TRANSMISSION SECTION

CONTROL SYSTEMS	CS
AUTOMATIC TRANSMISSION	4AT
AUTOMATIC TRANSMISSION (DIAGNOSTICS)	4AT(diag)
AUTOMATIC TRANSMISSION	5AT
AUTOMATIC TRANSMISSION (DIAGNOSTICS)	5AT(diag)
MANUAL TRANSMISSION AND DIFFERENTIAL	5MT
MANUAL TRANSMISSION AND DIFFERENTIAL	6MT
CLUTCH SYSTEM	CL

This service manual has been prepared to provide SUBARU service personnel with the necessary information and data for the correct maintenance and repair of SUBARU vehicles.
This manual includes the procedures for maintenance, disassembling, reassembling, inspection and adjustment of components and diagnostics for guidance of experienced mechanics.
Please peruse and utilize this manual fully to ensure complete repair work for satisfying our customers by keeping their vehicle in optimum condition. When replacement of parts during repair work is needed, be sure to use SUBARU genuine parts.

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

FUJI HEAVY INDUSTRIES LTD. G2360GE5

CONTROL SYSTEMS

CS

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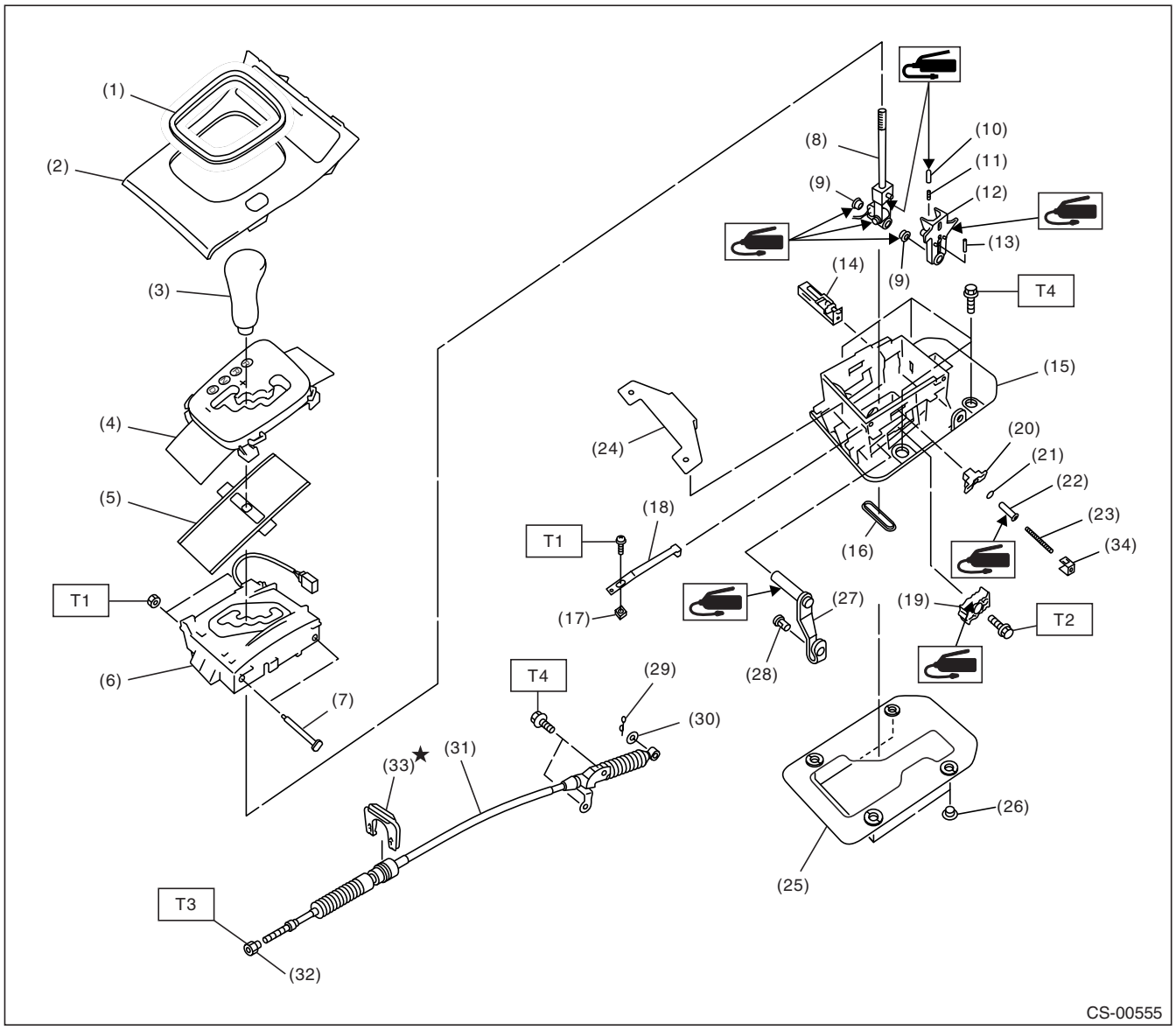
1. General Description

A: SPECIFICATION

Item		Specifications
Swing torque of rod against lever	N (kgf, lbf)	3.7 (0.38, 0.84) or less

B: COMPONENT

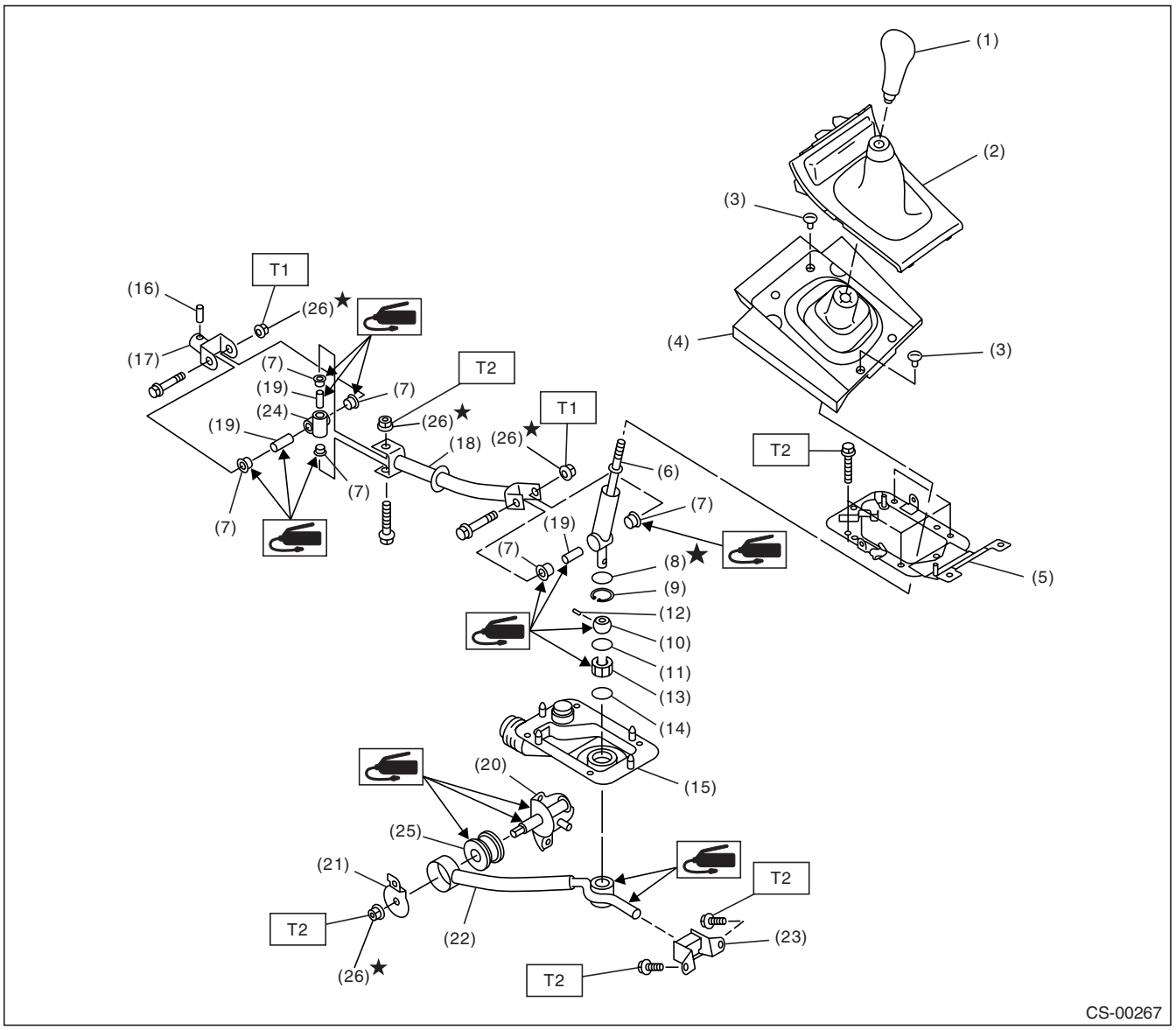
1. AT SELECT LEVER



(1) Ring indicator
(2) Console front panel
(3) Grip
(4) Indicator cover ASSY
(5) Blind
(6) Guide plate
(7) Pin
(8) Lever ASSY
(9) Bushing
(10) Rod
(11) Spring
(12) Arm
(13) Spring pin
(14) Shift lock solenoid unit
(15) Plate
(16) Grommet
(17) Plate nut
(18) Detent spring
(19) Detent plate
(20) Bushing
(21) Cushion
(22) Rod
(23) Spring A
(24) Bracket
(25) Packing
(26) Spacer
(27) Arm ASSY
(28) Connector pin
(29) Snap pin
(30) Washer
(31) Select cable
(32) Adjusting nut A
(33) Clamp
(34) Clamp

Tightening torque: N·m (kgf-m, ft-lb)
T1: 2.2 (0.22, 1.62)
T2: 6 (0.6, 4.4)
T3: 7.5 (0.76, 5.5)
T4: 18 (1.8, 13.3)

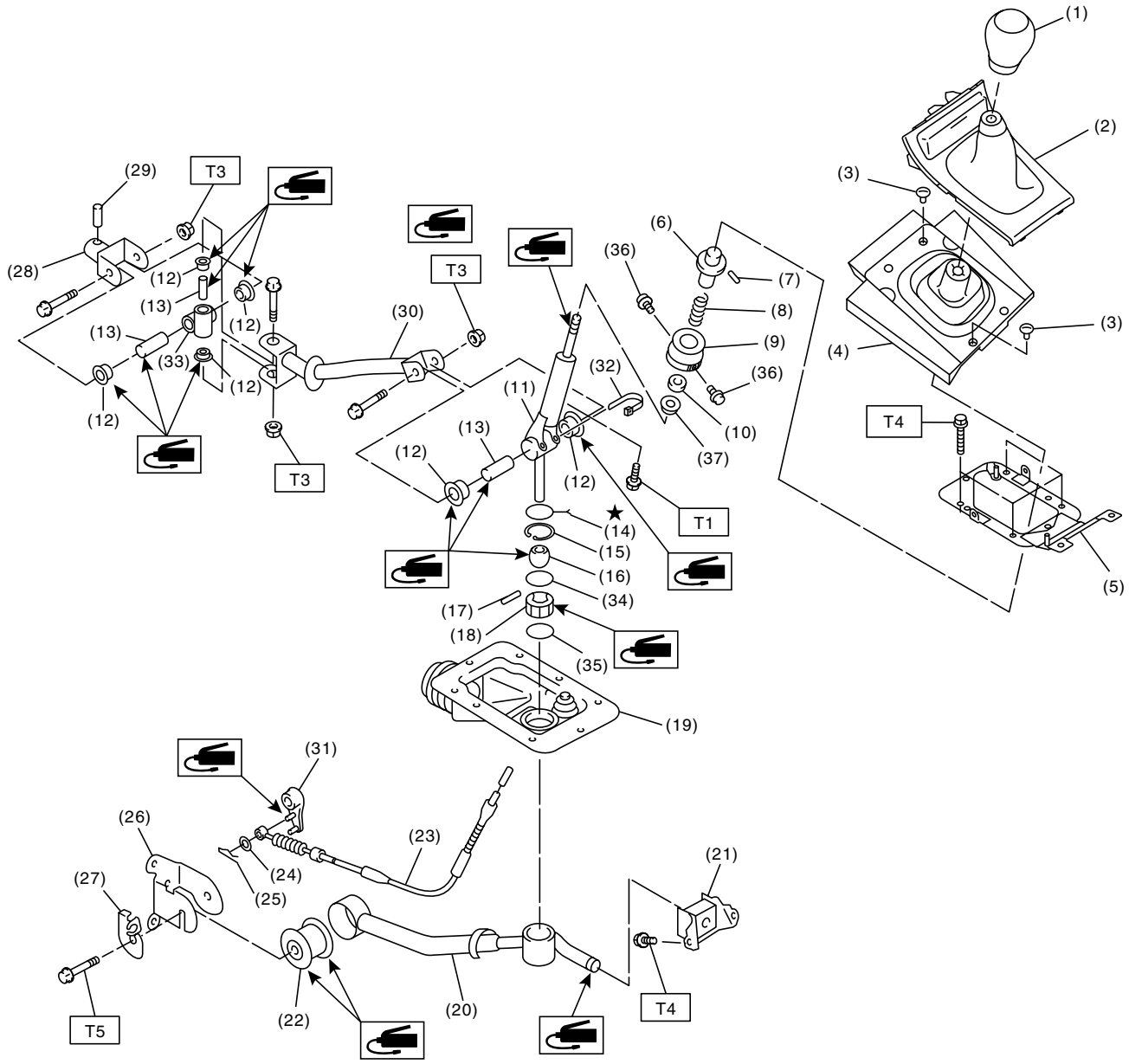
2. 5MT GEAR SHIFT LEVER



(1) Gear shift knob
(2) Front cover ASSY
(3) Clamp
(4) Boot and insulator ASSY
(5) Plate ASSY
(6) Lever
(7) Bushing
(8) Lock wire
(9) Snap ring
(10) Bushing
(11) O-ring
(12) Spring pin
(13) Bushing B
(14) O-ring
(15) Boot
(16) Spring pin
(17) Joint
(18) Rod
(19) Spacer
(20) Bracket
(21) Washer
(22) Stay
(23) Cushion rubber
(24) Boss
(25) Bushing
(26) Self-locking nut

Tightening torque: N·m (kgf-m, ft-lb)
T1: 12 (1.2, 8.9)
T2: 18 (1.8, 13.3)

3. 6MT GEAR SHIFT LEVER

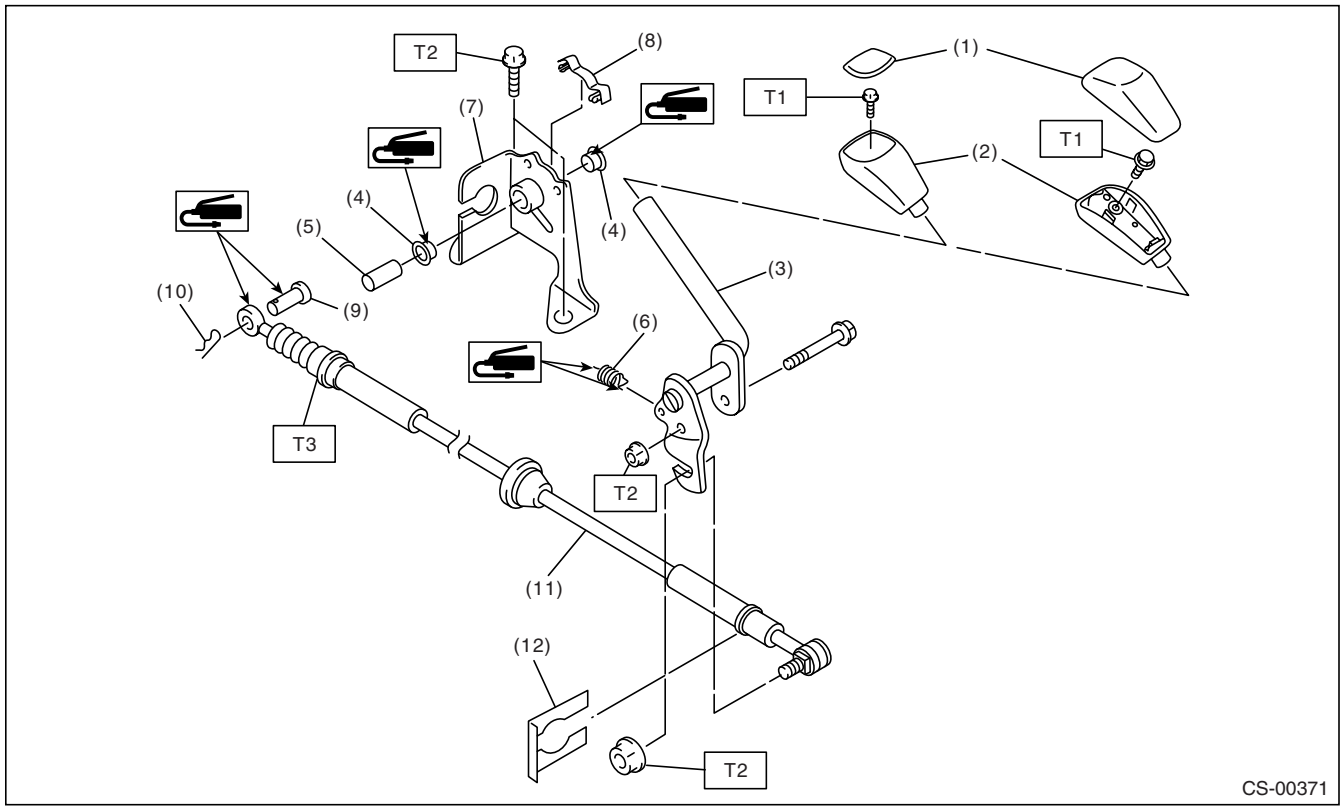


CS-00561

(1) Gear shift knob
(2) Front cover ASSY
(3) Clamp
(4) Boot and insulator ASSY
(5) Plate ASSY
(6) Slider
(7) Spring pin
(8) Spring
(9) Holder
(10) Seat cushion
(11) Lever
(12) Bushing
(13) Spacer
(14) Lock wire
(15) Snap ring
(16) Bushing
(17) Spring pin
(18) Bushing
(19) Boot
(20) Stay
(21) Cushion rubber
(22) Bushing
(23) Reverse check cable
(24) Washer
(25) Snap pin
(26) Bracket
(27) Cable plate
(28) Joint
(29) Spring pin
(30) Rod
(31) Reverse check lever
(32) Band clip
(33) Boss
(34) O-ring
(35) O-ring
(36) Screw
(37) Spring seat

Tightening torque: N·m (kgf-m, ft-lb)
T1: 1.3 (0.13, 0.96)
T2: 7.5 (0.76, 5.5)
T3: 12 (1.2, 8.9)
T4: 18 (1.8, 13.3)
T5: 32 (3.3, 23.6)

4. DRIVE SELECT LEVER

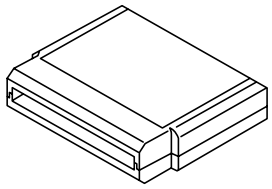


(1) Cover
(2) Knob
(3) Lever ASSY
(4) Bushing
(5) Spacer
(6) Spring
(7) Plate ASSY
(8) Bushing
(9) Clevis pin
(10) Snap pin
(11) Cable
(12) Clip

Tightening torque: N·m (kgf-m, ft-lb)
T1: 4.5 (0.46, 3.3)
T2: 12 (1.2, 8.9)
T3: 27.5 (2.80, 20.3)

C: PREPARATION TOOL

1. SPECIAL TOOL

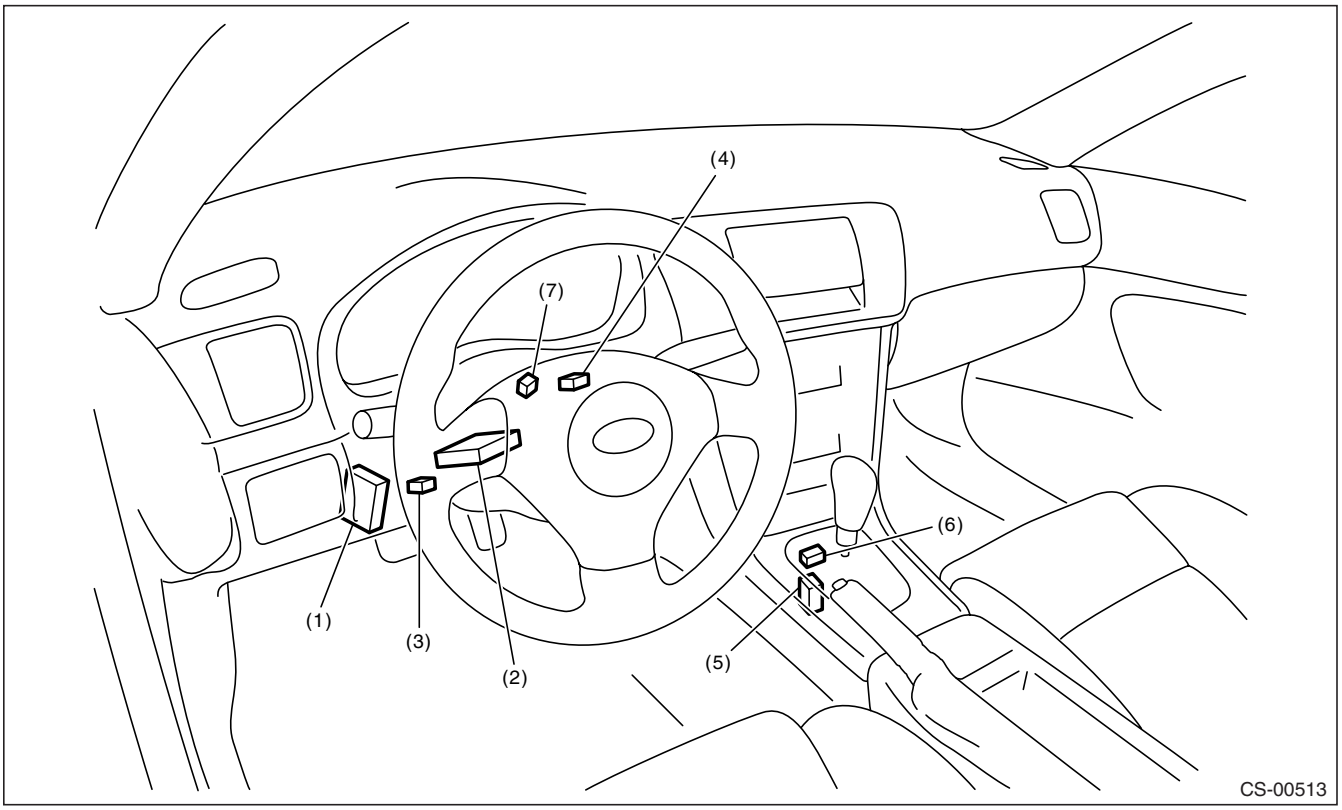
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST18482AA000	18482AA000 (Newly adopted tool)	CARTRIDGE	Troubleshooting for electrical system.
ST22771AA030	22771AA030	SUBARU SELECT MONITOR KIT	Troubleshooting for electrical system. • English: 22771AA030 (Without printer) • German: 22771AA070 (Without printer) • French: 22771AA080 (Without printer) • Spanish: 22771AA090 (Without printer)

D: CAUTION

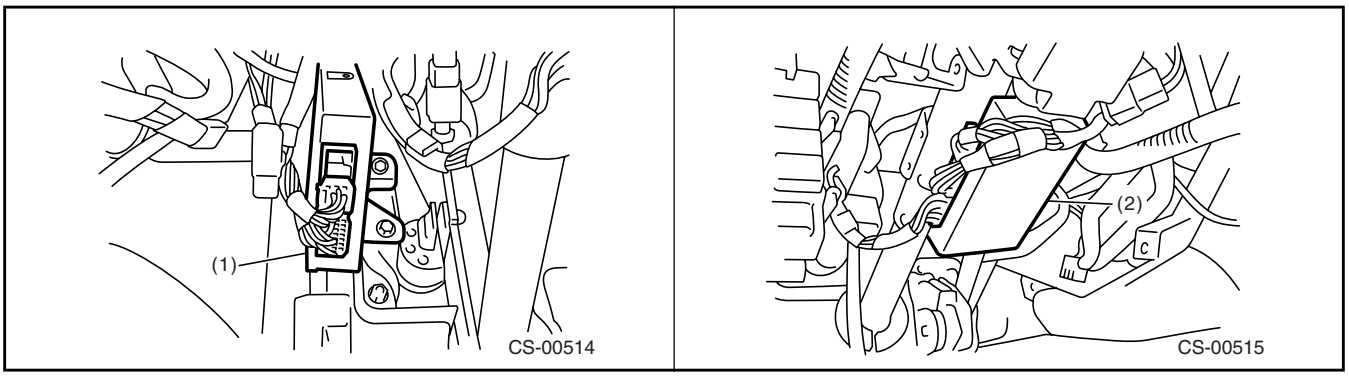
• Wear work clothing, including a cap, protective goggles, and protective shoes during operation.
• Remove contamination including dirt and corrosion before removal, installation or disassembly.
• Keep the disassembled parts in order and protect them from dust and dirt.
• Before removal, installation or disassembly, be sure to clarify the failure. Avoid unnecessary removal, installation, disassembly and replacement.
• Use SUBARU genuine fluid, grease etc. or 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 rigid racks 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 in a vice, place cushioning material such as wood blocks, aluminum plate, or cloth between the part and vice.
• Before disconnecting electrical connectors, be sure to disconnect the ground cable from battery.

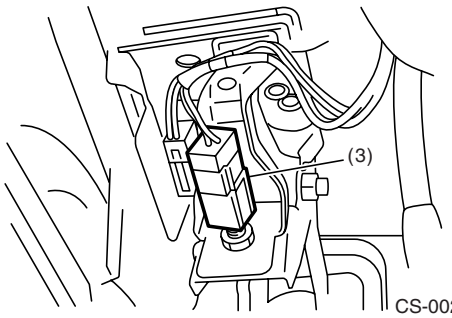
2. AT Shift Lock Control System

A: LOCATION

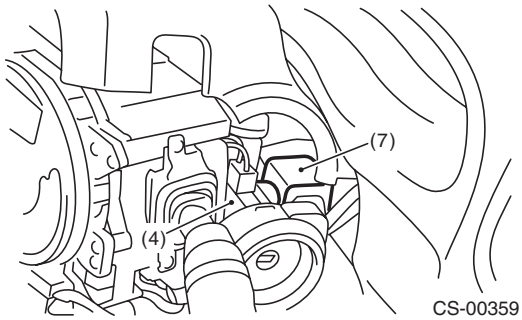


(1) TCM (“P” range)
(2) Body integrated module
(3) Stop light switch
(4) Key cylinder (with built-in key warning switch)
(5) Shift lock solenoid unit
(6) “P” range switch
(7) Key lock solenoid

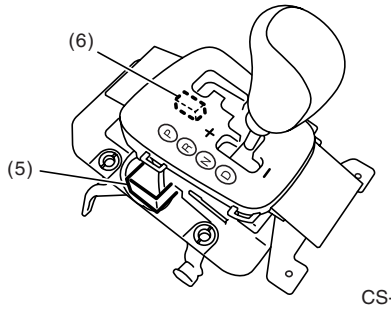




CS-00270

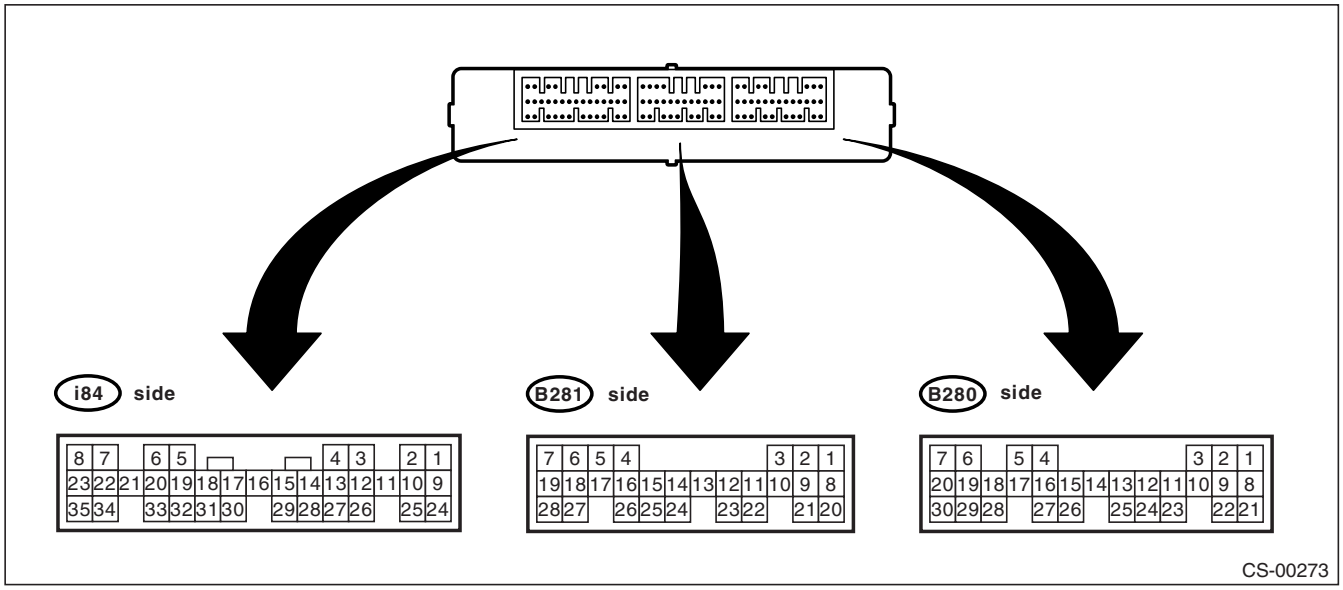


CS-00359



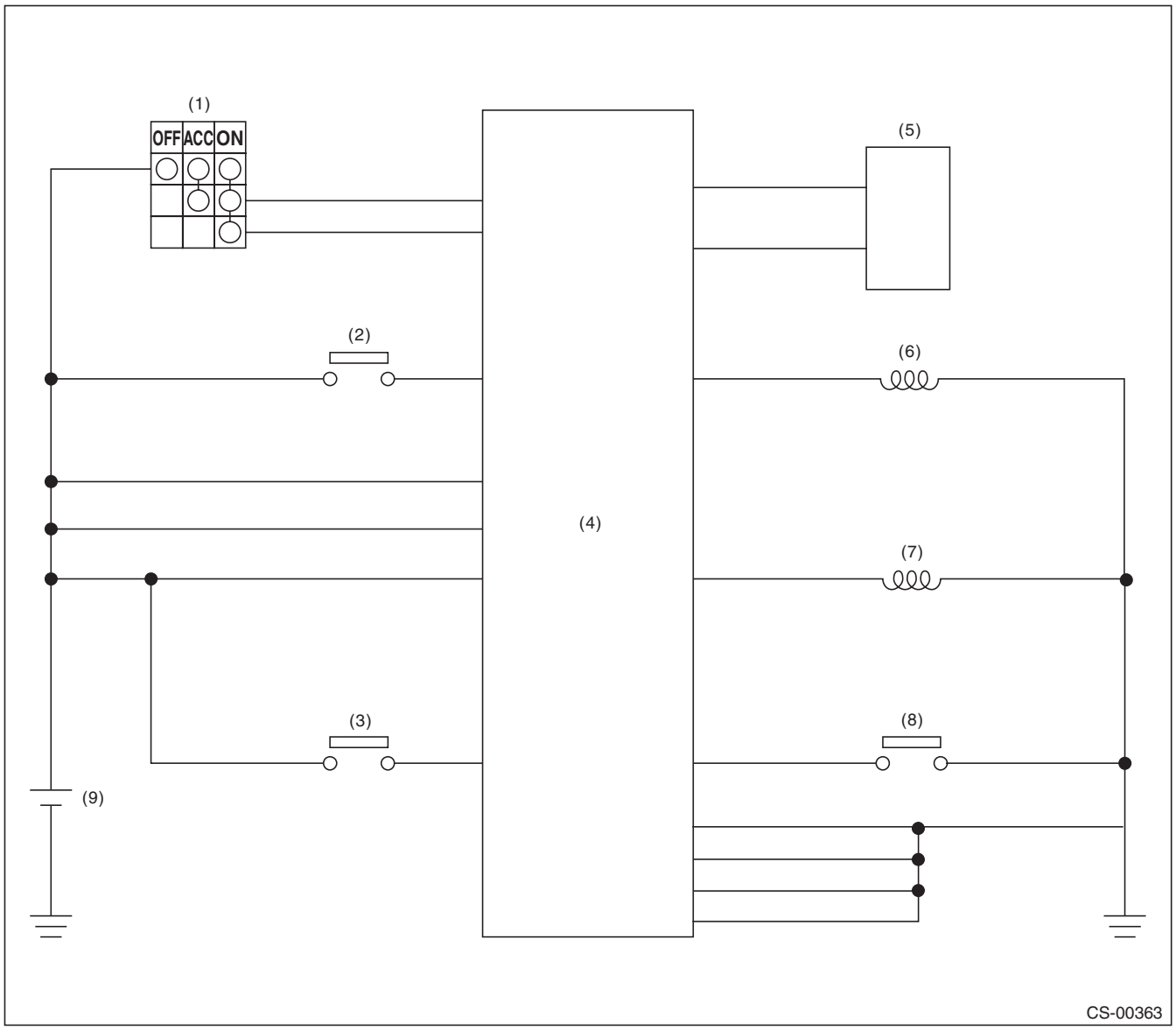
CS-00556

B: ELECTRICAL SPECIFICATION



Item	To connector No.	Terminal No.	Input/Output signal Measured value and measuring conditions
Battery power supply	B281	1	9 — 16 V
		2	
Ignition power supply	i84	1	10 — 15 V when ignition switch is at ON or START.
	i84	24	10 — 15 V when ignition switch is at ACC.
TCM (“P” range)	B280	20	Pulse signal
	B280	30	
Stop light switch	B281	23	9 — 16 V when stop light switch is ON. 0 V when stop light switch is OFF.
“P” range switch	B281	13	0 V when select lever is in “P” range. 9 — 16 V when select lever is in other positions than “P” range.
Shift lock solenoid signal	B280	6	8.5 — 16 V when shift lock is released. 0 V when shift lock is operating.
Key warning switch signal	B281	7	9 — 16 V when key is inserted. 0 V when key is removed.
Key lock solenoid signal	B280	5	7.5 — 16 V when ignition switch is ON, select lever is in “P” range and brake switch is ON. 0 V at other conditions than above.
Ground	B280	22	—
	i84	21	
	B281	8	
		9	

C: WIRING DIAGRAM



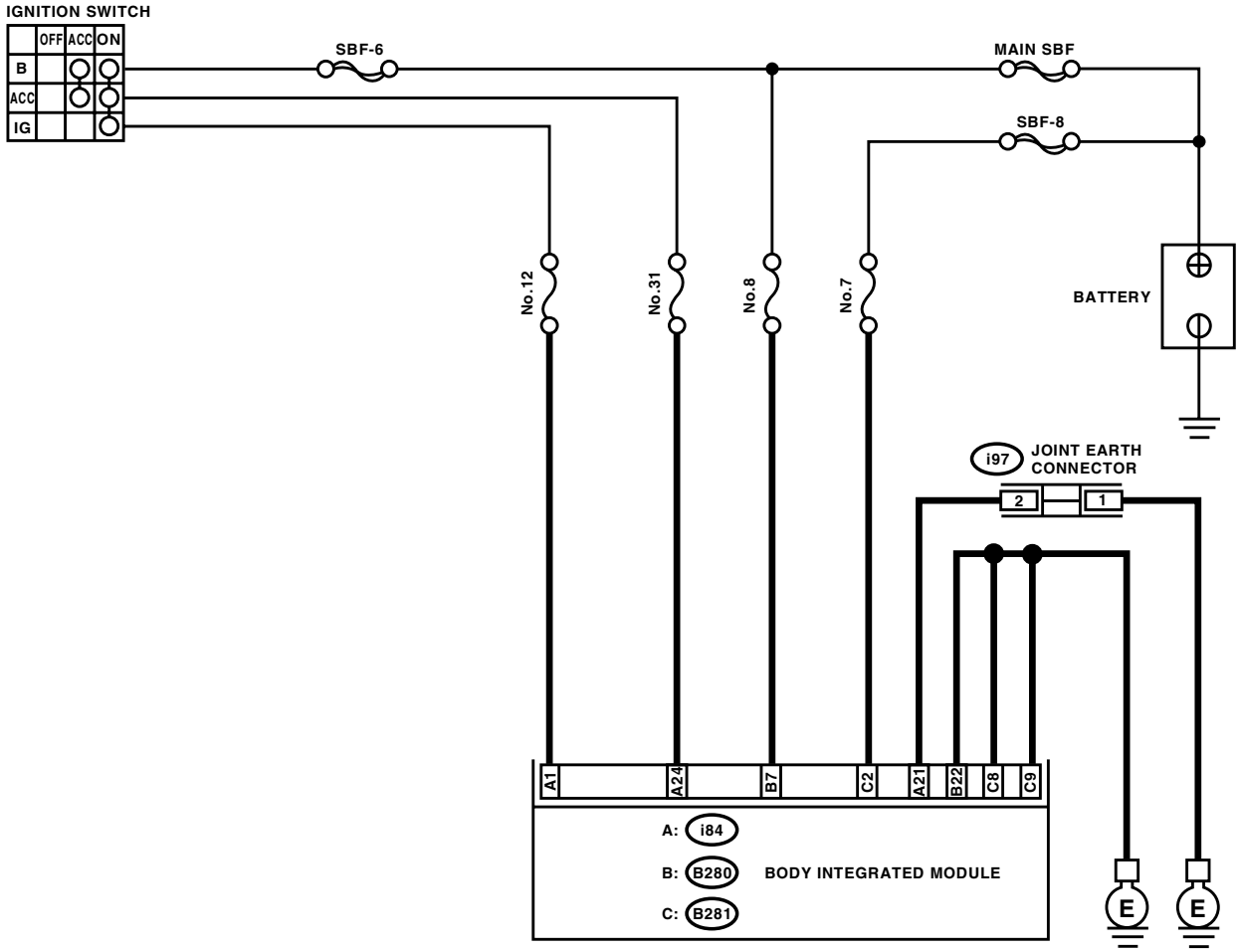
(1) Ignition switch
(2) Stop light switch
(3) Key warning switch
(4) Body integrated module
(5) TCM (“P” range)
(6) Key lock solenoid
(7) Shift lock solenoid
(8) “P” range switch
(9) Battery

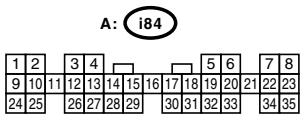
D: INSPECTION

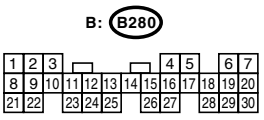
1. SHIFT LOCK OPERATION

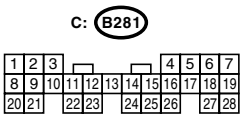
	Step	Check	Yes	No
1	**CHECK SHIFT LOCK.** 1) Turn the ignition switch to ON. 2) Shift the select lever to “P” range.	While brake pedal is not depressed, can select lever move from “P” range to other ranges?	Inspect “SELECT LEVER CANNOT BE SHIFT LOCKED”. <Ref. to CS-15, SELECT LEVER CANNOT BE SHIFTED, INSPECTION, AT Shift Lock Control System.>	Go to step **2.**
2	**CHECK SHIFT LOCK.**	While brake pedal is depressed, can select lever move from “P” range to other ranges?	Go to step **3.**	Inspect “SELECT LEVER SHIFT LOCK CANNOT BE RELEASED”. <Ref. to CS-17, SHIFT LOCK OF SELECT LEVER CANNOT BE RELEASED, INSPECTION, AT Shift Lock Control System.>
3	**CHECK KEY INTERLOCK.**	Is the ignition switch turned to the “LOCK” position when the select lever is set to other than “P” range?	Inspect “KEY INTERLOCK DOES NOT BE LOCKED OR RELEASED”. <Ref. to CS-17, SHIFT LOCK OF SELECT LEVER CANNOT BE RELEASED, INSPECTION, AT Shift Lock Control System.>	Go to step **4.**
4	**CHECK KEY INTERLOCK.**	Is the ignition switch turned to the “LOCK” position when the select lever is set to “P” range?	AT shift lock system is normal.	Inspect “KEY INTERLOCK DOES NOT BE LOCKED OR RELEASED”. <Ref. to CS-17, SHIFT LOCK OF SELECT LEVER CANNOT BE RELEASED, INSPECTION, AT Shift Lock Control System.>

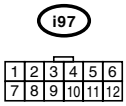
2. BODY INTEGRATED MODULE POWER SUPPLY AND GROUND CIRCUIT









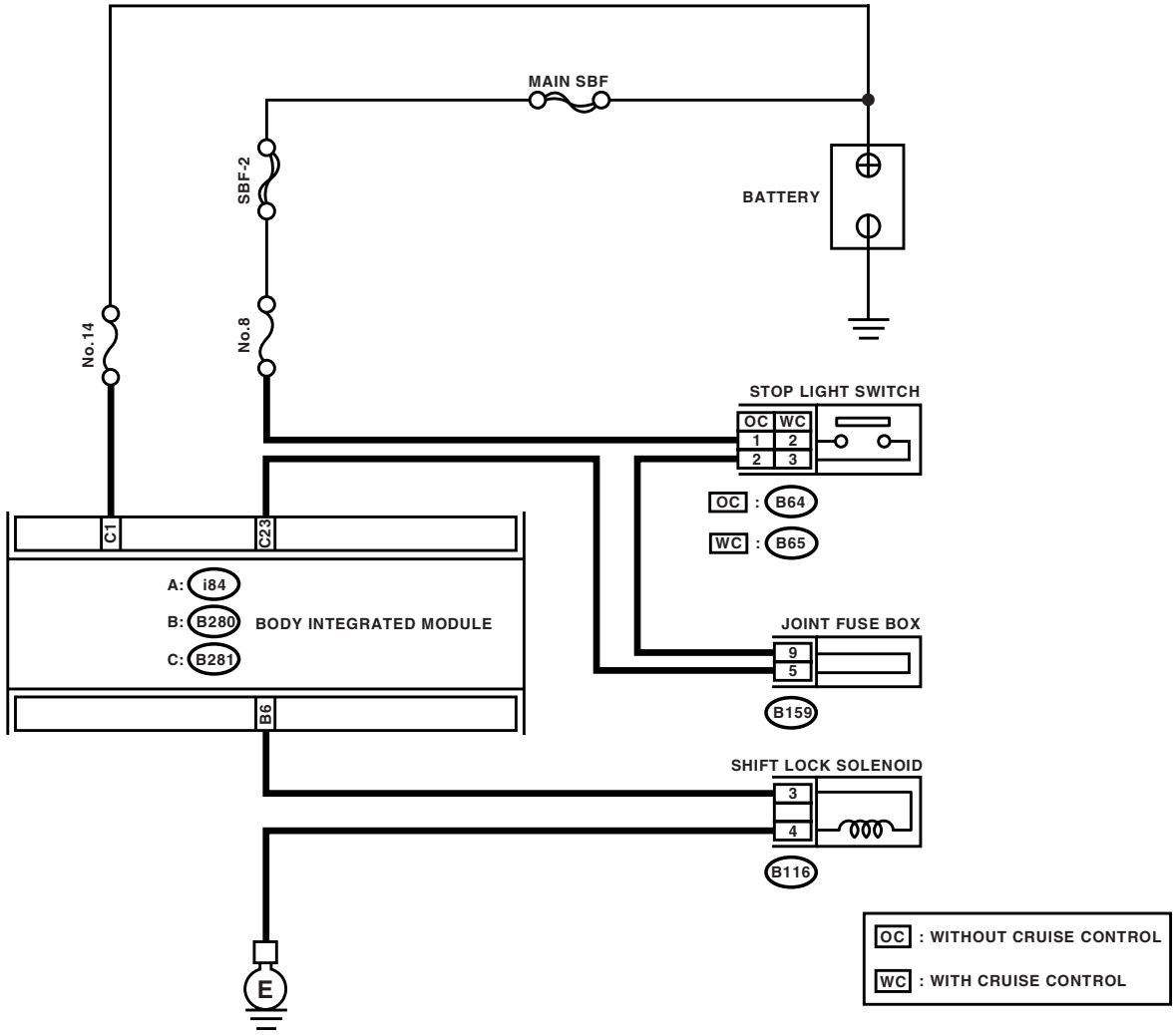


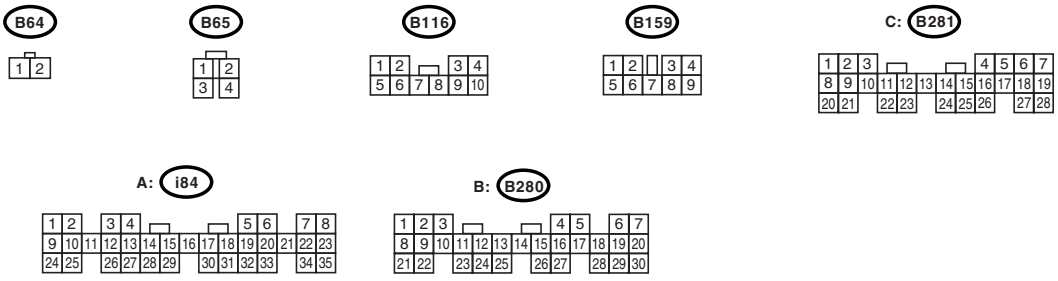
CS-00562

	Step	Check	Yes	No
1	**CHECK DTC OF BODY INTEGRATED MODULE.** Check DTC of body integrated module. <Ref. to LAN(diag)-14, OPERATION, Subaru Select Monitor.>	Is the DTC of power line displayed on body integrated module?	Repair or replace it according to the DTC.	Go to step **2.**

	Step	Check	Yes	No
2	**CHECK HARNESS CONNECTOR BETWEEN BODY INTEGRATED MODULE AND CHASSIS GROUND.** 1) Turn the ignition switch to OFF. 2) Measure the harness resistance between body integrated module and chassis ground. ***Connector & terminal*** ***(i84) No. 21 — Chassis ground:*** ***(B280) No. 22 — Chassis ground:*** ***(B281) No. 8 — Chassis ground:*** ***(B281) No. 9 — Chassis ground:***	Is the resistance less than 1 Ω?	Go to step **3.**	Repair open circuit of the harness between body integrated module and chassis ground.
3	**CHECK FOR POOR CONTACT.**	Is there poor contact in connector?	Repair the poor contact.	Check the body integrated module.

3. SELECT LEVER CANNOT BE SHIFTED

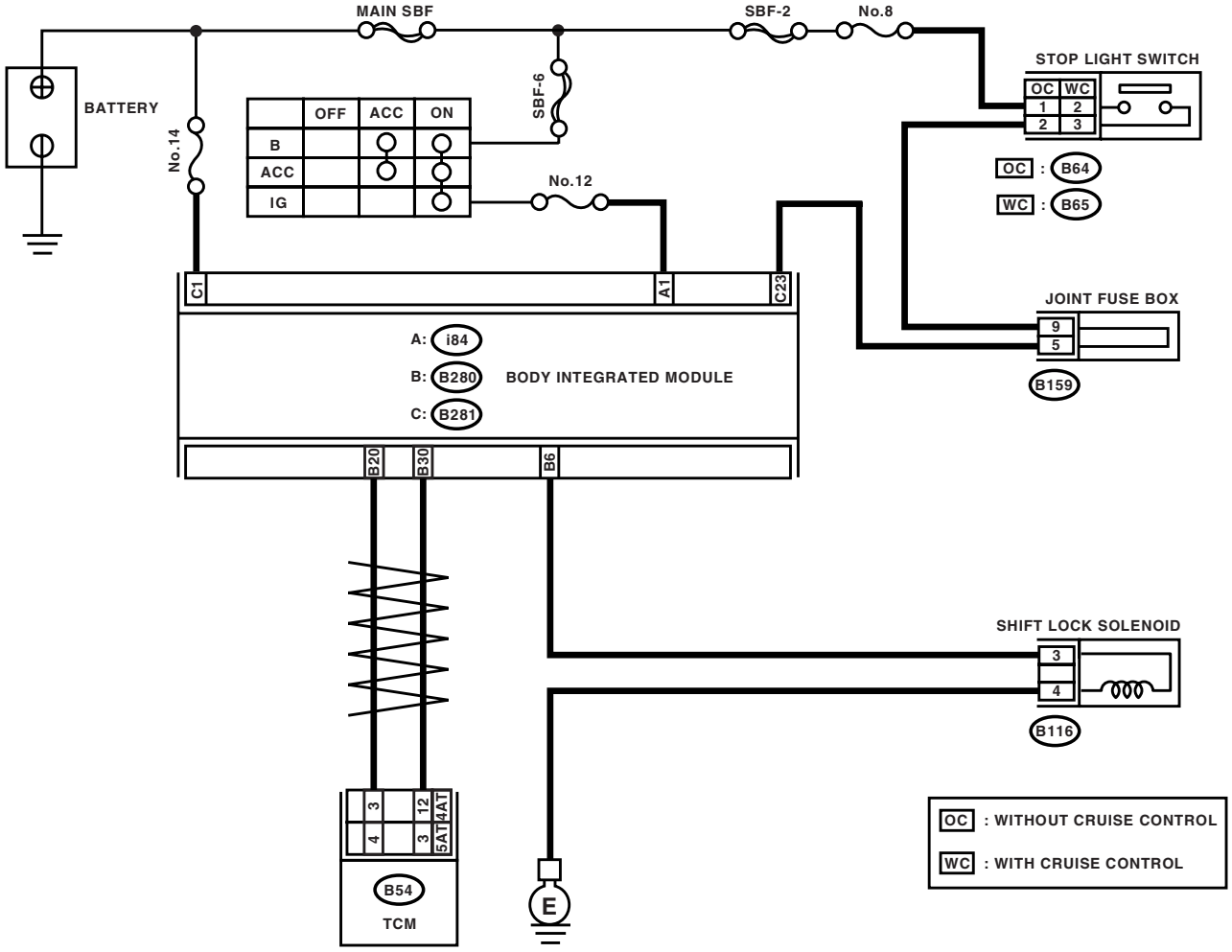


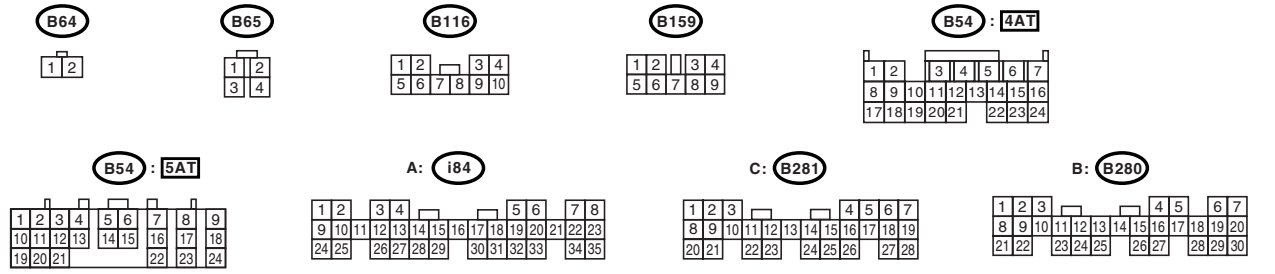


CS-00553

	Step	Check	Yes	No
1	**CHECK INPUT SIGNAL OF BODY INTEGRATED MODULE USING SUBARU SELECT MONITOR.** 1) Turn the ignition switch to OFF. 2) Connect the Subaru Select Monitor to data link connector. 3) Turn the ignition switch and Subaru Select Monitor power switch to ON. 4) Depress the brake pedal. 5) Read the input signal of stop light switch from Subaru Select Monitor. <Ref. to LAN(diag)-14, OPERATION, Subaru Select Monitor.>	Is "ON" displayed?	Go to step **2.**	Go to step **3.**
2	**CHECK DTC OF BODY INTEGRATED MODULE.** Check DTC of body integrated module. <Ref. to LAN(diag)-24, OPERATION, Read Diagnostic Trouble Code (DTC).>	Is DTC (B0106) displayed?	Repair or replace it according to the DTC.	Go to step **6.**
3	**CHECK STOP LIGHT SWITCH.** Depress the brake pedal.	Does the stop light illuminate?	Go to step **4.**	Check the stop light system.
4	**CHECK HARNESS BETWEEN STOP LIGHT SWITCH AND BODY INTEGRATED MODULE.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors of body integrated module and stop light switch. 3) Measure the resistance of harness between stop light switch and body integrated module. ***Connector & terminal*** ***Without cruise control*** ***(B64) No. 2 — (B281) No. 23:*** ***With cruise control*** ***(B65) No. 3 — (B281) No. 23:***	Is the resistance more than 1 MΩ?	Repair open circuit of the harness between body integrated module and stop light switch.	Go to step **5.**
5	**CHECK HARNESS BETWEEN STOP LIGHT SWITCH AND BODY INTEGRATED MODULE.** Measure the resistance of harness between stop light switch and chassis ground. ***Connector & terminal*** ***Without cruise control*** ***(B64) No. 2 — Chassis ground:*** ***With cruise control*** ***(B65) No. 3 — Chassis ground:***	Is the resistance less than 1 Ω?	Repair short circuit of the harness between body integrated module and stop light switch.	Go to step **7.**
6	**CHECK SHIFT LOCK SOLENOID.** 1) Disconnect the connector of shift lock solenoid. 2) Connect the battery to connector terminal of shift lock solenoid, and operate the solenoid. ***Terminal*** ***No. 3 (+) — No. 4 (−):***	Is the shift lock solenoid operating properly?	Go to step **7.**	Replace the shift lock solenoid.
7	**CHECK SHIFT LOCK OPERATION.** 1) Connect all the connectors. 2) Shift the select lever to "P" range. 3) Shift the select lever from "P" range to "R" range.	Can the select lever shift from "P" range to "R" range?	Check the body integrated module.	A temporary poor contact of connector or harness may be the cause.

4. SHIFT LOCK OF SELECT LEVER CANNOT BE RELEASED

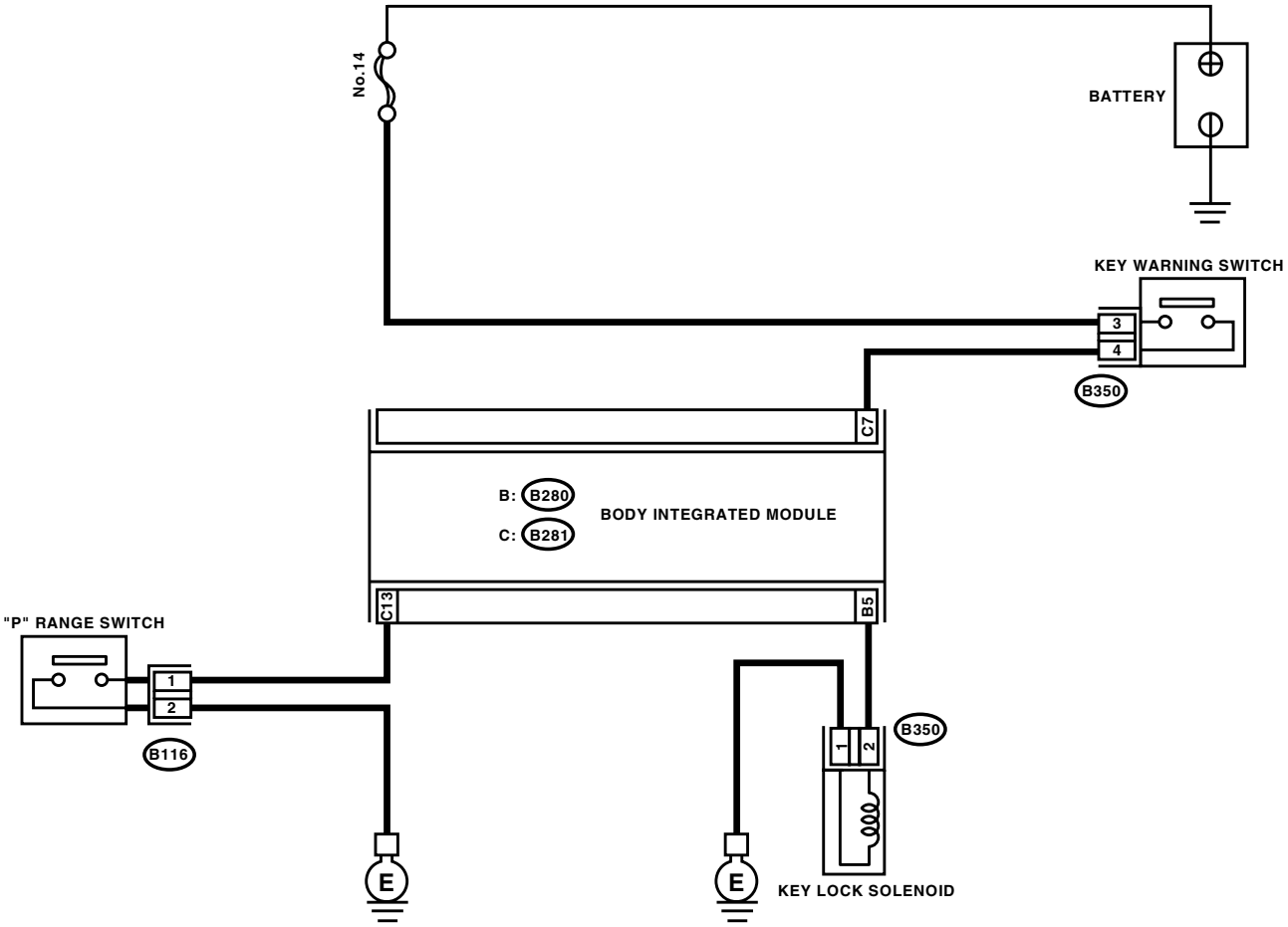


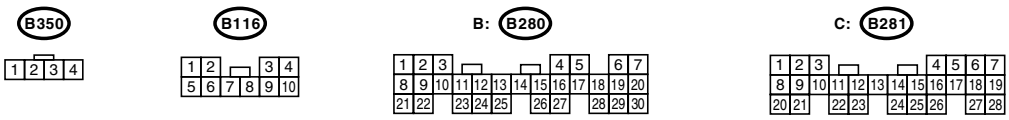


CS-00554

	Step	Check	Yes	No
1	**CHECK INPUT SIGNAL OF BODY INTEGRATED MODULE USING SUBARU SELECT MONITOR.** 1) Turn the ignition switch to OFF. 2) Connect the Subaru Select Monitor to data link connector. 3) Turn the ignition switch and Subaru Select Monitor power switch to ON. 4) Depress the brake pedal. 5) Read the input signal of shift position from Subaru Select Monitor. <Ref. to LAN(diag)-14, OPERATION, Subaru Select Monitor.>	Is "7" displayed?	Go to step **2.**	Check the inhibitor switch, TCM, body integrated module and communication circuit.
2	**CHECK INPUT SIGNAL OF BODY INTEGRATED MODULE USING SUBARU SELECT MONITOR.** Read the input signal of stop light switch from Subaru Select Monitor. <Ref. to LAN(diag)-14, OPERATION, Subaru Select Monitor.>	Is "ON" displayed?	Go to step **5.**	Go to step **3.**
3	**CHECK STOP LIGHT SWITCH.** Depress the brake pedal.	Does the stop light illuminate?	Go to step **4.**	Check the stop light system.
4	**CHECK HARNESS BETWEEN STOP LIGHT SWITCH AND BODY INTEGRATED MODULE.** 1) Depress the brake pedal. 2) Measure the voltage between body integrated module and chassis ground. ***Connector & terminal*** ***(B281) No. 23 (+) — Chassis ground (−):***	Is the voltage more than 9 V?	Go to step **5.**	Repair open or short circuit of the harness between the body integrated module and stop light switch.
5	**CHECK DTC OF BODY INTEGRATED MODULE.** Check DTC of body integrated module. <Ref. to LAN(diag)-24, OPERATION, Read Diagnostic Trouble Code (DTC).>	Is DTC (B0106) displayed?	Repair or replace it according to the DTC.	Go to step **6.**
6	**CHECK SHIFT LOCK SOLENOID.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector of shift lock solenoid. 3) Connect the battery to connector terminal of shift lock solenoid, and operate the solenoid. ***Terminal*** ***No. 3 (+) — No. 4 (−):***	Is the shift lock solenoid operating properly?	Go to step **7.**	Replace the shift lock solenoid.
7	**CHECK OPERATION.** 1) Connect all the connectors. 2) Turn the ignition switch to ON. (engine OFF) 3) Shift the select lever to "P" range. 4) Depress the brake pedal. 5) Shift the select lever from "P" range to "R" range.	Can the select lever shift from "P" range to "R" range?	A temporary poor contact of connector or harness may be the cause.	Check the body integrated module.

5. KEY INTERLOCK DOES NOT LOCK OR RELEASE





CS-00277

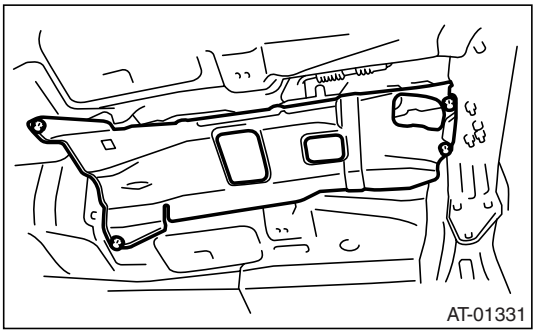
	Step	Check	Yes	No
1	**CHECK INPUT SIGNAL OF BODY INTEGRATED MODULE USING SUBARU SELECT MONITOR.** 1) Turn the ignition switch to OFF. 2) Connect the Subaru Select Monitor to data link connector. 3) Turn the ignition switch and Subaru Select Monitor power switch to ON. 4) Depress the brake pedal. 5) Read the input signal of key warning switch from Subaru Select Monitor. <Ref. to LAN(diag)-14, OPERATION, Subaru Select Monitor.>	Is "ON" displayed?	Go to step **2.**	Go to step **4.**
2	**CHECK INPUT SIGNAL OF BODY INTEGRATED MODULE USING SUBARU SELECT MONITOR.** 1) Shift the select lever to "P" range. 2) Read the input signal of "P" range switch from Subaru Select Monitor. <Ref. to LAN(diag)-14, OPERATION, Subaru Select Monitor.>	Is "ON" displayed?	Go to step **3.**	Go to step **8.**
3	**CHECK DTC OF BODY INTEGRATED MODULE.** Check DTC of body integrated module. <Ref. to LAN(diag)-24, OPERATION, Read Diagnostic Trouble Code (DTC).>	Is DTC (B0105) displayed?	Repair or replace it according to the DTC.	Check the body integrated module.
4	**CHECK HARNESS BETWEEN BATTERY AND KEY WARNING SWITCH.** 1) Disconnect the connector of key warning switch. 2) Measure the voltage of harness between key warning switch and chassis ground. ***Connector & terminal*** ***(B350) No. 3 (+) — Chassis ground (−):***	Is the voltage 9 — 16 V?	Go to step **5.**	Repair open or short circuit of the harness between battery and key warning switch.
5	**CHECK KEY WARNING SWITCH.** Measure the resistance between connector terminals of key warning switch. ***Terminal*** ***No. 3 — No. 4:***	Is the resistance more than 1 MΩ?	Replace the key warning switch.	Go to step **6.**
6	**CHECK KEY WARNING SWITCH.** 1) Remove the key. 2) Measure the resistance between connector terminals of key warning switch. ***Terminal*** ***No. 3 — No. 4:***	Is the resistance more than 1 MΩ?	Go to step **7.**	Replace the key warning switch.
7	**CHECK HARNESS BETWEEN BODY INTEGRATED MODULE AND KEY WARNING SWITCH.** 1) Connect the connector of key warning switch and insert the key. 2) Disconnect the connector of body integrated module. 3) Measure the voltage between body integrated module and chassis ground. ***Connector & terminal*** ***(B281) No. 7 (+) — Chassis ground (−):***	Is the voltage more than 9 V?	Go to step **8.**	Repair open circuit of the harness between body integrated module and key warning switch.

	Step	Check	Yes	No
8	**CHECK HARNESS BETWEEN "P" RANGE SWITCH AND CHASSIS GROUND.** Measure the resistance of harness between "P" range switch and chassis ground. ***Connector & terminal*** ***(B116) No. 1 — Chassis ground:***	Is the resistance less than 1 Ω?	Repair short circuit of the harness between "P" range switch and body integrated module.	Go to step **9.**
9	**CHECK HARNESS BETWEEN BODY INTEGRATED MODULE AND "P" RANGE SWITCH.** 1) Disconnect the connector of "P" range switch. 2) Measure the resistance of harness between body integrated module and "P" range switch. ***Connector & terminal*** ***(B116) No. 1 — (B281) No. 13:***	Is the resistance more than 1 MΩ?	Repair open circuit of the harness between body integrated module and "P" range switch.	Go to step **10.**
10	**CHECK HARNESS BETWEEN "P" RANGE SWITCH AND CHASSIS GROUND.** Measure the resistance of harness between "P" range switch and chassis ground. ***Connector & terminal*** ***(B116) No. 2 — Chassis ground:***	Is the resistance more than 1 MΩ?	Repair open circuit in the harness between "P" range switch and chassis ground.	Go to step **11.**
11	**CHECK "P" RANGE SWITCH.** 1) Shift the select lever to "P" range. 2) Measure the resistance between "P" range switch connector terminals. ***Terminal*** ***No. 2 — No. 1:***	Is the resistance less than 1 Ω?	Go to step **12.**	Replace the "P" range switch.
12	**CHECK "P" RANGE SWITCH.** 1) Shift the select lever to other than "P" range. 2) Measure the resistance between "P" range switch connector terminals. ***Terminal*** ***No. 2 — No. 1:***	Is the resistance more than 1 MΩ?	Go to step **13.**	Replace the "P" range switch.
13	**CHECK OPERATION.** 1) Connect all the connectors. 2) Operate the key lock solenoid.	Does the key lock solenoid operate normally?	A temporary poor contact of connector or harness may be the cause.	Check the body integrated module.

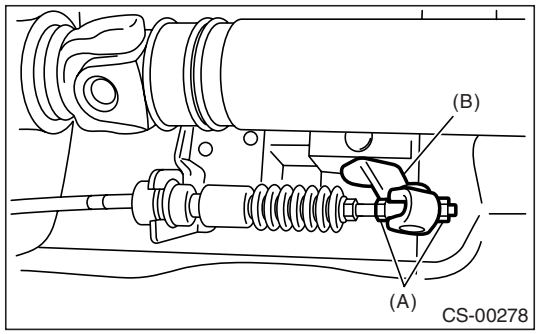
3. Select Lever

A: REMOVAL

1) Set the vehicle on a lift.
2) Disconnect the ground cable from battery.
3) Shift the select lever to “N” range.
4) Lift-up the vehicle.
5) Remove the rear exhaust pipe and muffler.
• SOHC model
<Ref. to EX(H4SO 2.0)-10, REMOVAL, Rear Exhaust Pipe.> <Ref. to EX(H4SO 2.0)-12, REMOVAL, Muffler.>
• DOHC non-turbo model
<Ref. to EX(H6DO)-7, REMOVAL, Rear Exhaust Pipe.> <Ref. to EX(H6DO)-9, REMOVAL, Muffler.>
• DOHC turbo model
<Ref. to EX(H4DOTC)-11, REMOVAL, Rear Exhaust Pipe.> <Ref. to EX(H4DOTC)-12, REMOVAL, Muffler.>
6) Remove the heat shield cover.

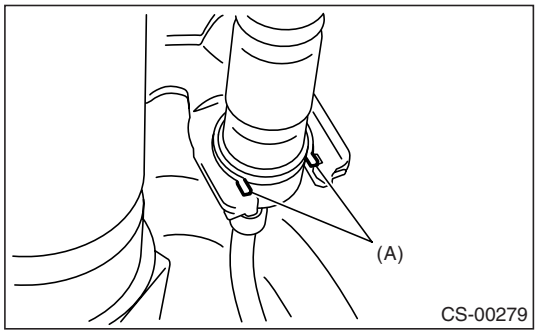


7) Remove the select cable from arm assembly.



(A) Adjusting nut
(B) Arm ASSY

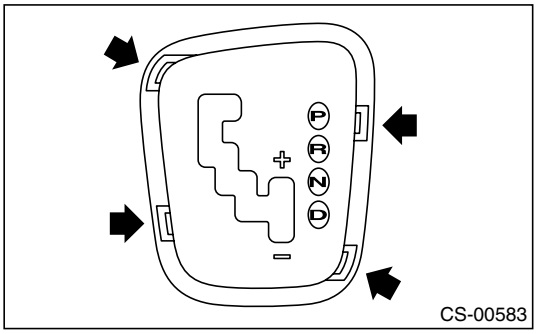
8) Raise the pawl of clamp to remove the select cable.



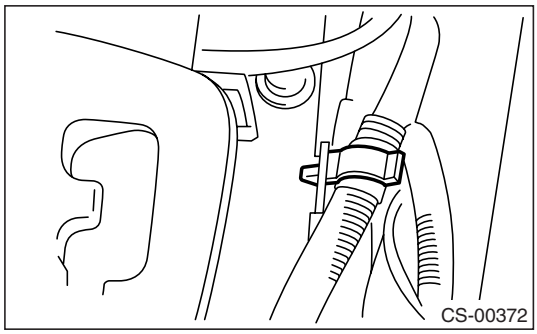
(A) Pawl

9) Lower the vehicle.
10) Remove the console box. <Ref. to EI-53, REMOVAL, Console Box.>
11) Remove the ring indicator.
Insert the tip of a flap tip screwdriver into the gap between ring indicator and console front panel, and lift up gradually.

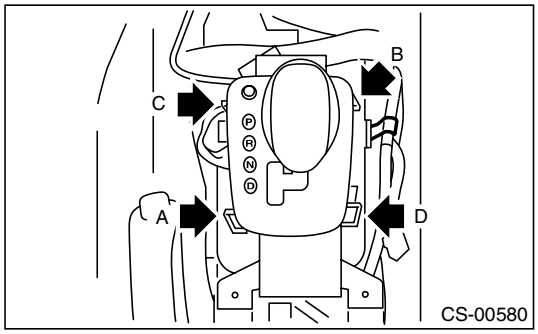
NOTE:
• Wrap the tip of a flat tip screwdriver with cloth.
• Insert the tip of a flat tip screwdriver into four pawls, and remove the ring indicator equally and gradually.



12) Remove the console front panel.
13) Remove the harness clips from bracket.



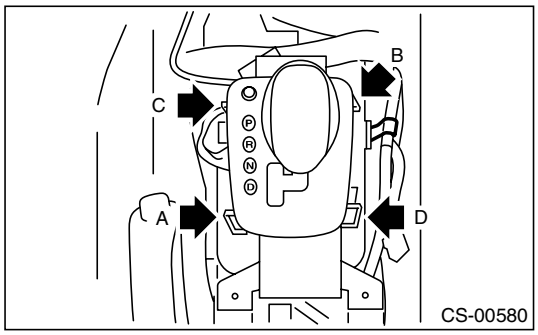
14) Disconnect the connectors, and then remove the four bolts to take out the select lever assembly from vehicle body.



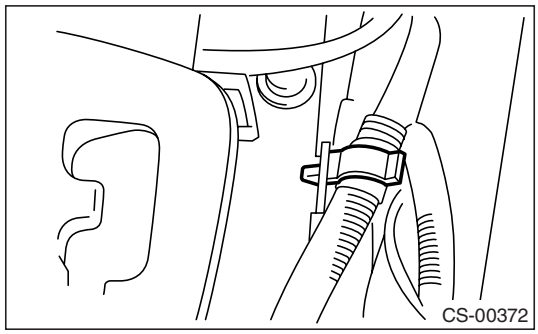
B: INSTALLATION

1) Set the select lever assembly to vehicle body.
2) Tighten the four bolts to install the select lever to vehicle body, and then connect the connector.
   (1) Temporarily tighten the bolt A.
   (2) Tighten the bolt B.
   (3) Tighten the bolt A.
   (4) Tighten the bolts C and D.

Tightening torque:
18 N·m (1.8 kgf-m, 13.3 ft-lb)



3) Install the harness clips to the bracket.



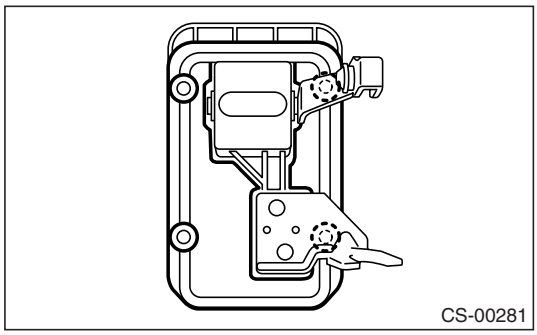
4) Install the console front panel.
5) Install the ring indicator.
6) Install the console box. <Ref. to EI-53, INSTALLATION, Console Box.>
7) Shift the select lever to “N” range.
8) Lift-up the vehicle.
9) Fix the select cable to bracket. <Ref. to CS-28, INSTALLATION, Select Cable.>
10) Adjust the select cable position. <Ref. to CS-30, ADJUSTMENT, Select Cable.>
11) After the completion of adjustment, confirm that the select lever operates properly at all range positions.
12) Install the heat shield cover.
13) Install the rear exhaust pipe and muffler.
• SOHC model
<Ref. to EX(H4SO 2.0)-10, INSTALLATION, Rear Exhaust Pipe.> <Ref. to EX(H4SO 2.0)-12, INSTALLATION, Muffler.>
• DOHC non-turbo model
<Ref. to EX(H6DO)-7, INSTALLATION, Rear Exhaust Pipe.> <Ref. to EX(H6DO)-9, INSTALLATION, Muffler.>
• DOHC turbo model
<Ref. to EX(H4DOTC)-11, INSTALLATION, Rear Exhaust Pipe.> <Ref. to EX(H4DOTC)-12, INSTALLATION, Muffler.>
14) Inspect the following items. When the malfunctions are found in the inspection, adjust the select cable and inhibitor switch.

NOTE:
Inhibitor switch for 5AT model is not adjustable. <Ref. to CS-30, ADJUSTMENT, Select Cable.> <Ref. to 4AT-51, ADJUSTMENT, Inhibitor Switch.>

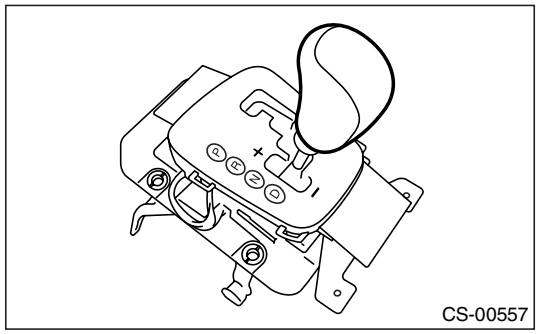
   (1) Engine starts when the select lever is in “P” and “N” range, but not in other range.
   (2) Back-up light illuminates when the select lever is in the “R” range, but not in other range.
   (3) Select lever and indicator positions are matched.

C: DISASSEMBLY

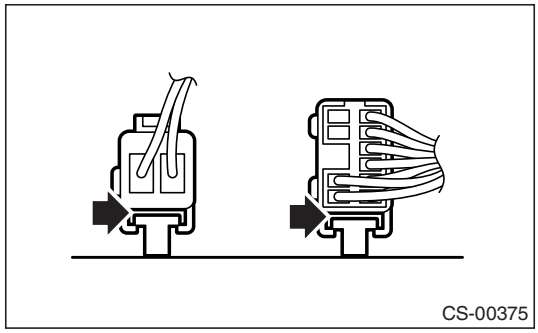
1) Remove the packing and plate.



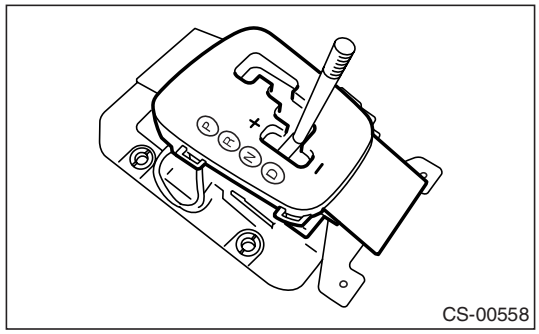
2) Remove the grip.



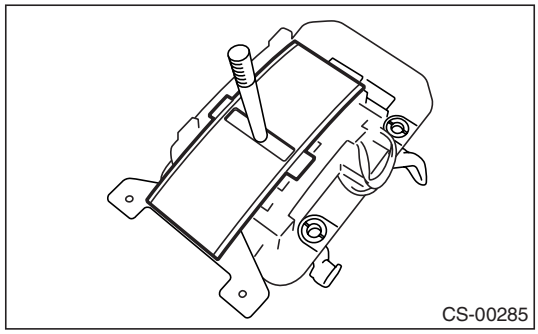
3) Insert a flat-tip screwdriver with thin tip under the connector to disconnect each connector from the plate assembly.



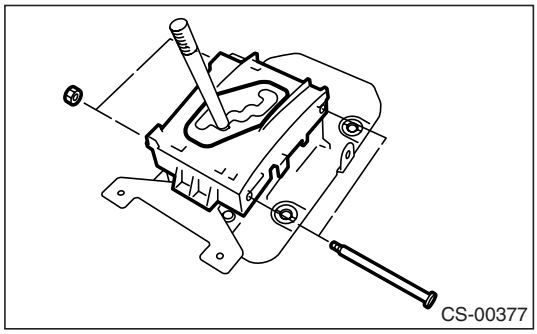
4) Remove the indicator cover.



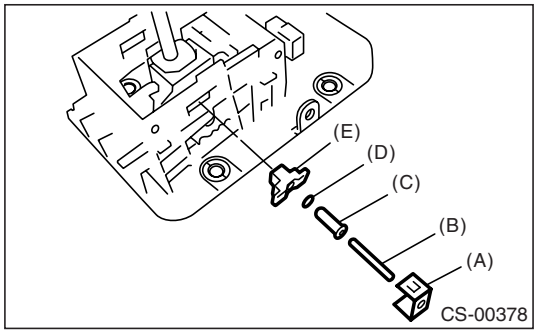
5) Remove the blind.



6) Remove the bolts, and then remove the guide plate.

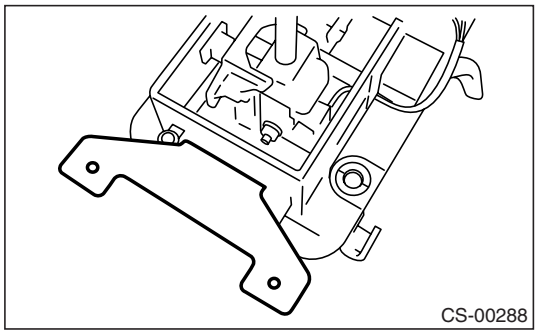


7) Remove the clamp, spring A, rod, cushion and bushing.

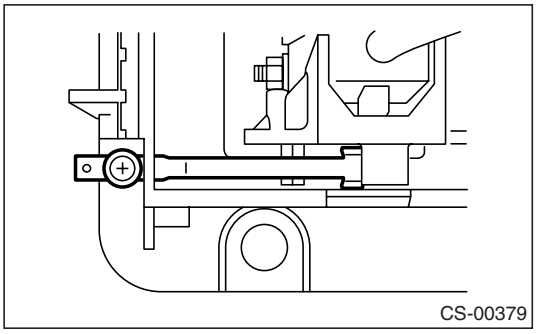


(A) Clamp
(B) Spring A
(C) Rod
(D) Cushion
(E) Bushing

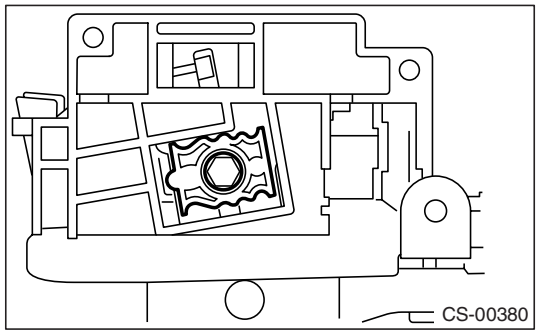
8) Remove the bracket.



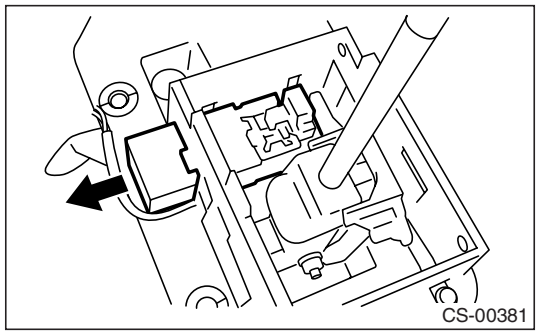
9) Remove the detent spring.



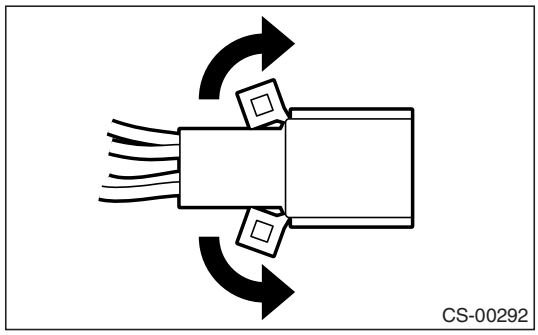
10) Remove the detent plate.



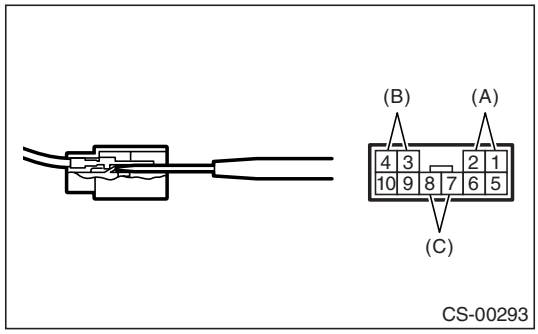
11) Remove the shift lock solenoid unit.



12) Raise the pawl of connector.

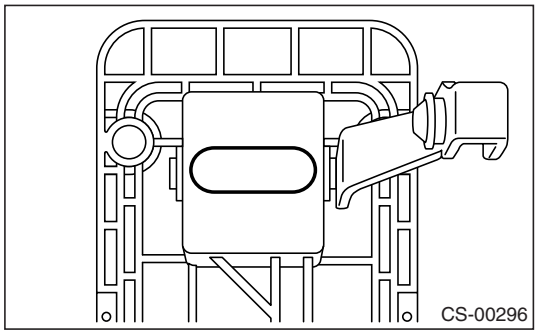


13) Use a flat-tip screwdriver with thin tip to disconnect the connectors from terminals of SPORT mode switch, “P” range switch and shift lock solenoid unit.

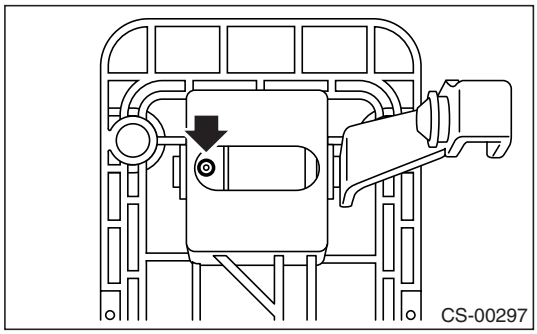


(A) “P” range switch terminal
(B) Shift lock solenoid terminal
(C) SPORT mode switch terminal

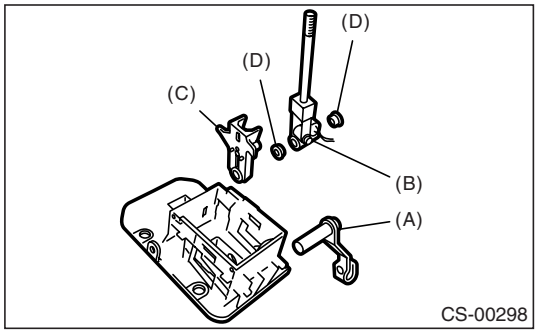
14) Remove the grommet.



15) Remove the spring pin.

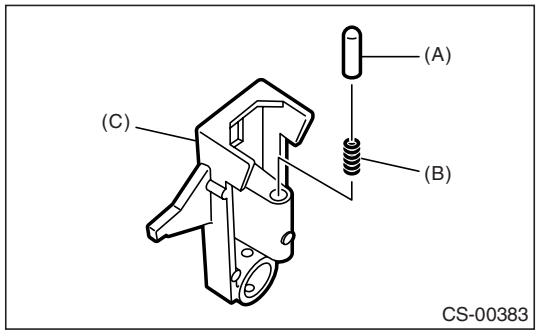


16) Pull out the arm assembly, and then remove the select lever assembly to remove the arm and bushing.



(A) Arm ASSY
(B) Select lever ASSY
(C) Arm
(D) Bushing

17) Remove the rod and spring from arm.

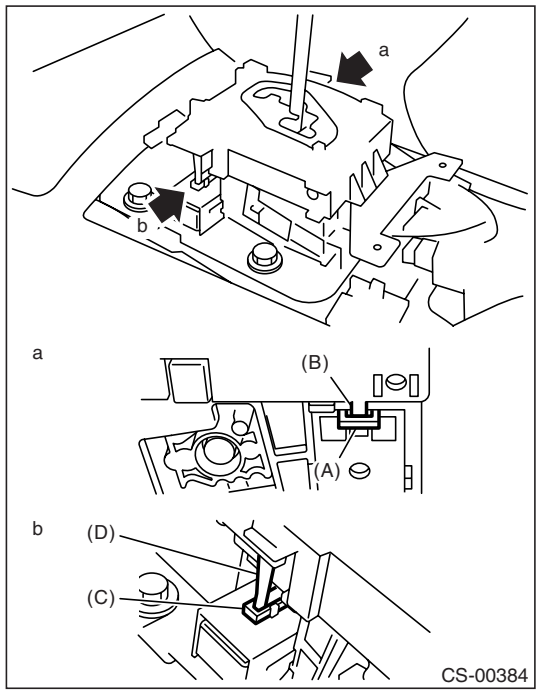


(A) Rod
(B) Spring
(C) Arm

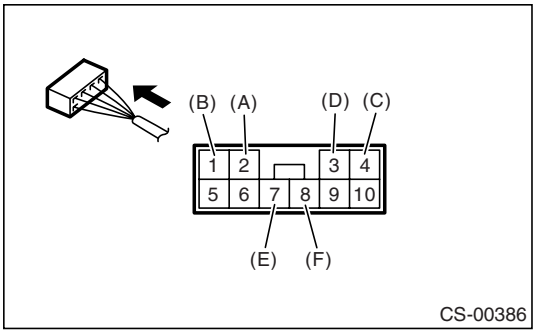
D: ASSEMBLY

1) Clean all the parts before assembly.
2) Apply grease [KOPR-KOTE (Part No. 003603001) or equivalent] to each parts. <Ref. to CS-3, AT SELECT LEVER, COMPONENT, General Description.>
3) Assemble in the reverse order of disassembly.

NOTE:
• When installing the guide plate, shift the select lever to “D” range (normal mode position), care should be taken in the following points.
(1) Insert the protrusion (B) of guide plate into the hole of shift lock solenoid unit (A).
(2) Insert the link (D) of shift lock release into the link (C) of shift lock solenoid unit.



• Connect the switch and solenoid terminal to connector.



(A) “P” range switch (Color code: Red)
(B) “P” range switch (Color code: Red)
(C) Shift lock solenoid (Color code: Black)
(D) Shift lock solenoid (Color code: Blue and Red)
(E) SPORT mode switch (Color code: White)
(F) SPORT mode switch (Color code: Black)

4) After completion of installation, shift the select lever from “P” range to “D” range, then check whether the indicator and select lever matches, whether the pointer and position mark matches and what the operating force is.

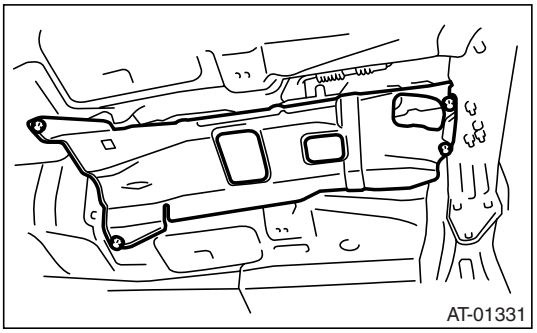
E: INSPECTION

1) Inspect the removed parts by comparing with new ones for deformation, damage and wear. Repair or replace if defective.
2) Confirm the select lever operating condition before assembly. Normal if it operates smoothly.

4. Select Cable

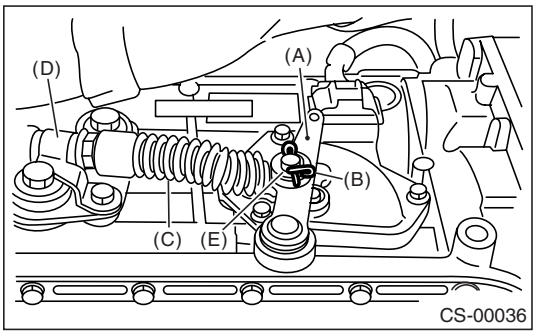
A: REMOVAL

1) Set the vehicle on a lift.
2) Shift the select lever to “N” range.
3) Disconnect the ground cable from battery.
4) Lift-up the vehicle.
5) Remove the front, center and rear exhaust pipes and muffler. (SOHC and DOHC non-turbo model)
• SOHC model
<Ref. to EX(H4SO 2.0)-6, REMOVAL, Front Exhaust Pipe.> <Ref. to EX(H4SO 2.0)-9, REMOVAL, Center Exhaust Pipe.> <Ref. to EX(H4SO 2.0)-10, REMOVAL, Rear Exhaust Pipe.> <Ref. to EX(H4SO 2.0)-12, REMOVAL, Muffler.>
• DOHC non-turbo model
<Ref. to EX(H6DO)-4, REMOVAL, Front Exhaust Pipe.> <Ref. to EX(H6DO)-7, REMOVAL, Rear Exhaust Pipe.> <Ref. to EX(H6DO)-9, REMOVAL, Muffler.>
6) Remove the center exhaust pipe, rear exhaust pipe and muffler. (DOHC turbo model)
<Ref. to EX(H4DOTC)-6, REMOVAL, Center Exhaust Pipe.> <Ref. to EX(H4DOTC)-11, REMOVAL, Rear Exhaust Pipe.> <Ref. to EX(H4DOTC)-12, REMOVAL, Muffler.>
7) Remove the heat shield cover.


AT-01331

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

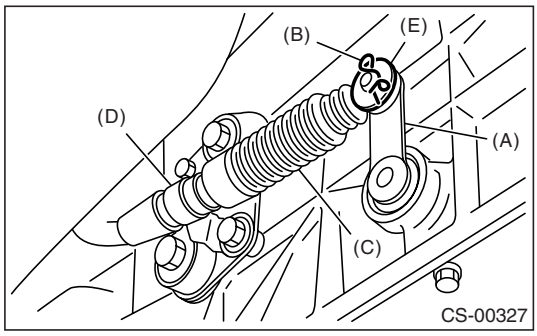
• 4AT



CS-00036

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

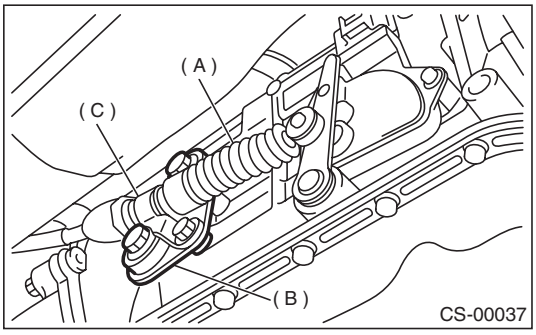
• 5AT



CS-00327

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

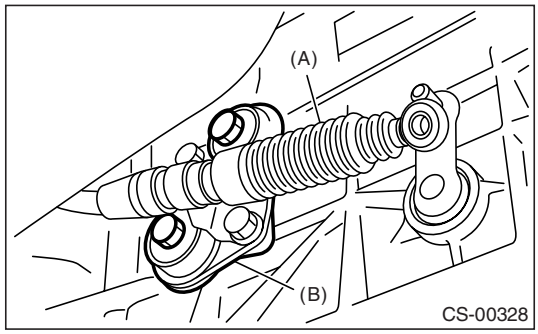
9) Remove the plate assembly from transmission case.
• 4AT



CS-00037

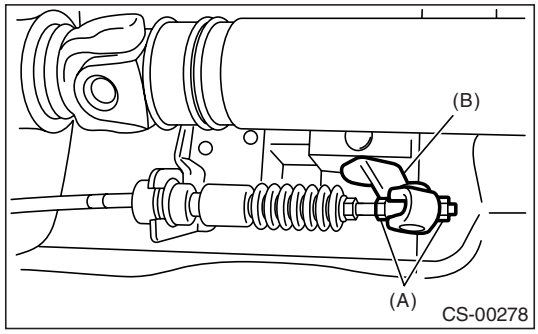
(A) Select cable
(B) Plate ASSY
(C) Bracket

• 5AT



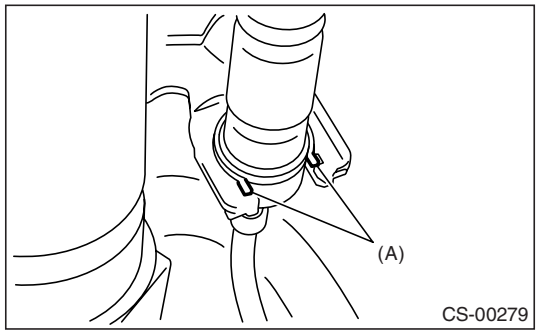
(A) Select cable
(B) Plate ASSY

10) Disconnect the select cable from arm assembly.



(A) Adjusting nut
(B) Arm ASSY

11) Raise the pawl of clamp to remove the cable from bracket.



(A) Pawl

12) Remove the select cable from plate assembly.

B: INSTALLATION

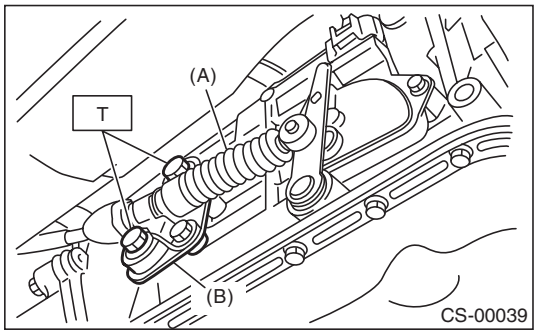
1) Install the select cable to plate assembly.

Tightening torque:
18 N·m (1.8 kgf-m, 13.3 ft-lb)

2) Install the select cable to range select lever.
3) Install the plate assembly to transmission.

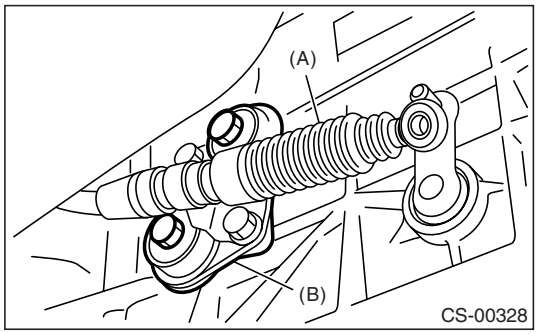
Tightening torque:
25 N·m (2.5 kgf-m, 18.4 ft-lb)

• 4AT



(A) Select cable
(B) Plate ASSY

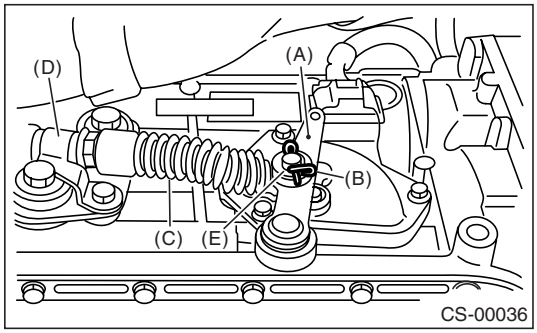
• 5AT



(A) Select cable
(B) Plate ASSY

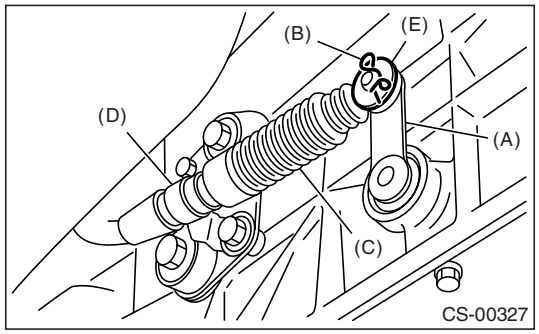
4) Install the washer and snap pin to range select lever.

• 4AT



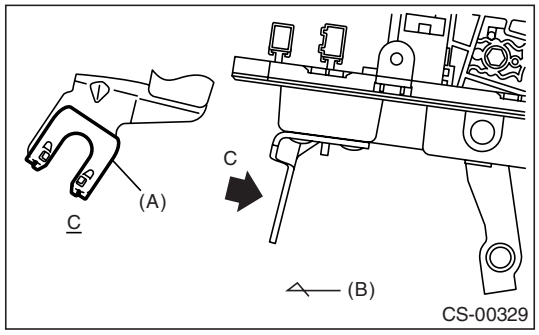
(A) Range select lever
(B) Snap pin
(C) Select cable
(D) Bracket
(E) Washer

• 5AT



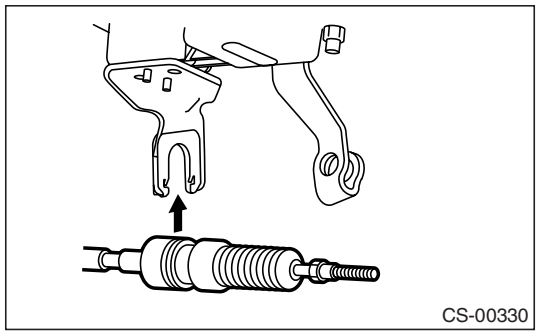
(A) Range select lever
(B) Snap pin
(C) Select cable
(D) Bracket
(E) Washer

5) Install a new clamp paying attention to the installing direction.



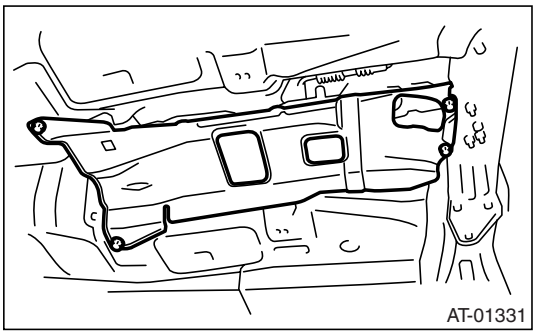
(A) Clamp
(B) Forward

6) Insert the tip of inner cable into connector hole of the select lever, and fix the select cable to bracket.



7) Shift the select lever to “N” range, and then adjust the select cable position. <Ref. to CS-30, ADJUSTMENT, Select Cable.>

8) Install the heat shield cover.



9) Install the front, center and rear exhaust pipes and muffler. (SOHC and DOHC non-turbo model)

• SOHC model

<Ref. to EX(H4SO 2.0)-7, INSTALLATION, Front Exhaust Pipe.> <Ref. to EX(H4SO 2.0)-9, INSTALLATION, Center Exhaust Pipe.> <Ref. to EX(H4SO 2.0)-10, INSTALLATION, Rear Exhaust Pipe.> <Ref. to EX(H4SO 2.0)-12, INSTALLATION, Muffler.>

• DOHC non-turbo model

<Ref. to EX(H6DO)-5, INSTALLATION, Front Exhaust Pipe.> <Ref. to EX(H6DO)-7, INSTALLATION, Rear Exhaust Pipe.> <Ref. to EX(H6DO)-9, INSTALLATION, Muffler.>

10) Install the center exhaust pipe, rear exhaust pipe and muffler. (DOHC turbo model)

<Ref. to EX(H4DOTC)-7, INSTALLATION, Center Exhaust Pipe.> <Ref. to EX(H4DOTC)-11, INSTALLATION, Rear Exhaust Pipe.> <Ref. to EX(H4DOTC)-12, INSTALLATION, Muffler.>

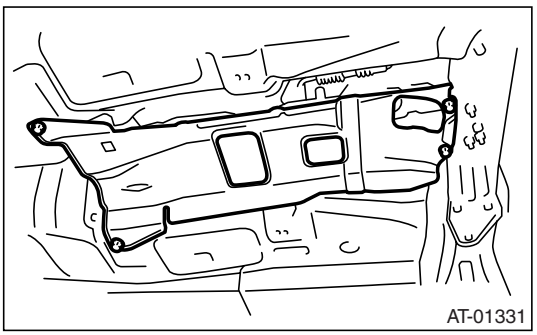
C: INSPECTION

Check the removed cable and replace or adjust if damaged, rusty or malfunctioning.

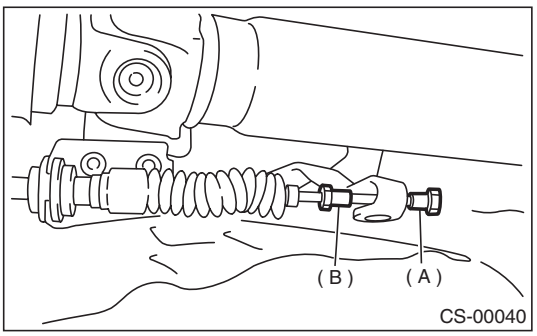
1) Check for smooth operation of the cable.
2) Check the inner cable for damage and rust.
3) Check the outer cable for damage, bends and cracks.
4) Check the boot for damage, cracks and deterioration.
5) Move the select lever from “P” to “D” range. Check the existence of feel to contact the detents in each range. If the detents cannot be felt or the position pointer is improperly aligned, adjust the cable.
6) Check if the starter motor rotates when the select lever is set to “P” range.
7) Check the back-up light illumination when the select lever is in “R” range.
8) Check the parking lock operation when the select lever is in “P” range.

D: ADJUSTMENT

1) Shift the select lever to “N” range.
2) Remove the rear exhaust pipe and muffler.
• SOHC model
<Ref. to EX(H4SO 2.0)-10, REMOVAL, Rear Exhaust Pipe.> <Ref. to EX(H4SO 2.0)-12, REMOVAL, Muffler.>
• DOHC non-turbo model
<Ref. to EX(H6DO)-7, REMOVAL, Rear Exhaust Pipe.> <Ref. to EX(H6DO)-9, REMOVAL, Muffler.>
• DOHC turbo model
<Ref. to EX(H4DOTC)-11, REMOVAL, Rear Exhaust Pipe.> <Ref. to EX(H4DOTC)-12, REMOVAL, Muffler.>
3) Remove the heat shield cover.

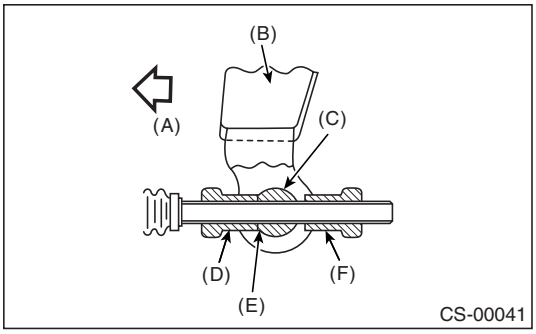


4) Loosen the adjusting nuts on both sides.



(A) Adjusting nut A
(B) Adjusting nut B

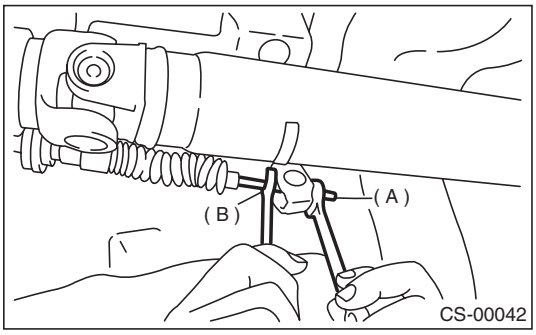
5) Turn the adjusting nut B until it lightly touches the connector.



(A) Forward side
(B) Select lever
(C) Connector
(D) Adjusting nut B
(E) Contact point
(F) Adjusting nut A

6) Set a spanner wrench to adjusting nut B so that it does not rotate, and then tighten the adjusting nut A.

Tightening torque:
7.5 N·m (0.76 kgf-m, 5.5 ft-lb)



(A) Adjusting nut A
(B) Adjusting nut B

7) After the completion of adjustment, confirm that the select lever operates normally at all ranges.
8) Install in the reverse order of removal.

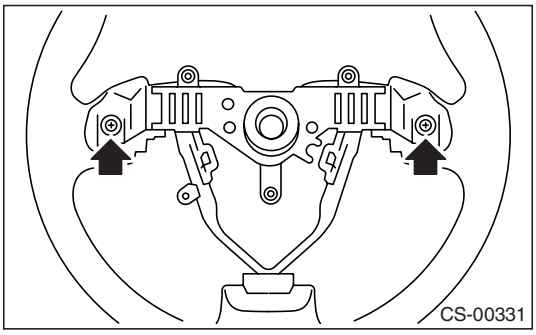
5. AT Steering Shift Switch

A: REMOVAL

1) Disconnect the ground cable from battery.
2) Set the tire to the straight-ahead position.
3) Remove the airbag module. <Ref. to AB-16, REMOVAL, Driver's Airbag Module.>

WARNING:
With the airbag module equipped, always refer to "Airbag System" when performing the airbag module repair service. <Ref. to AB-16, INSPECTION, Driver's Airbag Module.>

4) Remove the steering wheel. <Ref. to PS-21, REMOVAL, Steering Wheel.>
5) Remove the cover from steering wheel.
6) Remove each one of AT steering shift switch mounting screw from the LH and RH side.

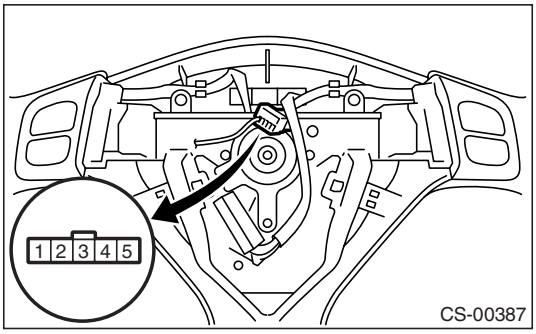


7) Remove the steering shift switch.

B: INSTALLATION

1) Clean all parts before installation.
2) Install in the reverse order of removal.
3) After completion of installation, set the select lever to SPORT shift side and confirm that manual mode "1" illuminates on the combination meter.
4) Operate the steering shift switch and confirm that the "2" illuminates on combination meter.

C: INSPECTION



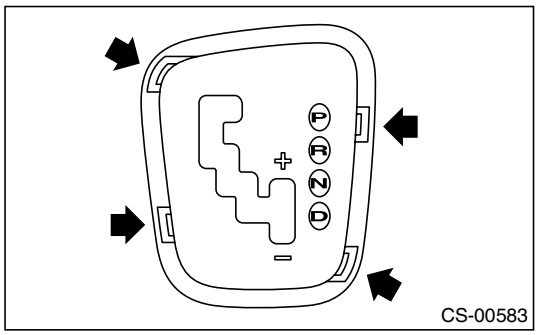
Step		Check	Yes	No
1	**SHIFT-UP SWITCH CONTINUITY CHECK.** 1) Press the shift-up switch. 2) Measure the resistance between shift switch connector terminals. ***Terminal*** ***No. 4 — No. 3:***	Is the resistance less than 10 Ω?	Go to step **2.**	Replace the steering shift switch.
2	**SHIFT-DOWN SWITCH CONTINUITY CHECK.** 1) Press the shift-down switch. 2) Measure the resistance between shift switch connector terminals. ***Terminal*** ***No. 3 — No. 2:***	Is the resistance less than 10 Ω?	Go to step **3.**	Replace the steering shift switch.
3	**CHECK SHIFT SWITCH INSULATION.** 1) Not to operate the shift switch. 2) Measure the resistance between shift switch connector terminals. ***Terminal*** ***No. 3 — No. 2:*** ***No. 3 — No. 4:***	Is the resistance more than 1 MΩ?	Steering shift switch is normal.	Replace the steering shift switch.

6. Shift Lock Solenoid

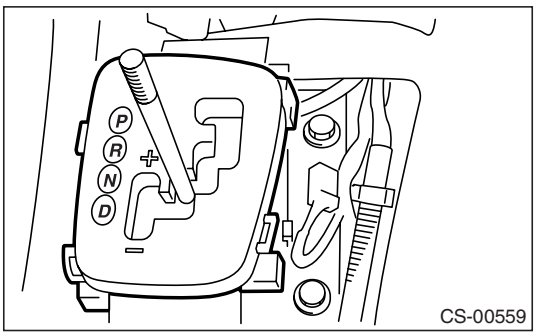
A: REMOVAL

1) Remove the console box. <Ref. to EI-53, REMOVAL, Console Box.>
2) Remove the ring indicator.
Insert the tip of a flap tip screwdriver into the gap between ring indicator and console front panel, and lift up gradually.

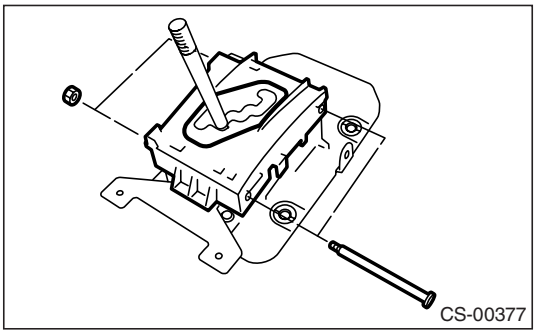
NOTE:
• Wrap the tip of a flat tip screwdriver with cloth.
• Insert the tip of a flat tip screwdriver into four pawls, and remove the ring indicator equally and gradually.



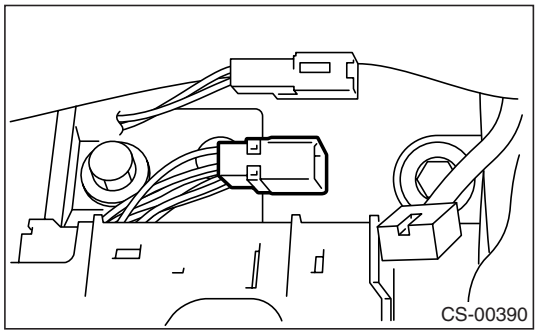
3) Remove the console front panel.
4) Remove the connector.
5) Press the shift lock release button, and shift the select lever to “N” range.
6) Remove the grip.
7) Remove the indicator cover.



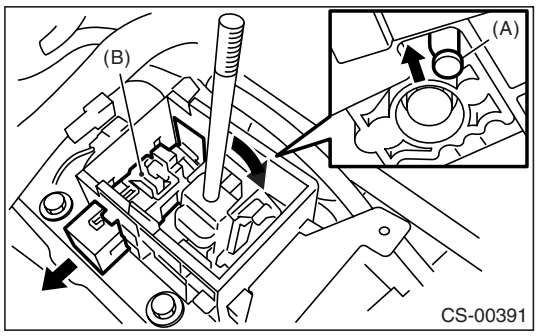
8) Remove the blind.
9) Remove the bolts, and then remove the guide plate.



10) Remove the connector from the plate assembly using a flat-tip screwdriver.

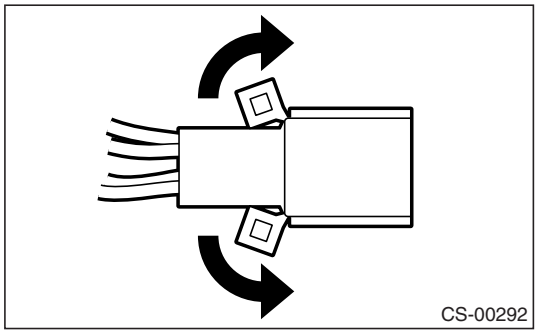


11) Press the select lever backward while lifting up the detent spring, and remove the shift lock solenoid unit.

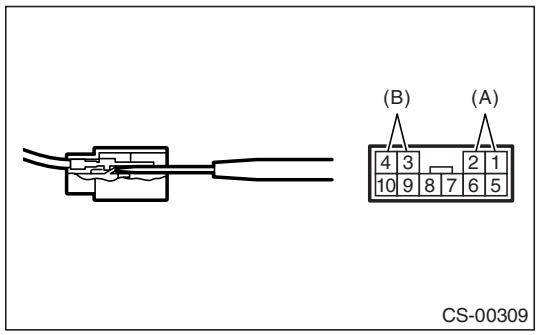


(A) Detent spring
(B) Shift lock solenoid unit

12) Raise the pawl of connector.



13) Disconnect the terminal of shift lock solenoid unit from connector, using a flat-tip screwdriver with thin tip.



(A) "P" range switch terminal
(B) Shift lock solenoid terminal

B: INSTALLATION

Install in the reverse order of removal.

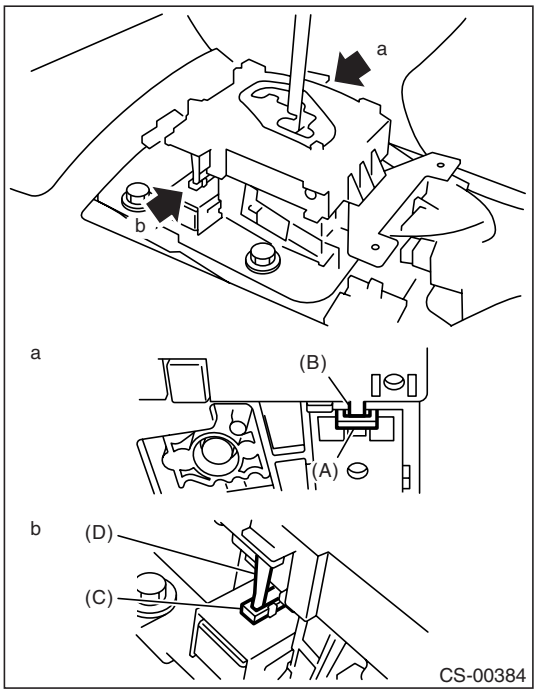
NOTE:

• Refer to "COMPONENT" for each tightening torque. <Ref. to CS-3, COMPONENT, General Description.>

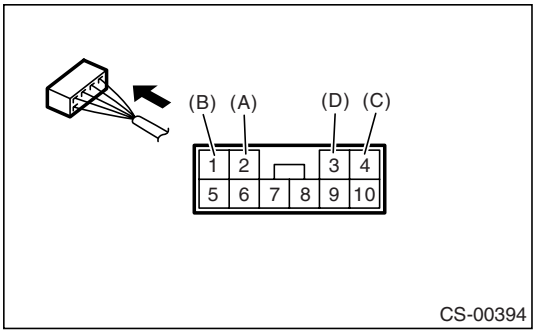
• When installing the guide plate, shift the select lever to "D" range (normal mode position), care should be taken in the following points.

(1) Insert the protrusion (B) of guide plate into the hole of shift lock solenoid unit (A).

(2) Insert the link (D) of shift lock release into the link (C) of shift lock solenoid unit.



• Connect the switch and solenoid terminal to connector.



(A) "P" range switch (Color code: Red)
(B) "P" range switch (Color code: Red)
(C) Shift lock solenoid (Color code: Black)
(D) Shift lock solenoid (Color code: Blue and Red)

C: INSPECTION

	Step	Check	Yes	No
1	**CHECK SHIFT LOCK SOLENOID.** Measure the resistance of shift lock solenoid connector terminals. ***Terminal*** ***No. 4 — No. 3:***	Is the resistance 12 — 18 Ω	Go to step **2.**	Replace the shift lock solenoid.
2	**CHECK SHIFT LOCK SOLENOID.** Connect the battery to shift lock solenoid connector terminal, and then operate the solenoid. ***Terminal*** ***No. 3 (+) — No. 4 (–):***	Does the shift lock solenoid operate normally?	Go to step **3.**	Replace the shift lock solenoid.
3	**CHECK "P" RANGE SWITCH.** 1) Set the select lever to "P" range. 2) Measure the resistance between "P" range switch connector terminals. ***Terminal*** ***No. 1 — No. 2:***	Is the resistance less than 1 Ω?	Go to step **4.**	Replace the "P" range switch.
4	**CHECK "P" RANGE SWITCH.** 1) Set the select lever to other than "P" range. 2) Measure the resistance between "P" range switch connector terminals. ***Terminal*** ***No. 1 — No. 2:***	Is the resistance more than 1 MΩ?	Normal	Replace the "P" range switch.

7. Body Integrated Module

A: NOTE

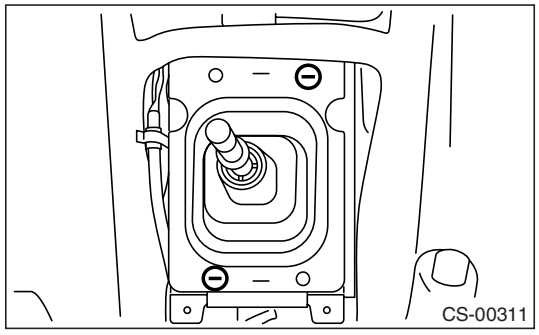
Refer to “Body Integrated Module” for removal and installation procedure. <Ref. to SL-44, Body Integrated Module.>

8. MT Gear Shift Lever

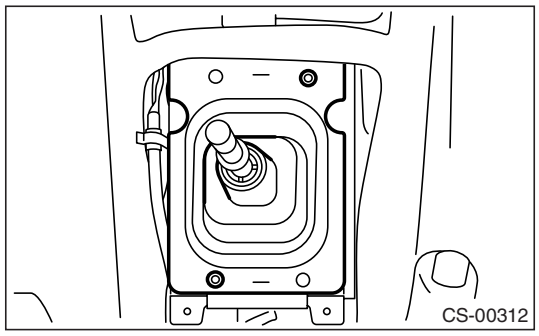
A: REMOVAL

1. 5MT MODEL

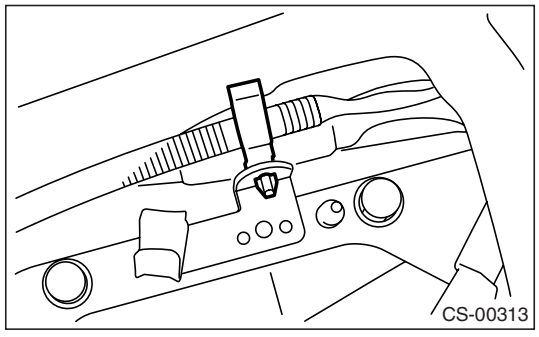
1) Set the vehicle on a lift.
2) Disconnect the ground cable from battery.
3) Remove the gear shift knob.
4) Remove the console box. <Ref. to EI-53, REMOVAL, Console Box.>
5) Remove the front cover assembly.
6) Remove the clamp.



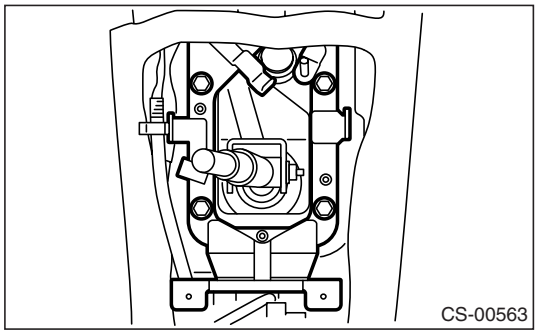
7) Remove the boot and insulator assembly.



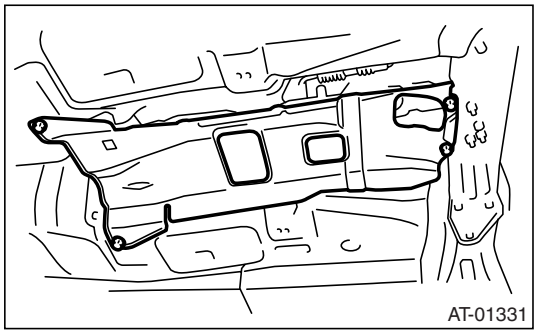
8) Remove the harness clamp from plate.



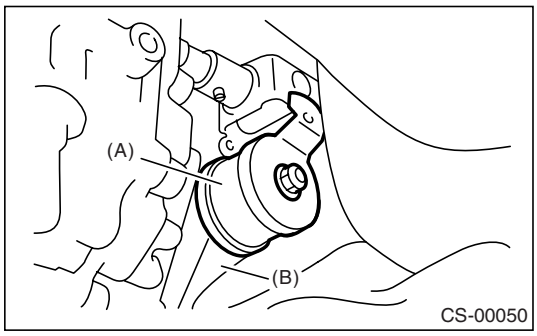
9) Remove the plate assembly from vehicle body.



10) Lift-up the vehicle.
11) Remove the rear exhaust pipe and muffler.
• SOHC model
<Ref. to EX(H4SO 2.0)-10, REMOVAL, Rear Exhaust Pipe.> <Ref. to EX(H4SO 2.0)-12, REMOVAL, Muffler.>
• DOHC non-turbo model
<Ref. to EX(H6DO)-7, REMOVAL, Rear Exhaust Pipe.> <Ref. to EX(H6DO)-9, REMOVAL, Muffler.>
• DOHC turbo model
<Ref. to EX(H4DOTC)-11, REMOVAL, Rear Exhaust Pipe.> <Ref. to EX(H4DOTC)-10, REMOVAL, Joint Pipe.>
12) Remove the heat shield cover.

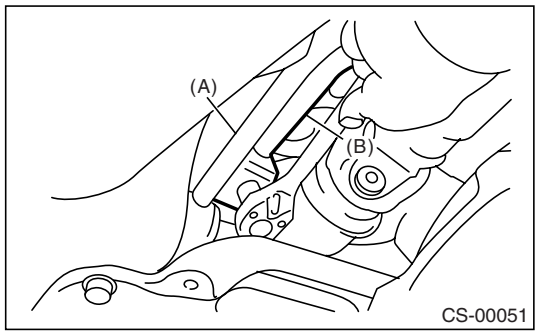


13) Remove the stay from transmission bracket.



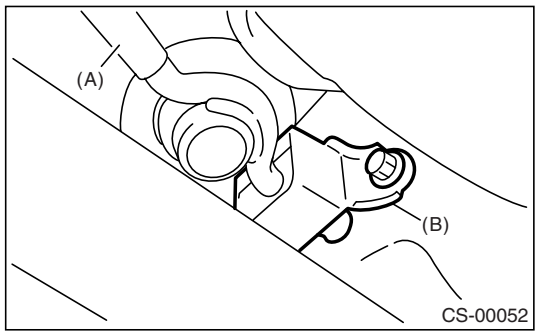
(A) Stay
(B) Transmission bracket

14) Remove the rod from joint.



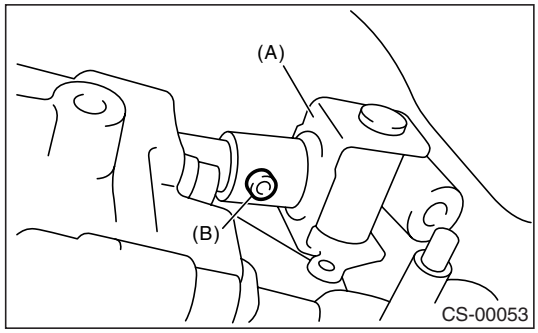
(A) Stay
(B) Rod

15) Remove the cushion rubber from vehicle body.



(A) Stay
(B) Cushion rubber

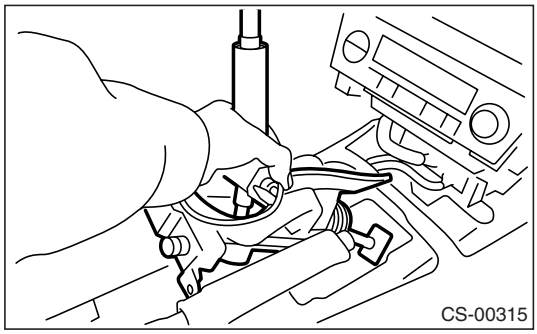
16) Extract the spring pin and remove the joint.



(A) Joint
(B) Spring pin

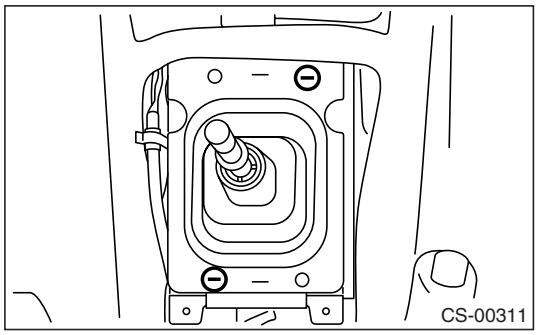
17) Lower the vehicle.

18) Remove the gear shift lever.

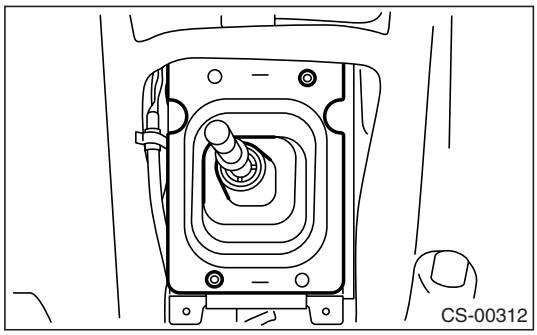


2. 6MT MODEL

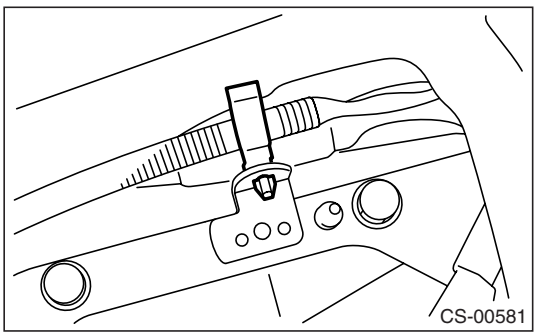
1) Lift-up the vehicle.
2) Disconnect the ground cable from battery.
3) Remove the gear shift knob.
4) Remove the console box front. <Ref. to EI-53, REMOVAL, Console Box.>
5) Remove the front cover assembly.
6) Remove the clamp.



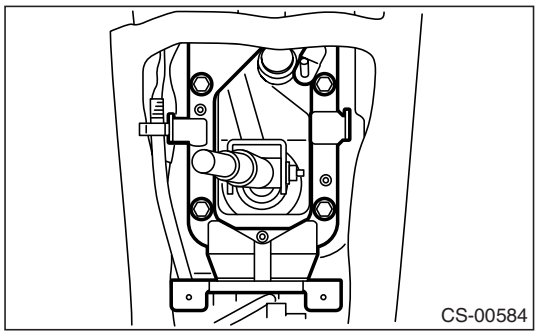
7) Remove the boot and insulator assembly.



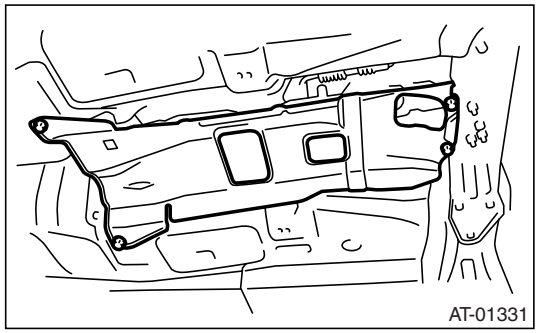
8) Remove the harness clamp from plate.



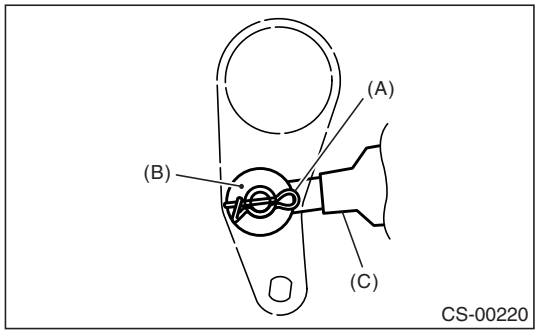
9) Remove the plate assembly from vehicle body.



10) Lift-up the vehicle.
11) Remove the under cover.
12) Remove the rear exhaust pipe and muffler. <Ref. to EX(H6DO)-7, REMOVAL, Rear Exhaust Pipe.> <Ref. to EX(H6DO)-9, REMOVAL, Muffler.>
13) Remove the heat shield cover.



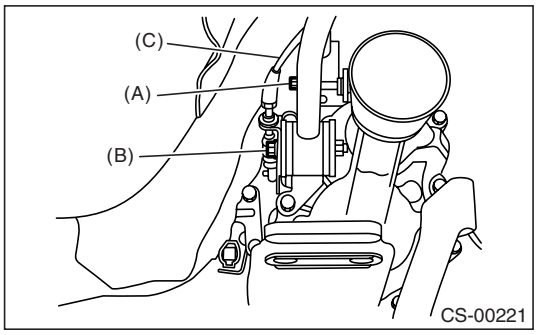
14) Remove the crossmember. <Ref. to 6MT-32, REMOVAL, Transmission Mounting System.>
15) Remove the snap pin and washer, and then remove the reverse check cable from reverse check lever.



(A) Snap pin
(B) Washer
(C) Reverse check cable

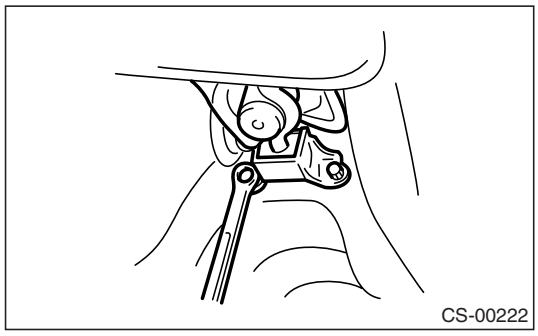
16) Move the transmission to the right side, then remove the joint COMPL, stay bolt and reverse check cable.

NOTE:
If the transmission is not moved, joint COMPL and stay bolt may contact the body. It will cause damage.



(A) Joint COMPL bolt
(B) Stay bolt
(C) Reverse check cable

17) Remove the cushion rubber from body.



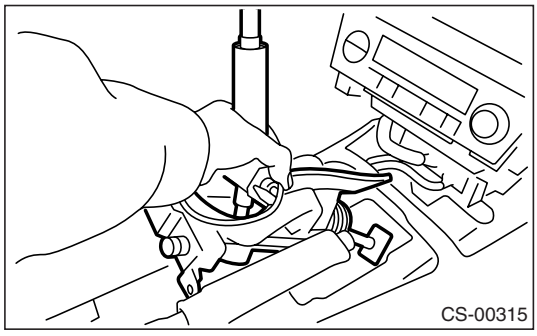
18) Lower the vehicle.
19) Remove the gear shift lever.

B: INSTALLATION

1. 5MT MODEL

1) Install the joint to transmission and secure with spring pin.
2) Insert the gear shift lever from the room side.

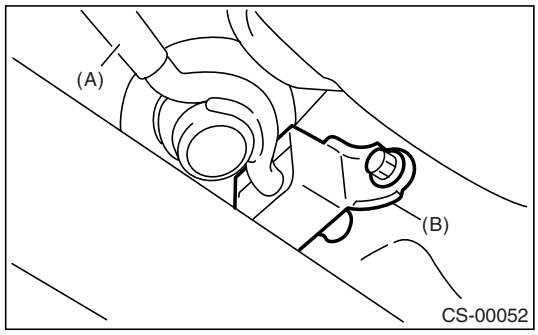
NOTE:
Insert the rod and the stay, and then temporarily set them onto transmission mounting.



3) Lift-up the vehicle.

4) Mount the cushion rubber on the vehicle body.

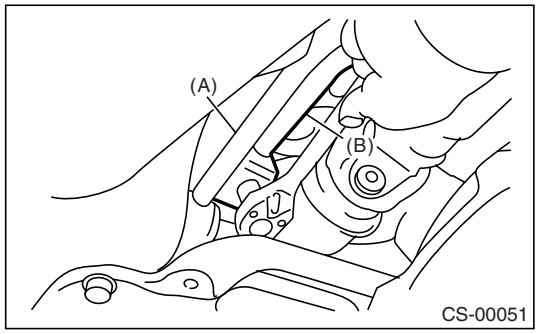
Tightening torque:
18 N·m (1.8 kgf-m, 13.3 ft-lb)



(A) Stay
(B) Cushion rubber

5) Using new self-locking nuts, connect the rod to the joint.

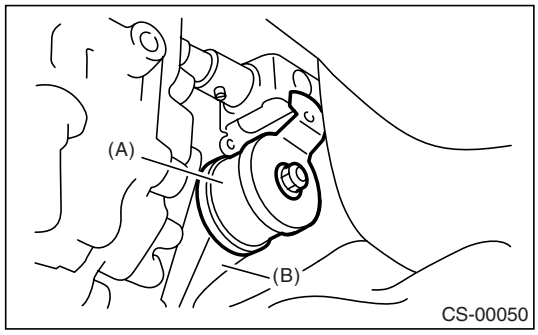
Tightening torque:
18 N·m (1.8 kgf-m, 13.3 ft-lb)



(A) Stay
(B) Rod

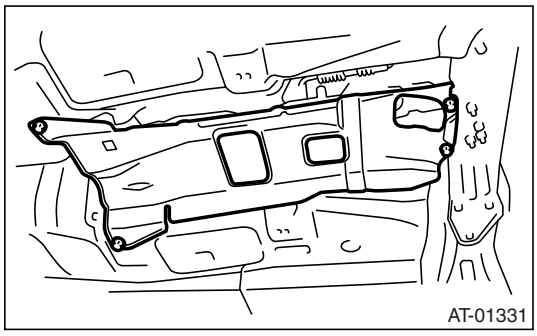
6) Using new self-locking nuts, connect the stay to transmission bracket.

Tightening torque:
18 N·m (1.8 kgf-m, 13.3 ft-lb)



(A) Stay
(B) Transmission bracket

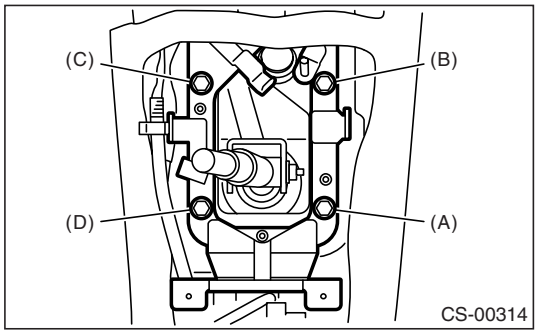
7) Install the heat shield cover.



8) Install the rear exhaust pipe and muffler.
• SOHC model
<Ref. to EX(H4SO 2.0)-10, INSTALLATION, Rear Exhaust Pipe.> <Ref. to EX(H4SO 2.0)-12, INSTALLATION, Muffler.>
• DOHC non-turbo model
<Ref. to EX(H6DO)-7, INSTALLATION, Rear Exhaust Pipe.> <Ref. to EX(H6DO)-9, INSTALLATION, Muffler.>
• DOHC turbo model
<Ref. to EX(H4DOTC)-11, INSTALLATION, Rear Exhaust Pipe.> <Ref. to EX(H4DOTC)-12, INSTALLATION, Muffler.>
9) Install the plate assembly to body.

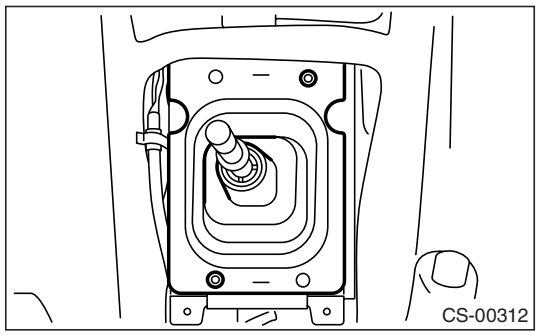
Tightening torque:
18 N·m (1.8 kgf-m, 13.3 ft-lb)

(1) Set the plate assembly to vehicle.
(2) Temporarily tighten the bolt (A).
(3) Tighten the bolt (B).
(4) Tighten the bolt (A).
(5) Tighten the bolts (C) and (D).



10) Install the harness clamp to plate.

11) Install the boot and the insulator assembly, and secure them with clamp.



12) Install the front cover assembly.
13) Install the console box. <Ref. to EI-53, INSTALLATION, Console Box.>

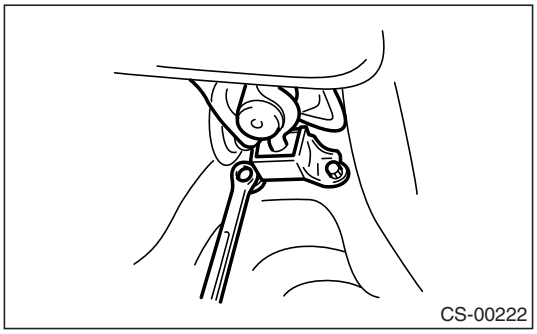
2. 6MT MODEL

1) Insert the gear shift lever from the room side.

NOTE:
Insert the rod and the stay, and then position them onto transmission mounting.

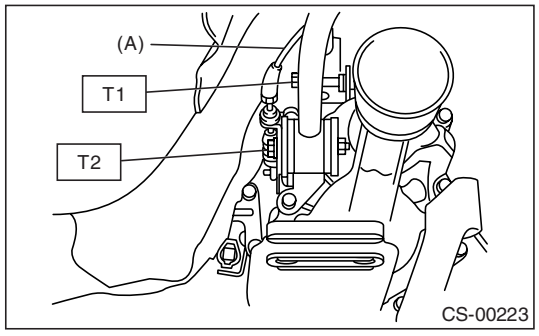
2) Mount the cushion rubber on the body.

Tightening torque:
18 N·m (1.8 kgf-m, 13.3 ft-lb)



3) Move the transmission to the right side, then install the joint COMPL and stay.

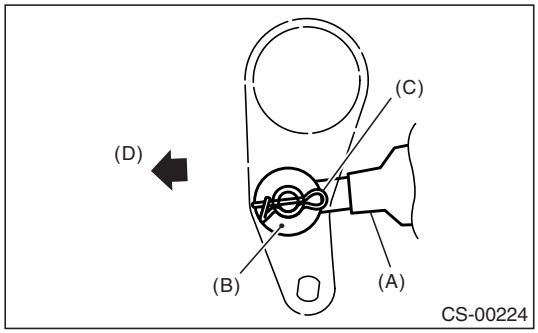
Tightening torque:
T1: 12 N·m (1.2 kgf-m, 8.9 ft-lb)
T2: 32 N·m (3.3 kgf-m, 23.6 ft-lb)



(A) Reverse check cable

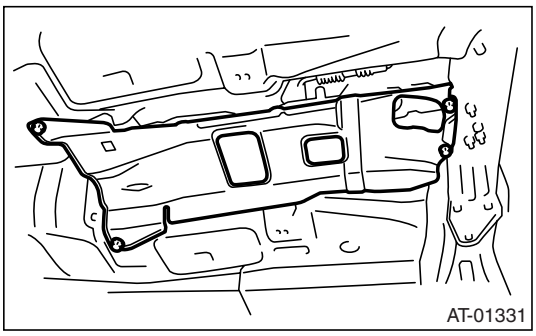
4) Install the crossmember. <Ref. to 6MT-32, INSTALLATION, Transmission Mounting System.>
5) Install the reverse check cable end, washer and snap pin to reverse check lever.

NOTE:
• Take care to install the snap pin in proper direction.
• Perform adjustment of reverse check cable before installation. <Ref. to CS-54, ADJUSTMENT, Reverse Check Cable.>



(A) Reverse check cable
(B) Washer
(C) Snap pin
(D) Front side

6) Install the heat shield cover.

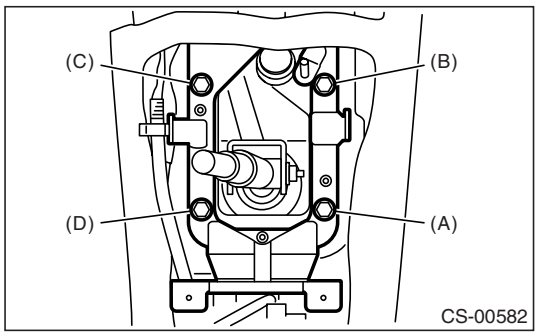


7) Install the rear exhaust pipe and muffler. <Ref. to EX(H6DO)-7, INSTALLATION, Rear Exhaust Pipe.> <Ref. to EX(H6DO)-9, INSTALLATION, Muffler.>
8) Install the under cover.
9) Install the plate assembly to body.

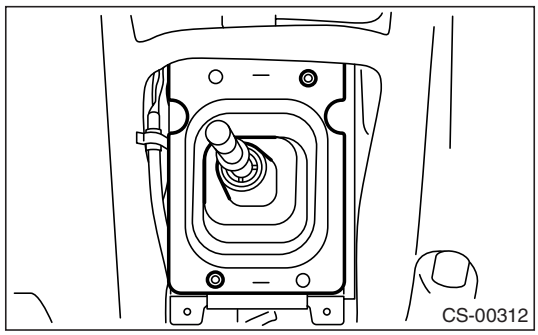
Tightening torque:
18 N·m (1.8 kgf-m, 13.3 ft-lb)

(1) Set the plate assembly to vehicle.
(2) Temporarily tighten the bolt (A).
(3) Tighten the bolt (B).
(4) Tighten the bolt (A).

(5) Tighten the bolts (C) and (D).



10) Install the harness clamp to plate.
11) Install the boot and the insulator assembly, and secure them with clamp.

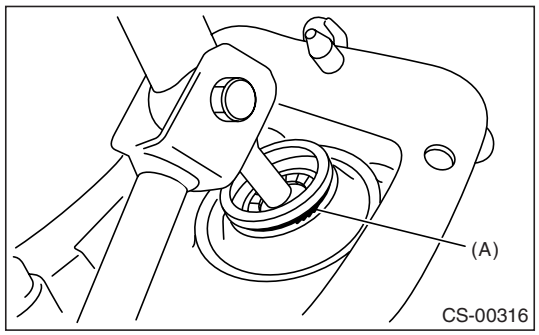


12) Install the front cover assembly.
13) Install the console box. <Ref. to EI-53, INSTALLATION, Console Box.>
14) Confirm that gear shift can be shift to each gear properly.

C: DISASSEMBLY

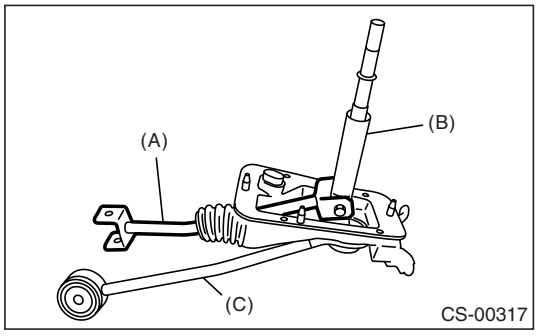
1. 5MT MODEL

1) Remove the lock wires.



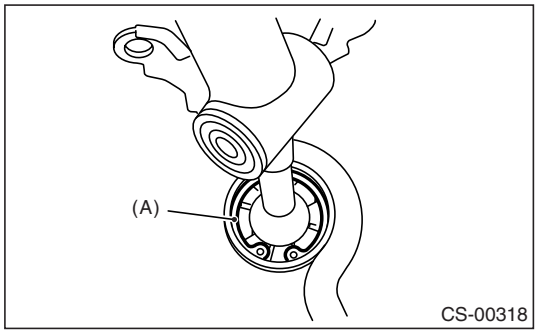
(A) Lock wire

2) Remove the rod from lever.



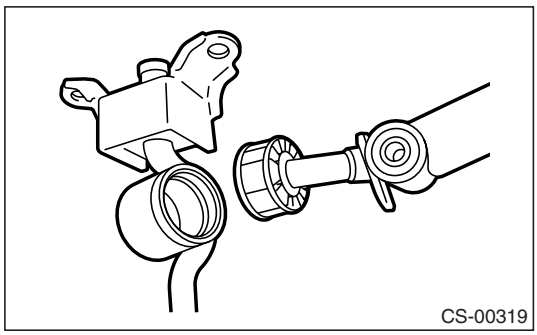
(A) Rod
(B) Lever
(C) Stay

3) Separate the rod and inner boot.
4) Remove the snap ring from the stay.

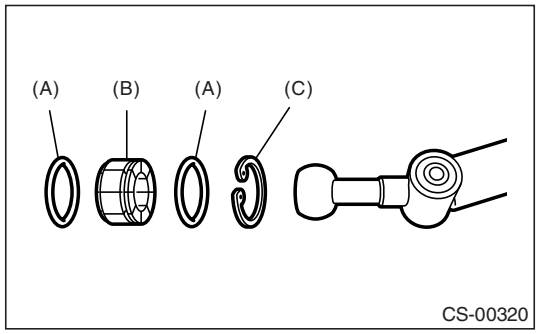


(A) Snap ring

5) Separate the gear shift lever and the stay.

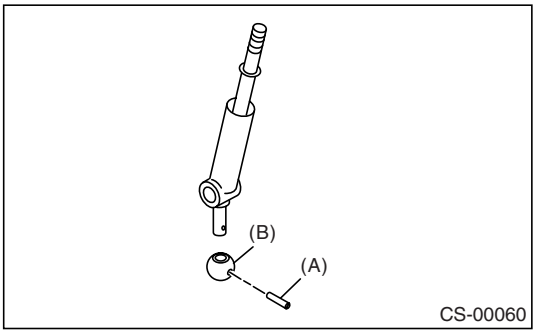


6) Remove the boot, bushing and snap ring from gear shift lever.



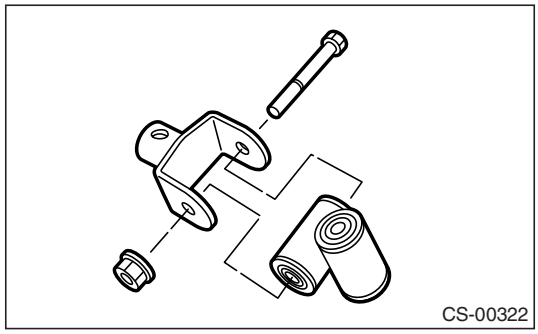
(A) O-ring
(B) Bushing
(C) Snap ring

7) Remove the spring pin, and then remove the bushing and snap ring.

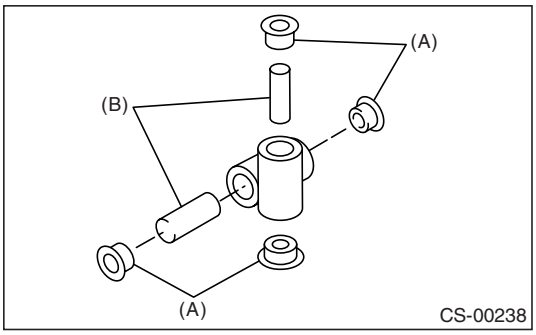


(A) Spring pin
(B) Bushing

8) Remove the boss from the joint.

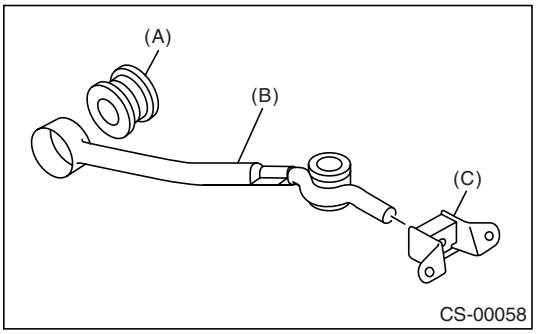


9) Remove the bushing and spacer from boss.



(A) Bushing
(B) Spacer

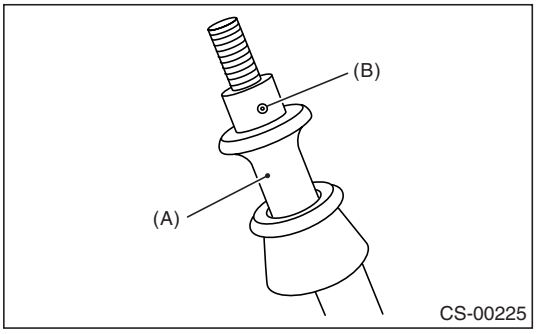
10) Remove the bushing and cushion rubber from the stay.



(A) Bushing B
(B) Stay
(C) Cushion rubber

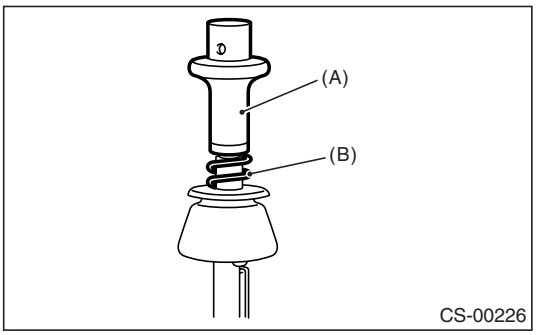
2. 6MT MODEL

1) Remove the spring pin from the slider.



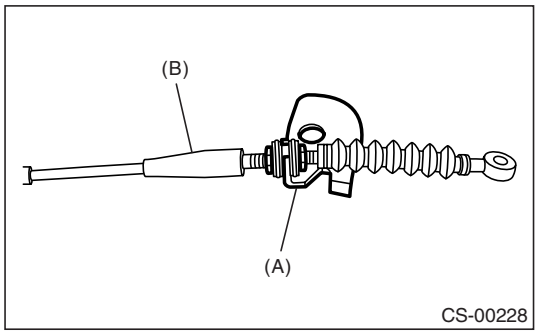
(A) Slider
(B) Spring pin

2) Remove the slider and spring.



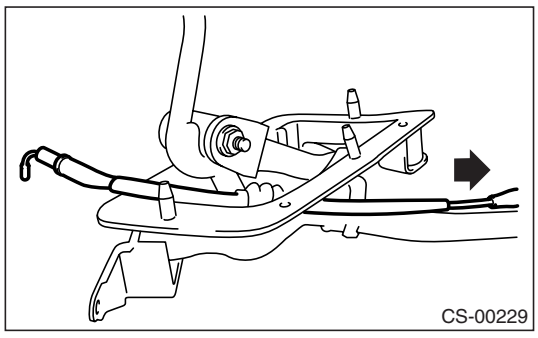
(A) Slider
(B) Spring

3) Cut off the band clip
4) Remove the reverse check cable from cable plate.

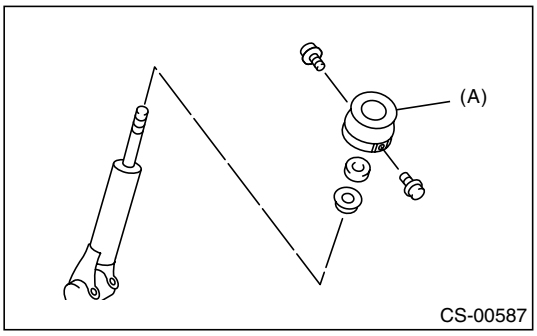


(A) Cable plate
(B) Reverse check cable

5) Remove the reverse check cable from gear shift assembly.



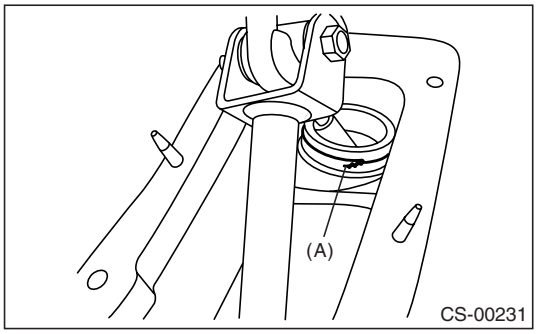
6) Remove the holder and spring.



(A) Holder

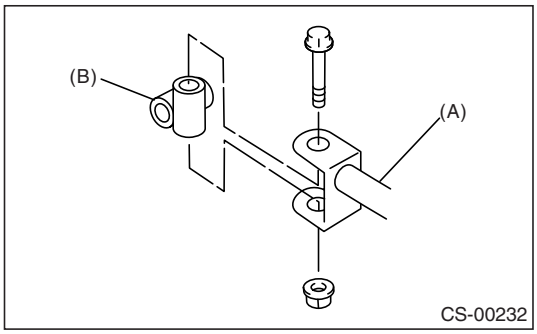
7) Disassemble the lock wires.

NOTE:
Do not reuse the lock wires.



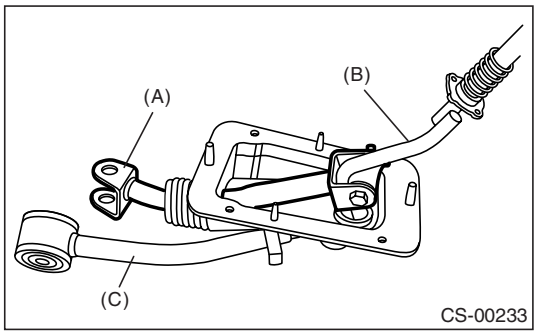
(A) Lock wire

8) Remove the boss from the rod.



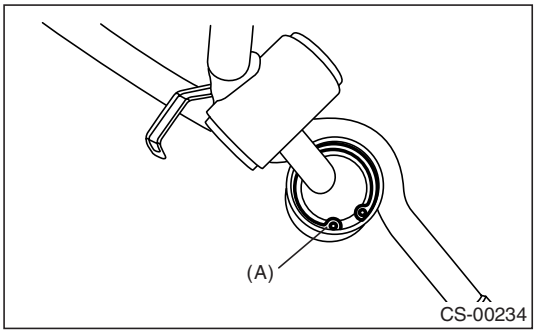
(A) Rod
(B) Boss

9) Remove the rod from lever.



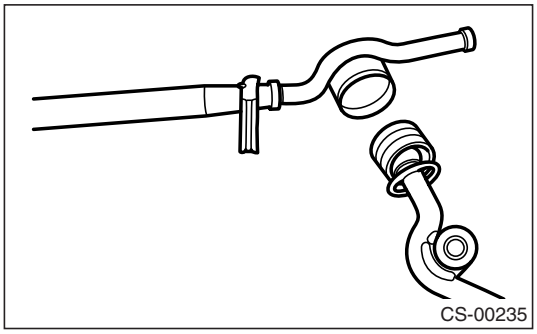
(A) Rod
(B) Lever
(C) Stay

10) Separate the rod and inner boot.
11) Remove the snap ring from the stay.

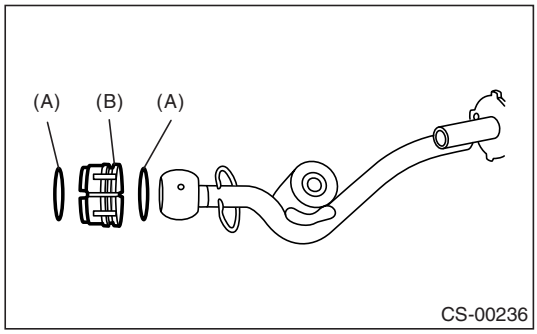


(A) Snap ring

12) Separate the gear shift lever and the stay.

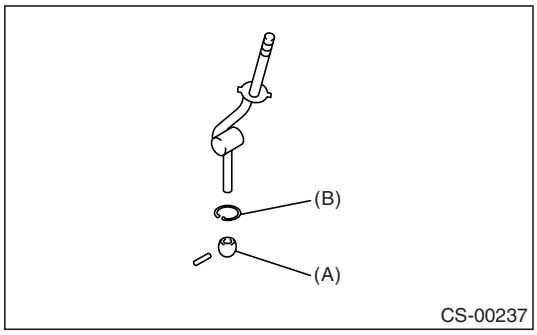


13) Remove the boot and bushing from gear shift lever.



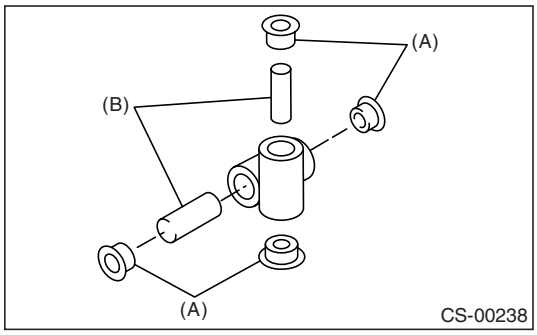
(A) O-ring
(B) Bushing

14) Remove the spring pin, the bushing and the snap ring.



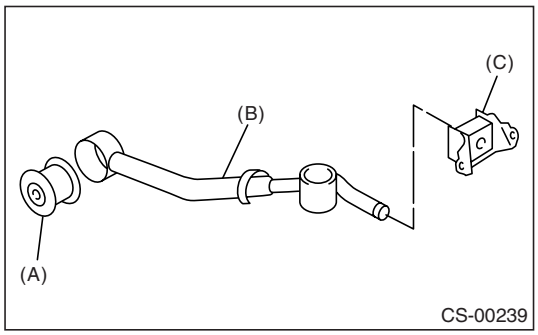
(A) Bushing
(B) Snap ring

15) Remove the bushing and spacer from boss.



(A) Bushing
(B) Spacer

16) Remove the bushing and cushion rubber from the stay.



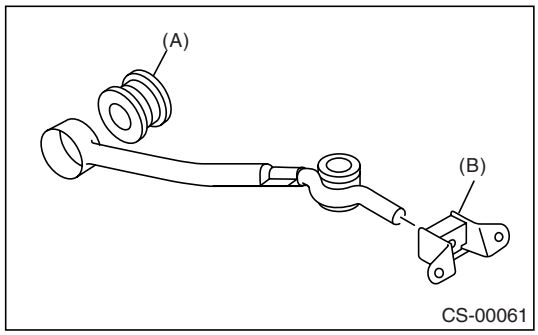
(A) Bushing
(B) Stay
(C) Cushion rubber

D: ASSEMBLY

1. 5MT MODEL

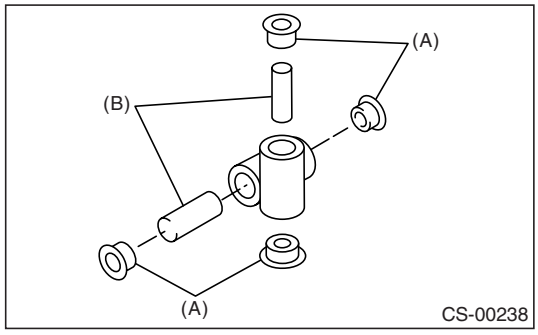
NOTE:
• Clean all the parts before assembly.
• Apply grease [KOPR-KOTE (Part No. 003603001) or equivalent] to each part.

1) Mount the bushing and cushion rubber on the stay.



(A) Bushing
(B) Cushion rubber

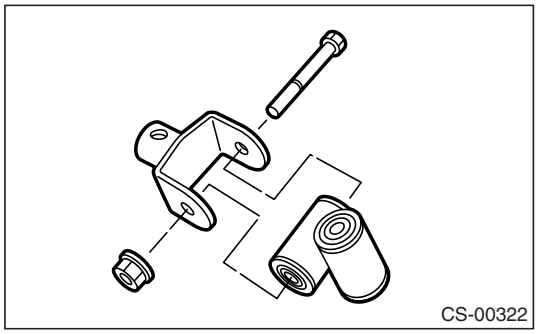
2) Install the bushing and spacer to boss.



(A) Bushing
(B) Spacer

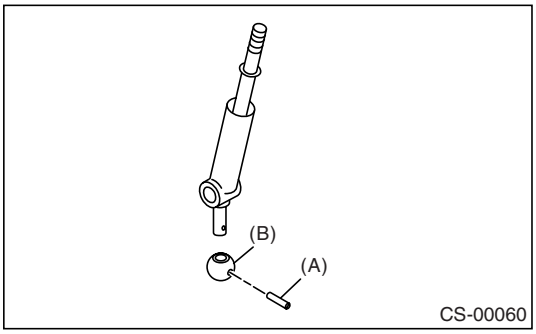
3) Using new self-locking nuts, install the boss to the joint.

Tightening torque:
18 N·m (1.8 kgf-m, 13.3 ft-lb)



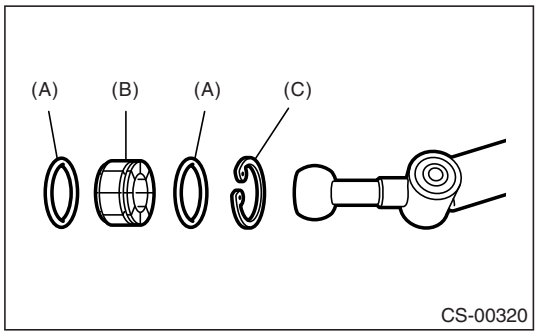
4) Install the snap ring to gear shift lever and install the bushing.

NOTE:
Apply grease to the bushing.



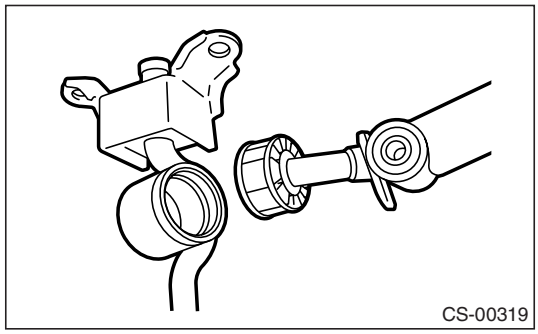
(A) Spring pin
(B) Bushing

5) Apply grease to the bushing and O-ring, and then install to the gear shift lever.

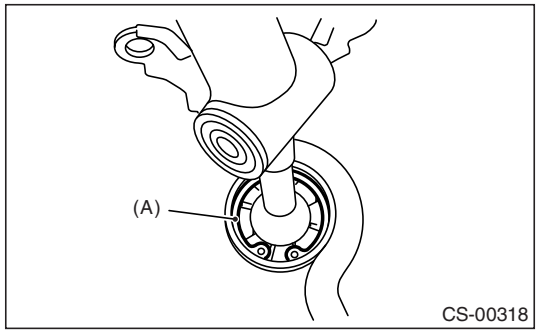


(A) O-ring
(B) Bushing
(C) Snap ring

6) Apply sufficient grease into boss, and then install the gear shift lever to the stay.



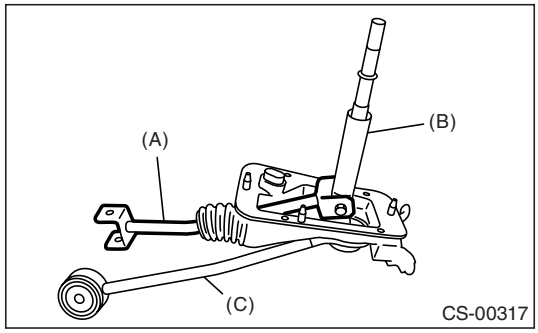
7) Install the washer and snap ring.



(A) Snap ring

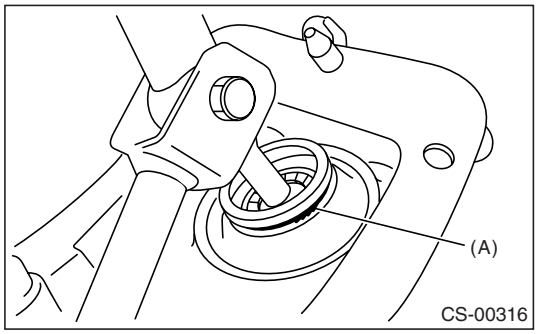
8) Insert the gear shift lever and rod into boot hole.
9) Install the rod.

Tightening torque:
12 N·m (1.2 kgf-m, 8.9 ft-lb)



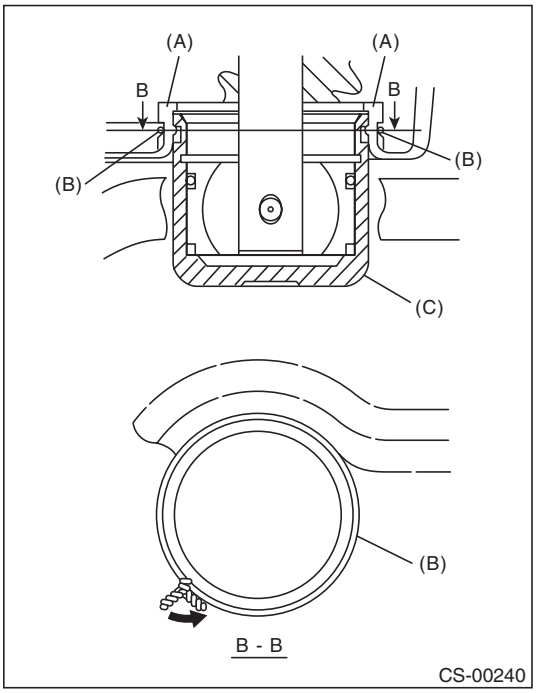
(A) Rod
(B) Lever
(C) Stay

10) Install a new lock wire.



(A) Lock wire

NOTE:
• Install the lock wire to the stay groove.
• Bend the extra wire to same direction of lock wire winding.

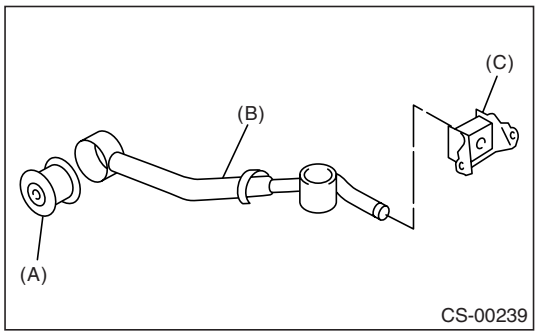


(A) Inner boot
(B) Lock wire
(C) Stay

2. 6MT MODEL

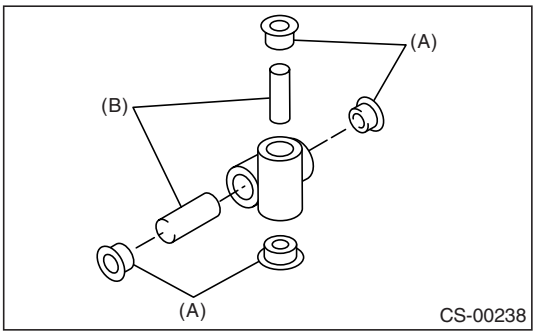
NOTE:
• Clean all the parts before assembly.
• Apply NIGTIGHT LYW No. 2 grease or equivalent to each parts.

1) Mount the bushing and cushion rubber on the stay.



(A) Bushing
(B) Stay
(C) Cushion rubber

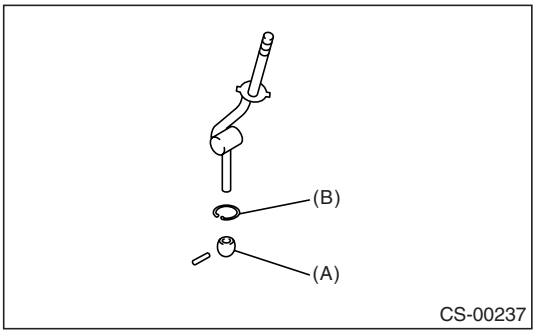
2) Install the bushing and spacer to boss.



(A) Bushing
(B) Spacer

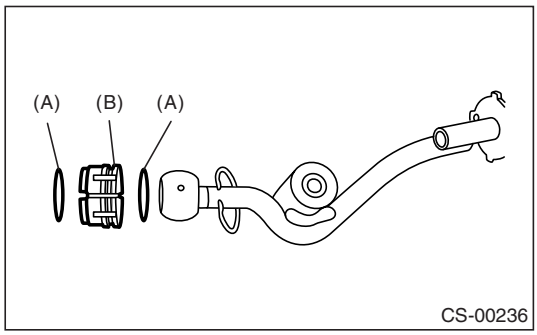
3) Install the snap ring to gear shift lever and install the bushing.

NOTE:
Apply grease to the bushing.



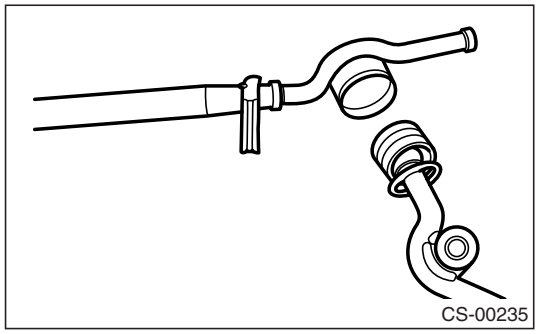
(A) Bushing
(B) Snap ring

4) Apply grease to the bushing and O-ring, and then install to the gear shift lever.

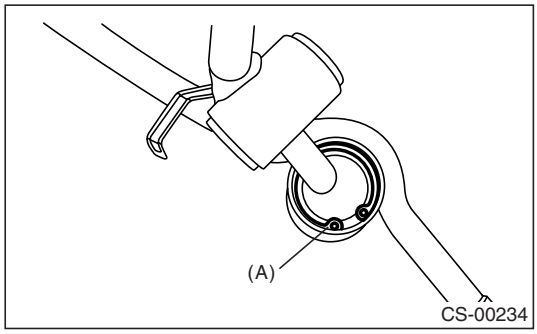


(A) O-ring
(B) Bushing

5) Apply sufficient grease into boss, and then install the gear shift lever to the stay.



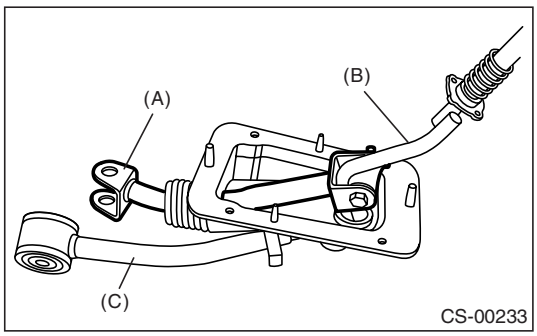
6) Install the washer and snap ring.



(A) Snap ring

7) Insert the gear shift lever and rod into boot hole.
8) Install the rod.

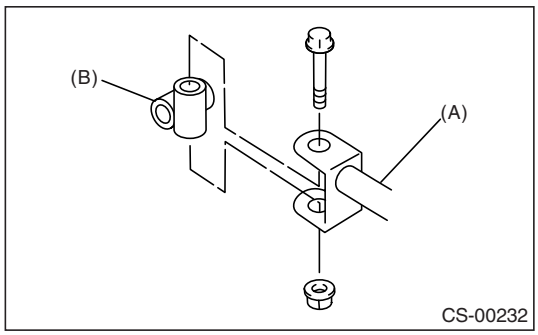
Tightening torque:
12 N·m (1.2 kgf-m, 8.9 ft-lb)



(A) Rod
(B) Lever
(C) Stay

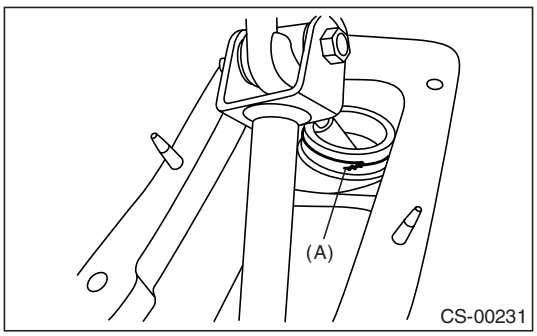
9) Install the boss to the rod.

Tightening torque:
12 N·m (1.2 kgf-m, 8.9 ft-lb)



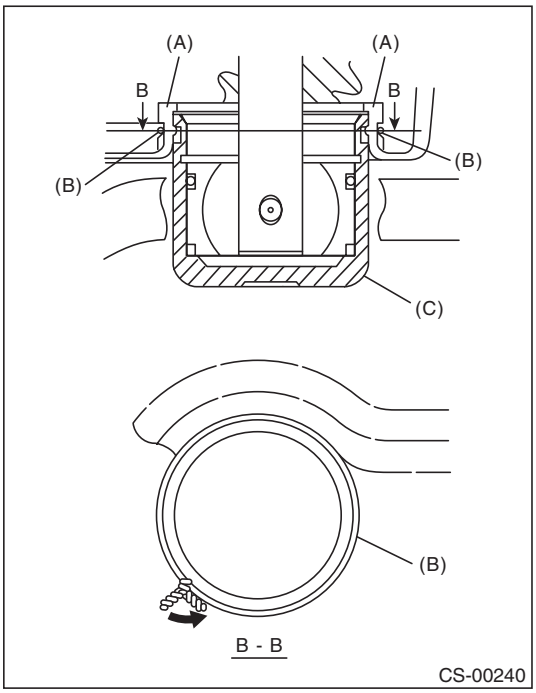
(A) Rod
(B) Boss

10) Install a new lock wire.



(A) Lock wire

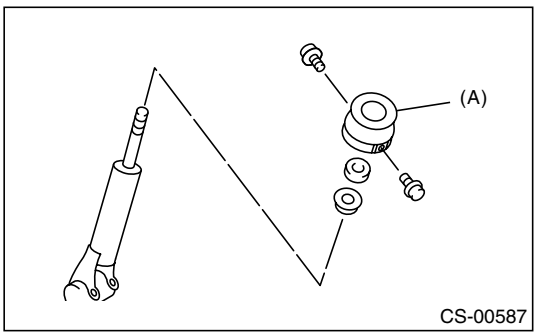
NOTE:
• Install the lock wire to the stay groove.
• Bend the extra wire to same direction of lock wire winding.



(A) Inner boot
(B) Lock wire
(C) Stay

11) Install the holder.

Tightening torque:
1.3 N·m (0.13 kgf-m, 0.96 ft-lb)

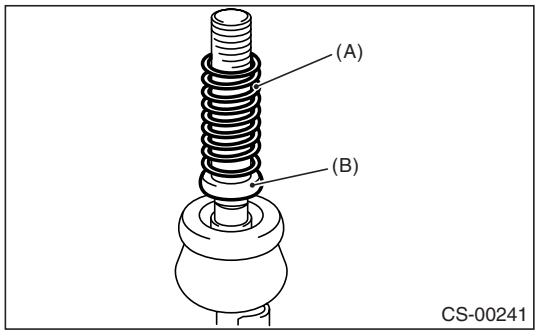


(A) Holder

12) Insert the reverse check cable into boot hole.
13) Insert the reverse check cable into gear shift assembly, and secure it with band clip.

NOTE:
• Cut off the extra band clip
• Make sure that the reverse check cable is inserted into gear shift lever assembly witout any clearance.

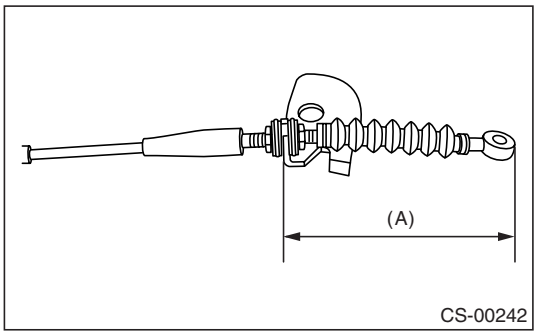
14) Install the seat cushion and spring.



(A) Spring
(B) Seat cushion

15) Adjust the length between end of cable plate and reverse check cable to 84 mm (3.31 in), and then tighten the lock nut.

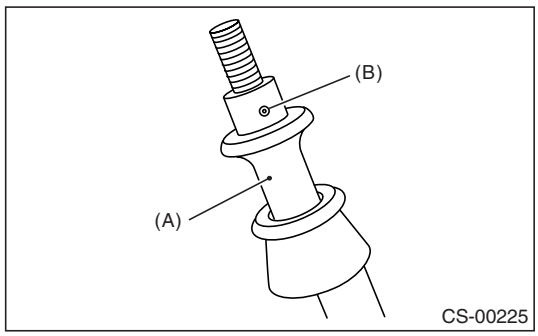
Tightening torque:
6 N·m (0.6 kgf-m, 4.4 ft-lb)



(A) 84 mm (3.31 in)

16) Using spring pin, fix the slider and reverse check cable end.

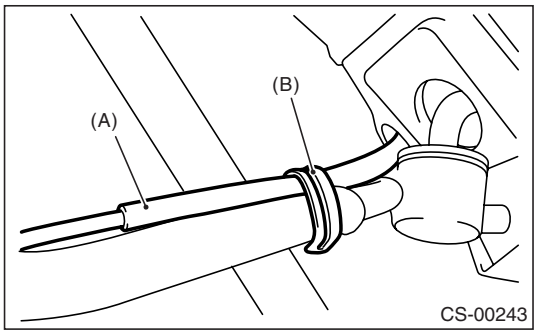
NOTE:
Apply grease to sliding area of the slider.



(A) Slider
(B) Spring pin

17) Secure the reverse check cable to clip of stay.

NOTE:
Install the reverse check cable to upper side of stay.

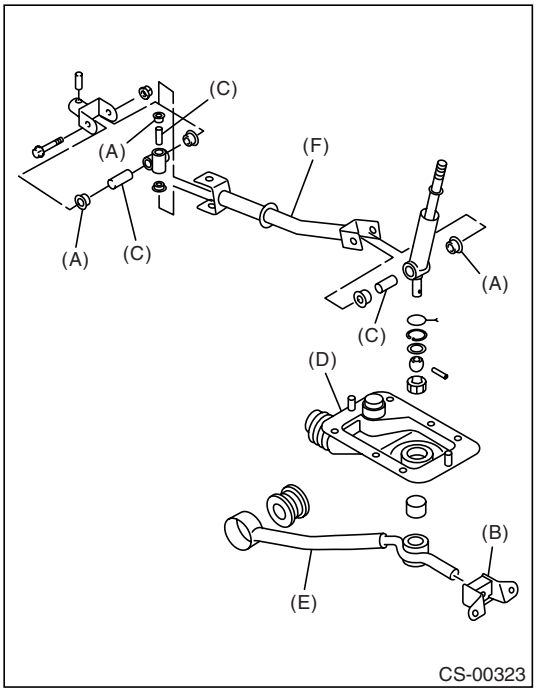


(A) Reverse check cable
(B) Clip

E: INSPECTION

1. 5MT MODEL

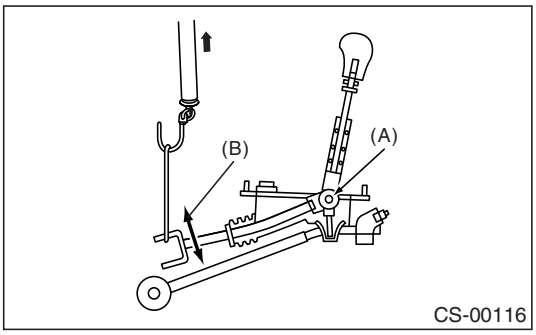
1) Check the parts (bushing, cushion rubber, spacer, boot, stay and rod, etc.) for deformation, damage and wear. If necessary, repair or replace faulty parts. Compare the removed parts with new ones to judge if there are damages or not.



(A) Bushing
(B) Cushion rubber
(C) Spacer
(D) Boot
(E) Stay
(F) Rod

2) Check the swing torque of rod linked with the gear shift lever.
If the torque exceeds the specifications, replace the bushing or check the tightening of nuts.

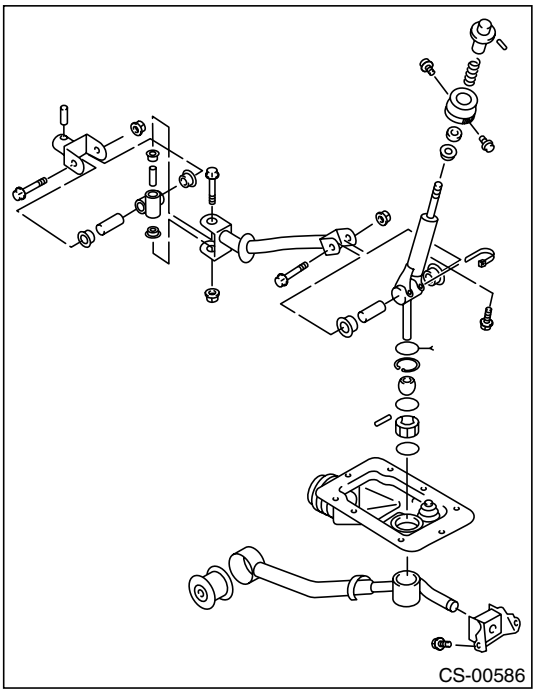
Swing torque:
Less than 3.7 N (0.38 kgf, 0.83 lbf)



(A) Pivot
(B) Swing torque

2. 6MT MODEL

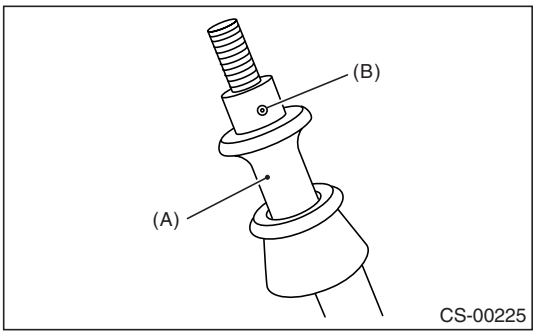
Check the parts (bushing, cushion rubber, spacer, boot, stay and rod, etc.) for deformation, damage and wear. If necessary, repair or replace faulty parts. Compare the removed parts with new ones to judge if there are damages or not.



9. Reverse Check Cable

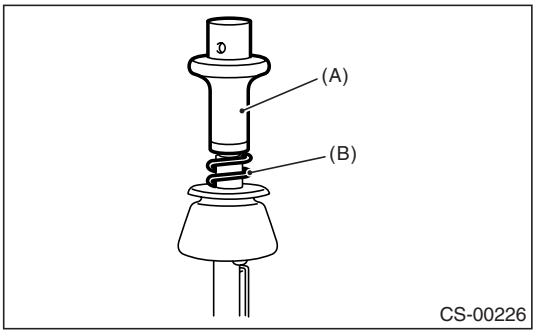
A: REMOVAL

1) Set the vehicle on a lift.
2) Remove the gear shift knob.
3) Remove the console box front. <Ref. to EI-53, REMOVAL, Console Box.>
4) Remove the front cover assembly.
5) Remove the spring pin from the slider.



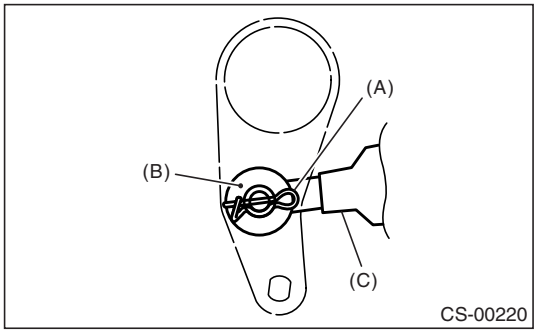
(A) Slider
(B) Spring pin

6) Remove the slider and spring.



(A) Slider
(B) Spring

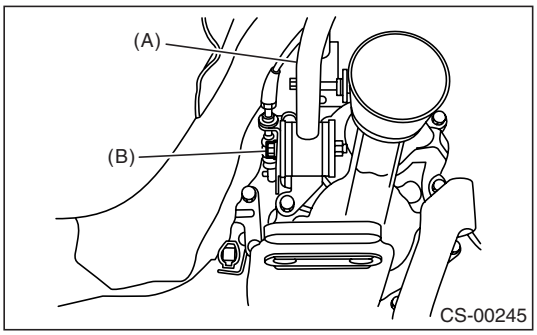
7) Cut off the band clip and separate the reverse check cable from gear shift lever.
8) Lift-up the vehicle.
9) Remove the under cover.
10) Remove the rear exhaust pipe and muffler. <Ref. to EX(H6DO)-7, REMOVAL, Rear Exhaust Pipe.> <Ref. to EX(H6DO)-9, REMOVAL, Muffler.>
11) Remove the crossmember. <Ref. to 6MT-32, REMOVAL, Transmission Mounting System.>
12) Remove the snap pin and washer, and then separate the reverse check cable from reverse check lever.



(A) Snap pin
(B) Washer
(C) Reverse check cable

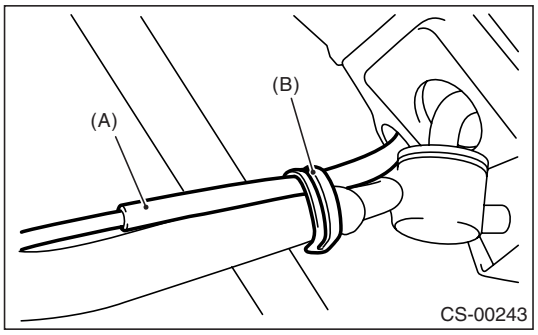
13) Move the transmission to the right side, then remove the stay bolt and reverse check cable.

NOTE:
If the transmission is not moved, stay bolt may contact the body. It will cause damage.



(A) Stay
(B) Stay bolt

14) Raise the clip of stay, and then separate the stay and reverse check cable.

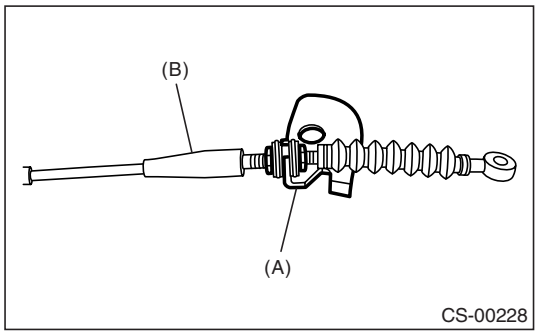


(A) Reverse check cable
(B) Clip

15) Remove the reverse check cable by pulling from underneath the vehicle.

NOTE:
Be careful not to damage the innner boot.

16) Loose the lock nut, and then remove the reverse check cable from cable plate.



(A) Cable plate
(B) Reverse check cable

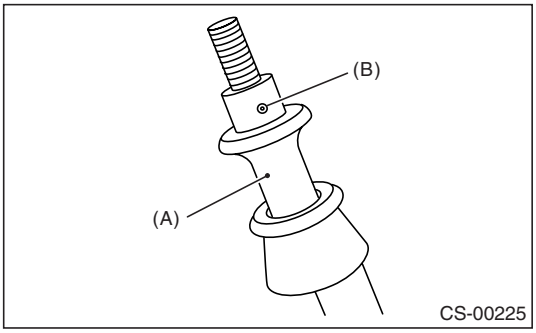
B: INSTALLATION

1) Insert the reverse check cable to the hole of inner boot from underneath the vehicle.
2) Insert the reverse check cable into gear shift lever assembly, and secure it with band clip.

NOTE:
- Cut off the extra band clip
- Make sure that the reverse check cable is inserted into gear shift lever assembly witout any clearance.

3) Using spring pin, fix the slider and reverse check cable end.

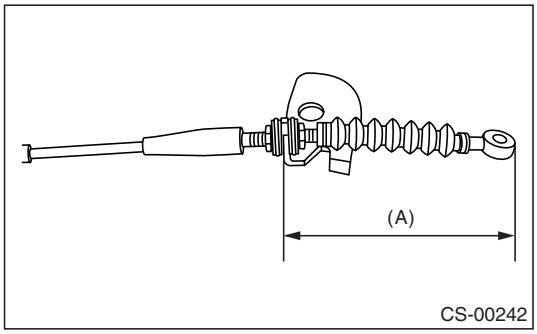
NOTE:
Apply grease to sliding area of the slider.



(A) Slider
(B) Spring pin

4) Lift-up the vehicle.
5) Adjust the length between end of cable plate and reverse check cable to 84 mm (3.31 in) with cable pulled, and then tighten the lock nut.

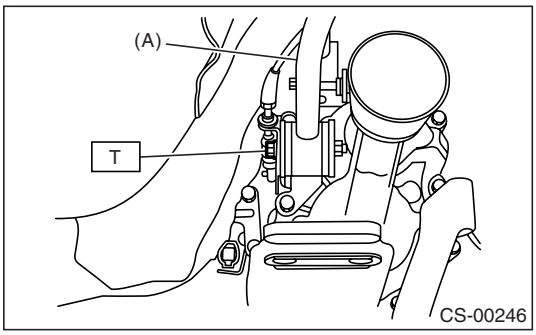
Tightening torque:
6 N·m (0.6 kgf-m, 4.4 ft-lb)



(A) 84 mm (3.31 in)

6) Move the transmission to the right side, then install the stay.

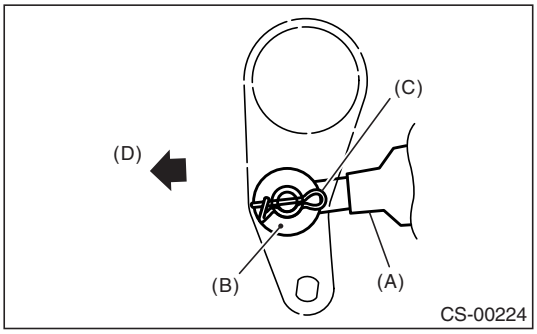
Tightening torque:
T: 32 N·m (3.3 kgf-m, 23.6 ft-lb)



(A) Stay

7) Install the reverse check cable, washer and snap pin to reverse check lever.

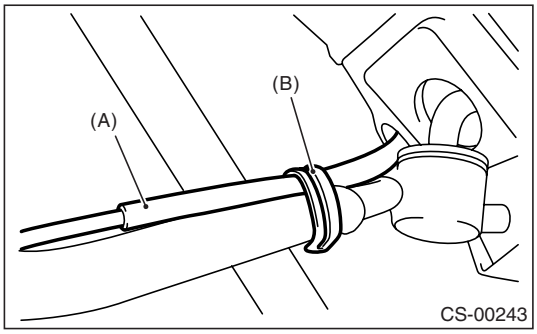
NOTE:
Take care to install the snap pin in proper direction.



(A) Reverse check cable
(B) Washer
(C) Snap pin
(D) Front side

8) Secure the reverse check cable to clip of stay.

NOTE:
Install the reverse check cable to upper side of stay.



(A) Reverse check cable
(B) Clip

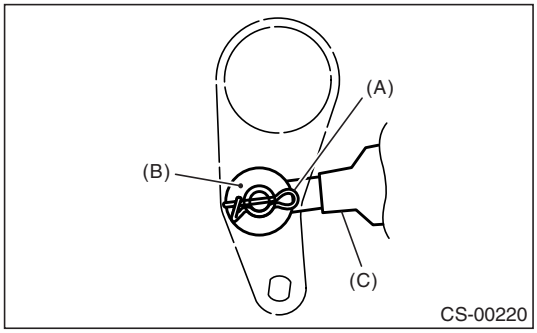
9) Install the rear exhaust pipe and muffler. <Ref. to EX(H6DO)-7, INSTALLATION, Rear Exhaust Pipe.> <Ref. to EX(H6DO)-9, INSTALLATION, Muffler.>
10) Lower the vehicle.
11) Install the front cover assembly.
12) Install the console box. <Ref. to EI-53, INSTALLATION, Console Box.>

C: INSPECTION

1) Make sure the slider moves smoothly. If it does not move, adjust the reverse check cable or check the slider for damage. <Ref. to CS-54, ADJUSTMENT, Reverse Check Cable.>
2) Check that the gear is shift to reverse, when the slider is pulled up. If the gear is not shift to reverse, adjust the reverse check cable. <Ref. to CS-54, ADJUSTMENT, Reverse Check Cable.>
3) Check that the gear is not shift to reverse, when the slider is not pulled up. If the gear is shift to reverse, adjust or replace the reverse check cable. <Ref. to CS-54, ADJUSTMENT, Reverse Check Cable.>

D: ADJUSTMENT

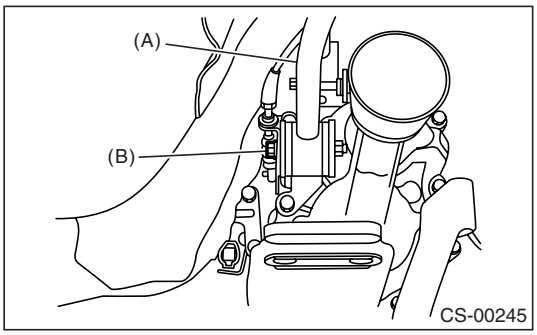
1) Lift-up the vehicle.
2) Remove the under cover.
3) Remove the rear exhaust pipe and muffler. <Ref. to EX(H6DO)-7, REMOVAL, Rear Exhaust Pipe.> <Ref. to EX(H6DO)-9, REMOVAL, Muffler.>
4) Remove the crossmember. <Ref. to 6MT-32, REMOVAL, Transmission Mounting System.>
5) Remove the snap pin and washer, and then separate the reverse check cable from reverse check lever.



(A) Snap pin
(B) Washer
(C) Reverse check cable

6) Move the transmission to the right side, then remove the stay bolt and reverse check cable.

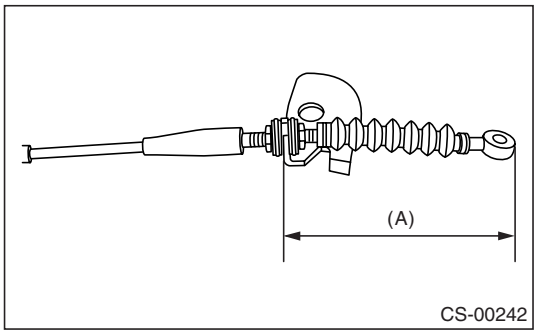
NOTE:
If the transmission is not moved, stay bolt may contact the body. It will cause damage.



(A) Stay
(B) Stay bolt

7) Adjust the length between end of cable plate and reverse check cable to 84 mm (3.31 in), and then tighten the lock nut.

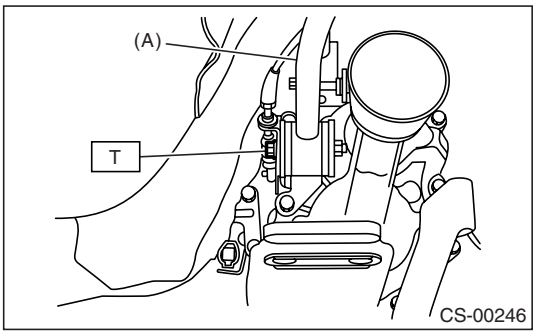
Tightening torque:
6 N·m (0.6 kgf-m, 4.4 ft-lb)



(A) 84 mm (3.31 in)

8) Move the transmission to the right side, then install the stay.

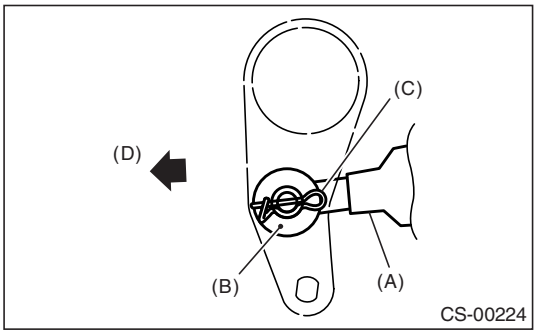
Tightening torque:
T: 32 N·m (3.3 kgf-m, 23.6 ft-lb)



(A) Stay

9) Install the crossmember. <Ref. to 6MT-32, INSTALLATION, Transmission Mounting System.>
10) Install the rear exhaust pipe and muffler. <Ref. to EX(H6DO)-7, INSTALLATION, Rear Exhaust Pipe.> <Ref. to EX(H6DO)-9, INSTALLATION, Muffler.>
11) Install the reverse check cable, washer and snap pin to reverse check lever.

NOTE:
Take care to install the snap pin in proper direction.



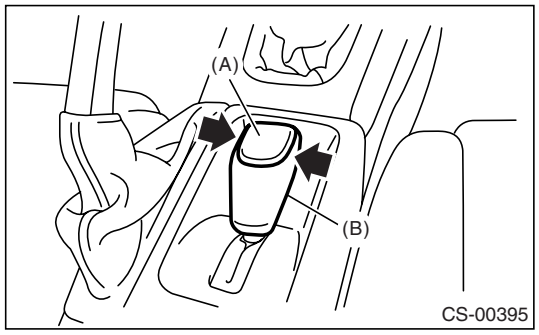
(A) Reverse check cable
(B) Washer
(C) Snap pin
(D) Front side

12) Install the under cover.

10.MT Drive Select Lever

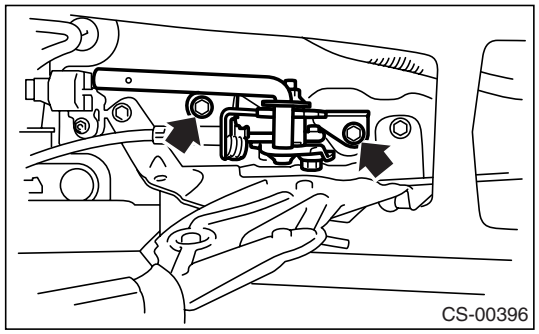
A: REMOVAL

1) Set the drive select lever to “HI” position.
2) Push the both sides of knob and remove the cover. (Rubber type)

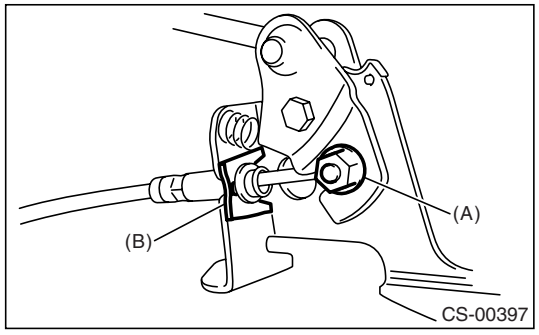


(A) Cover
(B) Knob

3) Insert a screwdriver with thin tip into the both sides of knob and push to remove the cover. (Leather type)
4) Remove the bolts, and then remove the knob.
5) Remove the console box. <Ref. to EI-53, REMOVAL, Console Box.>
6) Remove the drive select lever from vehicle body.



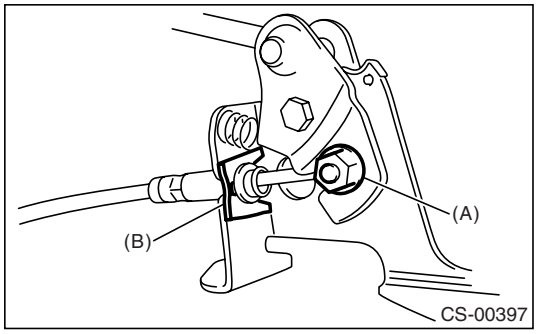
7) Remove the flange nut and clip, and then remove the drive select cable.



(A) Flange nut
(B) Clip

B: INSTALLATION

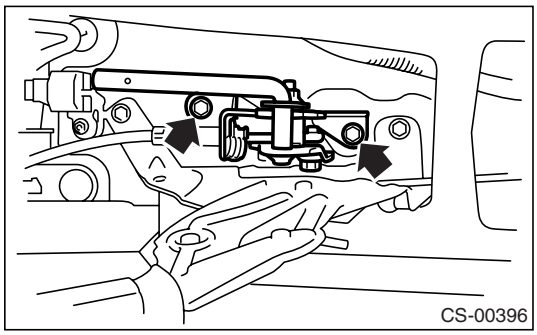
1) Secure the drive select cable to the lever with clip, and temporary tighten the flange nut.



(A) Flange nut
(B) Clip

2) Install the drive select lever to vehicle.

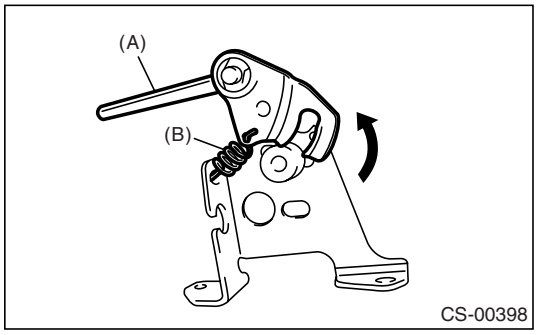
Tightening torque:
12 N·m (1.2 kgf-m, 8.9 ft-lb)



3) Adjust the drive select cable. <Ref. to CS-59, ADJUSTMENT, Drive Select Cable.>
4) Install in the reverse order of removal.

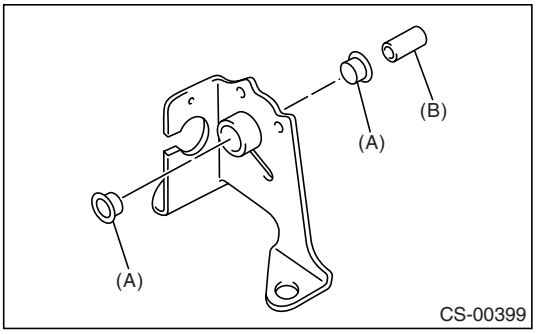
C: DISASSEMBLY

1) Remove the bolts and nuts.
2) Remove the lever and spring.



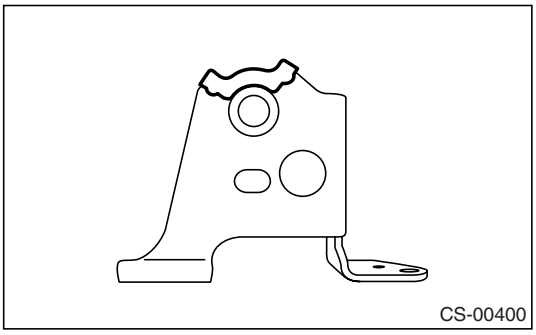
(A) Lever
(B) Spring

3) Remove the bushing and spacer from plate assembly.



(A) Bushing
(B) Spacer

4) Remove the bushing from plate assembly.



D: ASSEMBLY

1) Assemble in the reverse order of disassembly.

Tightening torque:
12 N·m (1.2 kgf-m, 8.9 ft-lb)

NOTE:
For the area to be applied with grease, refer to "COMPONENT". <Ref. to CS-3, COMPONENT, General Description.>

2) Make sure the select lever moves smoothly.

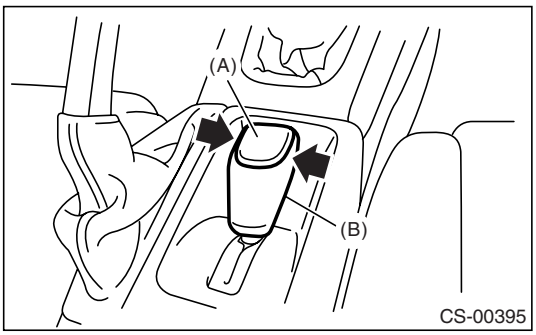
E: INSPECTION

1) Check that the select lever moves smoothly. If it does not move smoothly, check the transmission and drive select lever.
2) Check that HI and LO are switched properly. If they do not switched properly, adjust the drive select cable and inspect the transmission.
3) Check that the drive select lever for damage. Repair or replace if it is damaged.

11.Drive Select Cable

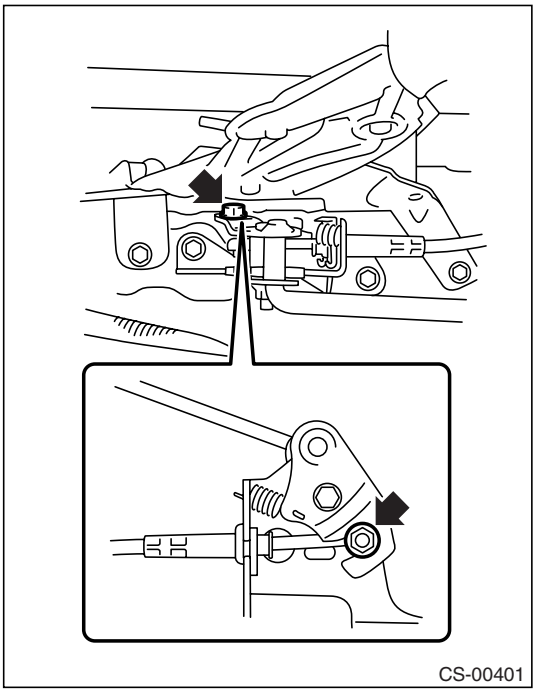
A: REMOVAL

1) Set the vehicle on a lift.
2) Set the drive select lever to “HI” position.
3) Push the both sides of knob and remove the cover. (Rubber type)

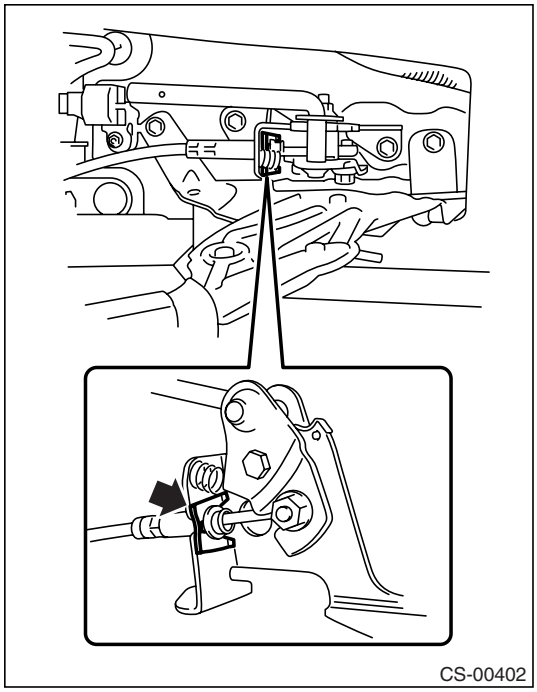


(A) Cover
(B) Knob

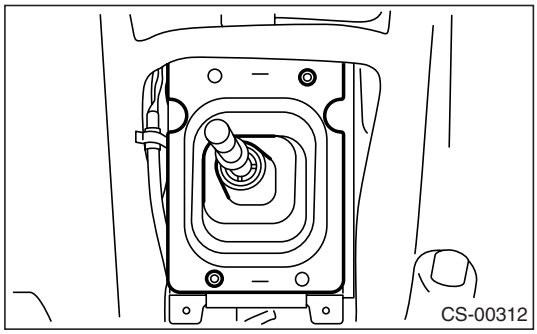
4) Insert a screwdriver with thin tip into the both sides of knob and push to remove the cover. (Leather type)
5) Remove the bolts, and then remove the knob.
6) Remove the gear shift knob.
7) Remove the console box. <Ref. to EI-53, REMOVAL, Console Box.>
8) Remove the front cover assembly.
9) Loosen the flange nut.



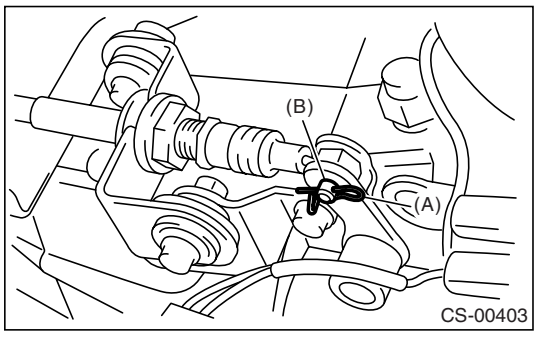
10) Remove the clamp, and then remove the drive select cable from plate assembly.



11) Remove the boot and insulator assembly.

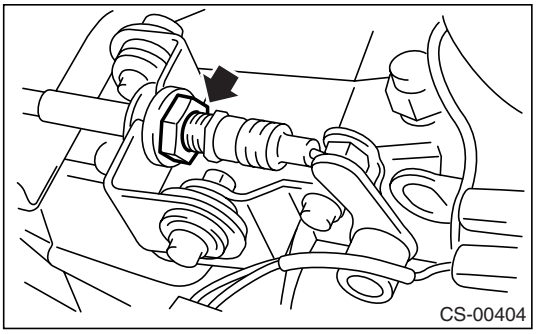


12) Remove the air intake chamber and the air intake duct. <Ref. to IN(H4SO 2.0)-7, REMOVAL, Air Intake Chamber.> <Ref. to IN(H4SO 2.0)-8, REMOVAL, Air Intake Duct.>
13) Remove the snap pin and clevis pin.

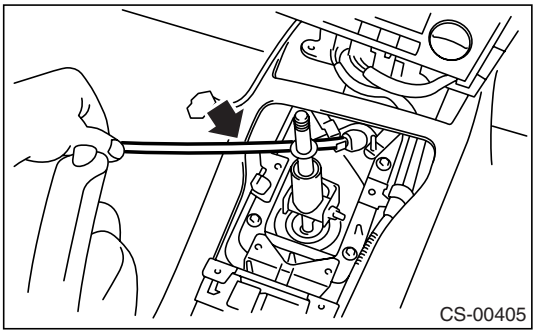


(A) Snap pin
(B) Clevis pin

14) Loose the nut, and then remove the cable from cable bracket.


CS-00404

15) Lift-up the vehicle, and then remove the cable under vehicle.


CS-00405

B: INSTALLATION

Install in the reverse order of removal.

NOTE:

• Adjust the drive select cable. <Ref. to CS-59, ADJUSTMENT, Drive Select Cable.>

• Refer to “COMPONENT” for tightening torque. <Ref. to CS-3, COMPONENT, General Description.>

• Securely insert the cable end bolt to slit of lever arm.

C: INSPECTION

1) Check the transmission is set in HI or LO position according to the operation of drive select lever. If it is not set to HI or LO, adjust the cable. <Ref. to CS-59, ADJUSTMENT, Drive Select Cable.>

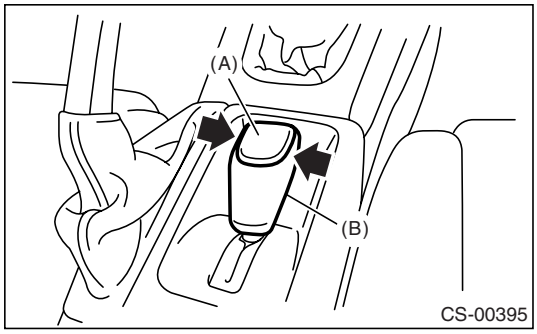
2) Check cable for damage.

3) Check for smooth operation of the cable. If it does not move smoothly, replace it.

D: ADJUSTMENT

1) Set the drive select lever to “HI” position.

2) Push the both sides of knob and remove the cover. (Rubber type)



CS-00395

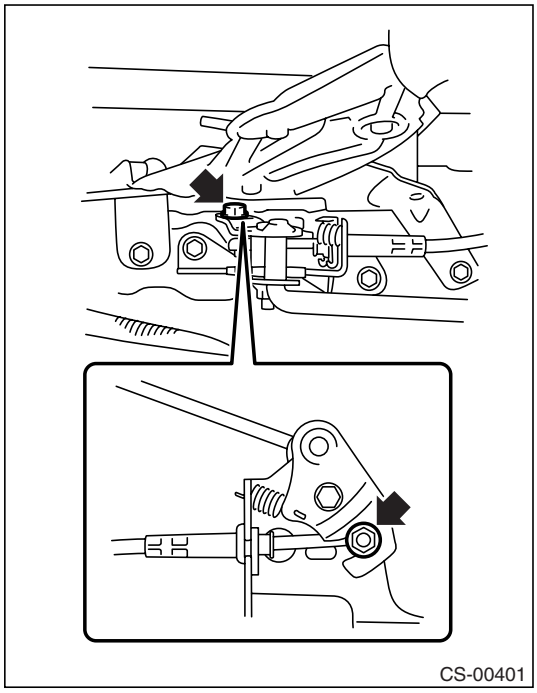
(A) Cover
(B) Knob

3) Insert a screwdriver with thin tip into the both sides of knob and push to remove the cover. (Leather type)

4) Remove the bolts, and then remove the knob.

5) Remove the console box. <Ref. to EI-53, REMOVAL, Console Box.>

6) Loosen the flange nut.


CS-00401

7) Verify the transmission gear is set in HI position. If not in HI position, pull the cable to set it in HI position.

8) Verify the select lever is set in HI position.

9) Tighten the flange nut with cable fixed.

Tightening torque:
12 N·m (1.2 kgf-m, 8.9 ft-lb)

10) Install in the reverse order of removal.

12.General Diagnostic Table

A: INSPECTION

Symptom	Possible cause	Corrective action
Select lever	Starter does not run.	Adjust the select cable and inhibitor switch, or inspect circuit.
	Back-up light does not illuminate.	Adjust the select cable and inhibitor switch, or inspect circuit.
	AT shift lock system does not operate normally.	Adjust the select cable and inhibitor switch, or inspect circuit.
	Manual mode is not engaged.	Inspect the mode switch and select lever, or inspect circuit.
	Up-shift is not engaged at manual mode.	Check the shift-up switch and circuit.
	Down-shift is not engaged at manual mode.	Check the shift-down switch and circuit.
Drive select lever	HI or LO is not changed.	Adjust the drive select cable or inspect the transmission.

AUTOMATIC TRANSMISSION

4AT

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1. General Description

A: SPECIFICATION

1. TORQUE CONVERTER CLUTCH

Model	2.0 L	2.5 L
Type	Symmetric, 3 element, single stage, 2 phase torque converter	
Stall torque ratio	2.0 — 2.2	1.8 — 2.15
Nominal diameter mm (in)	236 (9.29)	246 (9.69)
Stall speed (at sea level)	2,000 — 2,500 rpm	2,300 — 2,800 rpm
One-way clutch	Sprague type one-way clutch	

2. OIL PUMP

Type	Parachoid constant-discharge 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

1st	2.785
2nd	1.545
3rd	1.000
4th	0.694
Rev	2.272

5. PLANETARY GEAR AND PLATE

Model	2.0 L	2.5 L
Front sun gear number of teeth	33	
Front pinion number of teeth	21	
Front internal gear number of teeth	75	
Rear sun gear number of teeth	42	
Rear pinion number of teeth	17	
Rear internal gear number of teeth	75	
Drive plate number of high clutch	4	
Drive plate number of low clutch	4	5
Drive plate number of reverse clutch	2	
Drive plate number of 2-4 brake	2	3
Drive plate number of low & reverse brake	4	5

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)	4-forward automatic gear change 1st ←→ 2nd ←→ 3rd ←→ 4th
SPORT mode	4-forward automatic gear change 1st ←→ 2nd ←→ 3rd ←→ 4th
Manual mode (+)	4-forward manual gear change (shift up) 1st → 2nd → 3rd → 4th
Manual mode (–)	4-forward manual gear change (shift down) 1st ← 2nd ← 3rd ← 4th
Control method	Wire cable type

7. HYDRAULIC CONTROL AND LUBRICATION

Type		Electronic hydraulic control [Four forward speed changes by electrical signals of vehicle speed and accelerator (throttle) opening]
Fluid		SUBARU ATF or IDEMITSU “Apolloil ATF HP”, Castrol “Transmax J” NOTE: If the ATF above are not available, use Dexron III.
Fluid capacity ℓ (US qt, Imp qt)	2.0 L	8.4 — 8.7 (8.9 — 9.2, 7.4 — 7.7)
	2.5 L	9.3 — 9.6 (9.8 — 10.1, 8.2 — 8.4)
Lubrication system		Forced feed lubrication with oil pump
Oil		Automatic transmission fluid (above mentioned)

8. COOLING AND HARNESS

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

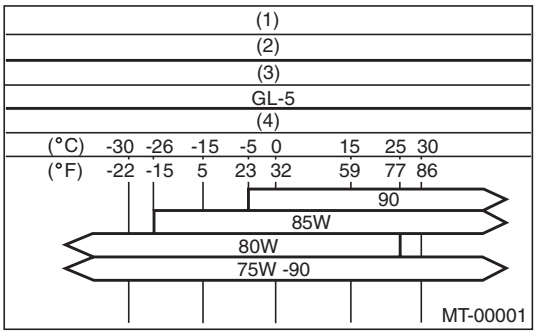
9. TRANSFER

Model	2.0 L	2.5 L except for VTD model	2.5 L VTD model
Transfer type	Multi-plate transfer (MP-T)		Variable torque distribution (VTD)
Drive & driven plate number of transfer clutch	4	5	3
Control method	Electronic hydraulic type		
Lubricant	The same Automatic transmission fluid used in automatic transmission		
Reduction gear ratio	1.000 (53/53)		

10.FINAL REDUCTION

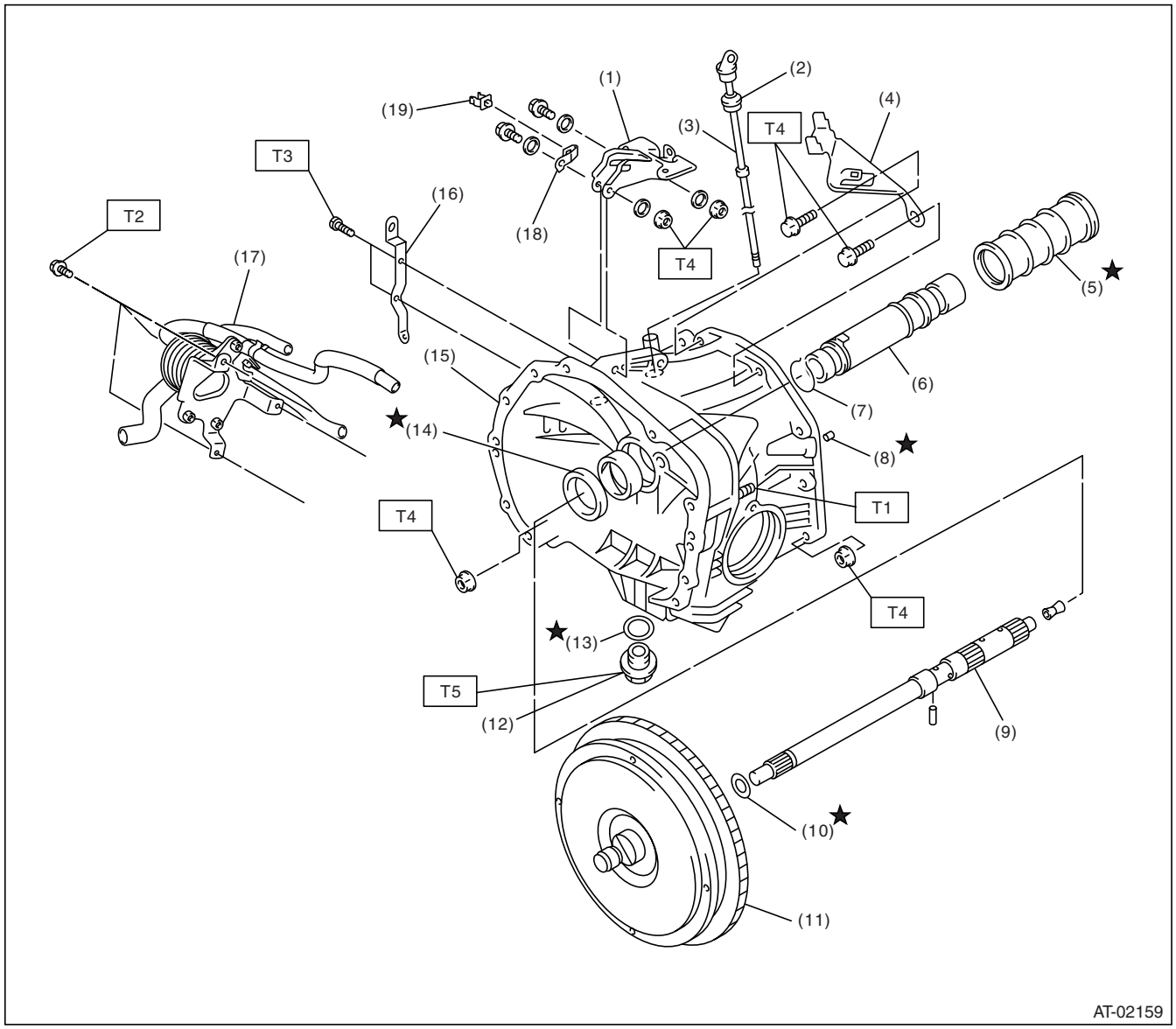
Model	Except for OUTBACK	OUTBACK
Front final reduction gear ratio	4.111 (37/9)	4.444 (40/9)

11.RECOMMENDED GEAR OIL

Lubrication oil	 (1) Item (2) Front differential gear oil (3) API standard (4) SAE viscosity No. and applicable temperature
Front differential oil capacity ℓ (US qt, Imp qt)	1.1 — 1.3 (1.2 — 1.4, 1.0 — 1.1)

B: COMPONENT

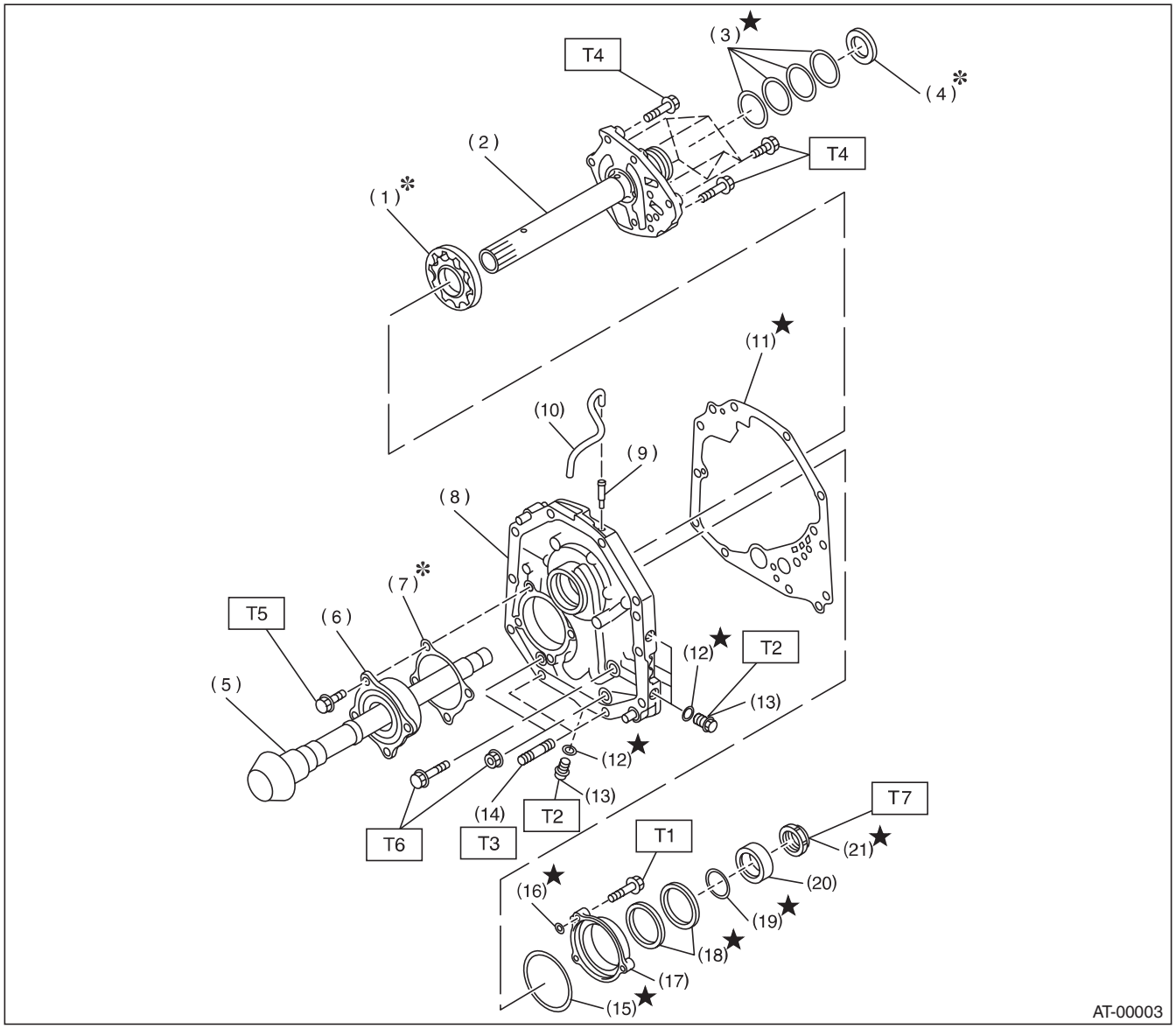
1. TORQUE CONVERTER CLUTCH AND CASE



(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) Converter case
(16) Harness stay
(17) ATF cooler ASSY with warmer function (if equipped)
(18) Bracket (if equipped)
(19) Clip (if equipped)

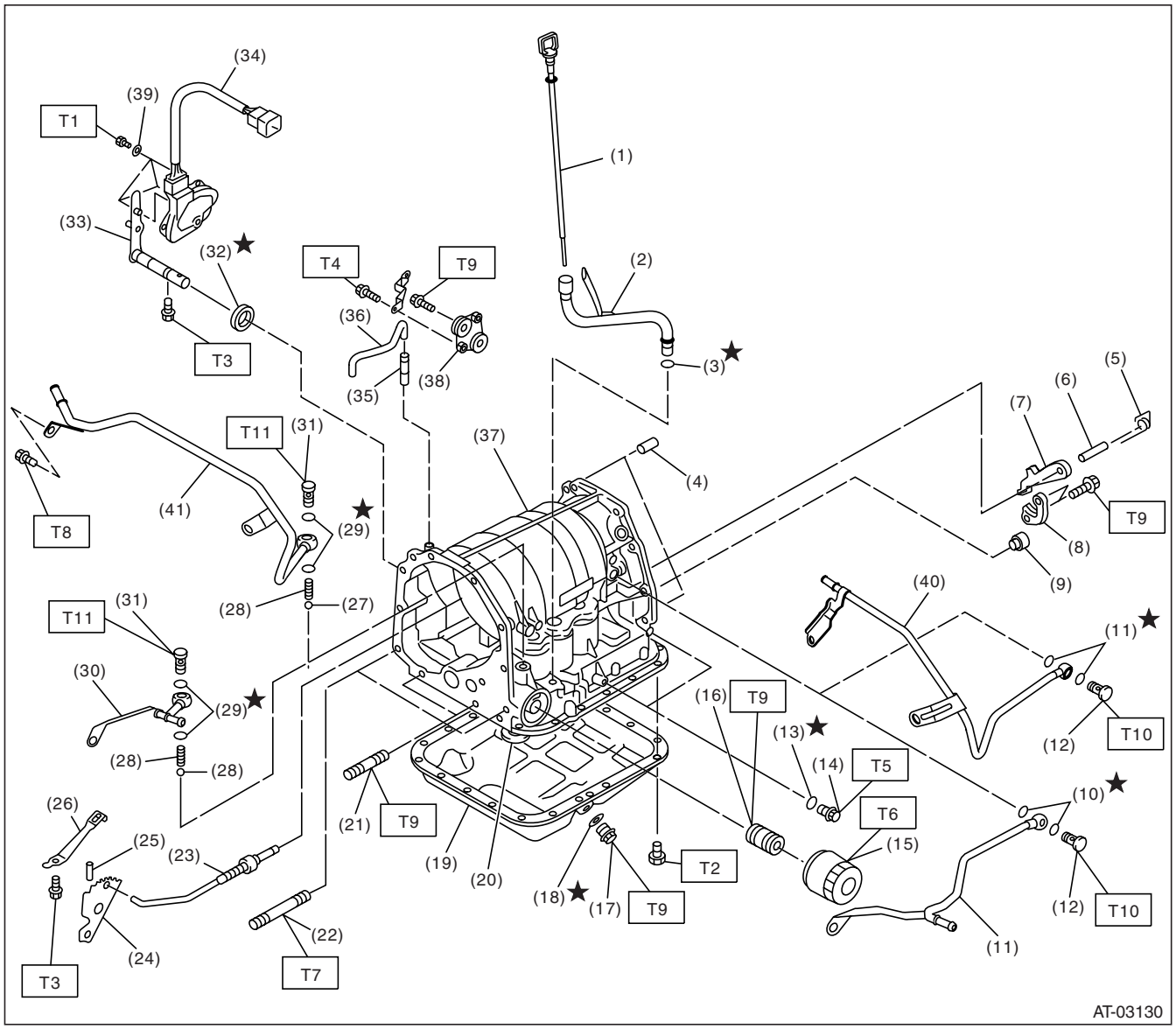
Tightening torque: N·m (kgf-m, ft-lb)
T1: 18 (1.8, 13.3)
T2: 23 (2.3, 17)
T3: 33 (3.4, 24.3)
T4: 41 (4.2, 30.4)
T5: 44 (4.5, 32.5) (Aluminum gasket)
70 (7.1, 51.6) (Copper gasket)

2. OIL PUMP



(1)	Oil pump rotor	(11)	Gasket	(21)	Lock nut
(2)	Oil pump cover	(12)	O-ring		
(3)	Seal ring	(13)	Test plug	***Tightening torque: N·m (kgf-m, ft-lb)***	
(4)	Thrust needle bearing	(14)	Stud bolt	***T1: 7 (0.7, 5.1)***	
(5)	Drive pinion shaft	(15)	O-ring	***T2: 13 (1.3, 9.6)***	
(6)	Roller bearing	(16)	O-ring	***T3: 18 (1.8, 13.3)***	
(7)	Shim	(17)	Oil seal retainer	***T4: 25 (2.5, 18.4)***	
(8)	Oil pump housing	(18)	Oil seal	***T5: 40 (4.1, 29.5)***	
(9)	Nipple	(19)	O-ring	***T6: 42 (4.3, 31)***	
(10)	Air breather hose	(20)	Drive pinion collar	***T7: 116 (11.8, 85)***	

3. TRANSMISSION CASE AND CONTROL DEVICE

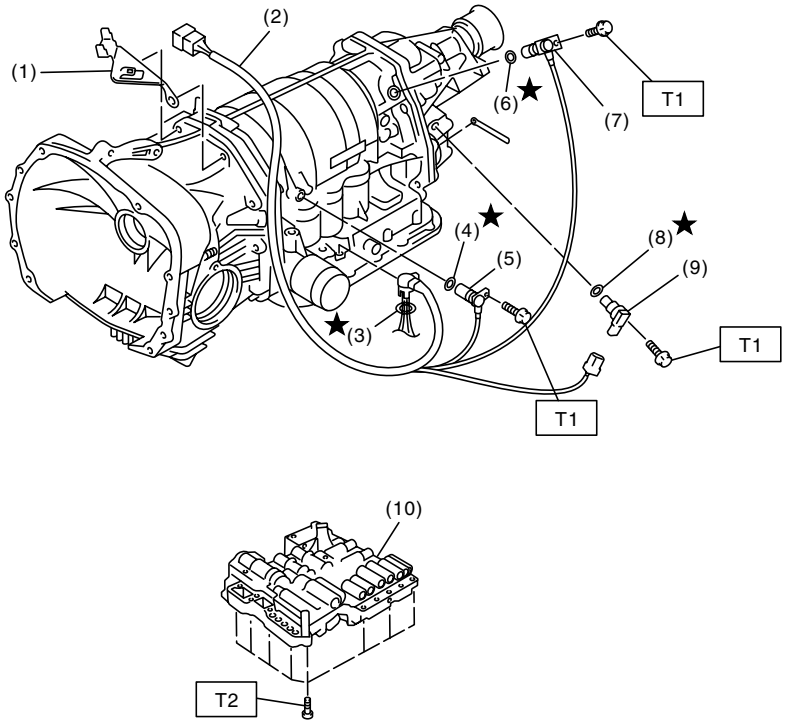


(1) ATF level gauge
(2) Oil charge pipe
(3) O-ring
(4) Straight pin
(5) Return spring
(6) Shaft
(7) Parking pawl
(8) Parking support
(9) Bushing
(10) Gasket
(11) Inlet pipe (Model without ATF cooler with warmer function)
(12) Union screw
(13) O-ring
(14) Test plug
(15) Oil filter
(16) Oil filter stud bolt
(17) Drain plug
(18) Gasket
(19) Oil pan
(20) Magnet
(21) Stud bolt (Short)
(22) Stud bolt (Long)
(23) Parking rod
(24) Manual plate
(25) Spring pin
(26) Detention spring
(27) Ball
(28) Spring
(29) Gasket
(30) Outlet pipe (Model without ATF cooler with warmer function)
(31) Union screw
(32) Oil seal
(33) Select lever
(34) Inhibitor switch ASSY
(35) Nipple
(36) Air breather hose
(37) Transmission case
(38) Plate ASSY
(39) Washer
(40) Inlet pipe (Model with ATF cooler with warmer function)
(41) Outlet pipe (Model with ATF cooler with warmer function)

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:	***12 (1.2, 8.7)***
T5:	***13 (1.3, 9.6)***
T6:	***14 (1.4, 10)***
T7:	***18 (1.8, 13.3)***
T8:	***21 (2.1, 15.5)***
T9:	***25 (2.5, 18.4)***
T10:	***40 (4.1, 29.5)***
T11:	***44 (4.5, 32.5)***

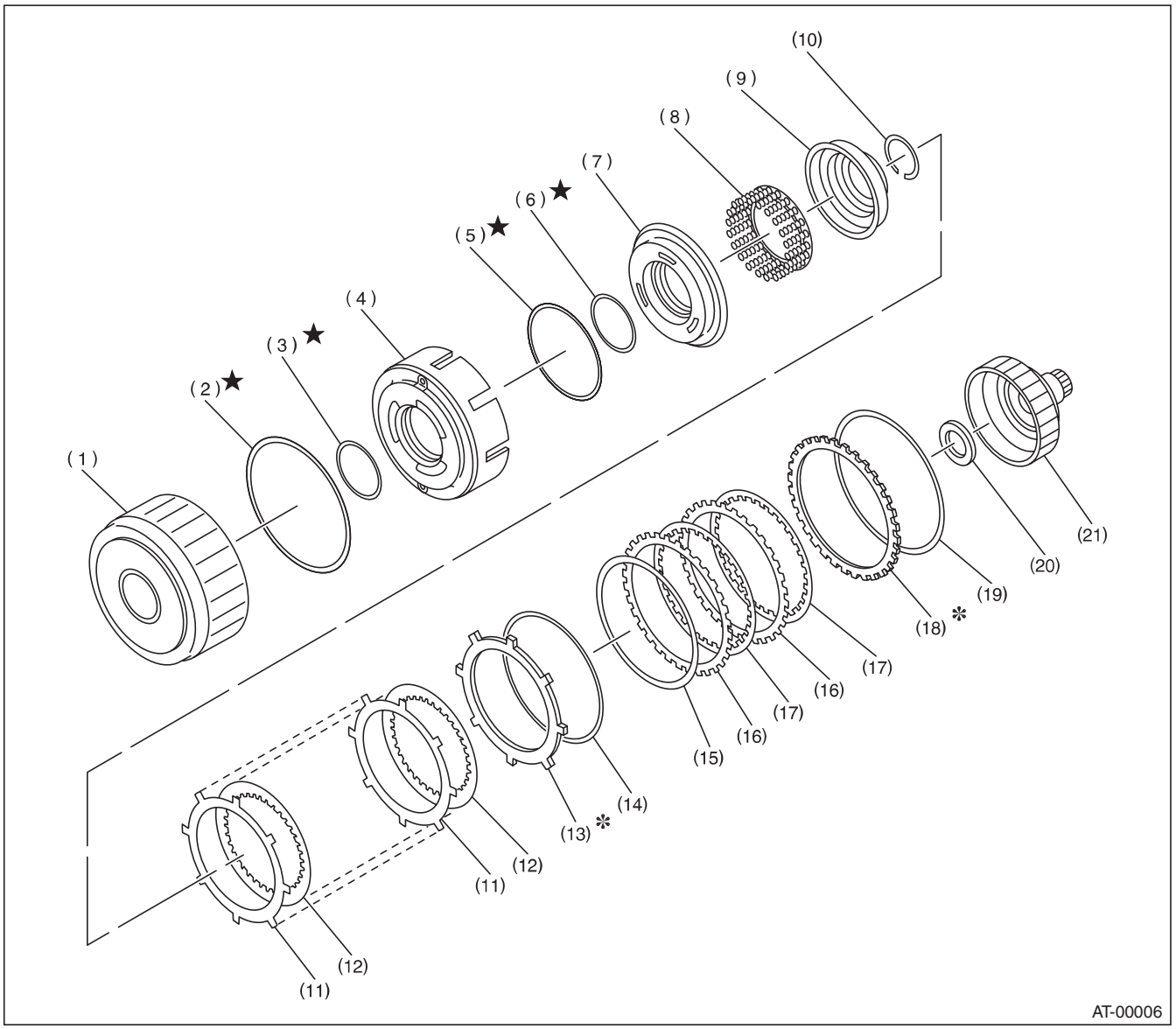
4. CONTROL VALVE AND HARNESS ROUTING



(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
(10) Control valve body

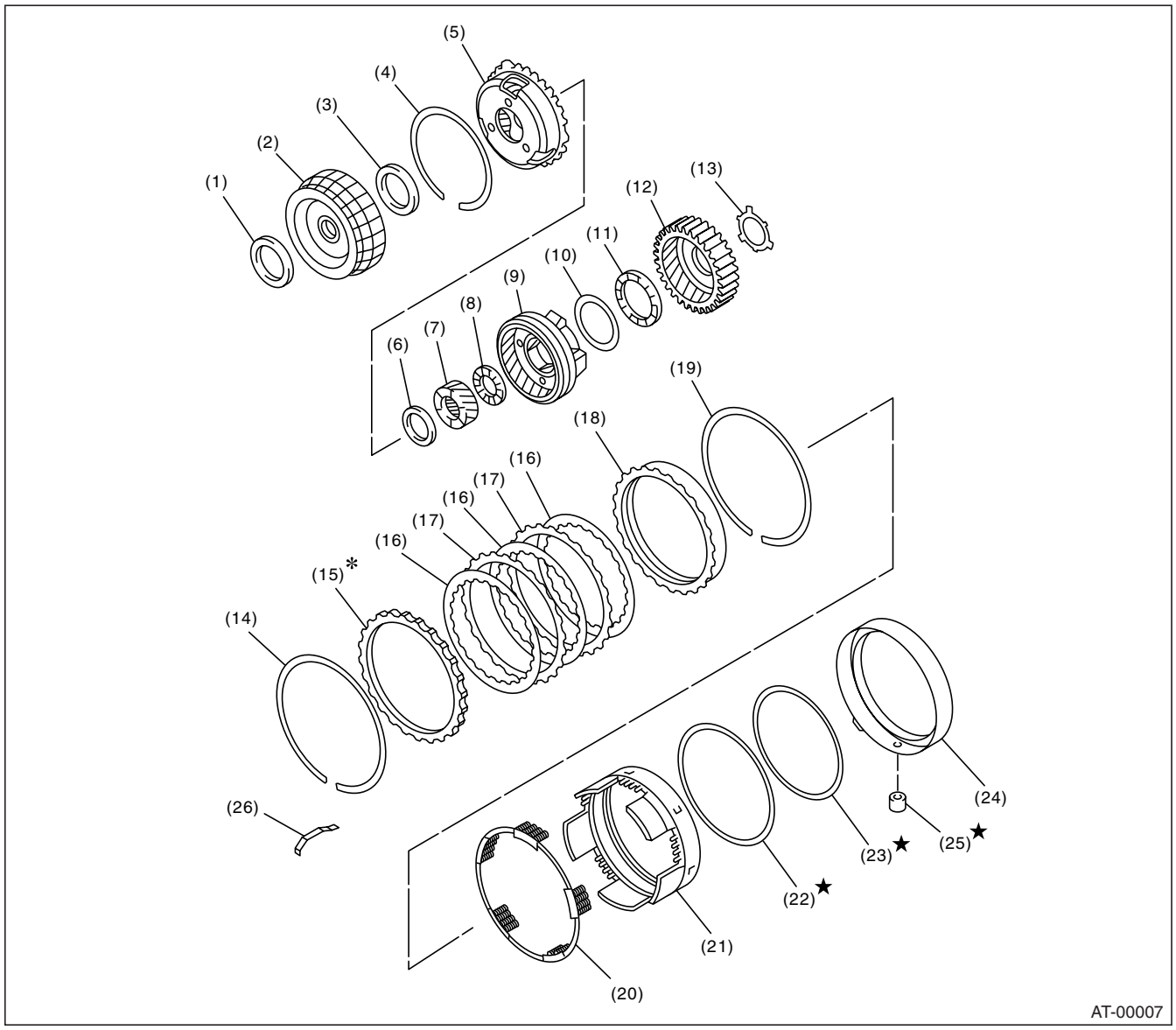
Tightening torque: N·m (kgf-m, ft-lb)
T1: 7 (0.7, 5.1)
T2: 8 (0.8, 5.8)

5. HIGH CLUTCH AND REVERSE CLUTCH



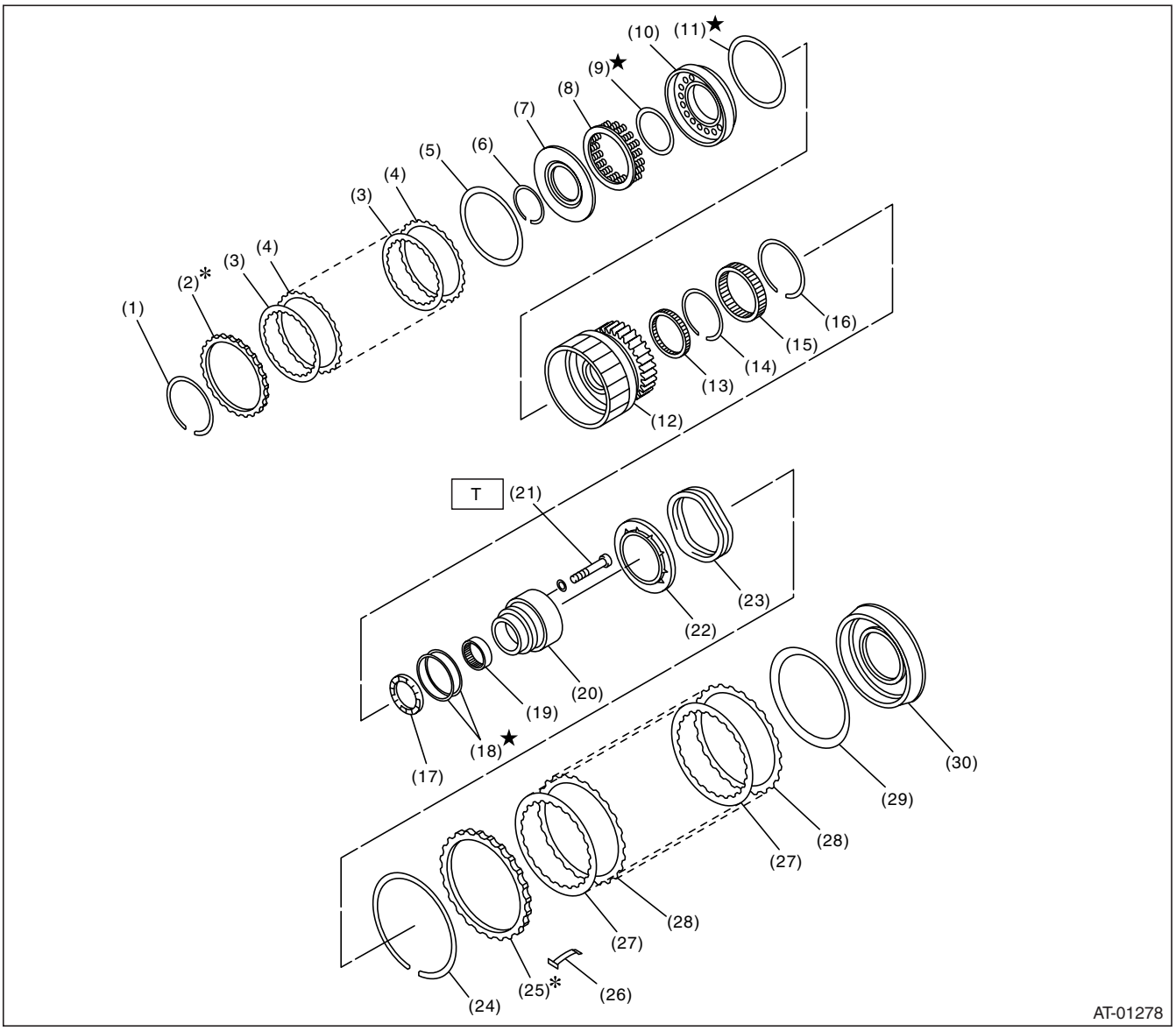
(1) High clutch drum
(2) Lip seal
(3) D-ring
(4) Reverse clutch piston
(5) D-ring
(6) D-ring
(7) High clutch piston
(8) Spring retainer
(9) Cover
(10) Snap ring
(11) Driven plate (High clutch)
(12) Drive plate (High clutch)
(13) Retaining plate (High clutch)
(14) Snap ring
(15) Dish plate
(16) Driven plate (Reverse clutch)
(17) Drive plate (Reverse clutch)
(18) Retaining plate (Reverse clutch)
(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, LOW & REVERSE BRAKE

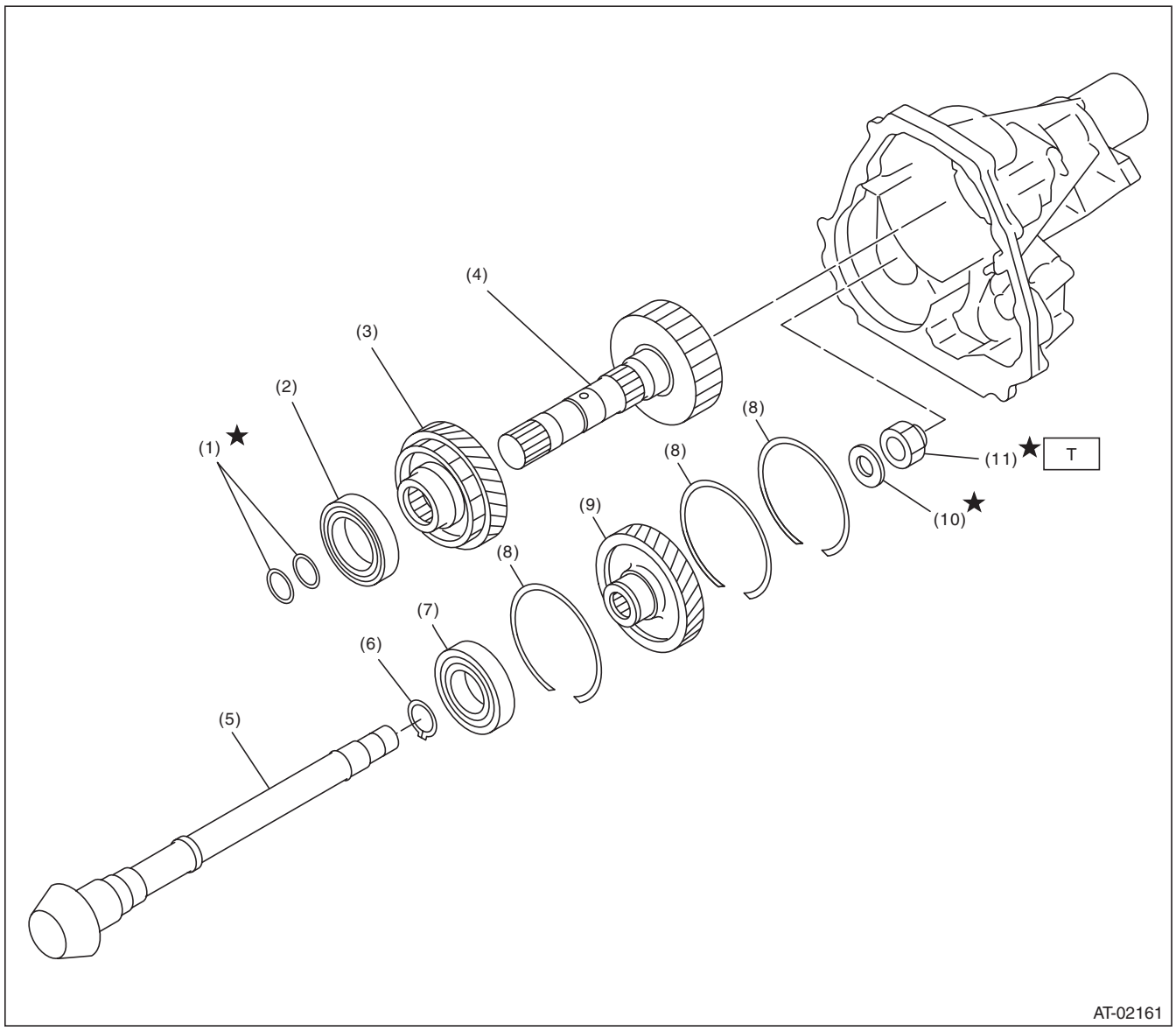


(1) Snap ring
(2) Retaining plate
(3) Drive plate
(4) Driven plate
(5) Dish plate
(6) Snap ring
(7) Cover
(8) Spring retainer
(9) D-ring
(10) Low clutch piston
(11) D-ring
(12) Low clutch dram
(13) Needle bearing
(14) Snap ring
(15) One-way clutch
(16) Snap ring
(17) Thrust needle bearing
(18) Seal ring
(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, 18.4)

8. REDUCTION GEAR

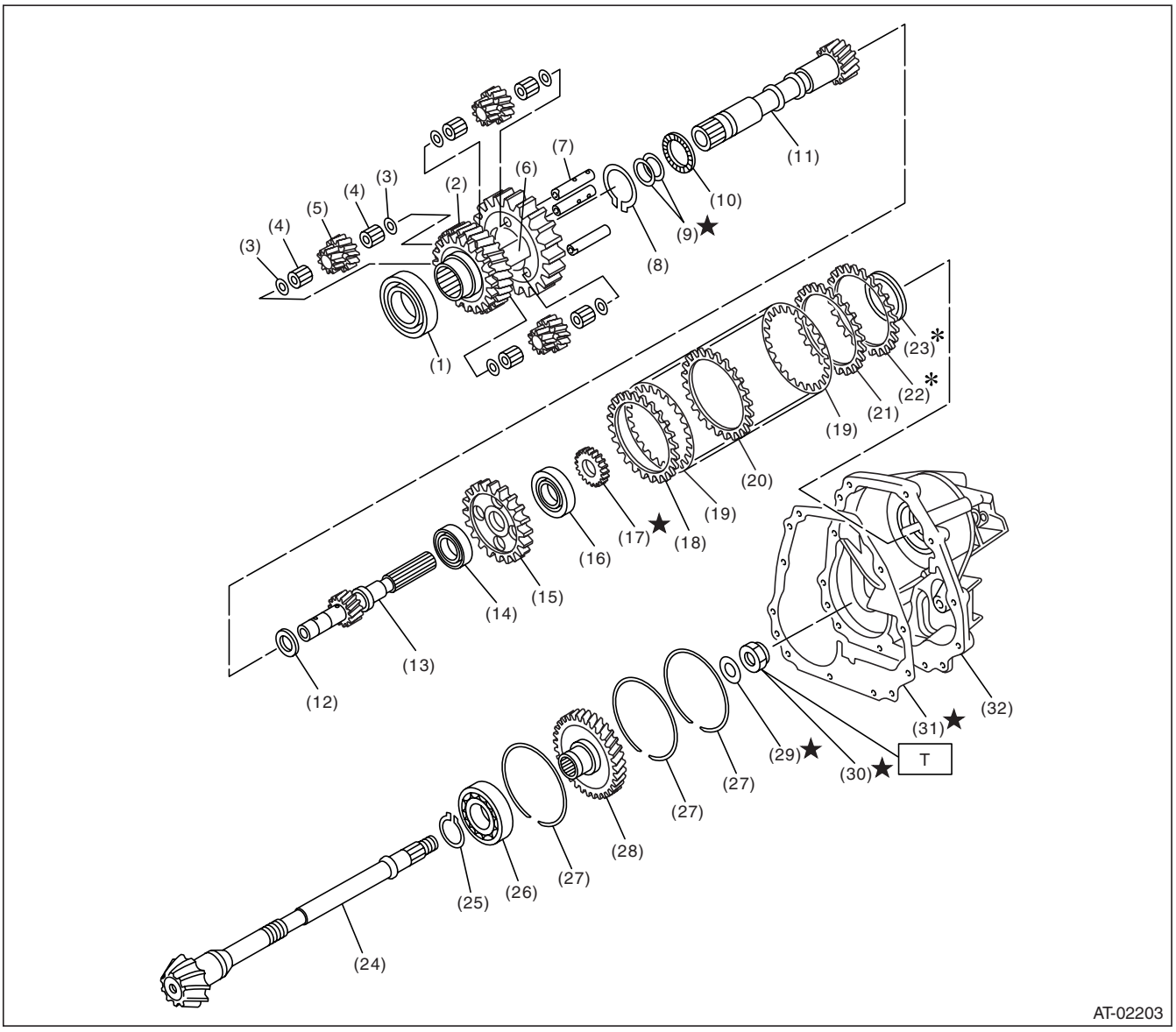
- MP-T model



(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) Snap ring
(9) Reduction driven gear
(10) Washer
(11) Lock nut

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

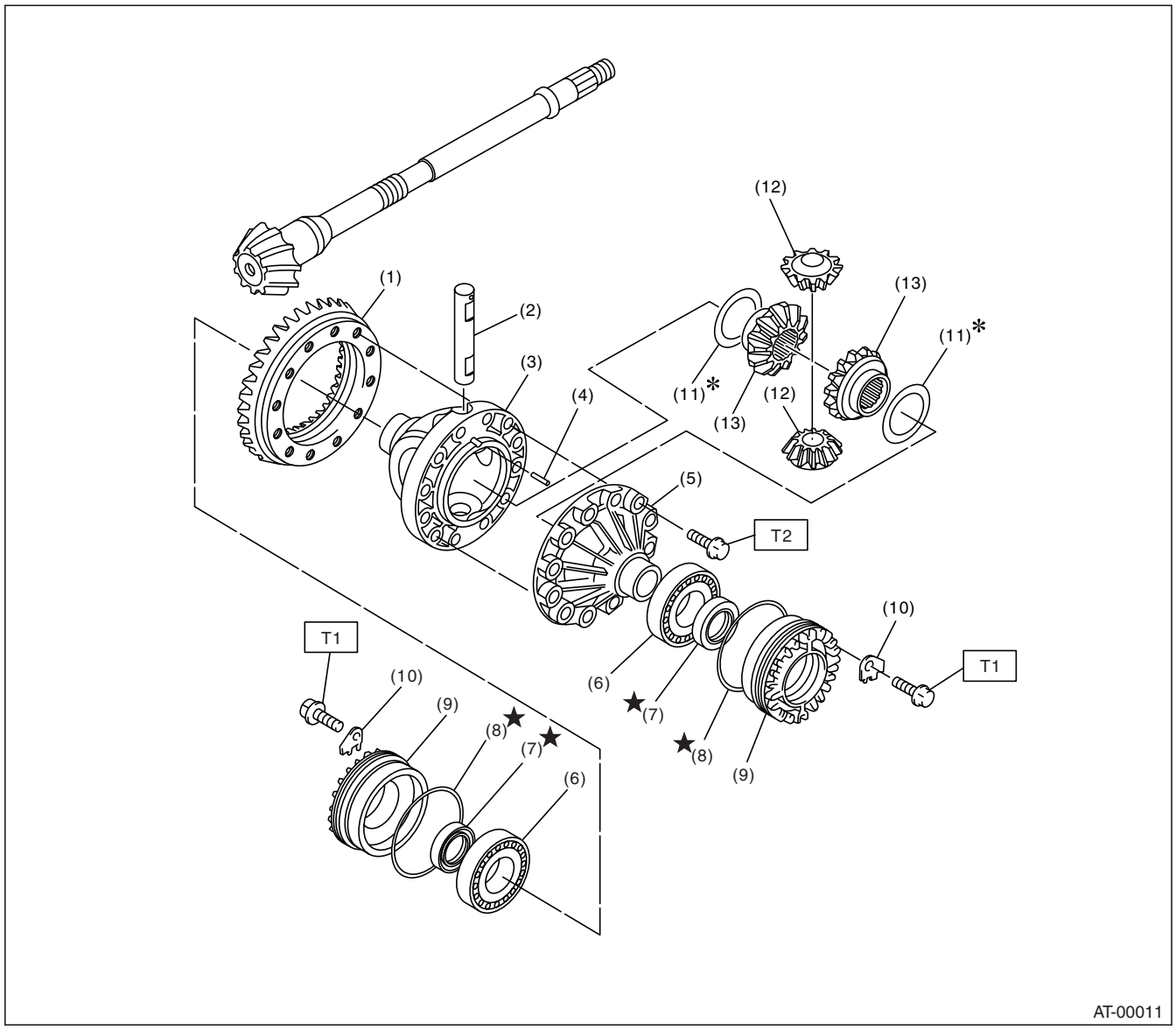
- VTD model



(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) Drive 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) Snap ring
(28) Reduction driven gear
(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)

9. DIFFERENTIAL GEAR

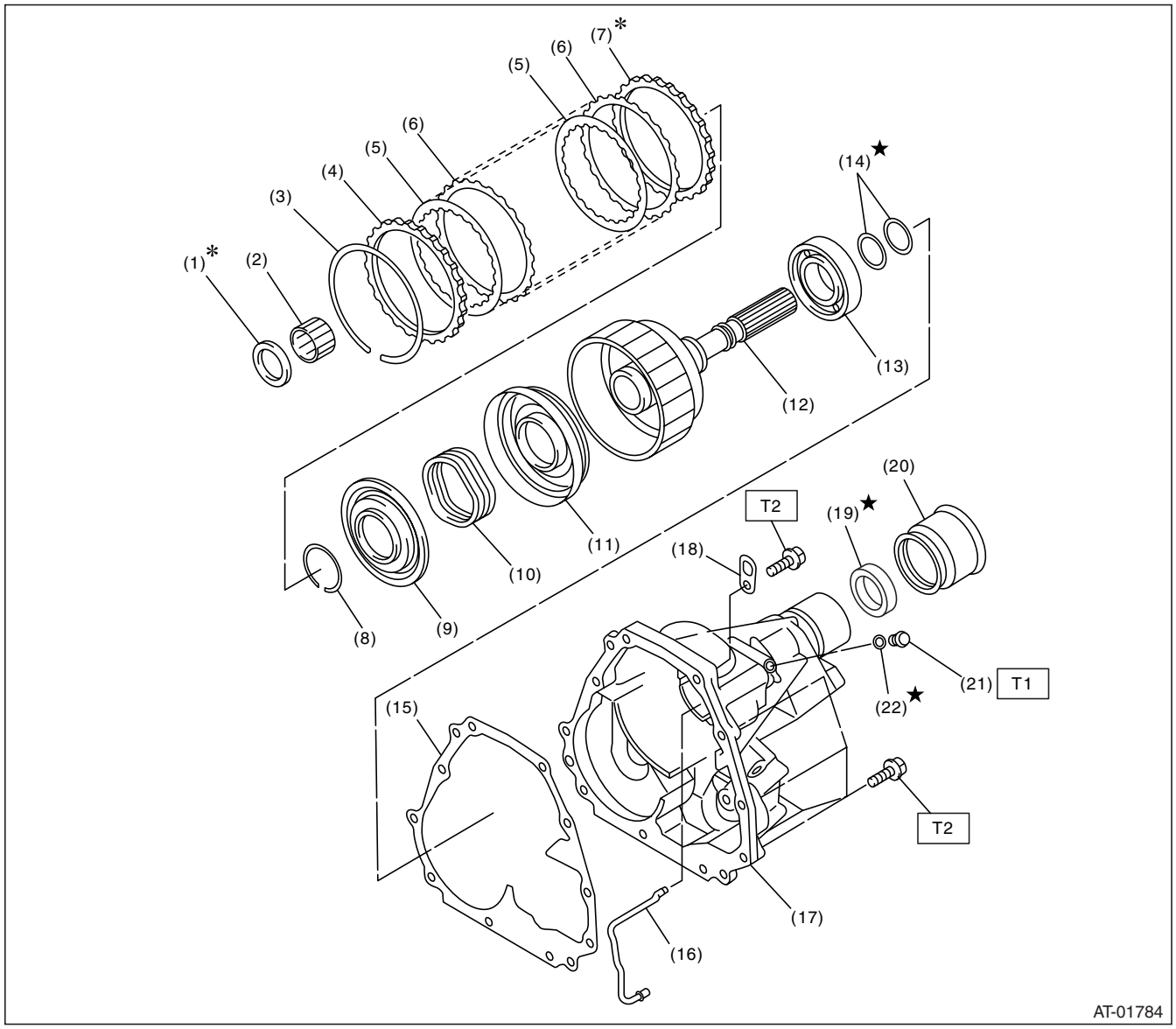


(1) Hypoid driven gear
(2) Pinion shaft
(3) Differential case (RH)
(4) Straight pin
(5) Differential case (LH)
(6) Taper roller bearing
(7) Oil seal
(8) O-ring
(9) Differential side retainer
(10) Lock plate
(11) Washer
(12) Differential bevel pinion
(13) Differential bevel gear

Tightening torque: N·m (kgf-m, ft-lb)
T1: 25 (2.5, 18.4)
T2: 62 (6.3, 45.6)

10.TRANSFER AND EXTENSION CASE

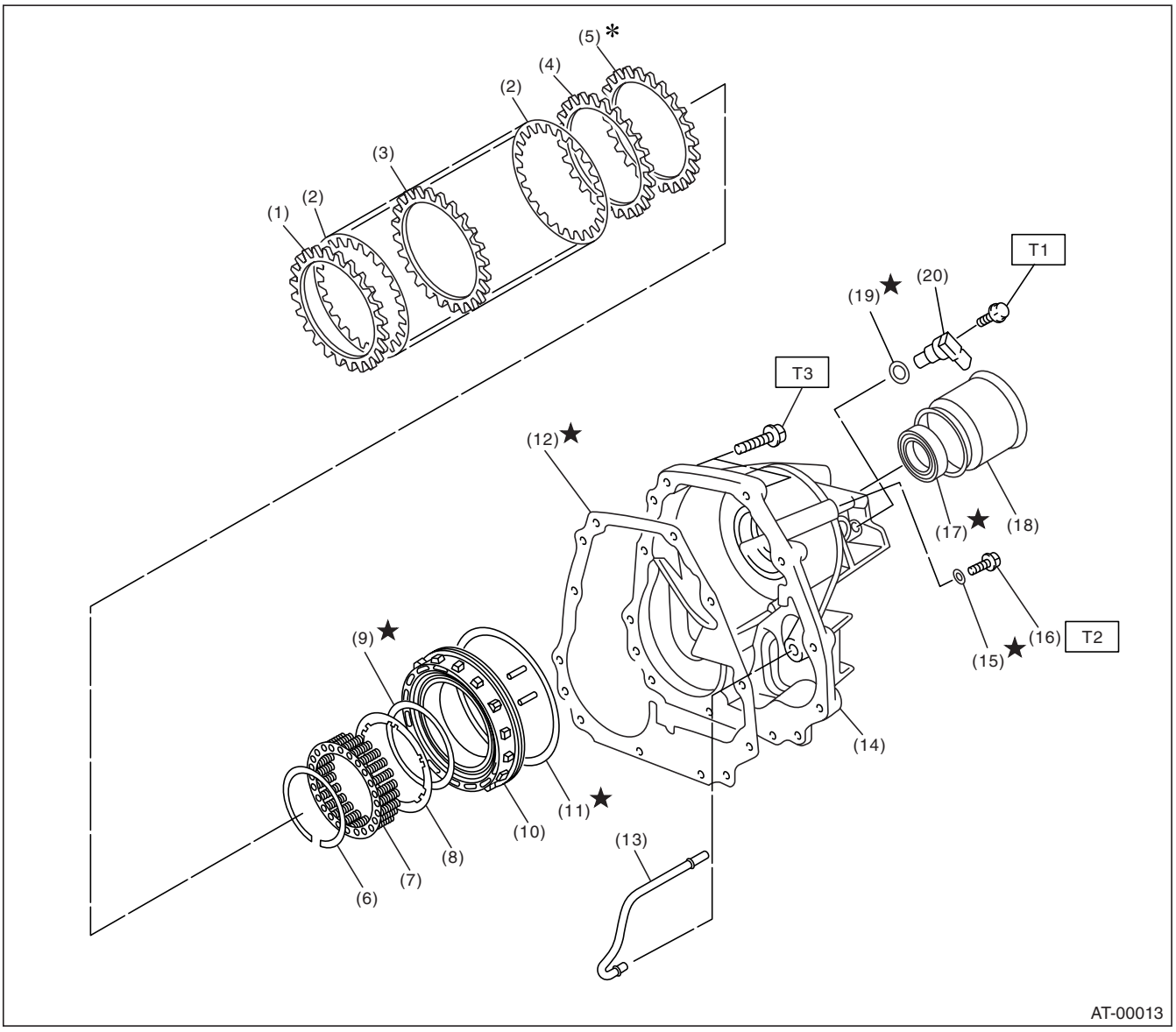
- MP-T model



(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, 9.6)
T2: 25 (2.5, 18.4)

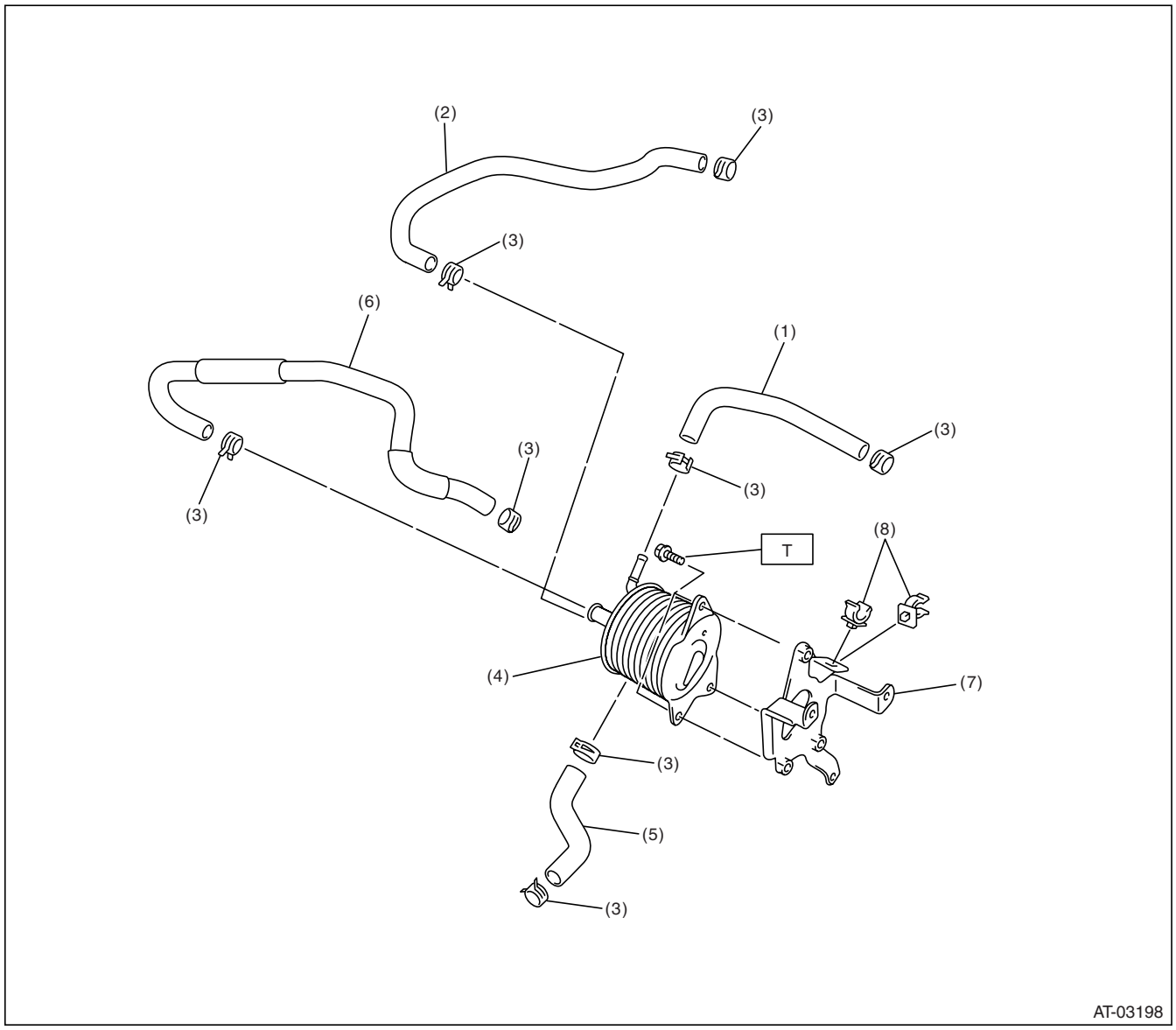
- VTD model



(1) Driven plate (Thick)
(2) Drive 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 assembly
(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

Tightening torque: N·m (kgf-m, ft-lb)
T1: 7 (0.7, 5.1)
T2: 13 (1.3, 9.6)
T3: 25 (2.5, 18.4)

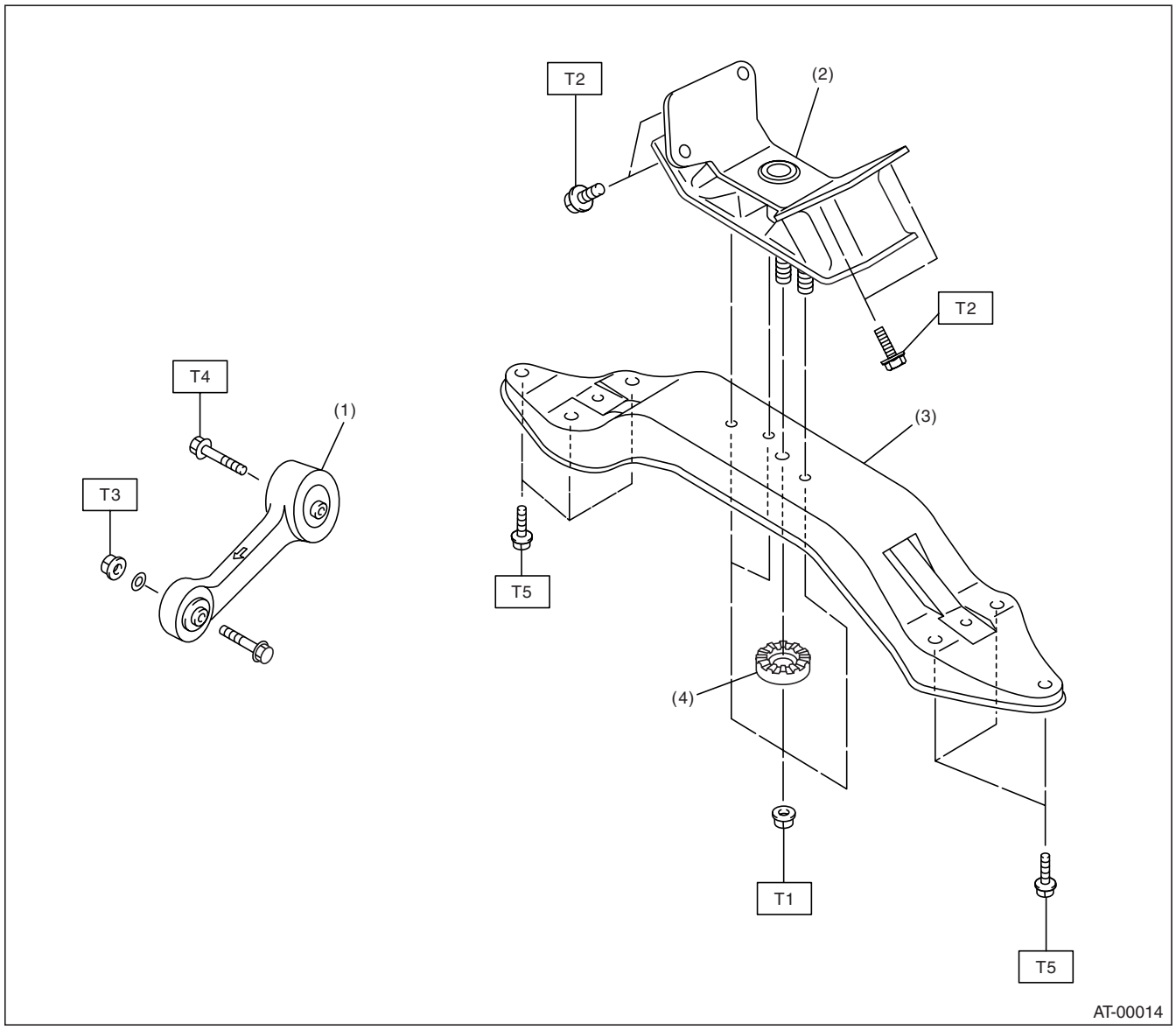
11.ATF COOLER (WITH ATF WARMER FUNCTION)



(1) ATF cooler outlet hose
(2) ATF cooler inlet hose
(3) Hose clamp
(4) ATF cooler ASSY
(5) Engine coolant inlet hose
(6) Engine coolant outlet hose
(7) ATF cooler bracket
(8) Clip

Tightening torque: N·m (kgf-m, ft-lb)
T: 23 (2.3, 17)

12.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: 40 (4.1, 29.5)
T3: 50 (5.1, 36.9)
T4: 58 (5.9, 42.8)
T5: 70 (7.1, 51.6)

C: CAUTION

• Wear work 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 and dirt.
• Do not place the oil pan with its inner side facing upward until it is installed so as to prevent foreign matter intrusion into 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 yourself, 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 a lift, a shop jack or a rigid rack at the specified position.
• Before installation, apply gear oil or ATF onto sliding or revolution surface according to purpose of part.
• Replace deformed or otherwise damaged snap rings with new ones.
• Before installing O-rings or oil seals, apply sufficient amount of ATF 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 cloth between the part and the vise.
• Avoid damaging the mating surface of the case.
• Before applying liquid gasket, completely remove the old seal.

D: PREPARATION TOOL

1. SPECIAL TOOL

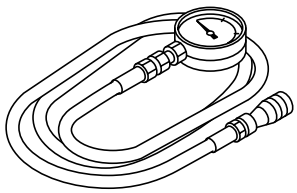
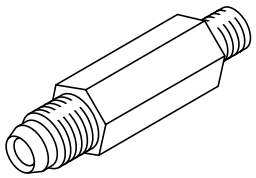
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-498575400	498575400	OIL PRESSURE GAUGE ASSY	Used for measuring oil pressure.
 ST-498897200	498897200	ADAPTER	Used for oil pump housing when measuring reverse clutch pressure and line pressure.

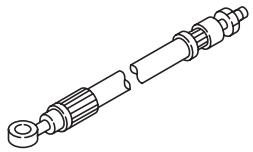
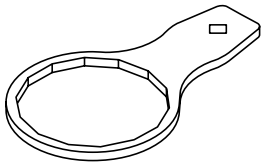
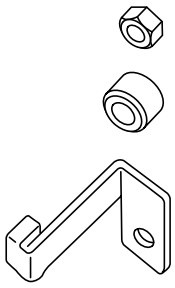
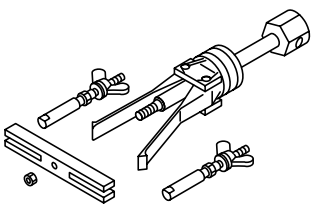
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-498897700	498897700	ADAPTER SET	Used for measuring transfer clutch pressure.
 ST-498545400	498545400	FILTER WRENCH	Used for removing and installing ATF filter.
 ST-498277200	498277200	STOPPER SET	Used for removing and installing automatic transmission assembly to engine.
 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 oil seal.

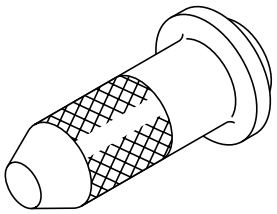
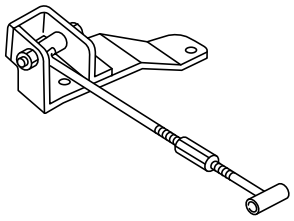
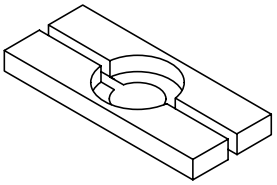
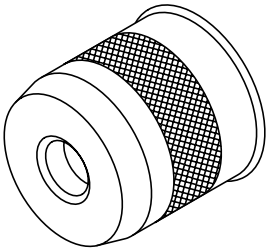
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-498057300	498057300	INSTALLER	Used for installing extension oil seal.
 ST41099AC000	41099AC000	ENGINE SUPPORT ASSY	Used for supporting engine.
 ST-498077000	498077000	REMOVER	Used for removing differential taper roller bearing.
 ST-499247400	499247400	INSTALLER	• Used for installing transfer outer snap ring. • Used with GUIDE (499257300).

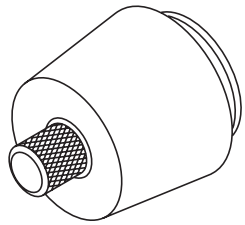
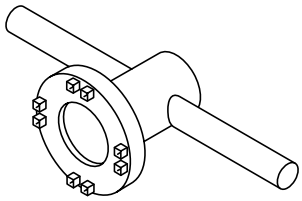
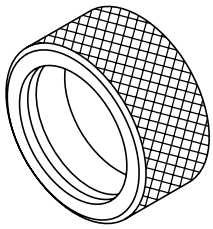
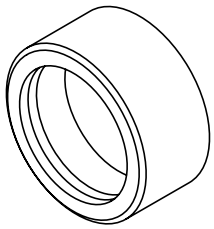
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-499257300	499257300	SNAP RING OUTER GUIDE	• Used for installing transfer outer snap ring. • Used with INSTALLER (499247400).
 ST-499787000	499787000	WRENCH ASSY	Used for removing and installing differential side retainer.
 ST-398437700	398437700	DRIFT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

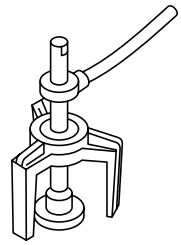
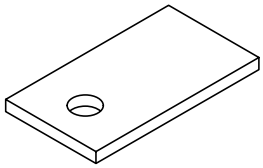
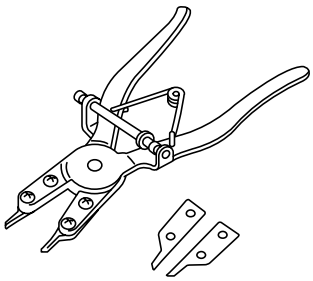
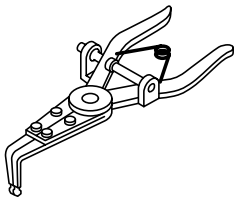
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-398673600	398673600	COMPRESSOR	Used for removing and installing clutch spring.
 ST-498255400	498255400	PLATE	Used for measuring backlash of hypoid gear.
 ST-398663600	398663600	PLIERS	Used for removing and installing clutch spring.
 ST-399893600	399893600	PLIERS	Used for removing and installing clutch spring.

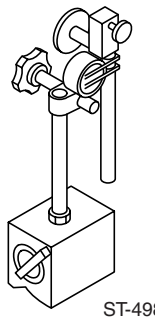
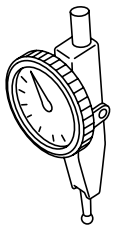
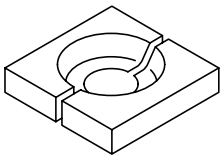
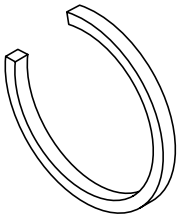
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-498247001	498247001	MAGNET BASE	• Used for measuring gear backlash. • Used with DIAL GAUGE (498247100).
 ST-498247100	498247100	DIAL GAUGE	• Used for measuring gear backlash. • Used with MAGNET BASE (498247001).
 ST-498517000	498517000	REPLACER	Used for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

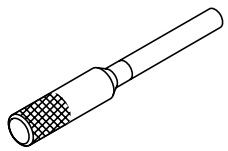
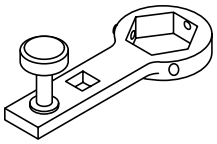
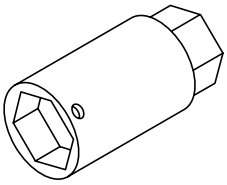
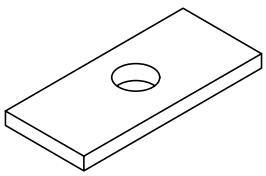
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-499267300	499267300	STOPPER PIN	Used for installing inhibitor switch.
 ST-499787700	499787700	WRENCH	Used for removing and installing drive pinion lock nut.
 ST-499787500	499787500	ADAPTER	Used for removing and installing drive pinion lock nut.
 ST-398643600	398643600	GAUGE	Used for measuring total end play, extension end play and drive pinion height.

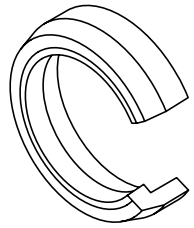
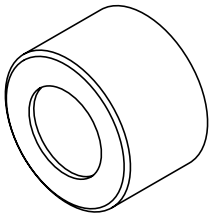
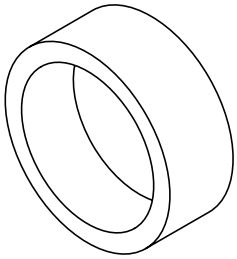
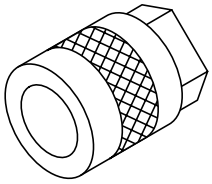
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-498627100	498627100	SEAT	Used for holding low clutch piston retainer spring when installing snap ring.
 ST-499577000	499577000	GAUGE	• Used for measuring mating surface of transmission to end of reduction gear. • For MP-T model
 ST-398744300	398744300	PISTON GUIDE	• Used for measuring height from mating surface of transmission case to pressure plate. • For VTD model
 ST-499737000	499737000	PULLER	Used for removing reduction driven gear assembly.

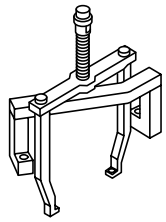
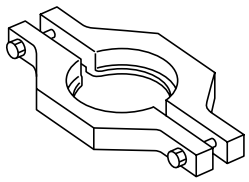
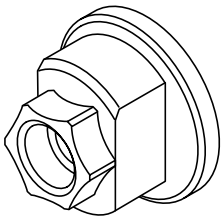
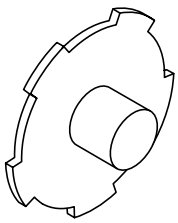
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-499737100	499737100	PULLER SET	Used for removing reduction drive gear assembly.
 ST-498077600	498077600	REMOVER	Used for removing ball bearing.
 ST-498937110	498937110	HOLDER	Used for removing and installing drive pinion lock nut.
 ST-498677100	498677100	COMPRESSOR	Used for installing 2-4 brake snap ring.

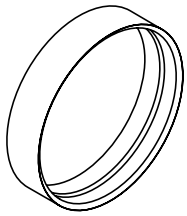
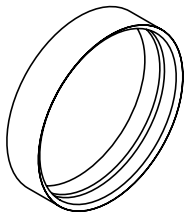
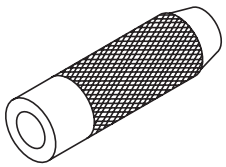
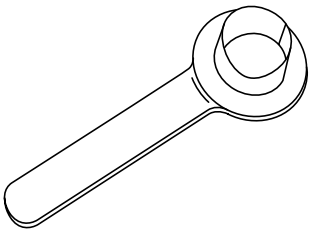
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-498437000	498437000	HIGH CLUTCH PISTON GUIDE	Used for installing high clutch piston.
 ST-498437100	498437100	LOW CLUTCH PISTON GUIDE	Used for installing low clutch piston.
 ST-899580100	899580100	INSTALLER	Used for press-fitting of ball bearing for transfer clutch.
 ST28399SA010	28399SA010	OIL SEAL PROTECTOR	Used for installing axle shaft.

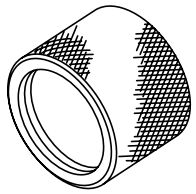
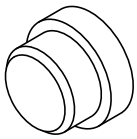
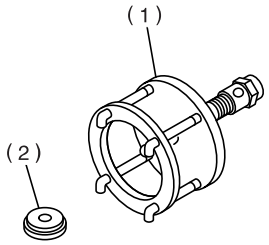
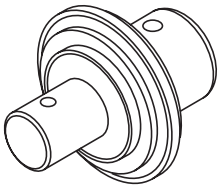
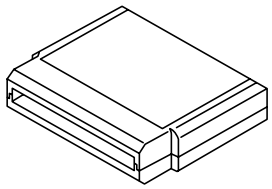
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST18675AA000	18675AA000	DIFFERENTIAL OIL SEAL INSTALLER	Used for installing differential side retainer oil seal.
 ST-398497701	398497701	SEAT	Used for installing needle bearing.
 ST-899524100	899524100	PULLER SET	Used for bolt only. • Used with PULLER SET (499737100). • Used with PULLER (499737000). (1) PULLER (2) Cap
 ST-499247300	499247300	INSTALLER	Used for installing oil pump housing retainer oil seal.

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST18482AA000	18482AA000 (Newly adopted tool)	CARTRIDGE	Troubleshooting for electrical system.
ST22771AA030	22771AA030	SUBARU SELECT MONITOR KIT	Troubleshooting for electrical system. • English: 22771AA030 (Without printer) • German: 22771AA070 (Without printer) • French: 22771AA080 (Without printer) • Spanish: 22771AA090 (Without printer)

2. GENERAL TOOL

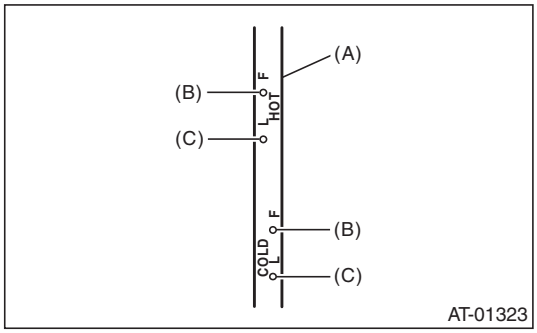
TOOL NAME	REMARKS
Depth gauge	Used for measuring transmission end play.
Thickness gauge	Used for measuring clearance of clutch, brake and oil pump.
Micro meter	Used for measuring thickness of drive pinion.
Spring balance	Used for measuring starting torque of drive pinion.
Circuit tester	Used for measuring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

2. Automatic Transmission Fluid

A: INSPECTION

NOTE:
The level of ATF varies with fluid temperature. Pay attention to the ATF 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(diag)-16, READ CURRENT DATA, OPERATION, Subaru Select Monitor.>
2) Park the vehicle on a level surface.
3) After selecting all positions (P, R, N, D), set the select lever in "P" range. Measure the ATF level with 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 between 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 fluid level exceeds the center between upper and lower marks.

CAUTION:
- **Use care not to exceed the upper level.**
- **When the transmission is cold, be careful no to add ATF to the upper mark. Overfilling of ATF may cause oil splashing.**

6) 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(diag)-16, READ CURRENT DATA, OPERATION, Subaru Select Monitor.>
7) Check the ATF for leaks.
Visually check for leaks in the transmission. If there are leaks, replace the gasket, oil seal, plug or other parts.

B: REPLACEMENT

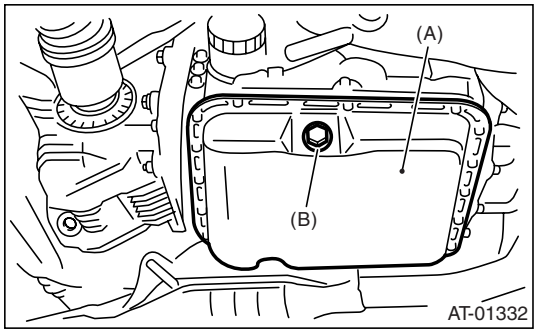
1) Lift up the vehicle.
2) Remove the ATF drain plug to drain ATF.

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

3) Check the condition of ATF. <Ref. to 4AT-32, CONDITION CHECK, Automatic Transmission Fluid.>
4) Tighten the ATF drain plug.

NOTE:
Use a new gasket.

Tightening torque:
25 N·m (2.5 kgf-m, 18.4 ft-lb)



(A) Oil pan
(B) ATF drain plug

5) Lower the vehicle.
6) Pour ATF from the oil charge pipe.

Recommended fluid:
SUBARU ATF (Part No. K0410Y0700) or IDEMITSU "Apolloil ATF HP", Castrol "Transmax J".

NOTE:
If the ATF above are not available, use Dexron III.

Capacity:
Fill the same amount of ATF when drained.

Capacity when transmission is overhauled:
2.0 L model
8.4 — 8.7 ℓ (8.9 — 9.2 US qt, 7.4 — 7.7 Imp qt)
2.5 L model
9.3 — 9.6 ℓ (9.8 — 10.1 US qt, 8.2 — 8.4 Imp qt)

7) Bleed the air of control valve.
<Ref. to 4AT-64, Air Bleeding of Control Valve.>
8) Check the level and leaks of ATF.
<Ref. to 4AT-31, INSPECTION, Automatic Transmission Fluid.>

C: CONDITION CHECK

NOTE:
When replacing ATF, check the inside condition of transmission body by inspecting the drained ATF.

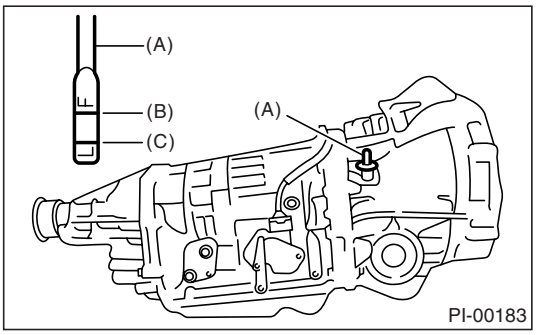
Fluid condition	Trouble and possible cause	Corrective action
Large amount of metallic pieces are found.	Excessive wear of the internal of the transmission body	Replace ATF and check if AT operates correctly.
Thick and varnish-form fluid	Burned clutch and etc.	Replace ATF and check the AT body or vehicle for faulty.
Clouded fluid or bubbles are found in fluid.	Water mixed in fluid	Replace ATF and check the water entering point.

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 the level gauge again and note the reading. If the differential gear oil level is below "L" line, add oil to bring the level up to "F" line.

NOTE:
To prevent overfilling the differential gear oil, do not fill oil above the "F" line.



(A) Oil level gauge
(B) Upper level
(C) Lower level

B: REPLACEMENT

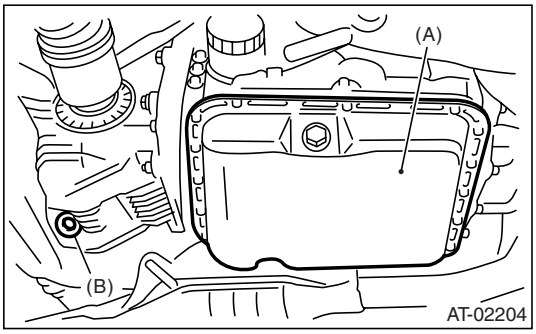
1) Lift up the vehicle.
2) Remove the differential gear oil drain plug using TORX® BIT T70, and drain the differential gear oil completely.

CAUTION:
• Directly after the vehicle has been running, 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) Tighten the differential gear oil drain plug using TORX® BIT T70.

NOTE:
Use a new gasket.

Tightening torque:
Aluminum gasket
44 N·m (4.5 kgf-m, 32.5 ft-lb)
Copper gasket:
70 N·m (7.1 kgf-m, 51.6 ft-lb)



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

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

Recommended gear oil:
<Ref. to 4AT-3, RECOMMENDED GEAR OIL, SPECIFICATION, General Description.>

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-33, INSPECTION, Differential Gear Oil.>

4. Road Test

A: INSPECTION

1. GENERAL PRECAUTION

Road tests should be conducted to properly diagnose the condition of 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 down from 4th to 3rd range while driving in 4th gear of manual mode [50 — 60 km/h (31 — 37 MPH)].
• Check the 2nd gear engine brake when shifting down from 3rd to 2nd range while driving in 3rd gear of manual mode [40 — 50 km/h (25 — 31 MPH)].
• Check the 1st gear engine brake when shifting down from 2nd to 1st range while driving in 2nd gear of manual mode [20 — 30 km/h (12 — 19 MPH)].

6. LOCK-UP FUNCTION

• Check that rpm does not change sharply when the axle pedal is lightly depressed while driving on flat roads at normal speed in “D” range.
• Check slip lock-up with following procedure. Subaru Select Monitor is needed for checking.
Before start checking, check that no DTC is displayed using Subaru Select Monitor. When DTC is displayed, perform the collective action with DTC and check that no more DTC is displayed, and then start the checking.
1) Perform the check on flat and straight road or free roller.

NOTE:
• Slip lock-up does not operate when vehicle is lifted up, because of no surface resistance.
• When checking on the free roller, it is easier to check with the foot brake lightly depressed, since the surface resistance will also be deficient.

2) Connect the Subaru Select Monitor.
3) Check the ATF temperature using Subaru Select Monitor.

NOTE:
• ATF temperature is between 50 — 100°C (122 — 212°F).
• When the temperature is low, warm-up the ATF by running the vehicle or etc.

4) Start the engine, so that the lock-up duty can be read on data display of Subaru Select Monitor.
5) Drive the vehicle at a constant speed of 35 — 40 km/h (22 — 25 MPH).
6) Read the lock-up duty while vehicle is running.

Specification:
25 — 45%

NOTE:
The value may be lower on the free roller.

• Slip lock-up control is not operating when the lock-up duty is less than 5%, or when the lock-up duty goes down immediately after starts rising. On these cases, improper ATF or deterioration of ATF may be the cause. Check the amount of ATF or replace them, and then recheck it.

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. NOISE AND VIBRATION

Check for noise 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 tight corner braking when the vehicle started with steering fully turned.

11.OIL LEAKAGE

After the driving test, inspect for oil leaks.

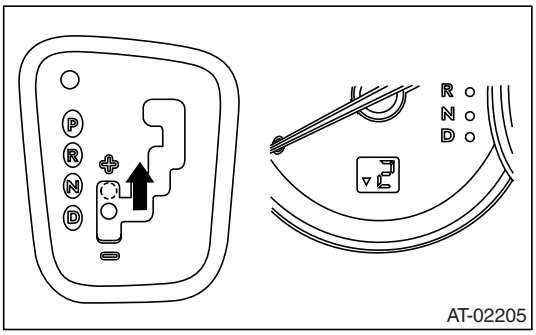
5. Stall Test

A: INSPECTION

NOTE:
The stall test is of extreme importance in diagnosing the condition of automatic transmission and engine. It should be conducted to measure the engine stall speeds in “R” and “2nd of manual mode”.
Purposes of the stall test:

- To check the operation of automatic transmission clutch.
- To check the operation of torque converter clutch.
- To check engine performance.

1) Check that the throttle valve opens fully.
2) Check that the engine oil level is correct.
3) Check that the coolant level is correct.
4) Check that the ATF level is correct.
5) Check that the differential gear oil level is correct.
6) Increase ATF temperature to 70 — 80°C (158 — 176°F) by idling the engine for approximately 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 then set to the 2nd on manual mode.



9) While depressing the brake pedal strongly, depress the accelerator pedal gradually.
10) When the engine speed is stabilized, quickly record that speed 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) f the stall speed in the 2nd of manual mode 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 perform the stall test for more than five 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 one minute with the select lever set in “P” or “N” range and with the idle speed lower than 1,200 rpm after performing stall test.
- If the stall speed is higher than the specified range, attempt to finish the stall test in as short a time as possible, in order to prevent the automatic transmission from sustaining damage.

Stall speed (at sea level):
2.0 L model
2,000 — 2,500 rpm
2.5 L model
2,300 — 2,800 rpm

Stall speed (at sea level)	Range	Cause
Less than specification	2nd gear of manual mode, R	• Throttle valve not fully open • Erroneous engine operation • Torque converter clutch’s one-way clutch slipping
More than specification	D	• Line pressure is too low • Low clutch slipping • One-way clutch malfunctioning
	R	• Line pressure is too low • Reverse clutch slipping • Low & reverse brake slipping
	2nd gear of manual mode	• Line pressure is too low • Low clutch slipping • 2-4 brake slipping

6. Time Lag Test

A: INSPECTION

NOTE:
When 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 operation fluid temperature 70 — 80°C (158 — 176°F).
- Be sure to allow a one minute interval between tests.
- Make three measurements and take the average value.

1) Fully apply the parking brake.
2) Start the engine.
Check the idle speed (A/C OFF).
3) Shift the select lever from “N” to “D” range.
Using a stop watch, measure the time which takes from shifting the lever until the shock is felt.

Time lag
Specification: 1.2 seconds or less

If “N” → “D” time lag is longer than specified:
- Line pressure too low
- Low clutch worn
- One-way clutch not operating properly
- D-ring for wear

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

Time lag
Specification: 1.5 seconds or less

If “N” → “R” time lag is longer than specified:
- Line pressure too low
- Reverse clutch worn
- Low & reverse brake worn
- D-ring for wear

7. Line Pressure Test

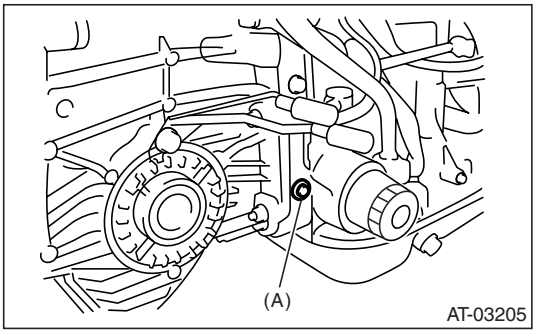
A: MEASUREMENT

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 up-shift 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 line pressure, jack-up all the wheels.
   (2) Maintain the temperature of ATF at approx. 70 — 80°C (158 — 176°F) during measurement. (ATF will reach the temperature mentioned above after idling the engine for approx. 30 minutes with the select lever in “N” or “P”.)
2) Line pressure measurement (under heavy load):
   (1) Before measuring line pressure, apply both the foot and parking brakes with all wheels chocked (Same as for “stall” test conditions).
   (2) Measure the line pressure when the select lever is in “R” or 2nd of manual mode with engine under stall conditions.
   (3) Measure the line pressure within 5 seconds after shifting the select lever to each position. (If the line pressure needs to be measured again, allow the engine to idle and cool it down more than 1 minute.)
   (4) Maintain the ATF temperature at approx. 70 — 80°C (158 — 176°F) during measurement. (ATF will reach the temperature mentioned above after idling the engine for approx. 30 minutes with the select lever in “N” or “P”.)
3) Remove the test plug and install the ST instead.

ST 498897200 OIL PRESSURE GAUGE ADAPTER



(A) Test plug

4) Connect the ST1 with ST2.

ST1 498897200 OIL PRESSURE GAUGE ADAPTER
ST2 498575400 OIL PRESSURE GAUGE ASSY

5) Check for duty ratio changes by adjusting the acceleration pedal position using Subaru Select Monitor.

Specified line pressure			
Range position	Line pressure duty ratio (%)	Throttle valve angle	Line pressure kPa (kgf/cm^2, psi)
Manual mode (2nd)	25 — 35	Full open	1,000 — 1,300 (10.2 — 13.3, 145 — 189)
R	15 — 25	Full open	1,500 — 1,850 (15.3 — 18.9, 217 — 268)
D	35 — 43	Full closed	500 — 800 (5.1 — 8.2, 73 — 116)

8. Transfer Clutch Pressure Test

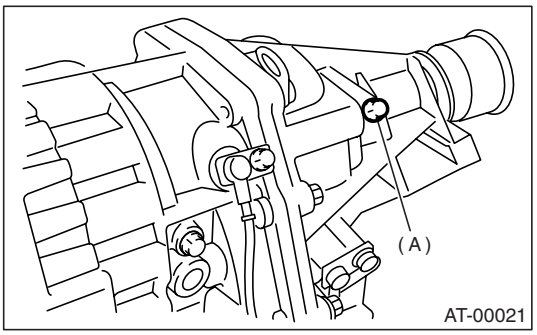
A: INSPECTION

Check the transfer clutch pressure in accordance with the following chart in the same manner as with line pressure. <Ref. to 4AT-37, Line Pressure Test.>

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

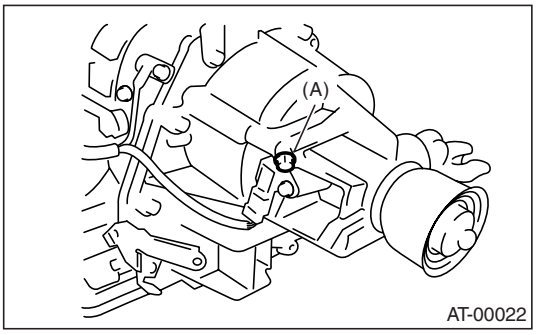
NOTE:
• Before setting in FWD mode, install the spare fuse on FWD mode switch. (MP-T model)

• MP-T model



(A) Test plug

• VTD model



(A) Test plug

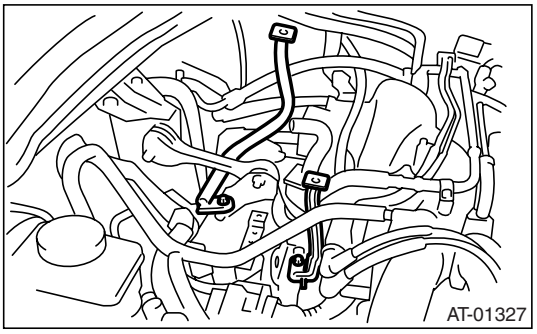
• If no oil pressure is produced or if it does not change in AWD mode, the control valve body may be malfunctioning. If the oil pressure is produced in FWD mode, the same defective as AWD mode occurs.

Range position	ON Duty ratio (%)	Accelera-tion pedal position (%)	Standard transfer clutch pressure kPa (kgf/cm^2, psi)	
			AWD mode	FWD mode
Manual mode (2nd)	95	Fully opened (100)	1,000 — 1,200 (10.2 — 12.2, 145 — 174)	—
	60	Adjust ON Duty ratio to 60%.	500 — 700 (5.1 — 7.1, 73 — 102)	—
	—	Fully closed (0)	—	0 (0, 0)
N or P	5	Fully closed (0)	0	—

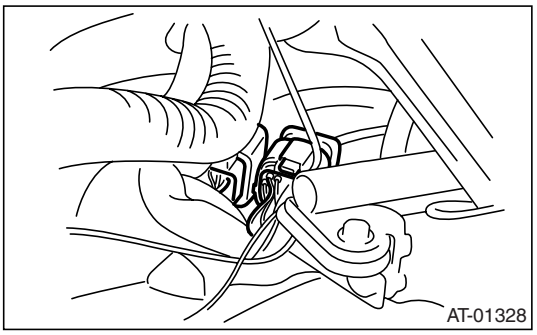
9. Automatic Transmission Assembly

A: REMOVAL

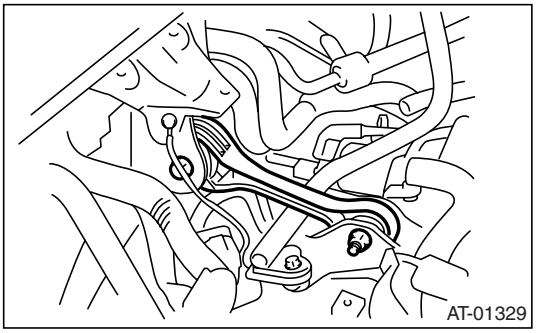
1) Set the vehicle on a lift.
2) Fully open the front hood and support with hood stay.
3) Disconnect the ground cable from battery.
4) Remove the air intake duct.
<Ref. to IN(H4SO 2.0)-8, REMOVAL, Air Intake Duct.>
5) Remove the air intake chamber.
<Ref. to IN(H4SO 2.0)-7, REMOVAL, Air Intake Chamber.>
6) Remove the air cleaner case stay.



7) Disconnect the following connectors.
(1) Transmission harness connectors

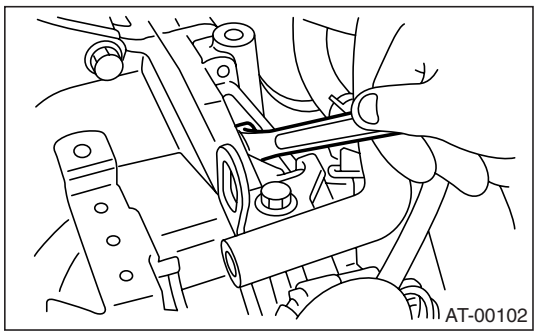


(2) Transmission ground terminal
8) Remove the starter.
<Ref. to SC(H4SO 2.0)-6, REMOVAL, Starter.>
9) Remove the pitching stopper.

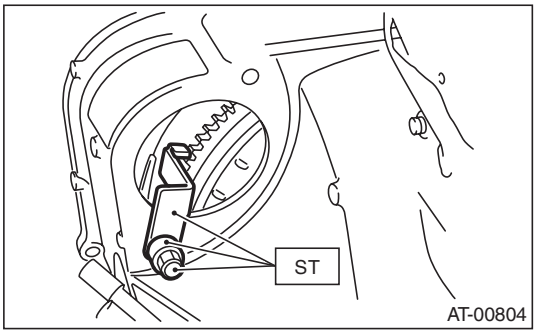


10) Separate the torque converter clutch from drive plate.
(1) Remove the V-belt covers.
(2) Remove the service hole plug.
(3) Remove the bolts which hold torque converter clutch to drive plate.
(4) Insert the wrench to crank pulley bolt, and then remove all the bolts with gradually rotating crank pulley.

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

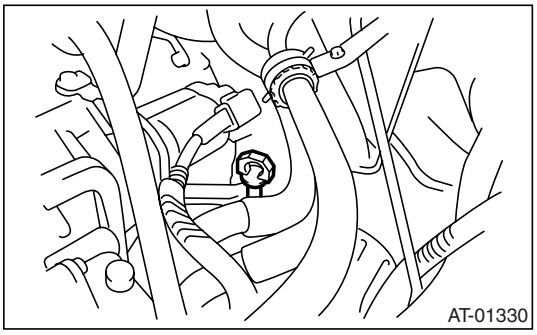


11) Install the ST to converter case.
ST 498277200 STOPPER SET



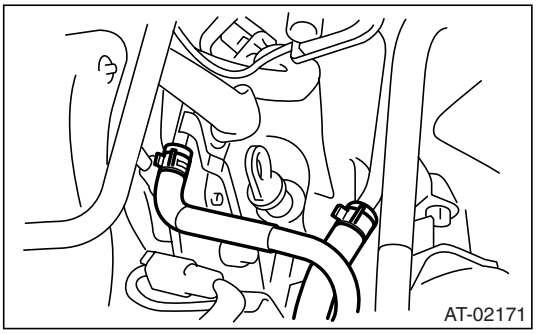
12) Remove the ATF level gauge.

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

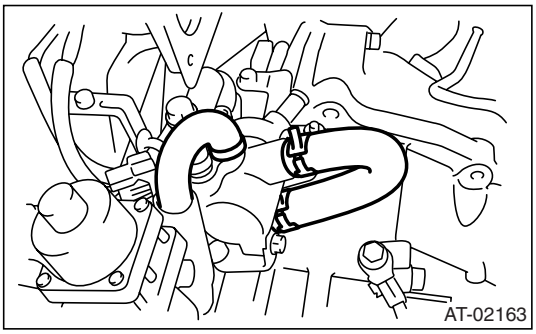


13) Remove the throttle body. <Ref. to FU(H4SO 2.0)-10, REMOVAL, Throttle Body.>

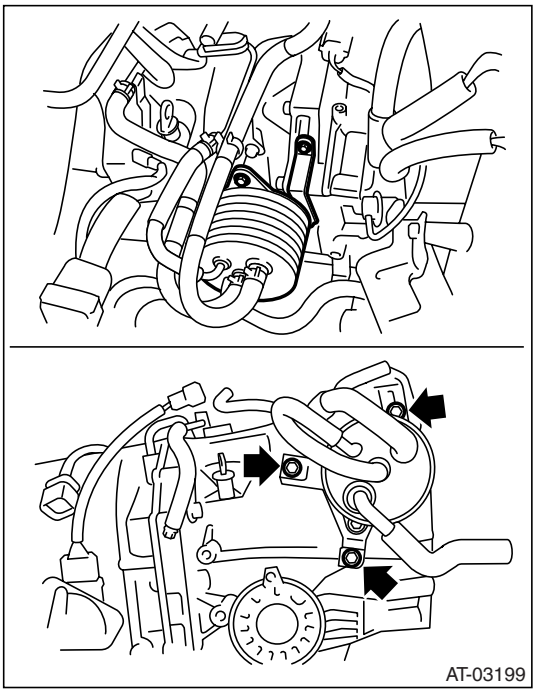
14) Drain engine coolant approx. 2 ℓ (2.1 US qt, 1.8 Imp qt). (Model with ATF cooler with warmer function)
15) Disconnect the ATF cooler inlet and outlet hoses from ATF cooler pipes.



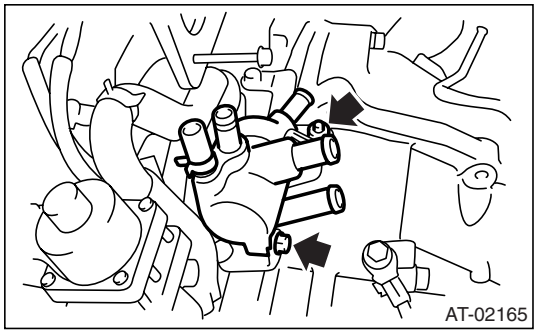
16) Disconnect each hose from warmer cock assembly.



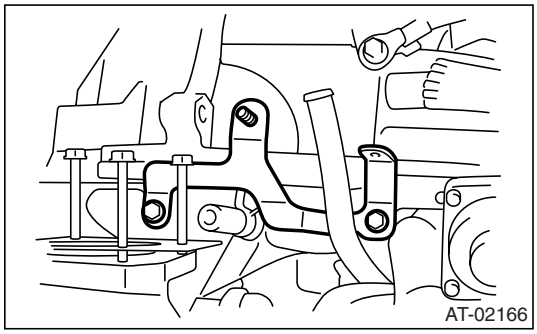
17) Remove the ATF cooler with warmer function from transmission body, and then secure it to vehicle body by wire, etc. Select the place not to prevent transmission from being replaced. (Model with ATF cooler with warmer function)



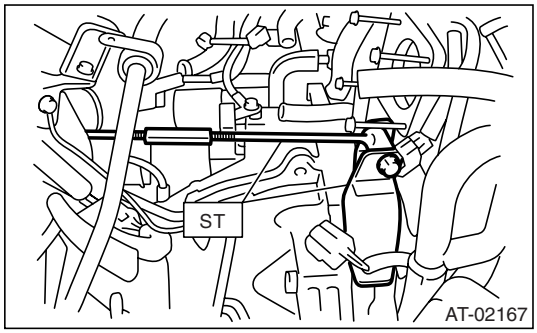
18) Remove the warmer cock assembly. (Model with ATF cooler with warmer function)



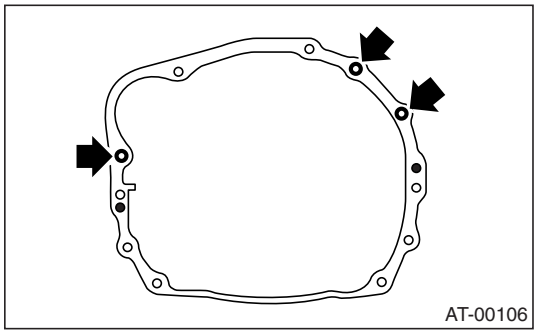
19) Remove the bracket of warmer cock assembly. (Model with ATF cooler with warmer function)



20) Remove the pitching stopper bracket.
21) Set the ST.
ST 41099AC000 ENGINE SUPPORT ASSEMBLY

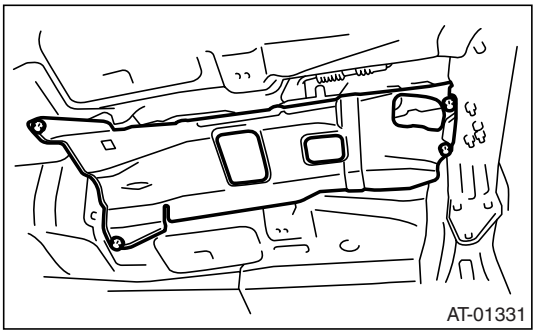


22) Remove the bolts which install upper side of transmission to engine.

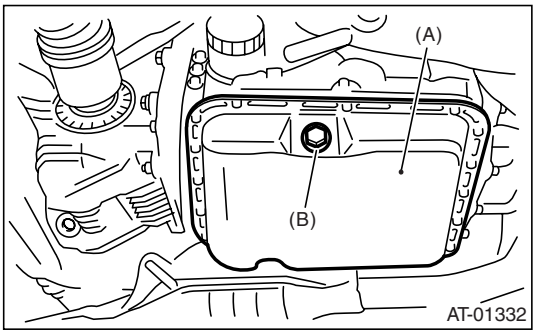


23) Lift up the vehicle.
24) Remove the under cover.

25) Remove the front, center and rear exhaust pipes and muffler.
<Ref. to EX(H4SO 2.0)-6, REMOVAL, Front Exhaust Pipe.> <Ref. to EX(H4SO 2.0)-10, REMOVAL, Rear Exhaust Pipe.> <Ref. to EX(H4SO 2.0)-12, REMOVAL, Muffler.>
26) Remove the heat shield cover.

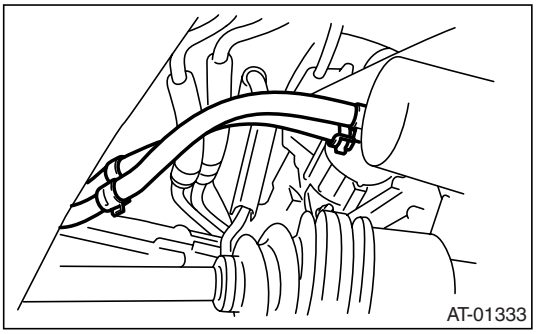


27) Remove the ATF drain plug to drain ATF.

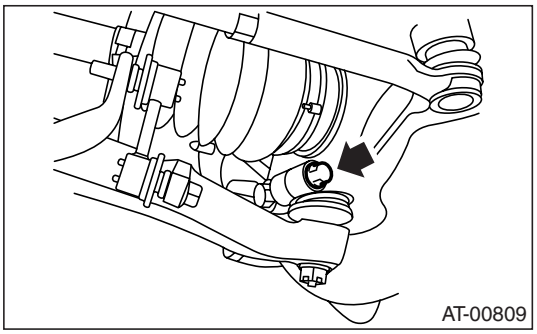


(A) Oil pan
(B) ATF drain plug

28) Disconnect the ATF cooler hoses from pipes of transmission side, and remove the oil charge pipe. (Model without ATF cooler with warmer function)



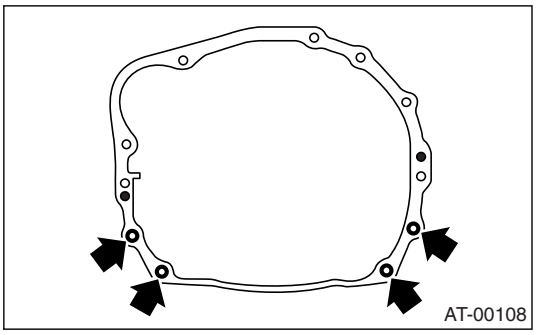
29) Remove the propeller shaft.
<Ref. to DS-10, REMOVAL, Propeller Shaft.>
30) Remove the shift select cable.
<Ref. to CS-27, REMOVAL, Select Cable.>
31) Remove the brackets (two) which hold front stabilizer.
32) Remove the ball joint of front arm from housing.



33) Pull out the front drive shaft from transmission.
(1) Using a tire lever or a pinch bar, etc., pull out the front drive shaft until its joint facing to transmission can move smoothly.

NOTE:
Place a cloth between tire lever or pinch bar and transmission in order to avoid damaging the side retainer of transmission.

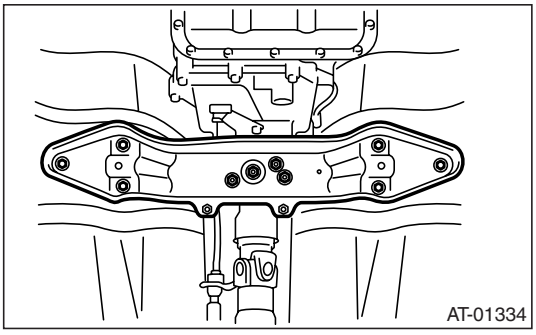
(2) Hold the transmission side joint portion of front drive shaft by hand and extract the housing from the transmission by pressing it outside so as not to stretch the boot.
34) Remove the bolts which hold the clutch housing cover.
35) Remove the bolts which install lower side of the transmission to engine.



36) Place the transmission jack under transmission.

NOTE:
Make sure that the support plates of transmission jack do not touch the oil pan.

37) Remove the transmission rear crossmember from the vehicle.

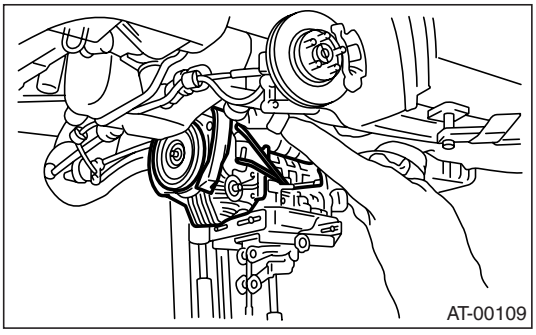


38) While lowering the transmission jack gradually, retract the engine support fully, and then tilt the engine backward.

NOTE:
Retract the support until the clearance between front crossmember and torque converter case becomes approx. 10 mm (0.39 in).

39) Remove the transmission.

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



40) Remove the rear cushion rubber from transmission assembly.

B: INSTALLATION

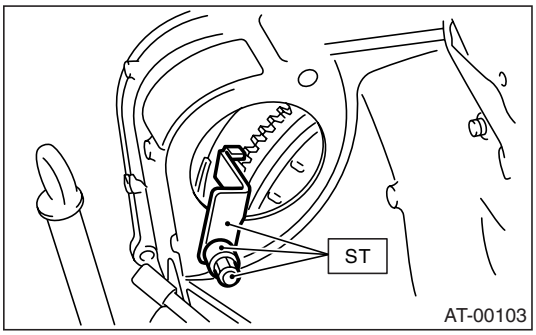
1) Replace the differential side oil seal with new one.

NOTE:
When a new oil seal has been installed, the replacement is not required.

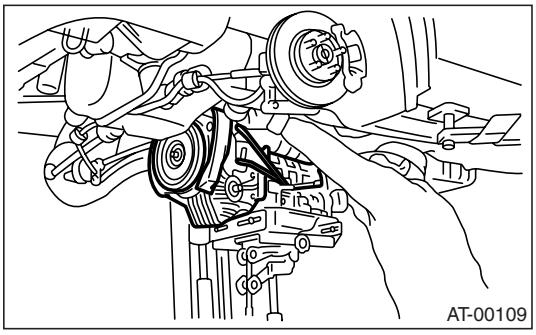
2) Install the rear cushion rubber to transmission assembly.

Tightening torque:
40 N·m (4.1 kgf-m, 29.5 ft-lb)

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



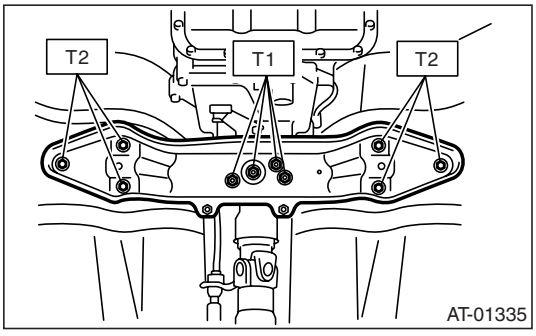
4) Install the transmission onto engine.
(1) Lift up the transmission gradually using a transmission jack.



(2) Engage them at spline portion.
(3) While lowering the transmission jack gradually, rotate the screw of engine support, and then tilt the engine forward.

5) Install the transmission rear crossmember.

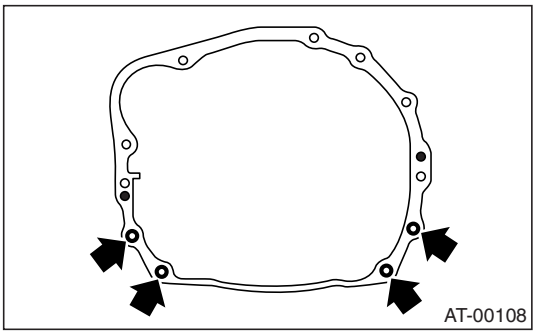
Tightening torque:
T1: 35 N·m (3.6 kgf-m, 26 ft-lb)
T2: 70 N·m (7.1 kgf-m, 51.6 ft-lb)



6) Take off the transmission jack.

7) Tighten the bolts which install lower side of transmission to engine.

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



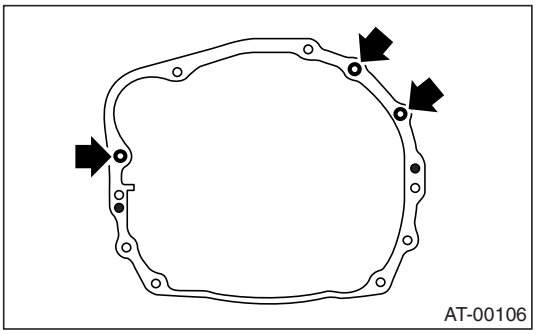
8) Screw the bolts for the clutch housing cover.
9) Lower the lift.
10) Connect the engine and transmission.
(1) Remove the ST from converter case.

NOTE:
When removing the ST, be careful not to drop it into converter case.

ST 498277200 STOPPER SET

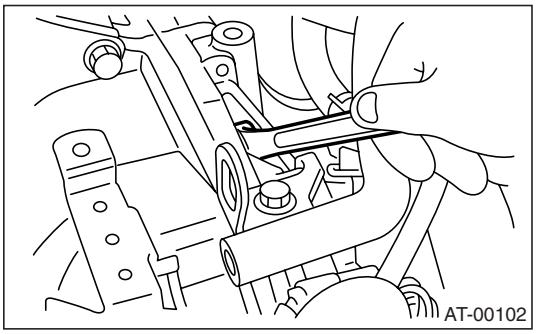
(2) Install the starter.
<Ref. to SC(H4SO 2.0)-6, INSTALLATION, Starter.>
(3) Tighten the bolts which install upper side of transmission to engine.

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

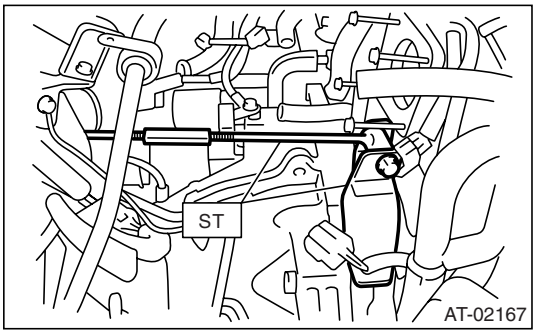


11) Install the torque converter clutch to drive plate.
(1) Tighten the bolts which install torque converter clutch to drive plate.
(2) Insert the wrench to crank pulley bolt, and then tighten all bolts while slightly rotating the crank pulley.

Tightening torque:
25 N·m (2.5 kgf-m, 18.4 ft-lb)

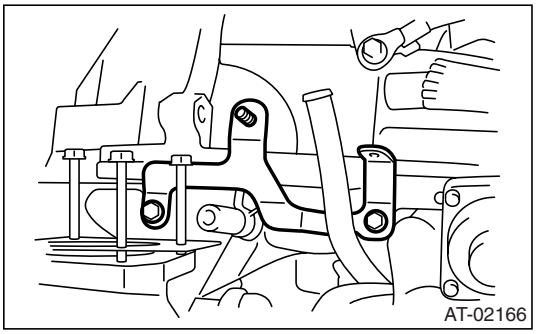


(3) Install the plug to service hole.
(4) Install the V-belt cover.
12) Remove the ST.



