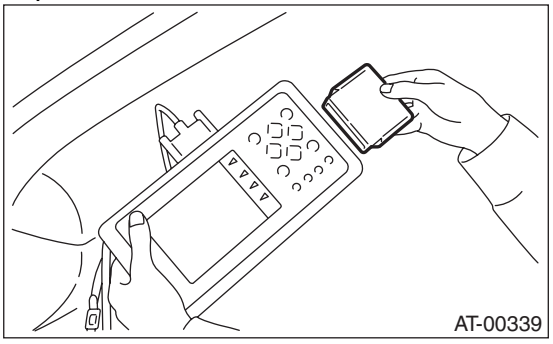
A: OPERATION

1. READ DIAGNOSTIC TROUBLE CODE (DTC)

1) Prepare the Subaru Select Monitor kit.

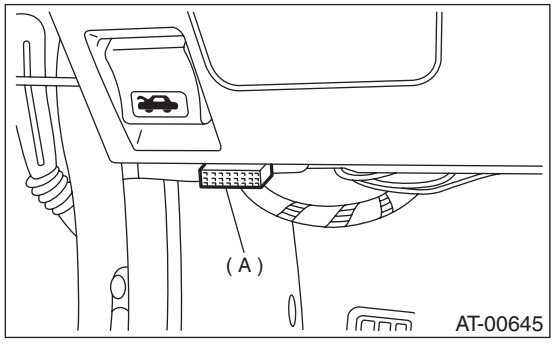


2) Connect the diagnosis cable to Subaru Select Monitor.
3) Insert the cartridge into Subaru Select Monitor. <Ref. to 4AT-7, PREPARATION TOOL, General Description.>



4) Connect the Subaru Select Monitor to data link connector.

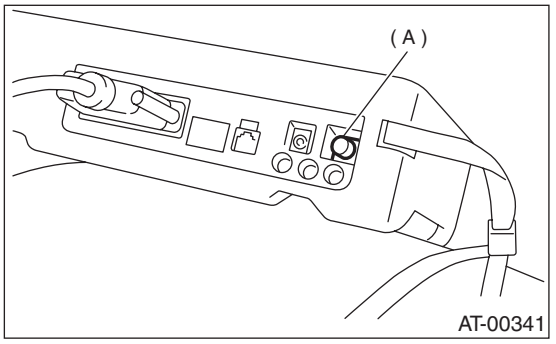
(1) Data link connector located in the lower portion of instrument panel (on driver's side).



(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-26, 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.

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 sensor	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	%
Intake manifold pressure sensor voltage	Mani. Pressure Voltage	V
Throttle position	Throttle Opening Angle	%
2 wheel drive switch signal	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.

7. Read Diagnostic Trouble Code (DTC)

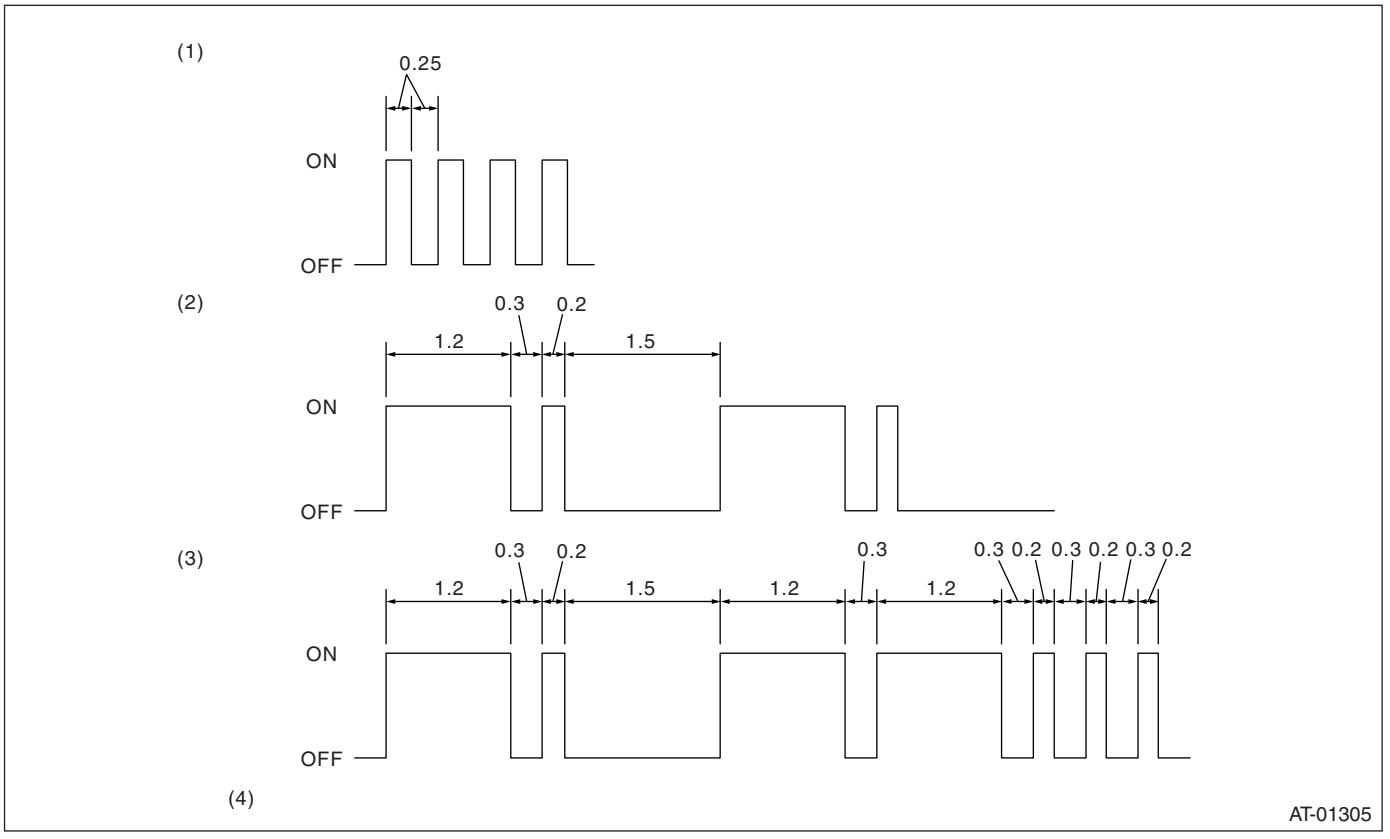
A: OPERATION

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-28, Diagnostic Procedure for AT OIL TEMP Warning Light.>, or Inspect inhibitor switch, wiring, TCM, etc.	Calling up the DTC again.

• 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
(2) DTC 11
(3) DTC 11 and 23
(4) Unit: Seconds

2. WITH SUBARU SELECT MONITOR

Refer to Subaru Select Monitor for information about how to obtain and understand DTC. <Ref. to 4AT-18, 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:

Remove the TCM connector (B55) 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.

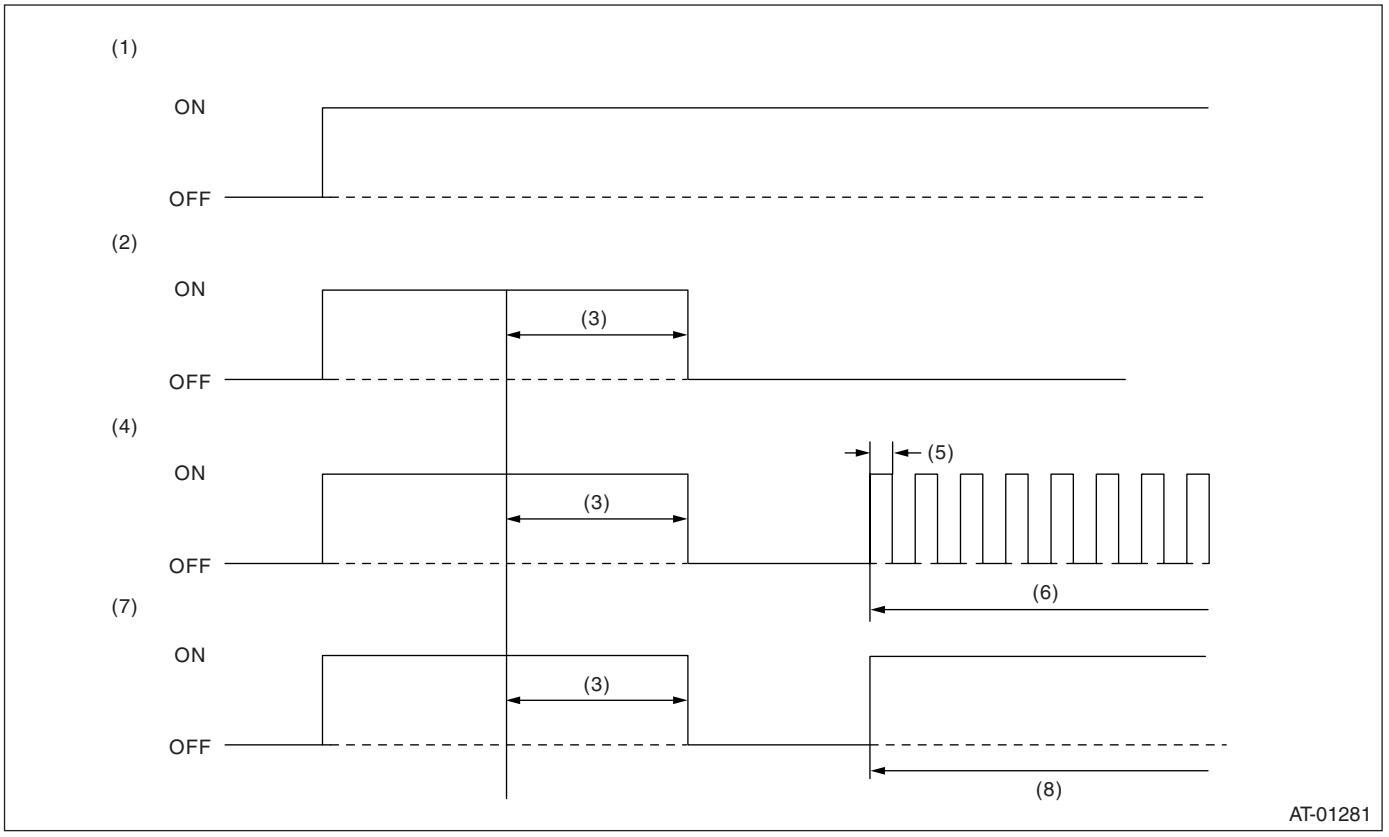
2. WITH SUBARU SELECT MONITOR

Refer to Subaru Select Monitor for information about how to clear DTC.
<Ref. to 4AT-20, CLEAR MEMORY MODE, OPERATION, Subaru Select Monitor.>

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 low)
(8) ATF temperature is high

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-38, DTC 11 ENGINE SPEED SIGNAL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
27	ATF temperature sensor	Detects open or shorted input signal circuit.	<Ref. to 4AT-40, 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-48, 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-52, 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-56, DTC 38 TORQUE CONTROL SIGNAL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
45	Intake manifold pressure signal	Detects open or shorted input signal circuit.	<Ref. to 4AT-58, DTC 45 INTAKE MANIFOLD PRESSURE SIGNAL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
71	Shift solenoid 1	Detects open or shorted output signal circuit.	<Ref. to 4AT-60, 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-64, 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-72, 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-76, 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-80, 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-84, 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).>

MEMO:

12.Diagnostic Procedure for AT OIL TEMP Warning Light

A: AT OIL TEMP WARNING LIGHT DOES NOT COME ON OR GO OFF

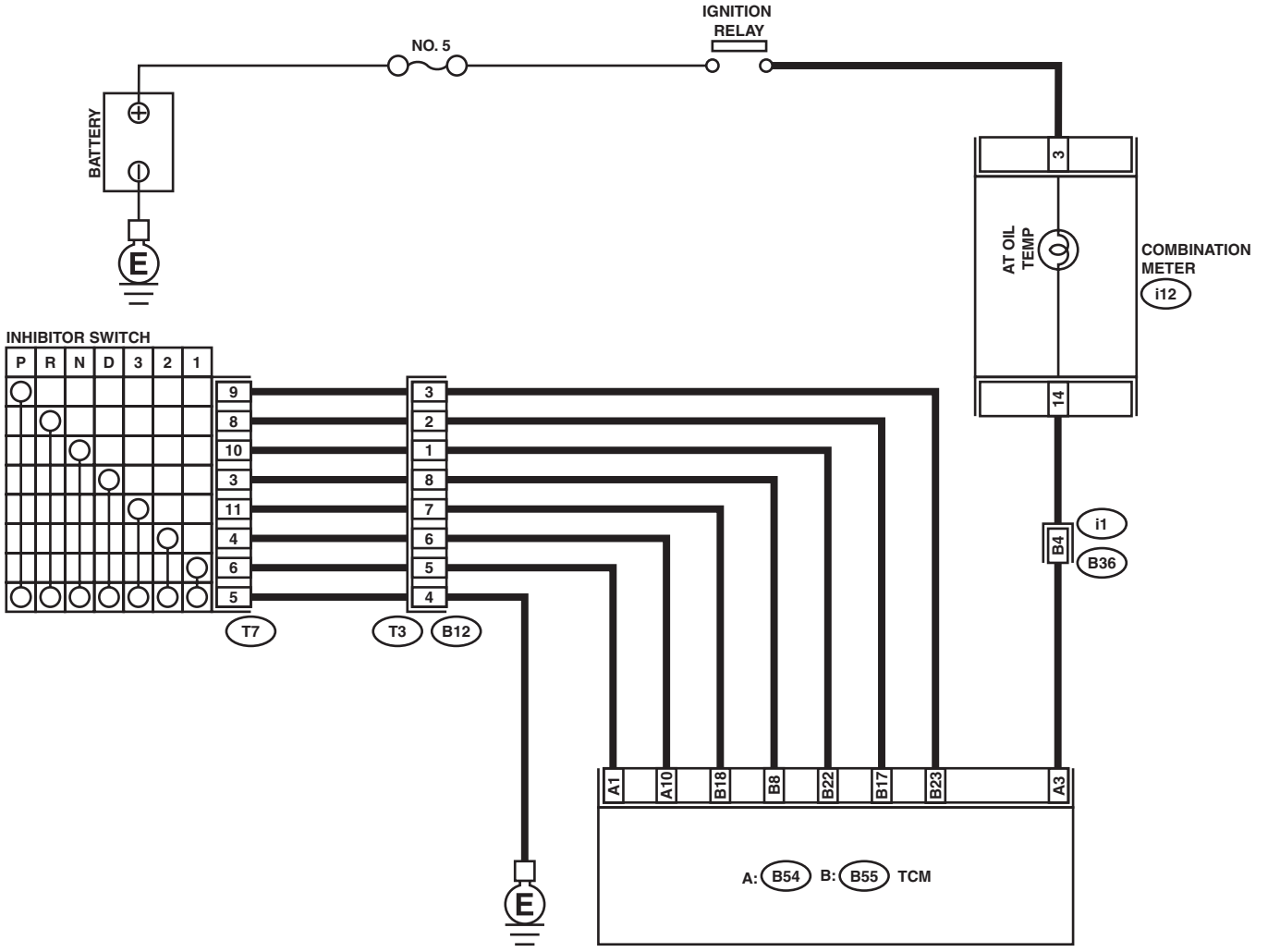
DIAGNOSIS:

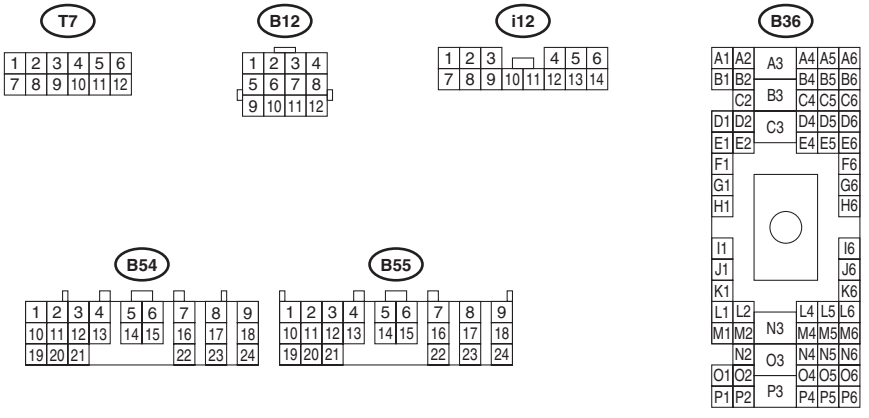
The AT OIL TEMP warning light circuit is open or shorted.

TROUBLE SYMPTOM:

- 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.

WIRING DIAGRAM:





AT-02954

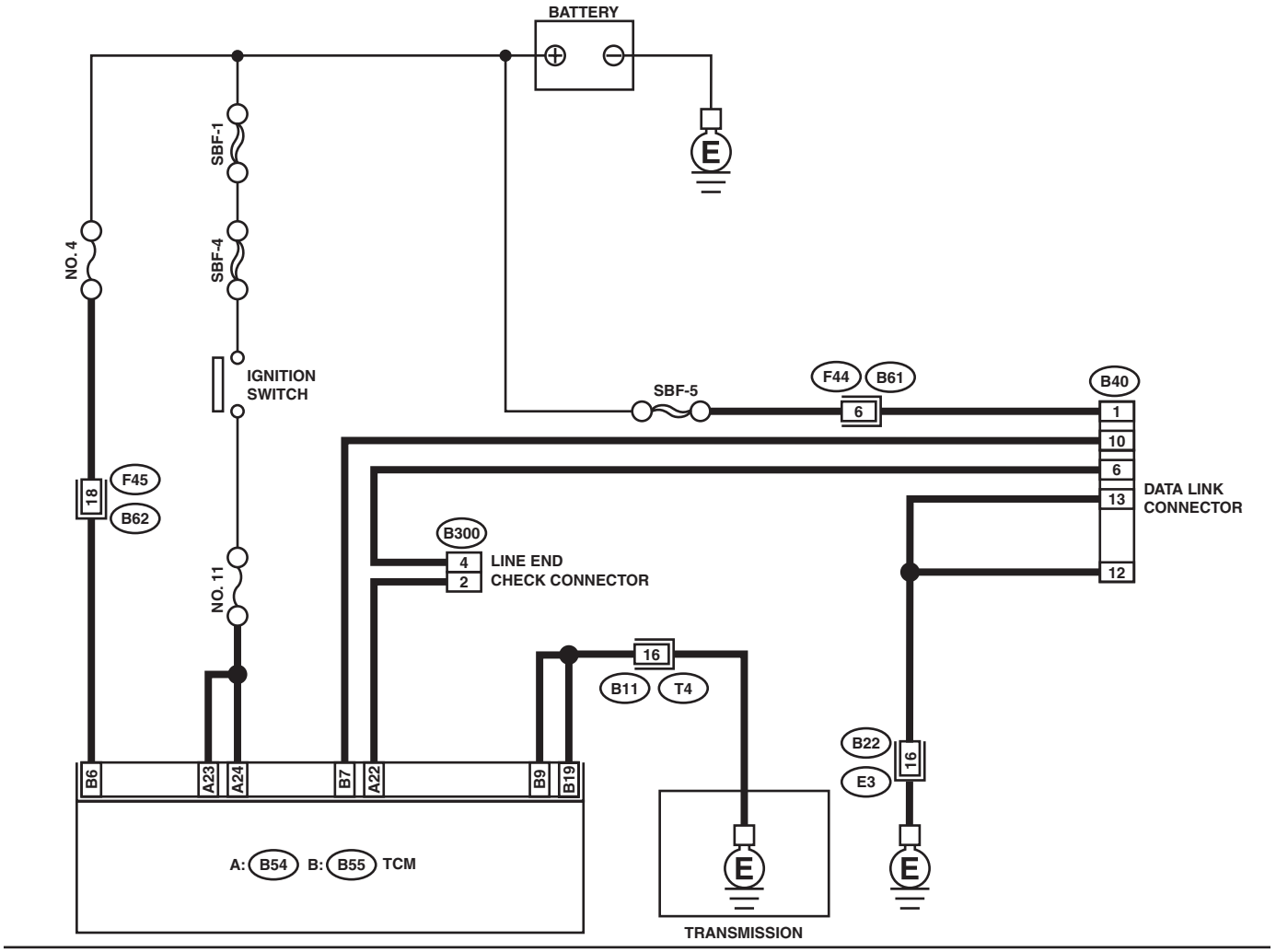
DIAGNOSTIC PROCEDURE FOR AT OIL TEMP WARNING LIGHT

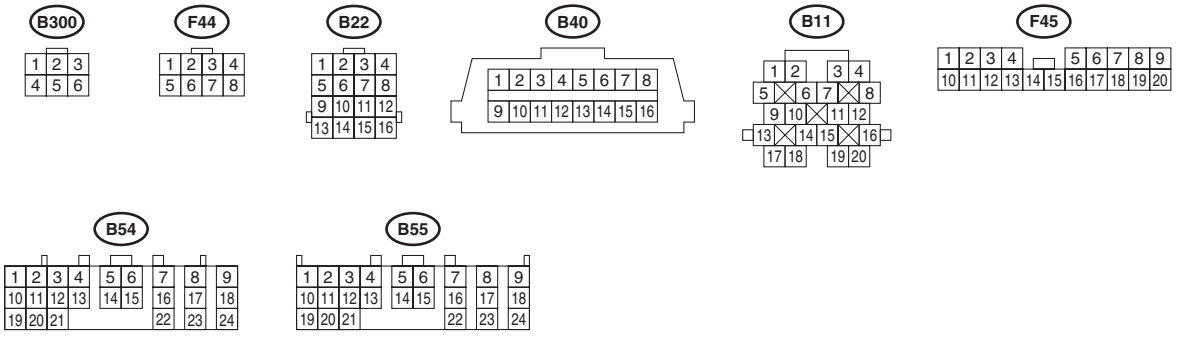
	Step	Check	Yes	No
1	**CHECK AT OIL TEMP WARNING LIGHT.** Turn the ignition switch to ON (engine OFF).	Does the AT OIL TEMP warning light illuminate?	Go to step **3.**	Go to step **2.**
2	**CHECK AT OIL TEMP WARNING LIGHT.** 1) Turn the ignition switch to OFF. 2) Remove the combination meter.	Is the AT 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-21, 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. 5).** Remove the fuse (No. 5).	Is the fuse (No. 5) blown out?	Replace the fuse (No. 5). If replaced fuse (No. 5) is blown out easily, repair short circuit in harness between fuse (No. 5) 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*** ***(i12) No. 3 (+) — 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*** ***(i12) No. 14 (+) — Chassis ground (–):***	Is the voltage less than 9 V?	Repair the combination meter. <Ref. to IDI-13, 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*** ***(B54) No. 3 — (i12) No. 14:***	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*** ***(B54) No. 3 (+) — 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-77, Transmission Control Module (TCM).>

	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-101, 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*** ***(B54) No. 13 — 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.

B: CHECK POWER SUPPLY AND GROUND LINE

WIRING DIAGRAM:





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	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.	Go to step **2.**
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*** ***(B55) No. 6 (+) — 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*** ***(B55) No. 9 — (B11) No. 16:*** ***(B55) No. 19 — (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-77, Transmission Control Module (TCM).>

13.Diagnostic Procedure for Select Monitor Communication

A: COMMUNICATION FOR INITIALIZING IMPOSSIBLE

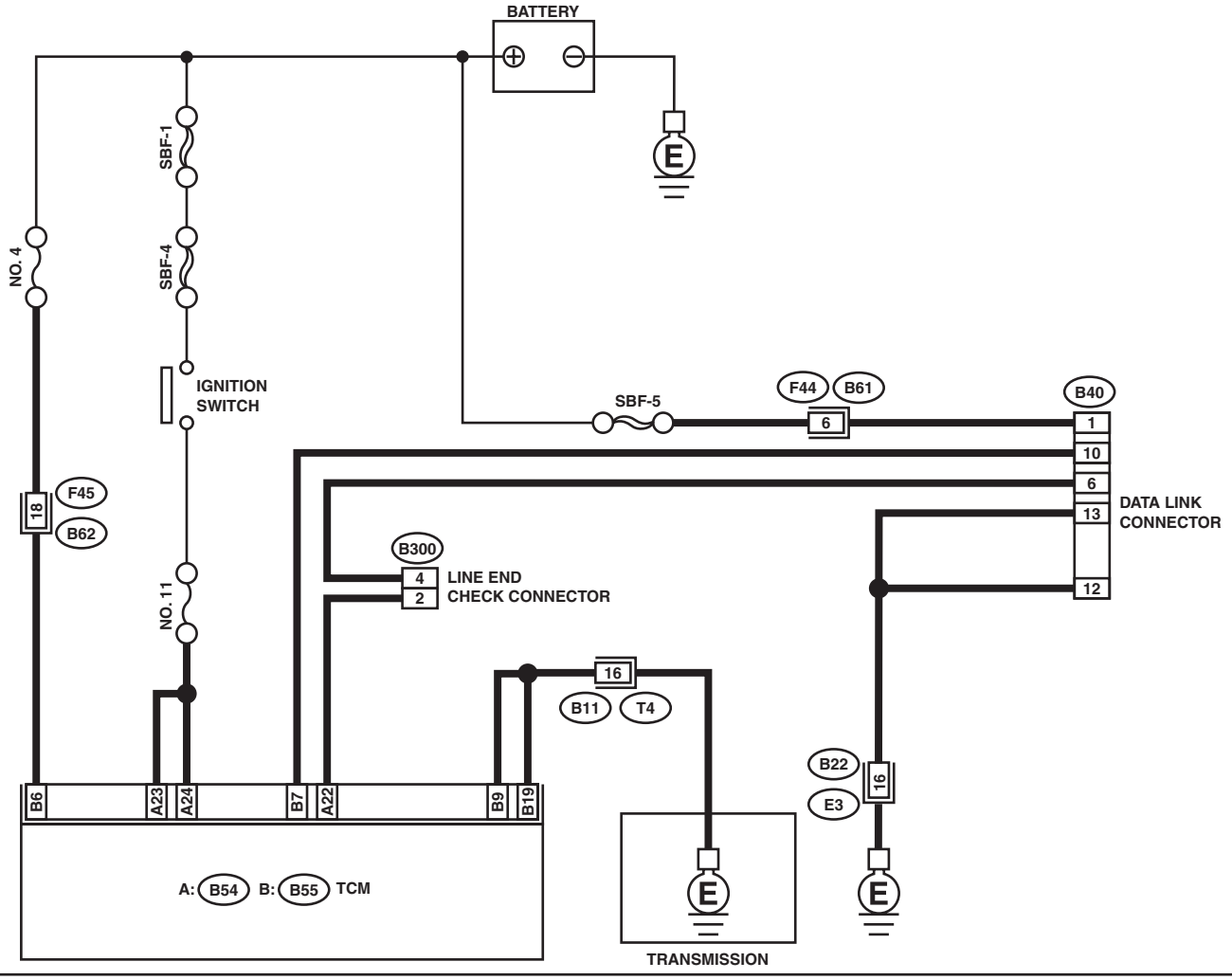
DIAGNOSIS:

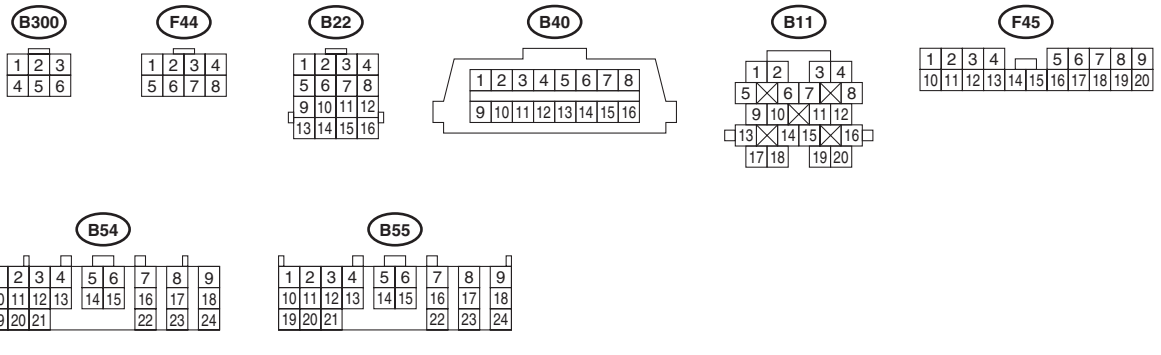
- Faulty harness connector

TROUBLE SYMPTOM:

- Select monitor communication failure

WIRING DIAGRAM:





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	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.	Is the name 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.	Is the name 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.	Is the name 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 MΩ?	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.**
8	**CHECK HARNESS/CONNECTOR BETWEEN TCM AND DATA LINK CONNECTOR.** Measure the resistance between TCM connector and data link connector. ***Connector & terminal*** ***(B55) No. 7 — (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.

	Step	Check	Yes	No
9	**CHECK HARNESS/CONNECTOR BETWEEN TCM AND DATA LINK CONNECTOR.** Measure the resistance between TCM and data link connector. ***Connector & terminal*** ***(B54) No. 22 — (B40) No. 6:***	Is the resistance more than 1 MΩ?	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-77, Transmission Control Module (TCM).>

MEMO:

14.Diagnostic Procedure with Diagnostic Trouble Code (DTC)

A: DTC 11 ENGINE SPEED SIGNAL

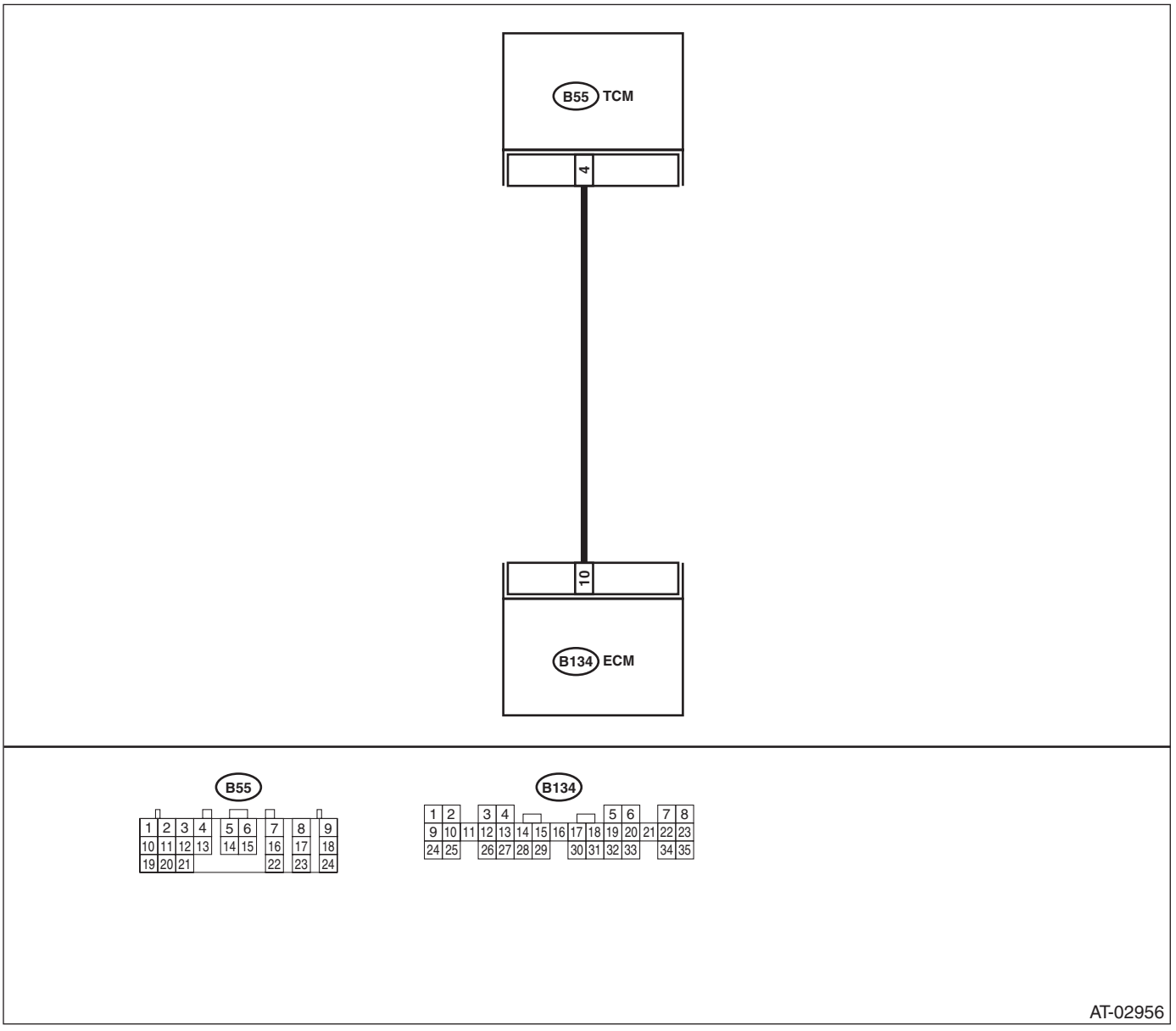
DIAGNOSIS:

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:



	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*** ***(B55) No. 4 — (B134) No. 10:***	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*** ***(B55) No. 4 — 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	**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*** ***(B55) No. 4 (+) — Chassis ground (−):***	Is the voltage more than 10.5 V?	Even if the AT OIL TEMP warning light blinks, 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 blinks, 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-77, Transmission Control Module (TCM).>	Replace the ECM.

B: DTC 27 ATF TEMPERATURE SENSOR

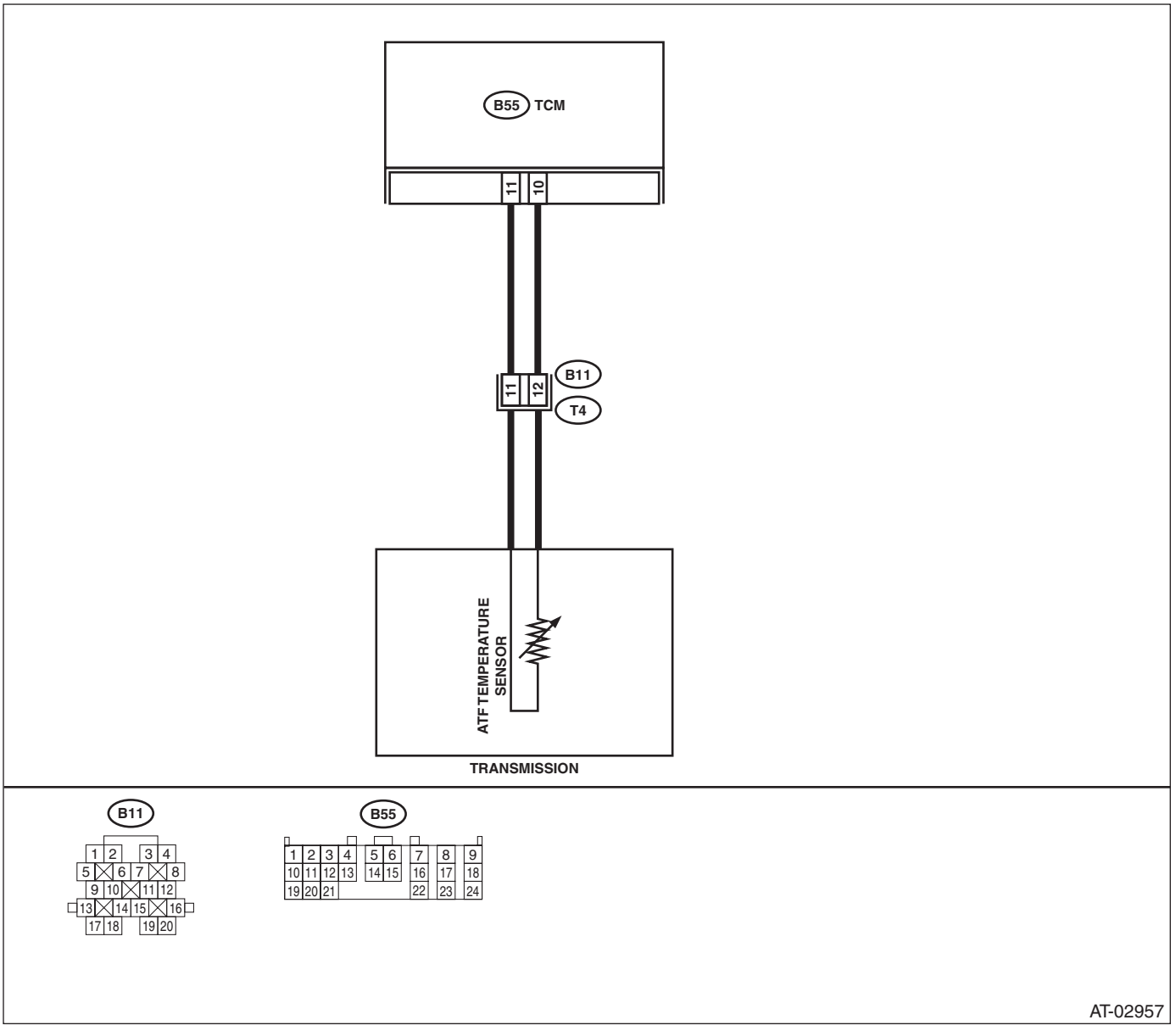
DIAGNOSIS:

The input signal circuit of TCM to ATF temperature sensor is open or shorted.

TROUBLE SYMPTOM:

Excessive shift shock.

WIRING DIAGRAM:



	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*** ***(B55) No. 10 — (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*** ***(B55) 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*** ***(B55) No. 10 — Chassis ground:***	Is the resistance more than 1 MΩ?	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*** ***(B55) No. 11 — Chassis ground:***	Is the resistance more than 1 MΩ?	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-71, Shift Solenoids, Duty Solenoids and ATF Temperature Sensor.>
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-71, 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.**

	Step	Check	Yes	No
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*** ***(B55) No. 11 (+) — No. 10 (–):***	Is the voltage 0.4 — 0.9 V?	Even if the AT OIL TEMP warning light blinks, 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 blinks, 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-77, Transmission Control Module (TCM).>

MEMO:

C: DTC 31 THROTTLE POSITION SENSOR

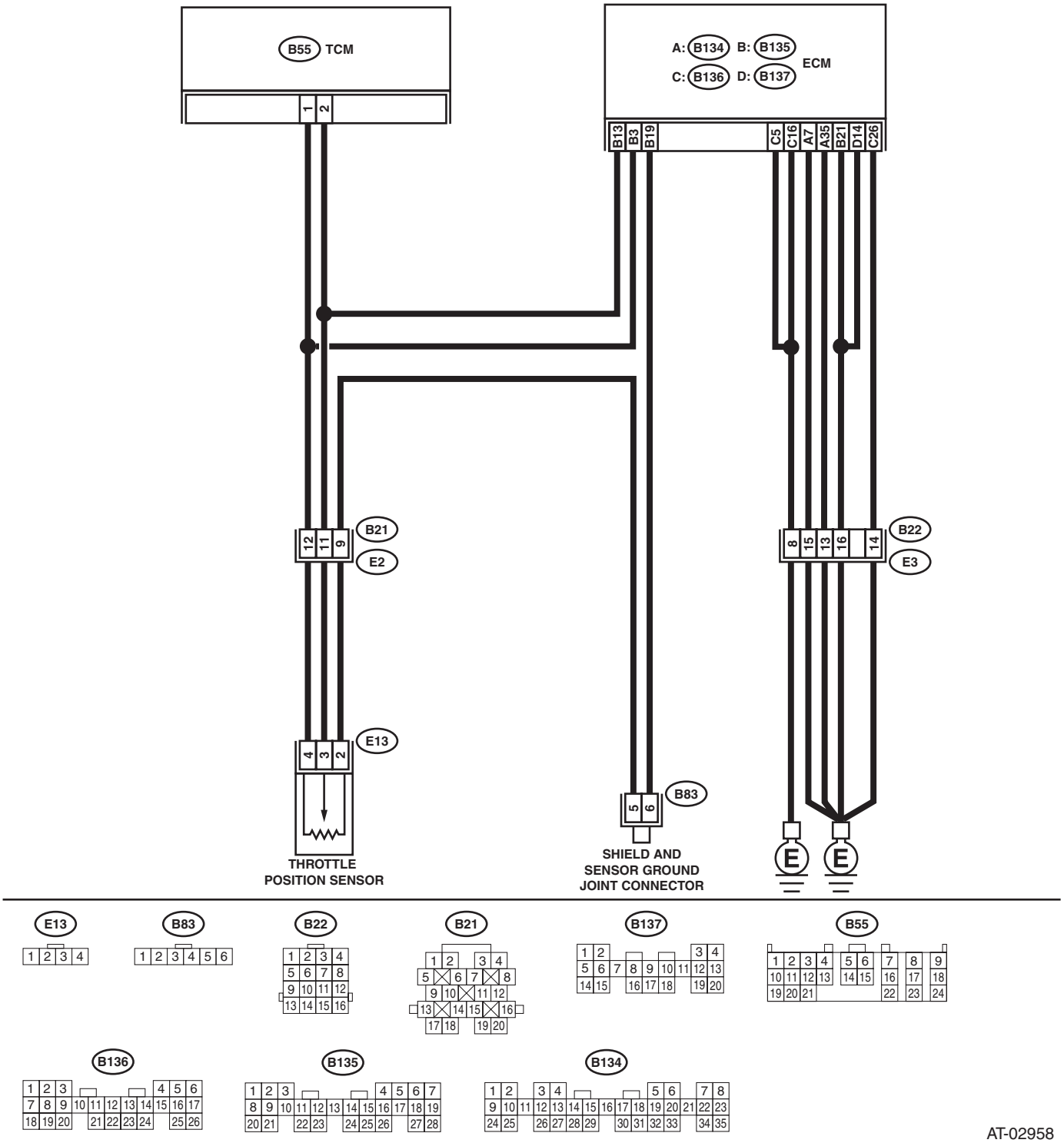
DIAGNOSIS:

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:



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	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*** ***(B134) No. 7 — Engine ground:*** ***(B134) No. 35 — Engine ground:*** ***(B136) No. 5 — Engine ground:*** ***(B136) No. 16 — Engine ground:*** ***(B136) No. 26 — Engine ground:*** ***(B135) No. 21 — Engine ground:*** ***(B137) No. 14 — 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*** ***No. 4 — No. 2:***	Is the resistance 3.0 — 4.2 kΩ?	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 kΩ?	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*** ***(B55) No. 2 — (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*** ***(B55) No. 1 — (E13) No. 4:***	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.
7	**CHECK HARNESS CONNECTOR BETWEEN TCM AND THROTTLE POSITION SENSOR.** Measure the resistance of harness between TCM connector and chassis ground. ***Connector & terminal*** ***(B55) No. 2 — 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*** ***(B55) No. 1 — 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.

	Step	Check	Yes	No
9	**CHECK HARNESS CONNECTOR BETWEEN TCM AND ECM.** Measure the resistance of harness between TCM and ECM connector. ***Connector & terminal*** ***(B55) No. 2 — (B135) No. 13:***	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*** ***(B55) No. 1 — (B135) No. 3:***	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*** ***(B55) No. 2 (+) — 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*** ***(B55) No. 2 (+) — Chassis ground (−):***	Is the voltage 4.2 — 4.7 V?	Go to step **16.**	Go to step **18.**
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: Depress the accelerator pedal until it touches the stopper.	Is the value voltage 4.2 — 4.7 V?	Go to step **18.**	Go to step **17.**

	Step	Check	Yes	No
16	**CHECK INPUT SIGNAL FOR TCM (THROTTLE POSITION SENSOR POWER SUPPLY).** Measure the voltage between TCM connector and chassis ground. ***Connector & terminal*** ***(B55) No. 1 (+) — Chassis ground (–):***	Is the voltage 4.8 — 5.3 V?	Even if the AT OIL TEMP warning light blinks, 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 blinks, 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-77, Transmission Control Module (TCM).>

D: DTC 33 FRONT VEHICLE SPEED SENSOR

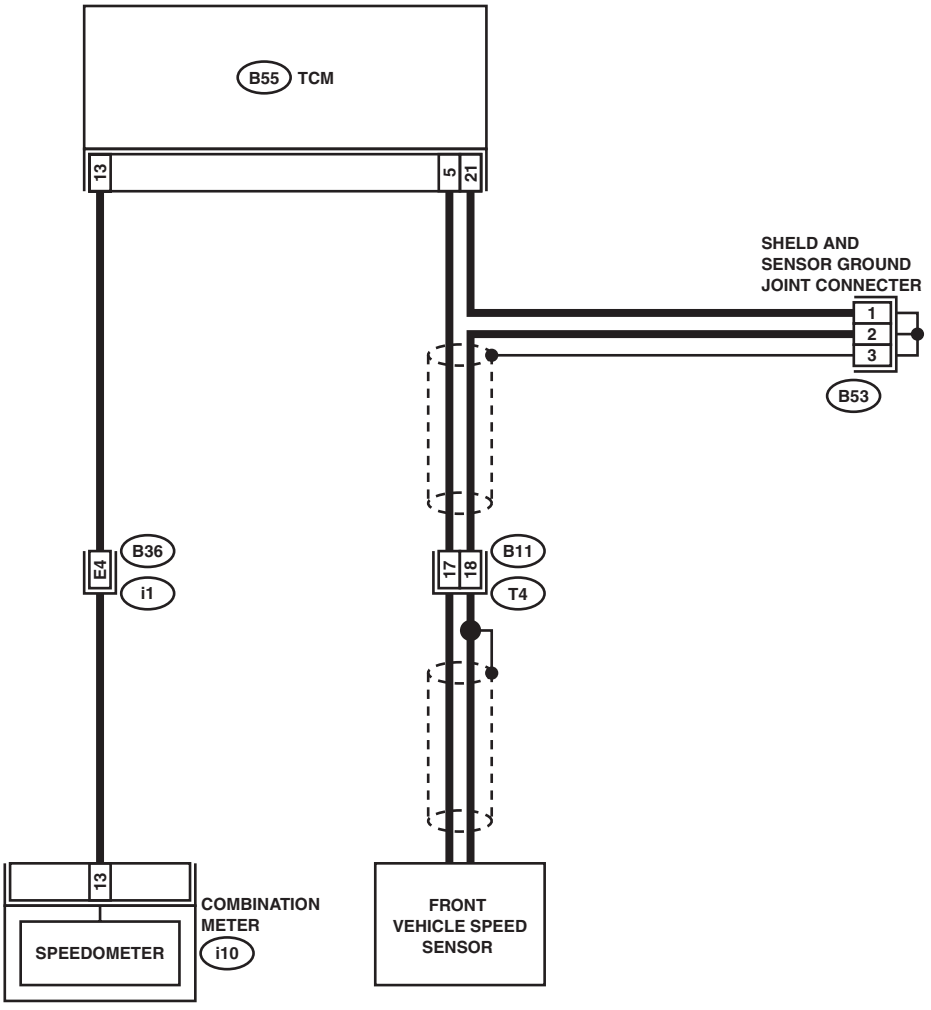
DIAGNOSIS:

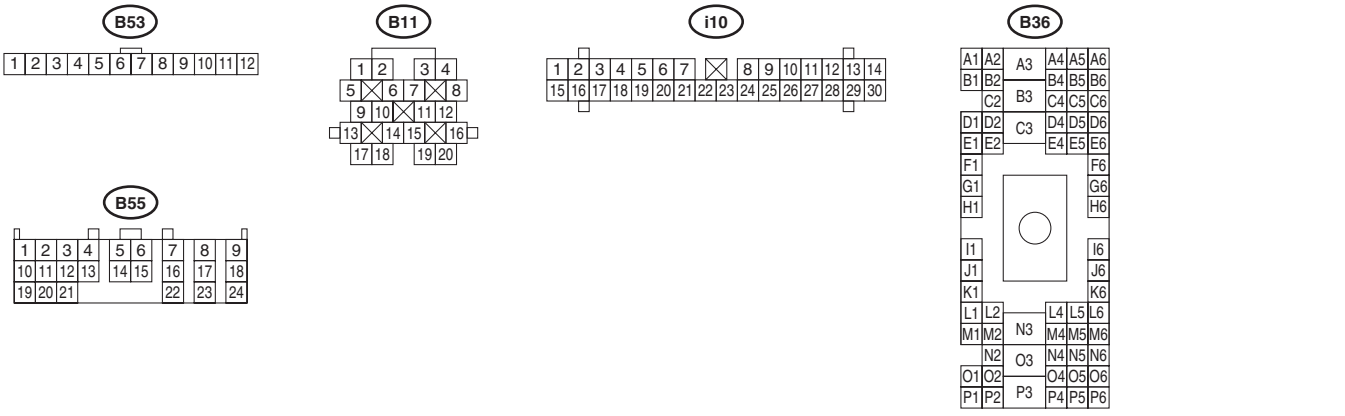
- The vehicle speed signal is abnormal.
- The circuit in combination meter is faulty.
- The harness connector between TCM and vehicle speed sensor is in short or open.

TROUBLE SYMPTOM:

- Erroneous idling.
- Engine stalls.
- Poor driving performance.

WIRING DIAGRAM:





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	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*** ***(B55) No. 5 — (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*** ***(B55) No. 21 — (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*** ***(B55) No. 21 — Chassis ground:***	Is the resistance more than 1 MΩ?	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*** ***(B55) No. 5 — Chassis ground:***	Is the resistance more than 1 MΩ?	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-54, 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.**
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*** ***(B55) No. 5 (+) — (B55) No. 21 (–):***	Is the voltage more than AC 1 V?	Even if the AT OIL TEMP warning light blinks, 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.**

	Step	Check	Yes	No
9	**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*** ***Positive probe; (B55) No. 5:*** ***Ground lead; (B55) No. 21:*** 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 blinks, 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.**
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 blinks, 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-77, Transmission Control Module (TCM).>

E: DTC 36 TORQUE CONVERTER TURBINE SPEED SENSOR

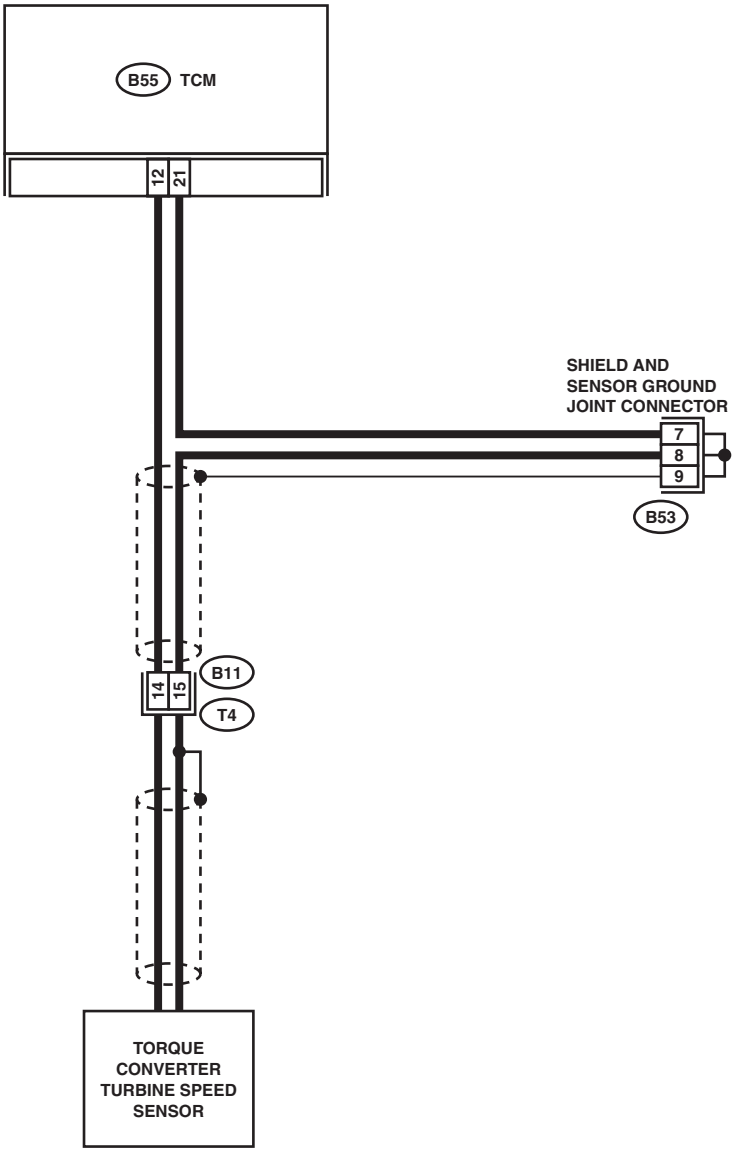
DIAGNOSIS:

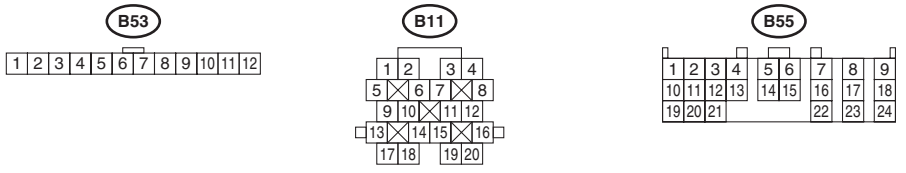
The input signal circuit of TCM is open or shorted.

TROUBLE SYMPTOM:

Excessive shift shock.

WIRING DIAGRAM:





AT-02960

	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-60, 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*** ***(B55) No. 12 — (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*** ***(B55) No. 21 — (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*** ***(B55) No. 21 — Chassis ground:***	Is the resistance more than 1 MΩ?	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*** ***(B55) No. 12 — Chassis ground:***	Is the resistance more than 1 MΩ?	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.**
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*** ***(B55) No. 12 (+) — No. 21 (–):***	Is the voltage more than AC 1 V?	Even if the AT OIL TEMP warning light blinks, 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.**

	Step	Check	Yes	No
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 blinks, 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*** ***Positive probe; (B55) No. 12:*** ***Ground lead; (B55) No. 21:*** 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 blinks, 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-77, Transmission Control Module (TCM).>

MEMO:

F: DTC 38 TORQUE CONTROL SIGNAL

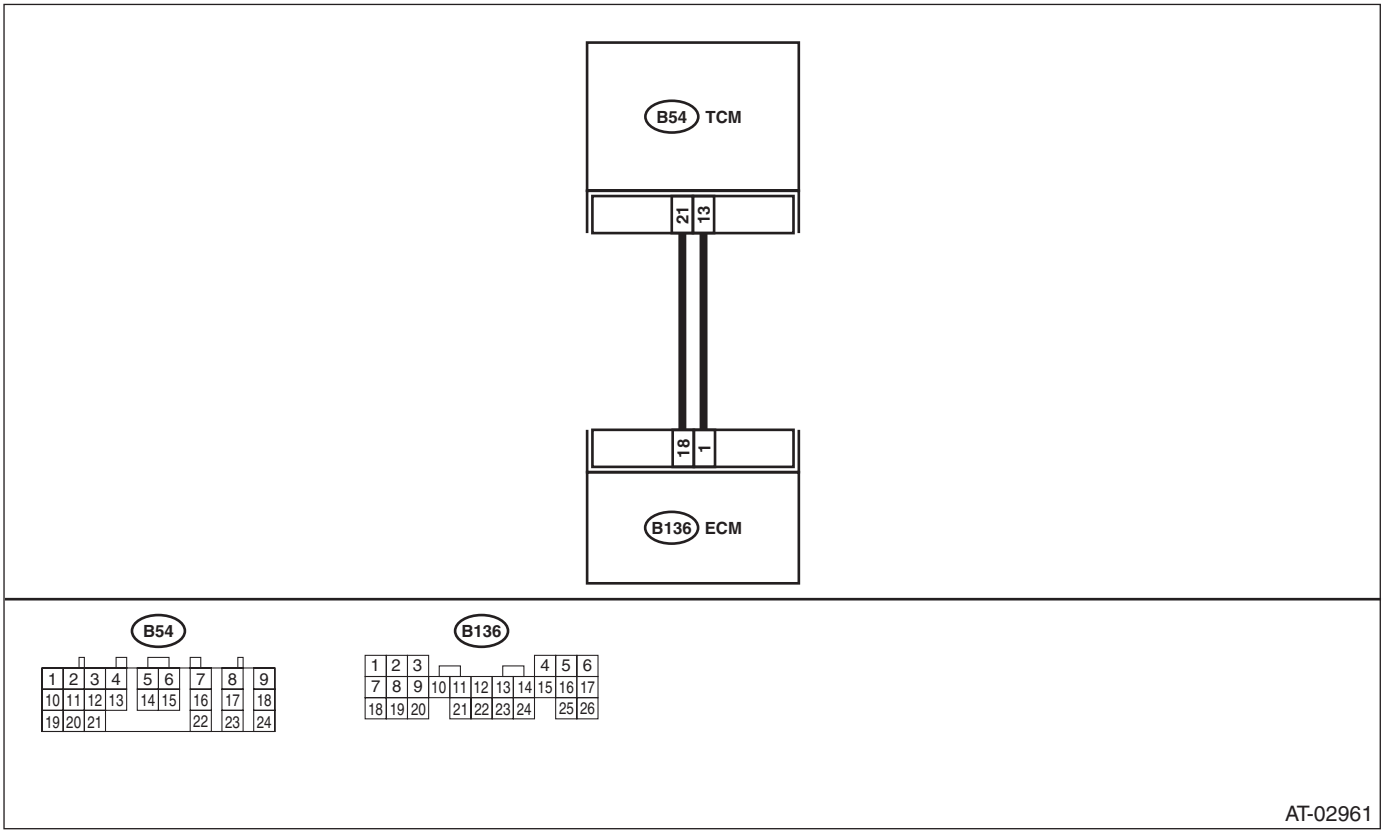
DIAGNOSIS:

- The signal circuit is open or shorted.

TROUBLE SYMPTOM:

Excessive shift shock.

WIRING DIAGRAM:

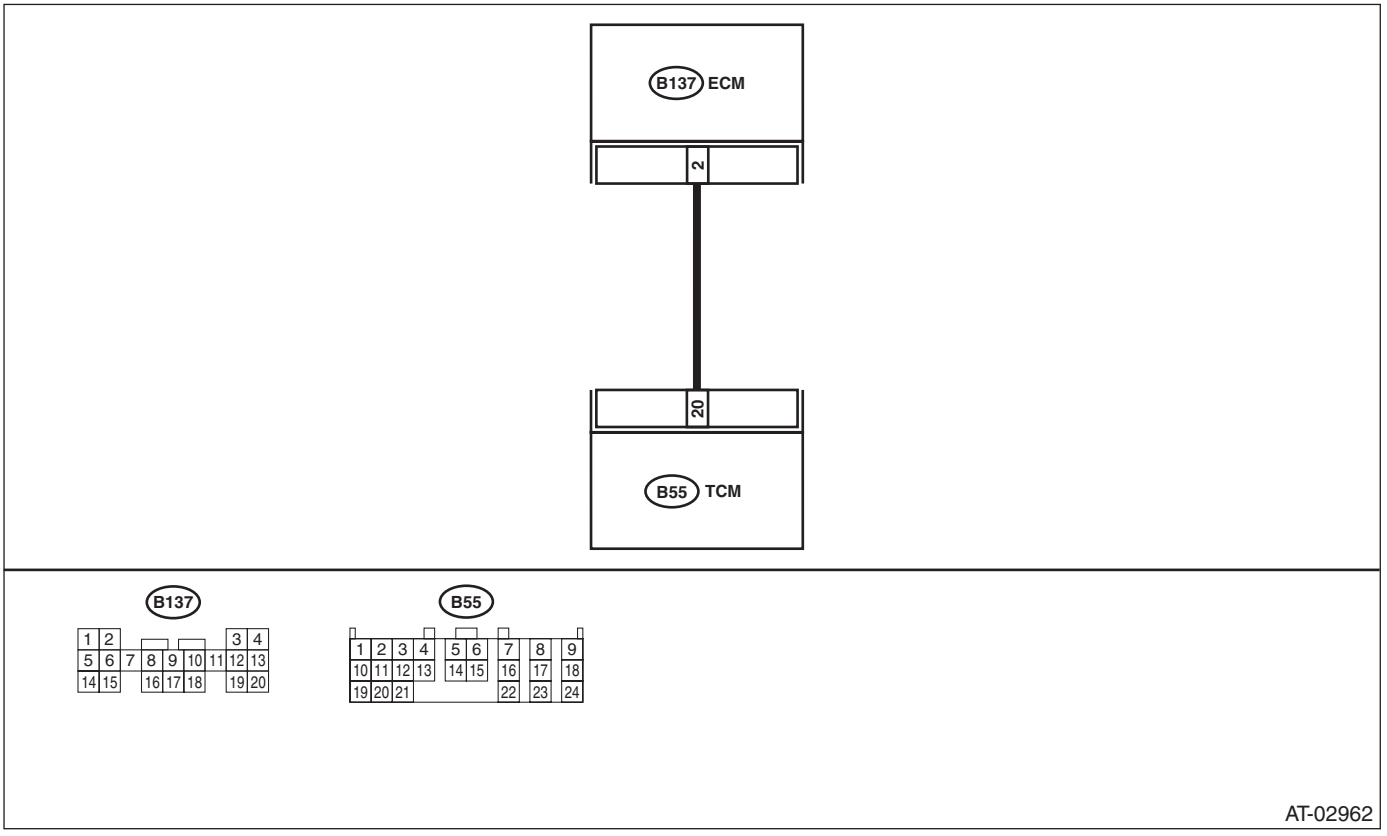


	Step	Check	Yes	No
1	**CHECK HARNESS CONNECTOR BETWEEN TCM AND ECM.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from TCM and ECM. 3) Measure the resistance of harness between TCM and ECM connector. ***Connector & terminal*** ***(B54) No. 21 — (B136) No. 18:*** ***(B54) No. 13 — (B136) No. 1:***	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*** ***(B54) No. 21 — Chassis ground:*** ***(B54) No. 13 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **3.**	Repair the short circuit in harness between TCM and ECM connector.

	Step	Check	Yes	No
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*** ***(B54) No. 21 (+) — Chassis ground (–):*** ***(B54) No. 13 (+) — Chassis ground (–):***	Is the voltage more than 4.8 V?	Even if the AT OIL TEMP warning light blinks, 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.**
9	**RECHECK OUTPUT SIGNAL EMITTED FROM TCM.** Measure the voltage between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 21 (+) — Chassis ground (–):*** ***(B54) No. 13 (+) — Chassis ground (–):***	Is each voltage more than 4 V?	Replace the TCM. <Ref. to 4AT-77, Transmission Control Module (TCM).>	Replace the ECM.

G: DTC 45 INTAKE MANIFOLD PRESSURE SIGNAL

DIAGNOSIS:
The input signal circuit of TCM from ECM is open or shorted.
TROUBLE SYMPTOM:
Excessive shift shock.
WIRING DIAGRAM:



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. 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.**

	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 blinks, 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 blinks, 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-77, Transmission Control Module (TCM).>

H: DTC 71 SHIFT SOLENOID 1

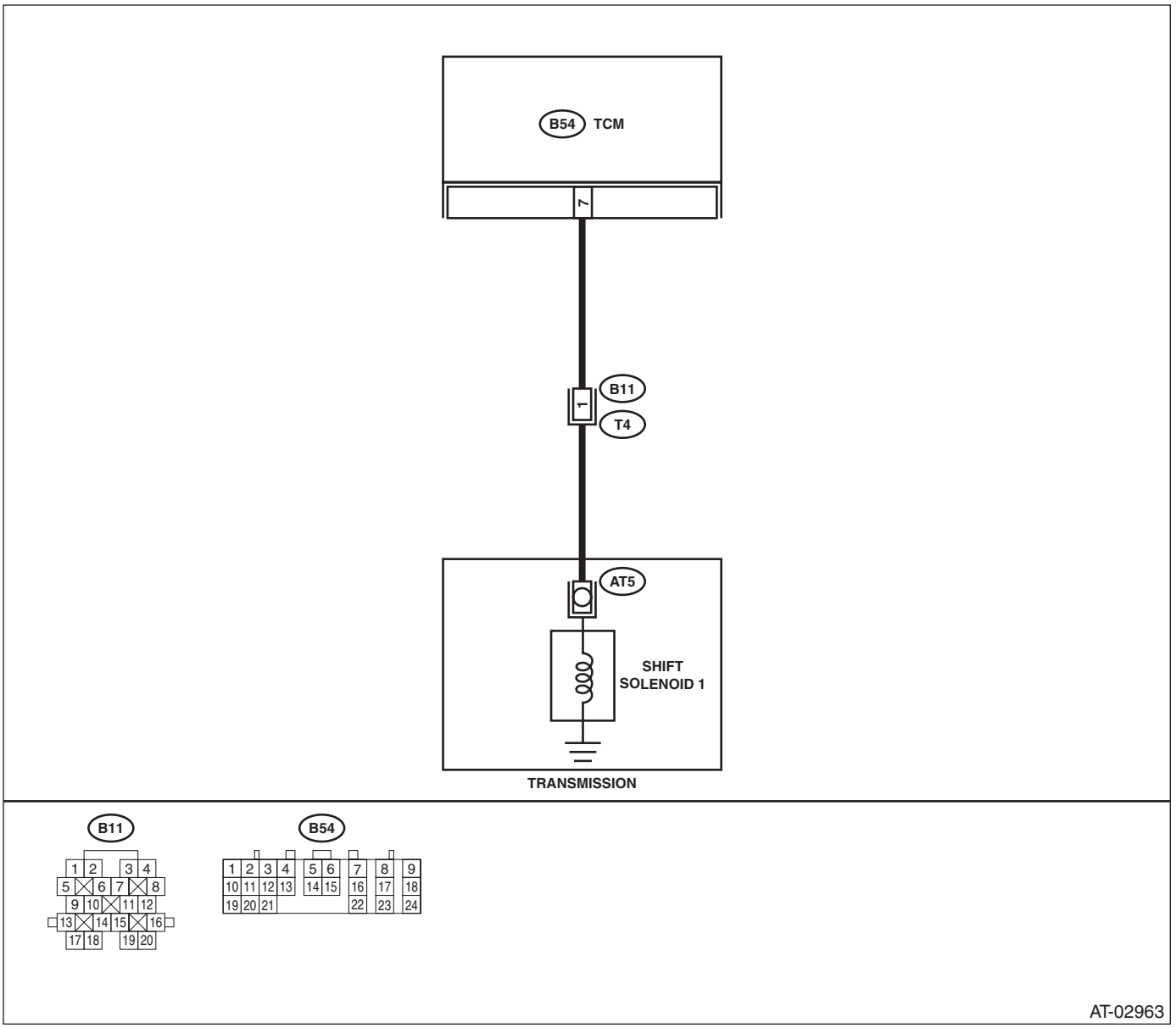
DIAGNOSIS:

The output signal circuit of shift solenoid 1 is open or shorted.

TROUBLE SYMPTOM:

Does not shift.

WIRING DIAGRAM:



	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*** ***(B54) No. 7 — (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*** ***(B54) No. 7 — Chassis ground:***	Is the resistance more than 1 MΩ?	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*** ***(B54) No. 7 (+) — 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*** ***(B54) No. 7 (+) — Chassis ground (–):***	Is the voltage less than 1 V?	Even if the AT OIL TEMP warning light blinks, 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-77, Transmission Control Module (TCM).>

	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-71, 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 MΩ?	Even if the AT OIL TEMP warning light blinks, 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.

MEMO:

I: DTC 72 SHIFT SOLENOID 2

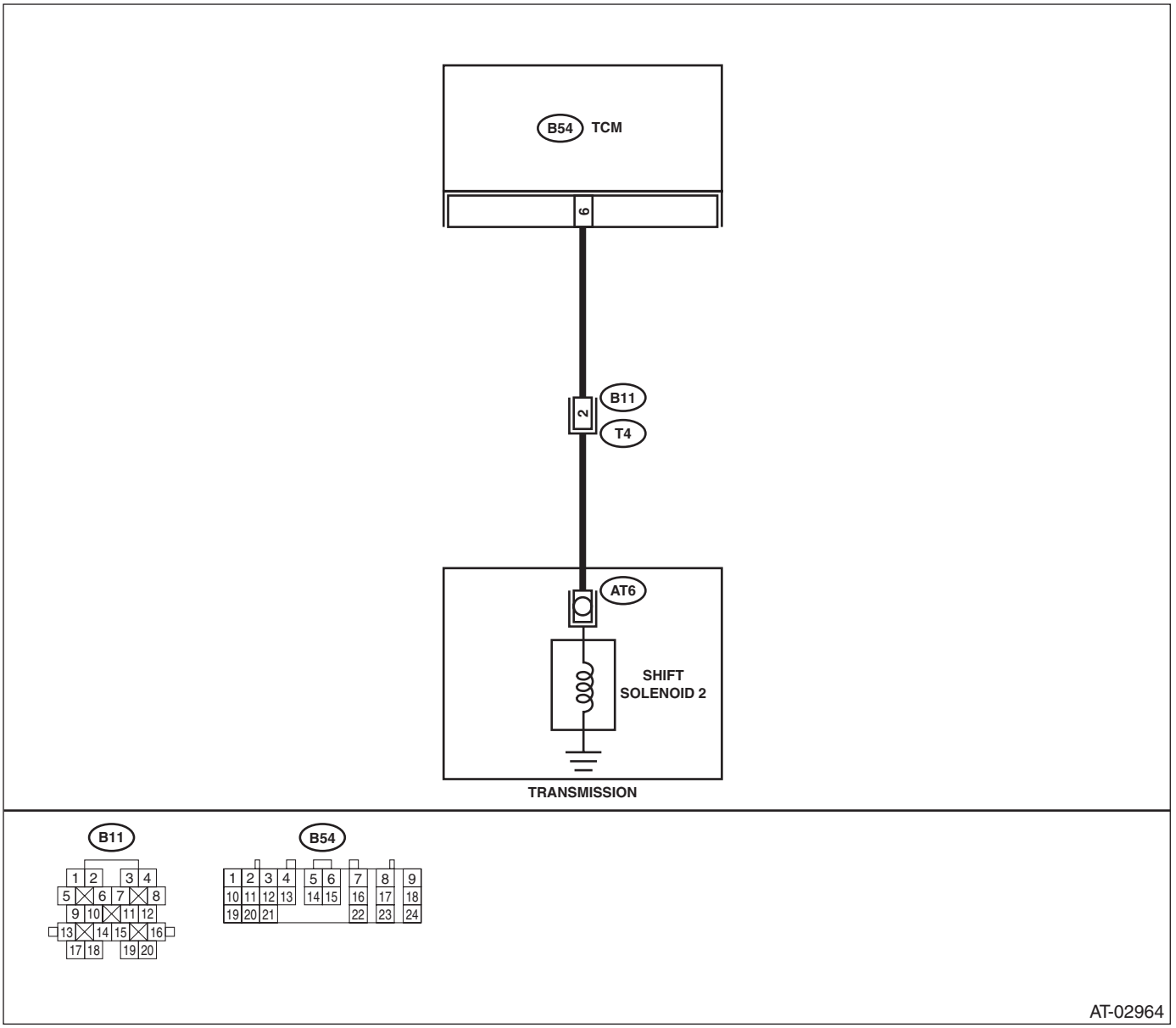
DIAGNOSIS:

The output signal circuit of shift solenoid 2 is open or shorted.

TROUBLE SYMPTOM:

Does not shift.

WIRING DIAGRAM:



	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*** ***(B54) No. 6 — (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*** ***(B54) No. 6 — Chassis ground:***	Is the resistance more than 1 MΩ?	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*** ***(B54) No. 6 (+) — Chassis ground (–):***	Is the voltage less than 1 V?	Even if the AT OIL TEMP warning light blinks, 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.**
5	**CHECK POOR CONTACT.**	Is there poor contact in shift solenoid 2 circuit?	Repair the poor contact.	Replace the TCM. <Ref. to 4AT-77, Transmission Control Module (TCM).>

	Step	Check	Yes	No
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-71, 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 blinks, 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.

MEMO:

J: DTC 73 LOW CLUTCH TIMING SOLENOID

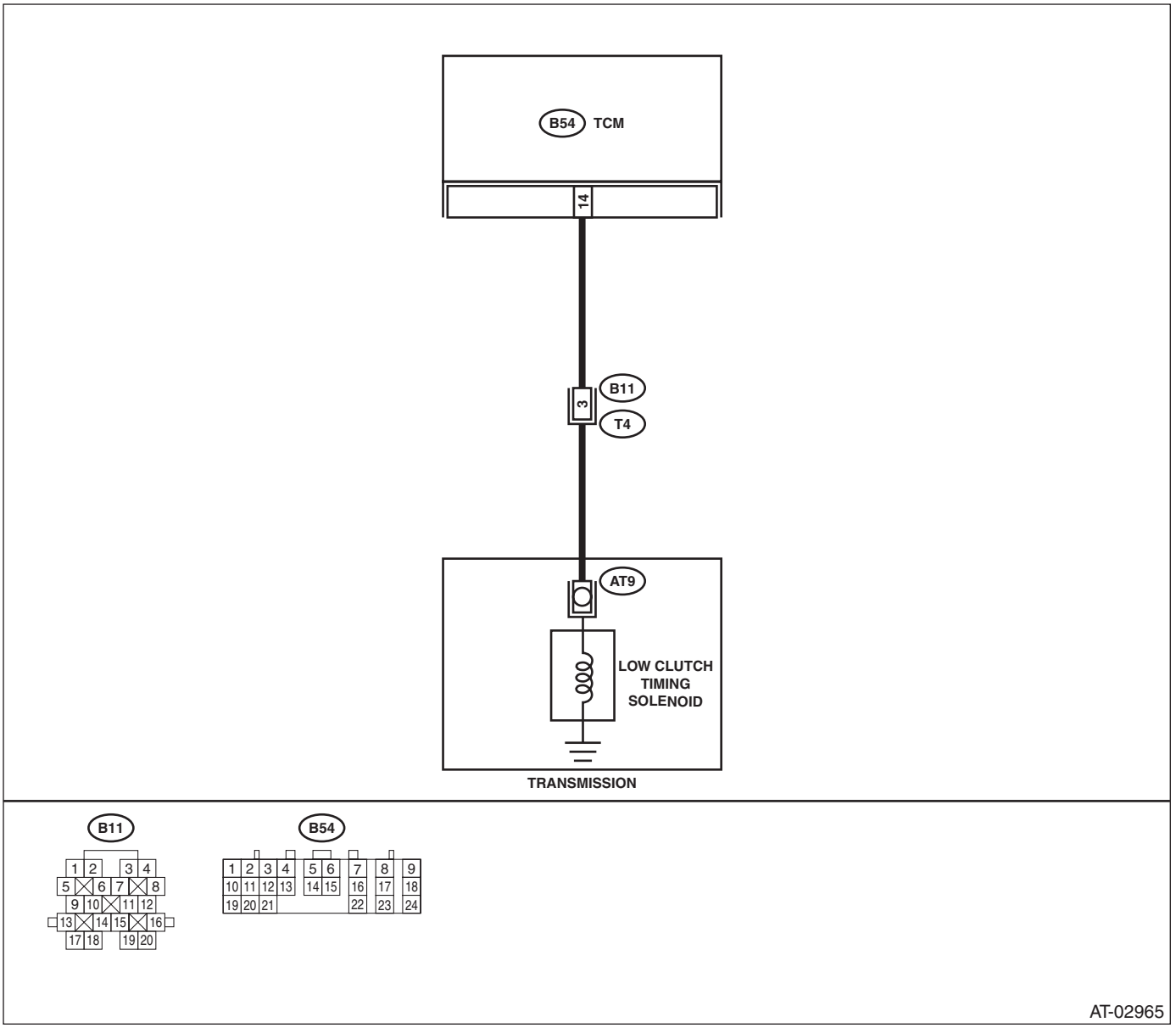
DIAGNOSIS:

The output signal circuit of low clutch timing solenoid is open or shorted.

TROUBLE SYMPTOM:

Excessive shift shock.

WIRING DIAGRAM:



	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*** ***(B54) No. 14 — (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*** ***(B54) No. 14 — Chassis ground:***	Is the resistance more than 1 MΩ?	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*** ***(B54) No. 14 (+) — 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*** ***(B54) No. 14 (+) — Chassis ground (–):***	Is the voltage less than 1 V?	Even if the AT OIL TEMP warning light blinks, 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-77, Transmission Control Module (TCM).>

	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-71, 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 MΩ?	Even if the AT OIL TEMP warning light blinks, 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.

MEMO:

K: DTC 74 2-4 BRAKE TIMING SOLENOID

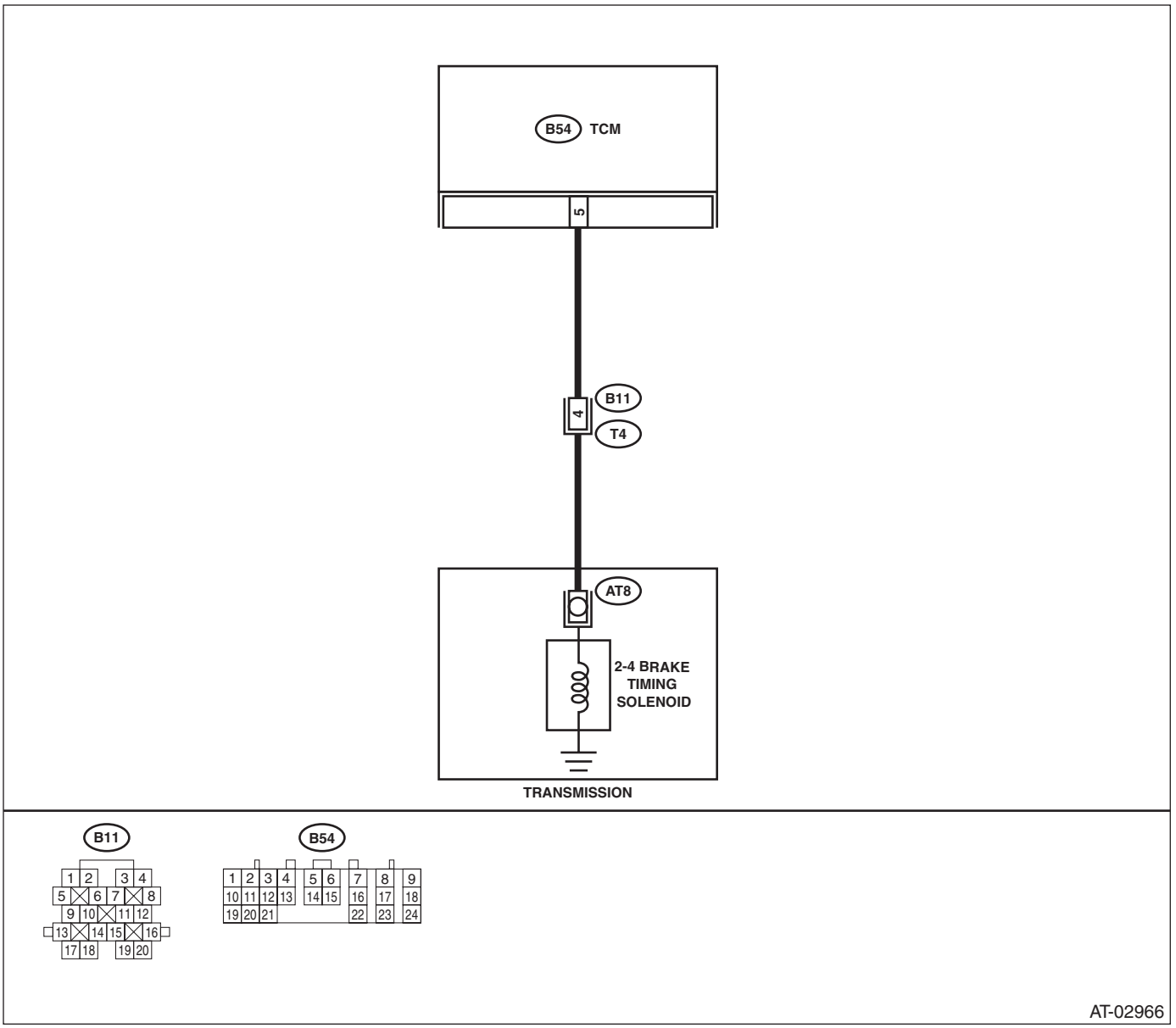
DIAGNOSIS:

The output signal circuit of 2-4 brake timing solenoid is open or shorted.

TROUBLE SYMPTOM:

Excessive shift shock.

WIRING DIAGRAM:



	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*** ***(B54) No. 5 — (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*** ***(B54) No. 5 — Chassis ground:***	Is the resistance more than 1 MΩ?	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*** ***(B54) No. 5 (+) — Chassis ground (−):***	Is the voltage less than 1 V?	Go to step **5.**	Go to step **6.**

	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*** ***(B54) No. 5 (+) — Chassis ground (–):***	Is the voltage more than 9 V?	Even if the AT OIL TEMP warning light blinks, 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-77, 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-71, 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.

	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 blinks, 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.

L: DTC 75 LINE PRESSURE DUTY SOLENOID

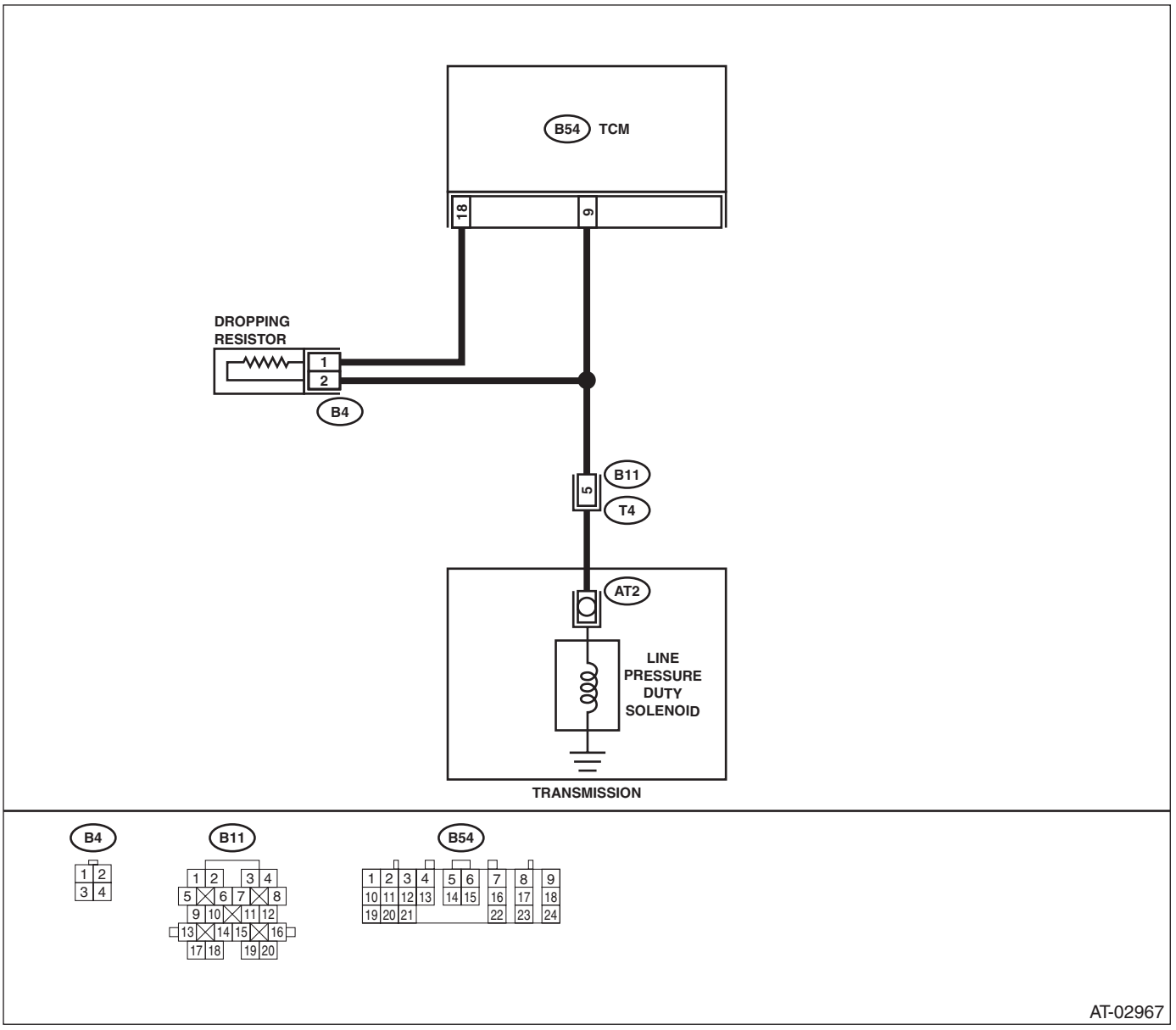
DIAGNOSIS:

Output signal circuit of line pressure duty solenoid is open or shorted.

TROUBLE SYMPTOM:

Excessive shift shock.

WIRING DIAGRAM:



	Step	Check	Yes	No
1	**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 **2.**	Replace the dropping resistor. <Ref. to 4AT-79, Dropping Resistor.>
2	**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. ***Connector & terminal*** ***(B54) No. 18 — (B4) No. 1:***	Is the resistance less than 1 Ω?	Go to step **3.**	Repair open circuit in harness between TCM and dropping resistor connector.
3	**CHECK HARNESS CONNECTOR BETWEEN TCM AND DROPPING RESISTOR.** Measure the resistance of harness between dropping resistor connector and chassis ground. ***Connector & terminal*** ***(B4) No. 1 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **4.**	Repair short circuit in harness between TCM and dropping resistor connector.
4	**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. ***Connector & terminal*** ***(B4) No. 2 — (B11) No. 5:***	Is the resistance less than 1 Ω?	Go to step **5.**	Repair open circuit in harness between dropping resistor and transmission connector.
5	**CHECK HARNESS CONNECTOR BETWEEN TRANSMISSION AND DROPPING RESISTOR.** Measure the resistance of harness between dropping resistor connector and chassis ground. ***Connector & terminal*** ***(B4) No. 2 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **6.**	Repair short circuit in harness between dropping resistor and transmission connector.
6	**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. ***Connector & terminal*** ***(B54) No. 9 — (B11) No. 5:***	Is the resistance less than 1 Ω?	Go to step **7.**	Repair the open circuit in harness between TCM and transmission connector.
7	**CHECK HARNESS CONNECTOR BETWEEN TCM AND CHASSIS GROUND.** Measure the resistance of harness between TCM and chassis ground. ***Connector & terminal*** ***(B54) No. 9 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **8.**	Repair the short circuit in harness between TCM and transmission connector.

	Step	Check	Yes	No
8	**CHECK LINE PRESSURE DUTY SOLENOID.** Measure the resistance between transmission connector receptacle's terminals. ***Terminals*** ***(T4) No. 5 — No. 16:***	Is the resistance between 2.0 and 4.5 Ω?	Go to step **9.**	Go to step **15.**
9	**PREPARE SUBARU SELECT MONITOR.**	Do you have a Subaru Select Monitor?	Go to step **12.**	Go to step **10.**
10	**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 **11.**	Go to step **14.**
11	**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 blinks, 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 **14.**
12	**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 **13.**	Go to step **14.**

	Step	Check	Yes	No
13	**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 blinks, 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 **14.**
14	**CHECK POOR CONTACT.**	Is there poor contact in line pressure duty solenoid circuit?	Repair the poor contact.	Replace the TCM. <Ref. to 4AT-77, Transmission Control Module (TCM).>
15	**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 **16.**	Replace the line pressure duty solenoid. <Ref. to 4AT-71, Shift Solenoids, Duty Solenoids and ATF Temperature Sensor.>
16	**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 **17.**	Repair the open circuit in harness between line pressure duty solenoid and transmission connector.
17	**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 MΩ?	Even if the AT OIL TEMP warning light blinks, 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.

M: DTC 76 2-4 BRAKE DUTY SOLENOID

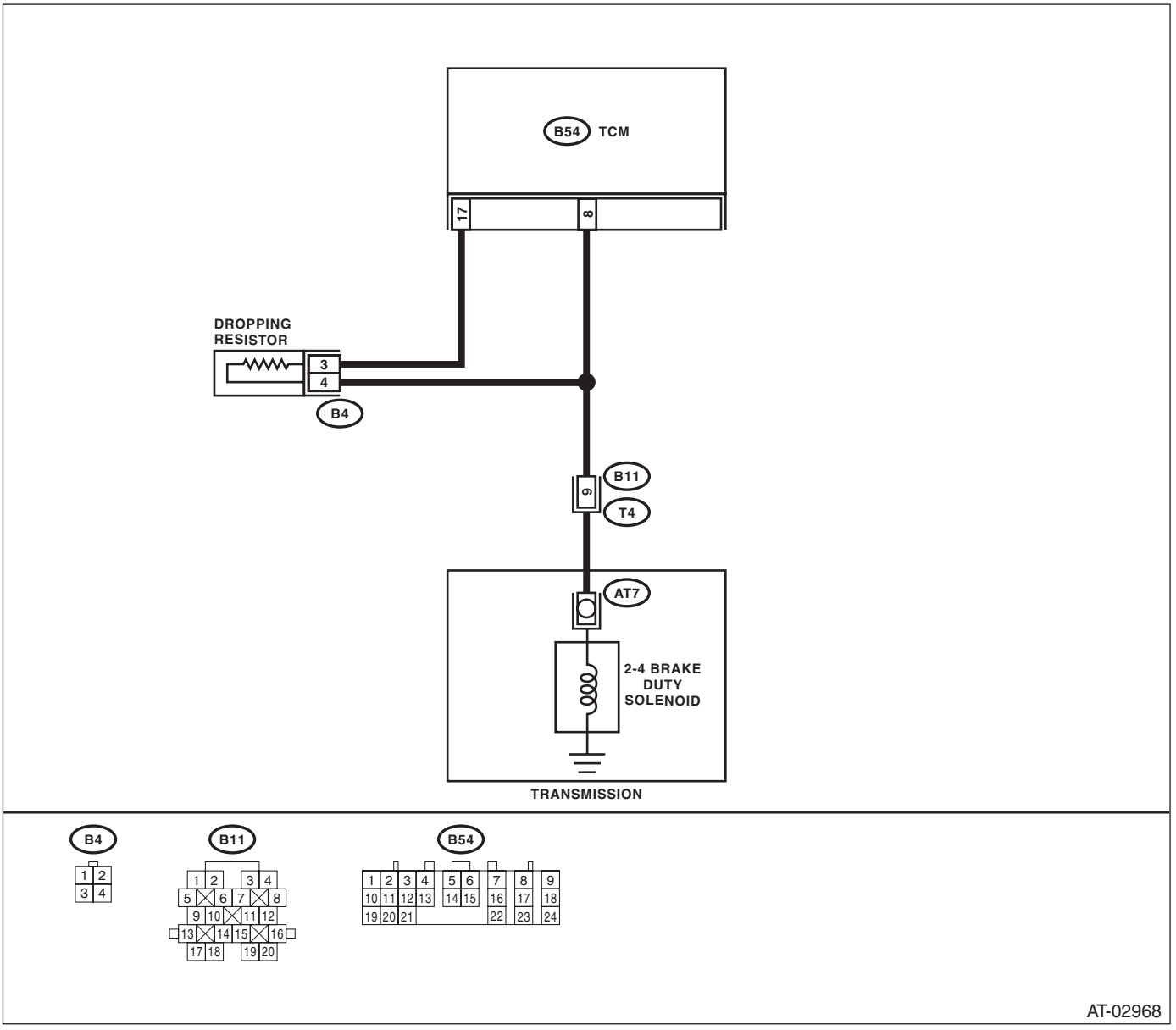
DIAGNOSIS:

Output signal circuit of 2-4 brake duty solenoid is open or shorted.

TROUBLE SYMPTOM:

Excessive shift shock.

WIRING DIAGRAM:



	Step	Check	Yes	No
1	**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 **2.**	Replace the dropping resistor. <Ref. to 4AT-79, Dropping Resistor.>
2	**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. ***Connector & terminal*** ***(B54) No. 17 — (B4) No. 3:***	Is the resistance less than 1 Ω?	Go to step **3.**	Repair open circuit in harness between TCM and dropping resistor connector.
3	**CHECK HARNESS CONNECTOR BETWEEN TCM AND DROPPING RESISTOR.** Measure the resistance of harness between dropping resistor connector and chassis ground. ***Connector & terminal*** ***(B4) No. 3 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **4.**	Repair short circuit in harness between TCM and dropping resistor connector.
4	**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. ***Connector & terminal*** ***(B4) No. 4 — (B11) No. 9:***	Is the resistance less than 1 Ω?	Go to step **5.**	Repair open circuit in harness between dropping resistor and transmission connector.
5	**CHECK HARNESS CONNECTOR BETWEEN TRANSMISSION AND DROPPING RESISTOR.** Measure the resistance of harness between dropping resistor connector and chassis ground. ***Connector & terminal*** ***(B4) No. 4 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **6.**	Repair short circuit in harness between dropping resistor and transmission connector.
6	**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. ***Connector & terminal*** ***(B54) No. 8 — (B11) No. 9:***	Is the resistance less than 1 Ω?	Go to step **7.**	Repair the open circuit in harness between TCM and transmission connector.
7	**CHECK HARNESS CONNECTOR BETWEEN TCM AND CHASSIS GROUND.** Measure the resistance of harness between TCM and chassis ground. ***Connector & terminal*** ***(B54) No. 8 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **8.**	Repair the short circuit in harness between TCM and transmission connector.

	Step	Check	Yes	No
8	**CHECK 2-4 BRAKE DUTY SOLENOID.** Measure the resistance between transmission connector receptacle's terminals. ***Terminals*** ***(T4) No. 16 — No. 9:***	Is the resistance 2.0 — 4.5 Ω?	Go to step **9.**	Go to step **15.**
9	**PREPARE SUBARU SELECT MONITOR.**	Do you have a Subaru Select Monitor?	Go to step **12.**	Go to step **10.**
10	**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. 8 (+) — Chassis ground (–):***	Is the voltage 1.5 — 5.0 V?	Go to step **11.**	Go to step **14.**
11	**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. 8 (+) — Chassis ground (–):***	Is the voltage less than 1 V?	Even if the AT OIL TEMP warning light blinks, 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 **14.**
12	**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 **13.**	Go to step **14.**

	Step	Check	Yes	No
13	**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 blinks, 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 **14.**
14	**CHECK POOR CONTACT.**	Is there poor contact in 2-4 brake duty solenoid circuit?	Repair the poor contact.	Replace the TCM. <Ref. to 4AT-77, Transmission Control Module (TCM).>
15	**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 **16.**	Replace the 2-4 brake duty solenoid. <Ref. to 4AT-71, Shift Solenoids, Duty Solenoids and ATF Temperature Sensor.>
16	**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 **17.**	Repair the open circuit in harness between 2-4 brake duty solenoid and transmission connector.
17	**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 MΩ?	Even if the AT OIL TEMP warning light blinks, 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.

N: DTC 77 LOCK-UP DUTY SOLENOID

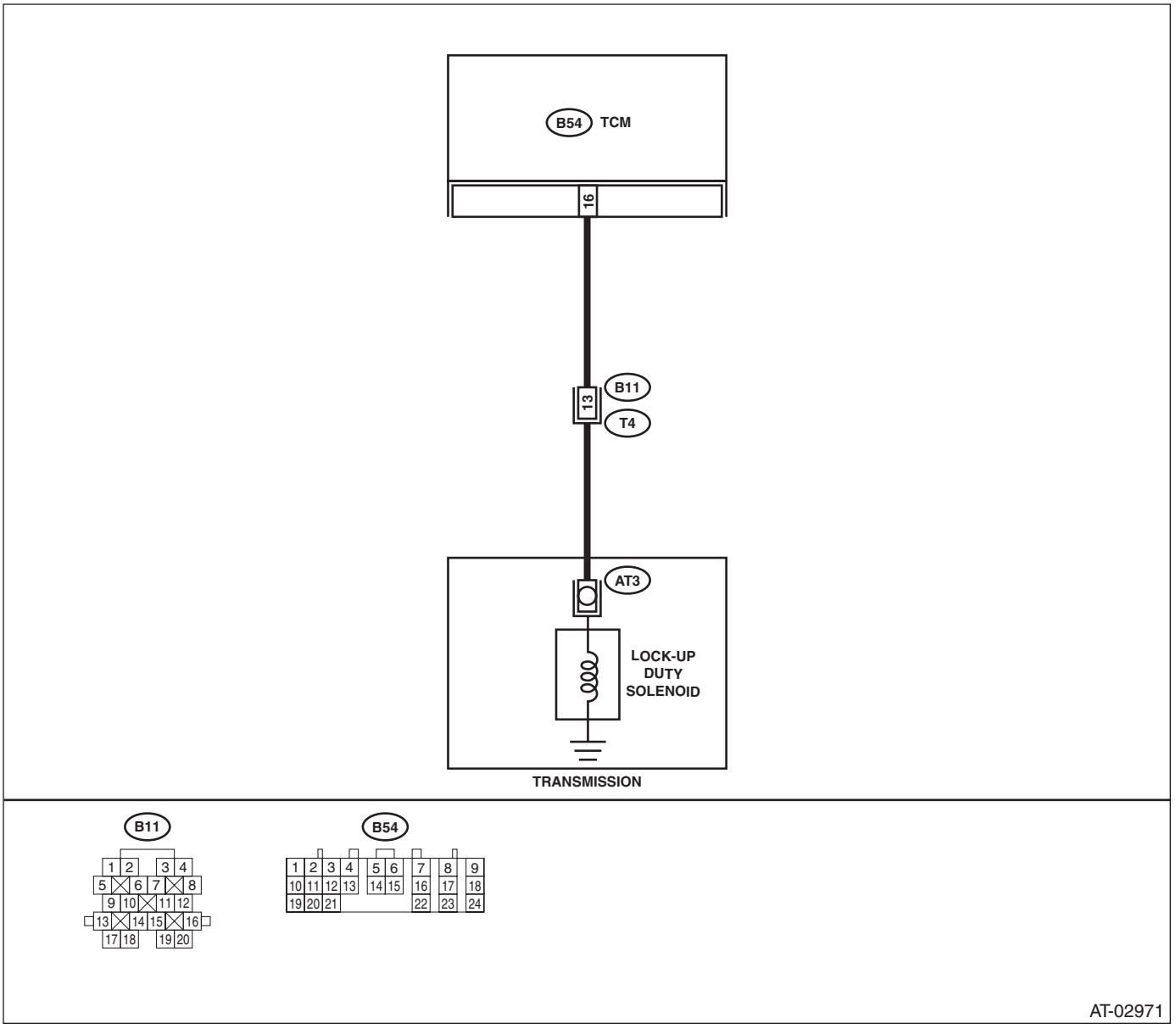
DIAGNOSIS:

The output signal circuit of lock-up duty solenoid is open or shorted.