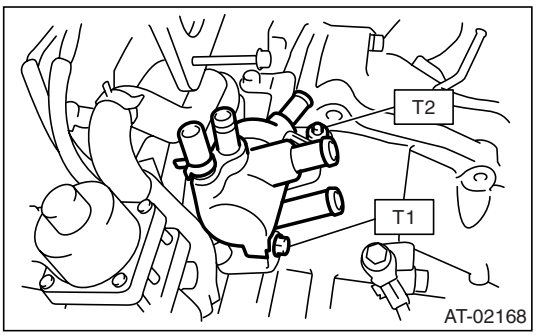
13) Install the bracket of warmer cock assembly. (Model with ATF cooler with warmer function)

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

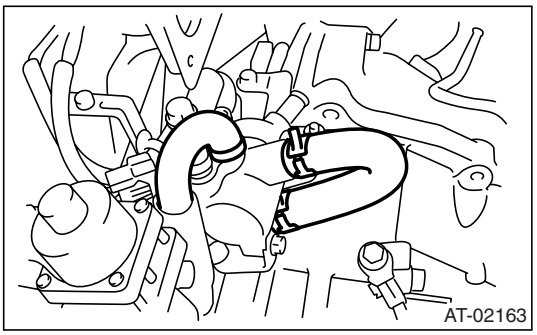


14) Install the warmer cock assembly. (Model with ATF cooler with warmer function)

Tightening torque:
T1: 6.4 N·m (0.65 kgf-m, 4.7 ft-lb)
T2: 15 N·m (1.5 kgf-m, 11.1 ft-lb)

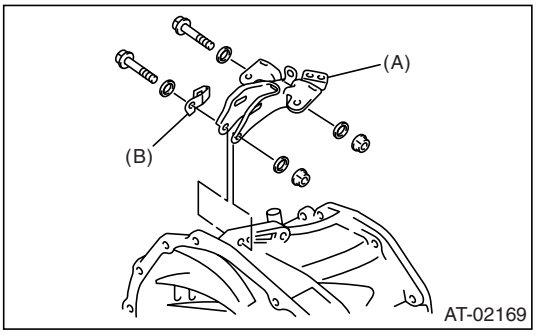


15) Connect each hose to warmer cock assembly. (Model with ATF cooler with warmer function)



16) Install the pitching stopper bracket and bracket (Model with ATF cooler with warmer function).

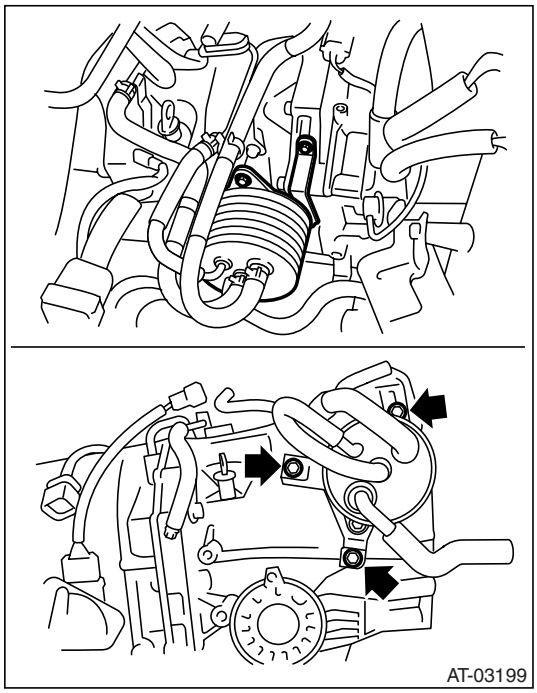
Tightening torque:
41 N·m (4.2 kgf-m, 30.4 ft-lb)



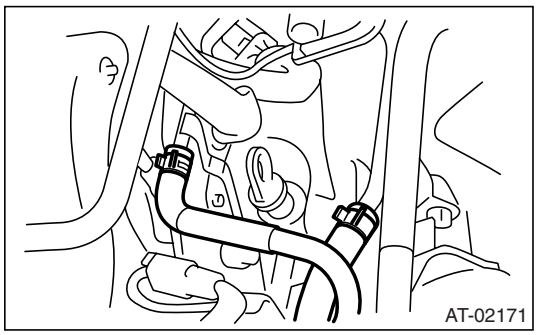
(A) Pitching stopper bracket
(B) Bracket (Model with ATF cooler with warmer function)

17) Install the ATF cooler with warmer function to transmission. (Model with ATF cooler with warmer function)

Tightening torque:
23 N·m (2.3 kgf-m, 17 ft-lb)



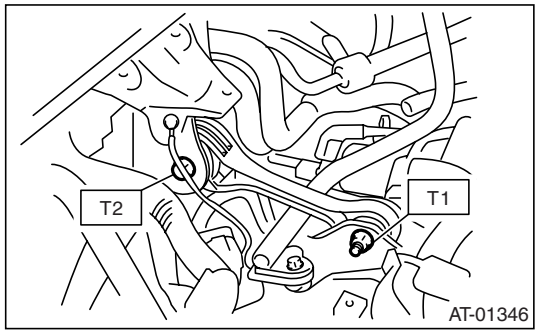
18) Connect the ATF cooler inlet and outlet hoses to ATF cooler pipes. (Model with ATF cooler with warmer function)



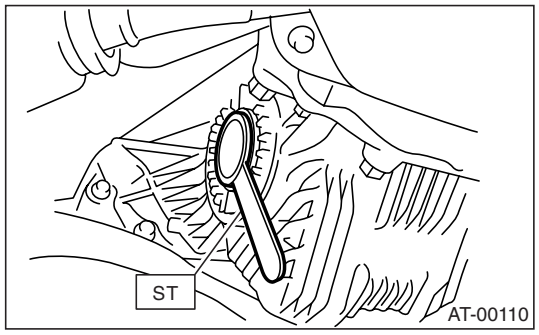
19) Install the throttle body. <Ref. to FU(H4SO 2.0)-10, INSTALLATION, Throttle Body.>

20) Install the pitching stopper.

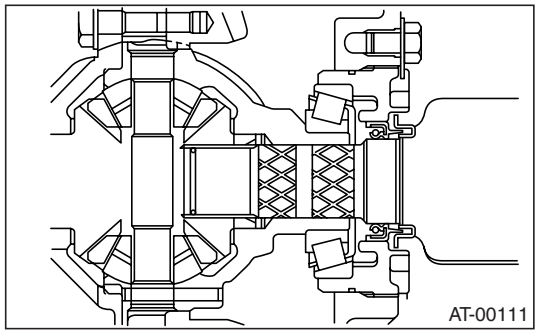
Tightening torque:
T1: 50 N·m (5.1 kgf-m, 36.9 ft-lb)
T2: 58 N·m (5.9 kgf-m, 42.8 ft-lb)



21) Lift up the vehicle.
22) Replace the snap ring of front drive shaft with a new one.
23) Apply grease to oil seal lips.
24) Install the ST to side retainer.
ST 28399SA010 OIL SEAL PROTECTOR



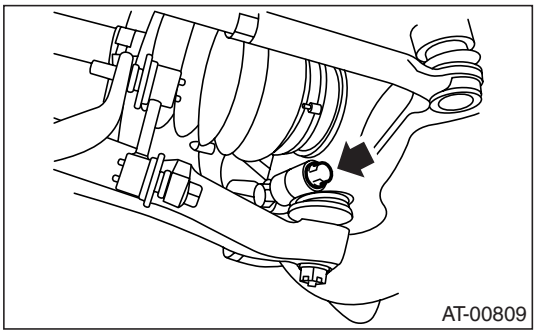
25) Align the spline of front differential shaft to that of differential bevel gear for insertion, and remove them using ST.
ST 28399SA010 OIL SEAL PROTECTOR
26) Insert the front drive shaft into transmission securely by pressing the front housing from outside.



27) Install the ball joint to housing.

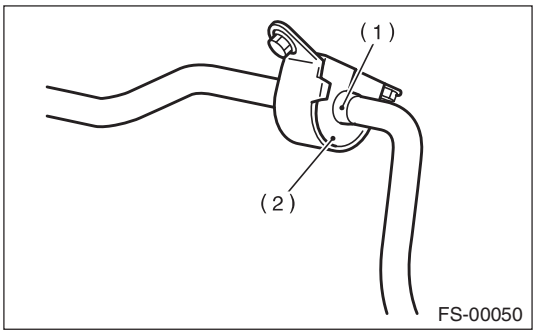
28) Tighten the mounting bolt.

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



29) Install the stabilizer to crossmember.

NOTE:
• Install the bushing (on front crossmember side) while aligning it with the paint mark on stabilizer.
• Ensure the bushing and stabilizer have the same identification colors when installing.



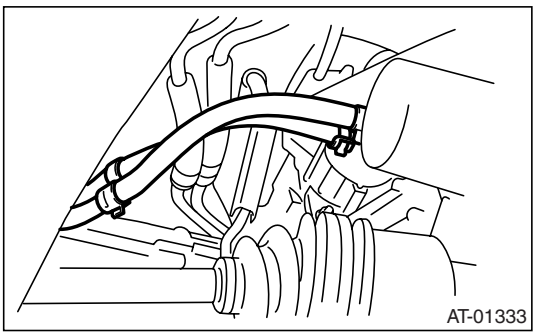
(1) Identification mark on stabilizer
(2) Bushing identification color

30) Always tighten the rubber bushing location when wheels are in full contact with the ground and vehicle is curb weight.

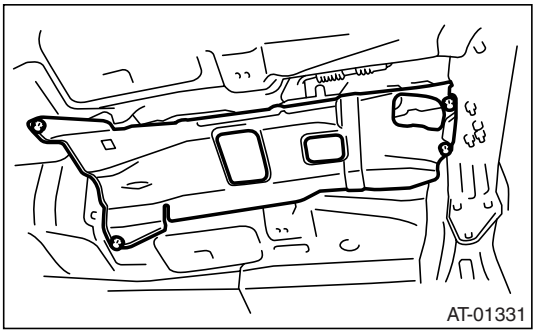
Tightening torque:
25 N·m (2.5 kgf-m, 18.4 ft-lb)

31) Install the shift select cable onto select lever.
<Ref. to CS-28, INSTALLATION, Select Cable.>

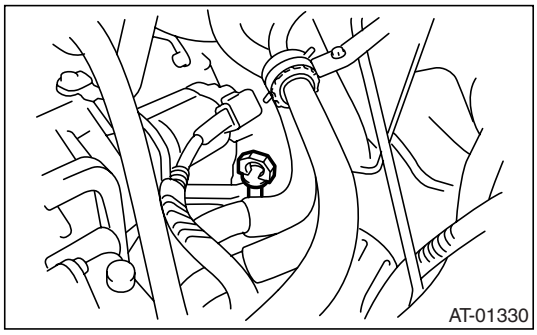
32) Install the oil charge pipe, and connect the ATF cooler hoses to pipe. (Model without ATF cooler with warmer function)



33) Install the oil charge pipe. (Model with ATF cooler with warmer function)
34) Install the propeller shaft.
<Ref. to DS-11, INSTALLATION, Propeller Shaft.>
35) Install the heat shield cover.



36) Install the rear exhaust pipe and muffler assembly.
<Ref. to EX(H4SO 2.0)-10, INSTALLATION, Rear Exhaust Pipe.> <Ref. to EX(H4SO 2.0)-12, INSTALLATION, Muffler.>
37) Install the front and center exhaust pipe.
<Ref. to EX(H4SO 2.0)-7, INSTALLATION, Front Exhaust Pipe.>
38) Install the under cover.
39) Lower the lift.
40) Install the ATF level gauge.



41) Connect the following connectors.
(1) Transmission harness connectors
(2) Transmission ground terminal
42) Install the air cleaner case stay.

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

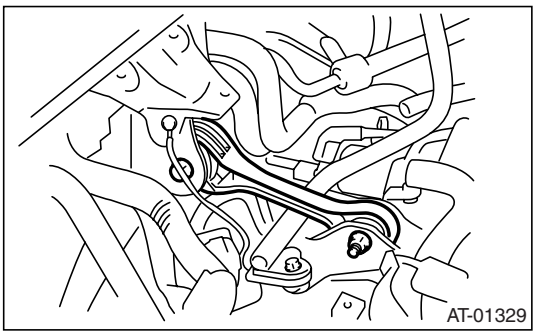
43) Install the air intake chamber.
<Ref. to IN(H4SO 2.0)-7, INSTALLATION, Air Intake Chamber.>
44) Install the air intake duct.
<Ref. to IN(H4SO 2.0)-8, INSTALLATION, Air Intake Duct.>
45) Using a gauge hole, add the ATF until the fluid level is found at the center between upper and lower levels of level gauge “COLD” side. <Ref. to 4AT-31, Automatic Transmission Fluid.>
46) Take off the vehicle from a lift.
47) Check the level of differential gear oil. <Ref. to 4AT-33, Differential Gear Oil.>
48) Check the select lever operation.
<Ref. to 4AT-51, INSPECTION, Inhibitor Switch.>
49) Bleed the air of control valve. <Ref. to 4AT-64, Air Bleeding of Control Valve.>
50) Check the ATF level. <Ref. to 4AT-31, Automatic Transmission Fluid.>
51) Execute the learning control promotion. <Ref. to 4AT(diag)-18, FACILITATION OF LEARNING CONTROL, OPERATION, Subaru Select Monitor.>
52) Perform the road test.
<Ref. to 4AT-34, Road Test.>

10. Transmission Mounting System

A: REMOVAL

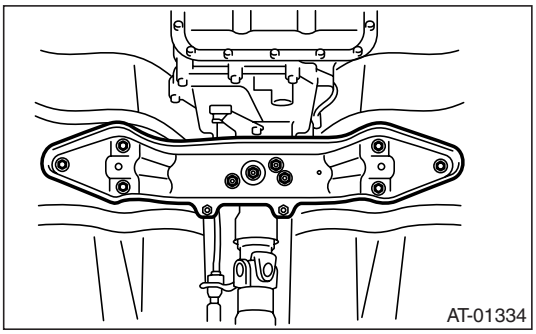
1. PITCHING STOPPER

1) Remove the air intake chamber.
<Ref. to IN(H4SO 2.0)-7, REMOVAL, Air Intake Chamber.>
2) Remove the pitching stopper.



2. TRANSMISSION REAR CROSSMEMBER & REAR CUSHION RUBBER

1) Disconnect the ground cable from battery.
2) Lift up the vehicle.
3) Remove the front, center and rear exhaust pipes and muffler.
<Ref. to EX(H4SO 2.0)-6, REMOVAL, Front Exhaust Pipe.> <Ref. to EX(H4SO 2.0)-10, REMOVAL, Rear Exhaust Pipe.> <Ref. to EX(H4SO 2.0)-12, INSTALLATION, Muffler.>
4) Remove the heat shield cover.
5) Set the transmission jack under the transmission. Make sure that the support plate of transmission jack does not touch the oil pan.
6) Remove the transmission rear crossmember.



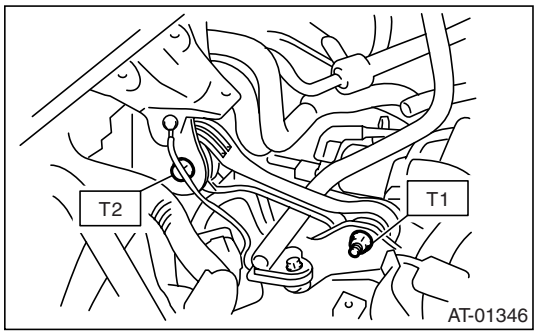
7) Remove the rear cushion rubber.

B: INSTALLATION

1. PITCHING STOPPER

1) Install the pitching stopper.

Tightening torque:
T1: 50 N·m (5.1 kgf-m, 36.9 ft-lb)
T2: 58 N·m (5.9 kgf-m, 42.8 ft-lb)



2) Install the air intake chamber.
<Ref. to IN(H4SO 2.0)-7, INSTALLATION, Air Intake Chamber.>

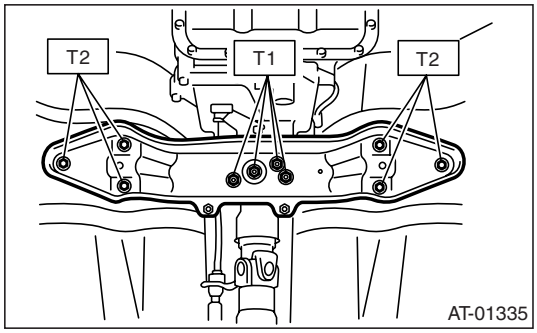
2. TRANSMISSION REAR CROSSMEMBER & REAR CUSHION RUBBER

1) Install the rear cushion rubber.

Tightening torque:
40 N·m (4.1 kgf-m, 29.5 ft-lb)

2) Install the crossmember.

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



3) Remove the transmission jack.
4) Install the heat shield cover.
5) Install the front, center and rear exhaust pipes and muffler.
<Ref. to EX(H4SO 2.0)-7, INSTALLATION, Front Exhaust Pipe.> <Ref. to EX(H4SO 2.0)-10, INSTALLATION, Rear Exhaust Pipe.> <Ref. to EX(H4SO 2.0)-12, INSTALLATION, Muffler.>

C: INSPECTION

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

1. PITCHING STOPPER

Make sure that the pitching stopper is not bent or damaged. Ensure there are no cracks, hardening or damage on rubbers.

2. TRANSMISSION REAR CROSSMEMBER & REAR CUSHION RUBBER

Make sure that the crossmember is not bent or damaged. Ensure there are no cracks, hardening, or damage on cushion rubbers.

11.Extension Case Oil Seal

A: INSPECTION

Inspect there is no ATF leakage from the joint of transmission and propeller shaft. If leaked, replace the oil seal. <Ref. to 4AT-49, REPLACEMENT, Extension Case Oil Seal.>

B: REPLACEMENT

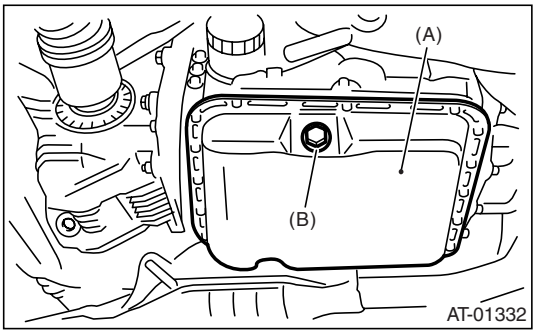
1) Lift up the vehicle.
2) Clean the transmission exterior.
3) Remove the ATF drain plug to drain ATF.

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

4) Tighten the ATF drain plug.

NOTE:
Use a new gasket.

Tightening torque:
25 N·m (2.5 kgf-m, 18.4 ft-lb)



(A) Oil pan
(B) ATF drain plug

5) Remove the rear exhaust pipe and muffler. <Ref. to EX(H4SO 2.0)-10, REMOVAL, Rear Exhaust Pipe.> <Ref. to EX(H4SO 2.0)-12, REMOVAL, Muffler.>
6) Remove the heat shield cover.
7) Remove the propeller shaft. <Ref. to DS-10, REMOVAL, Propeller Shaft.>
8) Using the ST, remove the oil seal.
ST 398527700 PULLER ASSY
9) Using the ST, install the oil seal.
ST 498057300 INSTALLER
10) Install the propeller shaft. <Ref. to DS-11, INSTALLATION, Propeller Shaft.>
11) Install the heat shield cover.
12) Install the rear exhaust pipe and muffler. <Ref. to EX(H4SO 2.0)-10, INSTALLATION, Rear Exhaust Pipe.> <Ref. to EX(H4SO 2.0)-12, INSTALLATION, Muffler.>
13) Pour ATF into the oil charge pipe.

Recommended fluid:
SUBARU ATF (Part No. K0410Y0700) or IDEMITSU "Apolloil ATF HP", Castrol "Transmax J".

NOTE:
If the ATF above are not available, use Dexron III.

Capacity:
Fill the same amount of ATF when drained.

14) Bleed air from control valve. <Ref. to 4AT-64, Air Bleeding of Control Valve.>
15) Check the level and leaks of ATF. <Ref. to 4AT-31, Automatic Transmission Fluid.>

12. Differential Side Retainer Oil Seal

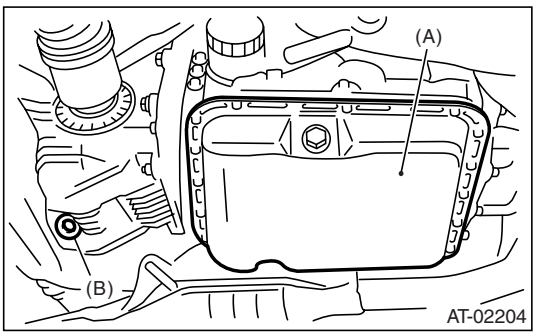
A: INSPECTION

Check the leakage of gear oil from differential side retainer oil seal part. If there is oil leakage, replace the oil seal.

B: REPLACEMENT

1) Lift up the vehicle.
2) Remove the front and center exhaust pipes. <Ref. to EX(H4SO 2.0)-6, REMOVAL, Front Exhaust Pipe.>
3) Remove the differential gear oil drain plug using TORX® BIT T70, and then drain differential gear oil.

CAUTION:
• Directly after the vehicle has been running, 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.



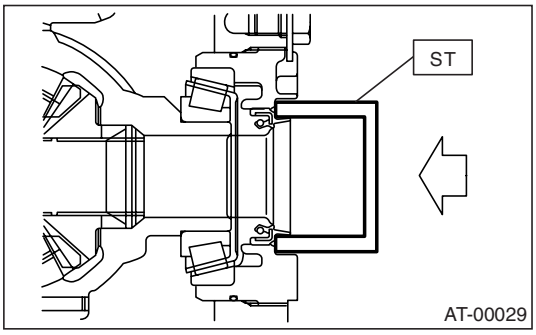
(A) Oil pan
(B) Differential gear oil drain plug

4) Tighten the differential gear oil drain plug.

NOTE:
Use a new gasket.

Tightening torque:
Aluminum gasket
44 N·m (4.5 kgf-m, 32.5 ft-lb)
Copper gasket:
70 N·m (7.1 kgf-m, 51.6 ft-lb)

5) Separate the front drive shaft from transmission. <Ref. to DS-22, REMOVAL, Front Drive Shaft.>
6) Remove the differential side retainer oil seal using driver wrapped with vinyl tape or etc.
7) Using the ST, install the differential side retainer by slightly tapping with hammer.
ST 18675AA000 DIFFERENTIAL SIDE OIL SEAL INSTALLER



8) Apply gear oil to the oil seal lips.
9) Install the front drive shaft. <Ref. to DS-22, INSTALLATION, Front Drive Shaft.>
10) Install the front and center exhaust pipes. <Ref. to EX(H4SO 2.0)-7, INSTALLATION, Front Exhaust Pipe.>
11) Lower the vehicle.
12) Pour gear oil into the gauge hole.

Recommended gear oil:
<Ref. to 4AT-3, RECOMMENDED GEAR OIL, SPECIFICATION, General Description.>

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

13) Check the level of differential gear oil. <Ref. to 4AT-33, 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.

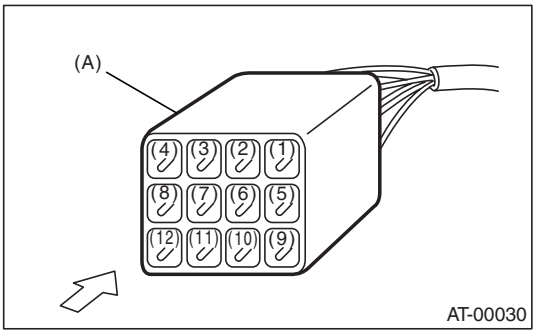
2) Check the continuity in inhibitor switch circuits with the select lever moved to each position.

NOTE:

• Check the continuity in ignition circuit does not exist when the select lever is in “R” and “D” ranges.

• If the inhibitor switch is inoperative, check for poor contact of connector on transmission side.

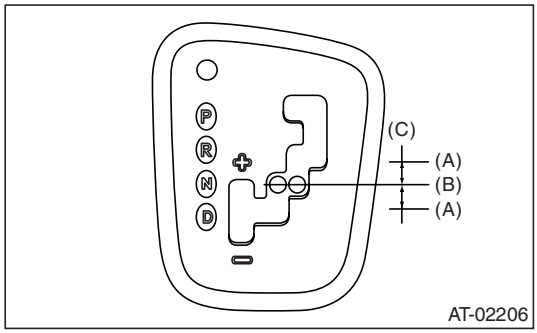
	Range	Pin No.
Signal sent to TCM	P	4 — 3
	R	4 — 2
	N	4 — 1
	D	4 — 8
Ignition circuit	P/N	12 — 11
Back-up light circuit	R	10 — 9



(A) Inhibitor switch connector

3) Check there is continuity at equal points when the select lever is turned 1.5° in both directions from the “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-51, ADJUSTMENT, Inhibitor Switch.>



(A) Continuity does not exist.

(B) Continuity exists.

(C) 1.5°

4) Repeat the above checks. If defective, adjust the select cable. <Ref. to CS-30, ADJUSTMENT, Select Cable.>

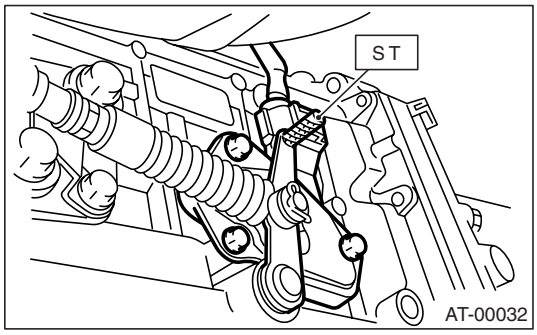
B: ADJUSTMENT

1) Set the select lever to “N” range.

2) Loosen the three bolts which secure inhibitor switch.

3) Insert the ST as vertical as possible into the holes in the inhibitor switch lever and switch body.

ST 499267300 STOPPER PIN



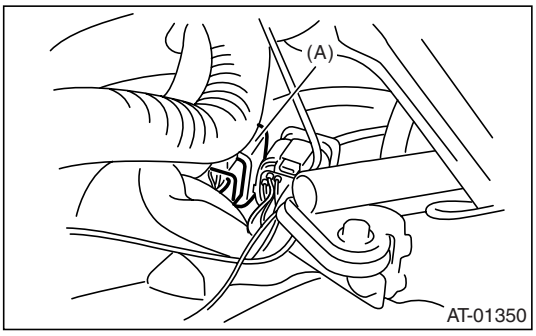
4) Tighten the three bolts which secure inhibitor switch.

Tightening torque:
3.4 N·m (0.35 kgf-m, 2.5 ft-lb)

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

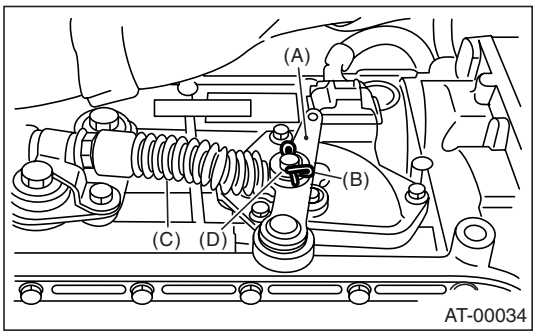
C: REMOVAL

1) Set the vehicle on a lift.
2) Set the select lever to “N” range.
3) Remove the air intake chamber.
<Ref. to IN(H4SO 2.0)-7, REMOVAL, Air Intake Chamber.>
4) Disconnect the inhibitor switch connector.



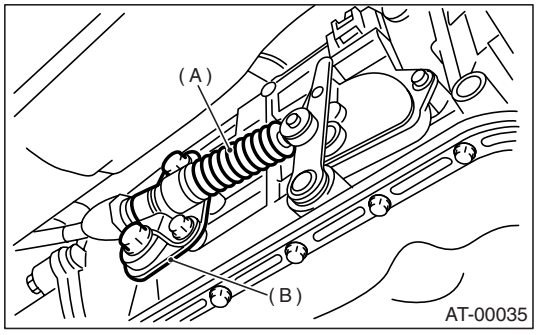
(A) Inhibitor switch connector

5) Remove the inhibitor switch connector from stay.
6) Lift up the vehicle.
7) Remove the front and center exhaust pipe.
<Ref. to EX(H4SO 2.0)-6, REMOVAL, Front Exhaust Pipe.>
8) Remove the snap pin and washers from range select lever.



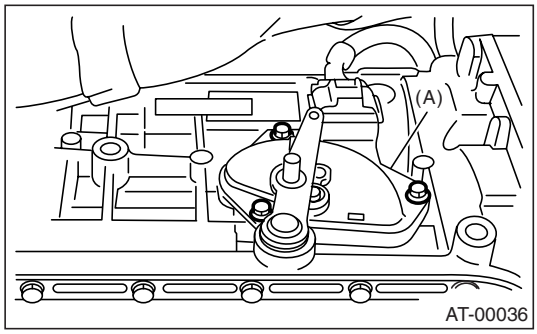
(A) Range select lever
(B) Snap pin
(C) Select cable
(D) Washer

9) Remove the plate assembly from transmission case.



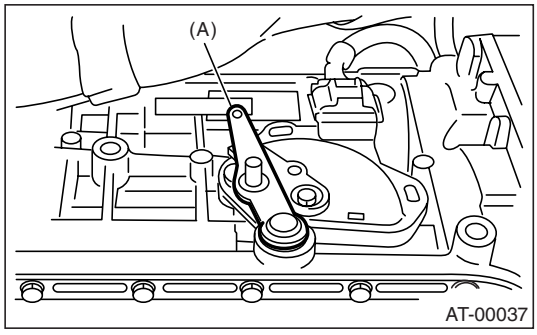
(A) Select cable
(B) Plate ASSY

10) Remove the three bolts which secure inhibitor switch.



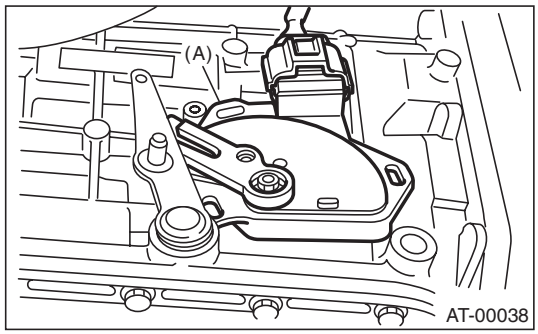
(A) Inhibitor switch

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



(A) Range select lever

12) Remove the inhibitor switch from transmission.

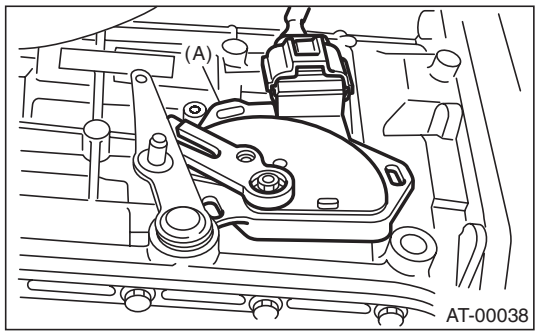


(A) Inhibitor switch

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

D: INSTALLATION

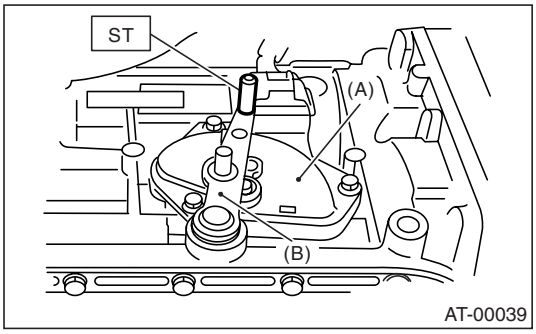
1) Connect the inhibitor switch harness connector to inhibitor switch.
2) Install the inhibitor switch to transmission case.



(A) Inhibitor switch

3) Move the range select lever to neutral position.
4) Tighten the three inhibitor switch securing bolts using ST.
ST 499267300 STOPPER PIN

Tightening torque:
3.4 N·m (0.35 kgf-m, 2.5 ft-lb)

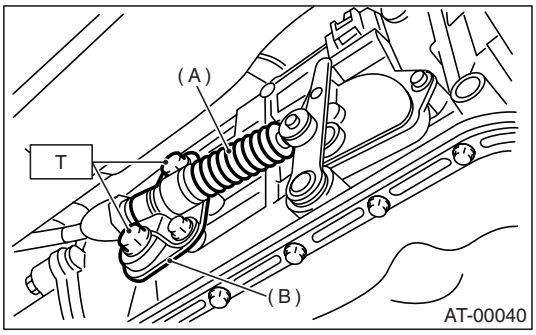


(A) Inhibitor switch
(B) Range select lever

5) Install the select cable to range select lever.

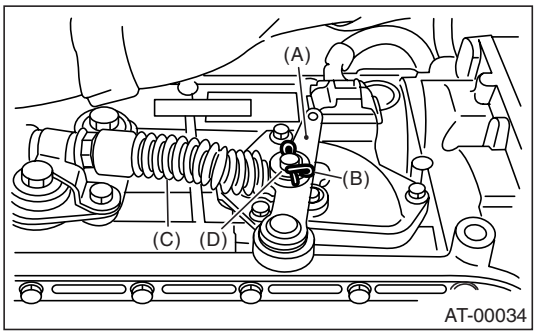
6) Install the plate assembly to transmission.

Tightening torque:
T: 25 N·m (2.5 kgf-m, 18.4 ft-lb)



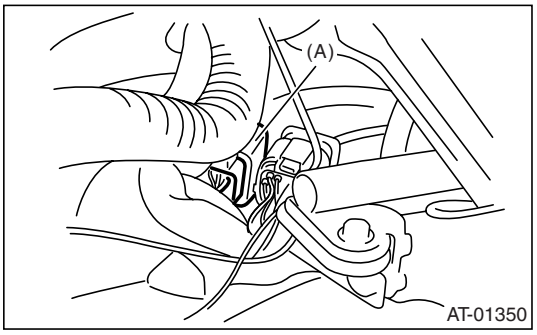
(A) Select cable
(B) Plate ASSY

7) Install the snap pin washers to range select lever.



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

8) Install the front and center exhaust pipe.
<Ref. to EX(H4SO 2.0)-7, INSTALLATION, Front Exhaust Pipe.>
9) Lower the vehicle.
10) Install the inhibitor switch connector to the stay.
11) Connect the inhibitor switch connector.



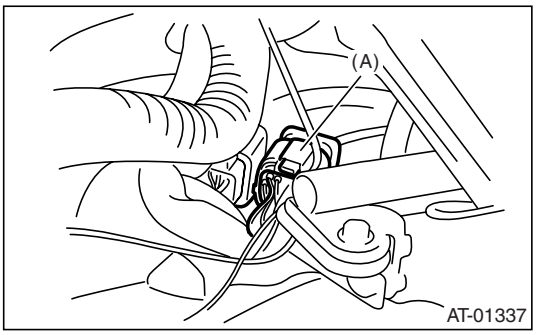
(A) Inhibitor switch connector

12) Install the air intake chamber.
<Ref. to IN(H4SO 2.0)-7, INSTALLATION, Air Intake Chamber.>
13) Inspect the inhibitor switch. <Ref. to 4AT-51, INSPECTION, Inhibitor Switch.>

14.Front Vehicle Speed Sensor

A: REMOVAL

1) Set the vehicle on a lift.
2) Disconnect the ground cable from battery.
3) Remove the air intake chamber.
<Ref. to IN(H4SO 2.0)-7, REMOVAL, Air Intake Chamber.>
4) Disconnect the transmission connector.



(A) Transmission connector

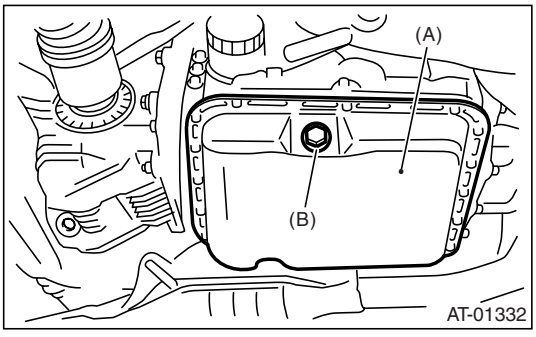
5) Remove the pitching stopper. <Ref. to 4AT-47, REMOVAL, Transmission Mounting System.>
6) Remove the transmission connector from the stay.
7) Lift up the vehicle.
8) Clean the transmission exterior.
9) Remove the ATF drain plug to drain ATF.

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

10) Tighten the ATF drain plug.

NOTE:
Use a new gasket.

Tightening torque:
25 N·m (2.5 kgf-m, 18.4 ft-lb)

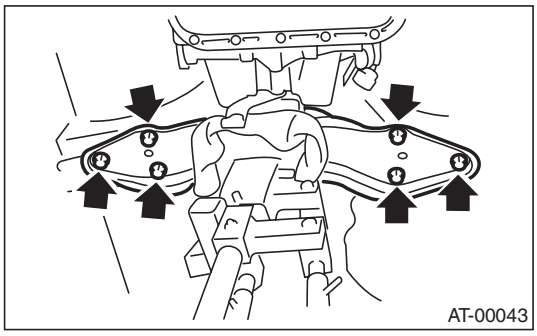


(A) Oil pan
(B) ATF drain plug

11) Remove the front, center and rear exhaust pipes and muffler. <Ref. to EX(H4SO 2.0)-6, REMOVAL, Front Exhaust Pipe.> <Ref. to EX(H4SO 2.0)-10, REMOVAL, Rear Exhaust Pipe.> <Ref. to EX(H4SO 2.0)-12, REMOVAL, Muffler.>
12) Remove the heat shield cover.
13) Remove the propeller shaft. <Ref. to DS-10, REMOVAL, Propeller Shaft.>
14) Place the transmission jack under transmission.

NOTE:
Make sure that the support plate of transmission jack does not touch the crossmember.

15) Remove the transmission rear crossmember bolt.



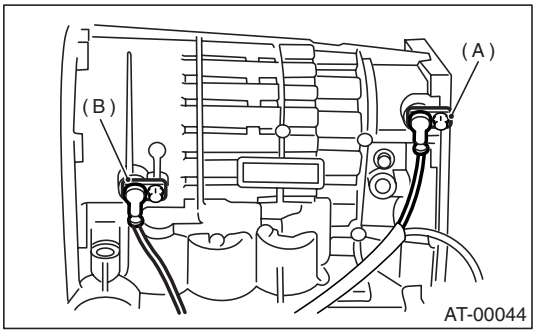
16) Lower the transmission jack.

NOTE:
Do not separate the transmission jack and transmission.

17) Remove the oil cooler inlet and outlet pipes.

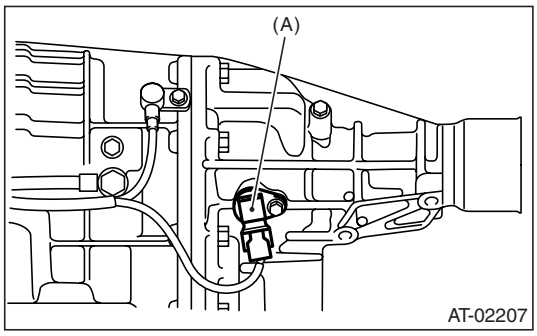
NOTE:
When removing the outlet pipe, be careful not to lose the ball and spring used with retaining screw.

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



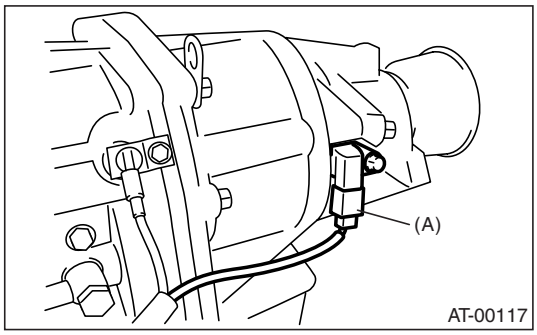
(A) Front vehicle speed sensor
(B) Torque converter turbine speed sensor

19) Disconnect the connector from rear vehicle speed sensor.
• MP-T model



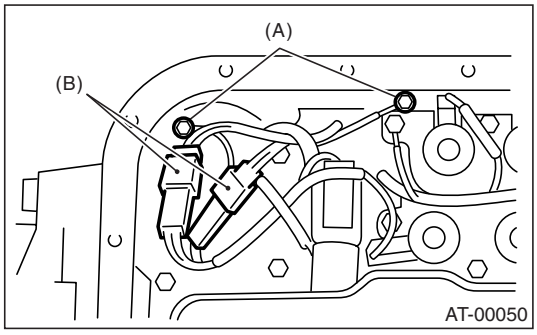
(A) Rear vehicle speed sensor

• VTD model



(A) Rear vehicle speed sensor

20) Remove the oil pan.
21) Disconnect the harness connector and transmission ground terminal.

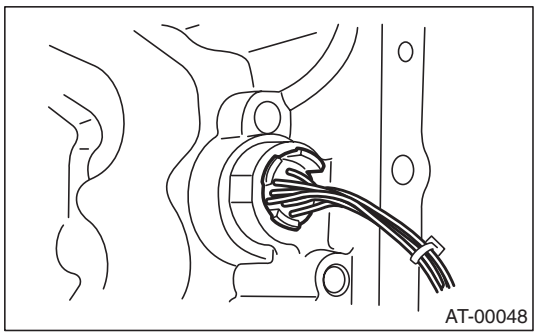


(A) Transmission ground
(B) Harness connector

22) Remove the harness assembly.

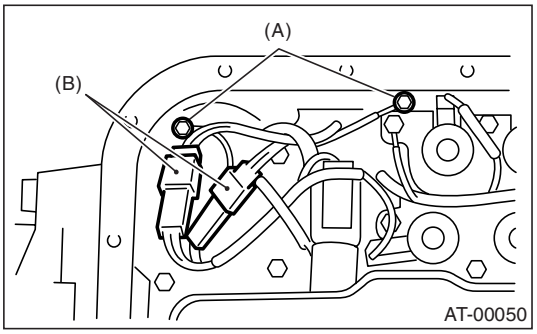
B: INSTALLATION

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



2) Connect the harness connector and transmission ground.

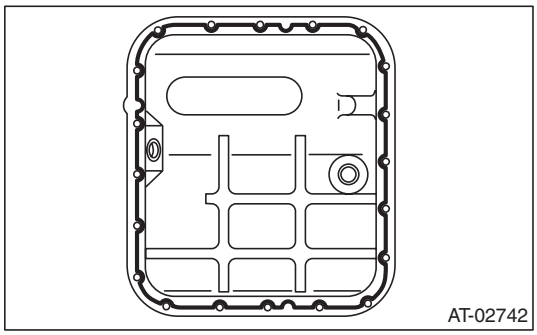
Tightening torque:
8 N·m (0.8 kgf-m, 5.8 ft-lb)



(A) Transmission ground
(B) Harness connector

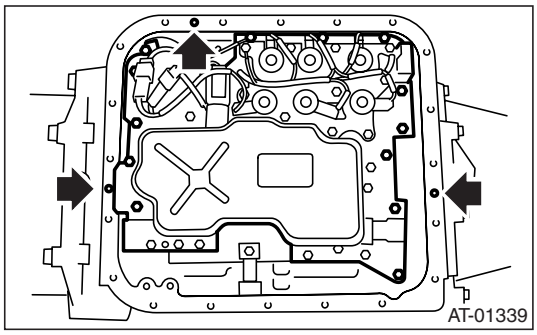
3) Apply proper amount of liquid gasket to the entire oil pan mating surface.

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



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

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



5) Install the oil pan.

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

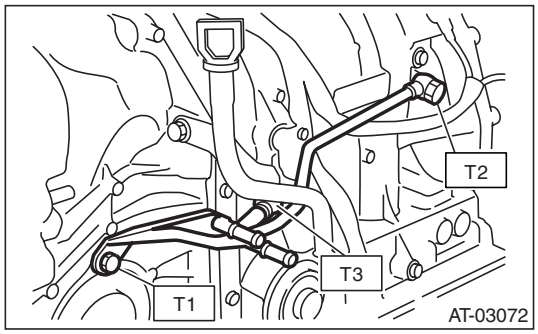
6) Install the front vehicle speed sensor and torque converter turbine speed sensor.

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

7) Connect the connector to rear vehicle speed sensor.
8) Install the oil cooler pipe.

NOTE:
Use a new copper washer.

Tightening torque:
T1: 25 N·m (2.5 kgf-m, 18.4 ft-lb)
T2: 40 N·m (4.1 kgf-m, 29.5 ft-lb)
T3: 44 N·m (4.5 kgf-m, 32.5 ft-lb)



9) Install the transmission rear crossmember bolt.

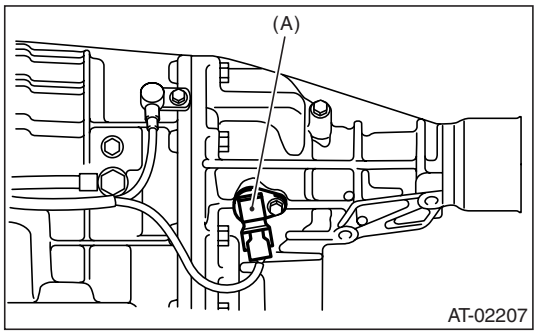
Tightening torque:
70 N·m (7.1 kgf-m, 51.6 ft-lb)

10) Install the propeller shaft. <Ref. to DS-11, INSTALLATION, Propeller Shaft.>
11) Install the heat shield cover.
12) Install the front, center and rear exhaust pipes and muffler.
<Ref. to EX(H4SO 2.0)-7, INSTALLATION, Front Exhaust Pipe.> <Ref. to EX(H4SO 2.0)-10, INSTALLATION, Rear Exhaust Pipe.> <Ref. to EX(H4SO 2.0)-12, INSTALLATION, Muffler.>
13) Lower the vehicle.
14) Install the transmission connector to the stay.
15) Install the pitching stopper. <Ref. to 4AT-47, INSTALLATION, Transmission Mounting System.>
16) Install the air intake chamber.
<Ref. to IN(H4SO 2.0)-7, INSTALLATION, Air Intake Chamber.>
17) Fill the same amount of ATF when drained.
18) Bleed the air of control valve.
<Ref. to 4AT-64, Air Bleeding of Control Valve.>
19) Check the level of ATF. <Ref. to 4AT-31, Automatic Transmission Fluid.>
20) Execute the learning control promotion. <Ref. to 4AT(diag)-18, FACILITATION OF LEARNING CONTROL, OPERATION, Subaru Select Monitor.>

15.Rear Vehicle Speed Sensor

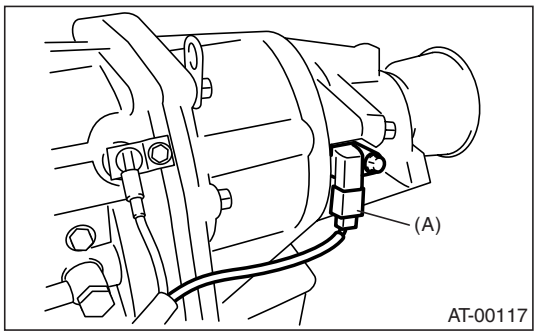
A: REMOVAL

1) Set the vehicle on a lift, and then lift up the vehicle.
2) Disconnect the connector from rear vehicle speed sensor.
• MP-T model



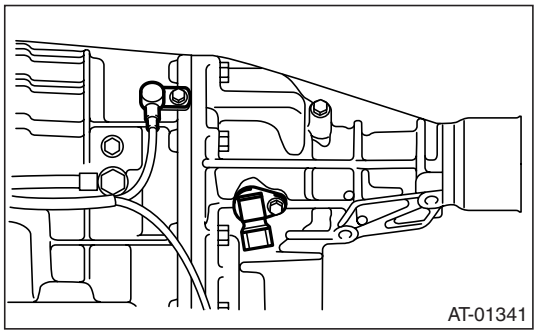
(A) Rear vehicle speed sensor

• VTD model

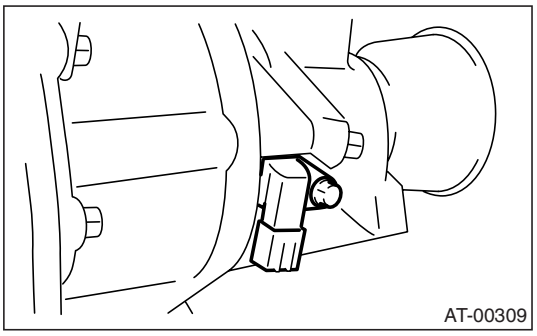


(A) Rear vehicle speed sensor

3) Remove the rear vehicle speed sensor.
• MP-T model



• VTD model



B: INSTALLATION

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

For removal procedure of torque converter turbine speed sensor, refer to “Front Vehicle Speed Sensor”. <Ref. to 4AT-55, REMOVAL, Front Vehicle Speed Sensor.>

B: INSTALLATION

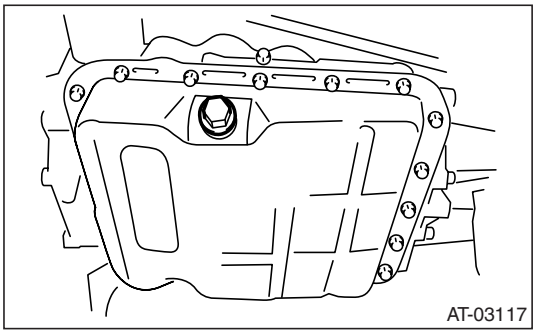
For installation procedure of torque converter turbine speed sensor, refer to “Front Vehicle Speed Sensor”. <Ref. to 4AT-56, INSTALLATION, Front Vehicle Speed Sensor.>

17.Control Valve Strainer

A: REMOVAL

1) Set the vehicle on a lift.
2) Disconnect the ground cable from the battery.
3) Lift up the vehicle.
4) Clean the transmission exterior.
5) Remove the drain plug (ATF) to drain the ATF.

CAUTION:
The ATF will be extremely hot after driving. Be careful not to receive burns.

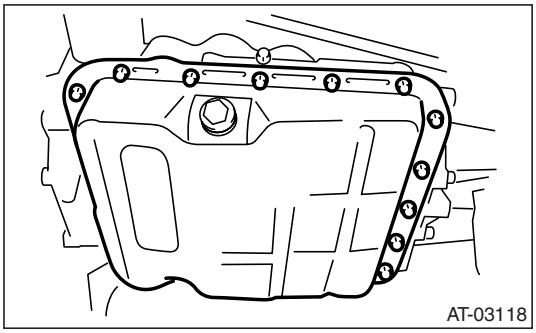

AT-03117

6) Perform replacement with a new gasket, and tighten the drain plug (ATF).

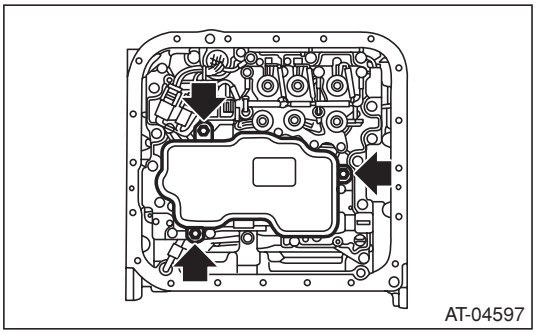
Tightening torque:
25 N·m (2.5 kgf-m, 18.4 ft-lb)

7) Remove the oil pan.

CAUTION:
Be careful not to allow foreign matter such as dust or dirt to enter the oil pan.


AT-03118

8) Remove the magnet.
9) Clean the magnet.
10) Completely remove the remaining liquid gasket on the transmission case and oil pan.
11) Remove the control valve strainer tightening bolt, and remove control valve strainer from the control valve body.


AT-04597

B: INSTALLATION

1) Check the control valve body for dust and other foreign matter.
2) Mount new control valve strainer to the control valve body.
   (1) Apply ATF to the entire perimeter of the O-ring on the control valve strainer.

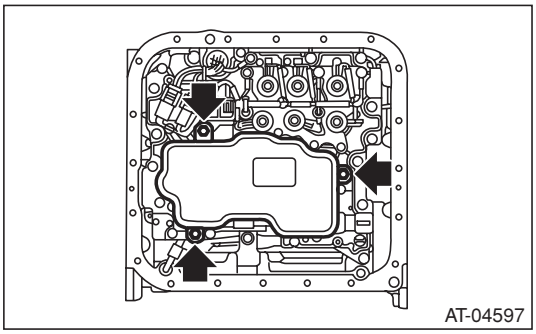
CAUTION:
Protect the O-ring from dust and dirt while applying ATF.

   (2) Install the control valve strainer to the control valve body from the O-ring side.

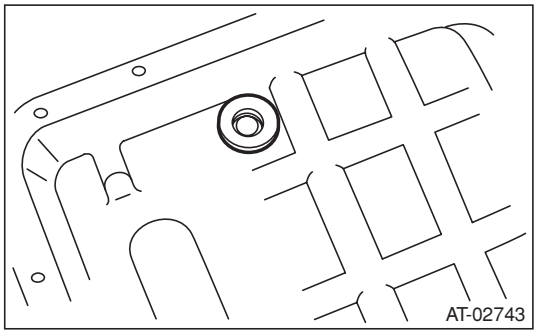
CAUTION:
If the control valve strainer is pushed in at an angle, the O-ring may be damaged. Be sure to push in the control valve strainer straight to install.

   (3) Tighten the three bolts.

Tightening torque:
10 N·m (1.0 kgf-m, 7.4 ft-lb)

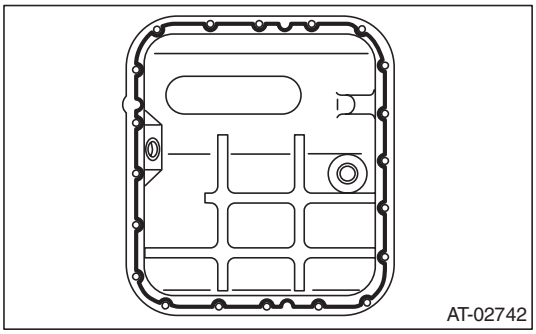

AT-04597

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



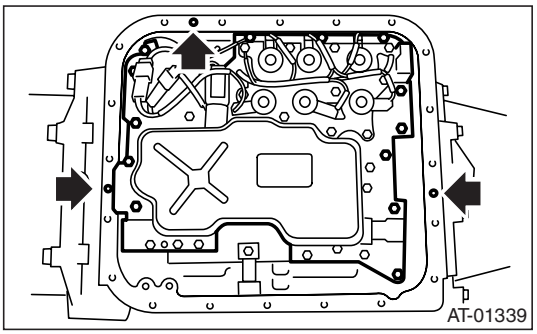
4) Apply proper amount of liquid gasket to the entire oil pan mating surface.

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



5) Fill the three holes aside from the bolt holes in the transmission case, with liquid gasket.

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



6) Install the oil pan by equally tightening the bolts.

Tightening torque:
5 N·m (0.5 kgf-m, 3.7 ft-lb)

7) Fill ATF from the oil charge pipe.

Recommended fluid:
<Ref. to 4AT-3, HYDRAULIC CONTROL AND LUBRICATION, SPECIFICATION, General Description.>

Capacity:
Fill with the same amount of ATF as drained.

8) Bleed the air of control valve. <Ref. to 4AT-64, Air Bleeding of Control Valve.>
9) Check the ATF level. <Ref. to 4AT-31, Automatic Transmission Fluid.>

C: INSPECTION

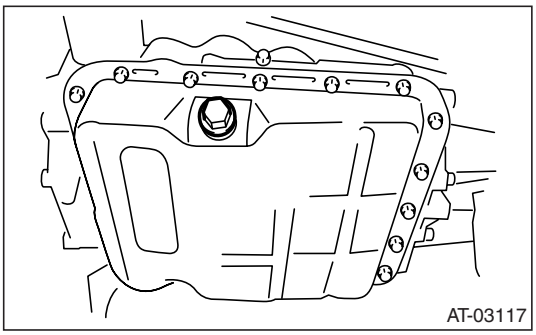
Check the control valve strainer for holes, damages or adhesion of dust and other foreign particles.

18.Control Valve Body

A: REMOVAL

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 ATF drain plug to drain ATF.

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



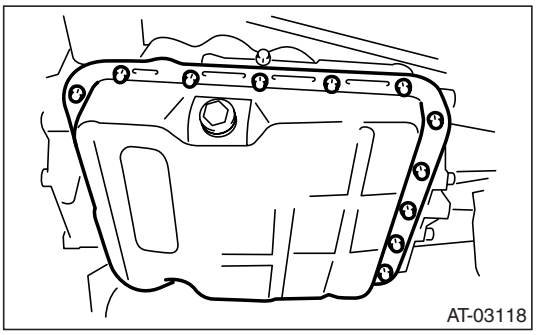
6) Tighten the ATF drain plug.

NOTE:
Use a new gasket.

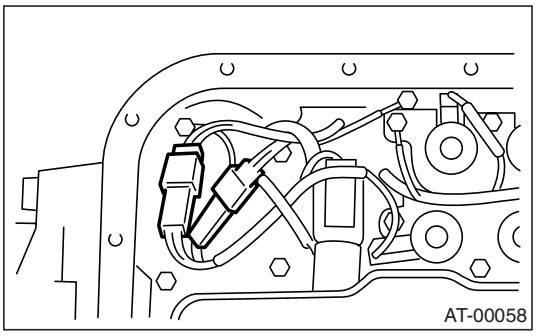
Tightening torque:
25 N·m (2.5 kgf-m, 18.4 ft-lb)

7) Remove the oil pan.

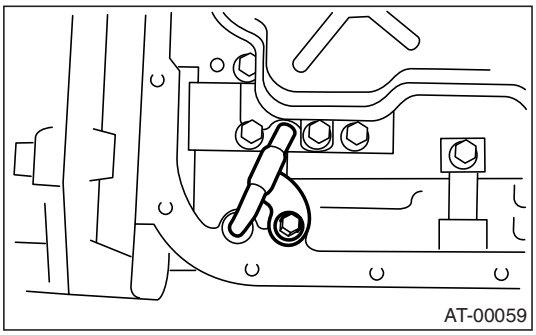
CAUTION:
Be sure to prevent the entering of dust and other foreign matters into oil pan.



8) Remove the magnet.
9) Clean the magnet.
10) Completely remove the remaining liquid gasket on transmission case and oil pan.
11) Disconnect the control valve connector.

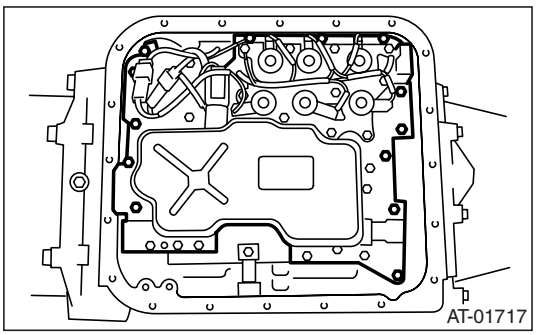


12) Remove the oil cooler pipe.



13) Remove the control valve body.

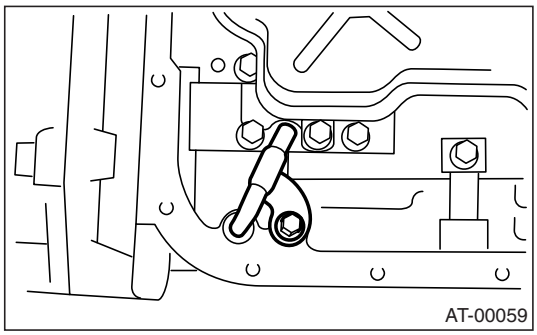
NOTE:
Replace the control valve body as assembly, because it is a non-disassemble part.



B: INSTALLATION

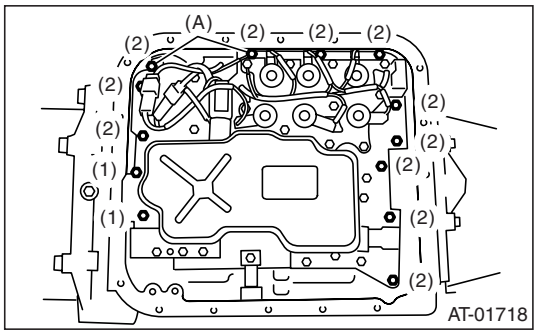
1) Check the control valve body for dust and other foreign matters.
2) Temporarily install the control valve body to transmission.
3) Install the oil cooler pipe.

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



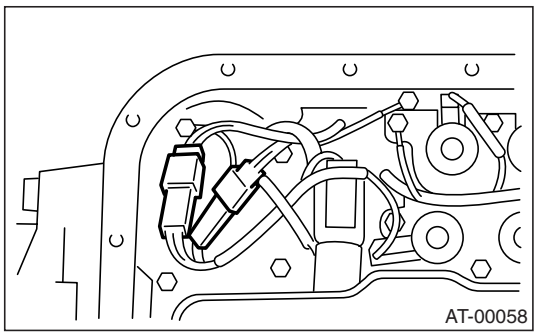
4) Tighten the bolts equally.

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



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

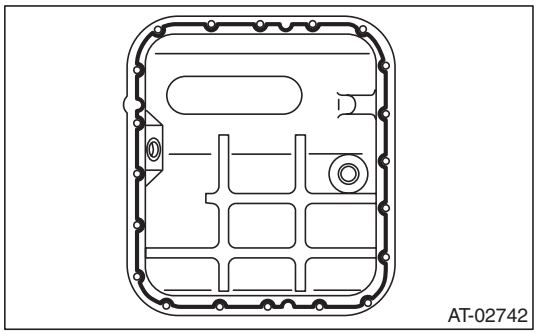
5) Connect the control valve connector.



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

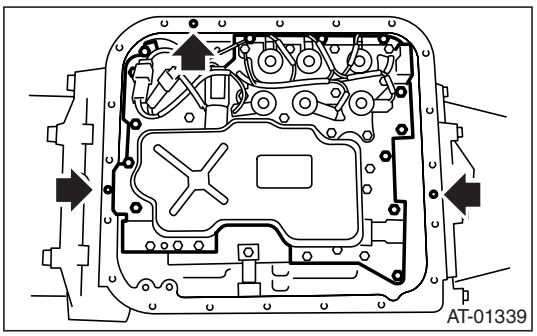
7) Apply liquid gasket to the oil pan.

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



8) Fill liquid gasket to the holes (three) except bolt holes of transmission case.

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



9) Install the oil pan by equally tightening the bolts.

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

10) Fill ATF from oil charge pipe.

Recommended fluid:
SUBARU ATF (Part No. K0410Y0700) or IDEMITSU "Apolloil ATF HP", Castrol "Transmax J".

NOTE:
If the ATF above are not available, use Dexron III.

Capacity:
Fill the same amount of ATF when drained.

11) Bleed the air of control valve. <Ref. to 4AT-64, Air Bleeding of Control Valve.>
12) Check the ATF level.
<Ref. to 4AT-31, Automatic Transmission Fluid.>
13) Execute the learning control promotion. <Ref. to 4AT(diag)-18, FACILITATION OF LEARNING CONTROL, OPERATION, Subaru Select Monitor.>

C: INSPECTION

Check each parts for holes, damages or other foreign matters.

19. Air Bleeding of Control Valve

A: PROCEDURE

1) Lift up the vehicle with select lever moved to “P” range and parking brake applied.
2) Connect the Subaru Select Monitor to the vehicle.
3) Using Subaru Select Monitor, check that the DTC is not output.
4) Using Subaru Select Monitor, check that the ATF temperature is in less than 60°C (140°F). <Ref. to 4AT(diag)-16, OPERATION, Subaru Select Monitor.>
5) Turn the Subaru Select Monitor power switch to OFF.
6) Release the manual mode, and then turn the ignition switch to OFF.
7) Set the select lever to “R” range.
8) Depress the brake pedal fully until the air bleeding is completed.
9) Turn the ignition switch to ON position.
10) Set the select lever to “P” range, and then wait for more than 3 seconds.
11) Set the select lever to “R” range, and then wait for more than 3 seconds.
12) Set the select lever to “N” range, and then wait for more than 3 seconds.
13) Set the select lever to “D” range, and then wait for more than 3 seconds.
14) Set the select lever to “N” range, and then wait for more than 3 seconds.
15) Slowly depress the accelerator pedal fully.
16) Slowly release the accelerator pedal fully.
17) Start the engine.
18) Set the select lever to the “D” range.
19) Turn the Subaru Select Monitor power switch to ON.
20) Select {Each System Check} in «Main Menu» of Subaru Select Monitor.
21) On the «System Selection Menu» display screen, select the “Transmission”. Air bleeding of control valve starts on transmission. At this time, the SPORT indicator light in the combination meter start blinking at 2 Hz. When the SPORT indicator light does not blink, repeat the procedures from step 4).
22) Air bleeding of control valve is finished when SPORT indicator light in combination meter changes from blinking of 2 Hz to turning off.

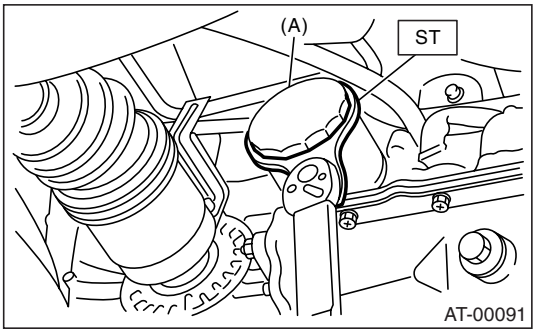
NOTE:
When SPORT indicator light changes from blinking of 2 Hz to 4 Hz during air bleeding, repeat the procedure from step 4).

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

20.ATF Filter

A: REMOVAL

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



(A) ATF filter

B: INSTALLATION

1) Apply a thin coat of ATF to the oil seal part of new ATF filter.
2) Install the ATF filter. Turn it by hand, being careful not to damage oil seal.
3) Tighten the ATF filter using ST.
Calculate the ATF filter tightening torque using 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 78 mm (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:
Install the ST straightly to converter case.
ST 498545400 OIL FILTER WRENCH
4) Fill the ATF.
5) Check the level of ATF. <Ref. to 4AT-31, Automatic Transmission Fluid.>

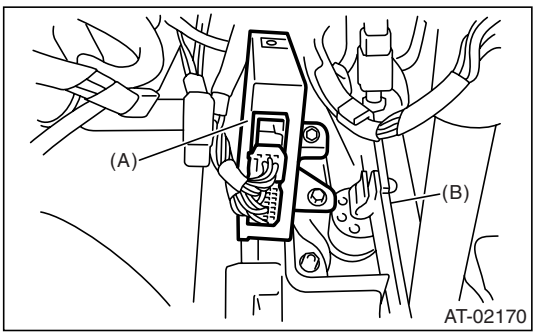
C: INSPECTION

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

21.Transmission Control Module (TCM)

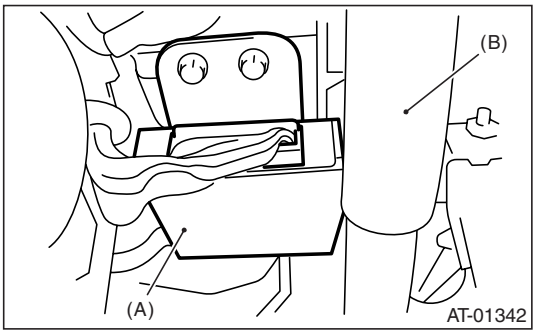
A: REMOVAL

1) Disconnect the ground cable from battery.
2) Remove the lower cover and remove the connector.
3) Remove the body integrated module. <Ref. to SL-44, REMOVAL, Body Integrated Module.>
4) Disconnect the connector from TCM.
• LHD model



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

• RHD model



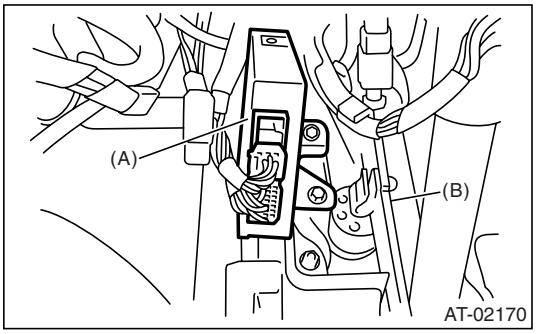
(A) Transmission control module (TCM)
(B) Steering column

5) Remove the TCM.

B: INSTALLATION

1) Install the TCM.
• LHD model

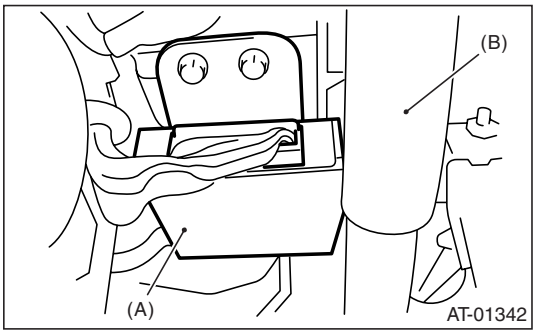
Tightening torque:
7.5 N·m (0.76 kgf-m, 5.5 ft-lb)



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

• RHD model

Tightening torque:
18 N·m (1.8 kgf-m, 13.3 ft-lb)



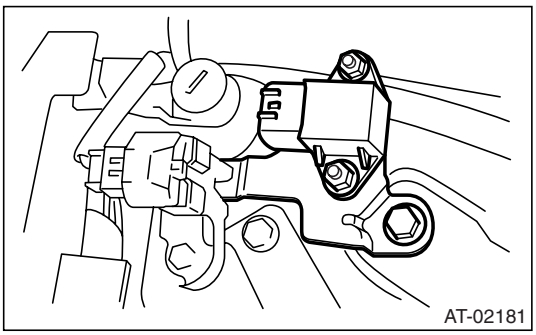
(A) Transmission control module (TCM)
(B) Steering column

2) Connect the connector to TCM.
3) Install in the reverse order of removal.
4) Execute the learning control promotion. <Ref. to 4AT(diag)-18, FACILITATION OF LEARNING CONTROL, OPERATION, Subaru Select Monitor.>

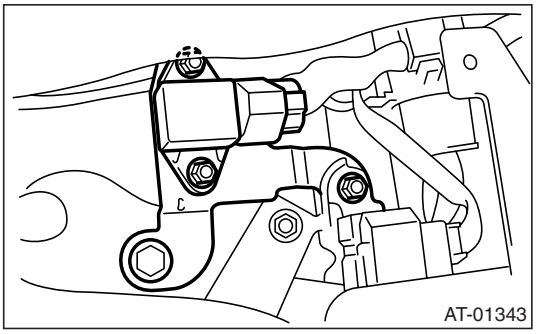
22.Lateral G Sensor

A: REMOVAL

1) Remove the console box. <Ref. to EI-53, REMOVAL, Console Box.>
2) Disconnect the connector from lateral G sensor.
• LHD model



• RHD model

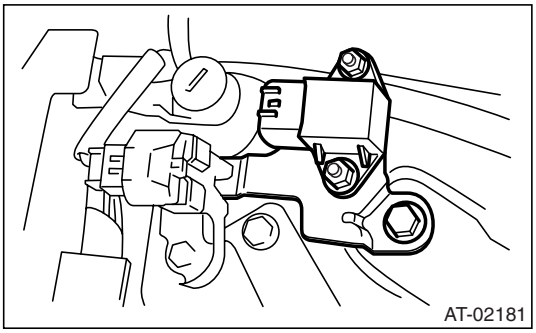


3) Remove the lateral G sensor.

B: INSTALLATION

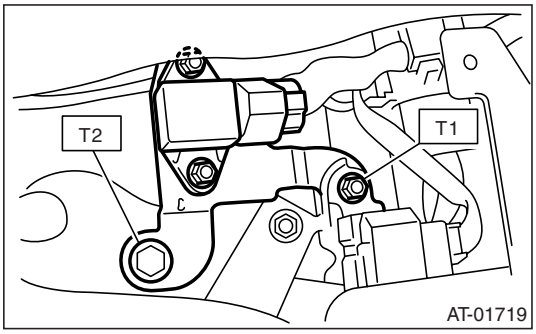
Install in the reverse order of removal.
• LHD model

Tightening torque:
18 N·m (1.8 kgf-m, 13.3 ft-lb)



• RHD model

Tightening torque:
T1: 7.5 N·m (0.76 kgf-m, 5.5 ft-lb)
T2: 18 N·m (1.8 kgf-m, 13.3 ft-lb)

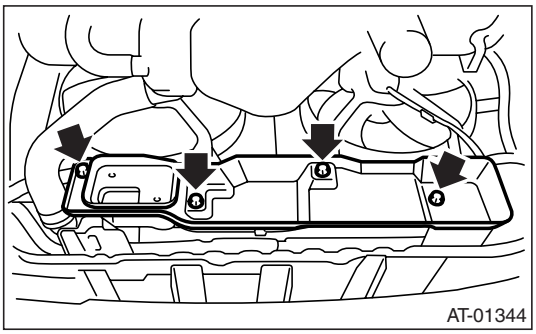


23.ATF Cooler Pipe and Hose

A: REMOVAL

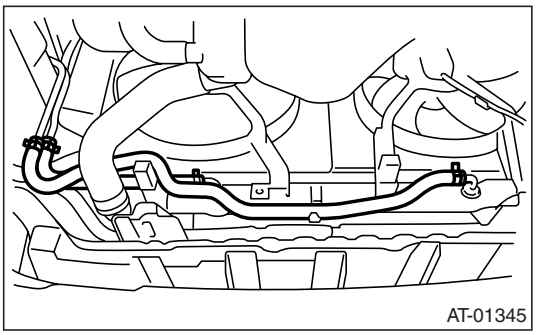
1. MODEL WITHOUT ATF COOLER WITH WARMER FUNCTION

1) Set the vehicle on a lift.
2) Remove the battery.
3) Lift up the vehicle.
4) Remove the under cover.
5) Remove the radiator under cover.


AT-01344

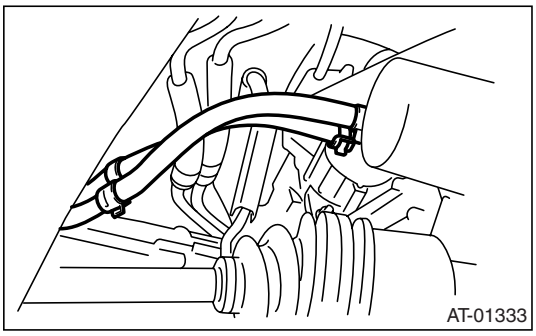
6) Disconnect the ATF cooler hose from radiator.

NOTE:
• Do not use a screwdriver or other pointed tools.
• When hard to remove the hose, wrap the hose with cloth to prevent from damaging, and then turn with pliers and pull out with hand straightly.

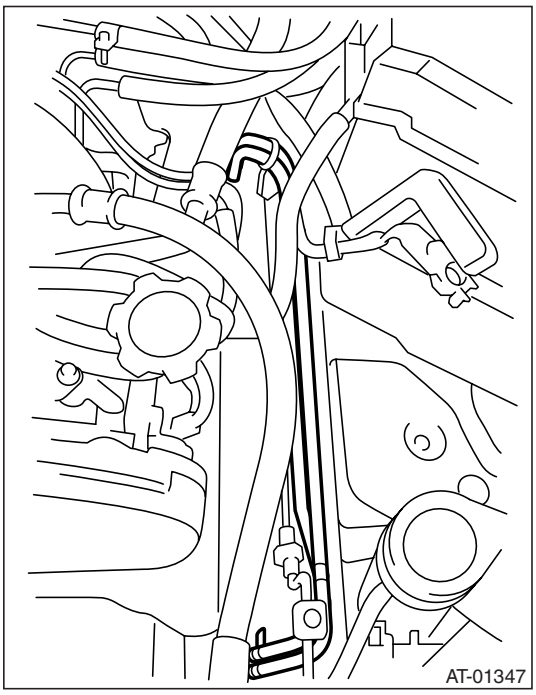

AT-01345

7) Disconnect the ATF cooler hoses from pipes.

NOTE:
• Do not use a screwdriver or other pointed tools.
• When hard to remove the hose, wrap the hose with cloth to prevent from damaging, and then turn with pliers and pull out with hand straightly.

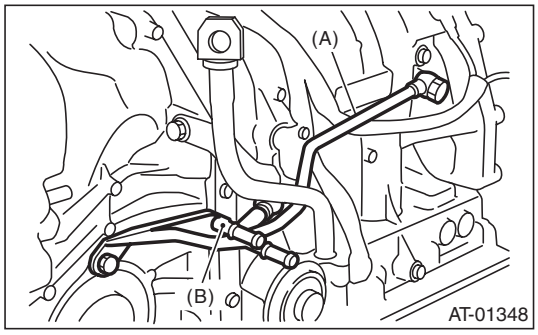

AT-01333

8) Disconnect the ATF cooler pipe from frame.


AT-01347

9) Remove the oil cooler inlet and outlet pipes.

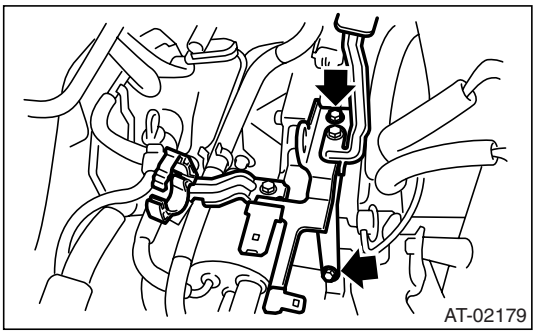
CAUTION:
When disconnecting the outlet pipe, be careful not to lose the ball and spring used with retaining screw.



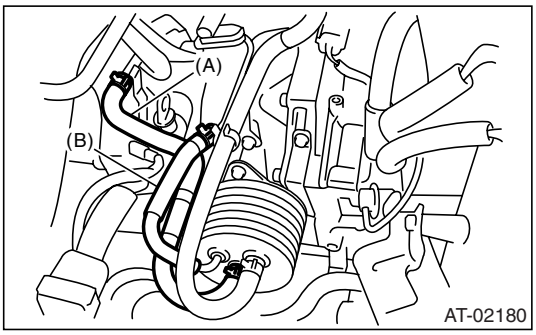
(A) Inlet pipe
(B) Outlet pipe

2. MODEL WITH ATF COOLER WITH ATF WARMER FUNCTION

1) Set the vehicle on a lift.
2) Remove the air intake chamber. <Ref. to IN(H4SO 2.0)-7, REMOVAL, Air Intake Chamber.>
3) Disconnect the inhibitor switch connector and transmission harness connector, and remove it from stay.
4) Remove the harness bracket.

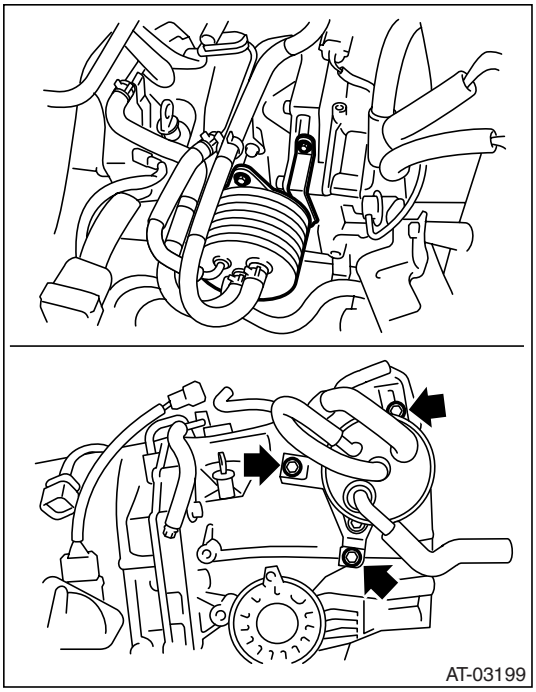


5) Disconnect the inlet and outlet hoses.



(A) Inlet hose
(B) Outlet hose

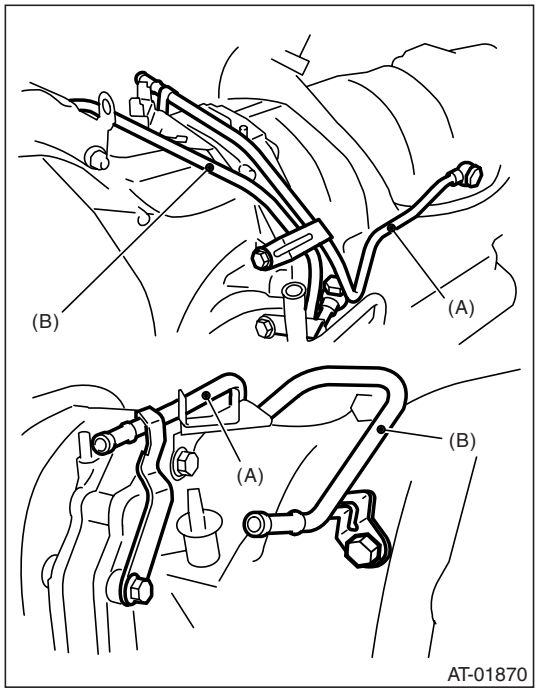
6) Remove the ATF cooler assembly from transmission body, and put it aside.



7) Remove the oil charge pipe. <Ref. to 4AT-80, REMOVAL, Oil Charge Pipe.>
8) Remove the air breather hose. <Ref. to 4AT-79, REMOVAL, Air Breather Hose.>

9) Remove the inlet and outlet pipes of oil cooler pipe.

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



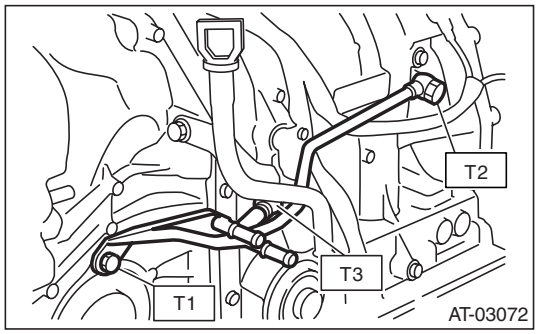
(A) ATF cooler outlet pipe
(B) ATF cooler inlet pipe

B: INSTALLATION

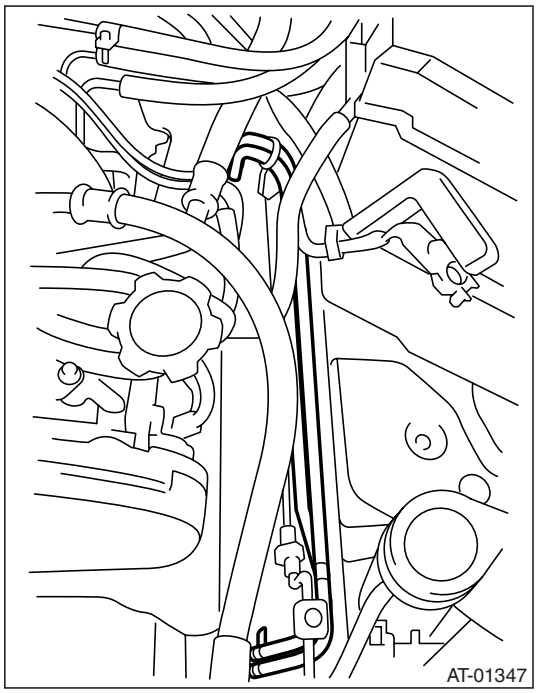
1. MODEL WITHOUT ATF COOLER WITH ATF WARMER FUNCTION

1) Install the oil cooler inlet pipe and outlet pipe with new washer.

Tightening torque:
T1: 25 N·m (2.5 kgf-m, 18.4 ft-lb)
T2: 40 N·m (4.1 kgf-m, 29.5 ft-lb)
T3: 44 N·m (4.5 kgf-m, 32.5 ft-lb)

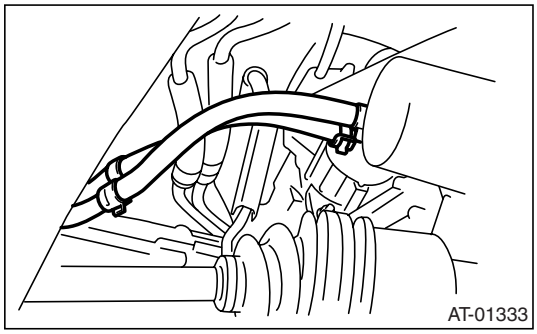


2) Install the ATF cooler pipe to frame.



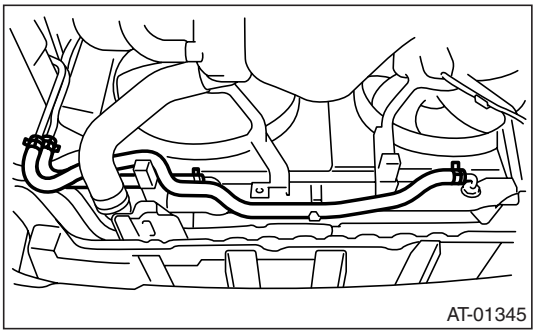
3) Connect the ATF cooler hose to pipe on the transmission side.

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



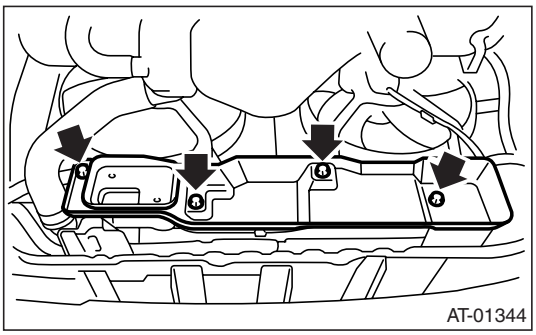
4) Connect the ATF cooler hose to pipe on the radiator side.

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 radiator under cover.

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



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

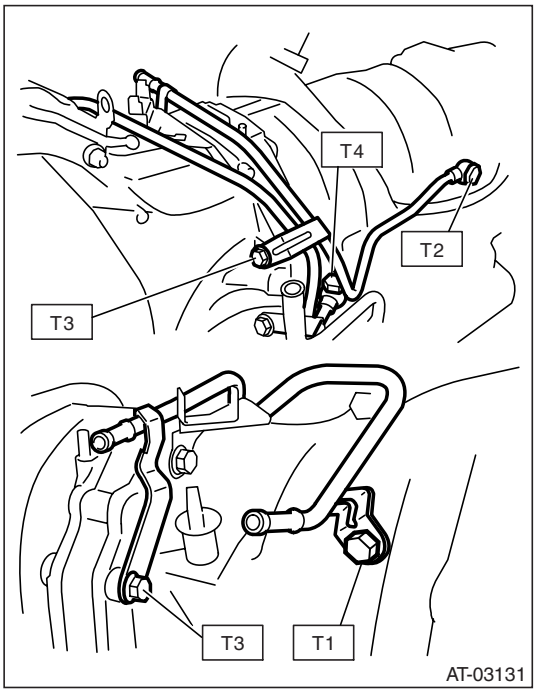
NOTE:
Make sure there are no ATF leaks in connections of the transmission, radiator, pipes and hoses.

2. MODEL WITH ATF COOLER WITH ATF WARMER FUNCTION

1) Install the ATF cooler inlet and outlet pipes.

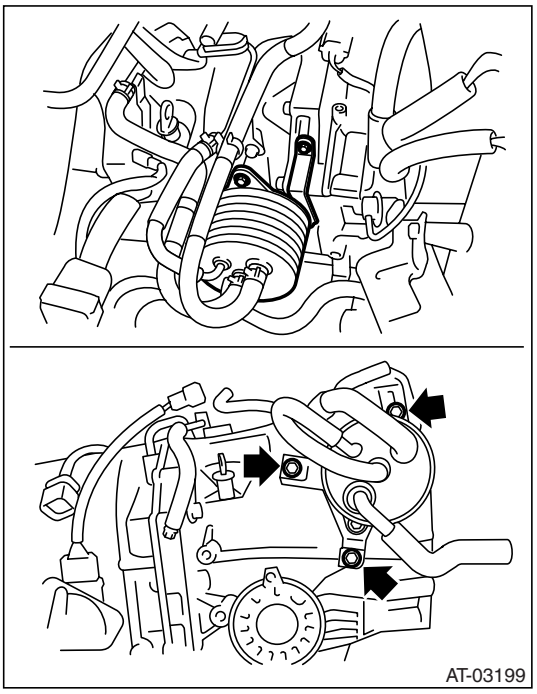
NOTE:
Use a new washer.

Tightening torque:
T1: 21 N·m (2.1 kgf-m, 15.5 ft-lb)
T2: 40 N·m (4.1 kgf-m, 29.5 ft-lb)
T3: 41 N·m (4.2 kgf-m, 30.4 ft-lb)
T4: 45 N·m (4.6 kgf-m, 33.2 ft-lb)

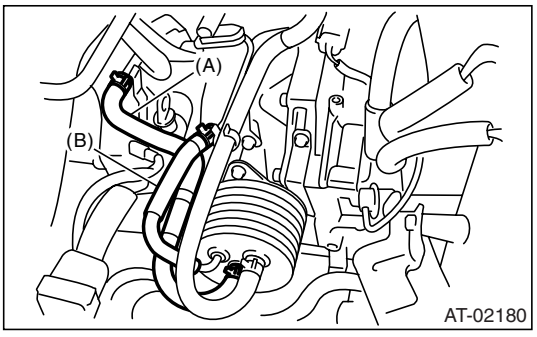


2) Install the ATF cooler assembly to transmission.

Tightening torque:
23 N·m (2.3 kgf-m, 17 ft-lb)



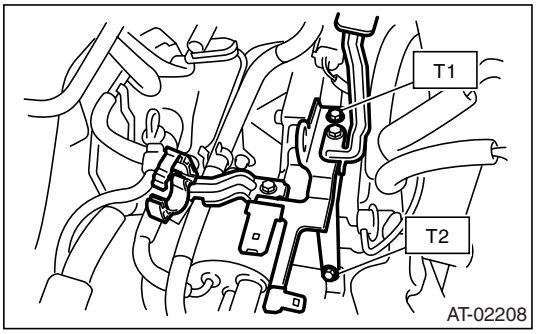
3) Install the oil charge pipe. <Ref. to 4AT-80, INSTALLATION, Oil Charge Pipe.>
4) Install the inlet and outlet hoses.



(A) Inlet hose
(B) Outlet hose

5) Install the harness bracket.

Tightening torque:
T1: 16 N·m(1.6 kgf-m, 11.6 ft-lb)
T2: 36 N·m (3.6 kgf-m, 26.0 ft-lb)



6) Install the inhibitor switch connector and transmission harness connector to stay, and then connect the harness connector.
7) Install the air breather hose. <Ref. to 4AT-79, INSTALLATION, Air Breather Hose.>
8) Install the air intake chamber. <Ref. to IN(H4SO 2.0)-7, INSTALLATION, Air Intake Chamber.>
9) Check the ATF level. <Ref. to 4AT-31, INSPECTION, Automatic Transmission Fluid.>

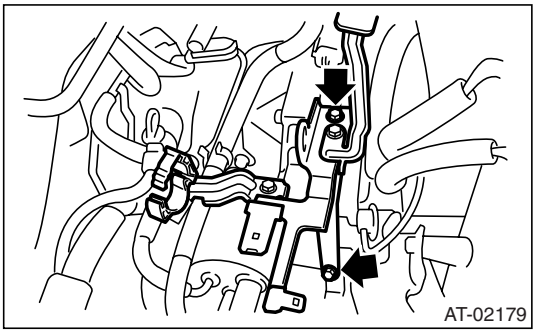
C: INSPECTION

Repair or replace any defective hoses, pipes, clamps, and washers found in the inspection below.
1) Check for ATF leaks in connections of the transmission, radiator, pipes and hoses.
2) Check the clamp for deformation.
3) Lightly bend the hose and check for cracks in the surface or other damages.
4) Pinch the hose with your fingers and check for poor elasticity. Also check for poor elasticity in the parts where the clamp was installed by pressing with your fingernail.
5) Check for peeling, cracks, and deformation at the tip of the hose.

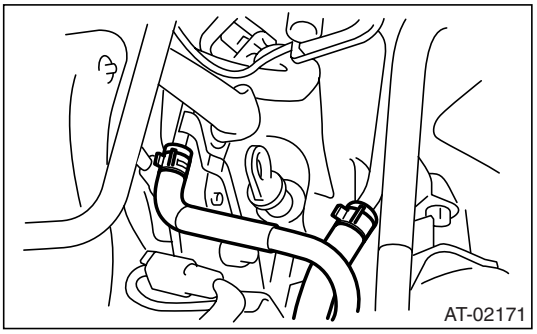
24. ATF Cooler (with Warmer Function)

A: REMOVAL

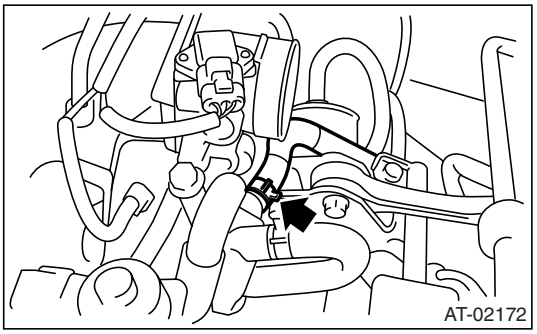
1) Drain engine coolant. <Ref. to CO(H4SO 2.0)-13, REPLACEMENT, Engine Coolant.>
2) Remove the air intake chamber. <Ref. to IN(H4SO 2.0)-7, REMOVAL, Air Intake Chamber.>
3) Disconnect the engine harness, and then remove the engine harness connector from engine harness bracket.
4) Remove the engine harness bracket.



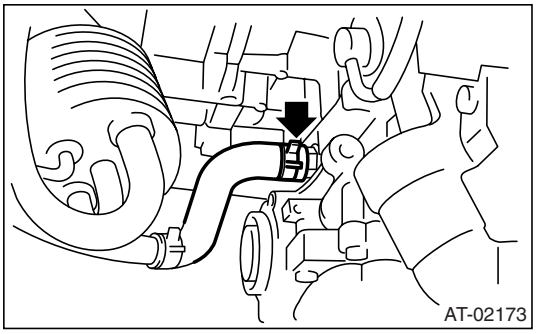
5) Disconnect the ATF cooler hose from the pipe on transmission side.



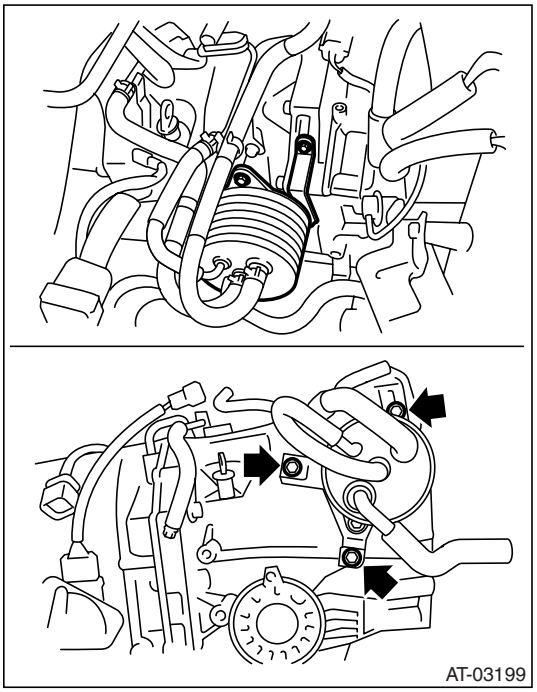
6) Disconnect the engine coolant outlet hose from warmer cock assembly.



7) Disconnect the engine coolant inlet hose from cylinder block.



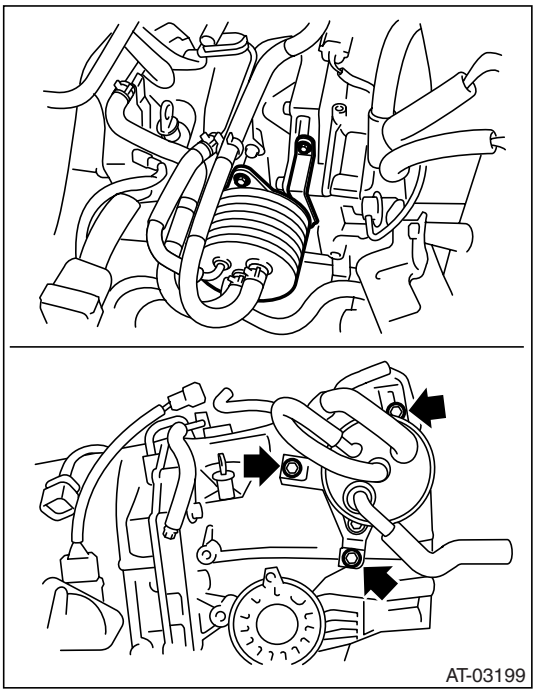
8) Remove the ATF cooler assembly from transmission.



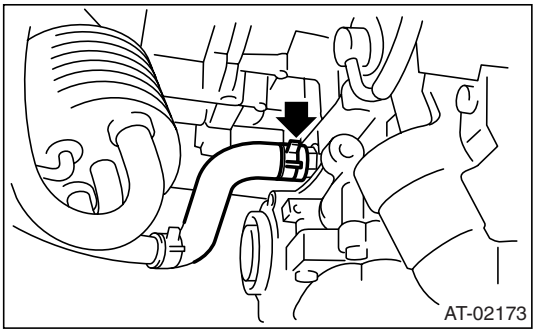
B: INSTALLATION

1) Install the ATF cooler assembly to transmission.

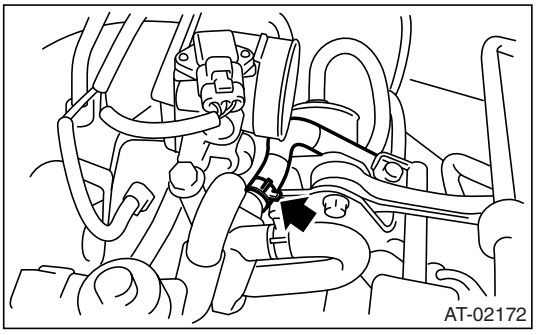
Tightening torque:
23 N·m (2.3 kgf-m, 17 ft-lb)



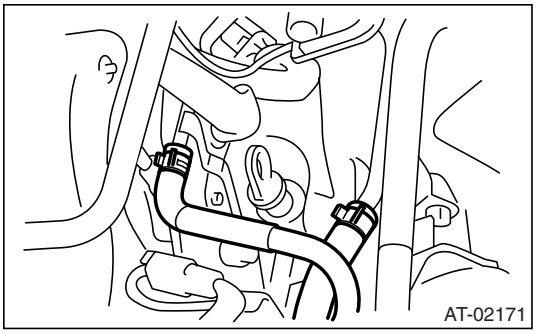
2) Connect the engine coolant inlet hose to cylinder block.



3) Connect the engine coolant outlet hose to warmer cock assembly.

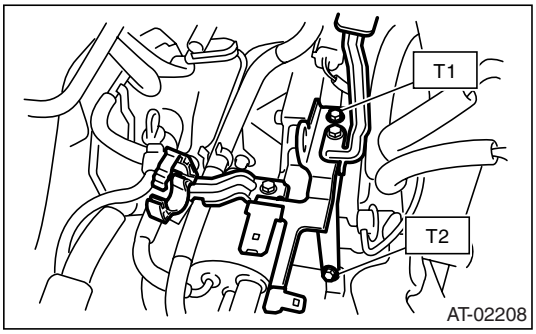


4) Connect the ATF cooler hose to pipe on transmission side.



5) Install the engine harness bracket.

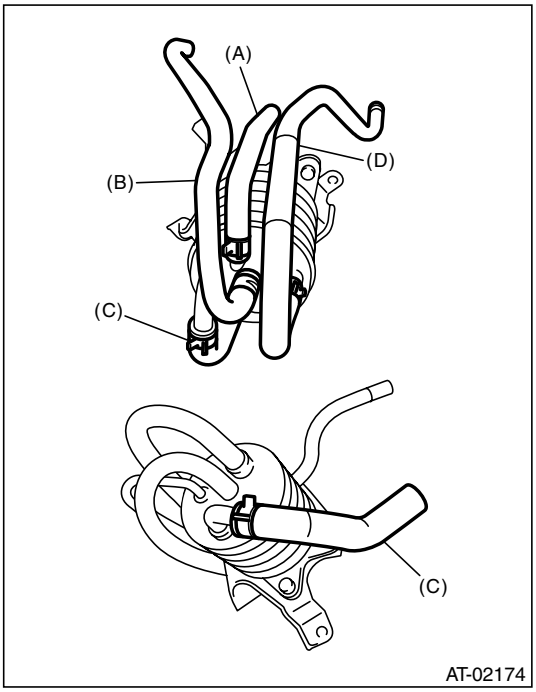
Tightening torque:
T1: 16 N·m (1.6 kgf-m, 11.6 ft-lb)
T2: 36 N·m (3.6 kgf-m, 26.0 ft-lb)



6) Install the harness connector to bracket, and connect the harness.
7) Install the air intake chamber. <Ref. to IN(H4SO 2.0)-7, INSTALLATION, Air Intake Chamber.>
8) Fill with engine coolant. <Ref. to CO(H4SO 2.0)-13, REPLACEMENT, Engine Coolant.>
9) Check the ATF level. <Ref. to 4AT-31, INSPECTION, Automatic Transmission Fluid.>

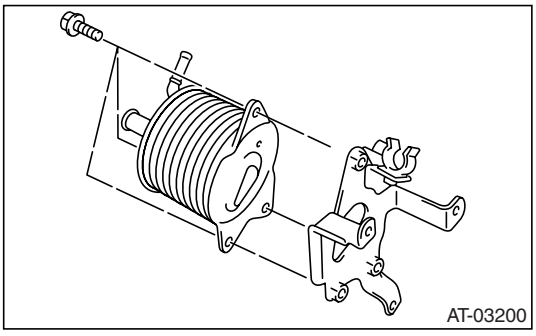
C: DISASSEMBLY

1) Remove each hose from ATF cooler.

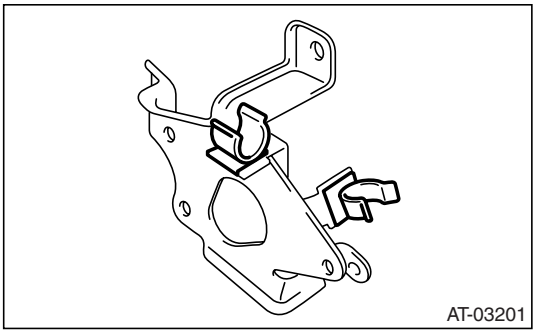


(A) ATF cooler inlet hose
(B) ATF cooler outlet hose
(C) Engine coolant inlet hose
(D) Engine coolant outlet hose

2) Remove the bracket from ATF cooler.

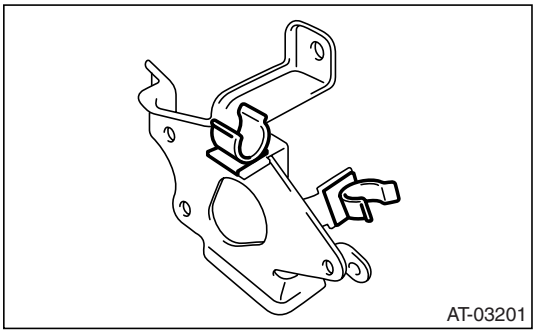


3) Remove the clip from bracket.



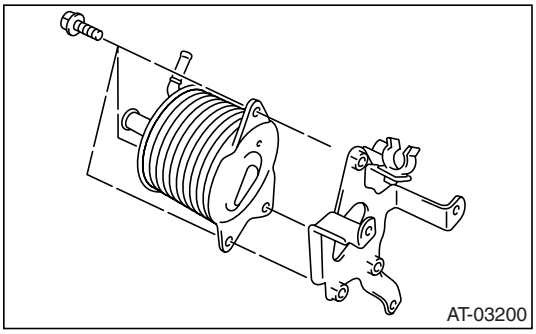
D: ASSEMBLY

1) Install the clip to bracket.



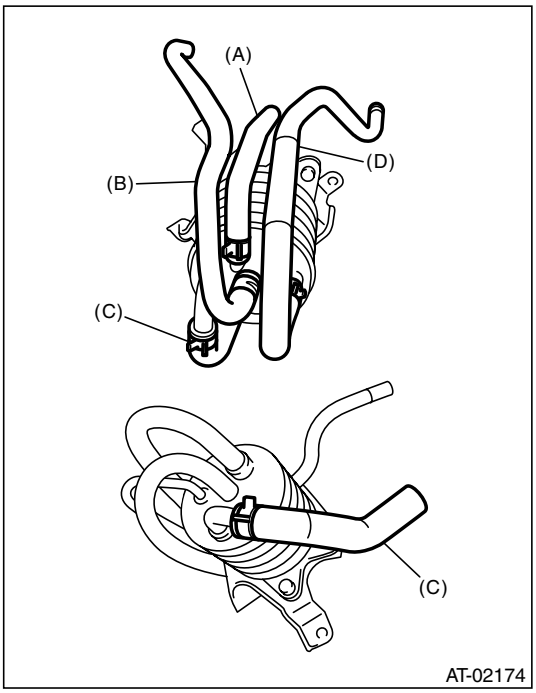
2) Install the bracket.

Tightening torque:
23 N·m (2.3 kgf-m, 17 ft-lb)



3) Install each hose to ATF cooler.

NOTE:
Be careful to the direction of hose.



(A) ATF cooler inlet hose
(B) ATF cooler outlet hose
(C) Engine coolant inlet hose
(D) Engine coolant outlet hose

E: INSPECTION

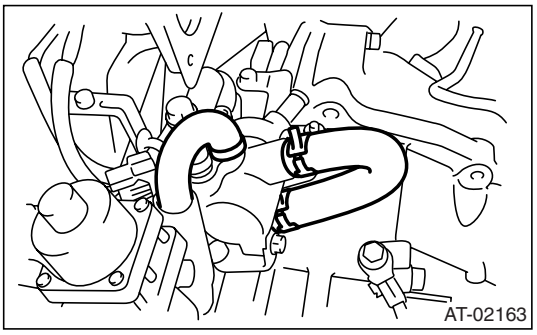
Repair or replace any defective hoses, pipes, clamps, and washers found in the inspection below.

1) Check each connection for leaks of ATF or engine coolant.
2) Check the clamp for deformation.
3) Lightly bend the hose and check for cracks in the surface or other damages.
4) Pinch the hose with your fingers and check for poor elasticity. Also check for poor elasticity in the parts where the clamp was installed by pressing with your fingernail.
5) Check the tip of each hose for peeling, cracks and deformation.
6) Check the ATF cooler for damage.

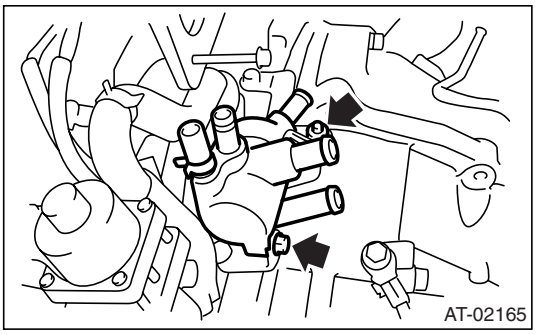
25. Warmer Cock

A: REMOVAL

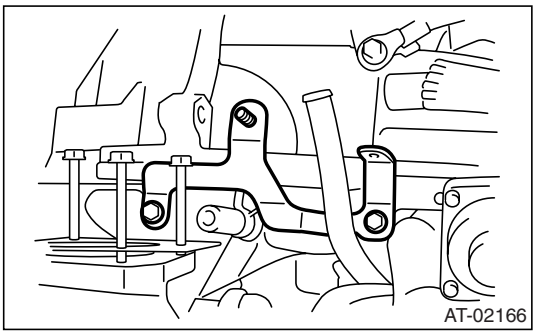
1) Remove the air intake chamber. <Ref. to IN(H4SO 2.0)-7, REMOVAL, Air Intake Chamber.>
2) Remove all the hoses from warmer cock.



3) Remove the warmer cock.



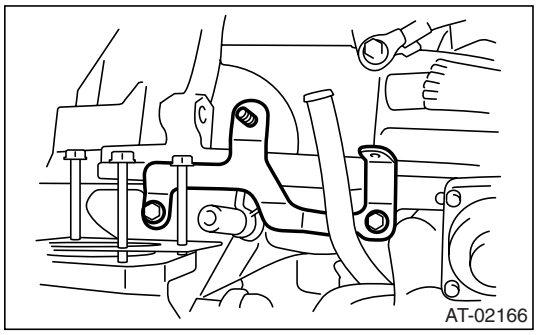
4) Remove the throttle body as necessary, and remove the bracket.



B: INSTALLATION

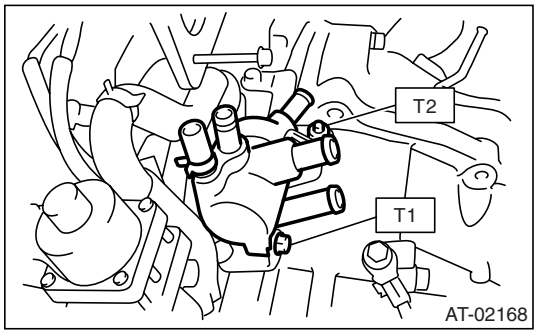
1) Install the bracket, and install the throttle body.

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

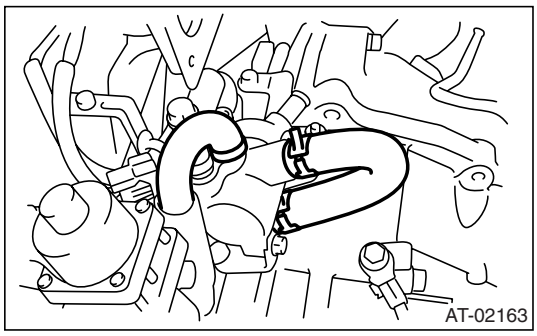


2) Install the warmer cock.

Tightening torque:
T1: 6.4 N·m (0.65 kgf-m, 4.7 ft-lb)
T2: 15 N·m (1.5 kgf-m, 10.8 ft-lb)



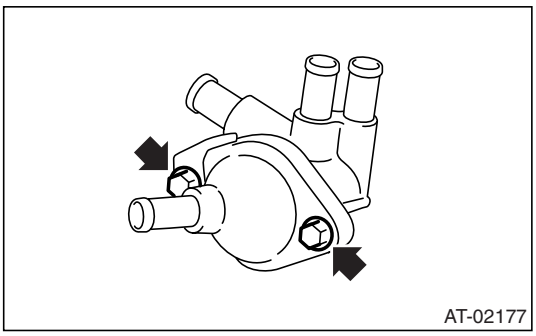
3) Connect the hoses to warmer cock.



4) Install the air intake chamber.
<Ref. to IN(H4SO 2.0)-7, INSTALLATION, Air Intake Chamber.>

C: DISASSEMBLY

Remove the bolt of warmer cock, and remove the thermostat.



D: ASSEMBLY

Assemble in the reverse order.

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

E: INSPECTION

Replace the thermostat if the valve does not close completely at an ambient temperature or if the following test shows unsatisfactory results.

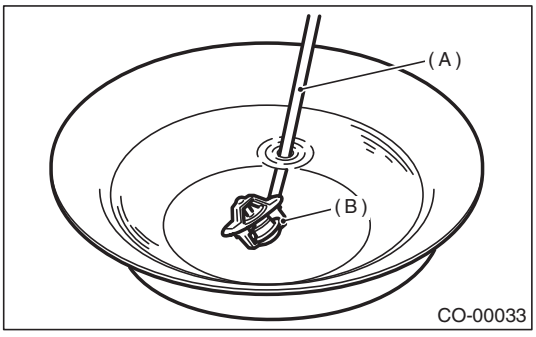
- Inspection method

Immerse the thermostat and a thermometer in water. Raise water temperature gradually, and measure the temperature and valve lift when the valve begins to open and when the valve is fully opened. During the test, agitate the water for even temperature distribution. The measured value should meet the specification.

Starting temperature to open:
69 — 73°C (156 — 163°F)

Fully opens:
84°C (183°F)

Valve lift:
9.0 mm (0.354 in) or more

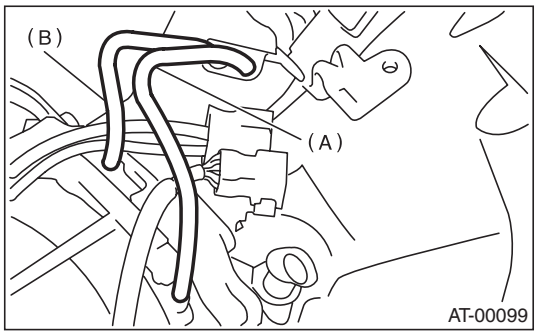


(A) Thermometer
(B) Thermostat

26.Air Breather Hose

A: REMOVAL

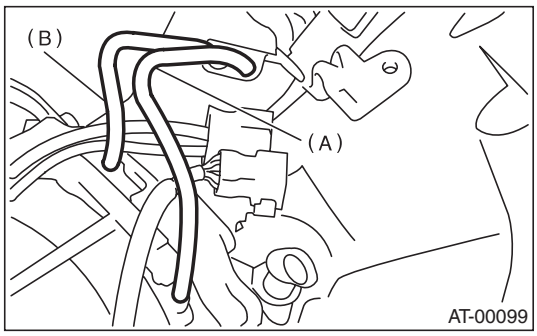
1) Remove the air intake chamber.
<Ref. to IN(H4SO 2.0)-7, REMOVAL, Air Intake Chamber.>
2) Disconnect the air breather hose.



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

B: INSTALLATION

1) Install the air breather hose.



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

2) Install the air intake chamber.
<Ref. to IN(H4SO 2.0)-7, INSTALLATION, Air Intake Chamber.>

C: INSPECTION

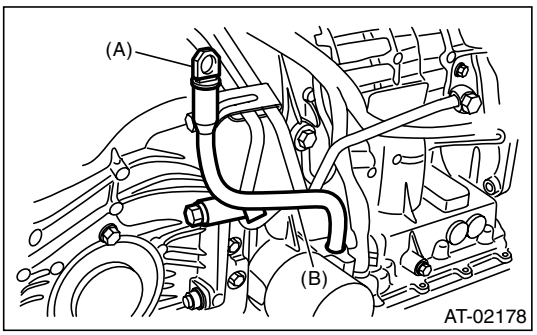
Make sure the hose is not cracked or clogged.

27.Oil Charge Pipe

A: REMOVAL

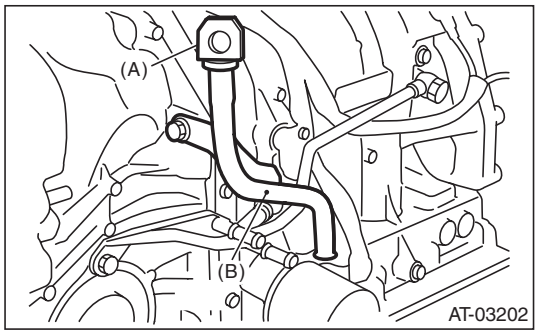
1) Remove the air intake chamber.
<Ref. to IN(H4SO 2.0)-7, REMOVAL, Air Intake Chamber.>
2) Remove the oil charge pipe, and then remove the O-ring from flange side.

- Model with ATF cooler with warmer function



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

- Model without ATF cooler with warmer function



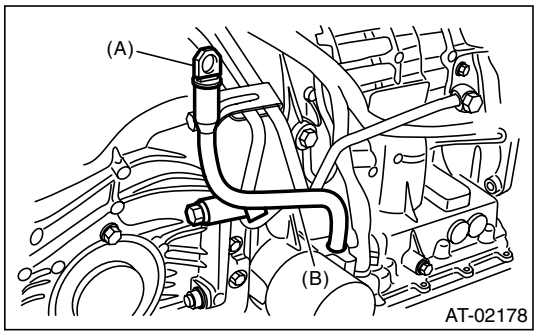
(A) Oil level gauge
(B) Oil charge pipe

B: INSTALLATION

1) Install the oil charge pipe with a new O-ring applied with ATF.

- Model with ATF cooler with warmer function

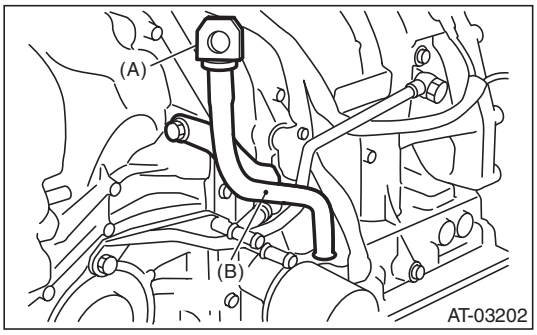
Tightening torque:
41 N·m (4.2 kgf-m, 30.4 ft-lb)



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

- Model without ATF cooler with warmer function

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



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

2) Install the air intake chamber.
<Ref. to IN(H4SO 2.0)-7, INSTALLATION, Air Intake Chamber.>

C: INSPECTION

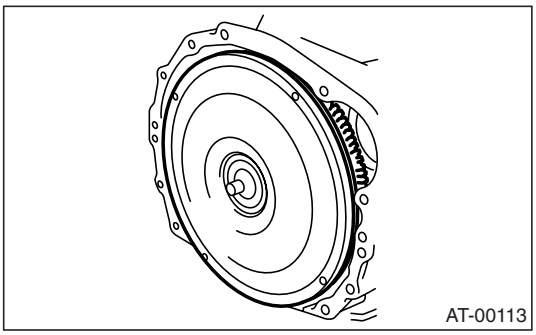
Make sure the oil charge pipe is not deformed or damaged.

28. Torque Converter Clutch Assembly

A: REMOVAL

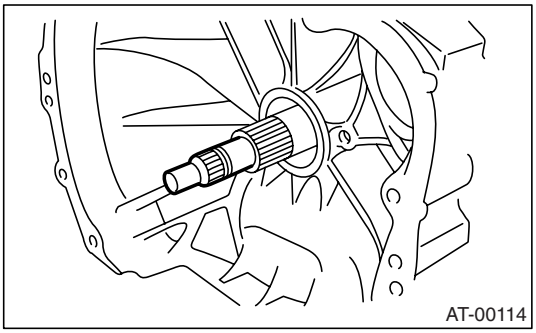
1) Remove the transmission assembly from vehicle. <Ref. to 4AT-39, REMOVAL, Automatic Transmission Assembly.>
2) Pull out the torque converter clutch and oil pump shaft horizontally.

NOTE:
Be sure not to scratch the inside of bushing in oil pump shaft.



3) Remove the input shaft.

NOTE:
When removing the torque converter clutch assembly, the input shaft is also removed.

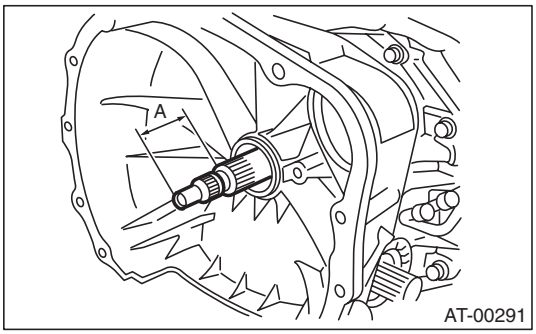


4) Remove the oil pump shaft from the torque converter clutch as necessary.

B: INSTALLATION

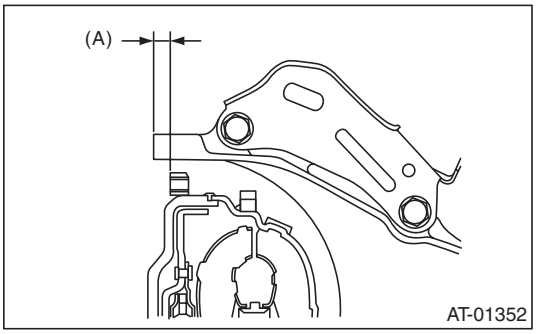
1) Install the shaft to the converter case when oil pump shaft is removed.
2) Install the oil pump shaft to torque converter clutch, and then make sure that the clip is secured on groove.
3) Apply ATF to O-ring, insert the input shaft while rotating it lightly by hand, and then check the protrusion.

Normal protrusion A:
50 — 55 mm (1.97 — 2.17 in)



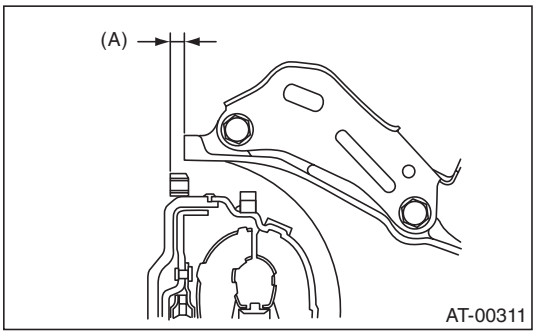
4) With holding the torque converter clutch assembly by hand, carefully install it to torque converter case. Take care not to damage the bushing. Do not contact the oil pump shaft bush with starter shaft part of oil pump cover inappropriately.
5) Lightly rotating the shaft by hands to engage the spline securely, and then check it is within the dimension A.

Dimension A:
2.0 L model
1.1 — 1.3 mm (0.043 — 0.051 in)



(A) Dimension A

2.5 L model
2.7 — 2.9 mm (0.106 — 0.114 in)



(A) Dimension A

6) Install the transmission assembly into vehicle. <Ref. to 4AT-42, INSTALLATION, Automatic Transmission Assembly.>

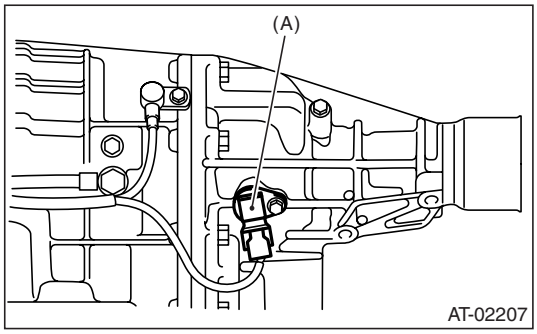
C: INSPECTION

Make sure the ring gear and protrusion of torque converter clutch end are not deformed or damaged.

29. Extension Case

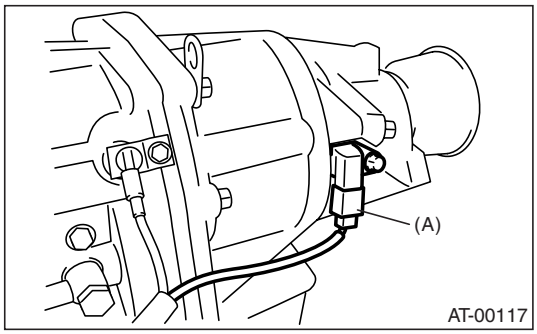
A: REMOVAL

1) Remove the transmission assembly.
<Ref. to 4AT-39, REMOVAL, Automatic Transmission Assembly.>
2) Remove the rear vehicle speed sensor.
• MP-T model



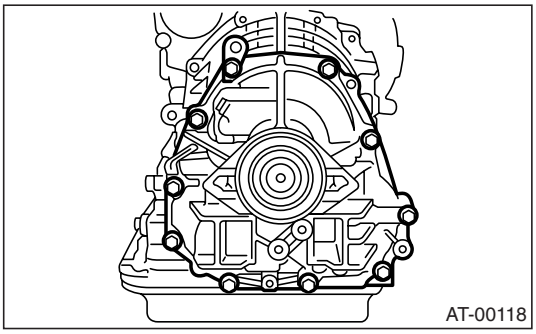
(A) Rear vehicle speed sensor

• VTD model



(A) Rear vehicle speed sensor

3) Separate the transmission case and extension case part.



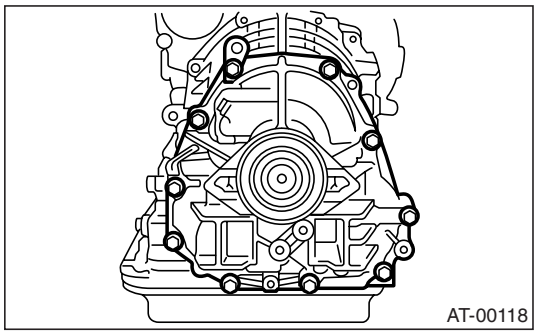
B: INSTALLATION

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

NOTE:
Install the thrust needle bearing in correct direction.

2) Install a new gasket.
3) Install the extension case to transmission case.
4) Tighten bolts to secure extension case.

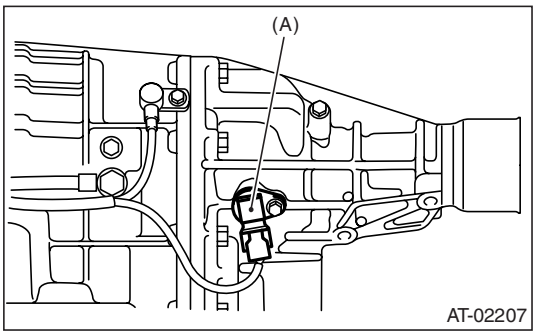
Tightening torque:
25 N·m (2.5 kgf-m, 18.4 ft-lb)



5) Install the rear vehicle speed sensor.

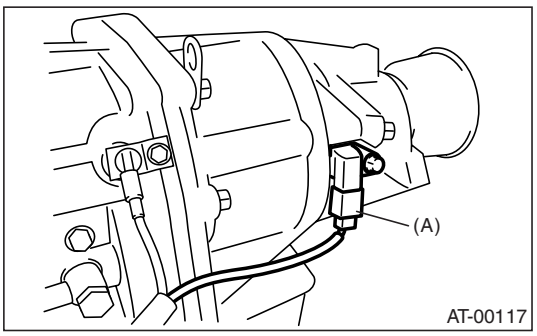
Tightening torque:
7 N·m (0.7 kgf-m, 5.1 ft-lb)

• MP-T model



(A) Rear vehicle speed sensor

• VTD model



(A) Rear vehicle speed sensor

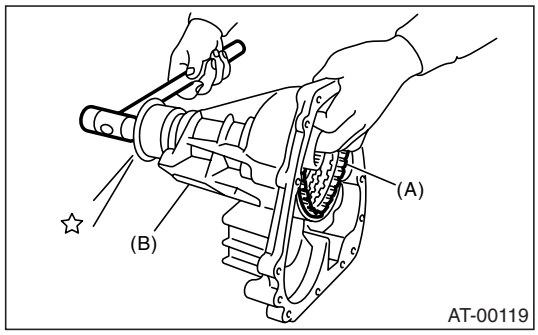
6) Install the transmission assembly.
<Ref. to 4AT-42, INSTALLATION, Automatic Transmission Assembly.>

C: DISASSEMBLY

1. MP-T MODEL

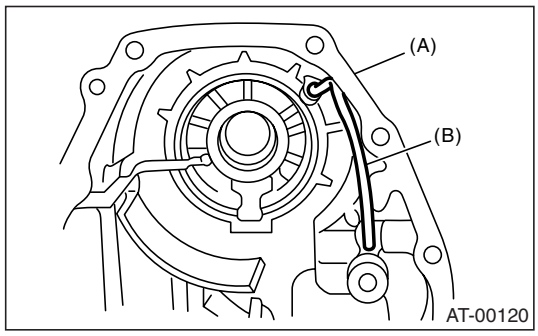
1) Take out the transfer clutch by lightly tapping the end of rear drive shaft.

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



(A) Transfer clutch
(B) Extension case

2) Remove the transfer clutch pipe without deforming the pipe.



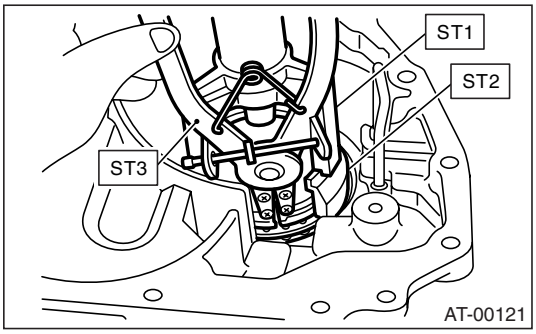
(A) Extension case
(B) Transfer clutch pipe

3) Remove the dust cover from extension case.
4) Remove the oil seal from extension case.

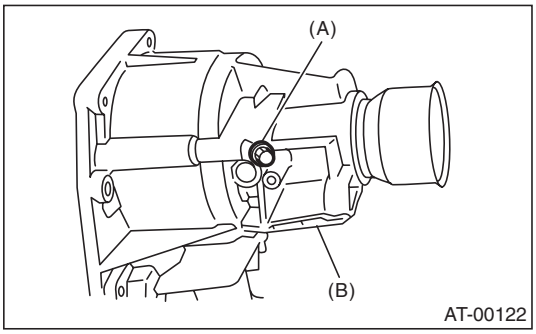
2. VTD MODEL

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

ST1	398673600	COMPRESSOR
ST2	498627100	SEAT
ST3	398663600	PLIERS

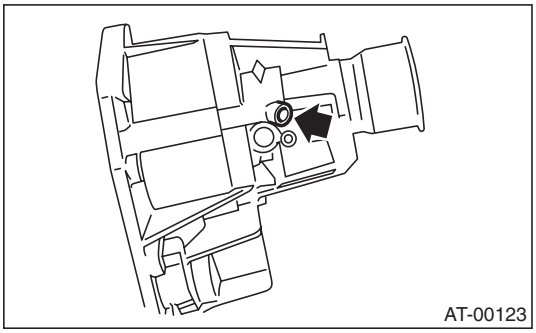


2) Remove the test plug.

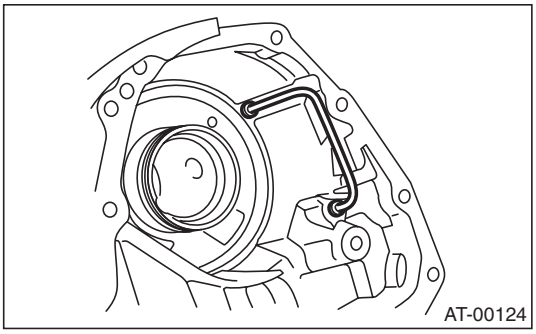


(A) Test plug
(B) Extension case

3) Supply compressed air to remove the clutch piston.



4) Remove the transfer clutch pipe without deforming the pipe.

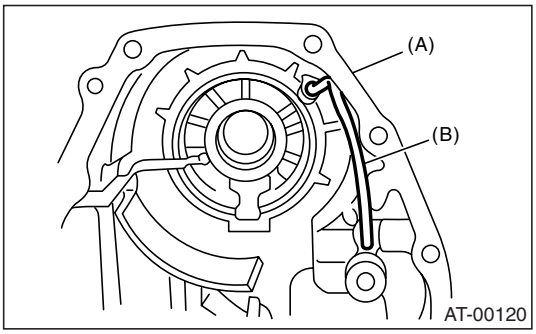


5) Remove the dust cover from extension case.
6) Remove the oil seal from extension case.

D: ASSEMBLY

1. MP-T MODEL

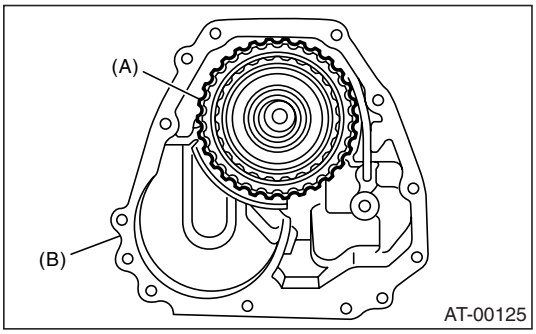
1) Press-fit new oil seal using ST and press.
ST 498057300 INSTALLER
2) Press-fit the dust cover.
3) Install the transfer clutch pipe to extension case without deforming the pipe.



(A) Extension case
(B) Transfer clutch pipe

4) Install the transfer clutch assembly to case.

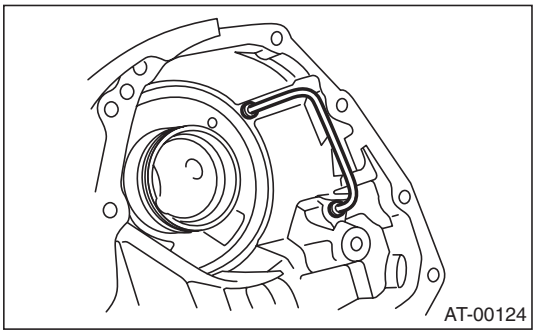
NOTE:
• Be careful not to damage the seal ring.
• Insert the clutch assembly to bottom of bearing shoulder completely.



(A) Transfer clutch
(B) Extension case

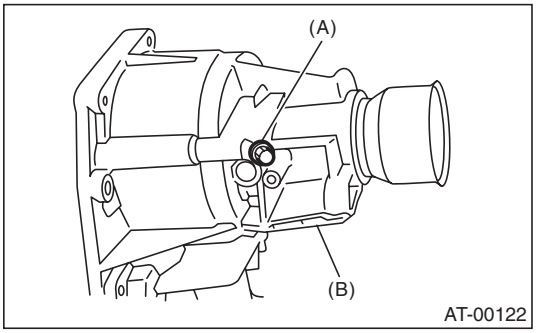
2. VTD MODEL

1) Press-fit new oil seal using ST and press.
ST 498057300 INSTALLER
2) Press-fit the dust cover.
3) Install the transfer clutch pipe to extension case without deforming the pipe.



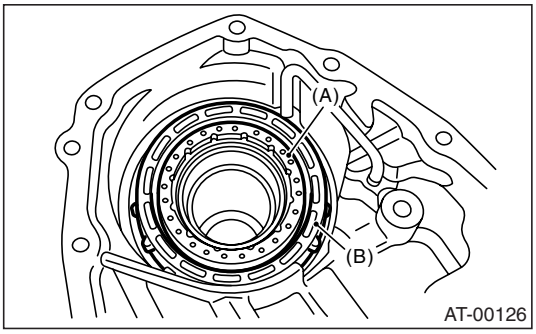
4) Apply ATF to new O-ring, and install the test plug.

Tightening torque:
13 N·m (1.3 kgf-m, 9.6 ft-lb)



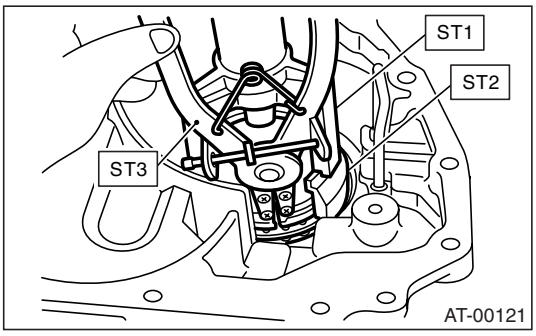
(A) Test plug
(B) Extension case

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



(A) Spring retainer
(B) Multi-plate clutch (LSD) piston assembly

6) Install the snap ring using ST1, ST2 and ST3.
ST1 398673600 COMPRESSOR
ST2 498627100 SEAT
ST3 398663600 PLIERS



E: INSPECTION

• Spray compressed air, and make sure the transfer pipe and extension case routes are not clogged and have no leak.
• Inspect the extension end play, and adjust it to within specification.
MP-T model
<Ref. to 4AT-90, MP-T MODEL, ADJUSTMENT, Transfer Clutch.>
VTD model
<Ref. to 4AT-91, VTD MODEL, ADJUSTMENT, Transfer Clutch.>

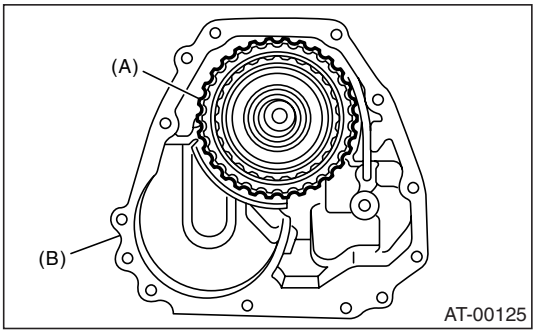
30.Transfer Clutch

A: REMOVAL

1) Remove the transmission assembly from vehicle. <Ref. to 4AT-39, REMOVAL, Automatic Transmission Assembly.>
2) Remove the extension case, and then remove the transfer clutch. <Ref. to 4AT-83, REMOVAL, Extension Case.> <Ref. to 4AT-84, DISASSEMBLY, Extension Case.>

B: INSTALLATION

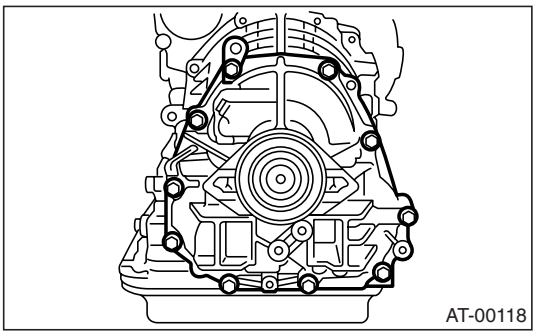
1) Select the thrust needle bearing. <Ref. to 4AT-90, ADJUSTMENT, Transfer Clutch.>
2) Install the transfer clutch assembly to case.



(A) Transfer clutch
(B) Extension case

3) Tighten the bolts to secure the case.

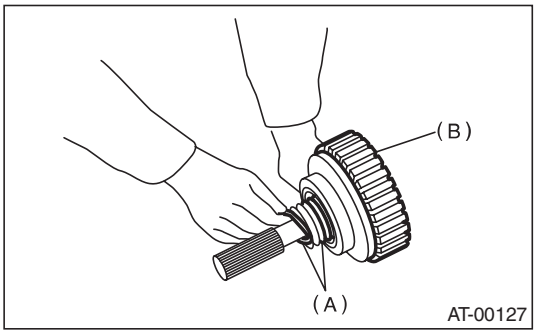
Tightening torque:
25 N·m (2.5 kgf-m, 18.4 ft-lb)



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

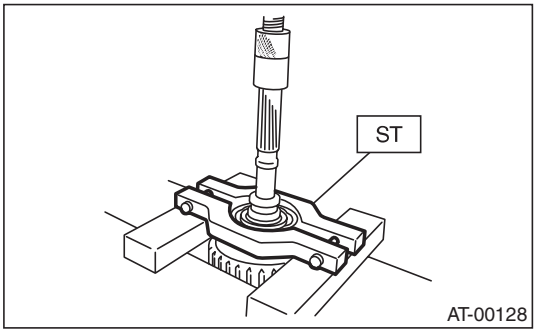
C: DISASSEMBLY

1) Remove the seal ring.

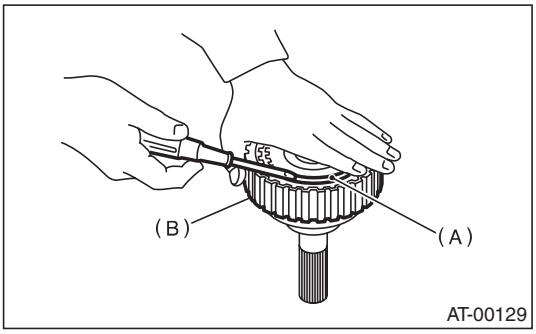


(A) Seal ring
(B) Transfer clutch

2) Remove the ball bearing using ST and press.
ST 498077600 REMOVER

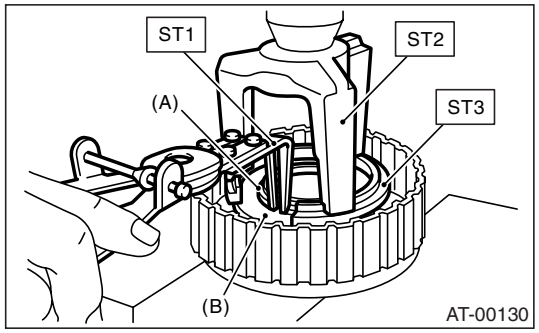


3) Remove the snap ring, and then take out the pressure plate, drive plate and driven plate.



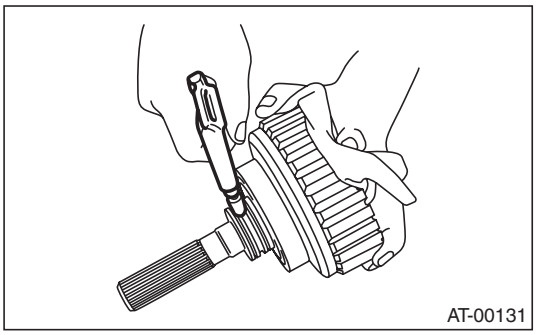
(A) Snap ring
(B) Transfer clutch

4) Using the ST1, ST2 and ST3, remove the snap ring, and then take out the return spring and transfer clutch piston seal.
ST1 399893600 PLIERS
ST2 398673600 COMPRESSOR
ST3 398623600 SEAT



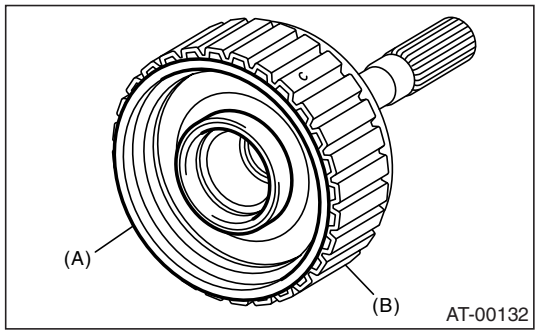
(A) Snap ring
(B) Transfer piston seal

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



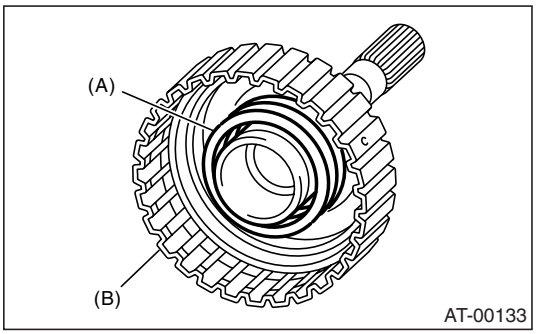
D: ASSEMBLY

1) Install the transfer clutch piston.



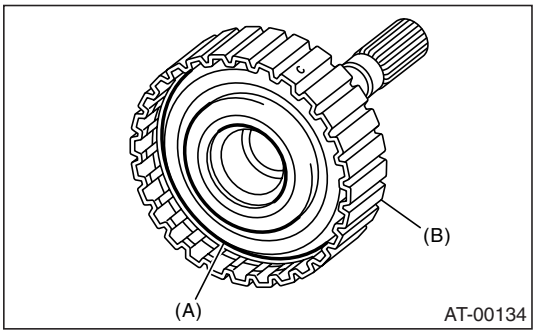
(A) Transfer clutch piston
(B) Rear drive shaft

2) Install the return spring to transfer clutch piston.



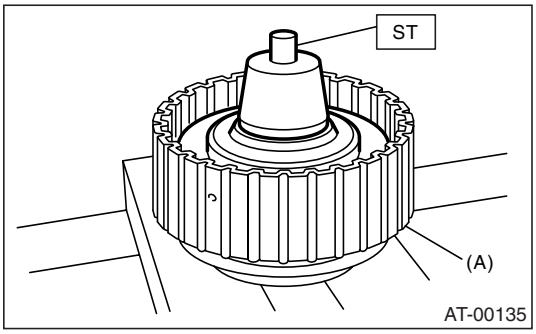
(A) Return spring
(B) Rear drive shaft

3) Apply ATF to the lip of transfer clutch piston seal and install it.



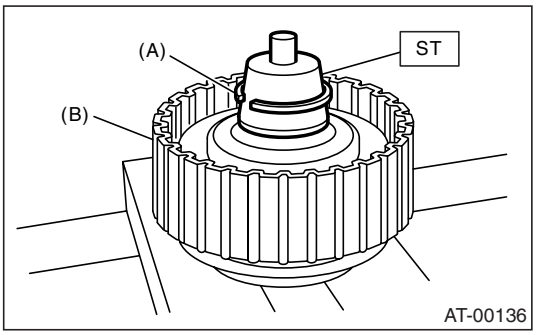
(A) Transfer clutch piston seal
(B) Rear drive shaft

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



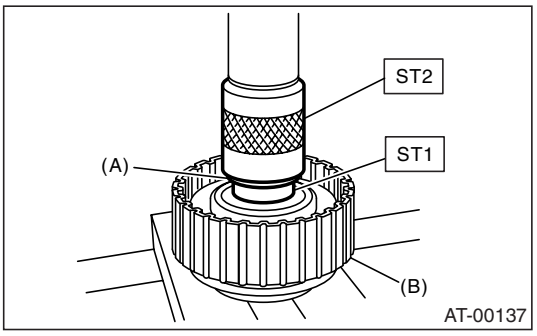
(A) Transfer clutch

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



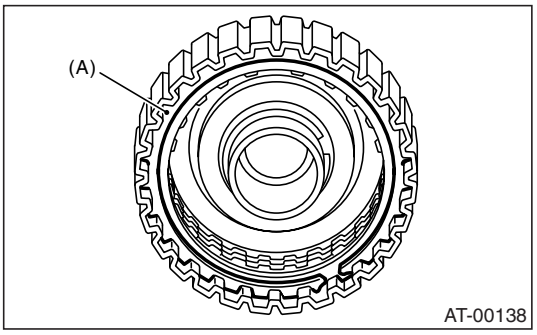
(A) Snap ring
(B) Transfer clutch

6) Install the snap ring to rear drive shaft using ST1 and ST2.
ST1 499257300 SNAP RING OUTER GUIDE
ST2 499247400 INSTALLER



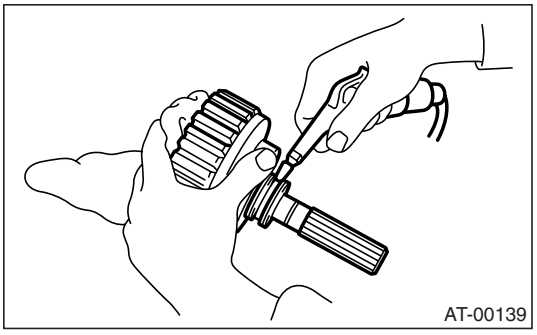
(A) Snap ring
(B) Transfer clutch

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

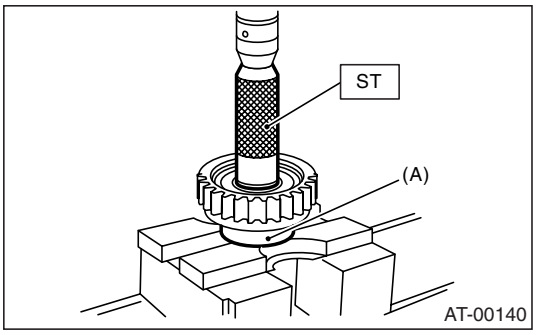


(A) Snap ring

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



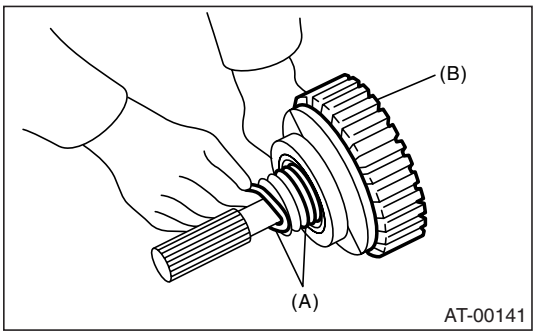
9) Check the clearance between snap ring and pressure gauge. <Ref. to 4AT-90, INSPECTION, Transfer Clutch.>
10) Press-fit new ball bearing using ST.
ST 899580100 INSTALLER



(A) Ball bearing

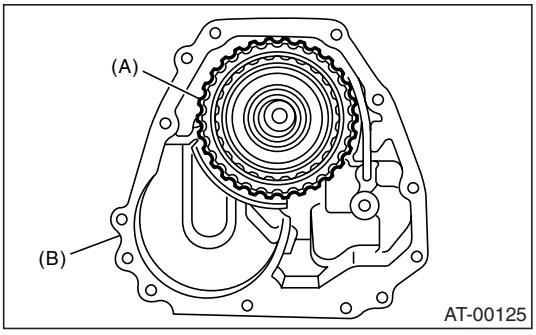
11) Apply vaseline to seal ring and install to the seal ring groove of shaft.

NOTE:
While installing the seal ring, do not expand it excessively.



(A) Seal ring
(B) Transfer clutch

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



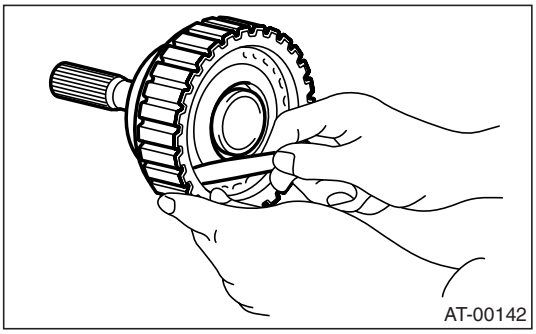
(A) Transfer clutch
(B) Extension case

E: INSPECTION

• Inspect the drive plate facing for wear and damage.
• Make sure the snap ring is not worn and the return spring has no permanent distortion, damage, or deformation.
• Inspect the D-ring for damage.
• Inspect the extension end play and adjust it to within specification. <Ref. to 4AT-90, ADJUSTMENT, Transfer Clutch.>
1) Check the clearance between snap ring and pressure gauge.
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 transfer clutch piston side.

Initial specification:
0.7 — 1.1 mm (0.028 — 0.043 in)

Service limit:
1.6 mm (0.063 in)



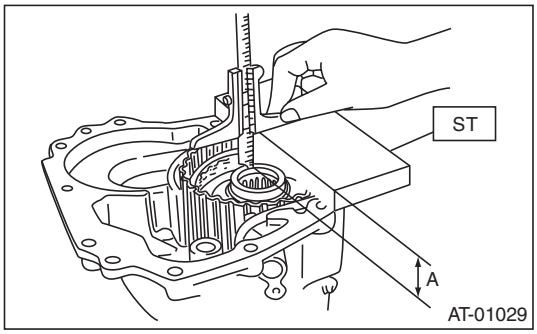
Pressure plate	
Part No.	Thickness mm (in)
31593AA151	3.3 (0.130)
31593AA161	3.7 (0.146)
31593AA171	4.1 (0.161)
31593AA181	4.5 (0.177)

4) Check that the tight corner braking phenomenon does not occur when the vehicle is started with steering fully turned. If tight corner braking phenomenon 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 phenomenon still persists, drive the vehicle again in a circle for several laps.

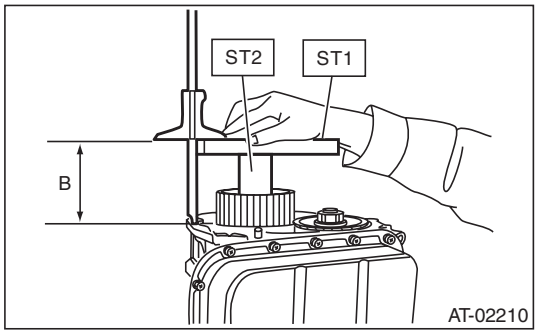
F: ADJUSTMENT

1. MP-T MODEL

1) Measure the depth “A” from the end of extension case to the end of rear drive shaft using ST.
ST 398643600 GAUGE



2) Measure the height “B” from the transmission case mating surface to the end of ST using ST1 and ST2.
ST1 398643600 GAUGE
ST2 499577000 GAUGE



3) Calculation formula:

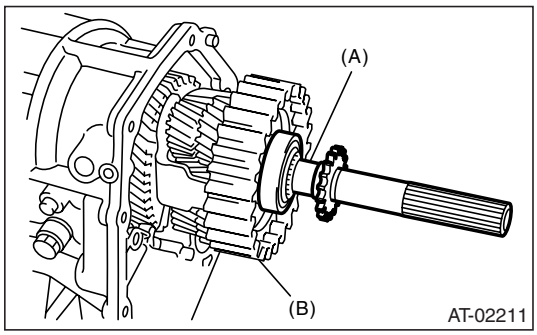
NOTE:
Calculate “T”:
T = A − B + 35.4 mm
[T = A − B + 1.3937 in]
T: Thrust needle bearing thickness
A: Depth from mating surface of extension case to end of surface of rear drive shaft ball bearing outer race
B: Height from mating surface of transmission case to end of ST
Example:
When A = 33.6 mm (1.3228 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 “T” becomes 3.95, therefore select bearing thickness of 3.8 mm (0.150 in).

NOTE:
Calculation formula for “T” is applied when measuring using ST (398643600 GAUGE, 499577000 GAUGE). When not using the ST,
T = (A − α + 0.45 mm) − (B − β) − H
[T = (A − α + 0.0177 in) − (B − β) − H]
is applied.
T: Thrust needle bearing thickness
A: Depth from mating surface of extension case to end of surface of rear drive shaft ball bearing outer race
B: Height from mating surface of transmission case to end of substitution as ST
α: Tool thickness used when measuring “A”
β: Tool thickness used when measuring “B”
0.45: Gasket thickness (mm)
0.0177: Gasket thickness (in)
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)

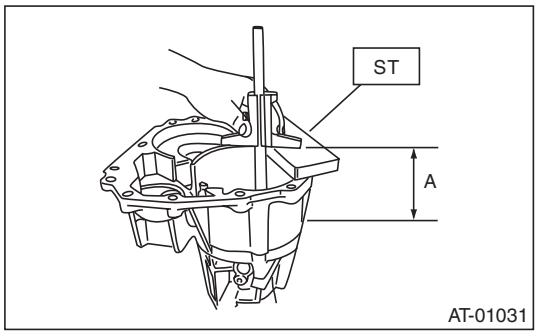
2. VTD MODEL

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

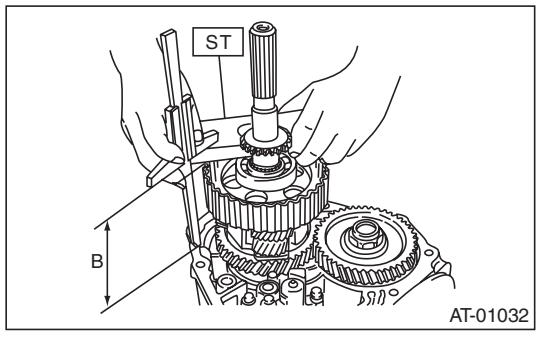


(A) Rear drive plate
(B) Center differential carrier

2) Using the ST, measure the depth “A”, which is from mating surface of extension case to rear drive shaft ball bearing outer ring contact surface.
ST 398643600 GAUGE



3) Using the ST, measure the height “B” from the mating surface of transmission case to rear drive shaft ball bearing.
ST 398643600 GAUGE



4) Calculation formula:

NOTE:
Calculate "T":
When the 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: Depth from mating surface of extension case to rear drive shaft ball bearing outer ring contact surface
B: Height from mating surface of transmission case to ball bearing end of rear drive shaft
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 when clearance is 0.05 mm (0.0020 in)
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]

NOTE:
Calculation formula for "T" above is applied when measuring using ST (398643600 GAUGE). When not using the ST,
T = (A − α + 0.45 mm) − (B − β) − H
[T = (A − α + 0.0177 in) − (B − β) − H]
is applied.
T: Thrust needle bearing thickness
A: Depth from mating surface of extension case to rear drive shaft ball bearing outer ring contact surface
B: Height from mating surface of transmission case to rear drive shaft ball bearing end surface
α: Tool thickness used when measuring "A"
β: Tool 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).

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

31.Multi-plate Clutch

A: REMOVAL

Remove the multi-plate clutch following the same instructions as for the extension case. <Ref. to 4AT-83, REMOVAL, Extension Case.>

B: INSTALLATION

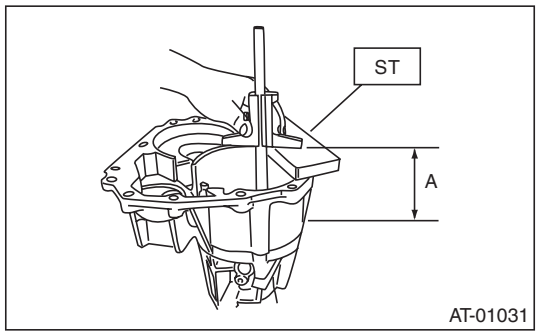
Install the multi-plate clutch following the same instructions as for the extension case. <Ref. to 4AT-83, INSTALLATION, Extension Case.>

C: INSPECTION

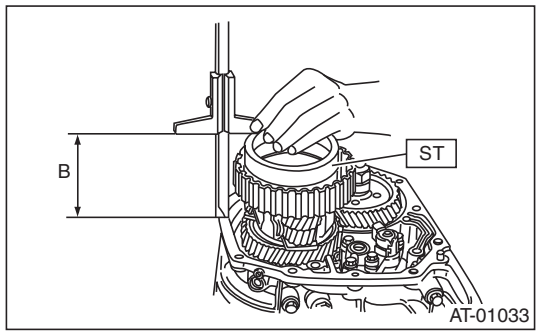
- Inspect the drive plate facing for wear and damage.
- Make sure the snap ring is not worn and the return spring has no permanent distortion, damage, or deformation.
- Inspect the D-ring for damage.
- Measure the multi-plate clutch clearance and adjust it within specification. <Ref. to 4AT-93, ADJUSTMENT, Multi-plate Clutch.>

D: ADJUSTMENT

1) Assemble the drive plate and driven plate to center differential carrier.
2) Using the ST, measure the depth “A” from mating surface of extension case to multi-plate clutch piston.
ST 398643600 GAUGE



3) Using the ST, measure the height “B” from transmission case mating surface to end of ST.
ST 398744300 PISTON GUIDE



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 GAUGE, 398744300 GAUGE). When not using the ST,
$T = (A - \alpha + 0.45\text{ mm}) - (B - \beta)$
[$T = (A - \alpha + 0.0177\text{ in}) - (B - \beta)$]
is applied.

T: Thrust needle bearing thickness
A: Depth from the end of the substitute as ST to multi-plate clutch piston
B: Height from mating surface of transmission case to end of substitution as ST
α: Tool thickness used when measuring “A”
β: Tool thickness used when measuring “B”
0.45: Gasket thickness (mm)
- Measure the thickness of multi-plate clutch piston driven and drive plate to find the clearance between measurement value and “T”.

Initial specification:
0.2 — 0.6 mm (0.008 — 0.024 in)

Service limit:
1.6 mm (0.063 in)

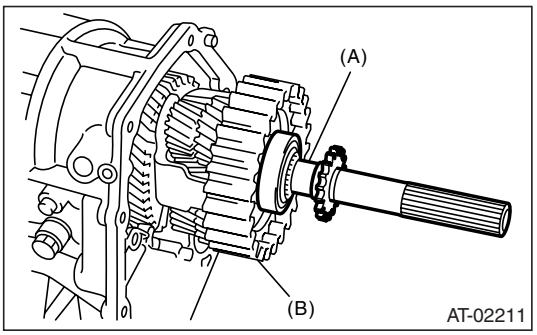
If the clearance exceeds the limit, replace the plate set (drive and driven). Select a driven plate of multi-plate clutch piston so that the clearance becomes within specification.

Driven plate	
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)

32.Rear Drive Shaft

A: REMOVAL

1) Remove the transmission assembly from vehicle. <Ref. to 4AT-39, REMOVAL, Automatic Transmission Assembly.>
2) Remove the rear vehicle speed sensor, and then separate the extension case from transmission case. <Ref. to 4AT-83, REMOVAL, Extension Case.>
3) Pull out the rear drive shaft from center differential assembly.



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

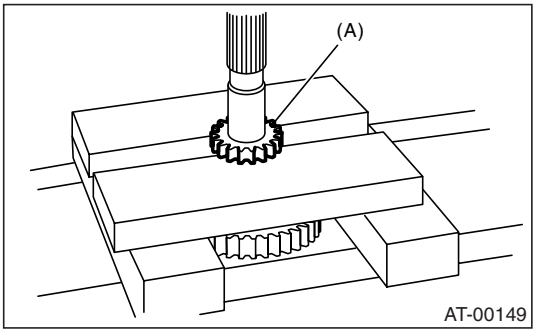
4) Remove the drive plate and driven plate.

B: INSTALLATION

1) Select the appropriate shim. <Ref. to 4AT-91, VTD MODEL, ADJUSTMENT, Transfer Clutch.>
2) Install the drive plate and driven plate.
3) Insert the rear drive shaft into center differential assembly.
4) Combine the transmission case with extension case, and then install the rear vehicle speed sensor. <Ref. to 4AT-83, INSTALLATION, Extension Case.>
5) Install the transmission assembly into vehicle. <Ref. to 4AT-42, INSTALLATION, Automatic Transmission Assembly.>

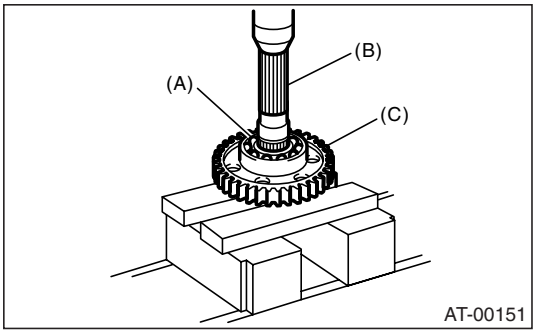
C: DISASSEMBLY

1) Using a press, remove the revolution gear.



(A) Revolution gear

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

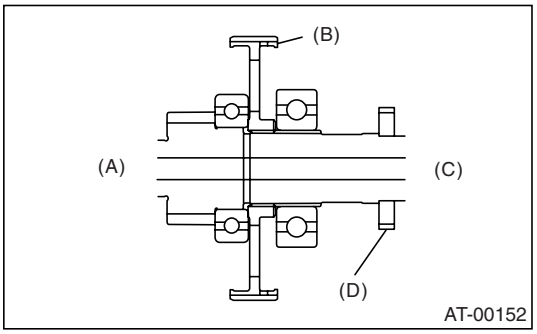


(A) Rear ball bearing
(B) Rear drive shaft
(C) Clutch hub

D: ASSEMBLY

Assemble in the reverse order of disassembly.

NOTE:
• Use new ball bearings and revolution gear.
• 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

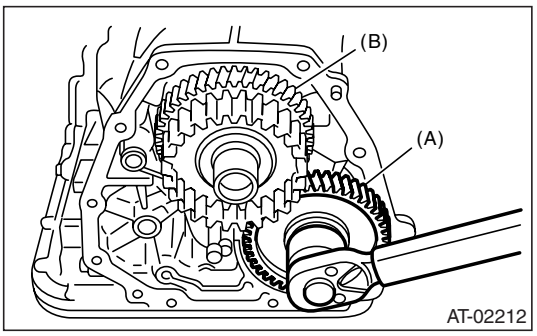
• Check that the holes, damages or other foreign matters are not on each parts.
• Inspect the extension end play and adjust it to within specification. <Ref. to 4AT-91, VTD MODEL, ADJUSTMENT, Transfer Clutch.>

33. Reduction Driven Gear

A: REMOVAL

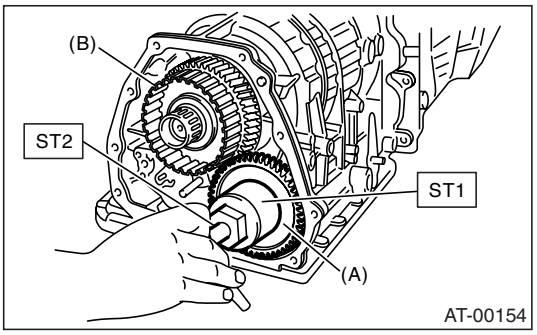
1. MP-T MODEL

1) Remove the transmission assembly from vehicle. <Ref. to 4AT-39, REMOVAL, Automatic Transmission Assembly.>
2) Remove the rear vehicle speed sensor, and then separate the extension case from transmission case. <Ref. to 4AT-83, REMOVAL, Extension Case.>
3) Set the select lever to “P” range.
4) Remove the caulking part, and then remove the lock nut.



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

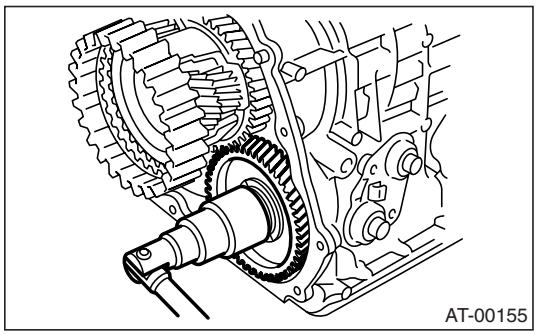
5) Using the ST1 and ST2, extract the reduction driven gear.
ST1 499737000 PULLER
ST2 899524100 PULLER SET



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

2. VTD MODEL

1) Remove the transmission assembly from vehicle. <Ref. to 4AT-39, REMOVAL, Automatic Transmission Assembly.>
2) Remove the rear vehicle speed sensor, and then separate the extension case from transmission case. <Ref. to 4AT-83, REMOVAL, Extension Case.>
3) Remove the rear drive shaft. <Ref. to 4AT-94, REMOVAL, Rear Drive Shaft.>
4) Set the select lever to “P” range.
5) Remove the caulking part, and then remove the lock nut.



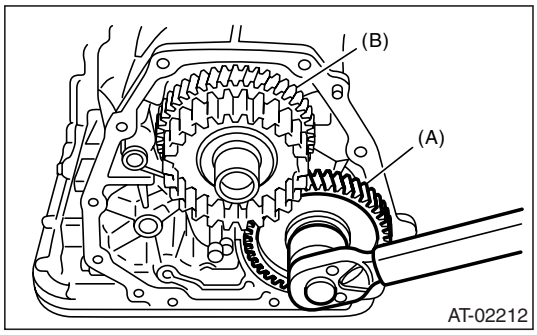
6) Using the ST1 and ST2, extract the reduction driven gear.
ST1 499737000 PULLER
ST2 899524100 PULLER SET
7) Pull out the center differential assembly. <Ref. to 4AT-99, REMOVAL, Center Differential Carrier.>

B: INSTALLATION

1. MP-T MODEL

1) Set the select lever to “P” range.
2) Using a plastic hammer, install the 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)



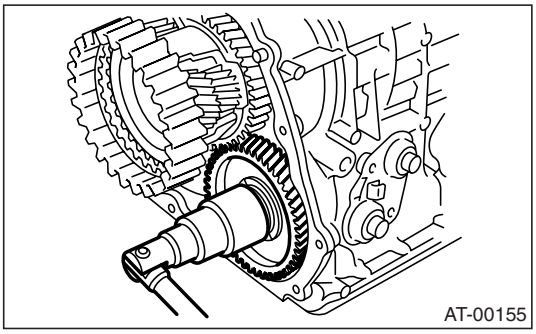
(A) Reduction driven gear
(B) Reduction drive gear

3) After tightening, caulk the lock nut.
4) Combine the transmission case with extension case, and then install the rear vehicle speed sensor. <Ref. to 4AT-83, INSTALLATION, Extension Case.>
5) Install the transmission assembly into vehicle. <Ref. to 4AT-42, INSTALLATION, Automatic Transmission Assembly.>

2. VTD MODEL

1) Set the select lever to “P” range.
2) Use a plastic hammer to install reduction driven gear assembly.
3) Use a plastic hammer to install the center differential.
4) Install new lock nut and washer.

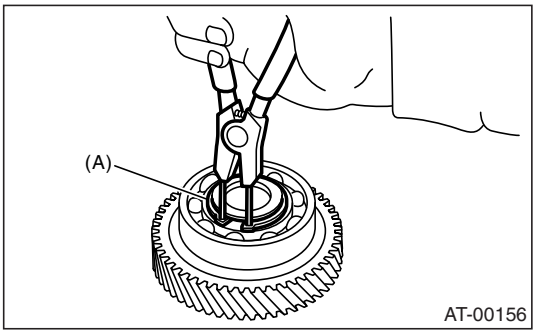
Tightening torque:
100 N·m (10.2 kgf-m, 73.8 ft-lb)



5) After tightening, caulk the lock nut.
6) Insert the rear drive shaft assembly. <Ref. to 4AT-94, INSTALLATION, Rear Drive Shaft.>
7) Combine the transmission case with extension case, and then install the rear vehicle speed sensor. <Ref. to 4AT-83, INSTALLATION, Extension Case.>
8) Install the transmission assembly into vehicle. <Ref. to 4AT-42, INSTALLATION, Automatic Transmission Assembly.>

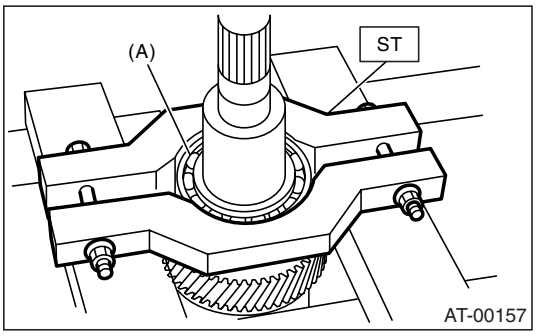
C: DISASSEMBLY

1) Remove the snap ring from reduction driven gear.



(A) Snap ring

2) Remove the ball bearing from reduction driven gear using ST.
ST 498077600 REMOVER

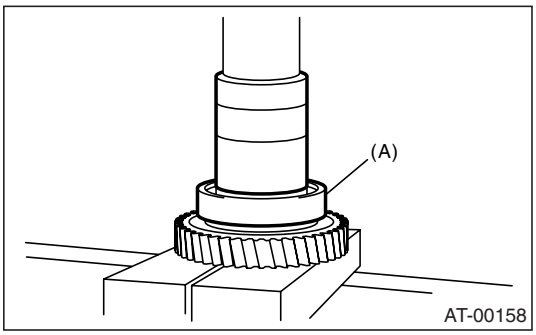


(A) Ball bearing

3) Remove the snap ring from reduction driven gear.

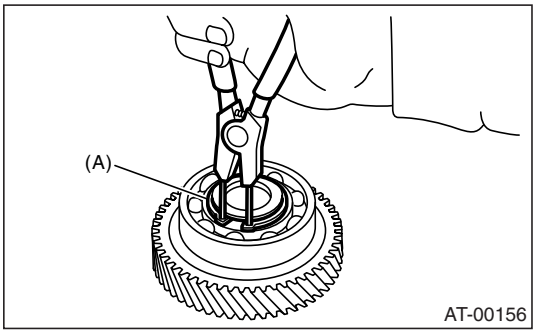
D: ASSEMBLY

1) Install the snap ring to reduction driven gear.
2) Install the new ball bearing to reduction driven gear using press.



(A) Ball bearing

3) Install the snap ring to reduction driven gear.



(A) Snap ring

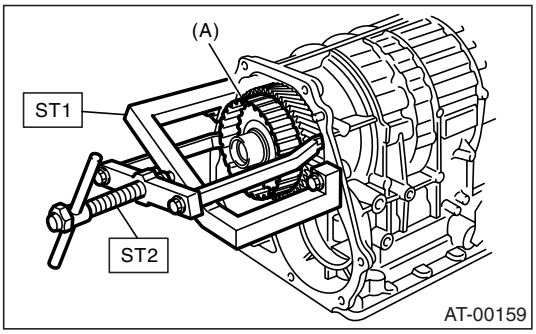
E: INSPECTION

Make sure the ball bearing and gear are not deformed or damaged.

34.Reduction Drive Gear

A: REMOVAL

1) Remove the transmission assembly from vehicle. <Ref. to 4AT-39, REMOVAL, Automatic Transmission Assembly.>
2) Remove the rear vehicle speed sensor, and then separate the extension case from transmission case. <Ref. to 4AT-83, REMOVAL, Extension Case.>
3) Remove the reduction driven gear. <Ref. to 4AT-95, REMOVAL, Reduction Driven Gear.>
4) Using the ST, pull out the reduction drive gear.
ST1 499737100 PULLER
ST2 899524100 PULLER SET

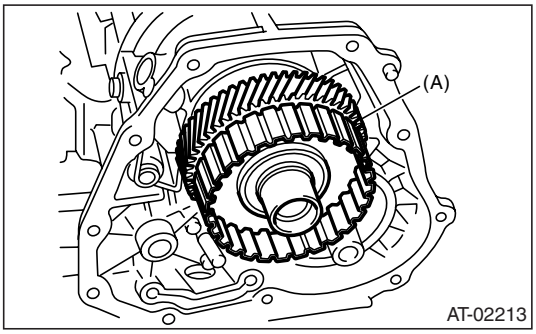


(A) Reduction drive gear

B: INSTALLATION

1) Install the reduction drive gear assembly.

NOTE:
Press-fit it to the bottom of bearing shoulder completely.

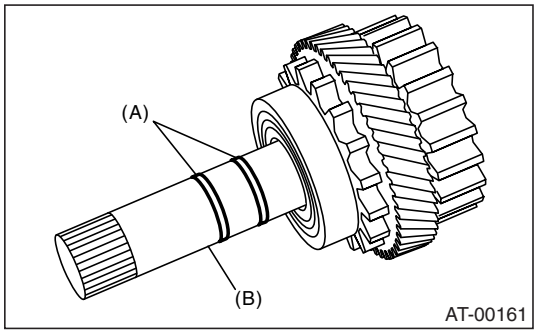


(A) Reduction drive gear

2) Install the reduction driven gear. <Ref. to 4AT-95, INSTALLATION, Reduction Driven Gear.>
3) Combine the transmission case with extension case, and then install the rear vehicle speed sensor. <Ref. to 4AT-83, INSTALLATION, Extension Case.>
4) Install the transmission assembly into vehicle. <Ref. to 4AT-42, INSTALLATION, Automatic Transmission Assembly.>

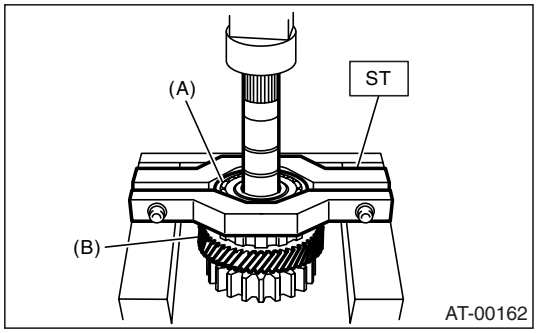
C: DISASSEMBLY

1) Take out the seal ring.



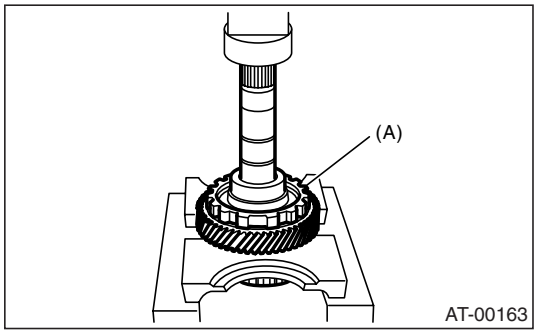
(A) Seal ring
(B) Reduction drive shaft

2) Remove the ball bearing using ST.
ST 498077600 REMOVER



(A) Ball bearing
(B) Reduction drive gear

3) Remove the reduction drive gear using press.

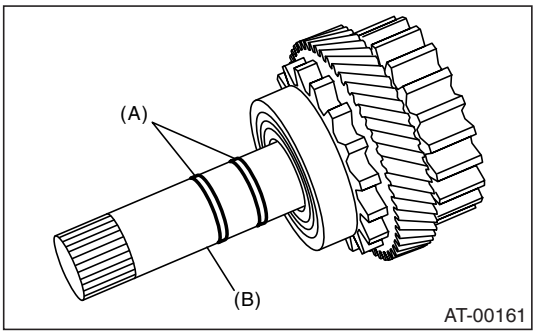


(A) Reduction drive gear

D: ASSEMBLY

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

4) Apply ATF to new seal ring, and install them.



(A) Seal ring
(B) Reduction drive shaft

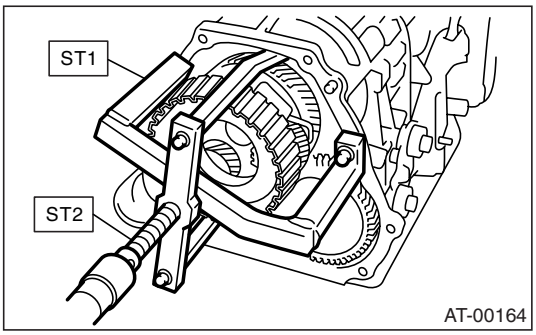
E: INSPECTION

- Rotate the bearing by hand, Check that it rotates smoothly.
- Check each part for hole, damage or other foreign matters.
- Measure the extension end play and adjust it to within specification. <Ref. to 4AT-90, ADJUSTMENT, Transfer Clutch.>

35.Center Differential Carrier

A: REMOVAL

1) Remove the transmission assembly from vehicle. <Ref. to 4AT-39, REMOVAL, Automatic Transmission Assembly.>
2) Remove the rear vehicle speed sensor, and then separate the extension case from transmission case. <Ref. to 4AT-83, REMOVAL, Extension Case.>
3) Pull out the rear drive shaft. <Ref. to 4AT-94, REMOVAL, Rear Drive Shaft.>
4) Using the ST, pull out the center differential carrier assembly.
ST1 499737100 PULLER
ST2 899524100 PULLER SET

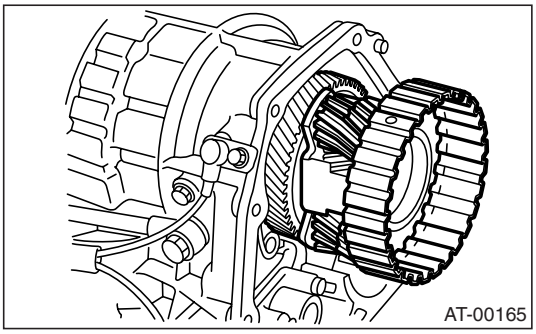


5) Pull out the shim(s) from transmission case.

B: INSTALLATION

1) Install the center differential assembly with shim.

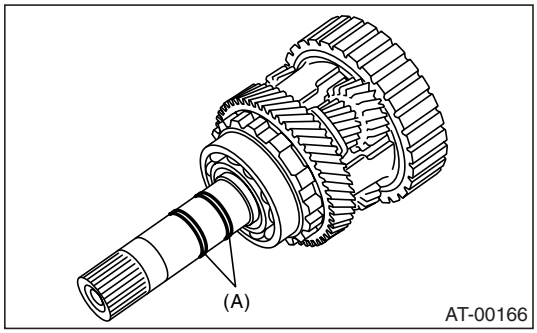
NOTE:
Press-fit it to the bottom of bearing shoulder completely.



2) Insert the rear drive shaft. <Ref. to 4AT-94, INSTALLATION, Rear Drive Shaft.>
3) Combine the transmission case with extension case, and then install the rear vehicle speed sensor. <Ref. to 4AT-83, INSTALLATION, Extension Case.>
4) Install the transmission assembly into vehicle. <Ref. to 4AT-42, INSTALLATION, Automatic Transmission Assembly.>

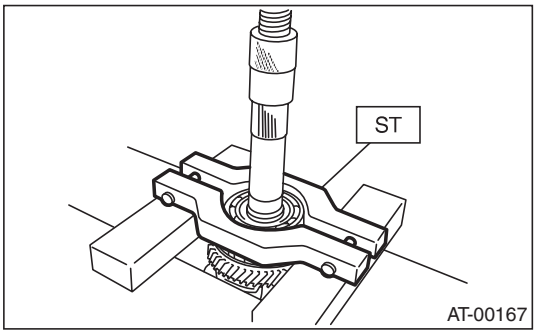
C: DISASSEMBLY

1) Remove the seal ring.

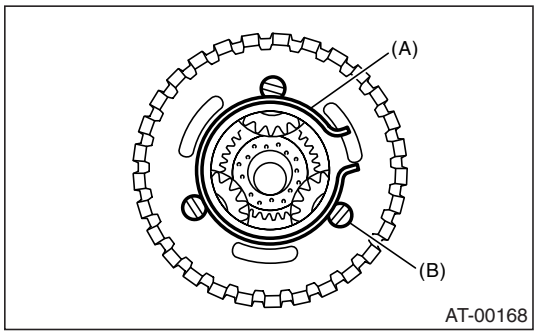


(A) Seal ring

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

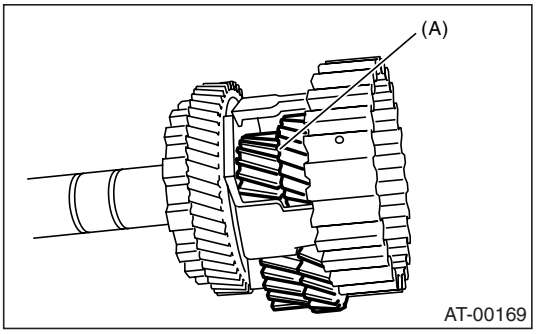


3) Remove the snap ring, and pull out the shaft from center differential assembly.



(A) Snap ring
(B) Shaft

4) Remove the thrust washer, pinion gear and washer from center differential assembly.

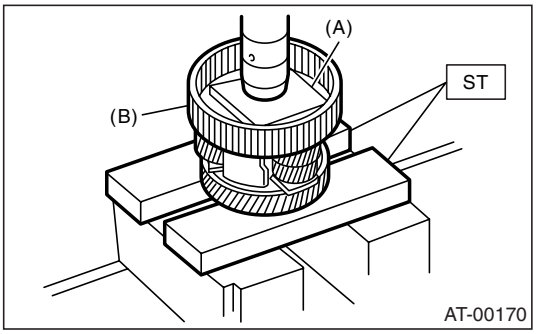


(A) Pinion gear

5) Pull out the intermediate shaft and thrust bearing.

D: ASSEMBLY

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

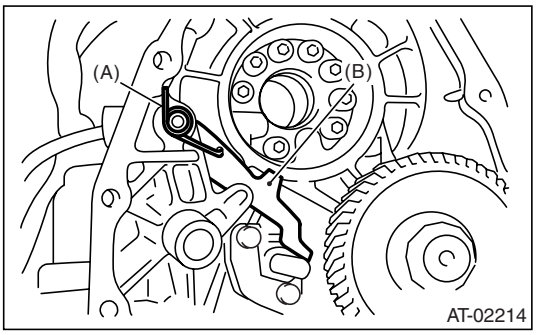
E: INSPECTION

• Check that the holes, damages or other foreign matters are not on each parts.
• Inspect the extension end play and adjust it to within specification. <Ref. to 4AT-91, VTD MODEL, Transfer Clutch.>

36.Parking Pawl

A: REMOVAL

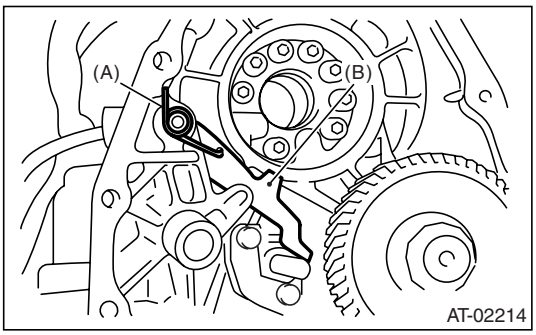
1) Remove the transmission assembly from vehicle. <Ref. to 4AT-39, REMOVAL, Automatic Transmission Assembly.>
2) Remove the rear vehicle speed sensor, and then separate the extension case from transmission case. <Ref. to 4AT-83, REMOVAL, Extension Case.>
3) Remove the reduction drive gear. (MP-T model) <Ref. to 4AT-97, REMOVAL, Reduction Drive Gear.>
4) Remove the center differential carrier. (VTD model) <Ref. to 4AT-99, REMOVAL, Center Differential Carrier.>
5) Remove the parking pawl, return spring and shaft.



(A) Return spring
(B) Parking pawl

B: INSTALLATION

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



(A) Return spring
(B) Parking pawl

2) Install the reduction drive gear. (MP-T model) <Ref. to 4AT-97, INSTALLATION, Reduction Drive Gear.>
3) Install the center differential carrier. (VTD model) <Ref. to 4AT-99, INSTALLATION, Center Differential Carrier.>
4) Install the rear vehicle speed sensor and extension case. <Ref. to 4AT-83, INSTALLATION, Extension Case.>
5) Install the transmission assembly into vehicle. <Ref. to 4AT-42, INSTALLATION, Automatic Transmission Assembly.>

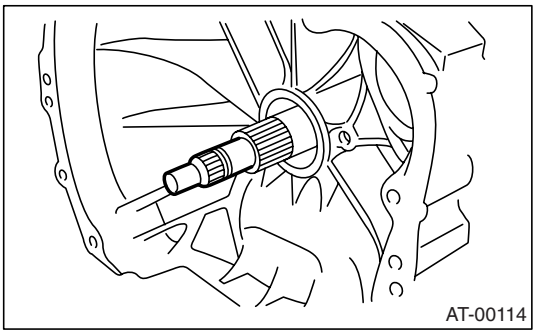
C: INSPECTION

Check the tab of parking pawl on reduction gear for wear or other damage.

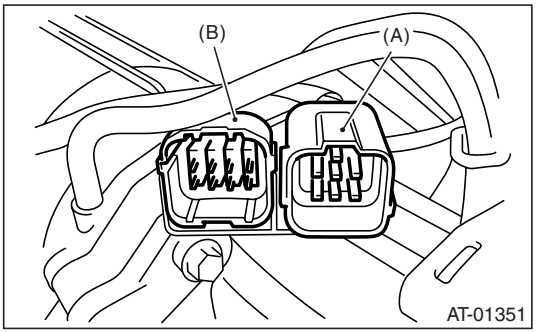
37.Converter Case

A: REMOVAL

1) Remove the transmission assembly from vehicle. <Ref. to 4AT-39, REMOVAL, Automatic Transmission Assembly.>
2) Pull out the torque converter clutch assembly. <Ref. to 4AT-81, REMOVAL, Torque Converter Clutch Assembly.>
3) Remove the input shaft.



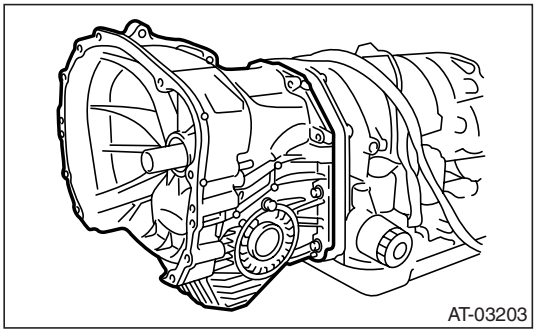
4) Lift up the lever on rear part of connector, and then disconnect it from stay.
5) Disconnect the inhibitor switch connector from stay.



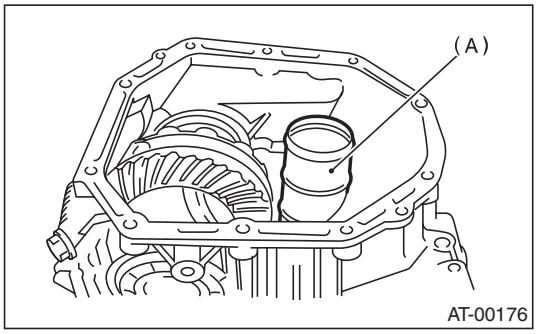
(A) Transmission connector
(B) Inhibitor switch connector

6) Remove the oil charge pipe. <Ref. to 4AT-80, REMOVAL, Oil Charge Pipe.>
7) Remove the oil cooler inlet and outlet pipes. <Ref. to 4AT-68, REMOVAL, ATF Cooler Pipe and Hose.>
8) Remove the converter case aligning bolt, and then separate the transmission case and converter case by lightly tapping with plastic hammer.

NOTE:
• Be careful not to damage the oil seal and bushing of converter case inside by oil pump cover.
• Be careful not to loosen the rubber seal.



9) Remove the seal pipe.

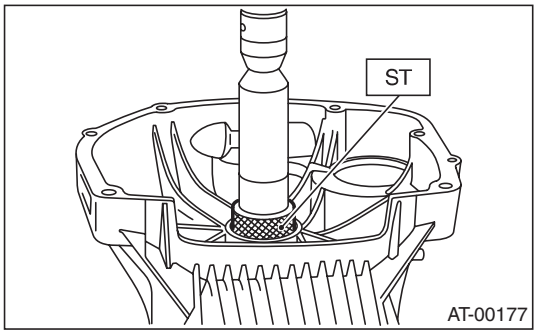


(A) Seal pipe

10) Remove the differential assembly. <Ref. to 4AT-115, REMOVAL, Front Differential Assembly.>
11) Remove the oil seal from converter case.

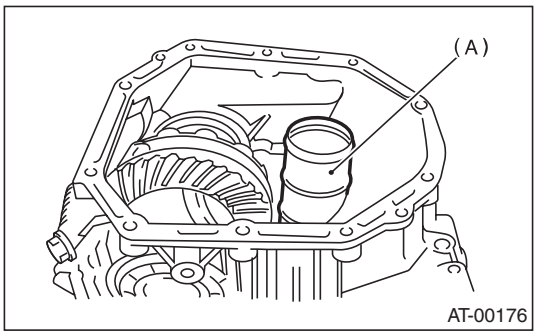
B: INSTALLATION

1) Check the appearance of each component and clean them.
2) Press-fit the oil seal to converter case using ST.
ST 398437700 DRIFT



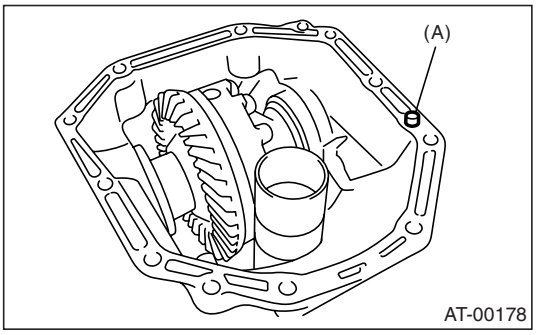
3) Install the differential assembly to case. <Ref. to 4AT-115, INSTALLATION, Front Differential Assembly.>
4) Install the left and right side retainers. <Ref. to 4AT-119, ADJUSTMENT, Front Differential Assembly.>

5) Install new seal pipe to converter case.



(A) Seal pipe

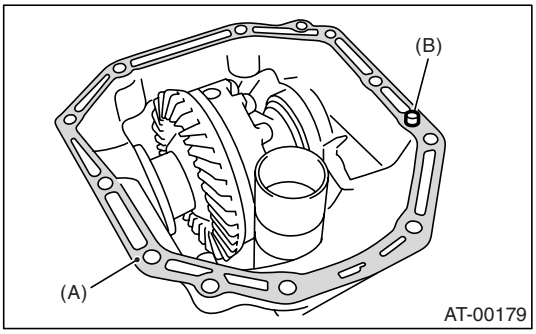
6) Install the rubber seal to converter case.



(A) Rubber seal

7) Apply proper amount of liquid gasket to the entire matching surface of converter case.

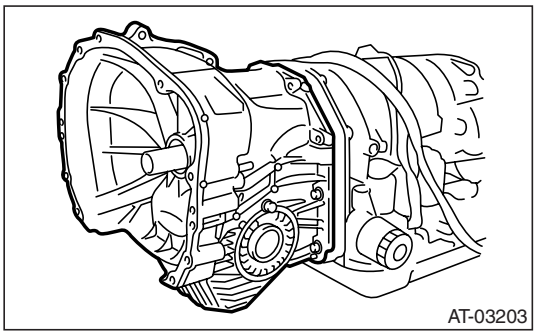
Liquid gasket:
THREE BOND 1215 (Part No. 004403007)



(A) THREE BOND 1215
(B) Rubber seal

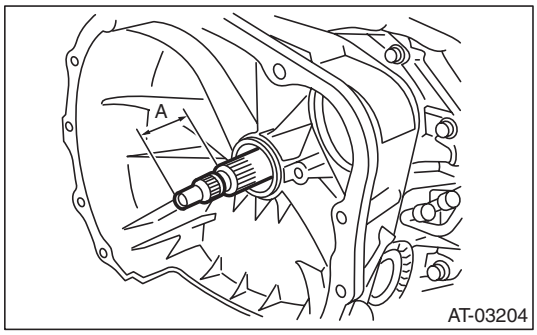
8) Install the converter case assembly without damaging bushing and oil seal.

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



9) Insert the inhibitor switch and transmission connector to stay.
10) Install the air breather hose. <Ref. to 4AT-79, INSTALLATION, Air Breather Hose.>
11) Install the oil cooler pipe. <Ref. to 4AT-70, INSTALLATION, ATF Cooler Pipe and Hose.>
12) Install the oil charge pipe with O-ring. <Ref. to 4AT-80, INSTALLATION, Oil Charge Pipe.>
13) Insert the input shaft while rotating it lightly by hand, and then check the protrusion amount.

Normal protrusion A:
50 — 55 mm (1.97 — 2.17 in)



14) Install the torque converter clutch assembly. <Ref. to 4AT-81, INSTALLATION, Torque Converter Clutch Assembly.>
15) Install the transmission assembly into vehicle. <Ref. to 4AT-42, INSTALLATION, Automatic Transmission Assembly.>

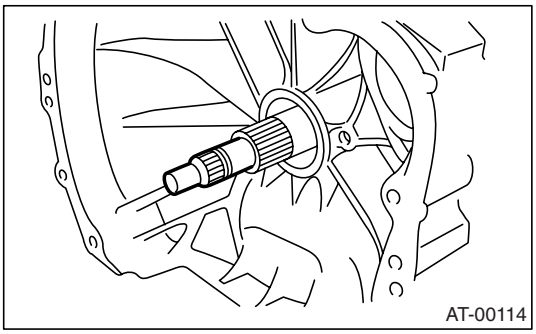
C: INSPECTION

Measure the backlash, and then adjust it within specification. <Ref. to 4AT-112, ADJUSTMENT, Drive Pinion Shaft Assembly.>

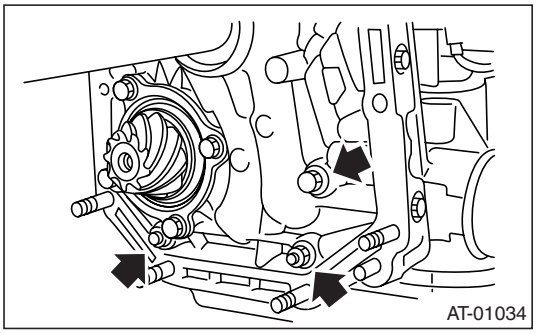
38.Oil Pump Housing

A: REMOVAL

1) Remove the transmission assembly from vehicle. <Ref. to 4AT-39, REMOVAL, Automatic Transmission Assembly.>
2) Pull out the torque converter clutch assembly. <Ref. to 4AT-81, REMOVAL, Torque Converter Clutch Assembly.>
3) Remove the input shaft.

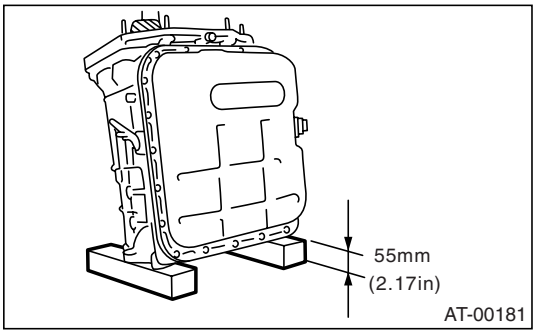


4) Lift up the lever on rear part of transmission harness connector, and then remove it from stay.
5) Remove the inhibitor switch connector from stay.
6) Remove the oil charge pipe. <Ref. to 4AT-80, REMOVAL, Oil Charge Pipe.>
7) Remove the oil cooler inlet and outlet pipes. <Ref. to 4AT-68, REMOVAL, ATF Cooler Pipe and Hose.>
8) Separate the converter case and transmission case part. <Ref. to 4AT-102, REMOVAL, Converter Case.>
9) Separate the transmission case and extension case part. <Ref. to 4AT-83, REMOVAL, Extension Case.>
10) Remove the reduction drive gear. (MP-T model) <Ref. to 4AT-97, REMOVAL, Reduction Drive Gear.>
11) Remove the center differential carrier. (VTD model) <Ref. to 4AT-99, REMOVAL, Center Differential Carrier.>
12) Remove the reduction driven gear. <Ref. to 4AT-95, REMOVAL, Reduction Driven Gear.>
13) Loosen the oil pump housing mounting bolts.

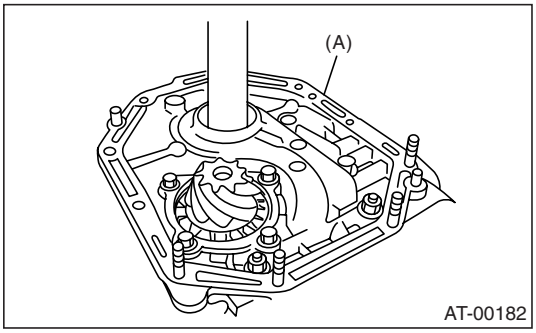


14) Place two wooden blocks on the workbench, and stand the transmission case with its rear end facing down.

NOTE:
• Be careful not to scratch the rear mating surface of transmission case.
• Note that the parking rod and drive pinion protrudes from mating surface.



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

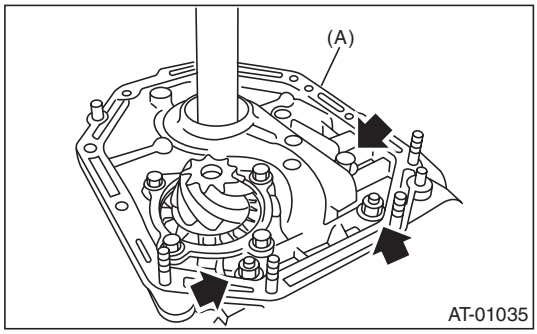


(A) Oil pump housing

B: INSTALLATION

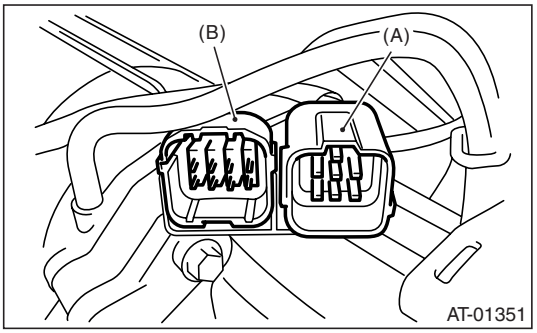
1) Secure the oil pump housing with two nuts and a bolt.

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



(A) Oil pump housing

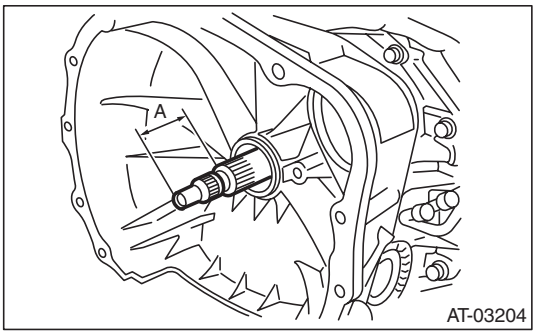
2) Install the converter case assembly into transmission case assembly. <Ref. to 4AT-81, INSTALLATION, Torque Converter Clutch Assembly.>
3) Install the reduction driven gear. <Ref. to 4AT-95, INSTALLATION, Reduction Driven Gear.>
4) Install the reduction drive gear. (MP-T model) <Ref. to 4AT-97, INSTALLATION, Reduction Drive Gear.>
5) Install the center differential carrier. (VTD model) <Ref. to 4AT-99, INSTALLATION, Center Differential Carrier.>
6) Combine the transmission case with extension case, and then install the rear vehicle speed sensor. <Ref. to 4AT-83, INSTALLATION, Extension Case.>
7) Insert the inhibitor switch and transmission connector to stay.



(A) Transmission connector
(B) Inhibitor switch connector

8) Install the oil cooler pipe. <Ref. to 4AT-70, INSTALLATION, ATF Cooler Pipe and Hose.>
9) Install the oil charge pipe with a O-ring. <Ref. to 4AT-80, INSTALLATION, Oil Charge Pipe.>
10) Insert the input shaft while rotating it lightly by hand, and then check the protrusion amount.

Normal protrusion A:
50 — 55 mm (1.97 — 2.17 in)

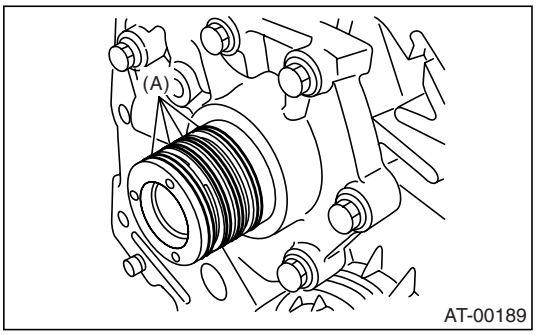


11) Install the torque converter clutch assembly. <Ref. to 4AT-81, INSTALLATION, Torque Converter Clutch Assembly.>
12) Install the transmission assembly into vehicle. <Ref. to 4AT-42, INSTALLATION, Automatic Transmission Assembly.>

C: DISASSEMBLY

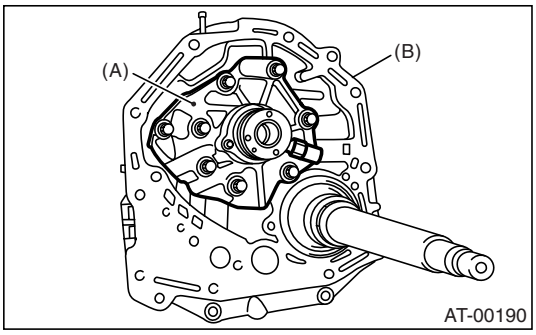
1. OIL PUMP COVER

1) Remove four seal rings.



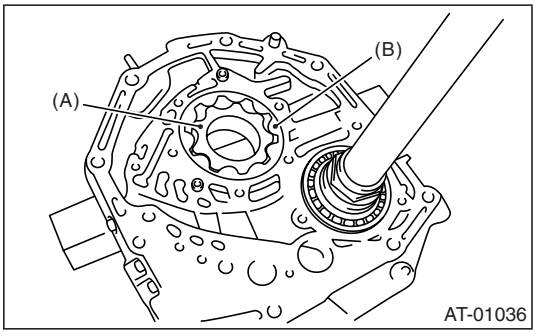
(A) Seal ring

2) Remove the cover by lightly tapping the end of stator shaft.



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

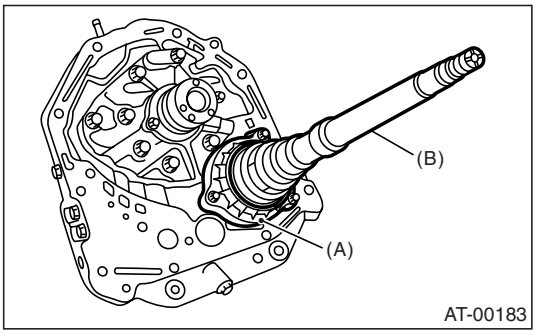
3) Remove the inner and outer rotor.



(A) Inner rotor
(B) Outer rotor

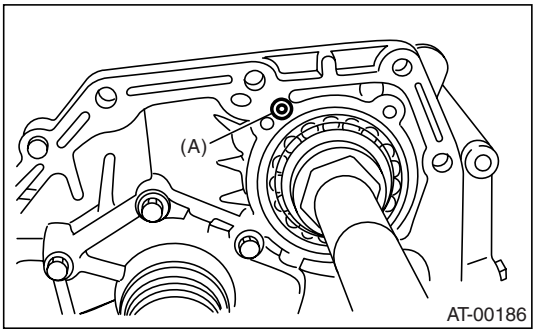
2. OIL SEAL RETAINER

1) Remove the oil seal retainer.



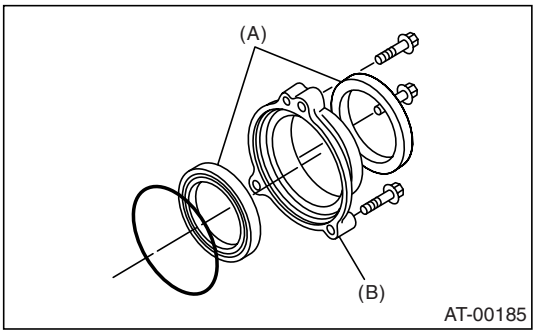
(A) Oil seal retainer
(B) Drive pinion shaft

2) Remove the O-ring.



(A) O-ring

3) Remove the oil seal from oil seal retainer.

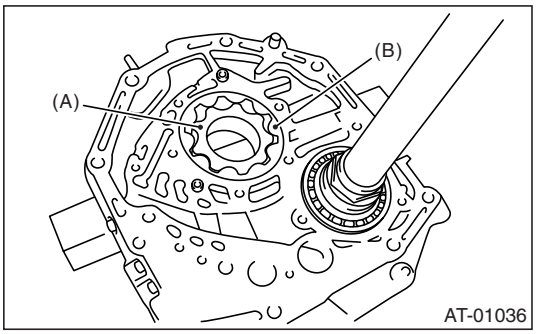


(A) Oil seal
(B) Oil seal retainer

D: ASSEMBLY

1. OIL PUMP COVER

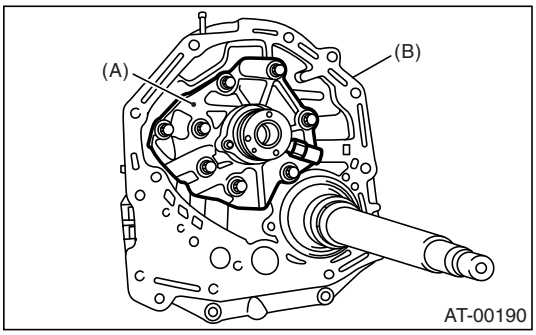
1) Install the oil pump rotor assembly to oil pump housing.



(A) Inner rotor
(B) Outer rotor

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

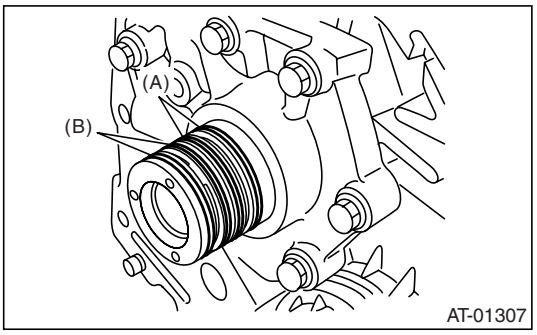
Tightening torque:
25 N·m (2.5 kgf-m, 18.4 ft-lb)



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

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

4) Apply vaseline to oil seal retainer and new seal ring, and install them. After installing, adjust the tooth contact and backlash of drive pinion. <Ref. to 4AT-108, ADJUSTMENT, Oil Pump Housing.>

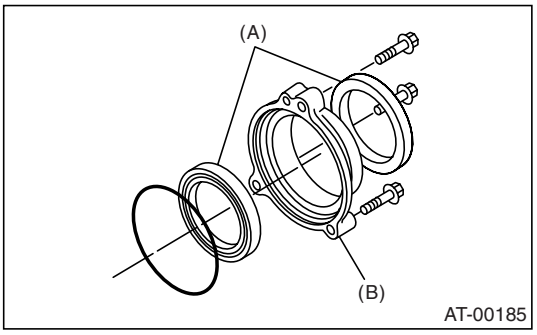


(A) Seal ring (Black)
(B) Seal ring (Brown)

2. OIL SEAL RETAINER

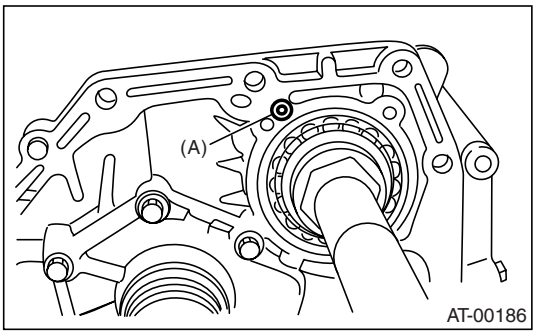
1) Apply ATF to new oil seals (two), and install them to oil seal retainer in proper direction using ST.

ST 499247300 INSTALLER



(A) Oil seal
(B) Oil seal retainer

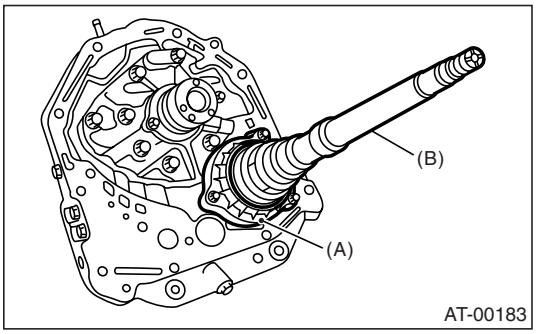
2) Apply ATF to new O-ring, and install it to oil seal retainer. Install the seal to oil pump housing bore.



(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)

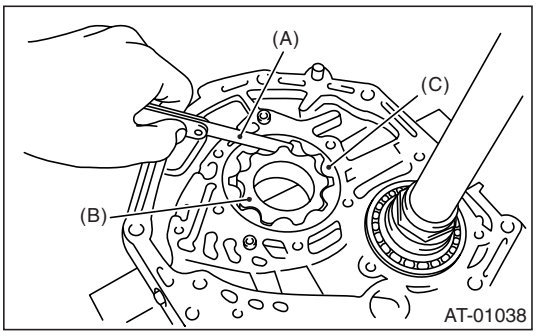


(A) Oil seal retainer
(B) Drive pinion shaft

E: INSPECTION

1) Check the seal ring and oil seal for breaks or damages.
2) Check other parts for dents or abnormalities.
3) Selection of oil pump rotor assembly
(1) Tip clearance
Install the inner rotor and outer rotor to oil pump. With rotor gears facing each other, measure the crest-to-crest clearance.

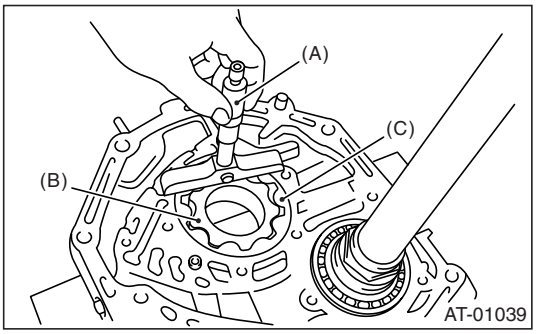
Tip clearance:
0.02 — 0.15 mm (0.0008 — 0.0059 in)



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

(2) Side clearance
Set a depth gauge to oil pump housing, then measure the oil pump housing-to-rotor clearance.

Side clearance:
0.02 — 0.04 mm (0.0008 — 0.0016 in)



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

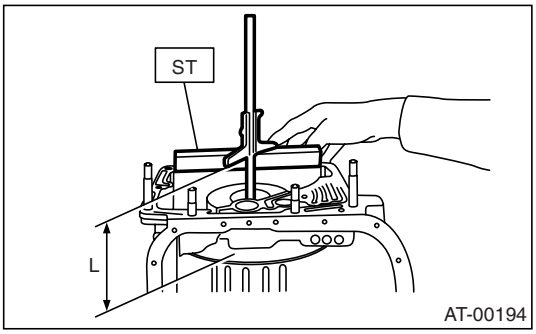
(3) If the depth and/or side clearance are not within the specification, replace the rotor assembly.

Oil pump rotor ASSY	
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)

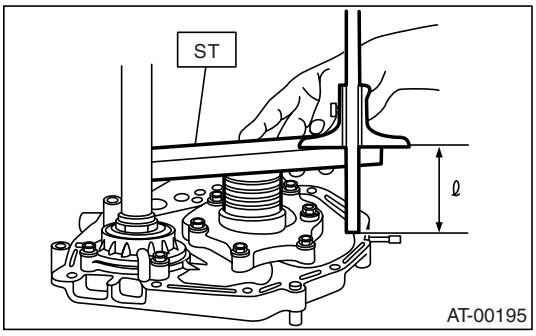
Measure the total end play and adjust it within specification. <Ref. to 4AT-108, ADJUSTMENT, Oil Pump Housing.>

F: ADJUSTMENT

1) Using the ST, measure the depth from the mating surface of transmission to the recessed portion "L" of high clutch drum.
ST 398643600 GAUGE

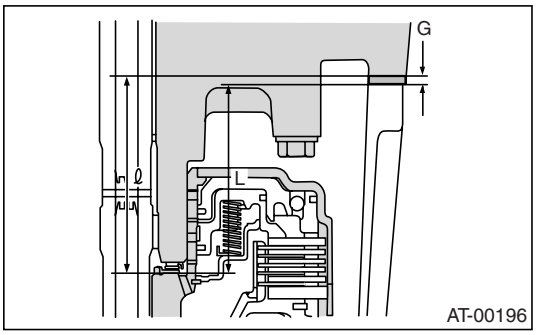


2) Using the ST, measure the height from oil pump housing mating surface to the top surface of oil pump cover with thrust needle bearing.
ST 398643600 GAUGE



3) Calculation of total end play
Select the suitable bearing race from the table below so that clearance C to be within 0.25 to 0.55 mm (0.0098 to 0.0217 in).
$C = (L + G) - \ell$

C	Clearance between concave portion of high clutch and end of clutch drum support
L	Depth 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



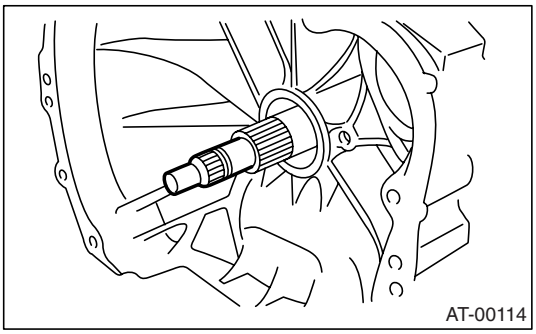
Thrust needle bearing	
Part No.	Thickness mm (in)
806528050	4.1 (0.161)
806528060	4.3 (0.169)
806528070	4.5 (0.177)
806528080	4.7 (0.185)
806528090	4.9 (0.193)
806528100	5.1 (0.201)

4) After completing the total end play adjustment, insert the bearing race in recess of the high clutch. Install the thrust needle bearing to oil pump cover using vaseline.
5) After correctly install 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 case.
6) Install both parts with dowel pins aligned. Make sure no clearance at mating surface.

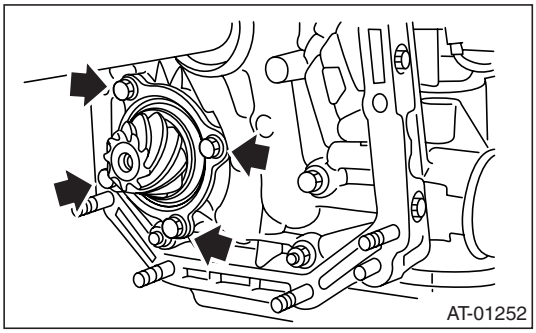
39. Drive Pinion Shaft Assembly

A: REMOVAL

1) Remove the transmission assembly from vehicle. <Ref. to 4AT-39, REMOVAL, Automatic Transmission Assembly.>
2) Pull out the torque converter clutch assembly. <Ref. to 4AT-81, REMOVAL, Torque Converter Clutch Assembly.>
3) Remove the input shaft.


AT-00114

4) Lift up the lever on rear side of transmission harness connector, and then disconnect it from the stay.
5) Disconnect the inhibitor switch connector from stay.
6) Disconnect the air breather hose. <Ref. to 4AT-79, REMOVAL, Air Breather Hose.>
7) Remove the oil charge pipe. <Ref. to 4AT-80, REMOVAL, Oil Charge Pipe.>
8) Remove the oil cooler inlet and outlet pipes. <Ref. to 4AT-68, REMOVAL, ATF Cooler Pipe and Hose.>
9) Separate the converter case and transmission case part. <Ref. to 4AT-102, REMOVAL, Converter Case.>
10) Separate the transmission case and extension case part. <Ref. to 4AT-83, REMOVAL, Extension Case.>
11) Remove the reduction drive gear. (MP-T model) <Ref. to 4AT-97, REMOVAL, Reduction Drive Gear.>
12) Remove the center differential carrier. (VTD model) <Ref. to 4AT-99, REMOVAL, Center Differential Carrier.>
13) Remove the reduction driven gear. <Ref. to 4AT-95, REMOVAL, Reduction Driven Gear.>
14) Remove the drive pinion shaft mounting bolt and remove the drive pinion shaft assembly from oil pump housing.

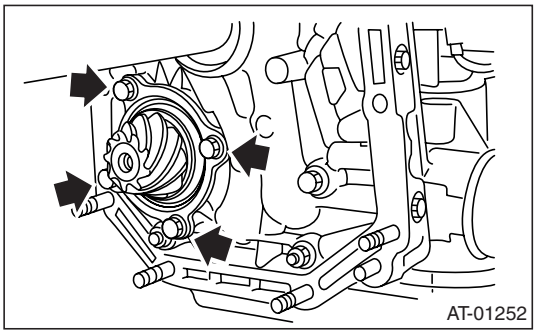

AT-01252

B: INSTALLATION

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

NOTE:
- Be careful not to bend the shim.
- Be careful not to press-fit the pinion into housing bore.

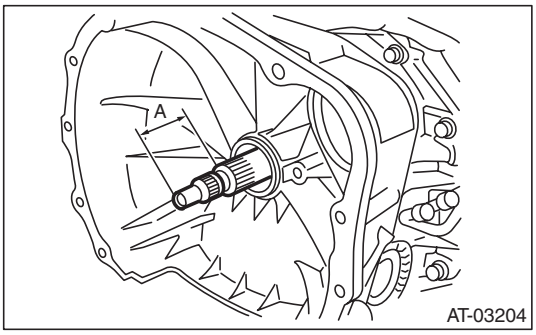
Tightening torque:
40 N·m (4.1 kgf-m, 29.5 ft-lb)


AT-01252

2) Combine the torque converter case with transmission case. <Ref. to 4AT-102, INSTALLATION, Converter Case.>
3) Install the reduction driven gear. <Ref. to 4AT-95, INSTALLATION, Reduction Driven Gear.>
4) Install the reduction drive gear. (MP-T model) <Ref. to 4AT-97, INSTALLATION, Reduction Drive Gear.>
5) Install the center differential carrier. (VTD model) <Ref. to 4AT-99, INSTALLATION, Center Differential Carrier.>
6) Combine the transmission case with extension case, and then install the rear vehicle speed sensor. <Ref. to 4AT-83, INSTALLATION, Extension Case.>
7) Insert the inhibitor switch and transmission connector to stay.
8) Install the oil cooler inlet and outlet pipes. <Ref. to 4AT-70, INSTALLATION, ATF Cooler Pipe and Hose.>
9) Install the oil charge pipe with O-ring.

10) Insert the input shaft while rotating it lightly by hand, and then check the protrusion amount.

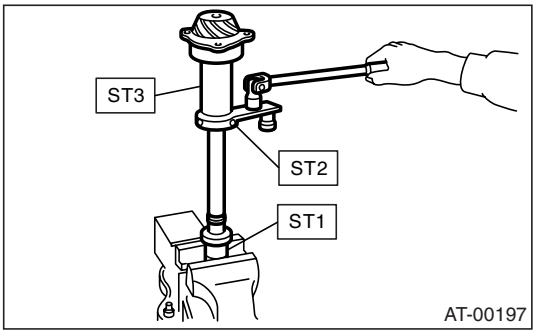
Normal protrusion A:
50 — 55 mm (1.97 — 2.17 in)



11) Install the torque converter clutch assembly. <Ref. to 4AT-81, INSTALLATION, Torque Converter Clutch Assembly.>
12) Install the transmission assembly into vehicle. <Ref. to 4AT-42, INSTALLATION, Automatic Transmission Assembly.>

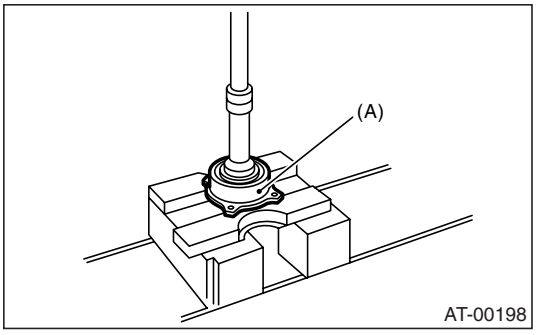
C: DISASSEMBLY

1) Remove the caulking part of lock nut, and then remove the lock nut with holding rear spline part of shaft using ST1 and ST2. Pull out the drive pinion collar.
ST1 498937110 HOLDER
ST2 499787700 WRENCH
ST3 499787500 ADAPTER



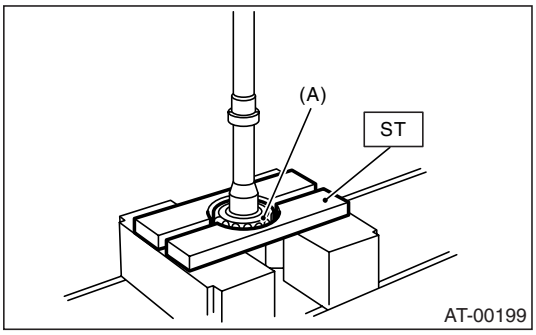
2) Remove the O-ring.

3) Separate the roller bearing and outer race from shaft using press.



(A) Outer race

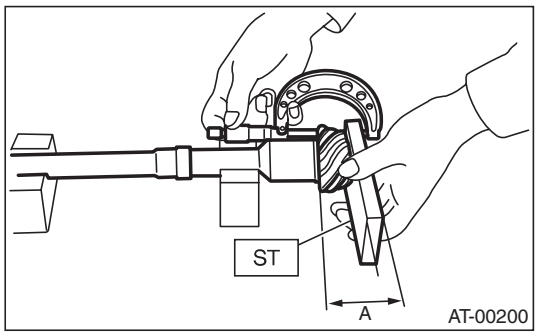
4) Separate the front roller bearing from shaft using press and ST.
ST 498517000 REPLACER



(A) Front roller bearing

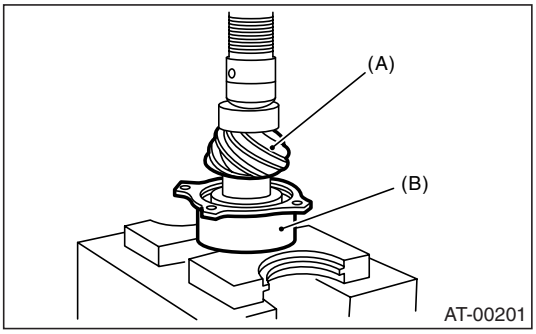
D: ASSEMBLY

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



2) Using a press, press-fit the new roller bearing into specified position.

NOTE:
If excessive force is applied to roller bearing, the roller bearing will not turn easily.



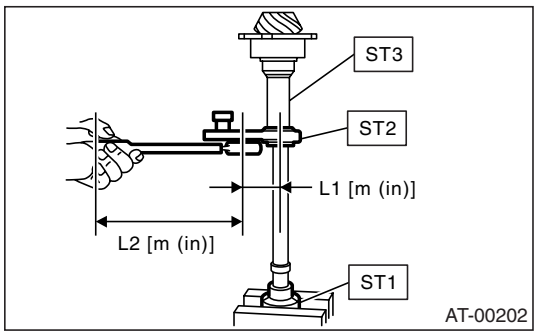
(A) Drive pinion shaft
(B) Roller bearing

3) After applying ATF to a new O-ring and fitting it to the shaft, attach the drive pinion collar to shaft.
4) Install the lock washer to drive pinion shaft in proper direction.
5) Tighten new lock nuts using ST1, ST2 and ST3. Calculate the lock washer and lock nut specification using following formula.
T2 = L2/(L1 + L2) × 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 N·m (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)

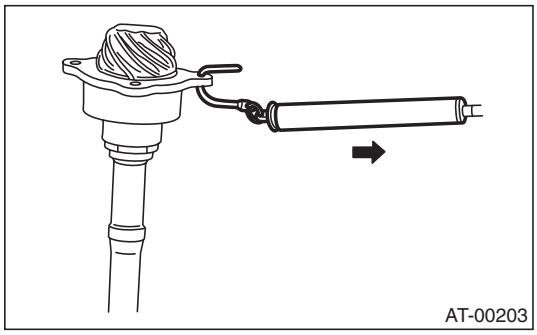
ST1 498937110 HOLDER
ST2 499787700 WRENCH
ST3 499787500 ADAPTER

NOTE:
Install the ST2 to torque wrench as straight as possible.

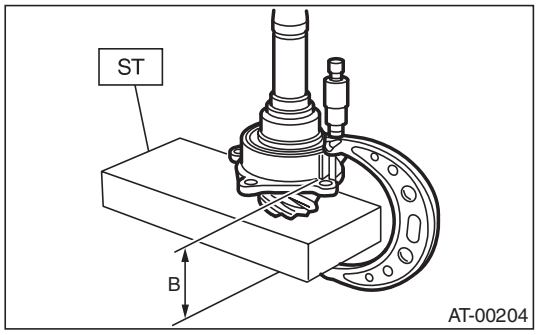


6) Measure the starting torque of bearing. Make sure the starting torque is within the specification. If the torque is not within specification, replace the roller bearing.

Starting torque:
7.6 — 38.1 N (0.776 — 3.88 kgf, 1.7 — 8.6 lbf)



7) Stake the caulking of lock nut at two points.
8) Measure the dimension “B” of drive pinion shaft
ST 398643600 GAUGE



9) Calculate the thickness “t” (mm) of drive pinion shim.
t = 6.5 ± 0.0625 − (B − A)

10) Select three or less shims from following table.

Drive pinion shim	
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

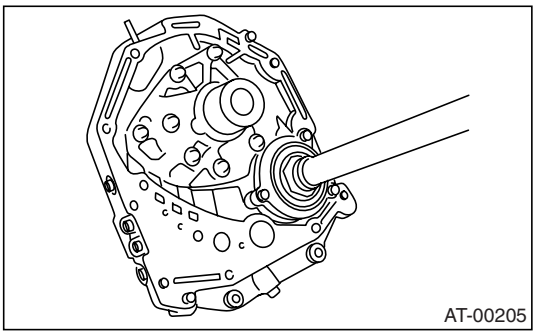
• Make sure that all component parts are free of scratches, holes and other faults.
• Adjust the teeth alignment. <Ref. to 4AT-112, ADJUSTMENT, Drive Pinion Shaft Assembly.>

F: ADJUSTMENT

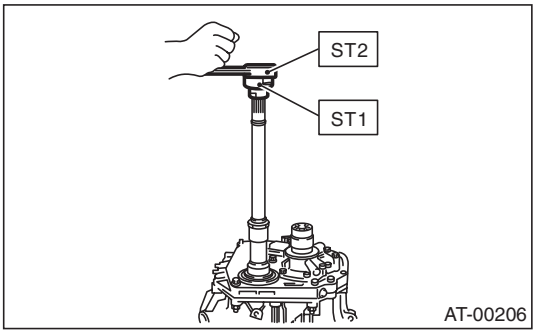
1) Remove the liquid gasket from the mating surface completely.
2) Install the oil pump housing assembly to converter case, and secure them with tightening four bolts evenly.

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

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

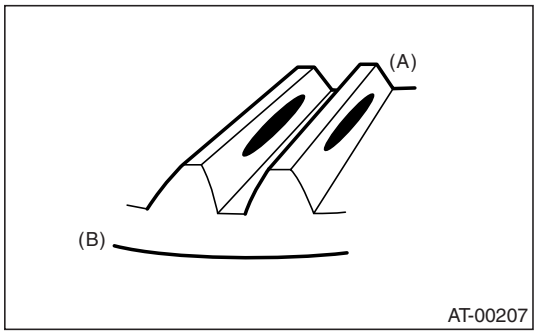

AT-00205

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



AT-00206

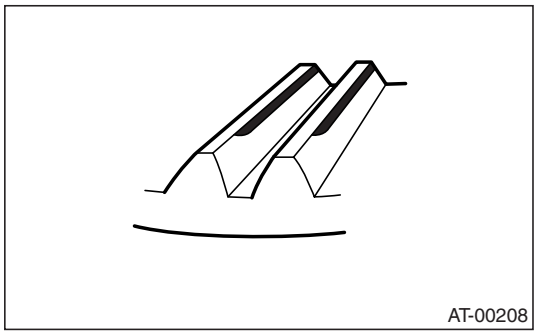
4) Adjust backlash between drive pinion and driven gear. <Ref. to 4AT-119, ADJUSTMENT, Front Differential Assembly.>
5) Apply red lead evenly to the surfaces of three or four teeth on driven gear. Rotate the drive pinion in the forward and reverse directions for several times. Remove the oil pump housing, and check the tooth contact pattern.
If the tooth contact is improper, readjust the backlash or shim thickness. <Ref. to 4AT-119, ADJUSTMENT, Front Differential Assembly.>
• Correct tooth contact
Checking item: Tooth contact pattern is slightly shifted toward to toe side under no-load rotation. (When loaded, it moves toward heel side.)



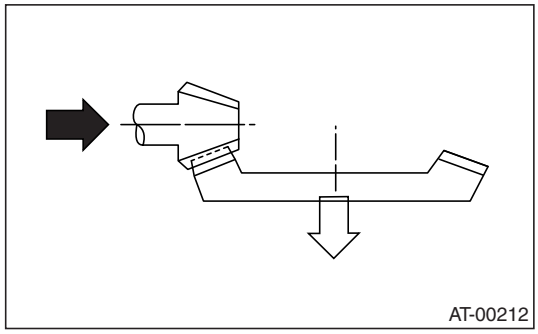
AT-00207

(A) Toe side
(B) Heel side

• Face contact
Checking item: Backlash is too large.
Contact pattern


AT-00208

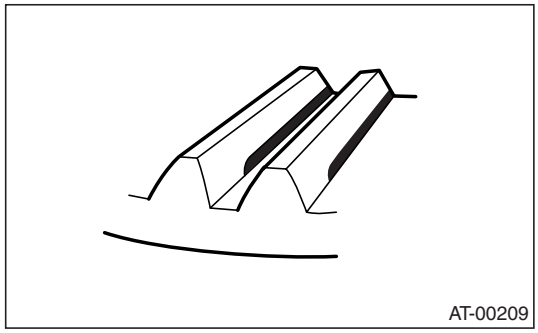
Corrective action: Increase thickness of drive pinion height adjusting shim in order to bring drive pinion close to hypoid driven gear.



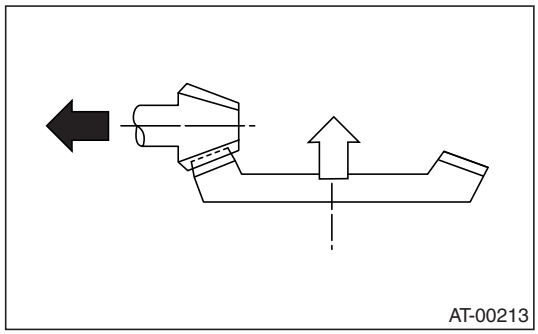
- Flank contact

Checking item: Backlash is too small.

Contact pattern



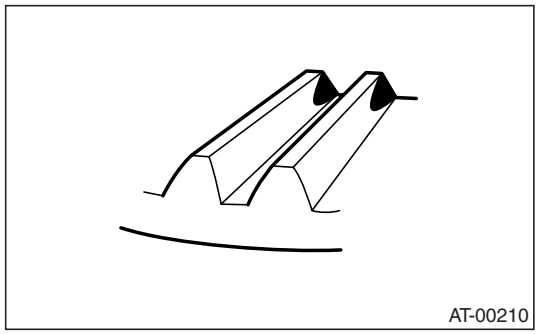
Corrective action: Reduce thickness of drive pinion height adjusting shim in order to bring drive pinion away from hypoid driven gear.



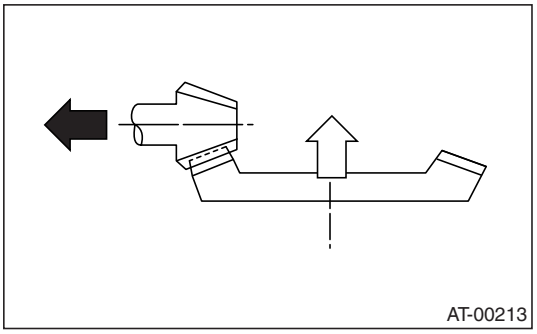
- Toe contact (inside end contact)

Checking item: Contact area is too small.

Contact pattern



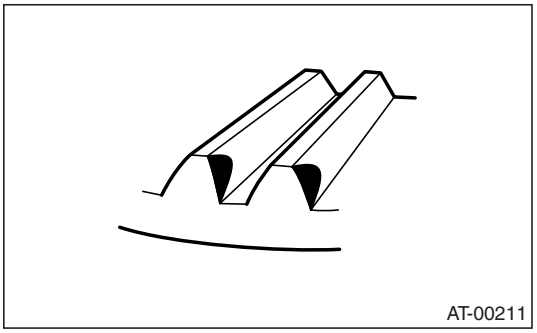
Corrective action: Reduce thickness of drive pinion height adjusting shim in order to bring drive pinion away from hypoid driven gear.



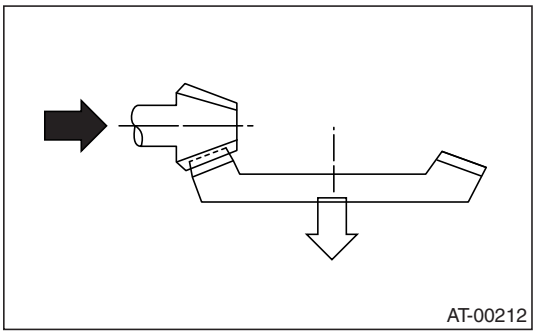
- Heel contact (outside end contact)

Checking item: Contact area is too small.

Contact pattern

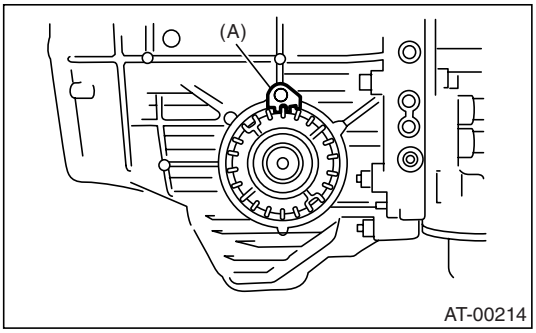


Corrective action: Increase thickness of drive pinion height adjusting shim in order to bring drive pinion close to hypoid driven gear.



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. Tighten the lock plate with the specified torque.

Tightening torque:
25 N·m (2.5 kgf-m, 18.4 ft-lb)

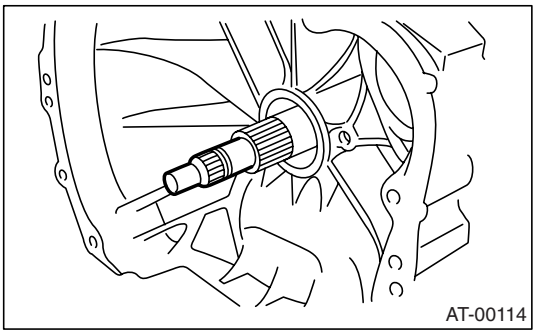


(A) Lock plate

40.Front Differential Assembly

A: REMOVAL

1) Remove the transmission assembly from vehicle. <Ref. to 4AT-39, REMOVAL, Automatic Transmission Assembly.>
2) Pull out the torque converter clutch assembly. <Ref. to 4AT-81, REMOVAL, Torque Converter Clutch Assembly.>
3) Remove the input shaft.



4) Lift up the lever on rear part of transmission harness connector, and then remove it from stay.
5) Remove the inhibitor switch from stay.
6) Remove the oil charge pipe. <Ref. to 4AT-80, REMOVAL, Oil Charge Pipe.>
7) Remove the oil cooler inlet and outlet pipes. <Ref. to 4AT-68, REMOVAL, ATF Cooler Pipe and Hose.>
8) Separate the converter case and transmission case. <Ref. to 4AT-102, REMOVAL, Converter Case.>
9) Remove the seal pipe.
10) Remove the differential side retainers using ST.

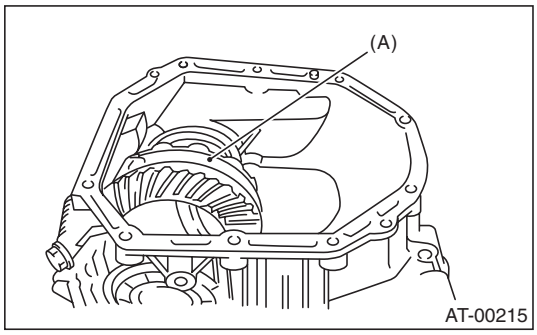
NOTE:
Hold the differential case assembly by hand to avoid damaging the retainer mounting hole of converter case.

ST 499787000 WRENCH ASSY

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

B: INSTALLATION

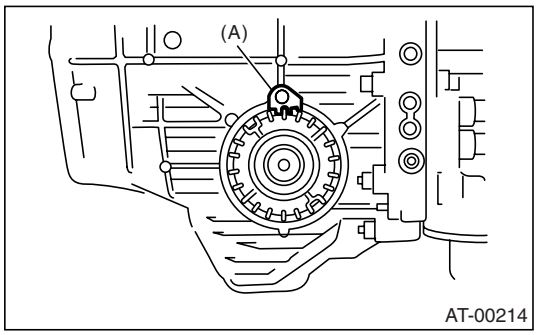
1) When installing the differential assembly to case, be careful not to damage the inside of case (particularly, the differential side retainer mating surface).



(A) Differential ASSY

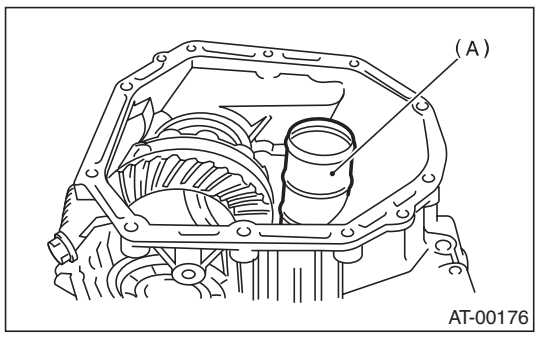
2) Install the O-ring to left and right side retainer.
3) Install the side retainers using ST. <Ref. to 4AT-119, ADJUSTMENT, Front Differential Assembly.>
ST 499787000 WRENCH ASSY
4) Adjust the front differential backlash. <Ref. to 4AT-119, ADJUSTMENT, Front Differential Assembly.>
5) Install the lock plate.

Tightening torque:
25 N·m (2.5 kgf-m, 18.4 ft-lb)



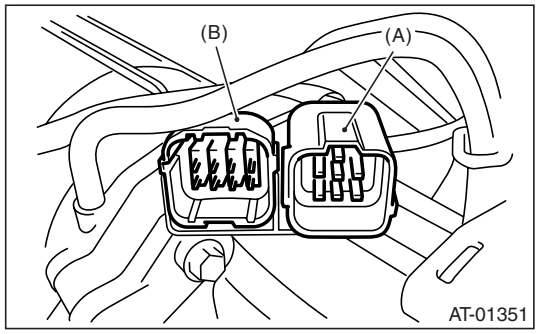
(A) Lock plate

6) Install new seal pipe to converter case.



(A) Seal pipe

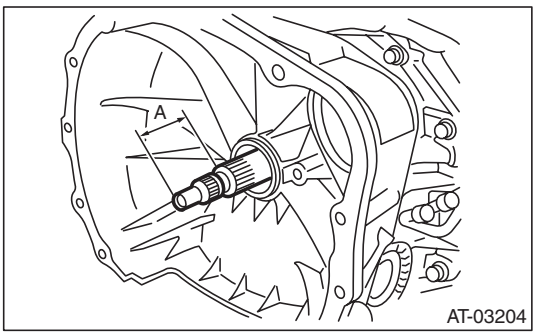
7) Install the converter case to transmission case. <Ref. to 4AT-102, INSTALLATION, Converter Case.>
8) Insert the inhibitor switch and transmission connector to stay.



(A) Transmission connector
(B) Inhibitor switch connector

9) Install the oil cooler pipe. <Ref. to 4AT-70, INSTALLATION, ATF Cooler Pipe and Hose.>
10) Install the oil charge pipe with a O-ring. <Ref. to 4AT-80, INSTALLATION, Oil Charge Pipe.>
11) Insert the input shaft while rotating it lightly by hand, and then check the protrusion amount.

Normal protrusion A:
50 — 55 mm (1.97 — 2.17 in)

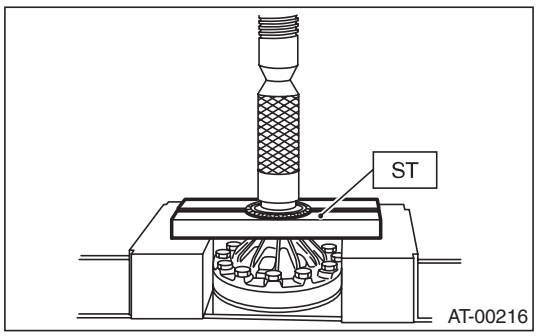


12) Install the torque converter clutch assembly. <Ref. to 4AT-81, INSTALLATION, Torque Converter Clutch Assembly.>
13) Install the transmission assembly into vehicle. <Ref. to 4AT-42, INSTALLATION, Automatic Transmission Assembly.>

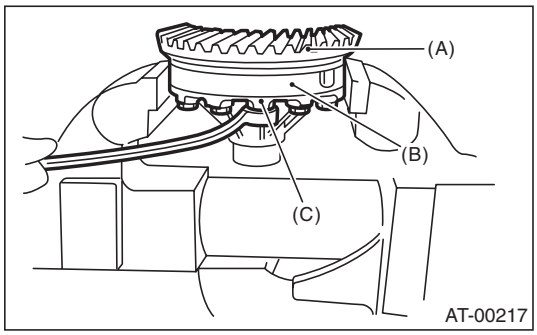
C: DISASSEMBLY

1. DIFFERENTIAL CASE ASSEMBLY

1) Remove the taper roller bearing using ST and press.
ST 498077000 REMOVER

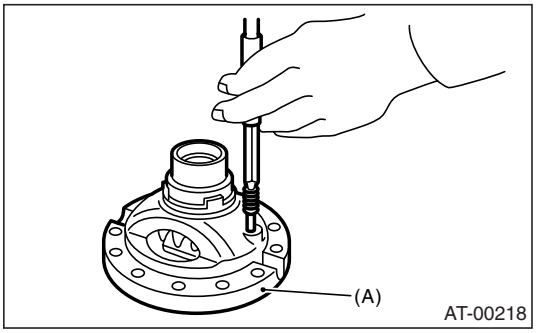


2) Secure the case in a vise, remove the hypoid driven gear tightening bolts, and then separate the hypoid driven gear into case (RH) and case (LH).



(A) Hypoid driven gear
(B) Differential case (RH)
(C) Differential case (LH)

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

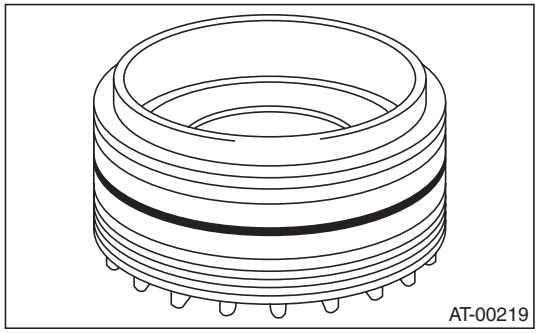


(A) Differential case (RH)

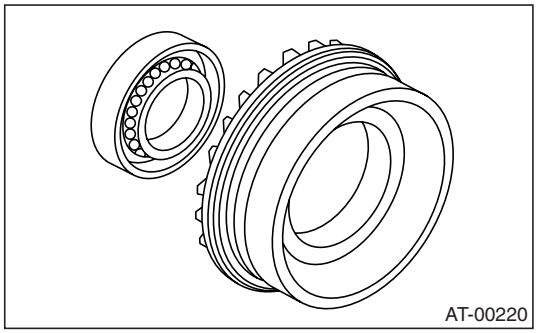
2. SIDE RETAINER

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

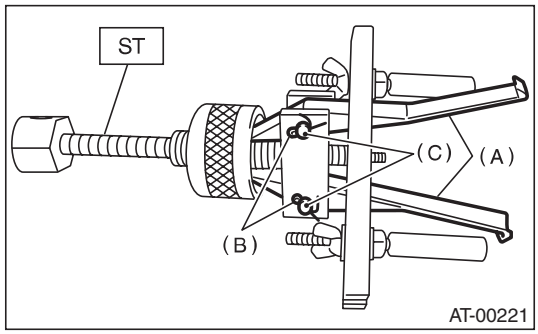
1) Remove the O-ring.



2) Remove the oil seal.

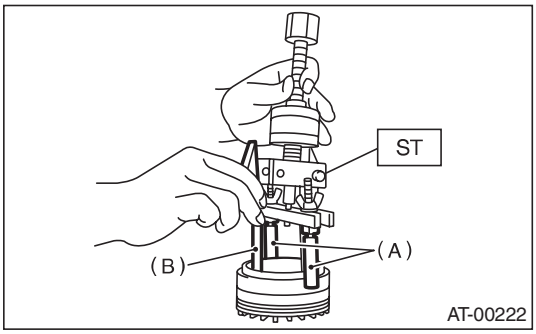


3) Remove the split pin, and then remove the claw.
ST 398527700 PULLER ASSY



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

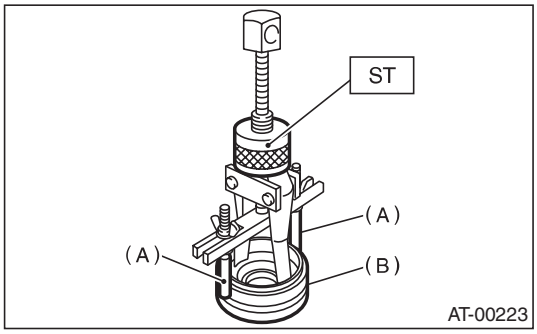
4) Attach two claws to the outer race, and set the ST to side retainer.
ST 398527700 PULLER ASSY



(A) Shaft
(B) Claw

5) Attach the removed claws to original position, and install the 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 the bearing inner and outer races as a single unit.

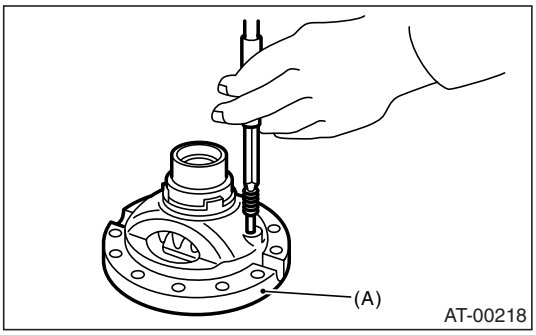


(A) Shaft
(B) Side retainer

D: ASSEMBLY

1. DIFFERENTIAL CASE ASSEMBLY

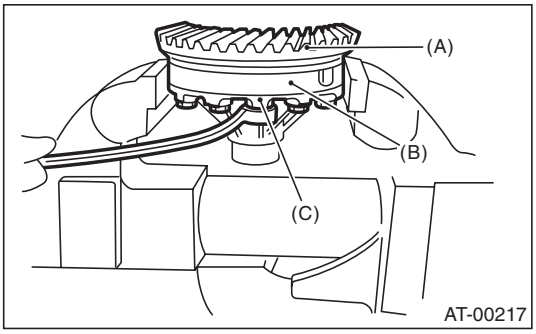
1) Install the washer, differential bevel gear and differential bevel pinion in the differential case (RH). Insert the pinion shaft.
2) Install the straight pin in reverse direction.



(A) Differential case (RH)

3) Install the washer and differential bevel gear to differential case (LH). Put the differential case (RH) on the case, and then combine both cases.
4) Install the hypoid driven gear and secure by tightening the bolt.

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

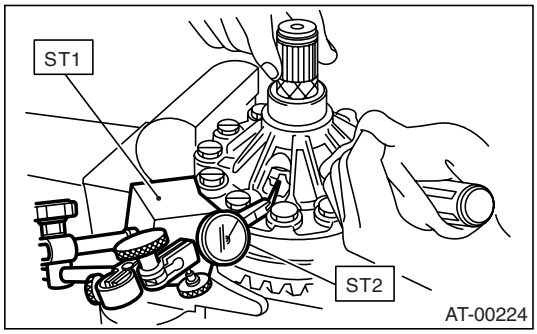


(A) Hypoid driven gear
(B) Differential case (RH)
(C) Differential case (LH)

5) Measurement of backlash (Selection of washer)
(1) Install the SUBARU genuine axle shaft to differential case.
Parts No. 38415AA070 AXLE SHAFT
(2) Measure the gear backlash using ST1 and ST2, and then insert the ST2 though the access window of case.
ST1 498247001 MAGNET BASE
ST2 498247100 DIAL GAUGE

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

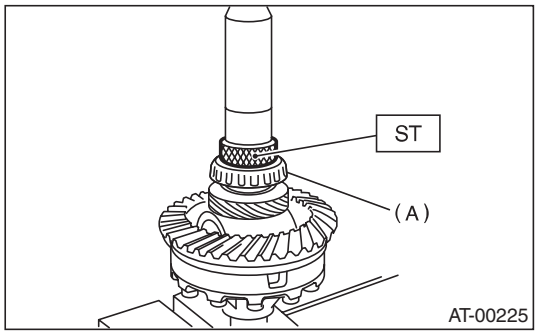
Specification:
0.13 — 0.18 mm (0.0051 — 0.0071 in)



(3) If the backlash is not within 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)

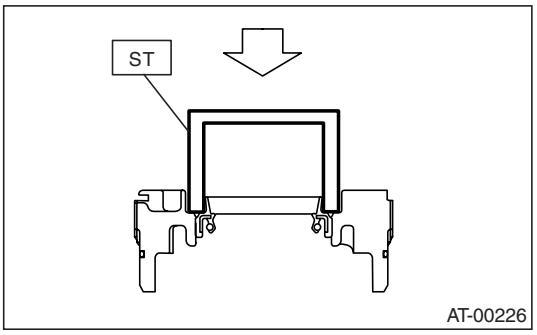
6) Using the ST, install the taper roller bearing.
ST 398487700 INSTALLER



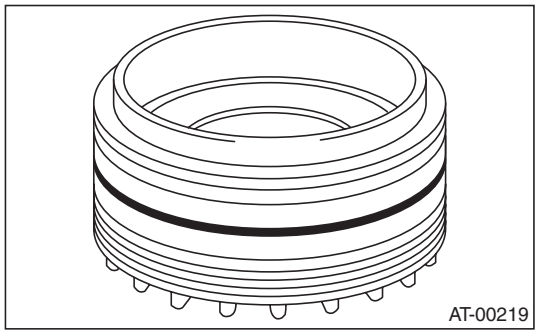
(A) Taper roller bearing

2. SIDE RETAINER

1) Install the bearing outer race to side retainer.
2) Install a new oil seal using ST and hammer.
ST 18675AA000 DIFFERENTIAL SIDE OIL SEAL INSTALLER



3) Apply gear oil to new O-ring and install it.



E: INSPECTION

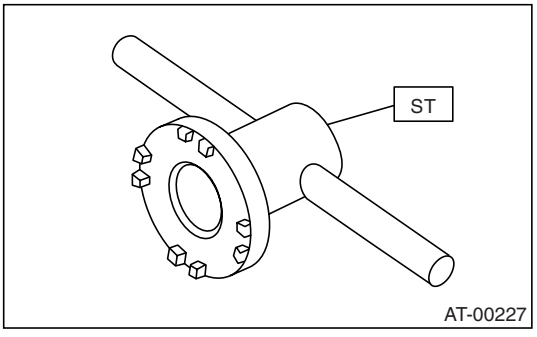
• Check each component for scratches, damage or other faults.
• Measure the backlash, and then adjust it within specification.
<Ref. to 4AT-119, ADJUSTMENT, Front Differential Assembly.>

F: ADJUSTMENT

1) Using the ST, screw-in the retainer until resistance is felt.

NOTE:
Screw-in the RH side slightly deeper than the LH side.

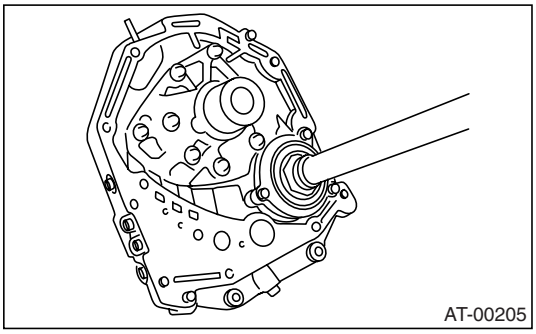
ST 499787000 WRENCH ASSY



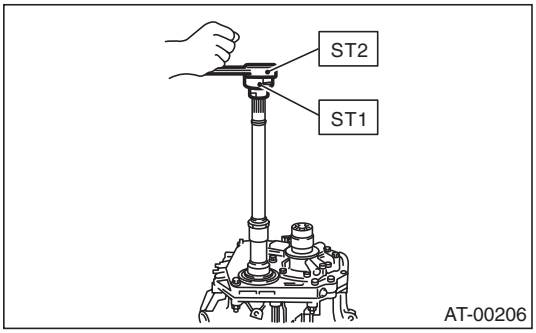
2) Remove the oil pump housing.
3) Remove the liquid gasket from the mating surface completely.
4) Install the oil pump housing assembly to converter case, and secure them with tightening four bolts evenly.

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

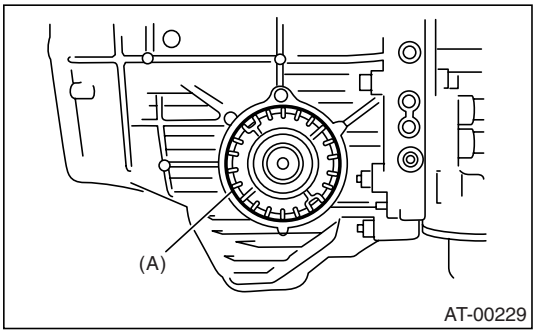
Tightening torque:
41 N·m (4.2 kgf-m, 30.4 ft-lb)



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

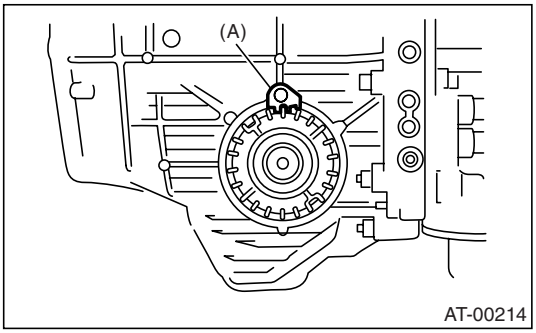


6) Tighten the retainer LH by rotating the shaft until resistance is felt. Then loosen the retainer RH. Keep tightening the retainer LH, and loosening the retainer RH until the pinion shaft no longer be turned. This is to the “zero” state.



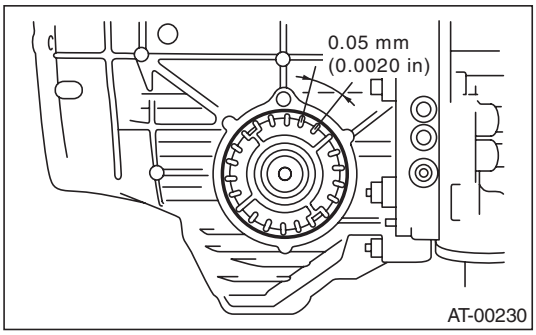
(A) Retainer

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



(A) Lock plate

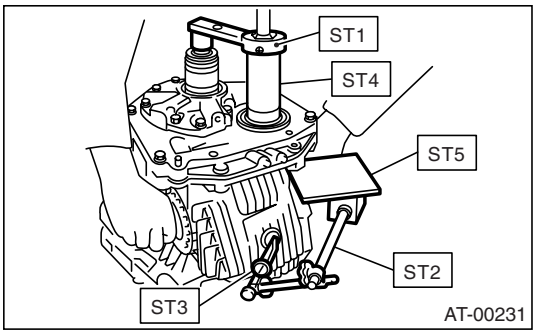
NOTE:
Turning the retainer by one tooth changes the backlash approx. 0.05 mm (0.0020 in).



8) Install the axle shaft of part to both side of front differential part.
Parts No. 38415AA000 AXLE SHAFT
9) Turn the drive pinion several times using ST1, and check to see if the backlash is within the specification using 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)

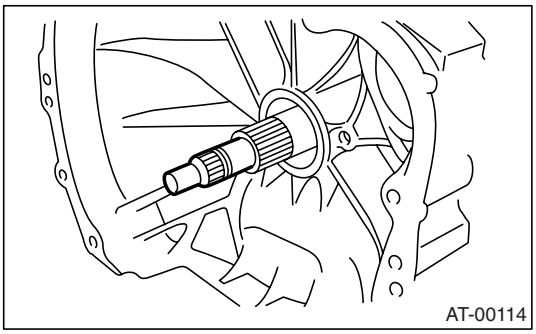


10) Adjust the tooth contact between front differential and drive shaft. <Ref. to 4AT-112, ADJUSTMENT, Drive Pinion Shaft Assembly.>

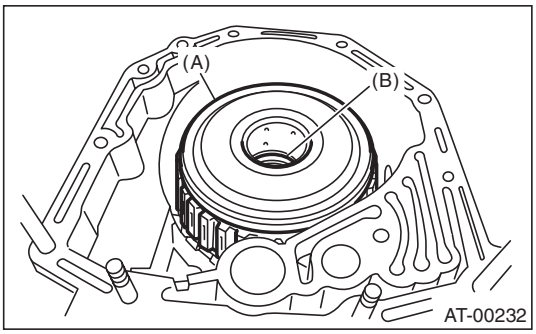
41.AT Main Case

A: REMOVAL

1) Remove the transmission assembly from vehicle. <Ref. to 4AT-39, REMOVAL, Automatic Transmission Assembly.>
2) Pull out the torque converter clutch assembly. <Ref. to 4AT-81, REMOVAL, Torque Converter Clutch Assembly.>
3) Remove the input shaft.

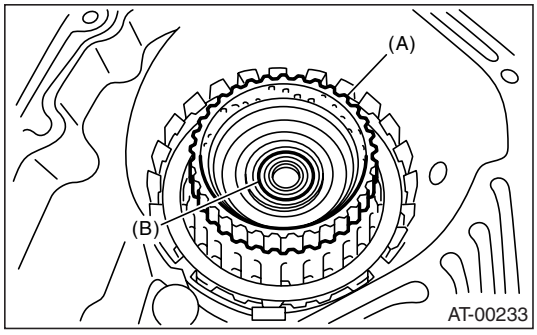


4) Lift up the lever on rear side of transmission harness connector, and then disconnect it from the stay.
5) Disconnect the inhibitor switch connector from stay.
6) Disconnect the air breather hose.
7) Remove the oil charge pipe. <Ref. to 4AT-80, REMOVAL, Oil Charge Pipe.>
8) Remove the oil cooler inlet and outlet pipes. <Ref. to 4AT-68, REMOVAL, ATF Cooler Pipe and Hose.>
9) Separate the converter case and transmission case. <Ref. to 4AT-102, REMOVAL, Converter Case.>
10) Remove the oil pump housing.
<Ref. to 4AT-104, REMOVAL, Oil Pump Housing.>
11) Take out the high clutch, thrust needle bearing and reverse clutch assembly.



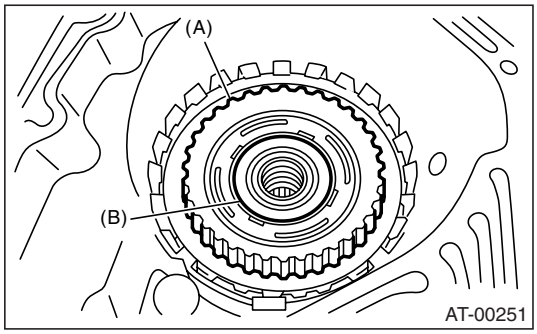
(A) High clutch and reverse clutch ASSY
(B) Thrust needle bearing

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



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

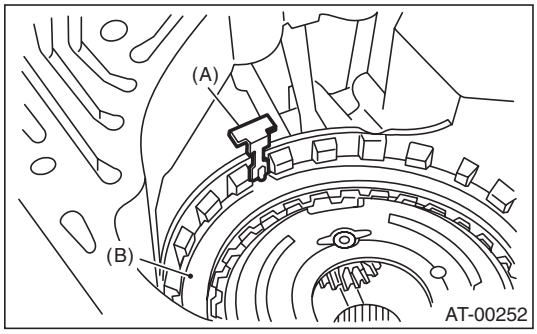
13) Take out the front sun gear and thrust needle bearing.



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

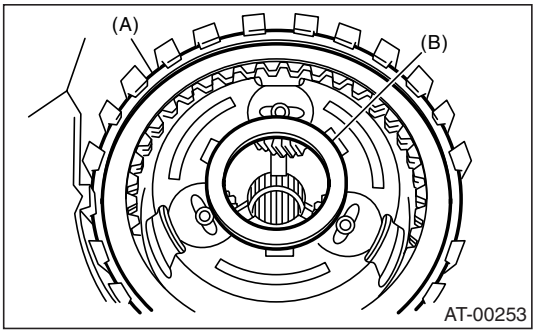
14) Pull out the leaf spring without folding.

NOTE:
Remove it while pressing down lower leaf spring.



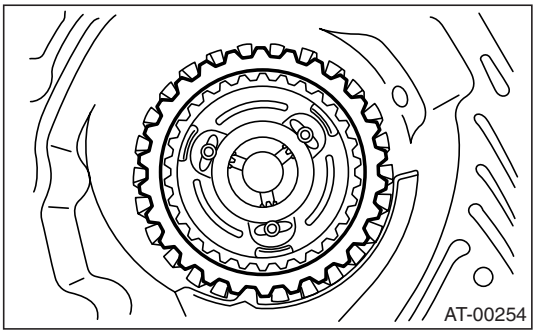
(A) Leaf spring
(B) Retaining plate

15) Remove the snap ring and thrust needle bearing.

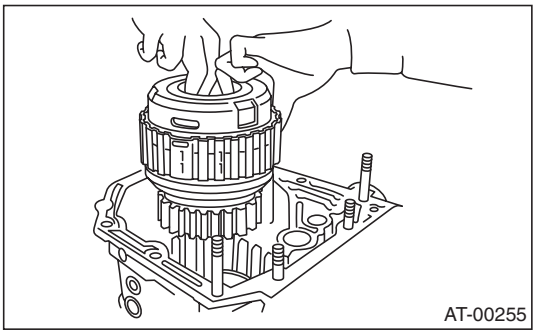


(A) Snap ring
(B) Thrust needle bearing

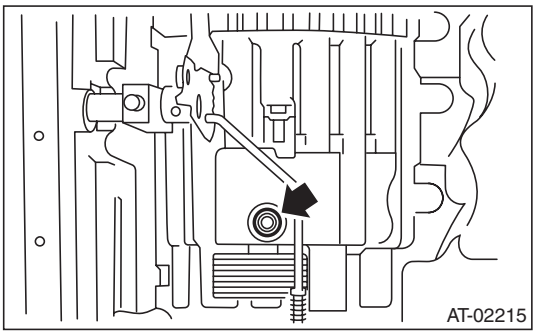
16) Take out the retaining plate, drive plate and driven plate of 2-4 brake.



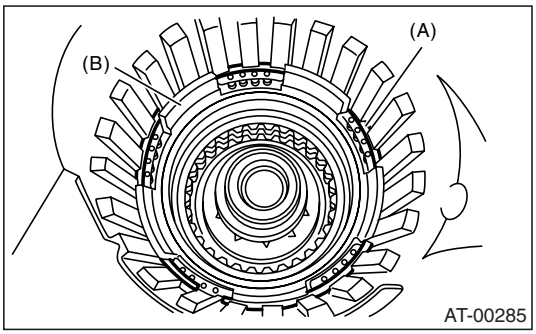
17) Take out the thrust needle bearing, planetary gear assembly and low clutch assembly.



18) Remove the 2-4 brake seal.

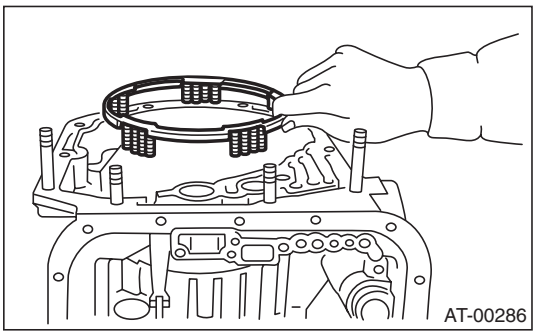


19) Remove the snap ring.

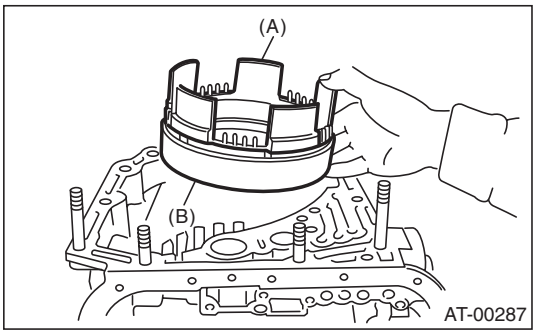


(A) Snap ring
(B) 2-4 brake piston

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

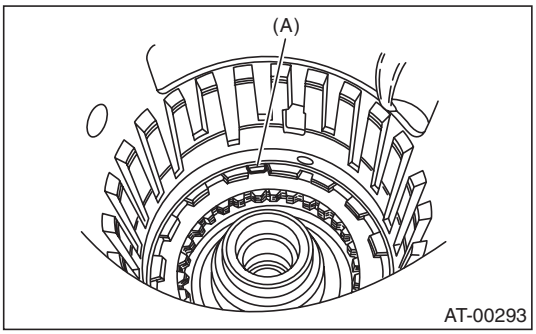


21) Remove the 2-4 brake piston and piston retainer without damaging.



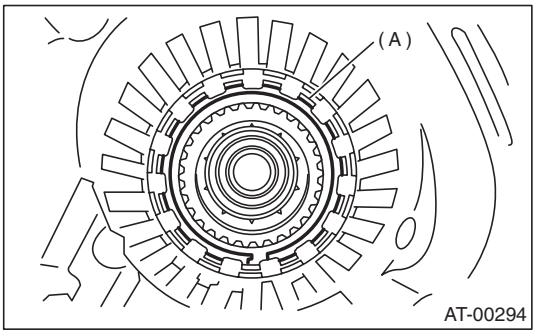
(A) 2-4 brake piston
(B) 2-4 brake piston retainer

22) Pull out the leaf spring without folding.



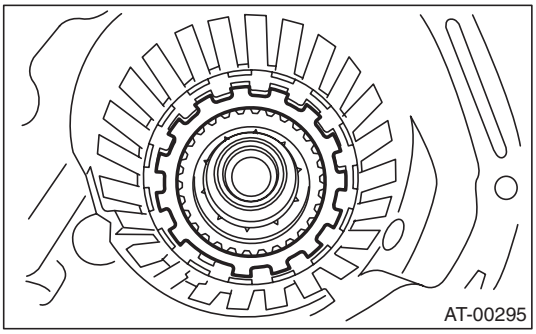
(A) Leaf spring

23) Remove the snap ring.

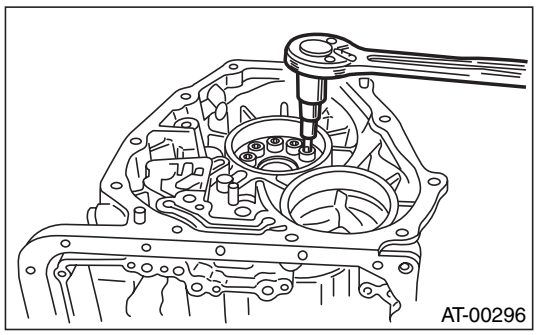


(A) Snap ring

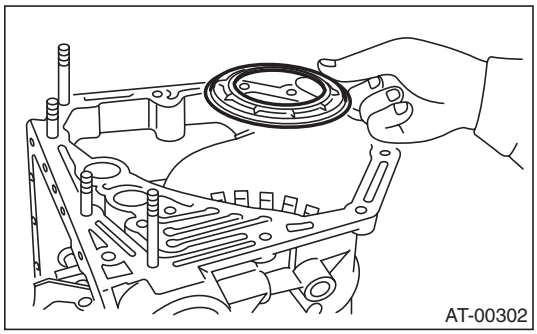
24) Take out the retaining plate, drive plate, driven plate and dish plate.



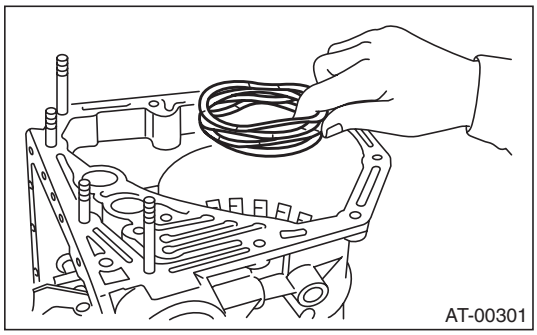
25) Turn the transmission case upside down, and then take out the socket bolts while holding the one-way clutch inner race with hand.



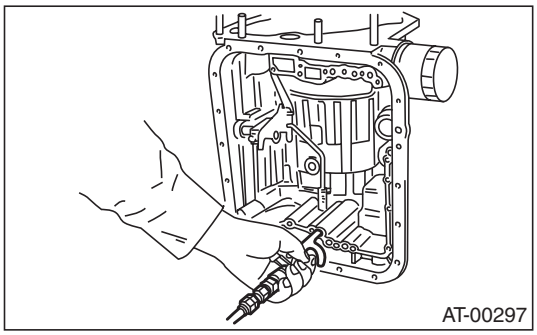
26) Remove the spring retainer.



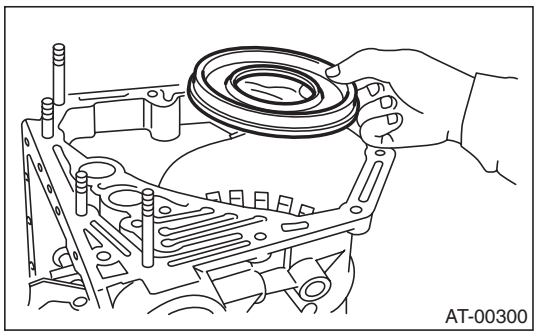
27) Take out the return spring.



28) Apply compressed air.



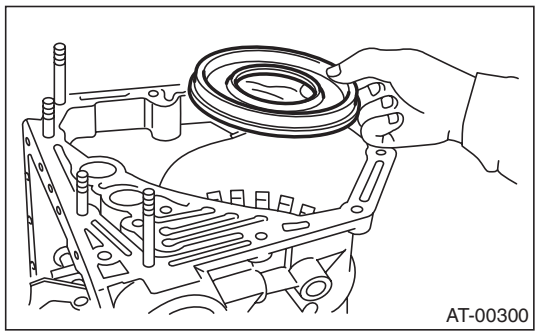
29) Take out the low & reverse piston.



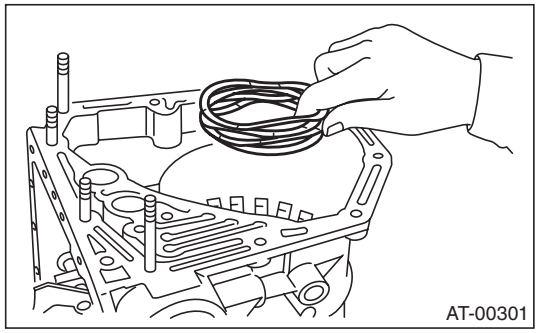
B: INSTALLATION

1) Install the low & reverse brake piston.

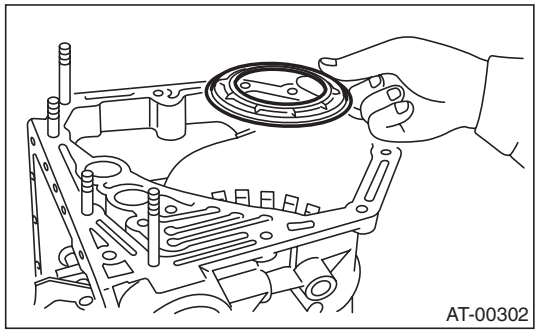
NOTE:
- Be careful not to damage the lip seal.
- Apply ATF to lips.



2) Install the return spring.



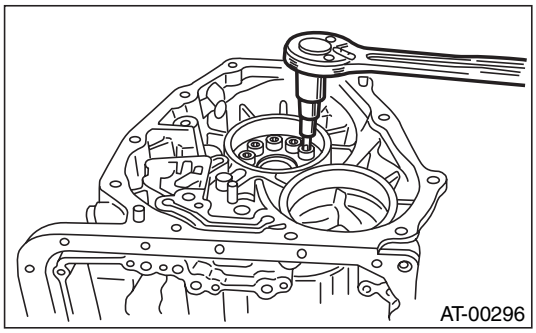
3) Install the spring retainer.



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

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

Tightening torque:
25 N·m (2.5 kgf-m, 18.4 ft-lb)



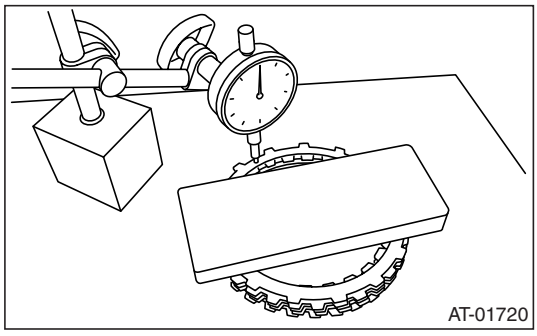
6) Place the front side of transmission body up.
7) Install the thrust needle bearing.
8) Place the dish plate, driven plate, drive plate and retaining plate neatly in this order on surface table.
9) Set the dial gauge to clutch, and read its scale.

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 retaining plate.

NOTE:
- Use a stiff board which does not bend against load as a flat board to be put on retaining plate.
- Use a flat board of its weight less than 8.5 kg (18.7 lb).

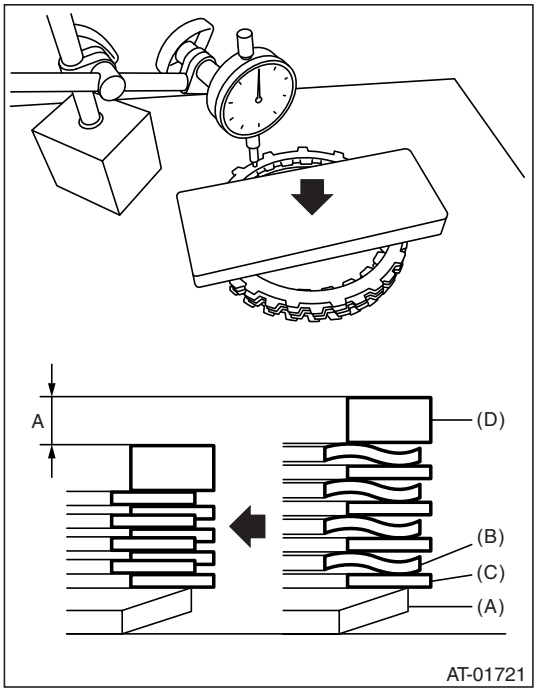
11) Put the flat board weighed on retaining plate.



12) Using the following formula, calculate “N” indicated on the push/pull gauge.
N = 83 N (8.5 kgf, 18.7 lbf) − Z
N: Value indicated on push/pull gauge
83 N (8.5 kgf, 18.7 lbf): Load applied to clutch plate
Z: Flat board weight

13) Press the center of retaining plate by applying a force of N using push/pull gauge, and then measure and record the height A. Measure at three places or more in even distance and take the average value.

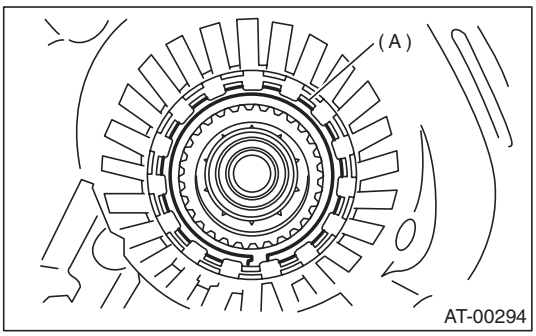
NOTE:
If three places, measure in every 120°. If four places, measure in every 90°.



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

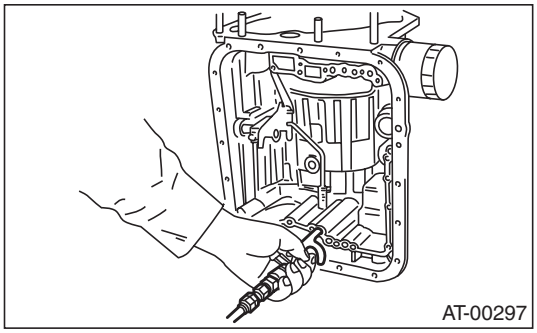
14) Installation of the low & reverse brake
Install the dish plate, driven plate and retaining plate, and then secure them with snap ring.

NOTE:
Pay attention to the orientation of dish plate.



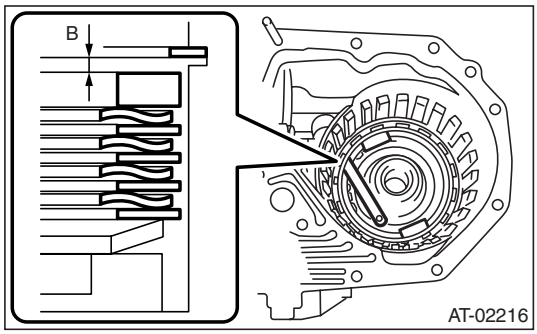
(A) Snap ring

15) Apply compressed air intermittently to check for operation.



16) Place the same thickness of shim on both sides to prevent plate from tilting, measure and record the clearance B.

NOTE:
Do not press the shim downward with excessive force, otherwise the waveform of drive plates will be broken down.



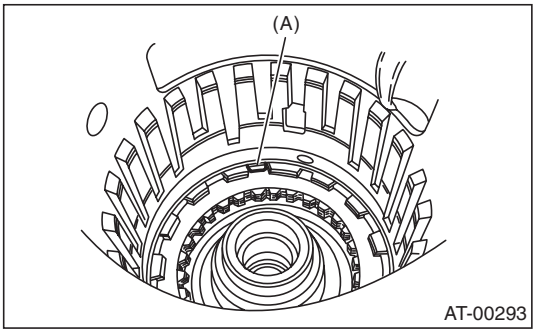
17) Piston stroke calculation
Select the retaining plate within the specification by calculating with A and B dimensions recorded before. If the calculated value exceeds the service limit, replace the drive plate with a new one and adjust it within the specification.
T = A + B
T: Piston stroke
A: Collapse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

Initial specification:
2.15 — 2.65 mm (0.085 — 0.104 in)

Service limit:
2.95 mm (0.116 in)

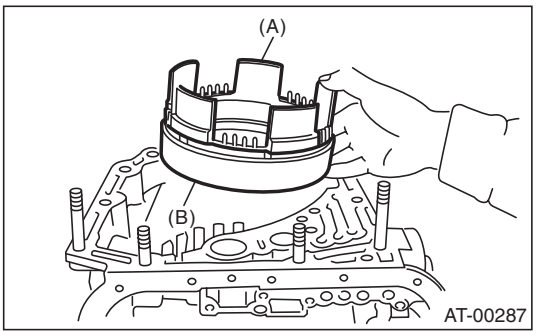
Retaining plate	
Part No.	Thickness mm (in)
31667AA420	3.8 (0.150)
31667AA320	4.1 (0.161)
31667AA330	4.4 (0.173)
31667AA340	4.7 (0.185)
31667AA350	5.0 (0.197)
31667AA360	5.3 (0.209)
31667AA370	5.6 (0.220)
31667AA380	5.9 (0.232)

18) Install the leaf spring of low & reverse brake.



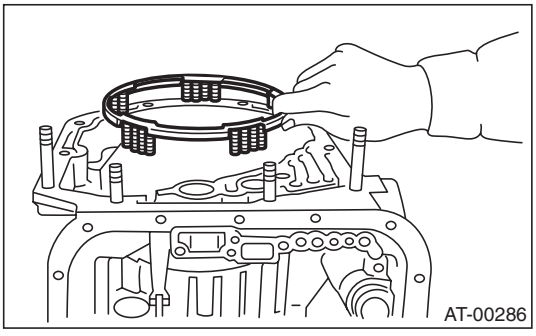
(A) Leaf spring

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

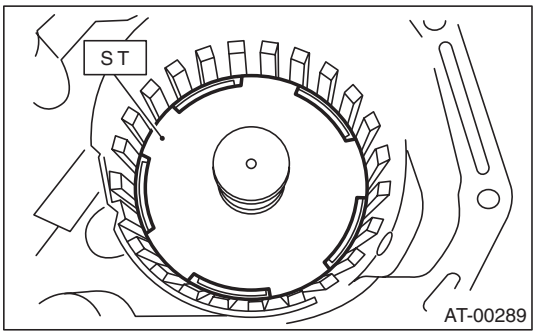


(A) 2-4 brake piston
(B) 2-4 brake piston retainer

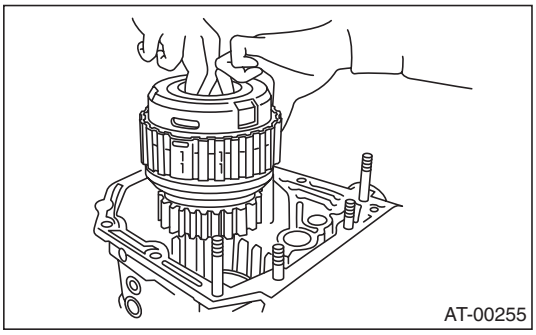
20) Install 2-4 brake piston return spring to transmission case.



21) Position the snap ring in transmission. Using the ST, press-fit the snap ring into specified 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.



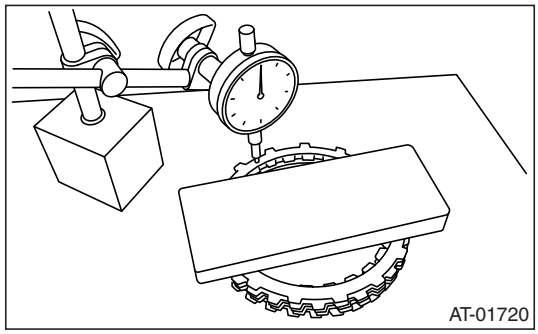
23) Place the dish plate, driven plate, drive plate and retaining plate neatly in this order on surface table.
24) Set the dial gauge to clutch, and read its scale.

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

25) Scale and record the weight “Z” of a flat board which will be put on retaining plate.

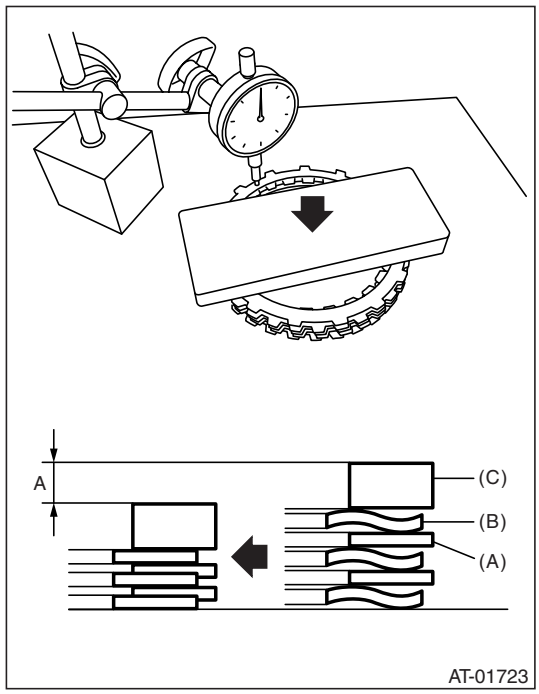
NOTE:
• Use a stiff board which does not bend against load as a flat board to be put on retaining plate.
• Use a flat board of its weight less than 10.2 kg (22.5 lb).

26) Put the flat board weighed on retaining plate.



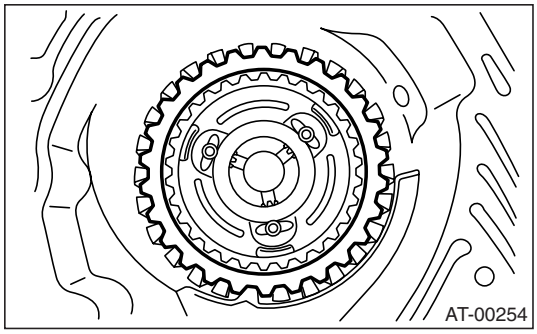
27) Using the following formula, calculate “N” indicated on the push/pull gauge.
N = 100 N (10.2 kgf, 22.5 lbf) − Z
N: Value indicated on push/pull gauge
100 N (10.2 kgf, 22.5 lbf): Load applied to clutch plate
Z: Flat board weight
28) Press the center of retaining plate by applying a force of N using push/pull gauge, and then measure and record the height A. Measure at three places or more in even distance and take the average value.

NOTE:
If three places, measure in every 120°. If four places, measure in every 90°.

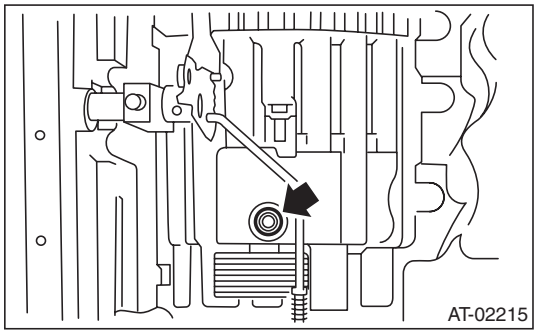


(A) Driven plate
(B) Drive plate
(C) Retaining plate

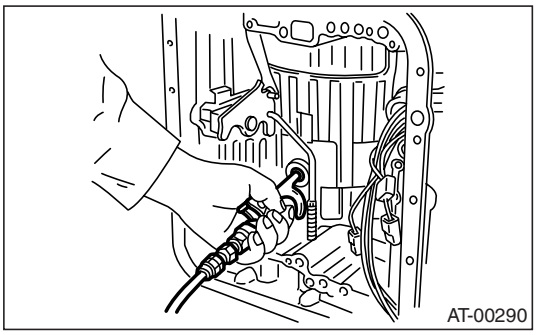
29) Install the pressure plate, drive plate, driven plate, retaining plate and snap ring.



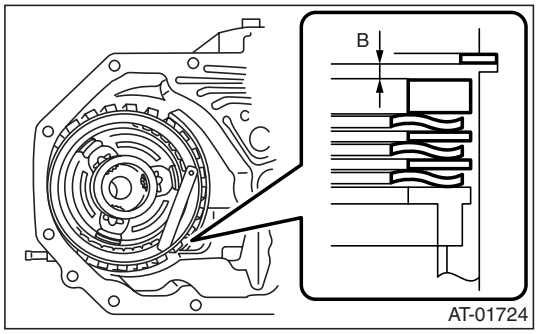
30) Install a new 2-4 brake oil seal to transmission case.



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



32) Measure the clearance B between retaining plate and snap ring.



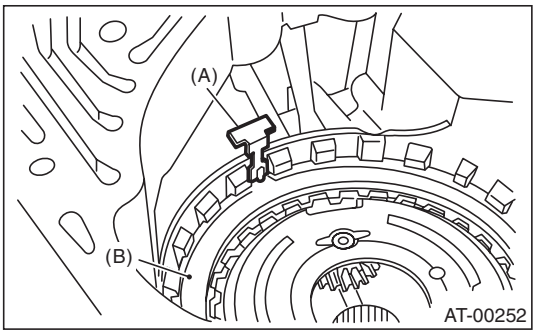
33) Piston stroke calculation
Select the retaining plate within the specification by calculating with A and B dimensions recorded before. If the calculated value exceeds the service limit, replace the drive plate with a new one and adjust it within the specification.
T = A + B
T: Piston stroke
A: Collapse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

2.0 L SOHC model:
Initial specification
1.4 — 1.8 mm (0.055 — 0.071 in)
Service limit
1.95 mm (0.077 in)

Except for 2.0 L SOHC model:
Initial specification
1.7 — 2.1 mm (0.067 — 0.083 in)
Service limit
2.3 mm (0.091 in)

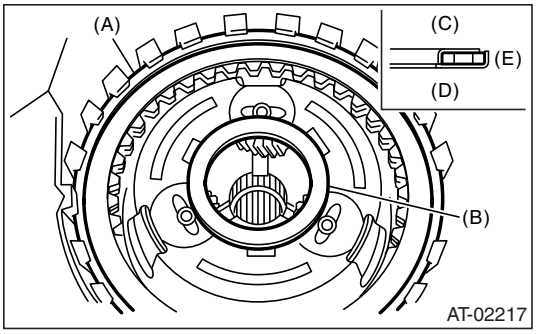
Retaining plate	
Part No.	Thickness mm (in)
31567AA991	5.6 (0.220)
31567AB001	5.8 (0.228)
31567AB011	6.0 (0.236)
31567AB021	6.2 (0.244)
31567AB031	6.4 (0.252)
31567AB041	6.6 (0.260)

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



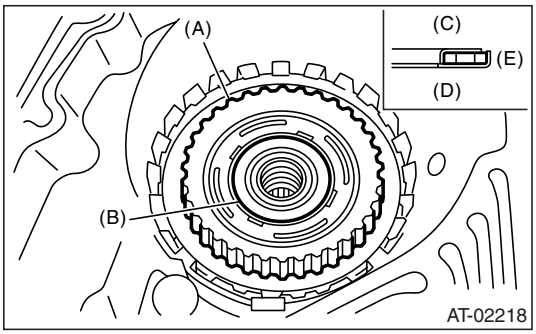
(A) Leaf spring
(B) Retaining plate

35) Install the thrust needle bearing in correct direction.



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

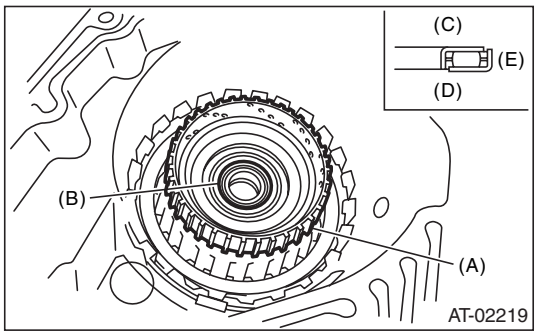
36) Install the front sun gear and thrust needle bearing.



(A) Front sun gear
(B) Thrust needle bearing
(C) Upside
(D) Downside
(E) Outside

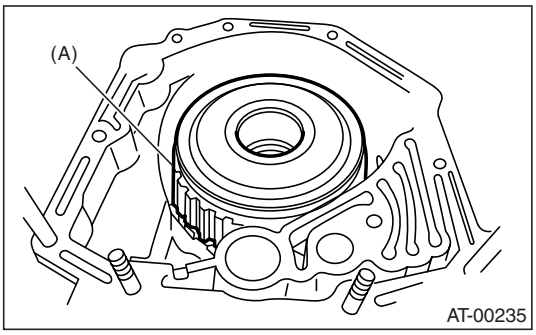
37) Install the high clutch hub.
Attach the thrust needle bearing to hub using vaseline, and then install the hub by correctly engaging the splines of the front planetary carrier.

38) Install the thrust needle bearing in proper direction.



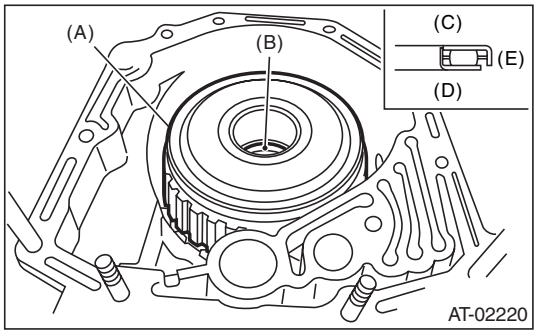
(A) High clutch hub
(B) Thrust needle bearing
(C) Upside
(D) Downside
(E) Outside

39) Install the high clutch assembly.



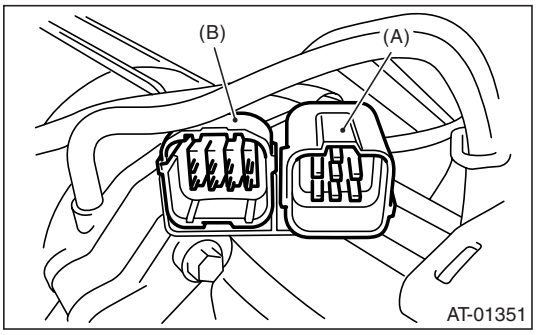
(A) High clutch and reverse clutch ASSY

40) Adjust total end play. <Ref. to 4AT-108, ADJUSTMENT, Oil Pump Housing.>
41) 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

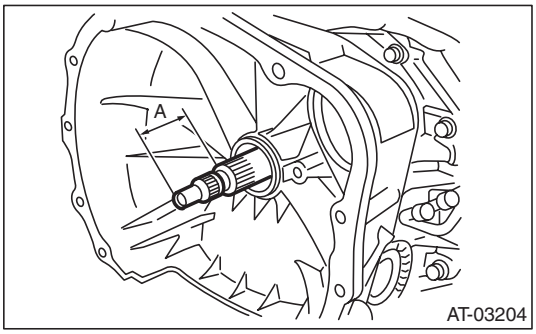
42) Install the oil pump housing assembly with a new gasket. <Ref. to 4AT-104, Oil Pump Housing.>
43) Install the converter case assembly into transmission case assembly. <Ref. to 4AT-102, INSTALLATION, Converter Case.>
44) Insert the inhibitor switch connector and transmission connector to stay.
45) Install the air breather hose. <Ref. to 4AT-79, INSTALLATION, Air Breather Hose.>



(A) Transmission connector
(B) Inhibitor switch connector

46) Install the oil cooler pipe. <Ref. to 4AT-70, INSTALLATION, ATF Cooler Pipe and Hose.>
47) Install the oil charge pipe with a O-ring. <Ref. to 4AT-80, INSTALLATION, Oil Charge Pipe.>
48) Insert the input shaft while rotating it lightly by hand, and then check the protrusion amount.

Normal protrusion A:
50 — 55 mm (1.97 — 2.17 in)

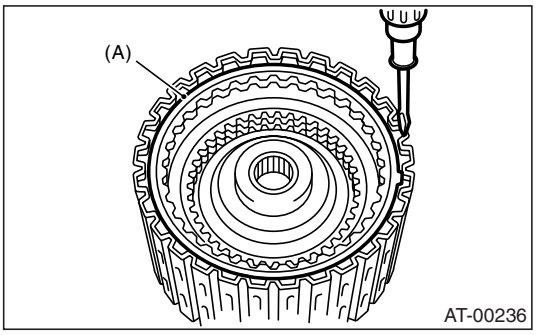


49) Install the torque converter clutch assembly. <Ref. to 4AT-81, INSTALLATION, Torque Converter Clutch Assembly.>
50) Install the transmission assembly into vehicle. <Ref. to 4AT-42, INSTALLATION, Automatic Transmission Assembly.>

C: DISASSEMBLY

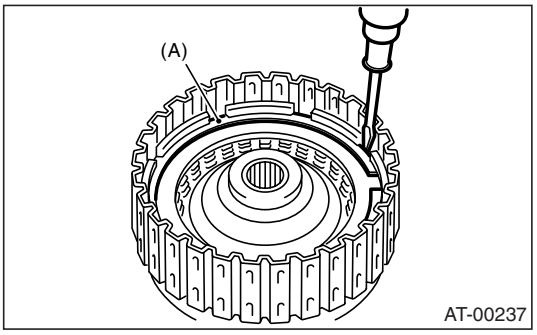
1. HIGH CLUTCH AND REVERSE CLUTCH

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



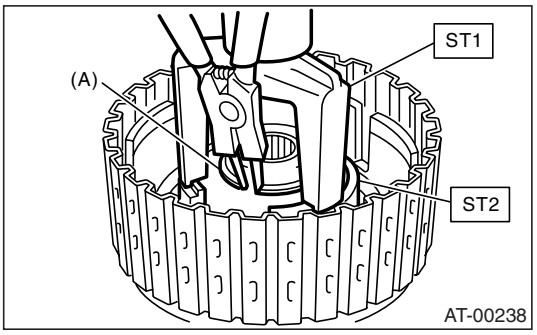
(A) Snap ring

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



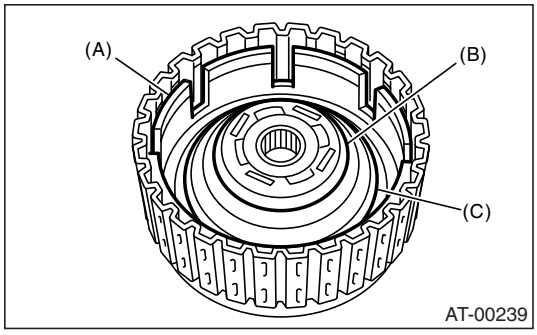
(A) Snap ring

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



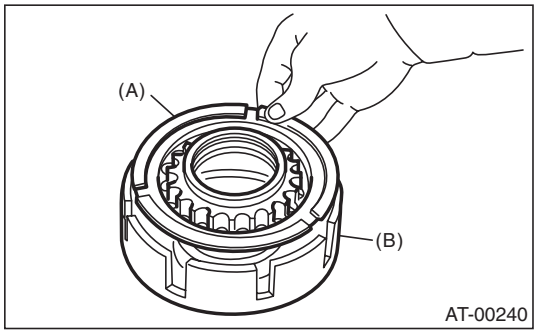
(A) Snap ring

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



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

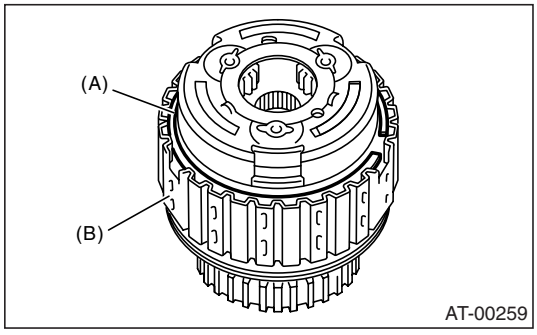
5) Remove the seal ring and lip seal from high clutch piston and reverse clutch piston.



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

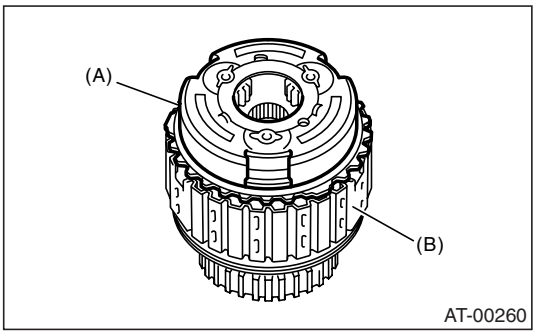
2. PLANETARY GEAR AND LOW CLUTCH

1) Remove the snap ring from low clutch drum.



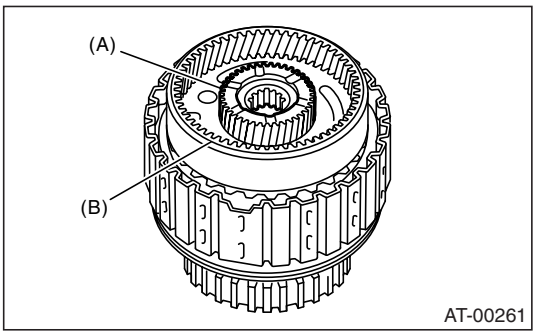
(A) Snap ring
(B) Low clutch dram

2) Take out the front planetary carrier.



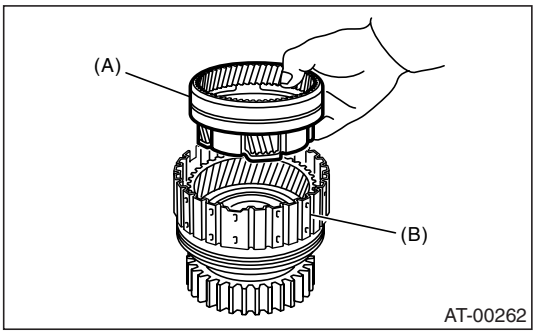
(A) Front planetary carrier
(B) Low clutch dram

3) Take out the rear sun gear.



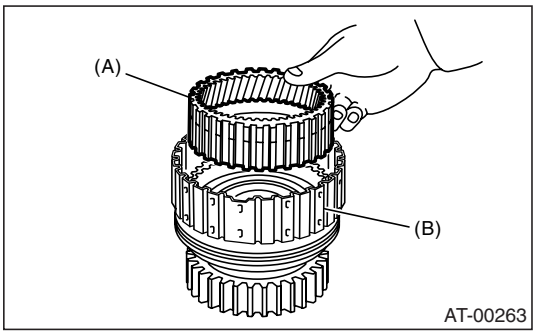
(A) Rear sun gear
(B) Rear planetary carrier

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



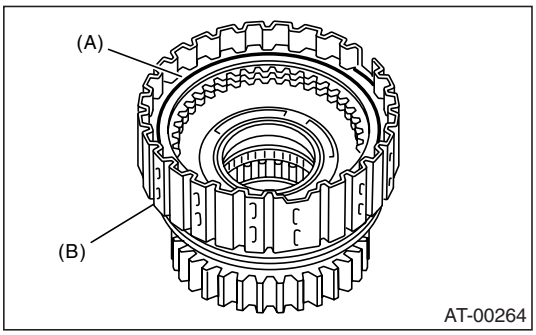
(A) Rear planetary carrier
(B) Low clutch dram

5) Take out the rear internal gear.



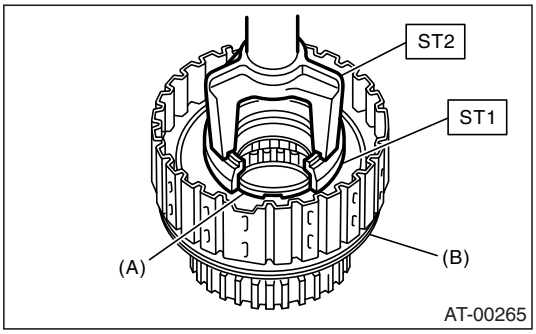
(A) Rear internal gear
(B) Low clutch dram

6) Remove the snap ring from low clutch drum.



(A) Snap ring
(B) Low clutch dram

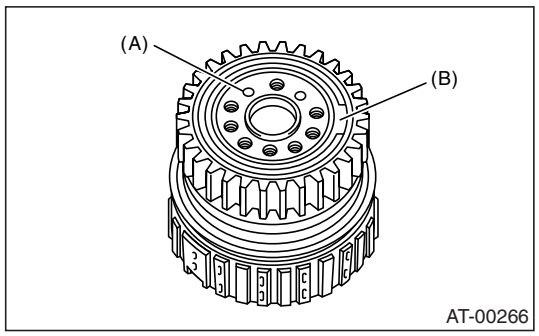
7) Compress the spring retainer, and remove the snap ring from low clutch drum using ST1 and ST2.
ST1 498627100 SEAT
ST2 398673600 COMPRESSOR



(A) Snap ring
(B) Low clutch dram

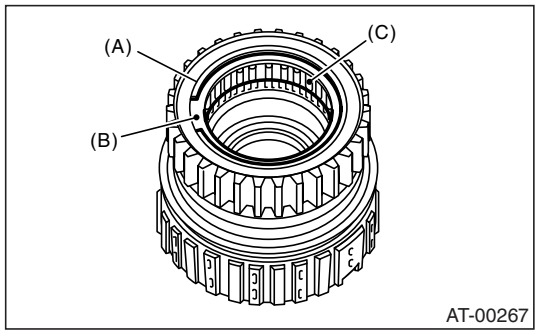
8) Remove the one-way clutch. <Ref. to 4AT-121, REMOVAL, AT Main Case.>

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



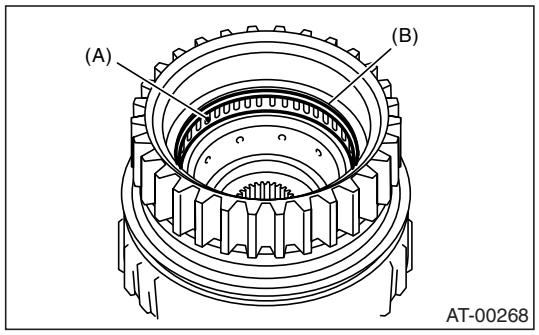
(A) Apply compressed air.
(B) One-way clutch inner race

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

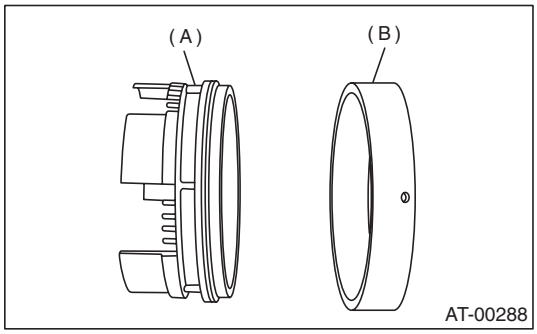
12) Remove the needle bearing after taking out the snap ring.



(A) Needle bearing
(B) Snap ring

3. 2-4 BRAKE

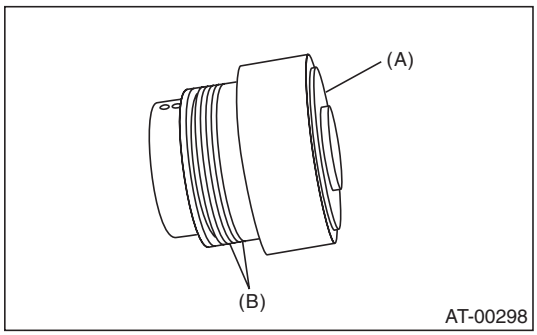
Separate the 2-4 brake piston and piston retainer.



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

4. ONE-WAY CLUTCH INNER RACE

1) Remove the seal ring.

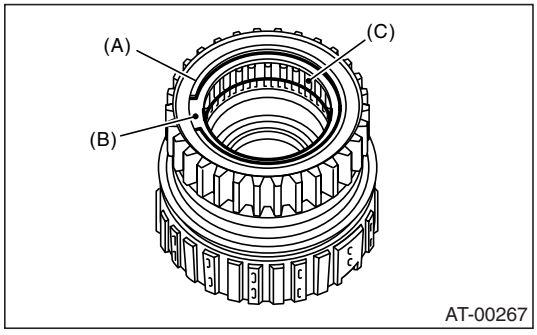


(A) One-way clutch inner race
(B) Seal ring

2) Remove the needle bearing using ST.
ST 398527700 PULLER ASSY

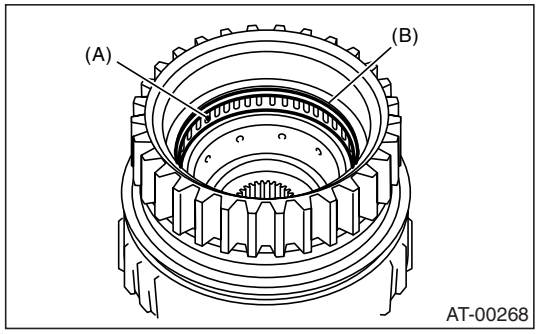
5. ONE-WAY CLUTCH OUTER RACE

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.

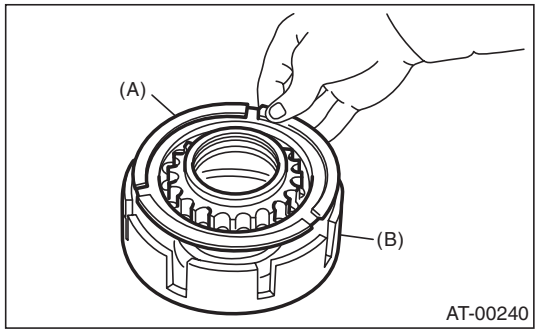


(A) Needle bearing
(B) Snap ring

D: ASSEMBLY

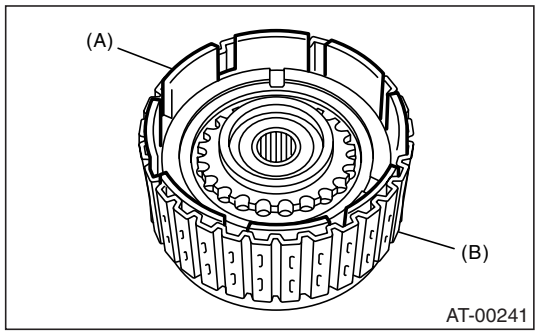
1. HIGH CLUTCH AND REVERSE CLUTCH

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.



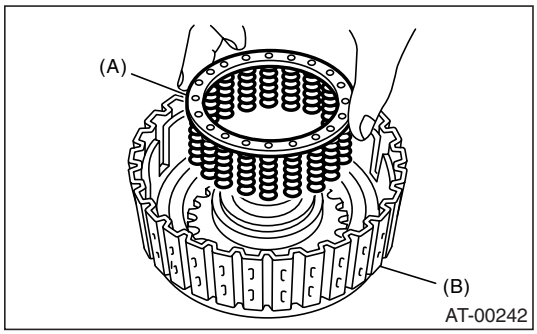
(A) High clutch piston
(B) Reverse clutch piston

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.



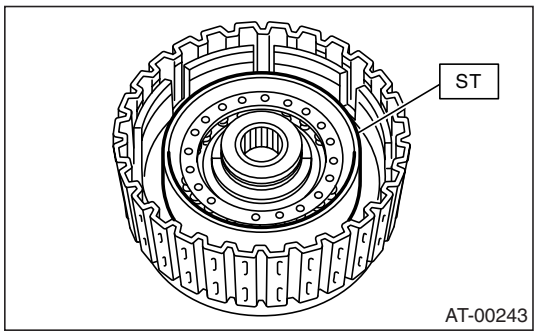
(A) Reverse clutch piston
(B) High clutch drum

4) Install the spring retainer to high clutch piston.

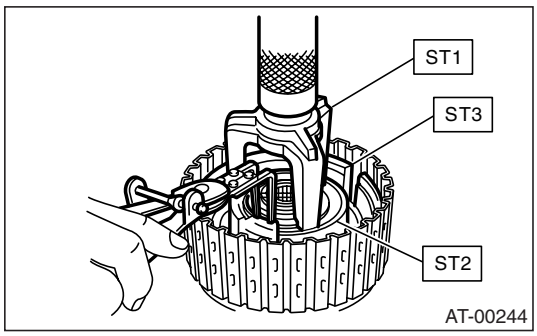


(A) Spring retainer
(B) High clutch drum

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



6) Install the cover to high clutch piston in order to prevent the high clutch piston seal from folding.
7) Install the snap ring using ST1 and ST2.
ST1 398673600 COMPRESSOR
ST2 498627100 SEAT
ST3 498437000 HIGH CLUTCH PISTON GUIDE



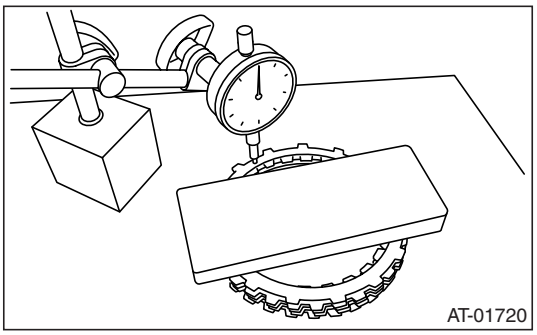
8) Place the dish plate, driven plate, drive plate and retaining plate neatly in this order on surface table.
9) Set the dial gauge to clutch, and read its scale.

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 retaining plate.

NOTE:
• Use a stiff board which does not bend against load as a flat board to be put on retaining plate.
• Use a flat board of its weight less than 25.5 kg (56.2 lb).

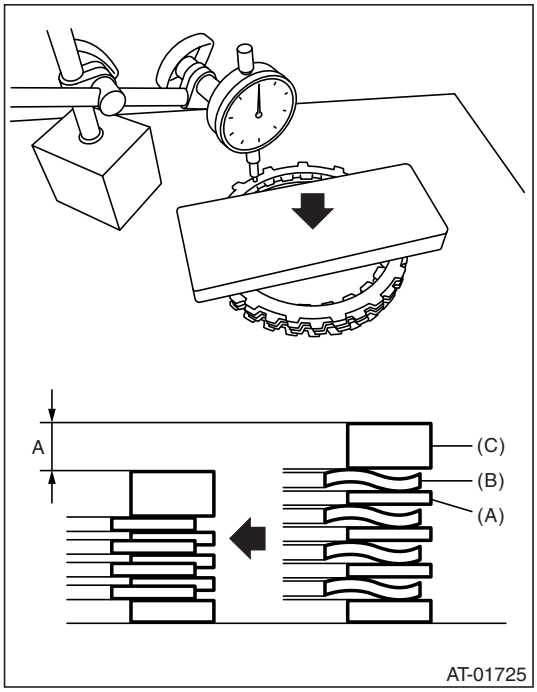
11) Put the flat board weighed on retaining plate.



12) Using the following formula, calculate “N” indicated on the push/pull gauge.
N = 250 N (25.5 kgf, 56.2 lbf)− Z
N: Value indicated on push/pull gauge
250 N (25.5 kgf, 56.2 lbf): Load applied to clutch plate
Z: Flat board weight

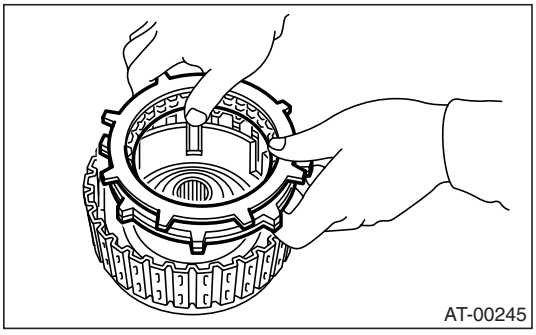
13) Press the center of retaining plate by applying a force of N using push/pull gauge, and then measure and record the height A. Measure at three places or more in even distance and take the average value.

NOTE:
If three places, measure in every 120°. If four places, measure in every 90°.



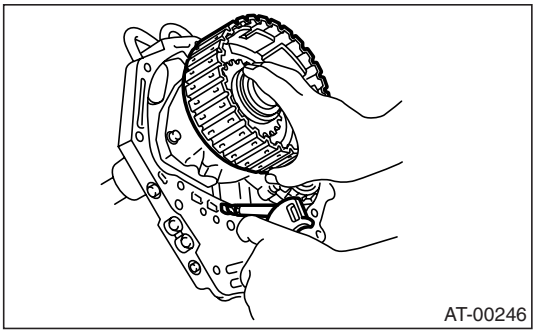
(A) Driven plate
(B) Drive plate
(C) Retaining plate

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

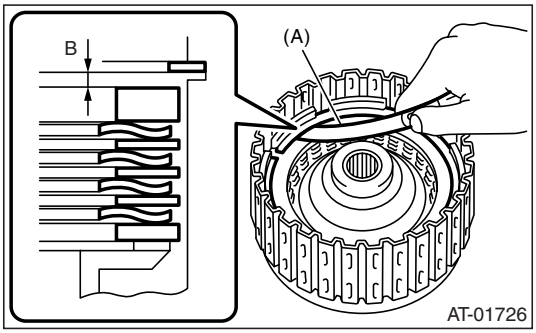


15) Install the snap ring to high clutch drum.

16) Apply compressed air intermittently to check for operation.



17) Measure the clearance B between 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 recorded before. If the calculated value exceeds the service limit, replace the drive plate with a new one and adjust it within the specification.
T = A + B
T: Piston stroke
A: Collapse amount of drive plate
B: Clearance between retaining plate and snap ring

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

Service limit:
2.6 mm (0.102 in)

High clutch retaining plate	
Part No.	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)

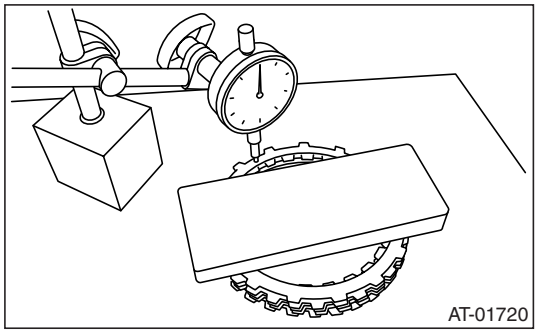
19) Place the dish plate, driven plate, drive plate and retaining plate neatly in this order on surface table.
20) Set the dial gauge to clutch, and read its scale.

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 retaining plate.

NOTE:
• Use a stiff board which does not bend against load as a flat board to be put on retaining plate.
• Use a flat board of its weight less than 15.3 kg (33.7 lb).

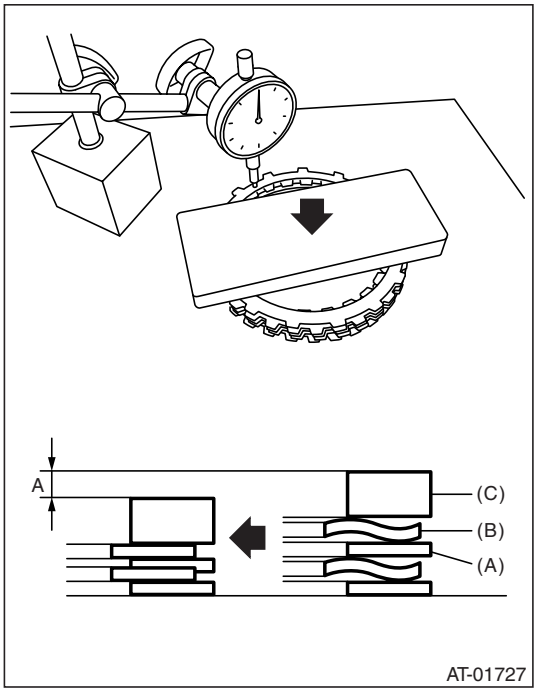
22) Put the flat board weighed on retaining plate.



23) Using the following formula, calculate “N” indicated on the push/pull gauge.
N = 150 N (15.3 kgf, 33.7 lbf) − Z
N: Value indicated on push/pull gauge
150 N (15.3 kgf, 33.7 lbf): Load applied to clutch plate
Z: Flat board weight

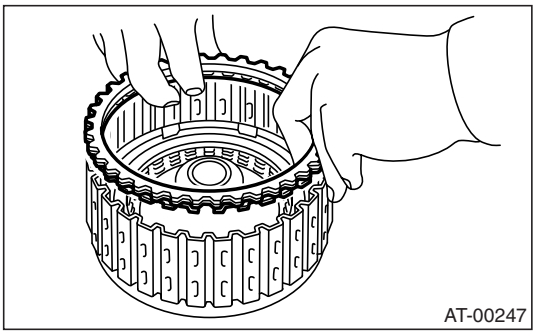
24) Press the center of retaining plate by applying a force of N using push/pull gauge, and then measure and record the height A. Measure at three places or more in even distance and take the average value.

NOTE:
If three places, measure in every 120°. If four places, measure in every 90°.

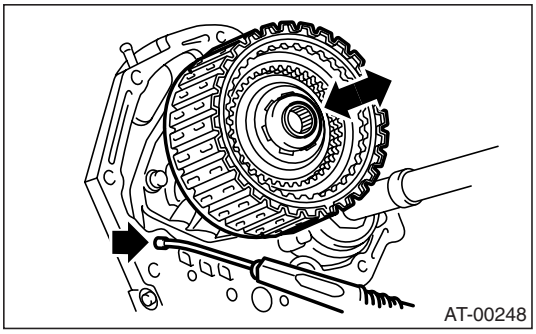


(A) Driven plate
(B) Drive plate
(C) Retaining plate

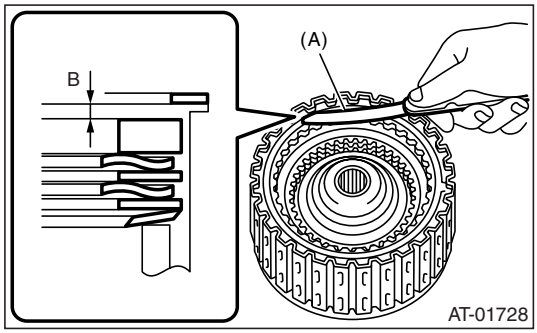
25) Install the driven plate, drive plate, retaining plate and snap ring.



26) Apply compressed air intermittently to check for operation.



27) Measure the clearance B between 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 recorded before. If the calculated value exceeds the service limit, replace the drive plate with a new one and adjust it within the specification.
T = A + B
T: Piston stroke
A: Collapse amount of drive plate
B: Clearance between retaining plate and snap ring

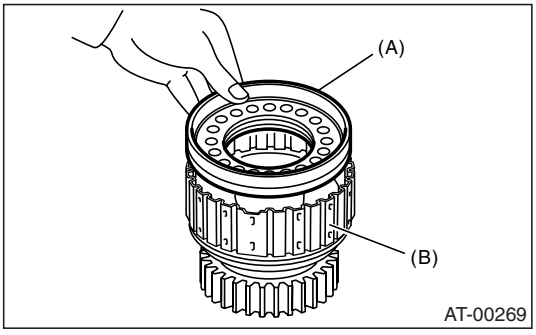
Initial specification:
1.1 — 1.4 mm (0.043 — 0.055 in)

Service limit:
1.6 mm (0.063 in)

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

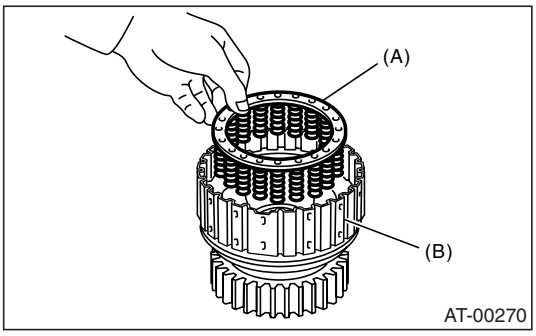
2. PLANETARY GEAR AND LOW CLUTCH

1) Apply ATF to D-ring, and then install it to the low clutch piston.
2) Install the low clutch piston to low clutch drum.



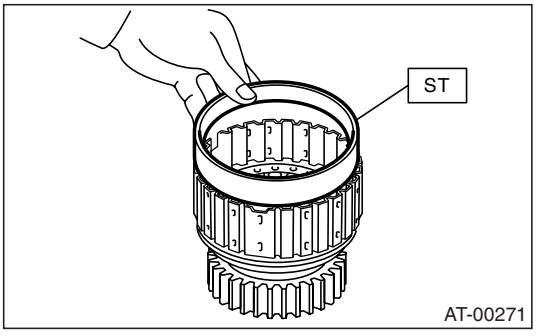
(A) Low clutch piston
(B) Low clutch dram

3) Install the spring retainer to low clutch piston.

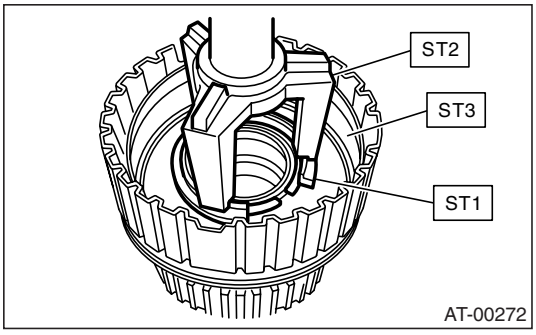


(A) Spring retainer
(B) Low clutch dram

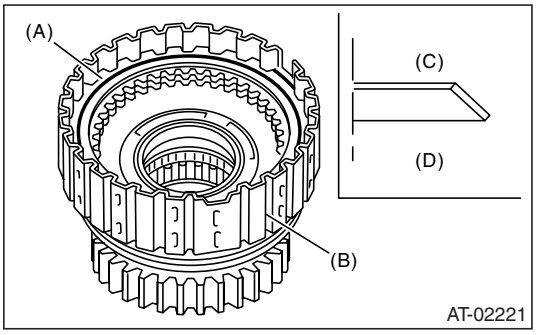
4) Install the ST to low clutch drum.
ST 498437100 LOW CLUTCH PISTON GUIDE



5) Set the cover on piston with a press using ST1 and ST2, and install the snap ring. At this time, be careful not to fold the cover seal.
ST1 498627100 SEAT
ST2 398673600 COMPRESSOR
ST3 498437100 LOW CLUTCH PISTON GUIDE

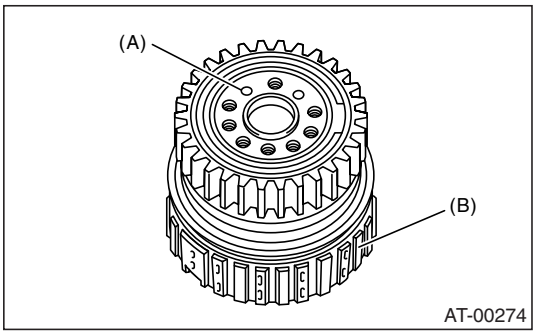


6) Install the dish plate, driven plate and retaining plate, and then secure them with snap ring.



(A) Snap ring
(B) Low clutch dram
(C) Dish plate
(D) Low clutch piston side

7) Check the low clutch for operation.
(1) Remove the one-way clutch. <Ref. to 4AT-121, REMOVAL, AT Main Case.>
(2) Set the one-way clutch inner race, and apply compressed air for checking.

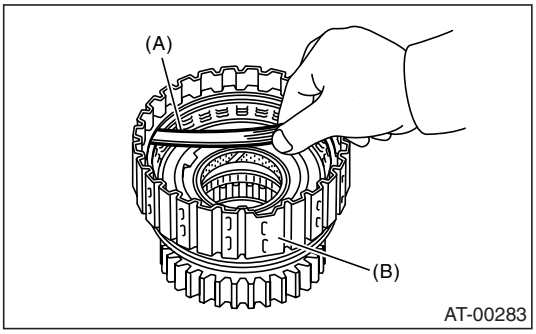


(A) Apply compressed air.
(B) Low clutch dram

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

Initial specification:
0.7 — 1.1 mm (0.028 — 0.043 in)

Service limit:
1.5 mm (0.059 in)

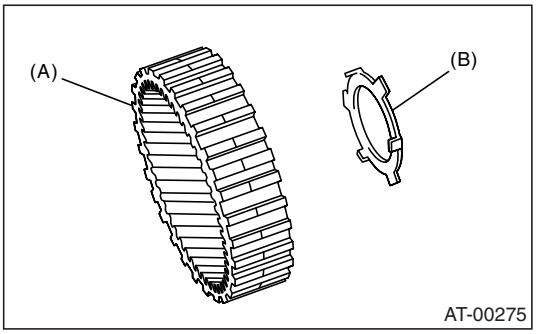


(A) Thickness gauge
(B) Low clutch dram

If the clearance is out of specification, select a suitable retaining plate to adjust it within specification.

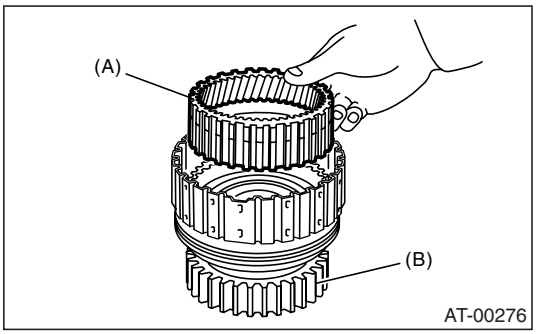
Retaining plate	
Part No.	Thickness mm (in)
31567AB050	3.8 (0.150)
31567AB060	4.0 (0.157)
31567AB070	4.2 (0.165)
31567AB080	4.4 (0.173)
31567AB090	4.6 (0.181)

9) Install the washer to rear internal gear.



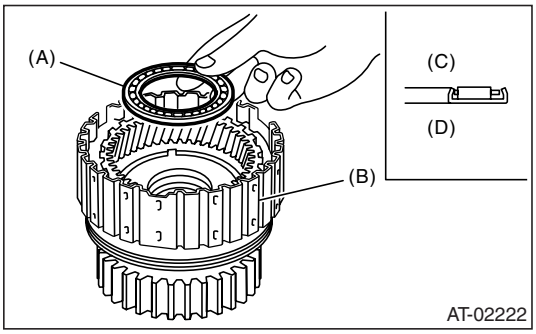
(A) Rear internal gear
(B) Washer

10) Install the rear internal gear.



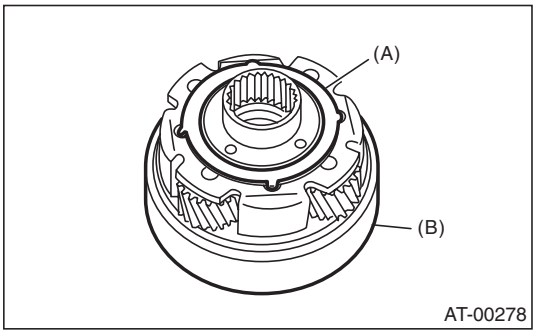
(A) Rear internal gear
(B) Low clutch dram

11) Install the thrust needle bearing in correct direction.



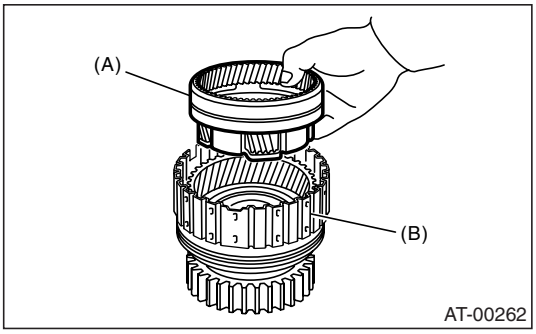
(A) Thrust needle bearing
(B) Low clutch dram
(C) Rear planetary carrier side
(D) Low clutch piston side

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



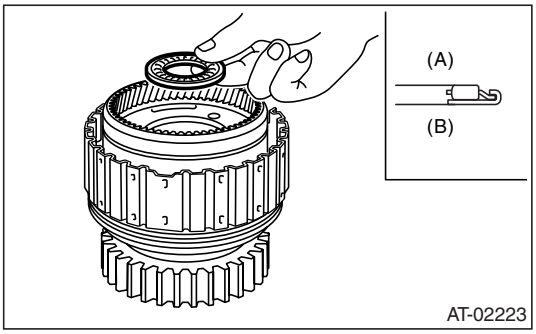
(A) Washer
(B) Rear planetary carrier

13) Install the rear planetary carrier to low clutch drum.



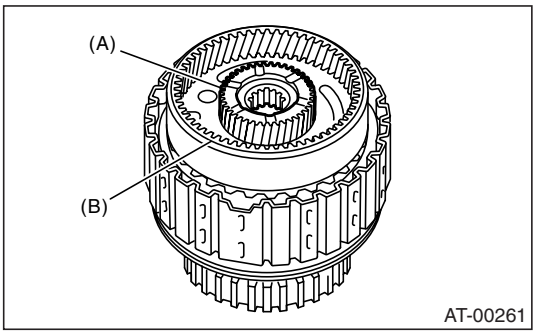
(A) Rear planetary carrier
(B) Low clutch dram

14) Install the thrust needle bearing in correct direction.



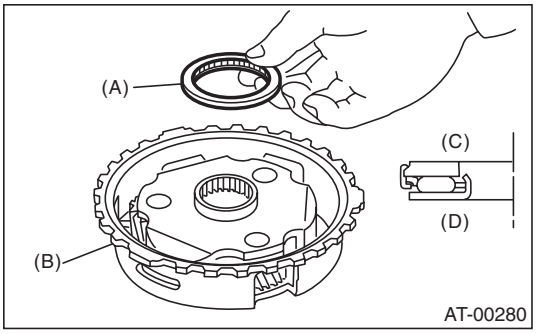
(A) Rear sun gear side
(B) Rear planetary carrier side

15) Install the rear sun gear in proper direction.



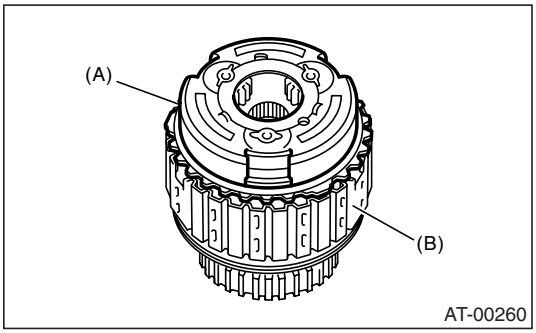
(A) Rear sun gear
(B) Rear planetary carrier

16) Install the thrust needle bearing in proper direction.



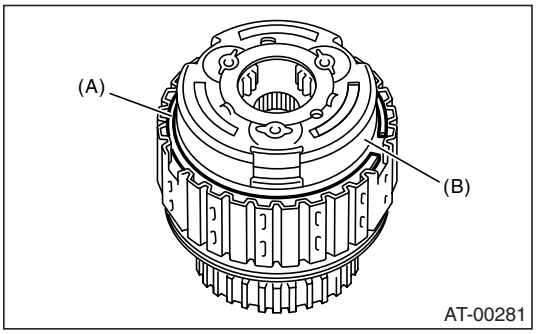
(A) Thrust needle bearing
(B) Front planetary carrier
(C) Rear sun gear side
(D) Front planetary carrier side

17) Install the front planetary carrier to low clutch drum.



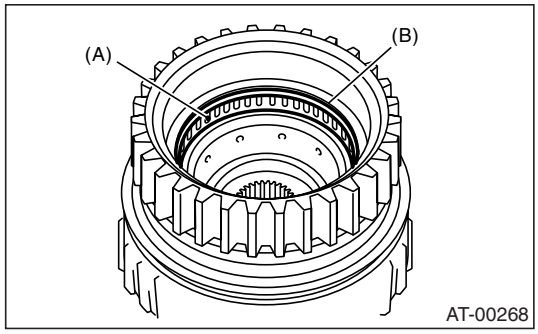
(A) Front planetary carrier
(B) Low clutch dram

18) Install the snap ring to low clutch drum.



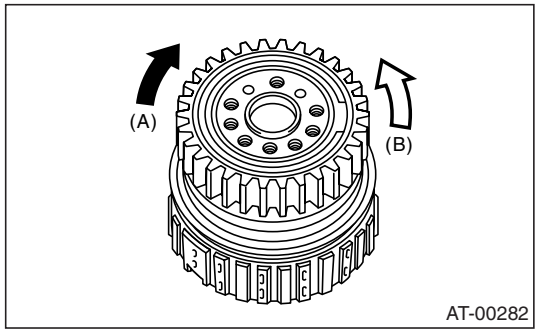
(A) Snap ring
(B) Front planetary carrier

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



(A) Needle bearing
(B) Snap ring

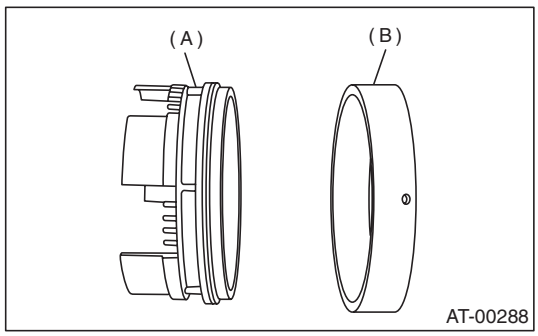
20) Install the one-way clutch, and then secure with snap ring.
21) Set the one-way clutch inner race. Make sure that the clutch locks in the clockwise direction and rotates in the counterclockwise direction.



(A) Lock
(B) Rotate

3. 2-4 BRAKE

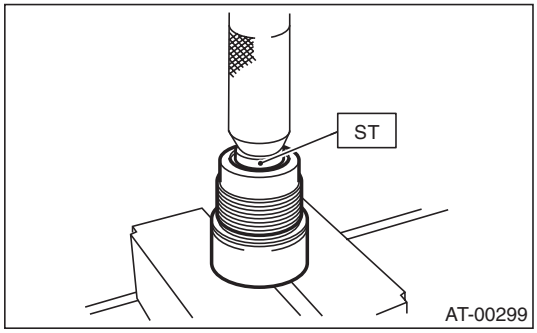
1) Apply ATF to D-ring, and then install it to 2-4 brake piston.
2) Install 2-4 brake piston to 2-4 brake piston retainer.



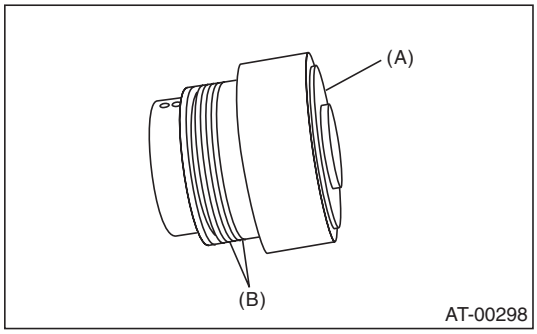
(A) 2-4 brake piston
(B) 2-4 brake piston retainer

4. ONE-WAY CLUTCH INNER RACE

1) Install the needle bearing to inner race using ST and press.
ST 398497701 SEAT



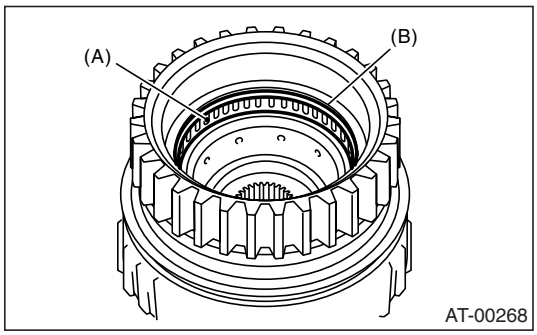
2) Apply vaseline to the groove of inner race and seal ring.
3) Install two seal rings to one-way clutch inner race.



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

5. ONE-WAY CLUTCH OUTER RACE

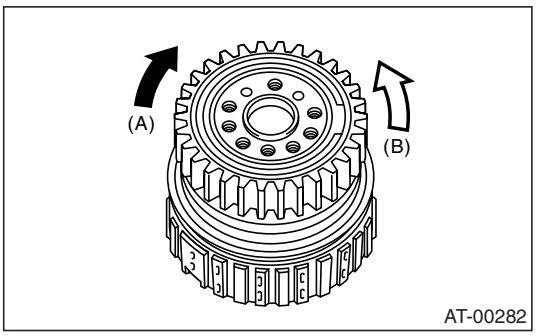
1) Install the needle bearing, and then secure with the snap ring.



(A) Needle bearing
(B) Snap ring

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

3) Set the inner race. Make sure that the clutch locks in the clockwise direction and rotates in the counterclockwise direction.



(A) Lock
(B) Rotate

E: INSPECTION

1. HIGH CLUTCH AND REVERSE CLUTCH

Check the following items.
- Drive plate facing for wear or damage
- Driven plate for discoloration (burned color)
- 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-108, ADJUSTMENT, Oil Pump Housing.>

2. PLANETARY GEAR AND LOW CLUTCH

Check the following items.
- Drive plate facing for wear or damage
- Driven plate for discoloration (burned color)
- Snap ring for wear, return spring for setting and breakage, and spring retainer for deformation
- Lip seal and D-ring for damage
- Piston check ball for operation
- Measure the total end play and adjust it within specification. <Ref. to 4AT-108, ADJUSTMENT, Oil Pump Housing.>

3. 2-4 BRAKE

Check the following items.
- Drive plate facing for wear or damage
- Driven plate for discoloration (burned color)
- Snap ring for wear and spring retainer for deformation
- Lip seal and D-ring for damage
- Measure the total end play and adjust it within specification. <Ref. to 4AT-108, ADJUSTMENT, Oil Pump Housing.>

4. ONE-WAY CLUTCH

- Check the snap ring is not worn and the seal rings are not deformed.
- Measure the total end play and adjust it within specification. <Ref. to 4AT-108, ADJUSTMENT, Oil Pump Housing.>

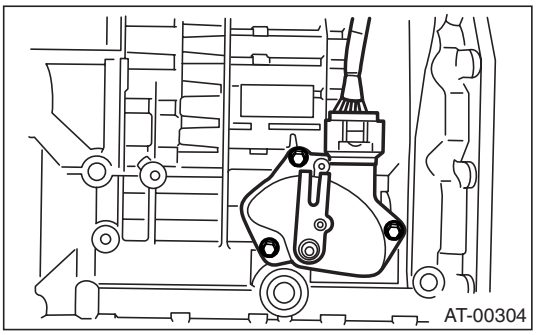
5. LOW & REVERSE BRAKE

Check the following items.
- Drive plate facing for wear or damage
- Driven plate for discoloration (burned color)
- Snap ring for wear and spring retainer for deformation

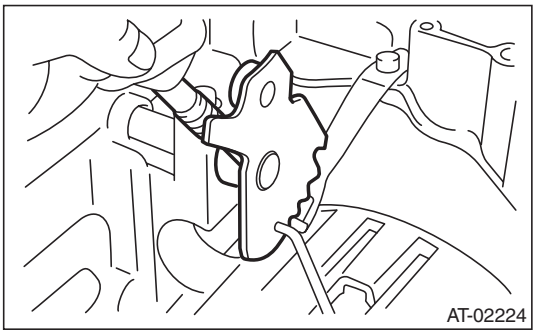
42.Transmission Control Device

A: REMOVAL

1) Remove the transmission assembly from vehicle. <Ref. to 4AT-39, REMOVAL, Automatic Transmission Assembly.>
2) Pull out the torque converter clutch assembly. <Ref. to 4AT-81, REMOVAL, Torque Converter Clutch Assembly.>
3) Remove the input shaft.
4) Lift up the lever on rear part of transmission harness connector, and then remove it from stay.
5) Disconnect the air breather hose. <Ref. to 4AT-79, REMOVAL, Air Breather Hose.>
6) Remove the inhibitor switch connector from stay.
7) Wrap vinyl tape around the nipple attached to the air breather hose.
8) Remove the pitching stopper bracket.
9) Remove the inhibitor switch.

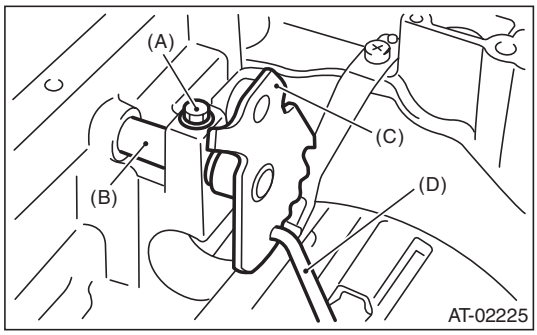


10) Remove the control valve body assembly. <Ref. to 4AT-62, REMOVAL, Control Valve Body.>
11) Pull out the straight pin of manual plate.



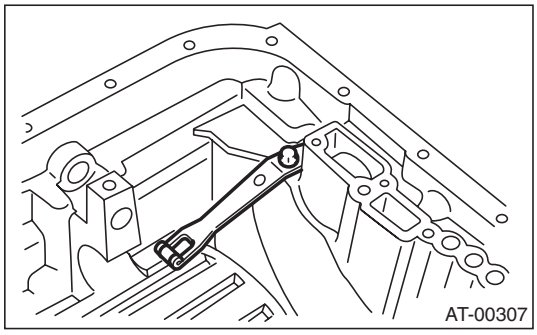
12) Remove the bolts securing select lever, and then remove the select lever, manual plate and parking rod.

NOTE:
Be careful not to damage the lips of press-fitted oil seal in the case.



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

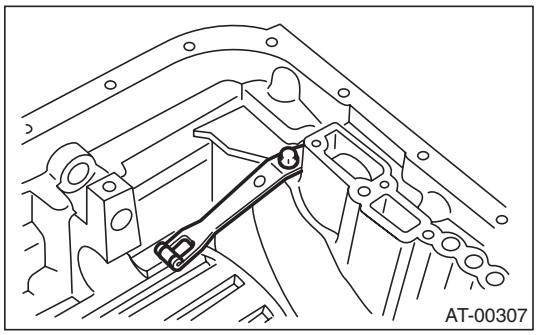
13) Remove the detention spring.



B: INSTALLATION

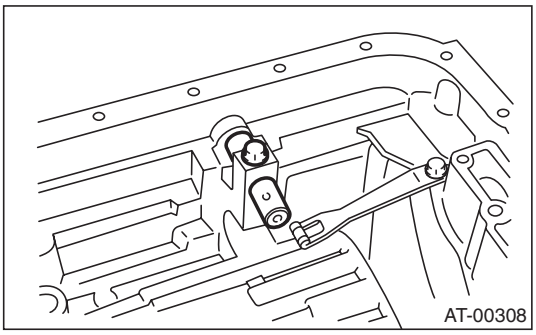
1) Install the detention spring to transmission case.

Tightening torque:
6 N·m (0.6 kgf-m, 4 ft-lb)

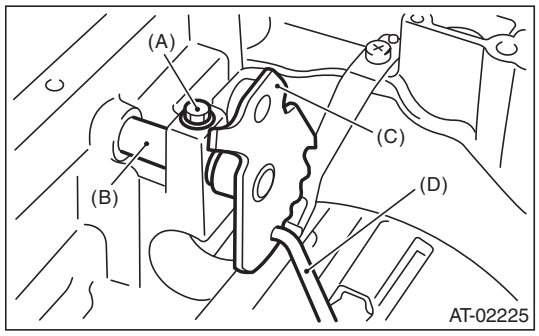


2) Insert the select lever, and then tighten the bolt.

Tightening torque:
6 N·m (0.6 kgf-m, 4 ft-lb)

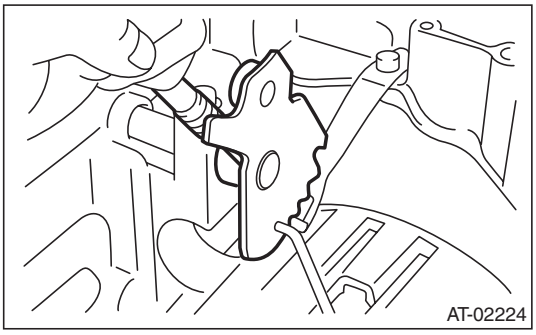


3) Insert the manual plate and parking rod.



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

4) Insert the straight pin to manual plate.

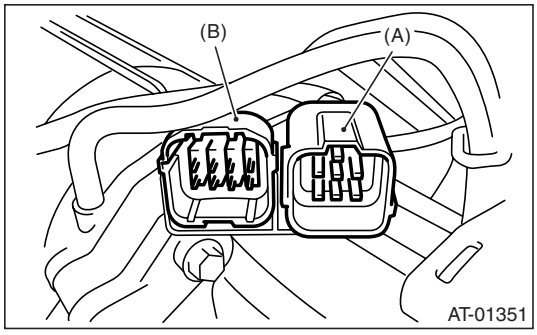


5) Install the oil pan and control valve assembly. <Ref. to 4AT-63, INSTALLATION, Control Valve Body.>
6) Turn over the transmission case to its original position.
7) Install the pitching stopper bracket.

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

8) Install and adjust the inhibitor switch. <Ref. to 4AT-51, Inhibitor Switch.>

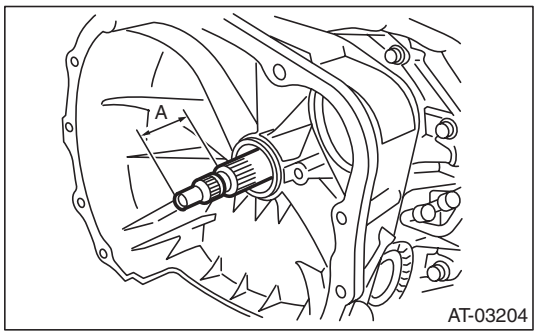
9) Insert the inhibitor switch and transmission connector to stay.



(A) Transmission connector
(B) Inhibitor switch connector

10) Install the air breather hose. <Ref. to 4AT-79, INSTALLATION, Air Breather Hose.>
11) Insert the input shaft while rotating it lightly by hand, and then check the protrusion amount.

Normal protrusion A:
50 — 55 mm (1.97 — 2.17 in)



12) Install the torque converter clutch assembly. <Ref. to 4AT-81, INSTALLATION, Torque Converter Clutch Assembly.>
13) Install the transmission assembly into vehicle. <Ref. to 4AT-42, INSTALLATION, Automatic Transmission Assembly.>

C: INSPECTION

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

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

4AT(diag)

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4. Electrical Component Location 7
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6. Subaru Select Monitor 16
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8. Inspection Mode 20
9. Clear Memory Mode 21
10. SPORT Indicator Light Display 22
11. Diagnostic Procedure for Subaru Select Monitor Communication 26
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13. Diagnostic Procedure with Diagnostic Trouble Code (DTC) 33
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1. Basic Diagnostic Procedure

A: PROCEDURE

	Step	Check	Yes	No
1	**CHECK PRE-INSPECTION.** 1) Ask the customer when and how the trouble occurred using the interview checklist. <Ref. to 4AT(diag)-4, Check List for Interview.> 2) Before performing diagnosis, inspect the following items which might influence the AT problems. • General inspection <Ref. to 4AT(diag)-5, INSPECTION, General Description.> • Disconnection of harness connector • Visual check for harness damage • Oil leakage • Stall speed test <Ref. to 4AT-35, Stall Test.> • Line pressure test <Ref. to 4AT-37, Line Pressure Test.> • Transfer clutch pressure test <Ref. to 4AT-38, Transfer Clutch Pressure Test.> • Time lag test <Ref. to 4AT-36, Time Lag Test.> • Road test <Ref. to 4AT-34, Road Test.> • Inhibitor switch <Ref. to 4AT-51, Inhibitor Switch.>	Is the unit that might influence the AT problem normal?	Go to step **2.**	Repair or replace each item.
2	**CHECK SPORT INDICATOR LIGHT.** After starting the engine, wait for at least 2 seconds.	Does the SPORT indicator light blink?	Go to step **4.**	Go to step **3.**
3	**CHECK SPORT INDICATOR LIGHT.** 1) Turn the ignition switch to OFF. 2) Check the SPORT indicator light. <Ref. to 4AT(diag)-23, INSPECTION, SPORT Indicator Light Display.> 3) After the ignition switch is turned to “ON”, wait for at least 2 seconds. 4) Start the engine.	Does the SPORT indicator light blink?	Go to step **4.**	Go to step **5.**
4	**CHECK INDICATION OF DTC.** Display DTC. NOTE: If the communication function of Subaru Select Monitor cannot be executed normally, check communication circuit. <Ref. to 4AT(diag)-26, COMMUNICATION FOR INITIALIZING IMPOSSIBLE, Diagnostic Procedure for Subaru Select Monitor Communication.>	Is DTC displayed on the Subaru Select Monitor?	Go to step **6.** NOTE: Record all DTC.	Go to step **5.**
5	**PERFORM GENERAL DIAGNOSTICS.** 1) Inspect using “Diagnostic Procedure without Diagnostic Trouble Code (DTC)”. <Ref. to 4AT(diag)-119, Diagnostic Procedure without Diagnostic Trouble Code (DTC).> 2) Inspect using “Diagnostics with Phenomenon”. <Ref. to 4AT(diag)-134, Diagnostics with Phenomenon.> 3) Perform the inspection mode. <Ref. to 4AT(diag)-20, Inspection Mode.> 4) Display DTC.	Is DTC displayed on the Subaru Select Monitor?	Go to step **6.**	Finish the diagnosis.

	Step	Check	Yes	No
6	**PERFORM DIAGNOSIS.** 1) Inspect using the “Diagnostic Procedure with Diagnostic Trouble Code (DTC)”. <Ref. to 4AT(diag)-33, Diagnostic Procedure with Diagnostic Trouble Code (DTC).> NOTE: For DTC table, refer to “List of Diagnostic Trouble Code (DTC)”. <Ref. to 4AT(diag)-31, 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(diag)-20, Inspection Mode.> 5) Display DTC.	Is DTC displayed on the Subaru Select Monitor?	Inspect using the “Diagnostic Procedure with Diagnostic Trouble Code (DTC)”. <Ref. to 4AT(diag)-33, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>	Finish 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 sale			
Date of repair			
Trans. model	Transmission	V.I.N.	
Odometer reading	km (miles)		
Frequency	❑ Continuous ❑ Intermittent (times a day)		
Weather	❑ Fine ❑ Cloudy ❑ Rainy ❑ Snowy ❑ Others ( )		
Place	❑ Highland ❑ Suburbs ❑ Inner city ❑ Uphill ❑ Rough road ❑ Others ( )		
Ambient air temperature	❑ Hot ❑ Warm ❑ Cool ❑ Cold		
Vehicle speed	km/h (MPH)		
AT warning light (SPORT indicator light)	❑ Blinks continuously	❑ Not blink	
Select lever position	❑ P ❑ R ❑ N ❑ D ❑ SPORT mode		
Driving condition	❑ Not affected ❑ At racing ❑ When decelerating	❑ At starting ❑ When accelerating ❑ While turning (❑ RH/❑ LH)	❑ While idling ❑ While cruising
SPORT mode	❑ ON ❑ OFF		
Symptom	❑ 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 the airbag system wiring harnesses and connectors are colored yellow. Do not use an electric test equipment on these circuits.

• Be careful not to damage the airbag system wiring harness when performing diagnostics or servicing the TCM.

• Measurement

When measuring the voltage and resistance of the ECM, TCM or each sensor, use a tapered pin with a diameter of less than 0.64 mm (0.025 in) in order to avoid poor contact. Do not insert a pin of more than 0.65 mm (0.026 in) diameter.

B: INSPECTION

1. BATTERY

Measure the battery voltage and specific gravity of electrolyte.

Standard voltage: 12 V or more

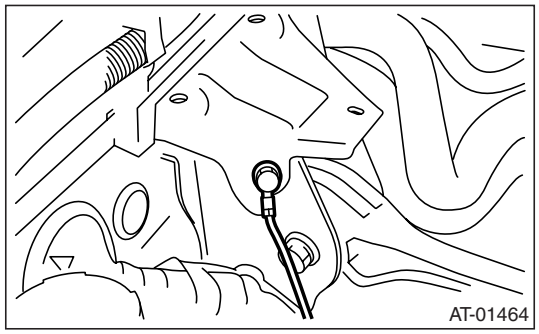
Specific gravity: 1.260 or more

2. TRANSMISSION GROUND

Make sure that the ground terminal bolt is tightened securely.

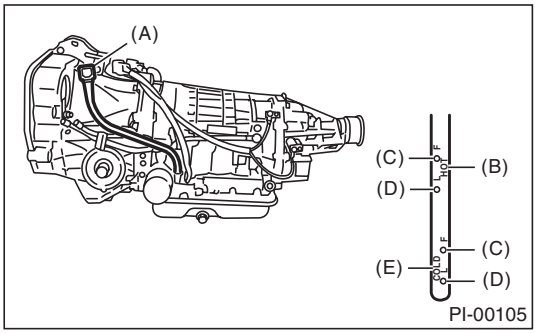
• Chassis side

Tightening torque:
13 N·m (1.3 kgf-m, 9.6 ft-lb)



3. ATF LEVEL

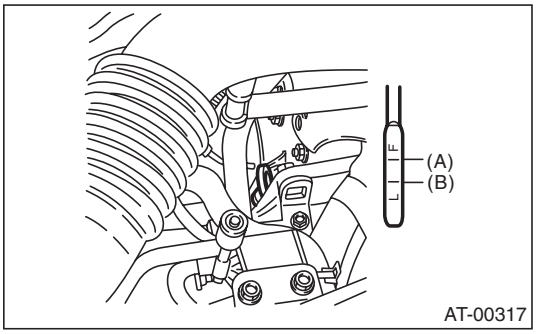
Make sure that ATF level is the specified amount. <Ref. to 4AT-31, INSPECTION, Automatic Transmission Fluid.>



(A) Level gauge
(B) Check position when "HOT"
(C) Upper level
(D) Lower level
(E) Check position when "COLD"

4. FRONT DIFFERENTIAL OIL LEVEL

Make sure the front differential oil level is the specified amount. <Ref. to 4AT-33, INSPECTION, Differential Gear Oil.>

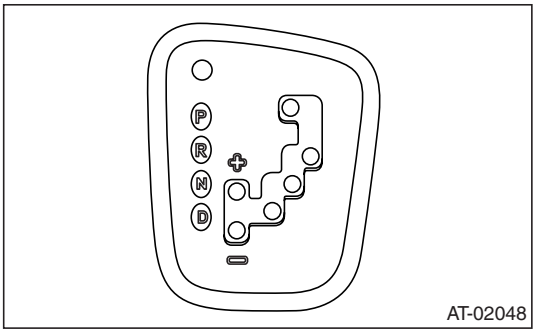


(A) Upper level
(B) Lower level

5. OPERATION OF SHIFT SELECT LEVER

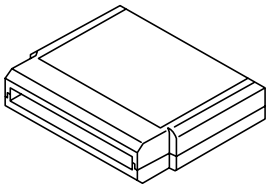
Make sure there is no noise, dragging or contact pattern in each select lever range.

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



C: PREPARATION TOOL

1. SPECIAL TOOL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST18482AA000	18482AA000 (Newly adopted tool)	CARTRIDGE	Troubleshooting for electrical system.
ST22771AA030	22771AA030	SUBARU SELECT MONITOR KIT	Troubleshooting for electrical system. • English: 22771AA030 (Without printer) • German: 22771AA070 (Without printer) • French: 22771AA080 (Without printer) • Spanish: 22771AA090 (Without printer)

2. GENERAL TOOL

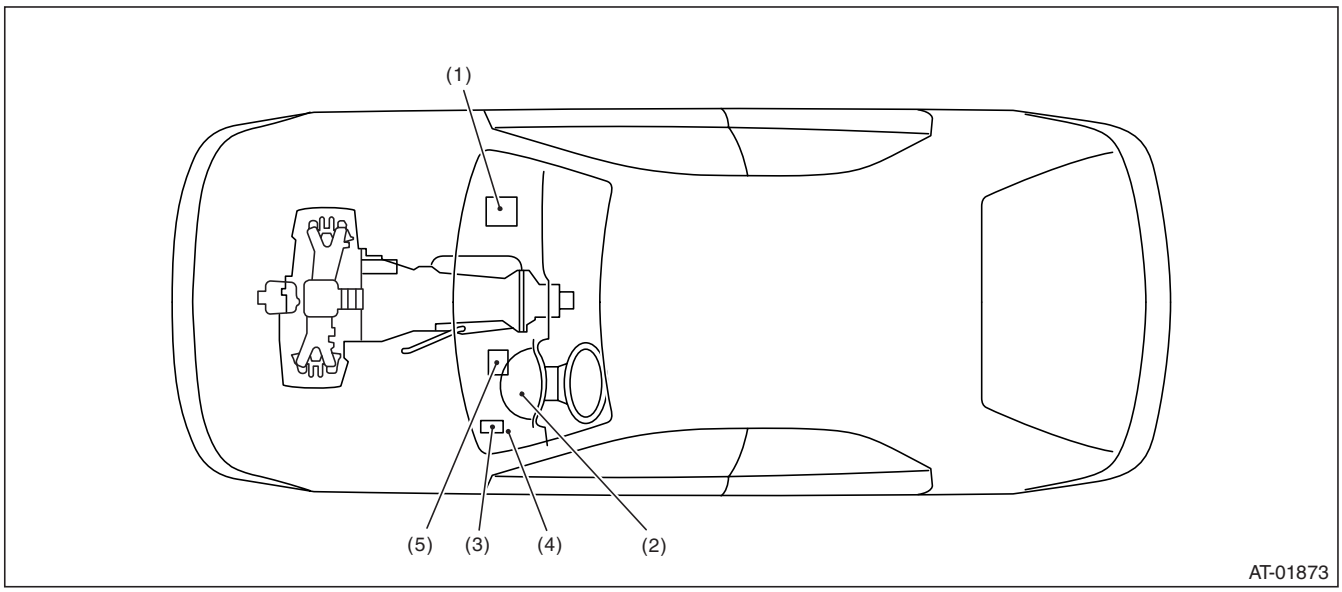
TOOL NAME	REMARKS
Circuit tester	Used for measuring resistance, voltage and current.
Oscilloscope	Used for measuring sensor.

4. Electrical Component Location

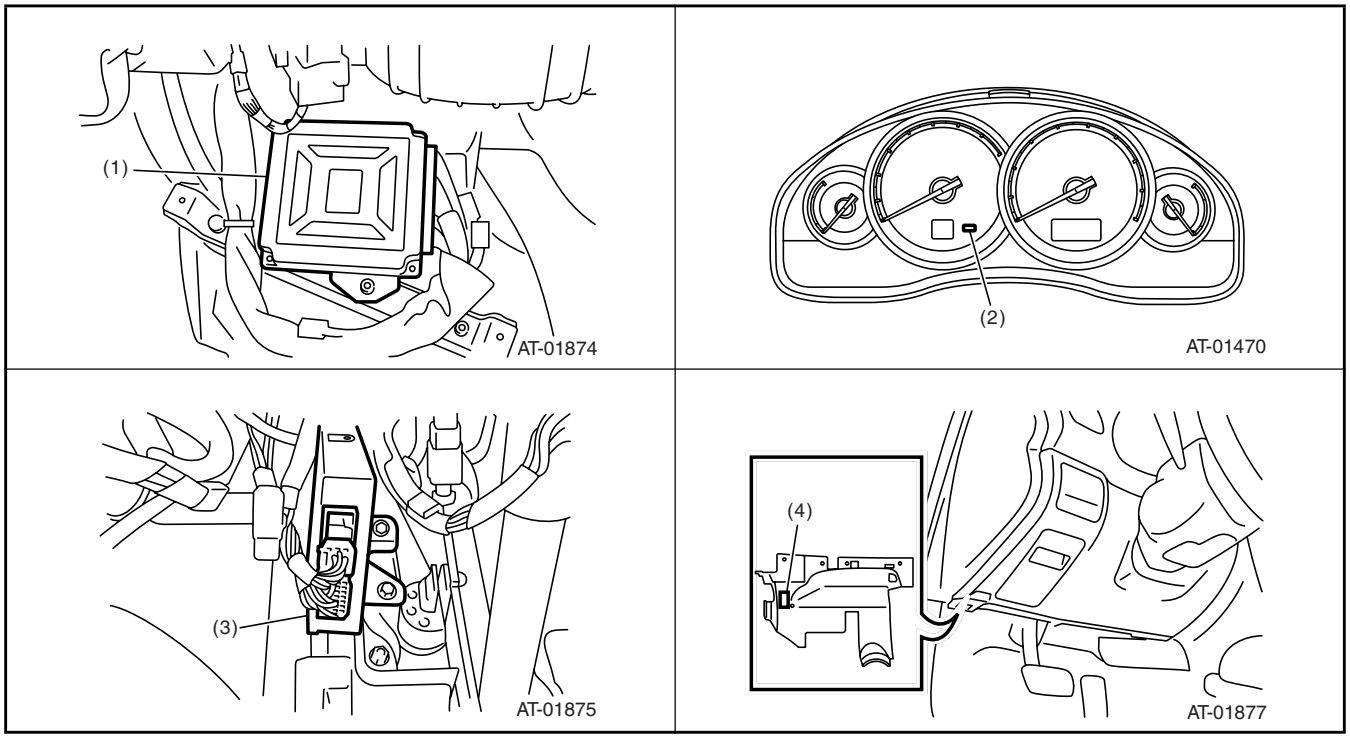
A: LOCATION

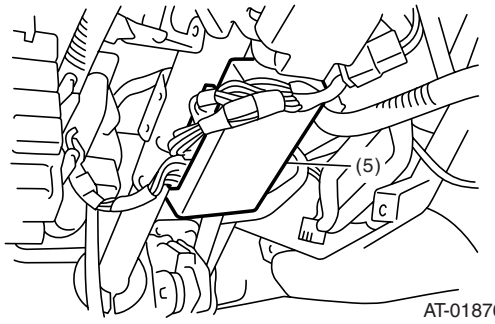
1. CONTROL MODULE

- LHD model



(1) Engine control module (ECM)
(2) SPORT indicator light (AT warning light)
(3) Transmission control module (TCM)
(4) Data link connector
(5) Body integrated module

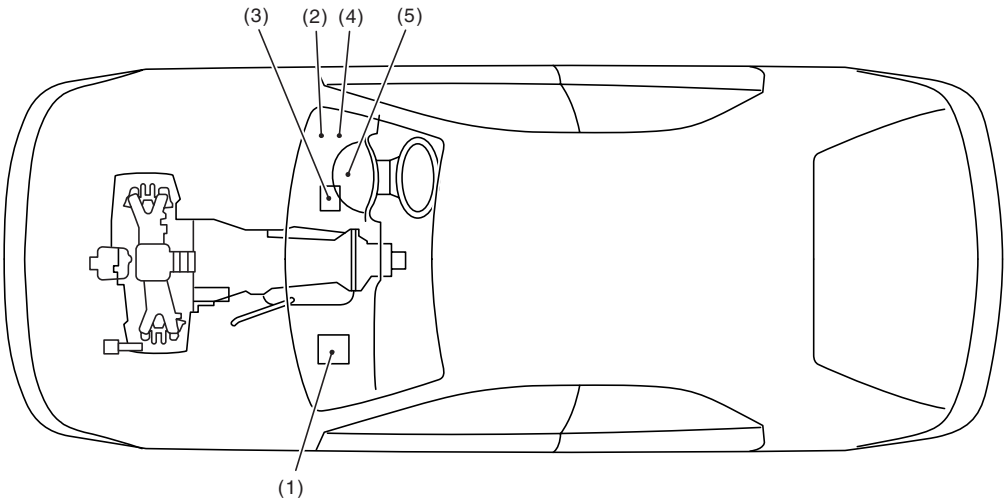




AT-01876

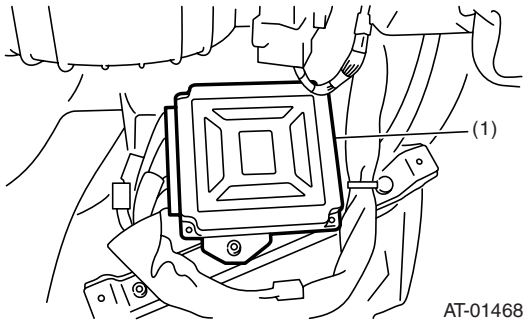
SUBARU.

• RHD model

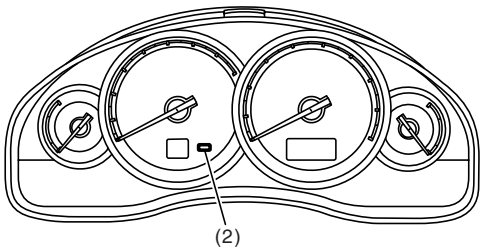


AT-01467

(1) Engine control module (ECM)
(2) SPORT indicator light (AT warning light)
(3) Transmission control module (TCM)
(4) Data link connector
(5) Body integrated module



AT-01468



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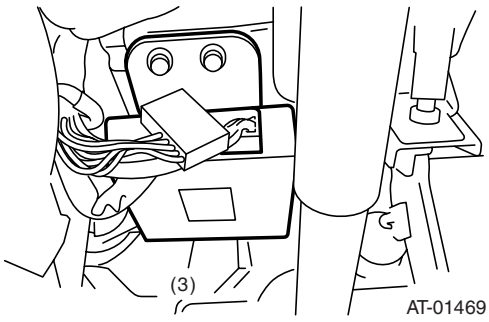

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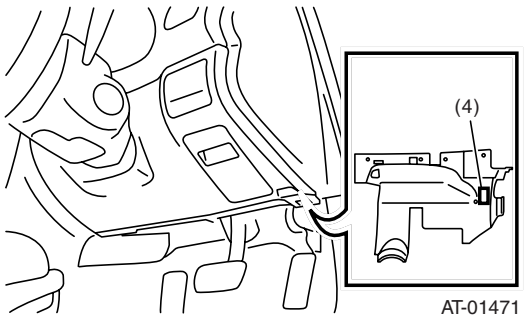
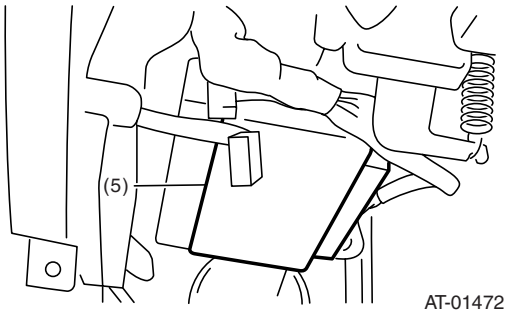


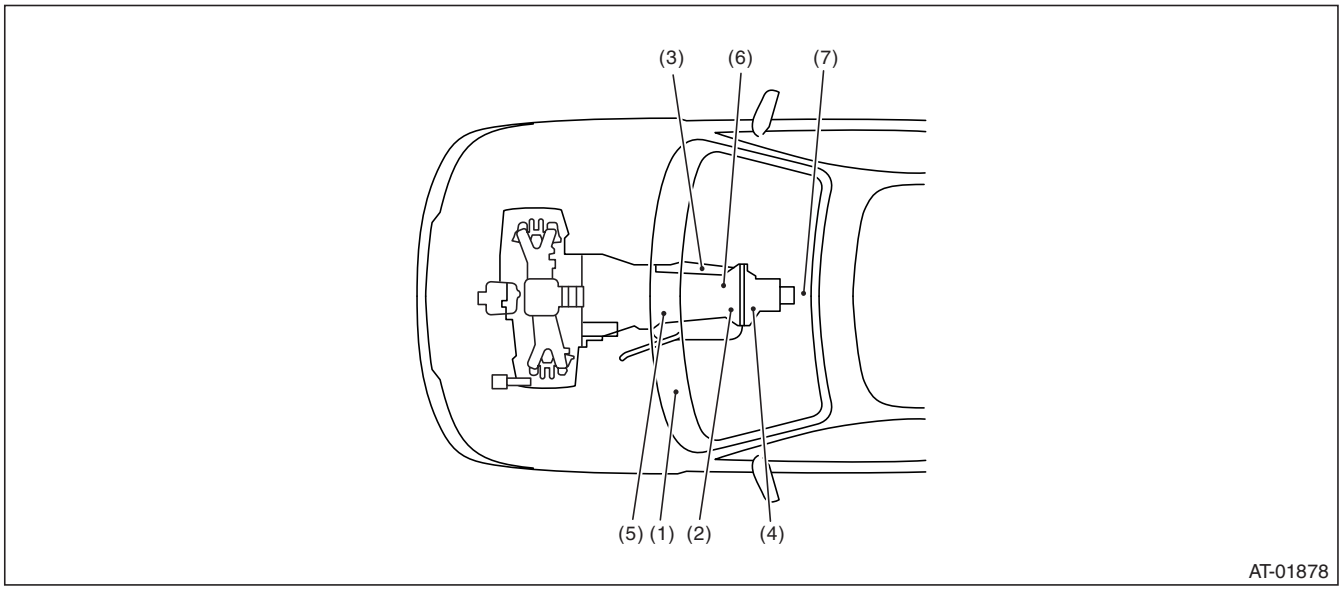
AT-01471



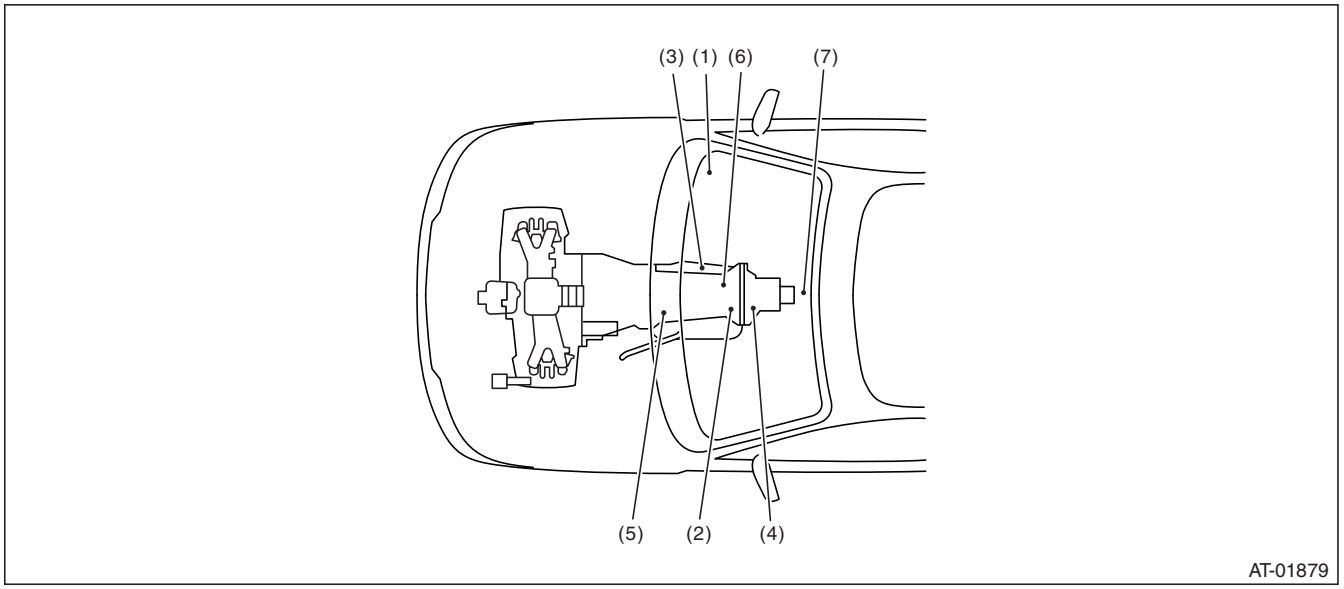
AT-01472

2. SENSOR

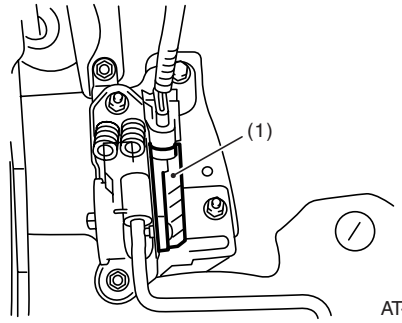
- LHD model



- RHD model

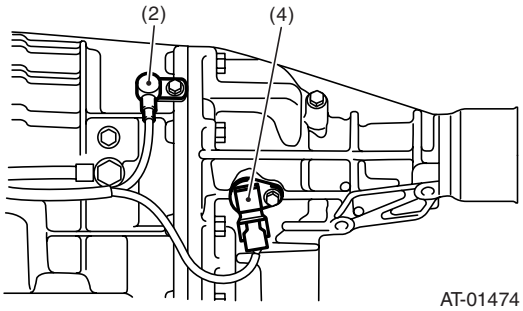


(1) Accelerator pedal position sensor
(2) Front vehicle speed sensor
(3) Inhibitor switch
(4) Rear vehicle speed sensor
(5) Torque converter turbine speed sensor
(6) ATF temperature sensor
(7) Lateral G sensor



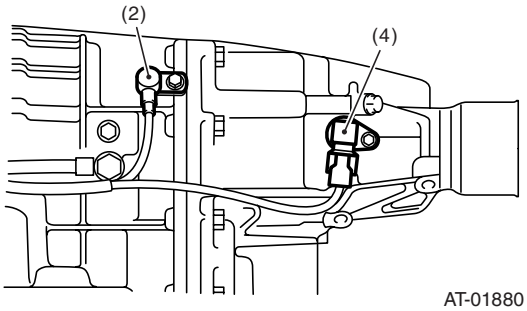
AT-00375

Model without vehicle dynamics control (VDC)

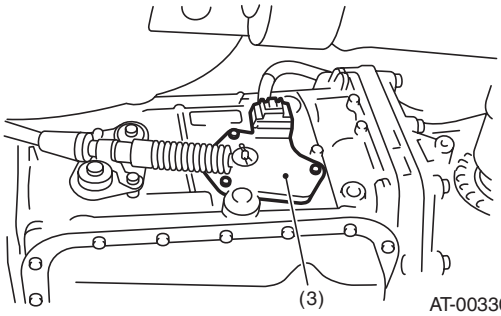


AT-01474

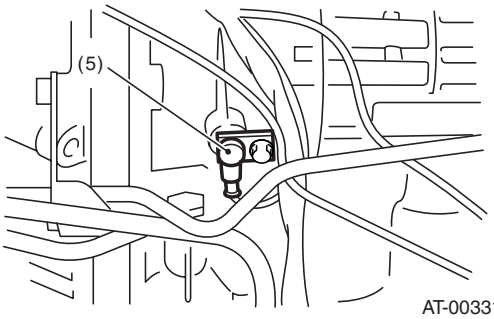
Model with vehicle dynamics control (VDC)



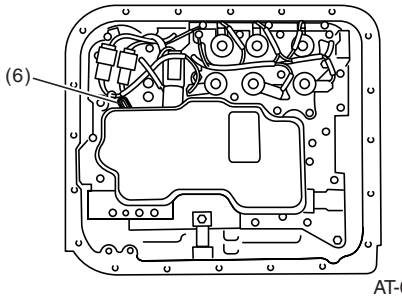
AT-01880



AT-00330

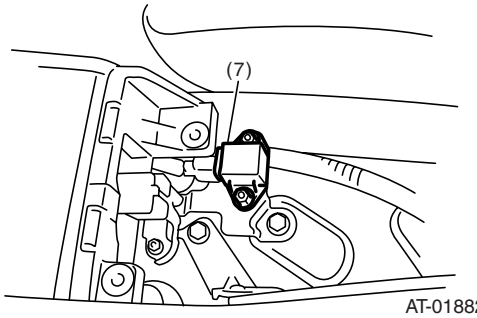


AT-00331



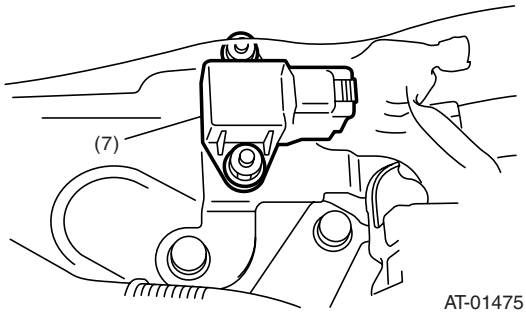
AT-00378

LHD model



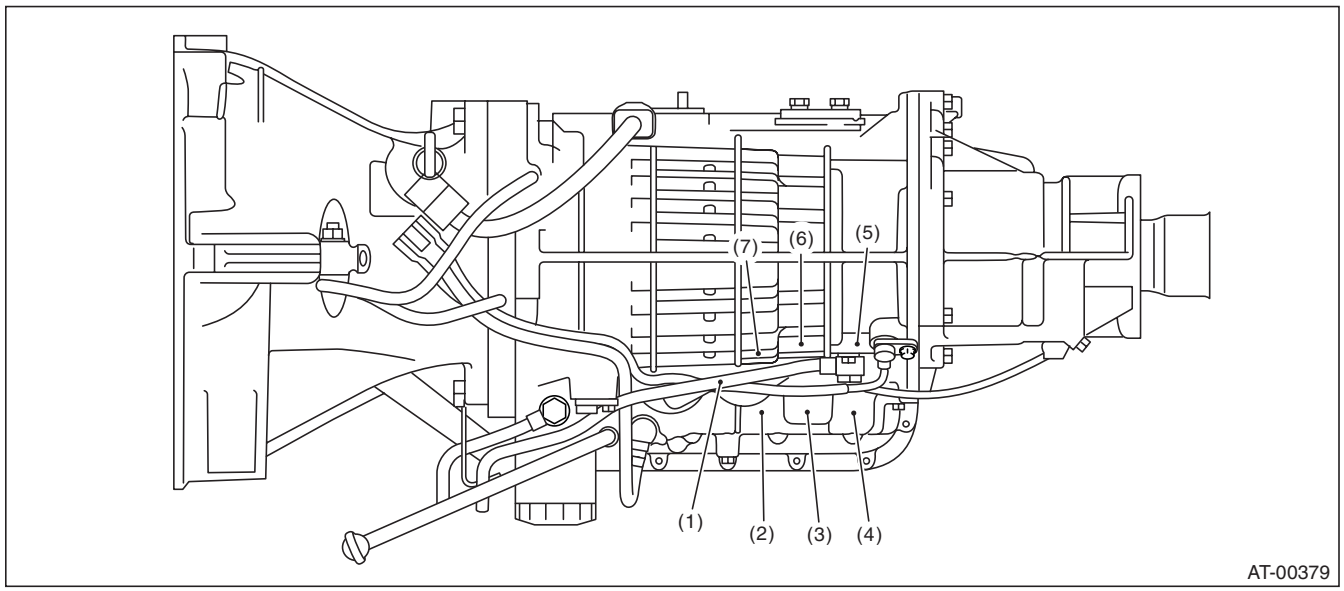
AT-01882

RHD model

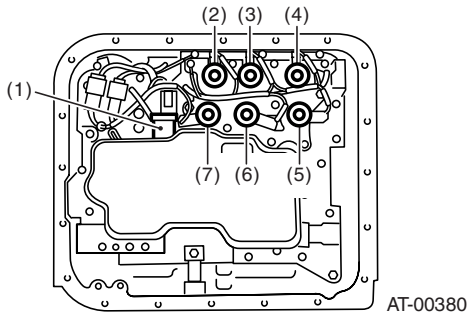


AT-01475

3. SOLENOID

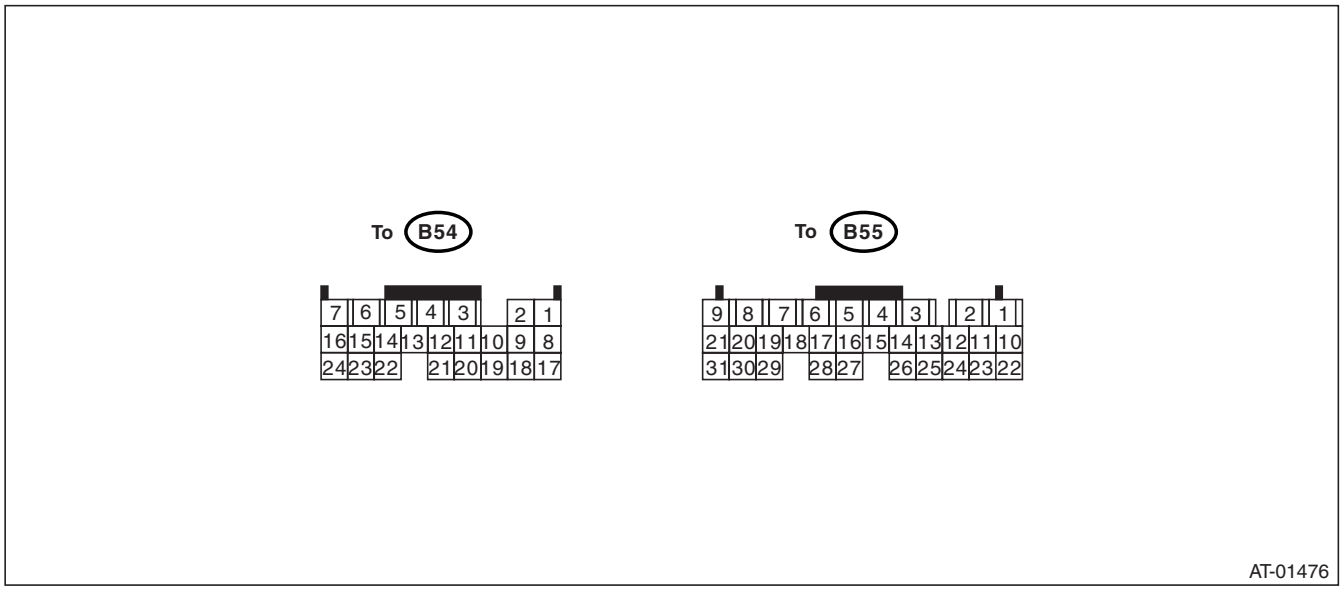


(1) Line pressure linear solenoid
(2) High clutch duty solenoid
(3) 2-4 brake duty solenoid
(4) Low & reverse duty solenoid
(5) Low clutch duty solenoid
(6) Transfer duty solenoid
(7) Lock-up duty solenoid



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

A: ELECTRICAL SPECIFICATION



Check with ignition switch ON.						
Item		Connector No.	Terminal No.	Measuring conditions	Voltage (V)	Resistance to chassis ground (Ω)
Back-up power supply		B55	27	Ignition switch OFF	10 — 13	—
			28			
			29			
ACC power supply		B55	16	Ignition switch ACC	10 — 13	—
Ignition power supply		B55	21	Ignition switch ON (with engine OFF)	10 — 13	—
			31			
Inhibitor switch	"P" range switch	B54	5	Selector lever in "P" range	Less than 1	—
				Select lever in any other than "P" range (except "N" range)	8 or more	
	"N" range switch	B54	22	Selector lever in "N" range	Less than 1	—
				Selector lever in any other than "N" range	8 or more	
	"R" range switch	B54	14	Selector lever in "R" range	Less than 1	—
				Selector lever in any other than "R" range	8 or more	
	"D" range switch	B54	4	Selector lever in "D" range	Less than 1	—
				Selector lever in any other than "D" range	8 or more	
Accelerator pedal position sensor		B54	19	Throttle fully closed.	0.2 or more	—
				Throttle fully open.	4.6 or less	
Accelerator pedal position sensor power supply		B54	10	Ignition switch ON (with engine OFF)	Approx. 4.6 — 5.4	—
ATF temperature sensor		B54	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		B54	24	Vehicle speed at least 20 km/h (12 MPH)	2 or more (AC range)	—

Check with ignition switch ON.					
Item	Connector No.	Terminal No.	Measuring conditions	Voltage (V)	Resistance to chassis ground (Ω)
Front vehicle speed sensor	B54	6	Vehicle stopped	0	450 — 750
			Vehicle speed at least 20 km/h (12 MPH)	1 or more (AC range)	
Torque converter turbine speed sensor	B54	7	Engine idling after warm-up (“D” range)	0	450 — 750
			Engine idling after warm-up (“N” range)	1 or more (AC range)	
Engine speed signal	B54	13	Ignition switch ON (with engine OFF)	Less than 1	—
			Ignition switch ON (engine ON)	5 or more (AC range)	
Line pressure linear solenoid	B55	20	Ignition switch ON (with engine OFF) Throttle fully closed in “R” range after warm-up.	3.7 — 7.5	4.0 — 8.0
			Ignition switch ON (with engine OFF) “R” range throttle fully open after warm-up.	1.4 — 4.9	
Lock-up duty solenoid	B55	5	When lock up occurs.	10.5 or more	2.0 — 6.0
			When lock up is released.	Less than 1	
Transfer duty solenoid	B55	4	“P” or “N” range	Less than 1	2.0 — 6.0
			1st gear	1.7 — 4.0	
2-4 brake duty solenoid	B55	6	“P” or “N” range	10.5 or more	2.0 — 6.0
			2nd or 4th gear	Less than 1	
High clutch duty solenoid	B55	8	3rd or 4th gear	Less than 1	2.0 — 6.0
			“P” or “N” range	10.5 or more	
Low clutch duty solenoid	B55	9	1st or 2nd gear	Less than 1	2.0 — 6.0
			“P” or “N” range	10.5 or more	
Low & reverse duty solenoid	B55	7	“P” or “N” range	10.5 or more	2.0 — 6.0
			Driving at 1st on manual mode (15 km/h (9.3 MPH) or more)	5 — 10	
Front vehicle speed sensor ground	B54	15	—	0	Less than 1
Rear vehicle speed sensor ground	B54	23	—	0	Less than 1
Torque converter turbine speed sensor ground	B54	16	—	0	Less than 1
System ground circuit	B54	17	—	0	Less than 1
	B55	2			
	B55	3			
	B54	8			
Sensor ground line 3	B55	19	—	0	Less than 1
Sensor ground line 4	B54	9	—	0	Less than 1
Range lock signal	B55	18	“D” range vehicle speed 0 km/h (0 MPH)	10.5 or more	7 — 18
			“D” range vehicle speed 20 km/h (12 MPH)	Less than 1	
Data link signal (Subaru Select Monitor)	B55	12	—	—	—

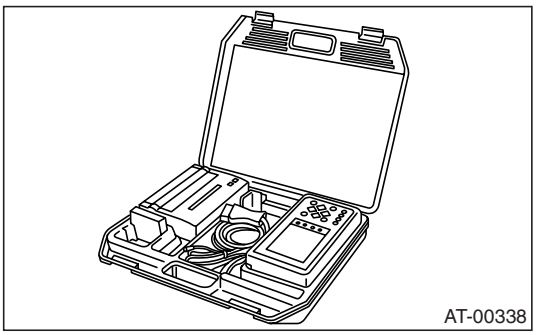
Check with ignition switch ON.					
Item	Connector No.	Terminal No.	Measuring conditions	Voltage (V)	Resistance to chassis ground (Ω)
CAN communication signal (+)	B54	3	Ignition switch ON	Pulse signal	—
CAN communication signal (–)	B54	12	Ignition switch ON	Pulse signal	—
FWD switch	B55	17	Fuse removed	10.5 or more	—
			Fuse installed	1 or less	
Lateral G sensor	B54	11	Ignition switch ON (Lateral G sensor in horizontal position)	2.0 — 3.0	—
Lateral G sensor power supply	B54	2	Ignition switch ON	4.75 — 5.25	—

6. Subaru Select Monitor

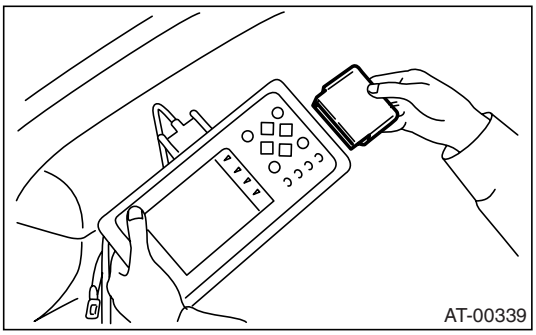
A: OPERATION

1. READ DIAGNOSTIC TROUBLE CODE (DTC)

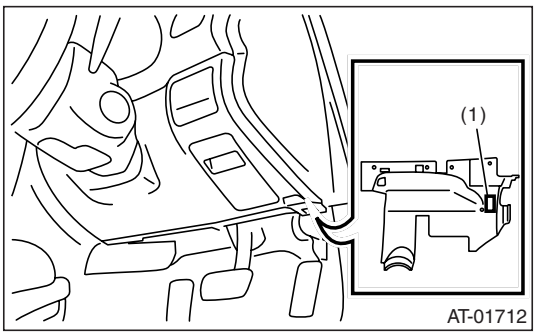
1) Prepare the Subaru Select Monitor kit.



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



4) Connect the Subaru Select Monitor to data link connector.
(1) Data link connector is located in the lower portion of instrument panel (on the driver's side).

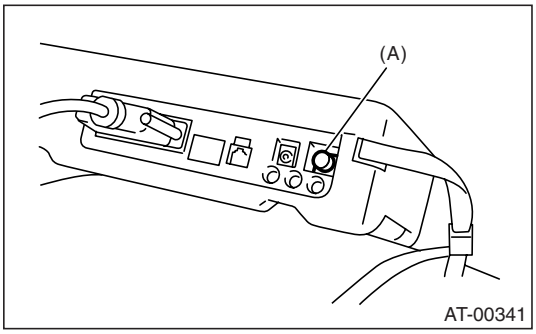


(1) Data link connector

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

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

5) Turn the ignition switch to ON (engine OFF), and turn the Subaru Select Monitor power 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} 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 {Diagnosis Code(s) Display} and press [YES] key.

NOTE:
• For details concerning operation procedure, refer to the SUBARU SELECT MONITOR OPERATION MANUAL.
• For details concerning DTC, refer to "List of Diagnostic Trouble Code (DTC)". <Ref. to 4AT(diag)-31, 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} 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, scroll the display screen up or down until the desired data is shown.

- A list of the support data is shown in the following table.

Item	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
Accelerator pedal position sensor	Throttle Sensor Voltage	V
Gear position	Gear position	—
Line pressure control duty ratio	Line pressure duty	%
Lock up clutch control duty ratio	L/U Duty	%
Transfer clutch control duty ratio	AWD duty	%
Accelerator pedal position sensor power supply	Throttle sensor power supply	V
Torque converter turbine speed signal	Turbine Revolution Speed	rpm
2-4 Brake timing pressure control duty ratio	2-4 B Pressure Duty	%
Low clutch duty ratio	L/C Duty	%
High clutch duty ratio	H/C Duty	%
Low & reverse brake duty ratio	L&R/B Duty	%
Accelerator position	Accel. Opening Angle	%
FWD switch signal	FWD SW	ON or OFF
Stop light switch signal	Stop Light Switch	ON or OFF
Anti lock brake system signal	ABS signal	ON or OFF
Parking range signal	P range	ON or OFF
Neutral range signal	N range	ON or OFF
Reverse range signal	R Range	ON or OFF
Drive range signal	D Range	ON or OFF
Automatic transmission diagnosis light output signal	Diagnosis Lamp	ON or OFF
Cruise control signal	Cruise Control Signal	ON or OFF
AT OIL TEMP warning light	ATF Temperature Lamp	ON or OFF
Up-shift signal	Up Switch	ON or OFF
Down shift signal	Down Switch	ON or OFF
Tip signal	Tiptronic Mode Switch	ON or OFF
Shift lock solenoid signal	Shift lock solenoid	ON or OFF
Lateral G sensor	Lateral G sensor	V

NOTE:
For details concerning operation procedure, refer to the SUBARU SELECT MONITOR OPERATION MANUAL.

3. CLEAR MEMORY MODE

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} 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.

NOTE:
When {Clear Memory 2} is selected and executed, DTC and learned control memory is cleared. If Clear Memory 2 is performed, execute the advance operation of learning control. <Ref. to 4AT(diag)-18, 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(diag)-18, CLEAR MEMORY MODE, OPERATION, Subaru Select Monitor.>
5) Using Subaru Select Monitor, check that the DTC is not output. <Ref. to 4AT(diag)-16, READ DIAGNOSTIC TROUBLE CODE (DTC), 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(diag)-16, 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) With turning ignition key to OFF, wait for 30 seconds until ACC goes 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) Check that the Subaru Select Monitor is returned to normal operation.
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 SPORT indicator light in the combination meter start blinking at 2 Hz. When the SPORT indicator light does not blink, turn the ignition switch to OFF and repeat the procedures from step 4). When the SPORT indicator light stop blinking at 2 Hz and goes OFF, facilitation of learning control is completed.

NOTE:
When blinking of SPORT indicator 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 “P” range to complete the facilitation of learning control.

7. Read Diagnostic Trouble Code (DTC)

A: OPERATION

Refer to “Subaru Select Monitor” for information about how to display DTC. <Ref. to 4AT(diag)-16, OPERATION, Subaru Select Monitor.>
For details concerning DTCs, refer to “List of Diagnostic Trouble Code (DTC)”. <Ref. to 4AT(diag)-31, List of Diagnostic Trouble Code (DTC).>

NOTE:
DTC can not be read by SPORT indicator light.

8. Inspection Mode

A: PROCEDURE

WARNING:
Observe the traffic law during actual driving.

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

9. Clear Memory Mode

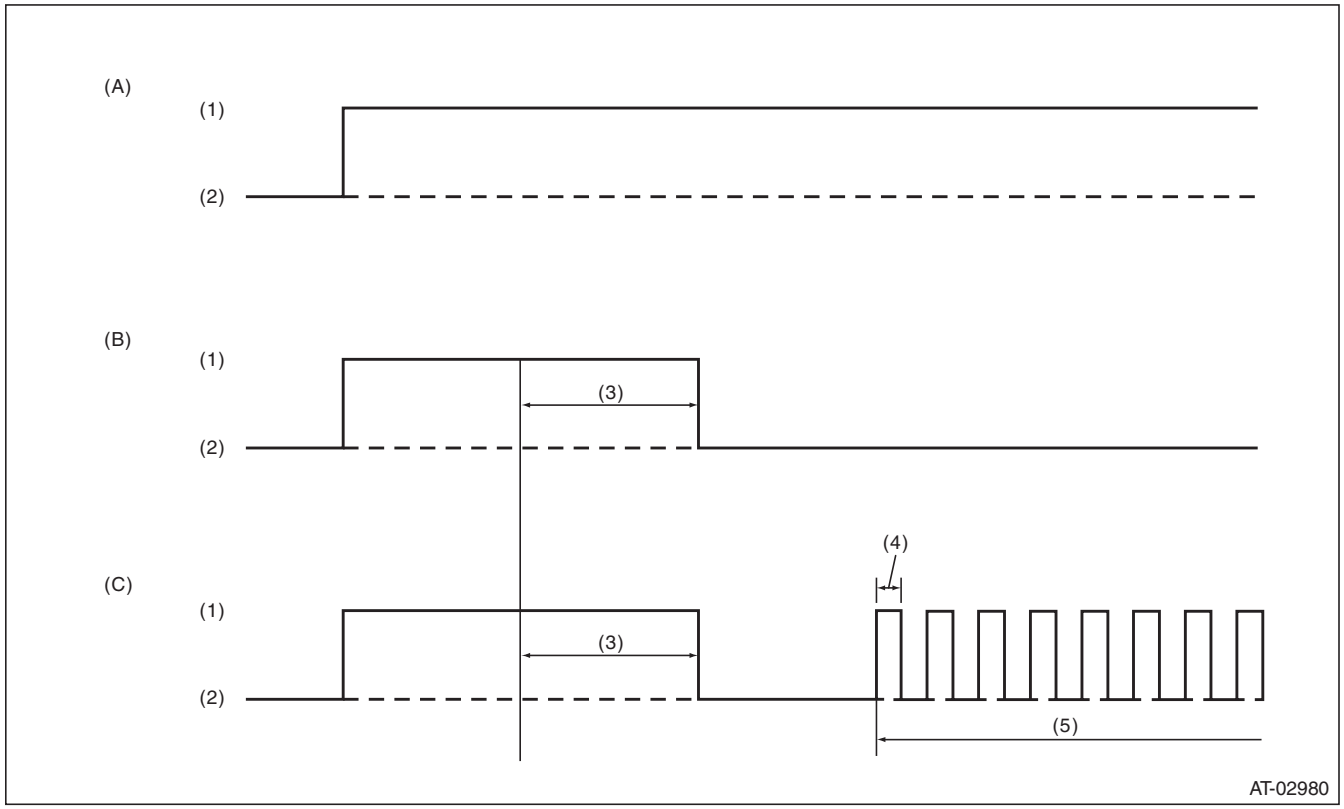
A: OPERATION

Refer to “Subaru Select Monitor” for information about how to clear DTC.
<Ref. to 4AT(diag)-18, CLEAR MEMORY MODE, OPERATION, Subaru Select Monitor.>

10.SPORT Indicator Light Display

A: OPERATION

When any on-board diagnostics item is malfunctioning, the display on the SPORT indicator light blinks from the time the malfunction is detected after starting the engine until the ignition switch is turned OFF. The malfunctioning part or unit can be determined by a DTC during the on-board diagnostics operation. Problems which occurred previously can also be identified through the memory function. If the SPORT indicator 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 Subaru Select Monitor. Indicator light signal patterns are as shown in the figure.



(A)	Ignition switch (Engine OFF)	(B)	Normal (Engine ON)	(C)	Faulty (Engine ON)
(1)	ON	(3)	2 sec.	(5)	Blink
(2)	OFF	(4)	0.25 sec.		

Perform the inspection when the SPORT indicator light does not operate correctly. <Ref. to 4AT(diag)-23, INSPECTION, SPORT Indicator Light Display.>

B: INSPECTION

DIAGNOSIS:

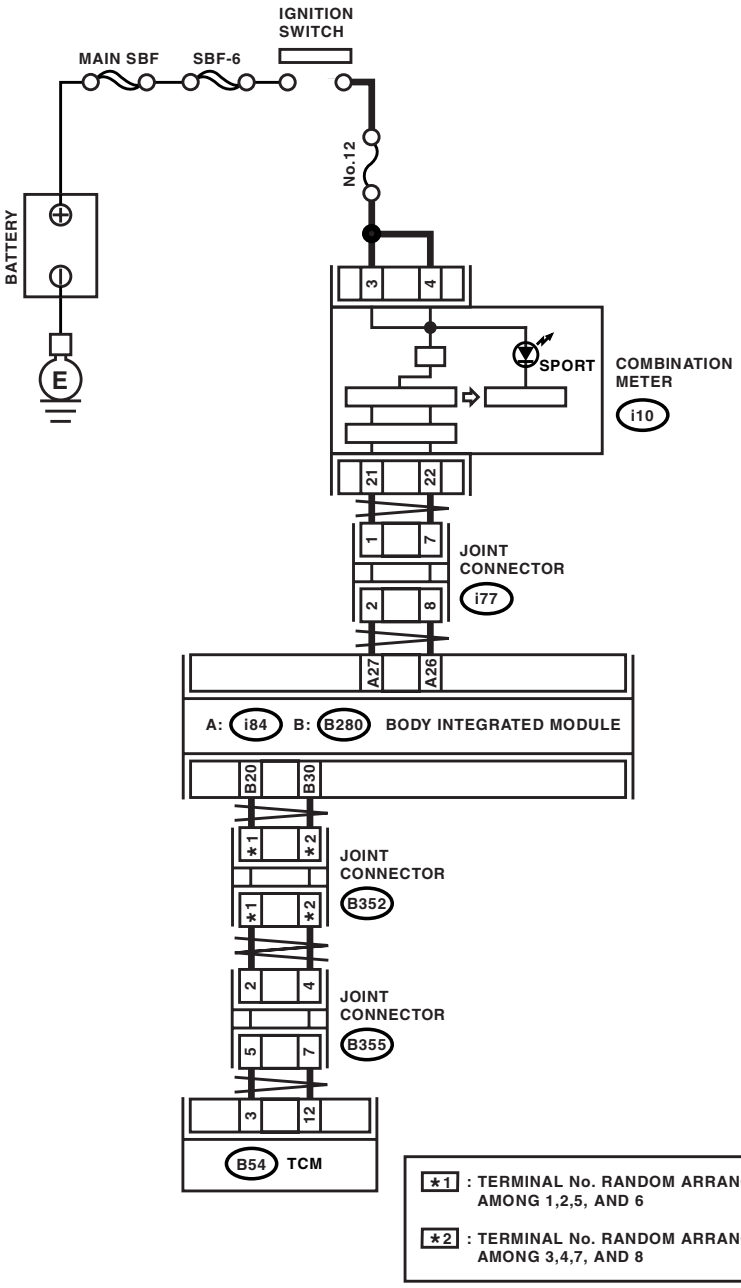
SPORT indicator light circuit is open or shorted.

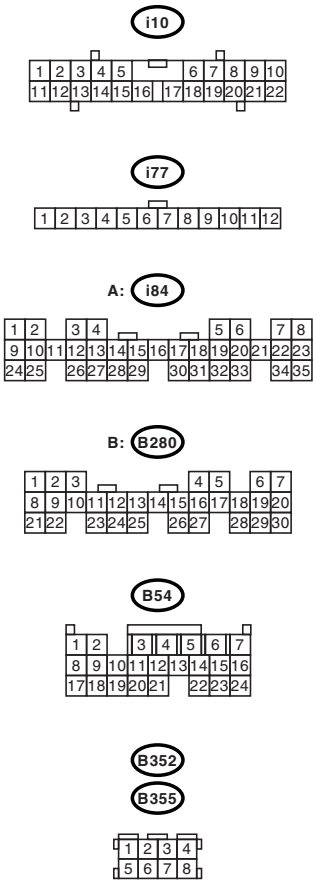
TROUBLE SYMPTOM:

When the ignition switch is turned to ON (engine OFF), SPORT indicator light does not illuminate.

WIRING DIAGRAM:

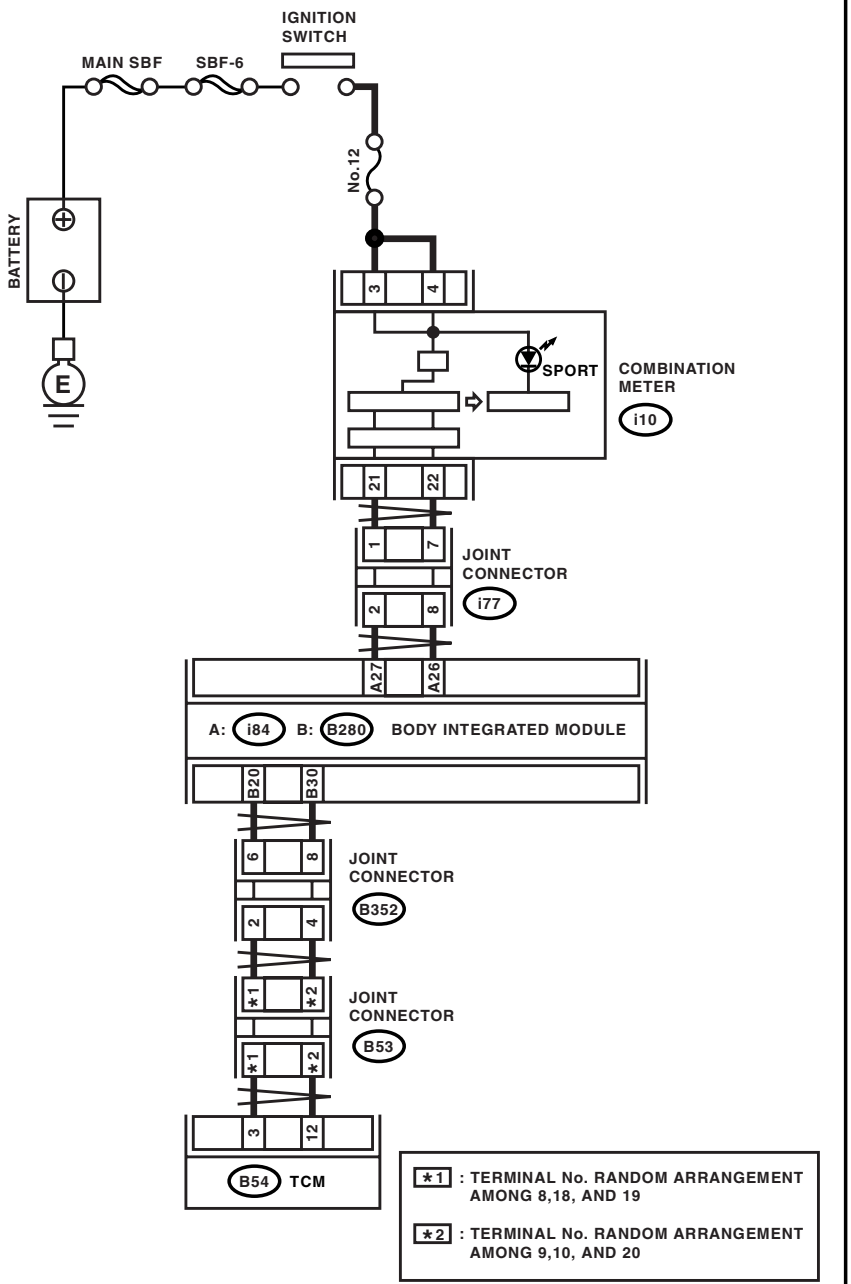
- LHD model

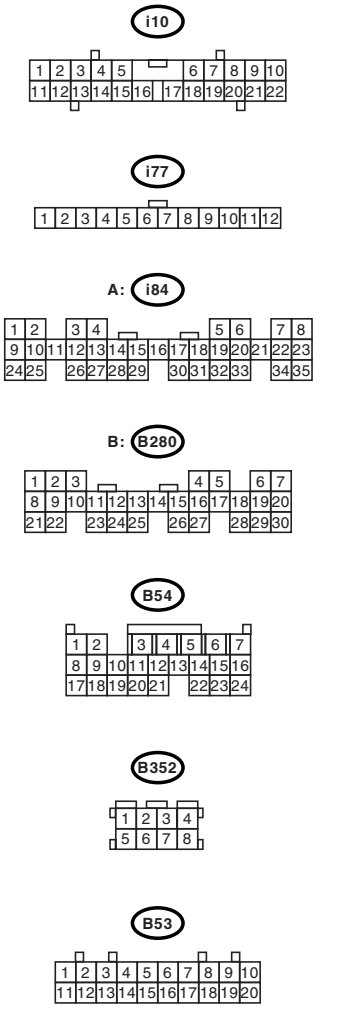




AT-03151

- RHD model





AT-03152

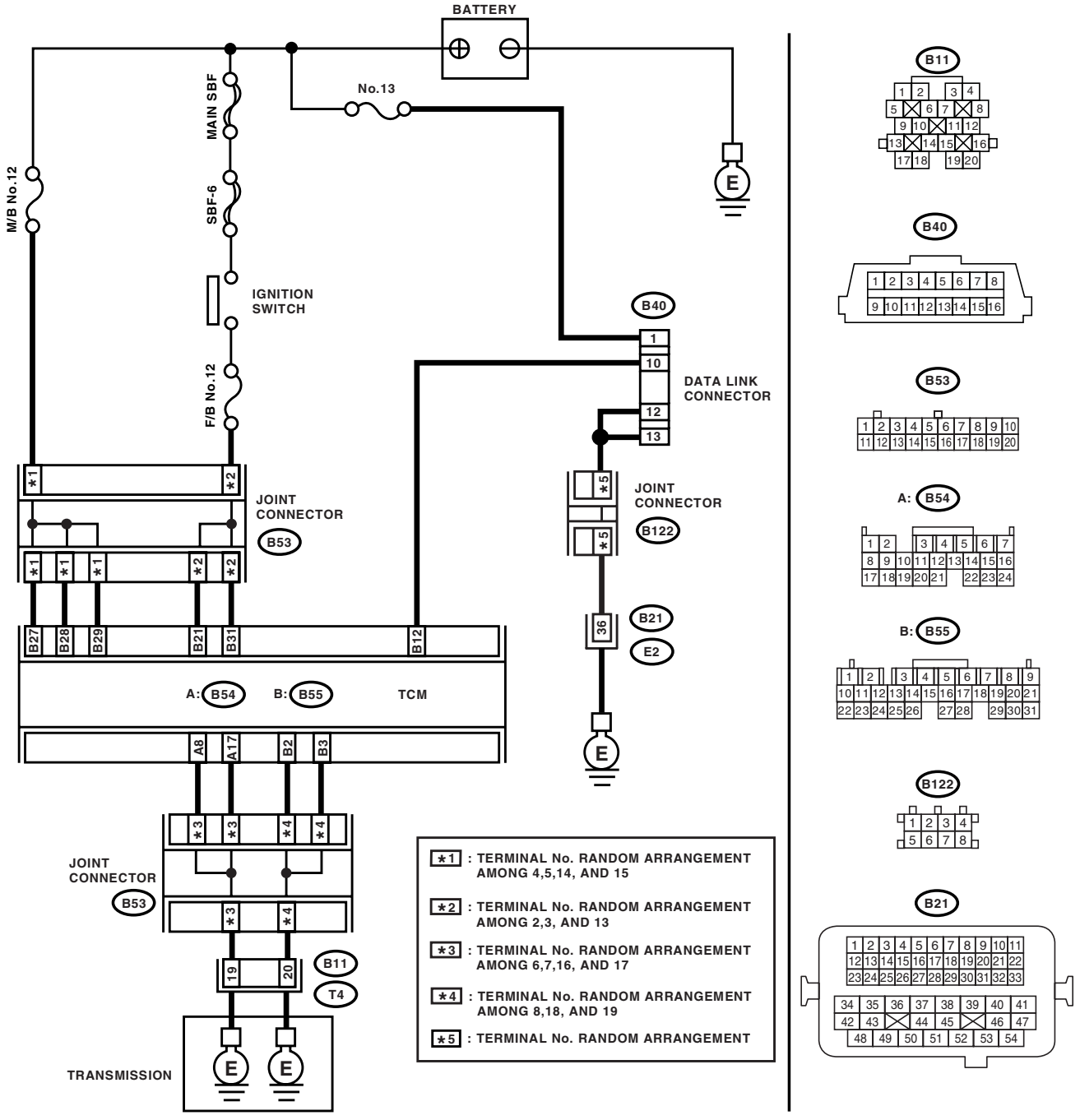
	Step	Check	Yes	No
1	**CHECK SPORT INDICATOR LIGHT.** Turn the ignition switch to ON.	Does the SPORT indicator light illuminate?	Go to step **2.**	Perform the self-diagnosis of combination meter.
2	**CHECK SPORT INDICATOR LIGHT.** After the ignition switch is ON, wait for at least 2 seconds.	Does the SPORT indicator light illuminate?	Go to step **3.**	Go to step **4.**
3	**CHECK SPORT INDICATOR LIGHT.** Start the engine.	Does the SPORT indicator light go off?	Normal. Go back to “Basic Diagnostic Procedure”. <Ref. to 4AT(diag)-2, Basic Diagnostic Procedure.>	Go to step **7.**
4	**CHECK SUBARU SELECT MONITOR COMMUNICATION.** Connect the Subaru Select Monitor to data link connector.	Is the communication between Subaru Select Monitor and TCM normal?	Go to step **5.**	Check the power supply ground circuit of TCM and Subaru Select Monitor communication. <Ref. to 4AT(diag)-26, Diagnostic Procedure for Subaru Select Monitor Communication.>
5	**CHECK TCM.** Display the current data of TCM using Subaru Select Monitor.	Is the “Diagnosis Lamp” output signal “ON”?	Go to step **6.**	Replace the TCM. <Ref. to 4AT-66, Transmission Control Module (TCM).>
6	**CHECK BODY INTEGRATED MODULE.** Display the current data of body integrated module using Subaru Select Monitor. <Ref. to LAN(diag)-14, OPERATION, Subaru Select Monitor.>	Is the “SPORT Lamp” input signal “Illuminate”?	Replace the combination meter assembly. <Ref. to IDI-15, Combination Meter.>	Check DTC of body integrated module. <Ref. to LAN(diag)-14, OPERATION, Subaru Select Monitor.>
7	**CHECK TCM.** Display the current data of TCM using Subaru Select Monitor. <Ref. to 4AT(diag)-16, OPERATION, Subaru Select Monitor.>	Is the “Diagnosis Lamp” output signal “ON”?	Replace the TCM. <Ref. to 4AT-66, Transmission Control Module (TCM).>	Go to step **8.**
8	**CHECK BODY INTEGRATED MODULE.** Display the current data of body integrated module using Subaru Select Monitor. <Ref. to LAN(diag)-14, OPERATION, Subaru Select Monitor.>	Is the “SPORT Lamp” input signal “Illuminate”?	Check DTC of body integrated module. Perform the diagnosis according to DTC. <Ref. to LAN(diag)-14, OPERATION, Subaru Select Monitor.>	Perform the self-diagnosis for combination meter. <Ref. to IDI-3, INSPECTION, Combination Meter System.>

11.Diagnostic Procedure for Subaru Select Monitor Communication

A: COMMUNICATION FOR INITIALIZING IMPOSSIBLE

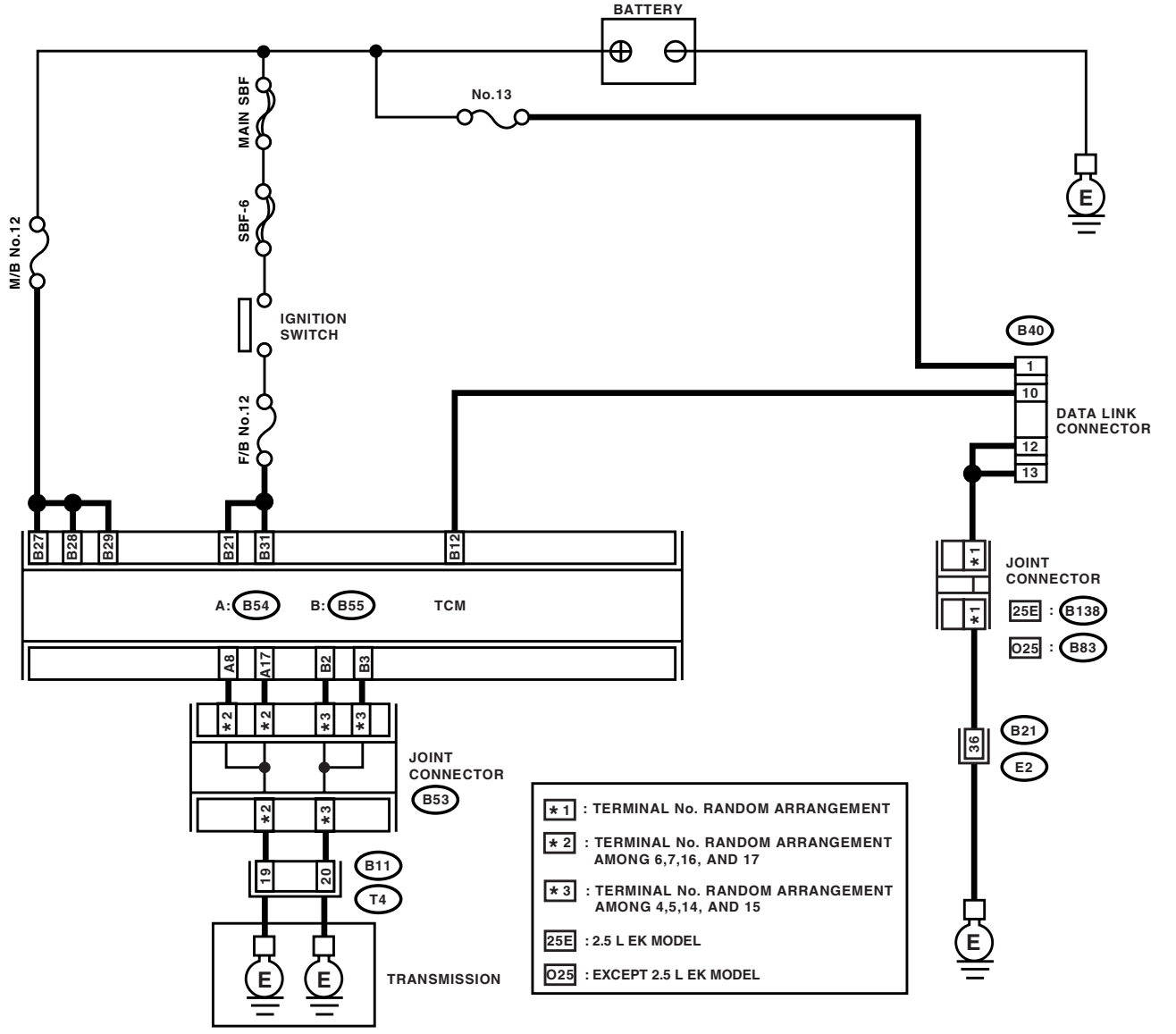
DIAGNOSIS:
Defective harness connector
TROUBLE SYMPTOM:
Subaru Select Monitor communication failure
WIRING DIAGRAM:

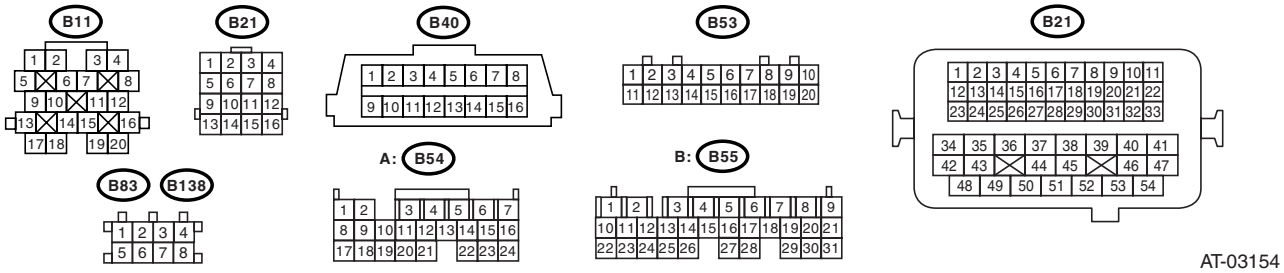
- LHD model



AT-03153

- RHD model





AT-03154

	Step	Check	Yes	No
1	**CHECK INSTALLATION OF TCM CONNECTOR.** Turn the ignition switch to OFF.	Is TCM connector connected to TCM?	Go to step **2.**	Connect the TCM connector to TCM.
2	**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 **3.**	Repair the harness connector and connector between battery and data link connector, and poor contact in connector.
3	**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:***	Is the resistance less than 1 Ω?	Go to step **4.**	Repair the open circuit of harness between data link connector and ground terminal.
4	**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.	Are the name of system displayed on Subaru Select Monitor?	Go to step **9.**	Go to step **5.**
5	**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.	Are the name of system displayed on Subaru Select Monitor?	Go to step **7.**	Go to step **6.**
6	**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.	Are the name of system displayed on Subaru Select Monitor?	Inspect the ECM.	Go to step **7.**
7	**CHECK HARNESS CONNECTOR BETWEEN EACH CONTROL MODULE AND DATA LINK CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the TCM and ECM connector. 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 **8.**	Check harness and connector between each control module and data link connector.
8	**CHECK OUTPUT SIGNAL OF 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?	Check harness and connector between each control module and data link connector.	Go to step **9.**
9	**CHECK HARNESS CONNECTOR BETWEEN TCM AND DATA LINK CONNECTOR.** Measure the resistance between TCM connector and data link connector. ***Connector & terminal*** ***(B55) No. 12 — (B40) No. 10:***	Is the resistance less than 1 Ω?	Go to step **10.**	Repair the harness and connector between TCM and data link connector.

	Step	Check	Yes	No
10	**CHECK INSTALLATION OF TRANSMISSION HARNESS CONNECTOR.**	Is the transmission harness connector connected to bulkhead harness connector?	Go to step **11.**	Connect the bulkhead harness connector to transmission harness connector.
11	**CHECK POOR CONTACT IN CONNECTORS.**	Is there poor contact in control module power supply and data link connector?	Repair the poor contact.	Go to step **12.**
12	**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. 27 (+) — Chassis ground (−):*** ***(B55) No. 28 (+) — Chassis ground (−):*** ***(B55) No. 29 (+) — Chassis ground (−):***	Is the voltage 10 — 13 V?	Go to step **14.**	Go to step **13.**
13	**CHECK FUSE.** 1) Turn the ignition switch to OFF. 2) Remove the fuse M/B (No. 12).	Is the fuse M/B (No. 12) blown out?	Replace the fuse M/B (No. 12). If the replaced fuse M/B (No. 12) has blown out easily, repair the short circuit of harness between fuse M/B (No. 12) and TCM.	Repair the open circuit of harness between fuse M/B (No. 12) and TCM, or fuse M/B (No. 12) and battery, and poor contact in connector.
14	**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*** ***(B55) No. 21 (+) — Chassis ground (−):*** ***(B55) No. 31 (+) — Chassis ground (−):***	Is the voltage 10 — 13 V?	Go to step **16.**	Go to step **15.**
15	**CHECK FUSE.** Remove the fuse F/B (No. 12).	Is the fuse F/B (No. 12) blown out?	Replace the fuse F/B (No. 12). If the replaced fuse F/B (No. 12) has blown out easily, repair the short circuit of harness between fuse F/B (No. 12) and TCM.	Repair the open circuit of harness between fuse F/B (No. 12) and TCM, or fuse F/B (No. 12) and battery, and poor contact in connector.
16	**CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from TCM and transmission. 3) Measure the resistance of harness between TCM and transmission connector. ***Connector & terminal*** ***(B54) No. 8 — (B11) No. 19:*** ***(B54) No. 17 — (B11) No. 19:*** ***(B55) No. 2 — (B11) No. 20:*** ***(B55) No. 3 — (B11) No. 20:***	Is the resistance less than 1 Ω?	Go to step **17.**	Repair the open circuit of harness between TCM and transmission harness connector, and poor contact in connector.

	Step	Check	Yes	No
17	**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 **18.**	Repair the open circuit of harness between transmission and transmission ground.
18	**CHECK POOR CONTACT IN CONNECTORS.**	Is there poor contact in TCM power supply, ground and data link connector?	Repair the connector.	Replace the TCM. <Ref. to 4AT-66, Transmission Control Module (TCM).>

12.List of Diagnostic Trouble Code (DTC)

A: LIST

DTC	Item	Contents of diagnosis	Reference target
P0705	Transmission Range Sensor Circuit (PRNDL Input)	Inhibitor switch malfunction short circuit	<Ref. to 4AT(diag)-33, DTC P0705 TRANSMISSION RANGE SENSOR CIRCUIT (PRNDL INPUT), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0712	Transmission Fluid Temperature Sensor Circuit Low Input	ATF temperature sensor is faulty or input signal circuit is open.	<Ref. to 4AT(diag)-41, DTC P0712 TRANSMISSION FLUID TEMPERATURE SENSOR CIRCUIT LOW INPUT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0713	Transmission Fluid Temperature Sensor Circuit High Input	ATF temperature sensor is faulty or input signal circuit is shorted.	<Ref. to 4AT(diag)-44, DTC P0713 TRANSMISSION FLUID TEMPERATURE SENSOR CIRCUIT HIGH INPUT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0715	Input/Turbine Speed Sensor Circuit	Torque converter turbine speed sensor malfunction, short input signal circuit	<Ref. to 4AT(diag)-47, DTC P0715 INPUT/TURBINE SPEED SENSOR CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0719	Torque Converter/Brake Switch “B” Circuit Low	Brake switch malfunction, open input signal circuit	<Ref. to 4AT(diag)-49, DTC P0719 TORQUE CONVERTER/BRAKE SWITCH “B” CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0720	Output Speed Sensor Circuit	Front vehicle speed sensor malfunction, open or short input signal circuit	<Ref. to 4AT(diag)-53, DTC P0720 OUTPUT SPEED SENSOR CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0724	Torque Converter/Brake Switch “B” Circuit High	Brake switch malfunction, short input signal circuit	<Ref. to 4AT(diag)-56, DTC P0724 TORQUE CONVERTER/BRAKE SWITCH “B” CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0725	Engine Speed Input Circuit	Open or short engine speed output signal circuit	<Ref. to 4AT(diag)-59, DTC P0725 ENGINE SPEED INPUT CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0731	Gear 1 Incorrect Ratio	Vehicle sensor, torque converter turbine speed sensor or control valve malfunction	<Ref. to 4AT(diag)-61, DTC P0731 GEAR 1 INCORRECT RATIO, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0732	Gear 2 Incorrect Ratio	Vehicle sensor, torque converter turbine speed sensor or control valve malfunction	<Ref. to 4AT(diag)-61, DTC P0732 GEAR 2 INCORRECT RATIO, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0733	Gear 3 Incorrect Ratio	Vehicle sensor, torque converter turbine speed sensor or control valve malfunction	<Ref. to 4AT(diag)-61, DTC P0733 GEAR 3 INCORRECT RATIO, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0734	Gear 4 Incorrect Ratio	Vehicle sensor, torque converter turbine speed sensor or control valve malfunction	<Ref. to 4AT(diag)-61, DTC P0734 GEAR 4 INCORRECT RATIO, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0736	Reverse Incorrect Ratio	Vehicle sensor, torque converter turbine speed sensor or control valve malfunction	<Ref. to 4AT(diag)-62, DTC P0736 REVERSE INCORRECT RATIO, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0741	Torque Converter Clutch Circuit Performance or Stuck Off	Lock-up clutch is faulty or valve is stuck.	<Ref. to 4AT(diag)-63, DTC P0741 TORQUE CONVERTER CLUTCH CIRCUIT PERFORMANCE OR STUCK OFF, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0743	Torque Converter Clutch Circuit Electrical	Lock-up solenoid is faulty or output signal circuit is open or shorted.	<Ref. to 4AT(diag)-64, DTC P0743 TORQUE CONVERTER CLUTCH CIRCUIT ELECTRICAL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

List of Diagnostic Trouble Code (DTC)

DTC	Item	Contents of diagnosis	Reference target
P0748	Pressure Control Solenoid “A” Electrical	Line pressure linear solenoid is faulty or output signal circuit is open or shorted.	<Ref. to 4AT(diag)-67, DTC P0748 PRESSURE CONTROL SOLENOID “A” ELECTRICAL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0753	Shift Solenoid “A” Electrical	Low clutch duty solenoid is faulty or output signal circuit is open or shorted.	<Ref. to 4AT(diag)-69, DTC P0753 SHIFT SOLENOID “A” ELECTRICAL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0758	Shift Solenoid “B” Electrical	2-4 brake duty solenoid is faulty or output signal circuit is open or shorted.	<Ref. to 4AT(diag)-72, DTC P0758 SHIFT SOLENOID “B” ELECTRICAL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0763	Shift Solenoid “C” Electrical	High clutch duty solenoid is faulty or output signal circuit is open or shorted.	<Ref. to 4AT(diag)-75, DTC P0763 SHIFT SOLENOID “C” ELECTRICAL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0768	Shift Solenoid “D” Electrical	Low & reverse clutch duty solenoid is faulty or output signal circuit is open or shorted.	<Ref. to 4AT(diag)-78, DTC P0768 SHIFT SOLENOID “D” ELECTRICAL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0801	Reverse Inhibit Control Circuit	Shift lock solenoid is faulty or output signal circuit is open or shorted.	<Ref. to 4AT(diag)-81, DTC P0801 REVERSE INHIBIT CONTROL CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1706	AT Vehicle Speed Sensor Circuit Malfunction (Rear Wheel)	Rear vehicle speed sensor is faulty or input signal circuit is open or shorted.	<Ref. to 4AT(diag)-83, DTC P1706 AT VEHICLE SPEED SENSOR CIRCUIT MALFUNCTION (REAR WHEEL), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1707	AT AWD Solenoid Valve Circuit Malfunction	Transfer duty solenoid is faulty or output signal circuit is open or shorted.	<Ref. to 4AT(diag)-86, DTC P1707 AT AWD SOLENOID VALVE CIRCUIT MALFUNCTION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1708	Throttle Position Sensor Circuit Low Input	Accelerator pedal position sensor is faulty or input signal circuit is open.	<Ref. to 4AT(diag)-89, DTC P1708 THROTTLE POSITION SENSOR CIRCUIT LOW INPUT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1709	Throttle Position Sensor Circuit High Input	Accelerator pedal position sensor is faulty or input signal circuit is shorted.	<Ref. to 4AT(diag)-95, DTC P1709 THROTTLE POSITION SENSOR CIRCUIT HIGH INPUT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1714	Throttle Position Sensor Power Supply Circuit	Accelerator pedal position sensor is faulty or input signal circuit is open or shorted.	<Ref. to 4AT(diag)-101, DTC P1714 THROTTLE POSITION SENSOR POWER SUPPLY CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1718	CAN Communication Circuit	CAN communication circuit is open or shorted	<Ref. to 4AT(diag)-106, DTC P1718 CAN COMMUNICATION CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1760	Lateral Acceleration Sensor Performance Problem	Lateral G sensor malfunction	<Ref. to 4AT(diag)-107, DTC P1760 LATERAL ACCELERATION SENSOR PERFORMANCE PROBLEM, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1761	Lateral Acceleration Sensor Circuit Low	Lateral G sensor is faulty or input signal circuit is open.	<Ref. to 4AT(diag)-110, DTC P1761 LATERAL ACCELERATION SENSOR CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1762	Lateral Acceleration Sensor Circuit High	Lateral G sensor is faulty or input signal circuit is shorted.	<Ref. to 4AT(diag)-112, DTC P1762 LATERAL ACCELERATION SENSOR CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1817	Sports Mode Switch Circuit	SPORT mode and manual mode switch is faulty or input signal circuit is open or shorted.	<Ref. to 4AT(diag)-115, DTC P1817 SPORT MODE SWITCH CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

13. Diagnostic Procedure with Diagnostic Trouble Code (DTC)

A: DTC P0705 TRANSMISSION RANGE SENSOR CIRCUIT (PRNDL INPUT)

DTC DETECTING CONDITION:

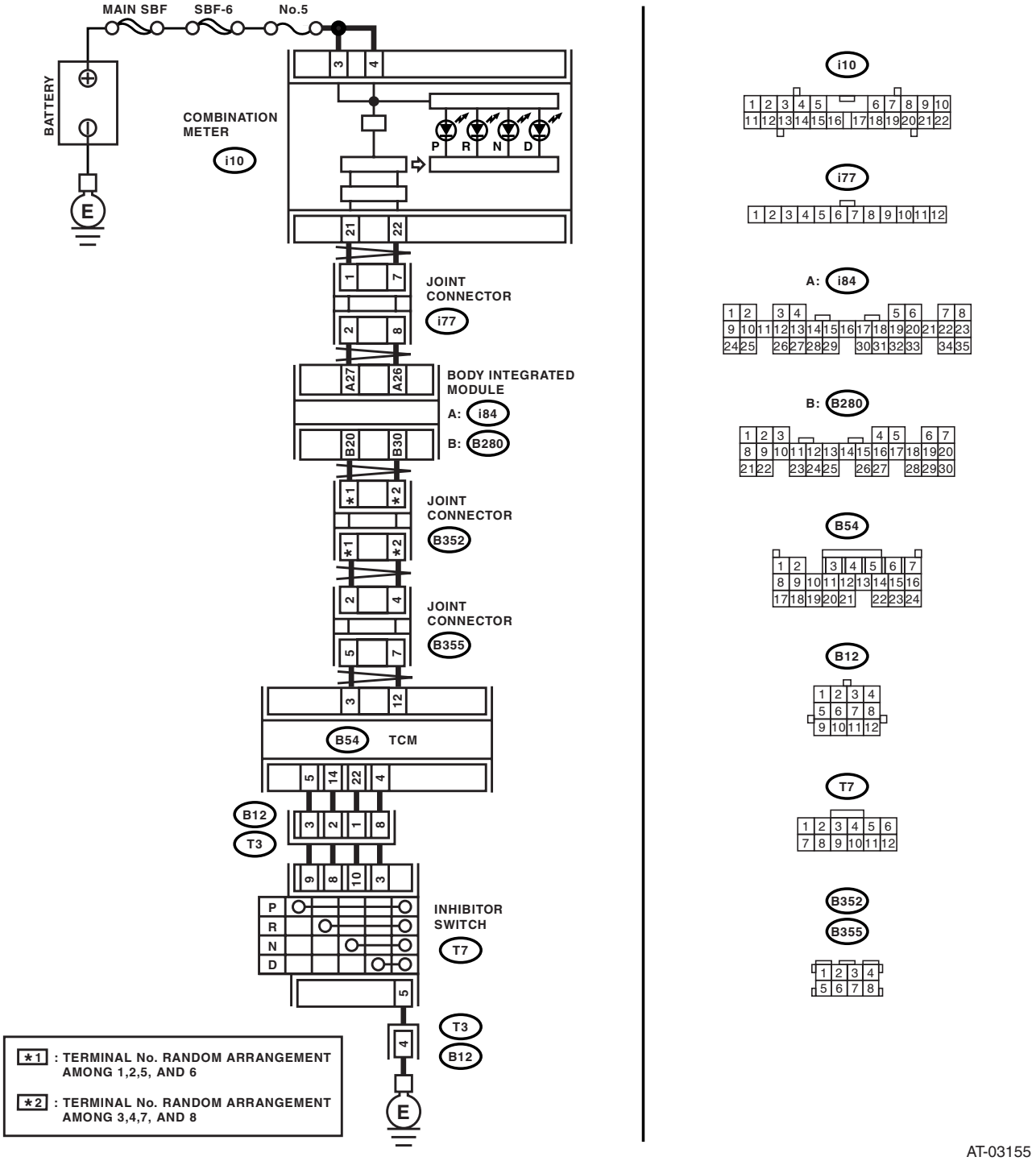
- Inhibitor switch is faulty.
- More than 2 range signal is input.

TROUBLE SYMPTOM:

- Shift characteristics are erroneous.
- Range position of select lever and AT select lever position indicator light on the combination meter is not matched.

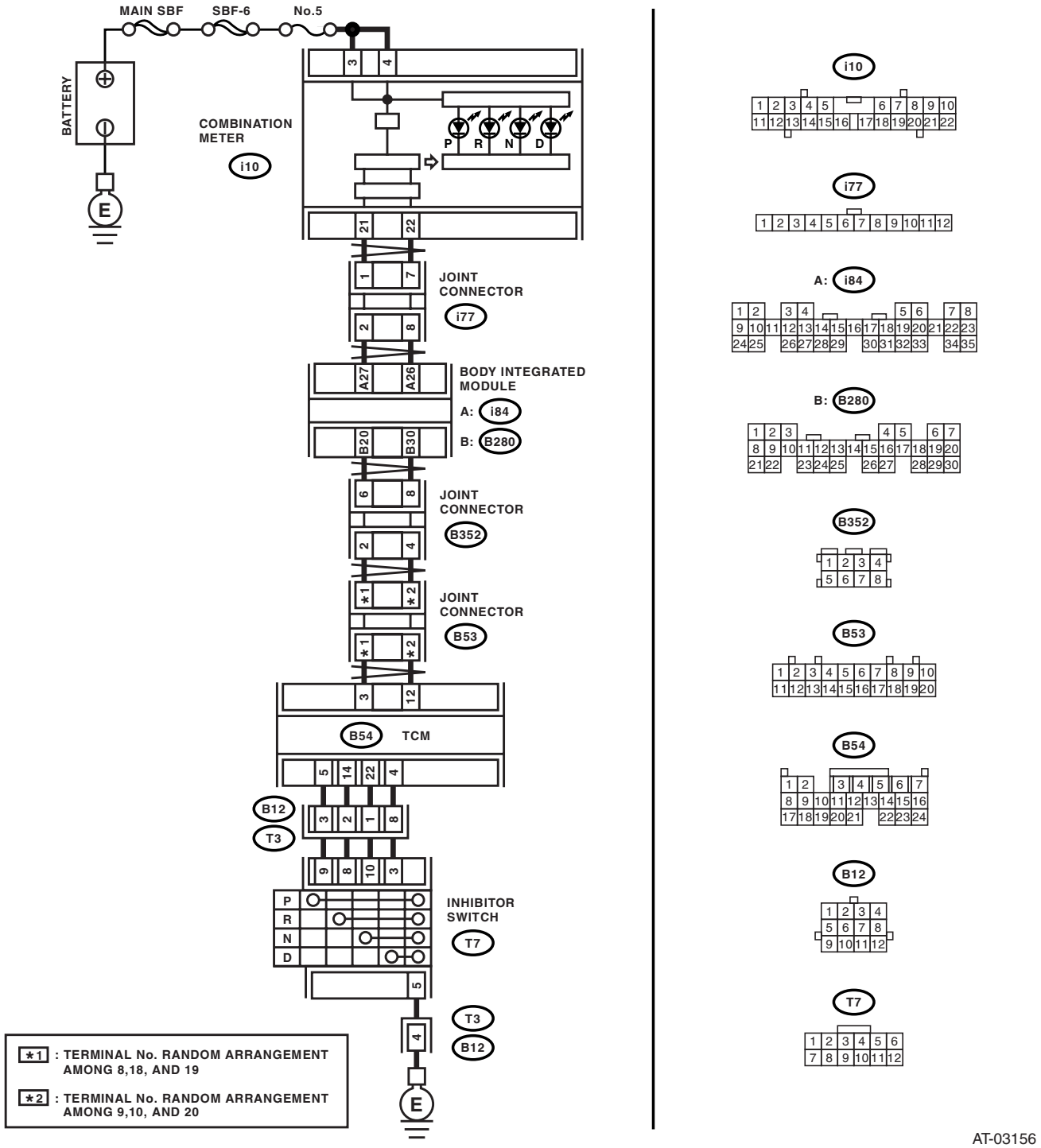
WIRING DIAGRAM:

- LHD model



AT-03155

- RHD model



AT-03156

	Step	Check	Yes	No
1	**CHECK INDICATOR LIGHT.** 1) Turn the ignition switch to ON. 2) Shift the select lever to “P” range.	Does the “P” range indicator light on combination meter illuminate?	Go to step **2.**	Go to step **12.**
2	**CHECK INDICATOR LIGHT.**	Does the “R” range indicator light on combination meter illuminate?	Go to step **26.**	Go to step **3.**
3	**CHECK INDICATOR LIGHT.**	Does the “N” range indicator light on combination meter illuminate?	Go to step **33.**	Go to step **4.**
4	**CHECK INDICATOR LIGHT.**	Does the “D” range indicator light on combination meter illuminate?	Go to step **40.**	Go to step **5.**
5	**CHECK “P” RANGE SWITCH.** 1) Connect the Subaru Select Monitor to data link connector. 2) Shift the select lever to “R” range.	Does the “P” range LED of Subaru Select Monitor illuminate?	Go to step **19.**	Go to step **6.**
6	**CHECK INDICATOR LIGHT.**	Does the “R” range indicator light on combination meter illuminate?	Go to step **8.**	Go to step **7.**
7	**CHECK “R” RANGE SWITCH.**	Does the “R” range LED of Subaru Select Monitor illuminate?	Go to step **23.**	Go to step **20.**
8	**CHECK INDICATOR LIGHT.** Shift the select lever to “N” range.	Does the “P” range indicator light on combination meter illuminate?	Go to step **10.**	Go to step **9.**
9	**CHECK “N” RANGE SWITCH.**	Does the “N” range LED of Subaru Select Monitor illuminate?	Go to step **30.**	Go to step **27.**
10	**CHECK INDICATOR LIGHT.** Shift the select lever to “D” range.	Does the “D” range indicator light on combination meter illuminate?	Even if the SPORT indicator light is blinking, the circuit has returned to normal condition at this time. A temporary poor contact of connector or harness may be the cause. Repair the harness or connector in TCM and transmission.	Go to step **11.**
11	**CHECK “D” RANGE SWITCH.**	Does the “D” range LED of Subaru Select Monitor illuminate?	Go to step **37.**	Go to step **34.**
12	**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 **13.**	Repair the open circuit of harness between inhibitor switch connector and chassis ground, and poor contact in coupling connector.

	Step	Check	Yes	No
13	**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. 5 — (T7) No. 9:***	Is the resistance less than 1 Ω?	Go to step **14.**	Repair the open circuit of harness between TCM and inhibitor switch connector, and poor contact in coupling connector.
14	**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) Shift the select lever to "P" range. 5) Measure the voltage between TCM and chassis ground. ***Connector & terminal*** ***(B54) No. 5 (+) — Chassis ground (−):***	Is the voltage less than 1 V?	Go to step **15.**	Go to step **41.**
15	**CHECK INPUT SIGNAL FOR TCM.** 1) Shift the select lever to any range other than "P". 2) Measure the voltage between TCM and chassis ground. ***Connector & terminal*** ***(B54) No. 5 (+) — Chassis ground (−):***	Is the voltage more than 8 V?	Go to step **16.**	Replace the TCM. <Ref. to 4AT-66, Transmission Control Module (TCM).>
16	**CHECK BODY INTEGRATED MODULE.** Read the data of inhibitor switch from Subaru Select Monitor. <Ref. to LAN(diag)-14, OPERATION, Subaru Select Monitor.>	Is 7 displayed?	Go to step **17.**	Check the body integrated module.
17	**CHECK BODY INTEGRATED MODULE.** Check DTC of body integrated module.	Is DTC of CAN communication displayed?	Perform the diagnosis according to DTC.	Go to step **18.**
18	**CHECK COMBINATION METER.** Check the "P" range indicator light. <Ref. to IDI-3, INSPECTION, Combination Meter System.>	Is the "P" range indicator light OK?	Go to step **41.**	Replace the combination meter assembly. <Ref. to IDI-15, Combination Meter.>
19	**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 connector and chassis ground. ***Connector & terminal*** ***(B54) No. 5 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **42.**	Repair the ground short circuit in "P" range circuit.
20	**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. 14 — (T7) No. 8:***	Is the resistance less than 1 Ω?	Go to step **21.**	Repair the open circuit of harness between TCM and inhibitor switch connector, and poor contact in coupling connector.

	Step	Check	Yes	No
21	**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) Shift the select lever to "R" range. 5) Measure the voltage between TCM and chassis ground. ***Connector & terminal*** ***(B54) No. 14 (+) — Chassis ground (−):***	Is the voltage less than 1 V?	Go to step **22.**	Go to step **41.**
22	**CHECK INPUT SIGNAL FOR TCM.** 1) Shift the select lever to other than "R" range. 2) Measure the voltage between TCM and chassis ground. ***Connector & terminal*** ***(B54) No. 14 (+) — Chassis ground (−):***	Is the voltage more than 8 V?	Go to step **41.**	Replace the TCM. <Ref. to 4AT-66, Transmission Control Module (TCM).>
23	**CHECK BODY INTEGRATED MODULE.** Read the data of shift position from Subaru Select Monitor. <Ref. to LAN(diag)-14, OPERATION, Subaru Select Monitor.>	Is 6 displayed?	Go to step **24.**	Check the body integrated module.
24	**CHECK BODY INTEGRATED MODULE.** Check DTC of body integrated module.	Is DTC of CAN communication displayed?	Perform the diagnosis according to DTC.	Go to step **25.**
25	**CHECK COMBINATION METER.** Check the "R" range indicator light. <Ref. to IDI-3, INSPECTION, Combination Meter System.>	Is the "R" range indicator light OK?	Go to step **41.**	Replace the combination meter assembly. <Ref. to IDI-15, Combination Meter.>
26	**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 connector and chassis ground. ***Connector & terminal*** ***(B54) No. 14 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **41.**	Repair the ground short circuit in "R" range circuit.
27	**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. 22 — (T7) No. 10:***	Is the resistance less than 1 Ω?	Go to step **28.**	Repair the open circuit of harness between TCM and inhibitor switch connector, and poor contact in coupling connector.
28	**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) Shift the select lever to "N" range. 5) Measure the voltage between TCM and chassis ground. ***Connector & terminal*** ***(B54) No. 22 (+) — Chassis ground (−):***	Is the voltage less than 1 V?	Go to step **29.**	Go to step **41.**

	Step	Check	Yes	No
29	**CHECK INPUT SIGNAL FOR TCM.** 1) Shift the select lever to other than “N” range. 2) Measure the voltage between TCM and chassis ground. ***Connector & terminal*** ***(B54) No. 22 (+) — Chassis ground (−):***	Is the voltage more than 8 V?	Go to step **41.**	Replace the TCM. <Ref. to 4AT-66, Transmission Control Module (TCM).>
30	**CHECK BODY INTEGRATED MODULE.** Read the data of shift position from the Subaru Select Monitor. <Ref. to LAN(diag)-14, OPERATION, Subaru Select Monitor.>	Is 5 displayed?	Go to step **31.**	Check the body integrated module.
31	**CHECK BODY INTEGRATED MODULE.** Check DTC of body integrated module.	Is DTC of CAN communication displayed?	Perform the diagnosis according to DTC.	Go to step **32.**
32	**CHECK COMBINATION METER.** Check the “N” range indicator light. <Ref. to IDI-3, INSPECTION, Combination Meter System.>	Is the “N” range indicator light OK?	Go to step **41.**	Replace the combination meter assembly. <Ref. to IDI-15, Combination Meter.>
33	**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 connector and chassis ground. ***Connector & terminal*** ***(B54) No. 22 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **41.**	Repair the ground short circuit in “N” range circuit.
34	**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. 3:***	Is the resistance less than 1 Ω?	Go to step **35.**	Repair the open circuit of harness between TCM and inhibitor switch connector, and poor contact in coupling connector.
35	**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) Shift the select lever to “D” 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 **36.**	Go to step **41.**
36	**CHECK INPUT SIGNAL FOR TCM.** 1) Shift the select lever to other than “D” 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 **41.**	Replace the TCM. <Ref. to 4AT-66, Transmission Control Module (TCM).>
37	**CHECK BODY INTEGRATED MODULE.** Read the data of inhibitor switch from Subaru Select Monitor. <Ref. to LAN(diag)-14, OPERATION, Subaru Select Monitor.>	Is 4 displayed?	Go to step **38.**	Check the body integrated module.

	Step	Check	Yes	No
38	**CHECK BODY INTEGRATED MODULE.** Check DTC of body integrated module.	Is DTC of CAN communication displayed?	Perform the diagnosis according to DTC.	Go to step **39.**
39	**CHECK COMBINATION METER.** Check the “D” range indicator light. <Ref. to IDI-3, INSPECTION, Combination Meter System.>	Is the “D” range indicator light OK?	Go to step **41.**	Replace the combination meter assembly. <Ref. to IDI-15, Combination Meter.>
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 connector and chassis ground. ***Connector & terminal*** ***(B55) No. 4 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **41.**	Repair the ground short circuit in “D” range circuit.
41	**CHECK POOR CONTACT.**	Is there poor contact in inhibitor switch circuit?	Repair the poor contact.	Go to step **42.**
42	**CHECK INHIBITOR SWITCH.**	Is the inhibitor switch in normal position?	Replace the TCM. <Ref. to 4AT-66, Transmission Control Module (TCM).>	Adjust inhibitor switch and select cable. <Ref. to 4AT-51, Inhibitor Switch.> <Ref. to CS-27, Select Cable.>

B: DTC P0712 TRANSMISSION FLUID TEMPERATURE SENSOR CIRCUIT LOW INPUT

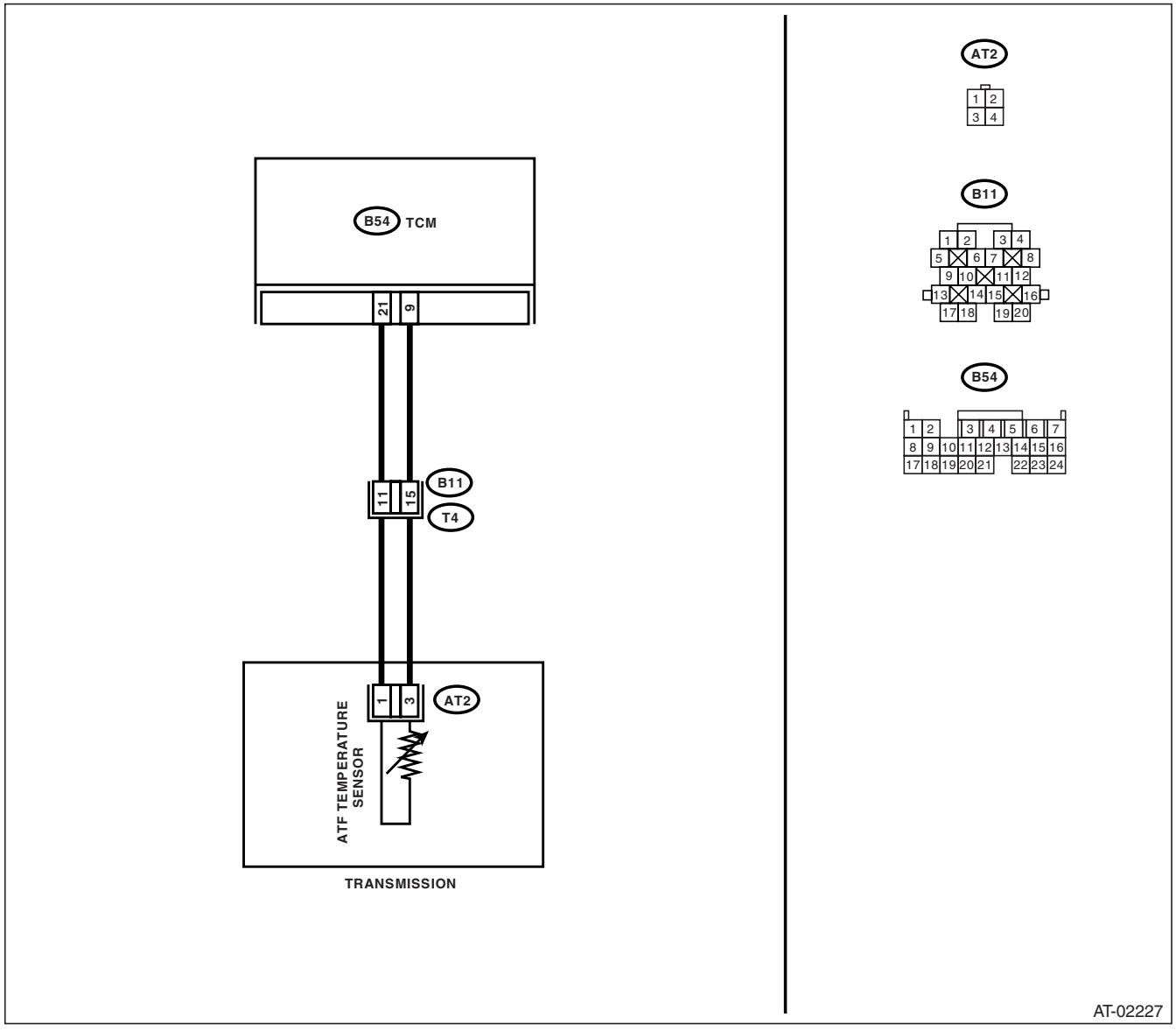
DTC DETECTING CONDITION:

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*** ***(B54) No. 21 — (B11) No. 11:***	Is the resistance less than 1 Ω?	Go to step **2.**	Repair the open circuit of 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*** ***(B54) No. 9 — (B11) No. 15:***	Is the resistance less than 1 Ω?	Go to step **3.**	Repair the open circuit of 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 the ATF temperature exceeds 80°C (176°F). NOTE: If the ambient temperature is below 0°C (32°F), drive the vehicle until the 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 while the 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) Connect the Subaru Select Monitor to data link connector. 3) Turn the ignition switch to ON (engine OFF). 4) Read the data of ATF temperature using Subaru Select Monitor.	Does the ATF temperature gradually decrease?	Even if the SPORT indicator light is blinking, the circuit has returned to normal condition at this time. A temporary poor contact of connector or harness may be the cause. Repair the harness or contact in the 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-66, 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. NOTE: Raise all wheels off floor. 5) Drain the ATF. **CAUTION:** **Do not drain ATF until it cools down.** 6) Remove the oil pan, and disconnect the connector from control valve. 7) Measure the resistance of harness between ATF temperature sensor and transmission connector. ***Connector & terminal*** ***(T4) No. 11 — (AT2) No. 1:***	Is the resistance less than 1 Ω?	Go to step **8.**	Repair the open circuit of 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 — (AT2) No. 3:***	Is the resistance less than 1 Ω?	Go to step **9.**	Repair the open circuit of 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 of 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-62, Control Valve Body.>	Repair the short circuit of harness between ATF temperature sensor and transmission connector.

C: DTC P0713 TRANSMISSION FLUID TEMPERATURE SENSOR CIRCUIT HIGH INPUT

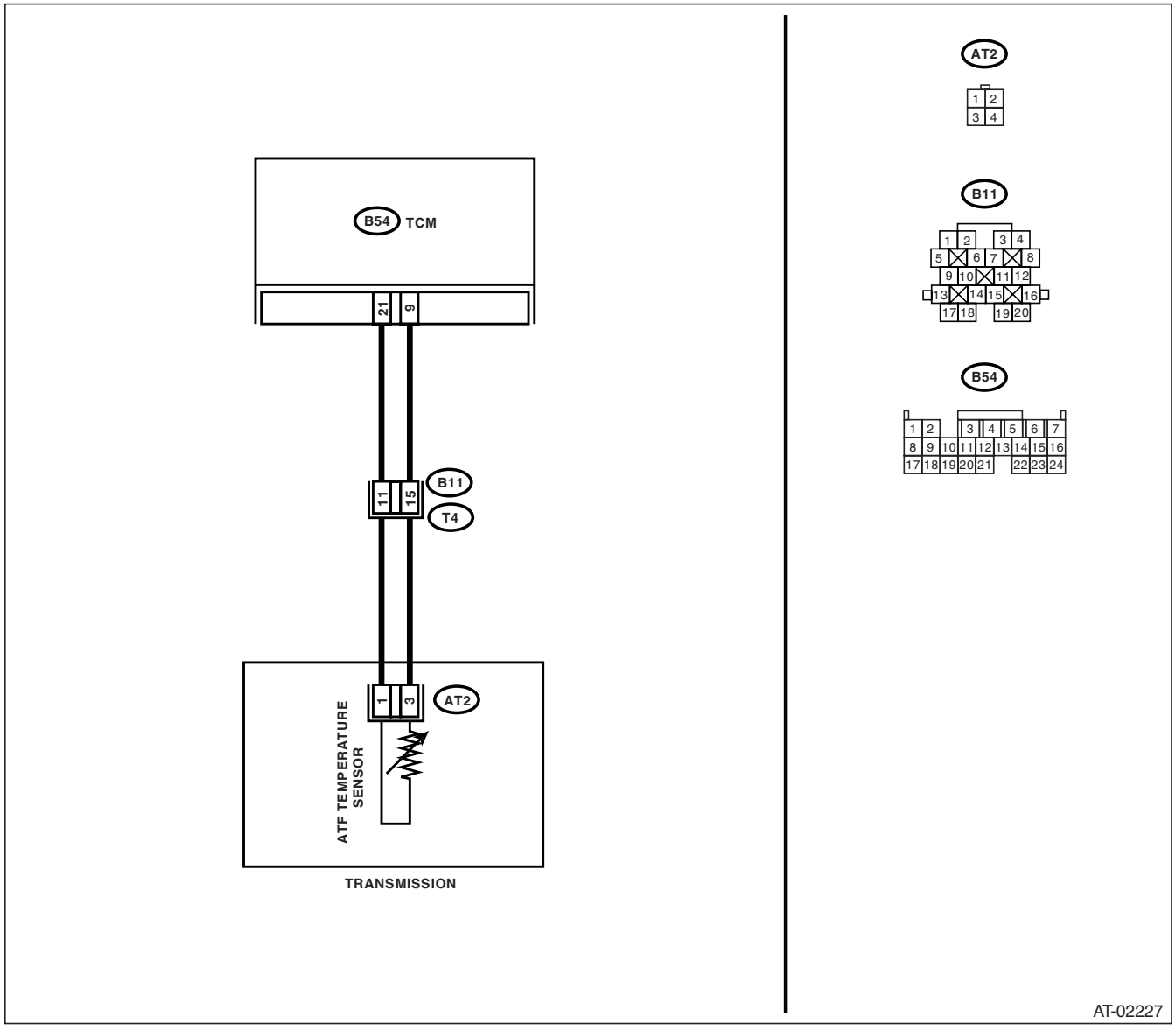
DTC DETECTING CONDITION:

Input signal circuit of TCM to ATF temperature sensor is 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 TCM. 3) Measure the resistance between TCM connector terminals. ***Connector & terminal*** ***(B54) No. 21 — No. 9:***	Is the resistance more than 500 Ω?	Go to step **2.**	Go to step **4.**
2	**CHECK HARNESS CONNECTOR BETWEEN TCM AND ATF TEMPERATURE SENSOR.** Measure the resistance of harness between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 21 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **3.**	Go to step **4.**
3	**CHECK HARNESS.** Measure the resistance between TCM connector terminals while shaking the harness. ***Connector & terminal*** ***(B54) No. 21 — No. 9:***	Does the resistance change?	Go to step **4.**	Replace the TCM. <Ref. to 4AT-66, Transmission Control Module (TCM).>
4	**CHECK HARNESS CONNECTOR BETWEEN TCM AND ATF TEMPERATURE SENSOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from transmission. 3) Measure the resistance of harness between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 21 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **5.**	Repair the short circuit of harness between TCM and transmission harness.
5	**CHECK HARNESS CONNECTOR BETWEEN TCM AND ATF TEMPERATURE SENSOR.** Measure the resistance of harness between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 9 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **6.**	Repair the short circuit of harness between TCM and transmission harness.
6	**CHECK ATF TEMPERATURE SENSOR.** Measure the resistance between transmission connector terminals. ***Connector & terminal*** ***(T4) No. 11 — No. 15:***	Is the resistance more than 500 Ω?	Even if the SPORT indicator light is blinking, the circuit has returned to normal condition at this time. A temporary short circuit of connector or harness may be the cause. Repair the harness or connector.	Go to step **7.**

	Step	Check	Yes	No
7	**CHECK TRANSMISSION HARNESS.** 1) Lift-up the vehicle. 2) Drain the ATF. **CAUTION:** **Do not drain ATF until it cools down.** 3) Remove the oil pan. 4) Disconnect the harness connector from control valve. 5) Measure the resistance between ATF temperature sensor connector terminals 6) Measure the resistance between transmission connector and transmission ground. ***Connector & terminal*** ***(T4) No. 11 — Transmission ground:***	Is the resistance more than 1 MΩ?	Go to step **8.**	Replace the transmission harness.
8	**CHECK TRANSMISSION HARNESS.** Measure the resistance between transmission connector and transmission ground. ***Connector & terminal*** ***(T4) No. 15 — Transmission ground:***	Is the resistance more than 1 MΩ?	Go to step **9.**	Replace the transmission harness.
9	**CHECK ATF TEMPERATURE SENSOR.** Measure the resistance between control valve connector terminals ***Terminal*** ***No. 1 — No. 3:***	Is the resistance more than 500 Ω?	Even if the SPORT indicator light is blinking, the circuit has returned to normal condition at this time. A temporary short circuit of connector or harness may be the cause. Repair the harness or connector.	Replace the control valve body. <Ref. to 4AT-62, Control Valve Body.>

D: DTC P0715 INPUT/TURBINE SPEED SENSOR CIRCUIT

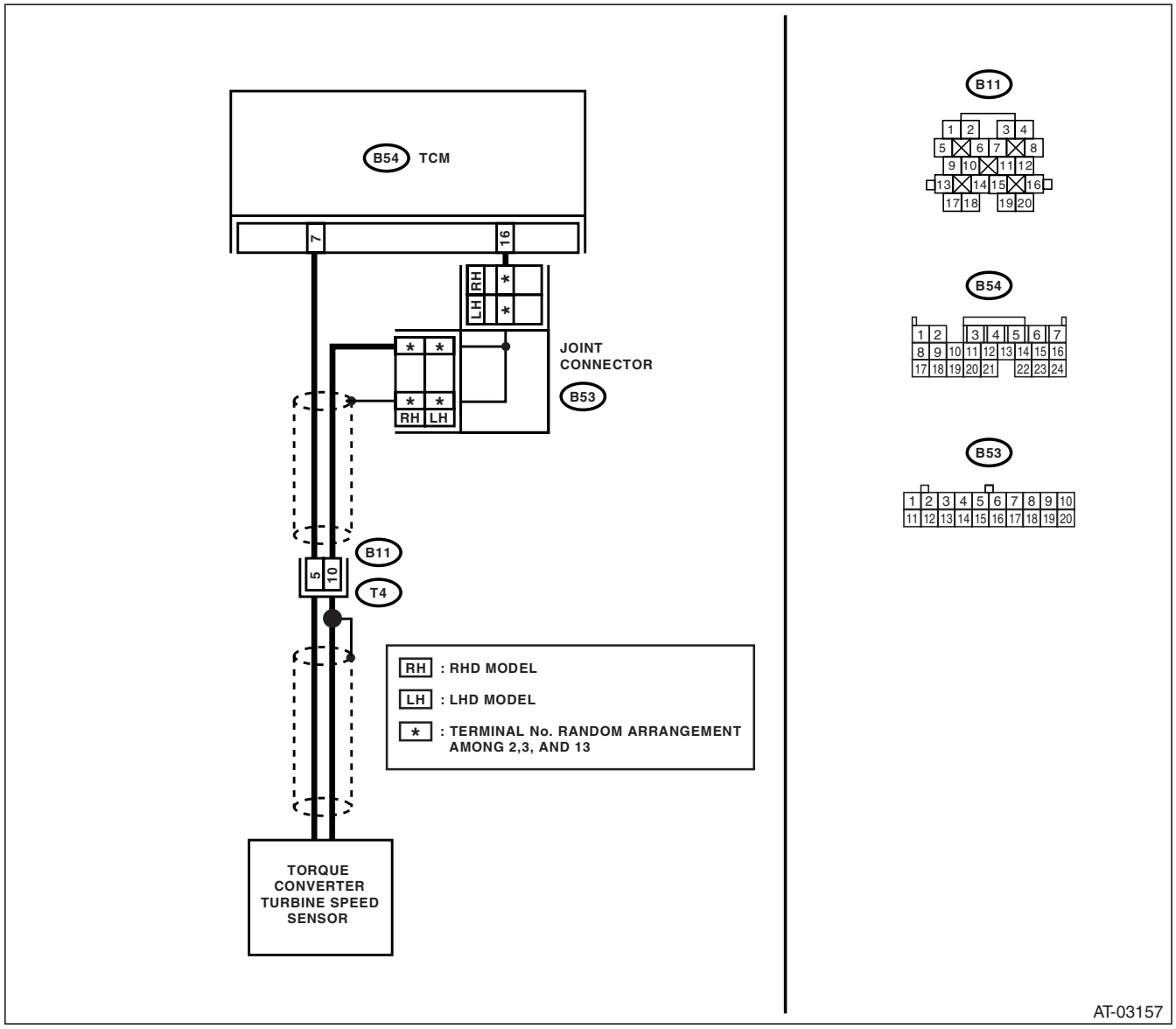
DTC DETECTING CONDITION:

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 torque converter turbine speed sensor. <Ref. to 4AT-59, 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*** ***(B54) No. 7 — (B11) No. 5:***	Is the resistance less than 1 Ω?	Go to step **3.**	Repair the open circuit of 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*** ***(B54) No. 16 — (B11) No. 10:***	Is the resistance less than 1 Ω?	Go to step **4.**	Repair the open circuit of harness between TCM and transmission connector, and poor contact in connector.
4	**CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION.** Measure the resistance of harness between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 16 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **5.**	Repair the short circuit of harness between TCM and transmission connector.
5	**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 **6.**	Repair the short circuit of harness between TCM and transmission connector, and poor contact in 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 the Subaru Select Monitor power switch to ON. 4) Start the engine. 5) Shift 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 SPORT indicator light is blinking, the circuit has returned to normal condition at this time. A temporary poor contact of 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-66, Transmission Control Module (TCM).>

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

DTC DETECTING CONDITION:

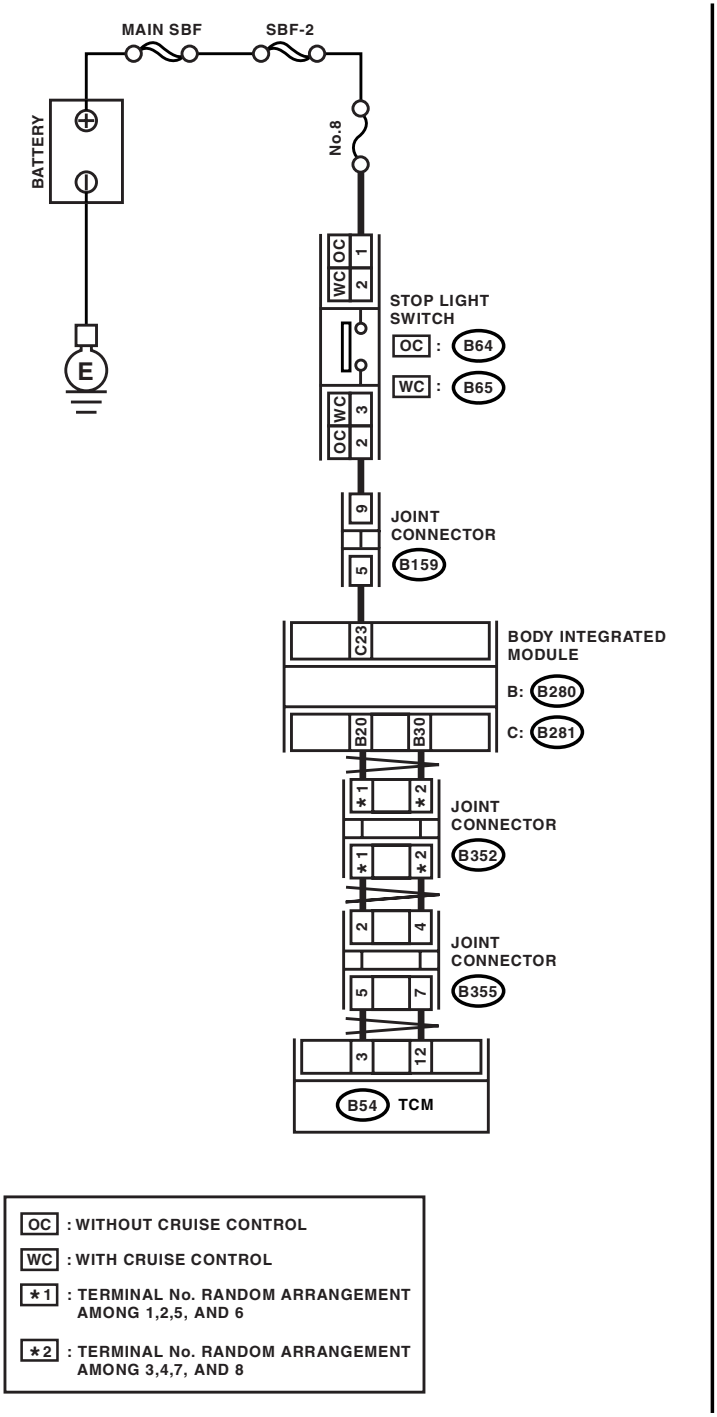
Brake switch malfunction, open input signal circuit

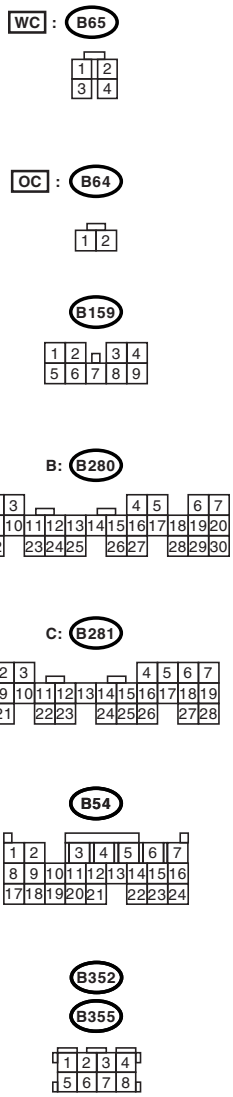
TROUBLE SYMPTOM:

- Gear is not shifted down when driving a down hill.
- The neutralizing control does not operate.

WIRING DIAGRAM:

- LHD model





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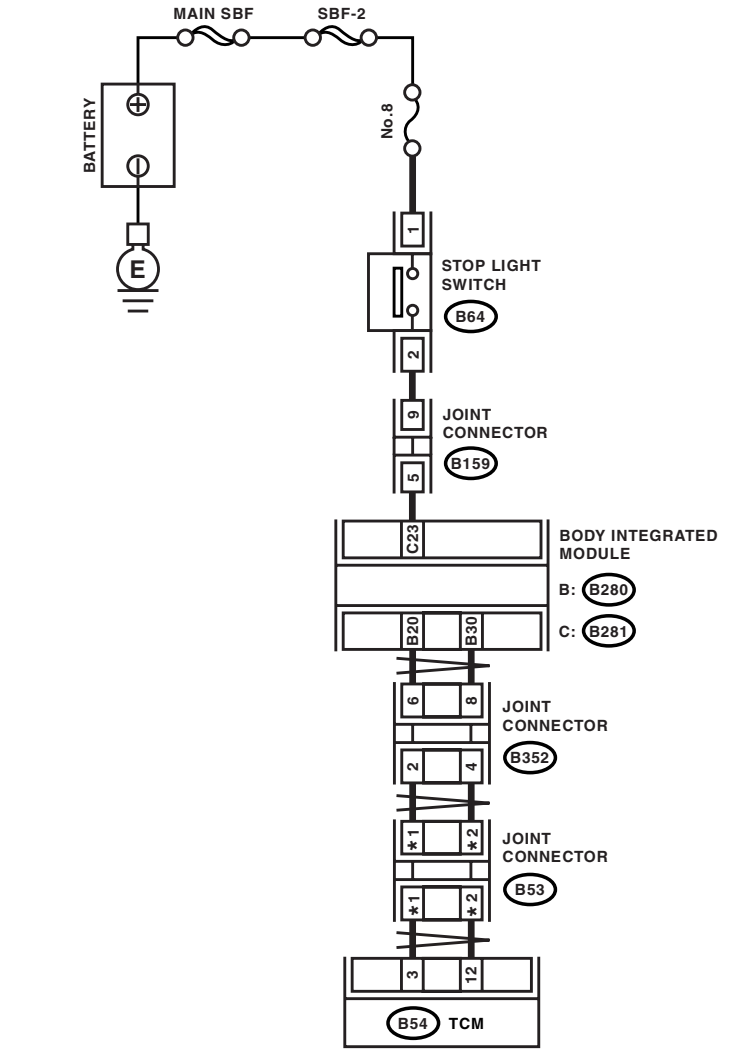
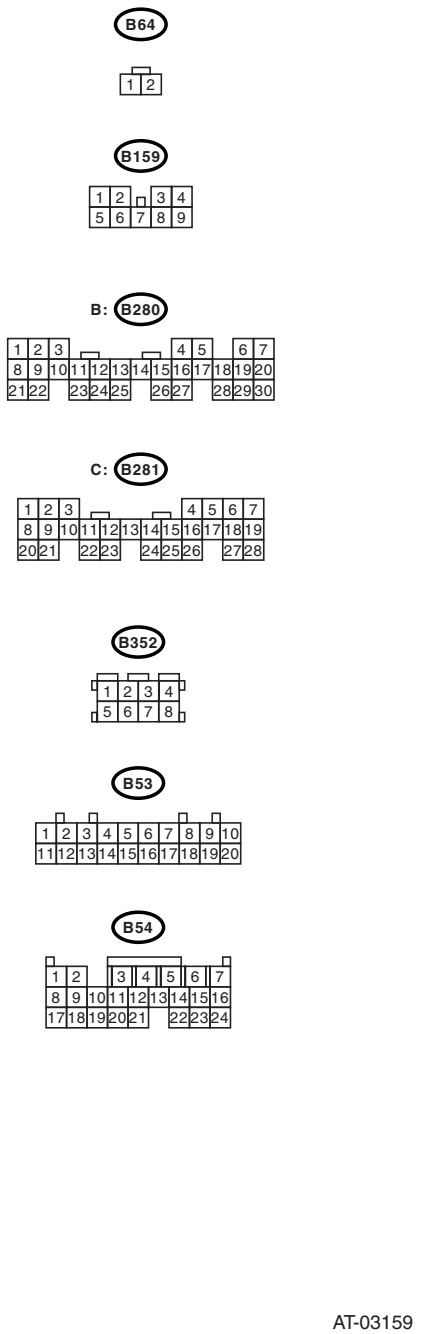
- RHD model





AT-03159

Step	Check	Yes	No
1 CHECK DTC.	Does the DTC of CAN communication appear in the on-board diagnostics test mode?	Perform the diagnosis according to DTC.	Go to step **2.**

	Step	Check	Yes	No
2	**CHECK FUSE.** 1) Turn the ignition switch to OFF. 2) Remove the fuse (No. 8).	Is the fuse (No. 8) blown out?	Replace the fuse (No. 8). If the replaced fuse (No. 8) has blown out easily, repair the short circuit of harness between fuse (No. 8) and stop light switch.	Go to step **3.**
3	**CHECK BODY INTEGRATED MODULE.** 1) Turn the ignition switch to OFF. 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 power switch to ON. 5) Depress the brake pedal. 6) Read the data of brake pedal switch using Subaru Select Monitor. <Ref. to LAN(diag)-14, OPERATION, Subaru Select Monitor.>	Is ON displayed?	Go to step **4.**	Go to step **5.**
4	**CHECK TCM.** Read the data of brake pedal switch using Subaru Select Monitor. <Ref. to 4AT(diag)-16, OPERATION, Subaru Select Monitor.>	Is ON displayed?	A temporary poor contact of connector or harness may be the cause. Check the poor contact.	Replace the TCM. <Ref. to 4AT-66, Transmission Control Module (TCM).>
5	**CHECK BODY INTEGRATED MODULE INPUT SIGNAL.** 1) Depress the brake pedal. 2) Disconnect the connector from body integrated module. 3) Measure the voltage of harness between body integrated module and stop light switch. ***Connector & terminal*** ***LHD model (With cruise control)*** ***(B281) No. 23 (+) — (B65) No. 3 (–):*** ***LHD model (Without cruise control)*** ***(B281) No. 23 (+) — (B64) No. 2 (–):*** ***RHD model*** ***(B281) No. 23 (+) — (B64) No. 2 (–):***	Is the voltage more than 10 V?	Go to step **8.**	Go to step **6.**
6	**CHECK HARNESS CONNECTOR BETWEEN BODY INTEGRATED MODULE AND STOP LIGHT SWITCH.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from stop light switch. 3) Measure the resistance of harness between body integrated module and stop light switch. ***Connector & terminal*** ***LHD model (With cruise control)*** ***(B281) No. 23 — (B65) No. 3:*** ***LHD model (Without cruise control)*** ***(B281) No. 23 — (B64) No. 2:*** ***RHD model*** ***(B281) No. 23 — (B64) No. 2:***	Is the resistance less than 1 Ω?	Go to step **7.**	Repair the open circuit of harness between body integrated module and stop light switch.

	Step	Check	Yes	No
7	**CHECK HARNESS CONNECTOR BETWEEN BODY INTEGRATED MODULE AND STOP LIGHT SWITCH.** Measure the resistance of harness between body integrated module and stop light switch. ***Connector & terminal*** ***(B281) No. 23 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **8.**	Repair the short circuit of harness between body integrated module and stop light switch.
8	**CHECK POOR CONTACT.**	Is there poor contact in input signal of brake switch?	Repair the poor contact.	Check the body integrated module.

F: DTC P0720 OUTPUT SPEED SENSOR CIRCUIT

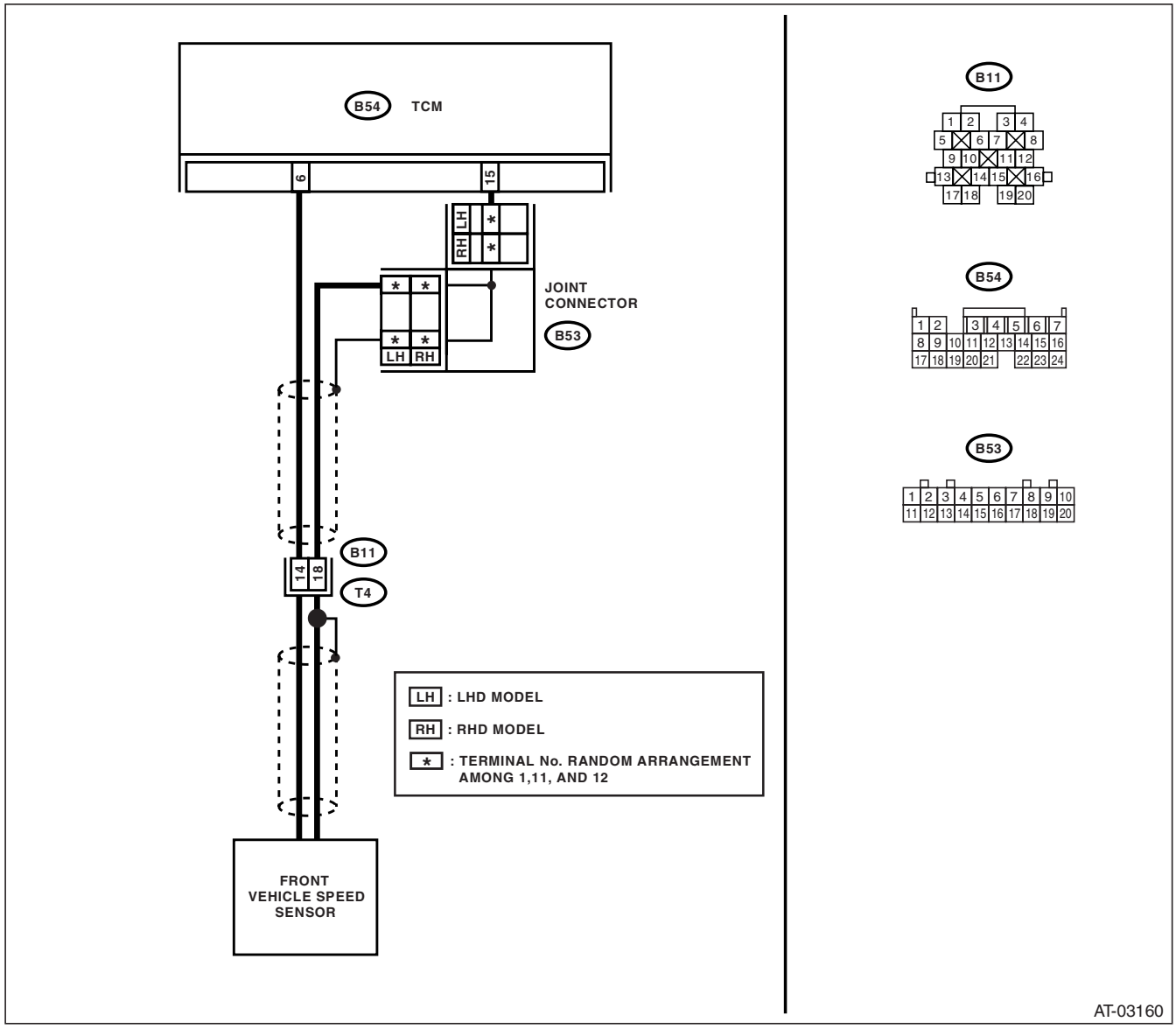
DTC DETECTING CONDITION:

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

TROUBLE SYMPTOM:

- The neutralizing control does not operate.
- The slip lock up control does not operate.
- 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 connectors from TCM and transmission. 3) Measure the resistance of harness between TCM and transmission connector. ***Connector & terminal*** ***(B54) No. 6 — (B11) No. 14:***	Is the resistance less than 1 Ω?	Go to step **2.**	Repair the open circuit of 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*** ***(B54) No. 15 — (B11) No. 18:***	Is the resistance less than 1 Ω?	Go to step **3.**	Repair the open circuit of harness between TCM and transmission connector, and poor contact in connector.
3	**CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION.** Measure the resistance of harness between TCM and transmission connector. ***Connector & terminal*** ***(B54) No. 6 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **4.**	Repair the short circuit of 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*** ***(B54) No. 15 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **5.**	Repair the short circuit of harness between TCM and transmission connector, and poor contact in 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-55, Front Vehicle Speed Sensor.>

	Step	Check	Yes	No
6	**CHECK INPUT SIGNAL FOR TCM USING SUBARU SELECT MONITOR.** 1) Connect all the connectors. 2) Connect the Subaru Select Monitor to data link connector. 3) Lift-up the vehicle. NOTE: Raise all wheels off floor. 4) Turn the ignition switch to ON and the Subaru Select Monitor power 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 (37 MPH). NOTE: The speed difference between front and rear wheels may light the ABS warning light or VDC warning light, but this indicates no malfunction. When AT control diagnosis is finished, perform the ABS memory clearance procedure or VDC memory clearance procedure of on-board diagnostics system. <Ref. to ABS(diag)-26, Clear Memory Mode.> <Ref. to VDC(diag)-25, Clear Memory Mode.>	Does the speedometer indication increase as the front wheel vehicle speed data of Subaru Select Monitor increases?	Even if the SPORT indicator light is blinking, the circuit has returned to normal condition at this time. A temporary poor contact of connector or harness may be the cause. Repair the harness in the 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-66, Transmission Control Module (TCM).>

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

DTC DETECTING CONDITION:

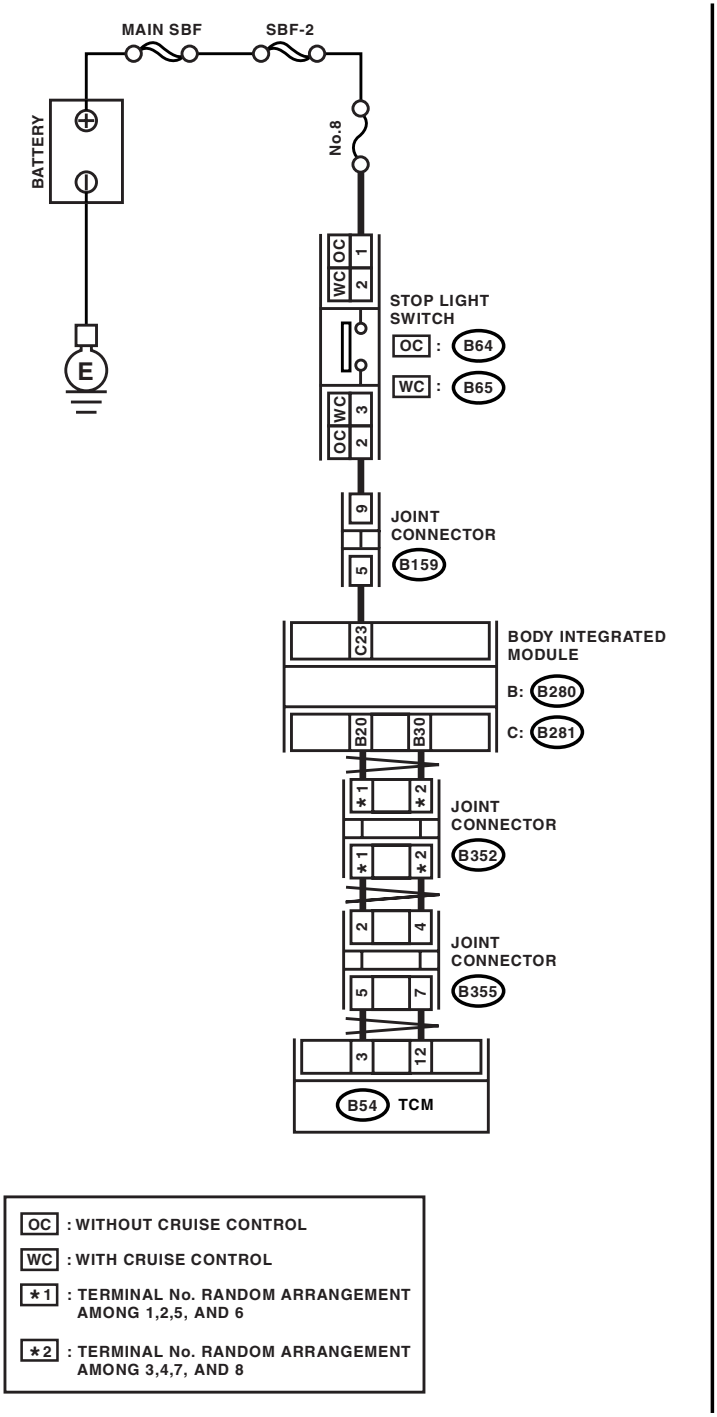
Brake switch malfunction, open input signal circuit

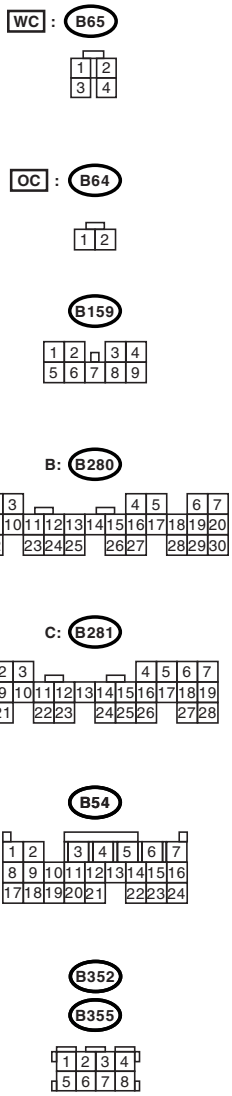
TROUBLE SYMPTOM:

- Gear is not shifted down when driving a down hill.
- The neutralizing control does not operate.

WIRING DIAGRAM:

- LHD model





OC : WITHOUT CRUISE CONTROL

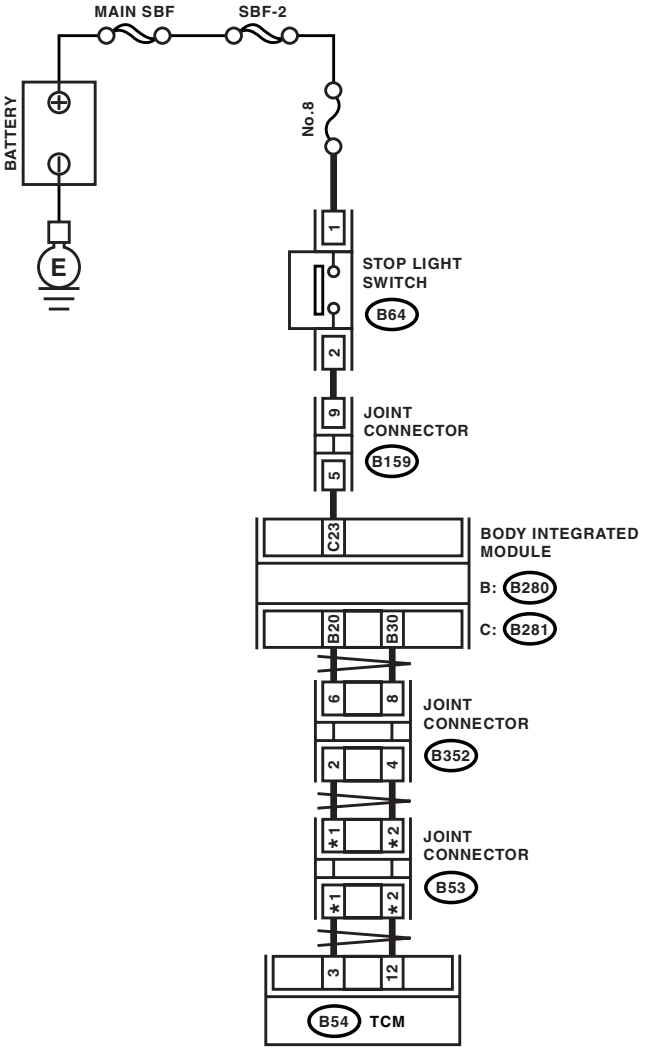
WC : WITH CRUISE CONTROL

*1 : TERMINAL No. RANDOM ARRANGEMENT AMONG 1,2,5, AND 6

*2 : TERMINAL No. RANDOM ARRANGEMENT AMONG 3,4,7, AND 8

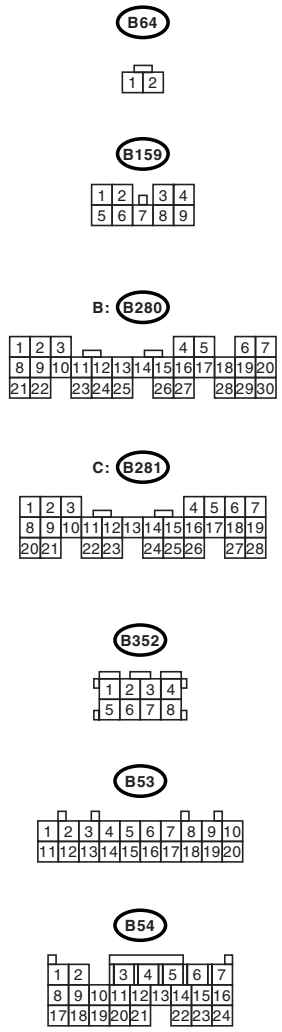
AT-03158

- RHD model



*1 : TERMINAL No. RANDOM ARRANGEMENT AMONG 8,18, AND 19

*2 : TERMINAL No. RANDOM ARRANGEMENT AMONG 9,10, AND 20



AT-03159

	Step	Check	Yes	No
1	**CHECK DTC.**	Does the DTC of CAN communication appear in the on-board diagnostics test mode?	Perform the diagnosis according to DTC.	Go to step **2.**
2	**CHECK BODY INTEGRATED MODULE.** 1) Turn the ignition switch to OFF. 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 power switch to ON. 5) Read the data of brake pedal switch using Subaru Select Monitor. <Ref. to 4AT(diag)-16, OPERATION, Subaru Select Monitor.>	Is OFF displayed?	Go to step **3.**	Go to step **4.**
3	**CHECK TCM.** Read the data of brake pedal switch using Subaru Select Monitor. <Ref. to 4AT(diag)-16, OPERATION, Subaru Select Monitor.>	Is OFF displayed?	A temporary poor contact of connector or harness may be the cause. Check the poor contact.	Replace the TCM. <Ref. to 4AT-66, Transmission Control Module (TCM).>
4	**CHECK BODY INTEGRATED MODULE INPUT SIGNAL.** 1) Disconnect the harness connector of body integrated module. 2) Measure the voltage of harness between body integrated module and stop light switch. ***Connector & terminal*** ***(B281) No. 23 (+) — Chassis ground (−):***	Is the voltage more than 10 V?	Go to step **5.**	Go to step **7.**
5	**CHECK STOP LIGHT SWITCH.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from stop light switch. 3) Measure the resistance of harness between stop light switch terminals. ***Terminal*** ***LHD model (With cruise control)*** ***No. 2 — No. 3:*** ***LHD model (Without cruise control)*** ***No. 1 — No. 2:*** ***RHD model*** ***No. 1 — No. 2:***	Is the resistance more than 1 MΩ?	Go to step **6.**	Replace the stop light switch.
6	**CHECK HARNESS CONNECTOR BETWEEN BODY INTEGRATED MODULE AND STOP LIGHT SWITCH.** 1) Turn the ignition switch to ON. 2) Measure the voltage of harness between body integrated module and chassis ground. ***Connector & terminal*** ***(B281) No. 23 (+) — Chassis ground (−):***	Is the voltage less than 1 V?	Go to step **7.**	Repair the short circuit of harness between TCM and stop light switch.
7	**CHECK POOR CONTACT.**	Is there poor contact in input signal of brake switch?	Repair the poor contact.	Check the body integrated module.

H: DTC P0725 ENGINE SPEED INPUT CIRCUIT

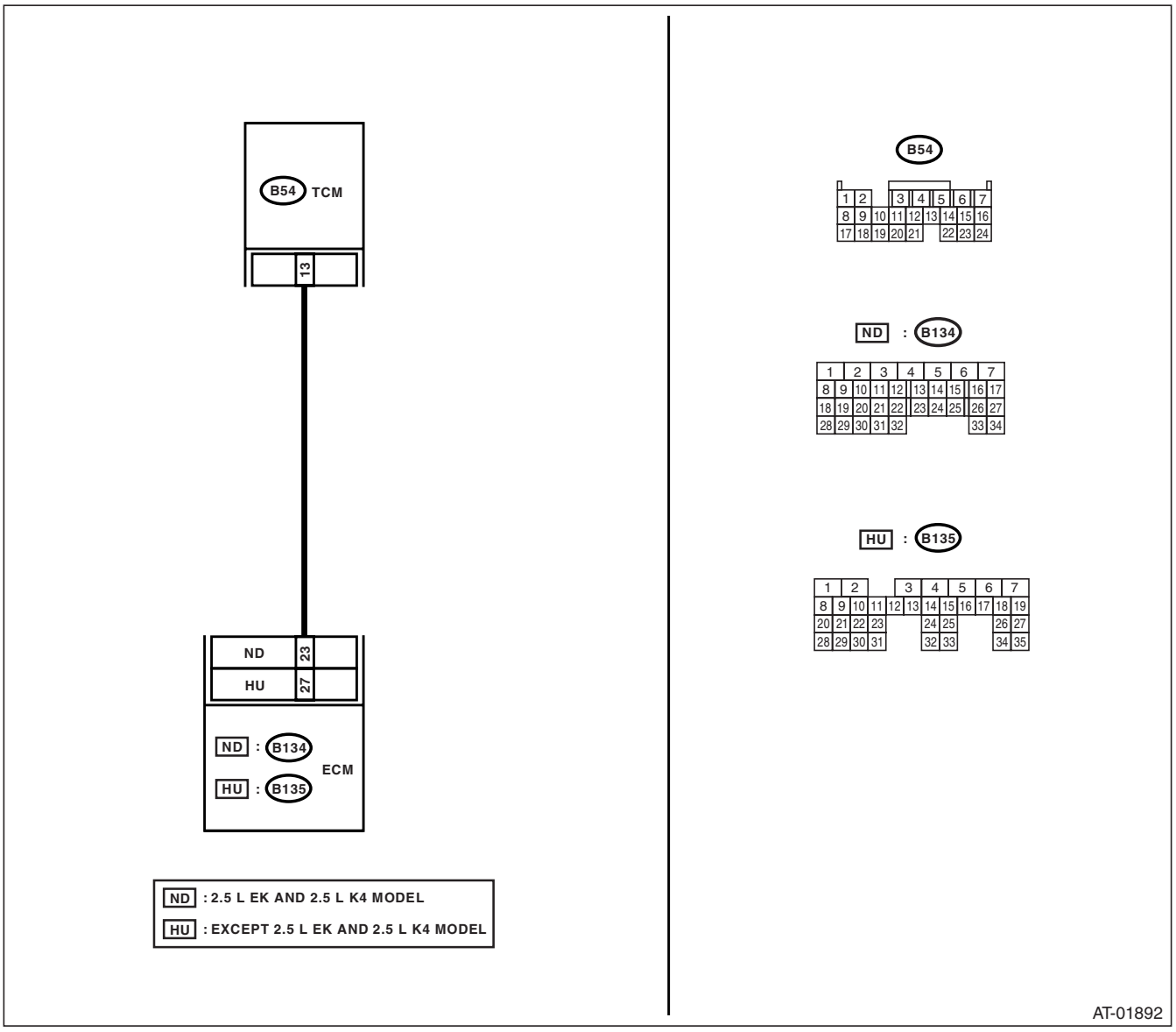
DTC DETECTING CONDITION:

Engine speed input signal circuit is open or shorted.

TROUBLE SYMPTOM:

- No lock-up occurs. (After engine is warmed-up)
- SPORT indicator light remains on when the 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 connector from TCM and ECM. 3) Measure the resistance of harness between TCM and ECM. ***Connector & terminal*** ***2.5 L EK and 2.5 L K4 model*** ***(B54) No. 13 — (B134) No. 23:*** ***Except for 2.5 L EK and 2.5 L K4 model*** ***(B54) No. 13 — (B135) No. 27:***	Is the resistance less than 1 Ω?	Go to step **2.**	Repair the open circuit of 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. 13 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **3.**	Repair the short circuit of 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 the Subaru Select Monitor power switch to ON. 4) Run the engine at idle. 5) Read the data of engine speed using Subaru Select Monitor. • Display shows engine speed signal value sent from ECM.	Is the revolution value same as the tachometer reading shown on the combination meter?	Even if the SPORT indicator light is blinking, the circuit has returned to normal condition at this time. A temporary poor contact of connector or harness may be the cause. Repair the harness or connector in the 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 the memory has been cleared?	Replace the TCM. <Ref. to 4AT-66, Transmission Control Module (TCM).>	Replace the ECM. <Ref. to FU(H4SO 2.0)-34, Engine Control Module (ECM).>

I: DTC P0731 GEAR 1 INCORRECT RATIO

NOTE:
Refer to DTC P0736 for diagnostic procedure. <Ref. to 4AT(diag)-62, DTC P0736 REVERSE INCORRECT RATIO, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

J: DTC P0732 GEAR 2 INCORRECT RATIO

NOTE:
Refer to DTC P0736 for diagnostic procedure. <Ref. to 4AT(diag)-62, DTC P0736 REVERSE INCORRECT RATIO, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

K: DTC P0733 GEAR 3 INCORRECT RATIO

NOTE:
Refer to DTC P0736 for diagnostic procedure. <Ref. to 4AT(diag)-62, DTC P0736 REVERSE INCORRECT RATIO, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

L: DTC P0734 GEAR 4 INCORRECT RATIO

NOTE:
Refer to DTC P0736 for diagnostic procedure. <Ref. to 4AT(diag)-62, DTC P0736 REVERSE INCORRECT RATIO, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

M: DTC P0736 REVERSE INCORRECT RATIO

DTC DETECTING CONDITION:

Vehicle sensor, torque converter turbine speed sensor or control valve malfunction

TROUBLE SYMPTOM:

- Shift point is too high or too low.
- Excessive shift shock
- Tight corner braking phenomenon 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 on Subaru Select Monitor display.	Does the value of accelerator pedal position sensor change from 0% to 100% smoothly when throttle was operated from fully closing to fully opening?	Go to step **2.**	Check the accelerator pedal position sensor circuit. <Ref. to 4AT(diag)-89, DTC P1708 THROTTLE POSITION SENSOR CIRCUIT LOW INPUT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
2	**CHECK FRONT VEHICLE SPEED SENSOR.** 1) Lift-up the vehicle. 2) Start the engine. 3) Shift the select lever “D” range and slowly increase vehicle speed. NOTE: The speed difference between front and rear wheels may light the ABS warning light or VDC warning light, but this indicates no malfunction. When AT control diagnosis is finished, perform the ABS memory clearance procedure or VDC memory clearance procedure of on-board diagnostics system. <Ref. to ABS(diag)-26, Clear Memory Mode.> <Ref. to VDC(diag)-25, Clear Memory Mode.>	Does the vehicle speed displayed by Subaru Select Monitor almost correspond with vehicle speed indicated by combination meter?	Go to step **3.**	Check front vehicle speed sensor circuit.
3	**CHECK TORQUE CONVERTER TURBINE SPEED SENSOR.** 1) Shift 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 torque converter turbine speed sensor circuit.

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

DTC DETECTING CONDITION:

- Lock up clutch malfunction
- Valve anchoring

TROUBLE SYMPTOM:

No lock-up occurs.

	Step	Check	Yes	No
1	**CHECK LOCK-UP DUTY SOLENOID CIRCUIT.** Diagnose according to DTC P0743 procedure.	Is there any trouble?	Repair or replace the lock-up duty solenoid circuit.	Go to step **2.**
2	**CHECK INHIBITOR SWITCH CIRCUIT.** Diagnose according to DTC P0705 procedure.	Is there any trouble?	Repair or replace the inhibitor switch circuit.	Go to step **3.**
3	**CHECK STOP LIGHT SWITCH CIRCUIT.** Diagnose according to DTC P0719 and P0724 procedure.	Is there any trouble?	Repair or replace the stop light switch circuit.	Go to step **4.**
4	**CHECK ATF TEMPERATURE SENSOR CIRCUIT.** Diagnose according to DTC P0712 AND P0713 procedure.	Is there any trouble?	Repair or replace the ATF temperature sensor 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 on Subaru Select Monitor display.	Does the value of accelerator pedal position sensor change from 0% to 100% smoothly when throttle 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) Shift the select lever to “P” or “N” range. 2) Idle the engine.	Does the turbine speed displayed by Subaru Select Monitor almost correspond with turbine speed indicated by tachometer?	Go to step **7.**	Check torque converter turbine speed sensor circuit.
7	**CHECK ENGINE SPEED SIGNAL.** Idle the engine.	Does the engine speed displayed by Subaru Select Monitor almost correspond with engine speed indicated by tachometer?	There is transmission assembly mechanical malfunction.	Check engine speed signal circuit.

O: DTC P0743 TORQUE CONVERTER CLUTCH CIRCUIT ELECTRICAL

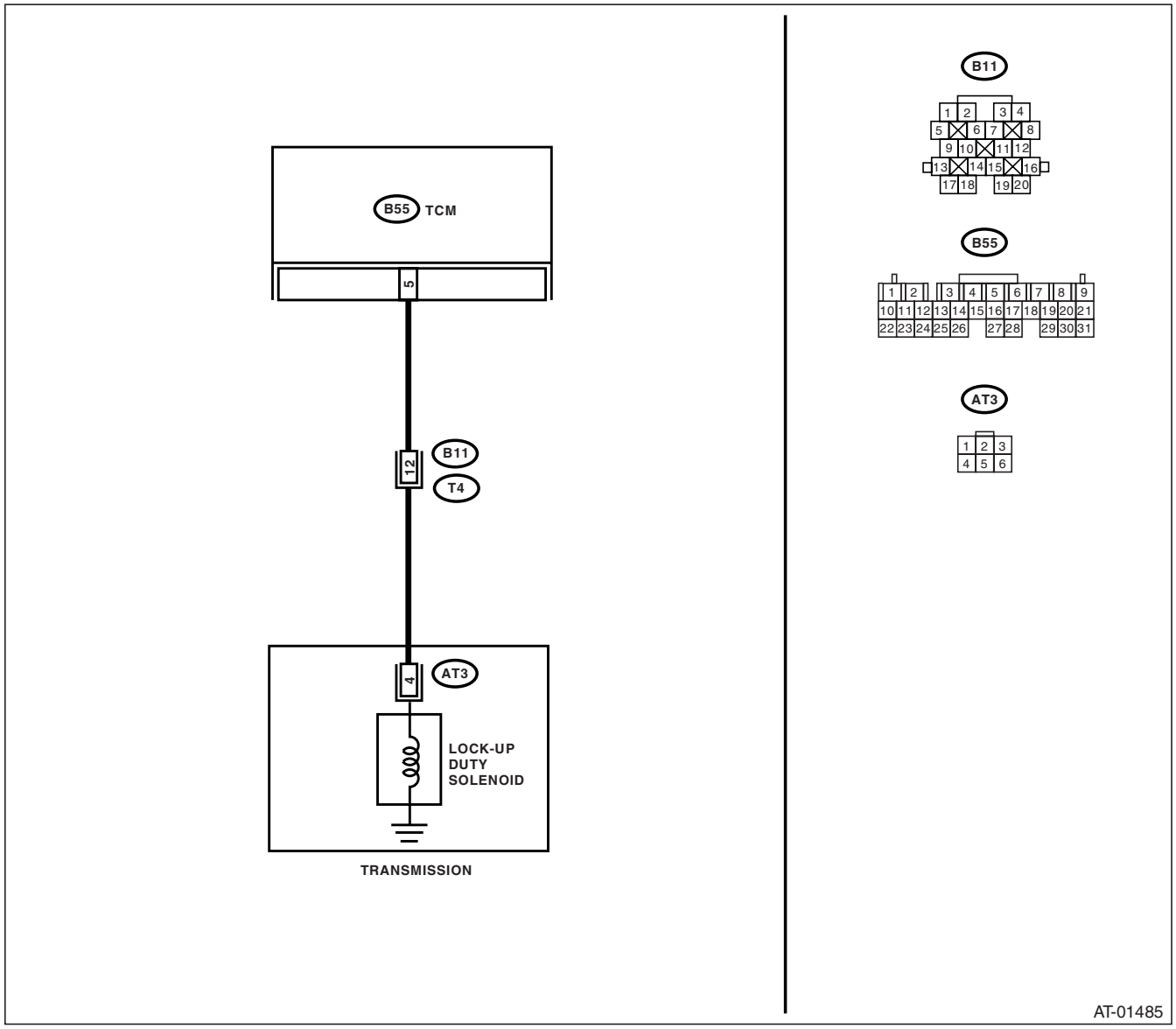
DTC DETECTING CONDITION:

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

TROUBLE SYMPTOM:

No lock-up occurs. (After engine is warmed-up)

WIRING DIAGRAM:



Step		Check	Yes	No
1	**CHECK ANY OTHER DTC ON DISPLAY.**	Is any other DTC displayed?	Perform the diagnosis according to DTC.	Go to step **2.**

	Step	Check	Yes	No
2	**CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from TCM and transmission. 3) Measure the resistance of harness between TCM and transmission connector. ***Connector & terminal*** ***(B55) No. 5 — (B11) No. 12:***	Is the resistance less than 1 Ω?	Go to step **3.**	Repair the open circuit of harness between TCM and transmission connector.
3	**CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION.** Measure the resistance of harness connector between TCM connector and chassis ground. ***Connector & terminal*** ***(B55) No. 5 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **4.**	Repair the short circuit of 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 — 6.0 Ω?	Go to step **5.**	Go to step **8.**
5	**CHECK OUTPUT SIGNAL EMITTED FROM TCM USING SUBARU SELECT MONITOR.** 1) Connect the connectors to TCM and transmission. 2) Lift-up the vehicle. NOTE: Raise all wheels off floor. 3) Connect the Subaru Select Monitor to data link connector. 4) Start the engine, and turn the Subaru Select Monitor power switch to ON. 5) Start the engine and warm-up the engine until the ATF temperature exceeds 80°C (176°F). NOTE: If the ambient temperature is below 0°C (32°F), drive the vehicle until the 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) Shift the select lever to "D", and slowly increase vehicle speed to 60 km/h (37 MPH). NOTE: The speed difference between front and rear wheels may light the ABS warning light or VDC warning light, but this indicates no malfunction. When AT control diagnosis is finished, perform the ABS memory clearance procedure or VDC memory clearance procedure of on-board diagnostics system. <Ref. to ABS(diag)-26, Clear Memory Mode.> <Ref. to VDC(diag)-25, Clear Memory Mode.>	Is the value 95%?	Go to step **6.**	Go to step **7.**

	Step	Check	Yes	No
6	**CHECK OUTPUT SIGNAL EMITTED FROM TCM USING SUBARU SELECT MONITOR.** Return the engine to idling speed, shift the select lever to "N" range and read the data. NOTE: The speed difference between front and rear wheels may light the ABS warning light or VDC warning light, but this indicates no malfunction. When AT control diagnosis is finished, perform the ABS memory clearance procedure or VDC memory clearance procedure of on-board diagnostics system. <Ref. to ABS(diag)-26, Clear Memory Mode.> <Ref. to VDC(diag)-25, Clear Memory Mode.>	Is the value 5%?	Even if the SPORT indicator light is blinking, the circuit has returned to normal condition at this time. A temporary poor contact of 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 lock-up duty solenoid circuit?	Repair the poor contact.	Replace the TCM. <Ref. to 4AT-66, Transmission Control Module (TCM).>
8	**CHECK LOCK-UP DUTY SOLENOID (IN TRANSMISSION).** 1) Disconnect the transmission connector. 2) Drain the ATF. **CAUTION:** **Do not drain ATF until it cools down.** 3) Remove the oil pan, and disconnect the connector from control valve body. 4) Measure the resistance between lock-up duty solenoid and transmission ground. ***Connector & terminal*** ***(AT3) No. 4 — Transmission ground:***	Is the resistance 2.0 — 6.0 Ω?	Go to step **9.**	Replace the control valve body. <Ref. to 4AT-62, Control Valve Body.>
9	**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 — (AT3) No. 4:***	Is the resistance less than 1 Ω?	Go to step **10.**	Repair the open circuit of harness between TCM and transmission connector.
10	**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 SPORT indicator light is blinking, the circuit has returned to normal condition at this time. A temporary poor contact of connector or harness may be the cause. Repair the harness or connector in lock-up duty solenoid and transmission.	Repair the short circuit of harness between lock-up duty solenoid and transmission connector.

P: DTC P0748 PRESSURE CONTROL SOLENOID "A" ELECTRICAL

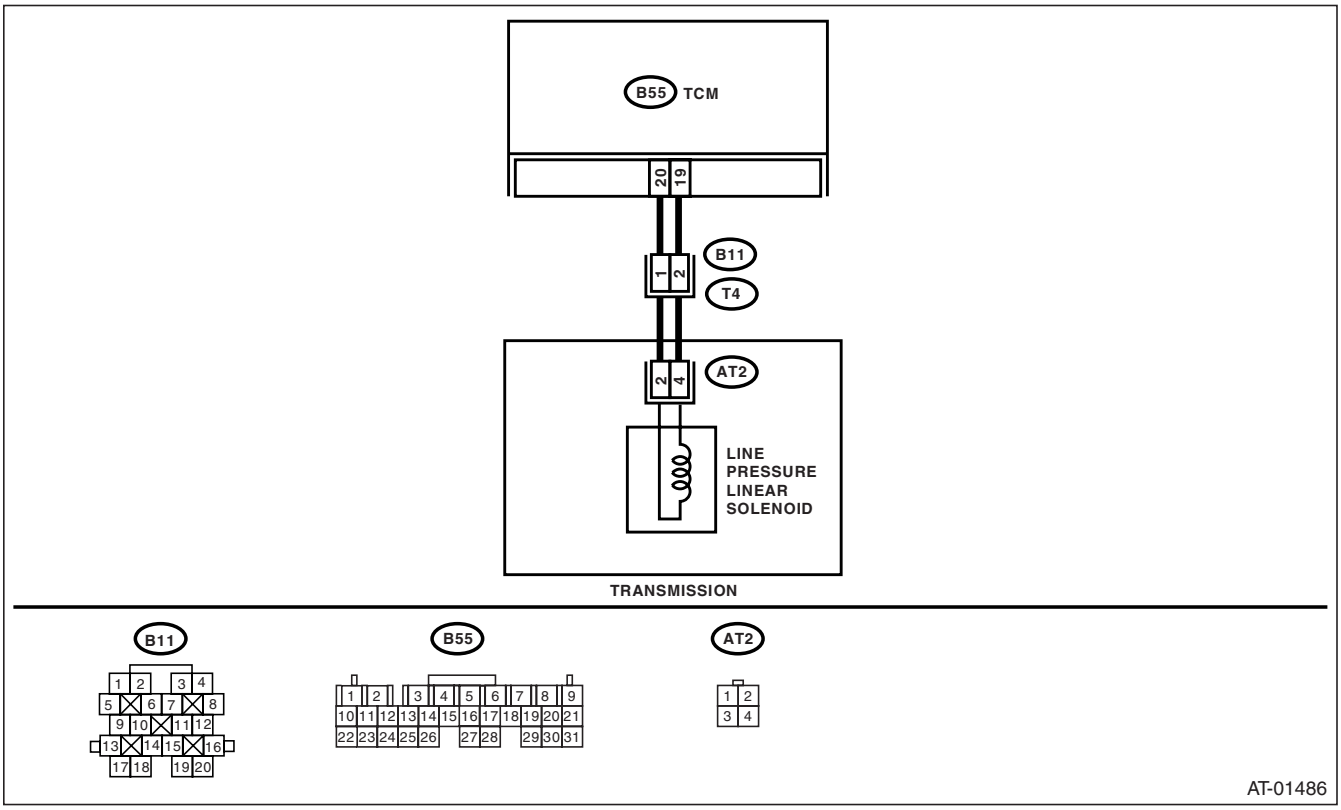
DTC DETECTING CONDITION:

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*** ***(B55) No. 19 — (B11) No. 2:*** ***(B55) No. 20 — (B11) No. 1:***	Is the resistance less than 1 Ω?	Go to step **2.**	Repair the open circuit of 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*** ***(B55) No. 19 — Chassis ground:*** ***(B55) No. 20 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **3.**	Repair the short circuit of 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 — 8 Ω?	Repair the TCM. <Ref. to 4AT-66, Transmission Control Module (TCM).>	Go to step **4.**

	Step	Check	Yes	No
4	**CHECK LINE PRESSURE LINEAR SOLENOID (IN TRANSMISSION).** 1) Remove the transmission connector from bracket. 2) Drain the ATF. **CAUTION:** **Do not drain ATF until it cools down.** 3) Remove the oil pan, and disconnect the connector from control valve body. 4) Measure the resistance between line pressure linear solenoid connector terminals. ***Connector & terminal*** ***(AT2) No. 2 — No. 4:***	Is the resistance 4 — 8 Ω?	Go to step **5.**	Replace the control valve body. <Ref. to 4AT-62, 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 — (AT2) No. 4:*** ***(T4) No. 1 — (AT2) No. 2:***	Is the resistance less than 1 Ω?	Go to step **6.**	Repair the open circuit of harness between line pressure linear solenoid and transmission connector.
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 SPORT indicator light is blinking, the circuit has returned to normal condition at this time. A temporary poor contact of connector or harness may be the cause. Repair the harness or connector in line pressure linear solenoid and transmission.	Repair the short circuit of harness between line pressure linear solenoid and transmission connector.

Q: DTC P0753 SHIFT SOLENOID “A” ELECTRICAL

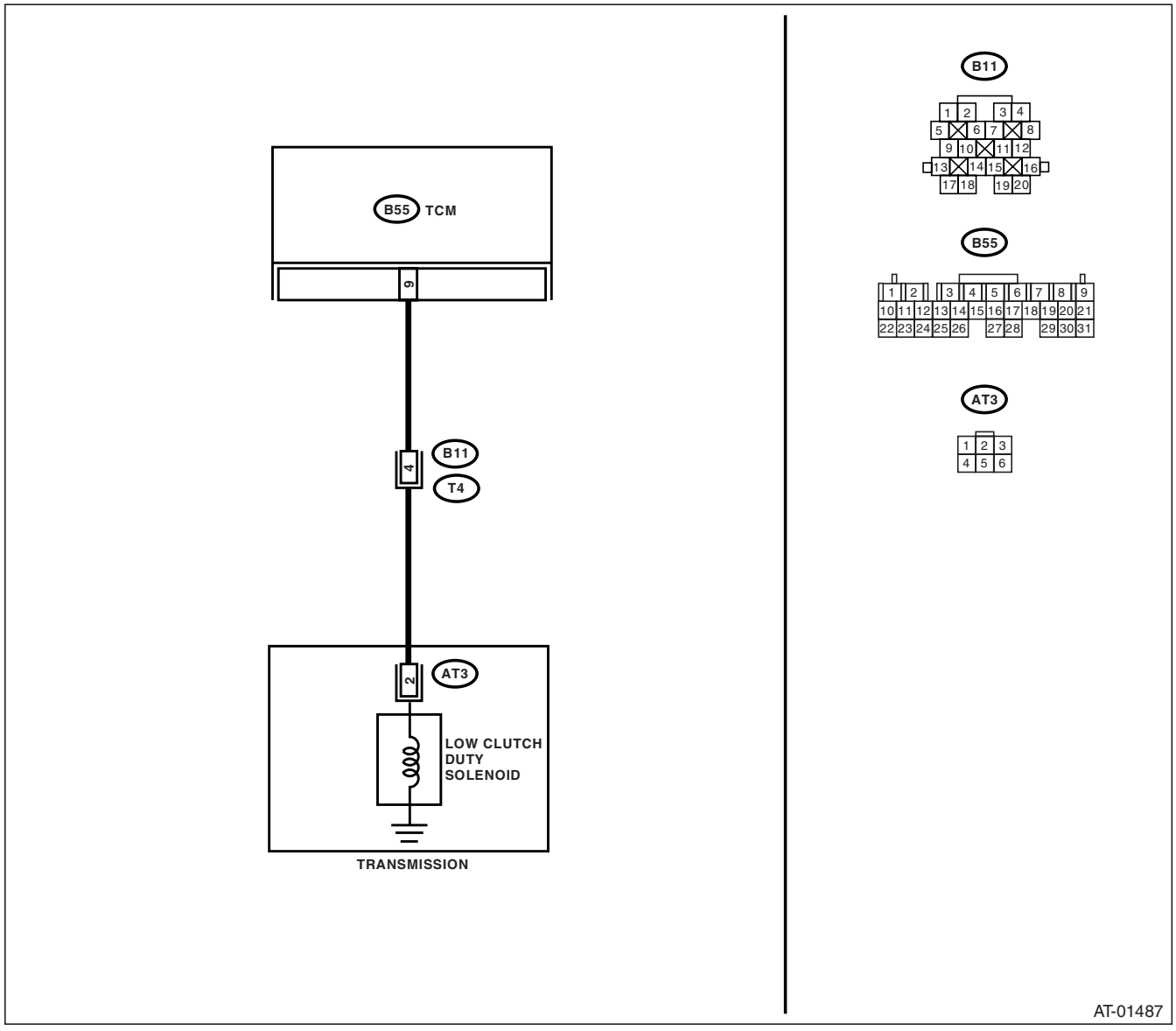
DTC DETECTING CONDITION:

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 connectors from TCM and transmission. 3) Measure the resistance of harness between TCM and transmission connector. ***Connector & terminal*** ***(B55) No. 9 — (B11) No. 4:***	Is the resistance less than 1 Ω?	Go to step **2.**	Repair the open circuit of 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*** ***(B55) No. 9 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **3.**	Repair the short circuit of 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 **5.**	Go to step **4.**
4	**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 the Subaru Select Monitor power switch to ON. 4) Warm-up the transmission until the ATF temperature exceeds approx. 80°C (176°F). NOTE: If the ambient temperature is below 0°C (32°F), drive the vehicle until the ATF reaches its operating temperature. 5) Stop the engine and turn the ignition switch to ON (engine OFF). 6) Shift the select lever to “P” or “N” range, and depress the 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 **7.**
5	**CHECK OUTPUT SIGNAL EMITTED FROM TCM USING SUBARU SELECT MONITOR.** 1) Turn the ignition switch to ON (engine OFF). 2) Shift the select lever to “D” range. 3) Read the data of low clutch duty solenoid.	Is the value 0%?	Even if the SPORT indicator light is blinking, the circuit has returned to normal condition at this time. A temporary poor contact of 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-66, 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 ATF until it cools down.** 3) Remove the oil pan, and disconnect the connector from control valve body. 4) Measure the resistance between low clutch duty solenoid connector and transmission ground. ***Connector & terminal*** ***(AT3) No. 2 — Transmission ground:***	Is the resistance 2.0 — 6.0 Ω?	Go to step **8.**	Replace the control valve body. <Ref. to 4AT-62, 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 — (AT3) No. 2:***	Is the resistance less than 1 Ω?	Go to step **9.**	Repair the open circuit of 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 SPORT indicator light is blinking, the circuit has returned to normal condition at this time. A temporary poor contact of connector or harness may be the cause. Repair the harness or connector in low clutch duty solenoid and transmission.	Repair the short circuit of harness between low clutch duty solenoid and transmission connector.

R: DTC P0758 SHIFT SOLENOID “B” ELECTRICAL

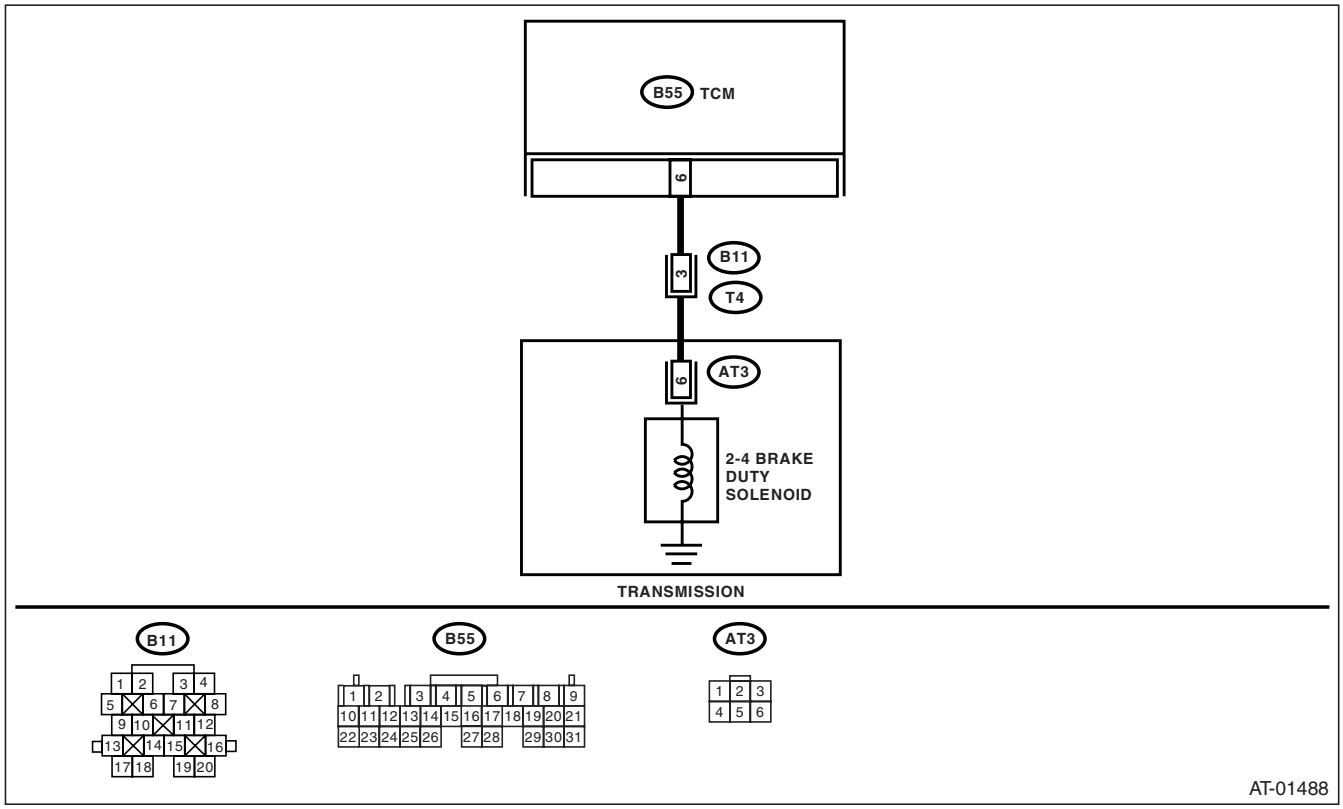
DTC DETECTING CONDITION:

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 connectors from TCM and transmission. 3) Measure the resistance of harness between TCM and transmission connector. ***Connector & terminal*** ***(B55) No. 6 — (B11) No. 3:***	Is the resistance less than 1 Ω?	Go to step **2.**	Repair the open circuit of 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*** ***(B55) No. 6 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **3.**	Repair the short circuit of 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.**

	Step	Check	Yes	No
4	**CHECK OUTPUT SIGNAL EMITTED FROM TCM USING SUBARU SELECT MONITOR.** 1) Connect all the connectors. 2) Connect the Subaru Select Monitor to data link connector. 3) Start the engine, and turn the Subaru Select Monitor power switch to ON. 4) Warm-up the transmission until the ATF temperature exceeds approx. 80°C (176°F). NOTE: If the ambient temperature is below 0°C (32°F), drive the vehicle until the ATF reaches its operating temperature. 5) Stop the engine and turn the ignition switch to ON (engine OFF). 6) Shift the select lever to "N" range, and depress the accelerator pedal. 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 EMITTED FROM TCM USING SUBARU SELECT MONITOR.** Shift the select lever to 2nd on manual mode.	Is the value 0%?	Even if the SPORT indicator light is blinking, the circuit has returned to normal condition at this time. A temporary poor contact of 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-66, Transmission Control Module (TCM).>
7	**CHECK 2-4 BRAKE DUTY SOLENOID (IN TRANSMISSION).** 1) Remove the transmission connector from bracket. 2) Drain the ATF. **CAUTION:** **Do not drain ATF until it cools down.** 3) Remove the oil pan, and disconnect the connector from 2-4 brake duty solenoid. 4) Measure the resistance of harness between 2-4 brake duty solenoid connector and transmission ground. ***Connector & terminal*** ***(AT3) No. 6 — Transmission ground:***	Is the resistance 2.0 — 6.0 Ω?	Go to step **8.**	Replace the control valve body. <Ref. to 4AT-62, Control Valve Body.>

	Step	Check	Yes	No
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 — (AT3) No. 6:***	Is the resistance less than 1 Ω?	Go to step **9.**	Repair the open circuit of 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 SPORT indicator light is blinking, the circuit has returned to normal condition at this time. A temporary poor contact of connector or harness may be the cause. Repair the harness or connector in 2-4 brake duty solenoid and transmission.	Repair the short circuit of harness between 2-4 brake duty solenoid and transmission connector.

S: DTC P0763 SHIFT SOLENOID "C" ELECTRICAL

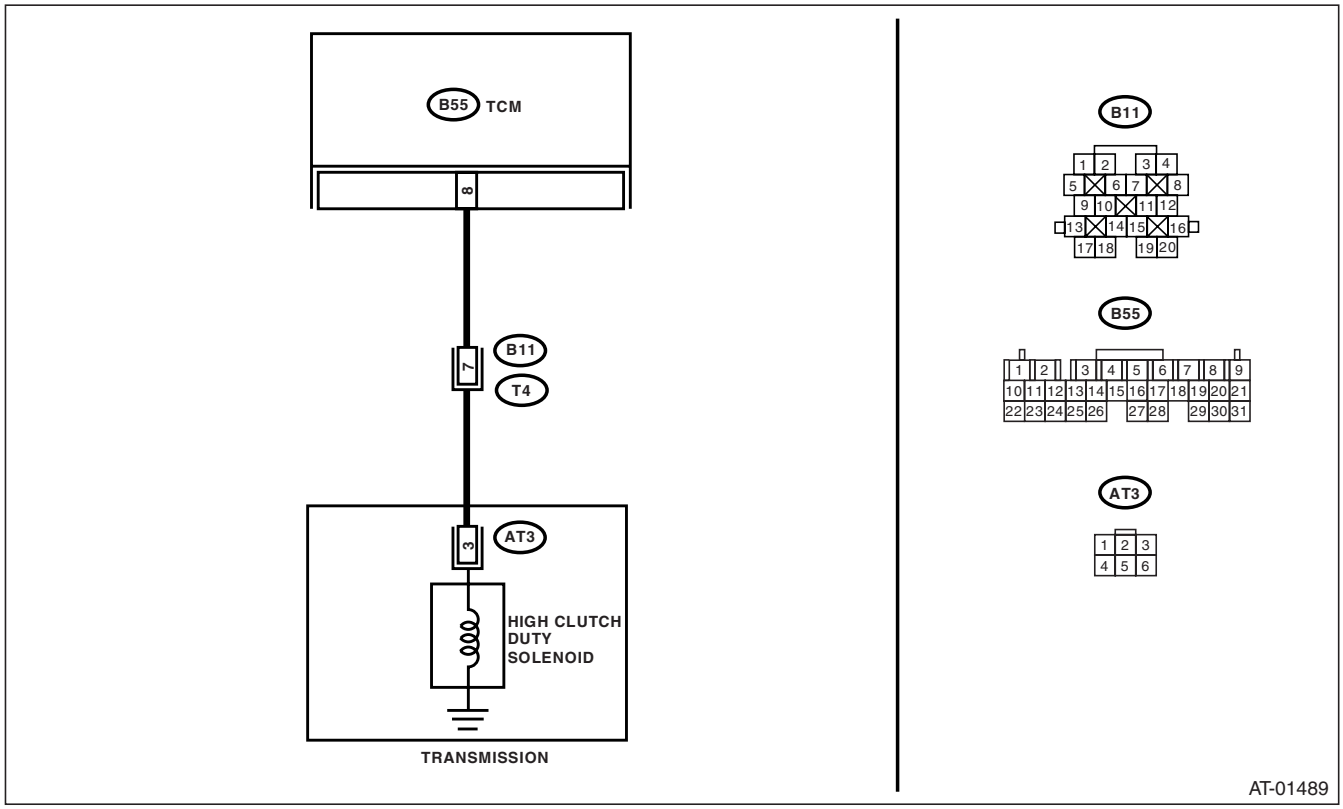
DTC DETECTING CONDITION:

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 connectors from TCM and transmission. 3) Measure the resistance of harness between TCM and transmission connector. ***Connector & terminal*** ***(B55) No. 8 — (B11) No. 7:***	Is the resistance less than 1 Ω?	Go to step **2.**	Repair the open circuit of harness between TCM and transmission connector.
2	**CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION.** Measure the resistance of harness connector between TCM connector and chassis ground. ***Connector & terminal*** ***(B55) No. 8 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **3.**	Repair the short circuit of 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.**

	Step	Check	Yes	No
4	**CHECK OUTPUT SIGNAL EMITTED FROM TCM USING SUBARU SELECT MONITOR.** 1) Connect the connectors to TCM and transmission. 2) Lift-up the vehicle. NOTE: Raise all wheels off floor. 3) Connect the Subaru Select Monitor to data link connector. 4) Start the engine, and turn the Subaru Select Monitor power switch to ON. 5) Start the engine and warm-up the engine until the ATF temperature exceeds 80°C (176°F). NOTE: If the ambient temperature is below 0°C (32°F), drive the vehicle until the 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) Shift the select lever to "D", and slowly increase vehicle speed at 3rd or 4th to measure. NOTE: The speed difference between front and rear wheels may light the ABS warning light or VDC warning light, but this indicates no malfunction. When AT control diagnosis is finished, perform the ABS memory clearance procedure or VDC memory clearance procedure of on-board diagnostics system. <Ref. to ABS(diag)-26, Clear Memory Mode.> <Ref. to VDC(diag)-25, Clear Memory Mode.>	Is the value 0%?	Go to step **5.**	Go to step **6.**
5	**CHECK OUTPUT SIGNAL EMITTED FROM TCM USING SUBARU SELECT MONITOR.** Return the engine to idling speed and shift the select lever to "N" range. NOTE: The speed difference between front and rear wheels may light the ABS warning light or VDC warning light, but this indicates no malfunction. When AT control diagnosis is finished, perform the ABS memory clearance procedure or VDC memory clearance procedure of on-board diagnostics system. <Ref. to ABS(diag)-26, Clear Memory Mode.> <Ref. to VDC(diag)-25, Clear Memory Mode.>	Is the value 100%?	Even if the SPORT indicator light is blinking, the circuit has returned to normal condition at this time. A temporary poor contact of 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 solenoid circuit?	Repair the poor contact.	Replace the TCM. <Ref. to 4AT-66, Transmission Control Module (TCM).>

	Step	Check	Yes	No
7	**CHECK HIGH CLUTCH DUTY SOLENOID (IN TRANSMISSION).** 1) Remove the transmission connector from bracket. 2) Drain the ATF. **CAUTION:** **Do not drain ATF until it cools down.** 3) Remove the oil pan, and disconnect the control valve body connector. 4) Measure the resistance between high clutch duty solenoid connector and transmission ground. ***Connector & terminal*** ***(AT3) No. 3 — Transmission ground:***	Is the resistance 2.0 — 6.0 Ω?	Go to step **8.**	Replace the control valve body. <Ref. to 4AT-62, 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 — (AT3) No. 3:***	Is the resistance less than 1 Ω?	Go to step **9.**	Repair the open circuit of 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 SPORT indicator light is blinking, the circuit has returned to normal condition at this time. A temporary poor contact of connector or harness may be the cause. Repair the harness or connector in high clutch duty solenoid and transmission.	Repair the short circuit of harness between high clutch duty solenoid and transmission connector.

T: DTC P0768 SHIFT SOLENOID "D" ELECTRICAL

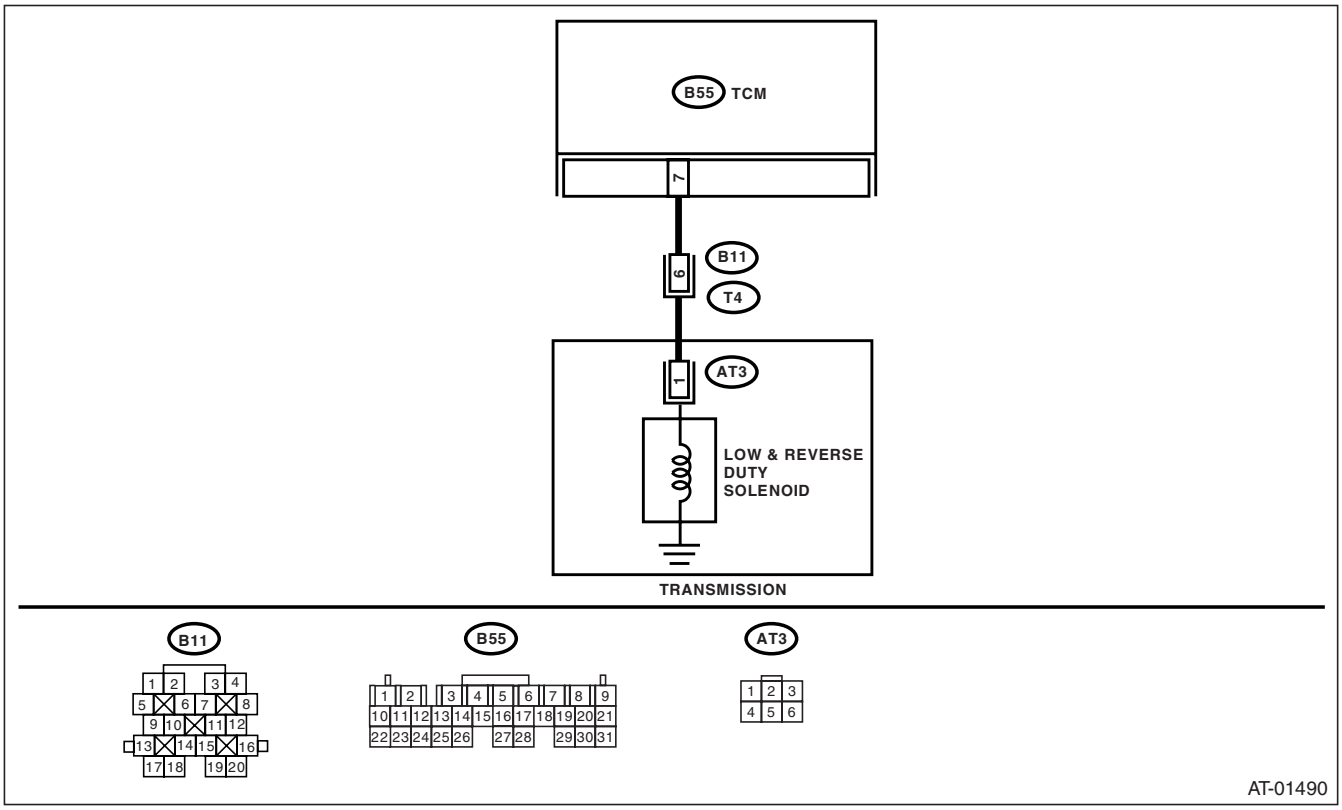
DTC DETECTING CONDITION:

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*** ***(B55) No. 7 — (B11) No. 6:***	Is the resistance less than 1 Ω?	Go to step **2.**	Repair the open circuit of 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*** ***(B55) No. 7 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **3.**	Repair the short circuit of harness between TCM and transmission connector.
3	**CHECK LOW & REVERSE DUTY SOLENOID.** Measure the resistance between transmission connector terminals. ***Connector & terminal*** ***(T4) No. 6 — No. 20:***	Is the resistance 2.0 — 6.0 Ω?	Go to step **4.**	Go to step **7.**

	Step	Check	Yes	No
4	**CHECK OUTPUT SIGNAL EMITTED FROM TCM USING SUBARU SELECT MONITOR.** 1) Connect all the connectors. 2) Connect the Subaru Select Monitor to data link connector. 3) Start the engine, and turn the Subaru Select Monitor power switch to ON. 4) Warm-up the transmission until the ATF temperature exceeds approx. 80°C (176°F). NOTE: If the ambient temperature is below 0°C (32°F), drive the vehicle until the ATF reaches its operating temperature. 5) Stop the engine and turn the ignition switch to ON (engine OFF). 6) Shift 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 EMITTED FROM TCM USING SUBARU SELECT MONITOR.** 1) Lift-up the vehicle. NOTE: Raise all wheels off floor. 2) Shift the select lever to manual mode, and then hold it on 1st. Slowly increase the vehicle speed up to 15 km/h (9 MPH), and then return the accelerator pedal. NOTE: The speed difference between front and rear wheels may light the ABS warning light or VDC warning light, but this indicates no malfunction. When AT control diagnosis is finished, perform the ABS memory clearance procedure or VDC memory clearance procedure of on-board diagnostics system. <Ref. to ABS(diag)-26, Clear Memory Mode.> <Ref. to VDC(diag)-25, Clear Memory Mode.> 3) Read the data of low & reverse duty solenoid.	Is the value 55%?	Even if the SPORT indicator light is blinking, the circuit has returned to normal condition at this time. A temporary poor contact of 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-66, Transmission Control Module (TCM).>

	Step	Check	Yes	No
7	**CHECK LOW & REVERSE DUTY SOLENOID (IN TRANSMISSION).** 1) Remove the transmission connector from bracket. 2) Drain the ATF. **CAUTION:** **Do not drain ATF until it cools down.** 3) Remove the oil pan, and disconnect the connector from control valve body. 4) Measure the resistance between low & reverse duty solenoid connector and transmission ground. ***Connector & terminal*** ***(AT3) No. 1 — Transmission ground:***	Is the resistance 2.0 — 6.0 Ω?	Go to step **8.**	Replace the control valve body. <Ref. to 4AT-62, 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 — (AT3) No. 1:***	Is the resistance less than 1 Ω?	Go to step **9.**	Repair the open circuit of harness between low & reverse duty solenoid and transmission connector.
9	**CHECK HARNESS CONNECTOR BETWEEN TRANSMISSION AND LOW & REVERSE 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 SPORT indicator light is blinking, the circuit has returned to normal condition at this time. A temporary poor contact of connector or harness may be the cause. Repair the harness or connector in low & reverse duty solenoid and transmission.	Repair the short circuit of harness between low & reverse brake solenoid and transmission connector.

U: DTC P0801 REVERSE INHIBIT CONTROL CIRCUIT

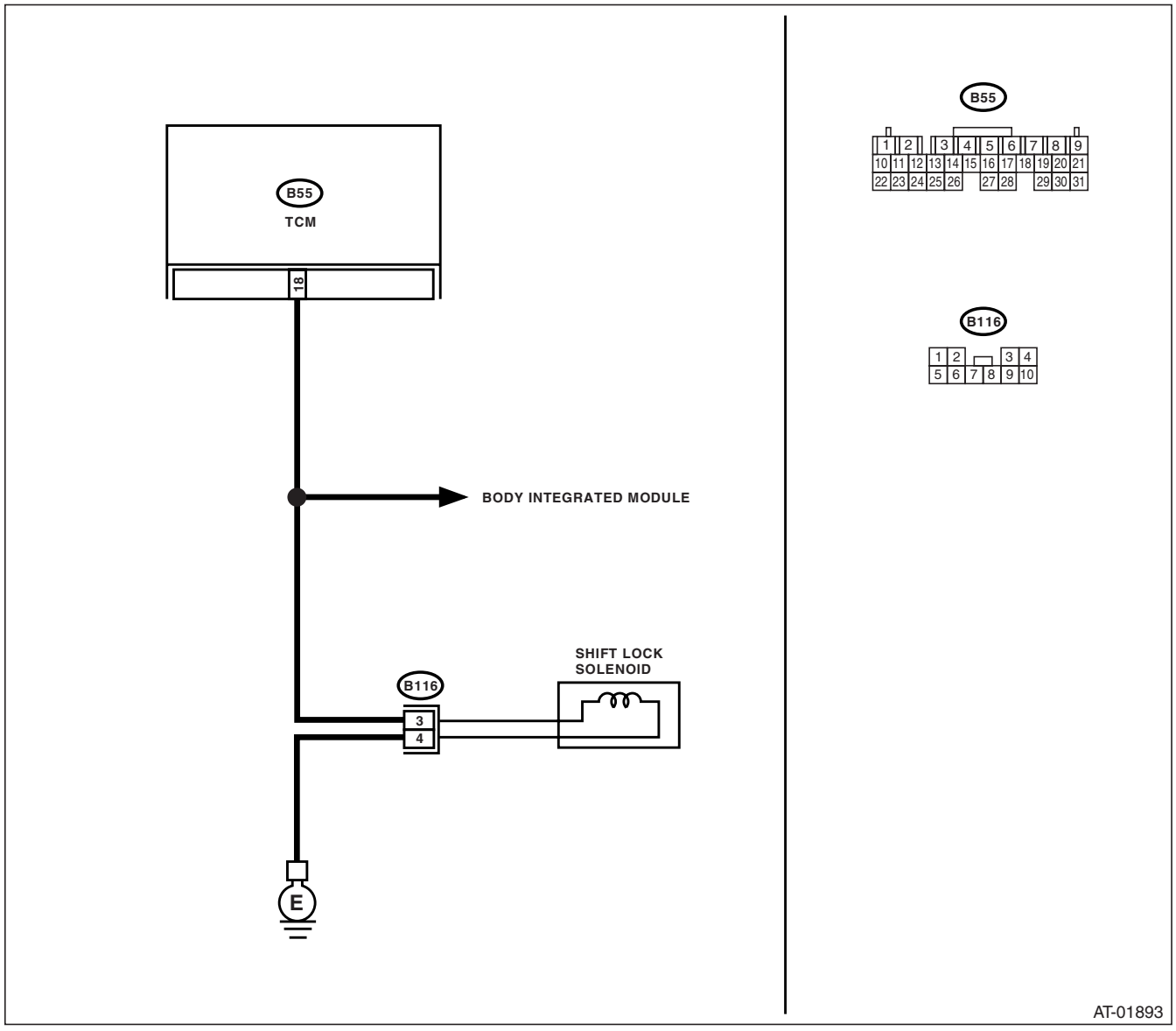
DTC DETECTING CONDITION:

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 cannot 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 of harness between TCM and shift lock solenoid connector. ***Connector & terminal*** ***(B55) No. 18 — (B116) No. 3:***	Is the resistance less than 1 Ω?	Go to step **2.**	Repair the open circuit of harness between TCM and shift lock solenoid connector.

	Step	Check	Yes	No
2	**CHECK HARNESS CONNECTOR BETWEEN TCM AND SHIFT LOCK SOLENOID.** 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 **3.**	Repair the short circuit of harness between TCM and shift lock solenoid connector.
3	**CHECK HARNESS BETWEEN SHIFT LOCK SOLENOID AND CHASSIS GROUND TERMINAL.** Measure the resistance of harness between shift lock solenoid and chassis ground. ***Connector & terminal*** ***(B116) No. 4 — Chassis ground:***	Is the resistance less than 1 Ω?	Go to step **4.**	Repair the open circuit of harness between chassis ground and shift lock solenoid connector.
4	**CHECK SHIFT LOCK SOLENOID.** Measure the resistance of shift lock solenoid terminals. ***Connector & terminal*** ***(B116) No. 3 — No. 4:***	Is the resistance 12 — 18 Ω?	Go to step **5.**	Replace the shift lock solenoid.
5	**CHECK OUTPUT SIGNAL OF TCM.** 1) Connect all the connectors. 2) Turn the ignition switch to ON. 3) Shift the select lever to “D” range. 4) Measure the voltage between TCM and chassis ground. ***Connector & terminal*** ***(B55) No. 18 (+) — Chassis ground (−):***	Is the voltage more than 10.5 V?	Go to step **6.**	Go to step **7.**
6	**CHECK OUTPUT SIGNAL OF TCM.** 1) Lift-up the vehicle. NOTE: Raise all wheels off floor. 2) Start the engine. 3) Shift the select lever to “D” range and slowly increase vehicle speed to 20 km/h (12 MPH). NOTE: The speed difference between front and rear wheels may light the ABS warning light or VDC warning light, but this indicates no malfunction. When AT control diagnosis is finished, perform the ABS memory clearance procedure or VDC memory clearance procedure of on-board diagnostics system. <Ref. to ABS(diag)-26, Clear Memory Mode.> <Ref. to VDC(diag)-25, Clear Memory Mode.> 4) Measure the voltage between TCM and chassis ground. ***Connector & terminal*** ***(B55) No. 18 (+) — Chassis ground (−):***	Is the voltage less than 1 V?	Even if the SPORT indicator light is blinking, the circuit has returned to normal condition at this time. A temporary poor contact of connector or harness may be the 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-66, Transmission Control Module (TCM).>

V: DTC P1706 AT VEHICLE SPEED SENSOR CIRCUIT MALFUNCTION (REAR WHEEL)

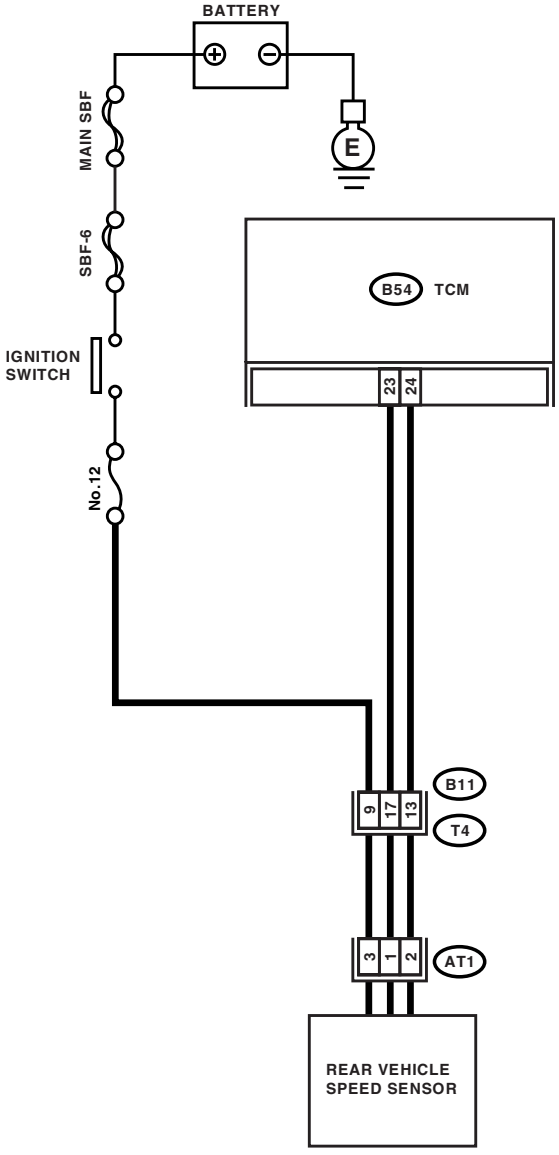
DTC DETECTING CONDITION:

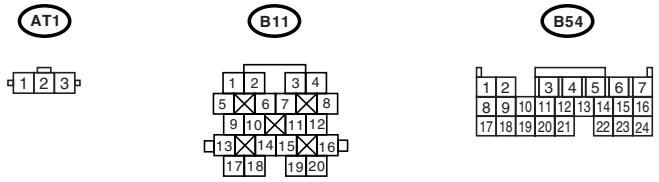
Input signal circuit of TCM is open or shorted.

TROUBLE SYMPTOM:

No lock-up or occurring tight corner braking phenomenon.

WIRING DIAGRAM:





AT-03161

	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. Turn the ignition switch to ON. 3) Measure the ignition power supply voltage between rear vehicle speed sensor connector and transmission ground. ***Connector & terminal*** ***(AT1) 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 connector and rear vehicle speed sensor connector. ***Connector & terminal*** ***(B54) No. 23 — (AT1) 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 connector and rear vehicle speed sensor connector. ***Connector & terminal*** ***(B54) No. 24 — (AT1) 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 connector and chassis ground. ***Connector & terminal*** ***(B54) No. 23 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **5.**	Repair the short circuit of harness between TCM and rear vehicle speed sensor connector.
5	**CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION.** Measure the resistance of harness between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 24 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **6.**	Repair the short circuit of harness between TCM and rear vehicle speed sensor connector.

	Step	Check	Yes	No
6	**CHECK INPUT SIGNAL FOR TCM.** 1) Connect the connectors to TCM and transmission. 2) Lift-up the vehicle and support with rigid racks. 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 or VDC warning light, but this indicates no malfunction. When AT control diagnosis is finished, perform the ABS memory clearance procedure or VDC memory clearance procedure of on-board diagnostics system. <Ref. to ABS(diag)-26, Clear Memory Mode.> <Ref. to VDC(diag)-25, Clear Memory Mode.> 4) Measure the AC voltage between TCM connector terminals. ***Connector & terminal*** ***(B54) No. 24 (+) — No. 23 (–):***	Is the voltage approx. 2 V or more?	Go to step **7.**	Replace the rear vehicle speed sensor.
7	**CHECK POOR CONTACT.**	Is there poor contact in rear vehicle speed sensor circuit?	Repair the poor contact.	Replace the TCM. <Ref. to 4AT-66, Transmission Control Module (TCM).>

W: DTC P1707 AT AWD SOLENOID VALVE CIRCUIT MALFUNCTION

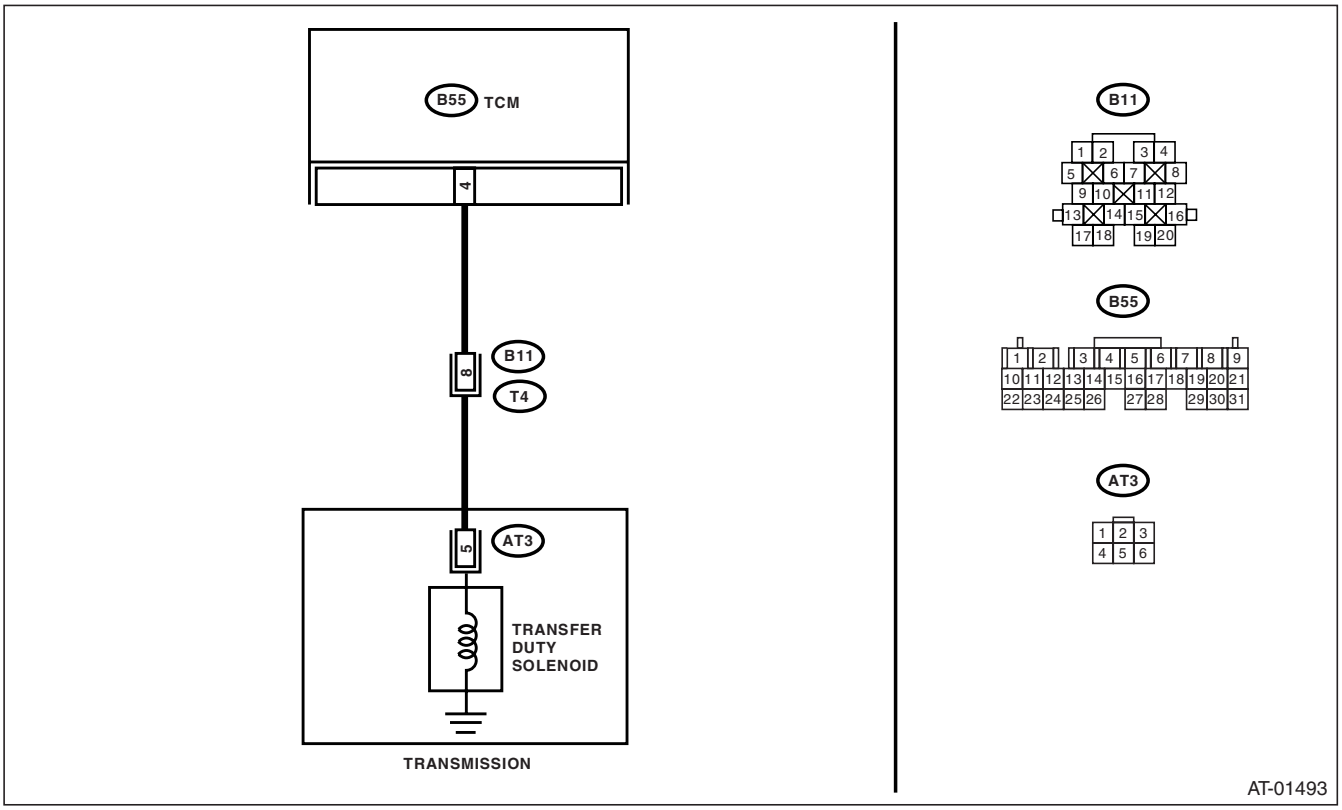
DTC DETECTING CONDITION:

Output signal circuit of transfer duty solenoid is open or shorted.

TROUBLE SYMPTOM:

- Tight corner braking phenomenon is occurred.
- Front wheel slips on the slippery road.

WIRING DIAGRAM:



	Step	Check	Yes	No
1	**CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from TCM and transmission. 3) Measure the resistance of harness between TCM and transmission connector. ***Connector & terminal*** ***(B55) No. 4 — (B11) No. 8:***	Is the resistance less than 1 Ω?	Go to step **2.**	Repair the open circuit of 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*** ***(B55) No. 4 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **3.**	Repair the short circuit of 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 — 6.0 Ω?	Go to step **4.**	Go to step **7.**

	Step	Check	Yes	No
4	**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 the Subaru Select Monitor power switch to ON. 4) Shift the select lever to the "N" range, and fully close the throttle pedal. (Vehicle speed is 0 km/h (0 MPH)) 5) Read the data of transfer duty solenoid using Subaru Select Monitor. • Transfer duty solenoid is indicated in "%".	Is the measured value approx. 5%?	Go to step **5.**	Go to step **6.**
5	**CHECK OUTPUT SIGNAL EMITTED FROM TCM USING SUBARU SELECT MONITOR.** 1) Shift the select lever to "D" range. 2) Read the data of transfer duty solenoid using Subaru Select Monitor. • Transfer duty solenoid is indicated in "%".	Is the measured value 18 — 35%?	Even if the SPORT indicator light is blinking, the circuit has returned to normal condition at this time. A temporary poor contact of 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 transfer duty solenoid circuit?	Repair the poor contact.	Replace the TCM. <Ref. to 4AT-66, Transmission Control Module (TCM).>
7	**CHECK TRANSFER DUTY SOLENOID (IN TRANSMISSION).** 1) Lift-up the vehicle and support with rigid racks. NOTE: Raise all wheels off floor. 2) Drain the ATF. **CAUTION:** **Do not drain ATF until it cools down.** 3) Remove the extension case, and disconnect the connector from transfer duty solenoid. 4) Measure the resistance between transfer duty solenoid connector and transmission ground. ***Connector & terminal*** ***(AT3) No. 5 — Transmission ground:***	Is the resistance 2.0 — 6.0 Ω?	Go to step **8.**	Replace the control valve body. <Ref. to 4AT-62, Control Valve Body.>
8	**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 — (AT3) No. 5:***	Is the resistance less than 1 Ω?	Go to step **9.**	Repair the open circuit of harness between transfer duty solenoid and transmission connector.

	Step	Check	Yes	No
9	**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 SPORT indicator light is blinking, the circuit has returned to normal condition at this time. A temporary poor contact of connector or harness may be the cause. Repair the harness or poor contact in the transfer duty solenoid and transmission.	Repair the short circuit of harness between transfer duty solenoid and transmission connector.

X: DTC P1708 THROTTLE POSITION SENSOR CIRCUIT LOW INPUT

DTC DETECTING CONDITION:

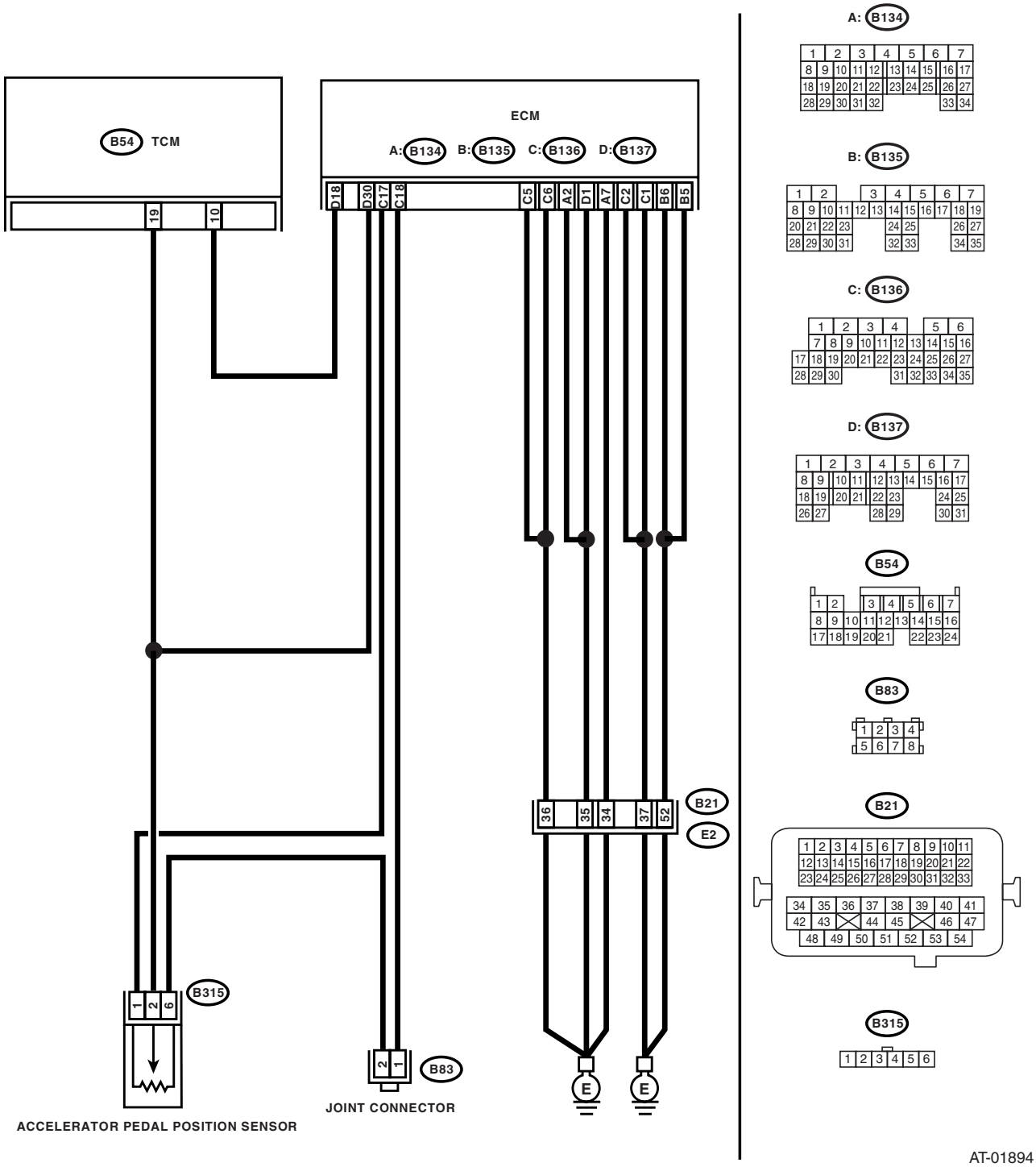
The input signal circuit of accelerator pedal position sensor is open or shorted.

TROUBLE SYMPTOM:

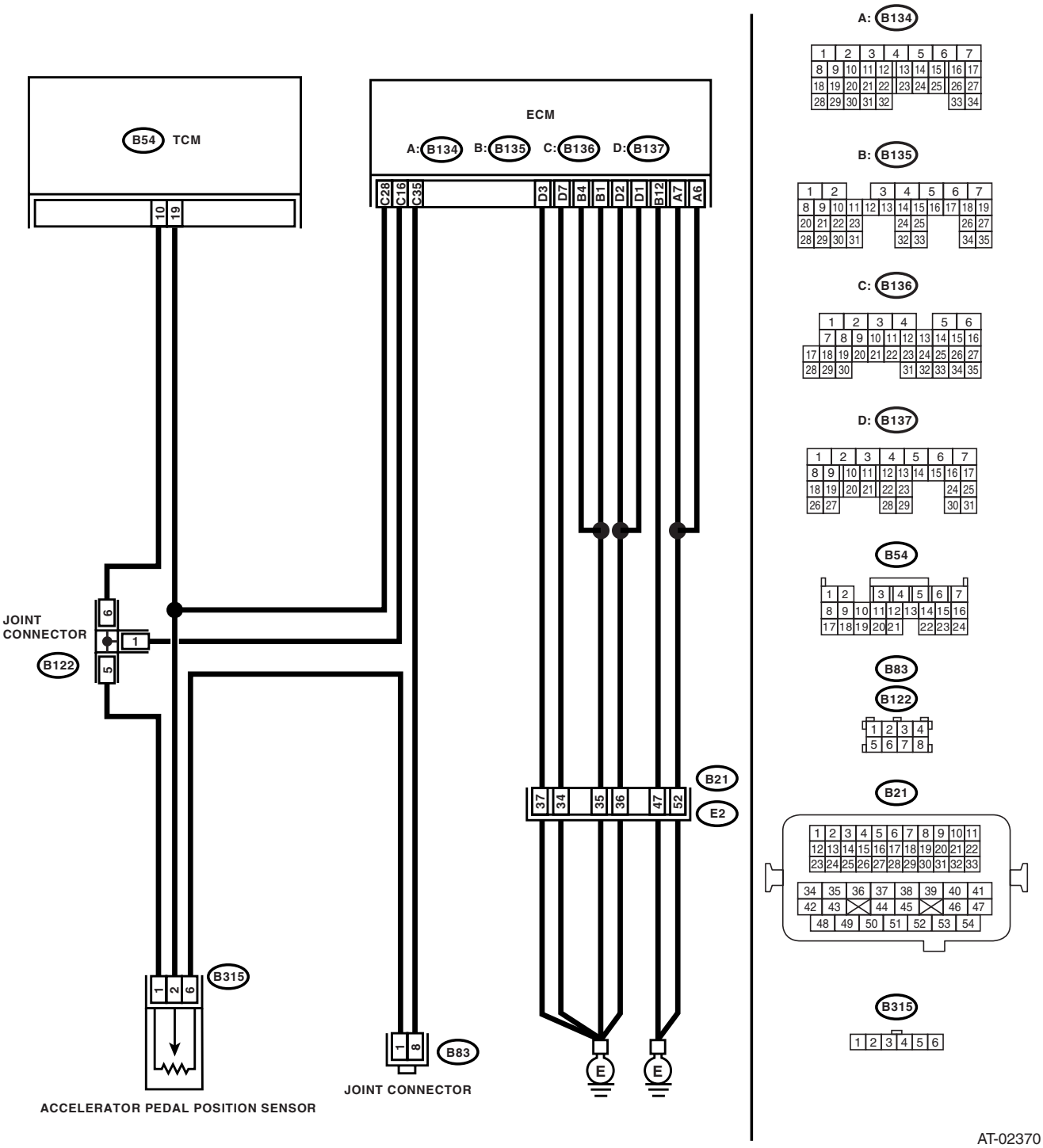
- Shift point is too high or too low.
- Excessive shift shock
- Tight corner braking phenomenon is occurred.

WIRING DIAGRAM:

- 2.0 L LHD and 2.5 L KS model

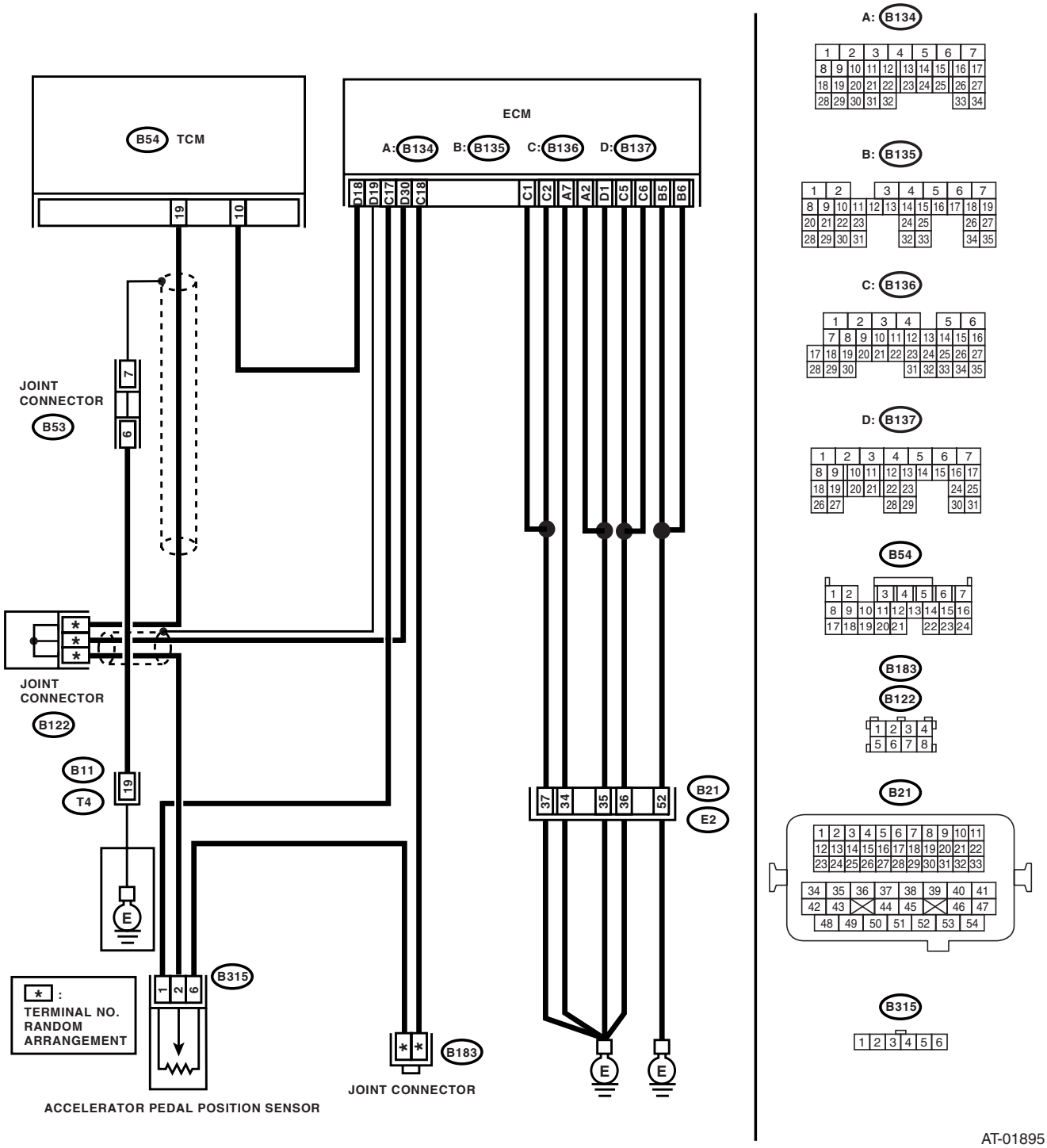


- 2.5 L EC, K4 model



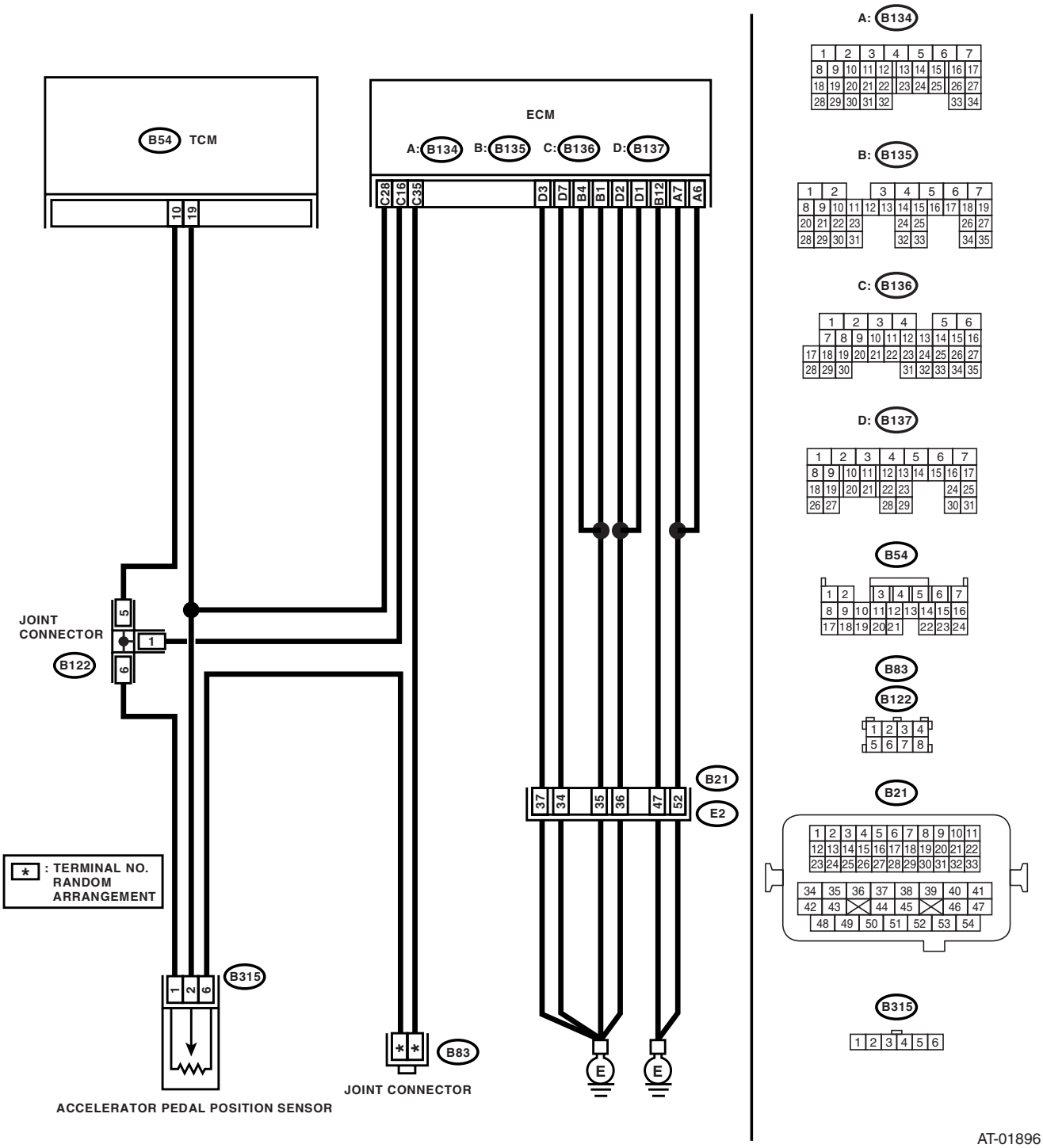
AT-02370

- 2.0 L RHD and 2.5 L KA model



AT-01895

- 2.5 L EK model


B54 TCM
10
19
ECM
A: B134 B: B135 C: B136 D: B137
C28 C16 C35 D3 D7 B4 B1 D2 D1 B12 A7 A6
JOINT CONNECTOR
B122
5
1
6
B21
37 34 35 36 47 52
E2
* : TERMINAL NO. RANDOM ARRANGEMENT
B315
1 2 6
B83
JOINT CONNECTOR
E
E
ACCELERATOR PEDAL POSITION SENSOR
A: B134
B: B135
C: B136
D: B137
B54
B83
B122
B21
B315
AT-01896

	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 FOR 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*** ***2.0 L model and 2.5 L KS, KA model*** ***(B134) No. 2 — Engine ground:*** ***(B134) No. 7 — Engine ground:*** ***(B135) No. 5 — Engine ground:*** ***(B135) No. 6 — Engine ground:*** ***(B136) No. 1 — Engine ground:*** ***(B136) No. 2 — Engine ground:*** ***(B136) No. 5 — Engine ground:*** ***(B136) No. 6 — Engine ground:*** ***(B137) No. 1 — Engine ground:*** ***2.5 L EC, EK, K4 model*** ***(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. 1 — Engine ground:*** ***(B137) No. 2 — Engine ground:*** ***(B137) No. 3 — Engine ground:*** ***(B137) No. 7 — Engine ground:***	Is the resistance less than 5 Ω?	Go to step **3.**	Repair the open circuit of harness between ECM connector and engine grounding terminal.
3	**CHECK ACCELERATOR PEDAL POSITION SENSOR.** 1) Disconnect the connectors 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 — 1.05 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*** ***(B54) No. 19 — (B315) No. 2:***	Is the resistance less than 1 Ω?	Go to step **6.**	Repair the open circuit of 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*** ***(B54) No. 19 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **7.**	Repair the short circuit of harness between TCM and accelerator pedal position sensor connector.

	Step	Check	Yes	No
7	**CHECK HARNESS CONNECTOR BETWEEN ECM AND ACCELERATOR PEDAL POSITION SENSOR.** 1) Remove the connector from ECM. 2) Measure the resistance of harness between accelerator pedal position sensor connector 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 of harness between ECM and accelerator pedal position sensor.
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 power switch to ON. 5) Fully close the throttle. 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 0.2 V?	Even if the SPORT indicator light is blinking, the circuit has returned to normal condition at this time. A temporary poor contact of 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-66, Transmission Control Module (TCM).>

Y: DTC P1709 THROTTLE POSITION SENSOR CIRCUIT HIGH INPUT

DTC DETECTING CONDITION:

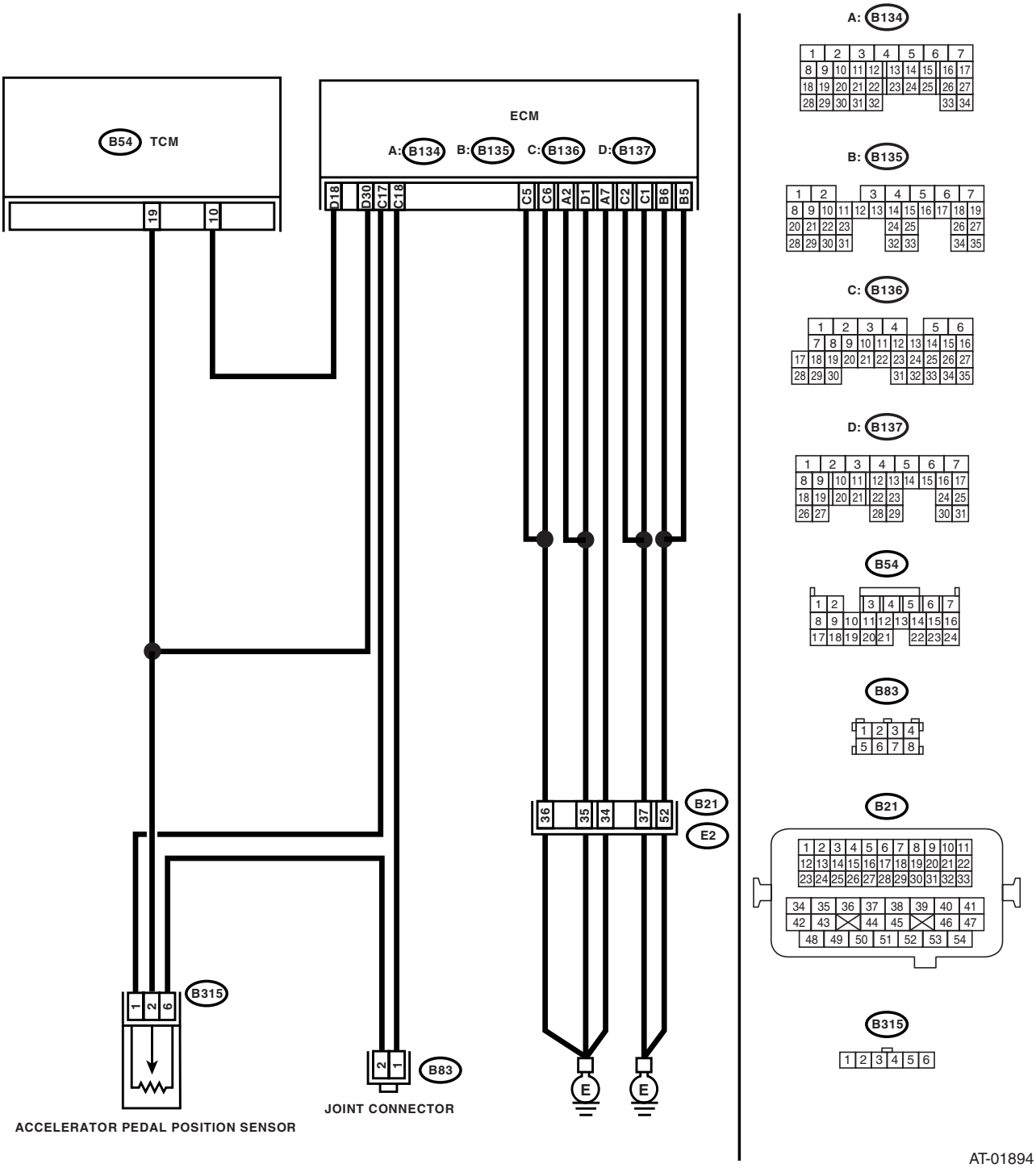
The input signal circuit of accelerator pedal position sensor is shorted.

TROUBLE SYMPTOM:

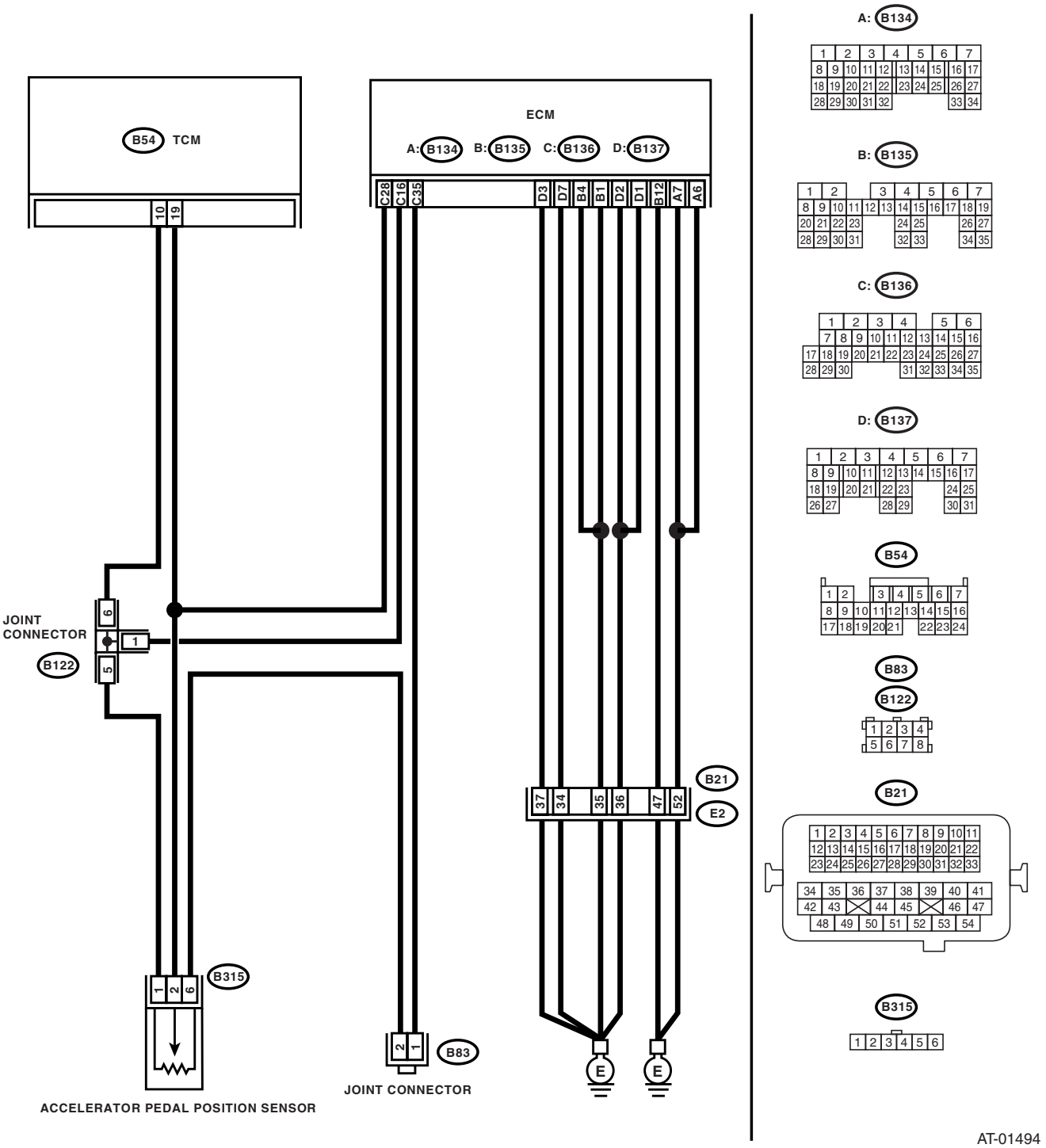
- Shift point is too high or too low.
- Excessive shift shock
- Tight corner braking phenomenon is occurred.

WIRING DIAGRAM:

- 2.0 L LHD and 2.5 L KS model

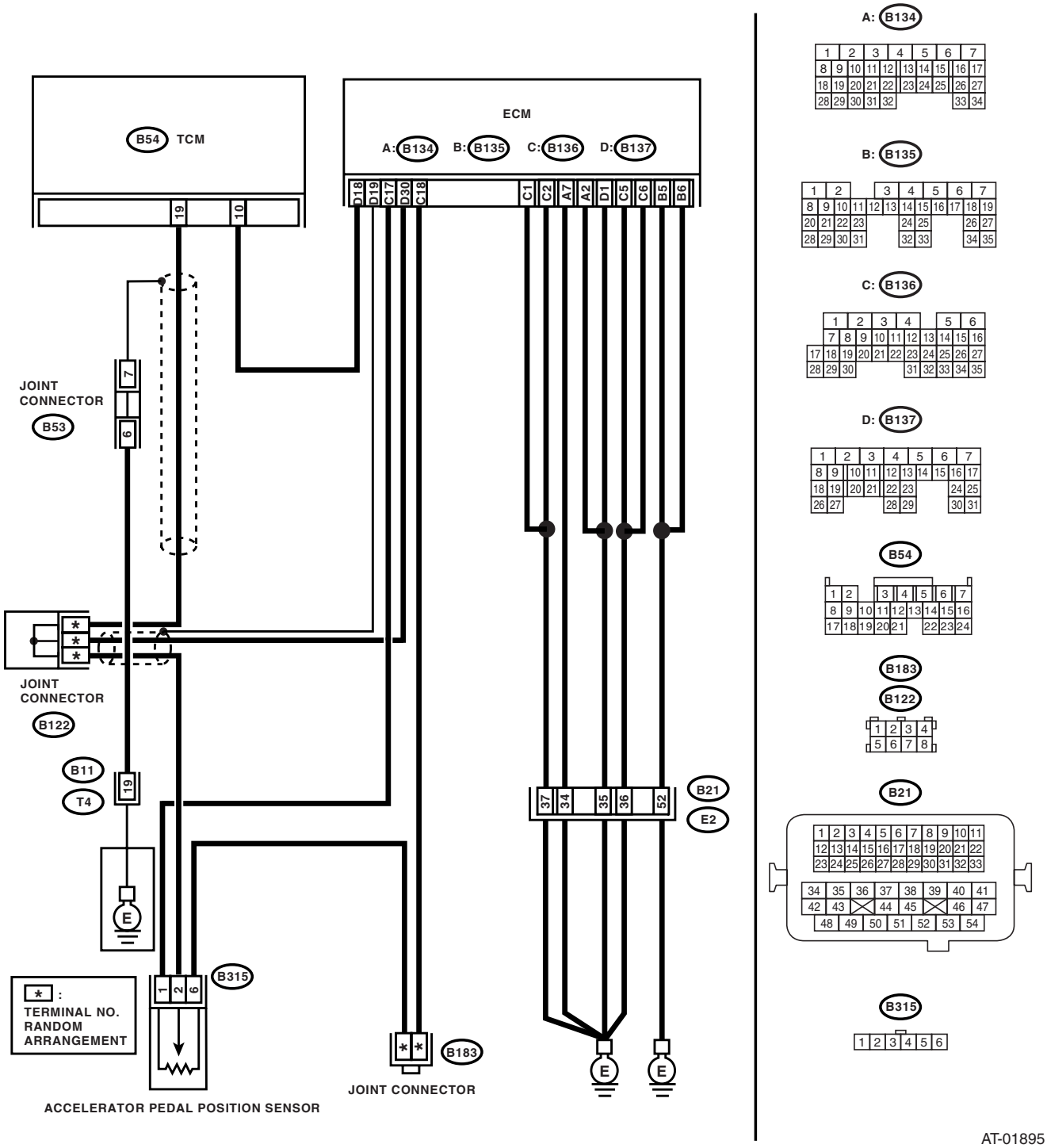


- 2.5 L EC, K4 model



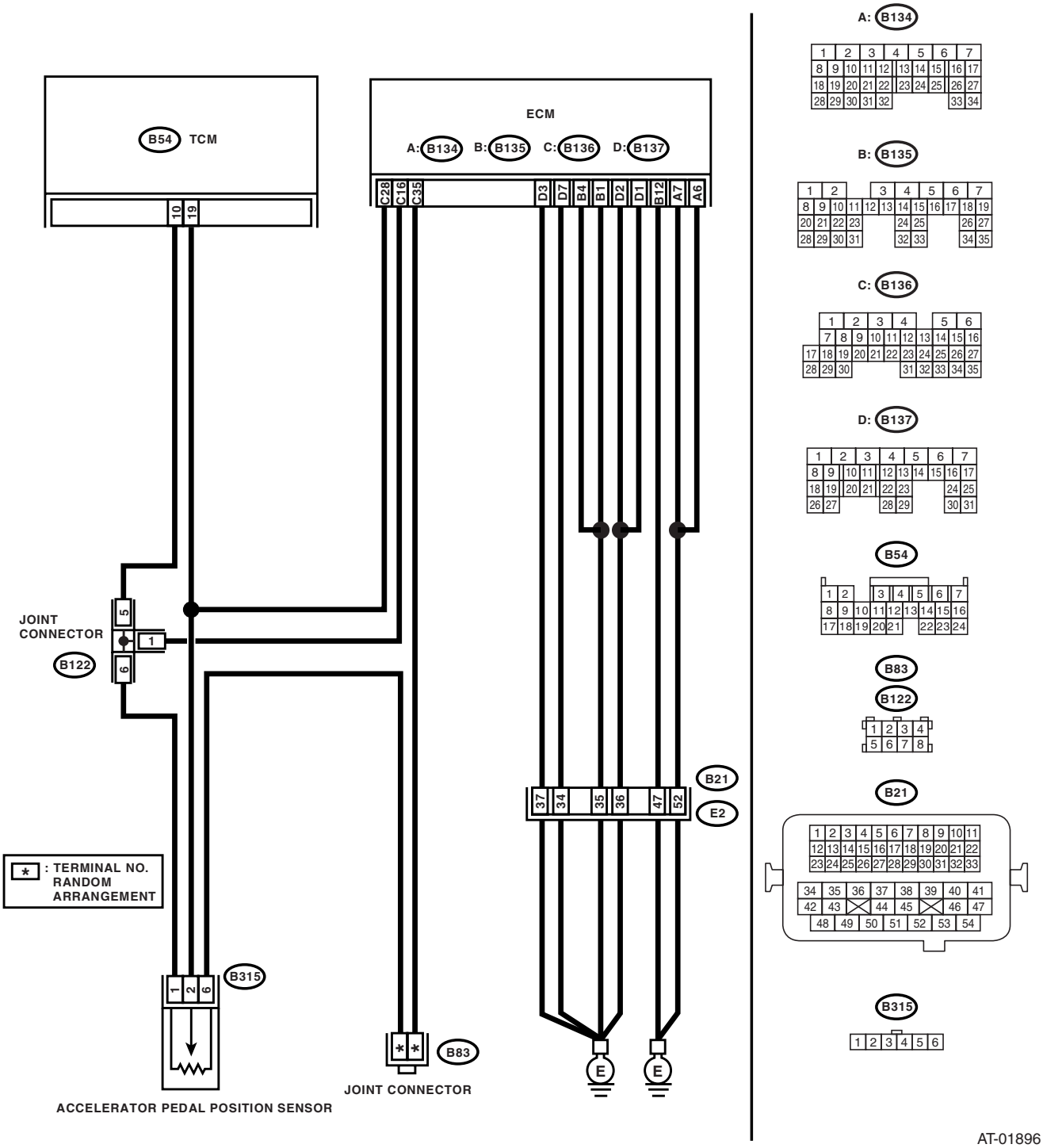
AT-01494

- 2.0 L RHD and 2.5 L KA model



AT-01895

- 2.5 L EK model



AT-01896

	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 FOR 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*** ***2.0 L model and 2.5 L KS, KA model*** ***(B134) No. 2 — Engine ground:*** ***(B134) No. 7 — Engine ground:*** ***(B135) No. 5 — Engine ground:*** ***(B135) No. 6 — Engine ground:*** ***(B136) No. 1 — Engine ground:*** ***(B136) No. 2 — Engine ground:*** ***(B136) No. 5 — Engine ground:*** ***(B136) No. 6 — Engine ground:*** ***(B137) No. 1 — Engine ground:*** ***2.5 L EC, EK, K4 model*** ***(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. 1 — Engine ground:*** ***(B137) No. 2 — Engine ground:*** ***(B137) No. 3 — Engine ground:*** ***(B137) No. 7 — Engine ground:***	Is the resistance less than 5 Ω?	Go to step **3.**	Repair the open circuit of harness between ECM connector and engine grounding terminal.
3	**CHECK ACCELERATOR PEDAL POSITION SENSOR.** 1) Disconnect the connectors 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 — 1.05 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*** ***(B54) No. 19 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **6.**	Repair the short circuit of harness between TCM and accelerator pedal position sensor connector.

	Step	Check	Yes	No
6	**CHECK HARNESS CONNECTOR BETWEEN ECM AND ACCELERATOR PEDAL POSITION SENSOR.** 1) Remove the connector from ECM. 2) Measure the resistance of harness between ECM connector and accelerator pedal position sensor connector. ***Connector & terminal*** ***2.0 L model and 2.5 L KS, KA model (B315) No. 6 — (B136) No. 18:*** ***2.5 L EC, EK, K4 model (B315) No. 6 — (B136) No. 35:***	Is the resistance less than 1 Ω?	Go to step **7.**	Repair the open circuit of harness between ECM and accelerator pedal position sensor.
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 power switch to ON. 5) Fully open the throttle. 6) Read the data of accelerator pedal position sensor using Subaru Select Monitor. • Accelerator pedal position sensor input signal is indicated.	Is the voltage less than 4.6 V?	Go to step **8.**	Even if the SPORT indicator light is blinking, the circuit has returned to normal condition at this time. A temporary poor contact of 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-66, Transmission Control Module (TCM).>

Z: DTC P1714 THROTTLE POSITION SENSOR POWER SUPPLY CIRCUIT

DTC DETECTING CONDITION:

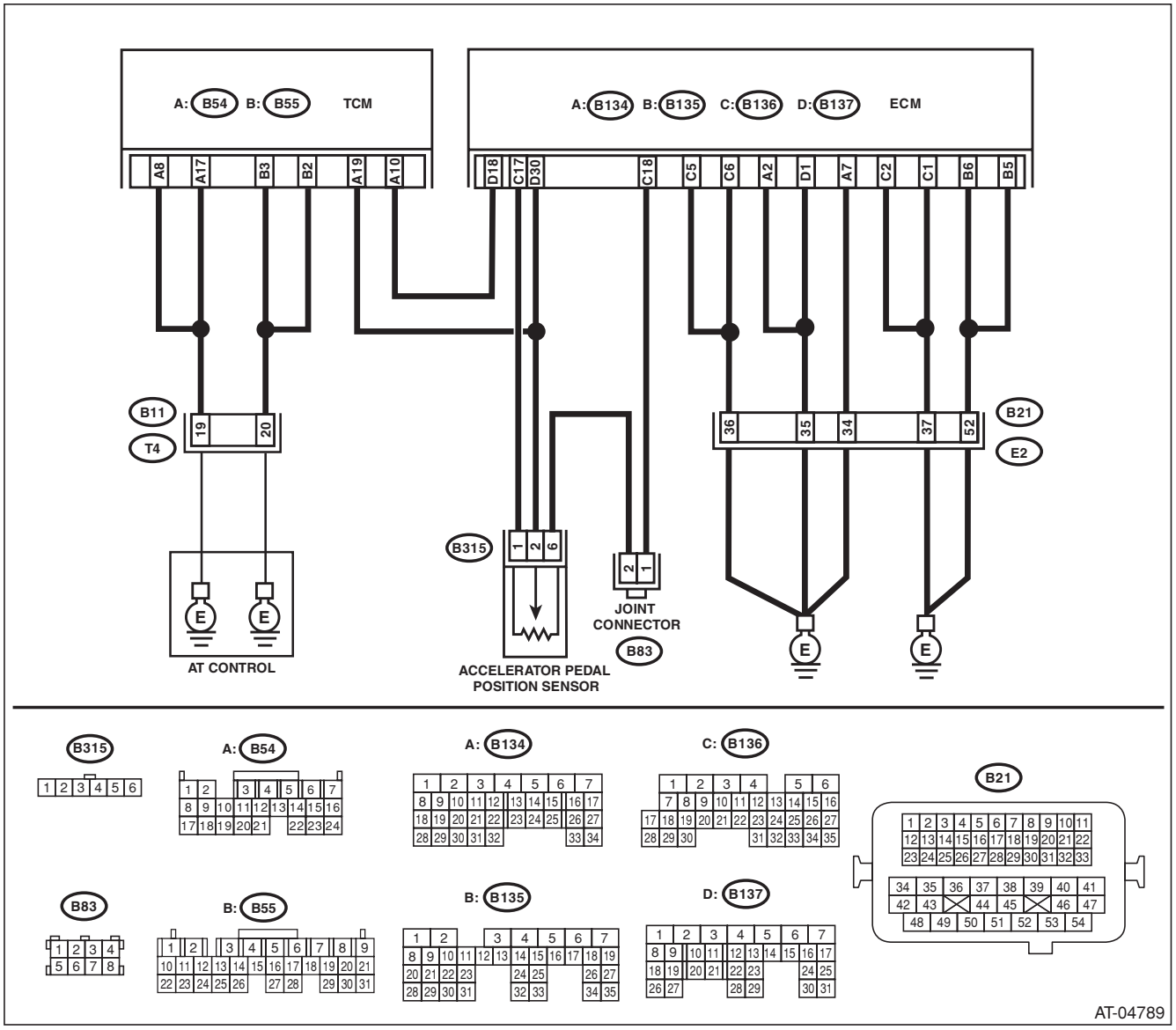
The power supply circuit of accelerator pedal position sensor is open or shorted.

TROUBLE SYMPTOM:

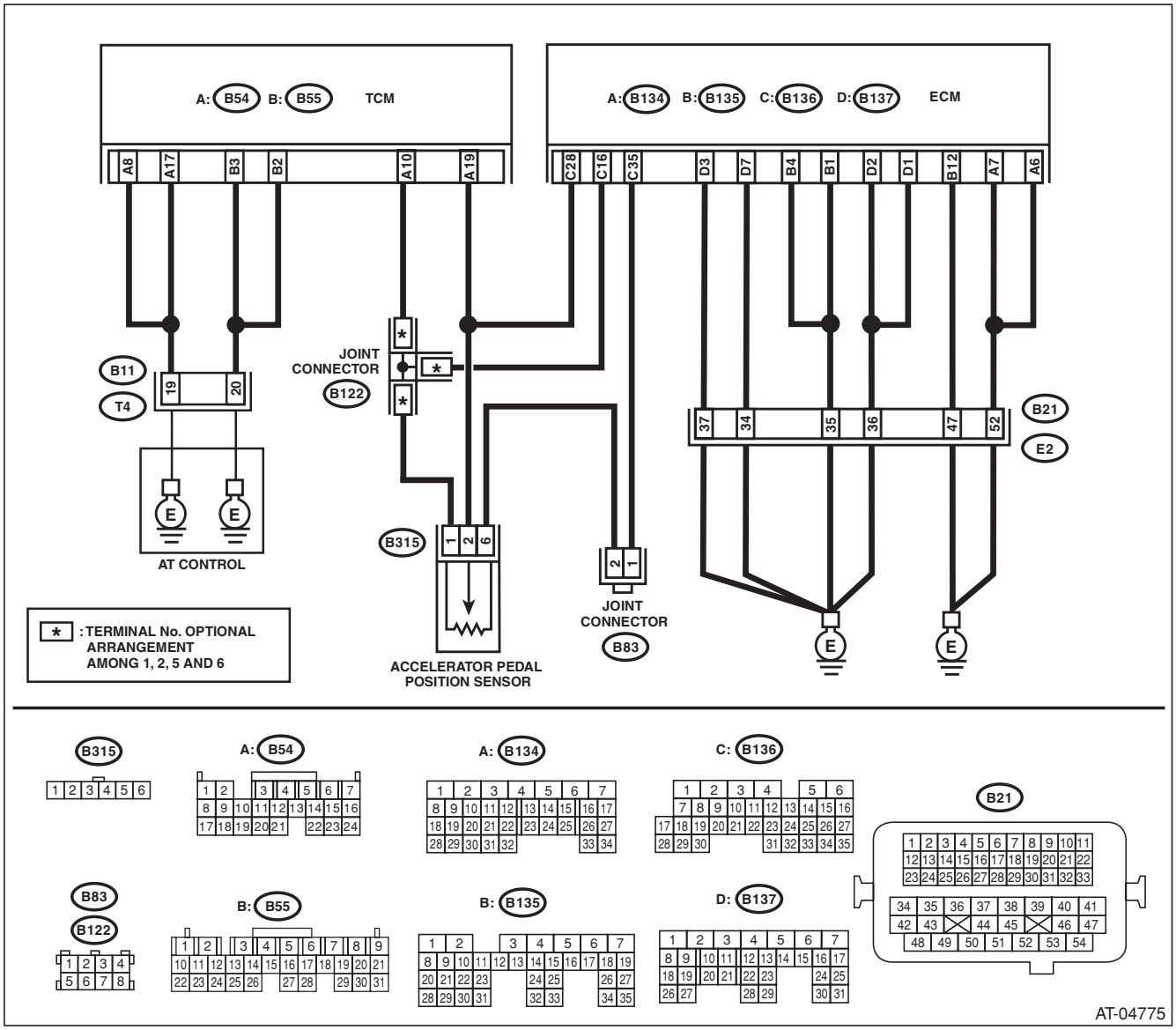
- Shift point is too high or too low.
- Excessive shift shock
- Tight corner braking phenomenon is occurred.

WIRING DIAGRAM:

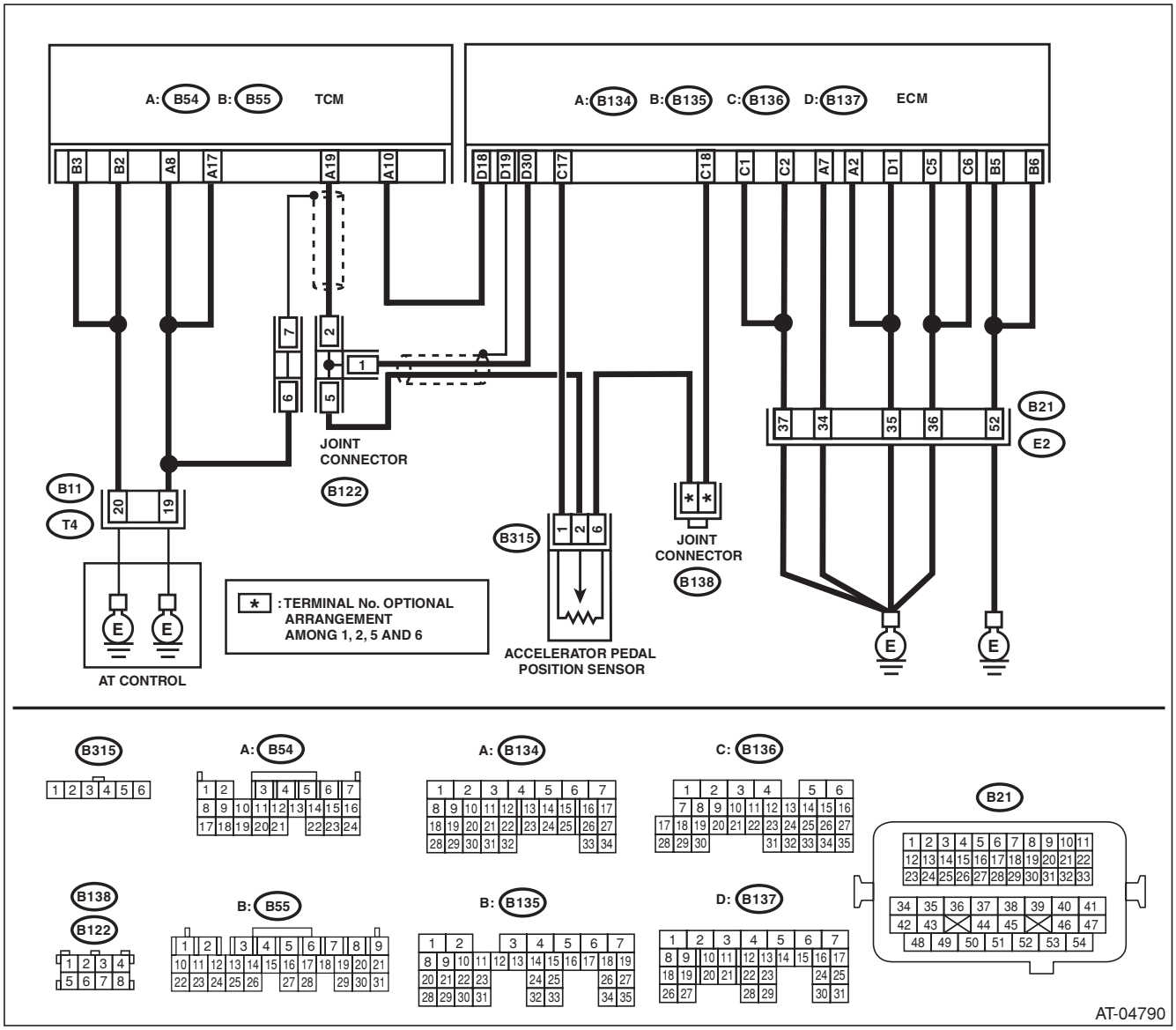
- 2.0 L LHD and 2.5 L KS model



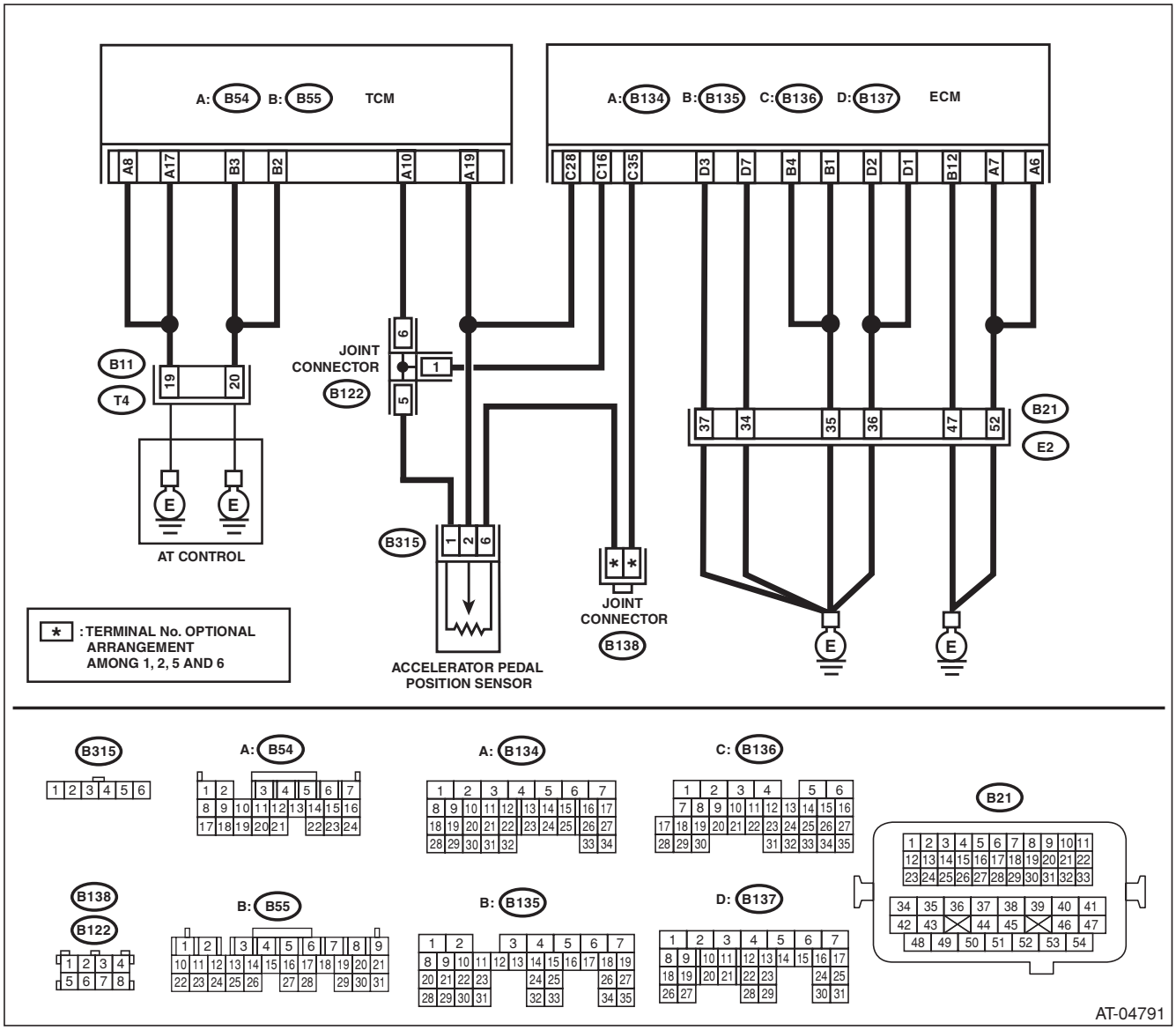
- 2.5 L EC, K4 model



- 2.0 L RHD and 2.5 L KA model



- 2.5 L EK model


A: B54 B: B55 TCM
A: B134 B: B135 C: B136 D: B137 ECM
A8 A17 B3 B2 A10 A19
C28 C16 C35 D3 D7 B4 B1 D2 D1 B12 A7 A6
B11
T4
19 20
JOINT CONNECTOR B122
6 1 5
37 34 35 36 47 52
B21
E2
E E
AT CONTROL
B315
1 2 6
JOINT CONNECTOR B138
E E
* : TERMINAL No. OPTIONAL ARRANGEMENT AMONG 1, 2, 5 AND 6
ACCELERATOR PEDAL POSITION SENSOR
B315
A: B54
A: B134
C: B136
B21
B138
B122
B: B55
B: B135
D: B137
AT-04791

	Step	Check	Yes	No
1	**CHECK TCM SIGNAL.** 1) Connect the Subaru Select Monitor to the data link connector. 2) Turn the ignition switch to ON. 3) Read the data of "Throttle sensor power supply" using Subaru Select Monitor.	Is the value less than 4.75 V?	Go to step **2.**	Go to step **5.**
2	**CHECK HARNESS CONNECTOR BETWEEN TCM AND ACCELERATOR PEDAL POSITION SENSOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from TCM. 3) Measure the resistance of harness between TCM and accelerator pedal position sensor connector. ***Connector & terminal*** ***2.5L EC, K4, EK model*** ***(B55) No. 10 — (B315) No. 1:*** ***Except for 2.5L EC, K4 ,EK model*** ***(B55) No. 19 — (B315) No. 2:***	Is the resistance less than 1 Ω?	Go to step **3.**	Repair the open circuit of harness between TCM and accelerator pedal position sensor connector, and poor contact of connector.
3	**CHECK HARNESS CONNECTOR BETWEEN TCM AND ECM.** 1) Disconnect the connector from ECM. 2) Measure the resistance of harness between TCM and ECM connector. ***Connector & terminal*** ***2.0L model and 2.5L KA, KS model*** ***(B54) No. 10 — (B137) No. 18:*** ***2.5L EK, EC, K4 model*** ***(B54) No. 10 — (B136) No. 16:***	Is the resistance less than 1 Ω?	Go to step **4.**	Repair the open circuit of harness between TCM and ECM connector, and poor contact of connector.
4	**CHECK HARNESS CONNECTOR AMONG TCM, ACCELERATOR PEDAL POSITION SENSOR AND ECM.** Measure the resistance of harness between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 10 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **5.**	Repair the short circuit of harness among TCM, accelerator pedal position sensor and ECM connector.
5	**CHECK HARNESS CONNECTOR BETWEEN TCM CONNECTOR AND TRANSMISSION GROUND.** 1) Disconnect the connector from transmission. 2) Measure the resistance of harness between TCM and transmission connector. ***Connector & terminal*** ***(B54) No. 8 — (B11) No. 19:*** ***(B54) No. 17 — (B11) No. 19:*** ***(B55) No. 2 — (B11) No. 20:*** ***(B55) No. 3 — (B11) No. 20:***	Is the resistance less than 1 Ω?	Go to step **6.**	Repair the open circuit of harness between TCM and transmission connector, and poor contact of connector.
6	**CHECK CIRCUIT BETWEEN TRANSMISSION CONNECTOR AND TRANSMISSION GROUND.** Measure the resistance of harness between transmission connector and transmission case. ***Connector & terminal*** ***(B11) No. 19 — Transmission ground:*** ***(B11) No. 20 — Transmission ground:***	Is the resistance less than 1 Ω?	Go to step **7.**	Repair the open circuit of harness between transmission connector and transmission ground, poor contact of connector and insufficient tightening of ground bolt.

	Step	Check	Yes	No
7	**CHECK ECM POWER SUPPLY AND GROUND LINE.** Check ECM power supply circuit and ground circuit. <Ref. to EN(H4SO 2.0)(diag)-54, CHECK POWER SUPPLY AND GROUND LINE OF ENGINE CONTROL MODULE (ECM), Diagnostics for Engine Starting Failure.> <Ref. to EN(H4SO 2.5)(diag)-57, CHECK POWER SUPPLY AND GROUND LINE OF ENGINE CONTROL MODULE (ECM), Diagnostics for Engine Starting Failure.> <Ref. to EN(H4DOTC)(diag)-53, CHECK POWER SUPPLY AND GROUND LINE OF ENGINE CONTROL MODULE (ECM), Diagnostics for Engine Starting Failure.> <Ref. to EN(H6DO)(diag)-57, CHECK POWER SUPPLY AND GROUND LINE OF ENGINE CONTROL MODULE (ECM), Diagnostics for Engine Starting Failure.>	Is there any abnormal condition?	Repair the malfunction of ECM power supply circuit and ground circuit.	Replace the TCM. <Ref. to 4AT-66, Transmission Control Module (TCM).>

AA:DTC P1718 CAN COMMUNICATION CIRCUIT

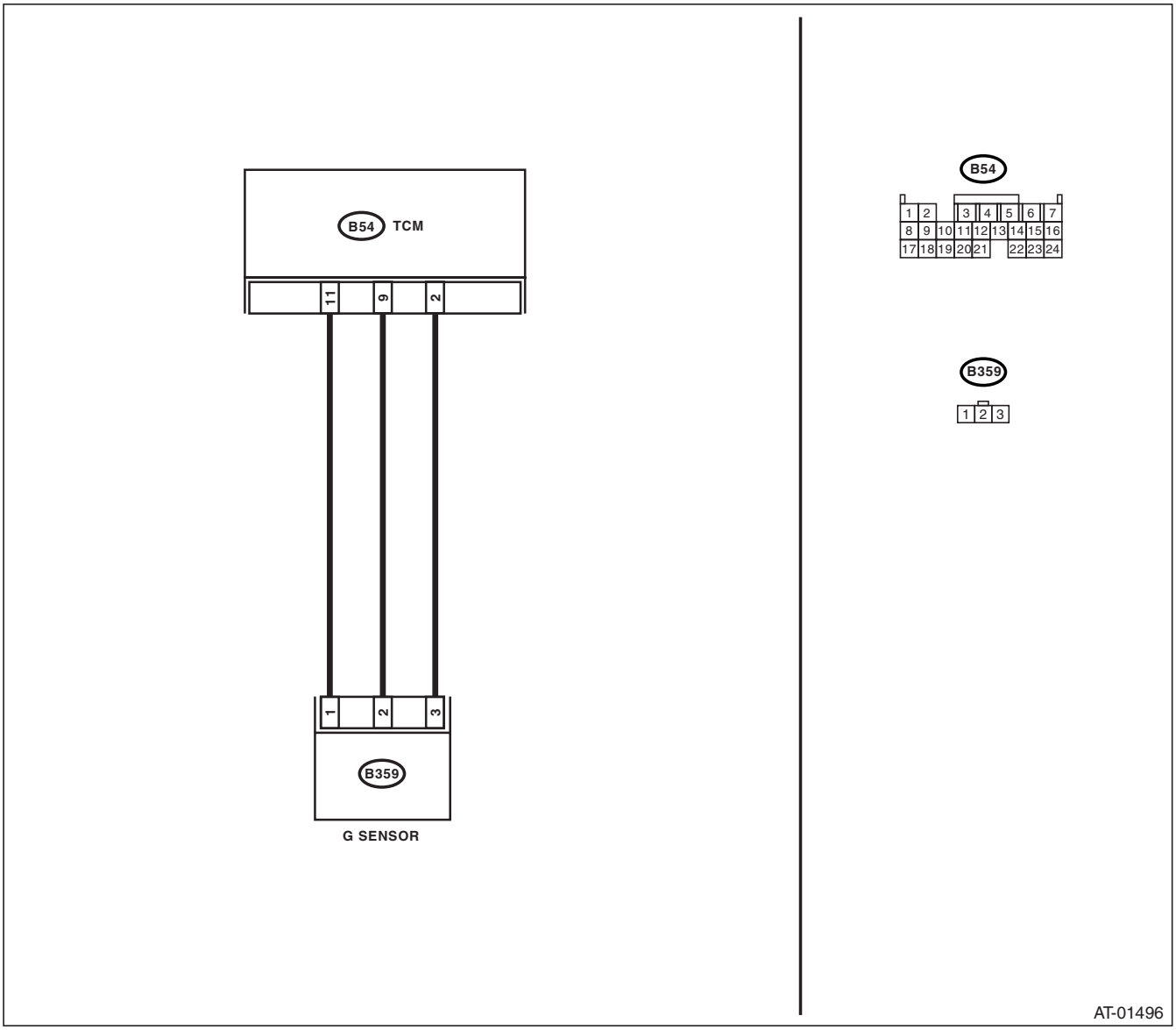
NOTE:
Refer to “Body Integrated Module” for diagnosis of P1718. <Ref. to LAN(diag)-2, Basic Diagnostic Procedure.>

AB:DTC P1760 LATERAL ACCELERATION SENSOR PERFORMANCE PROBLEM

DTC DETECTING CONDITION:

Faulty lateral G sensor output voltage

WIRING DIAGRAM:



	Step	Check	Yes	No
1	**CHECK OUTPUT OF LATERAL G SENSOR USING SUBARU SELECT MONITOR.** 1) Select {Current Data Display & Save} in Subaru Select Monitor. 2) Read the Subaru Select Monitor display.	Is the value on display 2.3 — 2.7 V when the vehicle is on a level?	Go to step **2.**	Go to step **7.**
2	**CHECK OUTPUT OF LATERAL G SENSOR USING SUBARU SELECT MONITOR.** 1) Turn the ignition switch to OFF. 2) Remove the console box. 3) Remove the lateral G sensor from vehicle. (Do not disconnect connector.) 4) Turn the ignition switch to ON. 5) Select {Current Data Display & Save} in Subaru Select Monitor. 6) Read the Subaru Select Monitor display.	Is the value on display 3.3 — 4.3 V when lateral G sensor is inclined to the right to 90°?	Go to step **3.**	Replace the lateral G sensor. <Ref. to 4AT-67, Lateral G Sensor.>
3	**CHECK OUTPUT OF LATERAL G SENSOR USING SUBARU SELECT MONITOR.** Read the Subaru Select Monitor display.	Is the value on display 0.7 — 1.7 V when lateral G sensor is inclined to the left to 90°?	Go to step **4.**	Replace the lateral G sensor. <Ref. to 4AT-67, Lateral G Sensor.>
4	**CHECK POOR CONTACT IN CONNECTOR.** Turn the ignition switch to OFF.	Is there poor contact in connector between TCM and lateral G sensor?	Repair the connector.	Go to step **5.**
5	**CHECK ABSCM&H/U.** 1) Connect all the connectors. 2) Perform the clear memory mode. 3) Perform the inspection mode. 4) Read the DTC.	Is the same DTC still displayed?	Replace the TCM. <Ref. to 4AT-66, Transmission Control Module (TCM).>	Go to step **6.**
6	**CHECK ANY OTHER DTC ON DISPLAY.**	Is any other DTC displayed?	Perform the diagnosis according to DTC.	Temporary poor contact occurs.
7	**CHECK OPEN CIRCUIT IN LATERAL G SENSOR OUTPUT HARNESS AND GROUND HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from TCM. 3) Measure the resistance between TCM connector terminals. ***Connector & terminal*** ***(B54) No. 2 — No. 9:***	Is the resistance 5.0 — 6.0 kΩ?	Go to step **8.**	Repair the harness connector between lateral G sensor and TCM.
8	**CHECK LATERAL G SENSOR.** 1) Remove the console box. 2) Remove the lateral G sensor from vehicle. 3) Connect the connector to lateral G sensor. 4) Connect the connector to ABSCM&H/U. 5) Turn the ignition switch to ON. 6) Measure the voltage between lateral G sensor connector terminals. ***Connector & terminal*** ***(B359) No. 3 (+) — No. 2 (–):***	Is the voltage 2.3 — 2.7 V when lateral G sensor is horizontal?	Go to step **9.**	Replace the lateral G sensor. <Ref. to 4AT-67, Lateral G Sensor.>
9	**CHECK LATERAL G SENSOR.** Measure the voltage between lateral G sensor connector terminals. ***Connector & terminal*** ***(B359) No. 3 (+) — No. 2 (–):***	Is the voltage 3.3 — 4.3 V when lateral G sensor is inclined to the right to 90°?	Go to step **10.**	Replace the lateral G sensor. <Ref. to 4AT-67, Lateral G Sensor.>
10	**CHECK LATERAL G SENSOR.** Measure the voltage between lateral G sensor connector terminals. ***Connector & terminal*** ***(B359) No. 3 (+) — No. 2 (–):***	Is the voltage 0.7 — 1.7 V when lateral G sensor is inclined to the left to 90°?	Go to step **11.**	Replace the lateral G sensor. <Ref. to 4AT-67, Lateral G Sensor.>

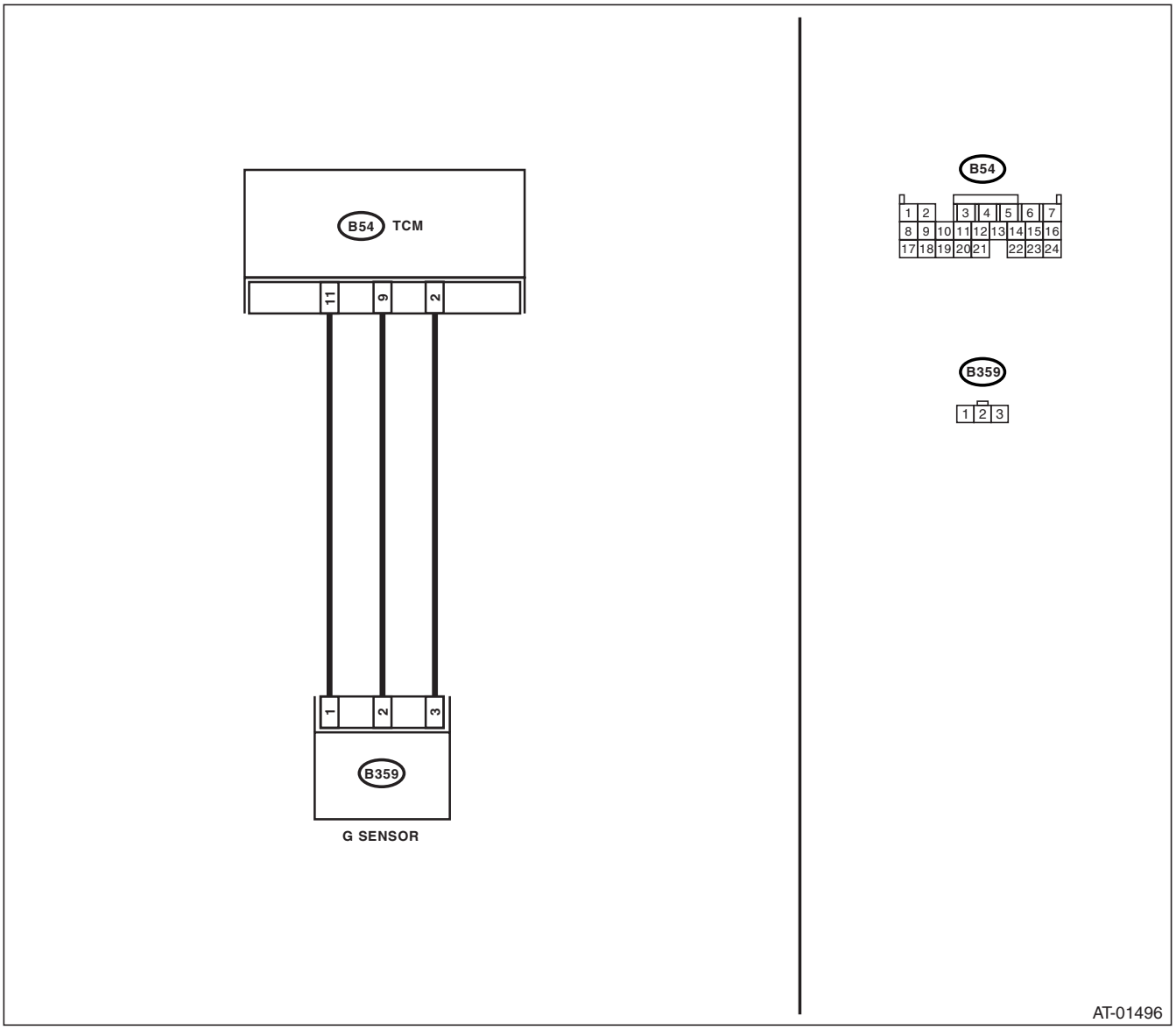
	Step	Check	Yes	No
11	**CHECK ABSCM&H/U.** 1) Turn the ignition switch to OFF. 2) Connect all the connectors. 3) Perform the clear memory mode. 4) Perform the inspection mode. 5) Read the DTC.	Is the same DTC still displayed?	Replace the TCM. <Ref. to 4AT-66, Transmission Control Module (TCM).>	Go to step **12.**
12	**CHECK ANY OTHER DTC ON DISPLAY.**	Is any other DTC displayed?	Perform the diagnosis according to DTC.	Temporary poor contact occurs.

AC:DTC P1761 LATERAL ACCELERATION SENSOR CIRCUIT LOW

DTC DETECTING CONDITION:

Faulty lateral G sensor output voltage

WIRING DIAGRAM:



	Step	Check	Yes	No
1	**CHECK OUTPUT OF LATERAL G SENSOR USING SUBARU SELECT MONITOR.** 1) Select {Current Data Display & Save} in Subaru Select Monitor. 2) Read the lateral G sensor output on Subaru Select Monitor display.	Is the value on display 2.3 — 2.7 V when the lateral G sensor is in horizontal position?	Go to step **2.**	Go to step **5.**
2	**CHECK POOR CONTACT IN CONNECTOR.** Turn the ignition switch to OFF.	Is there poor contact in connector between TCM and lateral G sensor?	Repair the connector.	Go to step **3.**

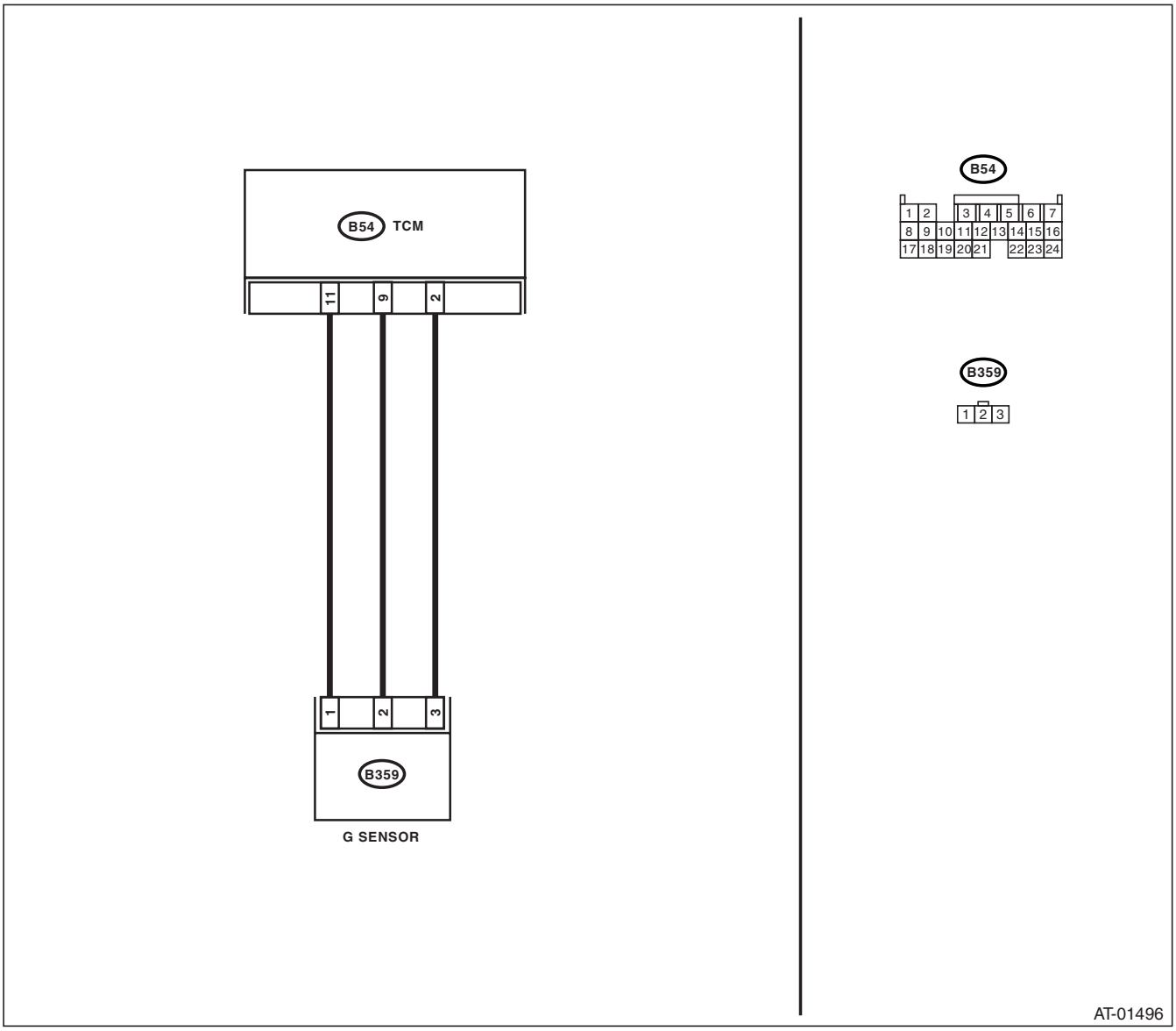
	Step	Check	Yes	No
3	**CHECK TCM.** 1) Connect all the connectors. 2) Perform the clear memory mode. 3) Perform the inspection mode. 4) Read the DTC.	Is the same DTC still displayed?	Replace the TCM. <Ref. to 4AT-66, Transmission Control Module (TCM).>	Go to step **4.**
4	**CHECK ANY OTHER DTC ON DISPLAY.**	Is any other DTC displayed?	Perform the diagnosis according to DTC.	Temporary poor contact occurs.
5	**CHECK OPEN CIRCUIT IN LATERAL G SENSOR OUTPUT HARNESS AND GROUND HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from TCM. 3) Measure the resistance between TCM connector terminals. ***Connector & terminal*** ***(B54) No. 2 — No. 9:***	Is the resistance 5.0 — 6.0 kΩ?	Go to step **6.**	Repair the harness connector between lateral G sensor and TCM.
6	**CHECK GROUND SHORT OF HARNESS.** Measure the resistance between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 9 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **7.**	Repair the harness between lateral G sensor and TCM. Replace the TCM. <Ref. to 4AT-66, Transmission Control Module (TCM).>
7	**CHECK LATERAL G SENSOR.** 1) Remove the console box. 2) Remove the lateral G sensor from vehicle. 3) Connect the connector to lateral G sensor. 4) Connect the connector to the TCM. 5) Turn the ignition switch to ON. 6) Measure the voltage between lateral G sensor connector terminals. ***Connector & terminal*** ***(B359) No. 3 (+) — No. 2 (−):***	Is the voltage 2.3 — 2.7 V when lateral G sensor is horizontal?	Go to step **8.**	Replace the lateral G sensor. <Ref. to 4AT-67, Lateral G Sensor.>
8	**CHECK LATERAL G SENSOR.** Measure the voltage between lateral G sensor connector terminals. ***Connector & terminal*** ***(B359) No. 3 (+) — No. 2 (−):***	Is the voltage 3.3 — 4.3 V when lateral G sensor is inclined to the right to 90°?	Go to step **9.**	Replace the lateral G sensor. <Ref. to 4AT-67, Lateral G Sensor.>
9	**CHECK LATERAL G SENSOR.** Measure the voltage between lateral G sensor connector terminals. ***Connector & terminal*** ***(B359) No. 3 (+) — No. 2 (−):***	Is the voltage 0.7 — 1.7 V when lateral G sensor is inclined to the left to 90°?	Go to step **10.**	Replace the lateral G sensor. <Ref. to 4AT-67, Lateral G Sensor.>
10	**CHECK TCM.** 1) Turn the ignition switch to OFF. 2) Connect all the connectors. 3) Perform the clear memory mode. 4) Perform the inspection mode. 5) Read the DTC.	Is the same DTC still displayed?	Replace the TCM. <Ref. to 4AT-66, Transmission Control Module (TCM).>	Go to step **11.**
11	**CHECK ANY OTHER DTC ON DISPLAY.**	Is any other DTC displayed?	Perform the diagnosis according to DTC.	Temporary poor contact occurs.

AD:DTC P1762 LATERAL ACCELERATION SENSOR CIRCUIT HIGH

DTC DETECTING CONDITION:

Faulty lateral G sensor output voltage

WIRING DIAGRAM:



	Step	Check	Yes	No
1	**CHECK OUTPUT OF LATERAL G SENSOR USING SUBARU SELECT MONITOR.** 1) Select {Current Data Display & Save} in Subaru Select Monitor. 2) Read the lateral G sensor output on Subaru Select Monitor display.	Is the value on display 2.3 — 2.7 V when the lateral G sensor is in horizontal position?	Go to step **2.**	Go to step **5.**
2	**CHECK POOR CONTACT IN CONNECTOR.**	Is there poor contact in connector between TCM and lateral G sensor?	Repair the connector.	Go to step **3.**
3	**CHECK ABSCM&H/U.** 1) Connect all the connectors. 2) Perform the clear memory mode. 3) Perform the inspection mode. 4) Read the DTC.	Is the same DTC still displayed?	Replace the TCM. <Ref. to 4AT-66, Transmission Control Module (TCM).>	Go to step **4.**
4	**CHECK ANY OTHER DTC ON DISPLAY.**	Is any other DTC displayed?	Perform the diagnosis according to DTC.	Temporary poor contact occurs.
5	**CHECK CONDITIONAL INFORMATION WHEN FAULTY.** Read the lateral G sensor output on Subaru Select Monitor display.	Is the reading on monitor display 4.65 V or more?	Go to step **6.**	Go to step **12.**
6	**CHECK OPEN CIRCUIT IN LATERAL G SENSOR OUTPUT HARNESS AND GROUND HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from TCM. 3) Measure the resistance between TCM connector terminals. ***Connector & terminal*** ***(B54) No. 2 — No. 9:***	Is the resistance 4.3 — 4.9 kΩ?	Go to step **7.**	Repair the harness connector between lateral G sensor and ABSCM&H/U.
7	**CHECK BATTERY SHORT OF HARNESS.** 1) Turn the ignition switch to OFF. 2) Remove the console box. 3) Disconnect the connector from lateral G sensor. 4) Disconnect the connector from TCM. 5) Measure the voltage between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 2 (+) — Chassis ground (−):***	Is the voltage less than 1 V?	Go to step **8.**	Repair the harness between lateral G sensor and TCM.
8	**CHECK BATTERY SHORT OF HARNESS.** 1) Turn the ignition switch to ON. 2) Measure the voltage between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 2 (+) — Chassis ground (−):***	Is the voltage less than 1 V?	Go to step **9.**	Repair the harness between lateral G sensor and TCM.
9	**CHECK POOR CONTACT IN CONNECTOR.**	Is there poor contact in connector between TCM and lateral G sensor?	Repair the connector.	Go to step **10.**
10	**CHECK TCM.** 1) Connect all the connectors. 2) Perform the clear memory mode. 3) Perform the inspection mode. 4) Read the DTC.	Is the same DTC still displayed?	Replace the TCM. <Ref. to 4AT-66, Transmission Control Module (TCM).>	Go to step **11.**
11	**CHECK ANY OTHER DTC ON DISPLAY.**	Is any other DTC displayed?	Perform the diagnosis according to DTC.	Temporary poor contact occurs.

	Step	Check	Yes	No
12	**CHECK INPUT VOLTAGE OF LATERAL G SENSOR.** 1) Turn the ignition switch to OFF. 2) Remove the console box. 3) Remove the lateral G sensor from vehicle. (Do not disconnect connector.) 4) Turn the ignition switch to ON. 5) Measure the voltage between lateral G sensor connector terminals. ***Connector & terminal*** ***(B359) No. 1 (+) — No. 2 (–):***	Is the voltage 4.75 — 5.25 V?	Go to step **13.**	Repair the harness connector between lateral G sensor and TCM.
13	**CHECK OPEN CIRCUIT IN LATERAL G SENSOR OUTPUT HARNESS AND GROUND HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from TCM. 3) Measure the resistance between TCM connector terminals. ***Connector & terminal*** ***(B54) No. 2 — No. 9:***	Is the resistance 5.0 — 5.6 kΩ?	Go to step **14.**	Repair the harness connector between lateral G sensor and TCM.
14	**CHECK LATERAL G SENSOR.** 1) Connect the connector to lateral G sensor. 2) Connect the connector to the TCM. 3) Turn the ignition switch to ON. 4) Measure the voltage between lateral G sensor connector terminals. ***Connector & terminal*** ***(B359) No. 3 (+) — No. 2 (–):***	Is the voltage 2.3 — 2.7 V when lateral G sensor is horizontal?	Go to step **15.**	Replace the lateral G sensor. <Ref. to 4AT-67, Lateral G Sensor.>
15	**CHECK LATERAL G SENSOR.** Measure the voltage between lateral G sensor connector terminals. ***Connector & terminal*** ***(B359) No. 3 (+) — No. 2 (–):***	Is the voltage 3.3 — 4.3 V when lateral G sensor is inclined to the right to 90°?	Go to step **16.**	Replace the lateral G sensor. <Ref. to 4AT-67, Lateral G Sensor.>
16	**CHECK LATERAL G SENSOR.** Measure the voltage between lateral G sensor connector terminals. ***Connector & terminal*** ***(B359) No. 3 (+) — No. 2 (–):***	Is the voltage 0.7 — 1.7 V when lateral G sensor is inclined to the left to 90°?	Go to step **17.**	Replace the lateral G sensor. <Ref. to 4AT-67, Lateral G Sensor.>
17	**CHECK POOR CONTACT IN CONNECTOR.** Turn the ignition switch to OFF.	Is there poor contact in connector between TCM and lateral G sensor?	Repair the connector.	Go to step **18.**
18	**CHECK ABSCM&H/U.** 1) Connect all the connectors. 2) Perform the clear memory mode. 3) Perform the inspection mode. 4) Read the DTC.	Is the same DTC still displayed?	Replace the TCM. <Ref. to 4AT-66, Transmission Control Module (TCM).>	Go to step **19.**
19	**CHECK ANY OTHER DTC ON DISPLAY.**	Is any other DTC displayed?	Perform the diagnosis according to DTC.	Temporary poor contact occurs.

AE:DTC P1817 SPORT MODE SWITCH CIRCUIT

DTC DETECTING CONDITION:

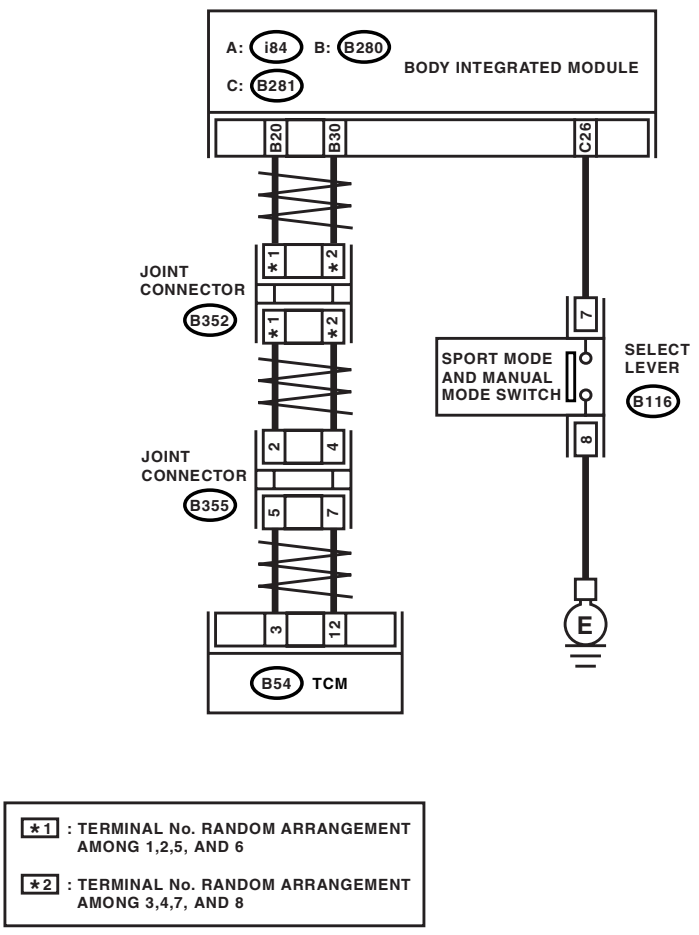
Input signal circuit of SPORT mode and manual mode switch is shorted.

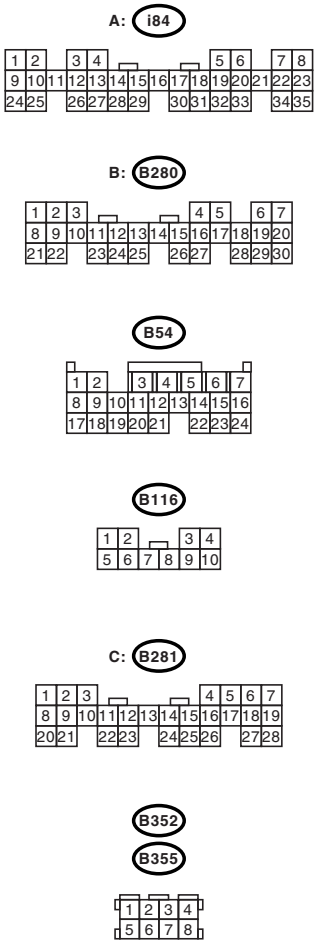
TROUBLE SYMPTOM:

- Manual mode can not be set.
- The SPORT indicator light does not illuminate.
- SPORT mode can not be set.