TROUBLE SYMPTOM:

No “lock-up” (after engine warm-up).

WIRING DIAGRAM:



	Step	Check	Yes	No
1	**CHECK DTC.**	Do multiple DTCs appear in the on-board diagnostics test mode?	Go to another DTC.	Go to step **2.**
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*** ***(B54) No. 16 — (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*** ***(B54) No. 16 — Chassis ground:***	Is the resistance more than 1 MΩ?	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.**
6	**CHECK OUTPUT SIGNAL EMITTED FROM TCM.** 1) Connect the connectors to TCM and transmission. 2) Lift-up the vehicle and place 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 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.> 5) Measure the voltage between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 16 (+) — Chassis ground (−):***	Is the voltage more than 8.5 V?	Go to step **7.**	Go to step **10.**

	Step	Check	Yes	No
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 connector and chassis ground. ***Connector & terminal*** ***(B54) No. 16 (+) — Chassis ground (−):***	Is the voltage less than 0.5 V?	Even if the AT OIL TEMP warning light blinks, 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.**
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 blinks, 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.**

	Step	Check	Yes	No
10	**CHECK POOR CONTACT.**	Is there poor contact in lock-up duty solenoid circuit?	Repair poor contact.	Replace the TCM. <Ref. to 4AT-77, Transmission Control Module (TCM).>
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-71, 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 MΩ?	Even if the AT OIL TEMP warning light blinks, 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.

O: DTC 79 TRANSFER DUTY SOLENOID

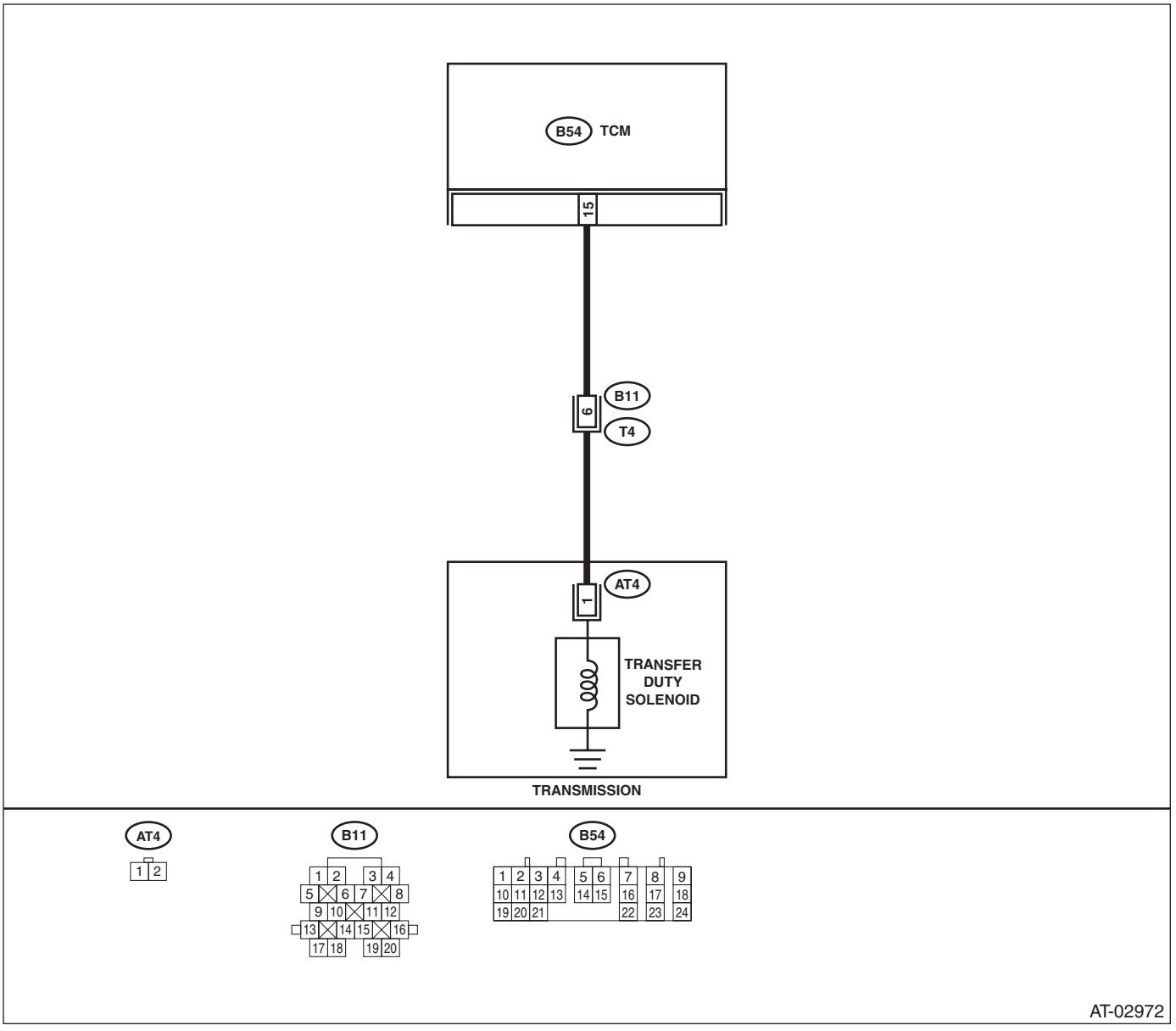
DIAGNOSIS:

The output signal circuit of transfer duty solenoid is open or shorted.

TROUBLE SYMPTOM:

Excessive “braking” in tight corners.

WIRING DIAGRAM:



	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*** ***(B54) No. 15 — (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*** ***(B54) No. 15 — Chassis ground:***	Is the resistance more than 1 MΩ?	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 **10.**
4	**PREPARE SUBARU SELECT MONITOR.**	Do you have a Subaru Select Monitor?	Go to step **7.**	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*** ***(B54) No. 15 (+) — Chassis ground (−):***	Is the voltage less than 1 V?	Go to step **6.**	Go to step **9.**
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*** ***(B54) No. 15 (+) — Chassis ground (−):***	Is the voltage more than 8.5 V?	Even if the AT OIL TEMP warning light blinks, 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 **9.**

	Step	Check	Yes	No
7	**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 **8.**	Go to step **9.**
8	**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. 5 — 10%?	Even if the AT OIL TEMP warning light blinks, 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 **9.**
9	**CHECK POOR CONTACT.**	Is there poor contact in transfer duty solenoid circuit?	Repair the poor contact.	Replace the TCM. <Ref. to 4AT-77, Transmission Control Module (TCM).>
10	**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 **11.**	Replace the transfer duty solenoid.
11	**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 **12.**	Repair the open circuit in harness between transfer duty solenoid and transmission connector.

Step		Check	Yes	No
12	**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 MΩ?	Even if the AT OIL TEMP warning light blinks, 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.

P: DTC 93 REAR VEHICLE SPEED SENSOR

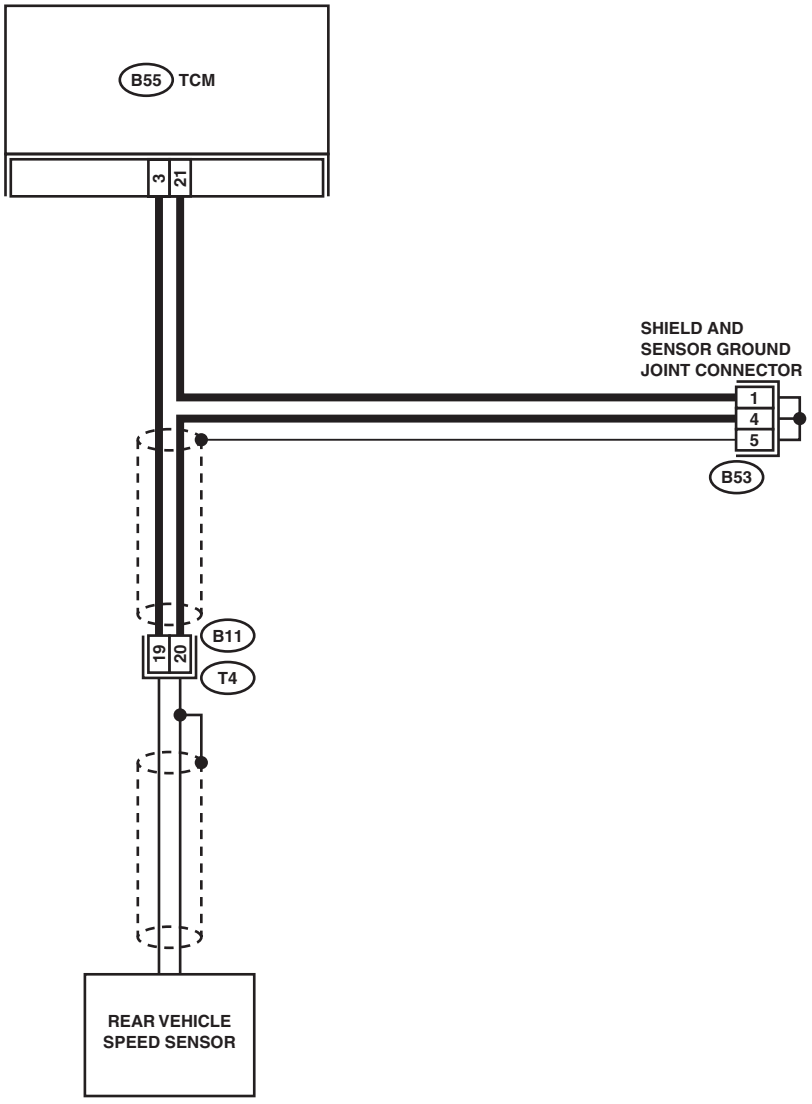
DIAGNOSIS:

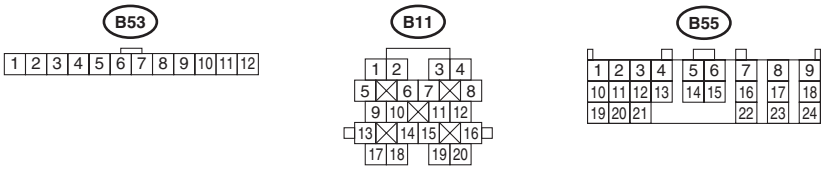
The input signal circuit of TCM is open or shorted.

TROUBLE SYMPTOM:

No lock-up or excessive tight corner “braking”.

WIRING DIAGRAM:





AT-02973

	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*** ***(B55) No. 3 — (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*** ***(B55) No. 21 — (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*** ***(B55) No. 3 — Chassis ground:***	Is the resistance more than 1 MΩ?	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*** ***(B55) No. 21 — Chassis ground:***	Is the resistance more than 1 MΩ?	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-59, 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.**
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*** ***(B55) No. 3 (+) — (B55) No. 21 (–):***	Is the voltage more than AC 1 V?	Even if the AT OIL TEMP warning light blinks, 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.**

	Step	Check	Yes	No
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) 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 blinks, 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) Lift-up or raise the vehicle and place safety stands. NOTE: Raise all wheels off floor. 3) Set the oscilloscope to TCM connector terminals. ***Connector & terminal*** ***Positive probe; (B55) No. 3:*** ***Ground lead; (B55) No. 21:*** 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 blinks, 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-77, Transmission Control Module (TCM).>

MEMO:

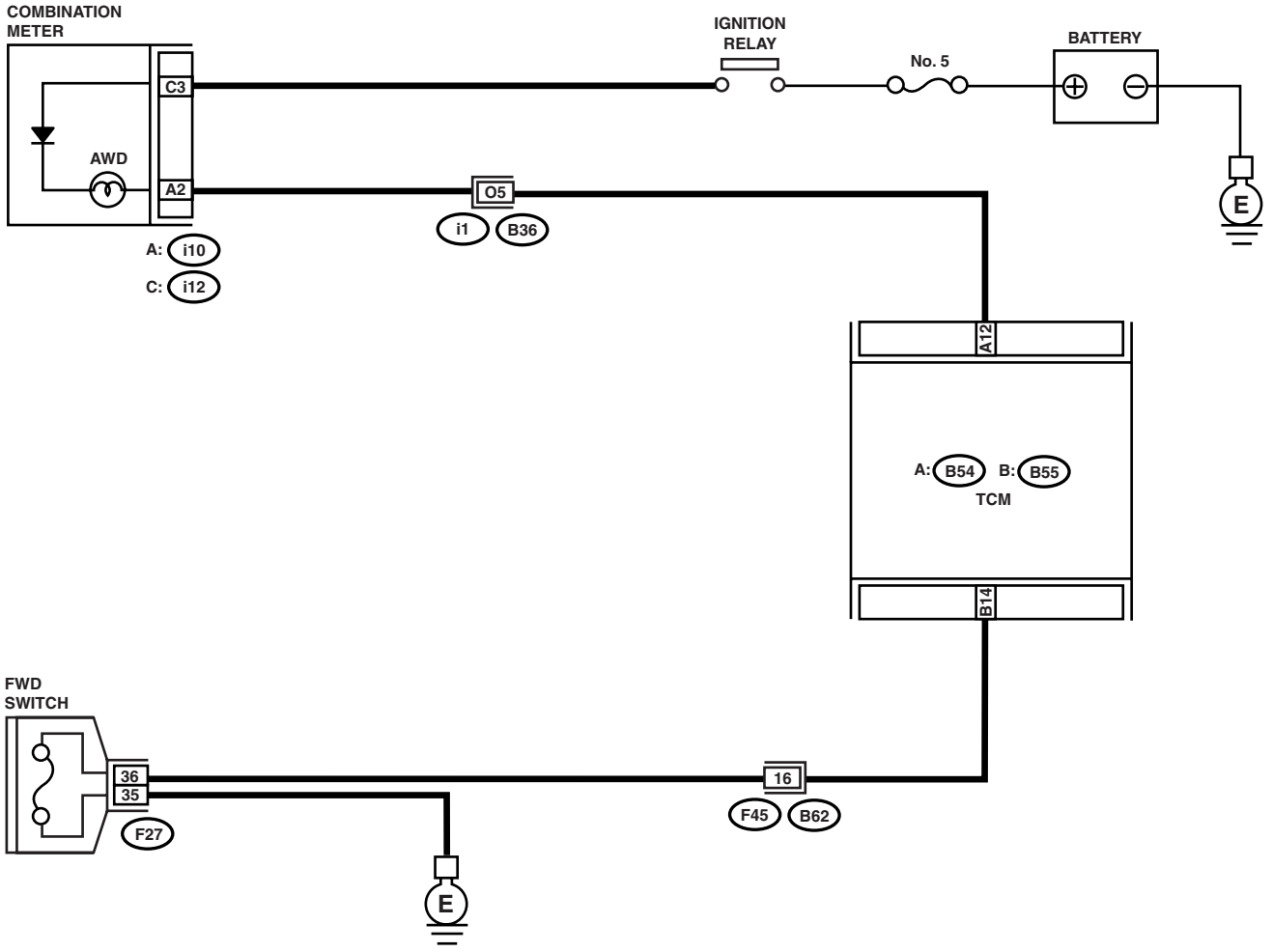
15.Diagnostic Procedure without Diagnostic Trouble Code (DTC)

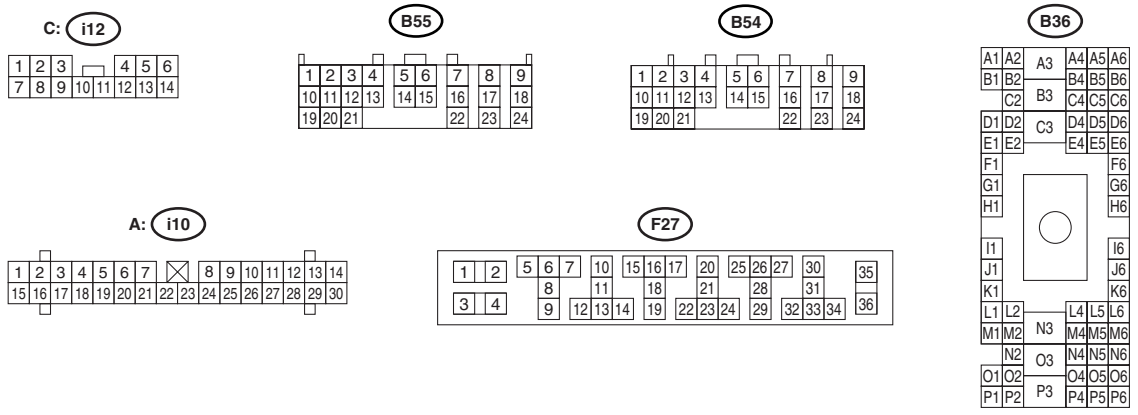
A: CHECK FWD SWITCH

DIAGNOSIS:

- The LED does not come on even if FWD switch is ON.
- The FWD switch circuit is open or short.

WIRING DIAGRAM:





AT-02974

	Step	Check	Yes	No
1	**CHECK FWD SWITCH.** Connect Select Monitor to data link connector, and display the LED monitor.	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 **2.**
2	**CHECK AWD WARNING LIGHT.** 1) Turn the ignition switch to OFF. 2) Remove the combination meter.	Is the AWD warning light bulb OK?	Go to step **3.**	Check the AWD warning light bulb. <Ref. to IDI-13, Combination Meter Assembly.>
3	**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 **4.**	Repair the open circuit in harness between TCM and FWD switch connector.
4	**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 **5.**	Repair the open circuit in harness between FWD switch connector and chassis ground.
5	**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 MΩ?	Go to step **6.**	Repair the short circuit in harness between TCM and FWD switch connector.
6	**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 **7.**	Go to step **11.**
7	**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 **8.**	Replace the TCM. <Ref. to 4AT-77, Transmission Control Module (TCM).>
8	**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 — (i12) No. 11:***	Is the resistance less than 1 Ω?	Go to step **9.**	Repair the open circuit in harness between TCM and combination meter and poor contact in connector.

	Step	Check	Yes	No
9	**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 MΩ?	Go to step **10.**	Repair the short circuit in harness between TCM and combination meter connector.
10	**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 **11.**	Go to step **12.**
11	**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 more than 9 V?	Go to step **12.**	Replace the TCM. <Ref. to 4AT-77, Transmission Control Module (TCM).>
12	**CHECK POOR CONTACT.**	Is there poor contact in FWD switch circuit?	Repair the poor contact.	Replace the TCM. <Ref. to 4AT-77, Transmission Control Module (TCM).>

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-100, 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-101, CHECK INHIBITOR SWITCH, Diagnostic Procedure without Diagnostic Trouble Code (DTC).>	Check the cruise control. Turbo and U5 model <Ref. to CC(ETC)-2, Basic Diagnostic Procedure.> Except turbo and U5 model <Ref. to CC-2, Basic Diagnostic Procedure.>

D: CHECK INHIBITOR SWITCH

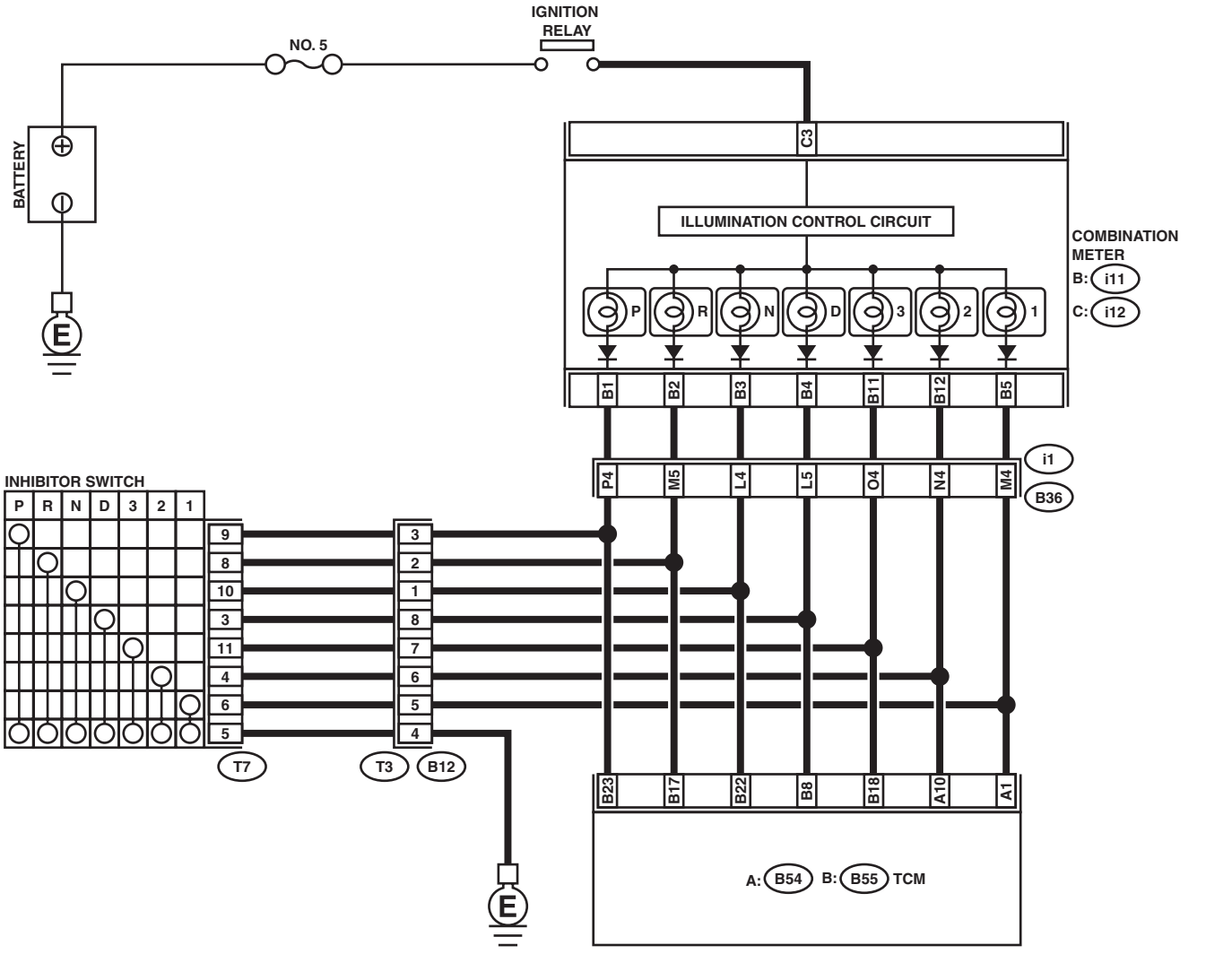
DIAGNOSIS:

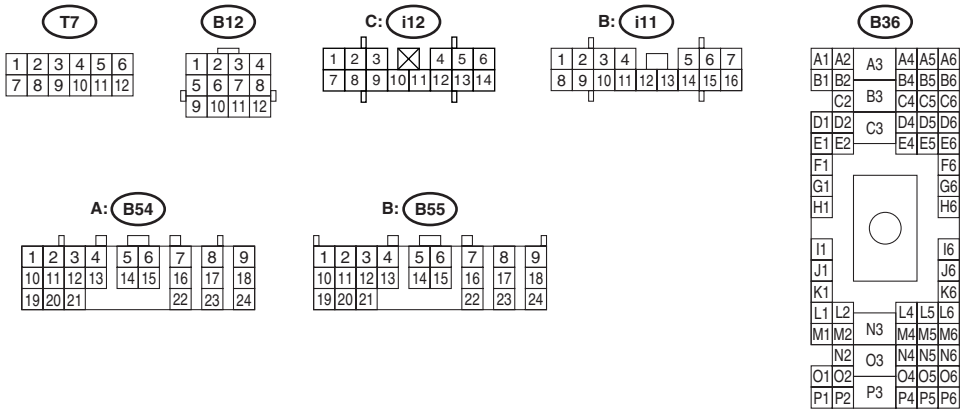
The input signal circuit of inhibitor switch is open or shorted.

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:





AT-02975

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 Symptom Related Diagnostic. <Ref. to 4AT-111, Symptom Related Diagnostic.>

	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*** ***(B55) No. 23 — (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*** ***(B55) No. 23 (+) — 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*** ***(B55) No. 23 (+) — Chassis ground (−):***	Is the voltage more than 8 V?	Go to step **65.**	Replace the TCM. <Ref. to 4AT-77, 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-13, Combination Meter Assembly.>
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*** ***(B55) No. 23 — (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.

	Step	Check	Yes	No
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*** ***(B55) No. 23 — Chassis ground:***	Is the resistance less than 1 MΩ?	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*** ***(B55) No. 17 — (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*** ***(B55) No. 17 (+) — 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*** ***(B55) No. 17 (+) — Chassis ground (−):***	Is the voltage more than 8 V?	Go to step **65.**	Replace the TCM. <Ref. to 4AT-77, Transmission Control Module (TCM).>
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-13, 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*** ***(B55) No. 17 — (i11) No. 2:***	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*** ***(B55) No. 17 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **35.**	Repair the ground short circuit in "R" range circuit.

	Step	Check	Yes	No
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*** ***(B55) No. 22 — (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*** ***(B55) No. 22 (+) — Chassis ground (–):***	Is the voltage less than 1 V?	Go to step **37.**	Go to step **65.**
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. ***Connector & terminal*** ***(B55) No. 22 (+) — Chassis ground (–):***	Is the voltage more than 8 V?	Go to step **65.**	Replace the TCM. <Ref. to 4AT-77, 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-13, 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. ***Connector & terminal*** ***(B55) No. 22 — (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. ***Connector & terminal*** ***(B55) No. 22 — Chassis ground:***	Is the resistance more than 1 MΩ?	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. ***Connector & terminal*** ***(B55) No. 8 — (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.

	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*** ***(B55) No. 8 (+) — 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*** ***(B55) No. 8 (+) — Chassis ground (–):***	Is the voltage more than 8 V?	Go to step **65.**	Replace the TCM. <Ref. to 4AT-77, 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-13, 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*** ***(B55) No. 8 — (i11) No. 4:***	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*** ***(B55) No. 8 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **47.**	Repair the ground short circuit in “D” range circuit.
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*** ***(B55) No. 18 — (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*** ***(B55) No. 18 (+) — Chassis ground (–):***	Is the voltage less than 1 V?	Go to step **49.**	Go to step **65.**

	Step	Check	Yes	No
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*** ***(B55) No. 18 (+) — Chassis ground (−):***	Is the voltage more than 8 V?	Go to step **65.**	Replace the TCM. <Ref. to 4AT-77, 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-13, 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*** ***(B55) No. 18 — (i11) No. 11:***	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.
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*** ***(B55) No. 18 — 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*** ***(B54) No. 10 — (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*** ***(B54) No. 10 (+) — 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*** ***(B54) No. 10 (+) — Chassis ground (−):***	Is the voltage more than 8 V?	Go to step **65.**	Replace the TCM. <Ref. to 4AT-77, Transmission Control Module (TCM).>

	Step	Check	Yes	No
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-13, Combination Meter Assembly.>
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*** ***(B54) No. 10 — (i11) No. 12:***	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*** ***(B54) No. 10 — Chassis ground:***	Is the resistance more than 1 MΩ?	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*** ***(B54) No. 1 — (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*** ***(B54) No. 1 (+) — 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*** ***(B54) No. 1 (+) — Chassis ground (–):***	Is the voltage more than 8 V?	Go to step **65.**	Replace the TCM. <Ref. to 4AT-77, Transmission Control Module (TCM).>
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-13, Combination Meter Assembly.>

	Step	Check	Yes	No
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*** ***(B54) No. 1 — (i11) 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*** ***(B54) No. 1 — 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-50, ADJUSTMENT, Inhibitor Switch.> and <Ref. to CS-31, Select Cable.>

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	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	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	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	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

MEMO:

1. Basic Diagnostic Procedure

A: PROCEDURE

NOTE:
This section is specified for H4DOTC engine model.

	Step	Check	Yes	No
1	**CHECK PRE-INSPECTION.** 1) Ask the customer when and how trouble occurred using interview checklist. <Ref. to 4AT(D)-4, Check List for Interview.> 2) Before performing the diagnosis, inspect following items which might influence the AT problems. • General inspection <Ref. to 4AT(D)-5, INSPECTION.> • Oil leak • Check each harness connector to ensure it is connected securely. • Visually check harness for any damage. • Stall speed test <Ref. to 4AT-34, Stall Test.> • Line pressure test <Ref. to 4AT-36, Line Pressure Test.> • Transfer clutch pressure test <Ref. to 4AT-38, Transfer Clutch Pressure Test.> • Time lag test <Ref. to 4AT-35, Time Lag Test.> • Road test <Ref. to 4AT-33, Road Test.> • Inhibitor switch <Ref. to 4AT-50, 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 turn on?	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 or power supply and ground line circuit. <Ref. to 4AT(D)-24, Diagnostic Procedure for “AT OIL TEMP” Warning Light.> 3) Turn the ignition switch to ON.	Does the AT OIL TEMP warning light blink?	Go to step **4.**	Go to step **5.**
4	**READ OF DTC.** Calling up the DTC. NOTE: If the communication function of Subaru Select Monitor cannot be executed normally, check the communication circuit. <Ref. to 4AT(D)-30, COMMUNICATION FOR INITIALIZING IMPOSSIBLE.>	Is the DTC displayed?	Go to step **6.** NOTE: Record all DTC.	Go to step **5.**
5	**PERFORM THE GENERAL DIAGNOSTICS.** 1) Inspect using “Diagnostics Procedure without Diagnostic Trouble Code (DTC)”.<Ref. to 4AT(D)-116, Diagnostic Procedure without Diagnostic Trouble Code (DTC).> 2) Inspect using “Symptom Related Diagnostic”. <Ref. to 4AT(D)-124, Symptom and Related Malfunction.> 3) Perform the inspection mode. <Ref. to 4AT(D)-18, Inspection Mode.> 4) Calling up the DTC.	Is the DTC displayed?	Go to step **6.**	Complete the diagnosis.

	Step	Check	Yes	No
6	**PERFORM THE DIAGNOSIS.** 1) Inspect using “Diagnostics Procedure with DTC”. <Ref. to 4AT(D)-33, Diagnostic Procedure with Diagnostic Trouble Code (DTC).> NOTE: For DTC table, refer to “List of DTC”. <Ref. to 4AT(D)-21, List of Diagnostic Trouble Code (DTC).> 2) Repair the trouble cause. 3) Perform the clear memory mode. 4) Perform the inspection mode. <Ref. to 4AT(D)-18, Inspection Mode.> 5) Calling up the DTC.	Is the DTC displayed?	Inspect using “Diagnostics procedure with Subaru Select Monitor”. <Ref. to 4AT(D)-33, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>	Complete the diagnosis.

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 blinking	❑ Not blinking	
Select lever position	❑ P ❑ R ❑ N ❑ D ❑ 3 ❑ 2 ❑ 1 ❑ SPORT shift mode		
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 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 (0.026 in).

B: INSPECTION

1. BATTERY

Measure the battery voltage and specific gravity of electrolyte.

Standard voltage: 12 V or more

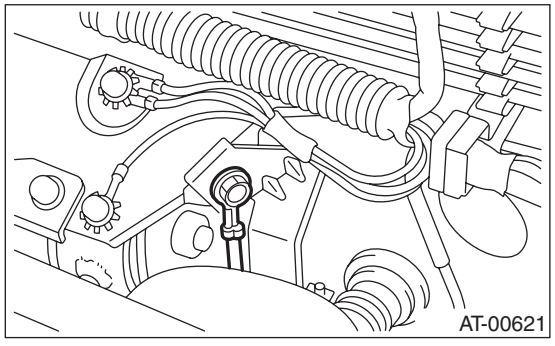
Specific gravity: Above 1.260

2. TRANSMISSION GROUND

Make sure that the ground terminal bolt is tightened securely.

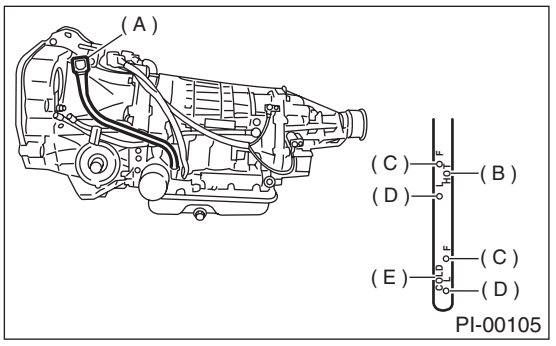
• Chassis side

Tightening torque:
13 N·m (1.3 kgf-m, 9.4 ft-lb)



3. ATF LEVEL

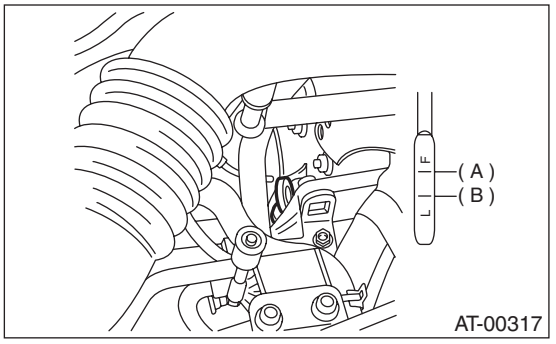
Make sure that ATF level is in the specification. <Ref. to 4AT-31, INSPECTION, Automatic Transmission Fluid.>



(A) Level gauge
(B) "HOT" side
(C) Upper level
(D) Lower level
(E) "COLD" side

4. FRONT DIFFERENTIAL OIL LEVEL

Make sure that front differential oil level is in the specification. <Ref. to 4AT-32, INSPECTION, Differential Gear Oil.>

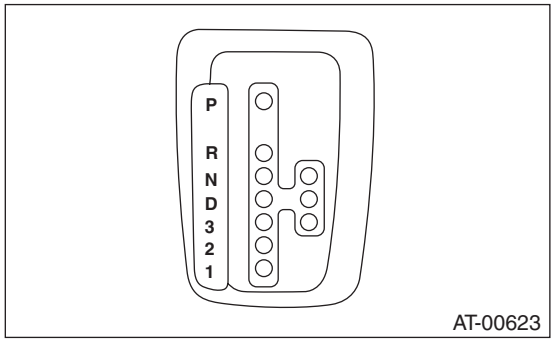


(A) Upper level
(B) Lower level

5. OPERATION OF SELECT LEVER

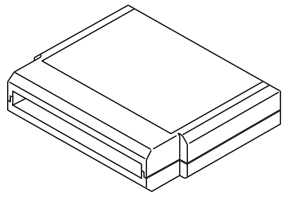
Make sure there is no abnormal noise, dragging or contact pattern in each select lever range.

WARNING:
Stop the engine while checking operation of select lever.



C: PREPARATION TOOL

1. SPECIAL TOOLS

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST24082AA260	24082AA260	CARTRIDGE	Troubleshooting for electrical systems.
ST22771AA030	22771AA030	SUBARU SELECT MONITOR KIT	Troubleshooting for electrical systems.

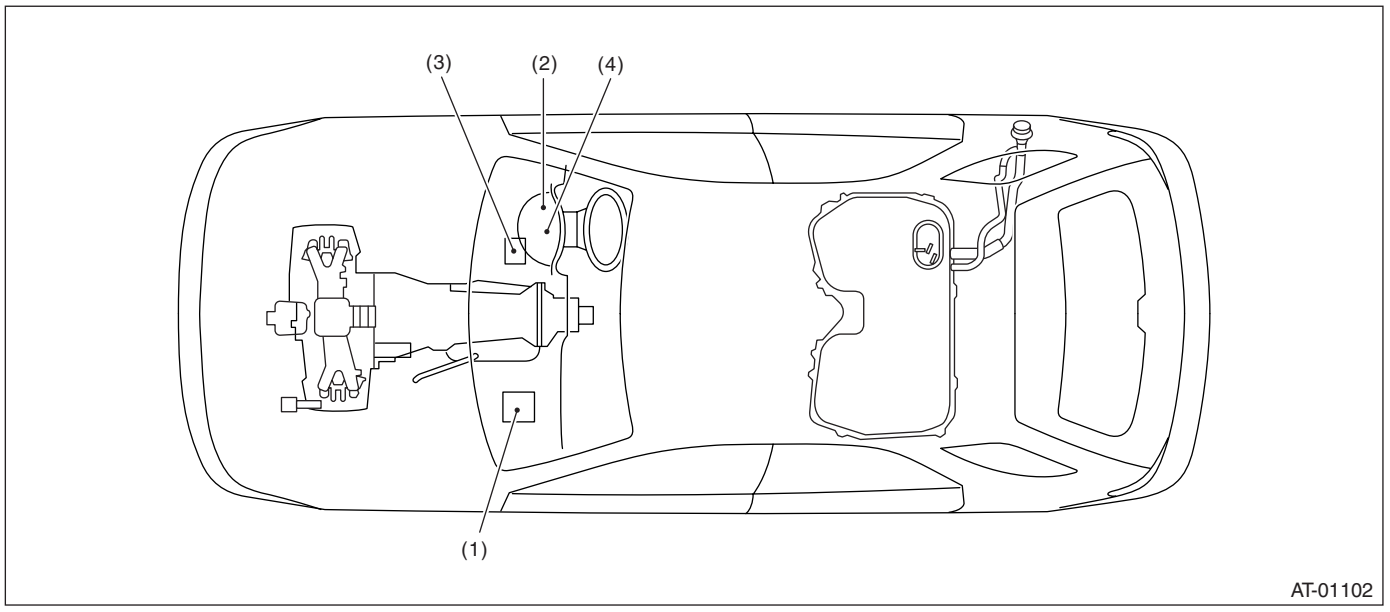
2. GENERAL PURPOSE TOOLS

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

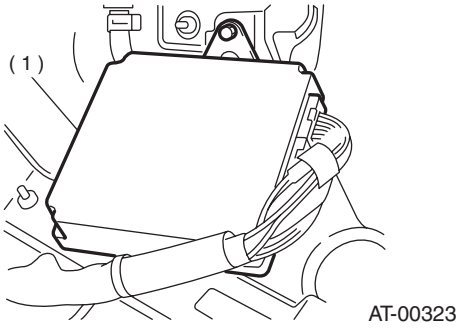
4. Electrical Components Location

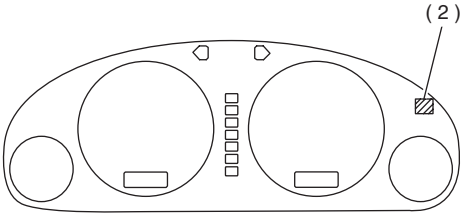
A: LOCATION

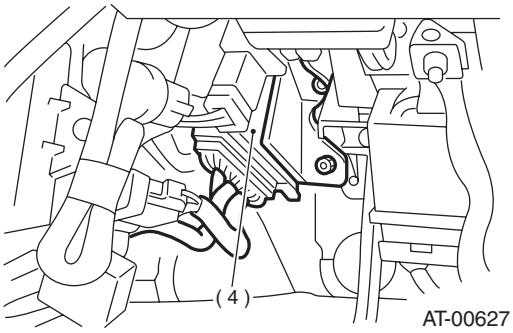
1. CONTROL MODULE

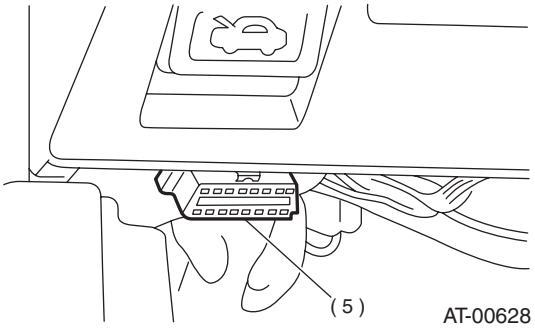


(1) Engine control module (ECM)
(2) AT OIL TEMP warning light (AT diagnostic indicator light)
(3) Transmission control module (TCM)
(4) Data link connector

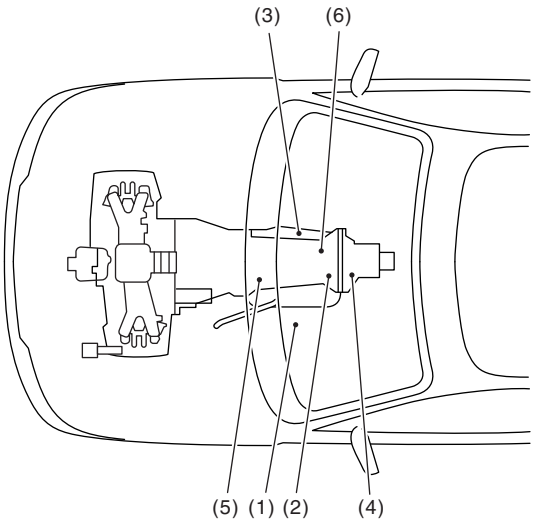






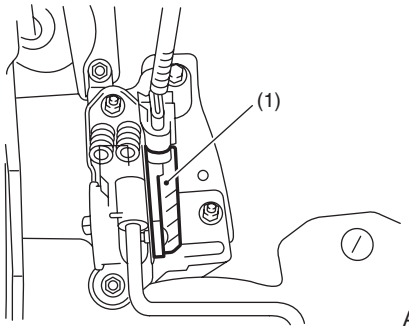


2. SENSOR

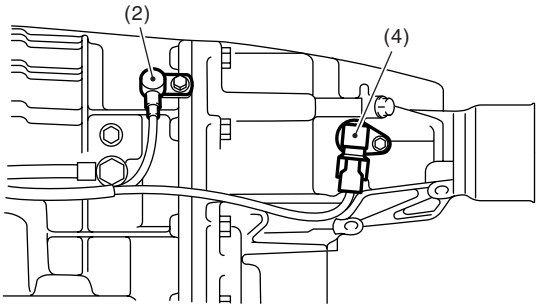


AT-01614

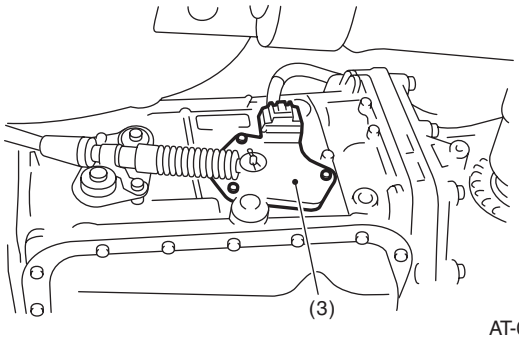
(1) Accelerator pedal position sensor
(2) Front vehicle speed sensor
(3) Inhibitor switch
(4) Rear vehicle speed sensor
(5) Torque converter turbine speed sensor
(6) ATF temperature sensor



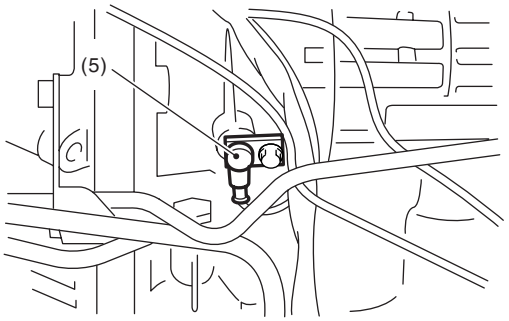
AT-00375



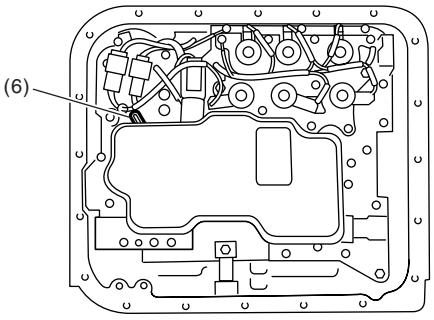
AT-01106



AT-00330

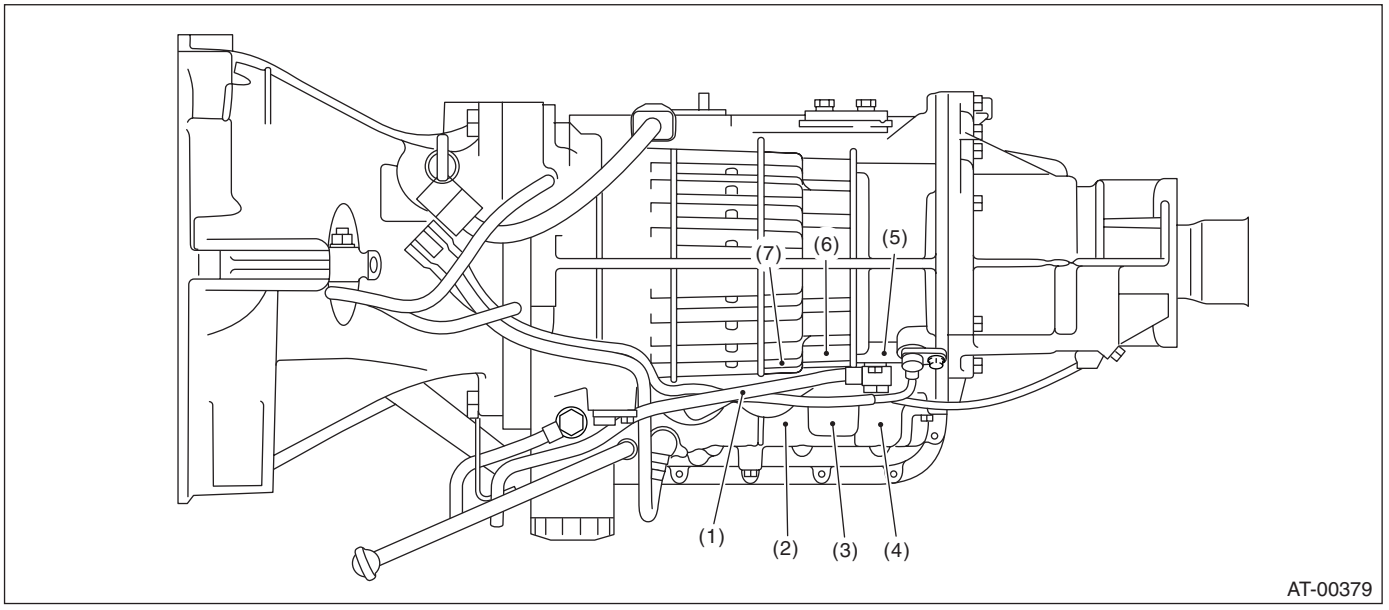


AT-00331

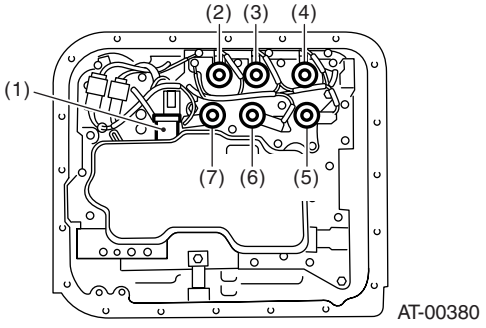


AT-00378

3. SOLENOID

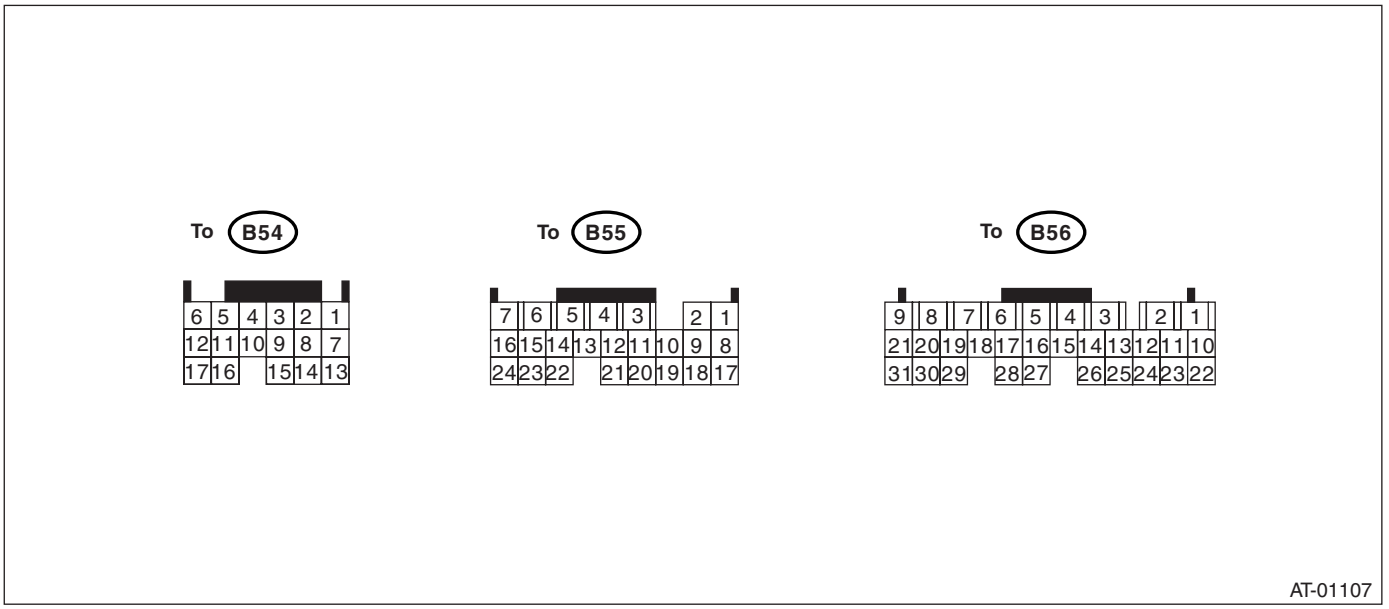


(1) Line pressure linear solenoid
(2) High clutch duty solenoid
(3) 2-4 brake duty solenoid
(4) Low & reverse duty solenoid
(5) Low clutch duty solenoid
(6) Transfer duty solenoid
(7) Lock-up duty solenoid



5. Transmission Control Module (TCM) I/O Signal

A: ELECTRICAL SPECIFICATION



Check with ignition switch ON.						
Content		Connector No.	Terminal No.	Measuring conditions	Voltage (V)	Resistance to body (Ω)
Back-up power supply		B56	27	Ignition switch OFF	10 — 13	—
			28			
			29			
ACC power supply		B56	16	Ignition switch ACC	10 — 13	—
Ignition power supply		B56	21	Ignition switch ON (with engine OFF)	10 — 13	—
		B56	31			
Inhibitor switch	"P" range switch	B55	5	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	More than 8	
	"R" range switch	B55	14	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	B54	16	Select lever in "3" range	Less than 1	—
				Select lever in any other than "3" range	More than 8	
	"2" range switch	B54	4	Select lever in "2" range	Less than 1	—
				Select lever in any other than "2" range	More than 8	
	"1" range switch	B54	10	Select lever in "1" range	Less than 1	—
				Select lever in any other than "1" range	More than 8	
Brake switch		B55	20	Brake pedal depressed.	More than 10.5	—
				Brake pedal released.	Less than 1	

Check with ignition switch ON.					
Content	Connector No.	Terminal No.	Measuring conditions	Voltage (V)	Resistance to body (Ω)
Throttle position sensor	B55	19	Throttle fully closed.	More than 0.2	—
			Throttle fully open.	Less than 4.6	
Throttle position sensor power supply	B55	10	Ignition switch ON (with engine OFF)	Approx. 5	—
ATF temperature sensor	B55	21	ATF temperature 20°C (68°F)	3.5 — 4.3	2.3 k — 5.3 k
			ATF temperature 80°C (176°F)	1.0 — 2.2	300 — 800
Rear vehicle speed sensor	B55	24	Vehicle speed at least 20 km/h (12 MPH)	More than 2 (AC range)	—
Front vehicle speed sensor	B55	6	Vehicle stopped.	0	450 — 750
			Vehicle speed at least 20 km/h (12 MPH)	More than 1 (AC range)	
Torque converter turbine speed sensor	B55	7	Engine idling after warm-up. (“D” range)	0	450 — 750
			Engine idling after warm-up. (“N” range)	More than 1 (AC range)	
Vehicle speed output signal	B56	1	Vehicle speed at least 10 km/h (6 MPH)	Less than 1← →More than 4	—
Engine speed signal	B55	13	Ignition switch ON (with engine OFF)	Less than 1	—
			Ignition switch ON (with engine ON)	More than 5 (AC range)	
Line pressure linear solenoid	B56	20	Ignition switch ON (with engine OFF) Throttle fully closed after warm-up. (“R” range)	3.9 — 7.7	4.0 — 8.0
			Ignition switch ON (with engine OFF) Throttle fully open after warm-up. (“R” range)	1.1 — 4.6	
Lock-up duty solenoid	B56	5	When lock up occurs.	More than 10.5	2.0 — 4.5
			When lock up is released.	Less than 1	
Transfer duty solenoid	B56	4	“P” or “N” range	Less than 1	2.0 — 4.5
			Throttle fully open and with select lever in 1st gear.	More than 10.5	
2-4 brake duty solenoid	B56	6	“P” or “N” range	More than 10.5	2.0 — 4.5
			2nd or 4th gear	Less than 1	
High clutch duty solenoid	B56	8	3rd or 4th gear	Less than 1	2.0 — 4.5
			“P” or “N” range	More than 10.5	
Low clutch duty solenoid	B56	9	1st or 2nd gear	Less than 1	2.0 — 4.5
			“P” or “N” range	More than 10.5	
Low & reverse duty solenoid	B56	7	“P” or “N” range	More than 10.5	2.0 — 4.5
			“1” range	More than 5	
AT OIL TEMP warning light	B56	13	Light ON	Less than 1	—
			Light OFF	More than 9	
ABS signal	B54	12	ABS switch ON	Less than 1	—
			ABS switch OFF	6.5 — 15	
Front vehicle speed sensor ground	B55	15	—	0	Less than 1
Rear vehicle speed sensor ground	B55	23	—	0	Less than 1

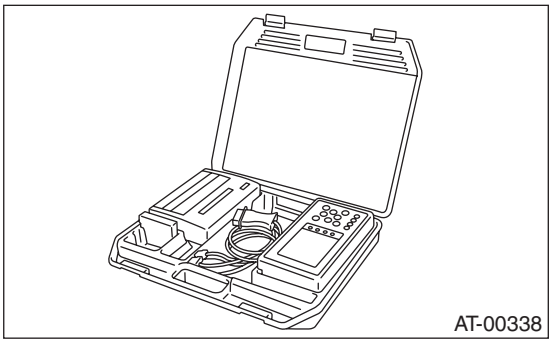
Check with ignition switch ON.					
Content	Connector No.	Terminal No.	Measuring conditions	Voltage (V)	Resistance to body (Ω)
Torque converter turbine speed sensor ground	B55	16	—	0	Less than 1
System ground line	B55	17	—	0	Less than 1
	B56	2			
	B56	3			
	B55	8			
Sensor ground line	B55	9	—	0	Less than 1
Range lock signal	B56	18	"D" range 0 km/h (0 mile)	More than 10.5	20 — 40
			"D" range 20 km/h (12 mile/h)	Less than 1	
Data link signal (Subaru Select Monitor)	B56	12	—	—	—
SPORT shift mode switch	B54	3	SPORT shift mode switch ON	Less than 1	—
			SPORT shift mode switch OFF	More than 8	
Shift up switch	B54	9	Shift up switch ON	Less than 1	—
			Shift up switch OFF	More than 8	
Shift down switch	B54	15	Shift down switch ON	Less than 1	—
			Shift down switch OFF	More than 8	
Buzzer	B56	24	ON	Less than 1	—
			OFF	More than 8	
SPORT shift indicator 4	B54	7	SPORT shift mode OFF	More than 4	—
			Shift down indicator ON	Less than 1	
SPORT shift indicator 3	B54	5	SPORT shift mode OFF	More than 4	—
			SPORT shift mode with 4th gear	Less than 1	
SPORT shift indicator 2	B54	17	SPORT shift mode OFF	More than 4	—
			SPORT shift mode with 2nd and 3rd gear	Less than 1	
SPORT shift indicator 1	B54	6	SPORT shift mode OFF	More than 4	—
			SPORT shift mode with 1st and 3rd gear	Less than 1	
CAN communication signal +	B55	3	Ignition switch ON	Pulse signal	—
CAN communication signal –	B55	12	Ignition switch ON	Pulse signal	

6. Subaru Select Monitor

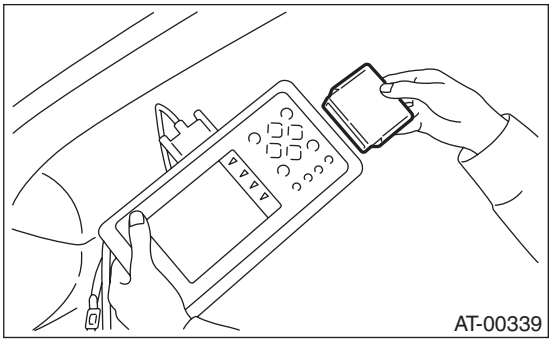
A: OPERATION

1. READ DIAGNOSTIC TROUBLE CODE

1) Prepare the Subaru Select Monitor kit.

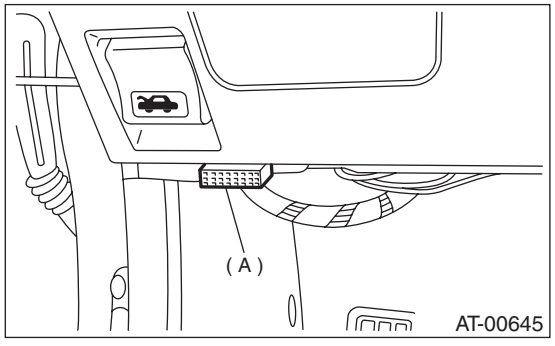


2) Connect the diagnosis cable to Subaru Select Monitor.
3) Insert the cartridge into Subaru Select Monitor. <Ref. to 4AT(D)-6, PREPARATION TOOL.>



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).

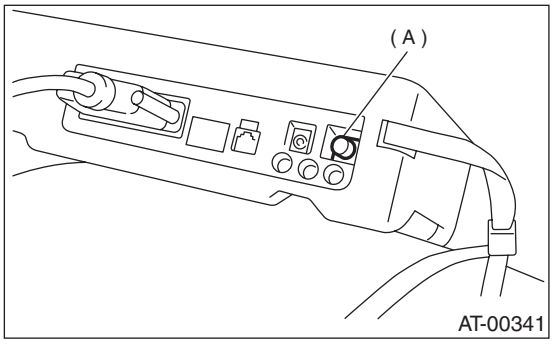


(A) Data link connector

(2) Connect the diagnosis cable to data link connector.

NOTE:
Do not connect scan tools except for Subaru Select Monitor.

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 {Diagnostic Code(s) Display} 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 DTC LIST. <Ref. to 4AT(D)-21, 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 «Transmission Diagnosis» 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.

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
ATF temperature signal	ATF Temp.	°C or °F
Throttle position signal	Throttle Sensor Voltage	V
Gear position	Gear Position	—
Throttle opening angle	Throttle Opening Angle	%
Line pressure control duty ratio	Line Pressure Duty Ratio	%
Lock up clutch control duty ratio	Lock Up Duty Ratio	%
Transfer clutch control duty ratio	Transfer Duty Ratio	%
Power supply for throttle position sensor	Throttle Power Supply	V
Torque converter turbine speed signal	Turbine Revolution Speed	rpm
2-4 brake timing pressure control duty ratio	Brake Clutch Duty Ratio	%
Low clutch duty ratio	L/C Duty	%
High clutch duty ratio	H/C Duty	%
Low & reverse brake duty ratio	L&R/B Duty	%
Stop light switch signal	Stop Light Switch	ON or OFF
ABS signal	ABS 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
AT diagnosis indicator lamp	Diagnosis Lamp	ON or OFF
Shift up signal	Up Switch	ON or OFF
Shift down signal	Down Switch	ON or OFF
Tip signal	Tip Mode Switch	ON or OFF
Shift lock solenoid signal	Shift Lock solenoid	ON or OFF
ATF temperature warning light	ATF temperature light	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}.
2) On the «System Selection Menu» display screen, select the {Transmission Control System}.
3) Select the {OK} after the information of transmission type is displayed.
4) On the «Transmission Diagnosis» display screen, select the {Clear Memory}.
5) When the “Done” is 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.
• When {Clear Memory 2} is selected and executed, DTC and learned control memory is cleared. If Clear Memory 2 is performed, execute the learning control. <Ref. to 4AT(D)-16, FACILITATION OF LEARNING CONTROL, OPERATION, Subaru Select Monitor.>

4. FACILITATION OF LEARNING CONTROL

1) Shift the select lever to “P” range, and apply parking brake.
2) Lift-up the vehicle.
3) Connect the Subaru Select Monitor to data link connector, and then turn the ignition switch to ON.
4) Perform the {Clear Memory 2} using Subaru Select Monitor.<Ref. to 4AT(D)-16, CLEAR MEMORY MODE, OPERATION, Subaru Select Monitor.>
5) Using Subaru Select Monitor, check that the DTC is not output. <Ref. to 4AT(D)-14, READ DIAGNOSTIC TROUBLE CODE, OPERATION, Subaru Select Monitor.>
6) Warm-up the engine until the ATF temperature which is displayed on the Subaru Select Monitor is within 60 - 90 °C (140 - 194 °F). <Ref. to 4AT(D)-15, READ CURRENT DATA, OPERATION, Subaru Select Monitor.>
7) Shift the select lever to “R” range.
8) Turn all switches including headlight, air conditioner, seat heater, rear defogger and etc. to OFF.
9) Turn the ignition switch to OFF.
10) Depress the brake pedal fully until the facilitation of learning control is completed when the “Communication Failed!” is displayed on Subaru Select Monitor.
11) Turn the ignition switch to ON.
12) Read the current data to check that the Subaru Select Monitor is returned to normal operation. <Ref. to 4AT(D)-15, READ CURRENT DATA, OPERATION, Subaru Select Monitor.>
13) Shift the select lever to “P” range, and then wait for more than 3 seconds.
14) Shift the select lever to “R” range, and then wait for more than 3 seconds.
15) Shift the select lever to “N” range, and then wait for more than 3 seconds.
16) Shift the select lever to “D” range, and then wait for more than 3 seconds.
17) Shift the select lever to “N” range, and then wait for more than 3 seconds.
18) Slowly depress the accelerator pedal fully.
19) Slowly release the accelerator pedal fully.
20) Start the engine, and idle it.
21) Shift the select lever to “D” range.
22) Start the facilitation of learning control. At this time, the AT OIL TEMP warning light in combination meter blinks at 2 Hz. When the AT OIL TEMP warning light does not blink, turn the ignition switch to OFF and repeat the procedures from step 4). When the AT OIL TEMP warning light which blinking at 2 Hz changes to blink at 0.5 Hz, facilitation of learning control is completed.

NOTE:
When blinking of AT OIL TEMP warning light changes from 2 Hz to 4 Hz during facilitation of learning control, repeat the procedure from step 4).

23) Shift the select lever to “N” range, and then turn the ignition switch to OFF.
24) Shift the select lever to the “P” range, and then complete the facilitation of learning control.

7. Read Diagnostic Trouble Code (DTC)

A: OPERATION

Refer to Subaru Select Monitor for information about how to obtain and understand DTC. <Ref. to 4AT(D)-14, OPERATION.>

NOTE:
DTC can not be read through AT OIL TEMP warning light.

8. Inspection Mode

A: OPERATION

WARNING:
Observe the road traffic law.

1) Move the select lever to “D” range, and then drive the vehicle at 60 km/h (37 MPH) for at least 10 seconds.
2) Drive vehicle in SPORT shift mode.

9. Clear Memory Mode

A: OPERATION

1. WITHOUT SUBARU SELECT MONITOR

Current diagnostic trouble codes (DTC) shown on display are cleared by turning the ignition switch to OFF after conducting on-board diagnostics operation. Previous diagnostic trouble codes (DTC), however, cannot be cleared since they are stored in the TCM memory which is operating on back-up power supply. These diagnostic trouble codes (DTC) can be cleared by removing the TCM connector for at least two minutes.

CLEAR MEMORY:

Removal of TCM connector (B56) (for at least two minutes)

- The TCM connector (B56) is located in the line to memory back-up power supply of TCM. Removal of this connector clears the previous diagnostic trouble codes (DTC) stored in TCM memory.
- Be sure to remove the TCM connector (B56) for at least the specified length of time. Otherwise, the diagnostic trouble codes (DTC) may not be cleared.

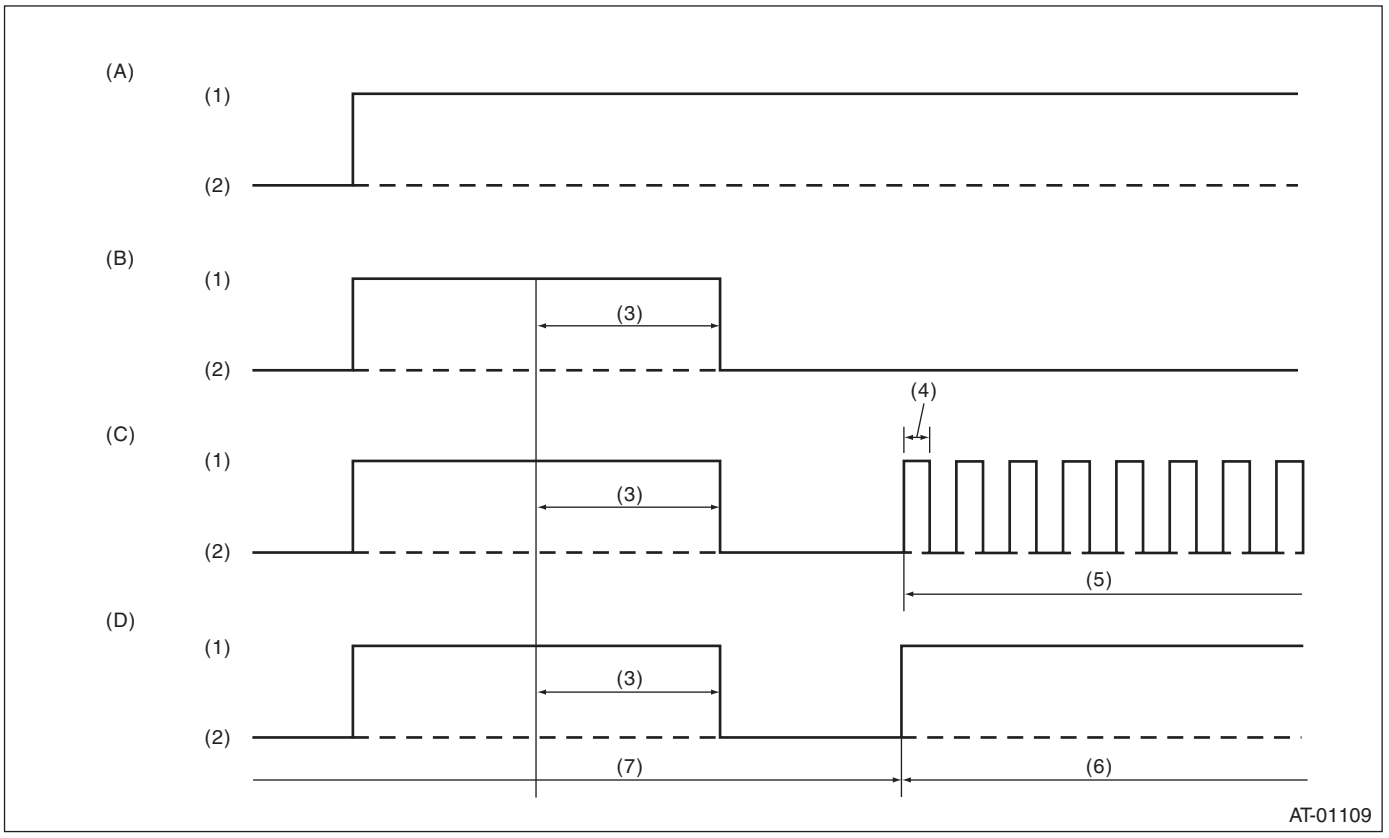
2. WITH SUBARU SELECT MONITOR

Refer to Subaru Select Monitor for information about how to clear DTC.
<Ref. to 4AT(D)-16, CLEAR MEMORY MODE.>

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.



(A) Ignition switch (engine OFF)
(B) Normal (engine ON)
(C) Faulty (engine ON)
(D) Normal (ATF temperature is high.)

(1) ON
(2) OFF
(3) 2 sec.
(4) 0.25 sec.
(5) Blink
(6) ATF temperature (High)
(7) ATF temperature (Low)

11.List of Diagnostic Trouble Code (DTC)

A: LIST

DTC	Item	Diagnosis content	Reference
P0705	Transmission Range Sensor Circuit (PRNDL Input)	Inhibitor switch malfunction, open or short circuit	<Ref. to 4AT(D)-33, DTC P0705 — TRANSMISSION RANGE SENSOR —.>
P0712	Transmission Fluid Temperature Sensor Circuit Low Input	ATF temperature sensor malfunction, open input signal circuit	<Ref. to 4AT(D)-44, DTC P0712 — TRANSMISSION FLUID TEMPERATURE SENSOR CIRCUIT LOW INPUT —.>
P0713	Transmission Fluid Temperature Sensor Circuit High Input	ATF temperature sensor malfunction, open input signal circuit	<Ref. to 4AT(D)-48, DTC P0713 — TRANSMISSION FLUID TEMPERATURE SENSOR CIRCUIT HIGH INPUT —.>
P0715	Input/Turbine Speed Sensor Circuit	Torque converter turbine speed sensor malfunction, open or short input signal circuit	<Ref. to 4AT(D)-52, DTC P0715 — INPUT/TURBINE SPEED SENSOR CIRCUIT —.>
P0719	Torque Converter/Brake Switch “B” Circuit Low	Brake switch malfunction, open input signal circuit	<Ref. to 4AT(D)-54, DTC P0719 — TORQUE CONVERTER/BRAKE SWITCH “B” CIRCUIT LOW —.>
P0720	AT Vehicle Speed Sensor Circuit	Front vehicle speed sensor malfunction, open or short input signal circuit	<Ref. to 4AT(D)-56, DTC P0720 — AT VEHICLE SPEED SENSOR CIRCUIT —.>
P0724	Torque Converter/Brake Switch “B” Circuit High	Brake switch malfunction, short input signal circuit	<Ref. to 4AT(D)-60, DTC P0724 — TORQUE CONVERTER/BRAKE SWITCH “B” CIRCUIT HIGH —.>
P0725	Engine Speed Input Circuit	Open or short engine speed output signal circuit	<Ref. to 4AT(D)-62, DTC P0725 — ENGINE SPEED INPUT CIRCUIT —.>
P0731	Gear 1 Incorrect Ratio	Vehicle speed sensor, torque converter turbine speed sensor, or control valve malfunction	<Ref. to 4AT(D)-64, DTC P0731 — GEAR 1 INCORRECT RATIO —.>
P0732	Gear 2 Incorrect Ratio	Vehicle speed sensor, torque converter turbine speed sensor, or control valve malfunction	<Ref. to 4AT(D)-64, DTC P0732 — GEAR 2 INCORRECT RATIO —.>
P0733	Gear 3 Incorrect Ratio	Vehicle speed sensor, torque converter turbine speed sensor, or control valve malfunction	<Ref. to 4AT(D)-64, DTC P0733 — GEAR 3 INCORRECT RATIO —.>
P0734	Gear 4 Incorrect Ratio	Vehicle speed sensor, torque converter turbine speed sensor, or control valve malfunction	<Ref. to 4AT(D)-64, DTC P0734 — GEAR 4 INCORRECT RATIO —.>
P0736	Reverse Incorrect Ratio	Vehicle speed sensor, torque converter turbine speed sensor, or control valve malfunction	<Ref. to 4AT(D)-65, DTC P0736 — REVERSE INCORRECT RATIO —.>
P0741	Torque Converter Clutch Circuit Performance or Stuck Off	Lock up clutch malfunction or locking of valve	<Ref. to 4AT(D)-66, DTC P0741 — TORQUE CONVERTER CLUTCH CIRCUIT PERFORMANCE OR STUCK OFF —.>
P0743	Torque Converter Clutch Circuit Electrical	Lock up solenoid malfunction, open or short output signal circuit	<Ref. to 4AT(D)-68, DTC P0743 — TORQUE CONVERTER CLUTCH CIRCUIT ELECTRICAL —.>
P0748	Pressure Control Solenoid “A” Electrical	Line pressure linear solenoid malfunction, open or short output signal circuit	<Ref. to 4AT(D)-70, DTC P0748 — PRESSURE CONTROL SOLENOID “A” ELECTRICAL —.>
P0753	Shift Solenoid “A” Electrical	Low clutch duty solenoid malfunction, open or short output signal circuit	<Ref. to 4AT(D)-74, DTC P0753 — SHIFT SOLENOID “A” ELECTRICAL —.>

DTC	Item	Diagnosis content	Reference
P0758	Shift Solenoid “B” Electrical	2-4 brake duty solenoid malfunction, open or short output signal circuit	<Ref. to 4AT(D)-78, DTC P0758 — SHIFT SOLENOID “B” ELECTRICAL — .>
P0763	Shift Solenoid “C” Electrical	High clutch duty solenoid malfunction, open or short output signal circuit	<Ref. to 4AT(D)-82, DTC P0763 — SHIFT SOLENOID “C” ELECTRICAL — .>
P0768	Shift Solenoid “D” Electrical	Low & reverse clutch duty solenoid malfunction, open or short output signal circuit	<Ref. to 4AT(D)-86, DTC P0768 — SHIFT SOLENOID “D” ELECTRICAL — .>
P0801	Reverse Inhibitor Control Circuit	Shift lock solenoid malfunction, open or short output signal circuit	<Ref. to 4AT(D)-90, DTC P0801 — REVERSE INHIBITOR CONTROL CIRCUIT —.>
P1706	AT Vehicle Speed Sensor Circuit Malfunction (rear wheel)	Rear vehicle speed sensor malfunction, open or short input signal circuit	<Ref. to 4AT(D)-92, DTC P1706 — AT VEHICLE SPEED SENSOR CIRCUIT MALFUNCTION (REAR WHEEL) —.>
P1707	AT AWD Solenoid Valve Circuit Malfunction	Transfer duty solenoid malfunction, open or short output signal circuit	<Ref. to 4AT(D)-96, DTC P1707 — AT AWD SOLENOID VALVE CIRCUIT MALFUNCTION —.>
P1708	Throttle Position Sensor Circuit Low Input	Accelerator pedal position sensor malfunction, open input signal circuit	<Ref. to 4AT(D)-100, DTC P1708 — THROTTLE POSITION SENSOR CIRCUIT LOW INPUT —.>
P1709	Throttle Position Sensor Circuit High Input	Accelerator pedal position sensor malfunction, open input signal circuit	<Ref. to 4AT(D)-104, DTC P1709 — THROTTLE POSITION SENSOR CIRCUIT HIGH INPUT —.>
P1714	Throttle Position Sensor Power Supply Circuit	Accelerator pedal position sensor malfunction, open or short input signal circuit	<Ref. to 4AT(D)-108, DTC P1714 — THROTTLE POSITION SENSOR POWER SUPPLY CIRCUIT —.>
P1718	CAN Communication Circuit Malfunction	Open or short CAN communication signal circuit	<Ref. to 4AT(D)-110, DTC P1718 — CAN COMMUNICATION CIRCUIT MALFUNCTION —.>
P1817	SPORT Mode Switch Circuit (Manual Switch)	Sport shift mode switch malfunction, open or short input signal circuit	<Ref. to 4AT(D)-112, DTC P1817 — SPORT MODE SWITCH CIRCUIT (MANUAL SWITCH) —.>

MEMO:

12.Diagnostic Procedure for “AT OIL TEMP” Warning Light

A: “AT OIL TEMP” WARNING LIGHT DOES NOT COME ON OR GO OFF

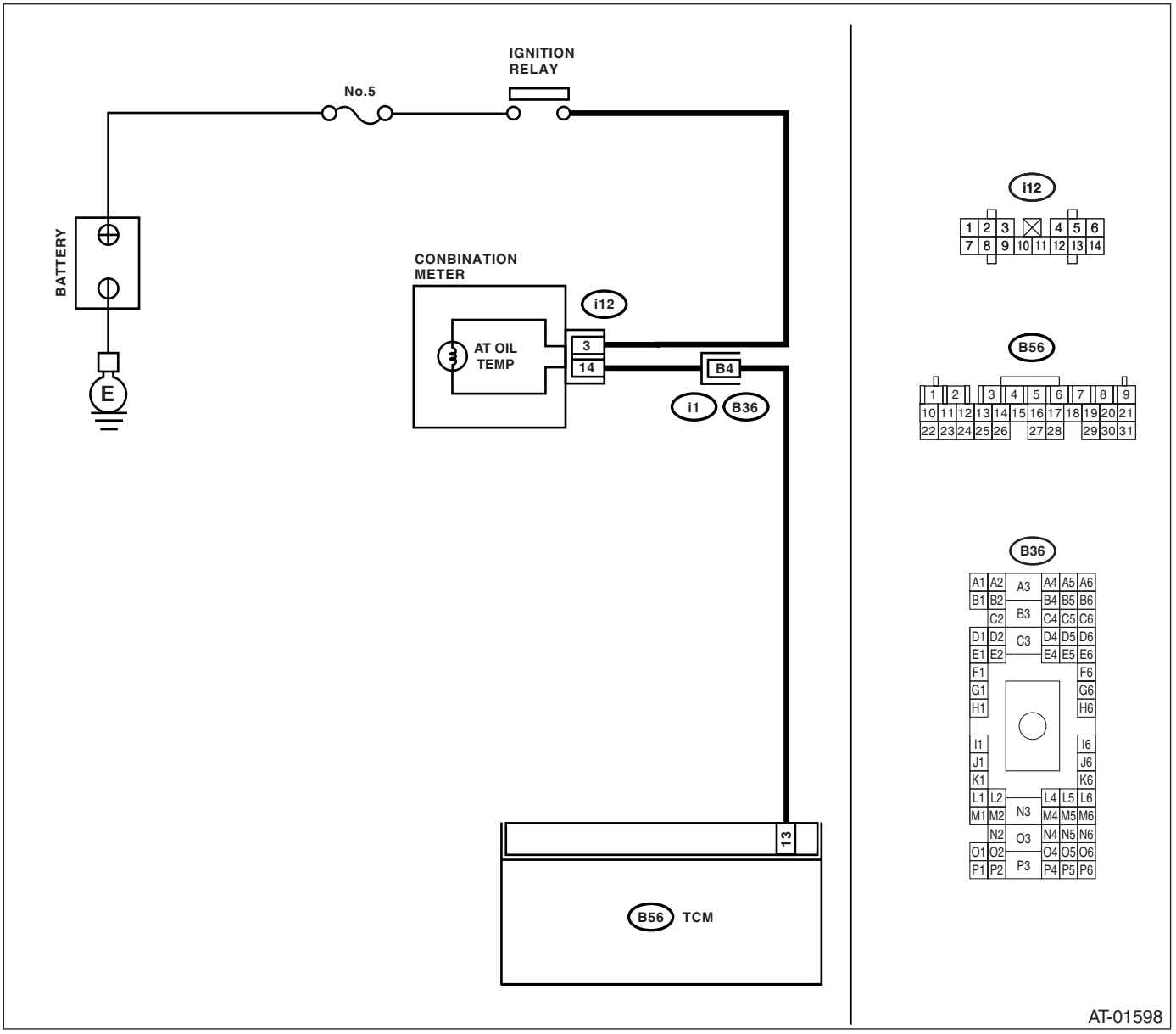
DIAGNOSIS:

AT OIL TEMP warning light circuit is open or shorted.

TROUBLE SYMPTOM:

- When the ignition switch is turned to ON (engine OFF), AT OIL TEMP warning light does not turn on.

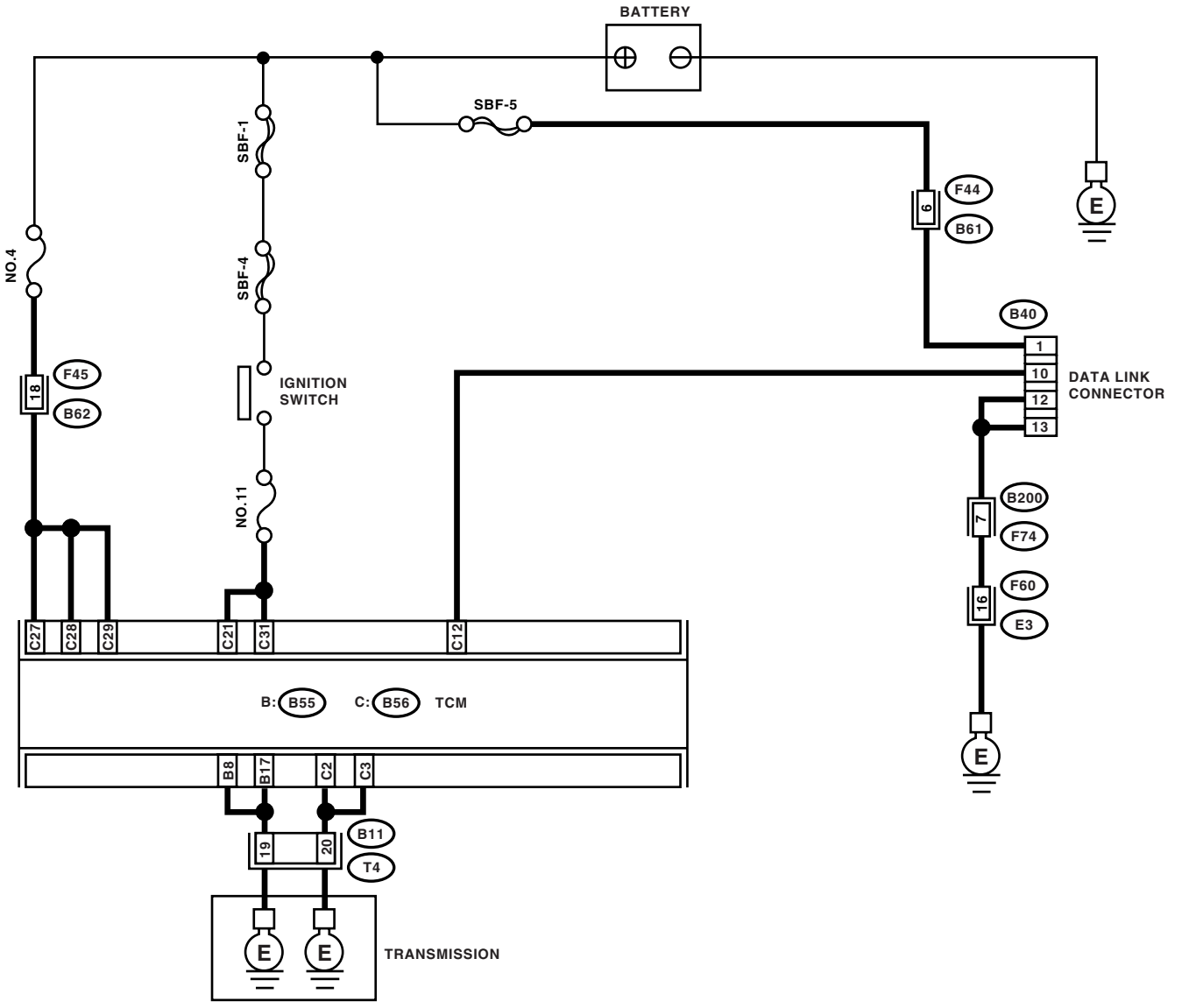
WIRING DIAGRAM:

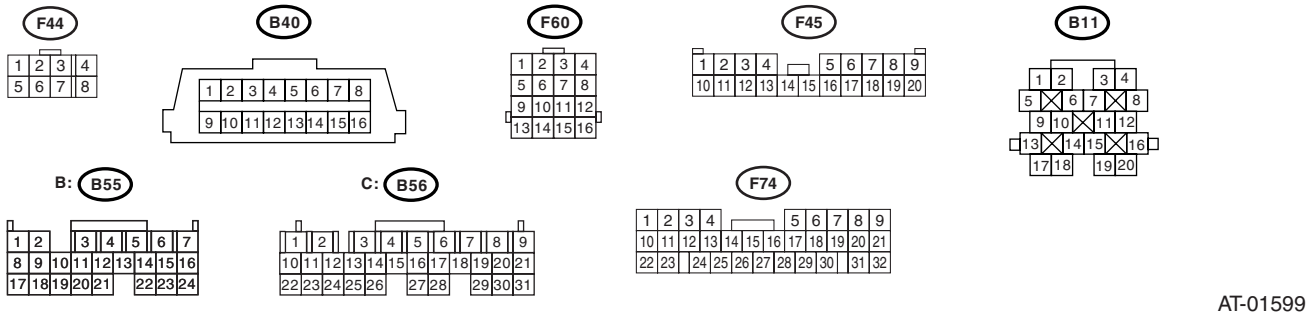


	Step	Check	Yes	No
1	**CHECK AT OIL TEMP WARNING LIGHT.** Turn the ignition switch to ON (engine OFF).	Does the AT OIL TEMP warning light turn on?	Go to step **3.**	Go to step **2.**
2	**CHECK FUSE (No. 5).** Remove the fuse (No. 5).	Is the fuse (No. 5) blown out?	Replace the fuse (No. 5). If replaced fuse (No. 5) is blown out easily, repair short circuit in harness between fuse (No. 5) and combination meter.	Go to step **3.**
3	**CHECK HARNESS CONNECTOR BETWEEN COMBINATION METER AND IGNITION SWITCH.** 1) Turn the ignition switch to OFF. 2) Remove combination meter. 3) Turn the ignition switch to ON (engine OFF). 4) Measure the voltage between combination meter connector and chassis ground. ***Connector & terminal*** ***(i12) No. 3 (+) — Chassis ground (–):***	Is the voltage more than 9 V?	Go to step **4.**	Repair the open circuit in harness between combination meter and battery.
4	**CHECK OPEN CIRCUIT OF HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from TCM. 3) Measure the resistance of harness between combination meter and TCM. ***Connector & terminal*** ***(B56) No. 13 — (i12) No. 14:***	Is the resistance less than 1 Ω?	Go to step **5.**	Repair the open circuit in harness between TCM and combination meter, and poor contact in coupling connector.
5	**CHECK COMBINATION METER.** Measure the resistance between combination meter connector and chassis ground. ***Connector & terminal*** ***(i12) No. 14 (+) — Chassis ground (–):***	Is the resistance more than 1 MΩ?	Go to step **6.**	Repair the short circuit in harness between TCM and combination meter.
6	**CHECK INPUT SIGNAL FOR TCM.** 1) Connect the connector to combination meter. 2) Turn the ignition switch to ON (engine OFF). 3) Measure the voltage between TCM connector and chassis ground. ***Connector & terminal*** ***(B56) No. 13 (+) — Chassis ground (–):***	Is the voltage more than 9 V?	Replace the TCM. <Ref. to 4AT-77, Transmission Control Module (TCM).>	Replace the combination meter. <Ref. to IDI-13, Combination Meter Assembly.>

B: CHECK POWER SUPPLY AND GROUND LINE

WIRING DIAGRAM:





AT-01599

	Step	Check	Yes	No
1	**CHECK BATTERY TERMINAL.** Turn the ignition switch to OFF.	Is there poor contact in battery terminal?	Repair or tighten the battery terminal.	Go to step **2.**
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*** ***(B56) No. 27 (+) — Chassis ground (–):*** ***(B56) No. 28 (+) — Chassis ground (–):*** ***(B56) No. 29 (+) — Chassis ground (–):***	Is the voltage 10 — 13 V?	Go to step **4.**	Go to step **3.**
3	**CHECK FUSE (NO. 4).** 1) Turn the ignition switch to OFF. 2) 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*** ***(B56) No. 21 (+) — Chassis ground (–):*** ***(B56) No. 31 (+) — 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. 11) and TCM, or fuse (No. 11) 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*** ***(B55) No. 8 — (B11) No. 19:*** ***(B55) No. 17 — (B11) No. 19:*** ***(B56) No. 2 — (B11) No. 20:*** ***(B56) No. 3 — (B11) No. 20:***	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. 19 — Transmission ground:*** ***(T4) No. 20 — Transmission ground:***	Is the resistance less than 1 Ω?	Go to step **8.**	Repair the open circuit in harness between transmission and transmission ground.

Step		Check	Yes	No
8	CHECK POOR CONTACT IN CONNECTORS.	Is there poor contact in TCM power supply, ground line and data link connector?	Repair the connector.	Replace the TCM. <Ref. to 4AT-77, Transmission Control Module (TCM).>

MEMO:

13.Diagnostic Procedure for Subaru Select Monitor Communication

A: COMMUNICATION FOR INITIALIZING IMPOSSIBLE

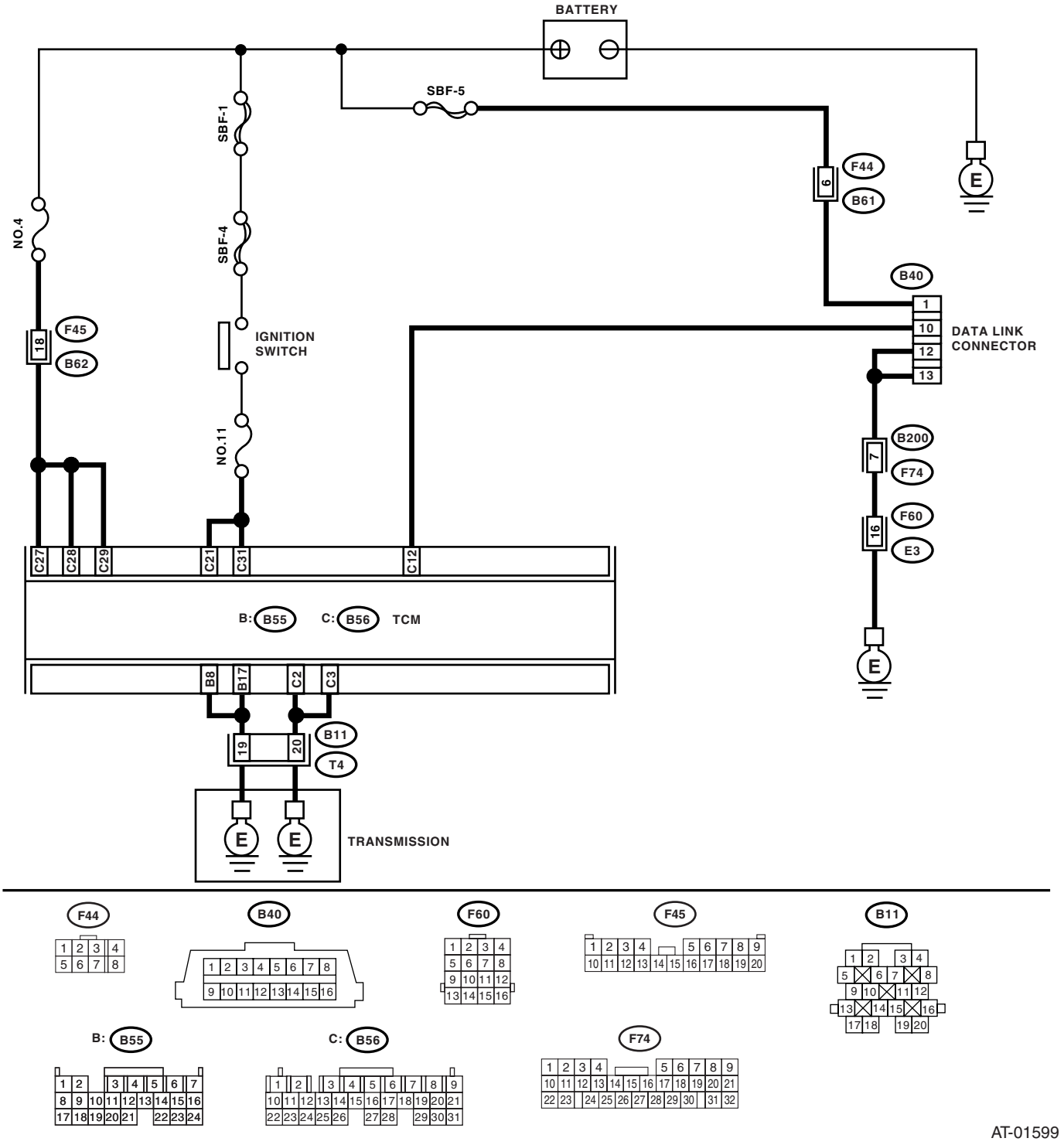
DIAGNOSIS:

- Faulty harness connector

TROUBLE SYMPTOM:

- Subaru Select Monitor communication failure

WIRING DIAGRAM:



	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 SUBARU SELECT MONITOR.** 1) Turn the ignition switch to ON. 2) Using the Subaru Select Monitor, check whether communication to transmission systems can be executed normally.	Is the system name displayed on Subaru Select Monitor?	Go to step **8.**	Go to step **4.**
4	**CHECK COMMUNICATION OF SUBARU 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.	Is the system name displayed on Subaru Select Monitor?	Go to step **6.**	Go to step **5.**
5	**CHECK COMMUNICATION OF SUBARU 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.	Is the system name 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 and ECM connectors. 3) Measure the resistance between TCM connector and chassis ground. ***Connector & terminal*** ***(B40) No. 10 — Chassis ground:***	Is the resistance more than 1 MΩ?	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 (–):***	Is the voltage more than 1 V?	Repair the harness and connector between each control module and data link connector.	Go to step **8.**
8	**CHECK HARNESS/CONNECTOR BETWEEN TCM AND DATA LINK CONNECTOR.** Measure the resistance between TCM connector and data link connector. ***Connector & terminal*** ***(B56) No. 12 — (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.

Step		Check	Yes	No
9	**INSPECTION OF TRANSMISSION HARNESS CONNECTOR.**	Is the transmission harness connector inserted into bulkhead harness connector?	Go to step **10.**	Connect the bulkhead harness connector to transmission harness connector.
10	**CHECK POOR CONTACT IN CONNECTORS.**	There is poor contact. Is there poor contact in control module and data link connector?	Repair the poor contact.	Replace the TCM. <Ref. to 4AT-77, Transmission Control Module (TCM).>

14.Diagnostic Procedure with Diagnostic Trouble Code (DTC)

A: DTC P0705 — TRANSMISSION RANGE SENSOR —

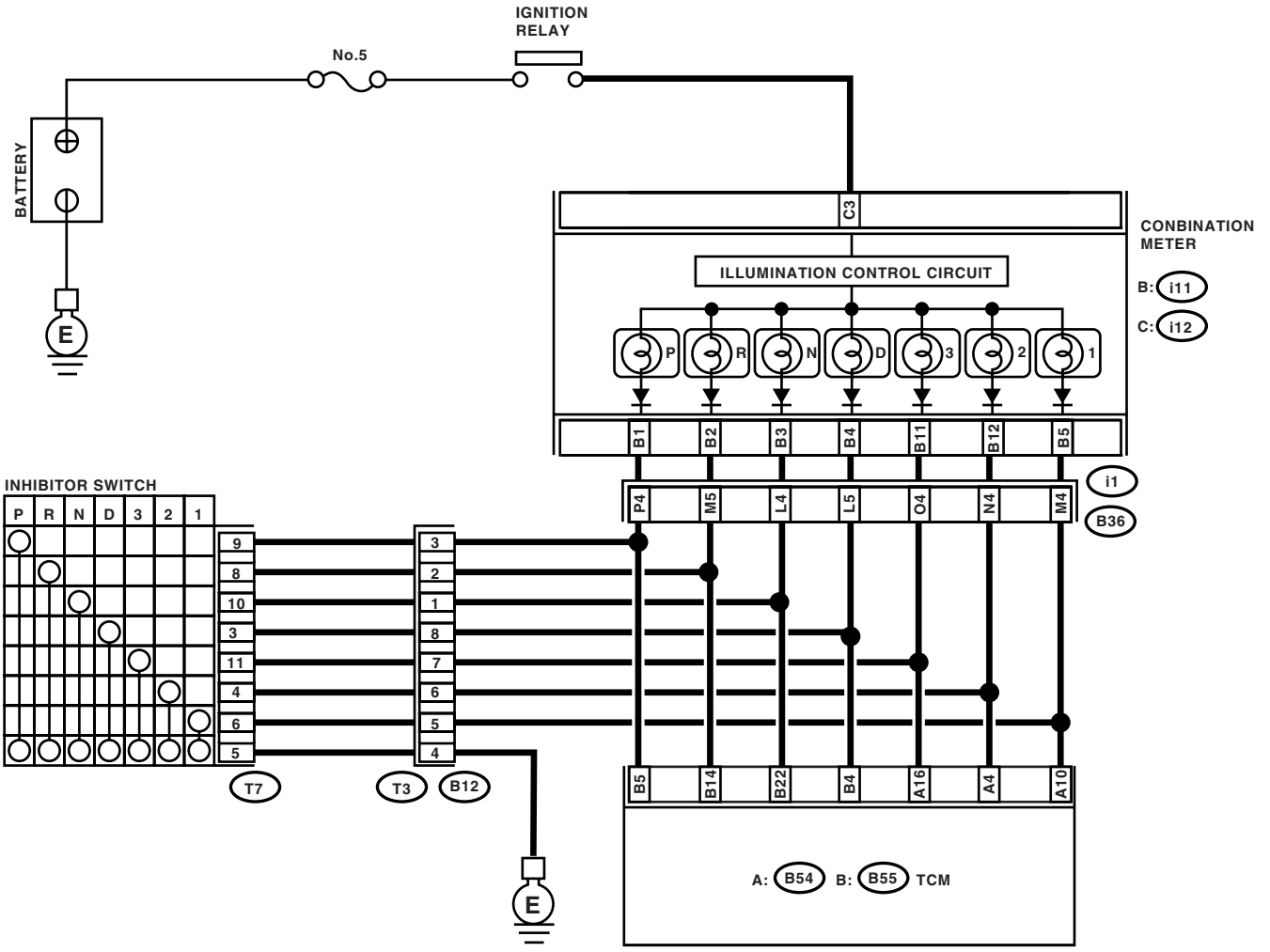
DIAGNOSIS:

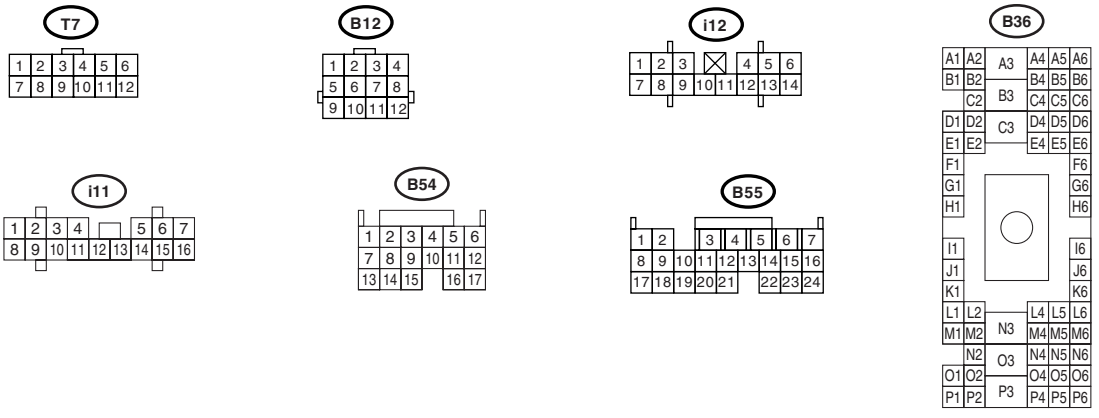
- There is malfunction in inhibitor switch.
- The input signal circuit of inhibitor switch is open or shorted.

TROUBLE SYMPTOM:

- Shift characteristics are erroneous.
- Engine brake is not effected when select lever is in “3” range.
- Engine brake is not effected when select lever is in “2” range.
- Engine brake is not effected when select lever is in “1” range.

WIRING DIAGRAM:





AT-01600

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.**	Replace the TCM. <Ref. to 4AT-77, Transmission Control Module (TCM).>

	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*** ***(B55) No. 5 — (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*** ***(B55) No. 5 (+) — Chassis ground (–):***	Is the voltage less than 1 V?	Go to step **25.**	Go to step **65.**
25	**CHECK INPUT SIGNAL FOR TCM.** 1) Move the select lever except for “P” range. 2) Measure the voltage between TCM and chassis ground. ***Connector & terminal*** ***(B55) No. 5 (+) — Chassis ground (–):***	Is the voltage more than 8 V?	Go to step **65.**	Replace the TCM. <Ref. to 4AT-77, 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-13, Combination Meter Assembly.>
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*** ***(B55) No. 5 — (i11) No. 1:***	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*** ***(B55) No. 5 — Chassis ground:***	Is the resistance less than 1 MΩ?	Go to step **29.**	Repair the ground short circuit in “P” range circuit.

	Step	Check	Yes	No
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*** ***(B55) No. 14 — (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*** ***(B55) No. 14 (+) — Chassis ground (–):***	Is the voltage less than 1 V?	Go to step **31.**	Go to step **65.**
31	**CHECK INPUT SIGNAL FOR TCM.** 1) Move the select lever except for “R” range. 2) Measure the voltage between TCM and chassis ground. ***Connector & terminal*** ***(B55) No. 14 (+) — Chassis ground (–):***	Is the voltage more than 8 V?	Go to step **65.**	Replace the TCM. <Ref. to 4AT-77, Transmission Control Module (TCM).>
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-13, 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*** ***(B55) No. 14 — (i11) No. 2:***	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*** ***(B55) No. 14 — Chassis ground:***	Is the resistance more than 1 MΩ?	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*** ***(B55) No. 22 — (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.

	Step	Check	Yes	No
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*** ***(B55) No. 22 (+) — Chassis ground (–):***	Is the voltage less than 1 V?	Go to step **37.**	Go to step **65.**
37	**CHECK INPUT SIGNAL FOR TCM.** 1) Move the select lever to except for "N" range. 2) Measure the voltage between TCM and chassis ground. ***Connector & terminal*** ***(B55) No. 22 (+) — Chassis ground (–):***	Is the voltage more than 8 V?	Go to step **65.**	Replace the TCM. <Ref. to 4AT-77, 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-13, 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. ***Connector & terminal*** ***(B55) No. 22 — (i11) No. 3:***	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. ***Connector & terminal*** ***(B55) No. 22 — Chassis ground:***	Is the resistance more than 1 MΩ?	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. ***Connector & terminal*** ***(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.
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*** ***(B55) No. 4 (+) — Chassis ground (–):***	Is the voltage less than 1 V?	Go to step **43.**	Go to step **65.**

	Step	Check	Yes	No
43	**CHECK INPUT SIGNAL FOR TCM.** 1) Move the select lever except for "D" range. 2) Measure the voltage between TCM and chassis ground. ***Connector & terminal*** ***(B55) No. 4 (+) — Chassis ground (–):***	Is the voltage more than 8 V?	Go to step **65.**	Replace the TCM. <Ref. to 4AT-77, 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-13, 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*** ***(B55) No. 4 — (i11) No. 4:***	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*** ***(B55) No. 4 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **47.**	Repair the ground short circuit in "D" range circuit.
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*** ***(B54) No. 16 — (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*** ***(B54) No. 16 (+) — Chassis ground (–):***	Is the voltage less than 1 V?	Go to step **49.**	Go to step **65.**
49	**CHECK INPUT SIGNAL FOR TCM.** 1) Move the select lever except for "3" range. 2) Measure the voltage between TCM and chassis ground. ***Connector & terminal*** ***(B54) No. 16 (+) — Chassis ground (–):***	Is the voltage more than 8 V?	Go to step **65.**	Replace the TCM. <Ref. to 4AT-77, Transmission Control Module (TCM).>

	Step	Check	Yes	No
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-13, 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*** ***(B54) No. 16 — (i11) No. 11:***	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.
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*** ***(B54) No. 16 — 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*** ***(B54) No. 4 — (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*** ***(B54) No. 4 (+) — Chassis ground (–):***	Is the voltage less than 1 V?	Go to step **55.**	Go to step **65.**
55	**CHECK INPUT SIGNAL FOR TCM.** 1) Move the select lever except for "2" range. 2) Measure the voltage between TCM and chassis ground. ***Connector & terminal*** ***(B54) No. 4 (+) — Chassis ground (–):***	Is the voltage more than 8 V?	Go to step **65.**	Replace the TCM. <Ref. to 4AT-77, 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-13, Combination Meter Assembly.>

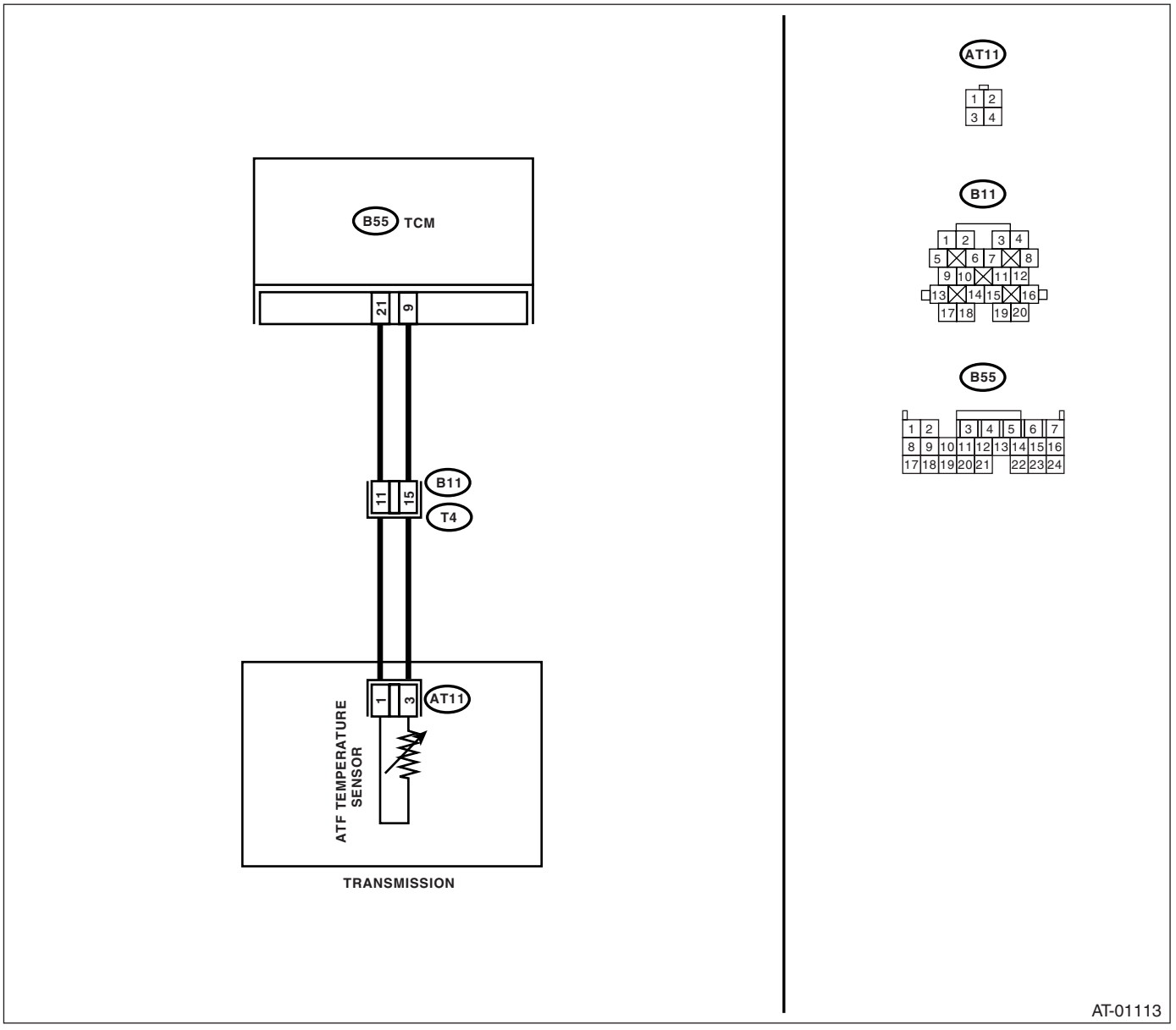
	Step	Check	Yes	No
57	**CHECK HARNESS CONNECTOR BETWEEN TCM AND COMBINATION METER.** 1) Disconnect the connectors from TCM and combination meter. 2) Measure the resistance of harness between TCM and combination meter. ***Connector & terminal*** ***(B54) No. 4 — (i11) No. 12:***	Is the resistance less 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*** ***(B54) No. 4 — Chassis ground:***	Is the resistance more than 1 MΩ?	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*** ***(B54) No. 10 — (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*** ***(B54) No. 10 (+) — Chassis ground (–):***	Is the voltage less than 1 V?	Go to step **61.**	Go to step **65.**
61	**CHECK INPUT SIGNAL FOR TCM.** 1) Move the select lever except for "1" range. 2) Measure the voltage between TCM and chassis ground. ***Connector & terminal*** ***(B54) No. 10 (+) — Chassis ground (–):***	Is the voltage more than 8 V?	Go to step **65.**	Replace the TCM. <Ref. to 4AT-77, Transmission Control Module (TCM).>
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-13, 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*** ***(B54) No. 10 — (i11) 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.

	Step	Check	Yes	No
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*** ***(B54) No. 10 — 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.	Go to step **66.**
66	**CHECK INHIBITOR SWITCH.**	Is the inhibitor switch in proper position?	Replace the TCM. <Ref. to 4AT-77, Transmission Control Module (TCM).>	Adjust the inhibitor switch and select cable. <Ref. to 4AT-50, Inhibitor Switch.> and <Ref. to CS-31, Select Cable.>

MEMO:

B: DTC P0712 — TRANSMISSION FLUID TEMPERATURE SENSOR CIRCUIT LOW INPUT —

DIAGNOSIS:
The input signal circuit of TCM to ATF temperature sensor is open or shorted.
TROUBLE SYMPTOM:
Excessive shift shock.
WIRING DIAGRAM:



	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*** ***(B55) No. 21 — (B11) No. 11:***	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*** ***(B55) No. 9 — (B11) No. 15:***	Is the resistance less than 1 Ω?	Go to step **3.**	Repair the open circuit in harness between TCM and transmission connector.
3	**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. 15:***	Is the resistance 300 — 800 Ω?	Go to step **4.**	Go to step **7.**
4	**CHECK ATF TEMPERATURE SENSOR.** Measure the resistance between transmission connector terminals. ***Connector & terminal*** ***(T4) No. 11 — No. 15:***	Does the resistance value increase when ATF temperature decreases?	Go to step **5.**	Go to step **7.**
5	**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 blinks, 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 **6.**
6	**CHECK POOR CONTACT.**	Is there poor contact in ATF temperature sensor circuit?	Repair the poor contact.	Replace the TCM. <Ref. to 4AT-77, Transmission Control Module (TCM).>

	Step	Check	Yes	No
7	**CHECK HARNESS CONNECTOR BETWEEN TRANSMISSION AND ATF TEMPERATURE SENSOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from transmission. 3) Remove the transmission connector from bracket. 4) Lift-up the vehicle and place safety stand. NOTE: Raise all wheels off floor. 5) Drain the ATF. **CAUTION:** **Do not drain the ATF until it cools down.** 6) Remove the oil pan, and disconnect the connector from ATF temperature sensor connector. 7) Measure the resistance of harness between ATF temperature sensor and transmission connector. ***Connector & terminal*** ***(T4) No. 11 — (AT11) No. 1:***	Is the resistance less than 1 Ω?	Go to step **8.**	Repair the open circuit in harness between ATF temperature sensor and transmission connector.
8	**CHECK HARNESS CONNECTOR BETWEEN TRANSMISSION AND ATF TEMPERATURE SENSOR.** Measure the resistance of harness between ATF temperature sensor and transmission connector. ***Connector & terminal*** ***(T4) No. 15 — (AT11) No. 3:***	Is the resistance less than 1 Ω?	Go to step **9.**	Repair the open circuit in harness between ATF temperature sensor and transmission connector.
9	**CHECK HARNESS CONNECTOR BETWEEN TRANSMISSION AND ATF TEMPERATURE SENSOR.** Measure the resistance of harness between transmission connector and transmission ground. ***Connector & terminal*** ***(T4) No. 11 — Transmission ground:***	Is the resistance more than 1 MΩ?	Go to step **10.**	Repair the short circuit in harness between ATF temperature sensor and transmission connector.
10	**CHECK HARNESS CONNECTOR BETWEEN TRANSMISSION AND ATF TEMPERATURE SENSOR.** Measure the resistance of harness between transmission connector and transmission ground. ***Connector & terminal*** ***(T4) No. 15 — Transmission ground:***	Is the resistance more than 1 MΩ?	Replace the control valve body. <Ref. to 4AT-61, Control Valve Body.>	Repair the short circuit in harness between ATF temperature sensor and transmission connector.

MEMO:

C: DTC P0713 — TRANSMISSION FLUID TEMPERATURE SENSOR CIRCUIT HIGH INPUT —

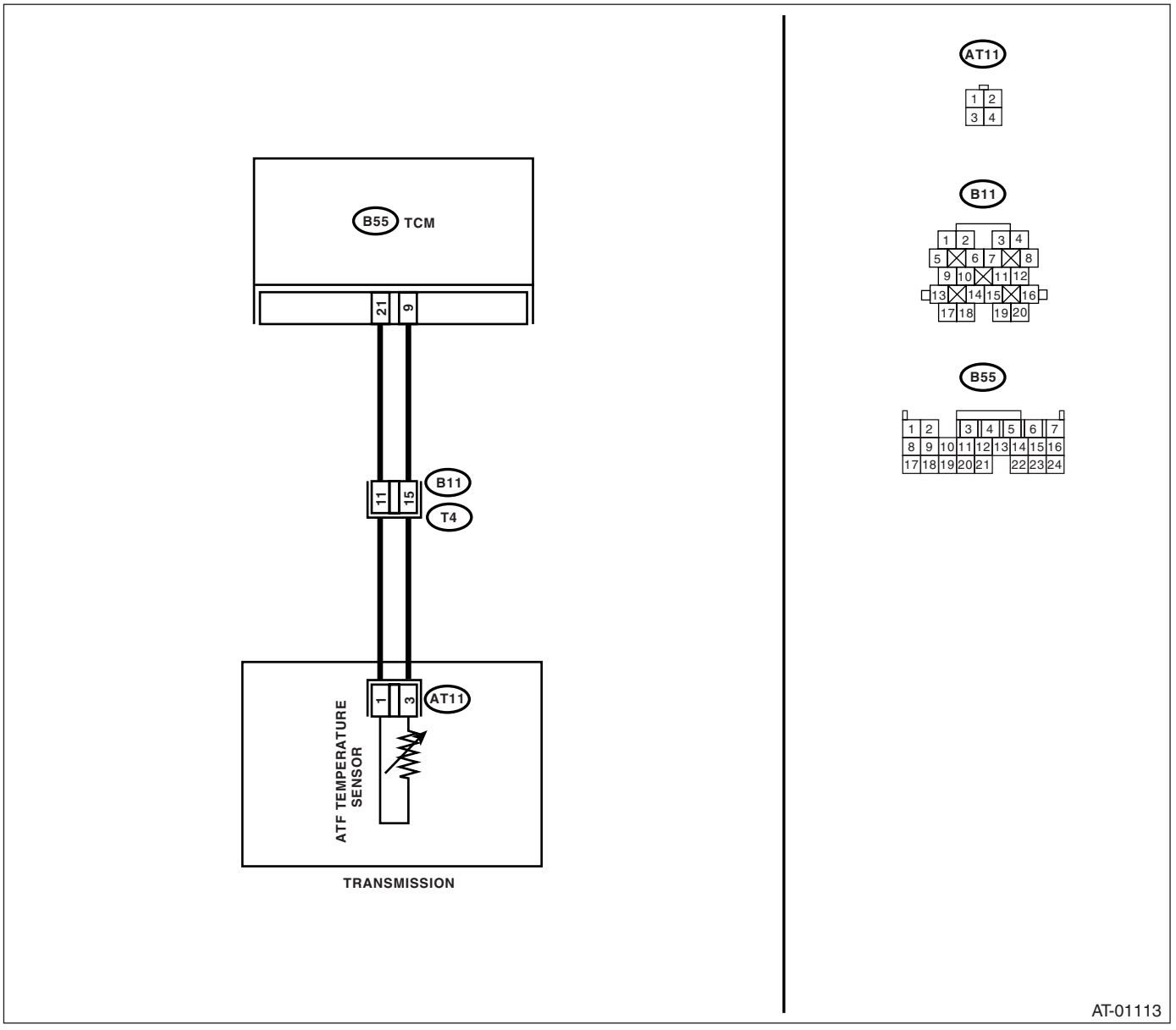
DIAGNOSIS:

The input signal circuit of TCM to ATF temperature sensor is open or shorted.

TROUBLE SYMPTOM:

Excessive shift shock.

WIRING DIAGRAM:



	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) Turn the ignition switch to ON. 4) Measure the voltage of harness between TCM connector and chassis ground. ***Connector & terminal*** ***(B55) No. 21 (+) — Chassis ground (–):***	Is the voltage less than 1 V?	Go to step **2.**	Repair the short circuit in harness between TCM and transmission connector.
2	**CHECK HARNESS CONNECTOR BETWEEN TCM AND ATF TEMPERATURE SENSOR.** Measure the voltage of harness between TCM connector and chassis ground. ***Connector & terminal*** ***(B55) No. 9 (+) — Chassis ground (–):***	Is the voltage less than 1 V?	Go to step **3.**	Repair the short circuit in harness between TCM and transmission connector.
3	**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. 15:***	Is the resistance 500 — 600 Ω?	Go to step **4.**	Replace control valve body.
4	**CHECK ATF TEMPERATURE SENSOR.** Measure the resistance between transmission connector terminals. ***Connector & terminal*** ***(T4) No. 11 — No. 15:***	Does the resistance value increase when ATF temperature decreases?	Go to step **7.**	Replace control valve body.
5	**PREPARE SUBARU SELECT MONITOR.**	Do you have a Subaru Select Monitor?	Go to step **7.**	Go to step **6.**
6	**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*** ***(B55) No. 9 (+) — No. 21 (–):***	Is the voltage 1.5 — 1.9 V?	Even if the AT OIL TEMP warning light turns on, 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 **8.**

	Step	Check	Yes	No
7	**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 turns on, 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 **8.**
8	**CHECK POOR CONTACT.**	Is there poor contact in ATF temperature sensor circuit?	Repair the poor contact.	Replace the TCM. <Ref. to 4AT-77, Transmission Control Module (TCM).>

MEMO:

D: DTC P0715 — INPUT/TURBINE SPEED SENSOR CIRCUIT —

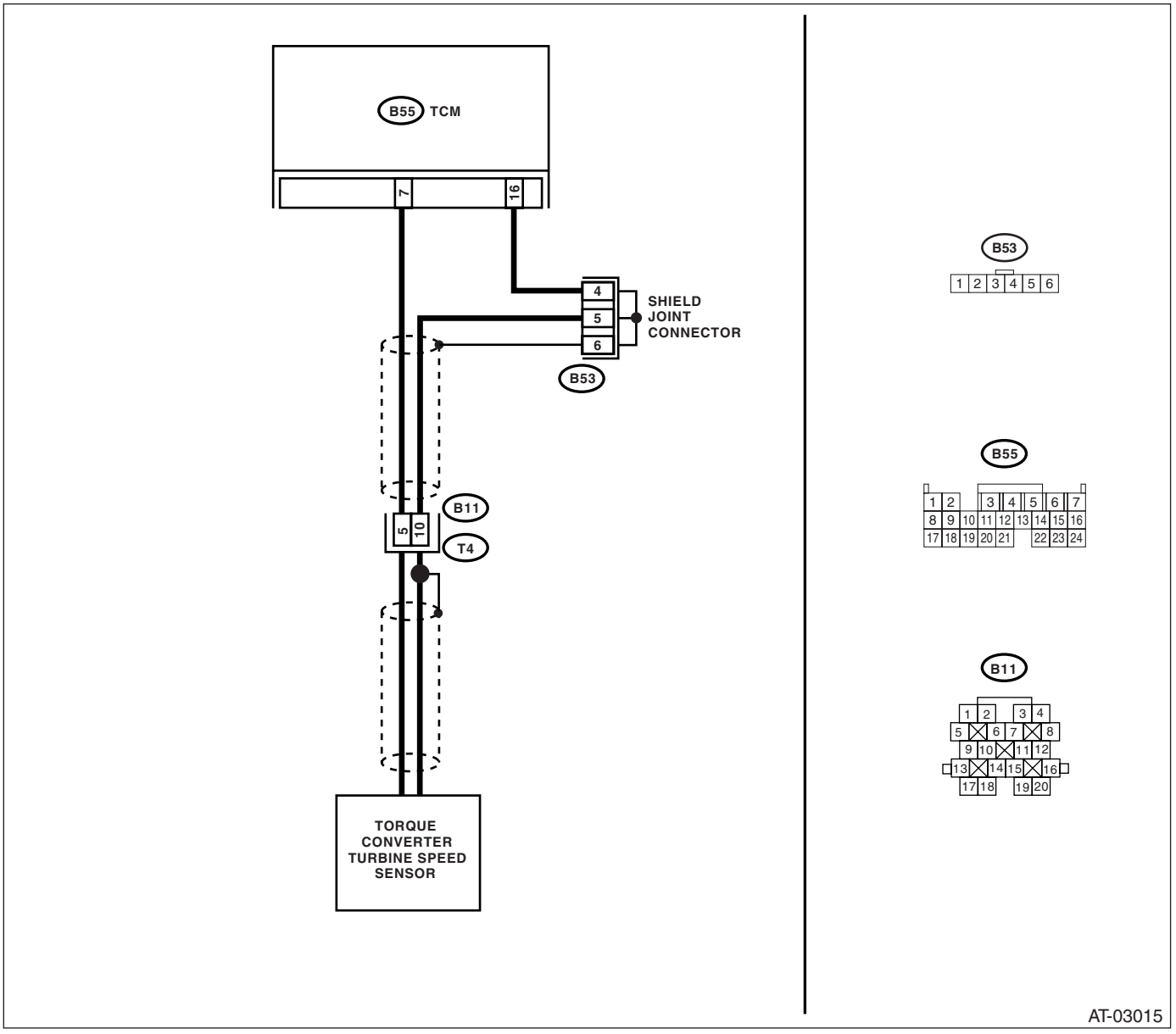
DIAGNOSIS:

The input signal circuit of TCM is open or shorted.

TROUBLE SYMPTOM:

Excessive shift shock.

WIRING DIAGRAM:



	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. 5 — No. 10:***	Is the resistance 450 — 650 Ω?	Go to step **2.**	Replace the turbine speed sensor. <Ref. to 4AT-60, 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*** ***(B55) No. 7 — (B11) No. 5:***	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*** ***(B55) No. 16 — (B11) No. 10:***	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*** ***(B55) No. 16 — Chassis ground:***	Is the resistance more than 1 MΩ?	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*** ***(B55) No. 7 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **6.**	Repair the short circuit in harness between TCM and transmission connector, and poor contact in coupling connector.
6	**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 blinks, 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 **7.**
7	**CHECK POOR CONTACT.**	Is there poor contact in torque converter turbine speed sensor circuit?	Repair the poor contact.	Replace the TCM. <Ref. to 4AT-77, Transmission Control Module (TCM).>

E: DTC P0719 — TORQUE CONVERTER/BRAKE SWITCH “B” CIRCUIT LOW —

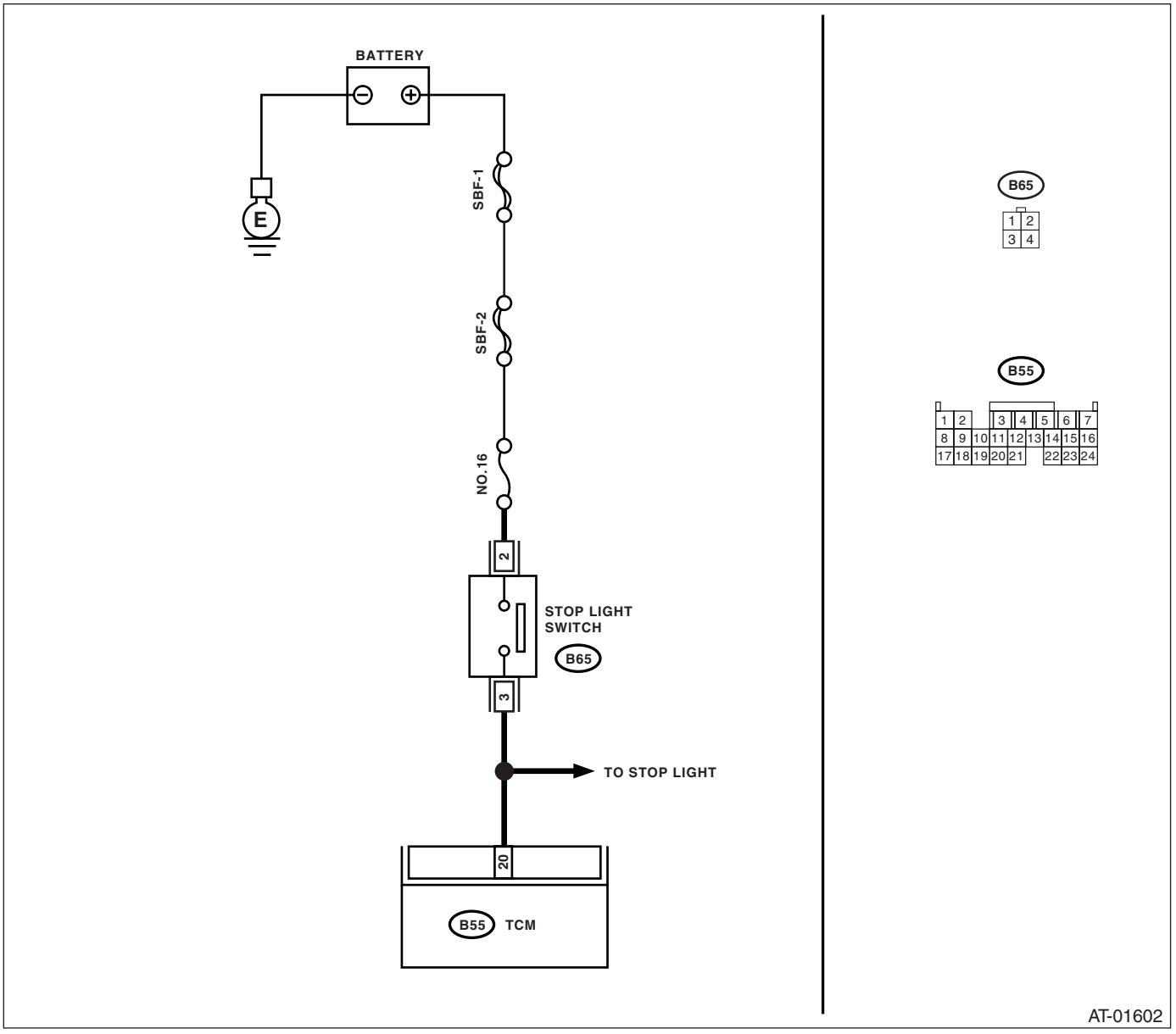
DIAGNOSIS:

Brake switch malfunction or input signal open circuit.

TROUBLE SYMPTOM:

Gear is not shifted down when climbing hill.

WIRING DIAGRAM:



	Step	Check	Yes	No
1	**CHECK OPERATION OF BRAKE LIGHT.** Depress the brake pedal.	Does the brake light illuminate?	Go to step **2.**	Check the brake light circuit.
2	**CHECK TCM INPUT SIGNAL.** 1) Depress the brake pedal. 2) Measure the voltage of harness between TCM and stop light switch. ***Connector & terminal*** ***(B55) No. 20 (+) — Chassis ground (−):***	Is the voltage more than 10 V?	Go to step **5.**	Go to step **3.**
3	**HECK HARNESS CONNECTOR BETWEEN TCM AND BRAKE LIGKT SWITCH.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from TCM and stop light switch. 3) Measure the resistance between TCM and stop light switch. ***Connector & terminal*** ***(B55) No. 20 — (B65) No. 3:***	Is the resistance less than 1 Ω?	Go to step **4.**	Repair the open harness between TCM and stop light switch.
4	**CHECK HARNESS CONNECTOR BETWEEN TCM AND BRAKE LIGKT SWITCH.** Measure the resistance between TCM and stop light switch. ***Connector & terminal*** ***(B55) No. 20 — (B65) No. 3:***	Is the resistance more than 1 MΩ?	Go to step **5.**	Repair the short harness between TCM and stop light switch.
5	**INSPECT POOR CONTACT.**	Is there poor contact in the brake switch input signal circuit?	Repair poor contact.	Replace the TCM. <Ref. to 4AT-77, Transmission Control Module (TCM).>

F: DTC P0720 — AT VEHICLE SPEED SENSOR CIRCUIT —

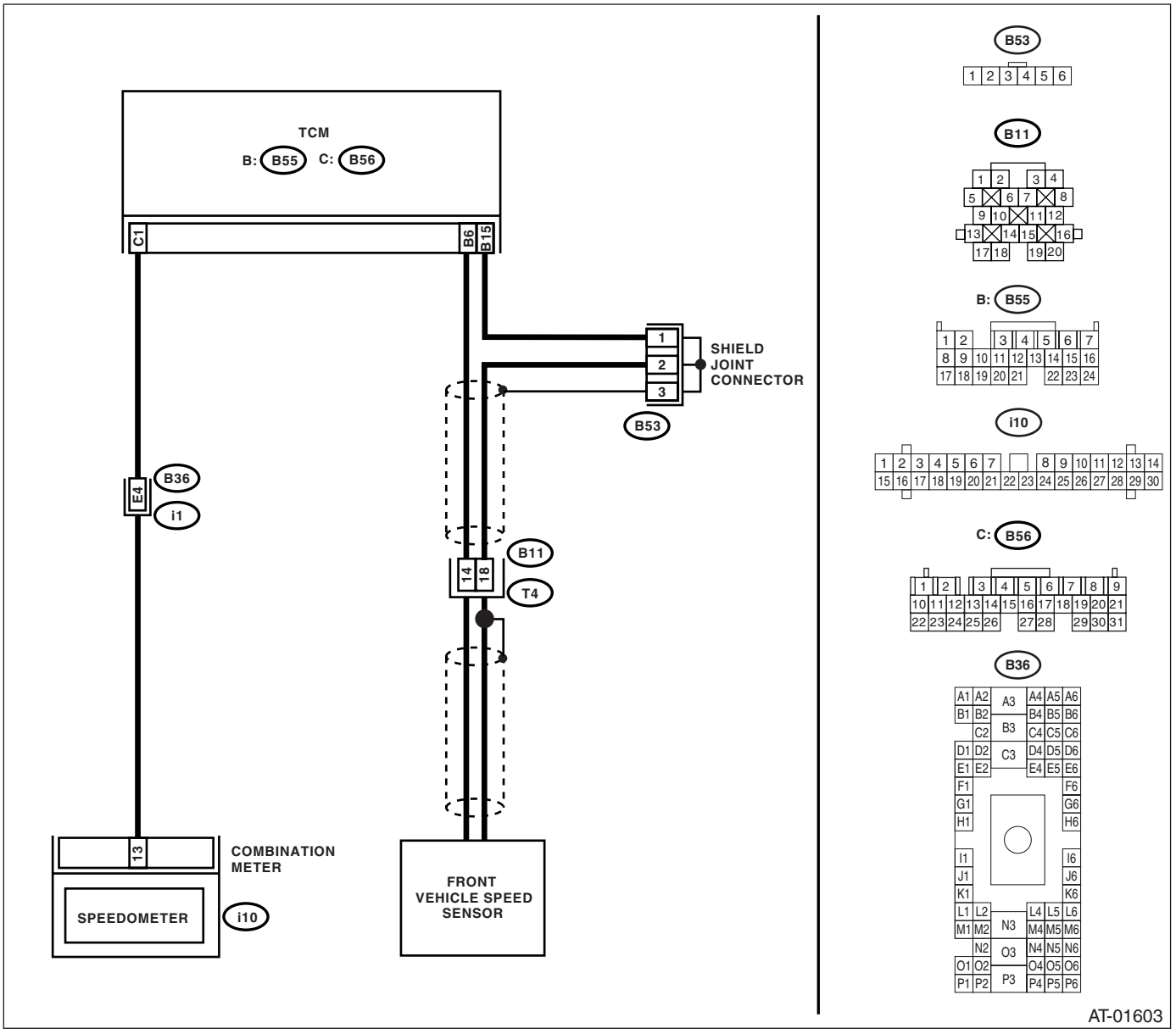
DIAGNOSIS:

- 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.

WIRING DIAGRAM:



	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*** ***(B55) No. 6 — (B11) No. 14:***	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*** ***(B55) No. 15 — (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*** ***(B55) No. 6 — Chassis ground:***	Is the resistance more than 1 MΩ?	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*** ***(B55) No. 15 — Chassis ground:***	Is the resistance more than 1 MΩ?	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. 14 — No. 18:***	Is the resistance 450 — 650 Ω?	Go to step **6.**	Replace the front vehicle speed sensor. <Ref. to 4AT-54, Front Vehicle Speed Sensor.>

	Step	Check	Yes	No
6	**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 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 front wheel speed data increases?	Even if the AT OIL TEMP warning light blinks, 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 **7.**
7	**CHECK POOR CONTACT.**	Is there poor contact in front vehicle speed sensor circuit?	Repair the poor contact.	Replace the TCM. <Ref. to 4AT-77, Transmission Control Module (TCM).>

MEMO:

G: DTC P0724 — TORQUE CONVERTER/BRAKE SWITCH “B” CIRCUIT HIGH —

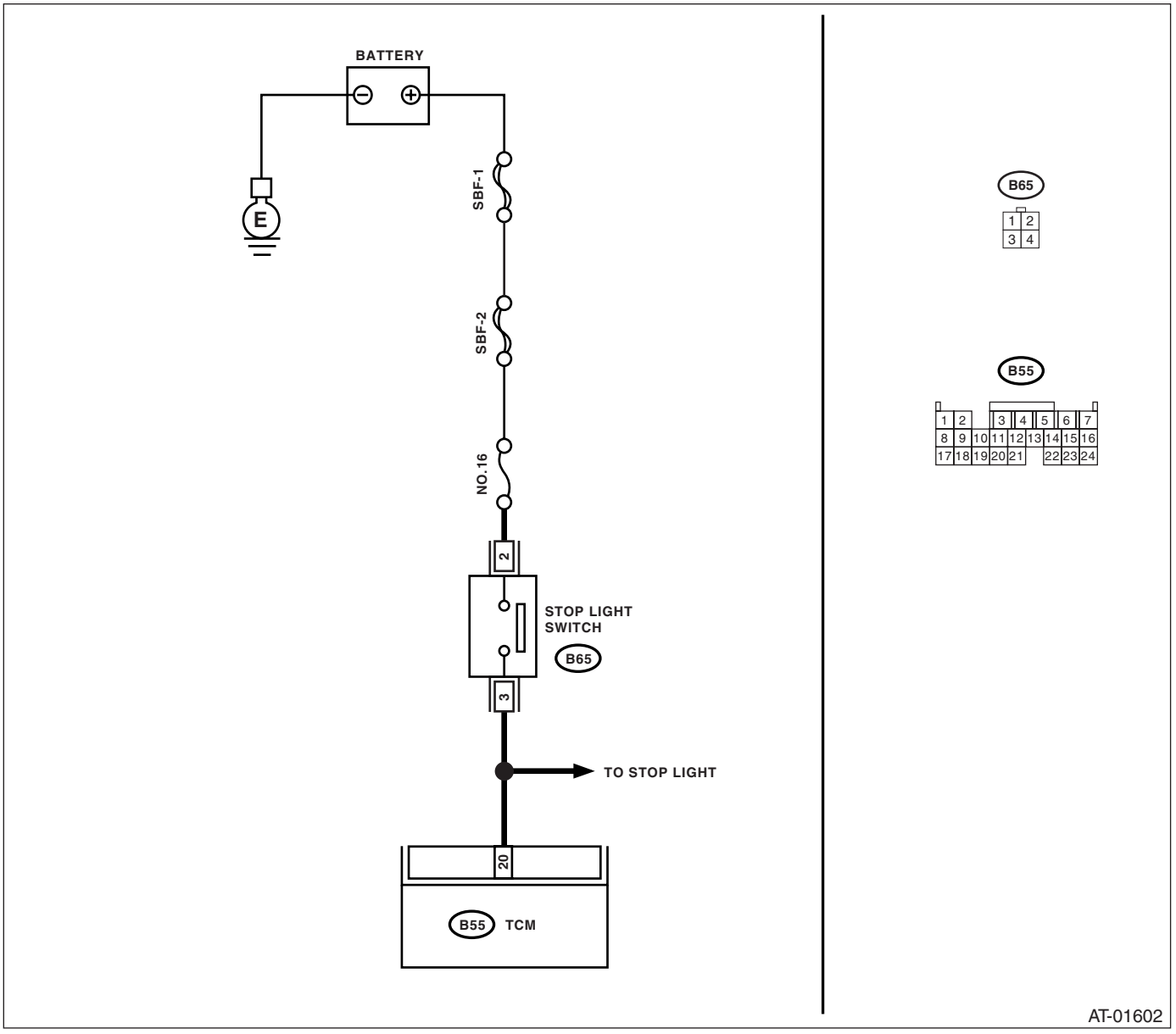
DIAGNOSIS:

Brake switch malfunction or open brake switch input signal circuit.

TROUBLE SYMPTOM:

Gear is not shifted down when climbing hill.

WIRING DIAGRAM:



	Step	Check	Yes	No
1	**CHECK TCM INPUT SIGNAL.** 1) Disconnect the harness connector from TCM. 2) Measure the voltage of harness between TCM and stop light switch. ***Connector & terminal*** ***(B55) No. 20 (+) — Chassis ground (−):***	Is the voltage more than 10 V?	Go to step **2.**	Go to step **4.**
2	**CHECK STOP LIGHT SWITCH.** 1) Turn the ignition switch OFF. 2) Disconnect the connector from stop light switch. 3) Measure the resistance between stop light switch connector. ***Connector & terminal*** ***No. 2 — No. 3:***	Is the resistance more than 1 MΩ?	Go to step **3.**	Replace the stop light switch.
3	**CHECK HARNESS CONNECTOR BETWEEN TCM AND STOP LIGHT SWITCH.** 1) Turn the ignition switch ON. 2) Measure the voltage between TCM and chassis ground. ***Connector & terminal*** ***(B55) No. 20 (+) — Chassis ground (−):***	Is the voltage less than 1 V?	Go to step **4.**	Repair the short in power supply circuit to harness between TCM and stop light switch.
4	**INSPECT POOR CONTACT.**	Is there poor contact in the brake switch input signal circuit?	Repair poor contact.	Replace the TCM. <Ref. to 4AT-77, Transmission Control Module (TCM).>

H: DTC P0725 — ENGINE SPEED INPUT CIRCUIT —

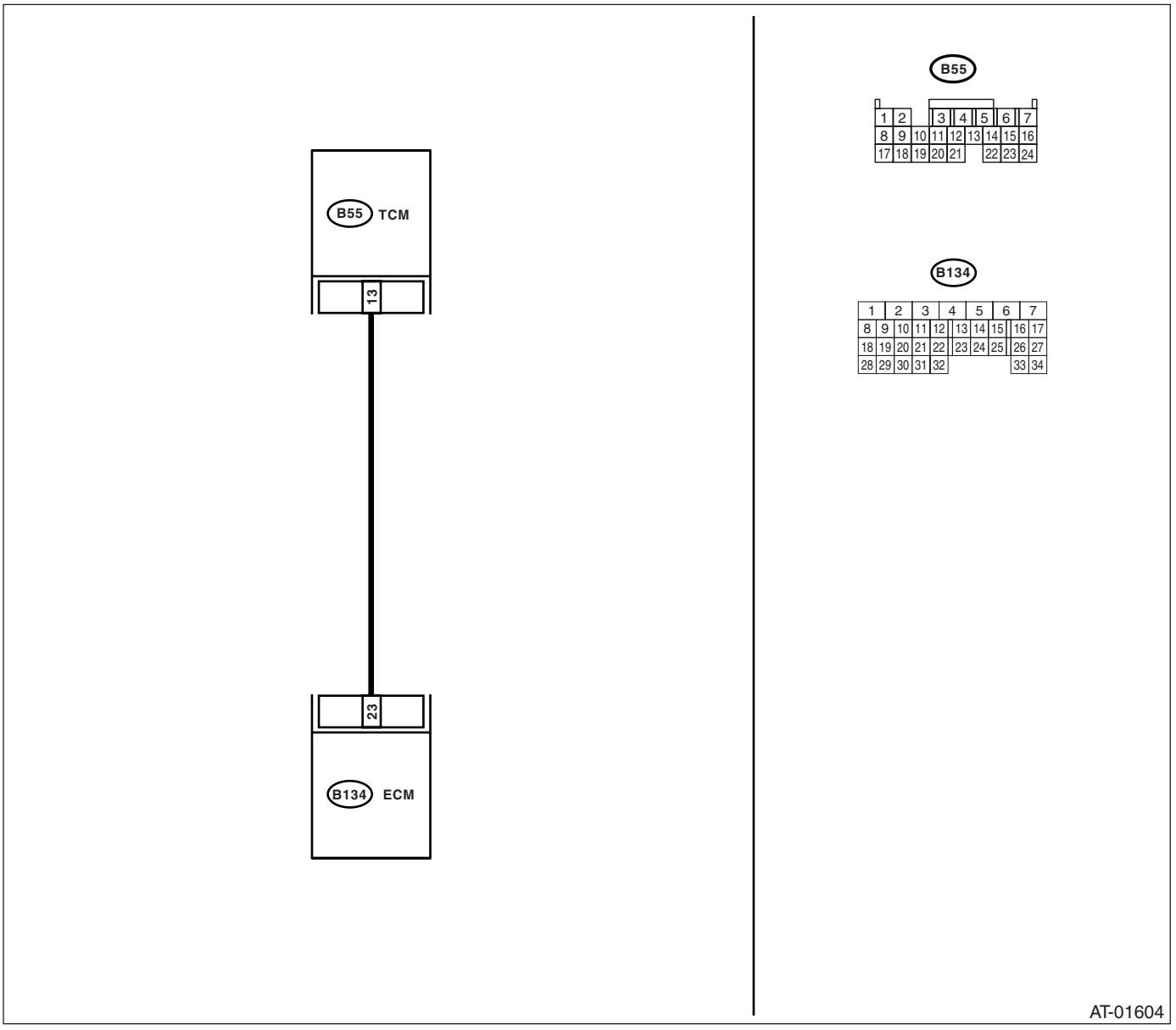
DIAGNOSIS:

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:



	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*** ***(B55) No. 13 — (B134) No. 23:***	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*** ***(B55) No. 13 — 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 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) Idle the engine. 5) 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 blinks, 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 engine speed signal circuit?	Repair the poor contact.	Go to step **5.**
5	**CONFIRM DTC P0725.** Replace the ECM with a new one.	Does the DTC appear again, after memory has been cleared?	Replace the TCM. <Ref. to 4AT-77, Transmission Control Module (TCM).>	Replace the ECM.

I: DTC P0731 — GEAR 1 INCORRECT RATIO —

NOTE:
Refer to DTC P0736 for diagnostic procedure. <Ref. to 4AT(D)-65, DTC P0736 — REVERSE INCORRECT RATIO —.>

J: DTC P0732 — GEAR 2 INCORRECT RATIO —

NOTE:
Refer to DTC P0736 for diagnostic procedure. <Ref. to 4AT(D)-65, DTC P0736 — REVERSE INCORRECT RATIO —.>

K: DTC P0733 — GEAR 3 INCORRECT RATIO —

NOTE:
Refer to DTC P0736 for diagnostic procedure. <Ref. to 4AT(D)-65, DTC P0736 — REVERSE INCORRECT RATIO —.>

L: DTC P0734 — GEAR 4 INCORRECT RATIO —

NOTE:
Refer to DTC P0736 for diagnostic procedure. <Ref. to 4AT(D)-65, DTC P0736 — REVERSE INCORRECT RATIO —.>

M: DTC P0736 — REVERSE INCORRECT RATIO —

DIAGNOSIS:

Vehicle speed sensor malfunction and torque converter turbine speed sensor malfunction, etc. or control valve malfunction.

TROUBLE SYMPTOM:

- Shift point is too high or too low.
- Excessive shift shock.
- Tight cornering condition is occurred.
- Gear is not shifted to reverse.
- Gear position is held by fail safe function.

	Step	Check	Yes	No
1	**CHECK ACCELERATOR PEDAL POSITION SENSOR.** 1) Connect the Subaru Select Monitor to data link connector. 2) Turn the ignition switch to ON. 3) Read the value of accelerator pedal position sensor.	Does the value of accelerator pedal position sensor change from 0% to 100% smoothly when throttle position sensor was operated from fully closing to fully opening?	Go to step **2.**	Check accelerator pedal position sensor. <Ref. to 4AT(D)-100, DTC P1708 — THROTTLE POSITION SENSOR CIRCUIT LOW INPUT —.>
2	**FRONT VEHICLE SPEED SENSOR.** 1) Lift-up the vehicle and place safety stand. 2) Start the engine. 3) Move the select lever “D” range and slowly increase vehicle speed. NOTE: The speed difference between front and rear wheels may light 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.	Does the vehicle speed displayed by Subaru Select Monitor almost correspond with vehicle speed indicated by combination meter?	Go to step **3.**	Check the front vehicle speed sensor.
3	**CHECK TORQUE CONVERTER TURBINE SPEED SENSOR.** 1) Move the select lever to “P” or “N” range. 2) Idle the engine.	Does the turbine speed sensor revolution displayed by Subaru Select Monitor almost correspond with engine revolution indicated by tachometer?	There are malfunctions in TCM, TCM connector poor contact, or transmission assembly mechanical malfunction.	Check the torque converter turbine speed sensor circuit.

N: DTC P0741 — TORQUE CONVERTER CLUTCH CIRCUIT PERFORMANCE OR STUCK OFF —

DIAGNOSIS:

- Lock up clutch malfunction
- Locking of valve

TROUBLE SYMPTOM:

Lock up is not operated.

	Step	Check	Yes	No
1	**CHECK LOCK UP DUTY SOLENOID CIRCUIT.** Check according as DTC P0743 procedure.	Is there malfunction?	Repair or replace the lock up duty solenoid circuit.	Go to step **2.**
2	**CHECK INHIBITOR SWITCH CIRCUIT.** Check according as DTC P0705 procedure.	Is there malfunction?	Repair or replace the inhibitor switch circuit.	Go to step **3.**
3	**CHECK BRAKE LIGHT SWITCH CIRCUIT.** Check according as DTC P0719 and DTC P0724 procedure.	Is there malfunction?	Repair or replace the stop light switch circuit.	Go to step **4.**
4	**CHECK ATF TEMPERATURE SENSOR CIRCUIT.** Check according to DTC P0712 and DTC P0713 procedure.	Is there malfunction?	Repair or replace the ATF temperature circuit.	Go to step **5.**
5	**CHECK ACCELERATOR PEDAL POSITION SENSOR.** 1) Connect the Subaru Select Monitor to data link connector. 2) Turn the ignition switch to ON. 3) Read the value of accelerator pedal position sensor.	Does the value of accelerator pedal position sensor change from 0% to 100% smoothly when throttle position sensor was operated from fully closing to fully opening?	Go to step **6.**	Check the accelerator pedal position sensor circuit.
6	**CHECK TORQUE CONVERTER TURBINE SPEED SENSOR.** 1) Move the select lever to “P” or “N” range. 2) Idle the engine.	Does the engine revolution displayed by Subaru Select Monitor almost correspond with engine revolution indicated by tachometer?	Go to step **7.**	Check the torque converter turbine speed sensor circuit.
7	**CHECK ENGINE SPEED SIGNAL.** Idle the engine.	Does the turbine revolution displayed by Subaru Select Monitor almost correspond with engine revolution indicated by tachometer?	There is malfunction in TCM, TCM connector poor contact, or transmission assembly mechanical malfuction.	Check the engine speed signal circuit.

MEMO:

O: DTC P0743 — TORQUE CONVERTER CLUTCH CIRCUIT ELECTRICAL —

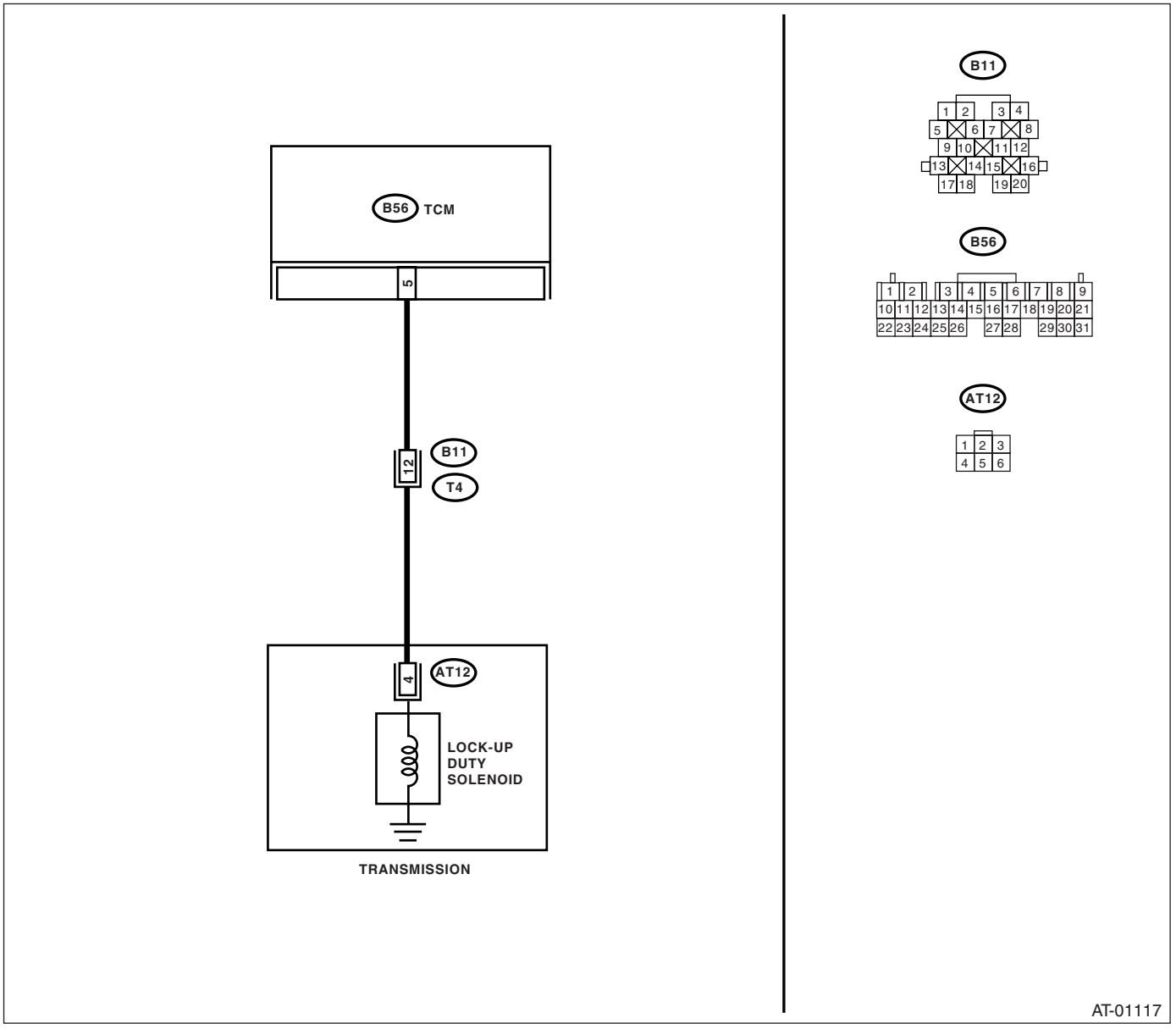
DIAGNOSIS:

The output signal circuit of lock-up duty solenoid is open or shorted.

TROUBLE SYMPTOM:

No “lock-up” (after engine warm-up).

WIRING DIAGRAM:



	Step	Check	Yes	No
1	**CHECK DTC.**	Do multiple DTCs appear in the on-board diagnostics test mode?	Go to another DTC.	Go to step **2.**
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*** ***(B56) No. 5 — (B11) No. 12:***	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*** ***(B56) No. 5 — Chassis ground:***	Is the resistance more than 1 MΩ?	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. 12 — No. 20:***	Is the resistance 2.0 — 4.5 Ω?	Go to step **6.**	Go to step **5.**
5	**CHECK LOCK-UP DUTY SOLENOID (IN TRANSMISSION).** 1) Disconnect the transmission connector. 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 and transmission ground. ***Connector & terminal*** ***(AT12) No. 4 — Transmission ground:***	Is the resistance 2.0 — 4.5 Ω?	Go to step **6.**	Replace the control valve body. <Ref. to 4AT-61, Control Valve Body.>
6	**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. 12 — (AT12) No. 4:***	Is the resistance less than 1 Ω?	Go to step **7.**	Repair the open circuit in harness between TCM and transmission connector.
7	**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. 12 — Transmission ground:***	Is the resistance more than 1 MΩ?	Even if the AT OIL TEMP warning light blinks, 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.

P: DTC P0748 — PRESSURE CONTROL SOLENOID "A" ELECTRICAL —

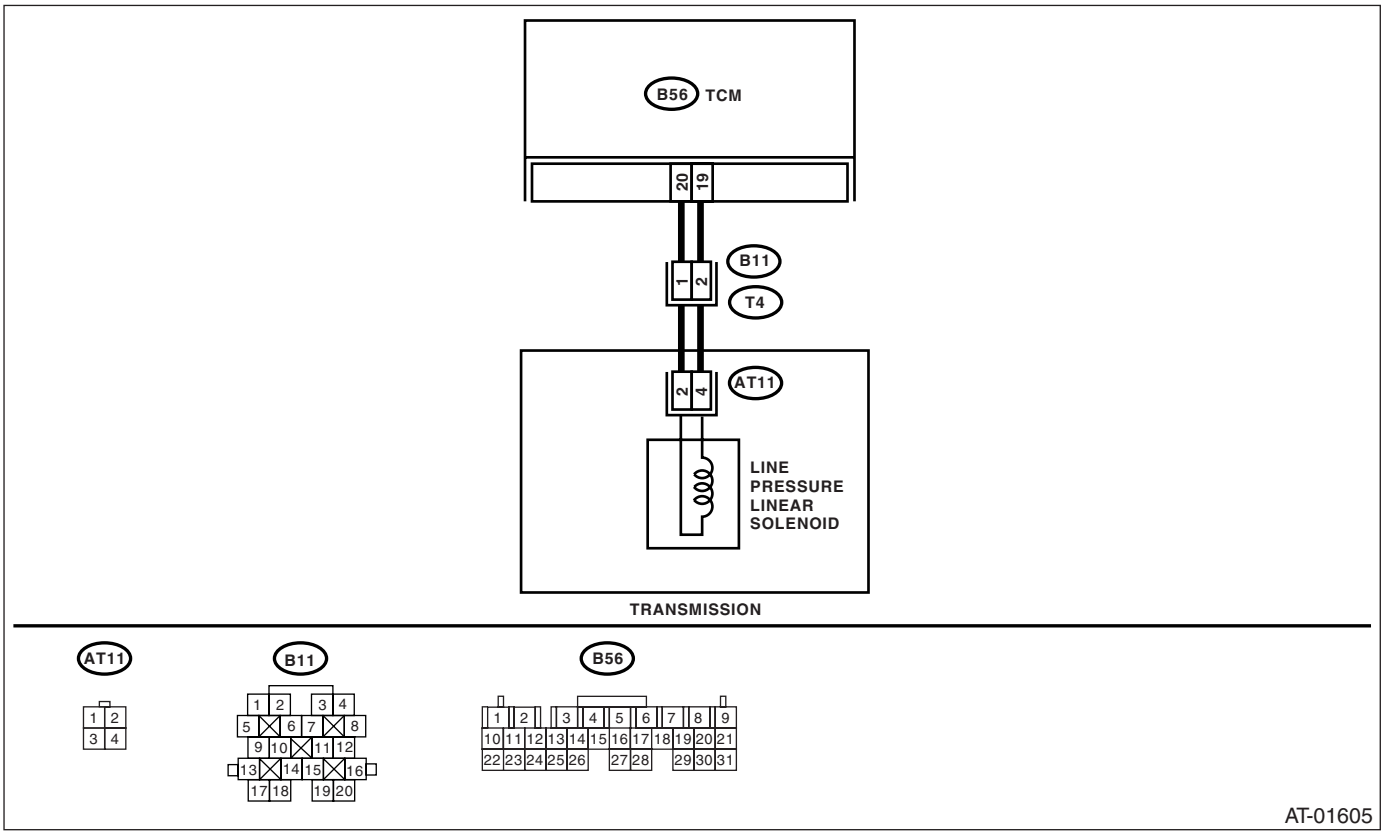
DIAGNOSIS:

The output signal circuit of line pressure linear solenoid is open or shorted.

TROUBLE SYMPTOM:

Excessive shift shock.

WIRING DIAGRAM:



	Step	Check	Yes	No
1	**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. ***Connector & terminal*** ***(B56) No. 19 — (B11) No. 2:*** ***(B56) No. 20 — (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 CHASSIS GROUND.** Measure the resistance of harness between TCM and chassis ground. ***Connector & terminal*** ***(B56) No. 19 — Chassis ground:*** ***(B56) No. 20 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **3.**	Repair the short circuit in harness between TCM and transmission connector.
3	**CHECK LINE PRESSURE LINEAR SOLENOID.** Measure the resistance between transmission connector receptacle's terminals. ***Connector & terminal*** ***(T4) No. 1 — No. 2:***	Is the resistance 4 — 6 Ω?	Go to step **5.**	Go to step **4.**
4	**CHECK LINE PRESSURE LINEAR 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 linear solenoid. 4) Measure the resistance between line pressure linear solenoid connector and transmission ground. ***Connector & terminal*** ***(AT11) No. 2 — No. 4:***	Is the resistance 2.0 — 4.5 Ω?	Go to step **5.**	Replace the control valve body. <Ref. to 4AT-61, Control Valve Body.>
5	**CHECK HARNESS CONNECTOR BETWEEN TRANSMISSION AND LINE PRESSURE LINEAR SOLENOID.** Measure the resistance of harness between line pressure linear solenoid and transmission connector. ***Connector & terminal*** ***(T4) No. 2 — (AT11) No. 4:*** ***(T4) No. 1 — (AT11) No. 2:***	Is the resistance less than 1 Ω?	Go to step **6.**	Repair the open circuit in harness between line pressure linear solenoid and transmission connector.

	Step	Check	Yes	No
6	**CHECK HARNESS CONNECTOR BETWEEN TRANSMISSION AND LINE PRESSURE LINEAR SOLENOID.** Measure the resistance of harness between transmission connector and transmission ground. ***Connector & terminal*** ***(T4) No. 1 — Transmission ground:*** ***(T4) No. 2 — Transmission ground:***	Is the resistance more than 1 MΩ?	Even if the AT OIL TEMP warning light blinks, 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 linear solenoid and transmission.	Repair the short circuit in harness between line pressure linear solenoid and transmission connector.

MEMO:

Q: DTC P0753 — SHIFT SOLENOID “A” ELECTRICAL —

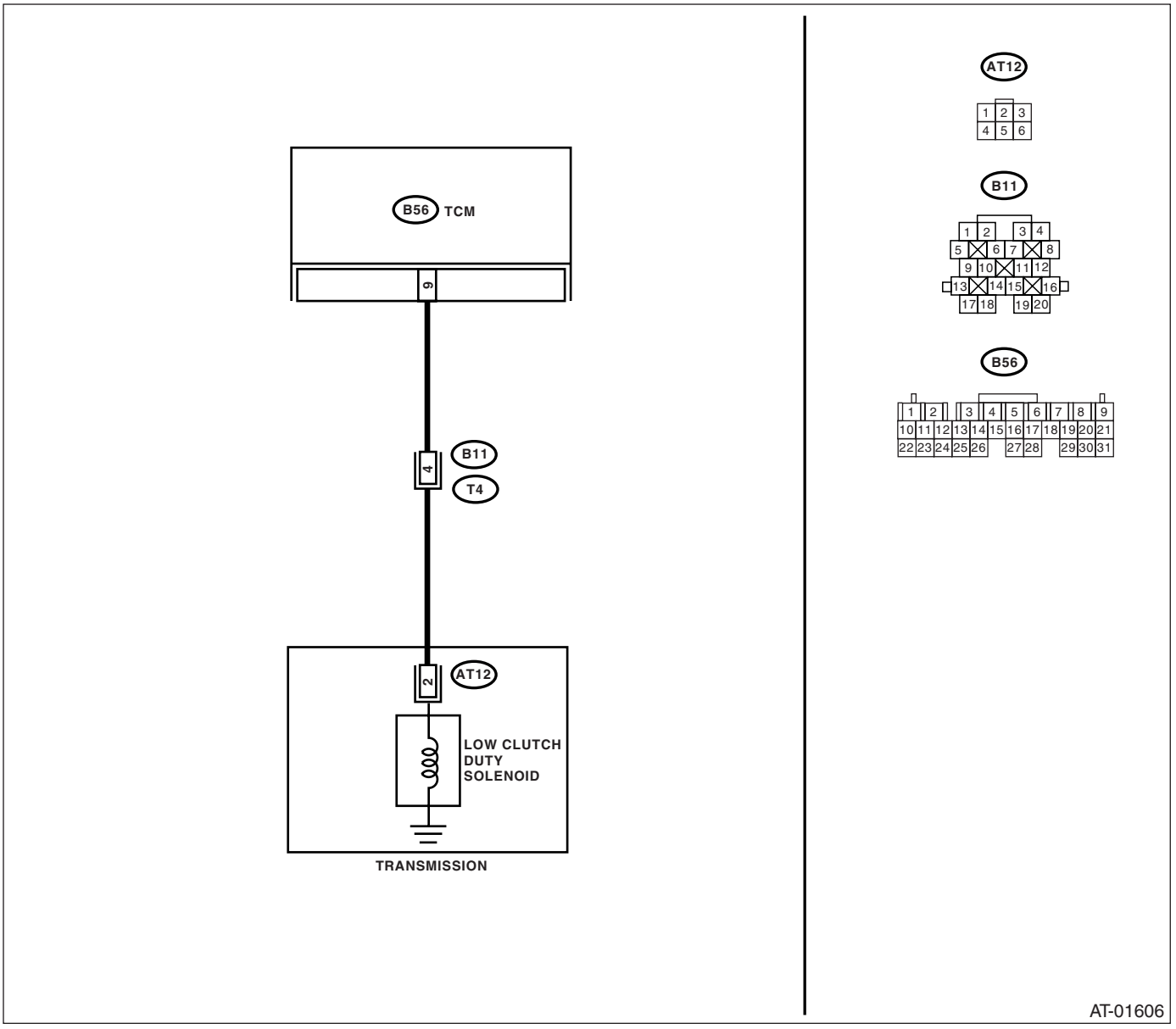
DIAGNOSIS:

The output signal circuit of low clutch duty solenoid is open or shorted.

TROUBLE SYMPTOM:

Excessive shift shock.

WIRING DIAGRAM:



	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*** ***(B56) No. 9 — (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*** ***(B56) No. 9 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **3.**	Repair the short circuit in harness between TCM and transmission connector.
3	**CHECK LOW CLUTCH DUTY SOLENOID.** Measure the resistance between transmission connector terminals. ***Connector & terminal*** ***(T4) No. 4 — No. 20:***	Is the resistance 2.0 — 6.0 Ω?	Go to step **4.**	Go to step **7.**
4	**CHECK OUTPUT SIGNAL 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 “P” or “N” range and depress accelerator pedal. 7) Read the data of low clutch duty solenoid using Subaru Select Monitor. • Low clutch duty solenoid is indicated in “%”.	Is the value 100%?	Go to step **5.**	Go to step **6.**
5	**CHECK OUTPUT SIGNAL FROM TCM USING SUBARU SELECT MONITOR.** 1) Turn the ignition switch to ON (engine OFF). 2) Move the select lever to “D” range. 3) Read the data of low clutch duty solenoid.	Is the value 0%?	Even if the AT OIL TEMP warning light blinks, 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 **6.**
6	**CHECK POOR CONTACT.**	Is there poor contact in low clutch duty solenoid circuit?	Repair the poor contact.	Replace the TCM. <Ref. to 4AT-77, Transmission Control Module (TCM).>

	Step	Check	Yes	No
7	**CHECK LOW CLUTCH 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 low clutch duty solenoid. 4) Measure the resistance between low clutch duty solenoid connector and transmission ground. ***Connector & terminal*** ***(AT12) No. 2 — Transmission ground:***	Is the resistance 2.0 — 6.0 Ω?	Go to step **8.**	Replace the control valve body. <Ref. to 4AT-61, Control Valve Body.>
8	**CHECK HARNESS CONNECTOR BETWEEN TRANSMISSION AND LOW CLUTCH DUTY SOLENOID.** Measure the resistance of harness between low clutch duty solenoid and transmission connector. ***Connector & terminal*** ***(T4) No. 4 — (AT12) No. 2:***	Is the resistance less than 1 Ω?	Go to step **9.**	Repair the open circuit in harness between low clutch duty solenoid and transmission connector.
9	**CHECK HARNESS CONNECTOR BETWEEN TRANSMISSION AND LOW CLUTCH DUTY SOLENOID.** Measure the resistance of harness between transmission 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 blinks, 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 duty solenoid and transmission.	Repair the short circuit in harness between low clutch duty solenoid and transmission connector.

MEMO:

R: DTC P0758 — SHIFT SOLENOID "B" ELECTRICAL —

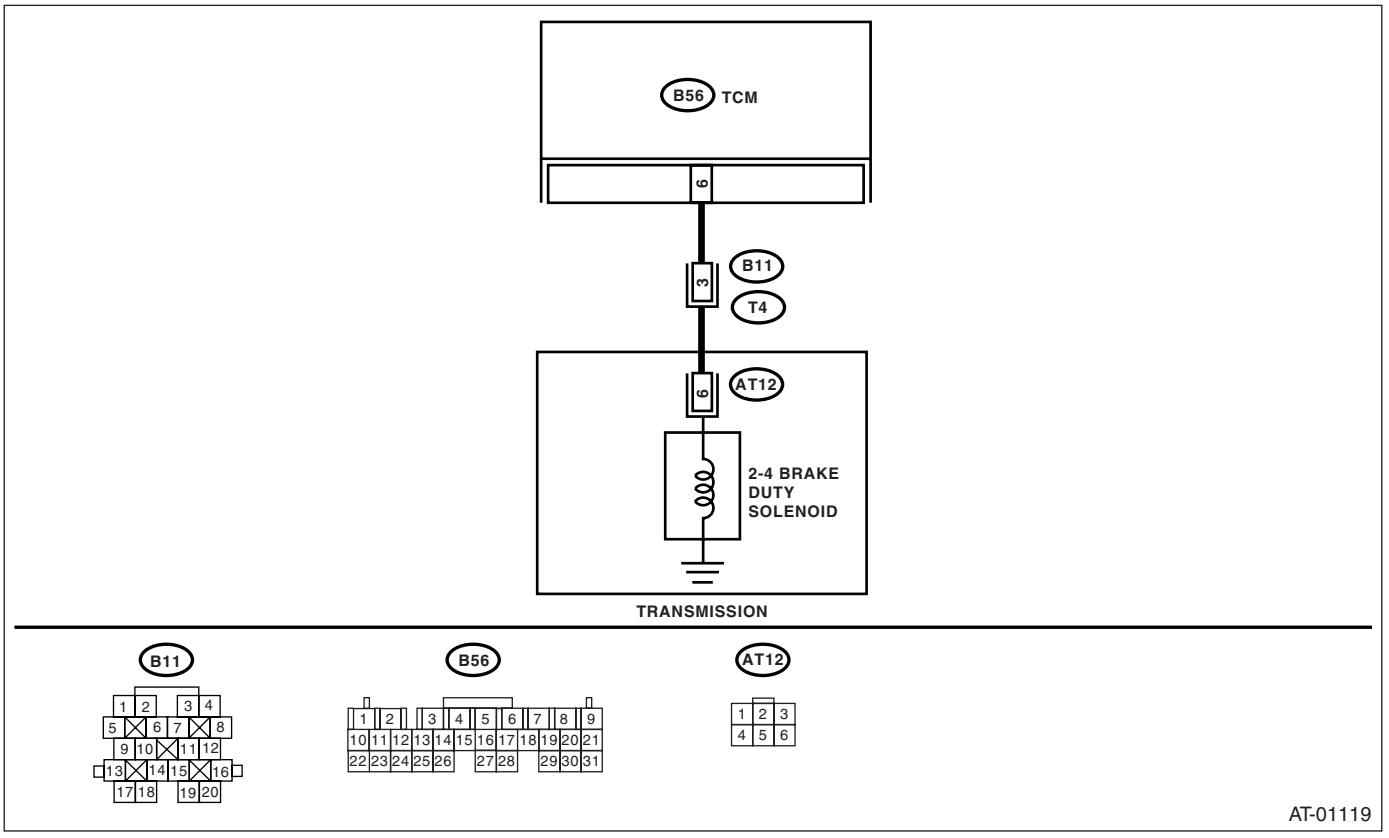
DIAGNOSIS:

The output signal circuit of 2-4 brake duty solenoid is open or shorted.

TROUBLE SYMPTOM:

Excessive shift shock.

WIRING DIAGRAM:



	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 transmission connector. ***Connector & terminal*** ***(B56) No. 6 — (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 CHASSIS GROUND.** Measure the resistance of harness between TCM connector and chassis ground. ***Connector & terminal*** ***(B56) No. 6 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **3.**	Repair the short circuit in harness between TCM and transmission connector.
3	**CHECK 2-4 BRAKE DUTY SOLENOID.** Measure the resistance between transmission connector terminals. ***Connector & terminal*** ***(T4) No. 3 — No. 20:***	Is the resistance 2.0 — 6.0 Ω?	Go to step **4.**	Go to step **7.**
4	**CHECK OUTPUT SIGNAL 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) Read the data of 2-4 brake duty solenoid using Subaru Select Monitor. • 2-4 brake duty solenoid is indicated in “%”.	Is the value 100%?	Go to step **5.**	Go to step **6.**
5	**CHECK OUTPUT SIGNAL FROM TCM USING SUBARU SELECT MONITOR.** Move the select lever to “2” range.	Is the value 0%?	Even if the AT OIL TEMP warning light blinks, 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 **6.**
6	**CHECK POOR CONTACT.**	Is there poor contact in 2-4 brake duty solenoid circuit?	Repair the poor contact.	Replace the TCM. <Ref. to 4AT-77, Transmission Control Module (TCM).>

	Step	Check	Yes	No
7	**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. ***Connector & terminal*** ***(AT12) No. 6 — Transmission ground:***	Is the resistance 2.0 — 6.0 Ω?	Go to step **8.**	Replace control valve body. <Ref. to 4AT-61, Control Valve Body.>
8	**CHECK HARNESS CONNECTOR BETWEEN 2-4 BRAKE DUTY SOLENOID AND TRANSMISSION.** Measure the resistance of harness between 2-4 brake duty solenoid and transmission connector. ***Connector & terminal*** ***(T4) No. 3 — (AT12) No. 6:***	Is the resistance less than 1 Ω?	Go to step **9.**	Repair open circuit in harness between 2-4 brake duty solenoid and transmission connector.
9	**CHECK HARNESS CONNECTOR BETWEEN 2-4 BRAKE DUTY SOLENOID AND TRANSMISSION.** Measure the resistance of harness between transmission connector and transmission ground. ***Connector & terminal*** ***(T4) No. 3 — Transmission ground:***	Is the resistance more than 1 MΩ?	Even if the AT OIL TEMP warning light blinks, 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 high clutch duty solenoid and transmission.	Repair short circuit in harness between 2-4 brake duty solenoid and transmission connector.

MEMO:

S: DTC P0763 — SHIFT SOLENOID “C” ELECTRICAL —

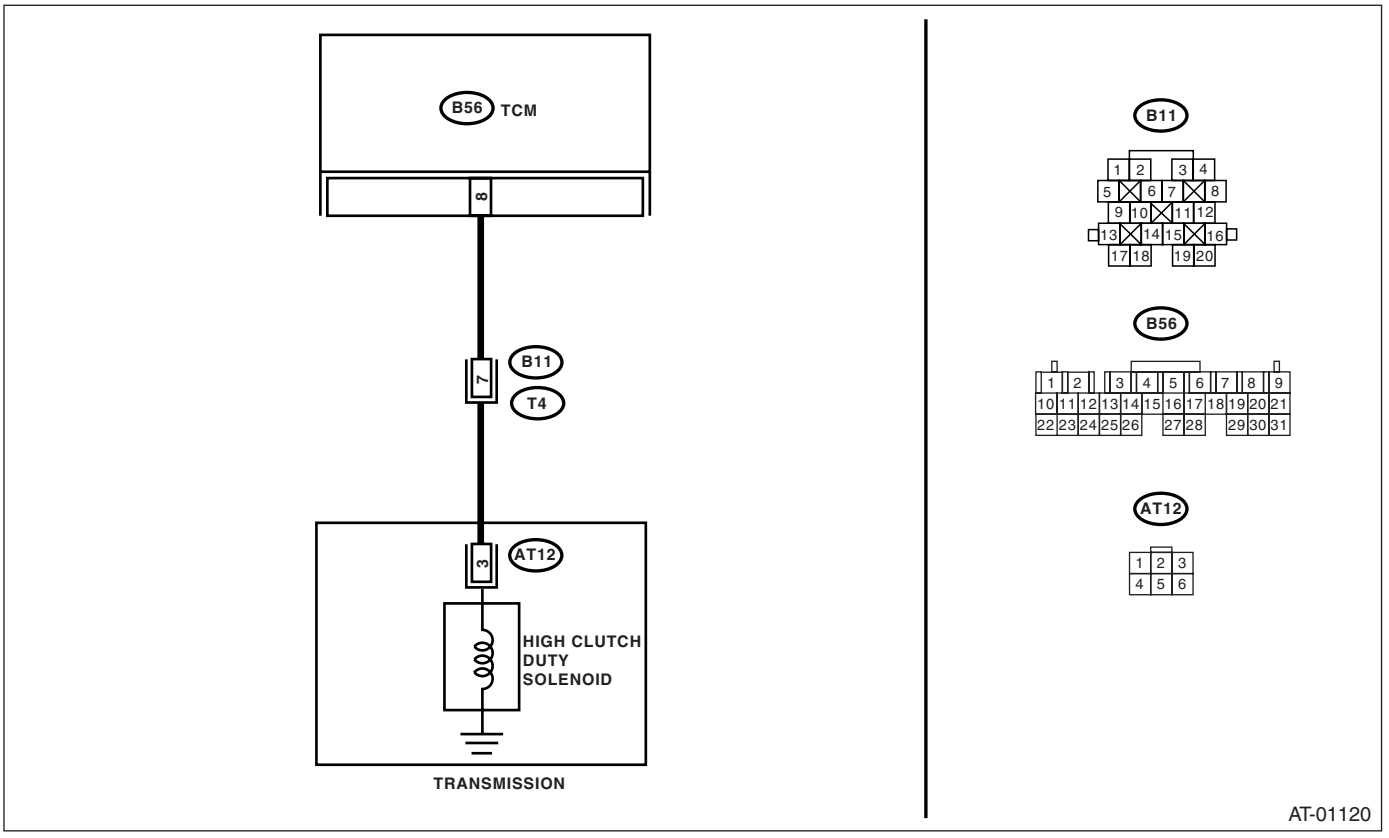
DIAGNOSIS:

The output signal circuit of high clutch duty solenoid is open or shorted.

TROUBLE SYMPTOM:

Excessive shift shock.

WIRING DIAGRAM:



	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*** ***(B56) No. 8 — (B11) No. 7:***	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 connector between TCM and chassis ground. ***Connector & terminal*** ***(B56) No. 8 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **3.**	Repair the short circuit in harness between TCM and transmission connector.
3	**CHECK HIGH CLUTCH DUTY SOLENOID.** Measure the resistance between transmission connector receptacle's terminals. ***Connector & terminal*** ***(T4) No. 7 — No. 20:***	Is the resistance 2.0 — 6.0 Ω?	Go to step **4.**	Go to step **7.**
4	**CHECK OUTPUT SIGNAL 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 high clutch duty solenoid using Subaru Select Monitor. • High clutch duty solenoid is indicated in "%". 7) Move the select lever to "D" range and slowly increase vehicle speed and measure at 3rd or 4th gear. 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 0%?	Go to step **5.**	Go to step **6.**

	Step	Check	Yes	No
5	**CHECK OUTPUT SIGNAL FROM TCM USING SUBARU SELECT MONITOR.** Return the engine to idling speed and move select 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 100%?	Even if the AT OIL TEMP warning light blinks, 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 **6.**
6	**CHECK POOR CONTACT.**	Is there poor contact in high clutch duty circuit?	Repair poor contact.	Replace the TCM. <Ref. to 4AT-77, Transmission Control Module (TCM).>
7	**CHECK HIGH CLUTCH 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 high clutch duty solenoid. 4) Measure the resistance between high clutch duty solenoid connector and transmission ground. ***Connector & terminal*** ***(AT12) No. 3 — Transmission ground:***	Is the resistance 2.0 — 6.0 Ω?	Go to step **8.**	Replace the control valve body. <Ref. to 4AT-61, Control Valve Body.>
8	**CHECK HARNESS CONNECTOR BETWEEN HIGH CLUTCH DUTY SOLENOID AND TRANSMISSION.** Measure the resistance of harness between high clutch duty solenoid and transmission connector. ***Connector & terminal*** ***(T4) No. 7 — (AT12) No. 3:***	Is the resistance less than 1 Ω?	Go to step **9.**	Repair the open circuit in harness between TCM and transmission connector.
9	**CHECK HARNESS CONNECTOR BETWEEN HIGH CLUTCH DUTY SOLENOID AND TRANSMISSION.** Measure the resistance of harness between transmission connector and transmission ground. ***Connector & terminal*** ***(T4) No. 7 — Transmission ground:***	Is the resistance more than 1 MΩ?	Even if the AT OIL TEMP warning light blinks, 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 high clutch duty solenoid and transmission.	Repair the short circuit in harness between high clutch duty solenoid and transmission connector.

MEMO:

T: DTC P0768 — SHIFT SOLENOID “D” ELECTRICAL —

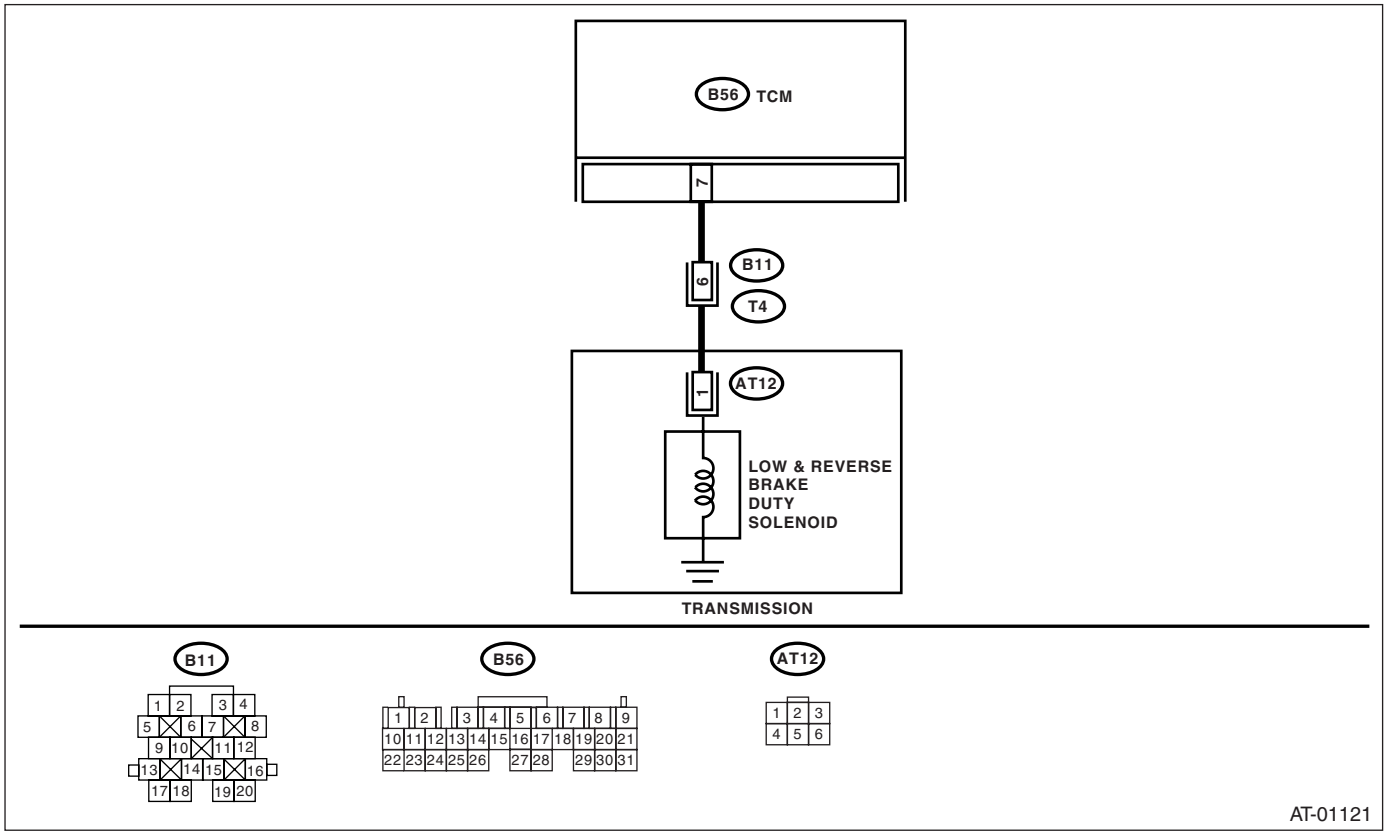
DIAGNOSIS:

The output signal circuit of low & reverse duty solenoid is open or shorted.

TROUBLE SYMPTOM:

Gear is not changed.

WIRING DIAGRAM:



	Step	Check	Yes	No
1	**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. ***Connector & terminal*** ***(B56) No. 7 — (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 CHASSIS GROUND.** Measure the resistance of harness between TCM and chassis ground. ***Connector & terminal*** ***(B56) No. 7 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **3.**	Repair the short circuit in harness between TCM and transmission connector.
3	**CHECK LOW & REVERSE BRAKE DUTY SOLENOID.** Measure the resistance between transmission connector receptacle's terminals. ***Connector & terminal*** ***(T4) No. 6 — No. 20:***	Is the resistance 2.0 — 6.0 Ω?	Go to step **4.**	Go to step **7.**
4	**CHECK OUTPUT SIGNAL 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) Read the data of low & reverse duty solenoid using Subaru Select Monitor. • Low & reverse duty solenoid is indicated in "%".	Is the value 100%?	Go to step **5.**	Go to step **6.**
5	**CHECK OUTPUT SIGNAL FROM TCM USING SUBARU SELECT MONITOR.** 1) Move the select lever to "1" range. 2) Read the data of low & reverse duty solenoid.	Is the value 61.5%?	Even if the AT OIL TEMP warning light blinks, 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 **6.**
6	**CHECK POOR CONTACT.**	Is there poor contact in low & reverse duty solenoid circuit?	Repair the poor contact.	Replace the TCM. <Ref. to 4AT-77, Transmission Control Module (TCM).>

	Step	Check	Yes	No
7	**CHECK LOW & REVERSE 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 low & reverse duty solenoid. 4) Measure the resistance between low & reverse duty solenoid connector and transmission ground. ***Connector & terminal*** ***(AT12) No. 1 — Transmission ground:***	Is the resistance 2.0 — 6.0 Ω?	Go to step **8.**	Replace the control valve body. <Ref. to 4AT-61, Control Valve Body.>
8	**CHECK HARNESS CONNECTOR BETWEEN TRANSMISSION AND LOW & REVERSE DUTY SOLENOID.** Measure the resistance of harness between low & reverse duty solenoid and transmission connector. ***Connector & terminal*** ***(T4) No. 6 — (AT12) No. 1:***	Is the resistance less than 1 Ω?	Go to step **9.**	Repair the open circuit in harness between low & reverse brake duty solenoid and transmission connector.
9	**CHECK HARNESS CONNECTOR BETWEEN TRANSMISSION AND LOW & REVERSE BRAKE DUTY SOLENOID.** Measure the resistance of harness between transmission connector and transmission ground. ***Connector & terminal*** ***(T4) No. 6 — Transmission ground:***	Is the resistance more than 1 MΩ?	Even if the AT OIL TEMP warning light blinks, 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 & reverse brake duty solenoid and transmission.	Repair the short circuit in harness between low & reverse brake duty solenoid and transmission connector.

MEMO:

U: DTC P0801 — REVERSE INHIBITOR CONTROL CIRCUIT —

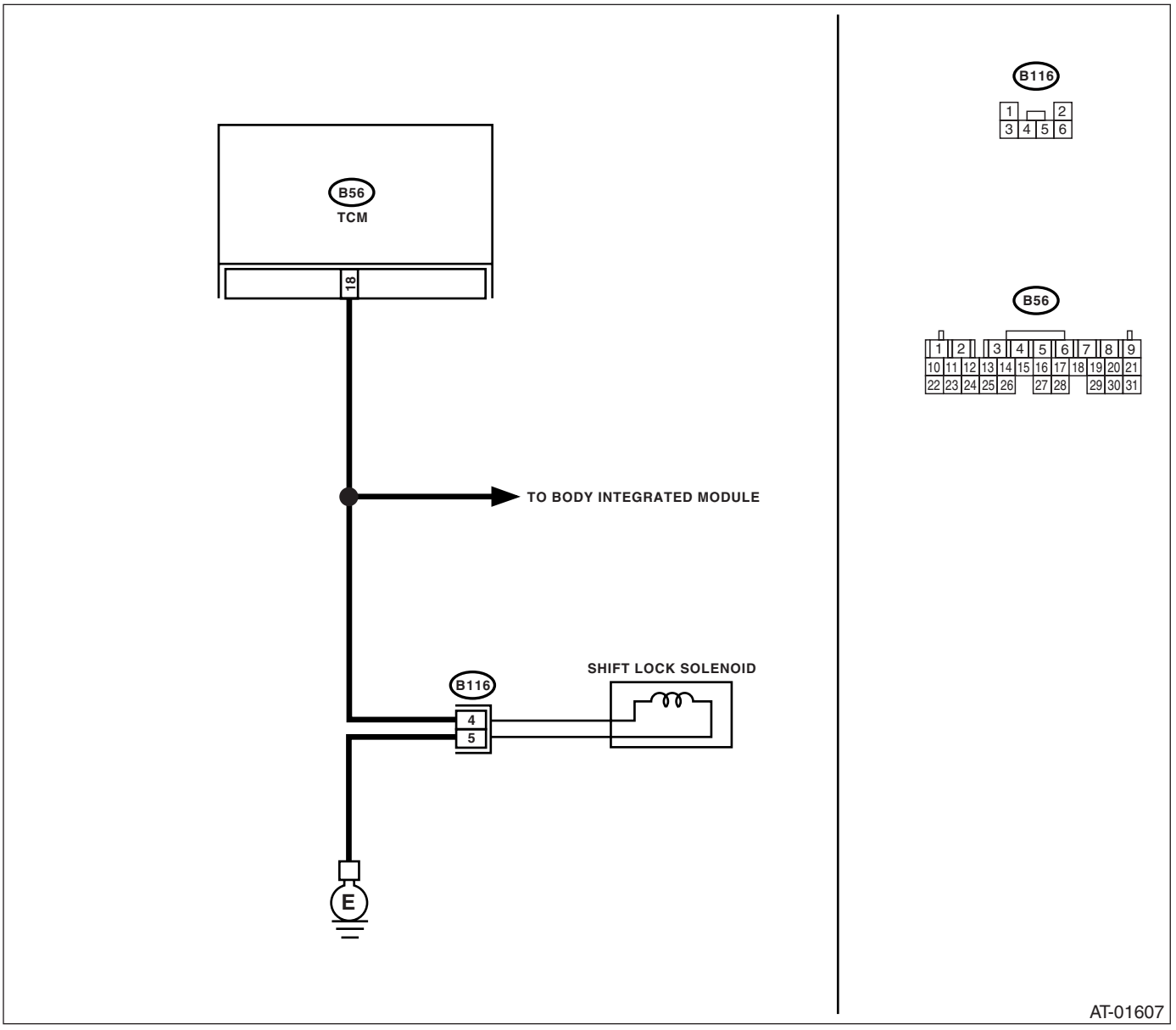
DIAGNOSIS:

Shift lock solenoid malfunction, open or short reverse inhibitor control circuit.

TROUBLE SYMPTOM:

- Gear is shifted from “N” range to “R” range during driving at 20 km/h (12 MPH) or more.
- Gear can not be shifted from “N” range to “R” range.

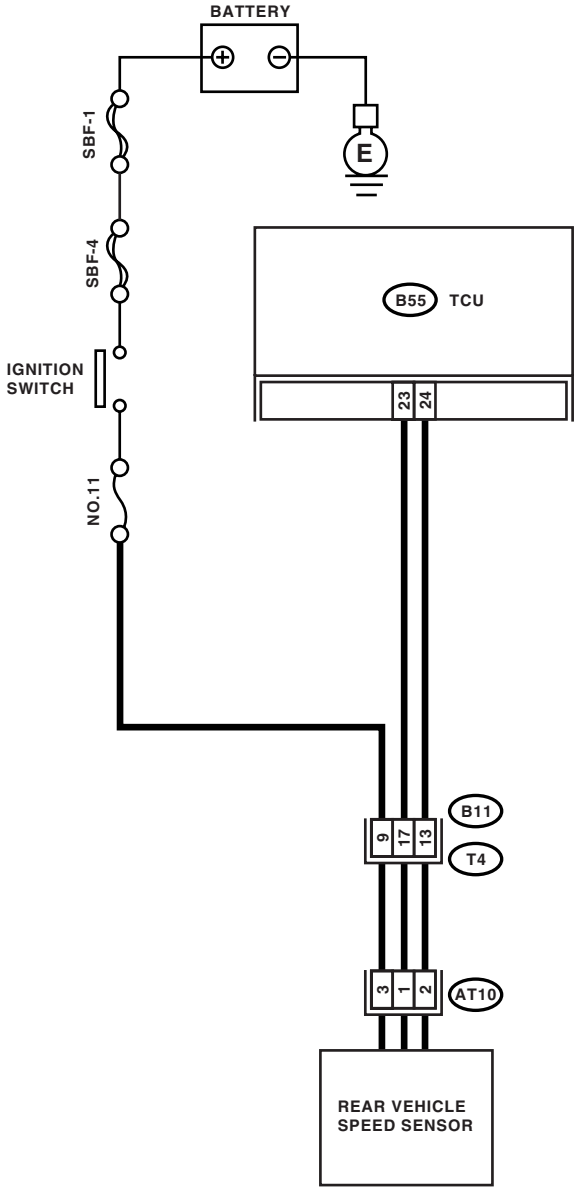
WIRING DIAGRAM:

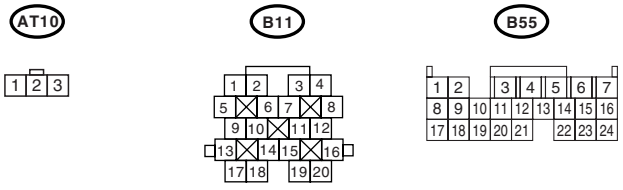


	Step	Check	Yes	No
1	**CHECK HARNESS CONNECTOR BETWEEN TCM AND SHIFT LOCK SOLENOID.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from TCM and shift lock solenoid. 3) Measure the resistance harness between TCM and shift lock solenoid connector. ***Connector & terminal*** ***(B56) No. 18 — (B116) No. 4:***	Is the resistance less than 1 Ω?	Go to step **2.**	Repair the open circuit in harness between TCM and shift lock solenoid connector.
2	**CHECK HARNESS CONNECTOR BETWEEN TCM AND SHIFT LOCK SOLENOID.** Measure the resistance of harness between TCM and chassis ground. ***Connector & terminal*** ***(B56) No. 18 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **3.**	Repair the short circuit in harness between TCM and shift lock solenoid connector.
3	**CHECK HARNESS CONNECTOR BETWEEN SHIFT LOCK SOLENOID AND CHASSIS GROUND.** Measure the resistance of harness between shift lock solenoid and chassis ground. ***Connector & terminal*** ***(B116) No. 5 — Chassis ground:***	Is the resistance less than 1 Ω?	Go to step **4.**	Repair the open circuit in harness between chassis ground terminal and shift lock solenoid connector.
4	**CHECK SHIFT LOCK SOLENOID.** Measure the resistance between shift lock solenoid. ***Connector & terminal*** ***(B116) No. 5 — No. 4:***	Is the resistance 20 — 40 Ω?	Go to step **5.**	Replace the shift lock solenoid.
5	**CHECK TCM OUTPUT SIGNAL.** 1) Connect all connectors. 2) Turn the ignition switch to ON. 3) Move the select lever to “D” range. 4) Measure the voltage between TCM and chassis ground. ***Connector & terminal*** ***(B56) No. 18 (+) — Chassis ground (−):***	Is the voltage more than 10.5 V?	Go to step **6.**	Go to step **7.**
6	**CHECK OUTPUT SIGNAL FROM TCM.** 1) Lift-up the vehicle and place safety stand. NOTE: Raise all wheels off ground. 2) Start the engine. 3) Move the select lever “D” range and slowly increase vehicle speed to 20 km/h (12 MPH). NOTE: The speed difference between front and rear wheels may light 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. 4) Measure the voltage between TCM and chassis ground. ***Connector & terminal*** ***(B56) No. 18 (+) — Chassis ground (−):***	Is the voltage less than 1 V?	Even if the AT OIL TEMP warning light blinks, the circuit has returned to a normal condition at this time. A temporary poor contact of the connector or harness may be cause. Repair the harness or connector in reverse inhibitor control circuit.	Go to step **7.**
7	**CHECK POOR CONTACT.**	Is there poor contact in the reverse inhibitor control circuit?	Repair the poor contact.	Replace the TCM. <Ref. to 4AT-77, Transmission Control Module (TCM).>

V: DTC P1706 — AT VEHICLE SPEED SENSOR CIRCUIT MALFUNCTION (REAR WHEEL) —

DIAGNOSIS:
The input signal circuit of TCM is open or shorted.
TROUBLE SYMPTOM:
No lock-up or excessive tight corner “braking”.
WIRING DIAGRAM:





AT-03016

	Step	Check	Yes	No
1	**CHECK IGNITION POWER SUPPLY CIRCUIT.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from rear vehicle speed sensor. 3) Measure the ignition power supply between rear vehicle speed sensor connector and transmission ground. ***Connector & terminal*** ***(AT10) No. 3 (+) — Transmission ground (–):***	Is the voltage more than 10 V?	Go to step **2.**	Check harness between rear vehicle speed sensor and battery for open circuit, short or poor contact. Repair the harness if required.
2	**CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION.** 1) Turn the ignition switch to OFF. 2) Measure the resistance of harness between TCM and transmission connector. ***Connector & terminal*** ***(B55) No. 23 — (AT10) No. 1:***	Is the resistance less than 1 Ω?	Go to step **3.**	Repair the open circuit or poor contact of connector in harness between TCM and rear vehicle speed sensor connector.
3	**CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION.** Measure the resistance of harness between TCM and transmission connector. ***Connector & terminal*** ***(B55) No. 24 — (AT10) No. 2:***	Is the resistance less than 1 Ω?	Go to step **4.**	Repair the open circuit or poor contact of connector in harness between TCM and rear vehicle speed sensor connector.
4	**CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION.** Measure the resistance of harness between TCM and chassis ground. ***Connector & terminal*** ***(B55) No. 23 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **5.**	Repair the short circuit in harness between TCM and rear vehicle speed sensor connector.
5	**CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION.** Measure the resistance of harness between TCM and chassis ground. ***Connector & terminal*** ***(B55) No. 24 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **7.**	Repair the short circuit in harness between TCM and rear vehicle speed sensor connector.
6	**PREPARE OSCILLOSCOPE.**	Do you have an oscilloscope?	Go to step **8.**	Go to step **7.**
7	**CHECK INPUT SIGNAL FOR TCM.** 1) Connect the connectors to TCM and transmission. 2) Lift-up the vehicle and place safety stands. NOTE: Raise all wheels off ground. 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 AC voltage between TCM connector terminals. ***Connector & terminal*** ***(B55) No. 24 (+) — No. 23 (–):***	Is the voltage more than AC 2 V?	Go to step **9.**	Replace the rear vehicle speed sensor.