WIRING DIAGRAM:

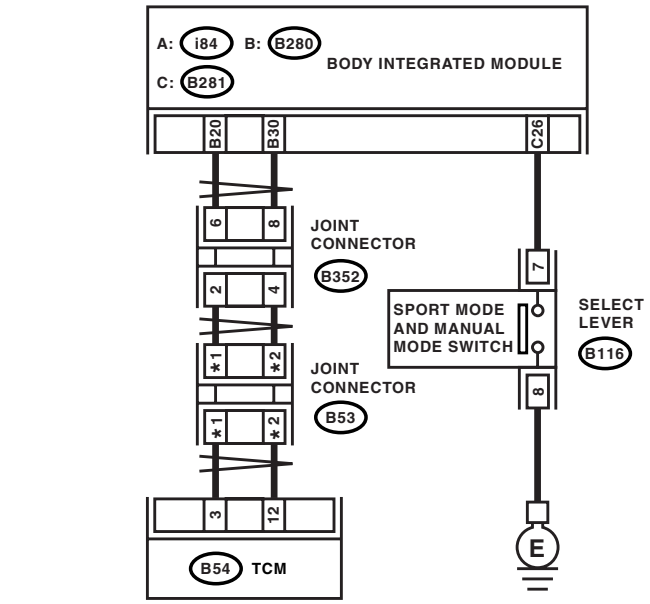
- LHD model

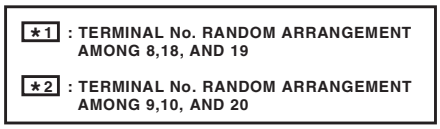


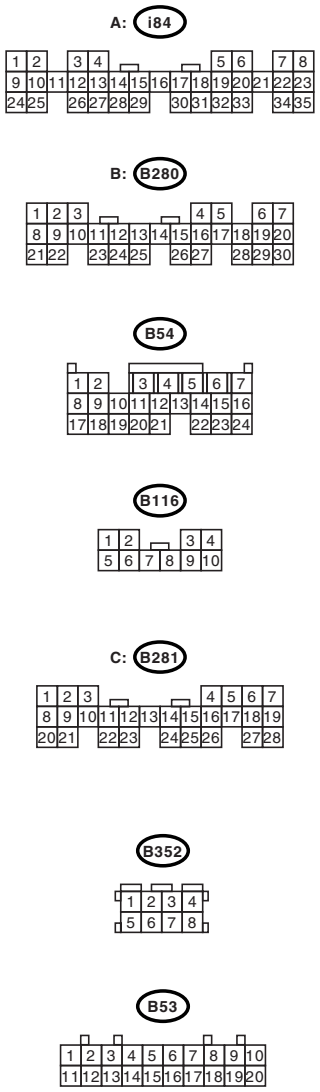


AT-03162

- RHD model







AT-03163

	Step	Check	Yes	No
1	**CHECK BODY INTEGRATED MODULE.** 1) Connect the Subaru Select Monitor to data link connector. 2) Turn the ignition switch to ON. (engine OFF) 3) Read the DTC of body integrated module using Subaru Select Monitor. <Ref. to LAN(diag)-14, OPERATION, Subaru Select Monitor.>	Is DTC displayed?	Perform the diagnosis according to DTC.	Go to step **2.**
2	**CHECK BODY INTEGRATED MODULE INPUT SIGNAL.** 1) Shift the select lever to “P” range. 2) Read the Tiptronic Mode Switch data of body integrated module using Subaru Select Monitor. <Ref. to LAN(diag)-14, OPERATION, Subaru Select Monitor.>	Is OFF displayed?	Go to step **3.**	Go to step **7.**
3	**CHECK BODY INTEGRATED MODULE INPUT SIGNAL.** 1) Shift the select lever from “P” to “D” range. 2) Read the Tiptronic Mode Switch data of body integrated module using Subaru Select Monitor. <Ref. to LAN(diag)-14, OPERATION, Subaru Select Monitor.>	Is the indication on each range OFF?	Go to step **4.**	Replace the select lever assembly. <Ref. to CS-22, Select Lever.>
4	**CHECK BODY INTEGRATED MODULE INPUT SIGNAL.** 1) Shift the select lever to manual mode side. 2) Shift the select lever to any other than “D” range. 3) Read the Tiptronic Mode Switch data of body integrated module using Subaru Select Monitor. <Ref. to LAN(diag)-14, OPERATION, Subaru Select Monitor.>	Is OFF displayed?	Go to step **5.**	Replace the select lever assembly. <Ref. to CS-22, Select Lever.>
5	**CHECK INHIBITOR SWITCH.** Shift the select lever from “P” to “D” range.	Is the indication of range position indicator light in combination meter synchronized with position of select lever?	Go to step **6.**	Adjust the inhibitor switch and select cable. <Ref. to 4AT-51, ADJUSTMENT, Inhibitor Switch.> <Ref. to CS-30, ADJUSTMENT, Select Cable.>
6	**CHECK TCM INPUT SIGNAL.** 1) Shift the select lever from “P” to “D” range. 2) Read the Tiptronic Mode Switch data of TCM using Subaru Select Monitor. <Ref. to 4AT(diag)-16, OPERATION, Subaru Select Monitor.>	Is the indication on each range OFF?	Even if the SPORT indicator light is blinking, the circuit has returned to normal condition at this time. A temporary short circuit of connector or harness may be the cause. Repair the harness or connector.	Replace the TCM. <Ref. to 4AT-66, Transmission Control Module (TCM).>

	Step	Check	Yes	No
7	**CHECK HARNESS BETWEEN BODY INTEGRATED MODULE AND SWITCH FOR SPORT MODE AND MANUAL MODE.** 1) Turn the ignition switch to OFF. 2) Disconnect the harness connector from body integrated module and select lever. 3) Measure the resistance of body integrated module and chassis ground. ***Connector & terminal*** ***(B281) No. 26 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **8.**	Repair the short circuit of harness between body integrated module and switch for SPORT mode and manual mode.
8	**CHECK SWITCH FOR SPORT MODE AND MANUAL MODE.** 1) Shift the select lever to “P” range. 2) Measure the resistance between connector terminals of switch for SPORT mode and manual mode. ***Terminal*** ***No. 7 — No. 8:***	Is the resistance more than 1 MΩ?	Check the body integrated module.	Replace the select lever assembly. <Ref. to CS-22, Select Lever.>

14.Diagnostic Procedure without Diagnostic Trouble Code (DTC)

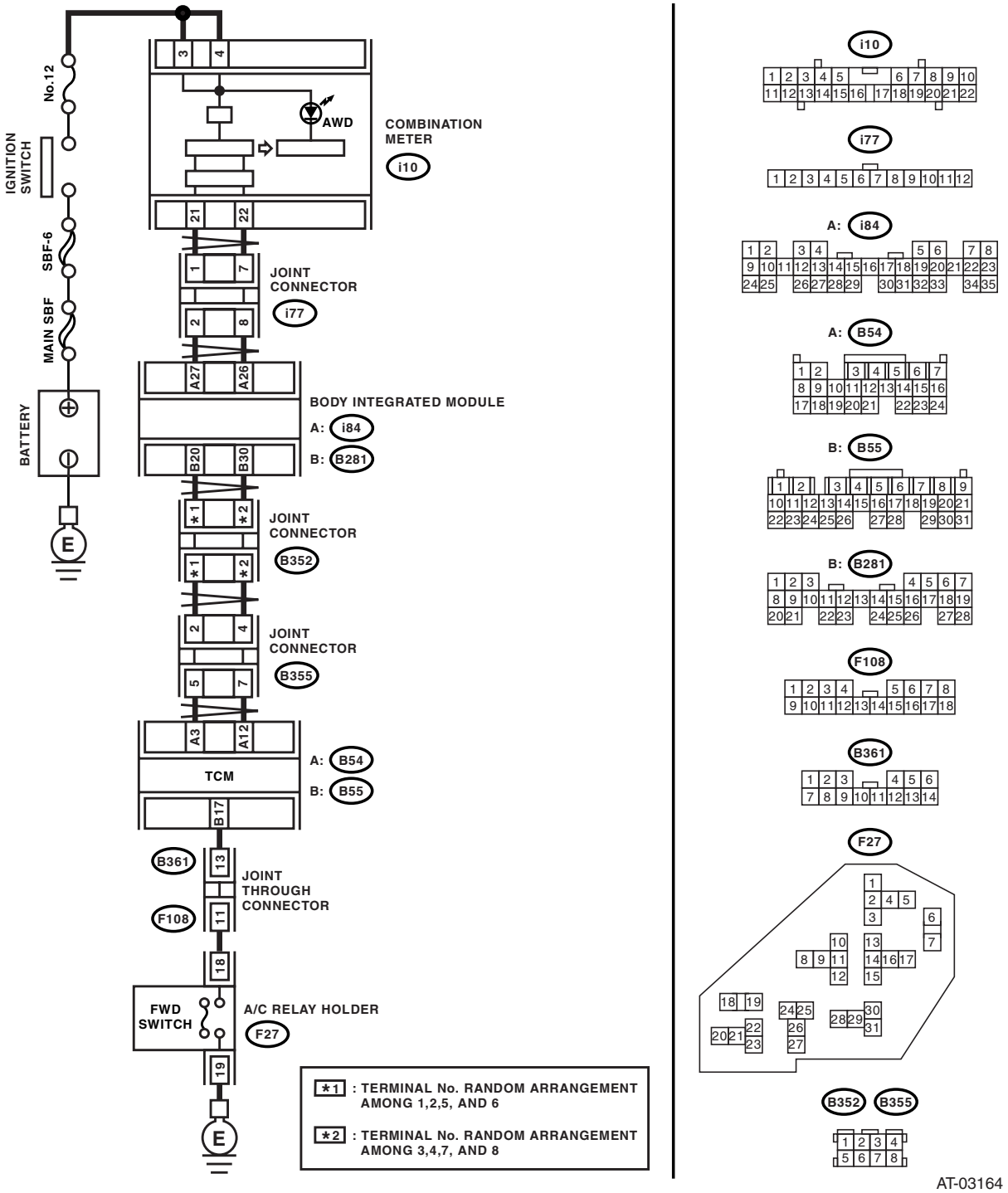
A: CHECK FWD SWITCH

DIAGNOSIS:

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

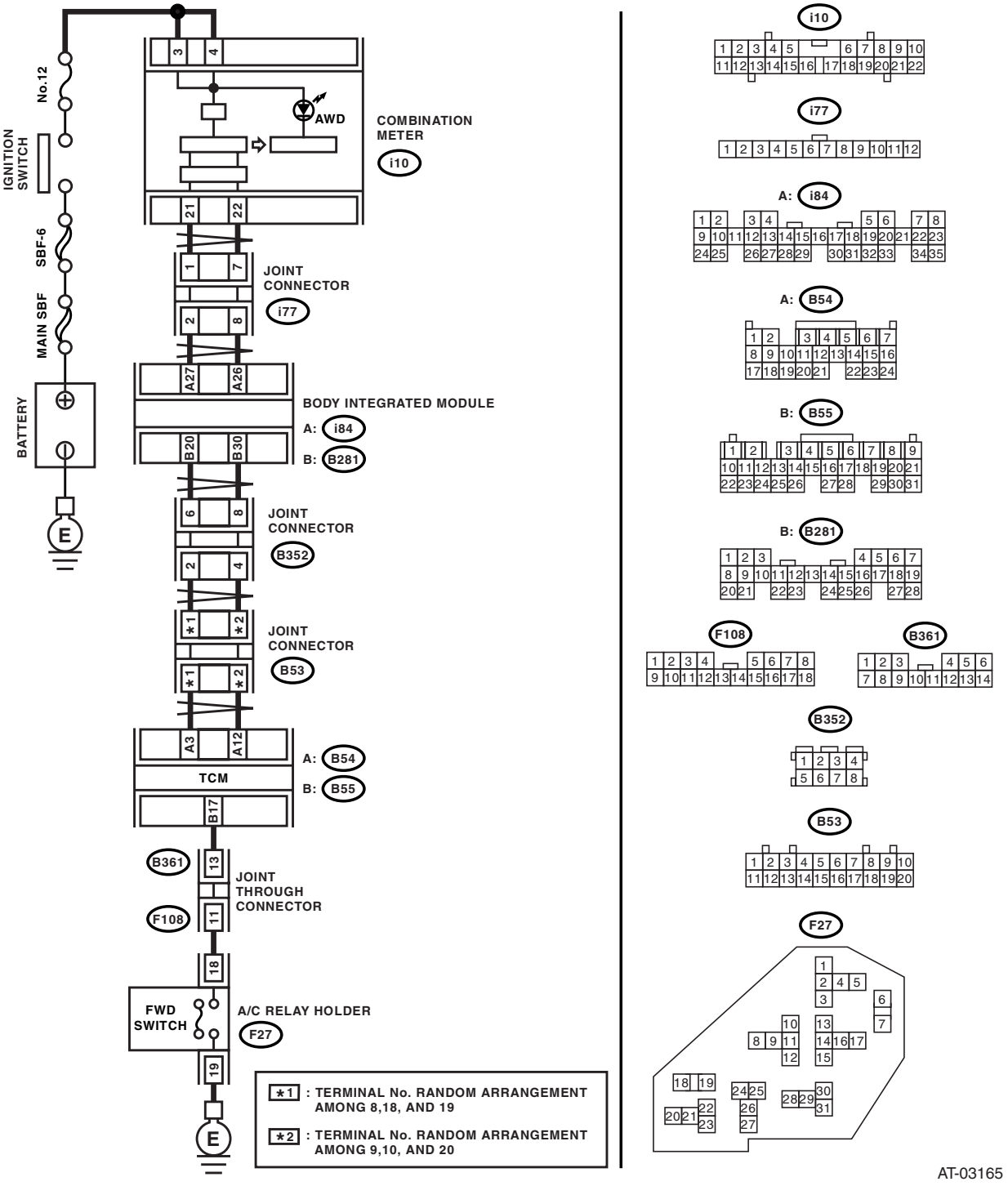
WIRING DIAGRAM:

- LHD model



AT-03164

- RHD model


IGNITION SWITCH
No.12
SBF-6
MAIN SBF
BATTERY
AWD
COMBINATION METER
i10
JOINT CONNECTOR
i77
BODY INTEGRATED MODULE
A: i84
B: B281
JOINT CONNECTOR
B352
JOINT CONNECTOR
B53
TCM
A: B54
B: B55
B361
F108
JOINT THROUGH CONNECTOR
FWD SWITCH
A/C RELAY HOLDER
F27
*1 : TERMINAL No. RANDOM ARRANGEMENT AMONG 8,18, AND 19
*2 : TERMINAL No. RANDOM ARRANGEMENT AMONG 9,10, AND 20
i10
i77
A: i84
A: B54
B: B55
B: B281
F108
B361
B352
B53
F27
AT-03165

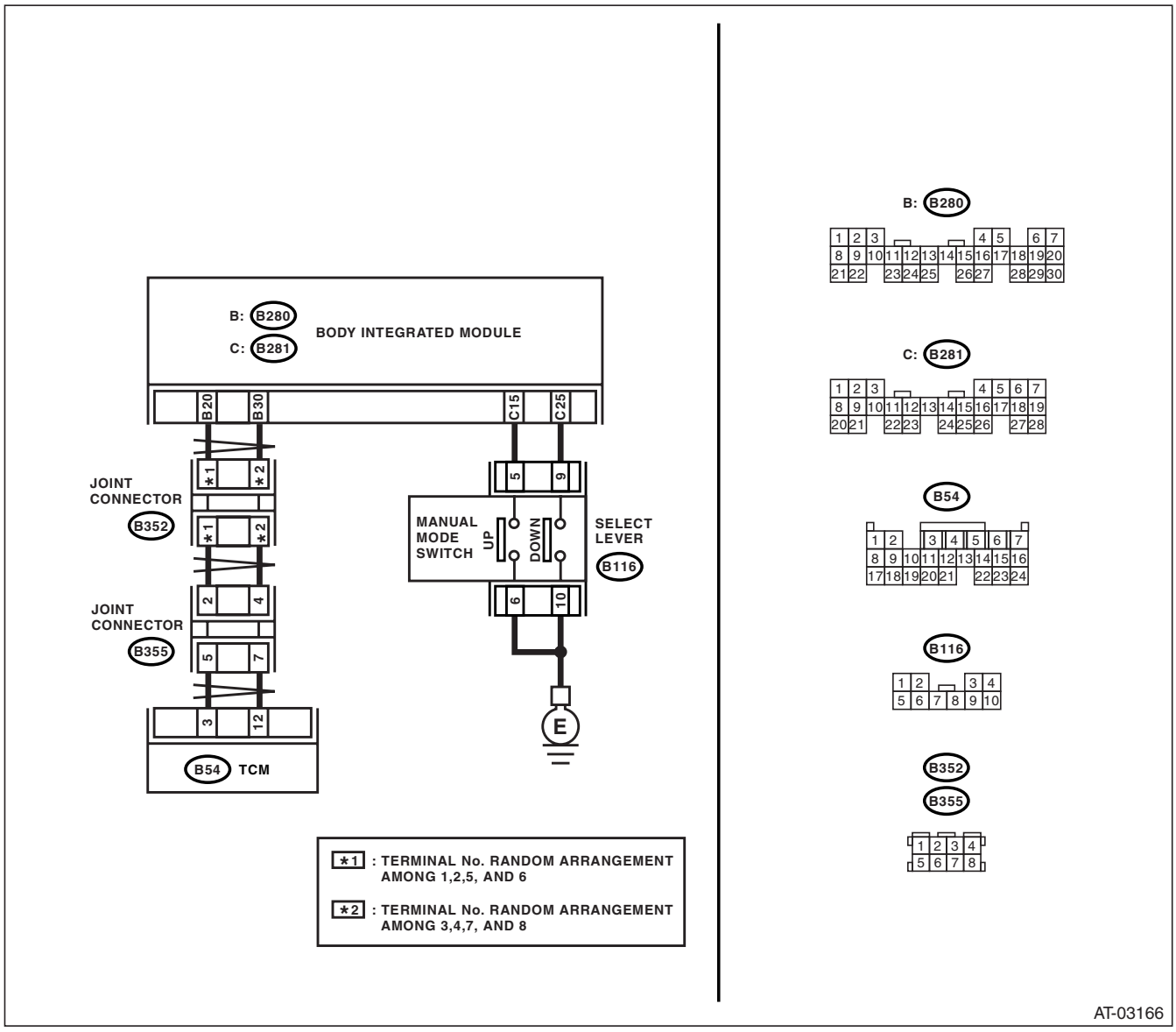
	Step	Check	Yes	No
1	**CONFIRM EQUIPMENT OF VEHICLE.**	Is the vehicle equipped with VDC?	Go to "CHECK MANUAL MODE SWITCH". <Ref. to 4AT(diag)-123, CHECK MANUAL MODE SWITCH, Diagnostic Procedure without Diagnostic Trouble Code (DTC).>	Go to step **2.**
2	**CHECK SPARE FUSE.**	Is the spare fuse OK?	Go to step **3.**	Replace the fuse.
3	**CHECK FWD SWITCH.** Connect the Subaru Select Monitor to data link connector.	When the fuse is inserted to FWD switch, does the LED light up?	Go to step **4.**	Go to step **5.**
4	**CHECK COMBINATION METER.**	Does the AWD warning light illuminate?	Go to "CHECK MANUAL MODE SWITCH". <Ref. to 4AT(diag)-123, CHECK MANUAL MODE SWITCH, Diagnostic Procedure without Diagnostic Trouble Code (DTC).>	Go to step **10.**
5	**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. 17 — (F27) No. 18:***	Is the resistance less than 1 Ω?	Go to step **6.**	Repair the open circuit of harness between TCM and FWD switch connector.
6	**CHECK HARNESS CONNECTOR BETWEEN FWD SWITCH AND CHASSIS GROUND.** Measure the resistance of harness between FWD switch and chassis ground. ***Connector & terminal*** ***(F27) No. 19 — Chassis ground:***	Is the resistance less than 1 Ω?	Go to step **7.**	Repair the open circuit of harness between FWD switch connector and chassis ground.
7	**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. 17 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **8.**	Repair the short circuit of harness between TCM and FWD switch connector.
8	**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. 17 (+) — Chassis ground (−):***	Is the voltage less than 1 V?	Go to step **9.**	Go to step **11.**
9	**CHECK INPUT SIGNAL FOR TCM.** Measure the signal voltage for TCM while removing the fuse from FWD switch connector. ***Connector & terminal*** ***(B55) No. 17 (+) — Chassis ground (−):***	Is the voltage more than 10.5 V?	Go to step **10.**	Replace the TCM. <Ref. to 4AT-66, Transmission Control Module (TCM).>

	Step	Check	Yes	No
10	**CHECK BODY INTEGRATED MODULE.** Check DTC of body integrated module.	Is DTC of CAN communication displayed?	Perform the diagnosis according to DTC.	Go to step **11.**
11	**CHECK COMBINATION METER.** Check AWD warning light. <Ref. to IDI-3, INSPECTION, Combination Meter System.>	Is the AWD warning light OK?	Go to step **12.**	Replace the combination meter assembly. <Ref. to IDI-15, Combination Meter.>
12	**CHECK POOR CONTACT.**	Is there poor contact in FWD switch circuit?	Repair the poor contact.	Replace the TCM. <Ref. to 4AT-66, Transmission Control Module (TCM).>

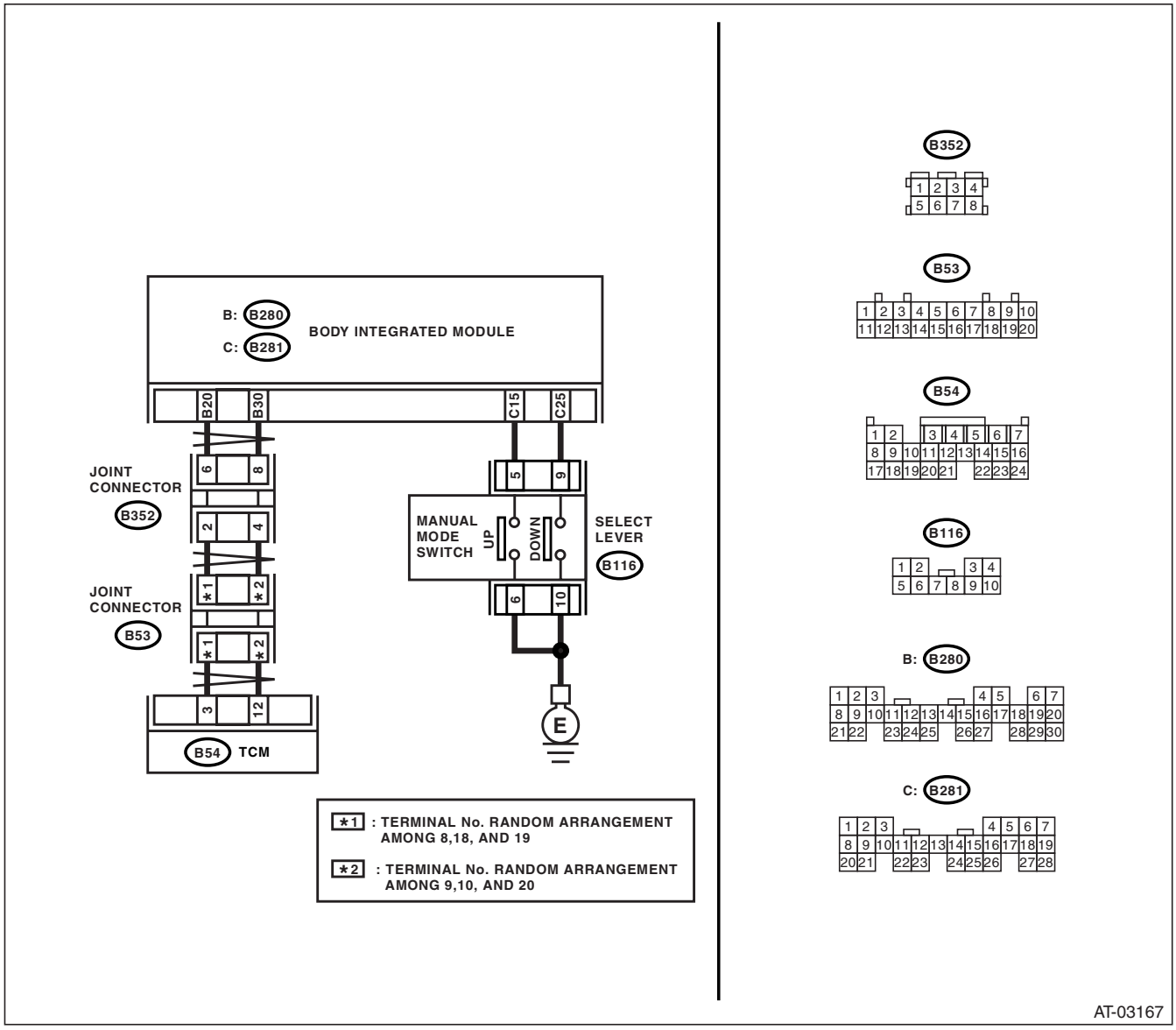
B: CHECK MANUAL MODE SWITCH

DIAGNOSIS:
Input signal circuit of manual mode switch is open or shorted.
TROUBLE SYMPTOM:
Does not shift on manual mode.
WIRING DIAGRAM:

- LHD model



- RHD model


B: B280
C: B281
BODY INTEGRATED MODULE
B20
B30
C15
C25
JOINT CONNECTOR
B352
JOINT CONNECTOR
B53
MANUAL MODE SWITCH
UP
DOWN
SELECT LEVER
B116
B54 TCM
E
*1 : TERMINAL No. RANDOM ARRANGEMENT AMONG 8,18, AND 19
*2 : TERMINAL No. RANDOM ARRANGEMENT AMONG 9,10, AND 20
B352
B53
B54
B116
B: B280
C: B281
AT-03167

	Step	Check	Yes	No
1	**CHECK SPORT SHIFT SWITCH.** 1) Shift the select lever to manual mode. 2) Shift and hold the select lever to up side. 3) Read the Up Switch data of TCM using Subaru Select Monitor. <Ref. to 4AT(diag)-16, READ CURRENT DATA, OPERATION, Subaru Select Monitor.>	Is ON displayed?	Go to step **2.**	Go to step **3.**
2	**CHECK MANUAL MODE SWITCH.** 1) Shift and hold the select lever to down side. 2) Read the Down Switch data of TCM using Subaru Select Monitor. <Ref. to 4AT(diag)-16, READ CURRENT DATA, OPERATION, Subaru Select Monitor.>	Is ON displayed?	Go to "CHECK SPORT INDICATOR" procedures. <Ref. to 4AT(diag)-128, CHECK SPORT INDICATOR., Diagnostic Procedure without Diagnostic Trouble Code (DTC).>	Go to step **12.**
3	**CHECK BODY INTEGRATED MODULE.** 1) Turn the ignition switch to ON. 2) Shift and hold the select lever to up side. 3) Read the TIP UP SW data of body integrated module using Subaru Select Monitor. <Ref. to LAN(diag)-14, OPERATION, Subaru Select Monitor.>	Is ON displayed?	Go to step **4.**	Go to step **5.**
4	**CHECK BODY INTEGRATED MODULE.** Check DTC of body integrated module. <Ref. to LAN(diag)-14, OPERATION, Subaru Select Monitor.>	Is DTC of CAN communication displayed?	Perform the diagnosis according to DTC.	Check the TCM.
5	**CHECK MANUAL MODE SWITCH GROUND CIRCUIT.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from manual mode switch. 3) Measure the resistance of harness between manual mode switch connector and chassis ground. ***Connector & terminal*** ***(B116) No. 6 — Chassis ground:***	Is the resistance less than 1 Ω?	Go to step **6.**	Repair the open circuit of harness between manual mode switch and chassis ground.
6	**CHECK MANUAL MODE SWITCH.** Measure the resistance between manual mode switch terminals. ***Connector & terminal*** ***(B116) No. 6 — No. 5:***	Is the resistance more than 1 MΩ?	Go to step **7.**	Replace the guide plate assembly.
7	**CHECK MANUAL MODE SWITCH.** 1) Shift and hold the select lever to up side. 2) Measure the resistance between manual mode switch terminals. ***Connector & terminal*** ***(B116) No. 6 — No. 5:***	Is the resistance less than 1 Ω?	Go to step **8.**	Replace the guide plate assembly.
8	**CHECK HARNESS CONNECTOR BETWEEN BODY INTEGRATED MODULE AND MANUAL MODE SWITCH.** 1) Disconnect the connector from body integrated module. 2) Measure the resistance of harness between body integrated module connector and manual mode switch connector. ***Connector & terminal*** ***(B116) No. 5 — (B281) No. 15:***	Is the resistance less than 1 Ω?	Go to step **9.**	Repair the open circuit of harness between manual mode switch connector and TCM connector, or poor contact in connector.

	Step	Check	Yes	No
9	**CHECK HARNESS CONNECTOR BETWEEN TCM AND MANUAL MODE SWITCH.** Measure the resistance of harness between manual mode switch connector and chassis ground. ***Connector & terminal*** ***(B116) No. 5 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **10.**	Repair the short circuit of harness between manual mode switch connector and TCM connector.
10	**CHECK INPUT SIGNAL TO BODY INTEGRATED MODULE.** 1) Connect all the connectors. 2) Turn the ignition switch to ON (engine OFF). 3) Check the signal voltage for body integrated module. ***Connector & terminal*** ***(B281) No. 15 (+) — Chassis ground (−):***	Is the voltage 1.5 — 8 V?	Go to step **11.**	Replace the body integrated module.
11	**CHECK INPUT SIGNAL TO BODY INTEGRATED MODULE.** 1) Shift and hold the select lever to up side. 2) Check the signal voltage for body integrated module. ***Connector & terminal*** ***(B281) No. 15 (+) — Chassis ground (−):***	Is the voltage less than 1 V?	Go to step **19.**	Replace the body integrated module.
12	**CHECK BODY INTEGRATED MODULE.** 1) Turn the ignition switch to ON. 2) Shift and hold the select lever to down side. 3) Read the TIP UP SW data of body integrated module using Subaru Select Monitor. <Ref. to LAN(diag)-14, OPERATION, Subaru Select Monitor.>	Is ON displayed?	Go to step **13.**	Go to step **14.**
13	**CHECK BODY INTEGRATED MODULE.** Check DTC of body integrated module.	Is DTC of CAN communication displayed?	Perform the diagnosis according to DTC.	Check the TCM.
14	**CHECK MANUAL MODE SWITCH GROUND CIRCUIT.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from manual mode switch. 3) Measure the resistance of harness between manual mode switch connector and chassis ground. ***Connector & terminal*** ***(B116) No. 10 (+) — Chassis ground:***	Is the resistance less than 1 Ω?	Go to step **15.**	Repair the open circuit of harness between manual mode switch and chassis ground.
15	**CHECK MANUAL MODE SWITCH.** Measure the resistance between manual mode switch terminals. ***Connector & terminal*** ***(B116) No. 10 — No. 9:***	Is the resistance more than 1 MΩ?	Go to step **16.**	Replace the guide plate assembly.
16	**CHECK MANUAL MODE SWITCH.** 1) Shift and hold the select lever to down side. 2) Measure the resistance between manual mode switch terminals. ***Connector & terminal*** ***(B116) No. 10 — No. 9:***	Is the resistance less than 1 Ω?	Go to step **17.**	Replace the guide plate assembly.

	Step	Check	Yes	No
17	**CHECK HARNESS CONNECTOR BETWEEN BODY INTEGRATED MODULE AND MANUAL MODE SWITCH.** 1) Disconnect the connector from body integrated module. 2) Measure the resistance of harness between body integrated module connector and manual mode switch connector. ***Connector & terminal*** ***(B116) No. 9 — (B281) No. 25:***	Is the resistance less than 1 Ω?	Go to step **18.**	Repair the open circuit of harness between manual mode switch connector and TCM connector, or poor contact in connector.
18	**CHECK HARNESS CONNECTOR BETWEEN BODY INTEGRATED MODULE AND MANUAL MODE SWITCH.** Measure the resistance of harness between manual mode switch connector and chassis ground. ***Connector & terminal*** ***(B116) No. 9 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **19.**	Repair the short circuit of harness between manual mode switch connector and TCM connector.
19	**CHECK INPUT SIGNAL TO BODY INTEGRATED MODULE.** 1) Connect all the connectors. 2) Turn the ignition switch to ON (engine OFF). 3) Check the signal voltage for body integrated module. ***Connector & terminal*** ***(B281) No. 25 (+) — Chassis ground (−):***	Is the voltage 1.5 — 8 V?	Go to step **20.**	Go to step **21.**
20	**CHECK INPUT SIGNAL TO BODY INTEGRATED MODULE.** 1) Shift and hold the select lever to down side. 2) Check the signal voltage for body integrated module. ***Connector & terminal*** ***(B281) No. 25 (+) — Chassis ground (−):***	Is the voltage less than 1 V?	Go to step **21.**	Replace the body integrated module. <Ref. to 4AT-66, Transmission Control Module (TCM).>
21	**CHECK POOR CONTACT.**	Is there poor contact in manual mode switch circuit?	Repair the poor contact.	A temporary poor contact of manual mode switch circuit connector or harness

C: CHECK SPORT INDICATOR.

DIAGNOSIS:

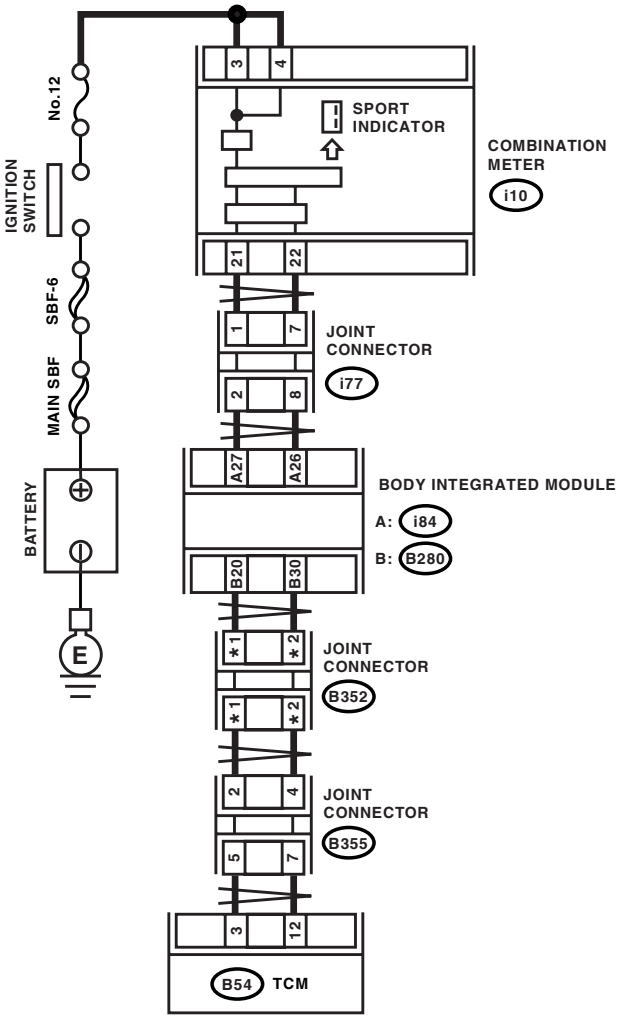
Output signal circuit of SPORT indicator is open or shorted.

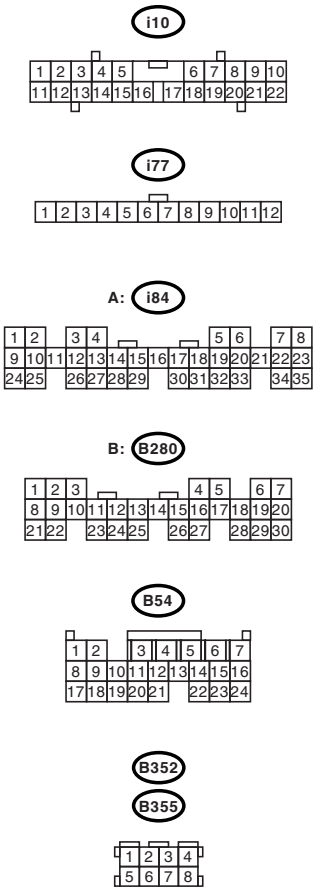
TROUBLE SYMPTOM:

- SPORT indicator does not display or remains displayed.
- SPORT indicator display does not change.

WIRING DIAGRAM:

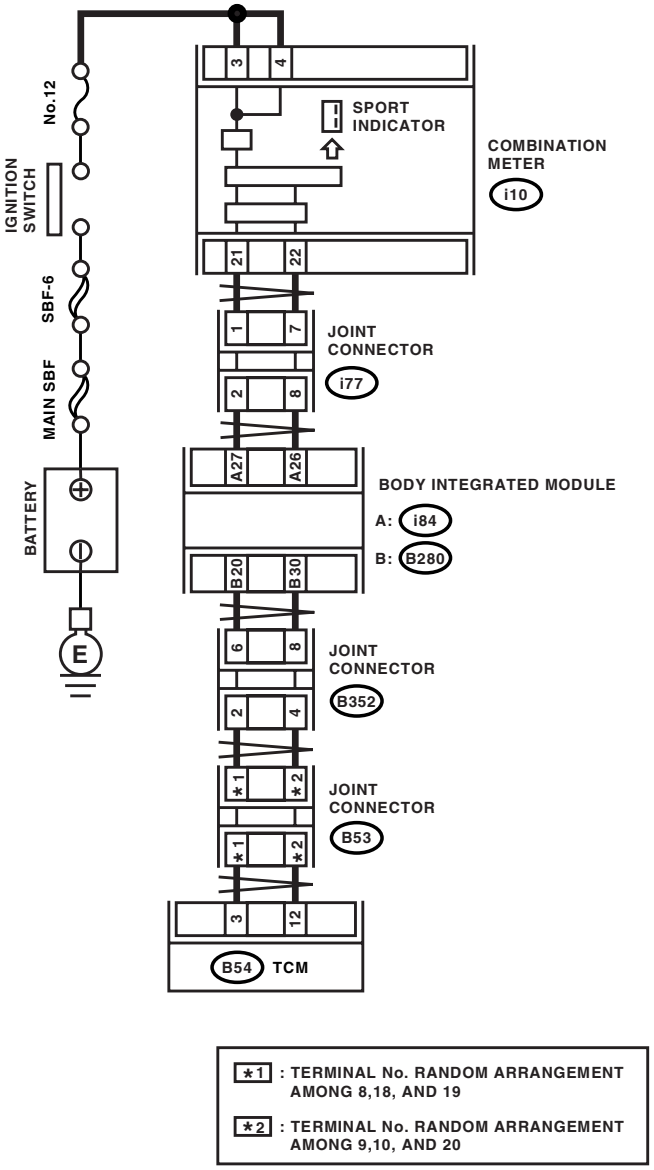
- LHD model

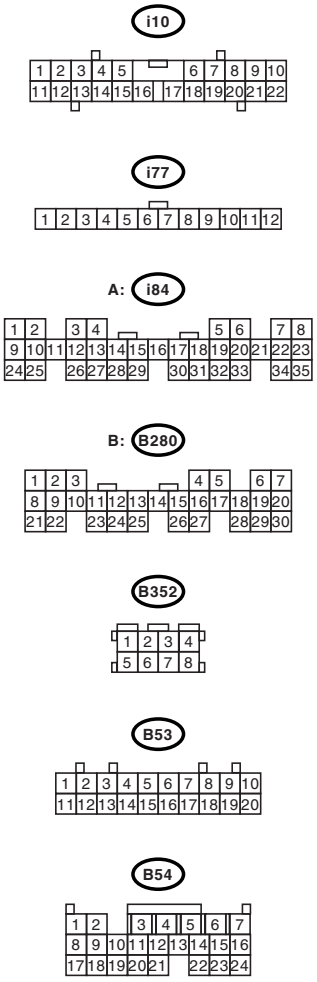




AT-03168

- RHD model



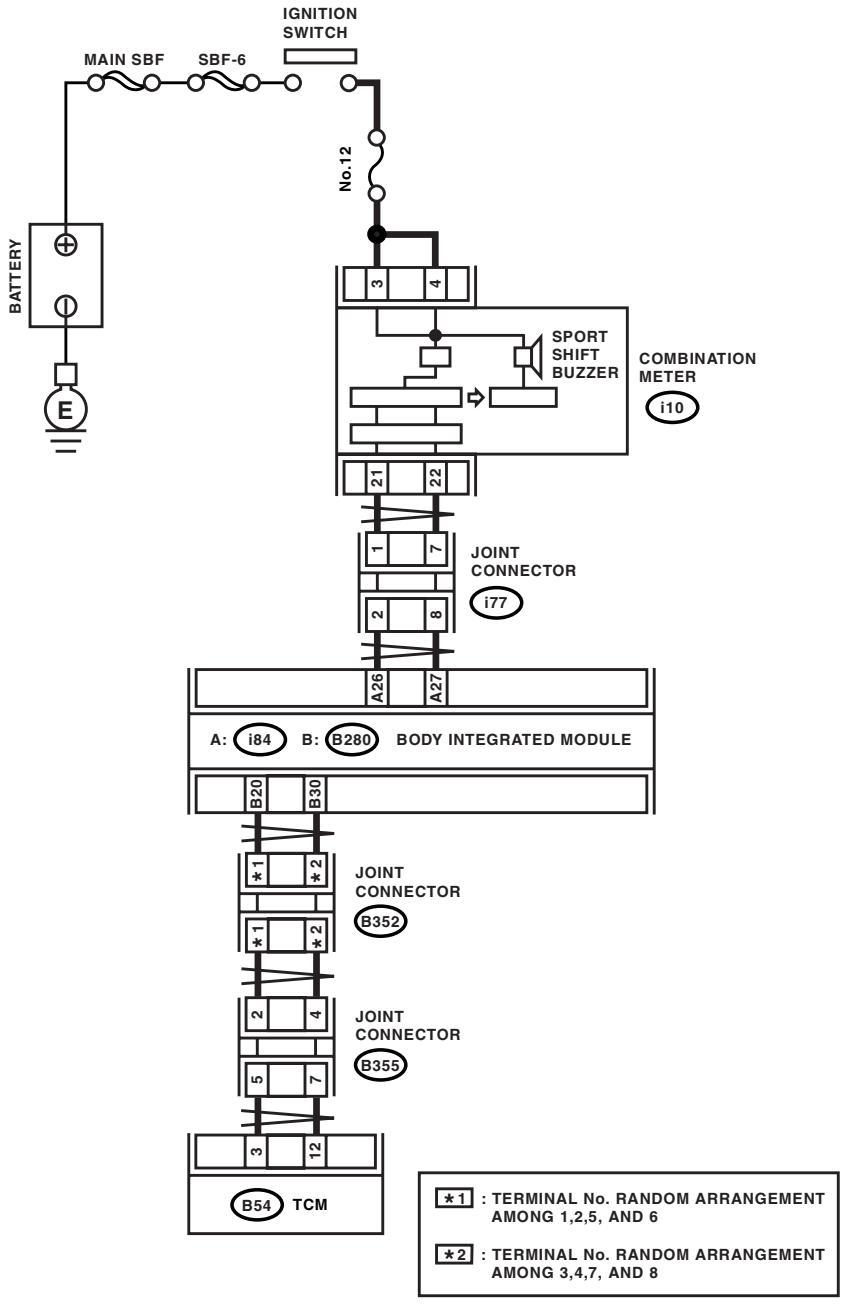


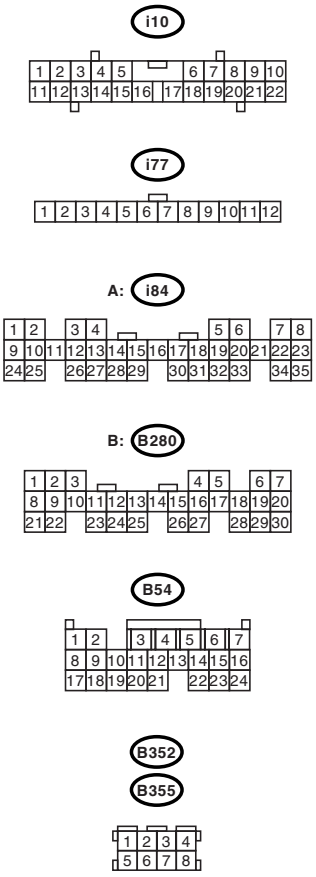
AT-03169

	Step	Check	Yes	No
1	**CHECK BODY INTEGRATED MODULE.** Check DTC of body integrated module.	Is DTC of CAN communication displayed?	Perform the diagnosis according to DTC.	Go to step **2.**
2	**CHECK TCM.** 1) Turn the ignition switch to OFF. 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 power switch to ON. 5) Shift the select lever to manual mode side. 6) Read the gear position data of TCM using Subaru Select Monitor.	Is the gear position 1?	Go to step **3.**	Replace the TCM. <Ref. to 4AT-66, Transmission Control Module (TCM).>
3	**CHECK TCM.** 1) Up-shift the select lever. 2) Read the gear position data of TCM using Subaru Select Monitor.	Is the gear position 2?	Go to step **4.**	Replace the TCM. <Ref. to 4AT-66, Transmission Control Module (TCM).>
4	**CHECK BODY INTEGRATED MODULE.** Read the data of SPORT shift gear position using Subaru Select Monitor.	Is the SPORT shift gear position 2?	Go to step **5.**	Check the body integrated module.
5	**CHECK COMBINATION METER.** <Ref. to IDI-3, INSPECTION, Combination Meter System.>	Is the SPORT indicator OK?	Check the buzzer. <Ref. to 4AT(diag)-134, Diagnostics with Phenomenon.>	Replace the combination meter assembly. <Ref. to IDI-15, Combination Meter.>

D: CHECK BUZZER

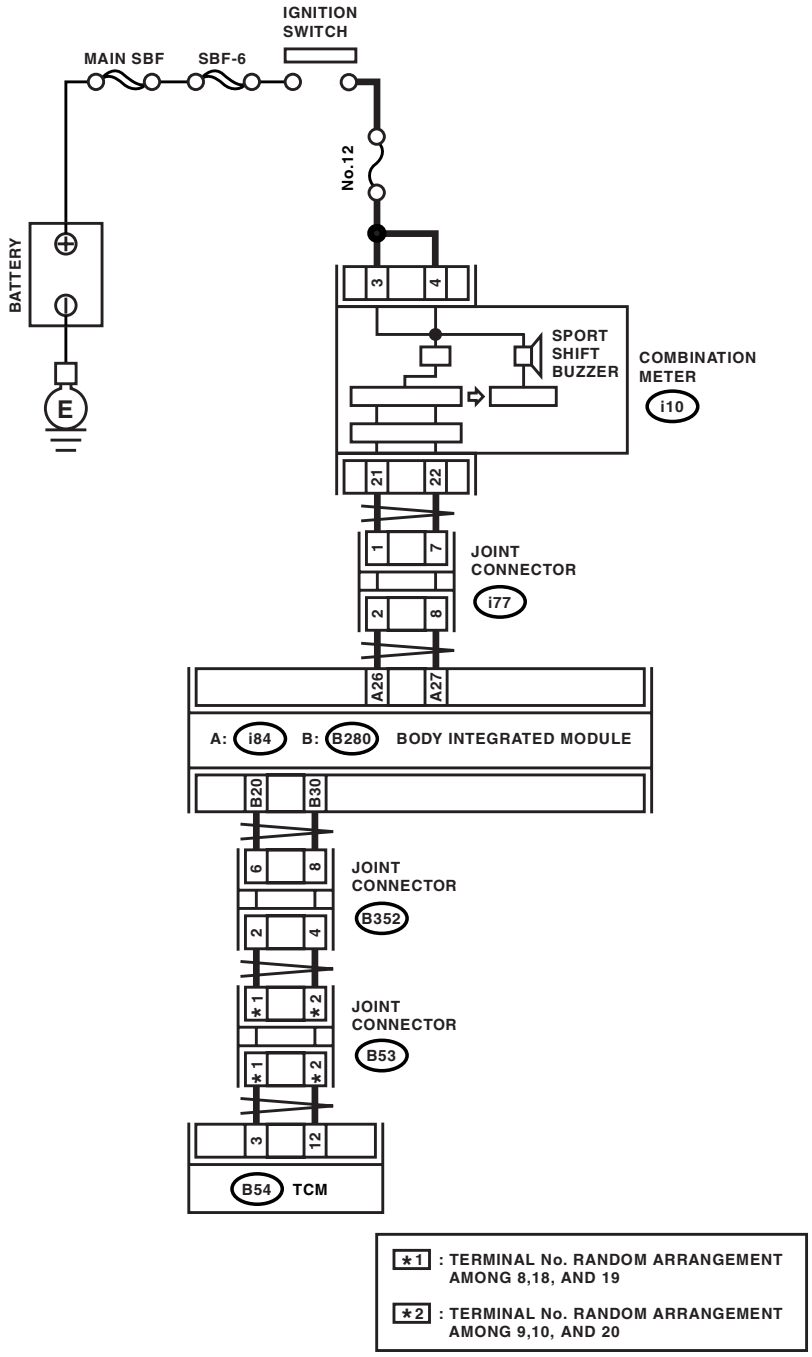
DIAGNOSIS:
Output signal circuit of buzzer is open or shorted.
TROUBLE SYMPTOM:
Buzzer remains sounded.
WIRING DIAGRAM:
- LHD model

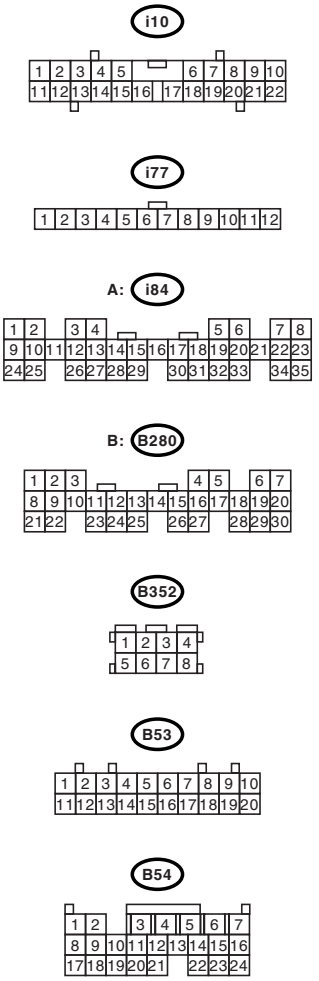




AT-03170

- RHD model





AT-03171

	Step	Check	Yes	No
1	**CHECK BODY INTEGRATED MODULE.** 1) Turn the ignition switch to OFF. 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 power switch to ON. 5) Read the data of SPORT shift buzzer using Subaru Select Monitor.	Is the SPORT shift buzzer display “ON”?	Replace the TCM. <Ref. to 4AT-66, Transmission Control Module (TCM).>	Go to step **2.**
2	**CHECK COMBINATION METER.** <Ref. to IDI-3, INSPECTION, Combination Meter System.>	Is the buzzer OK?	Refer to “Diagnostics with Phenomenon”. <Ref. to 4AT(diag)-134, Diagnostics with Phenomenon.>	Replace the combination meter assembly. <Ref. to IDI-15, Combination Meter.>

15.Diagnostics with Phenomenon

A: INSPECTION

Symptom	Faulty parts
Starter does not operate when select lever is in “P” or “N” range. Starter operates when select lever is in “R” or “D” range.	• Inhibitor switch • Select cable • Select lever • Starter motor and harness
Noise when select lever is in “P” or “N”.	• Strainer • Transfer duty solenoid • Oil pump • Drive plate • ATF level is too high or too low
Hissing noise occurs during standing start.	• Strainer • ATF level is too high or too low
Noise occurs while driving in “D1”.	• Final gear • Planetary gear • Reduction gear • Differential gear oil level is 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 is too high or too low
Noise occurs while driving in “D4”.	• Final gear • Low & reverse brake • Planetary gear • Reduction gear • Differential gear oil level is too high or too low
Vehicle moves when select lever is in “N”.	• Select cable • Inhibitor switch • TCM • Low clutch
Shock occurs when select lever is shifted 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 shifted 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 shifted from “N” to “R” range.	• Accelerator pedal position sensor • ATF temperature sensor • Line pressure linear solenoid • TCM • Harness • Control valve • ATF deterioration
Excessive time lag occurs when select lever is shifted from “N” to “R” range.	• Control valve • Low & reverse clutch • Reverse clutch • Line pressure linear solenoid • Seal ring • Front gasket of transmission case

Symptom	Faulty parts
Vehicle does not start in any shift range. (engine stalls)	• Parking brake mechanism • Planetary gear
Vehicle does not start in any shift range. (engine operates)	• 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 is too low • Front gasket of transmission case
Vehicle does not start in “R” range only. (engine operates)	• 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” range. (engine operates)	• Low clutch • One-way clutch
Vehicle does not start in “D” range. (engine stalls)	• Reverse clutch
Vehicle does not start in “R” range only. (engine operates)	• Control valve
Acceleration during standing start is poor. (high rpm stall)	• Control valve • Low clutch • Reverse clutch • ATF level is too low • ATF deterioration • Front gasket of transmission case • Differential gear oil level is too high or too low
Acceleration during standing start is poor. (low rpm stall)	• Oil pump • Torque converter one-way clutch • Engine performance
Acceleration is poor when select lever is in “D” range. (Normal rpm stall)	• TCM • Control valve • High clutch • 2-4 brake • Planetary gear
Acceleration is poor when select lever is in “R” range. (Normal rpm stall)	• 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 • Accelerator pedal position sensor • Control valve • 2-4 brake
No shift occurs from 2nd to 3rd gear.	• TCM • Control valve • High clutch

Symptom	Faulty parts
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 shifted from 4th gear to 3rd gear.	• Inhibitor switch • TCM • Accelerator pedal position sensor • Control valve
Engine brake is not effected when select lever is shifted from 3rd gear to 2nd gear.	• Control valve
Engine brake is not effected when select lever is shifted from 2nd gear to 1st gear.	• 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
No lock-up occurs.	• TCM • Accelerator pedal 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 is too high
Differential oil spurts out.	• Differential gear oil level is 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
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

Symptom	Faulty parts
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 shifted from 3rd gear to 2nd gear.	• 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
Shock occurs when select lever is shifted from 2nd gear to 1st gear.	• 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

Symptom	Faulty parts
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
It is not set in FWD mode.	• TCM • Transfer clutch • Transfer valve • Transfer duty solenoid
Select lever is hard to move.	• Select cable • Select lever • Detent spring • Manual plate
Select lever is excessively hard to move. (unreasonable resistance)	• Detent spring • Manual plate
Select lever slips out of operation during acceleration or while driving on rough terrain.	• Select cable • Select lever • Detent spring • Manual plate
Can not set to manual mode.	• SPORT mode switch • TCM • Body integrated module
Gear does not change though the select lever is operated in manual mode.	• Up shift switch • Down shift switch • TCM • Body integrated module

AUTOMATIC TRANSMISSION

5AT

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1. General Description

A: SPECIFICATION

1. TORQUE CONVERTER CLUTCH

Model	Turbo	Non-turbo
Type	Symmetric, 3 element, single stage, 2 phase torque converter	
Stall torque ratio	2.1	
Nominal diameter	250 mm (9.84 in)	
Stall speed (at sea level)	3,100 — 3,500 rpm	2,400 — 2,800 rpm
One-way clutch	Sprague type one-way clutch	

2. OIL PUMP

Type	Internal gear discharge pump	
Driving method	Driven by engine	
Number of teeth	Inner rotor	9
	Outer rotor	10

3. TRANSMISSION CONTROL ELEMENT

Type	5-forward, 1-reverse, double-row planetary gears
Multi-plate clutch	3 sets
Multi-plate brake	4 sets
One-way clutch (sprague type)	3 sets

4. TRANSMISSION GEAR RATIO

1st	3.540
2nd	2.264
3rd	1.471
4th	1.000
5th	0.834
Rev	2.370

5. PLANETARY GEAR AND PLATE

Model	Turbo	Non-turbo
Tooth number of front internal gear	106	
Tooth number of front carrier	28	
Tooth number of front sun gear	50	
Tooth number of mid internal gear	78	
Tooth number of mid carrier	18	
Tooth number of mid sun gear	42	
Tooth number of rear internal gear	110	
Tooth number of rear carrier	24	
Tooth number of rear sun gear	62	
Drive plate number of front brake	2	
Drive plate number of input clutch	6	5
Drive plate number of high & low reverse clutch	4	
Drive plate number of direct clutch	5	
Drive plate number of reverse brake	5	6
Drive plate number of forward brake	5	4
Drive plate number of low coast brake	3	

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 ← → 5th
Manual mode (+)	Manual gear change 1st→ 2nd→ 3rd→ 4th→ 5th
Manual mode (–)	Manual gear change 1st← 2nd← 3rd← 4th← 5th
Control method	Wire cable type

7. HYDRAULIC CONTROL & LUBRICATION

Type	Electronic/hydraulic control [Five forward speed changes by electrical signals of vehicle speed and accelerator (throttle) opening]
Fluid	Specified fluid: SUBARU ATF (Part No. K0140Y0700) Recommended fluid: IDEMITSU ATF HP Castrol Transmax J NOTE: Using of recommended fluid is permitted only on the area where the specified is not available.
Fluid capacity ℓ (US qt, Imp qt)	9.6 — 10.0 (10.1 — 10.6, 8.4 — 8.8)
Lubrication system	Forced feed lubrication with oil pump

8. COOLING & HARNESS

Cooling system	Liquid-cooled cooler incorporated in radiator or ATF liquid-cooled cooler
Transmission harness	20 + 8 poles

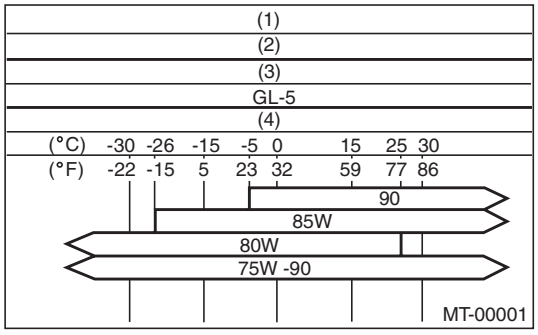
9. TRANSFER

Model	Turbo	Non-turbo
Transfer type	Variable torque distribution (VTD)	
Drive & driven plate number of transfer clutch	4	3
Reduction gear ratio	1.000 (41/41)	

10.FINAL REDUCTION

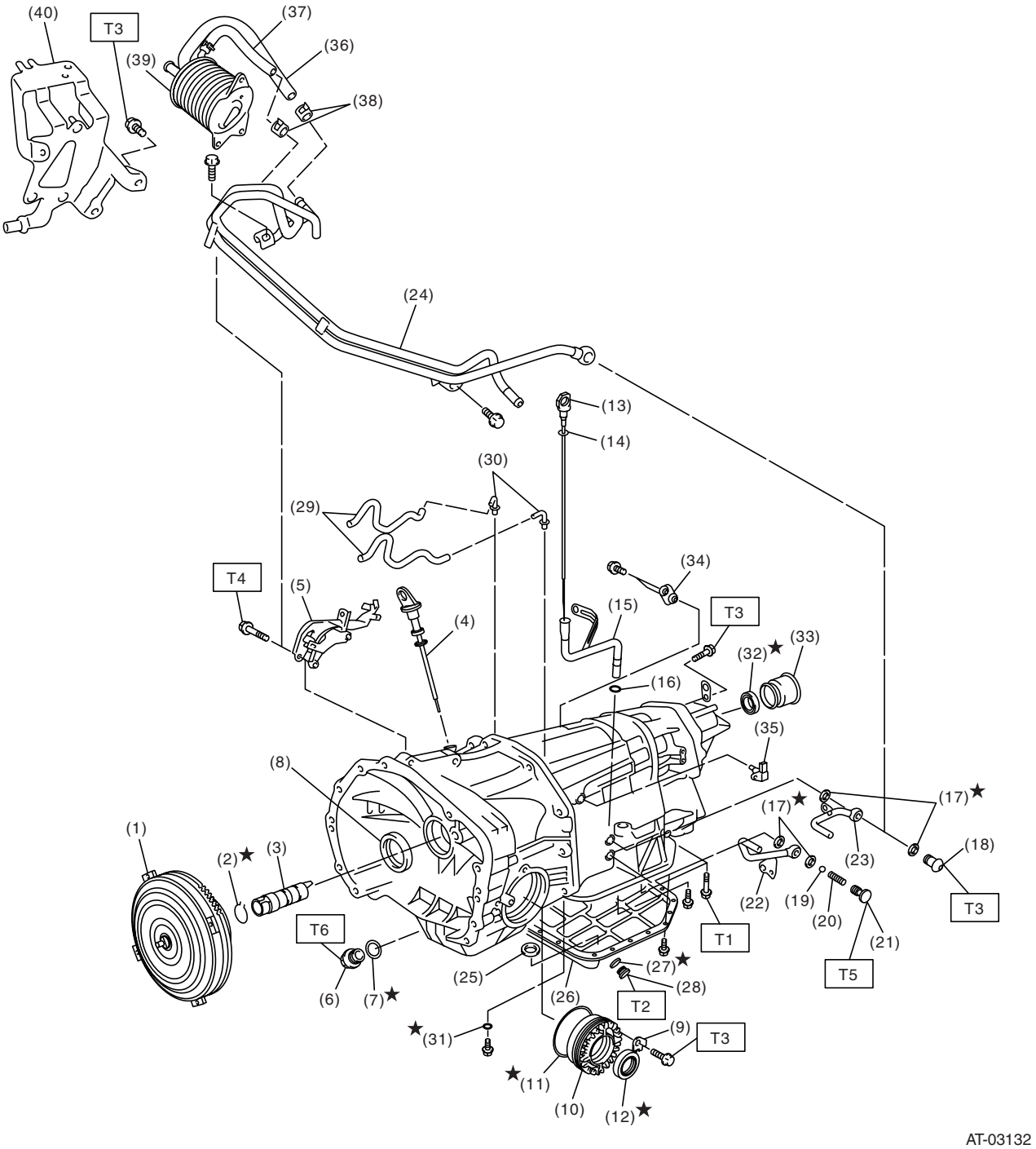
Model	Turbo	Non-turbo (OUTBACK)	Non-turbo (except for OUTBACK)
Front final reduction gear ratio	3.272		3.083

11.RECOMMENDED GEAR OIL

Lubrication oil	 (1) Item (2) Front differential gear oil (3) API standard (4) SAE viscosity No. and applicable temperature
Front differential gear oil capacity ℓ (US qt, Imp qt)	1.3 — 1.5 (1.4 — 1.6, 1.1 — 1.3)

B: COMPONENT

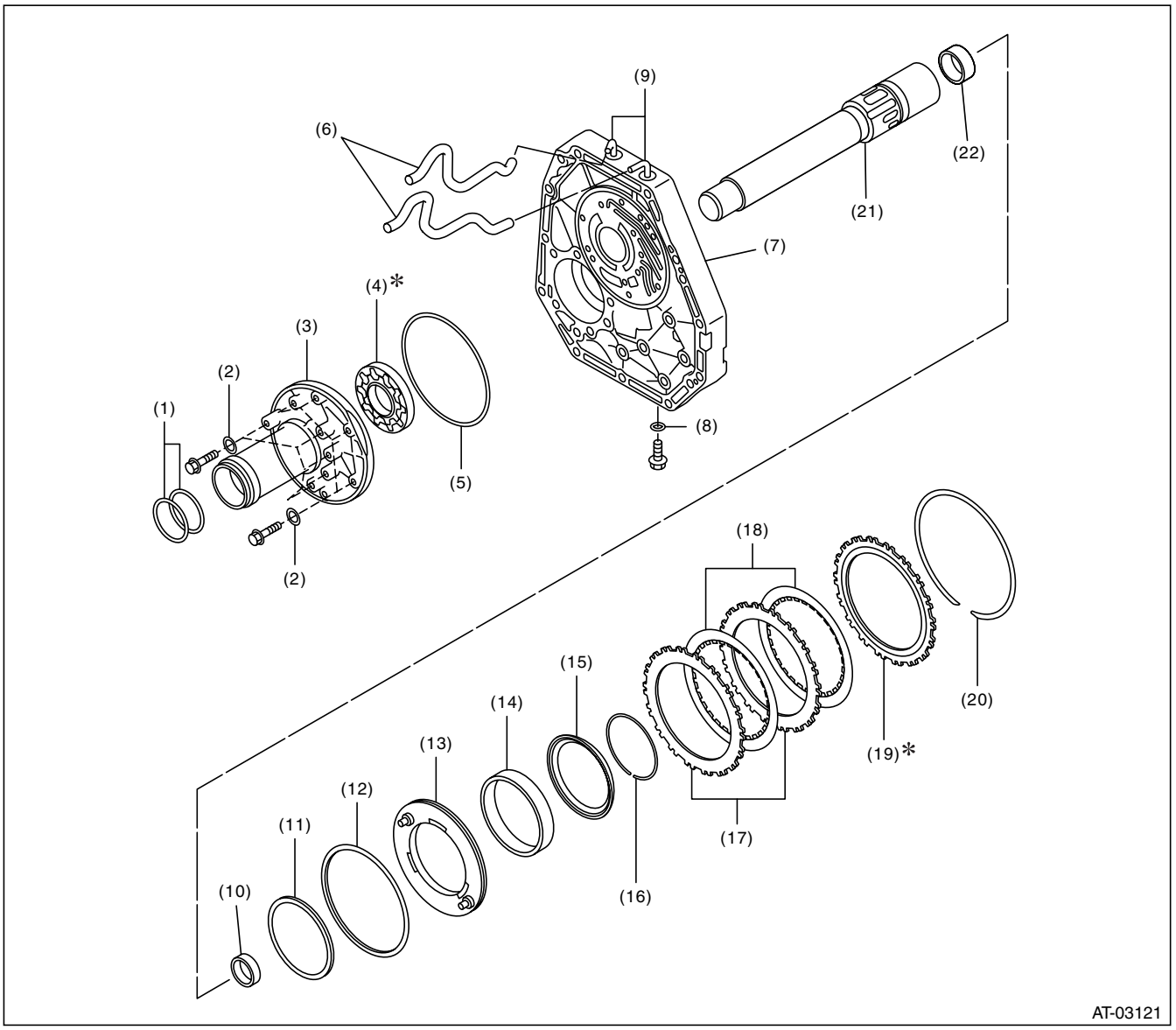
1. TORQUE CONVERTER CLUTCH & TRANSMISSION ASSEMBLY



(1) Torque converter ASSY
(2) Circlip
(3) Oil pump shaft
(4) Differential oil level gauge
(5) Pitching stopper bracket
(6) Differential oil drain plug
(7) Gasket
(8) Oil seal
(9) Lock plate
(10) Side retainer
(11) O-ring
(12) Oil seal
(13) ATF level gauge
(14) O-ring
(15) Oil charge pipe
(16) O-ring
(17) Gasket
(18) Union screw
(19) Ball
(20) Spring
(21) Union screw
(22) ATF outlet pipe
(23) ATF inlet pipe (Model without ATF warmer)
(24) ATF inlet pipe (Model with ATF warmer)
(25) Magnet
(26) Oil pan
(27) Gasket
(28) ATF drain plug
(29) Breather hose
(30) Nipple
(31) O-ring
(32) Oil seal
(33) Dust cover
(34) Floating bracket
(35) Turbine speed sensor 1
(36) ATF cooler inlet hose
(37) ATF cooler outlet hose
(38) Hose clamp (Model with ATF warmer)
(39) ATF cooler ASSY (Model with ATF warmer)
(40) ATF cooler bracket (Model with ATF warmer)

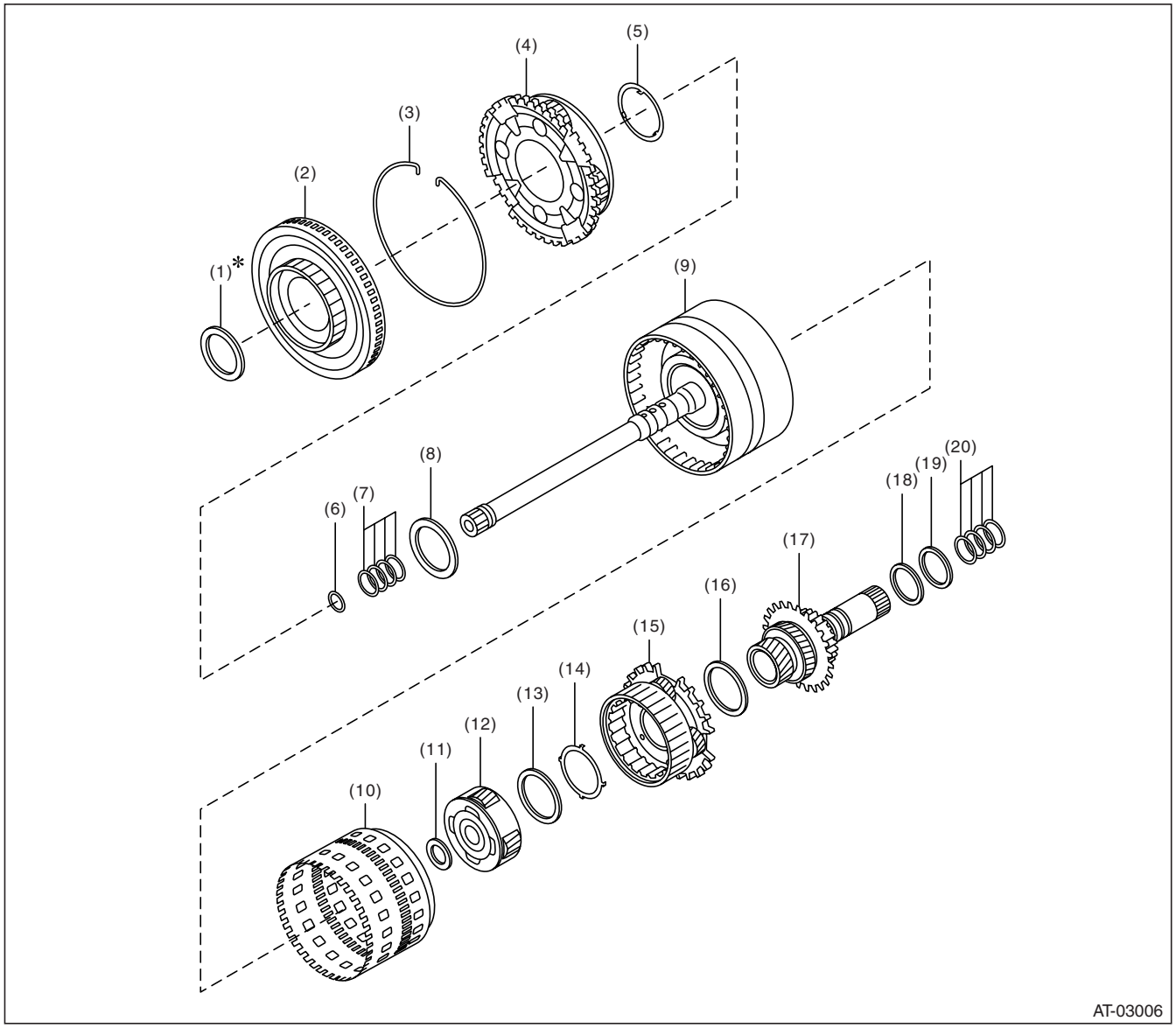
Tightening torque: N·m (kgf-m, ft-lb)
T1: 5 (0.5, 3.7)
T2: 20 (2.0, 14.8)
T3: 25 (2.5, 18.4)
T4: 41 (4.2, 30.2)
T5: 45 (4.6, 33.2)
T6: 70 (7.1, 51.6)

2. OIL PUMP & FRONT BRAKE



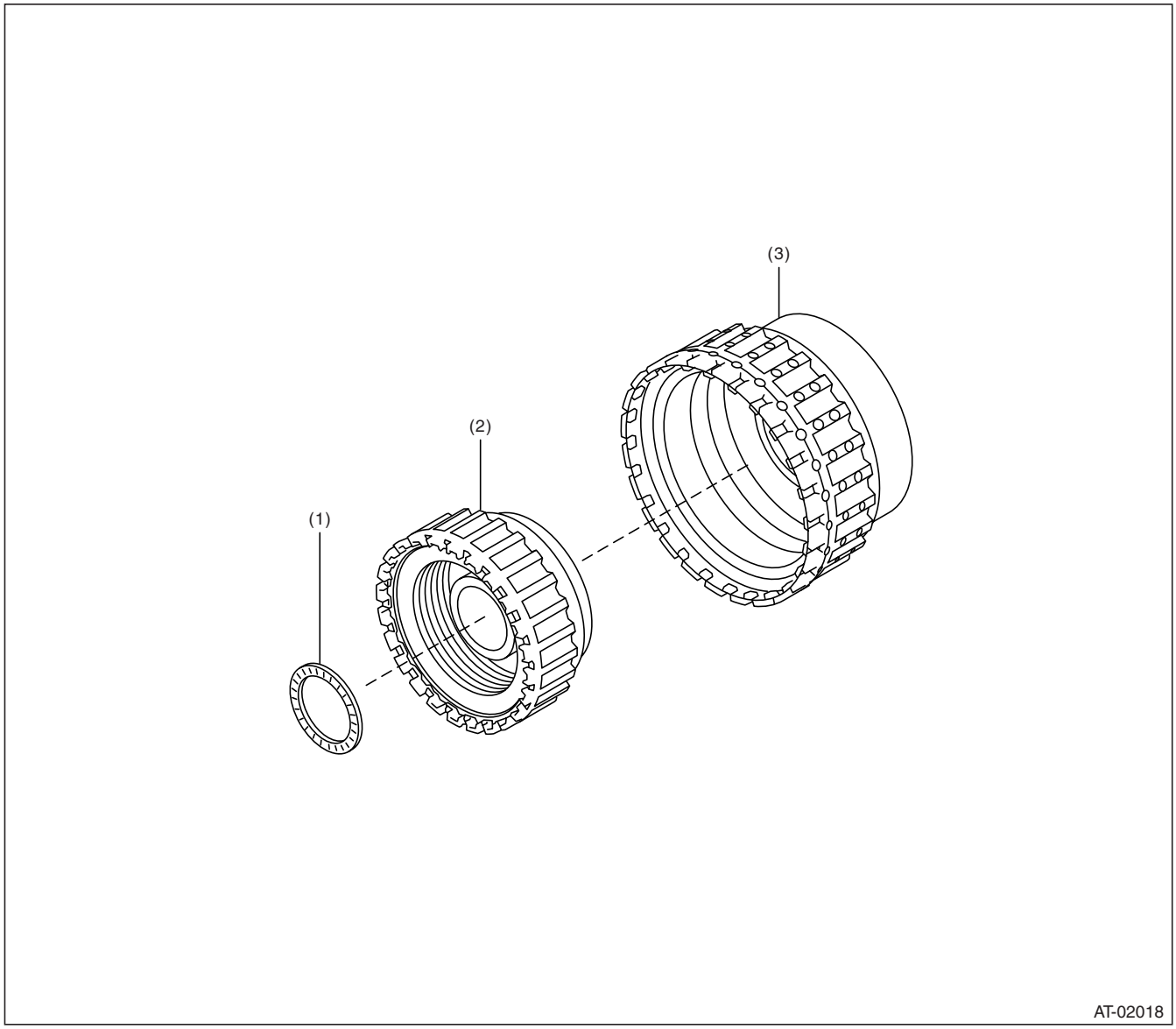
(1) O-ring
(2) Washer
(3) Oil pump housing
(4) Oil pump rotor
(5) O-ring
(6) Air breather hose
(7) Oil pump cover
(8) O-ring
(9) Nipple
(10) Needle bearing
(11) D-ring (Inner)
(12) D-ring (Outer)
(13) Front brake piston
(14) Return spring
(15) Retainer
(16) Snap ring
(17) Driven plate
(18) Drive plate
(19) Retaining plate
(20) Snap ring
(21) Stator shaft
(22) Needle bearing

3. FRONT PLANETARY CARRIER AND MIDDLE & REAR PLANETARY CARRIER



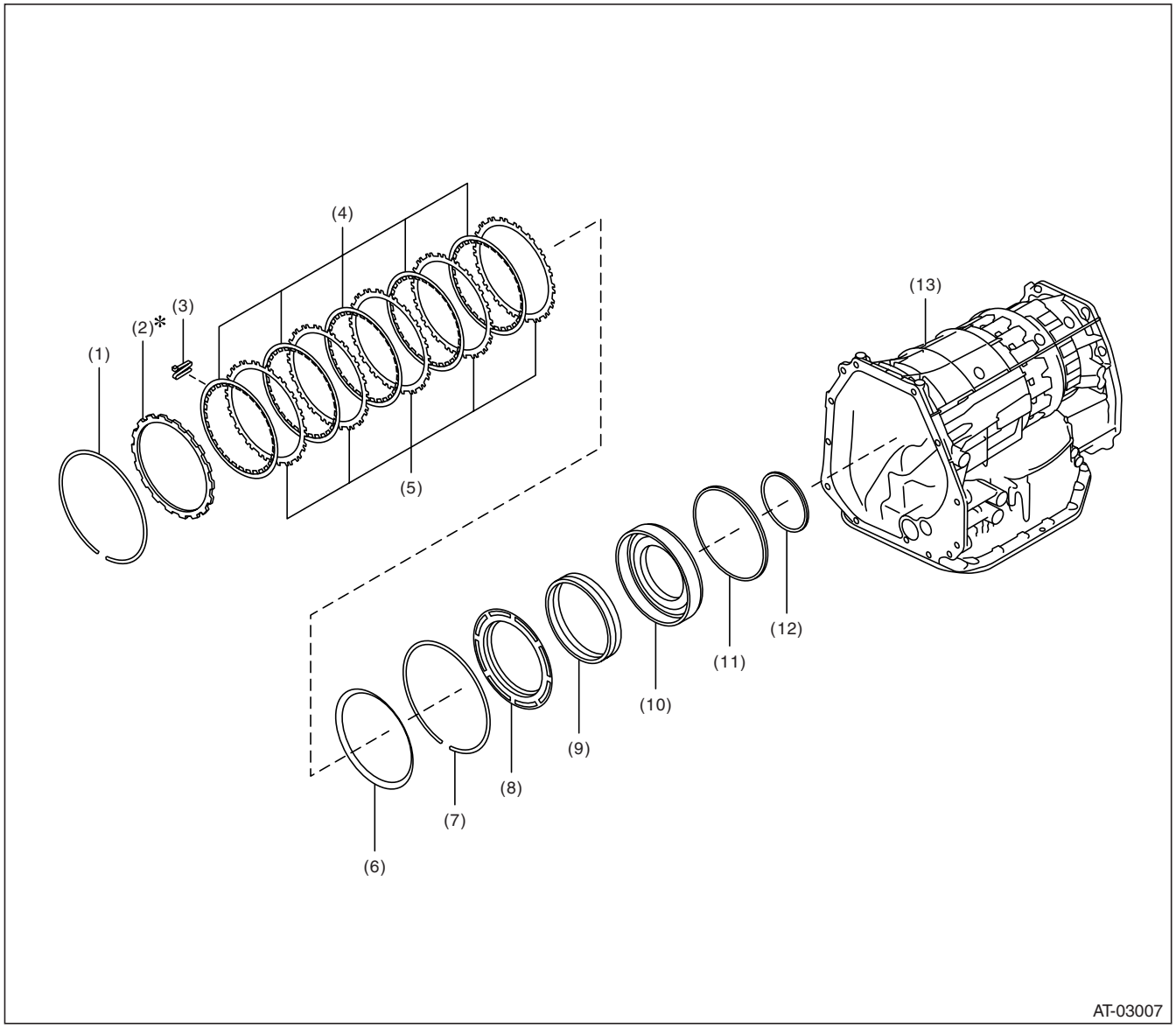
(1) Thrust bearing
(2) Front sun gear ASSY
(3) Snap ring
(4) Front carrier ASSY
(5) Race bearing
(6) O-ring
(7) Seal ring
(8) Thrust bearing
(9) Input clutch ASSY
(10) Rear internal gear ASSY
(11) Thrust bearing
(12) Middle carrier ASSY
(13) Thrust bearing
(14) Race bearing
(15) Rear carrier ASSY
(16) Thrust bearing
(17) Middle & Rear sun gear ASSY
(18) Washer
(19) Thrust bearing
(20) Seal ring

4. DIRECT CLUTCH AND HIGH & LOW REVERSE CLUTCH



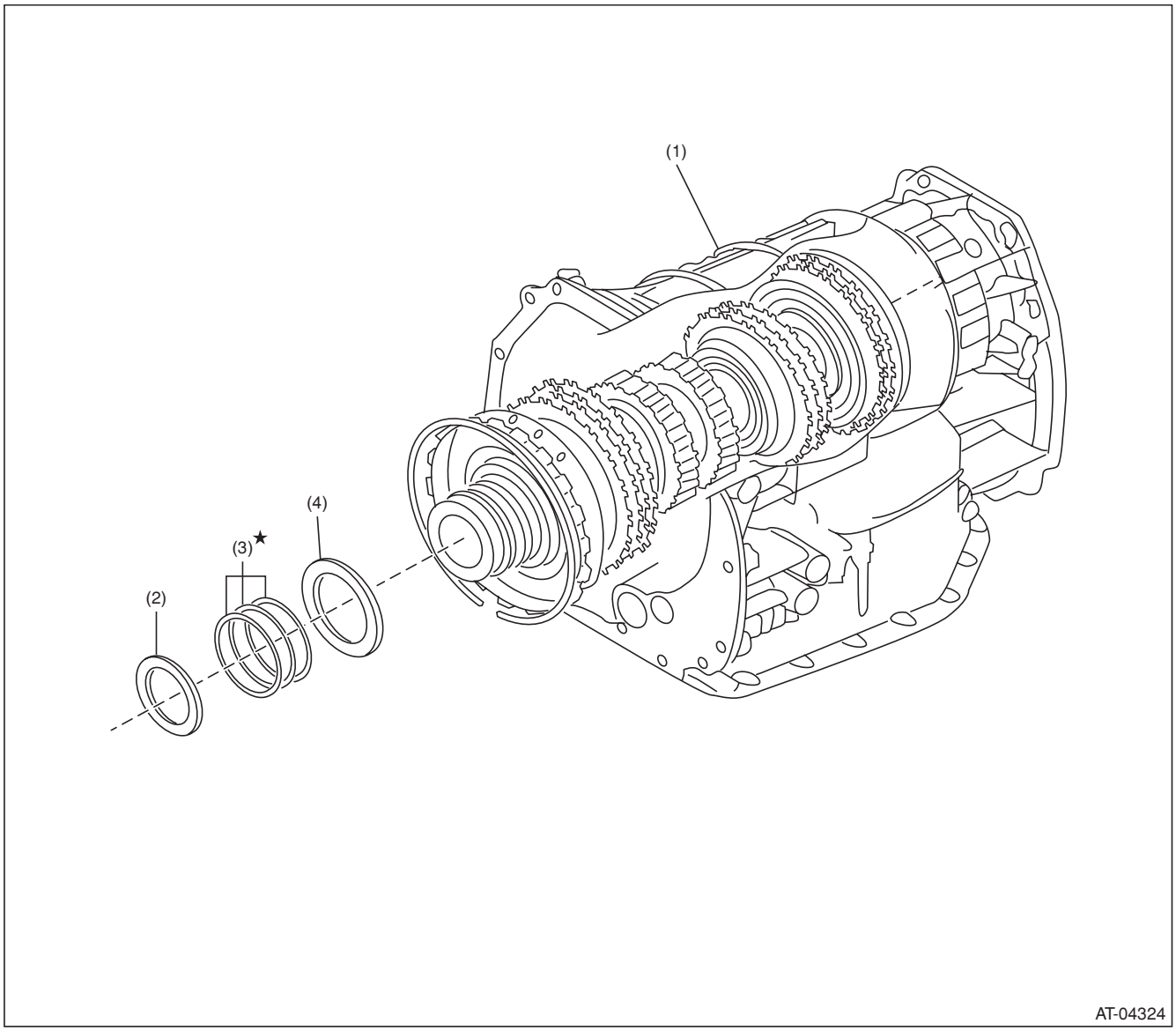
(1) Thrust bearing
(2) High & low reverse clutch ASSY
(3) Direct clutch ASSY

5. REVERSE BRAKE



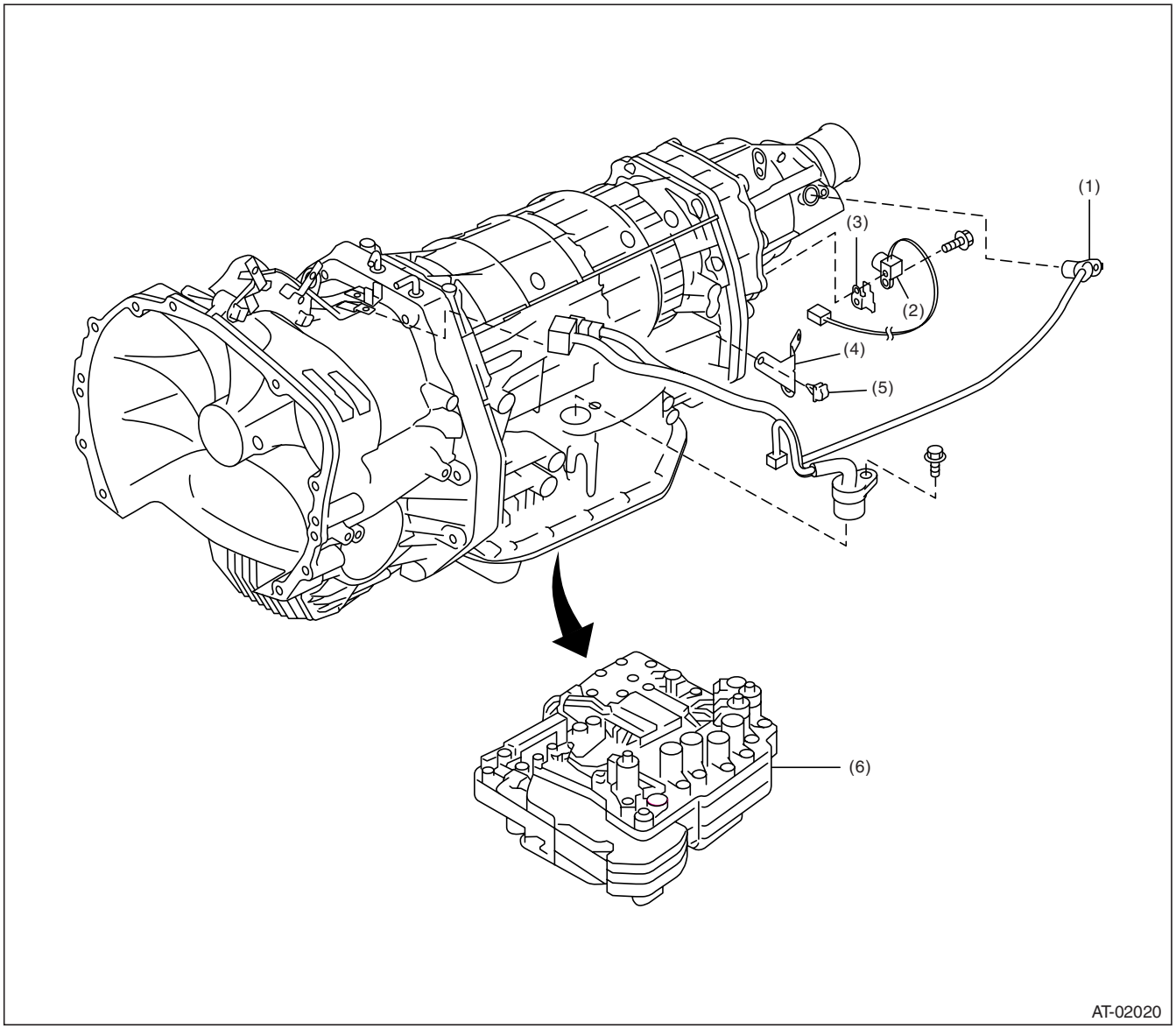
(1) Snap ring
(2) Retainer plate
(3) Leaf spring
(4) Drive plate
(5) Driven plate
(6) Dish plate
(7) Snap ring
(8) Retainer
(9) Leaf spring
(10) Reverse brake piston
(11) D-ring (Outer)
(12) D-ring (Inner)
(13) AT main case

6. SHORT AT ASSY



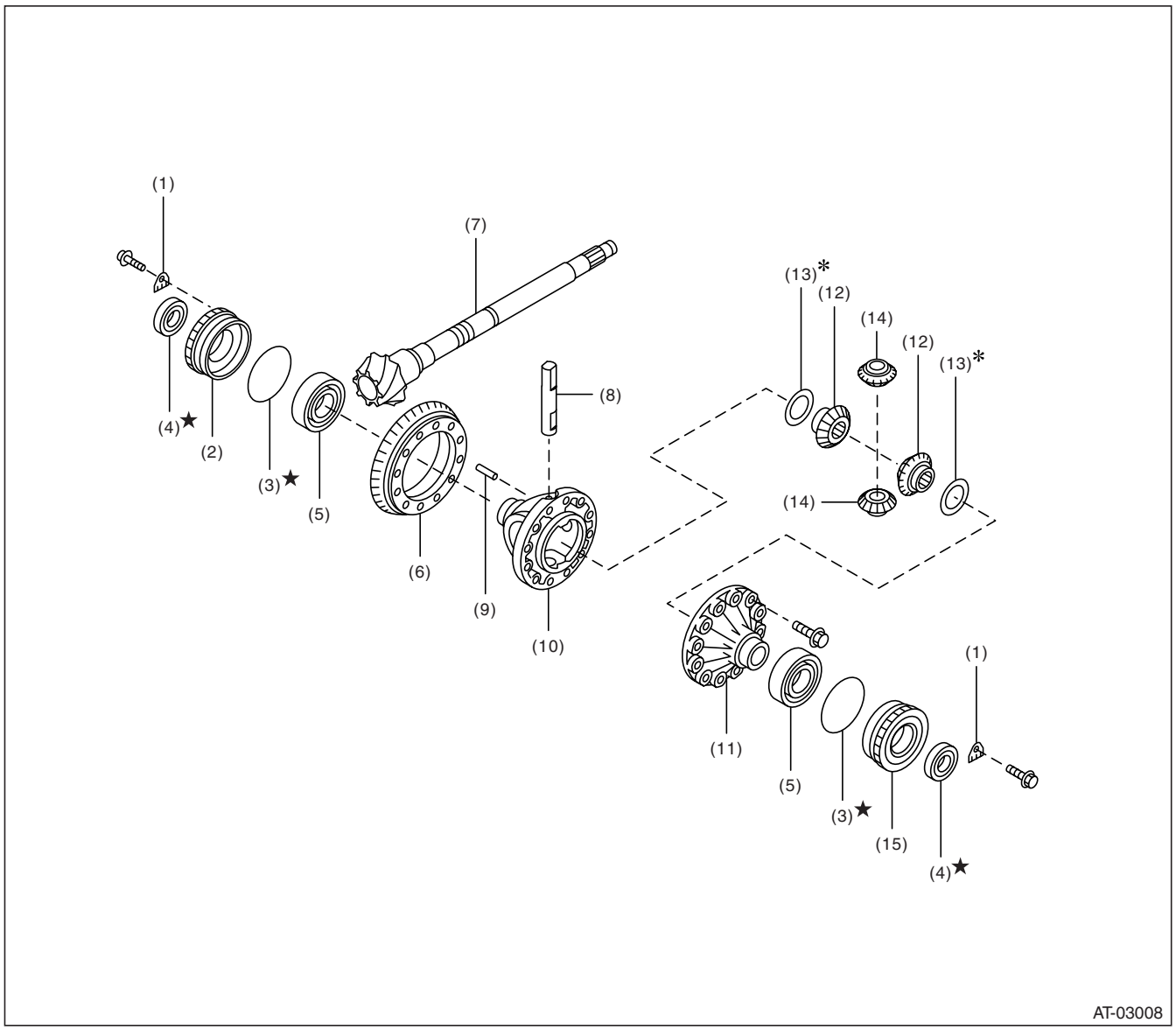
(1) Short AT ASSY (Non-disassembled)
(2) Thrust bearing
(3) Seal ring
(4) Thrust bearing

7. CONTROL VALVE & TRANSMISSION HARNESS



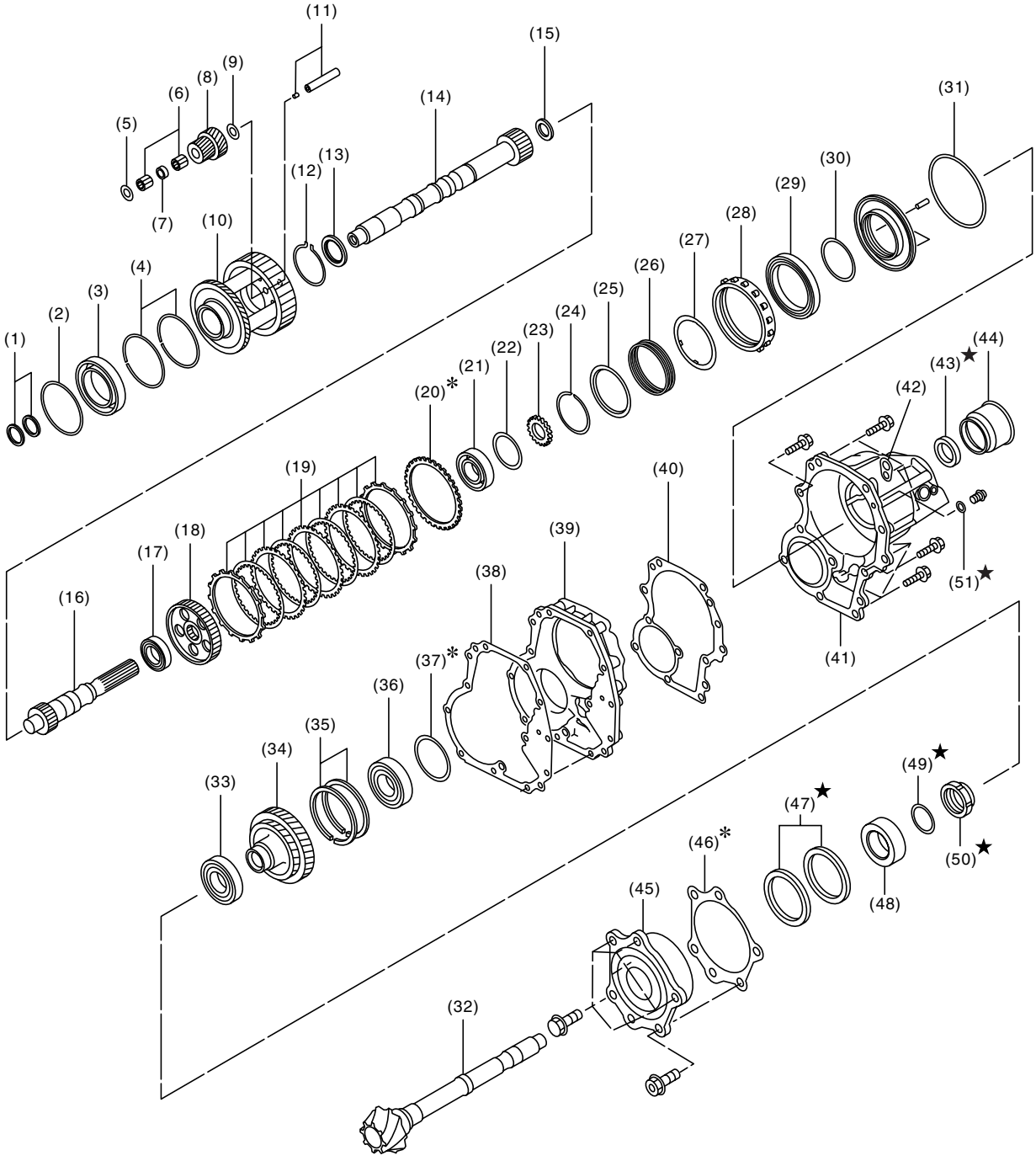
(1) Transmission harness ASSY
(2) Front vehicle speed sensor
(3) Sensor cover
(4) Harness bracket
(5) Clip
(6) Control valve ASSY

8. DIFFERENTIAL GEAR



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

9. TRANSFER CASE, EXTENSION CASE & REDUCTION GEAR



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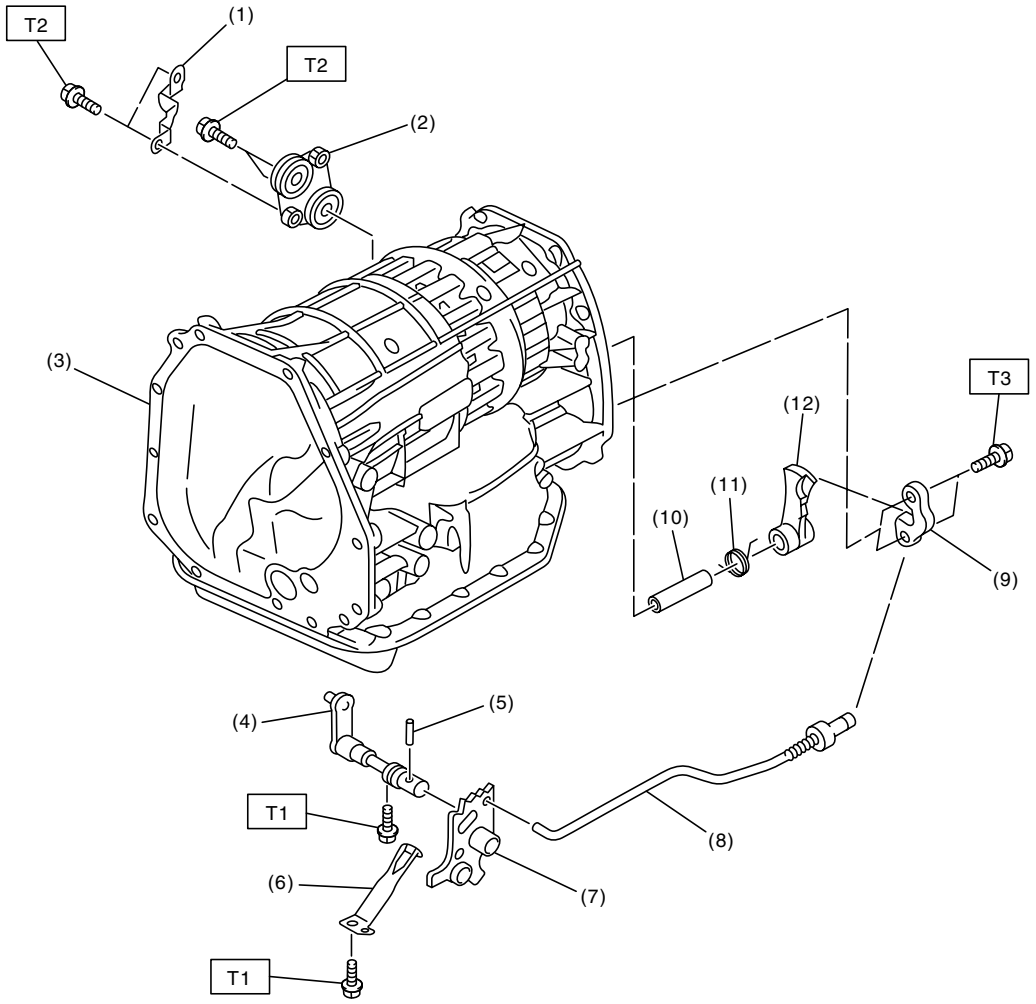
(1) Seal ring
(2) Reduction gear shim
(3) Ball bearing
(4) Snap ring
(5) Planetary pinion washer
(6) Needle bearing
(7) Spacer
(8) Pinion gear
(9) Washer
(10) Planetary carrier ASSY
(11) Planetary pinion shaft ASSY
(12) Snap ring
(13) Thrust bearing
(14) Intermediate shaft
(15) Thrust washer
(16) Rear drive shaft
(17) Ball bearing
(18) Transfer clutch hub
(19) Transfer clutch plate
(20) Driven plate No. 3.
(21) Ball bearing
(22) Rear drive shaft shim
(23) Revolution gear
(24) Snap ring
(25) Clutch spring retainer
(26) Return spring
(27) Spring retainer
(28) Pressure plate
(29) Ball bearing
(30) O-ring
(31) C-ring
(32) Drive pinion shaft
(33) Ball bearing
(34) Reduction driven gear
(35) Snap ring
(36) Ball bearing
(37) Rear drive shaft shim
(38) Gasket
(39) Intermediate case
(40) Shim
(41) Extension case
(42) Transmission hanger
(43) Oil seal
(44) Dust cover
(45) Taper roller bearing
(46) Drive pinion shim
(47) Oil seal
(48) Drive pinion collar
(49) O-ring
(50) Lock nut
(51) O-ring

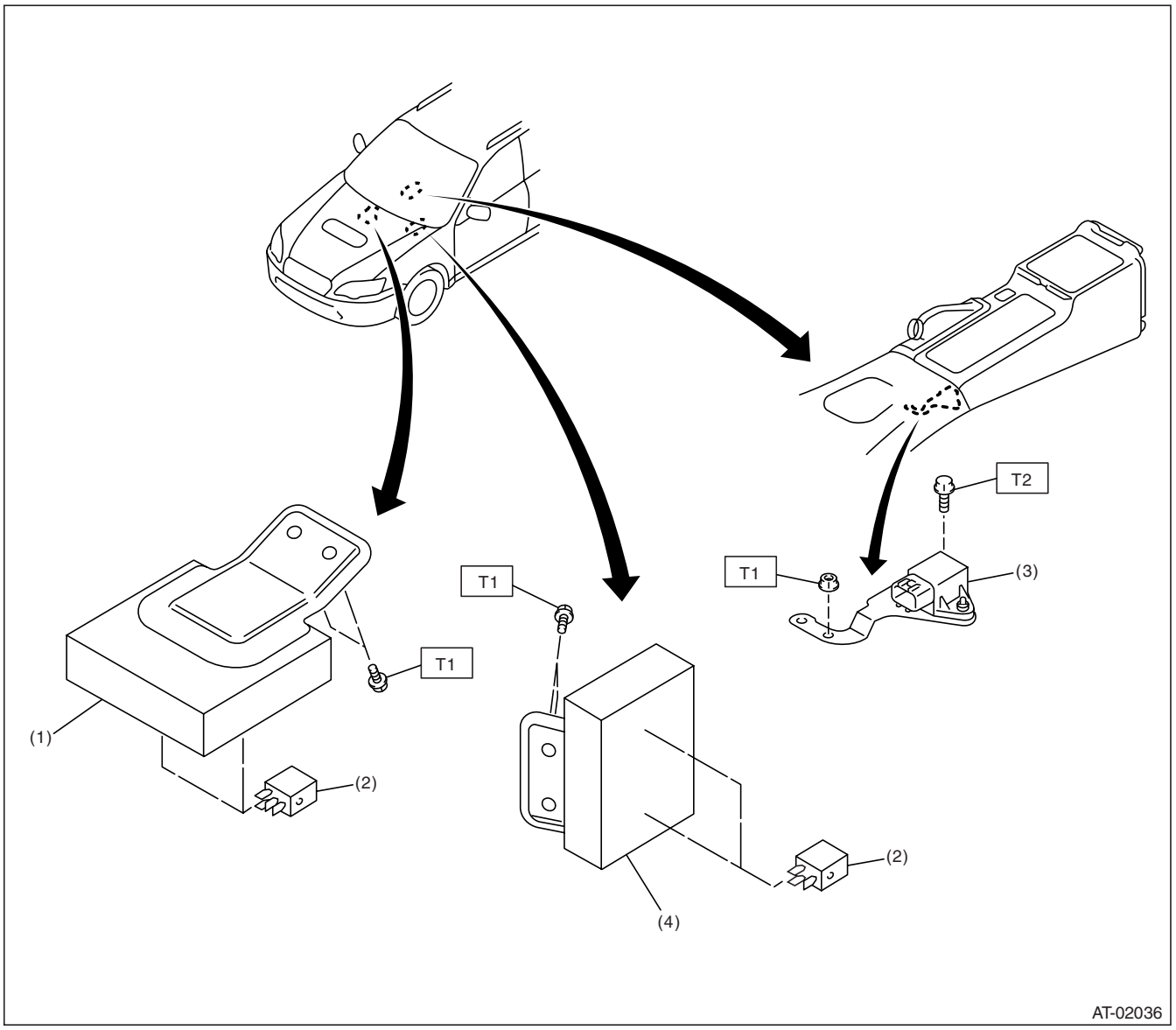
10.TRANSMISSION CONTROL DEVICE & PARKING SUPPORT



(1) Bracket
(2) Floating bracket
(3) AT main case
(4) Range select lever
(5) Straight pin
(6) Detent spring
(7) Manual plate
(8) Parking rod
(9) Parking support actuator
(10) Parking pawl shaft
(11) Return spring
(12) Parking pawl

Tightening torque: N·m (kgf-m, ft-lb)
T1: 6 (0.6, 4.4)
T2: 25 (2.5, 18.4)
T3: <Ref. to 5AT-80, Parking Pawl.>

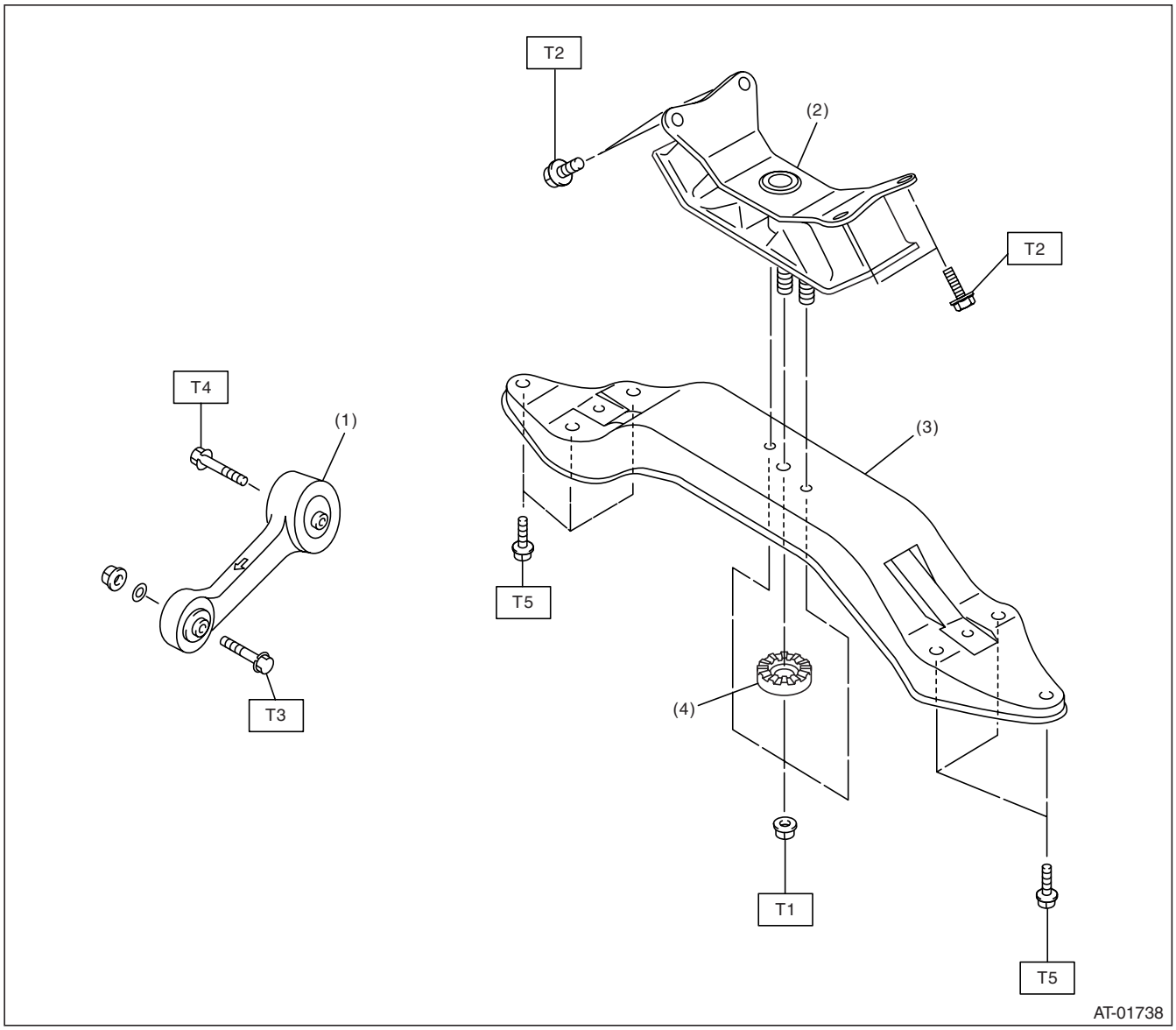
11.TRANSMISSION CONTROL MODULE



(1) Transmission control module (TCM) (RHD model)
(2) Relay
(3) Lateral G sensor
(4) Transmission control module (TCM) (LHD model)

Tightening torque: N·m (kgf-m, ft-lb)
T1: 7.5 (0.76, 5.5)
T2: 24.5 (2.5, 18.1)

12.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: 40 (4.1, 29.5)
T3: 50 (5.1, 36.9)
T4: 58 (5.9, 42.8)
T5: 70 (7.1, 51.6)

C: CAUTION

• Wear work 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 and dirt.
• Until the oil pan is removed, do not place with the oil pan side facing up to prevent foreign matter from entering the valve body.
• Before removal, installation or disassembly, be sure to clarify the failure. Avoid unnecessary removal, disassembly and replacement.
• When disassembling the case and other light alloy parts, disassemble them by slightly tapping with a plastic hammer. Do not pry it apart with a screwdriver or other tool.
• Be careful not to burn yourself, because each part on the vehicle is hot after running.
• Use SUBARU genuine gear oil, grease etc. or the equivalent. Do not mix them 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 rigid racks at the specified points.
• Apply gear oil onto sliding or revolution surfaces before installation.
• Replace deformed or otherwise damaged snap rings with new ones.
• Before installing O-rings or oil seals, apply sufficient amount of ATF fluid to avoid damage and deformation.
• Be careful not to incorrectly install or fail to install O-rings, snap rings and other such parts.
• Before securing a part on a vise, place cushioning material such as wood blocks, aluminum plate, or cloth between the part and the vise.
• Avoid damaging the mating surface of the case.
• Before applying liquid gasket, completely remove the old seal.

D: PREPARATION TOOL

1. SPECIAL TOOL

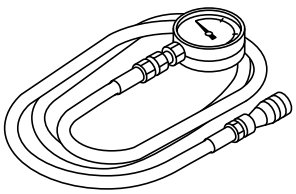
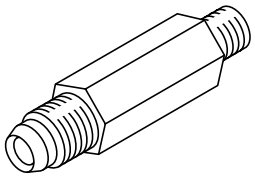
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-498575400	498575400	OIL PRESSURE GAUGE ASSY	Used for measuring oil pressure.
 ST-498897200	498897200	ADAPTER	• Used with oil pump cover installed on when measuring line pressure. • Used with extension case installed on when measuring transfer clutch pressure.

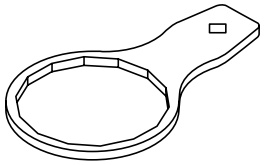
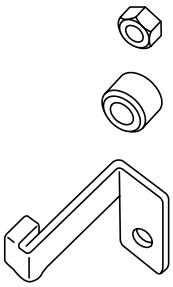
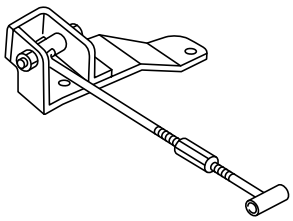
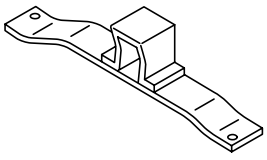
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-498545400	498545400	FILTER WRENCH	Used for removing and installing ATF filter.
 ST-498277200	498277200	STOPPER SET	Used for removing and installing automatic transmission assembly to engine.
 ST41099AC000	41099AC000	ENGINE SUPPORT ASSY	Used for supporting engine. (Turbo model)
 ST41099AA010	41099AA010	ENGINE SUPPORT BRACKET	Used for supporting engine. (Non-turbo model)

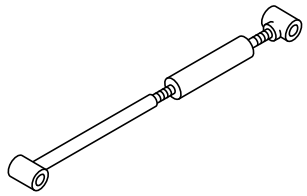
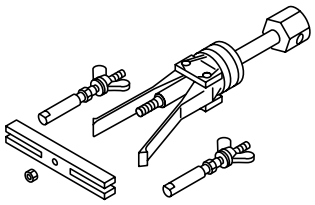
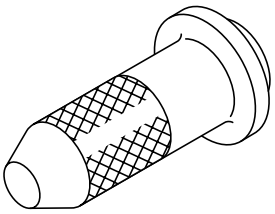
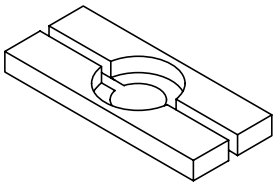
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST41099AA020	41099AA020	ENGINE SUPPORT	Used for supporting engine. (Non-turbo model)
 ST-398527700	398527700	PULLER ASSY	• Used for removing extension case roller bearing. • Used for removing extension oil seal. • Used for removing front differential side retainer bearing outer race. • Used for removing front differential side retainer oil seal.
 ST-498057300	498057300	INSTALLER	Used for installing extension oil seal.
 ST-498077000	498077000	REMOVER	Used for removing differential taper roller bearing.

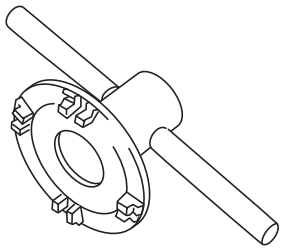
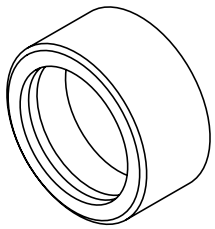
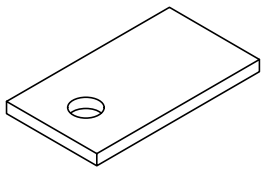
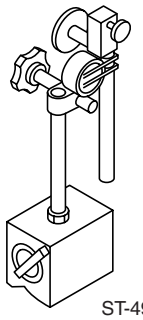
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST18630AA010	18630AA010	WRENCH COMPL RETAINER	Used for removing and installing differential side retainer.
 ST-398487700	398487700	DRIFT	Used for installing front differential taper roller bearing.
 ST-498255400	498255400	PLATE	Used for measuring backlash of hypoid gear.
 ST-498247001	498247001	MAGNET BASE	• Used for measuring gear backlash. • Used with DIAL GAUGE (498247100).

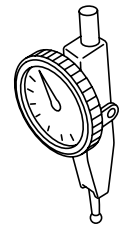
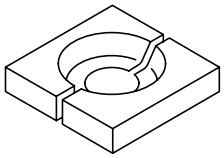
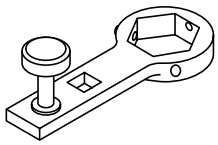
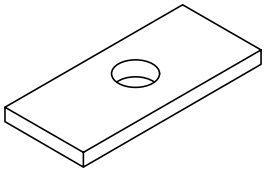
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-498247100	498247100	DIAL GAUGE	• Used for measuring gear backlash. • Used with MAGNET BASE (498247001).
 ST-498517000	498517000	REPLACER	Used for removing front roller bearing.
 ST-499787700	499787700	WRENCH	Used for removing and installing drive pinion lock nut.
 ST-398643600	398643600	GAUGE	Used for measuring total end play, extension end play and drive pinion height.

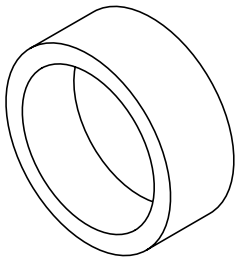
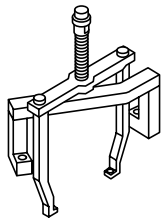
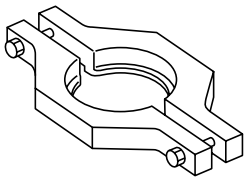
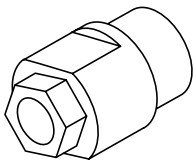
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-398744300	398744300	PISTON GUIDE	Used for measuring height from mating surface of intermediate case to pressure plate.
 ST-499737100	499737100	PULLER SET	Used for removing reduction drive gear assembly.
 ST-498077600	498077600	REMOVER	Used for removing ball bearing.
 ST18667AA010	18667AA010	HOLDER	• Used for removing and installing drive pinion lock nut. • Used as a handle to rotate gear when checking tooth contact.

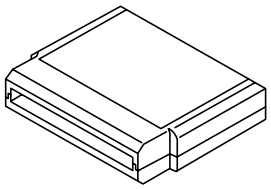
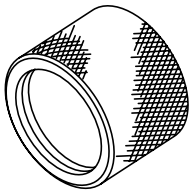
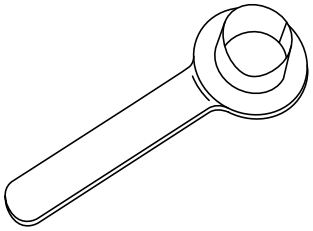
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST18482AA000	18482AA000 (Newly adopted tool)	CARTRIDGE	Troubleshooting for electrical system.
ST22771AA030	22771AA030	SUBARU SELECT MONITOR KIT	Troubleshooting for electrical system. • English: 22771AA030 (Without printer) • German: 22771AA070 (Without printer) • French: 22771AA080 (Without printer) • Spanish: 22771AA090 (Without printer)
 ST18675AA000	18675AA000	DIFFERENTIAL SIDE OIL SEAL INSTALLER	Used for installing differential side retainer oil seal.
 ST28399SA010	28399SA010	OIL SEAL PROTECTOR	Used for protecting oil seal when installing front drive shaft.

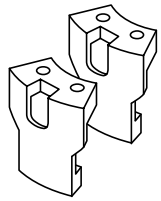
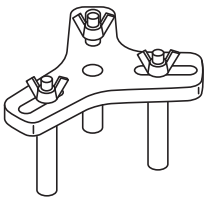
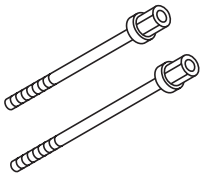
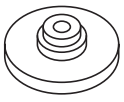
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST18680AA000	18680AA000	HOLDER GEAR	Used for removing reduction driven gear assembly. (2-piece set)
 ST18762AA000	18762AA000	COMPRESSOR SPECIAL TOOL	Used for disassembling multiplate clutch for shift transmission.
 ST18763AA000	18763AA000	COMPRESSOR SHAFT	Used for disassembling multiplate clutch for shift transmission.
 ST18765AA000	18765AA000	COMPRESSOR SUPPORT	Used for disassembling multiplate clutch for shift transmission.

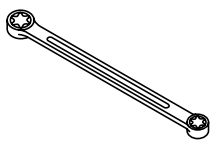
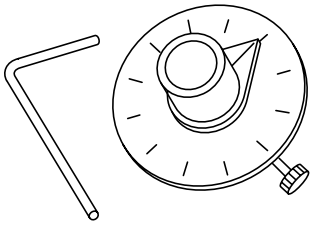
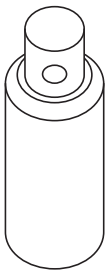
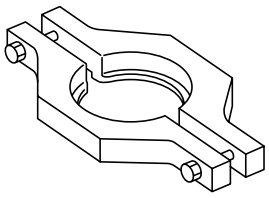
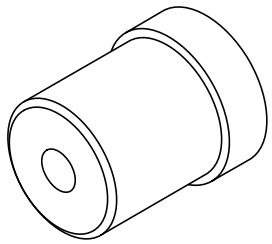
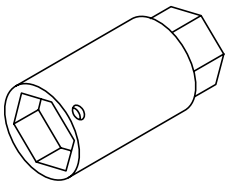
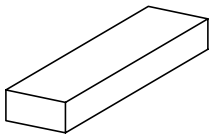
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST18676AA020	18676AA020	TORX® WRENCH	Used for disassembling torque converter case.
 ST18854AA000	18854AA000	ANGLE GAUGE	Used for tightening parking support.
 ST18679AA000	18679AA000	ADJUSTER	Used for adjusting position when tightening parking support.
 ST-498077300	498077300	REMOVER	Used for removing ball bearing of reduction driven gear.

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-499587100	499587100	OIL SEAL INSTALLER	Used for installing oil seal.
 ST-499787500	499787500	ADAPTER	Used for removing and installing drive pinion lock nut.
 ST-499575400	499575400	GAUGE	Used for measuring height of total end play.

2. GENERAL TOOL

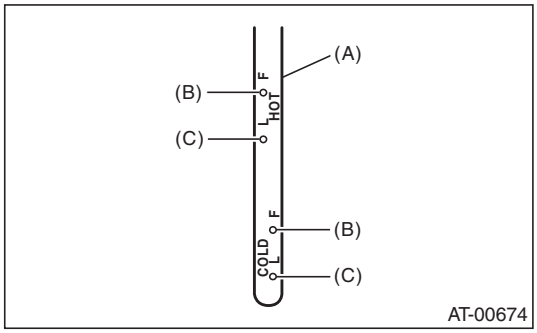
TOOL NAME	REMARKS
Depth gauge	Used for measuring transmission end play.
Thickness gauge	Used for measuring clearance of clutch, brake and oil pump.
Micro meter	Used for measuring thickness of drive pinion.
Spring balance	Used for measuring starting torque of drive pinion.
Circuit tester	Used for measuring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

2. Automatic Transmission Fluid

A: INSPECTION

NOTE:
The level of ATF varies with fluid temperature. Pay attention to the ATF 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 5AT(diag)-17, READ CURRENT DATA, OPERATION, Subaru Select Monitor.>
2) Park the vehicle on a level surface.
3) After selecting all positions (P, R, N, D), set the select lever in "P" range. Measure the ATF level with 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 between 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 fluid level is found above the center between upper and lower marks.

CAUTION:
- **Use care not to exceed the upper level.**
- **When the transmission is cold, be careful not to add ATF to the upper level on HOT side. Overfilling of ATF may cause oil splashing.**

6) 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 5AT(diag)-17, READ CURRENT DATA, OPERATION, Subaru Select Monitor.>
7) Check the ATF for leaks.
Visually check for leaks in the transmission. If there are leaks, replace the gasket, oil seal, plug or other parts.

B: REPLACEMENT

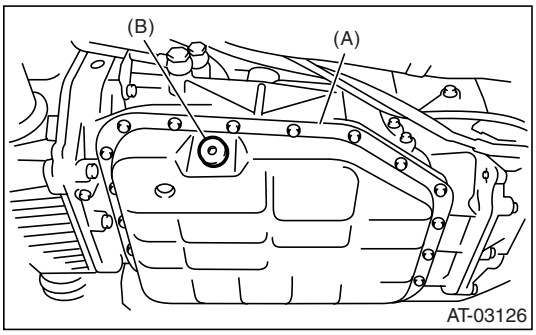
1) Lift-up the vehicle.
2) Remove the ATF drain plug to drain ATF.

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

3) Check the condition of ATF.
<Ref. to 5AT-29, CONDITION CHECK, Automatic Transmission Fluid.>
4) Tighten the ATF drain plug.

NOTE:
Use a new gasket.

Tightening torque:
20 N·m (2.0 kgf-m, 14.8 ft-lb)



(A) Oil pan
(B) ATF drain plug

5) Lower the vehicle.
6) Pour ATF from the oil charge pipe.

Specified fluid:
SUBARU ATF (Part No. K0140Y0700)

Recommended fluid:
IDEMITSU ATF HP
Castrol Transmax J

NOTE:
Use of recommended fluid is permitted only on the area where the specified fluid is not available.

Capacity:
Fill the same amount of ATF when drained.

Capacity when transmission is overhauled:
9.6 — 10.0 ℓ (10.1 — 10.6 US qt, 8.4 — 8.8 Imp qt)

7) Check the level and leaks of ATF.
<Ref. to 5AT-28, INSPECTION, Automatic Transmission Fluid.>

C: CONDITION CHECK

NOTE:
When replacing ATF, check the inside condition of transmission body by inspecting the drained ATF.

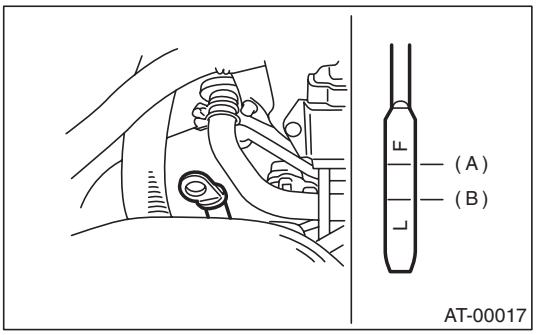
Fluid condition	Trouble and possible cause	Corrective action
Large amount of metallic pieces are found.	Excessive wear of the internal of the transmission body	Replace ATF and check if AT operates correctly.
Thick and varnish-form fluid	Burned clutch and etc.	Replace ATF and check if AT or vehicle for faulty.
Clouded fluid or bubbles are found in fluid.	Water mixed in fluid	Replace ATF and check the water entering point.

3. Differential Gear Oil

A: INSPECTION

1) Park the vehicle on a level surface.
2) Remove the collector cover.
3) Remove the oil level gauge and wipe it clean.
4) Reinsert the level gauge all the way. Be sure that the level gauge is correctly inserted and in the proper orientation.
5) Remove the oil level gauge again, and check the level of differential gear oil. If the differential gear oil level is below “L” line, add oil to bring the level up to “F” line.

NOTE:
To prevent overfilling the differential gear oil, do not fill oil above the “F” line.



(A) Upper level
(B) Lower level

B: REPLACEMENT

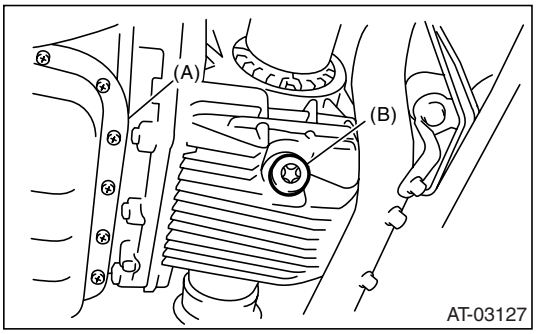
1) Lift-up the vehicle.
2) Remove the differential gear oil drain plug using TORX® BIT T70, and then drain differential gear oil.

CAUTION:
• Directly after the vehicle has been running, 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) Tighten the differential gear oil drain plug using TORX® BIT T70.

NOTE:
Use a new gasket.

Tightening torque:
70 N·m (7.1 kgf-m, 51.6 ft-lb)



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

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

Recommended gear oil:
<Ref. to 5AT-3, RECOMMENDED GEAR OIL, SPECIFICATION, General Description.>

Gear oil capacity:
1.3 — 1.5 ℓ (1.3 — 1.6 US qt, 1.1 — 1.3 Imp qt)

6) Check the level of differential gear oil.
<Ref. to 5AT-30, INSPECTION, Differential Gear Oil.>

4. Road Test

A: INSPECTION

1. GENERAL PRECAUTION

Road tests should be conducted to properly diagnose the condition of 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 ←→ 5th 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 4th gear engine brake when shifting down from 5th to 4th range while driving in 5th gear of manual mode [50 to 60 km/h (31 to 37 MPH)].
- Check the 3rd gear engine brake when shifting down from 4th to 3rd range while driving in 4th gear of manual mode [50 to 60 km/h (31 to 37 MPH)].
- Check the 2nd gear engine brake when shifting down from 3rd to 2nd range while driving in 3rd gear of manual mode [40 to 50 km/h (25 to 31 MPH)].
- Check the 1st gear engine brake when shifting down from 2nd to 1st range while driving in 2nd gear of manual mode [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 while 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. NOISE & VIBRATION

Check for noise and vibration while driving and during shifting.

9. OIL LEAKAGE

After the driving test, inspect for oil leaks from the transmission body.

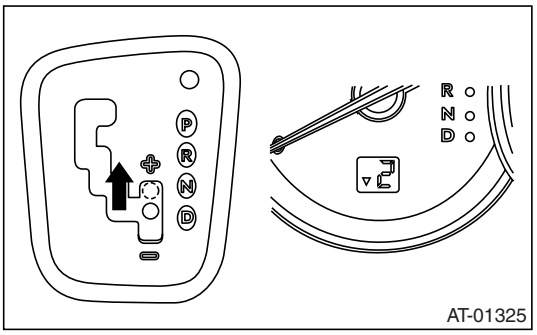
5. Stall Test

A: INSPECTION

NOTE:
The stall test is of extreme importance in diagnosing the condition of automatic transmission and engine. It should be conducted to measure the engine stall speeds in “R” and “2nd of manual mode”.
Purposes of the stall test:

- To check the operation of automatic transmission clutch.
- To check the operation of torque converter clutch.
- To check engine performance.

1) Check that the throttle valve opens.
2) Check that the engine oil level is correct.
3) Check that the coolant level is correct.
4) Check that the ATF level is correct.
5) Check that the differential gear oil level is correct.
6) 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 5AT(diag)-17, READ CURRENT DATA, OPERATION, Subaru Select Monitor.>
7) Place the wheel chocks at the front and rear of all wheels and apply the parking brake.
8) Move the manual linkage to ensure it operates properly, and then set to the “2nd on manual mode”.



9) While depressing the brake pedal strongly, depress the accelerator pedal gradually.
10) When the engine speed is stabilized, quickly record that speed 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) Perform the procedure for “R” range in the same way as “2nd on manual mode”.

NOTE:

- Do not continue the stall test for MORE THAN FIVE SECONDS at a time (from fully closed throttle to fully open throttle until stall speed reading). It makes engine oil and ATF deteriorate and the clutch and brake to be adversely affected.
- Be sure to cool down the engine for at least one minute with the select lever set in “P” or “N” range and with the idle speed lower than 1,200 rpm after performing stall test.
- 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):
TURBO MODEL
3,100 — 3,500 rpm
NON-TURBO MODEL
2,400 — 2,800 rpm

Stall speed (at sea level)	Range	Possible faulty part
Less than specification	R	• Engine • One-way clutch of the torque converter clutch
More than specification	2nd gear of manual mode	• Line pressure too low • Forward brake • Forward brake one-way clutch • Direct clutch • 3rd one-way clutch
	R	• Line pressure too low • Reverse clutch
Within specification	2nd gear of manual mode	• Reverse clutch • One-way clutch of the torque converter
	R	• Forward brake • Forward brake one-way clutch • Direct clutch • 3rd one-way clutch • One-way clutch of the torque converter

6. Time Lag Test

A: INSPECTION

NOTE:
When 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. Using this, check the condition of forward brake, reverse brake, 1st one-way clutch, forward one-way clutch and 3rd one-way clutch.

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

1) Fully apply the parking brake.
2) Start the engine.
Check the idle speed (A/C OFF).
3) Shift the select lever from "N" to "D" range. Using a stop watch, measure the time-lag which takes from shifting the lever until the shock is felt.

Time-lag
Specification: 1.2 sec. or less

If "N" → "D" time-lag is longer than specification:
- Line pressure too low
- Forward brake worn
- One-way clutch not operating properly

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

Time-lag
Specification: 1.5 sec. or less

If "N" → "R" time lag is longer than specification:
- Line pressure too low
- Reverse brake worn

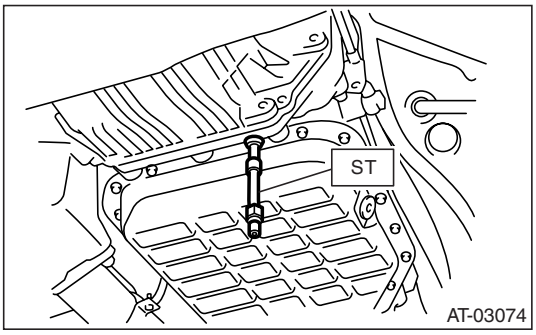
7. Line Pressure Test

A: MEASUREMENT

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

- Excessive shocks during up-shift 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) Set the vehicle on a lift.
2) Remove the under cover.
3) Remove the test plug and install the ST.
ST 498897200 ADAPTER



4) Set the ST1 and ST2.
ST1 498897200 ADAPTER
ST2 498575400 OIL PRESSURE GAUGE ASSY
5) Lower the vehicle, and pull the ST into vehicle.
ST 498575400 OIL PRESSURE GAUGE ASSY
6) Connect the Subaru Select Monitor to data link connector and read the current data. <Ref. to 5AT(diag)-17, READ CURRENT DATA, OPERATION, Subaru Select Monitor.>
   (1) Start the engine.
   (2) Turn the Subaru Select Monitor power switch to ON.
   (3) On the “Main Menu” display screen, select the {Each System Check} and press the [YES] key.
   (4) On the “System Selection Menu” display screen, select the {Transmission} and press the [YES] key.
   (5) Press the [YES] key after the information of transmission type has been displayed.
   (6) On the “Transmission Diagnosis” display screen, select the {Current Data Display/Save} and then press the [YES] key.
   (7) On the “Transmission Diagnosis” display screen, select the {Data Display} and press the [YES] key.
   (8) Using the scroll key, display the “P/L Solenoid Pressure”.
7) Perform the line pressure test.

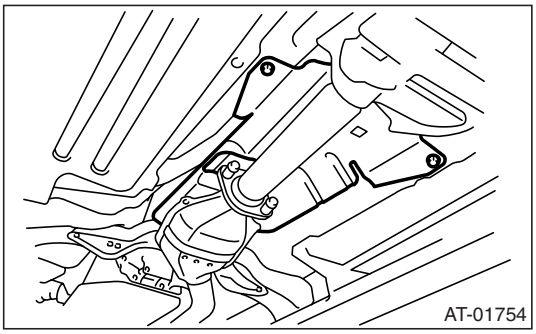
NOTE:
- Do not perform the line pressure test for more than 5 seconds at a time. It makes engine oil and ATF deteriorate and the clutch and brake to be adversely affected.
- Be sure to cool down the engine for at least one minute with the select lever set in “P” or “N” range and with the idle speed lower than 1,200 rpm after performing line pressure test.
- Adjust the throttle valve angle in order to obtain the “P/L Solenoid Pressure” displayed on the Subaru Select Monitor.

Range of the selector lever	Throttle valve angle	ATF temperature condition	“P/L Solenoid Pressure” displayed on the Subaru Select Monitor kPa	Specified line pressure kPa (kgf/cm^2, psi)
D	Full closed	45 — 55°C (113 — 131°F)	490	385 — 555 (3.93 — 5.66, 55.8 — 80.5)
	Full open		1,370	1,235 — 1,475 (12.59 — 15.04, 179.1 — 213.9)
R	Full closed		1,370	1,530 — 1,925 (15.60 — 19.6, 221.9 — 279.2)

8. Transfer Clutch Pressure Test

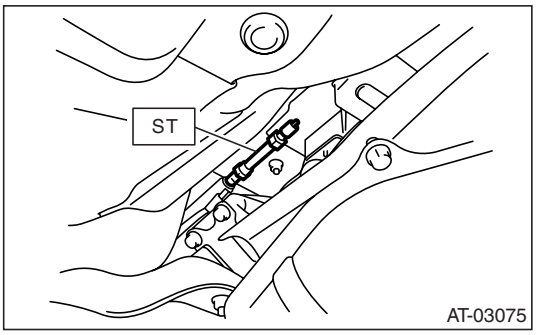
A: INSPECTION

1) Set the vehicle on a lift.
2) Remove the heat shield cover securing bolts to slide the heat shield cover.

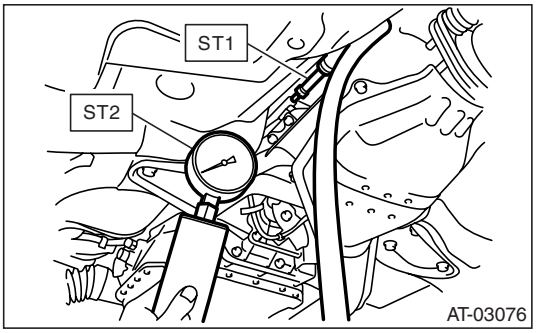


3) Remove the test plug and install the ST.
ST 498897200 ADAPTER

CAUTION:
Be careful not to cut your arm with the heat shield cover when removing the test plug and installing the ST.



4) Set the ST1 and ST2.
ST1 498897200 ADAPTER
ST2 498575400 OIL PRESSURE GAUGE ASSY



5) Lower the vehicle, and pull the ST into vehicle.
ST 498575400 OIL PRESSURE GAUGE ASSY

6) Connect the Subaru Select Monitor to data link connector and read the current data. <Ref. to 5AT(diag)-17, READ CURRENT DATA, OPERATION, Subaru Select Monitor.>
(1) Start the engine.
(2) Turn the Subaru Select Monitor power switch to ON.
(3) On the “Main Menu” display screen, select the {Each System Check} and press the [YES] key.
(4) On the “System Selection Menu” display screen, select the {Transmission} and press the [YES] key.
(5) Press the [YES] key after the information of transmission type has been displayed.
(6) On the “Transmission Diagnosis” display screen, select the {Current Data Display&Save} and then press the [YES] key.
(7) On the “Transmission Diagnosis” display screen, select the {Data Display} and press the [YES] key.
(8) Using the scroll key, display the “4WD Solenoid Pressure”.

7) Perform the transfer clutch pressure test.

NOTE:
• Do not perform the transfer clutch pressure test for more than 5 seconds at a time. It makes engine oil and ATF deteriorate and the clutch and brake to be adversely affected.
• Be sure to cool down the engine for at least one minute with the select lever set in “P” or “N” range and with the idle speed lower than 1,200 rpm after performing transfer clutch pressure test.
• Adjust the throttle valve angle in order to obtain the “4WD Solenoid Pressure” displayed on the Subaru Select Monitor.

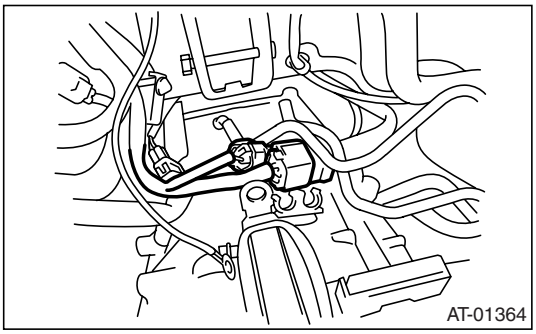
Range of the selector lever	Throttle valve angle	ATF temperature condition	“4WD Solenoid Pressure” displayed on the Subaru Select Monitor kPa	Specified line pressure kPa (kgf/cm^2, psi)
D	Full open	45 — 55°C (113 — 131°F)	900	800 — 915 (8.16 — 9.33, 116.0 — 132.7)
	Partial throttle		500	400 — 535 (4.08 — 5.46, 58.0 — 77.6)
N	Full closed		0	0 — 50 (0 — 0.51, 0 — 7.3)

9. Automatic Transmission Assembly

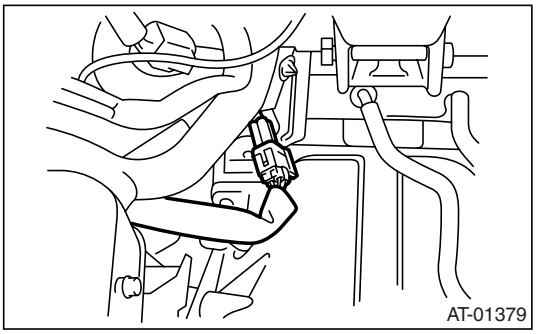
A: REMOVAL

1) Set the vehicle on a lift.
2) Fully open the front hood and support with hood stay.
3) Disconnect the ground cable from battery.
4) Remove the collector cover.
5) Remove the intercooler. (Turbo model) <Ref. to IN(H4DOTC)-12, REMOVAL, Intercooler.>
6) Remove the air intake chamber. (Non-turbo model) <Ref. to IN(H6DO)-7, REMOVAL, Air Intake Chamber.>
7) Remove the air cleaner case. (Non-turbo model) <Ref. to IN(H6DO)-5, REMOVAL, Air Cleaner Case.>
8) Remove the air breather hose. <Ref. to 5AT-68, REMOVAL, Air Breather Hose.>
9) Remove the starter. <Ref. to SC(H4SO 2.0)-6, REMOVAL, Starter.>
10) Disconnect the following connectors.

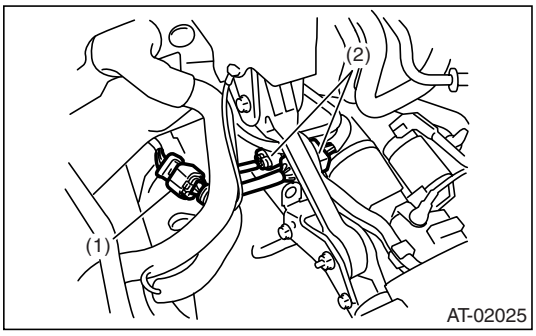
- Turbo model
  (1) Transmission harness connectors


AT-01364

  (2) Front oxygen (A/F) sensor


AT-01379

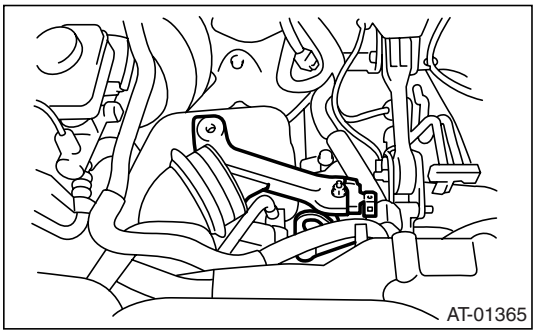
- Non-turbo model



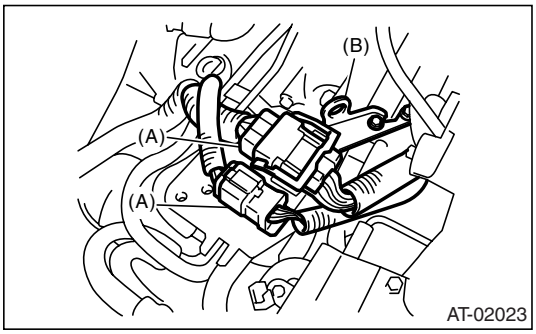
AT-02025

(1) Front oxygen (A/F) sensor
(2) Transmission harness connectors

11) Remove the intercooler stay and engine hanger rear. (Turbo model)


AT-01365

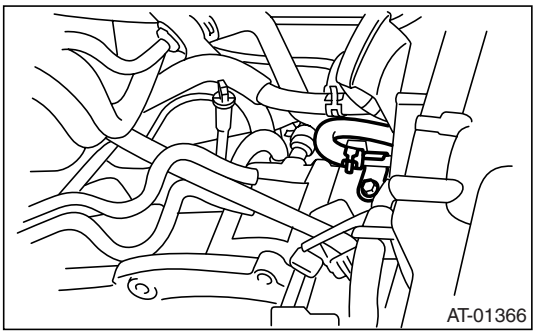
12) Disconnect the engine harness connectors, and then remove the engine hanger rear. (Non-turbo model)



AT-02023

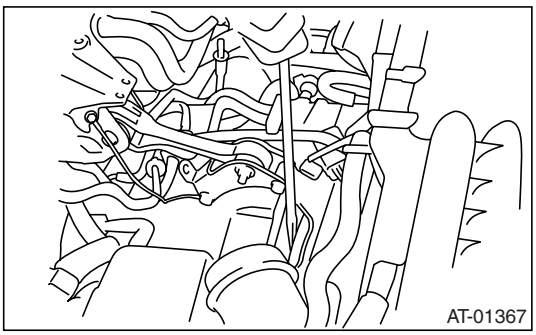
(A) Engine harness connectors
(B) Engine hanger rear

13) Remove the water by-pass pipe. (Turbo model)

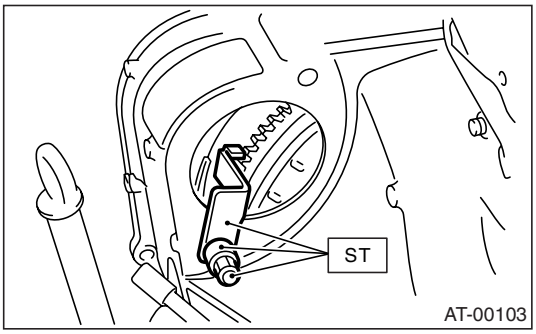


14) Separate the torque converter from drive plate.
(1) Remove the service hole plug.
(2) Remove the bolts which hold torque converter to drive plate.
(3) Remove the four bolts by rotating the clamp pulley a little at a time.
(4) Make sure the torque converter moves freely by rotating with finger through the starter installation hole.

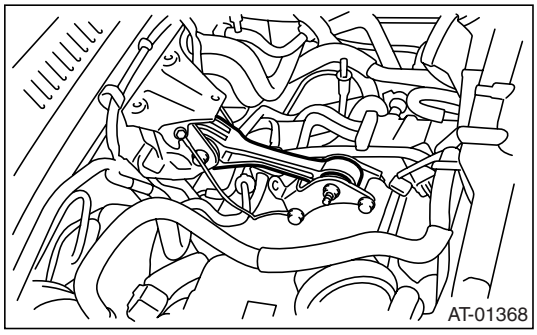
CAUTION:
Be careful not to drop bolts into converter housing.



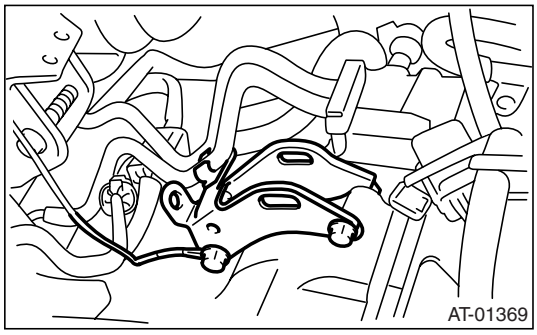
15) Install the ST to converter case.
ST 498277200 STOPPER SET



16) Lift-up the vehicle.
17) Remove the under cover. (Non-turbo model)
18) Remove the front exhaust pipe, rear exhaust pipe and muffler. (Non-turbo model) <Ref. to EX(H6DO)-4, REMOVAL, Front Exhaust Pipe.> <Ref. to EX(H6DO)-7, REMOVAL, Rear Exhaust Pipe.> <Ref. to EX(H6DO)-9, REMOVAL, Muffler.>
19) Remove the ATF cooler inlet and outlet pipes. (Non-turbo model) <Ref. to 5AT-63, REMOVAL, ATF Cooler Pipe and Hose.>
20) Remove the pitching stopper.

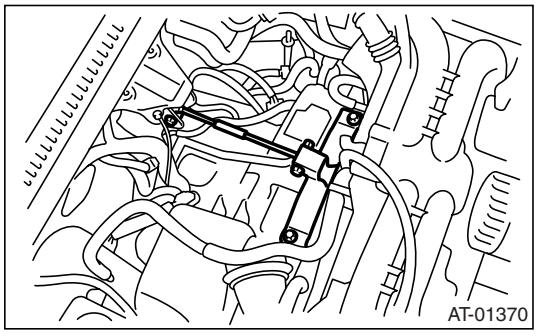


21) Remove the pitching stopper bracket.



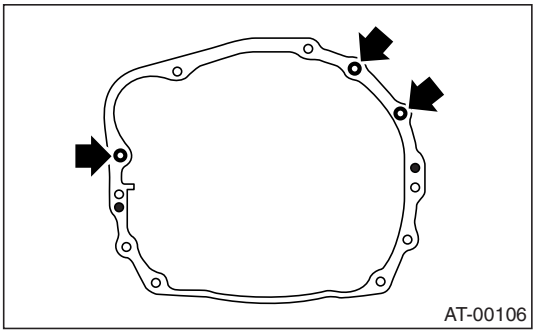
22) Set the ST.

ST	41099AC000	ENGINE SUPPORT ASSY (Turbo model)
ST	41099AA010	ENGINE SUPPORT BRACKET (Non-turbo model)
ST	41099AA020	ENGINE SUPPORT (Non-turbo model)

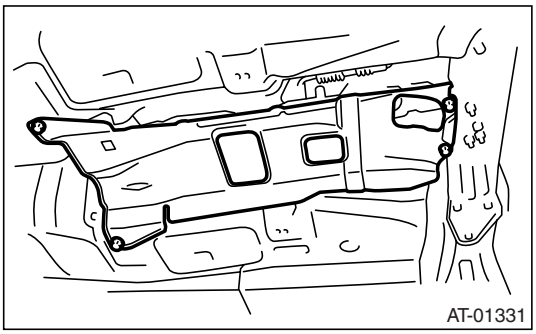


23) Remove the air intake duct. (Turbo model) <Ref. to IN(H4DOTC)-9, REMOVAL, Air Intake Duct.>
24) Remove the air cleaner case. (Turbo model) <Ref. to IN(H4DOTC)-8, REMOVAL, Air Cleaner Case.>
25) Remove the linear motion mounting. (Turbo model) <Ref. to ME(H4DOTC)-38, REMOVAL, Linear Motion Mounting.>

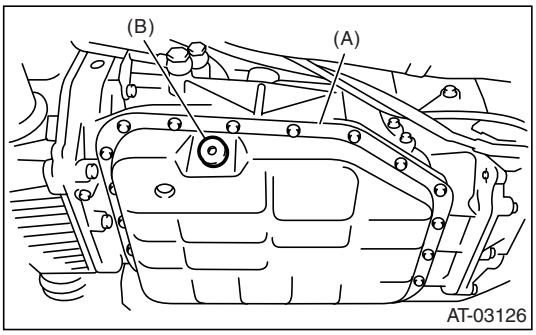
26) Remove the transmission mounting bolt (upper side).



27) Lift-up the vehicle. (Turbo model)
28) Remove the under cover. (Turbo model)
29) Remove the center exhaust pipe, rear exhaust pipe and muffler. (Turbo model) <Ref. to EX(H4DOTC)-6, REMOVAL, Center Exhaust Pipe.> <Ref. to EX(H4DOTC)-11, REMOVAL, Rear Exhaust Pipe.> <Ref. to EX(H4DOTC)-12, REMOVAL, Muffler.>
30) Remove the heat shield cover.

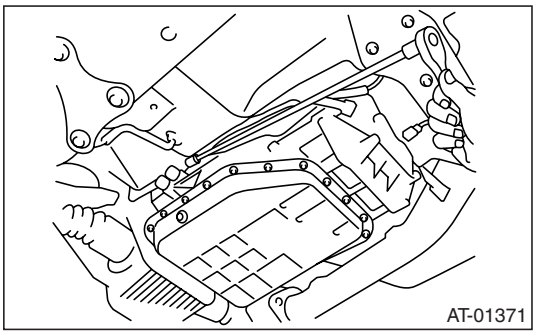


31) Remove the ATF drain plug to drain ATF.

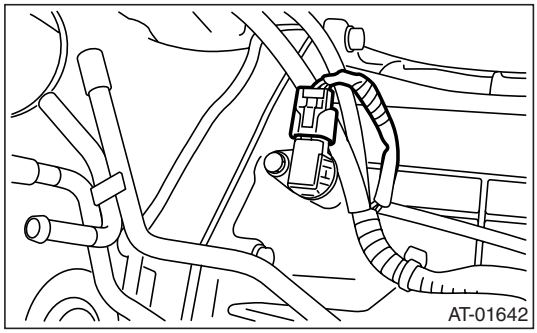


(A) Oil pan
(B) Drain plug

32) Remove the oil charge pipe.

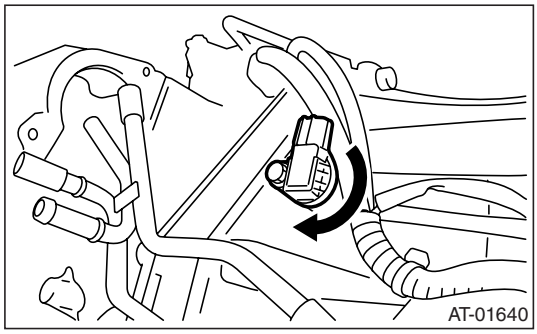


33) Disconnect the connector from turbine speed sensor 1.



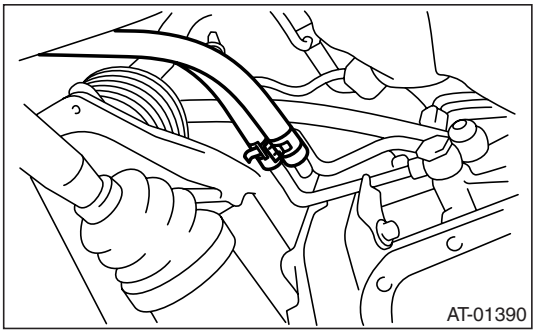
34) Remove the turbine speed sensor 1 connector mounting bolt, and rotate the sensor by 180°.

CAUTION:
Failure to follow this procedure may cause the interference between vehicle body and sensor while removing/installing transmission, and resulting in damage.



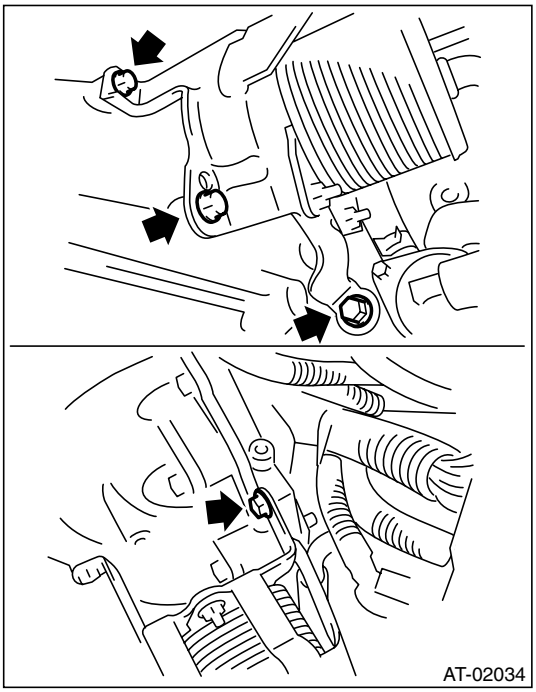
35) Remove the propeller shaft. <Ref. to DS-10, REMOVAL, Propeller Shaft.>
36) Remove the shift select cable. <Ref. to CS-27, REMOVAL, Select Cable.>

37) Disconnect the hose from the ATF inlet and outlet pipes.



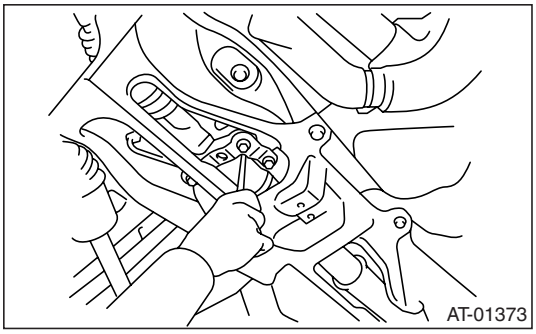
38) Remove the ATF cooler bracket from transmission body. (ATF cooler model with warmer function)

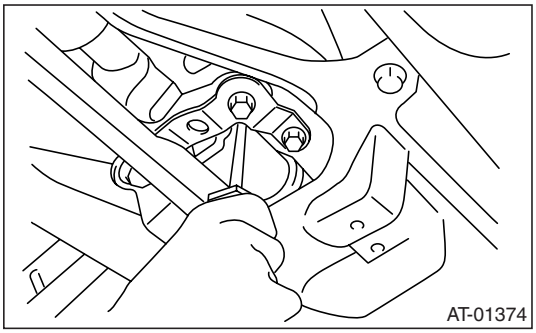
• Non-turbo model



39) Remove the front crossmember support plate. <Ref. to FS-14, REMOVAL, Front Crossmember Support Plate.>

40) Remove the two clutch housing cover securing bolts.



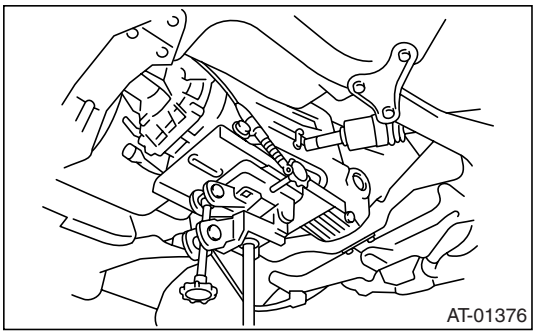


41) Remove the front stabilizer bracket. <Ref. to FS-15, REMOVAL, Front Stabilizer.>

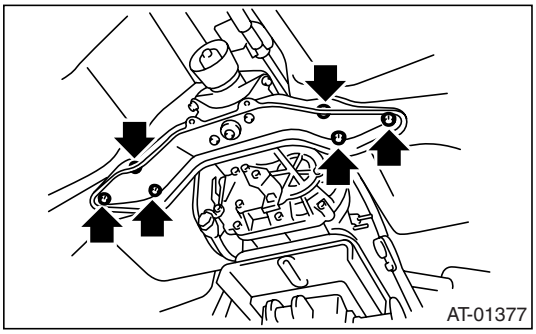
42) Remove the bolts which secure front ball joint to the housing. <Ref. to FS-16, REMOVAL, Front Ball Joint.>

43) Pull out the drive shaft from transmission.

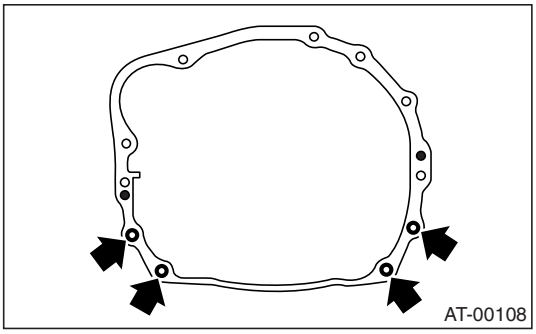
44) Set the transmission jack under the transmission.



45) Remove the rear crossmember.



46) Remove the transmission mounting bolt (lower side).

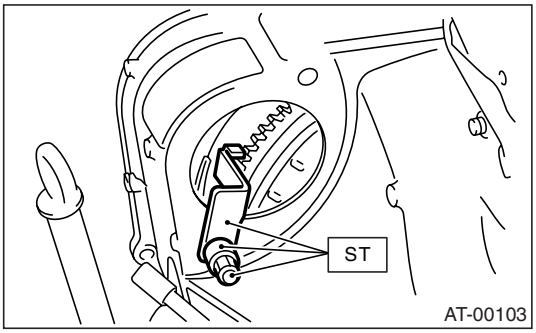


47) Remove the transmission.

NOTE:
• Turn the engine support assembly from the vehicle under body to the left (to shorten the engine support length), and lower the rear of the engine for easy disassembly.
• Be careful not to allow breather pipe and etc. to touch the vehicle body when detaching the automatic transmission assembly by pulling it backward.

B: INSTALLATION

1) Install the ST to converter case.
ST 498277200 STOPPER SET

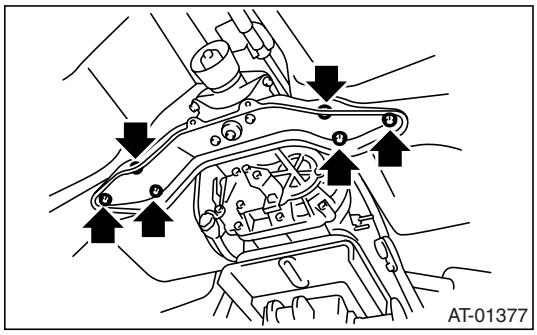


2) Install the transmission onto engine.
   (1) Lift up the transmission gradually using a transmission jack.
   (2) Align the transmission to engine.
3) Install the engine mounting bolt (lower side).

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

4) Install the transmission rear crossmember.

Tightening torque:
70 N·m (7.1 kgf-m, 51.6 ft-lb)



5) Take off the transmission jack.
6) Lower the vehicle.
7) Install the engine mounting bolt (upper side).

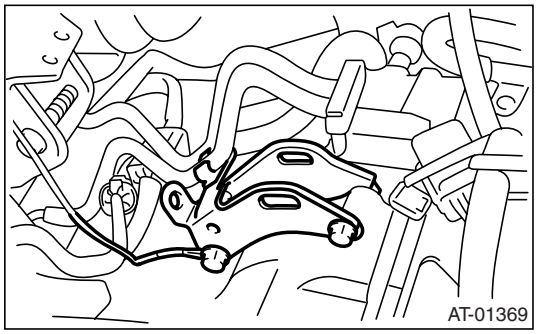
Tightening torque:
50 N·m (5.1 kgf-m, 36.9 ft-lb)

8) Remove the ST from converter case.
ST 498277200 STOPPER SET
9) Install the starter. <Ref. to SC(H4SO 2.0)-6, INSTALLATION, Starter.>
10) Install the torque converter to drive plate.
   (1) Install the bolts which hold torque converter to drive plate.
   (2) Install all four bolts by rotating the crank pulley a little at a time.
   (3) Install the service plug hole.

Tightening torque:
25 N·m (2.5 kgf-m, 18.4 ft-lb)

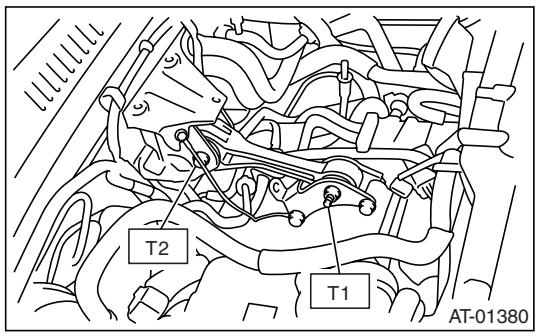
11) Remove the ST and install the pitching stopper bracket.

Tightening torque:
41 N·m (4.2 kgf-m, 30.2 ft-lb)



12) Install the pitching stopper.

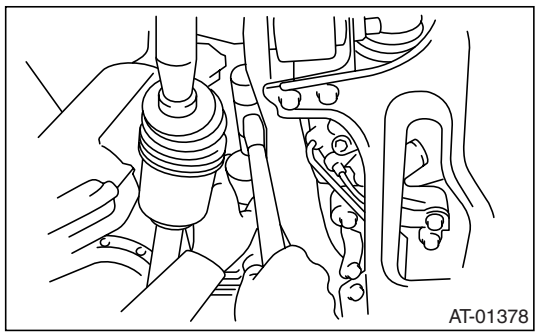
Tightening torque:
T1: 50 N·m (5.1 kgf-m, 36.9 ft-lb)
T2: 58 N·m (5.9 kgf-m, 42.8 ft-lb)



13) Lift-up the vehicle.
14) Replace the front differential side retainer oil seal.
(1) Remove the oil seal by using flat tip screwdriver, etc.
(2) Install a new oil seal using ST.

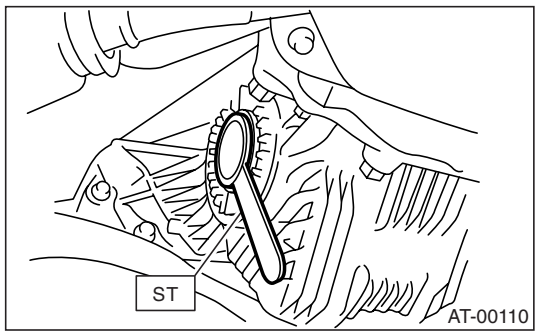
ST 18675AA000 DIFFERENTIAL SIDE OIL SEAL INSTALLER

NOTE:
• Apply oil to the oil seal lips.
• Always replace the differential side oil seal after extracting front drive shaft from transmission.



15) Apply grease to the oil seal lips.
16) Set the ST to side retainer.

ST 28399SA010 OIL SEAL PROTECTOR



17) Install the front drive shaft into transmission.

NOTE:
Replace the circlip of drive shaft with a new one.

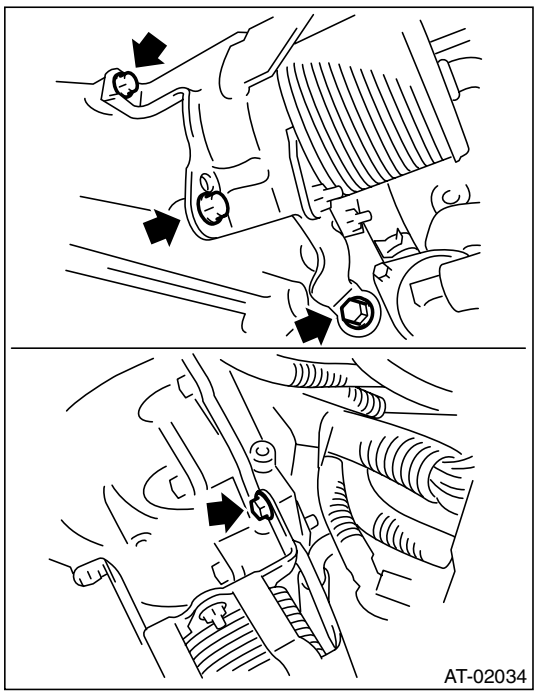
18) Install the front drive shaft into transmission, remove the ST and insert the drive shaft securely.

ST 28399SA010 OIL SEAL PROTECTOR

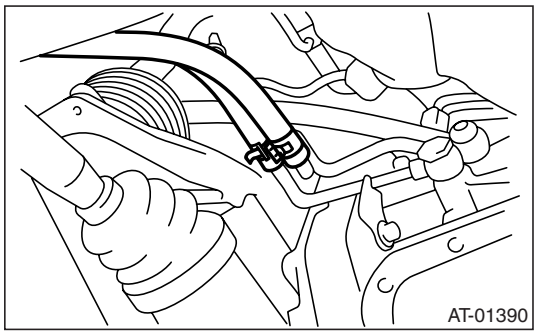
19) Install the ATF cooler inlet and outlet pipes. (Non-turbo model) <Ref. to 5AT-65, INSTALLATION, ATF Cooler Pipe and Hose.>
20) Install the ATF cooler bracket to transmission body. (ATF cooler model with warmer function)

Tightening torque:
25 N·m (2.5 kgf-m, 18.4 ft-lb)

• Non-turbo model

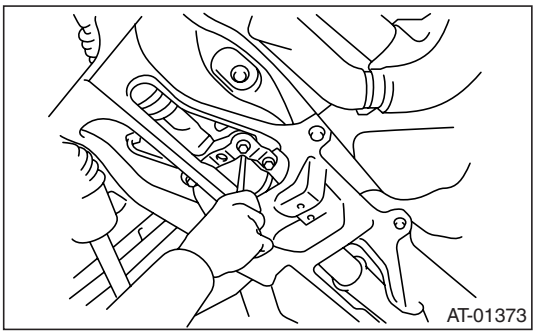


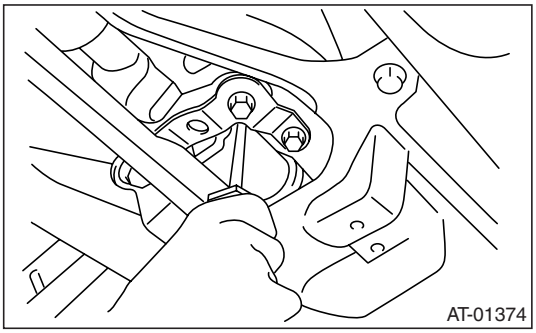
21) Install the inlet and outlet hoses to the ATF inlet and outlet pipes.



22) Insert the ball joint into housing. <Ref. to FS-16, INSTALLATION, Front Ball Joint.>
23) Install the front stabilizer bracket. <Ref. to FS-15, INSTALLATION, Front Stabilizer.>

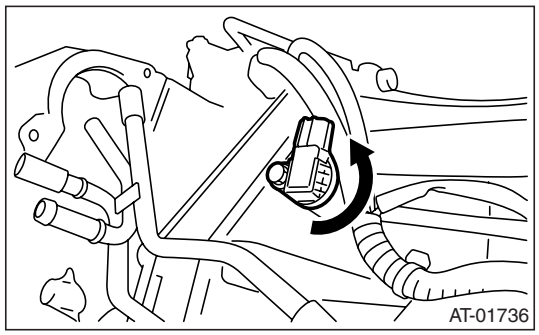
24) Install the clutch housing cover securing bolts.





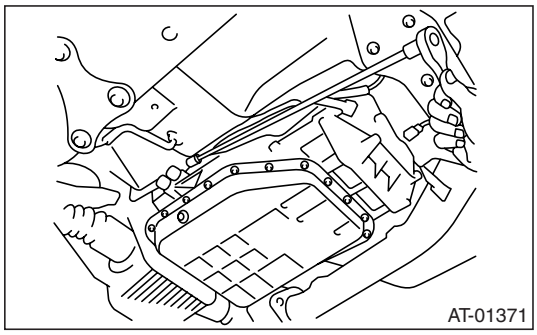
25) Install the front crossmember support plate. <Ref. to FS-14, INSTALLATION, Front Crossmember Support Plate.>
26) Install the propeller shaft. <Ref. to DS-11, INSTALLATION, Propeller Shaft.>
27) Install the shift select cable. <Ref. to CS-28, INSTALLATION, Select Cable.>
28) Install the turbine speed sensor 1 and harness, and then connect the connector.

Tightening torque:
7 N·m (0.7 kgf-m, 5.2 ft-lb)

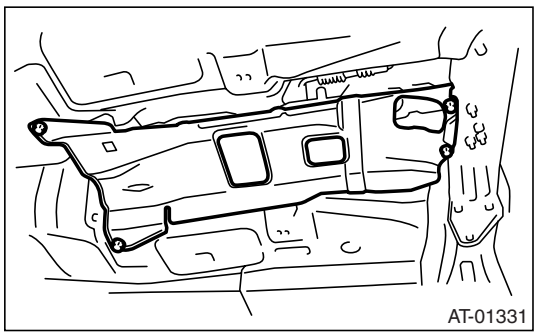


29) Install the oil charge pipe.

Tightening torque:
41 N·m (4.2 kgf-m, 30.2 ft-lb)

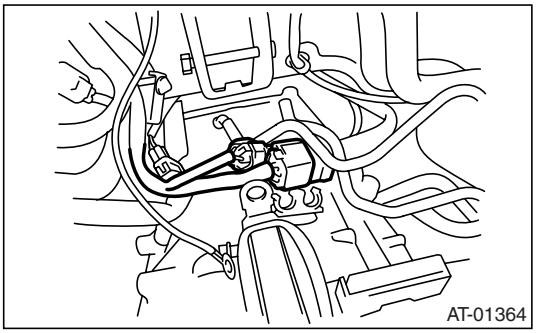


30) Install the heat shield cover.

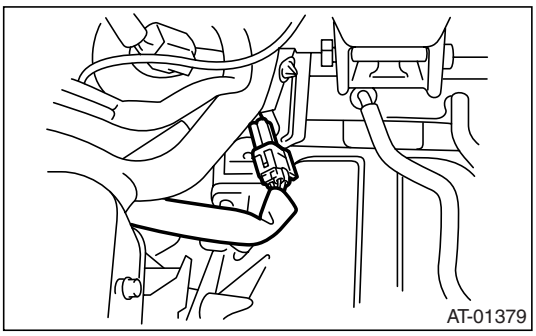


31) Install the center exhaust pipe, rear exhaust pipe and muffler. (Turbo model) <Ref. to EX(H4DOTC)-7, INSTALLATION, Center Exhaust Pipe.> <Ref. to EX(H4DOTC)-11, INSTALLATION, Rear Exhaust Pipe.> <Ref. to EX(H4DOTC)-12, INSTALLATION, Muffler.>
32) Install the front exhaust pipe, rear exhaust pipe and muffler. (Non-turbo model) <Ref. to EX(H6DO)-5, INSTALLATION, Front Exhaust Pipe.> <Ref. to EX(H6DO)-7, INSTALLATION, Rear Exhaust Pipe.> <Ref. to EX(H6DO)-9, INSTALLATION, Muffler.>
33) Install the under cover.
34) Lower the vehicle.
35) Install the linear motion mounting. (Turbo model) <Ref. to ME(H4DOTC)-38, INSTALLATION, Linear Motion Mounting.>
36) Install the air cleaner case.
<Ref. to IN(H4DOTC)-8, INSTALLATION, Air Cleaner Case.>
37) Install the air intake duct.
<Ref. to IN(H4DOTC)-9, INSTALLATION, Air Intake Duct.>

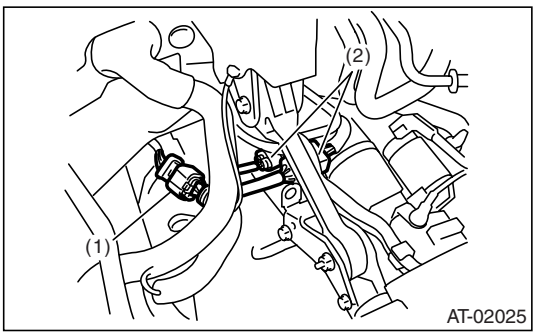
38) Connect the following connectors.
- Turbo model
  (1) Transmission harness connectors



  (2) Front oxygen (A/F) sensor

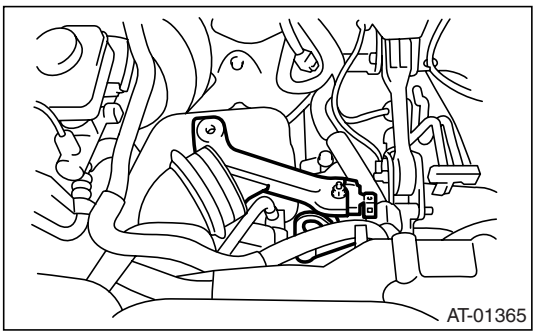


- Non-turbo model

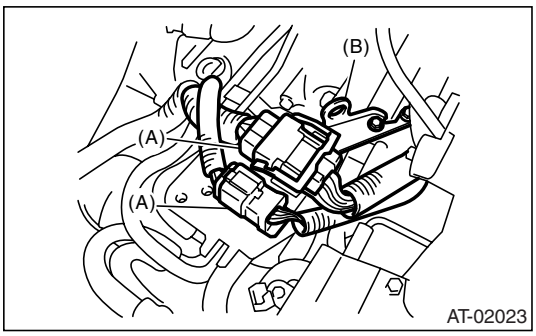


(1) Front oxygen (A/F) sensor
(2) Transmission harness connectors

39) Install the intercooler stay and engine hanger rear. (Turbo model)

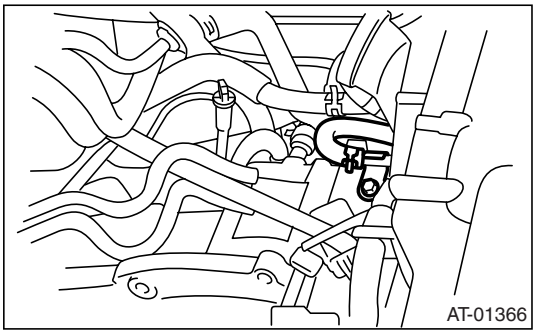


40) Install the engine hanger rear, and then connect the engine harness connector. (Non-turbo model)



(A) Engine harness connectors
(B) Engine hanger rear

41) Install the water by-pass pipe. (Turbo model)



42) Pour ATF through the oil charge pipe. <Ref. to 5AT-28, REPLACEMENT, Automatic Transmission Fluid.>
43) Install the air breather hose. <Ref. to 5AT-68, INSTALLATION, Air Breather Hose.>
44) Install the intercooler. (Turbo model) <Ref. to IN(H4DOTC)-12, INSTALLATION, Intercooler.>
45) Install the air intake chamber. (Non-turbo model) <Ref. to IN(H6DO)-7, INSTALLATION, Air Intake Chamber.>
46) Install the air cleaner case. (Non-turbo model) <Ref. to IN(H6DO)-6, INSTALLATION, Air Cleaner Case.>
47) Install the collector cover.
48) Connect the ground cable to battery.
49) Perform the Clear Memory 2. <Ref. to 5AT(diag)-19, CLEAR MEMORY MODE, OPERATION, Subaru Select Monitor.>
  (1) Connect the Subaru Select Monitor to data link connector.
  (2) Turn the ignition switch to ON (engine OFF), and turn the Subaru Select Monitor power switch to ON.
  (3) Ensure that the select lever is in “P” range.
  (4) On the “Main Menu” display screen, select the {Each System Check} and press the [YES] key.

(5) On the “System Selection Menu” display screen, select the {Transmission} and press the [YES] key.
(6) Press the [YES] key after the information of transmission type has been displayed.
(7) On the “Transmission Diagnosis” display screen, select the {Clear Memory 2} and press the [YES] key.

50) Perform the inspection with driving the vehicle at the end of repair work, and make sure there is no faulty as below;
- Excessive shift shock
- Oil leakage from transmission body and etc.
- Occurrence of noise caused by interference etc.

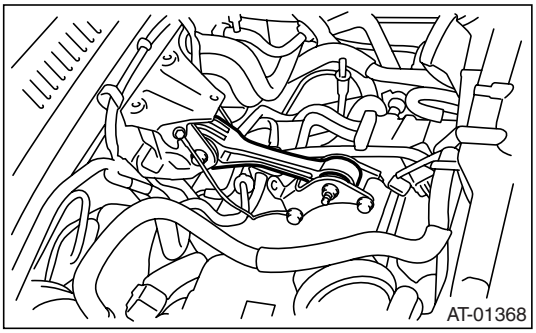
NOTE:
If excessive shift shock is felt, execute the advance operation of learning control. <Ref. to 5AT(diag)-23, PROCEDURE, Learning Control.>

10. Transmission Mounting System

A: REMOVAL

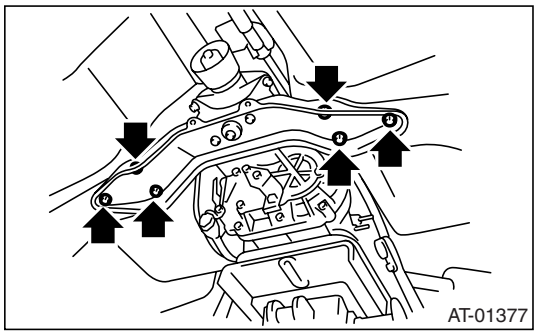
1. PITCHING STOPPER

1) Disconnect the ground cable from battery.
2) Remove the intercooler. (Turbo model)
<Ref. to IN(H4DOTC)-12, REMOVAL, Intercooler.>
3) Remove the air intake chamber. (Non-turbo model) <Ref. to IN(H6DO)-7, REMOVAL, Air Intake Chamber.>
4) Remove the pitching stopper.



2. TRANSMISSION REAR CROSSMEMBER & REAR CUSHION RUBBER

1) Disconnect the ground cable from battery.
2) Lift-up the vehicle.
3) Remove the center exhaust pipe, rear exhaust pipe and muffler. (Turbo model)
<Ref. to EX(H4DOTC)-6, REMOVAL, Center Exhaust Pipe.> <Ref. to EX(H4DOTC)-11, REMOVAL, Rear Exhaust Pipe.> <Ref. to EX(H4DOTC)-12, REMOVAL, Muffler.>
4) Remove the front exhaust pipe, rear exhaust pipe and muffler. (Non-turbo model) <Ref. to EX(H6DO)-4, REMOVAL, Front Exhaust Pipe.> <Ref. to EX(H6DO)-7, REMOVAL, Rear Exhaust Pipe.> <Ref. to EX(H6DO)-9, REMOVAL, Muffler.>
5) Remove the heat shield cover.
6) Set the transmission jack under the transmission. Make sure that the support plate of transmission jack does not touch the oil pan.
7) Remove the transmission rear crossmember.



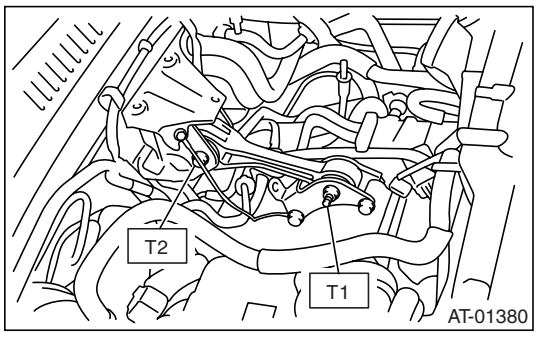
8) Remove the rear cushion rubber.

B: INSTALLATION

1. PITCHING STOPPER

1) Install the pitching stopper.

Tightening torque:
T1: 50 N·m (5.1 kgf-m, 36.9 ft-lb)
T2: 58 N·m (5.9 kgf-m, 42.8 ft-lb)



2) Install the intercooler. (Turbo model)
<Ref. to IN(H4DOTC)-12, INSTALLATION, Intercooler.>
3) Install the air intake chamber. (Non-turbo model) <Ref. to IN(H6DO)-7, INSTALLATION, Air Intake Chamber.>
4) Connect the ground cable to battery.

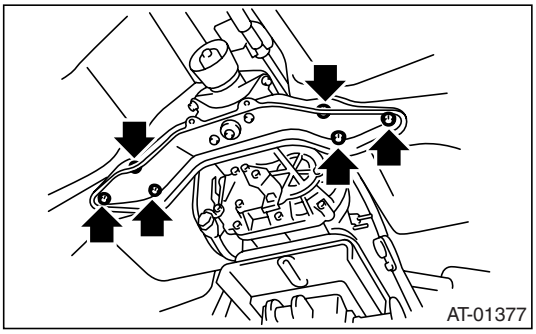
2. TRANSMISSION REAR CROSSMEMBER & REAR CUSHION RUBBER

1) Install the rear cushion rubber.

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

2) Install the crossmember.

Tightening torque:
70 N·m (7.1 kgf-m, 51.6 ft-lb)



3) Remove the transmission jack.
4) Install the heat shield cover.
5) Install the center exhaust pipe, rear exhaust pipe and muffler. (Turbo model)
<Ref. to EX(H4DOTC)-7, INSTALLATION, Center Exhaust Pipe.> <Ref. to EX(H4DOTC)-11, INSTALLATION, Rear Exhaust Pipe.> <Ref. to EX(H4DOTC)-12, INSTALLATION, Muffler.>
6) Install the front exhaust pipe, rear exhaust pipe and muffler. (Non-turbo model) <Ref. to EX(H6DO)-5, INSTALLATION, Front Exhaust Pipe.> <Ref. to EX(H6DO)-7, INSTALLATION, Rear Exhaust Pipe.> <Ref. to EX(H6DO)-9, INSTALLATION, Muffler.>
7) Connect the ground cable to battery.

C: INSPECTION

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

1. PITCHING STOPPER

Check the pitching stopper for bends or damage. Ensure there are no cracks, hardening or damage on rubbers.

2. TRANSMISSION REAR CROSSMEMBER & REAR CUSHION RUBBER

Check the crossmember for bends or damage. Ensure there are no cracks, hardening, or damage on cushion rubbers.

11.Extension Case Oil Seal

A: INSPECTION

Inspect there is no ATF leakage from the joint of transmission and propeller shaft. If leaked, replace the oil seal. <Ref. to 5AT-49, REPLACEMENT, Extension Case Oil Seal.>

B: REPLACEMENT

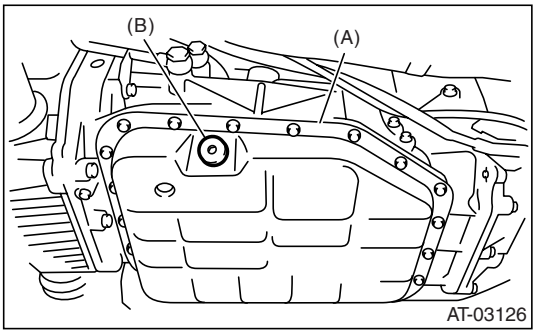
1) Lift-up the vehicle.
2) Clean the transmission exterior.
3) Remove the ATF drain plug to drain ATF.

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

4) Tighten the ATF drain plug.

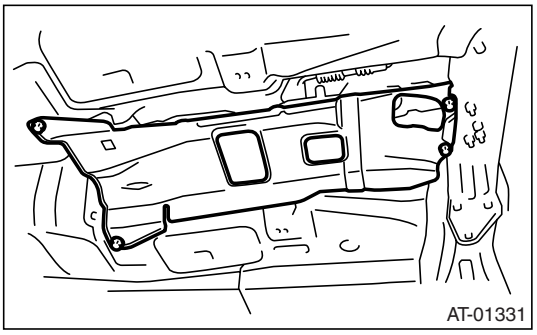
NOTE:
Use a new gasket.

Tightening torque:
20 N·m (2.0 kgf-m, 14.8 ft-lb)

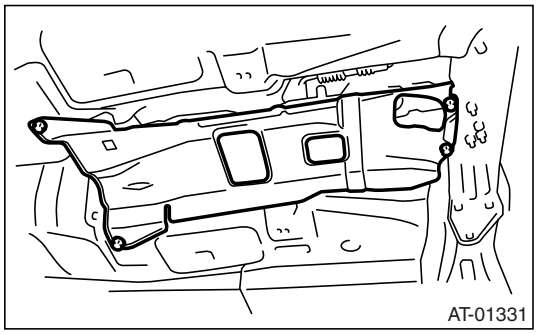


(A) Oil pan
(B) ATF drain plug

5) Remove the rear exhaust pipe and muffler. (Turbo model)
<Ref. to EX(H4DOTC)-11, REMOVAL, Rear Exhaust Pipe.> <Ref. to EX(H4DOTC)-12, REMOVAL, Muffler.>
6) Remove the rear exhaust pipe and muffler. (Non-turbo model) <Ref. to EX(H6DO)-7, REMOVAL, Rear Exhaust Pipe.> <Ref. to EX(H6DO)-9, REMOVAL, Muffler.>
7) Remove the heat shield cover.



8) Remove the propeller shaft. <Ref. to DS-10, REMOVAL, Propeller Shaft.>
9) Using the ST, remove the oil seal.
ST 398527700 PULLER ASSY
10) Using the ST, install the oil seal.
ST 498057300 INSTALLER
11) Install the propeller shaft. <Ref. to DS-11, INSTALLATION, Propeller Shaft.>
12) Install the heat shield cover.



13) Install the rear exhaust pipe and muffler. (Turbo model)
<Ref. to EX(H4DOTC)-11, INSTALLATION, Rear Exhaust Pipe.> <Ref. to EX(H4DOTC)-12, INSTALLATION, Muffler.>
14) Install the rear exhaust pipe and muffler. (Non-turbo model) <Ref. to EX(H6DO)-7, INSTALLATION, Rear Exhaust Pipe.> <Ref. to EX(H6DO)-7, INSTALLATION, Rear Exhaust Pipe.>
15) Pour ATF into the oil charge pipe.

Specified fluid:
<Ref. to 5AT-2, SPECIFICATION, General Description.>

Capacity:
Fill the same amount of ATF when drained.

16) Check the level and leaks of ATF. <Ref. to 5AT-28, Automatic Transmission Fluid.>

12. Differential Side Retainer Oil Seal

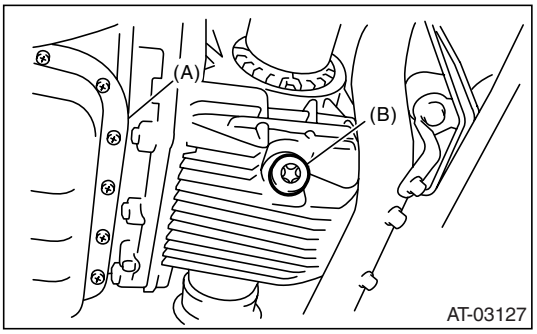
A: INSPECTION

Check the leakage of gear oil from differential side retainer oil seal part. If there is oil leakage, replace the oil seal.

B: REPLACEMENT

1) Lift-up the vehicle.
2) Remove the front exhaust pipe and center exhaust pipe. (Turbo model) <Ref. to EX(H4DOTC)-5, REMOVAL, Front Exhaust Pipe.> <Ref. to EX(H4DOTC)-6, REMOVAL, Center Exhaust Pipe.>
3) Remove the front exhaust pipe. (Non-turbo model) <Ref. to EX(H6DO)-4, REMOVAL, Front Exhaust Pipe.> <Ref. to EX(H4DOTC)-6, REMOVAL, Center Exhaust Pipe.>
4) Remove the differential gear oil drain plug using TORX® BIT T70, and then drain differential gear oil.

CAUTION:
• Directly after the vehicle has been running, 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.



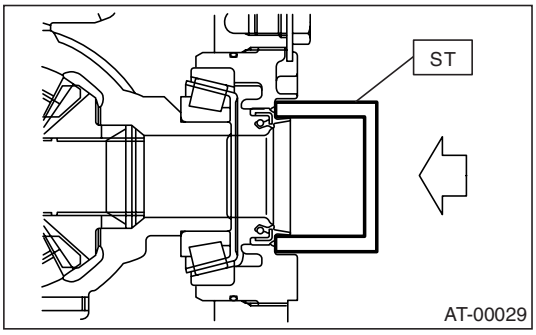
(A) Oil pan
(B) Differential gear oil drain plug

5) Tighten the differential gear oil drain plug.

NOTE:
Use a new gasket.

Tightening torque:
70 N·m (7.1 kgf-m, 51.6 ft-lb)

6) Separate the front drive shaft from transmission. <Ref. to DS-22, REMOVAL, Front Drive Shaft.>
7) Remove the differential side retainer oil seal using driver wrapped with vinyl tape or etc.
8) Using the ST, install the differential side retainer oil seal by slightly tapping with hammer.
ST 18675AA000 DIFFERENTIAL SIDE OIL SEAL INSTALLER



9) Apply oil to the oil seal lips.
10) Install the front drive shaft. <Ref. to DS-22, INSTALLATION, Front Drive Shaft.>
11) Install the front and center exhaust pipes. (Turbo model) <Ref. to EX(H4DOTC)-5, INSTALLATION, Front Exhaust Pipe.> <Ref. to EX(H4DOTC)-7, INSTALLATION, Center Exhaust Pipe.>
12) Install the front exhaust pipe. (Non-turbo model) <Ref. to EX(H6DO)-5, INSTALLATION, Front Exhaust Pipe.>
13) Lower the vehicle.
14) Pour gear oil into the gauge hole.

Recommended gear oil:
<Ref. to 5AT-3, RECOMMENDED GEAR OIL, SPECIFICATION, General Description.>

Gear oil capacity:
1.3 — 1.5 ℓ (1.4 — 1.6 US qt, 1.1 — 1.3 Imp qt)

15) Check the level of differential gear oil. <Ref. to 5AT-30, INSPECTION, Differential Gear Oil.>

13.Inhibitor Switch

A: INSPECTION

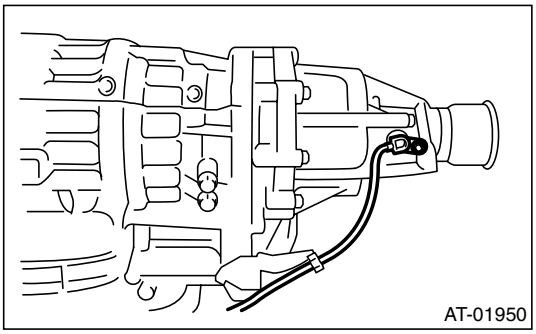
Inhibitor switch cannot be checked, because the inhibitor switch is installed on control valve assembly. When a malfunction occurs, refer to 5AT(diag) section. <Ref. to 5AT(diag)-35, DTC P0705 TRANSMISSION RANGE SENSOR CIRCUIT (PRNDL INPUT), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

14.Front Vehicle Speed Sensor

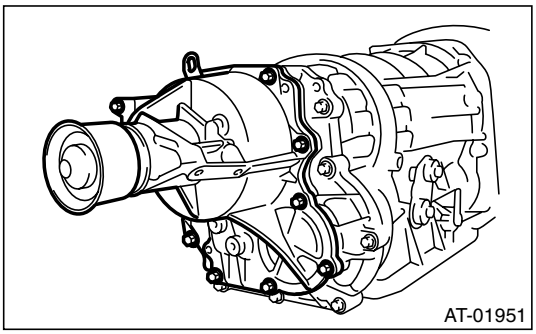
A: REMOVAL

1) Remove the transmission assembly from vehicle. <Ref. to 5AT-38, REMOVAL, Automatic Transmission Assembly.>
2) Remove the rear vehicle speed sensor.

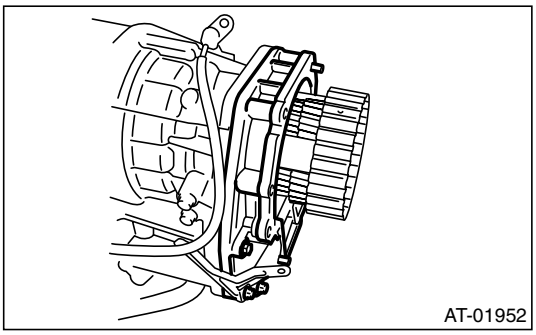
NOTE:
Secure the harness of the rear vehicle speed sensor to the transmission body using wire etc.


AT-01950

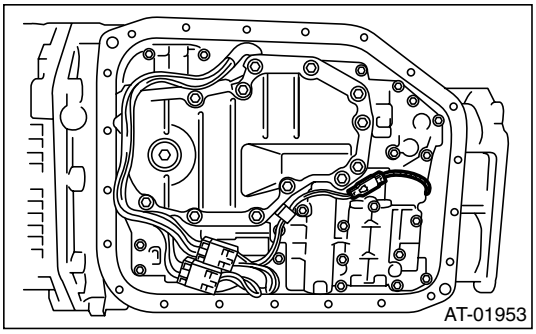
3) Remove the extension case.


AT-01951

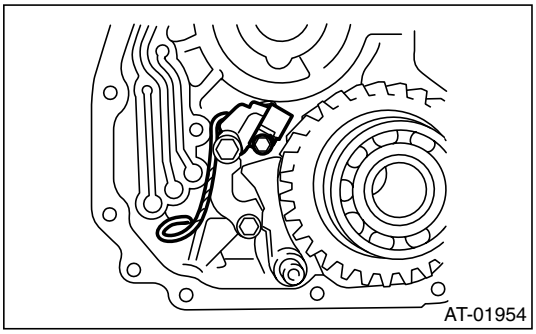
4) Remove the intermediate case.


AT-01952

5) Remove the center differential carrier. <Ref. to 5AT-78, REMOVAL, Center Differential Carrier.>
6) Lay along the transmission case, and then remove the oil pan.
7) Remove the old gasket on the oil pan and transmission case completely.
8) Disconnect the front vehicle speed sensor connector.


AT-01953

9) Remove the front vehicle speed sensor securing bolt.

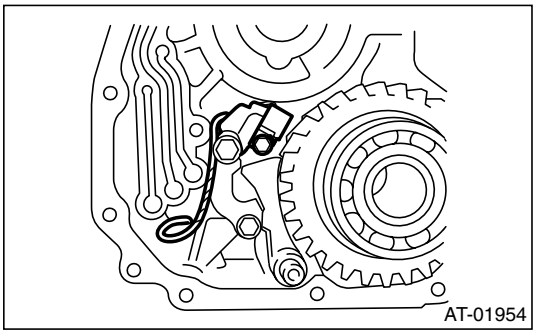

AT-01954

10) Remove the front vehicle speed sensor through the hole of AT transmission main case.

B: INSTALLATION

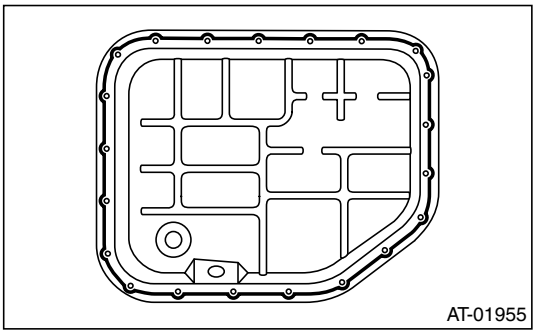
1) Install the front vehicle speed sensor.

Tightening torque:
7 N·m (0.7 kgf-m, 5.2 ft-lb)


AT-01954

2) Connect the front vehicle speed sensor connector.
3) Apply proper amount of liquid gasket to the entire oil pan mating surface.

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

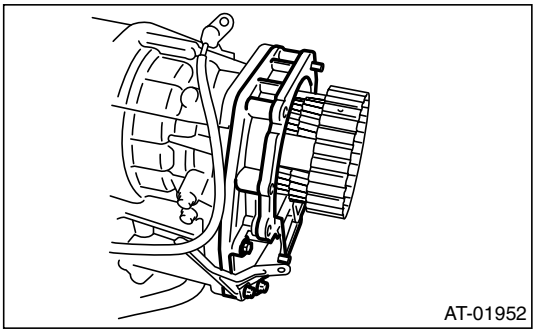


4) Install the oil pan by equally tightening the bolts.

Tightening torque:
5 N·m (0.5 kgf-m, 3.7 ft-lb)

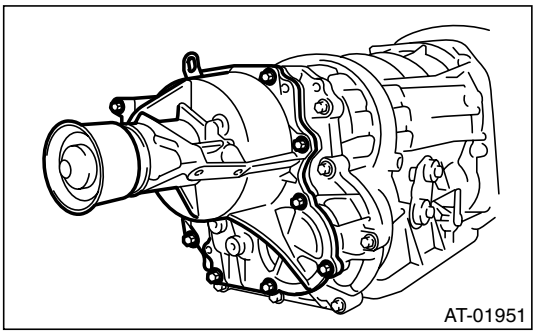
5) Install the center differential carrier. <Ref. to 5AT-78, INSTALLATION, Center Differential Carrier.>
6) Install the intermediate case.

Tightening torque:
25 N·m (2.5 kgf-m, 18.4 ft-lb)



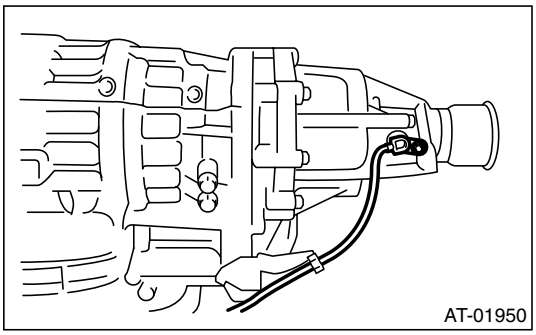
7) Install the extension case.

Tightening torque:
25 N·m (2.5 kgf-m, 18.4 ft-lb)



8) Install the rear vehicle speed sensor.

Tightening torque:
7 N·m (0.7 kgf-m, 5.2 ft-lb)

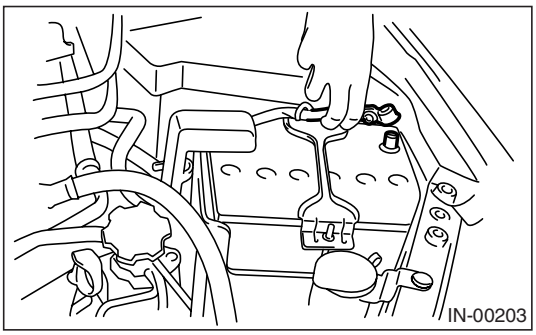


9) Install the transmission assembly into vehicle. <Ref. to 5AT-42, INSTALLATION, Automatic Transmission Assembly.>
10) Pour ATF through the oil charge pipe. <Ref. to 5AT-28, REPLACEMENT, Automatic Transmission Fluid.>
11) Check the level and leaks of ATF. <Ref. to 5AT-28, INSPECTION, Automatic Transmission Fluid.>

15.Rear Vehicle Speed Sensor

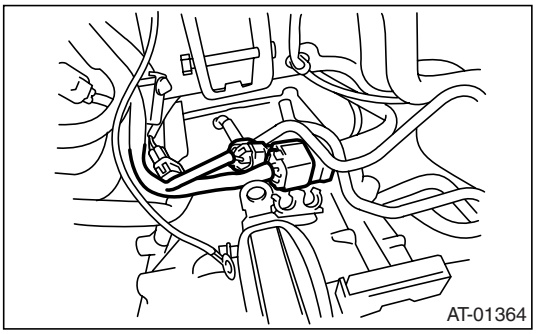
A: REMOVAL

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

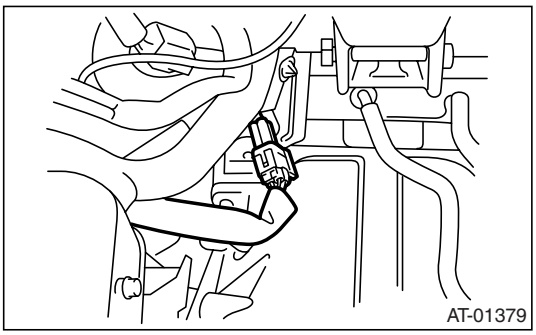


3) Remove the intercooler. (Turbo model)
<Ref. to IN(H4DOTC)-12, REMOVAL, Intercooler.>
4) Remove the air intake chamber. (Non-turbo model) <Ref. to IN(H6DO)-7, REMOVAL, Air Intake Chamber.>
5) Disconnect the following connectors.

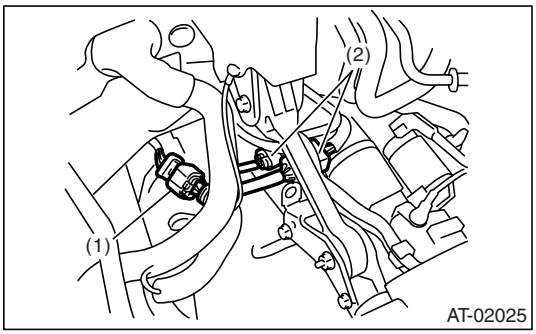
- Turbo model
  (1) Transmission harness connectors



  (2) Front oxygen (A/F) sensor



- Non-turbo model

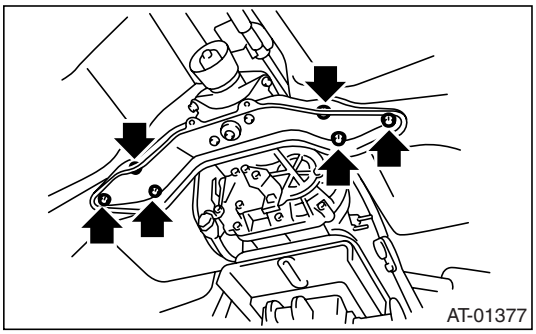


  (1) Front oxygen (A/F) sensor
  (2) Transmission harness connectors

6) Remove the transmission harness connector and front oxygen (A/F) sensor connector from the stay.
7) Lift-up the vehicle.
8) Clean the transmission exterior.
9) Drain the ATF completely. <Ref. to 5AT-28, REPLACEMENT, Automatic Transmission Fluid.>
10) Remove the center exhaust pipe, rear exhaust pipe and muffler. (Turbo model)
<Ref. to EX(H4DOTC)-6, REMOVAL, Center Exhaust Pipe.> <Ref. to EX(H4DOTC)-11, REMOVAL, Rear Exhaust Pipe.> <Ref. to EX(H4DOTC)-12, REMOVAL, Muffler.>
11) Remove the rear exhaust pipe and muffler. (Non-turbo model) <Ref. to EX(H6DO)-7, REMOVAL, Rear Exhaust Pipe.> <Ref. to EX(H6DO)-9, REMOVAL, Muffler.>
12) Remove the heat shield cover.
13) Remove the propeller shaft. <Ref. to DS-10, REMOVAL, Propeller Shaft.>
14) Place the transmission jack under transmission.

NOTE:
Make sure that the support plate of transmission jack does not touch the crossmember.

15) Remove the transmission rear crossmember bolt.



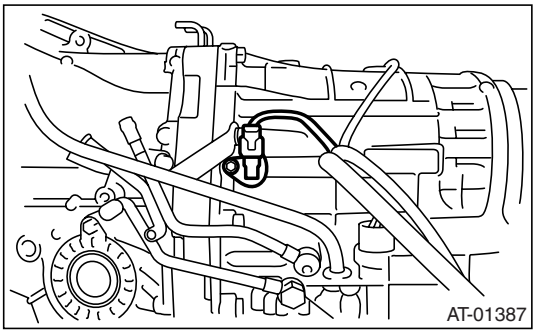
16) Lower the transmission jack.

NOTE:
Do not separate the transmission jack and transmission.

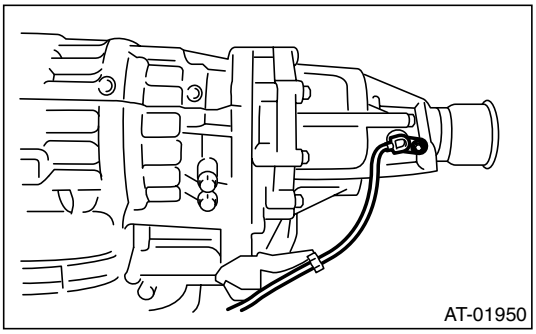
17) Remove the oil charge pipe. <Ref. to 5AT-69, REMOVAL, Oil Charge Pipe.>
18) Remove the ATF cooler inlet and outlet pipes.

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

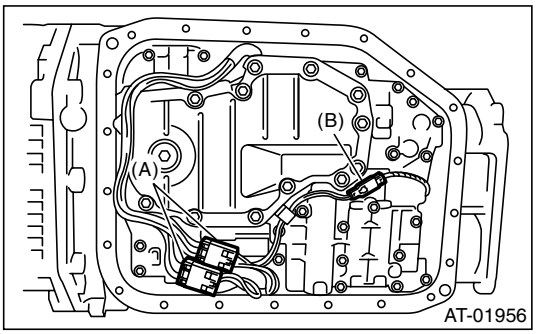
19) Disconnect the connector from turbine speed sensor 1.


AT-01387

20) Remove the rear vehicle speed sensor.


AT-01950

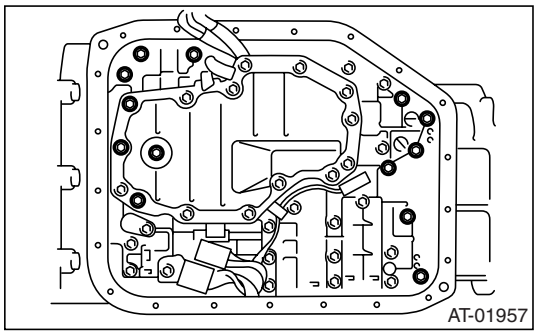
21) Remove the oil pan.
22) Disconnect the control valve connector and front vehicle speed sensor connector.



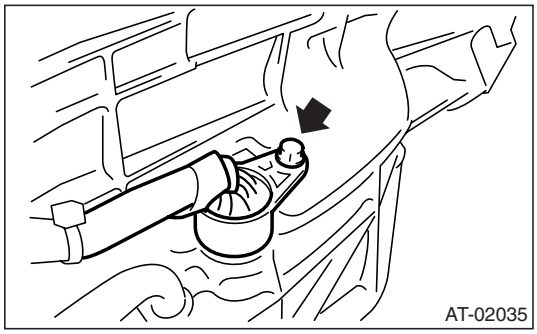
AT-01956

(A) Control valve connector
(B) Front vehicle speed sensor connector

23) Remove the control valve body.


AT-01957

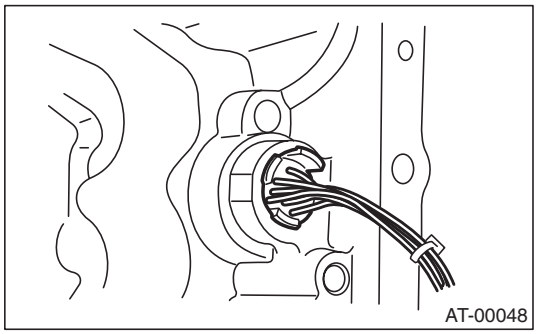
24) Remove the bolt securing harness of transmission main case.


AT-02035

25) Remove the harness assembly.

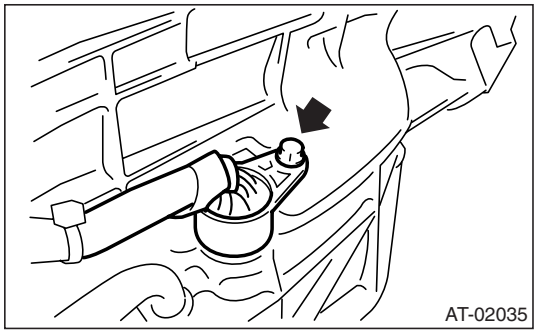
B: INSTALLATION

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


AT-00048

2) Install the securing bolt of transmission main case.

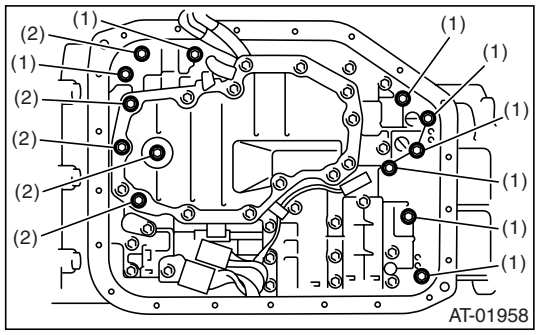
Tightening torque:
7 N·m (0.7 kgf-m, 5.2 ft-lb)


AT-02035

3) Install the control valve body.

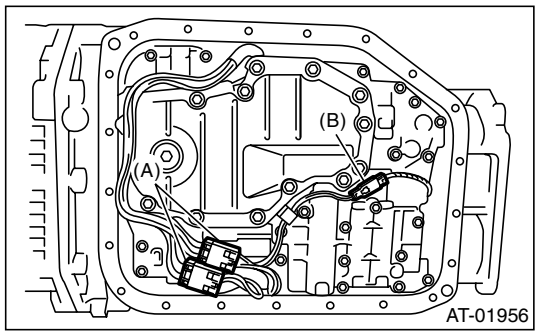
Tightening torque:
8 N·m (0.8 kgf-m, 5.9 ft-lb)

NOTE:
Be careful not to catch harness in.



(1) 58 mm (2.28 in)
(2) 65 mm (2.56 in)

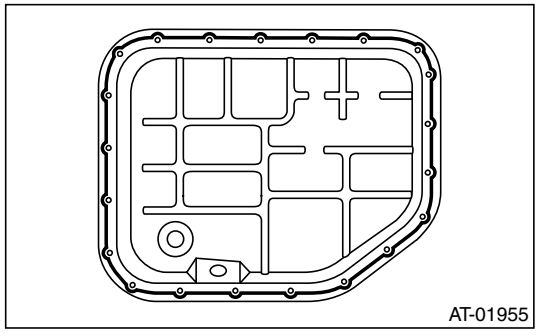
4) Connect the control valve connector and front vehicle speed sensor connector.



(A) Control valve connector
(B) Front vehicle speed sensor connector

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

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



6) Install the oil pan by equally tightening the bolts.

Tightening torque:
5 N·m (0.5 kgf-m, 3.7 ft-lb)

7) Install the rear vehicle speed sensor and turbine speed sensor 1, and then fasten the harness.

Tightening torque:
7 N·m (0.7 kgf-m, 5.2 ft-lb)

8) Install a new aluminum washer and oil cooler pipe.

Tightening torque:
25 N·m (2.5 kgf-m, 18.4 ft-lb)

9) Install the oil charge pipe. <Ref. to 5AT-69, INSTALLATION, Oil Charge Pipe.>
10) Install the transmission rear crossmember bolt.

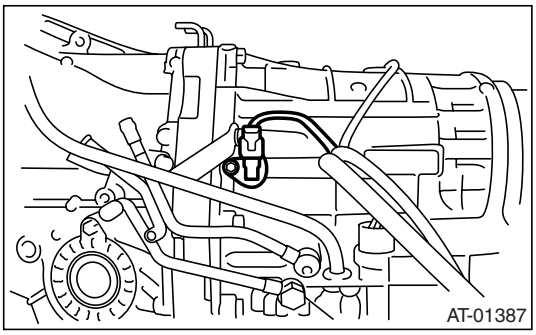
Tightening torque:
70 N·m (7.1 kgf-m, 51.6 ft-lb)

11) Install the propeller shaft. <Ref. to DS-11, INSTALLATION, Propeller Shaft.>
12) Install the heat shield cover.
13) Install the center exhaust pipe, rear exhaust pipe and muffler. (Turbo model)
<Ref. to EX(H4DOTC)-7, INSTALLATION, Center Exhaust Pipe.> <Ref. to EX(H4DOTC)-11, INSTALLATION, Rear Exhaust Pipe.> <Ref. to EX(H4DOTC)-12, INSTALLATION, Muffler.>
14) Install the rear exhaust pipe and muffler. (Non-turbo model) <Ref. to EX(H6DO)-7, INSTALLATION, Rear Exhaust Pipe.> <Ref. to EX(H6DO)-9, INSTALLATION, Muffler.>
15) Lower the vehicle.
16) Install the transmission connector to the stay, and then connect the connector.
17) Install the intercooler. (Turbo model) <Ref. to IN(H4DOTC)-12, INSTALLATION, Intercooler.>
18) Install the air intake chamber. (Non-turbo model) <Ref. to IN(H6DO)-7, INSTALLATION, Air Intake Chamber.>
19) Pour ATF from the oil charge pipe. <Ref. to 5AT-28, REPLACEMENT, Automatic Transmission Fluid.>
20) Check the level and leaks of ATF. <Ref. to 5AT-28, INSPECTION, Automatic Transmission Fluid.>
21) Execute the learning control promotion. <Ref. to 5AT(diag)-23, PROCEDURE, Learning Control.>

16.Turbine Speed Sensor 1

A: REMOVAL

1) Lift-up the vehicle.
2) Remove the intercooler. (Turbo model) <Ref. to IN(H4DOTC)-12, REMOVAL, Intercooler.>
3) Remove the air intake chamber. (Non-turbo model) <Ref. to IN(H6DO)-7, REMOVAL, Air Intake Chamber.>
4) Disconnect the turbine speed sensor 1 connector.



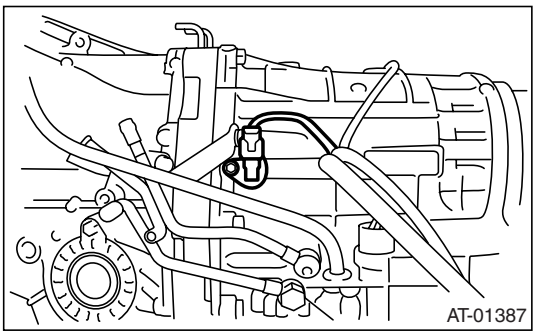
5) Remove the turbine speed sensor 1.

B: INSTALLATION

1) Install the turbine speed sensor 1.

Tightening torque:
7 N·m (0.7 kgf-m, 5.2 ft-lb)

2) Connect the turbine speed sensor 1 connector.



3) Install the intercooler. (Turbo model) <Ref. to IN(H4DOTC)-12, INSTALLATION, Intercooler.>
4) Install the air intake chamber. (Non-turbo model) <Ref. to IN(H6DO)-7, INSTALLATION, Air Intake Chamber.>

17.Control Valve Body

A: REMOVAL

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 ATF drain plug to drain ATF.

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

6) Tighten the ATF drain plug.

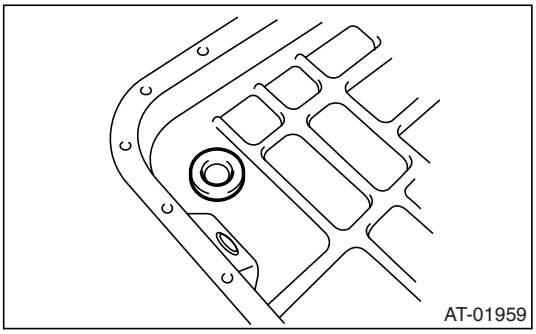
NOTE:
Use a new gasket.

Tightening torque:
25 N·m (2.5 kgf-m, 18.4 ft-lb)

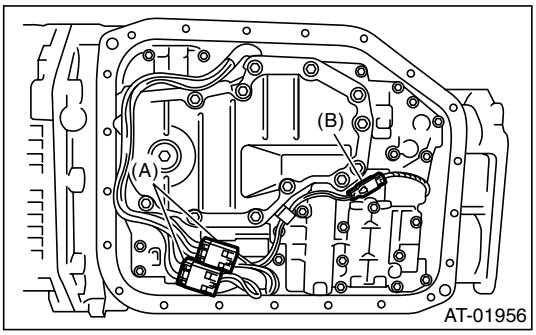
7) Remove the oil pan.

CAUTION:
Be sure to prevent the entering of dust and other foreign matters into oil pan.

8) Remove the magnet.



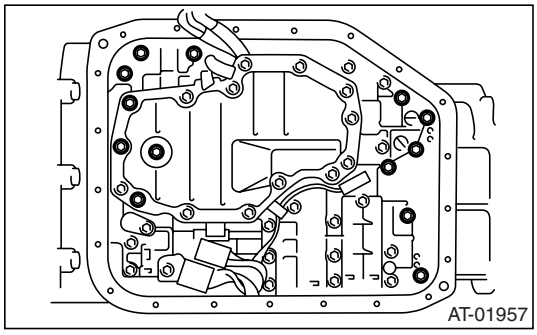
9) Clean the magnet.
10) Completely remove the remaining liquid gasket on the transmission case and oil pan.
11) Disconnect the control valve connector and front vehicle speed sensor connector.



(A) Control valve connector
(B) Front vehicle speed sensor connector

12) Remove the control valve body.

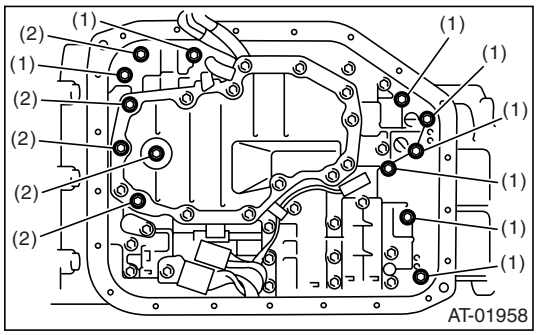
NOTE:
Replace the control valve body as assembly, because it is a non-disassemble part.



B: INSTALLATION

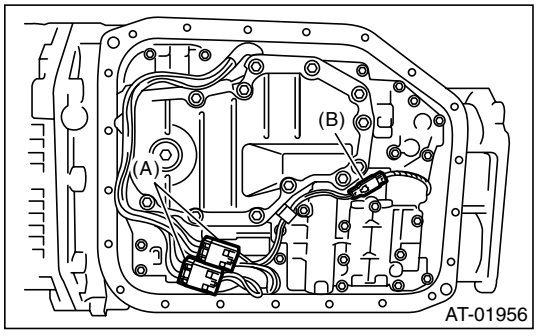
1) Check the control valve body for dust and other foreign matters.
2) Install the control valve body to transmission by equally tightening the bolts.

Tightening torque:
8 N·m (0.8 kgf-m, 5.9 ft-lb)



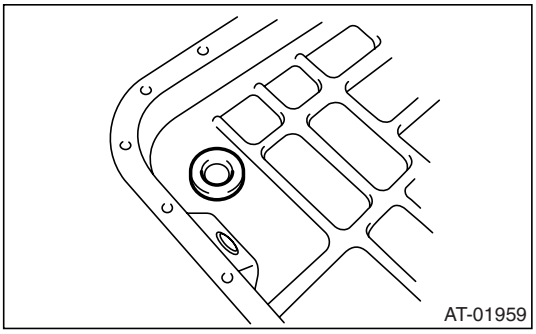
(1) 58 mm (2.28 in)
(2) 65 mm (2.56 in)

3) Connect the control valve connector.



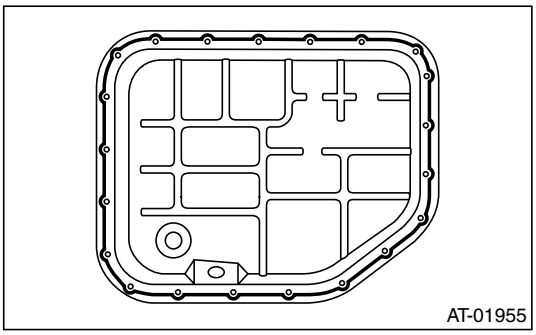
(A) Control valve connector
(B) Front vehicle speed sensor connector

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



5) Apply liquid gasket to the oil pan.

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



6) Install the oil pan by equally tightening the bolts.

Tightening torque:
5 N·m (0.5 kgf-m, 3.7 ft-lb)

7) Pour ATF through the oil charge pipe.

Specified fluid:
<Ref. to 5AT-2, SPECIFICATION, General Description.>

Capacity:
Fill the same amount of ATF when drained.

8) Check the ATF level.
<Ref. to 5AT-28, Automatic Transmission Fluid.>
9) Perform the Clear Memory 2. <Ref. to 5AT(diag)-19, CLEAR MEMORY MODE, OPERATION, Subaru Select Monitor.>
10) Perform the inspection with driving the vehicle at the end of repair work, and make sure there is no faulty as below;

- Excessive shift shock
- Oil leakage from transmission body and etc.
- Occurrence of noise caused by interference etc.

NOTE:
If excessive shift shock is felt, execute the advance operation of learning control. <Ref. to 5AT(diag)-23, PROCEDURE, Learning Control.>

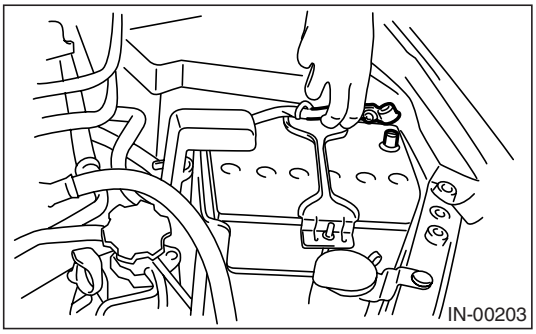
C: INSPECTION

Check each parts for holes, damages or other foreign matters.

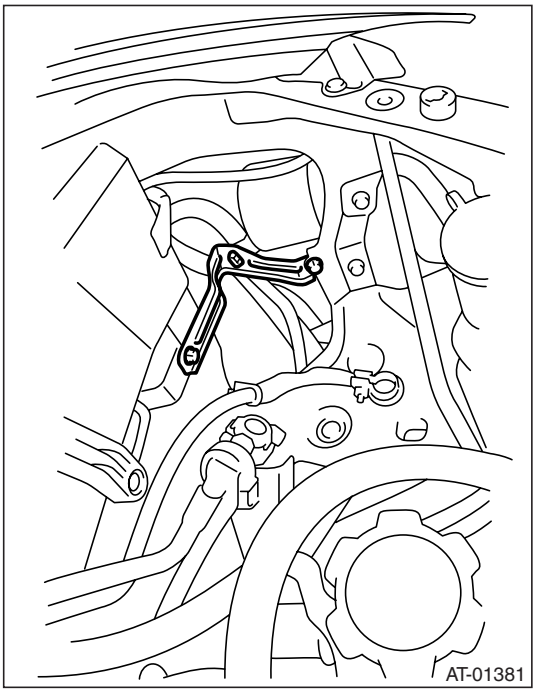
18.ATF Filter

A: REMOVAL

1) Disconnect the ground cable from battery and remove the battery from vehicle.



2) Remove the harness securing bracket.



3) Using the ST, remove the ATF filter.
ST 498545400 FILTER WRENCH

B: INSTALLATION

1) Apply a thin coat of ATF to the oil seal part of new ATF filter.
2) Install the ATF filter. Turn it by hand, being careful not to damage oil seal.
3) Tighten the ATF filter using ST.
Calculate the ATF filter tightening torque using 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 78 mm (3.07 in)
L2: Torque wrench length
Example:

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

NOTE:
Align the ST with torque wrench while tightening the ATF filter.
Calculation formula: 498545400 OIL FILTER WRENCH
4) Fill ATF.
5) Check the level of ATF. <Ref. to 5AT-28, Automatic Transmission Fluid.>
6) Install the harness securing bracket.
7) Install the battery.

C: INSPECTION

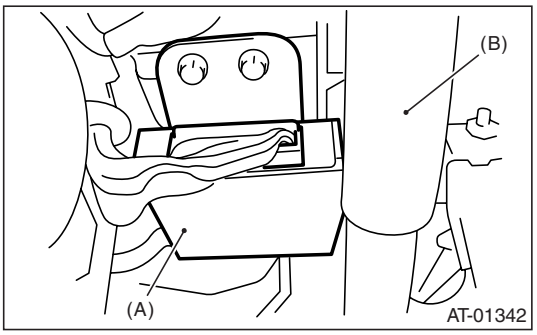
Check for rust, hole, ATF leaks or other damage.
Replace the part if any defect is found from the inspection.

19. Transmission Control Module (TCM)

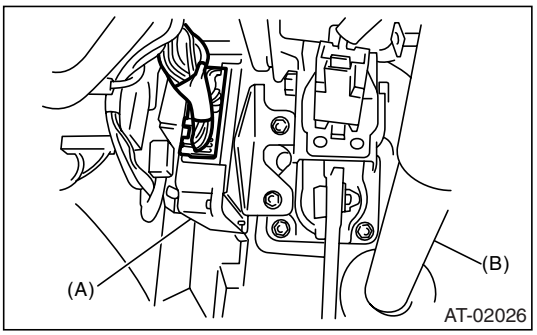
A: REMOVAL

1) Disconnect the ground cable from battery.
2) Remove the lower cover and then disconnect the connector.
3) Remove the body integrated module. (RHD mode) <Ref. to SL-44, REMOVAL, Body Integrated Module.>I
4) Disconnect the connector from TCM.

- RHD model



- LHD model



(A) Transmission control module (TCM)
(B) Steering column

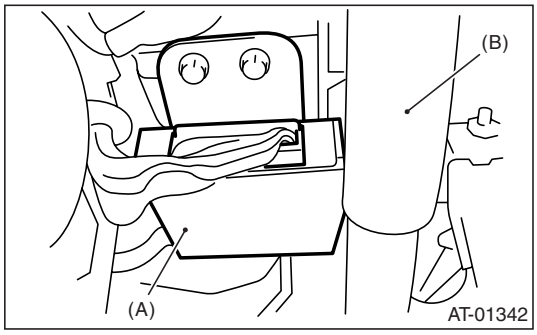
5) Remove the relay from TCM body.
6) Remove the TCM.

B: INSTALLATION

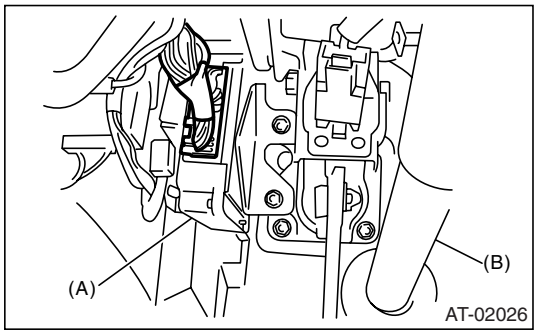
1) Install the relay to TCM body.
2) Install the TCM.

Tightening torque:
7.5 N·m (0.76 kgf-m, 5.5 ft-lb)

- RHD model



- LHD model



(A) Transmission control module (TCM)
(B) Steering column

3) Connect the connector to TCM.
4) Install in the reverse order of removal.
5) Perform the Clear Memory 2. <Ref. to 5AT(diag)-19, CLEAR MEMORY MODE, OPERATION, Subaru Select Monitor.>
6) Perform the inspection with driving the vehicle at the end of repair work, and make sure there is no faulty as below;

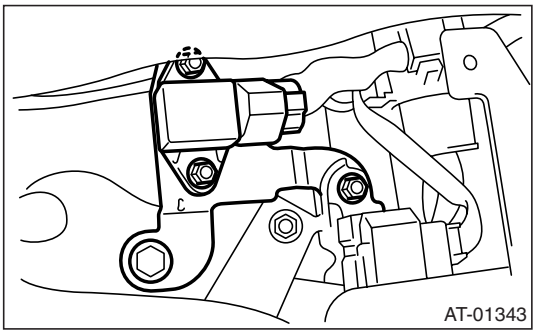
- Excessive shift shock
- Oil leakage from transmission body and etc.
- Occurrence of noise caused by interference etc.

NOTE:
If excessive shift shock is felt, execute the advance operation of learning control. <Ref. to 5AT(diag)-23, PROCEDURE, Learning Control.>

20. Lateral G Sensor

A: REMOVAL

1) Remove the console box. <Ref. to EI-53, REMOVAL, Console Box.>
2) Disconnect the connector from lateral G sensor.

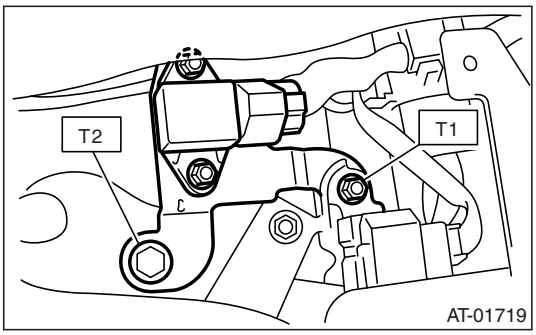


3) Remove the lateral G sensor.

B: INSTALLATION

Install in the reverse order of removal.

Tightening torque:
T1: 7.5 N·m (0.76 kgf-m, 5.5 ft-lb)
T2: 24.5 N·m (2.5 kgf-m, 18.1 ft-lb)

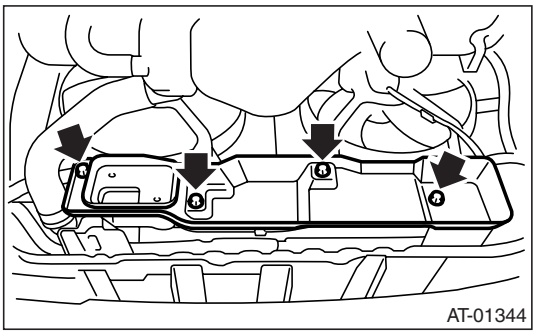


21.ATF Cooler Pipe and Hose

A: REMOVAL

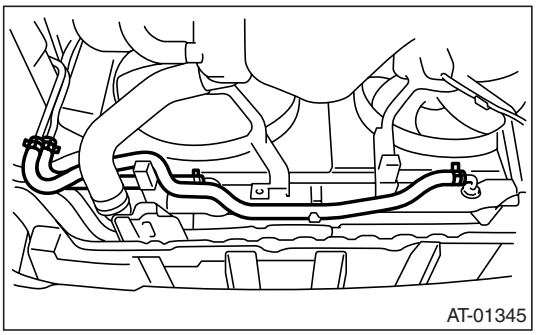
1. EXCEPT FOR ATF COOLER MODEL WITH WARMER FUNCTION

1) Set the vehicle on a lift.
2) Remove the battery.
3) Lift-up the vehicle.
4) Remove the under cover.
5) Remove the radiator under cover.


AT-01344

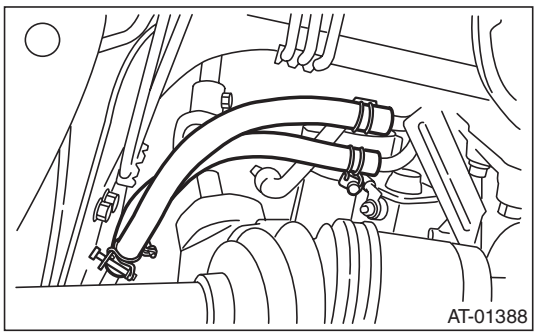
6) Disconnect the ATF cooler hose from radiator.

NOTE:
• Do not use a screwdriver or other pointed tools.
• When hard to remove the hose, wrap the hose with cloth to prevent from damaging, and then turn with pliers and pull out with hand straightly.

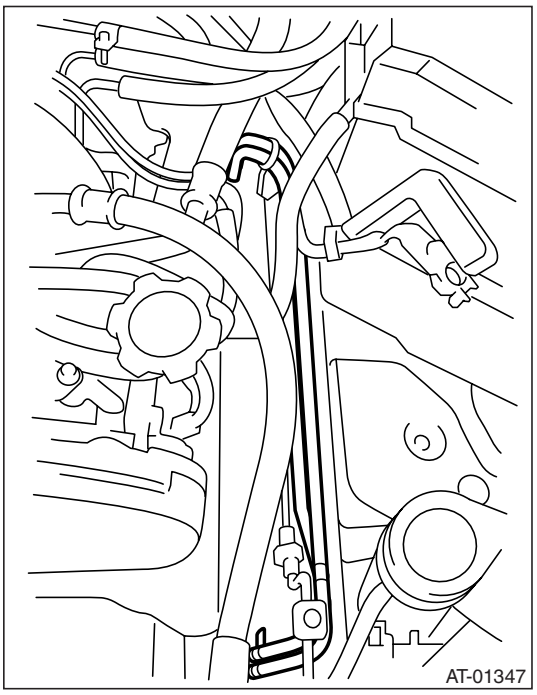

AT-01345

7) Disconnect the ATF cooler hoses from pipes.

NOTE:
• Do not use a screwdriver or other pointed tools.
• When hard to remove the hose, wrap the hose with cloth to prevent from damaging, and then turn with pliers and pull out with hand straightly.

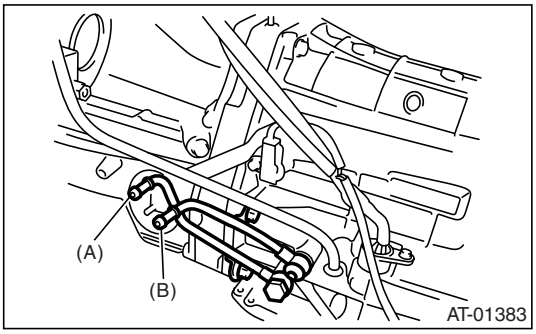

AT-01388

8) Disconnect the ATF cooler pipe from frame.


AT-01347

9) Remove the oil cooler inlet and outlet pipes.

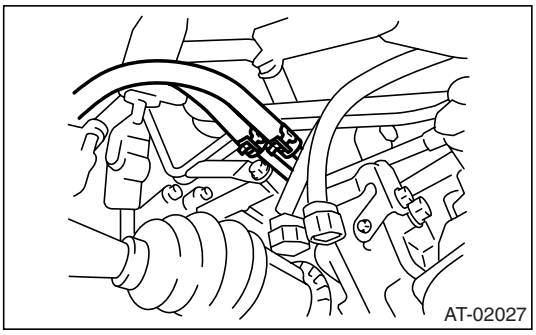
NOTE:
When disconnecting the outlet pipe, be careful not to lose the ball and spring used with retaining screw.



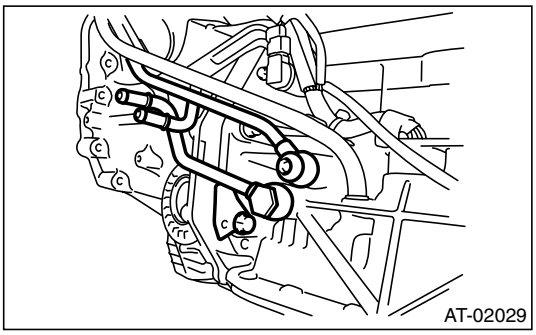
(A) Outlet pipe
(B) Inlet pipe

2. ATF COOLER MODEL WITH WARMER FUNCTION

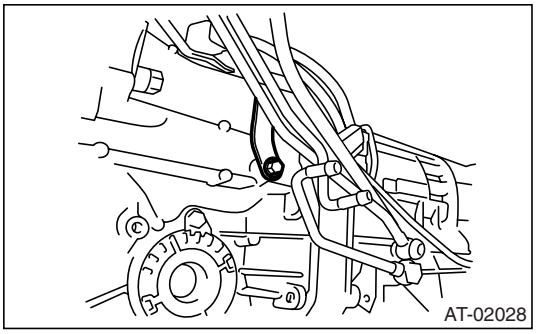
1) Lift-up the vehicle.
2) Remove the front exhaust pipe.
<Ref. to EX(H6DO)-4, REMOVAL, Front Exhaust Pipe.>
3) Disconnect the inlet and outlet of the ATF cooler hoses from oil cooler pipe.



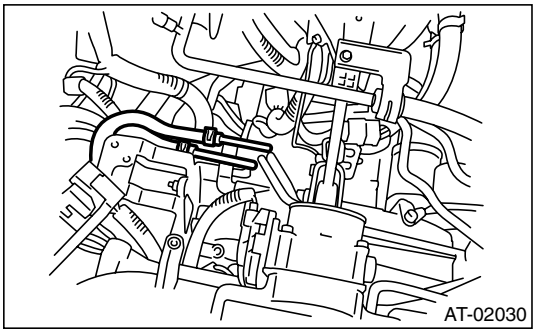
4) Remove the union screw of oil cooler inlet and outlet pipes.



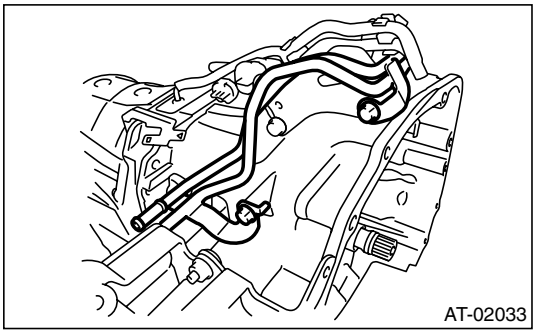
5) Remove the bolts which secure pipe on the side of transmission.



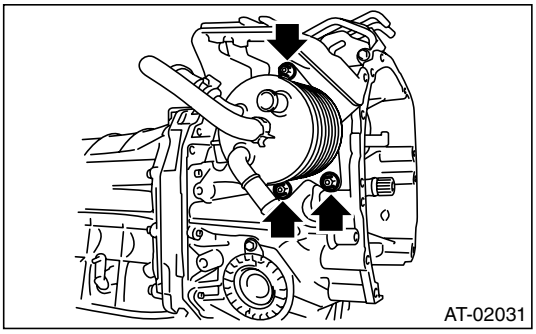
6) Lower the vehicle.
7) Remove the air intake chamber.
<Ref. to IN(H6DO)-7, REMOVAL, Air Intake Chamber.>
8) Remove the resonator chamber.
<Ref. to IN(H6DO)-9, REMOVAL, Resonator Chamber.>
9) Remove the oil charge pipe. <Ref. to 5AT-69, REMOVAL, Oil Charge Pipe.>
10) Disconnect the ATF cooler hoses and pipes.



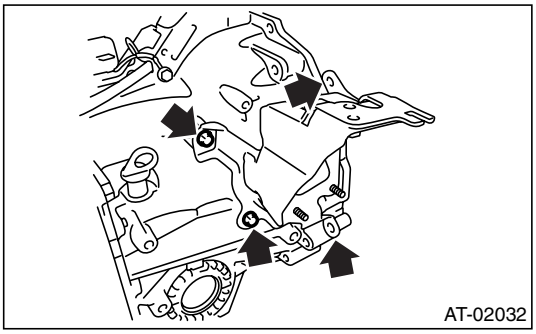
11) Remove the bolt which secure pitching stopper bracket and the bolt on the side of transmission, and then remove ATF cooler pipe.



12) Remove the ATF cooler from the installation bracket as necessary.



13) Remove the ATF cooler bracket from transmission body as necessary.

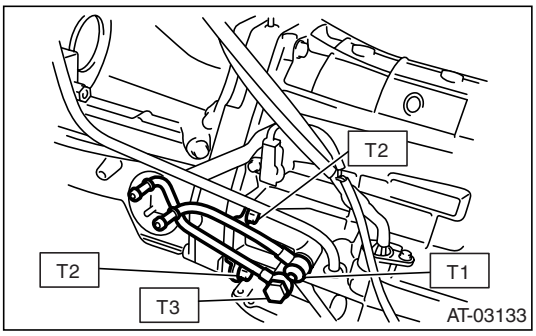


B: INSTALLATION

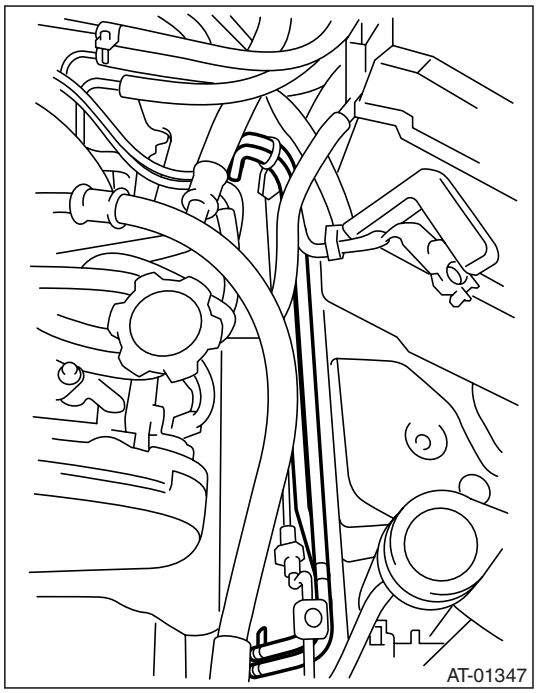
1. EXCEPT FOR ATF COOLER MODEL WITH WARMER FUNCTION

1) Install the oil cooler inlet and outlet pipes with new washer.

Tightening torque:
T1: 25 N·m (2.5 kgf-m, 18.4 ft-lb)
T2: 41 N·m (4.2 kgf-m, 30.2 ft-lb)
T3: 45 N·m (4.6 kgf-m, 33.2 ft-lb)

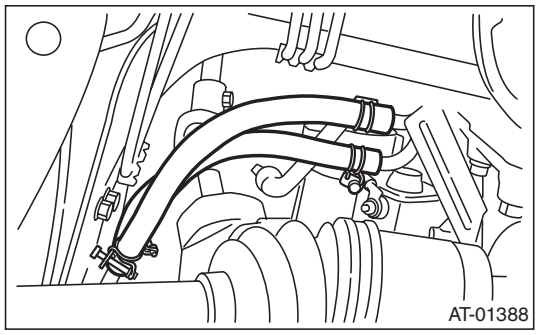


2) Install the ATF cooler pipe to frame.



3) Connect the ATF cooler hose to pipe on the transmission side.

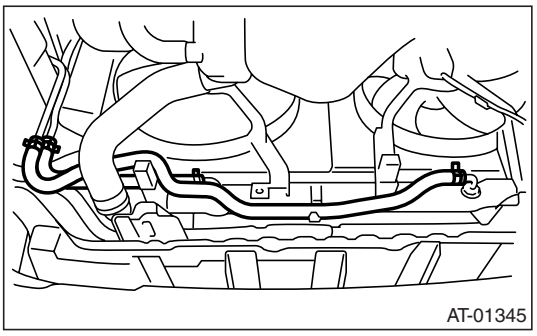
NOTE:
• Install so that the hose is not folded over, excessively bent or twisted.
• Be careful to insert the hose to the specified position.



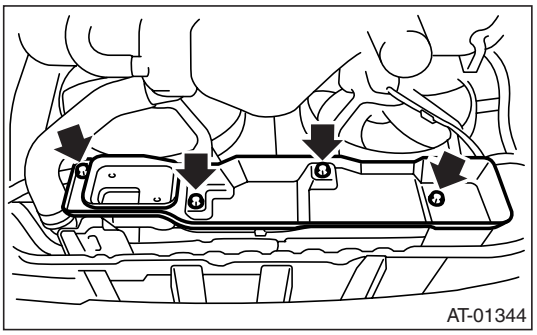
4) Connect the ATF cooler hose to pipe on the radiator side.

NOTE:
• Install so that the hose is not folded over, excessively bent or twisted.

• Be careful to insert the hose to the specified position.


AT-01345

5) Install the radiator under cover.
Tightening torque:
4.9 N·m (0.5 kgf-m, 3.6 ft-lb)


AT-01344

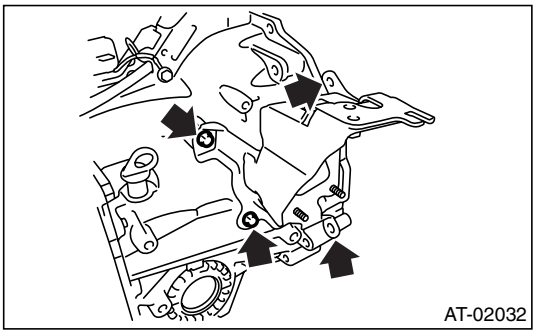
6) Install the under cover.
7) Install the battery.
8) Fill ATF. <Ref. to 5AT-28, Automatic Transmission Fluid.>

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

2. ATF COOLER MODEL WITH WARMER FUNCTION

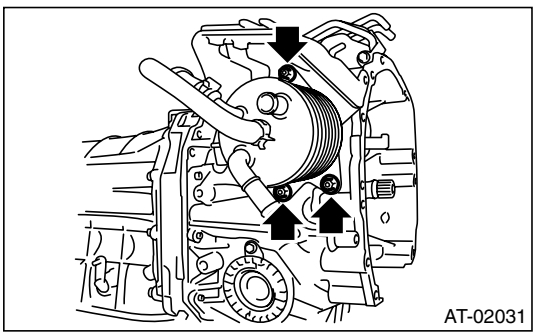
1) Install the ATF cooler bracket if it is removed from transmission body.

Tightening torque:
25 N·m (2.5 kgf-m, 18.4 ft-lb)

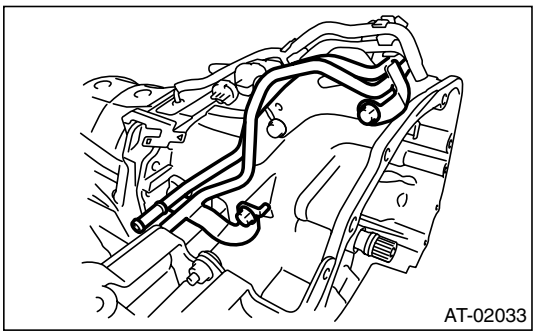

AT-02032

2) Install the ATF cooler if it is removed from installation bracket.

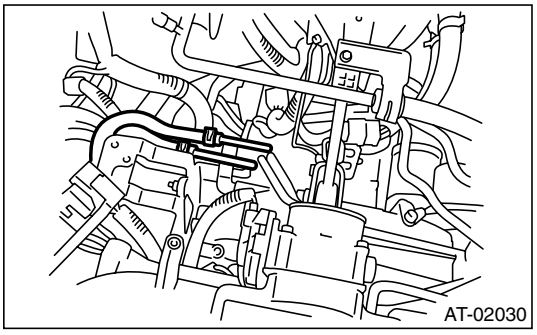
Tightening torque:
25 N·m (2.5 kgf-m, 18.4 ft-lb)


AT-02031

3) Install the pitching stopper securing bracket and bolt in the side of transmission.


AT-02033

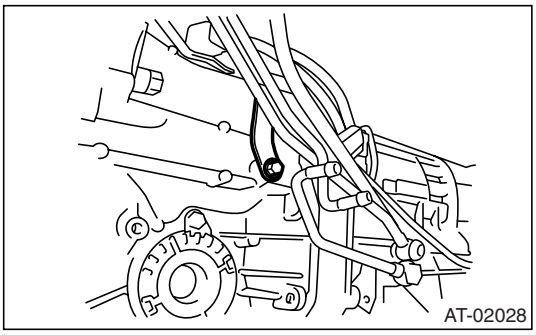
4) Install the ATF cooler hoses and pipes.


AT-02030

5) Connect the engine harness connectors, and then install the engine hanger rear.
6) Install the oil charge pipe. <Ref. to 5AT-69, INSTALLATION, Oil Charge Pipe.>
7) Install the resonator chamber.
<Ref. to IN(H6DO)-9, INSTALLATION, Resonator Chamber.>
8) Install the air intake chamber.
<Ref. to IN(H6DO)-7, INSTALLATION, Air Intake Chamber.>
9) Lift-up the vehicle.

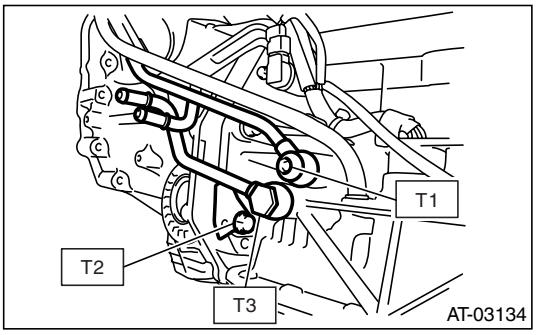
10) Install the pipe securing bolts on the side of transmission.

Tightening torque:
25 N·m (2.5 kgf-m, 18.4 ft-lb)

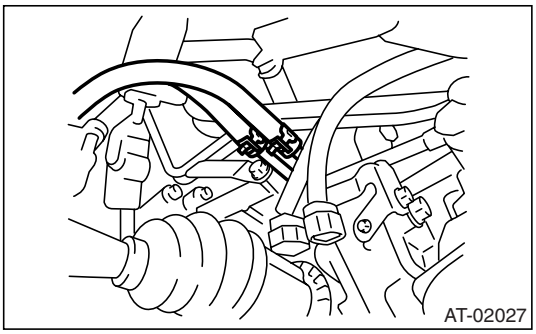


11) Install the union screw of oil cooler inlet and outlet pipes.

Tightening torque:
T1: 25 N·m (2.5 kgf-m, 18.4 ft-lb)
T2: 41 N·m (4.2 kgf-m, 30.2 ft-lb)
T3: 45 N·m (4.6 kgf-m, 33.2 ft-lb)



12) Install the inlet and outlet pipes of ATF oil cooler hose to oil cooler pipe.



13) Install the front exhaust pipe.
<Ref. to EX(H6DO)-5, INSTALLATION, Front Exhaust Pipe.>

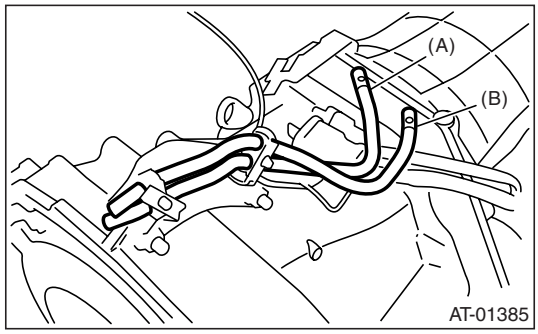
C: INSPECTION

Repair or replace any defective hoses, pipes, clamps, and washers found during the inspection below.
1) Check for ATF leaks in connections of the transmission, radiator, pipes and hoses.
2) Check for deformed clamps.
3) Lightly bend the hose and check for cracks in the surface or other damages.
4) Pinch the hose with your fingers and check for poor elasticity. Also check for poor elasticity in the parts where the clamp was installed by pressing with your fingernail.
5) Check for peeling, cracks, and deformation at the tip of the hose.
6) Check the ATF cooler for cracks or deformation. (ATF cooler model with warmer function)

22. Air Breather Hose

A: REMOVAL

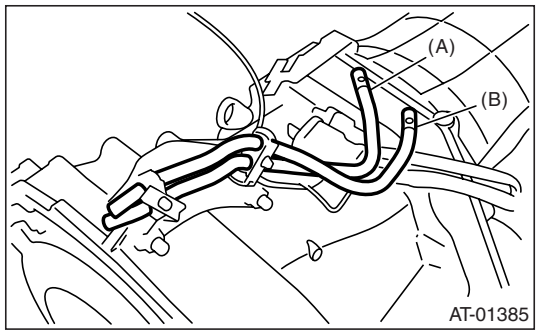
1) Remove the intercooler. (Turbo model) <Ref. to IN(H4DOTC)-12, REMOVAL, Intercooler.>
2) Remove the air intake chamber. (Non-turbo model) <Ref. to IN(H6DO)-7, REMOVAL, Air Intake Chamber.>
3) Disconnect the air breather hose.



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

B: INSTALLATION

1) Connect the air breather hose.



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

2) Install the intercooler. (Turbo model) <Ref. to IN(H4DOTC)-12, INSTALLATION, Intercooler.>
3) Install the air intake chamber. (Non-turbo model) <Ref. to IN(H6DO)-7, INSTALLATION, Air Intake Chamber.>

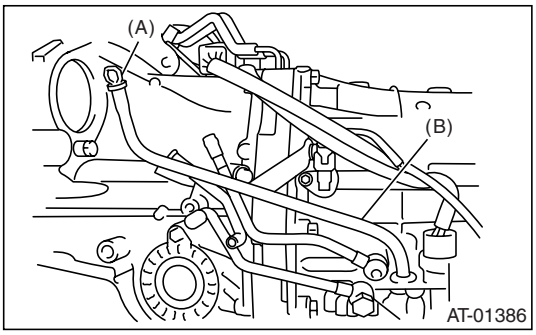
C: INSPECTION

Make sure the hose is not cracked or clogged.

23.Oil Charge Pipe

A: REMOVAL

1) Remove the intercooler. (Turbo model) <Ref. to IN(H4DOTC)-12, REMOVAL, Intercooler.>
2) Remove the air intake chamber. (Non-turbo model) <Ref. to IN(H6DO)-7, REMOVAL, Air Intake Chamber.>
3) Remove the oil charge pipe, and then remove the O-ring from flange side.

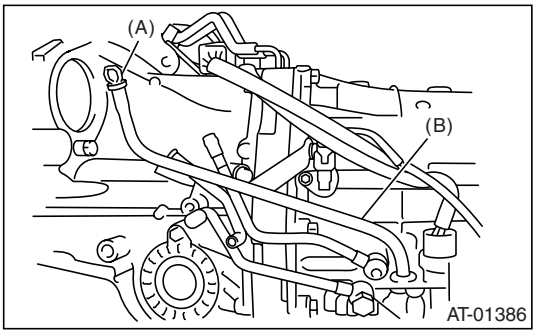


(A) Oil level gauge
(B) Oil charge pipe

B: INSTALLATION

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

Tightening torque:
41 N·m (4.2 kgf-m, 30.2 ft-lb)



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

2) Install the intercooler. (Turbo model) <Ref. to IN(H4DOTC)-12, INSTALLATION, Intercooler.>
3) Install the air intake chamber. (Non-turbo model) <Ref. to IN(H6DO)-7, INSTALLATION, Air Intake Chamber.>

C: INSPECTION

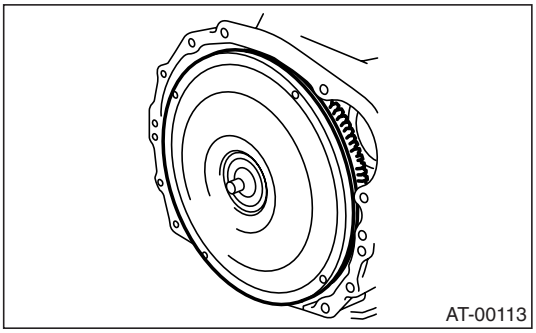
Make sure the oil charge pipe is not deformed or damaged.

24.Torque Converter Assembly

A: REMOVAL

1) Remove the transmission assembly from vehicle. <Ref. to 5AT-38, REMOVAL, Automatic Transmission Assembly.>
2) Pull out the torque converter and oil pump shaft horizontally.

NOTE:
• Be sure not to scratch the inside of bushing in oil pump shaft.
• Be careful that the oil pump shaft may drawn out simultaneously.



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

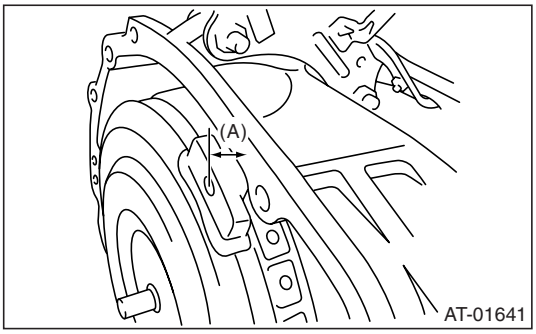
B: INSTALLATION

1) When the oil pump shaft is removed, install the shaft to torque converter.

NOTE:
Make sure the clip is firmly inserted.

2) Install the oil pump shaft to torque converter, and then make sure that the clip is secured on groove.
3) Apply ATF to the revolution and sliding surface oil pump shaft.
4) Holding the torque converter assembly by hand, lightly rotate it to engage with the oil pump rotor.
5) Check the protruding dimension of torque converter assembly.

Dimension A:
8 mm (0.31 in) or less



(A) Dimension A

6) Install the transmission assembly into vehicle. <Ref. to 5AT-42, INSTALLATION, Automatic Transmission Assembly.>

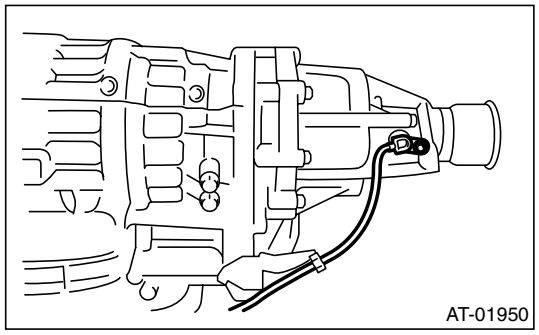
C: INSPECTION

Make sure the ring gear and protrusion of torque converter end are not deformed or damaged.

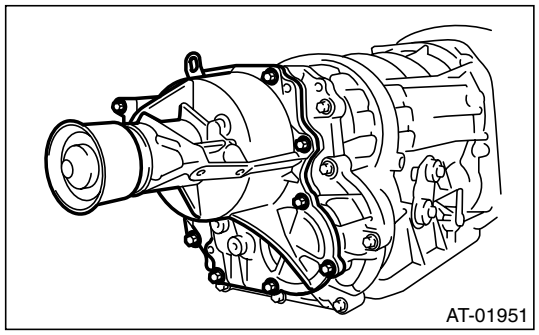
25. Extension Case and Intermediate Case

A: REMOVAL

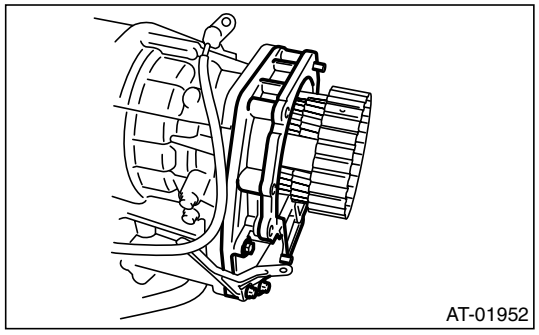
1) Remove the transmission assembly.
<Ref. to 5AT-38, REMOVAL, Automatic Transmission Assembly.>
2) Remove the rear vehicle speed sensor.


AT-01950

3) Separate the extension case and intermediate case.


AT-01951

4) Separate the intermediate case and transmission main case.

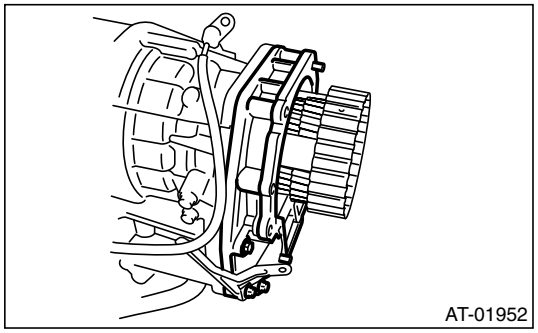

AT-01952

B: INSTALLATION

1) Secure the intermediate case to transmission main case.

Tightening torque:
25 N·m (2.5 kgf-m, 18.4 ft-lb)

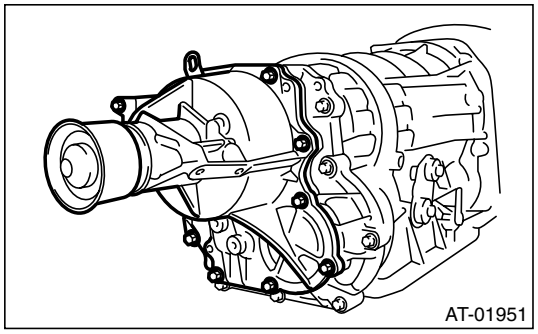
NOTE:
Use a new gasket.


AT-01952

2) Attach the selected reduction driven gear shim to end surface of reduction driven gear with vaseline. <Ref. to 5AT-77, ADJUSTMENT, Reduction Driven Gear.>
3) Install the extension case to intermediate case.

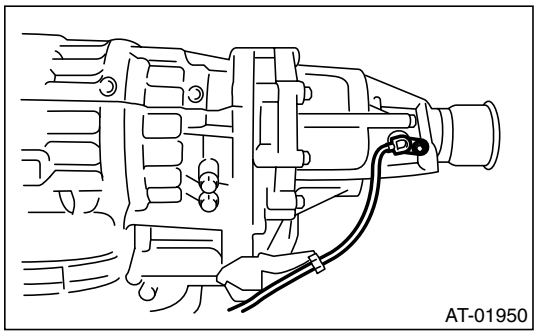
NOTE:
Use a new gasket.

Tightening torque:
25 N·m (2.5 kgf-m, 18.4 ft-lb)


AT-01951

4) Install the rear vehicle speed sensor.

Tightening torque:
7 N·m (0.7 kgf-m, 5.2 ft-lb)


AT-01950

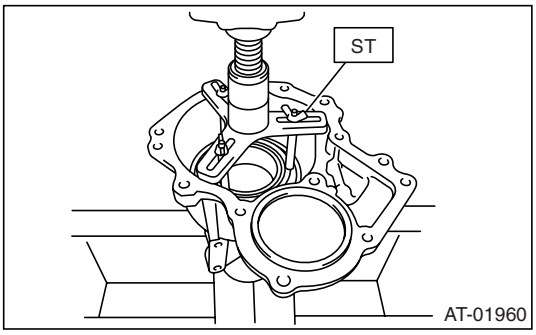
5) Install the transmission assembly.
<Ref. to 5AT-42, INSTALLATION, Automatic Transmission Assembly.>

C: DISASSEMBLY

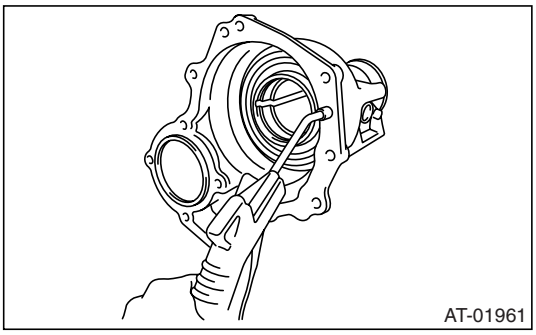
1) Take out the transfer clutch and multi-plate clutch hub assembly by lightly tapping the end of rear drive shaft.

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

2) Remove the snap ring using ST and press.
ST 18762AA000 COMPRESSOR SPECIAL TOOL



3) Supply compressed air to remove the clutch piston.

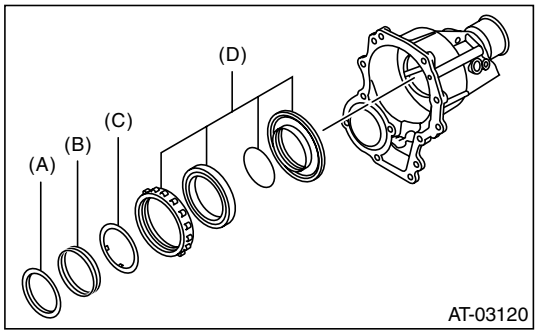


4) Remove the dust cover from extension case.
5) Remove the oil seal from extension case.

D: ASSEMBLY

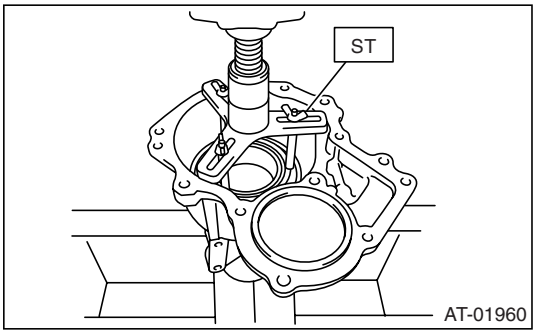
1) Press-fit new oil seal using ST and press.
ST 498057300 INSTALLER
2) Press-fit the dust cover.

3) Insert the transfer clutch assembly, spring retainer, return spring and clutch spring retainer.



(A) Clutch spring retainer
(B) Return spring
(C) Spring retainer
(D) Transfer clutch piston assembly

4) Using the ST and compressor, install the snap ring.
ST 18762AA000 COMPRESSOR SPECIAL TOOL



5) Install the transfer clutch. <Ref. to 5AT-73, INSTALLATION, Transfer Clutch.>

NOTE:
For 3-transfer clutch model, make sure the pressure plate is included.

6) Install the multi-plate hub assembly.

E: INSPECTION

• Use compressed air to make sure the extension case routes are not clogged or leaked.
• Inspect the extension end play, and adjust it to within specification.
<Ref. to 5AT-73, ADJUSTMENT, Transfer Clutch.>

26.Transfer Clutch

A: REMOVAL

1) Remove the transmission assembly from vehicle. <Ref. to 5AT-38, REMOVAL, Automatic Transmission Assembly.>
2) Remove the extension case, and then remove the transfer clutch. <Ref. to 5AT-71, REMOVAL, Extension Case and Intermediate Case.> <Ref. to 5AT-72, DISASSEMBLY, Extension Case and Intermediate Case.>

B: INSTALLATION

1) Select the rear drive shaft shim. <Ref. to 5AT-73, ADJUSTMENT, Transfer Clutch.>
2) Select the driven plate No. 3. <Ref. to 5AT-73, ADJUSTMENT, Transfer Clutch.>
3) Install the extension case and intermediate case. <Ref. to 5AT-71, INSTALLATION, Extension Case and Intermediate Case.>
4) Install the transmission assembly into vehicle. <Ref. to 5AT-42, INSTALLATION, Automatic Transmission Assembly.>

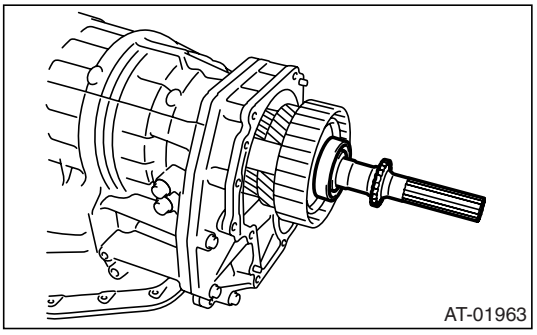
C: INSPECTION

- Inspect the drive plate facing for wear and damage.
- Make sure the snap ring is not worn and the return spring has no permanent distortion, damage, or deformation.
- Check that the D-ring is not damaged.
- Inspect the extension end play and adjust it to within specification. <Ref. to 5AT-73, ADJUSTMENT, Transfer Clutch.>

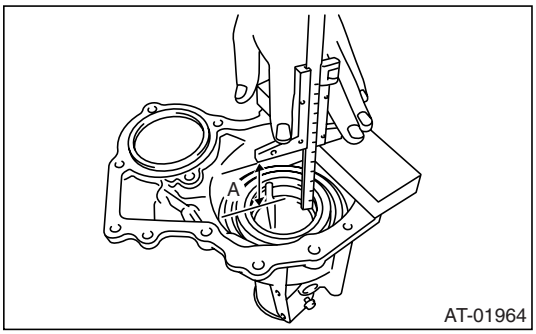
D: ADJUSTMENT

1. SELECTION OF REAR DRIVE SHAFT SHIM

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

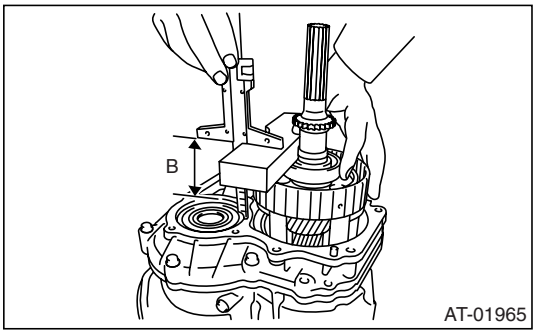

AT-01963

2) Using the ST, measure the depth “A”, which is from mating surface of extension case to ball bearing outer ring contact surface.
ST 398643600 GAUGE



AT-01964

3) Using the ST, measure the height “B” from the intermediate case mating surface to ball bearing outer ring contact surface.
ST 398643600 GAUGE



AT-01965

4) Calculation formula:
When clearances are 0.05 mm (0.0020 in):
T (mm) = A − B + 0.23
[T (in) = A − B + 0.0091]
When clearances are 0.25 mm (0.0098 in):
T (mm) = A − B + 0.03
[T (in) = A − B + 0.0012]

Specification:
0.05 — 0.25 mm (0.0020 — 0.0098 in)

A: Depth from end of extension case to ball bearing outer ring contact surface
B: Height from end of intermediate case to ball bearing outer ring contact surface
T: Shim thickness

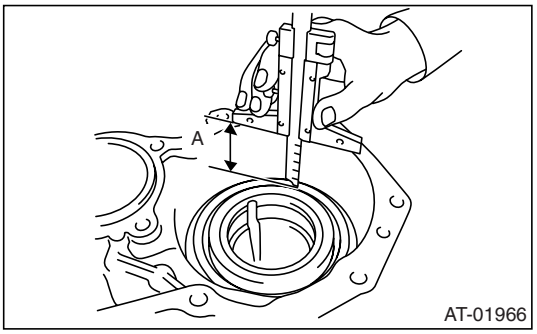
NOTE:
Calculation formula for “T” is applied when measuring using ST (398643600 GAUGE). When not using ST, apply following.
When clearances are 0.05 mm (0.0020 in):
T (mm) = (A − α) − ((B − β) − 0.28) − 0.05
[T (in) = (A − α) − ((B − β) − 0.011) − 0.0020]
When clearances are 0.25 mm (0.0098 in):
T (mm) = (A − α) − ((B − β) − 0.28) − 0.25
[T (in) = (A − α) − ((B − β) − 0.011) − 0.0098]

T: Shim thickness
A: Depth from end of extension case to ball bearing outer ring contact surface
B: Height from end of intermediate case to ball bearing outer ring contact surface
α: Tool thickness used when measuring "A"
β: Tool thickness used when measuring "B"
0.28 (0.011): Gasket thickness (Unit mm (in))

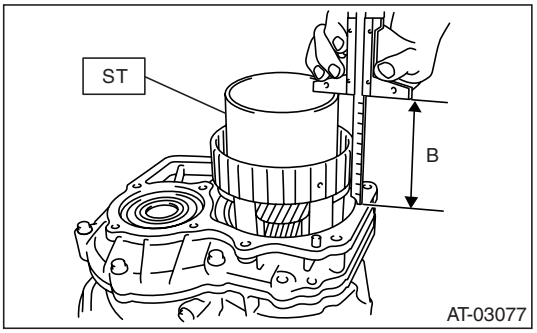
Adjustment shim	
Part No.	Thickness mm (in)
33281AA040	0.2 (0.008)
33281AA050	0.5 (0.020)
33281AA060	0.3 (0.012)

2. SELECTION OF DRIVEN PLATE No. 3

1) Install the drive plate and driven plate to center differential carrier.
2) Measure the depth "A" from the mating surface of extension case to multi-plate clutch (LSD) piston.



3) Using the ST, measure the height "B" from the intermediate case mating surface to end of ST, and then subtract the thickness of ST (piston guide) (50 mm (1.97 in)) from measured value.
ST 398744300 PISTON GUIDE



4) Calculation formula:
When clearances are 0.2 mm (0.008 in):
T (mm) = A − B + 0.08
[T (in) = A − B + 0.0031]
When clearances are 0.6 mm (0.024 in):
T (mm) = A − B + 0.32
[T (in) = A − B + 0.0126]
T: Thickness of driven plate No. 3
A: Depth from mating surface of extension case to multi-plate clutch (LSD) piston
B: Height from mating surface of intermediate case to end surface of ST

Specification:
0.2 — 0.6 mm (0.008 — 0.024 in)

NOTE:
Calculation formula for "T" is applied when measuring using ST (398643600 GAUGE, 398744300 PISTON GUIDE). When not using ST, apply following.
When clearances are 0.2 mm (0.008 in):
T (mm) = A − (B − α − 0.28) − 0.2
[T (in) = A − (B − α − 0.011) − 0.008]
When clearances are 0.6 mm (0.024 in):
T (mm) = A − (B − α − 0.28) − 0.6
[T (in) = A − (B − α − 0.011) − 0.024]

T: Thickness of driven plate No. 3
A: Depth from mating surface of extension case to multi-plate clutch (LSD) piston
B: Height from mating surface of intermediate case to end surface of tool as substitution for ST
α: Tool thickness used when measuring "B"
0.28 (0.011): Gasket thickness (Unit mm (in))

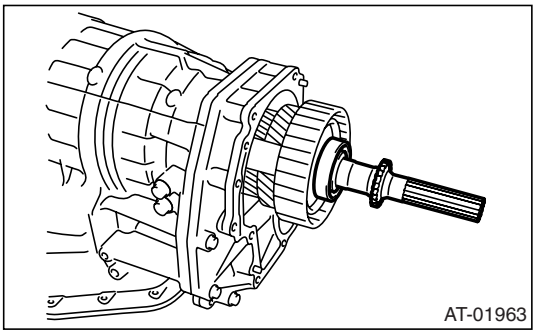
If out of specification, select the driven plate No. 3 to adjust within the specification.

Driven plate No. 3.	
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)

27.Rear Drive Shaft

A: REMOVAL

1) Remove the transmission assembly from vehicle. <Ref. to 5AT-38, REMOVAL, Automatic Transmission Assembly.>
2) Remove the rear vehicle speed sensor, and then remove the extension case. <Ref. to 5AT-71, REMOVAL, Extension Case and Intermediate Case.>
3) Pull out the rear drive shaft from center differential assembly.



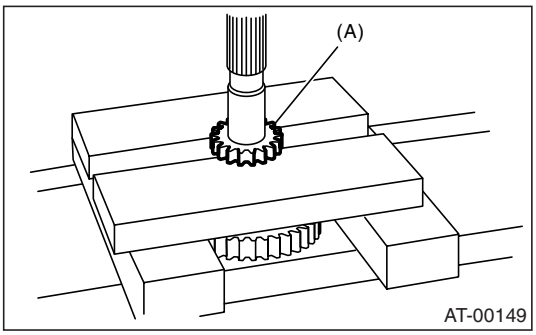
4) Remove the drive plate and driven plate.

B: INSTALLATION

1) Select the appropriate shim. <Ref. to 5AT-73, ADJUSTMENT, Transfer Clutch.>
2) Install the drive plate and driven plate.
3) Insert the rear drive shaft into center differential assembly.
4) Combine the extension case, and then install the rear vehicle speed sensor. <Ref. to 5AT-71, INSTALLATION, Extension Case and Intermediate Case.>
5) Install the transmission assembly into vehicle. <Ref. to 5AT-42, INSTALLATION, Automatic Transmission Assembly.>

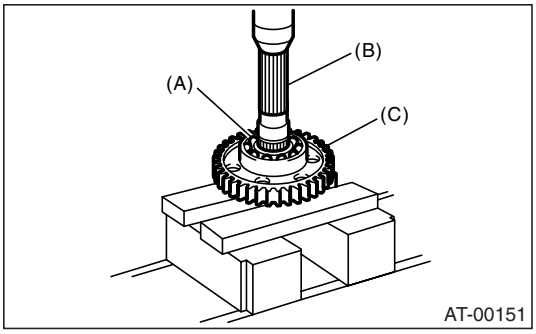
C: DISASSEMBLY

1) Using a press, remove the revolution gear.



(A) Revolution gear

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

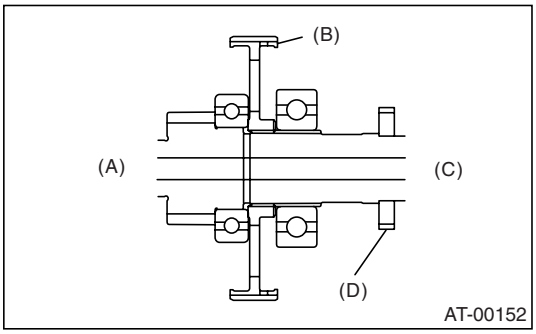


(A) Rear ball bearing
(B) Rear drive shaft
(C) Clutch hub

D: ASSEMBLY

Assemble in the reverse order of disassembly.

NOTE:
• Use new ball bearings and revolution gear.
• Make sure the clutch hub is oriented in the correct direction.



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

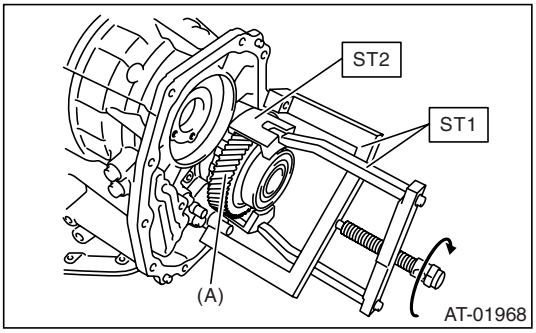
E: INSPECTION

• Check each parts for holes, damages or other foreign matters.
• Inspect the extension end play and adjust it to within specification. <Ref. to 5AT-73, ADJUSTMENT, Transfer Clutch.>

28.Reduction Driven Gear

A: REMOVAL

1) Remove the transmission assembly from vehicle. <Ref. to 5AT-38, REMOVAL, Automatic Transmission Assembly.>
2) Remove the rear vehicle speed sensor, and then separate the extension case and intermediate case from transmission case. <Ref. to 5AT-71, REMOVAL, Extension Case and Intermediate Case.>
3) Remove the center differential carrier. <Ref. to 5AT-78, REMOVAL, Center Differential Carrier.>
4) Move the select lever to “P” range.
5) Using the ST1 and ST2, extract the reduction driven gear.
ST1 499737100 PULLER SET
ST2 18680AA000 HOLDER GEAR



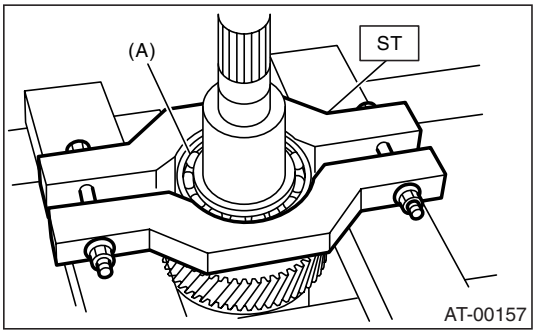
(A) Reduction driven gear

B: INSTALLATION

1) Move the select lever to “P” range.
2) Use a plastic hammer to install reduction driven gear assembly.
3) Select the reduction gear shim. <Ref. to 5AT-77, ADJUSTMENT, Reduction Driven Gear.>
4) Connect the transmission case, extension case and intermediate case, and install the rear wheel speed sensor. <Ref. to 5AT-71, INSTALLATION, Extension Case and Intermediate Case.>
5) Install the transmission assembly into vehicle. <Ref. to 5AT-42, INSTALLATION, Automatic Transmission Assembly.>

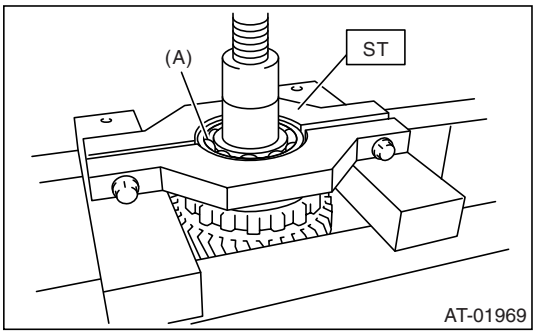
C: DISASSEMBLY

1) Remove the ball bearing from reduction driven gear using ST.
ST 498077300 REMOVER



(A) Ball bearing

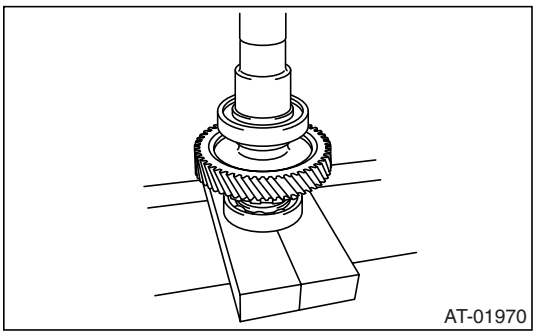
2) Remove the ball bearing on the reverse side with the same procedure as step 1).



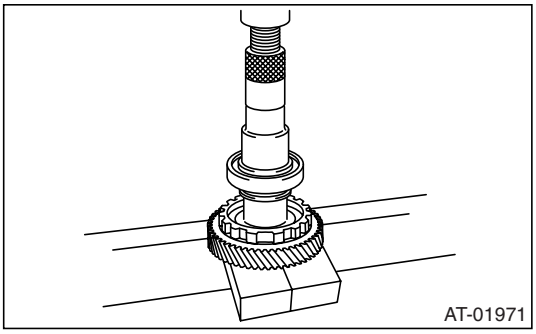
3) Remove the snap ring from reduction driven gear.

D: ASSEMBLY

1) Install the snap ring to reduction driven gear.
2) Install the new ball bearing to reduction driven gear using press.



3) Install the ball bearing on the reverse side with the same procedure as step 2).

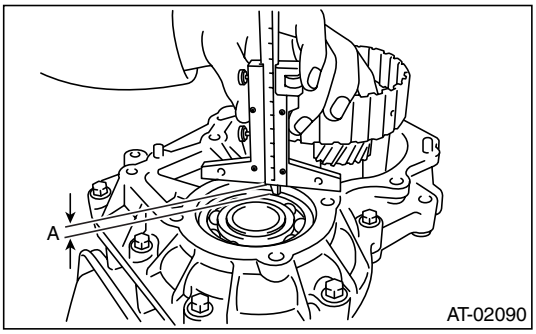


E: INSPECTION

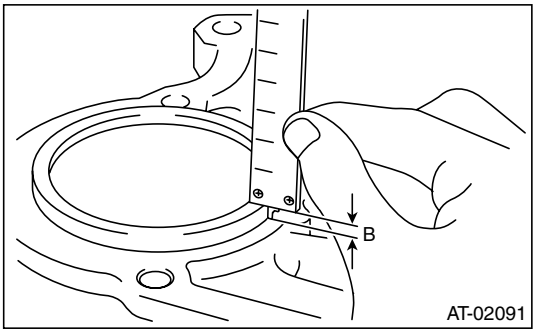
Make sure the ball bearing and gear are not deformed or damaged.

F: ADJUSTMENT

1) Using a depth gauge, measure the depth “A” from the mating surface of extension case to ball bearing on rear end of reduction driven gear.



2) Using a depth gauge, measure the height “B” from the mating surface of extension case to ball bearing inside low part of extension case.



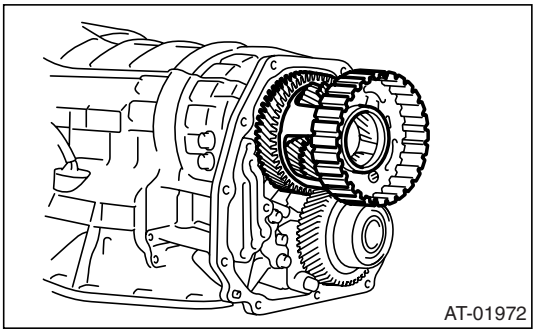
3) Calculation formula:
Select the ball bearing shim from the table to adjust clearances within 0.05 — 0.25 mm (0.0020 — 0.0098 in).
When clearances are 0.05 mm (0.0020 in):
T (mm) = A − B + 0.23
[T (in) = A − B + 0.0091]
When clearances are 0.25 mm (0.0098 in):
T (mm) = A − B + 0.03
[T (in) = A − B + 0.0012]
T: Shim clearance
A: Depth from mating surface of extension case to ball bearing outer ring end surface
B: Height from mating surface of extension case to ball bearing inside low part

Reduction gear shim	
Part No.	Thickness mm (in)
31288AA030	0.2 (0.008)
31288AA050	0.5 (0.020)
31288AA060	0.3 (0.012)

29.Center Differential Carrier

A: REMOVAL

1) Remove the transmission assembly from vehicle. <Ref. to 5AT-38, REMOVAL, Automatic Transmission Assembly.>
2) Remove the rear wheel speed sensor, and separate the extension case and intermediate case from transmission case. <Ref. to 5AT-71, REMOVAL, Extension Case and Intermediate Case.>
3) Pull out the rear drive shaft. <Ref. to 5AT-75, REMOVAL, Rear Drive Shaft.>
4) Pull out the center differential carrier assembly.

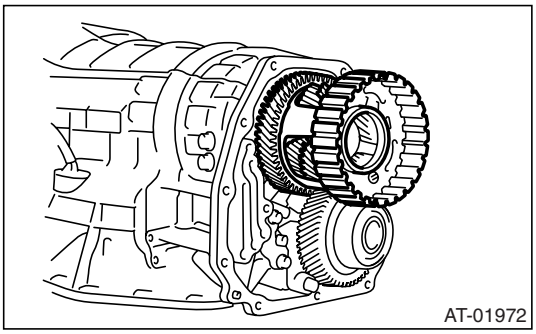

AT-01972

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

B: INSTALLATION

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

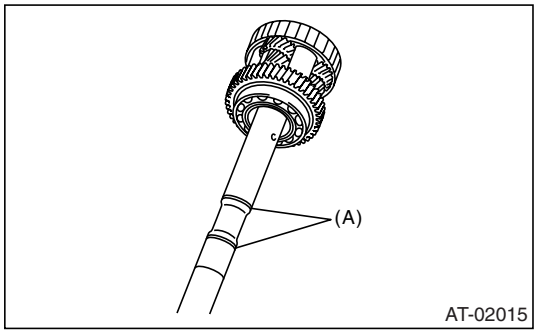
NOTE:
Press-fit it to the bottom of bearing shoulder completely.


AT-01972

2) Insert the rear drive shaft. <Ref. to 5AT-75, INSTALLATION, Rear Drive Shaft.>
3) Connect the transmission case, extension case and intermediate case, and install the rear wheel speed sensor. <Ref. to 5AT-71, INSTALLATION, Extension Case and Intermediate Case.>
4) Install the transmission assembly into vehicle. <Ref. to 5AT-42, INSTALLATION, Automatic Transmission Assembly.>

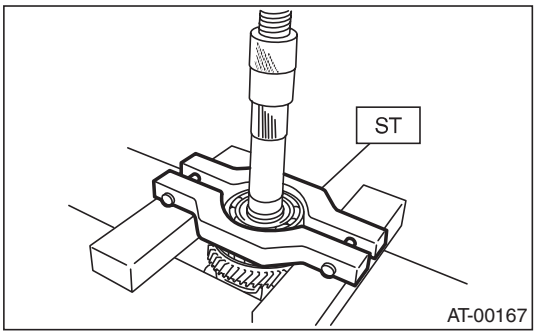
C: DISASSEMBLY

1) Remove the seal ring (A).



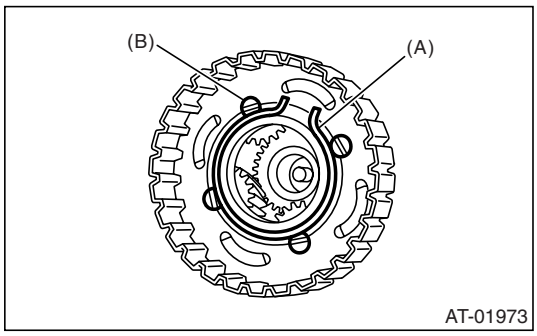
AT-02015

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



AT-00167

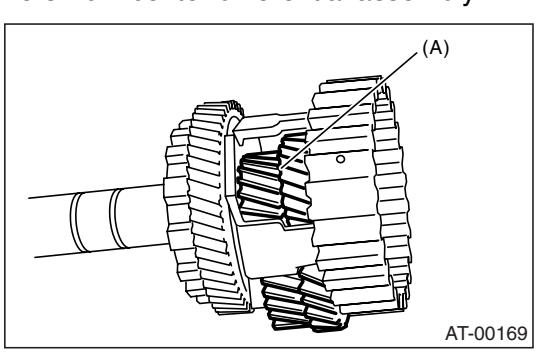
3) Remove the snap ring, and pull out the shaft from center differential assembly.



AT-01973

(A) Snap ring
(B) Shaft

4) Remove the thrust washers, pinion gear (A) and washers from center differential assembly.

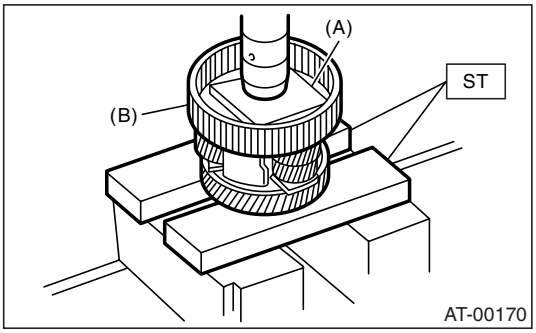


AT-00169

5) Pull out the intermediate shaft and thrust bearing.

D: ASSEMBLY

1) Install the thrust washer onto intermediate shaft.
2) Install the thrust bearing onto 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 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 a new seal rings.

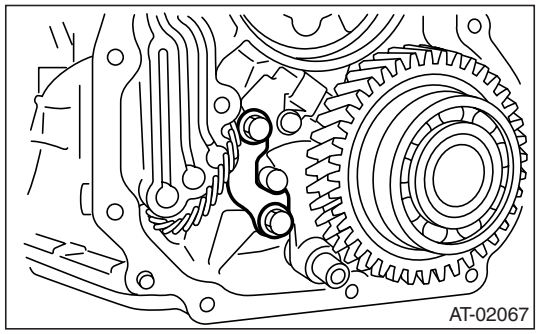
E: INSPECTION

• Check each parts for holes, damages or other foreign matters.
• Inspect the extension end play and adjust it to within specification. <Ref. to 5AT-73, ADJUSTMENT, Transfer Clutch.>

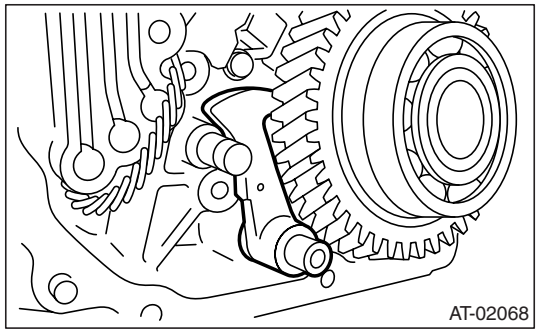
30. Parking Pawl

A: REMOVAL

1) Remove the transmission assembly from vehicle. <Ref. to 5AT-38, REMOVAL, Automatic Transmission Assembly.>
2) Remove the extension case and intermediate case. <Ref. to 5AT-71, REMOVAL, Extension Case and Intermediate Case.>
3) Remove the center differential carrier. <Ref. to 5AT-78, REMOVAL, Center Differential Carrier.>
4) Remove the parking support actuator.

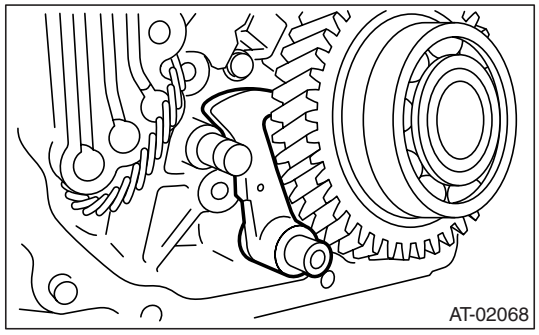

AT-02067

5) Remove the parking pawl, parking pawl shaft and return spring.


AT-02068

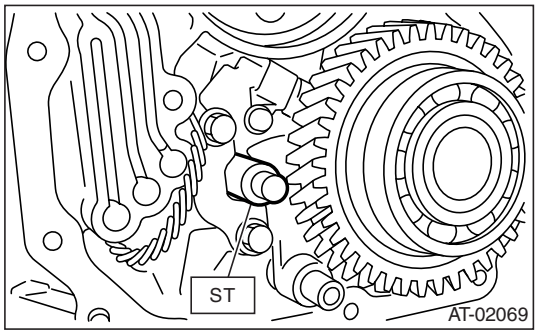
B: INSTALLATION

1) Set the transmission to “N” range.
2) Install the parking pawl, parking pawl shaft and return spring.


AT-02068

3) Temporarily secure the parking support actuator.
4) Set the ST between parking pawl and parking support actuator.

ST 18679AA000 ADJUSTER

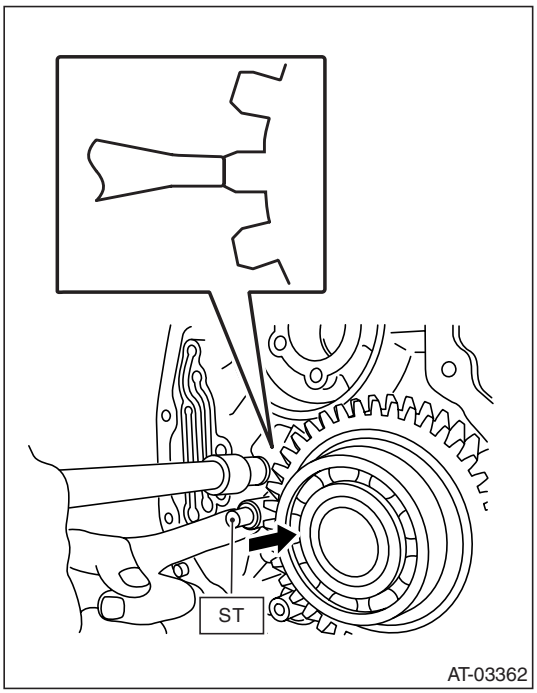


AT-02069

5) Tighten the securing bolts while pressing parking support actuator with finger.

Tightening torque:
10±2 N·m (1.0±0.2 kgf-m, 7.4±1.5 ft-lb)

CAUTION:
Press the reduction driven gear and parking pawl in top condition.



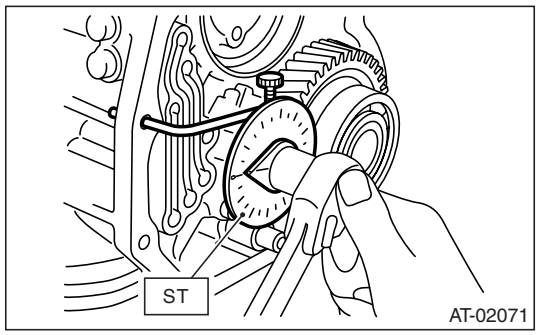
AT-03362

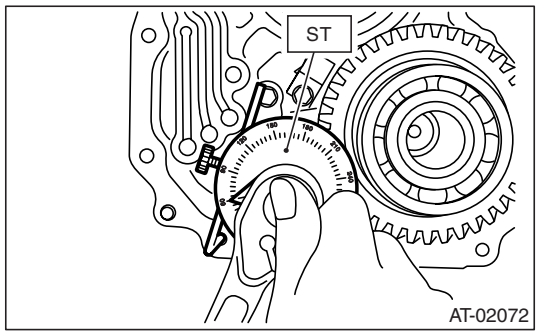
6) Using the ST, tighten the bolts which tightened in step 5) with specified angle.

Tightening angle:
18°±2°

ST1 18679AA000 ADJUSTER
ST2 18854AA000 ANGLE GAUGE

NOTE:
Do not use extension as much as possible.





7) Install the center differential carrier. <Ref. to 5AT-78, INSTALLATION, Center Differential Carrier.>
8) Install the extension case and intermediate case. <Ref. to 5AT-71, INSTALLATION, Extension Case and Intermediate Case.>
9) Install the transmission assembly into vehicle. <Ref. to 5AT-42, INSTALLATION, Automatic Transmission Assembly.>

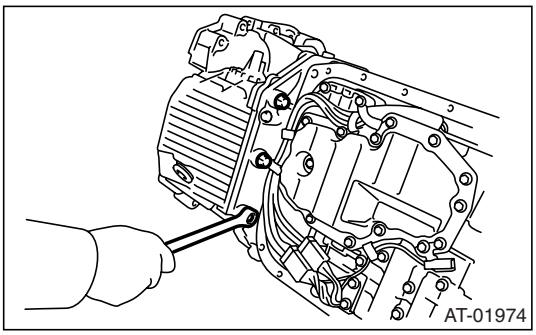
C: INSPECTION

Make sure that the tab of parking pawl on reduction driven gear is not worn or otherwise damaged.

31.Converter Case

A: REMOVAL

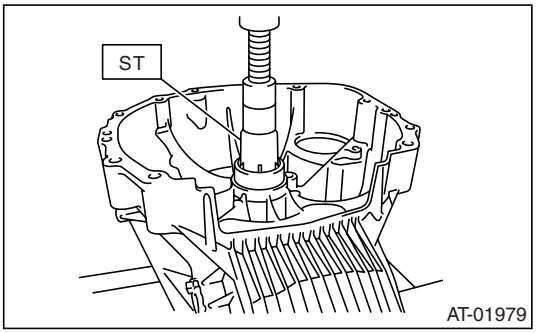
1) Remove the transmission assembly from vehicle. <Ref. to 5AT-38, REMOVAL, Automatic Transmission Assembly.>
2) Remove the torque converter assembly. <Ref. to 5AT-70, REMOVAL, Torque Converter Assembly.>
3) Remove the transmission harness connector from stay.
4) Remove the turbine speed sensor 1. <Ref. to 5AT-57, REMOVAL, Turbine Speed Sensor 1.>
5) Remove the oil charge pipe. <Ref. to 5AT-69, REMOVAL, Oil Charge Pipe.>
6) Remove the ATF filter inlet and outlet pipes. <Ref. to 5AT-60, REMOVAL, ATF Filter.>
7) Remove the converter case mounting bolt.
8) Lay along the transmission body, and then remove the oil pan.
9) Remove the three converter case mounting bolts (TORX®).
ST 18676AA020 TORX® WRENCH



10) Separate the converter case by lightly tapping with plastic hammer.
11) Remove the differential assembly. <Ref. to 5AT-92, REMOVAL, Front Differential Assembly.>
12) Remove the oil seal from converter case.

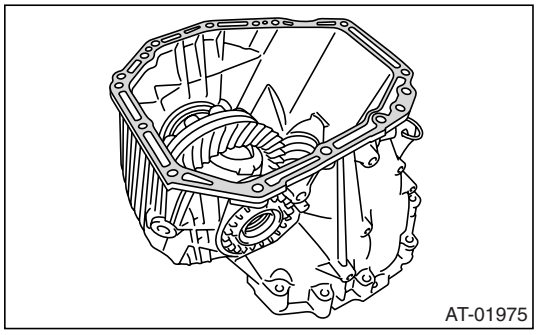
B: INSTALLATION

1) Check the appearance of each component and clean them.
2) Press-fit the oil seal to converter case using ST.
ST 499587100 OIL SEAL INSTALLER



3) Install the differential assembly to case. <Ref. to 5AT-92, INSTALLATION, Front Differential Assembly.>
4) Install the left and right side retainers. <Ref. to 5AT-95, ADJUSTMENT, Front Differential Assembly.>
5) Apply proper amount of liquid gasket to the entire matching surface of converter case.

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

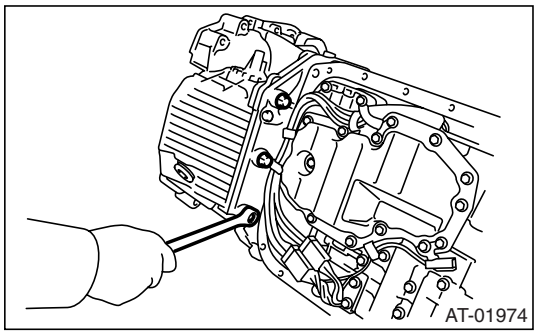


6) Install the converter case assembly without damaging bushing and oil seal.

Tightening torque:
41 N·m (4.2 kgf-m, 30.2 ft-lb)

7) Install the three converter case mounting bolts (TORX®).
ST 18676AA020 TORX® WRENCH

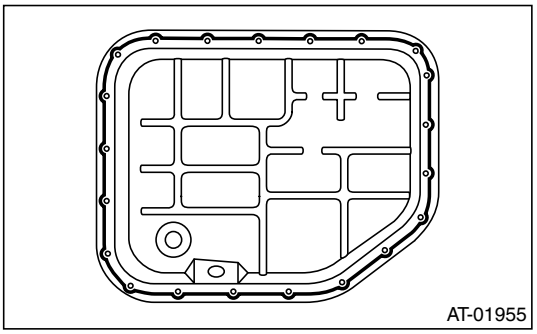
Tightening torque:
41 N·m (4.2 kgf-m, 30.2 ft-lb)



8) Apply proper amount of liquid gasket to the entire oil pan mating surface, and then install it.

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

Tightening torque:
5 N·m (0.5 kgf-m, 3.7 ft-lb)



9) Install the transmission harness connector to the stay.
10) Install the air breather hose. <Ref. to 5AT-68, INSTALLATION, Air Breather Hose.>
11) Install the ATF filter pipe. <Ref. to 5AT-60, INSTALLATION, ATF Filter.>
12) Install the oil charge pipe with O-ring. <Ref. to 5AT-69, INSTALLATION, Oil Charge Pipe.>
13) Install the torque converter assembly. <Ref. to 5AT-70, INSTALLATION, Torque Converter Assembly.>
14) Install the transmission assembly into vehicle. <Ref. to 5AT-42, INSTALLATION, Automatic Transmission Assembly.>

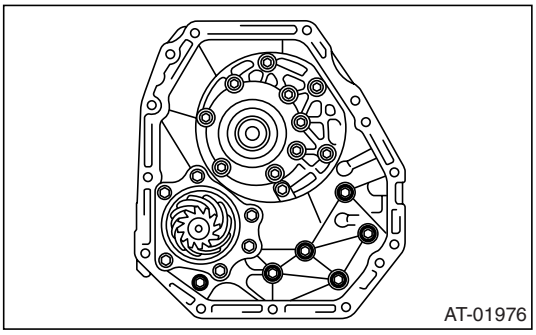
C: INSPECTION

Measure the backlash, and then adjust it within specification. <Ref. to 5AT-89, ADJUSTMENT, Drive Pinion Shaft Assembly.>

32.Oil Pump Cover

A: REMOVAL

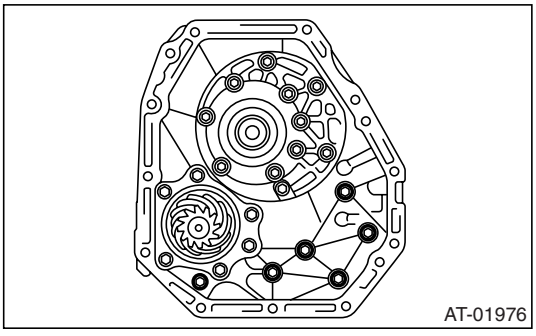
1) Remove the transmission assembly from vehicle. <Ref. to 5AT-38, REMOVAL, Automatic Transmission Assembly.>
2) Pull out the torque converter assembly. <Ref. to 5AT-70, REMOVAL, Torque Converter Assembly.>
3) Remove the transmission harness connector from stay.
4) Remove the oil charge pipe. <Ref. to 5AT-69, REMOVAL, Oil Charge Pipe.>
5) Remove the ATF filter inlet and outlet pipes. <Ref. to 5AT-60, REMOVAL, ATF Filter.>
6) Separate the converter case and transmission case part. <Ref. to 5AT-82, REMOVAL, Converter Case.>
7) Remove the oil pump cover mounting bolt, and then separate the oil pump cover from the AT main case by lightly tapping with plastic hammer.



B: INSTALLATION

1) Secure the oil pump cover.

Tightening torque:
41 N·m (4.2 kgf-m, 30.2 ft-lb)

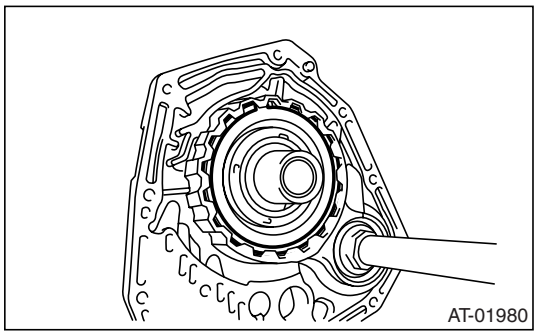


2) Install the converter case assembly into transmission case assembly. <Ref. to 5AT-70, INSTALLATION, Torque Converter Assembly.>
3) Install the transmission harness connector to the stay.
4) Install the ATF filter pipe. <Ref. to 5AT-60, INSTALLATION, ATF Filter.>
5) Install the oil charge pipe with a O-ring. <Ref. to 5AT-69, INSTALLATION, Oil Charge Pipe.>
6) Install the torque converter assembly. <Ref. to 5AT-70, INSTALLATION, Torque Converter Assembly.>
7) Install the transmission assembly into vehicle. <Ref. to 5AT-42, INSTALLATION, Automatic Transmission Assembly.>

C: DISASSEMBLY

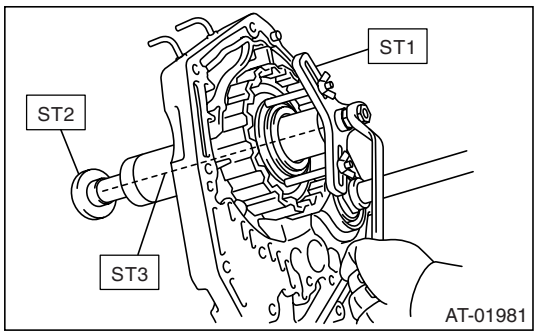
1. FRONT BRAKE

1) Remove the snap ring.

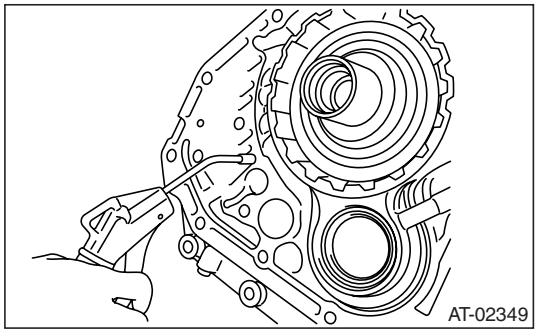


2) Remove the retainer plate, drive plate and driven plate.
3) Using the ST1, ST2 and ST3, remove the snap ring.

ST1	18762AA000	COMPRESSOR SPECIAL TOOL
ST2	18765AA000	COMPRESSOR SUPPORT
ST3	18763AA000	COMPRESSOR SHAFT



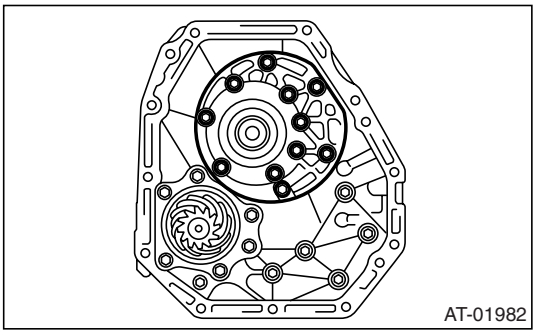
4) Remove the retainer and return spring.
5) Remove the front brake piston using compressed air.



6) Remove the D-ring from front brake piston.

2. OIL PUMP

1) Take out the oil pump housing.



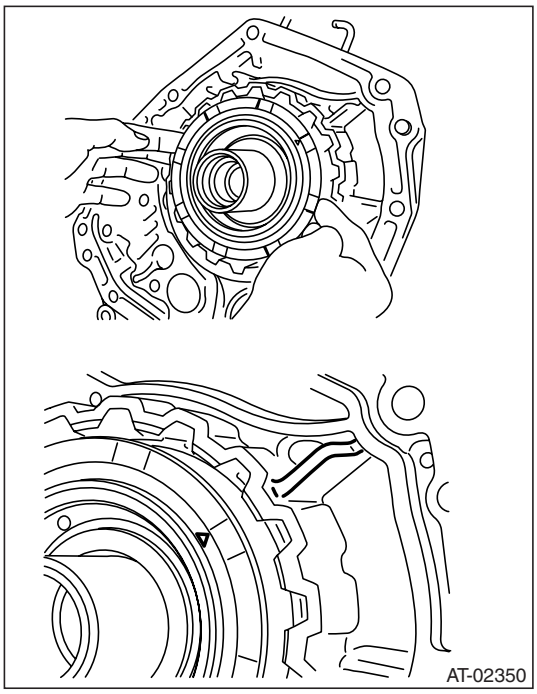
2) Take out the oil pump body.

D: ASSEMBLY

1. FRONT BRAKE

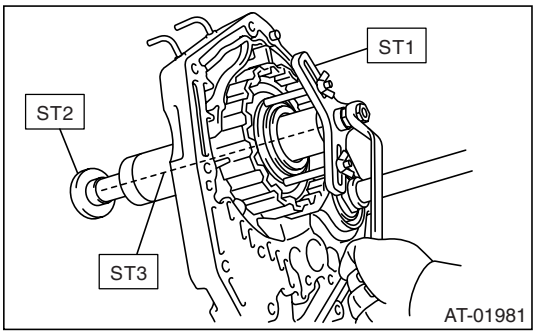
1) Apply ATF to D-ring, and then install it to the front brake piston.
2) Install the front brake piston to oil pump cover.

NOTE:
Install by aligning the "▲" mark on front brake piston surface with the oil pump cover rib.

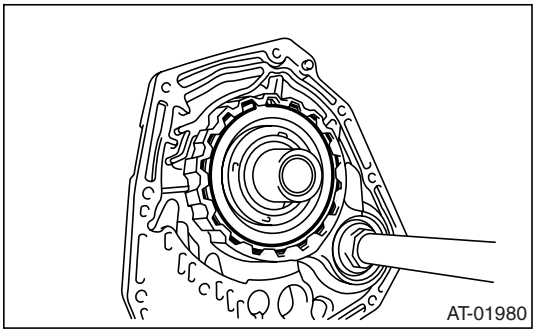


3) Install the retainer and return spring.
4) Install the front brake piston assembly using ST1, ST2 and ST3.

ST1 18762AA000 COMPRESSOR SPECIAL TOOL
ST2 18765AA000 COMPRESSOR SUPPORT
ST3 18763AA000 COMPRESSOR SHAFT

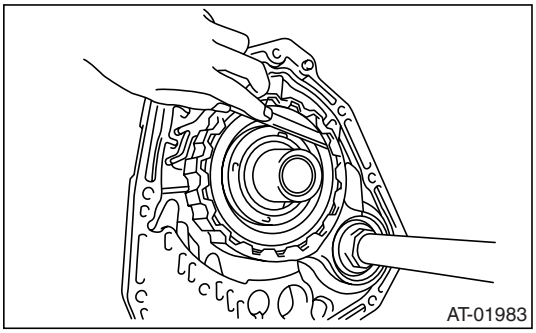


5) Install the genuine driven plate instead of retainer plate, and temporarily assemble the drive plate and driven plate.
Part No. 31536AA290 DRIVEN PLATE
6) Install the snap ring.



7) Measure the clearance between retainer plate and snap ring, and then select the suitable retainer plate from table.

Front brake clearance specification:
0.7 — 1.1 mm (0.028 — 0.043 in)



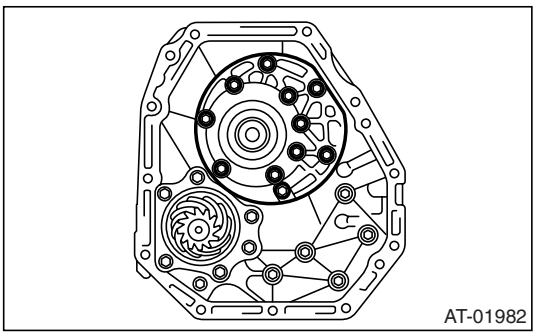
Front brake retainer plate	
Part No.	Thickness mm (in)
31567AB130	3.4 (0.134)
31567AB140	3.6 (0.142)
31567AB150	3.8 (0.150)
31567AB160	4.0 (0.157)

8) Remove the snap ring, replace the drive plate which used in measurement of clearance with retainer plate, and then reassemble.

2. OIL PUMP

1) Apply ATF to oil pump assembly, and then install it to oil pump housing.
2) Install the O-ring to oil pump cover.
3) Install the oil pump housing to oil pump cover.

Tightening torque:
10 N·m (1.0 kgf-m, 7.4 ft-lb)



E: INSPECTION

1. FRONT BRAKE

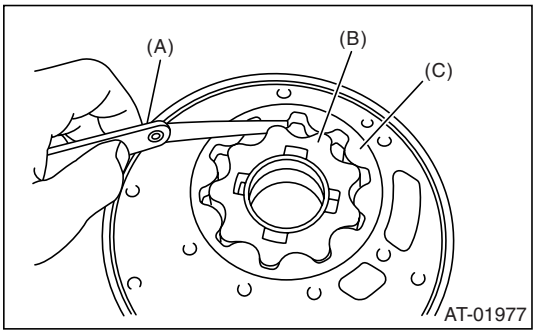
Check the following items.
- Drive plate facing for wear and damage
- Snap ring for wear, return spring for damage, and retainer for damage
- Piston for damage
- D-ring for damage

2. OIL PUMP

Check the following items.
- Oil pump cover and oil seal for breakage or damage
- Oil pump body for scratch or damage

1) Check the seal ring and oil seal for breaks or damages.
2) Check other parts for dents or abnormalities.
3) Selection of oil pump rotor assembly
   (1) Tip clearance
   Install the inner rotor and outer rotor to oil pump housing. With rotor gears facing each other, measure the crest-to-crest clearance.

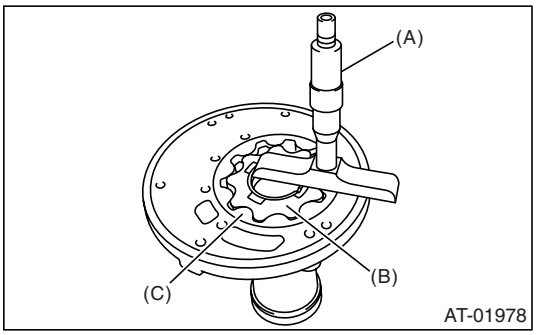
Tip clearance:
0.02 — 0.15 mm (0.0008 — 0.0059 in)



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

(2) Side clearance
Set a depth gauge to oil pump housing, then measure the oil pump housing-to-rotor clearance.

Side clearance:
0.02 — 0.045 mm (0.0008 — 0.0018 in)



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

(3) If the depth and/or side clearance are not within the specification, replace the rotor assembly.

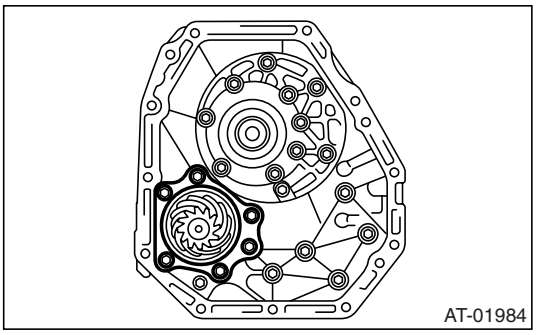
Oil pump rotor ASSY	
Part No.	Thickness mm (in)
15008AA130	11.37 — 11.38 (0.4476 — 0.4480)
15008AA140	11.38 — 11.39 (0.4480 — 0.4484)
15008AA150	11.39 — 11.40 (0.4484 — 0.4488)

Measure the total end play and adjust it within specification. <Ref. to 5AT-105, ADJUSTMENT, AT Main Case.>

33.Drive Pinion Shaft Assembly

A: REMOVAL

1) Remove the transmission assembly from vehicle. <Ref. to 5AT-38, REMOVAL, Automatic Transmission Assembly.>
2) Pull out the torque converter assembly. <Ref. to 5AT-70, REMOVAL, Torque Converter Assembly.>
3) Remove the transmission harness connector from stay.
4) Disconnect the air breather hose. <Ref. to 5AT-68, REMOVAL, Air Breather Hose.>
5) Remove the oil charge pipe. <Ref. to 5AT-69, REMOVAL, Oil Charge Pipe.>
6) Remove the ATF filter inlet and outlet pipes. <Ref. to 5AT-60, REMOVAL, ATF Filter.>
7) Separate the converter case and transmission case part. <Ref. to 5AT-82, REMOVAL, Converter Case.>
8) Remove the drive pinion shaft mounting bolt, and then remove the drive pinion shaft assembly from oil pump cover.



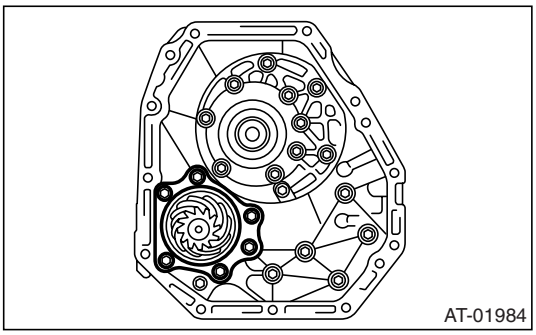
9) Remove the oil pump cover from AT main case. <Ref. to 5AT-84, REMOVAL, Oil Pump Cover.>

B: INSTALLATION

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

NOTE:
Be careful not to bend the shim.

Tightening torque:
70 N·m (7.1 kgf-m, 51.6 ft-lb)

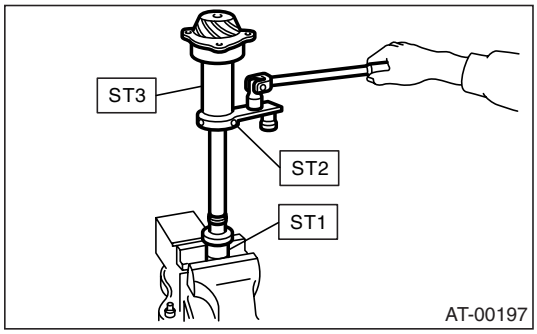


2) Adjust the tooth contact between drive pinion shaft assembly and front differential side gear. <Ref. to 5AT-89, ADJUSTMENT, Drive Pinion Shaft Assembly.>
3) Combine the converter case with transmission case. <Ref. to 5AT-82, INSTALLATION, Converter Case.>
4) Install the transmission harness connector to the stay.
5) Install the ATF filter pipe. <Ref. to 5AT-60, INSTALLATION, ATF Filter.>
6) Install the oil charge pipe with O-ring.
7) Install the torque converter assembly. <Ref. to 5AT-70, INSTALLATION, Torque Converter Assembly.>
8) Install the transmission assembly into vehicle. <Ref. to 5AT-42, INSTALLATION, Automatic Transmission Assembly.>

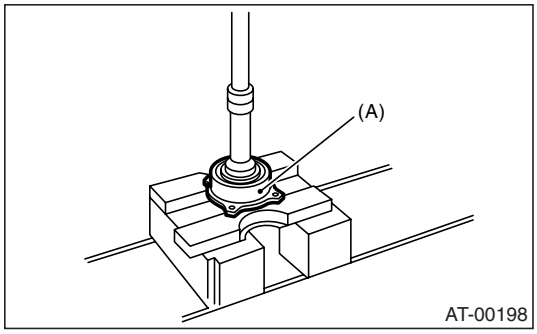
C: DISASSEMBLY

1) Remove the caulking part of lock nut, and then remove the lock nut with holding rear spline part of the shaft using ST1 and ST2. Pull out the drive pinion collar.

ST1	18667AA010	HOLDER
ST2	499787700	WRENCH
ST3	499787500	ADAPTER

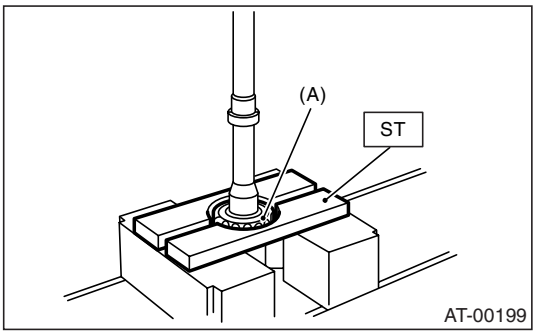


2) Remove the O-ring.
3) Separate the rear roller bearing and outer race (A) from shaft using press.



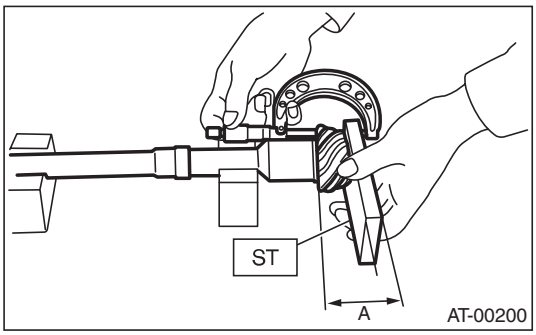
4) Separate the front roller bearing (A) from shaft using press and ST.

ST 498517000 REPLACER



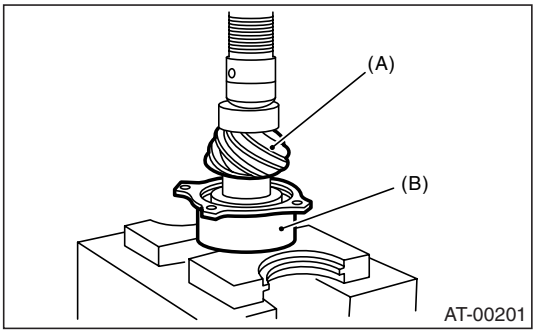
D: ASSEMBLY

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



2) Using a press, press-fit the new roller bearing into specified position.

NOTE:
If excessive force is applied to roller bearing, the roller bearing will not turn easily.



(A) Drive pinion shaft
(B) Roller bearing

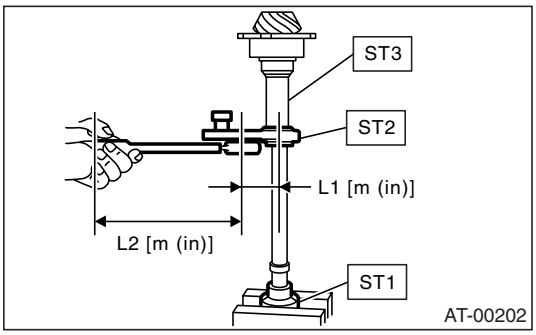
3) After fitting a new O-ring to the shaft, attach the drive pinion collar to shaft.
4) Install the lock washer to drive pinion shaft in proper direction.

5) Tighten new lock nuts using ST1, ST2 and ST3. Calculate the lock washer and lock nut specification using 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 N·m (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)

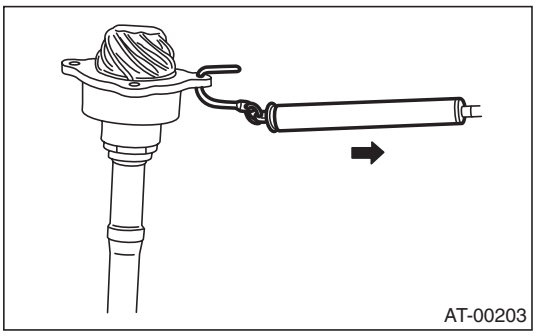
ST1 18667AA010 HOLDER
ST2 499787700 WRENCH
ST3 499787500 ADAPTER

NOTE:
Install the ST2 to torque wrench as straight as possible.



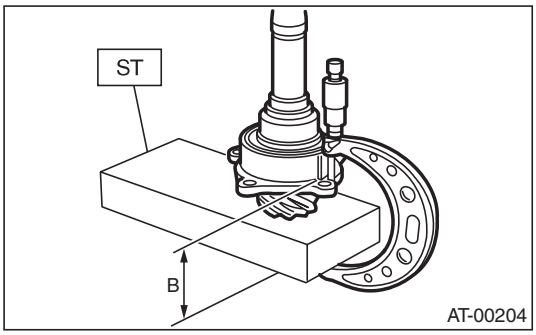
6) Measure the starting torque of bearing. Make sure the starting torque is within the specification. If the torque is not within specification, replace the roller bearing.

Starting torque:
7.6 — 38.1 N (0.776 — 3.88 kgf, 1.7 — 8.6 lbf)



7) Stake the caulking of lock nut at two points.

8) Measure the dimension “B” of drive pinion shaft
ST 398643600 GAUGE



9) Calculate the thickness “t” (mm) of drive pinion shim.
$t = 6.5 \pm 0.0625 - (B - A)$
10) Select three or less shims from following table.

Drive pinion shim	
Part No.	Thickness mm (in)
31451AA180	0.150 (0.0059)
31451AA190	0.175 (0.0069)
31451AA200	0.200 (0.0079)
31451AA210	0.225 (0.0089)
31451AA220	0.250 (0.0098)
31451AA230	0.275 (0.0108)

E: INSPECTION

- Make sure that all component parts are free of scratches, holes and other faults.
- Adjust the teeth alignment. <Ref. to 5AT-89, ADJUSTMENT, Drive Pinion Shaft Assembly.>

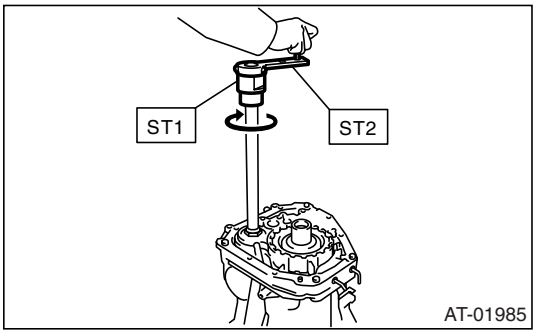
F: ADJUSTMENT

1) Remove the liquid gasket from the mating surface completely.
2) Install the converter case to oil pump cover, and secure them with tightening four bolts evenly.

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

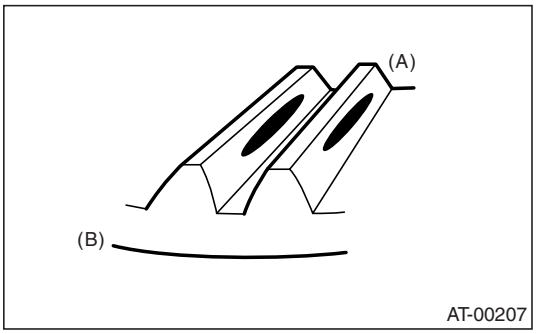
Tightening torque:
41 N·m (4.2 kgf-m, 30.2 ft-lb)

3) Rotate the drive pinion several times using ST1 and ST2.
ST1 18667AA010 HOLDER
ST2 499787700 WRENCH



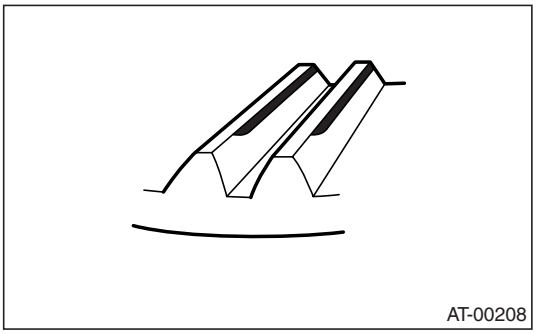
4) Adjust the backlash between drive pinion and hypoid driven gear. <Ref. to 5AT-95, ADJUSTMENT, Front Differential Assembly.>
5) Apply red lead evenly to the surfaces of three or four teeth on hypoid driven gear. Rotate the drive pinion in the leftward and rightward for several times. Remove the oil pump cover, and check the tooth contact pattern.
If the tooth contact is improper, readjust the backlash or shim thickness. <Ref. to 5AT-95, ADJUSTMENT, Front Differential Assembly.>
- Correct tooth contact

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

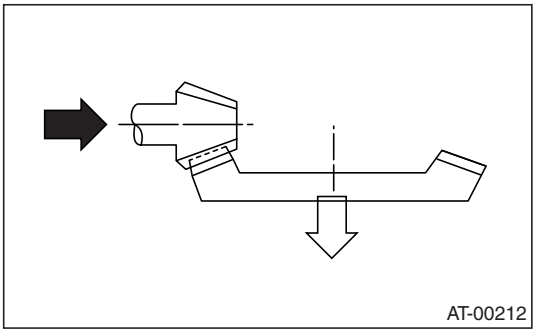


(A) Toe side
(B) Heel side

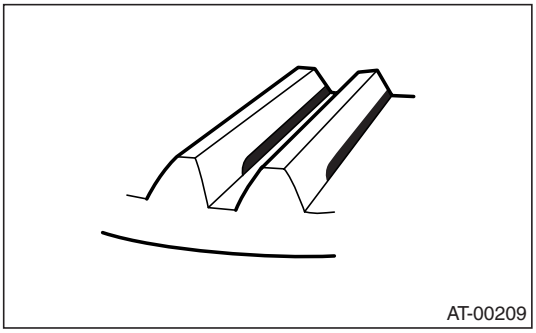
• Face contact
Checking item: Backlash is too large.
Contact pattern



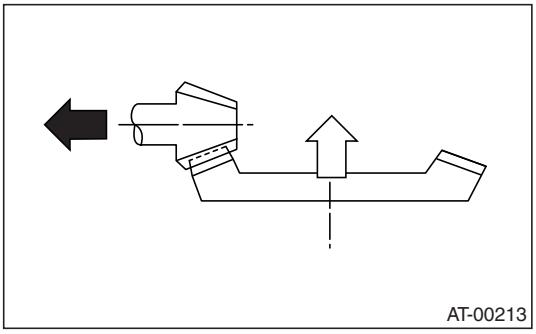
Corrective action: Increase thickness of drive pinion height adjusting washer in order to bring drive pinion close to driven gear.



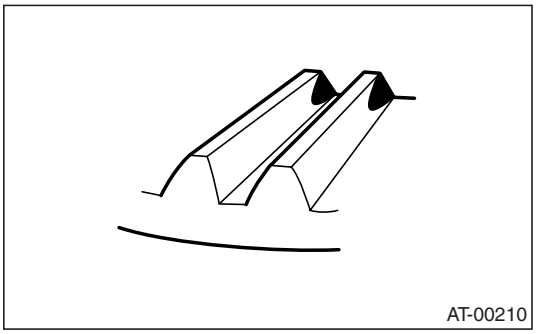
• Flank contact
Checking item: Backlash is too small.
Contact pattern



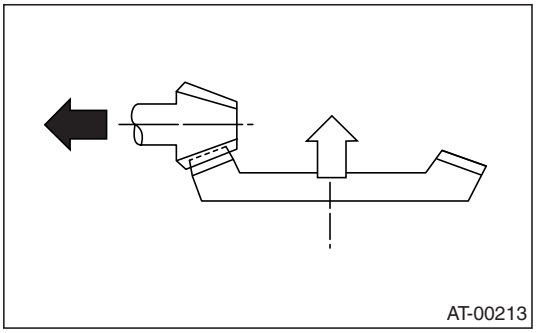
Corrective action: Reduce thickness of pinion height adjusting washer in order to bring drive pinion away from driven gear.



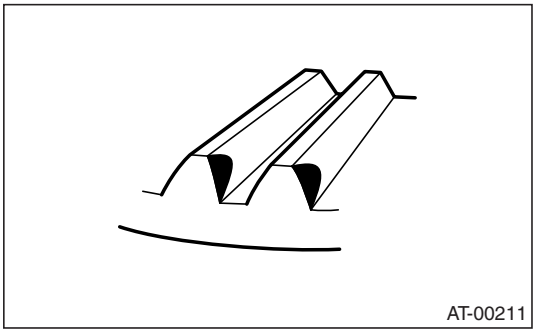
• Toe contact (inside end contact)
Checking item: Contact area is too small.
Contact pattern



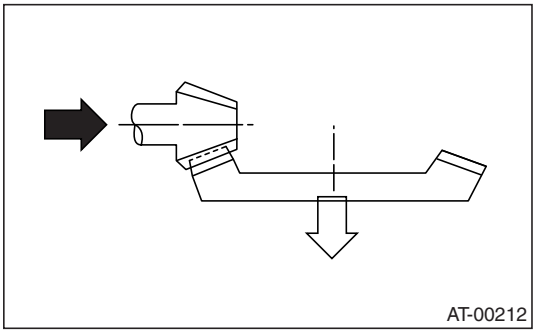
Corrective action: Reduce thickness of drive pinion height adjusting washer in order to bring drive pinion away from driven gear.



• Heel contact (outside end contact)
Checking item: Contact area is too small.
Contact pattern

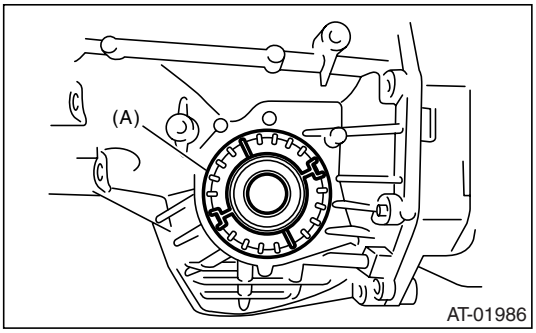


Corrective action: Increase thickness of drive pinion height adjusting washer in order to bring drive pinion close to driven gear.



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. Tighten the lock plate (A) to specified torque.

Tightening torque:
25 N·m (2.5 kgf-m, 18.4 ft-lb)



34.Front Differential Assembly

A: REMOVAL

1) Remove the transmission assembly from vehicle. <Ref. to 5AT-38, REMOVAL, Automatic Transmission Assembly.>
2) Pull out the torque converter assembly. <Ref. to 5AT-70, REMOVAL, Torque Converter Assembly.>
3) Remove the transmission harness connector from stay.
4) Remove the oil charge pipe. <Ref. to 5AT-69, REMOVAL, Oil Charge Pipe.>
5) Remove the ATF filter inlet and outlet pipes. <Ref. to 5AT-60, REMOVAL, ATF Filter.>
6) Separate the converter case and transmission case. <Ref. to 5AT-82, REMOVAL, Converter Case.>
7) Remove the differential side retainers using ST.

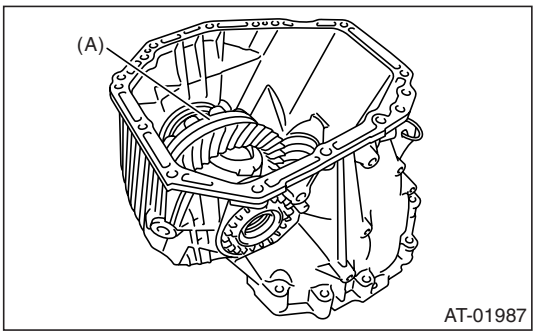
NOTE:
Hold the differential case assembly by hand to avoid damaging the retainer mounting hole of converter case.

ST 18630AA010 WRENCH COMPL RETAINER

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

B: INSTALLATION

1) When installing the differential assembly (A) to case, be careful not to damage the inside of case (particularly, the differential side retainer mating surface).

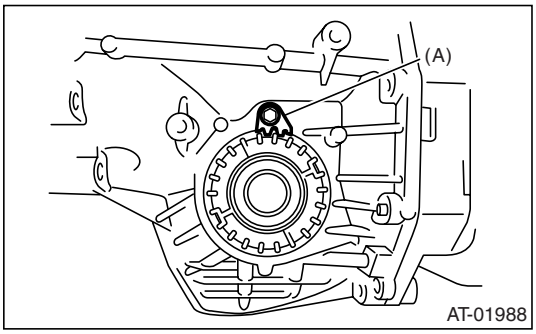


2) Install the O-ring to left and right side retainer.
3) Install the side retainers using ST. <Ref. to 5AT-92, REMOVAL, Front Differential Assembly.>

ST 18630AA010 WRENCH COMPL RETAINER

4) Adjust the front differential backlash. <Ref. to 5AT-95, ADJUSTMENT, Front Differential Assembly.>
5) Install the lock plate (A).

Tightening torque:
25 N·m (2.5 kgf-m, 18.4 ft-lb)



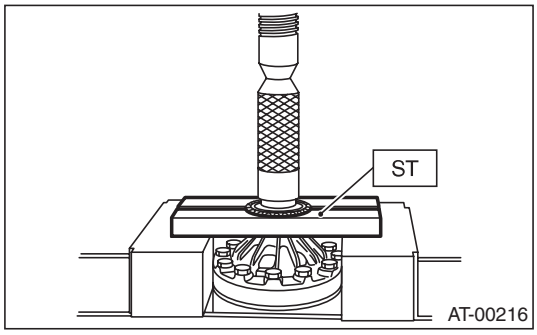
6) Install the converter case to transmission case. <Ref. to 5AT-82, INSTALLATION, Converter Case.>
7) Install the transmission harness connector to the stay.
8) Install the ATF filter pipe. <Ref. to 5AT-60, INSTALLATION, ATF Filter.>
9) Install the oil charge pipe with a O-ring. <Ref. to 5AT-69, INSTALLATION, Oil Charge Pipe.>
10) Install the torque converter assembly. <Ref. to 5AT-70, INSTALLATION, Torque Converter Assembly.>
11) Install the transmission assembly into vehicle. <Ref. to 5AT-42, INSTALLATION, Automatic Transmission Assembly.>

C: DISASSEMBLY

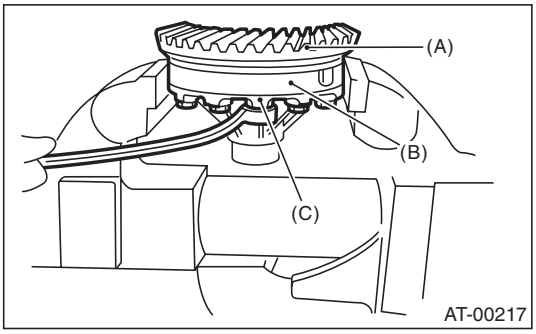
1. DIFFERENTIAL CASE ASSEMBLY

1) Remove the taper roller bearing using ST and press.

ST 498077000 REMOVER

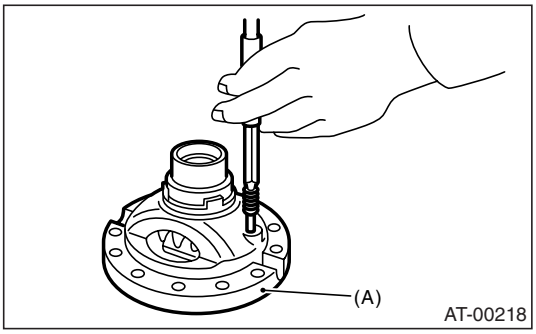


2) Secure the case in a vise, remove the hypoid driven gear tightening bolts, and then separate the hypoid driven gear into case (RH) and case (LH).



(A) Hypoid driven gear
(B) Differential case (RH)
(C) Differential case (LH)

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

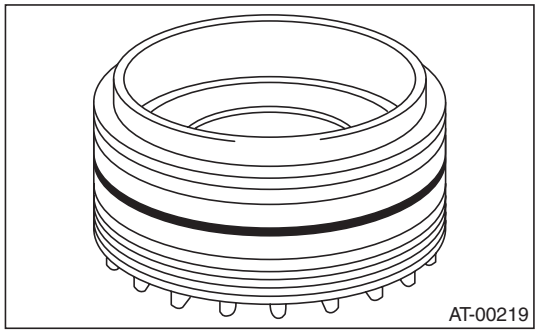


(A) Differential case (RH)

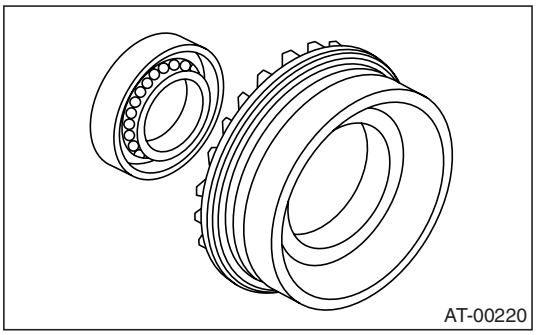
2. SIDE RETAINER

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

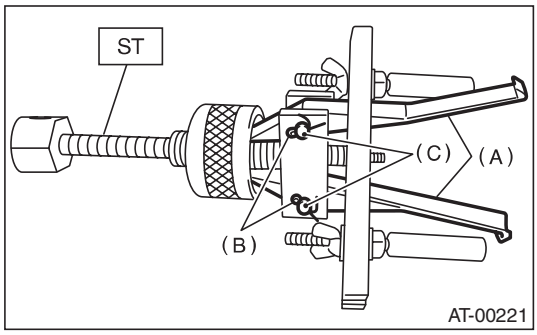
1) Remove the O-ring.



2) Remove the oil seal.

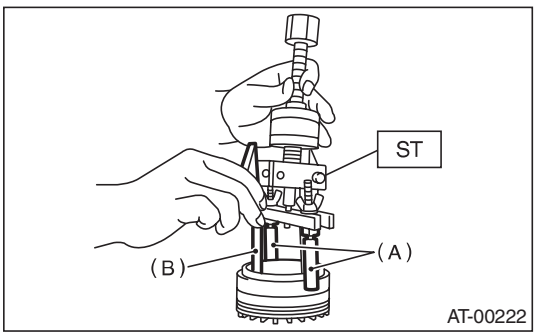


3) Remove the split pin, and then remove the claw.
ST 398527700 PULLER ASSY



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

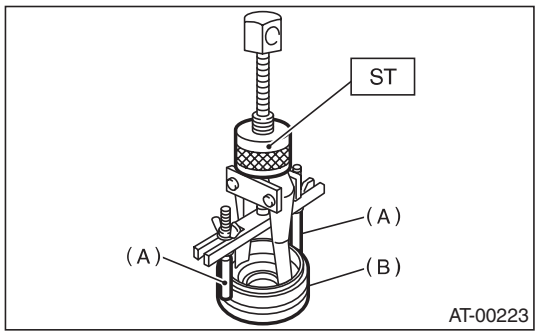
4) Attach two claws to the outer race, and set the ST to side retainer.
ST 398527700 PULLER ASSY



(A) Shaft
(B) Claw

5) Attach the removed claws to original position, and install the 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 the bearing inner and outer races as a single unit.

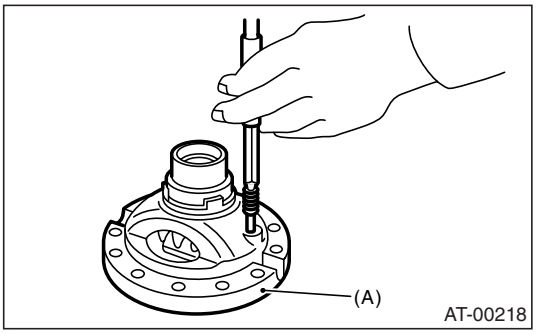


(A) Shaft
(B) Side retainer

D: ASSEMBLY

1. DIFFERENTIAL CASE ASSEMBLY

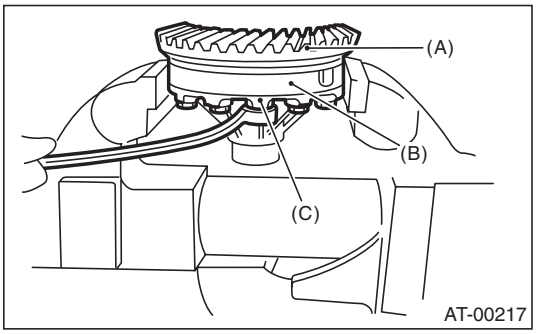
1) Install the washer, differential bevel gear and differential bevel pinion in the differential case (RH). Insert the pinion shaft.
2) Install the straight pin in reverse direction.



(A) Differential case (RH)

3) Install the washer and differential bevel gear to differential case (LH). Put the differential case (RH) on the case, and then combine both cases.
4) Install the hypoid driven gear and secure by tightening the bolt.

Tightening torque:
62 N·m (6.3 kgf-m, 45.7 ft-lb)

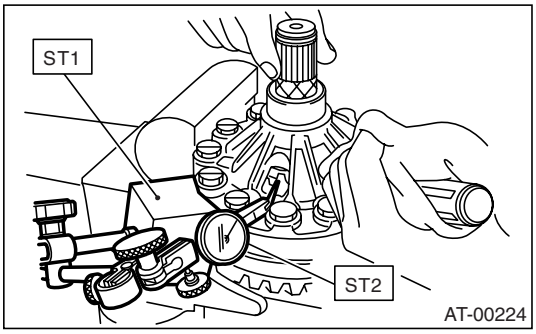


(A) Hypoid driven gear
(B) Differential case (RH)
(C) Differential case (LH)

5) Measurement of backlash (Selection of washer)
(1) Install the SUBARU genuine axle shaft to differential case.
Part No. 38415AA070 AXLE SHAFT
(2) Measure the gear backlash using ST1 and ST2, and then insert the ST2 though the access window of case.
ST1 498247001 MAGNET BASE
ST2 498247100 DIAL GAUGE

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

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



(3) If the backlash is not within specification, 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 the ST, install the taper roller bearing.
ST 398487700 DRIFT

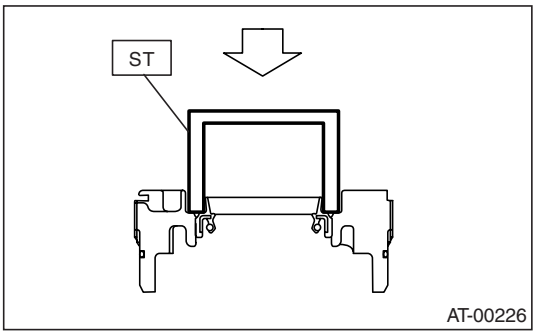
2. SIDE RETAINER

NOTE:
Install the oil seal and O-ring of side retainer after the adjustment of backlash and tooth contact.

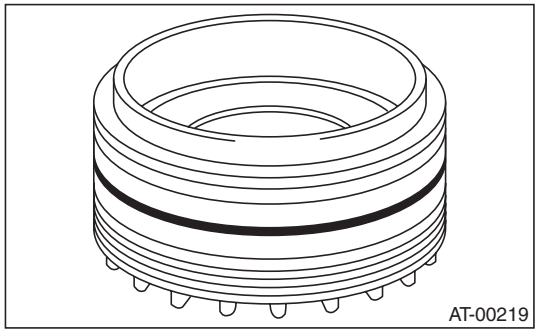
1) Install the bearing outer race to side retainer.
2) Install a new oil seal using ST.

ST 18675AA000 DIFFERENTIAL SIDE OIL SEAL INSTALLER

NOTE:
Apply oil to the oil seal lips.



3) Install a new O-ring.



E: INSPECTION

- Check each component for scratches, damage or other faults.
- Measure the backlash, and then adjust it within specification.

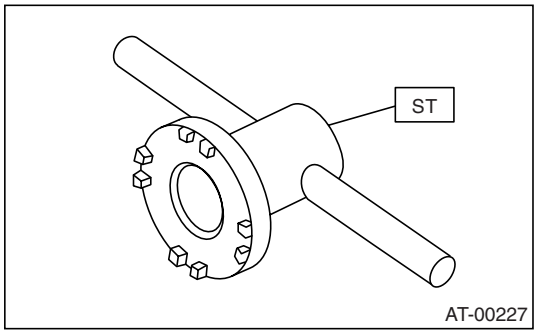
<Ref. to 5AT-95, ADJUSTMENT, Front Differential Assembly.>

F: ADJUSTMENT

1) Using the ST, screw-in the retainer until resistance is felt.

NOTE:
Screw-in the RH side slightly deeper than the LH side.

ST 18630AA010 WRENCH COMPL RETAINER



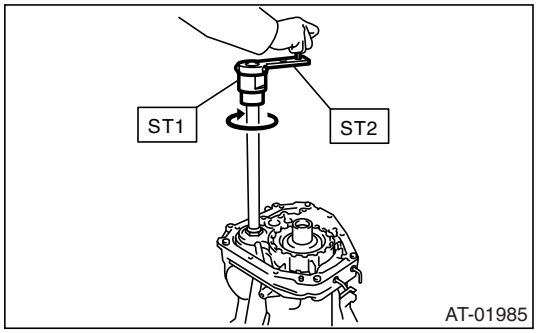
2) Remove the oil pump cover.
3) Remove the liquid gasket from the mating surface completely.
4) Install the oil pump cover to converter case, and secure them with tightening four bolts evenly.

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

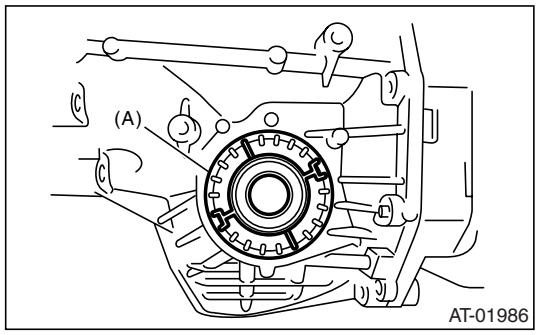
Tightening torque:
41 N·m (4.2 kgf-m, 30.2 ft-lb)

5) Rotate the drive pinion ten times or more using ST1 and ST2.

ST1 18667AA010 HOLDER
ST2 499787700 WRENCH

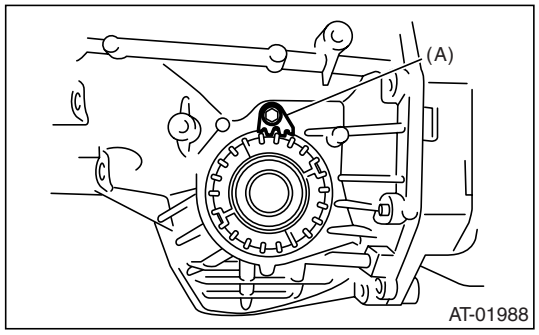


6) Tighten the retainer LH by rotating the shaft until resistance is felt. Then loosen the retainer RH. Keep tightening the retainer LH, and loosening the retainer RH until the pinion shaft no longer be turned. This is to the “zero” state.

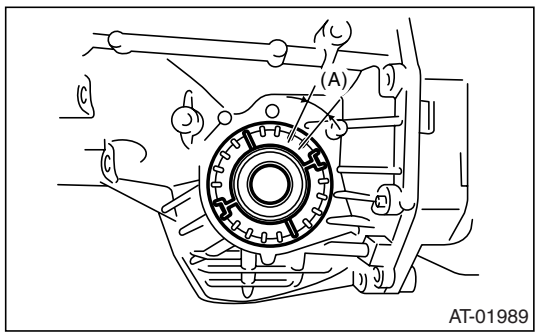


(A) Retainer

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



NOTE:
Turning the retainer by one tooth changes the backlash approx. 0.05 mm (0.0020 in).



(A) 0.05 mm (0.0020 in)

8) Turn the drive pinion several times using ST1, and check to see if the backlash is within the specification using 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)

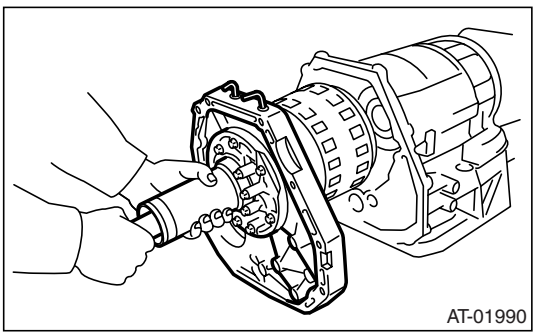
9) Adjust the tooth contact between front differential and drive shaft. <Ref. to 5AT-89, ADJUSTMENT, Drive Pinion Shaft Assembly.>

35.AT Main Case

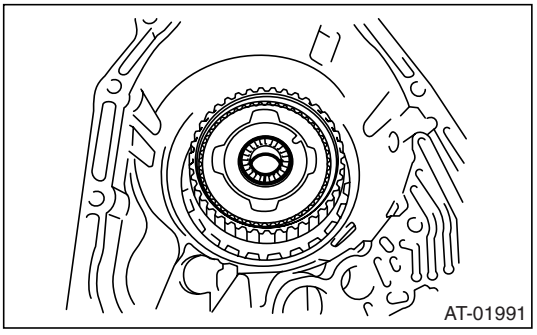
A: REMOVAL

1) Remove the transmission assembly from vehicle. <Ref. to 5AT-38, REMOVAL, Automatic Transmission Assembly.>
2) Pull out the torque converter assembly. <Ref. to 5AT-70, REMOVAL, Torque Converter Assembly.>
3) Remove the transmission harness connector from stay.
4) Disconnect the air breather hose.
5) Remove the oil charge pipe. <Ref. to 5AT-69, REMOVAL, Oil Charge Pipe.>
6) Remove the ATF filter inlet and outlet pipes. <Ref. to 5AT-60, REMOVAL, ATF Filter.>
7) Remove the extension case and intermediate case. <Ref. to 5AT-71, REMOVAL, Extension Case and Intermediate Case.>
8) Remove the center differential carrier. <Ref. to 5AT-78, REMOVAL, Center Differential Carrier.>
9) Remove the reduction driven gear. <Ref. to 5AT-76, REMOVAL, Reduction Driven Gear.>
10) Separate the converter case and transmission case. <Ref. to 5AT-82, REMOVAL, Converter Case.>
11) Remove the control valve body. <Ref. to 5AT-58, REMOVAL, Control Valve Body.>
12) Remove the oil pump cover.
<Ref. to 5AT-84, REMOVAL, Oil Pump Cover.>

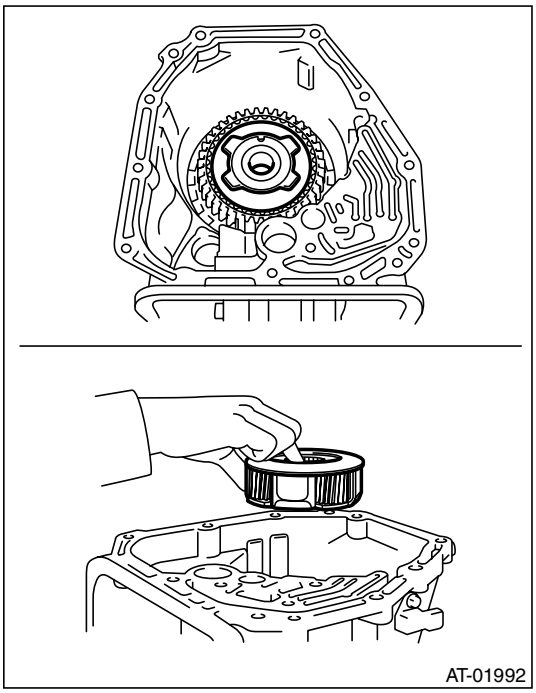
NOTE:
The input clutch pack assembly and front sun gear assembly are also removed together.


AT-01990

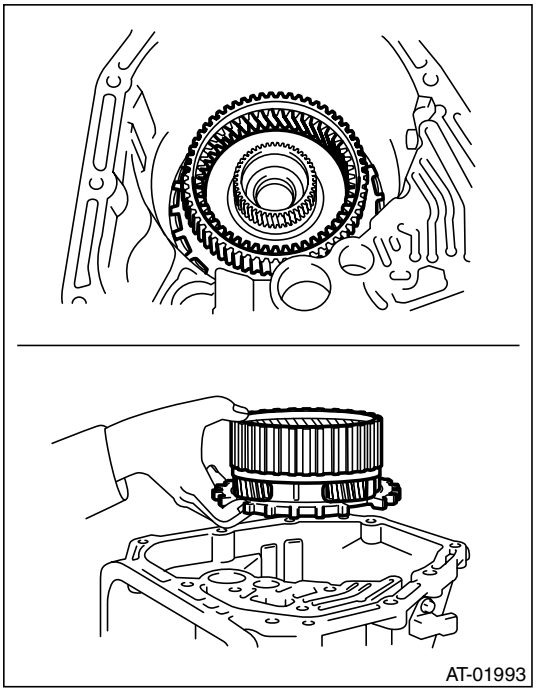
13) Remove the needle bearing of middle carrier assembly.


AT-01991

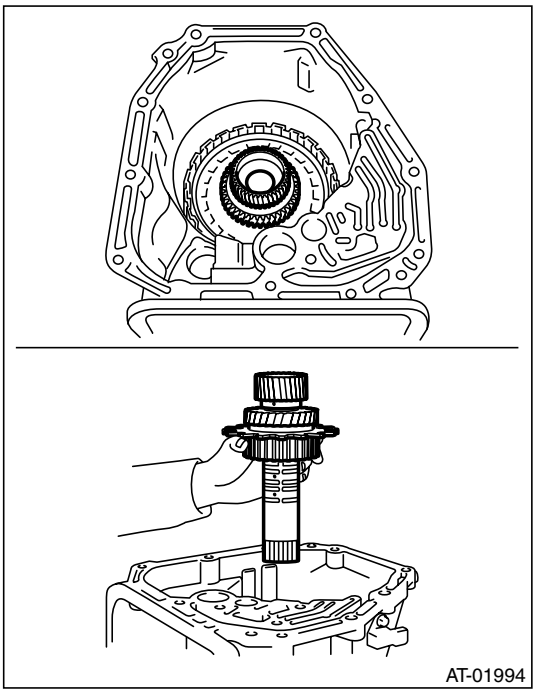
14) Remove the middle carrier assembly.


AT-01992

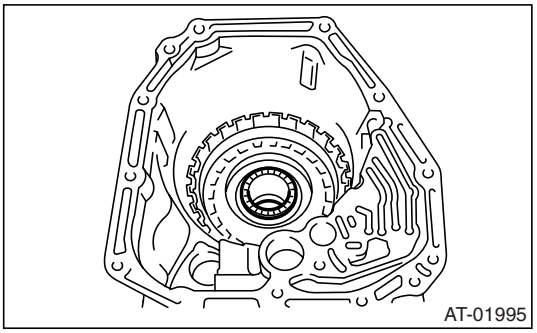
15) Remove the rear carrier assembly.


AT-01993

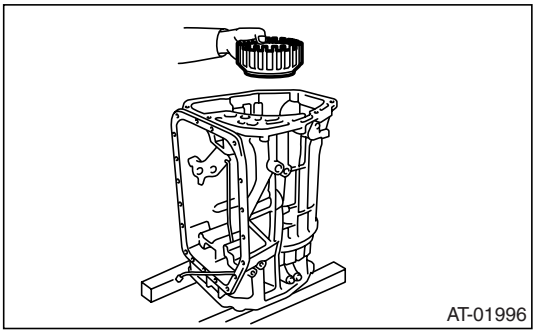
16) Remove the middle & rear sun gear assembly.



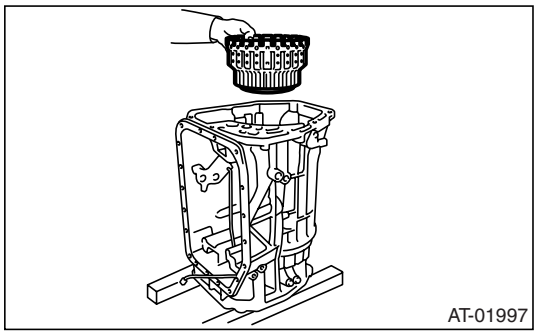
17) Remove the thrust needle bearing of high & low reverse clutch.



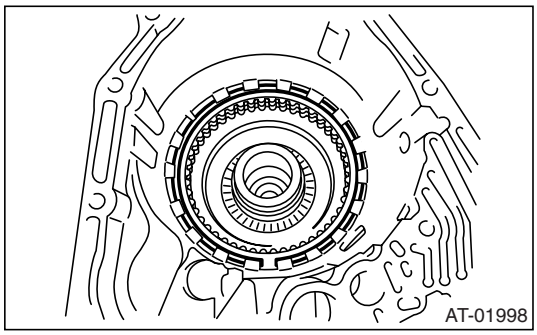
18) Remove the high & low reverse clutch assembly.



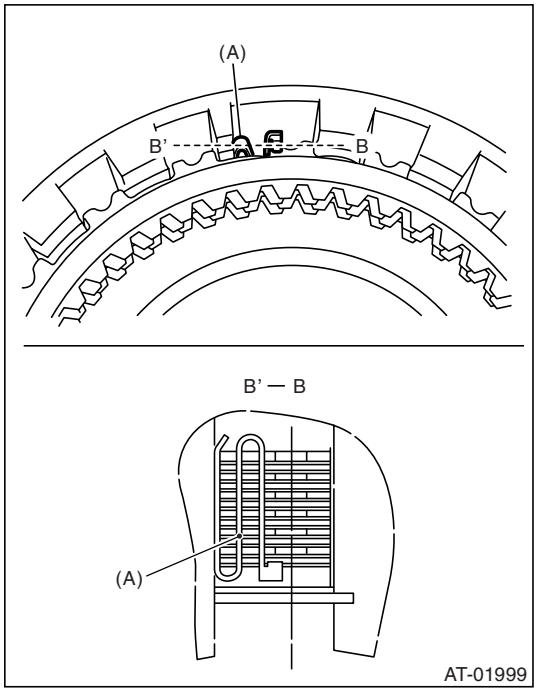
19) Remove the direct clutch assembly.



20) Remove the snap ring of reverse brake.



21) Remove the retaining plate.
22) Remove the leaf spring.

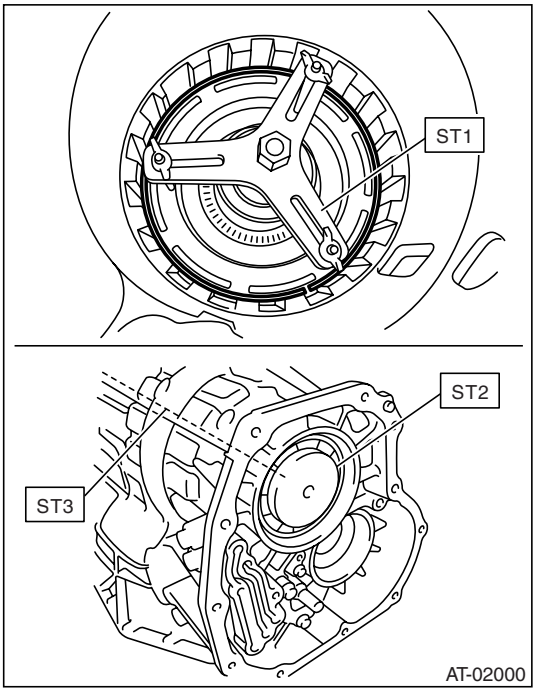


(A) Leaf spring

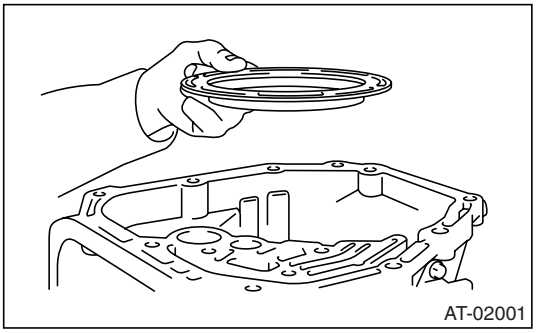
23) Take out the drive plate, driven plate and dish plate.

24) Remove the snap ring of the spring retainer of reverse brake.

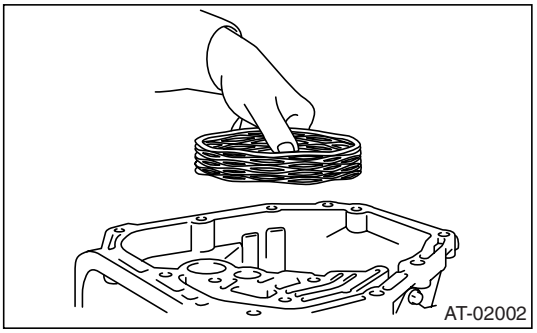
ST1 18762AA000 COMPRESSOR SPECIAL TOOL
ST2 18765AA000 COMPRESSOR SUPPORT
ST3 18763AA000 COMPRESSOR SHAFT



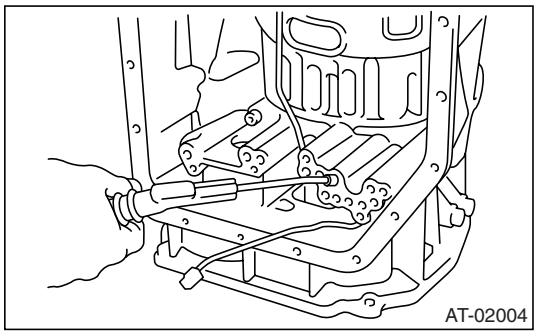
25) Remove the spring retainer.



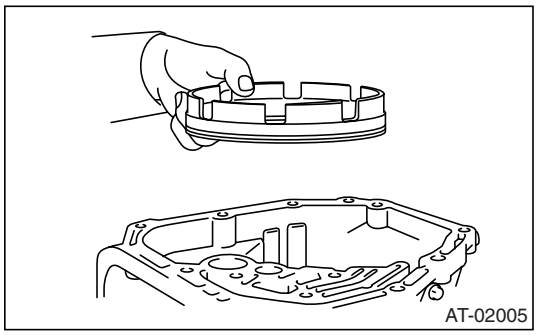
26) Remove the return spring.



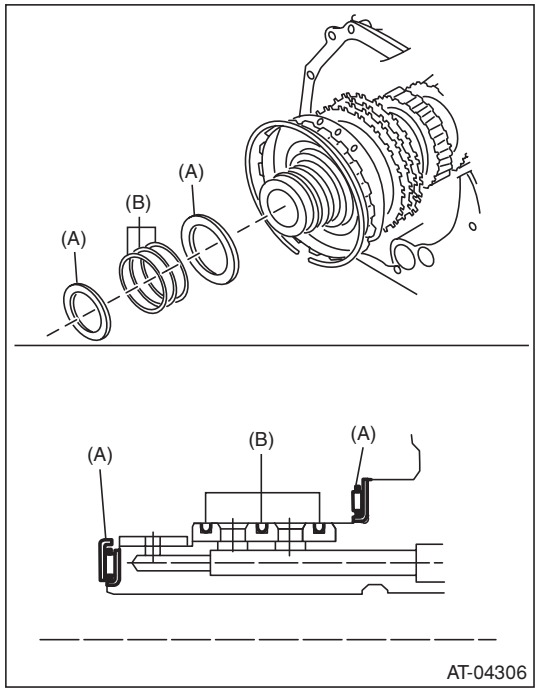
27) Apply compressed air.



28) Remove the reverse brake piston.



29) Remove the thrust bearing and seal ring.

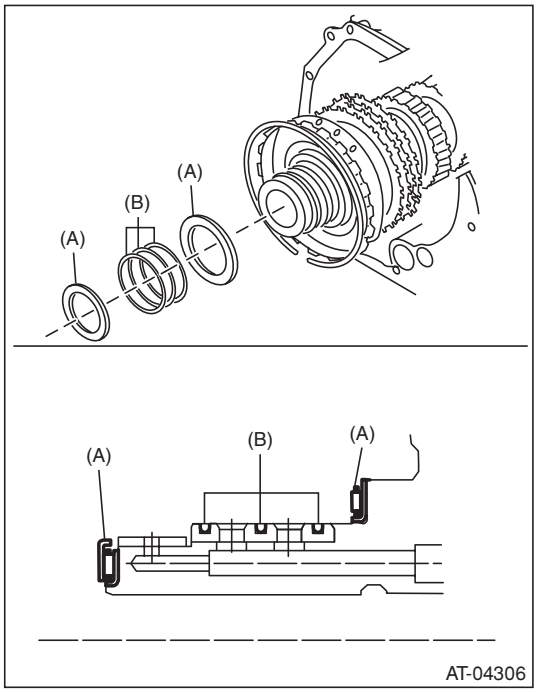


(A) Thrust bearing
(B) Seal ring

B: INSTALLATION

1) Apply ATF to a new seal ring.

2) Install the thrust bearing and new seal ring to drum support.



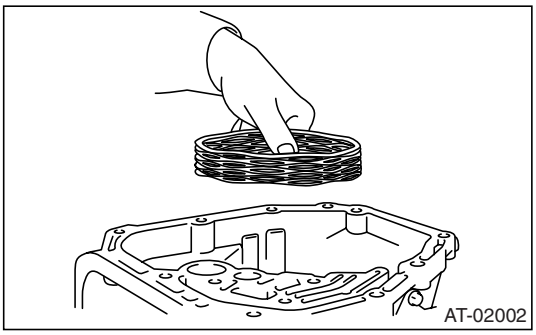
(A) Thrust bearing
(B) Seal ring

3) Install the reverse brake piston.

NOTE:
Apply ATF onto the piston sliding surface.

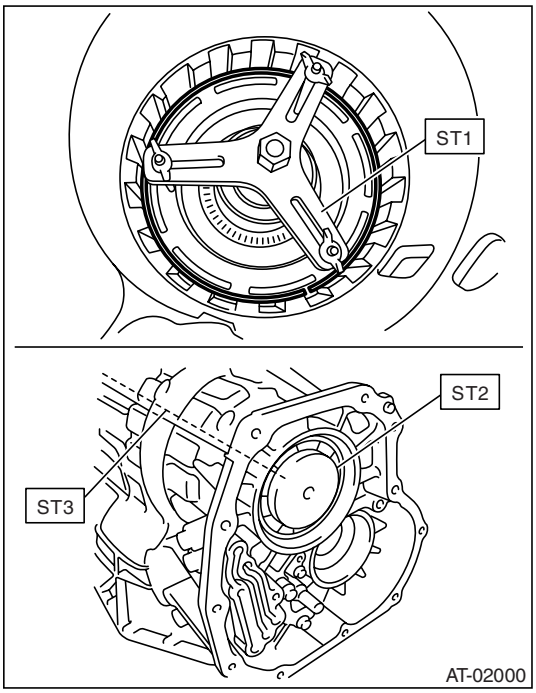
ST1 18762AA000 COMPRESSOR SPECIAL TOOL
ST2 18765AA000 COMPRESSOR SUPPORT
ST3 18763AA000 COMPRESSOR SHAFT

4) Install the return spring.



5) Install the spring retainer and snap ring.

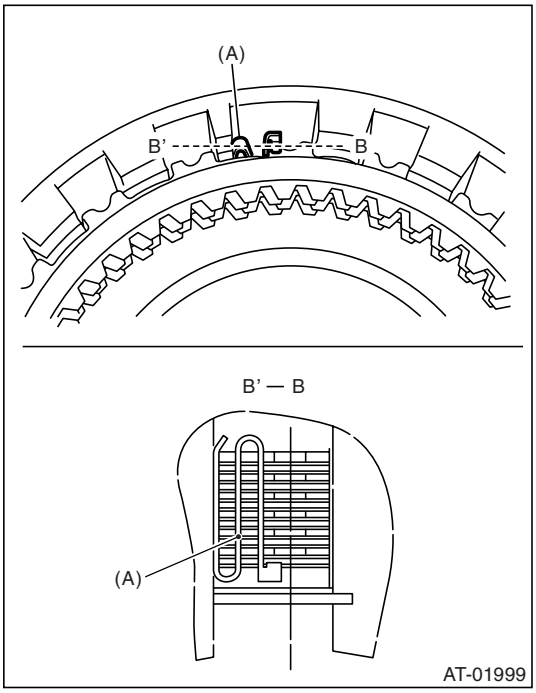
ST1 18762AA000 COMPRESSOR SPECIAL TOOL
ST2 18765AA000 COMPRESSOR SUPPORT
ST3 18763AA000 COMPRESSOR SHAFT



6) Install the dish plate.

NOTE:
When installing, make sure that the identification mark is facing the front side of transmission.

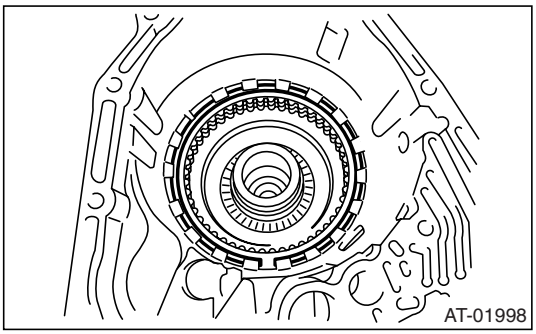
7) Install the drive plate and driven plate.
8) Install the leaf spring.



(A) Leaf spring

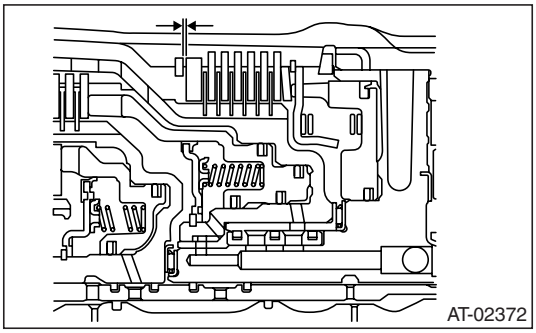
9) Install the retaining plate.

10) Install the snap ring of reverse brake.



11) Perform the clearance check of reverse brake.
(1) Measure the clearance between retainer plate and snap ring using thickness gauge.

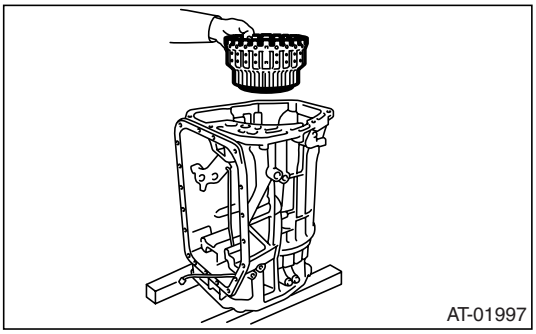
Specification:
0.7 — 1.1 mm (0.028 — 0.043 in)



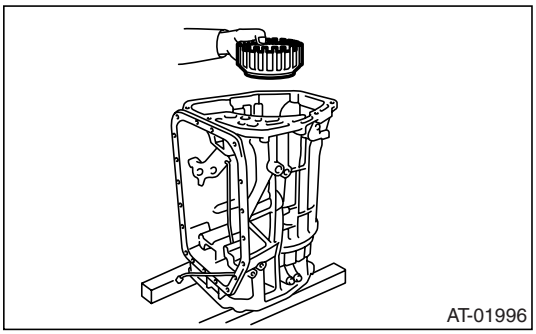
(2) If the clearance is out of specification, select a suitable retainer plate from following table and assemble it.

Retainer plate	
Part No.	Thickness mm (in)
31567AB100	4.2 (0.165)
31567AB170	4.4 (0.173)
31567AB180	4.6 (0.181)
31567AB190	4.8 (0.189)
31567AB200	5.0 (0.197)

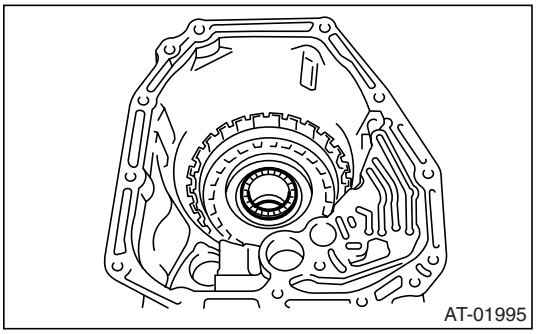
12) Install the direct clutch assembly.



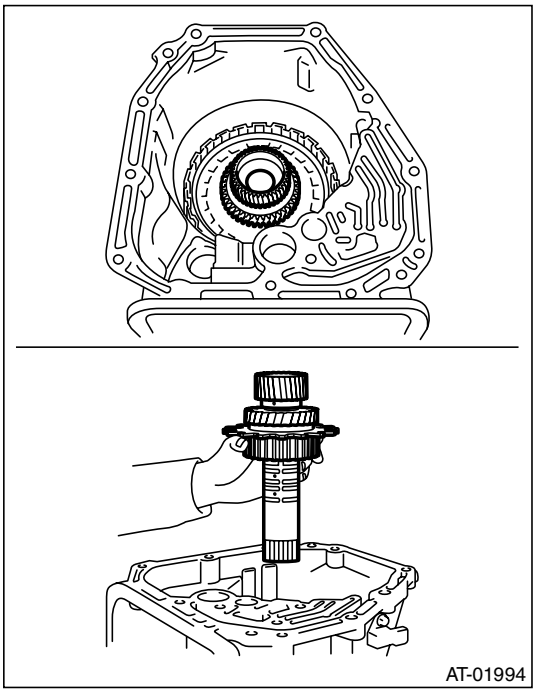
13) Install the high & low reverse clutch assembly.



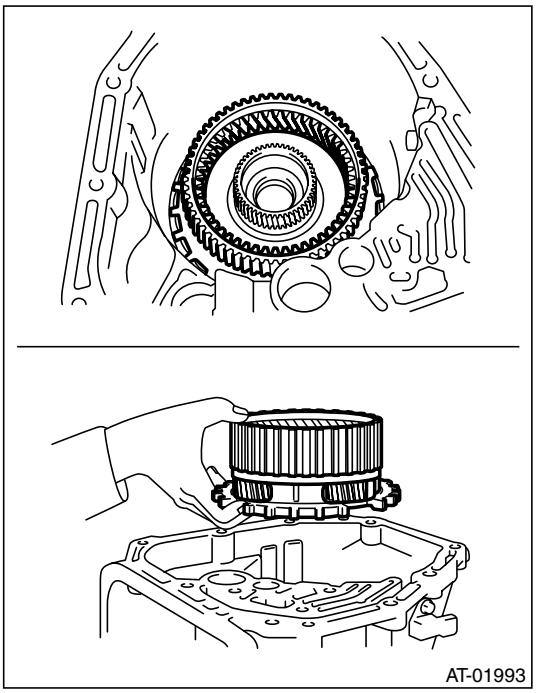
14) Install the thrust needle bearing of high & low reverse clutch.



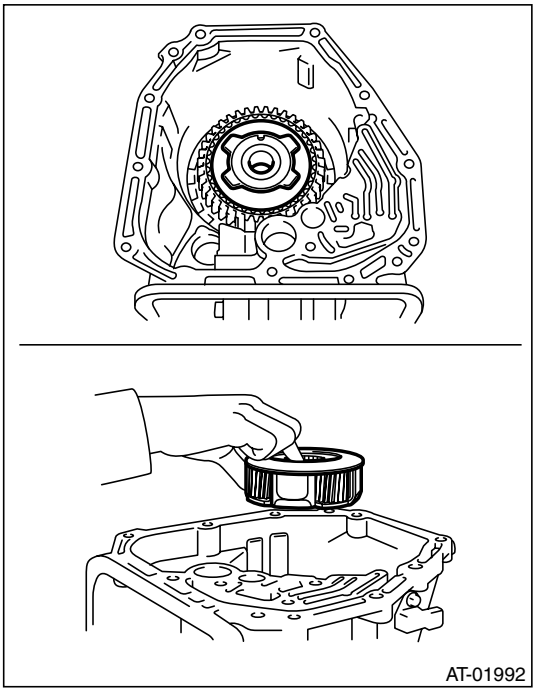
15) Install the middle & rear sun gear assembly.



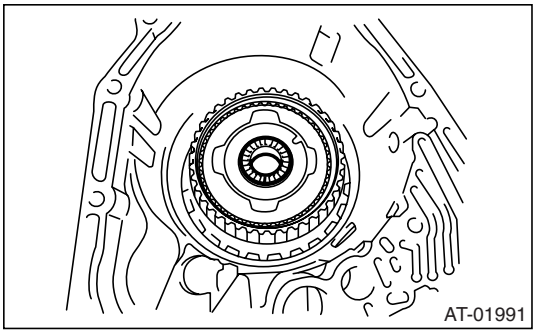
16) Install the rear carrier assembly.



17) Install the middle carrier assembly.

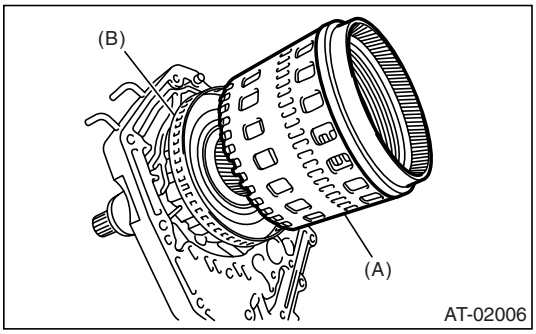


18) Install the thrust needle bearing of middle carrier assembly.



19) Measure the total end play, and select the bearing. <Ref. to 5AT-105, ADJUSTMENT, AT Main Case.>

20) Install the impact clutch pack assembly to oil pump cover.



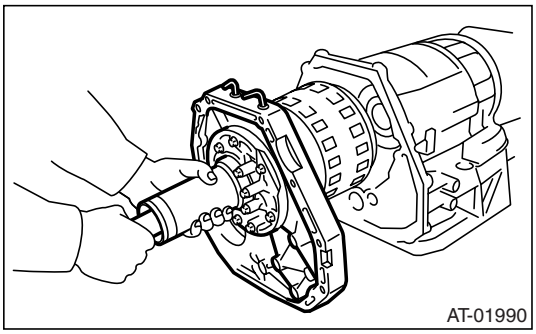
(A) Impact clutch pack ASSY
(B) Front sun gear ASSY

21) Turn the transmission sideways.

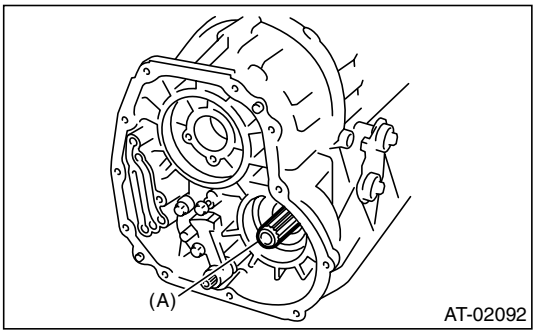
22) Install the oil pump cover.

(1) Apply ATF to the O-ring of input clutch shaft.

(2) Install the oil pump cover to AT main case while supporting the input clutch shaft and oil pump housing with your hand.



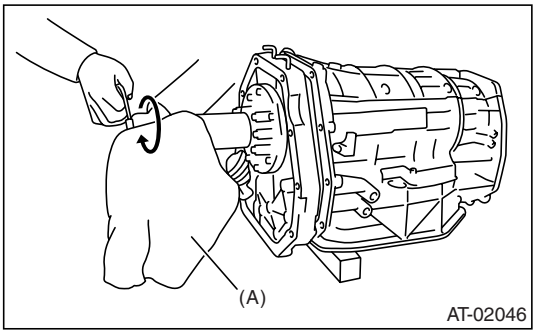
(3) Make sure the rear end of drive pinion shaft is engaged to the spline of reduction driven gear.



(A) Drive pinion shaft

(4) Protect the input clutch shaft with a cloth, and rotate to engage the spline of input clutch and rear carrier using pliers.

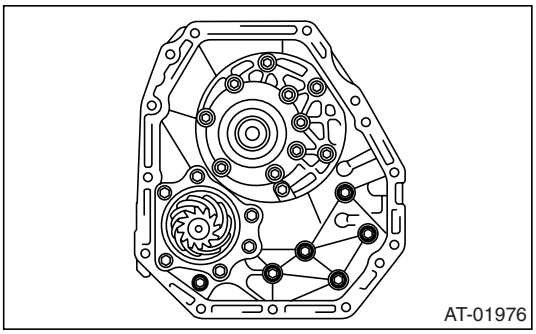
NOTE:
Work with pressing the oil pump cover.



(A) Cloth

(5) Combine the oil pump cover with transmission main case.

Tightening torque:
41 N·m (4.2 kgf-m, 30.2 ft-lb)



23) Install the center differential carrier. <Ref. to 5AT-78, INSTALLATION, Center Differential Carrier.>
24) Install the reduction driven gear. <Ref. to 5AT-76, INSTALLATION, Reduction Driven Gear.>
25) Install the extension case and intermediate case. <Ref. to 5AT-71, INSTALLATION, Extension Case and Intermediate Case.>
26) Install the control valve body. <Ref. to 5AT-58, INSTALLATION, Control Valve Body.>
27) Install the converter case assembly into transmission case assembly. <Ref. to 5AT-82, INSTALLATION, Converter Case.>
28) Install the air breather hose. <Ref. to 5AT-68, INSTALLATION, Air Breather Hose.>
29) Install the ATF filter pipe. <Ref. to 5AT-60, INSTALLATION, ATF Filter.>
30) Install the oil charge pipe with a O-ring. <Ref. to 5AT-69, INSTALLATION, Oil Charge Pipe.>
31) Install the torque converter assembly. <Ref. to 5AT-70, INSTALLATION, Torque Converter Assembly.>
32) Install the transmission assembly into vehicle. <Ref. to 5AT-42, INSTALLATION, Automatic Transmission Assembly.>
33) Perform the Clear Memory 2. <Ref. to 5AT(diag)-19, CLEAR MEMORY MODE, OPERATION, Subaru Select Monitor.>
34) Perform the inspection with driving the vehicle at the end of repair work, and make sure there is no faulty as below;

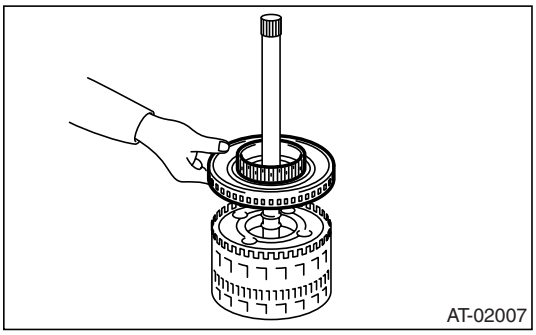
- Excessive shift shock
- Oil leakage from transmission body and etc.
- Occurrence of noise caused by interference etc.

NOTE:
If excessive shift shock is felt, execute the advance operation of learning control. <Ref. to 5AT(diag)-23, PROCEDURE, Learning Control.>

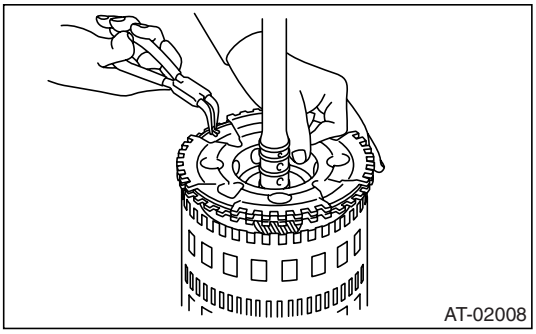
C: DISASSEMBLY

1. INPUT CLUTCH PACK ASSEMBLY

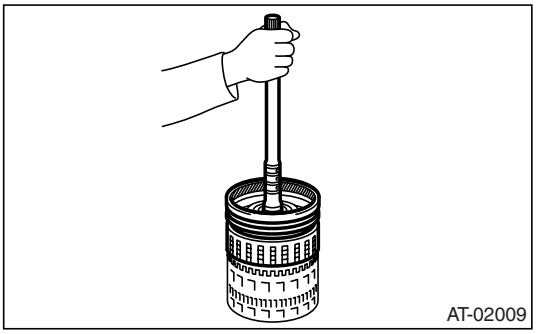
1) Remove the front sun gear.



2) Remove the snap ring, and then remove the front carrier.



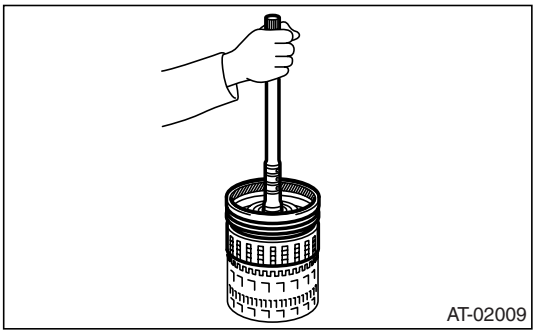
3) Remove the input clutch assembly from rear internal gear.



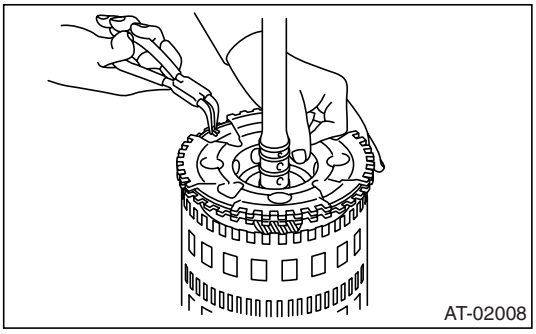
D: ASSEMBLY

1. INPUT CLUTCH PACK ASSEMBLY

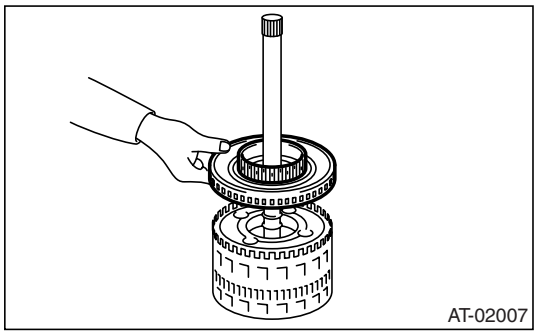
1) Assemble the input clutch assembly to rear internal gear.



2) Install the front carrier, and then install the snap ring.



3) Install the front sun gear.



E: INSPECTION

1. FRONT, MIDDLE & REAR PLANETARY CARRIER ASSEMBLY

Check the following items.
- Visually inspect the tooth surface of planetary gear, and replace with new one if damaged, broken or excessively worn.
- Inspect the planetary carrier body for damage or breakage.

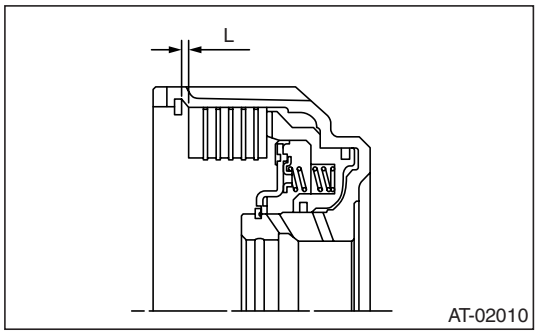
2. INPUT CLUTCH

Check for damage on the drive plate, driven plate and snap ring, and replace them as input clutch assembly if damaged.

3. HIGH & LOW REVERSE CLUTCH ASSEMBLY

Check the clearance of high & low reverse clutch.
Measure the clearance “L” between snap ring and retaining plate using thickness gauge. If the measured value is out of specification, replace them as high & low reverse clutch assembly.

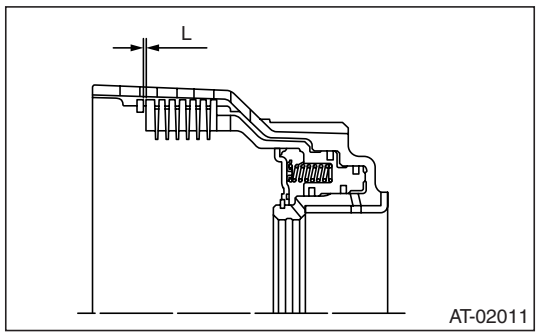
Specification:
1.8 — 2.2 mm (0.070 — 0.087 in)



4. DIRECT CLUTCH ASSEMBLY

Check the clearance of direct clutch.
Measure the clearance “L” between snap ring and retaining plate using thickness gauge. If the measured value is out of specification, replace them as direct clutch assembly.

Specification:
0.6 — 1.0 mm (0.024 — 0.039 in)

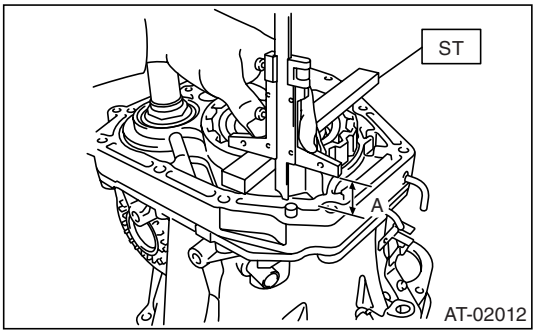


5. REVERSE BRAKE

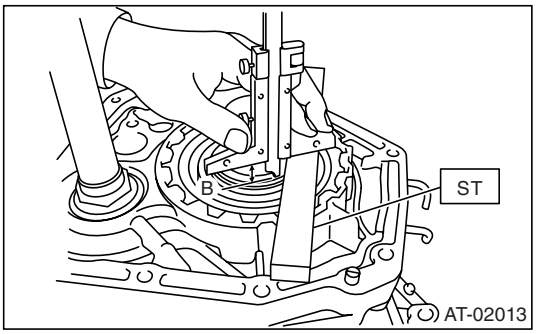
Check the following items.
- Drive plate facing for wear or damage
- Snap ring for wear, return spring for breakage, and spring retainer for deformation
- Lip seal and D-ring for damage
- Piston operation

F: ADJUSTMENT

1) Using the ST, measure the height “A” from the AT main case mating surface to convex surface of oil pump cover.
ST 499575400 GAUGE

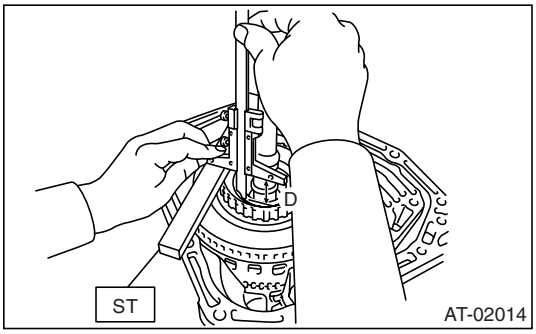


2) Using the ST, measure the depth “B” from the convex surface of oil pump cover to thrust bearing transferring surface.
ST 499575400 GAUGE



3) Calculate the measured value from step 1) and 2), and then set the calculated value as “C”
Calculation formula: C = A − B

4) Using the ST, measure the depth “D” from the AT main case mating surface to thrust bearing transferring surface of front sun gear.
ST 499575400 GAUGE



5) Set the value as “E” which subtract the thickness of ST (GAUGE) from the measured value on step 4).
Calculation formula:
E (mm) = D − 15
[E (in) = D − 0.59]
6) Calculation formula:
Select one thrust bearing from the table to adjust clearance within 0.25 — 0.55 mm (0.0098 — 0.022 in).
When clearances are 0.25 mm (0.0098 in):
T (mm) = E − C + 0.03
[T (in) = E − C + 0.0012]
When clearances are 0.55 mm (0.022 in):
T (mm) = E − C − 0.27
[T (in) = E − C − 0.012]

T: Thrust bearing clearance
C: Distance from oil pump cover mating surface to rear end of oil pump cover
E: Depth from mating surface of AT main case to bearing surface of front sun gear

Example:
Assuming A is 39.50 mm (1.56 in), B is 16.20 mm (0.64 in), then C will be 23.30 mm (0.92 in) by the calculation.
When the D is 41.90 mm (1.65 in), subtract the thickness of ST (GAUGE) from D, and the value E will be 26.90 mm (1.06 in).
Calculation when clearance is 0.25 mm (0.0098 in)
T (mm) = 26.90 − 23.30 + 0.03 = 3.63
[T (in) = 1.059 − 0.917 + 0.0012 = 0.143]
Calculation when clearance is 0.55 mm (0.022 in)
T (mm) = 26.90 − 23.30 − 0.27 = 3.33
[T (in) = 1.059 − 0.917 − 0.012 = 0.131]

According to the calculation, the value “T” is found to be 3.33 — 3.63 mm (0.131 — 0.143 in), therefore select the thrust bearing with the thickness of 3.4 mm (0.134 in) or 3.6 mm (0.142 in) from the table.

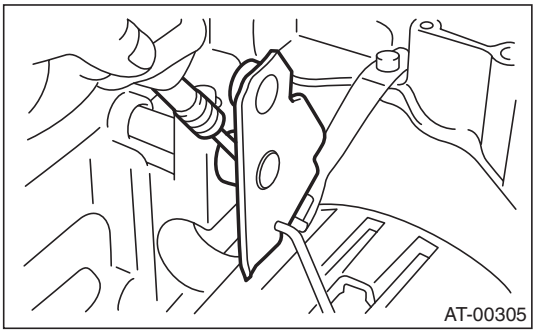
NOTE:
Calculation formula for “T” is applied when measuring using ST (499575400 GAUGE). In the calculation without using ST, substitute the thickness of collar used to calculate the value “E” on step 5).

Thrust bearing	
Part No.	Thickness mm (in)
806548020	3.2 (0.126)
606548030	3.4 (0.134)
806548040	3.6 (0.142)
806548050	3.8 (0.150)
806548060	4.0 (0.157)
806548070	4.2 (0.165)

36.Transmission Control Device

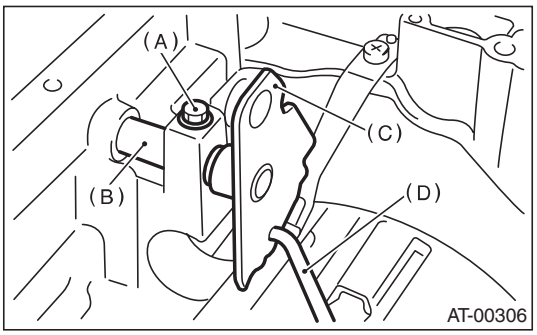
A: REMOVAL

1) Remove the transmission assembly from vehicle. <Ref. to 5AT-38, REMOVAL, Automatic Transmission Assembly.>
2) Pull out the torque converter assembly. <Ref. to 5AT-70, REMOVAL, Torque Converter Assembly.>
3) Lift-up the lever on rear side of transmission harness connector, and then disconnect it from the stay.
4) Disconnect the air breather hose. <Ref. to 5AT-68, REMOVAL, Air Breather Hose.>
5) Wrap vinyl tape around the nipple attached to the air breather hose.
6) Remove the pitching stopper bracket.
7) Remove the control valve body assembly. <Ref. to 5AT-58, REMOVAL, Control Valve Body.>
8) Pull out the straight pin of manual plate.



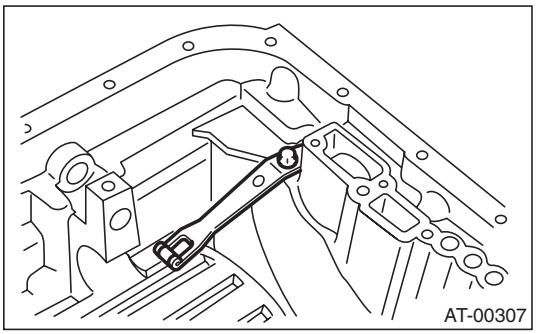
9) Remove the bolts securing select lever, and then remove the select lever, manual plate and parking rod.

NOTE:
Be careful not to damage the lips of press-fitted oil seal in the case.



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

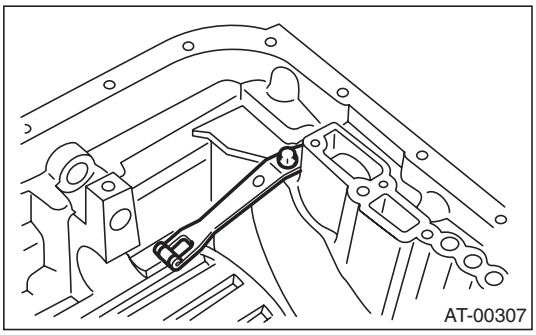
10) Remove the detent spring.



B: INSTALLATION

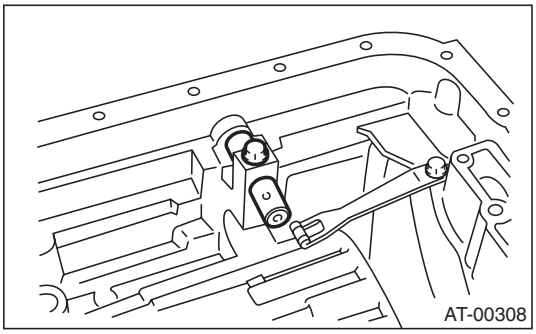
1) Install the detent spring to transmission case.

Tightening torque:
6 N·m (0.6 kgf-m, 4.4 ft-lb)

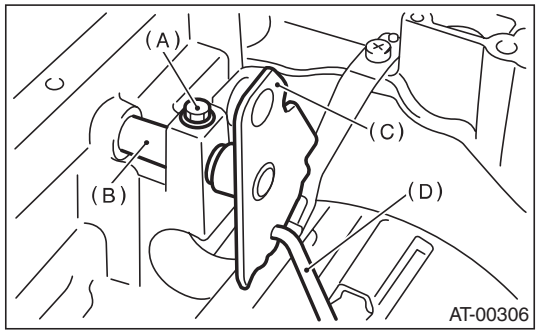


2) Insert the select lever, and then tighten the bolt.

Tightening torque:
6 N·m (0.6 kgf-m, 4.4 ft-lb)

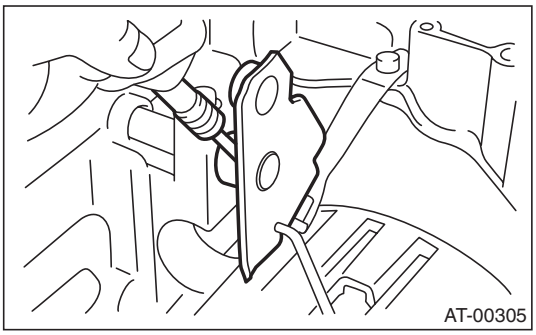


3) Insert the manual plate and parking rod.



(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 body assembly and oil pan. <Ref. to 5AT-58, INSTALLATION, Control Valve Body.>
6) Install the pitching stopper bracket.

Tightening torque:
41 N·m (4.2 kgf-m, 30.2 ft-lb)

7) Insert the transmission connector to the stay.
8) Install the air breather hose. <Ref. to 5AT-68, INSTALLATION, Air Breather Hose.>
9) Install the torque converter assembly. <Ref. to 5AT-70, INSTALLATION, Torque Converter Assembly.>
10) Install the transmission assembly into vehicle. <Ref. to 5AT-42, INSTALLATION, Automatic Transmission Assembly.>

C: INSPECTION

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

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

5AT(diag)

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1. Basic Diagnostic Procedure

A: PROCEDURE

Step		Check	Yes	No
1	**CHECK PRE-INSPECTION.** 1) Ask the customer when and how the trouble occurred using the interview checklist. <Ref. to 5AT(diag)-4, Check List for Interview.> 2) Before performing diagnosis, inspect the following items which might influence the AT problems. • General inspection <Ref. to 5AT(diag)-5, INSPECTION, General Description.> • Oil leakage • Stall speed test <Ref. to 5AT-32, Stall Test.> • Line pressure test <Ref. to 5AT-35, Line Pressure Test.> • Transfer clutch pressure test <Ref. to 5AT-36, Transfer Clutch Pressure Test.> • Time lag test <Ref. to 5AT-34, Time Lag Test.> • Road test <Ref. to 5AT-31, Road Test.> • Inhibitor switch <Ref. to 5AT-51, Inhibitor Switch.>	Is the unit that might influence the AT problem normal?	Go to step **2.**	Repair or replace each item.
2	**CHECK SPORT INDICATOR LIGHT.** After the ignition switch is turned to ON, wait for at least 2 seconds.	Does the SPORT indicator light illuminate?	Go to step **4.**	Go to step **3.**
3	**CHECK SPORT INDICATOR LIGHT.** 1) Turn the ignition switch to OFF. 2) Check the SPORT indicator light. <Ref. to 5AT(diag)-25, INSPECTION, SPORT Indicator Light Display.> 3) After the ignition switch is turned to ON, wait for at least 2 seconds.	Does the SPORT indicator light blink?	Go to step **4.**	Go to step **5.**
4	**CHECK DTC.** Display DTC. NOTE: If the communication function of the Subaru Select Monitor cannot be executed normally, check the communication circuit. <Ref. to 5AT(diag)-27, COMMUNICATION FOR INITIALIZING IMPOSSIBLE, Diagnostic Procedure for Subaru Select Monitor Communication.>	Is DTC displayed on the Subaru Select Monitor?	Go to step **6.** NOTE: Record all DTC.	Go to step **5.**
5	**PERFORM GENERAL DIAGNOSTICS.** 1) Inspect using “Diagnostic Procedure without Diagnostic Trouble Code (DTC)”. <Ref. to 5AT(diag)-128, Diagnostic Procedure without Diagnostic Trouble Code (DTC).> 2) Perform the clear memory mode. 3) Perform the inspection mode. <Ref. to 5AT(diag)-21, Inspection Mode.> 4) Display DTC.	Is DTC displayed on the Subaru Select Monitor?	Go to step **6.**	Inspect using “General Diagnostic Table”. <Ref. to 5AT(diag)-137, General Diagnostic Table.>

	Step	Check	Yes	No
6	**PERFORM DIAGNOSIS.** 1) Inspect using the “Diagnostic Procedure with Diagnostic Trouble Code (DTC)”. <Ref. to 5AT(diag)-35, Diagnostic Procedure with Diagnostic Trouble Code (DTC).> NOTE: For DTC table, refer to “List of Diagnostic Trouble Code (DTC)”. <Ref. to 5AT(diag)-31, List of Diagnostic Trouble Code (DTC).> 2) Repair the trouble cause. 3) Perform the clear memory mode. 4) Perform the inspection mode. <Ref. to 5AT(diag)-21, Inspection Mode.> 5) Display DTC.	Is DTC displayed on the Subaru Select Monitor?	Inspect using the “Diagnostic Procedure with Diagnostic Trouble Code (DTC)”. <Ref. to 5AT(diag)-35, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>	Inspect using “General Diagnostic Table”. <Ref. to 5AT(diag)-137, General Diagnostic Table.>

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 sale			
Date of repair			
Trans. model	TRANSMISSION	V.I.N.	
Odometer reading	km (miles)		
Symptom	❑ 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 ( )		
Frequency	❑ Continuous ❑ Intermittent (times a day)		
Weather	❑ Fine ❑ Cloudy ❑ Rainy ❑ Snowy ❑ Others ( )		
Place	❑ Highland ❑ Suburbs ❑ Inner city ❑ Uphill ❑ Rough road ❑ Others ( )		
Ambient air temperature	❑ Hot ❑ Warm ❑ Cool ❑ Cold		
Vehicle speed	km/h (MPH)		
AT warning light (SPORT indicator light)	❑ Blinks continuously	❑ Not blink	
Select lever position	❑ P ❑ R ❑ N ❑ D ❑ Manual mode		
Driving condition	❑ Not affected ❑ At racing ❑ When decelerating	❑ At starting ❑ When accelerating ❑ While turning (❑ RH/❑ LH)	❑ While idling ❑ While cruising
Manual mode	❑ ON ❑ OFF		

3. General Description

A: CAUTION

• Supplemental Restraint System "Airbag"

The airbag system wiring harness is routed near the TCM.

CAUTION:

• All the airbag system wiring harnesses and connectors are colored yellow. Do not use an electric test equipment on these circuits.

• Be careful not to damage the airbag system wiring harness when performing diagnostics or servicing the TCM.

• Measurement

When measuring the voltage and resistance of the ECM, TCM or each sensor, use a tapered pin with a diameter of less than 0.64 mm (0.025 in) in order to avoid poor contact. Do not insert a pin of more than 0.65 mm (0.026 in) diameter.

B: INSPECTION

1. BATTERY

Measure the battery voltage and specific gravity of electrolyte.

Standard voltage: 12 V or more

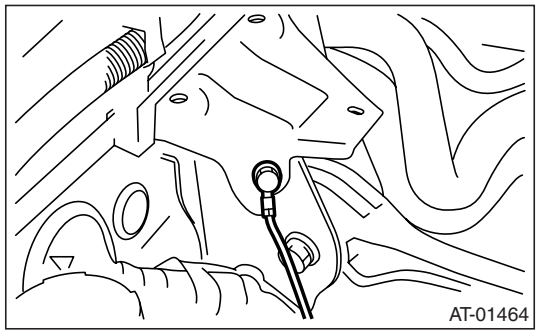
Specific gravity: 1.260 or more

2. TRANSMISSION GROUND

Make sure that the ground terminal bolt is tightened securely.

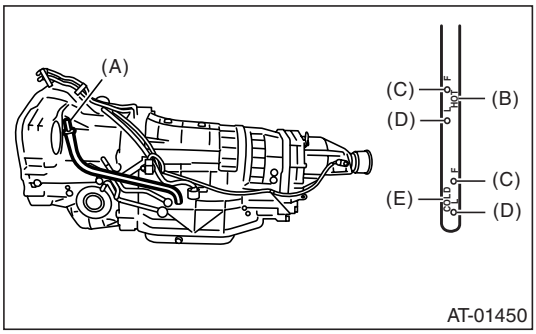
• Chassis side

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



3. ATF LEVEL

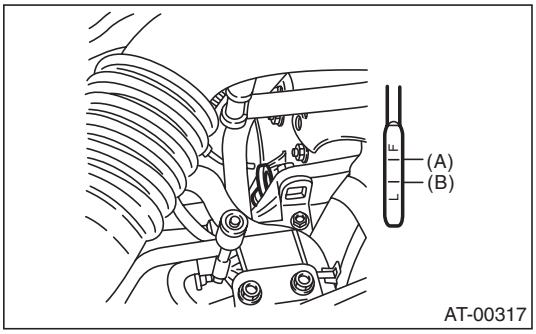
Make sure that ATF level is the specified amount. <Ref. to 5AT-28, INSPECTION, Automatic Transmission Fluid.>



(A) Level gauge
(B) Check position when "HOT"
(C) Upper level
(D) Lower level
(E) Check position when "COLD"

4. FRONT DIFFERENTIAL OIL LEVEL

Make sure the front differential oil level is the specified amount. <Ref. to 5AT-30, INSPECTION, Differential Gear Oil.>



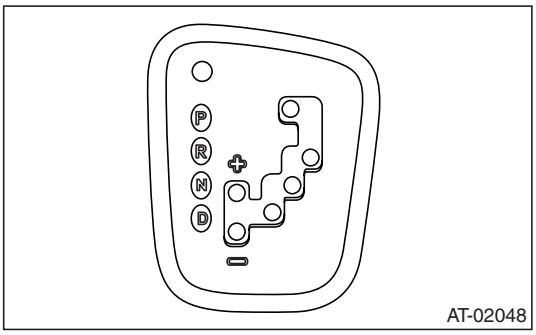
(A) Upper level
(B) Lower level

5. OPERATION OF SHIFT SELECT LEVER

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

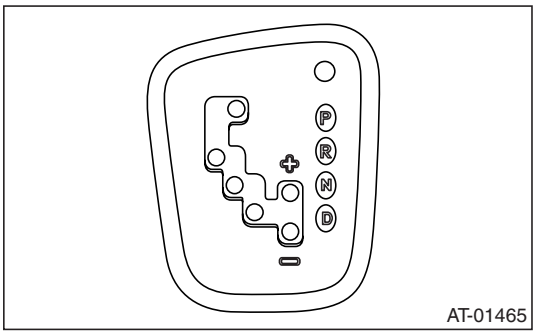
WARNING:
Stop the engine while checking operation of the select lever.

- LHD model



AT-02048

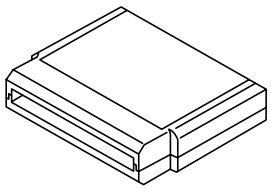
- RHD model



AT-01465

C: PREPARATION TOOL

1. SPECIAL TOOL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST18482AA000	18482AA000 (Newly adopted tool)	CARTRIDGE	Troubleshooting for electrical system.
ST22771AA030	22771AA030	SUBARU SELECT MONITOR KIT	Troubleshooting for electrical system. • English: 22771AA030 (Without printer) • German: 22771AA070 (Without printer) • French: 22771AA080 (Without printer) • Spanish: 22771AA090 (Without printer)

2. GENERAL TOOL

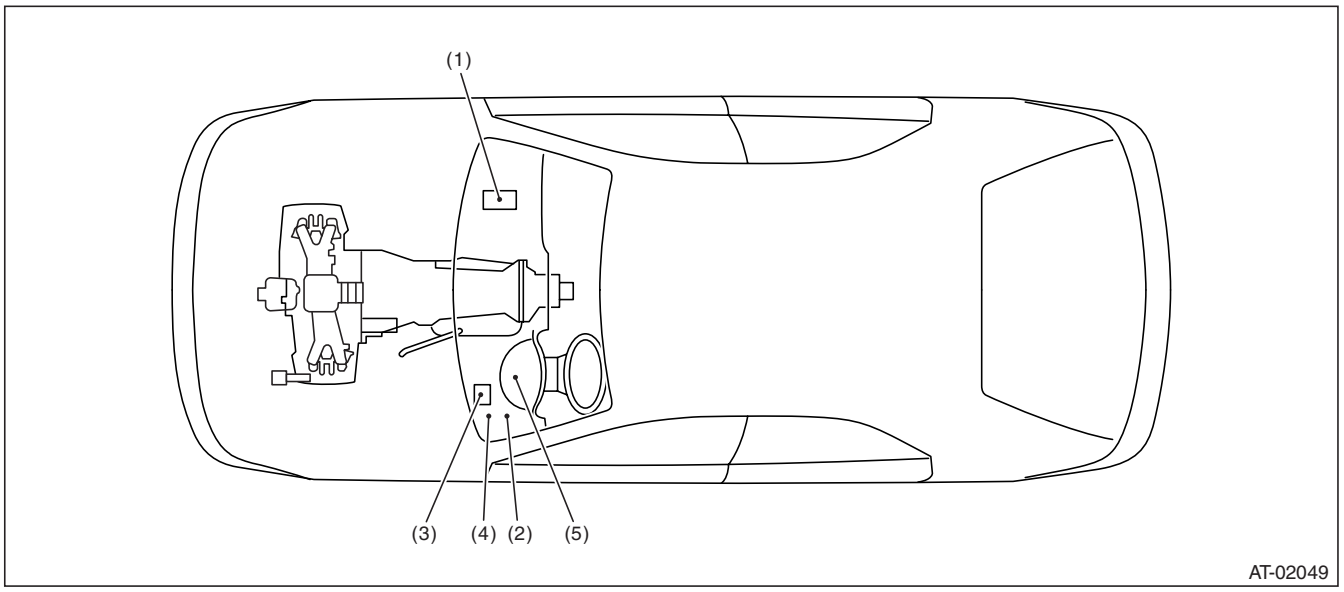
TOOL NAME	REMARKS
Circuit tester	Used for measuring resistance, voltage and current.
Oscilloscope	Used for measuring sensor.

4. Electrical Component Location

A: LOCATION

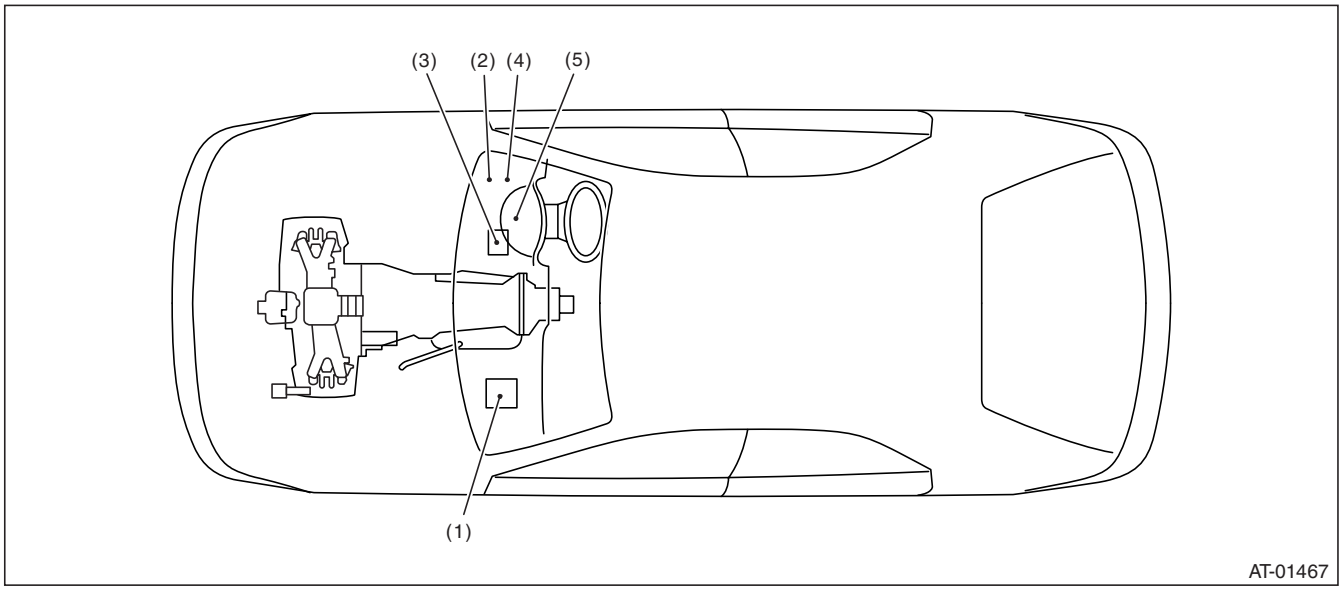
1. CONTROL MODULE

- LHD model



(1) Engine control module (ECM)
(2) SPORT indicator light (AT warning light)
(3) Transmission control module (TCM)
(4) Data link connector
(5) Body integrated module

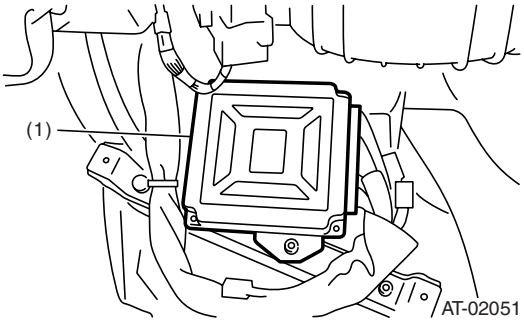
- RHD model

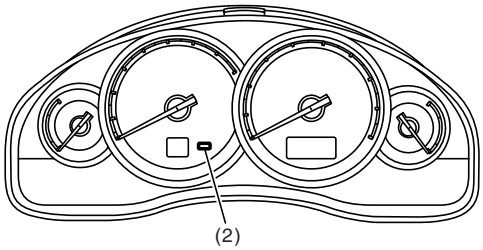


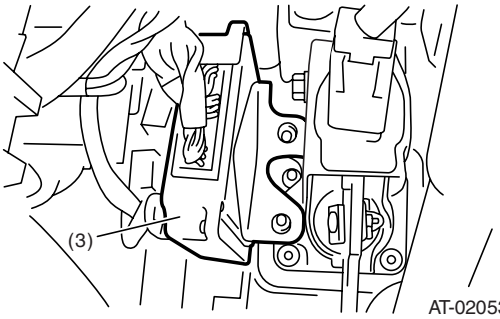
(1) Engine control module (ECM)
(2) SPORT indicator light (AT warning light)
(3) Transmission control module (TCM)
(4) Data link connector
(5) Body integrated module

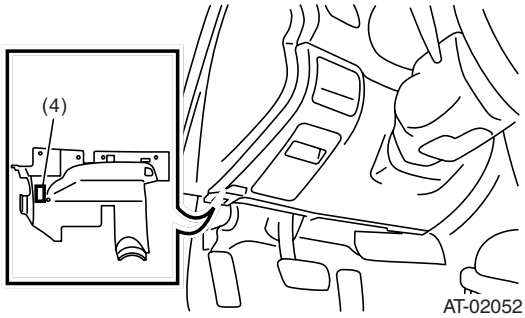
Electrical Component Location

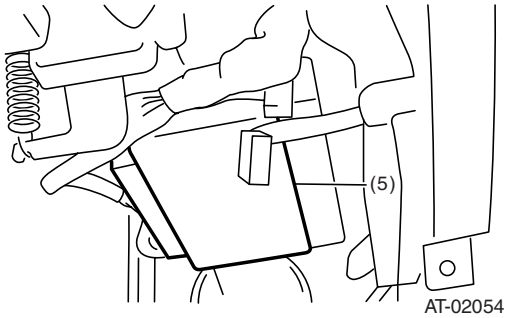
- LHD model





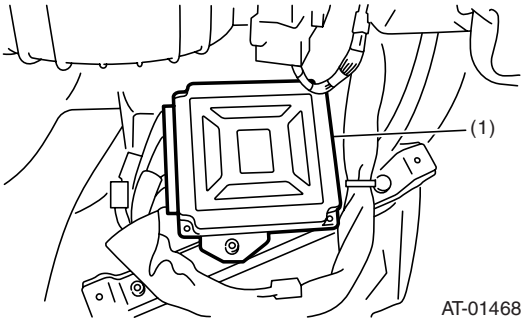


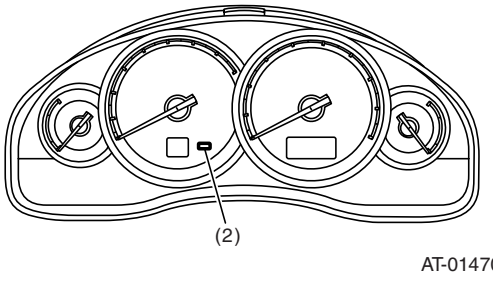


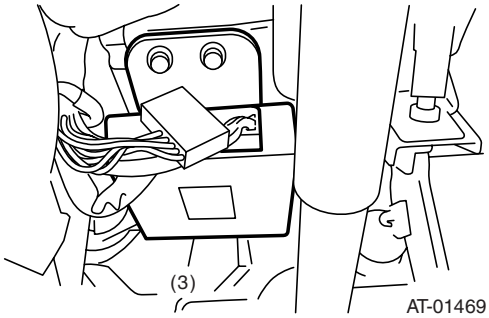


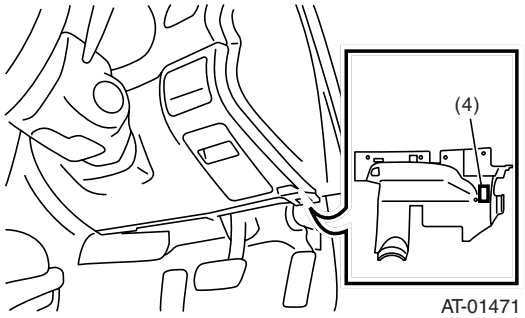
SUBARU.

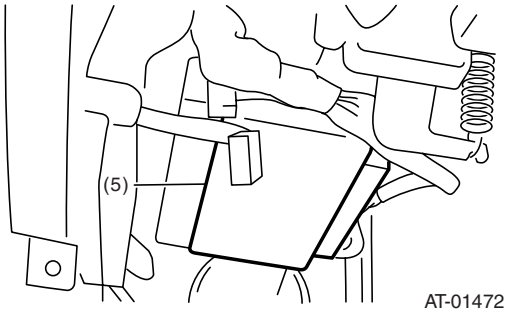
• RHD model







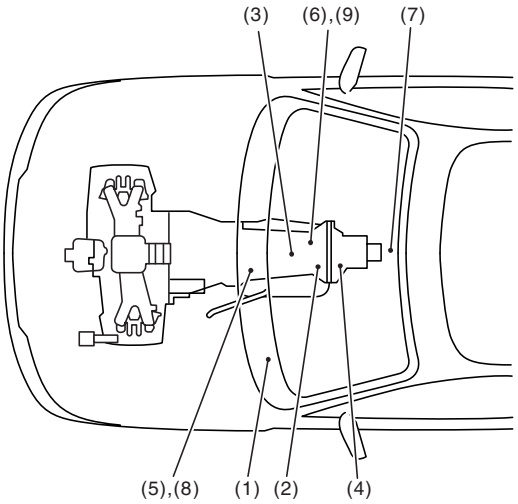




SUBARU.

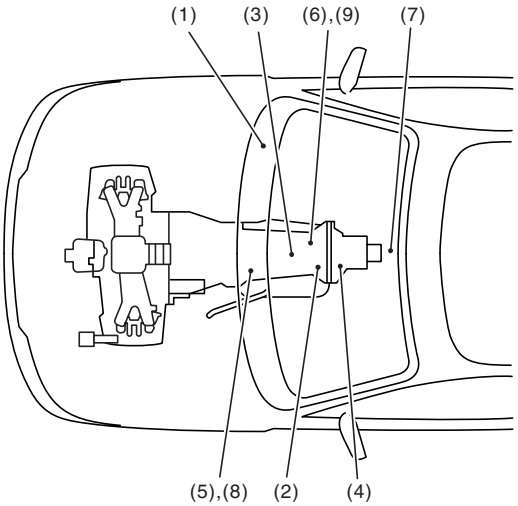
2. SENSOR

- LHD model



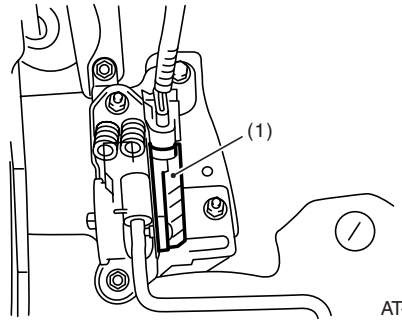
AT-02050

- RHD model

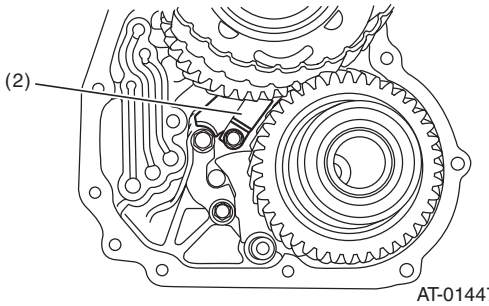


AT-01443

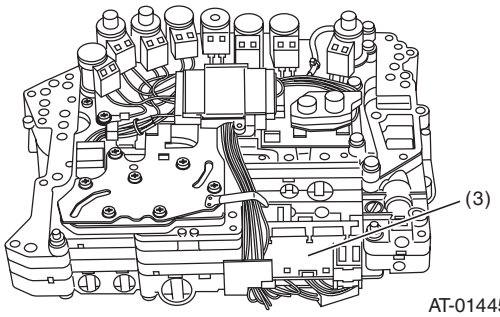
(1) Accelerator pedal position sensor
(2) Front vehicle speed sensor
(3) Inhibitor switch
(4) Rear vehicle speed sensor
(5) Turbine speed sensor 1
(6) ATF temperature sensor 1
(7) Lateral G sensor
(8) Turbine speed sensor 2
(9) ATF temperature sensor 2



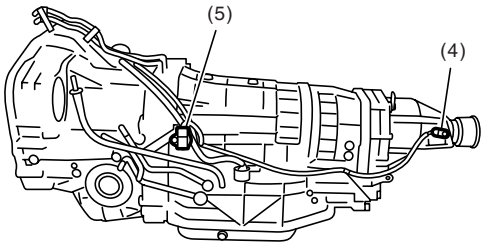
AT-00375



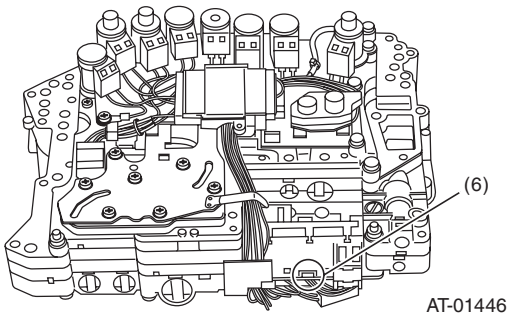
AT-01447



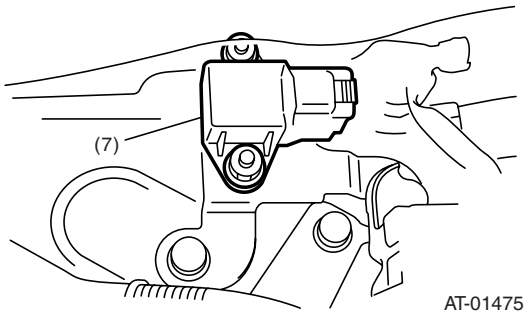
AT-01445



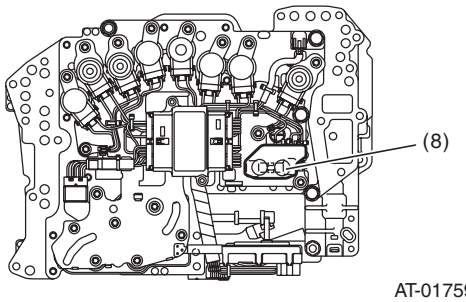
AT-01448



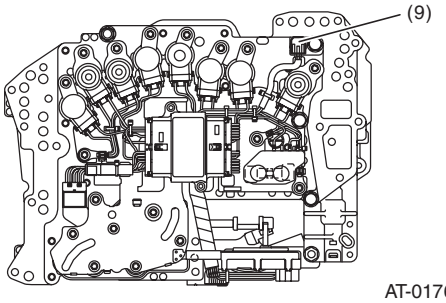
AT-01446



AT-01475

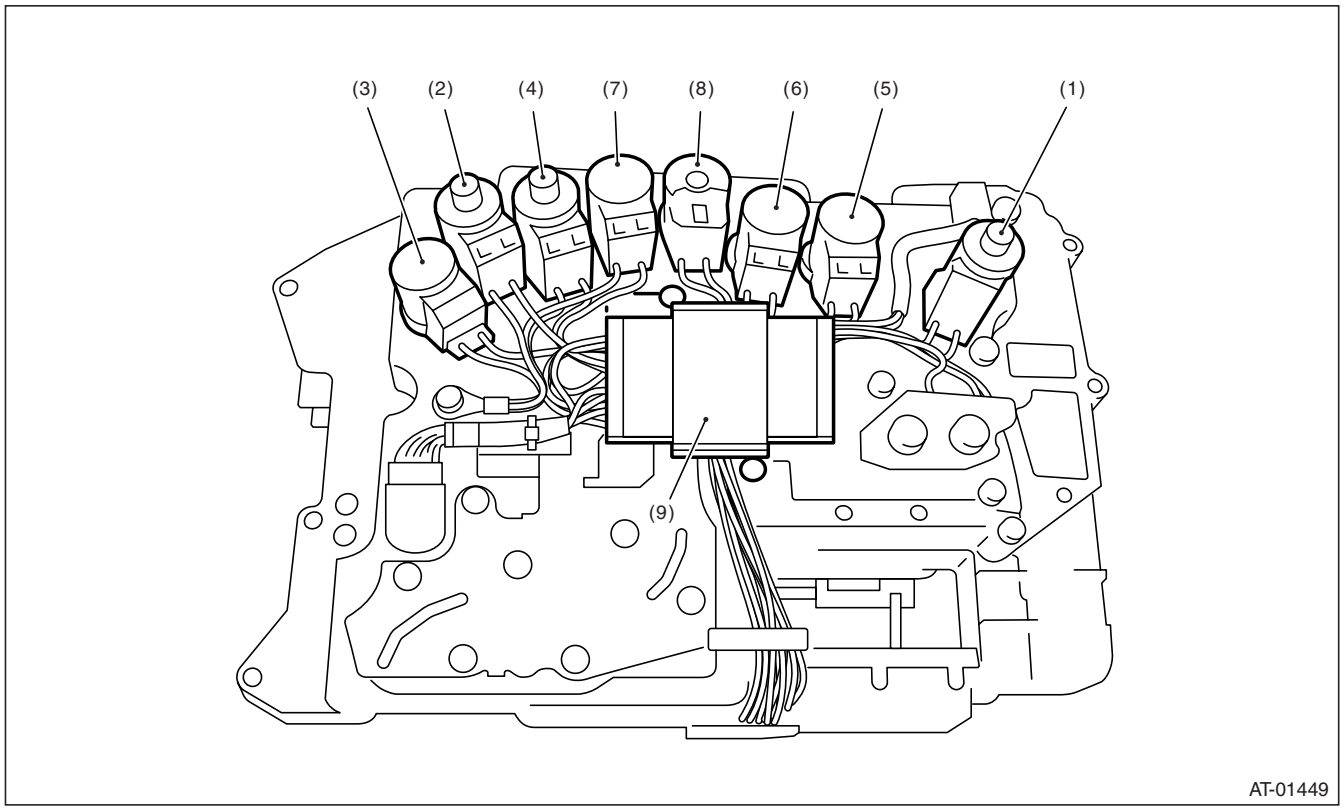


AT-01759



AT-01760

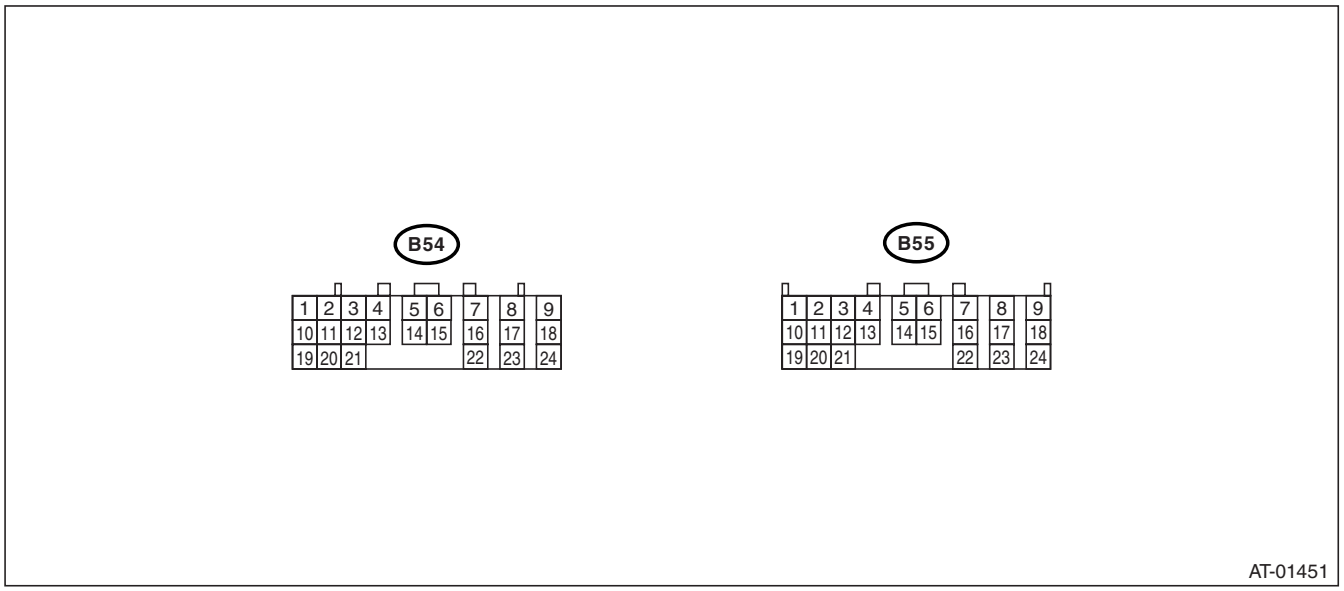
3. SOLENOID



(1) High & low reverse clutch solenoid
(2) Direct clutch solenoid
(3) Front brake solenoid
(4) Input clutch solenoid
(5) Line pressure solenoid
(6) Lock up solenoid
(7) Transfer solenoid
(8) Low coast brake solenoid
(9) Memory box

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

A: ELECTRICAL SPECIFICATION



NOTE:
The measurement should be performed after warming up.

Item	Connector No.	Terminal No.	Measuring conditions	Voltage (V)	Resistance between terminal and chassis ground	Remarks
P/L solenoid output	B54	9	Engine ON, "P" range, Accelerator OFF, Brake ON	Approx. 4.0 — 6.0 V	3 — 9 Ω (ATF temperature 20°C (68°F))	Driving frequency 750 — 850 Hz
			Manual mode 1st, Accelerator OFF, Brake ON	Approx. 2.0 — 4.0 V		
PVIGN power supply	B54	8	Ignition switch ON	Power supply voltage	—	
		7	Ignition switch ON	Power supply voltage	—	
I/C oil pressure switch input	B54	6	—	—	—	The condition of I/C oil pressure switch cannot read by the tester.
Power GND	B54	5	Always	Approx. 0 V	—	
CAN communication line (+)	B54	4	—	—	—	
CAN communication line (–)	B54	3	—	—	—	
ATF temperature sensor 1 input	B54	2	Ignition switch ON	2.5 — 2.9 V (ATF temperature 20°C (68°F)) 0.8 — 1.0 V (ATF temperature 80°C (176°F))	4.0 — 5.0 kΩ (ATF temperature 20°C (68°F)) 0.7 — 0.9 kΩ (ATF temperature 80°C (176°F))	
Battery power supply	B54	1	Always	Power supply voltage	—	

Transmission Control Module (TCM) I/O Signal

Item	Connector No.	Terminal No.	Measuring conditions	Voltage (V)	Resistance between terminal and chassis ground	Remarks
I/C solenoid output	B54	18	While driving at 1st — 3rd of manual mode	Approx. 5.5 — 7.5 V	3 — 9 Ω (ATF temperature 20°C (68°F))	Driving frequency 750 — 850 Hz
			While driving at 4th or 5th of manual mode	Approx. 0 V		
H&LR/C solenoid output	B54	17	While driving at 2nd of manual mode	Approx. 5.5 — 7.5 V	3 — 9 Ω (ATF temperature 20°C (68°F))	Driving frequency 750 — 850 Hz
			While driving at 3rd — 5th of manual mode	Approx. 0 V		
Control valve power supply output	B54	16	Ignition switch ON	Power supply voltage	—	
			Ignition switch OFF	Approx. 0 V		
LC/B solenoid output	B54	15	While driving at 1st — 2nd of manual mode	Power supply voltage	5 — 17 Ω (ATF temperature 25°C (77°F))	
			While driving at 3rd — 5th of manual mode	Approx. 0 V		
Power GND	B54	14	Always	Approx. 0 V	—	
Analog GND (Sensor GND)	B54	13	Always	Approx. 0 V	—	
LC/B oil pressure switch input	B54	12	—	—	—	The condition of LC/B oil pressure switch cannot read by the tester.
ATF temperature sensor 2 input	B54	11	Ignition switch ON	2.3 — 2.7 V (ATF temperature 20°C (68°F)) 0.6 — 0.8 V (ATF temperature 80°C (176°F))	3.0 — 3.6 kΩ (ATF temperature 20°C (68°F)) 0.4 — 0.6 kΩ (ATF temperature 80°C (176°F))	
PVIGN power supply relay output	B54	10	Ignition switch ON	0 — 1.5 V	—	
Fr/B solenoid output	B54	24	While driving at other than 4th of manual mode	Approx. 4.5 — 6.5 V	3 — 9 Ω (ATF temperature 20°C (68°F))	Driving frequency 750 — 850 Hz
			While driving at 4th of manual mode	Approx. 0 V		
L/U solenoid output	B54	23	When lock-up	Approx. 3.5 — 5.5 V	3 — 9 Ω (ATF temperature 20°C (68°F))	Driving frequency 750 — 850 Hz
			When not lock-up	Approx. 0 V		
D/C solenoid output	B54	22	While driving at 1st or 5th of manual mode	Approx. 5.5 — 7.5 V	3 — 9 Ω (ATF temperature 20°C (68°F))	Driving frequency 750 — 850 Hz
			While driving at 2nd — 4th of manual mode	Approx. 0 V		
D/C oil pressure switch input	B54	21	—	—	—	The condition of D/C oil pressure switch cannot read by the tester.
Subaru Select Monitor communication line	B54	20	—	—	—	
Control GND	B54	19	Always	Approx. 0 V	—	

Item	Connector No.	Terminal No.	Measuring conditions	Voltage (V)	Resistance between terminal and chassis ground	Remarks
H&LR/C oil pressure switch input	B55	8	While driving at 2nd of manual mode	Power supply voltage	—	
			While driving at 3rd — 5th of manual mode	Approx. 0 V		
Front vehicle speed sensor input	B55	7	While driving at 2nd and 20 km/h (12 MPH) of manual mode	Approx. 140 — 170 rpm	—	
			While driving at 4th and 80 km/h (50 MPH) of manual mode	Approx. 560 — 680 rpm		
Lateral G sensor power supply	B55	6	Ignition switch ON	4.75 — 5.25 V	—	
Lateral G sensor signal input	B55	5	Ignition switch ON, Engine ON, Flat value	2.0 — 3.0 V	—	
Inhibitor switch 1 input	B55	4	Ignition switch ON, “P” range	4.0 — 5.0 V	—	
			Ignition switch ON, “N” range	1.5 V or less		
Inhibitor switch 2 input	B55	3	Ignition switch ON, “P” range	4.0 — 5.0 V	—	
			Ignition switch ON, “D” range	1.5 V or less		
Accessory power supply	B55	2	Accessory switch ON	Power supply voltage	—	
			Accessory switch OFF	Approx. 0 V		
Ignition power supply	B55	1	Ignition switch ON	Power supply voltage	—	
			Ignition switch OFF	Approx. 0 V		
Rear vehicle speed sensor input	B55	18	While driving at 2nd and 20 km/h (12 MPH) of manual mode	Approx. 190 — 230 rpm	—	
			While driving at 4th and 80 km/h (50 MPH) of manual mode	Approx. 760 — 920 rpm		
Fr/B oil pressure switch input	B55	17	Ignition switch ON, Engine ON, While driving at other than 4th	Approx. 0 V	—	
			Ignition switch ON, Engine ON, While driving at 4th	Power supply voltage		
Turbine speed sensor 1 input	B55	16	2nd of manual mode, Turbine speed sensor is 2,000 rpm (Read from Subaru Select Monitor)	Approx. 0 rpm	—	Use the Subaru Select Monitor.
			4th of manual mode, Turbine speed sensor is 2,000 rpm (Read from Subaru Select Monitor)	Approx. 1,900 — 2,100 rpm		Use the Subaru Select Monitor.
Range lock solenoid output	B55	15	Ignition switch ON, While stopping at “D” range	Approx. Power Supply Voltage – 1.2 V	7 — 21 Ω	
			Ignition switch ON, Vehicle speed at least 20 km/h (12 MPH)	Approx. 0 V		

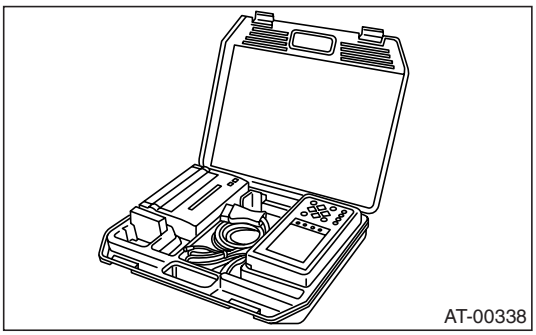
Item	Connector No.	Terminal No.	Measuring conditions	Voltage (V)	Resistance between terminal and chassis ground	Remarks
Inhibitor switch 3 input	B55	14	Ignition switch ON, “R” range	4.0 — 5.0 V	—	
			Ignition switch ON, “D” range	1.5 V or less		
Inhibitor switch 4 input	B55	13	Ignition switch ON, “P” range	4.0 — 5.0 V	—	
			Ignition switch ON, “D” range	1.5 V or less		
Control valve communication line	B55	12	—	—	—	
Back-up light relay output	B55	11	Ignition switch ON, “R” range	1.5 V	Approx. 90 — 110 Ω (ATF temperature 25°C (77°F))	
			Ignition switch ON, Other than “R” range	Power supply voltage		
Ignition power supply	B55	10	Ignition switch ON	Power supply voltage	—	
			Ignition switch OFF	Approx. 0 V		
AWD solenoid output	B55	23	Engine ON, “P” range or “N” range, Accelerator OFF	Approx. 0 V	3 — 9 Ω (ATF temperature 20°C (68°F))	Driving frequency 750 — 850 Hz
			Engine ON, “D” range, Accelerator OFF, Brake ON	Approx. 2.0 — 3.0 V		
Turbine speed sensor 2 input	B55	22	2nd of manual mode, Turbine speed sensor is 2,000 rpm (Read from Subaru Select Monitor)	Approx. 1,300 — 1,500 rpm		Use the Subaru Select Monitor.
			4th of manual mode, Turbine speed sensor is 2,000 rpm (Read from Subaru Select Monitor)	Approx. 1,900 — 2,100 rpm	—	Use the Subaru Select Monitor.
Control GND	B55	21	Always	Approx. 0 V	—	
Inhibitor switch 3 open circuit monitor input	B55	20	Ignition switch ON, “R” range	4.0 — 5.0 V	—	
			Ignition switch ON, “D” range	1.5 V or less		
PN signal output	B55	19	Ignition switch ON, Other than “P” range or “N” range	Power supply voltage	—	ECM should connected correctly
			Ignition switch ON, “P” range or “N” range	0 — 1.0 V	—	

6. Subaru Select Monitor

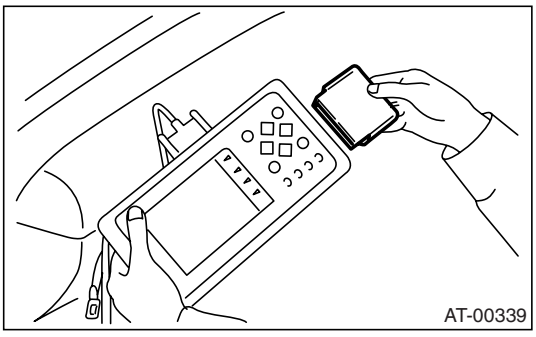
A: OPERATION

1. READ DIAGNOSTIC TROUBLE CODE (DTC)

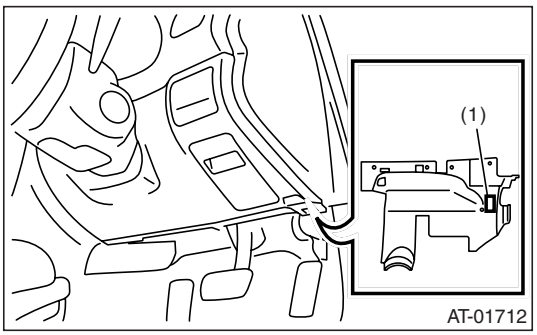
1) Prepare the Subaru Select Monitor kit.



2) Connect the diagnosis cable to Subaru Select Monitor.
3) Insert the cartridge to Subaru Select Monitor. <Ref. to 5AT(diag)-6, PREPARATION TOOL, General Description.>



4) Connect the Subaru Select Monitor to data link connector.
(1) Data link connector is located in the lower portion of instrument panel (on the driver's side).

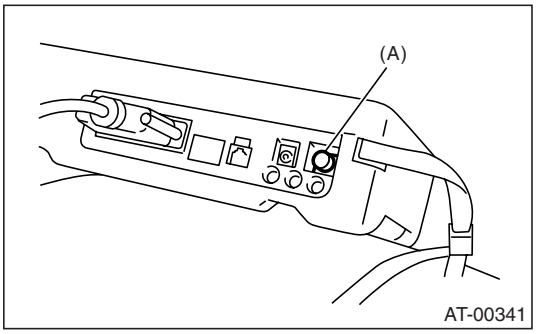


(1) Data link connector

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

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

5) Turn the ignition switch to ON (engine OFF), and turn the Subaru Select Monitor power 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} 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 {Diagnosis Code(s) Display} and press [YES] key.

NOTE:
• For details concerning operation procedure, refer to the SUBARU SELECT MONITOR OPERATION MANUAL.
• For details concerning DTCs, refer to the List of Diagnostic Trouble Code (DTC). <Ref. to 5AT(diag)-31, 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} 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 then 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, scroll the display screen up or down until the desired data is shown.
• A list of the support data is shown in the following table.

Item	Display	Unit of measure
Engine speed signal	Engine speed	rpm
Battery voltage	Battery Voltage	V
Accel. Pedal Position Sensor	Accel. opening angle	%
Front vehicle speed sensor signal	Front Wheel Speed	km/h
Gear position	Gear Position	—
Turbine speed sensor signal	Turbine Revolution Speed	rpm
Rear vehicle speed sensor signal	Rear Wheel Speed	km/h
Lateral G sensor	Lateral G sensor	V
ATF Temperature Sensor 1 Signal	ATF Temp.	°C
ATF Temperature Sensor 2 Signal	ATF Temperature 2	°C
Turbine speed sensor 1 signal	AT Turbine Speed 1	rpm
Turbine speed sensor 2 signal	AT Turbine Speed 2	rpm
High & Low Reverse Clutch Solenoid Indicator Current	H&LR/C Solenoid Current	A
Direct Clutch Solenoid Indicator Current	D/C Solenoid Current	A
Front Brake Solenoid Indicator Current	F/B Solenoid Current	A
Input Clutch Solenoid Indicator Current	I/C Solenoid Current	A
Line Pressure Solenoid Indicator Current	P/L Solenoid Current	A
Lock-up Solenoid Indicator Current	L/U Solenoid Current	A
Transfer Solenoid Indicator Current	AWD Sol. Current	A
High & Low Reverse Clutch Solenoid Target Oil Pressure	H&LR/C Solenoid Pressure	kPa
Direct Clutch Solenoid Target Oil Pressure	D/C Solenoid Pressure	kPa
Front Brake Solenoid Target Oil Pressure	F/B Solenoid Pressure	kPa
Input Clutch Solenoid Target Oil Pressure	I/C Solenoid Pressure	kPa
Line Pressure Solenoid Target Oil Pressure	P/L Solenoid Pressure	kPa
Lock-up Solenoid Target Oil Pressure	L/U Solenoid Pressure	kPa
Transfer Solenoid Target Oil Pressure	4WD Solenoid Pressure	kPa
Ignition switch	Ignition Switch	ON Input or OFF Input
Tip signal	Tip Mode Switch	ON or OFF
Cruise control On signal	Cruise Control Signal	ON or OFF
Tip Down Shift Signal	Down Switch	ON or OFF
Stop light switch signal	Stop Light Switch	ON or OFF
Tip Up Shift Signal	Up Switch	ON or OFF
Drive range signal	D Range Signal	ON or OFF
Reverse range signal	R Range Signal	ON or OFF
Diagnosis Light Output Signal	Diagnosis Lamp	ON or OFF
Shift lock solenoid signal	Shift lock solenoid	ON or OFF
Parking range signal	“P” Range	ON or OFF
P/N Range Output Signal	P/N Signal	ON or OFF
Neutral range signal	“N” Range	ON or OFF
Inhibitor Switch 1 Input Signal	Inhibitor SW1	High or Low
Inhibitor Switch 2 Input Signal	Inhibitor SW2	High or Low
Inhibitor Switch 3 Input Signal	Inhibitor SW3	High or Low
Inhibitor Switch 4 Input Signal	Inhibitor SW4	High or Low
Inhibitor Switch 3 Monitor Input Signal	Inhibitor SW3 Monitor	High or Low
Back Lamp relay output signal	Back Lamp relay	ON or OFF
High & Low Reverse Clutch Fluid Pressure Switch Input Signal	H&LR/C Fluid Pressure	ON or OFF
Direct Clutch Fluid Pressure Switch Input Signal	D/C Fluid Pressure	ON or OFF
Front Brake Fluid Pressure Switch Input Signal	Fr/B Fluid Pressure	ON or OFF
Input Clutch Fluid Pressure Switch Input Signal	I/C Fluid Pressure	ON or OFF

Item	Display	Unit of measure
Low Coast Brake Fluid Pressure Switch Input Signal	LC/B Fluid Pressure	ON or OFF
Low Coast Brake Solenoid Input Signal	LC/B Solenoid	ON or OFF

NOTE:
For details concerning operation procedure, refer to the SUBARU SELECT MONITOR OPERATION MANUAL.

3. CLEAR MEMORY MODE

NOTE:
To clear the previous DTC, use {Clear Memory}, and to clear the learned value, use {Clear Memory 2}.

1) Check that the select lever is in “P” range.
2) On the «Main Menu» display screen, select the {Each System Check} and press the [YES] key.
3) On the «System Selection Menu» display screen, select the {Transmission} and press the [YES] key.
4) Press the [YES] key after the information of transmission type is displayed.
5) On the «Transmission Diagnosis» display screen, select the {Clear Memory} and press the [YES] key.

NOTE:
If {Clear Memory 2} is selected and performed, DTC may not be cleared.

6) When the “Done” are shown on the display screen, turn off the Subaru Select Monitor and turn the ignition switch to OFF. To turn the ignition switch ON again, wait for more than 10 seconds.

NOTE:
For details concerning operation procedure, refer to the SUBARU SELECT MONITOR OPERATION MANUAL.

7. Read Diagnostic Trouble Code (DTC)

A: OPERATION

Refer to “Subaru Select Monitor” for information about how to obtain and understand the DTC. <Ref. to 5AT(diag)-17, OPERATION, Subaru Select Monitor.>

NOTE:
DTC can not be read by SPORT indicator light.

8. Inspection Mode

A: PROCEDURE

WARNING:
Observe the traffic law during actual driving.

1) Shift the select lever to “D” range, and then drive the vehicle with changing the gear from 1st to 5th.
2) When driving the vehicle at 5th speed of “D” range, set the gear to manual mode and drive the vehicle with shifting down using “–” of steering switch or “–” of select lever from 5th → 4th, 4th → 3rd, 3rd → 2nd, 2nd → 1st.

NOTE:
At shifting down, drive the vehicle at least 10 seconds in each speed.

3) Shift the select lever to “R” range and drive the vehicle for more than 2 seconds.

9. Clear Memory Mode

A: OPERATION

Use “Subaru Select Monitor” to clear DTC. <Ref. to 5AT(diag)-19, CLEAR MEMORY MODE, OPERATION, Subaru Select Monitor.>

NOTE:
DTC cannot be cleared without using Subaru Select Monitor.

10.Learning Control

A: GENERAL DESCRIPTION

Be sure to perform the {Clear Memory 2} only when the following services are performed. And when the shifting shock is occurred in total check with vehicle driving, perform the learning with following procedures. <Ref. to 5AT(diag)-19, CLEAR MEMORY MODE, OPERATION, Subaru Select Monitor.>

- Replacement of TCM
- Replacement of transmission assembly
- Replacement of each clutch
- Replacement of control valve body

CAUTION:
When {Clear Memory 2} is executed, DTC may not be cleared.

B: PROCEDURE

1) Turn the ignition switch to ON.
2) Turn the air conditioner switch to OFF.
3) Turn the headlight switch to OFF.
4) Turn the rear defogger switch to OFF.
5) Start the engine.
6) Connect the Subaru Select Monitor to the vehicle.
7) Drive the vehicle for 5 — 10 km (3 — 6 mile) to warm up ATF temperature more than 70 °C (158 °F).
8) While the throttle opening angle on Subaru Select Monitor indicates within specified range, shift the gear from 1st → 2nd, 2nd → 3rd, 3rd → 4th while driving the vehicle at “D” range. <Ref. to 5AT(diag)-17, READ CURRENT DATA, OPERATION, Subaru Select Monitor.>

Throttle opening angle :
Turbo model 10%±2%
Non-turbo model 19%±2%

9) While the throttle opening angle on Subaru Select Monitor indicates within specified range, shift the gear from 4th → 5th with the vehicle at “D” range.

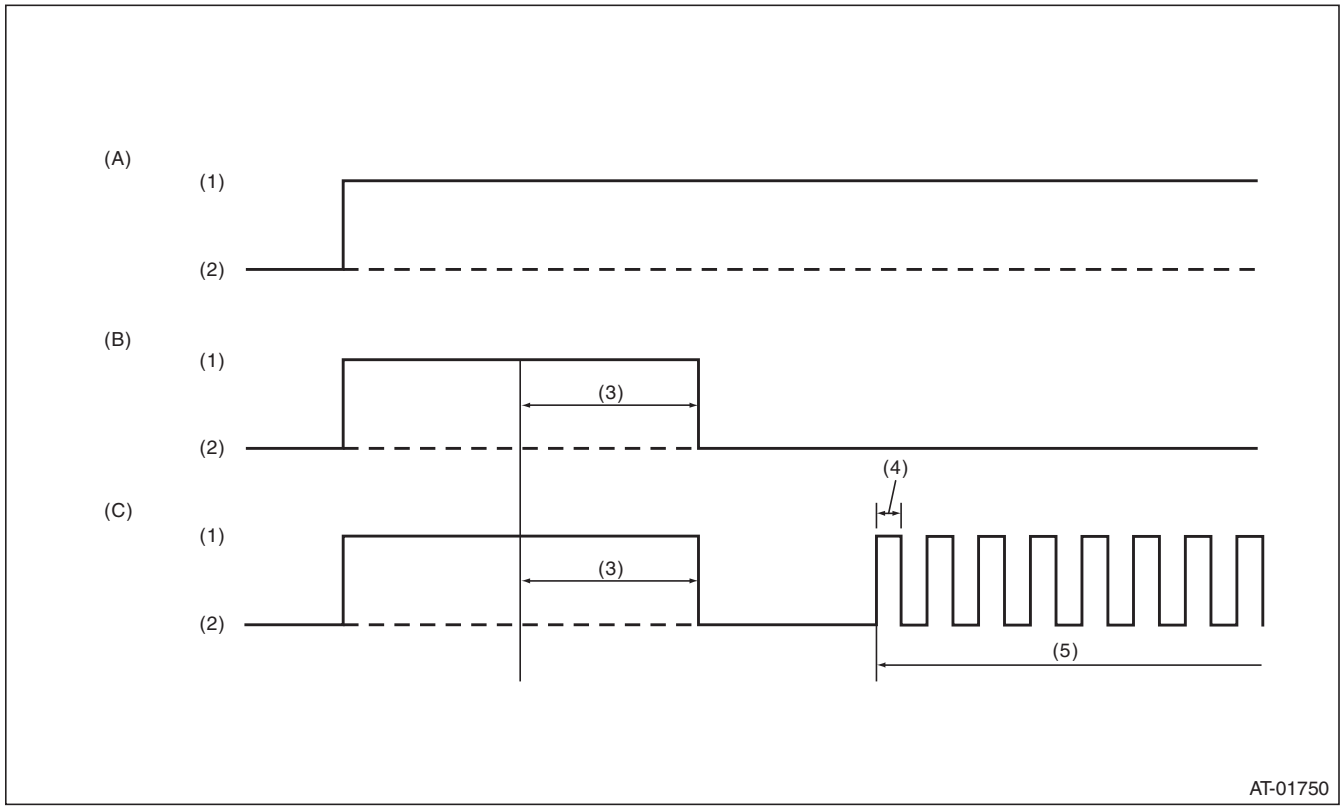
Throttle opening angle :
Turbo model 12.5%±2%
Non-turbo model 22%±2%

10) Repeat the steps 8) — 9) until reducing of shifting shock was felt.
11) If reducing of shifting shock is not felt after 5 cycles, recheck that the learning conditions (throttle opening angle, ATF temperature, etc.) are as specified and recheck that other parts are normal.

11.SPORT Indicator Light Display

A: OPERATION

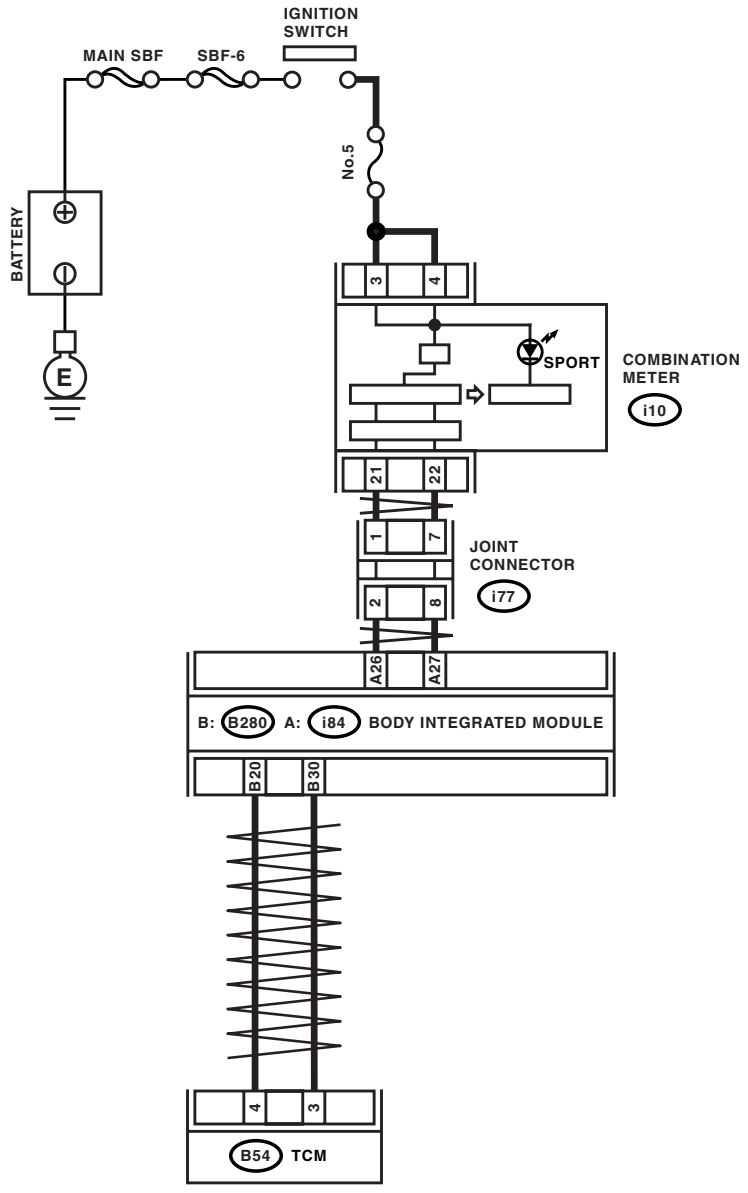
When any on-board diagnostics item is malfunctioning, the display on the SPORT indicator light blinks from the time the malfunction is detected after starting the engine until the ignition switch is turned OFF. The malfunctioning part or unit can be determined by a DTC during the on-board diagnostics operation. Problems which occurred previously can also be identified through the memory function. If the SPORT indicator 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 Subaru Select Monitor. Indicator light signal patterns are as shown in the figure.
When the SPORT indicator light does not operates normally though the DTC is not stored, perform the SPORT indicator light inspection. <Ref. to 5AT(diag)-25, INSPECTION, SPORT Indicator Light Display.>

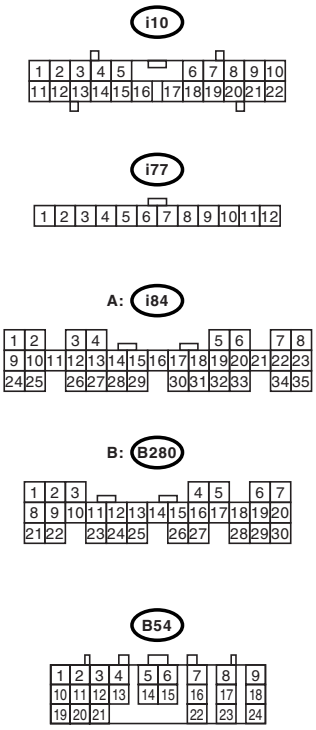


(A) Ignition switch (Engine OFF)
(B) Normal (Engine ON)
(C) Faulty (Engine ON)
(1) ON
(2) OFF
(3) 2 sec.
(4) 0.25 sec.
(5) Blink

B: INSPECTION

DIAGNOSIS:
SPORT indicator light circuit is open or shorted.
TROUBLE SYMPTOM:
When the ignition switch is turned to ON (engine OFF), SPORT indicator light does not illuminate.
WIRING DIAGRAM:





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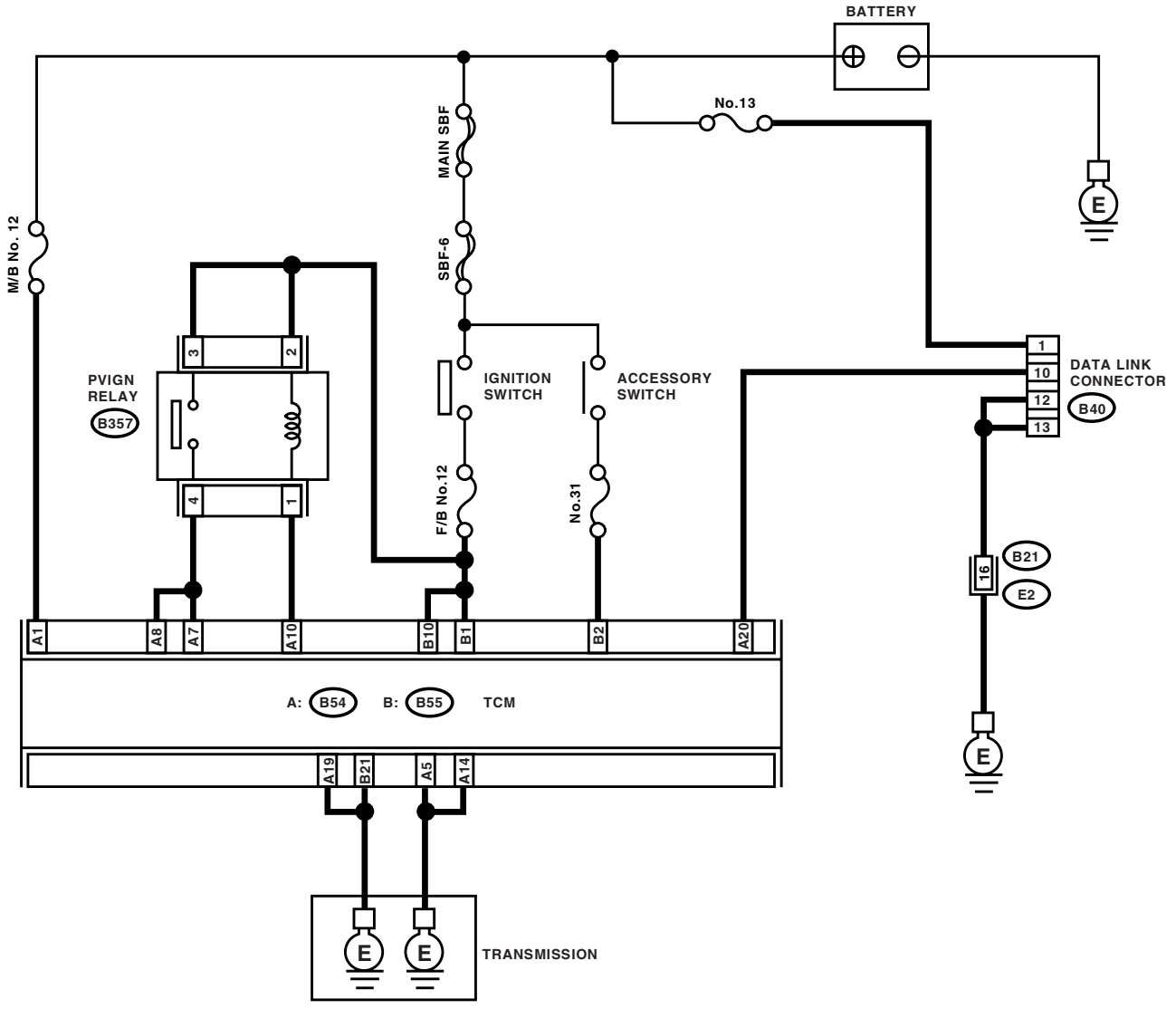
SPORT Indicator Light Display

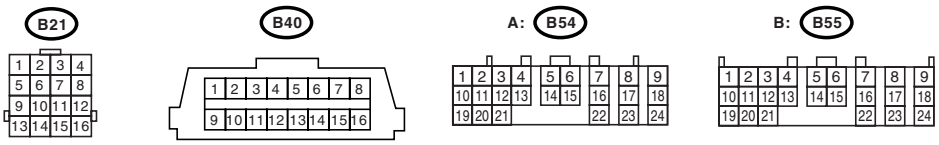
	Step	Check	Yes	No
1	**CHECK SPORT INDICATOR LIGHT.** Turn the ignition switch to ON.	Does the SPORT indicator light illuminate?	Go to step **2.**	Perform the self-diagnosis of combination meter.
2	**CHECK SPORT INDICATOR LIGHT.** After the ignition switch is ON, wait for at least 2 seconds.	Does the SPORT indicator light illuminate?	Go to step **3.**	Go to step **4.**
3	**CHECK SPORT INDICATOR LIGHT.** Start the engine.	Does the SPORT indicator light go off?	Normal. Go back to “Basic Diagnostic Procedure”. <Ref. to 5AT(diag)-2, Basic Diagnostic Procedure.>	Go to step **7.**
4	**CHECK SUBARU SELECT MONITOR COMMUNICATION.** Connect the Subaru Select Monitor to data link connector.	Is the communication between Subaru Select Monitor and TCM normal?	Go to step **5.**	Check the power supply ground circuit of TCM and Subaru Select Monitor communication. <Ref. to 5AT(diag)-27, Diagnostic Procedure for Subaru Select Monitor Communication.>
5	**CHECK TCM.** Display the current data of TCM using Subaru Select Monitor.	Is the “Diagnosis Lamp” output signal “ON”?	Go to step **6.**	Replace the TCM. <Ref. to 5AT-61, Transmission Control Module (TCM).>
6	**CHECK BODY INTEGRATED MODULE.** Display the current data of body integrated module using Subaru Select Monitor. <Ref. to LAN(diag)-14, OPERATION, Subaru Select Monitor.>	Is the “SPORT Lamp” input signal “Illuminate”?	Replace the combination meter assembly. <Ref. to IDI-15, Combination Meter.>	Check DTC of body integrated module. <Ref. to LAN(diag)-14, OPERATION, Subaru Select Monitor.>
7	**CHECK TCM.** 1) Start the engine. 2) Display the current data of TCM using Subaru Select Monitor. <Ref. to 5AT(diag)-17, OPERATION, Subaru Select Monitor.>	Is the “Diagnosis Lamp” output signal “ON”?	Replace the TCM. <Ref. to 5AT-61, Transmission Control Module (TCM).>	Go to step **8.**
8	**CHECK BODY INTEGRATED MODULE.** Display the current data of body integrated module using Subaru Select Monitor. <Ref. to LAN(diag)-14, OPERATION, Subaru Select Monitor.>	Is the “SPORT Lamp” input signal “Illuminate”?	Check DTC of body integrated module. Perform the diagnosis according to DTC. <Ref. to LAN(diag)-14, OPERATION, Subaru Select Monitor.>	Perform the self-diagnosis for combination meter. <Ref. to IDI-3, INSPECTION, Combination Meter System.>

12. Diagnostic Procedure for Subaru Select Monitor Communication

A: COMMUNICATION FOR INITIALIZING IMPOSSIBLE

DIAGNOSIS:
Defective harness connector
TROUBLE SYMPTOM:
Subaru Select Monitor communication failure
WIRING DIAGRAM:





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Diagnostic Procedure for Subaru Select Monitor Communication

	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 connector and connector between battery and data link connector, and poor contact in 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 of harness between data link connector and ground terminal, and poor contact in 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.	Are the name and year of system 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) Turn the ignition switch to ON. 4) Check whether communication to engine systems can be executed normally.	Are the name and year of system displayed on Subaru Select Monitor?	Go to step **6.**	Go to step **5.**
5	**CHECK COMMUNICATION OF SUBARU SELECT MONITOR.** 1) Turn the ignition switch to OFF. 2) Connect the TCM connector. 3) Disconnect the ECM connector. 4) Turn the ignition switch to ON. 5) Check whether communication to transmission systems can be executed normally.	Are the name and year of system displayed on Subaru Select Monitor?	Inspect the ECM.	Go to step **6.**
6	**CHECK HARNESS CONNECTOR BETWEEN EACH CONTROL MODULE AND DATA LINK CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the TCM and ECM connector. 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.**	Check harness and connector between each control module and data link connector.
7	**CHECK OUTPUT SIGNAL OF 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?	Check 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*** ***(B54) No. 20 — (B40) No. 10:***	Is the resistance less than 1 Ω?	Go to step **9.**	Repair the harness and connector between TCM and data link connector.

	Step	Check	Yes	No
9	**CHECK INSTALLATION OF TCM CONNECTOR.** Turn the ignition switch to OFF.	Is TCM connector connected to TCM?	Go to step **10.**	Connect the TCM connector to TCM.
10	**CHECK INSTALLATION OF TRANSMISSION HARNESS CONNECTOR.**	Is the transmission harness connector connected to bulkhead harness connector?	Go to step **11.**	Connect the bulkhead harness connector to transmission harness connector.
11	**CHECK POOR CONTACT IN CONNECTORS.**	Is there poor contact in control module power supply and data link connector?	Repair the poor contact.	Go to step **12.**
12	**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*** ***(B54) No. 1 (+) — Chassis ground (−):***	Is the voltage 10 — 13 V?	Go to step **15.**	Go to step **13.**
13	**CHECK FUSE.** 1) Turn the ignition switch to OFF. 2) Remove the fuse M/B (No. 12).	Is the fuse M/B (No. 12) blown out?	Go to step **14.**	Repair the open circuit of harness between fuse M/B (No. 12) and TCM, or fuse M/B (No. 12) and battery, and poor contact in connector.
14	**CHECK HARNESS.** Measure the resistance between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 1 — Chassis ground:***	Is the resistance less than 10 Ω?	Replace the fuse M/B (No. 12). If the replaced fuse M/B (No. 12) has blown out easily, repair the short circuit of harness between fuse M/B (No. 12) and TCM.	Replace the fuse M/B (No. 12).
15	**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*** ***(B55) No. 1 (+) — Chassis ground (−):*** ***(B55) No. 10 (+) — Chassis ground (−):***	Is the voltage 10 — 13 V?	Go to step **17.**	Go to step **16.**
16	**CHECK FUSE.** Remove the fuse F/B (No. 12).	Is the fuse F/B (No. 12) blown out?	Replace the fuse F/B (No. 12). If the replaced fuse F/B (No. 12) has blown out easily, repair the short circuit of harness between fuse F/B (No. 12) and TCM.	Repair the open circuit of harness between fuse F/B (No. 12) and TCM, or fuse F/B (No. 12) and battery, and poor contact in connector.

	Step	Check	Yes	No
17	**CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from TCM. 3) Measure the resistance of harness between TCM and transmission ground. ***Connector & terminal*** ***(B54) No. 19 — Transmission ground:*** ***(B55) No. 21 — Transmission ground:*** ***(B54) No. 5 — Transmission ground:*** ***(B54) No. 14 — Transmission ground:***	Is the resistance more than 1 MΩ?	Repair the open circuit of harness between TCM and transmission ground, and poor contact in connector.	Go to step **18.**
18	**CHECK POOR CONTACT IN CONNECTORS.**	Is there poor contact in TCM power supply, ground and data link connector?	Repair the connector.	Replace the TCM. <Ref. to 5AT-61, Transmission Control Module (TCM).>

13.List of Diagnostic Trouble Code (DTC)

A: LIST

DTC	Item	Contents of diagnosis	Reference target
P0705	Transmission Range Sensor Circuit (PRNDL Input)	Inhibitor switch malfunction, open or short circuit	<Ref. to 5AT(diag)-35, DTC P0705 TRANSMISSION RANGE SENSOR CIRCUIT (PRNDL INPUT), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0712	Transmission Fluid Temperature Sensor Circuit Low Input	ATF temperature sensor 1 malfunction, open input signal circuit	<Ref. to 5AT(diag)-39, DTC P0712 TRANSMISSION FLUID TEMPERATURE SENSOR CIRCUIT LOW INPUT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0713	Transmission Fluid Temperature Sensor Circuit High Input	ATF temperature sensor 1 malfunction, short input signal circuit	<Ref. to 5AT(diag)-42, DTC P0713 TRANSMISSION FLUID TEMPERATURE SENSOR CIRCUIT HIGH INPUT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0715	Input/Turbine Speed Sensor Circuit	Turbine speed sensor 1 malfunction, short input signal circuit	<Ref. to 5AT(diag)-45, DTC P0715 INPUT/TURBINE SPEED SENSOR CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0719	Torque Converter/Brake Switch “B” Circuit Low	Brake switch malfunction, open input signal circuit, body integrated module malfunction, CAN communication malfunction	<Ref. to 5AT(diag)-48, DTC P0719 TORQUE CONVERTER/BRAKE SWITCH “B” CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0720	Output Speed Sensor Circuit	Front wheel speed sensor is faulty or input signal circuit, ground, power supply is open or shorted.	<Ref. to 5AT(diag)-50, DTC P0720 OUTPUT SPEED SENSOR CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0724	Torque Converter/Brake Switch “B” Circuit High	Brake switch malfunction, short circuit of input signal, body integrated module malfunction, CAN communication malfunction	<Ref. to 5AT(diag)-53, DTC P0724 TORQUE CONVERTER/BRAKE SWITCH “B” CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0725	Engine Speed Input Circuit	Open or short engine speed output signal circuit, ECM malfunction, CAN communication malfunction	<Ref. to 5AT(diag)-55, DTC P0725 ENGINE SPEED INPUT CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0731	Gear 1 Incorrect Ratio	Vehicle sensor, turbine speed sensor, control valve malfunction or shift clutch malfunction	<Ref. to 5AT(diag)-55, DTC P0731 GEAR 1 INCORRECT RATIO, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0732	Gear 2 Incorrect Ratio	Vehicle sensor, turbine speed sensor, control valve malfunction or shift clutch malfunction	<Ref. to 5AT(diag)-55, DTC P0732 GEAR 2 INCORRECT RATIO, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0733	Gear 3 Incorrect Ratio	Vehicle sensor, torque converter turbine speed sensor or shift clutch malfunction	<Ref. to 5AT(diag)-55, DTC P0733 GEAR 3 INCORRECT RATIO, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0734	Gear 4 Incorrect Ratio	Vehicle sensor, torque converter turbine speed sensor or shift clutch malfunction	<Ref. to 5AT(diag)-55, DTC P0734 GEAR 4 INCORRECT RATIO, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0735	Gear 5 Incorrect Ratio	Vehicle sensor, torque converter turbine speed sensor or shift clutch malfunction	<Ref. to 5AT(diag)-55, DTC P0735 GEAR 5 INCORRECT RATIO, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0736	Reverse Incorrect Ratio	Vehicle sensor, torque converter turbine speed sensor or shift clutch malfunction	<Ref. to 5AT(diag)-56, DTC P0736 REVERSE INCORRECT RATIO, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0741	Torque Converter Clutch Circuit Performance or Stuck Off	Lock-up clutch is faulty or valve is stuck.	<Ref. to 5AT(diag)-57, DTC P0741 TORQUE CONVERTER CLUTCH CIRCUIT PERFORMANCE OR STUCK OFF, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

List of Diagnostic Trouble Code (DTC)

DTC	Item	Contents of diagnosis	Reference target
P0743	Torque Converter Clutch Circuit Electrical	L/U solenoid circuit malfunction or L/U solenoid body malfunction	<Ref. to 5AT(diag)-58, DTC P0743 TORQUE CONVERTER CLUTCH CIRCUIT ELECTRICAL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0748	Pressure Control Solenoid “A” Electrical	Line pressure solenoid circuit malfunction or line pressure solenoid body malfunction	<Ref. to 5AT(diag)-60, DTC P0748 PRESSURE CONTROL SOLENOID “A” ELECTRICAL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0751	Shift Solenoid “A” Performance or Stuck Off	Shift Solenoid “A” performance malfunction	<Ref. to 5AT(diag)-62, DTC P0751 SHIFT SOLENOID “A” PERFORMANCE OR STUCK OFF, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0753	Shift Solenoid “A” Electrical	Fr/B solenoid circuit malfunction or Fr/B solenoid body malfunction	<Ref. to 5AT(diag)-65, DTC P0753 SHIFT SOLENOID “A” ELECTRICAL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0756	Shift Solenoid “B” Performance or Stuck Off	Shift Solenoid “B” Performance malfunction	<Ref. to 5AT(diag)-67, DTC P0756 SHIFT SOLENOID “B” PERFORMANCE OR STUCK OFF, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0758	Shift Solenoid “B” Electrical	I/C solenoid circuit malfunction or I/C solenoid body malfunction	<Ref. to 5AT(diag)-70, DTC P0758 SHIFT SOLENOID “B” ELECTRICAL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0761	Shift Solenoid “C” Performance or Stuck Off	H&LR/C solenoid malfunction	<Ref. to 5AT(diag)-72, DTC P0761 SHIFT SOLENOID “C” PERFORMANCE OR STUCK OFF, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0763	Shift Solenoid “C” Electrical	H&LR/C solenoid circuit malfunction or H&LR/C solenoid body malfunction	<Ref. to 5AT(diag)-75, DTC P0763 SHIFT SOLENOID “C” ELECTRICAL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0766	Shift Solenoid “D” Performance or Stuck Off	D/C solenoid malfunction	<Ref. to 5AT(diag)-77, DTC P0766 SHIFT SOLENOID “D” PERFORMANCE OR STUCK OFF, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0768	Shift Solenoid “D” Electrical	D/C solenoid circuit malfunction or D/C solenoid body malfunction	<Ref. to 5AT(diag)-80, DTC P0768 SHIFT SOLENOID “D” ELECTRICAL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0771	Shift Solenoid “E” Performance or Stuck Off	LC/B solenoid malfunction	<Ref. to 5AT(diag)-82, DTC P0771 SHIFT SOLENOID “E” PERFORMANCE OR STUCK OFF, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0773	Shift Solenoid “E” Electrical	• LC/B solenoid circuit malfunction or LC/B solenoid body malfunction • OFF malfunction of PVIGN relay circuit or relay body	<Ref. to 5AT(diag)-85, DTC P0773 SHIFT SOLENOID “E” ELECTRICAL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0801	Reverse Inhibit Control Circuit	• Shift lock solenoid is faulty or output signal circuit is open or shorted. • Blown out of TCM+B fuse	<Ref. to 5AT(diag)-88, DTC P0801 REVERSE INHIBIT CONTROL CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0817	Starter Disable Circuit	• PN signal output circuit is open or shorted. • ECM Source Voltage Is Abnormal • Blown out of TCM+B fuse	<Ref. to 5AT(diag)-91, DTC P0817 STARTER DISABLE CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0882	TCM Power Input Signal Low	PVIGN relay output circuit is open, shorted or relay malfunction	<Ref. to 5AT(diag)-93, DTC P0882 TCM POWER INPUT SIGNAL LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

DTC	Item	Contents of diagnosis	Reference target
P0957	Backup Light Relay Circuit Low	Back-up relay output circuit is open, shorted or relay OFF malfunction	<Ref. to 5AT(diag)-95, DTC P0957 BACKUP LIGHT RELAY CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0958	Backup Light Relay Circuit High	Back-up relay output circuit is open, shorted or relay ON malfunction	<Ref. to 5AT(diag)-97, DTC P0958 BACKUP LIGHT RELAY CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1601	TCM Data Communication Failure	Communication Failure between TCM and Memory Box	<Ref. to 5AT(diag)-99, DTC P1601 TCM DATA COMMUNICATION FAILURE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1706	AT Vehicle Speed Sensor Circuit Malfunction (Rear Wheel)	Rear wheel speed sensor is faulty or input circuit, ground, power supply is open or shorted.	<Ref. to 5AT(diag)-101, DTC P1706 AT VEHICLE SPEED SENSOR CIRCUIT MALFUNCTION (REAR WHEEL), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1707	AT AWD Solenoid Valve Circuit Malfunction	AWD solenoid circuit malfunction or AWD solenoid body malfunction	<Ref. to 5AT(diag)-104, DTC P1707 AT AWD SOLENOID VALVE CIRCUIT MALFUNCTION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1710	Torque Converter Turbine 2 Speed Signal Circuit 2 Malfunction	Torque converter sensor 2 malfunction, input circuit, ground, power open, short circuit	<Ref. to 5AT(diag)-106, DTC P1710 TORQUE CONVERTER TURBINE 2 SPEED SIGNAL CIRCUIT 2 MALFUNCTION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1716	ATF Temp. Sensor 2 Circuit Low	ATF temperature sensor 2 malfunction, open input signal circuit	<Ref. to 5AT(diag)-109, DTC P1716 ATF TEMP. SENSOR 2 CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1717	ATF Temp. Sensor 2 Circuit High	ATF temperature sensor 2 malfunction, short input signal circuit	<Ref. to 5AT(diag)-112, DTC P1717 ATF TEMP. SENSOR 2 CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1718	AT CAN Communication Circuit	CAN communication line bus off is open, EUM short circuit, ABS/VDCCM, integrated CU malfunction	<Ref. to 5AT(diag)-114, DTC P1718 AT CAN COMMUNICATION CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1760	Lateral Acceleration Sensor Performance Problem	Lateral G sensor malfunction	<Ref. to 5AT(diag)-115, DTC P1760 LATERAL ACCELERATION SENSOR PERFORMANCE PROBLEM, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1761	Lateral Acceleration Sensor Circuit Low	Lateral G sensor is faulty, input signal circuit is open or CAN communication is malfunction.	<Ref. to 5AT(diag)-118, DTC P1761 LATERAL ACCELERATION SENSOR CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1762	Lateral Acceleration Sensor Circuit High	Lateral G sensor is faulty or input signal circuit is shorted.	<Ref. to 5AT(diag)-121, DTC P1762 LATERAL ACCELERATION SENSOR CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1798	Gear 1 Engine Brake	Malfunction of clutch oil pressure related to 1st engine brake, solenoid current malfunction	<Ref. to 5AT(diag)-123, DTC P1798 GEAR 1 ENGINE BRAKE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1799	Interlock	Malfunction of clutch oil pressure which emit interlock, solenoid current malfunction	<Ref. to 5AT(diag)-124, DTC P1799 INTERLOCK, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1817	SPORT Mode Switch Circuit (Manual Switch)	SPORT mode and manual mode switch is open or shorted, or switch malfunction	<Ref. to 5AT(diag)-125, DTC P1817 SPORT MODE SWITCH CIRCUIT (MANUAL SWITCH), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1840	Transmission Fluid Pressure Sensor/Switch A Circuit	Fr/B oil pressure switch is open or shorted, or switch malfunction	<Ref. to 5AT(diag)-127, DTC P1840 TRANSMISSION FLUID PRESSURE SENSOR/SWITCH A CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

List of Diagnostic Trouble Code (DTC)

DTC	Item	Contents of diagnosis	Reference target
P1842	Transmission Fluid Pressure Sensor/Switch C Circuit	I/C oil pressure switch is open or shorted, or switch malfunction	<Ref. to 5AT(diag)-127, DTC P1842 TRANSMISSION FLUID PRESSURE SENSOR/SWITCH C CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1843	Transmission Fluid Pressure Sensor/Switch D Circuit	D/C oil pressure switch is open or shorted, or switch malfunction	<Ref. to 5AT(diag)-127, DTC P1843 TRANSMISSION FLUID PRESSURE SENSOR/SWITCH D CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1844	Transmission Fluid Pressure Sensor/Switch E Circuit	H&LR/C oil pressure switch is open or shorted, or switch malfunction	<Ref. to 5AT(diag)-127, DTC P1844 TRANSMISSION FLUID PRESSURE SENSOR/SWITCH E CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

14. Diagnostic Procedure with Diagnostic Trouble Code (DTC)

A: DTC P0705 TRANSMISSION RANGE SENSOR CIRCUIT (PRNDL INPUT)

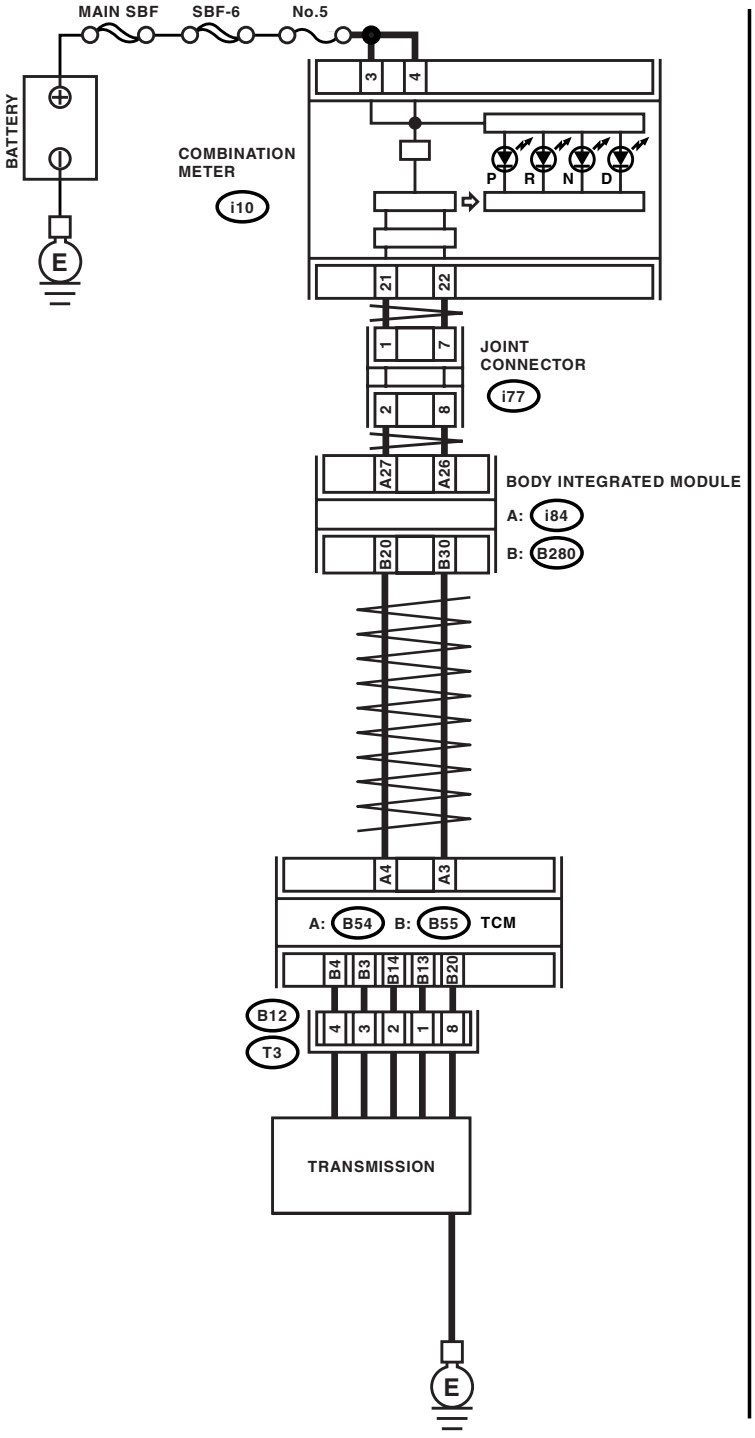
DTC DETECTING CONDITION:

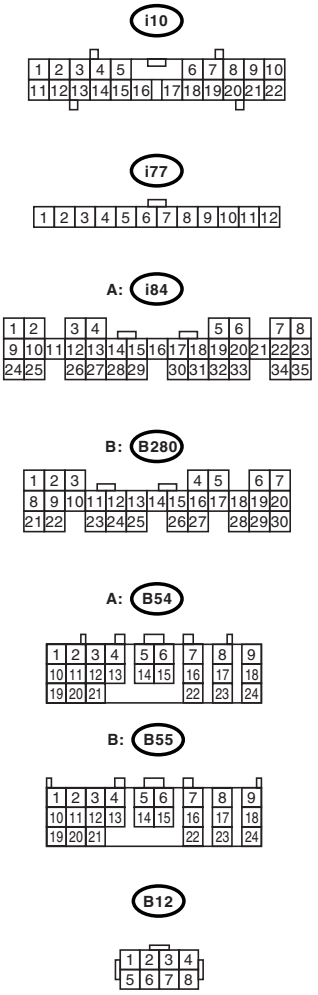
The inhibitor switch is open or short.

TROUBLE SYMPTOM:

- Shift characteristics are erroneous.
- Shift indicator light does not match with select lever.
- Shift indicator light does not illuminate.
- N-D, N-R shock occur.

WIRING DIAGRAM:





AT-03174

	Step	Check	Yes	No
1	**CHECK DTC OF TCM.**	Is DTC of AT CAN communication circuit displayed?	Perform the diagnosis according to DTC.	Go to step **2.**
2	**CHECK INHIBITOR SWITCH.** 1) Shift the select lever to "P" range. 2) Check input signal of inhibitor SW 1 — 4 and inhibitor SW 3 monitor using Subaru Select Monitor.	Are all indications High?	Go to step **4.**	Go to step **3.**
3	**CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from TCM and transmission. 3) Measure the resistance between TCM connector and chassis ground about the item which indicated Low on step 2. ***Connector & terminal*** ***(B55) No. 4 — Chassis ground:*** ***(B55) No. 3 — Chassis ground:*** ***(B55) No. 14 — Chassis ground:*** ***(B55) No. 13 — Chassis ground:*** ***(B55) No. 20 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **6.**	Repair the short circuit of harness between TCM connector and chassis ground.
4	**CHECK INHIBITOR SWITCH.** 1) Shift the select lever to "D" range. 2) Check input signal of inhibitor SW 1 — 4 and inhibitor SW 3 monitor using Subaru Select Monitor.	Are all indications Low?	Go to step **6.**	Go to step **5.**
5	**CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from TCM and transmission. 3) Measure the resistance of harness between TCM and transmission connector about the item which indicated High on step 4. ***Connector & terminal*** ***(B55) No. 4 — (B12) No. 4:*** ***(B55) No. 3 — (B12) No. 3:*** ***(B55) No. 14 — (B12) No. 2:*** ***(B55) No. 13 — (B12) No. 1:*** ***(B55) No. 20 — (B12) No. 8:***	Is the resistance less than 1 Ω?	Go to step **6.**	Repair the open circuit of harness between TCM connector and transmission connector.
6	**CHECK INPUT SIGNAL FOR TCM USING CIRCUIT TESTER.** 1) Turn the ignition switch to OFF. 2) Disconnect the transmission connector (B12). 3) Connect the TCM connector. 4) Turn the ignition switch to ON. 5) Measure the voltage between TCM terminals. ***Connector & terminal*** ***(B55) No. 4 — (B54) No. 19:*** ***(B55) No. 3 — (B54) No. 19:*** ***(B55) No. 14 — (B54) No. 19:*** ***(B55) No. 13 — (B54) No. 19:*** ***(B55) No. 20 — (B54) No. 19:***	Is the voltage 4 — 6 V for the inhibitor SW 1 — 4? / Is the voltage 3.5 — 5.5 V for the inhibitor SW 3 monitor?	Go to step **8.**	Go to step **7.**

	Step	Check	Yes	No
7	**CHECK TCM I/O SIGNAL.** Check I/O signal of power supply, ground and PVIGN power supply relay. <Ref. to 5AT(diag)-13, ELECTRICAL SPECIFICATION, Transmission Control Module (TCM) I/O Signal.>	Is TCM I/O signal OK?	Replace the TCM. <Ref. to 5AT-61, Transmission Control Module (TCM).>	Repair the open or short circuit for power supply and ground. Perform the diagnosis according to DTC for PVIGN power supply relay.
8	**CHECK HARNESS CONNECTOR BETWEEN TRANSMISSION AND CONTROL VALVE BODY.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from transmission. 3) Remove the transmission connector from bracket. 4) Jack-up the vehicle and place it on rigid racks. 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 control valve body connector. 7) Measure the resistance between transmission connector and control valve body connector. ***Connector & terminal*** ***(T3) No. 4 — (T10) No. 6:*** ***(T3) No. 3 — (T10) No. 5:*** ***(T3) No. 2 — (T10) No. 4:*** ***(T3) No. 1 — (T10) No. 3:*** ***(T3) No. 8 — (T10) No. 2:***	Is the resistance less than 1 Ω?	Go to step **9.**	Repair the open circuit of harness between control valve body connector and transmission connector.
9	**CHECK HARNESS CONNECTOR BETWEEN TRANSMISSION AND CONTROL VALVE BODY.** Measure the resistance between transmission ground and control valve body connector. ***Connector & terminal*** ***(T10) No. 6 — Transmission ground:*** ***(T10) No. 5 — Transmission ground:*** ***(T10) No. 4 — Transmission ground:*** ***(T10) No. 3 — Transmission ground:*** ***(T10) No. 2 — Transmission ground:***	Is the resistance more than 1 MΩ?	Go to step **10.**	Repair the short circuit of harness between control valve body connector and transmission connector.
10	**CHECK POOR CONTACT.**	Is there any poor contact in inhibitor SW 1 — 4 or inhibitor SW 3 monitor circuit?	Repair the poor contact.	Replace the control valve body. <Ref. to 5AT-58, Control Valve Body.>

B: DTC P0712 TRANSMISSION FLUID TEMPERATURE SENSOR CIRCUIT LOW INPUT

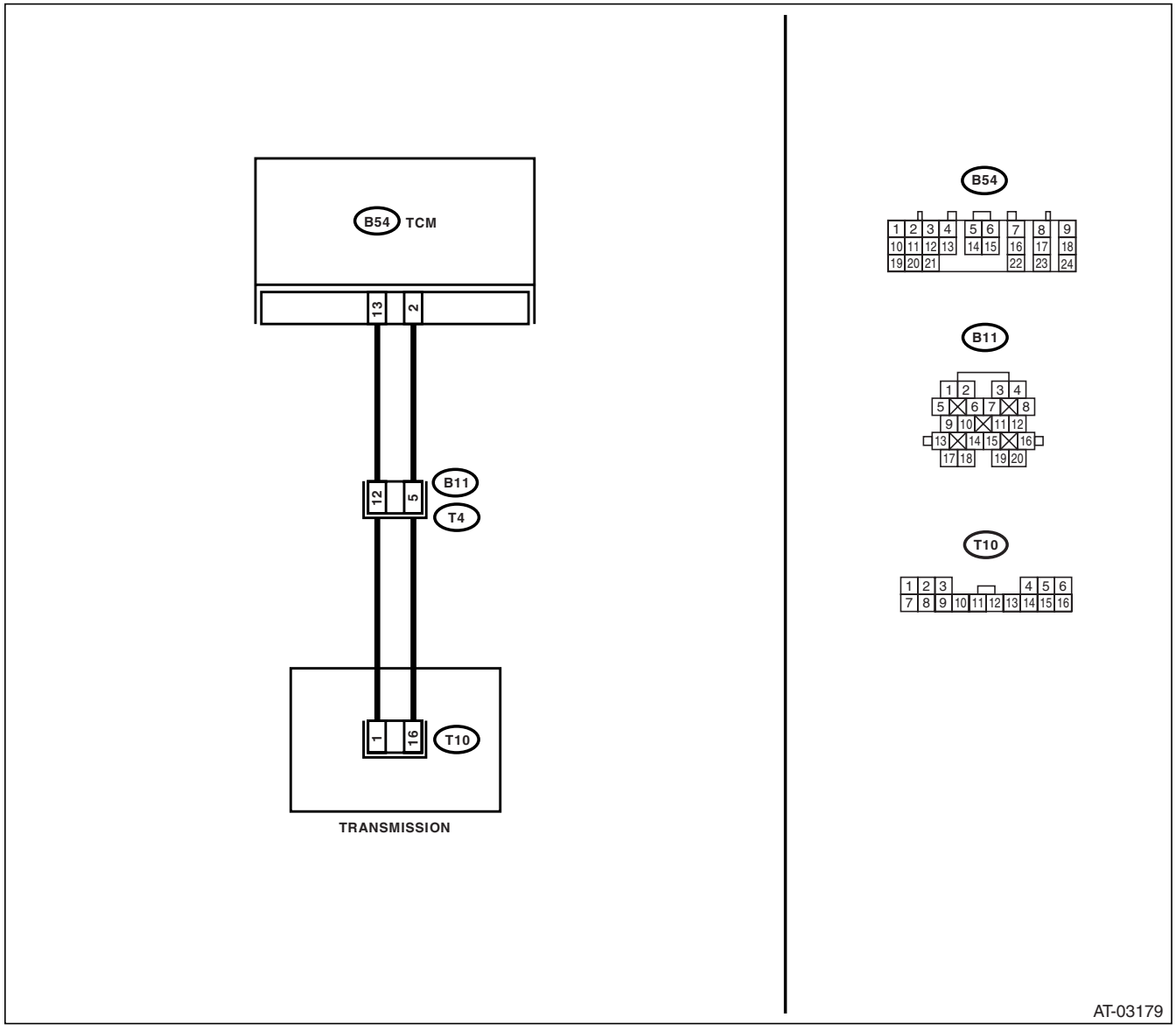
DTC DETECTING CONDITION:

Input signal circuit of TCM to ATF temperature sensor 1 is open.

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 connectors from TCM and transmission. 3) Measure the resistance of harness between TCM and transmission connector. ***Connector & terminal*** ***(B54) No. 13 — (B11) No. 12:*** ***(B54) No. 2 — (B11) No. 5:***	Is the resistance less than 1 Ω?	Go to step **2.**	Repair the open circuit of harness between TCM and transmission connector.
2	**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 the ATF temperature exceeds 80°C (176°F). NOTE: If the ambient temperature is below 0°C (32°F), drive the vehicle until the ATF reaches its operating temperature. 5) Disconnect the connector from transmission. 6) Measure the resistance between transmission connector terminals. ***Connector & terminal*** ***(T4) No. 5 — (T4) No. 12:***	Is the resistance 500 — 1,200 Ω	Go to step **3.**	Go to step **5.**
3	**CHECK ATF TEMPERATURE SENSOR.** Measure the resistance between transmission connector terminals. ***Connector & terminal*** ***(T4) No. 5 — (T4) No. 12:***	Does the resistance value increase while the ATF temperature decreases?	Go to step **4.**	Go to step **5.**
4	**CHECK INPUT SIGNAL FOR TCM USING SUBARU SELECT MONITOR.** 1) Connect the connector. 2) Turn the ignition switch to ON. (Engine OFF) 3) Read the ATF temperature using Subaru Select Monitor.	Does the ATF temperature gradually decrease?	Even if the SPORT indicator lights blinks, the system is in normal condition. A temporary poor contact of connector or harness may be the cause. Repair the poor contact of harness between ATF temperature sensor and transmission connector.	Go to step **6.**

	Step	Check	Yes	No
5	**CHECK HARNESS CONNECTOR BETWEEN TRANSMISSION AND CONTROL VALVE BODY.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from transmission. 3) Remove the transmission connector from bracket. 4) Jack-up the vehicle and place it on rigid racks. 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 control valve body connector. 7) Measure the resistance between transmission connector and control valve body connector. ***Connector & terminal*** ***(T4) No. 12 — (T10) No. 1:*** ***(T4) No. 5 — (T10) No. 16:***	Is the resistance less than 1 Ω?	Replace the control valve body. <Ref. to 5AT-58, Control Valve Body.>	Repair the open circuit of harness between control valve body connector and transmission connector.
6	**CHECK POOR CONTACT.**	Is there poor contact in ATF temperature sensor circuit 1?	Repair the poor contact.	Replace the TCM. <Ref. to 5AT-61, Transmission Control Module (TCM).>

C: DTC P0713 TRANSMISSION FLUID TEMPERATURE SENSOR CIRCUIT HIGH INPUT

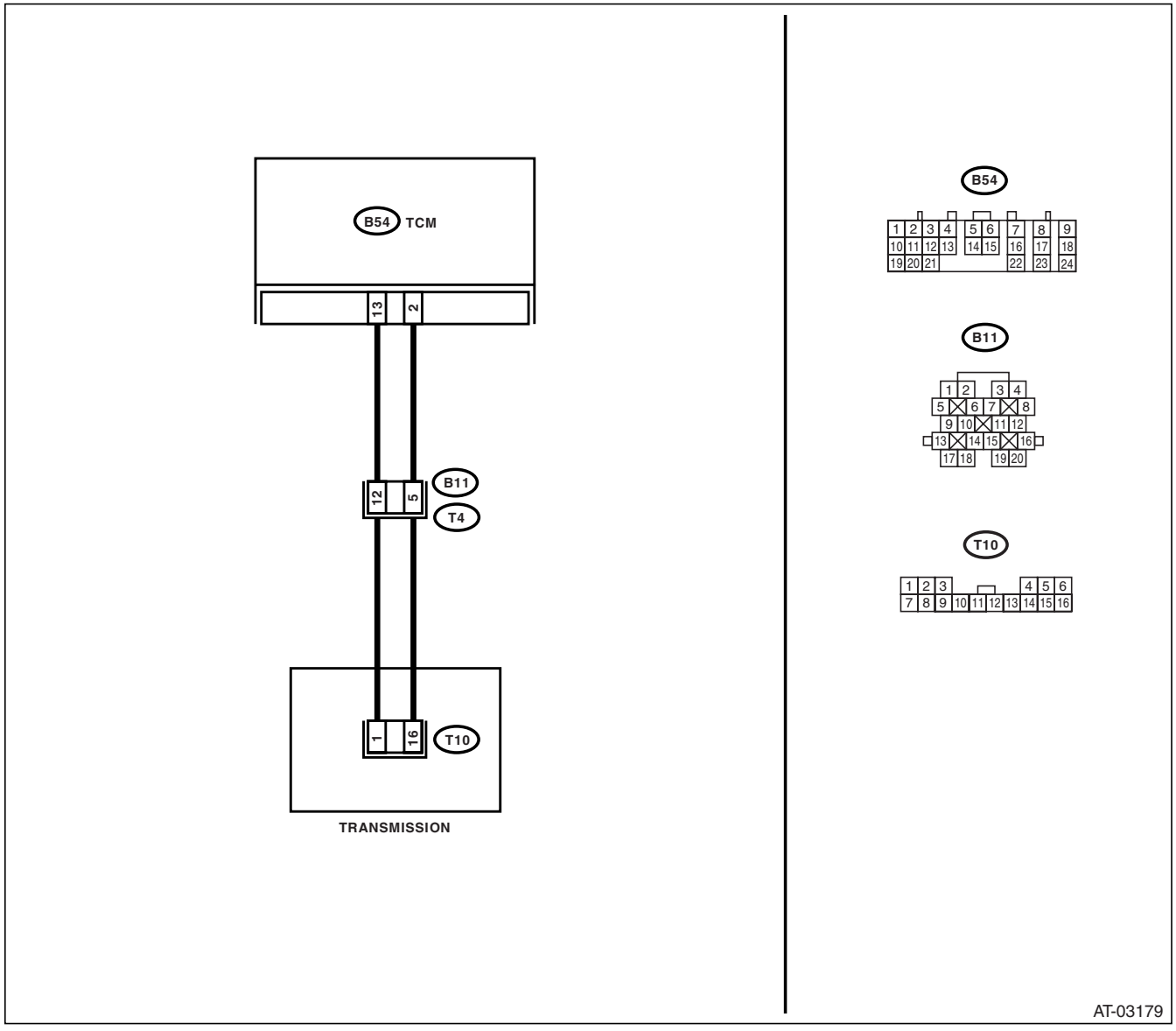
DTC DETECTING CONDITION:

Input signal circuit of TCM to ATF temperature sensor 1 is 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 connectors from TCM and transmission. 3) Measure the resistance of harness between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 13 — Chassis ground:*** ***(B54) No. 2 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **2.**	Repair the short circuit of harness between TCM and transmission connector.
2	**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 the ATF temperature exceeds 80°C (176°F). NOTE: If the ambient temperature is below 0°C (32°F), drive the vehicle until the ATF reaches its operating temperature. 5) Disconnect the connector from transmission. 6) Measure the resistance between transmission connector terminals. ***Connector & terminal*** ***(T4) No. 5 — (T4) No. 12:***	Is the resistance 500 — 1,200 Ω	Go to step **3.**	Go to step **5.**
3	**CHECK ATF TEMPERATURE SENSOR.** Measure the resistance between transmission connector terminals. ***Connector & terminal*** ***(T4) No. 5 — (T4) No. 12:***	Does the resistance value increase while the ATF temperature decreases?	Go to step **4.**	Go to step **5.**
4	**CHECK INPUT SIGNAL FOR TCM USING SUBARU SELECT MONITOR.** 1) Connect the connector. 2) Turn the ignition switch to ON. (Engine OFF) 3) Read the ATF temperature using Subaru Select Monitor.	Does the ATF temperature gradually decrease?	Even if the SPORT indicator lights blinks, the system is in normal condition. A temporary poor contact of connector or harness may be the cause. Repair the poor contact of harness between ATF temperature sensor and transmission connector.	Go to step **6.**

	Step	Check	Yes	No
5	**CHECK HARNESS CONNECTOR BETWEEN TRANSMISSION AND CONTROL VALVE BODY.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from transmission. 3) Remove the transmission connector from bracket. 4) Jack-up the vehicle and place it on rigid racks. 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 control valve body connector. 7) Measure the resistance between chassis ground and control valve body connector. ***Connector & terminal*** ***(T10) No. 1 — Chassis ground:*** ***(T10) No. 16 — Chassis ground:***	Is the resistance more than 1 MΩ?	Replace the control valve body. <Ref. to 5AT-58, Control Valve Body.>	Repair the short circuit of harness between control valve body connector and transmission connector.
6	**CHECK POOR CONTACT.**	Is there poor contact in ATF temperature sensor circuit 1?	Repair the poor contact.	Replace the TCM. <Ref. to 5AT-61, Transmission Control Module (TCM).>

D: DTC P0715 INPUT/TURBINE SPEED SENSOR CIRCUIT

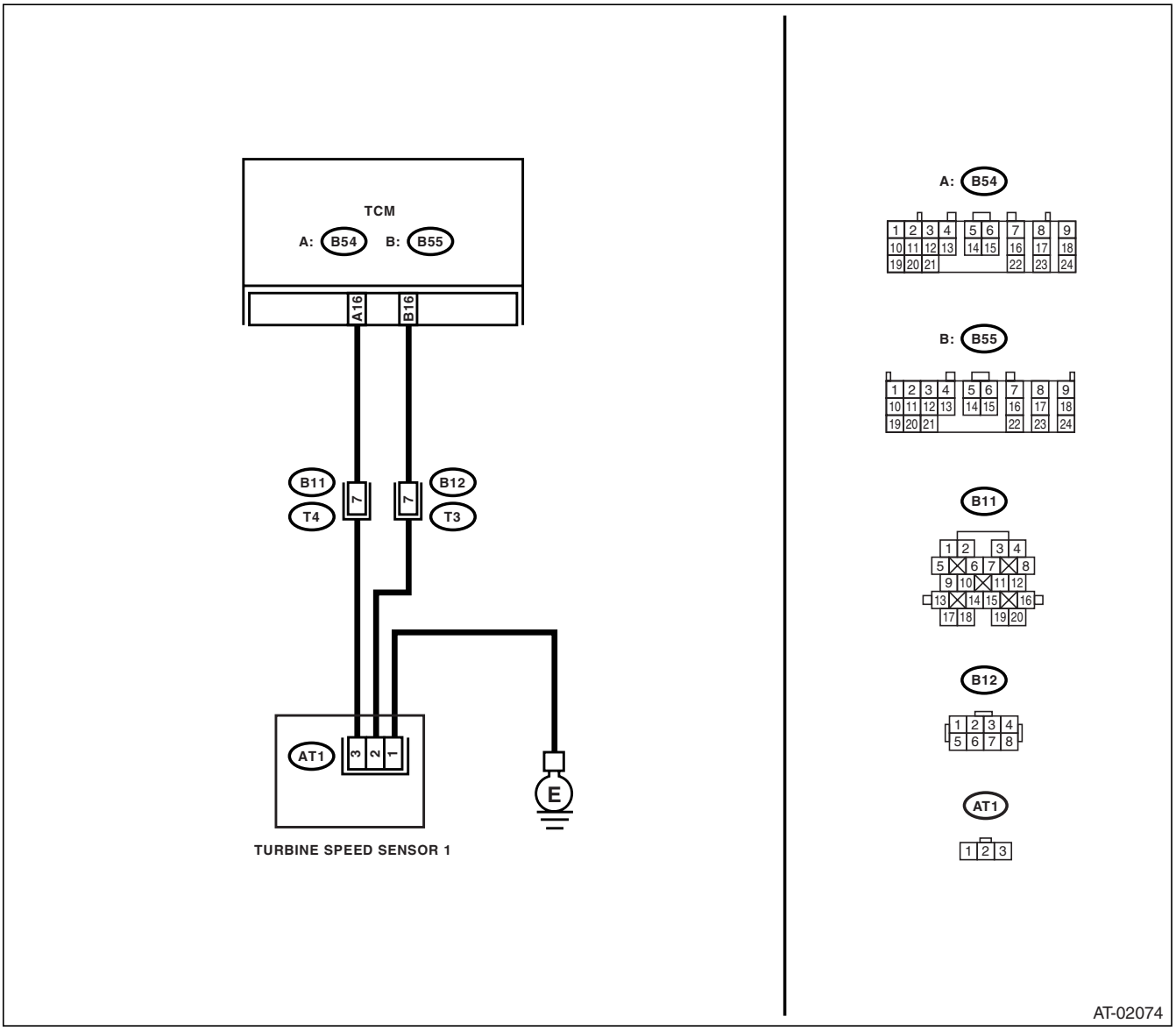
DTC DETECTING CONDITION:

Input signal circuit of TCM is open or shorted.

TROUBLE SYMPTOM:

- Excessive shift shock
- Does not shift to 5th

WIRING DIAGRAM:



	Step	Check	Yes	No
1	**CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from TCM and transmission. 3) Measure the resistance of harness between TCM and transmission connector. ***Connector & terminal*** ***(B55) No. 16 — (B12) No. 7:*** ***(B54) No. 16 — (B11) No. 7:***	Is the resistance less than 1 Ω?	Go to step **2.**	Repair the open circuit of 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*** ***(B55) No. 16 — Chassis ground:*** ***(B54) No. 16 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **3.**	Repair the short circuit of harness between TCM and chassis ground.
3	**CHECK TCM POWER SUPPLY OUTPUT.** 1) Connect the TCM connector. (Transmission connector is disconnected) 2) Turn the ignition switch to ON. (Engine OFF) 3) Measure the voltage between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 16 (+) — Chassis ground (−):***	Is the voltage 10 — 13 V?	Go to step **4.**	Go to step **5.**
4	**CHECK TURBINE SPEED SENSOR INPUT CIRCUIT OF TCM.** Measure the voltage between TCM connector terminals. ***Connector & terminal*** ***(B55) No. 16 (+) — (B54) No. 19 (−):***	Is the voltage 4 — 6 V?	Go to step **6.**	Go to step **5.**
5	**CHECK TCM I/O SIGNAL.** Check I/O signal of power supply, ground and PVIGN power supply relay. <Ref. to 5AT(diag)-13, ELECTRICAL SPECIFICATION, Transmission Control Module (TCM) I/O Signal.>	Is TCM I/O signal OK?	Replace the TCM. <Ref. to 5AT-61, Transmission Control Module (TCM).>	Repair the open or short circuit for power supply and ground. Perform the diagnosis according to DTC for PVIGN power supply relay.
6	**CHECK HARNESS ASSEMBLY (TURBINE SPEED SENSOR GROUND).** Check the installing condition of ground connecting harness of harness assembly (used for both of turbine speed sensor 1, rear vehicle speed sensor).	Is the ground connecting harness connected to transmission body securely? And there are no excessive damages on harness and terminal?	Go to step **7.**	When poor installation of ground occurs, install it securely. Replace the transmission assembly when the harness or terminal is damaged. <Ref. to 5AT-38, Automatic Transmission Assembly.>

	Step	Check	Yes	No
7	**CHECK HARNESS ASSEMBLY.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from transmission. 3) Disconnect the connector from turbine speed sensor 1. 4) Measure the resistance between transmission connector and turbine speed sensor 1 connector. ***Connector & terminal*** ***(T4) No. 7 — (AT1) No. 3:*** ***(T3) No. 7 — (AT1) No. 2:*** ***(AT1) No. 1 — Chassis ground:***	Is the resistance less than 1 Ω?	Go to step **8.**	Repair the open circuit of harness between TCM and transmission connector, and poor contact in connector.
8	**CHECK HARNESS ASSEMBLY.** Measure the resistance between transmission connector and chassis ground. ***Connector & terminal*** ***(T4) No. 7 — Chassis ground:*** ***(T3) No. 7 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **9.**	Repair the short circuit of harness between TCM and transmission connector.
9	**CHECK INPUT SIGNAL FOR TCM USING SUBARU SELECT MONITOR.** 1) Connect all the connectors. 2) Jack-up the vehicle and support with rigid racks. NOTE: Raise all wheels off floor. 3) Start the engine, and set the vehicle in 4th speed driving condition of manual mode. NOTE: Turbine speed sensor 1 signal can be measured only on 4th speed. 4) Read the current data of torque converter turbine speed sensor and turbine speed sensor 1 using Subaru Select Monitor. <Ref. to 5AT(diag)-17, READ CURRENT DATA, OPERATION, Subaru Select Monitor.> 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(diag)-26, Clear Memory Mode.>	Does the value of the turbine speed sensor 1 change depending on the acceleration and deceleration of the vehicle? Also, does the value of torque converter turbine speed sensor almost correspond with the value of turbine speed sensor 1?	Even if the SPORT indicator lights blinks, the system is in normal condition. A temporary poor contact of connector or harness may be the cause. Repair the poor contact of harness between ATF temperature sensor and transmission connector.	Replace the turbine speed sensor 1. <Ref. to 5AT-57, Turbine Speed Sensor 1.>

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

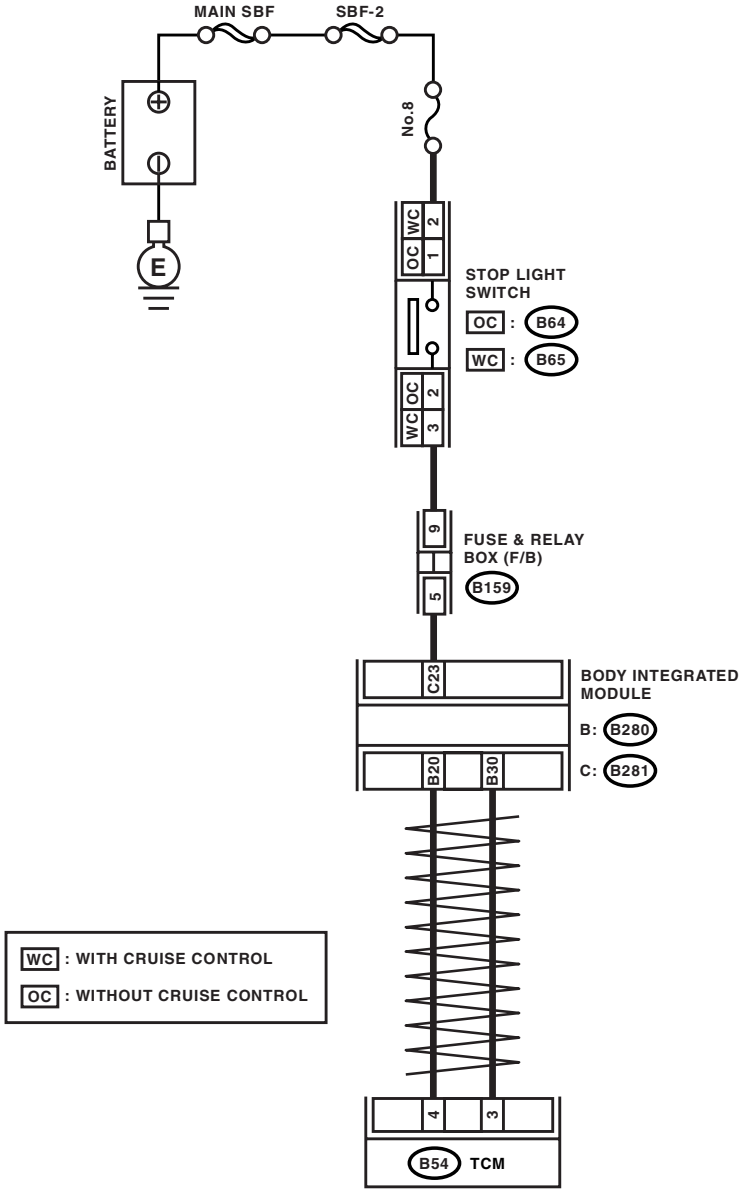
DTC DETECTING CONDITION:

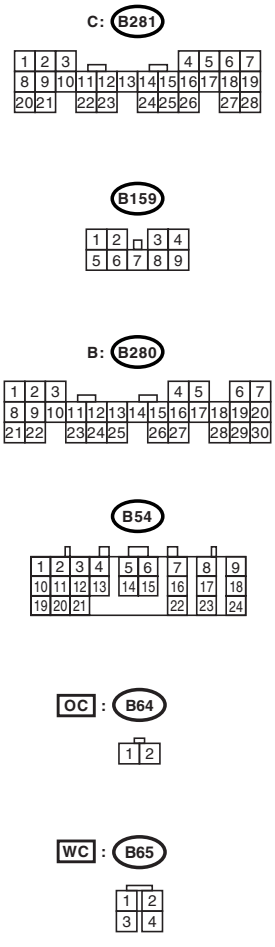
Brake switch malfunction, open input signal circuit

TROUBLE SYMPTOM:

- Brake down control is not operated at SPORT mode.
- No lock-up occurs at braking.

WIRING DIAGRAM:





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	Step	Check	Yes	No
1	**CHECK DTC.**	Is any of following DTC displayed? / AT CAN Communication Circuit / Output Speed Sensor Circuit / AT Vehicle Speed Sensor Circuit Malfunction (Rear Wheel)	Perform the diagnosis according to DTC.	Go to step **2.**
2	**CHECK BODY INTEGRATED MODULE.** 1) Turn the ignition switch to OFF. 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 power switch to ON. 5) Depress the brake pedal. 6) Read the data of brake pedal switch using Subaru Select Monitor. <Ref. to LAN(diag)-14, OPERATION, Subaru Select Monitor.>	Is ON displayed?	Go to step **3.**	Go to step **4.**
3	**CHECK TCM.** Read the data of brake pedal switch using Subaru Select Monitor. <Ref. to 5AT(diag)-17, OPERATION, Subaru Select Monitor.>	Is ON displayed?	A temporary poor contact of connector or harness may be the cause. Check the poor contact.	Replace the TCM. <Ref. to 5AT-61, Transmission Control Module (TCM).>
4	**CHECK BODY INTEGRATED MODULE INPUT SIGNAL.** 1) Disconnect the connector from body integrated module. 2) Depress the brake pedal. 3) Measure the voltage between body integrated module connector and chassis ground. ***Connector & terminal*** ***(B281) No. 23 (+) — Chassis ground (−):***	Is the voltage more than 10 V?	Go to step **7.**	Go to step **5.**
5	**CHECK HARNESS CONNECTOR BETWEEN BODY INTEGRATED MODULE AND STOP LIGHT SWITCH.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from stop light switch. 3) Measure the resistance of harness between body integrated module and stop light switch. ***Connector & terminal*** ***With cruise control*** ***(B281) No. 23 — (B65) No. 3:*** ***Without cruise control*** ***(B281) No. 23 — (B64) No. 2:***	Is the resistance less than 1 Ω?	Go to step **6.**	Repair the open circuit of harness between body integrated module and stop light switch.
6	**CHECK HARNESS CONNECTOR BETWEEN BODY INTEGRATED MODULE AND STOP LIGHT SWITCH.** Measure the resistance of harness between body integrated module connector and stop light switch. ***Connector & terminal*** ***(B281) No. 23 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **7.**	Repair the short circuit of harness between body integrated module and stop light switch.
7	**CHECK POOR CONTACT.**	Is there poor contact in input signal of brake switch?	Repair the poor contact.	Check the body integrated module.

F: DTC P0720 OUTPUT SPEED SENSOR CIRCUIT

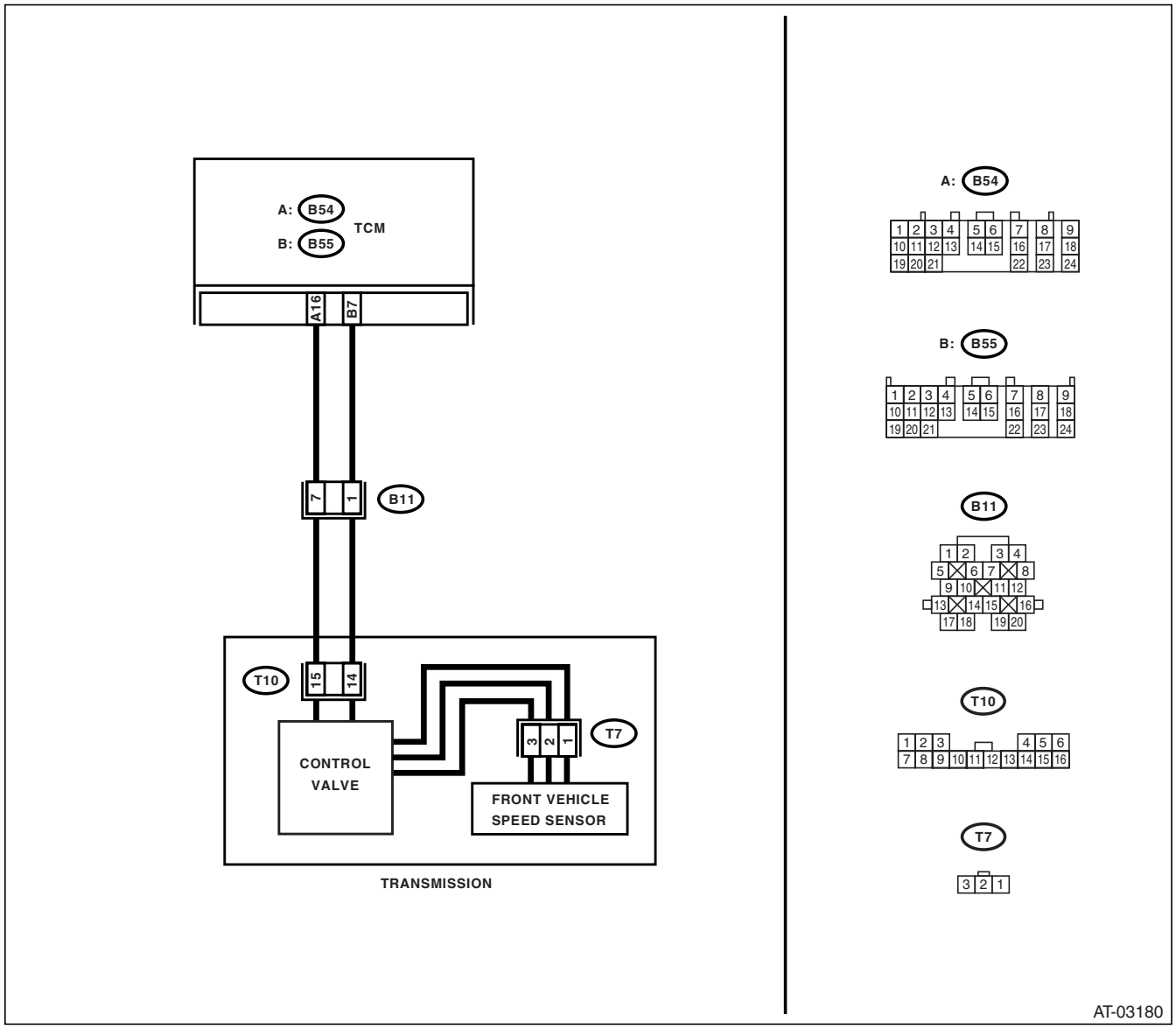
DTC DETECTING CONDITION:

- AT vehicle speed signal is abnormal.
- The harness connector between TCM and vehicle speed sensor is in short or open.

TROUBLE SYMPTOM:

- Deterioration of shifting quality.
- 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 connectors from TCM and transmission. 3) Measure the resistance of harness between TCM and transmission connector. ***Connector & terminal*** ***(B54) No. 16 — (B11) No. 7:*** ***(B55) No. 7 — (B11) No. 1:***	Is the resistance less than 1 Ω?	Go to step **2.**	Repair the open circuit of 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. 16 — Chassis ground:*** ***(B55) No. 7 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **3.**	Repair the short circuit of harness between TCM and chassis ground.
3	**CHECK TCM POWER SUPPLY OUTPUT.** 1) Connect the connector to TCM. (Transmission connector is disconnected) 2) Turn the ignition switch to ON. (engine OFF) 3) Measure the voltage between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 16 (+) — Chassis ground (−):***	Is the voltage 10 — 13 V?	Go to step **4.**	Go to step **5.**
4	**CHECK TURBINE SPEED SENSOR INPUT CIRCUIT OF TCM.** Measure the voltage between TCM connector terminals. ***Connector & terminal*** ***(B55) No. 7 (+) — (B54) No. 19 (−):***	Is the voltage 4 — 6 V?	Go to step **6.**	Go to step **5.**
5	**CHECK TCM I/O SIGNAL.** Check I/O signal of power supply, ground and PVIGN power supply relay. <Ref. to 5AT(diag)-13, ELECTRICAL SPECIFICATION, Transmission Control Module (TCM) I/O Signal.>	Is TCM I/O signal OK?	Replace the TCM. <Ref. to 5AT-61, Transmission Control Module (TCM).>	Repair the open or short circuit for power supply and ground. Perform the diagnosis according to DTC for PVIGN power supply relay.
6	**CHECK INPUT SIGNAL FOR TCM USING SUBARU SELECT MONITOR.** 1) Connect all the connectors. 2) Jack-up the vehicle and support with rigid racks. NOTE: Raise all wheels off floor. 3) Start the engine, and drive it. 4) Read the current data of front wheel speed using Subaru Select Monitor. <Ref. to 5AT(diag)-17, READ CURRENT DATA, OPERATION, Subaru Select Monitor.> 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(diag)-26, Clear Memory Mode.>	Does the value of the front wheel speed depending on the acceleration and deceleration of the vehicle?	Even if the SPORT indicator lights blinks, the system is in normal condition. A temporary poor contact of connector or harness may be the cause. Repair the poor contact of harness between ATF temperature sensor and transmission connector.	Go to step **7.**

	Step	Check	Yes	No
7	**CHECK HARNESS CONNECTOR BETWEEN TRANSMISSION AND CONTROL VALVE BODY.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from transmission. 3) Remove the transmission connector from bracket. 4) Jack-up the vehicle and place it on rigid racks. 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 control valve body connector. 7) Measure the resistance between transmission connector and control valve body connector. ***Connector & terminal*** ***(B11) No. 7 — (T10) No. 15:*** ***(B11) No. 1 — (T10) No. 14:***	Is the resistance less than 1 Ω?	Go to step **8.**	Repair the open circuit of harness between control valve body connector and transmission connector.
8	**CHECK HARNESS CONNECTOR BETWEEN TRANSMISSION AND CONTROL VALVE BODY.** Measure the resistance between transmission ground and control valve body connector. ***Connector & terminal*** ***(T10) No. 15 — Transmission ground:*** ***(T10) No. 14 — Transmission ground:***	Is the resistance more than 1 MΩ?	Go to step **9.**	Repair the short circuit of harness between transmission connector and transmission ground.
9	**CHECK HARNESS CONNECTOR BETWEEN CONTROL VALVE BODY AND VEHICLE SPEED SENSOR.** 1) Disconnect the connector from vehicle speed sensor. 2) Measure the resistance of harness between control valve body connector and vehicle speed sensor connector. ***Connector & terminal*** ***(T10) No. 15 — (T7) No. 3:*** ***(T10) No. 14 — (T7) No. 2:*** ***(T7) No. 1 — Transmission ground:***	Is the resistance less than 1 Ω?	Go to step **10.**	Replace the control valve body. <Ref. to 5AT-58, Control Valve Body.>
10	**CHECK HARNESS CONNECTOR BETWEEN CONTROL VALVE BODY AND VEHICLE SPEED SENSOR.** Measure the resistance of harness between control valve body connector and transmission ground. ***Connector & terminal*** ***(T10) No. 15 — Transmission ground:*** ***(T10) No. 14 — Transmission ground:***	Is the resistance more than 1 MΩ?	Replace the vehicle speed sensor.	Replace the control valve body. <Ref. to 5AT-58, Control Valve Body.>

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

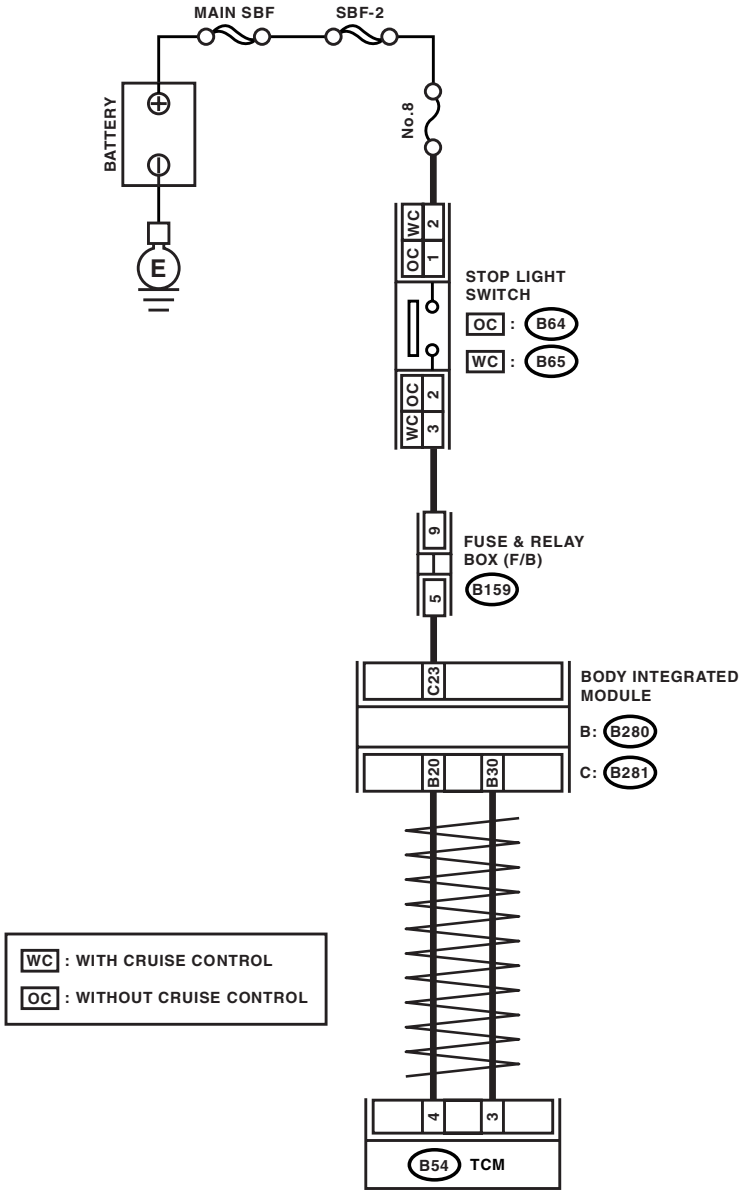
DTC DETECTING CONDITION:

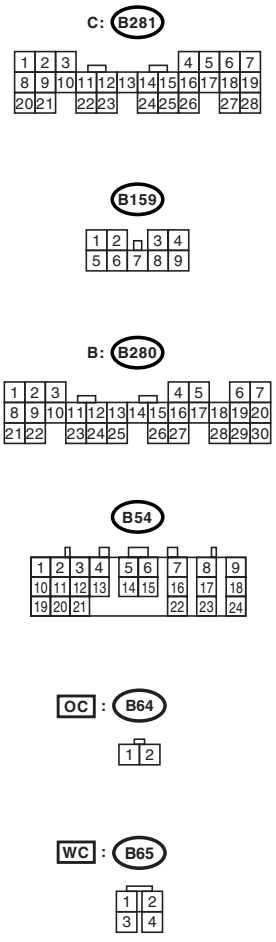
Brake switch malfunction, open input signal circuit

TROUBLE SYMPTOM:

Gear is not shifted down when climbing a hill.

WIRING DIAGRAM:





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	Step	Check	Yes	No
1	**CHECK DTC.**	Is any of following DTC detected? / AT CAN Communication Circuit / Output Speed Sensor Circuit / AT Vehicle Speed Sensor Circuit Malfunction (Rear Wheel)	Perform the diagnosis according to DTC.	Go to step **2.**
2	**CHECK BODY INTEGRATED MODULE.** 1) Turn the ignition switch to OFF. 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 power switch to ON. 5) Read the data of brake pedal switch using Subaru Select Monitor. <Ref. to 5AT(diag)-17, OPERATION, Subaru Select Monitor.>	Is OFF displayed?	Go to step **3.**	Go to step **4.**
3	**CHECK TCM.** Read the data of brake pedal switch using Subaru Select Monitor. <Ref. to 5AT(diag)-17, OPERATION, Subaru Select Monitor.>	Is OFF displayed?	A temporary poor contact of connector or harness may be the cause. Check the poor contact.	Replace the TCM. <Ref. to 5AT-61, Transmission Control Module (TCM).>
4	**CHECK BODY INTEGRATED MODULE INPUT SIGNAL.** 1) Disconnect the connector from body integrated module. 2) Measure the voltage between body integrated module connector and chassis ground. ***Connector & terminal*** ***(B281) No. 23 (+) — Chassis ground (−):***	Is the voltage more than 10 V?	Go to step **5.**	Go to step **7.**
5	**CHECK STOP LIGHT SWITCH.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from stop light switch. 3) Measure the resistance of stop light switch terminals. ***Terminal*** ***With cruise control*** ***(B65) No. 2 — No. 3:*** ***Without cruise control*** ***(B64) No. 1 — No. 2:***	Is the resistance more than 1 MΩ?	Go to step **6.**	Replace the stop light switch.
6	**CHECK HARNESS CONNECTOR BETWEEN BODY INTEGRATED MODULE AND STOP LIGHT SWITCH.** 1) Turn the ignition switch to ON. 2) Measure the voltage of harness between body integrated module connector and chassis ground. ***Connector & terminal*** ***(B281) No. 23 (+) — Chassis ground (−):***	Is the voltage less than 1 V?	Go to step **7.**	Repair the short circuit of harness between TCM and stop light switch.
7	**CHECK POOR CONTACT.**	Is there poor contact in input signal of brake switch?	Repair the poor contact.	Check the body integrated module.

H: DTC P0725 ENGINE SPEED INPUT CIRCUIT

DTC DETECTING CONDITION:
Information of engine speed is not correctly received from ECM.
TROUBLE SYMPTOM:
No lock-up (after engine warm-up).

	Step	Check	Yes	No
1	**CHECK DTC OF ECM.**	Is DTC of AT CAN communication circuit detected?	Perform the diagnosis according to DTC.	Go to step **2.**
2	**CHECK DTC OF TCM.**	Is DTC of AT CAN communication circuit detected?	Perform the diagnosis according to DTC.	Go to step **3.**
3	**CHECK DTC OF TCM.**	Is any of following DTC detected? / Output Speed Sensor Circuit / AT Vehicle Speed Sensor Circuit Malfunction (Rear Wheel)	Perform the diagnosis according to DTC.	Replace the TCM. <Ref. to 5AT-61, Transmission Control Module (TCM).>

I: DTC P0731 GEAR 1 INCORRECT RATIO

NOTE:
Refer to DTC P0736 for diagnostic procedure. <Ref. to 5AT(diag)-56, DTC P0736 REVERSE INCORRECT RATIO, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

J: DTC P0732 GEAR 2 INCORRECT RATIO

NOTE:
Refer to DTC P0736 for diagnostic procedure. <Ref. to 5AT(diag)-56, DTC P0736 REVERSE INCORRECT RATIO, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

K: DTC P0733 GEAR 3 INCORRECT RATIO

NOTE:
Refer to DTC P0736 for diagnostic procedure. <Ref. to 5AT(diag)-56, DTC P0736 REVERSE INCORRECT RATIO, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

L: DTC P0734 GEAR 4 INCORRECT RATIO

NOTE:
Refer to DTC P0736 for diagnostic procedure. <Ref. to 5AT(diag)-56, DTC P0736 REVERSE INCORRECT RATIO, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

M: DTC P0735 GEAR 5 INCORRECT RATIO

NOTE:
Refer to DTC P0736 for diagnostic procedure. <Ref. to 5AT(diag)-56, DTC P0736 REVERSE INCORRECT RATIO, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

N: DTC P0736 REVERSE INCORRECT RATIO

DTC DETECTING CONDITION:

Vehicle speed sensor, torque converter turbine speed sensor or control valve malfunction

TROUBLE SYMPTOM:

- Shift point is too high or too low.
- Excessive shift shock
- Tight corner braking phenomenon is occurred.
- Gear is not shifted to reverse.
- Gear position is held by fail safe function.
- Vehicle does not run.

	Step	Check	Yes	No
1	**CHECK DTC OF TCM.**	Is DTC P1799 displayed at the same time?	Perform the diagnosis according to DTC.	Go to step **2.**
2	**CHECK DTC OF TCM.**	Is any of the DTC P0751, P0756, P0761, P0766 displayed at the same time?	Perform the diagnosis according to DTC.	Go to step **3.**
3	**CHECK DTC OF TCM.**	Is any of the DTC P0705, P0715, P0720, P1706, P1710 displayed at the same time?	Perform the diagnosis according to DTC.	Go to step **4.**
4	**CHECK TURBINE SPEED.** Check the indication of Subaru Select Monitor.	Is the indication changes according to acceleration, braking and shifting?	Go to step **5.**	Perform the diagnosis according to DTC P0715, P1710.
5	**CHECK FRONT AND REAR VEHICLE SPEED SENSOR.**	Does the value of Subaru Select Monitor mostly match with indication of speed meter?	Go to step **6.**	Perform the diagnosis according to DTC P0720, P1706.
6	**CHECK INHIBITOR SWITCH.**	Does the value of Subaru Select Monitor match with value of meter indicator?	Go to step **7.**	Perform the diagnosis according to DTC P0705.
7	**CHECK DTC OF TCM.** 1) Perform the clear memory mode. 2) Perform the inspection mode. <Ref. to 5AT(diag)-21, PROCEDURE, Inspection Mode.>	Is DTC displayed?	Perform the diagnosis according to DTC.	Go to step **8.**
8	**DRIVING CHECK.** Perform the road test. <Ref. to 5AT-31, INSPECTION, Road Test.> NOTE: When performing the test, do not exceed posted speed limit.	Is malfunction corrected?	Temporary poor contact occurs. Check that the harness connector has no faulty.	Replace the transmission assembly.

O: DTC P0741 TORQUE CONVERTER CLUTCH CIRCUIT PERFORMANCE OR STUCK OFF

DTC DETECTING CONDITION:

- Lock up clutch malfunction
- Valve anchoring

TROUBLE SYMPTOM:

No lock-up occurs. (After engine is warmed-up)

	Step	Check	Yes	No
1	**CHECK DTC OF TCM.**	Is any of following DTC detected? / AT CAN Communication Circuit / Engine Speed Input Circuit / Input/Turbine Speed Sensor Circuit / Torque Converter Turbine 2 Speed Signal Circuit 2 Malfunction	Perform the diagnosis according to each DTC.	Go to step **2.**
2	**CHECK DTC OF TCM.** 1) Perform clear memory mode. <Ref. to 5AT(diag)-19, CLEAR MEMORY MODE, OPERATION, Subaru Select Monitor.> 2) Read DTC	Is DTC displayed?	Perform the diagnosis according to DTC.	Go to step **3.**
3	**CHECK INHIBITOR SWITCH CIRCUIT.** Diagnose according to DTC P0705 procedure.	Is there any trouble?	Repair or replace the inhibitor switch circuit.	Go to step **4.**
4	**CHECK STOP LIGHT SWITCH CIRCUIT.** Diagnose according to DTC P0719 and P0724 procedure.	Is there any trouble?	Repair or replace the stop light switch circuit.	Go to step **5.**
5	**CHECK ATF TEMPERATURE SENSOR CIRCUIT.** Diagnose according to DTC P0712, P0713, P1716 and P1717 procedure.	Is there any trouble?	Repair or replace the ATF temperature sensor circuit.	There are malfunctions in TCM, TCM connector poor contact, or transmission assembly mechanical malfunction.

P: DTC P0743 TORQUE CONVERTER CLUTCH CIRCUIT ELECTRICAL

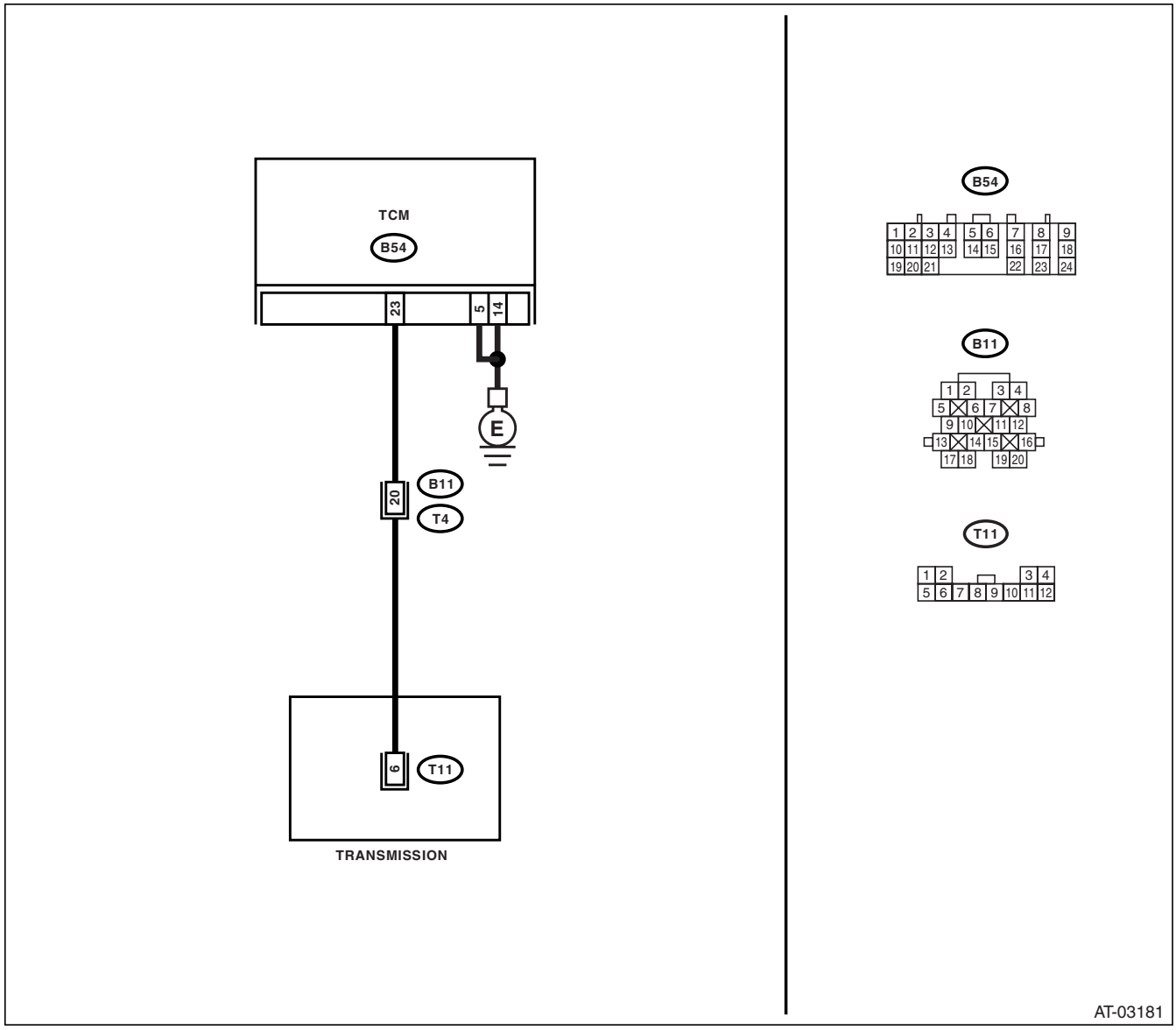
DTC DETECTING CONDITION:

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

TROUBLE SYMPTOM:

No lock-up (after engine warm-up).

WIRING DIAGRAM:



	Step	Check	Yes	No
1	**CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from TCM and transmission. 3) Measure the resistance of harness between TCM and transmission connector. ***Connector & terminal*** ***(B54) No. 23 — (B11) No. 20:*** ***(B54) No. 5 — Chassis ground:*** ***(B54) No. 14 — Chassis ground:***	Is the resistance less than 1 Ω?	Go to step **2.**	Repair the open circuit of harness between TCM connector and transmission connector.

	Step	Check	Yes	No
2	**CHECK HARNESS CONNECTOR BETWEEN TCM AND CHASSIS GROUND.** Measure the resistance of harness between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 23 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **3.**	Repair the short circuit of harness between TCM connector and transmission connector.
3	**CHECK HARNESS CONNECTOR BETWEEN TRANSMISSION AND CONTROL VALVE BODY.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from transmission. 3) Remove the transmission connector from bracket. 4) Jack-up the vehicle and place it on rigid racks. NOTE: Raise all wheels off floor. 5) Drain the ATF. **CAUTION:** **Do not drain ATF until it cools down.** 6) Remove the oil pan, and disconnect the control valve body connector. 7) Measure the resistance between transmission connector and control valve body connector. ***Connector & terminal*** ***(T4) No. 20 — (T11) No. 6:***	Is the resistance less than 1 Ω?	Go to step **4.**	Repair the open circuit of harness between control valve body connector and transmission connector.
4	**CHECK HARNESS CONNECTOR BETWEEN TRANSMISSION AND CONTROL VALVE BODY.** Measure the resistance between chassis ground and control valve body connector. ***Connector & terminal*** ***(T11) No. 6 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **5.**	Repair the short circuit of harness between control valve body connector and transmission ground.
5	**CHECK LOCK-UP SOLENOID.** Measure the resistance between transmission ground and control valve body connector. ***Connector & terminal*** ***(T11) No. 6 — Transmission ground:***	Is the resistance 3 — 9 Ω	Go to step **6.**	Replace the control valve body. <Ref. to 5AT-58, Control Valve Body.>
6	**CHECK POOR CONTACT.** Check that there are no poor contact in TCM connector, transmission connector and control valve body connector.	Is there any loosing terminal, entering foreign matter, damaging connector body?	Repair the poor contact.	Go to step **7.**
7	**CHECK AFTER REPAIR.** 1) Perform the clear memory mode. 2) Drive for a while, read the DTC, and verify that there is no faulty.	Is DTC displayed?	Replace the TCM. <Ref. to 5AT-61, Transmission Control Module (TCM).>	Temporary poor contact or open circuit occurs. Recheck that the harness connector has no faulty.

Q: DTC P0748 PRESSURE CONTROL SOLENOID “A” ELECTRICAL

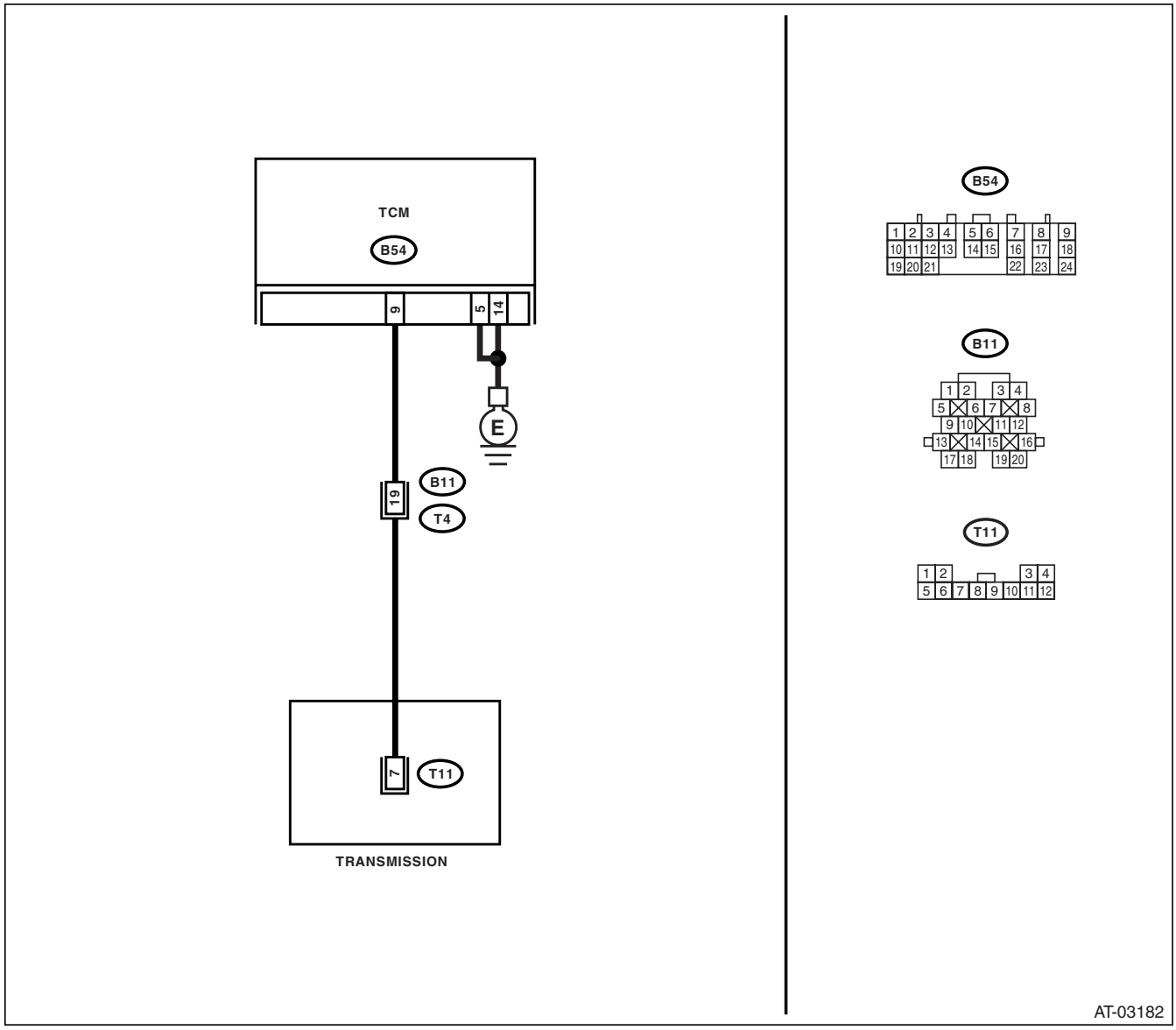
DTC DETECTING CONDITION:

Output signal circuit of line pressure 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 connectors from TCM and transmission. 3) Measure the resistance of harness between TCM and transmission connector. ***Connector & terminal*** ***(B54) No. 9 — (B11) No. 19:*** ***(B54) No. 5 — Chassis ground:*** ***(B54) No. 14 — Chassis ground:***	Is the resistance less than 1 Ω?	Go to step **2.**	Repair the open circuit of harness between TCM connector and transmission connector.

	Step	Check	Yes	No
2	**CHECK HARNESS CONNECTOR BETWEEN TCM AND CHASSIS GROUND.** Measure the resistance between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 9 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **3.**	Repair the short circuit of harness between TCM connector and transmission connector.
3	**CHECK HARNESS CONNECTOR BETWEEN TRANSMISSION AND CONTROL VALVE BODY.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from transmission. 3) Remove the transmission connector from bracket. 4) Jack-up the vehicle and place it on rigid racks. 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 control valve body connector. 7) Measure the resistance between transmission connector and control valve body connector. ***Connector & terminal*** ***(T4) No. 19 — (T11) No. 7:***	Is the resistance less than 1 Ω?	Go to step **4.**	Repair the open circuit of harness between control valve body connector and transmission connector.
4	**CHECK HARNESS CONNECTOR BETWEEN TRANSMISSION AND CONTROL VALVE BODY.** Measure the resistance between transmission ground and control valve body connector. ***Connector & terminal*** ***(T11) No. 7 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **5.**	Repair the short circuit of harness between control valve body connector and transmission ground.
5	**CHECK LINE PRESSURE SOLENOID.** Measure the resistance between transmission ground and control valve body connector. ***Connector & terminal*** ***(T11) No. 7 — Transmission ground:***	Is the resistance 3 — 9 Ω	Go to step **6.**	Replace the control valve body. <Ref. to 5AT-58, Control Valve Body.>
6	**CHECK POOR CONTACT.** Check that there are no poor contact in TCM connector, transmission connector and control valve body connector.	Is there any loosing terminal, entering foreign matter, damaging connector body?	Repair the poor contact.	Go to step **7.**
7	**CHECK AFTER REPAIR.** 1) Perform the clear memory mode. 2) Drive for a while, read the DTC, and verify that there is no faulty.	Is DTC displayed?	Replace the TCM. <Ref. to 5AT-61, Transmission Control Module (TCM).>	Temporary poor contact or open circuit occurs. Recheck that the harness connector has no faulty.

R: DTC P0751 SHIFT SOLENOID “A” PERFORMANCE OR STUCK OFF

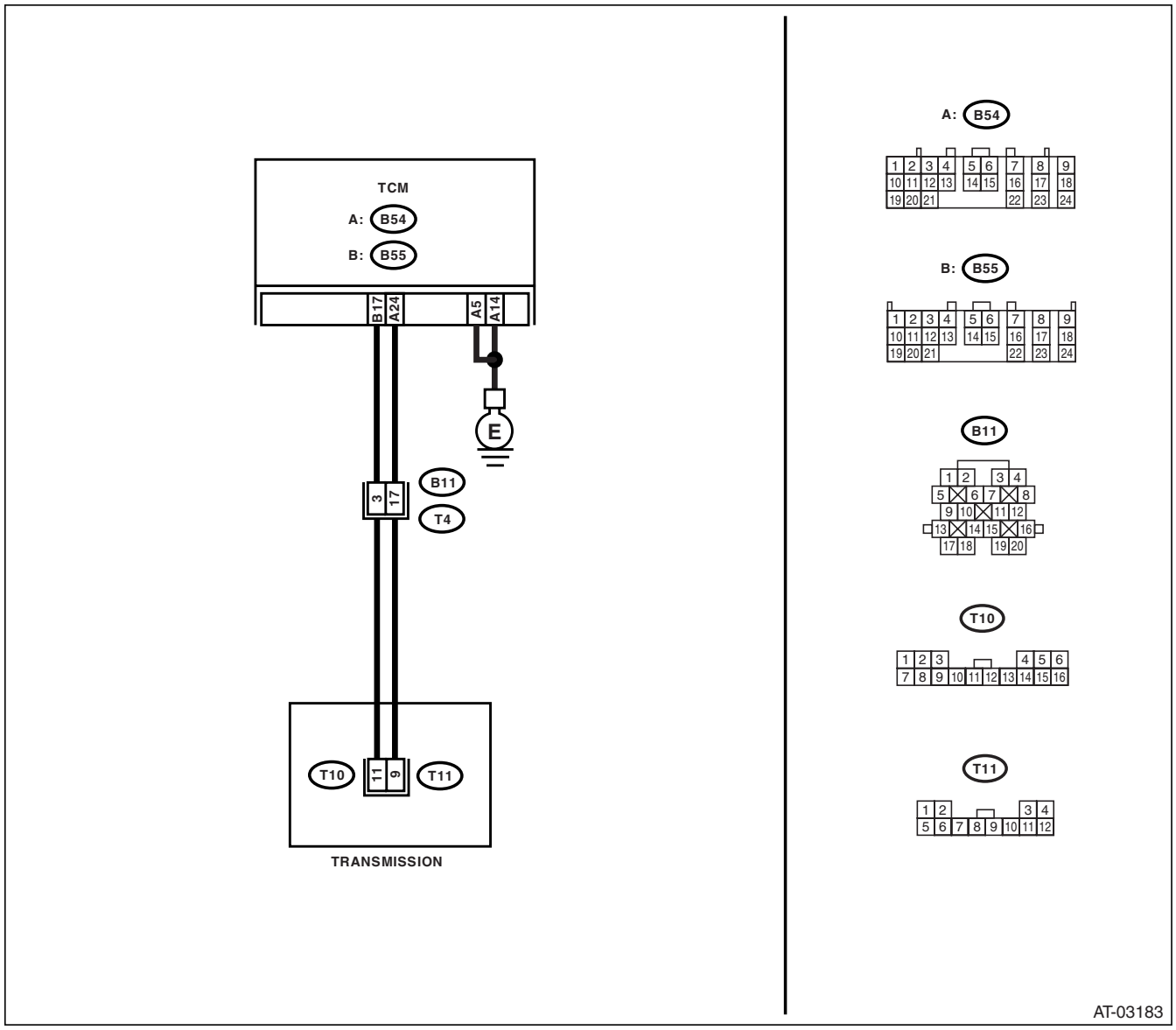
DTC DETECTING CONDITION:

Output signal of front brake solenoid does not match with oil pressure.

TROUBLE SYMPTOM:

Locked to 4th or 5th gear.

WIRING DIAGRAM:



	Step	Check	Yes	No
1	**CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from TCM and transmission. 3) Measure the resistance of harness between TCM and transmission connector. ***Connector & terminal*** ***(B54) No. 24 — (B11) No. 17:*** ***(B55) No. 17 — (B11) No. 3:*** ***(B54) No. 5 — Chassis ground:*** ***(B54) No. 14 — Chassis ground:***	Is the resistance less than 1 Ω?	Go to step **2.**	Repair the open circuit of 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*** ***(B54) No. 24 — Chassis ground:*** ***(B55) No. 17 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **3.**	Repair the short circuit of harness between TCM and transmission connector.
3	**CHECK INPUT SIGNAL FOR TCM USING SUBARU SELECT MONITOR.** 1) Connect all the connectors. 2) Turn the ignition switch to ON. (engine OFF) 3) Check input signal of Fr/B oil pressure SW.	Is OFF displayed?	Go to step **4.**	Go to step **7.**
4	**CHECK INPUT SIGNAL FOR TCM USING SUBARU SELECT MONITOR.** 1) Turn the ignition switch to OFF. 2) Turn the ignition switch to ON. (engine ON) 3) Shift to 4th speed with checking current gear position using Subaru Select Monitor. 4) Check input signal of Fr/B oil pressure SW.	Is OFF displayed?	Go to step **5.**	Replace the control valve body. <Ref. to 5AT-58, Control Valve Body.>
5	**CHECK INPUT SIGNAL FOR TCM USING SUBARU SELECT MONITOR.** 1) Turn the ignition switch to OFF. 2) Turn the ignition switch to ON. (engine ON) 3) Shift to 4th speed with checking current gear position using Subaru Select Monitor. 4) Check input signal of Fr/B oil pressure SW.	Is ON displayed?	Even if the SPORT indicator lights blinks, the system is in normal condition. A temporary poor contact of connector or harness may be the cause. Repair the poor contact of harness in the solenoid output and oil pressure SW input.	Go to step **6.**

	Step	Check	Yes	No
6	**CHECK HARNESS CONNECTOR BETWEEN TRANSMISSION AND CONTROL VALVE BODY.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from transmission. 3) Remove the transmission connector from bracket. 4) Jack-up the vehicle and place it on rigid racks. 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 control valve body connector. 7) Measure the resistance between transmission connector and control valve body connector. ***Connector & terminal*** ***(T4) No. 17 — (T11) No. 9:*** ***(T4) No. 3 — (T10) No. 11:***	Is the resistance less than 1 Ω?	Replace the transmission assembly. <Ref. to 5AT-38, Automatic Transmission Assembly.>	Repair the open circuit of harness between control valve body connector and transmission connector.
7	**CHECK HARNESS CONNECTOR BETWEEN TRANSMISSION AND CONTROL VALVE BODY.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from transmission. 3) Remove the transmission connector from bracket. 4) Jack-up the vehicle and place it on rigid racks. 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 control valve body connector. 7) Measure the resistance between transmission ground and control valve body connector. ***Connector & terminal*** ***(T11) No. 9 — Transmission ground:*** ***(T10) No. 11 — Transmission ground:***	Is the resistance more than 1 MΩ?	Replace the control valve body. <Ref. to 5AT-58, Control Valve Body.>	Repair the short circuit of harness between control valve body connector and transmission connector.

S: DTC P0753 SHIFT SOLENOID “A” ELECTRICAL

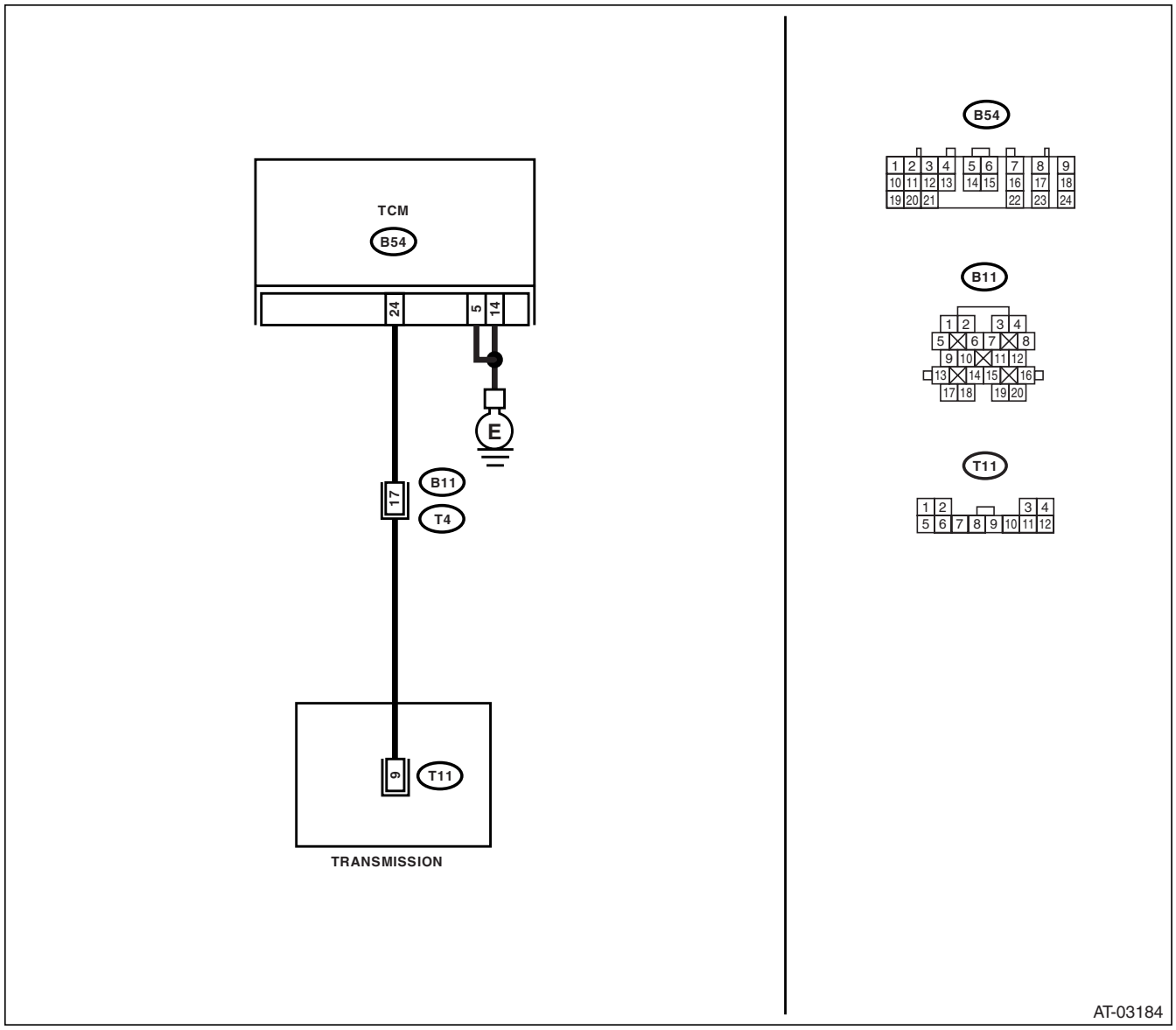
DTC DETECTING CONDITION:

Output signal circuit of front brake solenoid is open or shorted.

TROUBLE SYMPTOM:

Locked to 4th or 5th gear.

WIRING DIAGRAM:



Step		Check	Yes	No
1	**CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from TCM and transmission. 3) Measure the resistance of harness between TCM and transmission connector. ***Connector & terminal*** ***(B54) No. 24 — (B11) No. 17:*** ***(B54) No. 5 — Chassis ground:*** ***(B54) No. 14 — Chassis ground:***	Is the resistance less than 1 Ω?	Go to step **2.**	Repair the open circuit of harness between TCM connector and transmission connector.

	Step	Check	Yes	No
2	**CHECK HARNESS CONNECTOR BETWEEN TCM AND CHASSIS GROUND.** Measure the resistance of harness between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 24 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **3.**	Repair the short circuit of harness between TCM connector and transmission connector.
3	**CHECK HARNESS CONNECTOR BETWEEN TRANSMISSION AND CONTROL VALVE BODY.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from transmission. 3) Remove the transmission connector from bracket. 4) Jack-up the vehicle and place it on rigid racks. 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 control valve body connector. 7) Measure the resistance between transmission connector and control valve body connector. ***Connector & terminal*** ***(T4) No. 17 — (T11) No. 9:***	Is the resistance less than 1 Ω?	Go to step **4.**	Repair the open circuit of harness between control valve body connector and transmission connector.
4	**CHECK HARNESS CONNECTOR BETWEEN TRANSMISSION AND CONTROL VALVE BODY.** Measure the resistance between transmission ground and control valve body connector. ***Connector & terminal*** ***(T11) No. 9 — Transmission ground:***	Is the resistance more than 1 MΩ?	Go to step **5.**	Repair the short circuit of harness between control valve body and transmission connector.
5	**CHECK FRONT BRAKE SOLENOID.** Measure the resistance between transmission ground and control valve body connector. ***Connector & terminal*** ***(T11) No. 9 — Transmission ground:***	Is the resistance 3 — 9 Ω	Go to step **6.**	Replace the control valve body. <Ref. to 5AT-58, Control Valve Body.>
6	**CHECK POOR CONTACT.** Check that there are no poor contact in TCM connector, transmission connector and control valve body connector.	Is there any loosing terminal, entering foreign matter, damaging connector body?	Repair the poor contact.	Go to step **7.**
7	**CHECK AFTER REPAIR.** 1) Perform the clear memory mode. 2) Drive for a while, read the DTC, and verify that there is no faulty.	Is DTC displayed?	Replace the TCM. <Ref. to 5AT-61, Transmission Control Module (TCM).>	Temporary poor contact or open circuit occurs. Recheck that the harness connector has no faulty.

T: DTC P0756 SHIFT SOLENOID “B” PERFORMANCE OR STUCK OFF

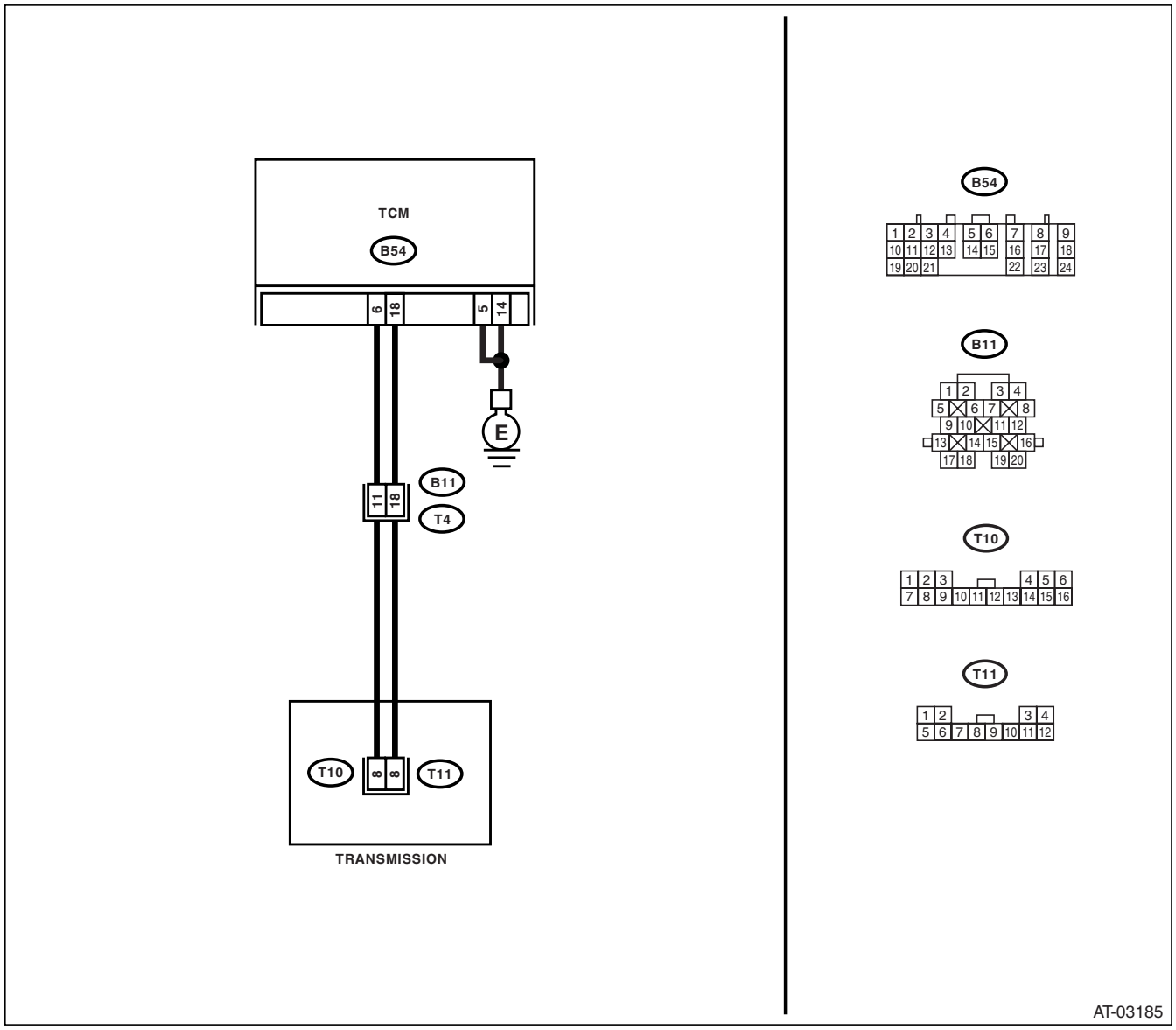
DTC DETECTING CONDITION:

Output signal value of input clutch solenoid and oil pressure does not match.

TROUBLE SYMPTOM:

Locked to 4th gear.

WIRING DIAGRAM:



	Step	Check	Yes	No
1	**CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from TCM and transmission. 3) Measure the resistance of harness between TCM and transmission connector. ***Connector & terminal*** ***(B54) No. 18 — (B11) No. 18:*** ***(B54) No. 6 — (B11) No. 11:*** ***(B54) No. 5 — Chassis ground:*** ***(B54) No. 14 — Chassis ground:***	Is the resistance less than 1 Ω?	Go to step **2.**	Repair the open circuit of 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*** ***(B54) No. 18 — Chassis ground:*** ***(B54) No. 6 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **3.**	Repair the short circuit of harness between TCM and transmission connector.
3	**CHECK INPUT SIGNAL FOR TCM USING SUBARU SELECT MONITOR.** 1) Connect all the connectors. 2) Turn the ignition switch to ON. (engine OFF) 3) Check input signal of I/C oil pressure SW.	Is OFF displayed?	Go to step **4.**	Go to step **7.**
4	**CHECK INPUT SIGNAL FOR TCM USING SUBARU SELECT MONITOR.** 1) Turn the ignition switch to OFF. 2) Turn the ignition switch to ON. (engine ON) 3) Shift to “D” range and brake ON (1st) with checking current gear position using Subaru Select Monitor. 4) Check input signal of I/C oil pressure SW.	Is OFF displayed?	Go to step **5.**	Replace the control valve body. <Ref. to 5AT-58, Control Valve Body.>
5	**CHECK INPUT SIGNAL FOR TCM USING SUBARU SELECT MONITOR.** 1) Turn the ignition switch to OFF. 2) Turn the ignition switch to ON. (engine ON) 3) Drive the vehicle on 4th speed of “D” range with checking current gear position using Subaru Select Monitor. 4) Check input signal of I/C oil pressure SW.	Is ON displayed?	Even if the SPORT indicator lights blinks, the system is in normal condition. A temporary poor contact of connector or harness may be the cause. Repair the poor contact of harness in the solenoid output and oil pressure SW input.	Go to step **6.**

	Step	Check	Yes	No
6	**CHECK HARNESS CONNECTOR BETWEEN TRANSMISSION AND CONTROL VALVE BODY.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from transmission. 3) Remove the transmission connector from bracket. 4) Jack-up the vehicle and place it on rigid racks. 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 control valve body connector. 7) Measure the resistance between transmission connector and control valve body connector. ***Connector & terminal*** ***(T4) No. 18 — (T11) No. 8:*** ***(T4) No. 11 — (T10) No. 8:***	Is the resistance less than 1 Ω?	Replace the transmission assembly. <Ref. to 5AT-38, Automatic Transmission Assembly.>	Repair the open circuit of harness between control valve body connector and transmission connector.
7	**CHECK HARNESS CONNECTOR BETWEEN TRANSMISSION AND CONTROL VALVE BODY.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from transmission. 3) Remove the transmission connector from bracket. 4) Jack-up the vehicle and place it on rigid racks. 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 control valve body connector. 7) Measure the resistance between transmission ground and control valve body connector. ***Connector & terminal*** ***(T4) No. 18 — Transmission ground:*** ***(T4) No. 11 — Transmission ground:***	Is the resistance more than 1 MΩ?	Replace the control valve body. <Ref. to 5AT-58, Control Valve Body.>	Repair the short circuit of harness between control valve body connector and transmission connector.

U: DTC P0758 SHIFT SOLENOID “B” ELECTRICAL

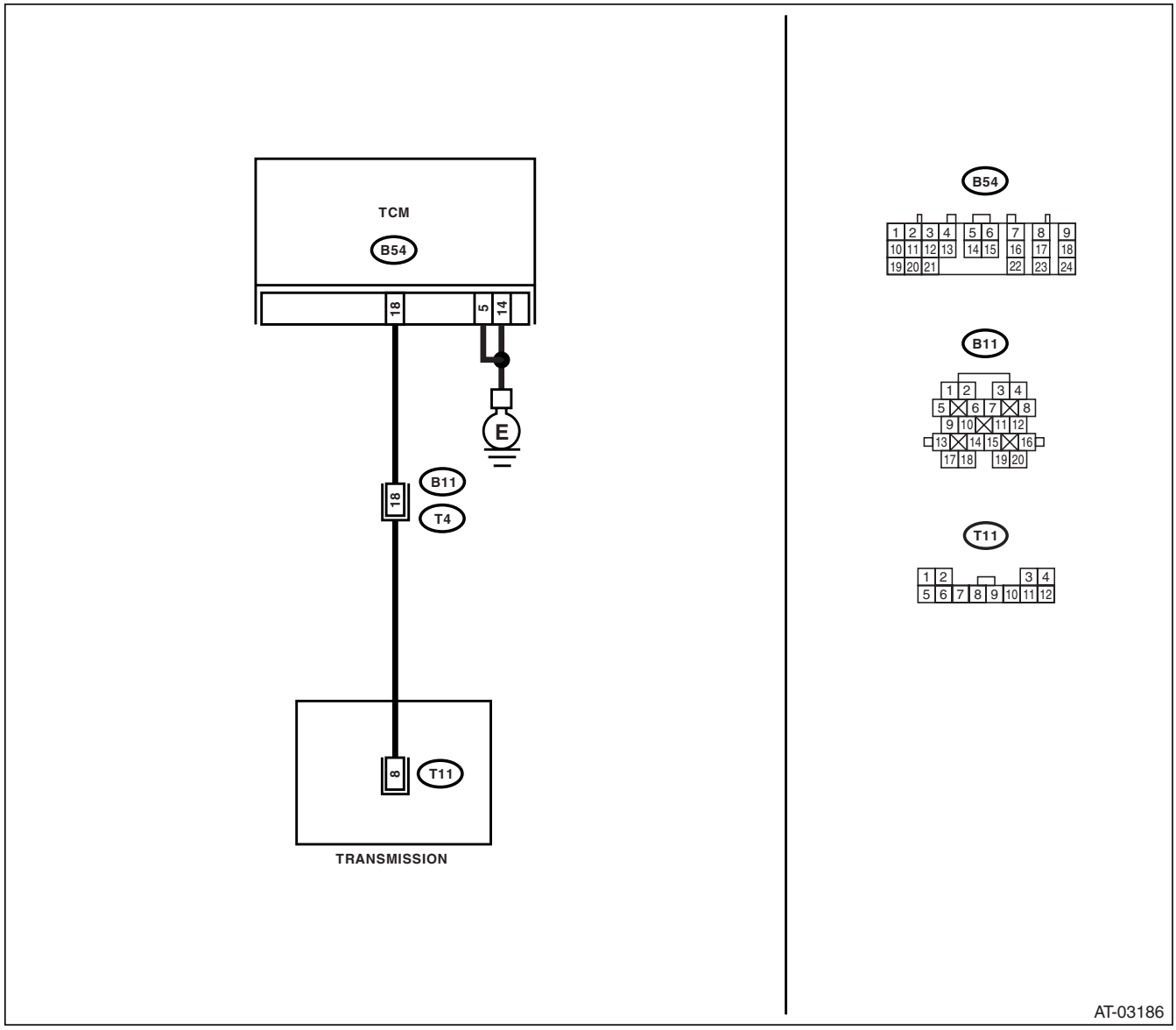
DTC DETECTING CONDITION:

Output signal circuit of input clutch solenoid is open or shorted.

TROUBLE SYMPTOM:

Locked to 4th gear.

WIRING DIAGRAM:



Step		Check	Yes	No
1	**CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from TCM and transmission. 3) Measure the resistance of harness between TCM and transmission connector. ***Connector & terminal*** ***(B54) No. 18 — (B11) No. 18:*** ***(B54) No. 5 — Chassis ground:*** ***(B54) No. 14 — Chassis ground:***	Is the resistance less than 1 Ω?	Go to step **2.**	Repair the open circuit of harness between TCM and transmission connector.

	Step	Check	Yes	No
2	**CHECK HARNESS CONNECTOR BETWEEN TCM AND BODY HARNESS.** Measure the resistance of harness between TCM connector and body harness. ***Connector & terminal*** ***(B54) No. 18 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **3.**	Repair the short circuit of harness between TCM and transmission connector.
3	**CHECK HARNESS CONNECTOR BETWEEN TRANSMISSION AND CONTROL VALVE BODY.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from transmission. 3) Remove the transmission connector from bracket. 4) Jack-up the vehicle and place it on rigid racks. 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 control valve body connector. 7) Measure the resistance between transmission connector and control valve body connector. ***Connector & terminal*** ***(T4) No. 18 — (T11) No. 8:***	Is the resistance less than 1 Ω?	Go to step **4.**	Repair the open circuit of harness between control valve body connector and transmission connector.
4	**CHECK HARNESS CONNECTOR BETWEEN TRANSMISSION AND CONTROL VALVE BODY.** Measure the resistance between chassis ground and control valve body connector. ***Connector & terminal*** ***(T11) No. 8 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **5.**	Repair the short circuit of harness between control valve body connector and transmission connector.
5	**CHECK INPUT CLUTCH SOLENOID.** Measure the resistance between transmission ground and control valve body connector. ***Connector & terminal*** ***(T11) No. 8 — Transmission ground:***	Is the resistance 3 — 9 Ω	Go to step **6.**	Replace the control valve body. <Ref. to 5AT-58, Control Valve Body.>
6	**CHECK POOR CONTACT.** Check that there are no poor contact in TCM connector, transmission connector and control valve body connector.	Is there any loosing terminal, entering foreign matter, damaging connector body?	Repair the poor contact.	Go to step **7.**
7	**CHECK AFTER REPAIR.** 1) Perform the clear memory mode. 2) Drive for a while, read the DTC, and verify that there is no faulty.	Is DTC displayed?	Replace the TCM. <Ref. to 5AT-61, Transmission Control Module (TCM).>	Temporary poor contact or open circuit occurs. Recheck that the harness connector has no faulty.

V: DTC P0761 SHIFT SOLENOID “C” PERFORMANCE OR STUCK OFF

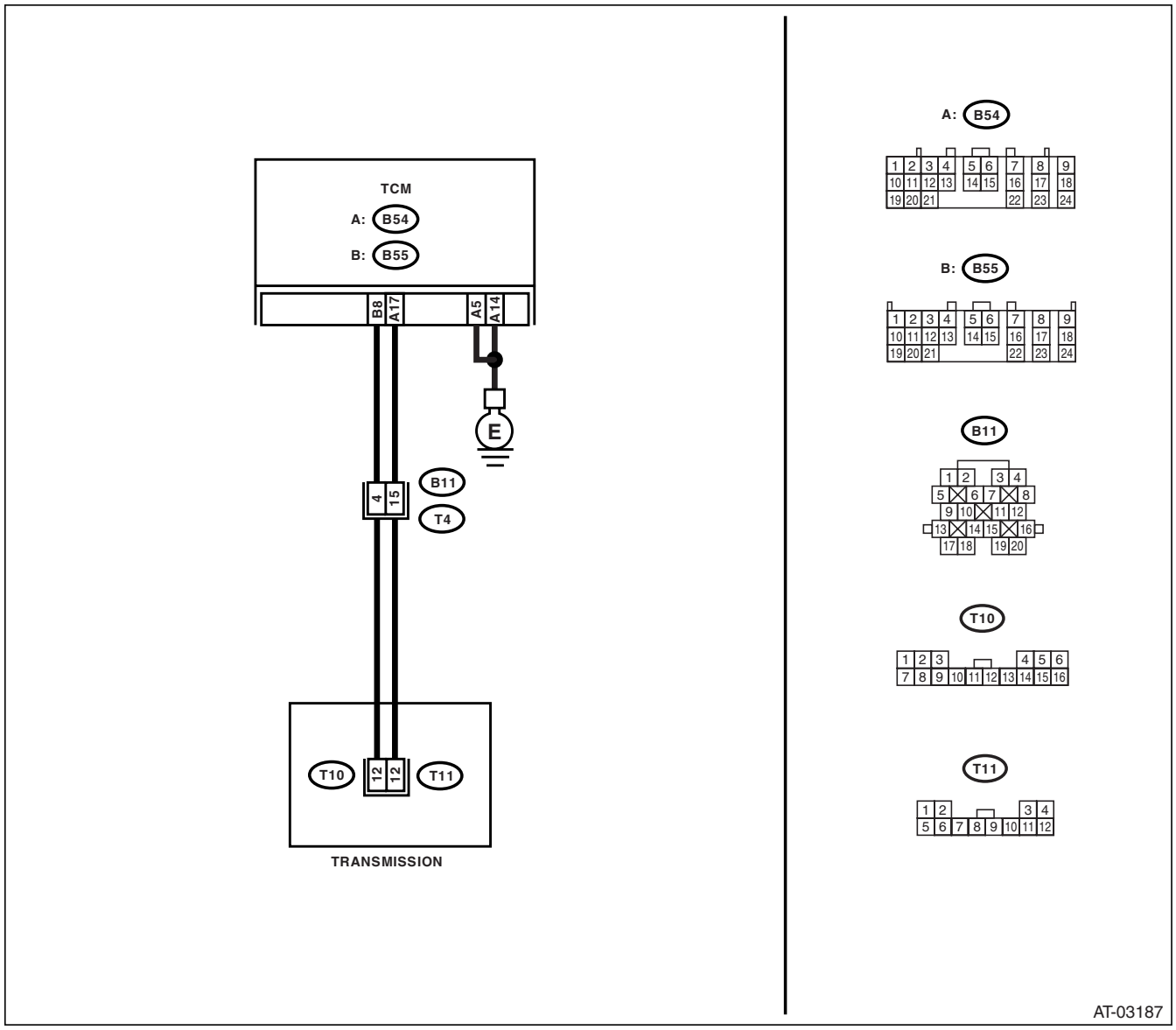
DTC DETECTING CONDITION:

Output signal value of high & low reverse clutch solenoid and oil pressure does not match.

TROUBLE SYMPTOM:

Locked to 4th gear.

WIRING DIAGRAM:



	Step	Check	Yes	No
1	**CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from TCM and transmission. 3) Measure the resistance of harness between TCM and transmission connector. ***Connector & terminal*** ***(B54) No. 17 — (B11) No. 15:*** ***(B55) No. 8 — (B11) No. 4:*** ***(B54) No. 5 — Chassis ground:*** ***(B54) No. 14 — Chassis ground:***	Is the resistance less than 1 Ω?	Go to step **2.**	Repair the open circuit of 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*** ***(B54) No. 17 — Chassis ground:*** ***(B55) No. 8 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **3.**	Repair the short circuit of harness between TCM and transmission connector.
3	**CHECK INPUT SIGNAL FOR TCM USING SUBARU SELECT MONITOR.** 1) Connect all the connectors. 2) Turn the ignition switch to ON. (engine OFF) 3) Check input signal of H&LR/C oil pressure SW.	Is OFF displayed?	Go to step **4.**	Go to step **7.**
4	**CHECK INPUT SIGNAL FOR TCM USING SUBARU SELECT MONITOR.** 1) Turn the ignition switch to OFF. 2) Turn the ignition switch to ON. (engine ON) 3) Drive the vehicle on 2nd speed of “D” range with checking current gear position using Subaru Select Monitor. 4) Check input signal of H&LR/C oil pressure SW.	Is OFF displayed?	Go to step **5.**	Replace the control valve body. <Ref. to 5AT-58, Control Valve Body.>
5	**CHECK INPUT SIGNAL FOR TCM USING SUBARU SELECT MONITOR.** 1) Turn the ignition switch to OFF. 2) Turn the ignition switch to ON. (engine ON) 3) Shift to “D” range and brake ON (1st) with checking current gear position using Subaru Select Monitor. 4) Check input signal of H&LR/C oil pressure SW.	Is ON displayed?	Even if the SPORT indicator lights blinks, the system is in normal condition. A temporary poor contact of connector or harness may be the cause. Repair the poor contact of harness in the solenoid output and oil pressure SW input.	Go to step **6.**

	Step	Check	Yes	No
6	**CHECK HARNESS CONNECTOR BETWEEN TRANSMISSION AND CONTROL VALVE BODY.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from transmission. 3) Remove the transmission connector from bracket. 4) Jack-up the vehicle and place it on rigid racks. 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 control valve body connector. 7) Measure the resistance between transmission connector and control valve body connector. ***Connector & terminal*** ***(T4) No. 15 — (T11) No. 12:*** ***(T4) No. 4 — (T10) No. 12:***	Is the resistance less than 1 Ω?	Replace the transmission assembly. <Ref. to 5AT-38, Automatic Transmission Assembly.>	Repair the open circuit of harness between control valve body connector and transmission connector.
7	**CHECK HARNESS CONNECTOR BETWEEN TRANSMISSION AND CONTROL VALVE BODY.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from transmission. 3) Remove the transmission connector from bracket. 4) Jack-up the vehicle and place it on rigid racks. 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 control valve body connector. 7) Measure the resistance between transmission ground and control valve body connector. ***Connector & terminal*** ***(T4) No. 15 — Transmission ground:*** ***(T4) No. 4 — Transmission ground:***	Is the resistance more than 1 MΩ?	Replace the control valve body. <Ref. to 5AT-58, Control Valve Body.>	Repair the short circuit of harness between control valve body connector and transmission connector.

W: DTC P0763 SHIFT SOLENOID “C” ELECTRICAL

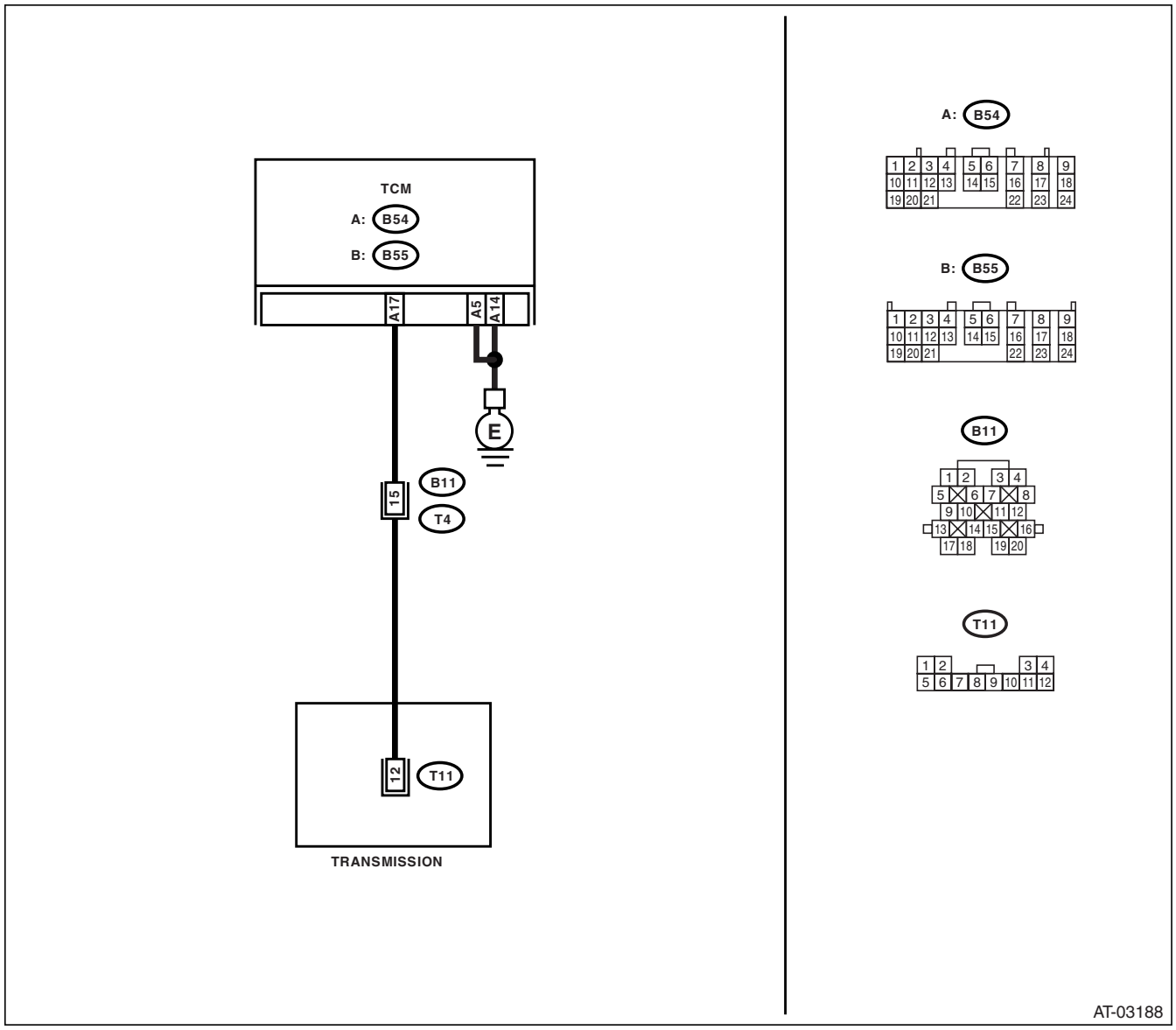
DTC DETECTING CONDITION:

Output signal circuit of high & low reverse clutch solenoid is open or shorted.

TROUBLE SYMPTOM:

Locked to 4th gear.

WIRING DIAGRAM:



Step		Check	Yes	No
1	**CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from TCM and transmission. 3) Measure the resistance of harness between TCM and transmission connector. ***Connector & terminal*** ***(B54) No. 17 — (B11) No. 15:*** ***(B54) No. 5 — Chassis ground:*** ***(B54) No. 14 — Chassis ground:***	Is the resistance less than 1 Ω?	Go to step **2.**	Repair the open circuit of harness between TCM connector and transmission connector.

	Step	Check	Yes	No
2	**CHECK HARNESS CONNECTOR BETWEEN TCM AND CHASSIS GROUND.** Measure the resistance of harness between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 17 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **3.**	Repair the short circuit of harness between TCM connector and transmission connector.
3	**CHECK HARNESS CONNECTOR BETWEEN TRANSMISSION AND CONTROL VALVE BODY.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from transmission. 3) Remove the transmission connector from bracket. 4) Jack-up the vehicle and place it on rigid racks. 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 control valve body connector. 7) Measure the resistance between transmission connector and control valve body connector. ***Connector & terminal*** ***(T4) No. 15 — (T11) No. 12:***	Is the resistance less than 1 Ω?	Go to step **4.**	Repair the open circuit of harness between control valve body connector and transmission connector.
4	**CHECK HARNESS CONNECTOR BETWEEN TRANSMISSION AND CONTROL VALVE BODY.** Measure the resistance of harness connector between control valve body connector and chassis ground. ***Connector & terminal*** ***(T11) No. 12 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **5.**	Repair the open circuit of harness between control valve body connector and transmission ground.
5	**CHECK HIGH & LOW REVERSE CLUTCH SOLENOID.** Measure the resistance between transmission ground and control valve body connector. ***Connector & terminal*** ***(T11) No. 12 — Transmission ground:***	Is the resistance 3 — 9 Ω	Go to step **6.**	Replace the control valve body. <Ref. to 5AT-58, Control Valve Body.>
6	**CHECK POOR CONTACT.** Check that there are no poor contact in TCM connector, transmission connector and control valve body connector.	Is there any loosing terminal, entering foreign matter, damaging connector body?	Repair the poor contact.	Go to step **7.**
7	**CHECK AFTER REPAIR.** 1) Perform the clear memory mode. 2) Drive for a while, read the DTC, and verify that there is no faulty.	Is DTC displayed?	Replace the TCM. <Ref. to 5AT-61, Transmission Control Module (TCM).>	Temporary poor contact or open circuit occurs. Recheck that the harness connector has no faulty.

X: DTC P0766 SHIFT SOLENOID “D” PERFORMANCE OR STUCK OFF

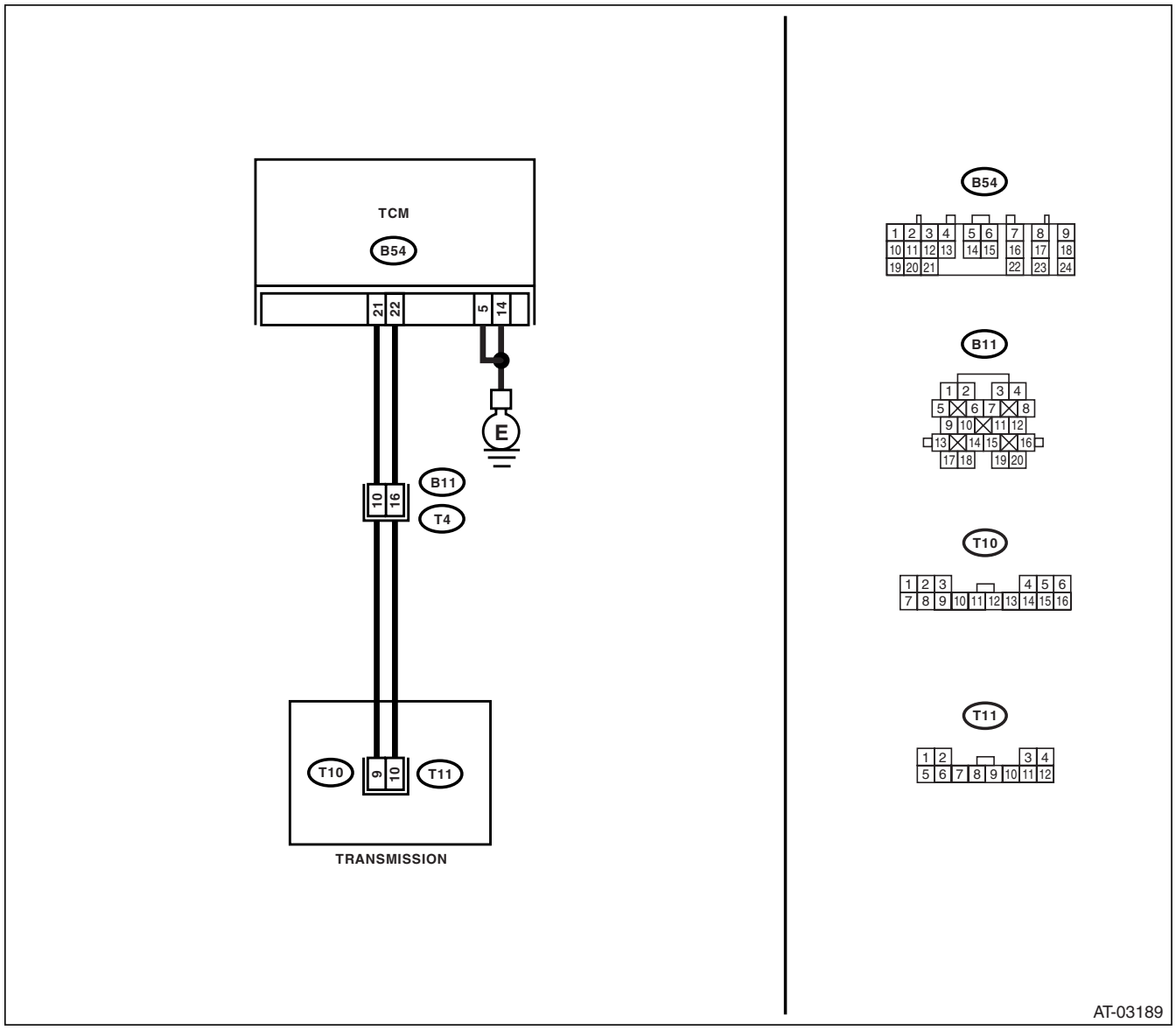
DTC DETECTING CONDITION:

Output signal value of direct clutch solenoid and oil pressure does not match.

TROUBLE SYMPTOM:

Locked to 4th gear.

WIRING DIAGRAM:



	Step	Check	Yes	No
1	**CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from TCM and transmission. 3) Measure the resistance of harness between TCM and transmission connector. ***Connector & terminal*** ***(B54) No. 22 — (B11) No. 16:*** ***(B54) No. 21 — (B11) No. 10:*** ***(B54) No. 5 — Chassis ground:*** ***(B54) No. 14 — Chassis ground:***	Is the resistance less than 1 Ω?	Go to step **2.**	Repair the open circuit of harness between TCM and transmission connector.
2	**CHECK HARNESS CONNECTOR BETWEEN TCM AND BODY HARNESS.** Measure the resistance of harness between TCM connector and body harness. ***Connector & terminal*** ***(B54) No. 22 — Chassis ground:*** ***(B54) No. 21 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **3.**	Repair the short circuit of harness between TCM and transmission connector.
3	**CHECK INPUT SIGNAL FOR TCM USING SUBARU SELECT MONITOR.** 1) Connect all the connectors. 2) Turn the ignition switch to ON. (engine OFF) 3) Check input signal of D/C oil pressure SW.	Is OFF displayed?	Go to step **4.**	Go to step **7.**
4	**CHECK INPUT SIGNAL FOR TCM USING SUBARU SELECT MONITOR.** 1) Turn the ignition switch to OFF. 2) Turn the ignition switch to ON. (engine ON) 3) Shift to “D” range and brake ON (1st) with checking current gear position using Subaru Select Monitor. 4) Check input signal of D/C oil pressure SW.	Is OFF displayed?	Go to step **5.**	Replace the control valve body. <Ref. to 5AT-58, Control Valve Body.>
5	**CHECK INPUT SIGNAL FOR TCM USING SUBARU SELECT MONITOR.** 1) Turn the ignition switch to OFF. 2) Turn the ignition switch to ON. (engine ON) 3) Shift to 2nd speed of manual mode and brake ON with checking current gear position using Subaru Select Monitor. 4) Check input signal of D/C oil pressure SW.	Is ON displayed?	Even if the SPORT indicator lights blinks, the system is in normal condition. A temporary poor contact of connector or harness may be the cause. Repair the poor contact of harness in the solenoid output and oil pressure SW input.	Go to step **6.**

	Step	Check	Yes	No
6	**CHECK HARNESS CONNECTOR BETWEEN TRANSMISSION AND CONTROL VALVE BODY.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from transmission. 3) Remove the transmission connector from bracket. 4) Jack-up the vehicle and place it on rigid racks. 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 control valve body connector. 7) Measure the resistance between transmission connector and control valve body connector. ***Connector & terminal*** ***(T4) No. 16 — (T11) No. 10:*** ***(T4) No. 10 — (T10) No. 9:***	Is the resistance less than 1 Ω?	Replace the transmission assembly. <Ref. to 5AT-38, Automatic Transmission Assembly.>	Repair the open circuit of harness between control valve body connector and transmission connector.
7	**CHECK HARNESS CONNECTOR BETWEEN TRANSMISSION AND CONTROL VALVE BODY.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from transmission. 3) Remove the transmission connector from bracket. 4) Jack-up the vehicle and place it on rigid racks. 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 control valve body connector. 7) Measure the resistance between chassis ground and control valve body connector. ***Connector & terminal*** ***(T11) No. 10 — Chassis ground:*** ***(T10) No. 9 — Chassis ground:***	Is the resistance more than 1 MΩ?	Replace the control valve body. <Ref. to 5AT-58, Control Valve Body.>	Repair the short circuit of harness between control valve body connector and transmission connector.

Y: DTC P0768 SHIFT SOLENOID “D” ELECTRICAL

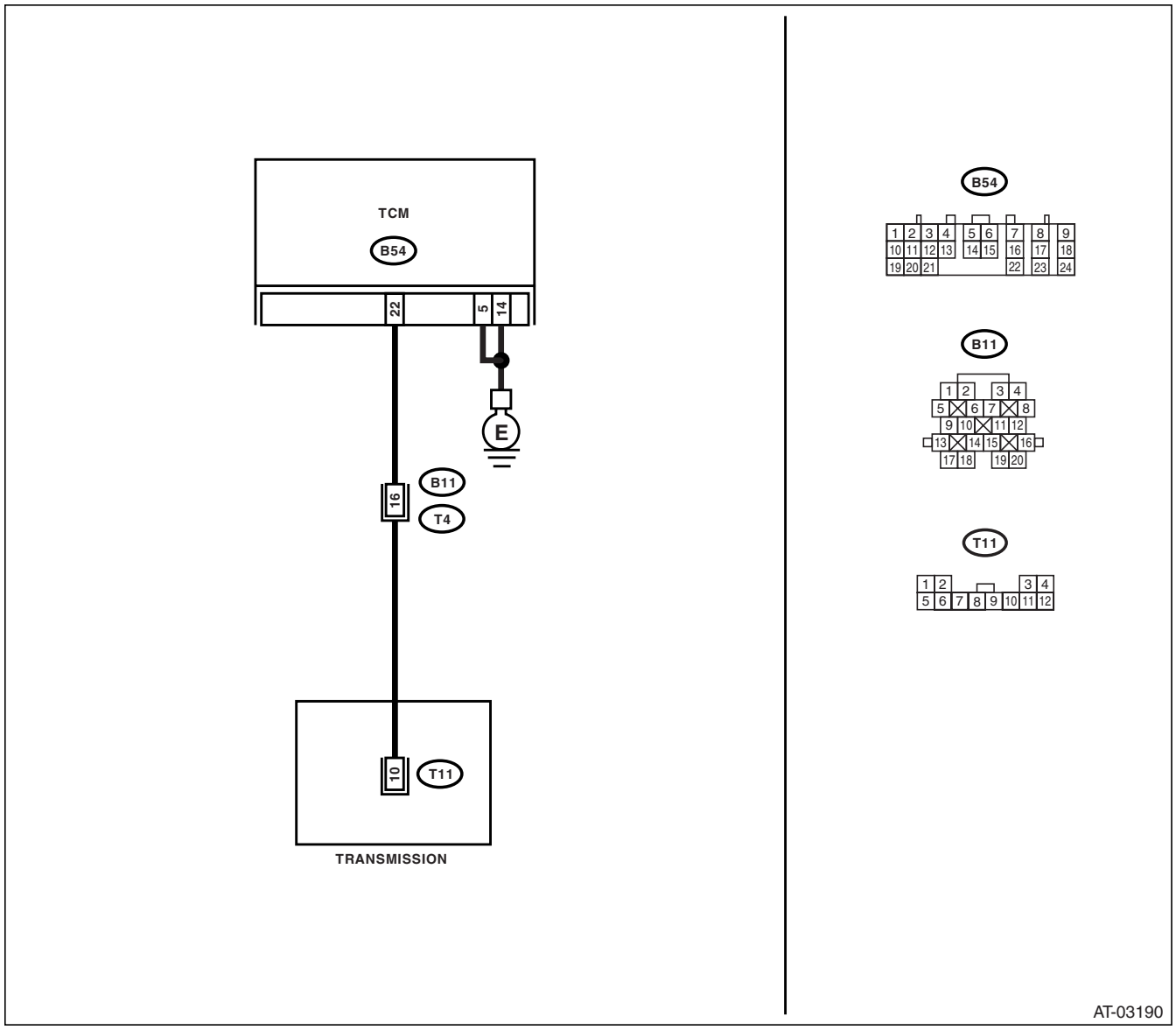
DTC DETECTING CONDITION:

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

TROUBLE SYMPTOM:

Locked to 4th gear.

WIRING DIAGRAM:



Step		Check	Yes	No
1	**CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from TCM and transmission. 3) Measure the resistance of harness between TCM and transmission connector. ***Connector & terminal*** ***(B54) No. 22 — (B11) No. 16:*** ***(B54) No. 5 — Chassis ground:*** ***(B54) No. 14 — Chassis ground:***	Is the resistance less than 1 Ω?	Go to step **2.**	Repair the open circuit of harness between TCM connector and transmission connector.

	Step	Check	Yes	No
2	**CHECK HARNESS CONNECTOR BETWEEN TCM AND CHASSIS GROUND.** Measure the resistance of harness between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 22 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **3.**	Repair the short circuit of harness between TCM connector and transmission connector.
3	**CHECK HARNESS CONNECTOR BETWEEN TRANSMISSION AND CONTROL VALVE BODY.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from transmission. 3) Remove the transmission connector from bracket. 4) Jack-up the vehicle and place it on rigid racks. 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 control valve body connector. 7) Measure the resistance between transmission connector and control valve body connector. ***Connector & terminal*** ***(T4) No. 16 — (T11) No. 10:***	Is the resistance less than 1 Ω?	Go to step **4.**	Repair the open circuit of harness between control valve body connector and transmission connector.
4	**CHECK HARNESS CONNECTOR BETWEEN TRANSMISSION AND CONTROL VALVE BODY.** Measure the resistance between chassis ground and control valve body connector. ***Connector & terminal*** ***(T11) No. 10 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **5.**	Repair the short circuit of harness between control valve body connector and transmission ground.
5	**CHECK DIRECT CLUTCH SOLENOID.** Measure the resistance of harness connector between control valve body connector and transmission ground. ***Connector & terminal*** ***(T11) No. 10 — Transmission ground:***	Is the resistance 3 — 9 Ω	Go to step **6.**	Replace the control valve body. <Ref. to 5AT-58, Control Valve Body.>
6	**CHECK POOR CONTACT.** Check that there are no poor contact in TCM connector, transmission connector and control valve body connector.	Is there any loosing terminal, entering foreign matter, damaging connector body?	Repair the poor contact.	Go to step **7.**
7	**CHECK AFTER REPAIR.** 1) Perform the clear memory mode. 2) Drive for a while, read the DTC, and verify that there is no faulty.	Is DTC displayed?	Replace the TCM. <Ref. to 5AT-61, Transmission Control Module (TCM).>	Temporary poor contact or open circuit occurs. Recheck that the harness connector has no faulty.

Z: DTC P0771 SHIFT SOLENOID “E” PERFORMANCE OR STUCK OFF

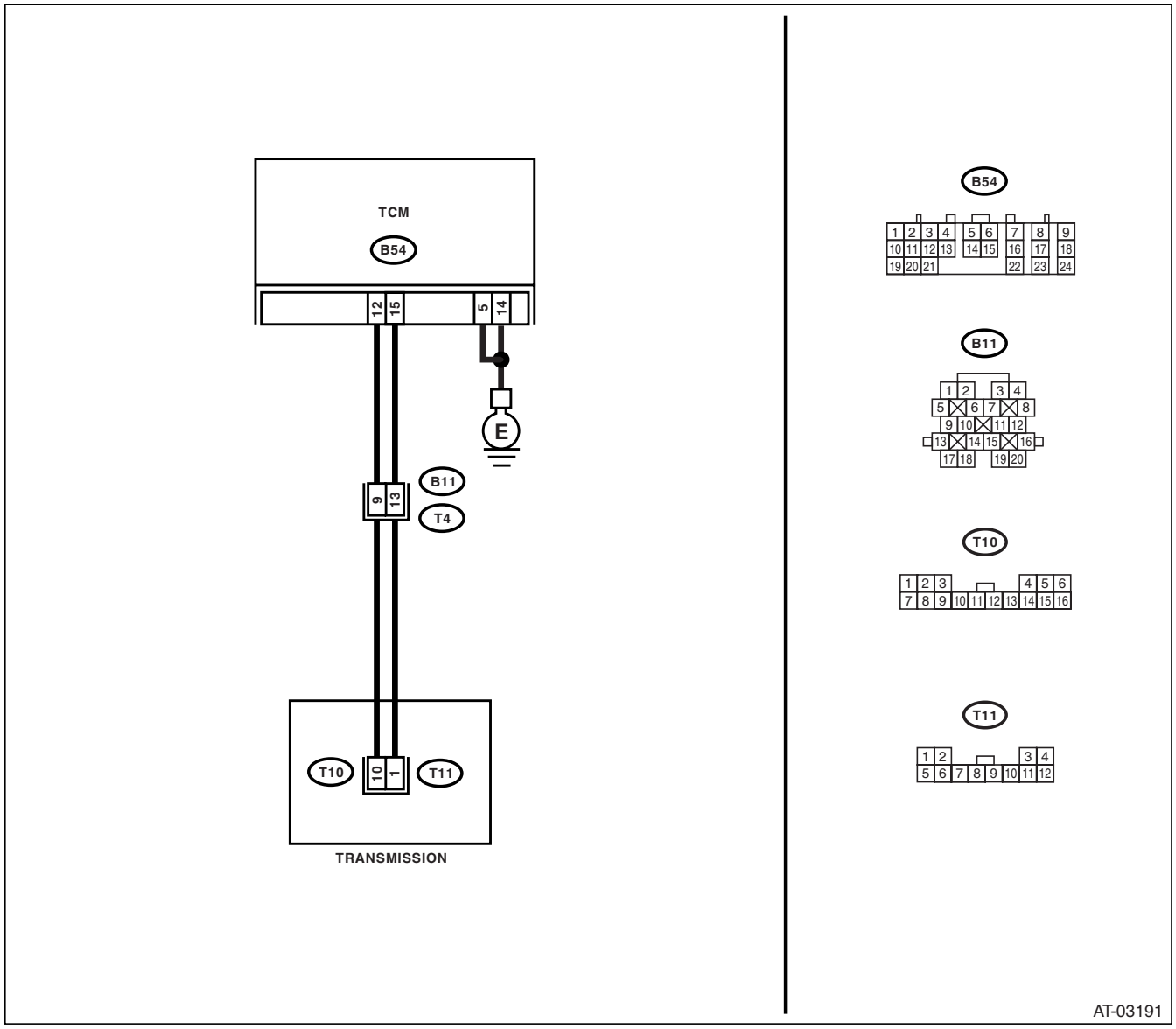
DTC DETECTING CONDITION:

Output signal value of low coast brake solenoid and oil pressure does not match.

TROUBLE SYMPTOM:

- Locked to 2nd gear.
- Engine brake does not function at 1st or 2nd of manual mode.

WIRING DIAGRAM:



	Step	Check	Yes	No
1	**CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from TCM and transmission. 3) Measure the resistance of harness between TCM and transmission connector. ***Connector & terminal*** ***(B54) No. 15 — (B11) No. 13:*** ***(B54) No. 12 — (B11) No. 9:*** ***(B54) No. 5 — Chassis ground:*** ***(B54) No. 14 — Chassis ground:***	Is the resistance less than 1 Ω?	Go to step **2.**	Repair the open circuit of harness between TCM and transmission connector.
2	**CHECK HARNESS CONNECTOR BETWEEN TCM AND CHASSIS GROUND.** Measure the resistance between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 15 — Chassis ground:*** ***(B54) No. 12 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **3.**	Repair the short circuit of harness between TCM and transmission connector.
3	**CHECK INPUT SIGNAL FOR TCM USING SUBARU SELECT MONITOR.** 1) Connect all the connectors. 2) Turn the ignition switch to ON. (engine OFF) 3) Check input signal of LC/B oil pressure SW.	Is OFF displayed?	Go to step **4.**	Go to step **7.**
4	**CHECK INPUT SIGNAL FOR TCM USING SUBARU SELECT MONITOR.** 1) Turn the ignition switch to OFF. 2) Turn the ignition switch to ON. (engine ON) 3) Shift to 3rd speed with checking current gear position using Subaru Select Monitor. 4) Check input signal of LC/B oil pressure SW.	Is OFF displayed?	Go to step **5.**	Replace the control valve body. <Ref. to 5AT-58, Control Valve Body.>
5	**CHECK INPUT SIGNAL FOR TCM USING SUBARU SELECT MONITOR.** 1) Turn the ignition switch to OFF. 2) Turn the ignition switch to ON. (engine ON) 3) Drive the vehicle on 2nd speed of manual mode 15 km/h (9 MPH) with checking current gear position using Subaru Select Monitor. 4) Check input signal of LC/B oil pressure SW.	Is ON displayed?	Even if the SPORT indicator lights blinks, the system is in normal condition. A temporary poor contact of connector or harness may be the cause. Repair the poor contact of harness in the solenoid output and oil pressure SW input.	Go to step **6.**

	Step	Check	Yes	No
6	**CHECK HARNESS CONNECTOR BETWEEN TRANSMISSION AND CONTROL VALVE BODY.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from transmission. 3) Remove the transmission connector from bracket. 4) Jack-up the vehicle and place it on rigid racks. 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 control valve body connector. 7) Measure the resistance between transmission connector and control valve body connector. ***Connector & terminal*** ***(T4) No. 13 — (T11) No. 1:*** ***(T4) No. 9 — (T10) No. 10:***	Is the resistance less than 1 Ω?	Replace the transmission assembly. <Ref. to 5AT-38, Automatic Transmission Assembly.>	Repair the open circuit of harness between control valve body connector and transmission connector.
7	**CHECK HARNESS CONNECTOR BETWEEN TRANSMISSION AND CONTROL VALVE BODY.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from transmission. 3) Remove the transmission connector from bracket. 4) Jack-up the vehicle and place it on rigid racks. 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 control valve body connector. 7) Measure the resistance between chassis ground and control valve body connector. ***Connector & terminal*** ***(T11) No. 1 — Chassis ground:*** ***(T10) No. 10 — Chassis ground:***	Is the resistance more than 1 MΩ?	Replace the control valve body. <Ref. to 5AT-58, Control Valve Body.>	Repair the short circuit of harness between control valve body connector and transmission connector.

AA:DTC P0773 SHIFT SOLENOID “E” ELECTRICAL

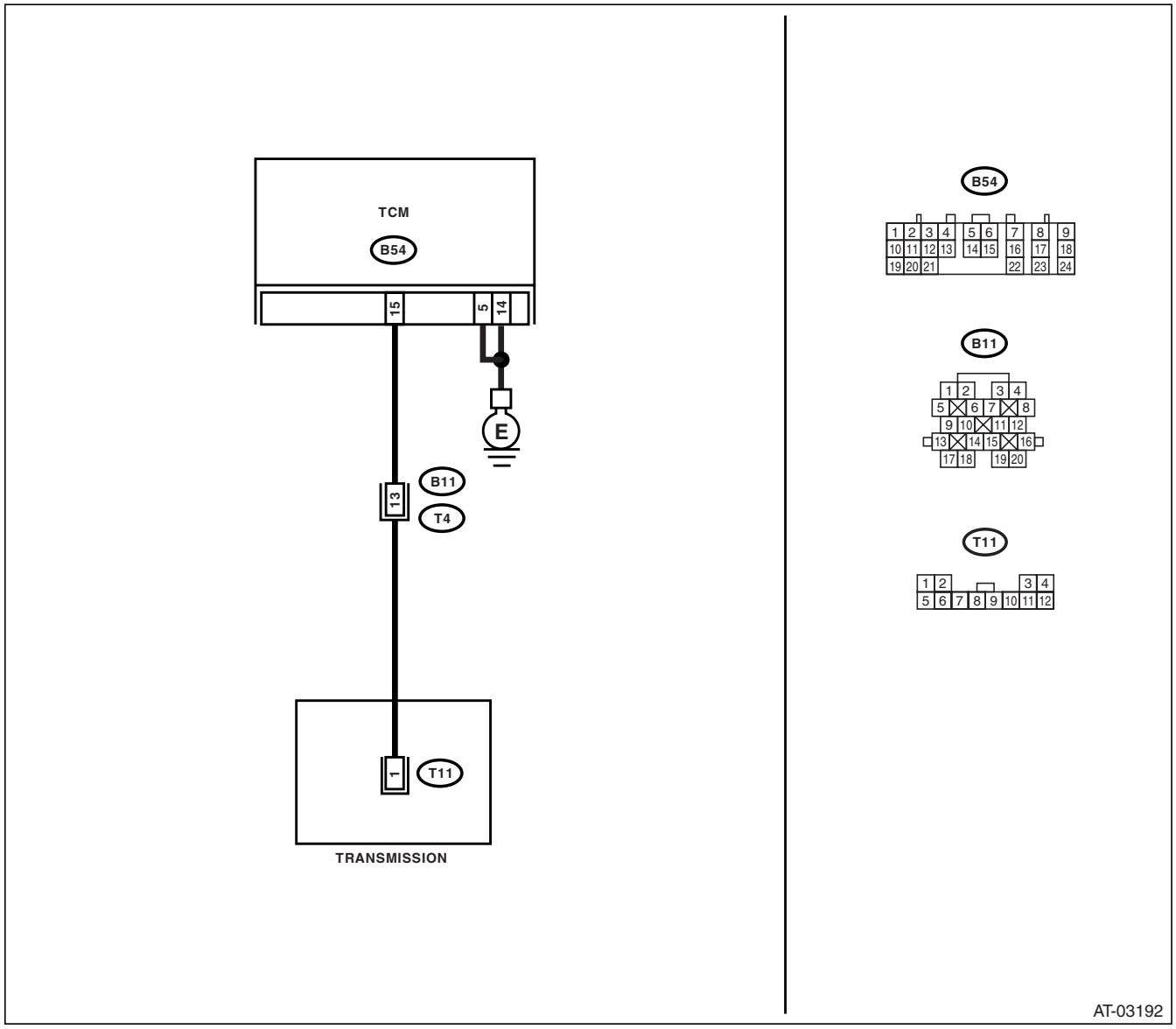
DTC DETECTING CONDITION:

Output signal circuit of low coast brake solenoid is open or shorted.

TROUBLE SYMPTOM:

- Locked to 2nd gear.
- Engine brake does not function at 1st or 2nd of manual mode.

WIRING DIAGRAM:



	Step	Check	Yes	No
1	**CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from TCM and transmission. 3) Measure the resistance of harness between TCM and transmission connector. ***Connector & terminal*** ***(B54) No. 15 — (B11) No. 13:*** ***(B54) No. 5 — Chassis ground:*** ***(B54) No. 14 — Chassis ground:***	Is the resistance less than 1 Ω?	Go to step **2.**	Repair the open circuit of harness between TCM connector and transmission connector.
2	**CHECK HARNESS CONNECTOR BETWEEN TCM AND BODY HARNESS.** Measure the resistance of harness between TCM connector and body harness. ***Connector & terminal*** ***(B54) No. 15 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **3.**	Repair the short circuit of harness between TCM connector and transmission connector.
3	**CHECK HARNESS CONNECTOR BETWEEN TRANSMISSION AND CONTROL VALVE BODY.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from transmission. 3) Remove the transmission connector from bracket. 4) Jack-up the vehicle and place it on rigid racks. 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 control valve body connector. 7) Measure the resistance between transmission connector and control valve body connector. ***Connector & terminal*** ***(T4) No. 13 — (T11) No. 1:***	Is the resistance less than 1 Ω?	Go to step **4.**	Repair the open circuit of harness between control valve body connector and transmission connector.
4	**CHECK HARNESS CONNECTOR BETWEEN TRANSMISSION AND CONTROL VALVE BODY.** Measure the resistance between chassis ground and control valve body connector. ***Connector & terminal*** ***(T11) No. 1 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **5.**	Repair the short circuit of harness between control valve body connector and transmission ground.
5	**CHECK LOW COAST BRAKE SOLENOID.** Measure the resistance of harness connector between control valve body connector and transmission ground. ***Connector & terminal*** ***(T11) No. 1 — Transmission ground:***	Is the resistance 5 — 17 Ω	Go to step **6.**	Replace the control valve body. <Ref. to 5AT-58, Control Valve Body.>
6	**CHECK POOR CONTACT.** Check that there are no poor contact in TCM connector, transmission connector and control valve body connector.	Is there any loosing terminal, entering foreign matter, damaging connector body?	Repair the poor contact.	Go to step **7.**

	Step	Check	Yes	No
7	**CHECK AFTER REPAIR.** 1) Perform the clear memory mode. 2) Drive for a while, read the DTC, and verify that there is no faulty.	Is DTC displayed?	Replace the TCM. <Ref. to 5AT-61, Transmission Control Module (TCM).>	Perform the diagnosis of DTC P0882. <Ref. to 5AT(diag)-93, DTC P0882 TCM POWER INPUT SIGNAL LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

AB:DTC P0801 REVERSE INHIBIT CONTROL CIRCUIT

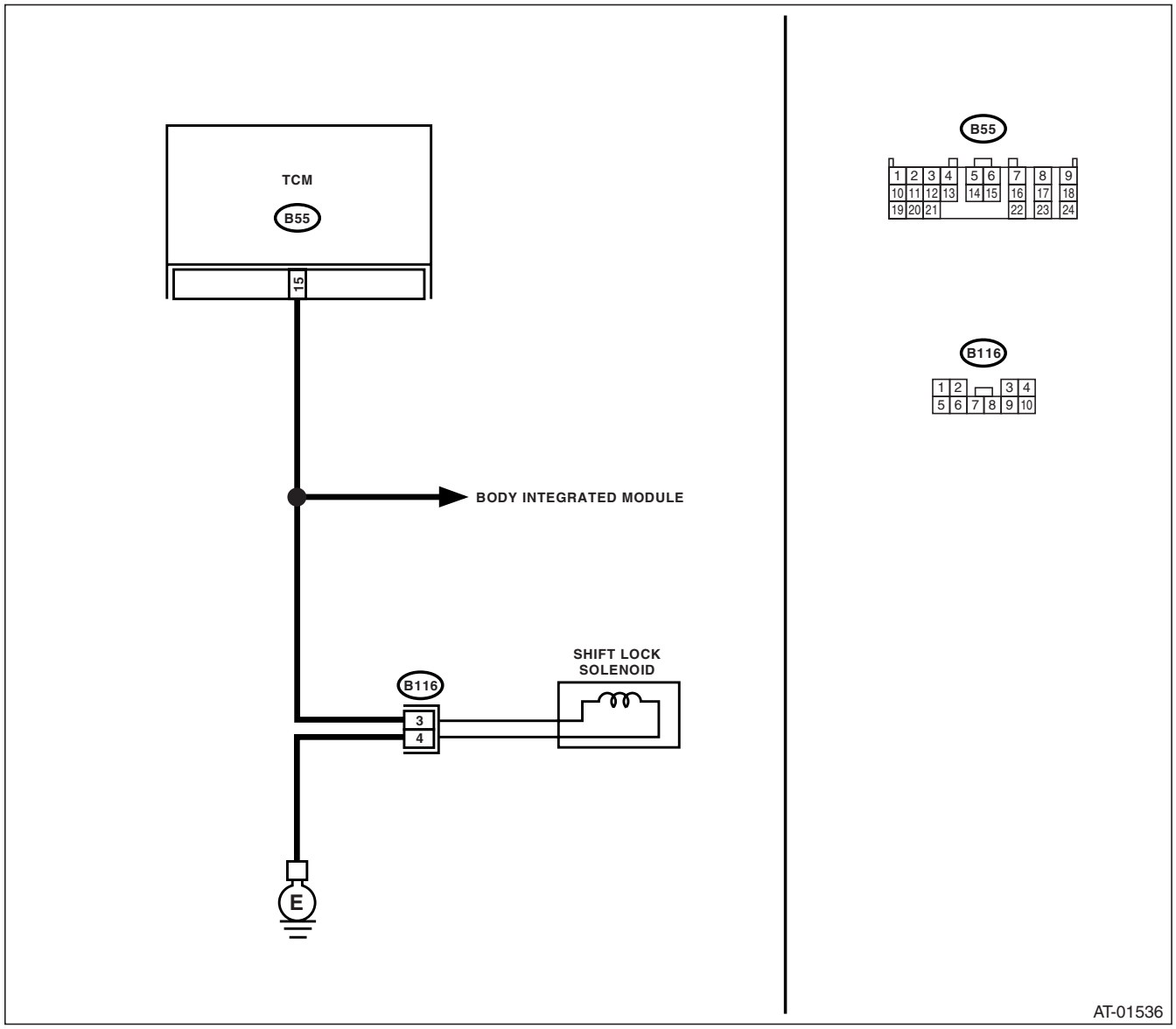
DTC DETECTING CONDITION:

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 though the vehicle is parked.

WIRING DIAGRAM:



	Step	Check	Yes	No
1	**CHECK FUSE.** 1) Turn the ignition switch to OFF. 2) Remove the fuse M/B (No. 12).	Is the fuse M/B (No. 12) blown out?	Replace the fuse M/B (No. 12). If the replaced fuse has blown out easily, repair the short circuit of harness between fuse M/B (No. 12) and TCM.	Go to step **2.**
2	**CHECK OUTPUT SIGNAL OF TCM.** 1) Turn the ignition switch to ON. 2) With the brake pedal depressed, shift the select lever to "D" range. 3) Measure the voltage between TCM and chassis ground. ***Connector & terminal*** ***(B55) No. 15 (+) — Chassis ground (−):***	Is the voltage more than 10.5 V?	Go to step **3.**	Replace the TCM. <Ref. to 5AT-61, Transmission Control Module (TCM).>
3	**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 of harness between TCM and shift lock solenoid connector. ***Connector & terminal*** ***(B55) No. 15 — (B116) No. 3:***	Is the resistance less than 1 Ω?	Go to step **4.**	Repair the open circuit of harness between TCM and shift lock solenoid connector.
4	**CHECK HARNESS CONNECTOR BETWEEN TCM AND SHIFT LOCK SOLENOID.** Measure the resistance of harness between TCM and chassis ground. ***Connector & terminal*** ***(B55) No. 15 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **5.**	Repair the short circuit of harness between TCM and shift lock solenoid connector.
5	**CHECK HARNESS BETWEEN SHIFT LOCK SOLENOID AND CHASSIS GROUND TERMINAL.** Measure the resistance of harness between shift lock solenoid and chassis ground. ***Connector & terminal*** ***(B116) No. 4 — Chassis ground:***	Is the resistance less than 1 Ω?	Go to step **6.**	Repair the open circuit of harness between chassis ground and shift lock solenoid connector.
6	**CHECK SHIFT LOCK SOLENOID.** Measure the resistance of shift lock solenoid terminals. ***Connector & terminal*** ***(B116) No. 3 — No. 4:***	Is the resistance 7 — 21 Ω	Go to step **7.**	Replace the shift lock solenoid.

	Step	Check	Yes	No
7	**CHECK OUTPUT SIGNAL OF TCM.** 1) Jack-up the vehicle and support with rigid racks. NOTE: Raise all wheels off floor. 2) Start the engine. 3) Shift the select lever to "D" range and slowly increase vehicle speed to 20 km/h (12 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(diag)-26, Clear Memory Mode.> 4) Measure the voltage between TCM and chassis ground. ***Connector & terminal*** ***(B55) No. 15 (+) — Chassis ground (−):***	Is the voltage less than 1 V?	Even if the SPORT indicator lights up, the circuit has returned to normal condition at this time. A temporary poor contact of connector or harness may be the cause. Repair the harness or connector in reverse inhibitor control circuit.	Go to step **8.**
8	**CHECK POOR CONTACT.**	Is there poor contact in the reverse inhibitor control circuit?	Repair the poor contact.	Replace the TCM. <Ref. to 5AT-61, Transmission Control Module (TCM).>

AC:DTC P0817 STARTER DISABLE CIRCUIT

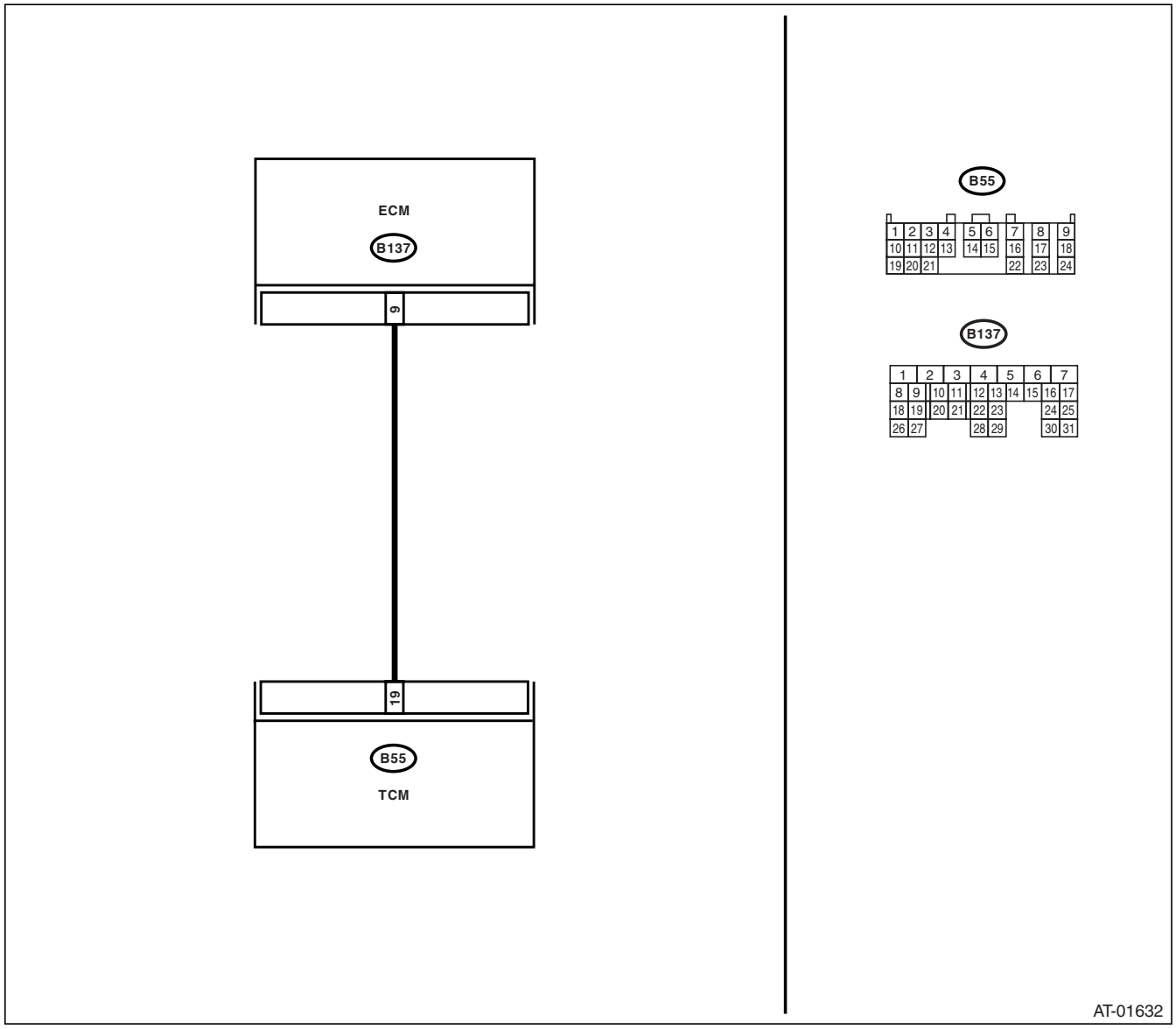
DTC DETECTING CONDITION:

Open or short in P/N signal output circuit

TROUBLE SYMPTOM:

- Engine can be started on other than “P” or “N” range.
- Engine can not be started on “P” or “N” range.

WIRING DIAGRAM:



	Step	Check	Yes	No
1	**CHECK DTC OF TCM.**	Is DTC of Transmission Range Sensor Circuit (PRNDL Input) circuit detected?	Perform the diagnosis according to DTC.	Go to step **2.**
2	**CHECK ECM.**	Is the communication between Subaru Select Monitor and ECM normal?	Go to step **3.**	Perform the diagnosis according to DTC concerning ECM.
3	**CHECK FUSE.** 1) Turn the ignition switch to OFF. 2) Remove the fuse.	Is the fuse M/B (No. 12) blown out?	Replace the fuse M/B (No. 12). If the replaced fuse M/B (No. 12) has blown out easily, repair the short circuit of harness between fuse M/B (No. 12) and TCM.	Go to step **4.**
4	**CHECK HARNESS CONNECTOR BETWEEN TCM AND ECM.** 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. 19 — (B137) No. 9:***	Is the resistance less than 1 Ω?	Go to step **5.**	Repair the open circuit of harness between TCM and transmission connector, and poor contact in connector.
5	**CHECK HARNESS CONNECTOR BETWEEN TCM AND ECM.** 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 of harness between transmission connector and chassis ground.
6	**CHECK TCM OUTPUT SIGNAL.** 1) Connect the TCM and ECM connector. 2) Turn the ignition switch to ON. (engine OFF) 3) Shift the select lever to “P” range. 4) Measure the voltage between TCM connector and chassis ground. ***Connector & terminal*** ***(B55) No. 19 (+) — Chassis ground (−):***	Is the voltage more than 10 V?	Go to step **7.**	Replace the TCM. <Ref. to 5AT-61, Transmission Control Module (TCM).>
7	**CHECK TCM OUTPUT SIGNAL.** 1) Shift the select lever to “D” range. 2) Measure the voltage between TCM connector and chassis ground. ***Connector & terminal*** ***(B55) No. 19 (+) — Chassis ground (−):***	Is the voltage less than 1 V?	Go to step **8.**	Replace the TCM. <Ref. to 5AT-61, Transmission Control Module (TCM).>
8	**CHECK POOR CONTACT.**	Is there any open or poor contact of connector (loosing terminal, entering foreign matter, damaging connector body)?	Repair the poor contact.	Check the neutral position switch of ECM.

AD:DTC P0882 TCM POWER INPUT SIGNAL LOW

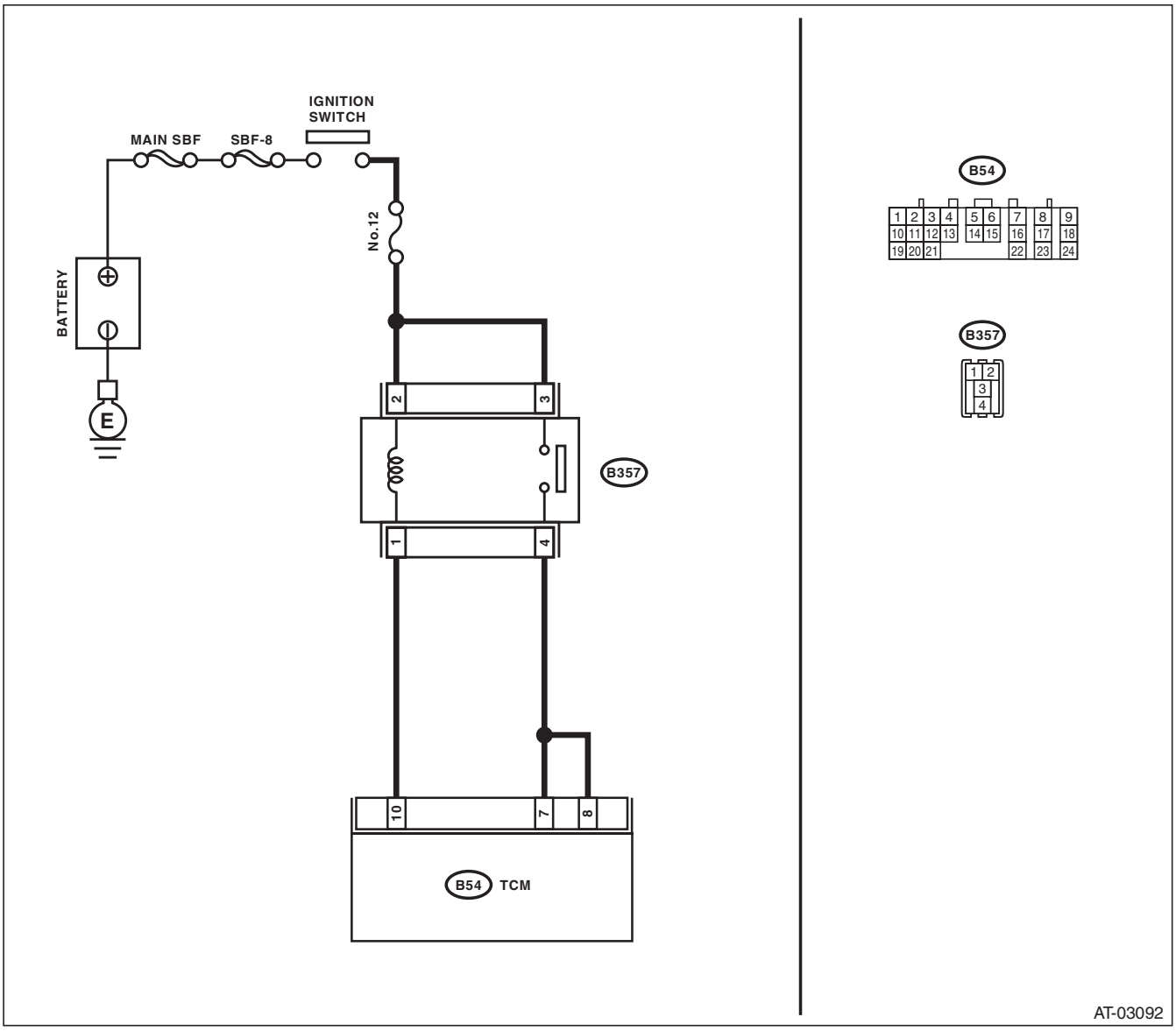
DTC DETECTING CONDITION:

Malfunction of PVIGN power supply relay or open, short circuit of PVIGN power supply circuit.

TROUBLE SYMPTOM:

Gear is not changed.

WIRING DIAGRAM:



	Step	Check	Yes	No
1	**CHECK FUSE.** 1) Turn the ignition switch to OFF. 2) Remove the MAIN SBF, SBF 8 and fuse (No. 12), and then check those are not blown out.	Is the fuse blown out?	Replace the fuse. If the replaced fuse has blown out easily, repair the short circuit of harness of each fuse.	Go to step **2.**
2	**CHECK INPUT VOLTAGE FOR PVIGN RELAY.** Measure the voltage between PVIGN relay and chassis ground. ***Connector & terminal*** ***(B357) No. 2 (+) — Chassis ground (−):*** ***(B357) No. 3 (+) — Chassis ground (−):***	Is the voltage 10 — 13 V?	Go to step **3.**	Repair the open circuit of harness between fuse (No. 12) and PVIGN relay.
3	**CHECK HARNESS BETWEEN PVIGN RELAY OF TCM.** Measure the resistance between TCM connector and PVIGN relay connector. ***Connector & terminal*** ***(B54) No. 10 — (B357) No. 1:*** ***(B54) No. 7 — (B357) No. 4:*** ***(B54) No. 8 — (B357) No. 4:***	Is the resistance less than 1 Ω?	Go to step **4.**	Repair the open circuit of harness.
4	**CHECK PVIGN POWER SUPPLY CIRCUIT.** 1) Turn the ignition switch to ON. (engine OFF) 2) Measure the voltage between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 7 (+) — Chassis ground (−):*** ***(B54) No. 8 (+) — Chassis ground (−):***	Is the voltage 10 — 13 V?	Temporary poor contact. Recheck the harness between TCM and relay. (Lightly move the harness and check that the open or short circuit is not occurred.)	Go to step **5.**
5	**CHECK PVIGN RELAY OUTPUT OF TCM.** Measure the voltage between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 10 (+) — Chassis ground (−):***	Is the voltage less than 1.5 V?	Replace the PVIGN relay.	Replace the TCM. <Ref. to 5AT-61, Transmission Control Module (TCM).>

AE:DTC P0957 BACKUP LIGHT RELAY CIRCUIT LOW

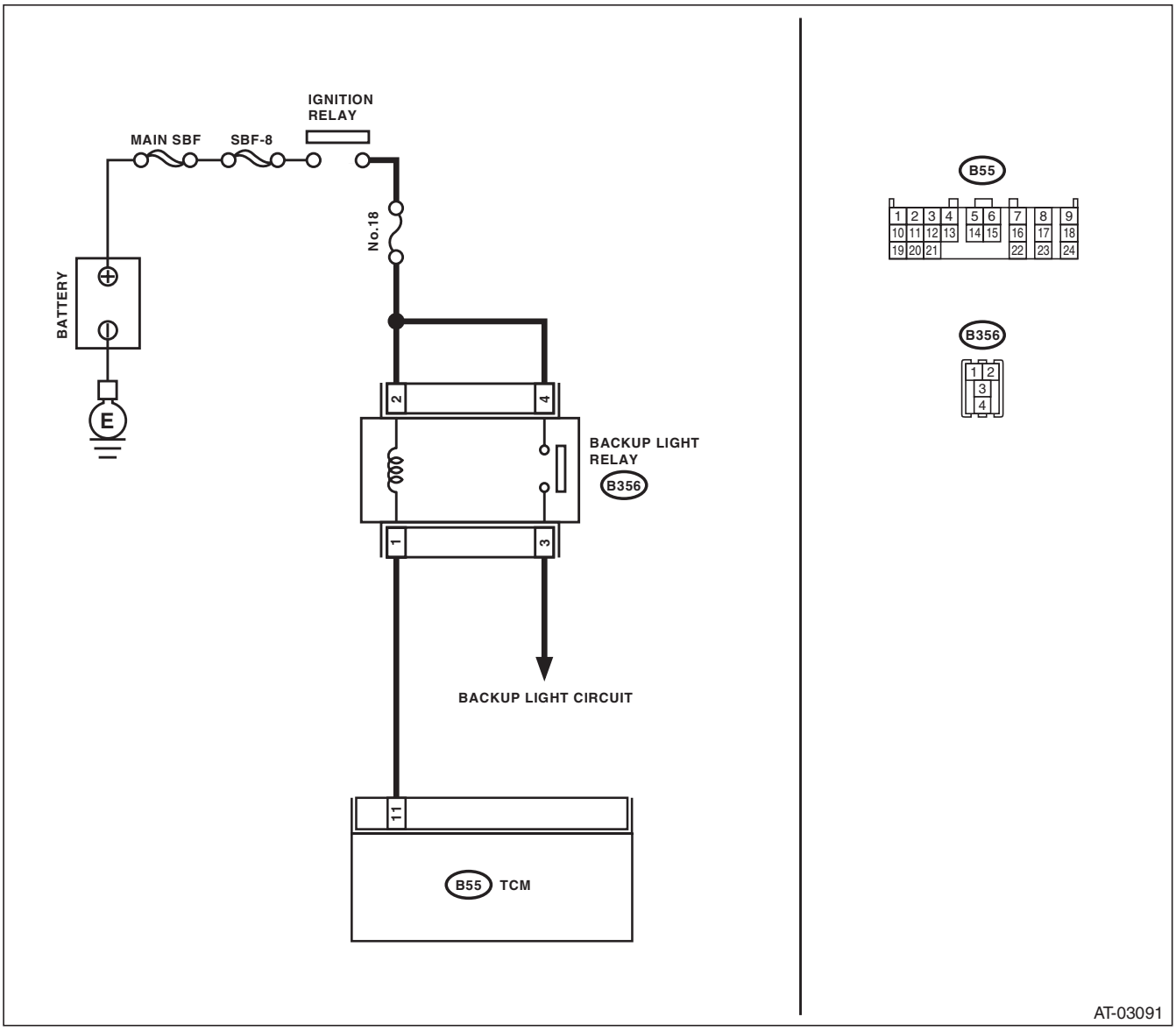
DTC DETECTING CONDITION:

Short circuit of back-up light relay output circuit

TROUBLE SYMPTOM:

Back-up light does not illuminate in “R” range.

WIRING DIAGRAM:



	Step	Check	Yes	No
1	**CHECK DTC OF TCM.**	Is DTC of Transmission Range Sensor Circuit (PRNDL Input) circuit detected?	Perform the diagnosis according to DTC.	Go to step **2.**
2	**CHECK HARNESS CONNECTOR BETWEEN TCM AND BACK-UP LIGHT RELAY.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from TCM and back-up light relay. 3) Measure the resistance of harness between TCM and back-up light relay connector. ***Connector & terminal*** ***(B55) No. 11 — (B356) No. 1:***	Is the resistance less than 1 Ω?	Go to step **3.**	Repair the open circuit of harness between TCM and transmission connector, and poor contact in connector.
3	**CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION.** 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 **4.**	Repair the short circuit of harness between TCM and transmission connector.
4	**CHECK TCM OUTPUT SIGNAL.** 1) Turn the ignition switch to ON. (engine OFF) 2) Set the select lever to “P” range.	Is the voltage more than 10 V?	Go to step **5.**	Replace the TCM. <Ref. to 5AT-61, Transmission Control Module (TCM).>
5	**CHECK TCM OUTPUT SIGNAL.** Set the select lever to “R” range.	Is the voltage less than 1 V?	Go to step **6.**	Replace the TCM. <Ref. to 5AT-61, Transmission Control Module (TCM).>
6	**CHECK INPUT VOLTAGE FOR BACK-UP LIGHT RELAY.** Measure the voltage between back-up light relay and chassis ground.	Is the voltage 10 — 13 V?	Replace the back-up light relay.	Check open or short circuit of harness between fuse (No. 18) and back-up light relay.

AF:DTC P0958 BACKUP LIGHT RELAY CIRCUIT HIGH

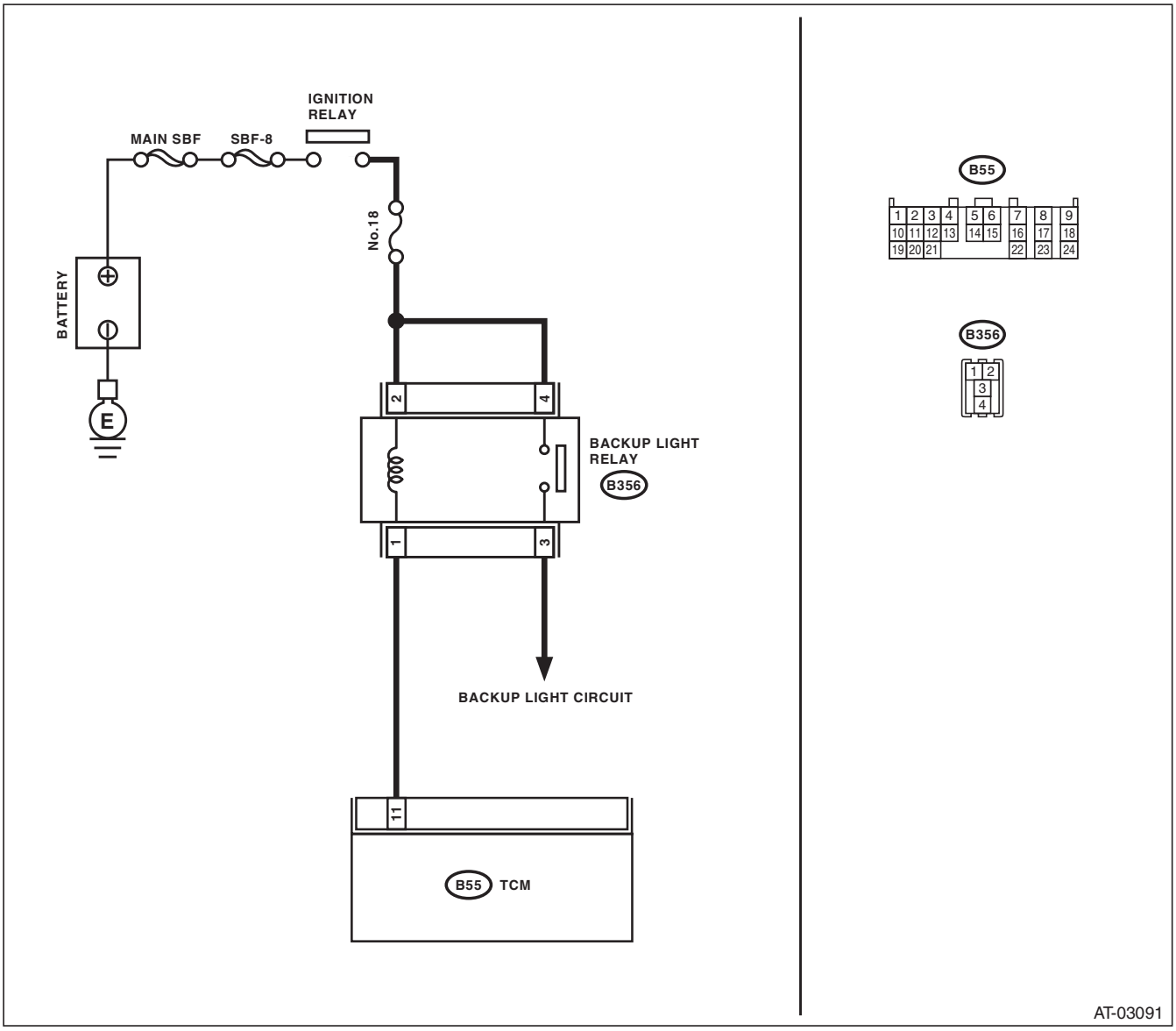
DTC DETECTING CONDITION:

Backup light relay malfunction, or open/short circuit in back-up light relay output circuit

TROUBLE SYMPTOM:

- Back-up light does not illuminate in “R” range.
- Back-up light always illuminate except in “R” range.

WIRING DIAGRAM:



	Step	Check	Yes	No
1	**CHECK DTC OF TCM.**	Is DTC of Transmission Range Sensor Circuit (PRNDL Input) detected?	Perform the diagnosis according to DTC.	Go to step **2.**
2	**CHECK HARNESS CONNECTOR BETWEEN TCM AND BACK-UP LIGHT RELAY.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from TCM and back-up light relay. 3) Measure the resistance of harness between TCM and back-up light relay connector. ***Connector & terminal*** ***(B55) No. 11 — (B356) No. 1:***	Is the resistance less than 1 Ω?	Go to step **3.**	Repair the open circuit of harness between TCM and transmission connector, and poor contact in connector.
3	**CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION.** 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 **4.**	Repair the short circuit of harness between TCM and transmission connector.
4	**CHECK TCM OUTPUT SIGNAL.** 1) Turn the ignition switch to ON. (engine OFF) 2) Set the select lever to “P” range.	Is the voltage more than 10 V?	Go to step **5.**	Replace the TCM. <Ref. to 5AT-61, Transmission Control Module (TCM).>
5	**CHECK TCM OUTPUT SIGNAL.** Set the select lever to “R” range.	Is the voltage less than 1 V?	Go to step **6.**	Replace the TCM. <Ref. to 5AT-61, Transmission Control Module (TCM).>
6	**CHECK INPUT VOLTAGE FOR BACK-UP LIGHT RELAY.** Measure the voltage between back-up light relay and chassis ground.	Is the voltage 10 — 13 V?	Replace the back-up light relay.	Check open or short circuit of harness between fuse (No. 18) and back-up light relay.

AG:DTC P1601 TCM DATA COMMUNICATION FAILURE

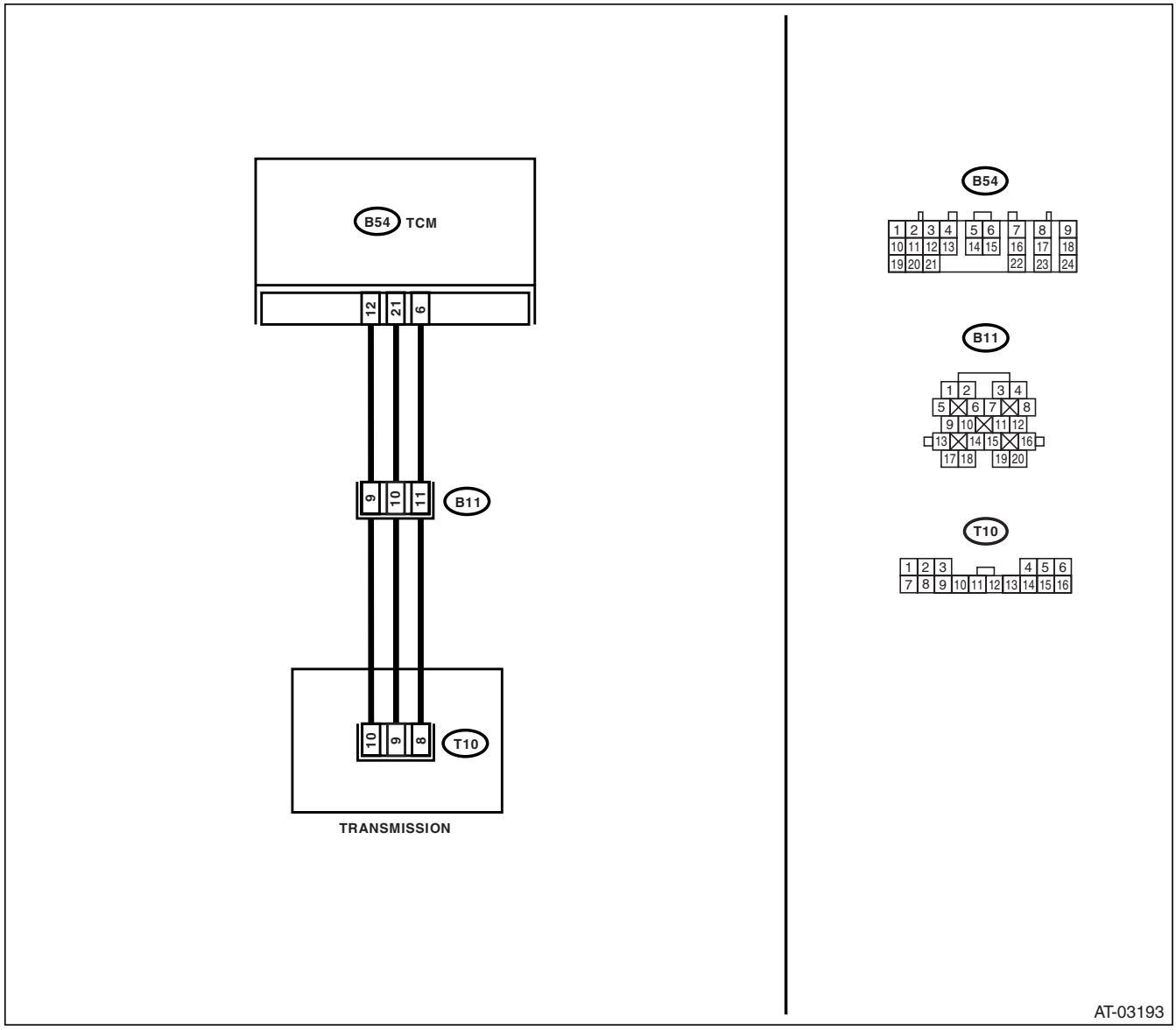
DTC DETECTING CONDITION:

Communication does not complete between control valve memory box.

TROUBLE SYMPTOM:

Shifting quality malfunction

WIRING DIAGRAM:



	Step	Check	Yes	No
1	**CHECK POOR CONTACT OF TRANSMISSION CONNECTOR.** Check loose connection on TCM connector (B54).	Is there poor contact on connector?	Connect it securely.	Go to step **2.**
2	**CHECK DTC OF TCM.**	Is DTC of oil pressure switch detected?	Perform the diagnosis according to DTC.	Go to step **3.**

	Step	Check	Yes	No
3	**CHECK TCM OUTPUT SIGNAL.** 1) Turn the ignition switch to ON. (engine OFF) 2) Measure the voltage between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 16 (+) — Chassis ground (−):***	Is the voltage 10 — 13 V?	Go to step **4.**	Go to step **5.**
4	**CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from TCM and transmission. 3) Measure the resistance of harness between TCM and transmission connector. ***Connector & terminal*** ***(B54) No. 12 — (B11) No. 9:*** ***(B54) No. 21 — (B11) No. 10:*** ***(B54) No. 6 — (B11) No. 11:***	Is the resistance less than 1 Ω?	Go to step **5.**	Repair the open circuit of harness between TCM and transmission connector, and poor contact in connector.
5	**CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION.** Measure the resistance of harness between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 12 — Chassis ground:*** ***(B54) No. 21 — Chassis ground:*** ***(B54) No. 6 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **6.**	Repair the short circuit of harness between TCM and transmission connector.
6	**CHECK HARNESS CONNECTOR BETWEEN TRANSMISSION CONNECTOR AND CONTROL VALVE BODY CONNECTOR.** Measure the resistance between transmission connector and control valve body connector. ***Connector & terminal*** ***(B11) No. 9 — (T10) No. 10:*** ***(B11) No. 10 — (T10) No. 9:*** ***(B11) No. 11 — (T10) No. 8:***	Is the resistance less than 1 Ω?	Go to step **7.**	Repair the open circuit of harness between control valve body connector and transmission connector.
7	**CHECK HARNESS CONNECTOR BETWEEN TRANSMISSION CONNECTOR AND CONTROL VALVE BODY CONNECTOR.** Measure the resistance between transmission connector and chassis ground. ***Connector & terminal*** ***(B11) No. 9 — Chassis ground:*** ***(B11) No. 10 — Chassis ground:*** ***(B11) No. 11 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **8.**	Repair the short circuit of harness between control valve body connector and transmission connector.
8	**CHECK POOR CONTACT.** NOTE: Data communication malfunction is detected when the malfunction occurred on inspection area above while transmission assembly is replacing or “Clear Memory 2” is performing. When the repair is performed with following diagnosis above, perform the “Clear Memory 2”, and then recheck that the DTC of TCM data communication malfunction is not detected.	Is there any open or poor contact of connector (loosing terminal, entering foreign matter, damaging connector body)?	Repair the poor contact.	Replace the transmission assembly. <Ref. to 5AT-38, Automatic Transmission Assembly.>

AH:DTC P1706 AT VEHICLE SPEED SENSOR CIRCUIT MALFUNCTION (REAR WHEEL)

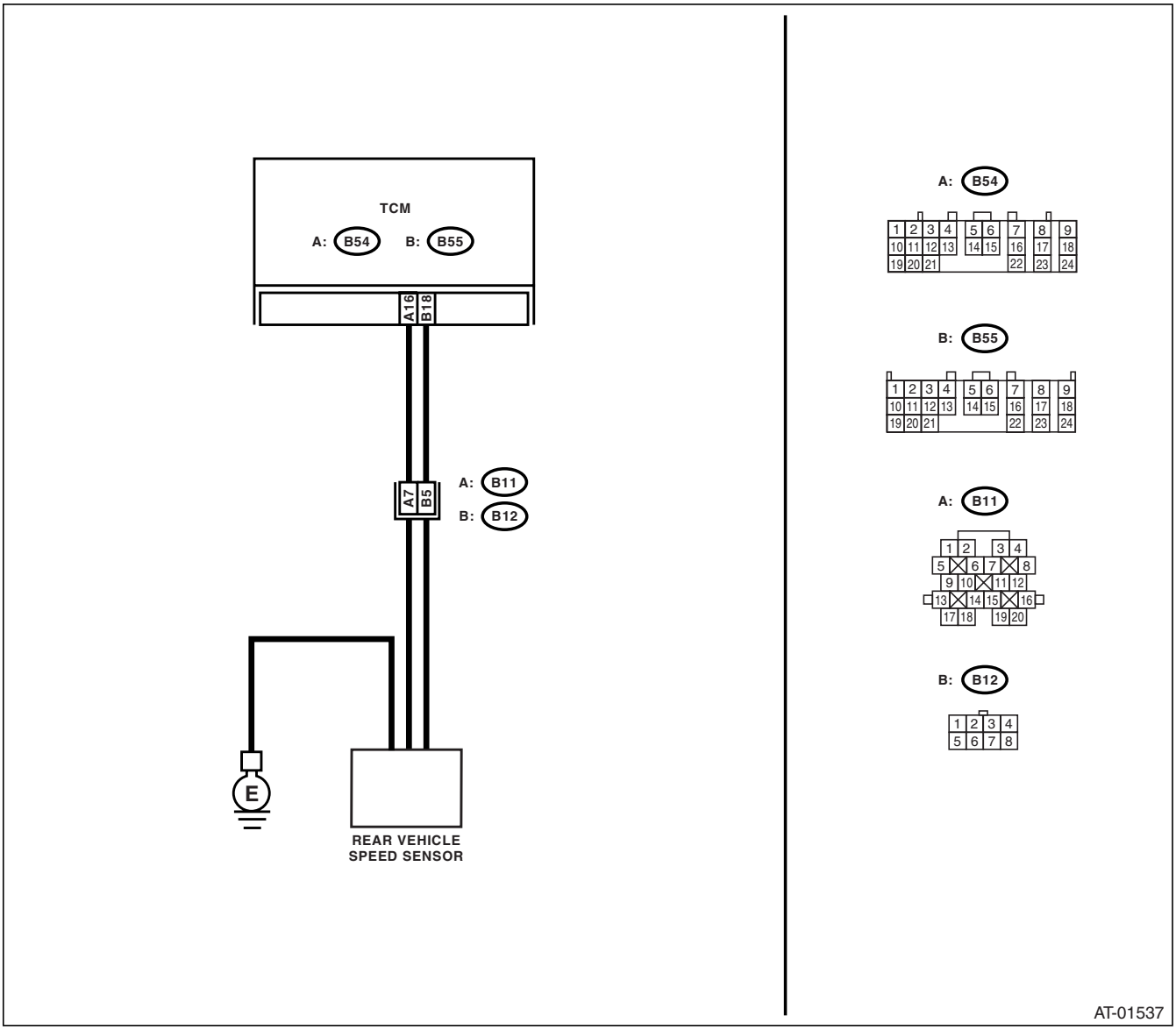
DTC DETECTING CONDITION:

Input signal circuit of TCM is open or shorted.

TROUBLE SYMPTOM:

- Shifting quality malfunction
- Tight corner braking phenomenon is occurred.

WIRING DIAGRAM:



	Step	Check	Yes	No
1	**CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from TCM and transmission. 3) Measure the resistance of harness between TCM and transmission connector. ***Connector & terminal*** ***(B54) No. 16 — (B11) No. 7:*** ***(B55) No. 18 — (B12) No. 5:***	Is the resistance less than 1 Ω?	Go to step **2.**	Repair the open circuit of 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. 16 — Chassis ground:*** ***(B55) No. 18 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **3.**	Repair the short circuit of harness between TCM and chassis ground.
3	**CHECK TCM POWER SUPPLY OUTPUT.** 1) Connect the connector to TCM. (Transmission connector is disconnected) 2) Turn the ignition switch to ON. (engine OFF) 3) Measure the voltage between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 16 (+) — Chassis ground (−):***	Is the voltage 10 — 13 V?	Go to step **4.**	Go to step **5.**
4	**CHECK TURBINE SPEED SENSOR INPUT CIRCUIT OF TCM.** Measure the voltage between TCM connector terminals. ***Connector & terminal*** ***(B55) No. 18 (+) — (B54) No. 19 (−):***	Is the voltage 4 — 6 V?	Go to step **6.**	Go to step **5.**
5	**CHECK TCM I/O SIGNAL.** Check TCM I/O signal of power supply, ground and PVIGN power supply relay. <Ref. to 5AT(diag)-13, ELECTRICAL SPECIFICATION, Transmission Control Module (TCM) I/O Signal.>	Is TCM I/O signal OK?	Replace the TCM. <Ref. to 5AT-61, Transmission Control Module (TCM).>	Repair the open or short circuit for power supply and ground. Perform the diagnosis according to DTC for PVIGN power supply relay.
6	**CHECK HARNESS ASSEMBLY (TURBINE SPEED SENSOR GROUND).** Check the installing condition of ground connecting harness (used for both of turbine speed sensor 1, rear vehicle speed sensor).	Is the ground connecting harness installed to transmission body correctly, or the harness and connector terminals not damaged?	Go to step **7.**	When the poor installation of ground connecting harness, install it securely. Replace the transmission assembly when the harness is damaged. <Ref. to 5AT-38, Automatic Transmission Assembly.>

	Step	Check	Yes	No
7	**CHECK INPUT SIGNAL FOR TCM USING SUBARU SELECT MONITOR.** 1) Connect all the connectors. 2) Jack-up the vehicle and support with rigid racks. NOTE: Raise all wheels off floor. 3) Start the engine, and drive the vehicle. 4) Read the current data of front wheel speed using Subaru Select Monitor. <Ref. to 5AT(diag)-17, OPERATION, Subaru Select Monitor.> 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(diag)-26, Clear Memory Mode.>	Does the value of the front wheel speed depending on the acceleration and deceleration of the vehicle?	Even if the SPORT indicator lights blinks, the system is in normal condition. A temporary poor contact of connector or harness may be the cause. Repair poor contact of harness in ATF temperature sensor and transmission connector.	Replace the transmission harness.

AI: DTC P1707 AT AWD SOLENOID VALVE CIRCUIT MALFUNCTION

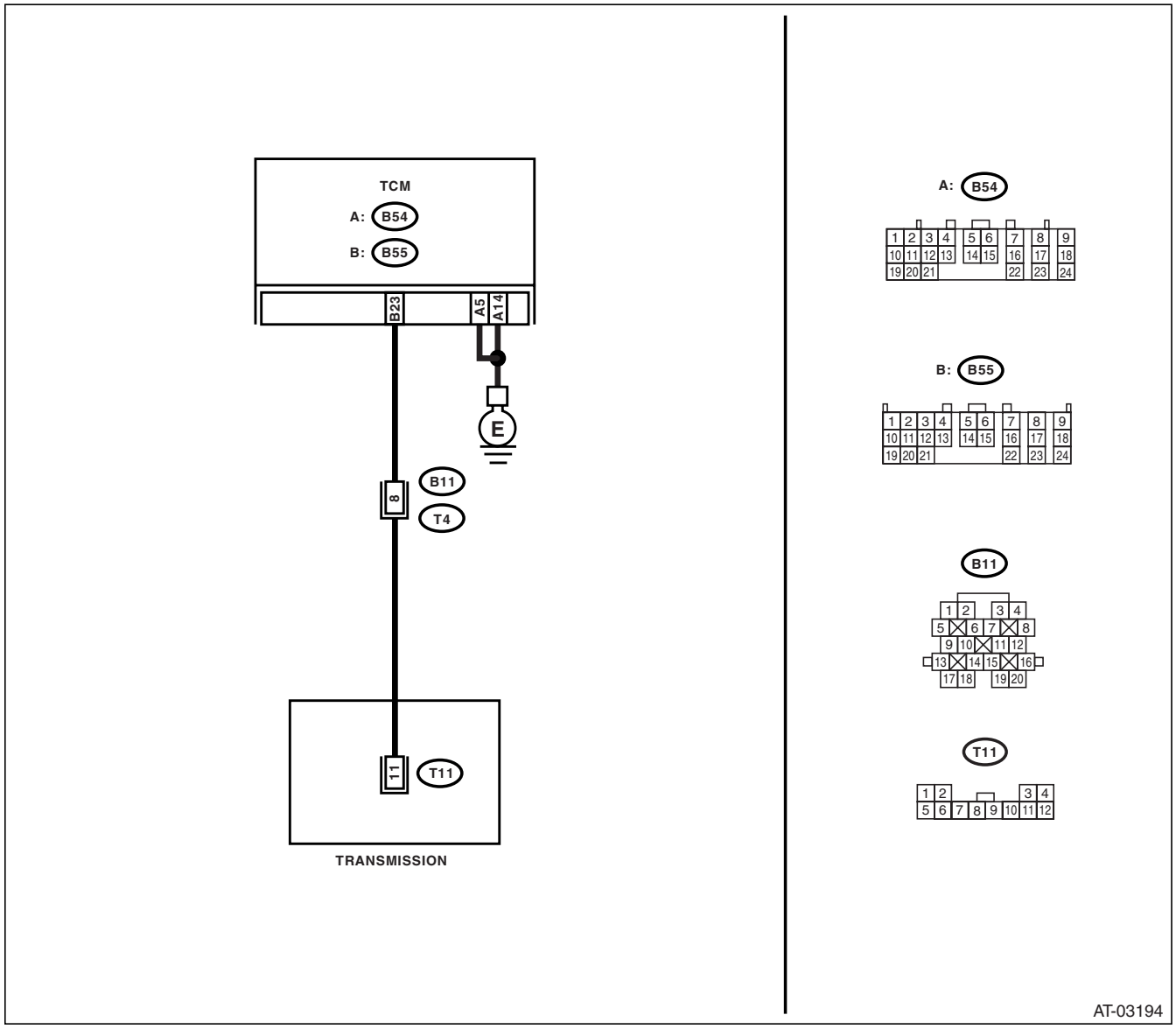
DTC DETECTING CONDITION:

Output signal circuit of transfer solenoid is open or shorted.

TROUBLE SYMPTOM:

- Tight corner braking phenomenon is occurred.
- Drivability getting worse.

WIRING DIAGRAM:



	Step	Check	Yes	No
1	**CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from TCM and transmission. 3) Measure the resistance of harness between TCM and transmission connector. ***Connector & terminal*** ***(B55) No. 23 — (B11) No. 8:*** ***(B54) No. 5 — Chassis ground:*** ***(B54) No. 14 — Chassis ground:***	Is the resistance less than 1 Ω?	Go to step **2.**	Repair the open circuit of harness between TCM connector 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*** ***(B55) No. 23 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **3.**	Repair the short circuit of harness between TCM connector and transmission connector.
3	**CHECK HARNESS CONNECTOR BETWEEN TRANSMISSION AND CONTROL VALVE BODY.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from transmission. 3) Remove the transmission connector from bracket. 4) Jack-up the vehicle and place it on rigid racks. 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 control valve body connector. 7) Measure the resistance between transmission connector and control valve body connector. ***Connector & terminal*** ***(T4) No. 8 — (T11) No. 11:***	Is the resistance less than 1 Ω?	Go to step **4.**	Repair the open circuit of harness between control valve body connector and transmission connector.
4	**CHECK HARNESS CONNECTOR BETWEEN TRANSMISSION AND CONTROL VALVE BODY.** Measure the resistance between transmission ground and control valve body connector. ***Connector & terminal*** ***(T11) No. 11 — Transmission ground:***	Is the resistance more than 1 MΩ?	Go to step **5.**	Repair the short circuit of harness between control valve body connector and transmission ground.
5	**CHECK AWD SOLENOID.** Measure the resistance between transmission ground and control valve body connector. ***Connector & terminal*** ***(T11) No. 11 — Transmission ground:***	Is the resistance 3 — 9 Ω	Go to step **6.**	Replace the control valve body. <Ref. to 5AT-58, Control Valve Body.>
6	**CHECK POOR CONTACT.** Check that there are no poor contact in TCM connector, transmission connector and control valve body connector.	Is there any loosing terminal, entering foreign matter, damaging connector body?	Repair the poor contact.	Go to step **7.**

Step		Check	Yes	No
7	**CHECK AFTER REPAIR.** 1) Perform the clear memory mode. 2) Drive for a while, read the DTC, and verify that there is no faulty.	Is DTC displayed?	Replace the TCM. <Ref. to 5AT-61, Transmission Control Module (TCM).>	Temporary poor contact or open circuit occurs. Recheck that the harness connector has no faulty.

AJ:DTC P1710 TORQUE CONVERTER TURBINE 2 SPEED SIGNAL CIRCUIT 2 MALFUNCTION

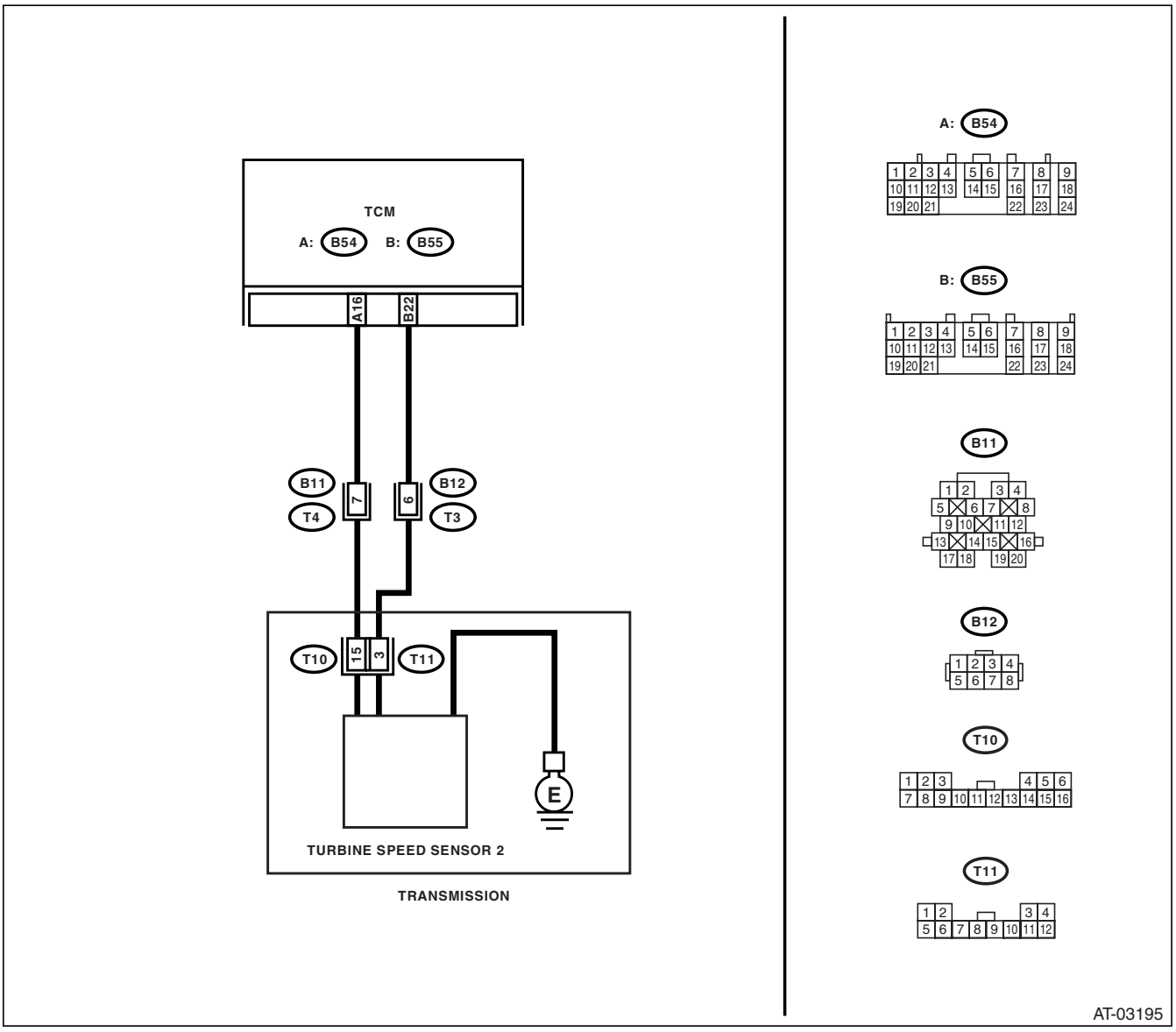
DTC DETECTING CONDITION:

Input signal circuit of TCM is open or shorted.

TROUBLE SYMPTOM:

- Excessive shift shock
- Does not shift to 5th

WIRING DIAGRAM:



	Step	Check	Yes	No
1	**CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from TCM and transmission. 3) Measure the resistance of harness between TCM and transmission connector. ***Connector & terminal*** ***(B55) No. 22 — (B12) No. 6:*** ***(B54) No. 16 — (B11) No. 7:***	Is the resistance less than 1 Ω?	Go to step **2.**	Repair the open circuit of 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*** ***(B55) No. 22 — Chassis ground:*** ***(B54) No. 16 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **3.**	Repair the short circuit of harness between TCM and transmission connector.
3	**CHECK TCM POWER SUPPLY OUTPUT.** 1) Connect the connector to TCM. (Transmission connector is disconnected) 2) Turn the ignition switch to ON. (engine OFF) 3) Measure the voltage between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 16 (+) — Chassis ground:***	Is the voltage 10 — 13 V?	Go to step **4.**	Go to step **5.**
4	**CHECK TURBINE SPEED SENSOR INPUT CIRCUIT OF TCM.** Measure the voltage between TCM connector terminals. ***Connector & terminal*** ***(B55) No. 22 (+) — (B54) No. 19 (−):***	Is the voltage 4 — 6 V?	Go to step **6.**	Go to step **5.**
5	**CHECK TCM I/O SIGNAL.** Check TCM I/O signal of power supply, ground and PVIGN power supply relay. <Ref. to 5AT(diag)-13, ELECTRICAL SPECIFICATION, Transmission Control Module (TCM) I/O Signal.>	Is I/O signal OK?	Replace the TCM. <Ref. to 5AT-61, Transmission Control Module (TCM).>	Repair the open or short circuit for power supply and ground. Perform the diagnosis according to DTC for PVIGN power supply relay.

	Step	Check	Yes	No
6	**CHECK INPUT SIGNAL FOR TCM USING SUBARU SELECT MONITOR.** 1) Connect all the connectors. 2) Jack-up the vehicle and support with rigid racks. NOTE: Raise all wheels off floor. 3) Start the engine, and set the vehicle in 1st speed driving condition of manual mode. 4) Read the current data of torque converter turbine speed 2 using Subaru Select Monitor. <Ref. to 5AT(diag)-17, OPERATION, Subaru Select Monitor.> 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(diag)-26, Clear Memory Mode.>	Does the value of the turbine speed sensor 2 change depending on the acceleration, deceleration and shifting gear of the vehicle? Also, is the value of turbine speed sensor 2 between 1,300 — 1,400 rpm when the value of torque converter turbine speed sensor is 2,000 rpm?	Even if the SPORT indicator lights blinks, the system is in normal condition. A temporary poor contact of connector or harness may be the cause. Repair the poor contact in harness of turbine speed sensor 2 and transmission connector.	Go to step **7.**
7	**CHECK HARNESS CONNECTOR BETWEEN TRANSMISSION AND CONTROL VALVE BODY.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from transmission. 3) Remove the transmission connector from bracket. 4) Jack-up the vehicle and place it on rigid racks. 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 control valve body connector. 7) Measure the resistance between transmission connector and control valve body connector. ***Connector & terminal*** ***(T3) No. 6 — (T11) No. 3:*** ***(T4) No. 7 — (T10) No. 15:***	Is the resistance less than 1 Ω?	Go to step **8.**	Repair the open circuit of harness between control valve body connector and transmission connector.
8	**CHECK HARNESS CONNECTOR BETWEEN TRANSMISSION AND CONTROL VALVE BODY.** Measure the resistance between transmission ground and control valve body connector. ***Connector & terminal*** ***(T11) No. 3 — Transmission ground:*** ***(T10) No. 15 — Transmission ground:***	Is the resistance more than 1 MΩ?	Replace the control valve body. <Ref. to 5AT-58, Control Valve Body.>	Repair the short circuit of harness between transmission connector and transmission ground.

AK:DTC P1716 ATF TEMP. SENSOR 2 CIRCUIT LOW

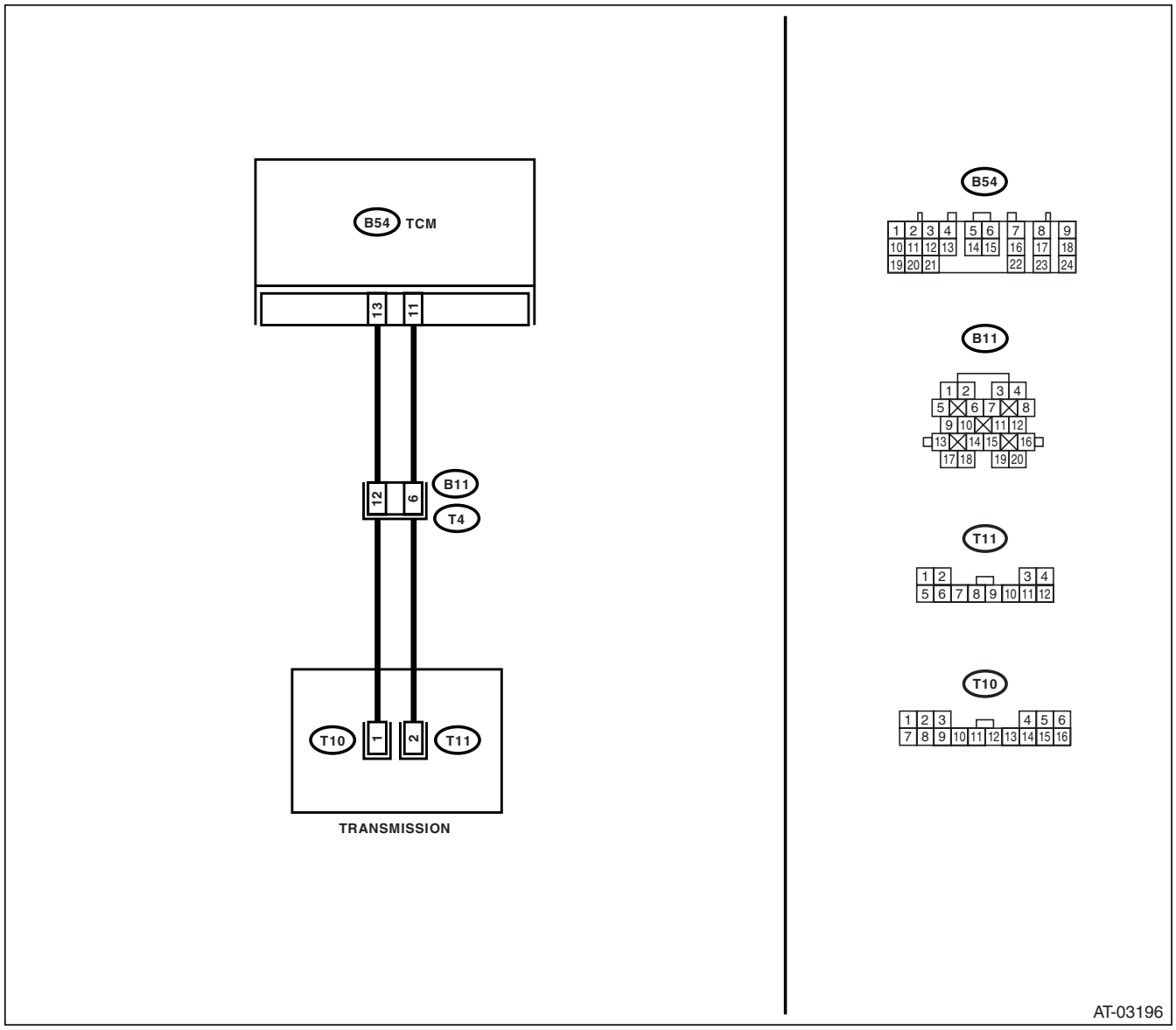
DTC DETECTING CONDITION:

Input signal circuit of TCM to ATF temperature sensor 2 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 connectors from TCM and transmission. 3) Measure the resistance of harness between TCM and transmission connector. ***Connector & terminal*** ***(B54) No. 13 — (B11) No. 12:*** ***(B54) No. 11 — (B11) No. 6:***	Is the resistance less than 1 Ω?	Go to step **2.**	Repair the open circuit of harness between TCM and transmission connector.
2	**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 the ATF temperature exceeds 80°C (176°F). NOTE: If the ambient temperature is below 0°C (32°F), drive the vehicle until the ATF reaches its operating temperature. 5) Disconnect the connector from transmission. 6) Measure the resistance between transmission connector terminals. ***Connector & terminal*** ***(T4) No. 6 — (T4) No. 12:***	Is the resistance 300 — 700 Ω	Go to step **3.**	Go to step **5.**
3	**CHECK ATF TEMPERATURE SENSOR.** Measure the resistance between transmission connector terminals. ***Connector & terminal*** ***(T4) No. 6 — (T4) No. 12:***	Does the resistance value increase while the ATF temperature decreases?	Go to step **4.**	Go to step **5.**
4	**CHECK INPUT SIGNAL FOR TCM USING SUBARU SELECT MONITOR.** 1) Connect the connector. 2) Turn the ignition switch to ON. (engine OFF) 3) Read the ATF temperature using Subaru Select Monitor.	Does the ATF temperature gradually decrease?	Even if the SPORT indicator lights blinks, the system is in normal condition. A temporary poor contact of connector or harness may be the cause. Repair the harness or contact in the ATF temperature sensor and transmission connector.	Go to step **6.**

	Step	Check	Yes	No
5	**CHECK HARNESS CONNECTOR BETWEEN TRANSMISSION AND CONTROL VALVE BODY.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from transmission. 3) Remove the transmission connector from bracket. 4) Jack-up the vehicle and place it on rigid racks. 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 control valve body connector. 7) Measure the resistance between transmission connector and control valve body connector. ***Connector & terminal*** ***(T4) No. 12 — (T10) No. 1:*** ***(T4) No. 6 — (T11) No. 2:***	Is the resistance less than 1 Ω?	Replace the control valve body. <Ref. to 5AT-58, Control Valve Body.>	Repair the open circuit of harness between control valve body connector and transmission connector.
6	**CHECK POOR CONTACT.** Check poor contact of ATF temperature sensor 1 circuit.	Is there poor contact?	Repair the poor contact.	Replace the TCM. <Ref. to 5AT-61, Transmission Control Module (TCM).>

AL:DTC P1717 ATF TEMP. SENSOR 2 CIRCUIT HIGH

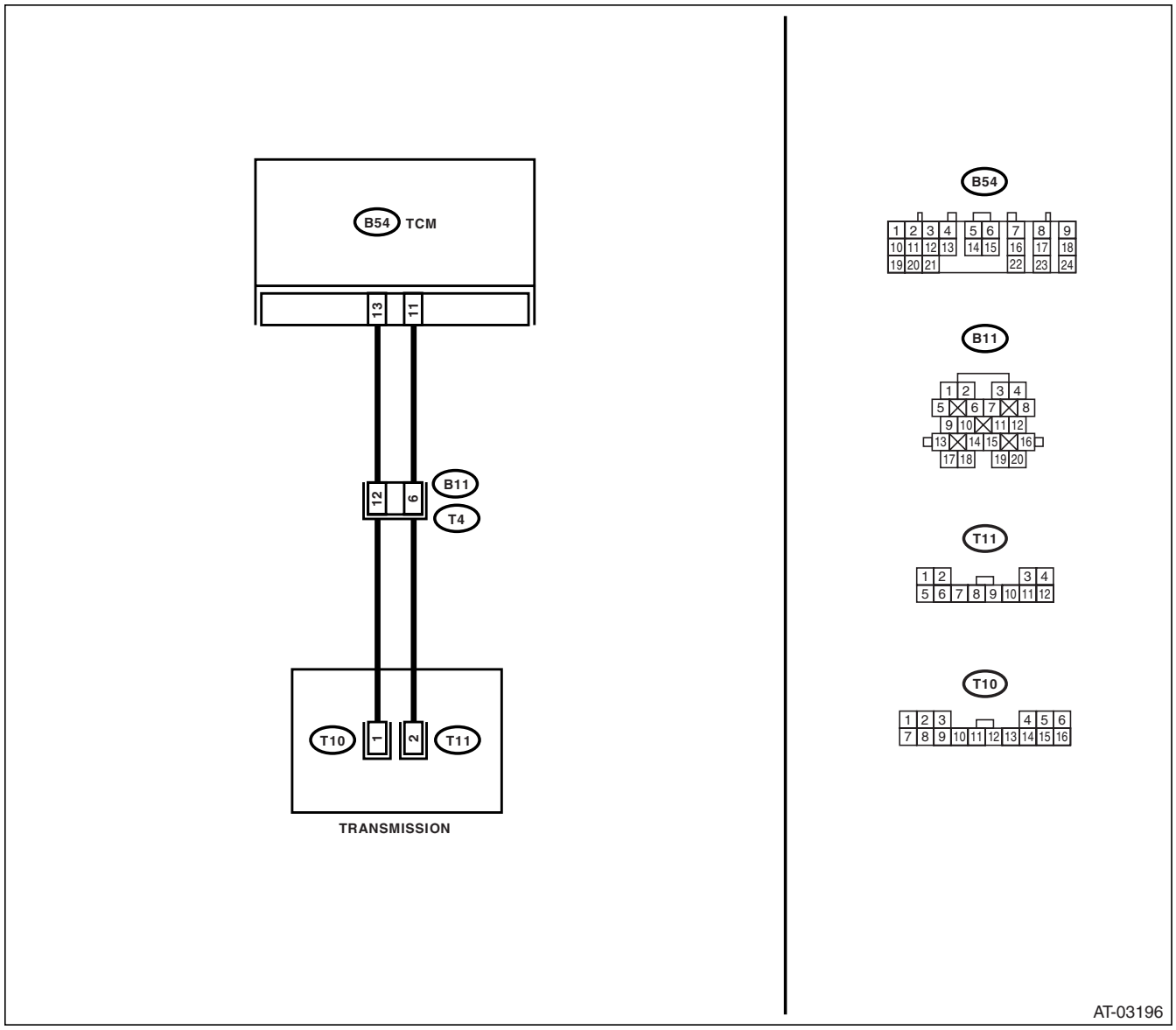
DTC DETECTING CONDITION:

Input signal circuit of TCM to ATF temperature sensor 2 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 connectors from TCM and transmission. 3) Measure the resistance of harness between TCM and transmission connector. ***Connector & terminal*** ***(B54) No. 13 — (B11) No. 12:*** ***(B54) No. 11 — (B11) No. 6:***	Is the resistance less than 1 Ω?	Go to step **2.**	Repair the open circuit of harness between TCM and transmission connector.
2	**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 the ATF temperature exceeds 80°C (176°F). NOTE: If the ambient temperature is below 0°C (32°F), drive the vehicle until the ATF reaches its operating temperature. 5) Disconnect the connector from transmission. 6) Measure the resistance between transmission connector terminals. ***Connector & terminal*** ***(T4) No. 6 — (T4) No. 12:***	Is the resistance 300 — 700 Ω	Go to step **3.**	Go to step **5.**
3	**CHECK ATF TEMPERATURE SENSOR.** Measure the resistance between transmission connector terminals. ***Connector & terminal*** ***(T4) No. 6 — (T4) No. 12:***	Does the resistance value increase while the ATF temperature decreases?	Go to step **4.**	Go to step **5.**
4	**CHECK INPUT SIGNAL FOR TCM USING SUBARU SELECT MONITOR.** 1) Connect the connector. 2) Turn the ignition switch to ON. (engine OFF) 3) Read the ATF temperature using Subaru Select Monitor.	Does the ATF temperature gradually decrease?	Even if the SPORT indicator lights blinks, the system is in normal condition. A temporary poor contact of connector or harness may be the cause. Repair the harness or contact in the ATF temperature sensor and transmission connector.	Go to step **6.**

	Step	Check	Yes	No
5	**CHECK HARNESS CONNECTOR BETWEEN TRANSMISSION AND CONTROL VALVE BODY.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from transmission. 3) Remove the transmission connector from bracket. 4) Jack-up the vehicle and place it on rigid racks. 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 control valve body connector. 7) Measure the resistance between transmission ground and control valve body connector. ***Connector & terminal*** ***(T10) No. 1 — Chassis ground:*** ***(T11) No. 2 — Chassis ground:***	Is the resistance more than 1 MΩ?	Replace the control valve body. <Ref. to 5AT-58, Control Valve Body.>	Repair the short circuit of harness between control valve body connector and transmission connector.
6	**CHECK POOR CONTACT.** Check poor contact of ATF temperature sensor 1 circuit.	Is there poor contact?	Repair the poor contact.	Replace the TCM. <Ref. to 5AT-61, Transmission Control Module (TCM).>

AM:DTC P1718 AT CAN COMMUNICATION CIRCUIT

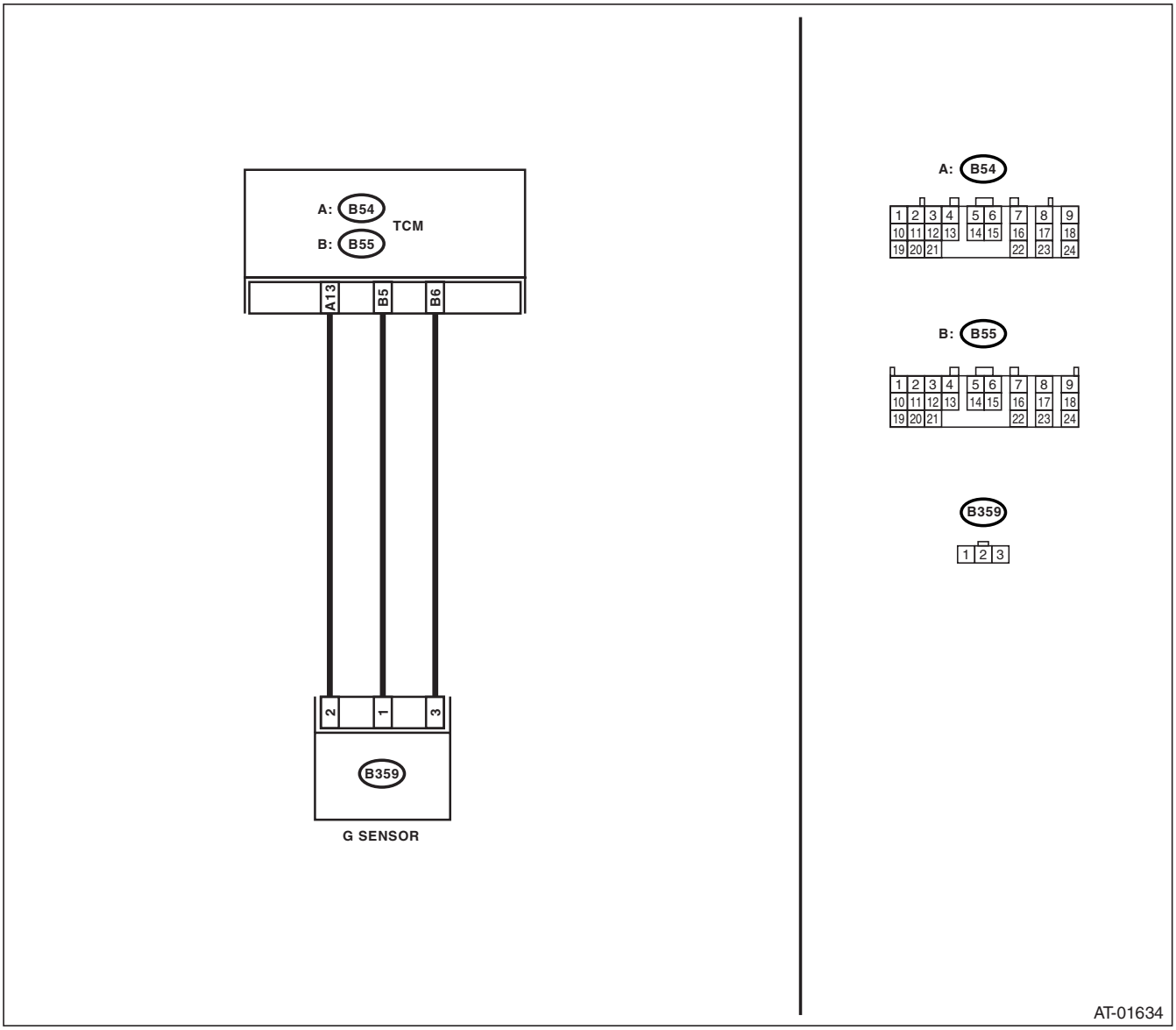
NOTE:
For DTC P1718 CAN Communication circuit, Refer to “LAN System”. <Ref. to LAN(diag)-14, READ DIAGNOSTIC TROUBLE CODE (DTC), OPERATION, Subaru Select Monitor.>

AN:DTC P1760 LATERAL ACCELERATION SENSOR PERFORMANCE PROBLEM

DTC DETECTING CONDITION:

Faulty lateral G sensor output voltage

WIRING DIAGRAM:



	Step	Check	Yes	No
1	**CONFIRM WQUIPMENT OF VEHICLE.**	Is VDC equipped with the vehicle? And is there VDC OFF switch in the instrument panel?	Go to step **2.**	Go to step **4.**
2	**CHECK DTC OF TCM.**	Is DTC of AT CAN communication detected?	Perform the diagnosis according to DTC.	Go to step **3.**
3	**CHECK DTC OF ABS.**	Is DTC of ABS detected?	Perform the diagnosis according to DTC of ABS	Temporary poor contact occurs. Recheck the harness and connector for faulty.
4	**CHECK OUTPUT OF LATERAL G SENSOR USING SUBARU SELECT MONITOR.** 1) Select {Current Data Display & Save} in Subaru Select Monitor. 2) Read the Subaru Select Monitor display.	Is the value on display 2.3 — 2.7 V when the vehicle is on a level?	Go to step **5.**	Go to step **10.**
5	**CHECK OUTPUT OF LATERAL G SENSOR USING SUBARU SELECT MONITOR.** 1) Turn the ignition switch to OFF. 2) Remove the console box. 3) Remove the lateral G sensor from vehicle. (Do not disconnect connector.) 4) Turn the ignition switch to ON. 5) Select {Current Data Display & Save} in Subaru Select Monitor. 6) Read the Subaru Select Monitor display.	Is the value on display 3.3 — 4.3 V when lateral G sensor is inclined to the right to 90°?	Go to step **6.**	Replace the lateral G sensor. <Ref. to 5AT-62, Lateral G Sensor.>
6	**CHECK OUTPUT OF LATERAL G SENSOR USING SUBARU SELECT MONITOR.** Read the Subaru Select Monitor display.	Is the value on display 0.7 — 1.7 V when lateral G sensor is inclined to the left to 90°?	Go to step **7.**	Replace the lateral G sensor. <Ref. to 5AT-62, Lateral G Sensor.>
7	**CHECK POOR CONTACT IN CONNECTOR.** Turn the ignition switch to OFF.	Is there poor contact in connector between TCM and lateral G sensor?	Repair the connector.	Go to step **8.**
8	**CHECK ABSCM&H/U.** 1) Connect all the connectors. 2) Perform the clear memory mode. 3) Perform the inspection mode. 4) Read the DTC.	Is the same DTC displayed?	Replace the TCM. <Ref. to 5AT-61, Transmission Control Module (TCM).>	Go to step **9.**
9	**CHECK OTHER DTC DETECTION.**	Is any other DTC displayed?	Perform the diagnosis according to DTC.	Temporary poor contact occurs.
10	**CHECK OPEN CIRCUIT IN LATERAL G SENSOR OUTPUT HARNESS AND GROUND HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from TCM. 3) Measure the resistance between TCM connector terminals. ***Connector & terminal*** ***(B54) No. 13 — (B55) No. 6:***	Is the resistance 5.0 — 6.0 kΩ?	Go to step **11.**	Repair the harness connector between lateral G sensor and TCM.

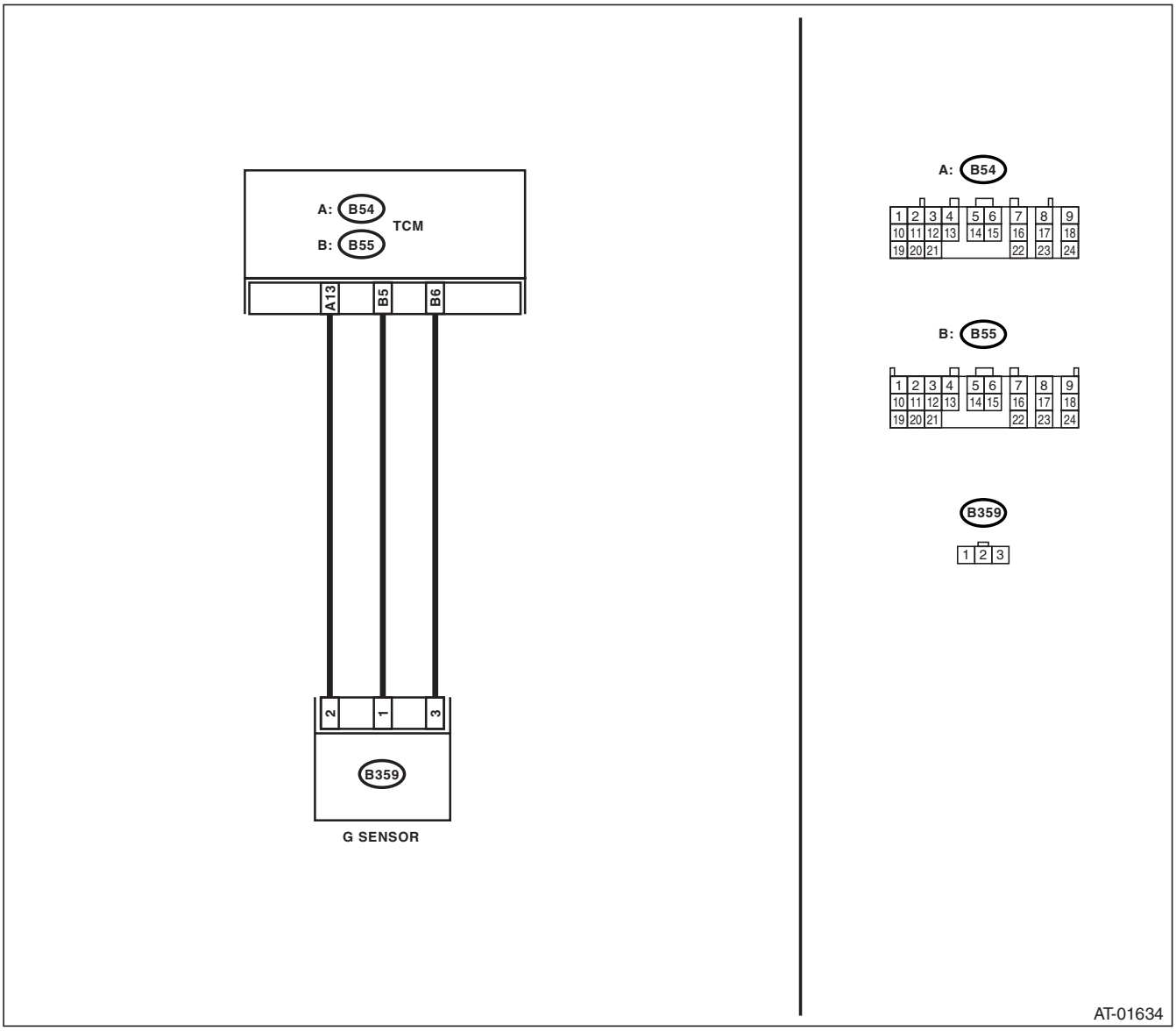
	Step	Check	Yes	No
11	**CHECK LATERAL G SENSOR.** 1) Remove the console box. 2) Remove the lateral G sensor from vehicle. 3) Connect the connector to lateral G sensor. 4) Connect the connector to ABSCM&H/U. 5) Turn the ignition switch to ON. 6) Measure the voltage between lateral G sensor connector terminals. ***Connector & terminal*** ***(B359) No. 3 (+) — No. 2 (−):***	Is the voltage 2.3 — 2.7 V when lateral G sensor is horizontal?	Go to step **12.**	Replace the lateral G sensor. <Ref. to 5AT-62, Lateral G Sensor.>
12	**CHECK LATERAL G SENSOR.** Measure the voltage between lateral G sensor connector terminals. ***Connector & terminal*** ***(B359) No. 3 (+) — No. 2 (−):***	Is the voltage 3.3 — 4.3 V when lateral G sensor is inclined to the right to 90°?	Go to step **13.**	Replace the lateral G sensor. <Ref. to 5AT-62, Lateral G Sensor.>
13	**CHECK LATERAL G SENSOR.** Measure the voltage between lateral G sensor connector terminals. ***Connector & terminal*** ***(B359) No. 3 (+) — No. 2 (−):***	Is the voltage 0.7 — 1.7 V when lateral G sensor is inclined to the left to 90°?	Go to step **14.**	Replace the lateral G sensor. <Ref. to 5AT-62, Lateral G Sensor.>
14	**CHECK ABSCM&H/U.** 1) Turn the ignition switch to OFF. 2) Connect all the connectors. 3) Perform the clear memory mode. 4) Perform the inspection mode. 5) Read the DTC.	Is the same DTC displayed?	Replace the TCM. <Ref. to 5AT-61, Transmission Control Module (TCM).>	Go to step **15.**
15	**CHECK OTHER DTC DETECTION.**	Is any other DTC displayed?	Perform the diagnosis according to DTC.	Temporary poor contact occurs.

AO:DTC P1761 LATERAL ACCELERATION SENSOR CIRCUIT LOW

DTC DETECTING CONDITION:

- Lateral G sensor is open or output voltage is faulty. (Model without VDC)
- CAN communication malfunction. (Model with VDC)

WIRING DIAGRAM:



	Step	Check	Yes	No
1	**CONFIRM WQUIPMENT OF VEHICLE.**	Is VDC equipped with the vehicle? And is there VDC OFF switch in the instrument panel?	Go to step **2.**	Go to step **4.**
2	**CHECK DTC OF TCM.**	Is DTC of AT CAN communication detected?	Perform the diagnosis according to DTC.	Go to step **3.**
3	**CHECK DTC OF ABS.**	Is DTC of ABS detected?	Perform the diagnosis according to DTC of ABS	Temporary poor contact occurs. Recheck the harness and connector for faulty.
4	**CHECK OUTPUT OF LATERAL G SENSOR USING SUBARU SELECT MONITOR.** 1) Select {Current Data Display & Save} in Subaru Select Monitor. 2) Read the lateral G sensor output on Subaru Select Monitor display.	Is the value on display 2.3 — 2.7 V when the lateral G sensor is in horizontal position?	Go to step **5.**	Go to step **8.**
5	**CHECK POOR CONTACT IN CONNECTOR.** Turn the ignition switch to OFF.	Is there poor contact in connector between TCM and lateral G sensor?	Repair the connector.	Go to step **6.**
6	**CHECK ABSCM&H/U.** 1) Connect all the connectors. 2) Perform the clear memory mode. 3) Perform the inspection mode. 4) Read the DTC.	Is the same DTC displayed?	Replace the TCM. <Ref. to 5AT-61, Transmission Control Module (TCM).>	Go to step **7.**
7	**CHECK OTHER DTC DETECTION.**	Is any other DTC displayed?	Perform the diagnosis according to DTC.	Temporary poor contact occurs.
8	**CHECK OPEN CIRCUIT IN LATERAL G SENSOR OUTPUT HARNESS AND GROUND HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from TCM. 3) Measure the resistance between TCM connector terminals. ***Connector & terminal*** ***(B54) No. 13 — (B55) No. 6:***	Is the resistance 5.0 — 6.0 kΩ?	Go to step **9.**	Repair the harness connector between lateral G sensor and TCM.
9	**CHECK GROUND SHORT OF HARNESS.** Measure the resistance between TCM connector and chassis ground. ***Connector & terminal*** ***(B54) No. 13 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **10.**	Repair the harness between lateral G sensor and TCM. Replace the TCM. <Ref. to 5AT-61, Transmission Control Module (TCM).>
10	**CHECK LATERAL G SENSOR.** 1) Remove the console box. 2) Remove the lateral G sensor from vehicle. 3) Connect the connector to lateral G sensor. 4) Connect the connector to the TCM. 5) Turn the ignition switch to ON. 6) Measure the voltage between lateral G sensor connector terminals. ***Connector & terminal*** ***(B359) No. 3 (+) — No. 2 (−):***	Is the voltage 2.3 — 2.7 V when lateral G sensor is horizontal?	Go to step **11.**	Replace the lateral G sensor. <Ref. to 5AT-62, Lateral G Sensor.>

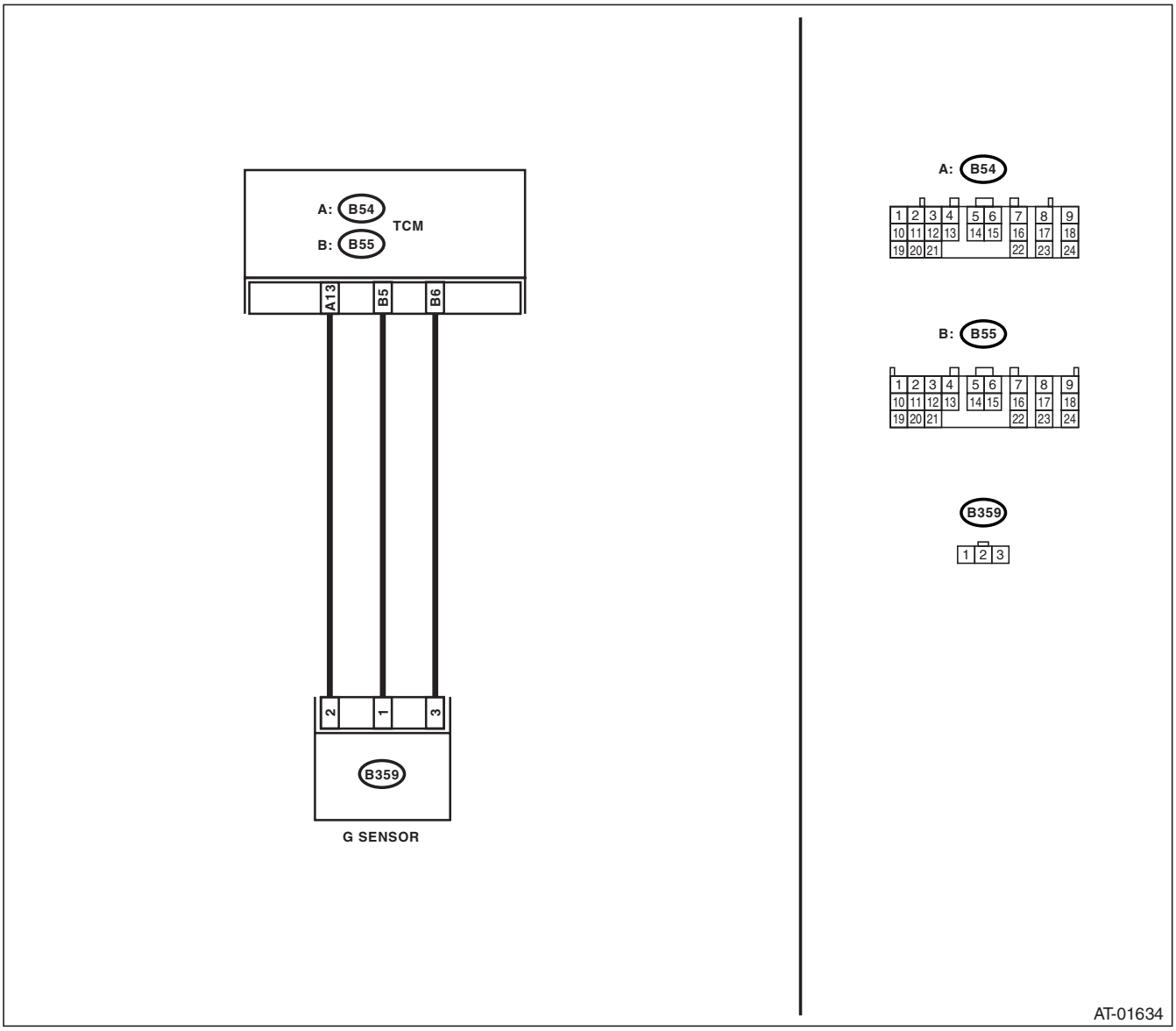
	Step	Check	Yes	No
11	**CHECK LATERAL G SENSOR.** Measure the voltage between lateral G sensor connector terminals. ***Connector & terminal*** ***(B359) No. 3 (+) — No. 2 (–):***	Is the voltage 3.3 — 4.3 V when lateral G sensor is inclined to the right to 90°?	Go to step **12.**	Replace the lateral G sensor. <Ref. to 5AT-62, Lateral G Sensor.>
12	**CHECK LATERAL G SENSOR.** Measure the voltage between lateral G sensor connector terminals. ***Connector & terminal*** ***(B359) No. 3 (+) — No. 2 (–):***	Is the voltage 0.7 — 1.7 V when lateral G sensor is inclined to the left to 90°?	Go to step **13.**	Replace the lateral G sensor. <Ref. to 5AT-62, Lateral G Sensor.>
13	**CHECK TCM.** 1) Turn the ignition switch to OFF. 2) Connect all the connectors. 3) Perform the clear memory mode. 4) Perform the inspection mode. 5) Read the DTC.	Is the same DTC displayed?	Replace the TCM. <Ref. to 5AT-61, Transmission Control Module (TCM).>	Go to step **14.**
14	**CHECK OTHER DTC DETECTION.**	Is any other DTC displayed?	Perform the diagnosis according to DTC.	Temporary poor contact occurs.

AP:DTC P1762 LATERAL ACCELERATION SENSOR CIRCUIT HIGH

DTC DETECTING CONDITION:

Faulty lateral G sensor output voltage

WIRING DIAGRAM:



	Step	Check	Yes	No
1	**CONFIRM WQUIPMENT OF VEHICLE.**	Is VDC equipped with the vehicle? And is there VDC OFF switch in the instrument panel?	Go to step **2.**	Go to step **4.**
2	**CHECK DTC OF TCM.**	Is DTC of AT CAN communication detected?	Perform the diagnosis according to DTC.	Go to step **3.**
3	**CHECK DTC OF ABS.**	Is DTC of ABS detected?	Perform the diagnosis according to DTC of ABS	Temporary poor contact occurs. Recheck the harness and connector for faulty.

	Step	Check	Yes	No
4	**CHECK OUTPUT OF LATERAL G SENSOR USING SUBARU SELECT MONITOR.** 1) Select {Current Data Display & Save} in Subaru Select Monitor. 2) Read the lateral G sensor output on Subaru Select Monitor display.	Is the value on display 2.3 — 2.7 V when the lateral G sensor is in horizontal position?	Go to step **5.**	Go to step **8.**
5	**CHECK POOR CONTACT IN CONNECTOR.**	Is there poor contact in connector between TCM and lateral G sensor?	Repair the connector.	Go to step **6.**
6	**CHECK ABSCM&H/U.** 1) Connect all the connectors. 2) Perform the clear memory mode. 3) Perform the inspection mode. 4) Read the DTC.	Is the same DTC displayed?	Replace the TCM. <Ref. to 5AT-61, Transmission Control Module (TCM).>	Go to step **7.**
7	**CHECK OTHER DTC DETECTION.**	Is any other DTC displayed?	Perform the diagnosis according to DTC.	Temporary poor contact occurs.
8	**CHECK CONDITIONAL INFORMATION WHEN FAULTY.** Read the lateral G sensor output on Subaru Select Monitor display.	Is the reading on monitor display 4.65 V or more?	Go to step **9.**	Go to step **15.**
9	**CHECK OPEN CIRCUIT IN LATERAL G SENSOR OUTPUT HARNESS AND GROUND HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from TCM. 3) Measure the resistance between TCM connector terminals. ***Connector & terminal*** ***(B55) No. 5 — No. 1:***	Is the resistance 4.3 — 4.9 kΩ?	Go to step **10.**	Repair the harness connector between lateral G sensor and ABSCM&H/U.
10	**CHECK BATTERY SHORT OF HARNESS.** 1) Turn the ignition switch to OFF. 2) Remove the console box. 3) Disconnect the connector from lateral G sensor. 4) Disconnect the connector from TCM. 5) Measure the voltage between TCM connector and chassis ground. ***Connector & terminal*** ***(B55) No. 6 (+) — Chassis ground (−):***	Is the voltage less than 1 V?	Go to step **11.**	Repair the harness between lateral G sensor and TCM.
11	**CHECK BATTERY SHORT OF HARNESS.** 1) Turn the ignition switch to ON. 2) Measure the voltage between TCM connector and chassis ground. ***Connector & terminal*** ***(B55) No. 6 (+) — Chassis ground (−):***	Is the voltage less than 1 V?	Go to step **12.**	Repair the harness between lateral G sensor and TCM.
12	**CHECK POOR CONTACT IN CONNECTOR.**	Is there poor contact in connector between TCM and lateral G sensor?	Repair the connector.	Go to step **13.**
13	**CHECK TCM.** 1) Connect all the connectors. 2) Perform the clear memory mode. 3) Perform the inspection mode. 4) Read the DTC.	Is the same DTC displayed?	Replace the TCM. <Ref. to 5AT-61, Transmission Control Module (TCM).>	Go to step **14.**
14	**CHECK OTHER DTC DETECTION.**	Is any other DTC displayed?	Perform the diagnosis according to DTC.	Temporary poor contact occurs.

	Step	Check	Yes	No
15	**CHECK INPUT VOLTAGE OF LATERAL G SENSOR.** 1) Turn the ignition switch to OFF. 2) Remove the console box. 3) Remove the lateral G sensor from vehicle. (Do not disconnect connector.) 4) Turn the ignition switch to ON. 5) Measure the voltage between lateral G sensor connector terminals. ***Connector & terminal*** ***(B359) No. 1 (+) — No. 2 (–):***	Is the voltage 4.75 — 5.25 V?	Go to step **16.**	Repair the harness connector between lateral G sensor and TCM.
16	**CHECK OPEN CIRCUIT IN LATERAL G SENSOR OUTPUT HARNESS AND GROUND HARNESS.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from TCM. 3) Measure the resistance between TCM connector terminals. ***Connector & terminal*** ***(B55) No. 5 — No. 6:***	Is the resistance 5.0 — 5.6 kΩ?	Go to step **17.**	Repair the harness connector between lateral G sensor and TCM.
17	**CHECK LATERAL G SENSOR.** 1) Connect the connector to lateral G sensor. 2) Connect the connector to the TCM. 3) Turn the ignition switch to ON. 4) Measure the voltage between lateral G sensor connector terminals. ***Connector & terminal*** ***(B359) No. 3 (+) — No. 2 (–):***	Is the voltage between 2.3 and 2.7 V when lateral G sensor is horizontal?	Go to step **18.**	Replace the lateral G sensor. <Ref. to 5AT-62, Lateral G Sensor.>
18	**CHECK LATERAL G SENSOR.** Measure the voltage between lateral G sensor connector terminals. ***Connector & terminal*** ***(B359) No. 3 (+) — No. 2 (–):***	Is the voltage between 3.3 — 4.3 V when lateral G sensor is inclined to the right to 90°?	Go to step **19.**	Replace the lateral G sensor. <Ref. to 5AT-62, Lateral G Sensor.>
19	**CHECK LATERAL G SENSOR.** Measure the voltage between lateral G sensor connector terminals. ***Connector & terminal*** ***(B359) No. 3 (+) — No. 2 (–):***	Is the voltage 0.7 — 1.7 V when lateral G sensor is inclined to the left to 90°?	Go to step **20.**	Replace the lateral G sensor. <Ref. to 5AT-62, Lateral G Sensor.>
20	**CHECK POOR CONTACT IN CONNECTOR.** Turn the ignition switch to OFF.	Is there poor contact in connector between TCM and lateral G sensor?	Repair the connector.	Go to step **21.**
21	**CHECK ABSCM&H/U.** 1) Connect all the connectors. 2) Perform the clear memory mode. 3) Perform the inspection mode. 4) Read the DTC.	Is the same DTC displayed?	Replace the TCM. <Ref. to 5AT-61, Transmission Control Module (TCM).>	Go to step **22.**
22	**CHECK OTHER DTC DETECTION.**	Is any other DTC displayed?	Perform the diagnosis according to DTC.	Temporary poor contact occurs.

AQ:DTC P1798 GEAR 1 ENGINE BRAKE

NOTE:
Refer to DTC P0773 for diagnostic procedure. <Ref. to 5AT(diag)-85, DTC P0773 SHIFT SOLENOID “E” ELECTRICAL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

AR:DTC P1799 INTERLOCK

DTC DETECTING CONDITION:

Perform the interlock judgment when the oil pressure switch pattern detects the specified interlock patterns other than shifting.

TROUBLE SYMPTOM:

Locked to 2nd, 4th or 5th gear depending on the vehicle condition at the time of diagnosis.

	Step	Check	Yes	No
1	**CHECK DTC OF TCM.**	Is any of the DTC P0751, P0756, P0761, P0766, P0771 displayed at the same time with P1799?	Perform the diagnosis according to DTC.	Go to step **2.**
2	**CHECK DTC P0756, P0766.**	Perform the diagnosis according to DTC P0756, P0766. Is any malfunction detected?	Perform the diagnosis according to DTC.	Go to step **3.**
3	**DRIVING CHECK.** 1) Turn the ignition switch to OFF. 2) Perform the inspection mode.	Is DTC displayed?	Replace the transmission assembly.	Temporary poor contact occurs. Check that the harness connector has no faulty.

AS:DTC P1817 SPORT MODE SWITCH CIRCUIT (MANUAL SWITCH)

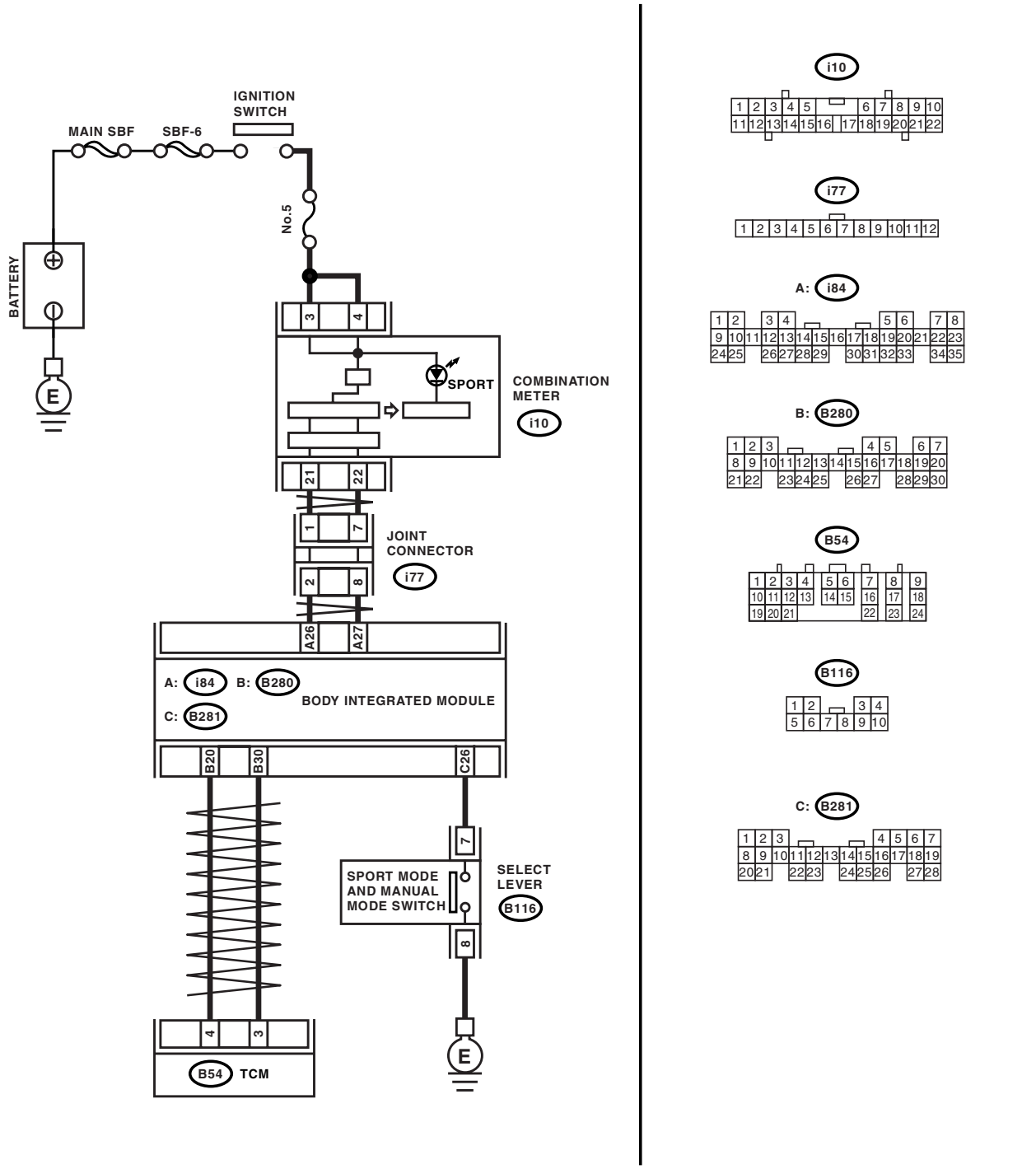
DTC DETECTING CONDITION:

Input signal circuit of SPORT mode and manual mode switch is open or shorted.

TROUBLE SYMPTOM:

- Manual mode can not be set.
- "SPORT" light illuminates when shifting to "N" → "D" range.

WIRING DIAGRAM:



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	Step	Check	Yes	No
1	**CHECK BODY INTEGRATED MODULE.** 1) Connect the Subaru Select Monitor to data link connector. 2) Turn the ignition switch to ON. (engine OFF) 3) Read the DTC of body integrated module using Subaru Select Monitor. <Ref. to LAN(diag)-14, OPERATION, Subaru Select Monitor.>	Is DTC displayed?	Perform the diagnosis according to DTC.	Go to step **2.**
2	**CHECK BODY INTEGRATED MODULE INPUT SIGNAL.** 1) Shift the select lever to “P” range. 2) Read the TIP mode SW data of body integrated module using Subaru Select Monitor. <Ref. to LAN(diag)-14, OPERATION, Subaru Select Monitor.>	Is OFF displayed?	Go to step **3.**	Go to step **7.**
3	**CHECK BODY INTEGRATED MODULE INPUT SIGNAL.** 1) Shift the select lever from “P” to “D” range. 2) Read the TIP mode SW data of body integrated module using Subaru Select Monitor. <Ref. to LAN(diag)-14, OPERATION, Subaru Select Monitor.>	Is the indication on each range OFF?	Go to step **4.**	Replace the select lever assembly. <Ref. to CS-22, Select Lever.>
4	**CHECK BODY INTEGRATED MODULE INPUT SIGNAL.** 1) Shift the select lever to manual mode. 2) Shift the select lever to other than “D” range. 3) Read the TIP mode SW data of body integrated module using Subaru Select Monitor. <Ref. to LAN(diag)-14, OPERATION, Subaru Select Monitor.>	Is OFF displayed?	Go to step **5.**	Replace the select lever assembly. <Ref. to CS-22, Select Lever.>
5	**CHECK DTC OF TCM.**	Is DTC of Transmission Range Sensor Circuit (PRNDL Input) and AT CAN communication circuit displayed?	Perform the diagnosis according to each DTC.	Go to step **6.**
6	**CHECK TCM INPUT SIGNAL.** 1) Shift the select lever from “P” to “D” range. 2) Read the TIP mode SW data of TCM using Subaru Select Monitor. <Ref. to 5AT(diag)-17, OPERATION, Subaru Select Monitor.>	Is the indication on each range OFF?	Even if the SPORT indicator lights blinks, the system is in normal condition. A temporary poor contact of connector or harness may be the cause.	Replace the TCM. <Ref. to 5AT-61, Transmission Control Module (TCM).>
7	**CHECK HARNESS BETWEEN BODY INTEGRATED MODULE AND SWITCH FOR SPORT MODE AND MANUAL MODE.** 1) Turn the ignition switch to OFF. 2) Disconnect harness connector from body integrated module and select lever. 3) Measure the harness resistance between body integrated module and chassis ground. ***Connector & terminal*** ***(B281) No. 26 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **8.**	Repair the short circuit of harness between body integrated module and switch for SPORT mode and manual mode.

	Step	Check	Yes	No
8	**CHECK SWITCH FOR SPORT MODE AND MANUAL MODE.** 1) Shift the select lever to "P" range. 2) Measure the resistance between harness connector terminals of switch for SPORT mode and manual mode. ***Terminal*** ***(B116) No. 7 — No. 8***	Is the resistance more than 1 MΩ?	Check the body integrated module.	Replace the select lever assembly. <Ref. to CS-22, Select Lever.>

AT:DTC P1840 TRANSMISSION FLUID PRESSURE SENSOR/SWITCH A CIRCUIT

DTC DETECTING CONDITION:
Front brake oil pressure switch malfunction
TROUBLE SYMPTOM:
Excessive shift shock

NOTE:
Refer to DTC P0751 for diagnostic procedure. <Ref. to 5AT(diag)-62, DTC P0751 SHIFT SOLENOID "A" PERFORMANCE OR STUCK OFF, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

AU:DTC P1842 TRANSMISSION FLUID PRESSURE SENSOR/SWITCH C CIRCUIT

DTC DETECTING CONDITION:
Input clutch oil pressure switch malfunction
TROUBLE SYMPTOM:
Excessive shift shock

NOTE:
Refer to DTC P0756 for diagnostic procedure. <Ref. to 5AT(diag)-67, DTC P0756 SHIFT SOLENOID "B" PERFORMANCE OR STUCK OFF, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

AV:DTC P1843 TRANSMISSION FLUID PRESSURE SENSOR/SWITCH D CIRCUIT

DTC DETECTING CONDITION:
Direct clutch oil pressure switch malfunction.
TROUBLE SYMPTOM:
Excessive shift shock

NOTE:
Refer to DTC P0766 for diagnostic procedure. <Ref. to 5AT(diag)-77, DTC P0766 SHIFT SOLENOID "D" PERFORMANCE OR STUCK OFF, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

AW:DTC P1844 TRANSMISSION FLUID PRESSURE SENSOR/SWITCH E CIRCUIT

DTC DETECTING CONDITION:
High & low reverse clutch oil pressure switch malfunction.
TROUBLE SYMPTOM:
Excessive shift shock

NOTE:
Refer to DTC P0761 for diagnostic procedure. <Ref. to 5AT(diag)-72, DTC P0761 SHIFT SOLENOID "C" PERFORMANCE OR STUCK OFF, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

15.Diagnostic Procedure without Diagnostic Trouble Code (DTC)

A: CHECK MANUAL MODE SWITCH

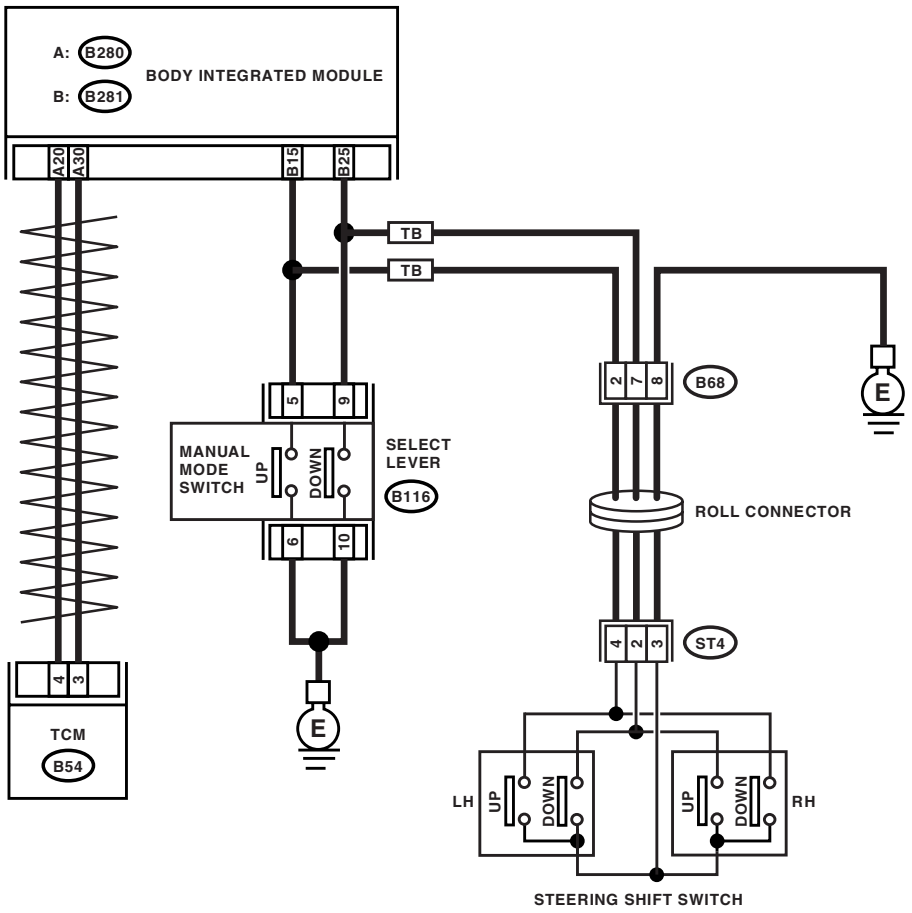
DIAGNOSIS:

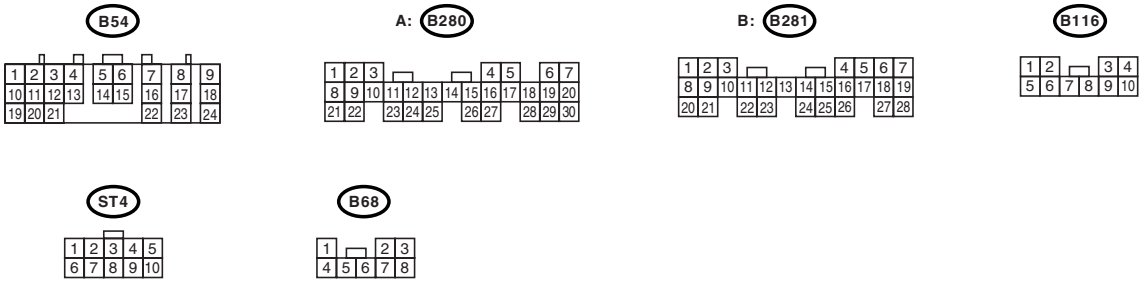
Input signal circuit of manual mode switch is open or shorted.

TROUBLE SYMPTOM:

Does not shift on manual mode.

WIRING DIAGRAM:





AT-03197

	Step	Check	Yes	No
1	**CHECK BODY INTEGRATED MODULE.** 1) Perform the ON/OFF operation on manual mode switch. 2) Read the data of manual mode switch signal using Subaru Select Monitor.	Both ON/OFF can be detected normally?	Go to step **2.**	Go to step **7.**
2	**CHECK DTC OF BODY INTEGRATED MODULE.**	Is DTC of AT CAN communication circuit detected?	Perform the diagnosis according to DTC.	Go to step **3.**
3	**CHECK TCM.** 1) Perform the ON/OFF operation on manual mode switch. 2) Read the data of manual mode switch signal using Subaru Select Monitor.	Both ON/OFF can be detected normally?	Go to step **4.**	Go to step **5.**
4	**CHECK SPORT INDICATOR LIGHT ON COMBINATION METER.**	Is the SPORT indicator light OK?	Go to step **6.**	Replace the combination meter assembly. <Ref. to IDI-15, Combination Meter.>
5	**CHECK DTC OF TCM.**	Is DTC of AT CAN communication circuit detected?	Perform the diagnosis according to DTC.	Replace the TCM. <Ref. to 5AT-61, Transmission Control Module (TCM).>
6	**CHECK DTC OF METER.**	Is DTC of AT CAN communication circuit detected?	Perform the diagnosis according to DTC.	Replace the meter.
7	**CHECK MANUAL MODE SWITCH GROUND CIRCUIT.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from manual mode switch. 3) Measure the resistance of harness between manual mode switch connector and chassis ground. ***Connector & terminal*** ***(B116) No. 6 — Chassis ground:***	Is the resistance less than 1 Ω?	Go to step **8.**	Repair the open circuit of harness between manual mode switch and chassis ground.
8	**CHECK MANUAL MODE SWITCH.** Measure the resistance between manual mode switch terminals. ***Connector & terminal*** ***(B116) No. 6 — No. 5:***	Is the resistance more than 1 MΩ?	Go to step **9.**	Replace the guide plate assembly.
9	**CHECK MANUAL MODE SWITCH.** 1) Shift the select lever to manual mode. 2) Measure the resistance between manual mode switch terminals. ***Connector & terminal*** ***(B116) No. 6 — No. 5:***	Is the resistance less than 1 Ω?	Go to step **10.**	Replace the guide plate assembly.
10	**CHECK HARNESS CONNECTOR BETWEEN BODY INTEGRATED MODULE AND MANUAL MODE SWITCH.** 1) Disconnect the connector from body integrated module. 2) Measure the resistance of harness between body integrated module connector and manual mode switch connector. ***Connector & terminal*** ***(B116) No. 5 — (B281) No. 15:***	Is the resistance less than 1 Ω?	Go to step **11.**	Repair the open circuit of harness between manual mode switch connector and TCM connector, or poor contact in connector.

	Step	Check	Yes	No
11	**CHECK HARNESS CONNECTOR BETWEEN BODY INTEGRATED MODULE AND MANUAL MODE SWITCH.** 1) Disconnect the connector from body integrated module. 2) Measure the resistance of harness between manual mode switch connector and chassis ground. ***Connector & terminal*** ***(B116) No. 5 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **12.**	Repair the short circuit of harness between manual mode switch connector and TCM connector.
12	**CHECK INPUT SIGNAL FOR TCM.** 1) Connect all the connectors. 2) Turn the ignition switch to ON. (engine OFF) 3) Measure the signal voltage for TCM. ***Connector & terminal*** ***(B281) No. 15 (+) — Chassis ground (−):***	Is the voltage more than 9 V?	Go to step **13.**	Replace the body integrated module. <Ref. to SL-44, Body Integrated Module.>
13	**CHECK INPUT SIGNAL FOR TCM.** 1) Shift and hold the select lever to up side. 2) Measure the signal voltage for TCM. ***Connector & terminal*** ***(B281) No. 15 (+) — Chassis ground (−):***	Is the voltage less than 1 V?	Go to step **14.**	Replace the body integrated module. <Ref. to SL-44, Body Integrated Module.>
14	**CHECK MANUAL MODE SWITCH GROUND CIRCUIT.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from manual mode switch. 3) Measure the resistance of harness between manual mode switch connector and chassis ground. ***Connector & terminal*** ***(B116) No. 10 — Chassis ground:***	Is the resistance less than 1 Ω?	Go to step **15.**	Repair the open circuit of harness between manual mode switch and chassis ground.
15	**CHECK MANUAL MODE SWITCH.** Measure the resistance between manual mode switch terminals. ***Connector & terminal*** ***(B116) No. 10 — No. 9:***	Is the resistance more than 1 MΩ?	Go to step **16.**	Replace the guide plate assembly.
16	**CHECK MANUAL MODE SWITCH.** 1) Shift the select lever to manual mode. 2) Measure the resistance between manual mode switch terminals. ***Connector & terminal*** ***(B116) No. 10 — No. 9:***	Is the resistance less than 1 Ω?	Go to step **17.**	Replace the guide plate assembly.
17	**CHECK HARNESS CONNECTOR BETWEEN BODY INTEGRATED MODULE AND MANUAL MODE SWITCH.** 1) Disconnect the connector from body integrated module. 2) Measure the resistance of harness between body integrated module connector and manual mode switch connector. ***Connector & terminal*** ***(B116) No. 9 — (B281) No. 25:***	Is the resistance less than 1 Ω?	Go to step **18.**	Repair the open circuit of harness between manual mode switch connector and body integrated module connector, or poor contact in connector.

	Step	Check	Yes	No
18	**CHECK HARNESS CONNECTOR BETWEEN BODY INTEGRATED MODULE AND MANUAL MODE SWITCH.** 1) Disconnect the steering roll connector. 2) Measure the resistance of harness between manual mode switch connector and chassis ground. ***Connector & terminal*** ***(B116) No. 9 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **19.**	Repair the short circuit of harness between manual mode switch connector and body integrated module connector.
19	**CHECK INPUT SIGNAL TO BODY INTEGRATED MODULE.** 1) Connect all the connectors. 2) Turn the ignition switch to ON. (engine OFF) 3) Check the signal voltage for body integrated module. ***Connector & terminal*** ***(B281) No. 25 (+) — Chassis ground (−):***	Is the voltage more than 9 V?	Go to step **20.**	Replace the body integrated module. <Ref. to SL-44, Body Integrated Module.>
20	**CHECK INPUT SIGNAL TO BODY INTEGRATED MODULE.** 1) Shift and hold the select lever to up side. 2) Check the signal voltage for body integrated module. ***Connector & terminal*** ***(B281) No. 25 (+) — Chassis ground (−):***	Is the voltage less than 1 V?	Go to step **21.**	Replace the body integrated module. <Ref. to SL-44, Body Integrated Module.>
21	**CHECK STEERING SHIFT SWITCH GROUND CIRCUIT.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from steering roll connector. 3) Measure the resistance of harness between steering roll connector and chassis ground. ***Connector & terminal*** ***(ST4) No. 3 — Chassis ground:***	Is the resistance less than 1 Ω?	Go to step **22.**	Repair the open circuit of harness between steering roll connector and chassis ground.
22	**CHECK STEERING SHIFT SWITCH.** Measure the resistance between steering roll connector terminals. ***Connector & terminal*** ***(ST4) No. 3 — No. 4:***	Is the resistance more than 1 MΩ?	Go to step **23.**	Replace the steering roll connector or steering shift switch. Or repair the poor contact in connector.
23	**CHECK STEERING SHIFT SWITCH.** 1) Press and hold the steering shift switch to + side. 2) Measure the resistance between steering shift switch terminals. ***Connector & terminal*** ***(ST4) No. 3 — No. 4:***	Is the resistance less than 1 Ω?	Go to step **24.**	Replace the steering roll connector or steering shift switch. Or repair the poor contact in connector.
24	**CHECK HARNESS CONNECTOR BETWEEN BODY INTEGRATED MODULE AND STEERING ROLL CONNECTOR.** 1) Disconnect the connector from body integrated module. 2) Measure the resistance of harness between body integrated module connector and steering roll connector. ***Connector & terminal*** ***(B281) No. 15 — (B68) No. 2:***	Is the resistance less than 1 Ω?	Go to step **25.**	Repair the open circuit of harness between body integrated module connector and steering roll connector, or poor contact in connector.

	Step	Check	Yes	No
25	**CHECK HARNESS CONNECTOR BETWEEN BODY INTEGRATED MODULE AND STEERING ROLL CONNECTOR.** 1) Disconnect the connector from body integrated module. 2) Measure the resistance of harness between body integrated module connector and steering roll connector. ***Connector & terminal*** ***(B281) No. 25 — (B68) No. 7:***	Is the resistance less than 1 Ω?	Go to step **26.**	Repair the open circuit of harness between body integrated module connector and steering roll connector, or poor contact in connector.
26	**CHECK POOR CONTACT.**	Is there poor contact in manual mode switch circuit?	Repair the poor contact.	A temporary poor contact of manual mode switch circuit connector or harness

B: CHECK SPORT INDICATOR LIGHT

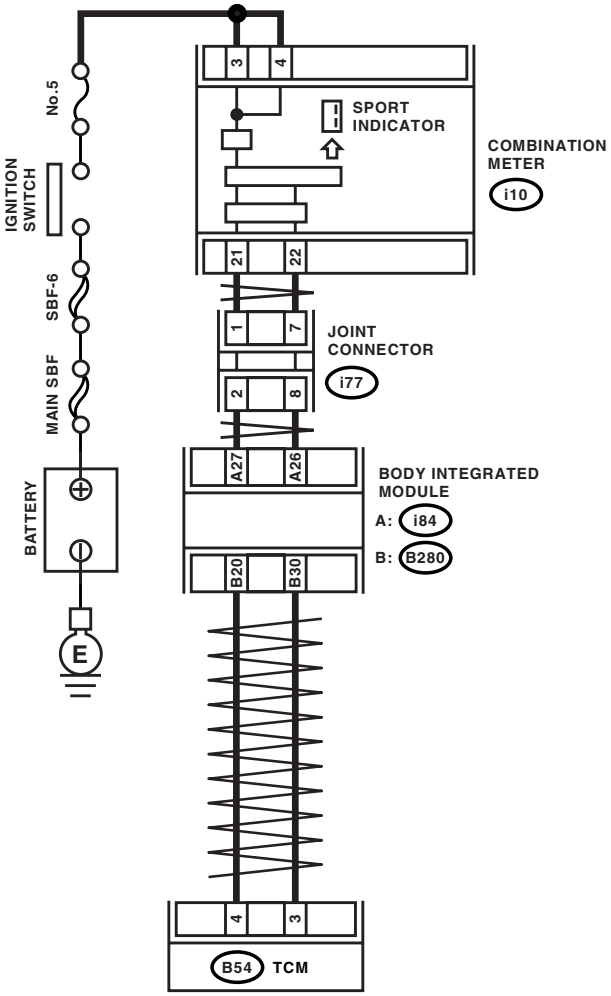
DIAGNOSIS:

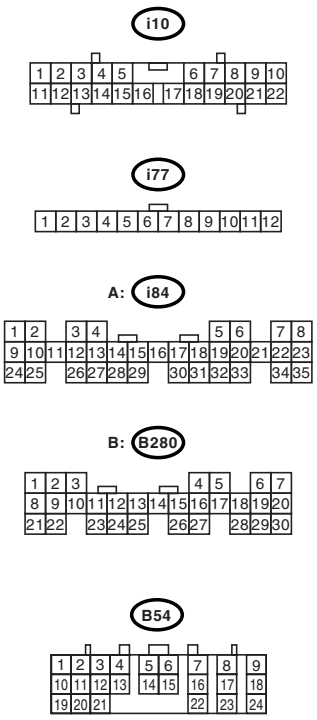
Output signal circuit of SPORT indicator light is open or shorted.

TROUBLE SYMPTOM:

- SPORT indicator light does not illuminate or remains illuminated.
- SPORT indicator light display does not change.

WIRING DIAGRAM:





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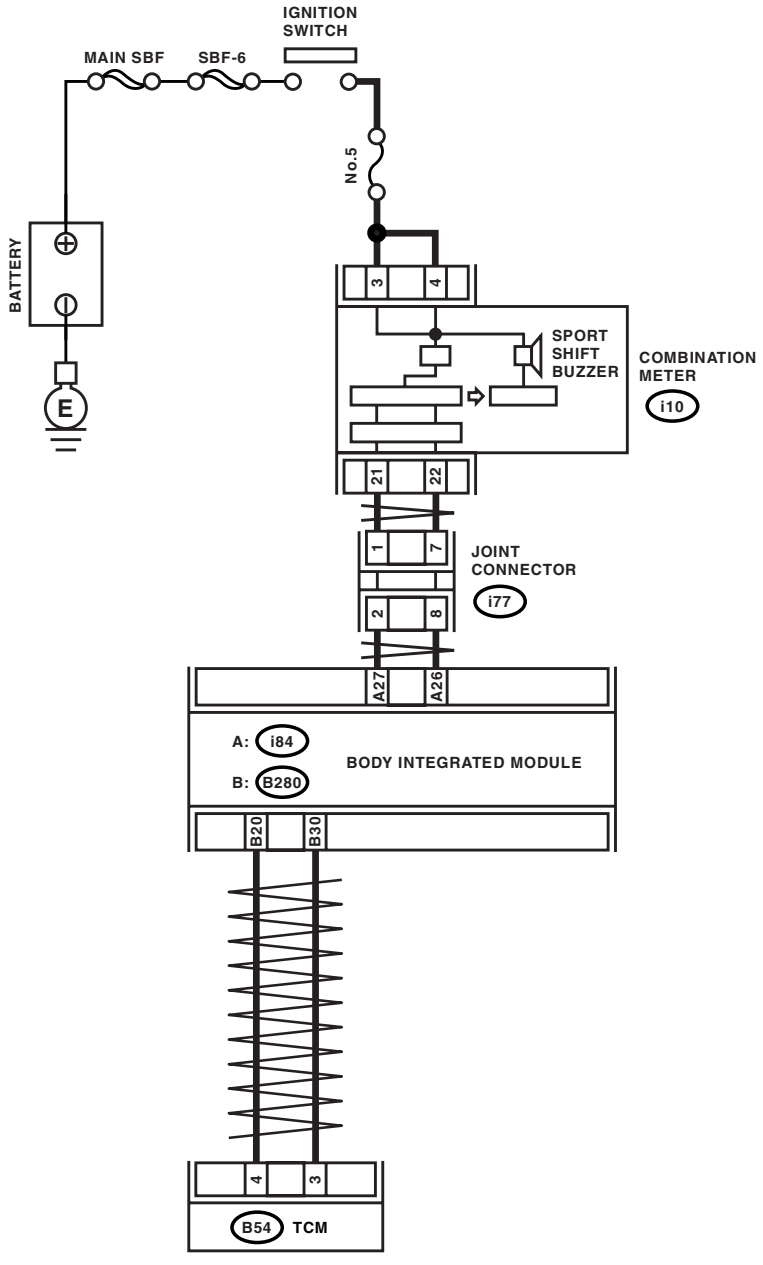
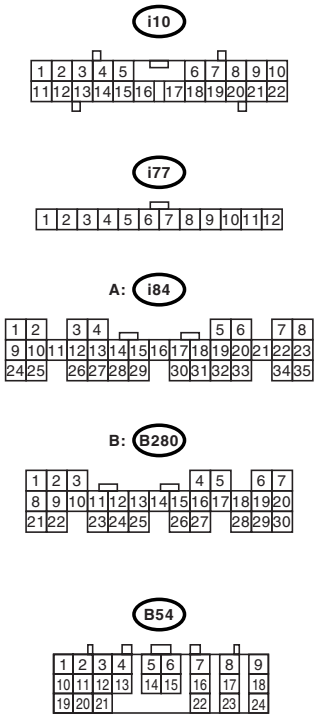
Diagnostic Procedure without Diagnostic Trouble Code (DTC)

	Step	Check	Yes	No
1	**CHECK BODY INTEGRATED MODULE.** Check DTC of body integrated module.	Is DTC of AT CAN communication circuit displayed?	Perform the diagnosis according to DTC.	Go to step **2.**
2	**CHECK TCM.** Check DTC of TCM.	Is DTC of AT CAN communication circuit displayed?	Perform the diagnosis according to DTC.	Go to step **3.**
3	**CHECK TCM.** 1) Turn the ignition switch to OFF. 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 power switch to ON. 5) Shift the select lever to manual mode side, and then shift down the select lever. 6) Read the indicator.	Is gear position 1 and "▲" displayed?	Go to step **4.**	Replace the TCM. <Ref. to 5AT-61, Transmission Control Module (TCM).>
4	**CHECK TCM.** 1) Shift up the select lever. 2) Read the indicator.	Is gear position 2 and "▼" displayed?	Go to step **5.**	Replace the TCM. <Ref. to 5AT-61, Transmission Control Module (TCM).>
5	**CHECK BODY INTEGRATED MODULE.** Read the data of gear position using Subaru Select Monitor.	Is SPORT shift gear position 2?	Go to step **6.**	Check the body integrated module. <Ref. to SL-44, Body Integrated Module.>
6	**CHECK COMBINATION METER.**	Is the SPORT indicator OK?	Refer to "General Diagnostic Table". <Ref. to 5AT(diag)-137, General Diagnostic Table.>	Replace the combination meter assembly. <Ref. to IDI-15, Combination Meter.>

C: CHECK BUZZER

DIAGNOSIS:
Output signal circuit of buzzer is open or shorted.
TROUBLE SYMPTOM:
Buzzer remains beeping.
WIRING DIAGRAM:





AT-03178

	Step	Check	Yes	No
1	**CHECK BODY INTEGRATED MODULE.** Check DTC of body integrated module.	Is DTC of AT CAN communication circuit displayed?	Perform the diagnosis according to DTC.	Go to step **2.**
2	**CHECK TCM.** Check DTC of TCM.	Is DTC of AT CAN communication circuit displayed?	Perform the diagnosis according to DTC.	Go to step **3.**
3	**CHECK BUZZER STOP.** Disconnect the connector (B54).	Does the buzzer stop?	Replace the TCM. <Ref. to 5AT-61, Transmission Control Module (TCM).>	Go to step **4.**
4	**CHECK BODY INTEGRATED MODULE.** 1) Turn the ignition switch to OFF. 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 power switch to ON. 5) Read the data of SPORT shift buzzer using Subaru Select Monitor.	Is the SPORT shift buzzer display “ON”?	Replace the body integrated module. <Ref. to SL-44, Body Integrated Module.>	Go to step **5.**
5	**CHECK COMBINATION METER.**	Is the buzzer OK?	Refer to “General Diagnostic Table”. <Ref. to 5AT(diag)-137, General Diagnostic Table.>	Replace the combination meter assembly. <Ref. to IDI-15, Combination Meter.>

16.General Diagnostic Table

A: INSPECTION

Symptom	Problem parts
Shifting vehicle speed is low on “D” range.	• Vehicle speed sensor 1 and Vehicle speed sensor 2 • Accelerator pedal position sensor • Throttle position sensor • ATF temperature sensor • CAN communication signal
Shifting vehicle speed is high on “D” range.	• Vehicle speed sensor 1 and Vehicle speed sensor 2 • Accelerator pedal position sensor • Throttle position sensor • CAN communication signal • Brake switch signal • Lateral G sensor • ATF temperature sensor
Excessive shock. (“N”→“D” range)	• Engine idle speed • Engine speed signal • Accelerator pedal position sensor • Throttle position sensor • Control cable adjustment • ATF temperature sensor • Oil pressure switch 1 and Front brake solenoid valve • CAN communication signal • Fluid level and condition • TCM power supply • PVIGN relay
Excessive shift shock on 1st of “D” range → 2nd of “D” range or “1st of manual mode” → “2nd of manual mode”.	• Accelerator pedal position sensor • Throttle position sensor • Control cable adjustment • Oil pressure switch 4 and Direct clutch solenoid valve • CAN communication signal • Engine speed signal • Torque converter turbine speed sensor • Vehicle speed sensor 1 and Vehicle speed sensor 2 • Fluid level and condition
Excessive shift shock on 2nd of “D” range → 3rd of “D” range or “2nd of manual mode” → “3rd of manual mode”.	• Accelerator pedal position sensor • Throttle position sensor • Control cable adjustment • Oil pressure switch 5 and High & low reverse clutch solenoid valve • CAN communication signal • Engine speed signal • Torque converter turbine speed sensor • Vehicle speed sensor 1 and Vehicle speed sensor 2 • Fluid level and condition
Excessive shift shock on 3rd of “D” range → 4th of “D” range or “3rd of manual mode” → “4th of manual mode”.	• Accelerator pedal position sensor • Throttle position sensor • Control cable adjustment • Oil pressure switch 3 and Input clutch solenoid valve • CAN communication signal • Engine speed signal • Torque converter turbine speed sensor • Vehicle speed sensor 1 and Vehicle speed sensor 2 • Fluid level and condition

General Diagnostic Table

Symptom	Problem parts
Excessive shift shock on 4th of “D” range → 5th of “D” range or “4th of manual mode” → “5th of manual mode”.	• Accelerator pedal position sensor • Throttle position sensor • Control cable adjustment • Oil pressure switch 1 and Front brake solenoid valve • CAN communication signal • Engine speed signal • Torque converter turbine speed sensor • Vehicle speed sensor 1 and Vehicle speed sensor 2 • Fluid level and condition
Excessive shock at kick down.	• Accelerator pedal position sensor • Throttle position sensor • Control cable adjustment • CAN communication signal • Engine speed signal • Torque converter turbine speed sensor • Vehicle speed sensor 1 and Vehicle speed sensor 2 • Fluid level and condition
Excessive shock at shift up.	• Accelerator pedal position sensor • Throttle position sensor • Control cable adjustment • Engine speed signal • CAN communication signal • Torque converter turbine speed sensor • Vehicle speed sensor 1 and Vehicle speed sensor 2 • Fluid level and condition
Excessive shock at lock up.	• Accelerator pedal position sensor • Throttle position sensor • Control cable adjustment • Engine speed signal • CAN communication signal • Torque converter turbine speed sensor • Lock up solenoid valve • Vehicle speed sensor 1 and Vehicle speed sensor 2 • Fluid level and condition
Excessive shock at engine brake.	• Accelerator pedal position sensor • Throttle position sensor • Control cable adjustment • CAN communication signal • Fluid level and condition • Line pressure • Low coast brake solenoid valve
Judder is occurred at lock up.	• Fluid level and condition • Engine speed signal • Torque converter turbine speed sensor • Vehicle speed sensor 1 and Vehicle speed sensor 2 • Accelerator pedal position sensor • Throttle position sensor • Lock up solenoid valve • ATF temperature sensor 1 and 2
Noise at “R”, “N” and “D” range.	• Fluid level and condition • Engine speed signal • ATF temperature sensor 1 and 2
Hold at “D” range or 1st on manual mode.	• Fluid level and condition • Vehicle speed sensor 1 and Vehicle speed sensor 2 • Direct clutch solenoid valve • Line pressure • Up switch signal • CAN communication signal • Accelerator pedal position sensor

Symptom	Problem parts
Hold at “D” range or 2nd on manual mode.	• Fluid level and condition • Vehicle speed sensor 1 and Vehicle speed sensor 2 • Low coast brake solenoid valve • Line pressure • Up switch signal • Down switch signal • CAN communication signal • Accelerator pedal position sensor
Hold at “D” range or 3rd on manual mode.	• Fluid level and condition • Vehicle speed sensor 1 and Vehicle speed sensor 2 • Line pressure • Up switch signal • Down switch signal • CAN communication signal • Accelerator pedal position sensor
Hold at “D” range or 4th on manual mode.	• Fluid level and condition • Vehicle speed sensor 1 and Vehicle speed sensor 2 • Oil pressure switch 3 and Input clutch solenoid valve • Oil pressure switch 4 and Direct clutch solenoid valve • Oil pressure switch 5 and High & low reverse clutch solenoid valve • Low coast brake solenoid valve • Front brake solenoid valve • Line pressure • Up switch signal • Down switch signal • CAN communication signal • Accelerator pedal position sensor • TCM power supply • PVIGN relay
Hold at “D” range or 5th on manual mode.	• Fluid level and condition • Vehicle speed sensor 1 and Vehicle speed sensor 2 • Oil pressure switch 1 and Front brake solenoid valve • Line pressure • Down switch signal • CAN communication signal • Accelerator pedal position sensor
Gear does not shift 1st of “D” range → 2nd of “D” range or “1st of manual mode” → “2nd of manual mode”.	• Fluid level and condition • Vehicle speed sensor 1 and Vehicle speed sensor 2 • Oil pressure switch 4 and Direct clutch solenoid valve • Line pressure • Up switch • CAN communication signal • Accelerator pedal position sensor
Gear does not shift 2nd of “D” range → 3rd of “D” range or “2nd of manual mode” → “3rd of manual mode”.	• Fluid level and condition • Vehicle speed sensor 1 and Vehicle speed sensor 2 • Oil pressure switch 5 and High & low reverse clutch solenoid valve • Line pressure • Up switch signal • CAN communication signal • Accelerator pedal position sensor
Gear does not shift 3rd of “D” range → 4th of “D” range or “3rd of manual mode” → “4th of manual mode”.	• Fluid level and condition • Vehicle speed sensor 1 and Vehicle speed sensor 2 • Oil pressure switch 3 and Input clutch solenoid valve • Oil pressure switch 1 and Front brake solenoid valve • Line pressure • Up switch signal • CAN communication signal • Accelerator pedal position sensor

General Diagnostic Table

Symptom	Problem parts
Gear does not shift 4th of “D” range → 5th of “D” range or “4th of manual mode” → “5th of manual mode”.	• Fluid level and condition • Vehicle speed sensor 1 and Vehicle speed sensor 2 • Oil pressure switch 1 and Front brake solenoid valve • Oil pressure switch 4 and Direct clutch solenoid valve • Torque converter turbine speed sensor • ATF temperature sensor • Line pressure • Up switch signal • CAN communication signal • Accelerator pedal position sensor
Gear does not shift down to 4th on “D” range or manual mode.	• Fluid level and condition • Vehicle speed sensor 1 and Vehicle speed sensor 2 • Oil pressure switch 1 and Front brake solenoid valve • Oil pressure switch 4 and Direct clutch solenoid valve • Line pressure • Down switch signal • CAN communication signal • Accelerator pedal position sensor
Gear does not shift down to 3rd on “D” range or manual mode.	• Fluid level and condition • Vehicle speed sensor 1 and Vehicle speed sensor 2 • Oil pressure switch 3 and Input clutch solenoid valve • Oil pressure switch 1 and Front brake solenoid valve • Line pressure • Down switch signal • CAN communication signal • Accelerator pedal position sensor • TCM power supply • PVIGN relay
Gear does not shift down to 2nd on “D” range or manual mode.	• Fluid level and condition • Vehicle speed sensor 1 and Vehicle speed sensor 2 • Oil pressure switch 5 and High & low reverse clutch solenoid • Line pressure • Down switch signal • CAN communication signal • Accelerator pedal position sensor
Gear does not shift down to 1st on “D” range or manual mode.	• Fluid level and condition • Vehicle speed sensor 1 and Vehicle speed sensor 2 • Oil pressure switch 4 and Direct clutch solenoid valve • Line pressure • Down switch signal • CAN communication signal • Accelerator pedal position sensor
No lock-up occurs.	• Fluid level and condition • Line pressure • Engine speed signal • Torque converter turbine speed sensor • Lock up solenoid valve • CAN communication signal • ATF temperature sensor 1 and 2 • Accelerator pedal position sensor • Brake switch signal • Range signal
No shift shock occurred when shifting 1st of “D” range → 2nd of “D” range or “1st of manual mode” → “2nd of manual mode”. Or clutch slipping occurred.	• Fluid level and condition • Vehicle speed sensor 1 and Vehicle speed sensor 2 • Oil pressure switch 4 and Direct clutch solenoid valve • Line pressure • CAN communication signal

Symptom	Problem parts
No shift shock occurred when shifting 2nd of “D” range → 3rd of “D” range or “2nd of manual mode” → “3rd of manual mode”. Or clutch slipping occurred.	• Fluid level and condition • Vehicle speed sensor 1 and Vehicle speed sensor 2 • Oil pressure switch 5 and High & low reverse clutch solenoid valve • Line pressure • CAN communication signal
No shift shock occurred when shifting 3rd of “D” range → 4th of “D” range or “3rd of manual mode” → “4th of manual mode”. Or clutch slipping occurred.	• Fluid level and condition • Vehicle speed sensor 1 and Vehicle speed sensor 2 • Oil pressure switch 3 and Input clutch solenoid valve • Oil pressure switch 1 and Front brake solenoid valve • Line pressure • CAN communication signal
No shift shock occurred when shifting 4th of “D” range → 5th of “D” range or “4th of manual mode” → “5th of manual mode”. Or clutch slipping occurred.	• Fluid level and condition • Vehicle speed sensor 1 and Vehicle speed sensor 2 • Oil pressure switch 1 and Front brake solenoid valve • Oil pressure switch 4 and Direct clutch solenoid valve • Line pressure • Accelerator pedal position sensor • Throttle position sensor
Engine skids when shifting 5th of “D” range → 4th of “D” range or “5th of manual mode” → “4th of manual mode”. Or slipping occurred.	• Fluid level and condition • Vehicle speed sensor 1 and Vehicle speed sensor 2 • Oil pressure switch 1 and Front brake solenoid valve • Oil pressure switch 4 and Direct clutch solenoid valve • Line pressure • Accelerator pedal position sensor • Throttle position sensor
Engine skids when shifting 4th of “D” range → 3rd of “D” range or “4th of manual mode” → “3rd of manual mode”. Or slipping occurred.	• Fluid level and condition • Vehicle speed sensor 1 and Vehicle speed sensor 2 • Oil pressure switch 3 and Input clutch solenoid valve • Oil pressure switch 1 and Front brake solenoid valve • Line pressure • Accelerator pedal position sensor • Throttle position sensor
Engine skids when shifting 3rd of “D” range → 2nd of “D” range or “3rd of manual mode” → “2nd of manual mode”. Or slipping occurred.	• Fluid level and condition • Vehicle speed sensor 1 and Vehicle speed sensor 2 • Oil pressure switch 5 and High & low reverse clutch solenoid valve • Oil pressure switch 4 and Direct clutch solenoid valve • Line pressure • Accelerator pedal position sensor • Throttle position sensor
Engine skids when shifting 2nd of “D” range → 1st of “D” range or “2nd of manual mode” → “1st of manual mode”. Or slipping occurred.	• Fluid level and condition • Vehicle speed sensor 1 and Vehicle speed sensor 2 • Oil pressure switch 4 and Direct clutch solenoid valve • Line pressure • Accelerator pedal position sensor • Throttle position sensor
Engine brake does not function at 5th → 4th of manual mode.	• Inhibitor switch • Fluid level and condition • Control cable adjustment • Manual mode switch • Oil pressure switch 1 • Down switch signal
Engine brake does not function at 4th → 3rd of manual mode.	• Inhibitor switch • Fluid level and condition • Control cable adjustment • Manual mode switch • Oil pressure switch 1 and Oil pressure switch 3 • Down switch signal

General Diagnostic Table

Symptom	Problem parts
Engine brake does not function at 3rd → 2nd of manual mode.	• Inhibitor switch • Fluid level and condition • Control cable adjustment • Manual mode switch • Oil pressure switch 5 • Low coast brake solenoid valve
Engine brake does not function at 2nd → 1st of manual mode.	• Inhibitor switch • Fluid level and condition • Control cable adjustment • Manual mode switch • Oil pressure switch 4 • Low coast brake solenoid valve
Excessive acceleration failure on “D” range.	• Fluid level and condition • Line pressure • Accelerator pedal position sensor • Throttle position sensor • CAN communication signal • Inhibitor switch • Control cable adjustment • Vehicle speed sensor 1, 2
Excessive acceleration failure on “R” range.	• Fluid level and condition • Line pressure • Accelerator pedal position sensor • Throttle position sensor • Oil pressure switch 5 and High & low reverse clutch solenoid valve • CAN communication signal • Inhibitor switch • Control cable adjustment • Vehicle speed sensor 1, 2
Engine skids when start driving (1st) the vehicle. Or slipping occurred.	• Fluid level and condition • Line pressure • Accelerator pedal position sensor • Throttle position sensor • CAN communication signal
Engine skids when driving at 2nd. Or slipping occurred.	• Fluid level and condition • Line pressure • Accelerator pedal position sensor • Throttle position sensor • CAN communication signal • Oil pressure switch 4 and Direct clutch solenoid valve
Engine skids when driving at 3rd. Or slipping occurred.	• Fluid level and condition • Line pressure • Accelerator pedal position sensor • Throttle position sensor • CAN communication signal • Oil pressure switch 5 and High & low reverse clutch solenoid valve
Engine skids when driving at 4th. Or slipping occurred.	• Fluid level and condition • Line pressure • Accelerator pedal position sensor • Throttle position sensor • CAN communication signal • Oil pressure switch 3 and Input clutch solenoid valve

Symptom	Problem parts
Engine skids when driving at 5th. Or slipping occurred.	• Fluid level and condition • Line pressure • Accelerator pedal position sensor • Throttle position sensor • CAN communication signal • Oil pressure switch 1 and Front brake solenoid valve
Slip at lock up.	• Fluid level and condition • Line pressure • Engine speed signal • Torque converter turbine speed sensor • Lock up solenoid valve • CAN communication signal
Maximum vehicle speed is low.	• Fluid level and condition • Line pressure • Accelerator pedal position sensor • Throttle position sensor • CAN communication signal • Direct clutch solenoid valve • Vehicle speed sensor 1 and 2
There is completely no creep.	• Fluid level and condition • Engine speed signal • CAN communication signal • Oil pressure switch 4 and Direct clutch solenoid valve • Line pressure
Excessive large creep.	• Engine speed signal • CAN communication signal • Oil pressure switch 4
Vehicle cannot be parking condition on “P” range. Parking condition is not released though shifting to other ranges.	• Inhibitor switch • Control cable adjustment
Vehicle can drive on “P” range.	• Inhibitor switch • Fluid level and condition • Control cable adjustment • Line pressure
Vehicle can drive on “N” range.	• Inhibitor switch • Fluid level and condition • Control cable adjustment • Line pressure
Vehicle cannot drive at any range.	• Fluid level and condition • Line pressure • Inhibitor switch • Control cable adjustment • Loosing or damaging of propeller shaft. • Loosing or damaging of drive shaft.
Vehicle cannot drive on “D” range.	• Fluid level and condition • Line pressure • Inhibitor switch • Control cable adjustment • Loosing or damaging of propeller shaft. • Loosing or damaging of drive shaft.
Vehicle cannot drive on “R” range.	• Fluid level and condition • Line pressure • Inhibitor switch • Control cable adjustment • Loosing or damaging of propeller shaft. • Loosing or damaging of drive shaft.

General Diagnostic Table

Symptom	Problem parts
Engine cannot start on “P” or “N” range	• Key switch and Starter • Control cable adjustment • Inhibitor switch • CAN communication line • TCM
Engine start other than “N” or “P” range	• Key switch and Starter • Control cable adjustment • Inhibitor switch • TCM
Engine stalls.	• Fluid level and condition • Engine speed signal • Torque converter turbine speed sensor • Lock up solenoid valve • Line pressure
Engine stalls when shifting to “N” → “D” and “R” range.	• Fluid level and condition • Engine speed signal • Torque converter turbine speed sensor • Lock up solenoid valve • Line pressure

MANUAL TRANSMISSION AND DIFFERENTIAL

5MT

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1. General Description

A: SPECIFICATION

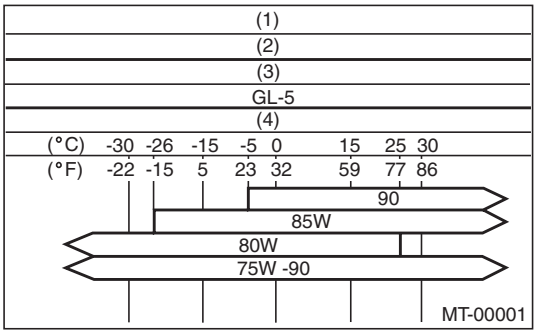
1. MANUAL TRANSMISSION AND DIFFERENTIAL

Option code★1			EC, K4, EK	KA	EC, K4, EK		KA, KS	
Model			2.0 L		2.5 L			
			2.0 i	2.0 GT	Except for OUTBACK	OUTBACK	Except for OUTBACK	OUTBACK
Type			5-forward speeds and 1-reverse (5 × 2-forward speeds and 1 × 2-reverse)★2					
Transmission gear ratio		1st	3.454	3.166	3.454			
		2nd	1.947	1.882	2.062			
		3rd	1.366	1.296	1.448			
		4th	0.972		1.088			
		5th	0.738		0.825		0.78	0.825
		Reverse	3.333					
Auxiliary transmission gear ratio★2		High	1.000					
		Low	1.447		1.196			
Front reduction gear	Final	Type of gear	Hypoid					
		Gear ratio	4.111		3.700	3.900	4.111	
Rear reduction gear	Transfer	Type of gear	Helical					
		Gear ratio	1.000					
	Final	Type of gear	Hypoid					
		Gear ratio	4.111		3.700	3.900	4.111	
Front differential	Type and number of gear		Straight bevel gear (Bevel pinion: 2, Bevel gear: 2)					
Center differential	Type and number of gear		Straight bevel gear (Bevel pinion: 2, Bevel gear: 2 and viscous coupling)					
Transmission gear oil			GL-5					
Transmission gear oil capacity		Single-range model	3.5 ℓ (3.7 US qt, 3.1 Imp qt)					
		Dual-range model	4.0 ℓ (4.2 US qt, 3.5 Imp qt)					

★1: For option code, refer to ID section. <Ref. to ID-5, MODEL NUMBER PLATE, IDENTIFICATION, Identification.>
★2: Dual-range model only

2. TRANSMISSION GEAR OIL

Recommended oil:



(1) Item
(2) Transmission gear oil
(3) API standard
(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 Number	Thickness mm (in)	Part Number	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 Number	Marking
4.00 — 4.13 (0.1575 — 0.1626)	32294AA041	1
3.87 — 3.99 (0.1524 — 0.1571)	32294AA051	2

Input shaft holder adjustment

Dimension “D” mm (in)	Shim Number
52.50 — 53.11 (2.0669 — 2.0909)	—
52.00 — 52.49 (2.0472 — 2.0665)	1
51.26 — 51.99 (2.0181 — 2.0468)	2

4. DRIVE PINION ASSEMBLY

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 Number	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 Number	Thickness mm (in)
803025059	3.850 (0.1516)
803025054	4.000 (0.1575)
803025058	4.150 (0.1634)

5. INPUT SHAFT ASSEMBLY

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

Snap ring (Outer-28)	
Part Number	Thickness mm (in)
805028050	2.48 (0.0976)
805028060	2.56 (0.1008)
805028070	2.64 (0.1039)

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

Snap ring (Inner-68)	
Part Number	Thickness mm (in)
805168020	1.84 (0.0724)
805168030	1.92 (0.0756)
805168040	2.00 (0.0787)

6. MAIN SHAFT

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

Snap ring (Outer-25)			
Part Number	Thickness mm (in)	Part Number	Thickness mm (in)
805025051	2.42 (0.0953)	805025055	2.62 (0.1031)
805025052	2.47 (0.0972)	805025056	2.67 (0.1051)
805025053	2.52 (0.0992)	805025057	2.72 (0.1071)
805025054	2.57 (0.1012)	805025058	2.37 (0.0933)

7. REVERSE IDLER GEAR

Adjustment of reverse idler gear position

Reverse idler gear to transmission case (LH) wall clearance:
6.0 — 7.5 mm (0.236 — 0.295 in)

Reverse shifter lever		
Part Number	Marking	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 clearance using washer.

Reverse idler gear to transmission case wall clearance:
0 — 0.5 mm (0 — 0.020 in)

Washer (20.5 × 26 × t)			
Part Number	Thickness mm (in)	Part Number	Thickness mm (in)
803020151	0.4 (0.016)	803020154	1.9 (0.075)
803020152	1.1 (0.043)	803020155	2.3 (0.091)
803020153	1.5 (0.059)	—	—

8. SHIFTER FORK AND ROD

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

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

1st-2nd shifter fork		
Part Number	Marking	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 Number	Marking	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)

9. TRANSFER CASE OR REAR CASE

Neutral position adjustment

Adjusting shim	
Part Number	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 Number	Marking	Angle θ	Remarks
32189AA000	0	28°	Arm stops closer to 5th gear.
32189AA010	1	31°	Arm stops closer to 5th gear.
33189AA020	2	34°	Arm stops in the center.
32189AA030	3	37°	Arm stops closer to reverse gear.
32189AA040	4	40°	Arm stops closer to reverse gear.

10.EXTENSION ASSEMBLY

Standard protrusion amount of taper roller bearing outer race:
0.2 — 0.3 mm (0.0008 — 0.012 in)

NOTE:
Be sure that it is within the standard protrusion amount.

Thrust washer (50 × 61 × t)	
Part Number	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 Number	Thickness mm (in)
803036050	0.9 (0.035)
803036054	1.0 (0.039)
803036051	1.1 (0.043)
803036055	1.2 (0.047)
803036052	1.3 (0.051)
803036056	1.4 (0.055)
803036053	1.5 (0.059)
803036057	1.6 (0.063)
803036058	1.7 (0.067)

11.FRONT DIFFERENTIAL

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

Washer (38.1 × 50 × t)			
Part Number	Thickness mm (in)	Part Number	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)	—	—

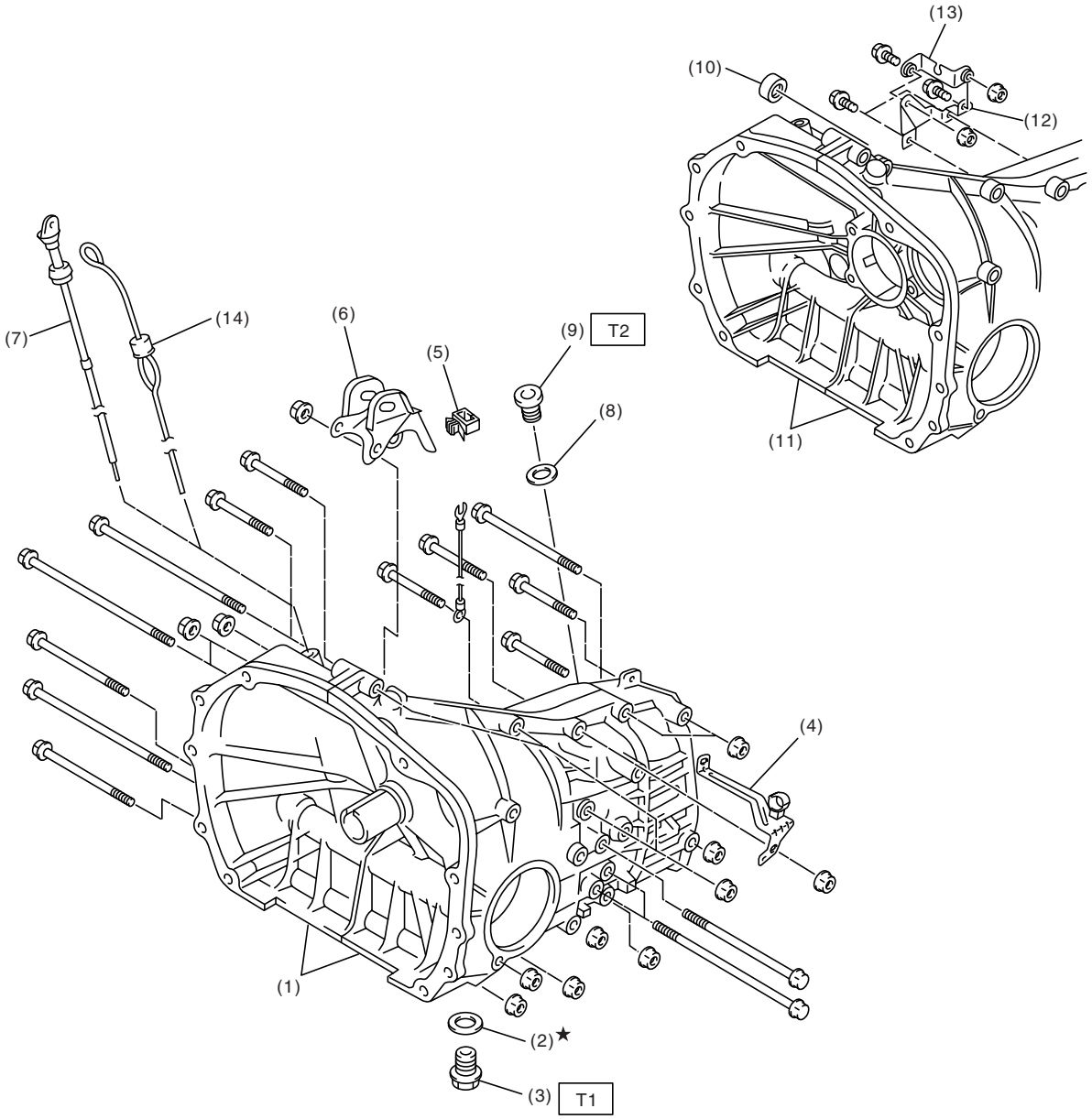
12.TRANSFER DRIVE GEAR

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

Snap ring (Outer-30)	
Part Number	Thickness mm (in)
805030041	1.53 (0.0602)
805030042	1.65 (0.0650)
805030043	1.77 (0.0697)

B: COMPONENT

1. TRANSMISSION CASE

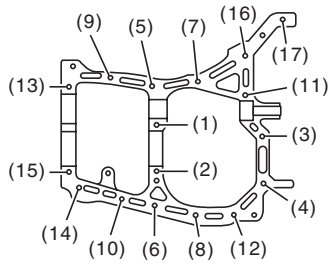


MT-01360

(1) Transmission case ASSY (Single-range)
(2) Gasket
(3) Drain plug
(4) Harness bracket
(5) Clamp
(6) Pitching stopper bracket
(7) Oil level gauge (Non-turbo model)
(8) Gasket
(9) Plug
(10) Oil seal (Dual-range)
(11) Transmission case ASSY (Dual-range)
(12) High-low cable bracket A (Dual-range)
(13) High-low cable bracket B (Dual-range)
(14) Oil level gauge (Turbo model)

Tightening torque: N·m (kgf-m, ft-lb)
T1: 70 (7.1, 51.6)
T2: 60 (6.1, 43.7)

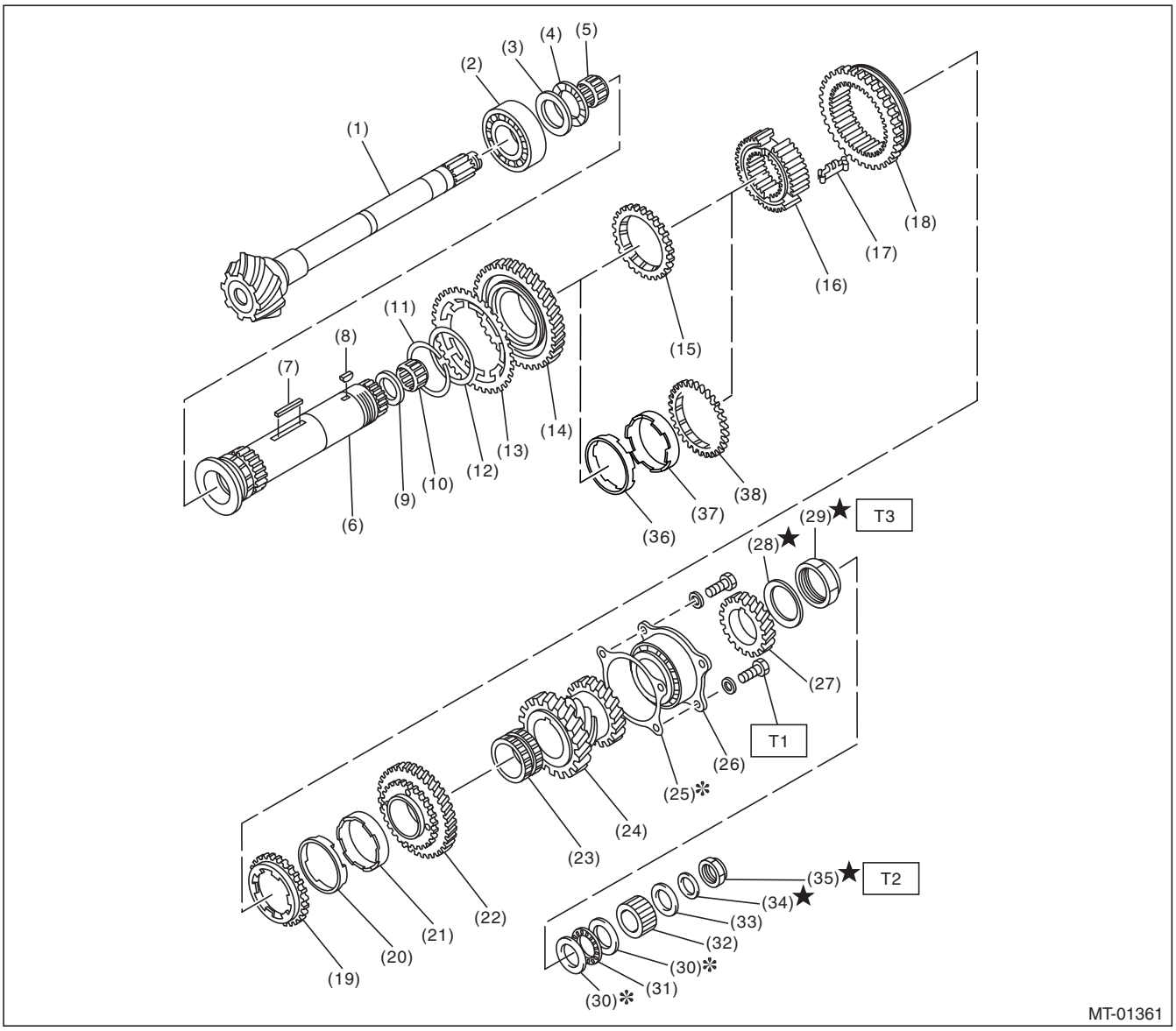
- Transmission case tightening torque



MT-00003

Bolt No.	Bolt size mm	Tightening torque: N·m (kgf-m, ft-lb)
(5) — (15)	8	25 (2.5, 18.4)
(1) — (4) (16) — (17)	10	39 (4.0, 28.9)

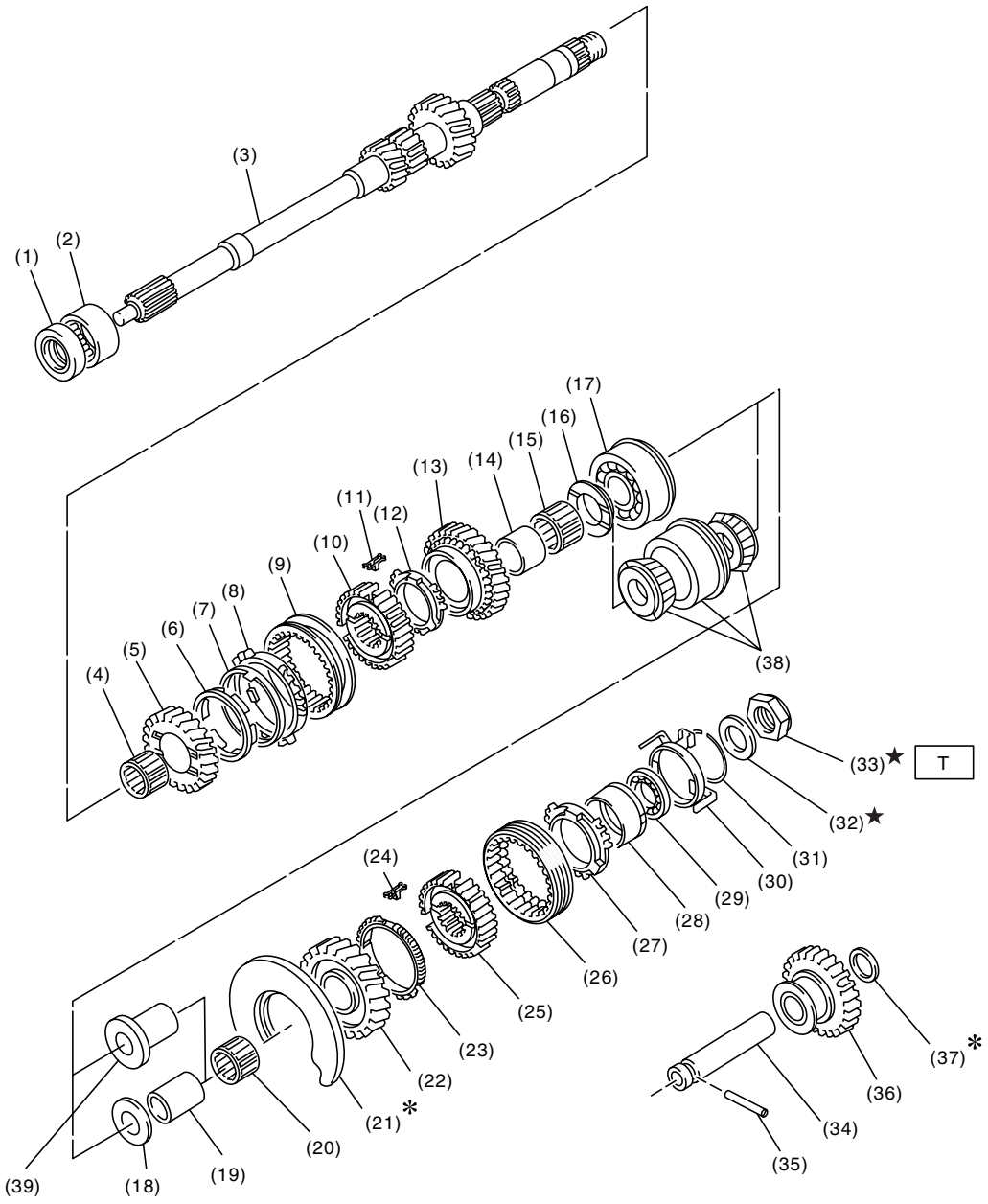
2. DRIVE PINION ASSEMBLY



(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 (KS and K4 model)
(12) Washer (KS and K4 model)
(13) Sub gear (KS and K4 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 bushing
(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
(36) Inner baulk ring (Turbo model)
(37) Synchro cone (Turbo model)
(38) Outer baulk ring (Turbo model)

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 FOR SINGLE-RANGE

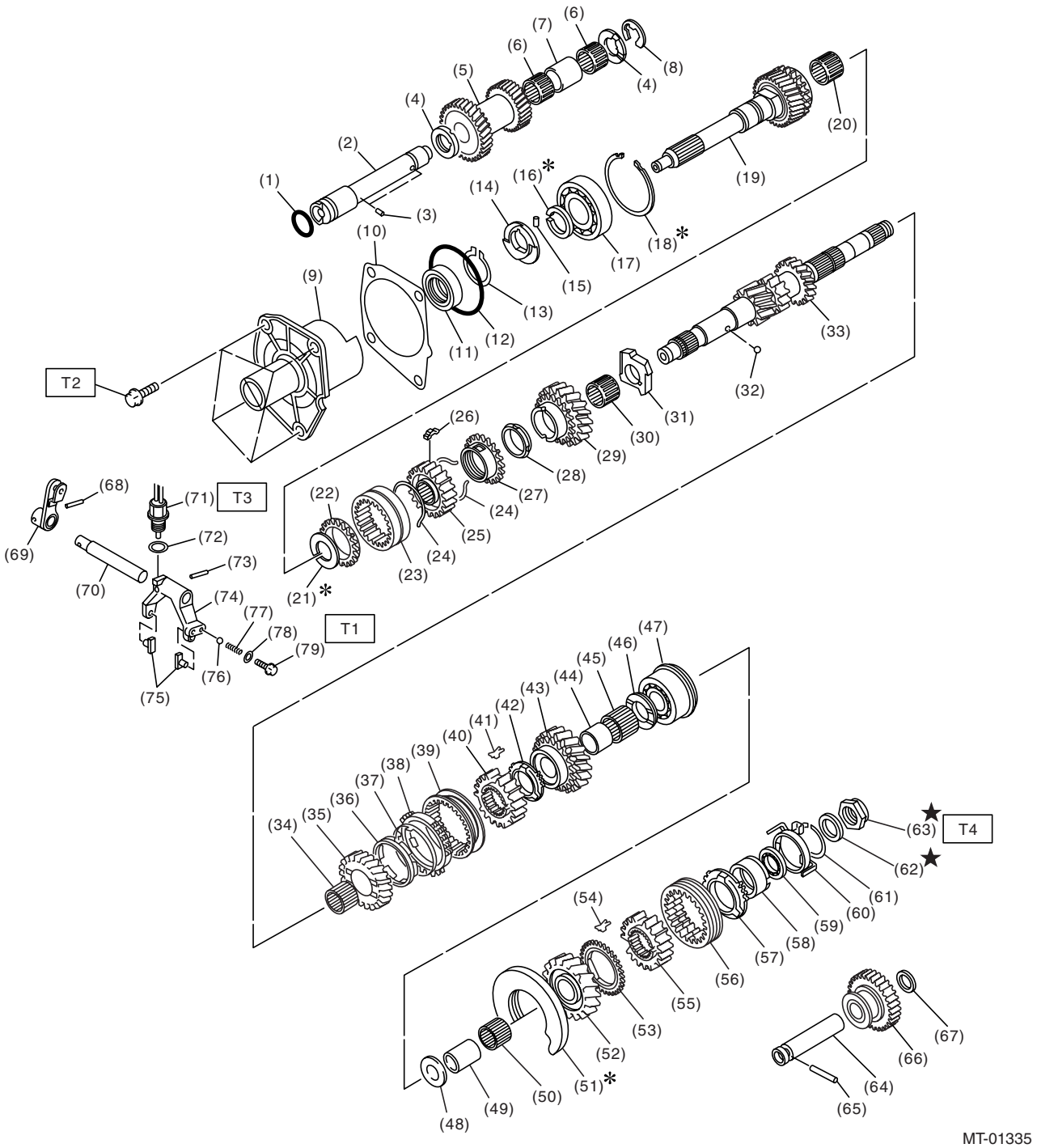


MT-01359

(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
(18) 5th gear thrust washer
(19) 5th needle bearing race
(20) Needle bearing
(21) Main shaft rear plate
(22) 5th drive gear
(23) 5th baulk ring
(24) 5th-Rev shifting insert key
(25) 5th-Rev synchronizer hub
(26) 5th-Rev coupling sleeve
(27) Reverse baulk ring
(28) Reverse 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)
(39) 5th needle bearing race (Turbo model)

Tightening torque: N·m (kgf-m, ft-lb)
T: 120 (12.2, 88.5)

4. MAIN SHAFT ASSEMBLY FOR DUAL-RANGE

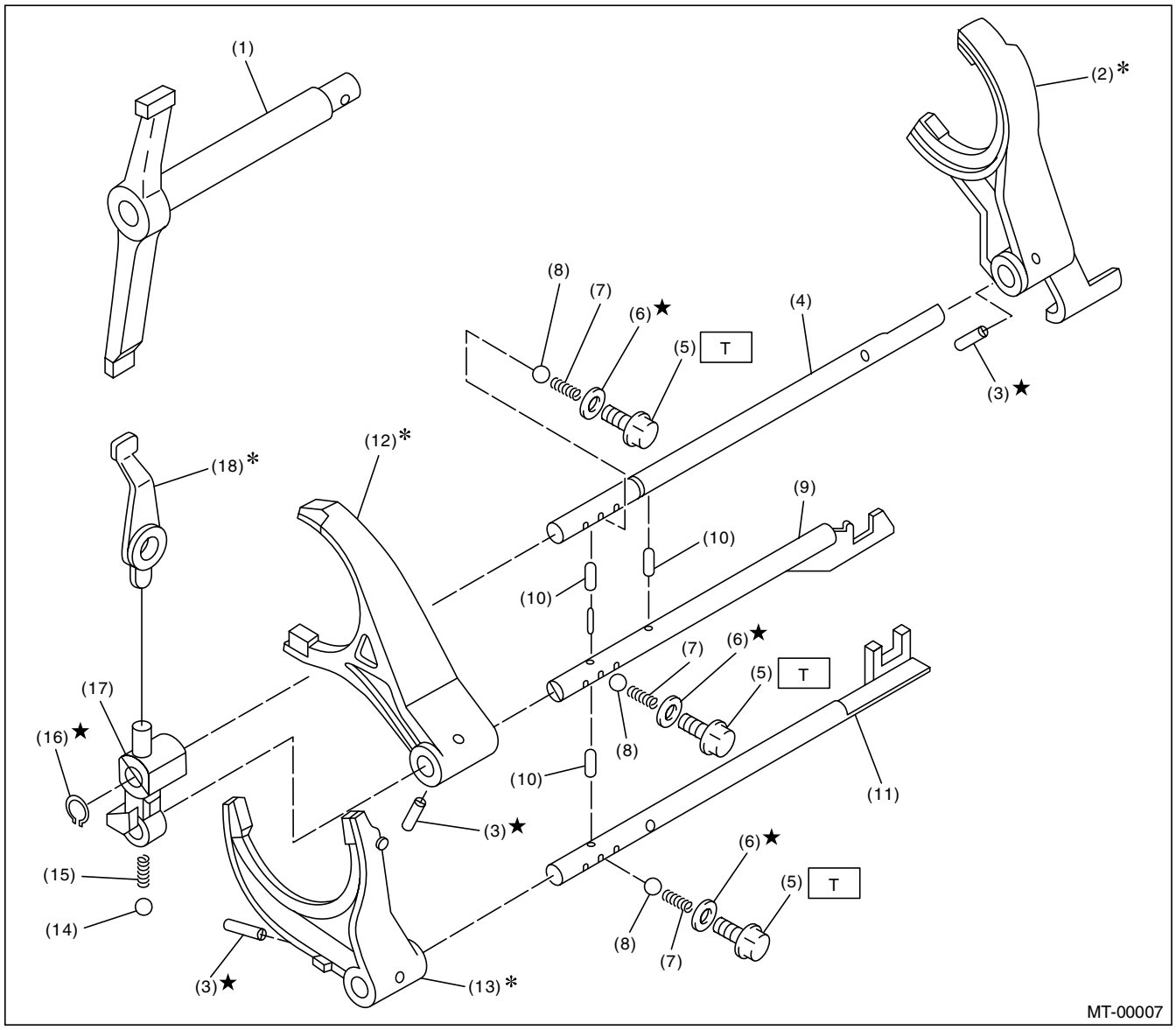


MT-01335

(1) O-ring
(2) High-low counter shaft
(3) Knock pin
(4) High-low counter washer
(5) Counter gear
(6) Needle bearing
(7) Counter gear collar
(8) Snap ring (Outer-19)
(9) Input shaft holder
(10) Input shaft shim
(11) Oil seal
(12) O-ring
(13) Snap ring (Outer-28)
(14) Oil squeeze
(15) Straight pin
(16) Snap ring (Outer-28)
(17) Ball bearing
(18) Snap ring (Inner-68)
(19) Input shaft
(20) Needle bearing
(21) Snap ring (Outer-25)
(22) High-low baulk ring
(23) High-low coupling sleeve
(24) High-low synchronizer spring
(25) High-low synchronizer hub
(26) Shifting insert key
(27) High-low baulk ring
(28) Friction damper
(29) Input low gear
(30) Needle bearing
(31) Input low gear spacer
(32) Ball
(33) Main shaft
(34) Needle bearing
(35) 3rd drive gear
(36) Inner baulk ring
(37) Synchro cone
(38) Outer baulk ring
(39) 3rd-4th coupling sleeve
(40) 3rd-4th synchronizer hub
(41) 3rd-4th shifting insert key
(42) 4th baulk ring
(43) 4th drive gear
(44) 4th needle bearing race
(45) Needle bearing
(46) 4th gear thrust washer
(47) Ball bearing
(48) 5th gear thrust washer
(49) 5th needle bearing race
(50) Needle bearing
(51) Main shaft rear plate
(52) 5th drive gear
(53) 5th baulk ring
(54) 5th-Rev shifting insert key
(55) 5th-Rev synchronizer hub
(56) 5th-Rev coupling sleeve
(57) Rev baulk ring
(58) Rev synchro cone
(59) Ball bearing
(60) Synchro cone stopper
(61) Snap ring
(62) Lock washer
(63) Lock nut
(64) Reverse idler gear shaft
(65) Straight pin
(66) Reverse idler gear
(67) Washer
(68) Straight pin
(69) High-low shifter lever
(70) High-low shifter shaft
(71) Low switch
(72) Gasket
(73) Straight pin
(74) High-low shifter fork
(75) High-low shifter piece
(76) Ball
(77) Spring
(78) Gasket
(79) Plug

Tightening torque: N·m (kgf-m, ft-lb)
T1: 10 (1.0, 7.4)
T2: 20 (2.0, 14.5)
T3: 25 (2.5, 18.4)
T4: 120 (12.2, 88.5)

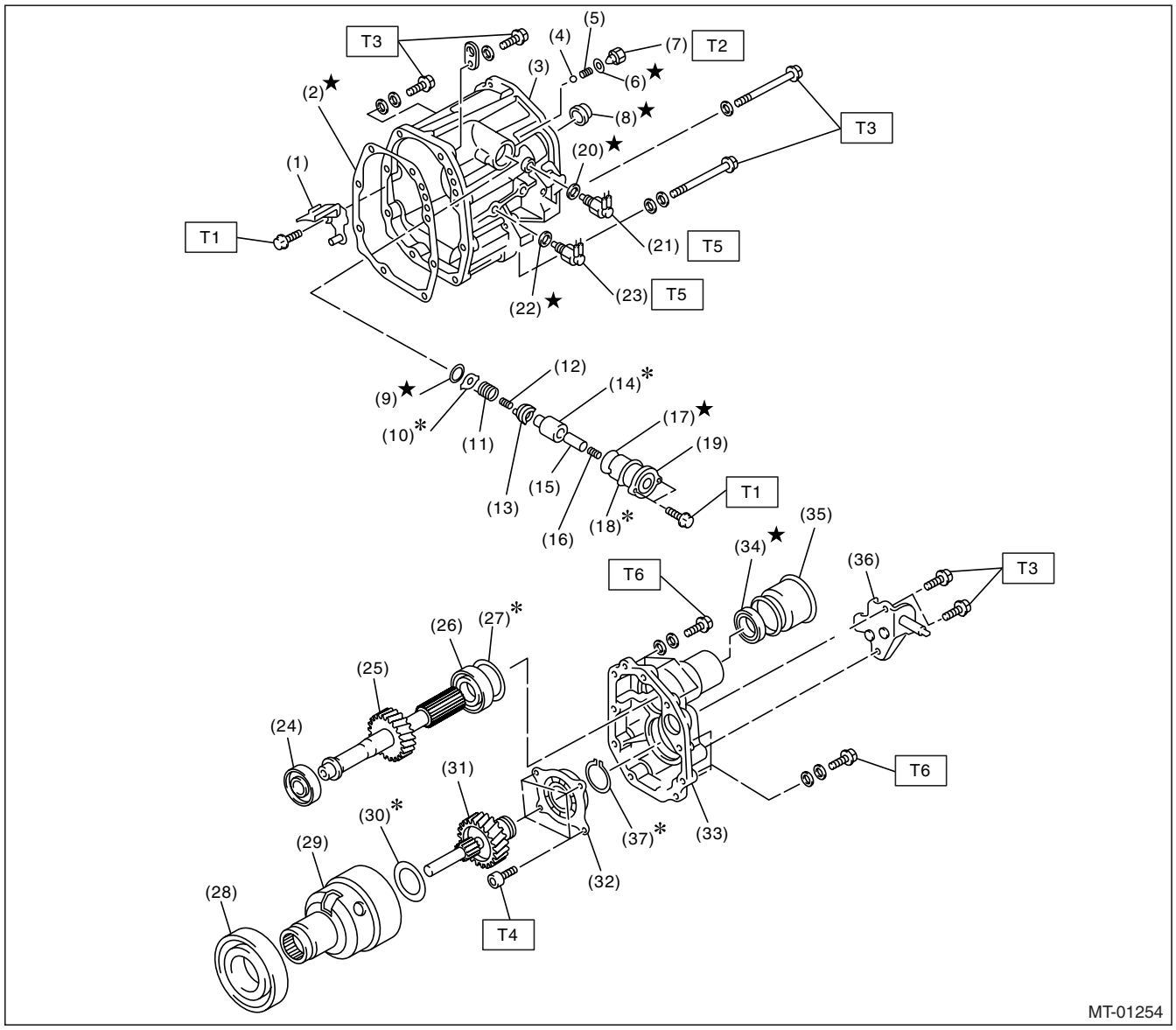
5. SHIFTER FORK AND SHIFTER ROD



(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: 19.5 (2.0, 14.4)

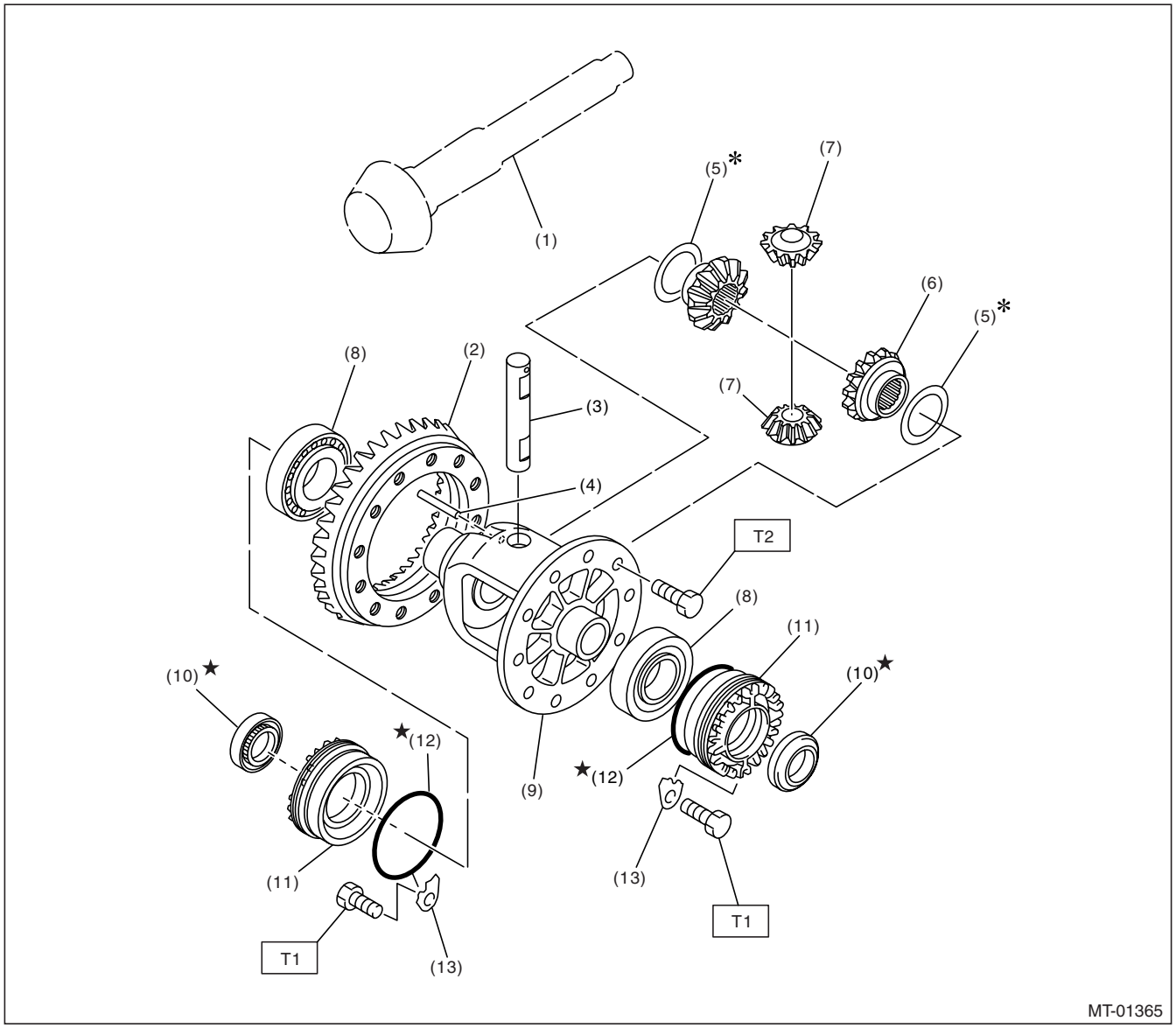
6. TRANSFER CASE AND EXTENSION



(1) Oil guide
(2) Gasket
(3) Transfer case
(4) Ball
(5) Reverse accent spring
(6) Gasket
(7) Plug
(8) Oil seal
(9) Snap ring (Inner)
(10) Reverse check plate
(11) Reverse check spring
(12) Reverse return spring
(13) Reverse check cam
(14) Reverse accent shaft
(15) Return spring cap
(16) Return spring
(17) O-ring
(18) Adjusting select shim
(19) Reverse check sleeve
(20) Gasket
(21) Neutral position 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: 10 (1.0, 7.4)
T3: 25 (2.5, 18.4)
T4: 26 (2.7, 20)
T5: 32 (3.3, 23.6)
T6: 40 (4.1, 29.7)

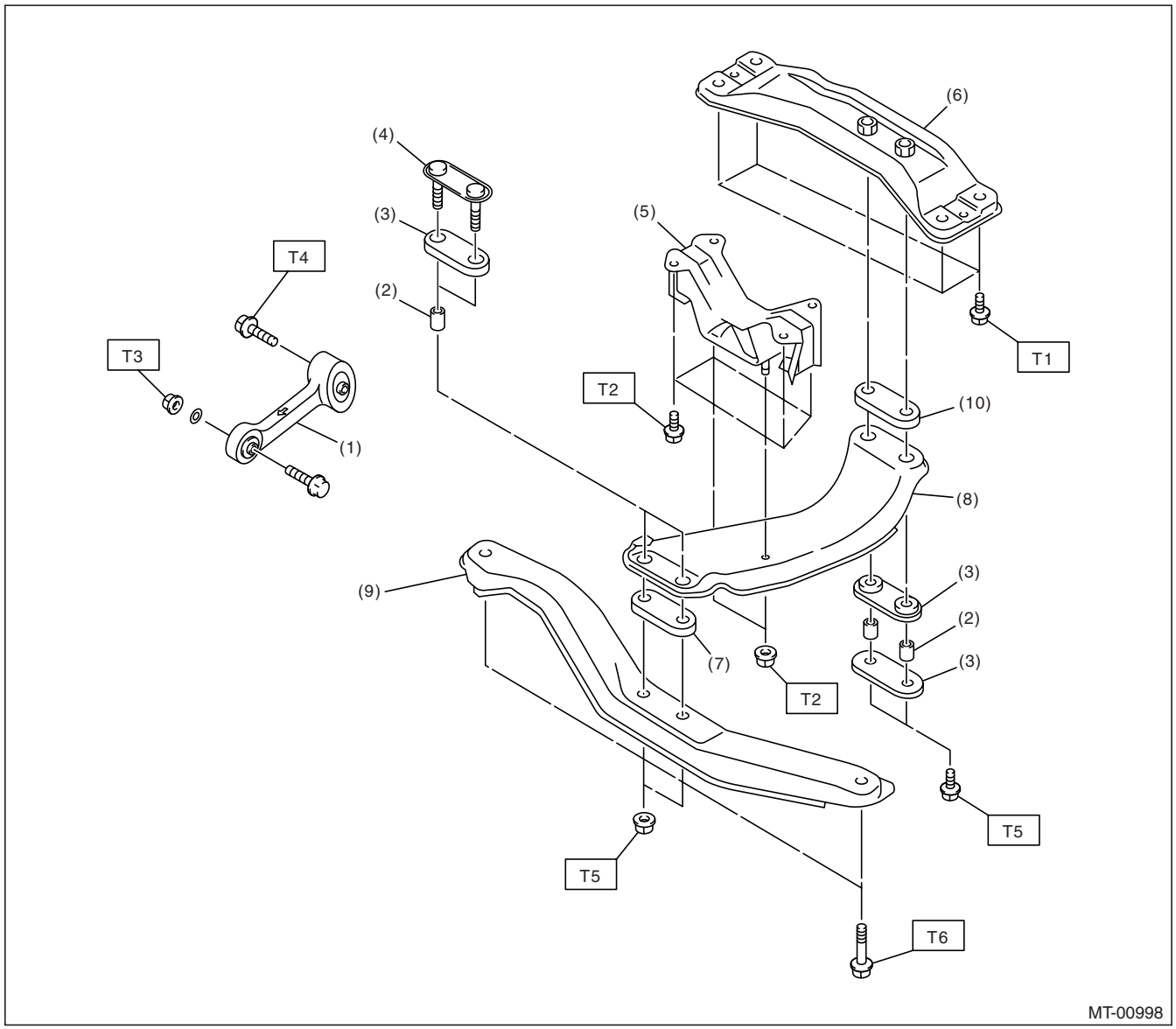
7. FRONT DIFFERENTIAL



(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) Roller bearing
(9) Differential case
(10) Oil seal
(11) Differential side retainer
(12) O-ring
(13) Retainer lock plate

Tightening torque: N·m (kgf-m, ft-lb)
T1: 25 (2.5, 18.4)
T2: 62 (6.3, 45.6)

8. TRANSMISSION MOUNTING



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

Tightening torque: N·m (kgf-m, ft-lb)
T1: 70 (7.1, 51.6)
T2: 35 (3.6, 26)
T3: 50 (5.1, 36.9)
T4: 58 (5.9, 42.8)
T5: 70 (7.1, 51.6)
T6: 140 (14.3, 103)

C: CAUTION

• Wear work 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 and 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 yourself, because each part on the vehicle is hot after running.
• Use SUBARU genuine gear oil, grease etc. or 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 rigid racks at the specified points.
• Apply gear oil onto sliding or revolution surfaces before installation.
• Replace deformed or damaged snap rings with new ones.
• Before installing O-rings or oil seals, apply sufficient amount of gear oil to avoid damage and deformation.
• Be careful not to incorrectly install or fail to install O-rings, snap rings and other such parts.
• Before securing a part on a vice, place cushioning material such as wood blocks, aluminum plate or cloth between the part and the vice.
• Avoid damaging the mating surface of the case.
• Before applying sealant, completely remove the old seal.

D: PREPARATION TOOL

1. SPECIAL TOOL

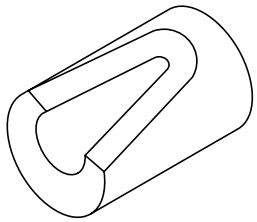
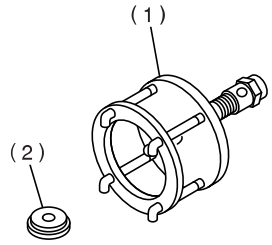
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-399411700	399411700	ACCENT BALL INSTALLER	Used for installing reverse shifter rail arm.
 ST-899524100	899524100	PULLER SET	Used for removing and installing roller bearing (Differential). (1) Puller (2) Cap

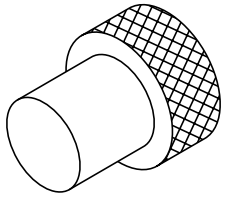
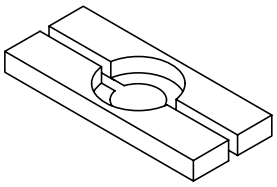
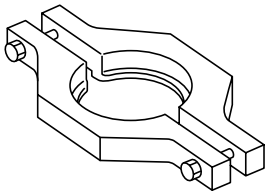
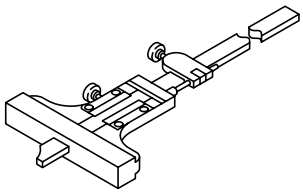
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-399780104	399780104	WEIGHT	Used for measuring preload on roller bearing.
 ST-498077000	498077000	REMOVER	Used for removing roller bearing of drive pinion shaft.
 ST-498077300	498077300	CENTER DIFFERENTIAL BEARING REMOVER	Used for removing the center differential cover ball bearing.
 ST-498147001	498147001	DEPTH GAUGE	Used for adjusting main shaft axial end play.

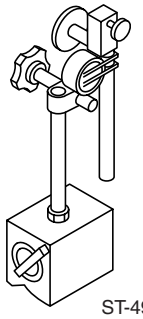
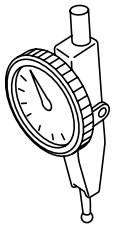
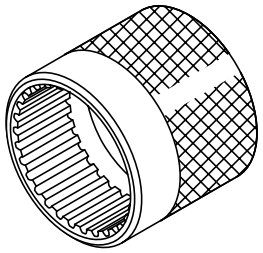
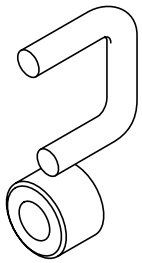
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-498247001	498247001	MAGNET BASE	• Used for measuring backlash between side gear and pinion, and hypoid gear. • Used with DIAL GAUGE (498247100).
 ST-498247100	498247100	DIAL GAUGE	• Used for measuring backlash between side gear and pinion, and hypoid gear. • Used with MAGNET BASE (498247001).
 ST-498427100	498427100	STOPPER	Used for securing drive pinion shaft assembly and driven gear assembly when removing lock nut of drive pinion shaft assembly.
 ST-498787100	498787100	MAIN SHAFT STOPPER	Used for removing and installing lock nut of transmission main shaft.

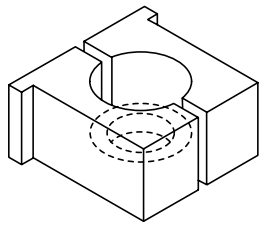
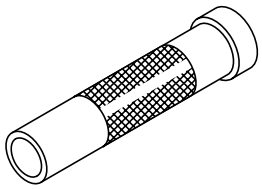
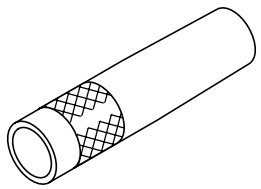
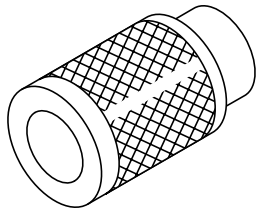
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-498937000	498937000	TRANSMISSION HOLDER	Used for removing and installing transmission main shaft lock nut.
 ST-499277100	499277100	BUSHING 1-2 INSTALLER	• Used for installing 1st driven gear thrust plate and 1st-2nd driven gear bushing. • Used for installing roller bearing outer races to differential case.
 ST-499277200	499277200	INSTALLER	Used for press-fitting 2nd driven gear, roller bearings, and 5th driven gear onto driven shaft.
 ST-499757002	499757002	INSTALLER	• Used for installing snap ring (OUT 25), and ball bearing (25 × 26 × 17). • Used for installing bearing cone of transfer driven gear (extension core side).

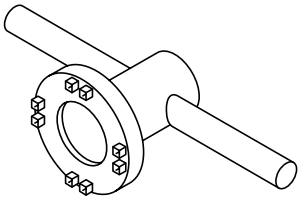
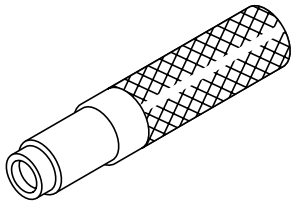
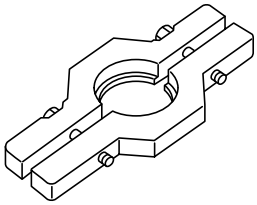
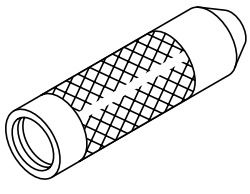
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-499787000	499787000	WRENCH ASSY	Used for removing and installing differential side retainer.
 ST-499827000	499827000	PRESS	Used for installing speedometer oil seal when installing speedometer cable to transmission.
 ST-499857000	499857000	5TH DRIVEN GEAR 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).

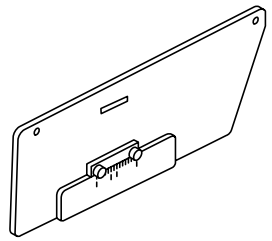
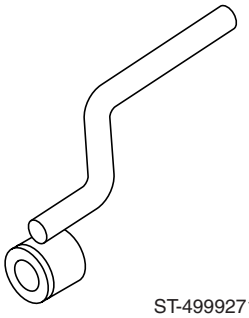
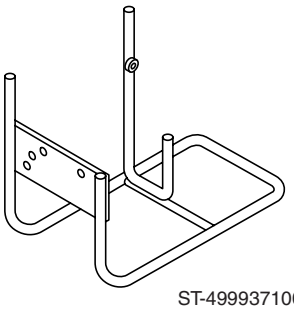
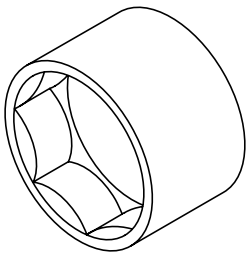
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-499917500	499917500	DRIVE PINION GAUGE ASSY	Used for adjusting drive pinion shim.
 ST-499927100	499927100	HANDLE	Used for fitting transmission main shaft.
 ST-499937100	499937100	TRANSMISSION STAND SET	Used for transmission disassembly and assembly.
 ST-499987003	499987003	SOCKET WRENCH (35)	Used for removing and installing main shaft lock nut.

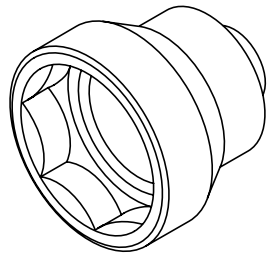
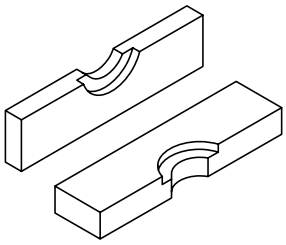
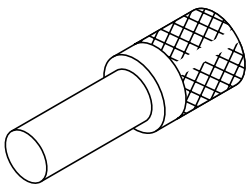
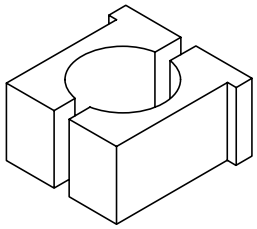
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-499987300	499987300	SOCKET WRENCH (50)	Used for removing and installing driven gear assembly lock nut.
 ST-899714110	899714110	REMOVER	Used for installing transmission main shaft drive pinion and rear drive shaft.
 ST-899864100	899864100	REMOVER	Used for removing parts on transmission main shaft and drive pinion.
 ST-899884100	899884100	HOLDER	Used for tightening lock nut on sleeve.

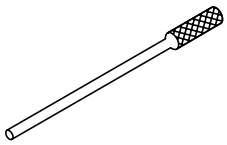
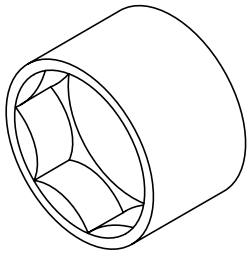
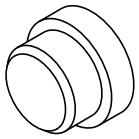
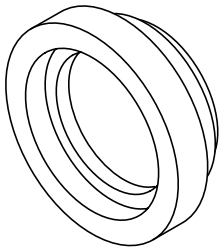
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-899904100	899904100	REMOVER	Used for removing and installing straight pin.
 ST-899988608	899988608	SOCKET WRENCH (27)	Used for removing and installing drive pinion lock nut.
 ST-398497701	398497701	ADAPTER	• Used for installing roller bearing onto differential case. • Used with INSTALLER (499277100).
 ST-499587000	499587000	INSTALLER	Used for installing driven gears to driven shaft.

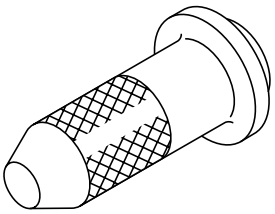
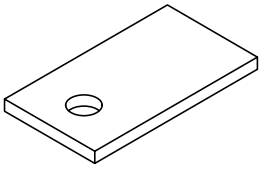
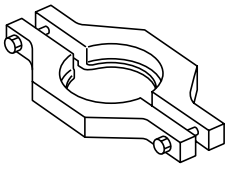
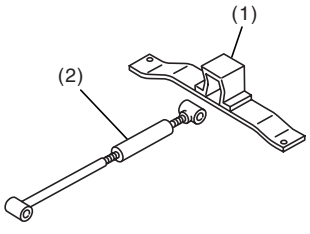
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-498057300	498057300	INSTALLER	Used for installing extension oil seal.
 ST-498255400	498255400	PLATE	Used for measuring backlash.
 ST-498077400	498077400	SYNCHRONIZER CONE REMOVER	• Used for removing synchronizer cone of main shaft. • Used for removing 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)

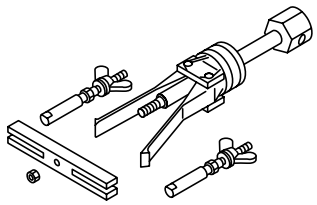
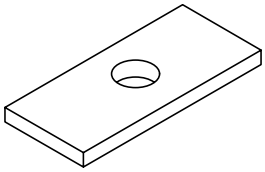
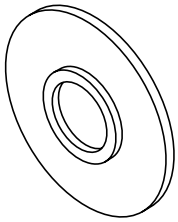
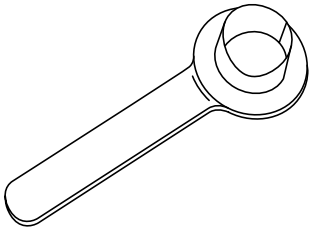
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-398527700	398527700	PULLER ASSY	Used for removing extension case roller bearing.
 ST-398643600	398643600	GAUGE	Used for measuring total end play, extension end play and drive pinion height.
 ST-398177700	398177700	INSTALLER	• Used for installing bearing cone of transfer driven gear (transfer case side). • Used for installing ball bearing of transfer drive gear.
 ST28399SA010	28399SA010	FRONT DRIVE SHAFT OIL SEAL PROTECTOR	Used for protecting oil seal from damage when inserting front drive shaft.

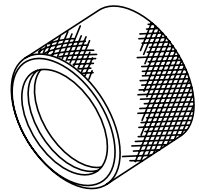
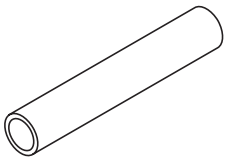
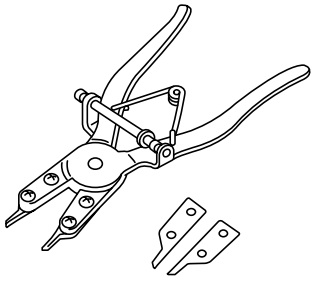
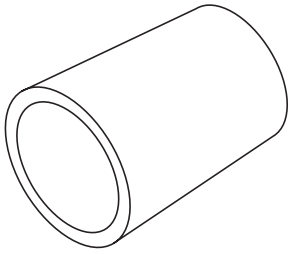
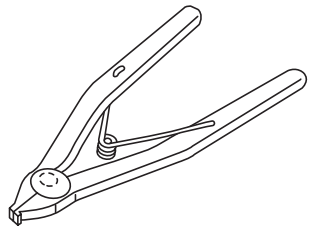
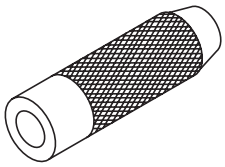
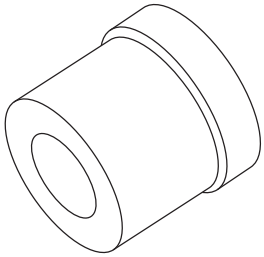
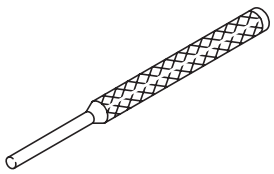
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST18675AA000	18675AA000	DIFFERENTIAL SIDE OIL SEAL INSTALLER	Used for installing differential side retainer oil seal.
 ST-398507703	398507703	DUMMY COLLAR	• Used for installing input shaft holder oil seal. • For dual-range model.
 ST-398663600	398663600	PLIERS	• Used for removing and installing input shaft snap ring. • For dual-range model.
 ST-499757001	499757001	SNAP RING GUIDE	• Used for installing snap ring (OUT 25). • For dual-range model.

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-899474100	899474100	EXPANDER	• Used for removing and installing snap ring. • For dual-range model.
 ST-899580100	899580100	INSTALLER	• Used for pressing ball bearings into input shaft. • For dual-range model.
 ST-399513600	399513600	INSTALLER	• Used for pressing ball bearings into input shaft. • For dual-range model.
 ST-398791700	398791700	STRAIGHT PIN REMOVER	Used for removing and installing straight pin.

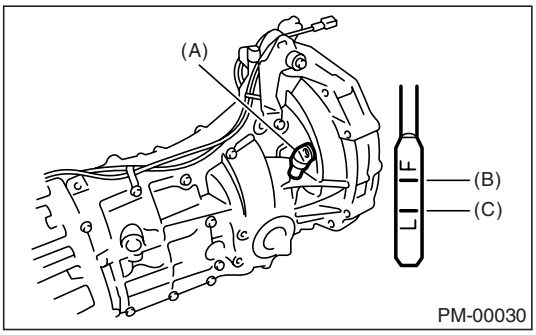
2. GENERAL TOOL

TOOL NAME	REMARKS
Circuit tester	Used for measuring resistance, voltage and ampere.
TORX® BIT T70	Used for removing and installing transmission gear oil drain plug.

2. Transmission Gear Oil

A: INSPECTION

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

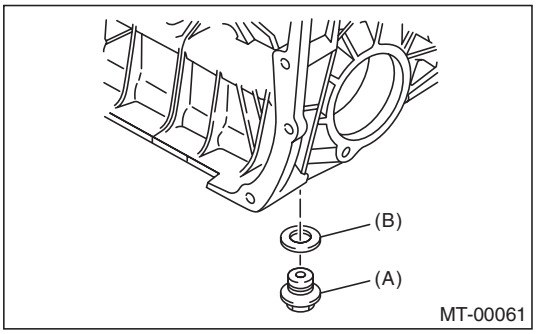
1) Pull out the oil level gauge.
2) Lift-up the vehicle.
3) Using TORX® BIT T70, remove the drain plug. Drain transmission gear oil completely.

CAUTION:
Immediately after the vehicle running, the transmission gear oil is very hot. Be careful not to burn yourself.

4) Using TORX® BIT T70, tighten the transmission gear oil drain plug after draining transmission gear oil.

NOTE:
Use a new gasket.

Tightening torque:
70 N·m (7.1 kgf-m, 51.6 ft-lb)



(A) Drain plug
(B) Gasket

5) Lower the vehicle.
6) Pour gear oil through the gauge hole.

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

Gear oil capacity:
Single-range model
3.5 ℓ (3.7 US qt, 3.1 Imp qt)
Dual-range model
4.0 ℓ (4.2 US qt, 3.5 Imp qt)

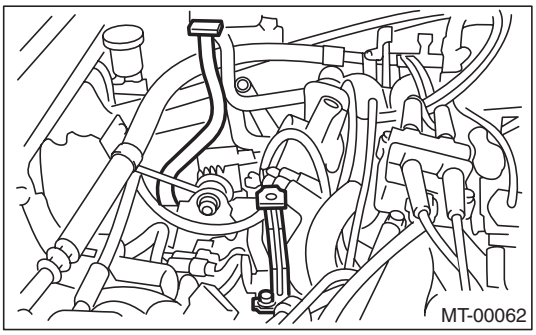
7) Check the level of transmission gear oil.

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

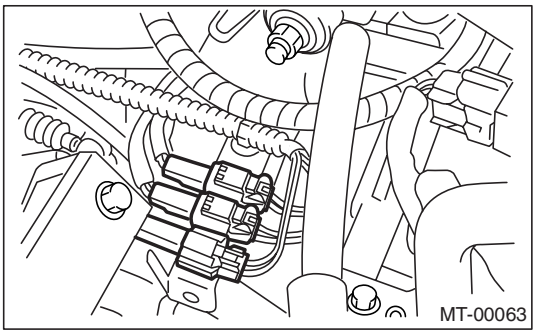
3. Manual Transmission Assembly

A: REMOVAL

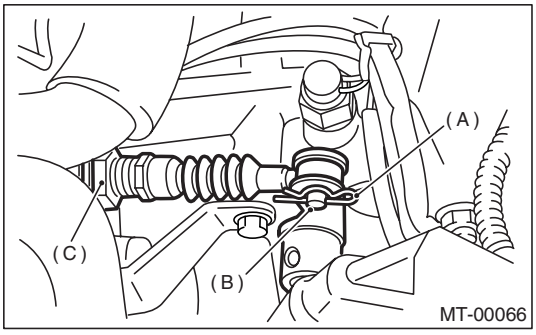
1) Open the front hood fully, and support with stay.
2) Disconnect the ground cable from battery.
3) Drain transmission gear oil completely.
4) Remove the air intake chamber and air cleaner case. <Ref. to IN(H4SO 2.0)-7, REMOVAL, Air Intake Chamber.> <Ref. to IN(H4SO 2.0)-5, REMOVAL, Air Cleaner Case.>
5) Remove the air intake chamber stay.



6) Disconnect the following connectors:
   (1) Neutral position switch connector
   (2) Back-up light switch connector
   (3) High-low switch connector (Dual-range model)

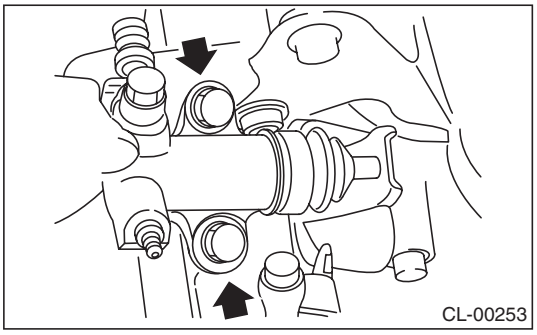


7) Remove the snap pin and clevis pin from drive select cable. (Dual-range model)
8) Remove the drive select cable on transmission side. (Dual-range model)

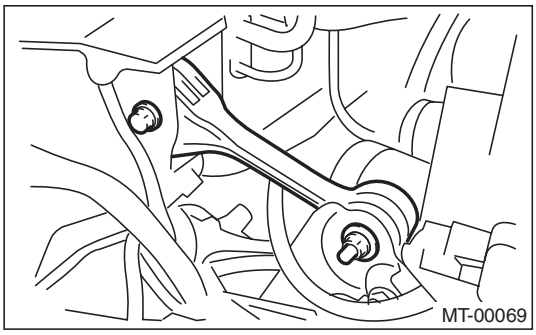


(A) Snap pin
(B) Clevis pin
(C) Drive select cable

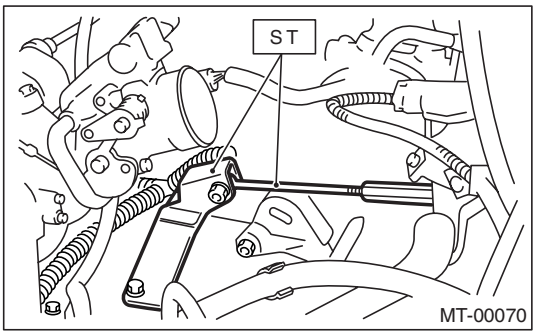
9) Remove the starter. <Ref. to SC(H4SO 2.0)-6, REMOVAL, Starter.>
10) Remove the operating cylinder from transmission.



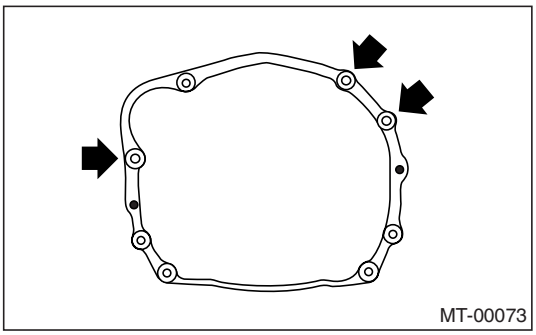
11) Remove the pitching stopper.



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



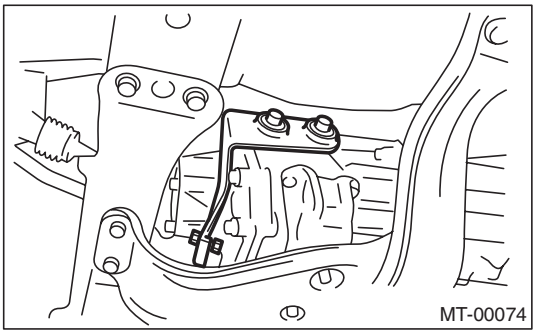
13) Remove the bolts which hold upper side of transmission to engine.



14) Lift-up the vehicle.
15) Remove the front and center exhaust pipes. <Ref. to EX(H4SO 2.0)-6, REMOVAL, Front Exhaust Pipe.>
16) Remove the rear exhaust pipe and muffler. <Ref. to EX(H4SO 2.0)-10, REMOVAL, Rear Exhaust Pipe.> <Ref. to EX(H4SO 2.0)-12, REMOVAL, Muffler.>

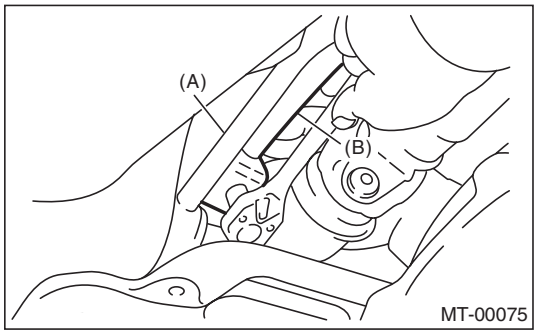
CAUTION:
When removing the exhaust pipes, be careful each exhaust pipe does not drop out.

17) Remove the heat shield cover. (if equipped)
18) Remove the hanger bracket from the right side of transmission.



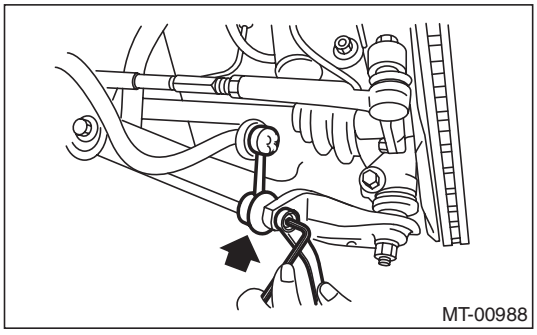
19) Remove the propeller shaft. <Ref. to DS-10, REMOVAL, Propeller Shaft.>

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

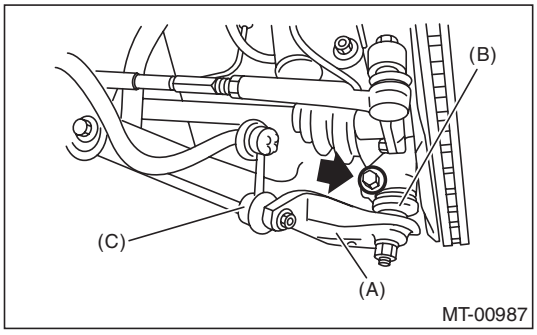


(A) Stay
(B) Rod

21) Remove the stabilizer link from front arm.

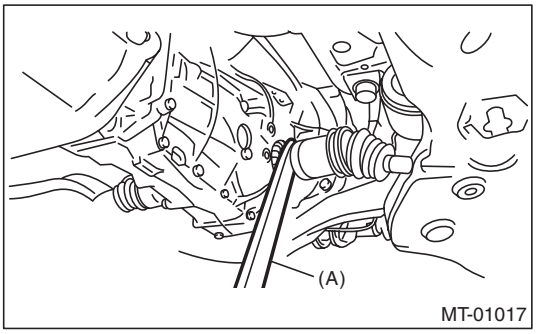


22) Remove the ball joint of front arm from housing.



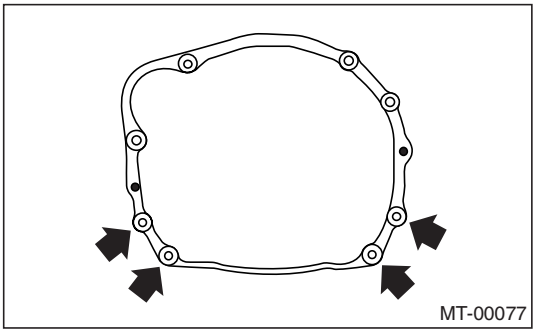
(A) Front arm
(B) Ball joint
(C) Stabilizer link

23) Using the pinch bar, remove the left and right front drive shaft from transmission.



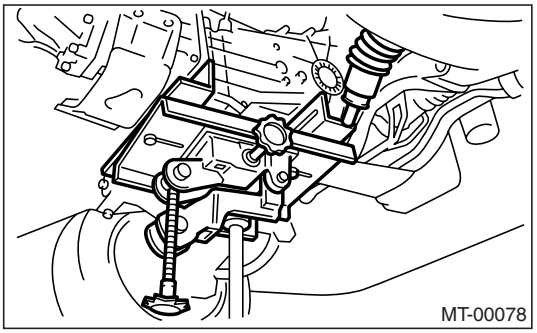
(A) Pinch bar

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

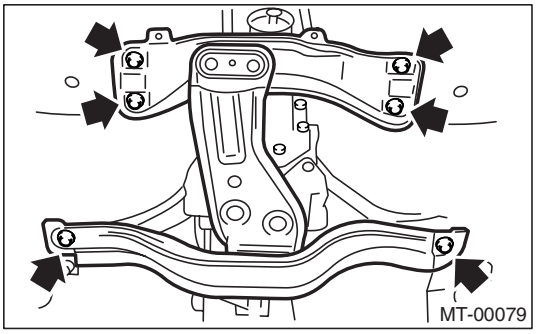


25) Place the transmission jack under transmission.

CAUTION:
Always support transmission case with a transmission jack.



26) Remove the transmission rear crossmember from vehicle.



27) Remove the transmission.

NOTE:
Move the transmission jack toward rear until main shaft is withdrawn from clutch disc.

28) Separate the transmission assembly from rear cushion rubber.

B: INSTALLATION

1) Install the rear cushion rubber to transmission assembly.

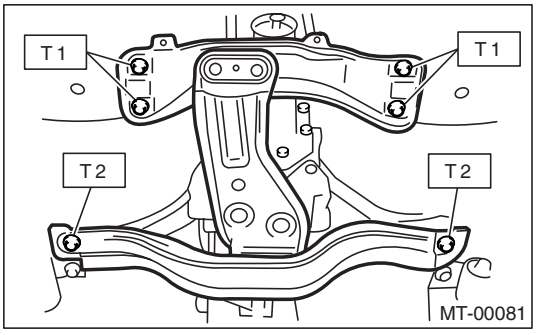
Tightening torque:
35 N·m (3.6 kgf-m, 26 ft-lb)

2) 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 housing cover.

3) Install the transmission rear crossmember.

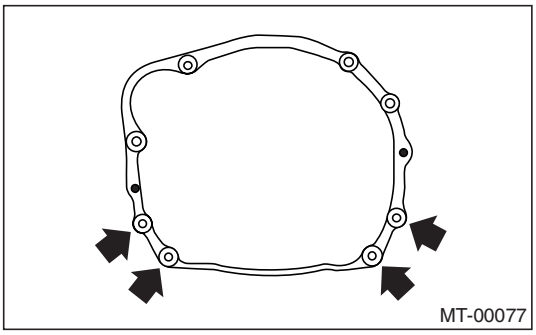
Tightening torque:
T1: 70 N·m (7.1 kgf-m, 51.6 ft-lb)
T2: 140 N·m (14.3 kgf-m, 103 ft-lb)



4) Take out the transmission jack.

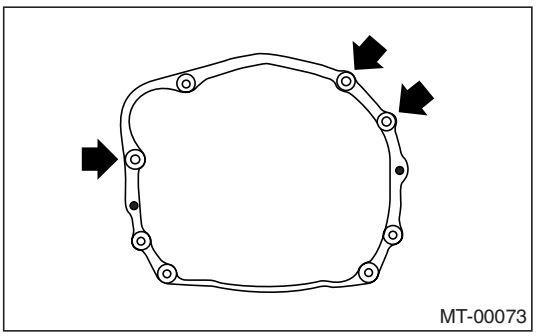
5) Tighten the nuts which hold lower side of transmission to engine.

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

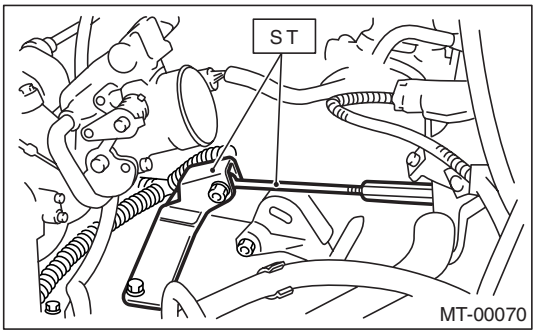


6) Connect the transmission to engine.
(1) Install the starter.
<Ref. to SC(H4SO 2.0)-6, INSTALLATION, Starter.>
(2) Tighten the bolts that hold upper side of transmission to engine.

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

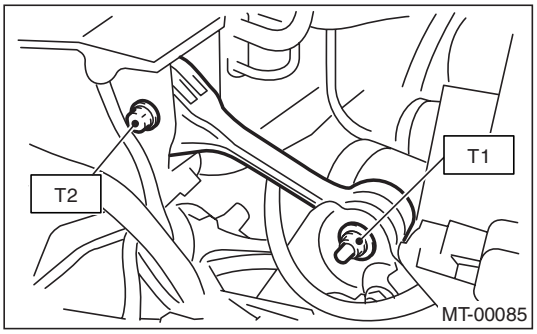


7) Remove the ST.



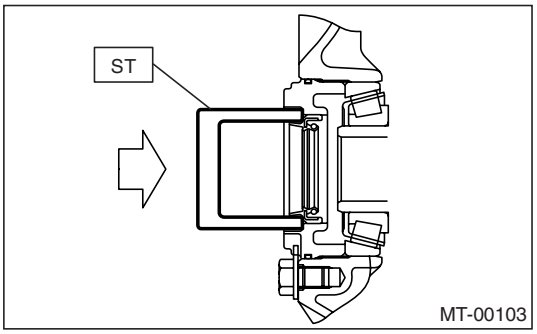
8) Install the pitching stopper.

Tightening torque:
T1: 50 N·m (5.1 kgf-m, 36.9 ft-lb)
T2: 58 N·m (5.9 kgf-m, 42.8 ft-lb)

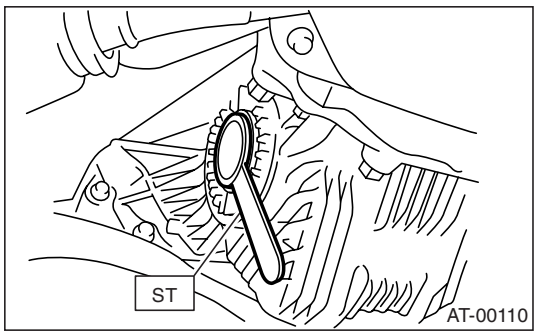


9) Lift-up the vehicle.
10) Install the front drive shaft into transmission.
11) Replace the differential side retainer oil seal. <Ref. to 5MT-39, REPLACEMENT, Differential Side Retainer Oil Seal.>
ST 186755AA000 DIFFERENTIAL SIDE OIL SEAL INSTALLER

NOTE:
Be sure to replace the differential side retainer oil seal after the procedure of removing the front drive shaft.

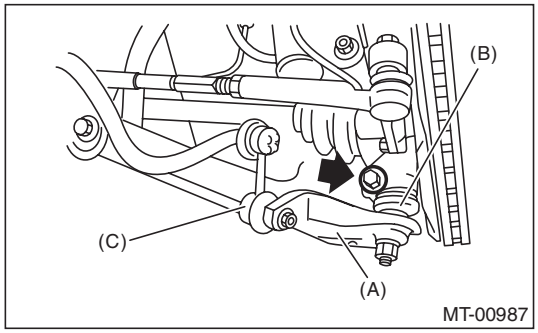


12) Install the front drive shaft into transmission.
ST 28399SA010 FRONT DRIVE SHAFT OIL SEAL PROTECTOR



13) Install the ball joint of front arm.

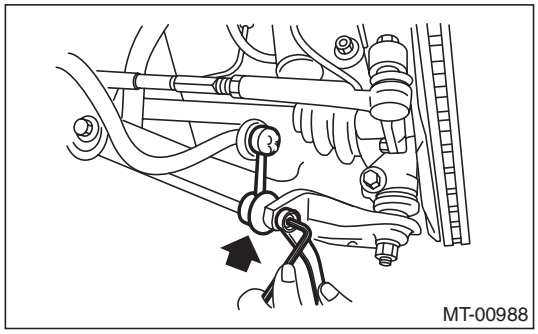
Tightening torque:
50 N·m (5.1 kgf-m, 36.9 ft-lb)



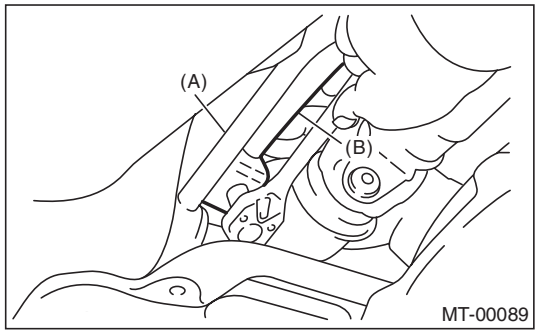
(A) Front arm
(B) Ball joint
(C) Stabilizer link

14) Install the stabilizer link into front arm.

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



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



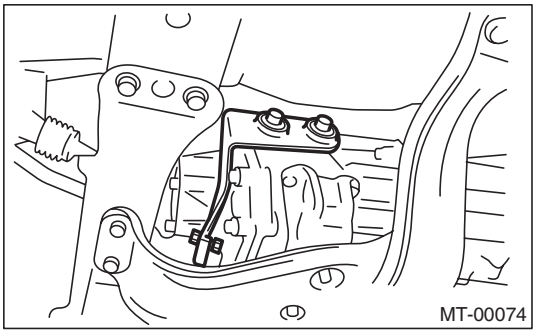
(A) Stay
(B) Rod

(2) Install the stay onto transmission.

16) Install the propeller shaft. <Ref. to DS-11, INSTALLATION, Propeller Shaft.>

17) Install the heat shield cover. (if equipped)

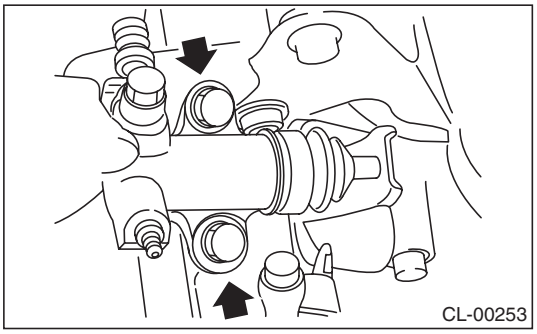
18) Install the hanger bracket on the right side of transmission.



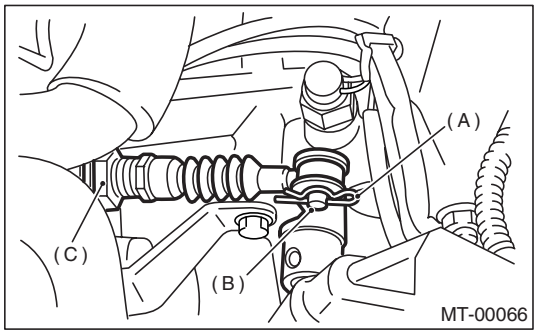
19) Install the front, center and rear exhaust pipe, and muffler. <Ref. to EX(H4SO 2.0)-7, INSTALLATION, Front Exhaust Pipe.> <Ref. to EX(H4SO 2.0)-10, INSTALLATION, Rear Exhaust Pipe.> <Ref. to EX(H4SO 2.0)-12, INSTALLATION, Muffler.>

20) Install the operating cylinder.

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



21) Install the drive select cable on transmission side. (Dual-range model)



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

22) Connect the following connectors:
(1) Transmission ground cable

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

(2) Neutral position switch connector
(3) Back-up light switch connector
(4) High-low switch connector (Dual-range model)

23) Fill transmission gear oil through the transmission level gauge hole.
24) Install the air intake chamber stay.

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

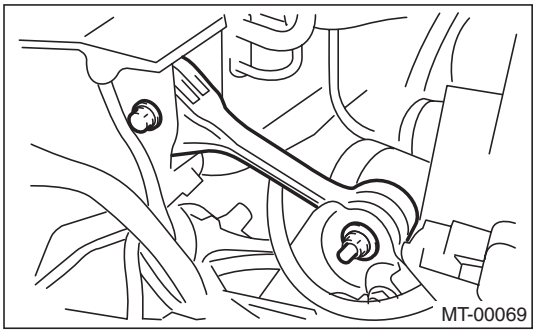
25) Install the air intake chamber and air cleaner case. <Ref. to IN(H4SO 2.0)-5, INSTALLATION, Air Cleaner Case.> <Ref. to IN(H4SO 2.0)-7, INSTALLATION, Air Intake Chamber.>
26) Connect the battery ground cable to battery.
27) Take off the vehicle from lift arms.

4. Transmission Mounting System

A: REMOVAL

1. PITCHING STOPPER

1) Disconnect the ground cable from battery.
2) Remove the air intake chamber. <Ref. to IN(H4SO 2.0)-7, REMOVAL, Air Intake Chamber.>
3) Remove the air cleaner case. <Ref. to IN(H4SO 2.0)-5, REMOVAL, Air Cleaner Case.>
4) Remove the pitching stopper.

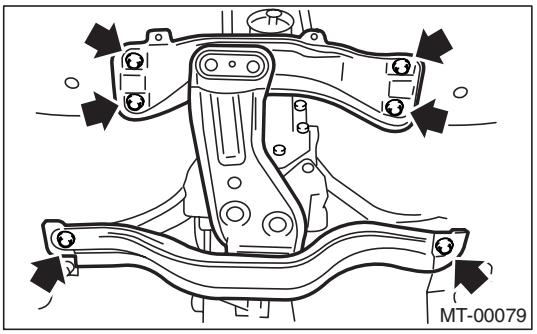


2. CROSSMEMBER AND CUSHION RUBBER

1) Disconnect the ground cable from battery.
2) Lift-up the vehicle.
3) Remove the front, center and rear exhaust pipe, and muffler. <Ref. to EX(H4SO 2.0)-6, REMOVAL, Front Exhaust Pipe.> <Ref. to EX(H4SO 2.0)-10, REMOVAL, Rear Exhaust Pipe.> <Ref. to EX(H4SO 2.0)-12, REMOVAL, Muffler.>
4) Remove the heat shield cover. (If equipped)
5) Set the transmission jack under transmission body.

CAUTION:
Always support the transmission case with a transmission jack.

6) Remove the rear crossmember.



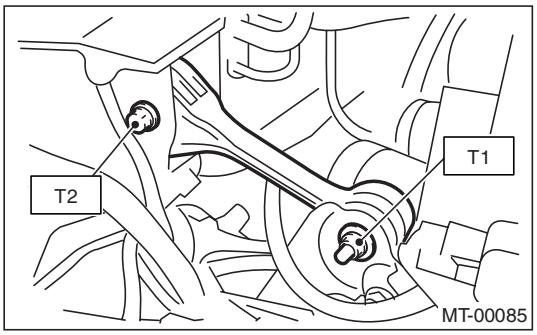
7) Remove the rear cushion rubber.

B: INSTALLATION

1. PITCHING STOPPER

1) Install the pitching stopper.

Tightening torque:
T1: 50 N·m (5.1 kgf-m, 36.9 ft-lb)
T2: 58 N·m (5.9 kgf-m, 42.8 ft-lb)



2) Install the air intake chamber and cleaner case. <Ref. to IN(H4SO 2.0)-5, INSTALLATION, Air Cleaner Case.> <Ref. to IN(H4SO 2.0)-7, INSTALLATION, Air Intake Chamber.>
3) Connect the battery ground cable to battery.

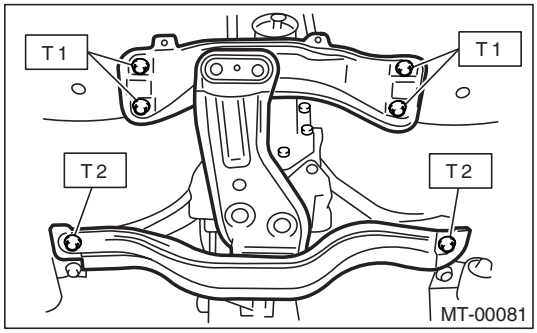
2. CROSSMEMBER AND CUSHION RUBBER

1) Install the rear cushion rubber.

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

2) Install the rear crossmember.

Tightening torque:
T1: 70 N·m (7.1 kgf-m, 51.6 ft-lb)
T2: 140 N·m (14.3 kgf-m, 103 ft-lb)



3) Remove the transmission jack.
4) Install the heat shield cover. (If equipped)
5) Install the front, center and rear exhaust pipe, and muffler. <Ref. to EX(H4SO 2.0)-7, INSTALLATION, Front Exhaust Pipe.> <Ref. to EX(H4SO 2.0)-10, INSTALLATION, Rear Exhaust Pipe.> <Ref. to EX(H4SO 2.0)-12, INSTALLATION, Muffler.>
6) Lower the vehicle.
7) Connect the battery ground cable to battery.

C: INSPECTION

Perform the following inspection procedures and repair or replace defective parts.

1. PITCHING STOPPER

Check pitching stopper for bends or damage. Check that the rubber is not stiff, cracked, or otherwise damaged.

2. CROSSMEMBER AND CUSHION RUBBER

Check crossmember for bends or damage. Check that the cushion rubber is not stiff, cracked, or otherwise damaged.

5. Oil Seal

A: INSPECTION

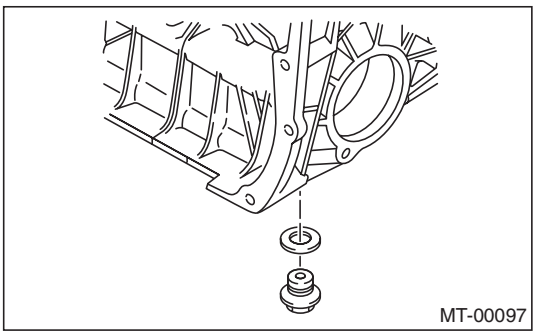
Check leakage of gear oil from the oil seal part. If there is oil leakage, replace with a new oil seal.

B: REPLACEMENT

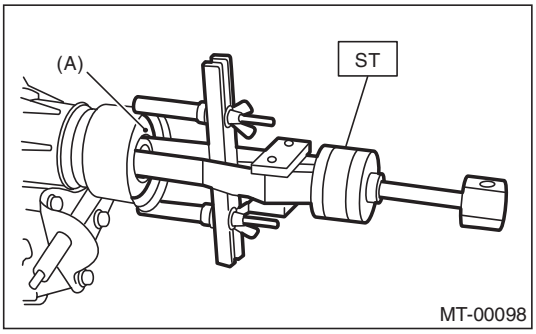
1) Clean the transmission exterior.
2) Drain gear oil completely.

NOTE:
Tighten the drain plug using new gasket after draining gear oil.

Tightening torque:
70 N·m (7.1 kgf-m, 51.6 ft-lb)

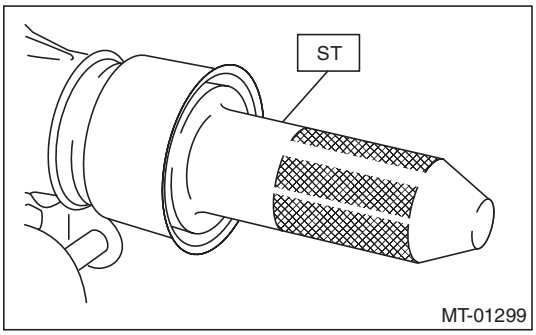


3) Remove the rear exhaust pipe and muffler. <Ref. to EX(H4SO 2.0)-10, REMOVAL, Rear Exhaust Pipe.> <Ref. to EX(H4SO 2.0)-12, REMOVAL, Muffler.>
4) Remove the heat shield cover. (If equipped)
5) Remove the propeller shaft. <Ref. to DS-10, REMOVAL, Propeller Shaft.>
6) Using the ST, remove the oil seal.
ST 398527700 PULLER ASSY



(A) Oil seal

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



8) Install the propeller shaft. <Ref. to DS-11, INSTALLATION, Propeller Shaft.>
9) Install the heat shield cover. (If equipped)
10) Install the rear exhaust pipe and muffler. <Ref. to EX(H4SO 2.0)-10, INSTALLATION, Rear Exhaust Pipe.> <Ref. to EX(H4SO 2.0)-12, INSTALLATION, Muffler.>
11) Pour gear oil and check the oil level. <Ref. to 5MT-29, REPLACEMENT, Transmission Gear Oil.>

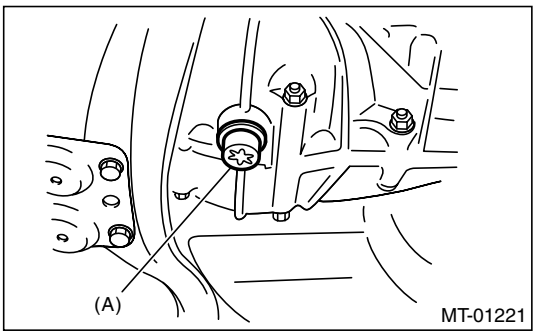
6. Differential Side Retainer Oil Seal

A: INSPECTION

Check leakage of gear oil from the differential side retainer oil seal part. If there is oil leakage, replace with a new oil seal.

B: REPLACEMENT

1) Lift-up the vehicle.
2) Using TORX® BIT T70, remove the drain plug. Drain gear oil completely.

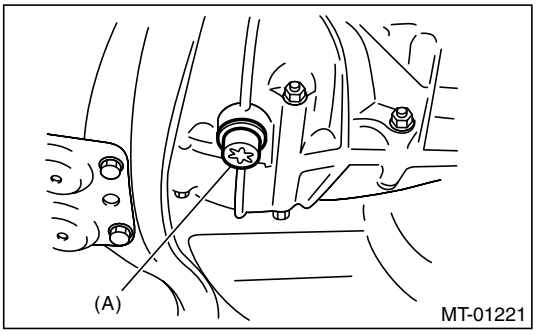


(A) Drain plug

3) Using TORX® BIT T70, tighten the drain plug.

NOTE:
Use a new gasket.

Tightening torque:
70 N·m (7.1 kgf-m, 51.6 ft-lb)



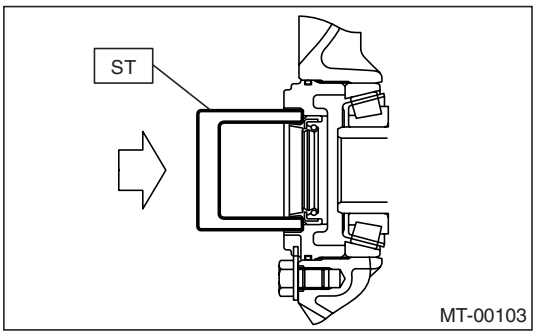
(A) Drain plug

4) Separate the front drive shaft from transmission. <Ref. to DS-22, REMOVAL, Front Drive Shaft.>
5) Remove the differential side retainer oil seal.

NOTE:
• Be sure to replace the differential side retainer oil seal after the procedure of removing the front drive shaft from transmission.
• Using the ST 398527700 puller assembly, remove the oil seal. When prying to remove the part using flat tip screwdriver, be careful not to scratch the differential side retainer.

6) Using the ST, install the differential side retainer by slightly tapping with a plastic hammer.
ST 18675AA000 DIFFERENTIAL SIDE OIL SEAL INSTALLER

NOTE:
Apply oil to the oil seal lips.



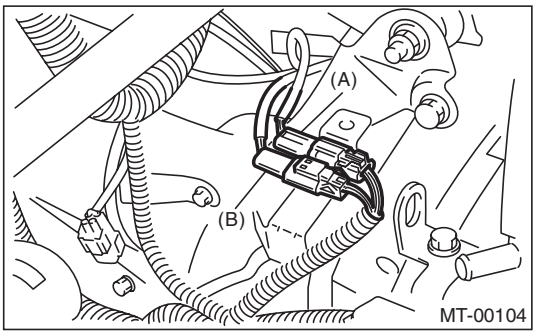
7) Install the front drive shaft. <Ref. to DS-22, INSTALLATION, Front Drive Shaft.>
ST 28399SA010 FRONT DRIVE SHAFT OIL SEAL PROTECTOR
8) Lower the vehicle.
9) Pour gear oil through the gauge hole. <Ref. to 5MT-29, REPLACEMENT, Transmission Gear Oil.>

7. Switches and Harness

A: REMOVAL

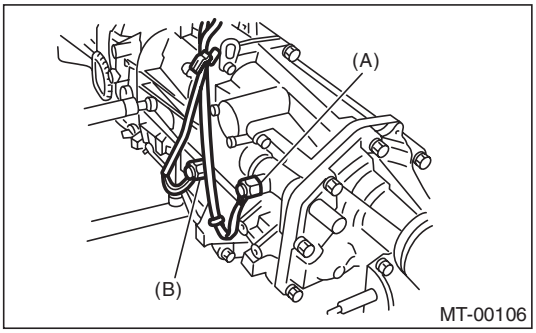
1. BACK-UP LIGHT SWITCH AND NEUTRAL POSITION SWITCH

1) Disconnect the ground cable from battery.
2) Remove the air intake chamber and cleaner case. <Ref. to IN(H4SO 2.0)-5, REMOVAL, Air Cleaner Case.> <Ref. to IN(H4SO 2.0)-7, REMOVAL, Air Intake Chamber.>
3) Disconnect the connectors of back-up light switch and neutral position switch.



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

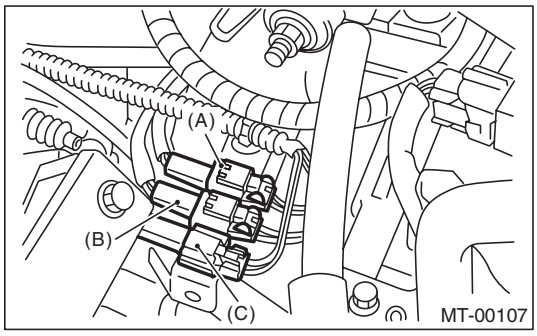
4) Lift-up the vehicle.
5) Remove the back-up light switch and neutral position switch with harness.



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

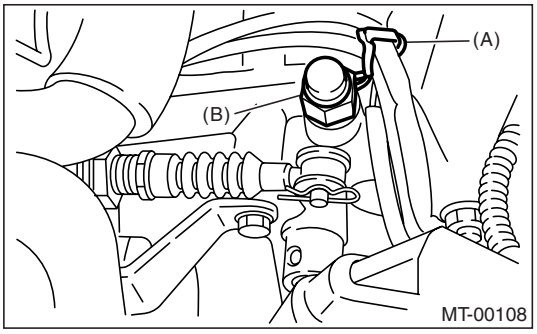
2. HIGH-LOW SWITCH (DUAL-RANGE MODEL)

1) Disconnect the ground cable from battery.
2) Remove the air intake chamber and cleaner case. <Ref. to IN(H4SO 2.0)-5, REMOVAL, Air Cleaner Case.> <Ref. to IN(H4SO 2.0)-7, REMOVAL, Air Intake Chamber.>
3) Disconnect the connector of high-low switch.



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

4) Remove the high-low switch cable from clamp.
5) Remove the high-low switch.



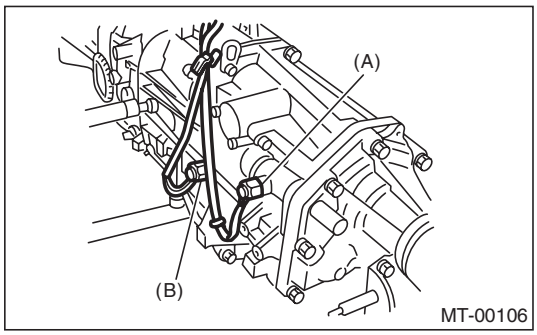
(A) Clamp
(B) High-low switch

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:
25 N·m (2.5 kgf-m, 18.4 ft-lb)



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

2) Connect the connectors of back-up light switch and neutral position switch.
3) Install the air intake chamber and cleaner case. <Ref. to IN(H4SO 2.0)-5, INSTALLATION, Air Cleaner Case.> <Ref. to IN(H4SO 2.0)-7, INSTALLATION, Air Intake Chamber.>
4) Connect the battery ground cable to battery.

2. HIGH-LOW SWITCH (DUAL-RANGE MODEL)

1) Install the high-low switch.

Tightening torque:
25 N·m (2.5 kgf-m, 18.4 ft-lb)

2) Install the high-low switch cable to clamp.
3) Connect the connector of high-low switch.
4) Install the air intake chamber and cleaner case. <Ref. to IN(H4SO 2.0)-5, INSTALLATION, Air Cleaner Case.> <Ref. to IN(H4SO 2.0)-7, INSTALLATION, Air Intake Chamber.>
5) Connect the battery ground cable to battery.

C: INSPECTION

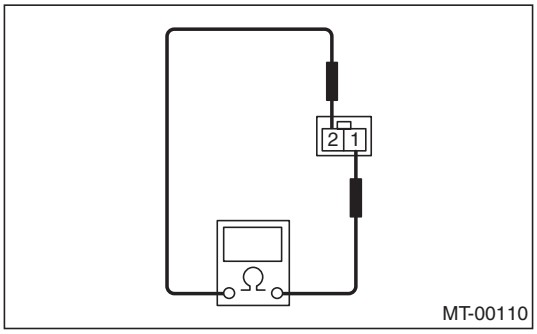
1. BACK-UP LIGHT SWITCH

Inspect the back-up light switch. <Ref. to LI-7, INSPECTION, Back-up Light System.>

2. NEUTRAL POSITION SWITCH

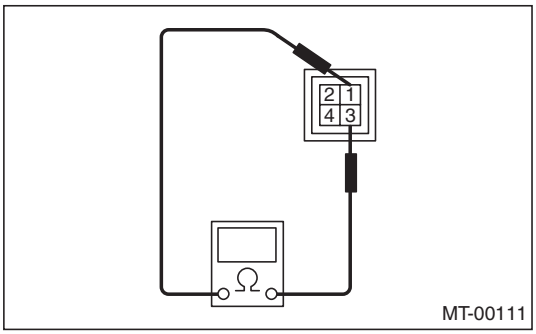
1) Turn the ignition switch to OFF.
2) Disconnect the connector of neutral position switch.
3) Measure the resistance between neutral position switch terminals.

- Non-turbo model



Gear shift position	Terminal No.	Specified resistance
Neutral position	1 and 2	Less than 1 Ω
Other positions		More than 1 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 the faulty parts.

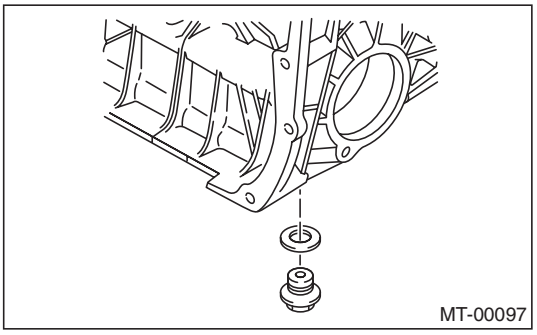
8. Preparation for Overhaul

A: PROCEDURE

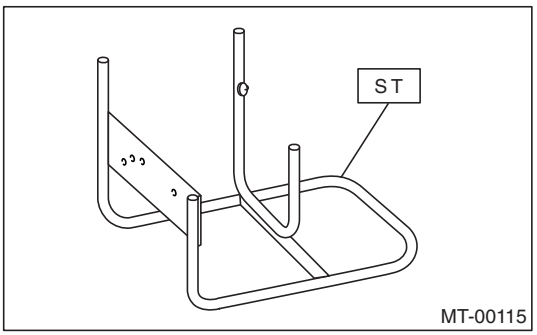
1) Clean oil, grease, dirt and dust from transmission.
2) Using TORX® BIT T70, remove the drain plug to drain oil. Tighten the engine oil drain plug after draining.

NOTE:
Use a new gasket.

Tightening torque:
70 N·m (7.1 kgf-m, 51.6 ft-lb)



3) Attach the transmission to ST.
ST 499937100 TRANSMISSION STAND

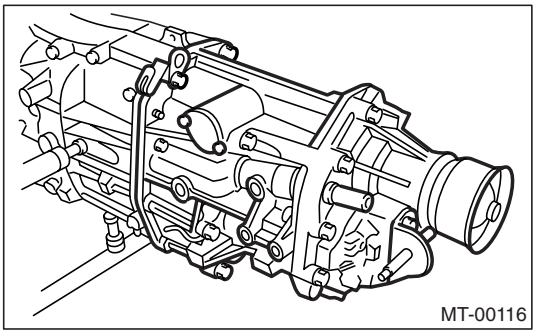


4) Rotating parts should be coated with oil prior to assembly.
5) All disassembled parts, if to be reused, should be reinstalled in the original positions and directions.
6) Always use new ones for gaskets, lock washers and lock nut.
7) Liquid gasket should be used where specified to prevent leakage.

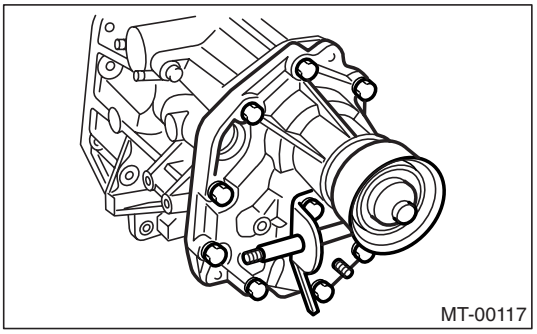
9. Transfer Case and Extension Case Assembly

A: REMOVAL

1) Remove the manual transmission assembly from vehicle. <Ref. to 5MT-30, REMOVAL, Manual Transmission Assembly.>
2) Remove the back-up light switch and neutral position switch. <Ref. to 5MT-40, REMOVAL, Switches and Harness.>
3) Remove the transfer case with extension case assembly.

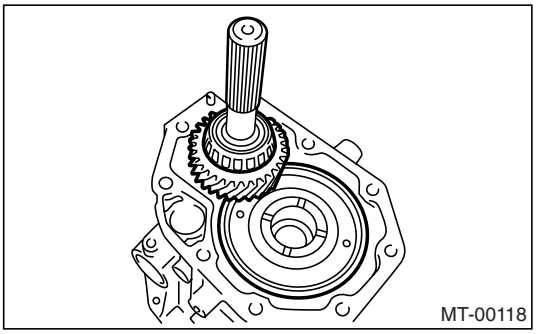

MT-00116

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

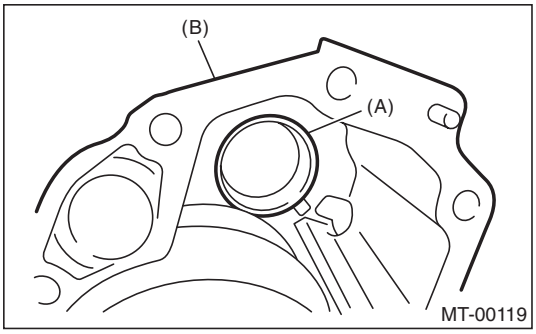

MT-00117

B: INSTALLATION

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


MT-00118

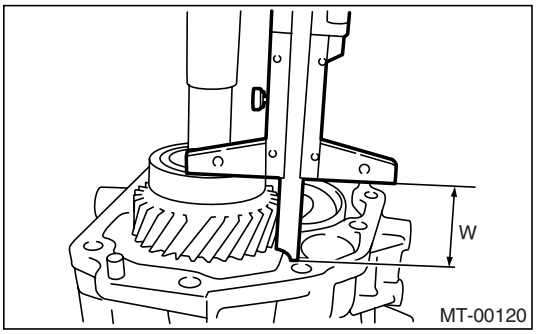
2) Remove the bearing outer race from extension case.



MT-00119

(A) Bearing outer race
(B) Extension case

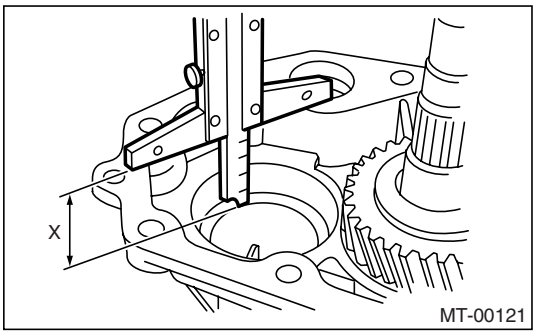
3) While pressing the bearing outer race horizontally, turn the driven shaft ten rotations.
4) Measure the height “W” between transfer case and taper roller bearing on the transfer driven gear.



MT-00120

5) Measure the depth “X” on bearing insertion part of extension case.

NOTE:
Measure with bearing outer race and thrust washer removed.



MT-00121

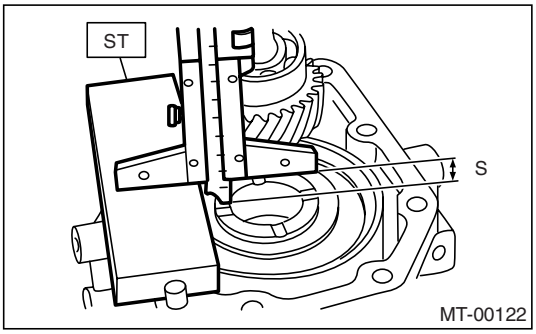
6) Calculate the thickness of thrust washer “t” using following equation.
t = X − W + 0.2 to 0.3 mm (0.008 to 0.012 in)
7) Select the washer of nearest value in the following table:

Standard protrusion amount of taper roller bearing outer race:
0.2 — 0.3 mm (0.008 — 0.012 in)

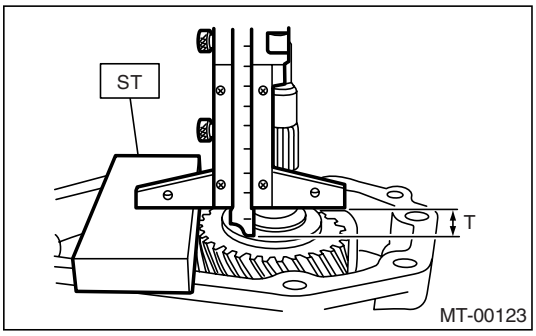
NOTE:
Be sure that the protrusion amount is within standard.

Thrust washer (50 × 61 × t)	
Part Number	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 outer race into extension case.
10) Measure the depth “S” between transfer case and center differential.
ST 398643600 GAUGE



11) Measure the height “T” between extension case and transfer drive gear.
ST 398643600 GAUGE



12) Calculate the thrust washer “U” using following equation.
U = 30 mm (1.18 in) − S − T − 0.15 — 0.35 mm (0.0059 — 0.0138 in)

U mm (in)	Thickness of transfer drive gear thrust washer
T mm (in)	Height from end of ST to transfer drive gear
S mm (in)	Depth from end of transmission case to the end of ST
0.15 — 0.35 mm (0.0059 — 0.0138 in)	Standard clearance between thrust washer and transfer drive gear.
30 mm (1.18 in)	Thickness of ST

13) Select a suitable washer in the following table:

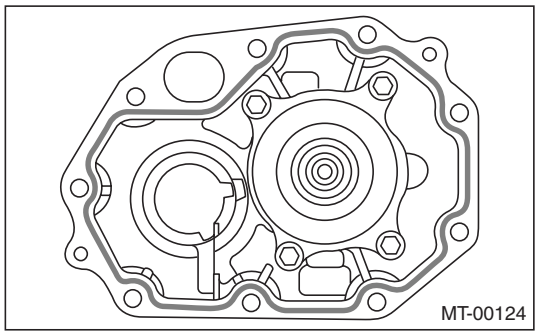
Standard clearance:
0.15 — 0.35 mm (0.0059 — 0.0138 in)

Thrust washer	
Part Number	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.

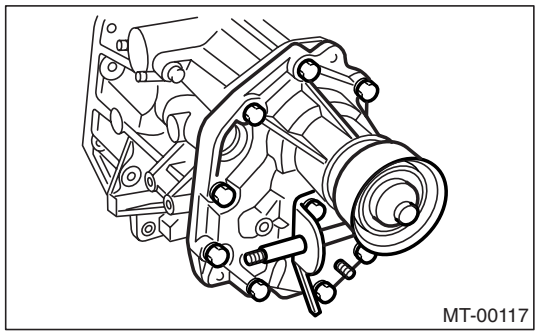
15) Apply proper amount of liquid gasket to the transfer case mating surface.

Liquid gasket
THREE BOND 1215 (Part No. 004403007) or equivalent

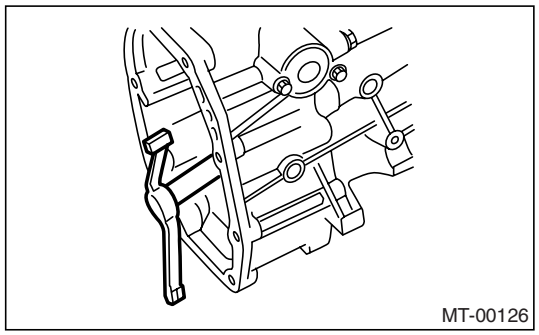

MT-00124

16) Install the extension assembly into transfer case.

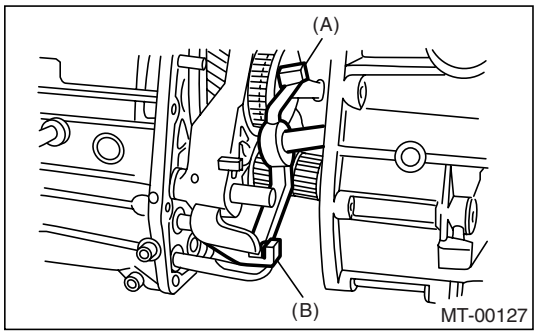
Tightening torque:
40 N·m (4.1 kgf-m, 29.7 ft-lb)


MT-00117

17) Install the shifter arm to transfer case.


MT-00126

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

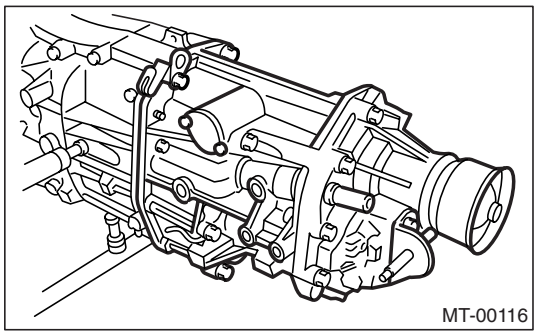


MT-00127

(A) Shifter arm
(B) 3rd-4th fork rod

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

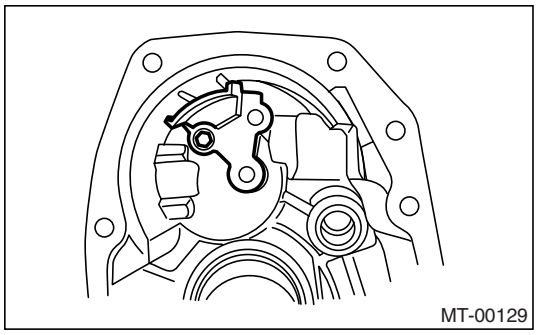
Tightening torque:
25 N·m (2.5 kgf-m, 18.4 ft-lb)


MT-00116

C: DISASSEMBLY

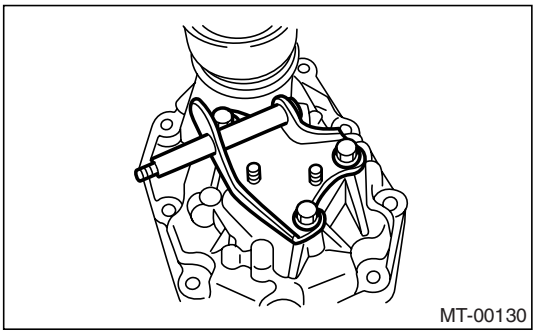
1. TRANSFER CASE

1) Remove the reverse check assembly. <Ref. to 5MT-52, REMOVAL, Reverse Check Sleeve.>
2) Remove the oil guide.


MT-00129

2. EXTENSION CASE

1) Remove the transfer drive gear assembly. <Ref. to 5MT-47, REMOVAL, Transfer Drive Gear.>
2) Remove the shift bracket.



3) Remove the oil seal from extension case. <Ref. to 5MT-38, Oil Seal.>

D: ASSEMBLY

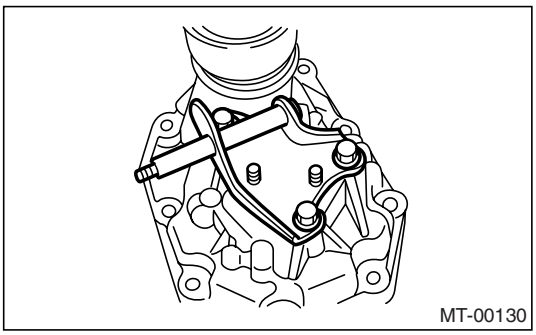
1. EXTENSION CASE

1) Using the ST, install the oil seal to extension case. <Ref. to 5MT-38, Oil Seal.>

NOTE:
Use a new oil seal.

2) Install the shift bracket to extension case.

Tightening torque:
25 N·m (2.5 kgf-m, 18.4 ft-lb)

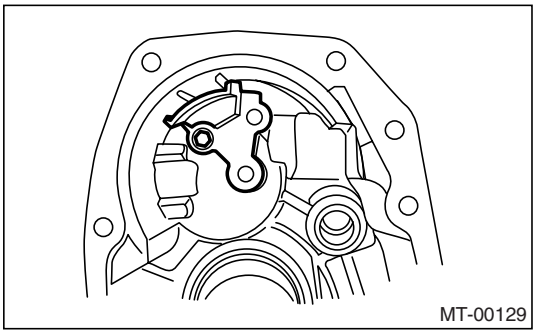


3) Install the transfer drive gear to extension case. <Ref. to 5MT-47, INSTALLATION, Transfer Drive Gear.>

2. TRANSFER CASE

1) Install the oil guide to transfer case.

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

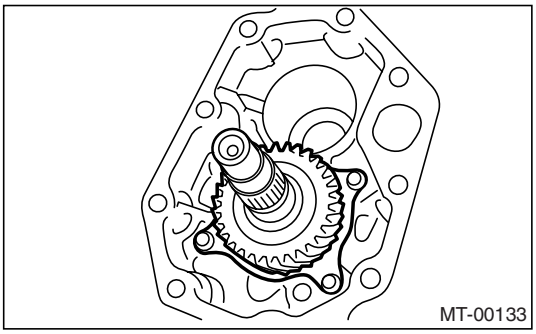


2) Install the reverse check sleeve assembly to transfer case. <Ref. to 5MT-52, INSTALLATION, Reverse Check Sleeve.>

10.Transfer Drive Gear

A: REMOVAL

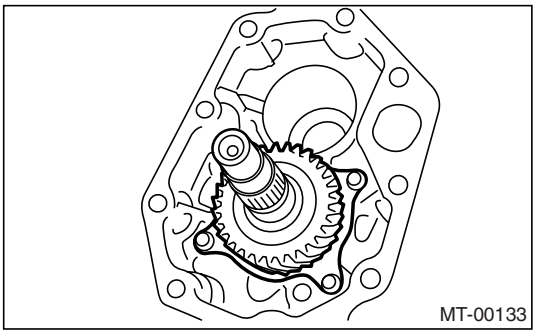
1) Remove the manual transmission assembly from vehicle. <Ref. to 5MT-30, REMOVAL, Manual Transmission Assembly.>
2) Remove the back-up light switch and neutral position switch. <Ref. to 5MT-40, REMOVAL, Switches and Harness.>
3) Remove the transfer case with extension case assembly. <Ref. to 5MT-43, REMOVAL, Transfer Case and Extension Case Assembly.>
4) Remove the extension case assembly.
5) Remove the transfer driven gear.
6) Remove the transfer drive gear.



B: INSTALLATION

1) Install the transfer drive gear.

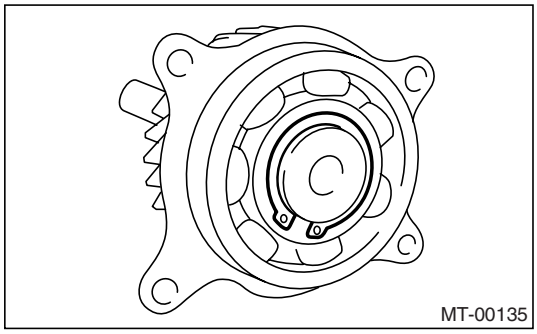
Tightening torque:
26 N·m (2.7 kgf-m, 20 ft-lb)



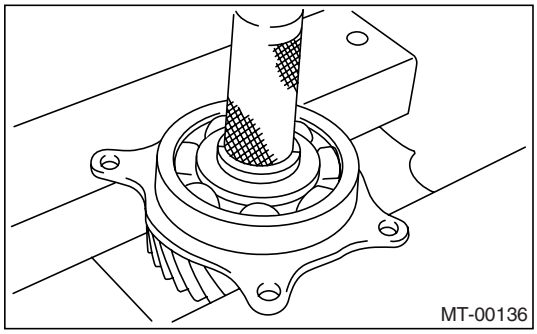
2) Install the transfer driven gear.
3) Install the extension case assembly.
4) Install the transfer case and extension case assembly. <Ref. to 5MT-43, INSTALLATION, Transfer Case and Extension Case Assembly.>
5) Install the back-up light switch and neutral position switch. <Ref. to 5MT-40, INSTALLATION, Switches and Harness.>
6) Install the manual transmission assembly into vehicle. <Ref. to 5MT-32, INSTALLATION, Manual Transmission Assembly.>

C: DISASSEMBLY

1) Remove the snap ring.



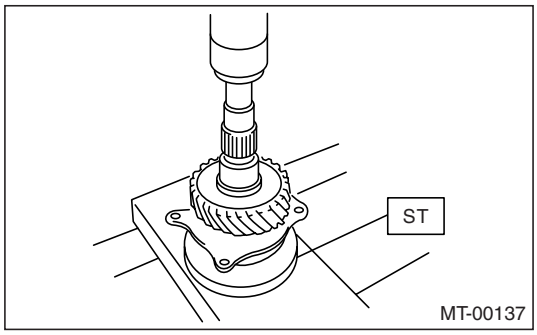
2) Remove the ball bearing.



D: ASSEMBLY

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

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



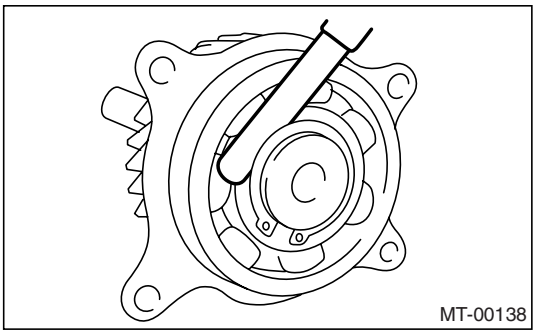
2) Install the snap ring on transfer drive shaft.
3) Inspect the clearance between snap ring and ball bearing. <Ref. to 5MT-48, INSPECTION, Transfer Drive Gear.>

E: INSPECTION

1) Bearings
Replace the bearing in following cases:
- In case of broken or rusty bearings
- In case of worn or damaged bearings
- When the bearings fail to turn smoothly or emit noise in rotation after gear oil lubrication.

2) Drive gear
Replace the drive gear when their tooth surface and shaft are excessively broken or damaged.
3) Measure the clearance between snap ring and inner race of ball bearing with a thickness gauge.

Clearance:
0.01 — 0.15 mm (0.0004 — 0.0059 in)



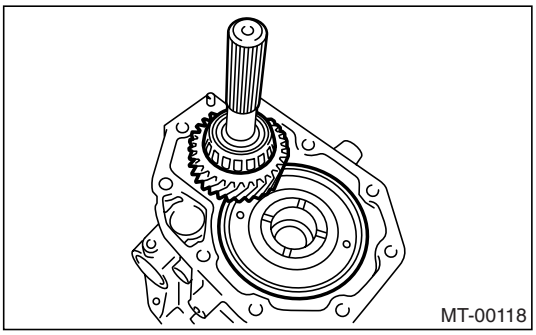
If the measurement is not within specification, select a suitable snap ring and replace it.

Snap ring (Outer-30)	
Part Number	Thickness mm (in)
805030041	1.53 (0.0602)
805030042	1.65 (0.0650)
805030043	1.77 (0.0697)

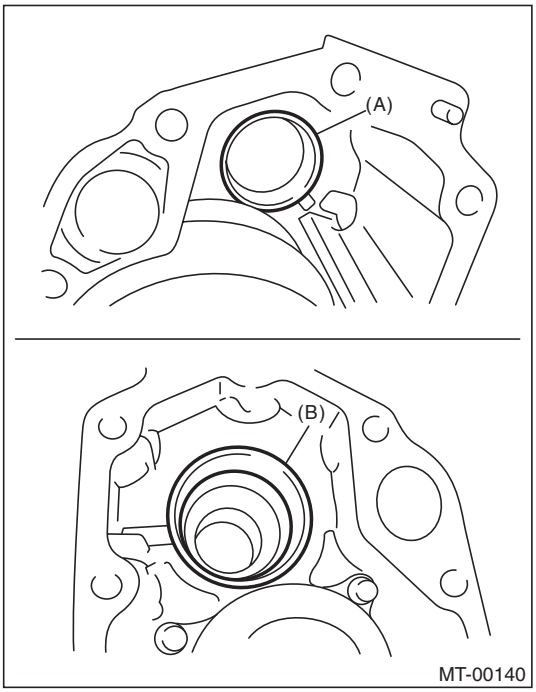
11.Transfer Driven Gear

A: REMOVAL

1) Remove the manual transmission assembly from vehicle. <Ref. to 5MT-30, REMOVAL, Manual Transmission Assembly.>
2) Remove the back-up light switch and neutral position switch. <Ref. to 5MT-40, REMOVAL, Switches and Harness.>
3) Remove the transfer case with extension case assembly. <Ref. to 5MT-43, REMOVAL, Transfer Case and Extension Case Assembly.>
4) Remove the extension case assembly.
5) Remove the transfer driven gear.



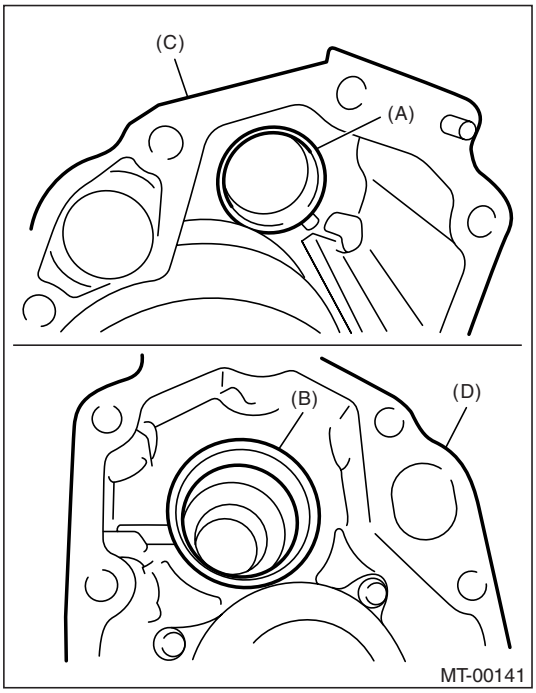
6) Remove the bearing outer races from the extension case and transfer case.



(A) Bearing outer race (Transfer case side)
(B) Bearing outer race (Extension case side)

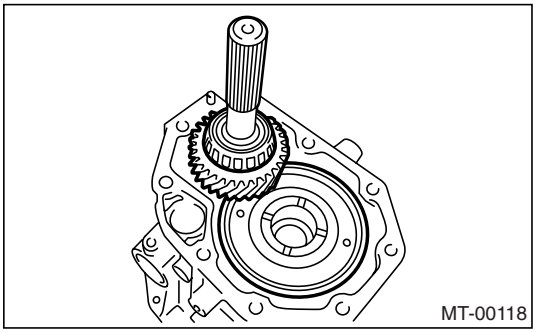
B: INSTALLATION

1) Install the bearing outer races to the extension case and transfer case.



(A) Bearing outer race
(B) Bearing outer race
(C) Transfer case
(D) Extension case

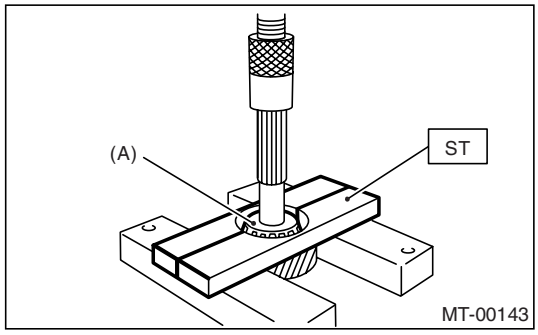
2) Install the transfer driven gear.



3) Install the transfer case and extension case assembly. <Ref. to 5MT-43, INSTALLATION, Transfer Case and Extension Case Assembly.>
4) Install the back-up light switch and neutral position switch. <Ref. to 5MT-40, INSTALLATION, Switches and Harness.>
5) Install the manual transmission assembly into vehicle. <Ref. to 5MT-32, INSTALLATION, Manual Transmission Assembly.>

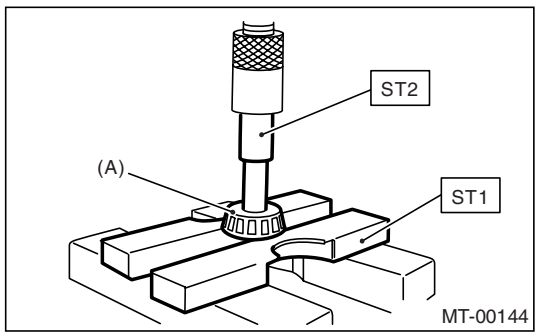
C: DISASSEMBLY

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

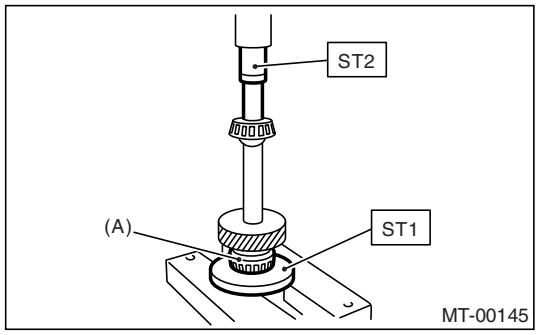


(A) Roller bearing

D: ASSEMBLY

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

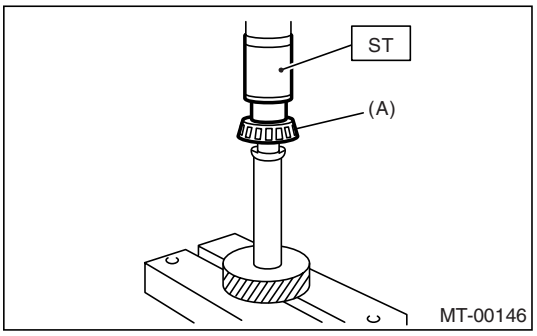
NOTE:
Do not apply pressure in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).



(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 bearing in following cases:
- In case of broken or rusty bearings
- In case of worn or damaged bearings
- When the bearings fail to turn smoothly or emit noise in rotation after gear oil lubrication.

2) Driven gear
Replace the driven gear when their tooth surface and shaft are excessively broken or damaged.

12.Center Differential

A: REMOVAL

1) Remove the manual transmission assembly from vehicle. <Ref. to 5MT-30, REMOVAL, Manual Transmission Assembly.>
2) Remove the transfer case with extension case assembly. <Ref. to 5MT-43, REMOVAL, Transfer Case and Extension Case Assembly.>
3) Remove the extension case assembly. <Ref. to 5MT-43, REMOVAL, Transfer Case and Extension Case Assembly.>
4) Remove the transfer driven gear. <Ref. to 5MT-49, 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-49, INSTALLATION, Transfer Driven Gear.>
3) Install the extension case assembly. <Ref. to 5MT-43, INSTALLATION, Transfer Case and Extension Case Assembly.>
4) Install the transfer case with extension case assembly. <Ref. to 5MT-43, INSTALLATION, Transfer Case and Extension Case Assembly.>
5) Install the back-up light switch and neutral position switch. <Ref. to 5MT-40, INSTALLATION, Switches and Harness.>
6) Install the manual transmission assembly into vehicle. <Ref. to 5MT-32, INSTALLATION, Manual Transmission Assembly.>

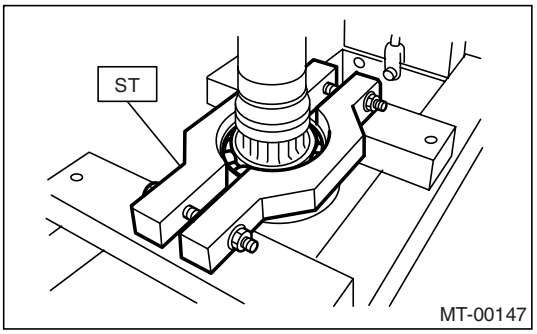
C: DISASSEMBLY

NOTE:
Center differential is a non-disassembled part which should not be disassembled.

Remove the ball bearing using ST.

NOTE:
Do not reuse the ball bearing.

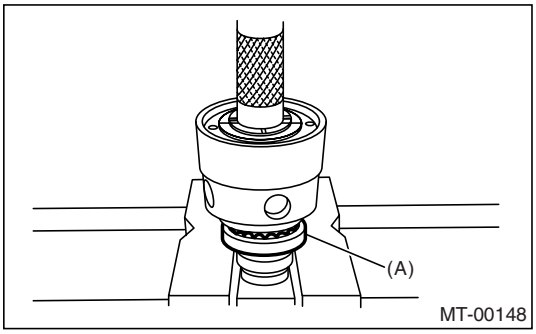
ST 498077300 CENTER DIFFERENTIAL BEARING REMOVER



D: ASSEMBLY

Install the ball bearing into 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

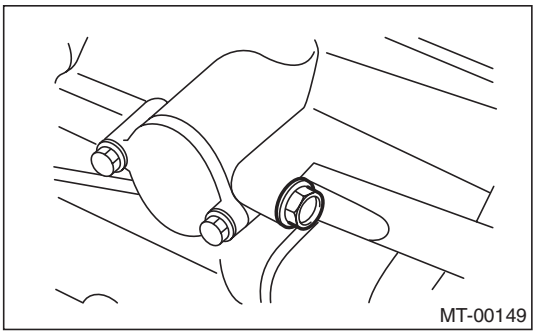
1) Bearings
Replace the bearing in following cases:
- In case of broken or rusty bearings
- In case of worn or damaged bearings
- When the bearings fail to turn smoothly or emit noise in rotation after gear oil lubrication.
- When bearings have other defects.

2) Center differential
Replace the center differential case assembly if worn or damaged.

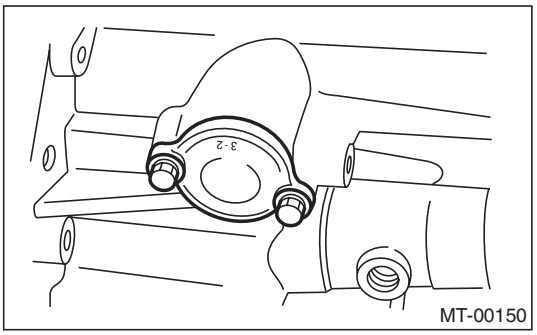
13.Reverse Check Sleeve

A: REMOVAL

1) Remove the manual transmission assembly from vehicle. <Ref. to 5MT-30, REMOVAL, Manual Transmission Assembly.>
2) Remove the transfer case with extension case assembly. <Ref. to 5MT-43, REMOVAL, Transfer Case and Extension Case Assembly.>
3) Remove the shifter arm.
4) Remove the plug, spring, washer and reverse check ball.


MT-00149

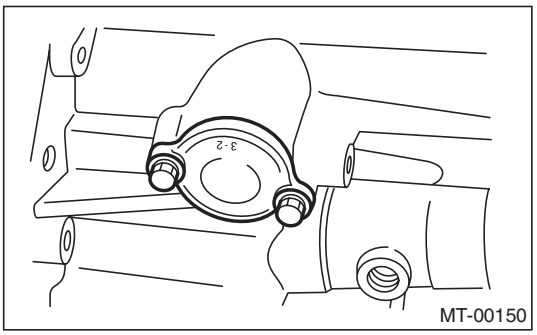
5) Remove the reverse check sleeve.


MT-00150

B: INSTALLATION

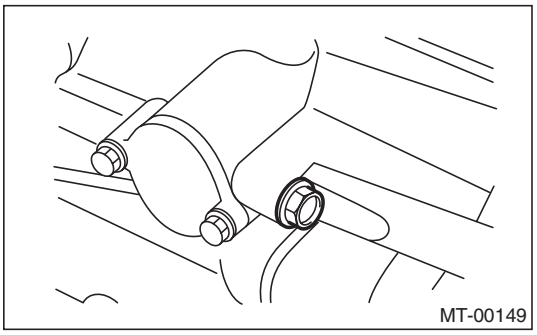
1) Install the reverse check sleeve.

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


MT-00150

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

Tightening torque:
10 N·m (1.0 kgf-m, 7.4 ft-lb)

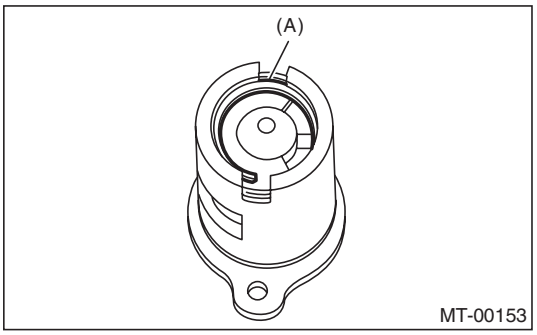

MT-00149

3) Install the shifter arm to transfer case assembly.
4) Install the transfer case with extension case assembly. <Ref. to 5MT-43, INSTALLATION, Transfer Case and Extension Case Assembly.>
5) Install the manual transmission assembly into vehicle. <Ref. to 5MT-32, INSTALLATION, Manual Transmission Assembly.>

C: DISASSEMBLY

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

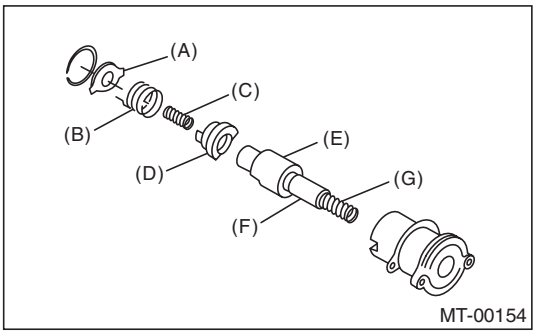
NOTE:
Replace the snap ring with a new one if it is deformed or reactive force is weakened.



MT-00153

(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)

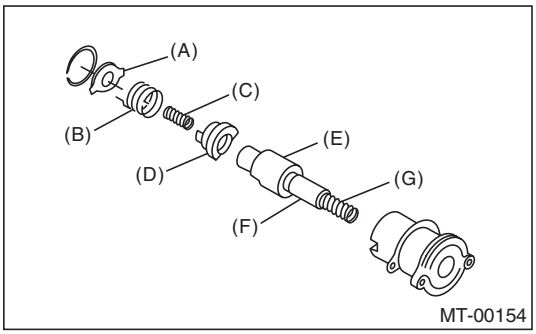
3) Remove the O-ring.

NOTE:
• Visually check the O-ring. Replace if defective.
• Be careful not to break 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, reverse check cam, return spring (5th-Rev.) and reverse check spring onto reverse check sleeve.

NOTE:
Be sure to position the bent section of reverse check spring in the groove in check cam.

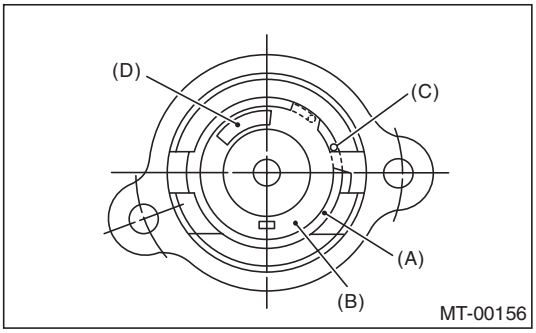


(A) Reverse check plate
(B) Reverse check spring
(C) Return spring (5th-Rev)
(D) Reverse check cam
(E) Reverse accent shaft
(F) Return spring cap
(G) Return spring (1st-2nd)

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 cam held in that position, install the reverse check plate onto reverse check sleeve and hold with snap ring.
5) Position the O-ring in the groove in sleeve.

E: INSPECTION

• Make sure the cutout of reverse accent shaft is aligned with the opening in reverse check sleeve.
• Check the cam for smooth rotation by turning with hand.
• Make sure the cam and shaft move all the way toward plate and release.
If the cam does not return properly, replace the reverse check spring. If the shaft does not return, check for scratches on the inner surface of sleeve. If the sleeve is in good order, replace the spring.



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

• Select a suitable reverse accent shaft and reverse check plate. <Ref. to 5MT-54, 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 the adjustment shim between sleeve assembly and case to adjust the clearance.

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

NOTE:
• When the shim is removed, the neutral position will move closer to reverse; when the shim is added, the neutral position will move closer to 1st gear.
• If the shims alone cannot adjust the clearance, replace the reverse accent shaft and re-adjust.

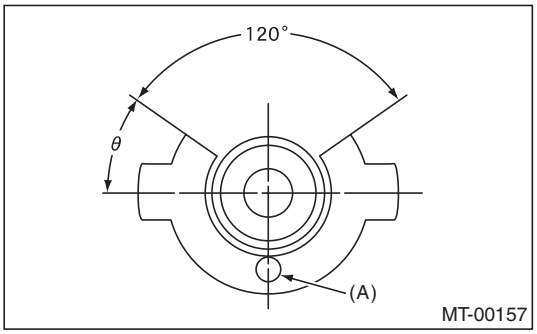
Adjusting shim	
Part Number	Thickness mm (in)
32190AA000	0.15 (0.0059)
32190AA010	0.30 (0.0118)

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.

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 the reverse position. If the arm does not return properly, replace the reverse check plate.

Reverse check plate			
Part Number	(A): No.	Angle θ	Remarks
32189AA000	0	28°	Arm stops closer to 5th gear.
32189AA010	1	31°	Arm stops closer to 5th gear.
32189AA020	2	34°	Arm stops in the center.
32189AA030	3	37°	Arm stops closer to reverse gear.
32189AA040	4	40°	Arm stops closer to reverse gear.

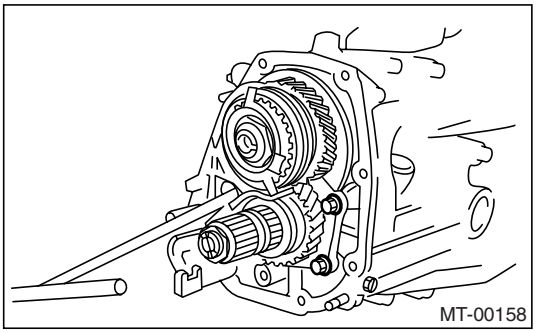


14.Transmission Case

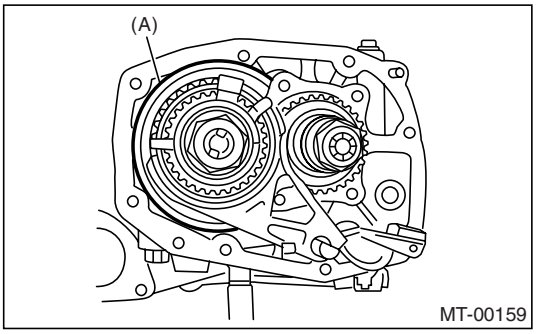
A: REMOVAL

1. SINGLE-RANGE MODEL

1) Remove the manual transmission assembly from vehicle. <Ref. to 5MT-30, REMOVAL, Manual Transmission Assembly.>
2) Remove the clutch release lever. <Ref. to CL-23, REMOVAL, Release Bearing and Lever.>
3) Remove the transfer case with extension case assembly. <Ref. to 5MT-43, REMOVAL, Transfer Case and Extension Case Assembly.>
4) Remove the bearing mounting bolts.


MT-00158

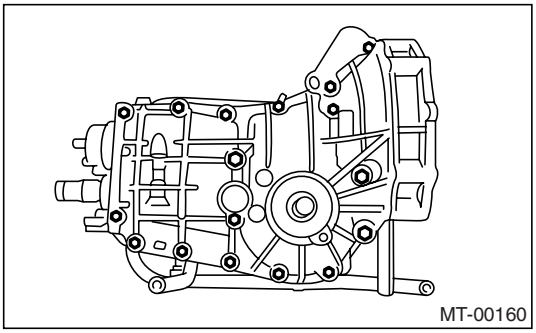
5) Remove the main shaft rear plate.



MT-00159

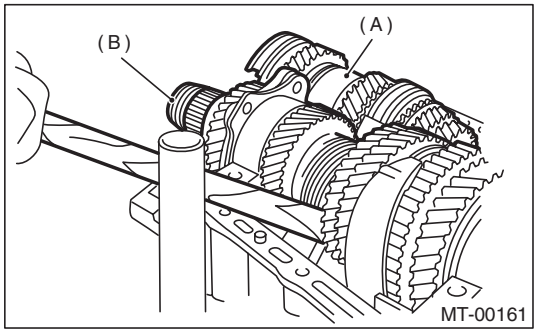
(A) Main shaft rear plate

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


MT-00160

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

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

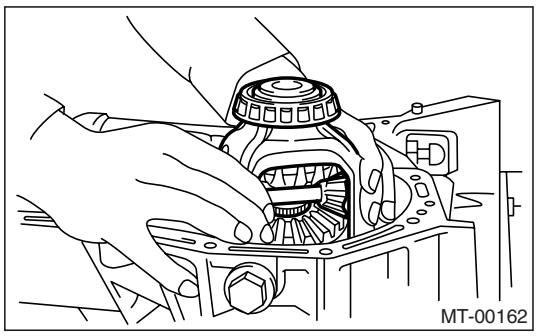


MT-00161

(A) Main shaft ASSY for single-range
(B) Drive pinion shaft ASSY

8) Remove the main shaft assembly for single-range.
9) Remove the differential assembly.

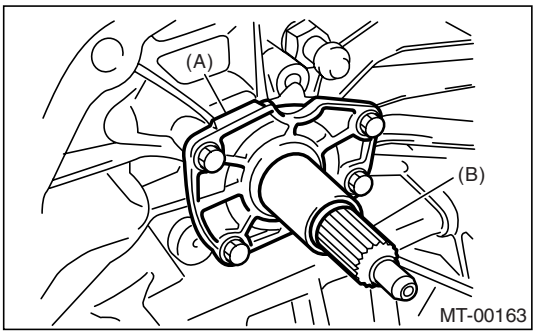
NOTE:
• Be careful not to confuse right and left roller bearing outer races.
• Be careful not to damage the oil seal of retainer.


MT-00162

2. DUAL-RANGE MODEL

1) Remove the manual transmission assembly from vehicle. <Ref. to 5MT-30, REMOVAL, Manual Transmission Assembly.>
2) Remove the clutch release lever. <Ref. to CL-23, REMOVAL, Release Bearing and Lever.>
3) Remove the transfer case with extension case assembly. <Ref. to 5MT-43, REMOVAL, Transfer Case and Extension Case Assembly.>

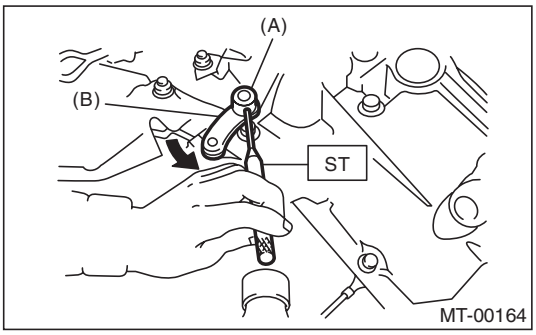
4) Remove the input shaft holder.



(A) Input shaft holder
(B) Input shaft

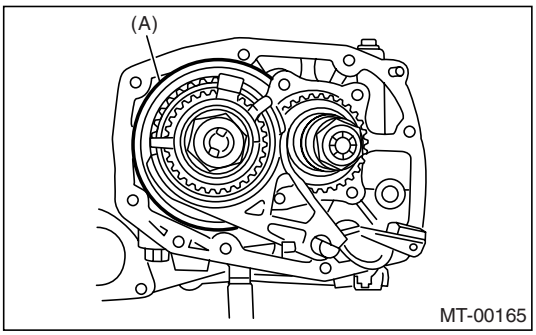
5) Remove the high-low switch. <Ref. to 5MT-40, REMOVAL, Switches and Harness.>
6) Using the ST, drive out the straight pin, and remove the high-low shifter lever.
ST 398791700 STRAIGHT PIN REMOVER 2

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



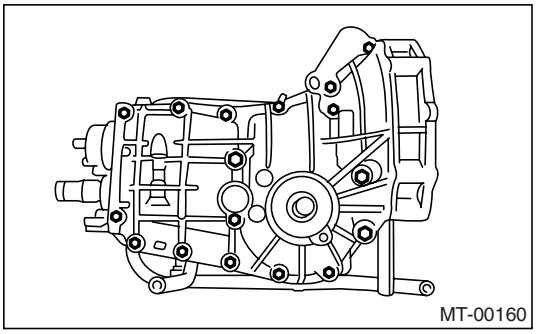
(A) Straight pin
(B) High-low shifter lever

7) Remove the main shaft rear plate.



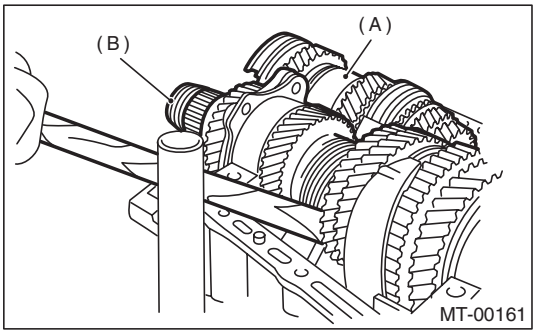
(A) Main shaft rear plate

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



9) Remove the drive pinion shaft assembly from transmission case LH.

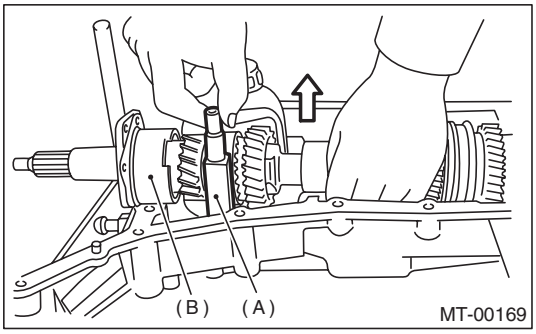
NOTE:
Use a hammer handle, etc. to remove if too tight.



(A) Main shaft ASSY for dual-range
(B) Drive pinion shaft ASSY

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

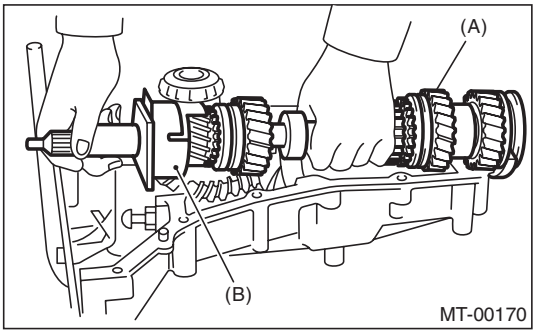
NOTE:
Be careful not to drop the two high-low shifter pieces.



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

11) Remove the main shaft assembly and input shaft assembly.

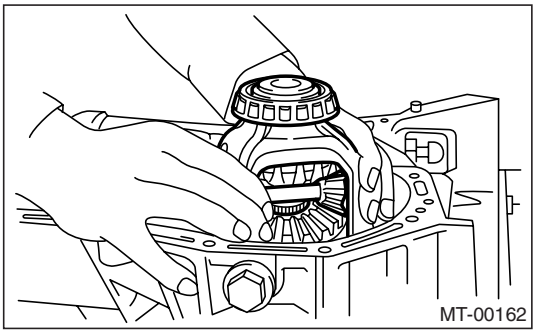
NOTE:
Be careful not to drop the input shaft and main shaft as they are separable.



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

12) 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.



B: INSTALLATION

1. SINGLE-RANGE MODEL

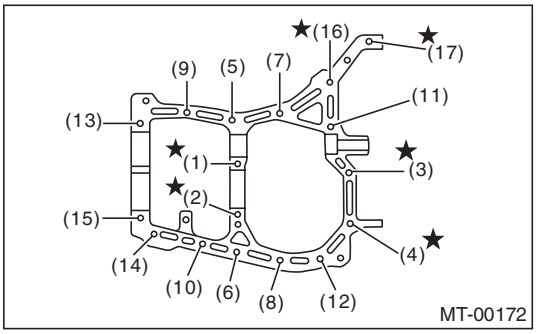
1) Wipe off grease, oil and dust on the mating surfaces of transmission cases with white gasoline.
2) Install the front differential assembly.
3) Install the main shaft assembly for single-range.
Install the transmission case knock pin into needle bearing knock pin hole.
4) Install the drive pinion shaft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

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

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

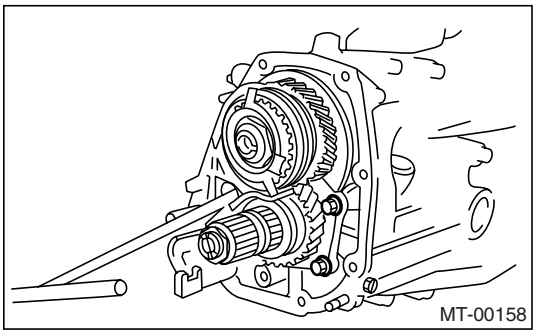
NOTE:
• Insert the bolts from the bottom and tighten nuts on the top.
• Put the cases together being careful that the drive pinion shim and input shaft holder shim are not caught up in between.

Tightening torque:
8 mm bolt
25 N·m (2.5 kgf-m, 18.4 ft-lb)
★ 10 mm bolt
39 N·m (4.0 kgf-m, 28.9 ft-lb)



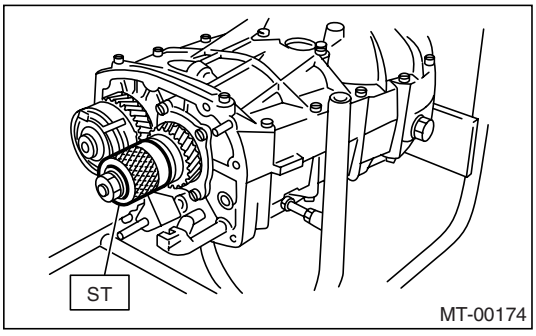
7) Tighten the ball bearing mounting bolts.

Tightening torque:
30 N·m (3.1 kgf-m, 22.4 ft-lb)



8) Adjust backlash of hypoid gear and preload of roller bearing.

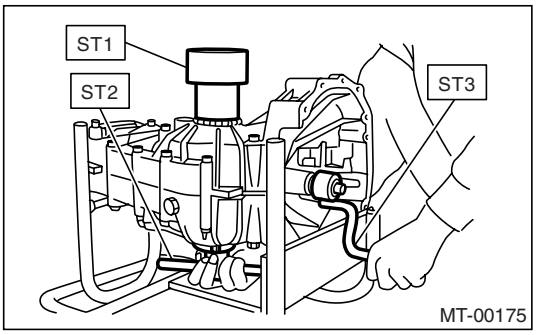
NOTE:
Set the ST on drive pinion assembly.
ST 498427100 STOPPER



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

10) Screw the retainer assembly into left case from the bottom with 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.

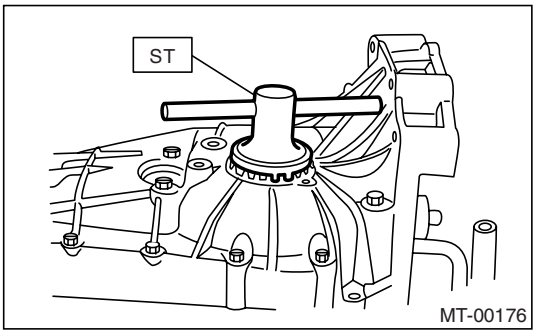
ST1 399780104 WEIGHT
ST2 499787000 WRENCH ASSY
ST3 499927100 HANDLE



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

NOTE:
At this condition, the backlash between hypoid gear and drive pinion shaft is zero.

ST 499787000 WRENCH ASSY



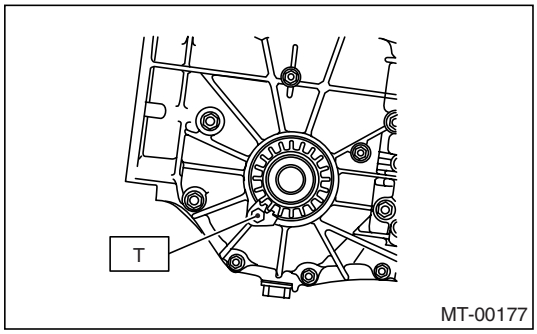
12) Loosen the retainer on the lower side by 3 notches, and turn the retainer on the upper side by the same amount in order to obtain the backlash.
13) Turn in the retainer on the upper side additionally by 1 notch in order to apply preload on taper roller bearing.
14) Install temporarily both the upper 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 retainer lightly with plastic hammer.
16) Inspect and adjust the backlash and tooth contact of hypoid gear. <Ref. to 5MT-87, 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 O-ring into the 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, 18.4 ft-lb)



18) Selecting of main shaft rear plate: <Ref. to 5MT-65, ADJUSTMENT, Main Shaft Assembly for Single-Range.>
19) Install the clutch release lever and bearing. <Ref. to CL-23, INSTALLATION, Release Bearing and Lever.>
20) Install the transfer case with extension case assembly. <Ref. to 5MT-43, INSTALLATION, Transfer Case and Extension Case Assembly.>
21) Install the manual transmission assembly into vehicle. <Ref. to 5MT-32, INSTALLATION, Manual Transmission Assembly.>

2. DUAL-RANGE MODEL

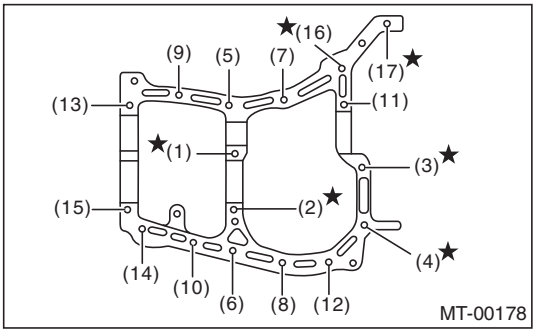
1) Wipe off grease, oil and dust on the mating surfaces of transmission cases with white gasoline.
2) Install the front differential assembly.
3) Install the main shaft assembly for dual-range and the input shaft assembly.
Connect the main shaft assembly for dual-range with the input shaft assembly, and 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 (Part No. 004403007) 1215 or equivalent

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

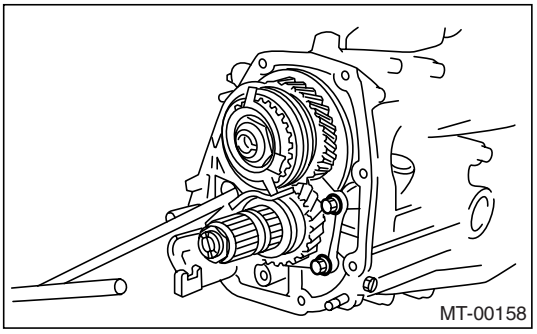
NOTE:
• Insert the bolts from the bottom and tighten the nuts at the top.
• Put the cases together being careful that the drive pinion shim and input shaft holder shim are not caught up in between.

Tightening torque:
8 mm bolt
25 N·m (2.5 kgf-m, 18.4 ft-lb)
★ 10 mm bolt
39 N·m (4.0 kgf-m, 28.9 ft-lb)



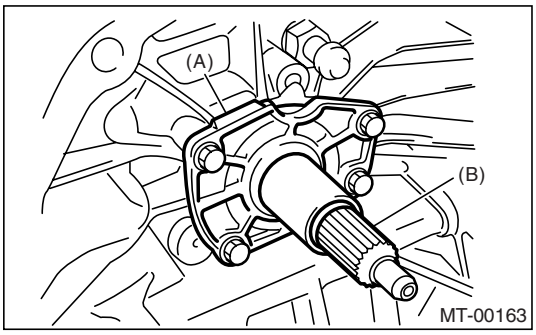
7) Tighten the ball bearing mounting bolts.

Tightening torque:
30 N·m (3.1 kgf-m, 22.4 ft-lb)



8) Tighten the input shaft holder attaching bolts.

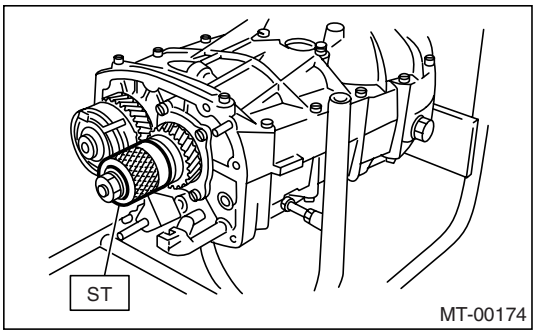
Tightening torque:
20 N·m (2.0 kgf-m, 14.5 ft-lb)



(A) Input shaft holder
(B) Input shaft

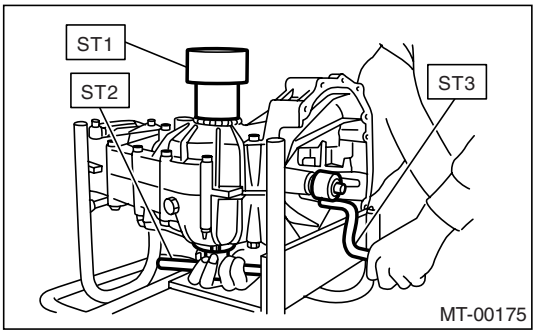
9) Backlash adjustment of hypoid gear and preload adjustment of roller bearing

NOTE:
Set the ST to drive pinion assembly.
ST 498427100 STOPPER



10) Place the transmission with the left side of case facing downward, and put ST1 on bearing cup.
11) 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.

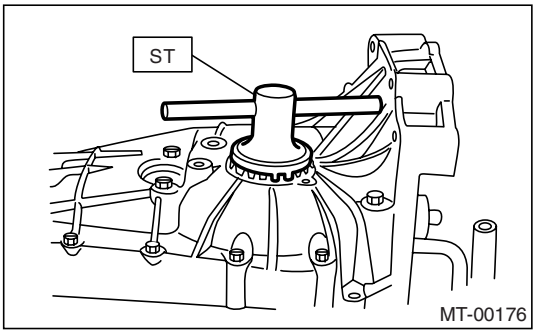
ST1 399780104 WEIGHT
ST2 499787000 WRENCH ASSY
ST3 499927100 HANDLE



12) 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:
In this condition, the backlash between hypoid gear and drive pinion shaft is zero.

ST 499787000 WRENCH ASSY



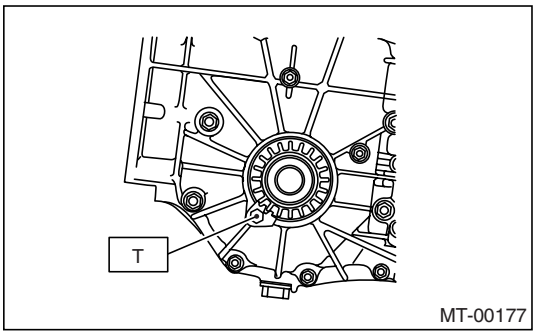
13) Loosen the retainer on the lower side by 3 notches and turn in the retainer on upper side by the same amount in order to obtain the backlash.
14) Turn in the retainer on the upper side additionally by 1 notch in order to apply preload on taper roller bearing.
15) Install temporarily both the upper 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.

16) Turn the transmission main shaft several times while tapping around the retainer lightly with plastic hammer.
17) Inspect and adjust the backlash and tooth contact of hypoid gear. <Ref. to 5MT-87, INSPECTION, Front Differential Assembly.>
18) 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, 18.4 ft-lb)



19) Selection of main shaft rear plate: <Ref. to 5MT-65, ADJUSTMENT, Main Shaft Assembly for Single-Range.>
20) Install the transfer case with extension case assembly. <Ref. to 5MT-43, INSTALLATION, Transfer Case and Extension Case Assembly.>
21) Install the clutch release lever and bearing. <Ref. to CL-23, INSTALLATION, Release Bearing and Lever.>
22) Install the manual transmission assembly into vehicle. <Ref. to 5MT-32, INSTALLATION, Manual Transmission Assembly.>

C: INSPECTION

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

15. Main Shaft Assembly for Single-Range

A: REMOVAL

1) Remove the manual transmission assembly from vehicle. <Ref. to 5MT-30, REMOVAL, Manual Transmission Assembly.>
2) Remove the transfer case with extension case assembly. <Ref. to 5MT-43, REMOVAL, Transfer Case and Extension Case Assembly.>
3) Remove the transmission case. <Ref. to 5MT-55, REMOVAL, Transmission Case.>
4) Remove the drive pinion shaft assembly. <Ref. to 5MT-76, REMOVAL, Drive Pinion Shaft Assembly.>
5) Remove the main shaft assembly for single range.

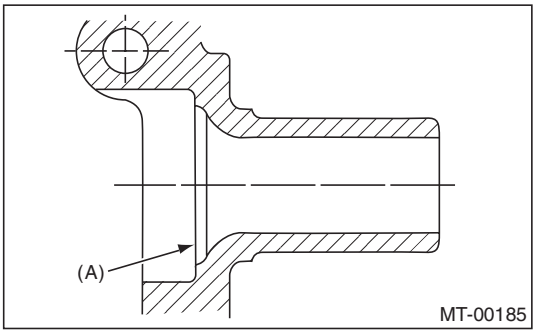
B: INSTALLATION

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

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 oil seal.

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

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



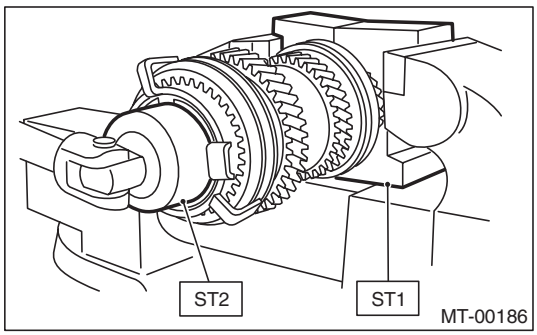
3) Install the drive pinion assembly. <Ref. to 5MT-76, INSTALLATION, Drive Pinion Shaft Assembly.>
4) Install the transmission case. <Ref. to 5MT-57, INSTALLATION, Transmission Case.>
5) Install the transfer case with extension case assembly. <Ref. to 5MT-43, INSTALLATION, Transfer Case and Extension Case Assembly.>
6) Install the manual transmission assembly into vehicle. <Ref. to 5MT-32, INSTALLATION, Manual Transmission Assembly.>

C: DISASSEMBLY

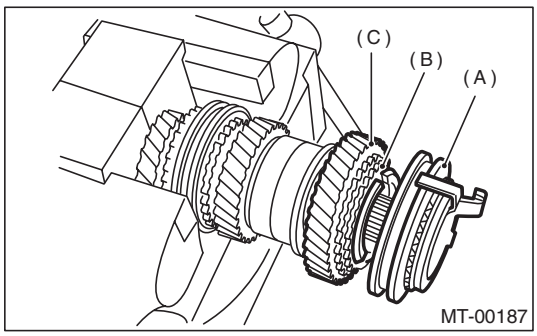
1) Put the vinyl tape around main shaft splines to protect oil seal from damage. Then pull out the oil seal and needle bearing by hand.
2) Remove the lock nut from transmission main shaft assembly for single range.

NOTE:
Unlock the caulking before removing lock nut.

ST1 498937000 TRANSMISSION HOLDER
ST2 499987003 SOCKET WRENCH (35)

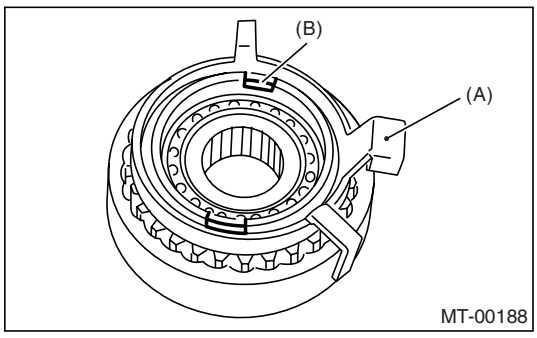


3) Remove the 5th-Rev sleeve & hub assembly, baulk ring, 5th drive gear & needle bearing.



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

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

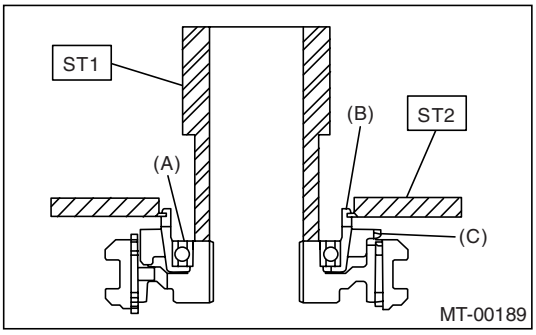


(A) Synchro cone stopper
(B) Snap ring

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

NOTE:
• When replacing the sleeve & hub with new ones, replace them as a set.
• Do not disassemble the sleeve & hub, because the aligning position is specified.
• If it is necessary to disassemble, mark the engaging points on the splines beforehand.
• Do not reuse the ball bearing.

ST1	499757002	INSTALLER
ST2	498077400	SYNCHRO CONE REMOVER

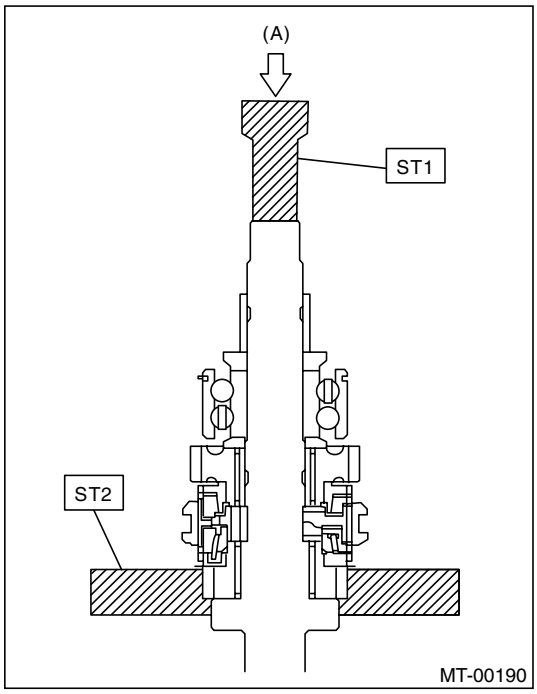


(A) Ball bearing
(B) Synchro cone
(C) Baulk ring

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

NOTE:
• When replacing the sleeve & hub with new ones, replace them as a set.
• Do not disassemble the sleeve & hub, because the aligning position is specified.
• If it is necessary to disassemble, mark the engaging points on the splines beforehand.

ST1	899864100	REMOVER
ST2	899714110	REMOVER

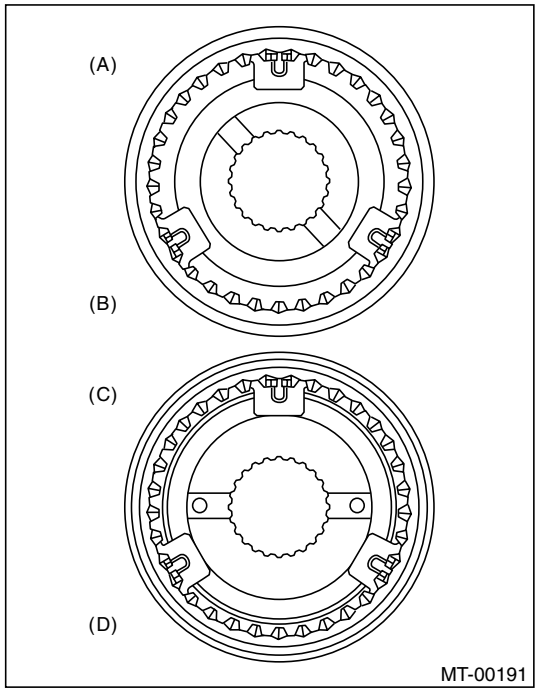


(A) Push

D: ASSEMBLY

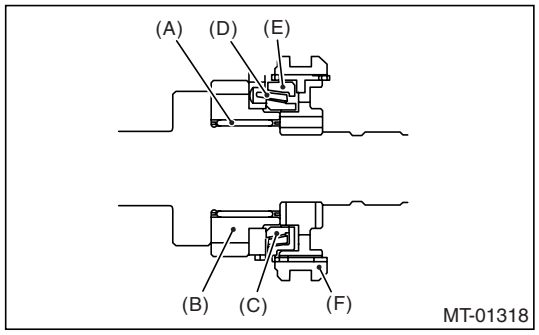
1) When the sleeve & hub assemblies have been disassembled, reassemble with aligning each engaging point.

NOTE:
Position 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 & hub assembly for 3rd needle bearing, on the transmission main shaft.



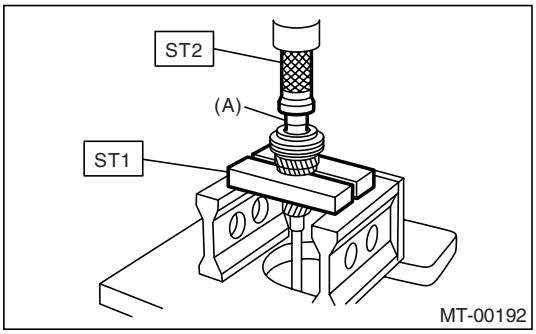
(A) 3rd needle bearing
(B) 3rd drive gear
(C) Inner baulk ring
(D) Synchro cone
(E) Outer baulk ring
(F) Sleeve & hub ASSY

NOTE:
Align the groove in baulk ring with shifting insert.

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).

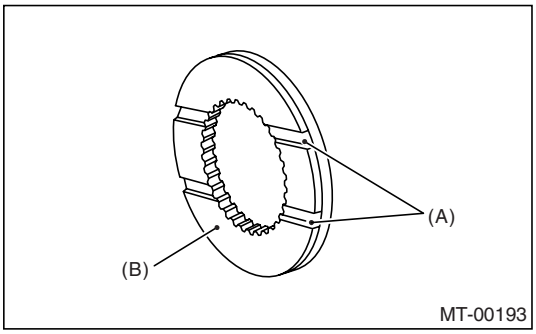
ST1 899714110 REMOVER
ST2 499877000 RACE 4-5 INSTALLER



(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.

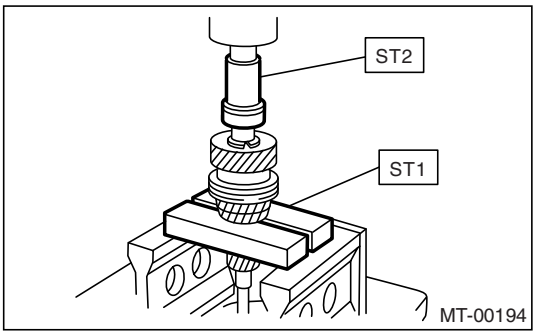


(A) Groove
(B) 4th gear side

5) Press the ball bearing into 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).

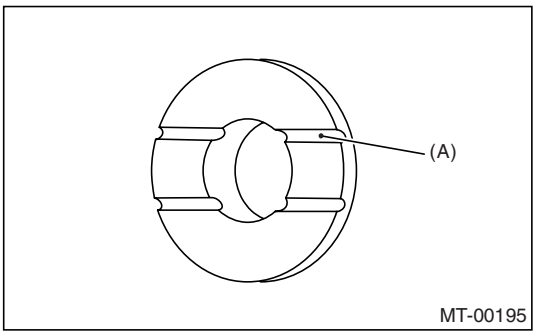
ST1 899714110 REMOVER
ST2 499877000 RACE 4-5 INSTALLER



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 the correct direction.

ST1 899714110 REMOVER
ST2 499877000 RACE 4-5 INSTALLER

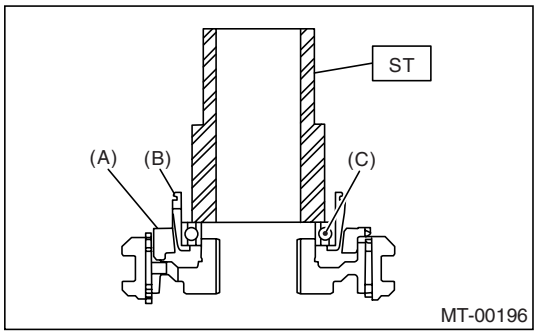


(A) Face this surface to 5th gear side.

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

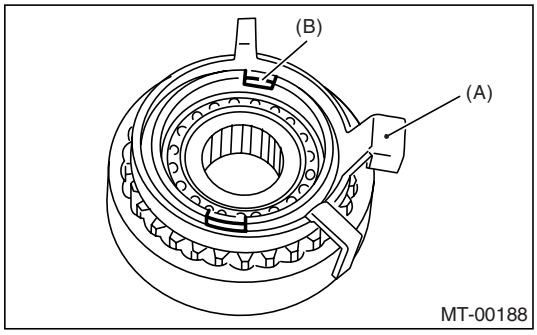
NOTE:
• Do not apply pressure in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).
• Use new ball bearing.
• Make sure the synchro cone rotates smoothly after press-fitting.

ST 499757002 INSTALLER



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

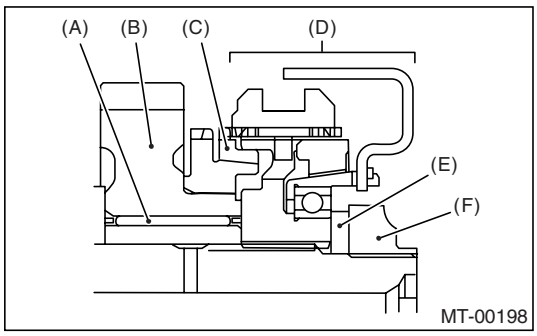
9) Install the synchro cone stopper and snap ring to 5th-Rev sleeve & hub assembly.



(A) Synchro cone stopper
(B) Snap ring

10) Install the rest of 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 & hub ASSY
(E) Lock washer
(F) Lock nuts

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

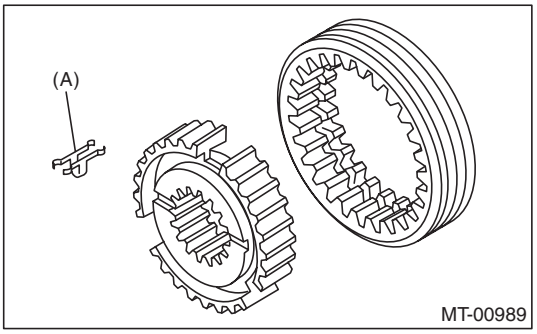
NOTE:
Caulk the lock nuts in two places after tightening.

ST1 499987003 SOCKET WRENCH (35)
ST2 498937000 TRANSMISSION HOLDER

Tightening torque:
120 N·m (12.2 kgf-m, 88.5 ft-lb)

E: INSPECTION

Disassembled parts should be washed with unleaded gasoline first and then inspected carefully.
1) Bearings
Replace the bearing in following cases:
• When the bearing balls, outer races and inner races are broken or rusty.
• When the bearing is worn.
• When the bearings fail to turn smoothly or emit noise in rotation after gear oil lubrication.
• When bearings have other defects.
2) Bushing (each gear)
Replace the bushings in following cases:
• When the sliding surface is damaged or abnormally worn.
• When the inner wall is abnormally worn.
3) Gears
• Replace gears with new ones if their tooth surfaces are broken, damaged or excessively worn.
• Correct or replace if the cone that contacts the baulk ring is rough or damaged.
• Correct or replace if the inner surface or end face is damaged.
4) Baulk ring
Replace the ring in following cases:
• When the inner surface and end face is damaged.
• When the ring inner surface is abnormally or partially worn.
• When contact surfaces of the synchronizer ring insert have cracks or abnormally worn.
5) Shifting insert key
Replace the insert key if deformed, excessively worn or defective in any way.



(A) Insert key

6) Oil seal
Replace the oil seal if the lip is deformed, hardened, 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.

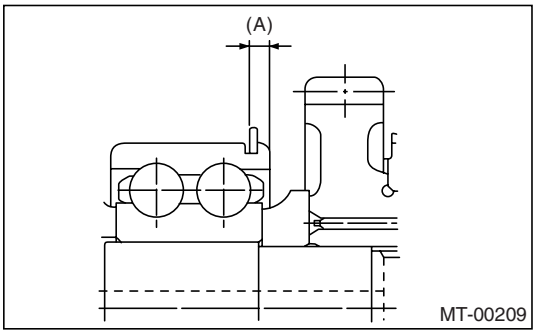
F: ADJUSTMENT

Selection of main shaft rear plate:
Using the ST, measure the amount (A) of ball bearing protrusion from transmission main case surface, and select a suitable 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 moving flange of bearing.

ST 498147001 DEPTH GAUGE

Dimension (A) mm (in)	Part Number	Marking
4.00 — 4.13 (0.1575 — 0.1626)	32294AA041	1
3.87 — 3.99 (0.1524 — 0.1571)	32294AA051	2



16. Main Shaft Assembly for Dual-Range

A: REMOVAL

1) Remove the manual transmission assembly from vehicle. <Ref. to 5MT-30, REMOVAL, Manual Transmission Assembly.>
2) Remove the transfer case with extension case assembly. <Ref. to 5MT-43, REMOVAL, Transfer Case and Extension Case Assembly.>
3) Remove the transmission case. <Ref. to 5MT-55, REMOVAL, Transmission Case.>
4) Remove the drive pinion shaft assembly. <Ref. to 5MT-76, REMOVAL, Drive Pinion Shaft Assembly.>
5) Remove the main shaft assembly and input shaft assembly.

B: INSTALLATION

1) Install the needle bearing onto the front of transmission main shaft assembly.
2) Connect the main shaft assembly and input shaft assembly.
3) Install the transmission case knock pin into needle bearing outer race knock pin hole.
4) Install the drive pinion assembly. <Ref. to 5MT-76, INSTALLATION, Drive Pinion Shaft Assembly.>
5) Install the transmission case. <Ref. to 5MT-57, INSTALLATION, Transmission Case.>
6) Install the transfer case with extension case assembly. <Ref. to 5MT-43, INSTALLATION, Transfer Case and Extension Case Assembly.>
7) Install the manual transmission assembly to vehicle. <Ref. to 5MT-32, INSTALLATION, Manual Transmission Assembly.>

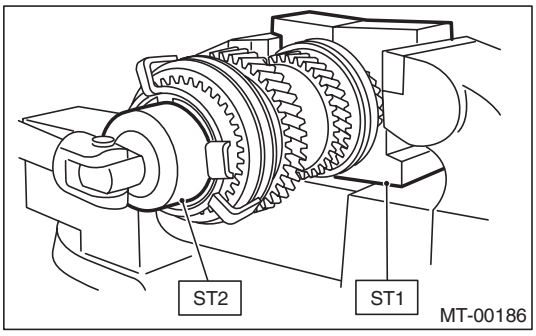
C: DISASSEMBLY

1) Put a 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.

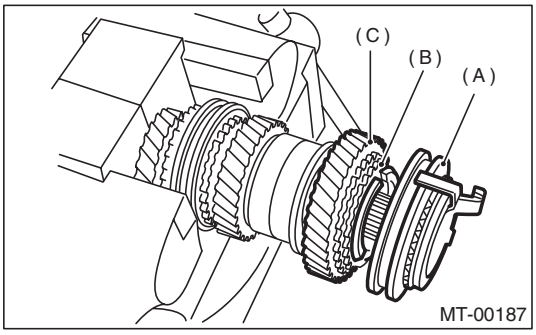
NOTE:
Straighten the caulking before taking off lock nut.

ST1 498937000 TRANSMISSION HOLDER

ST2 499987003 SOCKET WRENCH (35)

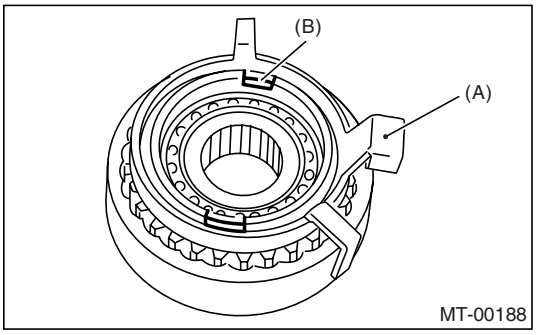


3) Remove the 5th-Rev sleeve & hub assembly, baulk ring, 5th drive gear and needle bearing.



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

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

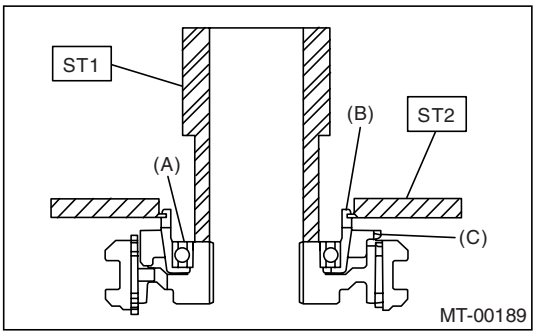


(A) Synchro cone stopper
(B) Snap ring

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

NOTE:
• When replacing the sleeve and hub with new ones, replace them as a set.
• Do not disassemble the sleeve and hub, because the aligning position is specified.
• If it is necessary to disassemble, mark the engaging points on the splines beforehand.
• Do not reuse the ball bearing.

ST1 499757002 INSTALLER
ST2 498077400 SYNCHRO CONE REMOVER

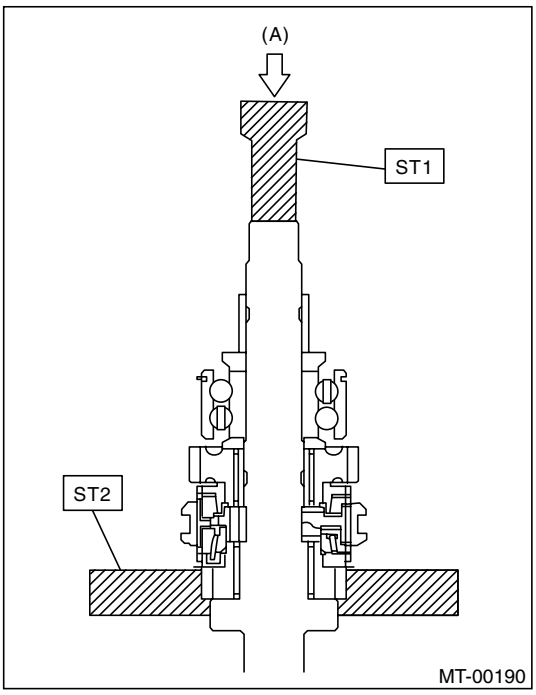


(A) Ball bearing
(B) Synchro cone
(C) Baulk ring

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

NOTE:
• When replacing the sleeve and hub with new ones, replace them as a set.
• Do not disassemble the sleeve and hub, because the aligning position is specified.
• If it is necessary to disassemble, mark the engaging points on the splines beforehand.

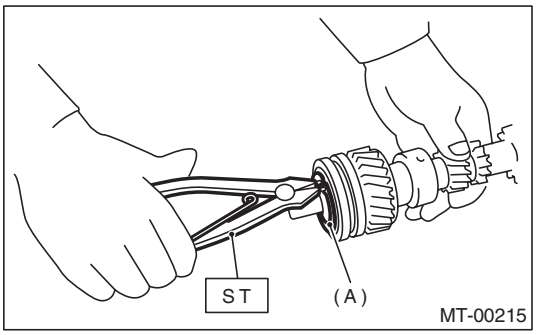
ST1 899864100 REMOVER
ST2 899714110 REMOVER



(A) Press

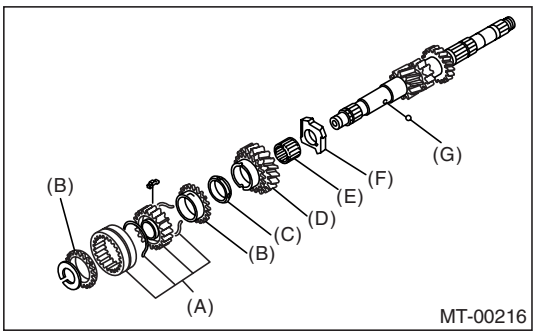
7) Remove the snap ring from main shaft.

ST 899474100 EXPANDER



(A) Snap ring

8) Remove rest of the parts.

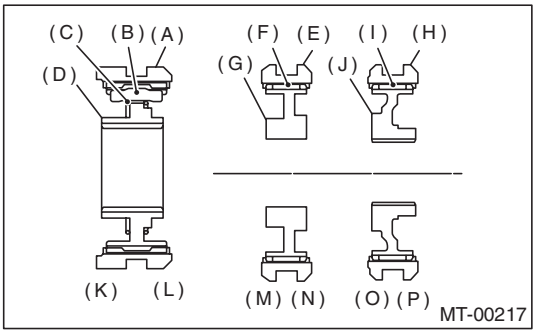


(A) Sleeve & hub ASSY
(B) High-low baulk ring
(C) Friction damper
(D) Low input gear
(E) Needle bearing
(F) Input low gear spacer
(G) Ball

D: ASSEMBLY

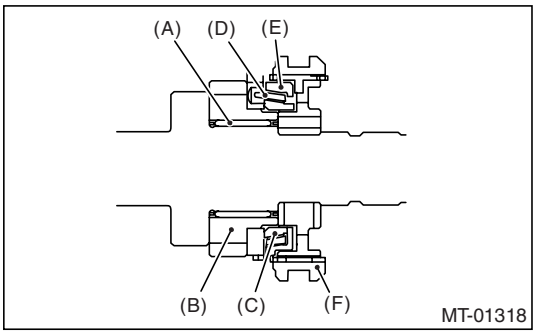
1) Assemble with aligning the matching mark if the sleeve & hub assembly have been disassembled.

NOTE:
Position the open ends of spring 120° apart.



(A) High-low coupling sleeve
(B) Shifting insert
(C) High-low synchronizer spring
(D) High-low synchronizer hub
(E) Sleeve
(F) Insert key
(G) 3rd-4th synchronizer hub
(H) Sleeve
(I) Insert key
(J) 5th-Rev synchronizer hub
(K) High side
(L) Low side
(M) 3rd side
(N) 4th side
(O) 5th side
(P) Rev side

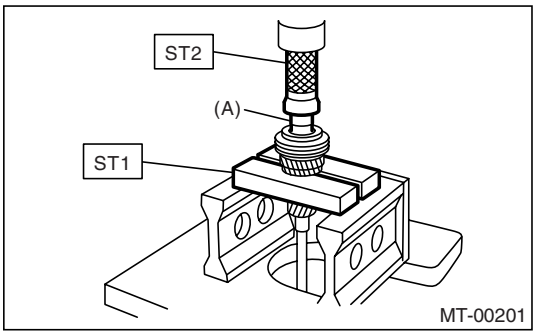
2) Install the 3rd drive gear, outer baulk ring, synchro cone, inner baulk ring, sleeve & hub assembly for 3rd needle bearing, on the transmission main shaft.



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

NOTE:
Align the groove in baulk ring with shifting insert.

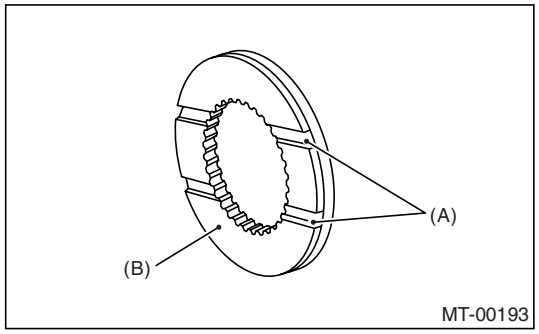
3) Install the 4th needle bearing race onto transmission main shaft using ST1, ST2 and a press.
ST1 899714110 REMOVER
ST2 499877000 RACE 4-5 INSTALLER



(A) 4th needle bearing race

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

NOTE:
Face the thrust washer in correct direction.

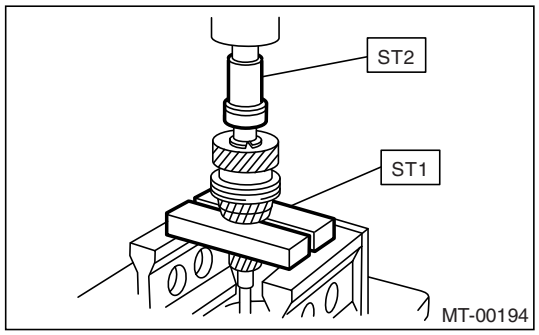


(A) Groove
(B) 4th gear side

5) Press-fit the ball bearing into 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).

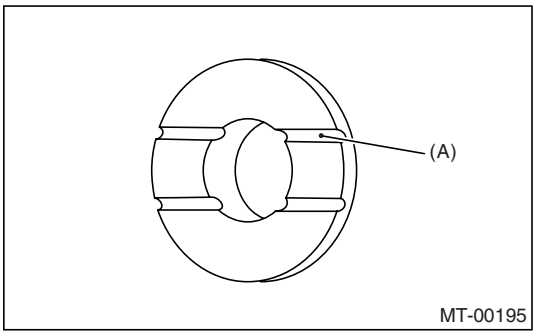
ST1 899714110 REMOVER
ST2 499877000 RACE 4-5 INSTALLER



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

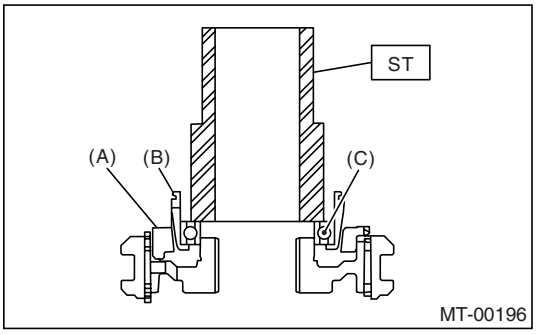


(A) Face this surface to 5th gear side.

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

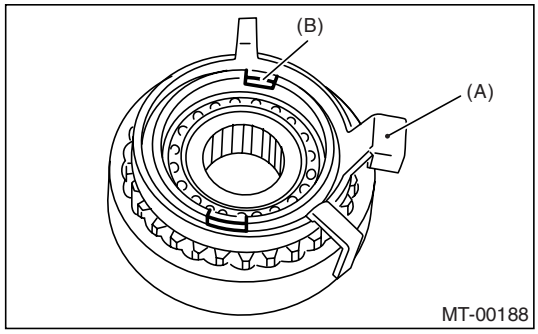
NOTE:
- Do not apply pressure in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).
- Use a new ball bearing.
- After press-fitting, make sure the synchro cone rotates freely.

ST 499757002 INSTALLER



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

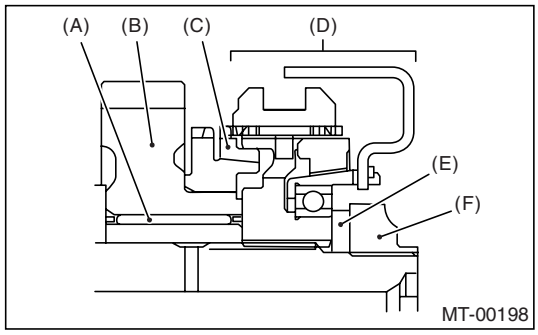
9) Install the synchro cone stopper and snap ring to 5th-Rev sleeve & hub assembly.



(A) Synchro cone stopper
(B) Snap ring

10) Install rest of the 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 & hub ASSY
(E) Lock washer
(F) Lock nuts

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

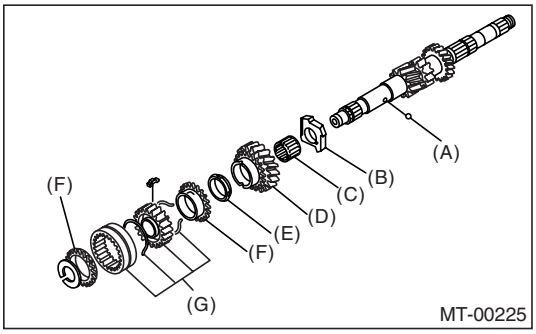
NOTE:
Stake the caulking of lock nuts in two places after tightening.

ST1 499987003 SOCKET WRENCH (35)
ST2 498937000 TRANSMISSION HOLDER

Tightening torque:
120 N·m (12.2 kgf-m, 88.5 ft-lb)

12) Install the needle bearing on main shaft.
13) Install rest of the parts to the front section of transmission main shaft.

NOTE:
• Be careful not to damage the graded section of transmission main shaft when installing the needle bearing.
• Face the grooved side toward input gear.
• Align the high-low baulk ring's groove with shifting insert.



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

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

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

ST1 499757002 INSTALLER
ST2 499757001 SNAP RING GUIDE

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

E: INSPECTION

Disassembled parts should be washed with unleaded gasoline first and then inspected carefully.

1) Bearings

Replace the bearings in following cases:

- Bearings balls, outer races and inner races are broken or rusty.
- Worn bearings
- Bearings fail to turn smoothly or emit noise in rotation after gear oil lubrication.
- Bearings having other defects

2) Bushing (each gear)

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

6) Oil seal

Replace the oil seal if the lip is deformed, hardened, 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

Select a suitable main shaft rear plate. <Ref. to 5MT-65, ADJUSTMENT, Main Shaft Assembly for Single-Range.>

17.Input Shaft Assembly

A: REMOVAL

1) Remove the manual transmission assembly from vehicle. <Ref. to 5MT-30, REMOVAL, Manual Transmission Assembly.>
2) Remove the transfer case with extension case assembly. <Ref. to 5MT-43, REMOVAL, Transfer Case and Extension Case Assembly.>
3) Remove the transmission case. <Ref. to 5MT-55, REMOVAL, Transmission Case.>
4) Remove the drive pinion shaft assembly. <Ref. to 5MT-76, REMOVAL, Drive Pinion Shaft Assembly.>
5) Remove the main shaft assembly and input shaft assembly.

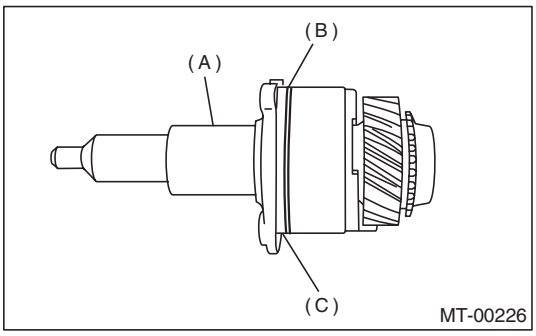
B: INSTALLATION

1) Install the needle bearing onto the front of transmission main shaft assembly.
2) Connect the main shaft assembly and input shaft assembly.
3) Install the transmission case knock pin into needle bearing outer race knock pin hole.
4) Install the drive pinion assembly. <Ref. to 5MT-76, INSTALLATION, Drive Pinion Shaft Assembly.>
5) Install the transmission case. <Ref. to 5MT-57, INSTALLATION, Transmission Case.>
6) Install the transfer case with extension case assembly. <Ref. to 5MT-43, INSTALLATION, Transfer Case and Extension Case Assembly.>
7) Install the manual transmission assembly on the vehicle. <Ref. to 5MT-32, INSTALLATION, Manual Transmission Assembly.>

C: DISASSEMBLY

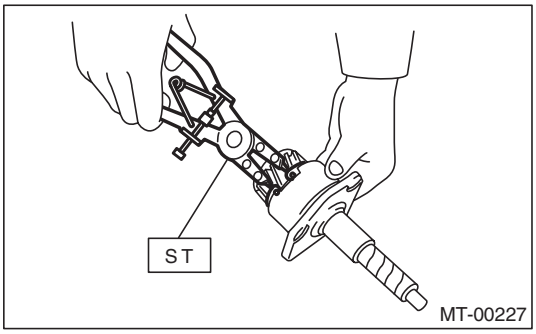
1) Remove the O-ring from input shaft holder. Also, remove the input shaft holder shim.

NOTE:
- Use a new O-ring.
- Number of shims used varies from zero to two.

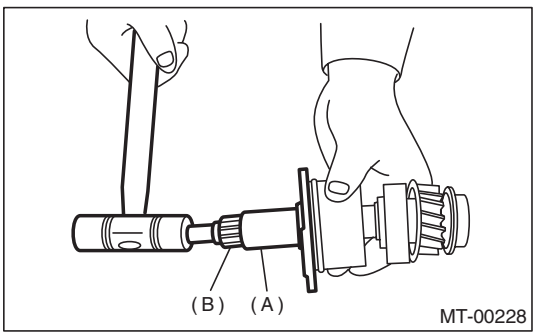


(A) Input shaft holder
(B) O-ring
(C) Input shaft holder shim

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

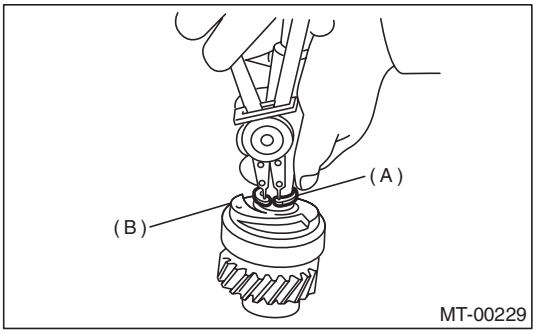


4) Hold the input shaft holder stationary and remove the input shaft by tapping its end with a plastic hammer.



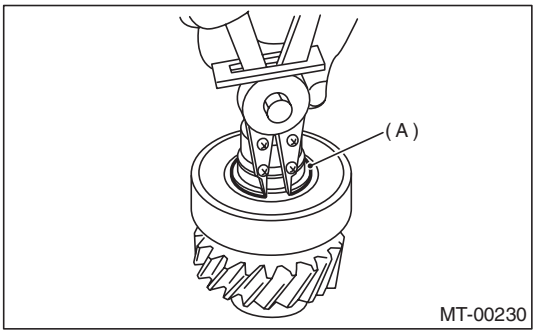
(A) Input shaft holder
(B) Input shaft

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



(A) Snap ring
(B) Oil squeeze plate

6) Remove the snap ring.

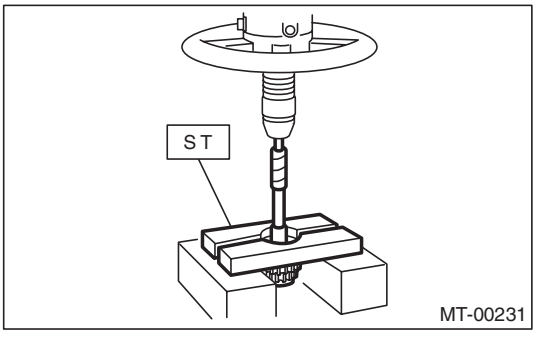


(A) Snap ring

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

NOTE:
Remove the inner snap ring before pressing.

ST 498077000 REMOVER



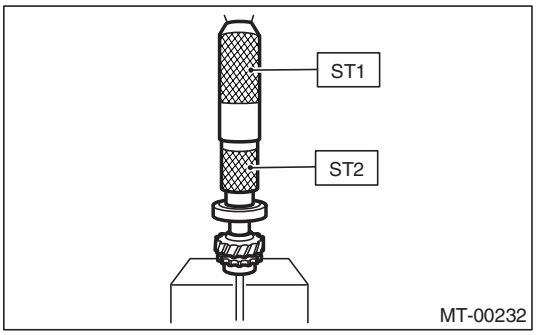
8) Remove the oil seal from input shaft holder.

D: ASSEMBLY

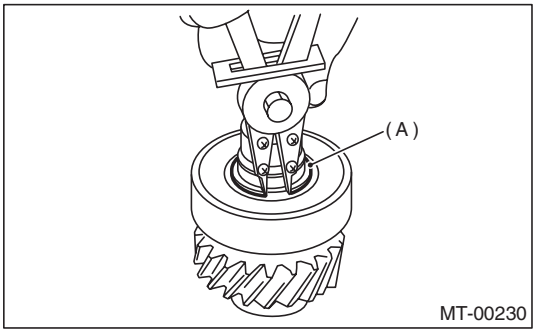
1) Install the ball bearing onto input shaft.

NOTE:
Place the snap ring between input shaft gear and ball bearing beforehand. Use the table at 8) as a guide in selecting a suitable snap ring.

ST1 899580100 INSTALLER
ST2 399513600 INSTALLER



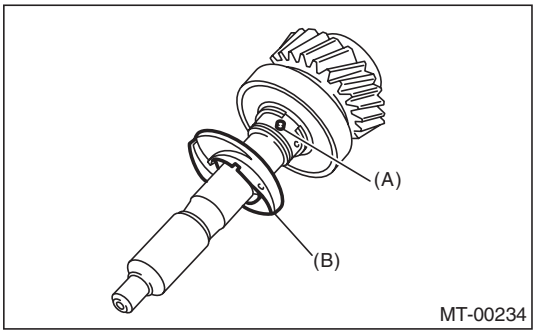
2) Install the snap ring on input shaft.



(A) Snap ring

3) Inspect the clearance between ball bearing and snap ring. <Ref. to 5MT-74, INSPECTION, Input Shaft Assembly.>

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



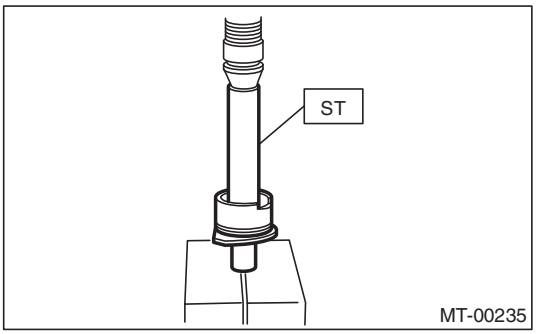
(A) Straight pin
(B) Oil squeeze plate

5) Install the snap ring.

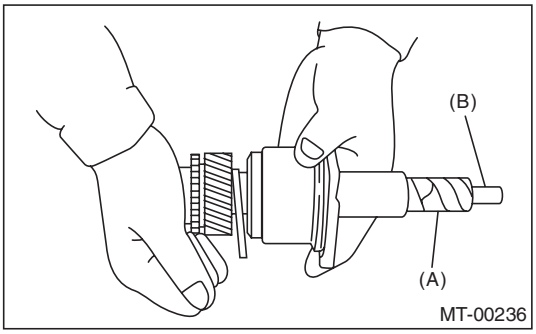
6) Install the oil seal into input shaft holder.

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

ST 398507703 DUMMY COLLAR



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

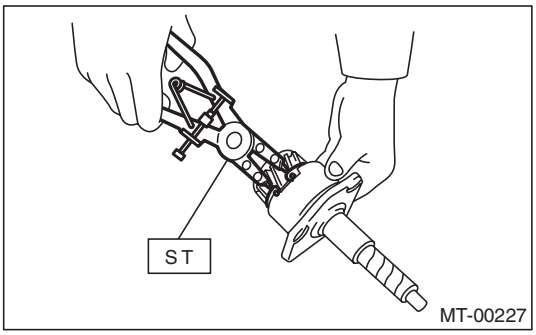


(A) Vinyl tape
(B) Input shaft

8) Install the snap ring to input shaft holder.

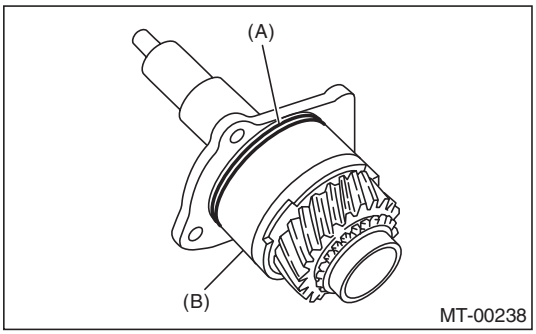
NOTE:
Select a suitable snap ring so that clearance between snap ring and bearing is held within 0 to 0.12 mm (0 to 0.0047 in).

ST 398663600 PLIERS



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

9) Install the O-ring to input shaft holder.



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

E: INSPECTION

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

1) Bearings
Replace the bearings in following cases:
• Bearing balls, outer races and inner races are broken or rusty.
• Worn bearings
• Bearings fail to turn smoothly or emit noise in rotation after gear oil lubrication.
• Bearings having other defects

2) Bushing (each gear)
Replace the bushing in 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.

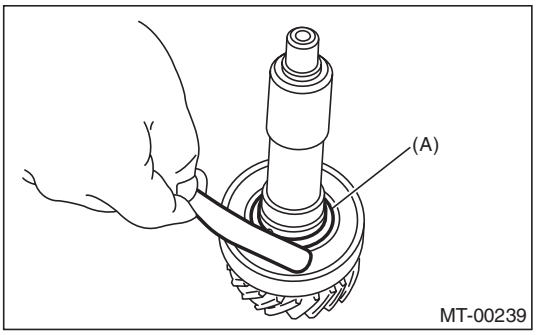
4) Baulk ring
Replace the ring in following cases:
• When the inner surface and end face are damaged.
• When the ring inner surface is abnormally or partially worn down.
• When the contact surface of the synchronizer ring insert is scored or abnormally worn down.

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

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

7) O-ring
Replace the O-ring if the sealing face is deformed, hardened, damaged, worn or defective in any way.
8) Gearshift mechanism
Repair or replace the gearshift mechanism if excessively worn, bent or defective in any way.
9) Measure the clearance between snap ring and ball bearing using thickness gauge.

Clearance:
0 — 0.12 mm (0 — 0.0047 in)



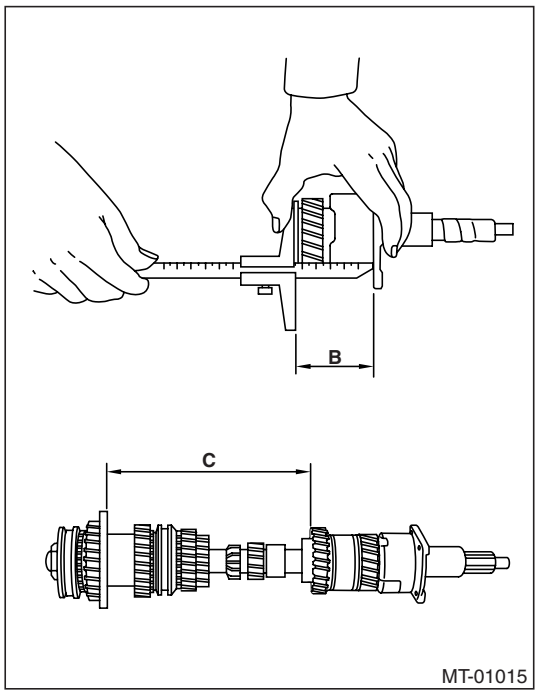
(A) Snap ring

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

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

F: ADJUSTMENT

1) Place transmission main shaft assembly and input shaft on transmission main case without shim.
2) The proper number of shim can be determined as follows:
D = A − (B + C)
A: Main case length (353 mm (13.90 in))
B: Input shaft complete length
C: Main shaft assembly length



NOTE:
The thickness of shim is 0.45 to 0.55 mm (0.0177 to 0.0217 in).

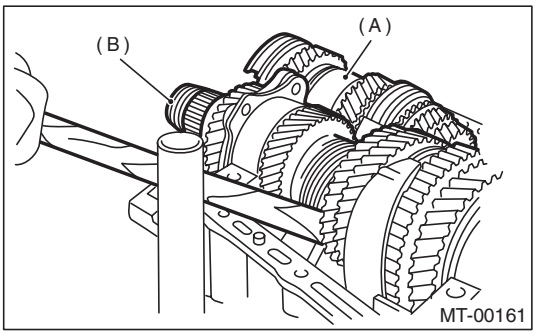
Dimension “D” mm (in)	Number of shims
52.50 — 53.11 (2.0669 — 2.0909)	—
52.00 — 52.49 (2.0472 — 2.0665)	1
51.26 — 51.99 (2.0181 — 2.0468)	2

18.Drive Pinion Shaft Assembly

A: REMOVAL

1) Remove the manual transmission assembly from vehicle. <Ref. to 5MT-30, REMOVAL, Manual Transmission Assembly.>
2) Remove the transfer case with extension case assembly. <Ref. to 5MT-43, REMOVAL, Transfer Case and Extension Case Assembly.>
3) Remove the transmission case. <Ref. to 5MT-55, REMOVAL, Transmission Case.>
4) Remove the drive pinion shaft assembly.

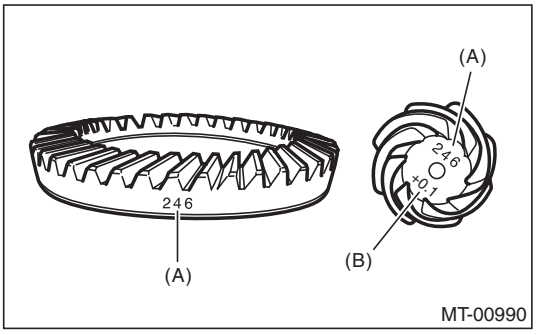
NOTE:
Use a hammer handle, etc. to remove if too tight.



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

B: INSTALLATION

1) Remove the differential assembly.
2) Use hypoid driven gear of its match number corresponding with upper one on the drive pinion (A). The figure (B) shows a number for shim adjustment. If no number is shown, the value is zero.

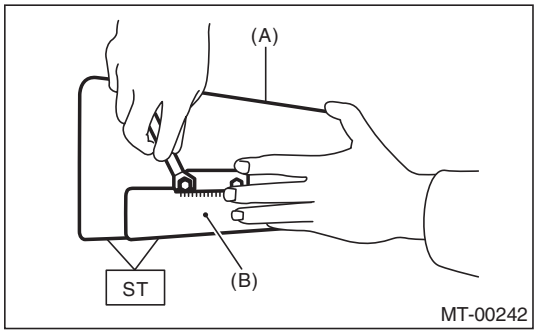


(A) Match number
(B) Number for shim adjustment

3) Place the drive pinion shaft assembly on the transmission main case RH without shim and tighten the bearing mounting bolts.
4) Inspect and adjust the ST.

NOTE:
• Loosen the two bolts and adjust so that the scale indicates 0.5 correctly when the plate end and the scale end are on the same level.
• Tighten the two bolts.

ST 499917500 DRIVE PINION GAUGE ASSY



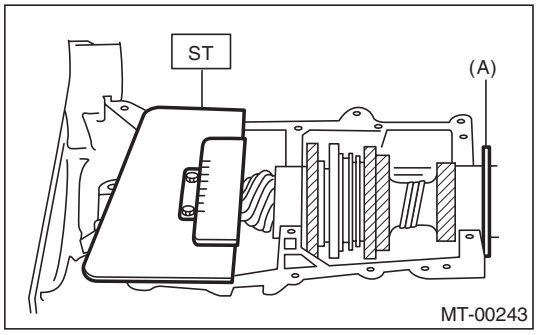
(A) Plate
(B) Scale

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

ST 499917500 DRIVE PINION GAUGE ASSY

6) Slide the drive pinion gauge scale with finger tip and read the value at the point where it matches with the end face of drive pinion.

ST 499917500 DRIVE PINION GAUGE ASSY



(A) Adjust clearance to zero without shim.

7) The thickness of shim shall be determined by adding the value indicated on drive pinion to the value indicated on the ST. (Add if the number on drive pinion is prefixed by +, and subtract if the number is prefixed by −.)

ST 499917500 DRIVE PINION GAUGE ASSY

8) Select one to three shims in the next table for the value determined as described above, and take the shim(s) which thickness is closest to the said value.

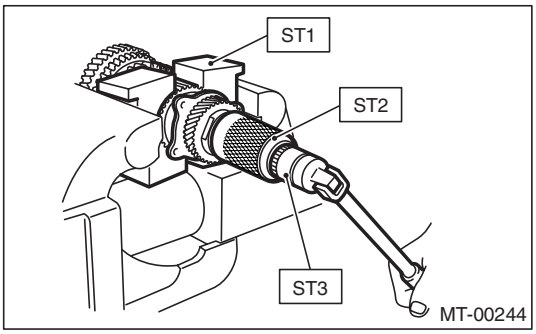
Drive pinion shim	
Part Number	Thickness mm (in)
32295AA031	0.150 (0.0059)
32295AA041	0.175 (0.0069)
32295AA051	0.200 (0.0079)
32295AA061	0.225 (0.0089)
32295AA071	0.250 (0.0098)
32295AA081	0.275 (0.0108)
32295AA091	0.300 (0.0118)
32295AA101	0.500 (0.0197)

9) Install the differential assembly. <Ref. to 5MT-84, INSTALLATION, Front Differential Assembly.>
10) Set the transmission main shaft assembly and drive pinion assembly in position. (So there is no clearance between these two when moved all the way to the front). Inspect the suitable 1st — 2nd, 3rd — 4th and 5th shifter fork so that the coupling sleeve and reverse driven gear are positioned in the center of their synchronizing mechanisms. <Ref. to 5MT-81, INSPECTION, Drive Pinion Shaft Assembly.>
11) Install the transmission case. <Ref. to 5MT-57, INSTALLATION, Transmission Case.>
12) Install the transfer case with extension case assembly. <Ref. to 5MT-43, INSTALLATION, Transfer Case and Extension Case Assembly.>
13) Install the manual transmission assembly to vehicle. <Ref. to 5MT-30, Manual Transmission Assembly.>

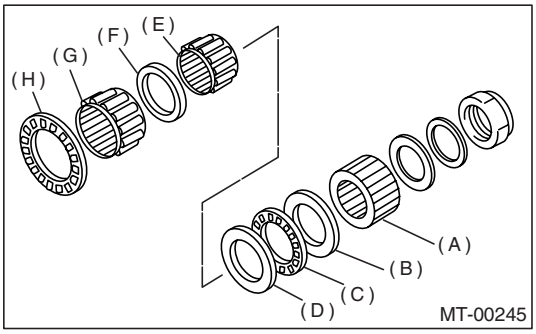
C: DISASSEMBLY

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) Unlock the caulking of lock nut. Remove the lock nut using ST1, ST2 and ST3.
ST1 899884100 HOLDER
ST2 498427100 STOPPER
ST3 899988608 SOCKET WRENCH (27)



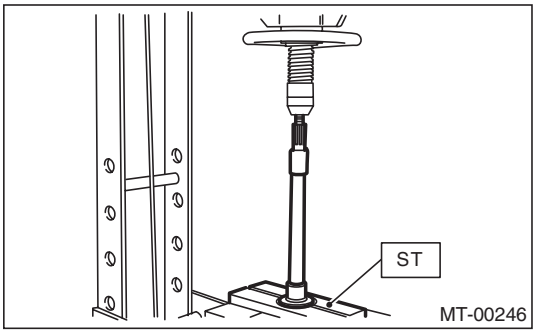
2) Draw out the drive pinion from driven shaft. Remove the differential bevel gear sleeve, adjusting washer No. 1, adjusting washer No. 2, thrust bearing, needle bearing and drive pinion collar.



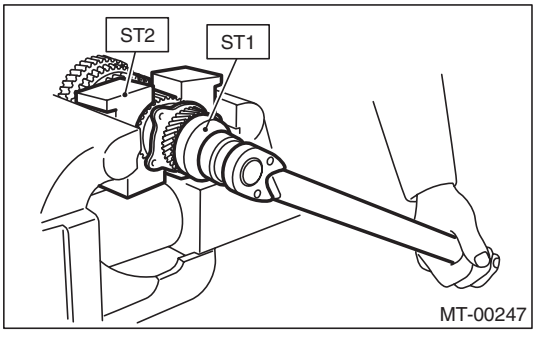
(A) Differential bevel gear sleeve
(B) Washer No. 1 (25 × 37.5 × t)
(C) Thrust bearing (25 × 37.5 × 3)
(D) Washer No. 2 (25 × 37.5 × 4)
(E) Needle bearing (25 × 30 × 20)
(F) Drive pinion collar
(G) Needle bearing (30 × 37 × 23)
(H) Thrust bearing (33 × 50 × 3)

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

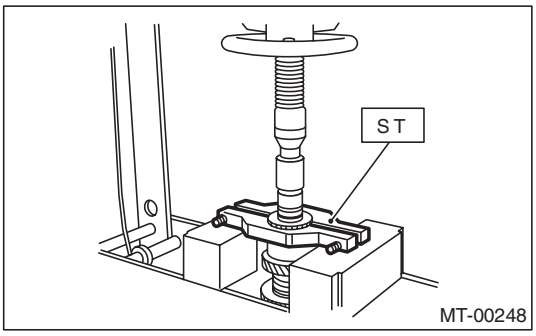
NOTE:
Do not reuse the roller bearing.
ST 498077000 REMOVER



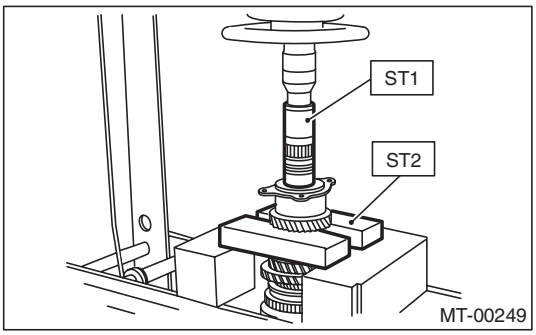
4) Unlock the caulking of lock nut. Remove the lock nut using ST1 and ST2.
ST1 499987300 SOCKET WRENCH (50)
ST2 899884100 HOLDER



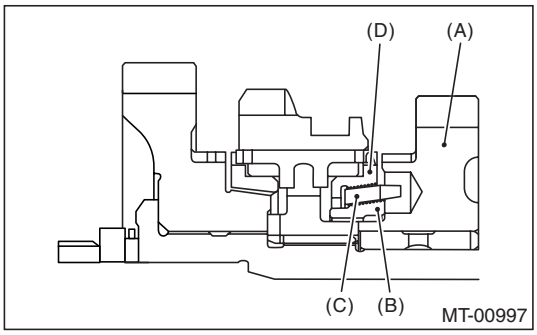
5) Remove the 5th driven gear using ST.
ST 499857000 5TH DRIVEN GEAR REMOVER



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

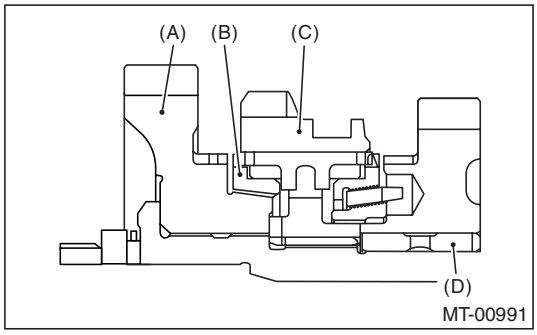


8) Remove the key.
9) Remove the 2nd driven gear, inner baulk ring, synchro cone and outer baulk ring.



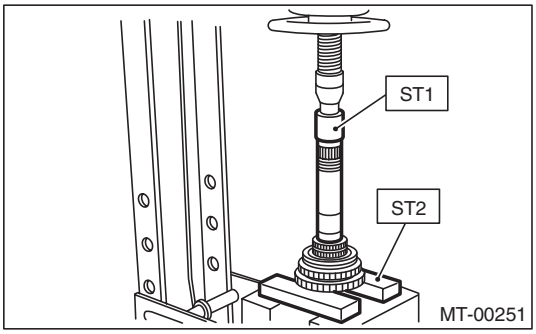
(A) 2nd driven gear
(B) Inner baulk ring
(C) Synchro cone
(D) Outer baulk ring

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



(A) 1st driven gear
(B) Inner baulk ring
(C) Hub
(D) 2nd gear bushing

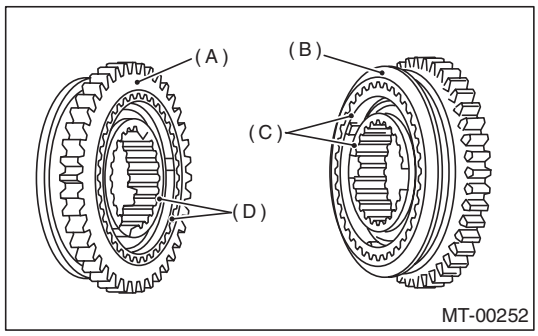
NOTE:
Replace the gear and hub if necessary. Do not disassemble because they must engage at a specified point. If they have to be disassembled, mark the engaging point on the spline beforehand.
ST1 499757002 INSTALLER
ST2 899714110 REMOVER



D: ASSEMBLY

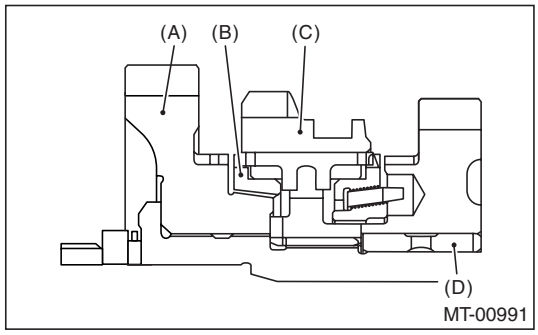
1) Install the sleeve and hub assembly by matching alignment marks.

NOTE:
Use the new gear and hub assembly, when replacing the gear or hub.



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

2) Install the washer to 1st driven gear. (EC, EK and KA model)
3) Install the washer, snap ring and sub gear onto 1st driven gear. (Except for EC, EK and KA model)
4) Install the 1st driven gear, 1st baulk ring, gear and hub assembly onto driven shaft.



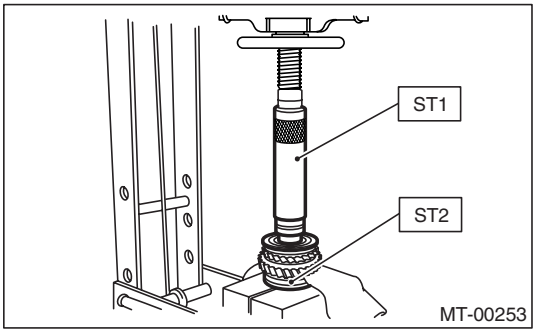
(A) 1st driven gear
(B) 1st baulk ring
(C) Gear and hub ASSY
(D) 2nd gear bushing

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

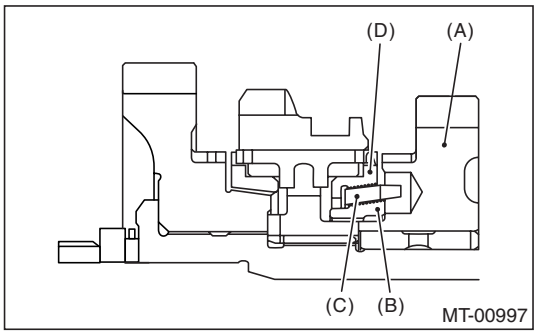
5) Install the 2nd driven gear bushing onto driven shaft using ST1, ST2 and a press.

NOTE:
• Do not apply pressure in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).
• Attach a cloth to the end of driven shaft to prevent damage.
• When press-fitting, align the oil holes of shaft and bushing.

ST1 499277200 INSTALLER
ST2 499587000 INSTALLER



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

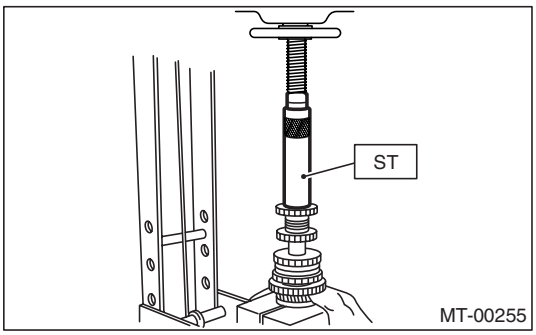


(A) 2nd driven gear
(B) Inner baulk ring
(C) Synchro cone
(D) Outer baulk ring

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

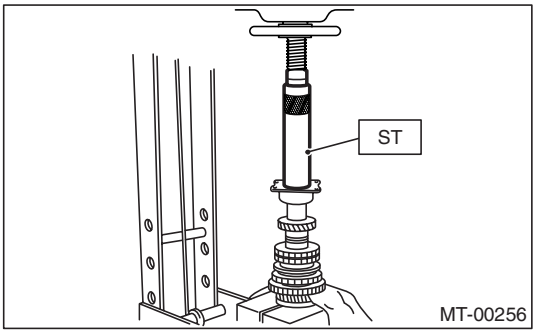
NOTE:
• Do not apply pressure in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).
• Align the groove in baulk ring with insert.

ST 499277200 INSTALLER



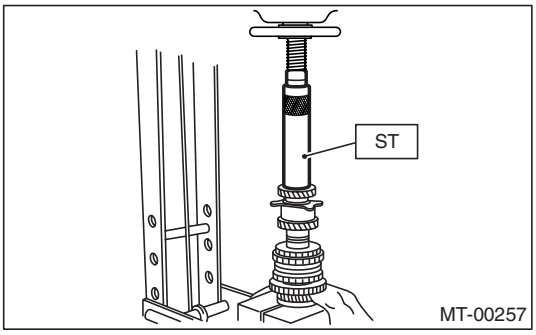
8) Install a set of roller bearings onto the driven shaft using ST and press.

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



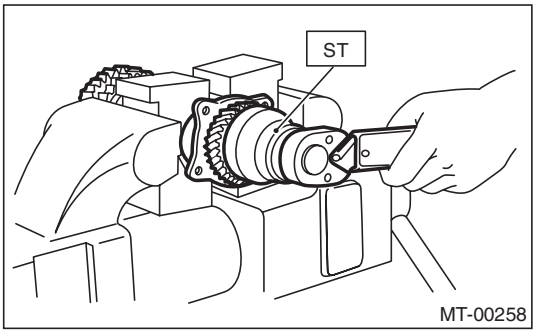
9) Position the woodruff key in groove on the rear of driven shaft. Install the 5th driven gear onto driven shaft using ST and press.

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



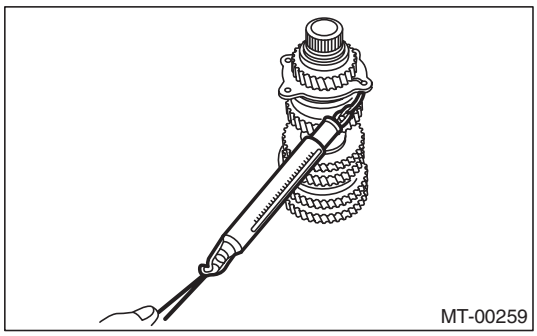
10) Install the lock washer. Install the lock nut and tighten to the specified torque using ST.
ST 499987300 SOCKET WRENCH (50)

Tightening torque:
260 N·m (26.5 kgf-m, 191.7 ft-lb)



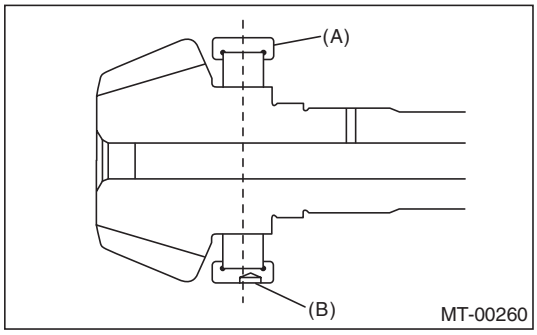
NOTE:
• Stake the caulking of lock nut at two points.

• Using a 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 lbf).



11) Install the roller bearing onto drive pinion.

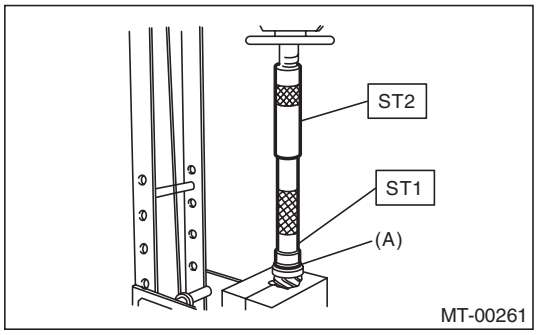
NOTE:
When installing roller bearing, note its directions (front and rear) because the knock pin hole in outer race is offset.



(A) Roller bearing
(B) Knock pin hole

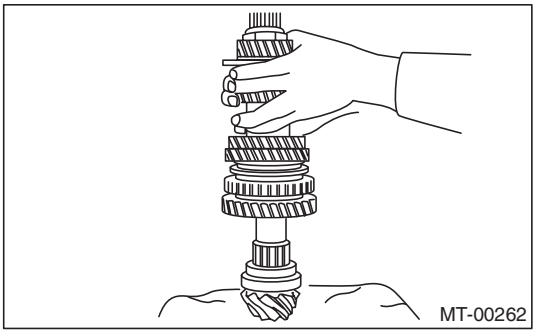
12) Install the washer using ST1, ST2 and a press.

NOTE:
Do not apply pressure in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).
ST1 499277100 BUSHING 1-2 INSTALLER
ST2 499277200 INSTALLER



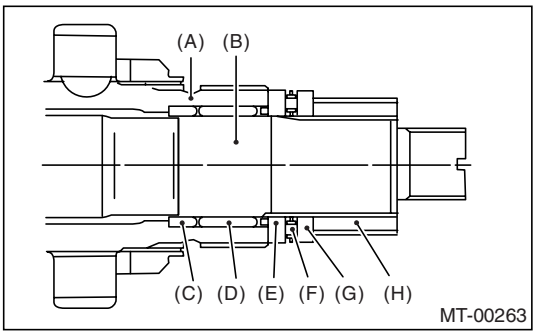
(A) Washer

13) Install the thrust bearing and needle bearing. Install the driven shaft assembly.



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

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

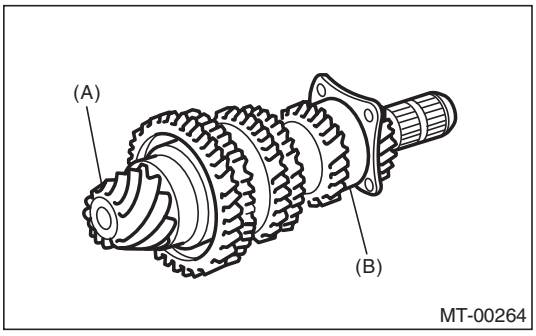


(A) Driven shaft
(B) Drive shaft
(C) Drive pinion collar
(D) Needle bearing (25 × 30 × 20)
(E) Washer No. 2 (25 × 36 × 4)
(F) Thrust bearing (25 × 37.5 × 3)
(G) Washer No. 1 (25 × 36 × t)
(H) Differential bevel gear sleeve

15) Adjust the thrust bearing preload. <Ref. to 5MT-82, THRUST BEARING PRELOAD, ADJUSTMENT, Drive Pinion Shaft Assembly.>

E: INSPECTION

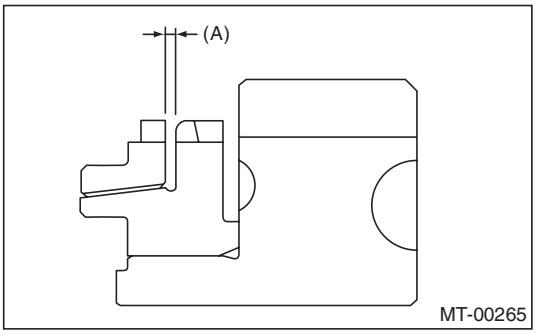
Disassembled parts should be washed with unleaded gasoline first and then inspected carefully.
1) Bearings
Replace the bearing in following cases:
• When the bearing balls, outer races and inner races are broken or rusty.
• When the bearing is worn.
• When the bearings fail to turn smoothly or emit noise in rotation 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 other bearings.



(A) Drive pinion shaft
(B) Ball bearing

• When bearings have other defects:
2) Bushing (each gear)
Replace the bushings in following cases:
• When the sliding surface is damaged or abnormally worn.
• When the inner wall is abnormally worn.
3) Gears
• Replace gears with new ones if their tooth surfaces are broken, damaged, or excessively worn.
• Correct or replace if the cone that contacts the baulk ring is rough or damaged.
• Correct or replace if the inner surface or end face is damaged.
4) Baulk ring
Replace the ring in following cases:
• When the inner surface and end face are damaged.
• When the ring inner surface is abnormally or partially worn.
• If the gap between the end faces of ring and the gear splined part is excessively small, check the clearance (A) while pressing the ring against the cone.

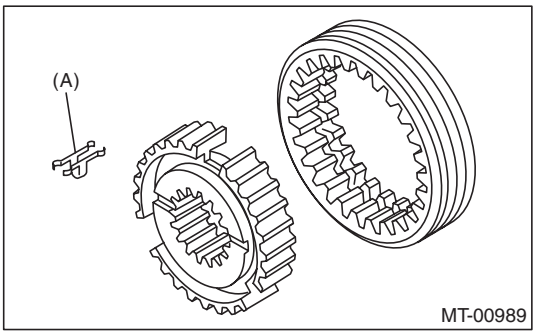
Clearance (A):
0.5 — 1.0 mm (0.020 — 0.040 in)



• When the contact surface of synchronizer ring insert is scratched or abnormally worn.

5) Shifting insert key

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



(A) Insert key

6) Oil seal

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

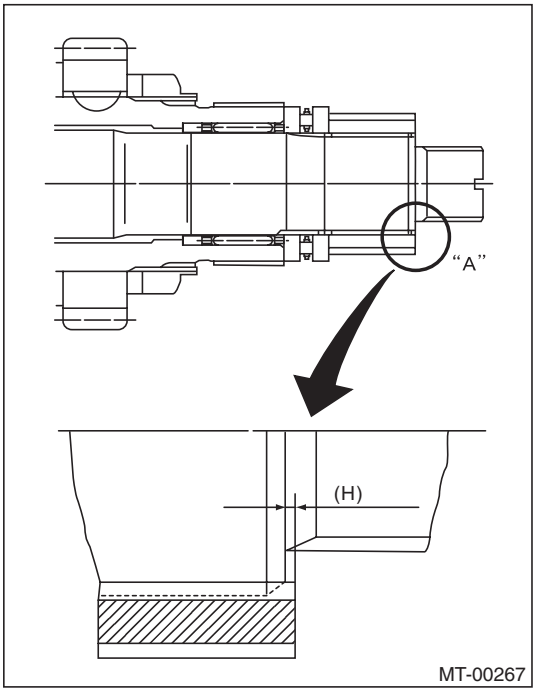
7) O-ring

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

F: ADJUSTMENT

1. THRUST BEARING PRELOAD

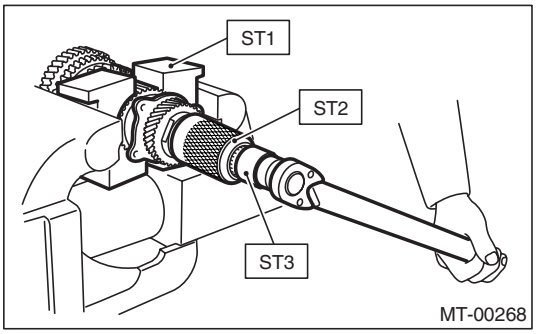
1) Select a suitable adjusting washer No. 1 to adjust dimension (H) to zero through visual check. Position the washer (18.3 × 30 × 4) and lock washer (18 × 30 × 2) and install the lock nut (18 × 13.5).



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

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

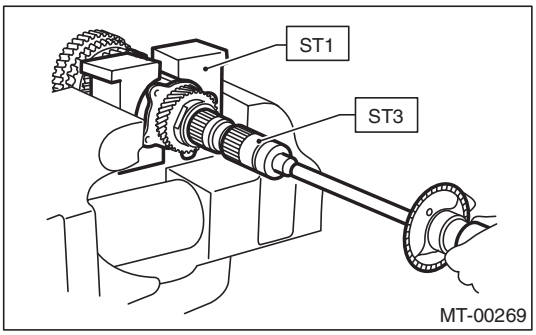
Tightening torque:
120 N·m (12.2 kgf-m, 88.5 ft-lb)



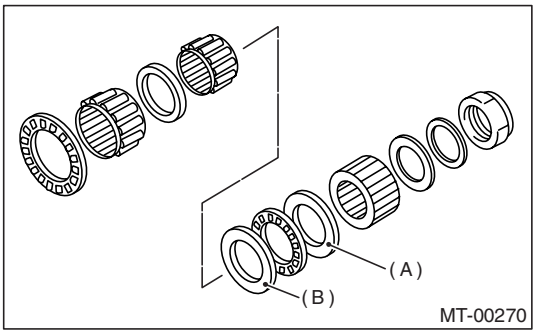
3) After removing the ST2, measure the starting torque using torque driver.

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)



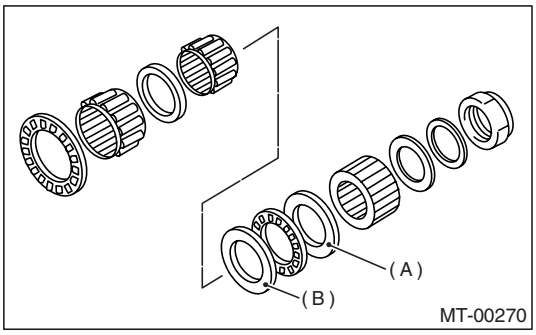
4) If the starting torque is not within specified limit, select new adjusting washer No. 1 and recheck starting torque.



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

Adjusting washer No. 1	
Part Number	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) When the specified starting torque cannot be obtained by the adjusting washer No. 1, select the adjusting washer No. 2 from 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 Number	Thickness mm (in)
803025059	3.850 (0.1516)
803025054	4.000 (0.1575)
803025058	4.150 (0.1634)

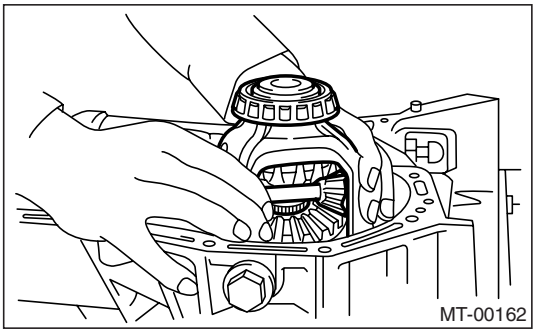
6) Recheck that the starting torque is within specified range, then clinch the lock nut at four positions.

19.Front Differential Assembly

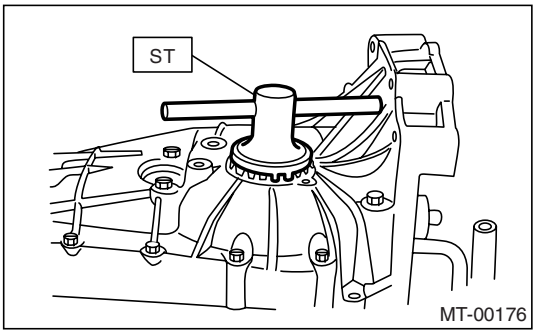
A: REMOVAL

1) Remove the manual transmission assembly from vehicle. <Ref. to 5MT-30, REMOVAL, Manual Transmission Assembly.>
2) Remove the transfer case with extension case assembly. <Ref. to 5MT-43, REMOVAL, Transfer Case and Extension Case Assembly.>
3) Remove the transmission case. <Ref. to 5MT-55, REMOVAL, Transmission Case.>
4) Removes the drive pinion shaft assembly. <Ref. to 5MT-76, REMOVAL, Drive Pinion Shaft Assembly.>
5) Remove the main shaft assembly.
• Single-range model
<Ref. to 5MT-61, REMOVAL, Main Shaft Assembly for Single-Range.>
• Dual-range model
<Ref. to 5MT-66, REMOVAL, Main Shaft Assembly for Dual-Range.>
6) Remove the differential assembly.

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



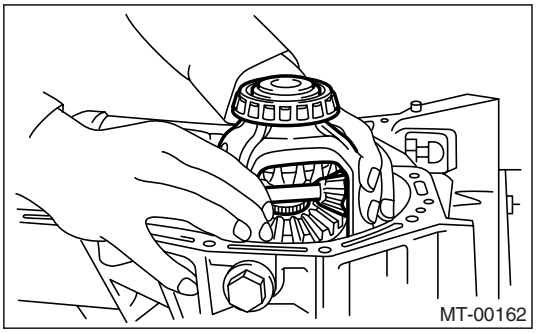
7) Remove the differential side retainers using ST.
ST 499787000 WRENCH ASSY



B: INSTALLATION

1) Install the differential side retainers using ST.
ST 499787000 WRENCH ASSY
2) Install the bearing outer race on transmission case.
3) Install the differential assembly.

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

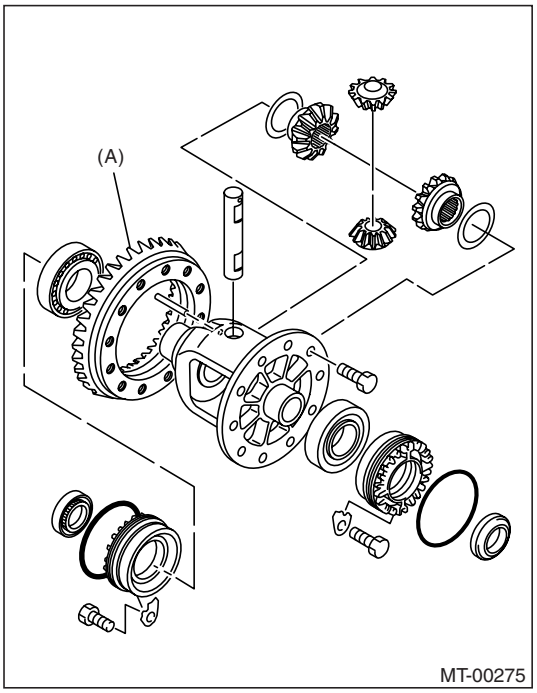


4) Install the main shaft assembly.
• Single-range model
<Ref. to 5MT-61, INSTALLATION, Main Shaft Assembly for Single-Range.>
• Dual-range model
<Ref. to 5MT-66, INSTALLATION, Main Shaft Assembly for Dual-Range.>
5) Install the drive pinion assembly. <Ref. to 5MT-76, INSTALLATION, Drive Pinion Shaft Assembly.>
6) Install the transmission case. <Ref. to 5MT-57, INSTALLATION, Transmission Case.>
7) Install the transfer case with extension case assembly. <Ref. to 5MT-43, INSTALLATION, Transfer Case and Extension Case Assembly.>
8) Install the manual transmission assembly into vehicle. <Ref. to 5MT-32, INSTALLATION, Manual Transmission Assembly.>

C: DISASSEMBLY

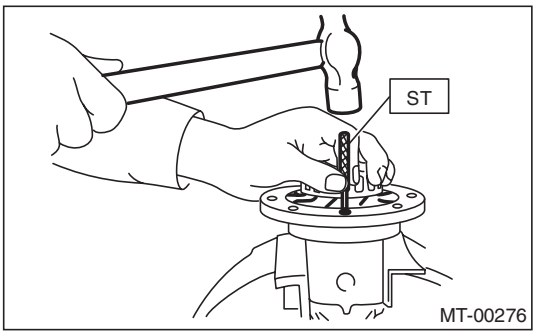
1. DIFFERENTIAL CASE ASSEMBLY

1) Loosen the twelve bolts and remove hypoid driven gear.

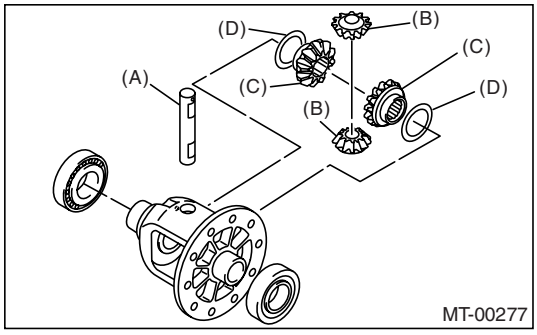


(A) Hypoid driven gear

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

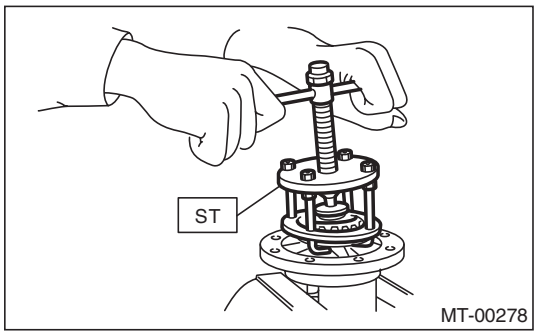


3) Pull out the pinion shaft, and remove the differential bevel pinion, bevel gear and washer.



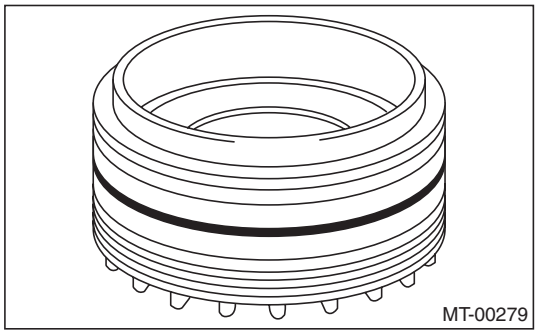
(A) Pinion shaft
(B) Bevel pinion
(C) Bevel gear
(D) Washer

4) Using the ST, remove the roller bearing.
ST 899524100 PULLER SET



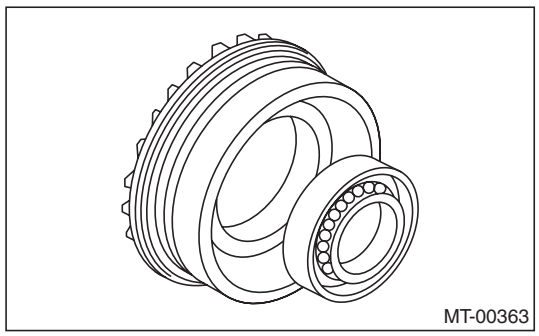
2. SIDE RETAINER

1) Remove the O-ring.



2) Remove the oil seal.

NOTE:
Do not reuse the oil seal. Replace with a new oil seal.

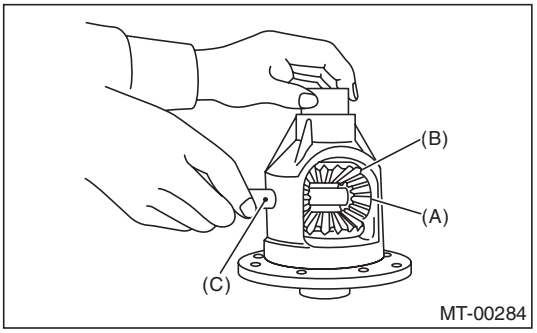


D: ASSEMBLY

1. DIFFERENTIAL CASE ASSEMBLY

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

NOTE:
Face the chamfered side of washer toward gear.

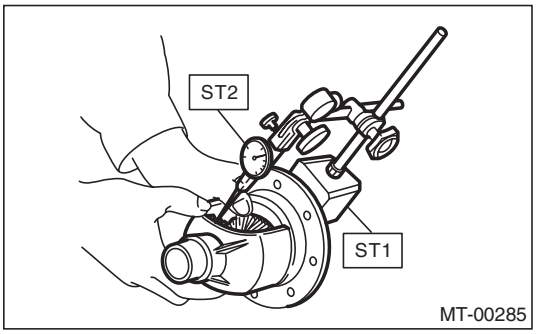


(A) Bevel pinion
(B) Bevel gear
(C) Pinion shaft

2) Measure the backlash between bevel gear and pinion. If it is not within specifications, install a suitable washer to adjust. <Ref. to 5MT-88, ADJUSTMENT, Front Differential Assembly.>

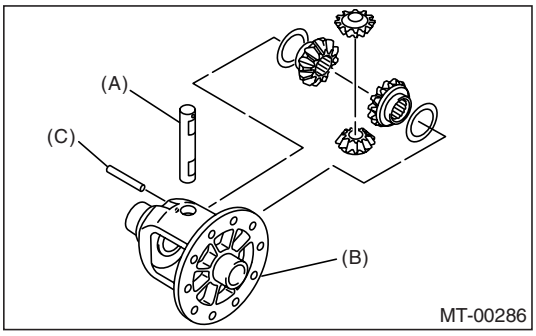
NOTE:
Be sure the pinion gear teeth contacts adjacent gear teeth during measurement.
ST1 498247001 MAGNET BASE
ST2 498247100 DIAL GAUGE

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.

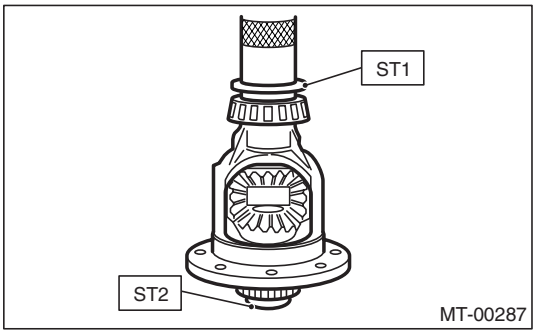
NOTE:
Lock the straight pin after installing.
ST 899904100 REMOVER



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

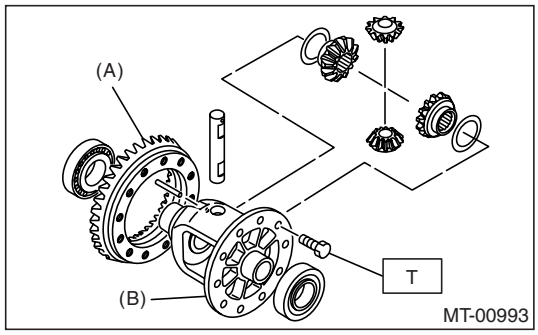
4) Install the roller bearing to differential case.

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 BUSHING 1-2 INSTALLER
ST2 398497701 ADAPTER



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

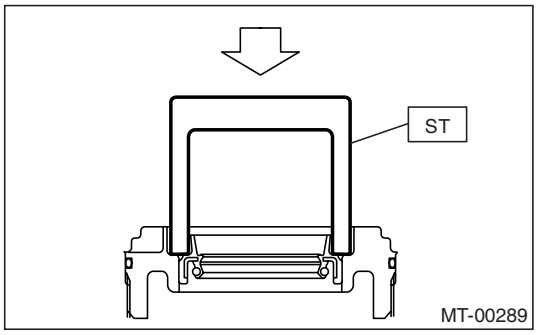
Tightening torque:
T: 62 N·m (6.3 kgf-m, 45.6 ft-lb)



(A) Hypoid driven gear
(B) Differential case

2. SIDE RETAINER

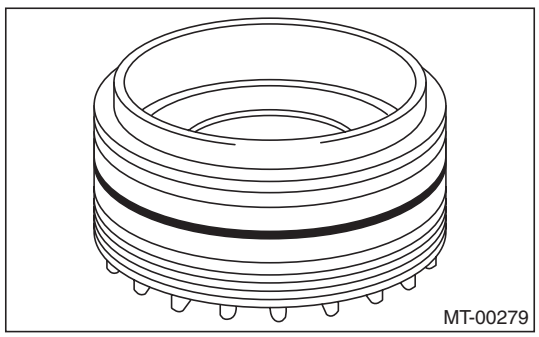
1) Install a new oil seal.
ST 18675AA000 DIFFERENTIAL SIDE OIL SEAL INSTALLER



NOTE:
• For press-fitting of oil seal to retainer, make tapping with plastic hammer etc.
• Do not use press.

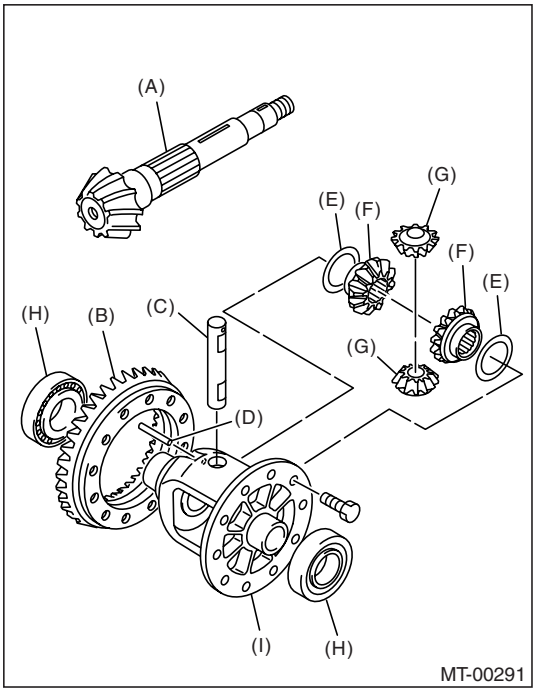
2) Install a new O-ring.

NOTE:
Do not stretch or damage the O-ring.



E: INSPECTION

Repair or replace the differential gear in following cases:
• When the hypoid drive gear and drive pinion shaft tooth surface are damaged, excessively worn or seized.
• When the roller bearing on the drive pinion shaft is worn or damaged.
• When there is damage, wear or seizure of the differential bevel pinion, differential bevel gear, washer, pinion shaft and straight pin.
• When the differential case sliding surfaces is worn or damaged.



(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) Roller bearing
(I) Differential case

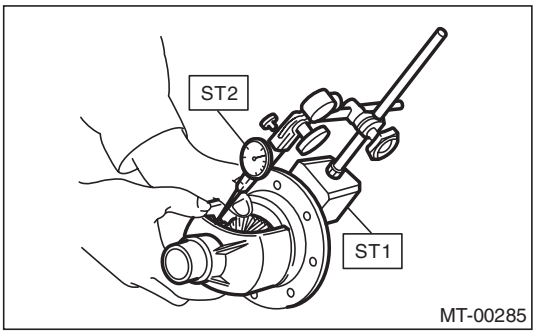
1. BEVEL PINION GEAR BACKLASH

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

NOTE:
Be sure the pinion gear teeth 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)



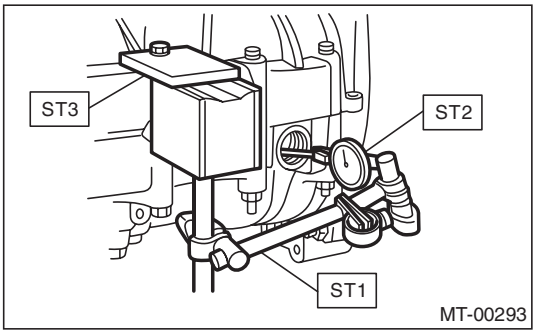
2. HYPOID GEAR BACKLASH

1) 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 on the right corner and check the backlash.

ST1 498247001 MAGNET BASE
ST2 498247100 DIAL GAUGE
ST3 498255400 PLATE

2) Install the SUBARU genuine axle shafts to both side, rotate in the inversion direction so that the gauge contact with the tooth surface and read the dial gauge.
Part No. 38415AA100AXLE SHAFT

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

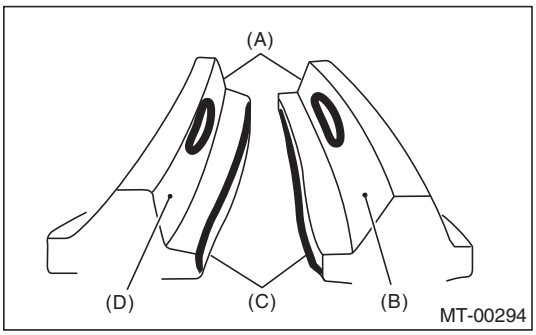


NOTE:
If the backlash is outside the specified range, adjust it by turning the side retainer in right side case.

3. TOOTH CONTACT OF HYPOID GEAR

Check tooth contact of hypoid gear as follows: Apply a uniform thin coat of red lead on both tooth surfaces of 3 or 4 teeth of the hypoid gear. Move the hypoid gear back and forth by turning the transmission main shaft until a definite contact pattern is developed on hypoid gear, and judge whether face contact is correct. If it is inaccurate, make adjustment. <Ref. to 5MT-88, 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-84, REMOVAL, Front Differential Assembly.>
2) Select a different washer from the table and install.

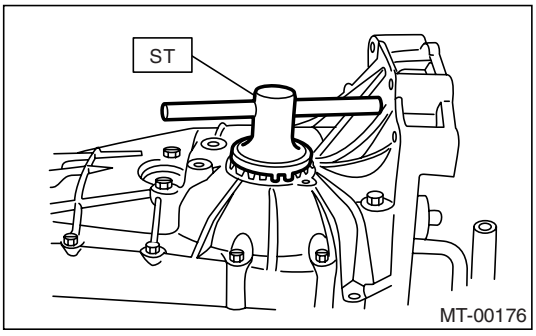
Washer	
Part Number	Thickness mm (in)
803038021	0.925 — 0.950 (0.0364 — 0.0374)
803038022	0.975 — 1.000 (0.0384 — 0.0394)
803038023	1.025 — 1.050 (0.0404 — 0.0413)

3) Adjust until the standard is obtained.

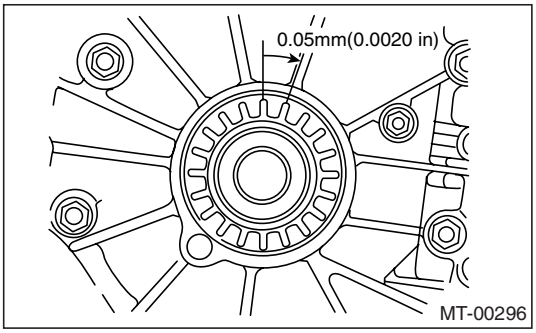
Backlash:
Standard
0.13 — 0.18 mm (0.0051 — 0.0071 in)

2. HYPOID GEAR BACKLASH

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

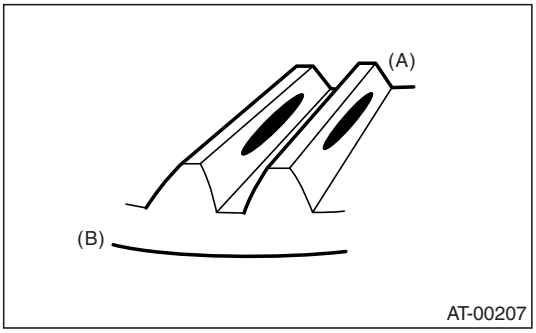


NOTE:
Each time the side retainer rotates one notch, backlash changes by 0.05 mm (0.020 in).



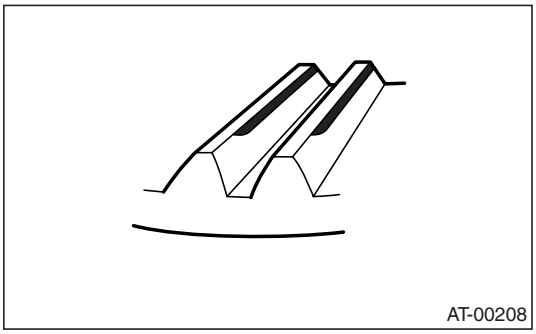
3. TOOTH CONTACT OF HYPOID GEAR

1) Adjust until correct teeth contact is obtained.
2) Check tooth contact as follows.
• Tooth contact
Checking item: Tooth contact pattern is slightly shifted to toe side under no-load rotation. [When loaded, contact pattern moves toward heel.]

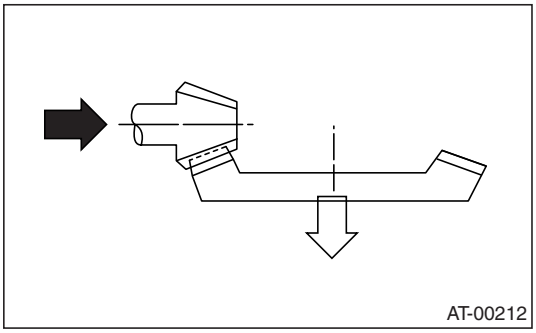


(A) Toe side
(B) Heel side

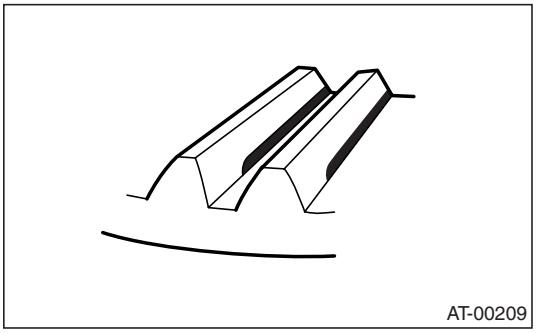
• Face contact
Checking item: Backlash is too large.
Contact pattern



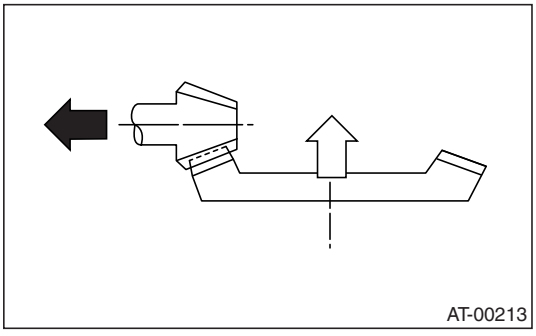
Corrective action: Reduce thickness of pinion height adjusting washer in order to bring drive pinion closer to driven gear.



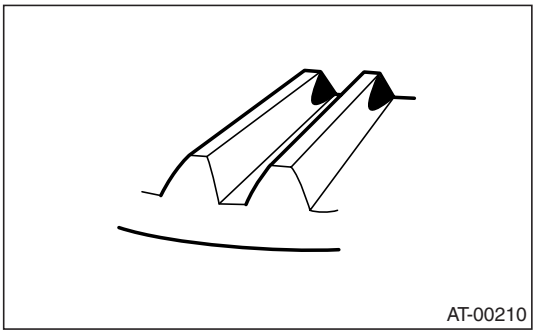
• Flank contact
Checking item: Backlash is too small.
Contact pattern



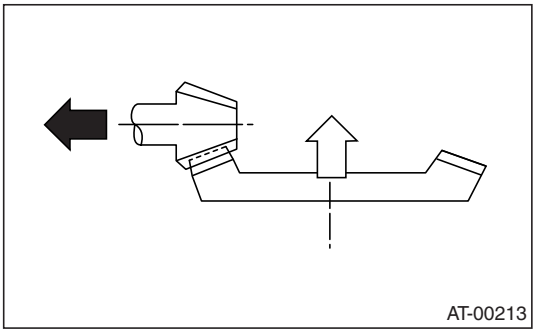
Corrective action: Increase thickness of pinion height adjusting washer in order to bring drive pinion away from driven gear.



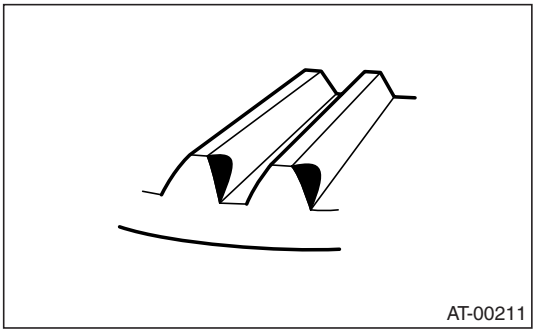
• Toe contact (inside end contact)
Checking item: Contact area is small.
Contact pattern



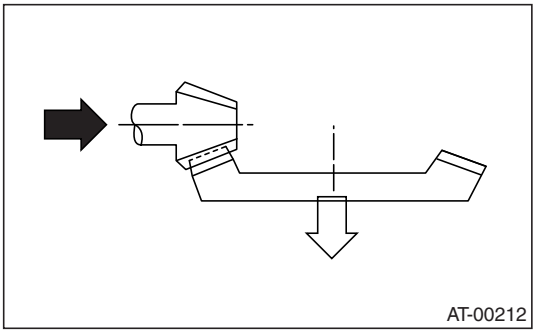
Corrective action: Increase thickness of pinion height adjusting washer in order to bring drive pinion closer to driven gear.



• Heel contact (outside end contact)
Checking item: Contact area is small.
Contact pattern



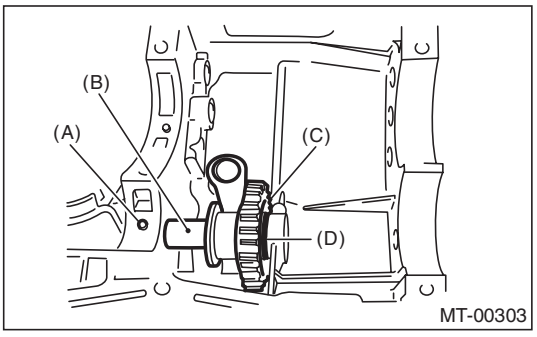
Corrective action: Reduce thickness of pinion height adjusting washer in order to bring drive pinion away from driven gear.



20. Reverse Idler Gear

A: REMOVAL

1) Remove the manual transmission assembly from vehicle. <Ref. to 5MT-30, REMOVAL, Manual Transmission Assembly.>
2) Remove the back-up light switch and neutral position switch. <Ref. to 5MT-40, REMOVAL, Switches and Harness.>
3) Remove the transfer case with extension case assembly. <Ref. to 5MT-43, REMOVAL, Transfer Case and Extension Case Assembly.>
4) Remove the transmission case. <Ref. to 5MT-76, REMOVAL, Drive Pinion Shaft Assembly.>
5) Remove the drive pinion shaft assembly. <Ref. to 5MT-76, REMOVAL, Drive Pinion Shaft Assembly.>
6) Remove the main shaft assembly.
• Single-range model
<Ref. to 5MT-61, REMOVAL, Main Shaft Assembly for Single-Range.>
• Dual-range model
<Ref. to 5MT-66, REMOVAL, Main Shaft Assembly for Dual-Range.>
7) Remove the differential assembly. <Ref. to 5MT-84, REMOVAL, Front Differential Assembly.>
8) Remove the shifter forks and rods. <Ref. to 5MT-93, REMOVAL, Shifter Fork and Rod.>
9) Pull out the straight pin, and remove the idler gear shaft, reverse idler gear and washer.



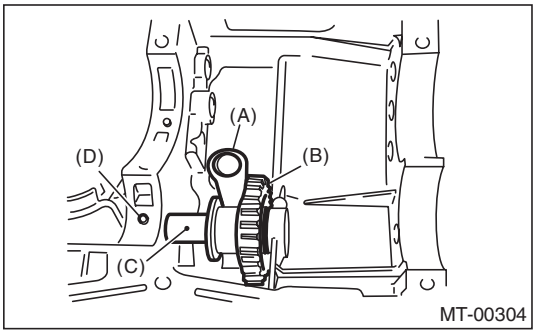
(A) Straight pin
(B) Reverse idler gear shaft
(C) Reverse idler gear
(D) Washer

10) Remove the reverse shifter lever.

B: INSTALLATION

1) Install the reverse shifter lever, reverse idler gear and reverse idler gear shaft, and secure them with straight pin.

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



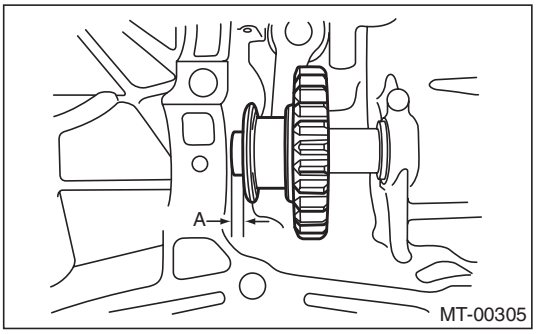
(A) Reverse shifter lever
(B) Reverse idler gear
(C) Reverse idler gear shaft
(D) Straight pin

2) Inspect and adjust the clearance between reverse idler gear and transmission case wall. <Ref. to 5MT-91, INSTALLATION, Reverse Idler Gear.> <Ref. to 5MT-92, ADJUSTMENT, Reverse Idler Gear.>
3) Install the shifter forks and rods. <Ref. to 5MT-93, INSTALLATION, Shifter Fork and Rod.>
4) Install the differential assembly. <Ref. to 5MT-84, INSTALLATION, Front Differential Assembly.>
5) Install the main shaft assembly.
• Single-range model
<Ref. to 5MT-61, INSTALLATION, Main Shaft Assembly for Single-Range.>
• Dual-range model
<Ref. to 5MT-66, INSTALLATION, Main Shaft Assembly for Dual-Range.>
6) Install the drive pinion shaft assembly. <Ref. to 5MT-76, INSTALLATION, Drive Pinion Shaft Assembly.>
7) Install the transmission case. <Ref. to 5MT-57, INSTALLATION, Transmission Case.>
8) Install the transfer case with extension case assembly. <Ref. to 5MT-43, INSTALLATION, Transfer Case and Extension Case Assembly.>
9) Install the back-up light switch and neutral position switch. <Ref. to 5MT-40, INSTALLATION, Switches and Harness.>
10) Install the manual transmission assembly into vehicle. <Ref. to 5MT-32, INSTALLATION, Manual Transmission Assembly.>

C: INSPECTION

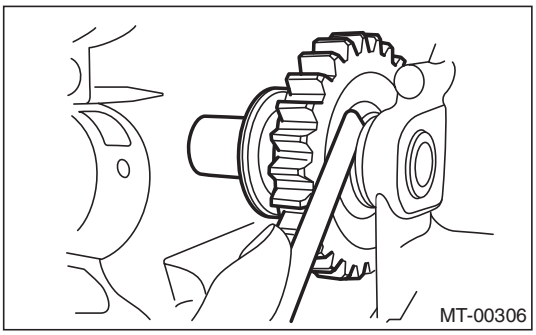
1) Move the reverse shifter rod toward reverse side. Inspect the clearance between reverse idler gear and transmission case wall.
If out of specification, select an appropriate reverse shifter lever and adjust.

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 an appropriate washer and adjust.

Clearance:
0 — 0.5 mm (0 — 0.020 in)

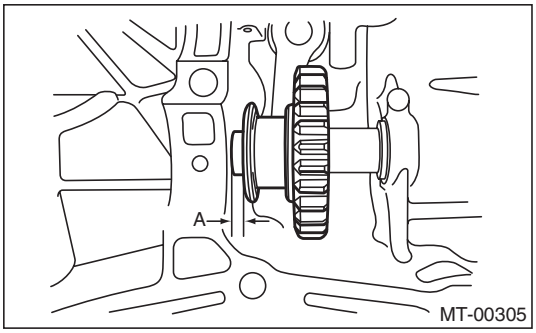


3) Check the reverse idler gear and shaft for damage. Replace if it is damaged.

D: ADJUSTMENT

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

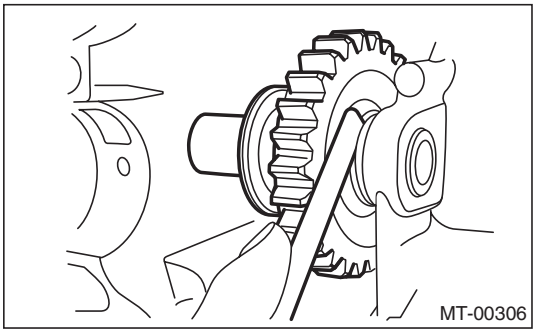
Clearance A:
6.0 — 7.5 mm (0.236 — 0.295 in)



Reverse shifter lever		
Part Number	Marking	Remarks
32820AA070	7	Further from case wall
32820AA080	8	Standard
32820AA090	9	Closer to case wall

2) Select an 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)

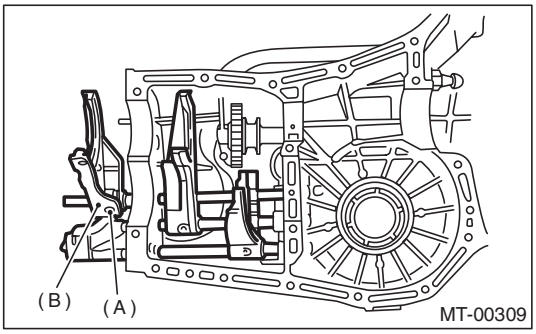


Washer	
Part Number	Thickness mm (in)
803020151	0.4 (0.016)
803020152	1.1 (0.043)
803020153	1.5 (0.059)
803020154	1.9 (0.075)
803020155	2.3 (0.091)

21.Shifter Fork and Rod

A: REMOVAL

1) Remove the manual transmission assembly from vehicle. <Ref. to 5MT-30, REMOVAL, Manual Transmission Assembly.>
2) Remove the back-up light switch and neutral position switch. <Ref. to 5MT-40, REMOVAL, Switches and Harness.>
3) Remove the transfer case with extension case assembly. <Ref. to 5MT-43, REMOVAL, Transfer Case and Extension Case Assembly.>
4) Remove transmission case. <Ref. to 5MT-55, REMOVAL, Transmission Case.>
5) Removes the drive pinion shaft assembly. <Ref. to 5MT-76, REMOVAL, Drive Pinion Shaft Assembly.>
6) Remove the main shaft assembly.
• Single-range model
<Ref. to 5MT-61, REMOVAL, Main Shaft Assembly for Single-Range.>
• Dual-range model
<Ref. to 5MT-66, REMOVAL, Main Shaft Assembly for Dual-Range.>
7) Remove the differential assembly. <Ref. to 5MT-84, REMOVAL, Front Differential Assembly.>
8) Drive out the straight pin tapping by ST, and pull out the 5th shifter fork.
ST 398791700 STRAIGHT PIN REMOVER

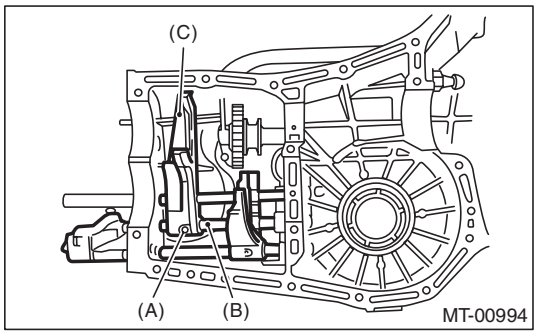


(A) Straight pin
(B) 5th shifter fork

9) Remove the plugs, springs and checking balls.
10) Drive out the straight pin tapping by ST, and pull out the 3-4 fork rod and shifter fork.

NOTE:
When removing a 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.

ST 398791700 STRAIGHT PIN REMOVER



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

11) Drive out the straight pin tapping by ST, and pull out the 1-2 fork rod and shifter fork.
ST 398791700 STRAIGHT PIN REMOVER
12) Remove the outer snap ring, and pull out reverse fork rod from reverse shifter rod arm. Then take out the ball, spring and interlock plunger from rod.
And then remove the rod.

NOTE:
When pulling out reverse shifter rod arm, be careful not to let 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 the hole in reverse fork rod arm, and hold it with outer snap ring using ST.

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

ST 399411700 ACCENT BALL INSTALLER
2) Position the ball, spring and new gasket in the reverse shifter rod hole on the left side of transmission case, and tighten the checking ball plug.
3) Install the 1-2 fork rod into 1-2 shifter fork through the hole on the rear of transmission case.
4) Align the holes in rod and fork, and drive new 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.

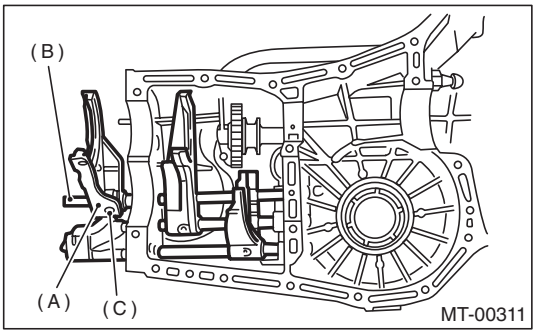
ST 398791700 STRAIGHT PIN REMOVER
5) Install the interlock plunger onto 3-4 fork rod.

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 through the hole on the rear of transmission case.
7) Align the holes in rod and fork, and drive new straight pin into these holes.

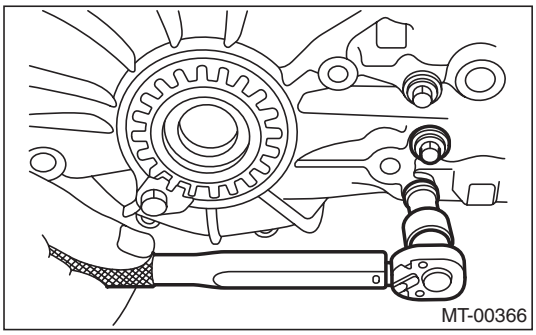
NOTE:
- Set the reverse fork rod to neutral.
- Make sure the interlock plunger (before installation) is on the reverse fork rod side.

ST 398791700 STRAIGHT PIN REMOVER
8) Install the 5th shifter fork onto the rear of reverse fork rod. Align the holes in the two parts and drive new straight pin into the specified 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.



10) Install the differential assembly. <Ref. to 5MT-84, INSTALLATION, Front Differential Assembly.>
11) Install the main shaft assembly.
- Single-range model

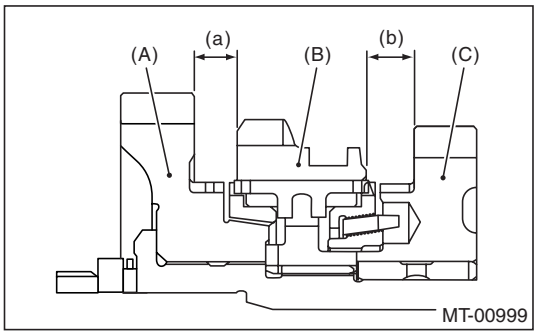
<Ref. to 5MT-61, INSTALLATION, Main Shaft Assembly for Single-Range.>
- Dual-range model

<Ref. to 5MT-66, INSTALLATION, Main Shaft Assembly for Dual-Range.>
12) Install the drive pinion shaft assembly. <Ref. to 5MT-76, INSTALLATION, Drive Pinion Shaft Assembly.>
13) Install the transmission case. <Ref. to 5MT-57, INSTALLATION, Transmission Case.>
14) Install the transfer case with extension case assembly. <Ref. to 5MT-43, INSTALLATION, Transfer Case and Extension Case Assembly.>
15) Install the back-up light switch and neutral position switch. <Ref. to 5MT-40, INSTALLATION, Switches and Harness.>
16) Install the manual transmission assembly into vehicle. <Ref. to 5MT-32, INSTALLATION, Manual Transmission Assembly.>

C: INSPECTION

1) Inspect the fork and rod for damage. Replace if it is 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)

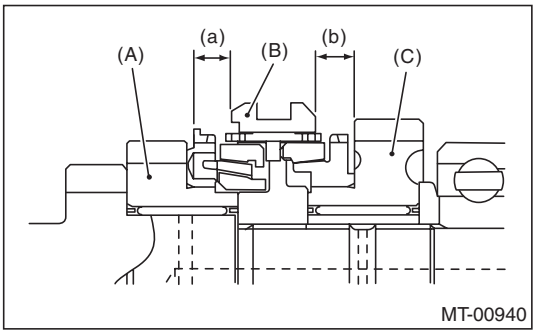


(A) 1st driven gear
(B) Reverse driven gear
(C) 2nd driven gear

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

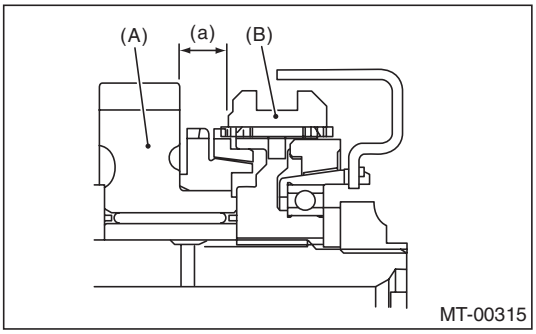


(A) 3rd drive gear
(B) Coupling sleeve
(C) 4th drive gear

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

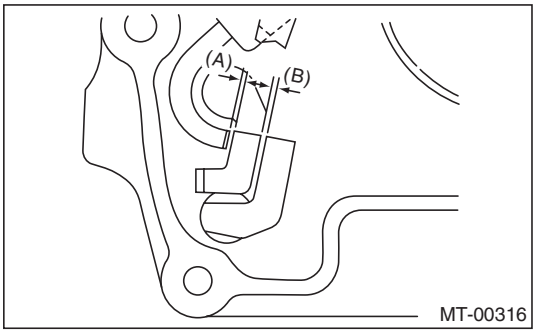
5th shifter fork (Non-turbo model)		
Part Number	Marking	Remarks
32812AA201	7	Approach to 5th gear by 0.2 mm (0.008 in).
32812AA211	No mark	Standard
32812AA221	9	Become distant from 5th gear by 0.2 mm (0.008 in).

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)

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

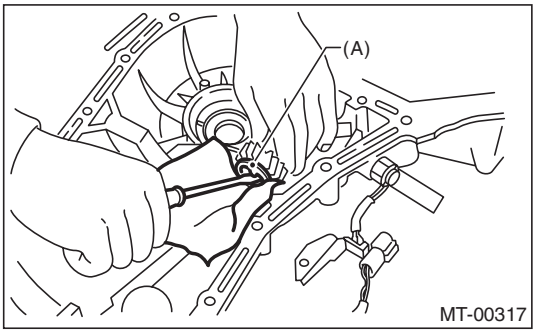
Clearance (B):
1st-2nd — 3rd-4th
0.4 — 1.4 mm (0.016 — 0.055 in)



22.Counter Gear

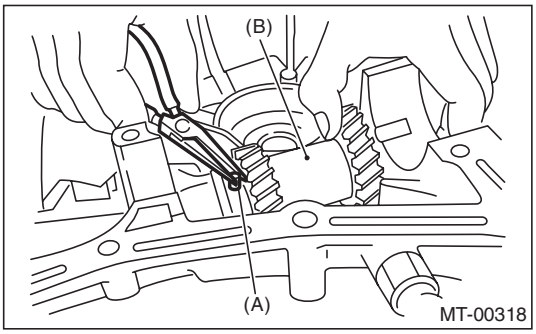
A: REMOVAL

1) Remove the manual transmission assembly from vehicle. <Ref. to 5MT-30, REMOVAL, Manual Transmission Assembly.>
2) Remove the transfer case with extension case assembly. <Ref. to 5MT-43, REMOVAL, Transfer Case and Extension Case Assembly.>
3) Remove the transmission case. <Ref. to 5MT-55, REMOVAL, Transmission Case.>
4) Move the counter gear shaft until it touches transmission case, and remove the snap ring with a suitable tool.



(A) Snap ring

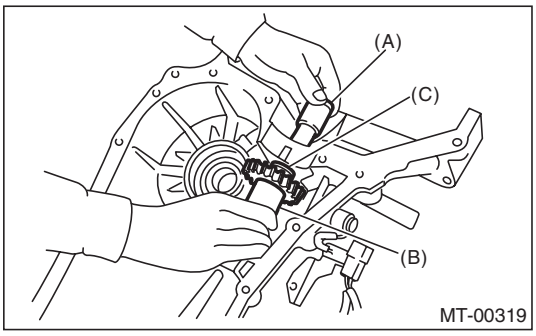
5) Slide the washer to the rear of high-low counter shaft, and remove the straight pin from counter shaft.



(A) Straight pin
(B) Counter gear

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

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



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

B: INSTALLATION

1) Install the O-ring and straight pin onto counter gear shaft.
2) Install the following parts in main case (Right-side), and push the shaft perfectly into case.
• Counter gear shaft
• Two counter gear washers
• Two needle bearings
• Counter gear collar
• Counter gear
• Straight pin
• Snap ring
3) Install the transmission case. <Ref. to 5MT-57, INSTALLATION, Transmission Case.>
4) Install the transfer case with extension case assembly. <Ref. to 5MT-43, INSTALLATION, Transfer Case and Extension Case Assembly.>
5) Install the manual transmission assembly on vehicle. <Ref. to 5MT-32, INSTALLATION, Manual Transmission Assembly.>

NOTE:
• Make sure that the cut-out end surface of counter gear shaft does not protrude above the end surface of the case.
• Position the cut-out portion of counter gear shaft.

C: INSPECTION

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

Clearance:
0.05 — 0.35 mm (0.0020 — 0.0138 in)

2) If the clearance is out of specified value, select a snap ring and install to put clearance within specified value. <Ref. to 5MT-97, ADJUSTMENT, Counter Gear.>

D: ADJUSTMENT

Selection of snap ring:
If the measurement is not within specification, select a suitable snap ring.

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

23. General Diagnostic Table

A: INSPECTION

1. MANUAL TRANSMISSION

Symptom	Possible cause	Corrective action
1. Gears are difficult to intermesh. NOTE: The cause for difficulty in shifting gears can be classified into two kinds: one is defective gear shift system and the other is defective 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	Rectify or replace.
2. Gear slip-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 (caused by 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 main shaft needle bearing	Replace.
	(j) Worn 4th drive gear bushing needle bearing	Replace.
	(k) Worn 5th drive gear bushing needle bearing	Replace.
	(l) Worn reverse idler gear and bushing	Replace.
3. Noise emit from transmission. NOTE: If a noise is heard when the vehicle is parked with its engine idling and if a noise ceases when the clutch is disengaged, it may be considered that the noise comes from the transmission.	(a) Insufficient or improper lubrication	Lubricate with specified oil or replace.
	(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	Corrective action
1. Broken differential (case, gear, bearing, etc.) NOTE: Noise will be developed and finally it will become impossible to continue to run due to broken pieces obstructing the gear revolution.	(a) Insufficient or improper oil	Disassemble differential and replace broken components. At the same time check other components for any trouble, and replace if necessary.
	(b) Use of vehicle under severe conditions such as excessive load and improper use of clutch	Readjust bearing preload and backlash and face contact of gears.
	(c) Improper adjustment of taper roller bearing	Adjustment.
	(d) Improper adjustment of drive pinion and hypoid driven gear	Adjustment.
	(e) Excessive backlash due to worn differential side gear, washer or differential pinion under severe operating conditions of the vehicle.	Add recommended oil to the specified level. Do not use vehicle under severe operating conditions.
	(f) Loose hypoid driven gear tightening 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 trouble. However noises from the engine, muffler, tire, exhaust gas, bearing, body, etc. are easily mistaken for the differential noise. Pay special attention to the hypoid gear noise because it is easily confused with other gear noises. There are the following four kinds of noises. • Gear noise when driving: If noise increases as the vehicle speed increases it may be due to insufficient gear oil, incorrect gear engagement, damaged gears, etc. • Gear noise when coasting: Damaged gears due to maladjusted bearings and incorrect shim adjustment. • Bearing noise when driving or coasting: Cracked, broken or rusty bearings • Noise mainly when turning: Noise occurs form differential side gear, differential pinion or differential pinion shaft, etc.	(a) Insufficient oil	Lubricate.
	(b) Improper adjustment of hypoid driven gear and drive pinion	Check tooth contact.
	(c) Worn teeth of hypoid driven gear and drive pinion	Replace as a set. Readjust bearing preload.
	(d) Loose roller bearing	Readjust hypoid driven gear to drive pinion backlash and check tooth contact.
	(e) Distorted hypoid driven gear or differential case	Replace.
	(f) Worn washer and differential pinion shaft	Replace.

MANUAL TRANSMISSION AND DIFFERENTIAL

6MT

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1. General Description

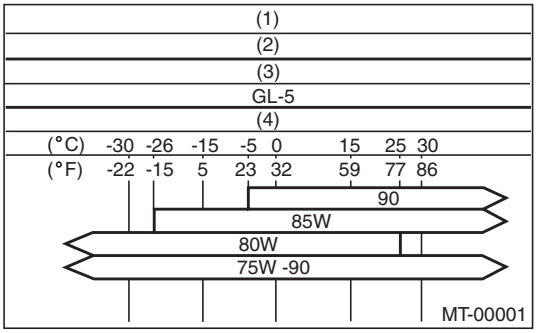
A: SPECIFICATION

1. MANUAL TRANSMISSION AND FRONT DIFFERENTIAL

Type			6-forward speeds and 1-reverse
Transmission gear ratio		1st	3.636
		2nd	2.375
		3rd	1.761
		4th	1.346
		5th	0.971
		6th	0.756
		Reverse	3.545
Front reduction gear	Final	Type of gear	Hypoid
		Gear ratio	3.900
Rear reduction gear	Transfer	Type of gear	Helical
		Gear ratio	1.100
	Final	Type of gear	Hypoid
		Gear ratio	3.545
Front differential	Type and number of gear		Straight bevel gear (Bevel pinion: 2, Bevel gear: 2)
Center Differential	Type and number of gear		Straight bevel gear (Bevel pinion: 2, Bevel gear: 2 and viscous coupling)
Transmission gear oil			GL-5
Transmission gear oil capacity			4.1 ℓ (4.3 US qt, 3.6 Imp qt)

2. TRANSMISSION GEAR OIL

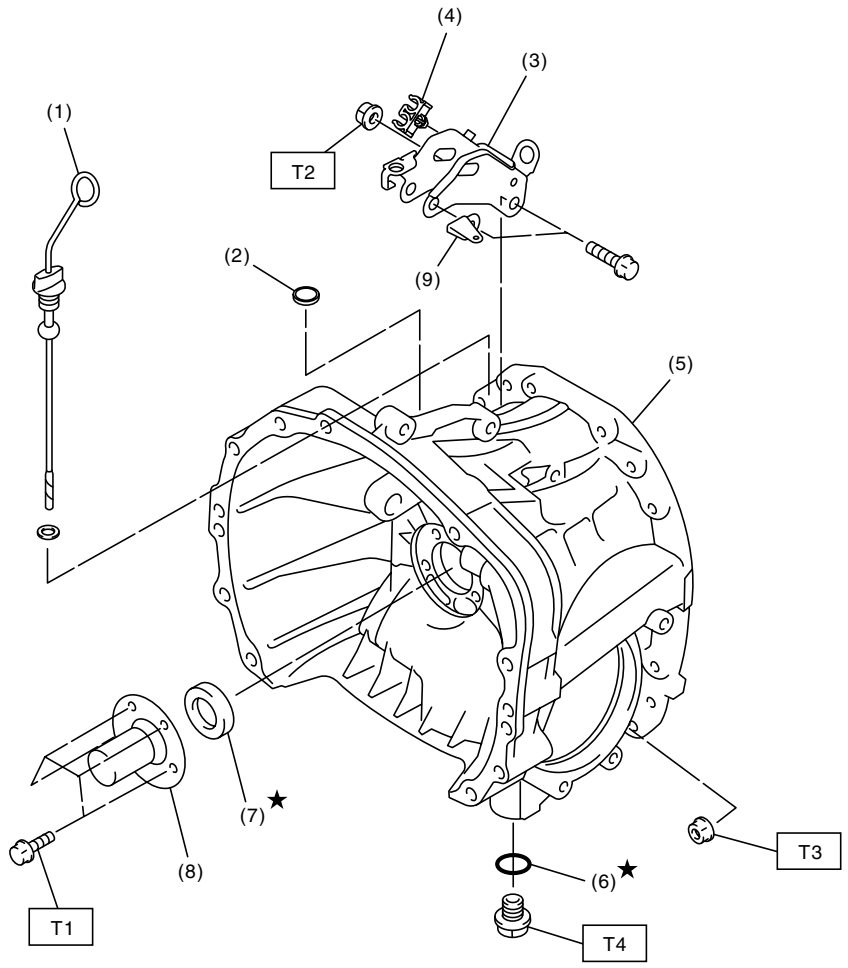
Recommended oil:
GL-5 or equivalent



(1) Item
(2) Transmission gear oil
(3) API standard
(4) SAE viscosity No. and applicable temperature

B: COMPONENT

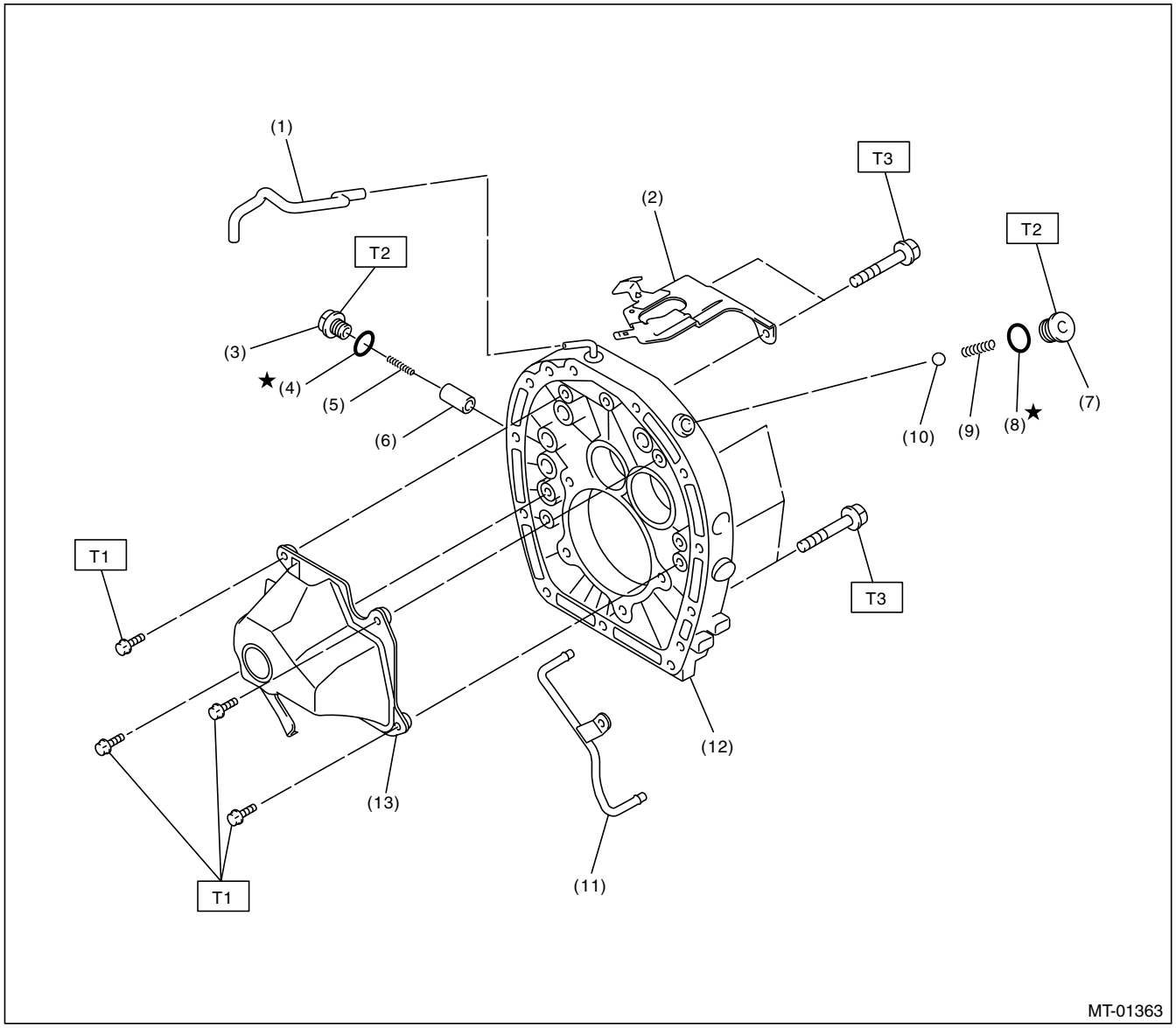
1. CLUTCH HOUSING



(1)	Oil level gauge	(6)	Gasket
(2)	Plug	(7)	Oil seal
(3)	Pitching stopper bracket	(8)	Clutch release bearing guide
(4)	Clip	(9)	Return spring bracket
(5)	Clutch housing		

Tightening torque: N·m (kgf-m, ft-lb)
T1: 6.4 (0.65, 4.7)
T2: 41 (4.2, 30.2)
T3: 50 (5.1, 36.9)
T4: 70 (7.1, 51.6)

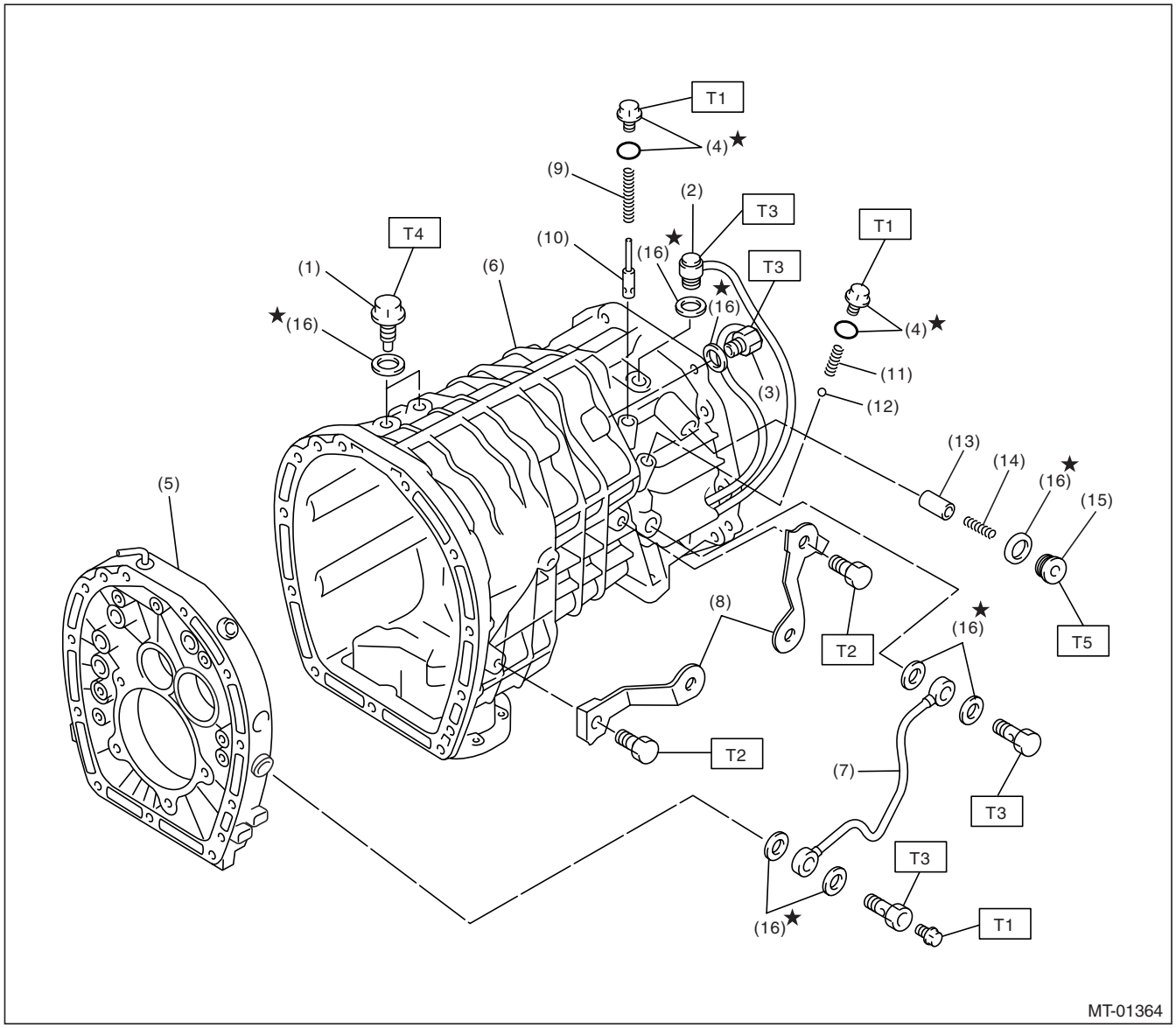
2. ADAPTER PLATE



(1) Breather hose
(2) Transmission harness stay
(3) Plug
(4) Gasket
(5) Spring
(6) Plunger
(7) Checking ball plug
(8) Gasket
(9) Checking ball spring
(10) Ball
(11) Lubrication pipe
(12) Adapter plate
(13) Oil chamber

Tightening torque: N·m (kgf-m, ft-lb)
T1: 6.4 (0.65, 4.7)
T2: 37 (3.8, 27.3)
T3: 50 (5.1, 36.9)

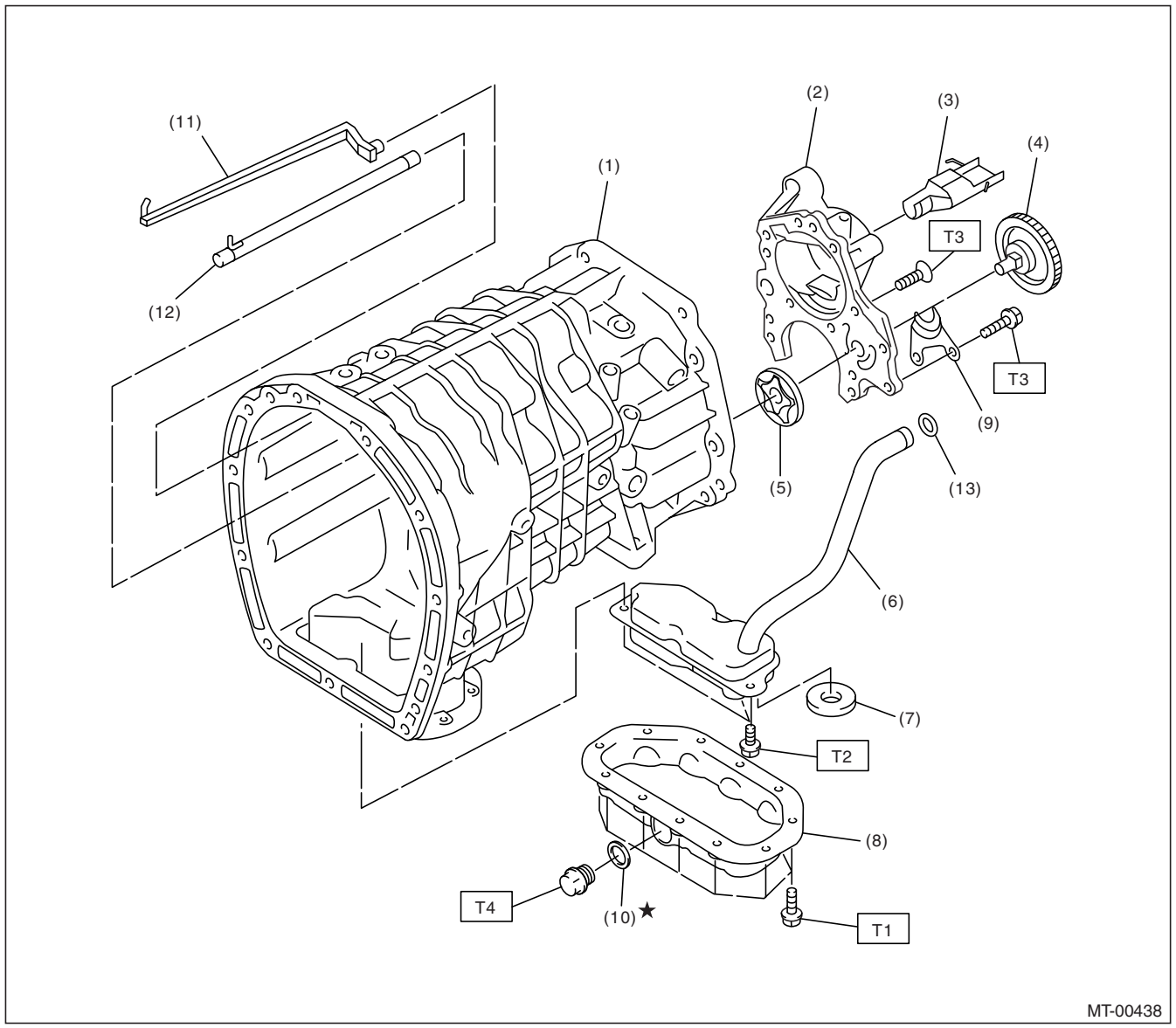
3. TRANSMISSION CASE



(1) Pilot bolt
(2) Neutral position switch
(3) Back-up light switch
(4) Seal bolt assembly
(5) Adapter plate
(6) Transmission case
(7) Oil pipe
(8) Harness bracket
(9) Relief valve spring
(10) Relief valve
(11) Valve spring
(12) Ball
(13) Plunger
(14) Spring
(15) Plug
(16) Gasket

Tightening torque: N·m (kgf-m, ft-lb)
T1: 13 (1.3, 9.6)
T2: 16 (1.6, 11.8)
T3: 32 (3.3, 23.6)
T4: 34 (3.5, 25.1)
T5: 41 (4.2, 30.2)

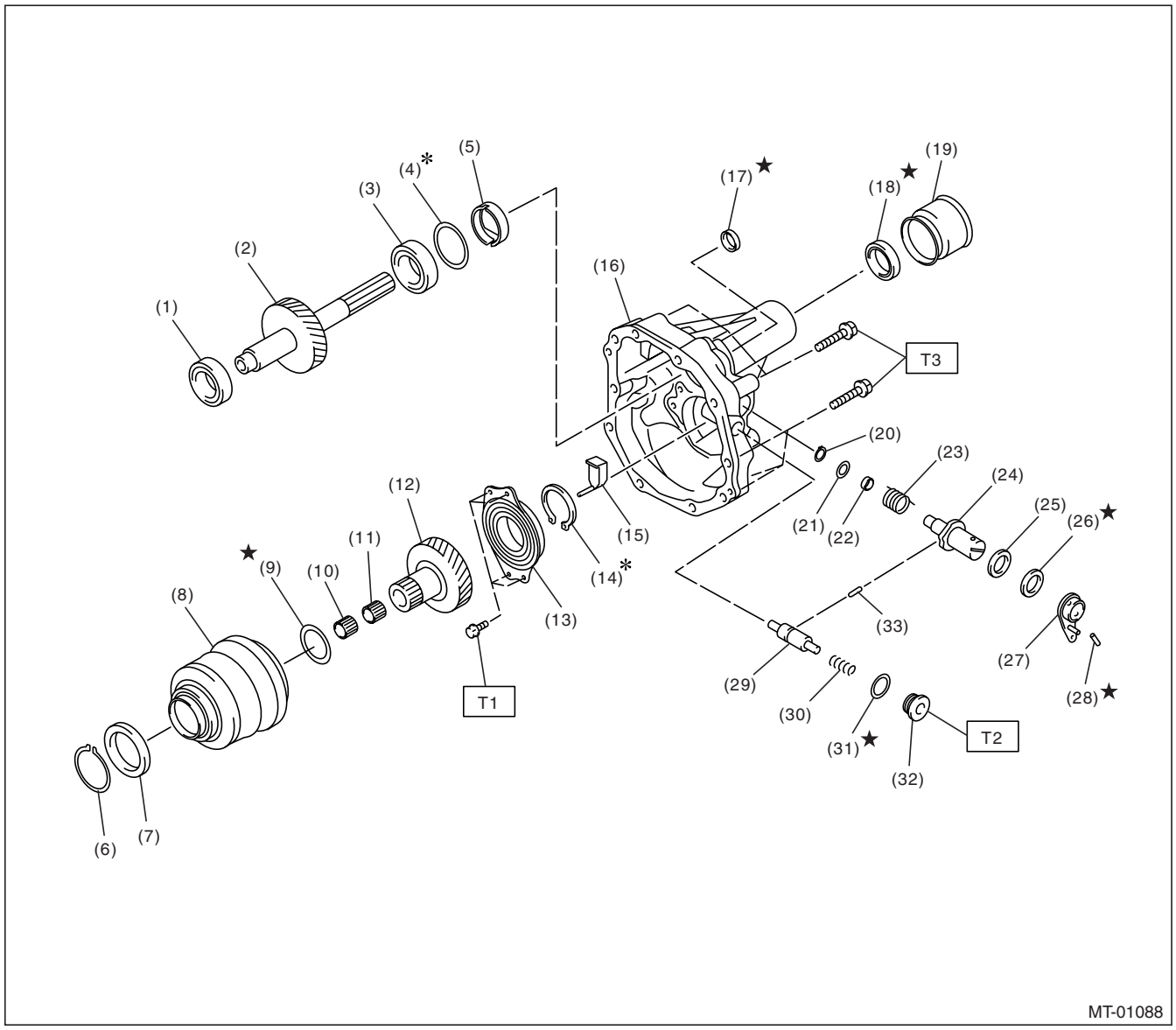
4. OIL PAN AND OIL PUMP



(1)	Transmission case	(8)	Oil pan
(2)	Oil pump cover	(9)	Plate
(3)	Oil guide	(10)	Gasket
(4)	Oil pump driven gear ASSY	(11)	Oil guide
(5)	Oil pump rotor ASSY	(12)	Oil pipe
(6)	Strainer ASSY	(13)	O-ring
(7)	Magnet		

Tightening torque: N·m (kgf-m, ft-lb)
T1: 6.4 (0.65, 4.7)
T2: 10 (1.0, 7.4)
T3: 25 (2.5, 18.4)
T4: 44 (4.5, 32.5)

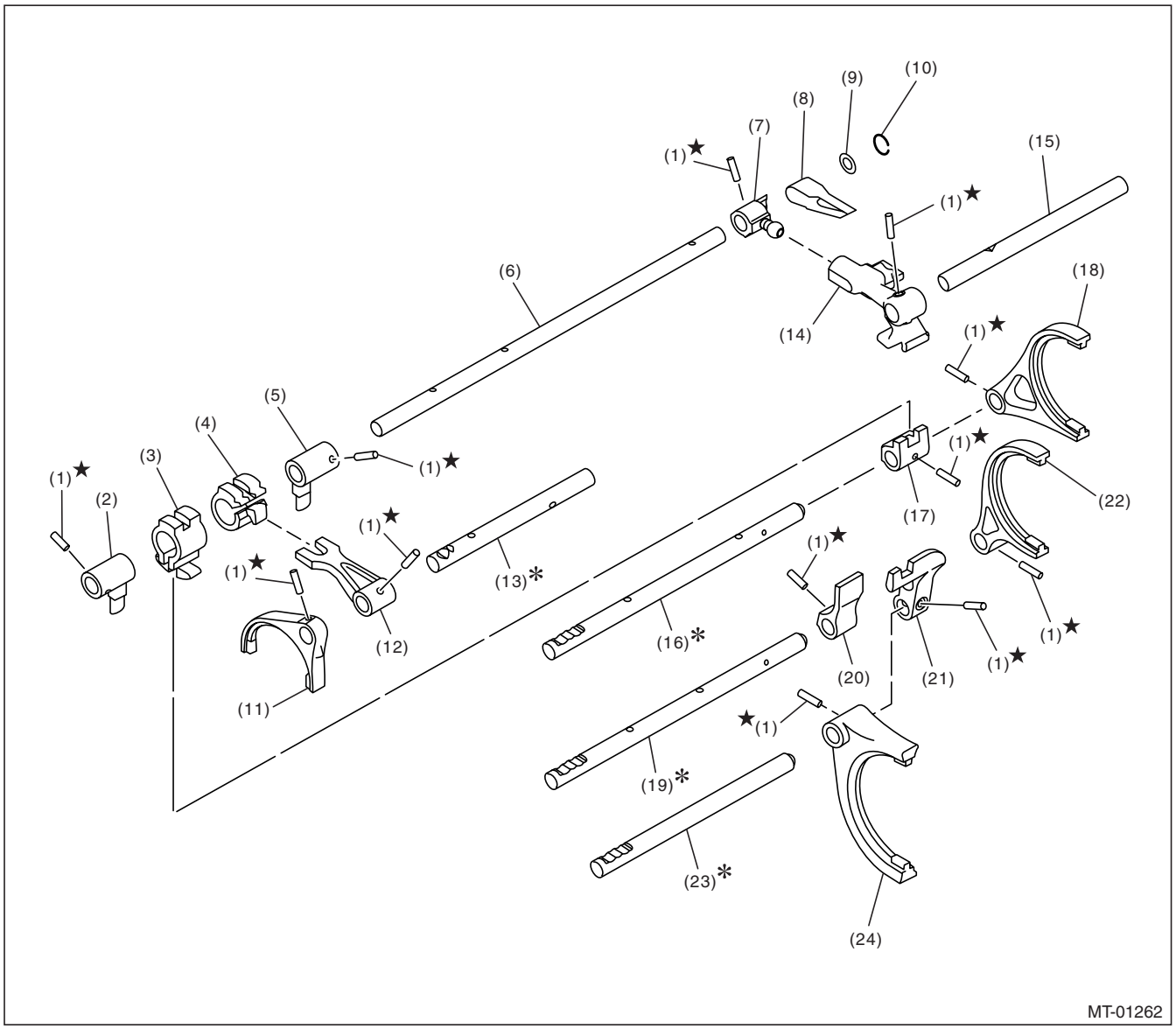
5. EXTENSION CASE AND CENTER DIFFERENTIAL



(1) Taper roller bearing
(2) Transfer driven gear
(3) Taper roller bearing
(4) Shim
(5) Oil plate
(6) Snap ring
(7) Oil pump drive gear
(8) Center differential
(9) Shim
(10) Needle bearing
(11) Needle bearing
(12) Transfer drive gear
(13) Ball bearing (with flange)
(14) Snap ring
(15) Extension guide
(16) Extension case
(17) Oil seal
(18) Oil seal
(19) Dust cover
(20) Snap ring
(21) Washer
(22) Bushing
(23) Spring
(24) Reverse check shaft
(25) Ball bearing
(26) Oil seal
(27) Reverse check lever COMPL
(28) Straight pin
(29) Reverse checking plug
(30) Spring
(31) Gasket
(32) Plug
(33) Plunger

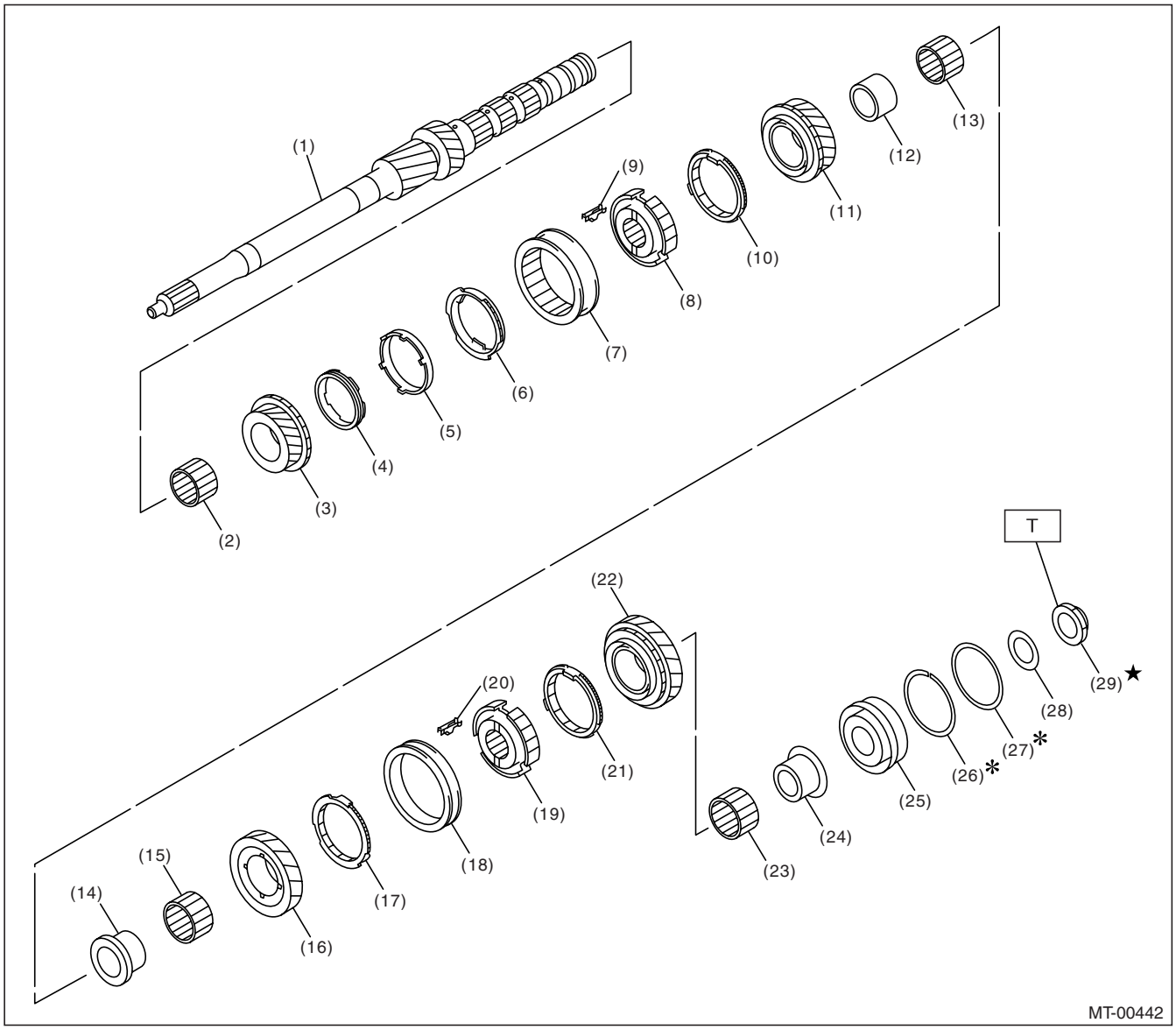
Tightening torque: N·m (kgf-m, ft-lb)
T1: 25 (2.5, 18.4)
T2: 41 (4.2, 30.2)
T3: 48 (4.9, 35.4)

6. SHIFTER FORK AND FORK ROD



(1) Spring pin
(2) Interlock arm
(3) Interlock block
(4) Reverse interlock block
(5) Interlock arm
(6) Striking rod
(7) Selector arm No. 2
(8) Neutral set spring
(9) Washer
(10) Snap ring
(11) Reverse fork COMPL
(12) Reverse shifter arm
(13) Reverse fork rod
(14) Selector arm
(15) Shifter arm shaft
(16) 5th-6th fork rod
(17) 5th-6th shifter arm
(18) 5th-6th fork COMPL
(19) 3rd-4th fork rod
(20) 3rd-4th shifter arm
(21) 1st-2nd shifter arm
(22) 3rd-4th fork COMPL
(23) 1st-2nd fork rod
(24) 1st-2nd fork COMPL

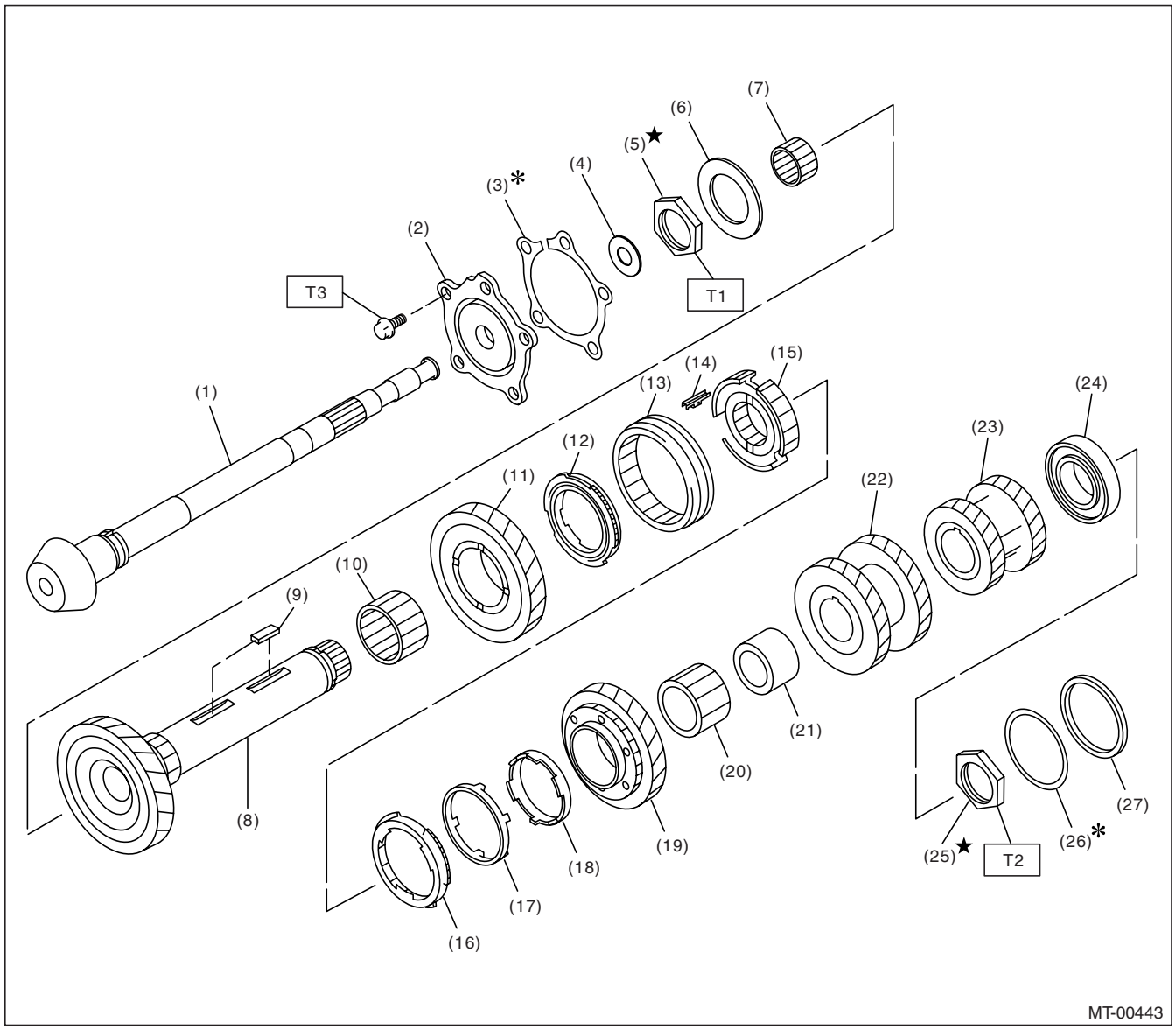
7. MAIN SHAFT ASSEMBLY



(1) Main shaft
(2) Needle bearing
(3) 3rd drive gear
(4) Inner baulk ring
(5) Synchro cone
(6) Outer baulk ring
(7) 3rd-4th sleeve
(8) 3rd-4th hub
(9) Shifting insert key
(10) 4th baulk ring
(11) 4th gear
(12) 4th bushing
(13) Needle bearing
(14) 5th bushing
(15) Needle bearing
(16) 5th drive gear
(17) 5th baulk ring
(18) 5th-6th sleeve
(19) 5th-6th hub
(20) Shifting insert key
(21) 6th baulk ring
(22) 6th drive gear
(23) Needle bearing
(24) 6th bushing
(25) Taper roller bearing
(26) Snap ring
(27) Washer
(28) Washer
(29) Lock nut

Tightening torque: N·m (kgf-m, ft-lb)
T: 392 (40, 289.1)

8. DRIVE PINION AND DRIVE SHAFT ASSEMBLY



(1) Drive pinion shaft
(2) Taper roller bearing
(3) Shim
(4) Washer
(5) Lock nut
(6) Thrust bearing
(7) Needle bearing
(8) Driven shaft
(9) Key
(10) Needle bearing
(11) 1st driven gear
(12) 1st synchro ring ASSY
(13) 1st-2nd sleeve
(14) Shifting insert key
(15) 1st-2nd hub
(16) Outer baulk ring
(17) Synchro cone
(18) Inner baulk ring
(19) 2nd driven gear
(20) Needle bearing
(21) 2nd bushing
(22) 3rd-4th driven gear
(23) 5th-6th driven gear
(24) Ball bearing
(25) Lock nut
(26) Shim
(27) Collar

Tightening torque: N·m (kgf-m, ft-lb)

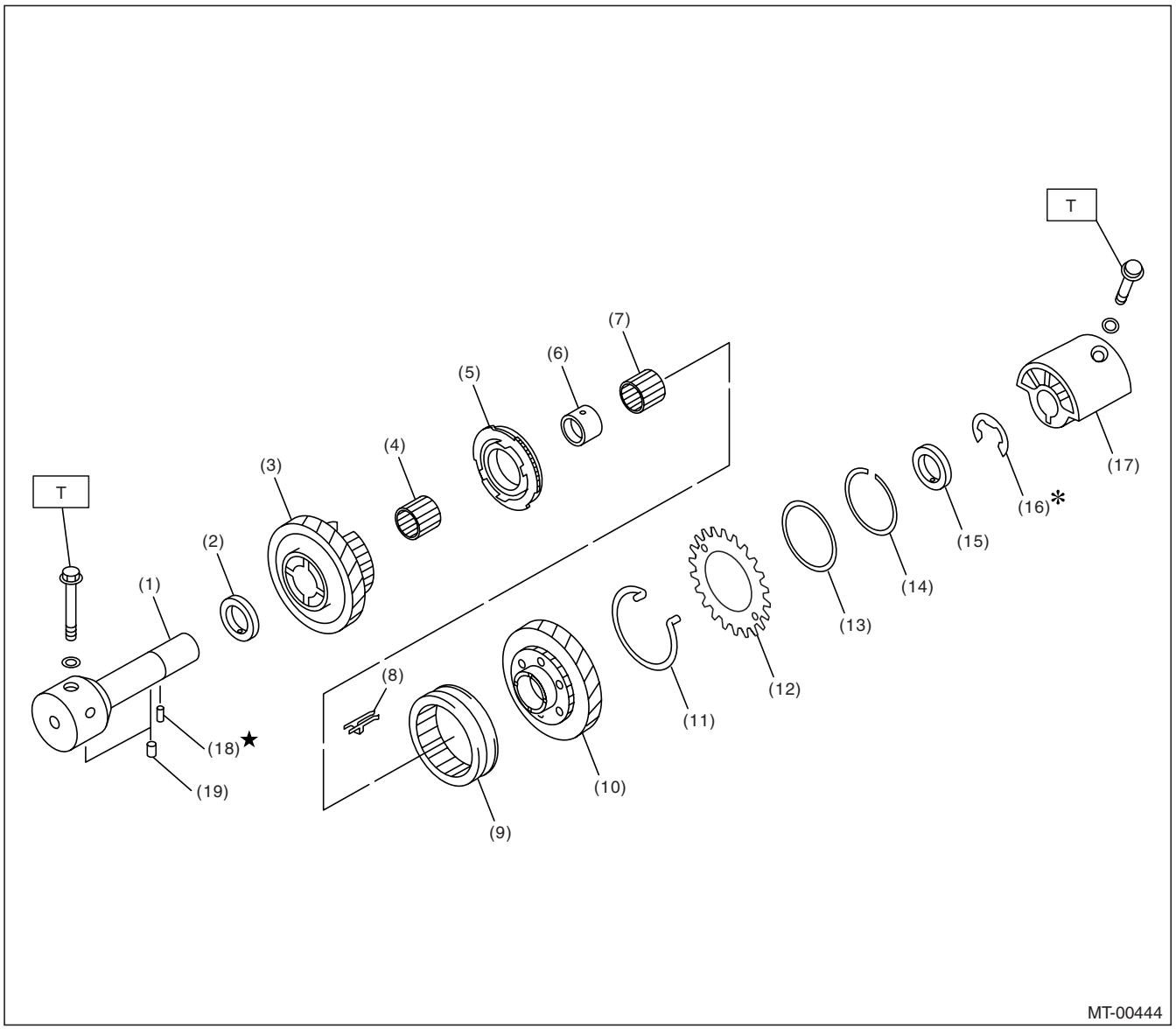
T1: 285 (29.1, 210)
**** 265 (27.0, 195)***

T2: 570 (58.1, 420)
**** 530 (54.0, 391)***

T3: 54 (5.5, 40)

* Tightening torque when ST used

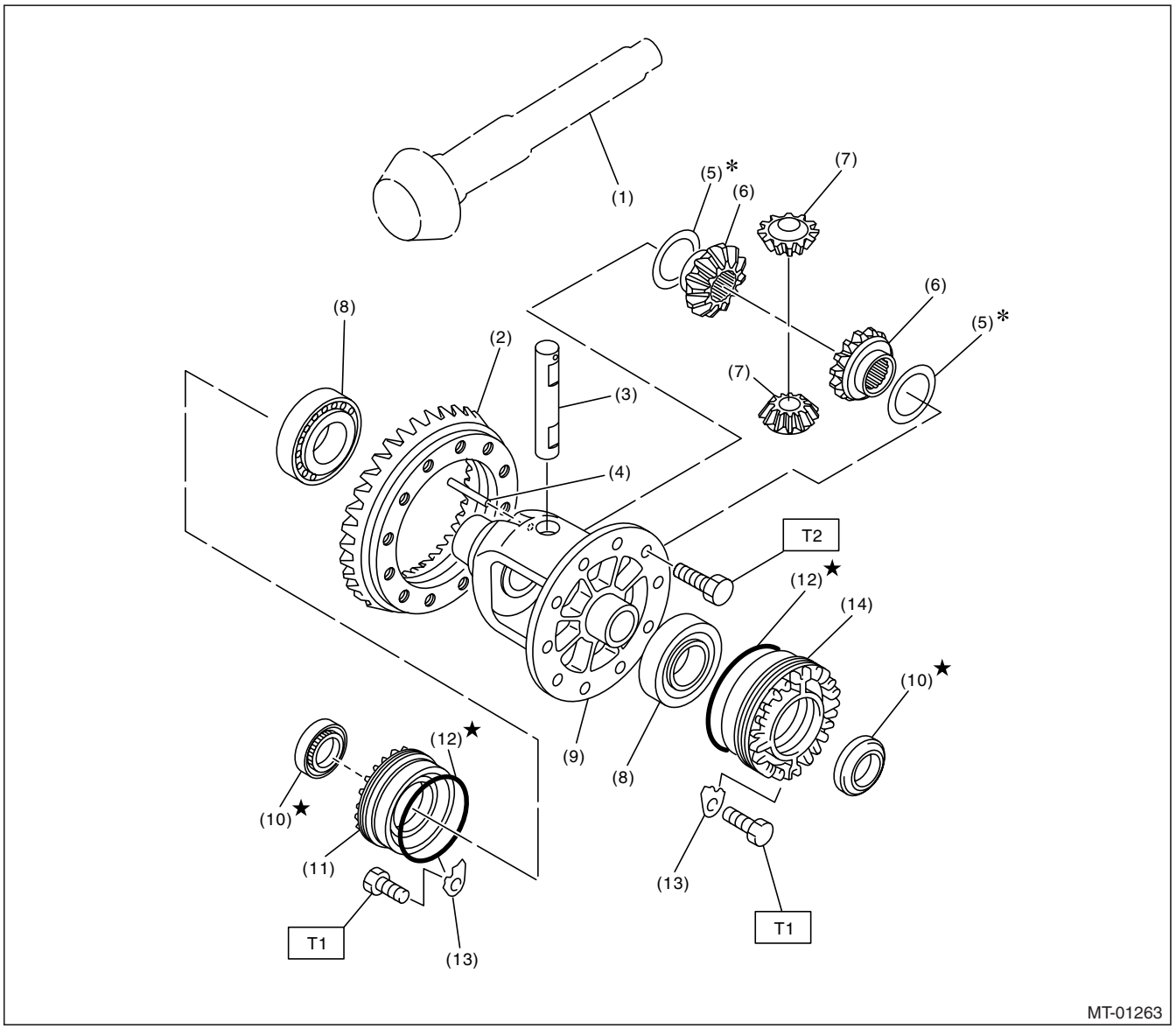
9. REVERSE IDLER GEAR ASSEMBLY



(1) Base COMPL
(2) Washer
(3) Reverse idler gear No. 2
(4) Needle bearing
(5) Reverse idler synchro set
(6) Reverse idler gear bushing
(7) Needle bearing
(8) Shifting insert key
(9) Reverse coupling sleeve
(10) Reverse idler gear
(11) Spring
(12) Sub gear
(13) Friction plate
(14) Snap ring
(15) Washer
(16) Snap ring
(17) Reverse idler holder
(18) Spring pin
(19) Knock pin

Tightening torque: N·m (kgf-m, ft-lb)
T: 25 (2.5, 18.4)

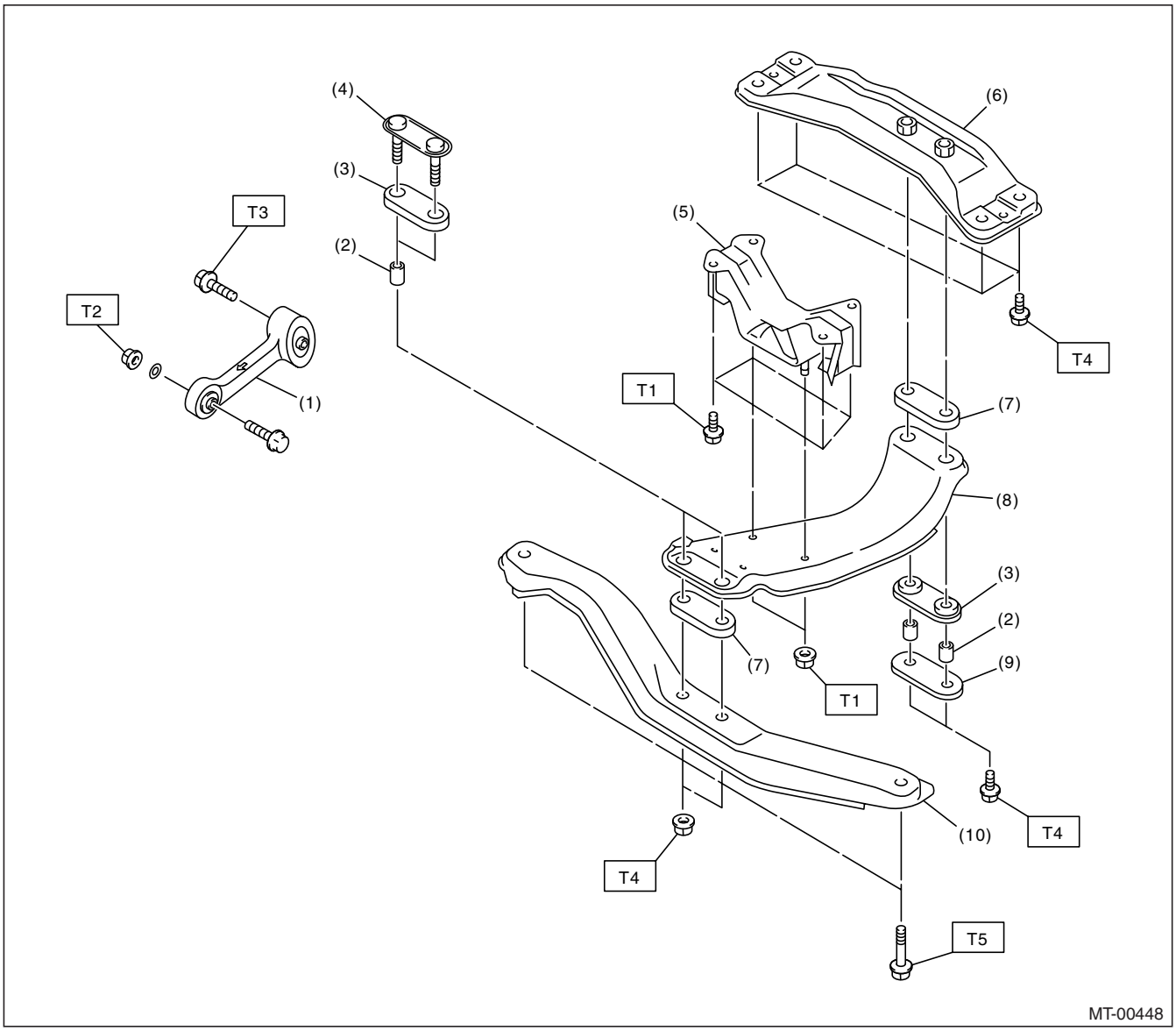
10.FRONT DIFFERENTIAL



(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) Roller bearing
(9) Differential case
(10) Oil seal
(11) Differential side retainer RH
(12) O-ring
(13) Retainer lock plate
(14) Differential side retainer LH

Tightening torque: N·m (kgf-m, ft-lb)
T1: 25 (2.5, 18.4)
T2: 69 (7.0, 50.9)

11.TRANSMISSION MOUNTING



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

Tightening torque: N·m (kgf-m, ft-lb)
T1: 35 (3.6, 25.8)
T2: 50 (5.1, 36.9)
T3: 58 (5.9, 42.8)
T4: 70 (7.1, 51.6)
T5: 140 (14.3, 103)

C: CAUTION

• Wear work 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 and 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 open the case. Do not pry it apart with a screwdriver or other tool.
• Be careful not to burn yourself, 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 rigid racks at the specified points.
• Apply gear oil onto sliding or revolution surfaces before installation.
• Replace deformed or otherwise damaged snap rings with new ones.
• Before installing O-rings or oil seals, apply sufficient amount of gear oil to avoid damage and deformation.
• Be careful not to incorrectly install or fail to install O-rings, snap rings and other such parts.
• Before securing a part on a vice, place cushioning material such as wood blocks, aluminum plate, or cloth between the part and the vice.
• Avoid damaging the mating surface of the case.
• Before applying sealant, completely remove the old seal.

D: PREPARATION TOOL

1. SPECIAL TOOL

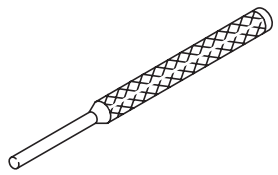
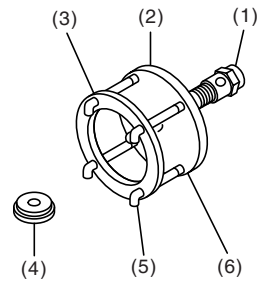
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-398791700	398791700	REMOVER	Used for removing and installing spring pin (6 mm).
 ST-399527700	399527700	PULLER SET	Used for removing and installing roller bearing (Differential). (1) Bolt (899521412) (2) Puller (399527702) (3) Holder (399527703) (4) Adapter (398497701) (5) Bolt (899520107) (6) Nut (021008000)

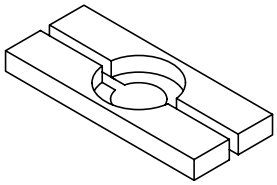
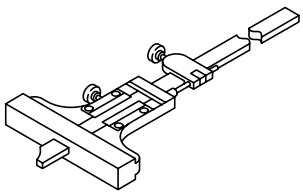
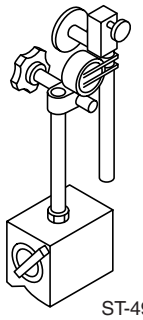
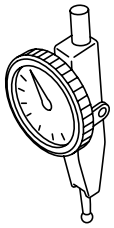
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-498515700	498515700	REMOVER	Used for removing roller bearing of drive pinion shaft.
 ST-498147000	498147000	DEPTH GAUGE	Used for adjusting main shaft axial end play.
 ST-498247001	498247001	MAGNET BASE	• Used for measuring backlash between side gear and 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).

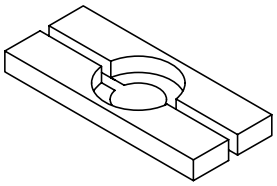
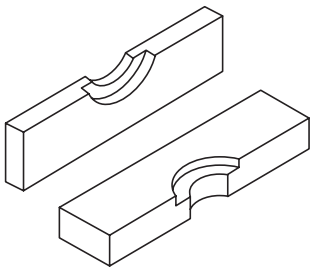
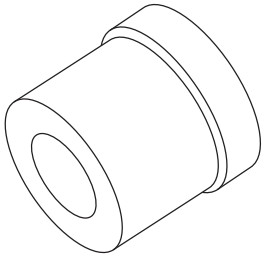
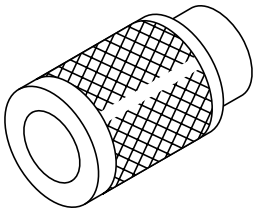
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-498077000	498077000	REMOVER	Used for removing differential taper roller bearing.
 ST-899858600	899858600	REMOVER	Used for removing roller bearing.
 ST-399513600	399513600	INSTALLER	Used for installing oil seal.
 ST-499757002	499757002	INSTALLER	Used for installing bearing cone of transfer driven gear (extension core side).

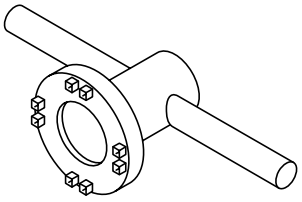
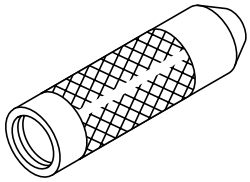
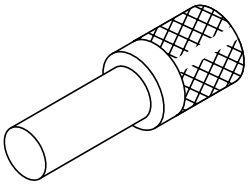
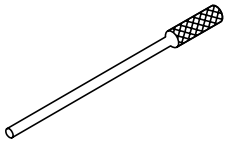
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-499787000	499787000	WRENCH ASSY	Used for removing and installing differential side retainer.
 ST-499877000	499877000	RACE 4-5 INSTALLER	Used for disassembling driven shaft and transfer driven gear.
 ST-899864100	899864100	REMOVER	Used for removing parts on transmission main shaft and drive pinion.
 ST-899904100	899904100	REMOVER	Used for removing and installing straight pin.

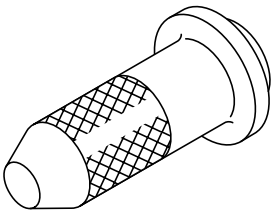
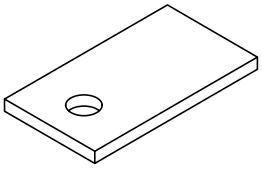
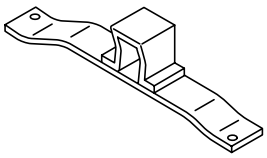
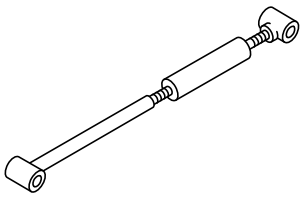
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-498057300	498057300	INSTALLER	Used for installing extension oil seal.
 ST-498255400	498255400	PLATE	Used for measuring backlash.
 ST41099AA010	41099AA010	ENGINE SUPPORT BRACKET	Used for supporting engine.
 ST41099AA020	41099AA020	ENGINE SUPPORT	Used for supporting engine.

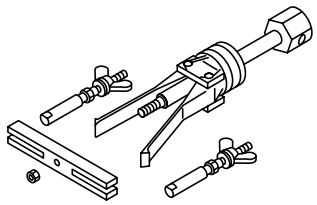
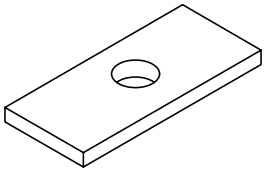
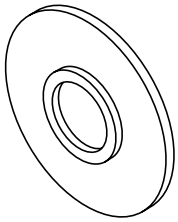
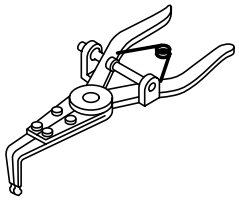
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-398527700	398527700	PULLER ASSY	Used for removing extension case oil seal and clutch housing oil seal.
 ST-499575500	499575500	GAUGE	Used for measuring total end play, extension end play and drive pinion height.
 ST-398177700	398177700	INSTALLER	Used for assembling main shaft.
 ST-399893600	399893600	PLIERS	• Used for removing and installing neutral set spring. • Used with CLAW (18756AA000).

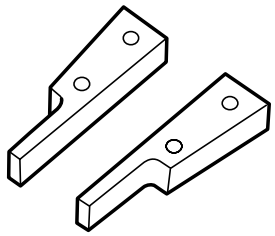
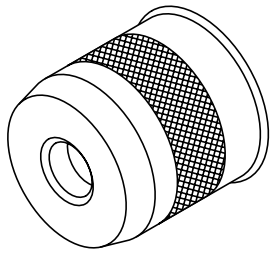
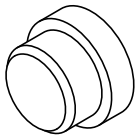
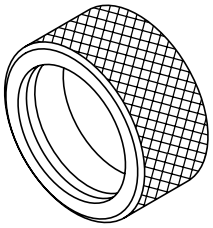
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST18756AA000	18756AA000	CLAW	• Used for removing and installing neutral set spring. • Used with PLIERS (399893600).
 ST-499247400	499247400	INSTALLER	Used for installing transfer drive gear ball bearing.
 ST-398497701	398497701	SEAT	Used for installing transfer drive gear ball bearing.
 ST-398437700	398437700	INSTALLER	Used for installing front differential side bearing.

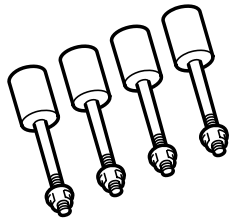
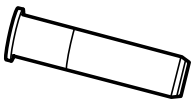
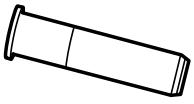
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST18632AA000	18632AA000	STAND ASSY	Used for disassembling and assembling transmission.
ST18671AA000	18671AA000	OIL SEAL GUIDE	• Used for installing oil seal to reverse check. • Used with INSTALLER (18657AA010).
 ST18657AA010	18657AA010	INSTALLER	• Used for installing oil seal to reverse check. • Used with OIL SEAL GUIDE (18671AA000).
 ST18657AA000	18657AA000	INSTALLER	Used for installing oil seal to shift rod.

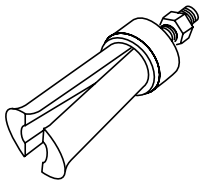
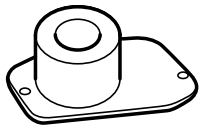
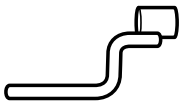
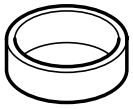
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST18758AA000	18758AA000	PULLER	Used for removing extension taper roller bearing outer race.
 ST18831AA000	18831AA000	GAUGE	Used for measuring extension taper roller bearing.
 ST18631AA000	18631AA000	HANDLE	Used for measuring front differential backlash.
 ST18754AA000	18754AA000	REMOVER	Used for removing each parts of driven gear.

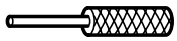
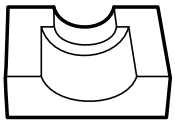
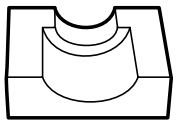
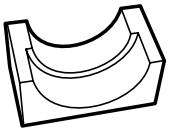
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST18757AA000	18757AA000	STRAIGHT PIN REMOVER	Used for installing reverse idler gear.
 ST18665AA000	18665AA000	HOLDER	• Used for removing and installing main shaft lock nut. • Used with BASE (18664AA000).
 ST18666AA000	18666AA000	HOLDER	• Used for removing and installing driven shaft lock nut. • Used with BASE (18664AA000).
 ST18667AA000	18667AA000	HOLDER	• Used for removing and installing drive pinion shaft lock nut. • Used with BASE (18664AA000).

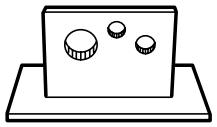
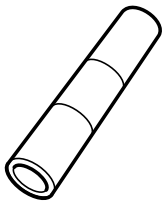
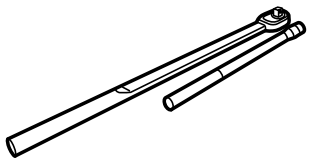
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST18664AA000	18664AA000	BASE	• Used for removing and installing main shaft lock nut. • Used for removing and installing drive pinion shaft lock nut. • Used for removing and installing driven shaft lock nut.
ST18722AA010	18722AA010	REMOVER	Used for disassembling main shaft.
 ST18651AA000	18651AA000	INSTALLER	Used for assembling main shaft.
 ST18852AA000	18852AA000	TORQUE WRENCH	• Used for tightening main shaft lock nut. • Used for tightening drive pinion shaft lock nut. • Used for tightening driven shaft lock nut.

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
ST18668AA000	18668AA000	PUNCH	Used for caulking main shaft lock nut.
ST18669AA000	18669AA000	PUNCH	Used for caulking driven shaft lock nut.
ST18670AA000	18670AA000	PUNCH	Used for caulking drive pinion shaft lock nut.
ST18620AA000	18620AA000	ADAPTER WRENCH	Used for removing and installing driven gear shaft lock nut.

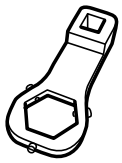
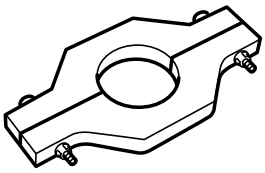
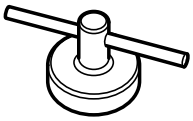
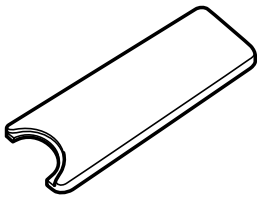
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST18621AA000	18621AA000	ADAPTER WRENCH	Used for removing and installing drive pinion shaft lock nut.
 ST18723AA000	18723AA000	REMOVER	Used for disassembling the driven shaft.
 ST18630AA000	18630AA000	WRENCH ASSY	Used for removing and installing differential side retainer LH.
 ST18672AA000	18672AA000	GUIDE CLIP	Used for installing reverse idler gear snap ring.

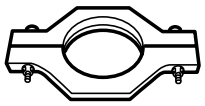
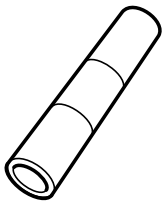
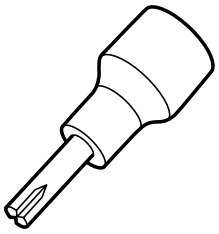
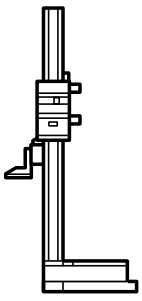
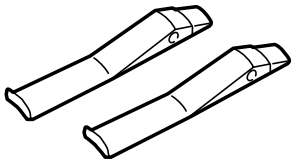
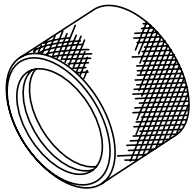
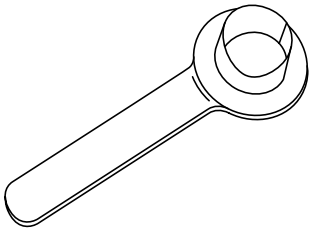
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST18720AA000	18720AA000	REMOVER	Used for disassembling main shaft.
 ST18654AA000	18654AA000	INSTALLER	Used for assembling driven shaft.
 ST18663AA000	18663AA000	SOCKET	Used for removing and installing oil pump cover.
 ST18853AA000	18853AA000	HEIGHT GAUGE	Used for selecting shift rod.

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST18760AA000	18760AA000	CLAW	• Used for removing front side retainer bearing outer race. • Used with PULLER ASSY (398527700).
 ST18675AA000	18675AA000	DIFFERENTIAL SIDE OIL SEAL INSTALLER	Used for installing differential side retainer oil seal.
 ST28399SA010	28399SA010	OIL SEAL PROTECTOR	Used for protecting oil seal when installing front drive shaft.

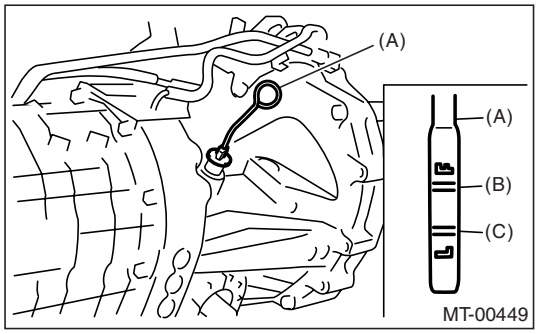
2. GENERAL TOOL

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

2. Transmission Gear Oil

A: INSPECTION

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



(A) Oil level gauge
(B) Upper level
(C) Lower level

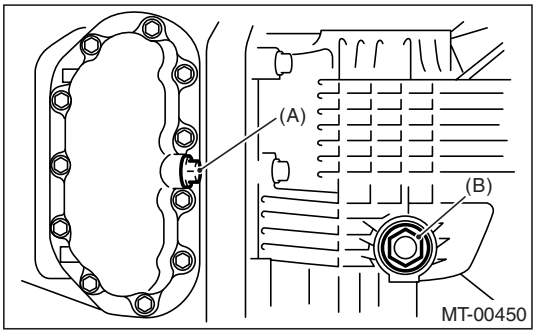
B: REPLACEMENT

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

CAUTION:
Directly after the vehicle has been running or the engine has been long idle running, the transmission gear oil is hot. Be careful not to burn yourself.

NOTE:
• Tighten the transmission gear oil drain plug after draining transmission gear oil.
• Use a new gasket.

Tightening torque:
Oil pan side
44 N·m (4.5 kgf-m, 32.5 ft-lb)
Clutch housing side
70 N·m (7.1 kgf-m, 51.6 ft-lb)



(A) Drain plug (Oil pan side)
(B) Drain plug (Clutch housing side)

5) Lower the vehicle.
6) Pour gear oil through the gauge hole.

Recommended gear oil:
GL-5 or equivalent

Gear oil capacity:
4.1 ℓ (4.3 US qt, 3.6 Imp qt)

7) Check the level of transmission gear oil.

NOTE:
• When inserting the level gauge into transmission gear, align the protrusion on the top part of the level gauge with the notch in the gauge hole.
• The gear oil level should be within the range marked on the level gauge.

3. Oil Seal

A: INSPECTION

Check the leakage of gear oil from oil seal part. Perform the following procedure if the oil seal is deformed, hardened, worn or defective in any way.

- Replace the oil seal.
- Check the propeller shaft.

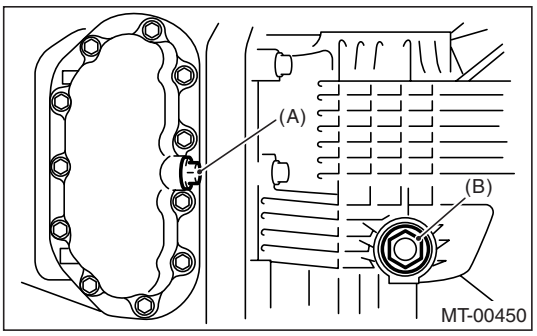
B: REPLACEMENT

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

NOTE:

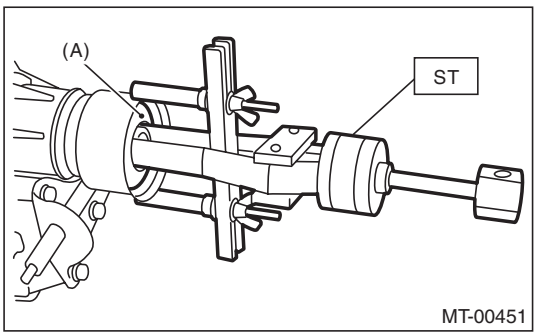
- Tighten the drain plug after draining gear oil.
- Use a new gasket.

Tightening torque:
Oil pan side
44 N·m (4.5 kgf-m, 32.5 ft-lb)
Clutch housing side
70 N·m (7.1 kgf-m, 51.6 ft-lb)



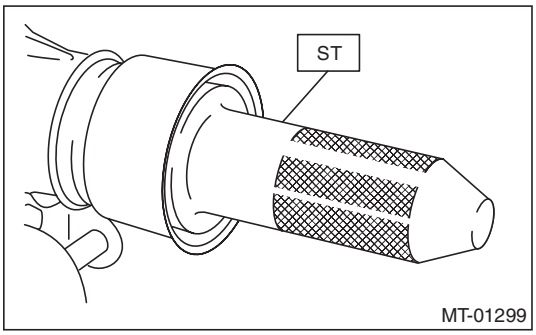
(A) Drain plug (Oil pan side)
(B) Drain plug (Clutch housing side)

3) Remove the rear exhaust pipe and muffler.
4) Remove the propeller shaft. <Ref. to DS-10, REMOVAL, Propeller Shaft.>
5) Using the ST, remove the oil seal.
ST 398527700 PULLER ASSY



(A) Oil seal

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



7) Install the propeller shaft. <Ref. to DS-11, INSTALLATION, Propeller Shaft.>
8) Install the rear exhaust pipe and muffler.
9) Pour gear oil and check the oil level. <Ref. to 6MT-29, REPLACEMENT, Transmission Gear Oil.>

4. Differential Side Retainer Oil Seal

A: INSPECTION

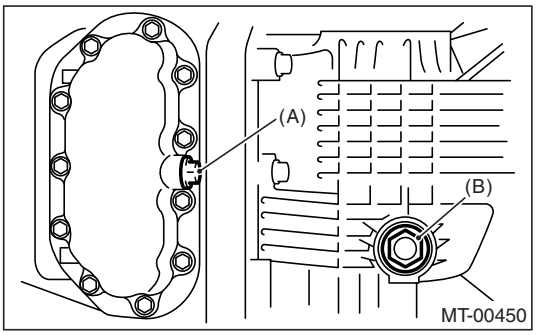
Inspect for oil leakage from the differential side retainer oil seal. If there is oil leakage, perform the following procedure.

- Replace the oil seal.
- Check the front drive shaft.

B: REPLACEMENT

1) Lift-up the vehicle.
2) Remove the front and center exhaust pipes. <Ref. to EX(H6DO)-4, REMOVAL, Front Exhaust Pipe.>
3) Drain the gear oil from drain plug.

CAUTION:
• Directly after the vehicle has been running or the engine has been long idle 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.



(A) Drain plug (Oil pan side)
(B) Drain plug (Clutch housing side)

4) Tighten the drain plug.

NOTE:
Use a new gasket.

Tightening torque:
Oil pan side
44 N·m (4.5 kgf-m, 32.5 ft-lb)
Clutch housing side
70 N·m (7.1 kgf-m, 51.6 ft-lb)

5) Separate the front drive shaft from transmission. <Ref. to DS-22, REMOVAL, Front Drive Shaft.>
6) Remove the differential side retainer oil seal using driver wrapped with vinyl tape or etc.
7) Using the ST, install the differential side retainer by slightly tapping with hammer.

ST 18675AA000 DIFFERENTIAL SIDE OIL SEAL INSTALLER

8) Apply gear oil to the oil seal lips.
9) Set ST to side retainer.
ST 28399SA010 OIL SEAL PROTECTOR
10) Install the front drive shaft into transmission.

NOTE:
Replace the circlip of drive shaft with a new one.

11) Install the front drive shaft into transmission, remove the ST and insert the drive shaft securely.
ST 28399SA010 OIL SEAL PROTECTOR
12) Install the front and center exhaust pipes. <Ref. to EX(H6DO)-5, INSTALLATION, Front Exhaust Pipe.>
13) Lower the vehicle.
14) Pour gear oil through the oil level gauge hole.

Recommended gear oil:
<Ref. to 6MT-2, TRANSMISSION GEAR OIL, SPECIFICATION, General Description.>

Gear oil capacity:
4.1 ℓ (4.3 US qt, 3.6 Imp qt)

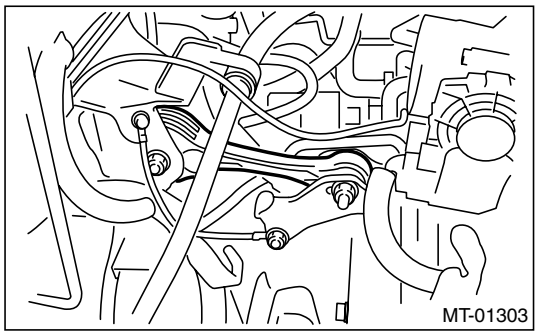
15) Check the level of the gear oil. <Ref. to 6MT-29, INSPECTION, Transmission Gear Oil.>

5. Transmission Mounting System

A: REMOVAL

1. PITCHING STOPPER

1) Disconnect the ground cable from battery.
2) Remove the air intake chamber.
<Ref. to IN(H6DO)-7, REMOVAL, Air Intake Chamber.>
3) Remove the air cleaner case. <Ref. to IN(H6DO)-5, REMOVAL, Air Cleaner Case.>
4) Remove the pitching stopper.

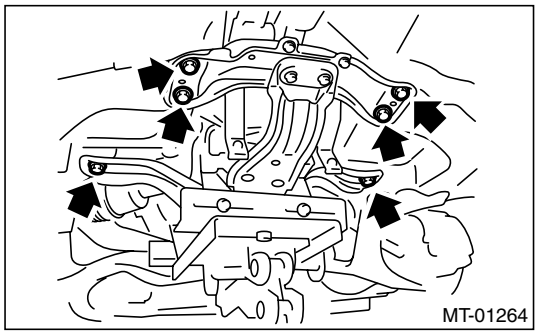


2. CROSSMEMBER AND CUSHION RUBBER

1) Disconnect the ground cable from battery.
2) Lift-up the vehicle.
3) Remove the front exhaust pipe, rear exhaust pipe and muffler.
<Ref. to EX(H6DO)-4, REMOVAL, Front Exhaust Pipe.> <Ref. to EX(H6DO)-7, REMOVAL, Rear Exhaust Pipe.> <Ref. to EX(H6DO)-9, REMOVAL, Muffler.>
4) Remove the heat shield cover.
5) Set the transmission jack under transmission body.

CAUTION:
Always support transmission case with a transmission jack.

6) Remove the rear crossmember.



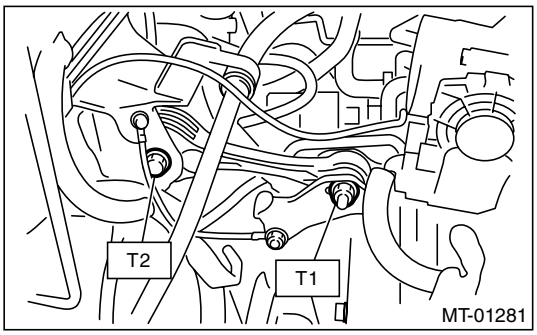
7) Remove the rear cushion rubber.

B: INSTALLATION

1. PITCHING STOPPER

1) Install the pitching stopper.

Tightening torque:
T1: 50 N·m (5.1 kgf-m, 36.9 ft-lb)
T2: 58 N·m (5.9 kgf-m, 42.8 ft-lb)



2) Install the air cleaner case.
<Ref. to IN(H6DO)-6, INSTALLATION, Air Cleaner Case.>
3) Install the air intake chamber.
<Ref. to IN(H6DO)-7, INSTALLATION, Air Intake Chamber.>
4) Connect the ground cable to battery.

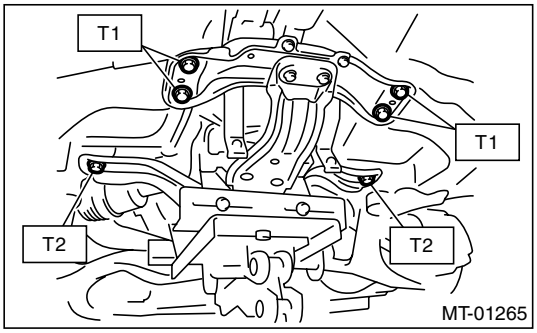
2. CROSSMEMBER AND CUSHION RUBBER

1) Install the rear cushion rubber.

Tightening torque:
35 N·m (3.6 kgf-m, 25.8 ft-lb)

2) Install the crossmember.

Tightening torque:
T1: 70 N·m (7.1 kgf-m, 51.6 ft-lb)
T2: 140 N·m (14.3 kgf-m, 103 ft-lb)



3) Remove the transmission jack.
4) Install the front exhaust pipe, rear exhaust pipe and muffler. <Ref. to EX(H6DO)-5, INSTALLATION, Front Exhaust Pipe.> <Ref. to EX(H6DO)-7, INSTALLATION, Rear Exhaust Pipe.> <Ref. to EX(H6DO)-9, INSTALLATION, Muffler.>

C: INSPECTION

Perform the following inspection procedures and repair or replace defective parts.

1. PITCHING STOPPER

Check the pitching stopper for bends or damage. Check that the rubber is not stiff, cracked or otherwise damaged.

2. CROSSMEMBER AND CUSHION RUBBER

Check the crossmember for bends or damage. Check that the cushion rubber is not stiff, cracked or otherwise damaged.

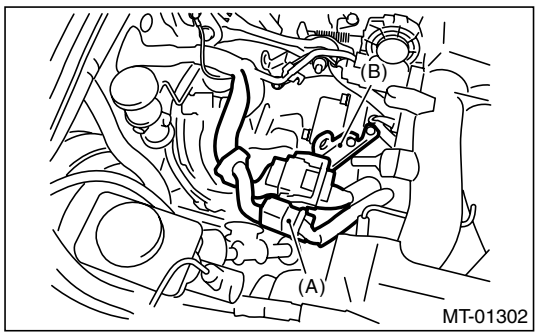
6. Manual Transmission Assembly

A: REMOVAL

1) Set the vehicle on a lift, then fully open the front hood and support with stay.

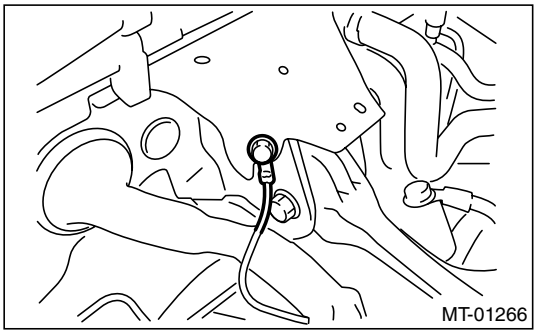
NOTE:
Set the hood stay to its specified hole.

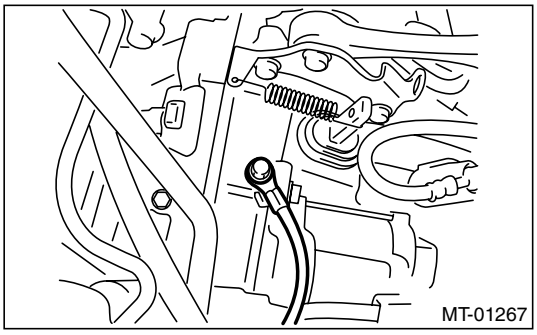
2) Disconnect the ground cable from battery.
3) Remove the collector cover.
4) Remove the air intake chamber.
<Ref. to IN(H6DO)-7, REMOVAL, Air Intake Chamber.>
5) Remove the air cleaner case.
<Ref. to IN(H6DO)-5, REMOVAL, Air Cleaner Case.>
6) Lift-up the vehicle and remove the under cover.
7) Remove the front wheels.
8) Remove the universal joint. <Ref. to PS-22, REMOVAL, Universal Joint.>
9) Disconnect the engine harness connectors, and then remove the engine hanger rear.



(A) Engine harness connectors
(B) Engine hanger rear

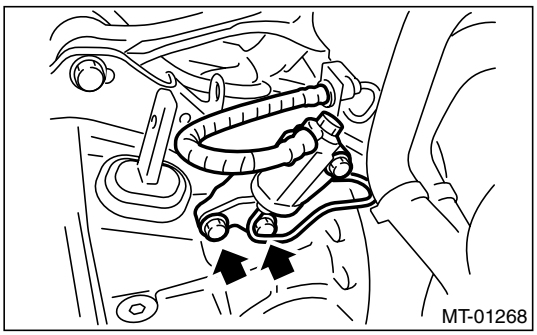
10) Disconnect the ground cable at upper side of transmission case and body.





11) Remove the starter assembly. <Ref. to SC(H4SO 2.0)-6, REMOVAL, Starter.>
12) Remove the operating cylinder from transmission.

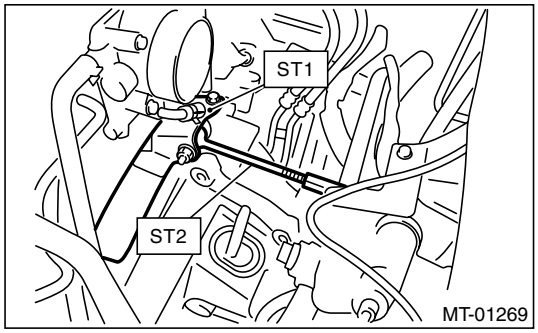
NOTE:
Hang the removed operating cylinder with wire or etc.



13) Remove the pitching stopper and remove the pitching stopper bracket.

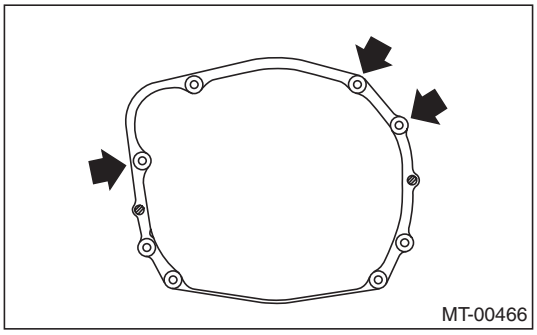
14) Set the ST.

ST1	41099AA010	ENGINE SUPPORT BRACKET
ST2	41099AA020	ENGINE SUPPORT



15) Remove the clutch release shaft.
(1) Remove the plug with hexagon wrench.
(2) Install a 6 mm (0.24 in) bolt to the release shaft, then pull out the release shaft.
(3) Lift up the release fork, and then remove it from the release bearing claw. Pull release fork to the engine side and set it free.

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



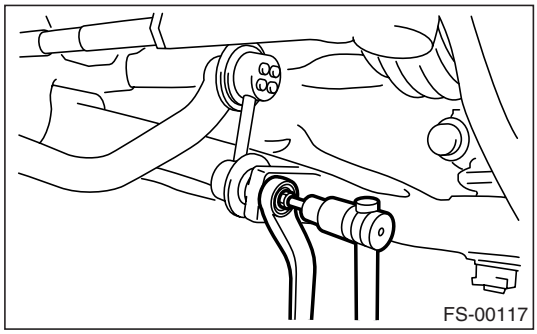
17) Remove the front exhaust pipe, rear exhaust pipe and muffler. <Ref. to EX(H6DO)-4, REMOVAL, Front Exhaust Pipe.> <Ref. to EX(H6DO)-7, REMOVAL, Rear Exhaust Pipe.> <Ref. to EX(H6DO)-9, REMOVAL, Muffler.>

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

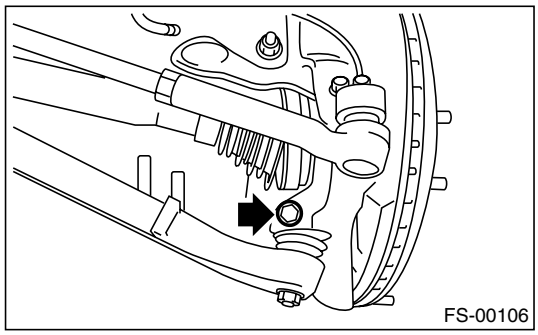
18) Remove the heat shield cover.

19) Remove the propeller shaft. <Ref. to DS-10, REMOVAL, Propeller Shaft.>

20) Remove the front stabilizer link.

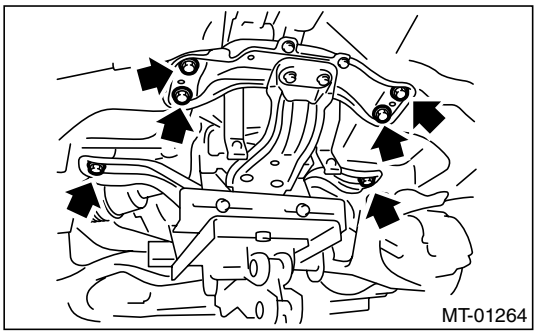


21) Remove the ball joint of front arm from housing.



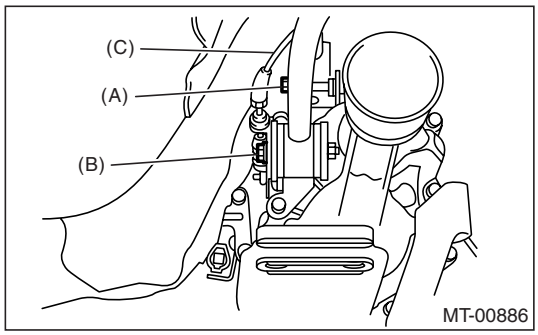
22) Remove the front drive shaft. <Ref. to DS-22, REMOVAL, Front Drive Shaft.>

23) Set the transmission jack under the transmission, then remove the front crossmember and rear crossmember.



24) Move the transmission to the right side of vehicle, then remove the joint COMPL, stay bolt and reverse check cable.

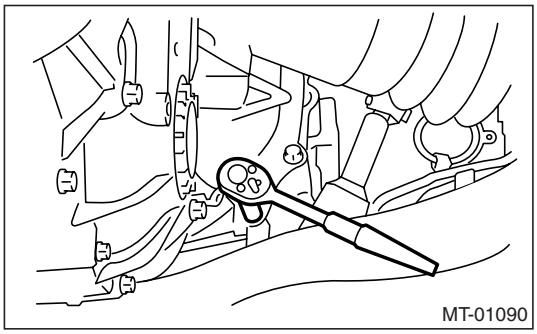
NOTE:
If the transmission is not moved, joint COMPL and stay bolt may contact the body. It will cause damage.

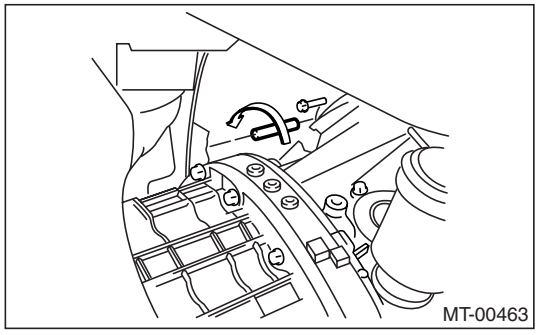


(A) Joint COMPL bolt
(B) Stay bolt
(C) Reverse check cable

25) Remove the fixing bolt of engine and transmission, then remove the transmission from vehicle.

NOTE:
• To facilitate removal, rotate the turn buckle of ST (engine support) to lower the rear side of engine.
• Take care not to let the transmission contact with body when pulling it backward to remove.
• Carefully remove the clutch pipe and breather pipe because they may interfere each other.



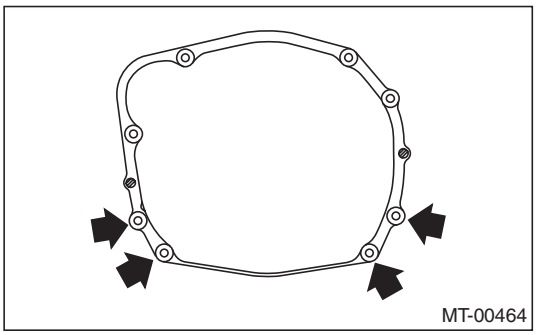


B: INSTALLATION

1) Set the release fork, release bearing and release shaft to transmission. <Ref. to CL-23, INSTALLATION, Release Bearing and Lever.>
2) Install the transmission.

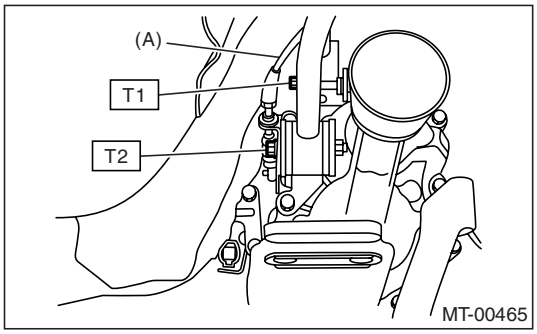
NOTE:
• Make sure the main shaft spline part is inserted completely.
• Make sure the rear side of engine is lowered.

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



3) Move the transmission to the right side, then install the joint COMPL bolt, stay bolt and reverse check cable.

Tightening torque:
T1: 11.8 N·m (1.2 kgf-m, 8.7 ft-lb)
T2: 32 N·m (3.3 kgf-m, 23.6 ft-lb)

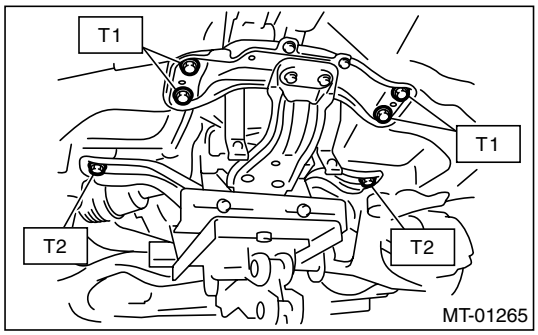


(A) Reverse check cable

4) Install the front crossmember and rear crossmember.

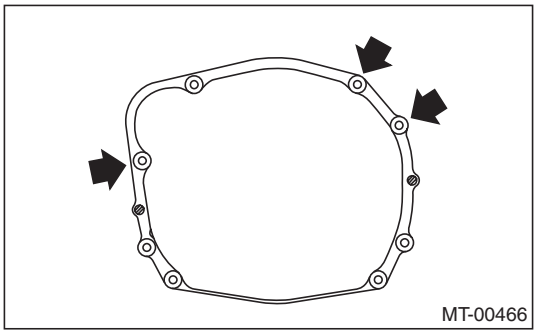
NOTE:
To facilitate installation, rotate the turn buckle of ST (engine support) to lift up the rear side of engine.

Tightening torque:
T1: 70 N·m (7.1 kgf-m, 51.6 ft-lb)
T2: 140 N·m (14.3 kgf-m, 103 ft-lb)



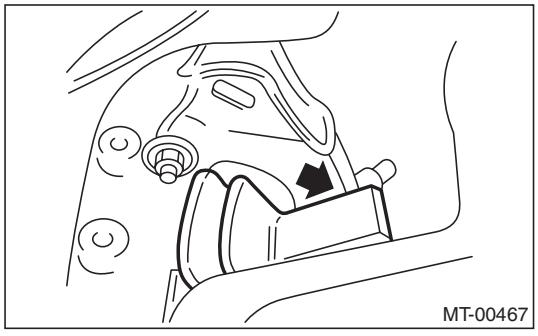
5) Lower the vehicle and install the fixing bolt.

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



6) Make sure the release bearing is installed completely.

NOTE:
• Push the release fork to operating cylinder side until you hear a “click” sound. Pull the release fork to engine side. Setting is completed if the release fork does not contact case.
• Make sure the boot cover is firmly set.

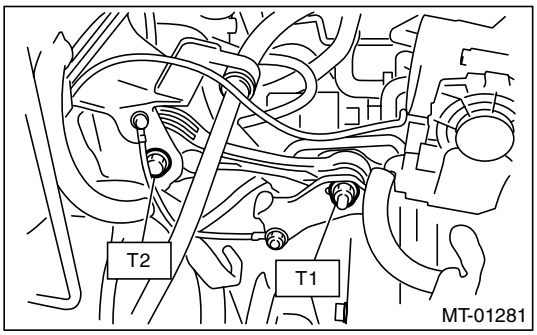


7) Install the pitching stopper bracket.

Tightening torque:
41 N·m (4.2 kgf-m, 30.2 ft-lb)

8) Install the pitching stopper.

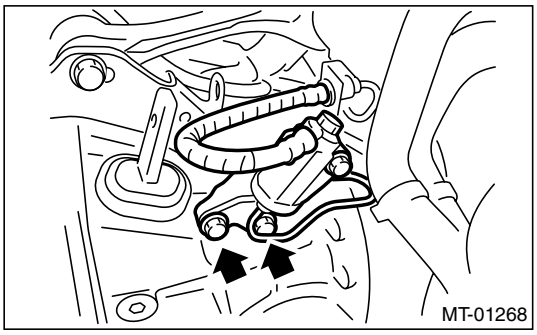
Tightening torque:
T1: 50 N·m (5.1 kgf-m, 36.9 ft-lb)
T2: 58 N·m (5.9 kgf-m, 42.8 ft-lb)



9) Install the clutch operating cylinder.

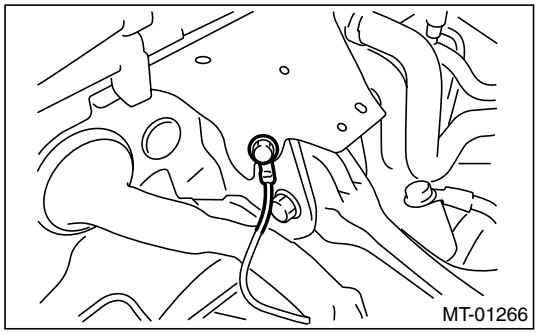
Tightening torque:
41 N·m (4.2 kgf-m, 30.2 ft-lb)

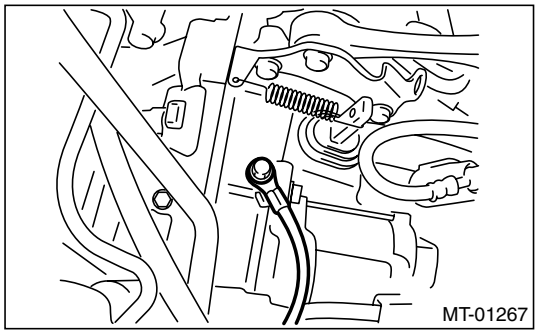
NOTE:
Check that the clutch hose is routed properly.



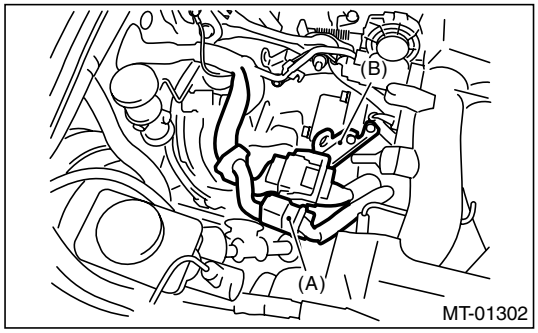
10) Install the starter assembly. <Ref. to SC(H4SO 2.0)-6, INSTALLATION, Starter.>

11) Install the ground cable to transmission and body.





12) Connect the engine harness connectors, and then install the engine hanger rear.



(A) Engine harness connectors
(B) Engine hanger rear

13) Replace the front differential side retainer oil seal.
(1) Remove the oil seal by using flat tip screwdriver, etc.
(2) Apply gear oil to the new oil seal lips.
(3) Install a new oil seal using the ST.

ST 18675AA000 DIFFERENTIAL SIDE OIL SEAL INSTALLER

NOTE:
Always replace the differential side oil seal after extracting front drive shaft from the transmission.

14) Set the ST to side retainer.
ST 28399SA010 OIL SEAL PROTECTOR

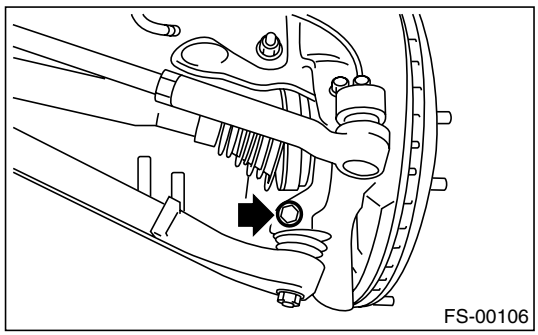
15) Install the front drive shaft into transmission.

NOTE:
Replace the circlip of drive shaft with a new one.

16) Install the front drive shaft into transmission, remove the ST and insert the drive shaft securely.
ST 28399SA010 OIL SEAL PROTECTOR

17) Install the ball joint of front arm.

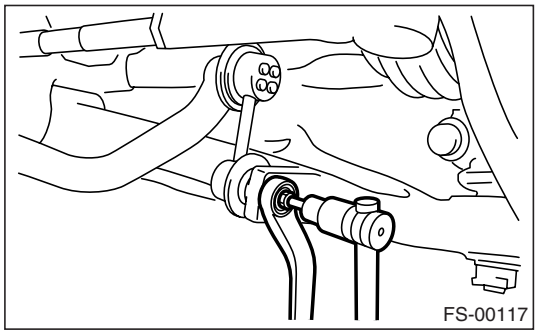
Tightening torque:
50 N·m (5.1 kgf-m, 36.9 ft-lb)



18) Install the front stabilizer link.

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

NOTE:
Use a new self-locking nut.



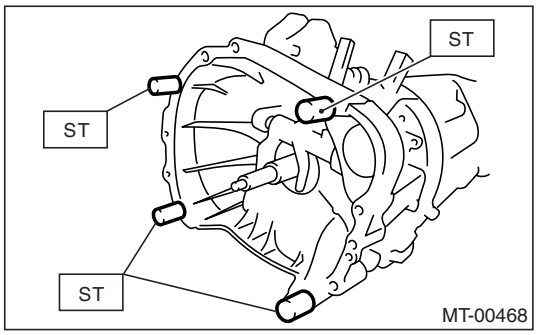
19) Install the heat shield cover.
20) Install the propeller shaft. <Ref. to DS-11, INSTALLATION, Propeller Shaft.>
21) Install the front exhaust pipe, rear exhaust pipe and muffler. <Ref. to EX(H6DO)-5, INSTALLATION, Front Exhaust Pipe.> <Ref. to EX(H6DO)-7, INSTALLATION, Rear Exhaust Pipe.> <Ref. to EX(H6DO)-9, INSTALLATION, Muffler.>
22) Install the universal joint. <Ref. to PS-22, INSTALLATION, Universal Joint.>
23) Install the under cover.
24) Pour transmission gear oil.
<Ref. to 6MT-29, REPLACEMENT, Transmission Gear Oil.>
25) Install the air cleaner case. <Ref. to IN(H6DO)-6, INSTALLATION, Air Cleaner Case.>

26) Install the air intake chamber. <Ref. to IN(H6DO)-7, INSTALLATION, Air Intake Chamber.>
27) Install the collector cover.
28) Connect the ground cable to battery.

7. Preparation for Overhaul

A: PROCEDURE

1) Clean oil, grease, dirt and dust from transmission.
2) Attach the transmission to ST.
ST 18632AA000 STAND ASSY

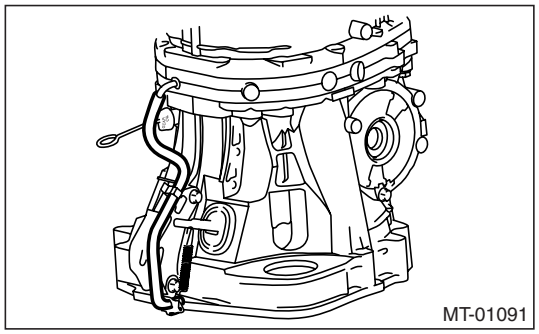


3) Rotating parts should be coated with oil prior to assembly.
4) All disassembled parts, if to be reused, should be assembled in the original positions and directions.
5) Always use new ones for gaskets, lock washers and lock nut.
6) Liquid gasket should be used where specified to prevent leakage.

8. Air Breather Hose

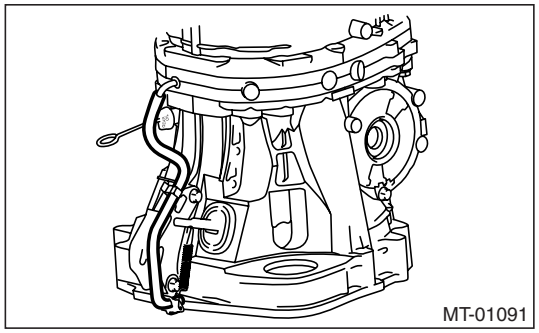
A: REMOVAL

Disconnect the air breather hose.



B: INSTALLATION

Connect the air breather hose.



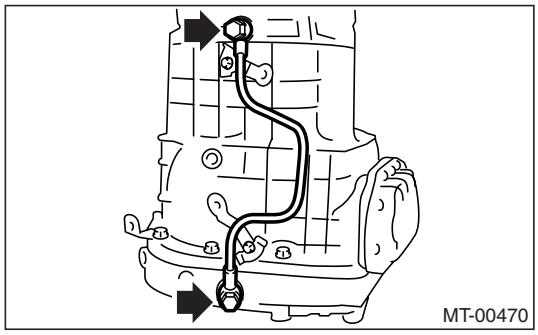
C: INSPECTION

Check that the hose is not cracked or clogged.

9. Oil Pipe

A: REMOVAL

Remove the oil pipe.

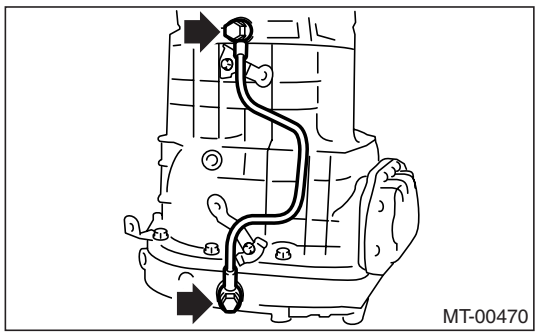


B: INSTALLATION

Install in the reverse order of removal.

NOTE:
Use a new gasket.

Tightening torque:
32 N·m (3.3 kgf-m, 23.6 ft-lb)



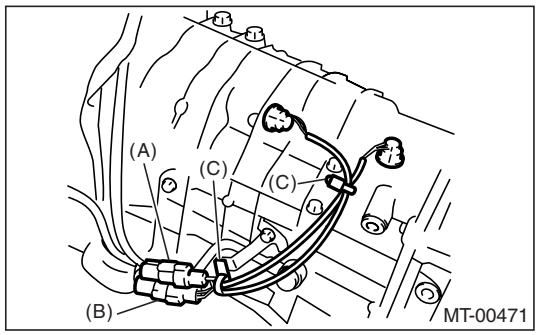
C: INSPECTION

1) Check there is no damage on pipe. If there is damage, replace the pipe.
2) Check the connection of pipe for oil leakage. If there is oil leakage, replace the gasket.

10. Back-up Light Switch

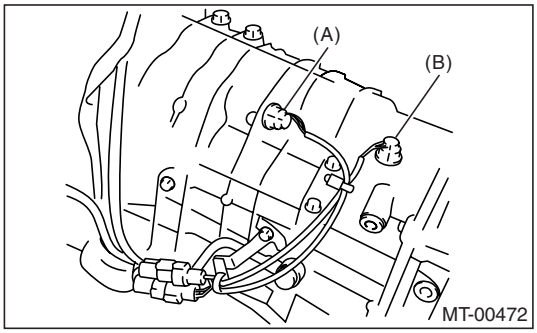
A: REMOVAL

1) Remove the manual transmission assembly from vehicle. <Ref. to 6MT-34, REMOVAL, Manual Transmission Assembly.>
2) Disconnect the back-up light switch connector.



(A) Back-up light switch connector (White)
(B) Neutral position switch connector (Black)
(C) Clip

3) Remove the back-up light switch.



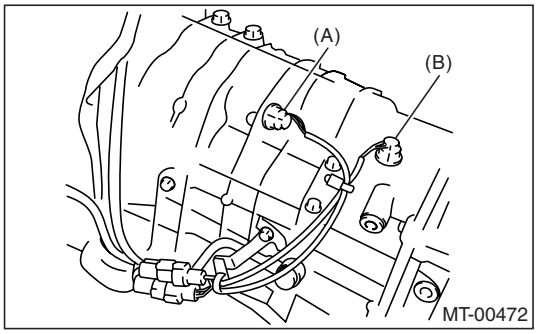
(A) Back-up light switch
(B) Neutral position switch

B: INSTALLATION

1) Install the back-up light switch.

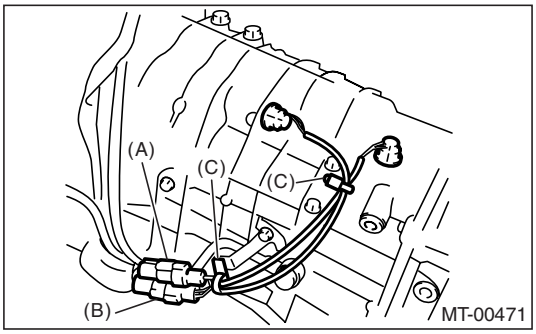
NOTE:
Use a new gasket.

Tightening torque:
32 N·m (3.3 kgf-m, 23.6 ft-lb)



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

2) Connect the back-up light switch connector.

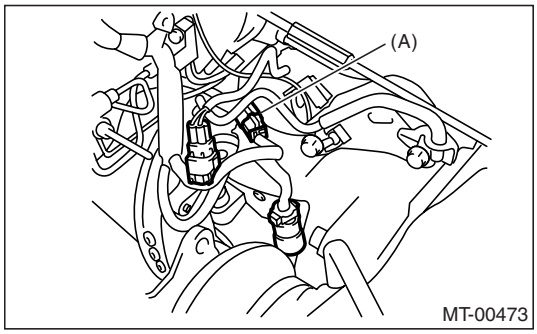


(A) Back-up light switch connector (White)
(B) Neutral position switch connector (Black)
(C) Clip

3) Install the manual transmission assembly into vehicle. <Ref. to 6MT-36, INSTALLATION, Manual Transmission Assembly.>

C: INSPECTION

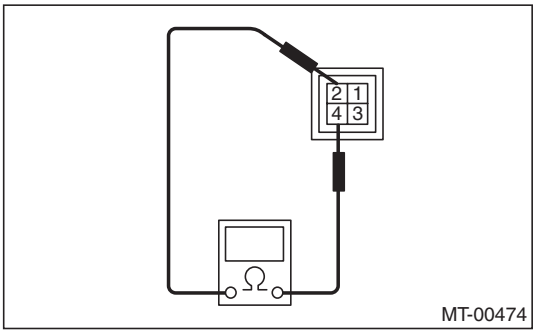
1) Disconnect the ground cable from battery.
2) Disconnect the transmission harness and chassis harness.



(A) Transmission connector

3) Measure the resistance between back-up light switch terminals. If it is not within specification, replace the back-up light switch.

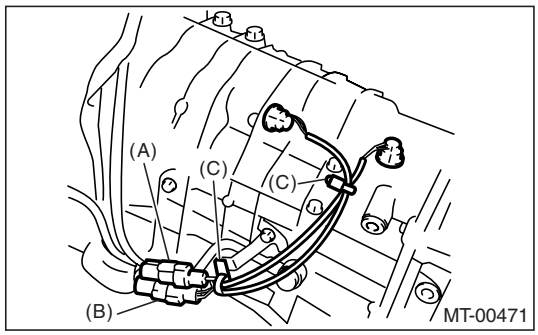
Gear shift position	Terminal No.	Specification
Back-up position	2 and 4	Less than 1 Ω
Other positions		More than 1 MΩ



11.Neutral Position Switch

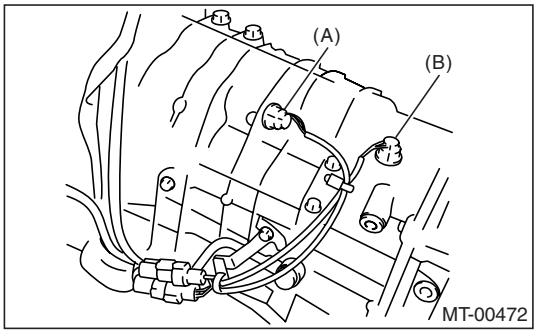
A: REMOVAL

1) Remove the manual transmission assembly from vehicle. <Ref. to 6MT-34, REMOVAL, Manual Transmission Assembly.>
2) Disconnect the neutral position switch connector and clip.



(A) Back-up light switch connector (White)
(B) Neutral position switch connector (Black)
(C) Clip

3) Remove the neutral position switch.



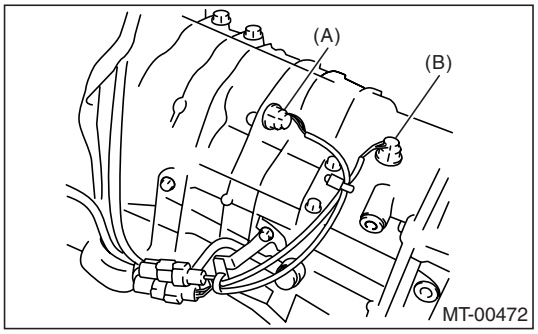
(A) Back-up light switch
(B) Neutral position switch

B: INSTALLATION

1) Install the neutral position switch.

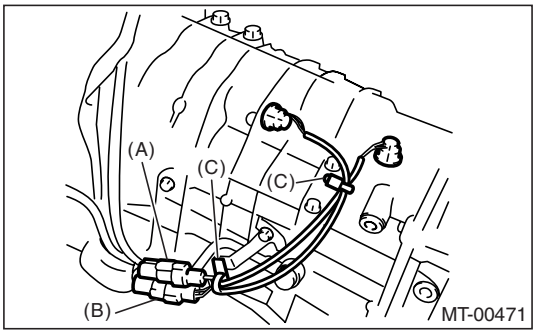
NOTE:
Use a new gasket.

Tightening torque:
32 N·m (3.3 kgf-m, 23.6 ft-lb)



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

2) Connect the neutral position switch connector and clip.

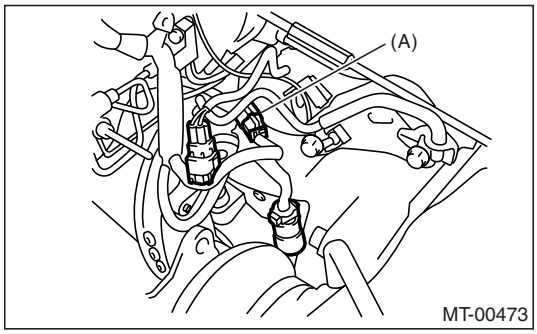


(A) Back-up light switch connector (White)
(B) Neutral position switch connector (Black)
(C) Clip

3) Install the manual transmission assembly into vehicle. <Ref. to 6MT-36, INSTALLATION, Manual Transmission Assembly.>

C: INSPECTION

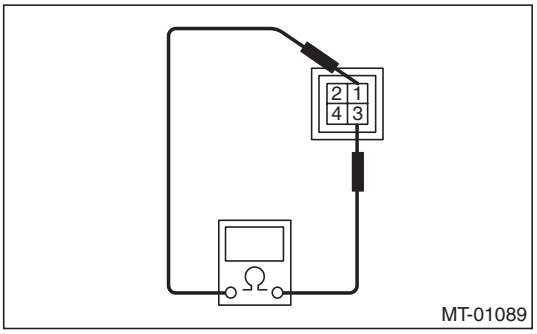
1) Disconnect the ground cable from battery.
2) Disconnect the transmission harness and chassis harness.



(A) Transmission connector

3) Measure the resistance between neutral position switch terminals. If it is not within specification, replace the neutral position switch.

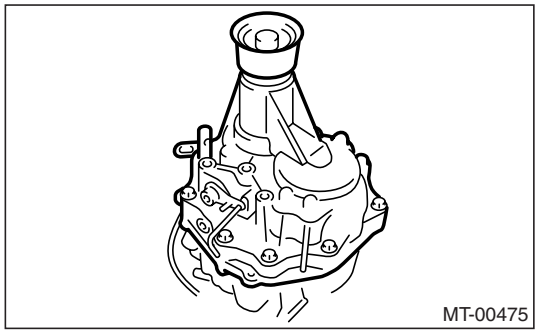
Gear shift position	Terminal No.	Specification
Neutral position	1 and 3	Less than 1 Ω
Other positions		More than 1 MΩ



12.Extension Case

A: REMOVAL

1) Remove the manual transmission assembly from vehicle. <Ref. to 6MT-34, REMOVAL, Manual Transmission Assembly.>
2) Prepare the transmission for overhaul. <Ref. to 6MT-40, Preparation for Overhaul.>
3) Remove the extension case.

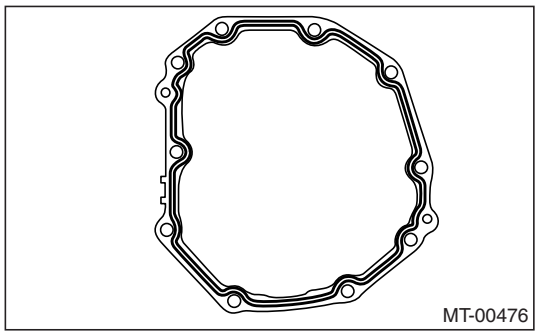

MT-00475

4) Completely remove the remaining liquid gasket from the extension case and transmission case.

B: INSTALLATION

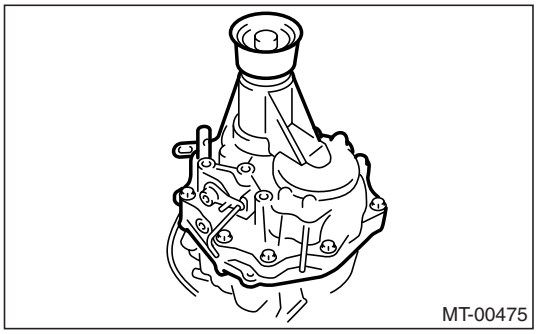
1) Select the transfer driven gear thrust washer, and then install to extension case. <Ref. to 6MT-49, ADJUSTMENT, Extension Case.>
2) Apply oil lightly to the outer periphery of bearing cone, and then install to extension case.
3) Select the thrust washer of transfer drive gear, and then install to center differential.
4) Apply liquid gasket to the transmission case.

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

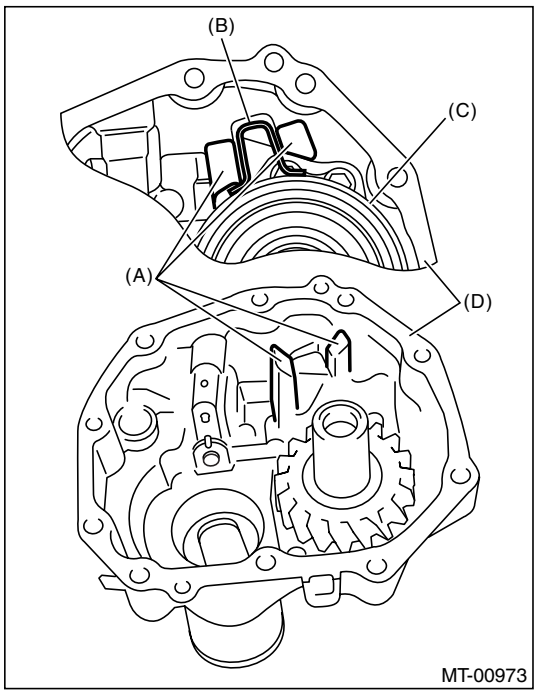

MT-00476

5) Install the extension case.

Tightening torque:
48 N·m (4.9 kgf-m, 35.4 ft-lb)


MT-00475

NOTE:
Insert the stopper portion of center differential between extension guides.



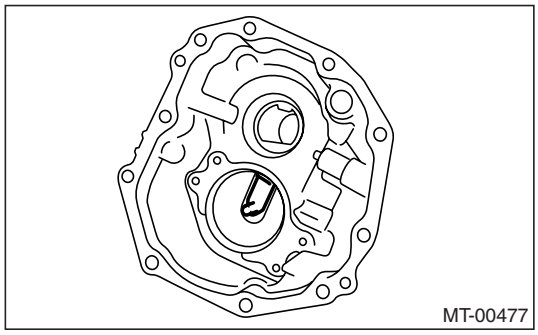
MT-00973

(A) Extension guide
(B) Stopper
(C) Center Differential
(D) Extension case

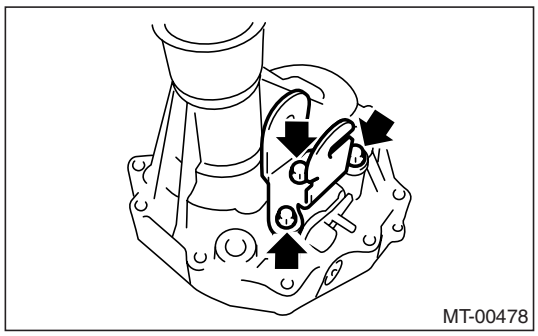
6) Install the manual transmission assembly into vehicle. <Ref. to 6MT-36, INSTALLATION, Manual Transmission Assembly.>

C: DISASSEMBLY

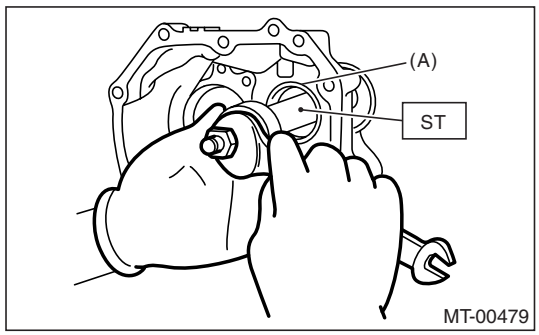
1) Remove the transfer drive gear. <Ref. to 6MT-56, REMOVAL, Transfer Drive Gear.>
2) Remove the extension guide.



3) Remove the shift bracket.

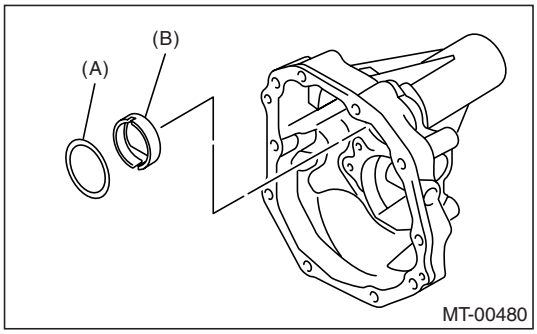


4) Using the ST, remove the bearing cone.
ST 18758AA000 PULLER



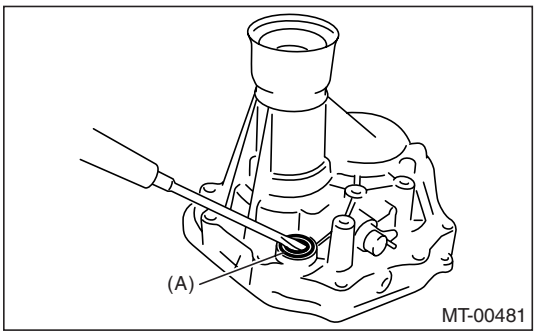
(A) Bearing cone

5) Remove the thrust washer and oil plate.



(A) Thrust washer
(B) Oil plate

6) Remove the shifter arm oil seal.

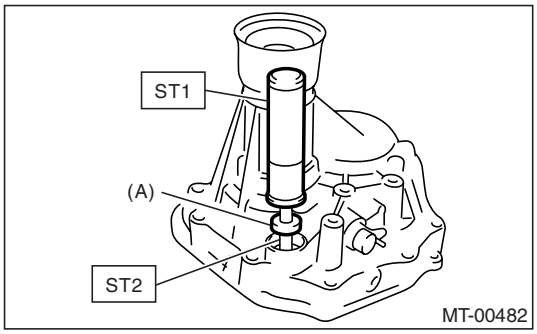


(A) Oil seal

7) Remove the reverse check system. <Ref. to 6MT-53, REMOVAL, Reverse Check System.>
8) Remove the extension case oil seal. <Ref. to 6MT-30, REPLACEMENT, Oil Seal.>

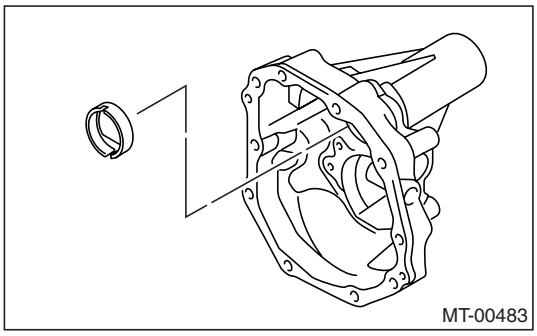
D: ASSEMBLY

1) Install the reverse check system. <Ref. to 6MT-54, INSTALLATION, Reverse Check System.>
2) Install the extension case oil seal. <Ref. to 6MT-30, REPLACEMENT, Oil Seal.>
3) Using the ST, install the shifter arm oil seal.
ST1 18657AA000 INSTALLER
ST2 18671AA000 OIL SEAL GUIDE



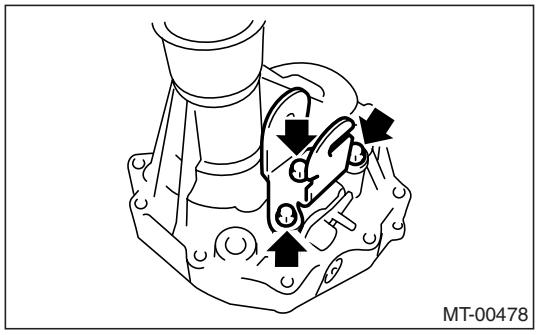
(A) Oil seal

4) Install the oil plate.



5) Select the bearing thrust washer, and then install to extension case. <Ref. to 6MT-49, ADJUSTMENT, Extension Case.>
6) Apply oil lightly to the outer periphery of bearing cone, and then install to extension case.
7) Install the shift bracket.

Tightening torque:
25 N·m (2.5 kgf-m, 18.4 ft-lb)



8) Install the extension guide, and then install the transfer driven gear. <Ref. to 6MT-56, INSTALLATION, Transfer Drive Gear.>

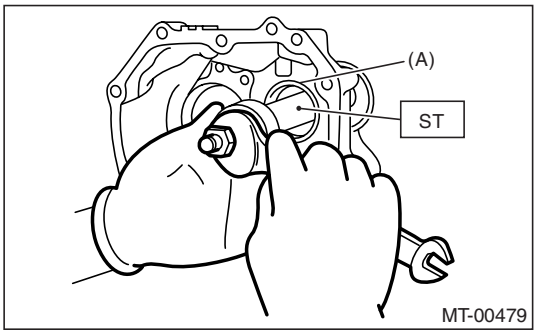
E: INSPECTION

1) Check there is no damage or crack on extension case. If there is damage or crack, replace the extension case.
2) Check the oil seal and the mating surface of extension case and transmission case for oil leakage. If there is oil leakage, replace the oil seal and liquid gasket.

F: ADJUSTMENT

1. TRANSFER DRIVEN GEAR BEARING THRUST WASHER ADJUSTMENT

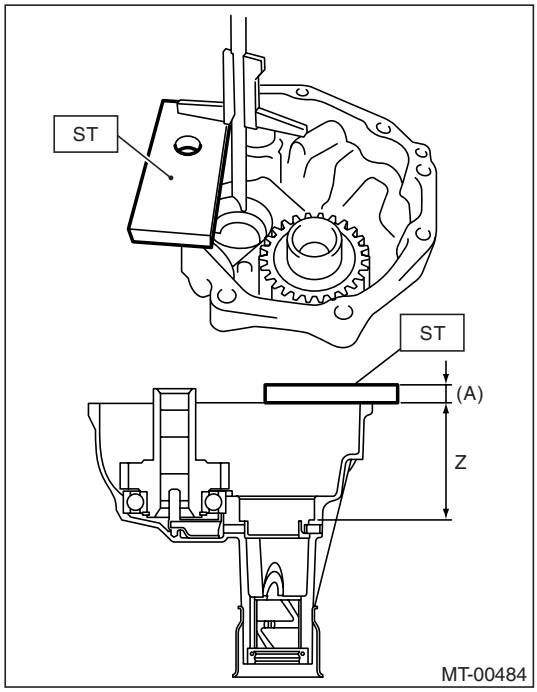
1) Using the ST, remove the bearing cone from extension case.
ST 18758AA000 PULLER



(A) Bearing cone

2) Remove the thrust washer.
3) Measure the depth “Z” between end of extension case and contact point of bearing cone.
ST 499575500 GAUGE

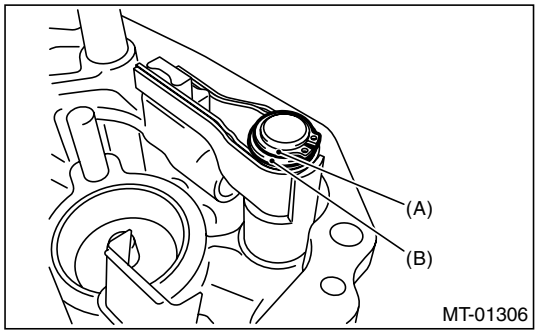
NOTE:
To measure the depth “Z”, subtract the thickness of ST [15 mm (0.59 in)] from the measured value.



(A) 15 mm (0.59 in)

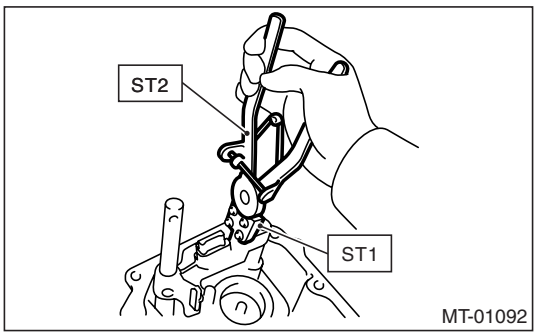
4) Remove the transfer driven gear. <Ref. to 6MT-58, REMOVAL, Transfer Driven Gear.>
5) Remove the center differential. <Ref. to 6MT-60, REMOVAL, Center Differential.>

6) Remove the snap ring and flat washer from selector arm part.

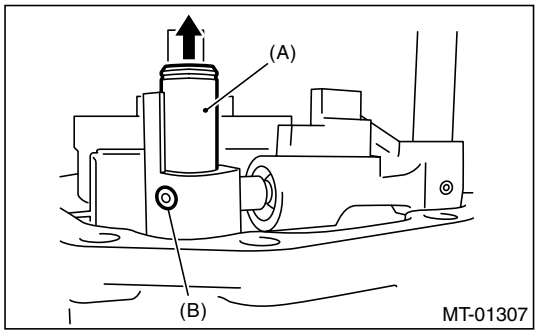


(A) Snap ring
(B) Flat washer

7) Using the ST, remove the neutral set spring and the support.
ST1 18756AA000 CLAW
ST2 399893600 PLIERS

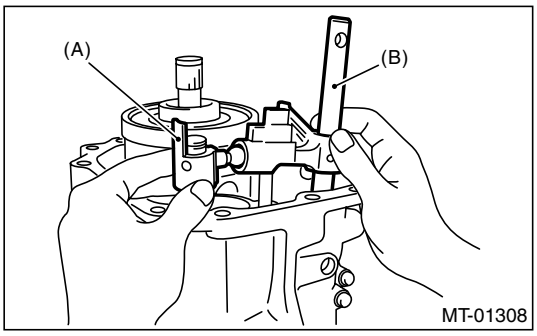


8) Raise the striking rod up, then remove the spring pin.



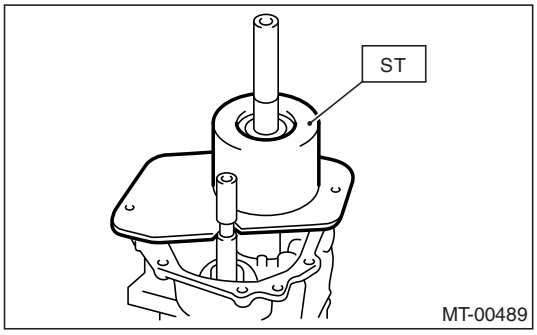
(A) Striking rod
(B) Spring pin

9) Remove the selector arm No. 2 and shifter arm.

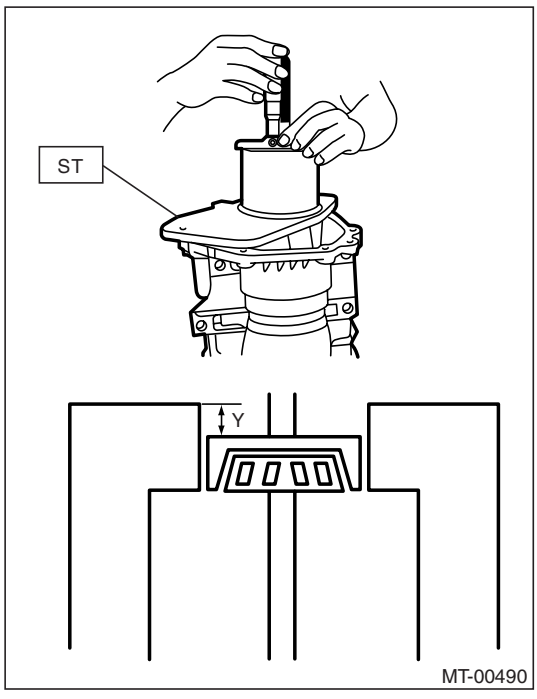


(A) Selector arm No. 2
(B) Shifter arm

10) Install the bearing cone to transfer driven gear.
11) Set the ST.
ST 18831AA000 GAUGE



12) Rotate the transfer driven gear approx. ten times to get the bearing accustomed.
13) Measure the depth “Y” between end of ST and bearing cone.
ST 18831AA000 GAUGE



14) Calculate the value "t" of transfer driven gear bearing thrust washer using the following equation.
t = Z − (100 − Y) − {−0.04 to 0.11 mm (−0.0016 to 0.0043 in)}

t mm (in)	Thickness of transfer driven gear bearing thrust washer
Y mm (in)	Depth from end of ST to bearing cone
Z mm (in)	Depth from end of extension case to contact point of bearing cone
−0.04 — 0.11 mm (−0.0016 — 0.0043 in)	Standard clearance between thrust washer and taper roller bearing
100 mm (3.94 in)	Height of ST

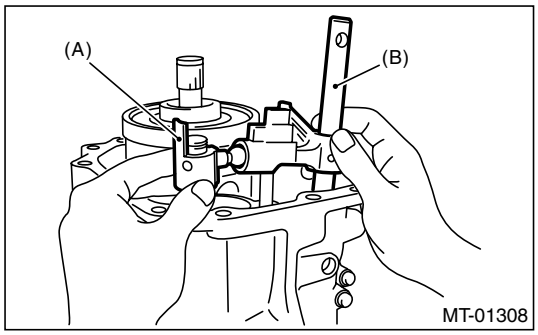
15) Select the nearest thrust washer from the following table, according to the calculated value "t".

Standard clearance between thrust washer and taper roller bearing:
−0.04 — 0.11 mm (−0.0016 — 0.0043 in)

NOTE:
Be sure that it is within standard clearance range.

Thrust washer (50 × 61 × t)	
Part No.	Thickness t mm (in)
803050060	0.50 (0.0197)
803050062	0.60 (0.0236)
803050064	0.70 (0.0276)
803050066	0.80 (0.0315)
803050068	0.90 (0.0354)
803050070	1.00 (0.0394)
803050072	1.10 (0.0433)
803050074	1.20 (0.0472)
803050076	1.30 (0.0512)
803050078	1.40 (0.0551)

16) Remove the selector arm No. 2 and shifter arm.

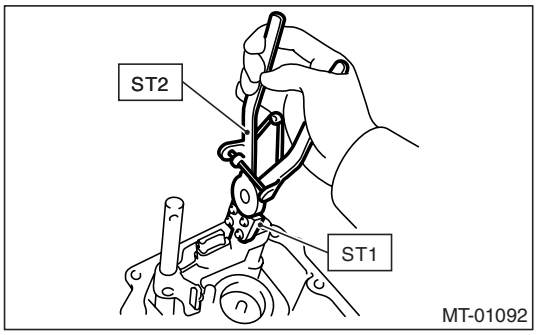


(A) Selector arm No. 2
(B) Shifter arm

17) Install the spring pin.

NOTE:
Use new spring pin.

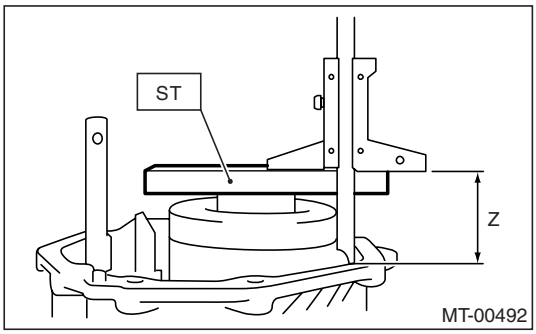
18) Using the ST, install the neutral set spring and support.
ST1 18756AA000 CLAW
ST2 399893600 PLIERS



19) Install the flat washer and snap ring.
20) Install the center differential.

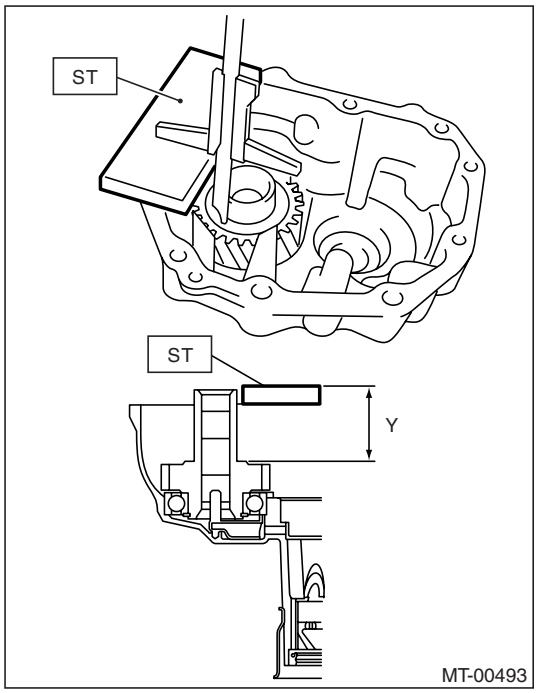
2. SELECTING THE TRANSFER DRIVE GEAR THRUST WASHER

1) Measure the height "Z" between end of transmission case and end of ST.
ST 499575500 GAUGE



2) Measure the depth "Y" between end of ST and transfer drive gear.

ST 499575500 GAUGE



3) Calculate the value "t" of transfer drive gear thrust washer using the following equation.
t = {Y − 15 mm (0.59 in)} − {Z − 15 mm (0.59 in)} − 0.45 — 0.65 mm (0.018 — 0.026 in)

t mm (in)	Thickness of transfer drive gear thrust washer
Y mm (in)	Depth from end of ST to transfer drive gear
Z mm (in)	Height from end of transmission case to the end of ST
0.45 to 0.65 mm (0.018 to 0.026 in)	Standard clearance between thrust washer and transfer drive gear.
15 mm (0.59 in)	Thickness of ST

4) Select the nearest thrust washer from the following table, according to the calculated value "t".

Standard clearance between thrust washer and transfer drive gear.
0.45 — 0.65 mm (0.018 — 0.026 in)

NOTE:
Be sure that it is within standard clearance range.

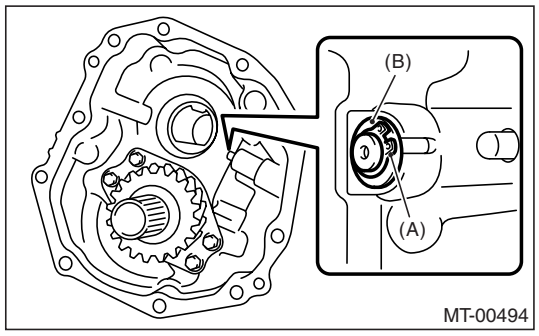
Thrust washer (36.3 × 52 × t)	
Part No.	Thickness mm (in)
803036070	0.80 (0.0315)
803036071	0.95 (0.0374)
803036072	1.10 (0.0433)
803036073	1.25 (0.0492)
803036074	1.40 (0.0551)
803036075	0.65 (0.0256)

5) Install the selected thrust washer.

13.Reverse Check System

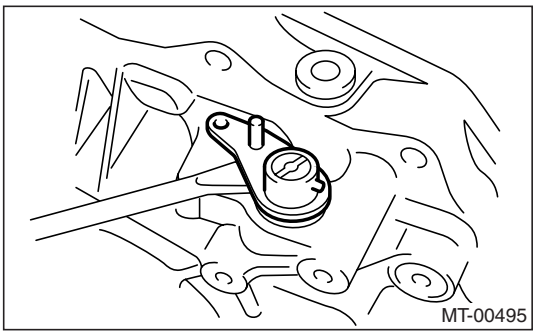
A: REMOVAL

1) Remove the manual transmission assembly from vehicle. <Ref. to 6MT-34, REMOVAL, Manual Transmission Assembly.>
2) Prepare the transmission for overhaul. <Ref. to 6MT-40, Preparation for Overhaul.>
3) Remove the extension case. <Ref. to 6MT-47, REMOVAL, Extension Case.>
4) Remove the snap ring and washer from reverse check shaft.



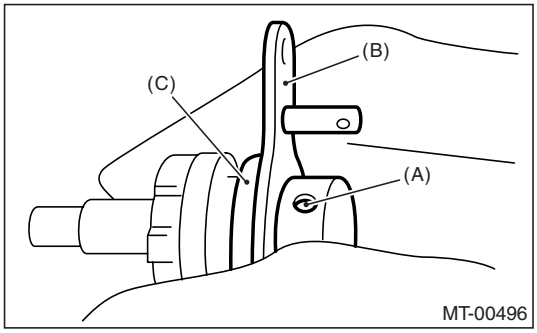
(A) Snap ring
(B) Washer

5) Remove the reverse check shaft and spring from the extension case.



6) Remove the spring pin, then remove the reverse check lever and oil seal from reverse check shaft.

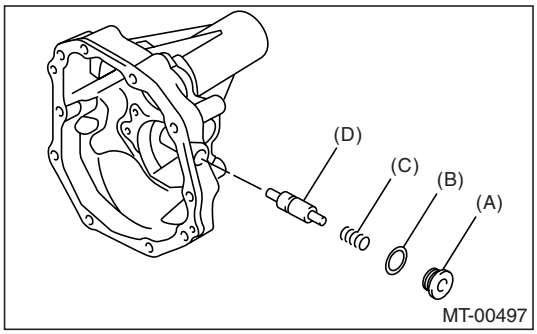
NOTE:
Use a new oil seal.



(A) Spring pin
(B) Reverse check lever
(C) Oil seal

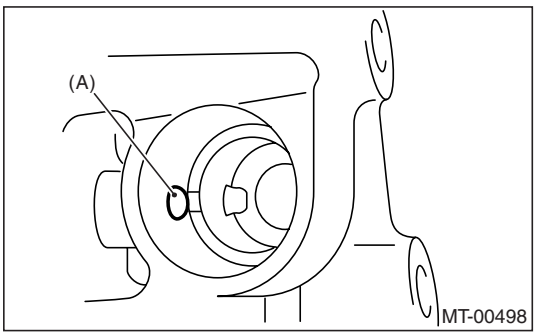
7) Remove the plug from extension case, then remove the gasket, spring and plunger.

NOTE:
Use a new gasket.



(A) Plug
(B) Gasket
(C) Spring
(D) Plunger

8) Remove the reverse lock plunger.

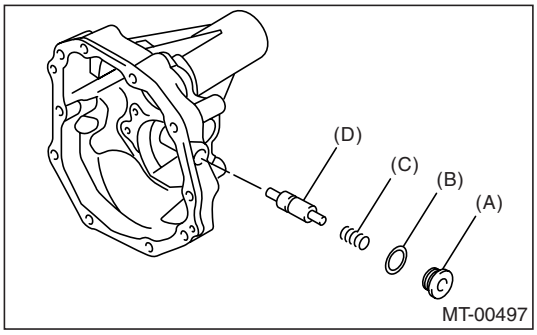


(A) Reverse lock plunger

B: INSTALLATION

1) Insert the reverse lock plunger.
2) Install in the order of reverse checking plug, spring, gasket and plug.

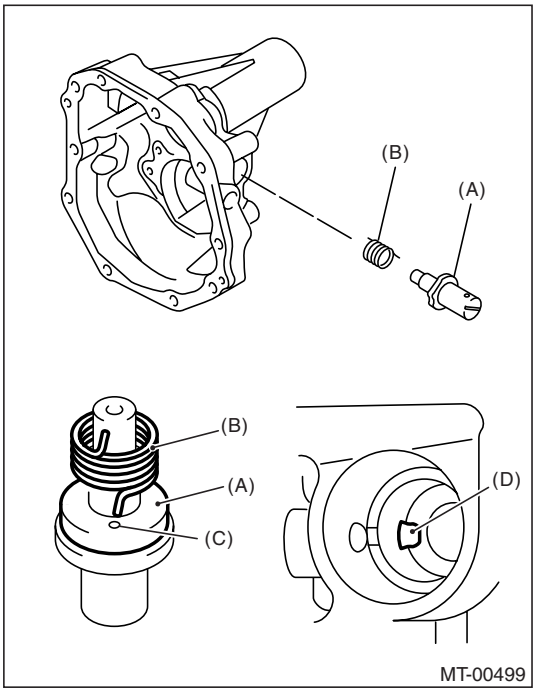
Tightening torque:
41 N·m (4.2 kgf-m, 30.2 ft-lb)



(A) Plug
(B) Gasket
(C) Spring
(D) Reverse checking plug

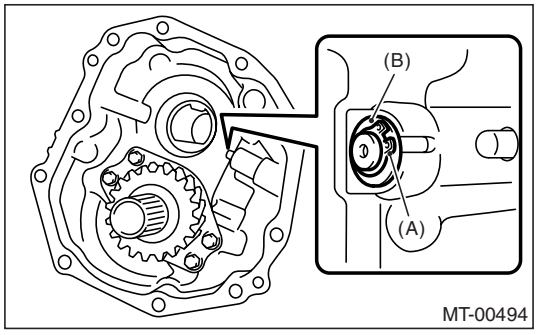
3) Install the spring and reverse check shaft to extension case.

NOTE:
Be sure the spring end aligns with the hole of reverse check shaft and the cutout portion of extension case.



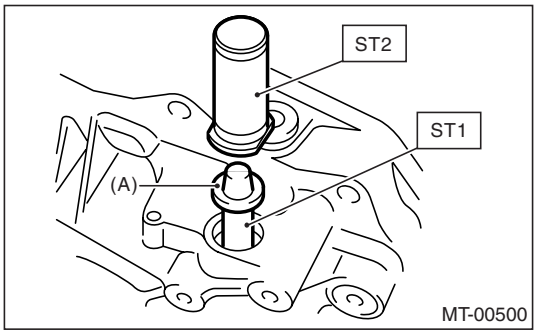
(A) Reverse check shaft
(B) Spring
(C) Hole
(D) Cutout portion

4) Install the washer and snap ring.



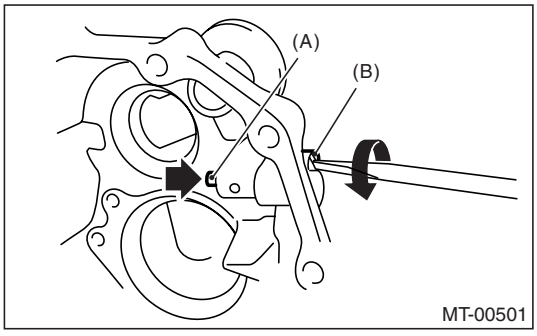
(A) Snap ring
(B) Washer

5) Set the ST1 to reverse check shaft. Install a new oil seal, then press with ST2.
ST1 18671AA000 OIL SEAL GUIDE
ST2 18657AA010 INSTALLER



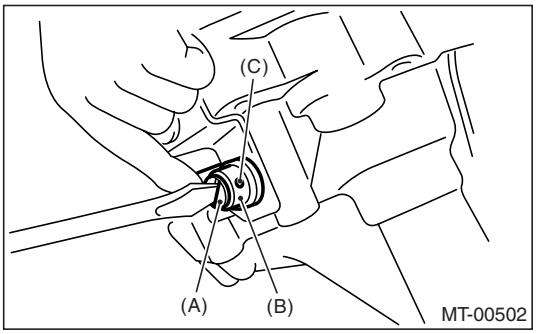
(A) Oil seal

6) Insert the reverse check lever, then rotate the reverse check shaft until the plunger can be pushed.



(A) Plunger
(B) Reverse check shaft

7) Align the hole of reverse check lever and reverse check shaft, then install the spring pin.

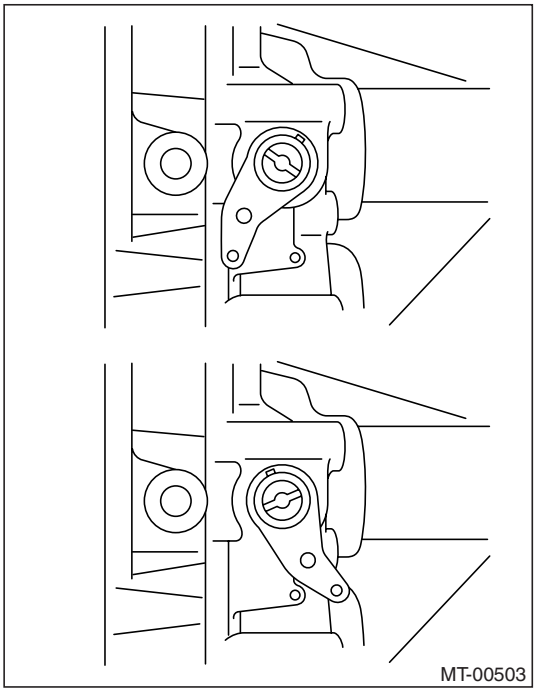


(A) Reverse check shaft
(B) Reverse check lever
(C) Hole

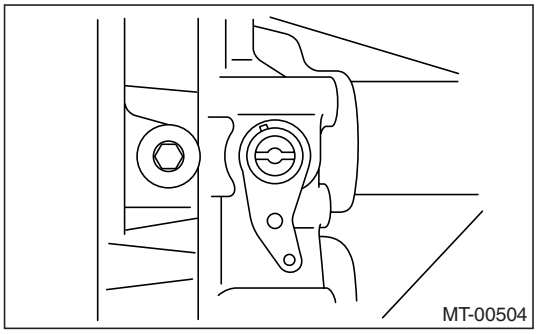
8) Make sure the reverse check operates correctly. <Ref. to 6MT-55, INSPECTION, Reverse Check System.>
9) Install the extension case. <Ref. to 6MT-47, INSTALLATION, Extension Case.>
10) Install the manual transmission assembly into vehicle. <Ref. to 6MT-36, INSTALLATION, Manual Transmission Assembly.>

C: INSPECTION

1) Check there is no damage on each part.
2) Check that the reverse check lever operates smoothly.
3) Check that there is no oil leakage on oil seal part of reverse check shaft. If there is oil leakage, replace the oil seal.
4) Inspect the reverse check operation.
(1) The plunger can be pushed or the gear can be shifted to reverse, when reverse check lever is in the following position.



(2) The plunger cannot be pushed or the gear cannot be shifted to reverse, when reverse check lever is in the following position.

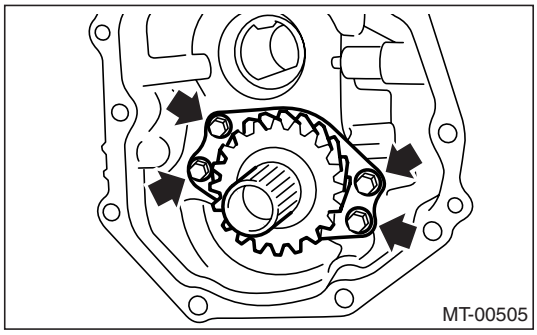


5) If not as specified, reassemble the reverse check system.

14.Transfer Drive Gear

A: REMOVAL

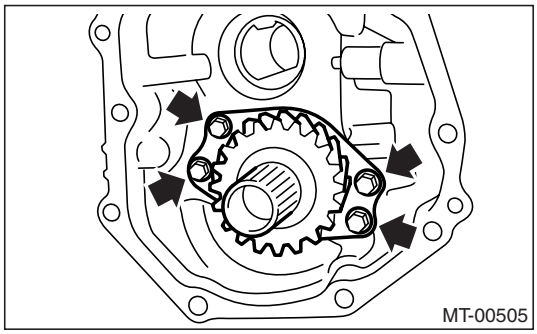
1) Remove the manual transmission assembly from vehicle. <Ref. to 6MT-34, REMOVAL, Manual Transmission Assembly.>
2) Prepare the transmission for overhaul. <Ref. to 6MT-40, Preparation for Overhaul.>
3) Remove the extension case. <Ref. to 6MT-47, REMOVAL, Extension Case.>
4) Remove the transfer drive gear.


MT-00505

B: INSTALLATION

1) Install the transfer drive gear.

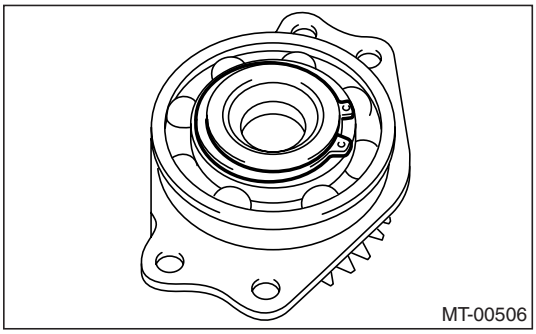
Tightening torque:
25 N·m (2.5 kgf-m, 18.4 ft-lb)


MT-00505

2) If the ball bearing, transfer drive gear or snap ring is replaced, select the transfer drive gear thrust washer. <Ref. to 6MT-48, ASSEMBLY, Extension Case.>
3) Install the extension case. <Ref. to 6MT-47, INSTALLATION, Extension Case.>
4) Install the manual transmission assembly into vehicle. <Ref. to 6MT-36, INSTALLATION, Manual Transmission Assembly.>

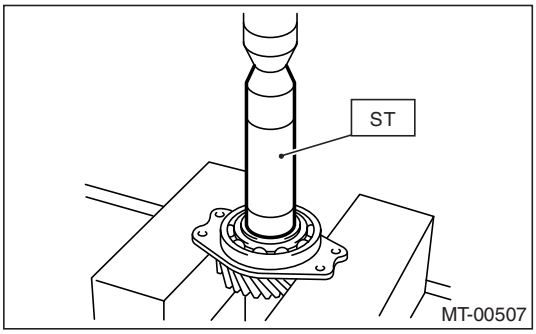
C: DISASSEMBLY

1) Remove the snap ring.


MT-00506

2) Using the ST, remove the bearing.
ST 499877000 RACE 4-5 INSTALLER

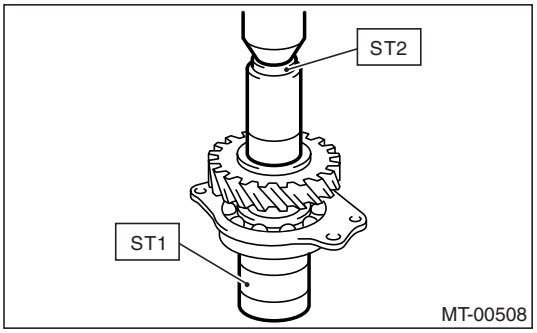
NOTE:
Use a new ball bearing.



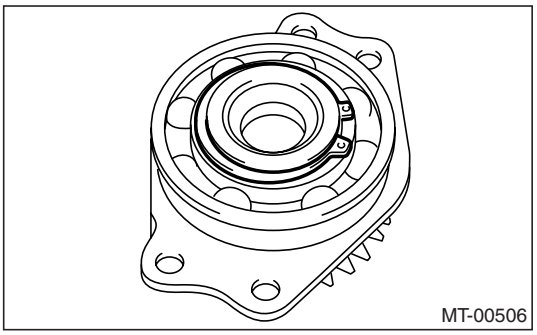
MT-00507

D: ASSEMBLY

1) Using the ST, install the ball bearing.
ST1 499247400 INSTALLER
ST2 398497701 SEAT



2) Install the snap ring.

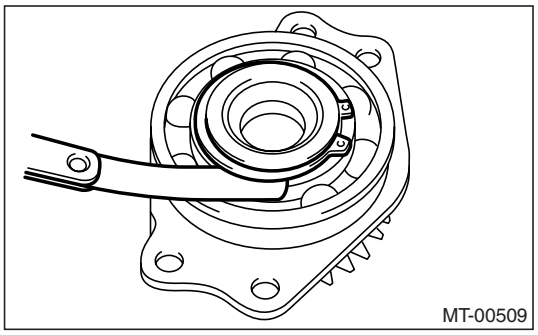


3) Inspect the clearance between snap ring and ball bearing. <Ref. to 6MT-57, INSPECTION, Transfer Drive Gear.>

E: INSPECTION

1) Bearing
Replace the bearings in the following cases.
• When there are breakage and rust on the bearings.
• When there are wear or damage.
• When bearings that fail to turn smoothly or make noise.
2) Drive gear
Replace the drive gear in the following case:
• When their tooth surface and shaft are excessively broken or damaged.
3) Measure the clearance between snap ring and inner race of ball bearing with a thickness gauge.

Standard clearance between snap ring and inner race:
0 — 0.15 mm (0 — 0.0059 in)



4) If the measurement is not within the range, select a suitable snap ring from the table below.

NOTE:
Be sure that it is within standard clearance range.

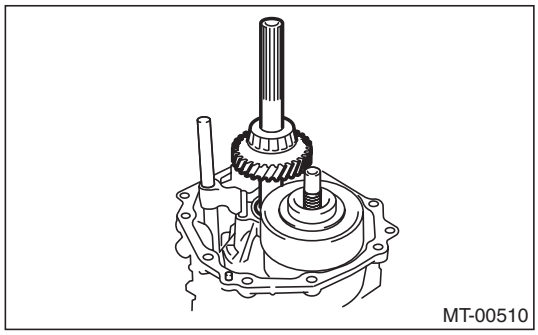
Snap ring	
Part No.	Thickness mm (in)
805045050	1.76 (0.069)
805045060	1.88 (0.074)
805045070	2.00 (0.079)

After replacement of the snap ring, inspect the clearance again.

15.Transfer Driven Gear

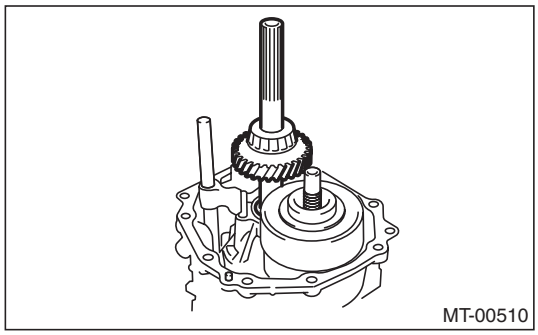
A: REMOVAL

1) Remove the manual transmission assembly from vehicle. <Ref. to 6MT-34, REMOVAL, Manual Transmission Assembly.>
2) Prepare the transmission for overhaul. <Ref. to 6MT-40, Preparation for Overhaul.>
3) Remove the extension case. <Ref. to 6MT-47, REMOVAL, Extension Case.>
4) Remove the transfer driven gear.



B: INSTALLATION

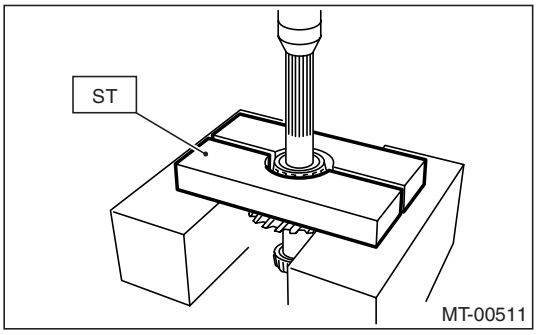
1) Install the transfer driven gear.



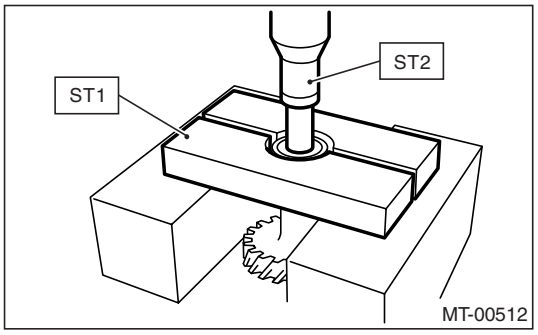
2) If the bearing or transfer driven gear is replaced, select the transfer driven thrust washer. <Ref. to 6MT-49, ADJUSTMENT, Extension Case.>
3) Install the extension case. <Ref. to 6MT-47, INSTALLATION, Extension Case.>
4) Install the manual transmission assembly into vehicle. <Ref. to 6MT-36, INSTALLATION, Manual Transmission Assembly.>

C: DISASSEMBLY

1) Using the ST, remove the roller bearing (extension case side).
ST 498515700 REMOVER



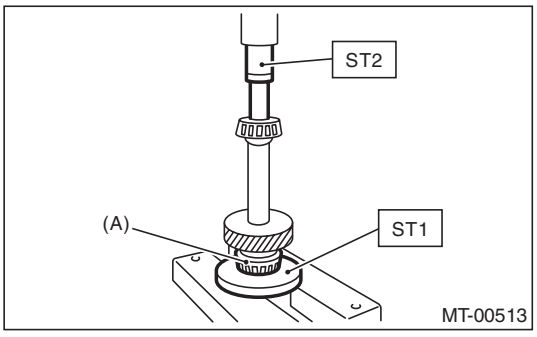
2) Using the ST1 and ST2, remove the roller bearing (transmission case side).
ST1 899858600 REMOVER
ST2 899864100 REMOVER



D: ASSEMBLY

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

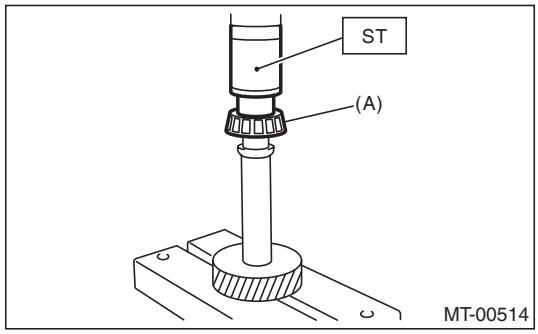
NOTE:
Do not apply pressure in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).



(A) Roller bearing

2) Using the ST, install the roller bearing of transmission 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

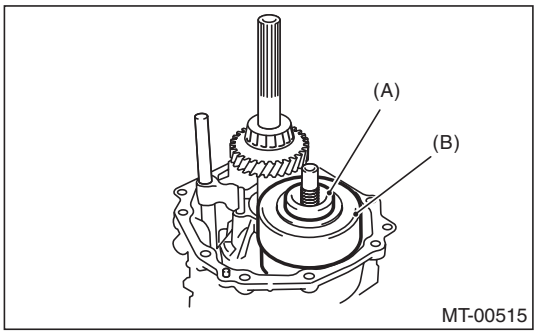
E: INSPECTION

1) Bearing
Replace the bearings in the following cases.
• When there are breakage and rust on the bearings.
• When there are wear or damage.
• When bearing that fails to turn smoothly or makes noise after gear oil lubrication.
2) Driven gear
Replace the driven gear in the following case.
• When driven gear tooth surface and shaft are excessively broken or damaged.

16.Center Differential

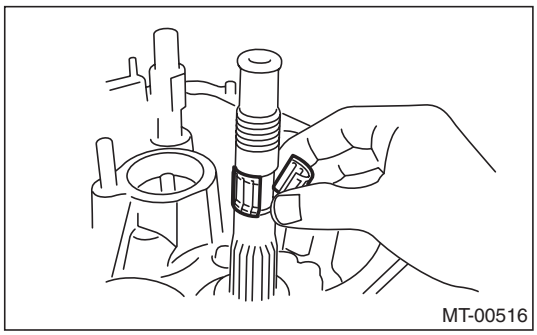
A: REMOVAL

1) Remove the manual transmission assembly from vehicle. <Ref. to 6MT-34, REMOVAL, Manual Transmission Assembly.>
2) Prepare the transmission for overhaul. <Ref. to 6MT-40, Preparation for Overhaul.>
3) Remove the extension case. <Ref. to 6MT-47, REMOVAL, Extension Case.>
4) Remove the transfer driven gear. <Ref. to 6MT-58, REMOVAL, Transfer Driven Gear.>
5) Remove the thrust washer and center differential.



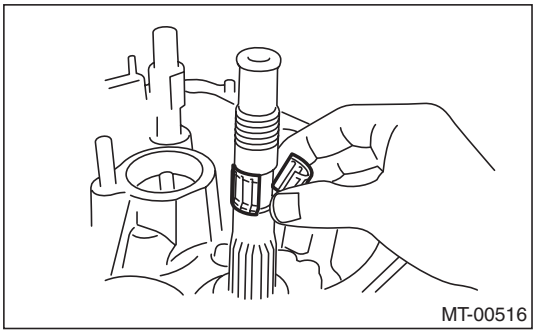
(A) Thrust washer
(B) Center Differential

6) Remove the needle bearing.

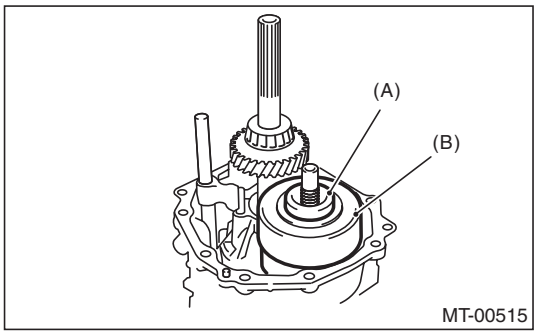


B: INSTALLATION

1) Install the needle bearing.



2) Install the thrust washer and center differential.



(A) Thrust washer
(B) Center Differential

3) If replacing the center differential, select the transfer drive gear and thrust washer and install. <Ref. to 6MT-49, ADJUSTMENT, Extension Case.>
4) Install the transfer driven gear. <Ref. to 6MT-58, INSTALLATION, Transfer Driven Gear.>
5) Install the extension case. <Ref. to 6MT-47, INSTALLATION, Extension Case.>
6) Install the manual transmission assembly into vehicle. <Ref. to 6MT-36, INSTALLATION, Manual Transmission Assembly.>

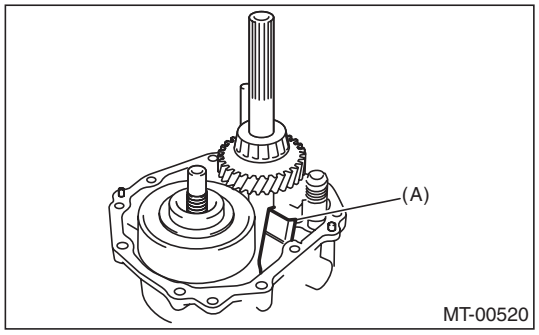
C: INSPECTION

Check there is no damage on the center differential. Replace if damaged.

17.Oil Pump

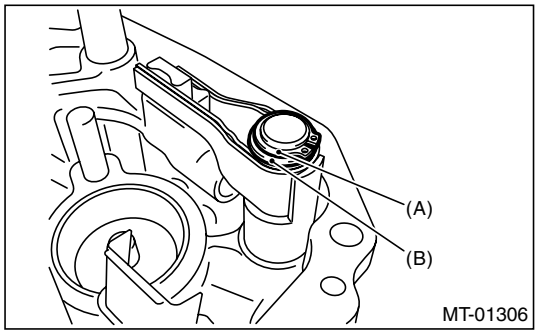
A: REMOVAL

1) Remove the manual transmission assembly from vehicle. <Ref. to 6MT-34, REMOVAL, Manual Transmission Assembly.>
2) Prepare the transmission for overhaul. <Ref. to 6MT-40, Preparation for Overhaul.>
3) Remove the extension case. <Ref. to 6MT-47, REMOVAL, Extension Case.>
4) Remove the transfer driven gear. <Ref. to 6MT-58, REMOVAL, Transfer Driven Gear.>
5) Remove the center differential. <Ref. to 6MT-60, REMOVAL, Center Differential.>
6) Remove the oil guide.



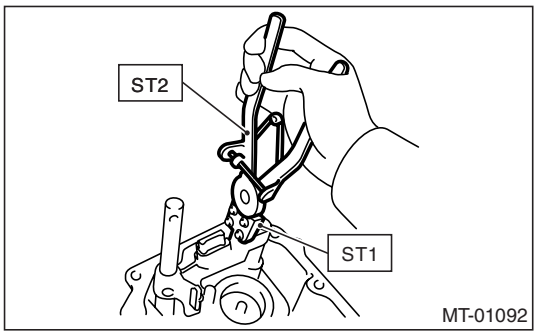
(A) Oil guide

7) Remove the snap ring and flat washer.

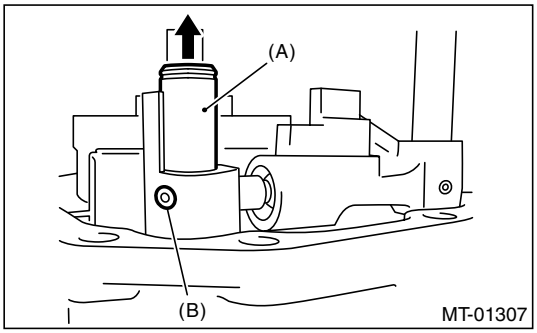


(A) Snap ring
(B) Flat washer

8) Using the ST, remove the neutral set spring and support.
ST1 18756AA000 CLAW
ST2 399893600 PLIERS

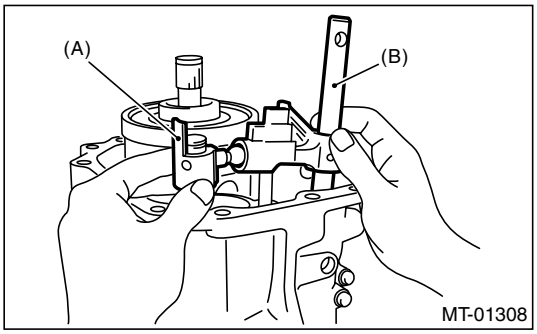


9) Raise the striking rod up, then remove the spring pin.



(A) Striking rod
(B) Spring pin

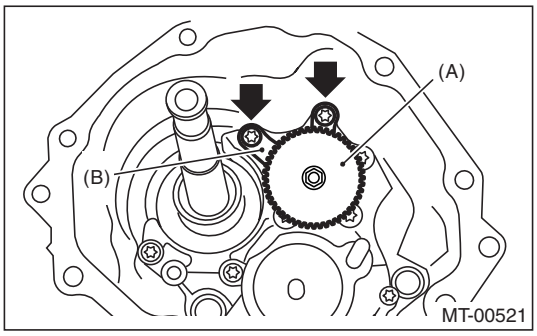
10) Remove the selector arm No. 2 and shifter arm.



(A) Selector arm No. 2
(B) Shifter arm

11) Using the ST, remove the oil pump shaft assembly and the plate.

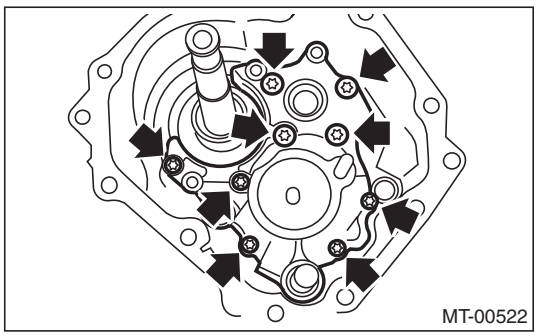
NOTE:
Remove the bolts using ST because damage may occur if general tool is used.
ST 18663AA000 SOCKET



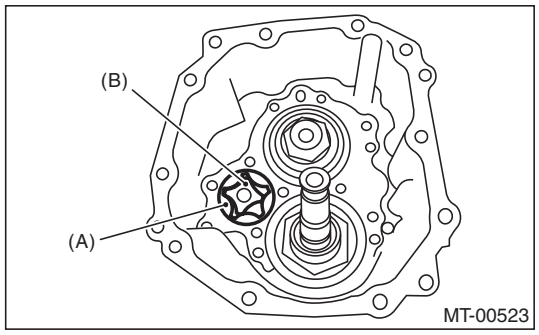
(A) Oil pump shaft assembly
(B) Plate

12) Using the ST, remove the oil pump cover assembly.

NOTE:
Remove the bolts using ST because damage may occur if general tool is used.
ST 18663AA000 SOCKET



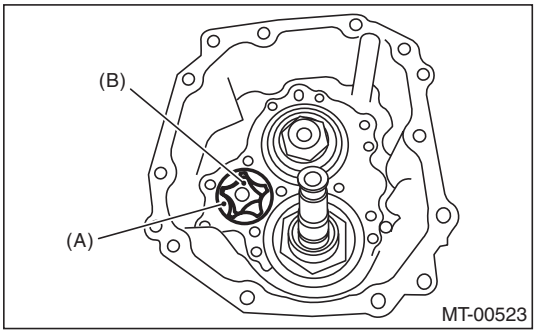
13) Remove the thrust washer on main shaft part.
14) Remove the oil pump rotor.



(A) Outer rotor
(B) Inner rotor

B: INSTALLATION

1) Apply oil to the outer periphery of outer rotor, then install to transmission case.

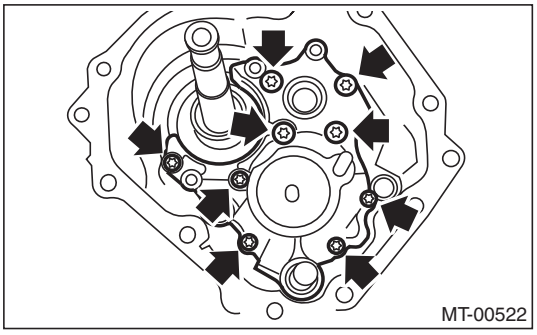


(A) Outer rotor
(B) Inner rotor

2) Install the thrust washer to main shaft part.
3) Using the ST, install the oil pump cover assembly.

Tightening torque:
25 N·m (2.5 kgf-m, 18.4 ft-lb)

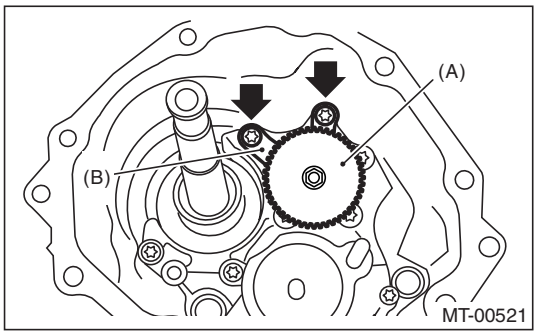
ST 18663AA000 SOCKET



4) Using the ST, install the oil pump shaft assembly and the plate.

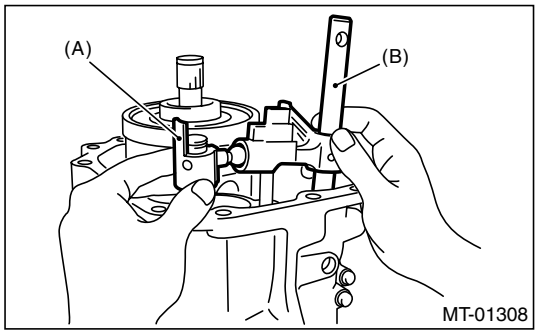
Tightening torque:
25 N·m (2.5 kgf-m, 18.4 ft-lb)

ST 18663AA000 SOCKET



(A) Oil pump shaft assembly
(B) Plate

5) If replacing the oil pump cover assembly, select the transfer driven gear and thrust washer, then install them to the extension case. <Ref. to 6MT-49, ADJUSTMENT, Extension Case.>
6) Remove the selector arm No. 2 and shifter arm.

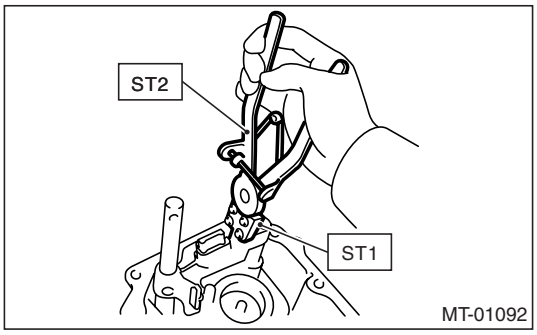


(A) Selector arm No. 2
(B) Shifter arm

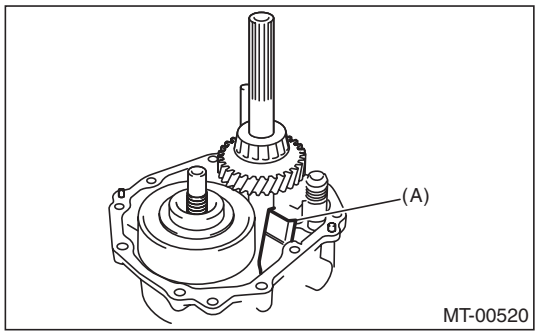
7) Install the spring pin.

NOTE:
Use new spring pin.

8) Using the ST, install the neutral set spring and support.
ST1 18756AA000 CLAW
ST2 399893600 PLIERS



9) Install the flat washer and snap ring.
10) Install the oil guide.



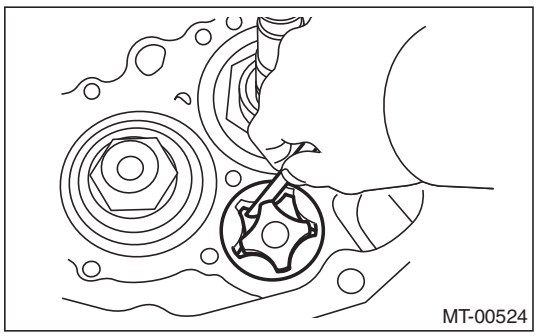
(A) Oil guide

11) Install the center differential. <Ref. to 6MT-60, INSTALLATION, Center Differential.>
12) Install the transfer driven gear. <Ref. to 6MT-58, INSTALLATION, Transfer Driven Gear.>
13) Install the extension case. <Ref. to 6MT-47, INSTALLATION, Extension Case.>
14) Install the manual transmission assembly into vehicle. <Ref. to 6MT-36, INSTALLATION, Manual Transmission Assembly.>

C: INSPECTION

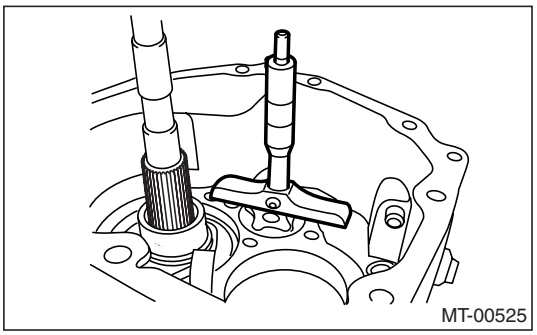
1) Check that there is no damage on the inner rotor and outer rotor. Replace the oil pump rotor assembly if damaged.
2) Tip clearance
Install the inner rotor and outer rotor to transmission case. Align tip of the inner rotor and outer rotor, then measure the clearance. Replace the oil pump rotor assembly if clearance exceeds specification.

Tip clearance specification:
Less than 0.15 mm (0.0059 in)



3) Side clearance
Measure to the transmission case and rotor. Replace the oil pump rotor assembly if clearance exceeds specification.

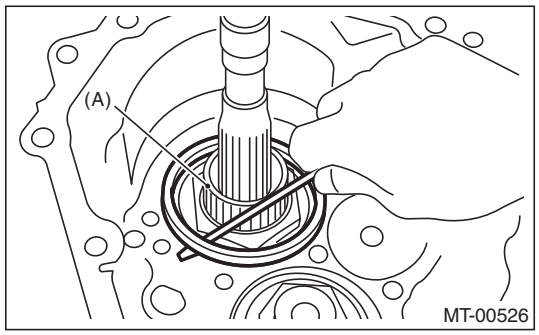
Side clearance specification:
0.03 — 0.10 mm (0.0012 — 0.0039 in)



18.Transmission Case

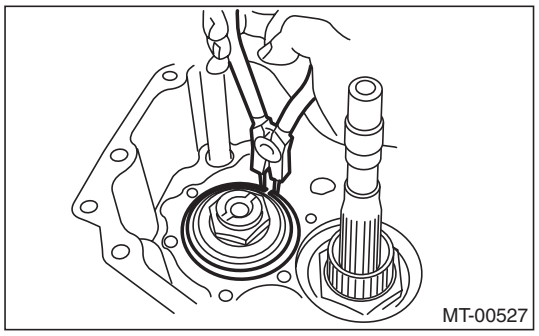
A: REMOVAL

1) Remove the manual transmission assembly from vehicle. <Ref. to 6MT-34, REMOVAL, Manual Transmission Assembly.>
2) Prepare the transmission for overhaul. <Ref. to 6MT-40, Preparation for Overhaul.>
3) Remove the oil pipe, neutral position switch, back-up light switch and harness. <Ref. to 6MT-42, REMOVAL, Oil Pipe.> <Ref. to 6MT-45, REMOVAL, Neutral Position Switch.> <Ref. to 6MT-43, REMOVAL, Back-up Light Switch.>
4) Remove the extension case. <Ref. to 6MT-47, REMOVAL, Extension Case.>
5) Remove the transfer driven gear. <Ref. to 6MT-58, REMOVAL, Transfer Driven Gear.>
6) Remove the center differential. <Ref. to 6MT-60, REMOVAL, Center Differential.>
7) Remove the oil pump. <Ref. to 6MT-61, REMOVAL, Oil Pump.>
8) Remove the shim and spacer of driven gear assembly.

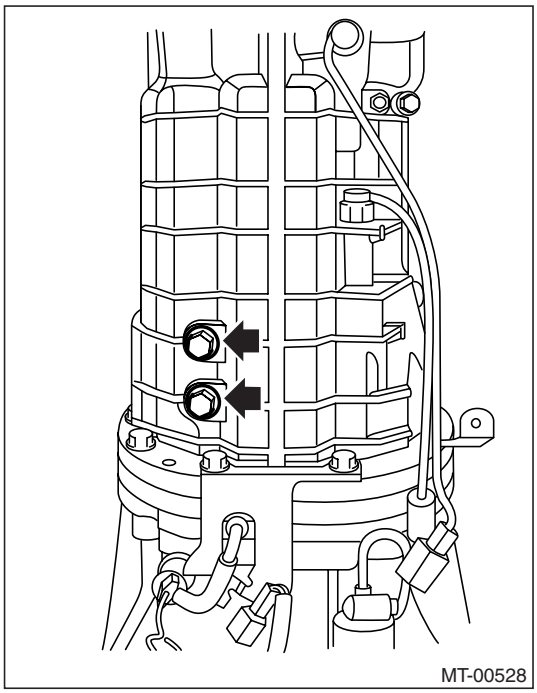


(A) Driven gear ASSY

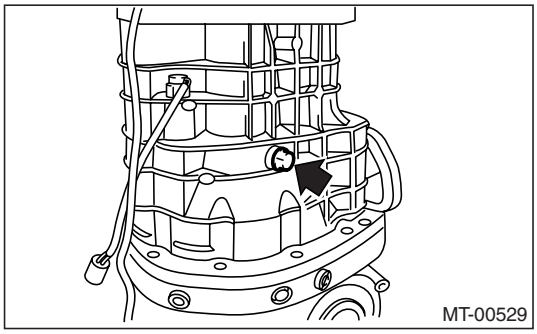
9) Remove the snap ring.



10) Remove the pilot bolt.

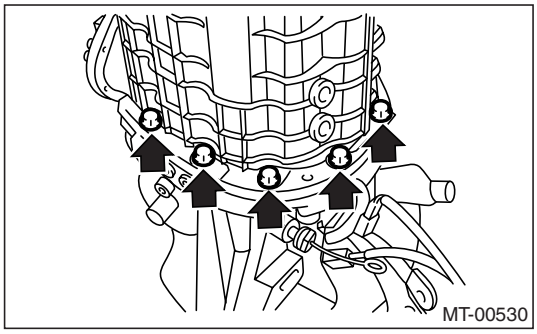


11) Remove the holder reverse bolt.



12) Remove the transmission case.

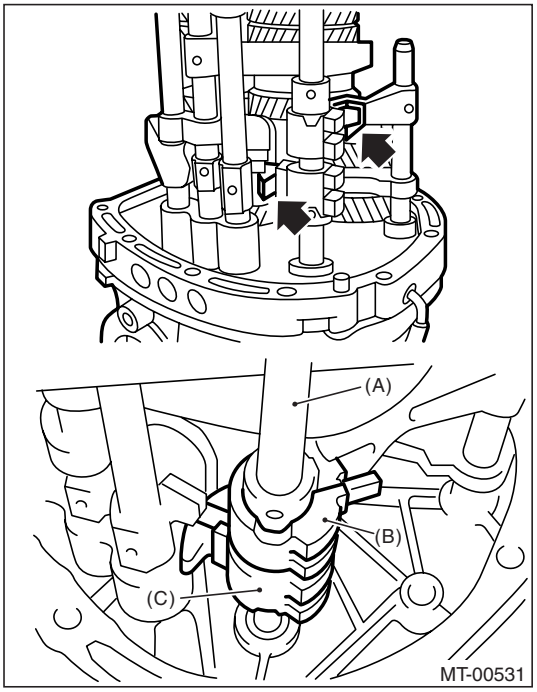
NOTE:
If the oil guide catches on shift fork, the transmission case may be difficult to be removed. Move the oil guide and the oil pipe to remove. Do not pull the transmission case by force.



13) Completely remove the remaining liquid gasket on transmission case and adapter plate.

B: INSTALLATION

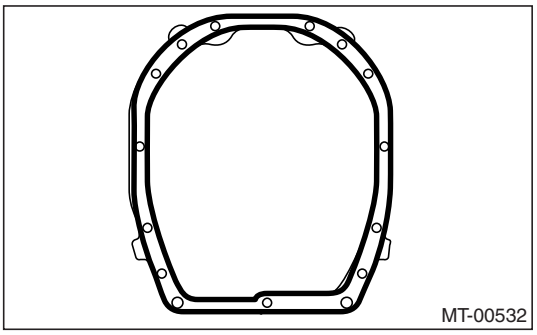
1) Make sure that each shifter fork and interlock block is shifted to neutral position. If not, shift to the neutral position.



(A) Striking rod
(B) Reverse interlock block
(C) Interlock block

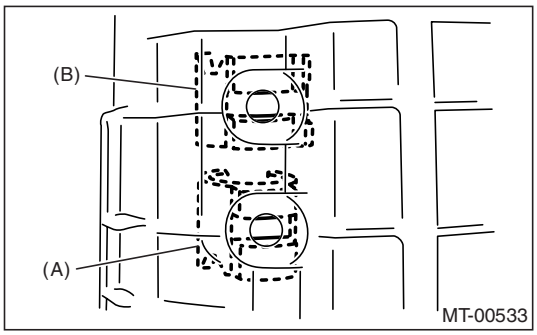
2) Apply liquid gasket to the adapter plate.

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



3) Install the transmission case.

4) Make sure the interlock block and reverse interlock block are aligned in neutral position by inspecting through the pilot bolt installation hole. If not aligned, remove the transmission case, then shift each shifter fork and interlock block to neutral position.



(A) Interlock block
(B) Reverse interlock block

5) Install the pilot bolts and gasket temporarily.

NOTE:
Use a new gasket.

6) Tighten the transmission case with bolts and nuts.

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

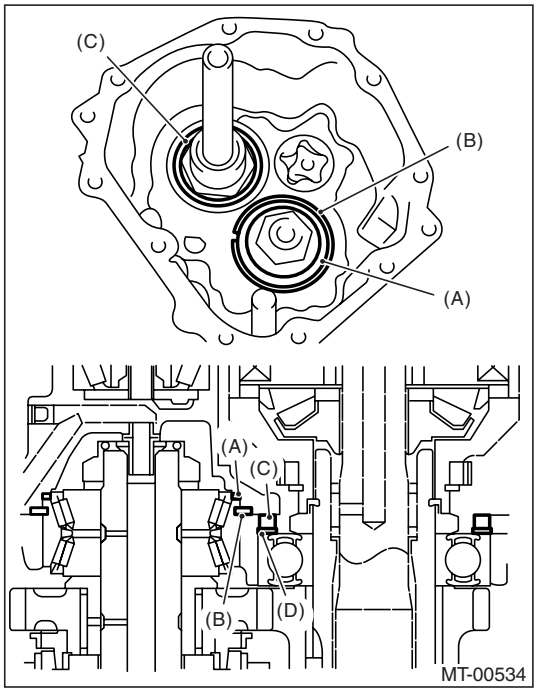
7) Tighten the pilot bolts.

Tightening torque:
34 N·m (3.5 kgf-m, 25.1 ft-lb)

8) Tighten the holder reverse bolt.

Tightening torque:
25 N·m (2.5 kgf-m, 18.4 ft-lb)

9) Install the snap ring, washer and collar of driven gear assembly.

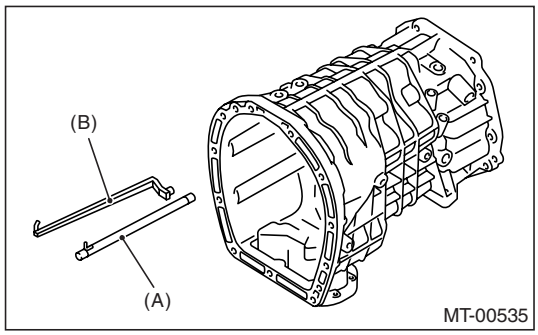


(A) Washer
(B) Snap ring
(C) Collar
(D) Washer

10) Install the oil pump. <Ref. to 6MT-62, INSTALLATION, Oil Pump.>
11) Install the center differential.f<Ref. to 6MT-60, INSTALLATION, Center Differential.>
12) Install the transfer driven gear. <Ref. to 6MT-58, INSTALLATION, Transfer Driven Gear.>
13) Install the extension case. <Ref. to 6MT-47, INSTALLATION, Extension Case.>
14) Install the oil pipe, neutral position switch, back-up light switch and harness. <Ref. to 6MT-42, INSTALLATION, Oil Pipe.> <Ref. to 6MT-45, INSTALLATION, Neutral Position Switch.> <Ref. to 6MT-43, INSTALLATION, Back-up Light Switch.>
15) Install the manual transmission assembly into vehicle. <Ref. to 6MT-36, INSTALLATION, Manual Transmission Assembly.>

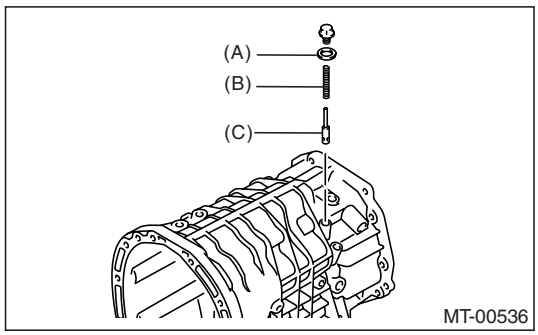
C: DISASSEMBLY

1) Remove the oil pipe and oil guide.



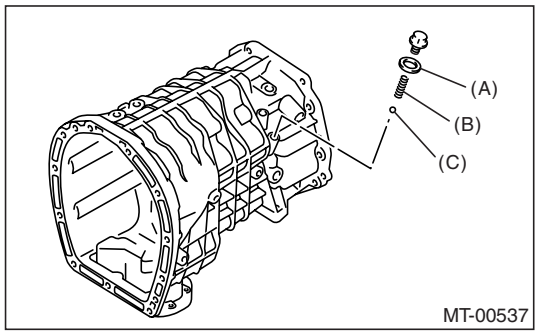
(A) Oil pipe
(B) Oil guide

2) Remove the seal bolt assembly, relief spring and relief valve.



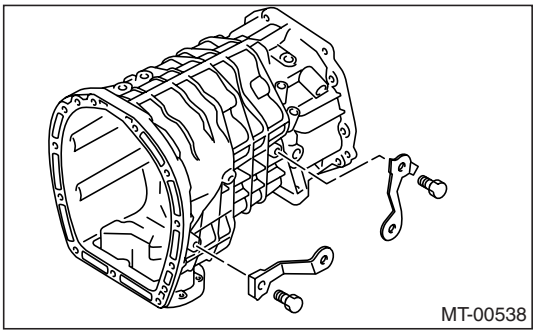
(A) Seal bolt assembly
(B) Relief valve spring
(C) Relief valve

3) Remove the seal bolt assembly, valve spring and ball.

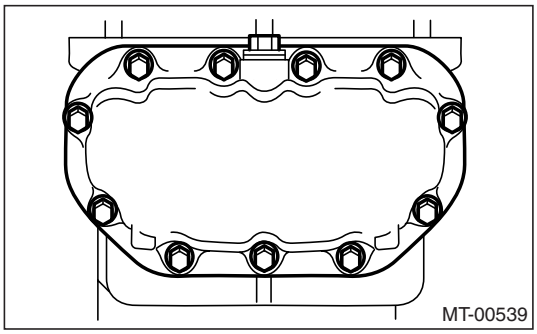


(A) Seal bolt assembly
(B) Valve spring
(C) Ball

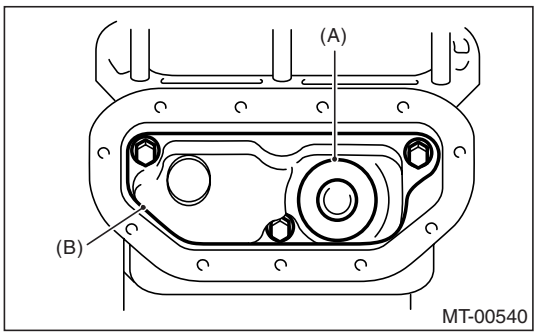
4) Remove the harness bracket.



5) Remove the oil pan.



6) Completely remove the remaining liquid gasket on transmission case and oil pan.
7) Remove the oil pan magnet, then remove the oil strainer.

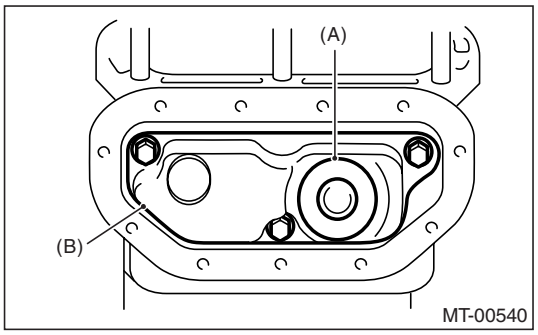


(A) Oil pan magnet
(B) Oil strainer

D: ASSEMBLY

1) Install the oil strainer and magnet.

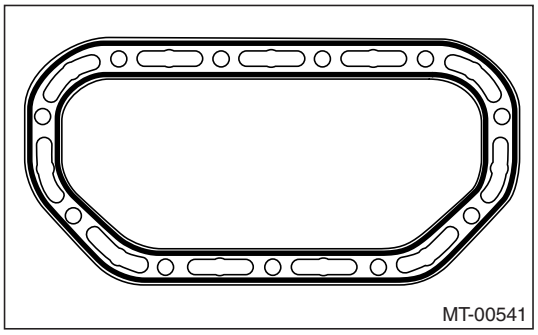
Tightening torque:
10 N·m (1.0 kgf-m, 7.4 ft-lb)



(A) Oil pan magnet
(B) Oil strainer

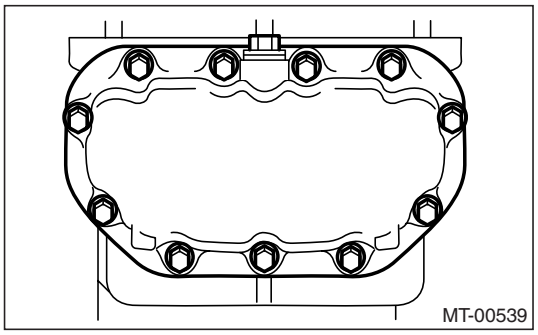
2) Apply liquid gasket to the oil pan.

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



3) Install the oil pan.

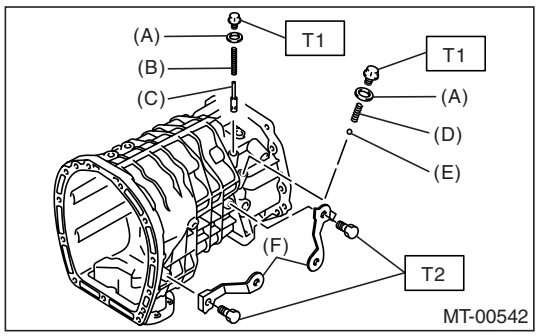
Tightening torque:
6.4 N·m (0.65 kgf-m, 4.7 ft-lb)



4) Install the relief valve, relief valve spring and new seal bolt assembly.

5) Install the ball, valve spring and new seal bolt assembly.

Tightening torque:
T1: 13 N·m (1.3 kgf-m, 9.6 ft-lb)
T2: 16 N·m (1.6 kgf-m, 11.8 ft-lb)



(A) Seal bolt assembly
(B) Relief valve spring
(C) Relief valve
(D) Valve spring
(E) Ball
(F) Harness bracket

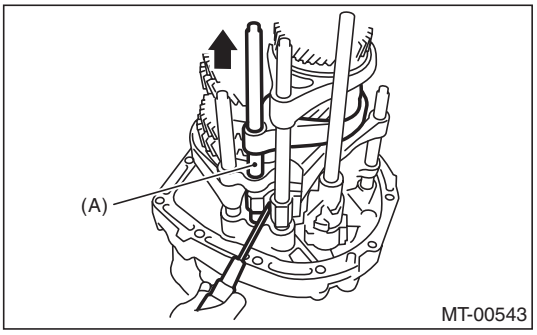
E: INSPECTION

1) Completely remove sludge using shop cloth if it is adhered to the oil pan magnet.
2) Check the oil strainer for clogging. Remove clogging or replace the oil strainer if there is clogging.
3) Check each part for damage. Replace the damaged part with a new one.

19.Main Shaft Assembly

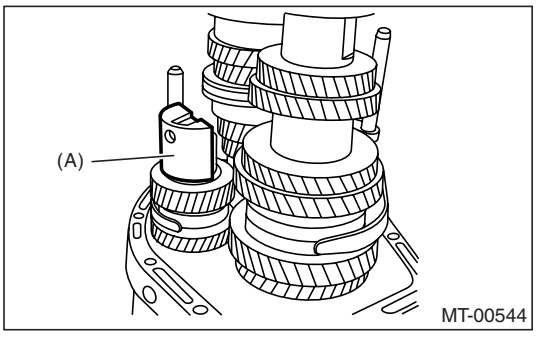
A: REMOVAL

1) Remove the manual transmission assembly from vehicle. <Ref. to 6MT-34, REMOVAL, Manual Transmission Assembly.>
2) Prepare the transmission for overhaul. <Ref. to 6MT-40, Preparation for Overhaul.>
3) Remove the oil pipe, neutral position switch, back-up light switch and harness. <Ref. to 6MT-42, REMOVAL, Oil Pipe.> <Ref. to 6MT-45, REMOVAL, Neutral Position Switch.> <Ref. to 6MT-43, REMOVAL, Back-up Light Switch.>
4) Remove the extension case. <Ref. to 6MT-47, REMOVAL, Extension Case.>
5) Remove the transfer driven gear. <Ref. to 6MT-58, REMOVAL, Transfer Driven Gear.>
6) Remove the center differential. <Ref. to 6MT-60, REMOVAL, Center Differential.>
7) Remove the oil pump. <Ref. to 6MT-61, REMOVAL, Oil Pump.>
8) Remove the transmission case. <Ref. to 6MT-64, REMOVAL, Transmission Case.>
9) Remove the striking rod.
10) Shift to 4th gear position using a screwdriver.



(A) 3rd-4th shift rod

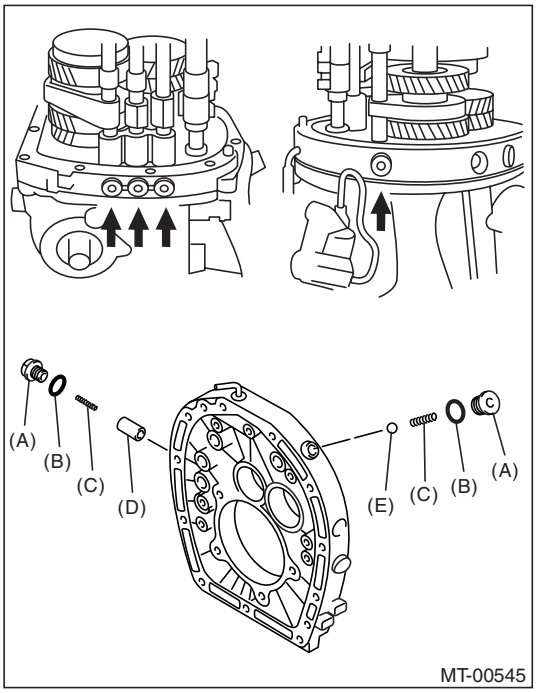
11) Remove the reverse idler holder.



(A) Reverse idler holder

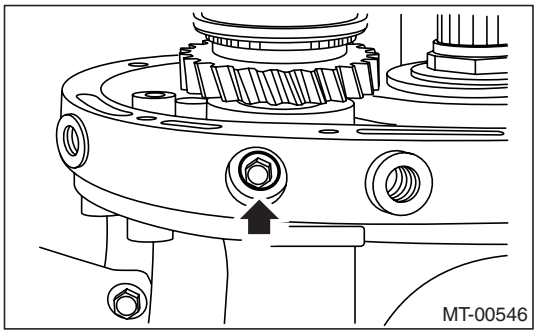
12) Remove all of the checking ball plug, gasket, checking ball spring, plunger and ball from adapter plate.

NOTE:
Use a new gasket.



(A) Checking ball plug
(B) Gasket
(C) Checking ball spring
(D) Plunger
(E) Ball

13) Remove the bolts and gasket which install the reverse idler shaft.

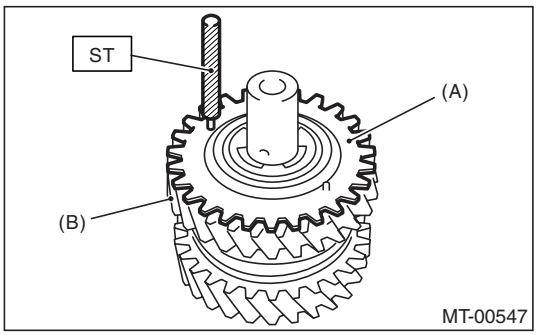


14) Push the main shaft assembly, driven gear assembly, reverse idler gear and each shifter fork to remove them from adapter plate at a time.

NOTE:
A helper is required to perform this work.

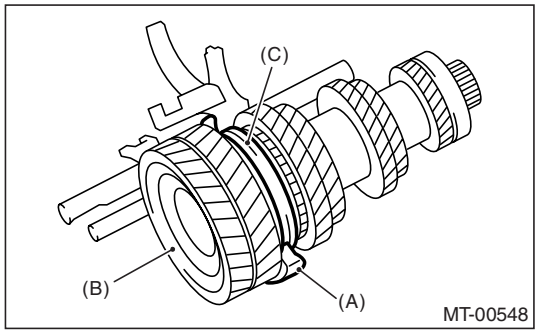
B: INSTALLATION

1) Adjust the 3rd-4th and 5th-6th shifter fork rod. <Ref. to 6MT-115, ADJUSTMENT, Shifter Fork and Rod.>
2) Rotate the sub gear counterclockwise for approx. three teeth. Insert the ST aligning sub gear and reverse idler gear hole.
ST 18757AA000 STRAIGHT PIN REMOVER



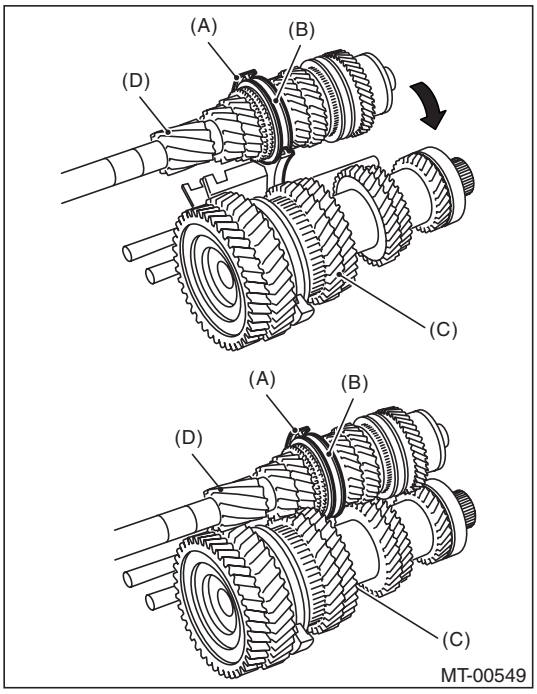
(A) Sub gear
(B) Reverse idler gear

3) Install the driven gear assembly to 1st-2nd shifter fork assembly.



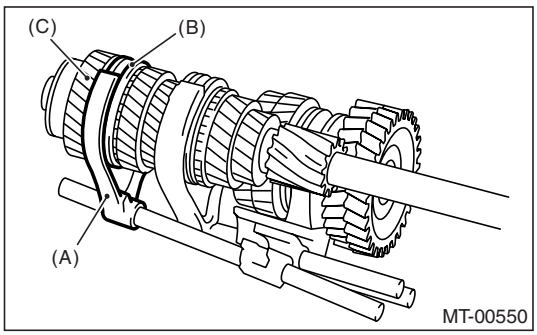
(A) 1st-2nd shifter fork
(B) Driven gear ASSY
(C) 1st-2nd sleeve

4) Install the main shaft assembly to 3rd-4th shifter fork and assemble them to driven gear assembly.



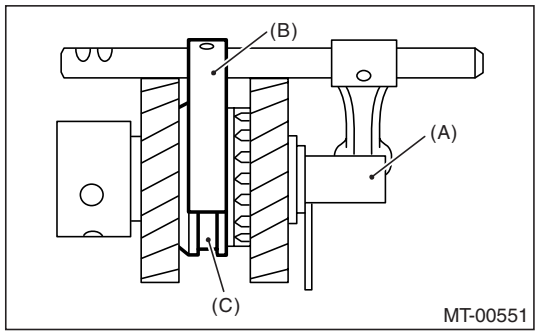
(A) 3rd-4th shifter fork
(B) 3rd-4th sleeve
(C) Driven gear ASSY
(D) Main shaft ASSY

5) Install the 5th-6th shifter fork assembly to main shaft assembly.



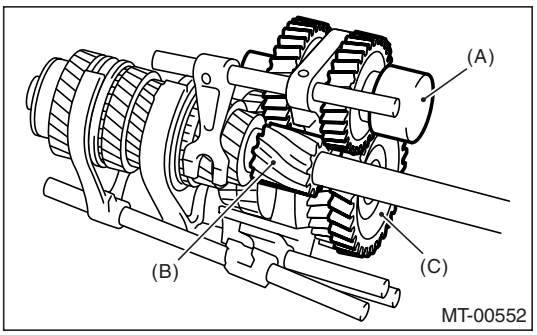
(A) 5th-6th shifter fork
(B) 5th-6th sleeve
(C) Main shaft ASSY

6) Install the reverse shifter fork assembly to reverse idler gear assembly.



(A) Reverse idler gear ASSY
(B) Reverse shifter fork
(C) Reverse sleeve

7) Install the reverse idler gear assembly.



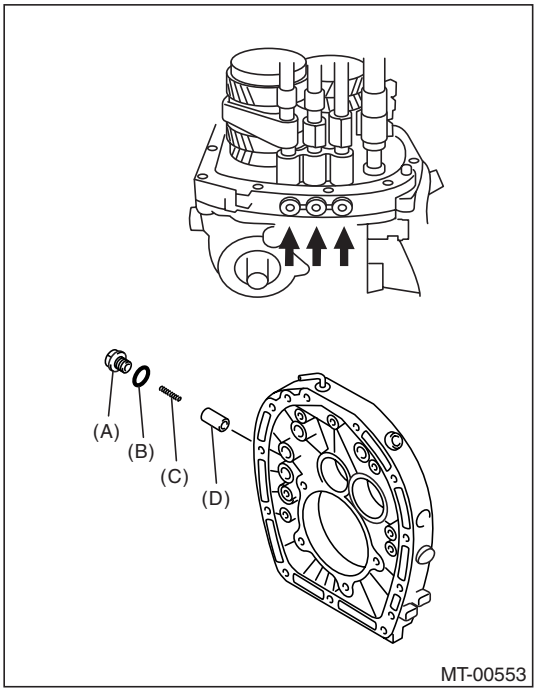
(A) Reverse idler gear ASSY
(B) 1st drive gear
(C) Reverse gear

8) Install the thrust bearing of driven gear assembly.
9) Push each shifter fork, main shaft assembly, driven gear assembly and reverse idler gear assembly to install them to adapter plate at a time.

NOTE:
A helper is required to perform this work.

10) Install the plunger, checking ball spring, new gasket and checking ball plug.

Tightening torque:
37 N·m (3.8 kgf-m, 27.3 ft-lb)

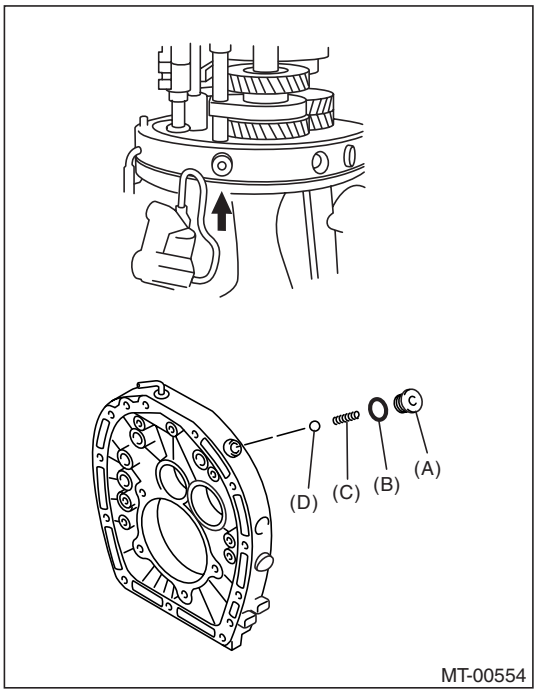


(A) Checking ball plug
(B) Gasket
(C) Checking ball spring
(D) Plunger

11) Install the ball, checking ball spring, gasket and checking ball plug.

NOTE:
Use a new gasket and checking ball plug.

Tightening torque:
37 N·m (3.8 kgf-m, 27.3 ft-lb)

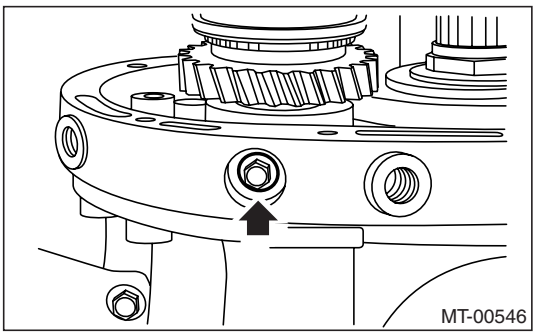


(A) Checking ball plug
(B) Gasket
(C) Checking ball spring
(D) Ball

12) Install the bolt and gasket.

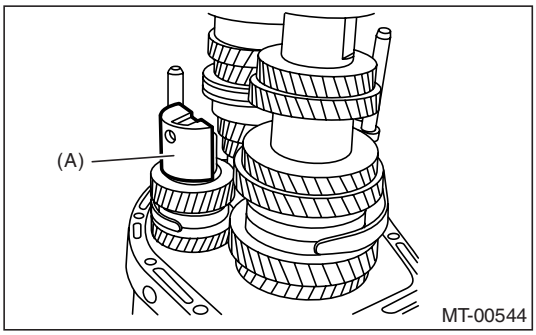
NOTE:
Use a new gasket.

Tightening torque:
25 N·m (2.5 kgf-m, 18.4 ft-lb)



13) Shift to 4th gear position using a screwdriver.

14) Install the reverse idler holder.



(A) Reverse idler holder

15) Install the striking rod.
16) Install the transmission case. <Ref. to 6MT-65, INSTALLATION, Transmission Case.>
17) Install the snap ring and washer of selected main shaft.
18) Install the oil pump. <Ref. to 6MT-62, INSTALLATION, Oil Pump.>
19) Install the center differential. <Ref. to 6MT-60, INSTALLATION, Center Differential.>
20) Install the transfer driven gear. <Ref. to 6MT-58, INSTALLATION, Transfer Driven Gear.>
21) Install the extension case. <Ref. to 6MT-47, INSTALLATION, Extension Case.>
22) Install the oil pipe, neutral position switch, back-up light switch and harness. <Ref. to 6MT-42, INSTALLATION, Oil Pipe.> <Ref. to 6MT-45, INSTALLATION, Neutral Position Switch.> <Ref. to 6MT-43, INSTALLATION, Back-up Light Switch.>
23) Install the manual transmission assembly to vehicle. <Ref. to 6MT-36, INSTALLATION, Manual Transmission Assembly.>

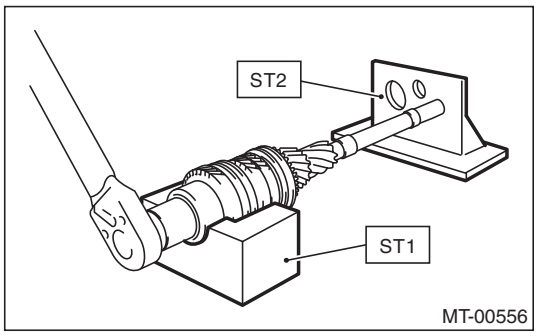
C: DISASSEMBLY

NOTE:
Each sleeve and hub engage at specified position. Before disassembly, put marks on the engagement position of sleeve and hub.

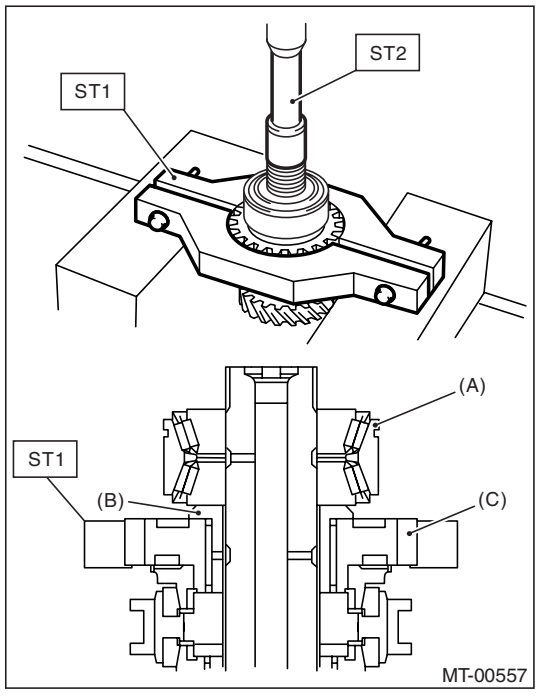
1) Secure the ST on workbench.
ST 18664AA000 BASE
2) Unlock the caulking of lock nut.

3) Set the main shaft assembly to ST and remove the lock nut and washer.
ST1 18665AA000 HOLDER
ST2 18664AA000 BASE

NOTE:
Use 38 mm socket wrench.

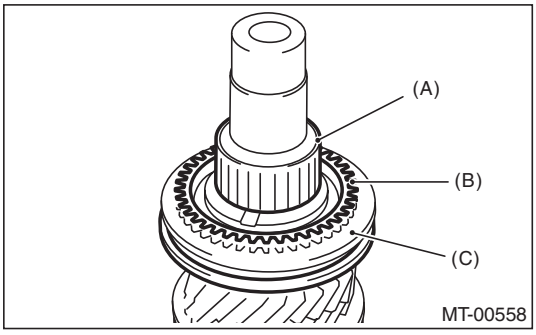


4) Remove the main shaft assembly from ST.
5) Set the ST1 to 6th drive gear and remove the taper roller bearing, bushing and 6th drive gear using a press.
ST1 18722AA010 REMOVER
ST2 899864100 REMOVER



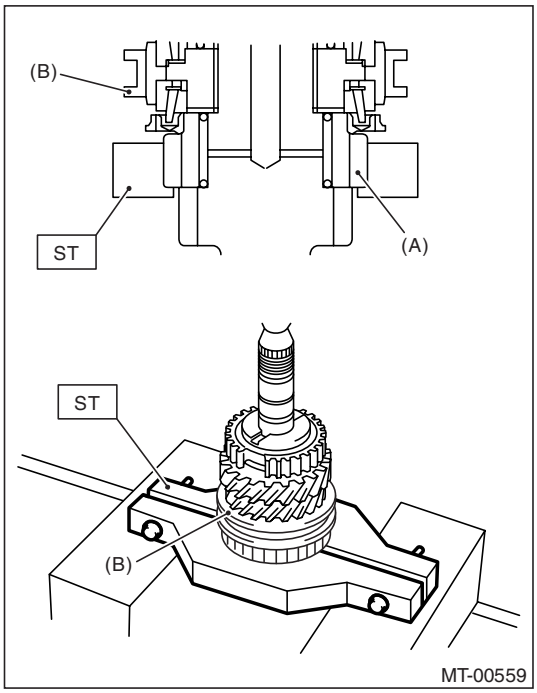
(A) Taper roller bearing
(B) Bushing
(C) 6th drive gear

6) Remove the 5th-6th sleeve, 6th needle bearing and 6th baulk ring.



(A) Needle bearing
(B) 6th baulk ring
(C) 5th-6th sleeve

7) Set the ST to 3rd drive gear and remove each part using a press.
ST 18720AA000 REMOVER

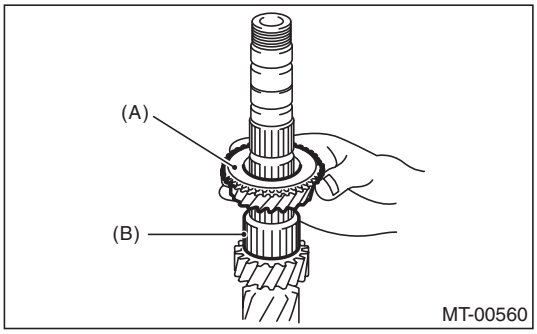


(A) 3rd drive gear
(B) 3rd-4th sleeve

D: ASSEMBLY

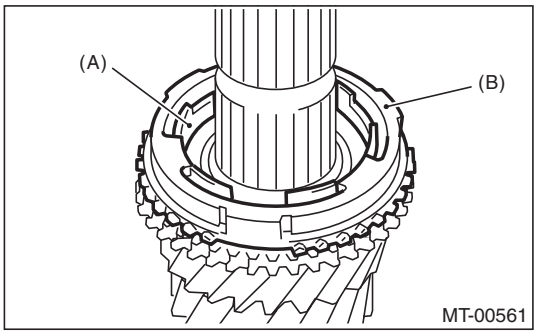
NOTE:
When replacing the following part, replace them as a set.
- Sleeve and hub
- Outer baulk ring, 3rd synchro cone and inner baulk ring
- Taper roller bearing

1) Apply sufficient amount of gear oil to the main shaft, and the inside of 3rd needle bearing and 3rd drive gear.
2) Install the 3rd needle bearing and 3rd drive gear to main shaft.



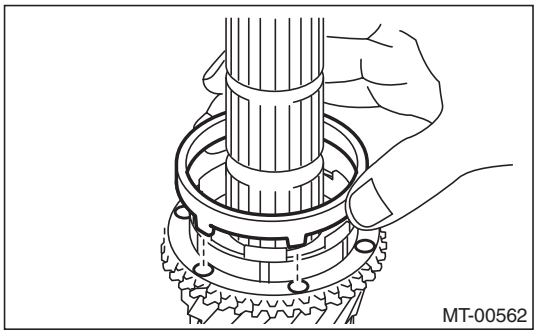
(A) 3rd drive gear
(B) 3rd needle bearing

3) Install the inner baulk ring, 3rd synchro cone and outer baulk ring.

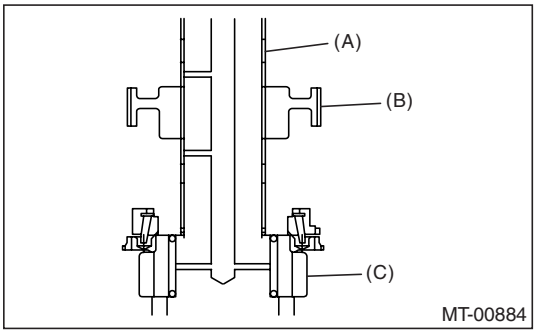


(A) Inner baulk ring
(B) Outer baulk ring

NOTE:
Install the 3rd synchro cone with aligning the protrusion of 3rd synchro cone to hole portion of 3rd drive gear.

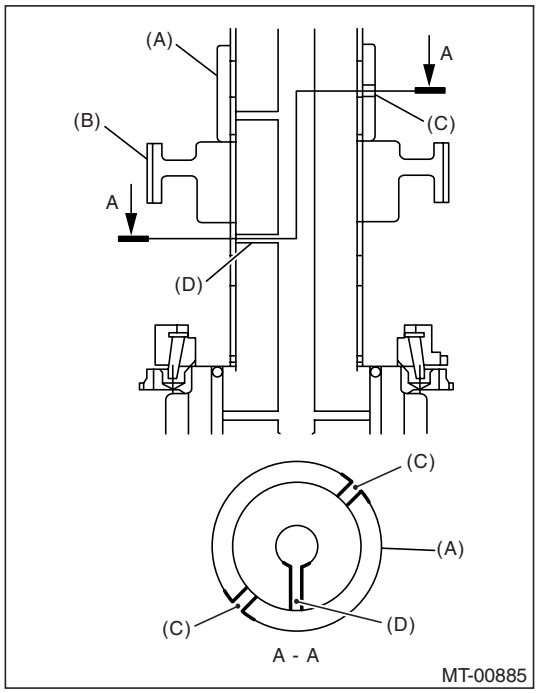


4) Install the 3rd-4th hub and 4th bushing.
(1) Set the 3rd-4th hub to main shaft paying attention to the installing direction.



(A) Main shaft
(B) 3rd-4th hub
(C) 3rd drive gear

(2) Install to the main shaft, taking care not to overlap the main shaft oil hole and 4th bushing oil hole.



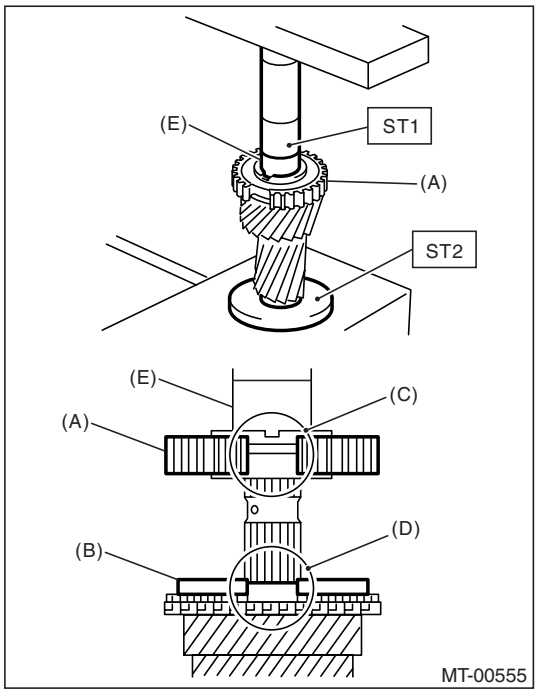
(A) 4th bushing
(B) 3rd-4th hub
(C) 4th bushing oil hole
(D) Main shaft oil hole

(3) Using the ST, press into 3rd-4th hub and 4th bushing at a time.

ST1 18651AA000 INSTALLER
ST2 398177700 INSTALLER

CAUTION:
Do not apply pressure in excess of 40 kN (4.0 ton, 4.4 US ton, 3.9 Imp ton).

NOTE:
When pressing into 3rd-4th hub and 4th bushing, move the outer baulk ring and align the protrusion of outer baulk ring to cutout portion of 3rd-4th bushing.

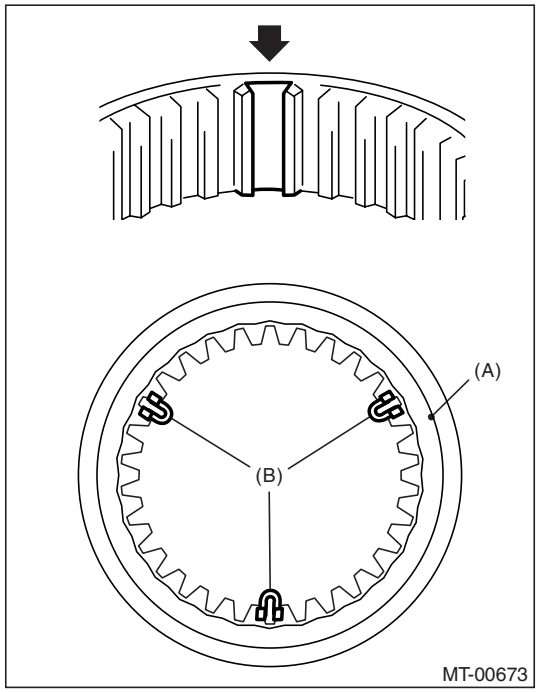


(A) 3rd-4th hub
(B) Outer baulk ring
(C) Cutout portion of 3rd-4th hub
(D) Protrusion of outer baulk ring
(E) 4th bushing

5) Be sure 3rd drive gear is rotated smoothly by hands. If it is not rotated smoothly, reassemble it.

6) Install the 3rd-4th shifting insert key to proper position of 3rd-4th sleeve.

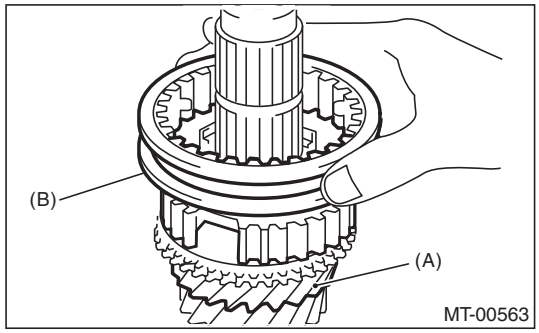
NOTE:
Angle of each shifting insert key is 120°.



(A) 3rd-4th sleeve
(B) 3rd-4th shifting insert key

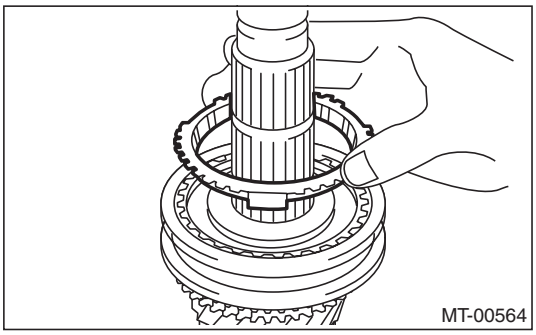
7) Install the 3rd-4th sleeve to 3rd-4th hub.

NOTE:
• 3rd-4th sleeve has an identification groove.
• Install the 3rd-4th sleeve with the groove facing towards 3rd drive gear side.

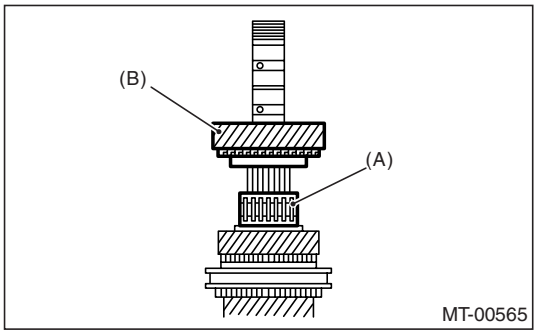


(A) 3rd drive gear
(B) 3rd-4th sleeve identification groove (one line)

8) Install the 4th baulk ring.

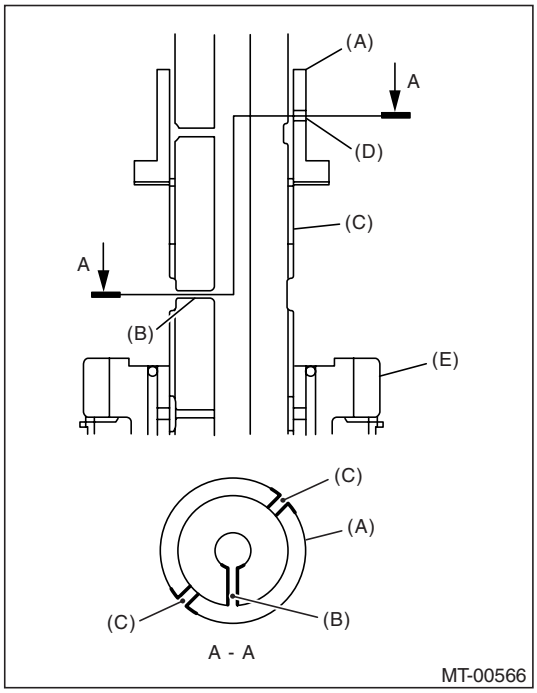


9) Apply sufficient amount of gear oil to the main shaft, and the inside of 4th needle bearing and 4th drive gear.
10) Install the 4th needle bearing and 4th drive gear.



(A) 4th needle bearing
(B) 4th drive gear

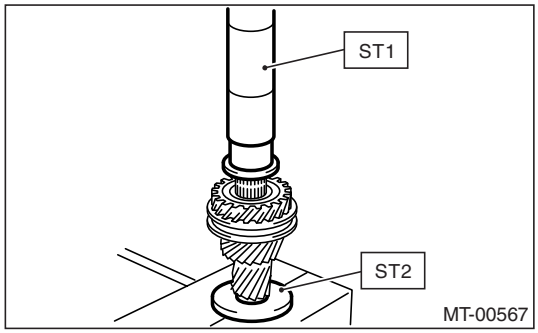
11) Install the 5th bushing.
(1) Install to the main shaft, taking care not to overlap the main shaft oil hole and 5th bushing oil hole.



(A) 5th bushing
(B) Main shaft oil hole
(C) Main shaft
(D) 5th bushing oil hole
(E) 4th drive gear

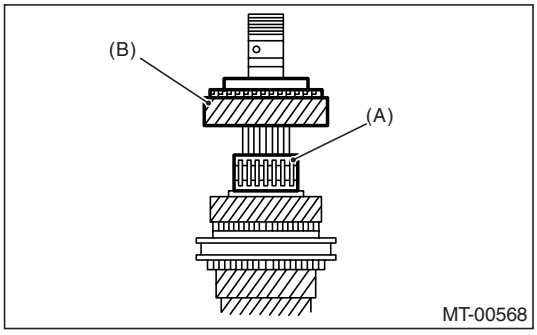
(2) Using the ST, press into 5th bushing.
ST1 18651AA000 INSTALLER
ST2 398177700 INSTALLER

CAUTION:
Do not apply pressure in excess of 40 kN (4.0 ton, 4.4 US ton, 3.9 Imp ton).



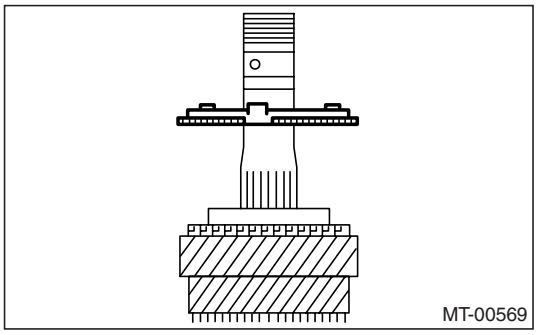
12) Be sure 4th drive gear is rotated smoothly by hands. If it is not rotated smoothly, reassemble it.
13) Apply sufficient amount of gear oil to the main shaft, and the inside of 5th needle bearing and 5th drive gear.

14) Install the 5th needle bearing and 5th drive gear.

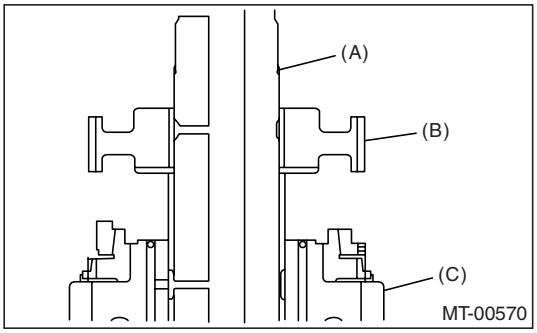


(A) 5th needle bearing
(B) 5th drive gear

15) Install the 5th baulk ring.



16) Install the 5th-6th hub.
(1) Set the 5th-6th hub to main shaft paying attention to the installing direction.

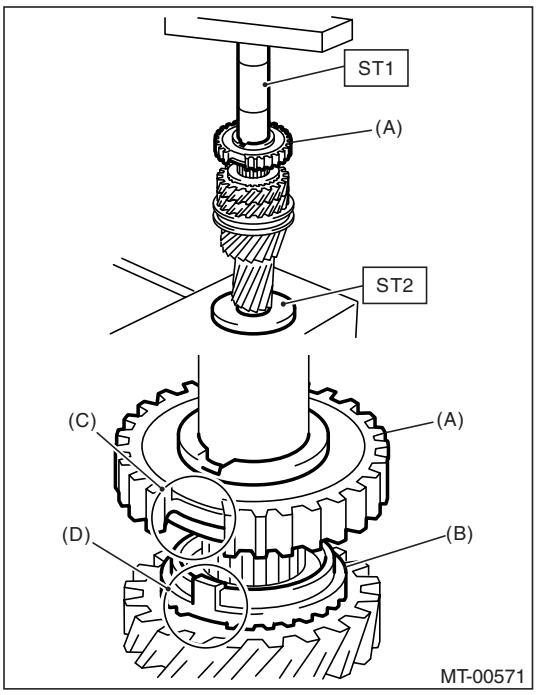


(A) Main shaft
(B) 5th-6th hub
(C) 5th drive gear

(2) Using the ST, press into 5th-6th hub.
ST1 18651AA000 INSTALLER
ST2 398177700 INSTALLER

CAUTION:
Do not apply pressure in excess of 40 kN (4.0 ton, 4.4 US ton, 3.9 Imp ton).

NOTE:
When pressing into 5th-6th hub, move the outer baulk ring and align the protrusion of outer baulk ring to cutout portion of 5th-6th bushing.

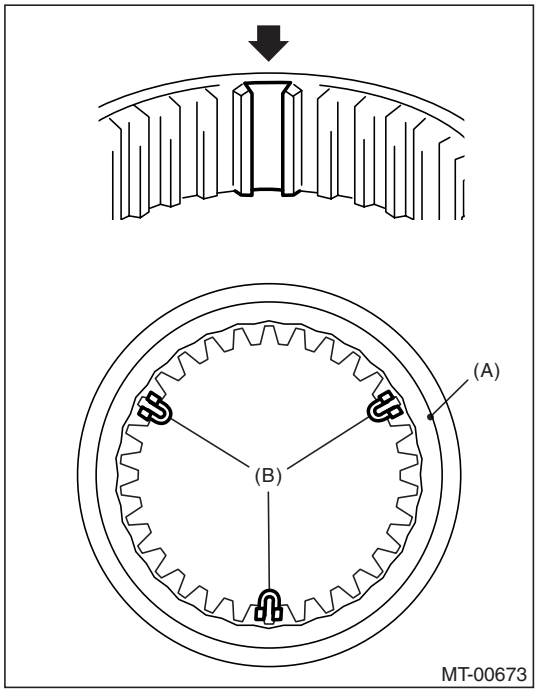


(A) 5th-6th hub
(B) Outer baulk ring
(C) Cutout portion of 5th-6th hub
(D) Protrusion of outer baulk ring

17) Be sure 5th drive gear is rotated smoothly by hands. If it is not rotated smoothly, reassemble it.

18) Install the 5th-6th shifting insert key to proper position of 5th-6th sleeve.

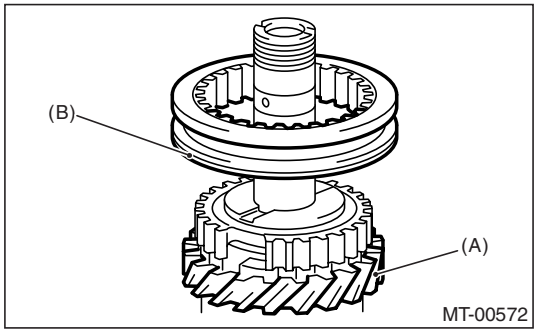
NOTE:
Angle of each shifting insert key is 120°.



(A) 5th-6th sleeve
(B) Shifting insert key

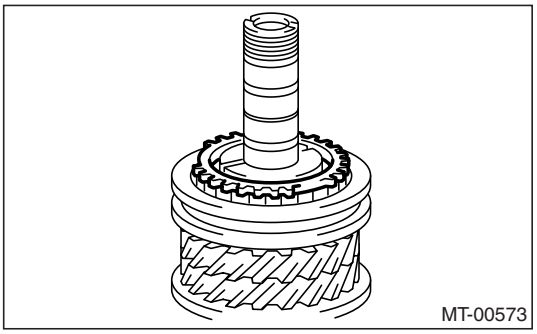
19) Install the 5th-6th sleeve to 5th-6th hub.

NOTE:
• 5th-6th sleeve has two identification grooves.
• Install the 5th-6th sleeve with the groove facing towards 5th drive gear side.

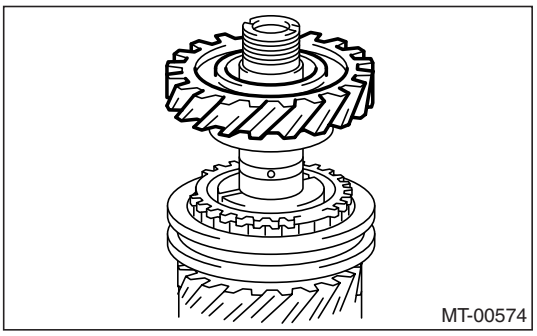


(A) 5th drive gear
(B) 5th-6th sleeve identification grooves (two lines)

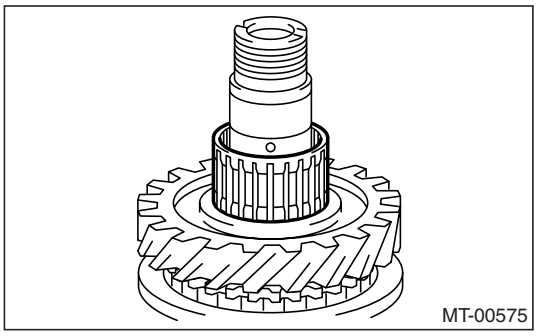
20) Install the 6th baulk ring.



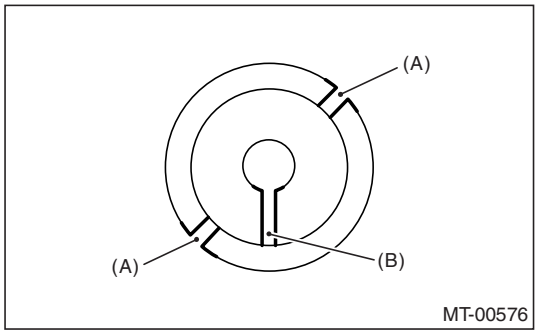
21) Apply sufficient amount of gear oil to the main shaft, and the inside of 6th needle bearing and 6th drive gear.
22) Install the 6th drive gear.



23) Install the 6th needle bearing.



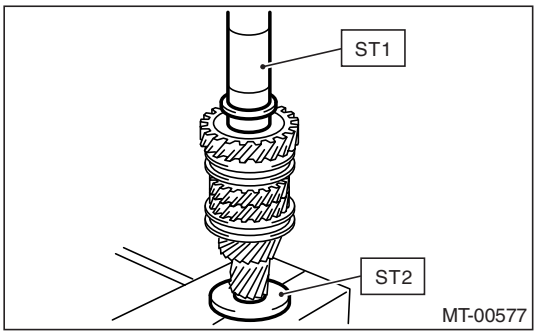
24) Set the 6th bushing to main shaft, taking care not to overlap the 6th bushing oil hole and main shaft oil hole.



(A) 6th bushing oil hole
(B) Main shaft oil hole

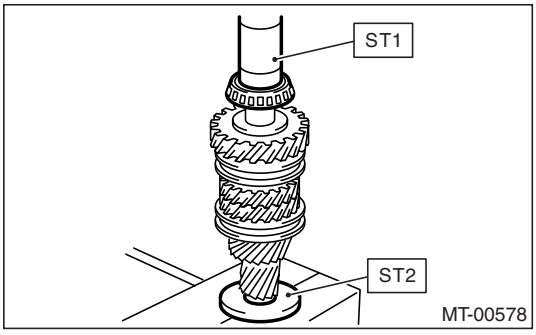
25) Using the ST, install the 6th bushing.
ST1 18651AA000 INSTALLER
ST2 398177700 INSTALLER

CAUTION:
Do not apply pressure in excess of 40 kN (4.0 ton, 4.4 US ton, 3.9 Imp ton).



26) Be sure 6th drive gear is rotated smoothly by hands. If it is not rotated smoothly, reassemble it.
27) Using the ST, install the inner race of inner bearing.
ST1 18651AA000 INSTALLER
ST2 398177700 INSTALLER

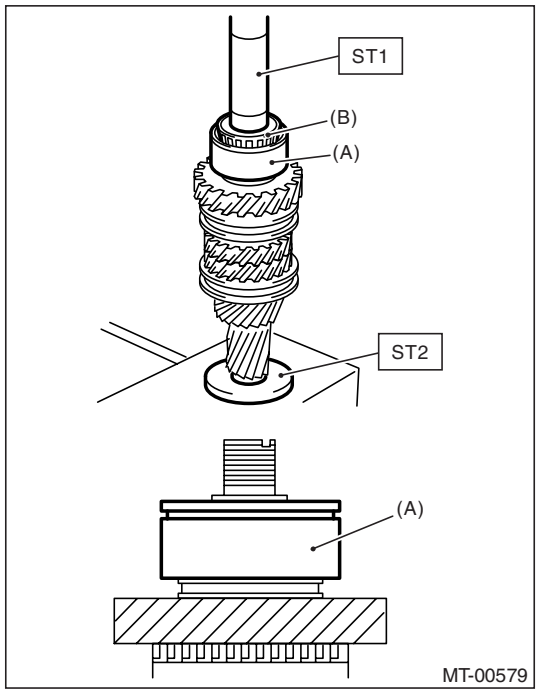
CAUTION:
Do not apply pressure in excess of 40 kN (4.0 ton, 4.4 US ton, 3.9 Imp ton).



28) Using the ST, install the retainer and inner race of outer bearing.
ST1 18651AA000 INSTALLER
ST2 398177700 INSTALLER

CAUTION:
Do not apply pressure in excess of 40 kN (4.0 ton, 4.4 US ton, 3.9 Imp ton).

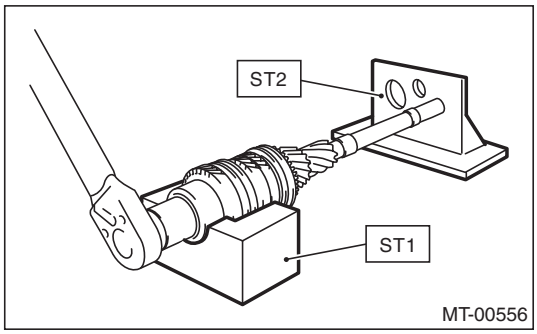
NOTE:
• Be sure the retainer is installed in proper direction.
• Press until the retainer has no backlash or the bearing can be rotated smoothly by hands.



(A) Retainer
(B) Inner race of outer bearing

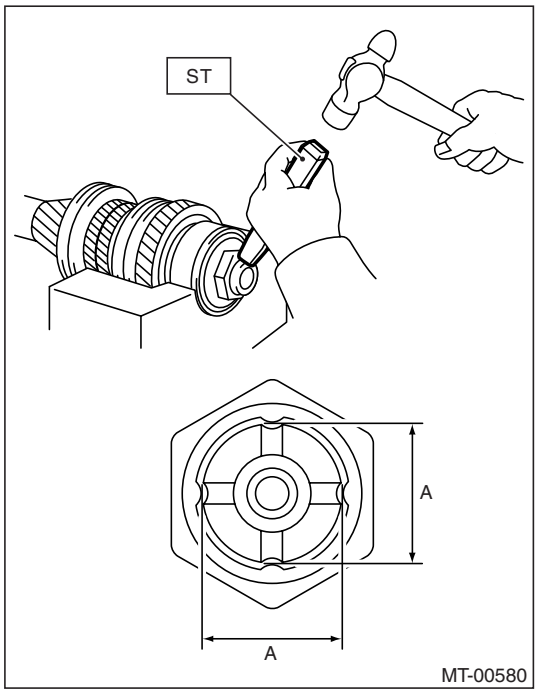
29) Be sure the taper roller bearing is rotated smoothly by hands. If it is not rotated smoothly, replace the taper roller bearing as a set and reassemble them.
30) Install the lock washer and new lock nut.
31) Set the main shaft assembly to ST and tighten the lock nut.
ST1 18665AA000 HOLDER
ST2 18664AA000 BASE

Tightening torque:
392 N·m (40 kgf-m, 289.1 ft-lb)



32) Using the ST, caulk the lock nut at four points at dimension A of 27±0.3 mm (1.06±0.01 in).
ST 18668AA000 PUNCH

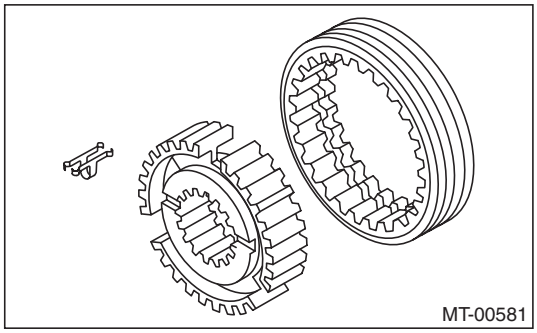
NOTE:
Do not damage the caulking portion of lock nut.



E: INSPECTION

Disassembled parts should be washed with unleaded gasoline first and then inspected carefully.
1) Bearing
Replace the bearings in the following cases.
• When there are wear, rust and damage on the bearing.
• When bearing that fails to turn smoothly or makes noise while turning.
• When bearings have other defects.
2) Bushing (each gear)
Replace the bushing in following cases.
• When the sliding surface is damaged or abnormally worn.
3) Gear
Replace the gear in the following cases.
• When the gear teeth surfaces are broken or excessively worn.
• When the parts that contact the baulk ring is damaged.
• When the inner surface of gear is damaged.
4) Baulk ring, synchro cone
Replace the baulk ring and synchro cone in the following case.
• When there are wear, rust and damage on baulk ring.

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



F: ADJUSTMENT

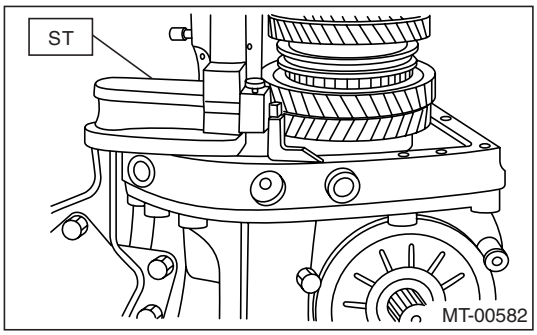
1. SELECTION OF MAIN SHAFT SNAP RING AND WASHER

NOTE:
Perform adjustment with following procedures below in the following cases.
- When replacing the driven gear from 1st to 6th.
- When replacing the 1st and 2nd synchro ring assembly.
- When replacing the ball bearing.
- When replacing the adapter plate.
- When replacing the driven shaft.

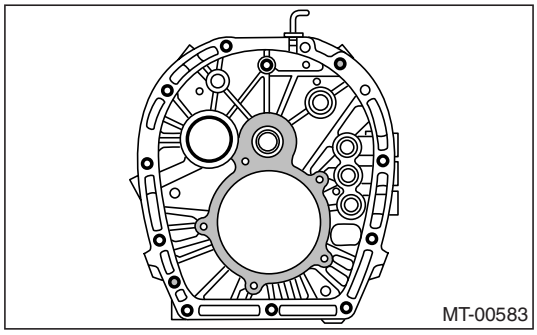
1) Insert the drive pinion assembly in adapter plate.

NOTE:
Make sure the thrust bearing outer race is not removed and drive pinion is not lifted-up.

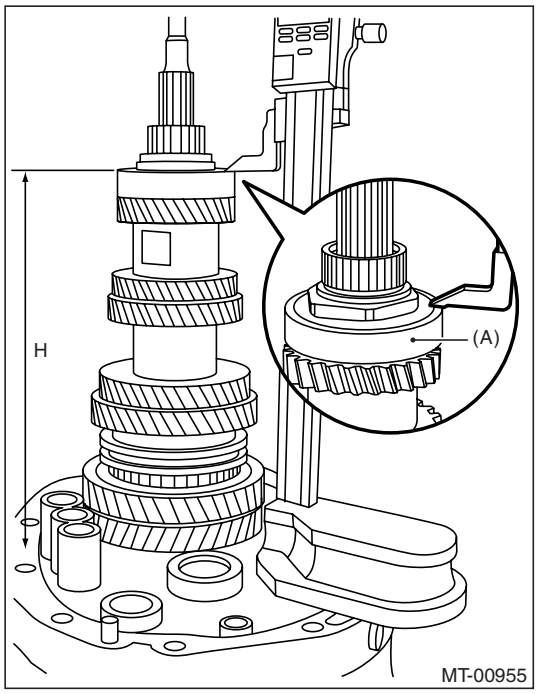
2) Set the height gauge to adapter plate. Lower the indicator of height gauge to mating surface of adapter plate and case, then set to zero point.
ST 18853AA000 HEIGHT GAUGE



NOTE:
- Remove the remaining gasket on edge surface with scraper, since the adapter plate is base point of measurement.
- Do not place the height gauge on shaded area in the figure during the measurement.

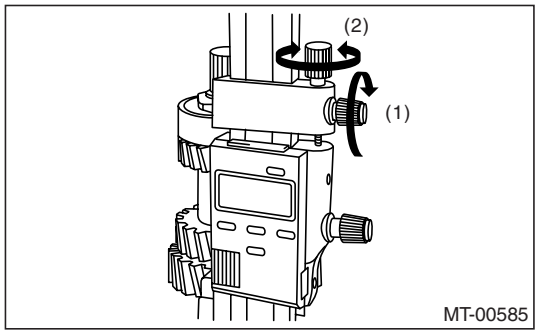


3) Measure the height to edge surface of ball bearing (height H).



(A) Ball bearing

NOTE:
Set the indicator of height gauge near measuring object, then lock the dial (1) as shown in the figure. Turn dial (2) to set the indicator to edge surface of bearing.



Measure five points of the ball bearing turning every approx. 120°. Round off each two upper and lower measurement value. Use the remaining middle value as measurement value.

4) According to measurement value, select the snap ring and washer from the following table.

• Snap ring

H: mm (in)	Part No.	Thickness: mm (in)
270.83 — 271.40 (10.66 — 10.69)	805072010	1.65 (0.065)
271.41 — 271.98 (10.69 — 10.71)	805072011	1.95 (0.077)
271.99 — 272.56 (10.71 — 10.73)	805072012	2.25 (0.089)

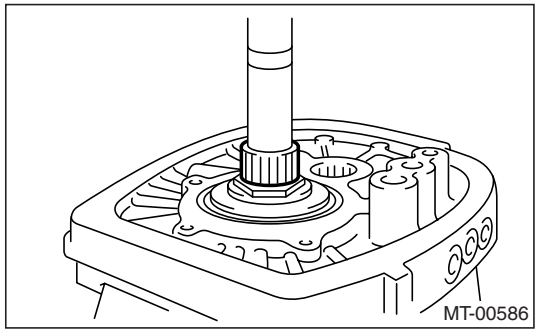
• Washer

H: mm (in)	Part No.	Thickness: mm (in)
270.83 — 271.40 (10.66 — 10.69)	803067012	1.6 (0.063)
271.41 — 271.98 (10.69 — 10.71)	803067011	1.3 (0.051)
271.99 — 272.56 (10.71 — .73)	803067010	1.0 (0.039)

20.Driven Gear Assembly

A: REMOVAL

1) Remove the manual transmission assembly from vehicle. <Ref. to 6MT-34, REMOVAL, Manual Transmission Assembly.>
2) Prepare the transmission for overhaul. <Ref. to 6MT-40, Preparation for Overhaul.>
3) Remove the oil pipe, neutral position switch, back-up light switch and harness. <Ref. to 6MT-42, REMOVAL, Oil Pipe.> <Ref. to 6MT-45, REMOVAL, Neutral Position Switch.> <Ref. to 6MT-43, REMOVAL, Back-up Light Switch.>
4) Remove the extension case. <Ref. to 6MT-47, REMOVAL, Extension Case.>
5) Remove the transfer driven gear. <Ref. to 6MT-58, REMOVAL, Transfer Driven Gear.>
6) Remove the center differential. <Ref. to 6MT-60, REMOVAL, Center Differential.>
7) Remove the oil pump. <Ref. to 6MT-61, REMOVAL, Oil Pump.>
8) Remove the transmission case. <Ref. to 6MT-64, REMOVAL, Transmission Case.>
9) Remove the driven gear assembly. <Ref. to 6MT-69, REMOVAL, Main Shaft Assembly.>
10) Remove the 1st needle bearing.

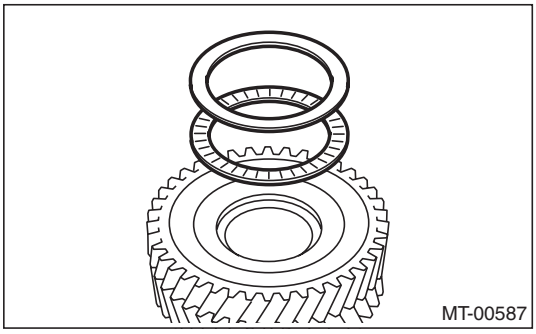


11) Remove the thrust needle bearing.

B: INSTALLATION

1) Adjust the main shaft snap ring. <Ref. to 6MT-81, ADJUSTMENT, Main Shaft Assembly.>
2) Adjust the 1st-2nd shifter rod. <Ref. to 6MT-115, ADJUSTMENT, Shifter Fork and Rod.>
3) Install the thrust needle bearing.

NOTE:
Be sure the thrust needle bearing is installed in proper direction.

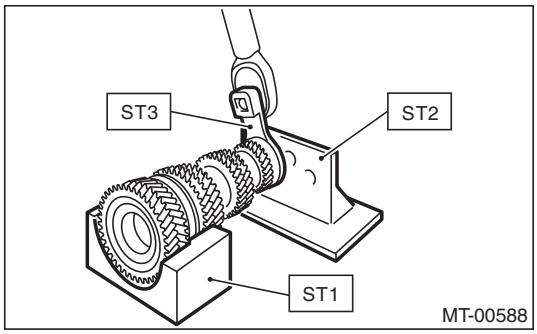


4) Install the 1st needle bearing.
5) Install the driven gear assembly. <Ref. to 6MT-70, INSTALLATION, Main Shaft Assembly.>
6) Install the transmission case. <Ref. to 6MT-65, INSTALLATION, Transmission Case.>
7) Adjust backlash at axial direction of driven gear assembly. <Ref. to 6MT-90, ADJUSTMENT, Driven Gear Assembly.>
8) Install the oil pump. <Ref. to 6MT-62, INSTALLATION, Oil Pump.>
9) Install the center differential. <Ref. to 6MT-60, INSTALLATION, Center Differential.>
10) Install the transfer driven gear. <Ref. to 6MT-58, INSTALLATION, Transfer Driven Gear.>
11) Install the extension case. <Ref. to 6MT-47, INSTALLATION, Extension Case.>
12) Install the oil pipe, neutral position switch, back-up light switch and harness. <Ref. to 6MT-42, INSTALLATION, Oil Pipe.> <Ref. to 6MT-45, INSTALLATION, Neutral Position Switch.> <Ref. to 6MT-43, INSTALLATION, Back-up Light Switch.>
13) Install the manual transmission assembly into vehicle. <Ref. to 6MT-36, INSTALLATION, Manual Transmission Assembly.>

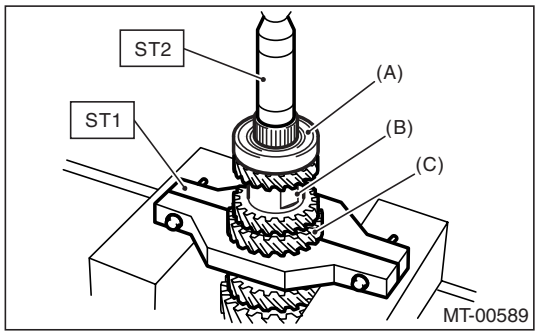
C: DISASSEMBLY

NOTE:
Each sleeve and hub engage at specified position. Before disassembly, put marks on the engagement position of sleeve and hub.

1) Secure the ST on workbench.
ST 18664AA000 BASE
2) Unlock the caulking portion of lock nut.
3) Install the ST3 to lock nut, set the driven gear assembly on ST, then remove the lock nut and washer.
ST1 18666AA000 HOLDER
ST2 18664AA000 BASE
ST3 18620AA000 ADAPTER WRENCH

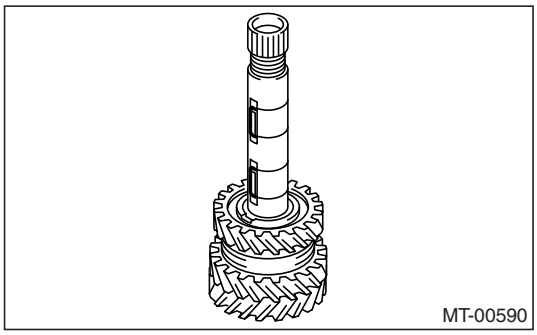


4) Install the ST1 to 4th gear, then remove the ball bearing, 5th-6th driven gear and 3rd-4th driven gear.
ST1 18723AA000 REMOVER
ST2 499877000 RACE 4-5 INSTALLER

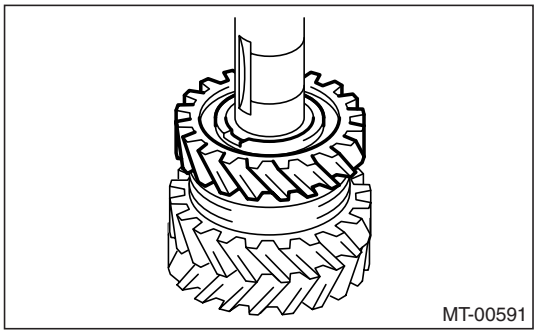


(A) Ball bearing
(B) 5th-6th driven gear
(C) 3rd-4th driven gear

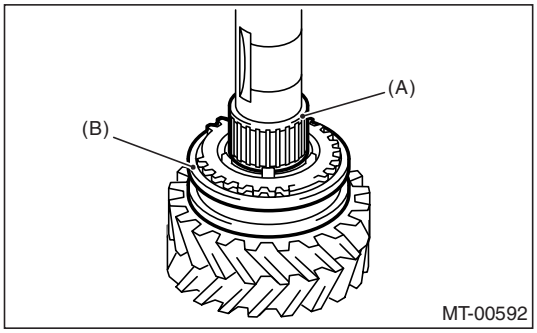
5) Remove the driven gear key.



6) Remove the 2nd gear.

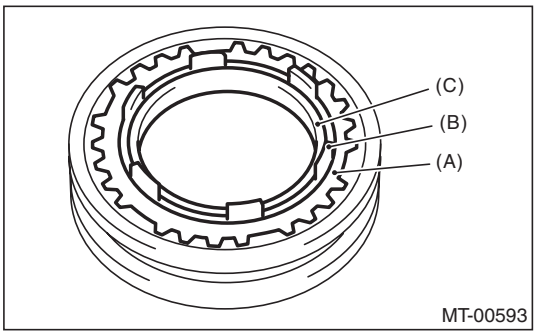


7) Remove the needle bearing and 1st-2nd sleeve.



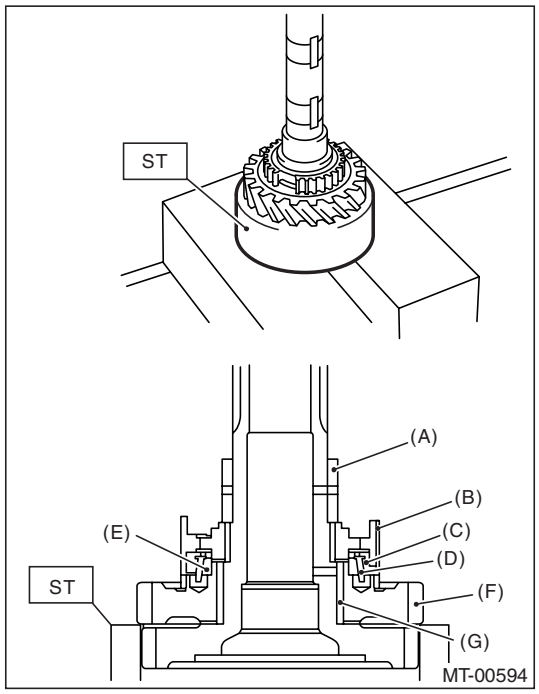
(A) Needle bearing
(B) 1st-2nd sleeve

8) Remove the outer baulk ring, 2nd synchro cone and inner baulk ring.



(A) Outer baulk ring
(B) 2nd synchro cone
(C) Inner baulk ring

9) Using the ST, remove each parts.
ST 18754AA000 REMOVER

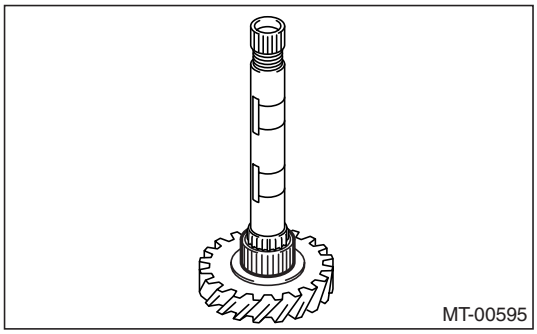


(A) 2nd bushing
(B) 1st-2nd hub
(C) Outer baulk ring
(D) 1st synchro cone
(E) Inner baulk ring
(F) 1st driven gear
(G) 1st needle bearing

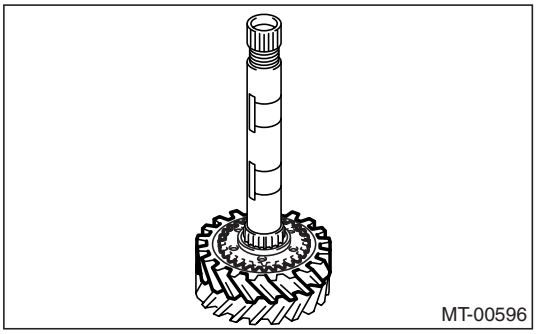
D: ASSEMBLY

NOTE:
When replacing the following part, replace them as a set.
• Sleeve and hub
• Outer baulk ring, 1st synchro cone, inner baulk ring
• Outer baulk ring, 2nd synchro cone, inner baulk ring

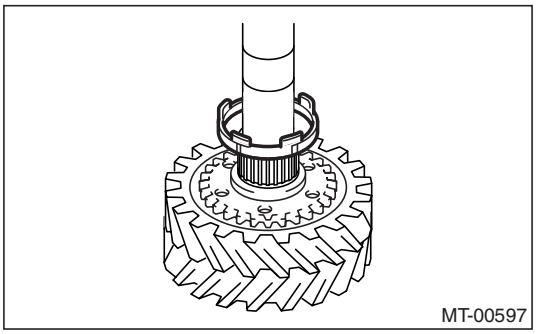
1) Apply sufficient amount of gear oil to the main shaft, 1st needle bearing and inner periphery of 1st driven gear.
2) Install the 1st needle bearing.



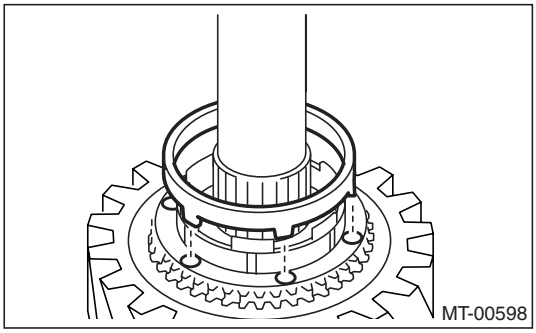
3) Install the 1st driven gear to driven shaft.



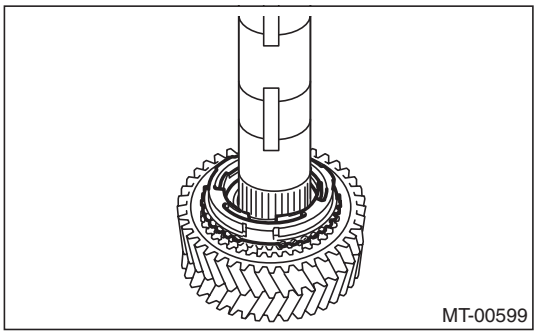
4) Install the inner baulk ring.



5) Align protrusion portions of the 1st synchro cone to the holes of 1st drive gear to install.

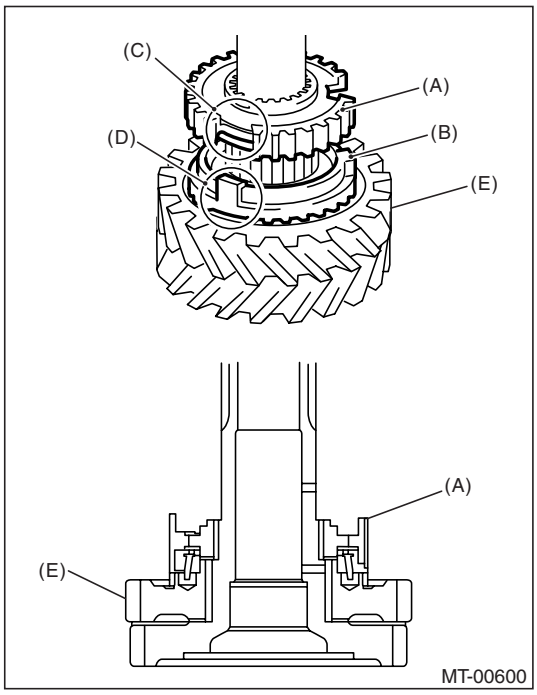


6) Install the outer baulk ring.



7) Install the 1st-2nd hub.

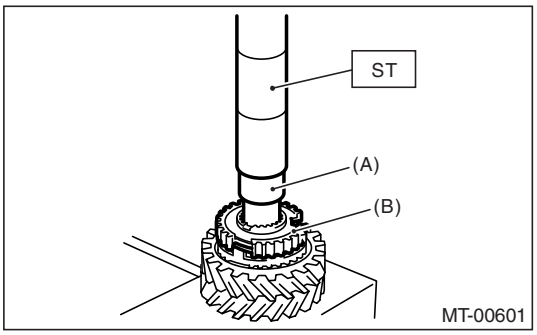
NOTE:
• Align the protrusion portion of outer baulk ring and cutout portion of 1st-2nd hub, then install.
• Be sure the 1st-2nd hub is installed in proper direction.



(A) 1st-2nd hub
(B) Outer baulk ring
(C) Cutout portion of 1st-2nd hub
(D) Protrusion of outer baulk ring
(E) 1st driven gear

8) Using the ST, install the 2nd hub.
ST 18654AA000 INSTALLER

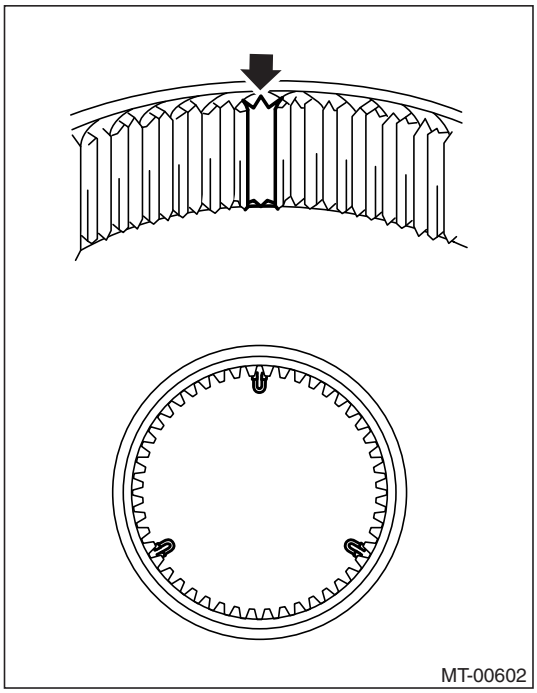
CAUTION:
Do not apply pressure in excess of 40 kN (4.0 ton, 4.4 US ton, 3.9 Imp ton).



(A) 2nd bushing
(B) 1st-2nd hub

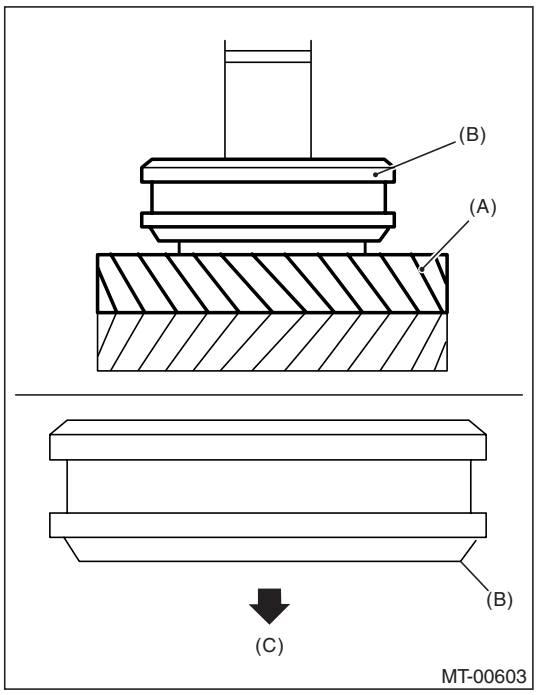
9) Make sure the 1st drive gear is smoothly turned by hand. If it is not rotated smoothly, reassemble it.
10) Install the shifting insert key in proper place of 1st-2nd sleeve.

NOTE:
Angle of each shifting insert key is 120°.



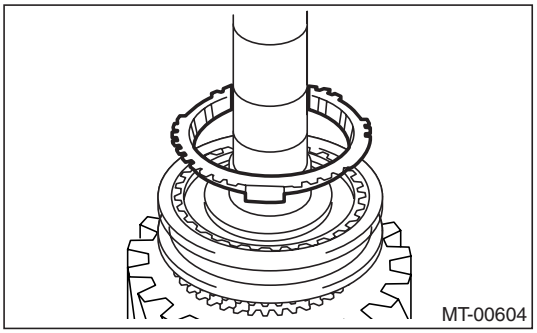
11) Install the 1st-2nd sleeve to 1st-2nd hub.

NOTE:
Be sure the 1st-2nd sleeve is installed in proper direction.

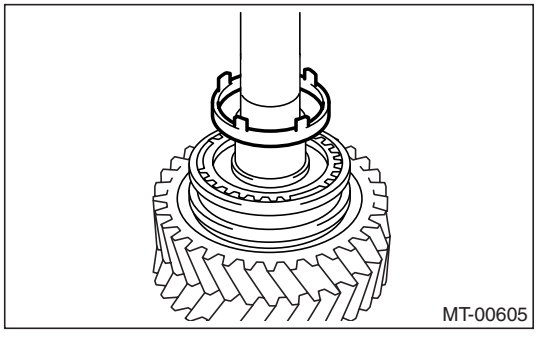


(A) 1st driven gear
(B) 1st-2nd sleeve
(C) 1st driven gear side

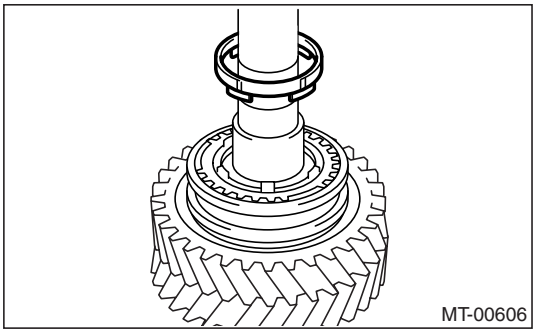
12) Install the outer baulk ring.



13) Install the 2nd synchro cone.

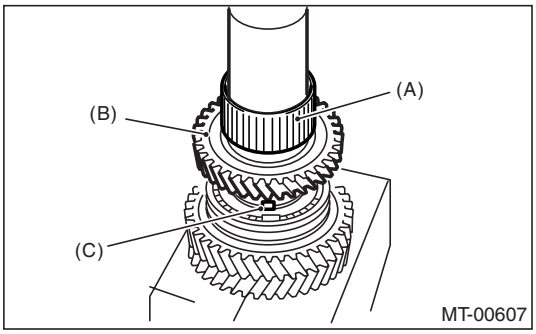


14) Install the inner baulk ring.



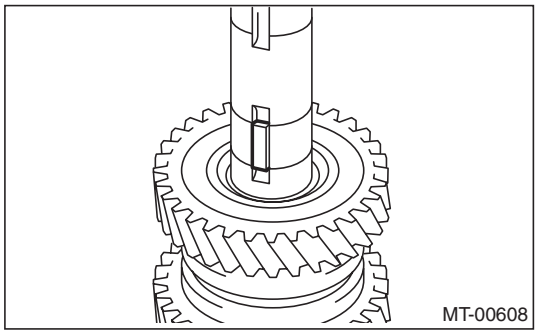
15) Apply sufficient amount of gear oil to the bushing, 2nd needle bearing and inner periphery of 2nd drive gear.
16) Install the 2nd needle bearing and 2nd driven gear.

NOTE:
Align the protrusion portion of 2nd synchro cone with 2nd driven gear hole, then install.



(A) 2nd needle bearing
(B) 2nd driven gear
(C) Protrusion portion of 2nd synchro cone

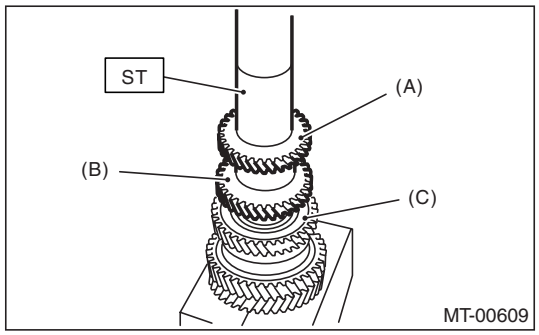
17) Install the key.



18) Using the ST, install the 3rd-4th driven gear.
ST 18654AA000 INSTALLER

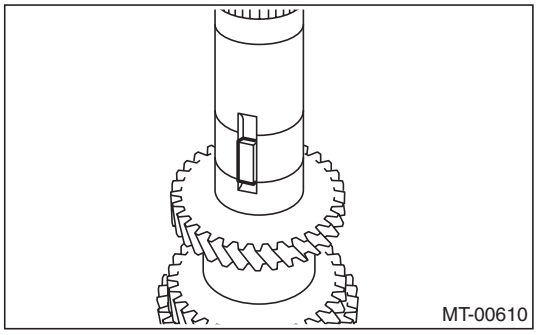
CAUTION:
Do not apply pressure in excess of 40 kN (4.0 ton, 4.4 US ton, 3.9 Imp ton).

NOTE:
• Be sure the 3rd-4th driven gear is installed in proper direction.
• Align the groove of 3rd-4th driven gear with key.



(A) 4th gear
(B) 3rd gear
(C) 2nd gear

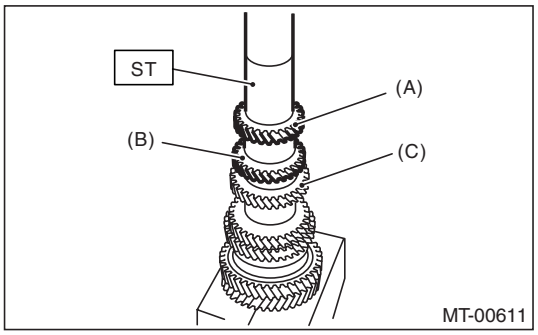
19) Make sure the 2nd driven gear is smoothly turned by hand. If it is not rotated smoothly, reassemble it.
20) Install the key.



21) Using the ST, install the 5th-6th driven gear.
ST 18654AA000 INSTALLER

CAUTION:
Do not apply pressure in excess of 40 kN (4.0 ton, 4.4 US ton, 3.9 Imp ton).

NOTE:
• Be sure the 5th-6th driven gear is installed in proper direction.
• Align the groove of 5th-6th driven gear with key.

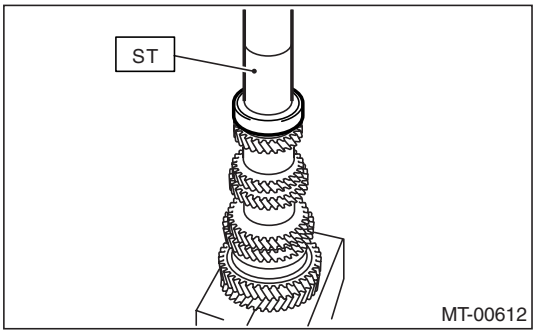


(A) 6th gear
(B) 5th gear
(C) 4th gear

22) Using the ST, install the ball bearing.
ST 18654AA000 INSTALLER

CAUTION:
Do not apply pressure in excess of 40 kN (4.0 ton, 4.4 US ton, 3.9 Imp ton).

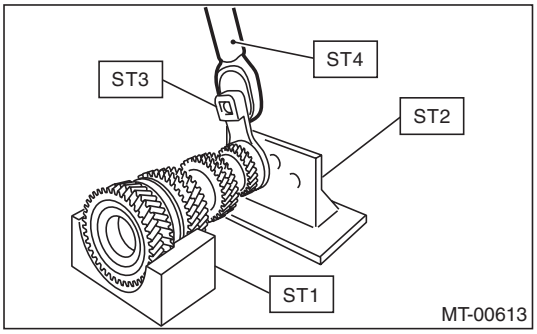
NOTE:
Be sure the ball bearing is installed in proper direction.



23) Make sure the ball bearing is smoothly turned by hand. If it is not rotated smoothly, reassemble it.
24) Install a new lock nut.

25) Install the ST3 to lock nut, then install the ST1 and ST2 to the driven gear assembly and tighten the lock nut.
ST1 18666AA000 HOLDER
ST2 18664AA000 BASE
ST3 18620AA000 ADAPTER WRENCH
ST4 18852AA000 TORQUE WRENCH

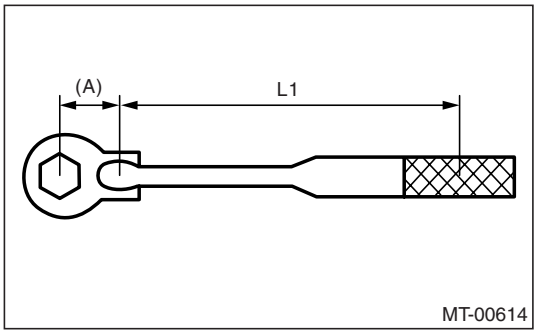
Tightening torque:
530 N·m (54.0 kgf-m, 391 ft-lb)



NOTE:
If torque wrench except ST4 is used, calculate the following calculation formula, then tighten the lock nut.

$T = L1 / (0.1 + L1) \times 570$

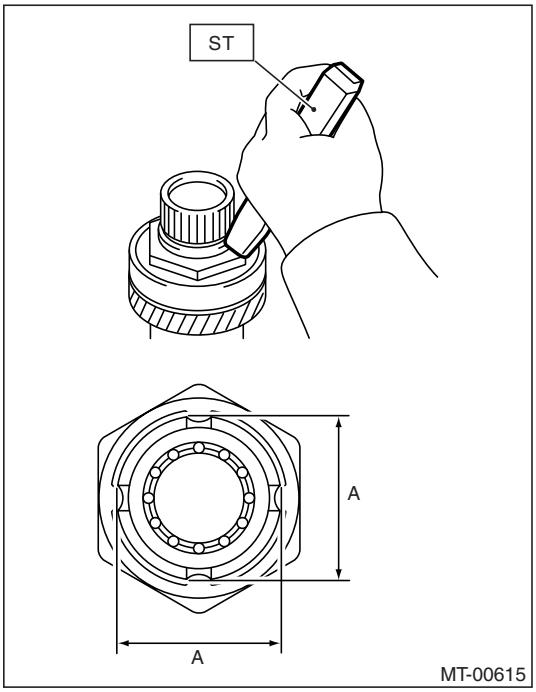
T N·m (kgf-m, ft-lb)	Setting value of torque wrench
L1 m (in)	Torque wrench length
0.1 m (3.94 in)	ST length
570 N·m (58.1 kgf-m, 420 ft-lb)	Tightening torque of lock nut:



(A) 0.1 m (3.94 in)

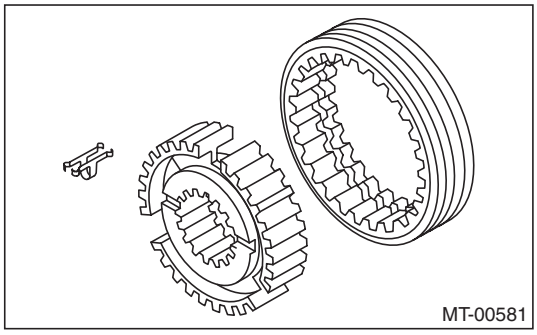
26) Using the ST, caulk the lock nut at four points at dimension A of 44±0.5 mm (1.73±0.02 in).
ST 18669AA000 PUNCH

NOTE:
Do not damage the caulking portion of lock nut.



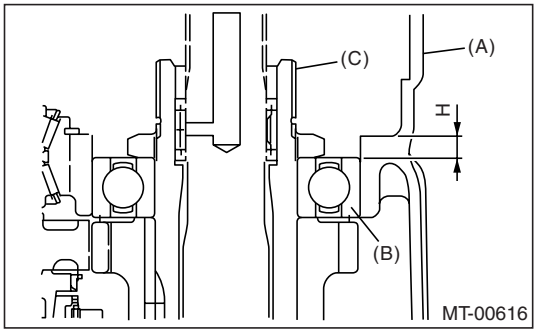
E: INSPECTION

Disassembled parts should be washed with unleaded gasoline first and then inspected carefully.
1) Bearing
Replace the bearings in the following cases.
• When there are wear, rust and damage on the bearing.
• When bearing that fails to turn smoothly or makes noise when turned.
• When bearings have other defects.
2) Bushing (each gear)
Replace the bushing in following cases.
• When the sliding surface is damaged or abnormally worn.
3) Gear
Replace the gear in the following cases.
• When the gear teeth surfaces are broken or excessively worn.
• When the parts that contact the baulk ring is damaged.
• When the inner surface of gear is damaged.
4) Baulk ring, synchro cone
Replace the baulk ring and synchro cone in the following case.
• When there are wear, rust and damage on the baulk ring.
5) Shifting insert key
Replace the shifting insert key if deformed, excessively worn or defective in any way.



F: ADJUSTMENT

1) Measure length “H”, which is from transmission case and oil pump cover mating surface to ball bearing edge.



(A) Transmission case
(B) Ball bearing
(C) Driven gear ASSY

2) Using the following calculation formula, calculate the washer thickness of driven gear assembly.
T = H – {5.8±0.05 mm (0.23±0.002 in)} – {0.1 — 0.3 mm (0.0039 — 0.0118 in)}

t	Thickness of washer
H	Length from transmission case and oil pump cover mating surface to ball bearing edge
5.8±0.05 mm (0.23±0.002 in)	Thickness of collar
0.1 to 0.3 mm (0.0039 to 0.0118 in)	Backlash specification at axial direction of driven gear assembly

3) Select 0 to 3 washers from the following table to adjust backlash closest to specification.

Backlash specification at axial direction of driven gear assembly:
0.1 — 0.3 mm (0.0039 — 0.0118 in)

Washer	
Part No.	Thickness t mm (in)
803072030	0.15 (0.0059)
803072031	0.30 (0.0118)
803072032	0.45 (0.0177)
803072033	0.60 (0.0236)

21.Reverse Idler Gear

A: REMOVAL

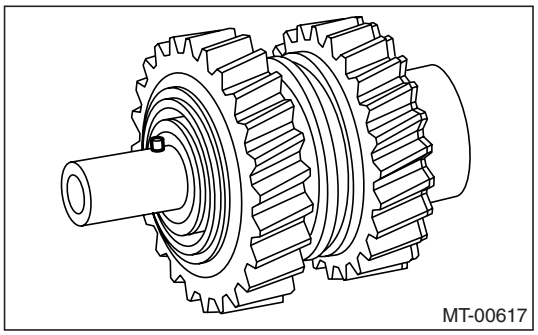
1) Remove the manual transmission assembly from vehicle. <Ref. to 6MT-34, REMOVAL, Manual Transmission Assembly.>
2) Prepare the transmission for overhaul. <Ref. to 6MT-40, Preparation for Overhaul.>
3) Remove the oil pipe, neutral position switch, back-up light switch and harness. <Ref. to 6MT-42, REMOVAL, Oil Pipe.> <Ref. to 6MT-45, REMOVAL, Neutral Position Switch.> <Ref. to 6MT-43, REMOVAL, Back-up Light Switch.>
4) Remove the extension case. <Ref. to 6MT-47, REMOVAL, Extension Case.>
5) Remove the transfer driven gear. <Ref. to 6MT-58, REMOVAL, Transfer Driven Gear.>
6) Remove the center differential. <Ref. to 6MT-60, REMOVAL, Center Differential.>
7) Remove the oil pump. <Ref. to 6MT-61, REMOVAL, Oil Pump.>
8) Remove the transmission case. <Ref. to 6MT-64, REMOVAL, Transmission Case.>
9) Remove the reverse idler gear assembly. <Ref. to 6MT-69, REMOVAL, Main Shaft Assembly.>

B: INSTALLATION

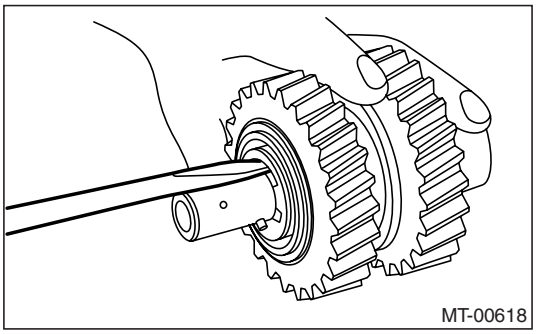
1) Select the reverse fork rod. <Ref. to 6MT-115, ADJUSTMENT, Shifter Fork and Rod.>
2) Install the reverse idler gear assembly. <Ref. to 6MT-70, INSTALLATION, Main Shaft Assembly.>
3) Install the transmission case. <Ref. to 6MT-65, INSTALLATION, Transmission Case.>
4) Install the oil pump. <Ref. to 6MT-62, INSTALLATION, Oil Pump.>
5) Install the center differential. <Ref. to 6MT-60, INSTALLATION, Center Differential.>
6) Install the transfer driven gear. <Ref. to 6MT-58, INSTALLATION, Transfer Driven Gear.>
7) Install the extension case. <Ref. to 6MT-47, INSTALLATION, Extension Case.>
8) Install the oil pipe, neutral position switch, back-up light switch and harness. <Ref. to 6MT-42, INSTALLATION, Oil Pipe.> <Ref. to 6MT-45, INSTALLATION, Neutral Position Switch.> <Ref. to 6MT-43, INSTALLATION, Back-up Light Switch.>
9) Install the manual transmission assembly into vehicle. <Ref. to 6MT-36, INSTALLATION, Manual Transmission Assembly.>

C: DISASSEMBLY

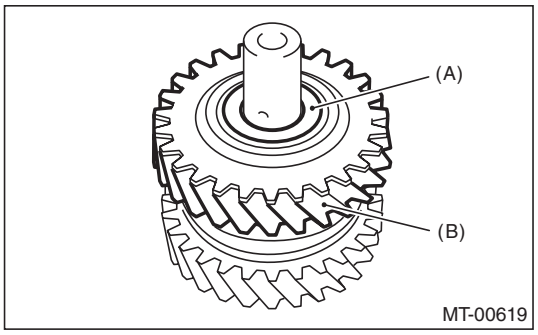
NOTE:
The sleeve and reverse gear engage at a specified position. Before disassembly, put the mark on engagement position of sleeve and hub.
1) Remove the spring pin.



2) Remove the snap ring.

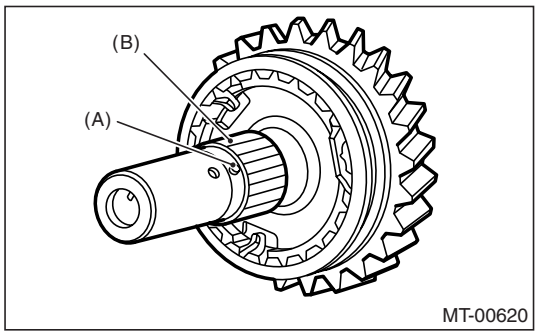


3) Remove the washer and reverse idler gear.



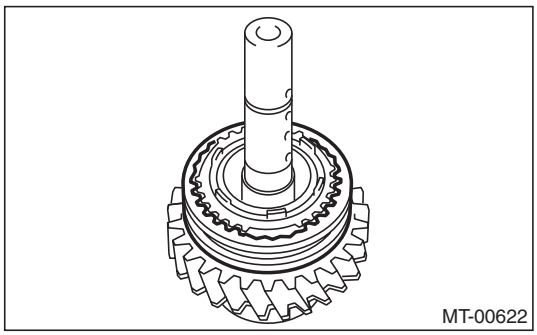
(A) Washer
(B) Reverse Idler Gear

4) Remove the knock pin and reverse idler gear needle bearing.

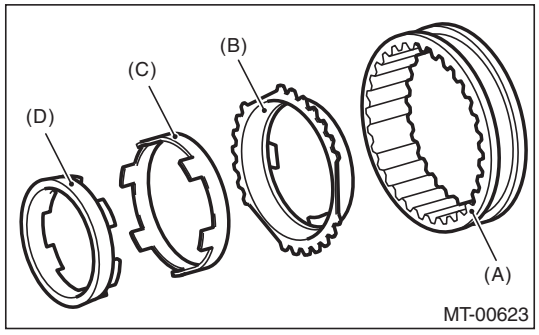


(A) Knock pin
(B) Reverse idler gear needle bearing

5) Remove the collar.
6) Remove the reverse sleeve.

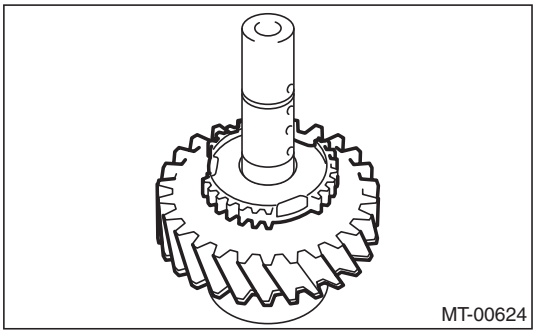


7) Remove the outer baulk ring, reverse synchro cone and inner baulk ring from reverse sleeve.

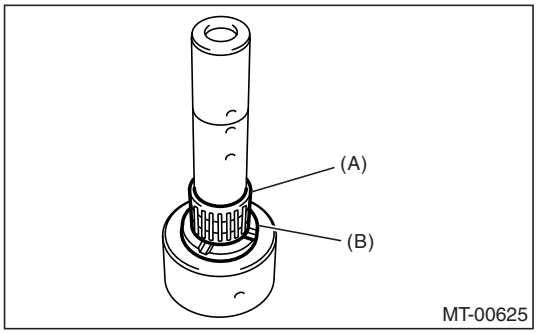


(A) Reverse sleeve
(B) Outer baulk ring
(C) Reverse synchro cone
(D) Inner baulk ring

8) Remove the reverse idler gear No. 2.

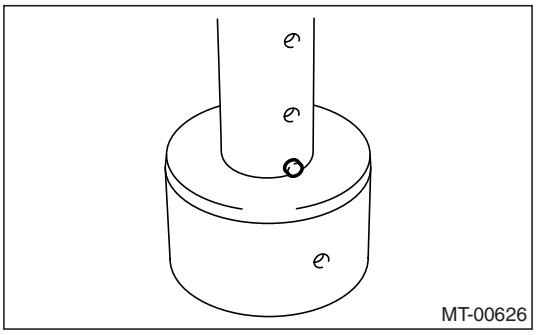


9) Remove the washer and needle bearing.

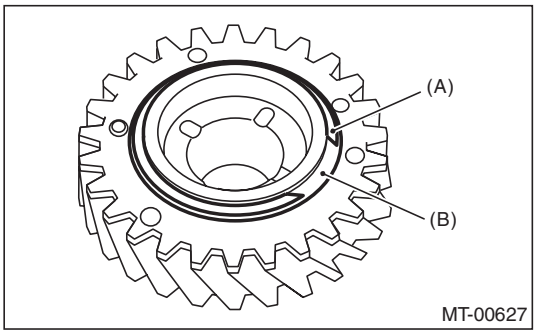


(A) Needle bearing
(B) Washer

10) Remove the knock pin.

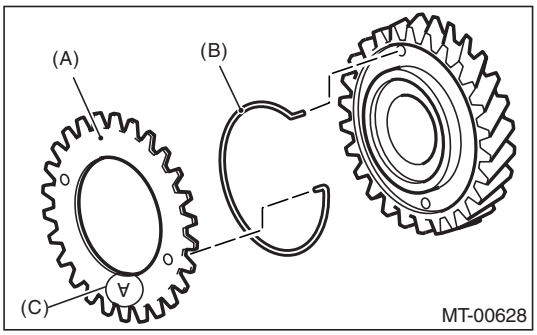


11) Remove the snap ring and friction plate from reverse gear.



(A) Snap ring
(B) Friction plate

12) Remove the sub gear and spring.

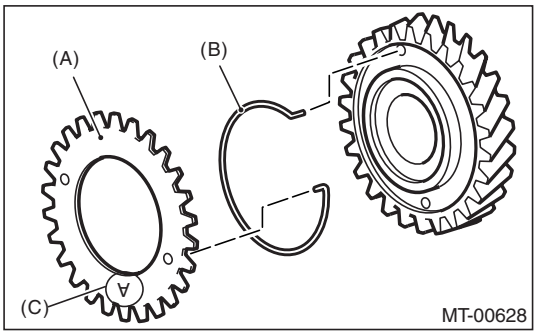


(A) Sub gear
(B) Spring
(C) Stamped mark (mark A)

D: ASSEMBLY

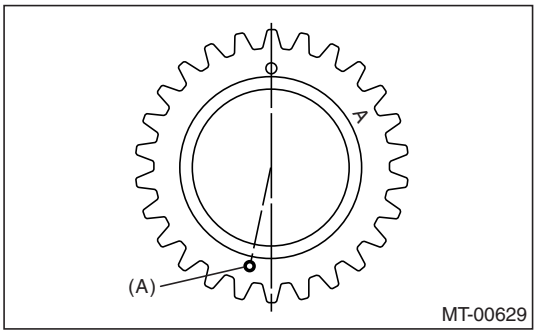
1) Install the sub gear and spring.

NOTE:
• Install the spring with white marking on hook part facing to sub gear side.
• Install the sub gear with stamped mark (mark A) facing outside.



(A) Sub gear
(B) Spring
(C) Stamped mark (mark A)

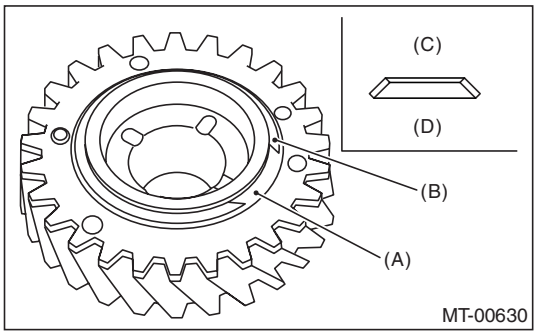
• Install the spring and sub gear, taking care to install the sub gear installation hole in proper direction.



(A) Installation hole

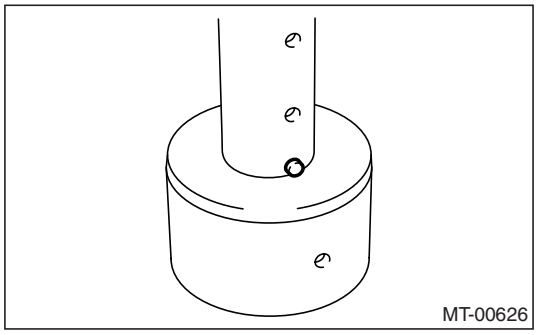
2) Install the friction plate and snap ring.

NOTE:
Be sure the friction plate is installed in proper direction.



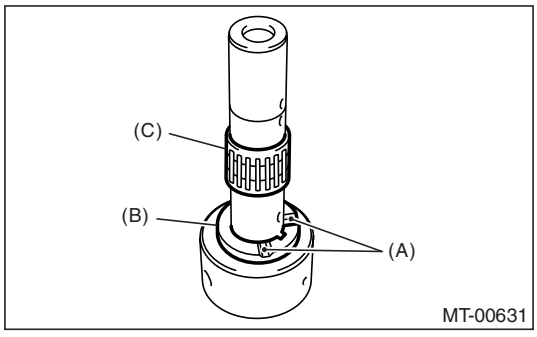
(A) Friction plate
(B) Snap ring
(C) Snap ring side
(D) Sub gear side

3) Apply sufficient amount of gear oil to the shaft, needle bearing and inner surface of reverse drive gear.
4) Install the knock pin.



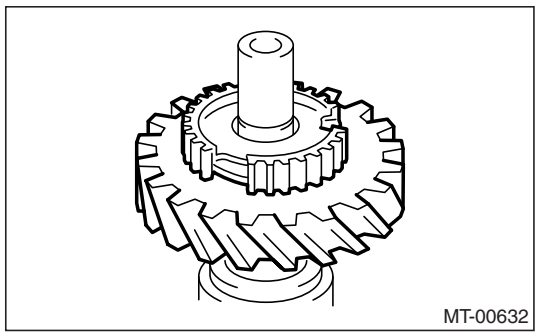
5) Install the washer and needle bearing.

NOTE:
Install the washer with groove facing to reverse idler gear.



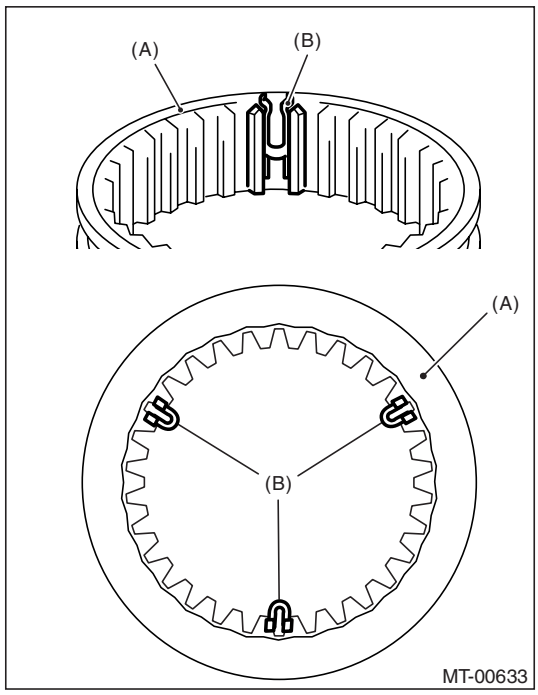
(A) Groove
(B) Washer
(C) Needle bearing

6) Install the reverse idler gear No. 2.



7) Install the shifting insert key in proper place of reverse sleeve.

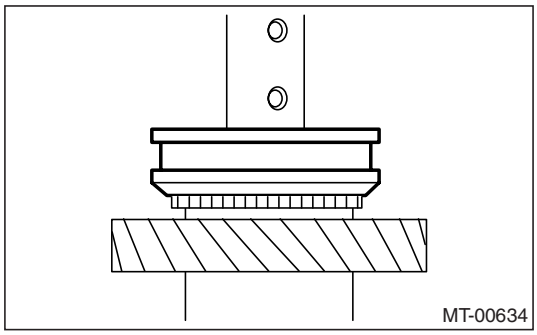
NOTE:
Angle of each shifting insert key is 120°.



(A) Reverse sleeve
(B) Shifting insert key

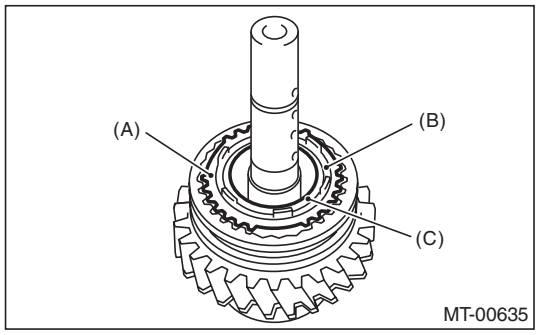
8) Install the reverse sleeve to reverse idler gear No. 2.

NOTE:
Be sure the reverse sleeve is installed in proper direction.



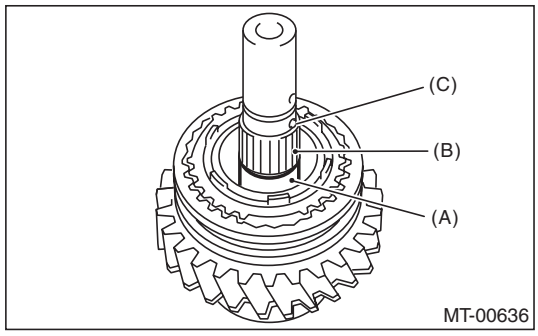
9) Apply sufficient amount of gear oil to the collar, needle bearing and inner periphery of reverse drive gear.

10) Install the outer baulk ring, reverse synchro cone and inner baulk ring.



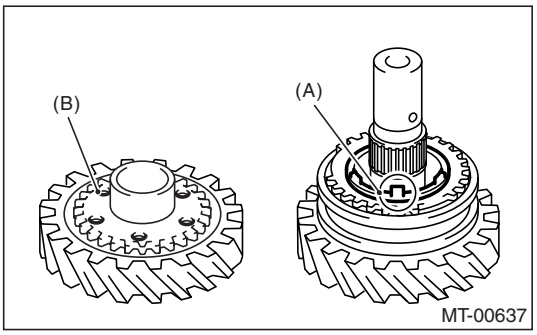
(A) Outer baulk ring
(B) Reverse synchro cone
(C) Inner baulk ring

11) Install the collar and needle bearing, then install the knock pin.



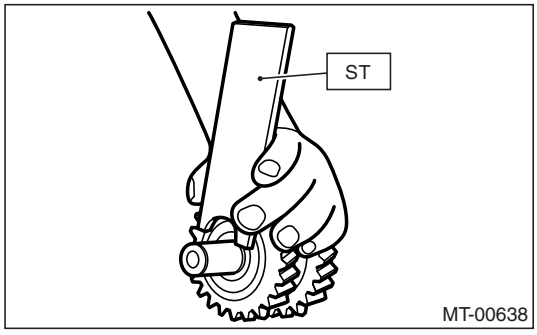
(A) Collar
(B) Needle bearing
(C) Knock pin

12) Align the protrusion portion of reverse synchro cone with reverse idler gear hole, then install the reverse idler gear.



(A) Protrusion portion of reverse synchro cone
(B) Reverse idler gear hole

13) Install the washer with groove facing to reverse idler gear.
14) Using the ST, install the snap ring.
ST 18672AA000 GUIDE CLIP

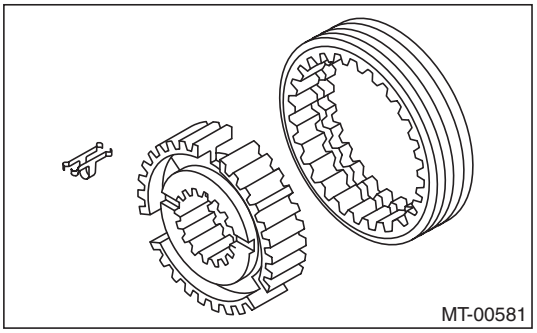


15) Inspect and adjust the clearance between snap ring and washer. <Ref. to 6MT-95, INSPECTION, Reverse Idler Gear.>
16) Install the spring pin.

NOTE:
Use a new spring pin.

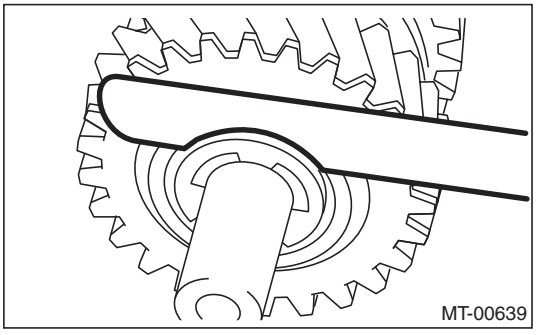
E: INSPECTION

Disassembled parts should be washed with unleaded gasoline first and then inspected carefully.
1) Bearing
Replace the bearings in the following cases.
• When there are wear, rust and damage on the bearing.
• When bearing that fails to turn smoothly or makes noise when turned.
• When bearings have other defects.
2) Bushing (each gear)
Replace the bushing in following cases.
• When the sliding surface is damaged or abnormally worn.
3) Gear
Replace the gear in the following cases.
• When the gear teeth surfaces are broken or excessively worn.
• When the parts that contact the baulk ring is damaged.
• When the inner surface of gear is damaged.
4) Baulk ring, synchro cone
Replace the baulk ring and synchro cone in the following case.
• When there are wear, rust and damage on the baulk ring.
5) Shifting insert key
Replace the shifting insert key if deformed, excessively worn or defective in any way.



6) Inspect the clearance between snap ring and washer.

Tip clearance specification:
0.1 — 0.3 mm (0.0039 — 0.0118 in)



Select the snap ring from the following table if clearance is out of specification.

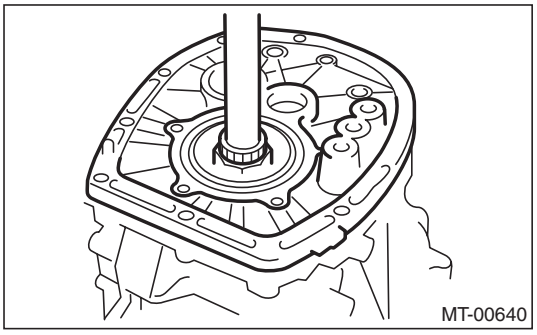
Snap ring	
Part No.	Thickness mm (in)
031319000	1.50 (0.059)
805019030	1.60 (0.062)
805019010	1.72 (0.068)

Inspect the clearance again after replacing snap ring.

22.Drive Pinion Shaft Assembly

A: REMOVAL

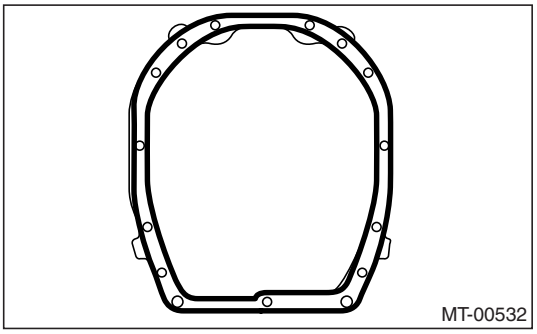
1) Remove the manual transmission assembly from vehicle. <Ref. to 6MT-34, REMOVAL, Manual Transmission Assembly.>
2) Prepare the transmission for overhaul. <Ref. to 6MT-40, Preparation for Overhaul.>
3) Remove the oil pipe, neutral position switch, back-up light switch and harness. <Ref. to 6MT-42, REMOVAL, Oil Pipe.> <Ref. to 6MT-45, REMOVAL, Neutral Position Switch.> <Ref. to 6MT-43, REMOVAL, Back-up Light Switch.>
4) Remove the extension case. <Ref. to 6MT-47, REMOVAL, Extension Case.>
5) Remove the transfer driven gear. <Ref. to 6MT-58, REMOVAL, Transfer Driven Gear.>
6) Remove the center differential. <Ref. to 6MT-60, REMOVAL, Center Differential.>
7) Remove the oil pump. <Ref. to 6MT-61, REMOVAL, Oil Pump.>
8) Remove the transmission case. <Ref. to 6MT-64, REMOVAL, Transmission Case.>
9) Remove each gear assembly. <Ref. to 6MT-69, REMOVAL, Main Shaft Assembly.>
10) Remove the drive pinion shaft assembly.


MT-00640

B: INSTALLATION

1) Completely remove the remaining gasket on drive plate and clutch housing.
2) Apply liquid gasket to the clutch housing.

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

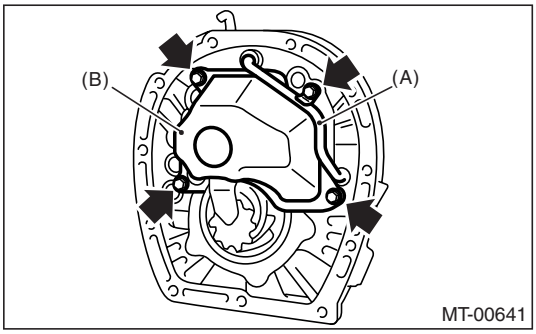

MT-00532

3) Install each gear assembly. <Ref. to 6MT-70, INSTALLATION, Main Shaft Assembly.>
4) Install the transmission case. <Ref. to 6MT-65, INSTALLATION, Transmission Case.>
5) Install the oil pump. <Ref. to 6MT-62, INSTALLATION, Oil Pump.>
6) Install the center differential. <Ref. to 6MT-60, INSTALLATION, Center Differential.>
7) Install the transfer driven gear. <Ref. to 6MT-58, INSTALLATION, Transfer Driven Gear.>
8) Install the extension case. <Ref. to 6MT-47, INSTALLATION, Extension Case.>
9) Install the oil pipe, neutral position switch, back-up light switch and harness. <Ref. to 6MT-42, INSTALLATION, Oil Pipe.> <Ref. to 6MT-45, INSTALLATION, Neutral Position Switch.> <Ref. to 6MT-43, INSTALLATION, Back-up Light Switch.>
10) Install the manual transmission assembly into vehicle. <Ref. to 6MT-36, INSTALLATION, Manual Transmission Assembly.>

C: DISASSEMBLY

NOTE:
When replacing the drive pinion shaft and hypoid driven gear, replace them as a set.

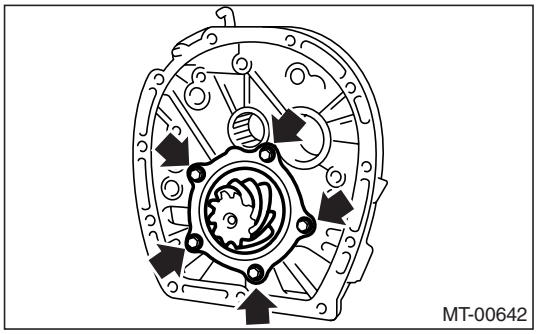
1) Remove the pipe and oil chamber.



MT-00641

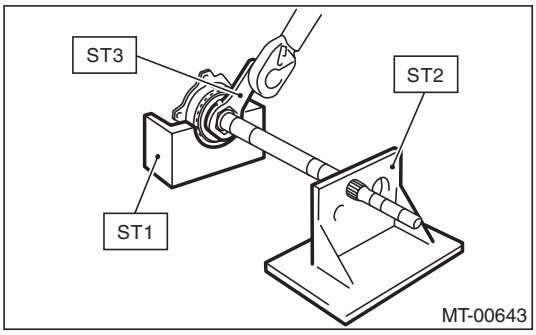
(A) Pipe
(B) Oil chamber

2) Remove the drive pinion shaft and shim from adapter plate.

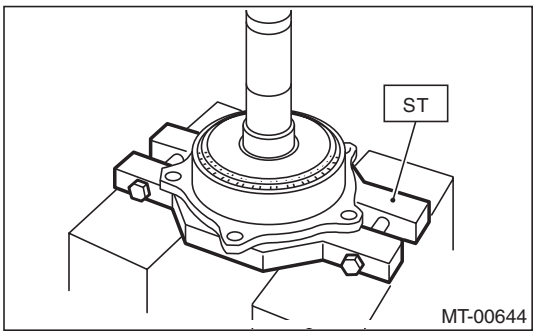

MT-00642

3) Secure the ST on workbench.
ST 18664AA000 BASE
4) Unlock the caulking of lock nut.

5) Install the ST3 to lock nut, then set drive pinion shaft to ST1 and ST2. Remove the lock nut and washer.
ST1 18667AA000 HOLDER
ST2 18664AA000 BASE
ST3 18621AA000 ADAPTER WRENCH



6) Using the ST, remove the taper roller bearing assembly.
ST 18723AA000 REMOVER

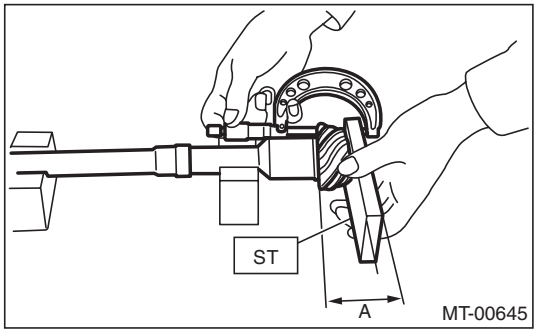


D: ASSEMBLY

1) Using the ST, measure dimension A of drive pinion.

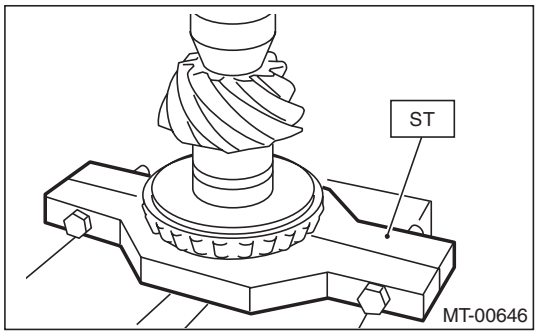
NOTE:
Refer to dimension A for selection of drive pinion shim.

ST 499575500 GAUGE



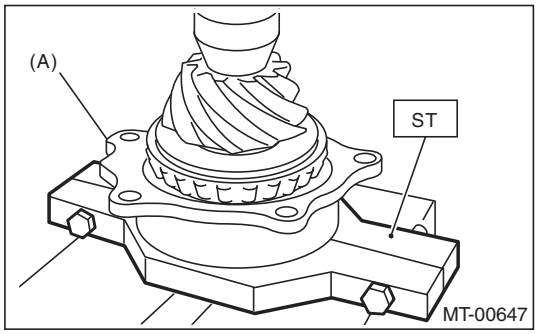
2) Install the inner bearing inner race to drive pinion shaft using ST and press.
ST 18723AA000 REMOVER

CAUTION:
Do not apply pressure in excess of 40 kN (4.0 ton, 4.4 US ton, 3.9 Imp ton).



3) Install the retainer and outer bearing inner race to drive pinion shaft using ST and press.
ST 18723AA000 REMOVER

NOTE:
Press to the point where bearing is turned smoothly without slack.



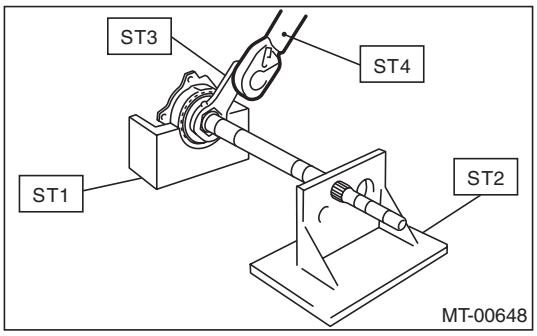
(A) Retainer

4) Install the washer and lock nut.

NOTE:
Use a new lock nut.

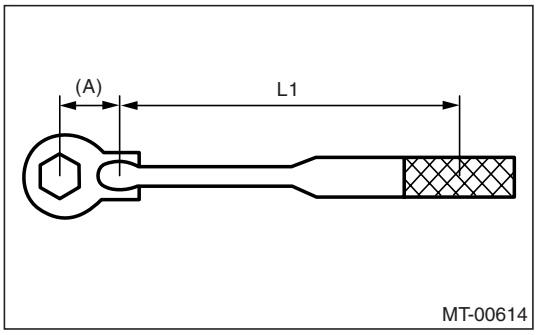
5) Set the ST to drive pinion, then tighten the lock nut.
ST1 18667AA000 HOLDER
ST2 18664AA000 BASE
ST3 18621AA000 ADAPTER WRENCH
ST4 18852AA000 TORQUE WRENCH

Tightening torque:
265 N·m (27.0 kgf-m, 195 ft-lb)



NOTE:
If torque wrench except ST4 is used, calculate the following calculation formula, then tighten the lock nut.
Tighten with the ST and torque wrench straight-lined.
T = L1 / (0.1 + L1) × 285

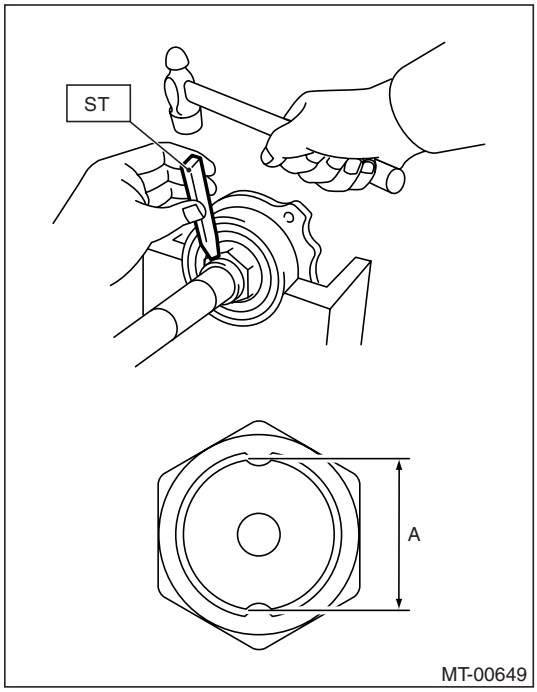
T N·m (kgf-m, ft-lb)	Setting value of torque wrench
L1 m (in)	Torque wrench length
0.1 m (3.94 in)	ST length
285 N·m (29.0 kgf-m, 210 ft-lb)	Tightening torque of lock nut:



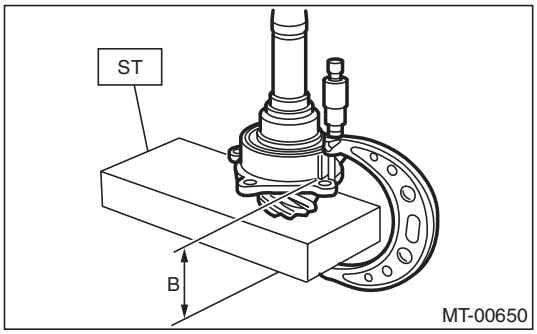
(A) 0.1 m (3.94 in)

6) Measure the starting torque. <Ref. to 6MT-99, INSPECTION, Drive Pinion Shaft Assembly.>
7) Using the ST, caulk the lock nut at two points at dimension A of 37±0.5 mm (1.46±0.02 in).
ST 18670AA000 PUNCH

NOTE:
Do not damage the caulking portion of lock nut.



8) Using the ST, measure dimension B of the drive pinion.
ST 499575500 GAUGE



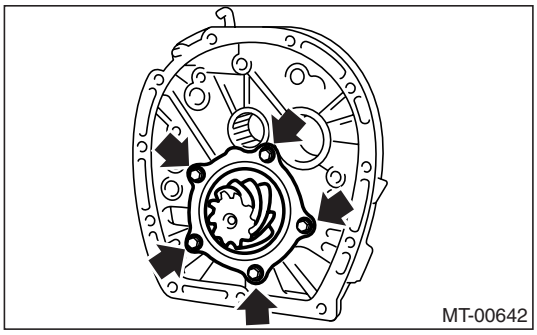
9) Calculate the following calculation formula, then select one or two pieces of drive pinion shim from the table below.
6.5±0.0625 mm – (B – A) [0.26±0.0025 in – (B – A)]

NOTE:
A: Measured value from step 1)
B: Measured value from step 8)

Drive pinion shim	
Part No.	Thickness mm (in)
32295AA270	0.15 (0.0059)
32295AA280	0.175 (0.0069)
32295AA290	0.20 (0.0079)
32295AA300	0.225 (0.0089)
32295AA310	0.25 (0.0098)
32295AA320	0.275 (0.0108)

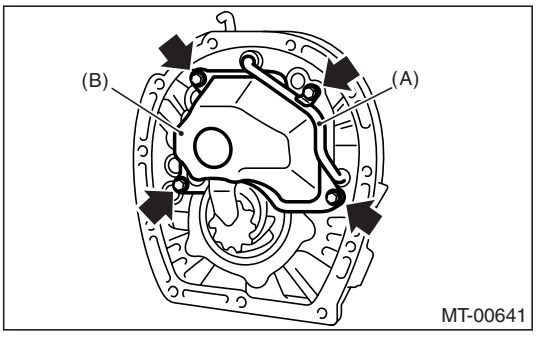
10) Apply gear oil to the side face of taper roller bearing, then install the drive pinion shaft and selected shim to adapter plate.

Tightening torque:
54 N·m (5.5 kgf-m, 40 ft-lb)



11) Install the oil chamber and pipe.

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

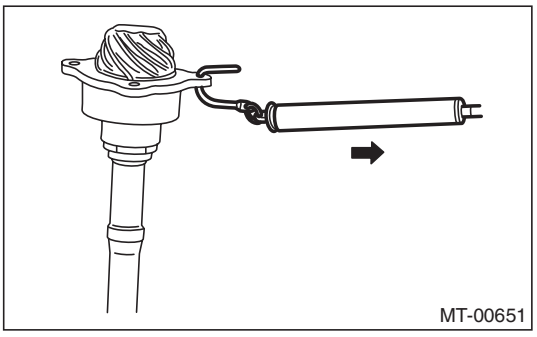


(A) Pipe
(B) Oil chamber

E: INSPECTION

1) Using the spring balance, measure the starting torque. If the starting torque is out of specification, replace the taper roller bearing.

Starting torque:
0 — 0.95 N (0 — 0.097 kgf, 0 — 0.21 lbf)



2) Gear
Replace the gear in the following cases.

• When the gear teeth surfaces are broken or excessively worn.

3) Bearing
Replace the bearings in the following cases.

• When there are wear, rust and damage on the bearing.
• When bearing that fails to turn smoothly or makes noise when turned.

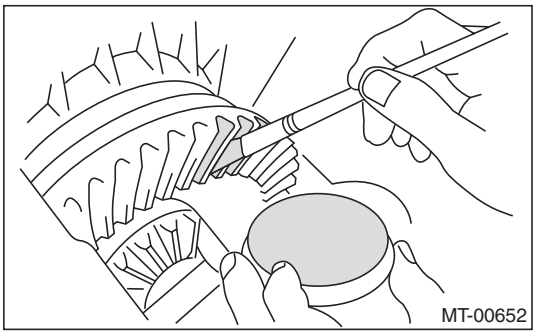
4) Adapter plate
Replace the adapter plate in the following cases.

• When the bearing is worn, rusted and damaged.
• When there is damage on adapter plate.

5) Make sure the pipe and pipe chamber is not damaged or clogged. Repair or replace if damaged or clogged.

F: ADJUSTMENT

1) Inspect and adjust the backlash between hypoid driven gear and drive pinion. <Ref. to 6MT-108, HYPOID GEAR BACKLASH, ADJUSTMENT, Front Differential Assembly.>
2) Apply a uniform thin coat of red lead on both tooth surfaces of three or four teeth of the hypoid driven gear.

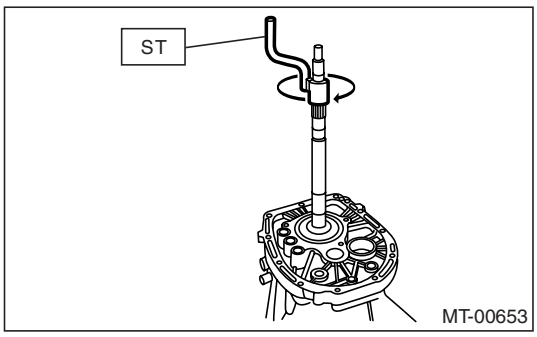


3) Install the drive pinion shaft assembly to clutch housing, then tighten at least four bolts.

NOTE:
Install with the liquid gasket remaining to prevent the mating surface of clutch housing and adapter plate from damaging.

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

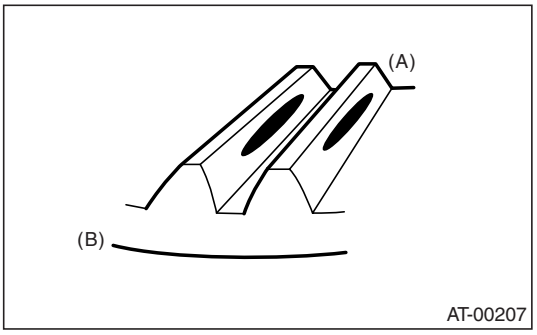
4) Using the ST, rotate several times.
ST 18631AA000 HANDLE



5) Remove the drive pinion shaft assembly, and then check tooth contact. If it is not normal, adjust the backlash or thickness of shim.

• Tooth contact

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

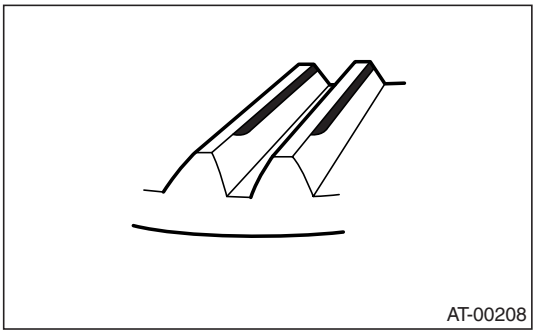


(A) Toe side
(B) Heel side

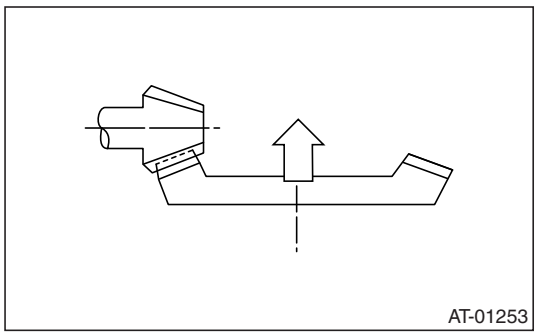
• Face contact

Checking item: Backlash is excessive.

Contact pattern



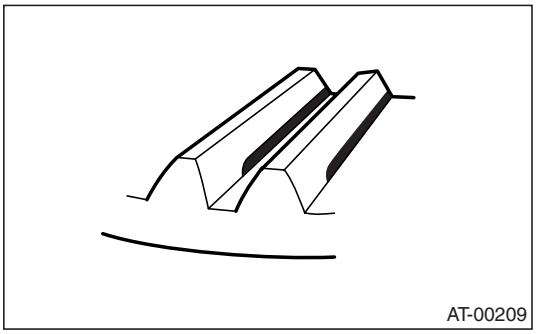
Adjustment: Check the backlash again and adjust it.



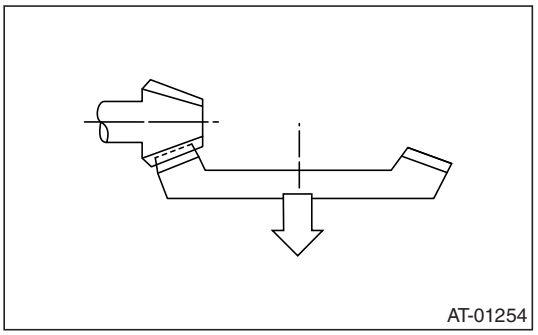
• Flank contact

Checking item: Backlash is too small.

Contact pattern



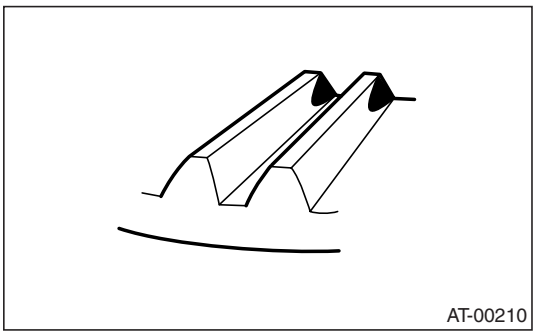
Adjustment: Check the backlash again and adjust it.



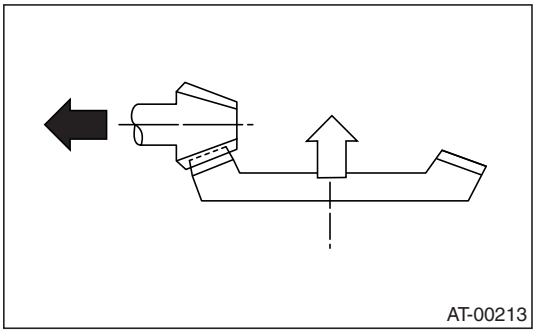
• Toe contact (inside end contact)

Checking item: Contact area is small.

Contact pattern



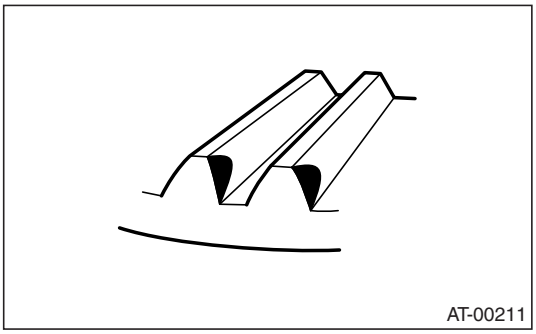
Adjustment: Reduce thickness of drive pinion shim according to the procedure for bringing drive pinion away from driven gear.



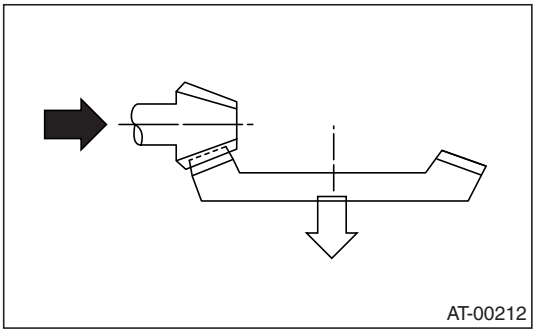
- Heel contact (outside end contact)

Checking item: Contact area is small.

Contact pattern



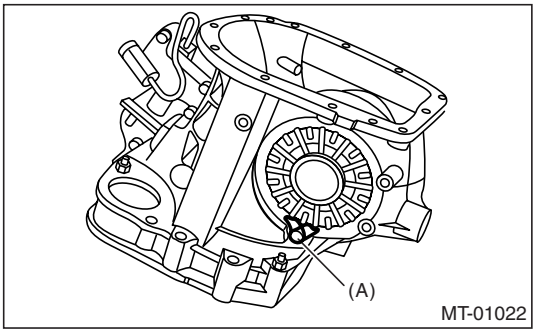
Adjustment: Increase thickness of drive pinion according to procedure for moving drive pinion closer to driven gear side.



23.Front Differential Assembly

A: REMOVAL

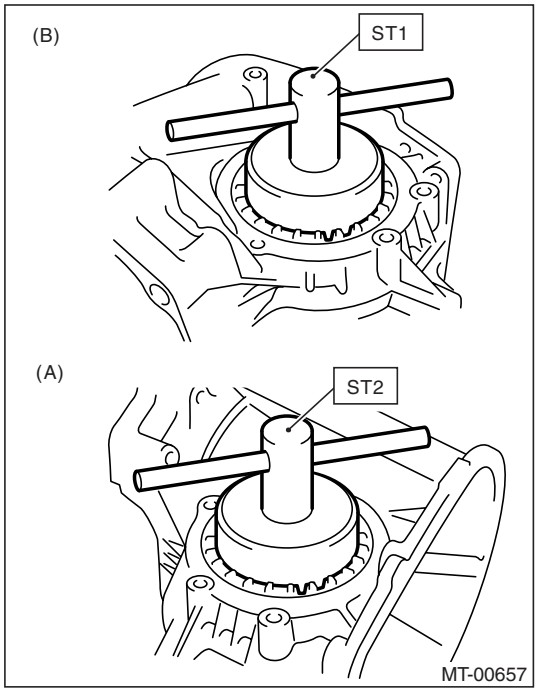
1) Remove the manual transmission assembly from vehicle. <Ref. to 6MT-34, REMOVAL, Manual Transmission Assembly.>
2) Prepare the transmission for overhaul. <Ref. to 6MT-40, Preparation for Overhaul.>
3) Remove the oil pipe, neutral position switch, back-up light switch and harness. <Ref. to 6MT-42, REMOVAL, Oil Pipe.> <Ref. to 6MT-45, REMOVAL, Neutral Position Switch.> <Ref. to 6MT-43, REMOVAL, Back-up Light Switch.>
4) Remove the extension case. <Ref. to 6MT-47, REMOVAL, Extension Case.>
5) Remove the transfer driven gear. <Ref. to 6MT-58, REMOVAL, Transfer Driven Gear.>
6) Remove the center differential. <Ref. to 6MT-60, REMOVAL, Center Differential.>
7) Remove the oil pump. <Ref. to 6MT-61, REMOVAL, Oil Pump.>
8) Remove the transmission case. <Ref. to 6MT-64, REMOVAL, Transmission Case.>
9) Remove each gear assembly. <Ref. to 6MT-69, REMOVAL, Main Shaft Assembly.>
10) Remove the drive pinion shaft assembly. <Ref. to 6MT-96, REMOVAL, Drive Pinion Shaft Assembly.>
11) Remove the lock plates on both side.



(A) Lock plate

12) Using the ST, remove the differential side retainer on both side.
ST1 4939787000 WRENCH ASSY (RH SIDE)
ST2 18630AA000 WRENCH ASSY (LH SIDE)

NOTE:
Be careful not to damage the part of clutch case where the retainer is to be installed.



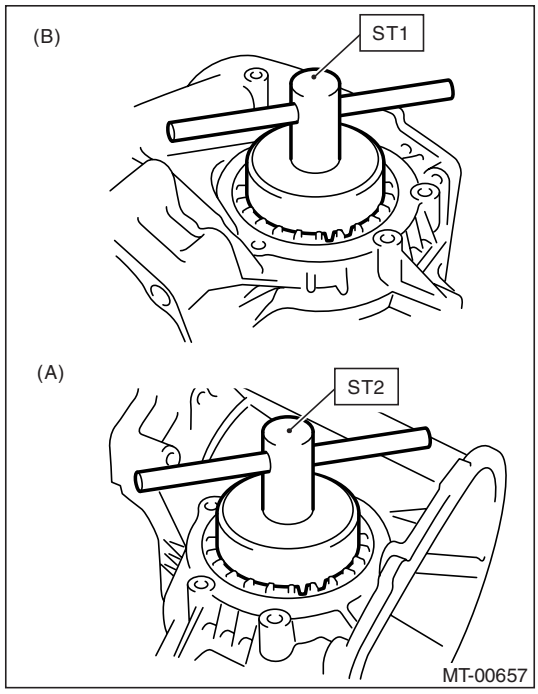
(A) LH side
(B) RH side

13) Remove the front differential.

B: INSTALLATION

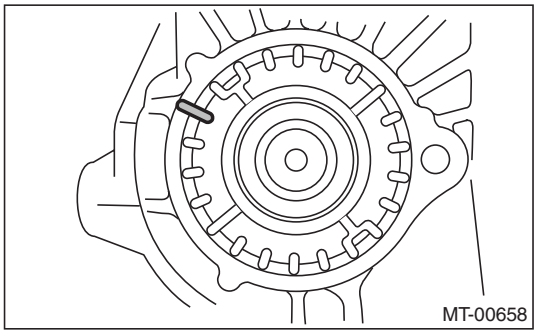
1) Install the differential assembly into clutch housing.
2) Apply gear oil to the threaded portion of side retainer.
3) Remove the O-ring from side retainer of both side.
4) Using the ST, install the differential side retainer to both side.
ST1 499787000 WRENCH ASSY (RH SIDE)
ST2 18630AA000 WRENCH ASSY (LH SIDE)

NOTE:
Be careful not to damage the oil seal.



(A) LH side
(B) RH side

5) Check and adjust the hypoid gear backlash. <Ref. to 6MT-107, HYPOID GEAR BACKLASH, INSPECTION, Front Differential Assembly.>
6) Check and adjust the tooth contact. <Ref. to 6MT-99, ADJUSTMENT, Drive Pinion Shaft Assembly.>
7) Put marks on the engagement position of the right and left side retainer and clutch housing.



8) Remove the differential side retainer from both side.

NOTE:
Record the rotating number of time till removal, when removing the side retainer.

9) Install the O-ring to retainer on both side.

NOTE:
Always use a new O-ring.

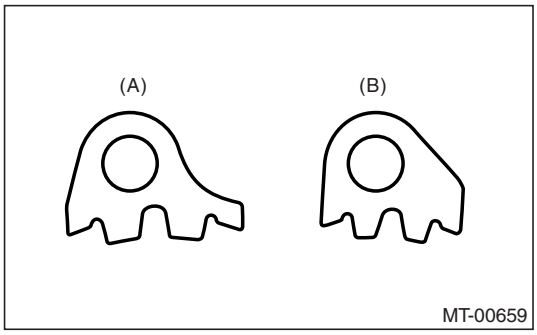
10) Install the differential side retainer to both side.

NOTE:
Install the side retainer by screwing in the same rotating number of time till removal, and then align the marks.

11) Install the lock plate.

Tightening torque:
25 N·m (2.5 kgf-m, 18.4 ft-lb)

NOTE:
Be careful not to confuse right and left lock plate.

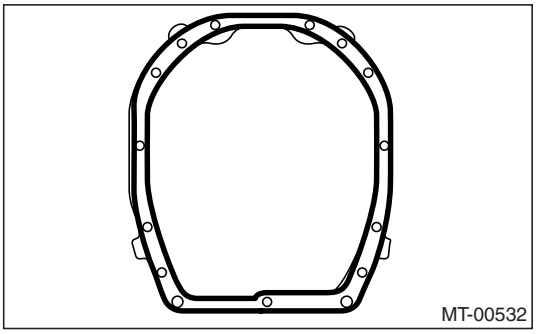


(A) LH
(B) RH

12) Completely remove the remaining liquid gasket from the clutch housing and adapter plate.

13) Apply liquid gasket to the clutch housing.

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

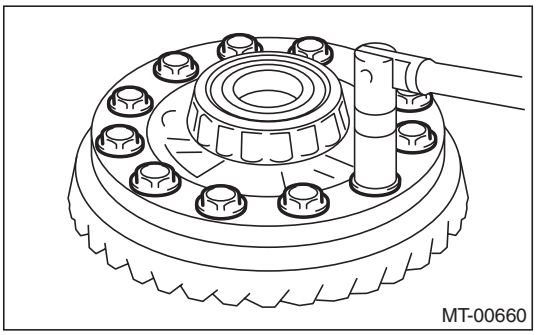


14) Install the drive pinion shaft assembly. <Ref. to 6MT-96, INSTALLATION, Drive Pinion Shaft Assembly.>
15) Install each gear assembly at a time. <Ref. to 6MT-70, INSTALLATION, Main Shaft Assembly.>
16) Install the transmission case. <Ref. to 6MT-65, INSTALLATION, Transmission Case.>
17) Install the oil pump. <Ref. to 6MT-62, INSTALLATION, Oil Pump.>
18) Install the center differential. <Ref. to 6MT-60, INSTALLATION, Center Differential.>
19) Install the transfer driven gear. <Ref. to 6MT-58, INSTALLATION, Transfer Driven Gear.>
20) Install the extension case. <Ref. to 6MT-47, INSTALLATION, Extension Case.>
21) Install the oil pipe, neutral position switch, back-up light switch and harness. <Ref. to 6MT-42, INSTALLATION, Oil Pipe.> <Ref. to 6MT-45, INSTALLATION, Neutral Position Switch.> <Ref. to 6MT-43, INSTALLATION, Back-up Light Switch.>
22) Install the manual transmission assembly into vehicle. <Ref. to 6MT-36, INSTALLATION, Manual Transmission Assembly.>

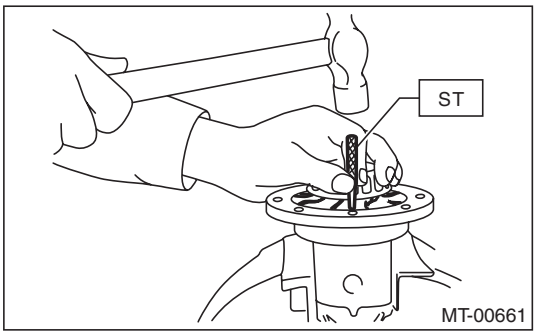
C: DISASSEMBLY

1. DIFFERENTIAL CASE

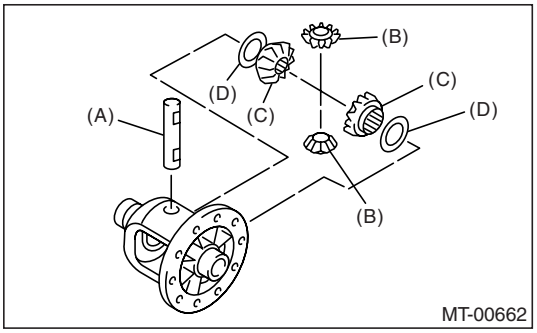
1) Secure the differential assembly on a vise, then remove the hypoid driven gear.



2) Using the ST, drive out the straight pin from differential assembly toward hypoid driven gear side.
ST 899904100 REMOVER

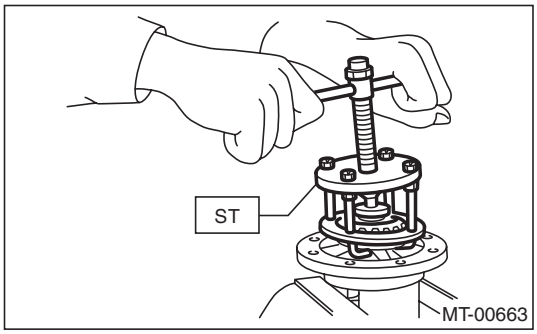


3) Pull out the pinion shaft, and remove the bevel pinion gear and bevel gear and washer.

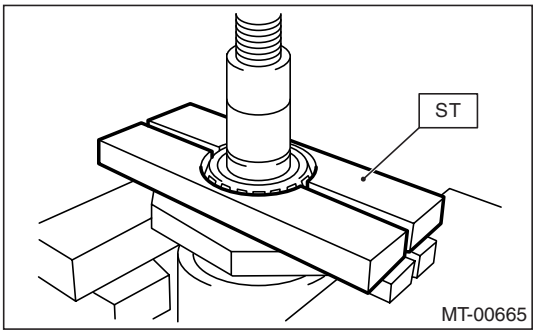


(A) Pinion shaft
(B) Bevel pinion gear
(C) Bevel gear
(D) Washer

4) Using the ST, remove the hypoid driven gear side bearing.
ST 399527700 PULLER SET

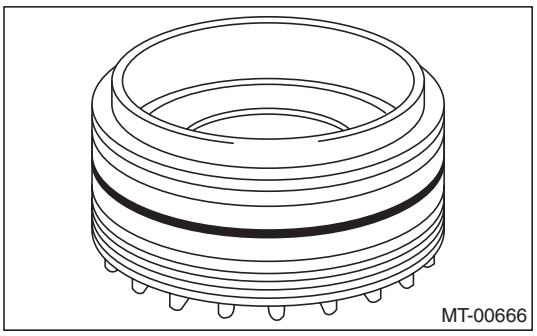


5) Using the ST, remove the roller bearing.
ST 498077000 REMOVER

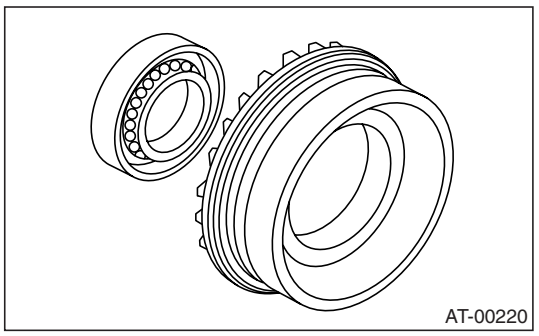


2. SIDE RETAINER

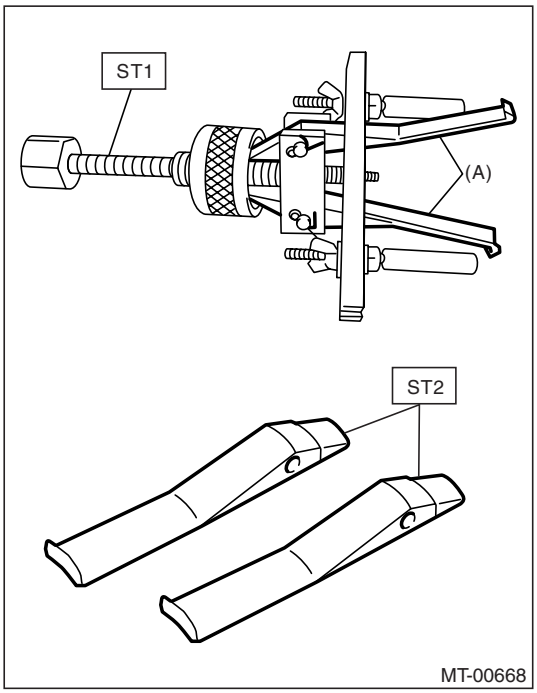
1) Remove the O-ring.



2) Remove the oil seal.

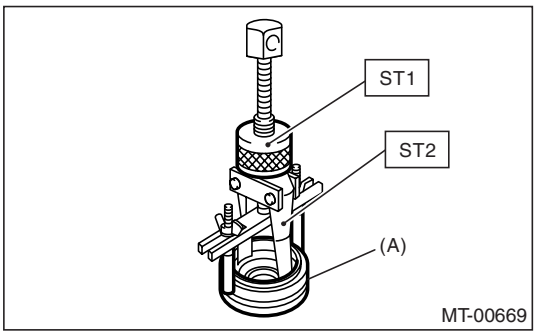


3) Remove the claw of ST1, and then install the claw of ST2.
ST1 398527700 PULLER ASSY
ST2 18760AA000 CLAW



(A) Claw

4) Using the ST, remove the bearing outer race from side retainer.
ST1 398527700 PULLER ASSY
ST2 18760AA000 CLAW



(A) Side retainer

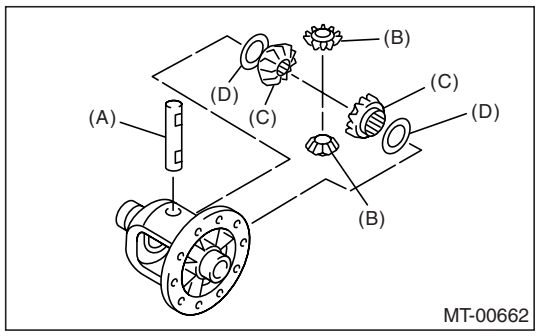
D: ASSEMBLY

1. DIFFERENTIAL CASE

1) Install the washer to bevel gear.

NOTE:
Face the chamfered side of washer toward gear.

2) Install the bevel gear and bevel pinion gear washer to differential case, and then insert the pinion shaft.



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

3) Check the bevel pinion gear backlash. <Ref. to 6MT-107, BEVEL PINION GEAR BACKLASH, INSPECTION, Front Differential Assembly.>

4) Using the ST, align the pinion shaft and differential case with their holes, and drive straight pin into holes.

ST 899904100 REMOVER

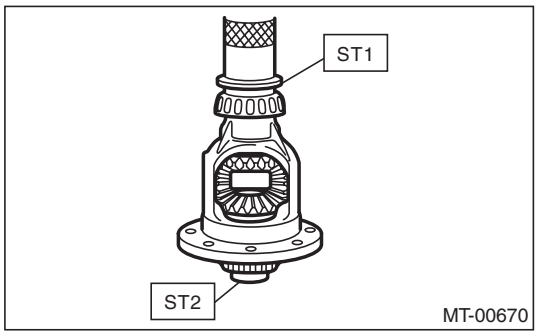
5) Caulk around the hole, be sure the straight pin is not removed.

6) Using the ST, install the bearing inner races of RH and LH side to differential case.

ST1 398437700 INSTALLER
ST2 398497701 SEAT

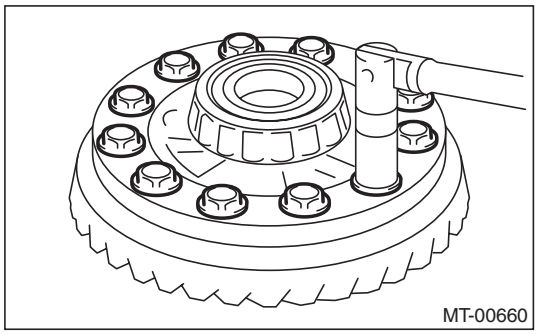
CAUTION:
Do not apply pressure in excess of 20 kN (2.0 ton, 2.2 US ton, 2.0 Imp ton).

NOTE:
Always replace the inner race and outer race as a set.



7) Install the hypoid driven gear to differential case.

Tightening torque:
69 N·m (7.0 kgf-m, 50.9 ft-lb)



2. SIDE RETAINER

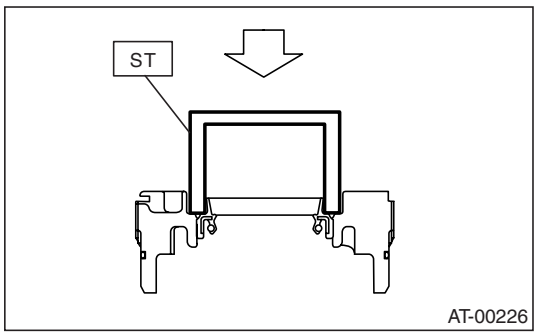
NOTE:
Install the oil seal and O-ring of side retainer after the adjustment of backlash and tooth contact.

1) Install the bearing outer race to side retainer.

2) Install the oil seal using the ST.

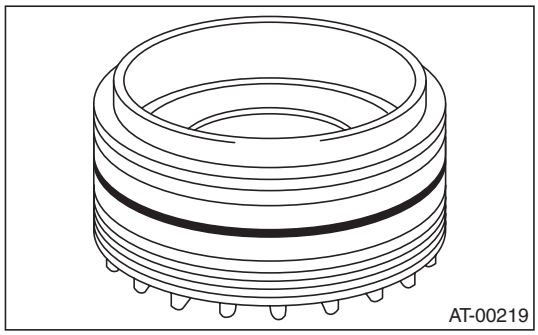
ST 18675AA000 DIFFERENTIAL SIDE OIL SEAL INSTALLER

NOTE:
- Use a new oil seal.
- Apply oil to the oil seal lips.



3) Install the O-ring.

NOTE:
Use a new O-ring.



E: INSPECTION

Repair or replace the front differential in following cases.
- When each gear is damaged, seized, or excessively worn.
- When sliding surfaces of the differential case is damaged, seized or excessively worn.
- When bearings and bearings part is damaged, rusted or worn.
- When bearing that fails to turn smoothly or makes noise when turned.

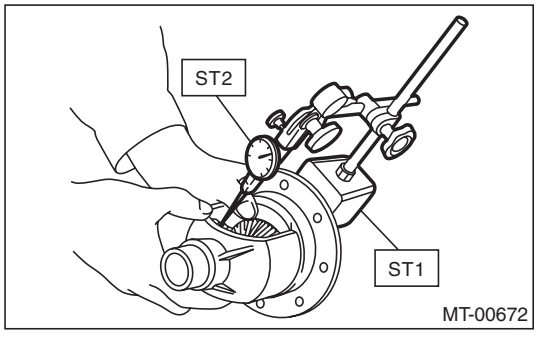
1. BEVEL PINION GEAR BACKLASH

Measure the bevel pinion gear backlash. If it is not within specification, install a suitable washer to adjust. <Ref. to 6MT-108, ADJUSTMENT, Front Differential Assembly.>

NOTE:
- Be sure the pinion gear teeth contact adjacent gear teeth during measurement.
- Before measuring the backlash, rotate each gear to get each part accustomed.

ST1 498247001 MAGNET BASE
ST2 498247100 DIAL GAUGE

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

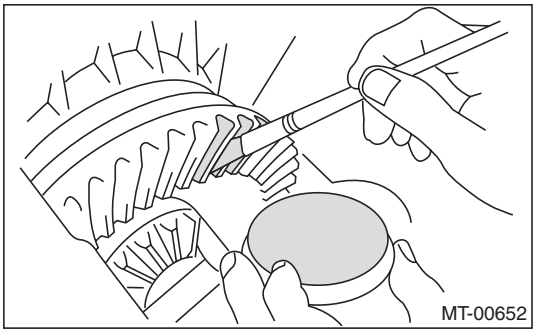


2. HYPOID GEAR BACKLASH

Check the hypoid gear backlash. If it is not within specification, adjust it. <Ref. to 6MT-108, HYPOID GEAR BACKLASH, ADJUSTMENT, Front Differential Assembly.>

3. TOOTH CONTACT OF HYPOID GEAR

1) Be sure the hypoid gear backlash is within specification. If it is not within specification, adjust it. <Ref. to 6MT-108, HYPOID GEAR BACKLASH, ADJUSTMENT, Front Differential Assembly.>
2) Apply a uniform thin coat of red lead on both tooth surfaces of three or four teeth of the hypoid driven gear.



3) Install the drive pinion shaft assembly, and then secure with four bolts.

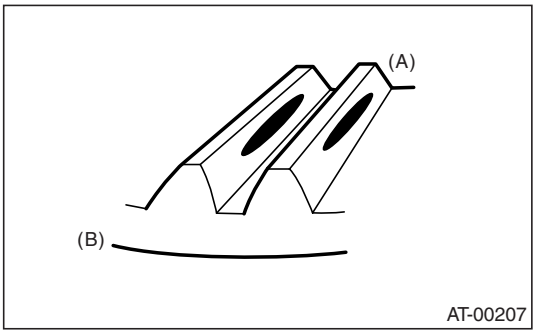
NOTE:
Use the old gasket and washer to prevent the mating surface of housing from damaging.

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

4) Rotate the drive pinion shaft to right and left for several times.

5) Remove the drive pinion shaft assembly, and then check tooth contact. If tooth contact is inaccurate, adjust it. <Ref. to 6MT-99, ADJUSTMENT, Drive Pinion Shaft Assembly.>
• Correct tooth contact

NOTE:
Under no load, tooth contacts 50 — 60% from center to toe side (tooth contact shifts to heel side when driving).

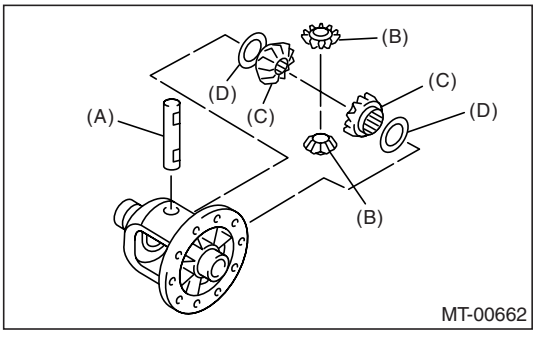


(A) Toe side
(B) Heel side

F: ADJUSTMENT

1. BEVEL PINION GEAR BACKLASH

1) Measure the bevel pinion gear backlash. <Ref. to 6MT-107, BEVEL PINION GEAR BACKLASH, INSPECTION, Front Differential Assembly.>
2) Disassemble the differential case. <Ref. to 6MT-104, DIFFERENTIAL CASE, DISASSEMBLY, Front Differential Assembly.>
3) Select a washer from the following table, and then assemble the differential case. <Ref. to 6MT-106, DIFFERENTIAL CASE, ASSEMBLY, Front Differential Assembly.>



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

NOTE:
If the backlash is excessive, select a thicker washer. If the backlash is insufficient, select a thinner new washer.

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)

2. HYPOID GEAR BACKLASH

1) Install the side retainers of RH and LH side.
ST1 499787000 WRENCH ASSY (RH SIDE)
ST2 18630AA000 WRENCH ASSY (LH SIDE)

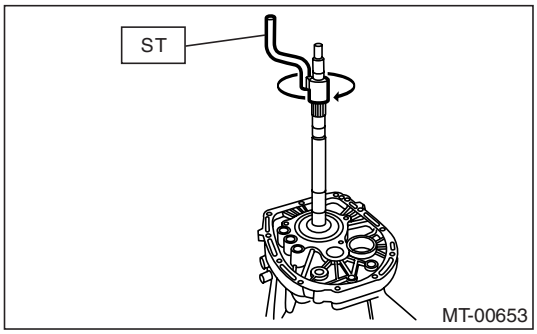
NOTE:
Screw in the side retainer of RH side a bit further than LH side.

2) Install the drive pinion shaft assembly, and then secure with four bolts.

NOTE:
Use the old gasket and washer to prevent the mating surface of housing from damaging.

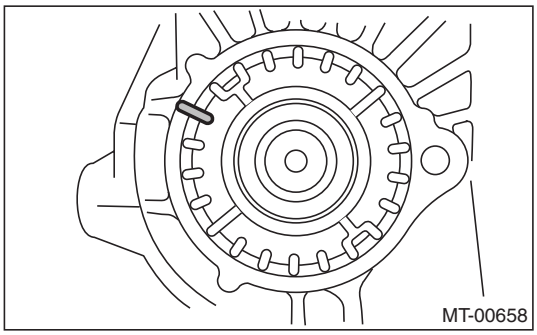
Tightening torque:
50 N·m (5.1 kgf-m, 36.9 ft-lb)

3) Using the ST, screw in the side retainer LH until the drive pinion and hypoid driven gear contacts lightly. Loosen the side retainer RH.
ST1 499787000 WRENCH ASSY (RH SIDE)
ST2 18630AA000 WRENCH ASSY (LH SIDE)
4) Using the ST, rotate the drive pinion shaft several times.
ST 18631AA000 HANDLE

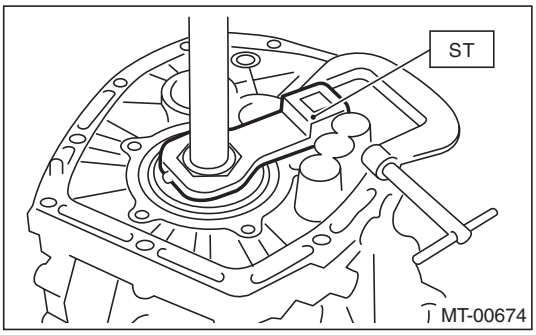


5) Repeat step 3) and 4) until the side retainer LH can not be rotated. For the side retainer RH, screw in until the inner race and outer race contacts lightly. This is “0” backlash condition.

6) Put marks on the engagement position of the right and left side retainer and clutch housing.

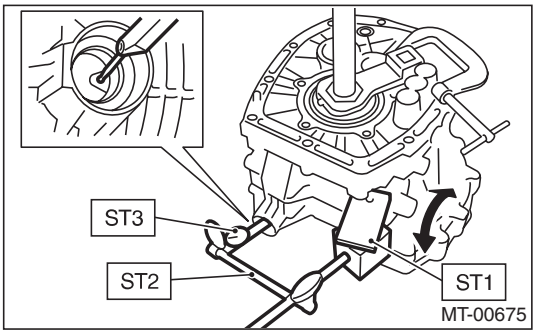


7) Return the side retainer LH for three teeth, and screw in the side retainer RH for three teeth.
8) Using the ST, secure the drive pinion shaft.
ST 18621AA000 ADAPTER WRENCH



9) Install the SUBARU genuine axle shaft to front differential LH and RH.
Parts No. 38415AA000 AXLE SHAFT
10) After rotating the drive pinion shaft several times, measure the hypoid gear backlash using the ST.
ST1 498255400 PLATE
ST2 498247001 MAGNET BASE
ST3 498247100 DIAL GAUGE

Hypoid gear backlash:
0.13 — 0.18 mm (0.0051 — 0.0071 in)



11) If the backlash is out of specification, adjust it by turning the right and left side retainers.
12) Screw in the side retainer of RH side for more than 1.75 teeth.

3. TOOTH CONTACT OF HYPOID GEAR

Refer to the section of drive pinion for checking of tooth contact. <Ref. to 6MT-107, TOOTH CONTACT OF HYPOID GEAR, INSPECTION, Front Differential Assembly.>

24.Shifter Fork and Rod

A: REMOVAL

1) Remove the manual transmission assembly from vehicle. <Ref. to 6MT-34, REMOVAL, Manual Transmission Assembly.>
2) Prepare the transmission for overhaul. <Ref. to 6MT-40, Preparation for Overhaul.>
3) Remove the oil pipe, neutral position switch, back-up light switch and harness. <Ref. to 6MT-42, REMOVAL, Oil Pipe.> <Ref. to 6MT-45, REMOVAL, Neutral Position Switch.> <Ref. to 6MT-43, REMOVAL, Back-up Light Switch.>
4) Remove the extension case. <Ref. to 6MT-47, REMOVAL, Extension Case.>
5) Remove the transfer driven gear. <Ref. to 6MT-58, REMOVAL, Transfer Driven Gear.>
6) Remove the center differential. <Ref. to 6MT-60, REMOVAL, Center Differential.>
7) Remove the oil pump. <Ref. to 6MT-61, REMOVAL, Oil Pump.>
8) Remove the transmission case. <Ref. to 6MT-64, REMOVAL, Transmission Case.>
9) Remove each gear assembly. <Ref. to 6MT-69, REMOVAL, Main Shaft Assembly.>

B: INSTALLATION

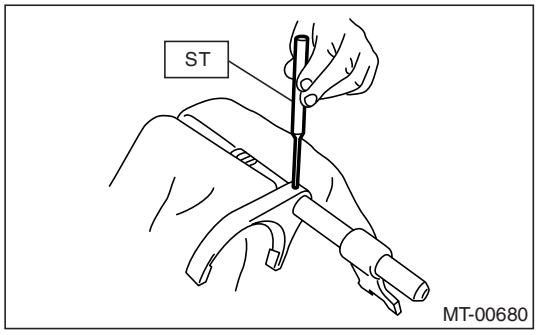
1) Install each gear assembly at a time. <Ref. to 6MT-70, INSTALLATION, Main Shaft Assembly.>
2) Install the transmission case. <Ref. to 6MT-65, INSTALLATION, Transmission Case.>
3) Install the oil pump. <Ref. to 6MT-62, INSTALLATION, Oil Pump.>
4) Install the center differential. <Ref. to 6MT-60, INSTALLATION, Center Differential.>
5) Install the transfer driven gear. <Ref. to 6MT-58, INSTALLATION, Transfer Driven Gear.>
6) Install the extension case. <Ref. to 6MT-47, INSTALLATION, Extension Case.>
7) Install the oil pipe, neutral position switch, back-up light switch and harness. <Ref. to 6MT-42, INSTALLATION, Oil Pipe.> <Ref. to 6MT-45, INSTALLATION, Neutral Position Switch.> <Ref. to 6MT-43, INSTALLATION, Back-up Light Switch.>
8) Install the manual transmission assembly into vehicle. <Ref. to 6MT-36, INSTALLATION, Manual Transmission Assembly.>

C: DISASSEMBLY

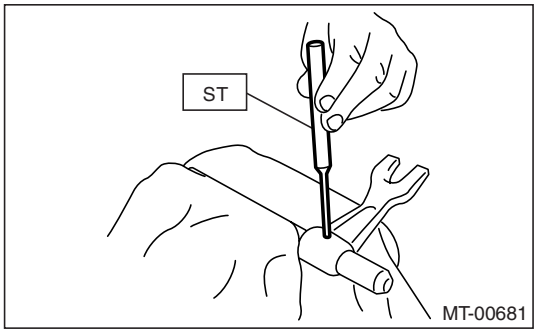
NOTE:
Discard the removed spring pin and replace with a new one.

1. REVERSE SHIFTER FORK

1) Using the ST, remove the reverse fork.
ST 398791700 REMOVER

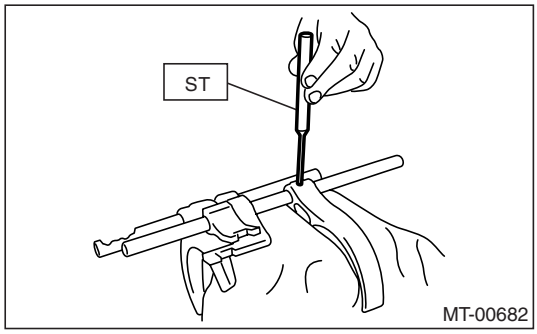


2) Using the ST, remove the reverse shifter arm.
ST 398791700 REMOVER

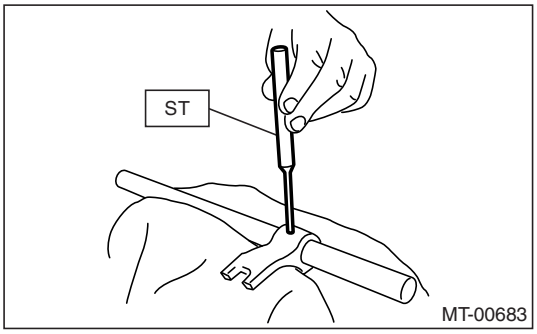


2. 1ST-2ND, 3RD-4TH SHIFTER FORK

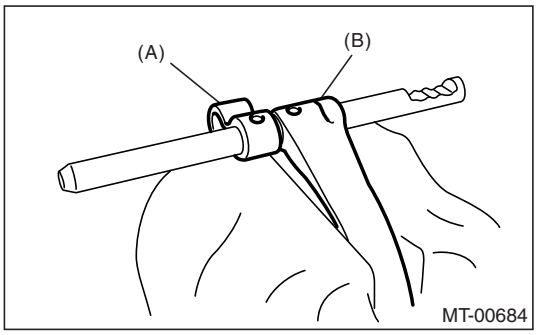
1) Using the ST, remove the 3rd-4th shifter fork.
ST 398791700 REMOVER



2) Using the ST, remove the 3rd-4th shifter arm.
ST 398791700 REMOVER



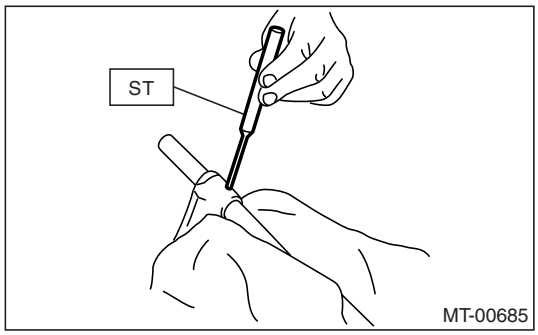
3) Using the ST, remove the 1st-2nd shifter arm and 1st-2nd shifter fork.
ST 398791700 REMOVER



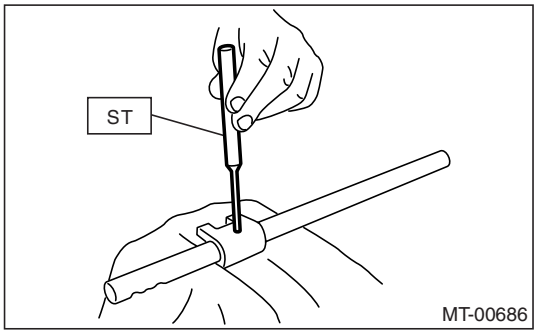
(A) 1st-2nd shifter arm
(B) 1st-2nd shifter fork

3. 5TH-6TH SHIFTER FORK

1) Using the ST, remove the 5th-6th shifter fork.
ST 398791700 REMOVER

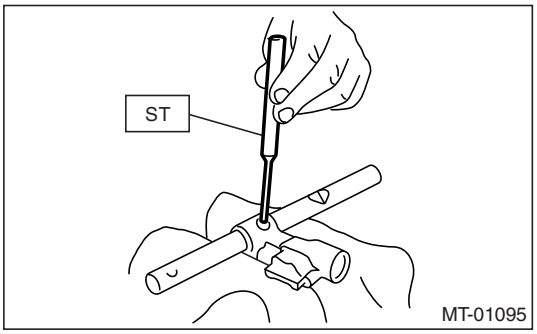


2) Using the ST, remove the 5th-6th shifter arm.
ST 398791700 REMOVER



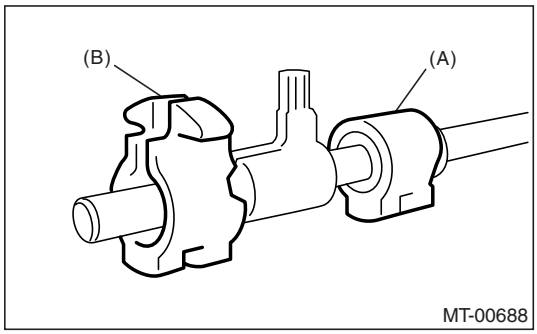
4. SHIFT ARM SHAFT

Using the ST, remove the selector arm.
ST 398791700 REMOVER



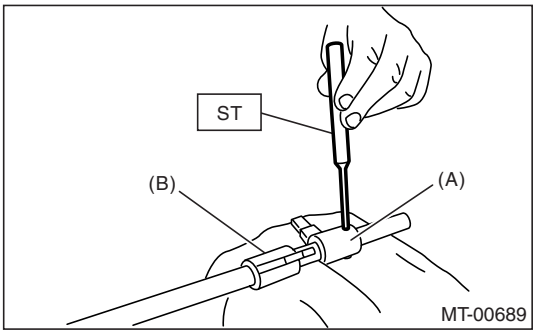
5. STRIKING ROD

1) Remove the reverse interlock block and interlock block from striking rod.



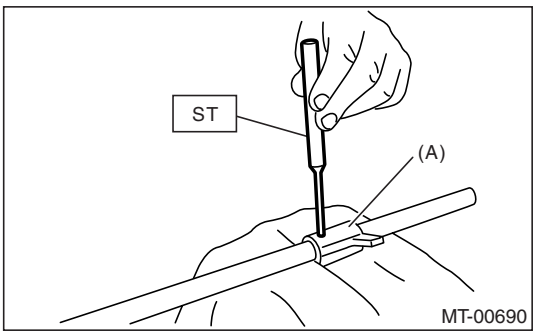
(A) Reverse interlock block
(B) Interlock block

2) Using the ST, remove the reverse interlock arm.
ST 398791700 REMOVER



(A) Reverse interlock arm
(B) Interlock arm

3) Using the ST, remove the interlock arm.
ST 398791700 REMOVER



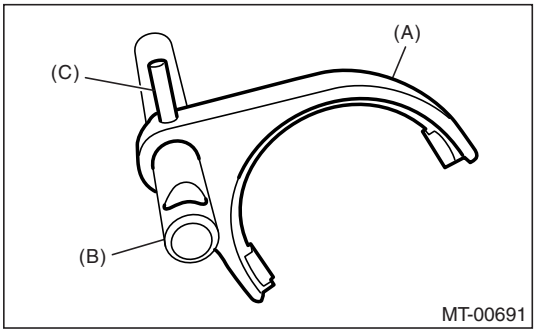
(A) Interlock arm

D: ASSEMBLY

1. REVERSE SHIFTER FORK

1) Using the ST, install the reverse fork.
ST 398791700 REMOVER

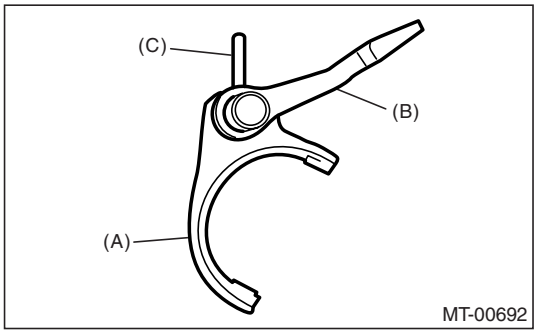
NOTE:
Be sure the reverse fork and rod are installed in proper direction.



(A) Reverse fork
(B) Reverse fork rod
(C) Spring pin

2) Using the ST, install the reverse arm.
ST 398791700 REMOVER

NOTE:
Be sure the reverse arm and rod are installed in proper direction.

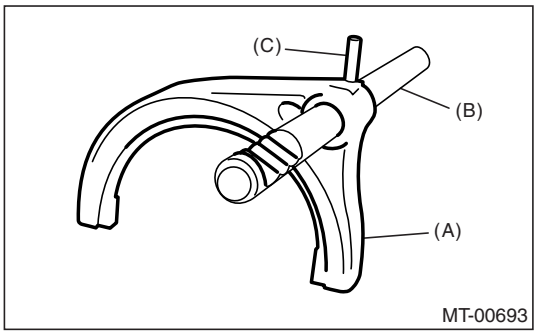


(A) Reverse fork
(B) Reverse shifter arm
(C) Spring pin

2. 1ST-2ND, 3RD-4TH SHIFTER FORK

1) Using the ST, install the 1st-2nd shifter fork.
ST 398791700 REMOVER

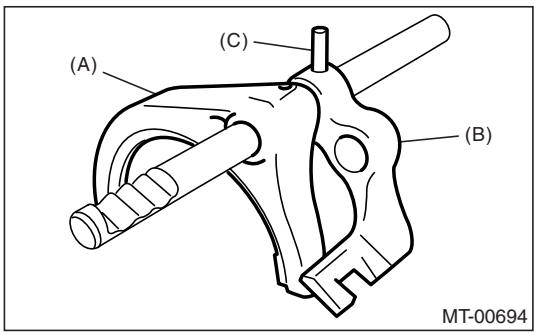
NOTE:
Be sure the 1st-2nd shifter fork and rod are installed in proper direction.



(A) 1st-2nd shifter fork
(B) 1st-2nd shifter rod
(C) Spring pin

2) Using the ST, install the 1st-2nd shifter arm.
ST 398791700 REMOVER

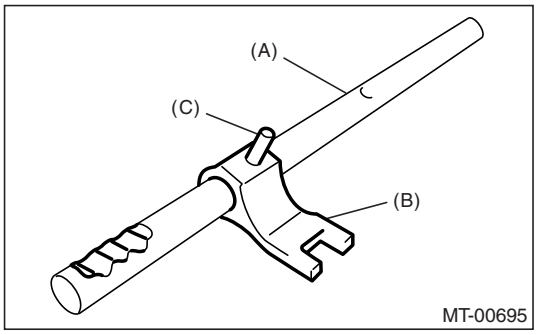
NOTE:
Be sure the 1st-2nd shifter arm and fork are installed in proper direction.



(A) 1st-2nd shifter fork
(B) 1st-2nd shifter arm
(C) Spring pin

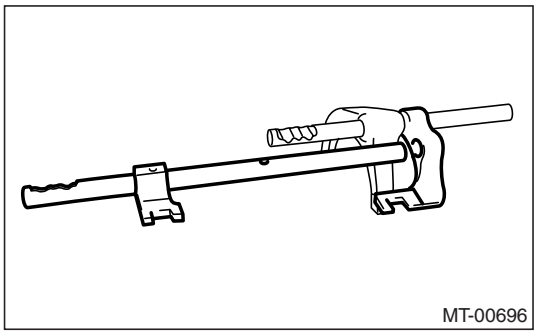
3) Using the ST, install the 3rd-4th shifter arm.
ST 398791700 REMOVER

NOTE:
Be sure the 3rd-4th shifter arm and rod are installed in proper direction.



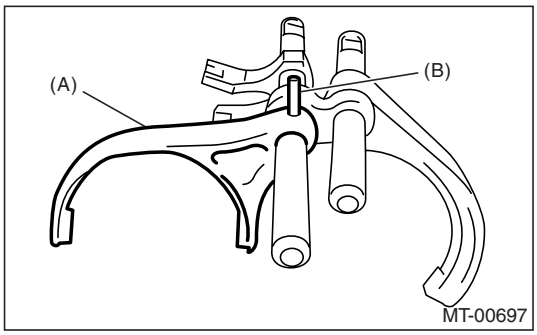
(A) 3rd-4th shifter rod
(B) 3rd-4th shifter arm
(C) Spring pin

4) Install the 3rd-4th fork rod into 1st-2nd shifter arm.



5) Using the ST, install the 3rd-4th shifter fork.
ST 398791700 REMOVER

NOTE:
Be sure the 3rd-4th shifter fork is installed in proper direction.

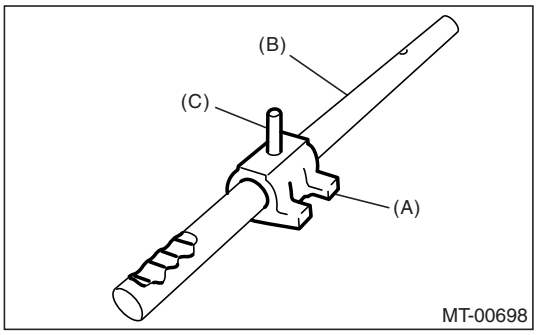


(A) 3rd-4th shifter fork
(B) Spring pin

3. 5TH-6TH SHIFTER FORK

1) Using ST, install the 5th-6th shifter arm.
ST 398791700 REMOVER

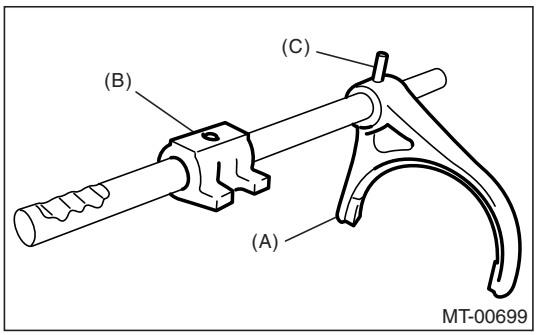
NOTE:
Be sure the 5th-6th shifter arm and rod are installed in proper direction.



(A) 5th-6th shifter arm
(B) 5th-6th shifter rod
(C) Spring pin

2) Using the ST, install the 5th-6th shifter fork.
ST 398791700 REMOVER

NOTE:
Be sure the 5th-6th shifter fork and arm are installed in proper direction.

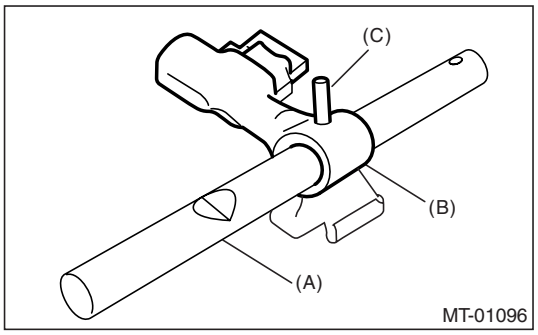


(A) 5th-6th shifter fork
(B) 5th-6th shifter arm
(C) Spring pin

4. SHIFT ARM SHAFT

Using the ST, install the selector arm.
ST 398791700 REMOVER

NOTE:
Be sure the selector arm and rod are installed in proper direction.

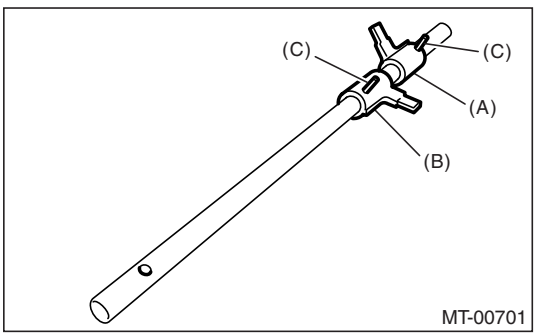


(A) Selector rod
(B) Selector arm
(C) Spring pin

5. STRIKING ROD

1) Using the ST, install the reverse interlock arm and interlock arm.
ST 398791700 REMOVER

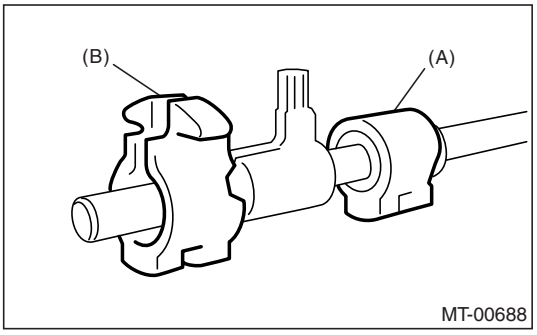
NOTE:
• Be sure the reverse interlock arm and rod are installed in proper direction.
• Be sure the interlock arm and rod are installed in proper direction.



(A) Reverse interlock arm
(B) Interlock arm
(C) Spring pin

2) Install the reverse interlock block and interlock block to striking rod.

NOTE:
Be sure the reverse interlock block and interlock block are installed in proper direction.



(A) Reverse interlock block
(B) Interlock block

E: INSPECTION

1) Check the shift shaft and shift rod for damage. Replace if damaged.
2) Repair or replace the gear shift mechanism if excessively worn, bent or defective in any way.

F: ADJUSTMENT

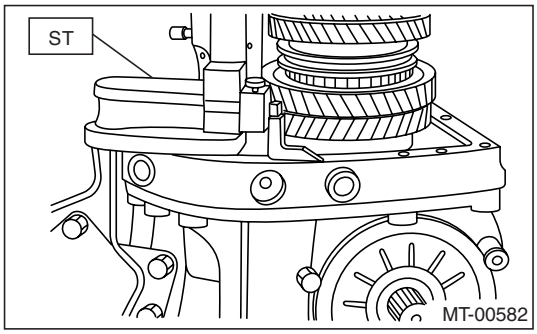
1. SELECTION OF 1ST-2ND FORK ROD

NOTE:
Perform the procedures below in the following cases.
- When replacing the 1st and 2nd driven gear.
- When replacing the 1st and 2nd synchro ring assembly.
- When replacing the adapter plate.
- When replacing the driven shaft.
- When replacing the 1st-2nd hub and sleeve assembly.

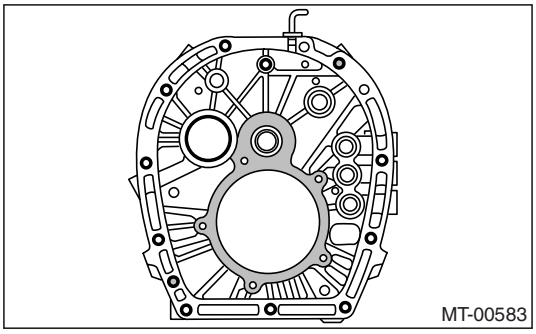
1) Insert the drive pinion assembly in adapter plate.

NOTE:
Make sure the thrust bearing outer race is not removed and drive pinion is not lifted-up.

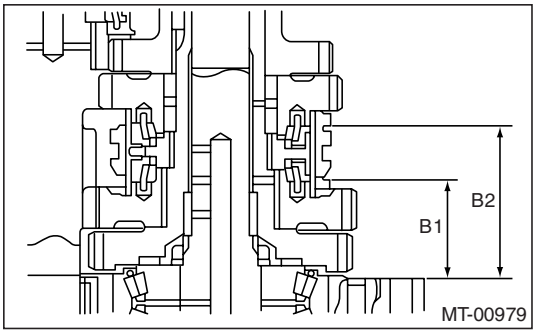
2) Set the height gauge to adapter plate. Lower the indicator of height gauge to mating surface of adapter plate and case, then set to zero point.
ST 18853AA000 HEIGHT GAUGE



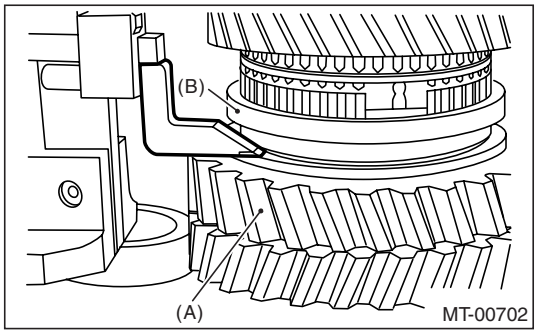
NOTE:
- Remove the remaining gasket on edge surface with scraper, since the adapter plate is base point of measurement.
- Do not place the height gauge on shaded area in the figure during the measurement.



3) Select the main shaft snap ring. <Ref. to 6MT-81, ADJUSTMENT, Main Shaft Assembly.>
4) Measure “B1” and “B2” as shown in the figure.

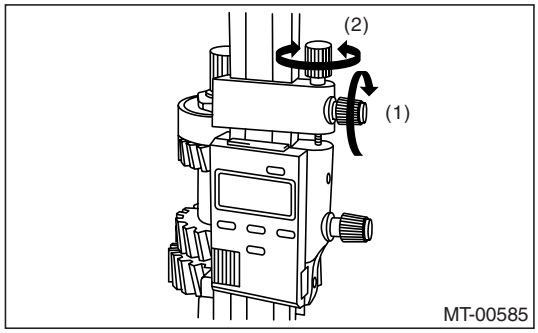


(1) Shift the 1st-2nd sleeve to 1st driven gear side, then press down to the stopper and measure “B1”.

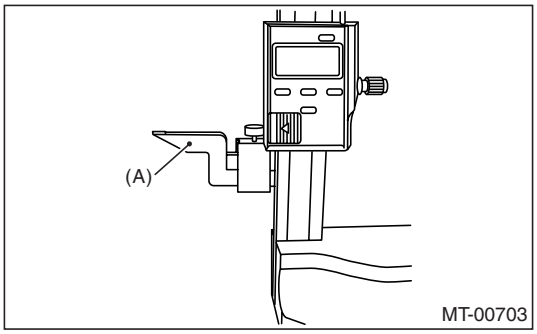


(A) 1st driven gear
(B) 1st-2nd sleeve

NOTE:
• Set the indicator of height gauge near measuring object, then lock the dial (1) as shown in the figure. Turn dial (2) to set the indicator to edge surface of sleeve 1st side.
• Measure five points of the sleeve turning every approx. 72°. Round off each two upper and lower measurement value. Use the remaining middle value as measurement value.

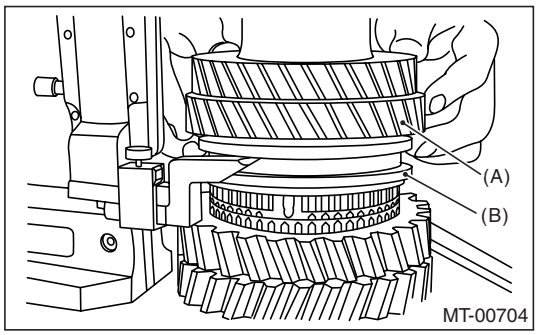


(2) Set the height gauge indicator upside down.



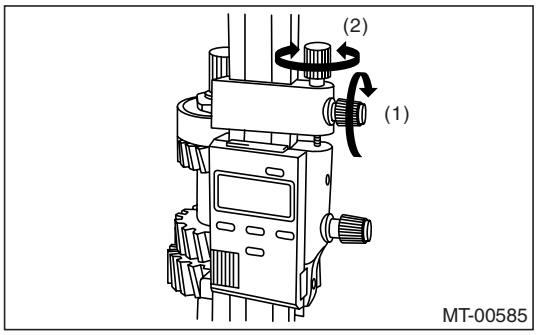
(A) Indicator

(3) Shift the 1st-2nd sleeve to 2nd driven gear side, then press down to the stopper and measure “B2”.



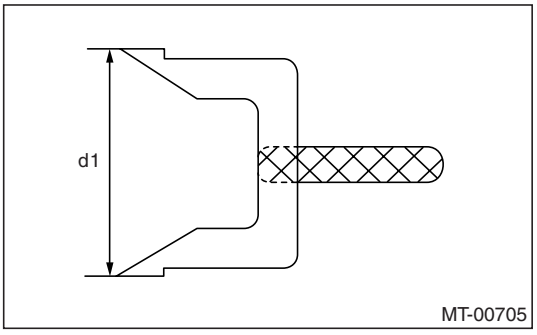
(A) 2nd driven gear
(B) 1st-2nd sleeve

NOTE:
• Set the indicator of height gauge near measuring object, then lock the dial (1) as shown in the figure. Turn dial (2) to set the indicator to edge surface of sleeve 2nd side.
• Perform the measuring procedure with two people, and measure the sleeve lifted up straight.
• Measure five points of the sleeve turning every approx. 72°. Round off each two upper and lower measurement value. Use the remaining middle value as measurement value.



(4) According to both measurements, calculate the 1st-2nd sleeve neutral position. Select the fork rod, which applies to the calculated value from following calculation formula.
Calculation formula: T = (B1 + B2) / 2
T: 1st-2nd sleeve center position
B1: Height from adapter plate edge to sleeve edge when shifted to 1st gear
B2: Height measurement from adapter plate edge to sleeve edge when shifted to 2nd gear: +55 mm (2.17 in)

NOTE:
The indicator is installed upside down compared to the setting procedure of zero point. Add d1 [fixing value: 55 mm (2.17 in)] from the following figure to “B2”, to obtain measurement value of “B2”.

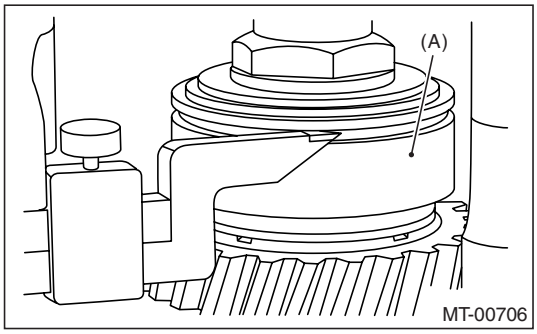


T mm (in)	Lot No. (Mark)
62.93 — 63.23 (2.4776 — 2.4894)	32801AA111 (1)
63.23 — 63.53 (2.4894 — 2.5012)	32801AA131 (None)
63.53 — 63.83 (2.5012 — 2.5130)	32801AA141 (2)

2. SELECTION OF 3RD-4TH FORK ROD

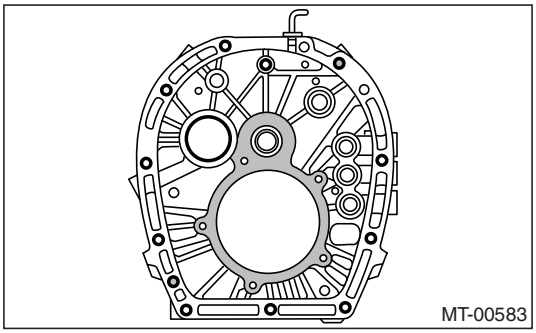
NOTE:
Perform the procedures below in the following cases.
• When replacing the main shaft.
• When replacing the 3rd, 3rd to 6th drive gear and bushing.
• When replacing the 3rd, 3rd to 6th synchro assembly and bushing.
• When replacing the 3rd-4th hub and sleeve assembly.

1) Insert the main shaft assembly in adapter plate.
2) Set the height gauge to adapter plate. Lower the indicator of height gauge to upper surface of snap ring groove, on the upper side of main rear bearing, then set to zero point.
ST 18853AA000 HEIGHT GAUGE

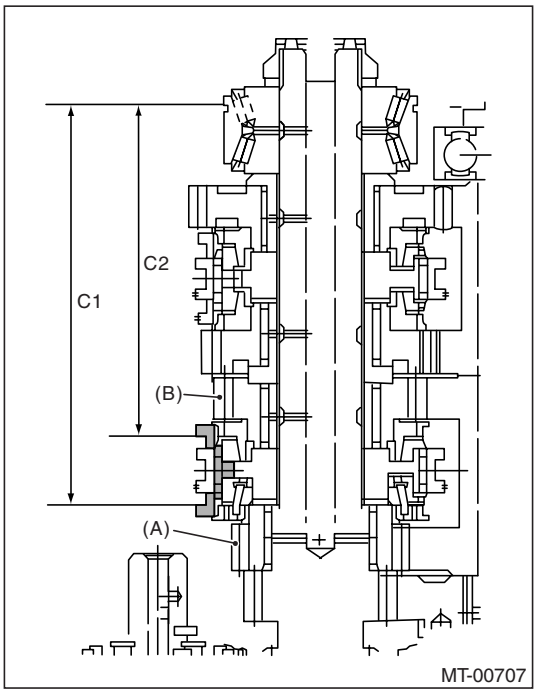


(A) Loller bearing

NOTE:
• Remove the remaining gasket on edge surface with scraper, since the height gauge is set on adapter plate during measurement.
• Do not place the height gauge on shaded area in the figure during the measurement.

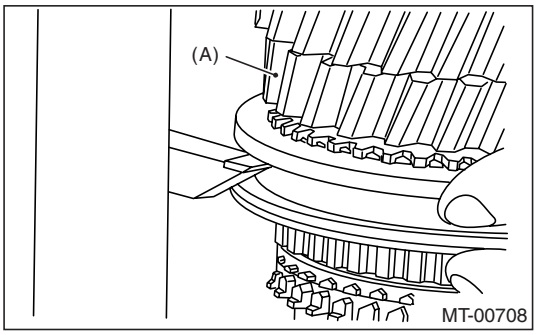


3) Using the height gauge, measure “C1” and “C2” shown in the figure.



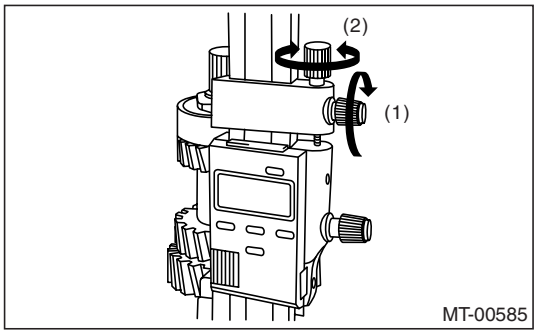
(A) 3rd drive gear
(B) 4th drive gear

(1) Shift the 3rd-4th sleeve to 4th gear side, then press down to the stopper and measure “C2”.

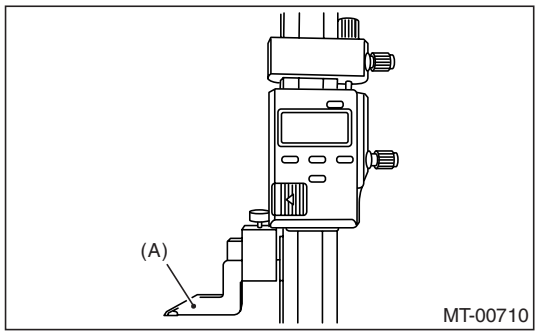


(A) 4th drive gear

NOTE:
• Set the indicator of height gauge near measuring object, then lock the dial (1) as shown in the figure.
• Turn dial (2) to set the indicator to edge surface of sleeve 4th side.
• Perform the measuring procedure with two people, and measure the sleeve lifted up straight.
• Measure five points of the sleeve turning every approx. 72°. Round off each two upper and lower measurement value. Use the remaining middle value as measurement value.

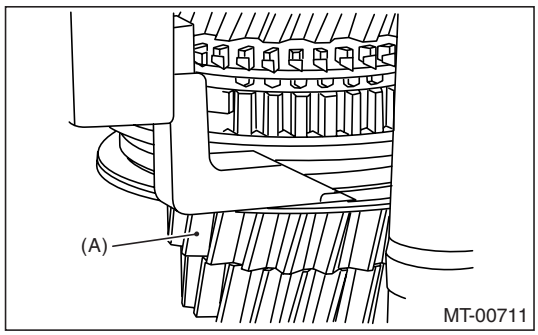


(2) Set the height gauge indicator upside down.



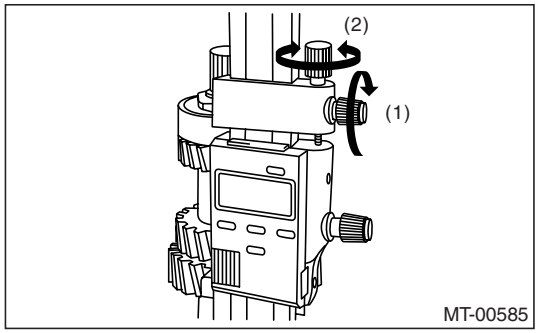
(A) Indicator

(3) Shift the 3rd-4th sleeve to 3rd drive gear side, then press down to the stopper and measure “C1”.



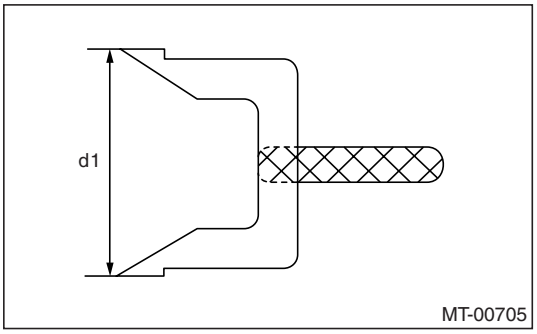
(A) 3rd drive gear

NOTE:
• Set the indicator of height gauge near measuring object, then lock the dial (1) as shown in the figure. Turn dial (2) to set the indicator to edge surface of sleeve 3rd side.
• Measure five points of the sleeve turning every approx. 72°. Round off each two upper and lower measurement value. Use the remaining middle value as measurement value.



4) According to both measurements, calculate the 3rd-4th sleeve neutral position. Select the fork rod, which applies to the calculated value from following calculation formula.
Calculation formula: T = (C1 + C2) / 2
T: 3th-4th sleeve center position
C1: Depth measurement from main shaft rear bearing snap ring groove to sleeve edge when shifted to 3rd gear: +55 mm (2.17 in)
C2: Depth from main shaft rear bearing snap ring groove to sleeve edge when shifted to 4th gear

NOTE:
The indicator is installed upside down compared to the setting procedure of zero point. Add d1 [fixing value: 55 mm (2.17 in)] from the following figure to “C1”, to obtain measurement value of “C1”.



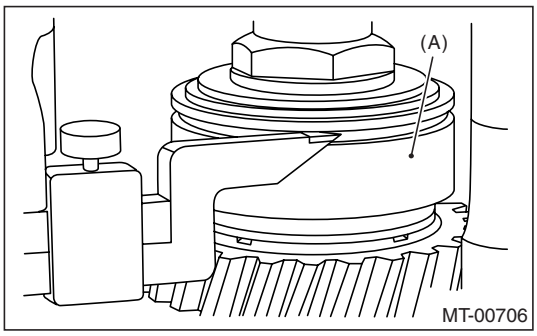
T mm (in)	Lot No. (Mark)		
	M.SFT Snap ring 805072010 [t = 1.65 mm (0.065 in)]	M.SFT Snap ring 805072011 [t = 1.95 mm (0.077 in)]	M.SFT Snap ring 805072012 [t = 2.25 mm (0.089 in)]
137.22 — 137.52 (5.4024 — 5.4142)	32809AA171 (None)	32809AA181 (2)	32809AA191 (4)
137.52 — 137.82 (5.4142 — 5.4260)	32809AA161 (1)	32809AA171 (None)	32809AA181 (2)
137.82 — 138.12 (5.4260 — 5.4378)	32809AA141 (3)	32809AA161 (1)	32809AA171 (None)

T = Thickness

3. SELECTION OF 5TH-6TH FORK ROD

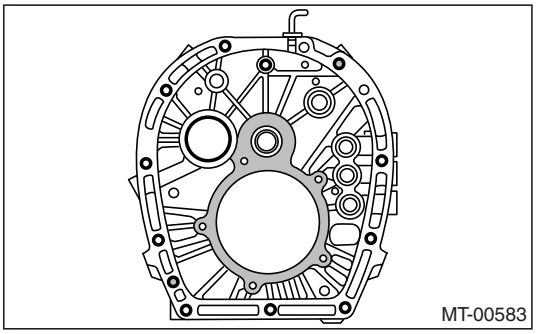
NOTE:
Perform the procedures below in the following cases.
- When replacing the main shaft.
- When replacing the 3rd to 6th drive gear and bushing.
- When replacing the 3rd to 6th synchro ring assembly.
- When replacing the 3rd-4th hub and sleeve assembly.
- When replacing the 5th-6th hub and sleeve assembly.

1) Insert the main shaft assembly in adapter plate.
2) Set the height gauge to adapter plate. Lower the indicator of height gauge to upper surface of snap ring groove, or the upper side of main rear bearing. Set to zero point.
ST 18853AA000 HEIGHT GAUGE

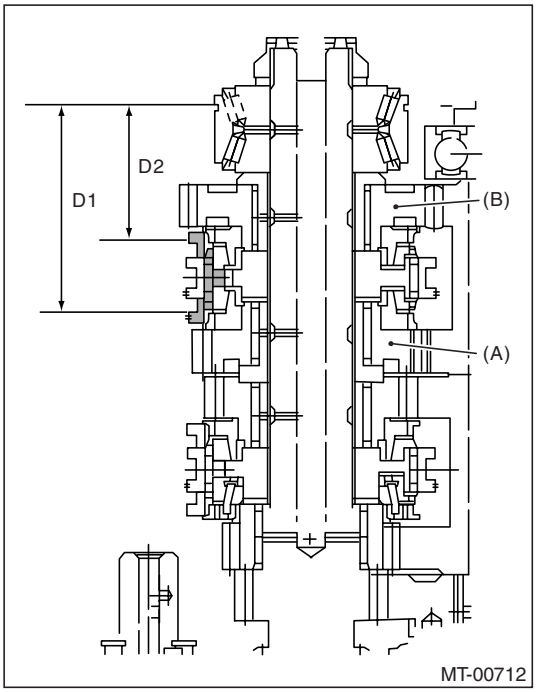


(A) Ball bearing

NOTE:
- Remove the remaining gasket on edge surface with scraper, since the height gauge is set on adapter plate during measurement.
- Do not place the height gauge on shaded area in the figure during the measurement.

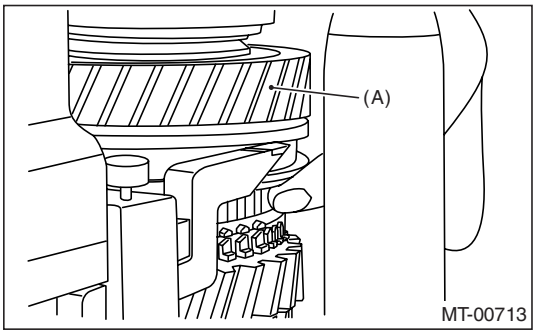


3) Using the height gauge, measure “D1” and “D2” shown in the figure.



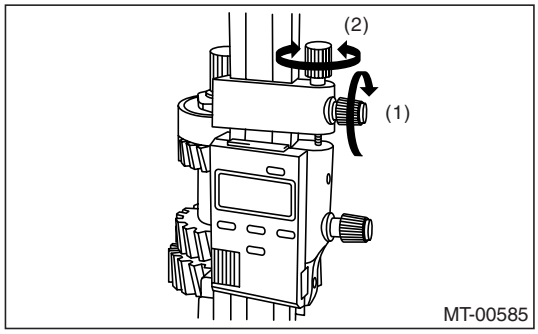
(A) 5th main gear
(B) 6th main gear

(1) Shift the 5th-6th sleeve to 6th main gear side, then press down to the stopper and measure “D2”.

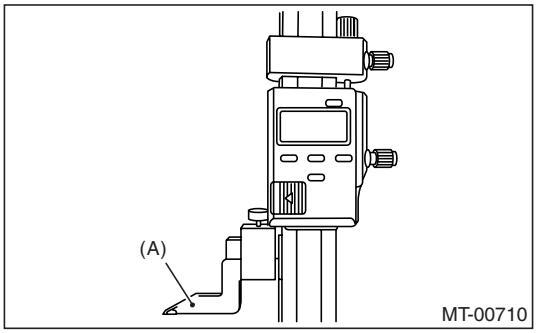


(A) 6th main gear

NOTE:
• Set the indicator of height gauge near measuring object, then lock the dial (1) as shown in the figure. Turn dial (2) to set the indicator to edge surface of sleeve 6th side.
• Perform the measuring procedure with two people, and measure the sleeve lifted up straight.
• Measure five points of the sleeve turning every approx. 72°. Round off each two upper and lower measurement value. Use the remaining middle value as measurement value.

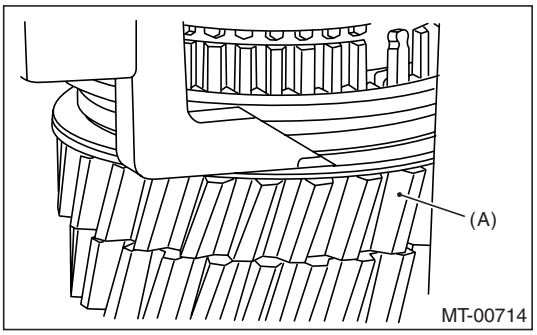


(2) Set the height gauge indicator upside down.



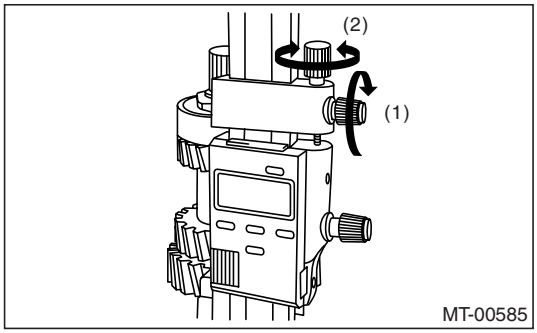
(A) Indicator

(3) Shift the 5th-6th sleeve to 5th main gear side, then press down to the stopper and measure “D1”.



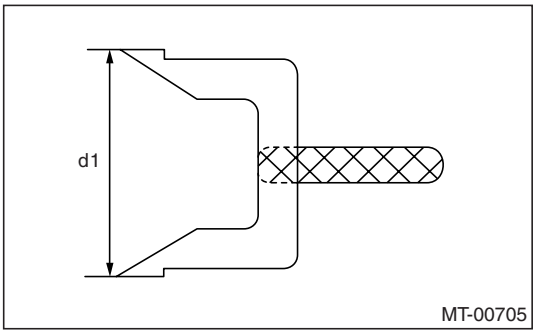
(A) 5th main gear

NOTE:
• Set the indicator of height gauge near measuring object, then lock the dial (1) as shown in the figure. Turn dial (2) to set the indicator to edge surface of sleeve 5th side.
• Measure five points of the sleeve turning every approx. 72°. Round off each two upper and lower measurement value. Use the remaining middle value as measurement value.



4) According to both measurements, calculate the 5th-6th sleeve neutral position. Select the fork rod, which applies to the calculated value from following calculation formula.
Calculation formula: T = (D1 + D2) / 2
T: 5th-6th sleeve center position
D1: Length from the shaft rear bearing snap ring groove to sleeve groove edge when shifted to 5th gear [Measurement +55 mm (2.17 in)]
D2: Length from main shaft rear bearing snap ring groove to sleeve groove edge when shifted to 6th gear

NOTE:
The indicator is installed upside down compared to the setting procedure of zero point. Add d1 [fixing value: 55 mm (2.17 in)] from the following figure to "D1", to obtain measurement value of "D1".



T mm (in)	Lot No. (Mark)		
	M.SFT Snap ring 805072010 [t = 1.65 mm (0.065 in)]	M.SFT Snap ring 805072011 [t = 1.95 mm (0.077 in)]	M.SFT Snap ring 805072012 [t = 2.25 mm (0.089 in)]
64.12 — 64.42 (2.5244 — 2.5362)	32945AA021 (None)	32945AA031 (2)	32945AA041 (4)
64.42 — 64.72 (2.5362 — 2.5480)	32945AA011 (1)	32945AA021 (None)	32945AA031 (2)
64.72 — 65.02 (2.5480 — 2.5598)	32945AA001 (3)	32945AA011 (1)	32945AA021 (None)

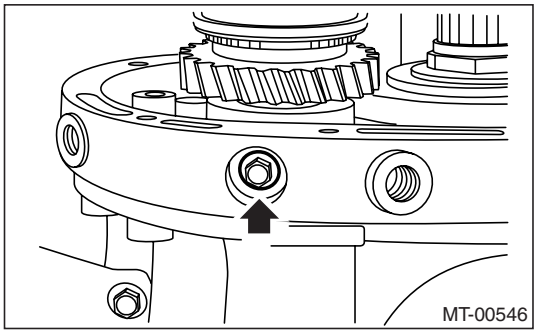
T = Thickness

4. SELECTION OF REVERSE FORK ROD

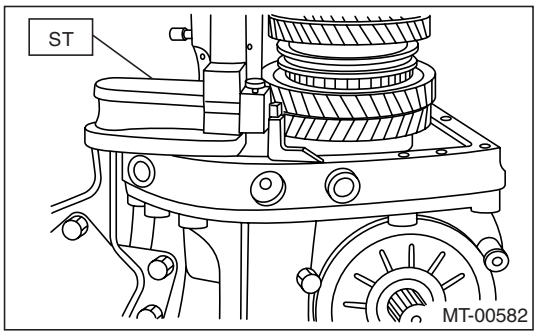
NOTE:
Perform the procedures below in the following cases.
- When replacing the reverse idler gear.
- When replacing the reverse idler gear No. 2.
- When replacing the adapter plate.
- When replacing the base.

1) Insert the reverse idler gear assembly in adapter plate.
2) Tighten the base COMPL fixing bolt.

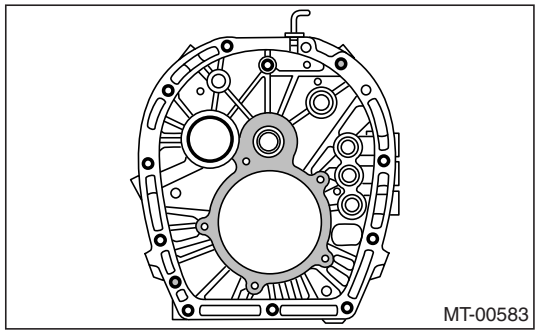
Tightening torque:
25 N·m (2.5 kgf-m, 18.4 ft-lb)



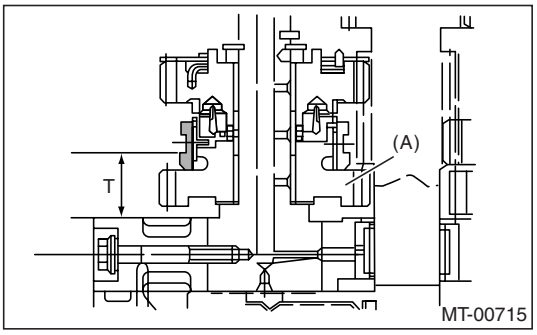
3) Set the height gauge to adapter plate. Lower the indicator of height gauge to mating surface of adapter plate and case, then set to zero point.
ST 18853AA000 HEIGHT GAUGE



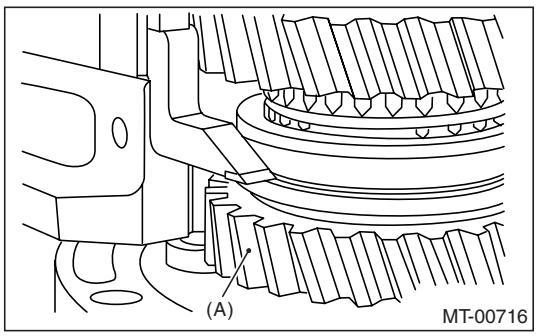
NOTE:
• Remove the remaining gasket on edge surface with scraper, since the adapter plate is base point of measurement.
• Do not place the height gauge on shaded area in the figure during the measurement.



4) Press the reverse sleeve to reverse side idler gear No. 2, then measure "T".

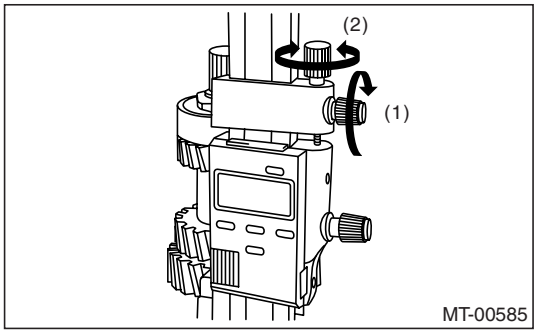


(A) Reverse idler gear No. 2.



(A) Reverse idler gear No. 2.

NOTE:
• Set the indicator of height gauge near measuring object, then lock the dial (1) as shown in the figure. Turn dial (2) to set the indicator to edge surface of reverse sleeve side.
• Measure five points of the sleeve turning every approx. 72°. Round off each two upper and lower measurement value. Use the remaining middle value as measurement value.



5) According to measurement, calculate the reverse sleeve neutral position. Select the fork rod, which applies to the calculated value from following calculation formula.
Calculation formula: T + 4.8 mm (0.189 in)

T + 4.8 mm (0.189 in) mm (in)	Lot No. (Mark)
33.50 — 33.80 (1.3189 — 1.3307)	32816AA110 (1)
33.80 — 34.10 (1.3307 — 1.3425)	32816AA130 (None)
34.10 — 34.40 (1.3425 — 1.3543)	32816AA140 (2)

T = Thickness

25.Clutch Housing

A: REMOVAL

1) Remove the manual transmission assembly from vehicle. <Ref. to 6MT-34, REMOVAL, Manual Transmission Assembly.>
2) Prepare the transmission for overhaul. <Ref. to 6MT-40, Preparation for Overhaul.>
3) Remove the oil pipe, neutral position switch, back-up light switch and harness. <Ref. to 6MT-42, REMOVAL, Oil Pipe.> <Ref. to 6MT-45, REMOVAL, Neutral Position Switch.> <Ref. to 6MT-43, REMOVAL, Back-up Light Switch.>
4) Remove the extension case. <Ref. to 6MT-47, REMOVAL, Extension Case.>
5) Remove the transfer driven gear. <Ref. to 6MT-58, REMOVAL, Transfer Driven Gear.>
6) Remove the center differential. <Ref. to 6MT-60, REMOVAL, Center Differential.>
7) Remove the oil pump. <Ref. to 6MT-61, REMOVAL, Oil Pump.>
8) Remove the transmission case. <Ref. to 6MT-64, REMOVAL, Transmission Case.>
9) Remove each gear assembly. <Ref. to 6MT-69, REMOVAL, Main Shaft Assembly.>
10) Remove the drive pinion shaft assembly. <Ref. to 6MT-96, REMOVAL, Drive Pinion Shaft Assembly.>
11) Remove the front differential assembly. <Ref. to 6MT-102, REMOVAL, Front Differential Assembly.>

B: INSTALLATION

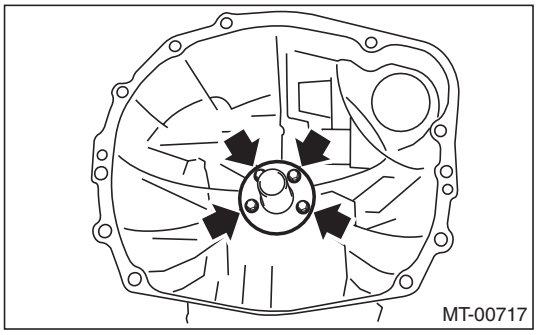
1) Install the pitching stopper bracket.

Tightening torque:
41 N·m (4.2 kgf-m, 30.2 ft-lb)

2) Install the front differential assembly. <Ref. to 6MT-103, INSTALLATION, Front Differential Assembly.>
3) Install the drive pinion shaft assembly. <Ref. to 6MT-96, INSTALLATION, Drive Pinion Shaft Assembly.>
4) Install each gear assembly at a time. <Ref. to 6MT-70, INSTALLATION, Main Shaft Assembly.>
5) Install the transmission case. <Ref. to 6MT-65, INSTALLATION, Transmission Case.>
6) Install the oil pump. <Ref. to 6MT-62, INSTALLATION, Oil Pump.>
7) Install the center differential. <Ref. to 6MT-60, INSTALLATION, Center Differential.>
8) Install the transfer driven gear. <Ref. to 6MT-58, INSTALLATION, Transfer Driven Gear.>
9) Install the extension case. <Ref. to 6MT-47, INSTALLATION, Extension Case.>
10) Install the oil pipe, neutral position switch, back-up light switch and harness. <Ref. to 6MT-42, INSTALLATION, Oil Pipe.> <Ref. to 6MT-45, INSTALLATION, Neutral Position Switch.> <Ref. to 6MT-43, INSTALLATION, Back-up Light Switch.>
11) Install the manual transmission assembly into vehicle. <Ref. to 6MT-36, INSTALLATION, Manual Transmission Assembly.>

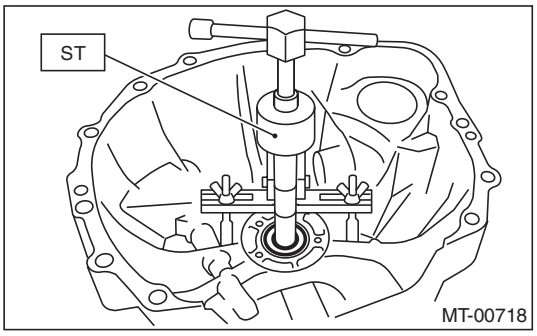
C: DISASSEMBLY

1) Remove the clutch release bearing guide.



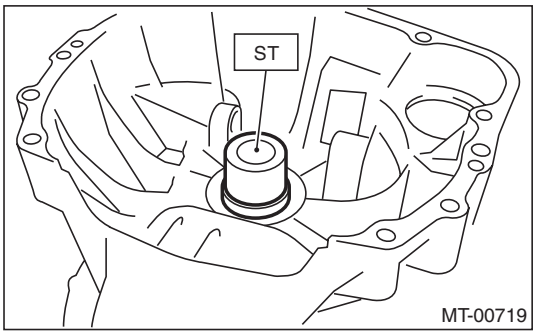
2) Remove the oil seal.
ST 398527700 PULLER ASSY

NOTE:
Use a new oil seal.



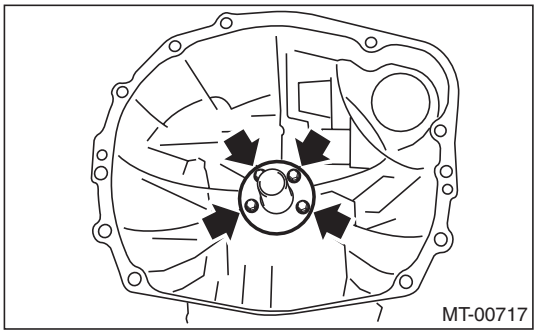
D: ASSEMBLY

1) Install the oil seal into clutch housing without damaging.
ST 399513600 INSTALLER



2) Install the clutch release bearing guide.

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



E: INSPECTION

1) Check there is no damage or crack on clutch housing. Replace the clutch housing with a new one if there is excessive damage.
2) Check the clutch housing for gear oil leakage. If there is oil leakage, repair or replace the leakage part.

26. General Diagnostic Table

A: INSPECTION

1. MANUAL TRANSMISSION

Symptom	Possible cause	Corrective action
1. Gears are difficult to intermesh. NOTE: The cause for difficulty in shifting gears can be classified into two kinds. One is defective gear shift system and the other is defective 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 slip-out. • Gear slips out when coasting on rough road. • Gear slips out during acceleration.	(a) Defective pitching stopper	Adjust.
	(b) Loose engine mounting bolts	Tighten or replace.
	(c) Worn fork shifter, broken shifter fork rail spring	Replace.
	(d) Worn or damaged ball bearing	Replace.
	(e) Excessive clearance between splines of synchronizer hub and synchronizer sleeve	Replace.
	(f) Worn tooth step of synchronizer hub (responsible for slip-out of 3rd gear)	Replace.
	(g) Worn 1st driven gear, needle bearing and race	Replace.
	(h) Worn 2nd driven gear, needle bearing and race	Replace.
	(i) Worn 3rd drive gear and bushing	Replace.
	(j) Worn 4th drive gear and bushing	Replace.
	(k) Worn 5th drive gear and bushing	Replace.
	(l) Worn 6th drive gear and bushing	Replace.
	(m) Worn reverse idler gear and bushing	Replace.
3. Noise emits from the transmission. NOTE: If noise is heard when the vehicle is parked with its engine idling and if a noise ceases when the clutch is disengaged, it may be considered that the noise comes from the transmission.	(a) Insufficient or improper lubrication	Lubricate with specified oil or replace.
	(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	Corrective action
1. Broken differential (case, gear, bearing, etc.) NOTE: Noise will be developed and finally it will become impossible to continue to run due to broken pieces obstructing the gear revolution.	(a) Insufficient or improper oil	Disassemble differential and replace broken components. At the same time check other components for any trouble, and replace if necessary.
	(b) Use of vehicle under severe conditions such as excessive load and improper use of clutch	Readjust bearing preload and backlash and face contact of gears.
	(c) Improper adjustment of taper roller bearing	Adjust.
	(d) Improper adjustment of drive pinion and hypoid driven gear	Adjust.
	(e) Loose hypoid driven gear tightening 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 trouble. However noises from the engine, muffler, tire, exhaust gas, bearing, body, etc. are easily mistaken for the differential noise. Pay special attention to the hypoid gear noise because it is easily confused with other gear noises. There are the following four kinds of noises. • Gear noise when driving: If noise increases as the vehicle speed increases it may be due to insufficient gear oil, incorrect gear engagement, damaged gears, etc. • Gear noise when coasting: Damaged gears due to maladjusted bearings and incorrect shim adjustment. • Bearing noise when driving or coasting: Cracked, broken or rusty bearings • Noise mainly when turning: Noise occurs form differential side gear, differential pinion or differential pinion shaft, etc.	(a) Insufficient oil	Lubricate.
	(b) Improper adjustment of hypoid driven gear and drive pinion	Check tooth contact.
	(c) Worn teeth of hypoid driven gear and drive pinion	Replace as a set. Readjust bearing preload.
	(d) Loose roller bearing	Readjust hypoid driven gear to drive pinion backlash and check tooth contact.
	(e) Distorted hypoid driven gear or differential case	Replace.

CLUTCH SYSTEM

CL

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1. General Description

A: SPECIFICATION

Option code★1			EC, EK, KA		KS, K4	
Model			2.0 L	2.5 L	2.0 L	2.5 L
Clutch cover	Diaphragm set load	N (kgf, lbf)	5,390 (550, 1,212)		4,410 (450, 991)	5,684 (580, 1,278)
Clutch disc	Facing material		Woven			
	Outer diameter × Inner diameter × Thickness	mm (in)	228 × 155 × 2.9 (9.00 × 6.10 × 0.1161)		225 × 150 × 3.5 (8.86 × 5.91 × 0.138)	
	Spline outer diameter	mm (in)	25.2 (0.992)			
	Depth of rivet head mm (in)	Standard	1.3 — 1.9 (0.051 — 0.075)			
		Limit of sinking	0.3 (0.012)			
	Limit for deflection	mm (in)	1.0 (0.039) at R = 110 (4.33)			
Clutch release lever ratio			1.6			
Release bearing			Grease-packed self-aligning			
Clutch pedal	Full stroke	mm (in)	130 — 135 (5.12 — 5.31)			
	Free play	mm (in)	4 — 13 (0.16 — 0.51)			
Flywheel	Type		Dual mass		Flexible	

★1: For option code, refer to “ID” section. <Ref. to ID-5, MODEL NUMBER PLATE, IDENTIFICATION, Identification.>

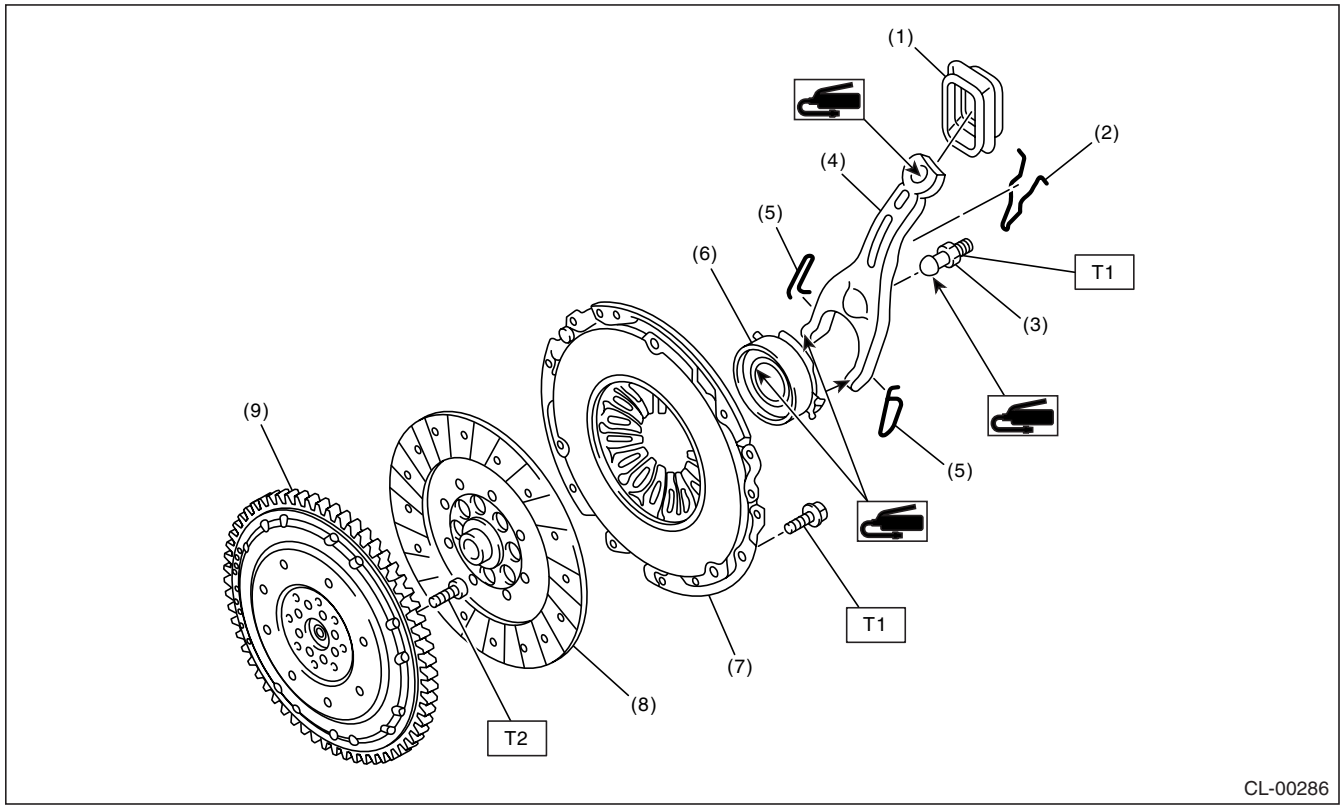
Option code★1			KA	—
Model			2.0 L DOHC turbo	3.0 L
Clutch cover	Diaphragm set load	N (kgf, lbf)	8,820 (900, 1,983)	6,770 (690, 1,522)
Clutch disc	Facing material		Woven	
	Outer diameter × Inner diameter × Thickness	mm (in)	240 × 155 × 3.2 (9.45 × 6.10 × 0.13)	Flywheel side: 240 × 160 × 3.2 (9.45 × 6.30 × 0.126) Clutch cover side: 240 × 160 × 3.5 (9.45 × 6.30 × 0.138)
	Spline outer diameter	mm (in)	25.2 (0.992)	
	Depth of rivet head mm (in)	Standard	1.3 — 1.9 (0.051 — 0.075)	Flywheel side: 1.35 — 1.95 (0.053 — 0.077) Clutch cover side: 1.65 — 2.25 (0.065 — 0.089)
		Limit of sinking	0.3 (0.012)	
	Limit for deflection	mm (in)	1.0 (0.039) at R = 110 (4.33)	
Clutch release lever ratio			1.6	1.7
Release bearing			Grease-packed self aligning	
Clutch pedal	Full stroke	mm (in)	135 — 140 (5.31 — 5.51)	130 — 135 (5.12 — 5.31)
	Free play	mm (in)	4 — 13 (0.16 — 0.51)	
Flywheel	Type		Dual mass	Conventional

★1: For option code, refer to “ID” section. <Ref. to ID-5, MODEL NUMBER PLATE, IDENTIFICATION, Identification.>

B: COMPONENT

1. CLUTCH ASSEMBLY

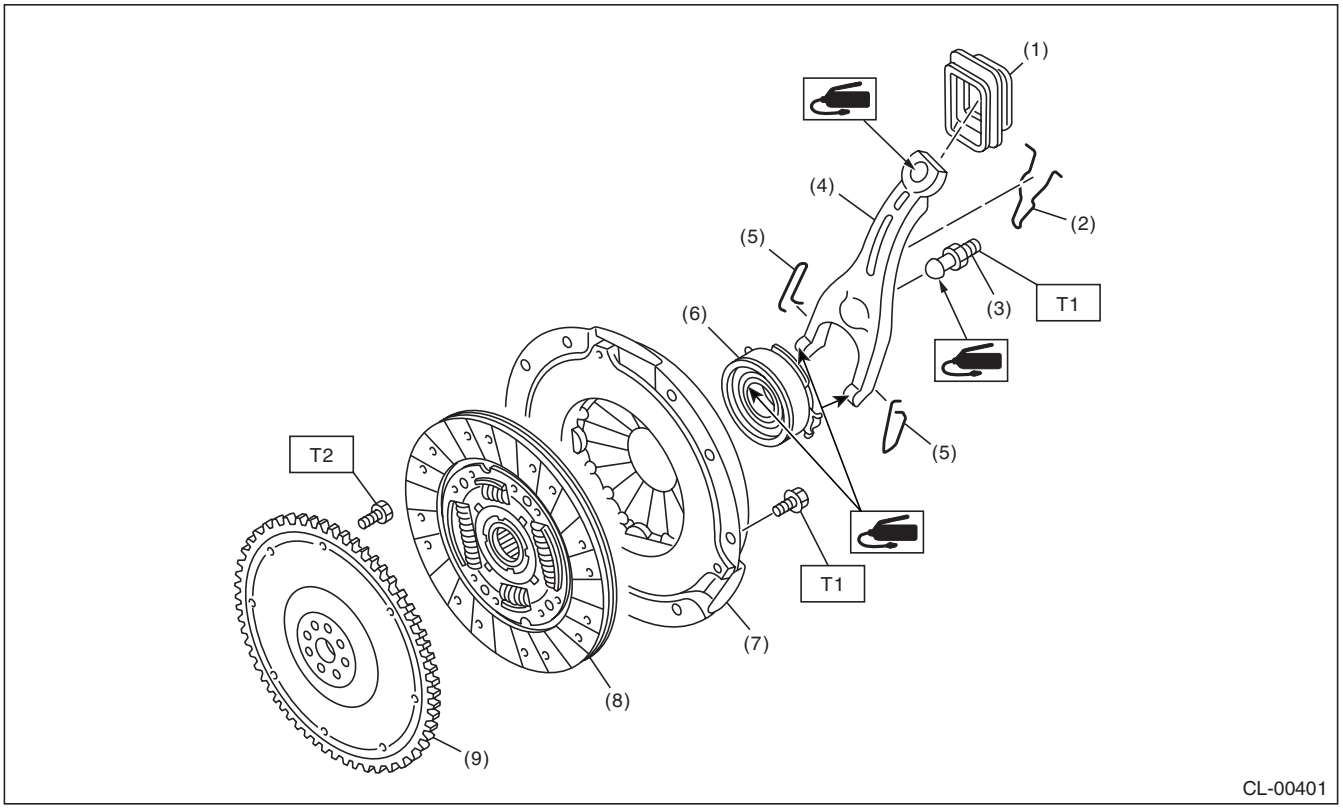
- 5MT EC, EK and KA model (Non-turbo model)



(1) Dust cover
(2) Lever spring
(3) Pivot
(4) Release lever
(5) Clip
(6) Release bearing
(7) Clutch cover
(8) Clutch disc
(9) Dual mass flywheel

Tightening torque: N·m (kgf-m, ft-lb)
T1: 16 (1.6, 11.8)
T2: 72 (7.3, 52.8)

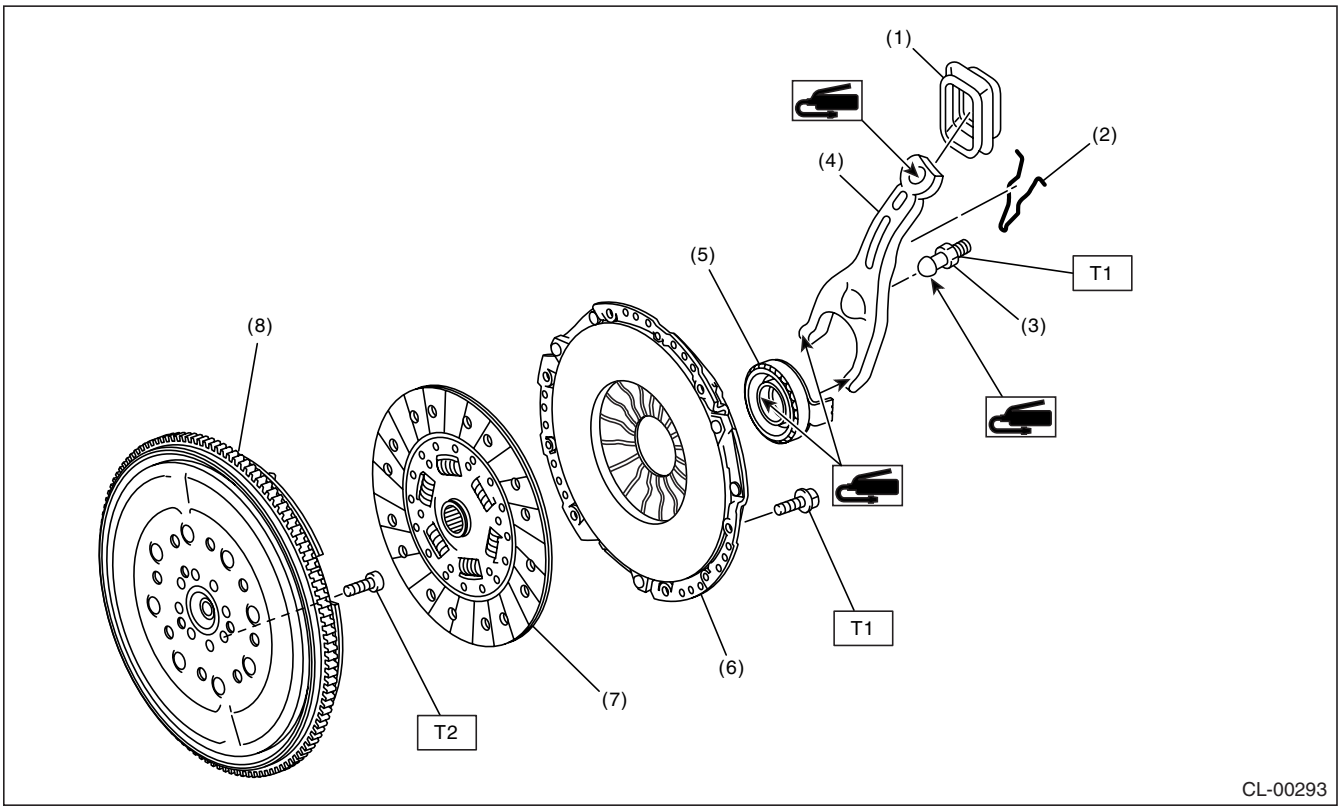
- 5MT KS and K4 model (Non-turbo model)



(1) Dust cover
(2) Lever spring
(3) Pivot
(4) Release lever
(5) Clip
(6) Release bearing
(7) Clutch cover
(8) Clutch disc
(9) Flexible flywheel

Tightening torque: N·m (kgf-m, ft-lb)
T1: 16 (1.6, 11.8)
T2: 72 (7.3, 52.8)

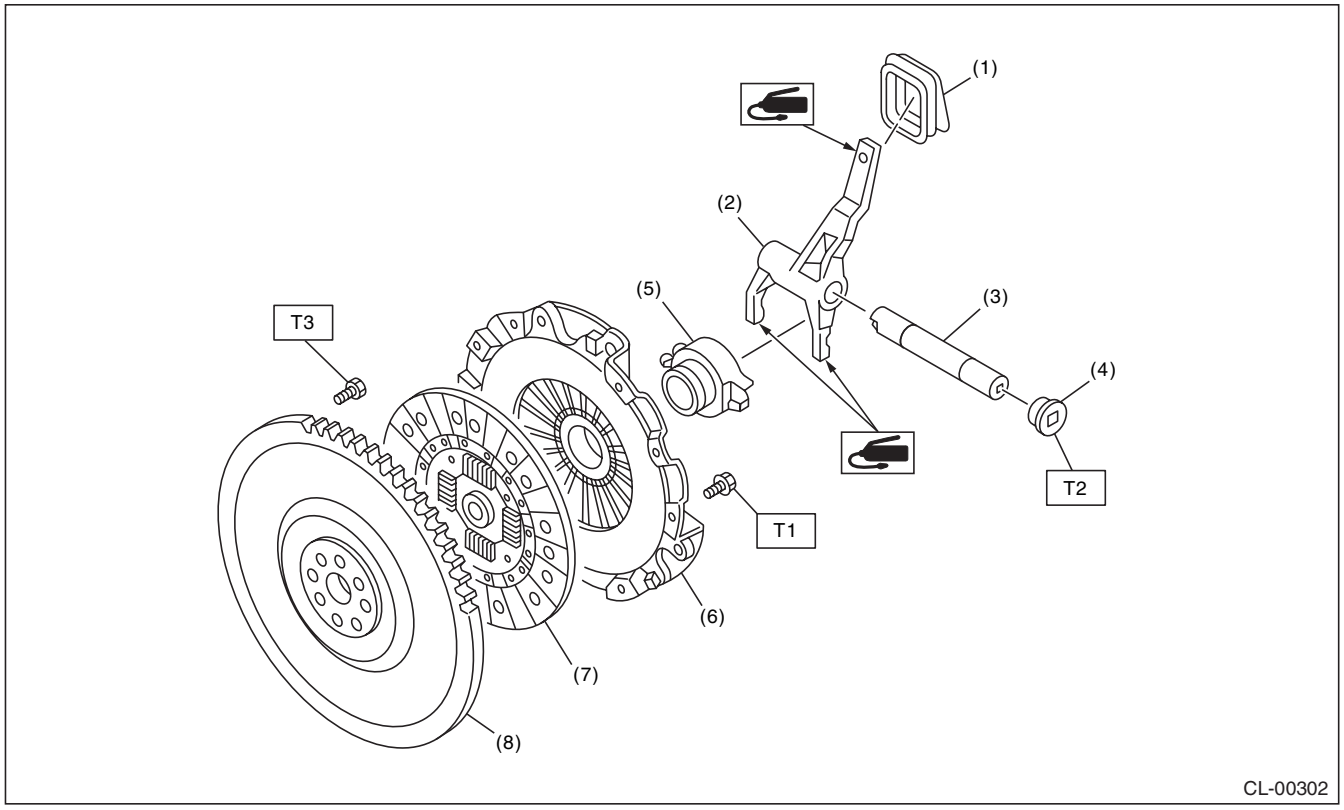
- 5MT Turbo model



(1) Dust cover
(2) Lever spring
(3) Pivot
(4) Release lever
(5) Release bearing
(6) Clutch cover
(7) Clutch disc
(8) Dual mass flywheel

Tightening torque: N·m (kgf-m, ft-lb)
T1: 16 (1.6, 11.8)
T2: 72 (7.3, 52.8)

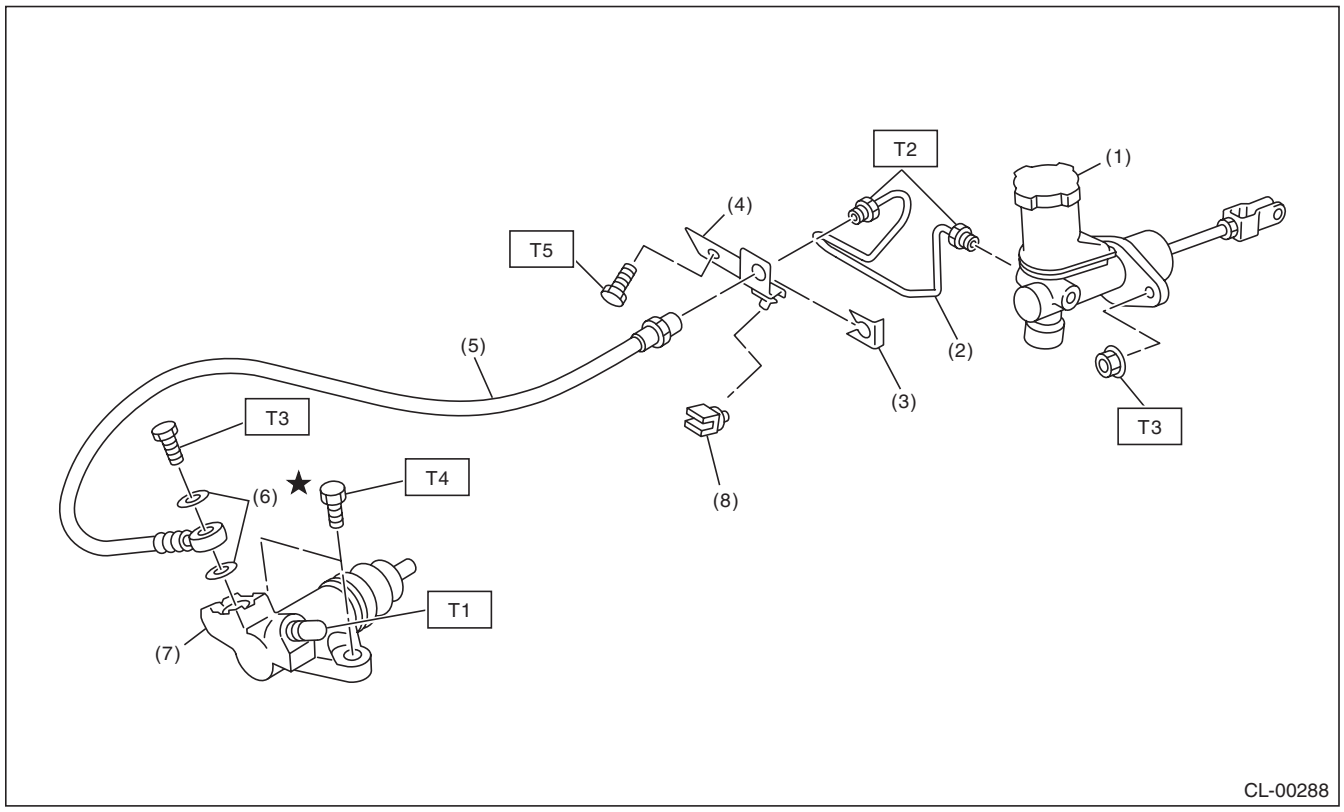
- 6MT model



(1)	Dust cover	(5)	Release bearing	***Tightening torque: N·m (kgf-m, ft-lb)***
(2)	Release lever	(6)	Clutch cover	***T1: 16 (1.6, 11.8)***
(3)	Release shaft	(7)	Clutch disc	***T2: 44 (4.5, 32.5)***
(4)	Plug	(8)	Flywheel	***T3: 81 (8.2, 59.4)***

2. CLUTCH PIPE AND HOSE

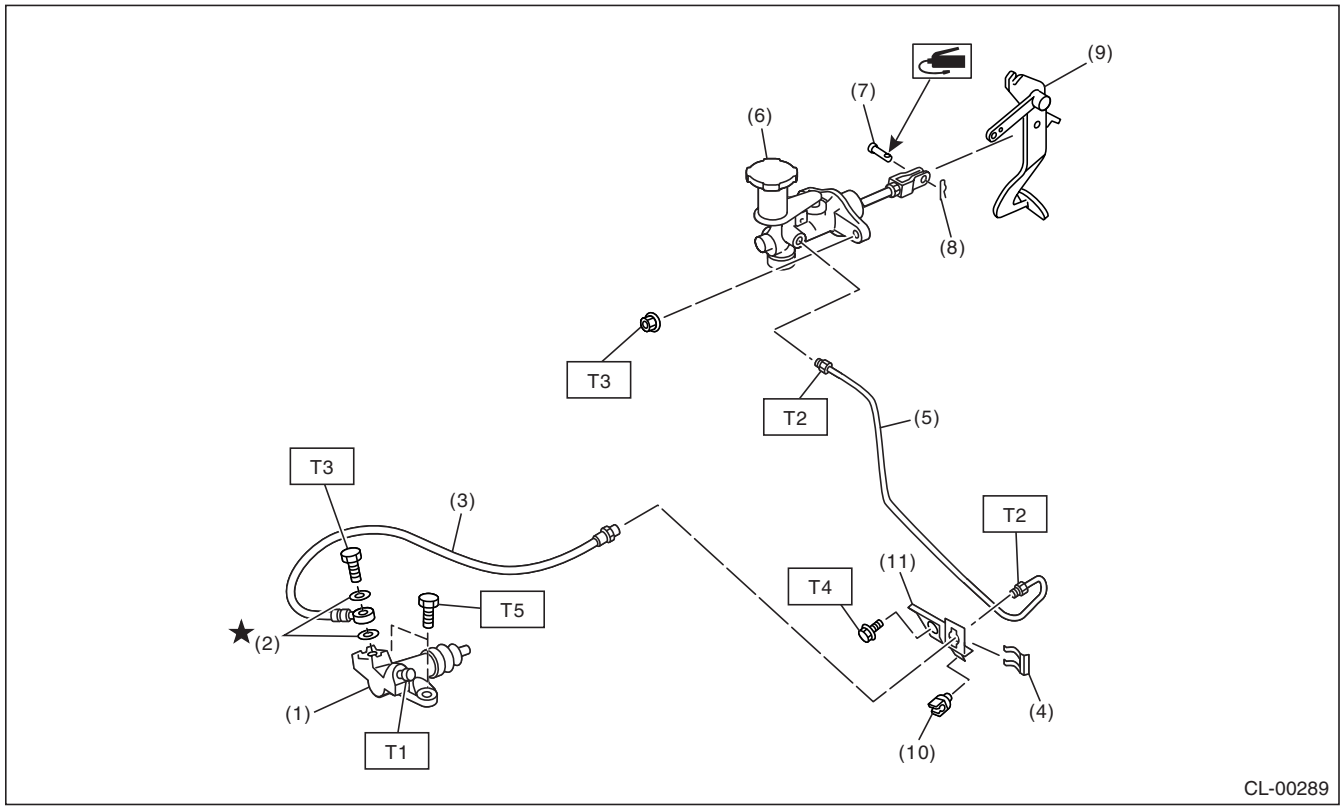
- 5MT LHD model



(1)	Master cylinder ASSY	(7)	Operating cylinder
(2)	Clutch pipe	(8)	Clip
(3)	Clamp		
(4)	Bracket		
(5)	Clutch hose		
(6)	Washer		

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, 18.4)

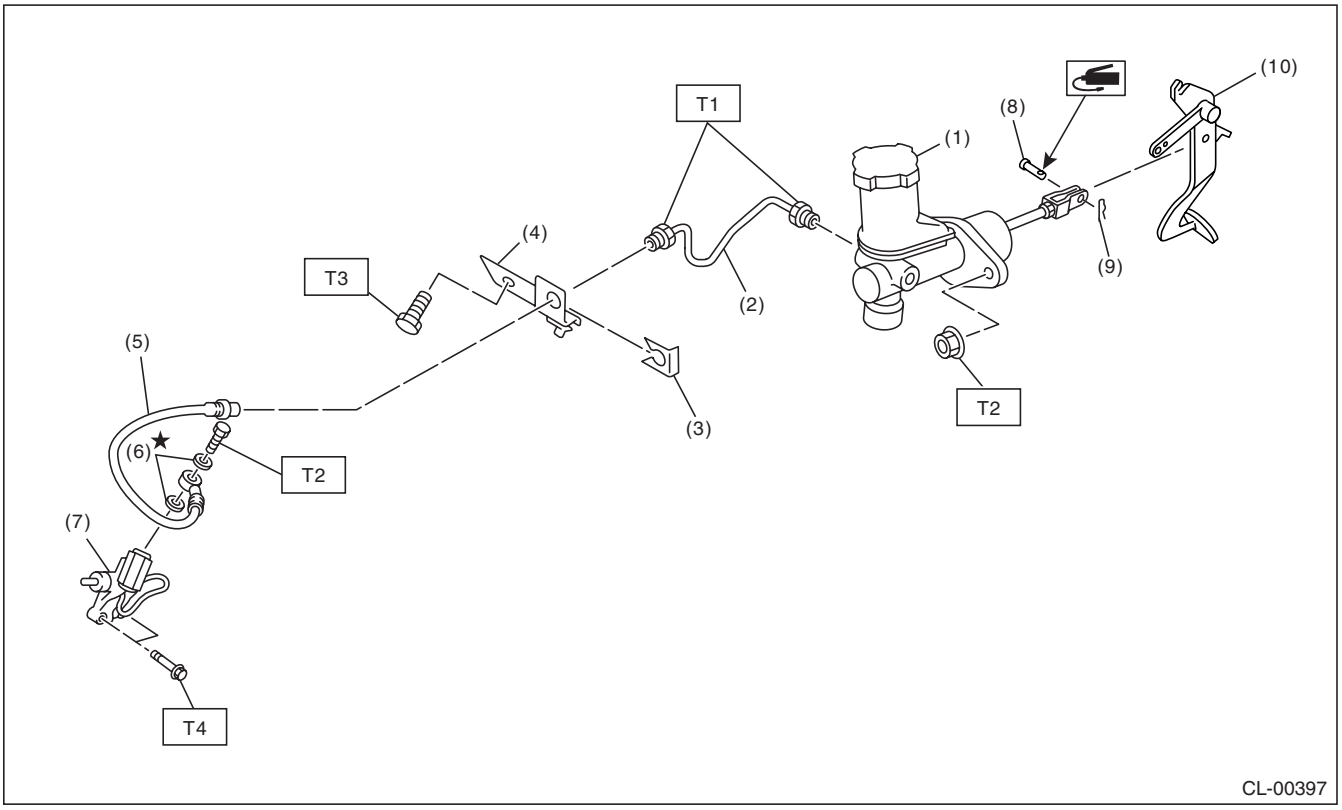
- 5MT RHD model



(1)	Operating cylinder	(7)	Clevis pin
(2)	Washer	(8)	Snap pin
(3)	Clutch hose	(9)	Pedal
(4)	Clamp	(10)	Clip
(5)	Clutch pipe	(11)	Bracket
(6)	Master cylinder ASSY		

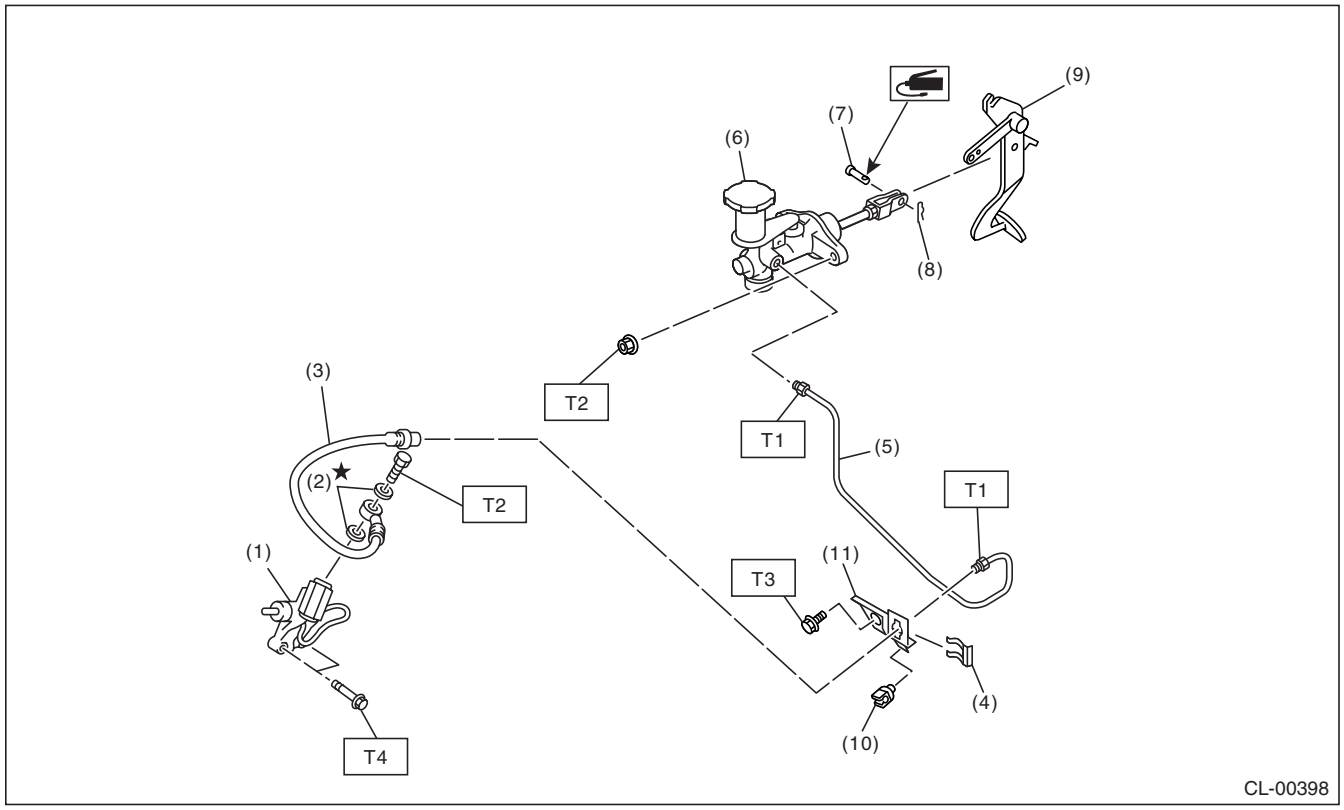
Tightening torque: N·m (kgf-m, ft-lb)
T1: 8 (0.8, 5.8)
T2: 15 (1.5, 10.8)
T3: 18 (1.8, 13.0)
T4: 25 (2.5, 18.4)
T5: 37 (3.8, 27.5)

• 6MT LHD model



(1)	Master cylinder ASSY	(6)	Washer	***Tightening torque: N·m (kgf-m, ft-lb)***
(2)	Clutch pipe	(7)	Operating cylinder	***T1: 15 (1.5, 10.8)***
(3)	Clamp	(8)	Clevis pin	***T2: 18 (1.8, 13.0)***
(4)	Bracket	(9)	Snap pin	***T3: 25 (2.5, 18.4)***
(5)	Clutch hose	(10)	Pedal	***T4: 41 (4.2, 30.2)***

- 6MT RHD model

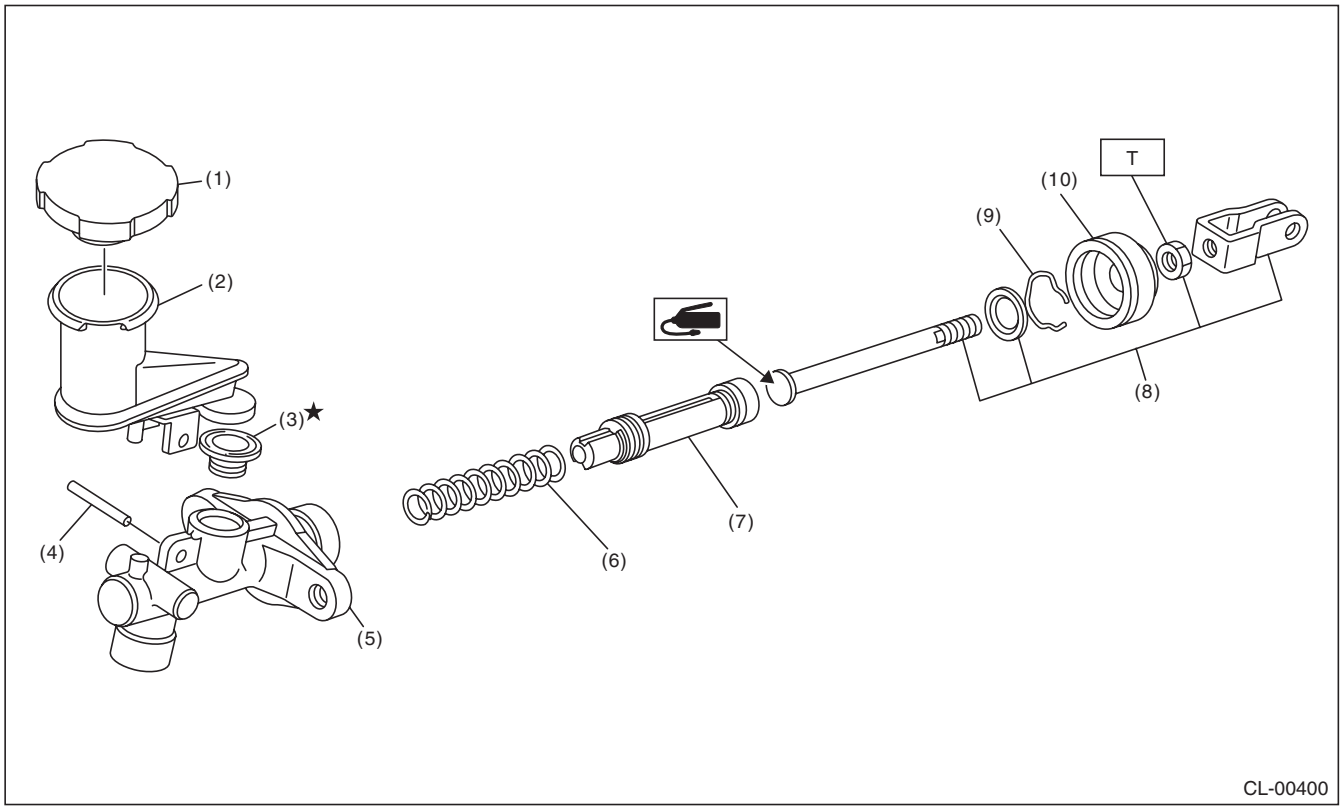


(1) Operating cylinder
(2) Washer
(3) Clutch hose
(4) Clamp
(5) Clutch pipe
(6) Master cylinder ASSY
(7) Clevis pin
(8) Snap pin
(9) Pedal
(10) Clip
(11) Bracket

Tightening torque: N·m (kgf-m, ft-lb)
T1: 15 (1.5, 10.8)
T2: 18 (1.8, 13.0)
T3: 25 (2.5, 18.4)
T4: 41 (4.2, 30.2)

3. MASTER CYLINDER

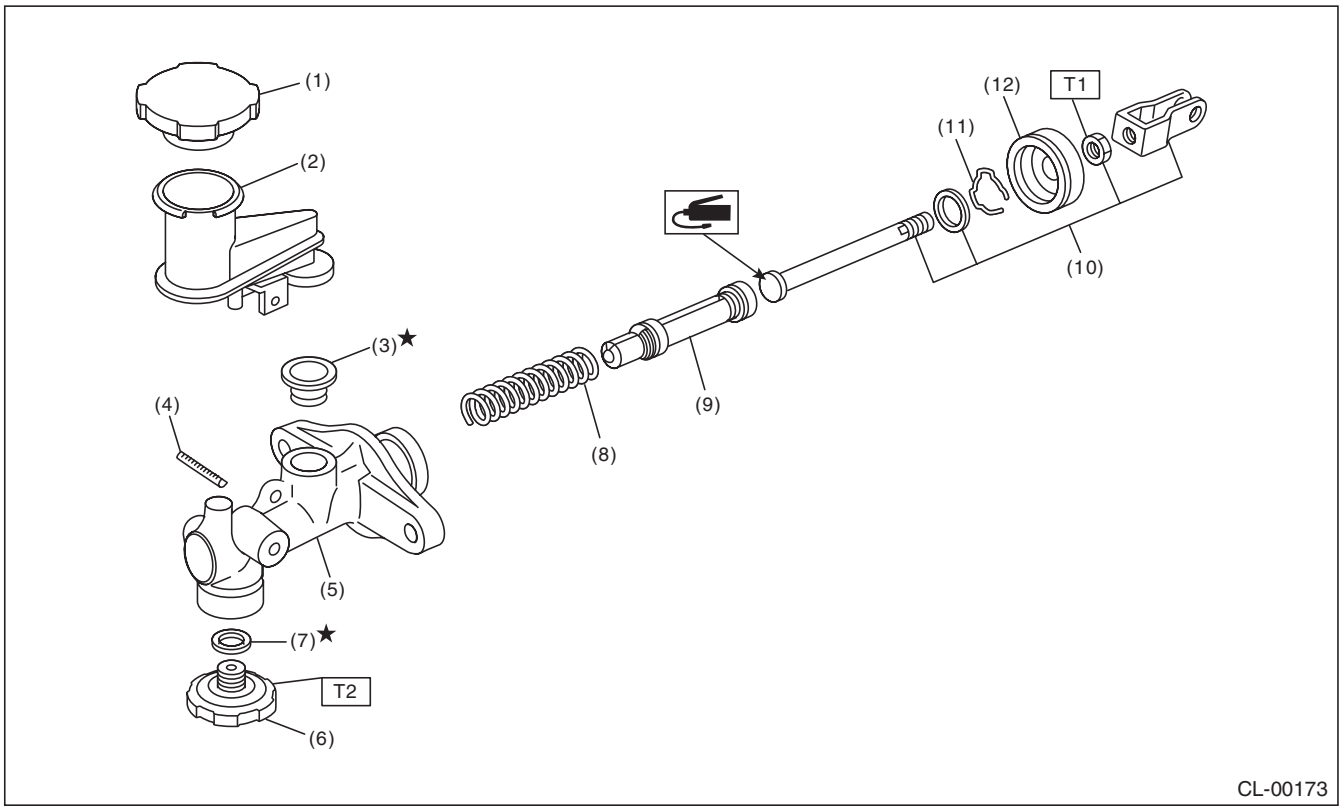
- 5MT Non-turbo model



(1)	Reservoir cap	(6)	Return spring
(2)	Reservoir tank	(7)	Piston
(3)	Oil seal	(8)	Push rod ASSY
(4)	Straight pin	(9)	Piston stop ring
(5)	Master cylinder	(10)	Cylinder boot

Tightening torque: N·m (kgf-m, ft-lb)
T: 10 (1.0, 7.4)

- 5MT Turbo model and 6MT model

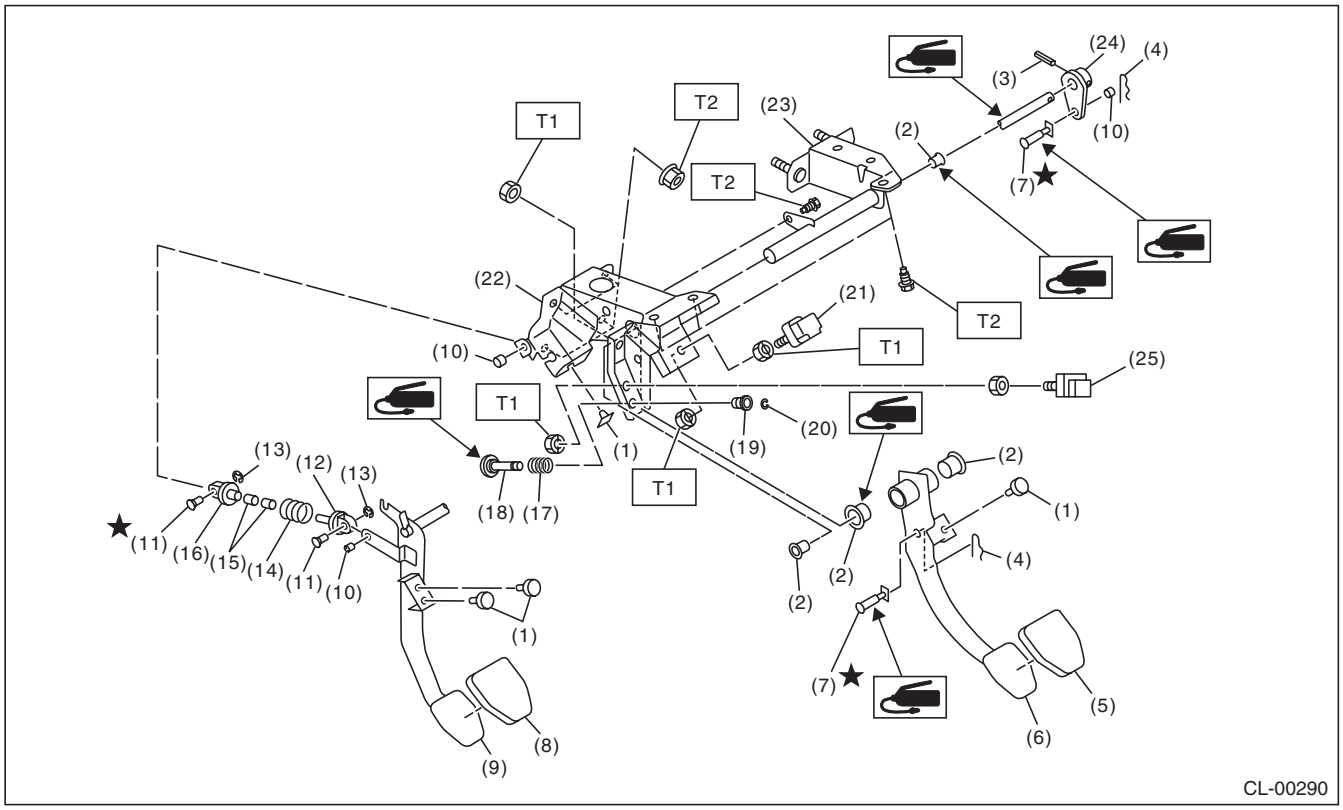


(1)	Reservoir cap	(7)	Gasket
(2)	Reservoir tank	(8)	Return spring
(3)	Oil seal	(9)	Piston
(4)	Straight pin	(10)	Push rod
(5)	Master cylinder	(11)	Piston stop ring
(6)	Clutch damper	(12)	Cylinder boot

Tightening torque: N·m (kgf-m, ft-lb)
T1: 10 (1.0, 7.4)
T2: 46.6 (4.75, 34.4)

4. CLUTCH PEDAL

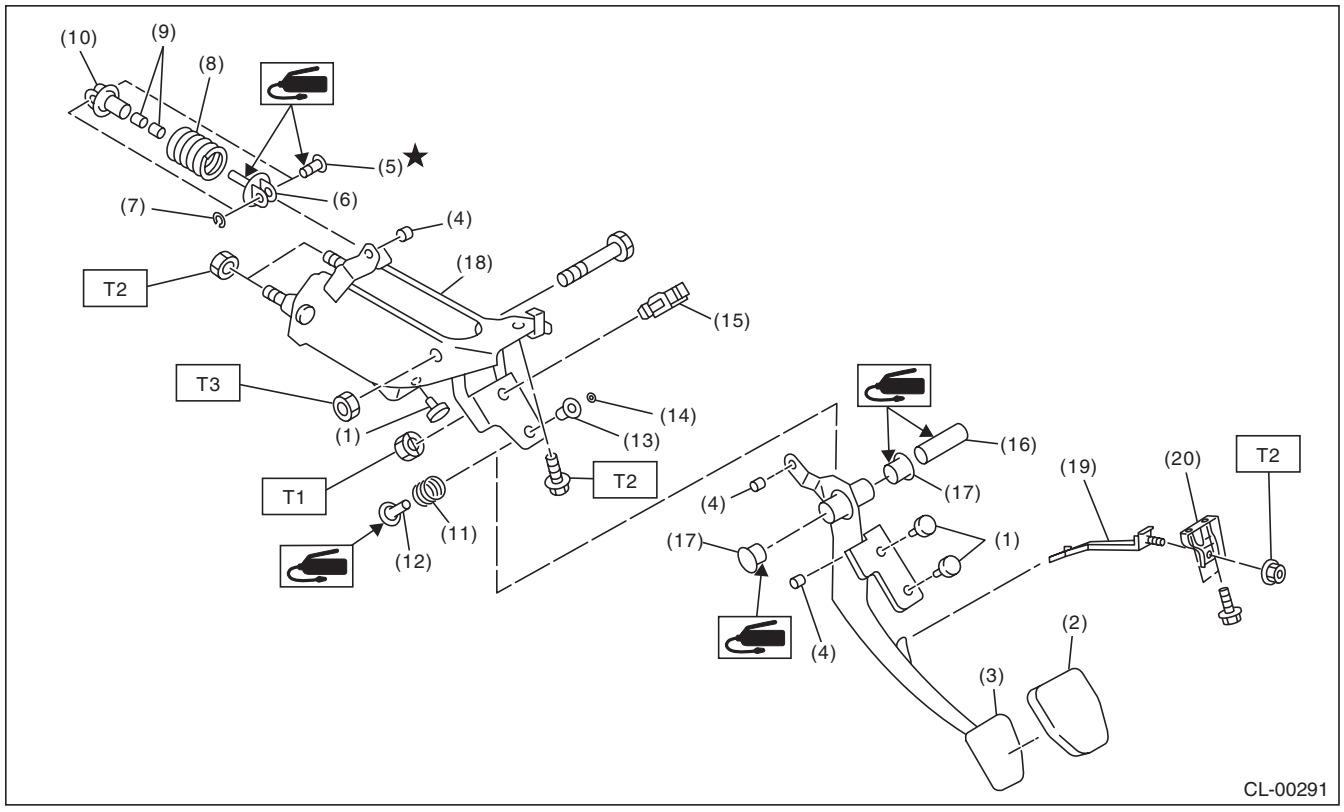
• LHD model



(1) Stopper
(2) Bushing
(3) Spring pin
(4) Snap pin
(5) Brake pedal pad
(6) Brake pedal
(7) Clevis pin
(8) Clutch pedal pad
(9) Clutch pedal
(10) Bushing C
(11) Clutch clevis pin
(12) Assist rod A
(13) Clip
(14) Assist spring
(15) Assist bushing
(16) Assist rod B
(17) Spring A (EC and 2.5 L model)
(18) Rod (EC and 2.5 L model)
(19) Bushing B (EC and 2.5 L model)
(20) Clip (EC and 2.5 L model)
(21) Stop light switch
(22) Pedal bracket
(23) Clutch master cylinder bracket
(24) Lever
(25) Clutch switch

Tightening torque: N·m (kgf-m, ft-lb)
T1: 8 (0.8, 5.8)
T2: 18 (1.8, 13.0)

• RHD model



(1) Stopper
(2) Clutch pedal pad
(3) Clutch pedal
(4) Bushing C
(5) Clutch clevis pin
(6) Assist rod A
(7) Clip
(8) Assist spring
(9) Assist bushing
(10) Assist rod B
(11) Spring A
(12) Rod S
(13) Bushing B
(14) Clip
(15) Clutch switch
(16) Spacer
(17) Bushing
(18) Clutch pedal bracket
(19) Clutch pedal catcher
(20) Bracket (Clutch pedal catcher)

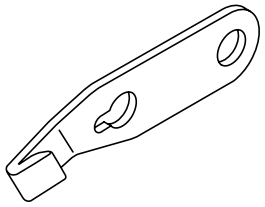
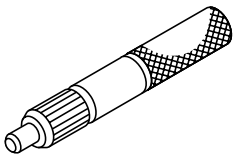
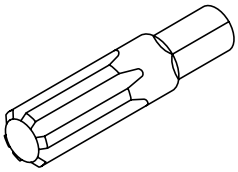
Tightening torque: N·m (kgf-m, ft-lb)
T1: 8 (0.8, 5.8)
T2: 18 (1.8, 13.0)
T3: 30 (3.1, 22.4)

C: CAUTION

• Wear work 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 and dirt.
• Before removal, installation or disassembly, be sure to clarify the failure. Avoid unnecessary removal, installation, disassembly and replacement.
• Be careful not to burn yourself, because each part on the vehicle is hot after running.
• Use SUBARU genuine fluid, grease etc. or 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 rigid racks 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 in a vise, place cushioning material such as wood blocks, aluminum plate or 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 TOOL

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 for installing clutch disc to flywheel.
 ST-499057000	499057000	TORX PLUS®	Used for removing flywheel (dual mass flywheel type).

2. GENERAL TOOL

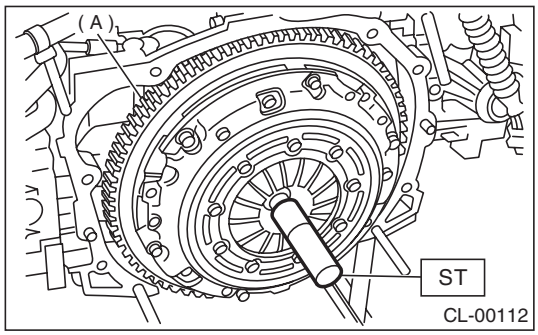
TOOL NAME	REMARKS
Circuit tester	Used for measuring resistance, voltage and ampere.
Dial gauge	Used for measuring clutch disc run-out.
Depth gauge	Used for measuring wear of clutch disc.

2. Clutch Disc and Cover

A: REMOVAL

1. 5MT EC, EK AND KA MODEL

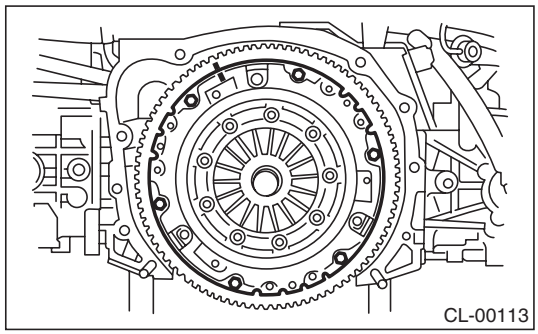
1) Remove the transmission assembly from vehicle. <Ref. to 5MT-30, REMOVAL, Manual Transmission Assembly.>
2) Insert the ST to flywheel.
ST 499747100 CLUTCH DISC GUIDE



(A) Dual mass flywheel

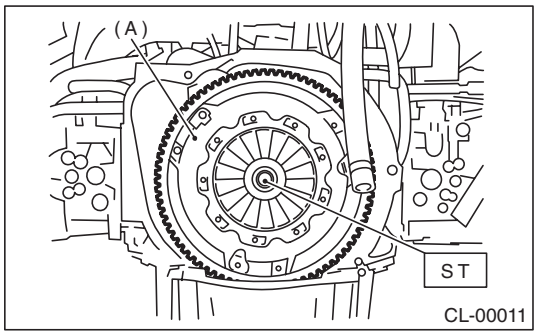
3) Remove the clutch cover and clutch disc.

NOTE:
• Take care not to allow oil on the clutch disc facing.
• Do not disassemble the clutch cover or clutch disc.
• Be sure to put alignment marks on the flywheel and clutch cover before removing clutch cover.



2. 5MT KS, K4, TURBO MODEL AND 6MT MODEL

1) Remove the transmission assembly from vehicle. <Ref. to 5MT-30, REMOVAL, Manual Transmission Assembly.> <Ref. to 6MT-34, REMOVAL, Manual Transmission Assembly.>
2) Install the ST to flywheel.
ST 499747100 CLUTCH DISC GUIDE



(A) Clutch cover

3) Remove the clutch cover and clutch disc.

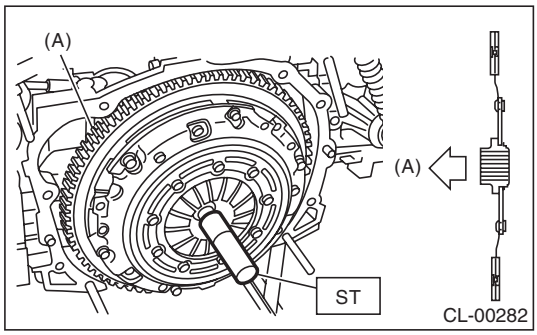
NOTE:
• Take care not to allow oil on the clutch disc facing.
• Do not disassemble the clutch cover or clutch disc.

B: INSTALLATION

1. 5MT EC, EK AND KA MODEL

1) Insert the ST into clutch disc, and install on the flywheel by inserting the ST end into pilot bearing.

NOTE:
When installing the clutch disc, be careful to its direction.
ST 499747100 CLUTCH DISC GUIDE



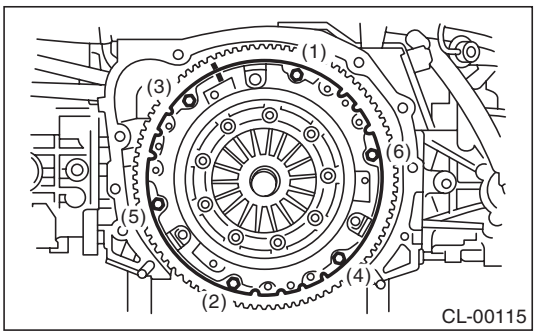
(A) Flywheel side

2) Install the clutch cover on flywheel and tighten bolts to the specified torque.

NOTE:
• When installing the clutch cover on the flywheel, position the clutch cover so that there is a gap of 120° or more between the paint marks " ● " on the flywheel and clutch cover. (the paint marks " ● " indicate the directions of residual unbalance.)
• Note the front and rear of the clutch disc when installing.

• Tighten the clutch cover installing bolts gradually. Each bolt should be tightened to the specified torque in a crisscross order.

Tightening torque:
16 N·m (1.6 kgf-m, 11.8 ft-lb)

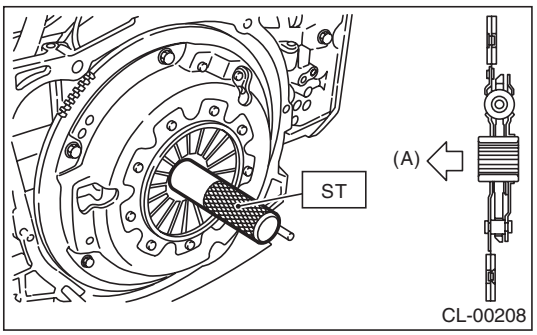


3) Remove the ST.
ST 499747100 CLUTCH DISC GUIDE
4) Install the transmission assembly. <Ref. to 5MT-32, INSTALLATION, Manual Transmission Assembly.>

2. 5MT KS, K4, TURBO MODEL AND 6MT MODEL

1) Insert the ST into clutch disc, and install on the flywheel by inserting the ST end into pilot bearing.

NOTE:
When installing the clutch disc, be careful to its direction.
ST 499747100 CLUTCH DISC GUIDE



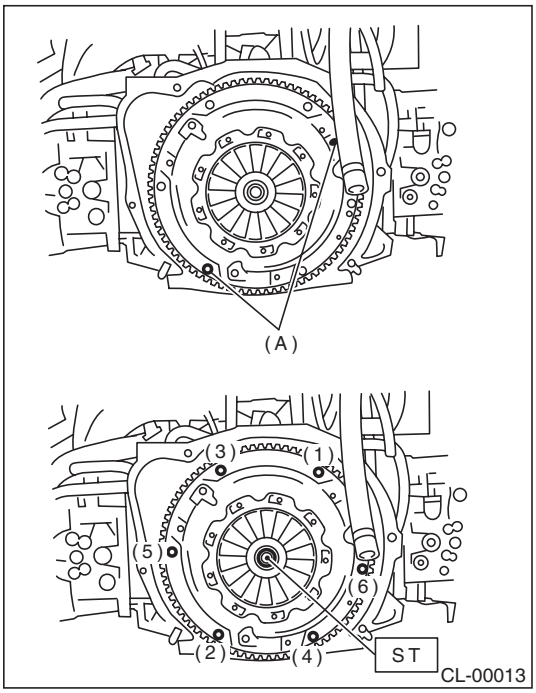
(A) Flywheel side

2) Install the clutch cover on flywheel and tighten the bolts to the specified torque.

NOTE:
• When installing the clutch cover on the flywheel, position the clutch cover so that there is a gap of 120° or more between the paint marks " ● " on the flywheel and clutch cover. (the paint marks " ● " indicate the directions of residual unbalance.)
• Note the front and rear of the clutch disc when installing.

• Temporarily tighten the bolts by hand. Each bolt should be tightened to the specified torque in a crisscross order.

Tightening torque:
16 N·m (1.6 kgf-m, 11.8 ft-lb)



(A) "0" mark

3) Remove the ST.
ST 499747100 CLUTCH DISC GUIDE
4) Install the transmission assembly. <Ref. to 5MT-32, INSTALLATION, Manual Transmission Assembly.> <Ref. to 6MT-36, INSTALLATION, Manual Transmission Assembly.>

C: INSPECTION

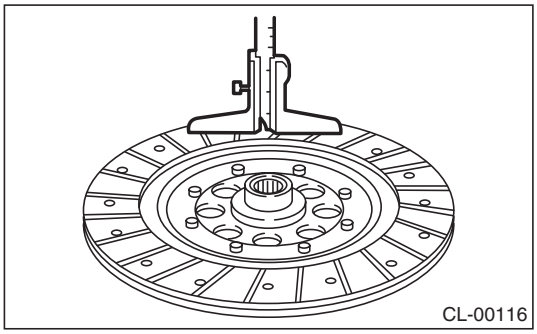
1. CLUTCH DISC

1) Wear of facing:
Measure the depth from the surface of facing to rivet head. Replace if the facings are worn locally or worn down to less than the specified value.

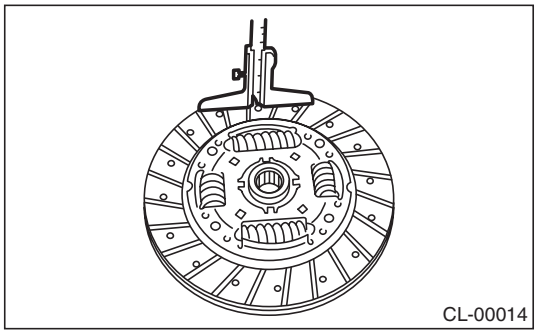
Depth of rivet head:
Limit of sinking
0.3 mm (0.012 in)

NOTE:
Do not wash the clutch disc with any cleaning fluid.

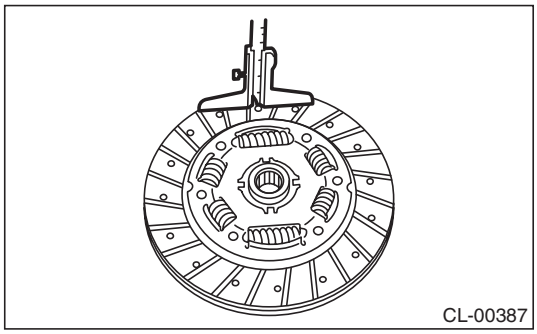
• 5MT EC, EK and KA model



• 5MT KS, K4 model and 6MT model



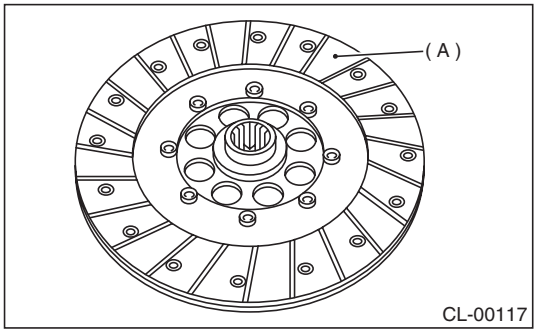
• 5MT turbo model



2) Hardened facing
Replace the clutch disc.

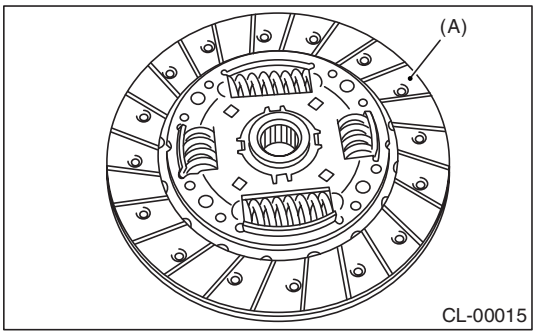
3) Oil leakage on facing
Replace the clutch disc, and inspect the transmission front oil seal, transmission case mating surface, engine rear oil seal and other points for oil leakage.

• 5MT EC, EK and KA model



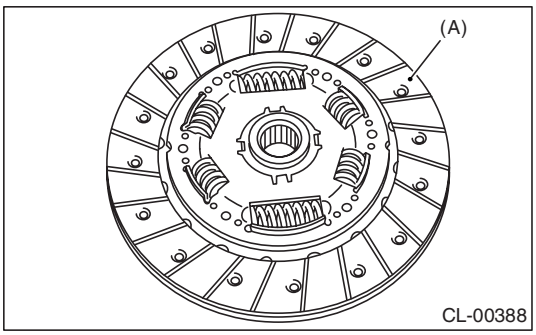
(A) Clutch facing

• 5MT KS, K4 model and 6MT model



(A) Clutch facing

• 5MT turbo model

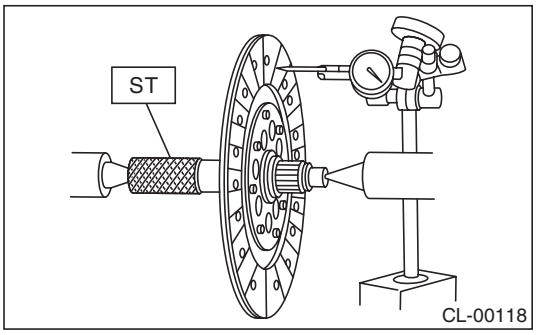


(A) Clutch facing

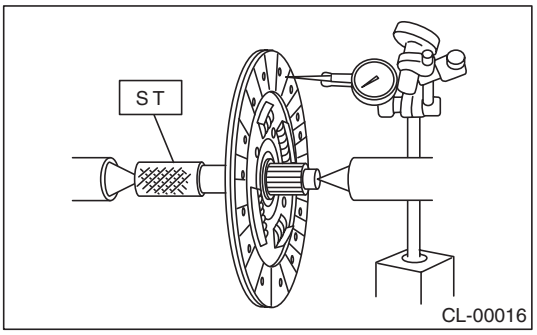
4) Deflection on facing
If the deflection at the outer circumference of facing exceeds the specified value, replace the clutch disc.
ST 499747100 CLUTCH DISC GUIDE

Limit for deflection:
1.0 mm (0.039 in) at R = 110 mm (4.33 in)

- 5MT EC, EK and KA model

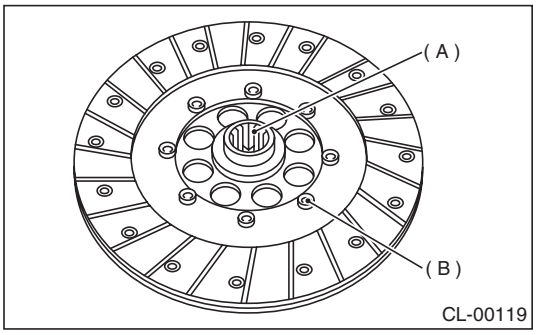


- 5MT KS, K4, turbo model and 6MT model



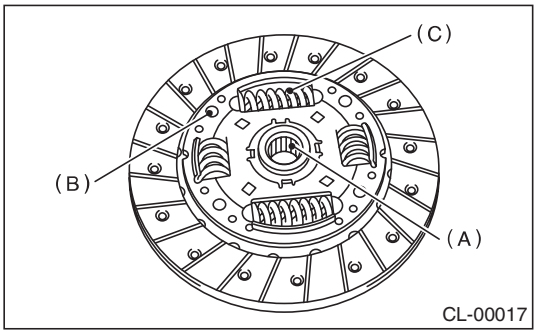
5) If there is worn spline, loose rivet or faulty damper spring, replace the clutch disc.

- 5MT EC, EK and KA model



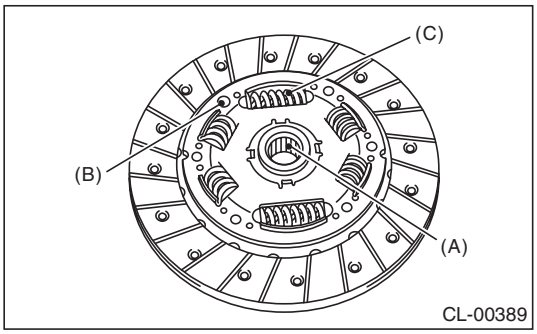
(A) Spline
(B) Rivet

- 5MT KS, K4 model and 6MT model



(A) Spline
(B) Rivet
(C) Damper spring

- 5MT turbo model



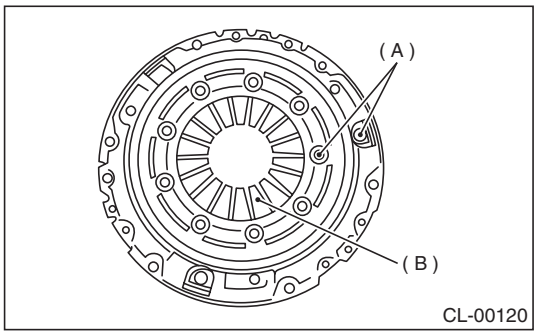
(A) Spline
(B) Rivet
(C) Damper spring

2. CLUTCH COVER

NOTE:
Visually check the following items without disassembling, and replace or repair if defective.

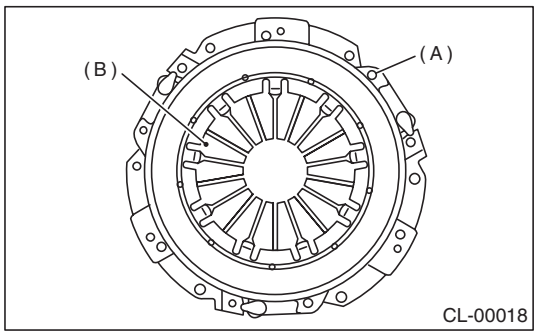
1) Loose thrust rivet
2) Damaged or worn bearing contact area at the center of diaphragm spring

- 5MT EC, EK and KA model



(A) Thrust rivet
(B) Diaphragm spring

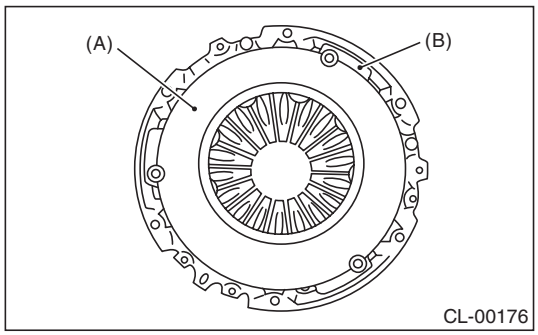
• 5MT KS, K4, turbo model and 6MT model



(A) Thrust rivet
(B) Diaphragm spring

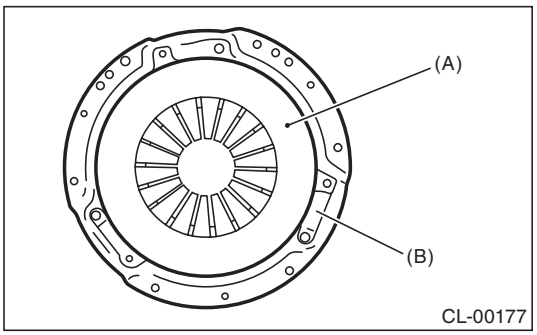
3) Damage or wear of disc contact surface on pressure plate
4) Loose strap plate installation area
5) Wear of diaphragm sliding area

• 5MT EC, EK and KA model



(A) Pressure plate
(B) Strap plate

• 5MT KS, K4, turbo model and 6MT model



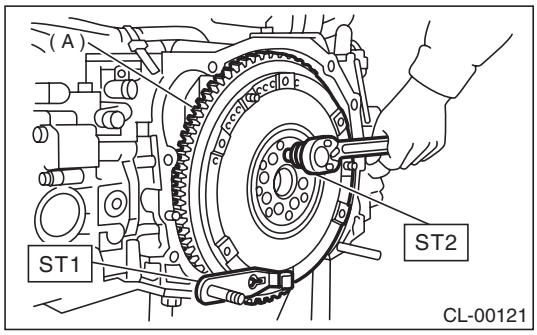
(A) Pressure plate
(B) Strap plate

3. Flywheel

A: REMOVAL

1. 5MT EC, EK AND KA MODEL

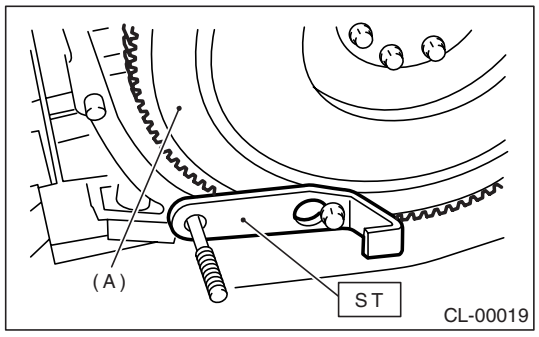
1) Remove the transmission assembly. <Ref. to 5MT-30, REMOVAL, Manual Transmission Assembly.>
2) Remove the clutch cover and clutch disc. <Ref. to CL-16, REMOVAL, Clutch Disc and Cover.>
3) Using the ST1 and ST2, remove the flywheel.
ST1 498497100 CRANKSHAFT STOPPER
ST2 499057000 TORX PLUS®



(A) Flywheel

2. 5MT KS, K4 MODEL AND 6MT MODEL

1) Remove the transmission assembly. <Ref. to 5MT-30, REMOVAL, Manual Transmission Assembly.> <Ref. to 6MT-36, INSTALLATION, Manual Transmission Assembly.>
2) Remove the clutch cover and clutch disc. <Ref. to CL-16, REMOVAL, Clutch Disc and Cover.>
3) Using the ST, remove the flywheel.
ST 498497100 CRANKSHAFT STOPPER

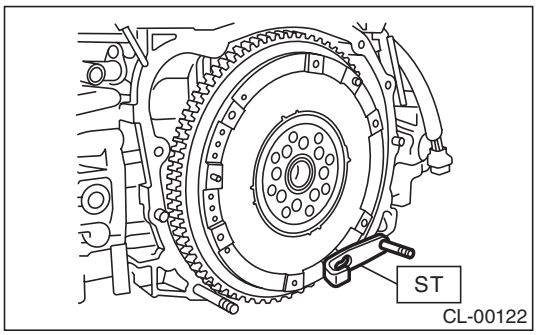


(A) Flywheel

B: INSTALLATION

1. 5MT EC, EK AND KA MODEL

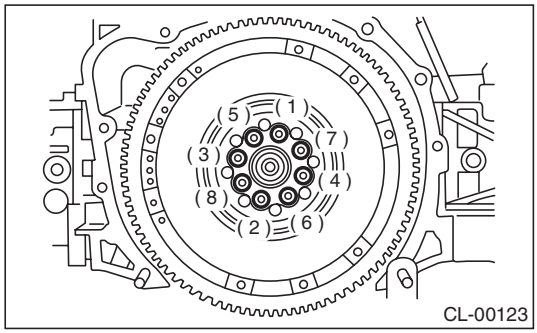
1) Install the flywheel and ST.
ST 498497100 CRANKSHAFT STOPPER



2) Tighten the flywheel attaching bolts to the specified torque.
ST 499057000 TORX PLUS®

NOTE:
Tighten the flywheel installing bolts gradually. Each bolt should be tightened to the specified torque in a crisscross order.

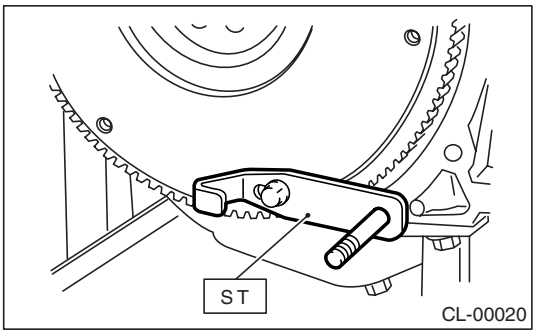
Tightening torque:
72 N·m (7.3 kgf-m, 52.8 ft-lb)



3) Install the clutch disc and cover. <Ref. to CL-16, INSTALLATION, Clutch Disc and Cover.>
4) Install the transmission assembly. <Ref. to 5MT-32, INSTALLATION, Manual Transmission Assembly.>

2. 5MT KS, K4 MODEL AND 6MT MODEL

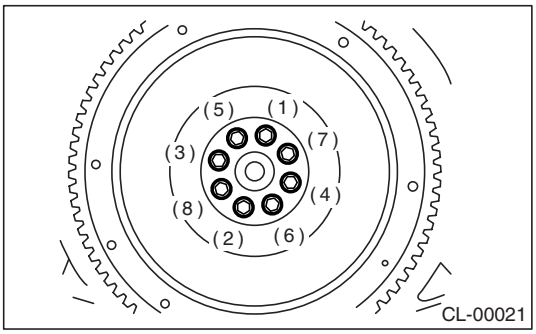
1) Install the flywheel and ST.
ST 498497100 CRANKSHAFT STOPPER



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 order.

Tightening torque:
5MT model
72 N·m (7.3 kgf-m, 52.8 ft-lb)
6MT model
81 N·m (8.2 kgf-m, 59.4 ft-lb)



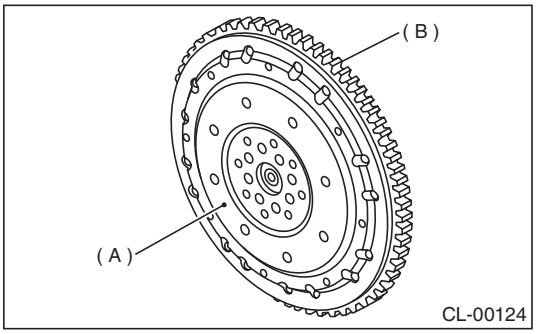
3) Install the clutch disc and cover. <Ref. to CL-17, 5MT KS, K4, TURBO MODEL AND 6MT MODEL, INSTALLATION, Clutch Disc and Cover.>
4) Install the transmission assembly. <Ref. to 5MT-32, INSTALLATION, Manual Transmission Assembly.> <Ref. to 6MT-36, INSTALLATION, Manual Transmission Assembly.>

C: INSPECTION

CAUTION:
Since this bearing is grease-sealed and non-lubrication type, do not wash it with gasoline or any other solvent.

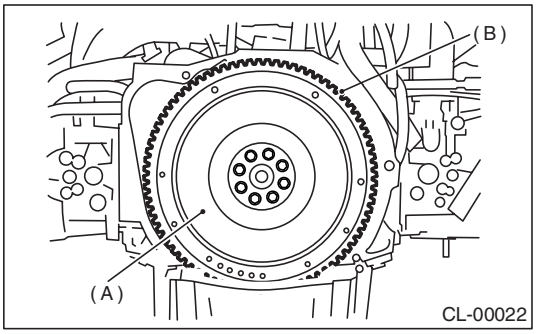
1) Damage on facing sliding surface and ring gear
If defective, replace the flywheel.

- 5MT EC, EK and KA model



(A) Flywheel
(B) Ring gear

- 5MT KS, K4 model and 6MT model



(A) Flywheel
(B) Ring gear

2) Smoothness of rotation
Rotate the ball bearing while applying pressure in thrust direction.
3) If noise or excessive play is noted, replace the flywheel.

4. Release Bearing and Lever

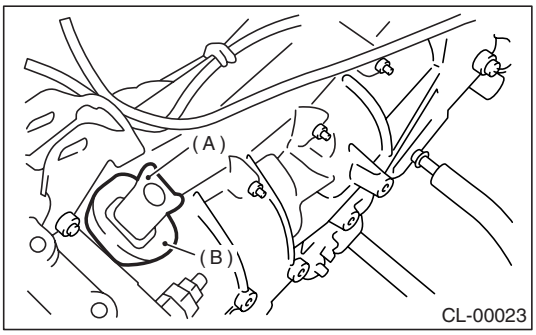
A: REMOVAL

1. 5MT MODEL

1) Remove the transmission assembly from vehicle.
<Ref. to 5MT-30, REMOVAL, Manual Transmission Assembly.>
2) Remove the two clips from release lever and remove the release bearing.

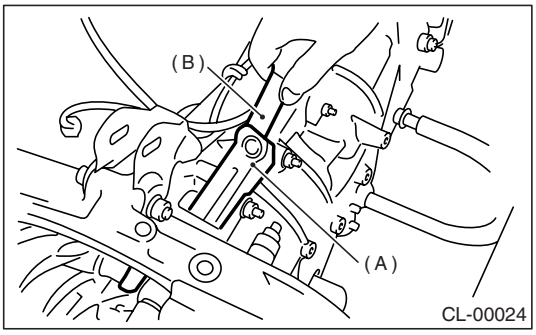
CAUTION:
Be careful not to deform the clips.

3) Remove the dust cover.



(A) Release lever
(B) Dust cover

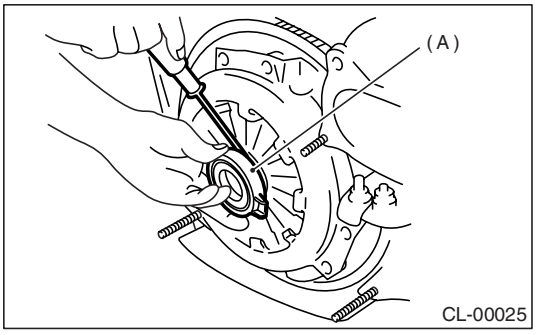
4) Remove the lever spring from the pivot with a screwdriver by accessing it through the clutch housing release lever hole. Then remove the release lever.



(A) Release lever
(B) Screwdriver

2. 6MT MODEL

1) Remove the transmission assembly from vehicle. <Ref. to 6MT-34, REMOVAL, Manual Transmission Assembly.>
2) Remove the release lever from transmission.
3) Put the release bearing to engine side.
4) Remove the release bearing from clutch cover using a flat tip screwdriver.



(A) Release bearing

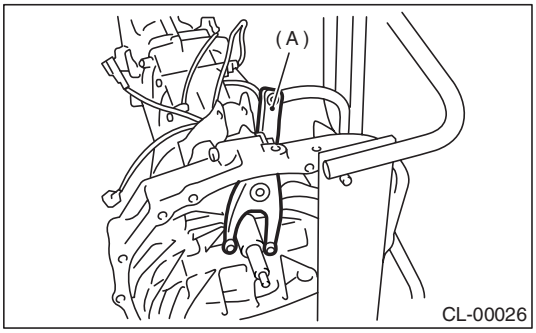
B: INSTALLATION

1. 5MT MODEL

1) Lubricate the following points with the specified grease prior to installation.
- Contact surface of lever and pivot
- Contact surface of lever and bearing
- Transmission main shaft spline (Use grease containing molybdenum disulphide.)

2) While pushing the release lever into pivot and twisting it to both sides, fit the lever spring onto the constricted portion of pivot.

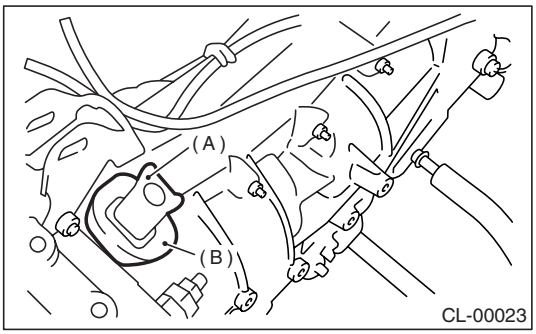
NOTE:
- Apply grease (KOPR-KOTE: Part No. 003603001) to the contact point of release lever and operating cylinder.
- Observing from the main case hole, check that the lever spring is installed securely.



(A) Release lever

3) Install the release bearing and fasten it with two clips.

4) Install the dust cover.

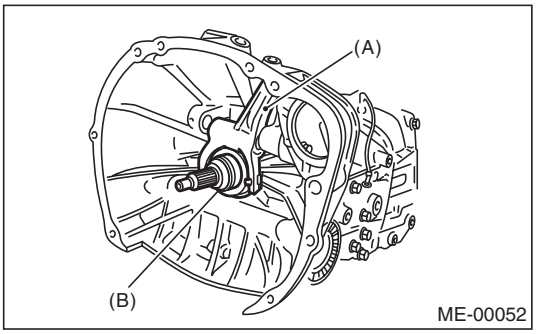


(A) Release lever
(B) Dust cover

5) Check the bearing for smooth movement by operating the release lever.
6) Install the transmission assembly.
<Ref. to 5MT-32, INSTALLATION, Manual Transmission Assembly.>

2. 6MT MODEL

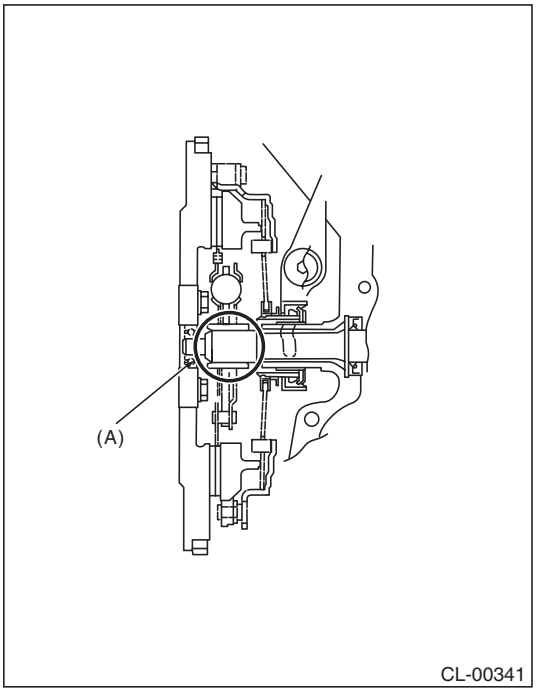
1) Install the release bearing onto transmission.
2) Insert the release lever into release bearing tab.



(A) Release lever
(B) Release bearing

3) Apply grease to the specified points.

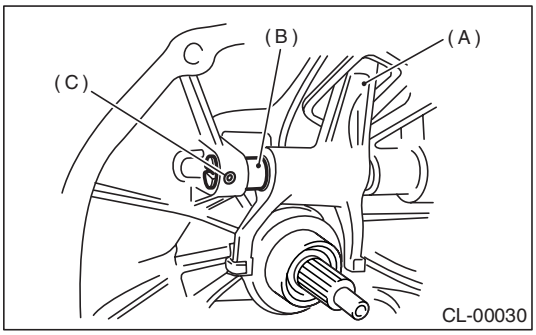
Grease:
NICHIMOLY N-130



(A) Spline

4) Insert the release shaft into release lever.

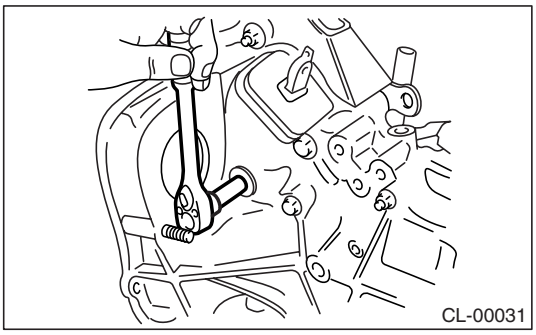
NOTE:
Make sure the cutout portion of the release shaft contacts spring pin.



(A) Release lever
(B) Release shaft
(C) Spring pin

5) Tighten the plug.

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



6) Check the release bearing and release lever for smooth movement by operating the release lever.
7) Install the transmission assembly. <Ref. to 6MT-36, INSTALLATION, Manual Transmission Assembly.>

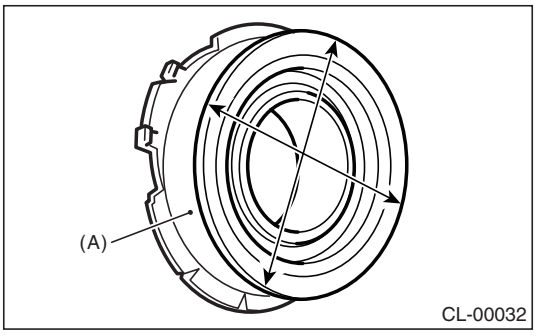
C: INSPECTION

1. RELEASE BEARING

CAUTION:
Since this bearing is grease-sealed and non-lubrication type, do not wash with gasoline or any other solvent when servicing clutch.

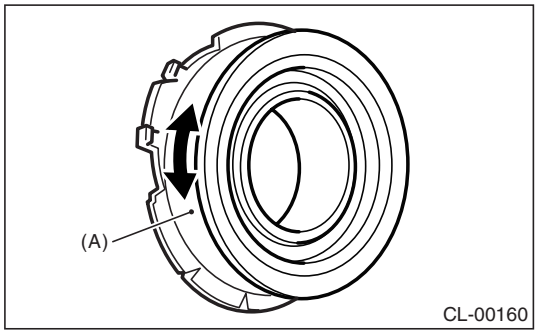
1) Check the bearing for smooth movement by applying force to the bearing in radial direction.

Radial direction stroke:
1.6 mm (0.063 in)



(A) Bearing case

2) Check the bearing for smooth rotation by applying force to the bearing in thrust direction.

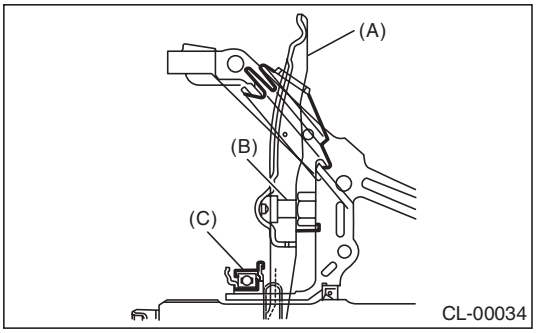


(A) Bearing case

3) Check for wear or damage on the bearing case surface which contacts lever.

2. RELEASE LEVER

Check the pivot and the contact area with release bearing case in the lever for wear.



(A) Release lever
(B) Pivot
(C) Release bearing

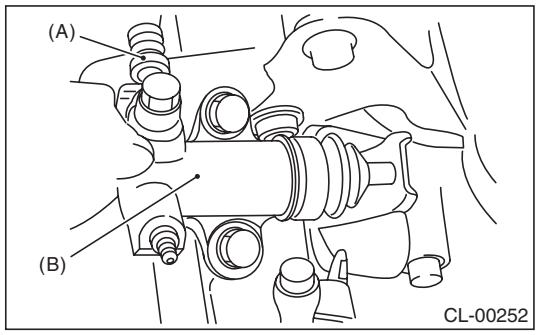
5. Operating Cylinder

A: REMOVAL

1) Remove the air intake chamber. (Non-turbo model) <Ref. to IN(H4SO 2.0)-7, REMOVAL, Air Intake Chamber.>
2) Remove the intercooler. (Turbo model) <Ref. to IN(H4DOTC)-12, REMOVAL, Intercooler.>
3) Disconnect the clutch hose from operating cylinder.

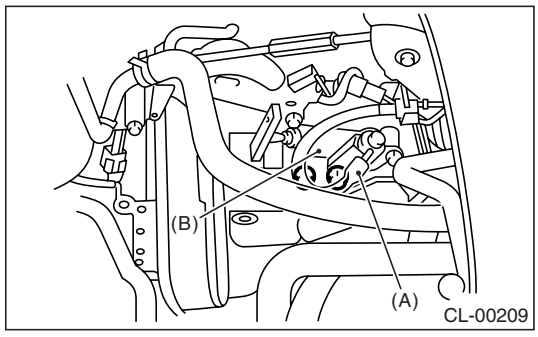
CAUTION:
Cover the hose joint to prevent clutch fluid from flowing out.

- 5MT model



(A) Clutch hose
(B) Operating cylinder

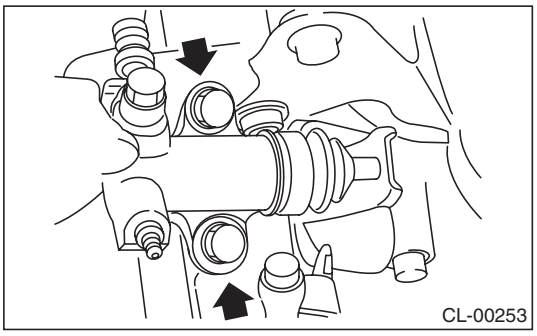
- 6MT model



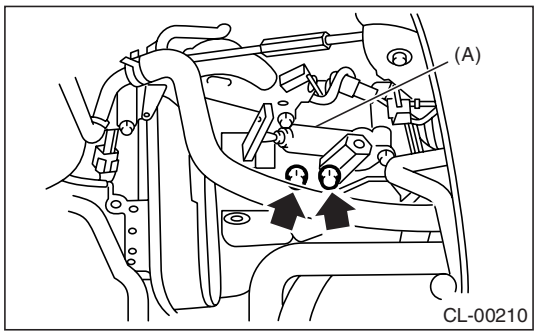
(A) Clutch hose
(B) Operating cylinder

4) Remove the operating cylinder from transmission.

- 5MT model



- 6MT model



(A) Operating cylinder

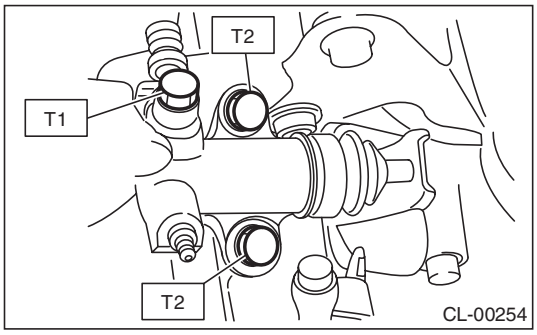
B: INSTALLATION

1. 5MT MODEL

1) Install in the reverse order of removal.

NOTE:
Before installing the operating cylinder, apply grease (KOPR-KOTE: Part No. 003603001) to the contact point of 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)



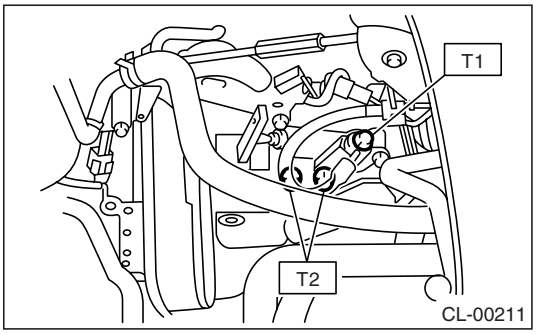
2) After bleeding air from the operating cylinder, ensure that clutch operates properly.
<Ref. to CL-34, Clutch Fluid Air Bleeding.>

2. 6MT MODEL

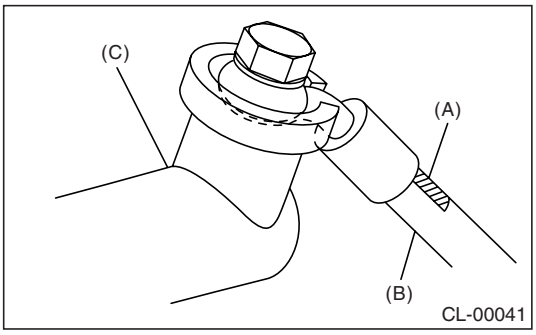
1) Install in the reverse order of removal.

NOTE:
Before installing the operating cylinder, apply grease (SUNLIGHT 2: Part No. 003602010) to the contact point of release lever and operating cylinder.

Tightening torque:
T1: 18 N·m (1.8 kgf-m, 13.0 ft-lb)
T2: 41 N·m (4.2 kgf-m, 30.2 ft-lb)



NOTE:
• Be sure to install the clutch hose with the marking side facing upward.
• Be careful not to twist the clutch hose during installation.



(A) Marking
(B) Clutch hose
(C) Operating cylinder

2) After bleeding air from the operating cylinder, ensure that clutch operates properly.
<Ref. to CL-34, Clutch Fluid Air Bleeding.>

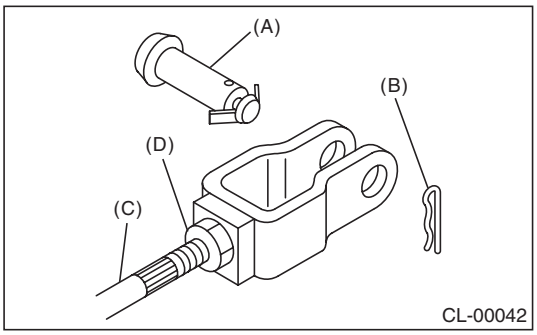
C: INSPECTION

1) Check the operating cylinder for damage. If operating cylinder is damaged, replace it.
2) Check for fluid leakage or damaged boot on the operating cylinder. If any leakage or damage is found, replace the operating cylinder.

6. Master Cylinder

A: REMOVAL

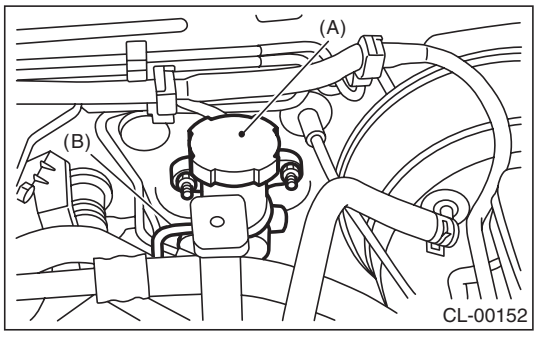
1) Thoroughly drain brake fluid from reservoir tank.
2) Remove the snap pin and clevis pin, and then separate the push rod of master cylinder from clutch pedal.



(A) Clevis pin
(B) Snap pin
(C) Push rod
(D) Lock nut

3) Remove the air intake chamber. (Non-turbo model) <Ref. to IN(H4SO 2.0)-7, REMOVAL, Air Intake Chamber.>
4) Remove the intercooler. (Turbo model) <Ref. to IN(H4DOTC)-12, REMOVAL, Intercooler.>
5) Disconnect the clutch pipes from master cylinder.
6) Remove the master cylinder and reservoir tank as a unit.

CAUTION:
Be careful not to spill the brake fluid. Since brake fluid spilt on the vehicle body harms paint surface, immediately wash away with water and wipe it off if it gets on the body.



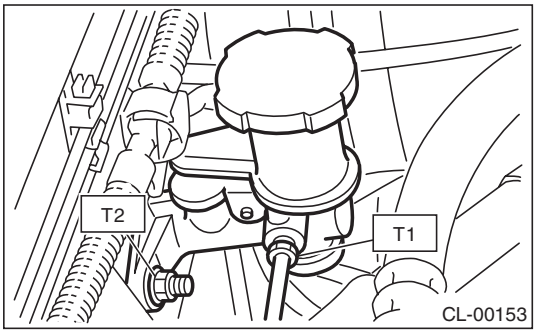
(A) Master cylinder ASSY
(B) Clutch pipe

B: INSTALLATION

1) Install the master cylinder to vehicle, and connect the clutch pipe to master cylinder.

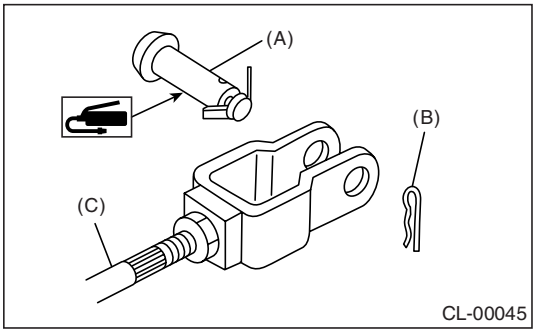
NOTE:
Check that the pipe is routed properly.

Tightening torque:
T1: 15 N·m (1.5 kgf-m, 10.8 ft-lb)
T2: 18 N·m (1.8 kgf-m, 13.0 ft-lb)



2) Connect the push rod of master cylinder to clutch pedal, and install the clevis pin and snap pin.

NOTE:
Apply grease to the clevis pin.



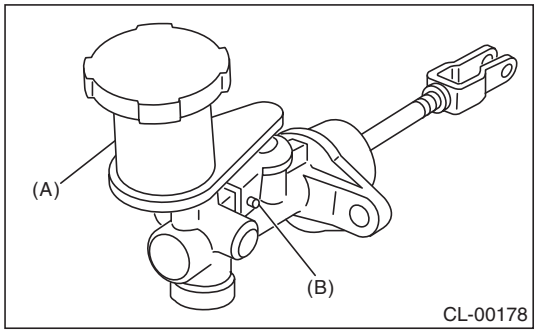
(A) Clevis pin
(B) Snap pin
(C) Push rod

3) After bleeding air from the clutch system, ensure that clutch operates properly.
<Ref. to CL-34, Clutch Fluid Air Bleeding.>
4) Install the air intake chamber. (Non-turbo model) <Ref. to IN(H4SO 2.0)-7, INSTALLATION, Air Intake Chamber.>
5) Install the intercooler. (Turbo model) <Ref. to IN(H4DOTC)-12, INSTALLATION, Intercooler.>

C: DISASSEMBLY

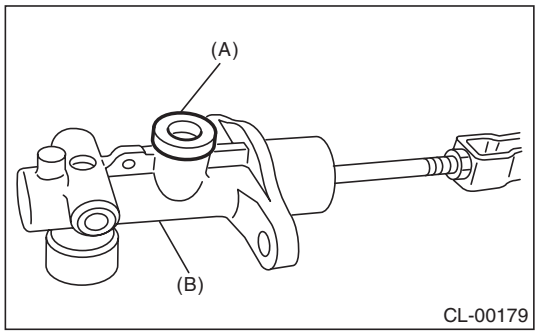
1. 5MT NON-TURBO MODEL

1) Remove the straight pin and reservoir tank.



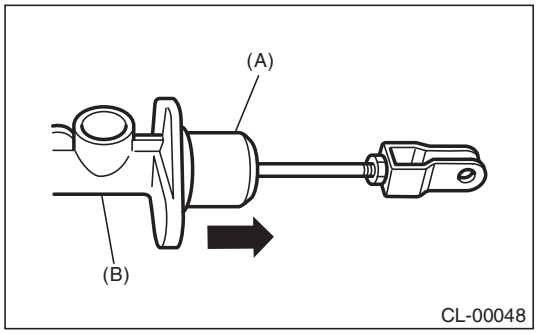
(A) Reservoir tank
(B) Straight pin

2) Remove the oil seal.



(A) Oil seal
(B) Master cylinder

3) Move the cylinder boot backward.



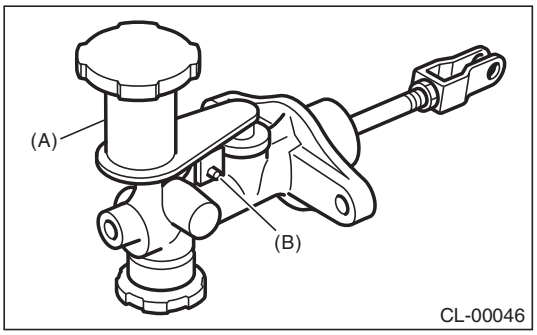
(A) Cylinder boot
(B) Master cylinder

4) Remove the snap ring.

CAUTION:
Be careful to prevent the rod, washer, piston and return spring from flying out when removing snap ring.

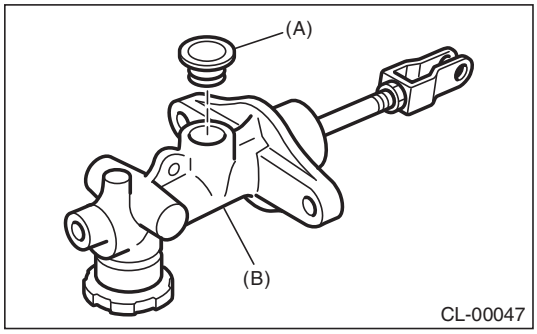
2. 5MT TURBO MODEL AND 6MT MODEL

1) Remove the straight pin and reservoir tank.



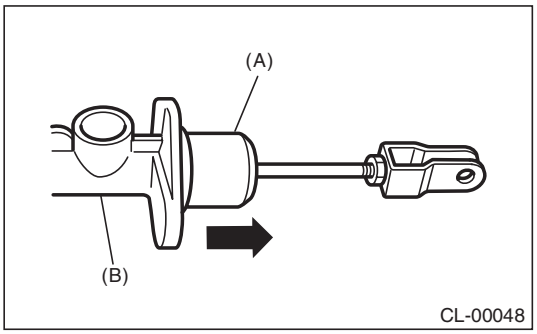
(A) Reservoir tank
(B) Straight pin

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 snap ring.

CAUTION:
Be careful to prevent the rod, washer, piston and return spring from flying out when removing snap ring.

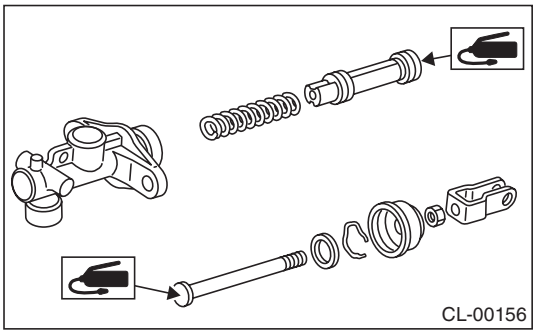
5) Remove the clutch damper.

D: ASSEMBLY

1. 5MT NON-TURBO MODEL

1) Apply a coat of grease to the contact surfaces of the push rod and piston before installation.

Grease:
SILICONE GREASE G40M (Part No. 004404003)



2) Assemble in the reverse order of disassembly.

Tightening torque:
10 N·m (1.0 kgf-m, 7.4 ft-lb)

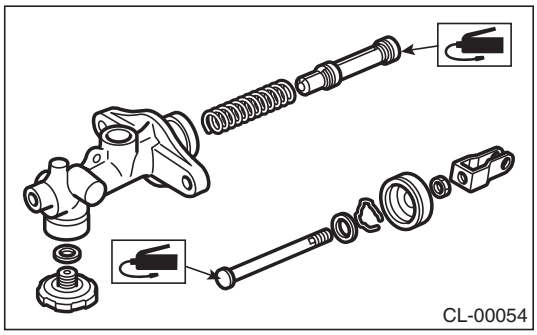
2. 5MT TURBO MODEL AND 6MT MODEL

1) Install the clutch damper.

Tightening torque:
46.6 N·m (4.75 kgf-m, 34.4 ft-lb)

2) Apply a coat of grease to the contact surfaces of the push rod and piston before installation.

Grease:
SILICONE GREASE G40M (Part No. 004404003)



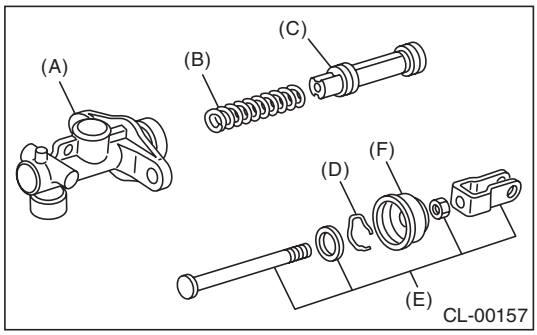
3) Assemble in the reverse order of disassembly.

Tightening torque:
10 N·m (1.0 kgf-m, 7.4 ft-lb)

E: INSPECTION

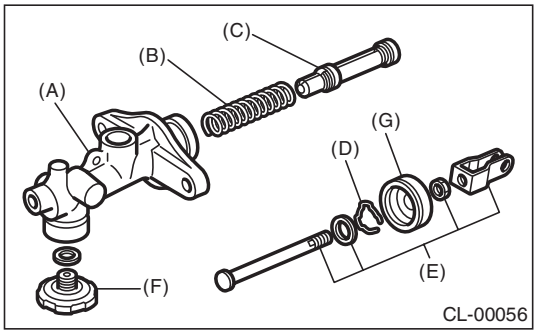
If any damage, deformation, wear, swelling, rust or other faults is found on the cylinder, piston, push rod, fluid reservoir, return spring, gasket, clutch damper cylinder boot or hose, replace the faulty part.

- 5MT Non-turbo model



(A) Master cylinder body
(B) Return spring
(C) Piston
(D) Stop ring
(E) Push rod ASSY
(F) Cylinder boot

- 5MT turbo model and 6MT model

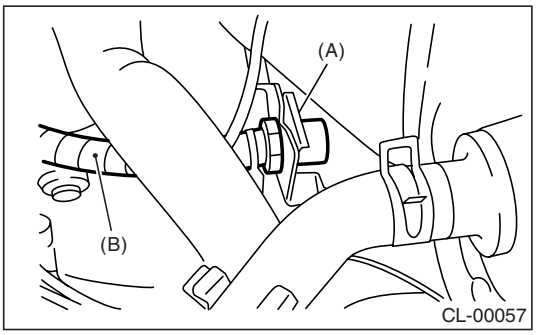


(A) Master cylinder body
(B) Return spring
(C) Piston
(D) Stop ring
(E) Push rod ASSY
(F) Clutch damper
(G) Cylinder boot

7. Clutch Pipe and Hose

A: REMOVAL

1) Remove the air intake chamber. (Non turbo model) <Ref. to IN(H4SO 2.0)-7, REMOVAL, Air Intake Chamber.>
2) Remove the intercooler. (Turbo model) <Ref. to IN(H4DOTC)-12, REMOVAL, Intercooler.>
3) Drain the clutch fluid. <Ref. to CL-33, Clutch Fluid.>
4) Disconnect 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) Disconnect the hose from operating cylinder.
7) Remove the bracket.

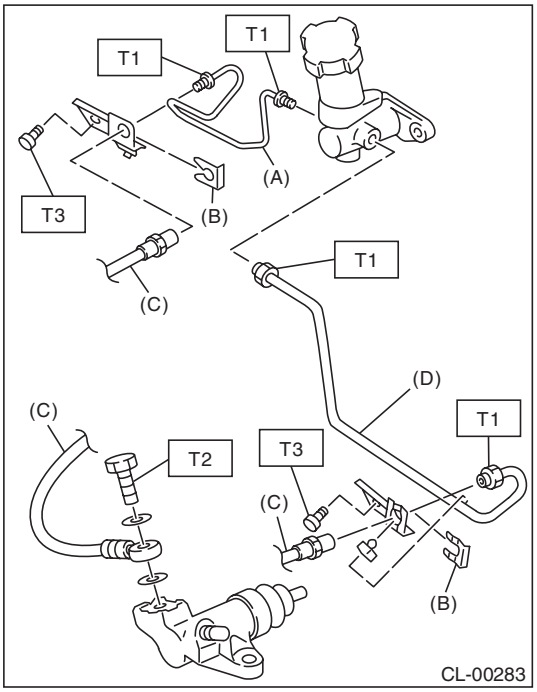
B: INSTALLATION

Install in the reverse order of removal.

NOTE:
Bleed air in the clutch fluid. <Ref. to CL-34, Clutch Fluid Air Bleeding.>

- 5MT model

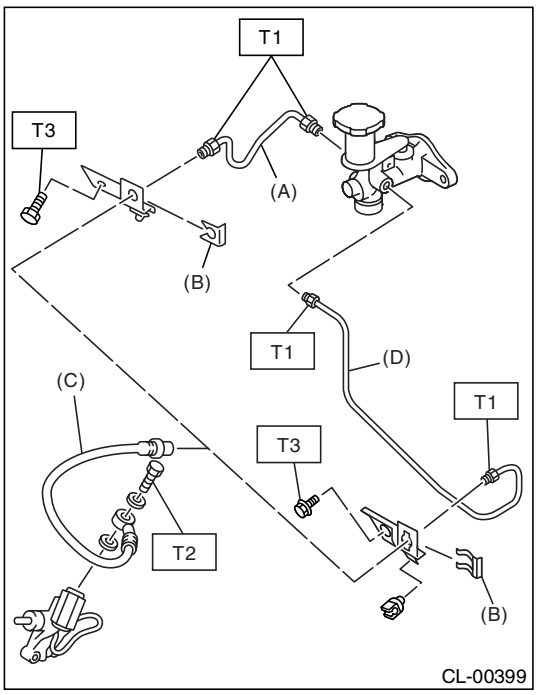
Tightening torque:
T1: 15 N·m (1.5 kgf-m, 10.8 ft-lb)
T2: 18 N·m (1.8 kgf-m, 13.0 ft-lb)
T3: 25 N·m (2.5 kgf-m, 18.4 ft-lb)



(A) Clutch pipe (LHD model)
(B) Clip
(C) Clutch hose
(D) Clutch pipe (RHD model)

- 6MT model

Tightening torque:
T1: 15 N·m (1.5 kgf-m, 10.8 ft-lb)
T2: 18 N·m (1.8 kgf-m, 13.0 ft-lb)
T3: 25 N·m (2.5 kgf-m, 18.4 ft-lb)



(A) Clutch pipe (LHD model)
(B) Clip
(C) Clutch hose
(D) Clutch pipe (RHD model)

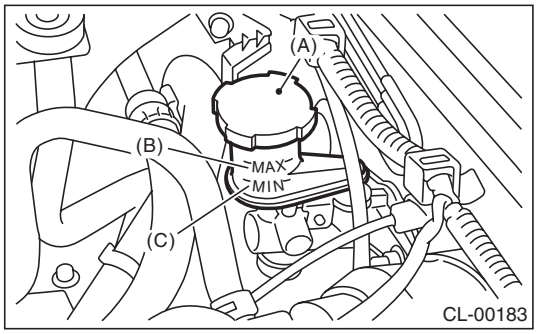
C: INSPECTION

Check the pipes and hoses for cracks, breakage or damage. Check the joints for fluid leakage. If any crack, breakage, damage or leakage is found, repair or replace the defective pipe or hose.

8. Clutch Fluid

A: INSPECTION

1) Park the vehicle on a level surface.
2) Inspect the fluid level using the scale on the outside of reservoir tank. If the level is below “MIN”, add fluid to bring it up to “MAX”, and then inspect for leakage.



(A) Reservoir tank
(B) MAX. level
(C) MIN. level

B: REPLACEMENT

CAUTION:
• The FMVSS No. 116, fresh DOT3 or 4 brake fluid must be used.
• When loosening the bleeder screw, cover the bleeder with cloth to prevent brake fluid from being splashed over surrounding parts.
• Avoid mixing different brands of brake fluid to prevent the quality of fluid from degrading.
• Be careful not to allow dirt or dust to get into the reservoir tank.

NOTE:
• During bleeding operation, keep the clutch reservoir tank filled with brake fluid to eliminate entry of air.
• Clutch pedal operation must be very slow.
• Bleed air from the oil line with help of a co-worker.
• The necessary amount of brake fluid is approx. 70 m ℓ (2.4 US fl oz, 2.5 Imp fl oz) for total clutch system.

1) Remove the air intake chamber. <Ref. to IN(H4SO 2.0)-7, REMOVAL, Air Intake Chamber.>
2) Drain the brake fluid from reservoir tank.
3) Refill the reservoir tank with recommended brake fluid.

Recommended brake fluid:
FMVSS No. 116, fresh DOT3 or 4 brake fluid

4) Drain all the contaminated fluid in the same method as air bleeding.

NOTE:
Keep the clutch reservoir tank filled with brake fluid to eliminate entry of air.

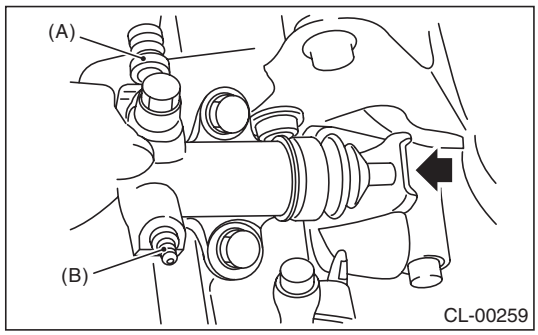
9. Clutch Fluid Air Bleeding

A: PROCEDURE

1. 5MT MODEL

NOTE:
Bleed air from the oil line with help of a co-worker.

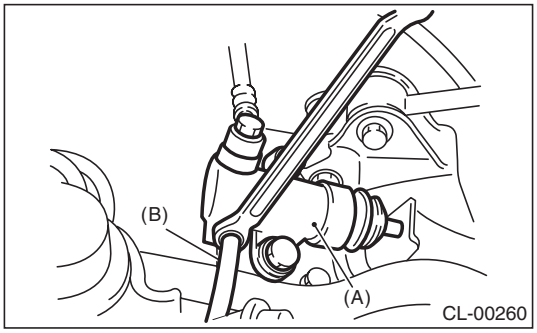
1) Remove the air intake chamber. <Ref. to IN(H4SO 2.0)-7, REMOVAL, Air Intake Chamber.>
2) Remove the intercooler. <Ref. to IN(H4DOTC)-12, REMOVAL, Intercooler.>
3) Fit one end of a vinyl tube into the air bleeder of operating cylinder and the other end into a brake fluid container.



(A) Clutch hose
(B) Air bleeder

4) Slowly depress the clutch pedal and keep it depressed. 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.

CAUTION:
Cover the bleeder with cloth to prevent brake fluid from being splashed over surrounding parts when loosening the bleeder.

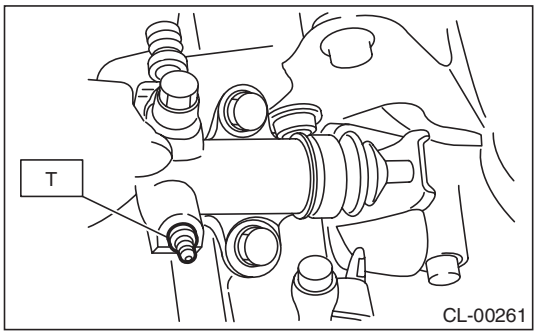


(A) Operating cylinder
(B) Vinyl tube

5) Repeat the step 4) until there are no more air bubbles in the vinyl tube.

6) Tighten the air bleeder.

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



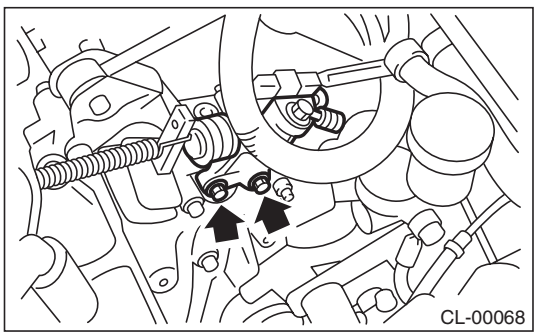
7) After depressing the clutch pedal, make sure that there are no leaks evident in the entire clutch system.
8) After bleeding air from the clutch system, ensure that clutch operates properly.

2. 6MT MODEL

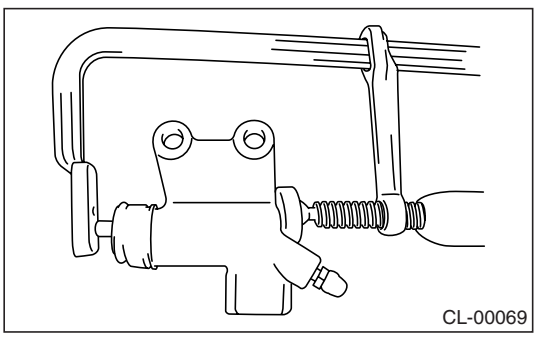
NOTE:
Bleed air from the oil line with help of a co-worker.

1) Remove the air cleaner case. <Ref. to IN(H6DO)-5, REMOVAL, Air Cleaner Case.>
2) Fit one end of a vinyl tube into the air bleeder of master cylinder and the other end into a brake fluid container.
3) Remove the operating cylinder.

NOTE:
Do not remove the clutch hose.

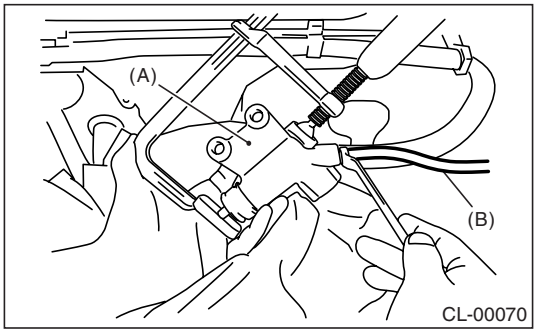


4) Fix the piston with clamp to avoid the piston from jumping out.



5) Fit one end of a vinyl tube into the air bleeder of operating cylinder and the other end into a brake fluid container.
6) Slowly depress the clutch pedal and keep it depressed. 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:
Bring the air breather screw part higher than the tip of operating cylinder when performing this procedure.



(A) Operating cylinder
(B) Vinyl tube

7) Repeat these steps until there are no more air bubbles in the vinyl tube.

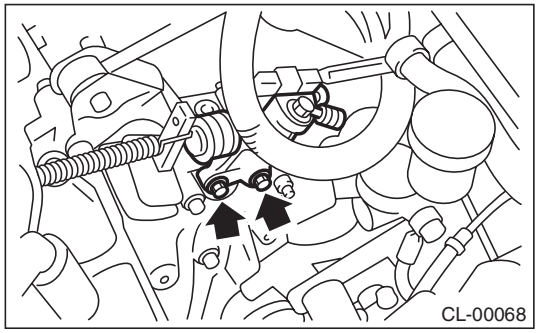
CAUTION:
Cover the bleeder with waste cloth when loosening it, to prevent brake fluid from being splashed over surrounding parts.

8) Tighten the air bleeder.

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

9) Install the operating cylinder.

Tightening torque:
41 N·m (4.2 kgf-m, 30.2 ft-lb)



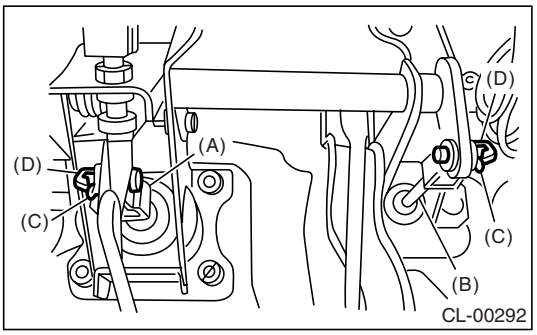
10) After depressing the clutch pedal, make sure that there are no leaks evident in the entire system.
11) After bleeding air from the system, ensure that clutch operates properly.
12) Install the air cleaner case. <Ref. to IN(H6DO)-5, REMOVAL, Air Cleaner Case.>

10.Clutch Pedal

A: REMOVAL

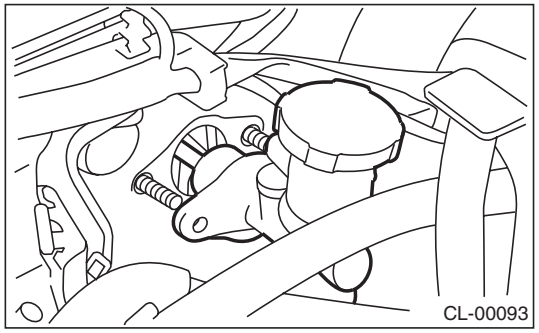
1. LHD MODEL

1) Disconnect the ground cable from battery.
2) Remove the steering column. <Ref. to PS-24, REMOVAL, Tilt Steering Column.>
3) Disconnect the connectors from the stop light switch and clutch switch.
4) Remove the snap pins from the clevis pins which secure lever to push rod and operating rod.
5) 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

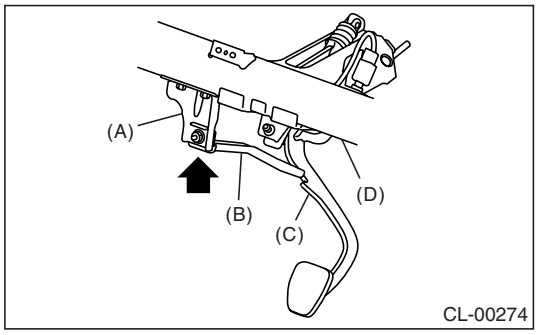
6) Remove the nut which secures clutch master cylinder.



7) Remove the bolts which secure brake pedal and clutch pedal, and remove the pedal assembly.

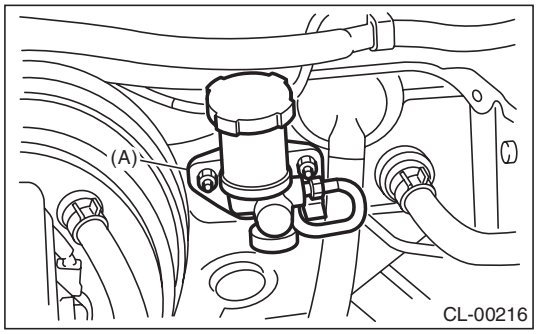
2. RHD MODEL

1) Disconnect the ground cable from battery.
2) Remove the instrument panel lower cover.
3) Remove the clutch pedal catcher from bracket (clutch pedal catcher).



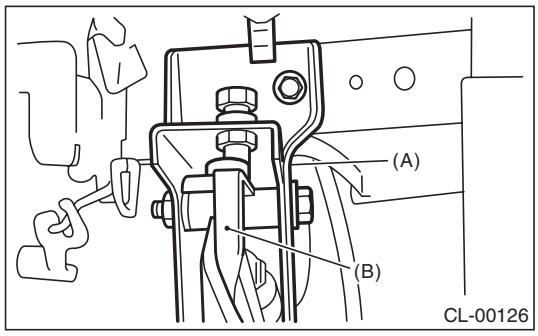
(A) Bracket (Clutch pedal catcher)
(B) Clutch pedal catcher
(C) Clutch pedal
(D) Steering support beam

4) Remove the clutch switch connector from clutch pedal.
5) Remove the snap pin and clevis pin which join the push rod and clutch pedal.
6) Remove the master cylinder mounting nuts.



(A) Master cylinder

7) Remove the clutch pedal and bracket as a unit.



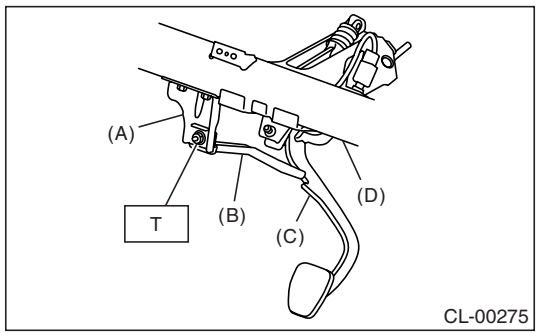
(A) Clutch pedal bracket
(B) Clutch pedal

B: INSTALLATION

1) Install in the reverse order of removal.

Tightening torque:
T: 18 N·m (1.8 kgf-m, 13.0 ft-lb)

- Clutch pedal catcher



(A) Bracket (Clutch pedal catcher)
(B) Clutch pedal catcher
(C) Clutch pedal
(D) Steering support beam

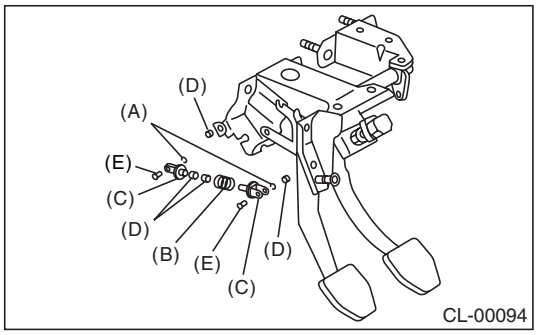
CAUTION:
Always use a new clevis pin.

2) Adjust the clutch pedal after installation. <Ref. to CL-39, ADJUSTMENT, Clutch Pedal.>

C: DISASSEMBLY

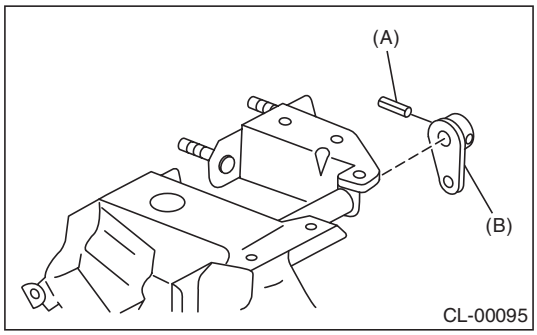
1. LHD MODEL

1) Remove the clutch switch.
2) Remove the clips, assist spring, rod and bushing.



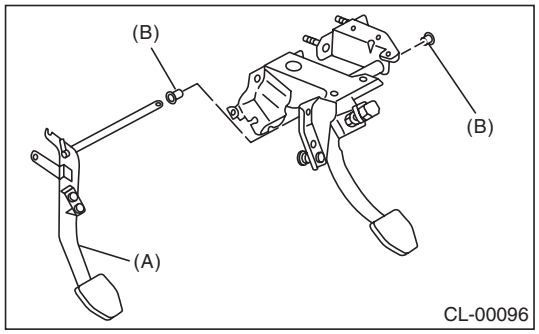
(A) Clip
(B) Assist spring
(C) Assist rod
(D) Bushing
(E) Clevis pin

3) Remove the spring pin and remove lever.



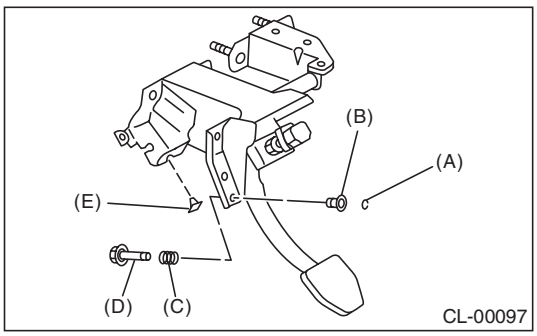
(A) Pin
(B) Lever

4) Remove the clutch pedal and bushings.



(A) Clutch pedal
(B) Bushing

5) Remove the stopper, clip and rod S, and then remove the spring and bushing S.

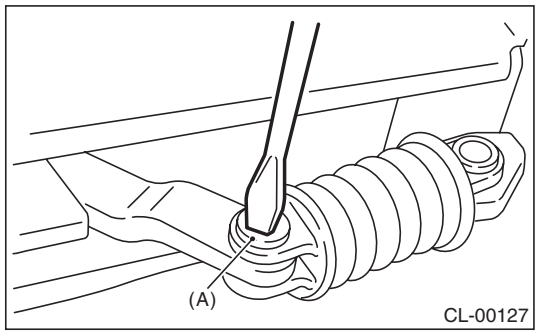


(A) Clip (EC model and 2.5 L model)
(B) Bushing S (EC model and 2.5 L model)
(C) Spring S (EC model and 2.5 L model)
(D) Rod S (EC model and 2.5 L model)
(E) Stopper

6) Remove the stopper from clutch pedal.
7) Remove the clutch pedal pad.

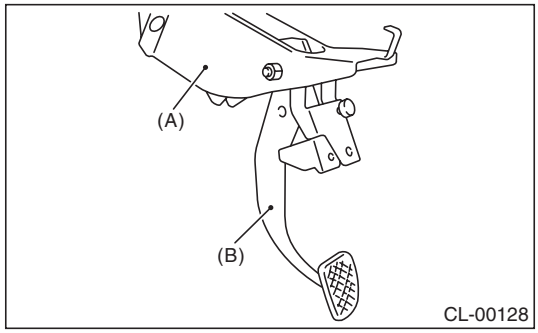
2. RHD MODEL

1) Remove the clutch switch.
2) Remove the clip, and then pull out the clevis pin.



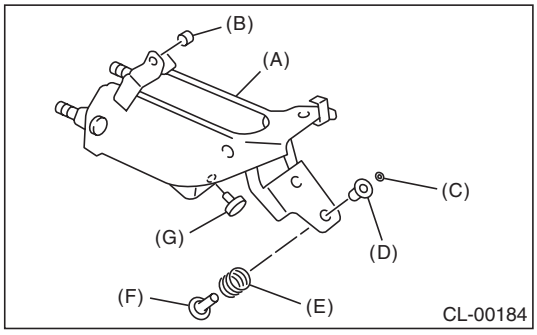
(A) Clevis pin

3) Remove the assist rod, spring and bushing.
4) Remove the clutch pedal from clutch pedal bracket.



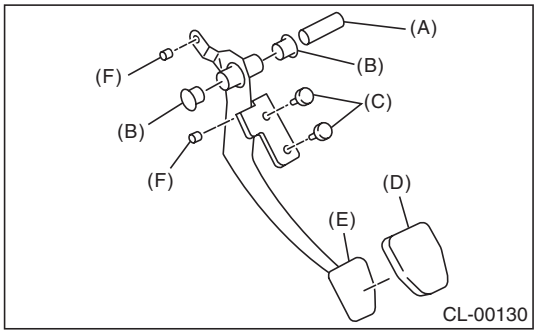
(A) Clutch pedal bracket
(B) Clutch pedal

5) Remove the following parts (B — G) from clutch pedal bracket (A) as shown in the figure.



(A) Clutch pedal bracket
(B) Bushing C
(C) Clip (2.0 L model and 2.5 L model)
(D) Bushing S (2.0 L model and 2.5 L model)
(E) Spring S (2.0 L model and 2.5 L model)
(F) Rod S (2.0 L model and 2.5 L model)
(G) Stopper

6) Remove the spacer, bushing and pedal pad from clutch pedal.



(A) Spacer
(B) Bushing
(C) Stopper
(D) Pedal pad
(E) Clutch pedal
(F) Bushing C

D: ASSEMBLY

1. LHD MODEL

1) Attach the clutch switch, etc. to pedal bracket temporarily.
2) Clean the inside of bores of clutch pedal and brake pedal, apply a thin coat of grease, and then set bushings into bores.
3) Align the bores of pedal bracket, clutch pedal and brake pedal, and then attach the brake pedal return spring, assist rods, spring and bushing.

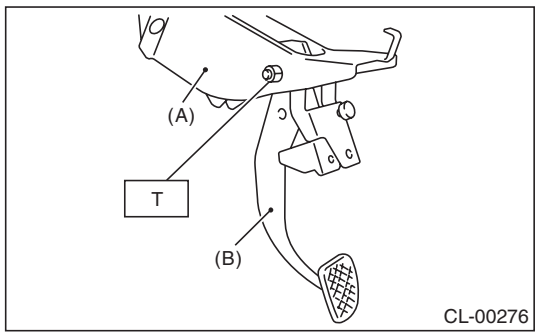
NOTE:
Clean up the inside of bushings and apply a thin coat of grease before installing spacer.

2. RHD MODEL

1) Clean the sliding surfaces of clutch pedal and bushing, and apply a thin coat of grease on them.
2) Install the pad, stopper, bushing C, spacer and bushing to clutch pedal.
3) Install the rod S, spring S, bushing S, clip, bushing, clutch switch and bushing C to clutch pedal bracket.

4) Install the pedal assembly, stopper, adjusting rod, bushing and spring to clutch pedal bracket.

Tightening torque:
T: 30 N·m (3.1 kgf-m, 22.4 ft-lb)



(A) Clutch pedal bracket
(B) Clutch pedal

5) Install the assist rod, bushing and assist spring to clutch pedal and pedal bracket.

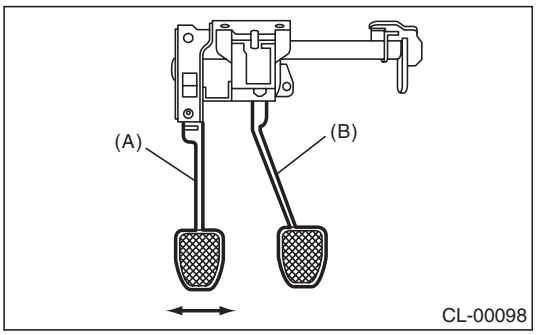
E: INSPECTION

1. CLUTCH PEDAL

Move the clutch pedal pads in the lateral direction with a force of approx. 10 N (1 kgf, 2 lbf) to ensure the pedal deflection is in specified range.
If excessive deflection is noted, replace the bushing with new one.

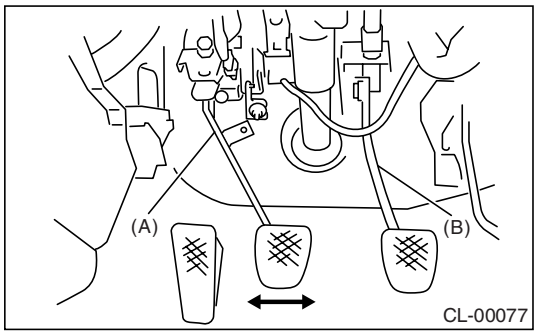
Deflection of clutch pedal:
Service limit
5.0 mm (0.197 in) or less

• LHD model



(A) Clutch pedal
(B) Brake pedal

• RHD model



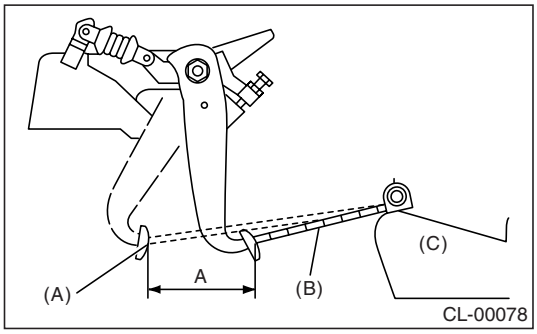
(A) Clutch pedal
(B) Brake pedal

F: ADJUSTMENT

1) Measure the amount of clutch pedal full stroke.

NOTE:
• Measure the length between the seat cushion front end and center point of clutch pedal.
• Slide the seat at seventh notch from the first notch.

Specified clutch pedal full stroke A:
Non-turbo model
130 — 135 mm (5.12 — 5.31 in)
Turbo model
135 — 140 mm (5.31 — 5.51 in)

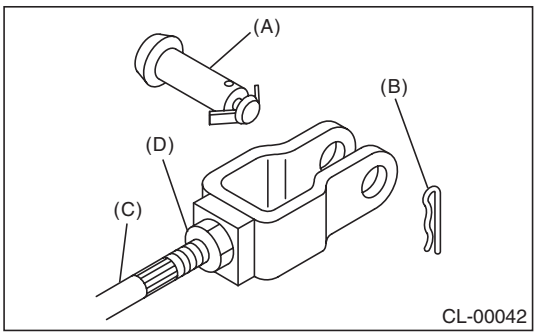


(A) Clutch pedal (at full stroke condition)
(B) Scale
(C) Seat

2) If the full stroke is out of specification, loosen the clutch stopper nut and adjust it.

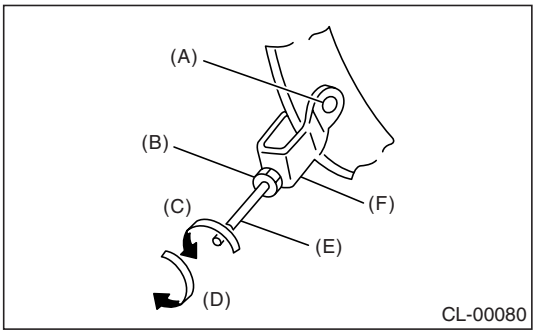
Tightening torque:
8 N·m (0.8 kgf-m, 5.8 ft-lb)

3) Loosen the push rod lock nut.



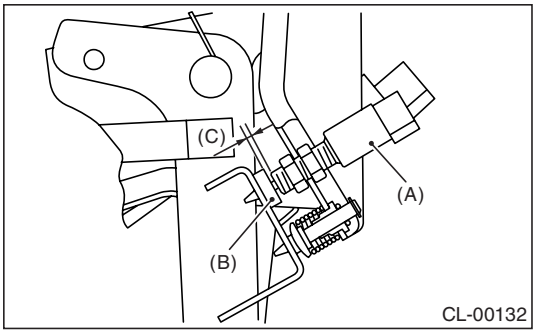
(A) Clevis pin
(B) Snap pin
(C) Push rod
(D) Push rod lock nut

4) Turn the push rod to adjust.
(1) Ensure that the clutch pedal contacts clutch switch side, when releasing the clutch pedal.
(2) Ensure that the clutch pedal contacts clutch pedal bracket stopper, when fully depressing the clutch pedal.



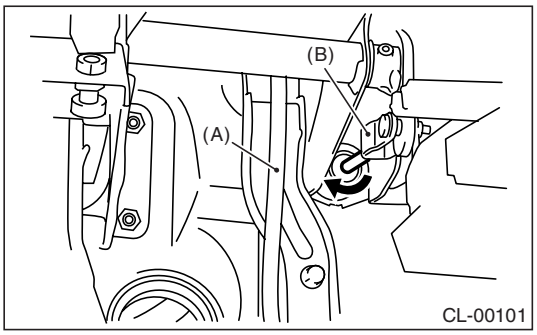
(A) Clevis hole
(B) Push rod lock nut
(C) Shortening direction
(D) Lengthening direction
(E) Push rod
(F) U shaped bracket

5) Turn the push rod counterclockwise to shorten until clearance is made at clutch switch side.



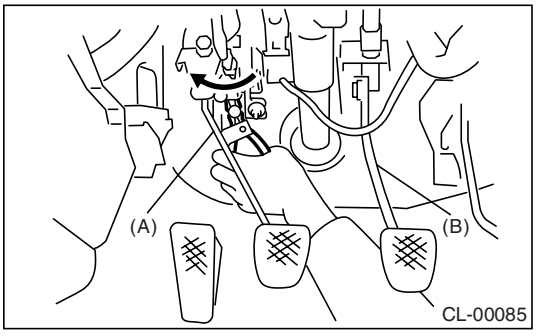
(A) Clutch switch
(B) Stopper
(C) Clearance

6) Turn the push rod clockwise to lengthen until the clutch pedal contacts to clutch switch.
7) Turn the push rod further 270° counterclockwise to shorten (the arrow direction shown in the figure).
• LHD model



(A) Accelerator pedal
(B) Clevis

• RHD model



(A) Clutch pedal
(B) Brake pedal

8) Move the clevis pin right and left to ensure it moves smoothly.

9) Tighten the push rod lock nut.

Tightening torque:
10 N·m (1.0 kgf-m, 7.4 ft-lb)

10) Depress and release the clutch pedal two or three times to ensure that clutch pedal and release lever operate smoothly. If the clutch pedal and release lever do not operate smoothly, bleed air from the clutch system. <Ref. to CL-34, Clutch Fluid Air Bleeding.>

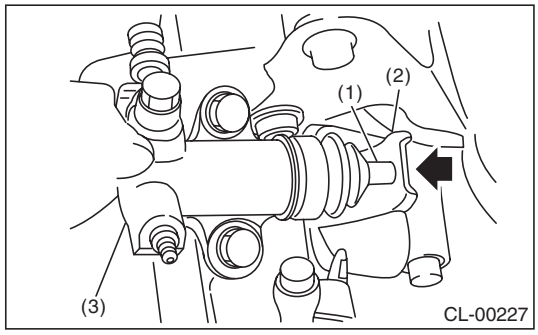
11) Measure the clutch pedal full stroke length again to ensure that it is within specifications. If it is not within the specified range, repeat the adjustment procedure from the beginning.

Specified clutch pedal full stroke:
Non-turbo model
130 — 135 mm (5.12 — 5.31 in)
Turbo model
135 — 140 mm (5.31 — 5.51 in)

12) Move the clevis pin to the left, then to the right. The clevis pin should move without resistance while it is rattling. If resistance is felt, repeat the adjustment procedure again from the beginning.

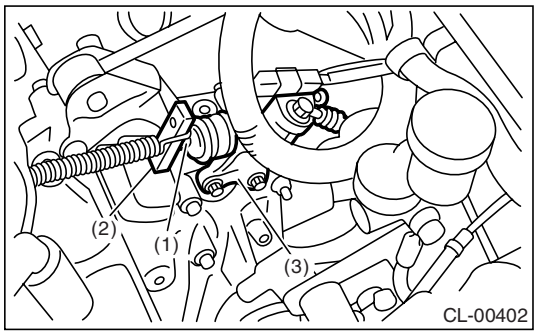
13) Push the release lever until operating cylinder push rod retracts. Ensure that the clutch fluid level in reservoir tank increases. If the clutch fluid level increases, clutch is adjusted correctly. If the fluid level does not increase or push rod does not retract, replace the master cylinder with new one. <Ref. to CL-28, Master Cylinder.>

• 2.0 L Non-turbo model and Turbo model



(1) Push rod
(2) Release lever
(3) Operating cylinder

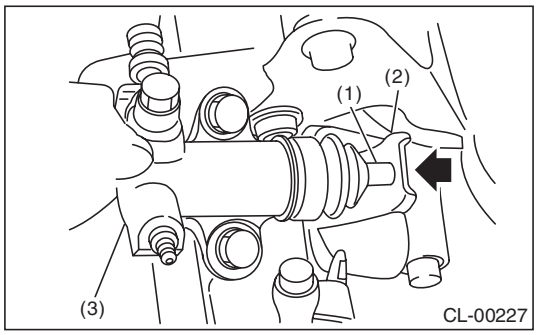
• 3.0 L model



(1) Push rod
(2) Release lever
(3) Operating cylinder

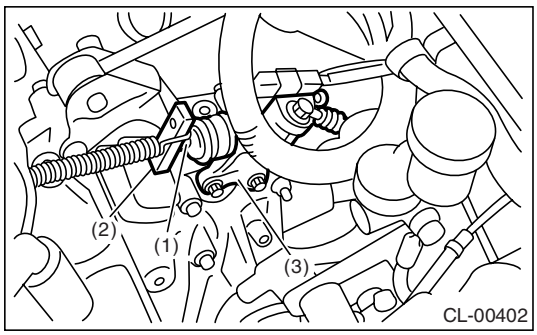
14) Push the release lever until operating cylinder push rod retracts. Check that the clutch fluid level in reservoir tank increases.

• 2.0 L Non-turbo model and Turbo model



(1) Push rod
(2) Release lever
(3) Operating cylinder

• 3.0 L model

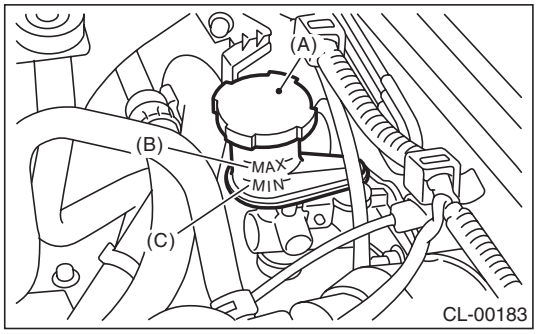


(1) Push rod
(2) Release lever
(3) Operating cylinder

15) If the clutch fluid level increases, clutch play is adjusted correctly.

16) If the clutch fluid level does not increase or push rod does not retract, clutch pedal must be re-adjusted.
17) Inspect the fluid level using the scale on the outside of reservoir tank. If the level is below “MIN”, add clutch fluid to bring it up to “MAX”.

Recommended clutch fluid:
FMVSS No. 116, fresh DOT3 or 4 brake fluid



(A) Reservoir tank
(B) MAX. level
(C) MIN. level

11.Clutch Switch

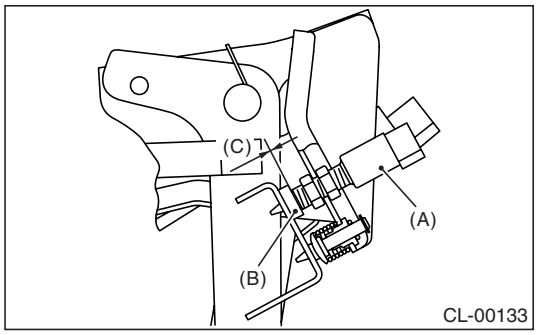
A: REMOVAL

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) Install the clutch switch so that the clearance from the clutch pedal stopper is 0 mm (0 in).

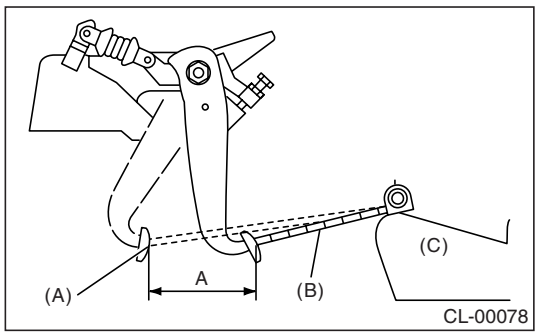
Tightening torque:
8 N·m (0.8 kgf-m, 5.8 ft-lb)



(A) Clutch switch
(B) Stopper
(C) 0 mm (0 in)

2) Measure the stroke of clutch pedal.

Specified clutch pedal full stroke A:
Non-turbo model
130 — 135 mm (5.12 — 5.31 in)
Turbo model
135 — 140 mm (5.31 — 5.51 in)



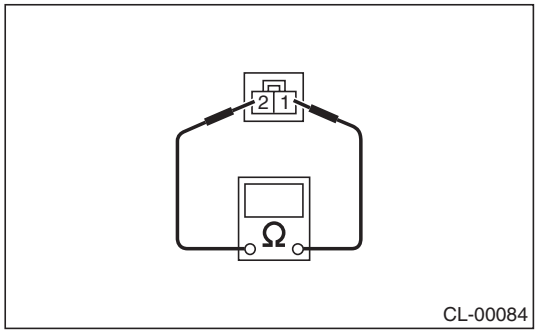
(A) Clutch pedal (at full stroke condition)
(B) Scale
(C) Seat

3) If the clutch pedal stroke is out of specification, adjust the stroke. <Ref. to CL-39, ADJUSTMENT, Clutch Pedal.>
4) Connect the clutch switch connector.

C: INSPECTION

Check the clutch switch continuity. If the continuity is not as specified, replace the switch.
(1) Disconnect the clutch switch connector.
(2) Measure the resistance between switch terminal 1 and 2.

Condition	Terminal No.	Specified resistance
When clutch pedal depressed	No. 1 — No. 2	More than 1 MΩ
When clutch pedal released	No. 1 — No. 2	Less than 1 Ω



D: ADJUSTMENT

Refer to “ADJUSTMENT” for clutch pedal. <Ref. to CL-39, ADJUSTMENT, Clutch Pedal.>

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 speeds up when shifting. • High-speed driving is impossible; especially rapid acceleration is impossible and vehicle speed does not increase in proportion to the 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 a stationary condition with parking brake fully applied. Disengage the clutch and shift the transmission gear into the 1st.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 neither the vehicle starts off nor the engine stalls.	(a) Clutch facing smeared with oil	Replace.
	(b) Worn clutch facing	Replace.
	(c) Deteriorated diaphragm spring	Replace.
	(d) Distorted pressure plate or flywheel	Rectify or replace.
	(e) Defective release bearing holder	Rectify 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 1st gear. However, because much trouble of this sort is due to defective synchronization mechanism, carry out the following tests. • Method of testing: <Ref. to CL-45, 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	Rectify or replace.
	(c) Stuck crankshaft pilot needle bearing	Replace.
	(d) Cracked clutch disc facing	Replace.
	(e) Stuck clutch disc (smeared with 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) Facing smeared with oil	Replace the clutch disc.
	(b) Weak or broken damper spring	Replace the clutch disc.
	(c) Defective facing contact or excessively worn disc	Replace the defective clutch disc.
	(d) Warped pressure plate or flywheel	Rectify or replace.
	(e) Loose disc rivets	Replace the clutch disc.
	(f) Loose engine mounting	Retighten or replace mounting.
	(g) Improper adjustment of pitching stopper	Adjust.
4. Noisy clutch Examine whether the noise is generated when the clutch is disengaged, engaged or partially engaged.	(a) Broken, worn or insufficient lubrication of release bearing	Replace the release bearing.
	(b) Insufficient lubrication of pilot bearing	Replace the pilot bearing.
	(c) Loose clutch disc hub	Replace the clutch disc.
	(d) Loose damper spring retainer	Replace the clutch disc.
	(e) Deteriorated or broken damper spring	Replace the clutch disc.

Symptom	Possible cause	Corrective action
5. Clutch grabs. When starting the vehicle with the clutch partially engaged, the clutch grabs 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 and apply grease, or replace clutch disc or main shaft.
	(d) Deteriorated or broken damper spring	Replace the clutch disc.
	(e) Loose engine mounting	Retighten or replace mounting.
	(f) Deteriorated diaphragm spring	Replace.

2. CLUTCH PEDAL

Trouble	Corrective action
Insufficient pedal play	Adjust pedal free play.
Insufficient clutch pedal free play	Adjust pedal free play.
Excessively worn and damaged pedal shaft or bushing	Replace the bushing 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) Depress the clutch pedal at idle and quickly shift from neutral to reverse.	Is there any noise from the transmission gear?	Go to step **2.**	Clutch is normal.
2	**CHECK GEAR NOISE.** Depress the clutch pedal at idle and shift from neutral to reverse within 0.5 — 1.0 seconds.	Is there any noise from the transmission gear?	Go to step **3.**	Defective transmission or excessive clutch drag torque. Inspect 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 pedal depressed, shift from neutral to reverse, reverse to neutral several times.	Is there any 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 and clutch disc hub spline.