	Step	Check	Yes	No
8	**CHECK INPUT SIGNAL FOR TCM USING OSCILLOSCOPE.** 1) Connect the connectors to TCM and transmission. 2) Lift-up the vehicle and place safety stands. NOTE: Raise all wheels off ground. 3) Set the oscilloscope to TCM connector terminals. ***Connector & terminal*** ***Positive probe; (B55) No. 24:*** ***Earth lead; (B55) No. 23:*** 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 pulse voltage approx. 5 V?	Go to step **9.**	Replace the rear vehicle speed sensor.
9	**CHECK POOR CONTACT.**	Is there poor contact in rear vehicle speed sensor circuit?	Repair the poor contact.	Replace the TCM. <Ref. to 4AT-77, Transmission Control Module (TCM).>

MEMO:

W: DTC P1707 — AT AWD SOLENOID VALVE CIRCUIT MALFUNCTION —

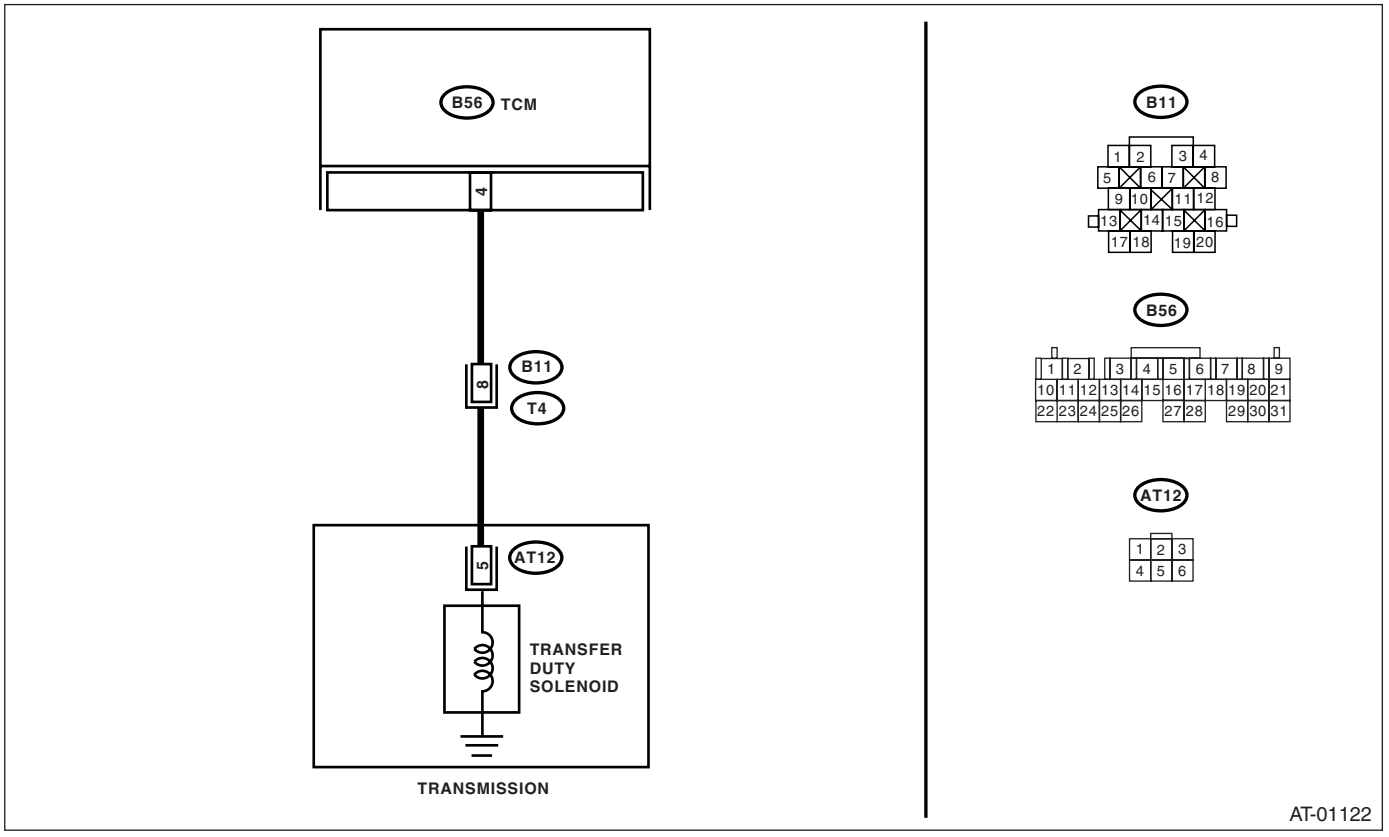
DIAGNOSIS:

The output signal circuit of transfer duty solenoid is open or shorted.

TROUBLE SYMPTOM:

Excessive tight corner “braking”.

WIRING DIAGRAM:



	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*** ***(B56) No. 4 — (B11) No. 8:***	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*** ***(B56) No. 4 — Chassis ground:***	Is the resistance more than 1 MΩ?	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. 8 — No. 20:***	Is the resistance 2.0 — 4.5 Ω?	Go to step **4.**	Go to step **6.**
4	**CHECK OUTPUT SIGNAL FROM TCM USING SUBARU SELECT MONITOR.** 1) Move the select lever to “D” range with throttle fully open (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 90 — 95%?	Even if the AT OIL TEMP warning light blinks, 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.**
5	**CHECK POOR CONTACT.**	Is there poor contact in transfer duty solenoid circuit?	Repair the poor contact.	Replace the TCM. <Ref. to 4AT-77, Transmission Control Module (TCM).>
6	**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*** ***(AT12) No. 5 — Transmission ground:***	Is the resistance 2.0 — 6.0 Ω?	Go to step **7.**	Replace the control valve body. <Ref. to 4AT-61, Control Valve Body.>

	Step	Check	Yes	No
7	**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. 8 — (AT12) No. 5:***	Is the resistance less than 1 Ω?	Go to step **8.**	Repair the open circuit in harness between transfer duty solenoid and transmission connector.
8	**CHECK HARNESS CONNECTOR BETWEEN TRANSFER DUTY SOLENOID AND TRANSMISSION.** Measure the resistance of harness between transmission connector and transmission ground. ***Connector & terminal*** ***(T4) No. 8 — Transmission ground:***	Is the resistance more than 1 MΩ?	Even if the AT OIL TEMP warning light blinks, 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.

MEMO:

X: DTC P1708 — THROTTLE POSITION SENSOR CIRCUIT LOW INPUT —

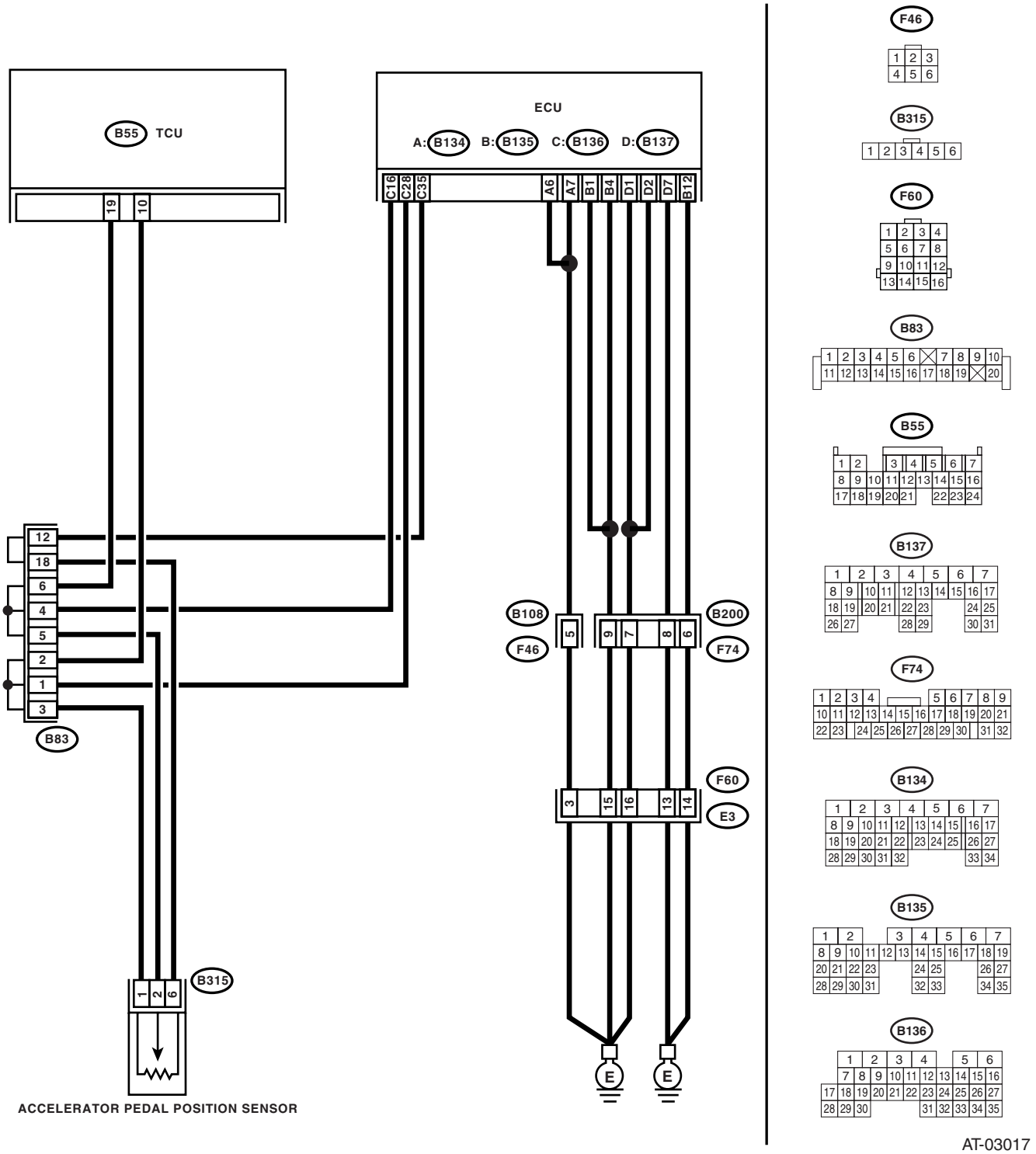
DIAGNOSIS:

The input signal circuit of accelerator pedal position sensor is open or shorted.

TROUBLE SYMPTOM:

- Shift point too high or too low.
- Excessive shift shock.
- Excessive tight corner “braking”.

WIRING DIAGRAM:



AT-03017

	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*** ***(B134) No. 7 — Engine ground:*** ***(B134) No. 6 — Engine ground:*** ***(B135) No. 1 — Engine ground:*** ***(B135) No. 4 — Engine ground:*** ***(B135) No. 12 — Engine ground:*** ***(B137) No. 2 — Engine ground:*** ***(B137) No. 1 — Engine ground:*** ***(B137) No. 7 — 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 ACCELERATOR PEDAL POSITION SENSOR.** 1) Disconnect the connector from accelerator pedal position sensor. 2) Measure the resistance between accelerator pedal position sensor connector receptacle's terminals. ***Connector & terminal*** ***No. 1 — No. 6:***	Is the resistance 0.75 — 3.15 kΩ?	Go to step **4.**	Replace the accelerator pedal position sensor.
4	**CHECK ACCELERATOR PEDAL POSITION SENSOR.** Measure the resistance between accelerator pedal position sensor connector receptacle's terminals. ***Connector & terminal*** ***No. 6 — No. 2:***	Is the resistance 0.15 — 0.63 kΩ?	Go to step **5.**	Replace the accelerator pedal position sensor.
5	**CHECK HARNESS CONNECTOR BETWEEN TCM AND ACCELERATOR PEDAL POSITION SENSOR.** 1) Disconnect the connector from TCM. 2) Measure the resistance of harness between TCM and accelerator pedal position sensor connector. ***Connector & terminal*** ***(B55) No. 19 — (B315) No. 2:***	Is the resistance less than 1 Ω?	Go to step **6.**	Repair the open circuit in harness between TCM and accelerator pedal position sensor connector, and poor contact in coupling connector.
6	**CHECK HARNESS CONNECTOR BETWEEN TCM AND ACCELERATOR PEDAL POSITION SENSOR.** Measure the resistance of harness between TCM connector and chassis ground. ***Connector & terminal*** ***(B55) No. 19 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **7.**	Repair the short circuit in harness between TCM and accelerator pedal position sensor connector.
7	**CHECK HARNESS CONNECTOR BETWEEN ECM AND ACCELERATOR PEDAL POSITION SENSOR.** 1) Disconnect the connector from ECM. 2) Measure the resistance of harness between accelerator pedal position sensor and chassis ground. ***Connector & terminal*** ***(B315) No. 6 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **8.**	Repair the short circuit in harness between ECM and accelerator pedal position sensor.

	Step	Check	Yes	No
8	**CHECK INPUT SIGNAL FOR TCM USING SUBARU SELECT MONITOR.** 1) Connect the connectors to TCM, accelerator pedal 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 accelerator pedal position sensor using Subaru Select Monitor. • Accelerator pedal position sensor input signal is indicated.	Is the voltage more than 0.4 V?	Even if the AT OIL TEMP warning light blinks, 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 accelerator pedal position sensor circuit.	Go to step **9.**
9	**CHECK POOR CONTACT.**	Is there poor contact in accelerator pedal position sensor circuit?	Repair the poor contact.	Replace the TCM. <Ref. to 4AT-77, Transmission Control Module (TCM).>

MEMO:

Y: DTC P1709 — THROTTLE POSITION SENSOR CIRCUIT HIGH INPUT —

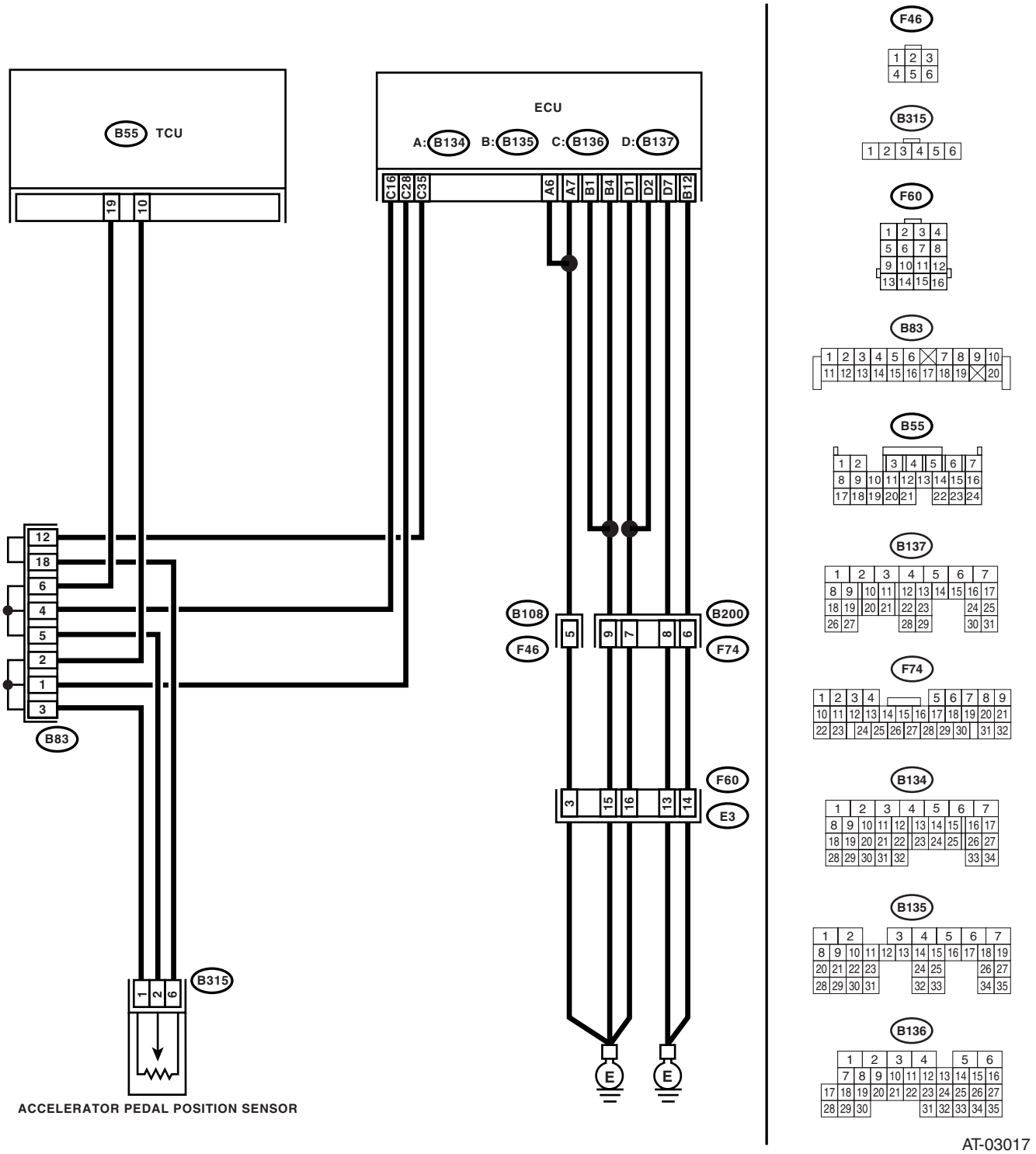
DIAGNOSIS:

The input signal circuit of accelerator pedal position sensor is shorted.

TROUBLE SYMPTOM:

- Shift point too high or too low.
- Excessive shift shock.
- Excessive tight corner “braking”.

WIRING DIAGRAM:



AT-03017

	Step	Check	Yes	No
1	**CHECK ENGINE GROUND TERMINALS.**	Have engine ground terminals been tightened securely?	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*** ***(B134) No. 6 — Engine ground:*** ***(B134) No. 7 — Engine ground:*** ***(B135) No. 1 — Engine ground:*** ***(B135) No. 4 — Engine ground:*** ***(B135) No. 12 — Engine ground:*** ***(B137) No. 1 — Engine ground:*** ***(B137) No. 2 — Engine ground:*** ***(B137) No. 7 — 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 ACCELERATOR PEDAL POSITION SENSOR.** 1) Disconnect the connector from accelerator pedal position sensor. 2) Measure the resistance between accelerator pedal position sensor connector receptacle's terminals. ***Connector & terminal*** ***No. 1 — No. 6:***	Is the resistance 0.75 — 3.15 kΩ?	Go to step **4.**	Replace the accelerator pedal position sensor.
4	**CHECK ACCELERATOR PEDAL POSITION SENSOR.** Measure the resistance between accelerator pedal position sensor connector receptacle's terminals. ***Connector & terminal*** ***No. 2 — No. 6:***	Is the resistance 0.15 — 0.63 kΩ?	Go to step **5.**	Replace the accelerator pedal position sensor.
5	**CHECK HARNESS CONNECTOR BETWEEN TCM AND ACCELERATOR PEDAL POSITION SENSOR.** 1) Disconnect the connector from TCM. 2) Measure the resistance of harness between TCM connector and chassis ground. ***Connector & terminal*** ***(B55) No. 19 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **6.**	Repair the short circuit in harness between TCM and accelerator pedal position sensor connector.
6	**CHECK HARNESS CONNECTOR BETWEEN ECM AND ACCELERATOR PEDAL POSITION SENSOR.** 1) Disconnect the connector from ECM. 2) Measure the resistance of harness between ECM connector and accelerator pedal position sensor connector. ***Connector & terminal*** ***(B315) No. 6 — (B136) No. 35:***	Is the resistance less than 1 Ω?	Go to step **7.**	Repair the short circuit in harness between ECM and accelerator pedal position sensor connector.

	Step	Check	Yes	No
7	**CHECK INPUT SIGNAL FOR TCM USING SUBARU SELECT MONITOR.** 1) Connect the connectors to TCM, accelerator pedal 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 opened. 6) Read the data of accelerator pedal position sensor using Subaru Select Monitor. • Accelerator pedal position sensor input signal is indicated.	Is the voltage more than 4.6 V?	Go to step **8.**	Even if the AT OIL TEMP warning light blinks, 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 accelerator pedal position sensor circuit.
8	**CHECK POOR CONTACT.**	Is there poor contact in accelerator pedal position sensor circuit?	Repair the poor contact.	Replace the TCM. <Ref. to 4AT-77, Transmission Control Module (TCM).>

MEMO:

Z: DTC P1714 — THROTTLE POSITION SENSOR POWER SUPPLY CIRCUIT —

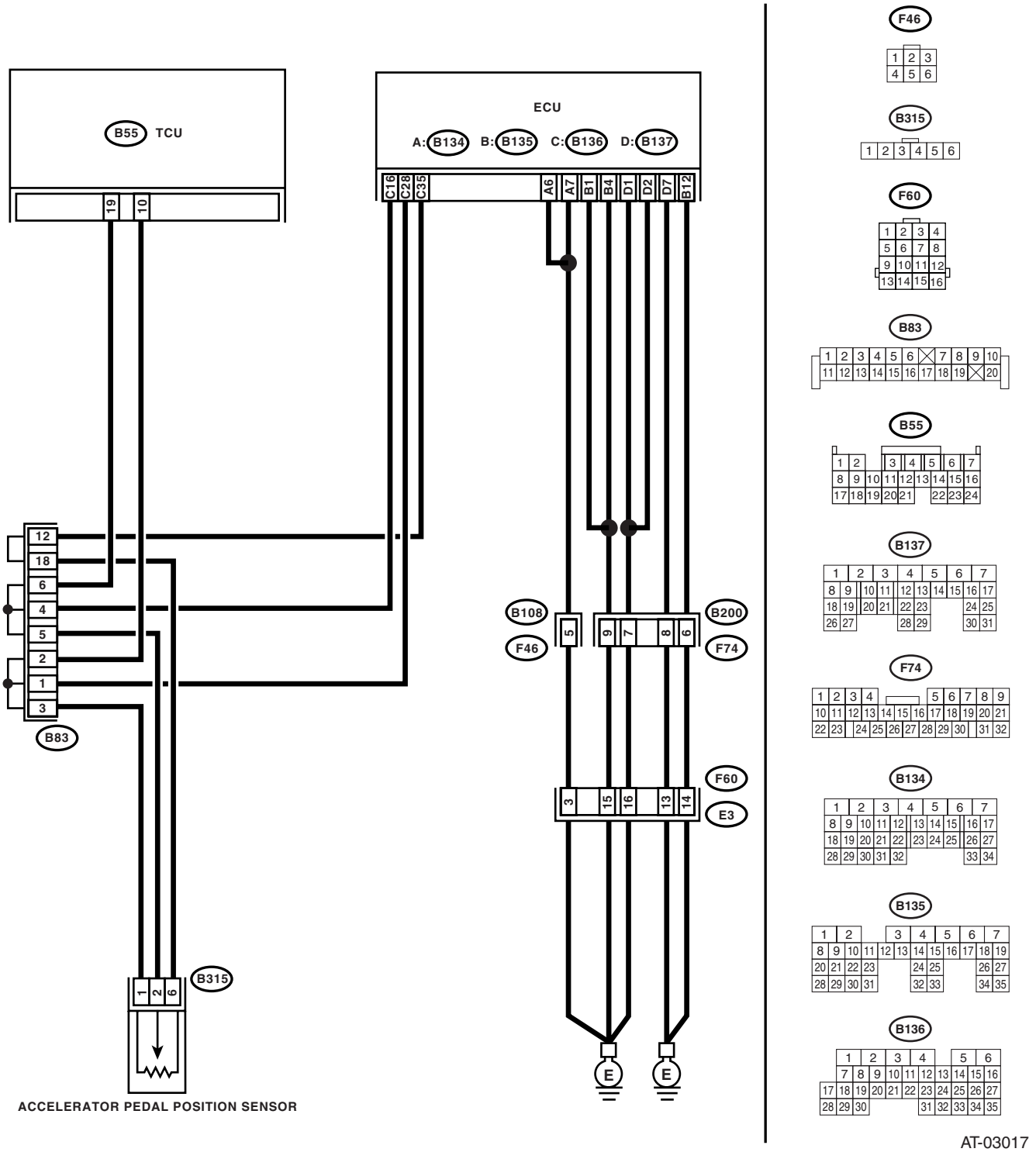
DIAGNOSIS:

The power supply circuit of accelerator pedal position sensor is open or shorted.

TROUBLE SYMPTOM:

- Shift point too high or too low.
- Excessive shift shock.
- Excessive tight corner “braking”.

WIRING DIAGRAM:



AT-03017

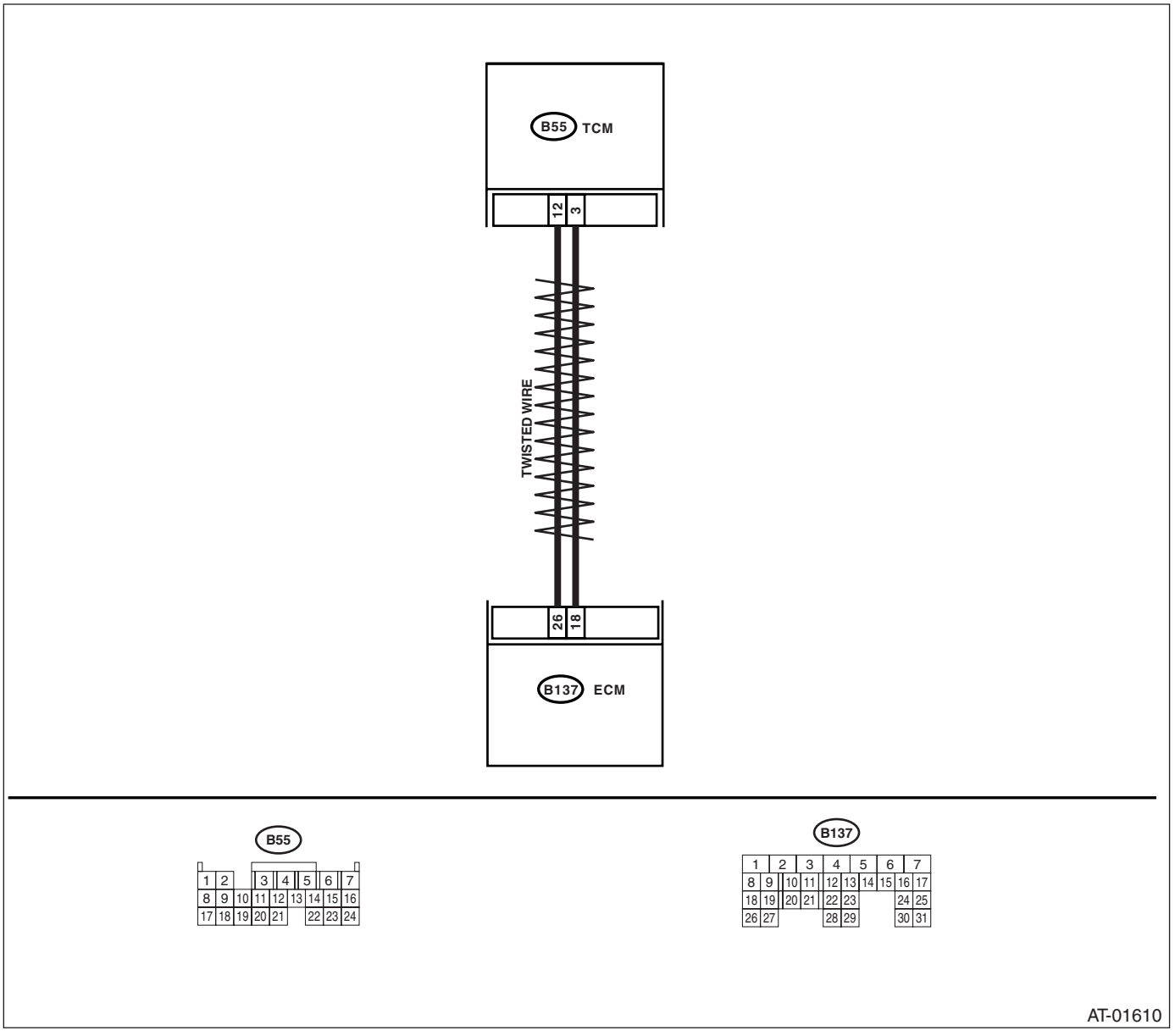
	Step	Check	Yes	No
1	**CHECK HARNESS CONNECTOR BETWEEN TCM AND ACCELERATOR PEDAL POSITION SENSOR.** 1) Disconnect the connector from TCM. 2) Measure the resistance of harness between TCM and accelerator pedal position sensor connector. ***Connector & terminal*** ***(B55) No. 10 — (B315) No. 1:***	Is the resistance less than 1 Ω?	Go to step **2.**	Repair the open circuit in harness between TCM and accelerator pedal position sensor connector, and poor contact in coupling connector.
2	**CHECK HARNESS CONNECTOR BETWEEN TCM AND ACCELERATOR PEDAL POSITION SENSOR.** Measure the resistance of harness between TCM connector and chassis ground. ***Connector & terminal*** ***(B55) No. 10 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **3.**	Repair the short circuit in harness between TCM and accelerator pedal position sensor connector.
3	**CHECK HARNESS CONNECTOR BETWEEN TCM AND ECM.** 1) Connect all connectors. 2) Turn the ignition switch to ON. 3) Measure the voltage between TCM and chassis ground. ***Connector & terminal*** ***(B55) No. 10 (+) — Chassis ground (−):***	Is the voltage approx. 5 V?	Go to step **4.**	Even if the AT OIL TEMP warning light blinks, 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 accelerator pedal position sensor circuit.
4	**CHECK POOR CONTACT.**	Is there poor contact in accelerator pedal position sensor circuit?	Repair the poor contact.	Replace the TCM. <Ref. to 4AT-77, Transmission Control Module (TCM).>

AA:DTC P1718 — CAN COMMUNICATION CIRCUIT MALFUNCTION —

DIAGNOSIS:

Input signal circuit of TCM is open or shorted.

WIRING DIAGRAM:



	Step	Check	Yes	No
1	**CHECK DTC.** Check if multiple trouble codes appear in the on-board diagnostics test mode.	Are multiple DTCs displayed?	Go to other DTC.	Go to step **2.**
2	**CHECK HERNESS CONNECTOR BETWEEN TCM AND ECM.** 1) Turn the ignition switch to OFF. 2) Disconnect TCM and ECM connectors. 3) Measure resistance of harness between ECM and TCM connector. ***Connector & Terminal*** ***(B55) No. 3 — (B137) No. 18:***	Is the measured value less than 1 Ω?	Go to step **3.**	Repair open circuit in harness between TCM and ECM, or poor contact in coupling connector.
3	**CHECK HERNESS CONNECTOR BETWEEN TCM AND ECM.** Measure resistance of harness between ECM and TCM connector. ***Connector & Terminal*** ***(B55) No. 12 — (B137) No. 26:***	Is the measured value less than 1 Ω?	Go to step **4.**	Repair open circuit in harness between TCM and ECM, or poor contact in coupling connector.
4	**CHECK HERNESS CONNECTOR BETWEEN TCM AND ECM.** Measure resistance of harness between TCM and chassis ground. ***Connector & Terminal*** ***(B55) No. 3 — Chassis ground:*** ***(B55) No. 12 — Chassis ground:***	Is the measured value more than 1 MΩ?	There is failure in the TCM or ECM. (Replace and check again)	Repair short circuit in harness between TCM and ECM.

AB:DTC P1817 — SPORT MODE SWITCH CIRCUIT (MANUAL SWITCH) —

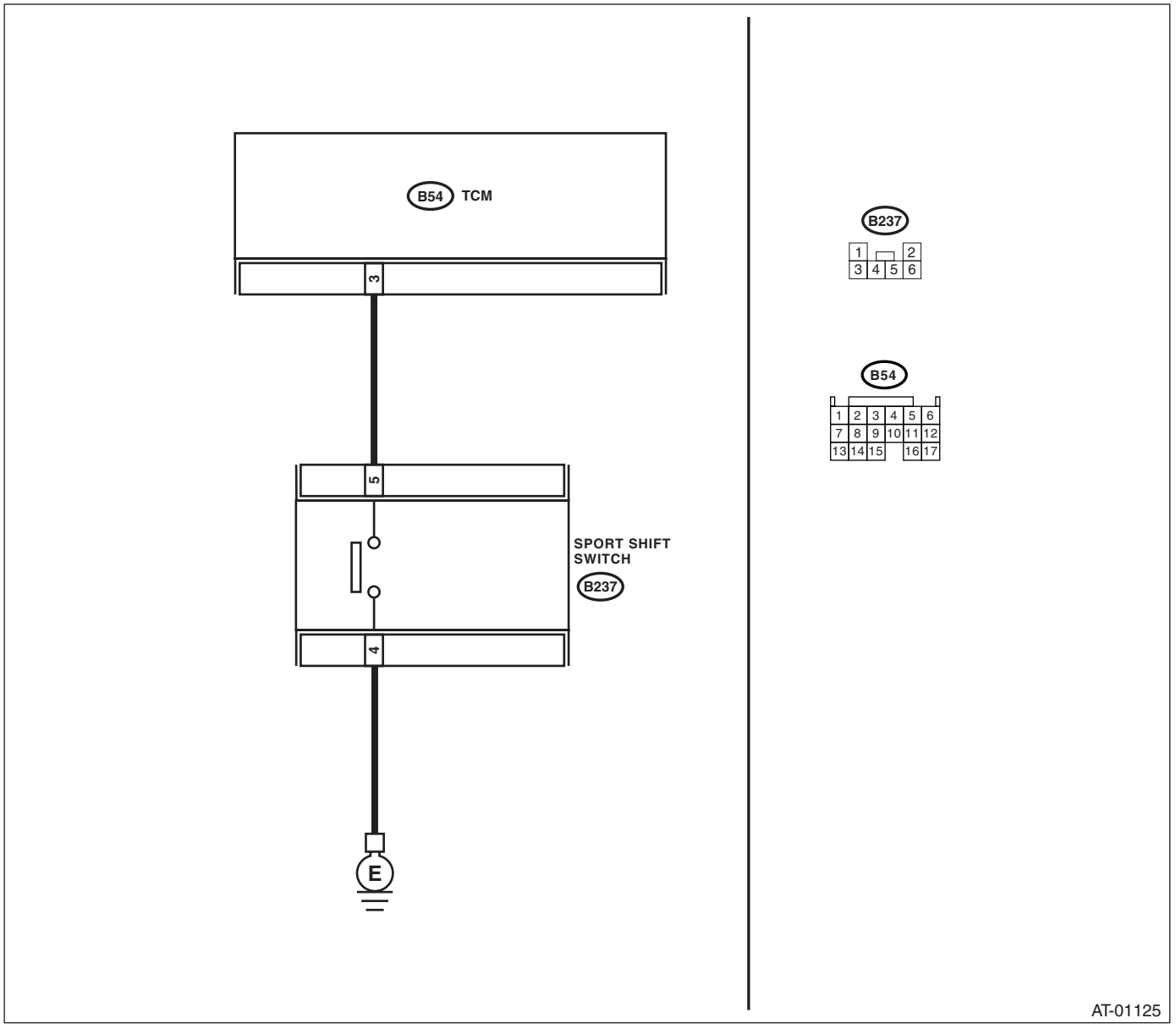
DIAGNOSIS:

The SPORT shift switch input signal circuit is open or shorted.

TROUBLE SYMPTOM:

- No SPORT shift mode occurs.

WIRING DIAGRAM:



	Step	Check	Yes	No
1	**CHECK SPORT SHIFT SWITCH GROUND LINE.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from SPORT shift switch. 3) Measure the resistance of harness between SPORT shift switch connector and chassis ground. ***Connector & terminal*** ***(B237) No. 4 —- Chassis ground:***	Is the resistance less than 1 Ω?	Go to step **2.**	Repair open circuit in harness between SPORT shift switch and chassis ground.
2	**CHECK SPORT SHIFT SWITCH.** Measure the resistance between SPORT shift switch terminals. ***Connector & terminal*** ***(B237) No. 4 —- No. 5:***	Is the resistance more than 1 MΩ?	Go to step **3.**	Replace the lever plate assembly.
3	**CHECK SPORT SHIFT SWITCH.** 1) Move the select lever to SPORT shift mode. 2) Measure the resistance between SPORT shift switch terminals. ***Connector & terminal*** ***(B237) No. 4 — No. 5:***	Is the resistance less than 1 Ω?	Go to step **4.**	Replace the lever plate assembly.
4	**CHECK HARNESS CONNECTOR BETWEEN TCM AND SPORT SHIFT SWITCH.** 1) Disconnect the connector from TCM. 2) Measure the resistance of harness between TCM connector and SPORT shift switch connector. ***Connector & terminal*** ***(B237) No. 5 — (B54) No. 3:***	Is the resistance less than 1 Ω?	Go to step **5.**	Repair the open circuit in harness between SPORT shift switch connector and TCM connector and poor contact in coupling connector.
5	**CHECK HARNESS CONNECTOR BETWEEN TCM AND SPORT SHIFT SWITCH.** 1) Disconnect the connector from TCM. 2) Measure the resistance of harness between SPORT shift switch connector and chassis ground. ***Connector & terminal*** ***(B237) No. 5 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **6.**	Repair the short circuit in harness between SPORT shift switch connector and TCM connector.
6	**CHECK INPUT SIGNAL FOR TCM.** 1) Connect the connector to TCM and SPORT shift switch. 2) Turn ignition switch to ON. (Engine is stopped.) 3) Move the select lever to normal mode. 4) Measure the signal voltage for TCM. ***Connector & terminal*** ***(B54) No. 3 (+) — Chassis ground (–):***	Is the voltage more than 9 V?	Go to step **7.**	Replace the TCM. <Ref. to 4AT-77, Transmission Control Module (TCM).>

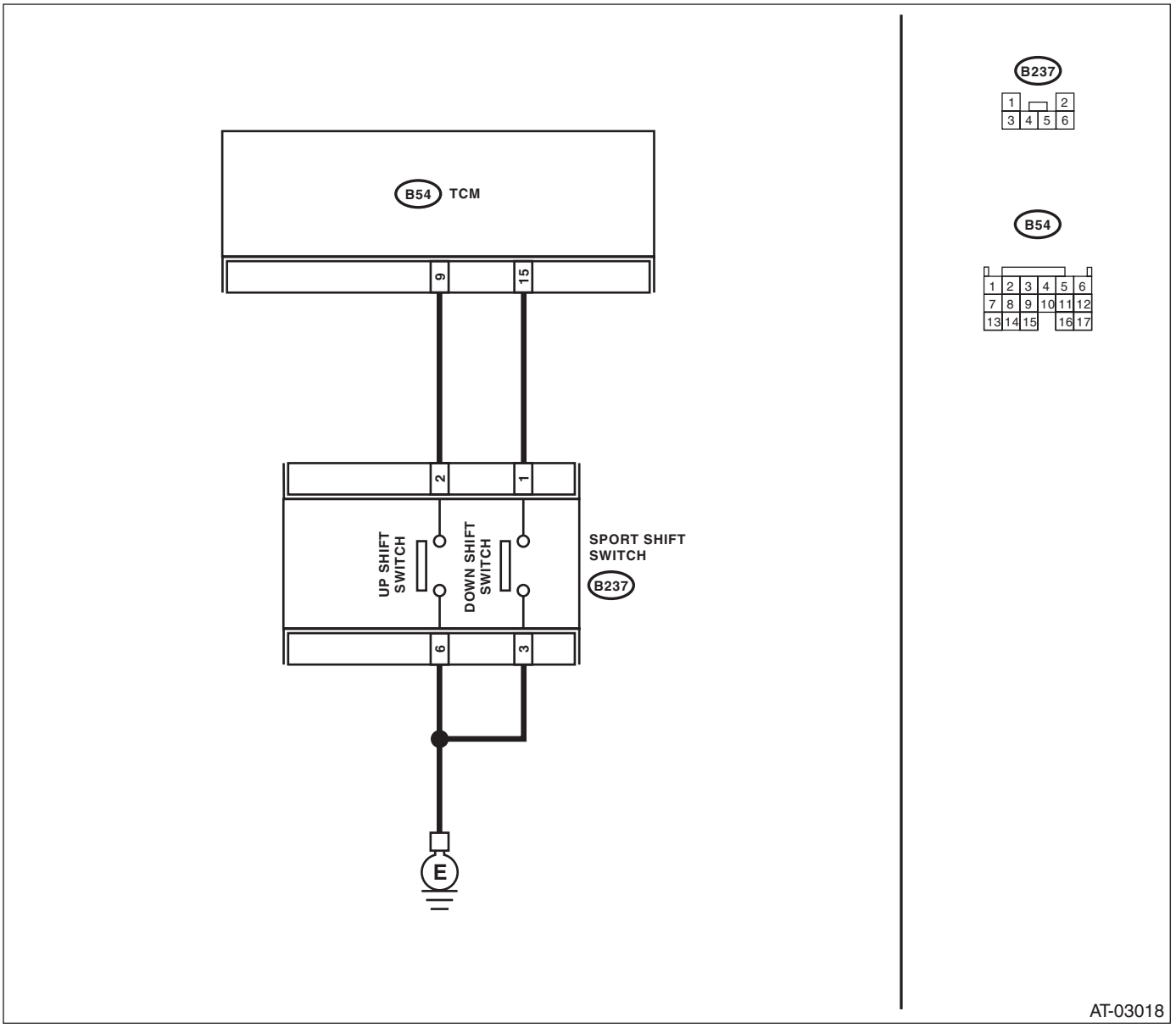
Step		Check	Yes	No
7	**CHECK INPUT SIGNAL FOR TCM.** 1) Move the select lever to SPORT shift mode. 2) Measure the signal voltage for TCM. ***Connector & terminal*** ***(B55) No. 15 (+) — Chassis ground (–):***	Is the voltage less than 1 V?	Even if the AT OIL TEMP warning light blinks, the circuit has returned to a normal condition at this time. A temporary poor contact of the connector or harness may be the cause. Repair the connector or harness in SPORT shift switch circuit.	Go to step **8.**
8	**CHECK POOR CONTACT.**	Is there poor contact in SPORT shift switch circuit?	Repair the poor the contact.	Replace the TCM. <Ref. to 4AT-77, Transmission Control Module (TCM).>

MEMO:

15.Diagnostic Procedure without Diagnostic Trouble Code (DTC)

A: CHECK SPORT SHIFT SWITCH

DIAGNOSIS:
SPORT shift switch input signal circuit is open or shorted.
TROUBLE SYMPTOM:
Does not shift gears in SPORT shift mode.
WIRING DIAGRAM:



	Step	Check	Yes	No
1	**CHECK SPORT SHIFT SWITCH.** 1) Connect the Subaru Select Monitor to vehicle and turn the ignition switch ON and Subaru Select Monitor ON. 2) Subaru Select Monitor is set with LED display screen. 3) Move the select lever to sport shift mode. 4) Move and hold the select lever to up side.	Does the up switch LED of Subaru Select Monitor light up?	Go to step **2.**	Go to step **3.**
2	**CHECK SPORT SHIFT SWITCH.** Move and hold the select lever to down side.	Does the down switch LED of Subaru Select Monitor light up?	Go to "Inspection of SPORT shift indicator" procedures. <Ref. to 4AT(D)-120, CHECK SPORT SHIFT INDICATOR, Diagnostic Procedure without Diagnostic Trouble Code (DTC).>	Go to step **12.**
3	**CHECK SPORT SHIFT SWITCH GROUND LINE.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from SPORT shift switch. 3) Measure the resistance of harness between SPORT shift switch connector and chassis ground. ***Connector & terminal*** ***(B237) No. 6 — Chassis ground:***	Is the resistance less than 1 Ω?	Go to step **4.**	Repair the open circuit in harness between SPORT shift switch and chassis ground.
4	**CHECK SPORT SHIFT SWITCH.** Measure the resistance between SPORT shift switch terminals. ***Connector & terminal*** ***(B237) No. 6 — No. 2:***	Is the resistance more than 1 MΩ?	Go to step **5.**	Replace the guide plate assembly.
5	**CHECK SPORT SHIFT SWITCH.** 1) Move the select lever to SPORT shift mode. 2) Measure the resistance between SPORT shift switch terminals. ***Connector & terminal*** ***(B237) No. 6 — No. 2:***	Is the resistance less than 1 Ω?	Go to step **6.**	Replace the guide plate assembly.
6	**CHECK HARNESS CONNECTOR BETWEEN TCM AND SPORT SHIFT SWITCH.** 1) Disconnect the connector from TCM. 2) Measure the resistance of harness between TCM connector and SPORT shift switch connector. ***Connector & terminal*** ***(B237) No. 2 — (B54) No. 9:***	Is the resistance less than 1 Ω?	Go to step **7.**	Repair the open circuit in harness between SPORT shift switch connector and TCM connector and poor contact in coupling connector.
7	**CHECK HARNESS CONNECTOR BETWEEN TCM AND SPORT SHIFT SWITCH.** 1) Disconnect the connector from steering roll connector. 2) Measure the resistance of harness between SPORT shift switch connector and chassis ground. ***Connector & terminal*** ***(B237) No. 2 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **8.**	Repair the short circuit in harness between SPORT shift switch connector and TCM connector.

	Step	Check	Yes	No
8	**CHECK INPUT SIGNAL FOR TCM.** 1) Connect all connectors. 2) Turn the ignition switch to ON. (Engine is stopped.) 3) Measure the signal voltage for TCM. ***Connector & terminal*** ***(B54) No. 9 (+) — Chassis ground (–):***	Is the voltage mode than 9 V?	Go to step **9.**	Replace the TCM. <Ref. to 4AT-77, Transmission Control Module (TCM).>
9	**CHECK INPUT SIGNAL FOR TCM.** 1) Move select lever to shift up side. 2) Measure the signal voltage for TCM. ***Connector & terminal*** ***(B54) No. 9 (+) — Chassis ground (–):***	Is the voltage less than 1 V?	Go to step **10.**	Replace the TCM. <Ref. to 4AT-77, Transmission Control Module (TCM).>
10	**CHECK SPORT SHIFT SWITCH GROUND LINE.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from SPORT shift switch. 3) Measure the resistance of harness between SPORT shift switch connector and chassis ground. ***Connector & terminal*** ***(B237) No. 3 — Chassis ground:***	Is the resistance less than 1 Ω?	Go to step **11.**	Repair the open circuit in harness between SPORT shift switch and chassis ground.
11	**CHECK SPORT SHIFT SWITCH.** Measure the resistance between SPORT shift switch terminals. ***Connector & terminal*** ***(B237) No. 3 — No. 1:***	Is the resistance more than 1 MΩ?	Go to step **12.**	Replace the guide plate assembly.
12	**CHECK SPORT SHIFT SWITCH.** 1) Move the select lever to SPORT shift mode. 2) Measure the resistance between SPORT shift switch terminals. ***Connector & terminal*** ***(B237) No. 3 — No. 1:***	Is the resistance less than 1 Ω?	Go to step **13.**	Replace the guide plate assembly.
13	**CHECK HARNESS CONNECTOR BETWEEN TCM AND SPORT SHIFT SWITCH.** 1) Disconnect the connector from TCM. 2) Measure the resistance of harness between TCM connector and SPORT shift switch connector. ***Connector & terminal*** ***(B237) No. 1 — (B54) No. 15:***	Is the resistance less than 1 Ω?	Go to step **14.**	Repair the open circuit in harness between SPORT shift switch connector and TCM connector and poor contact in coupling connector.
14	**CHECK HARNESS CONNECTOR BETWEEN TCM AND SPORT SHIFT SWITCH.** 1) Disconnect the steering roll connector. 2) Measure the resistance of harness between SPORT shift switch connector and chassis ground. ***Connector & terminal*** ***(B237) No. 1 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **15.**	Repair the short circuit in harness between SPORT shift switch connector and TCM connector.
15	**CHECK INPUT SIGNAL FOR TCM.** 1) Connect all connectors. 2) Turn the ignition switch to ON. (Engine is stopped.) 3) Measure the signal voltage for TCM. ***Connector & terminal*** ***(B54) No. 15 (+) — Chassis ground (–):***	Is the voltage more than 9 V?	Go to step **16.**	Replace the TCM. <Ref. to 4AT-77, Transmission Control Module (TCM).>

Step		Check	Yes	No
16	**CHECK INPUT SIGNAL FOR TCM.** 1) Move the select lever to shift down side. 2) Measure the signal voltage for TCM. ***Connector & terminal*** ***(B54) No. 15 (+) — Chassis ground (–):***	Is the voltage less than 1 V?	Go to step **17.**	Replace the TCM. <Ref. to 4AT-77, Transmission Control Module (TCM).>
17	**CHECK POOR CONTACT.**	Is there poor contact in SPORT shift switch circuit?	Repair the poor contact.	Intermittent poor contact in SPORT shift switch circuit connector or harness

B: CHECK SPORT SHIFT INDICATOR

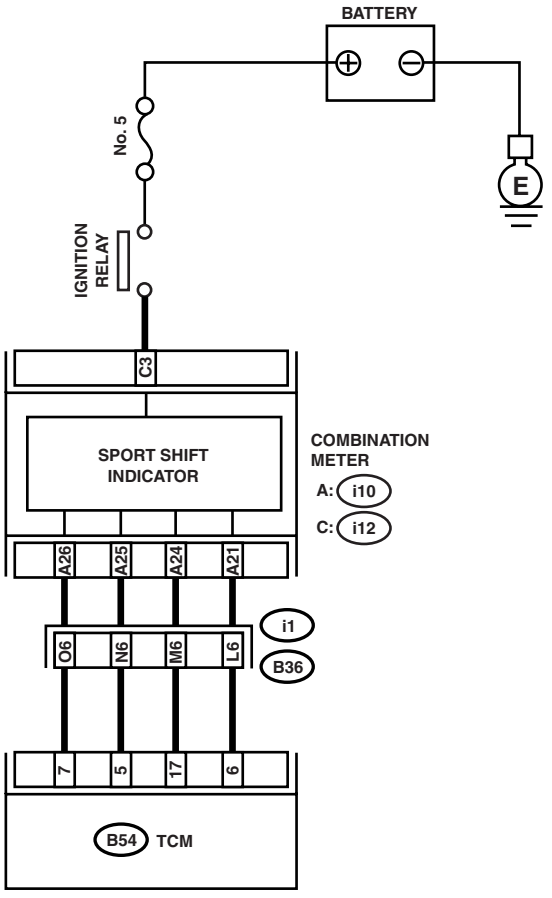
DIAGNOSIS:

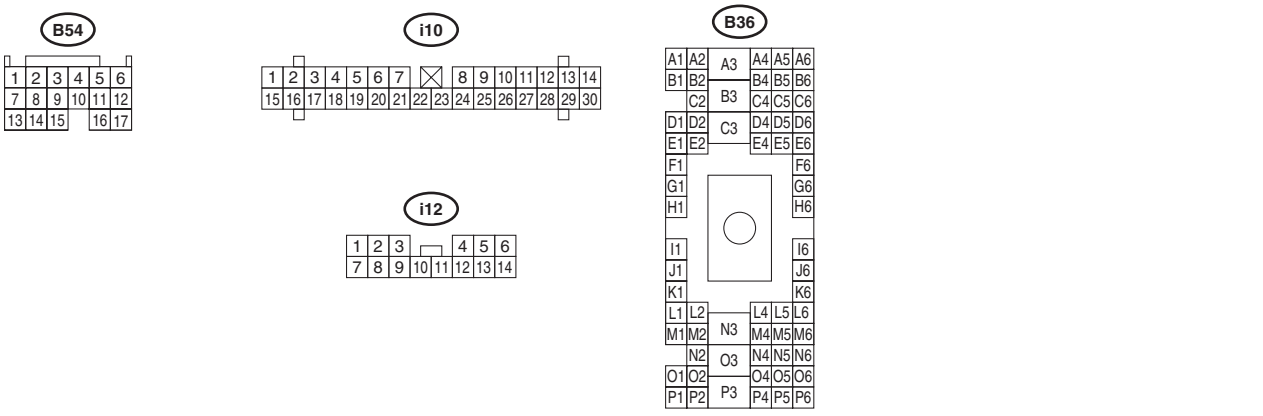
The SPORT shift indicator output signal circuit is open or shorted.

TROUBLE SYMPTOM:

- SPORT shift indicator does not illuminate or remains illuminated.
- SPORT shift indicator display does not change.

WIRING DIAGRAM:





AT-01612

	Step	Check	Yes	No
1	**CHECK SPORT SHIFT INDICATOR.**	Does SPORT shift indicator operate normally when driving in SPORT shift mode?	Go to "CHECK BUZZER". <Ref. to 4AT(D)-122, CHECK BUZZER, Diagnostic Procedure without Diagnostic Trouble Code (DTC).>	Go to step **2.**
2	**CHECK COMBINATION METER.**	Do meters and indicators other than SPORT shift indicator operate normally?	Go to step **3.**	Check the combination meter.
3	**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 combination meter. ***Connector & terminal*** ***(B54) No. 6 — (i10) No. 21:*** ***(B54) No. 17 — (i10) No. 24:*** ***(B54) No. 5 — (i10) No. 25:*** ***(B54) No. 7 — (i10) No. 26:***	Is the resistance less than 1 Ω?	Go to step **4.**	Repair the open circuit in harness between TCM and combination meter connector and poor contact in coupling connector.
4	**CHECK HARNESS CONNECTOR BETWEEN TCM AND COMBINATION METER.** Measure the resistance between TCM and chassis ground. ***Connector & terminal*** ***(B54) No. 6 — Chassis ground:*** ***(B54) No. 17 — Chassis ground:*** ***(B54) No. 5 — Chassis ground:*** ***(B54) No. 7 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **5.**	Repair the short circuit in harness between TCM and combination meter connector.
5	**CHECK OUTPUT SIGNAL EMITTED FROM TCM.** 1) Connect the connector to TCM and combination meter. 2) Turn the ignition switch to ON. (Engine is stopped.) 3) Measure the voltage between TCM and chassis ground. ***Connector & terminal*** ***(B54) No. 6 (+) — Chassis ground (–):*** ***(B54) No. 17 (+) — Chassis ground (–):*** ***(B54) No. 7 (+) — Chassis ground (–):*** ***(B54) No. 5 (+) — Chassis ground (–):***	Is the voltage more than 4 V?	Go to step **6.**	Replace the combination meter.
6	**CHECK POOR CONTACT.**	Is there poor contact in SPORT shift indicator circuit?	Repair the poor contact.	Replace the TCM.

C: CHECK BUZZER

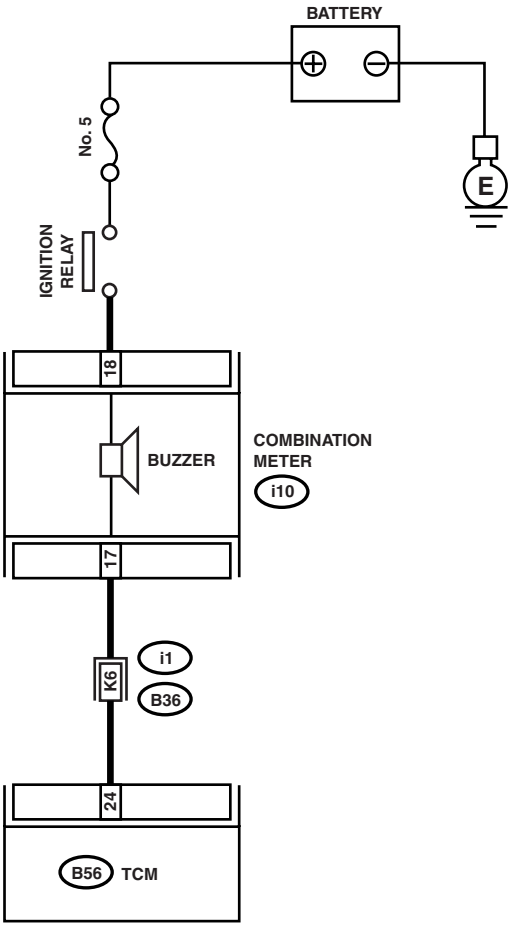
DIAGNOSIS:

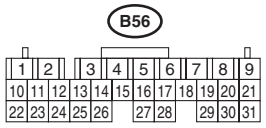
Buzzer output signal circuit is open or shorted.

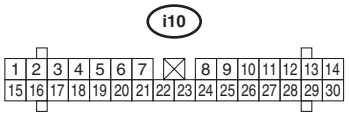
TROUBLE SYMPTOM:

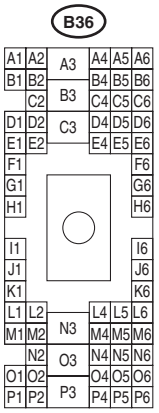
Buzzer remains sounded.

WIRING DIAGRAM:









AT-01613

	Step	Check	Yes	No
1	**CHECK HARNESS BETWEEN TCM AND COMBINATION METER.** 1) Turn ignition switch to OFF. 2) Disconnect connector from combination meter and TCM. 3) Measure the resistance between TCM connector and chassis ground. ***Connector & terminal*** ***(B56) No. 24 — (i10) No. 17:***	Is the resistance less than 1 Ω?	Go to step **2.**	Repair the open or short circuit between TCM and combination meter.
2	**CHECK HARNESS BETWEEN TCM AND COMBINATION METER.** 1) Turn ignition switch to OFF. 2) Disconnect connector from combination meter and TCM. 3) Measure the resistance between TCM connector and chassis ground. ***Connector & terminal*** ***(B56) No. 24 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **3.**	Repair the short circuit in harness between TCM and combination meter connector.
3	**CHECK COMBINATION METER.** 1) Connect connector to combination meter. 2) Turn ignition switch to ON. (Engine is stopped.)	Does buzzer sound?	Replace the combination meter.	Go to step **4.**
4	**CHECK POOR CONTACT.**	Is there poor contact in buzzer circuit?	Repair the poor contact.	Replace the TCM.

16.Symptom and Related Malfunction

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 “1” range to another.	• Control valve • Lock-up damper • Engine performance • Input shaft
Vehicle moves when select lever is in “N” range.	• Select cable • Inhibitor switch • TCM • Low clutch
Shock occurs when select lever is moved from “N” to “D” range.	• Accelerator pedal position sensor • ATF temperature sensor • Line pressure linear solenoid • Low clutch duty solenoid • Low clutch • 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 linear solenoid • Seal ring • Front gasket of transmission case
Shock occurs when select lever is moved from “N” to “R” range.	• Accelerator pedal position sensor • ATF temperature sensor • Line pressure linear solenoid • TCM • Harness • Control valve • ATF deterioration

Symptom	Problem parts
Excessive time lag occurs when select lever is moved from “N” to “R” range.	• Control valve • Low & reverse clutch • Reverse clutch • Line pressure linear solenoid • Seal ring • Front gasket of transmission case
Vehicle does not start in any shift range (engine stalls).	• Parking brake mechanism • Planetary gear
Vehicle does not start in any shift range (engine revving up).	• Strainer • Line pressure linear 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 of transmission case
Vehicle does not start in “R” range only (engine revving up).	• Select cable • Select lever • Line pressure linear solenoid • 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 • ATF deterioration • Front gasket of 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

Symptom	Problem parts
No shift occurs from 1st to 2nd gear.	• TCM • Rear vehicle speed sensor • Front vehicle speed sensor • Throttle position sensor • Control valve • 2-4 brake
No shift occurs from 2nd to 3rd gear.	• TCM • Control valve • High clutch
No shift occurs from 3rd to 4th gear.	• TCM • ATF temperature sensor • Control valve • 2-4 brake
Engine brake is not effected when select lever is in “3” range.	• Inhibitor switch • TCM • Accelerator pedal 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 • Accelerator pedal 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 • Torque converter turbine speed sensor • Accelerator pedal position sensor • 2-4 brake duty solenoid • ATF temperature sensor • Line pressure linear solenoid • Control valve • 2-4 brake • ATF deterioration • Engine performance • Low & reverse duty solenoid

Symptom	Problem parts
Slippage occurs from 1st to 2nd gear.	• TCM • Accelerator pedal position sensor • 2-4 brake duty solenoid • ATF temperature sensor • Line pressure linear solenoid • Control valve • 2-4 brake
Shock occurs from 2nd to 3rd gear.	• TCM • Torque converter turbine speed sensor • Accelerator pedal position sensor • 2-4 brake duty solenoid • ATF temperature sensor • Line pressure linear solenoid • Low & reverse duty solenoid • Control valve • High clutch • 2-4 brake • ATF deterioration • Engine performance • High clutch duty solenoid
Slippage occurs from 2nd to 3rd gear.	• TCM • Accelerator pedal position sensor • 2-4 brake duty solenoid • ATF temperature sensor • Line pressure linear solenoid • Control valve • High clutch • 2-4 brake • Low & reverse duty solenoid
Shock occurs from 3rd to 4th gear.	• TCM • Torque converter turbine speed sensor • Accelerator pedal position sensor • 2-4 brake duty solenoid • ATF temperature sensor • Line pressure linear solenoid • Control valve • Low clutch duty solenoid • 2-4 brake • ATF deterioration • Engine performance
Slippage occurs from 3rd to 4th gear.	• TCM • Accelerator pedal position sensor • 2-4 brake duty solenoid • ATF temperature sensor • Line pressure linear solenoid • Control valve • 2-4 brake
Shock occurs when select lever is moved from “3” to “2” range.	• TCM • Torque converter turbine speed sensor • Accelerator pedal position sensor • ATF temperature sensor • Line pressure linear solenoid • Control valve • 2-4 brake duty solenoid • 2-4 brake • ATF deterioration • High clutch duty solenoid

Symptom	Problem parts
Shock occurs when select lever is moved from “D” to “1” range.	• TCM • Torque converter turbine speed sensor • Accelerator pedal position sensor • ATF temperature sensor • Line pressure linear solenoid • Control valve • ATF deterioration • Low & reverse brake duty solenoid • Low & reverse clutch solenoid
Shock occurs when select lever is moved from “2” to “1” range.	• TCM • Torque converter turbine speed sensor • Accelerator pedal position sensor • ATF temperature sensor • Line pressure linear solenoid • Control valve • Low & reverse clutch • ATF deterioration • 2-4 brake duty solenoid • Low & reverse brake duty solenoid
Shock occurs when accelerator pedal is released at medium speeds.	• TCM • Accelerator pedal position sensor • ATF temperature sensor • Line pressure linear solenoid • Control valve • Lock-up damper • Engine performance
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 • Accelerator pedal 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 • Accelerator pedal position sensor • ATF temperature sensor • Control valve • Transfer clutch • Transfer valve • Transfer pipe • Transfer duty solenoid
Vehicle is not set in FWD mode.	• TCM • 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

Symptom	Problem parts
Select lever slips out of operation during acceleration or while driving on rough terrain.	• Select cable • Select lever • Detente spring • Manual plate
System does not shift to SPORT shift mode.	• SPORT shift switch

MEMO:

1. General Description

A: SPECIFICATIONS

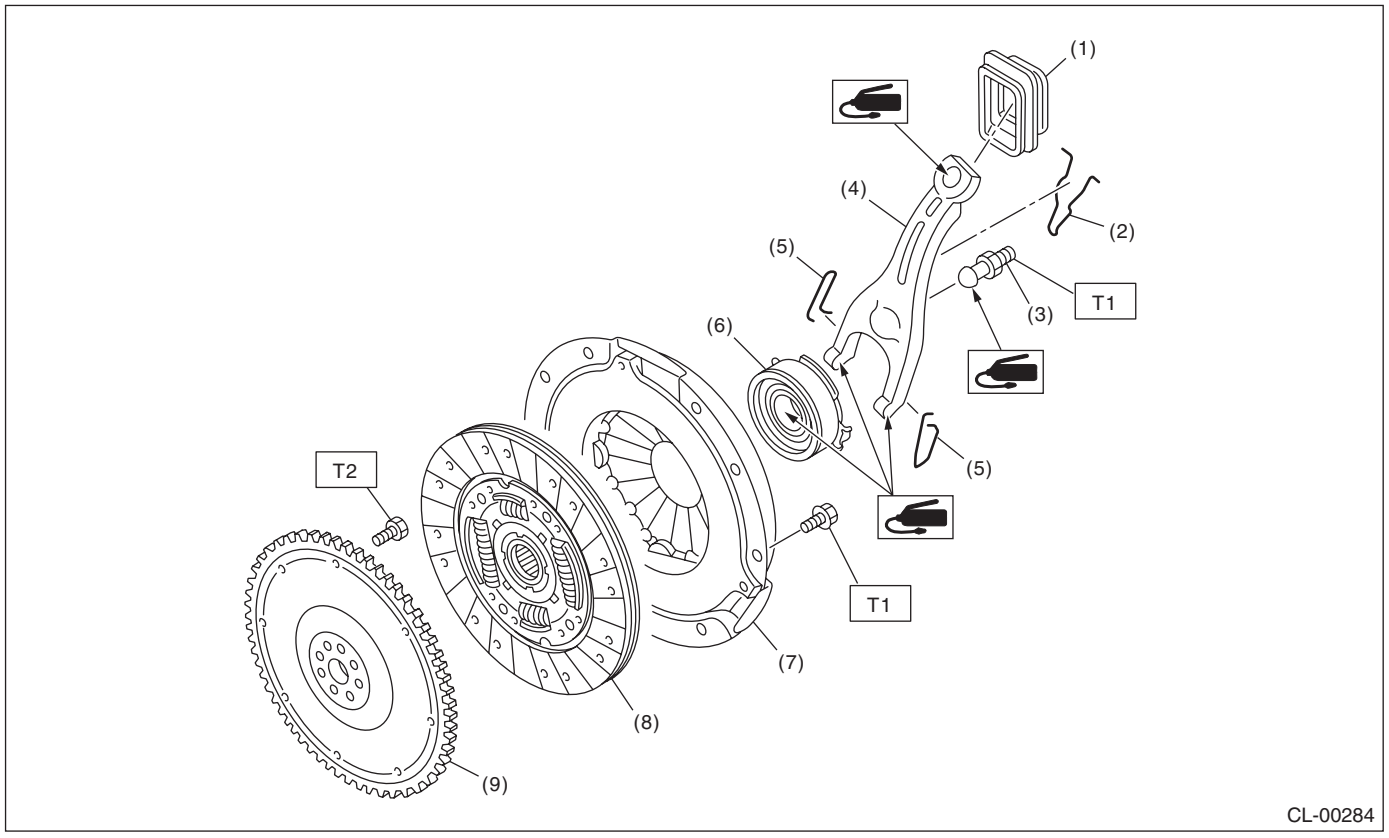
Item			Non-TURBO model	TURBO model
Clutch cover	Type		Push type	Pull type
	Diaphragm set load kg (lb)		580 (1,276)	800 (1,764)
Clutch disc	Facing material		Woven (Non asbestos)	Woven (Non asbestos)
	O.D. × I.D. × thickness mm (in)	Flywheel side	225 × 150 × 3.5 (8.86 × 5.91 × 0.138)	230 × 155 × 3.5 (9.06 × 6.10 × 0.1)
		Pressure plate side		230 × 155 × 3.2 (9.06 × 6.10 × 0.126)
	Spline O.D. mm (in)		25.2 (0.992), (No. of teeth: 24)	25.2 (0.992), (No. of teeth: 24)
Clutch release lever ratio			1.6	1.7
Release bearing			Grease-packed self-aligning	Grease-packed self-aligning
Clutch pedal	Full stroke mm (in)		130 — 135 (5.12 — 5.31)	130 — 135 (5.12 — 5.31)
	Free play mm (in)		4 — 13 (0.16 — 0.51)	4 — 13 (0.16 — 0.51)
Clutch disc	Depth of rivet head mm (in)	Standard	1.65 — 2.25 (0.065 — 0.089)	Flywheel side: 1.35 — 1.95 (0.0531 — 0.0768) Clutch cover side: 1.65 — 2.25 (0.0650 — 0.0886)
		Limit of sinking	0.3 (0.012)	0.3 (0.012)
	Limit for deflection mm (in)		0.8 (0.031) at R = 107 (4.21)	0.8 (0.031) at R = 110 (4.33)

I.D.: Inner diameter
O.D.: Outer diameter

B: COMPONENT

1. CLUTCH ASSEMBLY

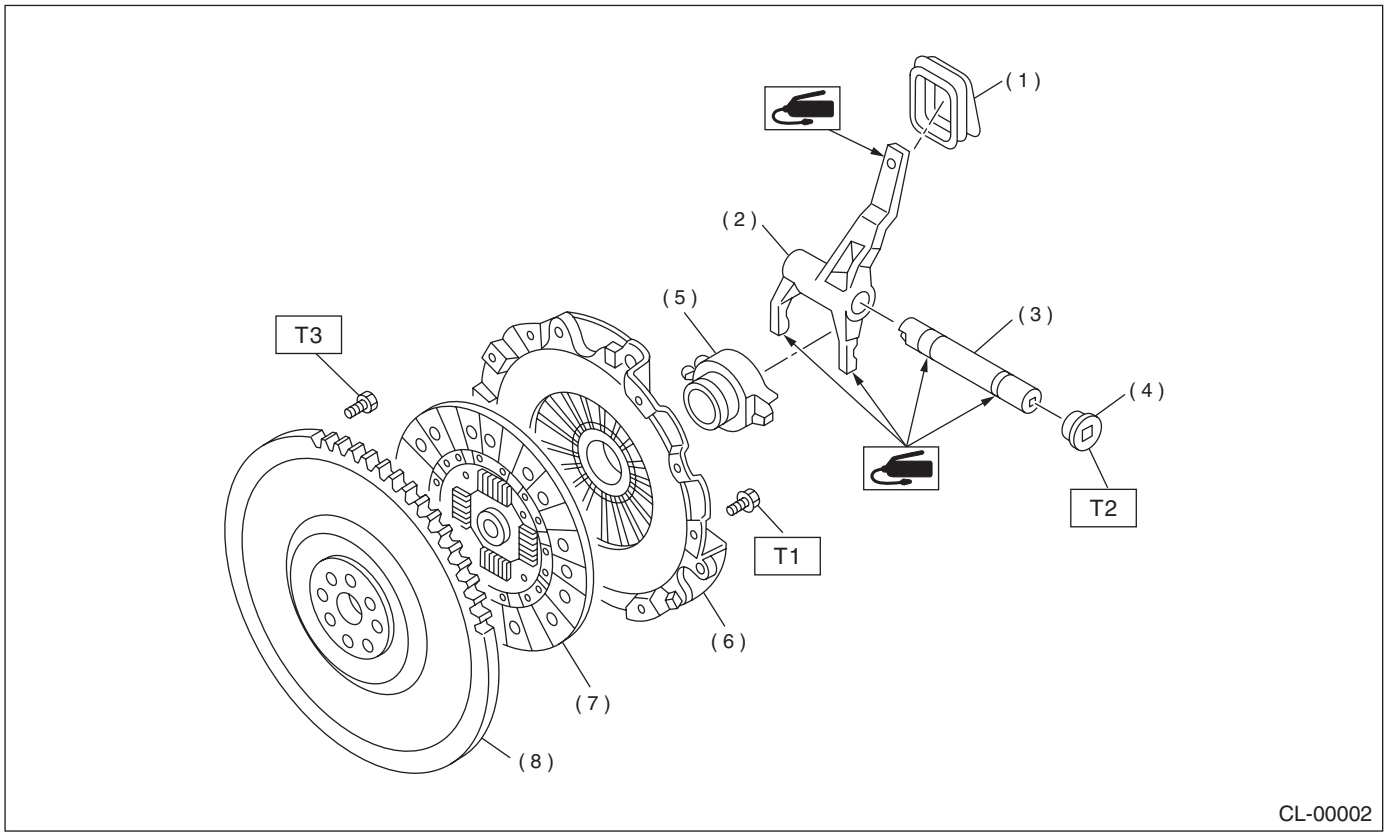
• Non-TURBO model



(1) Dust cover
(2) Retainer spring
(3) Pivot
(4) Clutch release lever
(5) Clip
(6) Clutch release bearing
(7) Clutch cover
(8) Clutch disc
(9) Flywheel

Tightening torque: N·m (kgf-m, ft-lb)
T1: 16 (1.6, 11.8)
T2: 72 (7.3, 52.8)

• TURBO model

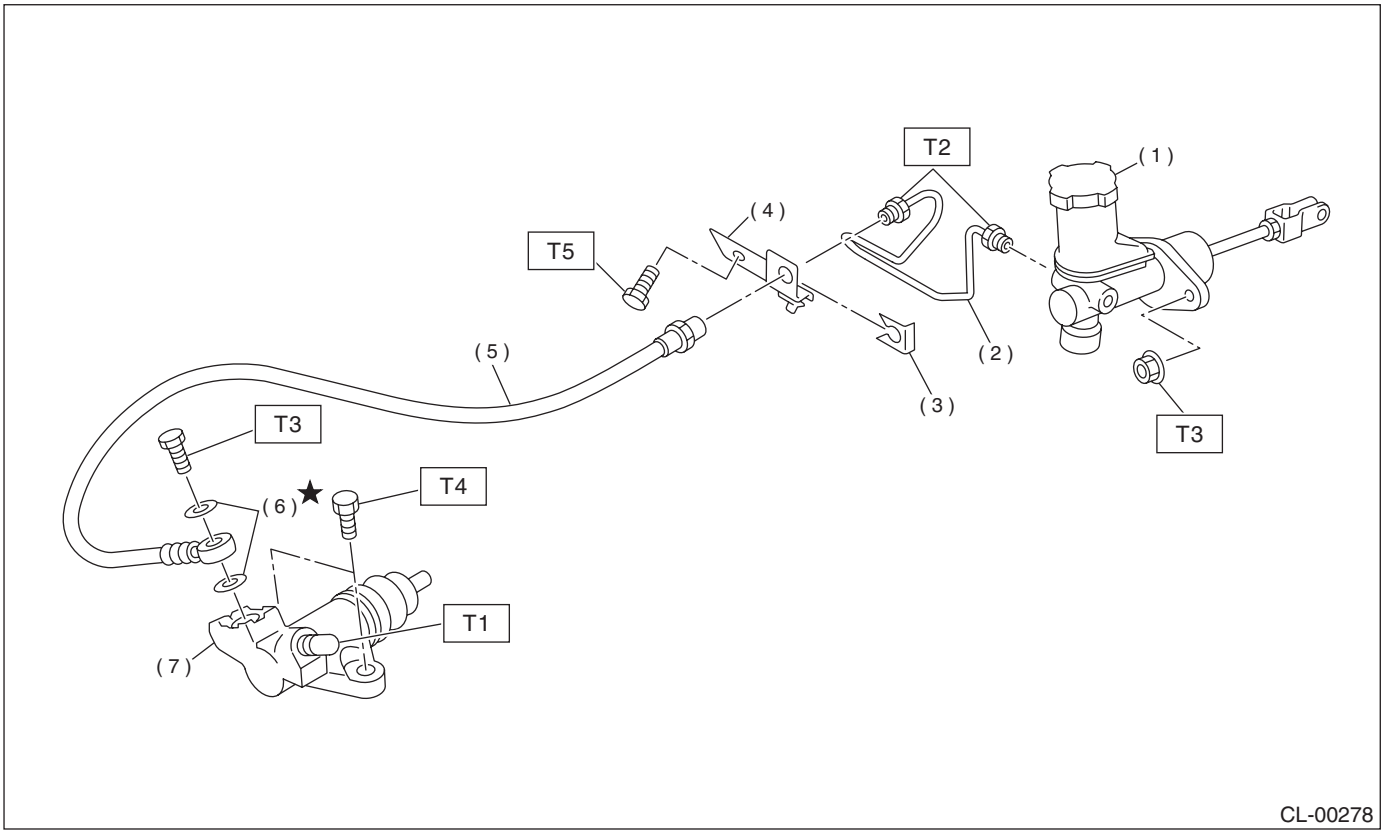


(1) Dust cover
(2) Clutch release lever
(3) Clutch release shaft
(4) Plug
(5) Clutch release bearing
(6) Clutch cover
(7) Clutch disc
(8) Flywheel

Tightening torque: N·m (kgf-m, ft-lb)
T1: 16 (1.6, 11.8)
T2: 44 (4.5, 32.5)
T3: 72 (7.3, 52.8)

2. CLUTCH PIPE AND HOSE

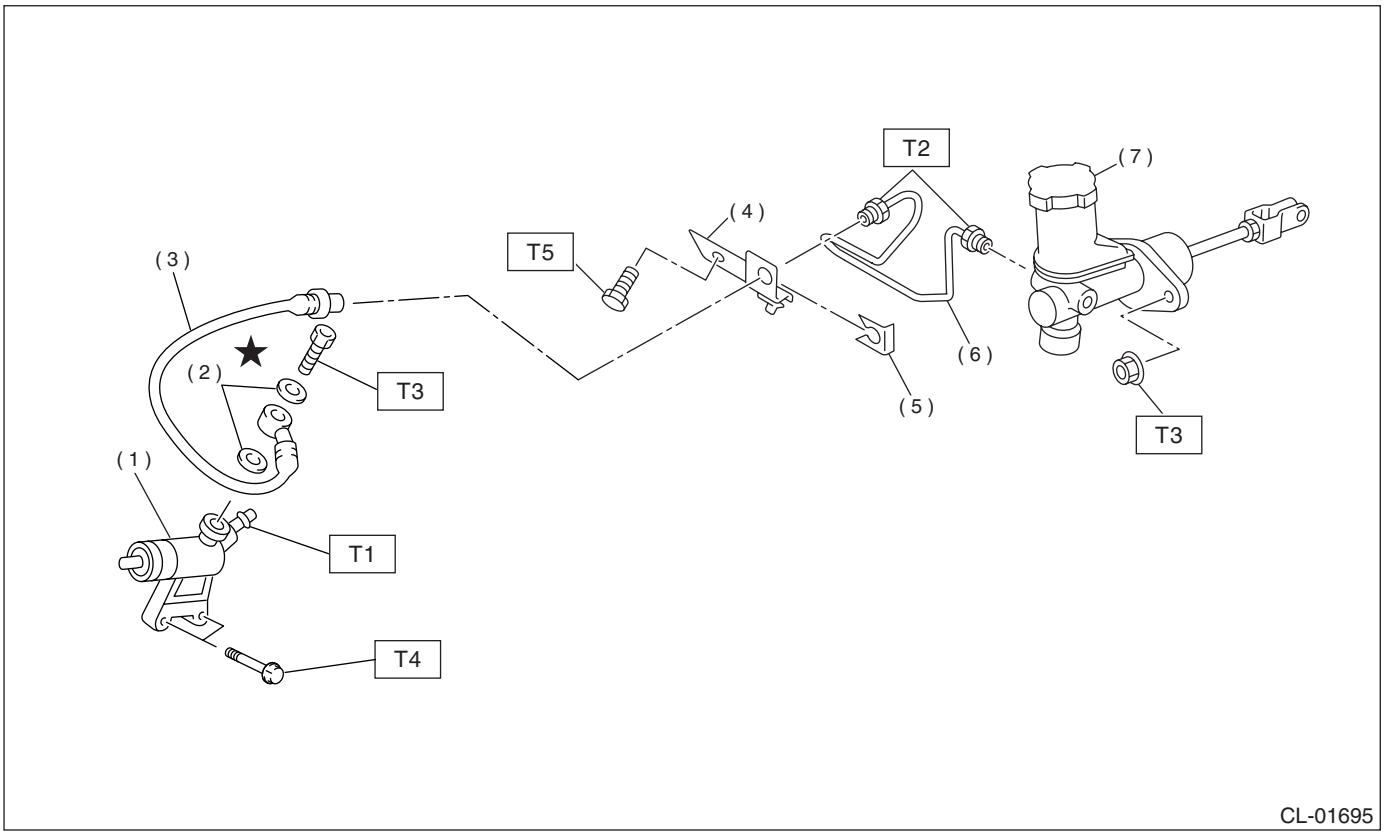
• Non-TURBO model



(1) Master cylinder ASSY
(2) Clutch pipe
(3) Clip
(4) Bracket
(5) Clutch hose
(6) Washer
(7) Operating cylinder

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)
T5: 25 (2.5, 18.1)

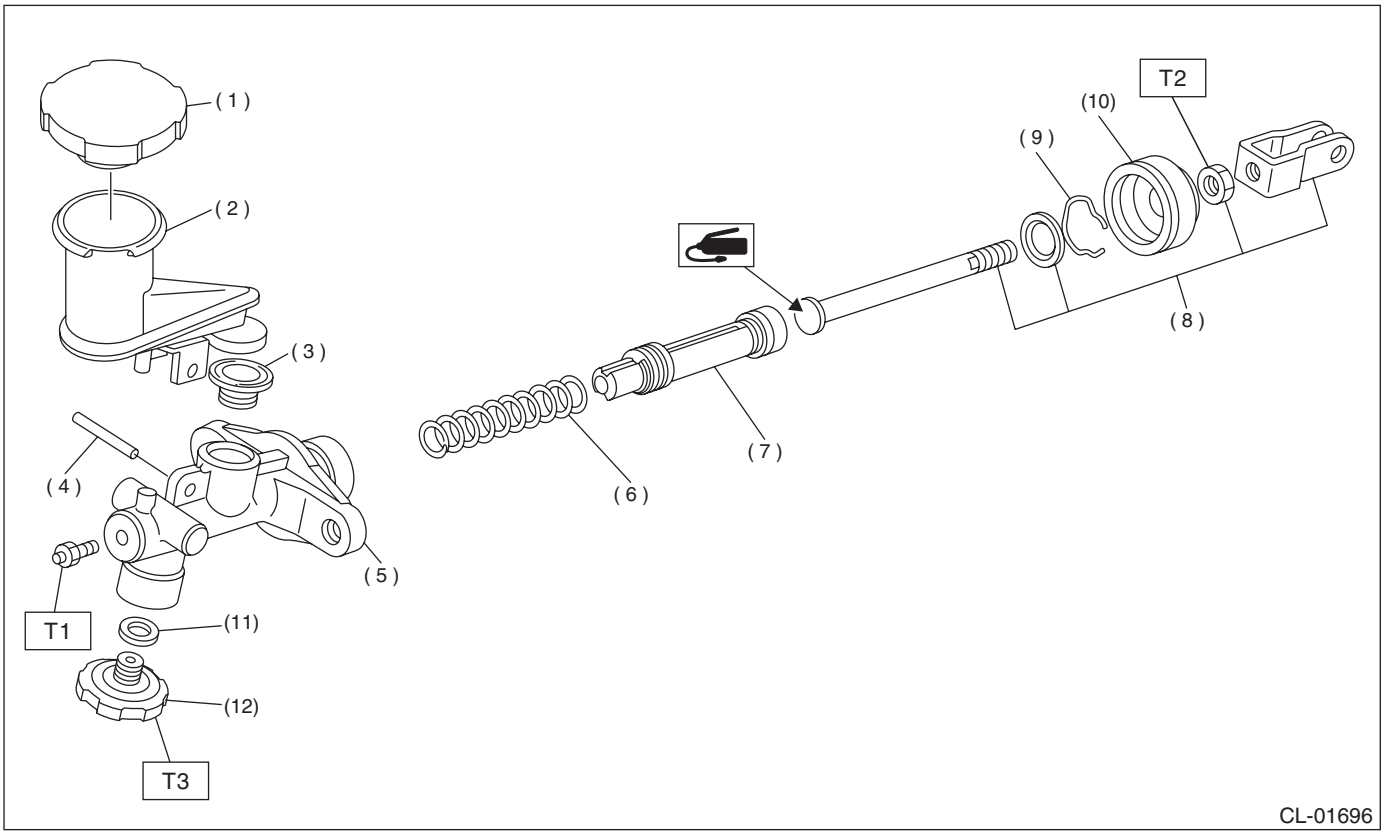
• TURBO model



(1) Operating cylinder
(2) Washer
(3) Clutch hose
(4) Bracket
(5) Clip
(6) Pipe
(7) Master cylinder ASSY

Tightening torque: N·m (kgf-m, ft-lb)
T1: 7.8 (0.8, 5.8)
T2: 15 (1.5, 10.8)
T3: 18 (1.8, 13.0)
T4: 37 (3.8, 27.5)
T5: 25 (2.5, 18.1)

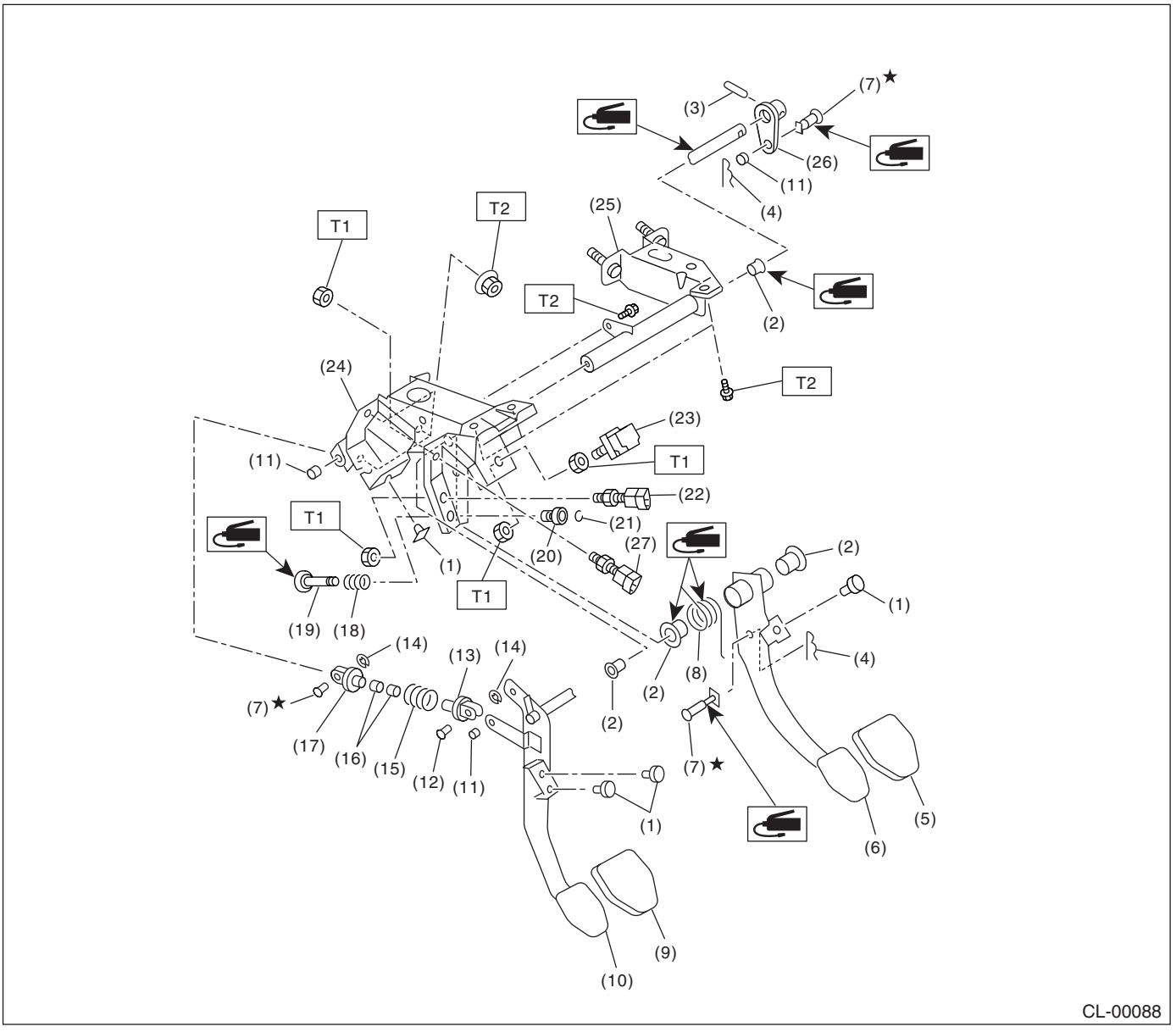
3. MASTER CYLINDER



(1) Reservoir cap
(2) Reservoir tank
(3) Oil seal
(4) Straight pin
(5) Master cylinder
(6) Return spring
(7) Piston
(8) Push rod
(9) Piston stop ring
(10) Cylinder boot
(11) Gasket (Turbo model)
(12) Clutch damper (Turbo model)

Tightening torque: N·m (kgf-m, ft-lb)
T1: 8 (0.8, 5.8)
T2: 10 (1.0, 7)
T3: 46.6 (4.8, 34)

4. CLUTCH PEDAL



CL-00088

(1) Stopper
(2) Bushing
(3) Spring pin
(4) Snap pin
(5) Brake pedal pad
(6) Brake pedal
(7) Clevisp pin
(8) Brake pedal spring
(9) Clutch pedal pad
(10) Clutch pedal
(11) Bushing C
(12) Clutch clevis pin
(13) Assist rod A
(14) Clip
(15) Assist spring
(16) Assist bushing
(17) Assist rod B
(18) Spring S
(19) Rod S
(20) Bushing S
(21) Clip
(22) Clutch switch (Cruise control)
(23) Stop light switch
(24) Pedal bracket
(25) Clutch master cylinder bracket
(26) Lever
(27) Clutch switch (Starter interlock)

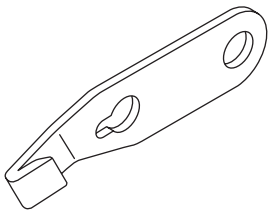
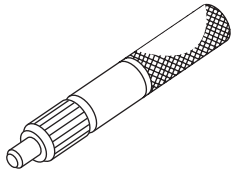
Tightening torque: N·m (kgf-m, ft-lb)
T1: 8 (0.8, 5.8)
T2: 18 (1.8, 13.0)

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.

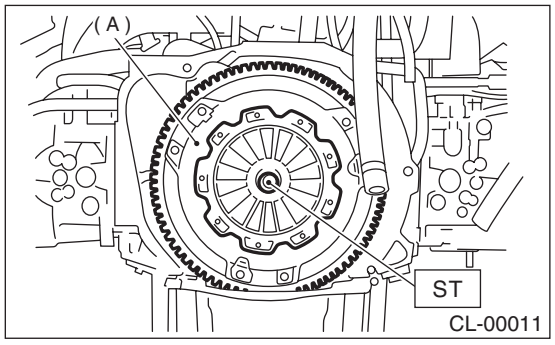
2. GENERAL PURPOSE TOOLS

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. <Ref. to 5MT-27, REMOVAL, Manual Transmission Assembly.>
2) Install the ST on flywheel.
ST 499747100 CRANKSHAFT STOPPER



(A) Clutch cover

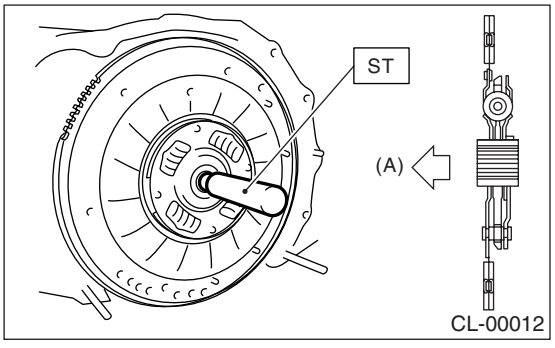
3) Remove the clutch cover and clutch disc.

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

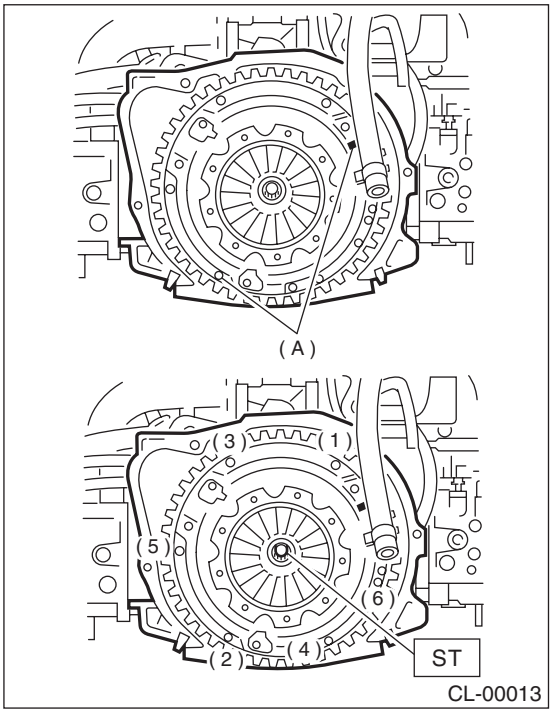


(A) Flywheel side

2) Position "0" marks on clutch cover and flywheel 120° apart, and then tighten the clutch cover installation bolts diagonallly.

NOTE:
• "0" marks indicate the directions of residual unbalance.
• 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. <Ref. to 5MT-30, INSTALLATION, Manual Transmission Assembly.>

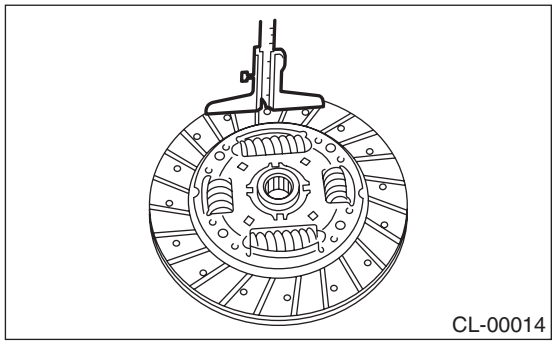
C: INSPECTION

1. CLUTCH DISC

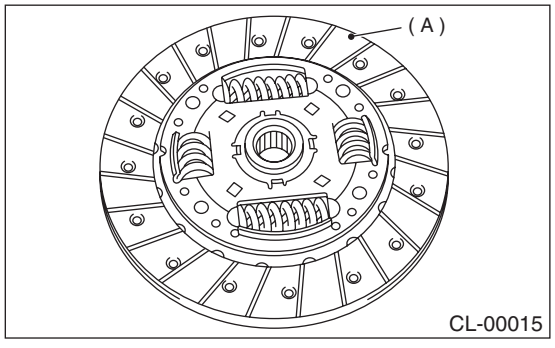
1) Facing wear
Measure the depth of rivet head from the surface of facing. Replace if facings are worn locally or worn down to less than the specified value.

Depth of rivet head:
Limit of sinking
0.3 mm (0.012 in)

NOTE:
Do not wash the clutch disc with any cleaning fluid.

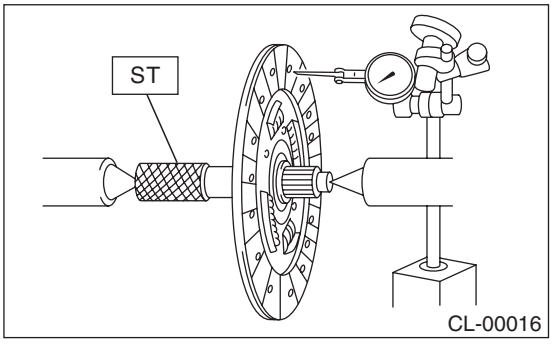


2) Hardened facing
Correct by using emery paper or replace.
3) Oil soakage on facing
Replace the clutch disc (A) and inspect the transmission front oil seal, transmission case mating surface, engine rear oil seal and other points for oil leakage.

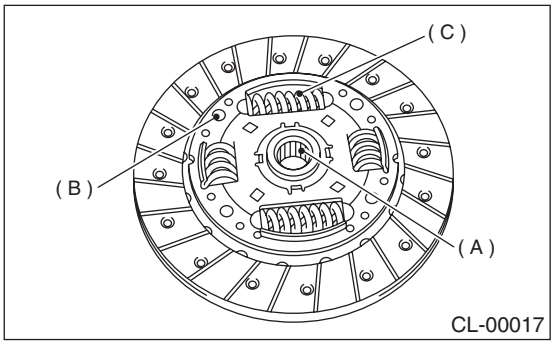


4) Deflection on facing
If deflection exceeds the specified value at the outer circumference of facing, replace.
ST 499747100 CLUTCH DISC GUIDE

Limit for deflection:
Non-TURBO model;
0.8 mm (0.031 in) at R = 107 mm (4.21 in)
TURBO model;
0.8 mm (0.031 in) at R = 110 mm (4.33 in)



5) Worn spline, loose rivets and torsion spring failure
If defective,replace clutch disc.

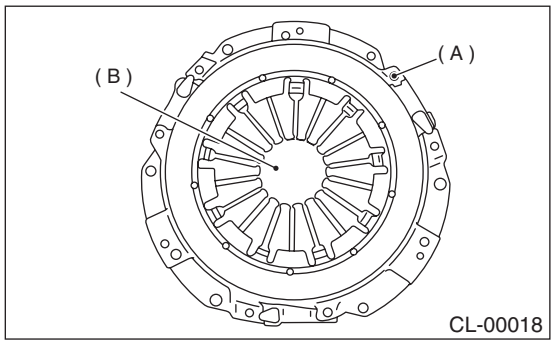


(A) Spline
(B) Rivet
(C) Torsion spring

2. CLUTCH COVER

NOTE:
Visually check for the following items without disassembling, and replace if defective.

1) Loose thrust rivet.
2) Damaged or worn bearing contact area at center of diaphragm spring.

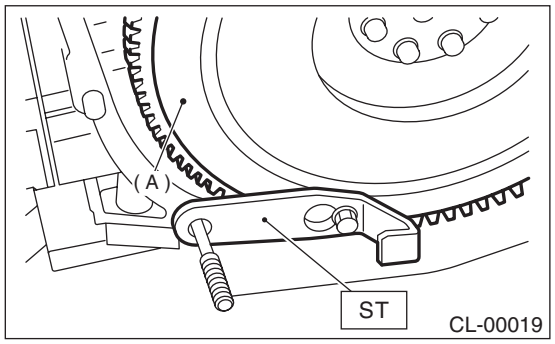


(A) Thrust rivet
(B) Diaphragm spring

3. Flywheel

A: REMOVAL

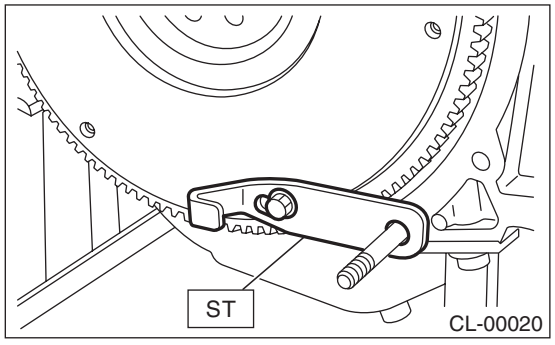
1) Remove the transmission assembly. <Ref. to 5MT-27, REMOVAL, Manual Transmission Assembly.>
2) Remove the clutch cover and clutch disc. <Ref. to CL-11, REMOVAL, Clutch Disc and Cover.>
3) Using the ST, remove the flywheel.
ST 498497100 CRANKSHAFT STOPPER



(A) Flywheel

B: INSTALLATION

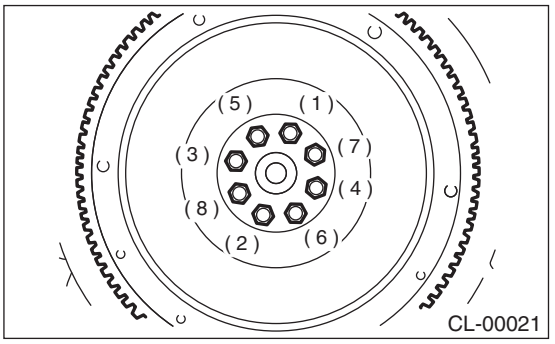
1) Install the flywheel and ST.
ST 498497100 CRANKSHAFT STOPPER



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:
72 N·m (7.3 kgf-m, 52.8 ft-lb)

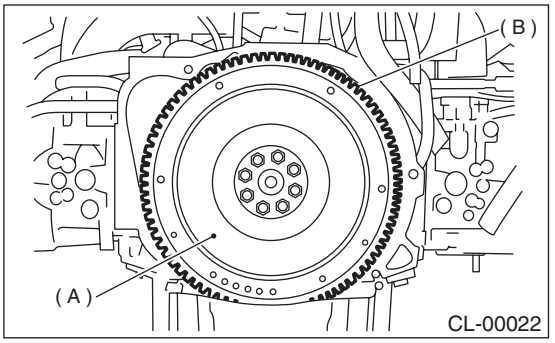


3) Install the clutch disc and cover. <Ref. to CL-11, INSTALLATION, Clutch Disc and Cover.>
4) Install the transmission assembly. <Ref. to 5MT-30, INSTALLATION, Manual Transmission Assembly.>

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, sliding surface 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

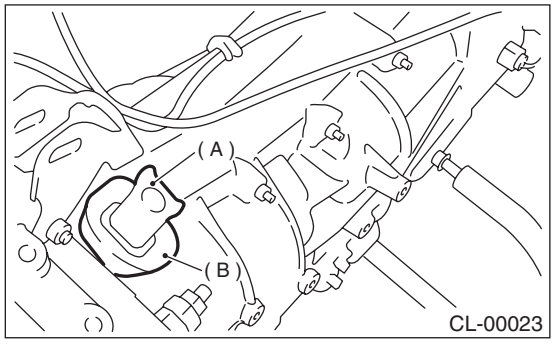
A: REMOVAL

1. NON-TURBO MODEL

1) Remove the transmission assembly from vehicle body. <Ref. to 5MT-27, REMOVAL, Manual Transmission Assembly.>
2) Remove the two clips from clutch release lever and remove the release bearing.

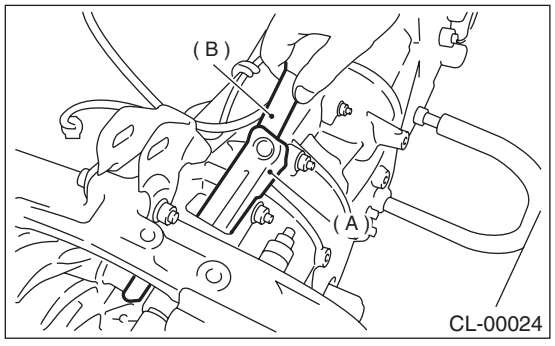
CAUTION:
Be careful not to deform clips.

3) Remove the dust cover.



(A) Clutch release lever
(B) Dust cover

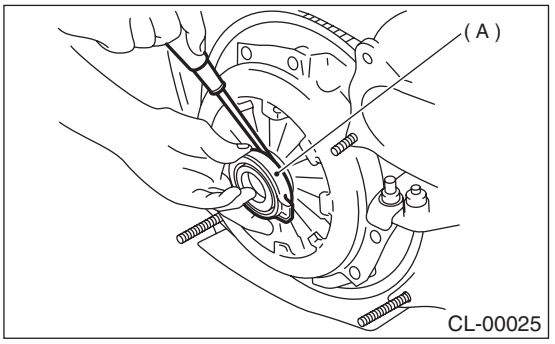
4) Remove the retainer spring from pivot with a screwdriver by accessing it through release lever hole. Then remove the release lever.



(A) Clutch release lever
(B) Screwdriver

2. TURBO MODEL

1) Remove the transmission assembly from vehicle body.
<Ref. to 5MT-27, 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.



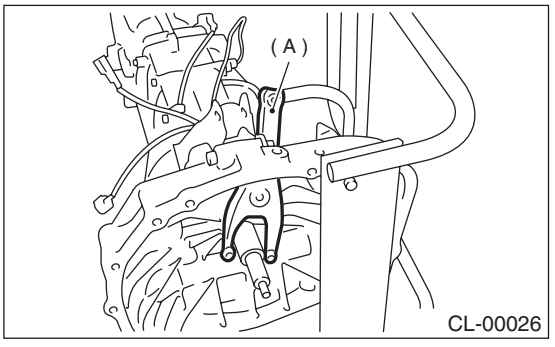
(A) Clutch release bearing

B: INSTALLATION

1. NON-TURBO MODEL

1) Before assembly, lubricate the following points with a coat of grease.
- Contact surface of lever and pivot
- Contact surface of lever and bearing
- Transmission main shaft spline (Use grease containing molybdenum disulphide.)
- Contact surface of lever and operating cylinder

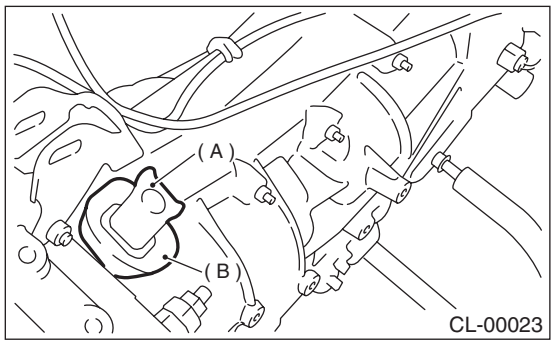
2) While pushing the fork to pivot and twisting it to both sides, fit the retainer spring onto the constricted portion of pivot.
Apply grease (SUNLIGHT 2: P/N 003602010) to the contact point of release lever and operating cylinder.
3) Confirm that the retainer spring is securely fitted by observing it through the release lever hole.



(A) Release lever

4) Install the release bearing and fasten it with two clips.

5) Install the release lever dust cover.

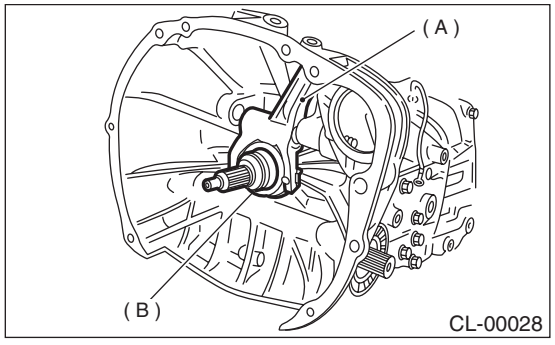


(A) Release lever
(B) Dust cover

6) Verify that the bearing moves smoothly with operating release fork.
7) Install the transmission assembly. <Ref. to 5MT-30, INSTALLATION, Manual Transmission Assembly.>

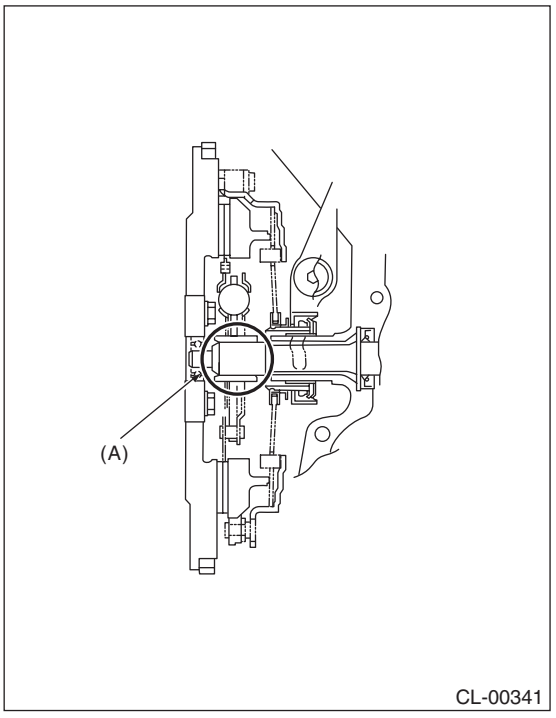
2. TURBO MODEL

1) Install the release bearing on transmission.
2) Insert the release fork into release bearing tab.



(A) Release fork
(B) Release bearing

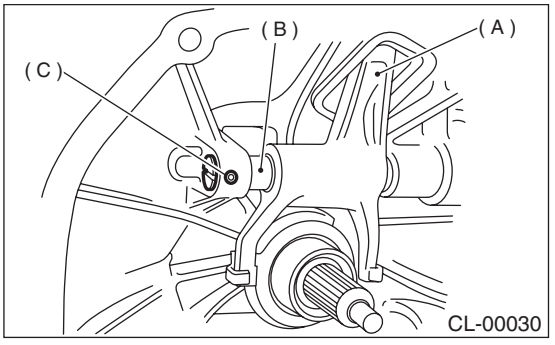
3) Apply grease to the specified points:
Spline FX2200 (Part No. 000040901)



(A) Spline (FX2200)

4) Insert the fork shaft into release fork.

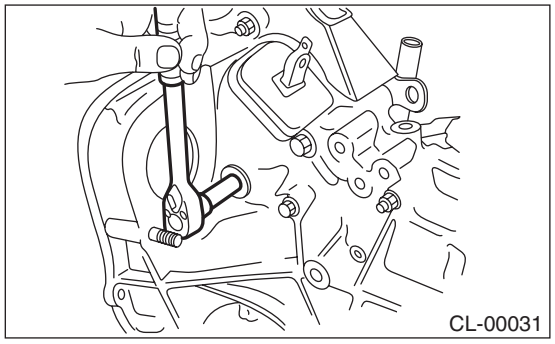
NOTE:
Make sure the cutout portion of fork shaft contacts spring pin.



(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.
<Ref. to 5MT-30, INSTALLATION, Manual Transmission Assembly.>

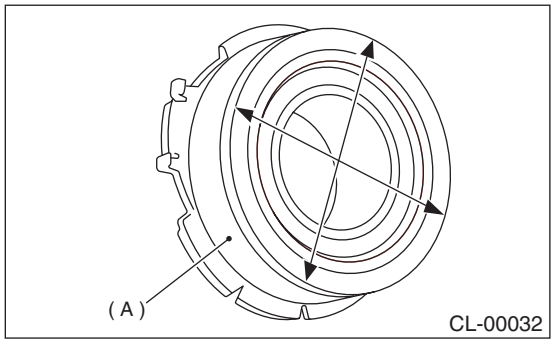
C: INSPECTION

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.

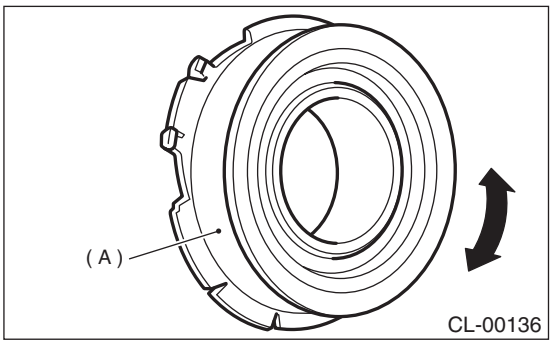
1) Check the bearing for smooth movement by applying force in the radial direction.

Radial direction stroke:
1.6 mm (0.063 in)



(A) Bearing case

2) Check the bearing for smooth rotation by applying pressure in the thrust direction.

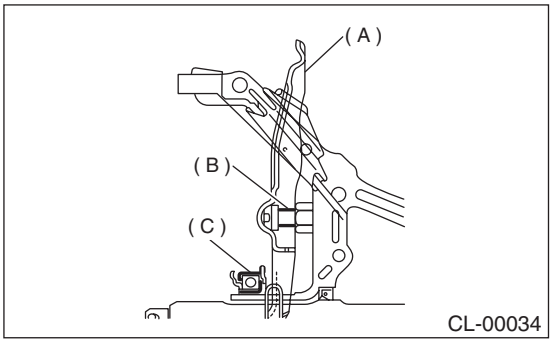


(A) Bearing case

3) Check wear and damage of the bearing case surface contacting with lever.

2. RELEASE LEVER

1) 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

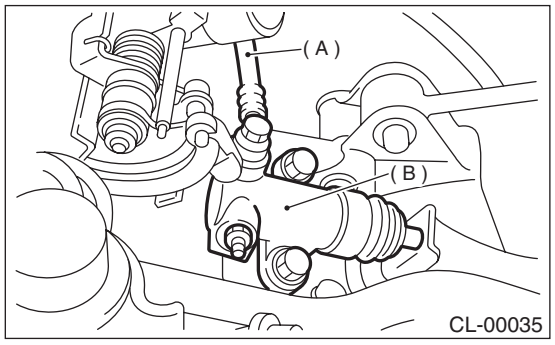
5. Operating Cylinder

A: REMOVAL

1) Remove the air cleaner case and air intake duct. <Ref. to IN(H4SO)-6, REMOVAL, Air Cleaner Case.> and <Ref. to IN(H4SO)-7, REMOVAL, Air Intake Duct.>
2) Remove the intercooler. <Ref. to IN(H4DOTC)-10, REMOVAL, Intercooler.>
3) Remove the clutch hose from operating cylinder.

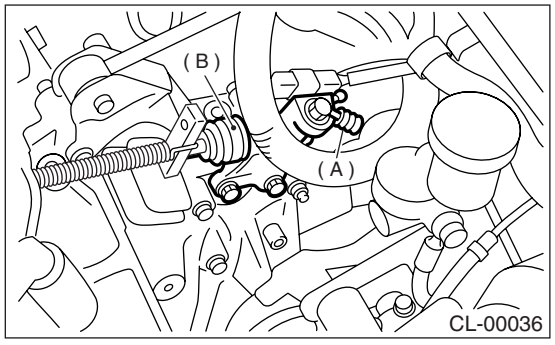
NOTE:
Cover the hose joint to prevent clutch fluid from flowing out.

- Non-TURBO model



(A) Clutch hose
(B) Operating cylinder

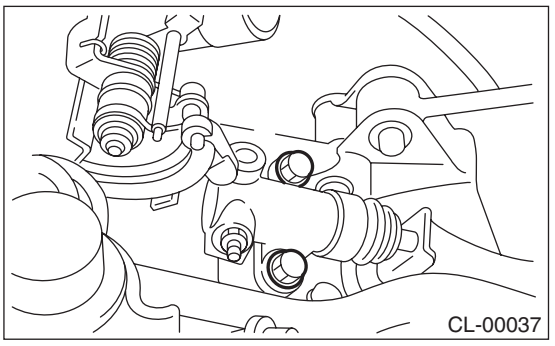
- TURBO model



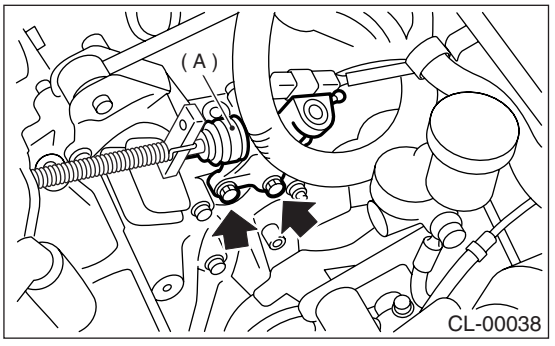
(A) Clutch hose
(B) Operating cylinder

4) Remove the operating cylinder from transmission.

- Non-TURBO model



- TURBO model

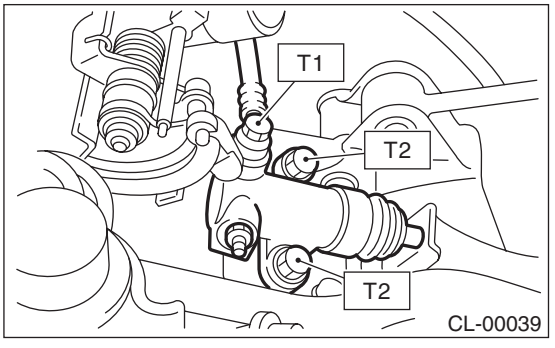


B: INSTALLATION

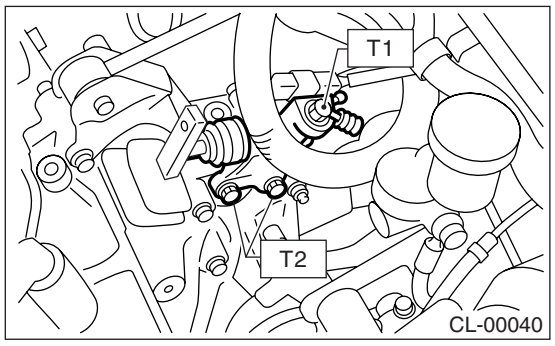
1) Apply grease (SUNLIGHT 2: P/N 003602010) to the contact point of the release lever and operating cylinder.
2) Install in the reverse order of removal.
Before installing the operating cylinder, apply grease (SUNLIGHT 2: P/N 003602010) to contact point of the release lever and operating cylinder.

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)

- Non-TURBO model



- TURBO model



3) After bleeding air from the operating cylinder, ensure that clutch operates properly. <Ref. to CL-24, Clutch Fluid Air Bleeding.>

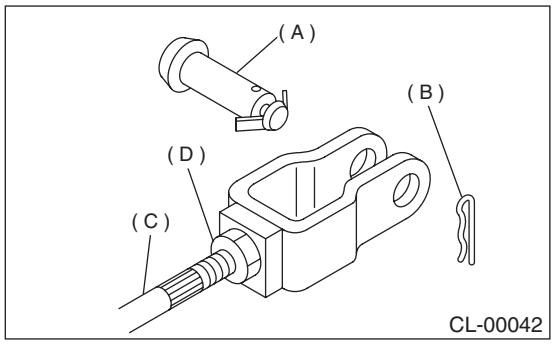
C: INSPECTION

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

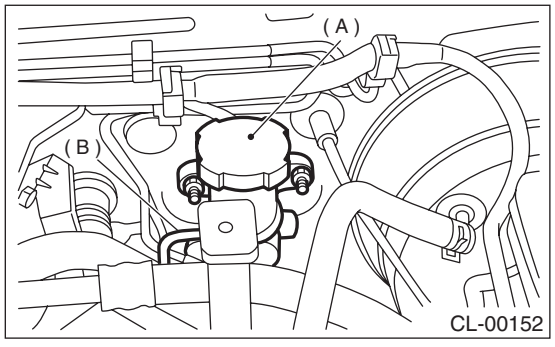
1) Thoroughly drain the brake fluid from reservoir tank.
2) Remove the snap pin, clevis pin and separate the push rod of master cylinder from clutch pedal.



(A) Clevis pin
(B) Snap pin
(C) Push rod
(D) Lock nut

3) Remove the air cleaner case and air intake duct. <Ref. to IN(H4SO)-6, REMOVAL, Air Cleaner Case.> and <Ref. to IN(H4SO)-7, REMOVAL, Air Intake Duct.>
4) Remove the intercooler. <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; immediately flush it away with water, and then wipe it off if spilt.



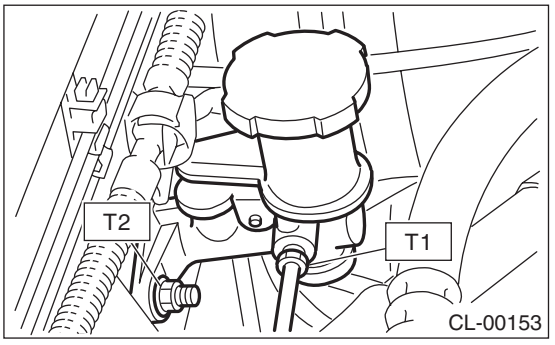
(A) Master cylinder
(B) Clutch pipe

B: INSTALLATION

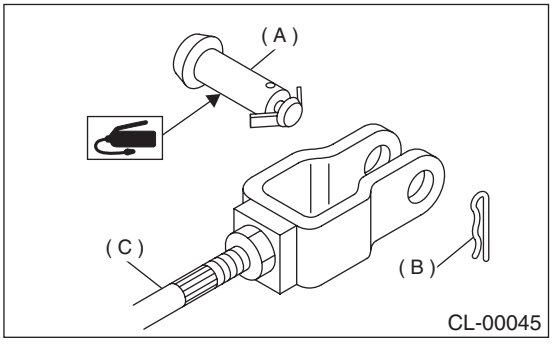
1) Install the master cylinder to body, and install the clutch pipe to master cylinder.

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) Apply a coat of grease to the clevis pin.
3) Connect the push rod of master cylinder to clutch pedal, and install the new clevis pin and snap pin.

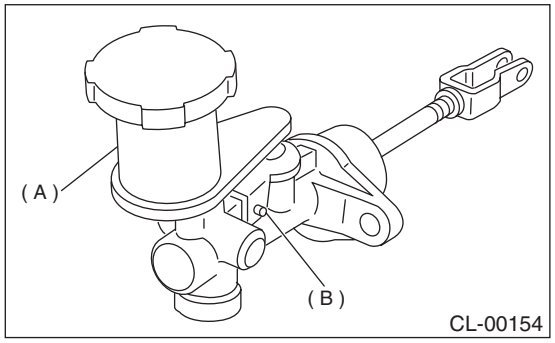


(A) Clevis pin
(B) Snap pin
(C) Push rod

4) After bleeding air from the system, ensure that clutch operates properly.
5) Adjust the clutch pedal. <Ref. to CL-28, ADJUSTMENT, Clutch Pedal.>
6) Install the air cleaner case and air intake duct. <Ref. to IN(H4SO)-6, INSTALLATION, Air Cleaner Case.> and <Ref. to IN(H4SO)-7, INSTALLATION, Air Intake Duct.>
7) Install the intercooler. (TURBO model) <Ref. to IN(H4DOTC)-11, INSTALLATION, Intercooler.>

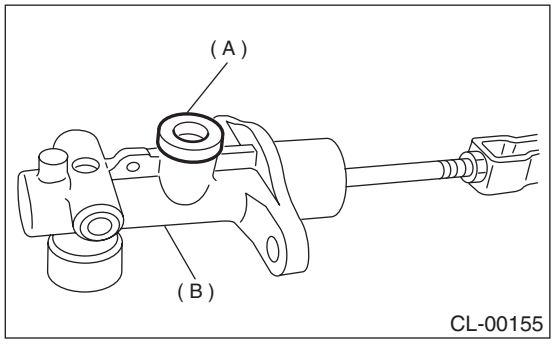
C: DISASSEMBLY

1) Remove the straight pin and reservoir tank.



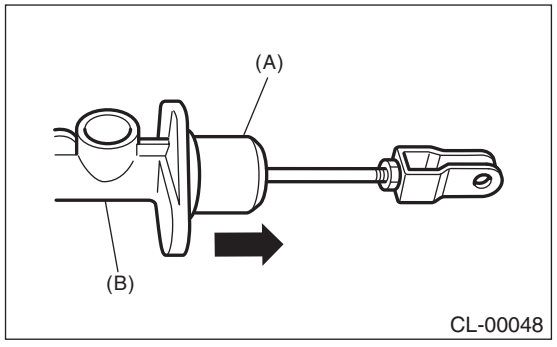
(A) Reservoir tank
(B) Straight pin

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. (Turbo model)

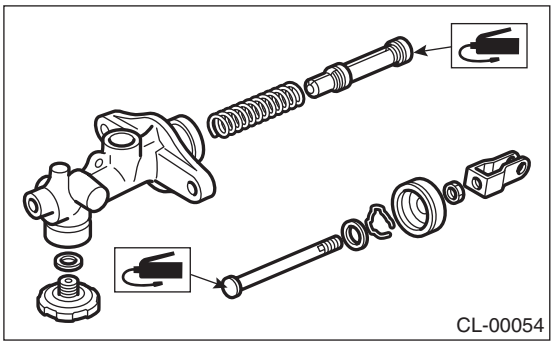
D: ASSEMBLY

1) Install the clutch damper. (Turbo model)

Tightening torque:
46.6 N·m (4.8 kgf-m, 34 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)

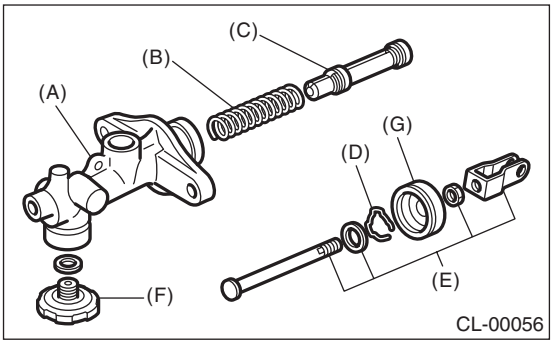


3) To assemble the master cylinder, reverse the sequence of disassembly procedure.

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, cylinder boot and hose replace the faulty part.

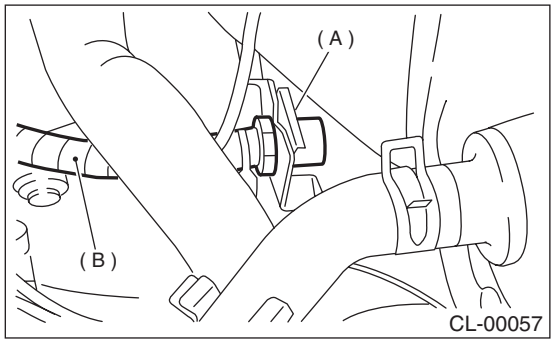


(A) Master cylinder body
(B) Return spring
(C) Piston
(D) Stop ring
(E) Rod ASSY
(F) Clutch damper
(G) Cylinder boot

7. Clutch Pipe and Hose

A: REMOVAL

1) Remove the air cleaner case and air intake duct. <Ref. to IN(H4SO)-6, REMOVAL, Air Cleaner Case.> and <Ref. to IN(H4SO)-7, 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, REPLACEMENT, 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.



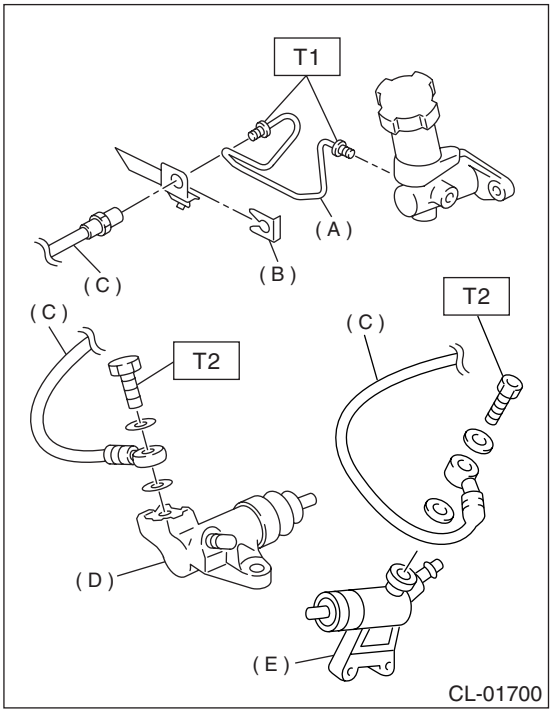
(A) Clamp
(B) Clutch hose

6) Remove the hose from operating cylinder.
7) Remove the bracket.

B: INSTALLATION

Install in the reverse order of removal.

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)



(A) Clutch pipe
(B) Clip
(C) Clutch hose
(D) Master cylinder (Non-TURBO model)
(E) Master cylinder (TURBO model)

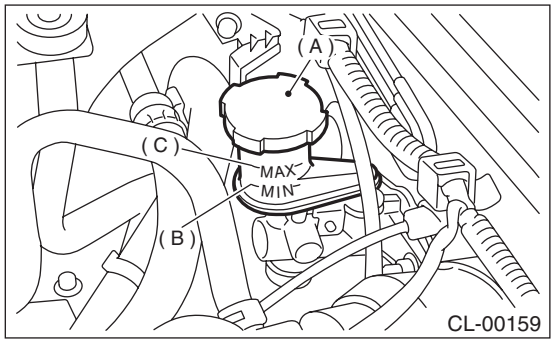
C: INSPECTION

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) Reservoir tank
(B) Min. level
(C) Max. level

B: REPLACEMENT

CAUTION:
• The FMVSS No. 116, fresh DOT3 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:
• For convenience and safety, it is advisable to have two men working.

1) Remove the air cleaner case and air duct.
2) Draw out the brake fluid from reservoir tank with syringe.
3) Refill the reservoir tank with recommended brake fluid.

Recommended brake fluid:
FMVSS No. 116, fresh DOT3 brake fluid

4) Drain fluid in the same method as air bleeding.
5) Refill the brake fluid before reservoir tank becomes empty, and drain contaminated fluid again.
6) Repeat the above procedure until the contaminated fluid is completely drained.

9. Clutch Fluid Air Bleeding

A: PROCEDURE

1. NON-TURBO MODEL

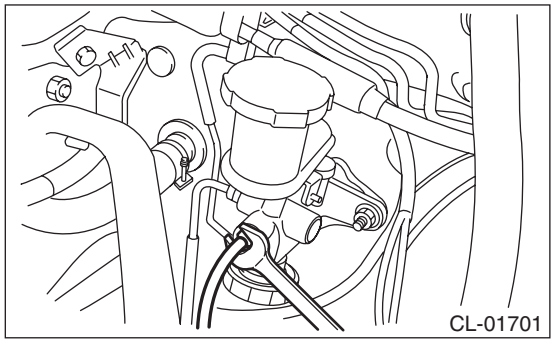
NOTE:
Bleed air from the oil line with help of co-worker.

1) Remove the air cleaner case and air intake duct. <Ref. to IN(H4SO)-6, REMOVAL, Air Cleaner Case.> and <Ref. to IN(H4SO)-7, REMOVAL, Air Intake Duct.>

2) Attach one end of a vinyl tube into the air bleeder of master cylinder and put the other end into a brake fluid container.

3) Slowly depress the clutch pedal and keep it. 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 brake pedal.



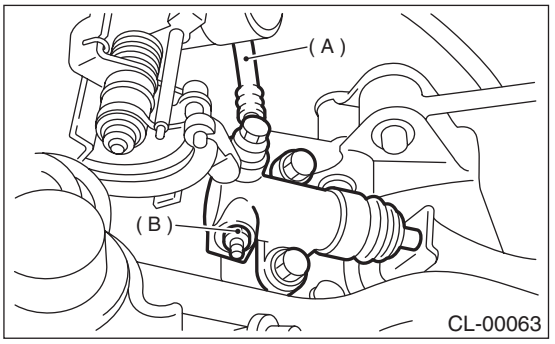
4) Repeat the above steps until there are no more air bubbles in the vinyl tube.

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:
8 N·m (0.8 kgf-m, 5.8 ft-lb)

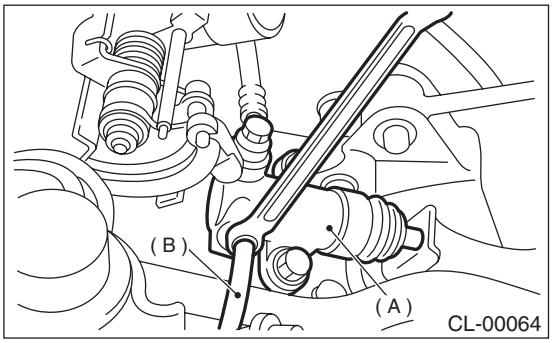
6) Fit one end of a vinyl tube into the air bleeder of operating cylinder and put the other end into a brake fluid container.



(A) Clutch hose
(B) Air bleeder

7) 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.



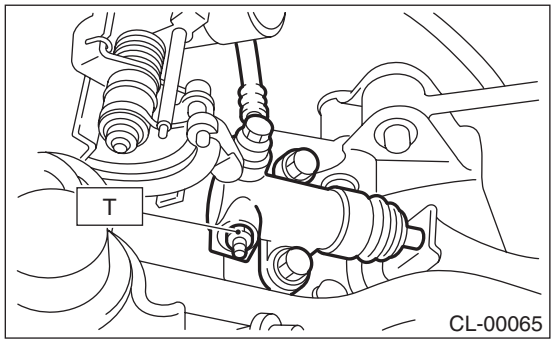
(A) Operating cylinder
(B) Vinyl tube

8) 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.

9) Tighten the air bleeder.

Tightening torque:
T: 8 N·m (0.8 kgf-m, 5.8 ft-lb)



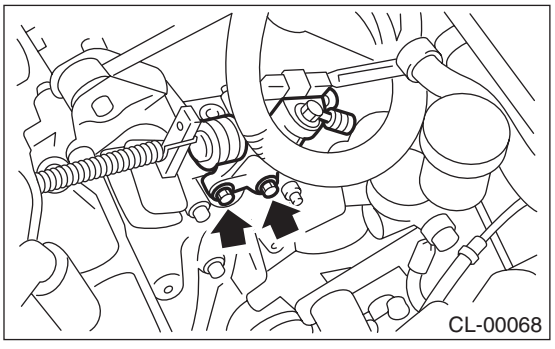
10) After depressing the clutch pedal, make sure that there are no leaks evident in the entire system.
11) After bleeding air from the system, ensure that clutch operates properly.

2. TURBO MODEL

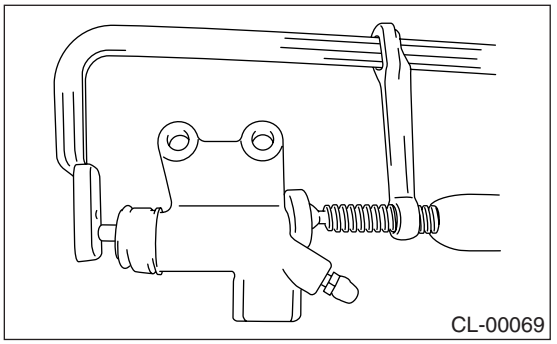
NOTE:
Bleed air from the oil line with help of a co-worker.

1) Remove the intercooler. <Ref. to IN(H4DOTC)-10, REMOVAL, Intercooler.>
2) Remove the operating cylinder.

NOTE:
Do not remove the clutch hose.

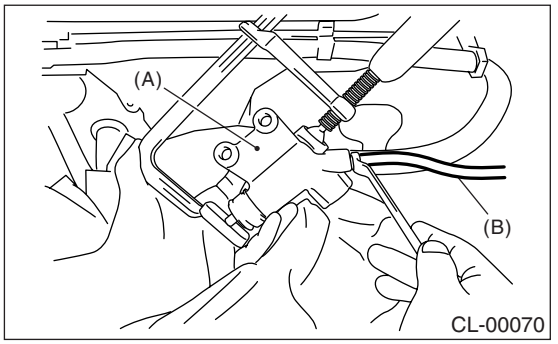


3) Fix the piston with clamp to avoid the piston from jumping out of cylinder.



4) Fit one end of a vinyl tube into the air bleeder of operating cylinder and put the other end into a brake fluid container.
5) 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 part higher than tip of operating cylinder when performing this procedure.



(A) Operating cylinder
(B) Vinyl tube

6) Repeat these steps until there are no more air bubbles in the vinyl tube.

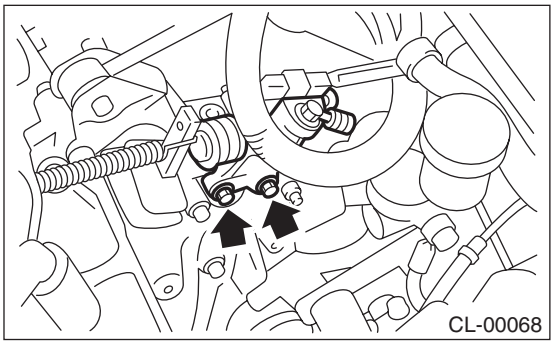
CAUTION:
Cover the bleeder with waste cloth when loosening it, to prevent brake fluid from being splashed over surrounding parts.

7) Tighten the air bleeder.

Tightening torque:
T: 8 N·m (0.8 kgf-m, 5.8 ft-lb)

8) Install the operation clylinder.

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

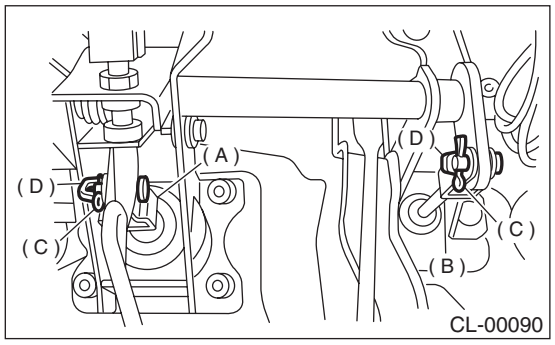


9) After depressing the clutch pedal, make sure that there are no leaks evident in the entire system.
10) After bleeding air from the system, ensure that the clutch operates properly.
11) Install the intercooler. <Ref. to IN(H4DOTC)-11, INSTALLATION, Intercooler.>

10.Clutch Pedal

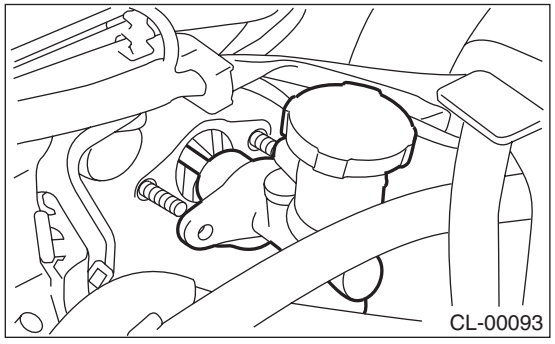
A: REMOVAL

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 accelerator pedal.
<Ref. to SP(H4SO)-3, REMOVAL, Accelerator Pedal.>
6) Remove the air cleaner case and intake duct. <Ref. to IN(H4SO)-6, REMOVAL, Air Cleaner Case.> and <Ref. to IN(H4SO)-7, REMOVAL, Air Intake Duct.>
7) Remove the intercooler. (TURBO model) <Ref. to IN(H4DOTC)-10, REMOVAL, Intercooler.>
8) Remove the nut which secures clutch master cylinder.



9) 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.

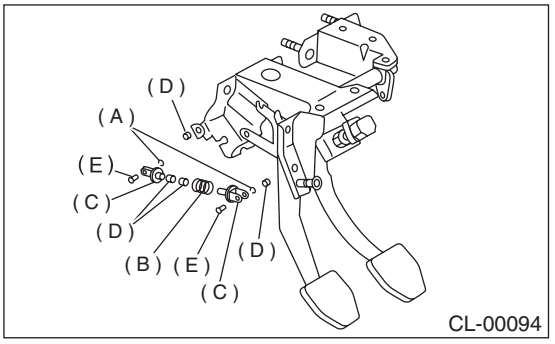
Tightening torque:
18 N·m (1.8 kgf-m, 13.0 ft-lb)

NOTE:
- 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.>
3) Adjust the clutch switch (starter interlock). <Ref. to CL-32, ADJUSTMENT, Clutch Switch.>

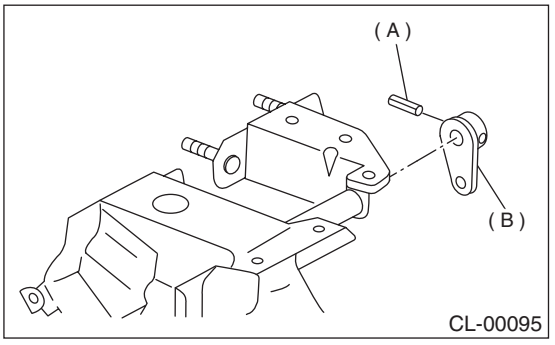
C: DISASSEMBLY

1) Remove the clips, assist spring, rod and bushing.



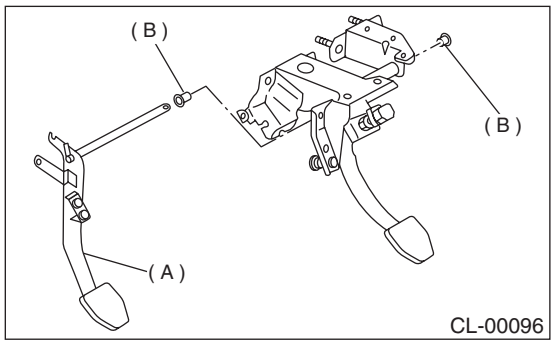
(A) Clip
(B) Assist spring
(C) Assist rod
(D) Bushing
(E) Clevis pin

2) Remove the spring pin and lever.



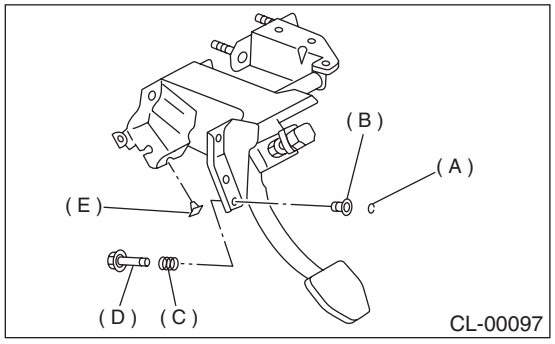
(A) Pin
(B) Lever

3) Remove the clutch pedal and bushings.



(A) Clutch pedal
(B) Bushing

4) Remove the stopper, clip, rod S, and then remove the spring and bushing S.



(A) Clip
(B) Bushing S
(C) Spring S
(D) Rod S
(E) Stopper

5) Remove the stoppers from clutch pedal.
6) Remove the clutch pedal pad.

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.

Grease:
SUNLIGHT No.2 (Part No. 003602010) or equivalent

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.

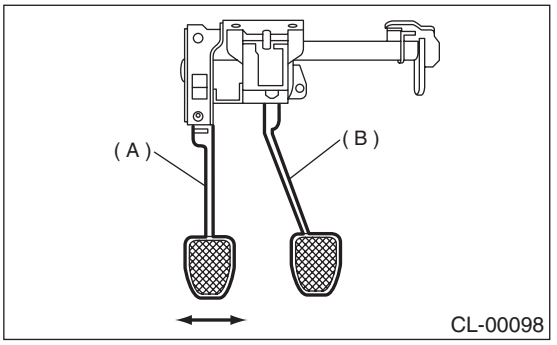
E: INSPECTION

1. CLUTCH PEDAL

Move the clutch pedal pads in the lateral direction with a force of approx. 10 N (1 kgf, 2 lb) to ensure pedal deflection is in specified range.

NOTE:
If excessive deflection is noted, replace the bushings with new ones.

Deflection of clutch pedal:
Service limit
5.0 mm (0.197 in) or less



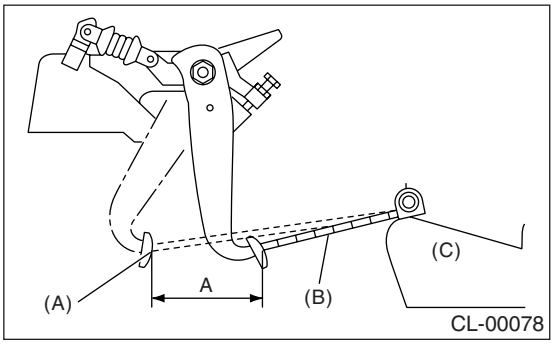
(A) Clutch pedal
(B) Brake pedal

F: ADJUSTMENT

1) Measure the full stroke amount of clutch pedal.

NOTE:
• Measure the length between seat cushion front end and center portion of clutch pedal.
• Slide the seat at seventh notch from first notch.

Specified clutch pedal full stroke: A
130 — 135 mm (5.12 — 5.31 in)

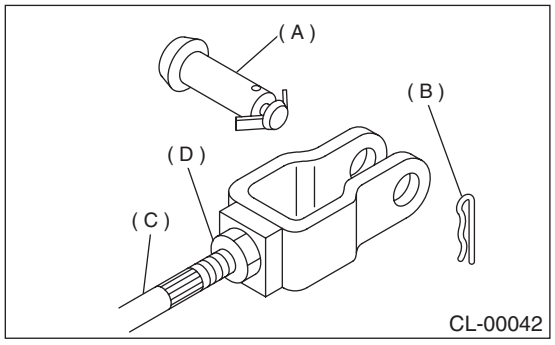


(A) Clutch (Full stroke condition)
(B) Scale
(C) Seat

2) If not as specified, loosen the clutch stopper nut to adjust it.

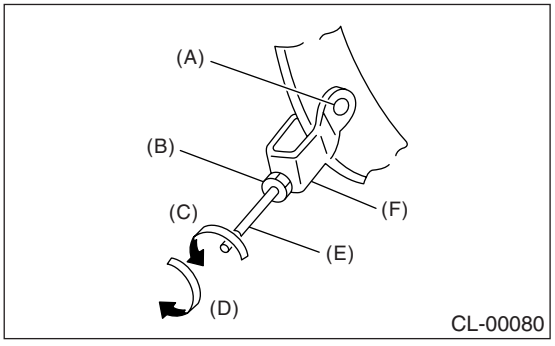
Tightening torque (Clutch stopper nut):
8 N·m (0.8 kgf-m, 5.8 ft-lb)

3) Loosen the push rod lock nut.



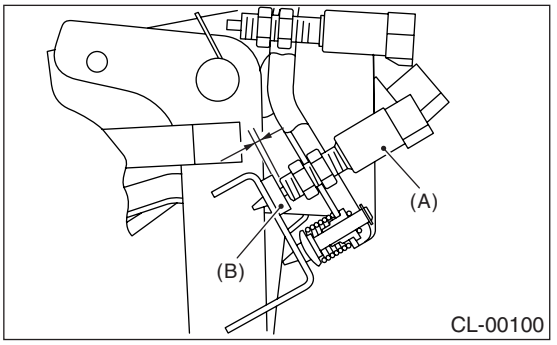
(A) Clevis pin
(B) Snap pin
(C) Push rod
(D) Push rod lock nut

4) Turn the push rod to adjust.
(1) Ensure that the clutch pedal contacts stopper bolt, when releasing the clutch pedal.
(2) Ensure that the clutch pedal contacts clutch pedal bracket stopper, when fully depressing the clutch pedal.



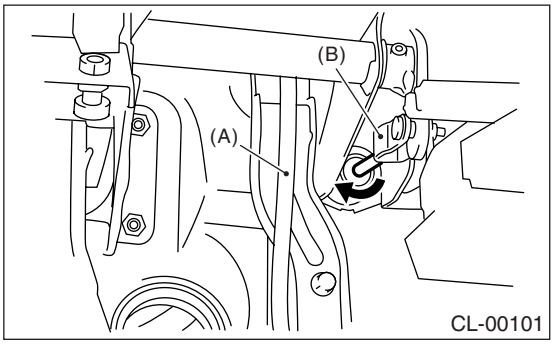
(A) Clevis hole
(B) Push rod lock nut
(C) Lengthening direction
(D) Shortening direction
(E) Push rod
(F) U shaped bracket

5) Turn the push rod clockwise to shorten until clearance is made at clutch switch.



(A) Clutch switch
(B) Stopper

6) Turn the push rod counter clockwise to lengthen until clutch pedal contacts to clutch switch.
7) Turn the push rod further 270° counterclockwise to lengthen (arrow direction as shown in the figure).



(A) Accelerator pedal
(B) Clevis

8) Move the clevis pin in lateral direction to ensure it moves smoothly.

9) Tighten the push rod lock nut.

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

10) Measure the full stroke amount of clutch pedal again.

Specified clutch pedal full stroke: A
130 — 135 mm (5.12 — 5.31 in)

11) Install the clutch start switch. <Ref. to CL-31, INSTALLATION, Clutch Switch.>

11.Clutch Switch

A: REMOVAL

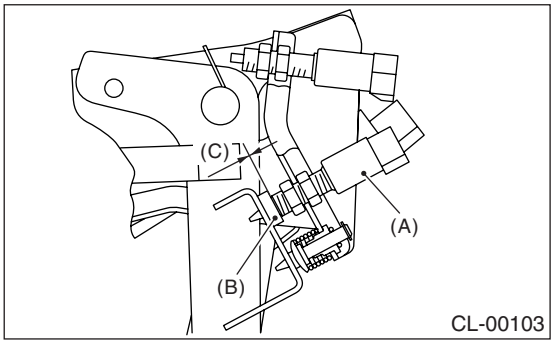
1) Disconnect the ground cable from battery.
2) Remove the instrument panel lower cover.
3) Disconnect the connector from clutch switch.
4) Remove the clutch switch.

B: INSTALLATION

1. CLUTCH SWITCH (WITH CRUISE CONTROL)

1) Install the clutch switch and clutch pedal stopper so that the gap between them is 0 mm (0 in).

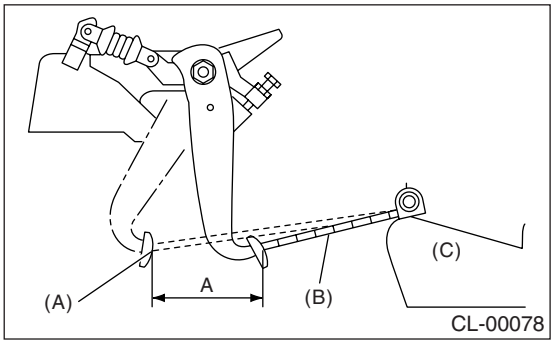
Tightening torque:
8 N·m (0.8 kgf-m, 5.8 ft-lb)



(A) Clutch swsitch
(B) Stopper
(C) 0 mm (0 in)

2) Measure stroke of clutch pedal.

Specified clutch pedal full stroke: A
130 — 135 mm (5.12 — 5.31 in)



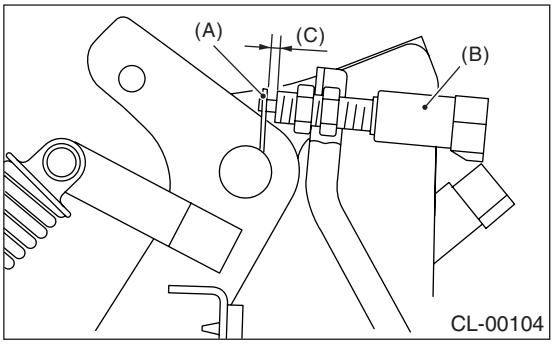
(A) Clutch (Full stroke condition)
(B) Scale
(C) Seat

3) If the clutch pedal stroke is out of specification, adjust the stroke. <Ref. to CL-28, ADJUSTMENT, Clutch Pedal.>
4) Connect clutch switch connector.

2. CLUTCH SWITCH (STARTER INTERLOCK)

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.

CLUTCH SWITCH

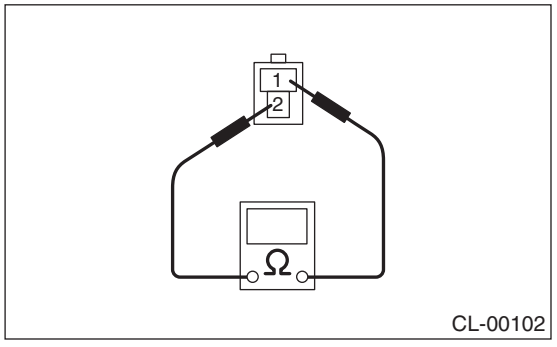
C: INSPECTION

1) Confirm that the engine does not start when the clutch pedal is released. If the engine starts, adjust the clutch switch and inspect the starter interlock circuit.
2) 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.
3) 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.

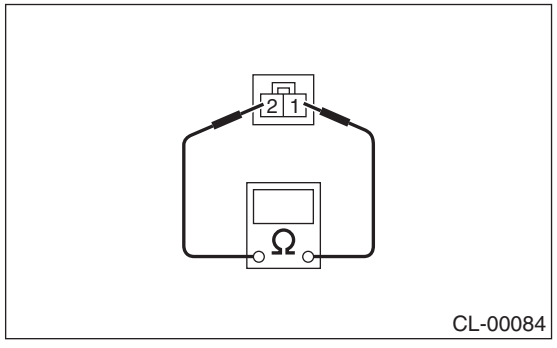
Terminals/Specified resistance
When clutch pedal depressed:
1 — 2/Less than 1 Ω

Terminals/Specified resistance
When clutch pedal not depressed:
1 — 2/More than 1 MΩ

Clutch switch (Starter interlock)

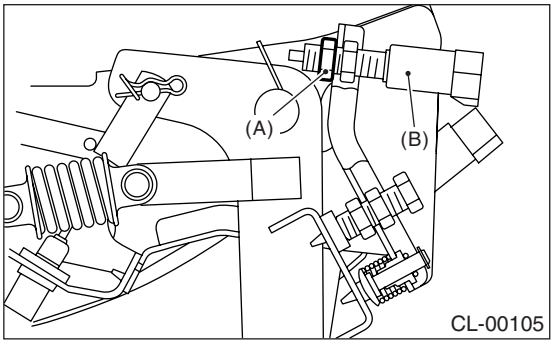


Clutch switch (Cruise control)



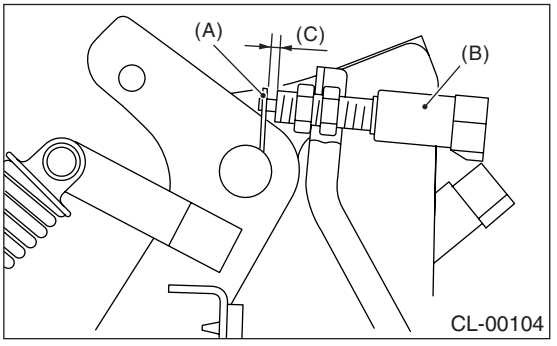
D: ADJUSTMENT

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 (Clutch stopper nut):
8 N·m (0.8 kgf-m, 13.0 ft-lb)

12.General Diagnostic Table

A: INSPECTION

1. CLUTCH

Symptom	Possible cause	Corrective action
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-34, DIAGNOSTIC DIAGRAM OF CLUTCH DRAG, 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	Replace.
	(c) Malfunction of crankshaft pilot bearing	Replace.
	(d) Cracked clutch disc facing	Replace.
	(e) Sticked 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 worn	Replace the clutch disc defection.
	(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	Replace the clutch disc.
	(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.

Symptom	Possible cause	Corrective action
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 flywheel seizure. Inspect the clutch disc, spline of clutch disc hub.

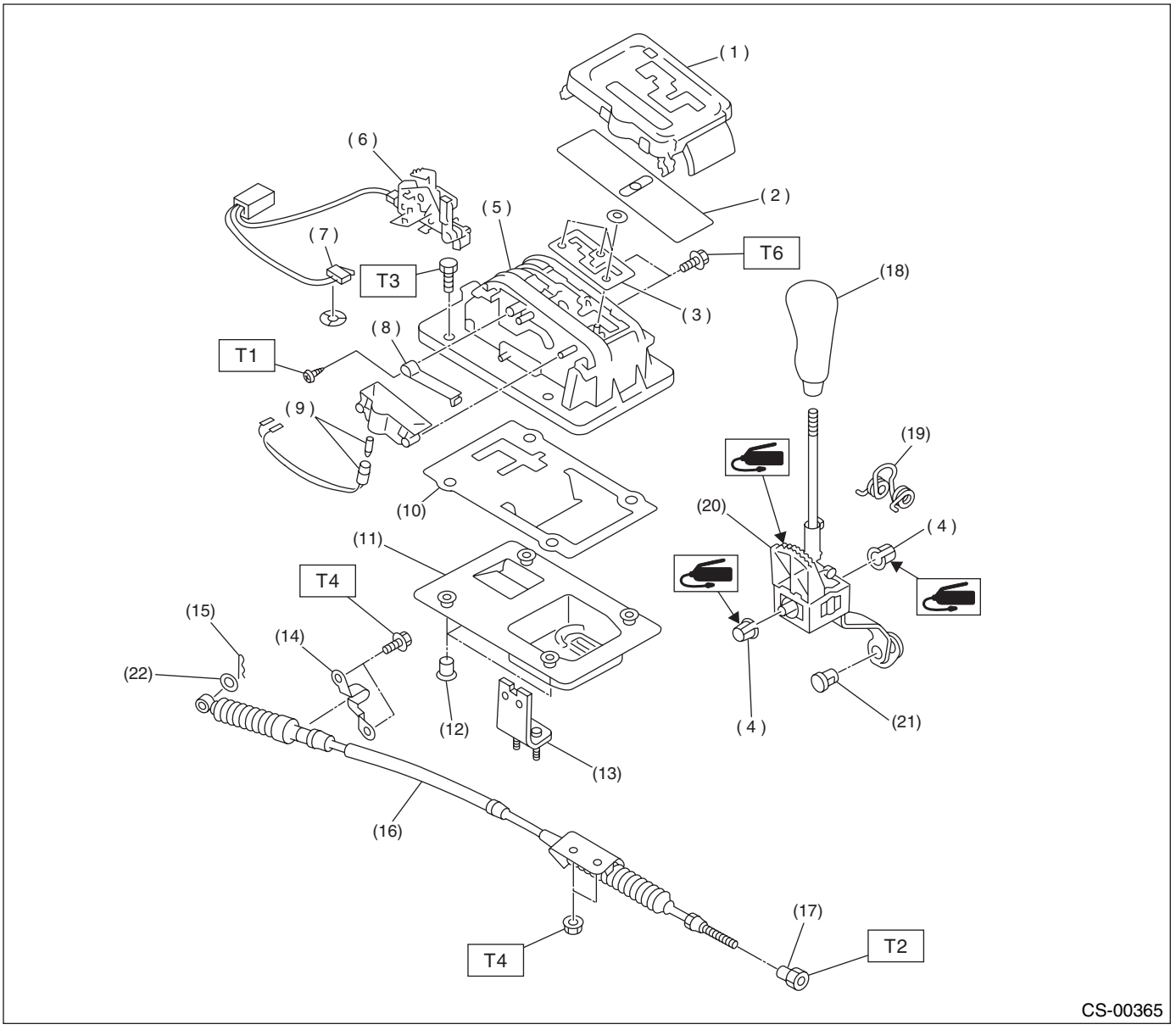
1. General Description

A: SPECIFICATIONS

Item	Specification
Swing torque of rod against MT gear shift lever N (kgf, lb)	3.7 (0.38, 0.84) or less

B: COMPONENT

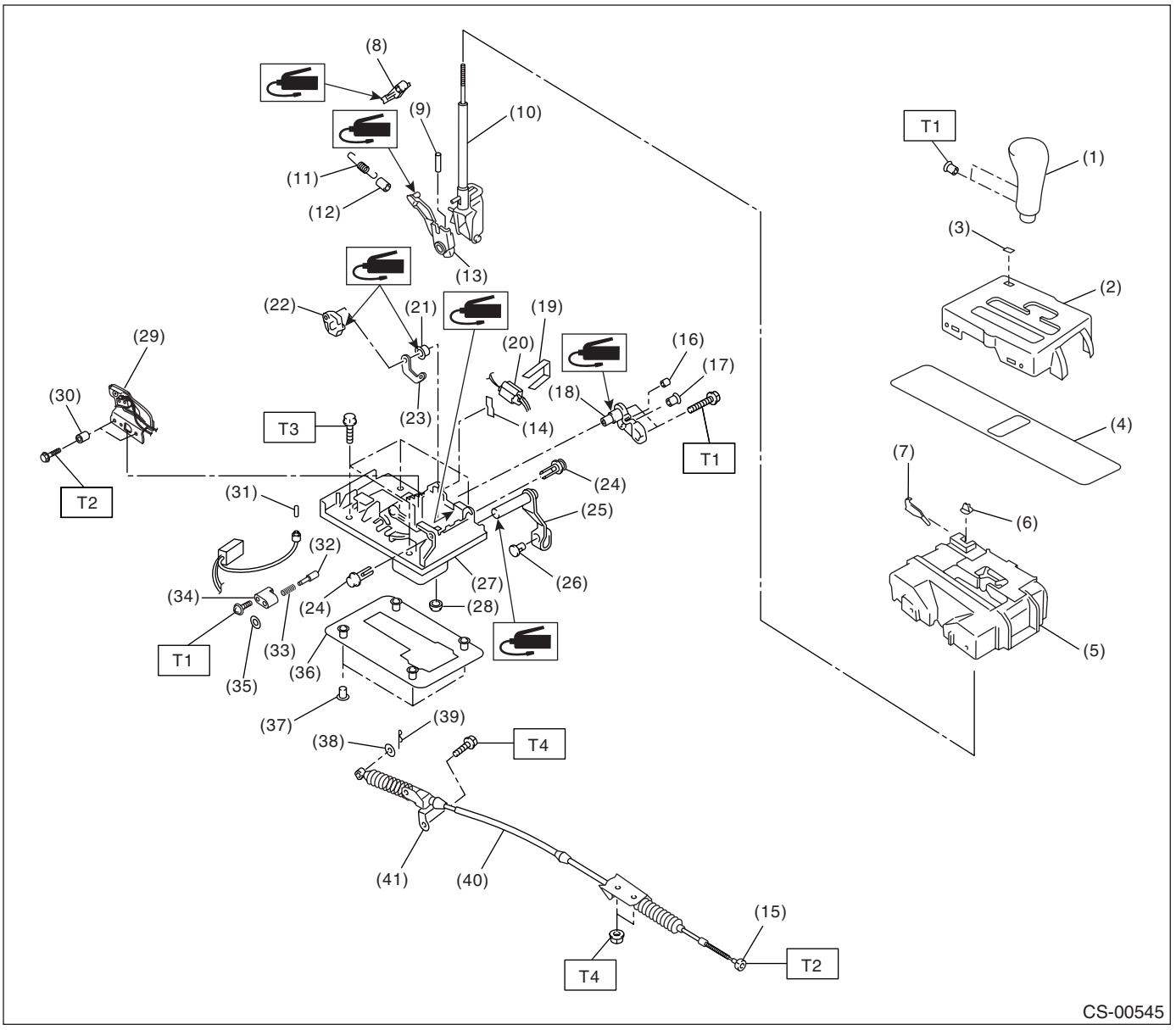
1. AT SELECT LEVER (EXCEPT SPORT SHIFT MODEL)



(1) Indicator cover
(2) Blind
(3) Cushion
(4) Bushing
(5) Plate
(6) Solenoid ASSY
(7) "P" position switch
(8) Detent spring
(9) Indicator bulb
(10) Plate
(11) Boot
(12) Spacer
(13) Cable bracket
(14) Cable clamp
(15) Snap pin
(16) Selector cable
(17) Nut A
(18) Grip
(19) Spring
(20) Select lever ASSY
(21) Bushing ASSY
(22) Washer

Tightening torque: N·m (kgf-m, ft-lb)	
T1:	*4.9 (0.50, 3.6)*
T2:	*7.5 (0.76, 5.5)*
T3:	*13 (1.3, 9.4)*
T4:	*18 (1.8, 13.0)*
T5:	*33 (3.4, 25)*
T6:	*51 (5.2, 38)*

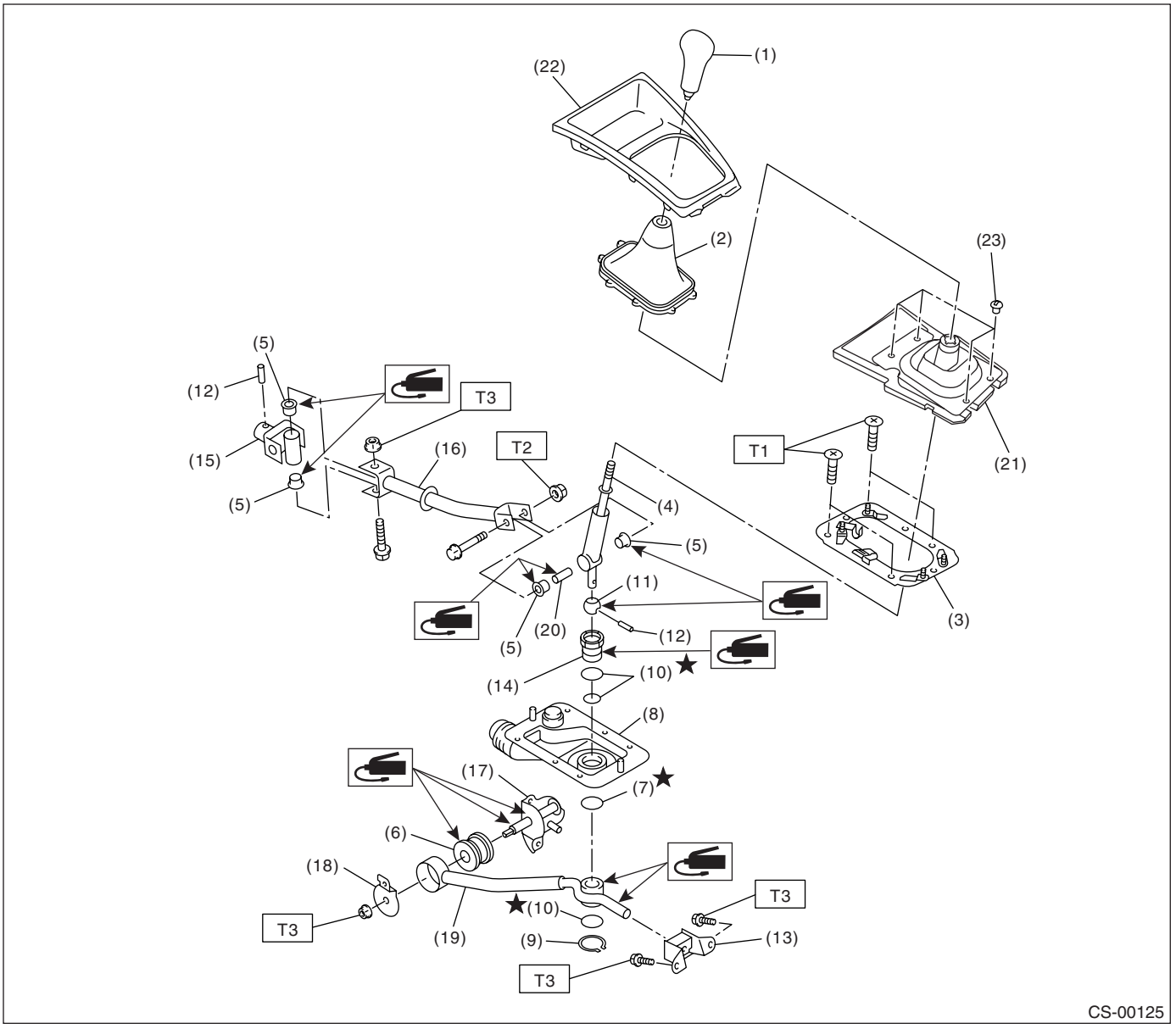
2. AT SELECT LEVER (SPORT SHIFT MODEL)



(1) Grip
(2) Indicator cover
(3) Cover
(4) Blind
(5) Guide plate
(6) Button
(7) Spring
(8) Detent arm
(9) Spring pin
(10) Lever ASSY
(11) Detent spring
(12) Tube
(13) Arm bracket
(14) Cushion
(15) Nut A
(16) Cushion
(17) Bushing
(18) Lock plate B
(19) Clamp
(20) Shift lock solenoid
(21) Bushing
(22) Lock plate A
(23) Lock plate C
(24) Clip
(25) Arm
(26) Bushing ASSY
(27) Base plate ASSY
(28) Grommet
(29) Bracket guide ASSY
(30) Spacer
(31) Indicator bulb
(32) Rod
(33) Spring
(34) Bushing
(35) Clip
(36) Packing
(37) Spacer
(38) Washer
(39) Snap pin
(40) Select cable
(41) Cable lamp

Tightening torque: N·m (kgf-m, ft-lb)
T1: 2.0 (0.2, 1.4)
T2: 7.5 (0.76, 5.5)
T3: 13 (1.3, 9.4)
T4: 18 (1.8, 13.0)

3. MT GEAR SHIFT LEVER



(1) Gear shift knob
(2) Console boot
(3) Plate ASSY
(4) Lever
(5) Bushing
(6) Bushing
(7) Lock wire
(8) Boot
(9) Snap ring
(10) O-ring
(11) Bushing A
(12) Spring pin
(13) Cushion rubber
(14) Bushing B
(15) Joint
(16) Rod
(17) Bracket
(18) Washer
(19) Stay
(20) Spacer
(21) Boot and insulator ASSY
(22) Front cover
(23) Clamp

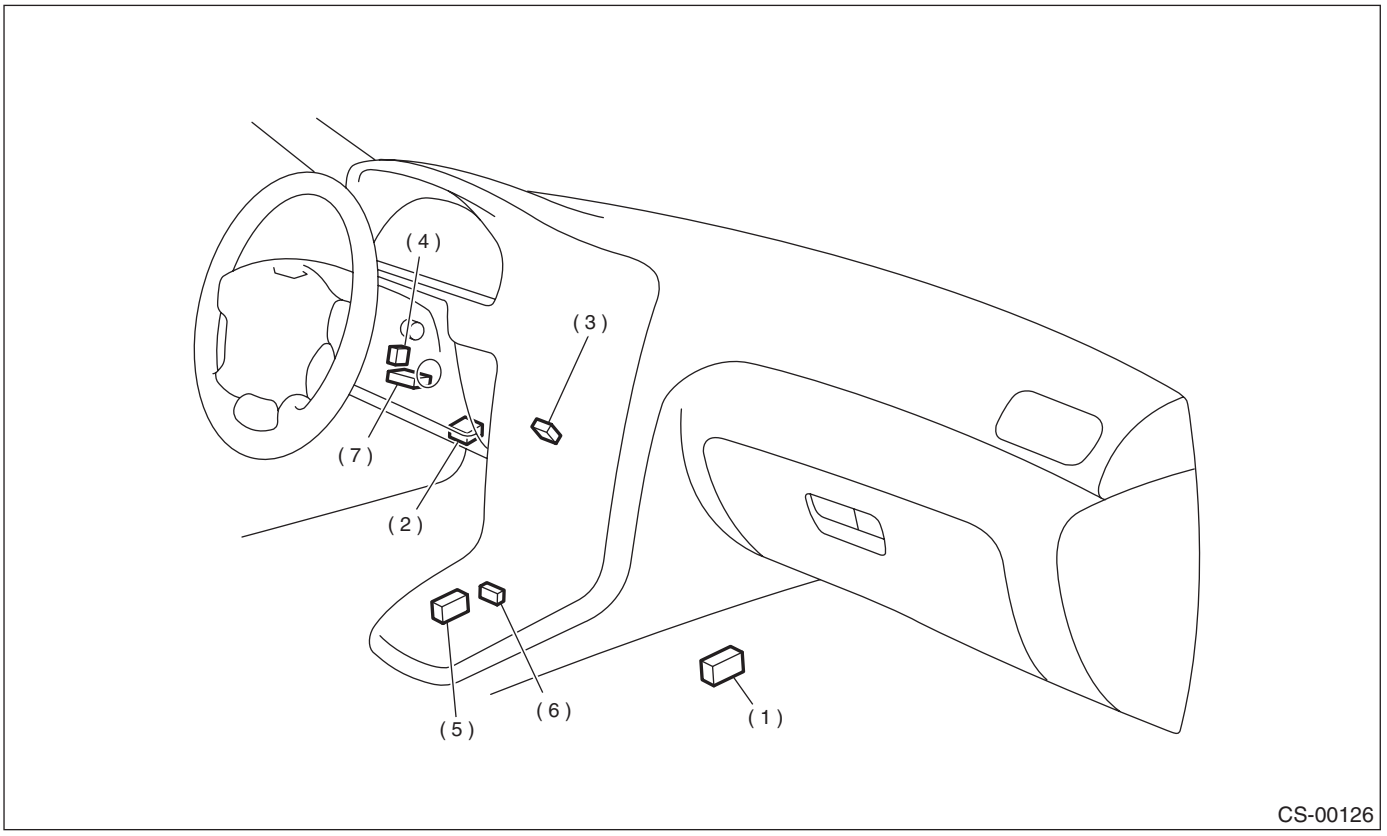
Tightening torque: N·m (kgf-m, ft-lb)
T1: 7.5 (0.76, 5.5)
T2: 12 (1.2, 8.7)
T3: 18 (1.8, 13.0)

C: CAUTION

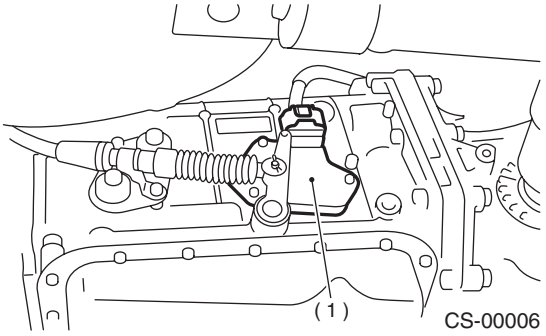
• Wear working clothing, including a cap, protective goggles, and protective shoes during operation.
• Remove contamination including dirt and corrosion before removal, installation or disassembly.
• Keep the disassembled parts in order and protect them from dust or dirt.
• Before removal, installation 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. Electrical Component

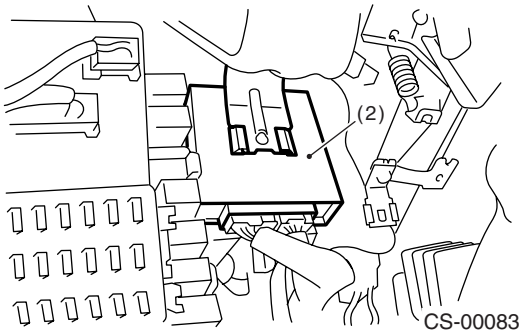
A: LOCATION



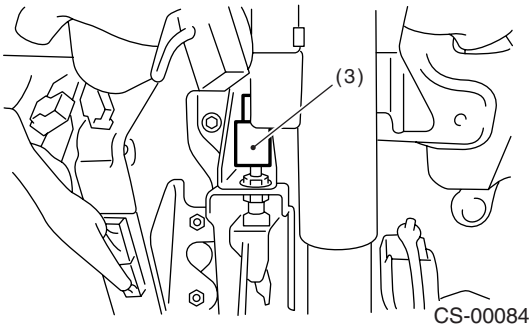
(1) Inhibitor switch
(2) Integrated module
(3) Stop light switch
(4) Key warning switch
(5) Shift lock solenoid
(6) “P” position switch
(7) Key lock solenoid



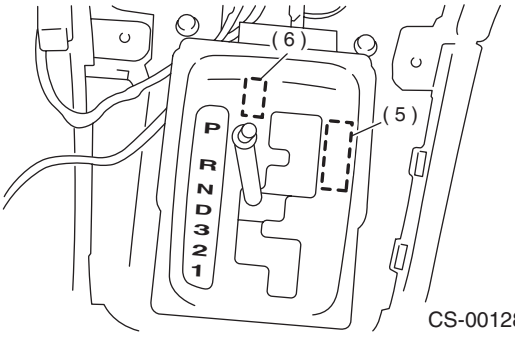
CS-00006



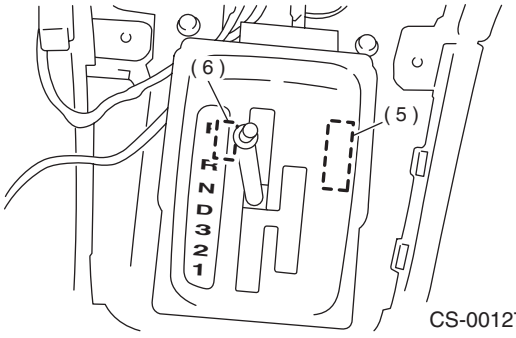
CS-00083



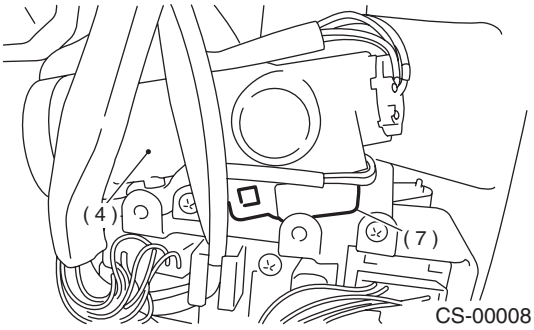
CS-00084



CS-00128



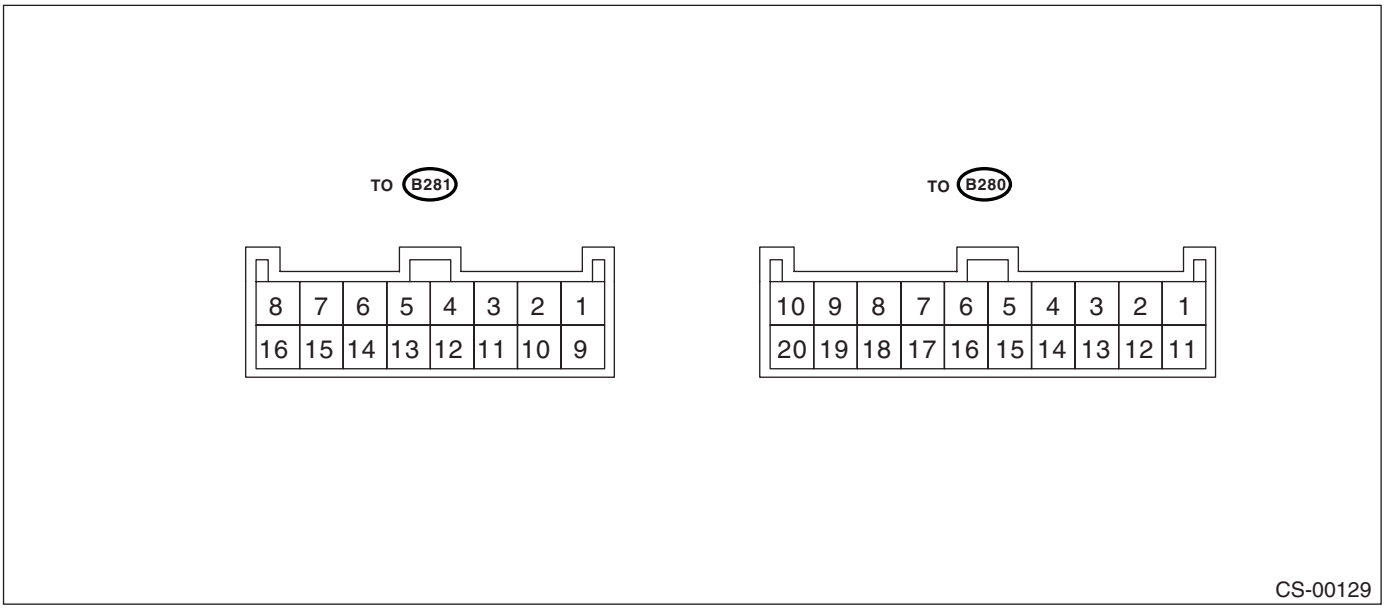
CS-00127



CS-00008

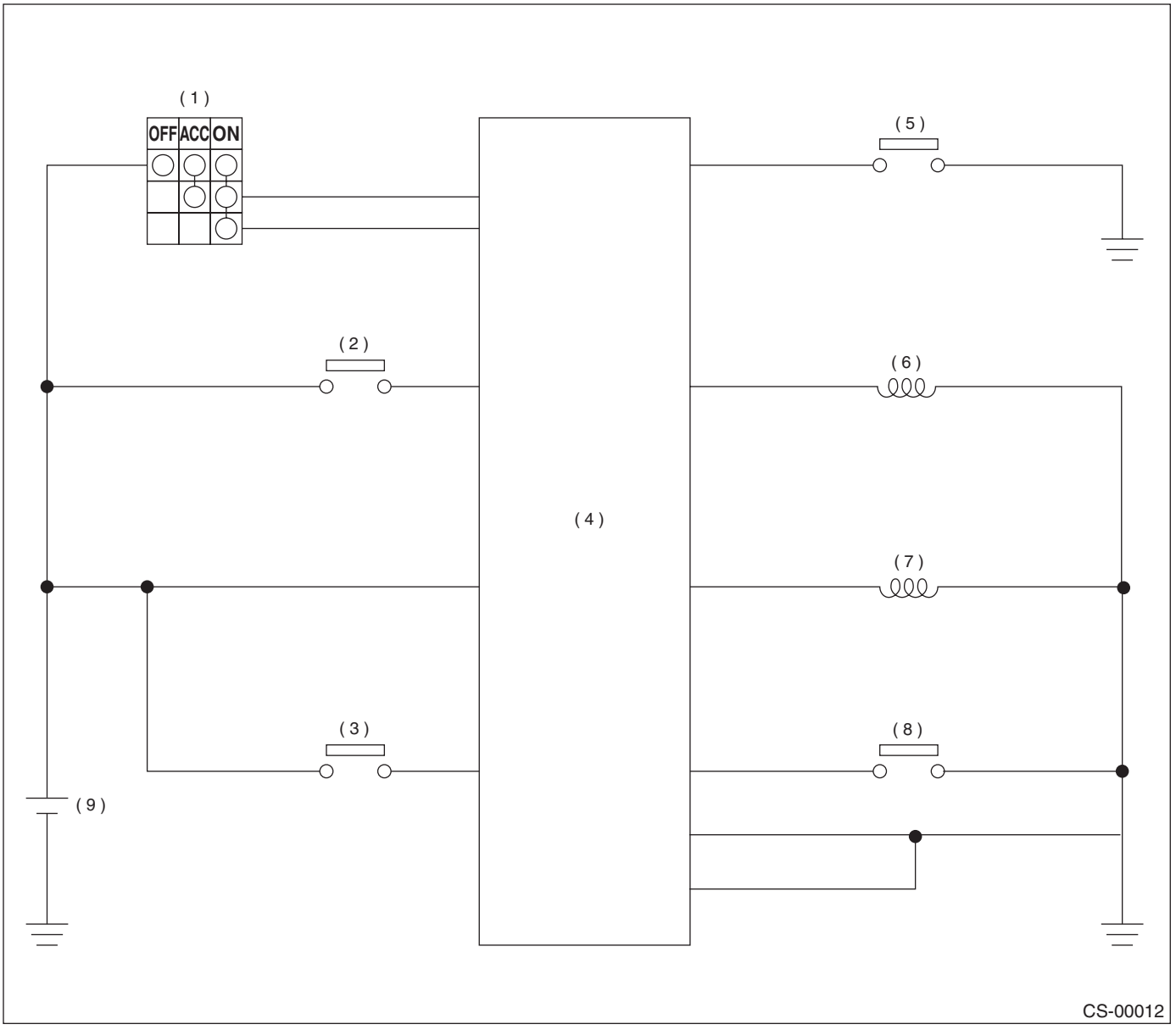
3. AT Shift Lock System

A: ELECTRICAL SPECIFICATION



Contents	To Connector No.	Terminal No.	Input/Output signal
			Measured value and measuring conditions
Battery power supply	B281	2	9 — 16 V
Ignition power supply	B280	19	10 — 15 V when ignition switch is at ON or START.
ACC power supply	B280	10	10 — 15 V when ignition switch is at ACC or ON.
Inhibitor Switch (“P” position)	B280	5	0 V when select lever is in “P” position. 9 — 16 V when select lever is in other positions than “P” position.
Stop light switch	B280	9	9 — 16 V when stop light switch is ON. 0 V when stop light switch is OFF.
“P” position switch	B280	6	0 V when select lever is in “P” position. 9 — 16 V when select lever is in other positions than “P” position.
Shift lock solenoid signal	B281	9	8.5 — 16 V when shift lock is released. 0 V when shift lock is operating.
Key warning switch signal	B280	20	9 — 16 V when key is inserted. 0 V when key is removed.
Key lock solenoid signal	B281	3	Pulse is output when switching key lock between locked and unlocked. 0 V at other conditions than above.
Ground	B281	4	—
Ground	B281	13	—

B: SCHEMATIC



(1) Ignition switch
(2) Stop light switch
(3) Key warning switch
(4) Integrated module
(5) Inhibitor switch
(6) Key lock solenoid
(7) Shift lock solenoid
(8) “P” position switch
(9) Battery

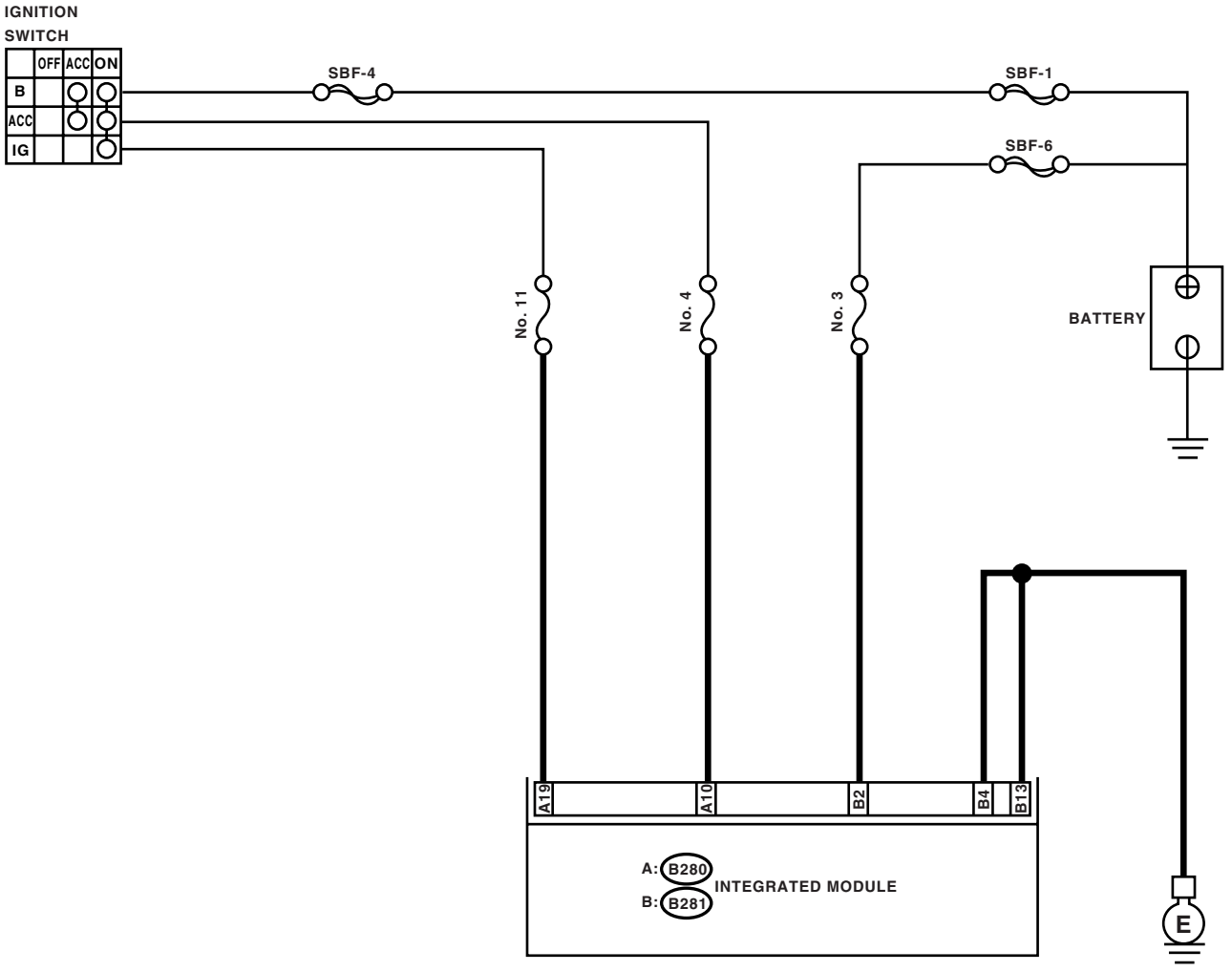
C: INSPECTION

	Step	Check	Yes	No
1	**CHECK SHIFT LOCK.** 1) Turn the ignition switch ON. 2) Move the select lever to “P” position.	While the brake pedal is depressed, can select lever move from “P” range to other positions?	Go to step **2.**	Inspect “SELECT LEVER SHIFT LOCK CANNOT BE RELEASED”. <Ref. to CS-18, SELECT LEVER SHIFT LOCK CANNOT BE RELEASED, INSPECTION, AT Shift Lock System.>
2	**CHECK SHIFT LOCK.**	While the brake pedal is not depressed, can select lever move from “P” range to other positions?	Inspect “SELECT LEVER CANNOT BE SHIFT LOCKED”. <Ref. to CS-16, SELECT LEVER CANNOT BE SHIFT LOCKED, INSPECTION, AT Shift Lock System.>	Go to step **3.**
3	**CHECK KEY INTERLOCK.**	When the select lever is in other than “P” position, does ignition switch turn to “LOCK” position?	Inspect “KEY INTERLOCK DOES NOT BE LOCKED OR RELEASED. <Ref. to CS-18, SELECT LEVER SHIFT LOCK CANNOT BE RELEASED, INSPECTION, AT Shift Lock System.>	Go to step **4.**
4	**CHECK KEY INTERLOCK.**	When the select lever is in “P” position, 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-18, SELECT LEVER SHIFT LOCK CANNOT BE RELEASED, INSPECTION, AT Shift Lock System.>

MEMO:

1. INTEGRATED MODULE POWER SUPPLY AND GROUND LINE

WIRING DIAGRAM:

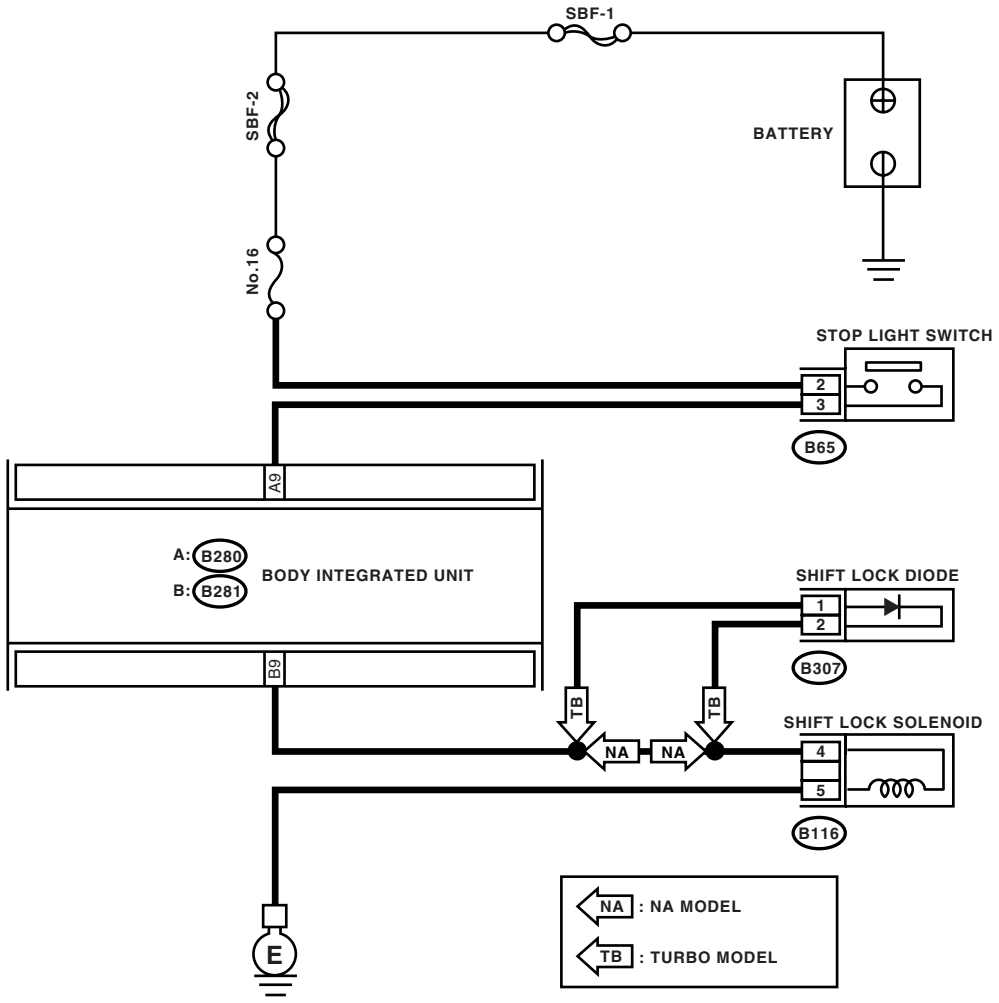


CS-00548

	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 18). If the replaced fuse (No. 3, 4 or 11) has blown out easily, repair short circuit in harness between fuse and integrated module.	Go to step **2.**
2	**CHECK HARNESS CONNECTOR BETWEEN INTEGRATED MODULE AND BODY GROUND.** 1) Turn the ignition switch to OFF. 2) Measure the resistance of harness between integrated module and chassis ground. ***Connector & terminal*** ***(B281) No. 4 — Chassis ground:*** ***(B281) No. 13 — Chassis ground:***	Is the measured value less than 1 Ω?	Go to step **3.**	Repair the open circuit in harness between integrated module and body ground.
3	**CHECK BATTERY POWER SUPPLY.** 1) Turn the ignition switch to ON (engine OFF). 2) Measure the voltages between integrated module and chassis ground. ***Connector & terminal*** ***(B281) No. 2 (+) — Chassis ground (-):***	Is the measured value more than 9 V?	Go to step **4.**	Repair the open circuit harness between battery and integrated module, and poor contact in coupling connector.
4	**CHECK IGNITION POWER SUPPLY CIRCUIT.** 1) Turn the ignition switch to ACC. 2) Measure the voltage between integrated module and chassis ground. ***Connector & terminal*** ***(B280) No. 10 (+) — Chassis ground (-):***	Is the measured value more than 9 V?	Go to step **5.**	Repair the open circuit harness between battery and integrated module, 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 integrated module and chassis ground. ***Connector & terminal*** ***(B280) No. 19 (+) — Chassis ground (-):***	Is the measured value more than 9 V?	Go to step **6.**	Repair the open circuit harness between battery and integrated module, and poor contact in coupling connector.
6	**CHECK POOR CONTACT.**	Is there poor contact in power supply and ground line circuit?	Repair the poor contact.	Replace the integrated module.

2. SELECT LEVER CANNOT BE SHIFT LOCKED

WIRING DIAGRAM:

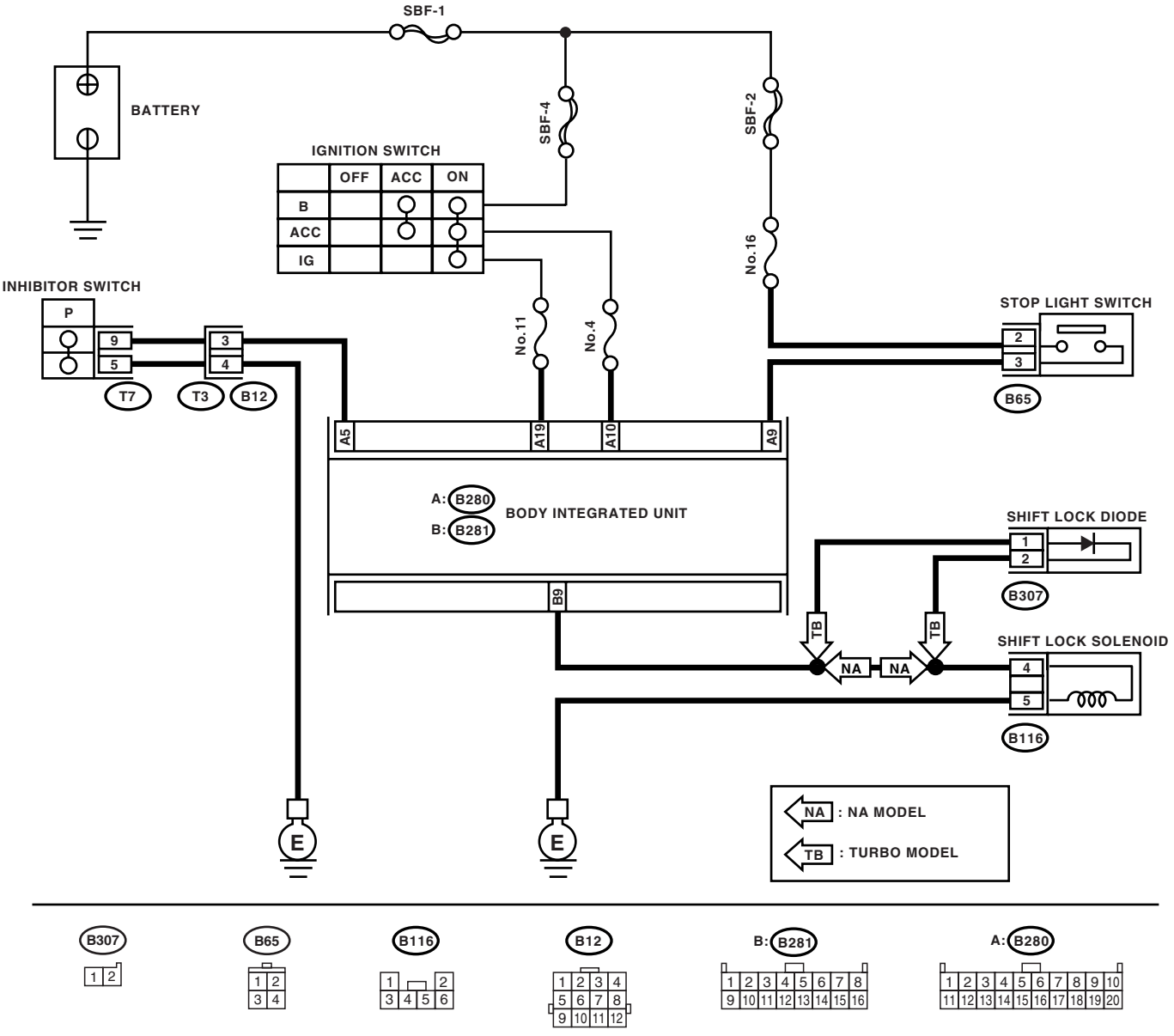


CS-00549

	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 INTEGRATED MODULE.** 1) Turn the ignition switch to OFF. 2) Disconnect the integrated module and stop-light switch connector. 3) Measure the resistance of harness between stop light switch and integrated module. ***Connector & terminal*** ***(B65) No. 3 — (B280) No. 9:***	Is the measured value more than 1 MΩ?	Repair the open circuit in harness between integrated module and stop light switch.	Go to step **3.**
3	**CHECK HARNESS BETWEEN STOP LIGHT SWITCH AND INTEGRATED MODULE.** Measure the resistance of harness between stop light switch and chassis ground. ***Connector & terminal*** ***(B65) No. 3 — Chassis ground:***	Is the measured value less than 1 Ω?	Repair the short circuit in harness between integrated module and stop light switch.	Go to step **4.**
4	**CHECK HARNESS BETWEEN INTEGRATED MODULE AND SHIFT LOCK SOLENOID.** 1) Disconnect the shift lock solenoid connector. 2) Measure the resistance of harness between integrated module and shift lock solenoid. ***Connector & terminal*** ***(B116) No. 4 — (B281) No. 9:***	Is the measured value more than 1 MΩ?	Repair the open circuit in harness between integrated module and shift lock solenoid.	Go to step **5.**
5	**CHECK HARNESS BETWEEN INTEGRATED MODULE AND SHIFT LOCK SOLENOID.** Measure the resistance of harness between shift lock solenoid and chassis ground. ***Connector & terminal*** ***(B116) No. 4 — Chassis ground:***	Is the measured value less than 1 Ω?	Repair the short circuit in harness between integrated module 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*** ***(B116) No. 5 — Chassis ground:***	Is the measured value 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. ***Terminal*** ***No. 4 — No. 5:***	Is the measured value within 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. ***Terminal*** ***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 AT shift lock circuit?	Repair the poor contact.	Replace the integrated module.

3. SELECT LEVER SHIFT LOCK CANNOT BE RELEASED

WIRING DIAGRAM:



CS-00550

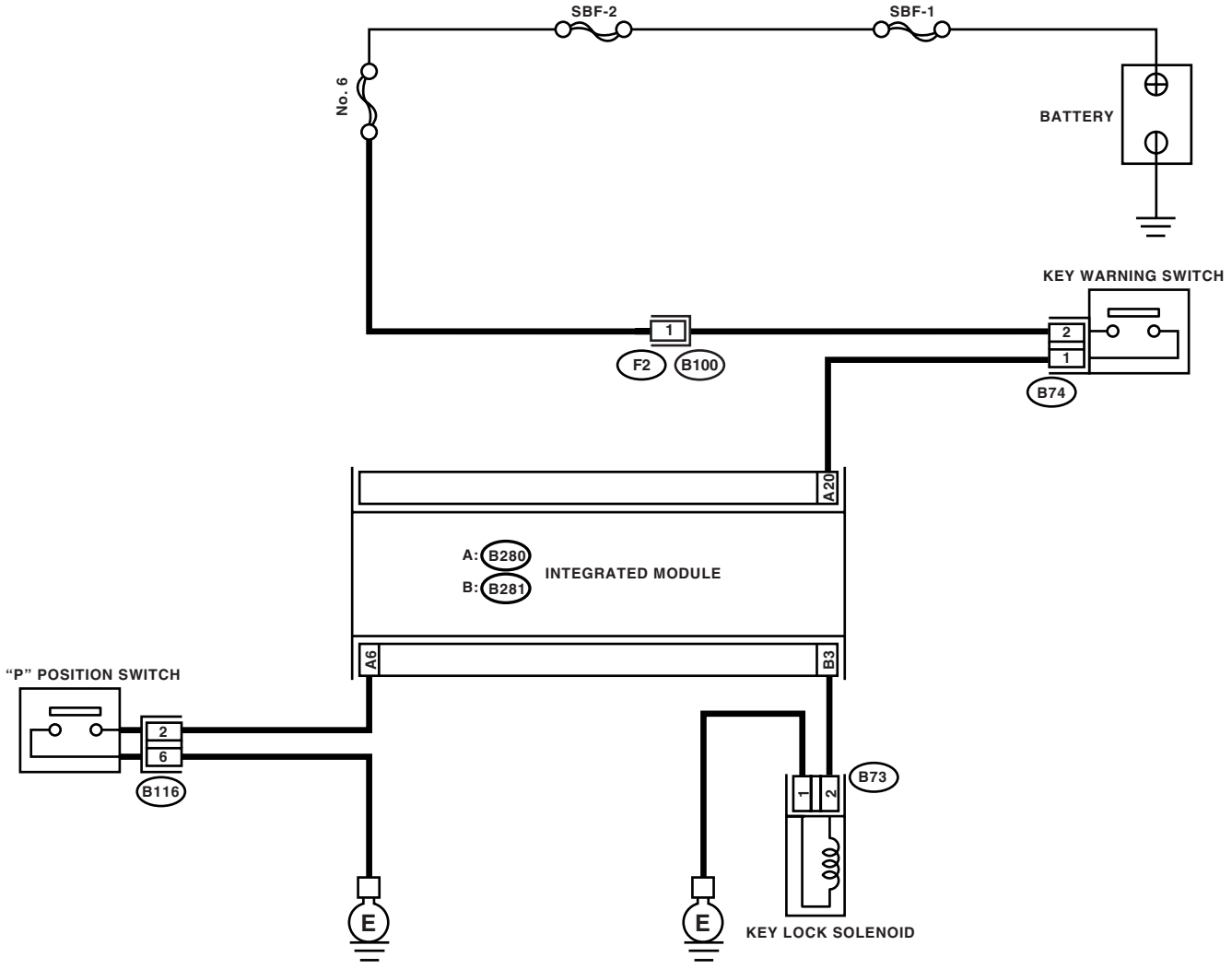
	Step	Check	Yes	No
1	**CHECK INHIBITOR SWITCH.** 1) Turn the ignition switch to ON (engine OFF). 2) Move the select lever from “P” to “1” range.	Are combination meter indicator light and select lever “P”, “R”, “N”, “3”, “2” and “1” correctly matched?	Go to step **2.**	Adjust the inhibitor switch and select cable.
2	**CHECK IGNITION POWER SUPPLY CIRCUIT.** 1) Turn the ignition switch to ON (engine OFF). 2) Measure the voltage between integrated module and chassis ground. ***Connector & terminal*** ***(B280) No. 19 (+) — Chassis ground (-):***	Is the measured value more than 9 V?	Go to step **3.**	Repair the open circuit harness between battery and integrated module, and poor contact in coupling connector.
3	**CHECK HARNESS BETWEEN INHIBITOR SWITCH AND INTEGRATED MODULE.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector of transmission harness and integrated module. 3) Measure the resistance of harness between integrated module and chassis ground. ***Connector & terminal*** ***(B280) No. 5 — Chassis ground:***	Is the measured value less than 1 Ω?	Repair the short circuit in harness between integrated module and transmission connector.	Go to step **4.**
4	**CHECK HARNESS BETWEEN INHIBITOR SWITCH AND INTEGRATED MODULE.** Measure the resistance of harness between integrated module and inhibitor switch. ***Connector & terminal*** ***(B12) No. 3 — (B280) No. 5:***	Is the measured value more than 1 MΩ?	Repair the open circuit in harness between integrated module and transmission connector	Go to step **5.**
5	**CHECK HARNESS BETWEEN INHIBITOR SWITCH AND CHASSIS GROUND.** Measure the resistance of harness between inhibitor switch and chassis ground. ***Connector & terminal*** ***(B12) No. 4 — Chassis ground:***	Is the measured value less than 1 Ω?	Go to step **6.**	Repair the open circuit in harness between inhibitor switch and chassis ground.
6	**CHECK INHIBITOR SWITCH.** 1) Move the select lever to “P” position. 2) Measure the resistance of transmission harness connector terminals. ***Connector & terminal*** ***(T3) No. 3 — No. 4:***	Is the measured value more than 1 MΩ?	Repair or replace the inhibitor switch.	Go to step **7.**
7	**CHECK OUTPUT SIGNAL FOR INTEGRATED MODULE.** 1) Connect all connectors. 2) Turn the ignition switch to ON. 3) Measure the voltage between integrated module and chassis ground. ***Connector & terminal*** ***(B280) No. 5 (+) — Chassis ground (-):***	Is the measured value within 9 — 16 V?	Go to step **8.**	Go to step **16.**
8	**CHECK STOP LIGHT SWITCH.** Depress the brake pedal.	Does the stop light turn on?	Go to step **9.**	Inspect the stop light system.
9	**CHECK HARNESS BETWEEN STOP LIGHT SWITCH AND INTEGRATED MODULE.** 1) Depress the brake pedal. 2) Measure the voltage between integrated module and chassis ground. ***Connector & terminal*** ***(B280) No. 9 (+) — Chassis ground (-):***	Is the measured value more than 9 V?	Go to step **10.**	Repair the open or short circuit in harness between integrated module and stop light switch.

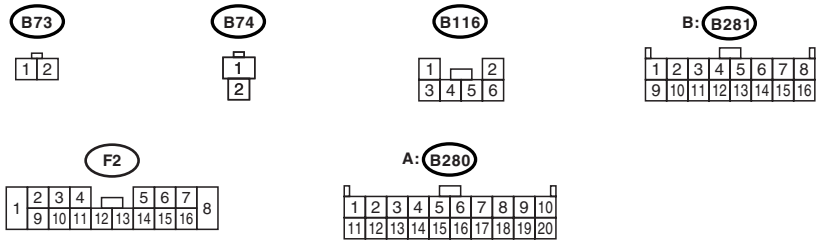
	Step	Check	Yes	No
10	**CHECK HARNESS BETWEEN INTEGRATED MODULE AND SHIFT LOCK SOLENOID.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from shift lock solenoid and integrated module. 3) Measure the resistance of harness between integrated module and shift lock solenoid. ***Connector & terminal*** ***(B281) No. 9 — (B116) No. 4:***	Is the measured value more than 1 MΩ?	Repair the open circuit in harness between integrated module and shift lock solenoid.	Go to step **11.**
11	**CHECK HARNESS BETWEEN INTEGRATED MODULE AND SHIFT LOCK SOLENOID.** Measure the resistance of harness between shift lock solenoid and chassis ground. ***Connector & terminal*** ***(B281) No. 9 — Chassis ground:***	Is the measured value less than 10 Ω?	Go to step **12.**	Repair the short circuit in harness between integrated module and shift lock solenoid.
12	**CHECK HARNESS BETWEEN SHIFT LOCK SOLENOID AND CHASSIS GROUND.** Measure the resistance of harness between shift lock solenoid and chassis ground. ***Connector & terminal*** ***(B116) No. 5 — Chassis ground:***	Is the measured value less than 1 Ω?	Go to step **13.**	Repair the open circuit in harness between shift lock solenoid and chassis ground.
13	**CHECK SHIFT LOCK SOLENOID.** Measure the resistance of shift lock solenoid connector terminals. ***Terminal*** ***No. 4 — No. 5:***	Is the measured value within 20 — 40 Ω?	Go to step **14.**	Replace the shift lock solenoid.
14	**CHECK SHIFT LOCK SOLENOID.** Connect the battery with shift lock solenoid connector terminal and operate solenoid. ***Terminal*** ***No. 4 (+) — No. 5 (-):***	Is the shift lock solenoid operating properly?	Go to step **15.**	Replace the shift lock solenoid.
15	**CHECK OUTPUT SIGNAL FOR INTEGRATED MODULE.** 1) Turn the ignition switch to ON (engine OFF). 2) Measure the voltage between integrated module and chassis ground. ***Connector & terminal*** ***(B281) No. 9 (+) — Chassis ground (-):***	Is the measured value more than 8.5 V?	Go to step **16.**	Replace the integrated module.
16	**CHECK POOR CONTACT.**	Is there poor contact in AT shift lock circuit?	Repair the poor contact.	Replace the integrated module.

MEMO:

4. KEY INTERLOCK DOES NOT LOCK OR RELEASE

WIRING DIAGRAM:





CS-00551

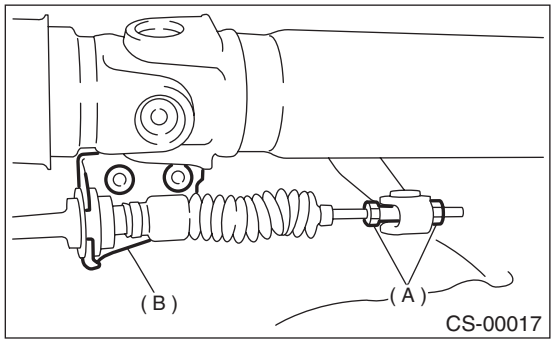
	Step	Check	Yes	No
1	**CHECK HARNESS BETWEEN BATTERY AND KEY WARNING SWITCH.** 1) Disconnect the connector key warning switch. 2) Measure the voltage of harness between key warning switch and chassis ground. ***Connector & terminal*** ***(B74) No. 2 (+) — Chassis ground (-):***	Is the measured value within 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. ***Terminal*** ***No. 1 — No. 2:***	Is the measured value more than 1 MΩ?	Replace the key warning switch.	Go to step **4.**
3	**CHECK KEY WARNING SWITCH.** 1) Remove the key. 2) Measure the resistance of key warning switch connector terminals. ***Terminal*** ***No. 1 — No. 2:***	Is the measured value more than 1 MΩ?	Go to step **4.**	Replace the key warning switch.
4	**CHECK HARNESS BETWEEN INTEGRATED MODULE AND KEY WARNING SWITCH.** 1) Disconnect the integrated module connector. 2) Measure the voltage of harness integrated module and chassis ground. ***Connector & terminal*** ***(B280) No. 20 (+) — Chassis ground (-):***	Is the measured value more than 9 V?	Go to step **5.**	Repair the open circuit in harness between integrated module and key warning switch.
5	**CHECK HARNESS BETWEEN INTEGRATED MODULE AND KEY LOCK SOLENOID.** 1) Disconnect the connector of key lock solenoid. 2) Measure the resistance of harness between integrated module and key lock solenoid. ***Connector & terminal*** ***(B73) No. 2 — (B281) No. 3:***	Is the measured value more than 1 MΩ?	Repair the open circuit in harness between integrated module and key lock solenoid.	Go to step **6.**
6	**CHECK HARNESS BETWEEN INTEGRATED MODULE AND KEY LOCK SOLENOID.** Measure the resistance of harness between integrated module and chassis ground. ***Connector & terminal*** ***(B281) No. 3 — Chassis ground:***	Is the measured value less than 1 Ω?	Go to step **7.**	Repair the short circuit in harness between integrated module 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 measured value 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. ***Terminal*** ***No. 1 — No. 2:***	Is the measured value within 4 — 8 Ω?	Go to step **14.**	Replace the key lock solenoid.
9	**CHECK HARNESS BETWEEN "P" POSITION SWITCH AND CHASSIS GROUND.** Measure the resistance of harness between "P" position switch and chassis ground. ***Connector & terminal*** ***(B116) No. 2 — Chassis ground:***	Is the measured value less than 1 Ω?	Go to step **10.**	Repair the short circuit in harness between "P" position switch and integrated module.

	Step	Check	Yes	No
10	**CHECK HARNESS BETWEEN INTEGRATED MODULE AND "P" POSITION SWITCH.** 1) Disconnect the connector from "P" position switch. 2) Measure the resistance of harness between integrated module and "P" position switch. ***Connector & terminal*** ***(B116) No. 2 — (B281) No. 6:***	Is the measured value more than 1 MΩ?	Repair the open circuit in harness between integrated module and "P" position switch.	Go to step **11.**
11	**CHECK HARNESS BETWEEN "P" POSITION SWITCH AND CHASSIS GROUND.** Measure the resistance of harness "P" position switch and chassis ground. ***Connector & terminal*** ***(B116) No. 6 — Chassis ground:***	Is the measured value more than 1 MΩ?	Go to step **12.**	Repair the open circuit in harness between "P" position switch and chassis ground.
12	**CHECK "P" POSITION SWITCH.** 1) Move the select lever to "P" position. 2) Measure resistance between "P" position switch connector terminals. ***Terminal*** ***No. 2 — No. 6:***	Is the measured value less than 1 Ω?	Go to step **13.**	Replace the "P" position switch.
13	**CHECK "P" POSITION SWITCH.** 1) Move the select lever to other than "P" position. 2) Measure resistance between "P" position switch connector terminals. ***Terminal*** ***No. 2 — No. 6:***	Is the measured value more than 1 MΩ?	Go to step **14.**	Replace the "P" position switch.
14	**CHECK OUTPUT SIGNAL FOR INTEGRATED MODULE.** 1) Connect all connectors. 2) Turn the ignition switch to ON (engine OFF). 3) Move the select lever to "P" position. 4) Press the brake pedal. 5) Measure the voltage between integrated module connector and chassis ground. ***Connector & terminal*** ***(B281) No. 3 (+) — Chassis ground (-):***	Is the measured value within 7.5 — 16 V?	Go to step **15.**	Replace the integrated module.
15	**CHECK POOR CONTACT.**	Is there poor contact in key lock circuit?	Repair the poor contact.	Replace the integrated module.

4. Select Lever

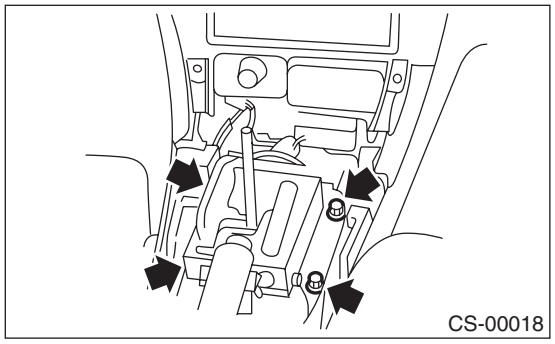
A: REMOVAL

1) Set the vehicle on a lift.
2) Disconnect the ground cable from battery.
3) Move the select lever to “N” position.
4) Lift-up the vehicle.
5) Remove the rear exhaust pipe and muffler.
NON-TURBO model
<Ref. to EX(H4SO)-9, REMOVAL, Rear Exhaust Pipe.>, <Ref. to EX(H4SO)-10, REMOVAL, Muffler.>
TURBO model
<Ref. to EX(H4DOTC)-14, REMOVAL, Rear Exhaust Pipe.>,<Ref. to EX(H4DOTC)-15, 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

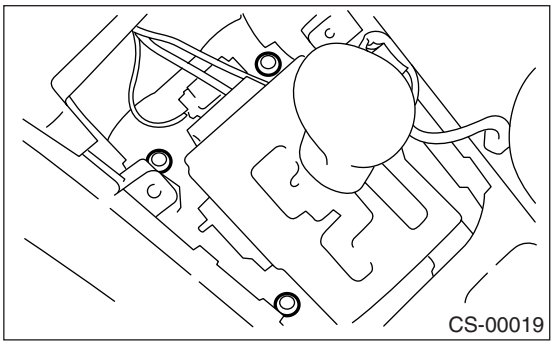
8) Lower the vehicle.
9) Remove the console box. <Ref. to EI-36, REMOVAL, Console Box.>
10) Disconnect the connectors, then remove the four bolts to take out the select lever assembly from body.



B: INSTALLATION

1) Mount the select lever onto the vehicle body.
2) Tighten the four bolts to install the select lever to vehicle body, then connect the connector.

Tightening torque:
13 N·m (1.3 kgf-m, 9.4 ft-lb)



3) Install the console box. <Ref. to EI-34, INSTALLATION, Glove Box.>
4) Set the location of select lever at “N” position.
5) Lift-up the vehicle.
6) Set the location of range select lever to “N” position.
7) Insert the thread portion of the other inner cable and into connector hole of the select lever, and fix the other outer cable end to bracket.

Tightening torque:
18 N·m (1.8kgf-m, 13.0 ft-lb)

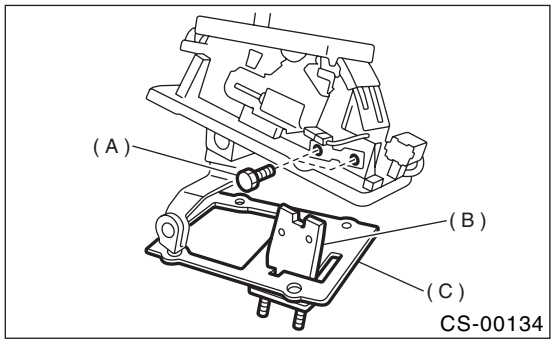
8) Adjust the select cable position. <Ref. to CS-32, ADJUSTMENT, Select Cable.>
9) After completion of fitting, make sure that the select lever operates smoothly all across the operating range.
10) Install the heat shield cover. (If equipped)
11) Install the rear exhaust pipe and muffler.
NON-TURBO model
<Ref. to EX(H4SO)-9, INSTALLATION, Rear Exhaust Pipe.>, <Ref. to EX(H4SO)-10, INSTALLATION, Muffler.>
TURBO model
<Ref. to EX(H4DOTC)-14, INSTALLATION, Rear Exhaust Pipe.>,<Ref. to EX(H4DOTC)-15, INSTALLATION, Muffler.>
12) Inspect the following items. If the following inspection reveals problems, adjust the select cable and inhibitor switch. <Ref. to CS-32, ADJUSTMENT, Select Cable.> and <Ref. to 4AT-50, ADJUSTMENT, Inhibitor Switch.>
(1) The engine starts operating when select lever is in position “P” or “N”, but not in other positions.
(2) The back-up light is lit when the select lever is in position “R”, but not in other positions.

(3) Select lever and indicator positions are matched.

C: DISASSEMBLY

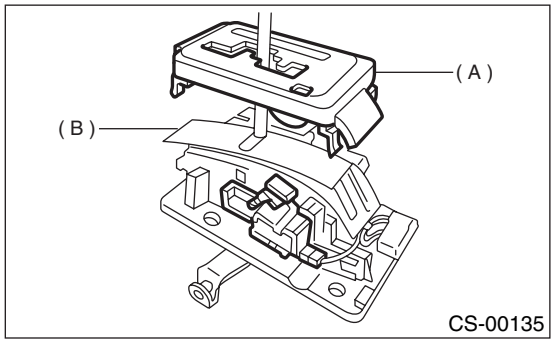
1. EXCEPT SPORT SHIFT MODEL

1) Remove four washers and then detach rubber boot.
2) Remove bolts and then remove cable bracket and plate.



(A) Bolt
(B) Cable bracket
(C) Plate

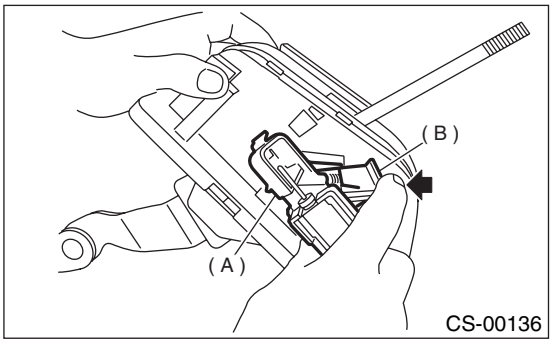
3) Remove select lever grip.
4) Detach indicator cover and pattern plate.



(A) Indicator cover
(B) Pattern plate

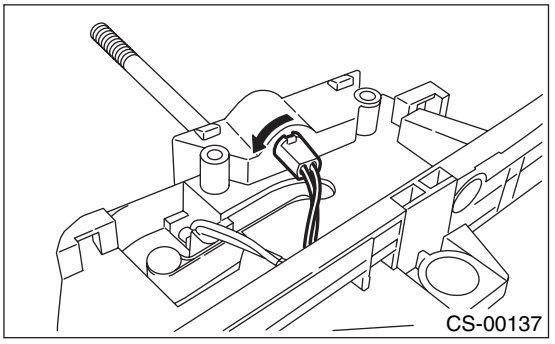
5) Disconnect solenoid assembly connector.

6) While pressing shift lock cancel button, remove shift lock solenoid assembly.

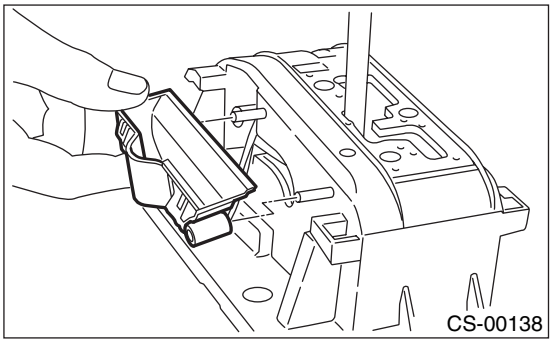


(A) Shift lock solenoid ASSY
(B) Button

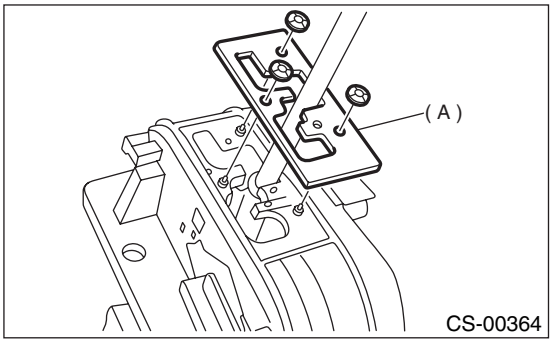
7) Remove indicator light.



8) Remove indicator bulb.
9) Remove indicator light cover.

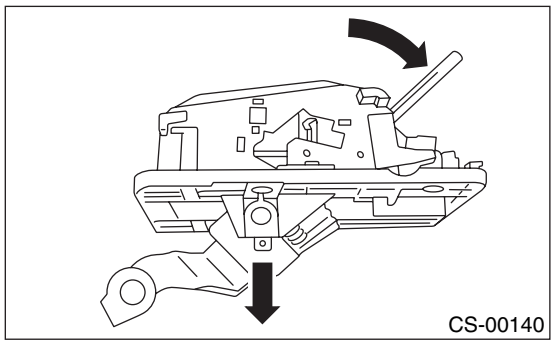


10) Remove cushion.

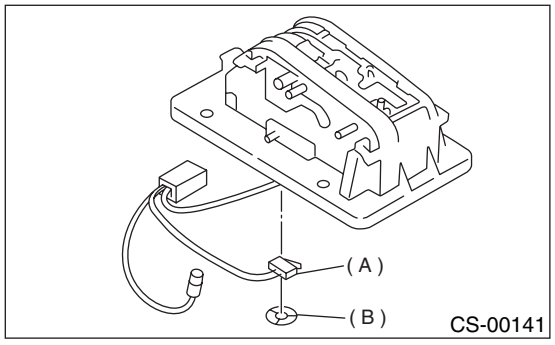


(A) Cushion

11) Tilt lever forward and pull down to separate it from frame.

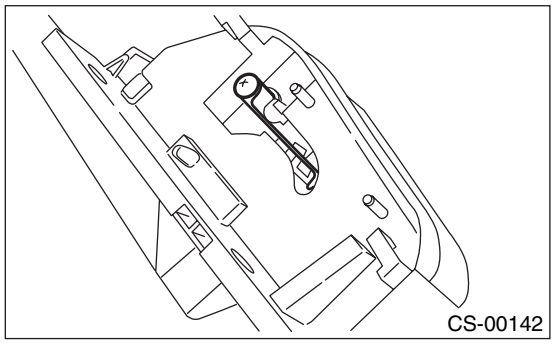


12) Remove clip, and “P” position switch with harness.



(A) “P” position switch
(B) Clip

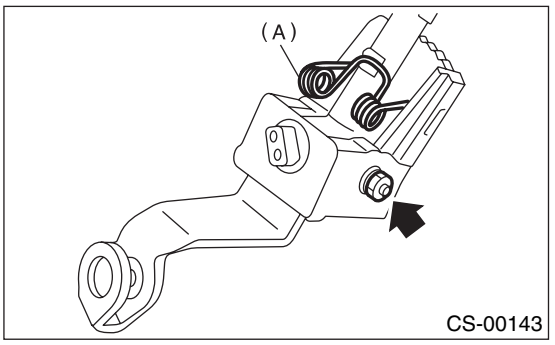
13) Remove detent spring.



14) Remove spring.

CAUTION:
Wear goggles. Do not allow spring to fly out during removal.

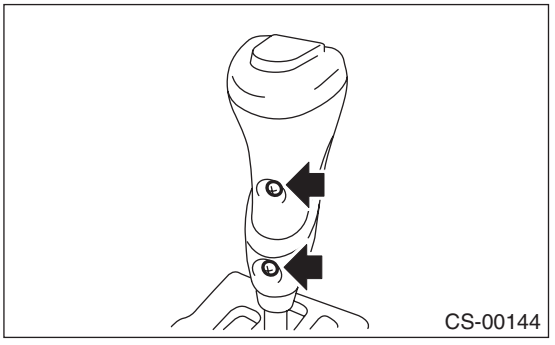
15) Remove bolt and then disconnect lever upper and lever lower.



(A) Spring

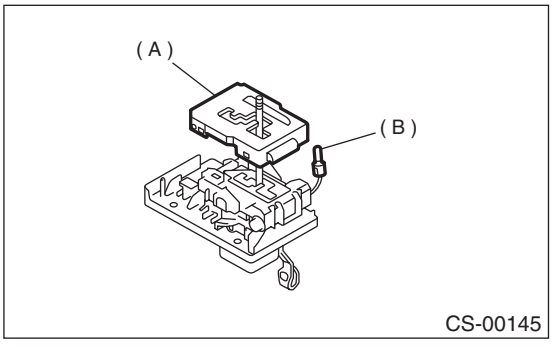
2. SPORT SHIFT MODEL

1) Remove the packing.
2) Remove the grip.



3) Remove the indicator light, and then remove the indicator cover.

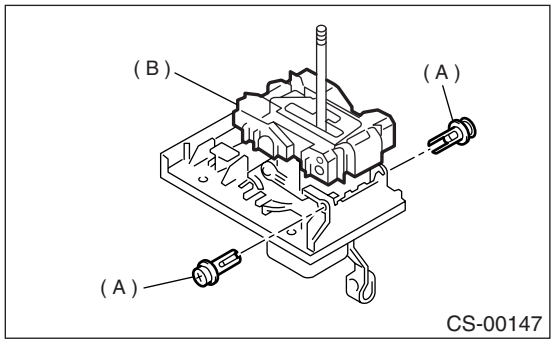
NOTE:
Be careful not to break the indicator light during removal.



(A) Indicator cover
(B) Indicator light

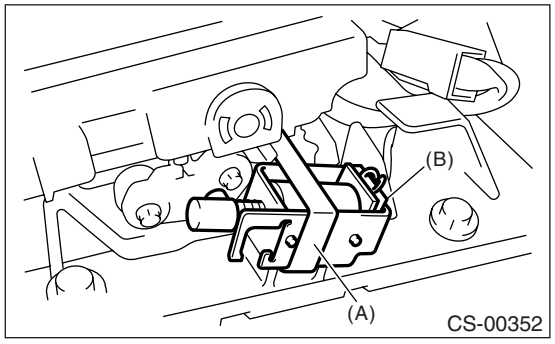
4) Remove the blind.

5) Remove the clips, and then remove the guide plate.



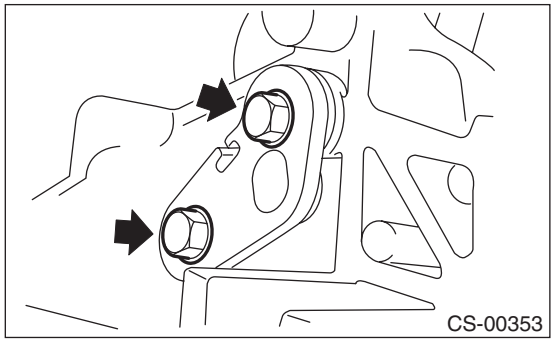
(A) Clips
(B) Guide plate

6) Remove the clamp, shift lock solenoid and cushion.

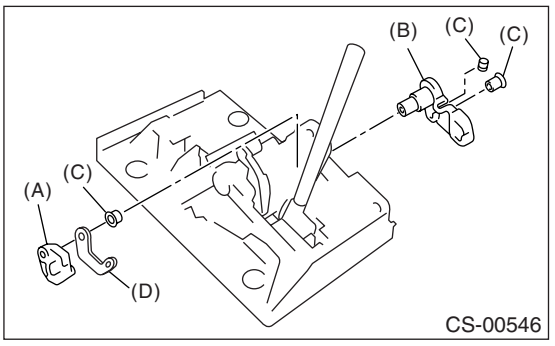


(A) Clamp
(B) Shift lock solenoid

7) Move select lever to “1” range.
8) Remove the bolt.

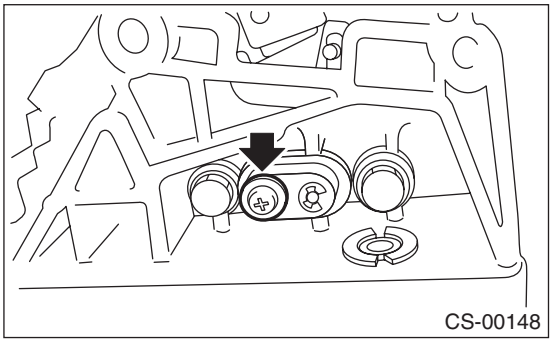


9) Remove the lock plate A, B, C and bushing.

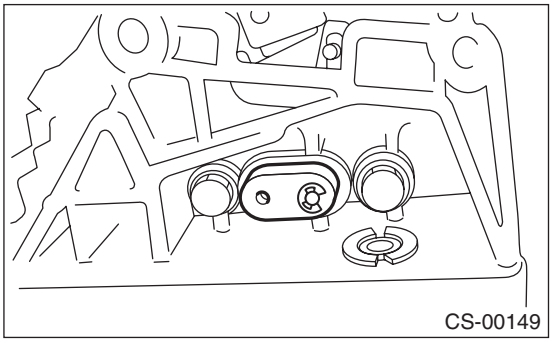


(A) Lock plate A
(B) Lock plate B
(C) Bushing
(D) Lock plate C

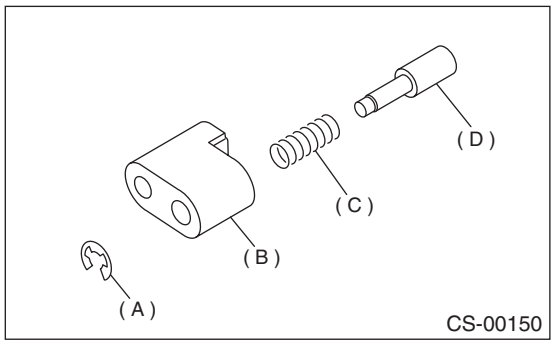
10) Remove the screw.



11) Remove the bushing.

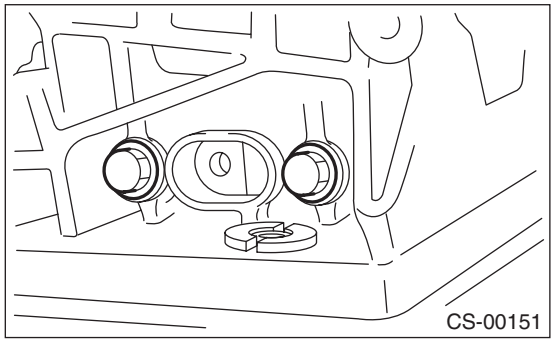


12) Remove the clip, and then remove the rod and the spring.

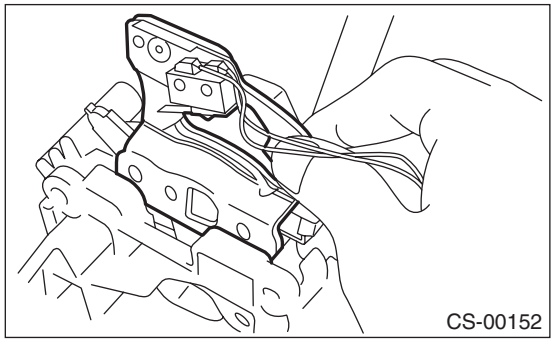


(A) Clip
(B) Bushing
(C) Spring
(D) Rod

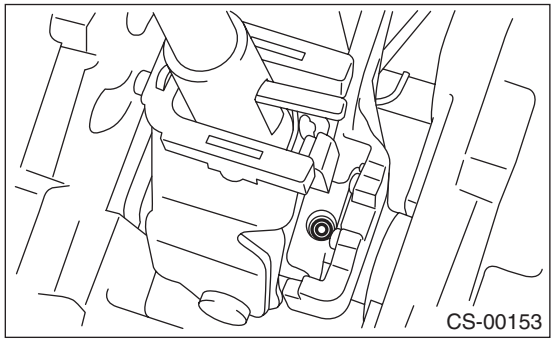
13) Remove the bolt.



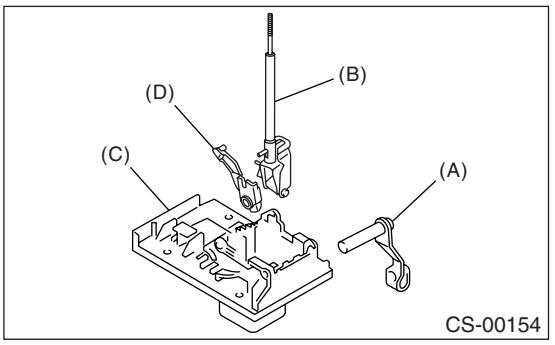
14) Remove the bracket guide ASSY.



15) Remove the grommet, and then extract spring pin from the top.



16) Remove the arm and then take away the lever and arm bracket from plate.



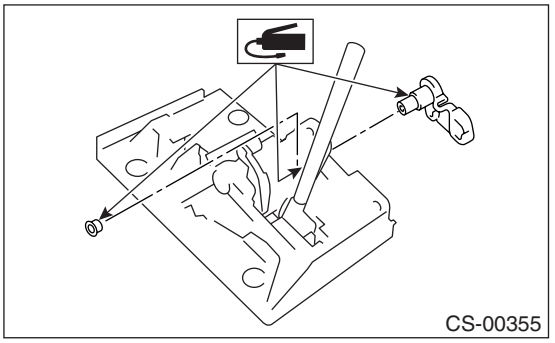
(A) Arm
(B) Lever
(C) Base plate
(D) Arm bracket

17) Remove the spring, and then remove the detent arm.

D: ASSEMBLY

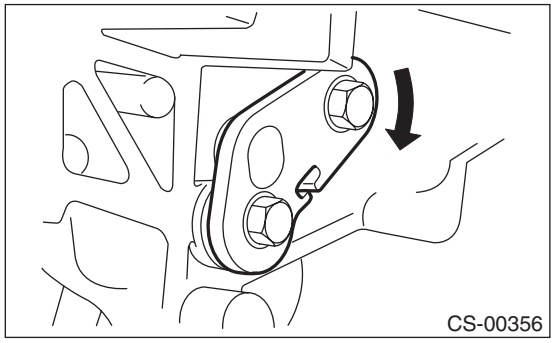
1) Clean all parts before assembly.
2) Apply grease [KOPR-KOTE (Part No. 003603001) or equivalent] and SUNCALL or equivalent to each parts. <Ref. to CS-3, AT SELECT LEVER (EXCEPT SPORT SHIFT MODEL), COMPONENT, General Description.> and <Ref. to CS-4, AT SELECT LEVER (SPORT SHIFT MODEL), COMPONENT, General Description.>

NOTE:
Do not apply SUNCALL to area except following parts.



3) Assembly is in the reverse order of disassembly.

NOTE:
• Refer to “COMPONENT” for tightening torque. <Ref. to CS-3, COMPONENT, General Description.>
• Tighten the lock plate bolt uniformly. After installation, locate the base plate upside down, and then push the lock plate up. Make sure the lock plate falls by its weight when releasing it. If not, retighten the bolt.



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.

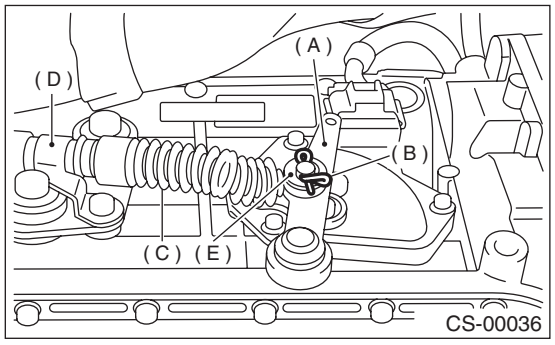
E: INSPECTION

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 ASSY, it should move smoothly.

5. Select Cable

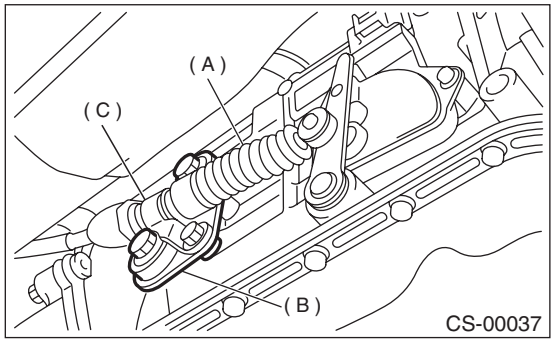
A: REMOVAL

1) Set the vehicle on a lift.
2) Disconnect the ground cable from battery.
3) Prior to removal, set the lever to “N” position.
4) Lift-up the vehicle.
5) Remove the front and center exhaust pipe. (Non-TURBO model)
<Ref. to EX(H4SO)-5, REMOVAL, Front Exhaust Pipe.>
6) Remove center exhaust pipe. (TURBO model) <Ref. to EX(H4DOTC)-9, REMOVAL, Center Exhaust Pipe.>
7) Remove the heat shield cover. (If equipped)
8) Remove the snap pin from range select lever.



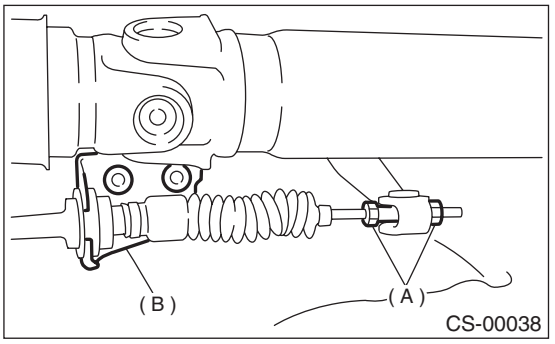
(A) Range select lever
(B) Snap pin
(C) Select cable
(D) Clamp
(E) Washer

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.

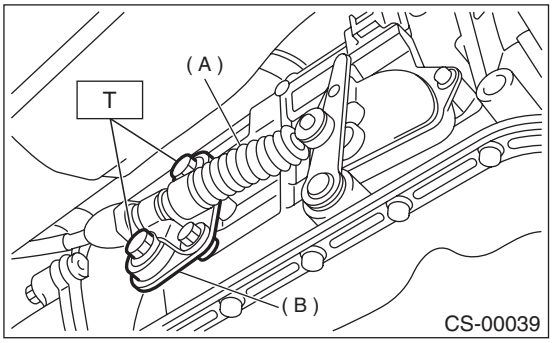
B: INSTALLATION

1) Install the select cable to base plate.

Tightening torque:
18 N·m (1.8 kgf-m, 13.0 ft-lb)

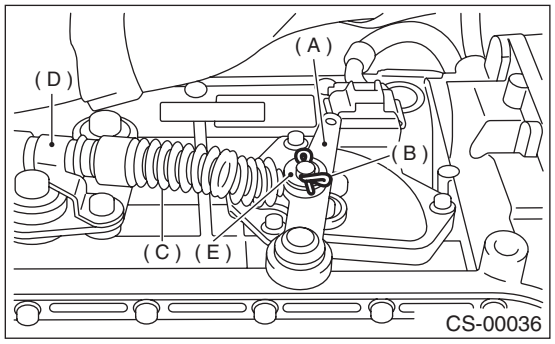
2) Install the select cable to range select lever.
3) Install the plate assembly to transmission.

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

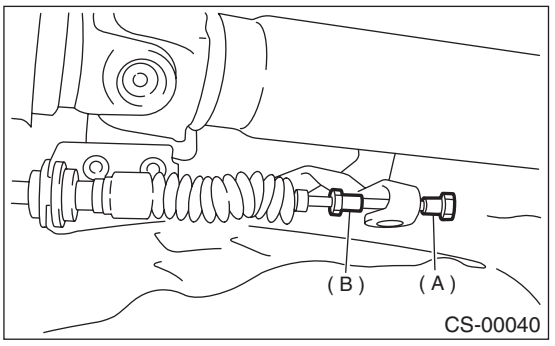
5) Move the select lever to “N” position, then adjust the select cable position. <Ref. to CS-32, ADJUSTMENT, Select Cable.>
6) Install the heat shield cover. (If equipped)
7) Install the front and center exhaust pipe. (Non-TURBO model)
<Ref. to EX(H4SO)-6, INSTALLATION, Front Exhaust Pipe.>
8) Install center exhaust pipe. (TURBO model)
<Ref. to EX(H4DOTC)-10, INSTALLATION, Center Exhaust Pipe.>

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” position to “1” position. You should be able to feel the detentes in each position. If the detentes cannot be felt or the position pointer is improperly aligned, adjust the cable.

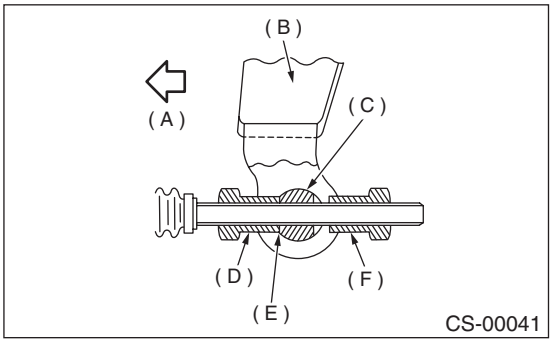
D: ADJUSTMENT

1) Set the vehicle on a lift.
2) Set the lever to “N” position.
3) Lift-up the vehicle.
4) Remove the rear exhaust pipe and muffler.
5) Remove the heat shield cover. (If equipped)
6) Loosen the adjusting nut on each side.



(A) Adjusting nut A
(B) Adjusting nut B

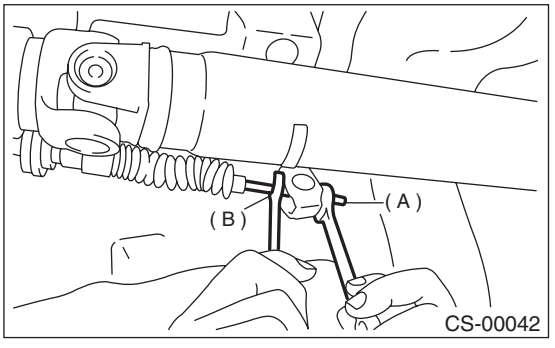
7) Turn the adjusting nut B until it lightly touches the connector.



(A) Front side
(B) Select lever
(C) Connector
(D) Adjusting nut B
(E) Contact point
(F) Adjusting nut A

8) 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

9) After completion of fitting, make sure that the select lever operates smoothly all across the operating range.
10) Install in the reverse order of removal.

6. AT Shift Lock Solenoid and “P” Position Switch

A: REMOVAL

1) Remove the select lever. <Ref. to CS-25, REMOVAL, Select Lever.>
2) Remove AT shift lock solenoid and “P” position switch.<Ref. to CS-26, DISASSEMBLY, Select Lever.>

B: INSTALLATION

1) Install AT shift lock solenoid and “P” position switch. <Ref. to CS-29, ASSEMBLY, Select Lever.>
2) Install the select lever. <Ref. to CS-25, INSTALLATION, Select Lever.>

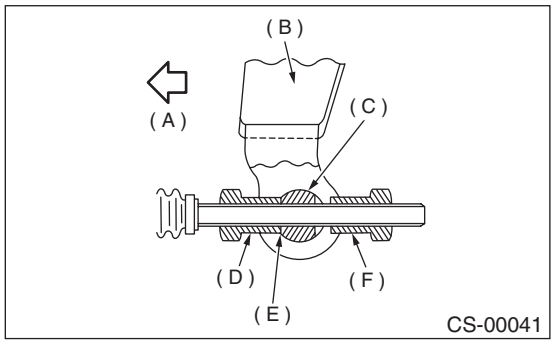
C: INSPECTION

	Step	Check	Yes	No
1	**CHECK SHIFT LOCK SOLENOID.** Measure the resistance of shift lock solenoid connector terminals. ***Terminal*** ***No. 4 — No. 5***	Is the measured value within 20 — 40 Ω?	Go to step **2.**	Replace the shift lock solenoid and “P” position switch assembly.
2	**CHECK SHIFT LOCK SOLENOID.** Connect the battery with shift lock solenoid connector terminal, operate solenoid. ***Terminal*** ***No. 4 (+) — No. 5 (-)***	Is the shift lock solenoid operating properly?	Go to step **3.**	Replace the shift lock solenoid and “P” position switch assembly.
3	**CHECK “P” POSITION SWITCH.** 1) Move the select lever to “P” position. 2) Measure resistance between “P” position switch connector terminals.	Is the measured value less than 1 Ω?	Go to step **4.**	Replace the “P” position switch.
4	**CHECK “P” POSITION SWITCH.** 1) Move the select lever to other than “P” position. 2) Measure resistance between “P” position switch connector terminals.	Is the measured value more than 1 MΩ?	Normal	Replace the “P” position switch.

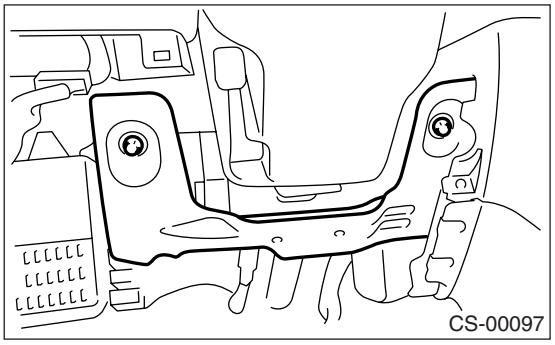
7. Integrated Module

A: REMOVAL

1) Disconnect the ground cable from battery.



2) Remove the lower cover.
3) Remove the knee bolster.



4) Disconnect the connector from integrated module.
5) Remove the integrated module from the steering column.

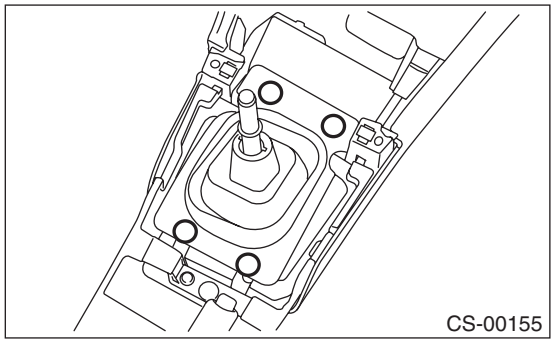
B: INSTALLATION

Install in the reverse order of removal.

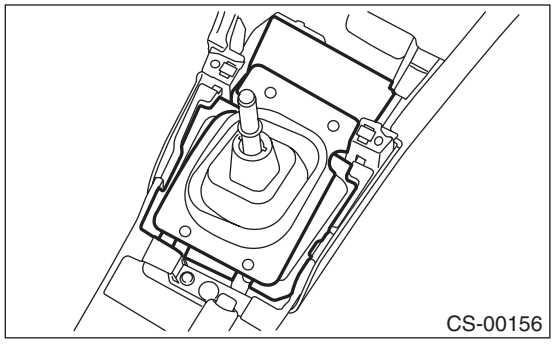
8. MT Gear Shift Lever

A: REMOVAL

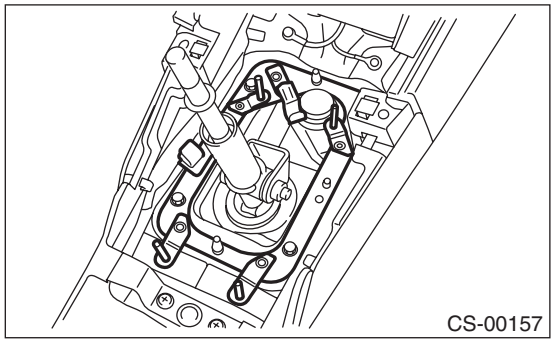
1) Set the vehicle on a lift.
2) Remove the gear shift knob.
3) Disconnect the ground cable from battery.
4) Remove the console box. <Ref. to EI-36, REMOVAL, Console Box.>
5) Remove the clamp.



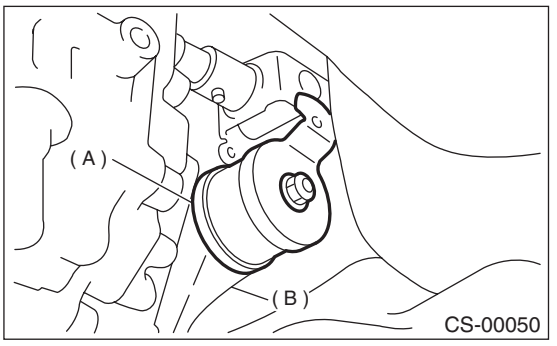
6) Remove the boot and insulator assembly.



7) Remove the plate ASSY from body.

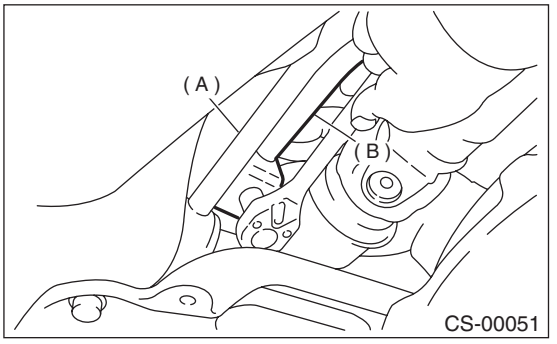


8) Lift-up the vehicle.
9) Remove the rear exhaust pipe and muffler.
NON-TURBO model
<Ref. to EX(H4SO)-9, REMOVAL, Rear Exhaust Pipe.>, <Ref. to EX(H4SO)-10, REMOVAL, Muffler.>
TURBO model
<Ref. to EX(H4DOTC)-14, REMOVAL, Rear Exhaust Pipe.>, <Ref. to EX(H4DOTC)-15, REMOVAL, Muffler.>
10) Remove the heat shield cover.
11) Remove the stay from transmission bracket.



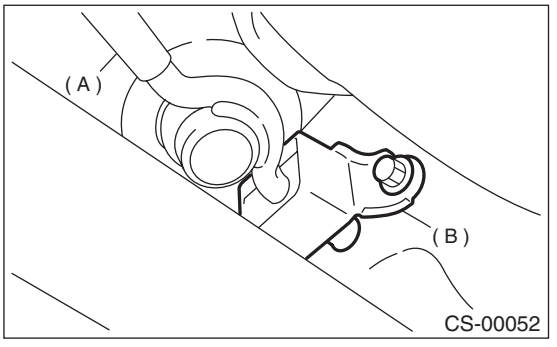
(A) Stay
(B) Transmission bracket

12) Remove the rod from joint.



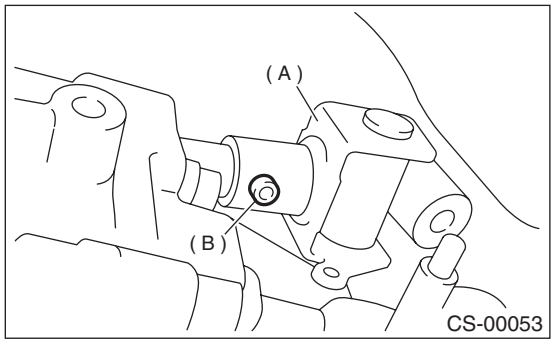
(A) Stay
(B) Rod

13) Remove the cushion rubber from body.



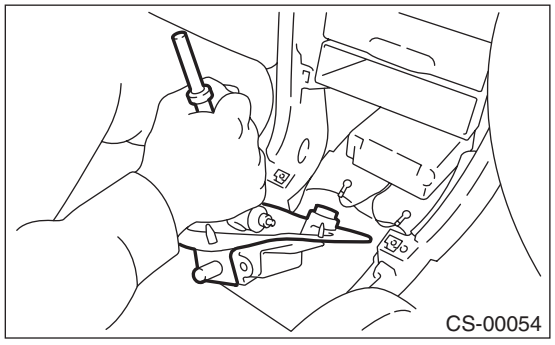
(A) Stay
(B) Cushion rubber

14) Remove the spring pin, and then extract the joint.



(A) Joint
(B) Spring pin

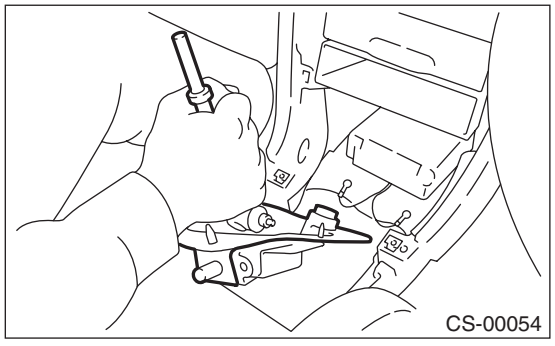
15) Lower the vehicle.
16) Remove the gear shift lever.



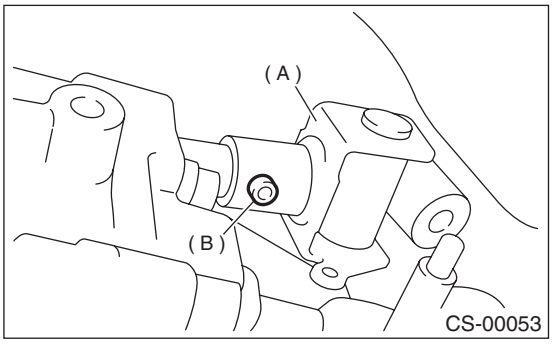
B: INSTALLATION

1) Install the joint to transmission and secure with the spring pin.
2) Insert the gear shift lever from room side.

NOTE:
After inserting the rod and stay, temporarily put them onto transmission mount.



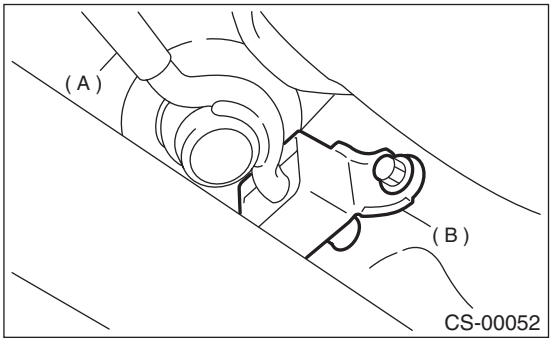
3) Lift-up the vehicle.
4) Install the joint to shifter arm.
5) Insert the spring pin.



(A) Joint
(B) Spring pin

6) Mount the cushion rubber on the body.

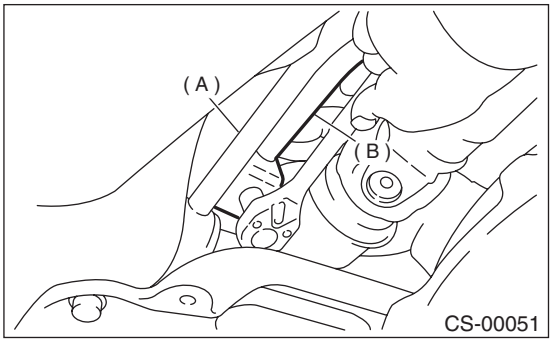
Tightening torque:
18 N·m (1.8 kgf-m, 13.0 ft-lb)



(A) Stay
(B) Cushion rubber

7) Connect the rod to the joint.

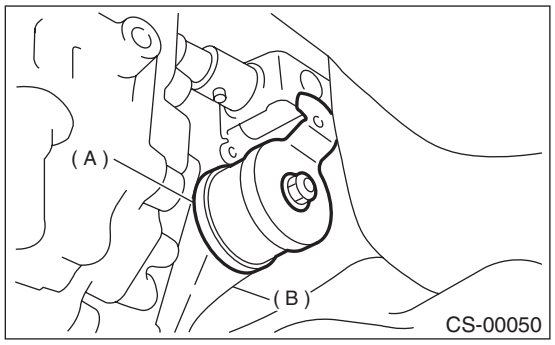
Tightening torque:
18 N·m (1.8 kgf-m, 13.0 ft-lb)



(A) Stay
(B) Rod

8) Connect the stay to transmission bracket.

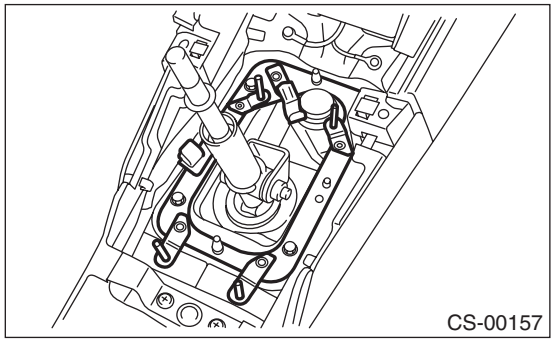
Tightening torque:
18 N·m (1.8 kgf-m, 13.0 ft-lb)



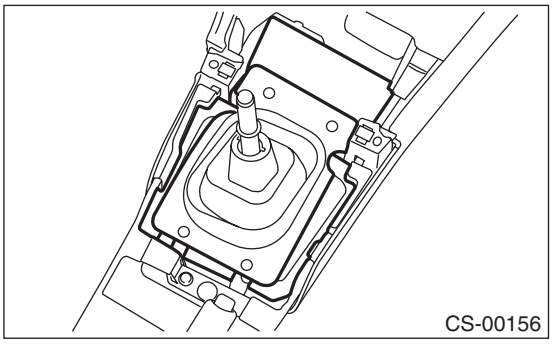
(A) Stay
(B) Transmission bracket

9) Install the heat shield cover. (If equipped)
10) Install the rear exhaust pipe and muffler.
NON-TURBO model
<Ref. to EX(H4SO)-9, INSTALLATION, Rear Exhaust Pipe.>, <Ref. to EX(H4SO)-10, INSTALLATION, Muffler.>
TURBO model
<Ref. to EX(H4DOTC)-14, INSTALLATION, Rear Exhaust Pipe.>, <Ref. to EX(H4DOTC)-15, INSTALLATION, Muffler.>
11) Lower the vehicle.
12) Install the plate ASSY to body.

Tightening torque:
7.5 N·m (0.76 kgf-m, 5.5 ft-lb)



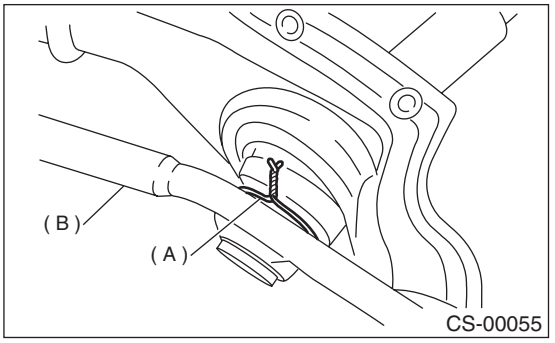
13) Install the boot and insulator assembly to vehicle in proper direction.



14) Install the clamp.
15) Install the console box. <Ref. to EI-36, INSTALLATION, Console Box.>

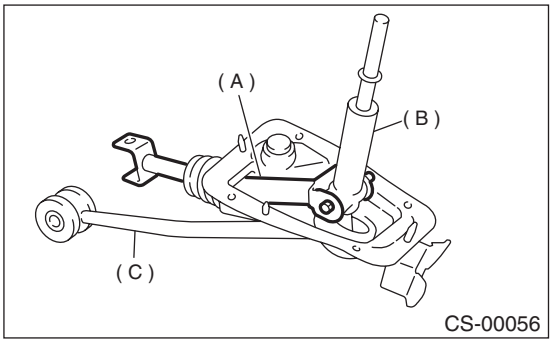
C: DISASSEMBLY

1) Disassemble the lock wire.



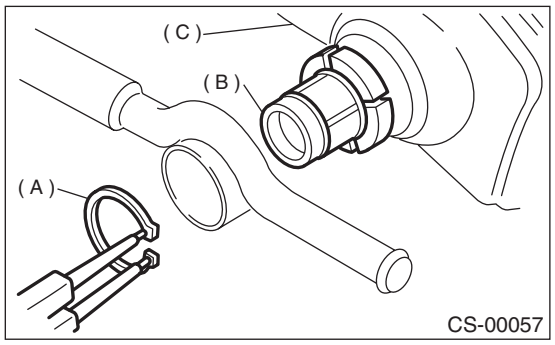
(A) Lock wire
(B) Stay

2) Remove the rod from lever.



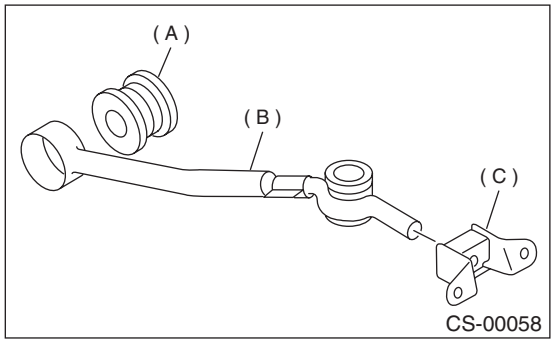
(A) Rod
(B) Lever
(C) Stay

3) Remove the snap ring from bushing B, and then disconnect the stay.



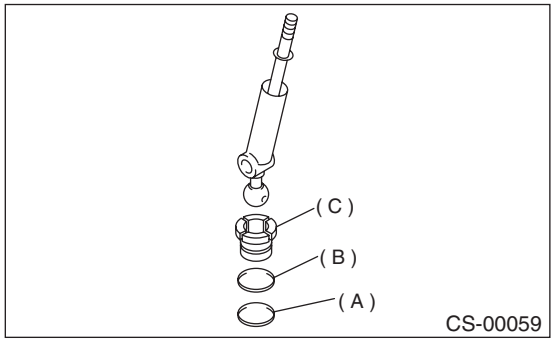
(A) Snap ring
(B) Bushing B
(C) Boot

4) Remove the boot from gear shift lever.
5) Remove the bushing and cushion rubber from stay.



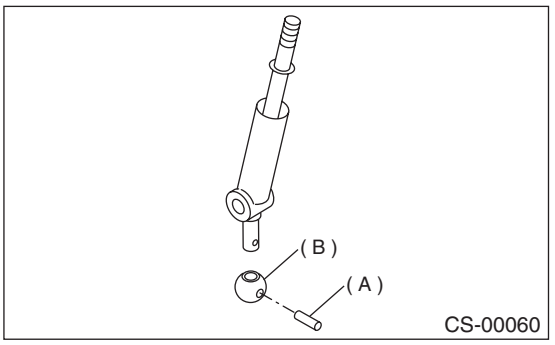
(A) Bushing
(B) Stay
(C) Cushion rubber

6) Remove the O-ring, and then disconnect the bushing B.



(A) O-ring
(B) O-ring
(C) Bushing B

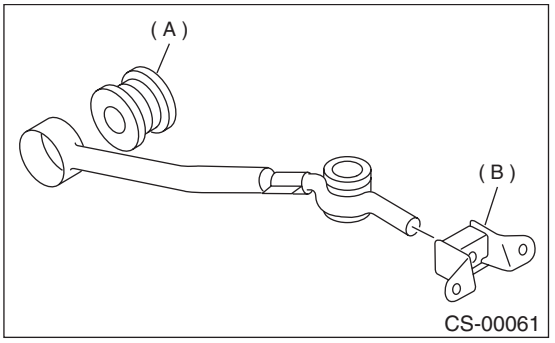
7) Draw out the spring pin, and then remove the bushing A from gear shift lever.



(A) Spring pin
(B) Bushing A

D: ASSEMBLY

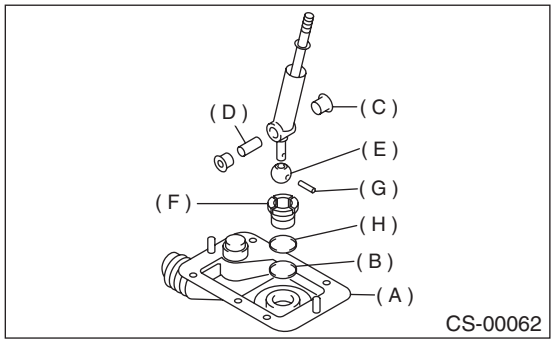
1) Clean all parts before assembly.
2) Mount the bushing and cushion rubber on the stay.



(A) Bushing
(B) Cushion rubber

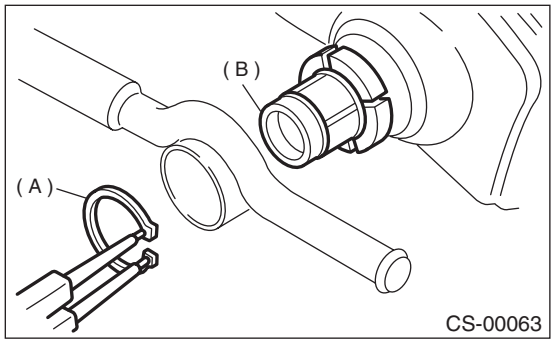
3) Mount each part; boot, O-ring, bushing A, spacer, bushing B, bushing and spring pin on the gear shift lever.

NOTE:
- Always use new O-rings.
- Apply grease [KOPR-KOTE (Part No. 003603001) or equivalent] to the inner and side surfaces of the bushing when installing the spacer.



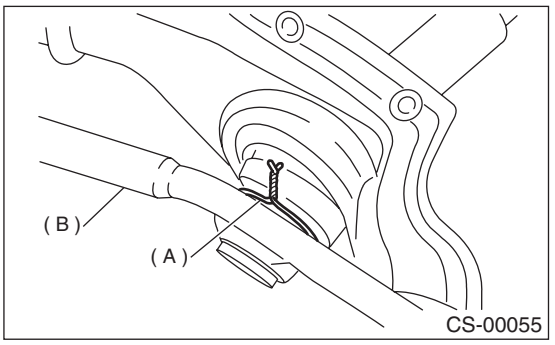
(A) Boot
(B) O-ring
(C) Bushing
(D) Spacer
(E) Bushing A
(F) Bushing B
(G) Spring pin
(H) O-ring

4) Insert the gear shift lever into boot hole.
5) Install the snap ring and stay to bushing B.



(A) Snap ring
(B) Bushing B

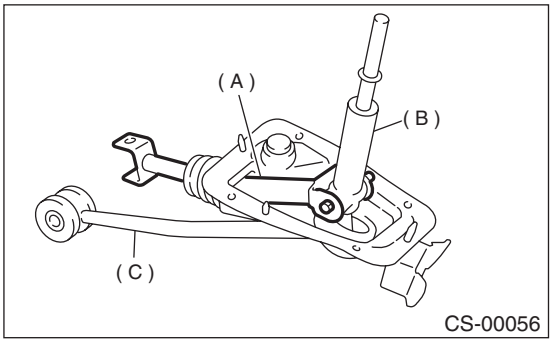
6) Tighten with a new lock wire to the extent that the boot will not come off.



(A) Lock wire
(B) Stay

7) Insert the rod into boot hole.
8) Connect the rod to gear shift lever.

Tightening torque:
11.8 N·m (1.2 kgf-m, 8.7 ft-lb)

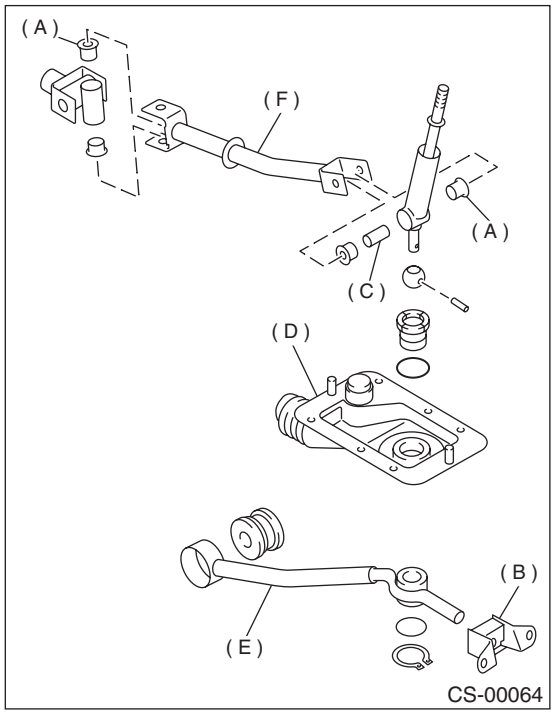


(A) Rod
(B) Lever
(C) Stay

9) Check the swing torque of the rod in relation to gear shift lever.
10) Check that there is no excessive play and that parts move smoothly.

E: INSPECTION

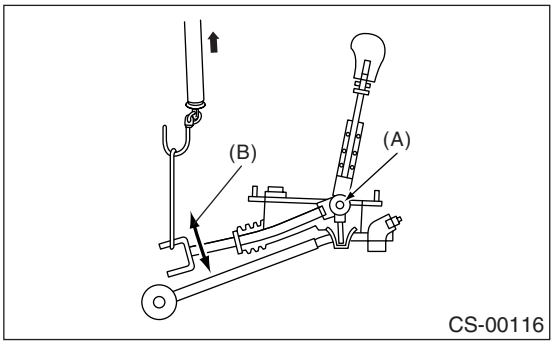
1) Check each part (bushing, cushion rubber, spacer, boot, stay and rod, etc.) for deformation, damage and wear. Repair or replace any defective part. Determine defective parts by comparing with new parts.



(A) Bushing
(B) Cushion rubber
(C) Spacer
(D) Boot
(E) Stay
(F) Rod

2) Check the swing torque of the rod in relation of gear shift lever.
If the torque exceeds specification, replace the bushing or retighten nuts.

Swing torque:
3.7 N (0.38 kgf, 0.84 lb) or less



(A) Center of rotation
(B) Swing torque

9. General Diagnostic

A: INSPECTION

Symptom	Problem parts
Shift lock does not function.	• Stop light switch • Shift lock solenoid • Integrated module
Shift lock cannot be released.	• Stop light switch • Shift lock solenoid • Integrated module • Inhibitor switch
Key interlock does not function.	• Key warning switch • “P” position switch • Key lock solenoid • Integrated module
Key interlock cannot be released.	• Key warning switch • “P” position switch • Key lock solenoid • Integrated module
Starter does not run.	• Inhibitor switch • Select cable • Starter circuit
Back-up light does not light up.	• Inhibitor switch • Select cable • Back-up light circuit

1. General Description

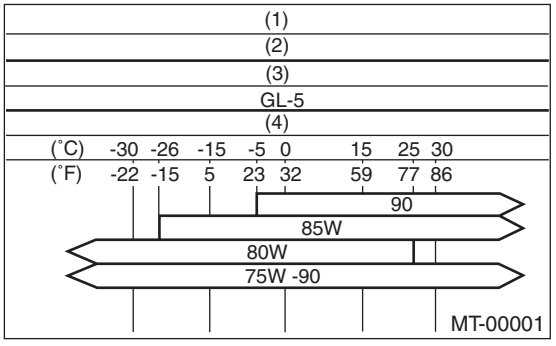
A: SPECIFICATIONS

1. Manual Transmission and Differential

Item			Model	
			Non-TURBO model	TURBO model
Type			5-forward speeds with synchromesh and 1 reverse	
Transmission gear ratio		1st	3.454	
		2nd	2.062	1.947
		3rd	1.448	1.366
		4th	1.088	0.972
		5th	0.871	0.738
		Reverse	3.333	
Front reduction gear	Final	Type of gear	Hypoid	
		Gear ratio	4.111	4.444
Rear reduction gear	Transfer	Type of gear	Helical	
		Gear ratio	1.000	
	Final	Type of gear	Hypoid	
		Gear ratio	4.111	4.444
Front differential	Type and number of gear		Straight bevel gear (Bevel pinion: 2, Bevel gear: 2)	
Center differential	Type and number of gear		Straight bevel gear (Bevel pinion: 2, Bevel gear: 2 and viscous coupling)	
Transmission gear oil			GL-5	
Transmission gear oil capacity			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

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. 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)	—	—

6. 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	7	Approach to 5th gear by 0.2 mm (0.008 in)
32812AA211	No mark	Standard
32812AA221	9	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)

7. 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
32188AA130	S	Neutral position is closer to 1st.
32188AA140	T	Standard
32188AA150	U	Neutral position is closer to reverse gear.

Reverse check plate adjustment

Reverse check plate			
Part No.	Mark	Angle θ	Remarks
32189AA000	0	28°	Arm stops closer to 5th gear.
32189AA010	1	31°	Arm stops closer to 5th gear.
33189AA020	2	34°	Arm stops in the center.
32189AA030	3	37°	Arm stops closer to reverse gear.
32189AA040	4	40°	Arm stops closer to reverse gear.

8. EXTENSION ASSEMBLY

Thrust washer (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)

9. FRONT DIFFERENTIAL

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

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

Pinion shaft to axle drive shaft clearance
0 — 0.2 mm (0 — 0.008 in)

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

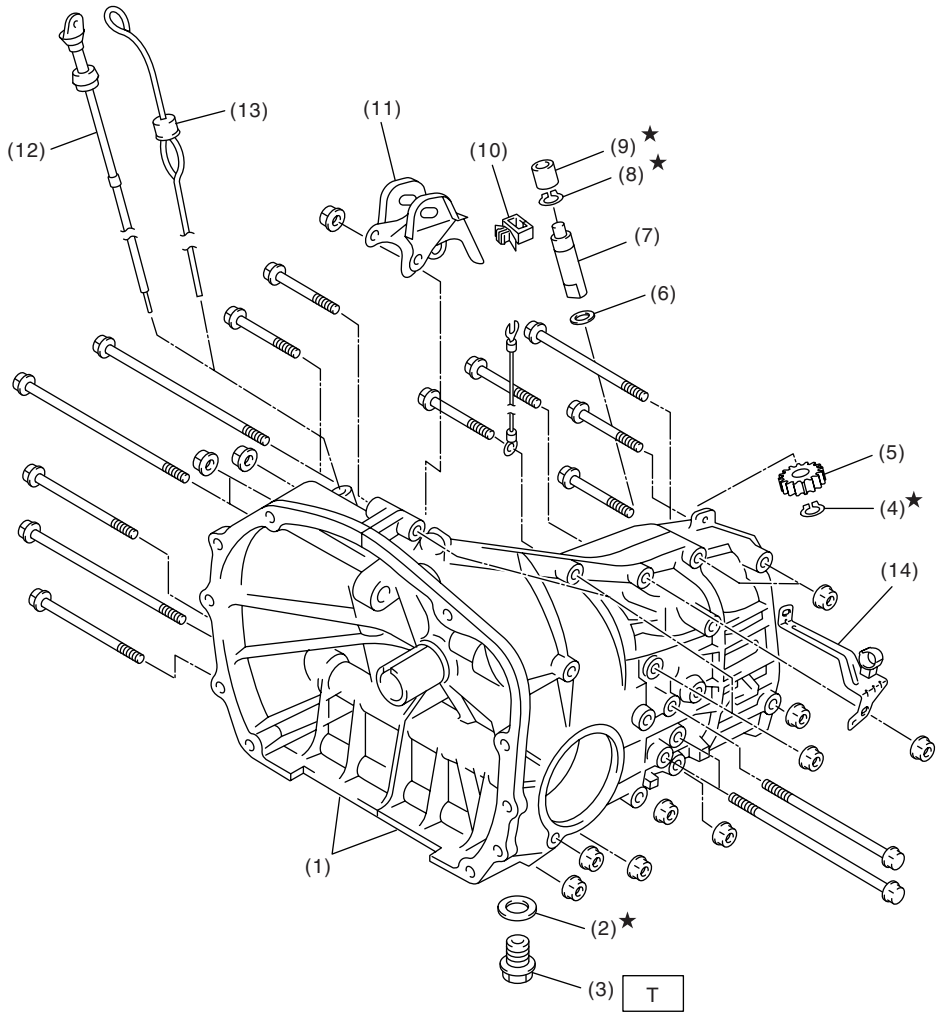
10.TRANSFER DRIVE GEAR

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

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

B: COMPONENT

1. TRANSMISSION CASE

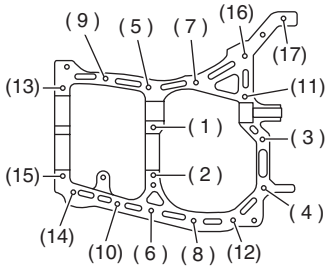


MT-00974

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

Tightening torque: N·m (kgf-m, ft-lb)
T: 70 (7.1, 51)

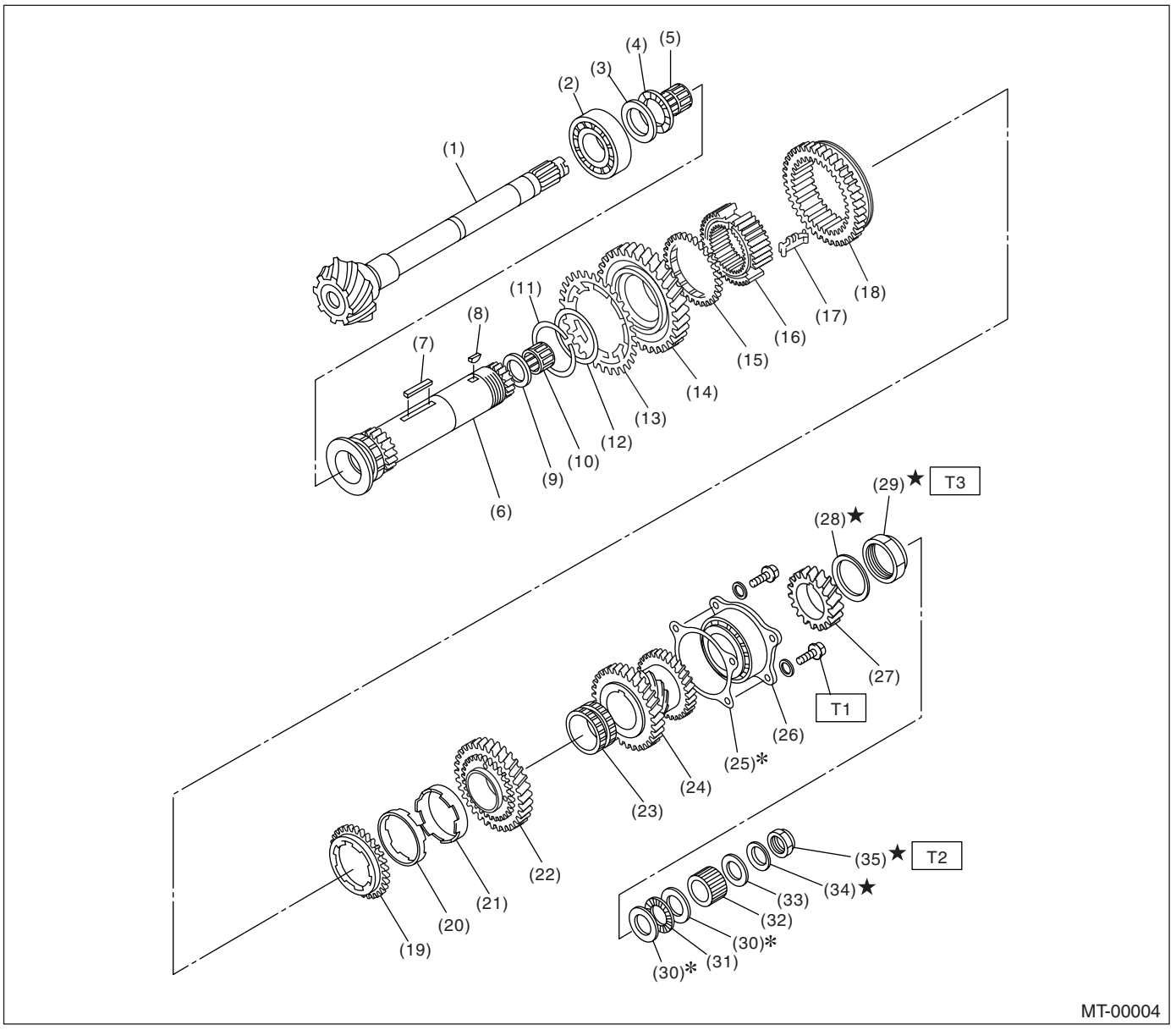
• Transmission case tightening torque



MT-00003

Bolt No.	Bolt size	Tightening torque: N·m (kgf-m, ft-lb)
<5> to <15>	8 mm	25 (2.5, 18.1)
<1> to <4> <16>, <17>	10 mm	39 (4.0, 28.9)

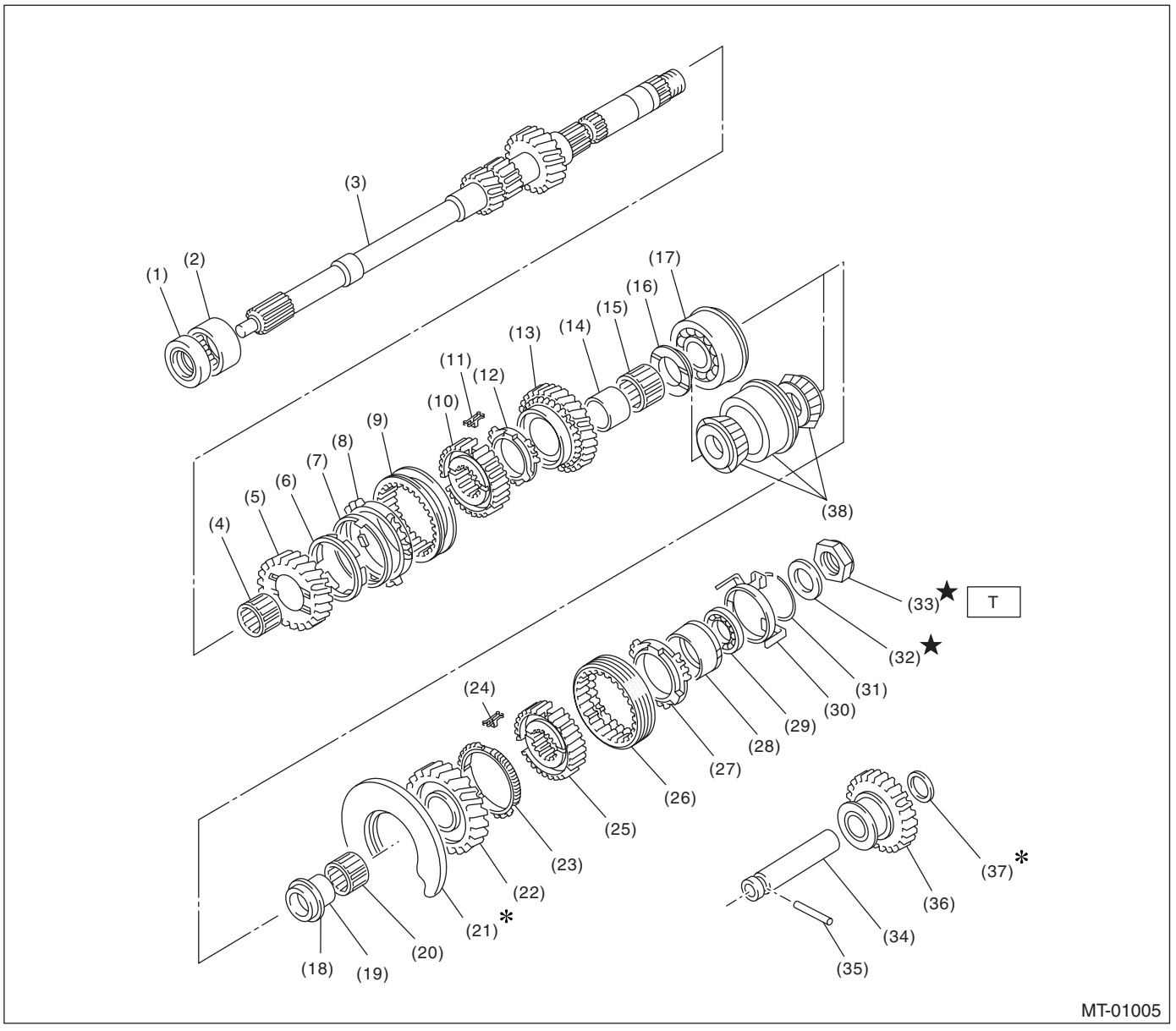
2. DRIVE PINION ASSEMBLY



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

Tightening torque: N·m (kgf-m, ft-lb)
T1: 30 (3.1, 22.4)
T2: 120 (12.2, 88.5)
T3: 260 (26.5, 191.7)

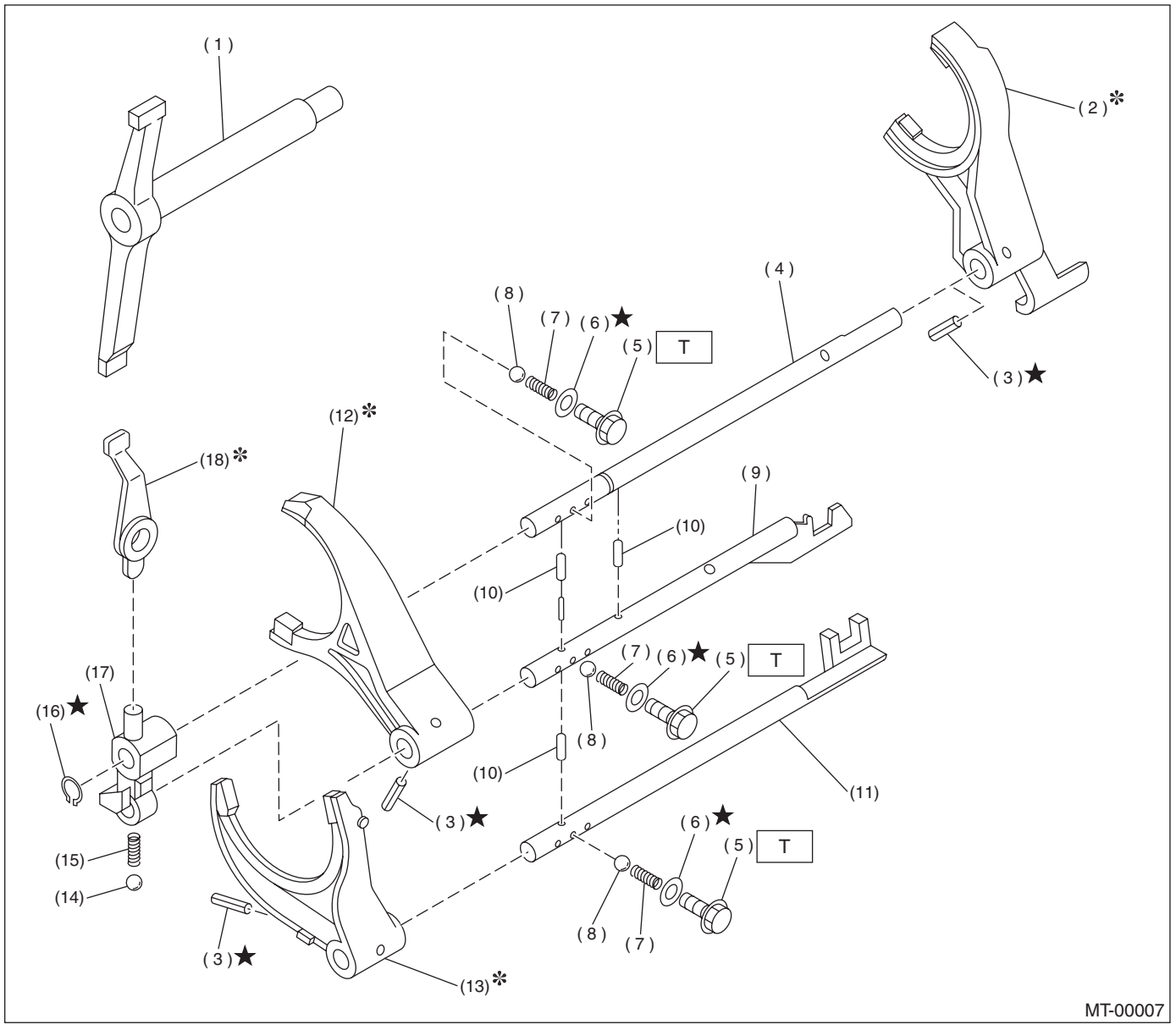
3. MAIN SHAFT ASSEMBLY



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

Tightening torque: N·m (kgf-m, ft-lb)
T: 120 (12.2, 88.5)

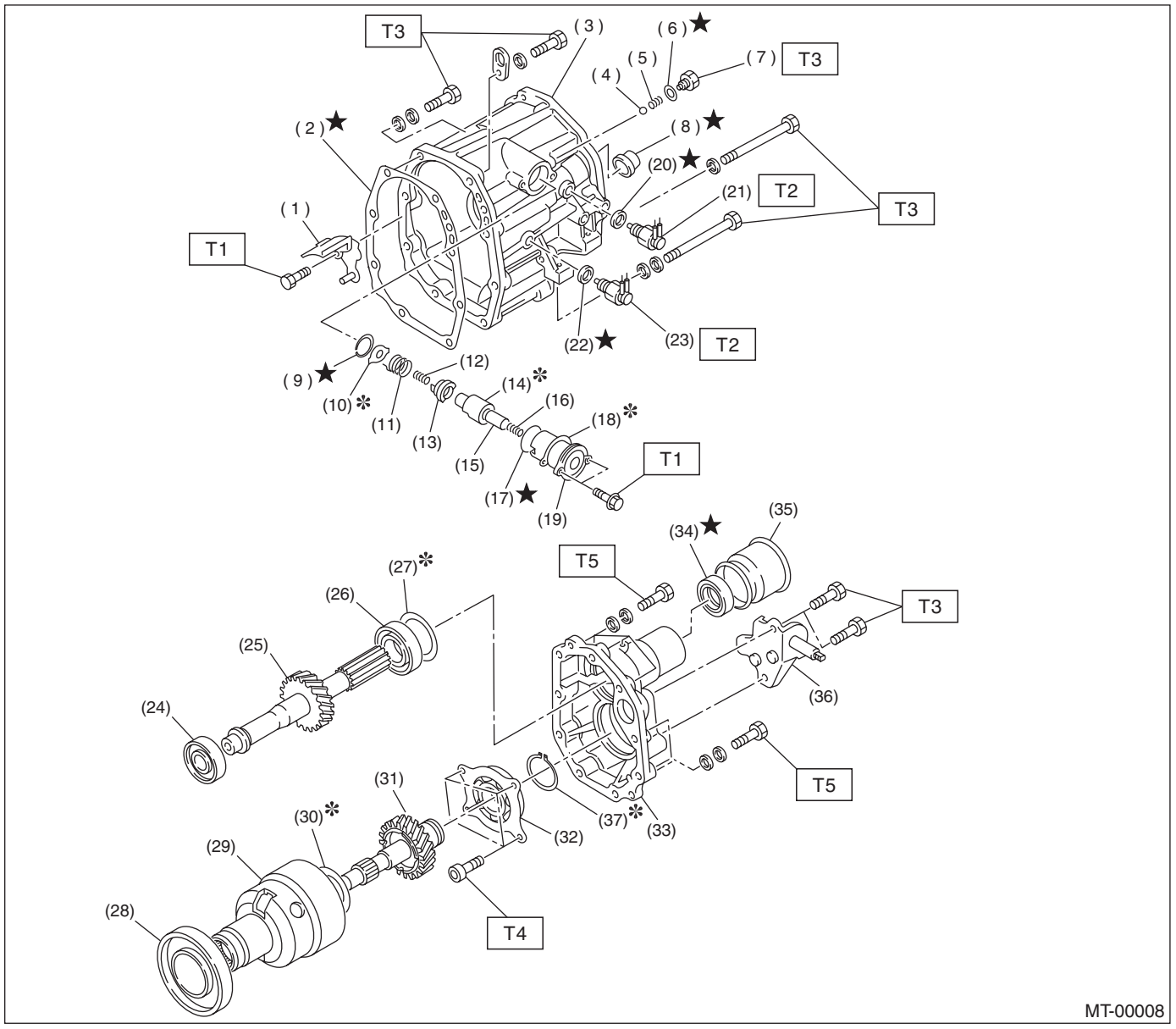
4. SHIFTER FORK AND SHIFTER ROD



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

Tightening torque: N·m (kgf-m, ft-lb)
T: 20 (2.0, 14.4)

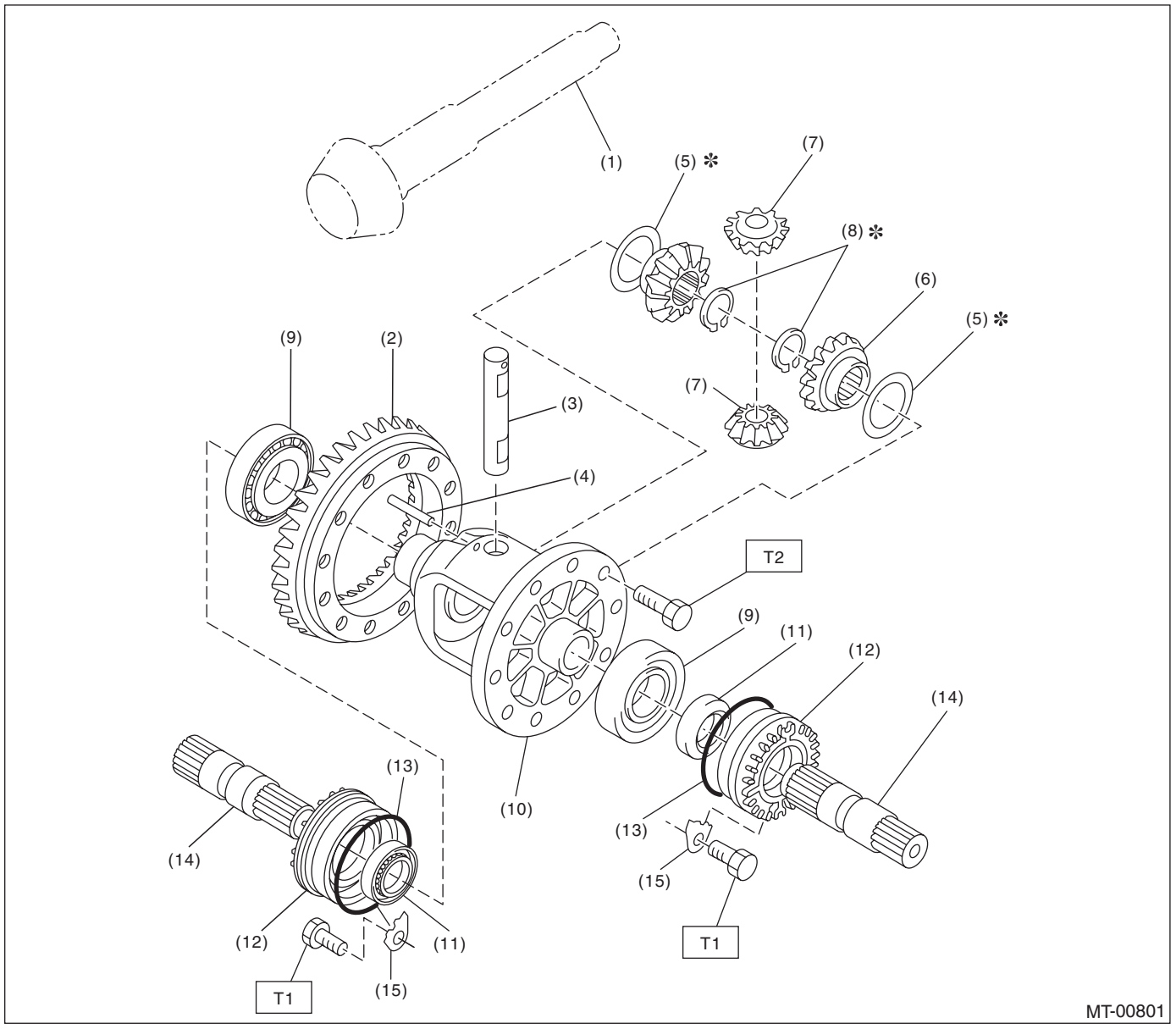
5. TRANSFER CASE AND EXTENSION



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

Tightening torque: N·m (kgf-m, ft-lb)
T1: 6.4 (0.65, 4.7)
T2: 32.3 (3.3, 24)
T3: 24.5 (2.5, 18.1)
T4: 26 (2.7, 20)
T5: 40 (4.1, 29.7)

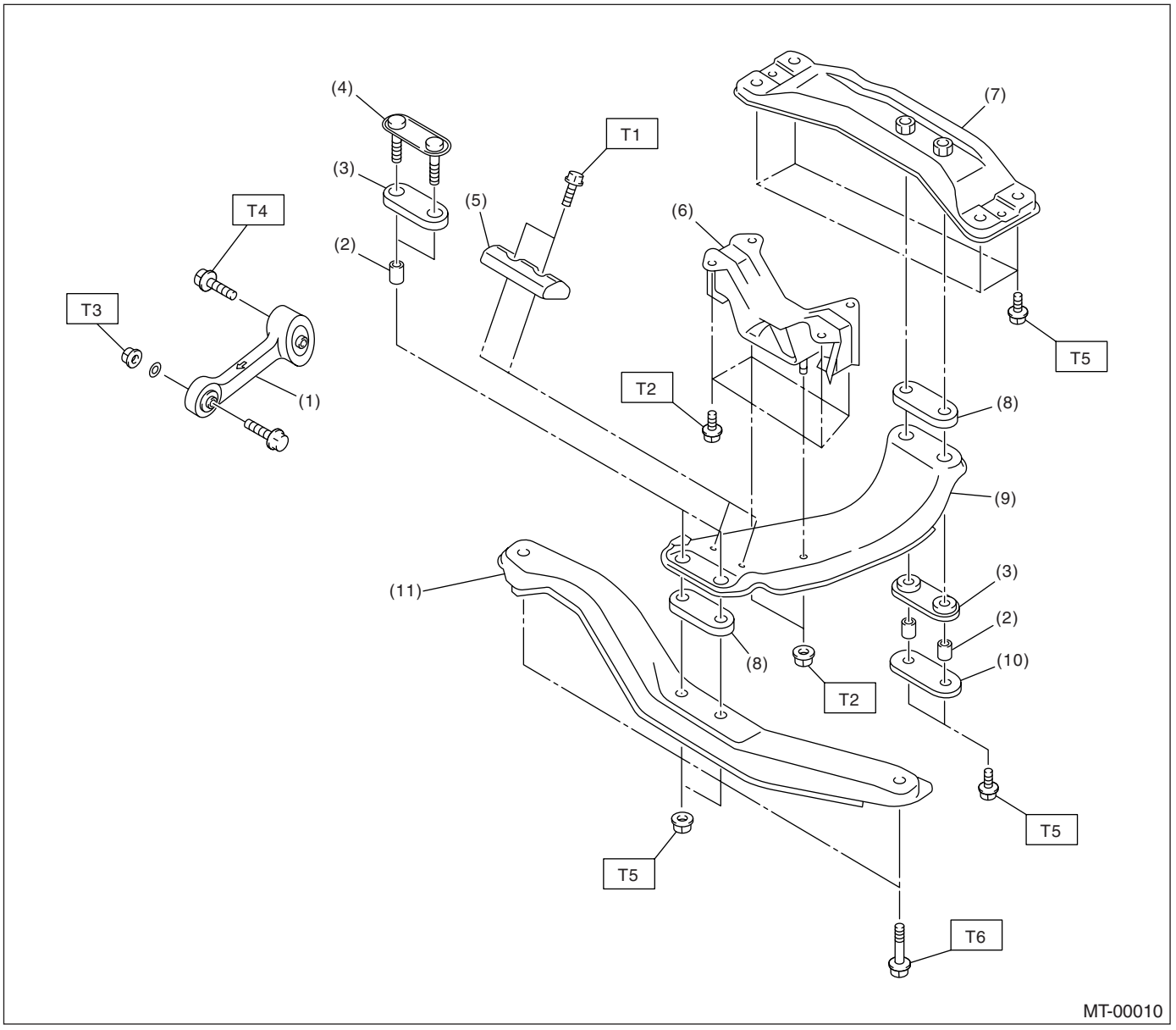
6. FRONT DIFFERENTIAL



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

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

7. TRANSMISSION MOUNTING



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

Tightening torque: N·m (kgf-m, ft-lb)
T1: 7.5 (0.76, 5.5)
T2: 35 (3.6, 26)
T3: 50 (5.1, 37)
T4: 58 (5.9, 43)
T5: 75 (7.7, 55.4)
T6: 140 (14.3, 103)

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

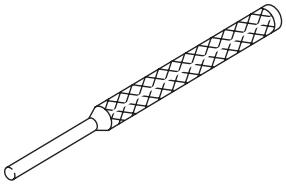
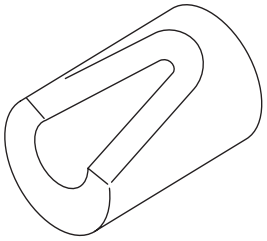
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-398791700	398791700	REMOVER	Used for removing and installing spring pin (6 mm).
 ST-399411700	399411700	ACCENT BALL INSTALLER	Used for installing reverse shifter rail arm.

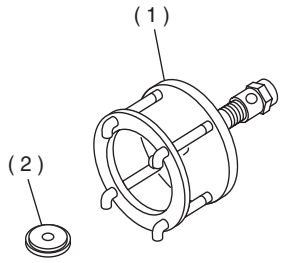
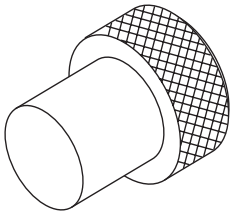
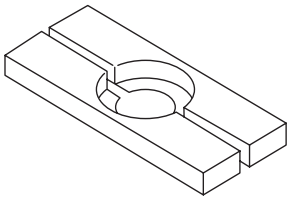
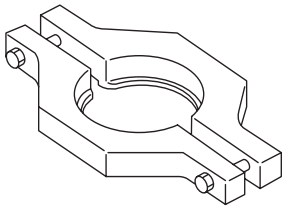
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-899524100	899524100	PULLER SET	Used for removing and installing roller bearing (Differential). (1) PULLER (2) CAP
 ST-399780104	399780104	WEIGHT	Used for measuring preload on roller bearing.
 ST-498077000	498077000	REMOVER	Used for removing roller bearing of drive pinion shaft.
 ST-498077300	498077300	CENTER DIFFERENTIAL BEARING REMOVER	Used for removing the center differential cover ball bearing.

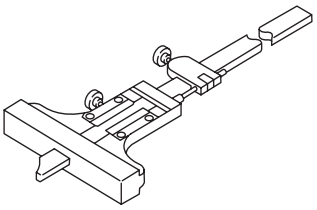
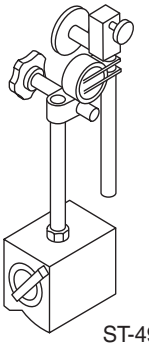
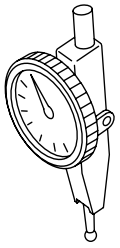
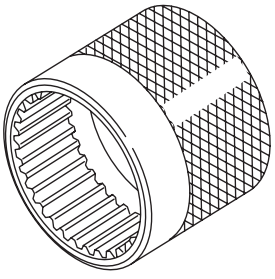
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-498147000	498147000	DEPTH GAUGE	Used for adjusting main shaft axial end play.
 ST-498247001	498247001	MAGNET BASE	• Used for measuring backlash between side gear and pinion, and hypoid gear. • Used with DIAL GAUGE (498247100).
 ST-498247100	498247100	DIAL 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.

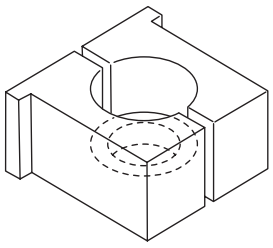
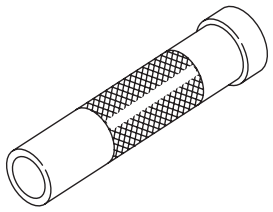
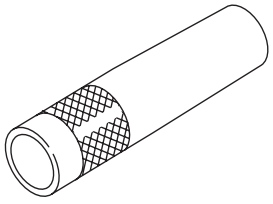
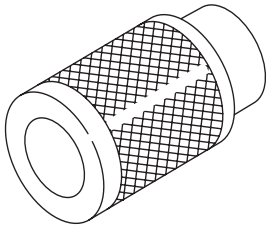
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-498937000	498937000	TRANSMISSION HOLDER	Used for removing and installing transmission main shaft lock nut.
 ST-499277100	499277100	BUSH 1-2 INSTALLER	• Used for installing 1st driven gear thrust plate and 1st-2nd driven gear bush. • Used for installing 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 ($25 \times 26 \times 17$). • Used for installing bearing cone of transfer driven gear (extension core side).

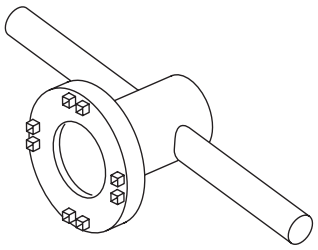
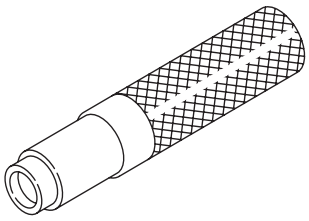
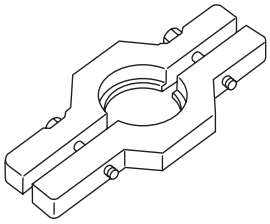
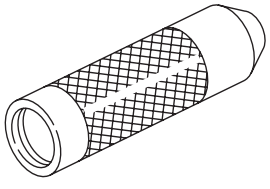
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-499787000	499787000	WRENCH ASSY	Used for removing and installing differential side retainer.
 ST-499827000	499827000	PRESS	Used for installing speedometer oil seal when installing speedometer cable to transmission.
 ST-499857000	499857000	5TH DRIVEN GEAR 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).

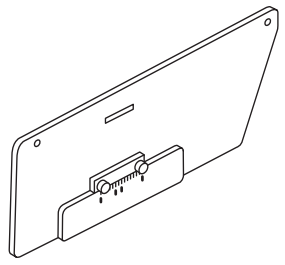
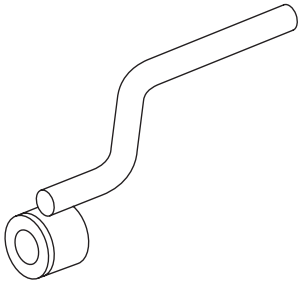
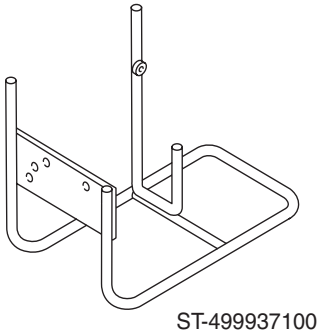
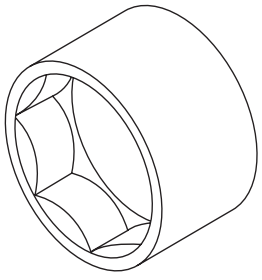
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-499917500	499917500	DRIVE PINION GAUGE ASSY	Used for adjusting drive pinion shim.
 ST-499927100	499927100	HANDLE	Used for fitting transmission main shaft.
 ST-499937100	499937100	TRANSMISSION STAND SET	Stand used for transmission disassembly and assembly.
 ST-499987003	499987003	SOCKET WRENCH (35)	Used for removing and installing driven pinion lock nut and main shaft lock nut.

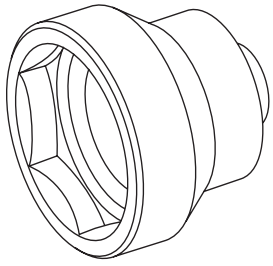
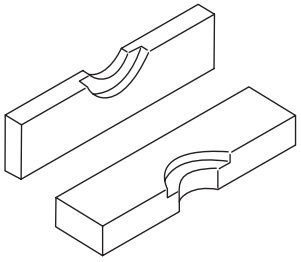
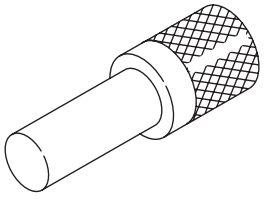
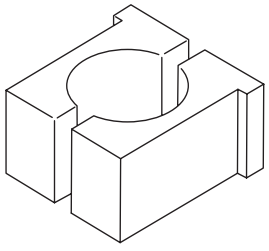
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-499987300	499987300	SOCKET WRENCH (50)	Used for removing and installing driven gear assembly lock nut.
 ST-899714110	899714110	REMOVER	Used for fixing transmission main shaft, drive pinion and rear drive shaft.
 ST-899864100	899864100	REMOVER	Used for removing parts on transmission main shaft and drive pinion.
 ST-899884100	899884100	HOLDER	Used for tightening lock nut on sleeve.

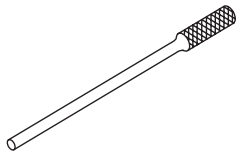
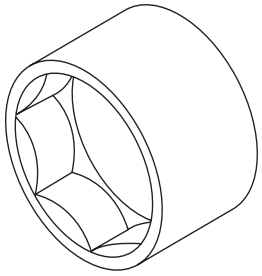
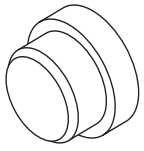
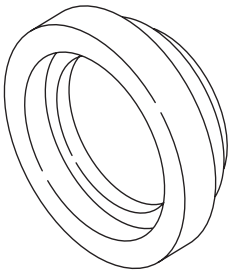
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-899904100	899904100	REMOVER	Used for removing and installing straight pin.
 ST-899988608	899988608	SOCKET WRENCH (27)	Used for removing and installing drive pinion lock nut.
 ST-398497701	398497701	ADAPTER	• Used for installing roller bearing onto differential case. • Used with INSTALLER (499277100).
 ST-499587000	499587000	INSTALLER	Used for installing driven gears to driven shaft.

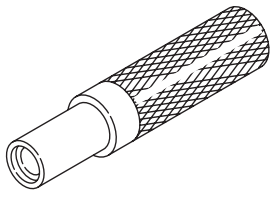
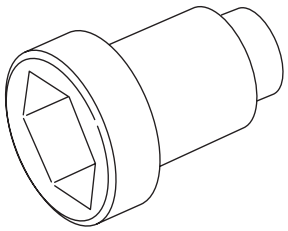
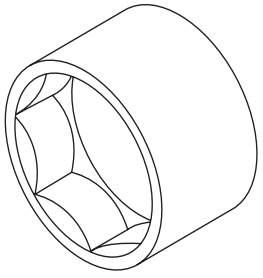
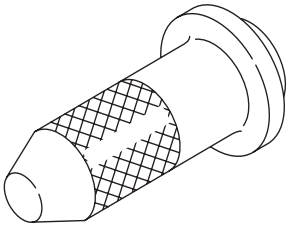
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-899824100	899824100	PRESS	Used for installing speedometer shaft oil seal.
 ST-499987100	499987100	SOCKET WRENCH (35)	Used for removing and installing drive pinion lock nut.
 ST-899984103	899984103	SOCKET WRENCH (35)	Used for removing and installing drive pinion lock nut.
 ST-498057300	498057300	INSTALLER	Used for installing extension oil seal.

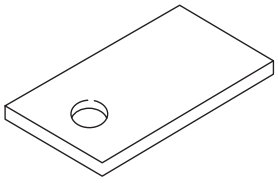
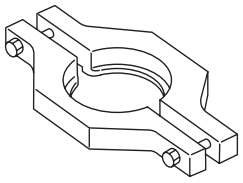
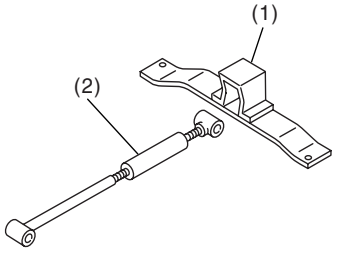
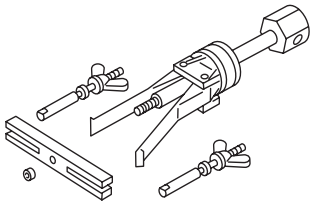
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-498255400	498255400	PLATE	Used for measuring backlash.
 ST-498077400	498077400	SYNCHRONIZER CONE REMOVER	• Used for removing synchronizer cone of main shaft. • Used for removing 5th driven gear of drive pinion shaft.
 ST41099AA000	41099AA000	ENGINE SUPPORT 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.

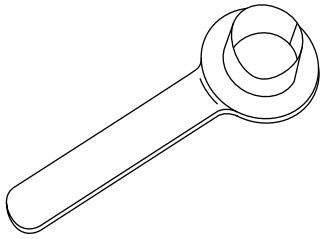
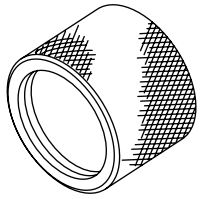
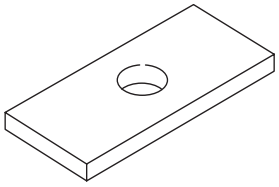
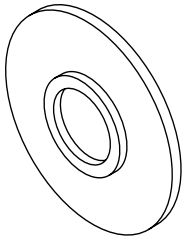
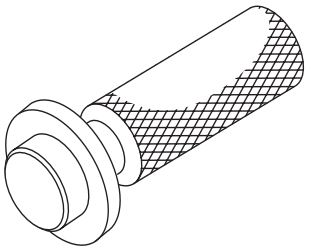
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST28399SA010	28399SA010	FRONT DRIVE SHAFT OIL SEAL PROTECTOR	• Used for protecting oil seal from scratches while installing front drive shaft. • TURBO model
 ST18675AA000	18675AA000	DIFFERENTIAL SIDE OIL SEAL INSTALLER	• Used for installing differential side retainer oil seal. • TURBO model
 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.

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-499797000	499797000	INSTALLER	• Used for installing differential side retainer oil seal. • Non-TURBO model

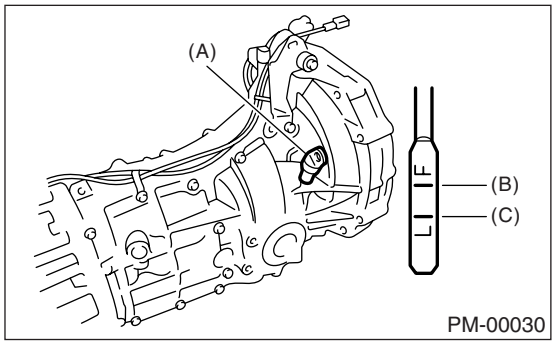
2. GENERAL PURPOSE TOOLS

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

2. Transmission Gear Oil

A: INSPECTION

1) Park 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

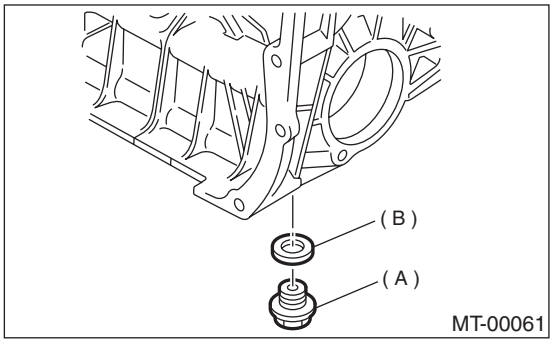
B: REPLACEMENT

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.
Be careful not to spill the transmission gear oil on exhaust pipe to prevent it from emitting smoke or fire. If transmission gear oil splashes on exhaust pipe, wipe it clean.

NOTE:
Tighten the transmission gear oil drain plug after draining the transmission gear oil.

Tightening torque:
70 N·m (7.1 kgf-m, 51 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.

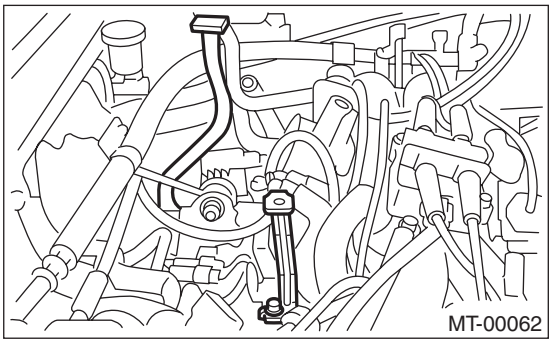
CAUTION:
When inserting the level gauge into transmission, align the protrusion on the side of the top part of level gauge with the notch in the gauge hole.

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

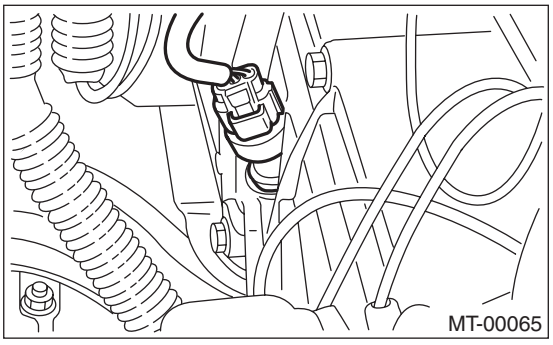
3. Manual Transmission Assembly

A: REMOVAL

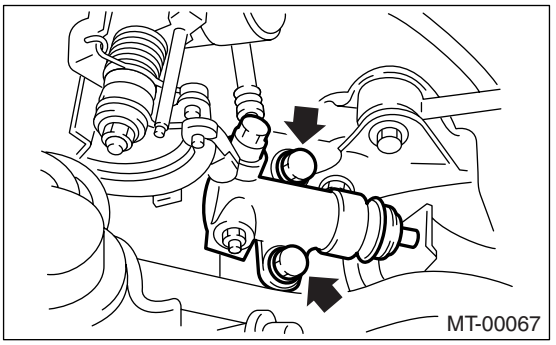
1) Open the front hood fully, and support with stay or the air intake chamber.
2) Disconnect ground cable from battery.
3) Remove the air intake duct and cleaner case or the air intake chamber. (Non-TURBO model) <Ref. to IN(H4SO)-7, REMOVAL, Air Intake Duct.> <Ref. to IN(H4SO)-6, REMOVAL, Air Cleaner Case.>
4) Remove the air cleaner case stay. (Non-TURBO model)



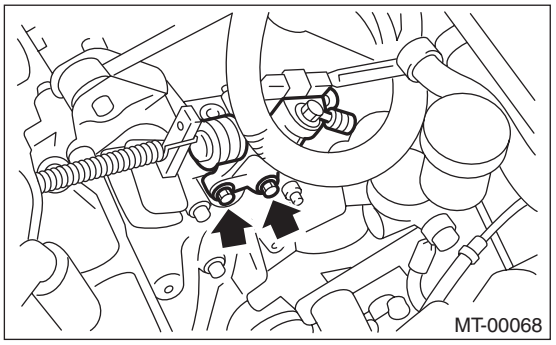
5) Remove the intercooler. (Turbo model) <Ref. to IN(H4DOTC)-10, REMOVAL, Intercooler.>
6) Disconnect the following connectors:
(1) Neutral position switch connector
(2) Back-up light switch connector
(3) Vehicle speed sensor



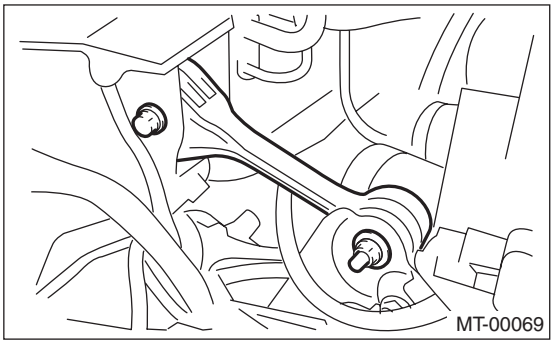
7) Remove the starter. <Ref. to SC(H4SO)-7, REMOVAL, Starter.>
8) Remove the operating cylinder from transmission.
• NON-TURBO MODEL



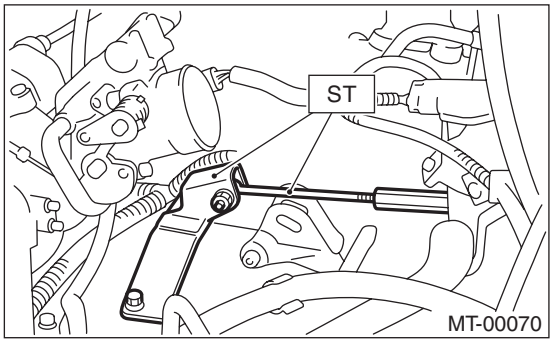
• TURBO MODEL



9) Remove the pitching stopper.



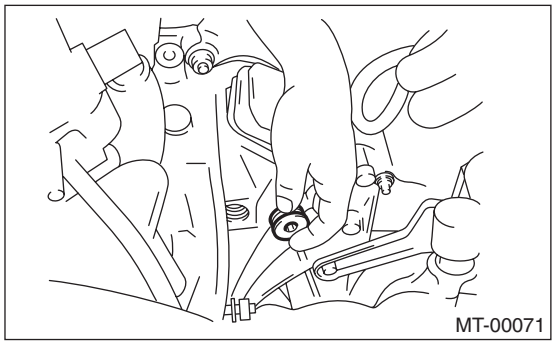
10) Set the ST.
ST 41099AA000 ENGINE SUPPORT ASSY



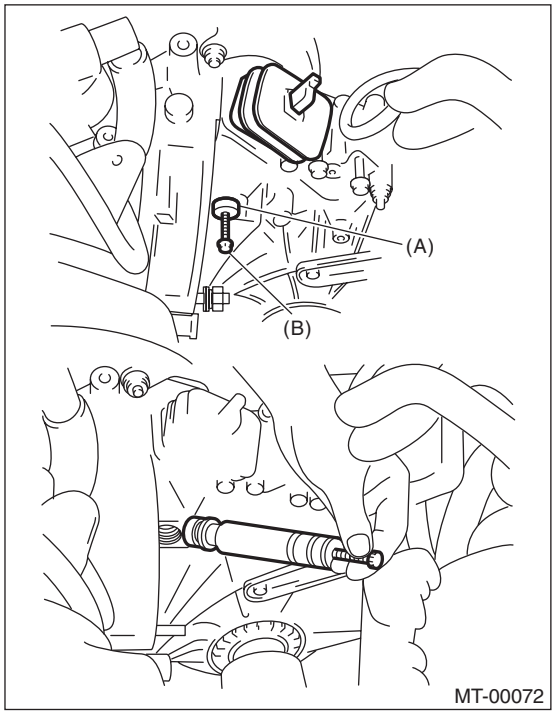
11) Separate the clutch release fork from release bearing. (Turbo model)

(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.

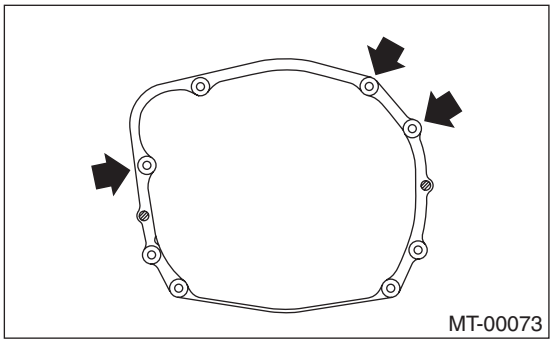


(A) Shaft
(B) Bolt

(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)-5, REMOVAL, Front Exhaust Pipe.>

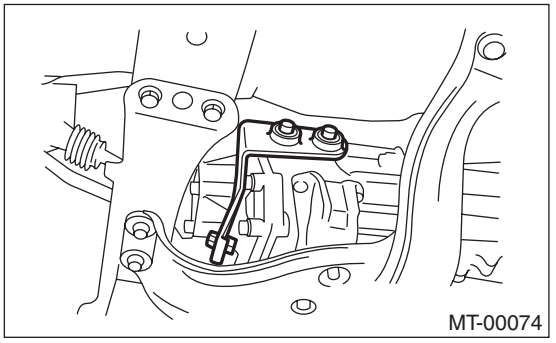
14) Remove the center exhaust pipe. (Turbo model). <Ref. to EX(H4DOTC)-9, REMOVAL, Center Exhaust Pipe.>

15) Remove the rear exhaust pipe and muffler.

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

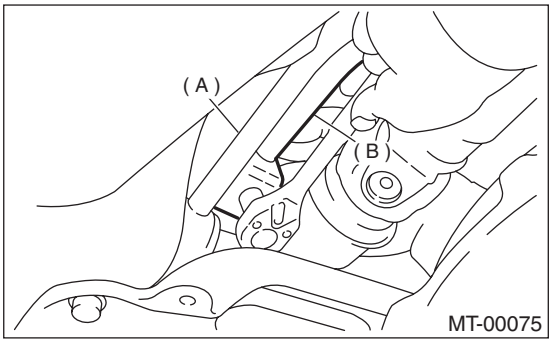
16) Remove the heat shield cover. (If equipped)

17) Remove the hanger bracket from right side of transmission.



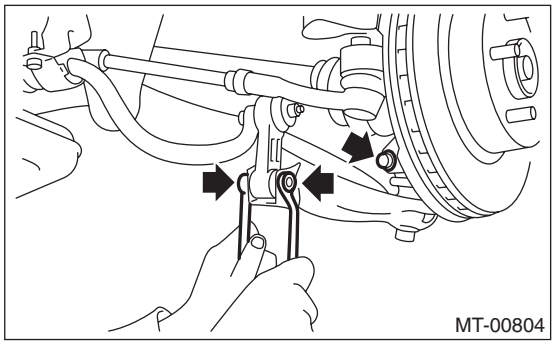
18) Remove the propeller shaft. <Ref. to DS-15, REMOVAL, Propeller Shaft.>

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

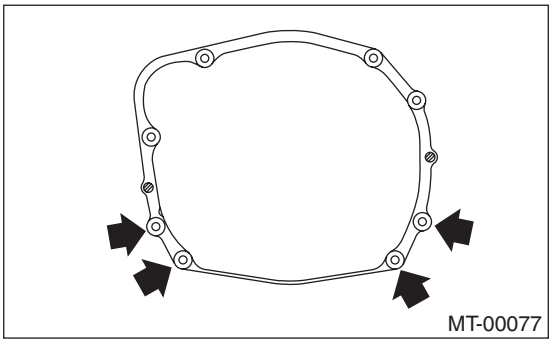


(A) Stay
(B) Rod

20) Disconnect the stabilizer link from transverse link.

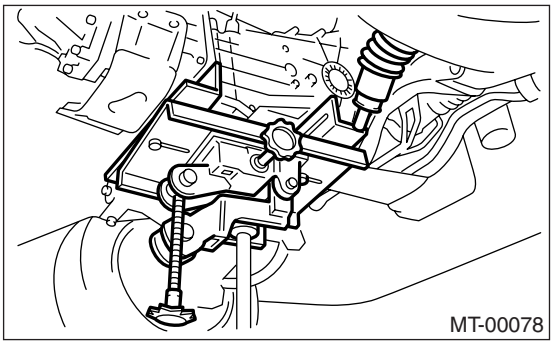


21) Remove the bolt securing ball joint of transverse link to housing.
22) Separate the front drive shafts from transmission. <Ref. to DS-29, REMOVAL, Front Drive Shaft.>
23) Remove the nuts which hold the lower side of transmission to engine.

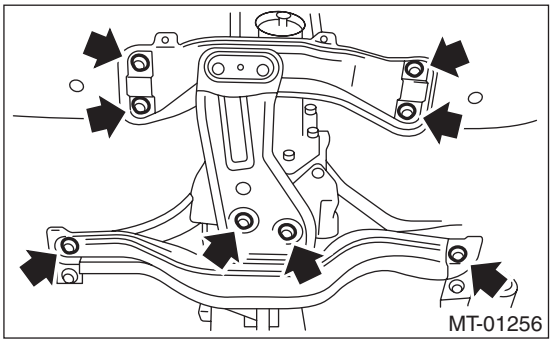


24) Place the transmission jack under transmission.

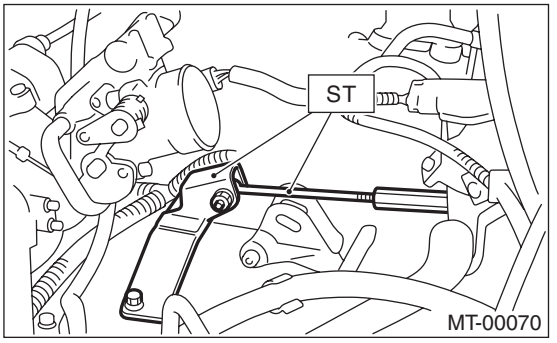
CAUTION:
Always support the transmission case with a transmission jack.



25) Remove the transmission rear crossmember from vehicle.



26) While compressing turn buckle of engine support assembly, bring down transmission jack and then tilt engine and transmission.
ST 41099AA000 ENGINE SUPPORT ASSY



27) Remove the transmission.

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

28) Separate the transmission assembly and rear cushion rubber.
29) Remove the clutch release bearing from engine side. (Turbo model) <Ref. to CL-15, REMOVAL, Release Bearing and Lever.>

B: INSTALLATION

1) Replace the differential side oil seal with a new one. (TURBO model) <Ref. to 5MT-36, REPLACEMENT, Differential Side Retainer Oil Seal.>

NOTE:
It is not necessary to replace the oil seal if a new one installed.

2) Install the rear cushion rubber to transmission assembly.

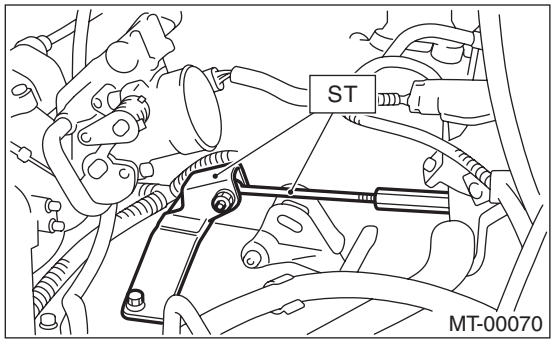
Tightening torque:
35 N·m (3.57 kgf-m, 25.8 ft-lb)

3) Install the clutch release lever and bearing onto transmission. (Turbo model) <Ref. to CL-15, INSTALLATION, Release Bearing and Lever.>

4) Install the transmission onto engine.
(1) Gradually raise the transmission with transmission jack.
(2) Engage them at splines.

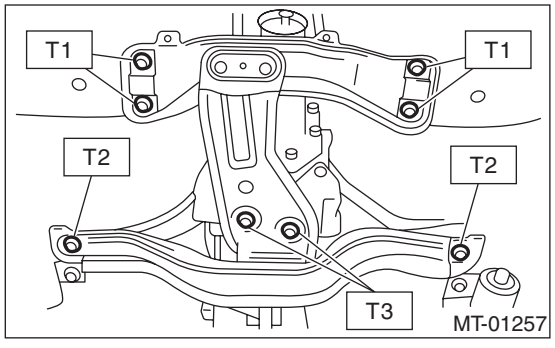
NOTE:
Be careful not to strike the main shaft against clutch cover.

5) While releasing turn buckle of engine support assembly,raise upward transmission jack, and then return tilt of engine and transmission.
ST 41099AA000 ENGINE SUPPORT ASSY



6) Install the transmission rear crossmember.

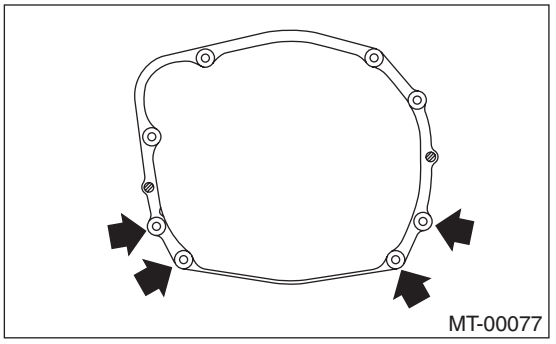
Tightening torque:
T1: 70 N·m (7.1 kgf-m, 51 ft-lb)
T2: 140 N·m (14.3 kgf-m, 103 ft-lb)
T3: 35 N·m (3.6 kgf-m, 25.9 ft-lb)



7) Take off the transmission jack.

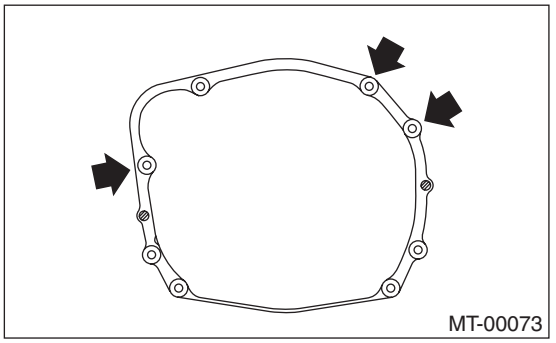
8) Tighten the nuts which hold the lower side of transmission to engine.

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

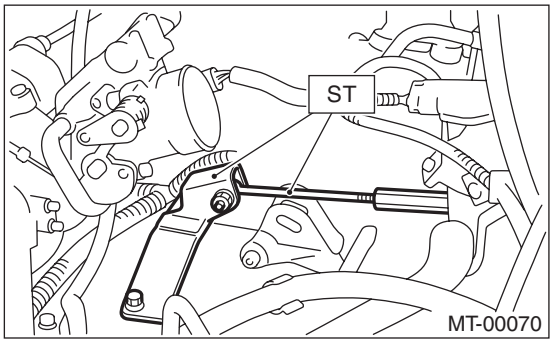


9) Connect the engine and transmission.
(1) Install the starter.
<Ref. to SC(H4SO)-7, INSTALLATION, Starter.>
(2) Tighten the bolt which holds right upper side of transmission to engine.

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

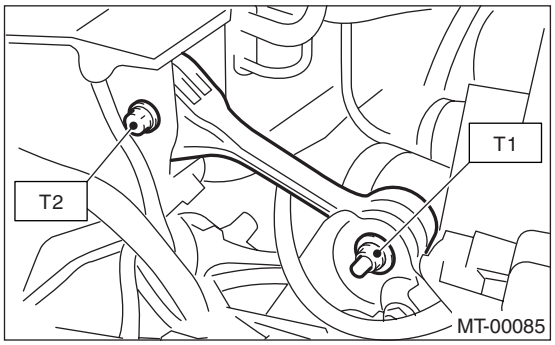


10) Remove the ST.



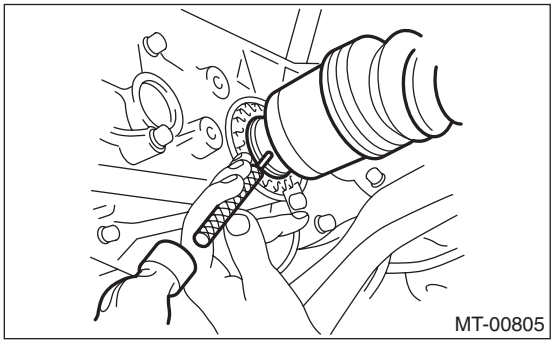
11) Install the pitching stopper.

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



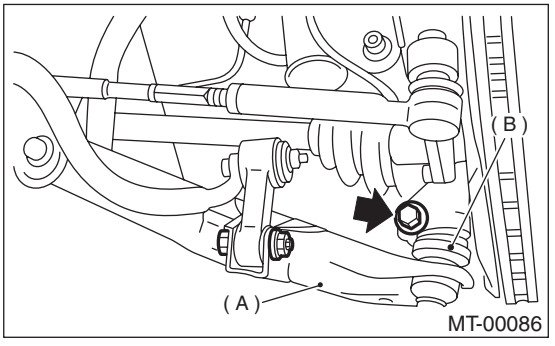
12) Lift-up the vehicle.
13) Drive the spring pin into chamfered hole of drive shaft. (Non-TURBO model)

NOTE:
Always use a new spring pin.



14) Replace the circlip with a new one, and insert the front drive shaft to transmission. (TURBO model) <Ref. to DS-29, REMOVAL, Front Drive Shaft.>
ST 28399SA010 FRONT DRIVE SHAFT OIL SEAL PROTECTOR
15) Install the ball joints of lower arm into knuckle arm of housing, and tighten the installing bolts.

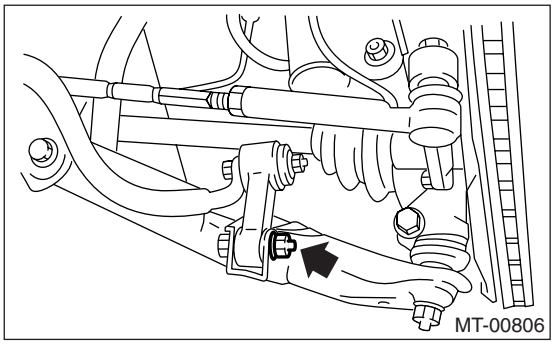
Tightening torque:
49 N·m (5.0 kgf-m, 36 ft-lb)



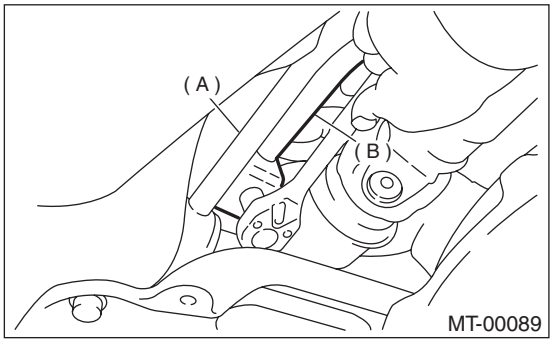
(A) Transverse link
(B) Ball joint

16) Install the stabilizer link from transverse link.

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

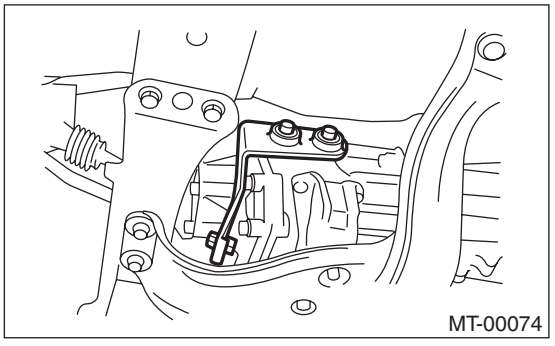


17) Install the gear shift rod and stay.
(1) Install the gear shift rod onto transmission.



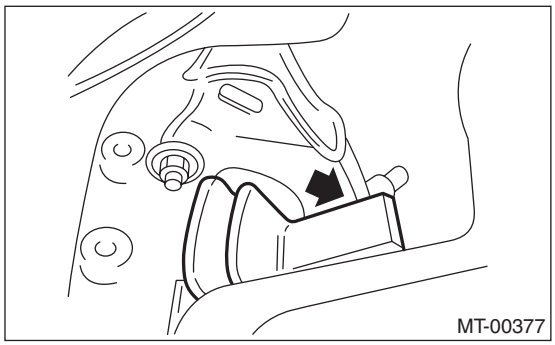
(A) Stay
(B) Rod

(2) Install the stay onto transmission.
18) Install the propeller shaft. <Ref. to DS-16, INSTALLATION, Propeller Shaft.>
19) Install the heat shield cover. (If equipped)
20) Install the hanger bracket on right side of transmission.



21) Install the rear exhaust pipe and muffler.
22) Install the front exhaust pipe and center exhaust pipe. (Non-TURBO model)
<Ref. to EX(H4SO)-6, INSTALLATION, Front Exhaust Pipe.>

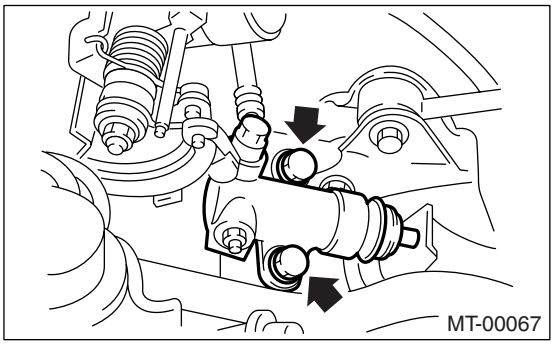
23) Install the center exhaust pipe. (TURBO model) <Ref. to EX(H4DOTC)-7, INSTALLATION, Front Exhaust Pipe.>
24) Install the under cover.
25) Push the clutch release lever to fit the bearing into clutch cover. (TURBO model)



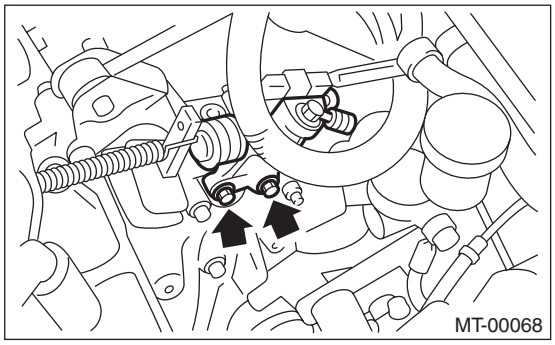
26) Install the operating cylinder.

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

- Non-TURBO MODEL



- TURBO MODEL



27) 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

28) Install the air cleaner case stay. (Non-TURBO model)

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

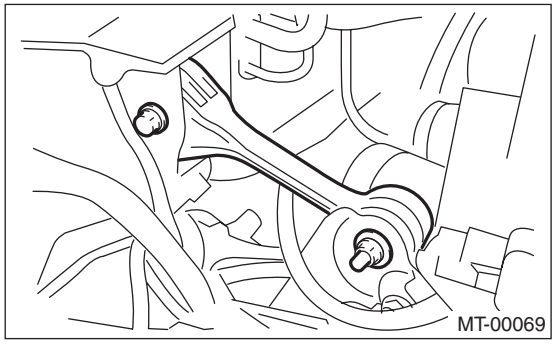
29) Install the air cleaner case or the air intake chamber and duct. (Non-TURBO model)
30) Install the intercooler. (TURBO model)

4. Transmission Mounting System

A: REMOVAL

1. PITCHING STOPPER

1) Remove the air intake duct. (Non-TURBO model) <Ref. to IN(H4SO)-7, INSTALLATION, Air Intake Duct.>
2) Remove the air cleaner case or the air intake chamber. (Non-TURBO model)
<Ref. to IN(H4SO)-6, REMOVAL, Air Cleaner Case.>
3) Remove the intercooler. (TURBO model) <Ref. to IN(H4DOTC)-10, INTERCOOLER, .>
4) Remove the pitching stopper.

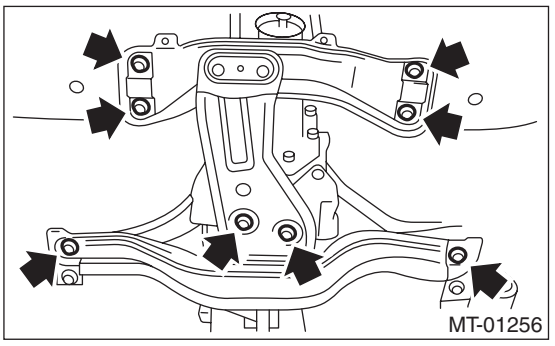


2. CROSSMEMBER AND CUSHION RUBBER

1) Disconnect 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)-5, REMOVAL, Front Exhaust Pipe.>
4) Remove the center exhaust pipe. (TURBO model) <Ref. to EX(H4DOTC)-9, 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.



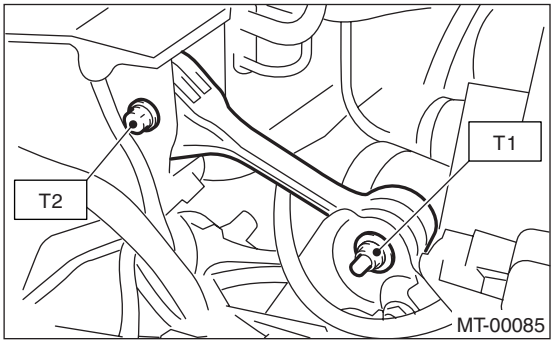
9) Remove the rear cushion rubber.

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 or the air intake chamber. (Non-TURBO model)
<Ref. to IN(H4SO)-6, INSTALLATION, Air Cleaner Case.>
3) Install the intercooler. (Turbo model)
<Ref. to IN(H4DOTC)-11, INSTALLATION, Intercooler.>
4) Connect the battery ground cable to battery.

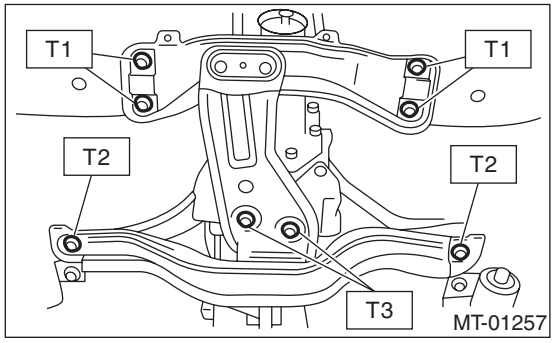
2. CROSSMEMBER AND CUSHION RUBBER

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)
T3: 35 N·m (3.6 kgf-m, 25.9 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)-6, INSTALLATION, Front Exhaust Pipe.>
6) Install the center exhaust pipe. (TURBO model)
<Ref. to EX(H4DOTC)-10, 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.

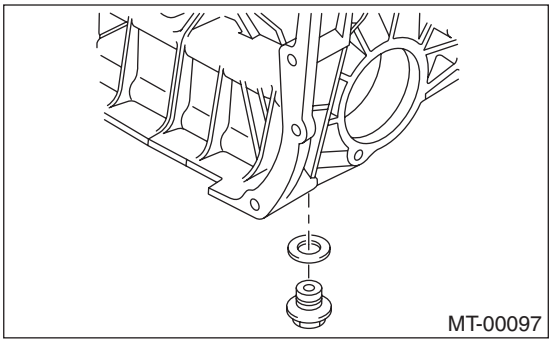
B: REPLACEMENT

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

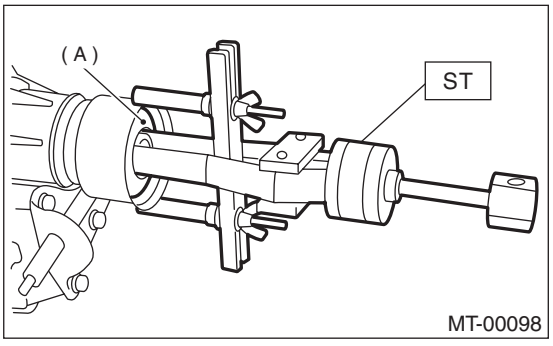
CAUTION:
• Directly after the engine has been running, the transmission gear oil is hot. Be careful not to burn yourself.
• Be careful not to spill the transmission gear oil on exhaust pipe to prevent it from emitting smoke or fire. If transmission gear oil splashes on exhaust pipe, wipe it clean.

NOTE:
Tighten the drain plug after draining gear oil.

Tightening torque:
70 N·m (7.1 kgf-m, 51 ft-lb)


MT-00097

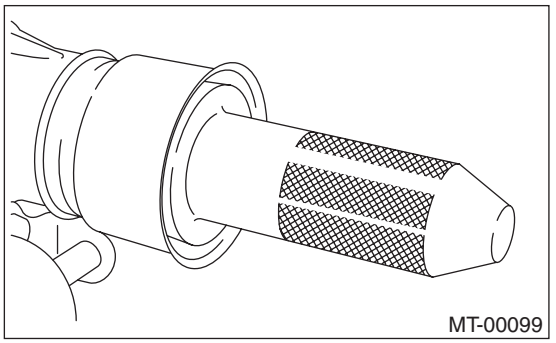
3) Remove the rear exhaust pipe and muffler.
4) Remove the heat shield cover. (If equipped)
5) Remove the propeller shaft. <Ref. to DS-15, REMOVAL, Propeller Shaft.>
6) Using the ST, remove the oil seal.
ST 398527700 PULLER ASSY



MT-00098

(A) Oil seal

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


MT-00099

8) Install the propeller shaft. <Ref. to DS-16, 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-26, REPLACEMENT, Transmission Gear Oil.>

6. Differential Side Retainer Oil Seal

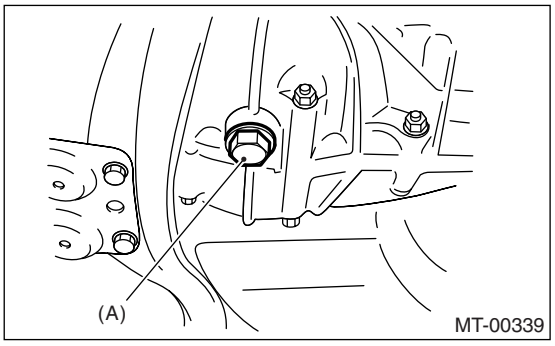
A: Inspection

Check the differential side retainer oil seal for leakage of gear oil. If oil leaks, replace the oil seal.

B: Replacement

1. TURBO model

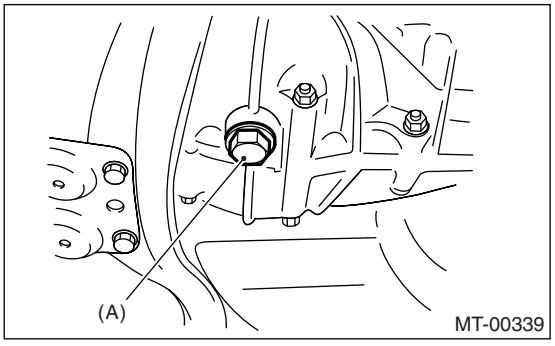
1) Lift-up the vehicle.
2) Remove the center exhaust pipe. <Ref. to EX(H4DOTC)-9, REMOVAL, Center Exhaust Pipe.>
3) Drain the gear oil from oil drain plug.



(A) Drain plug

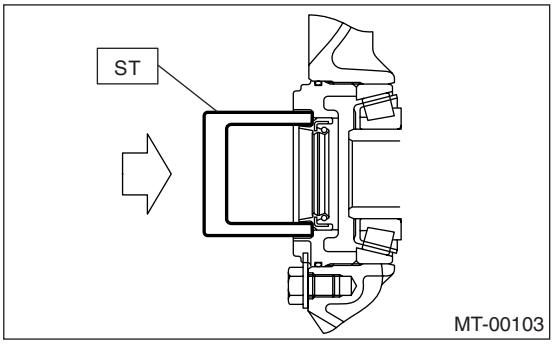
4) Replace the gasket with new one, and then tighten the differential oil drain plug.

Tightening torque:
70 N·m (7.1 kgf-m, 51 ft-lb)



(A) Drain plug

5) Separate the front drive shaft from transmission. <Ref. to DS-29, REMOVAL, Front Drive Shaft.>
6) Remove differential side retainer oil seal using screwdriver wrapped with vinyl tape.
7) Using the ST, install the differential side retainer oil seal tapping ST lightly with a hammer.
ST 18675AA000 DIFFERENTIAL OIL SEAL INSTALLER



8) Install the front drive shaft. <Ref. to DS-30, INSTALLATION, Front Drive Shaft.>
9) Install the front exhaust pipe and center exhaust pipe <Ref. to EX(H4DOTC)-9, REMOVAL, Center Exhaust Pipe.>.
10) Lower the vehicle.
11) Fill gear oil into the gauge hole. <Ref. to 5MT-26, REPLACEMENT, Transmission Gear Oil.>

2. Non-TURBO model

Remove front differential assembly and replace differential side retainer oil seal. <Ref. to 5MT-70, REMOVAL, Front Differential Assembly.>

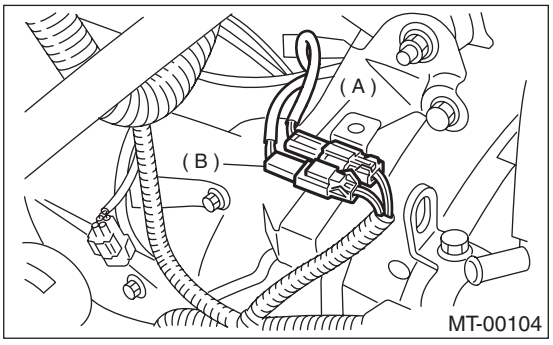
7. Switches and Harness

A: REMOVAL

1. BACK-UP LIGHT AND NEUTRAL POSITION SWITCH

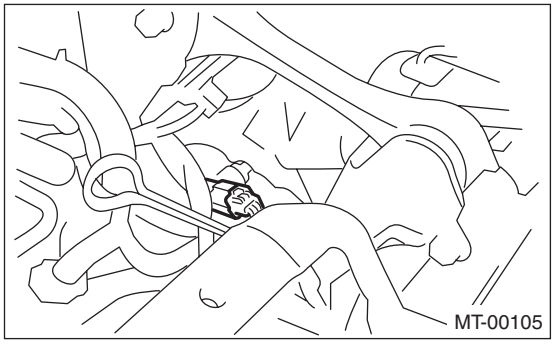
1) Disconnect ground cable from battery.
2) Remove the air intake duct and cleaner case or the air intake chamber. (Non-TURBO model) <Ref. to IN(H4SO)-6, REMOVAL, Air Cleaner Case.> and <Ref. to IN(H4SO)-7, REMOVAL, Air Intake Duct.>
3) Remove the intercooler. (Turbo model) <Ref. to IN(H4DOTC)-10, REMOVAL, Intercooler.>
4) Disconnect the connector of back-up light switch and neutral position switch.

- NON-TURBO MODEL

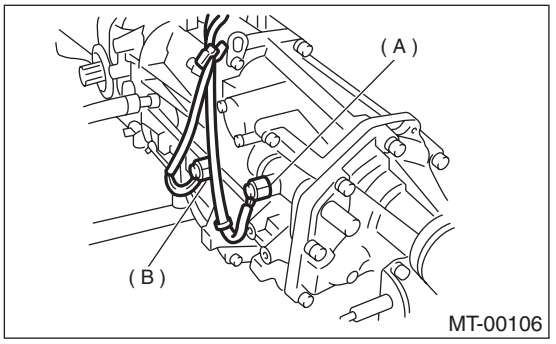


(A) Neutral switch (Brown)
(B) Back-up light switch (Gray)

- TURBO MODEL



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



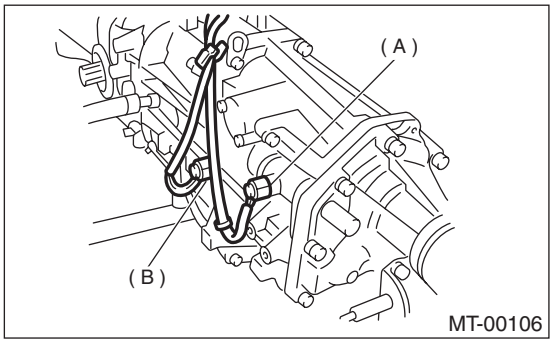
(A) Neutral switch (Brown)
(B) Back-up light switch (Gray)

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:
32.3 N·m (3.3 kgf-m, 24 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 or the air intake chamber. (Non-TURBO model) <Ref. to IN(H4SO)-6, INSTALLATION, Air Cleaner Case.> and <Ref. to IN(H4SO)-7, INSTALLATION, Air Intake Duct.>
4) Install the intercooler. (Turbo model)
<Ref. to IN(H4DOTC)-11, INSTALLATION, Intercooler.>
5) Connect the battery ground cable to battery.

C: INSPECTION

1. BACK-UP LIGHT SWITCH

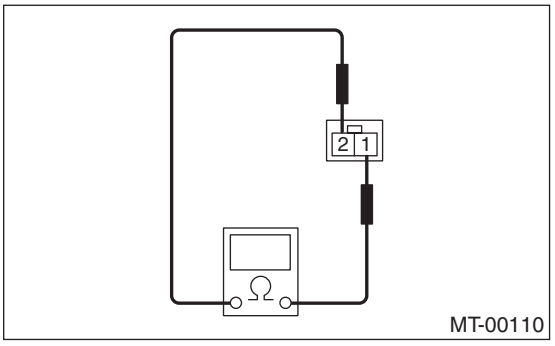
Inspect the back-up light switch. <Ref. to LI-7, Back-up Light System.>

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.

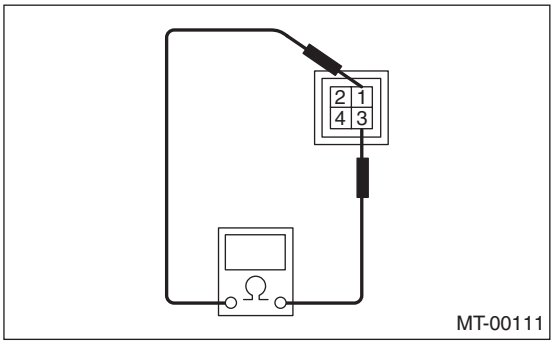
Non-TURBO model:

Gear shift position	Terminal No.	Specified resistance
Neutral position	1 and 2	Less than 1 Ω
Other positions		More than 1 MΩ



Turbo model:

Gear shift position	Terminal No.	Specified resistance
Neutral position	1 and 3	Less than 1 Ω
Other positions		More than 1 MΩ

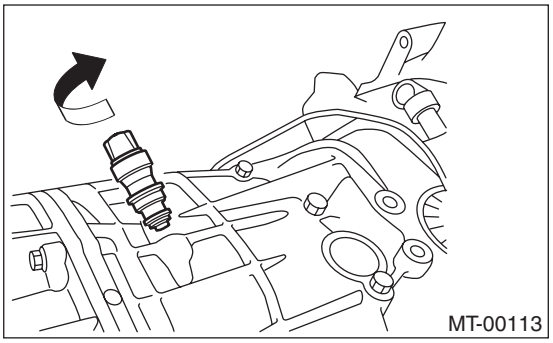


4) Replace defective parts.

8. Vehicle Speed Sensor

A: REMOVAL

1) Disconnect 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-4, INSPECTION, Combination Meter System.>

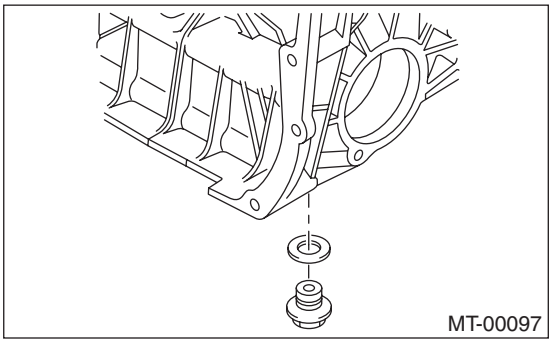
9. Preparation for Overhaul

A: PROCEDURE

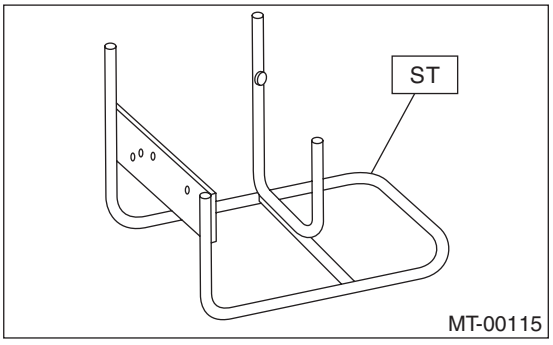
1) Clean oil, grease, dirt and dust from transmission.
2) Remove the drain plug to drain oil. After draining, retighten it as before.

NOTE:
Replace the gasket with a new one.

Tightening torque:
70 N·m (7.1 kgf-m, 51 ft-lb)



3) Attach the transmission to ST.

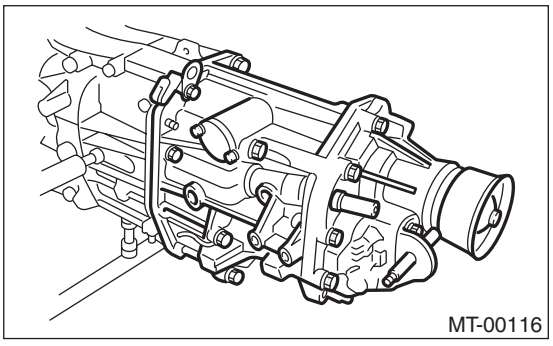


4) Rotating parts should be coated with oil prior to assembly.
5) All disassembled parts, if to be reused, should be reinstalled in the original positions and directions.
6) Gaskets, lock washers and lock nut must be replaced with new ones.
7) Liquid gasket should be used where specified to prevent leakage.

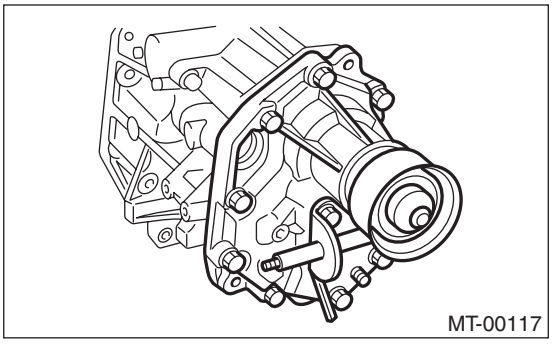
10.Transfer Case and Extension Case Assembly

A: REMOVAL

1) Remove the manual transmission assembly from vehicle. <Ref. to 5MT-27, REMOVAL, Manual Transmission Assembly.>
2) Remove the back-up light switch and neutral position switch. <Ref. to 5MT-37, REMOVAL, Switches and Harness.>
3) Remove the transfer case with extension case assembly.

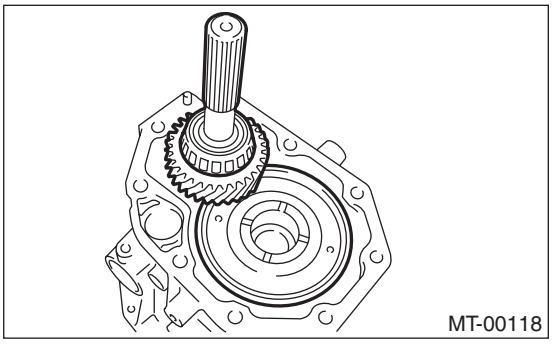

MT-00116

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

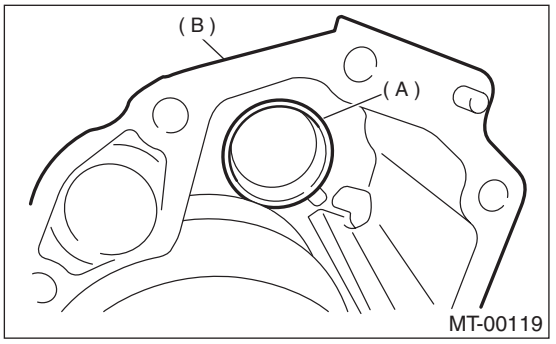

MT-00117

B: INSTALLATION

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


MT-00118

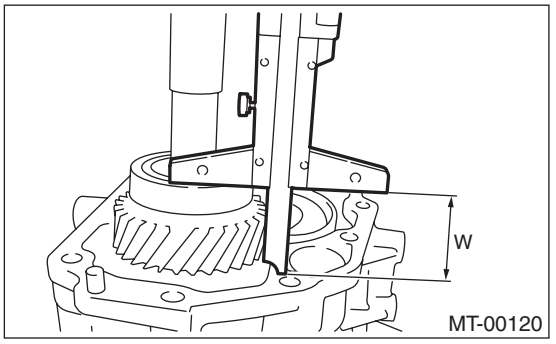
2) Remove the bearing outer race from the extension case.



MT-00119

(A) Bearing outer race
(B) Extension case

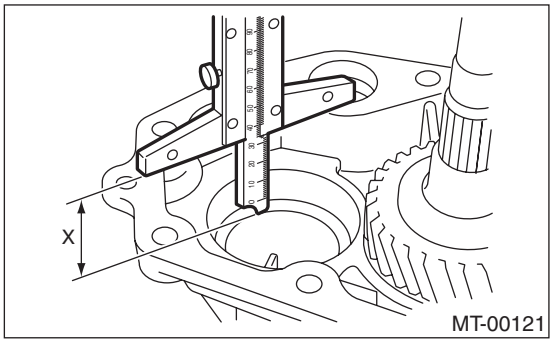
3) While pressing the bearing outer race horizontally, turn the driven shaft ten rotations.
4) Measure the height “W” between transfer case and taper roller bearing on the transfer driven gear.



MT-00120

5) Measure the depth “X”.

NOTE:
Measure with bearing cone and thrust washer removed.



MT-00121

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

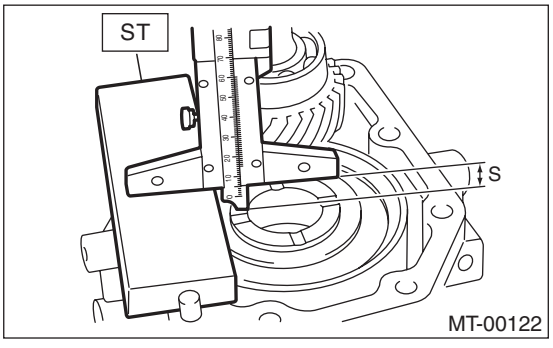
7) Select the nearest washer in the following table:

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

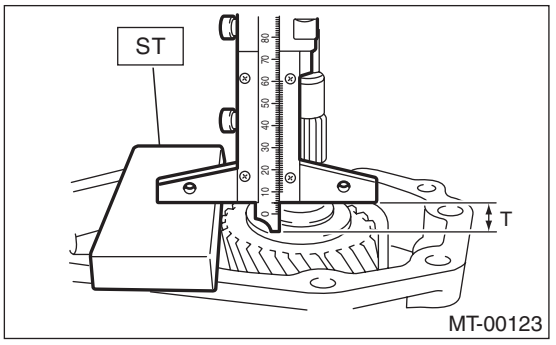
NOTE:
Be sure to keep the clearance within specifications.

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



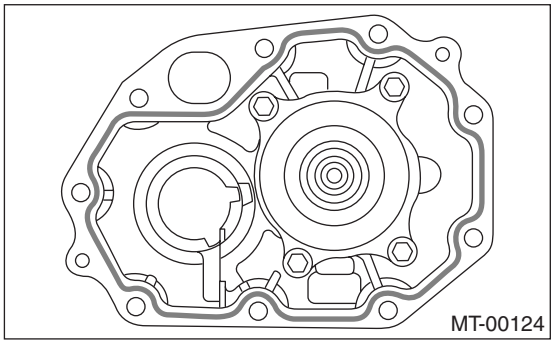
12) Calculate the space “U” using the following equation: U = S + T – 30 mm (1.18 in) [Thickness of ST]
13) Select the suitable washer in the following table:

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)

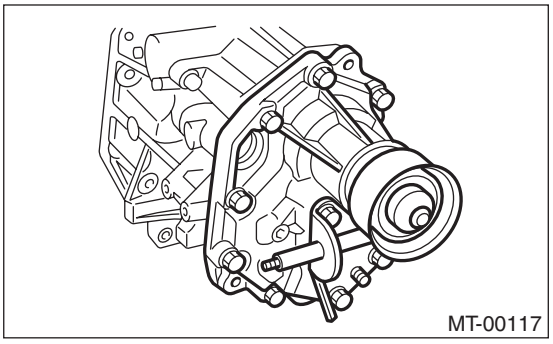
14) Fit the thrust washer on center differential.
15) Apply proper amount of liquid gasket to the transfer case mating surface.

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

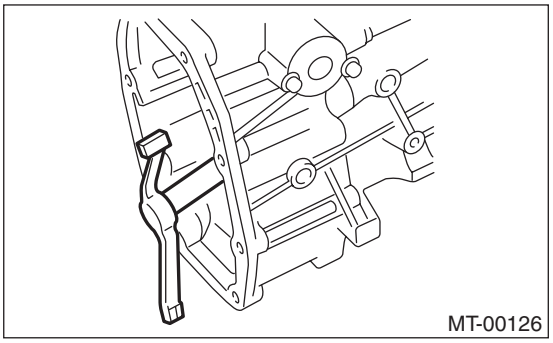


16) Install the extension assembly into transfer case.

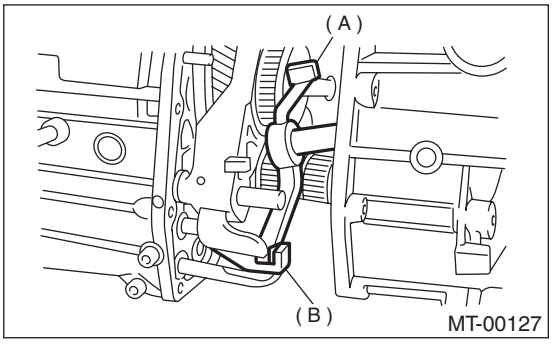
Tightening torque:
40 N·m (4.1 kgf-m, 29.7 ft-lb)



17) Install the shifter arm to transfer case.



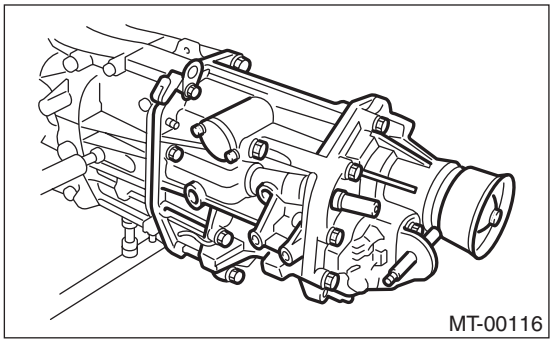
18) Hang the shifter arm on 3rd-4th fork rod.



(A) Shifter arm
(B) 3rd-4th fork rod

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

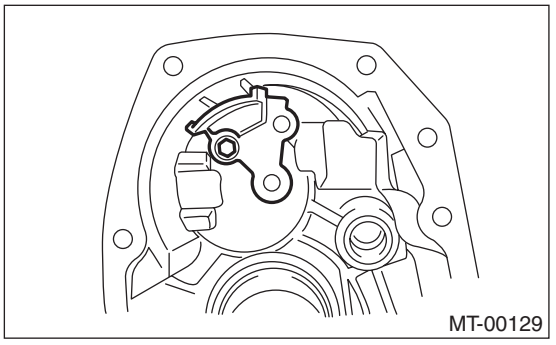
Tightening torque:
24.5 N·m (2.5 kgf-m, 18.1 ft-lb)



C: DISASSEMBLY

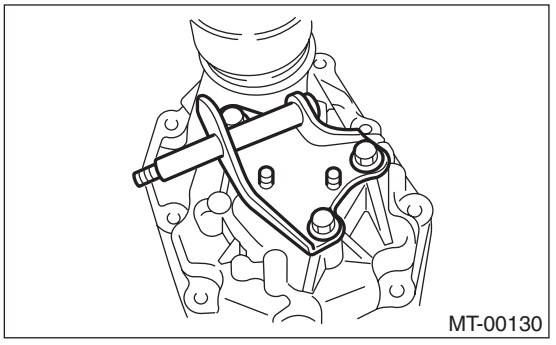
1. TRANSFER CASE

1) Remove the reverse check assembly. <Ref. to 5MT-50, REMOVAL, Reverse Check Sleeve.>
2) Remove the oil guide.



2. EXTENSION CASE

1) Remove the transfer drive gear assembly. <Ref. to 5MT-45, REMOVAL, Transfer Drive Gear.>
2) Remove the shift bracket.



3) Remove the oil seal from extension case. <Ref. to 5MT-35, Oil Seal.>

D: ASSEMBLY

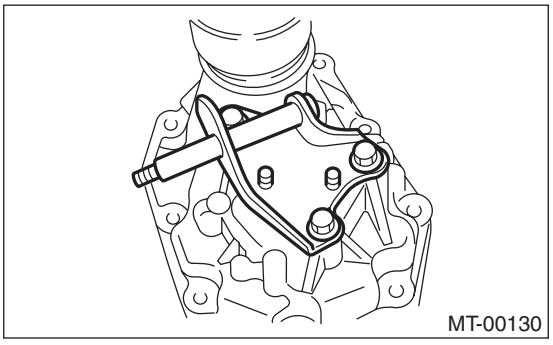
1. EXTENSION CASE

1) Using the ST, install the oil seal to extension case. <Ref. to 5MT-35, 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)

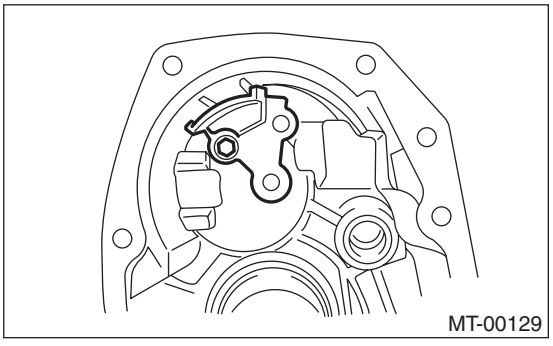

MT-00130

3) Install the transfer drive gear to extension case. <Ref. to 5MT-45, 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)

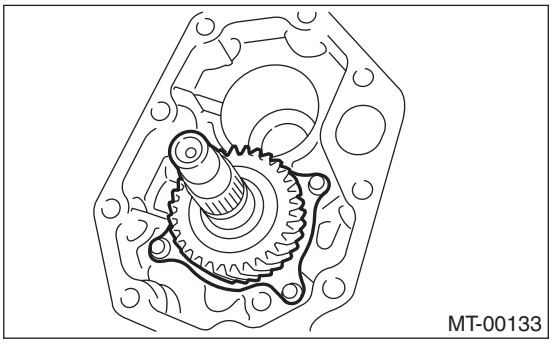

MT-00129

2) Install the reverse check sleeve assembly to transfer case. <Ref. to 5MT-50, INSTALLATION, Reverse Check Sleeve.>

11.Transfer Drive Gear

A: REMOVAL

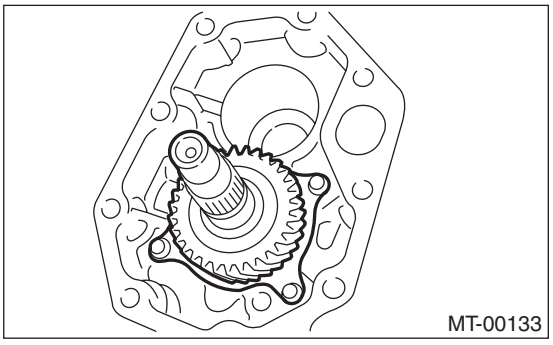
1) Remove the manual transmission assembly from vehicle. <Ref. to 5MT-27, REMOVAL, Manual Transmission Assembly.>
2) Remove the back-up light switch and neutral position switch. <Ref. to 5MT-37, REMOVAL, Switches and Harness.>
3) Remove the transfer case with extension case assembly. <Ref. to 5MT-41, 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.


MT-00133

B: INSTALLATION

1) Install the transfer drive gear.

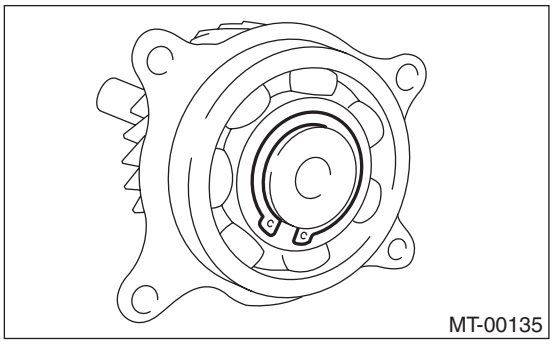
Tightening torque:
26 N·m (2.7 kgf-m, 20 ft-lb)


MT-00133

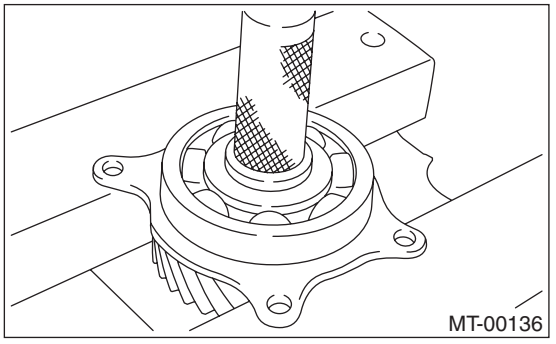
2) Install the transfer driven gear.
3) Install the extension case assembly.
4) Install the transfer case and extension case assembly. <Ref. to 5MT-41, INSTALLATION, Transfer Case and Extension Case Assembly.>
5) Install the back-up light switch and neutral position switch. <Ref. to 5MT-37, INSTALLATION, Switches and Harness.>
6) Install the manual transmission assembly from vehicle. <Ref. to 5MT-30, INSTALLATION, Manual Transmission Assembly.>

C: DISASSEMBLY

1) Remove the snap ring.


MT-00135

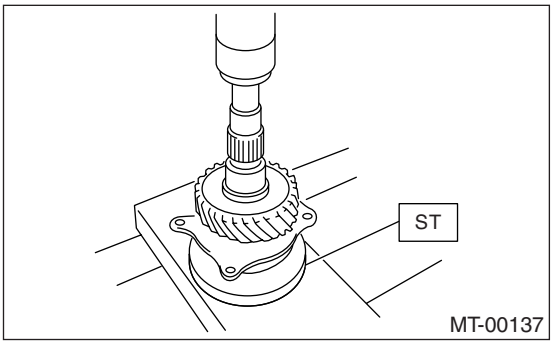
2) Remove the ball bearing.


MT-00136

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)



MT-00137

2) Install the snap ring on transfer drive shaft.
3) Check the clearance between snap ring and ball bearing. <Ref. to 5MT-46, INSPECTION, Transfer Drive Gear.>

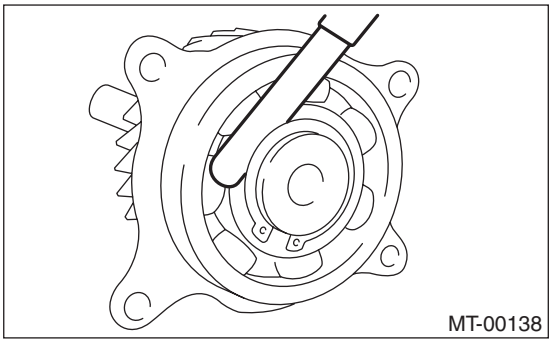
E: INSPECTION

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 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)



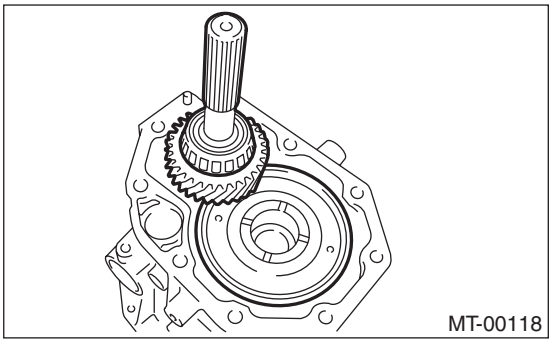
If the measurement is not within specification, select a suitable snap ring.

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

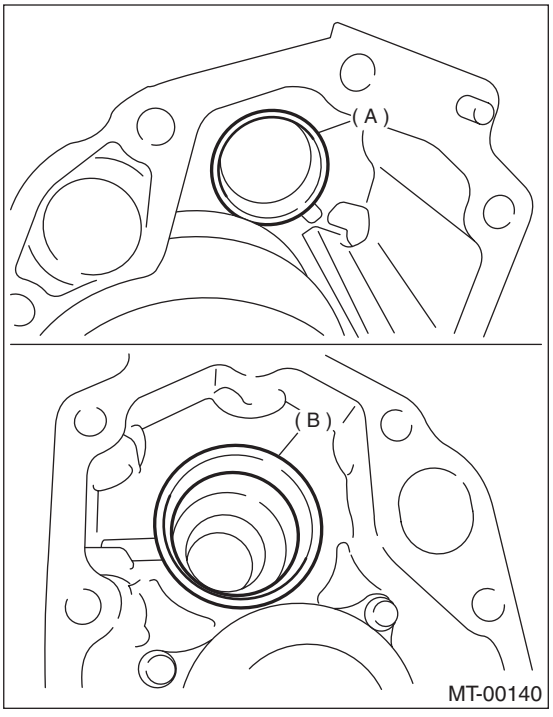
12.Transfer Driven Gear

A: REMOVAL

1) Remove the manual transmission assembly from vehicle. <Ref. to 5MT-27, REMOVAL, Manual Transmission Assembly.>
2) Remove the back-up light switch and neutral position switch. <Ref. to 5MT-37, REMOVAL, Switches and Harness.>
3) Remove the transfer case with extension case assembly. <Ref. to 5MT-41, REMOVAL, Transfer Case and Extension Case Assembly.>
4) Remove the extension case assembly.
5) Remove the transfer driven gear.



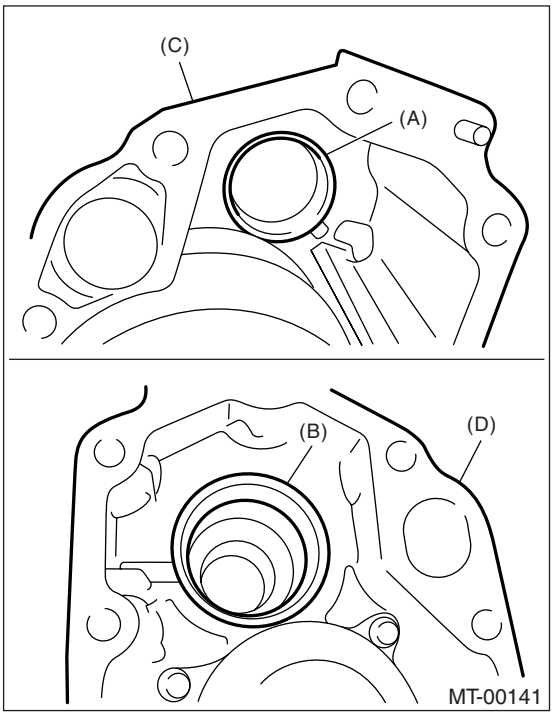
6) Remove the bearing outer race from extension case and transfer case.



(A) Bearing outer race (transfer case)
(B) Bearing outer race (extension case)

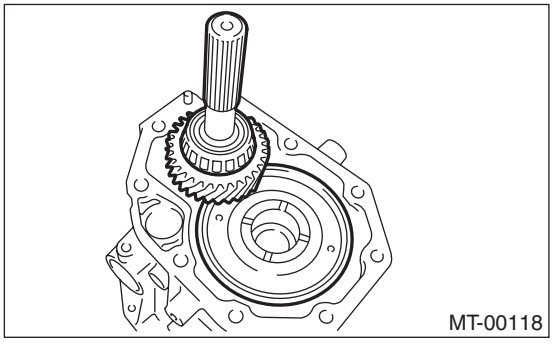
B: INSTALLATION

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

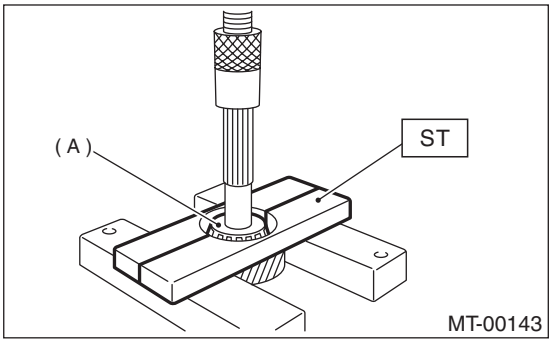
2) Install the transfer driven gear.



3) Install the transfer case and extension case assembly. <Ref. to 5MT-41, INSTALLATION, Transfer Case and Extension Case Assembly.>
4) Install the back-up light switch and neutral position switch. <Ref. to 5MT-37, INSTALLATION, Switches and Harness.>
5) Install the manual transmission assembly to vehicle. <Ref. to 5MT-30, INSTALLATION, Manual Transmission Assembly.>

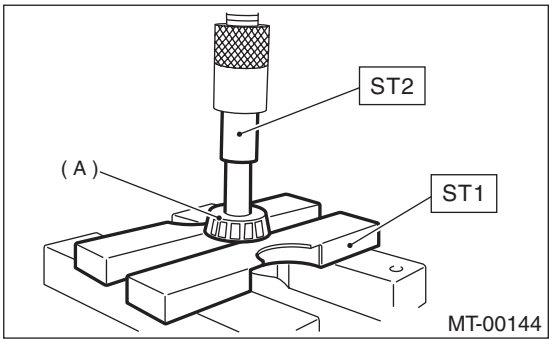
C: DISASSEMBLY

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

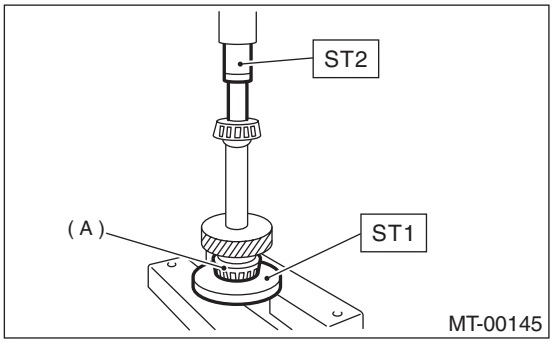


(A) Roller bearing

D: ASSEMBLY

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

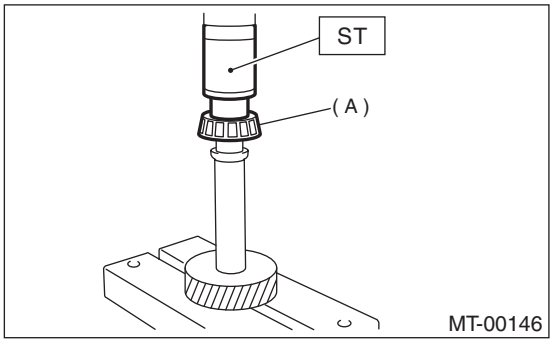
NOTE:
Do not apply pressure in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton)



(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.

13.Center Differential

A: REMOVAL

1) Remove the manual transmission assembly from vehicle. <Ref. to 5MT-27, REMOVAL, Manual Transmission Assembly.>
2) Remove the transfer case with extension case assembly. <Ref. to 5MT-41, REMOVAL, Transfer Case and Extension Case Assembly.>
3) Remove the extension case assembly. <Ref. to 5MT-41, REMOVAL, Transfer Case and Extension Case Assembly.>
4) Remove the transfer driven gear. <Ref. to 5MT-47, 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-47, INSTALLATION, Transfer Driven Gear.>
3) Install the extension case assembly. <Ref. to 5MT-41, INSTALLATION, Transfer Case and Extension Case Assembly.>
4) Install the transfer case with extension case assembly. <Ref. to 5MT-41, REMOVAL, Transfer Case and Extension Case Assembly.>
5) Install the back-up light switch and neutral position switch. <Ref. to 5MT-37, REMOVAL, Switches and Harness.>
6) Install the manual transmission assembly to vehicle. <Ref. to 5MT-30, INSTALLATION, Manual Transmission Assembly.>

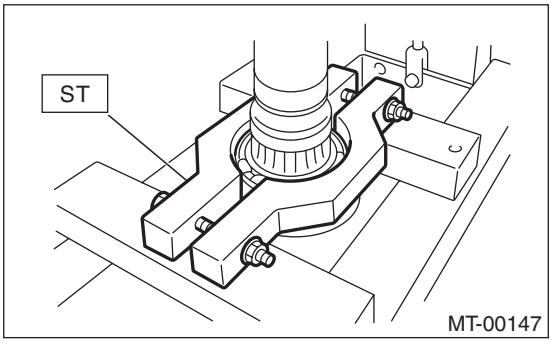
C: DISASSEMBLY

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.

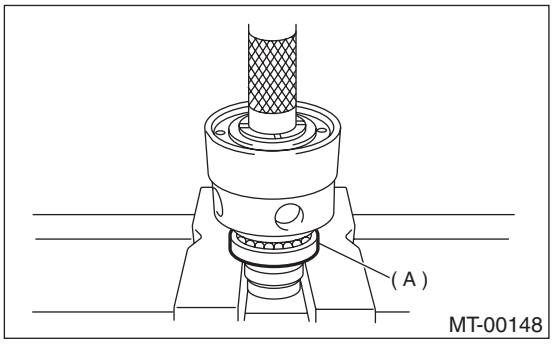
ST 498077300 CENTER DIFFERENTIAL BEARING REMOVER



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

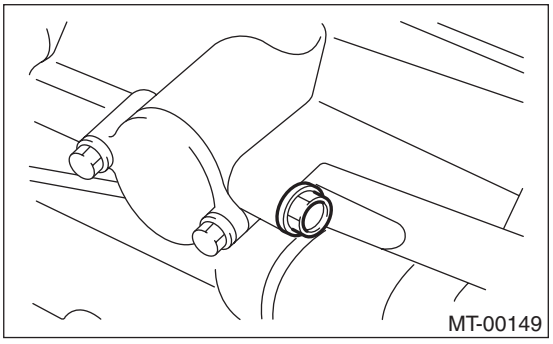
1) Bearings
Replace the bearings in the following cases:
- Broken or rusty bearings
- Worn or damaged
- Bearings that fail to turn smoothly or make abnormal noise when turned after gear oil lubrication.
- Bearings having other defects

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

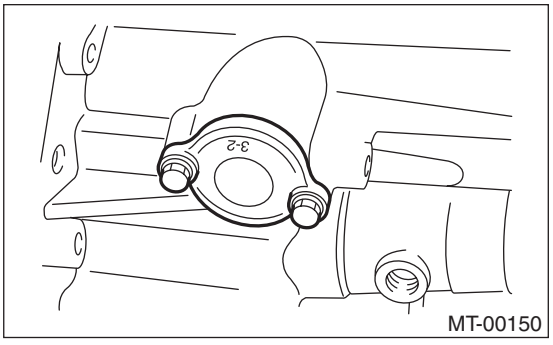
14.Reverse Check Sleeve

A: REMOVAL

1) Remove the manual transmission assembly from vehicle. <Ref. to 5MT-27, REMOVAL, Manual Transmission Assembly.>
2) Remove the transfer case with extension case assembly. <Ref. to 5MT-41, REMOVAL, Transfer Case and Extension Case Assembly.>
3) Remove the shifter arm.
4) Remove the plug, spring, washer and reverse check ball.



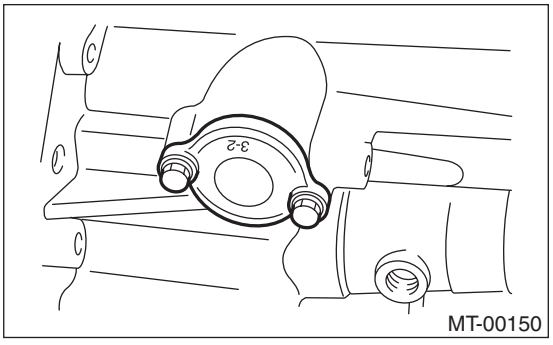
5) Remove the reverse check sleeve.



B: INSTALLATION

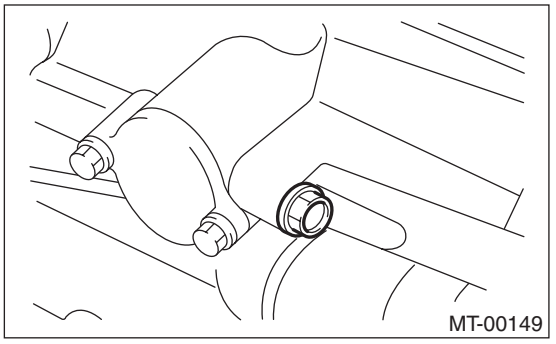
1) Install the reverse check sleeve.

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)

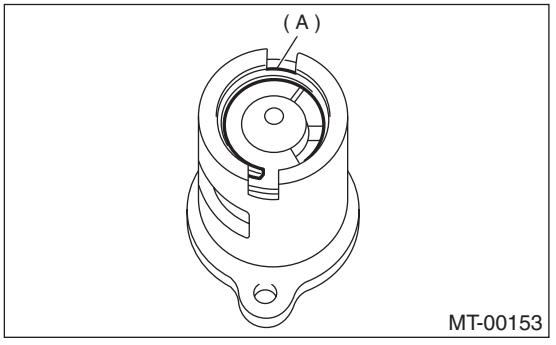


3) Install the shifter arm to transfer case assembly.
4) Install the transfer case with extension case assembly. <Ref. to 5MT-41, INSTALLATION, Transfer Case and Extension Case Assembly.>
5) Install the manual transmission assembly to vehicle. <Ref. to 5MT-30, INSTALLATION, Manual Transmission Assembly.>

C: DISASSEMBLY

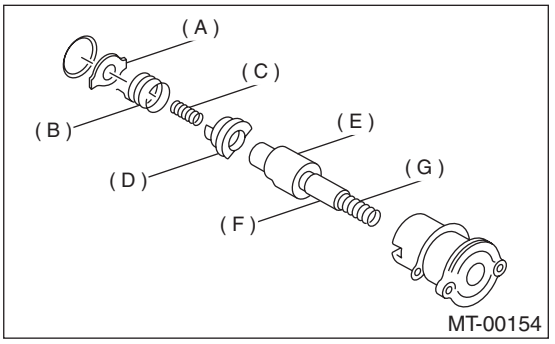
1) Cover the reverse check sleeve with a rag, and remove the snap ring using a screwdriver.

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)

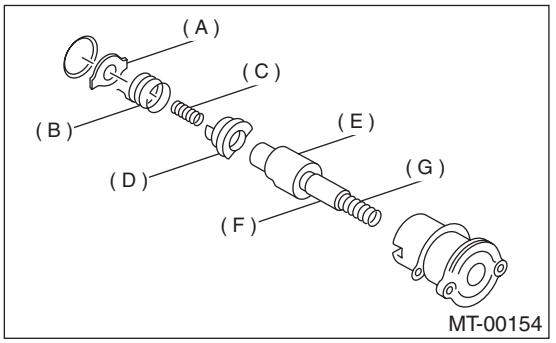
3) Remove the O-ring.

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.

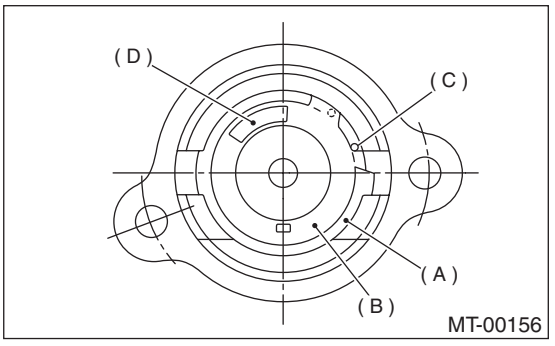


(A) Reverse check plate
(B) Reverse check spring
(C) Return spring (5th-Rev)
(D) Reverse check cam
(E) Reverse accent shaft
(F) Return spring cap
(G) Return spring (1st-2nd)

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.

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) Reverse check spring
(D) Reverse check cam

• Select a suitable reverse accent shaft and reverse check plate. <Ref. to 5MT-52, 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.

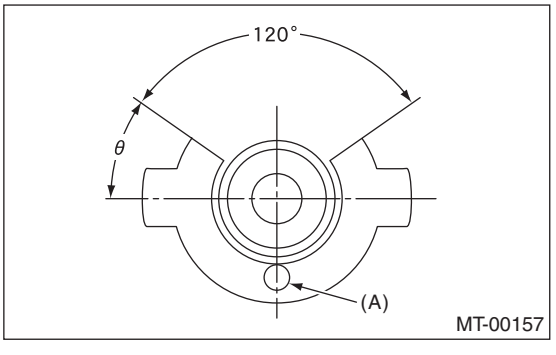
Adjustment shim	
Part No.	Thickness mm (in)
32190AA000	0.15 (0.0059)
32190AA010	0.30 (0.0118)

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.

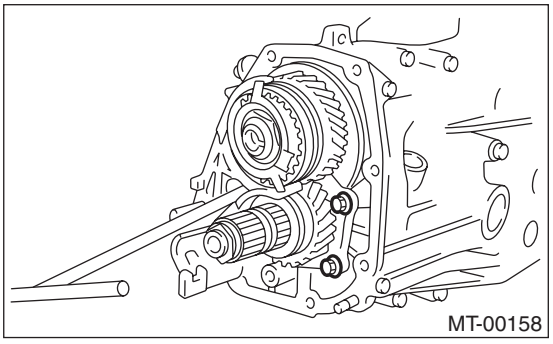
Reverse check plate			
Part No.	(A): No.	Angle θ	Remarks
32189AA000	0	28°	Arm stops closer to 5th gear.
32189AA010	1	31°	Arm stops closer to 5th gear.
32189AA020	2	34°	Arm stops in the center.
32189AA030	3	37°	Arm stops closer to reverse gear.
32189AA040	4	40°	Arm stops closer to reverse gear.



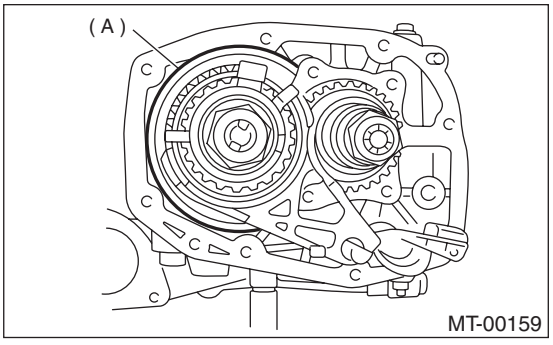
15.Transmission Case

A: REMOVAL

1) Remove the manual transmission assembly from vehicle. <Ref. to 5MT-27, 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-41, REMOVAL, Transfer Case and Extension Case Assembly.>
4) Remove the bearing mounting bolts.


MT-00158

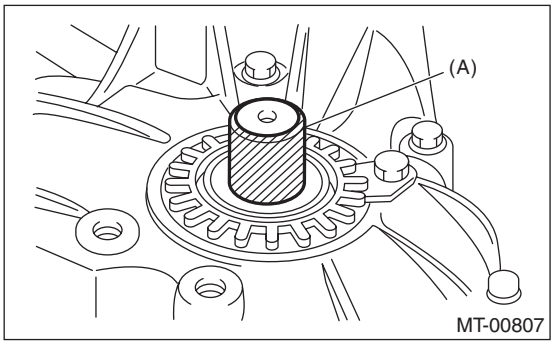
5) Remove the main shaft rear plate.



MT-00159

(A) Main shaft rear plate

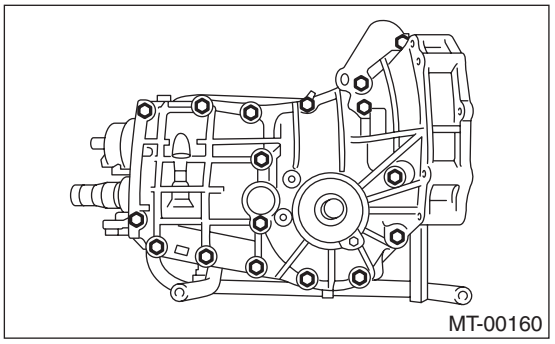
6) Put vinyl tape around the splines of right and left axle drive shafts to prevent damage to oil seal. (Non-TURBO model)



MT-00807

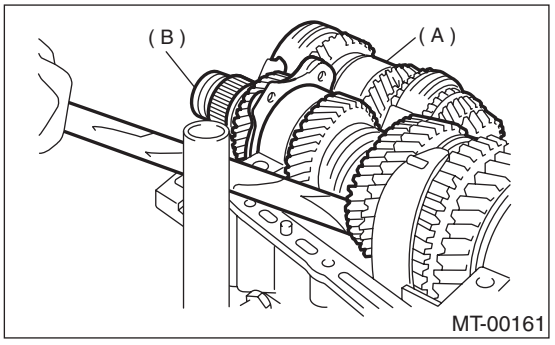
(A) Vinyl tape

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


MT-00160

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

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

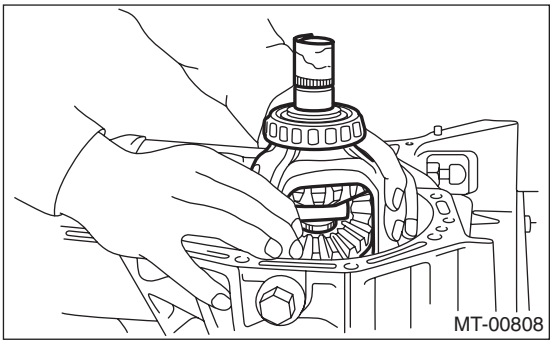


MT-00161

(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.


MT-00808

B: INSTALLATION

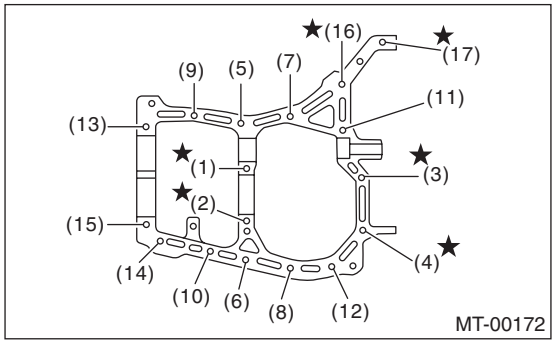
1) Wipe off grease, oil and dust on the mating surfaces of transmission cases with white gasoline.
2) Install the front differential assembly.
3) Install the main shaft assembly.
Install the transmission case knock pin into needle bearing knock pin hole.
4) Install the drive pinion shaft assembly.
Install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

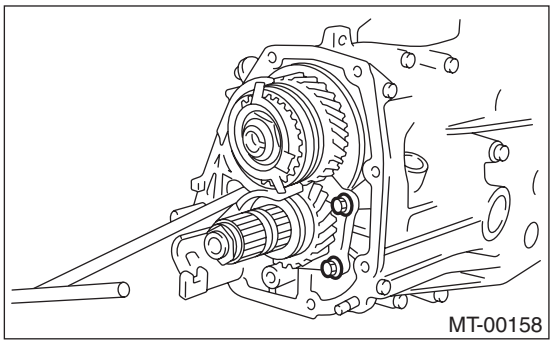
NOTE:
• Insert the bolts from bottom and tighten the nuts at top.
• Put the cases together so that drive pinion shim and input shaft holder shim are not caught up in between.
• Confirm that the speedometer gear is meshed.

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)



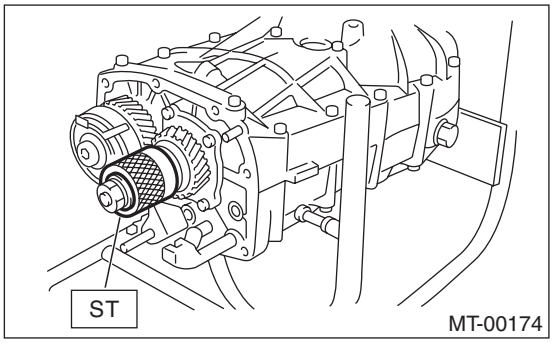
7) Tighten the ball bearing attachment bolts.

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

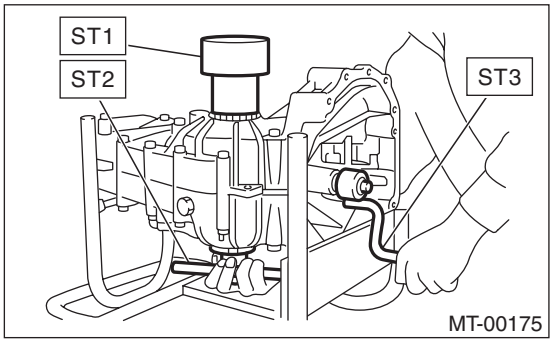


8) Backlash adjustment of hypoid gear and preload adjustment of roller bearing:

NOTE:
Support the drive pinion assembly with ST.
ST 498427100 STOPPER



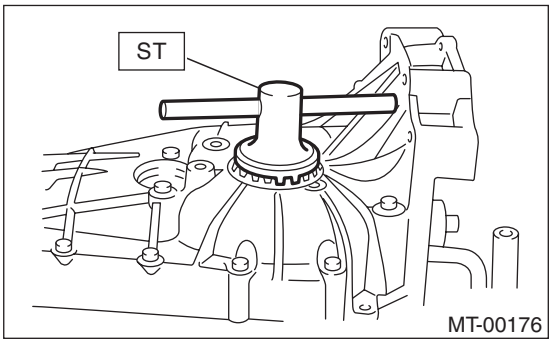
9) Place the transmission with case left side facing downward and put ST1 on bearing cup.
10) Screw the retainer assembly into left case from the bottom using ST2. Fit the ST3 on transmission main shaft. Shift the gear into 4th or 5th and turn the shaft several times. Screw in the retainer while turning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



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



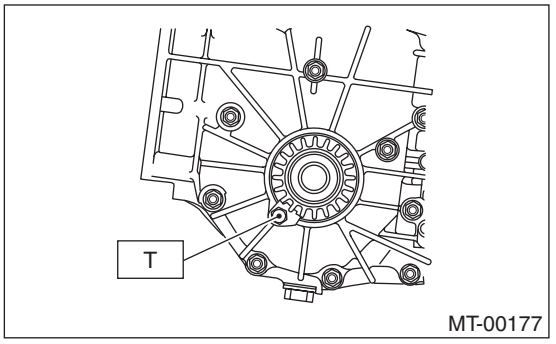
12) Loosen the retainer on the lower side by 3 notches and turn in the retainer on upper side by the same amount in order to obtain the backlash.
13) Turn in the retainer on the upper side additionally by 1 notch in order to apply preload on taper roller bearing.
14) Install temporarily both the upper and lower lock plates and mark both holder and lock plate for later readjustment.

NOTE:
Install the lock plate upside down if it is hard to install.

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-74, 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 to the original position.
Install the lock plate.

NOTE:
Record how many times the retainer is turned while loosening.
Carry out this job on both upper and lower retainers.

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



18) Selecting of main shaft rear plate. <Ref. to 5MT-61, ADJUSTMENT, Main Shaft Assembly.>
19) Install the clutch release lever and bearing. <Ref. to CL-15, INSTALLATION, Release Bearing and Lever.>
20) Install the transfer case with extension case assembly. <Ref. to 5MT-41, INSTALLATION, Transfer Case and Extension Case Assembly.>
21) Install the manual transmission assembly into the vehicle.<Ref. to 5MT-30, INSTALLATION, Manual Transmission Assembly.>

C: INSPECTION

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

16.Main Shaft Assembly

A: REMOVAL

1) Remove the manual transmission assembly from vehicle. <Ref. to 5MT-27, REMOVAL, Manual Transmission Assembly.>
2) Remove the transfer case with extension case assembly. <Ref. to 5MT-41, REMOVAL, Transfer Case and Extension Case Assembly.>
3) Remove the transmission case. <Ref. to 5MT-41, REMOVAL, Transfer Case and Extension Case Assembly.>
4) Remove the drive pinion shaft assembly. <Ref. to 5MT-62, REMOVAL, Drive Pinion Shaft Assembly.>
5) Remove the main shaft assembly.

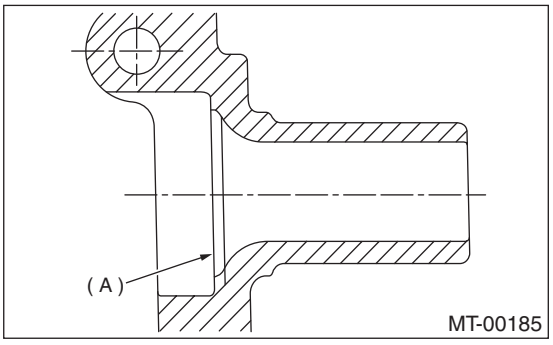
B: INSTALLATION

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.



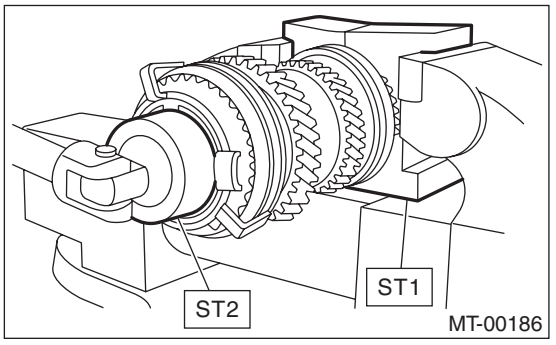
3) Install the drive pinion assembly. <Ref. to 5MT-62, INSTALLATION, Drive Pinion Shaft Assembly.>
4) Install the transmission case. <Ref. to 5MT-54, INSTALLATION, Transmission Case.>
5) Install the transfer case with extension case assembly. <Ref. to 5MT-41, INSTALLATION, Transfer Case and Extension Case Assembly.>
6) Install the manual transmission assembly to vehicle. <Ref. to 5MT-30, INSTALLATION, Manual Transmission Assembly.>

C: DISASSEMBLY

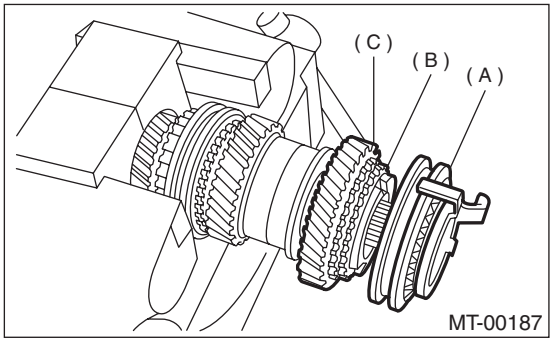
1) Put vinyl tape around the main shaft splines to protect oil seal from damage. Then pull out the oil seal and needle bearing by hand.
2) Remove the lock nut from transmission main shaft assembly.

NOTE:
Remove the caulking before removing lock nut.

ST1 498937000 TRANSMISSION HOLDER
ST2 499987003 SOCKET WRENCH (35)

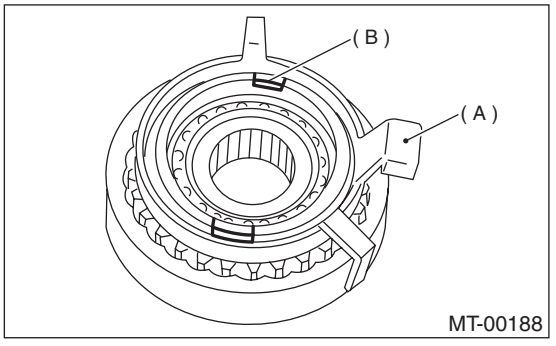


3) Remove the 5th-Rev sleeve and hub assembly, baulk ring, 5th drive gear and needle bearing.



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

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

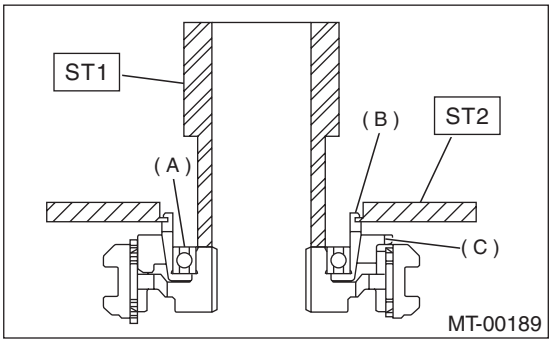


(A) Synchro cone stopper
(B) Snap ring

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

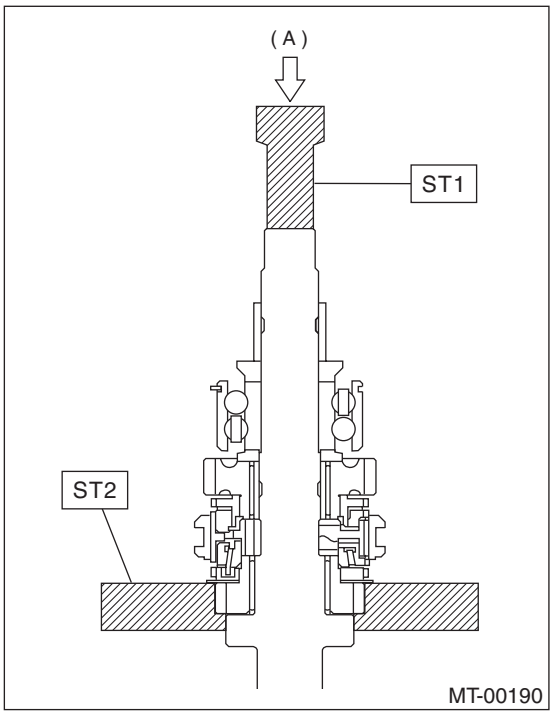


(A) Ball bearing
(B) Synchro cone
(C) Baulk ring

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

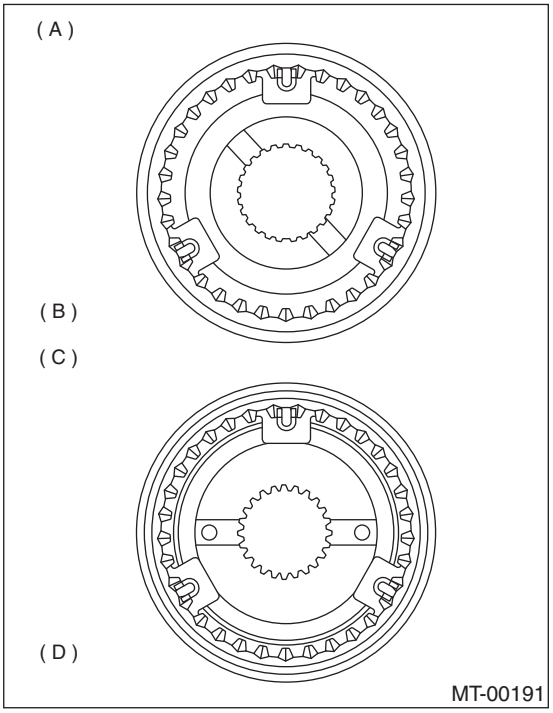


(A) Press

D: ASSEMBLY

1) Assemble each sleeve and hub assembly.

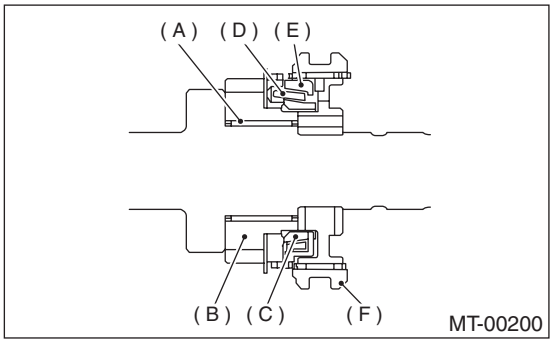
NOTE:
Position the open ends of spring 120° apart.



(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.

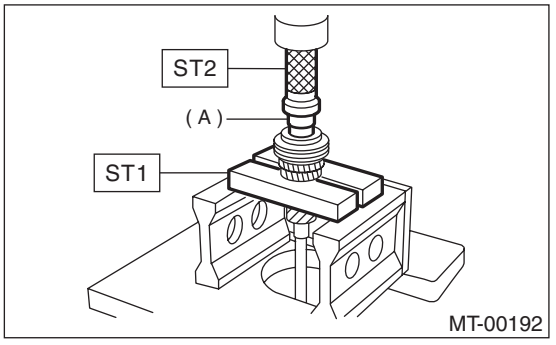


(A) 3rd needle bearing
(B) 3rd drive gear
(C) Inner baulk ring
(D) Synchro cone
(E) Outer baulk ring
(F) Sleeve and hub ASSY

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).

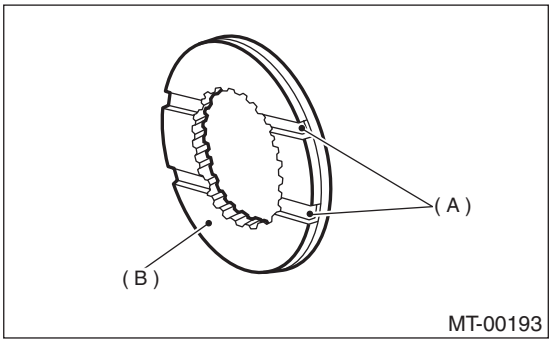
ST1 899714110 REMOVER
ST2 499877000 RACE 4-5 INSTALLER



(A) 4th needle bearing race

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.

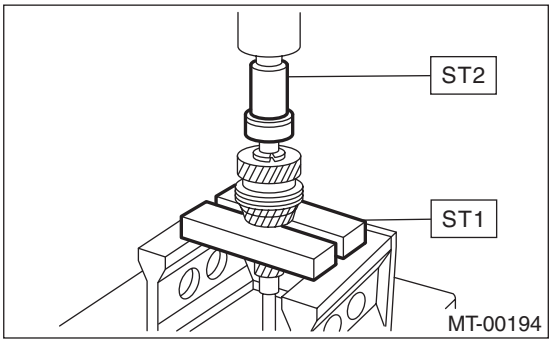


(A) Groove
(B) 4th gear side

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).

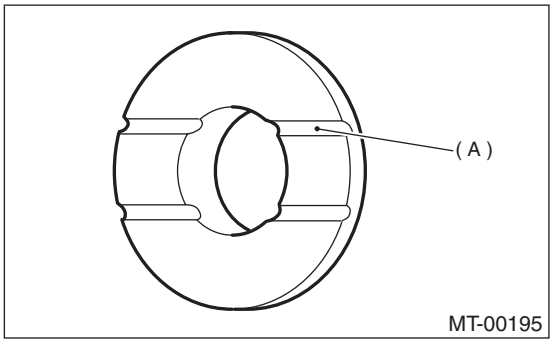
ST1 899714110 REMOVER
ST2 499877000 RACE 4-5 INSTALLER



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

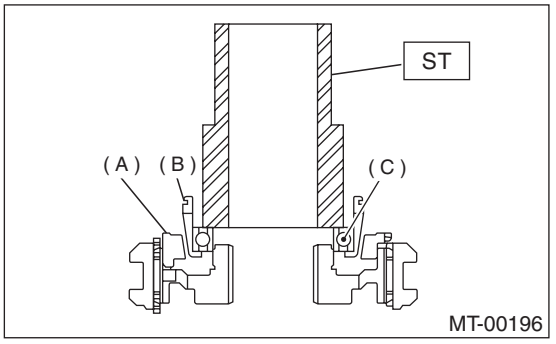


(A) Face this surface to 5th gear side.

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.

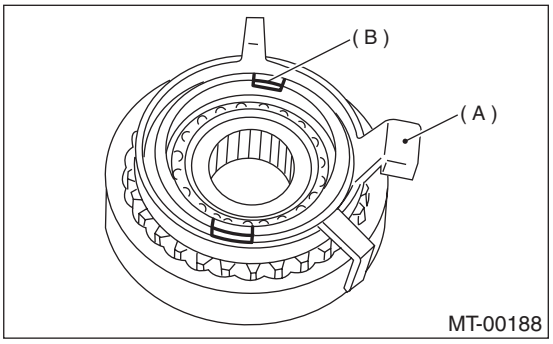
NOTE:
• Do not apply pressure in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).
• Use a new ball bearing.
• After press fitting, make sure the synchro cone rotates freely.

ST 499757002 INSTALLER



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

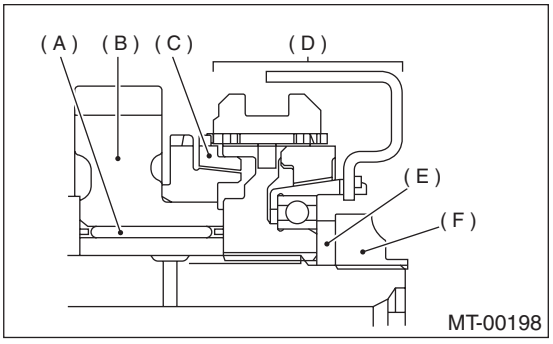
9) Install the synchro cone stopper and snap ring to 5th-Rev sleeve and hub assembly.



(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.

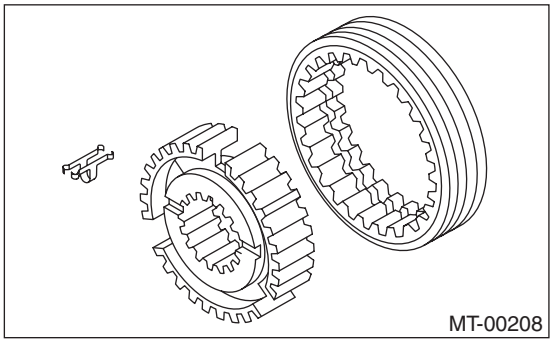
NOTE:
Secure the lock nuts in two places after tightening.

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.

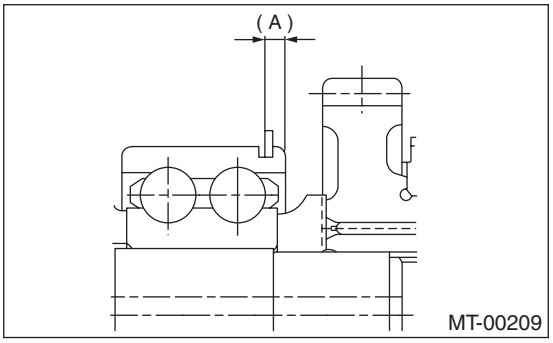
F: ADJUSTMENT

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

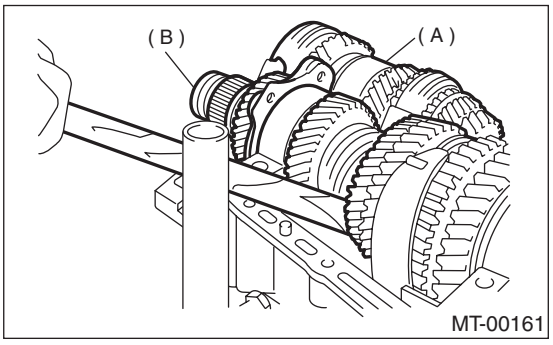


17.Drive Pinion Shaft Assembly

A: REMOVAL

1) Remove the manual transmission assembly from vehicle. <Ref. to 5MT-27, REMOVAL, Manual Transmission Assembly.>
2) Remove the transfer case with extension case assembly. <Ref. to 5MT-41, REMOVAL, Transfer Case and Extension Case Assembly.>
3) Remove the transmission case. <Ref. to 5MT-53, REMOVAL, Transmission Case.>
4) Remove the drive pinion shaft assembly.

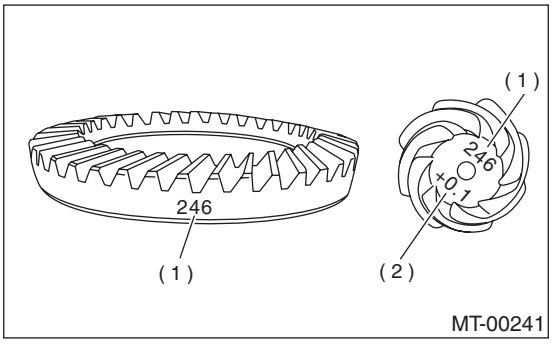
NOTE:
Use a hammer handle, etc. to remove if too tight.



(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.

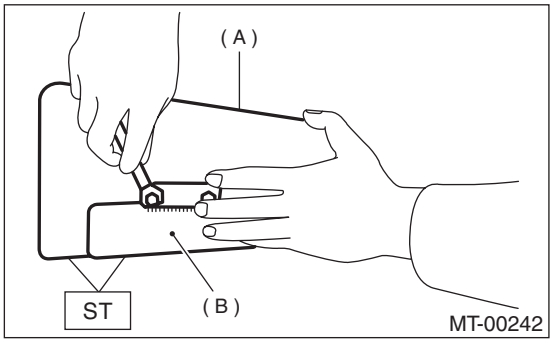


(A) Match number
(B) Shim adjust number

3) Place the drive pinion shaft assembly on right hand transmission main case without shim and tighten the bearing mounting bolts.
4) Inspection and adjustment of ST:

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

ST 499917500 DRIVE PINION GAUGE ASSY



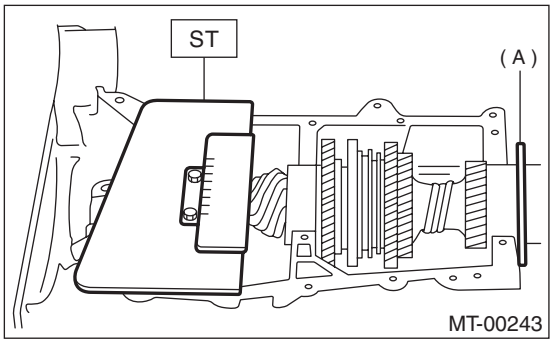
(A) Plate
(B) Scale

5) Position the ST by inserting the knock pin of ST into the knock hole in 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

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.

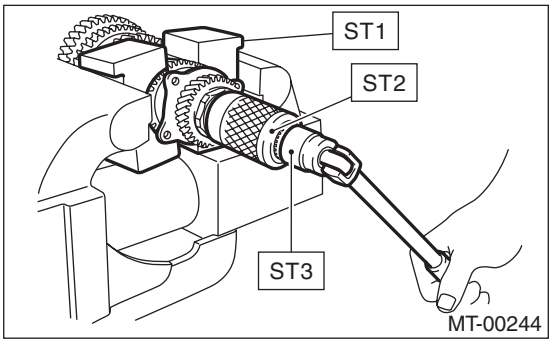
Drive pinion shim	
Part No.	Thickness mm (in)
32295AA031	0.150 (0.0059)
32295AA041	0.175 (0.0069)
32295AA051	0.200 (0.0079)
32295AA061	0.225 (0.0089)
32295AA071	0.250 (0.0098)
32295AA081	0.275 (0.0108)
32295AA091	0.300 (0.0118)
32295AA101	0.500 (0.0197)

9) Install the differential assembly. <Ref. to 5MT-70, 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-67, INSPECTION, Drive Pinion Shaft Assembly.>
11) Install the transmission case. <Ref. to 5MT-54, INSTALLATION, Transmission Case.>
12) Install the transfer case with extension case assembly. <Ref. to 5MT-41, INSTALLATION, Transfer Case and Extension Case Assembly.>
13) Install the manual transmission assembly to vehicle. <Ref. to 5MT-27, Manual Transmission Assembly.>

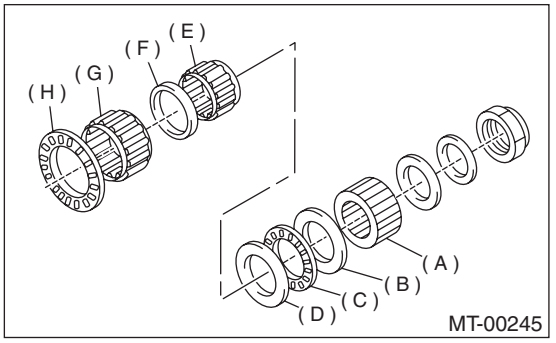
C: DISASSEMBLY

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)



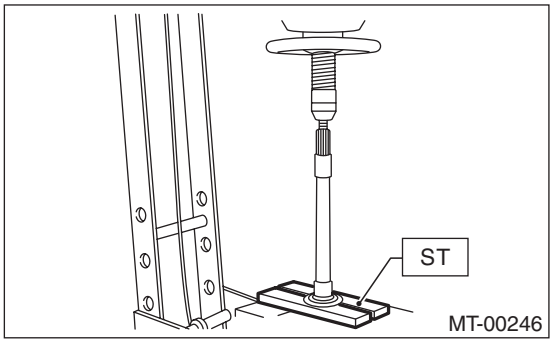
2) Withdraw the drive pinion from driven shaft. Remove the differential bevel gear sleeve, adjusting washer No. 1, adjusting washer No. 2, thrust bearing, needle bearing, drive pinion collar, needle bearing and thrust bearing.



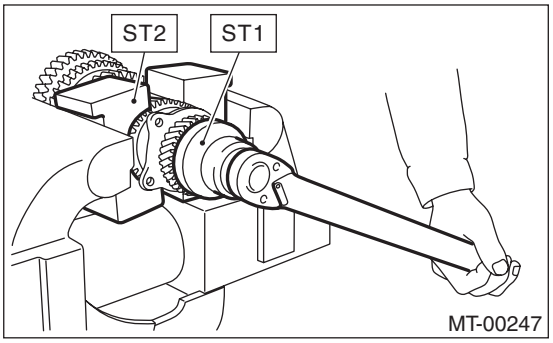
(A) Differential bevel gear sleeve
(B) Washer No. 1 ($25 \times 37.5 \times t$)
(C) Thrust bearing ($25 \times 37.5 \times 3$)
(D) Washer No. 2 ($25 \times 37.5 \times 4$)
(E) Needle bearing ($25 \times 30 \times 20$)
(F) Drive pinion collar
(G) Needle bearing ($30 \times 37 \times 23$)
(H) Thrust bearing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

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

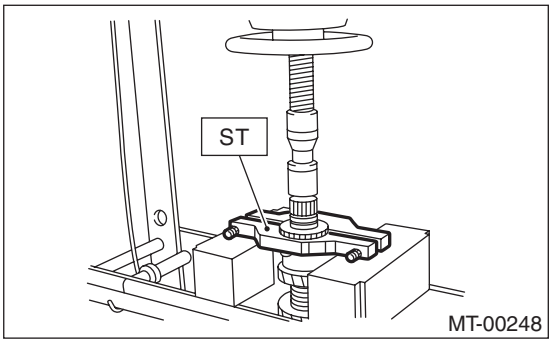
NOTE:
Do not reuse the roller bearing.
ST 498077000 REMOVER



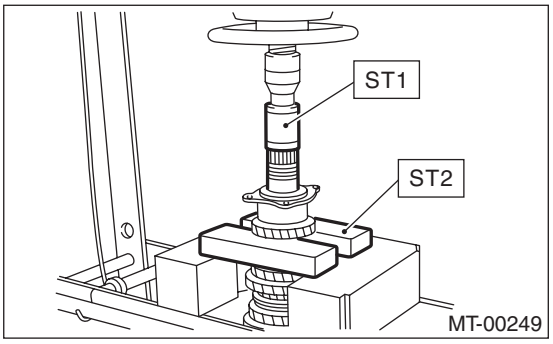
4) Straighten the lock nut at staked portion. Remove the lock nut using ST1 and ST2.
ST1 499987300 SOCKET WRENCH (50)
ST2 899884100 HOLDER



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

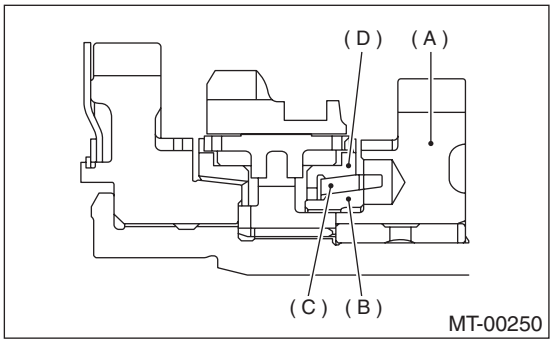


6) Remove the woodruff key.
7) Remove the roller bearing, 3rd-4th driven gear using ST1 and ST2.
ST1 499757002 INSTALLER
ST2 899714110 REMOVER



8) Remove the key.

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

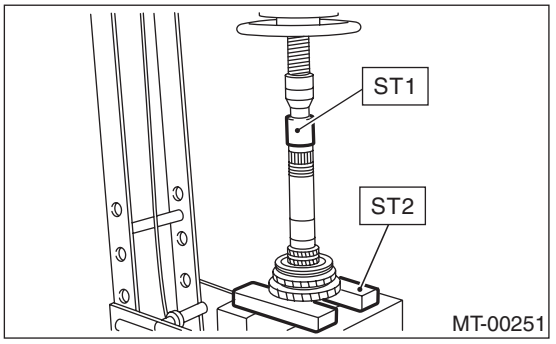


(A) 2nd driven gear
(B) Inner baulk ring
(C) Synchro cone
(D) Outer baulk ring

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.

ST1 499757002 INSTALLER
ST2 899714110 REMOVER

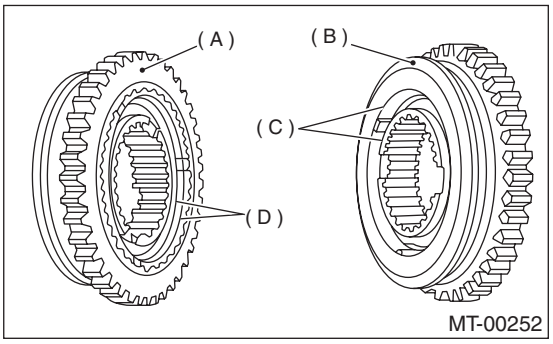


11) Remove the sub gear for 1st driven gear.

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

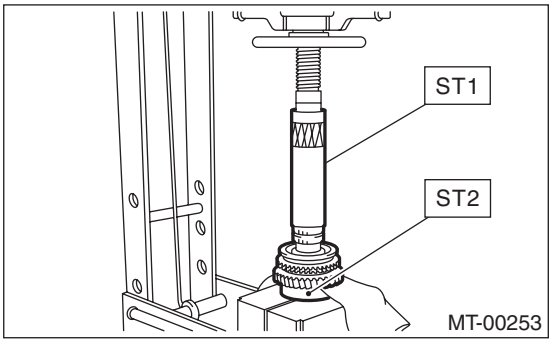
2) Install the washer, snap ring and sub gear to 1st driven gear.
3) Install the 1st driven gear, 1st baulk ring, gear and hub assembly onto driven shaft.

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

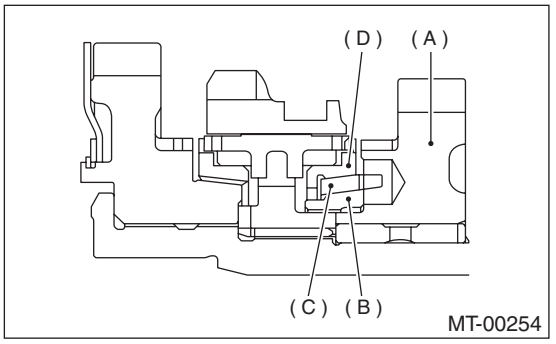
4) Install the 2nd driven gear bushing onto driven shaft using ST1, ST2 and press.

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.

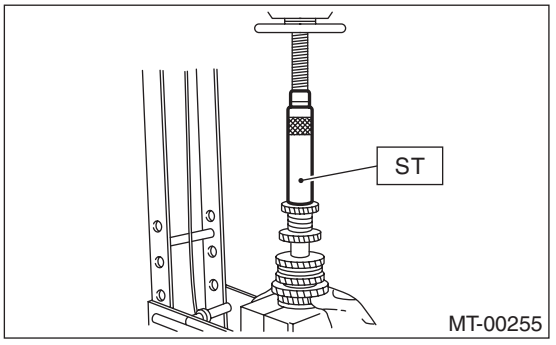


(A) 2nd driven gear
(B) Inner baulk ring
(C) Synchro cone
(D) Outer baulk ring

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.

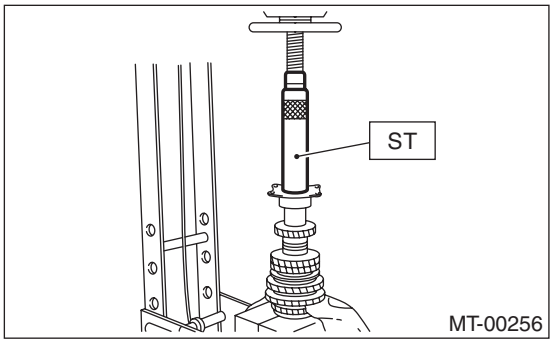
ST 499277200 INSTALLER



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).

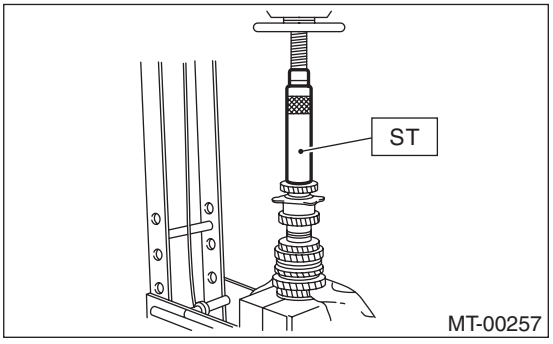
ST 499277200 INSTALLER



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).

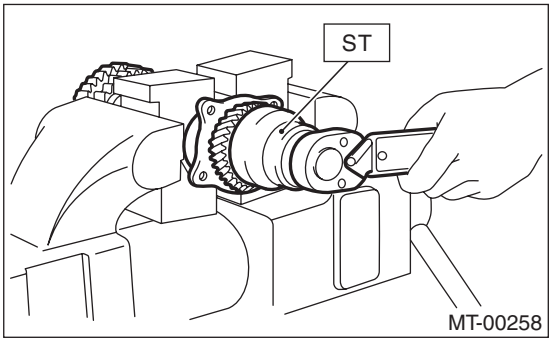
ST 499277200 INSTALLER



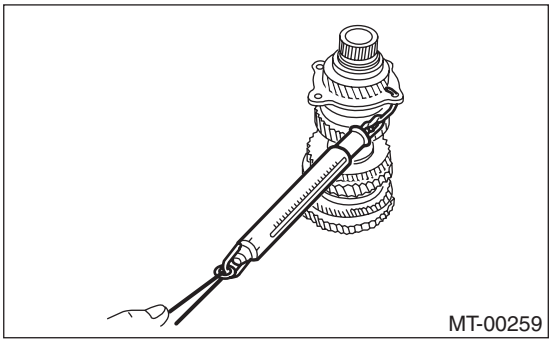
9) Install the lock washer. Install the lock nut and tighten to the specified torque using ST.

ST 499987300 SOCKET WRENCH (50)

Tightening torque:
260 N·m (26.5 kgf-m, 191.7 ft-lb)

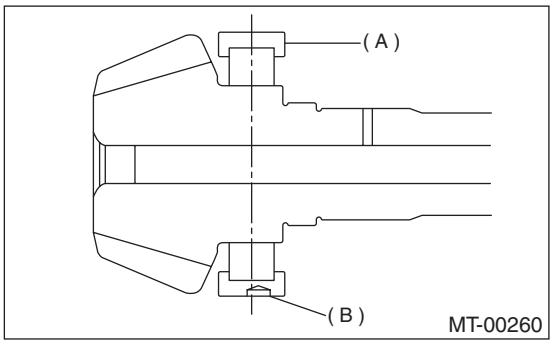


NOTE:
- Stake the lock nut at two points.
- Using the spring balancer, check that starting torque of roller bearing is 0.1 to 1.5 N (0.01 to 0.15 kgf, 0.02 to 0.33 lb).



10) Install the roller bearing onto drive pinion.

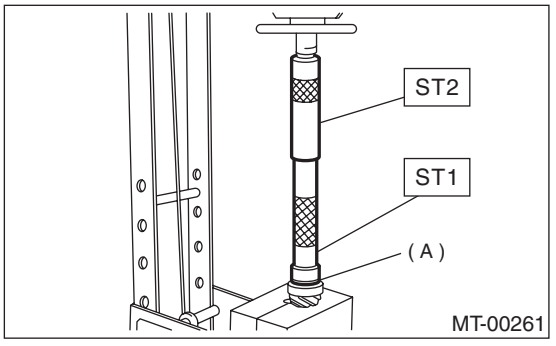
NOTE:
When installing the roller bearing, note its directions (front and rear) because the knock pin hole in outer race is offset.



(A) Roller bearing
(B) Knock pin hole

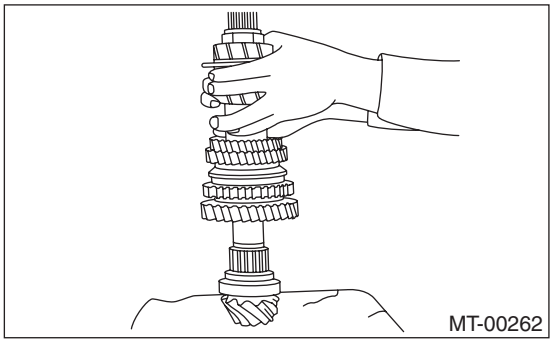
11) Install the washer using ST1, ST2 and press.

ST1 499277100 BUSH 1-2 INSTALLER
ST2 499277200 INSTALLER



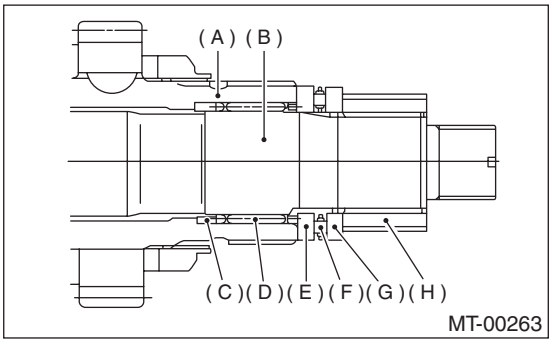
(A) Washer

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.

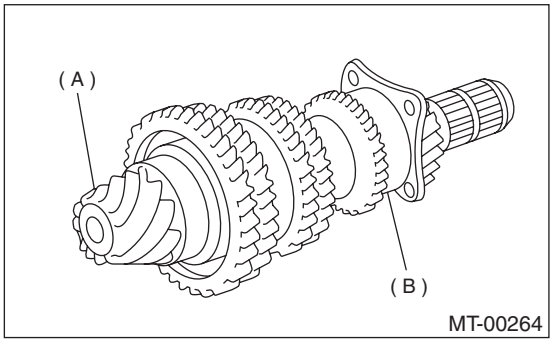


(A) Driven shaft
(B) Drive shaft
(C) Drive pinion collar
(D) Needle bearing (25 × 30 × 20)
(E) Washer No. 2 (25 × 36 × 4)
(F) Thrust bearing (25 × 37.5 × 3)
(G) Washer No. 1 (25 × 36 × t)
(H) Differential bevel gear sleeve

14) Adjust the thrust bearing preload. <Ref. to 5MT-68, ADJUSTMENT, Drive Pinion Shaft Assembly.>

E: INSPECTION

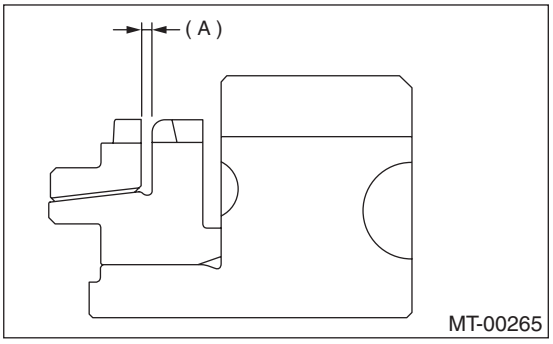
Disassembled parts should be washed clean first and then inspected carefully.
1) Bearings
Replace the bearings in the following cases:
• Bearings whose balls, outer races and inner races are broken or rusty.
• Worn bearings
• Bearings that fail to turn smoothly or make abnormal noise when turned after 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.



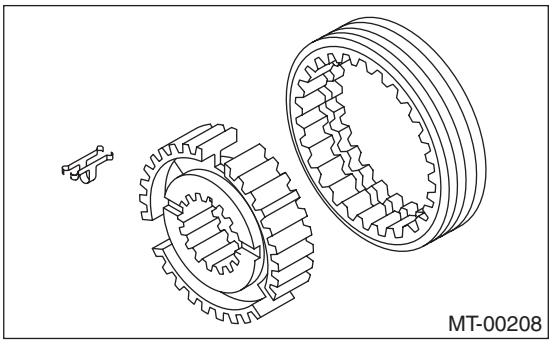
(A) Drive pinion shaft
(B) Ball bearing

• 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.
• Replace if the cone that contacts the baulk ring is rough or damaged.
• Repair or replace if the inner surface or end face is damaged.
4) Baulk ring
Replace the ring in the following cases:
• When the inner surface and end face are damaged.
• When the ring inner surface is abnormally or partially worn down.
• If the gap between the end faces of the ring and the gear splined part is excessively small when the ring is pressed against the cone.

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



• When the contact surface of the synchronizer ring insert is scored or abnormally worn down.
5) Shifting insert key
Replace the insert if deformed, excessively worn, or defective in any way.

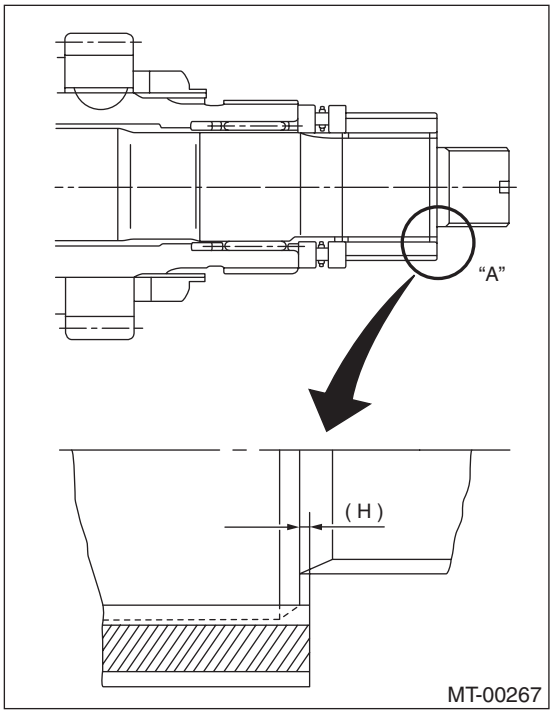


6) Oil seal
Replace the oil seal if the lip is deformed, hardened, damaged, worn, or defective in any way.
7) O-ring
Replace the O-ring if the sealing face is deformed, hardened, damaged, worn, or defective in any way.

F: ADJUSTMENT

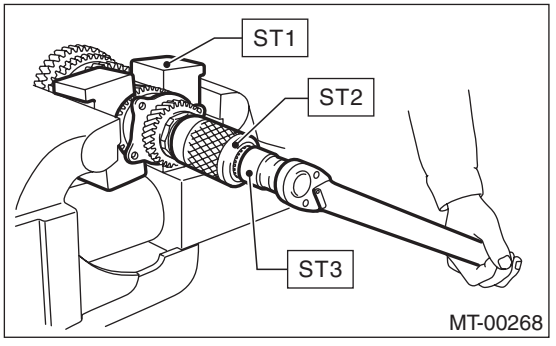
1. THRUST BEARING PRELOAD

1) 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).



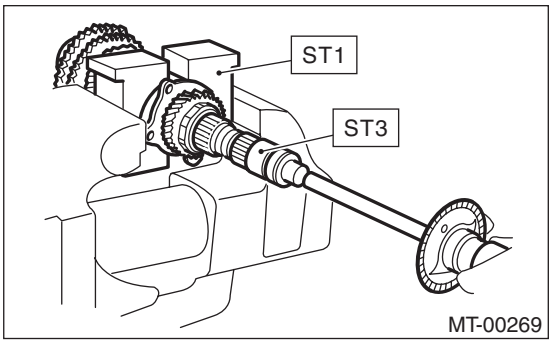
2) Using the ST1, ST2 and ST3, tighten the new lock nut to specified torque.
ST1 899884100 HOLDER
ST2 498427100 STOPPER
ST3 899988608 SOCKET WRENCH (27)

Tightening torque:
120 N·m (12.2 kgf-m, 88.5 ft-lb)

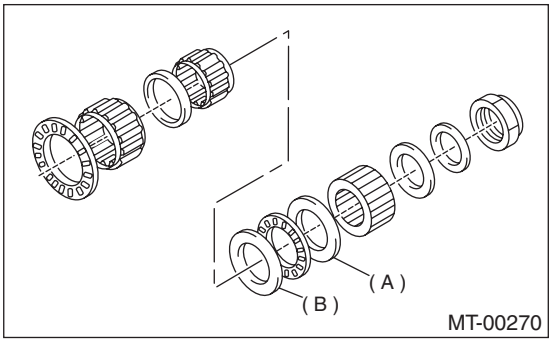


3) After removing the ST2, measure the starting torque using torque driver.
ST1 899884100 HOLDER
ST3 899988608 SOCKET WRENCH (27)

Starting torque:
0.3 — 0.8 N·m (0.03 — 0.08 kgf-m, 0.2 — 0.6 ft-lb)



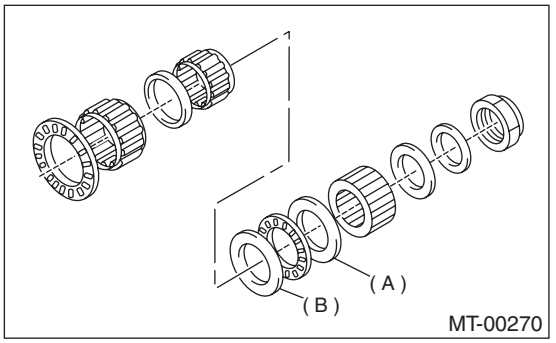
4) If the starting torque is not within specified limit, select a new adjusting washer No. 1 and recheck starting torque.



(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)

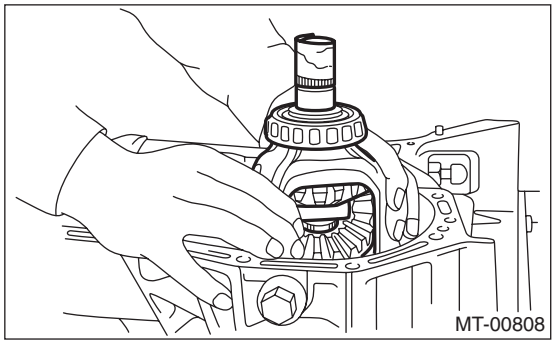
6) Recheck that the starting torque is within specified range, then clinch the lock nut at four positions.

18.Front Differential Assembly

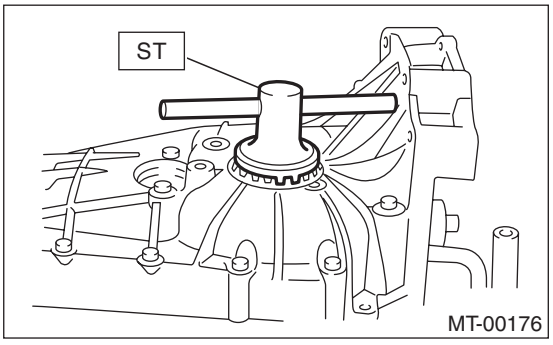
A: REMOVAL

1) Remove the manual transmission assembly from vehicle. <Ref. to 5MT-27, REMOVAL, Manual Transmission Assembly.>
2) Remove the transfer case with extension case assembly. <Ref. to 5MT-41, REMOVAL, Transfer Case and Extension Case Assembly.>
3) Remove the transmission case. <Ref. to 5MT-53, REMOVAL, Transmission Case.>
4) Remove the drive pinion shaft assembly. <Ref. to 5MT-62, REMOVAL, Drive Pinion Shaft Assembly.>
5) Remove the main shaft assembly.
<Ref. to 5MT-56, 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.



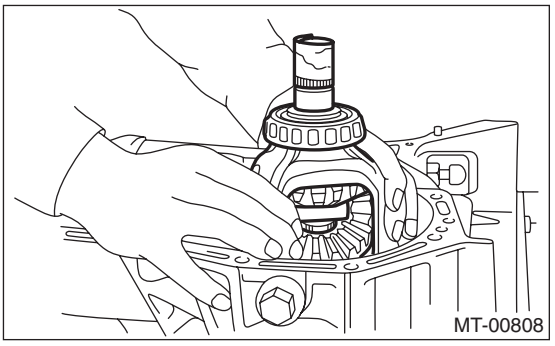
7) Remove the differential side retainers using ST.
ST 499787000 WRENCH ASSY



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-56, INSTALLATION, Main Shaft Assembly.>
5) Install the drive pinion assembly. <Ref. to 5MT-62, INSTALLATION, Drive Pinion Shaft Assembly.>
6) Install the transmission case. <Ref. to 5MT-54, INSTALLATION, Transmission Case.>
7) Install the transfer case with extension case assembly. <Ref. to 5MT-41, INSTALLATION, Transfer Case and Extension Case Assembly.>
8) Install the manual transmission assembly to vehicle. <Ref. to 5MT-30, INSTALLATION, Manual Transmission Assembly.>

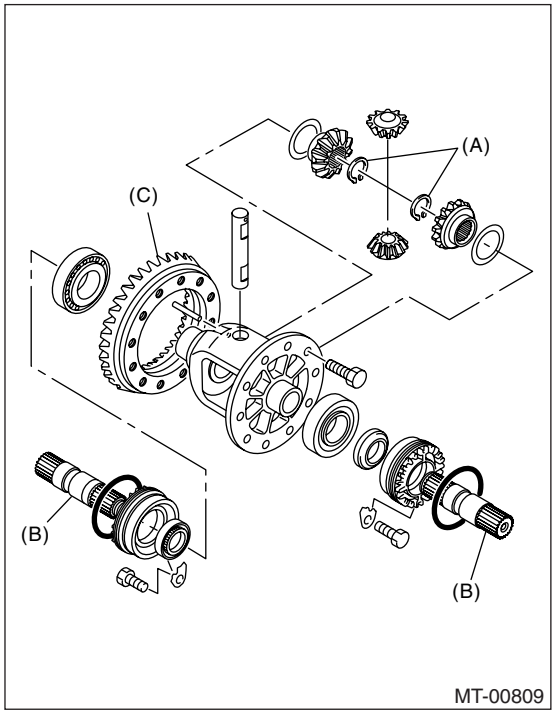
C: DISASSEMBLY

1. DIFFERENTIAL CASE ASSEMBLY

1) Remove the right and left snap rings from differential, and then remove the two axle drive shafts. (Non-TURBO model)

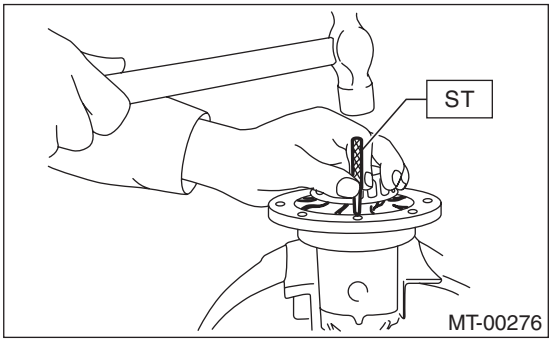
NOTE:
During reassembly, reinstall each axle drive shaft in the same place from which it was removed.

2) Loosen the twelve bolts and remove the hypoid driven gear.

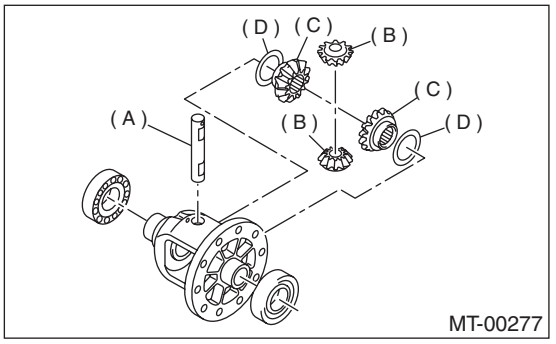


(A) Snap ring (Non-TURBO model)
(B) Axle drive shaft (Non-TURBO model)
(C) Hypoid driven gear

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

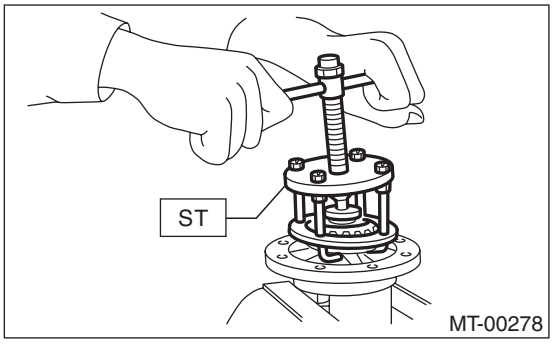


4) Pull out the pinion shaft, and remove the differential bevel pinion and gear and washer.



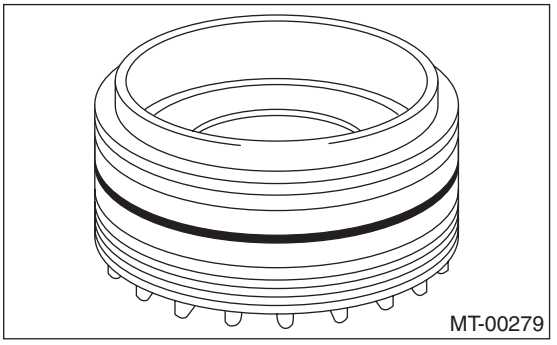
(A) Pinion shaft
(B) Bevel pinion
(C) Bevel gear
(D) Washer

5) Remove the roller bearing using ST.
ST 899524100 PULLER SET



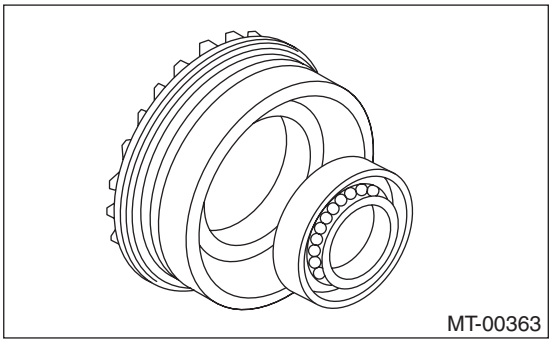
2. SIDE RETAINER

1) Remove the O-ring.



2) Remove the oil seal.

NOTE:
Do not reuse the oil seal. Prepare a new oil seal.

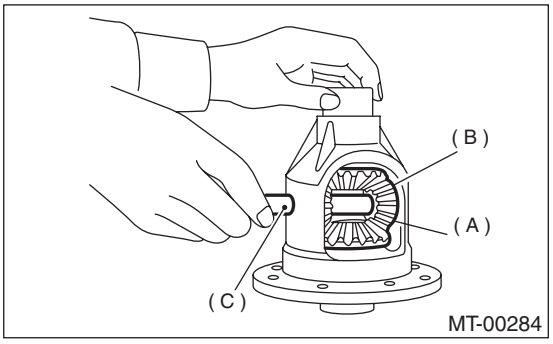


D: ASSEMBLY

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.



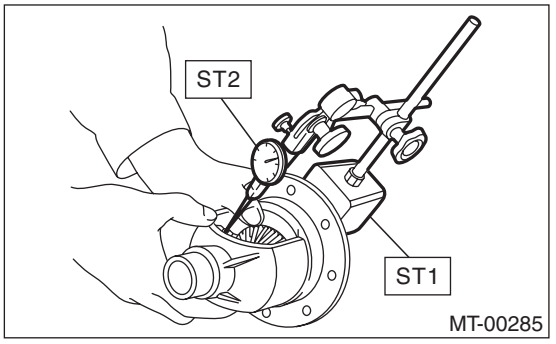
(A) Bevel pinion
(B) Bevel gear
(C) Pinion shaft

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-75, ADJUSTMENT, Front Differential Assembly.>

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

ST1 498247001 MAGNET BASE
ST2 498247100 DIAL GAUGE

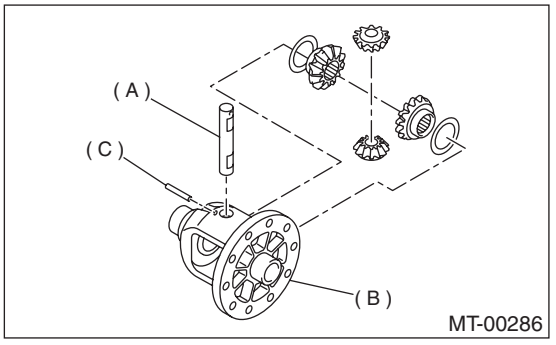
Standard backlash:
0.13 — 0.18 mm (0.0051 — 0.0071 in)



3) Align 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

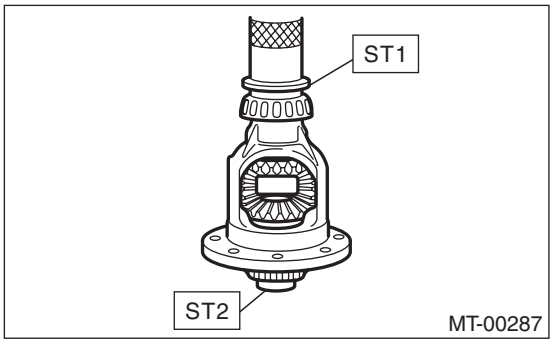


(A) Pinion shaft
(B) Differential case
(C) Straight pin

4) Install the roller bearing to differential case.

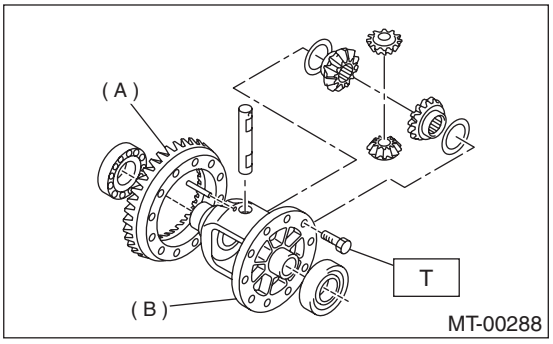
NOTE:
• Do not apply pressure in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).
• Be careful because the roller bearing outer races are used as a set.

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)



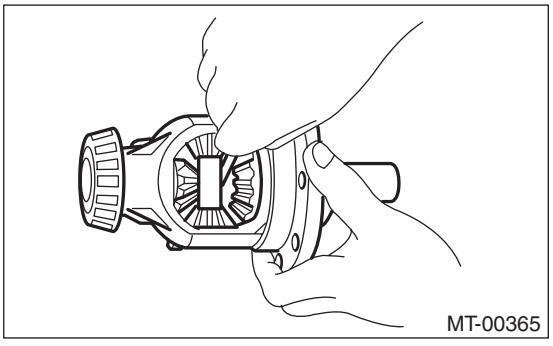
(A) Hypoid driven gear
(B) Differential case

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. (Non-TURBO model)

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)

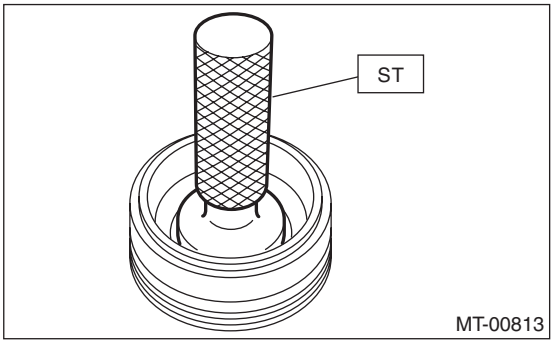
Clearance
0 — 0.2 mm (0 — 0.008 in)



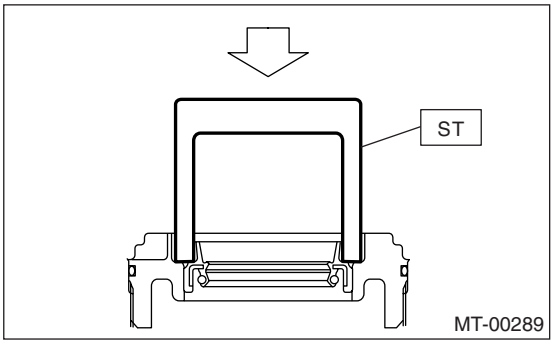
2. SIDE RETAINER

1) Install a new oil seal. (Non-TURBO model)

ST 49979700 INSTALLER

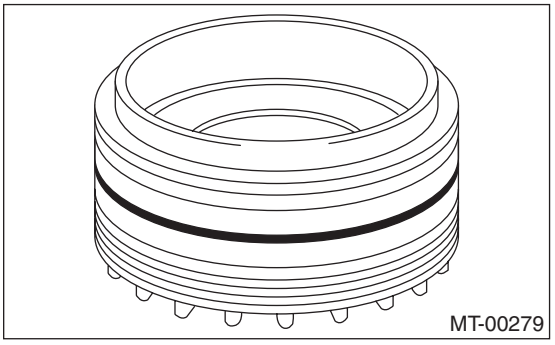


2) Install a new oil seal. (TURBO model)
ST 18675AA000 DIFFERENTIAL OIL SEAL INSTALLER



3) Install a new O-ring.

NOTE:
Do not stretch or damage the O-ring.



E: INSPECTION

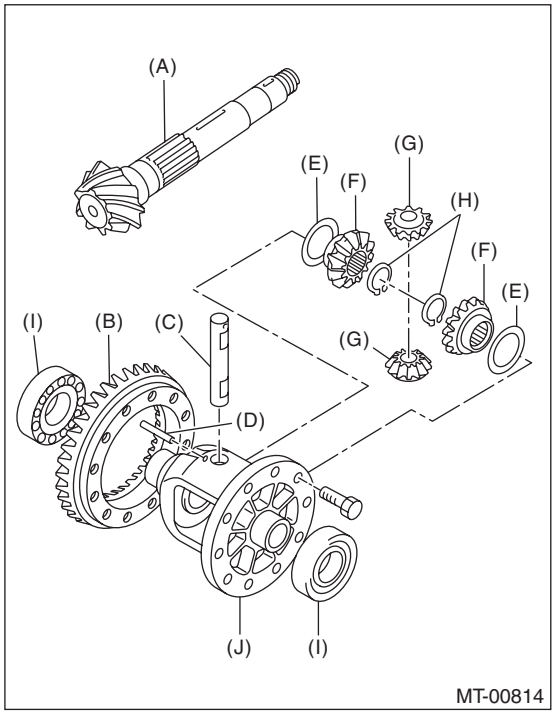
Repair or replace the differential gear in the following cases:

• 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

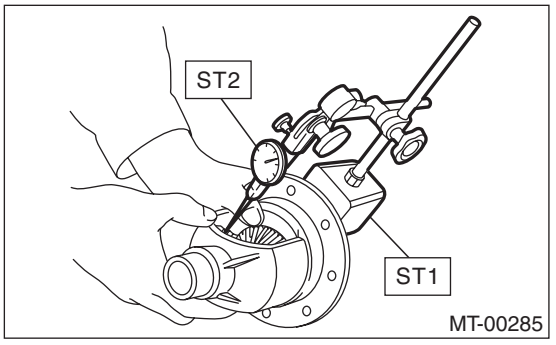
1. BEVEL PINION GEAR BACKLASH

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

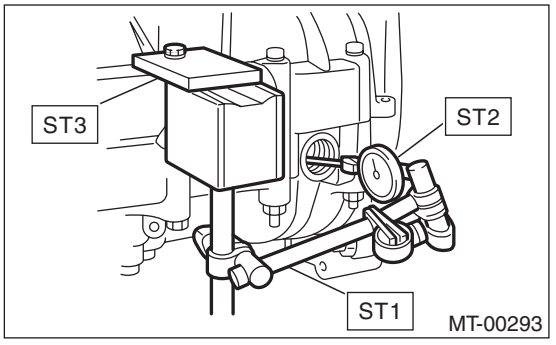
Standard backlash:
0.13 — 0.18 mm (0.0051 — 0.0071 in)



2. HYPOID GEAR BACKLASH

1) Insert the SUBARU genuine axle shaft into the left and right side retainer holes. (TURBO model)
ST 38415AA000 AXLE SHAFT
2) 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)

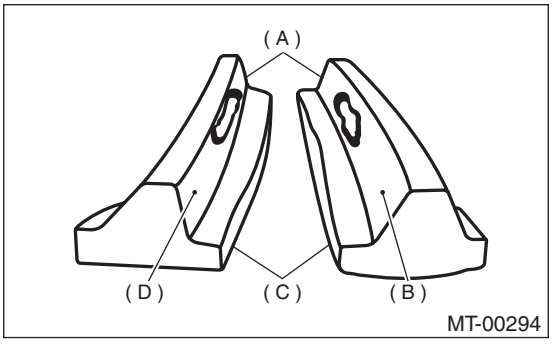


NOTE:
If the backlash is outside specified range, adjust it by turning the holder in right side case.

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-75, ADJUSTMENT, Front Differential Assembly.>

- Tooth contact is correct.



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

F: ADJUSTMENT

1. BEVEL PINION GEAR BACKLASH

1) Disassemble the front differential. <Ref. to 5MT-70, 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)

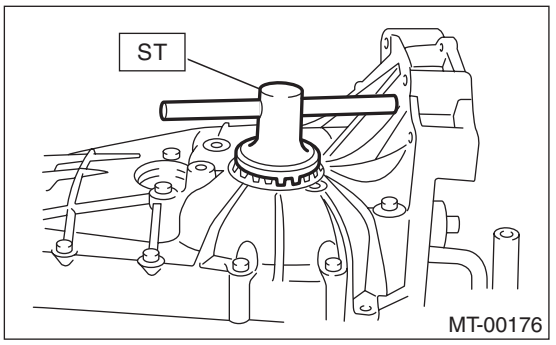
3) Adjust until the specified value is obtained.

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

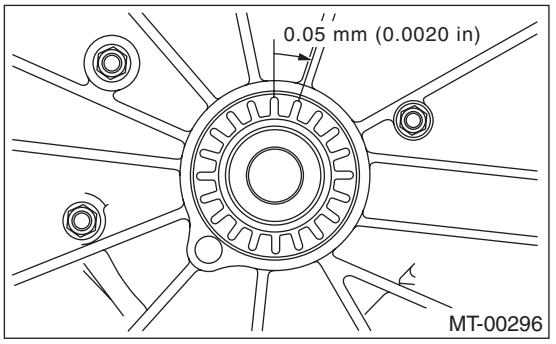
2. HYPOID GEAR BACKLASH

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 (0.0020 in).

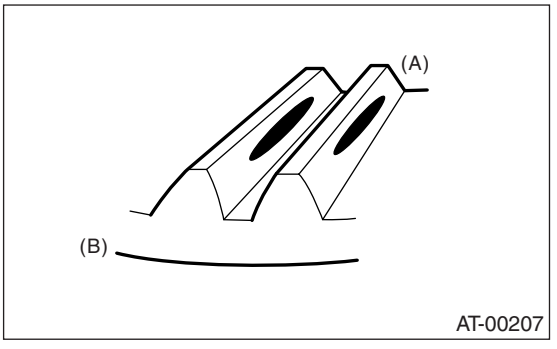


3. TOOTH CONTACT OF HYPOID GEAR

1) Adjust until the tooth contact is correct.
2) Check and adjust the tooth contact with following.

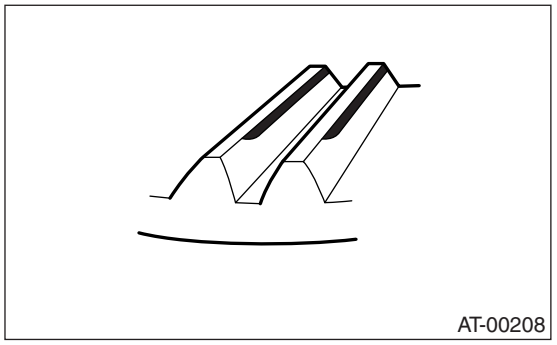
- Tooth contact

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

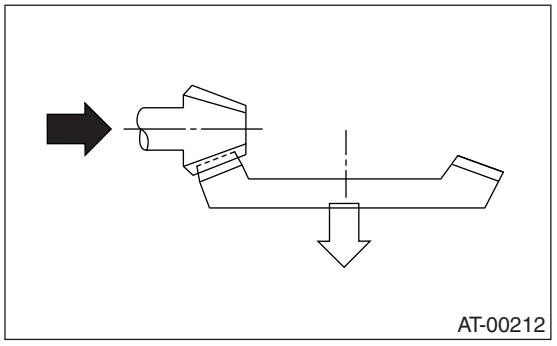


(A) Toe side
(B) Heel side

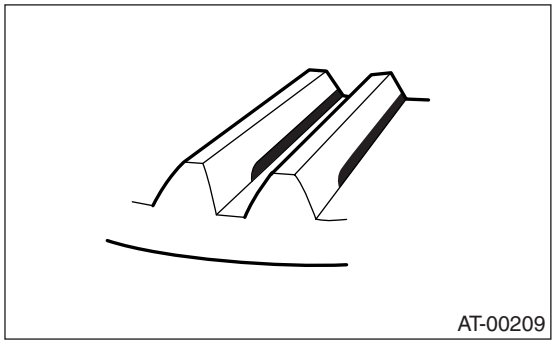
• Face contact
Checking item: Backlash is too large.
Contact pattern



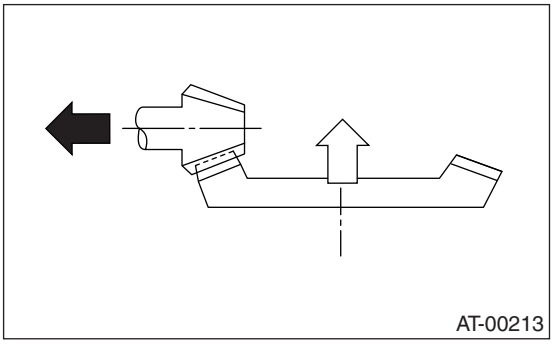
Corrective action: Reduce thickness of drive pinion shim in order to bring drive pinion close to driven gear.



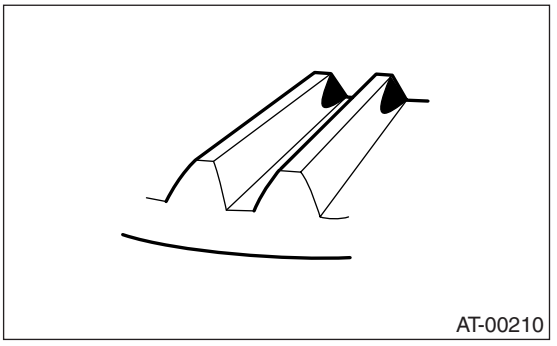
• Flank contact
Checking item: Backlash is too small.
Contact pattern



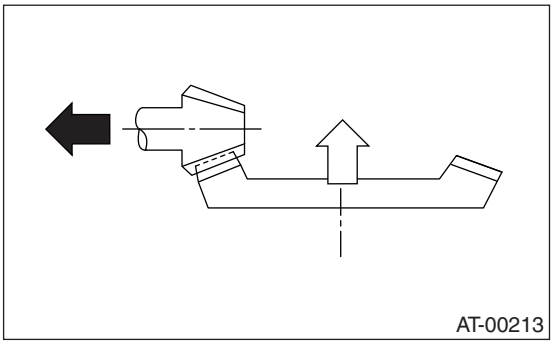
Corrective action: Increase thickness of drive pinion shim in order to move drive pinion away from driven gear.



• Toe contact (Inside end contact)
Checking item: Contact area is small.
Contact pattern

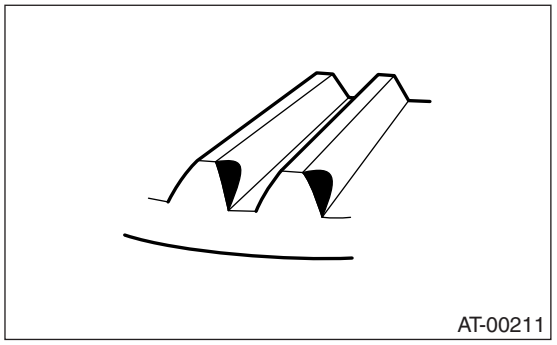


Corrective action: Increase thickness of drive pinion shim in order to bring drive pinion close to driven gear.

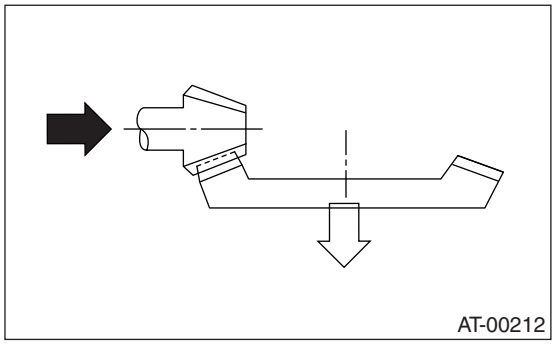


- Heel contact (Outside end contact)

Checking item: Contact area is small.
Contact pattern



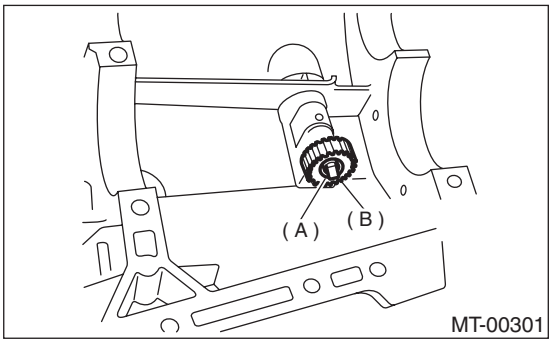
Corrective action: Reduce thickness of drive pinion shim in order to move drive pinion away from driven gear.



19.Speedometer Gear

A: REMOVAL

1) Remove the manual transmission assembly from vehicle. <Ref. to 5MT-27, REMOVAL, Manual Transmission Assembly.>
2) Remove the back-up light switch and neutral position switch. <Ref. to 5MT-37, REMOVAL, Switches and Harness.>
3) Remove the transfer case with extension case assembly. <Ref. to 5MT-41, REMOVAL, Transfer Case and Extension Case Assembly.>
4) Remove the transmission case. <Ref. to 5MT-53, REMOVAL, Transmission Case.>
5) Remove the vehicle speed sensor. <Ref. to 5MT-39, 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

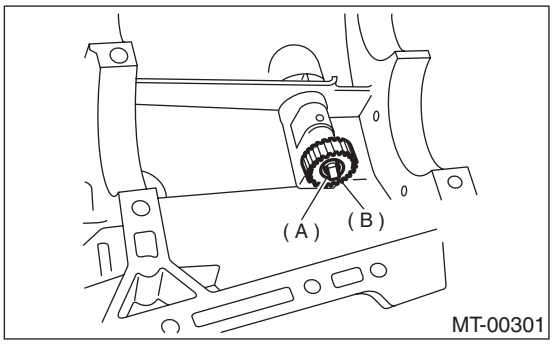
1) Install the washer and speedometer shaft, and press fit the oil seal with ST.

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

ST 899824100 or 499827000PRESS

2) Install the vehicle speed sensor. <Ref. to 5MT-39, 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-54, INSTALLATION, Transmission Case.>
5) Install the transfer case with extension case assembly. <Ref. to 5MT-41, INSTALLATION, Transfer Case and Extension Case Assembly.>
6) Install the back-up light switch and neutral position switch. <Ref. to 5MT-37, INSTALLATION, Switches and Harness.>
7) Install the manual transmission assembly to vehicle. <Ref. to 5MT-30, INSTALLATION, Manual Transmission Assembly.>

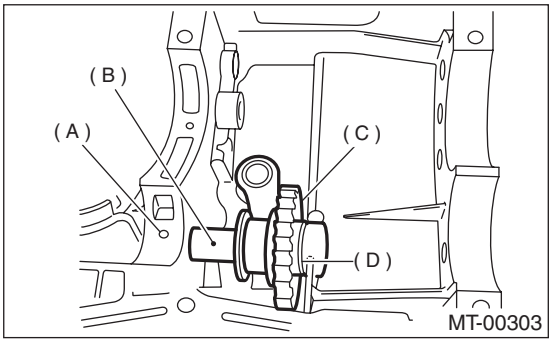
C: INSPECTION

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

20.Reverse Idler Gear

A: REMOVAL

1) Remove the manual transmission assembly from vehicle. <Ref. to 5MT-27, REMOVAL, Manual Transmission Assembly.>
2) Remove the back-up light switch and neutral position switch. <Ref. to 5MT-37, REMOVAL, Switches and Harness.>
3) Remove the transfer case with extension case assembly. <Ref. to 5MT-41, REMOVAL, Transfer Case and Extension Case Assembly.>
4) Remove the transmission case. <Ref. to 5MT-62, REMOVAL, Drive Pinion Shaft Assembly.>
5) Remove the drive pinion shaft assembly. <Ref. to 5MT-62, REMOVAL, Drive Pinion Shaft Assembly.>
6) Remove the main shaft assembly.
<Ref. to 5MT-56, REMOVAL, Main Shaft Assembly.>
7) Remove the differential assembly. <Ref. to 5MT-70, REMOVAL, Front Differential Assembly.>
8) Remove the shifter forks and rods. <Ref. to 5MT-81, REMOVAL, Shifter Fork and Rod.>
9) Pull out the straight pin, and remove the idler gear shaft, reverse idler gear and washer.



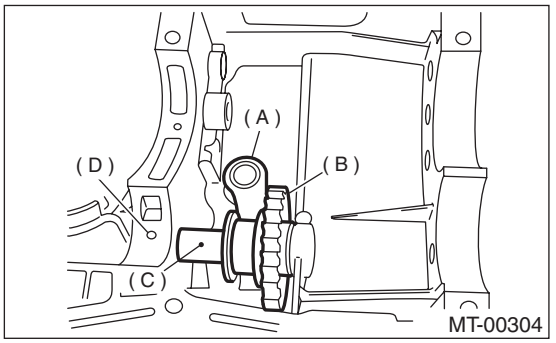
(A) Straight pin
(B) Idler gear shaft
(C) Idler gear
(D) Washer

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.



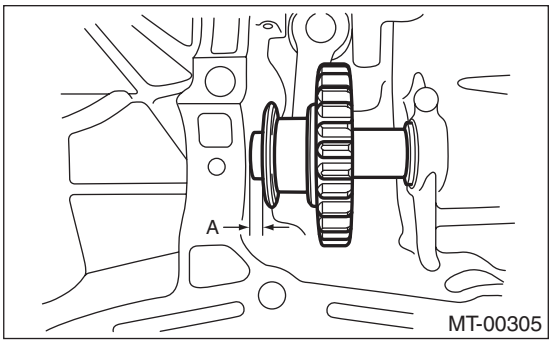
(A) Reverse shifter lever
(B) Reverse idler gear
(C) Reverse idler gear shaft
(D) Straight pin

2) Inspect and adjust the clearance between reverse idler gear and transmission case wall. <Ref. to 5MT-79, INSTALLATION, Reverse Idler Gear.> and <Ref. to 5MT-79, INSTALLATION, Reverse Idler Gear.>
3) Install the shifter forks and rods. <Ref. to 5MT-81, INSTALLATION, Shifter Fork and Rod.>
4) Install the differential assembly. <Ref. to 5MT-70, INSTALLATION, Front Differential Assembly.>
5) Install the main shaft assembly.
<Ref. to 5MT-56, INSTALLATION, Main Shaft Assembly.>
6) Install the drive pinion shaft assembly. <Ref. to 5MT-62, INSTALLATION, Drive Pinion Shaft Assembly.>
7) Install the transmission case. <Ref. to 5MT-54, INSTALLATION, Transmission Case.>
8) Install the transfer case with extension case assembly. <Ref. to 5MT-41, INSTALLATION, Transfer Case and Extension Case Assembly.>
9) Install the back-up light switch and neutral position switch. <Ref. to 5MT-37, INSTALLATION, Switches and Harness.>
10) Install the manual transmission assembly to vehicle. <Ref. to 5MT-30, INSTALLATION, Manual Transmission Assembly.>

C: INSPECTION

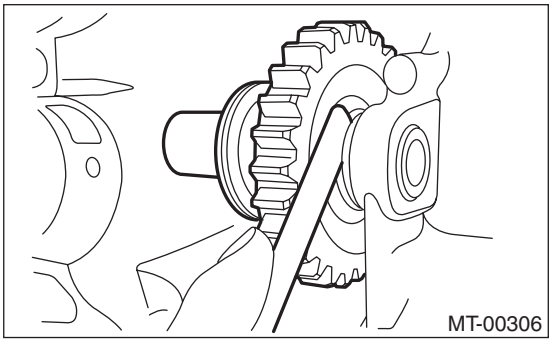
1) Move the reverse shifter rod toward the reverse side. Inspect the clearance between reverse idler gear and transmission case wall.
If out of specification, select the appropriate reverse shifter lever and adjust.

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)

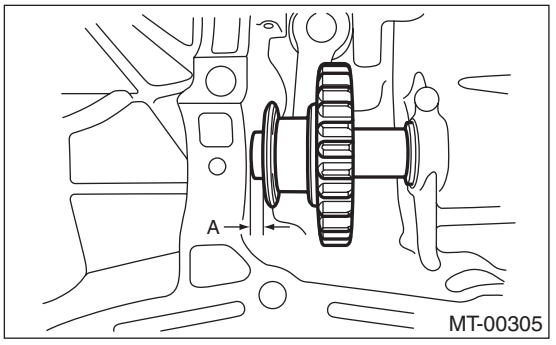


3) Check the reverse idler gear and shaft for damage. Replace if damaged.

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.

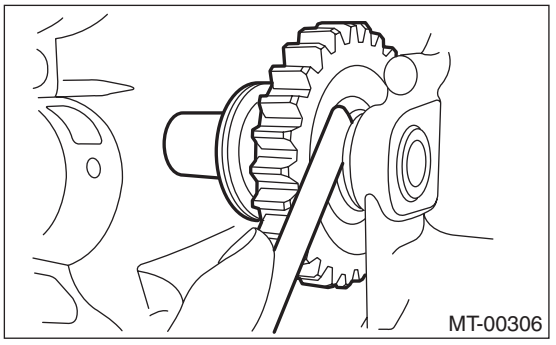
Clearance A:
6.0 — 7.5 mm (0.236 — 0.295 in)



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)

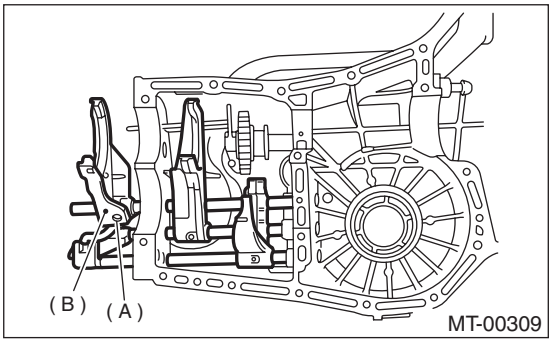


Washer	
Part No.	Thickness mm (in)
803020151	0.4 (0.016)
803020152	1.1 (0.043)
803020153	1.5 (0.059)
803020154	1.9 (0.075)
803020155	2.3 (0.091)

21.Shifter Fork and Rod

A: REMOVAL

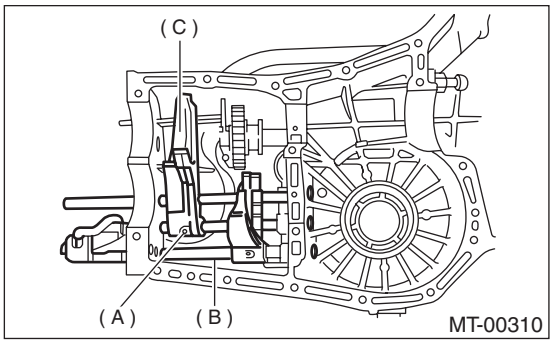
1) Remove the manual transmission assembly from vehicle. <Ref. to 5MT-27, REMOVAL, Manual Transmission Assembly.>
2) Remove the back-up light switch and neutral position switch. <Ref. to 5MT-37, REMOVAL, Switches and Harness.>
3) Remove the transfer case with extension case assembly. <Ref. to 5MT-41, REMOVAL, Transfer Case and Extension Case Assembly.>
4) Remove the transmission case. <Ref. to 5MT-53, REMOVAL, Transmission Case.>
5) Remove the drive pinion shaft assembly. <Ref. to 5MT-62, REMOVAL, Drive Pinion Shaft Assembly.>
6) Remove the main shaft assembly.
<Ref. to 5MT-56, REMOVAL, Main Shaft Assembly.>
7) Remove the differential assembly. <Ref. to 5MT-70, 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.

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.

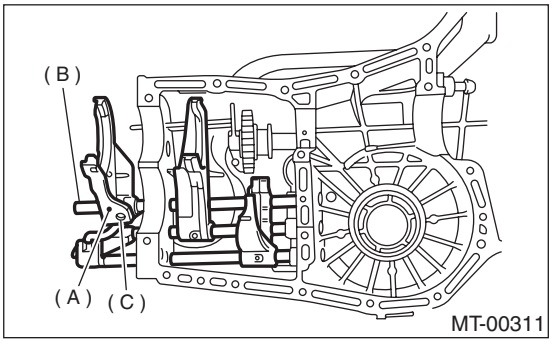
ST 398791700 STRAIGHT PIN REMOVER
5) Install the interlock plunger onto 3-4 fork rod.

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.

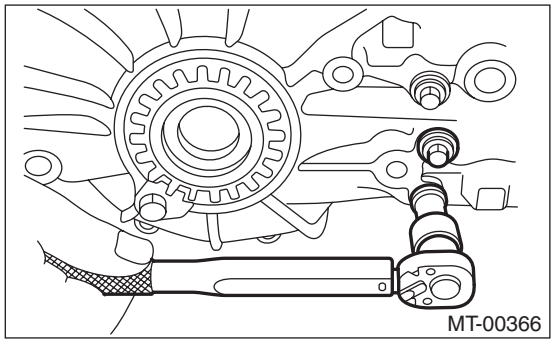
ST 398791700 STRAIGHT PIN REMOVER
8) Install the 5th shifter fork onto the rear of reverse fork rod. Align holes in the two parts and new drive straight pin into place.
ST 398791700 STRAIGHT PIN REMOVER



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

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

Tightening torque:
20 N·m (2.0 kgf-m, 14.1 ft-lb)

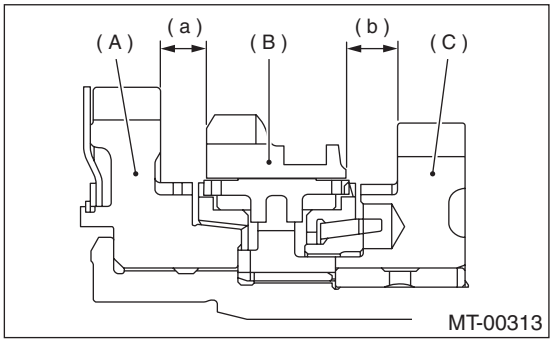


10) Install the differential assembly. <Ref. to 5MT-70, INSTALLATION, Front Differential Assembly.>
11) Install the main shaft assembly.
<Ref. to 5MT-56, INSTALLATION, Main Shaft Assembly.>
12) Install the drive pinion shaft assembly. <Ref. to 5MT-62, INSTALLATION, Drive Pinion Shaft Assembly.>
13) Install the transmission case. <Ref. to 5MT-54, INSTALLATION, Transmission Case.>
14) Install the transfer case with extension case assembly. <Ref. to 5MT-41, INSTALLATION, Transfer Case and Extension Case Assembly.>
15) Install the back-up light switch and neutral position switch. <Ref. to 5MT-37, INSTALLATION, Switches and Harness.>
16) Install the manual transmission assembly to vehicle. <Ref. to 5MT-30, INSTALLATION, Manual Transmission Assembly.>

C: INSPECTION

1) Check the shift shaft and shift rod for damage. Replace if damaged.
2) Gearshift mechanism:
Repair or replace the gearshift mechanism if excessively worn, bent, or defective in any way.
3) Inspect 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)

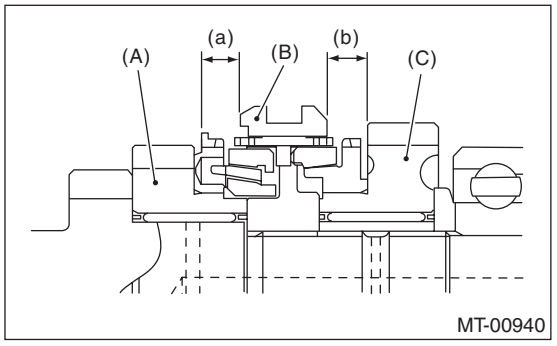


(A) 1st driven gear
(B) Reverse driven gear
(C) 2nd driven gear

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):
9.3 mm (0.366 in)

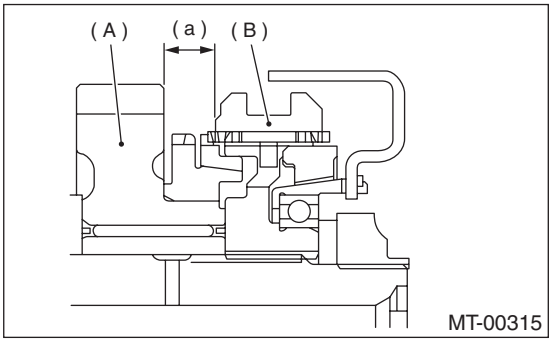


(A) 3rd drive gear
(B) Coupling sleeve
(C) 4th drive gear

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

5) Inspect 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

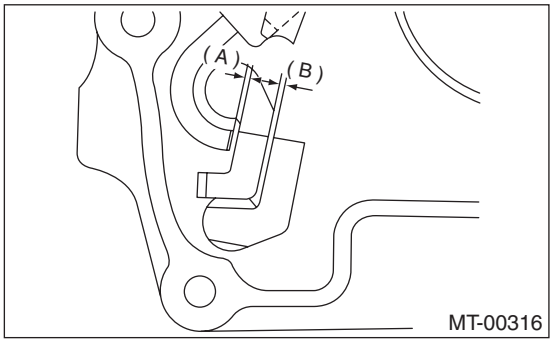
5th shifter fork (Non-TURBO)		
Part No.	Mark	Remarks
32812AA201	7	Approach to 5th gear by 0.2 mm (0.008 in).
32812AA211	—	Standard
32812AA221	9	Become distant from 5th gear by 0.2 mm (0.008 in).

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)



22.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.

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.

MEMO: