

General Description

AUTOMATIC TRANSMISSION

1. General Description

A: SPECIFICATION

1. TORQUE CONVERTER CLUTCH

Type	Symmetric, 3 element, single stage, 2 phase torque converter
Stall torque ratio	1.9
Nominal diameter	250 mm (9.84 in)
Stall speed (at sea level)	2,300 — 2,800 rpm
One-way clutch	Sprague type one-way clutch

2. OIL PUMP

Type	Internal gear fixed displacement 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	3.841
2nd	2.352
3rd	1.529
4th	1.000
5th	0.839
Rev.	2.764

5. PLANETARY GEAR AND PLATE

Number of front internal gear teeth	102
Number of front carrier teeth	24
Number of front sun gear teeth	54
Number of mid internal gear teeth	78
Number of mid carrier teeth	18
Number of mid sun gear teeth	42
Number of rear internal gear teeth	98
Number of rear carrier teeth	18
Number of rear sun gear teeth	62
Number of front brake drive plates	2
Number of input clutch drive plates	5
Number of high & low reverse clutch drive plates	4
Number of direct clutch drive plates	5
Number of reverse brake drive plates	5
Number of forward brake drive plates	4
Number of low coast brake drive plates	3

6. SELECTOR POSITION

P (Park)	Transmission is in neutral, output member is immovable, engine start is possible
R (Reverse)	Transmission in reverse for backing
N (Neutral)	Transmission is in neutral and engine start is 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 AND LUBRICATION

Type	Electronic/hydraulic control [5 forward gear changes made by electronic signals of vehicle speed and accelerator (throttle) opening]
Fluid	Specified fluid: SUBARU ATF HP Recommended fluid: IDEMITSU ATF HP CASTROL TRANSMAX J PENNZOIL QUAKER-STATE • PENNZOIL ATF-J NOTE: Use of the recommended fluid is permitted only in regions where the specified fluid is not available.
Fluid capacity $\varnothing$ (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 AND HARNESS

Cooling system	Liquid-cooler incorporated in radiator
Transmission harness	20 + 8 poles

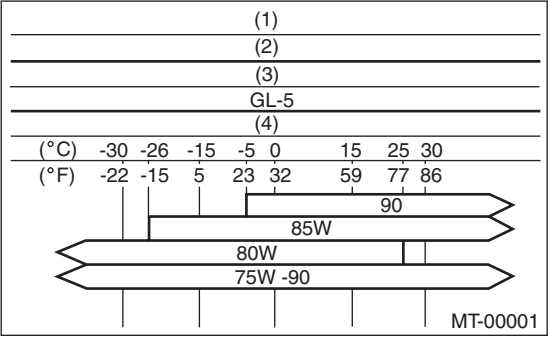
9. TRANSFER

Transfer type	Variable torque distribution (VTD)
Number of transfer clutch drives & driven plates	4
Reduction gear ratio	1.000 (41/41)

10.FINAL REDUCTION GEAR

Front final reduction gear ratio	3.583
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11.RECOMMENDED GEAR OIL

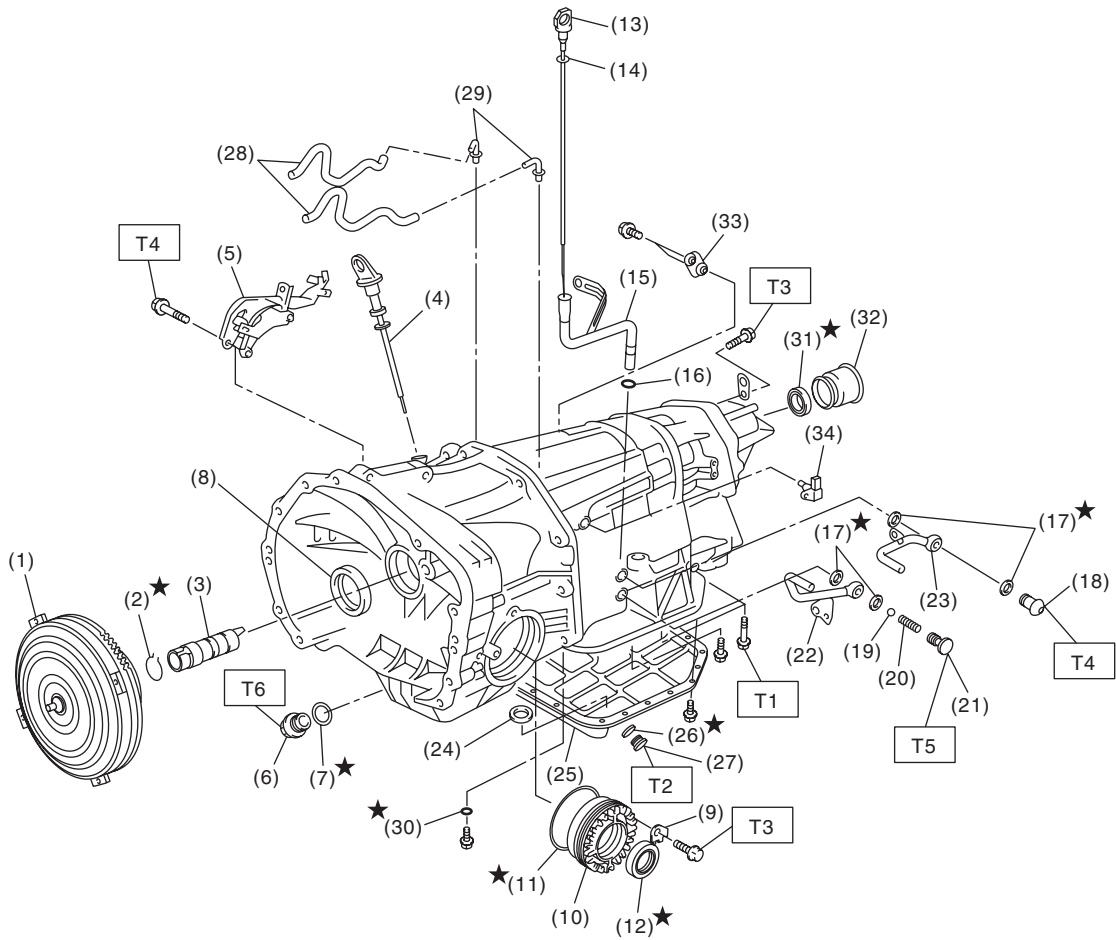
Lubrication oil	 (1) Item (2) Front differential gear oil (3) API standard (4) SAE viscosity No. and applicable temperature
Front differential gear oil capacity $\varnothing$ (US qt, Imp qt)	1.3 — 1.5 (1.4 — 1.6, 1.1 — 1.3)

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B: COMPONENT

1. TORQUE CONVERTER CLUTCH & TRANSMISSION ASSEMBLY



AT-03368

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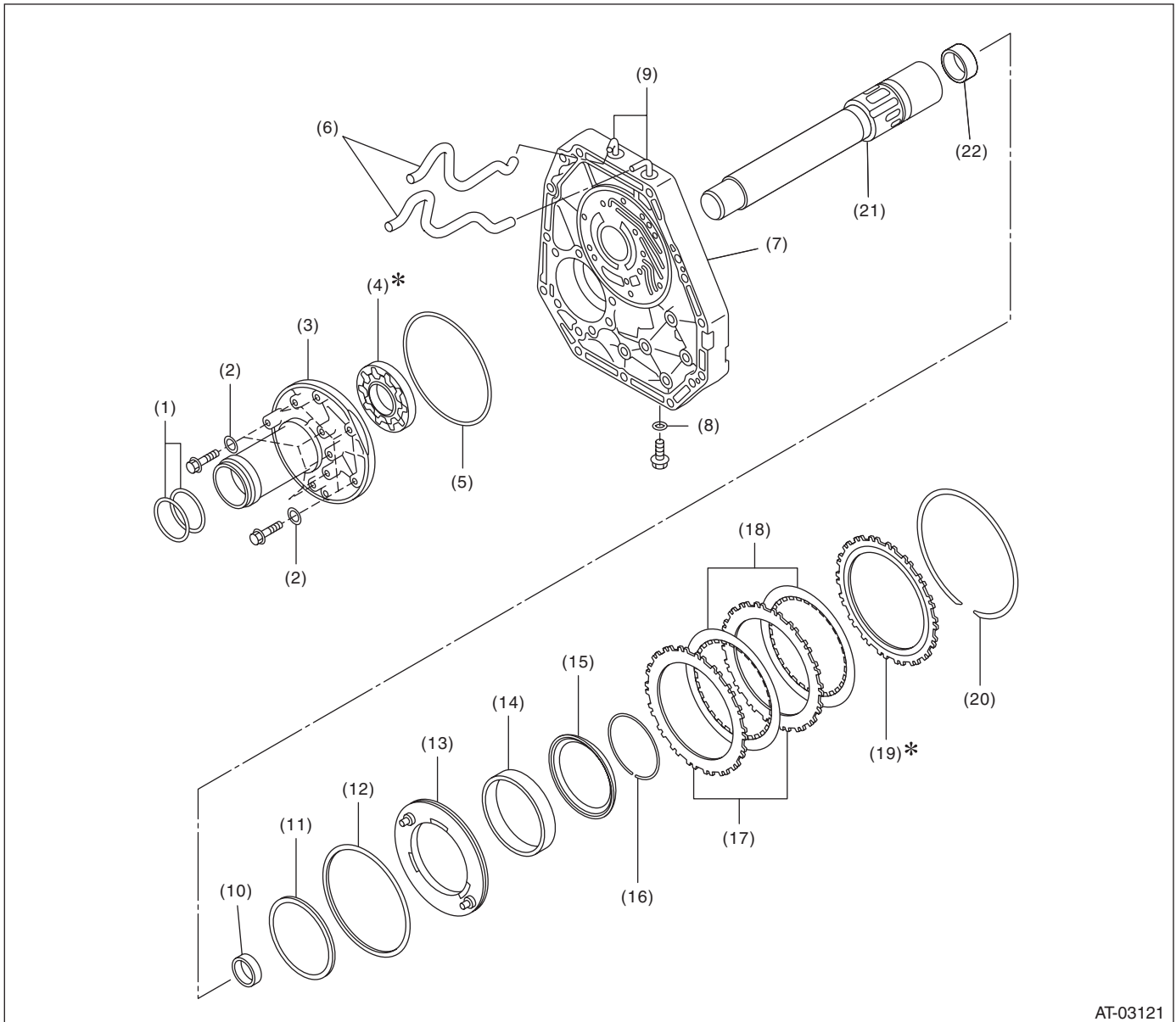
(1) Torque converter ASSY	(15) Oil charge pipe	(29) Nipple
(2) Circlip	(16) O-ring	(30) O-ring
(3) Oil pump shaft	(17) Gasket	(31) Oil seal
(4) Differential oil level gauge	(18) Union screw	(32) Dust cover
(5) Pitching stopper bracket	(19) Ball	(33) Floating bracket
(6) Differential oil drain plug	(20) Spring	(34) Turbine speed sensor 1
(7) Gasket	(21) Union screw	
(8) Oil seal	(22) ATF outlet pipe	
(9) Lock plate	(23) ATF inlet pipe	
(10) Side retainer	(24) Magnet	
(11) O-ring	(25) Oil pan	
(12) Oil seal	(26) Gasket	
(13) ATF level gauge	(27) ATF drain plug	
(14) O-ring	(28) Breather hose	

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)****T4: 40 (4.1, 29.5)****T5: 45 (4.6, 33.2)****T6: 70 (7.1, 51.6)**

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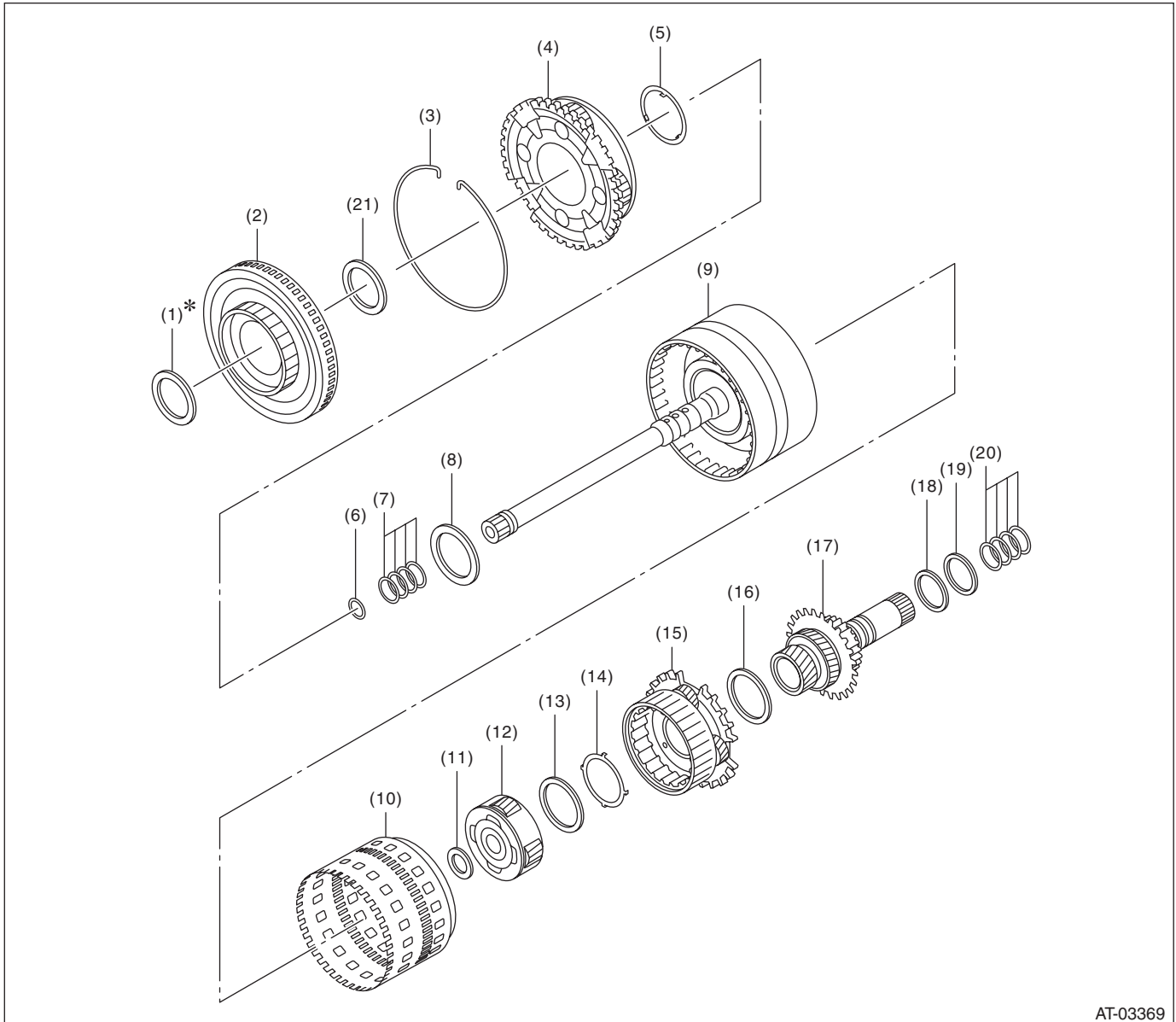
2. OIL PUMP & FRONT BRAKE



AT-03121

- | | | |
|-----------------------|-------------------------|---------------------|
| (1) O-ring | (9) Nipple | (17) Driven plate |
| (2) Washer | (10) Needle bearing | (18) Drive plate |
| (3) Oil pump housing | (11) D-ring (Inner) | (19) Retainer plate |
| (4) Oil pump rotor | (12) D-ring (Outer) | (20) Snap ring |
| (5) O-ring | (13) Front brake piston | (21) Stator shaft |
| (6) Air breather hose | (14) Return spring | (22) Needle bearing |
| (7) Oil pump cover | (15) Retainer | |
| (8) O-ring | (16) Snap ring | |

3. FRONT PLANETARY CARRIER AND MIDDLE & REAR PLANETARY CARRIER



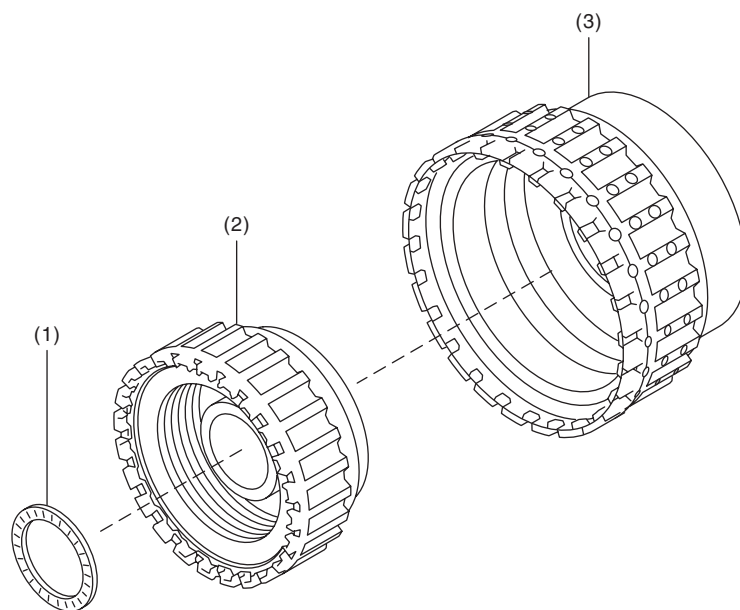
AT-03369

- | | | |
|-------------------------|------------------------------|----------------------------------|
| (1) Thrust bearing | (8) Thrust bearing | (15) Rear carrier ASSY |
| (2) Front sun gear ASSY | (9) Input clutch ASSY | (16) Thrust bearing |
| (3) Snap ring | (10) Rear internal gear ASSY | (17) Middle & rear sun gear ASSY |
| (4) Front carrier ASSY | (11) Thrust bearing | (18) Washer |
| (5) Race bearing | (12) Middle carrier ASSY | (19) Thrust bearing |
| (6) O-ring | (13) Thrust bearing | (20) Seal ring |
| (7) Seal ring | (14) Race bearing | (21) Thrust bearing |

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4. DIRECT CLUTCH AND HIGH & LOW REVERSE CLUTCH



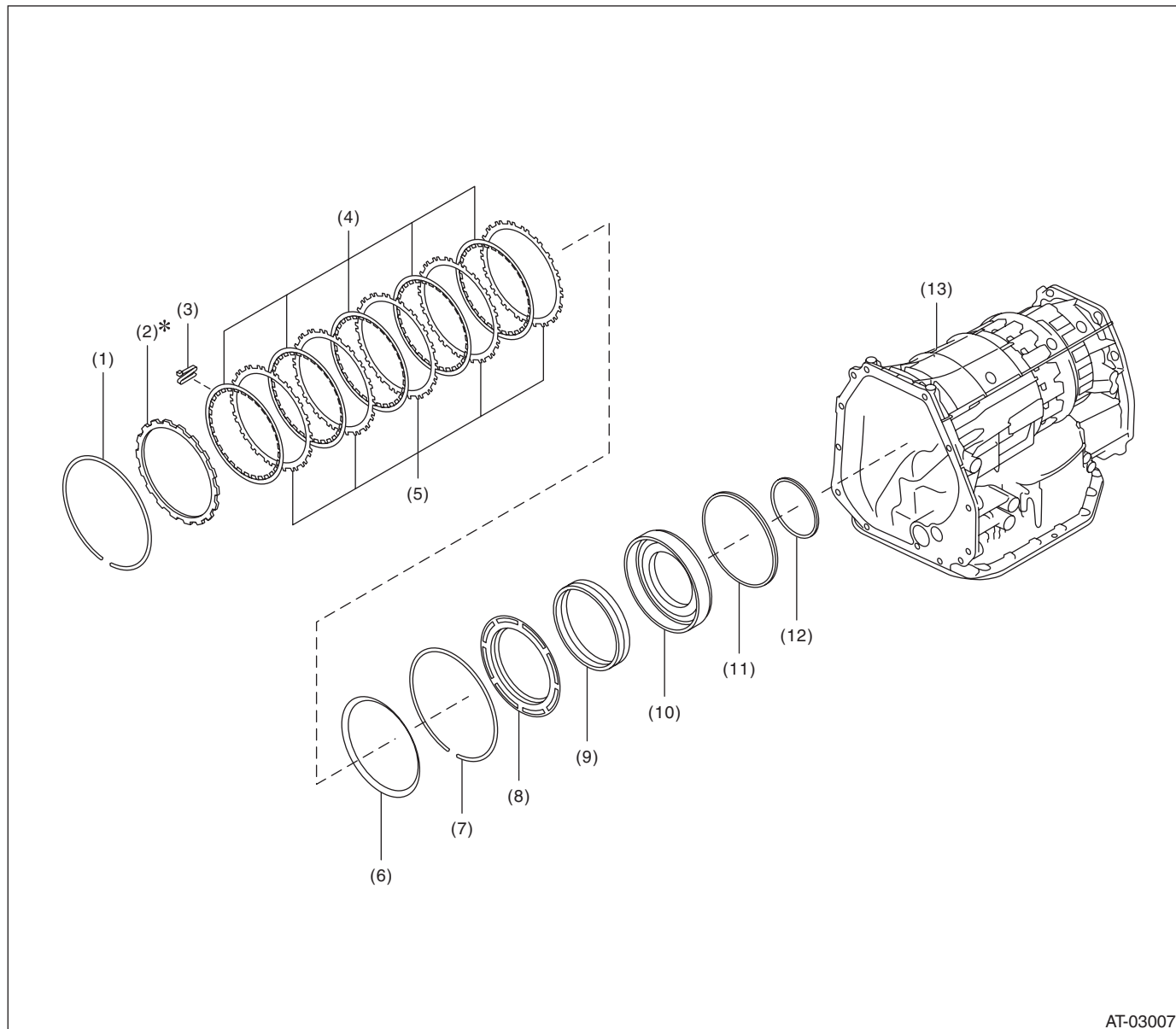
AT-02018

(1) Thrust bearing

(2) High & low reverse clutch ASSY

(3) Direct clutch ASSY

5. REVERSE BRAKE



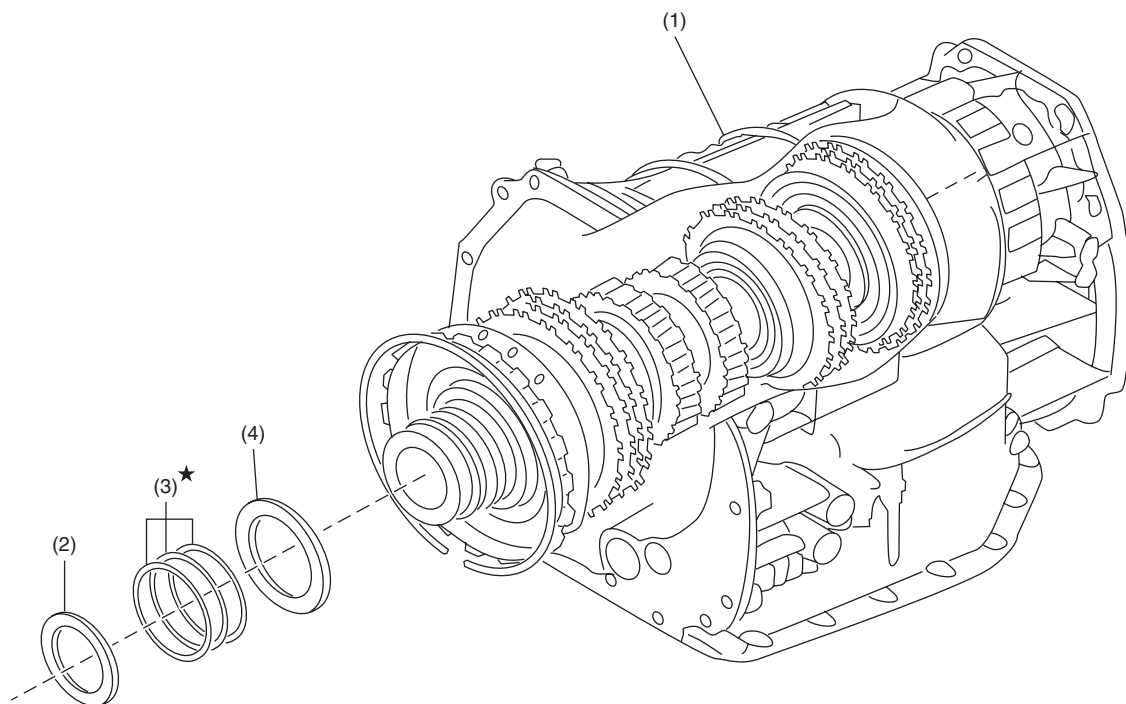
AT-03007

- | | | |
|--------------------|-----------------|---------------------------|
| (1) Snap ring | (6) Dish plate | (10) Reverse brake piston |
| (2) Retainer plate | (7) Snap ring | (11) D-ring (Outer) |
| (3) Leaf spring | (8) Retainer | (12) D-ring (Inner) |
| (4) Drive plate | (9) Leaf spring | (13) AT main case |
| (5) Driven plate | | |

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6. SHORT AT ASSEMBLY



AT-04324

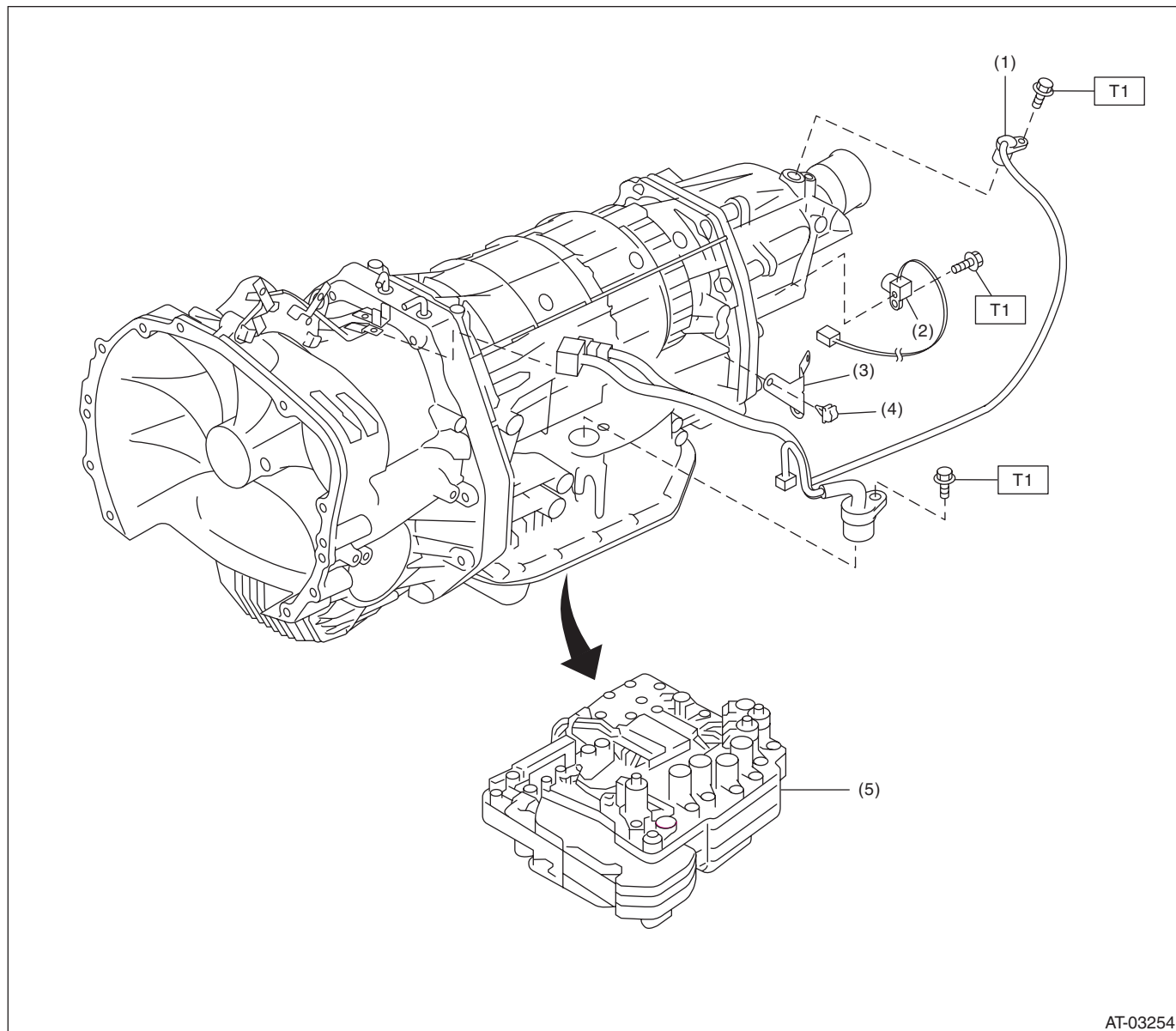
(1) Short AT ASSY
(non-disassembled)

(3) Seal ring

(4) Thrust bearing

(2) Thrust bearing

7. CONTROL VALVE & TRANSMISSION HARNESS



AT-03254

- (1) Transmission harness ASSY
- (2) Front vehicle speed sensor
- (3) Harness bracket

- (4) Clip
- (5) Control valve ASSY

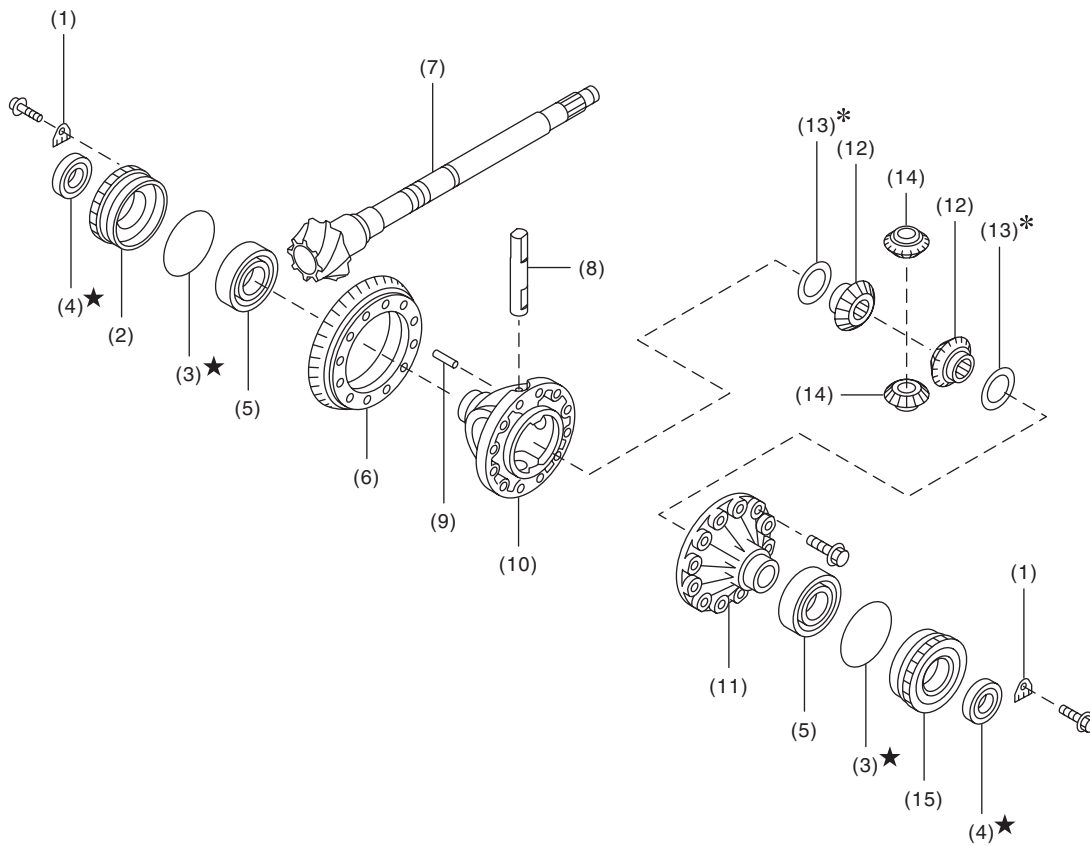
Tightening torque: N·m (kgf-m, ft-lb)

T1: 7 (0.7, 5.2)

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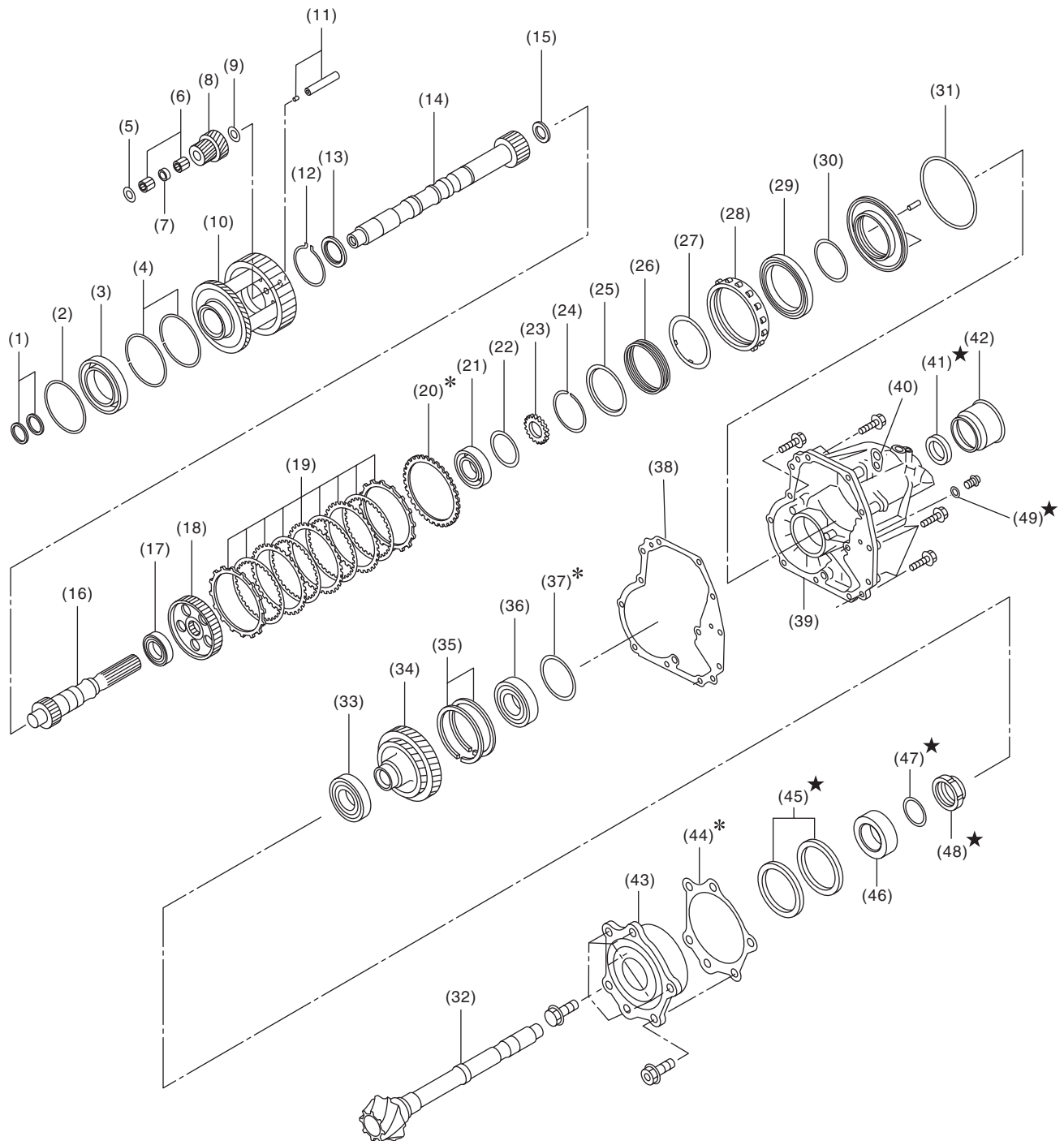
8. DIFFERENTIAL GEAR



AT-03008

- | | | |
|-----------------------------------|---------------------------|------------------------------------|
| (1) Retainer plate RH | (6) Hypoid driven gear | (11) Differential case LH |
| (2) Differential side retainer RH | (7) Drive pinion shaft | (12) Differential bevel gear |
| (3) O-ring | (8) Pinion shaft | (13) Washer |
| (4) Oil seal | (9) Straight pin | (14) Differential bevel pinion |
| (5) Taper roller bearing | (10) Differential case RH | (15) Differential side retainer LH |

9. TRANSFER CASE, EXTENSION CASE & REDUCTION GEAR



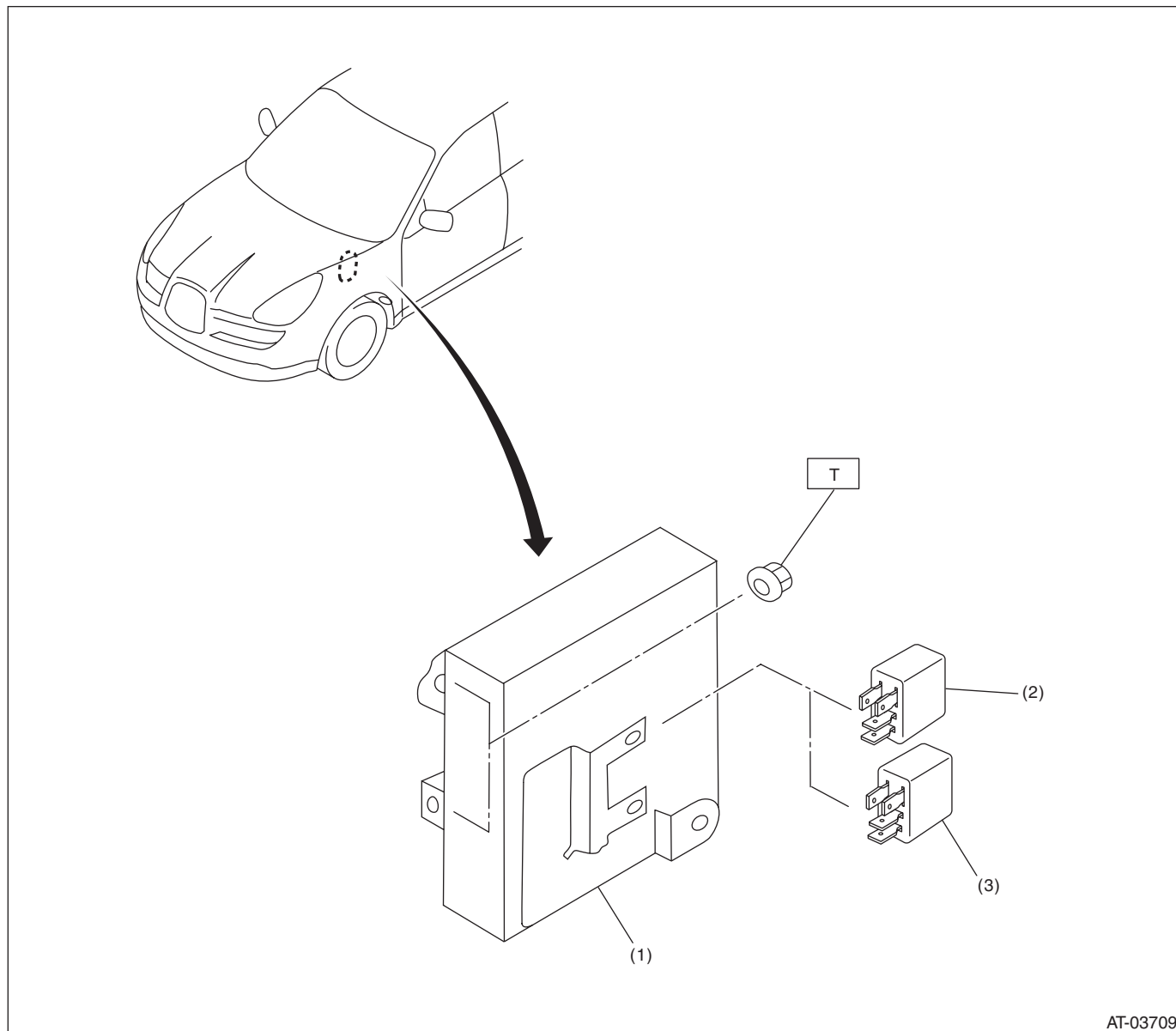
AT-03247

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(1) Seal ring	(18) Transfer clutch hub	(34) Reduction driven gear
(2) Reduction gear shim	(19) Transfer clutch plate	(35) Snap ring
(3) Ball bearing	(20) Driven plate No. 3	(36) Ball bearing
(4) Snap ring	(21) Ball bearing	(37) Shim
(5) Planetary pinion washer	(22) Rear drive shaft shim	(38) Shim
(6) Needle bearing	(23) Revolution gear	(39) Extension case
(7) Spacer	(24) Snap ring	(40) Transmission hanger
(8) Pinion gear	(25) Clutch spring retainer	(41) Oil seal
(9) Washer	(26) Return spring	(42) Dust cover
(10) Planetary carrier ASSY	(27) Spring retainer	(43) Taper roller bearing
(11) Planetary pinion shaft ASSY	(28) Pressure plate	(44) Drive pinion shim
(12) Snap ring	(29) Ball bearing	(45) Oil seal
(13) Thrust bearing	(30) O-ring	(46) Drive pinion collar
(14) Intermediate shaft	(31) D-ring	(47) O-ring
(15) Thrust washer	(32) Drive pinion shaft	(48) Lock nut
(16) Rear drive shaft	(33) Ball bearing	(49) O-ring
(17) Ball bearing		

10.TRANSMISSION CONTROL MODULE



AT-03709

(1) Transmission control module (TCM)

(2) P-VIGN relay

(3) Back-up light relay

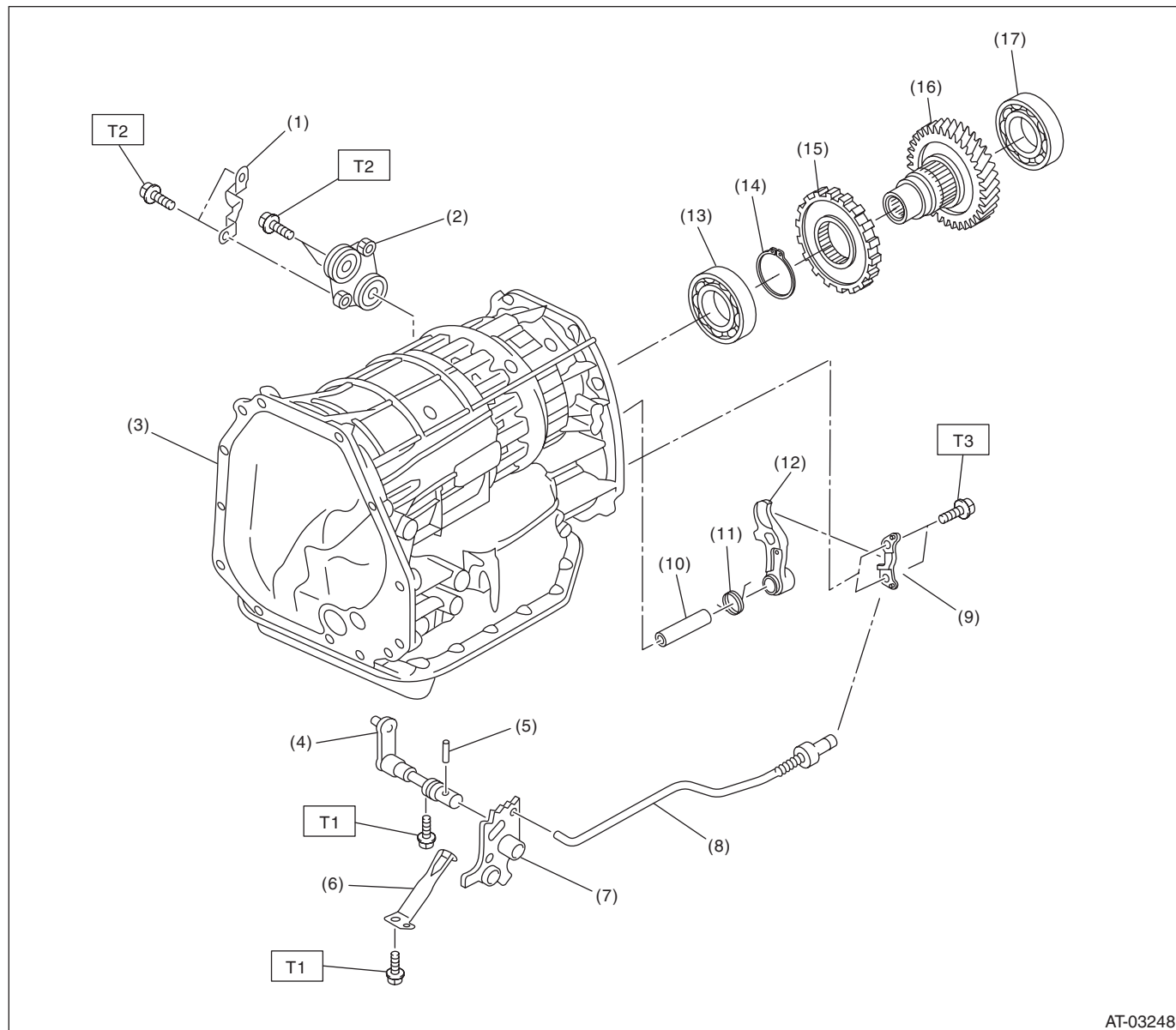
Tightening torque: N·m (kgf-m, ft-lb)

T: 7.5 (0.76, 5.5)

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11.TRANSMISSION CONTROL DEVICE & PARKING SUPPORT



AT-03248

- | | | |
|------------------------|------------------------------|----------------------------|
| (1) Bracket | (9) Parking support actuator | (16) Reduction driven gear |
| (2) Floating bracket | (10) Parking pawl shaft | (17) Ball bearing |
| (3) AT main case | (11) Return spring | |
| (4) Range select lever | (12) Parking pawl | |
| (5) Straight pin | (13) Ball bearing | |
| (6) Detent spring | (14) Snap ring | |
| (7) Manual plate | (15) Parking gear | |
| (8) Parking rod | | |

Tightening torque: N·m (kgf-m, ft-lb)

T1: 6 (0.6, 4.4)

T2: 25 (2.5, 18)

T3: <Ref. to 5AT-76, Parking Pawl.>

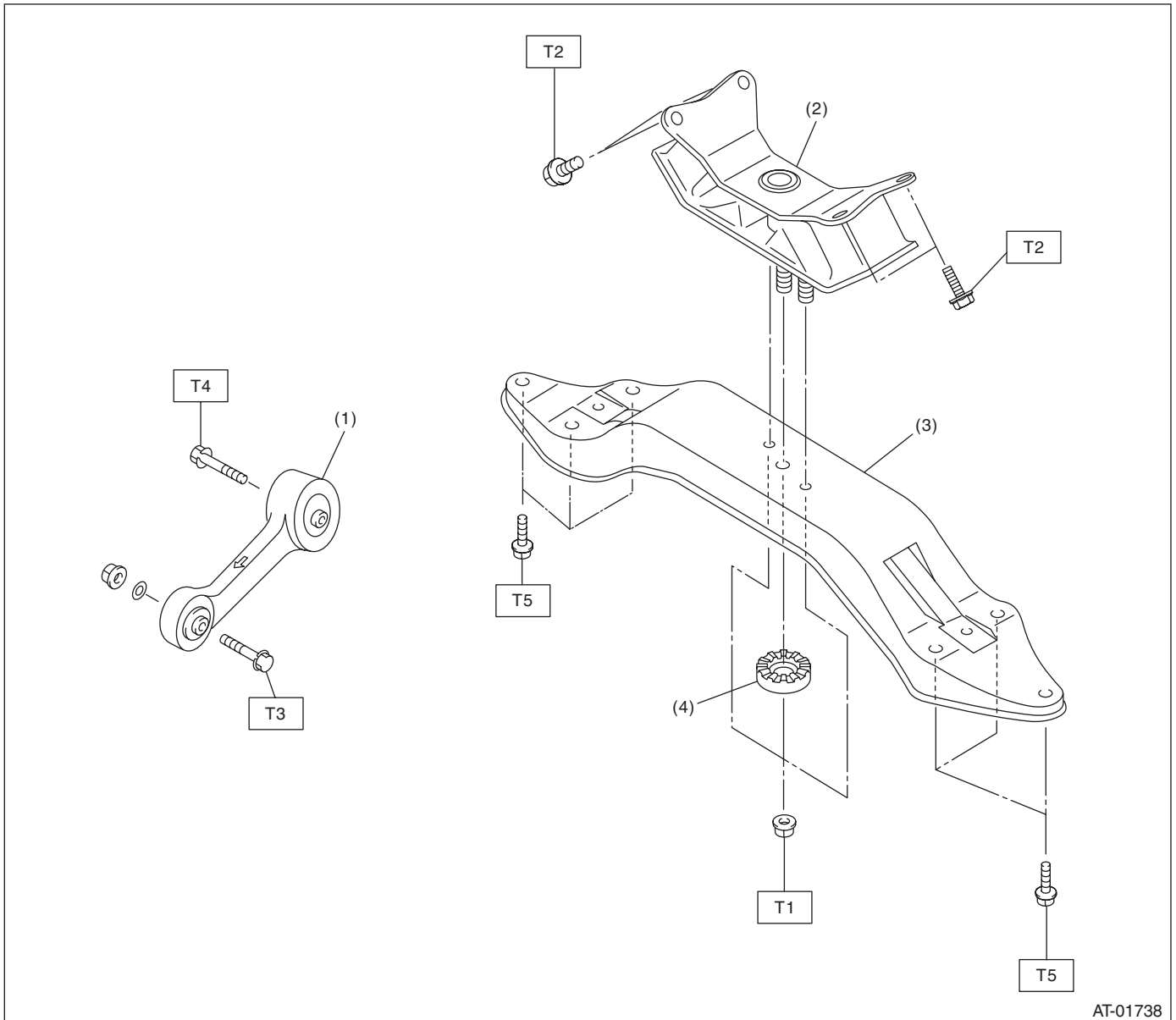
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- Tightening torque: N·m (kgf·m, ft·lb)**
T1: 7 (0.71, 5.2)
T2: 7.5 (0.76, 5.5)

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13.TRANSMISSION MOUNTING



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

- (3) Crossmember
(4) Stopper

Tightening torque: N·m (kgf·m, ft·lb)

T1: 35 (3.6, 26)

T2: 40 (4.1, 29.5)

T3: 50 (5.1, 36.9)

T4: 58 (5.9, 42.8)

T5: 75 (7.6, 55.3)

C: CAUTION

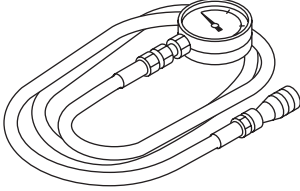
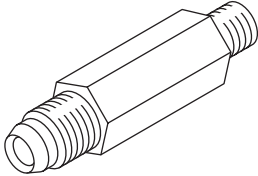
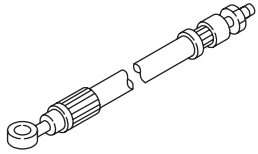
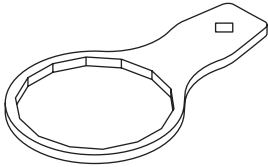
- Wear appropriate work clothing, including a cap, protective goggles and protective shoes when performing any work.
- Remove contamination including dirt and corrosion before removal, installation or disassembly.
- Keep the disassembled parts in order and protect them from dust and dirt.
- Until the 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 apart with screwdrivers or other tools.
- Vehicle components are extremely hot after driving. Be wary of receiving burns from heated parts.
- Use SUBARU genuine gear oil, grease or the equivalent. Do not mix them of different grades or manufacturers.
- Be sure to tighten bolts and nuts to the specified torque.
- Place shop jacks or rigid racks at the specified points.
- Apply gear oil onto sliding or revolving surfaces before installation.
- Replace deformed or damaged snap rings with new parts.
- 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 liquid gasket.

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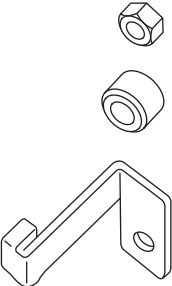
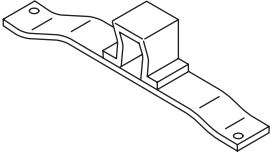
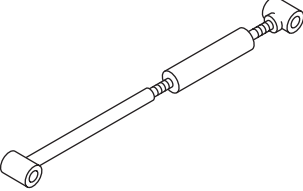
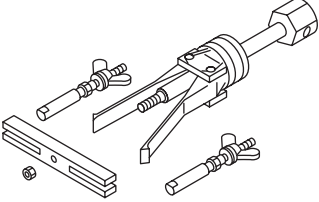
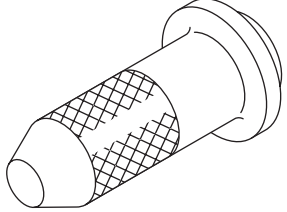
D: PREPARATION TOOL

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 together with oil pump cover installed on when measuring line pressure.
 ST-498897700	498897700	OIL PRESSURE ADAPTER	Used for measuring transfer clutch pressure.
 ST-498545400	498545400	FILTER WRENCH	Used for removing and installing the ATF filter.

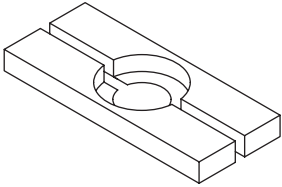
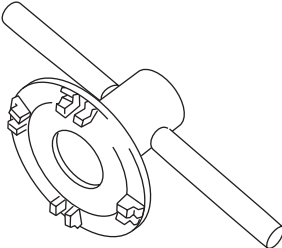
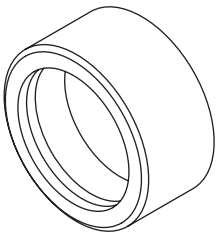
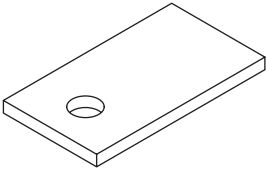
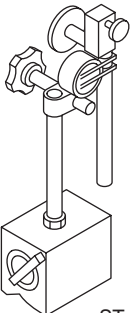
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ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-498277200	498277200	STOPPER SET	Used for preventing the torque converter assembly from falling when removing and installing automatic transmission assembly.
 ST41099AA010	41099AA010	ENGINE SUPPORT BRACKET	Used for supporting engine.
 ST41099AA020	41099AA020	ENGINE SUPPORT	Used for supporting engine.
 ST-398527700	398527700	PULLER ASSY	• Used for removing the extension case roller bearing. • Used for removing the extension oil seal. • Used for removing the front differential side retainer bearing outer race. • Used for removing the front differential side retainer oil seal.
 ST-498057300	498057300	INSTALLER	Used for installing the extension oil seal.

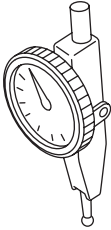
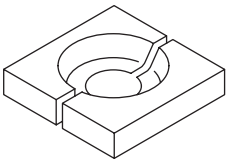
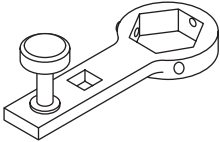
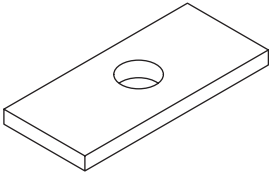
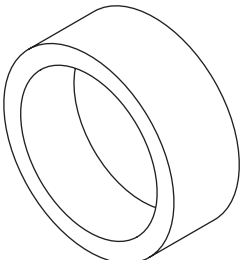
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ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-498077000	498077000	REMOVER	Used for removing the differential taper roller bearing.
 ST18630AA010	18630AA010	WRENCH COMPL RETAINER	Used for removing and installing the differential side retainer.
 ST-398487700	398487700	DRIFT	Used for installing the front differential taper roller bearing.
 ST-498255400	498255400	PLATE	Used for measuring the backlash of hypoid gear.
 ST-498247001	498247001	MAGNET BASE	- Used for measuring the gear backlash. - Used together with DIAL GAUGE (498247100).

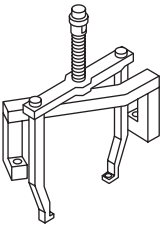
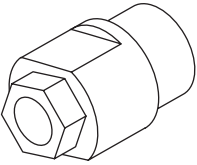
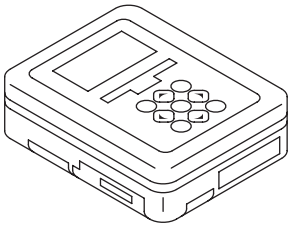
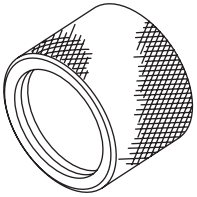
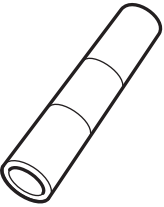
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ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-498247100	498247100	DIAL GAUGE	- Used for measuring the gear backlash. - Used together with MAGNET BASE (498247001).
 ST-498517000	498517000	REPLACER	Used for removing the front roller bearing.
 ST-499787700	499787700	WRENCH	Used for removing and installing the drive pinion lock nut.
 ST-398643600	398643600	GAUGE	Used for measuring the total end play, extension end play and drive pinion height.
 ST-398744300	398744300	PISTON GUIDE	Used for measuring height from mating surface of the main case to pressure plate.

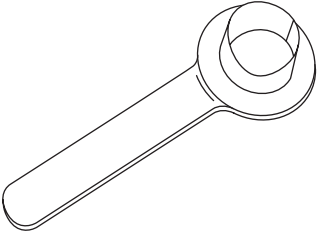
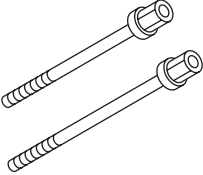
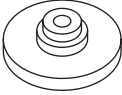
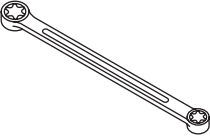
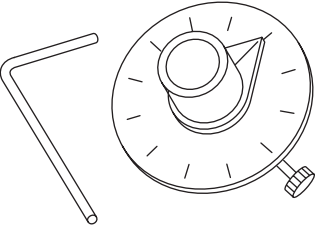
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ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-499737100	499737100	PULLER SET	Used for removing the reduction driven gear assembly.
 ST18667AA010	18667AA010	HOLDER	• Used for removing and installing the drive pinion lock nut. • Used as a handle to rotate gear when checking tooth contact.
 ST1B020XU0	1B020XU0	SUBARU SELECT MONITOR KIT	Used for troubleshooting the electrical system.
 ST18675AA000	18675AA000	DIFFERENTIAL SIDE OIL SEAL INSTALLER	Used for installing the differential side retainer oil seal.
 ST18654AA000	18654AA000	INSTALLER	Used for removing and installing the ball bearing.

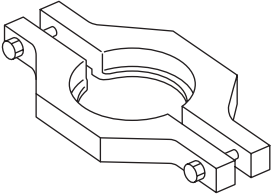
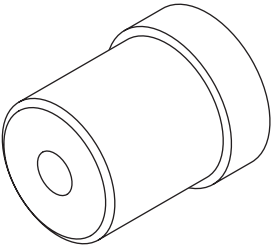
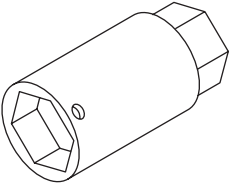
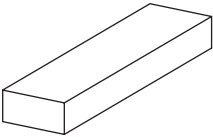
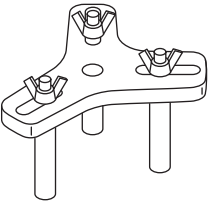
General Description

AUTOMATIC TRANSMISSION

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST28399SA010	28399SA010	OIL SEAL PROTECTOR	Used for protecting oil seal when installing front drive shaft.
 ST18763AA000	18763AA000	COMPRESSOR SHAFT	Used for disassembling multi-plate clutch for shift transmission.
 ST18765AA000	18765AA000	COMPRESSOR SUPPORT	Used for disassembling multi-plate clutch for shift transmission.
 ST18676AA020	18676AA020	TORX® WRENCH	Used for disassembling torque converter case.
 ST18854AA000	18854AA000	ANGLE GAUGE	Used for tightening parking support.

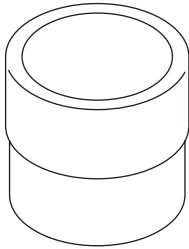
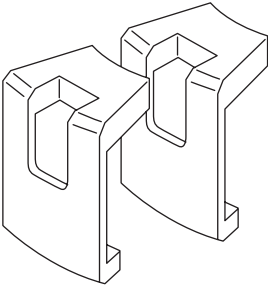
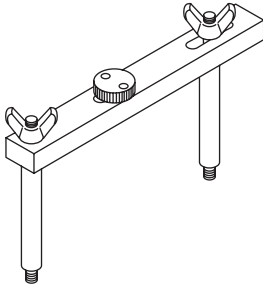
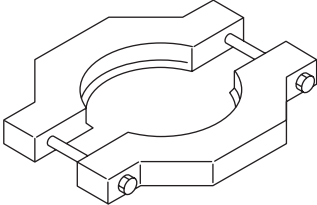
General Description

AUTOMATIC TRANSMISSION

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-498077300	498077300	REMOVER	Used for removing ball bearing of reduction driven gear.
 ST-499587100	499587100	OIL SEAL INSTALLER	Used for installing the 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.
 ST18762AA000	18762AA000	COMPRESSOR SPECIAL TOOL	Used for disassembling multi-plate clutch for shift transmission.

General Description

AUTOMATIC TRANSMISSION

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-499755602	499755602	PRESS	Used for installing the parking gear.
 ST18680AA010	18680AA010	HOLDER GEAR	Used for removing reduction driven gear assembly. (2-piece set)
 ST18766AA000	18766AA000	SUPPORT PULLER	Used for removing reduction driven gear assembly.
 ST18767AA000	18767AA000	REMOVER	- Used to pull out the parking gear. - Used to pull out the bearing from the VTD assembly.

2. GENERAL TOOL

TOOL NAME	REMARKS
Depth gauge	Used for measuring the transmission end play.
Thickness gauge	Used for measuring clearance of the clutch, brake and oil pump.
Micrometer	Used for measuring thickness of the drive pinion.
Spring scale	Used for measuring the starting torque of the 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.

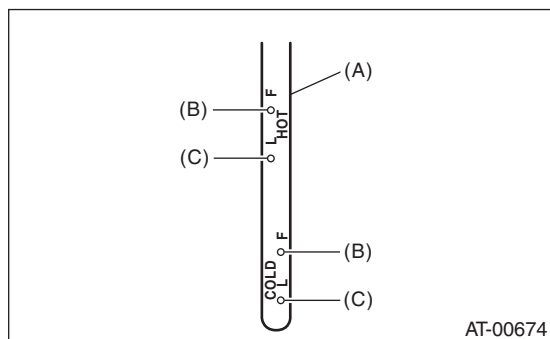
2. Automatic Transmission Fluid

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) displayed on Subaru Select Monitor. <Ref. to 5AT(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. Idle the engine for 1 or 2 minutes, and measure the ATF level.



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

- 4) Make sure that the ATF level is between upper and lower marks of the HOT side.
- 5) If the ATF level is below the lower mark, add recommended ATF until the fluid level is between upper and lower marks.

CAUTION:

- Be careful 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) displayed on Subaru Select Monitor. <Ref. to 5AT(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 or the engine has been long idle running, the ATF is hot. Be careful not to burn yourself.

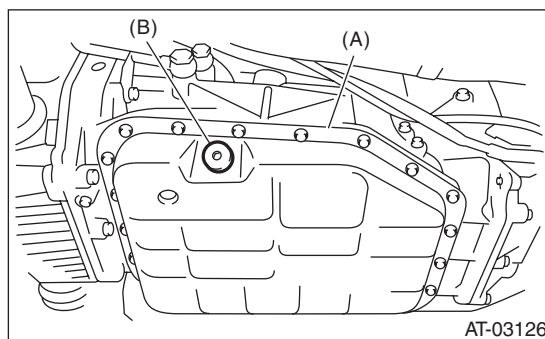
- 3) Check the condition of ATF. <Ref. to 5AT-29, CONDITION CHECK, Automatic Transmission Fluid.>
- 4) Tighten the ATF drain plug.

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 HP

Recommended fluid:

IDEMITSU ATF HP

CASTROL TRANSMAX J

PENNZOIL QUAKERSTATE • PENNZOIL ATF-J

NOTE:

Use of the recommended fluid is permitted only in regions 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.	Internal metal parts of transmission body are excessively worn.	Replace ATF and check if AT operates correctly.
Is thick and is a varnish-form fluid.	Clutch etc. is burned.	Replace ATF and check the AT body or vehicle for faulty.
Clouded fluid or bubbles are found in fluid.	Water is mixed.	Replace ATF and check the water entering point.

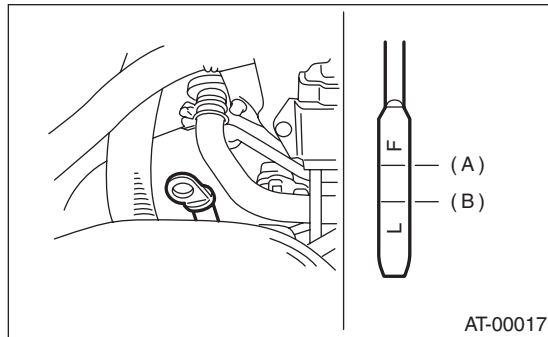
3. Differential Gear Oil

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. Make sure the level gauge is inserted correctly 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 add oil above the "F" line.



- (A) Upper level
(B) Lower level

B: REPLACEMENT

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

CAUTION:

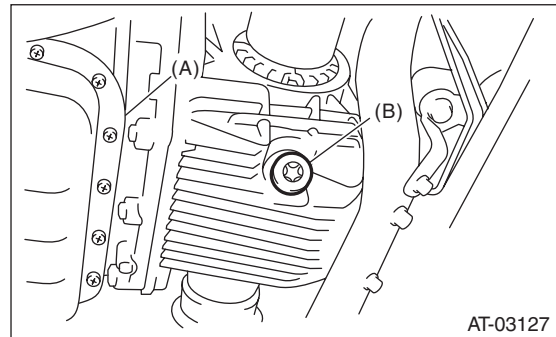
- Immediately after the vehicle has been running or after idling for a long time, the differential gear oil will be hot. Be careful not to burn yourself.
 - Be careful not to spill differential gear oil on the exhaust pipe to prevent it from emitting smoke or causing a fire. If differential gear oil is spilled on the exhaust pipe, wipe it off 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 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)

- 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 $\longleftrightarrow$ 2nd $\longleftrightarrow$ 3rd $\longleftrightarrow$ 4th $\longleftrightarrow$ 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. Check the shock level during kick-down at the same time.

5. ENGINE BRAKE OPERATION

- Check the 4th gear engine brake by 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 by 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 by 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 by shifting down from 2nd to 1st range while driving in 2nd gear of manual mode [20 — 30 km/h (12 — 19 MPH)].

6. P RANGE OPERATION

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

7. NOISE & VIBRATION

Check for noise and vibration while driving and during shifting.

8. OIL LEAKAGE

After the driving test, inspect for oil leaks from the transmission body.

5. Stall Test

A: INSPECTION

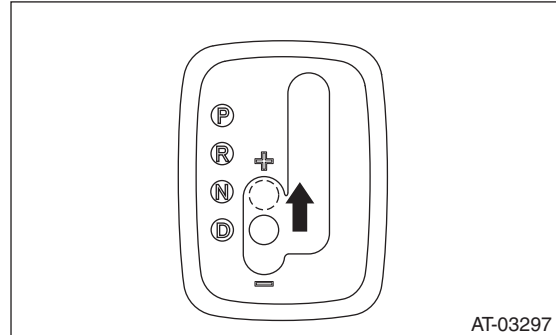
NOTE:

The stall test is extremely important in diagnosing the condition of an 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:

- Operational check of the automatic transmission clutch
 - Operational check of the torque converter clutch
 - Engine performance check
- 1) Check that the throttle valve fully 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 to 70 to 80°C (158 to 176°F) by driving a distance of 5 to 10 km (3 to 6 miles). Confirm the ATF temperature on Subaru Select Monitor. <Ref. to 5AT(diag)-16, 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 select lever to ensure it operates properly, and then set to the “2nd gear of manual mode”.



- 9) While stepping hard on the brake pedal, gradually step on the accelerator pedal.
- 10) When the engine speed is stabilized, quickly record the engine speed and release 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). Doing so will make the engine oil and ATF deteriorate and the clutch and brake to be adversely affected.
- After performing the stall test, be sure to cool down the engine for at least one minute with the select lever set in “P” or “N” range, and at an idle speed of 1,200 rpm or less.
- 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):

2,300 — 2,800 rpm

Stall speed (at sea level)	Range	Possible faulty part
Below specified value	R	•Engine •One-way clutch of torque converter clutch
Over specified value	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

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 shock is 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 of 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 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 of “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

Line Pressure Test

AUTOMATIC TRANSMISSION

7. Line Pressure Test

A: MEASUREMENT

NOTE:

If the clutch or brake shows a sign of slippage, or shifting interval is not correct, check the line pressure.

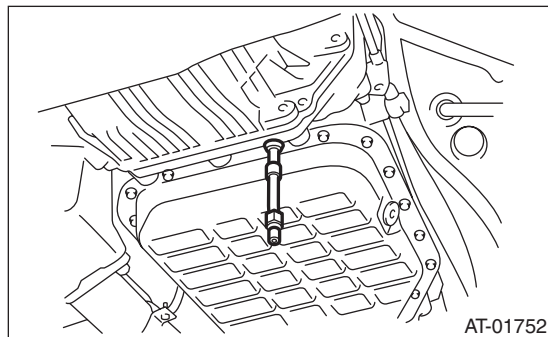
- Excessive shock during up-shift may be due to the line pressure being too high.
- Slippage or inability to operate the vehicle may, in most cases, be due to loss of oil pressure for the operation of clutch, brake or control valve.

1) Set the vehicle on a lift.

2) Remove the under cover.

3) Remove the test plug and install the ST.

ST 498897200 OIL PRESSURE ADAPTER



4) Set the ST1 and ST2.

ST1 498897200 OIL PRESSURE ADAPTER

ST2 498575400 OIL PRESSURE GAUGE
ASSY

5) Lower the vehicle, and pull ST1 and ST2 into the vehicle.

ST1 498897200 OIL PRESSURE ADAPTER

ST2 498575400 OIL PRESSURE GAUGE
ASSY

6) Connect the Subaru Select Monitor to the data link connector and read the current data. <Ref. to 5AT(diag)-16, READ CURRENT DATA, OPERATION, Subaru Select Monitor.>

7) Perform the line pressure test.

NOTE:

- Do not perform the line pressure test for more than 5 seconds at a time. Doing so will make the engine oil and ATF deteriorate and the clutch and brake to be adversely affected.

- After performing the line pressure test, 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 at 1,200 rpm or less.

- Adjust the throttle valve angle in order to match the "P/L Solenoid Pressure" displayed on the Subaru Select Monitor.

Range of the selector lever	Throttle opening angle	ATF temperature condition	"P/L Solenoid Pressure" displayed on the Subaru Select Monitor kPa	Standard line pressure kPa (kg/cm ² , psi)
D	Full closed	45 — 55°C (104 — 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

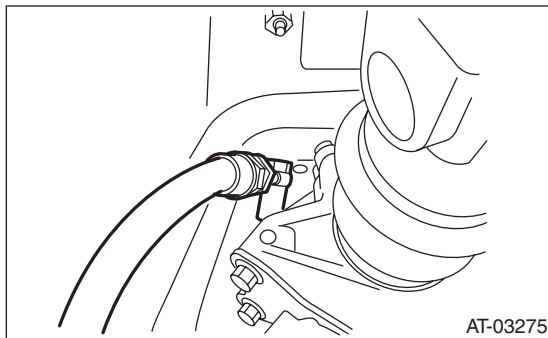
A: INSPECTION

- 1) Lift-up the vehicle.
- 2) Remove the bolts holding the heat shield cover, and move the heat shield cover to the rear.
- 3) Remove the test plug and install the ST.

CAUTION:

Be careful not to cut yourself on the heat shield cover when removing the test plugs and setting the ST.

ST 498897700 OIL PRESSURE ADAPTER
ST 498897800 ADAPTER SET



- 4) Set the ST.
ST 498575400 OIL PRESSURE GAUGE ASSY
- 5) Lower the vehicle, and pull ST3 into the vehicle.
ST1 498897700 OIL PRESSURE ADAPTER
ST2 498897800 ADAPTER SET
ST3 498575400 OIL PRESSURE GAUGE ASSY
- 6) Connect the Subaru Select Monitor to the data link connector and read the current data. <Ref. to 5AT(diag)-16, READ CURRENT DATA, OPERATION, Subaru Select Monitor.>
- 7) Perform the transfer clutch pressure test.

NOTE:

- Do not perform the transfer clutch pressure test for more than 5 seconds at a time. Doing so will make the engine oil and ATF deteriorate and the clutch and brake to be adversely affected.
- After performing the transfer clutch pressure test, be sure to cool down the engine for at least one minute with the select lever set in the "P" or "N" range, and at an idle speed of 1,200 rpm or less.
- Adjust the throttle valve angle in order to obtain the "T/F Solenoid Pressure" displayed on the Subaru Select Monitor.

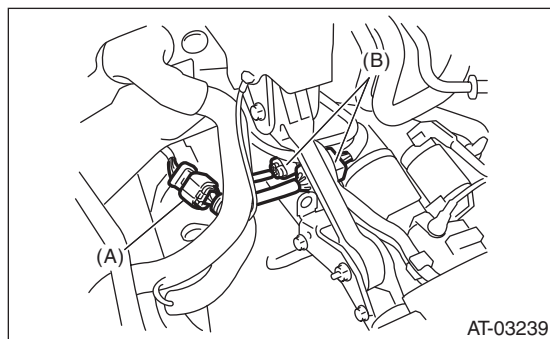
Range of the selector lever	Throttle opening angle	ATF temperature condition	"T/F Solenoid Pressure" displayed on the Subaru Select Monitor kPa	Standard line pressure kPa (kg/cm ² , psi)
D	Full open	45 — 55°C (104 — 131°F)	900	800 — 915 (8.16 — 9.33, 116.0 — 132.7)
	Partial throttle		500	400 — 535 (4.08 — 5.46, 58.0 — 77.6)
N	Full closed		0	0 — 50 (0 — 0.51, 0 — 7.3)

- 8) Remove the ST and install the test plug.
- 9) Install the heat shield cover.

9. Automatic Transmission Assembly

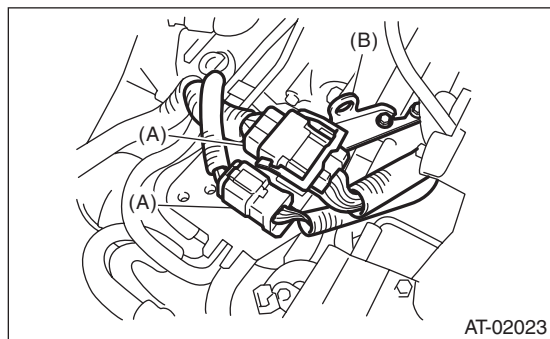
A: REMOVAL

- 1) Set the vehicle on a lift.
- 2) Open the front hood and support with the hood stay.
- 3) Disconnect the ground cable from the battery.
- 4) Remove the collector cover.
- 5) Remove the air intake chamber. <Ref. to IN(H6DO)-6, REMOVAL, Air Intake Chamber.>
- 6) Remove the air breather hose. <Ref. to 5AT-62, REMOVAL, Air Breather Hose.>
- 7) Remove the starter. <Ref. to SC(H6DO)-6, REMOVAL, Starter.>
- 8) Disconnect the front oxygen (A/F) sensor and transmission harness connector.



- (A) Front oxygen (A/F) sensor
(B) Transmission harness connectors

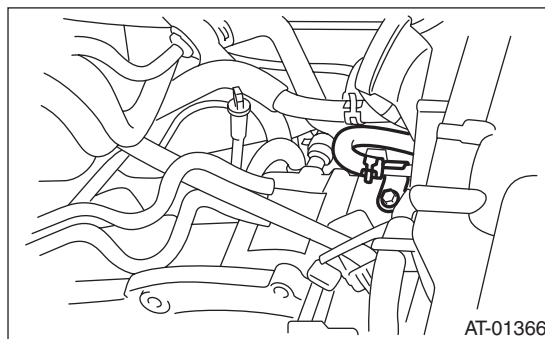
- 9) Disconnect the engine harness connectors, and then remove the engine hanger rear.



- (A) Engine harness connectors
(B) Engine hanger rear

- 10) Remove the vacuum pipe & hose assembly and the brake vacuum pump. <Ref. to BR-40, REMOVAL, Vacuum Pump.>

- 11) Remove the throttle body securing bolts to and slide the throttle body over.

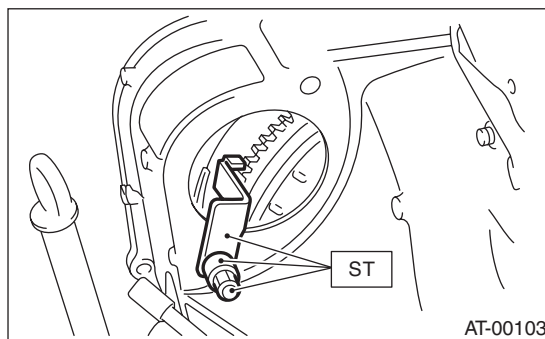


- 12) Separate the torque converter from drive plate.
 - (1) Remove the service hole plug.
 - (2) Remove the bolts which hold torque converter to drive plate.
 - (3) Remove the four bolts by rotating the clamp pulley a little at a time.
 - (4) Make sure the torque converter moves freely by rotating with finger through the starter installation hole.

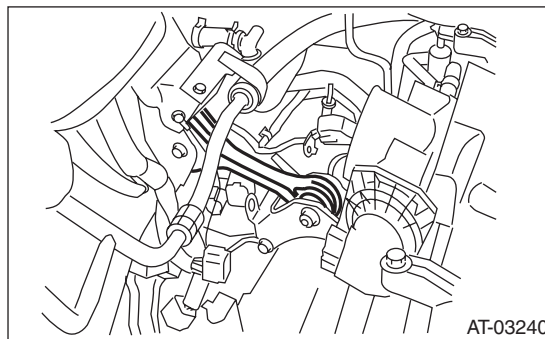
CAUTION:

Be careful not to drop bolts into converter housing.

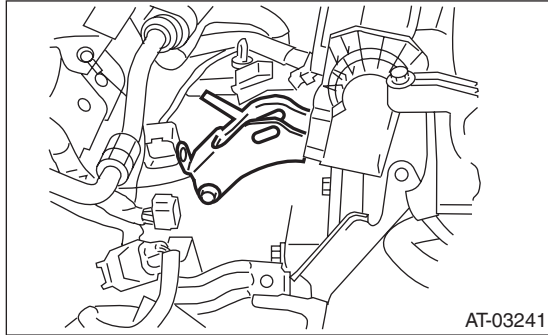
- 13) Attach the ST to the converter case.
ST 498277200 STOPPER SET



- 14) Remove the pitching stopper.



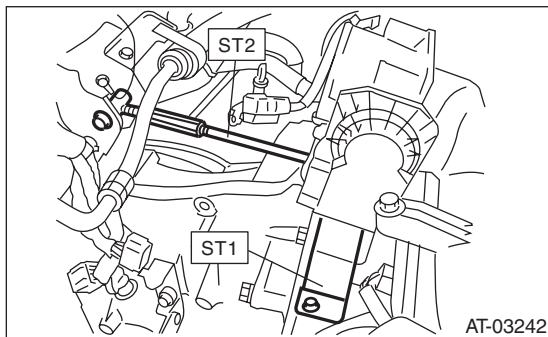
15) Remove the pitching stopper bracket.



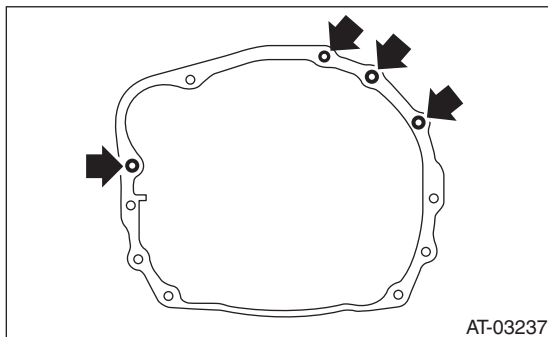
16) Set the ST.

ST1 41099AA010 ENGINE SUPPORT BRACKET

ST2 41099AA020 ENGINE SUPPORT



17) Remove the transmission mounting bolt (upper side).

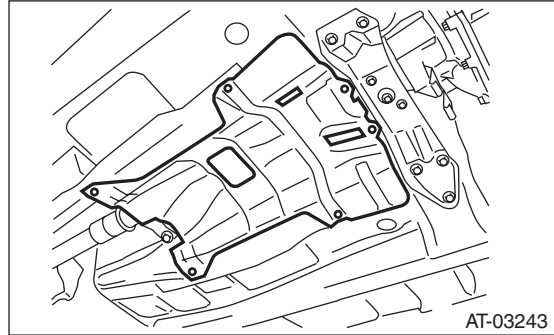


18) Lift-up the vehicle.

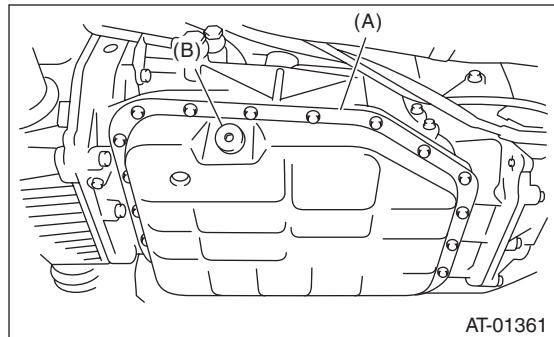
19) Remove the under cover.

20) Remove the front exhaust pipe, rear exhaust pipe and muffler. <Ref. to EX(H6DO)-4, REMOVAL, Front Exhaust Pipe.> <Ref. to EX(H6DO)-6, REMOVAL, Rear Exhaust Pipe.> <Ref. to EX(H6DO)-8, REMOVAL, Muffler.>

21) Remove the heat shield cover.



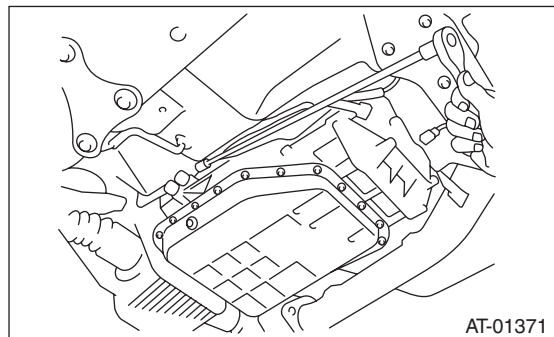
22) Remove the ATF drain plug to drain ATF.



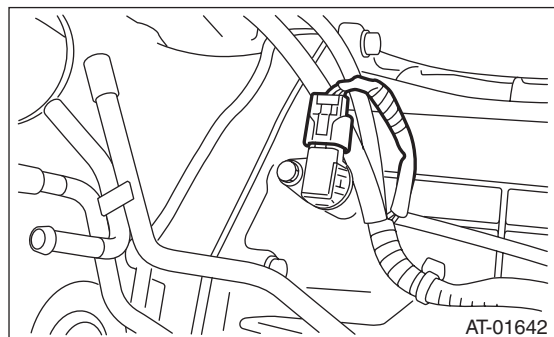
(A) Oil pan

(B) Drain plug

23) Remove the oil charge pipe.



24) Disconnect the connector from turbine speed sensor 1.



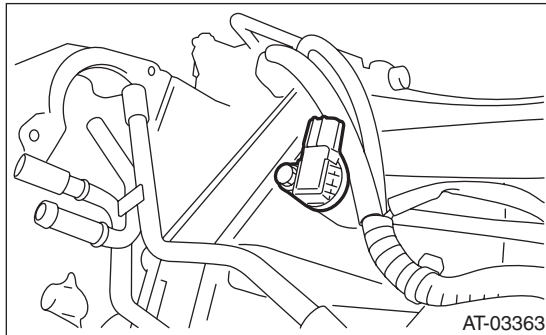
Automatic Transmission Assembly

AUTOMATIC TRANSMISSION

25) Remove the turbine speed sensor 1 from the transmission body.

CAUTION:

Failure to follow this procedure may cause the interference between vehicle body and sensor while removing/installing transmission, and resulting in damage.

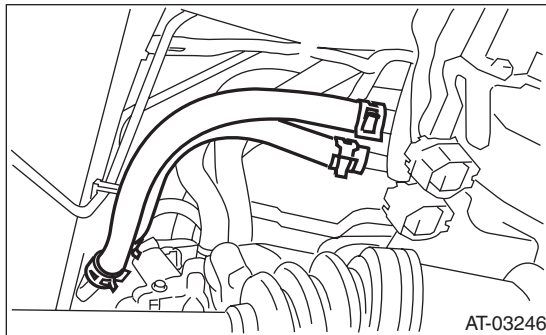


26) To prevent contamination by foreign objects, cover the attachment hole for turbine speed sensor 1 with vinyl tape.

27) Remove the propeller shaft. <Ref. to DS-10, REMOVAL, Propeller Shaft.>

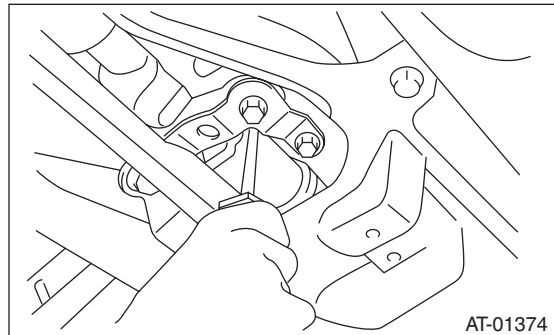
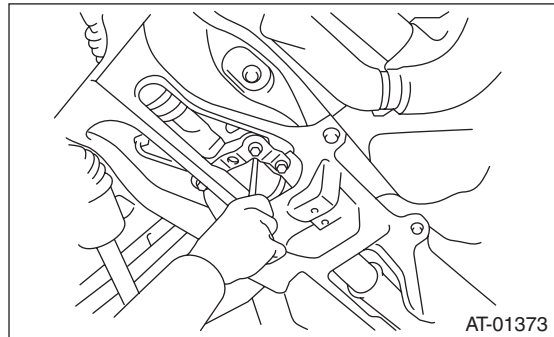
28) Remove the shift select cable. <Ref. to CS-27, REMOVAL, Select Cable.>

29) Disconnect the hose from the ATF inlet and outlet pipes.



30) Remove the front crossmember support plate. <Ref. to FS-15, REMOVAL, Front Crossmember Support Plate.>

31) Remove the two clutch housing cover securing bolts.

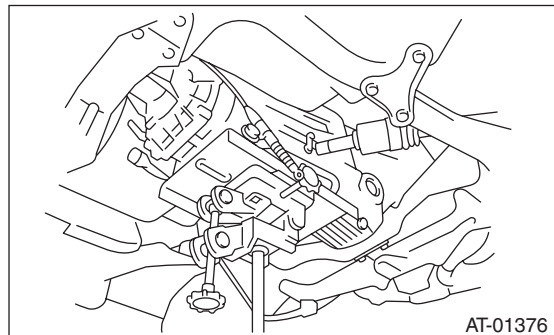


32) Remove the front stabilizer clamp. <Ref. to FS-16, REMOVAL, Front Stabilizer.>

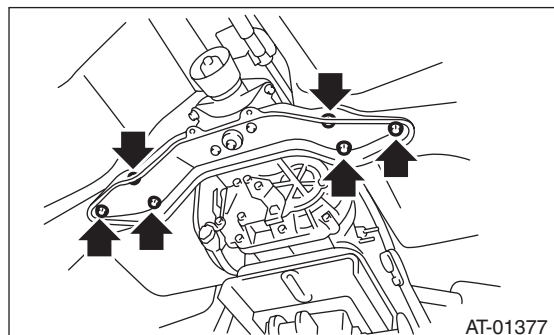
33) Remove the bolts which secure front ball joint to the housing. <Ref. to FS-17, REMOVAL, Front Ball Joint.>

34) Pull out the drive shaft from transmission.

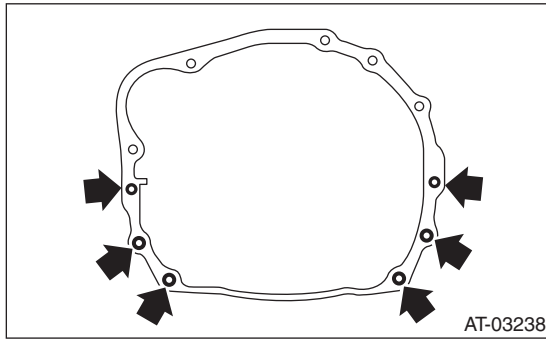
35) Set the transmission jack under the transmission.



36) Remove the rear crossmember.



- 37) Remove the transmission mounting bolts and nuts (lower side).



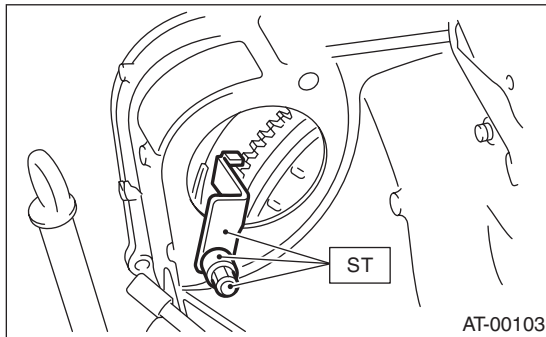
- 38) Remove the transmission.

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.

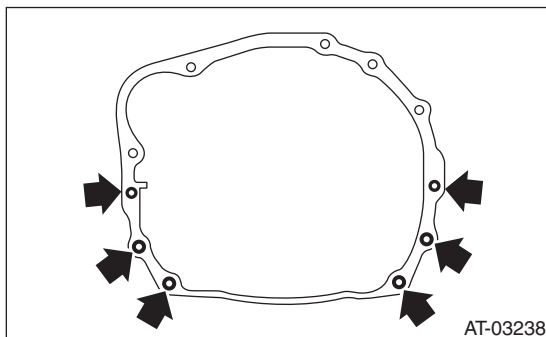
B: INSTALLATION

- 1) Attach the ST to converter case.
ST 498277200 STOPPER SET



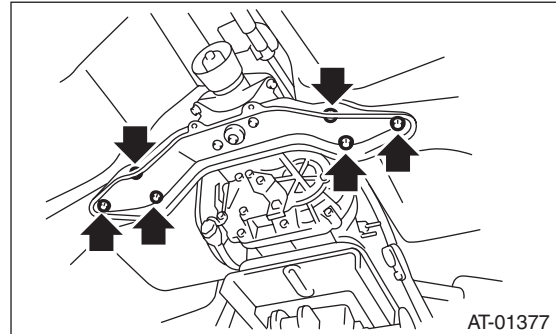
- 2) Install the transmission onto the engine.
3) Install the engine mounting bolts and nuts (lower side).

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



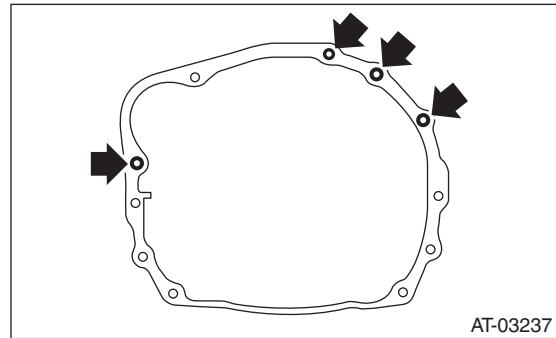
- 4) Install the transmission rear crossmember.

Tightening torque:
75 N·m (7.6 kgf-m, 55.3 ft-lb)



- 5) Remove 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 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 hole.

Tightening torque:
25 N·m (2.5 kgf-m, 18 ft-lb)

- 10) Install the starter. <Ref. to SC(H6DO)-6, INSTALLATION, Starter.>

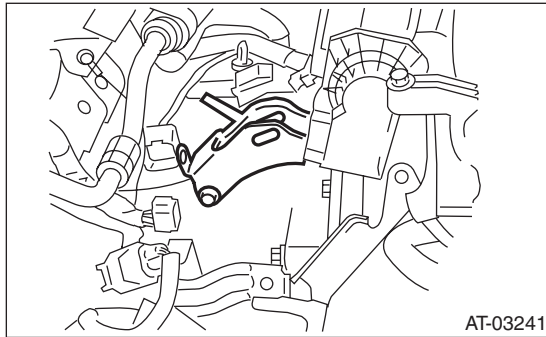
Automatic Transmission Assembly

AUTOMATIC TRANSMISSION

11) Remove the ST and install the pitching stopper bracket.

Tightening torque:

40 N·m (4.1 kgf-m, 29.5 ft-lb)

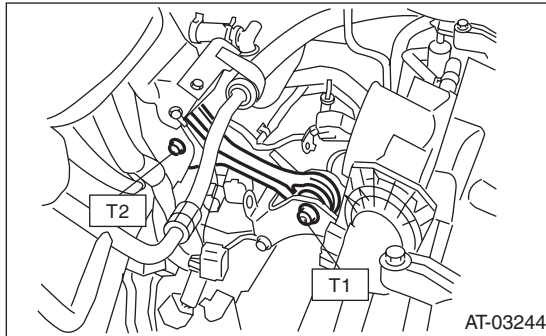


12) Install the pitching stopper.

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.

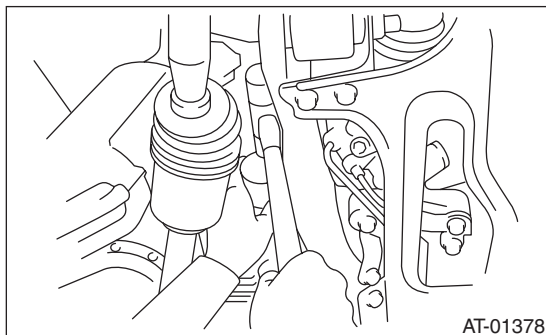
(1) Remove the oil seal by using flat tip screw-driver etc.

(2) Install a new oil seal using ST.

ST 18675AA000 DIFFERENTIAL SIDE OIL SEAL INSTALLER

NOTE:

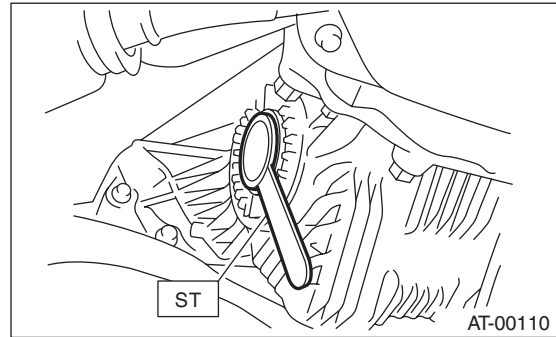
- Apply oil to the oil seal lips.
- Be sure to replace the differential side oil seal after the procedure of removing front drive shaft from transmission.



15) Apply grease to the oil seal lips.

16) Set the ST to side retainer.

ST 28399SA000 OIL SEAL PROTECTOR



17) Install the front drive shaft into the transmission.

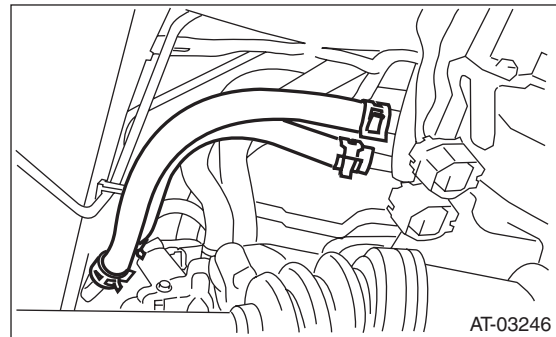
NOTE:

Replace the circlip of drive shaft with a new part.

18) Install the front drive shaft into transmission, remove the ST and insert the drive shaft securely.

ST 28399SA000 OIL SEAL PROTECTOR

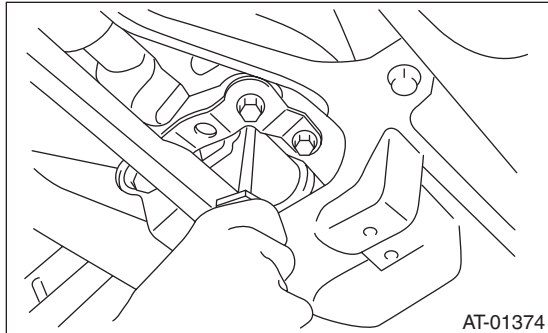
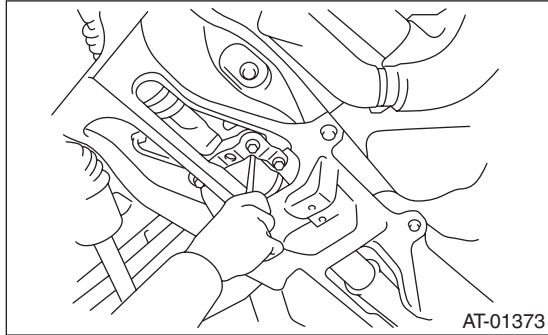
19) Install the inlet and outlet hoses to the ATF inlet and outlet pipes.



20) Insert the ball joint into housing. <Ref. to FS-17, INSTALLATION, Front Ball Joint.>

21) Install the front stabilizer clamp. <Ref. to FS-16, INSTALLATION, Front Stabilizer.>

22) Install the clutch housing cover securing bolts.



23) Install the front cross support plate. <Ref. to FS-15, INSTALLATION, Front Crossmember Support Plate.>

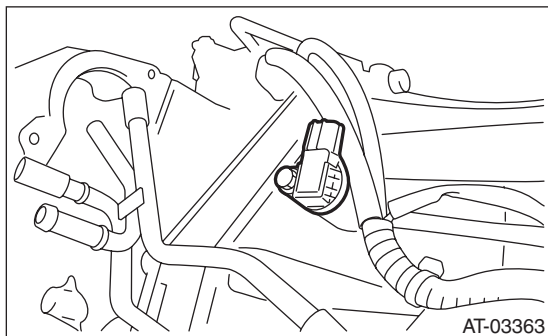
24) Install the propeller shaft. <Ref. to DS-11, INSTALLATION, Propeller Shaft.>

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

26) Install the turbine speed sensor 1 and harness, and then connect the connector.

Tightening torque:

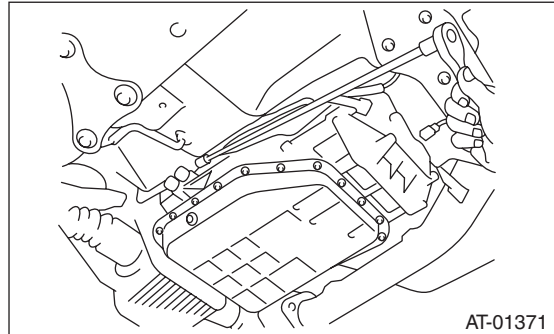
7 N·m (0.7 kgf-m, 5.2 ft-lb)



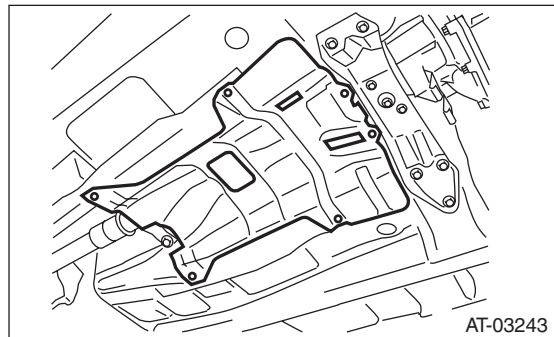
27) Install the oil charge pipe.

Tightening torque:

41 N·m (4.2 kgf-m, 30.2 ft-lb)



28) Install the heat shield cover.

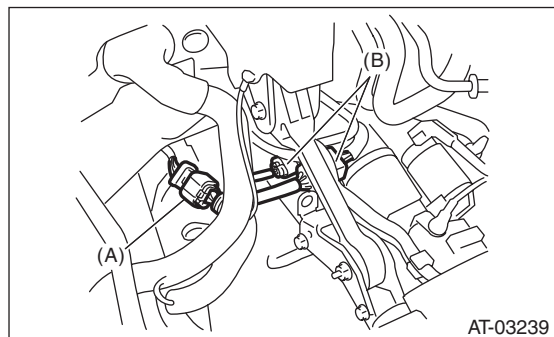


29) Install the front exhaust pipe, rear exhaust pipe and muffler. <Ref. to EX(H6DO)-5, INSTALLATION, Front Exhaust Pipe.> <Ref. to EX(H6DO)-6, INSTALLATION, Rear Exhaust Pipe.> <Ref. to EX(H6DO)-8, INSTALLATION, Muffler.>

30) Install the under cover.

31) Lower the vehicle.

32) Connect the front oxygen (A/F) sensor and transmission harness connector.



(A) Front oxygen (A/F) sensor

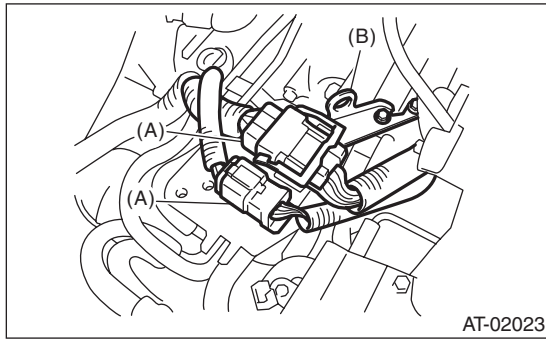
(B) Transmission harness connectors

33) Attach the vacuum pump and vacuum pipe & hose. <Ref. to BR-40, INSTALLATION, Vacuum Pump.>

Automatic Transmission Assembly

AUTOMATIC TRANSMISSION

34) Install the engine hanger rear, and then connect the engine harness connector.



- (A) Engine harness connectors
(B) Engine hanger rear

35) Pour ATF from the oil charge pipe. <Ref. to 5AT-28, REPLACEMENT, Automatic Transmission Fluid.>

36) Install the air breather hose. <Ref. to 5AT-62, INSTALLATION, Air Breather Hose.>

37) Install the throttle body to intake manifold.

Tightening torque:

8 N·m (0.8 kgf-m, 5.9 ft-lb)

38) Install the air intake chamber. <Ref. to IN(H6DO)-6, INSTALLATION, Air Intake Chamber.>

39) Install the collector cover.

40) Connect the battery ground cable to the battery.

41) Perform Clear Memory 2 operation. <Ref. to 5AT(diag)-17, CLEAR MEMORY MODE, OPERATION, Subaru Select Monitor.>

42) 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 the transmission body, etc.
- Occurrence of noise caused by interference etc.

NOTE:

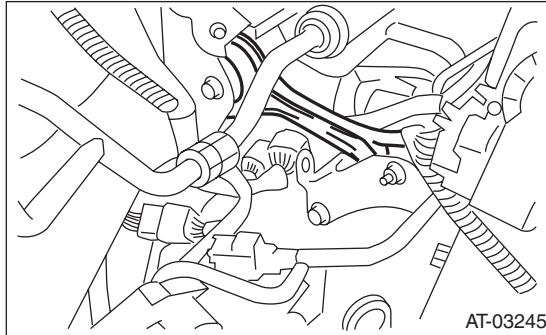
If excessive shift shock is felt, execute advance operation of learning control. <Ref. to 5AT(diag)-21, PROCEDURE, Learning Control.>

10. Transmission Mounting System

A: REMOVAL

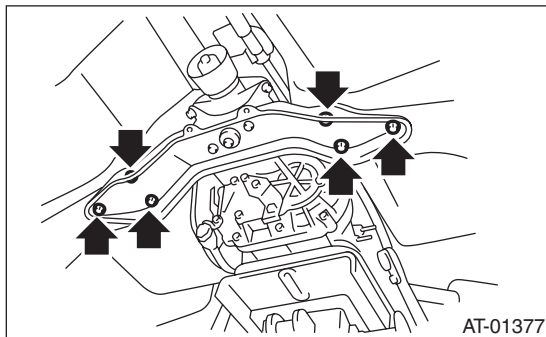
1. PITCHING STOPPER

- 1) Disconnect the ground cable from the battery.
- 2) Remove the air intake chamber. <Ref. to IN(H6DO)-6, REMOVAL, Air Intake Chamber.>
- 3) Remove the pitching stopper.



2. TRANSMISSION REAR CROSSMEMBER & REAR CUSHION RUBBER

- 1) Disconnect the ground cable from the battery.
- 2) Jack-up the vehicle and support it with rigid racks.
- 3) Remove the front exhaust pipe, rear exhaust pipe and muffler. <Ref. to EX(H6DO)-4, REMOVAL, Front Exhaust Pipe.> <Ref. to EX(H6DO)-6, REMOVAL, Rear Exhaust Pipe.> <Ref. to EX(H6DO)-8, REMOVAL, Muffler.>
- 4) Remove the heat shield cover.
- 5) Set the transmission jack under 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 from transmission.

B: INSTALLATION

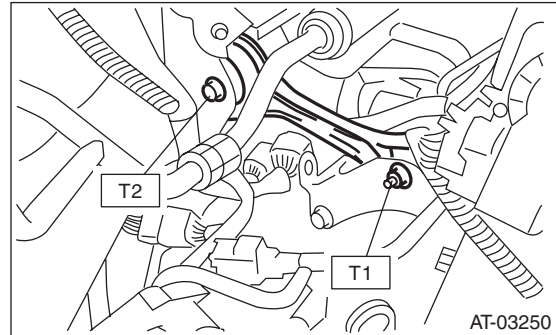
1. PITCHING STOPPER

- 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(H6DO)-6, INSTALLATION, Air Intake Chamber.>
- 3) Connect the battery ground cable to the battery.

2. TRANSMISSION REAR CROSSMEMBER & REAR CUSHION RUBBER

- 1) Install the rear cushion rubber to the transmission.

Tightening torque:

40 N·m (4.1 kgf-m, 29.5 ft-lb)

- 2) Attach the cross member to the rear cushion rubber.

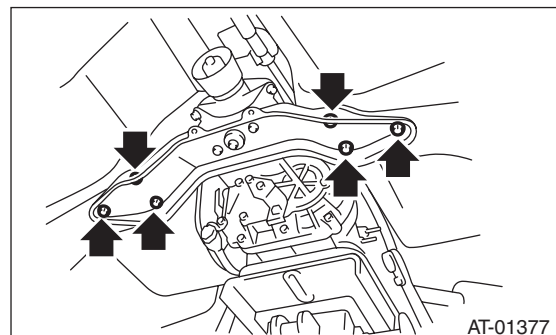
Tightening torque:

35 N·m (3.6 kgf-m, 26 ft-lb)

- 3) Install the cross member.

Tightening torque:

75 N·m (7.6 kgf-m, 55.3 ft-lb)



- 4) Remove the transmission jack.
- 5) Install the heat shield cover.
- 6) Install the front exhaust pipe, rear exhaust pipe and muffler. <Ref. to EX(H6DO)-5, INSTALLATION, Front Exhaust Pipe.> <Ref. to EX(H6DO)-6, INSTALLATION, Rear Exhaust Pipe.> <Ref. to EX(H6DO)-8, INSTALLATION, Muffler.>
- 7) Connect the battery ground cable to the battery.

Transmission Mounting System

AUTOMATIC TRANSMISSION

C: INSPECTION

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

1. PITCHING STOPPER

Check pitching stopper for bends or damage.
Check that there are no cracks, hardening or damage on rubber parts.

2. TRANSMISSION REAR CROSSMEMBER & REAR CUSHION RUBBER

Check the cross member for bends or damage.
Check that 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 a leak is found, replace the oil seal. <Ref. to 5AT-45, 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:

Immediately after the vehicle has been running or after idling for a long time, the ATF will be hot. Be careful not to burn yourself.

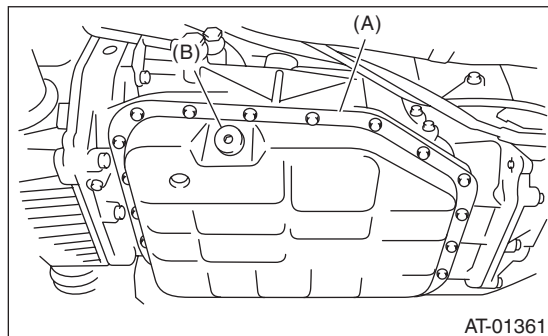
- 4) Tighten the ATF drain plug.

NOTE:

Use a new gasket.

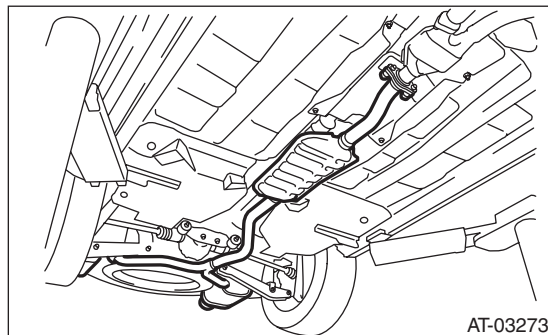
Tightening torque:

20 N·m (2.0 kgf-m, 14.8 ft-lb)



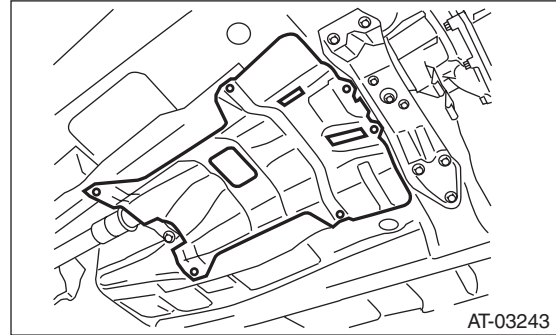
- (A) Oil pan
(B) ATF drain plug

- 5) Remove the rear exhaust pipe and muffler.



- 6) Remove the front exhaust pipe.

- 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.

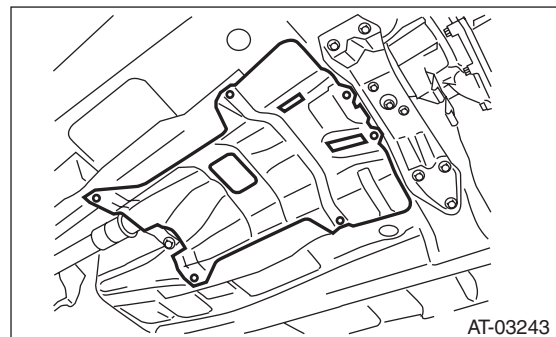
ST 398527700 PULLER ASSY

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

ST 498057300 INSTALLER

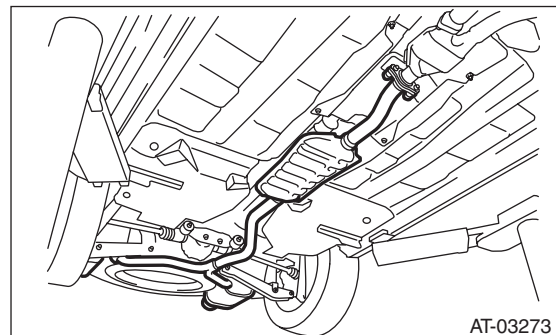
- 11) Install the propeller shaft. <Ref. to DS-11, INSTALLATION, Propeller Shaft.>

- 12) Install the heat shield cover.



- 13) Install the front exhaust pipe.

- 14) Install the rear exhaust pipe and muffler.



Extension Case Oil Seal

AUTOMATIC TRANSMISSION

15) Pour ATF from the oil charge pipe.

Specified fluid:

SUBARU ATF HP

Recommended fluid:

IDEMITSU ATF HP

CASTROL TRANSMAX J

PENNZOIL QUAKERSTATE • PENNZOIL ATF-J

NOTE:

Use of the recommended fluid is permitted only in regions where the specified fluid is not available.

Capacity:

Fill the same amount of ATF when drained.

16) Check the level and leaks of the ATF. <Ref. to 5AT-28, Automatic Transmission Fluid.>

12. Differential Side Retainer Oil Seal

A: INSPECTION

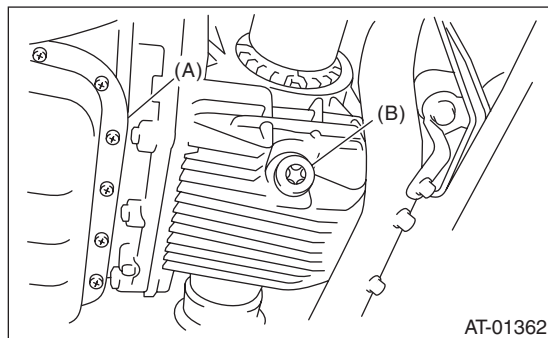
Check for leakage of gear oil from differential side retainer oil seal part. If there is an oil leak, replace the oil seal.

B: REPLACEMENT

- 1) Lift-up the vehicle.
- 2) Remove the front exhaust pipe. <Ref. to EX(H6DO)-4, REMOVAL, Front Exhaust Pipe.>
- 3) Remove the differential gear oil drain plug using TORX® BIT T70, and then drain differential gear oil.

CAUTION:

- Immediately after the vehicle has been running or after idling for a long time, the differential gear oil will be 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. If differential gear oil is spilled on the exhaust pipe, wipe it off completely.



(A) Oil pan

(B) Differential gear oil drain plug

- 4) Tighten the differential gear oil drain plug.

NOTE:

Use a new gasket.

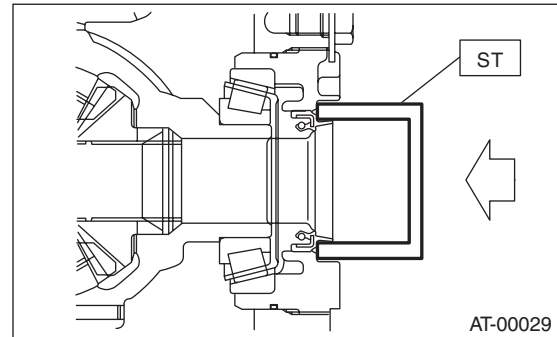
Tightening torque:

70 N·m (7.1 kgf-m, 51.6 ft-lb)

- 5) Separate the front drive shaft from the transmission. <Ref. to DS-24, REMOVAL, Front Drive Shaft.>
- 6) Remove the differential side retainer oil seal using driver wrapped with vinyl tape etc.

- 7) Using the ST, install the differential side retainer oil seal by lightly tapping with a hammer.

ST 18675AA000 DIFFERENTIAL SIDE OIL SEAL INSTALLER



- 8) Apply oil to the oil seal lips.
- 9) Install the front drive shaft. <Ref. to DS-24, INSTALLATION, Front Drive Shaft.>
- 10) Install the front exhaust pipe. <Ref. to EX(H6DO)-5, INSTALLATION, Front Exhaust Pipe.>
- 11) Lower the vehicle.
- 12) 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)

- 13) 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)-31, DTC P0705 TRANSMISSION RANGE SENSOR CIRCUIT (PRNDL INPUT), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

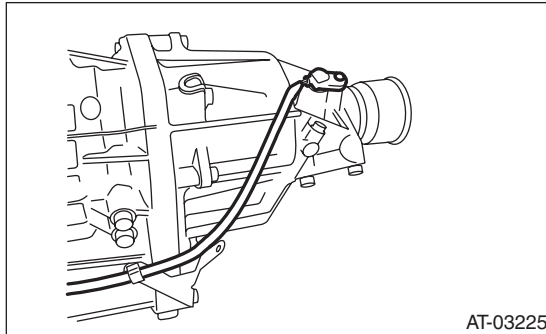
14. Front Vehicle Speed Sensor

A: REMOVAL

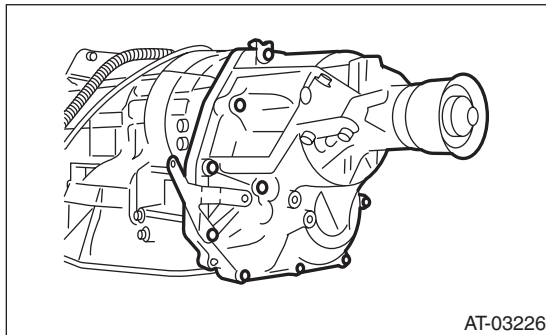
- 1) Remove the transmission assembly from vehicle body. <Ref. to 5AT-36, REMOVAL, Automatic Transmission Assembly.>
- 2) Remove the rear vehicle speed sensor.

NOTE:

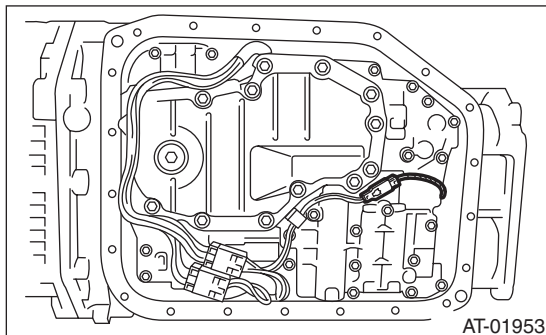
Secure the harness of the rear vehicle speed sensor to the transmission body using wire etc.



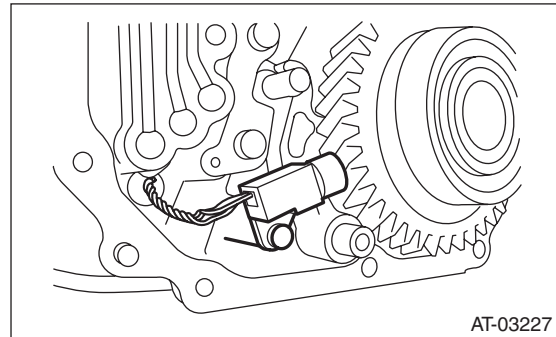
- 3) Remove the extension case.



- 4) Remove the center differential carrier. <Ref. to 5AT-74, REMOVAL, Center Differential Carrier.>
- 5) Lay along the transmission case, and then remove the oil pan.
- 6) Remove the old gasket on the oil pan and transmission case completely.
- 7) Disconnect the front vehicle speed sensor connector.



- 8) Remove the front vehicle speed sensor securing bolt.



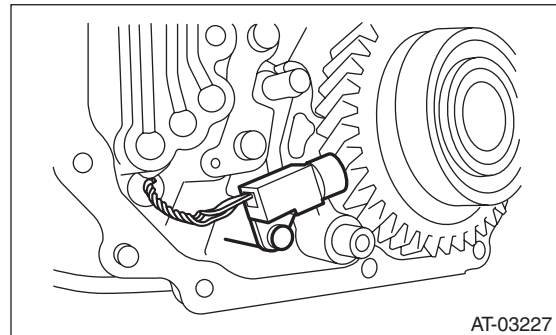
- 9) Remove the front vehicle speed sensor through the hole of AT transmission main case.

B: INSTALLATION

- 1) Install the front vehicle speed sensor.

Tightening torque:

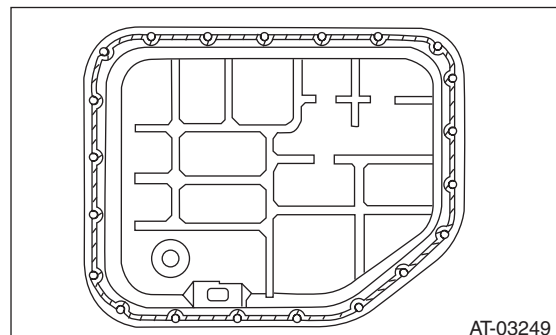
7 N·m (0.7 kgf-m, 5.2 ft-lb)



- 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-74, INSTALLATION, Center Differential Carrier.>

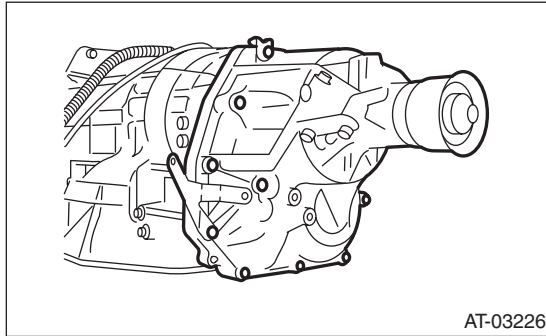
Front Vehicle Speed Sensor

AUTOMATIC TRANSMISSION

6) Install the extension case.

Tightening torque:

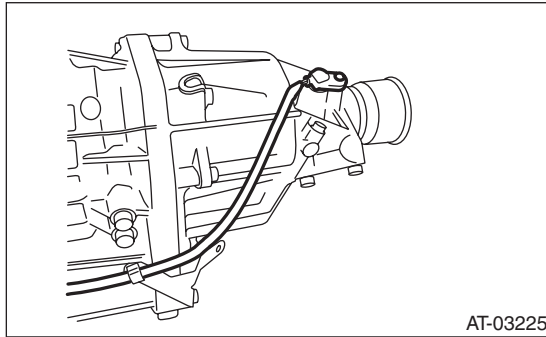
25 N·m (2.5 kgf-m, 18 ft-lb)



7) Install the rear vehicle speed sensor.

Tightening torque:

7 N·m (0.7 kgf-m, 5.2 ft-lb)



8) Install the transmission assembly to the vehicle.
<Ref. to 5AT-39, INSTALLATION, Automatic Transmission Assembly.>

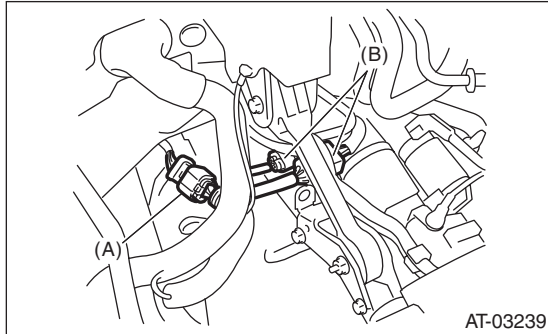
9) Pour ATF from the oil charge pipe. <Ref. to 5AT-28, REPLACEMENT, Automatic Transmission Fluid.>

10) 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 the battery.
- 3) Remove the air intake chamber. <Ref. to IN(H6DO)-6, REMOVAL, Air Intake Chamber.>
- 4) Disconnect the front oxygen (A/F) sensor and transmission harness connector.



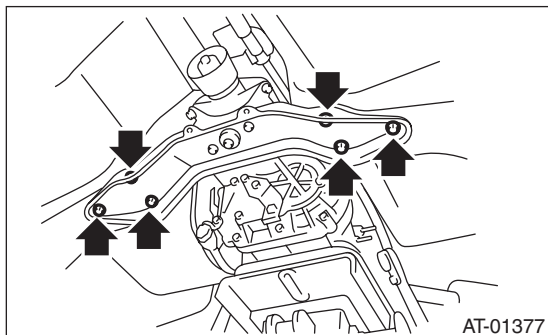
- (A) Front oxygen (A/F) sensor
(B) Transmission harness connectors

- 5) Remove the transmission harness connector and front oxygen (A/F) sensor connector from the stay.
- 6) Lift-up the vehicle.
- 7) Clean the transmission exterior.
- 8) Drain the ATF completely. <Ref. to 5AT-28, REPLACEMENT, Automatic Transmission Fluid.>
- 9) Remove the rear exhaust pipe and muffler. <Ref. to EX(H6DO)-6, REMOVAL, Rear Exhaust Pipe.> <Ref. to EX(H6DO)-8, REMOVAL, Muffler.>
- 10) Remove the heat shield cover.
- 11) Remove the propeller shaft. <Ref. to DS-10, REMOVAL, Propeller Shaft.>
- 12) Place the transmission jack under the transmission.

NOTE:

Make sure that the support plate of transmission jack does not touch the cross.

- 13) Remove the transmission rear crossmember bolt.



- 14) Lower the transmission jack.

NOTE:

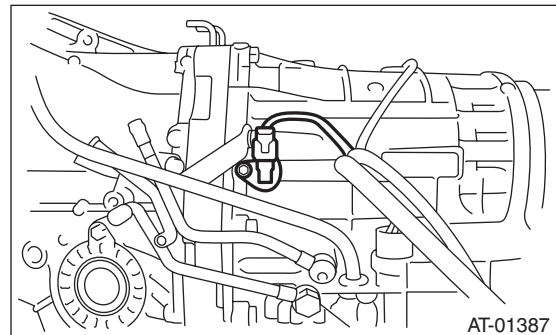
Do not separate the transmission jack and transmission.

- 15) Remove the oil charge pipe. <Ref. to 5AT-63, REMOVAL, Oil Charge Pipe.>
- 16) Remove the ATF cooler inlet and outlet pipes.

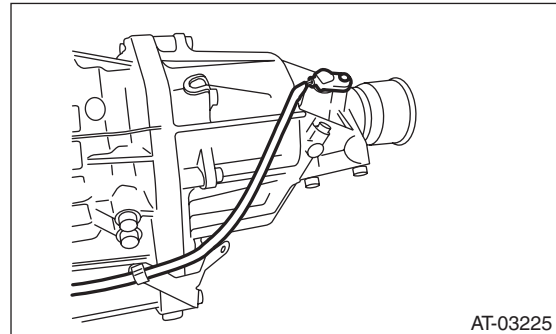
NOTE:

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

- 17) Disconnect the connector from turbine speed sensor 1.

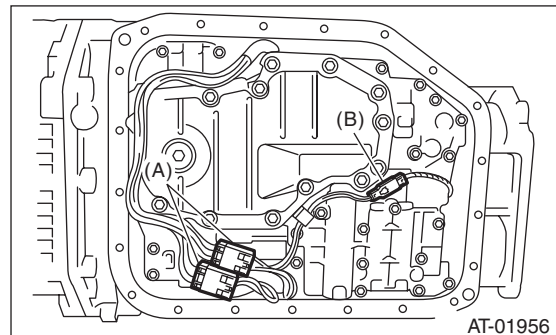


- 18) Remove the rear vehicle speed sensor.



- 19) Remove the oil pan.

- 20) Disconnect the control valve connector and front vehicle speed sensor connector.

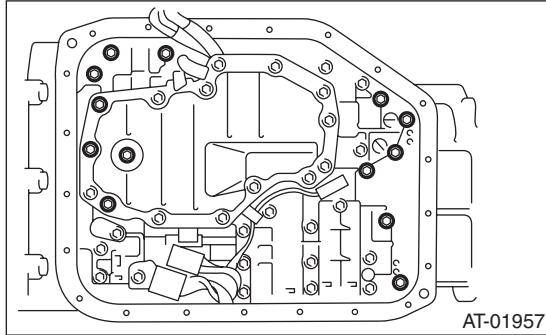


- (A) Control valve connector
(B) Front vehicle speed sensor connector

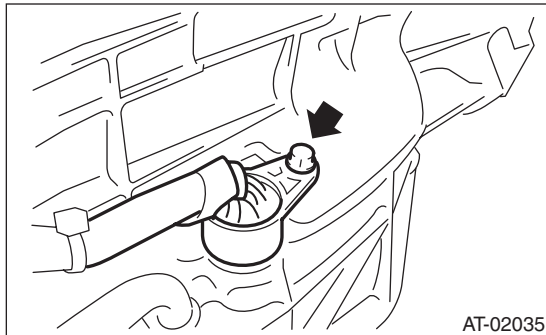
Rear Vehicle Speed Sensor

AUTOMATIC TRANSMISSION

21) Remove the control valve body.



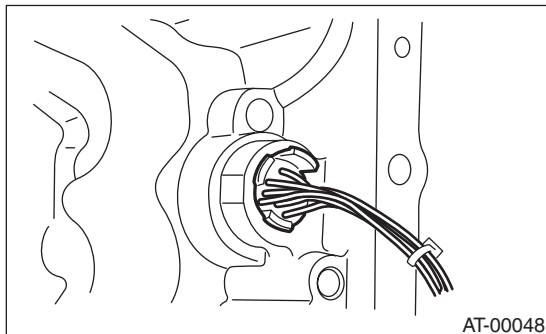
22) Remove the bolt securing harness of transmission main case.



23) Remove the harness assembly.

B: INSTALLATION

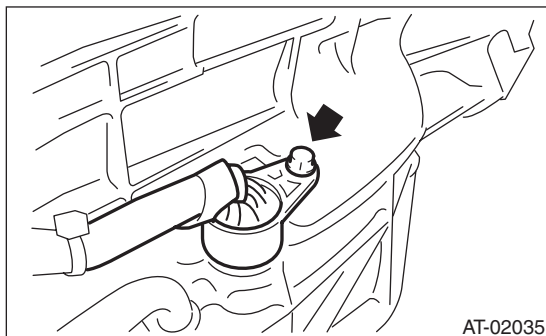
1) Pass the harness assembly through the hole in transmission case.



2) Install the securing bolt of transmission main case.

Tightening torque:

7 N·m (0.7 kgf-m, 5.2 ft-lb)



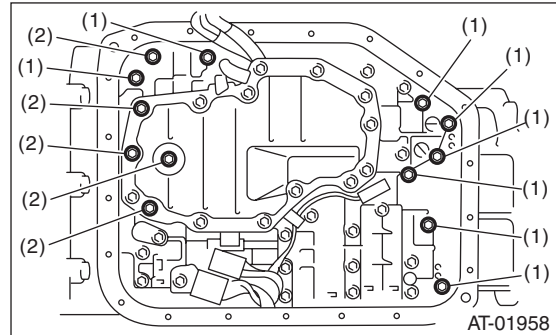
3) Install the control valve body.

Tightening torque:

8 N·m (0.8 kgf-m, 5.8 ft-lb)

NOTE:

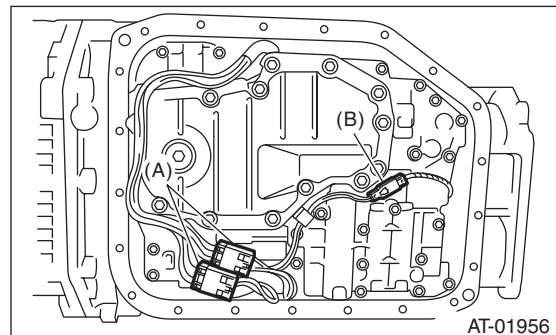
Be careful not to catch harness in.



(1) 58 mm (2.28 in)

(2) 65 mm (2.56 in)

4) Connect the control valve connector and front vehicle speed sensor connector.



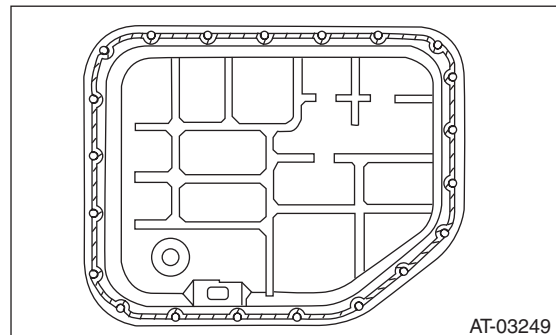
(A) Control valve connector

(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:

40 N·m (4.1 kgf-m, 29.5 ft-lb) (ATF inlet pipe)

45 N·m (4.6 kgf-m, 33.2 ft-lb) (ATF outlet pipe)

9) Install the oil charge pipe. <Ref. to 5AT-63, 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 rear exhaust pipe and muffler. <Ref. to EX(H6DO)-6, INSTALLATION, Rear Exhaust Pipe.> <Ref. to EX(H6DO)-8, INSTALLATION, Muffler.>

14) Lower the vehicle.

15) Install the transmission connector to the stay, and then connect the connector.

16) Install the air intake chamber. <Ref. to IN(H6DO)-6, INSTALLATION, Air Intake Chamber.>

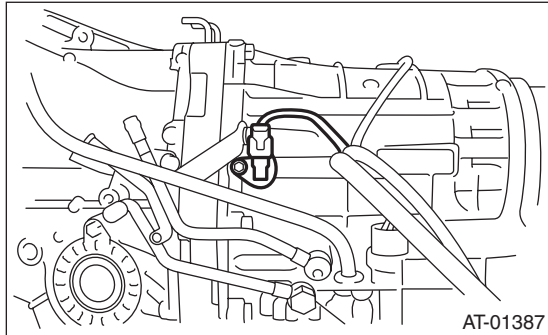
17) Pour ATF from the oil charge pipe. <Ref. to 5AT-28, REPLACEMENT, Automatic Transmission Fluid.>

18) Check the level and leaks of ATF. <Ref. to 5AT-28, INSPECTION, Automatic Transmission Fluid.>

16. Turbine Speed Sensor 1

A: REMOVAL

- 1) Remove the air intake chamber. <Ref. to IN(H6DO)-6, REMOVAL, Air Intake Chamber.>
- 2) Lift-up the vehicle.
- 3) Disconnect the turbine speed sensor 1 connector.



- 4) Remove the turbine speed sensor 1.

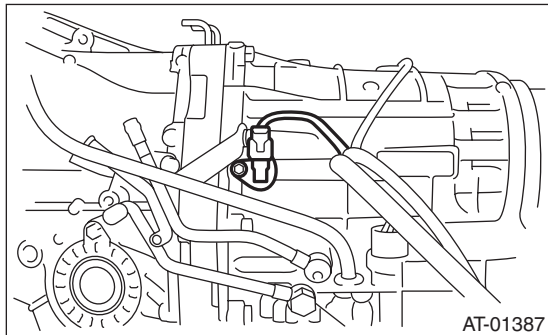
B: INSTALLATION

- 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) Lower the vehicle.
- 4) Install the air intake chamber. <Ref. to IN(H6DO)-6, INSTALLATION, Air Intake Chamber.>

17. Control Valve Body

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 ATF drain plug to drain ATF.

CAUTION:

Immediately after the vehicle has been running or after idling for a long time, the ATF will be hot. Be careful not to burn yourself.

- 6) Tighten the ATF drain plug.

NOTE:

Use a new gasket.

Tightening torque:

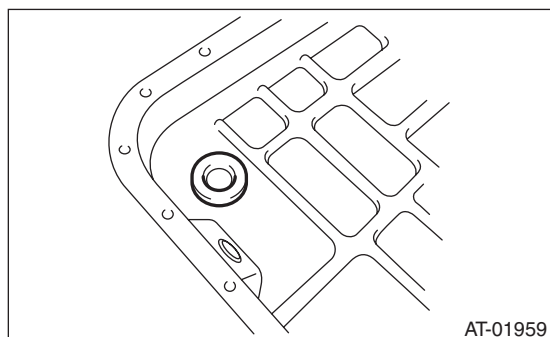
20 N·m (2.0 kgf-m, 14.8 ft-lb)

- 7) Remove the oil pan.

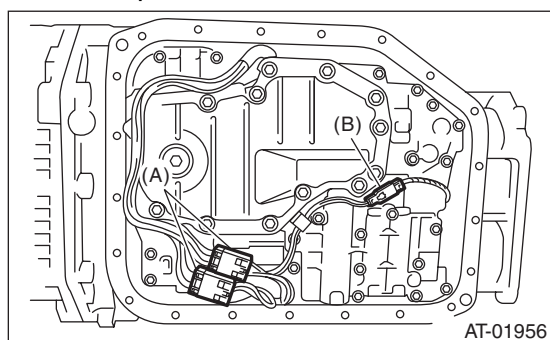
CAUTION:

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.

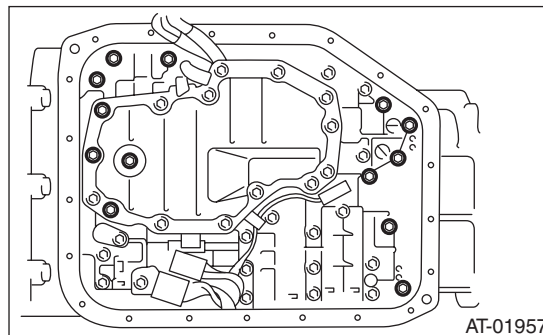


- (A) Control valve connector
(B) Front vehicle speed sensor connector

- 12) Remove the control valve body.

NOTE:

The control valve body is replaced as an assembly only, because it is a non-disassembly part.

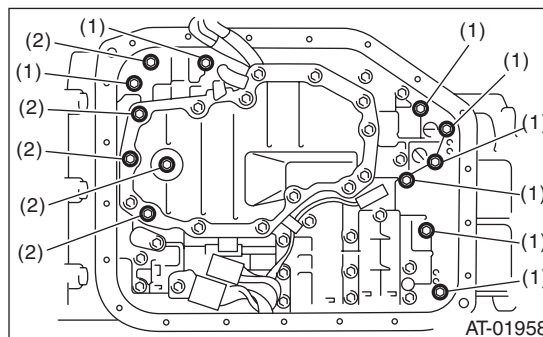


B: INSTALLATION

- 1) Check the control valve body for dust and other foreign matter.
- 2) Install the control valve body to transmission by equally tightening the bolts.

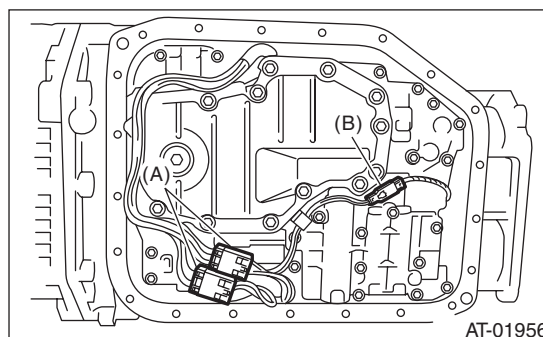
Tightening torque:

8 N·m (0.8 kgf-m, 5.8 ft-lb)



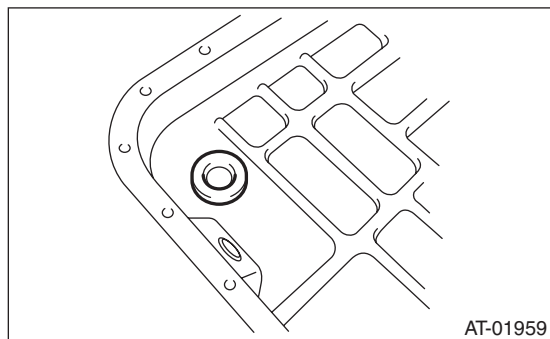
- (1) 58 mm (2.28 in)
(2) 65 mm (2.56 in)

- 3) Connect the control valve connector.



- (A) Control valve connector
(B) Front vehicle speed sensor connector

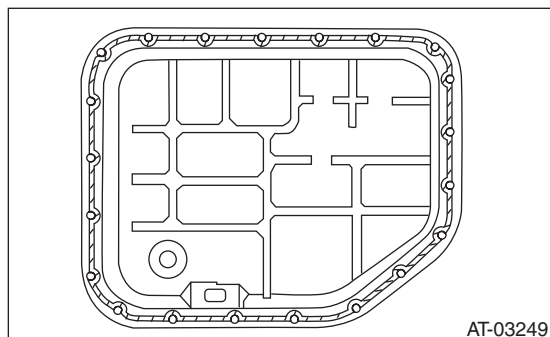
- 4) Attach the magnet at the specified position of the oil pan.



- 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 and recommended fluid:

<Ref. to 5AT-3, RECOMMENDED GEAR OIL, 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 Clear Memory 2 operation. <Ref. to 5AT(diag)-17, 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 the transmission body, etc.
- Occurrence of noise caused by interference etc.

NOTE:

If excessive shift shock is felt, execute advance operation of learning control. <Ref. to 5AT(diag)-21, PROCEDURE, Learning Control.>

C: INSPECTION

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

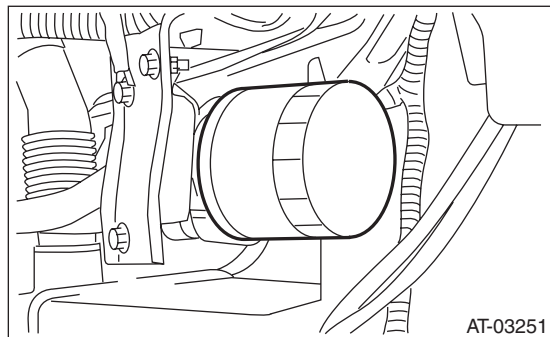
18.ATF Filter

A: REMOVAL

1) Remove the front bumper. <Ref. to EI-21, REMOVAL, Front Bumper.>

2) Using the ST, remove the ATF filter.

ST 498545400 OIL 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, 7.4)

NOTE:

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

ST 498545400 OIL FILTER WRENCH

4) Fill ATF.

5) Inspect the level of ATF. <Ref. to 5AT-28, Automatic Transmission Fluid.>

6) Install the front bumper. <Ref. to EI-22, INSTALLATION, Front Bumper.>

C: INSPECTION

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

Replace the part if any damage is found in the inspection.

Transmission Control Module (TCM)

AUTOMATIC TRANSMISSION

19. Transmission Control Module (TCM)

A: REMOVAL

- 1) Disconnect the ground cable from the battery.
- 2) Remove the lower cover and then disconnect the connector.
- 3) Disconnect the connector from TCM.



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

- 4) Remove the relay from TCM body.
- 5) 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)



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

- 3) Connect the connector to the TCM.
- 4) Install in the reverse order of removal.
- 5) Perform Clear Memory 2 operation. <Ref. to 5AT(diag)-17, 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 the transmission body, etc.
 - Occurrence of noise caused by interference etc.

NOTE:

If excessive shift shock is felt, execute advance operation of learning control. <Ref. to 5AT(diag)-21, PROCEDURE, Learning Control.>

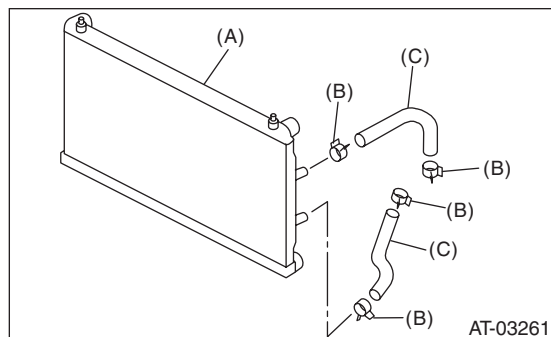
20.ATF Cooler Pipe and Hose

A: REMOVAL

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

NOTE:

- Do not use a screwdriver or other pointed tools.
- If it is hard to remove the hose, wrap the hose with cloth to prevent from damaging it, and while turning with pliers, pull straight out by hand.

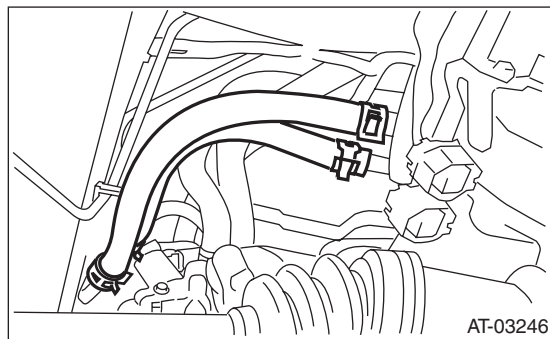


- (A) Radiator
(B) Clip
(C) ATF cooler hose

- 5) Disconnect the ATF cooler hoses from the pipes.

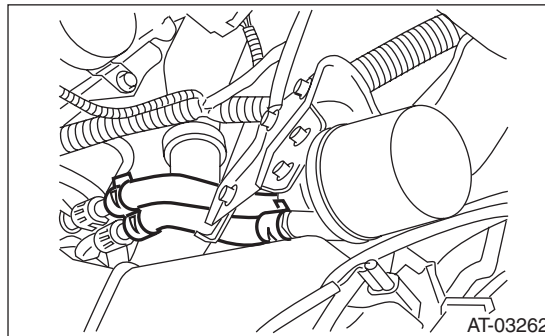
NOTE:

- Do not use a screwdriver or other pointed tools.
- If it is hard to remove the hose, wrap the hose with cloth to prevent from damaging it, and while turning with pliers, pull straight out by hand.

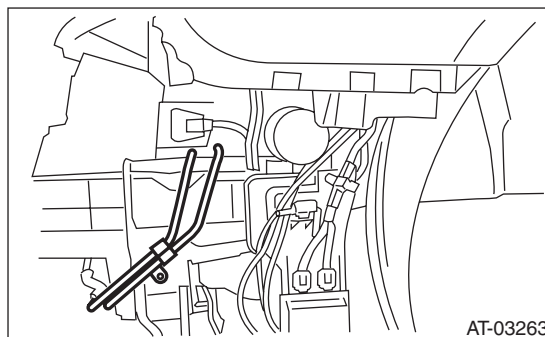


- 6) Remove the front bumper. <Ref. to EI-21, REMOVAL, Front Bumper.>

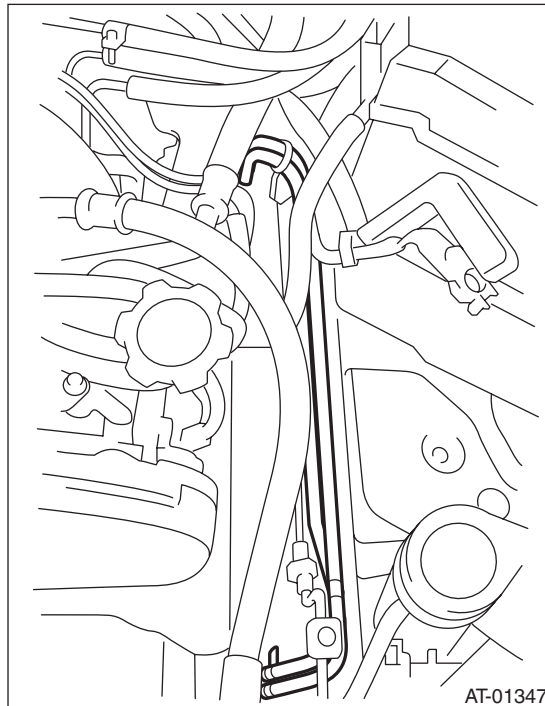
- 7) Remove the ATF filter inlet and outlet hoses.



- 8) Remove the bolts securing the ATF cooler pipe, and remove the ATF cooler hose.



- 9) Disconnect the ATF cooler pipe from frame.



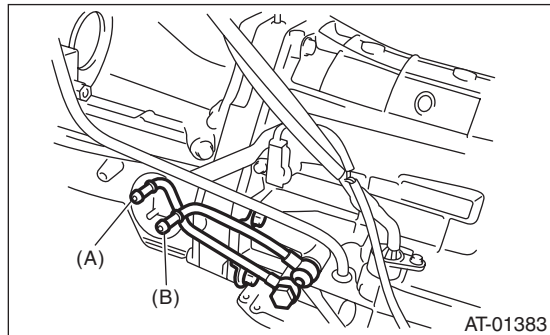
ATF Cooler Pipe and Hose

AUTOMATIC TRANSMISSION

10) Remove the oil cooler inlet and outlet pipes.

NOTE:

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



(A) Outlet pipe

(B) Inlet pipe

B: INSTALLATION

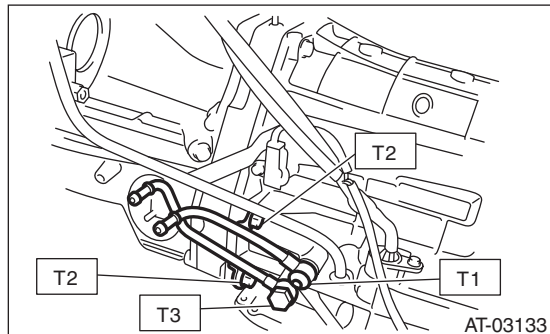
1) Install the oil cooler inlet and outlet pipes with new washer.

Tightening torque:

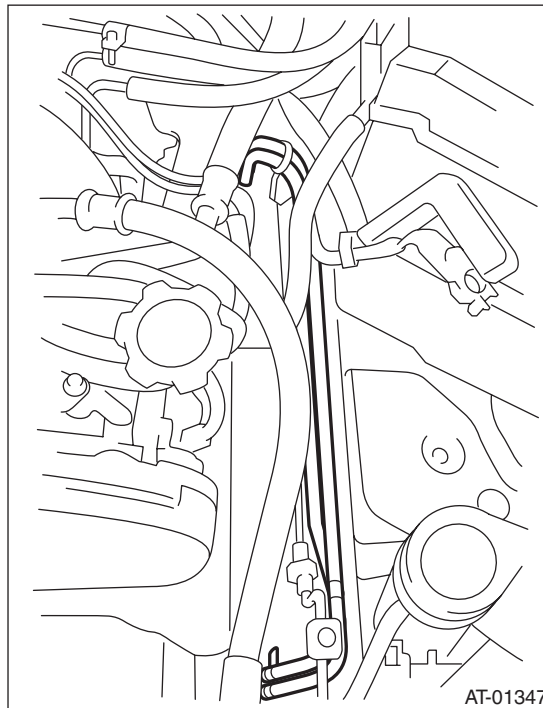
T1: 40 N·m (4.1 kgf-m, 29.5 ft-lb)

T2: 41 N·m (4.2 kgf-m, 30.4 ft-lb)

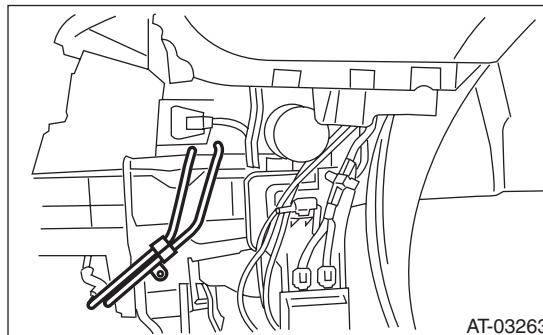
T3: 45 N·m (4.6 kgf-m, 33.2 ft-lb)



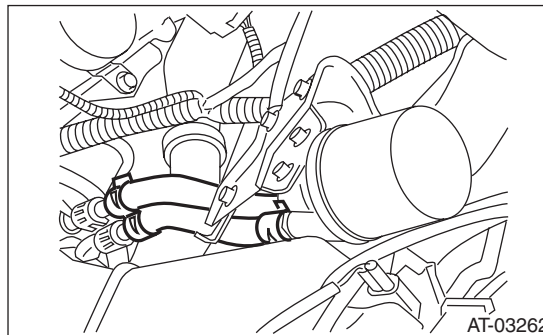
2) Install the ATF cooler pipe to frame.



3) Attach the bolts securing the ATF cooler pipe, and attach the ATF cooler hose.



4) Attach the ATF filter inlet and outlet hoses.

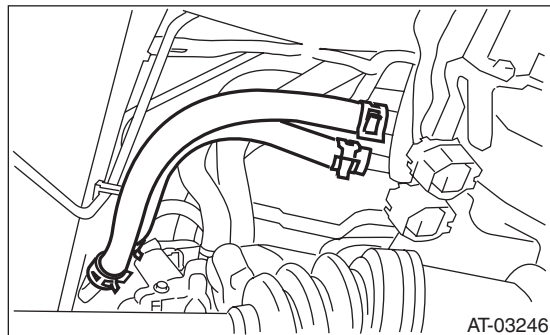


5) Install the front bumper. <Ref. to EI-22, INSTALLATION, Front Bumper.>

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

NOTE:

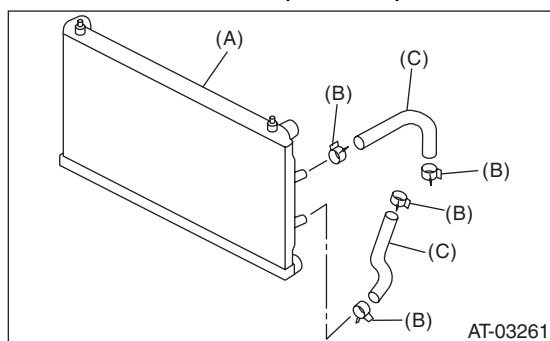
- Install so that the hose is not folded over, excessively bent or twisted.
- Insert the hose to the specified position.



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

NOTE:

- Install so that the hose is not folded over, excessively bent or twisted.
- Insert the hose to the specified position.



- (A) Radiator
- (B) Clip
- (C) ATF cooler hose

8) Install the under cover.

9) Fill ATF. <Ref. to 5AT-28, Automatic Transmission Fluid.>

NOTE:

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

C: INSPECTION

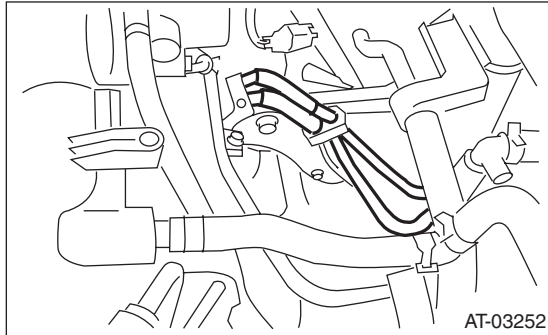
Repair or replace any faulty hoses, pipes, clips, and washers found in the inspection below.

- 1) Check for ATF leaks in joints between the transmission, radiator, pipes, and hoses.
- 2) Check clips 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 clip was installed by pressing with your fingernail.
- 5) Check for peeling, cracks, and deformation at the tip of the hose.

21. Air Breather Hose

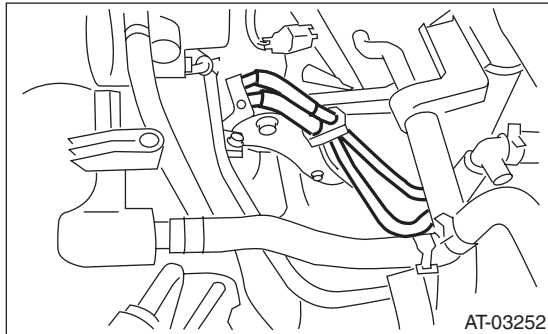
A: REMOVAL

- 1) Remove the air intake chamber. <Ref. to IN(H6DO)-6, REMOVAL, Air Intake Chamber.>
- 2) Disconnect the air breather hose.



B: INSTALLATION

- 1) Connect the air breather hose.



- 2) Install the air intake chamber. <Ref. to IN(H6DO)-6, INSTALLATION, Air Intake Chamber.>

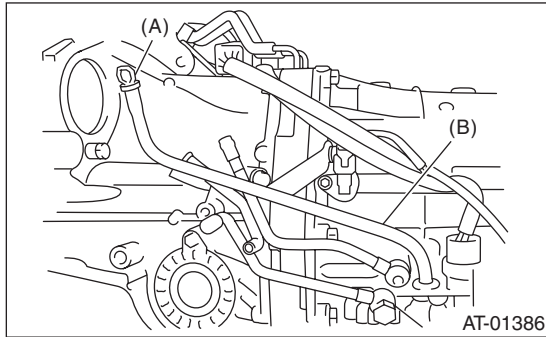
C: INSPECTION

Make sure the hose is not cracked or clogged.

22.Oil Charge Pipe

A: REMOVAL

- 1) Remove the air intake chamber. <Ref. to IN(H6DO)-6, REMOVAL, Air Intake Chamber.>
- 2) Remove the oil charge pipe, and then remove the O-ring from flange side.



(A) Oil level gauge

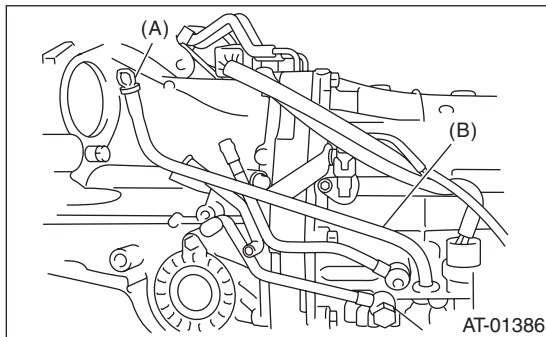
(B) Oil charge pipe

B: INSTALLATION

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

Tightening torque:

41 N·m (4.2 kgf-m, 30.4 ft-lb)



(A) Oil level gauge

(B) Oil charge pipe

- 2) Install the air intake chamber. <Ref. to IN(H6DO)-6, INSTALLATION, Air Intake Chamber.>

C: INSPECTION

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

Torque Converter Assembly

AUTOMATIC TRANSMISSION

23. Torque Converter Assembly

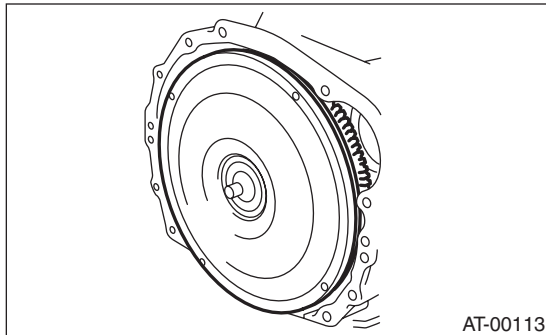
A: REMOVAL

1) Remove the transmission assembly from vehicle body. <Ref. to 5AT-36, 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.

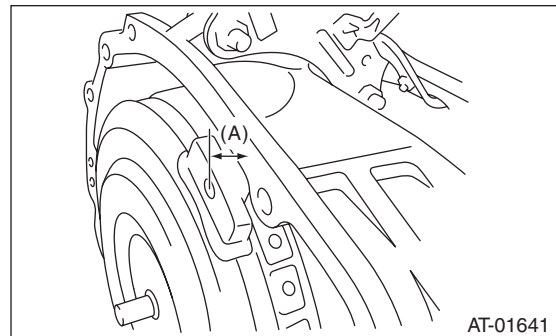
3) Apply ATF to the revolving and sliding surface of the oil pump shaft.

4) Holding the torque converter assembly by hand, lightly rotate it to engage with the oil pump rotor.

5) Check the protruding dimension of the torque converter assembly.

Dimension A:

8 mm (0.31 in) or less



(A) Dimension A

6) Install the transmission assembly to the vehicle. <Ref. to 5AT-39, INSTALLATION, Automatic Transmission Assembly.>

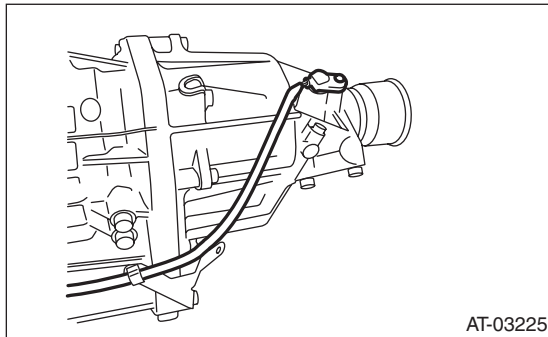
C: INSPECTION

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

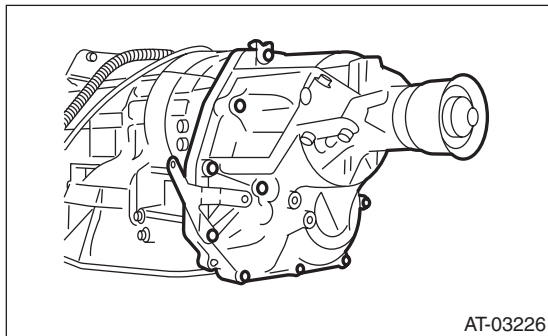
24.Extension Case

A: REMOVAL

- 1) Remove the transmission assembly.
<Ref. to 5AT-36, REMOVAL, Automatic Transmission Assembly.>
- 2) Remove the rear vehicle speed sensor.



- 3) Remove the extension case.



B: INSTALLATION

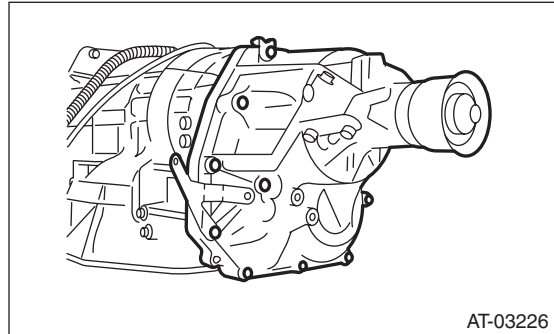
- 1) Attach the selected reduction driven gear shim to end surface of reduction driven gear with vase-line. <Ref. to 5AT-72, ADJUSTMENT, Reduction Driven Gear.>
- 2) Install the extension case.

NOTE:

Use a new gasket.

Tightening torque:

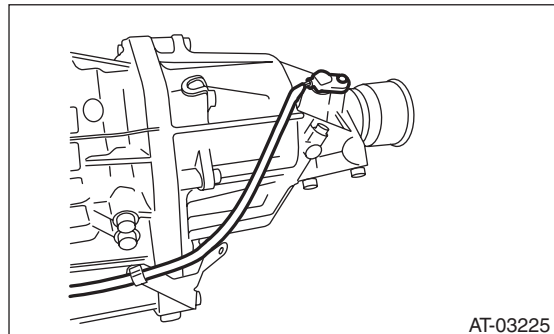
25 N·m (2.5 kgf-m, 18 ft-lb)



- 3) Install the rear vehicle speed sensor.

Tightening torque:

7 N·m (0.7 kgf-m, 5.2 ft-lb)



- 4) Install the transmission assembly.
<Ref. to 5AT-39, INSTALLATION, Automatic Transmission Assembly.>

Extension Case

AUTOMATIC TRANSMISSION

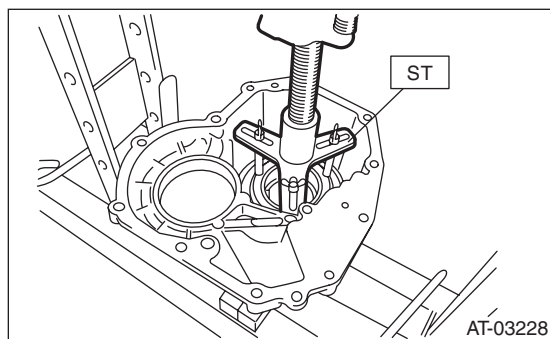
C: DISASSEMBLY

1) Take out the transfer clutch and multi-plate clutch hub assembly by lightly tapping the end of rear drive shaft.

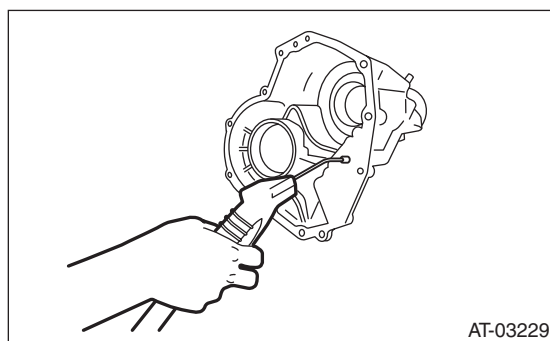
NOTE:

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

2) Remove the snap ring using the 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 the extension case.

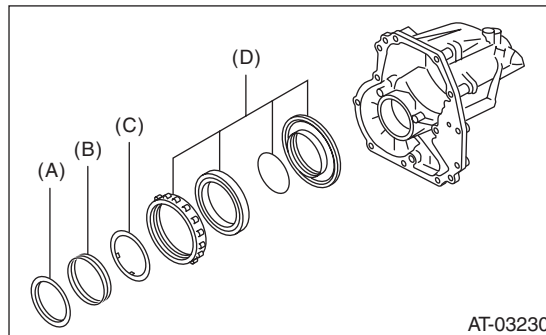
D: ASSEMBLY

1) Press-fit the new oil seal using ST and the 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

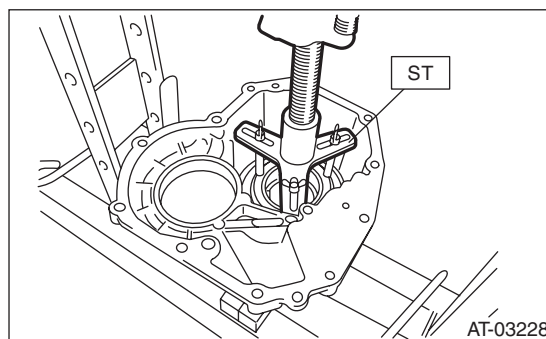
(B) Return spring

(C) Spring retainer

(D) Transfer clutch piston ASSY

4) Using the ST and compressor, install the snap ring.

ST 18762AA000 COMPRESSOR SPECIAL TOOL



5) Install the transfer clutch. <Ref. to 5AT-67, INSTALLATION, Transfer Clutch.>

6) Install the multi-plate hub assembly.

E: INSPECTION

- Use compressed air to make sure the extension case routes are not clogged or leaking.

- Inspect the extension end play, and adjust it to within the standard value.

<Ref. to 5AT-67, ADJUSTMENT, Transfer Clutch.>

25. Transfer Clutch

A: REMOVAL

- 1) Remove the transmission assembly from vehicle body. <Ref. to 5AT-36, REMOVAL, Automatic Transmission Assembly.>
- 2) Remove the extension case, and then remove the transfer clutch. <Ref. to 5AT-65, REMOVAL, Extension Case.> <Ref. to 5AT-66, DISASSEMBLY, Extension Case.>

B: INSTALLATION

- 1) Select the rear drive shaft shim. <Ref. to 5AT-67, ADJUSTMENT, Transfer Clutch.>
- 2) Select driven plate No. 3. <Ref. to 5AT-67, ADJUSTMENT, Transfer Clutch.>
- 3) Install the extension case. <Ref. to 5AT-65, INSTALLATION, Extension Case.>
- 4) Install the transmission assembly to the vehicle. <Ref. to 5AT-39, INSTALLATION, Automatic Transmission Assembly.>

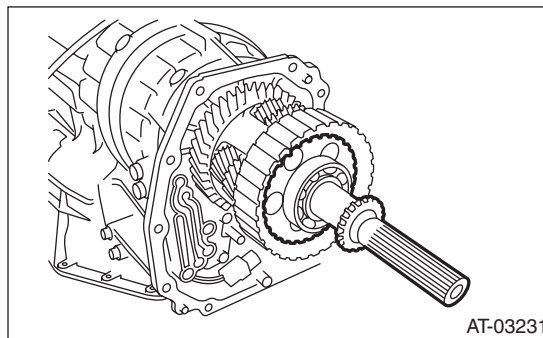
C: INSPECTION

- 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 the standard value. <Ref. to 5AT-67, ADJUSTMENT, Transfer Clutch.>

D: ADJUSTMENT

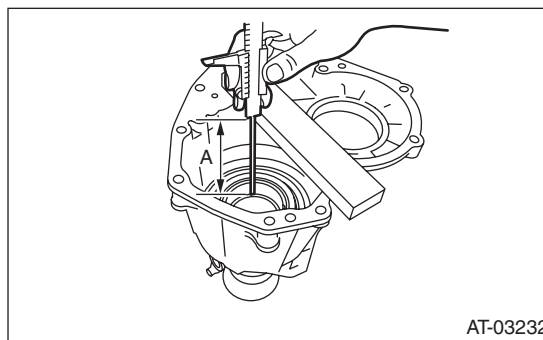
1. REAR DRIVE SHAFT SHIM SELECTION

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



- 2) Using the ST, measure the depth "A", which is from mating surface of extension case to ball bearing outer ring contact surface.

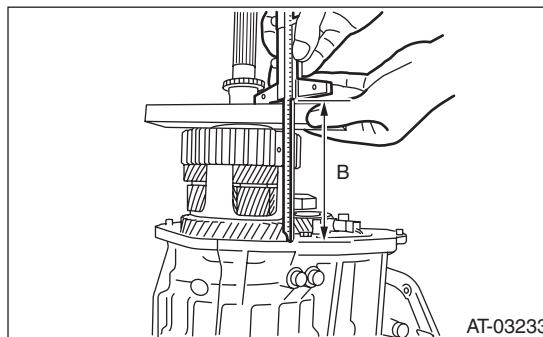
ST 398643600 GAUGE



A Measured value

- 3) Using the ST, measure the height "B" from the AT main case mating surface to ball bearing outer ring contact surface.

ST 398643600 GAUGE



B Measured value

Transfer Clutch

AUTOMATIC TRANSMISSION

4) Calculation formula:

When clearances are 0.05 mm (0.0020 in):

$$T \text{ (mm)} = A - B + 0.23$$

$$[T \text{ (in)} = A - B + 0.009]$$

When clearances are 0.25 mm (0.0098 in):

$$T \text{ (mm)} = A - B + 0.03$$

$$[T \text{ (in)} = A - B + 0.001]$$

A: Depth from end of extension case to ball bearing outer ring contact surface

B: Height from end of AT main case contact surface to the ball bearing outer ring contact surface

T: Shim thickness

Specification:

0.05 — 0.25 mm (0.0020 — 0.0098 in)

NOTE:

Calculation formula for “T” above is applied when measuring with the ST (398643600 GAUGE).

When not using the ST,

When clearances are 0.05 mm (0.0020 in):

$$T \text{ (mm)} = (A - \alpha) - ((B - \beta) - 0.28) - 0.05$$

$$[T \text{ (in)} = (A - \alpha) - ((B - \beta) - 0.011) - 0.0020]$$

When clearances are 0.25 mm (0.0098 in):

$$T \text{ (mm)} = (A - \alpha) - ((B - \beta) - 0.28) - 0.25$$

$$[T \text{ (in)} = (A - \alpha) - ((B - \beta) - 0.011) - 0.0098]$$

is applied.

T: Shim thickness

A: Depth from end of extension case to ball bearing outer ring contact surface

B: Height from end of AT main case contact surface to the ball bearing outer ring contact surface

α : Thickness of collar used when measuring “A”

β : Thickness of collar used when measuring “B”

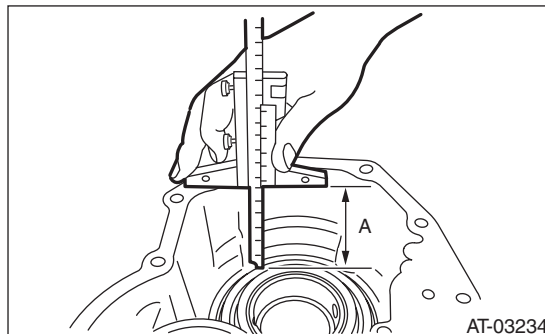
0.28 (0.011): Gasket thickness (Unit mm (in))

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

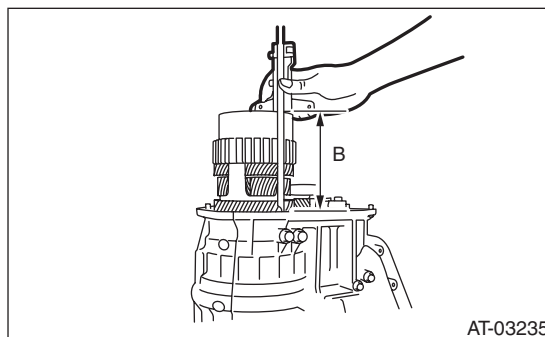
1) Install the drive plate and driven plate to the center differential carrier.

2) Measure the depth “A” from the mating surface of the extension case to the multi-plate clutch (LSD) piston.



3) Using the ST, measure the height “B” from the AT main 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):

$$T \text{ (mm)} = A - B + 0.08$$

$$[T \text{ (in)} = A - B + 0.0031]$$

When clearances are 0.6 mm (0.024 in):

$$T \text{ (mm)} = A - B + 0.32$$

$$[T \text{ (in)} = A - B + 0.0126]$$

T: Thickness of driven plate No. 3

A: Depth from mating surface of extension case to multi-plate clutch (LSD) piston

B: Height from AT main case mating surface to end 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 the ST,

When clearances are 0.2 mm (0.008 in):

$$T \text{ (mm)} = A - (B - \alpha - 0.28) - 0.2$$

$$[T \text{ (in)} = A - (B - \alpha - 0.011) - 0.008]$$

When clearances are 0.6 mm (0.024 in):

$$T \text{ (mm)} = A - (B - \alpha - 0.28) - 0.6$$

$$[T \text{ (in)} = A - (B - \alpha - 0.011) - 0.024]$$

is applied.

T: Thickness of driven plate No. 3

A: Depth from mating surface of extension case to multi-plate clutch (LSD) piston

B: Height from the AT main case mating surface to the contact face of the tool that was used as the substitute of the ST.

 α : Thickness of tool used when measuring “B”

0.28 (0.011): Gasket thickness (Unit mm (in))

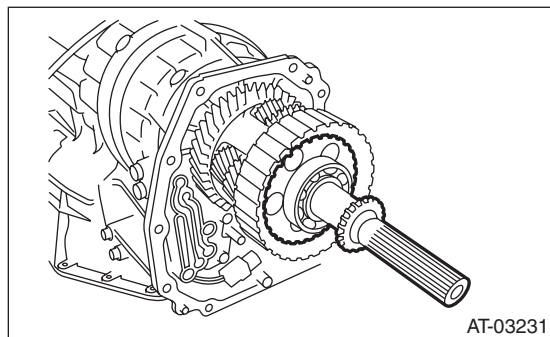
If it is out of specification, select the driven plate No. 3 to adjust within the specification.

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)

26.Rear Drive Shaft

A: REMOVAL

- 1) Remove the transmission assembly from vehicle body. <Ref. to 5AT-36, REMOVAL, Automatic Transmission Assembly.>
- 2) Remove the rear vehicle speed sensor, and then remove the extension case. <Ref. to 5AT-65, REMOVAL, Extension Case.>
- 3) Pull out the rear driveshaft from center differential assembly.



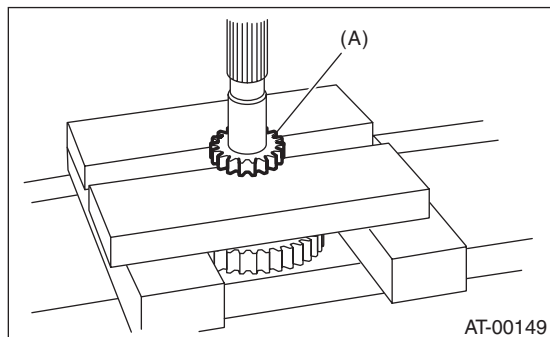
- 4) Remove the drive plate and driven plate.

B: INSTALLATION

- 1) Select the shim. <Ref. to 5AT-67, ADJUSTMENT, Transfer Clutch.>
- 2) Install drive plate and driven plate.
- 3) Insert the rear driveshaft into the center differential assembly.
- 4) Combine the extension case, and then install the rear vehicle speed sensor. <Ref. to 5AT-65, INSTALLATION, Extension Case.>
- 5) Install the transmission assembly to the vehicle. <Ref. to 5AT-39, INSTALLATION, Automatic Transmission Assembly.>

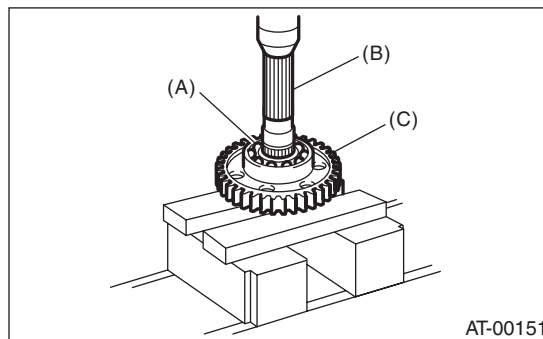
C: DISASSEMBLY

- 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.



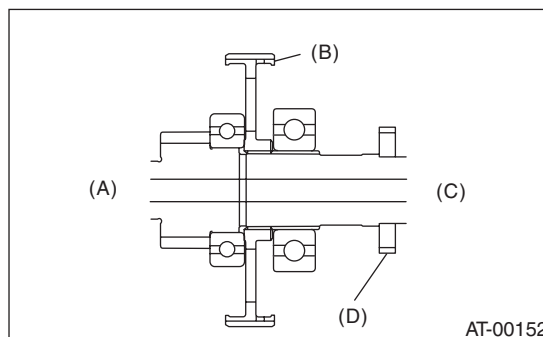
- (A) Rear ball bearing
(B) Rear drive shaft
(C) Clutch hub

D: ASSEMBLY

Assemble in the reverse order of disassembly.

NOTE:

- Use new ball bearings and revolution gear.
- Make sure the clutch hub is facing 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 the standard value. <Ref. to 5AT-67, ADJUSTMENT, Transfer Clutch.>

27.Reduction Driven Gear

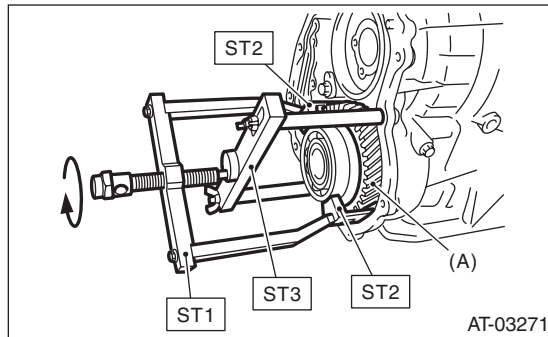
A: REMOVAL

- 1) Remove the transmission assembly from vehicle body. <Ref. to 5AT-36, REMOVAL, Automatic Transmission Assembly.>
- 2) Remove the rear wheel speed sensor, and separate the extension case from transmission case. <Ref. to 5AT-65, REMOVAL, Extension Case.>
- 3) Remove the center differential carrier. <Ref. to 5AT-74, REMOVAL, Center Differential Carrier.>
- 4) Set the range select lever to the "P" range.
- 5) Using ST1, ST2 and ST3, pull out the reduction driven gear.

ST1 499737100 PULLER SET

ST2 18680AA010 GEAR HOLDER

ST3 18766AA000 SUPPORT PULLER



(A) Reduction driven gear

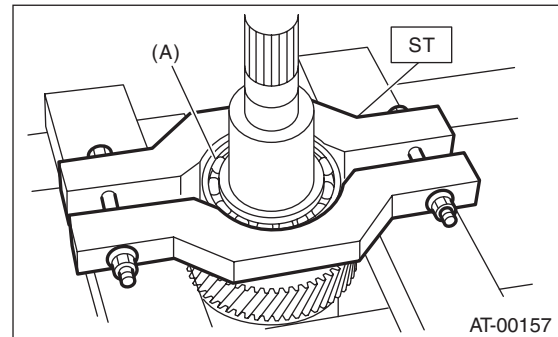
B: INSTALLATION

- 1) Set the range select lever to the "P" range.
- 2) Use a plastic hammer to install reduction driven gear assembly.
- 3) Select the reduction gear shims. <Ref. to 5AT-72, ADJUSTMENT, Reduction Driven Gear.>
- 4) Join the transmission case and the extension case, and then install the rear vehicle speed sensor. <Ref. to 5AT-65, INSTALLATION, Extension Case.>
- 5) Install the transmission assembly to the vehicle. <Ref. to 5AT-39, INSTALLATION, Automatic Transmission Assembly.>

C: DISASSEMBLY

- 1) Remove the ball bearing from reduction driven gear using ST.

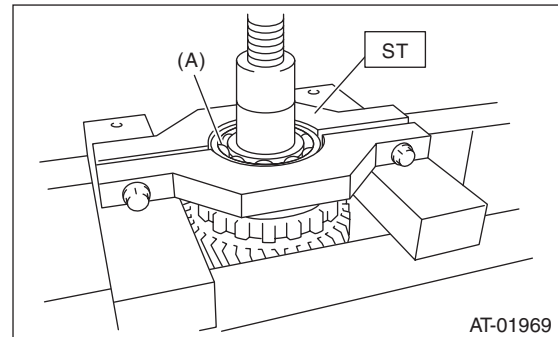
ST 498077300 REMOVER



(A) Ball bearing

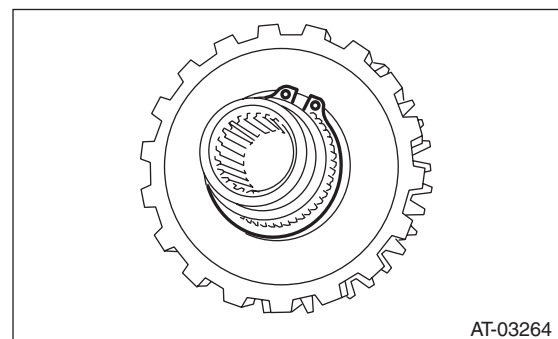
- 2) Remove the ball bearing on the reverse side with the same procedure as step 1).

ST 498077300 REMOVER



(A) Ball bearing

- 3) Remove the snap ring of the parking gear.

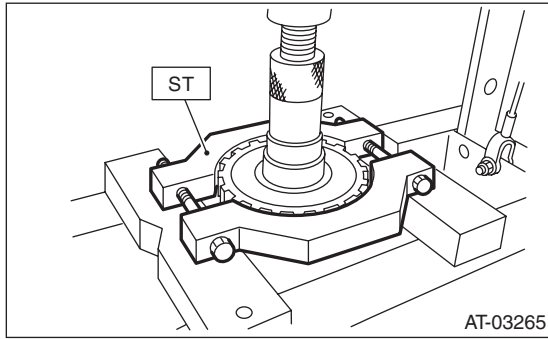


AT-03264

Reduction Driven Gear

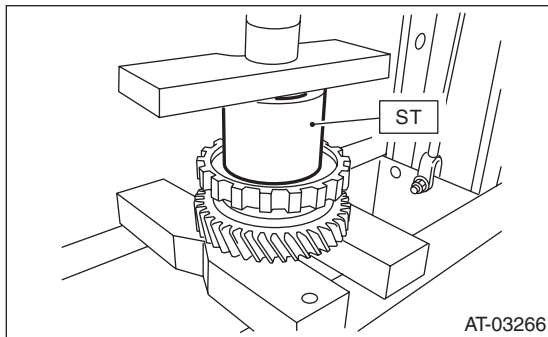
AUTOMATIC TRANSMISSION

- 4) Using the ST, remove the parking gear.
ST 18767AA000 REMOVER

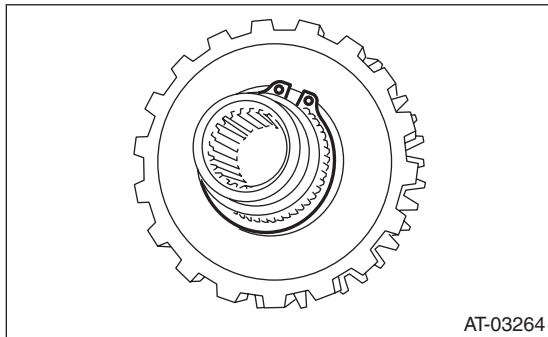


D: ASSEMBLY

- 1) Using the ST, install the parking gear.
ST 499755602 PRESS

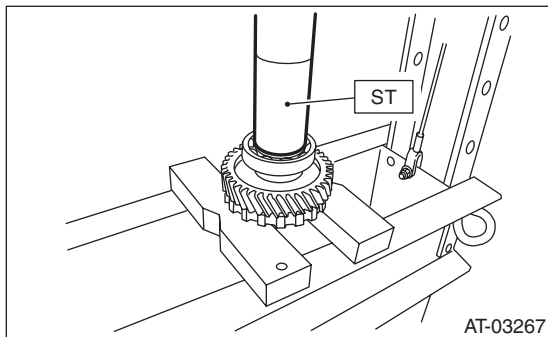


- 2) Install the snap ring.



- 3) Install the new ball bearing to reduction driven gear using press.

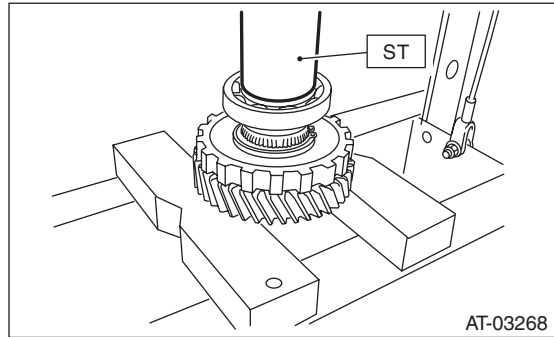
ST 18654AA000 INSTALLER



(A) Ball bearing 1

- 4) Install the ball bearing on the reverse side with the same procedure as step 3).

ST 18654AA000 INSTALLER



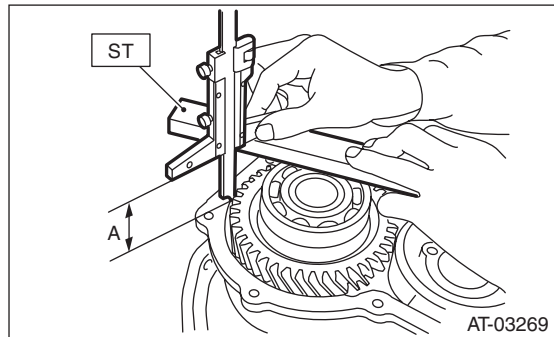
E: INSPECTION

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

F: ADJUSTMENT

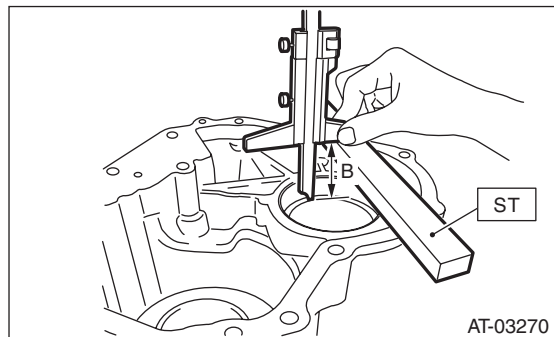
- 1) Using the ST, measure the height "A" from the AT main case mating surface to ball bearing outer ring contact surface.

ST 499575400 GAUGE



- 2) Using the ST, measure the depth "B", which is from mating surface of extension case to ball bearing outer ring contact surface.

ST 499575400 GAUGE



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):

$$T \text{ (mm)} = B - A + 0.23$$

$$[T \text{ (in)} = B - A + 0.0091]$$

When clearances are 0.25 mm (0.0098 in):

$$T \text{ (mm)} = B - A + 0.03$$

$$[T \text{ (in)} = B - A + 0.0011]$$

T: Shim clearance

A: Height from the mating surface of the AT main case to the ball bearing outer ring end surface

B: Depth from mating surface of extension case to ball bearing outer ring contact surface

Reduction gear shim	
Part No.	Thickness mm (in)
31288AA030	0.2 (0.008)
31288AA050	0.5 (0.020)
31288AA060	0.3 (0.012)

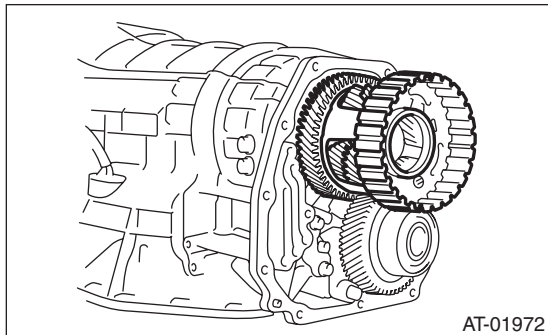
Center Differential Carrier

AUTOMATIC TRANSMISSION

28.Center Differential Carrier

A: REMOVAL

- 1) Remove the transmission assembly from vehicle body. <Ref. to 5AT-36, REMOVAL, Automatic Transmission Assembly.>
- 2) Remove the rear wheel speed sensor, and separate the extension case from transmission case. <Ref. to 5AT-65, REMOVAL, Extension Case.>
- 3) Extract the rear drive shaft. <Ref. to 5AT-70, REMOVAL, Rear Drive Shaft.>
- 4) Pull out the center differential carrier assembly.



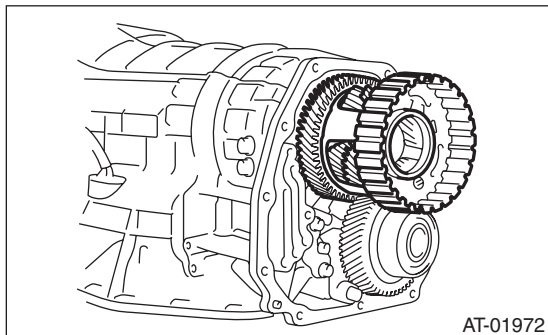
- 5) Pull out the shim(s) from transmission case.

B: INSTALLATION

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

NOTE:

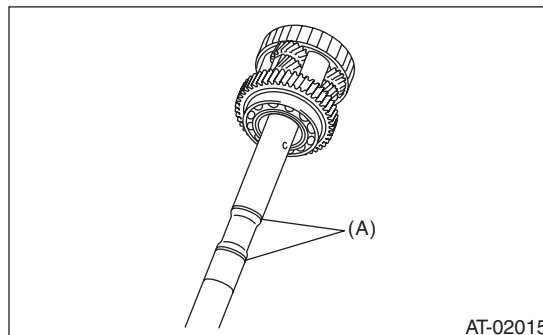
Press-fit it to the bottom of bearing shoulder completely.



- 2) Insert the rear drive shaft. <Ref. to 5AT-70, INSTALLATION, Rear Drive Shaft.>
- 3) Join the transmission case and the extension case, and then install the rear vehicle speed sensor. <Ref. to 5AT-65, INSTALLATION, Extension Case.>
- 4) Install the transmission assembly to the vehicle. <Ref. to 5AT-39, INSTALLATION, Automatic Transmission Assembly.>

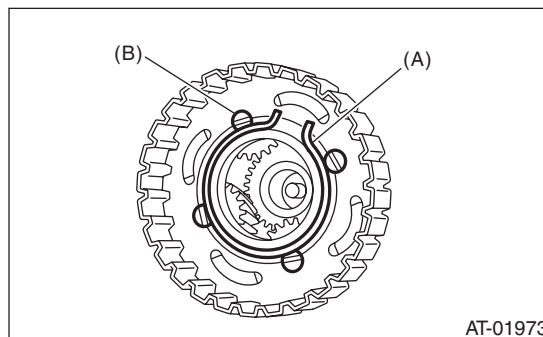
C: DISASSEMBLY

- 1) Remove the seal ring.



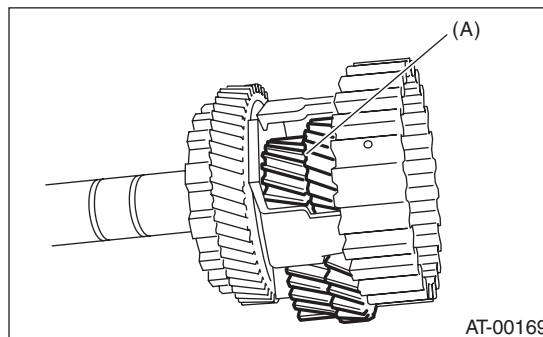
(A) Seal ring

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



(A) Snap ring
(B) Shaft

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



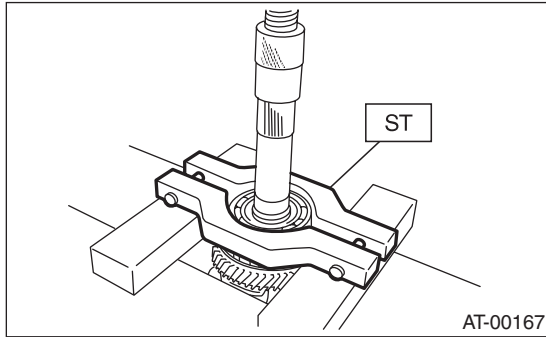
(A) Pinion gear

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

5) Extract the ball bearing with ST1 and ST2.

ST1 18654AA000 INSTALLER

ST2 18767AA000 REMOVER



D: ASSEMBLY

1) Install the thrust washer onto intermediate shaft.

2) Install the thrust bearing onto intermediate shaft.

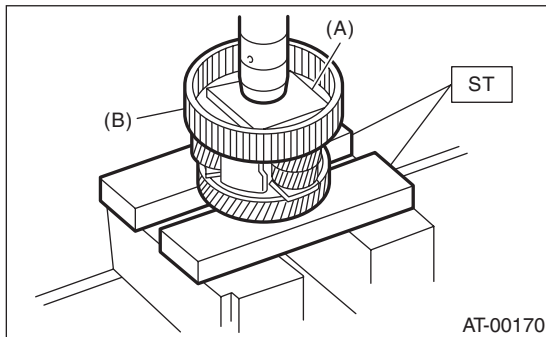
3) Install the pinion gears and washers.

4) Insert the shaft into the center differential assembly.

5) Install the snap ring.

6) Using a press, install a new ball bearing into the center differential assembly.

ST 498077000 REMOVER



(A) Plate

(B) Center differential carrier

7) Apply vaseline onto the seal ring outer surface and shaft grooves.

8) Install a new seal ring.

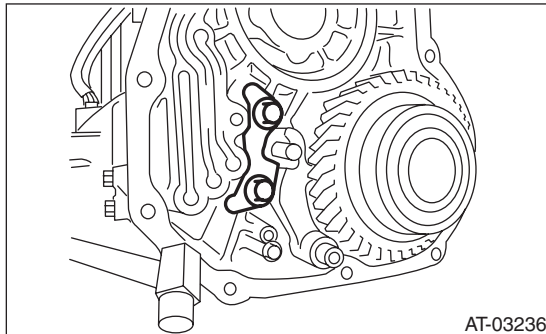
E: INSPECTION

- Check each parts for holes, damages or other foreign matters.
- Inspect the extension end play, and adjust it to within the standard value. <Ref. to 5AT-67, ADJUSTMENT, Transfer Clutch.>

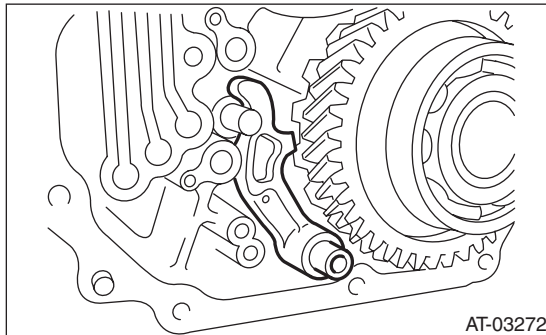
29. Parking Pawl

A: REMOVAL

- 1) Remove the transmission assembly from vehicle body. <Ref. to 5AT-36, REMOVAL, Automatic Transmission Assembly.>
- 2) Remove the extension case. <Ref. to 5AT-65, REMOVAL, Extension Case.>
- 3) Remove the center differential carrier. <Ref. to 5AT-74, REMOVAL, Center Differential Carrier.>
- 4) Remove the front vehicle speed sensor. <Ref. to 5AT-49, REMOVAL, Front Vehicle Speed Sensor.>
- 5) Remove the parking support actuator.

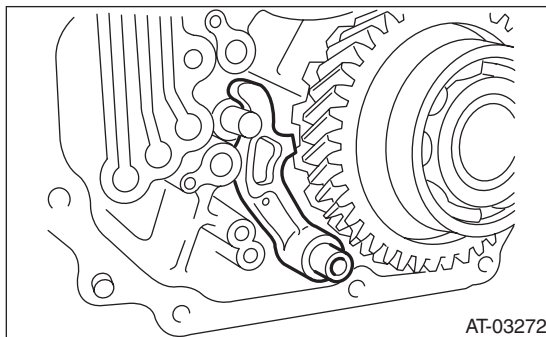


- 6) Remove the parking pawl, parking pawl shaft and return spring.



B: INSTALLATION

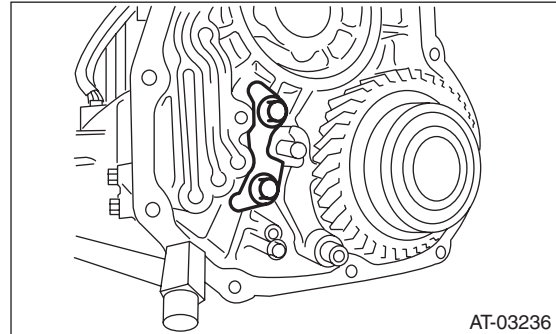
- 1) Set the transmission to the "N" range.
- 2) Install the parking pawl, parking pawl shaft and return spring.



- 3) Install the parking support actuator.

Tightening torque:

$10 \pm 2 \text{ N}\cdot\text{m}$ ($1.0 \pm 0.2 \text{ kgf}\cdot\text{m}$, $7.4 \pm 1.5 \text{ ft}\cdot\text{lb}$)



- 4) Using the ST, tighten the bolts which tightened in step 4) with specified angle.

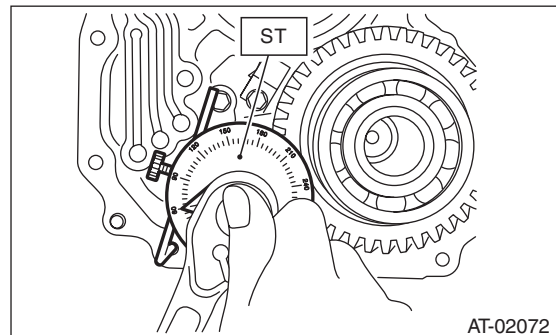
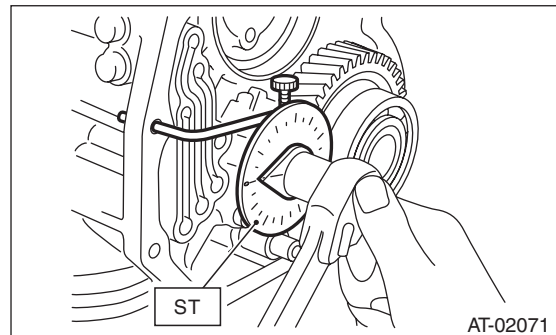
Tightening angle:

$17^\circ \pm 2^\circ$

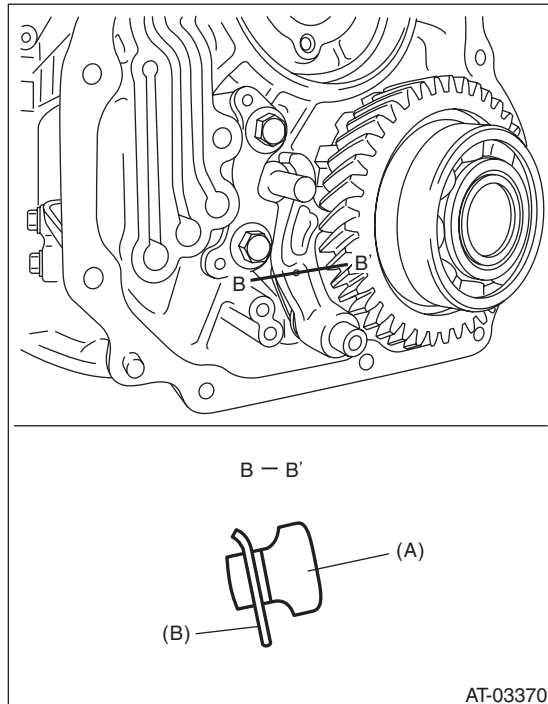
ST 18854AA000 ANGLE GAUGE

NOTE:

Do not use extension as much as possible.



5) Make sure that the return spring is sticking out of the parking pole hole.



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

6) Install the front vehicle speed sensor. <Ref. to 5AT-49, INSTALLATION, Front Vehicle Speed Sensor.>

7) Install the center differential carrier. <Ref. to 5AT-74, INSTALLATION, Center Differential Carrier.>

8) Install the extension case. <Ref. to 5AT-65, INSTALLATION, Extension Case.>

9) Install the transmission assembly to the vehicle. <Ref. to 5AT-39, INSTALLATION, Automatic Transmission Assembly.>

C: INSPECTION

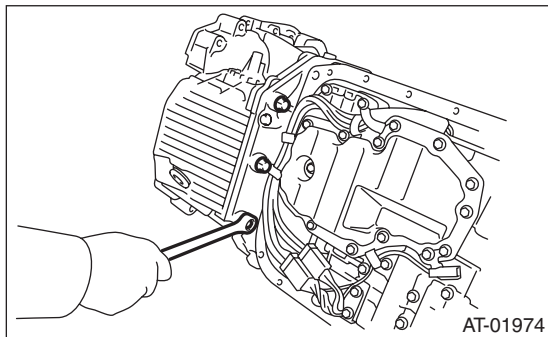
Make sure that the tab of parking pawl on reduction driven gear is not worn or otherwise damaged.

30. Converter Case

A: REMOVAL

- 1) Remove the transmission assembly from vehicle body. <Ref. to 5AT-36, REMOVAL, Automatic Transmission Assembly.>
- 2) Remove the torque converter assembly. <Ref. to 5AT-64, REMOVAL, Torque Converter Assembly.>
- 3) Remove the transmission harness connector from stay.
- 4) Remove the turbine speed sensor 1. <Ref. to 5AT-54, REMOVAL, Turbine Speed Sensor 1.>
- 5) Remove the oil charge pipe. <Ref. to 5AT-63, REMOVAL, Oil Charge Pipe.>
- 6) Remove the ATF filter inlet and outlet pipes. <Ref. to 5AT-59, REMOVAL, ATF Cooler Pipe and Hose.>
- 7) Remove the converter case attachment bolts.
- 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

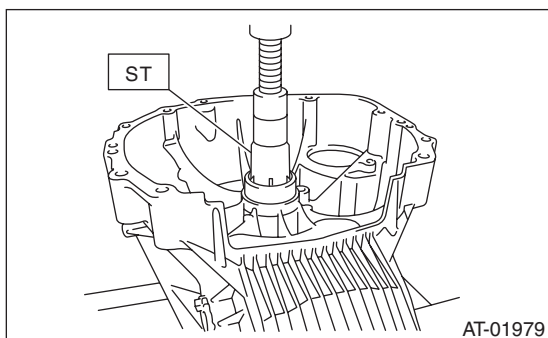


- 10) Separate the converter case by lightly tapping with plastic hammer.
- 11) Remove the differential assembly. <Ref. to 5AT-89, REMOVAL, Front Differential Assembly.>
- 12) Remove the oil seal from converter case.

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



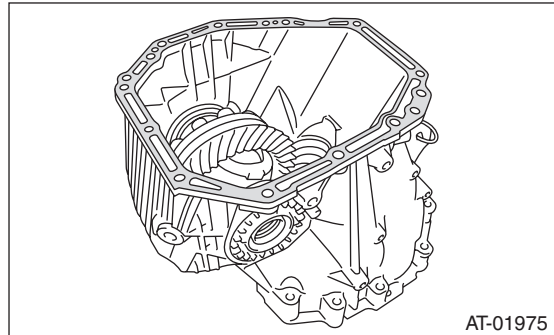
- 3) Install the differential assembly to the case. <Ref. to 5AT-89, INSTALLATION, Front Differential Assembly.>

- 4) Install the right and left side retainers. <Ref. to 5AT-92, 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:

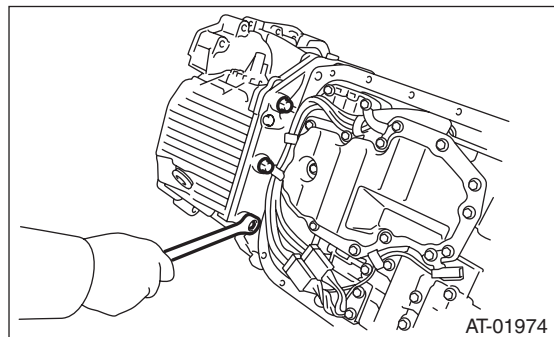
41 N·m (4.2 kgf-m, 30.4 ft-lb)

- 7) Install the three converter case mounting bolts (TORX®).

ST 18676AA020 TORX® WRENCH

Tightening torque:

41 N·m (4.2 kgf-m, 30.4 ft-lb)



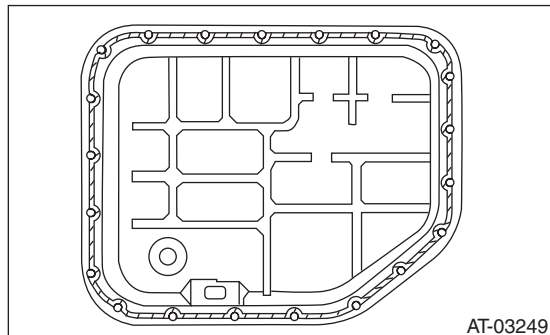
8) Apply proper amount of liquid gasket to the entire oil pan mating surface, and then install it.

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-62, INSTALLATION, Air Breather Hose.>

11) Install the ATF filter pipe. <Ref. to 5AT-60, INSTALLATION, ATF Cooler Pipe and Hose.>

12) Install the oil charge pipe with O-ring. <Ref. to 5AT-63, INSTALLATION, Oil Charge Pipe.>

13) Install the torque converter assembly. <Ref. to 5AT-64, INSTALLATION, Torque Converter Assembly.>

14) Install the transmission assembly to the vehicle. <Ref. to 5AT-39, INSTALLATION, Automatic Transmission Assembly.>

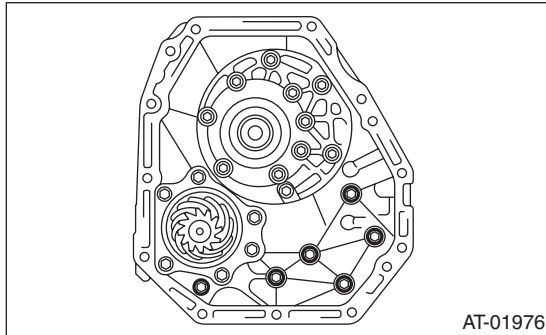
C: INSPECTION

Measure the backlash, and then adjust it to be within standard values. <Ref. to 5AT-87, ADJUSTMENT, Drive Pinion Shaft Assembly.>

31.Oil Pump Cover

A: REMOVAL

- 1) Remove the transmission assembly from vehicle body. <Ref. to 5AT-36, REMOVAL, Automatic Transmission Assembly.>
- 2) Pull out the torque converter assembly. <Ref. to 5AT-64, REMOVAL, Torque Converter Assembly.>
- 3) Remove the transmission harness connector from stay.
- 4) Remove the oil charge pipe. <Ref. to 5AT-63, REMOVAL, Oil Charge Pipe.>
- 5) Remove the ATF filter inlet and outlet pipes. <Ref. to 5AT-59, REMOVAL, ATF Cooler Pipe and Hose.>
- 6) Separate the converter case and transmission case. <Ref. to 5AT-78, 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.

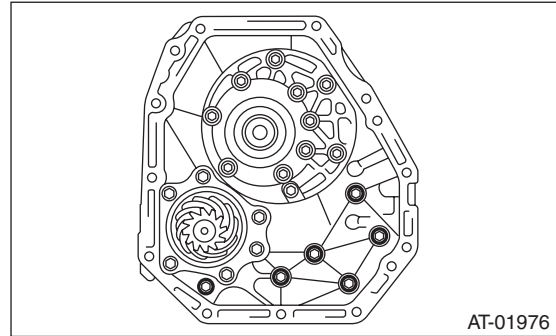


B: INSTALLATION

- 1) Secure the oil pump cover.

Tightening torque:

41 N·m (4.2 kgf-m, 30.4 ft-lb)

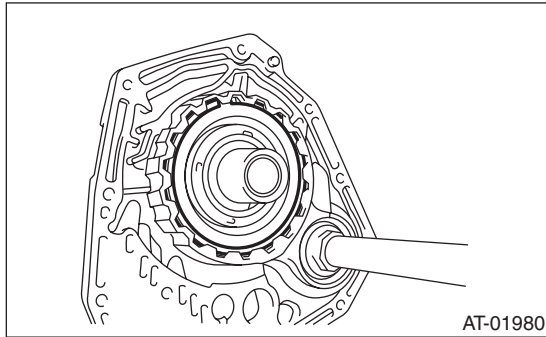


- 2) Install the converter case assembly to the transmission case assembly. <Ref. to 5AT-64, INSTALLATION, Torque Converter Assembly.>
- 3) Install the transmission harness connector to the stay.
- 4) Install the ATF filter pipe. <Ref. to 5AT-60, INSTALLATION, ATF Cooler Pipe and Hose.>
- 5) Install the oil charge pipe together with an O-ring. <Ref. to 5AT-63, INSTALLATION, Oil Charge Pipe.>
- 6) Install the torque converter assembly. <Ref. to 5AT-64, INSTALLATION, Torque Converter Assembly.>
- 7) Install the transmission assembly to the vehicle. <Ref. to 5AT-39, INSTALLATION, Automatic Transmission Assembly.>

C: DISASSEMBLY

1. FRONT BRAKE

- 1) Remove the snap ring.



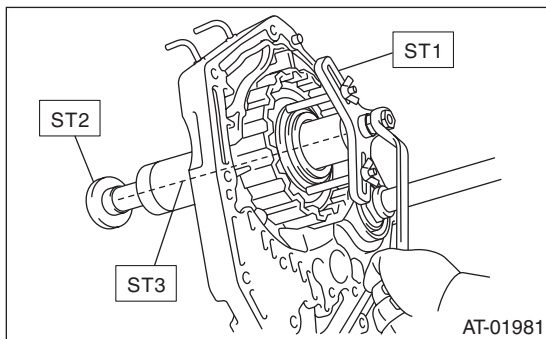
- 2) Remove the retainer plate, drive plate and driven plate.

- 3) Using the ST1, ST2 and ST3, remove the snap ring.

ST1 18762AA000 COMPRESSOR SPECIAL TOOL

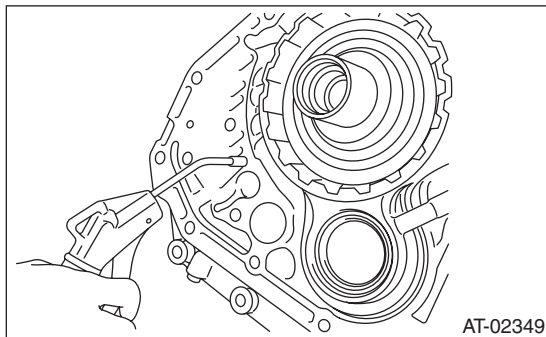
ST2 18765AA000 COMPRESSOR SUPPORT

ST3 18763AA000 COMPRESSOR SHAFT



- 4) Remove the retainer and return spring.

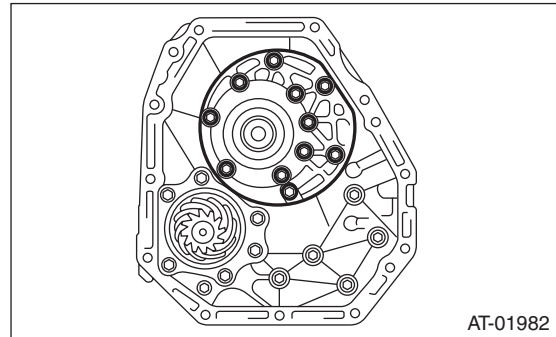
- 5) Remove the front brake piston using compressed air.



- 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

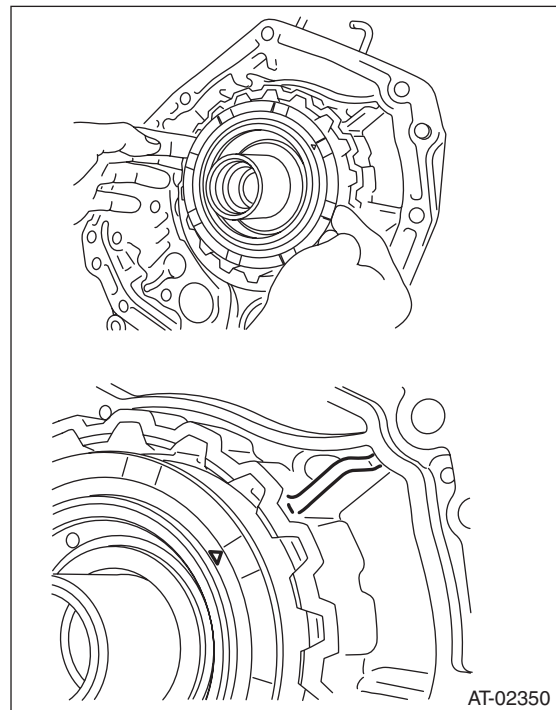
1. FRONT BRAKE

- 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.

Oil Pump Cover

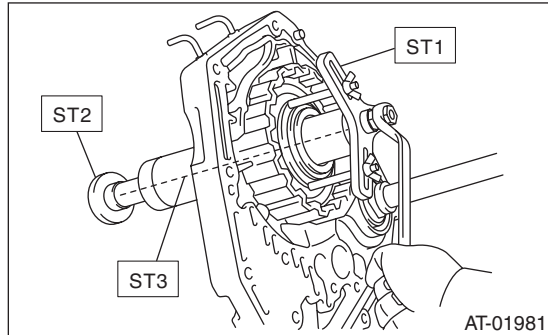
AUTOMATIC TRANSMISSION

4) Install the front brake piston assembly using ST1, ST2 and ST3.

ST1 18762AA000 COMPRESSOR SPECIAL TOOL

ST2 18765AA000 COMPRESSOR SUPPORT

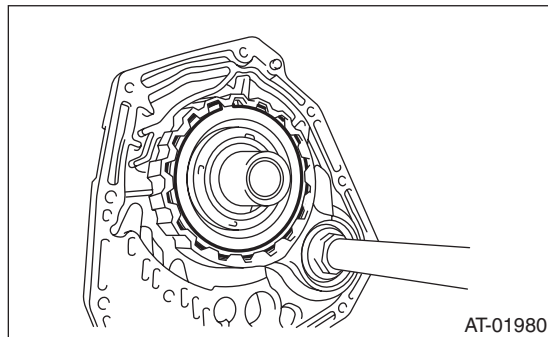
ST3 18763AA000 COMPRESSOR SHAFT



5) Install the genuine driven plate instead of retainer plate, and temporarily assemble the drive plate and driven plate.

Part No. 31536AA290DRIVEN PLATE

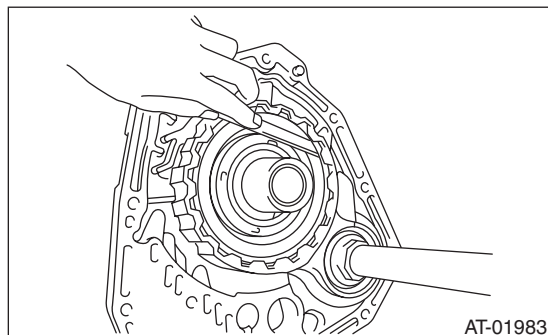
6) Install the snap ring.



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 driven plate used in measurement of clearance with the retainer plate, and then reassemble.

2. OIL PUMP

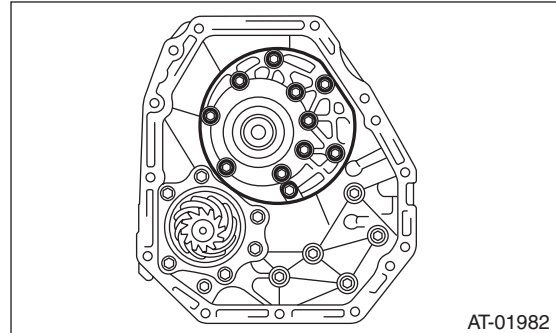
1) Apply ATF to oil pump assembly, and then install it to oil pump housing.

2) Install the O-ring to oil pump cover.

3) Install the oil pump housing to the 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 and damage.

2) Check other parts for dents or faults.

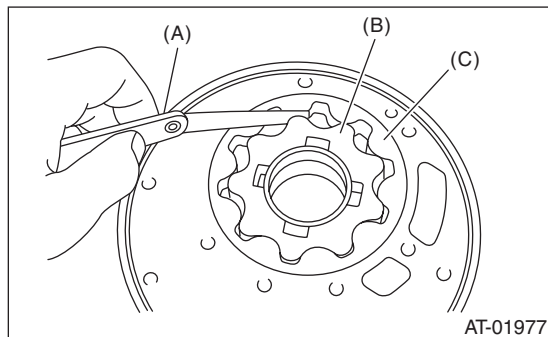
3) Oil pump rotor assembly selection

(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)



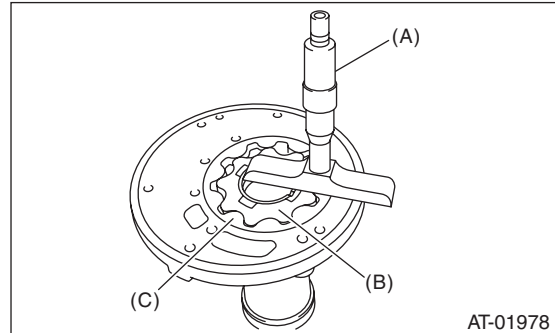
- (A) Thickness gauge
- (B) Inner rotor
- (C) Outer rotor

(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 assembly	
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 to be within specifications. <Ref. to 5AT-102, ADJUSTMENT, AT Main Case.>

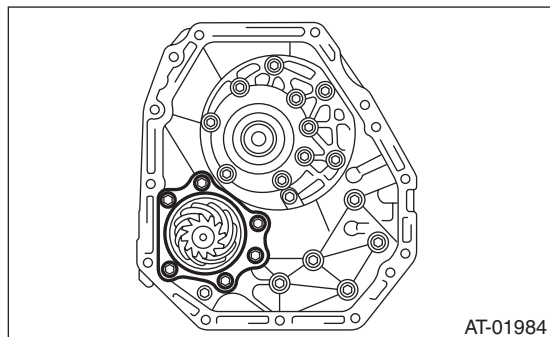
Drive Pinion Shaft Assembly

AUTOMATIC TRANSMISSION

32. Drive Pinion Shaft Assembly

A: REMOVAL

- 1) Remove the transmission assembly from vehicle body. <Ref. to 5AT-36, REMOVAL, Automatic Transmission Assembly.>
- 2) Pull out the torque converter assembly. <Ref. to 5AT-64, REMOVAL, Torque Converter Assembly.>
- 3) Remove the transmission harness connector from stay.
- 4) Disconnect the air breather hose. <Ref. to 5AT-62, REMOVAL, Air Breather Hose.>
- 5) Remove the oil charge pipe. <Ref. to 5AT-63, REMOVAL, Oil Charge Pipe.>
- 6) Remove the ATF filter inlet and outlet pipes. <Ref. to 5AT-59, REMOVAL, ATF Cooler Pipe and Hose.>
- 7) Separate the converter case and transmission case. <Ref. to 5AT-78, REMOVAL, Converter Case.>
- 8) Remove the drive pinion shaft mounting bolts, 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-80, Oil Pump Cover.>

B: INSTALLATION

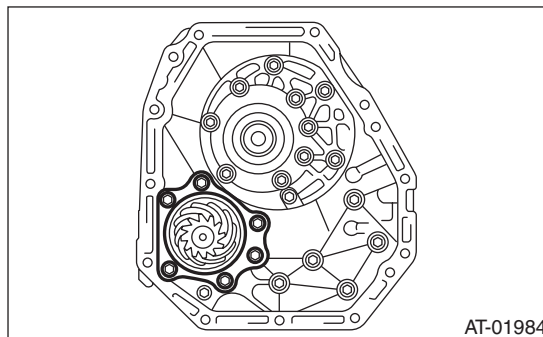
- 1) Assemble the drive pinion assembly to oil pump cover.

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 the front differential side gear. <Ref. to 5AT-87, ADJUSTMENT, Drive Pinion Shaft Assembly.>
- 3) Join the converter case with the transmission case. <Ref. to 5AT-78, INSTALLATION, Converter Case.>
- 4) Install the transmission harness connector to the stay.
- 5) Install the ATF filter pipe. <Ref. to 5AT-60, INSTALLATION, ATF Cooler Pipe and Hose.>
- 6) Install the oil charge pipe with O-ring.
- 7) Install the torque converter assembly. <Ref. to 5AT-64, INSTALLATION, Torque Converter Assembly.>
- 8) Install the transmission assembly to the vehicle. <Ref. to 5AT-39, INSTALLATION, Automatic Transmission Assembly.>

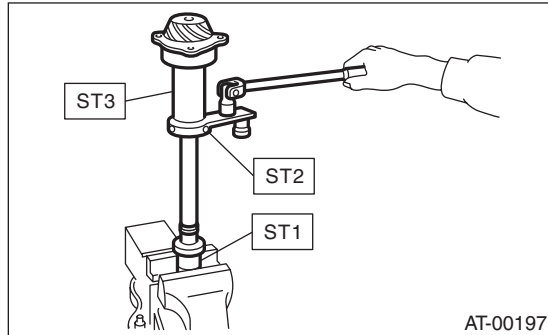
C: DISASSEMBLY

1) Remove the crimped part of the lock nut, and then remove the lock nut while holding the rear spline part of the shaft using ST1 and ST2. Pull out the drive pinion collar.

ST1 18667AA010 HOLDER

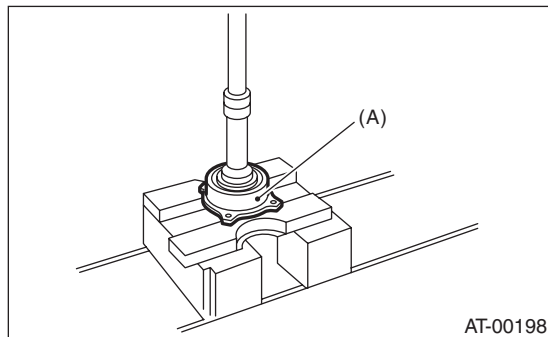
ST2 499787700 WRENCH

ST3 499787500 ADAPTER



2) Remove the O-ring.

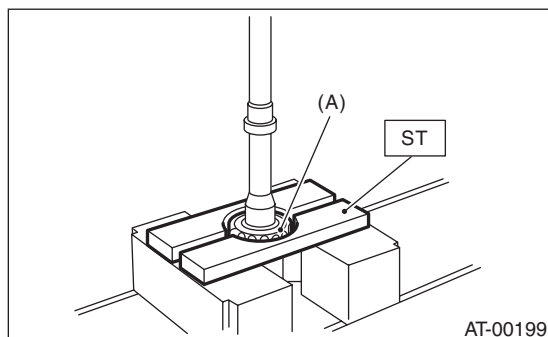
3) Separate the roller bearing and outer race from shaft using a press.



(A) Outer race

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

ST 498517000 REPLACER

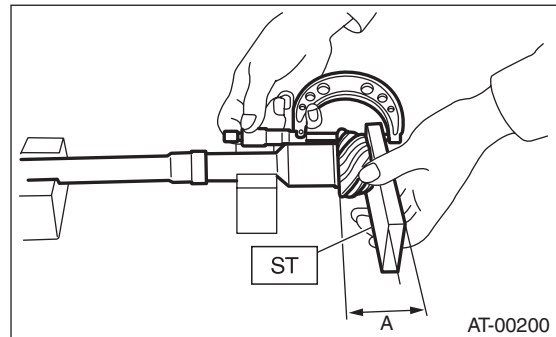


(A) Front roller bearing

D: ASSEMBLY

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

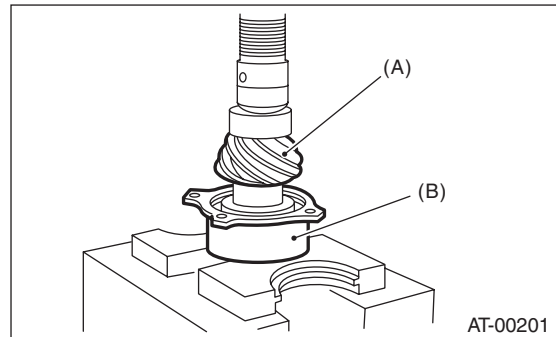
ST 398643600 GAUGE



2) Using a press, press-fit the new roller bearing into the 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 the shaft.

Drive Pinion Shaft Assembly

AUTOMATIC TRANSMISSION

4) Tighten the new lock nuts using ST1, ST2 and ST3.

Using the following equation, calculate the tightening torque.

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

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)

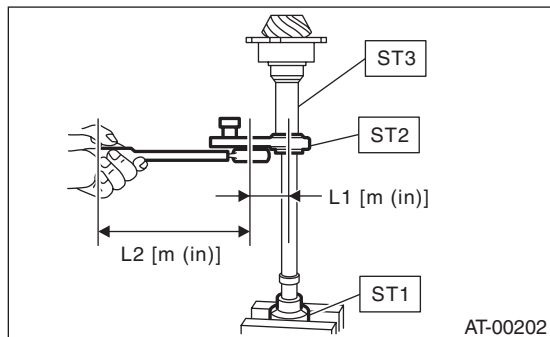
ST1 18667AA010 HOLDER

ST2 499787700 WRENCH

ST3 499787500 ADAPTER

NOTE:

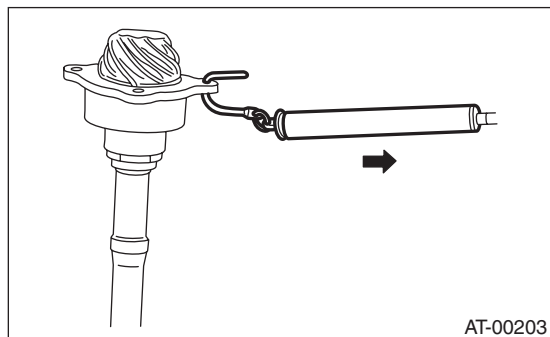
Attach ST2 to torque wrench as straight as possible.



5) Measure the starting torque of the bearing. Make sure the starting torque is within the specified range. If the torque is not within specified range, replace the roller bearing.

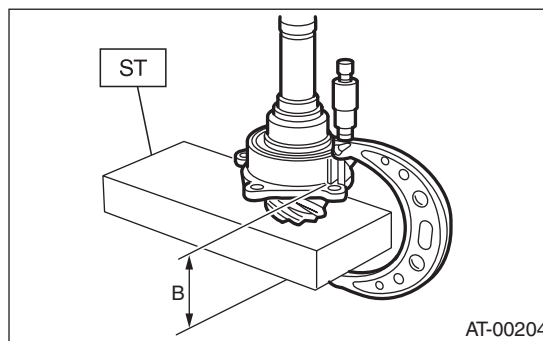
Starting torque:

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



6) Crimp the locknut in 2 locations.

7) Measure dimension "B" of the drive pinion shaft
ST 398643600 GAUGE



8) Calculate the thickness "t" (mm) of the drive pinion shim.

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

9) 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 tooth alignment. <Ref. to 5AT-87, 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 to prevent damaging the mating surface of the housing.

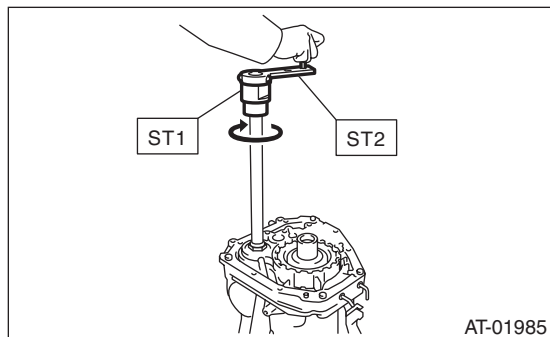
Tightening torque:

41 N·m (4.2 kgf-m, 30.4 ft-lb)

- 3) Rotate the drive pinion a few times using ST1 and ST2.

ST1 18667AA010 HOLDER

ST2 499787700 WRENCH



AT-01985

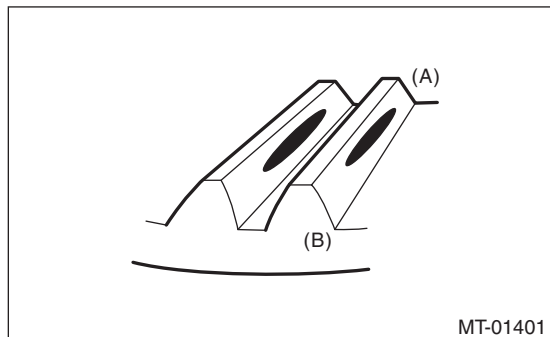
- 4) Adjust the drive pinion and hypoid driven gear backlash. <Ref. to 5AT-92, ADJUSTMENT, Front Differential Assembly.>

- 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 teeth contact is inappropriate, adjust the backlash or shim thickness. <Ref. to 5AT-92, ADJUSTMENT, Front Differential Assembly.>

- Correct tooth contact

Check item: Tooth contact surface is slightly shifted toward the toe side under a no-load condition. (When driving it will move toward the heel side.)



MT-01401

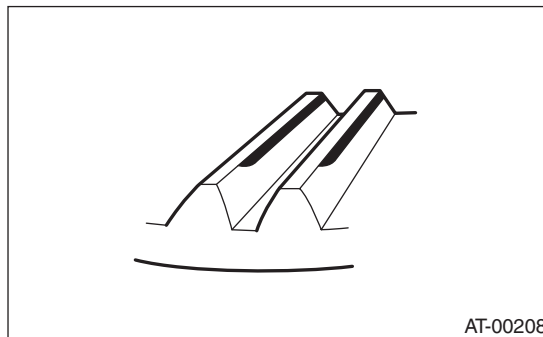
(A) Toe side

(B) Heel side

- Face contact

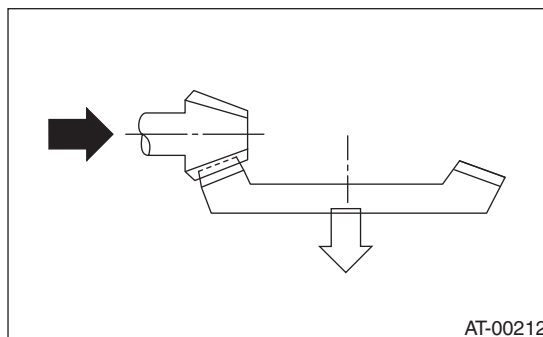
Check item: Backlash is too large.

Contact pattern



AT-00208

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

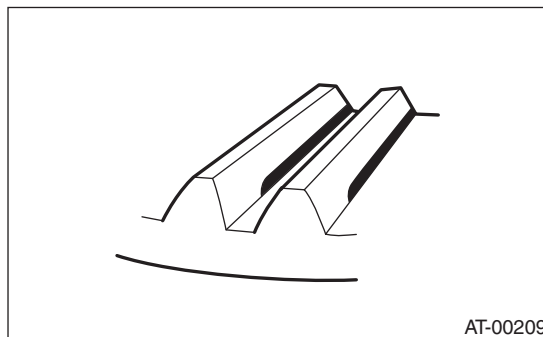


AT-00212

- Flank contact

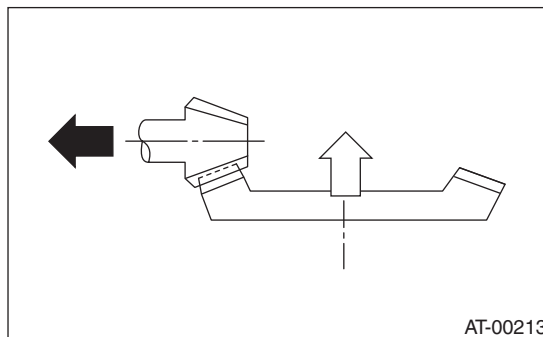
Check item: Backlash is too small.

Contact pattern



AT-00209

Adjustment: Reduce the thickness of pinion height adjusting washer according to the procedure for bringing drive pinion away from driven gear.



AT-00213

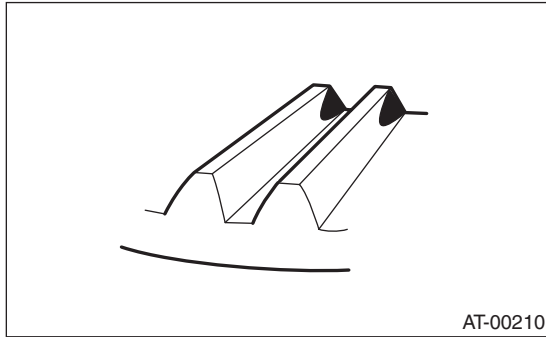
Drive Pinion Shaft Assembly

AUTOMATIC TRANSMISSION

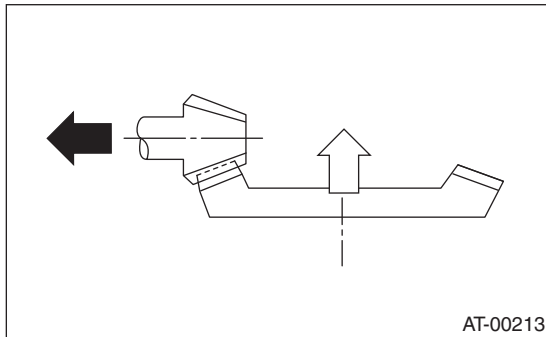
- Toe contact (inside contact)

Check item: Contact area is too small.

Contact pattern



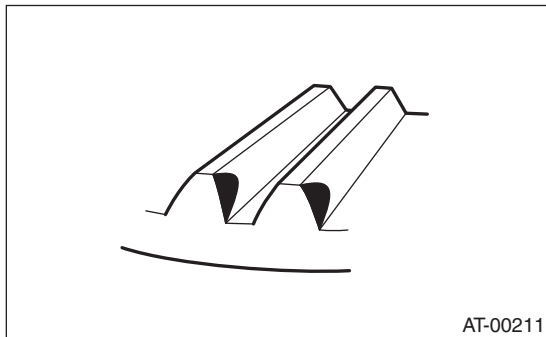
Adjustment: Reduce the thickness of pinion height adjusting washer according to the procedure for bringing drive pinion away from driven gear side.



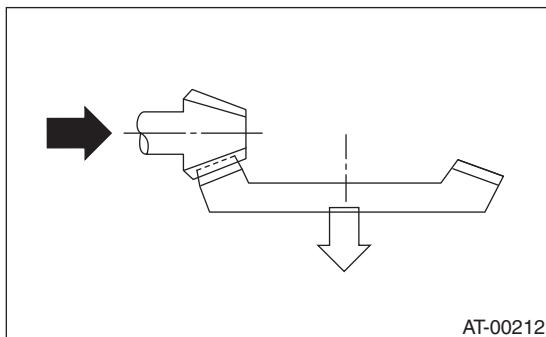
- Heel contact (outside end contact)

Check item: Contact area is too small.

Contact pattern



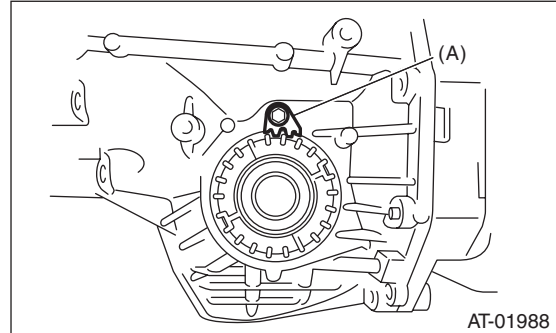
Corrective action: Increase thickness of drive pinion height adjusting washer in order to bring drive pinion close to driven gear.



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 with specified torque.

Tightening torque:

25 N·m (2.5 kgf-m, 18 ft-lb)



(A) Lock plate

33.Front Differential Assembly

A: REMOVAL

- 1) Remove the transmission assembly from vehicle body. <Ref. to 5AT-36, REMOVAL, Automatic Transmission Assembly.>
- 2) Pull out the torque converter assembly. <Ref. to 5AT-64, REMOVAL, Torque Converter Assembly.>
- 3) Remove the transmission harness connector from stay.
- 4) Remove the oil charge pipe. <Ref. to 5AT-63, REMOVAL, Oil Charge Pipe.>
- 5) Remove the ATF filter inlet and outlet pipes. <Ref. to 5AT-59, REMOVAL, ATF Cooler Pipe and Hose.>
- 6) Separate the converter case from the transmission case. <Ref. to 5AT-78, REMOVAL, Converter Case.>
- 7) Remove the differential side retainers using ST.

NOTE:

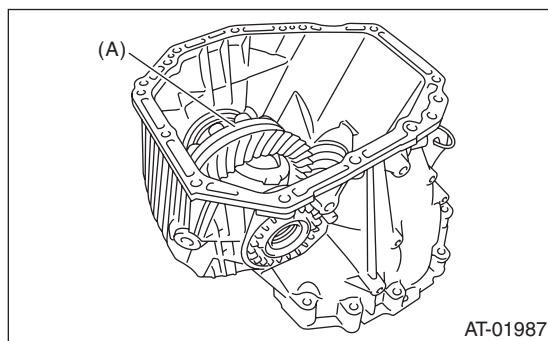
Hold the differential case assembly by hand to avoid damaging the retainer mounting hole of the converter case.

ST 18630AA010 WRENCH COMPL RETAINER

- 8) Remove the differential assembly while being careful not to damage the attachment 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).



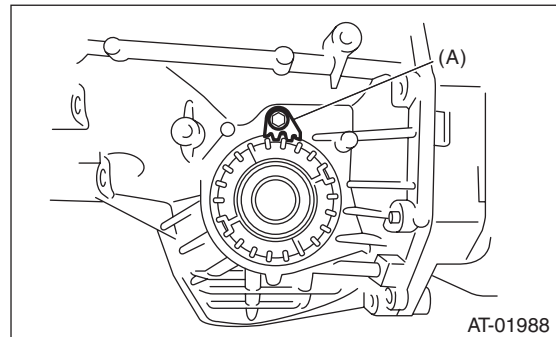
(A) Differential ASSY

- 2) Install the O-ring to left and right side retainer.
- 3) Using the ST, install the side retainer.
ST 18630AA010 WRENCH COMPL RETAINER
- 4) Adjust the backlash of the front differential. <Ref. to 5AT-92, ADJUSTMENT, Front Differential Assembly.>

- 5) Install the lock plate.

Tightening torque:

25 N·m (2.5 kgf-m, 18 ft-lb)



(A) Lock plate

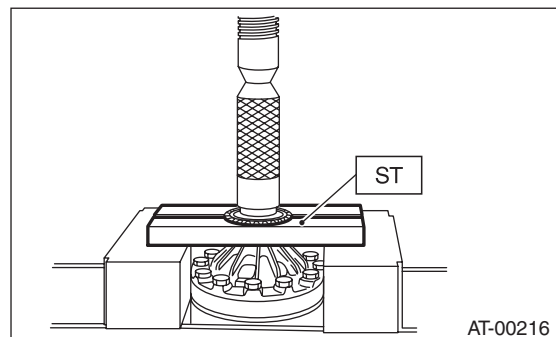
- 6) Install the converter case to the transmission case. <Ref. to 5AT-78, INSTALLATION, Converter Case.>
- 7) Install the transmission harness connector to the stay.
- 8) Install the ATF filter pipe. <Ref. to 5AT-60, INSTALLATION, ATF Cooler Pipe and Hose.>
- 9) Install the oil charge pipe together with an O-ring. <Ref. to 5AT-63, INSTALLATION, Oil Charge Pipe.>
- 10) Install the torque converter assembly. <Ref. to 5AT-64, INSTALLATION, Torque Converter Assembly.>
- 11) Install the transmission assembly to the vehicle. <Ref. to 5AT-39, INSTALLATION, Automatic Transmission Assembly.>

C: DISASSEMBLY

1. DIFFERENTIAL CASE ASSEMBLY

- 1) Remove the taper roller bearing using the ST and a press.

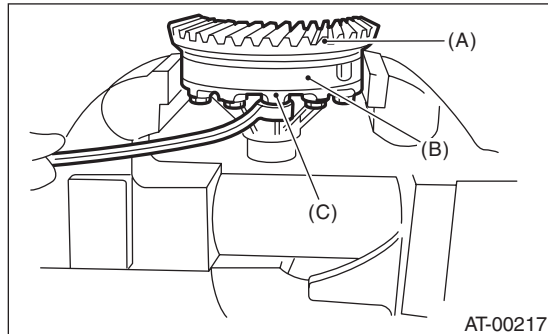
ST 498077000 REMOVER



Front Differential Assembly

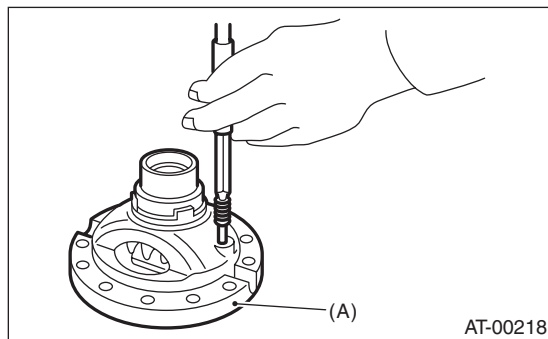
AUTOMATIC TRANSMISSION

2) Secure the case in a vise, remove the hypoid driven gear tightening bolts, 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.



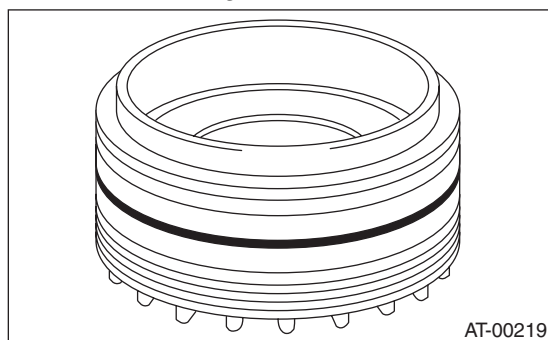
- (A) Differential case (RH)

2. SIDE RETAINER

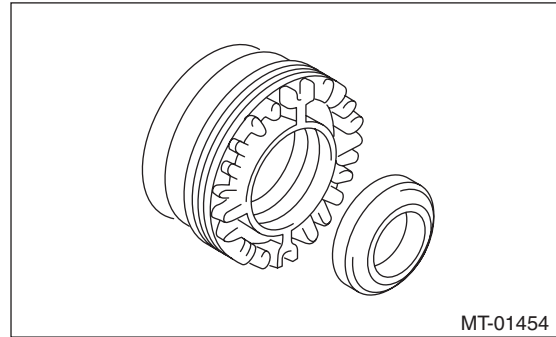
NOTE:

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

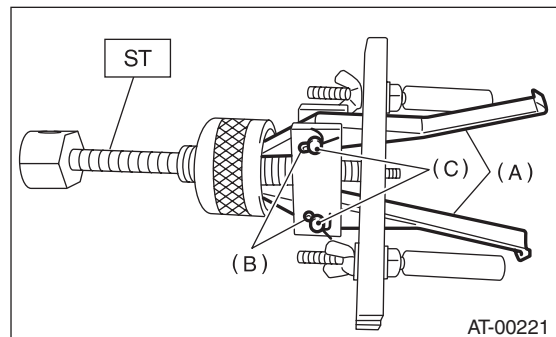
1) Remove the O-ring.



2) Remove the oil seal.



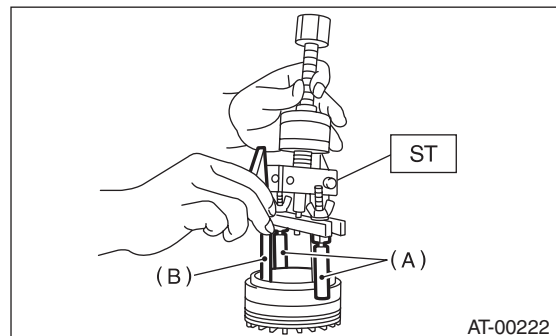
3) Remove the split pin, and then remove the claw.
ST 398527700 PULLER ASSY



- (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



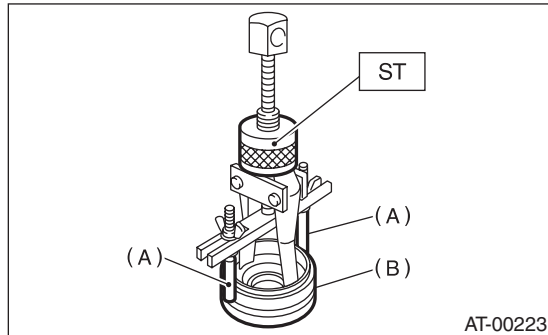
- (A) Shaft
- (B) Claw

5) Restore 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.



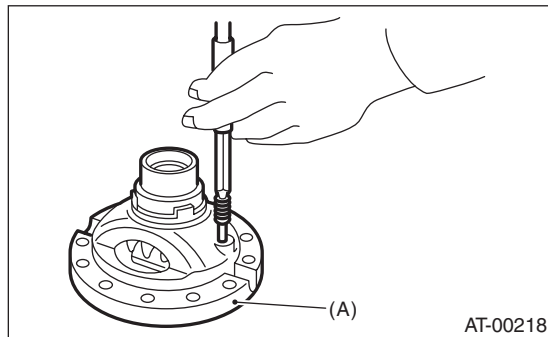
- (A) Shaft
(B) Side retainer

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) Attach the straight pin in the reverse direction.



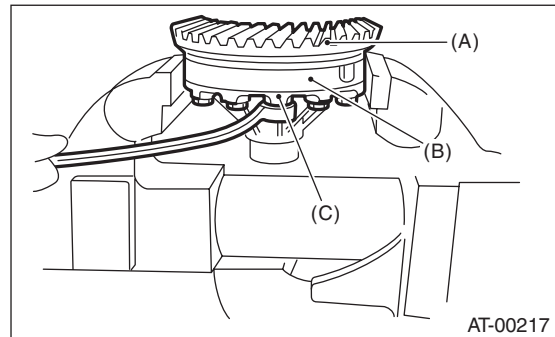
- (A) Differential case (RH)

3) Install the washer and differential bevel gear to the differential case (LH). Put the differential case (RH) on the case, and assemble two cases.

4) Install the hypoid driven gear and secure by tightening the bolt.

Tightening torque:

70 N·m (7.1 kgf-m, 51.6 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.

Part No. 38415AA070AXLE SHAFT

(2) Measure the gear backlash using ST1 and ST2, and then insert the ST2 through the access window of case.

ST1 498247001 MAGNET BASE

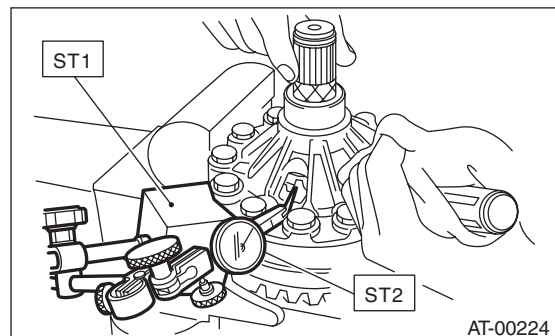
ST2 498247100 DIAL GAUGE

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)

Front Differential Assembly

AUTOMATIC TRANSMISSION

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.

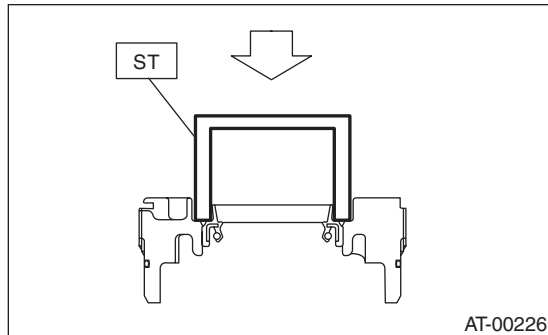
1) Install the bearing outer race to side retainer.

2) Install a new oil seal using ST.

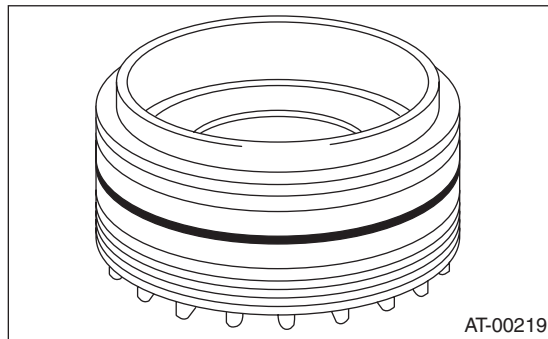
ST 18675AA000 DIFFERENTIAL SIDE OIL
SEAL INSTALLER

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 to be within specification.
<Ref. to 5AT-92, ADJUSTMENT, Front Differential Assembly.>

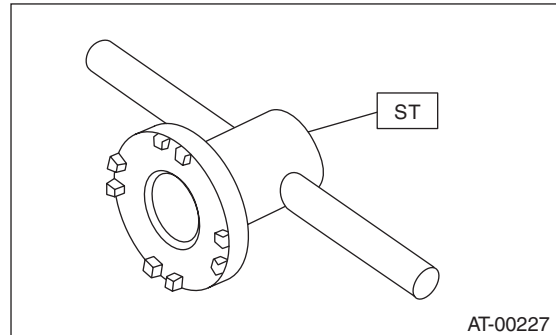
F: ADJUSTMENT

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 ASSY



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 to prevent damaging the mating surface of the housing.

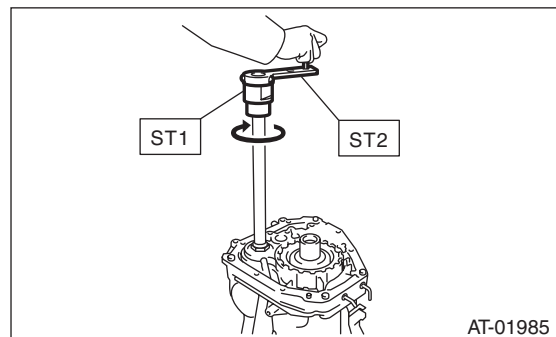
Tightening torque:

41 N·m (4.2 kgf-m, 30.4 ft-lb)

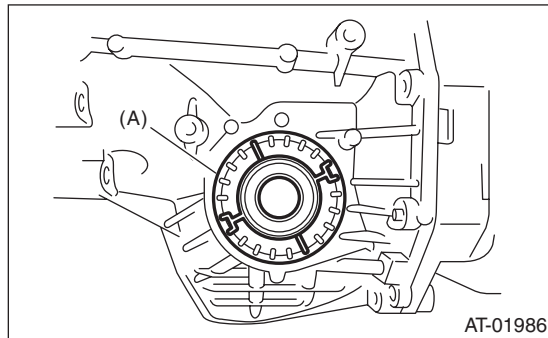
5) Rotate the drive pinion ten times or more using ST1 and ST2.

ST1 18667AA010 HOLDER

ST2 499787700 WRENCH

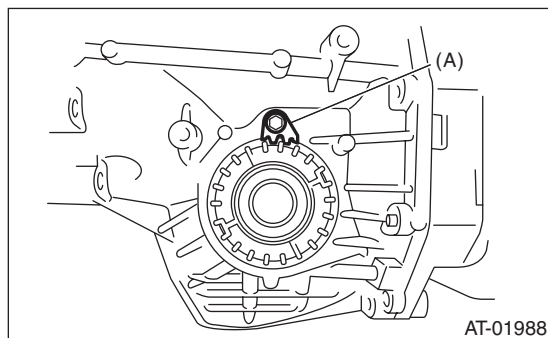


6) Tighten the LH retainer by rotating the shaft until resistance is felt. Then loosen the retainer RH. Keep tightening the retainer LH, and loosening the retainer RH until the pinion shaft no longer be turned. This is the “zero” state.



(A) Retainer

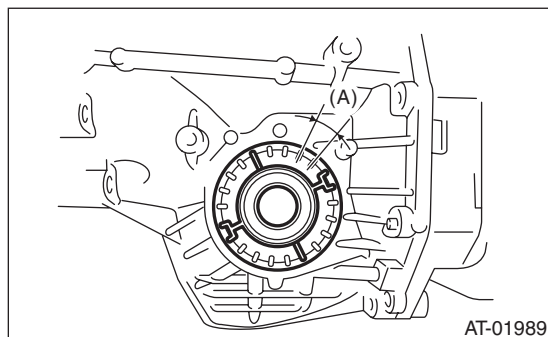
7) After the “zero” state is established, back off the retainer LH 3 notches and secure it with the lock plate. Then back off the retainer RH and retighten until it stops. Rotate the drive pinion 2 or 3 times. Tighten the retainer RH further 1-3/4 notches. This sets the preload. Finally, secure the retainer with its lock plate.



(A) Lock plate

NOTE:

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



(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:

0.10 — 0.15 mm (0.0039 — 0.0059 in)

9) Adjust the teeth contact of the front differential and drive shaft. <Ref. to 5AT-87, ADJUSTMENT, Drive Pinion Shaft Assembly.>

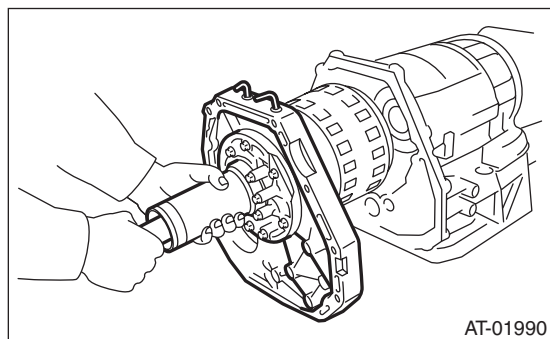
34.AT Main Case

A: REMOVAL

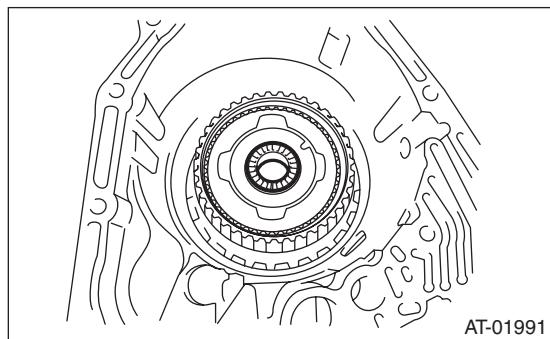
- 1) Remove the transmission assembly from vehicle body. <Ref. to 5AT-36, REMOVAL, Automatic Transmission Assembly.>
- 2) Pull out the torque converter assembly. <Ref. to 5AT-64, REMOVAL, Torque Converter Assembly.>
- 3) Remove the transmission harness connector from stay.
- 4) Disconnect the air breather hose.
- 5) Remove the oil charge pipe. <Ref. to 5AT-63, REMOVAL, Oil Charge Pipe.>
- 6) Remove the ATF filter inlet and outlet pipes. <Ref. to 5AT-59, REMOVAL, ATF Cooler Pipe and Hose.>
- 7) Remove the extension case. <Ref. to 5AT-65, REMOVAL, Extension Case.>
- 8) Remove the center differential carrier. <Ref. to 5AT-74, REMOVAL, Center Differential Carrier.>
- 9) Remove the reduction driven gear. <Ref. to 5AT-71, REMOVAL, Reduction Driven Gear.>
- 10) Separate the converter case from the transmission case. <Ref. to 5AT-78, REMOVAL, Converter Case.>
- 11) Remove the control valve body. <Ref. to 5AT-55, REMOVAL, Control Valve Body.>
- 12) Remove the oil pump cover. <Ref. to 5AT-80, REMOVAL, Oil Pump Cover.>

NOTE:

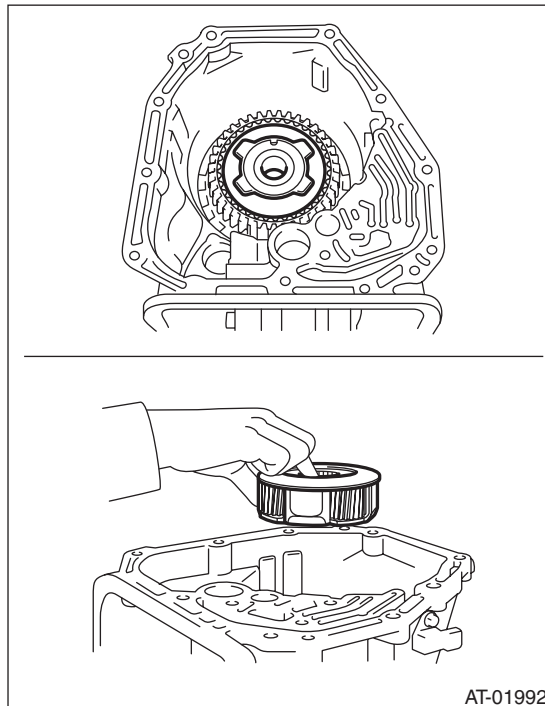
The input clutch pack assembly and front sun gear assembly are also removed together.



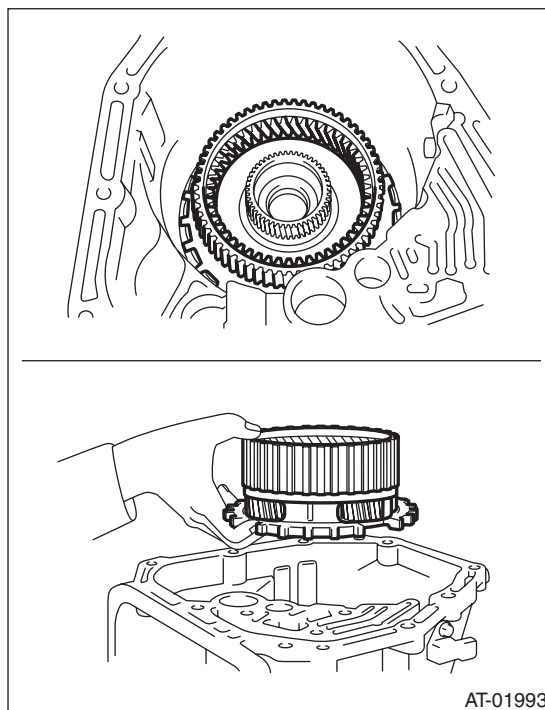
- 13) Remove the needle bearing of the middle carrier assembly.



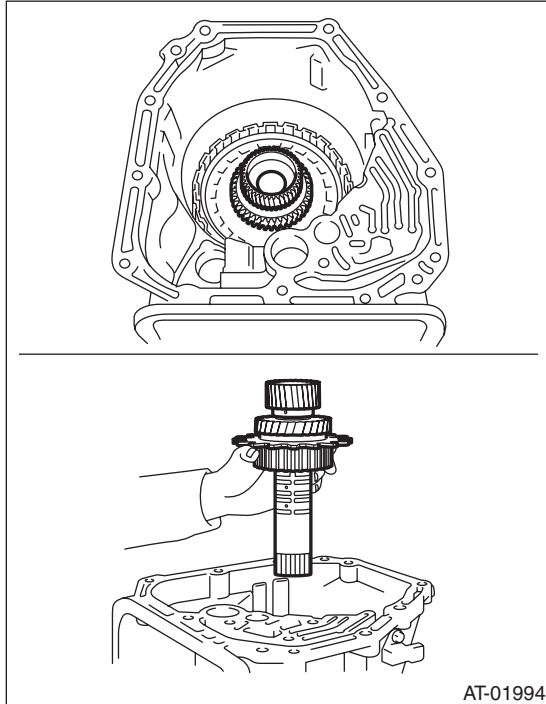
- 14) Remove the middle carrier assembly.



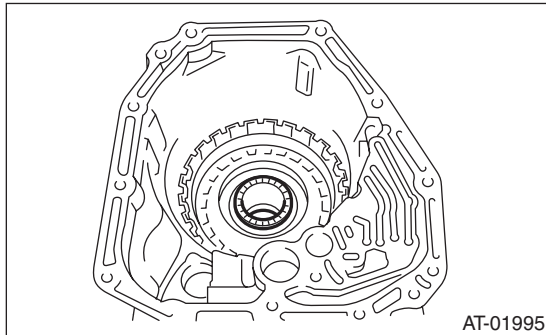
- 15) Remove the rear carrier assembly.



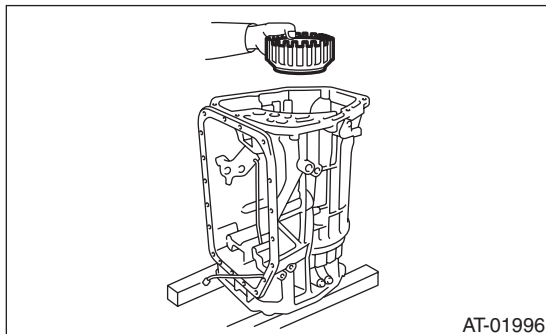
16) Remove the middle & rear sun gear assembly.



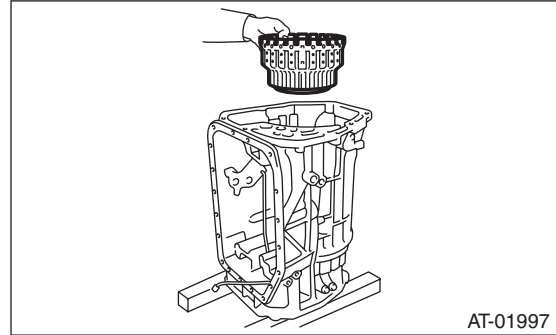
17) Remove the thrust needle bearing of high & low reverse clutch.



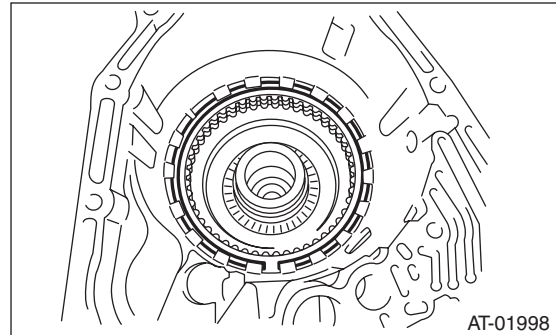
18) Remove the high & low reverse clutch assembly.



19) Remove the direct clutch assembly.

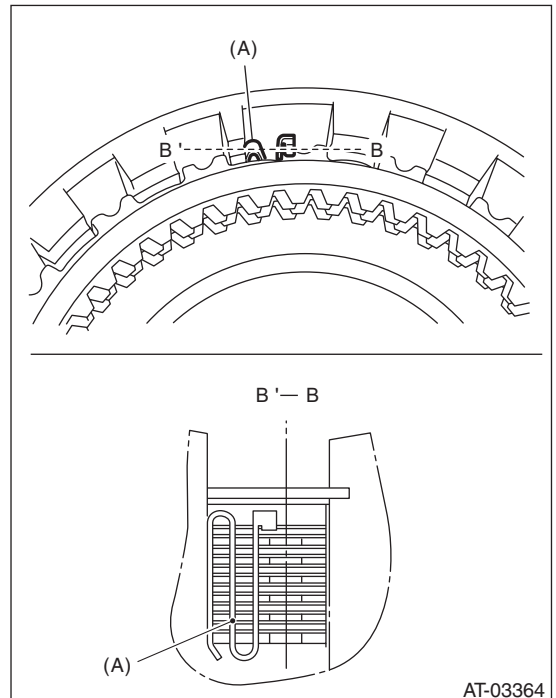


20) Remove the snap ring of reverse brake.



21) Remove the retaining plate.

22) Remove the leaf spring.



(A) Leaf spring

23) Take out the drive plate, driven plate and dish plate.

AT Main Case

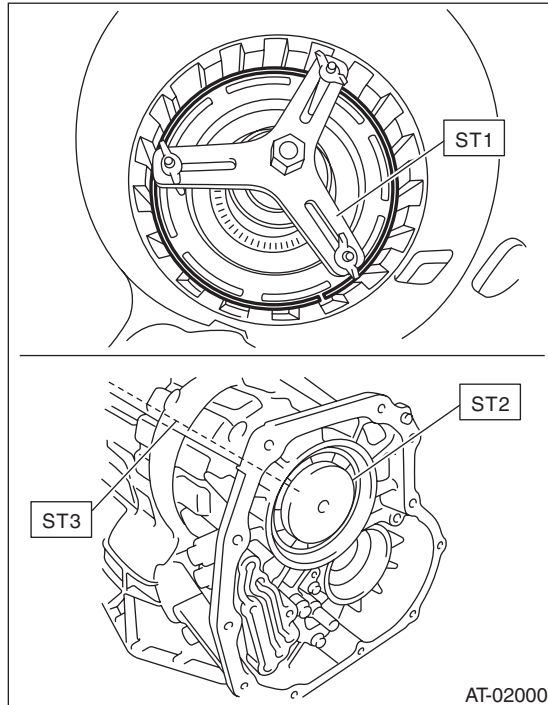
AUTOMATIC TRANSMISSION

24) Remove the snap ring of the reverse brake spring retainer.

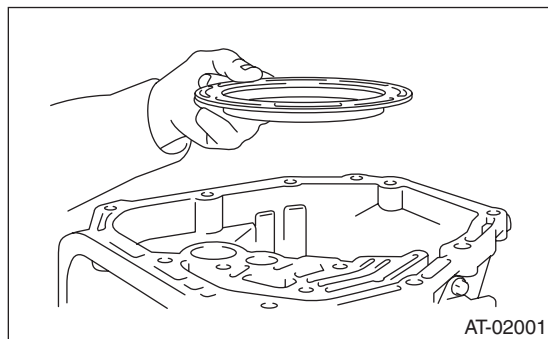
ST1 18762AA000 COMPRESSOR SPECIAL TOOL

ST2 18765AA000 COMPRESSOR SUPPORT

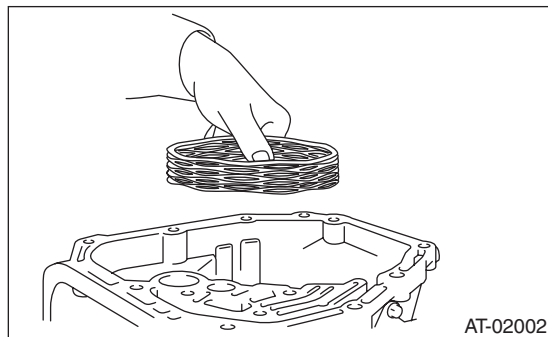
ST3 18763AA000 COMPRESSOR SHAFT



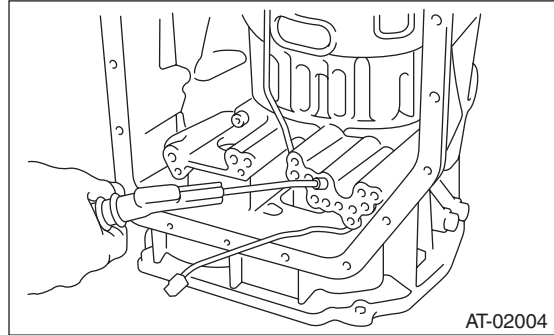
25) Remove the spring retainer.



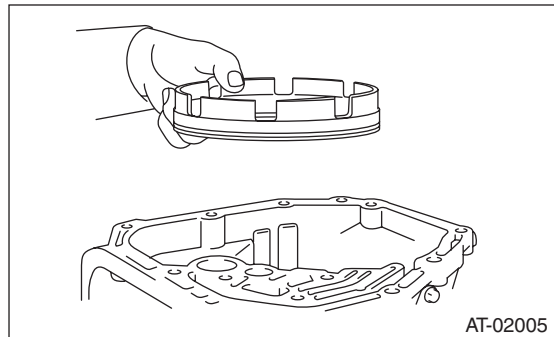
26) Remove the return spring.



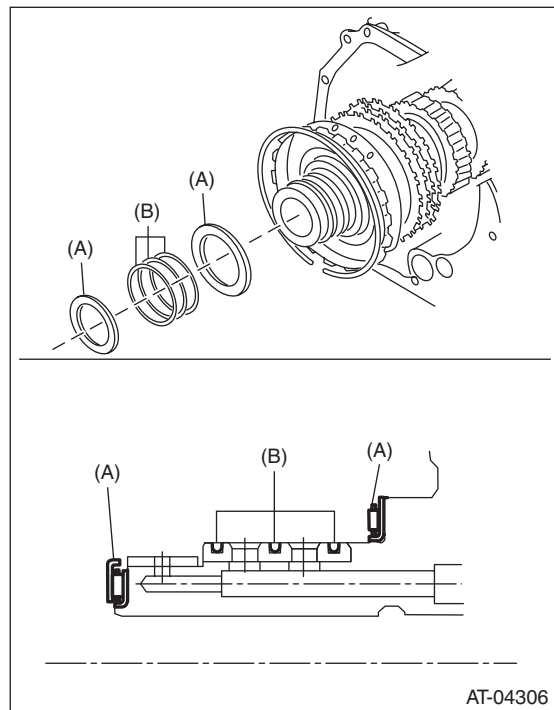
27) Apply compressed air.



28) Remove the reverse brake piston.



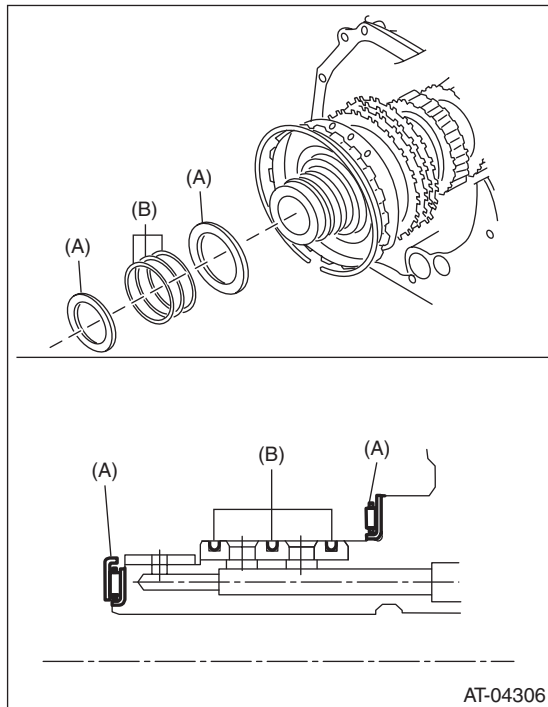
29) Remove the thrust bearings and seal rings.



(A) Thrust bearing
(B) Seal ring

B: INSTALLATION

- 1) Apply ATF to new seal rings.
- 2) Install the thrust bearings and new seal rings to the drum support.



- (A) Thrust bearing
(B) Seal ring

- 3) Install the reverse brake piston.

NOTE:

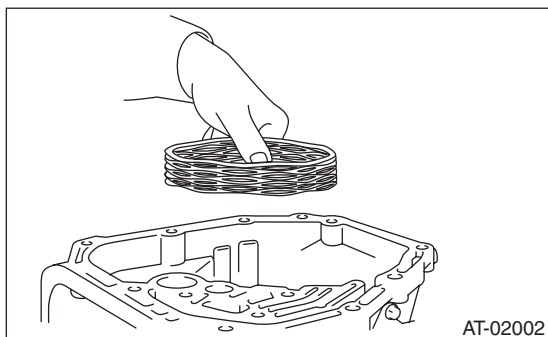
Apply ATF onto the piston sliding surface.

ST1 18762AA000 COMPRESSOR SPECIAL TOOL

ST2 18765AA000 COMPRESSOR SUPPORT

ST3 18763AA000 COMPRESSOR SHAFT

- 4) Install the return spring.

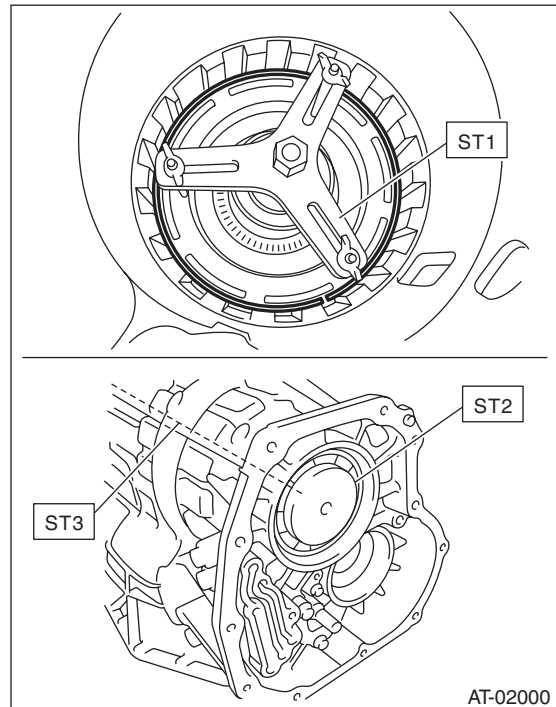


- 5) Install the spring retainer and snap ring.

ST1 18762AA000 COMPRESSOR SPECIAL TOOL

ST2 18765AA000 COMPRESSOR SUPPORT

ST3 18763AA000 COMPRESSOR SHAFT



- 6) Install the dish plate.

NOTE:

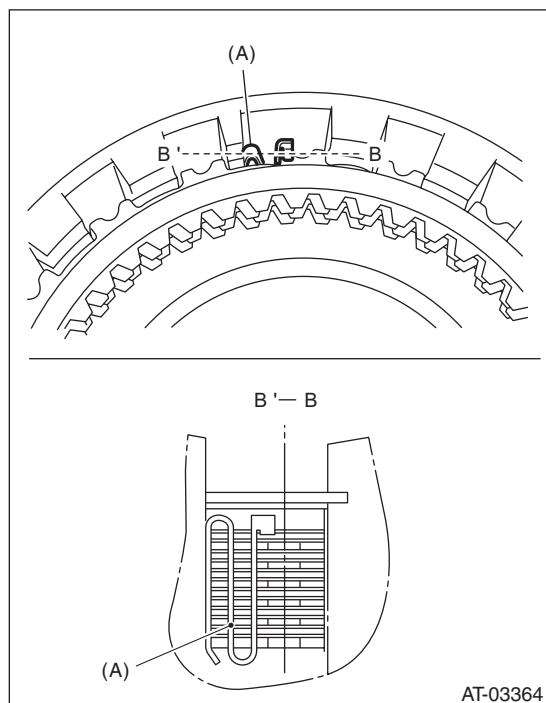
When installing, make sure that the identification mark is facing the front side of transmission.

- 7) Install the drive plate and driven plate.

AT Main Case

AUTOMATIC TRANSMISSION

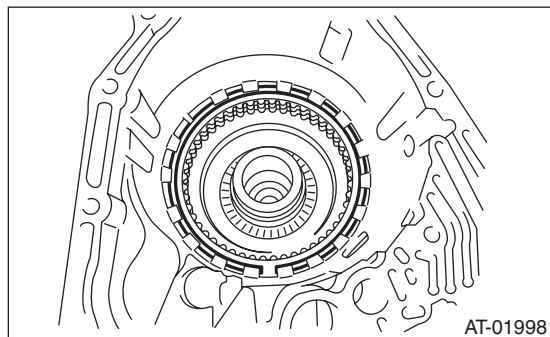
8) Install the leaf spring.



(A) Leaf spring

9) Install the retaining plate.

10) Install the snap ring of the reverse brake.

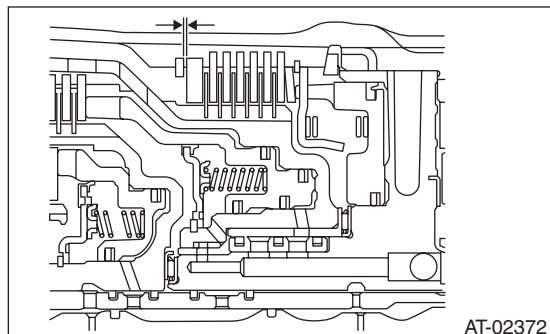


11) Perform the clearance check of reverse brake.

(1) Measure the clearance between retainer plate and snap ring using thickness gauge.

Specification:

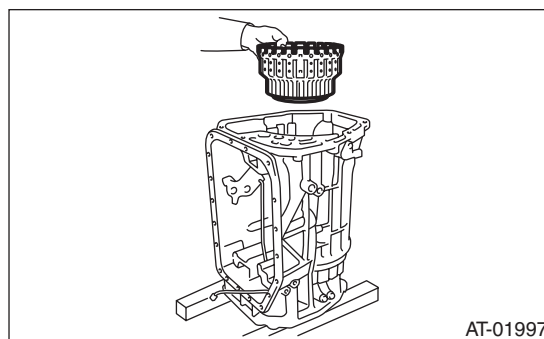
0.7 — 1.1 mm (0.028 — 0.043 in)



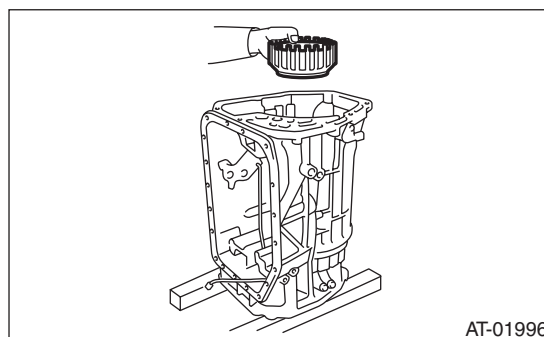
(2) If it is out of specification, select a suitable retainer plate from the following table and assemble it.

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)

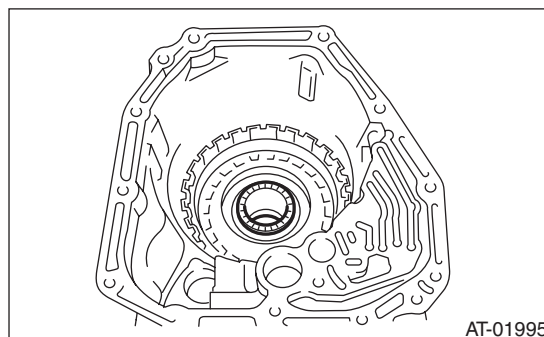
12) Install the direct clutch assembly.



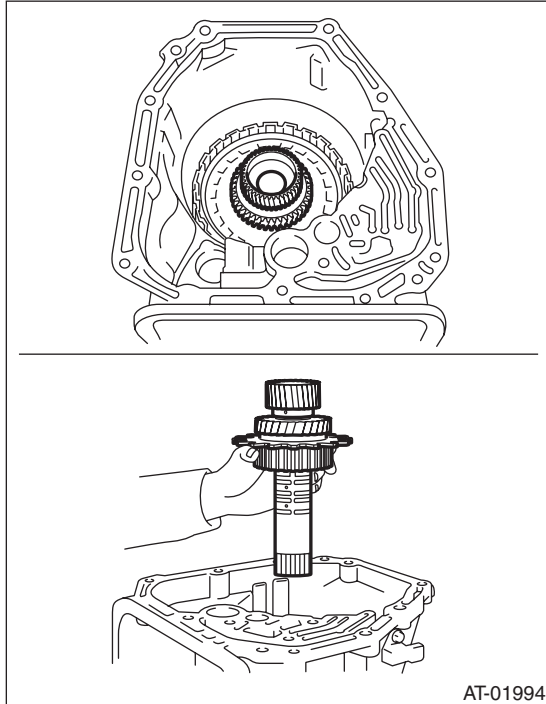
13) Install the high & low reverse clutch assembly.



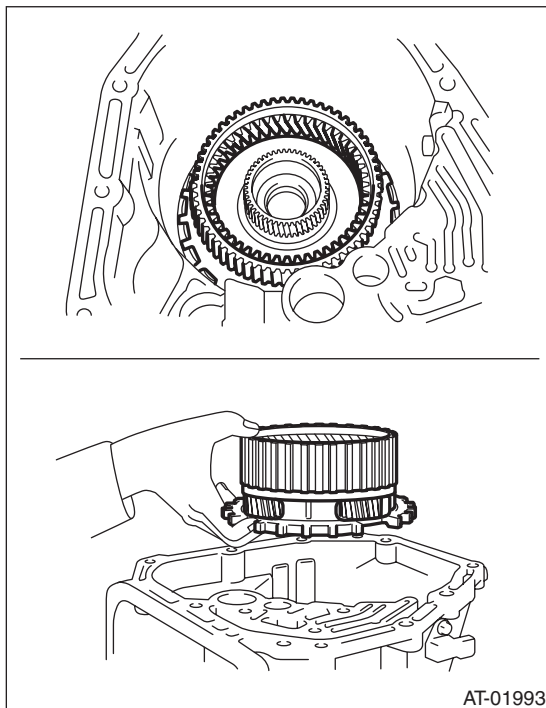
14) Install the thrust needle bearing of the high & low reverse clutch.



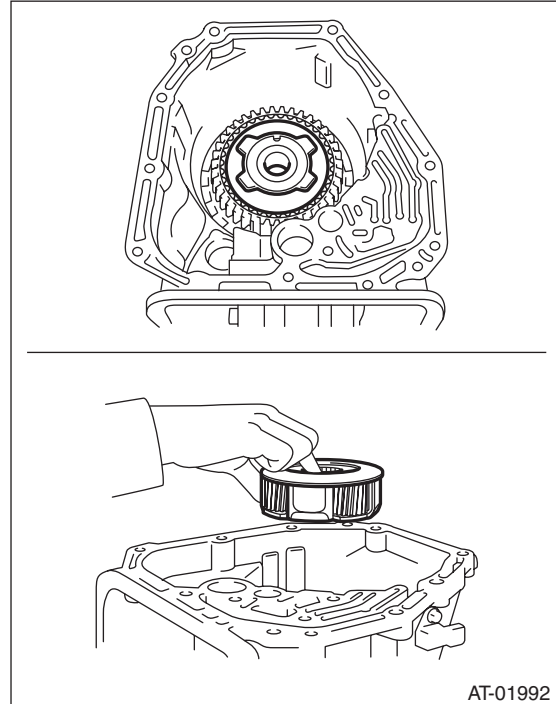
15) Install the middle & rear sun gear assembly.



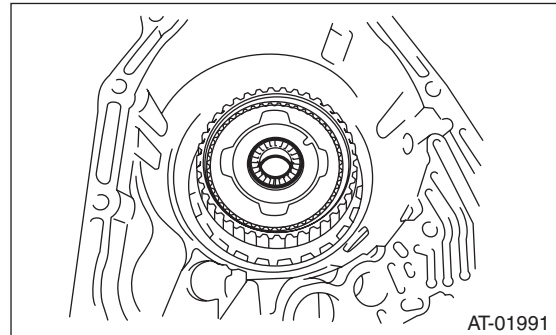
16) Install the rear carrier assembly.



17) Install the middle carrier assembly.

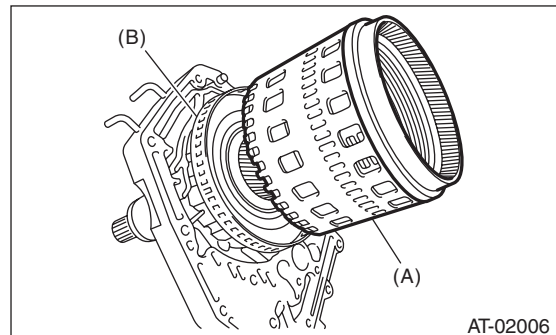


18) Install the thrust needle bearing of middle carrier assembly.



19) Measure the total end play, and select the bearing. <Ref. to 5AT-102, 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) Install the thrust needle bearing.

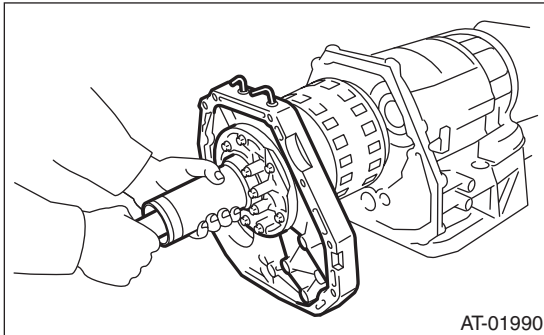
AT Main Case

AUTOMATIC TRANSMISSION

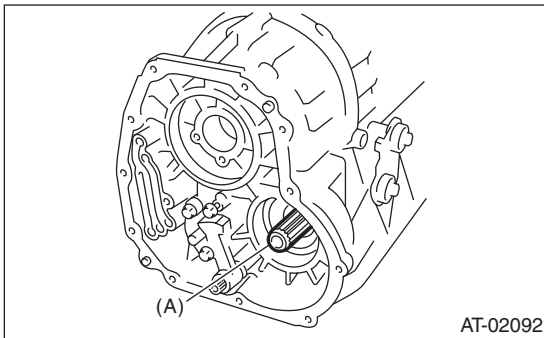
22) Turn the transmission sideways.

23) 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.

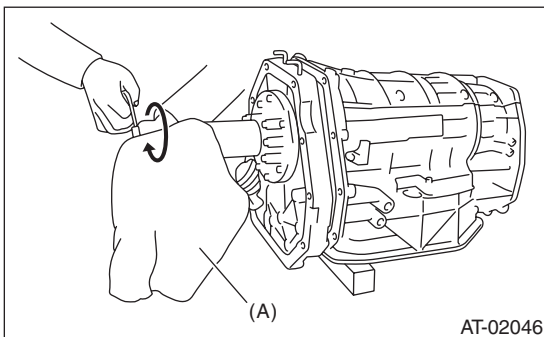


(A) Drive pinion shaft

(4) Protect the input clutch shaft with a cloth, and rotate to engage the spline of the input clutch and rear carrier using pliers.

NOTE:

Work with pressing the oil pump cover.

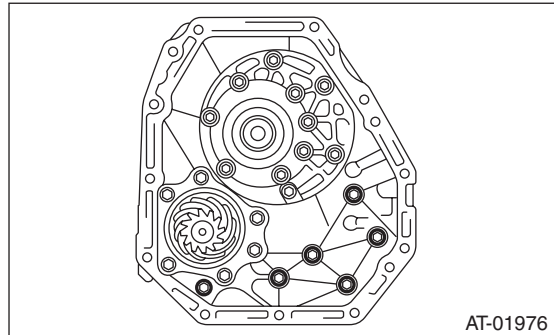


(A) Cloth

(5) Combine the oil pump cover with transmission main case.

Tightening torque:

41 N·m (4.2 kgf-m, 30.4 ft-lb)



24) Install the center differential carrier. <Ref. to 5AT-74, INSTALLATION, Center Differential Carrier.>

25) Install the reduction driven gear. <Ref. to 5AT-71, INSTALLATION, Reduction Driven Gear.>

26) Install the extension case. <Ref. to 5AT-65, INSTALLATION, Extension Case.>

27) Install the control valve body. <Ref. to 5AT-55, INSTALLATION, Control Valve Body.>

28) Install the converter case assembly to the transmission case assembly. <Ref. to 5AT-78, INSTALLATION, Converter Case.>

29) Install the air breather hose. <Ref. to 5AT-62, INSTALLATION, Air Breather Hose.>

30) Install the ATF filter pipe. <Ref. to 5AT-60, INSTALLATION, ATF Cooler Pipe and Hose.>

31) Install the oil charge pipe together with an O-ring. <Ref. to 5AT-63, INSTALLATION, Oil Charge Pipe.>

32) Install the torque converter assembly. <Ref. to 5AT-64, INSTALLATION, Torque Converter Assembly.>

33) Install the transmission assembly to the vehicle. <Ref. to 5AT-39, INSTALLATION, Automatic Transmission Assembly.>

34) Perform Clear Memory 2 operation. <Ref. to 5AT(diag)-17, CLEAR MEMORY MODE, OPERATION, Subaru Select Monitor.>

35) 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 the transmission body, etc.
- Occurrence of noise caused by interference etc.

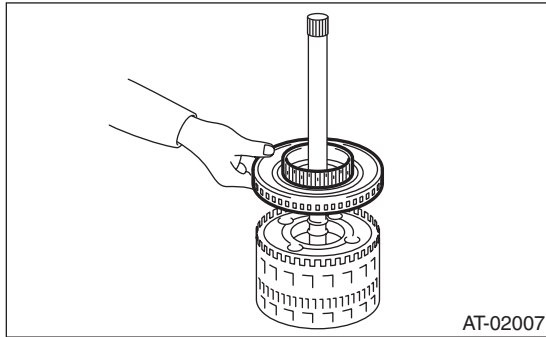
NOTE:

If excessive shift shock is felt, execute advance operation of learning control. <Ref. to 5AT(diag)-21, PROCEDURE, Learning Control.>

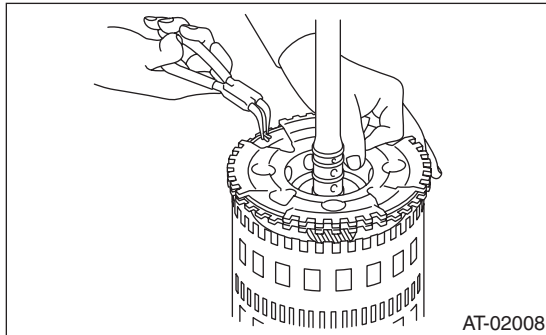
C: DISASSEMBLY

1. INPUT CLUTCH PACK ASSEMBLY

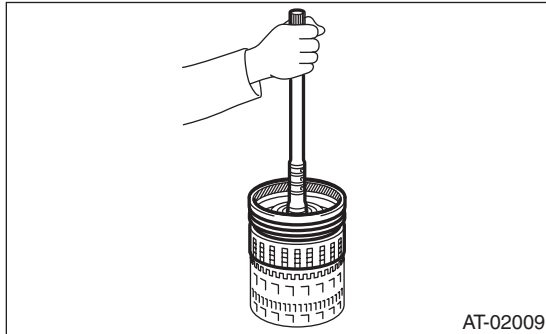
- 1) Remove the front sun gear.



- 2) Remove the thrust bearing.
- 3) Remove the snap ring, and then remove the front carrier.



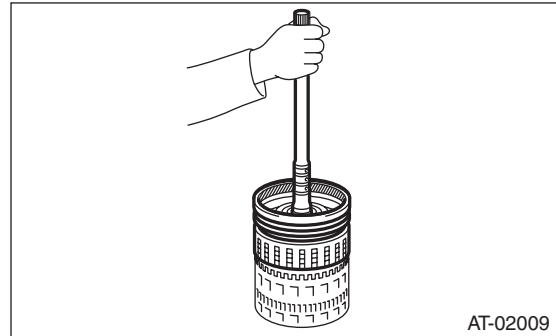
- 4) Remove the input clutch assembly from rear internal gear.



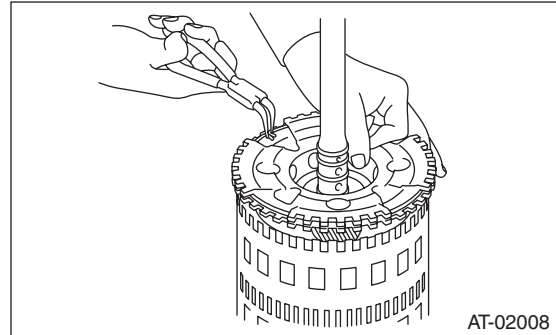
D: ASSEMBLY

1. INPUT CLUTCH PACK ASSEMBLY

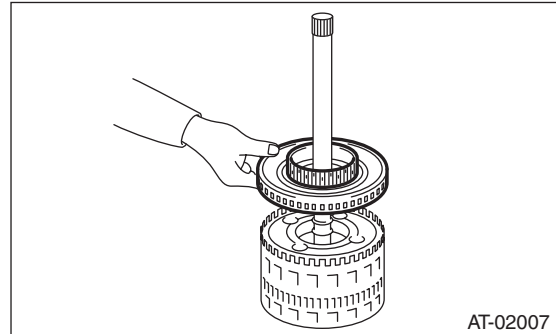
- 1) Assemble the input clutch assembly to rear internal gear.



- 2) Install the front carrier, and then install the snap ring.



- 3) Install the thrust needle bearing.
- 4) Install the front sun gear.



E: INSPECTION

1. FRONT, MIDDLE & REAR PLANETARY CARRIER ASSEMBLY

Check the following items.

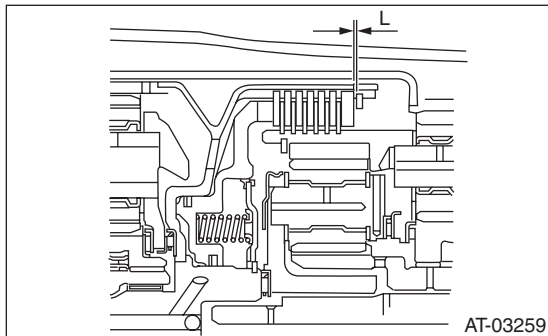
- Visually inspect the tooth surface of planetary gear, and replace with new part if damaged, broken or excessively worn.
- Inspect the planetary carrier body for damage or breakage.

2. INPUT CLUTCH

- Check the clearance of the input clutch. Measure the clearance “L” between snap ring and retaining plate using a thickness gauge. If it is out of specification, replace the entire direct clutch assembly.
- Check for damage on the drive plate, driven plate and snap ring, and replace the entire input clutch assembly if damaged.

Specification:

0.7 — 1.1 mm (0.028 — 0.043 in)



3. HIGH & LOW REVERSE CLUTCH ASSY

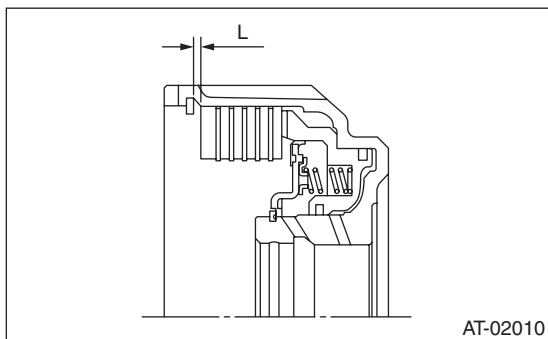
- Check the clearance of the high & low reverse clutch.

Measure the clearance “L” between snap ring and retaining plate using a thickness gauge. If it is out of specification, replace the entire high & low reverse clutch assembly.

- Check for damage on the drive plate, driven plate and snap ring, and replace the entire high & low reverse clutch assembly if damaged.

Specification:

1.8 — 2.2 mm (0.070 — 0.087 in)

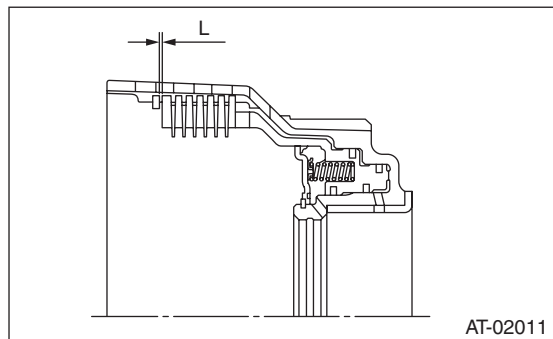


4. DIRECT CLUTCH ASSEMBLY

- Check the clearance of direct clutch. Measure the clearance “L” between snap ring and retaining plate using a thickness gauge. If it is out of specification, replace them as direct clutch assembly.
- Check for damage on the drive plate, driven plate and snap ring, and replace the entire direct clutch assembly if damaged.

Specification:

0.6 — 1.0 mm (0.024 — 0.039 in)



5. REVERSE BRAKE

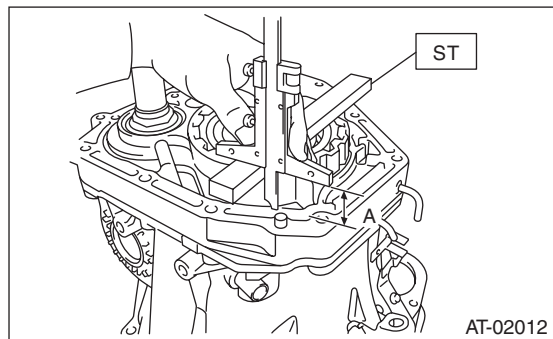
Check the following items.

- 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

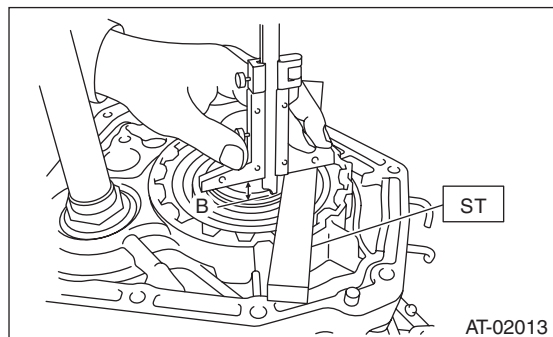
1) Using the ST, measure the height “A” from the AT main case mating surface to convex surface of oil pump cover.

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

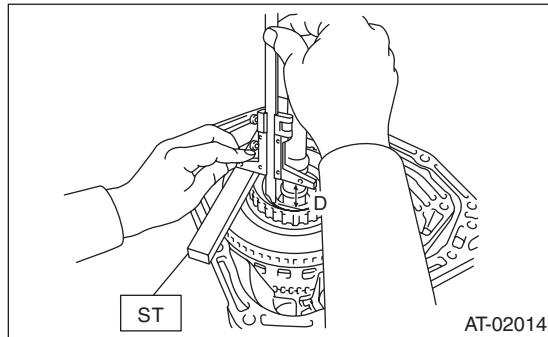


3) Calculate the measured value from step 1) and 2), and then set the calculated value as “C”

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: $E \text{ (mm)} = D - 15$

$[E \text{ (in)} = D - 0.59]$

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):

$T \text{ (mm)} = E - C + 0.03$

$[T \text{ (in)} = E - C + 0.0012]$

When clearances are 0.55 mm (0.022 in):

$T \text{ (mm)} = E - C + 0.27$

$[T \text{ (in)} = E - C + 0.012]$

T: Thrust needle bearing thickness

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

NOTE:

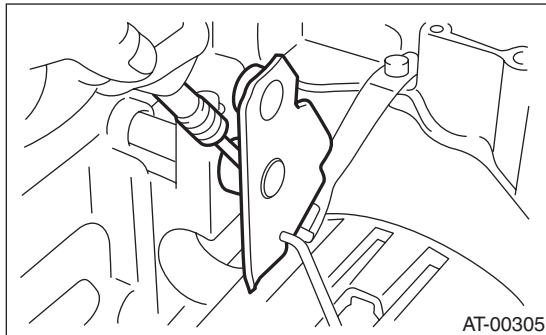
Calculation formula for “T” above is applied when measuring with the ST (499575400 GAUGE). In the calculation without using ST, substitute the thickness of collar used to calculate the value “E” on step 5).

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)

35. Transmission Control Device

A: REMOVAL

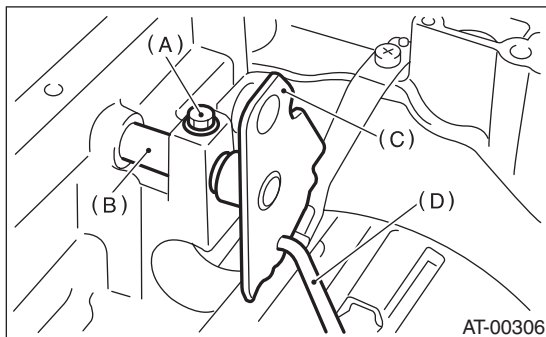
- 1) Remove the transmission assembly from vehicle body. <Ref. to 5AT-36, REMOVAL, Automatic Transmission Assembly.>
- 2) Pull out the torque converter assembly. <Ref. to 5AT-64, REMOVAL, Torque Converter Assembly.>
- 3) Lift-up the lever on the rear side of transmission harness connector, and then disconnect it from the stay.
- 4) Disconnect the air breather hose. <Ref. to 5AT-62, 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-55, 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.

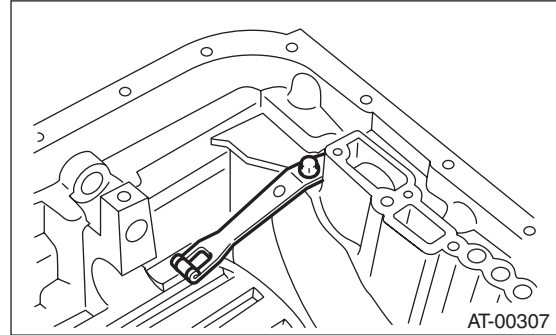
NOTE:

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 detention spring.

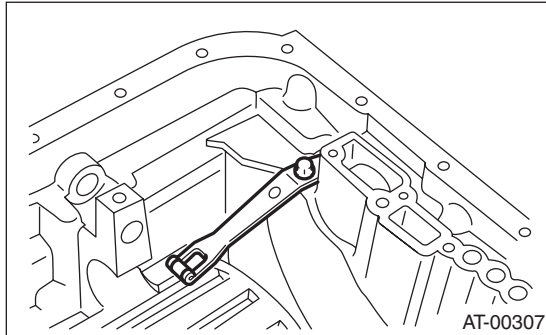


B: INSTALLATION

1) Install the detention spring to the transmission case.

Tightening torque:

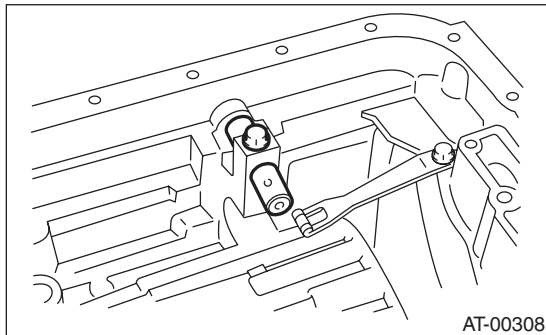
7 N·m (0.7 kgf-m, 5.2 ft-lb)



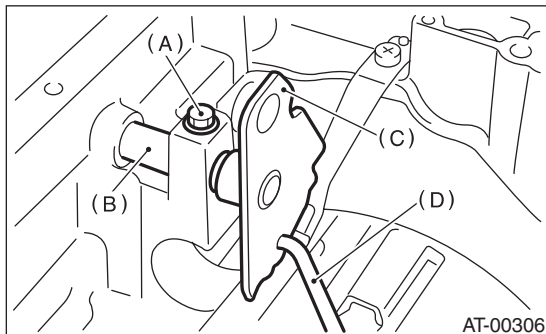
2) Insert the select lever, and then tighten the bolt.

Tightening torque:

6 N·m (0.6 kgf-m, 4.4 ft-lb)

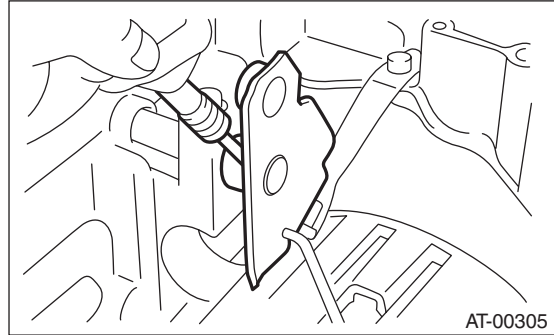


3) Insert the manual plate and parking rod.



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

4) Insert the spring pin to the manual plate.



5) Install the oil pan and the control valve assembly. <Ref. to 5AT-55, INSTALLATION, Control Valve Body.>

6) Install the pitching stopper bracket.

Tightening torque:

41 N·m (4.2 kgf-m, 30.4 ft-lb)

7) Insert the transmission connector to the stay.

8) Install the air breather hose. <Ref. to 5AT-62, INSTALLATION, Air Breather Hose.>

9) Install the torque converter assembly. <Ref. to 5AT-64, INSTALLATION, Torque Converter Assembly.>

10) Install the transmission assembly to the vehicle. <Ref. to 5AT-39, INSTALLATION, Automatic Transmission Assembly.>

C: INSPECTION

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

Transmission Control Device

AUTOMATIC TRANSMISSION

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

5AT(diag)

	Page
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3. General Description	5
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6. Subaru Select Monitor	15
7. Read Diagnostic Trouble Code (DTC)	18
8. Inspection Mode	19
9. Clear Memory Mode	20
10. Learning Control	21
11. SPORT Indicator Light Display	22
12. Diagnostic Procedure for Subaru Select Monitor Communication	25
13. List of Diagnostic Trouble Code (DTC)	28
14. Diagnostic Procedure with Diagnostic Trouble Code (DTC)	31
15. Diagnostic Procedure without Diagnostic Trouble Code (DTC)	117
16. General Diagnostic Table	125

Basic Diagnostic Procedure

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

1. Basic Diagnostic Procedure

A: PROCEDURE

Step	Check	Yes	No
1 CHECK PRE-INSPECTION. 1) Ask the customer when and how the trouble occurred using the interview checklist. <Ref. to 5AT(diag)-4, Check List for Interview.> 2) Before performing diagnosis, inspect the following item 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-34, Line Pressure Test.> • Transfer Clutch Pressure Test <Ref. to 5AT-35, Transfer Clutch Pressure Test.> • Time Lag Test <Ref. to 5AT-33, Time Lag Test.> • Road Test <Ref. to 5AT-31, Road Test.> • Inhibitor Switch <Ref. to 5AT-48, 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)-23, 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. Read the DTC. <Ref. to 5AT(diag)-18, OPERATION, Read Diagnostic Trouble Code (DTC).> NOTE: If the communication function of Subaru Select Monitor cannot be executed normally, check communication circuit. <Ref. to 5AT(diag)-25, COMMUNICATION FOR INITIALIZING IMPOSSIBLE, Diagnostic Procedure for Subaru Select Monitor Communication.>	Is DTC displayed?	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)-117, Diagnostic Procedure without Diagnostic Trouble Code (DTC).> 2) Perform the Clear Memory Mode. 3) Perform the Inspection Mode. <Ref. to 5AT(diag)-19, Inspection Mode.> 4) Display DTC.	Is DTC displayed?	Go to step 6.	Inspect using "General Diagnostic Table". <Ref. to 5AT(diag)-125, General Diagnostic Table.>

Basic Diagnostic Procedure

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step	Check	Yes	No
6 PERFORM THE DIAGNOSIS. 1) Inspect using the "Diagnostic Procedure with Diagnostic Trouble Code (DTC)". <Ref. to 5AT(diag)-31, Diagnostic Procedure with Diagnostic Trouble Code (DTC).> NOTE: For DTC table, refer to "List of Diagnostic Trouble Code (DTC)." <Ref. to 5AT(diag)-28, 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)-19, Inspection Mode.> 5) Display DTC.	Is DTC displayed?	Inspect using the "Diagnostic Procedure with Diagnostic Trouble Code (DTC)". <Ref. to 5AT(diag)-31, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>	Inspect using "General Diagnostic Table". <Ref. to 5AT(diag)-125, General Diagnostic Table.>

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Use copies of this page for interviewing customers.

5AT(diag)-4

3. General Description

A: CAUTION

• SRS AIRBAG SYSTEM

The airbag system wiring harness is routed near the TCM.

CAUTION:

• All airbag system wiring harnesses and connectors are colored yellow. Do not use an electric test equipment to check 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

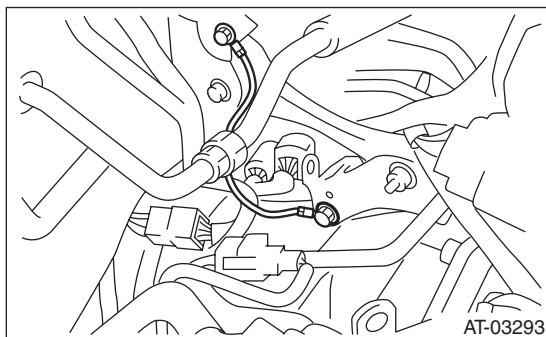
Specific gravity: 1.260 or more

2. TRANSMISSION GROUND

Make sure that the ground terminal bolt is tightened securely.

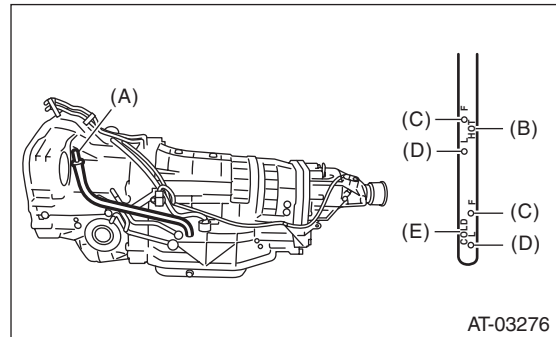
Tightening torque:

13 N·m (1.3 kgf-m, 9.4 ft-lb)



3. ATF LEVEL

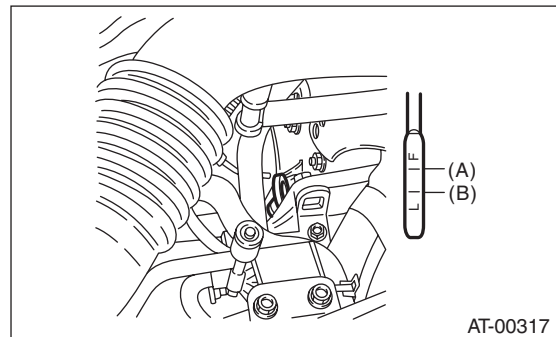
Make sure that ATF level is the specified amount. <Ref. to 5AT-28, INSPECTION, Automatic Transmission Fluid.>



- (A) Level gauge
- (B) Inspection position when "HOT"
- (C) Upper level
- (D) Lower level
- (E) Inspection 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

General Description

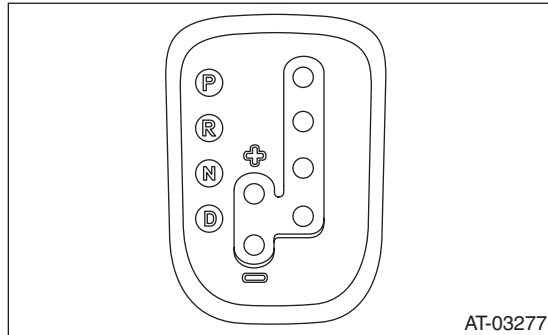
AUTOMATIC TRANSMISSION (DIAGNOSTICS)

5. OPERATION OF SHIFT SELECT LEVER

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

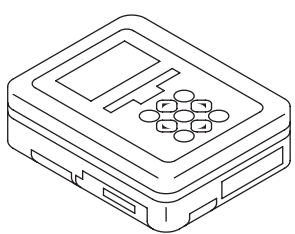
WARNING:

Stop the engine while checking operation of the select lever.



C: PREPARATION TOOL

1. SPECIAL TOOL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST1B020XU0	1B020XU0	SUBARU SELECT MONITOR KIT	Used for troubleshooting the electrical system.

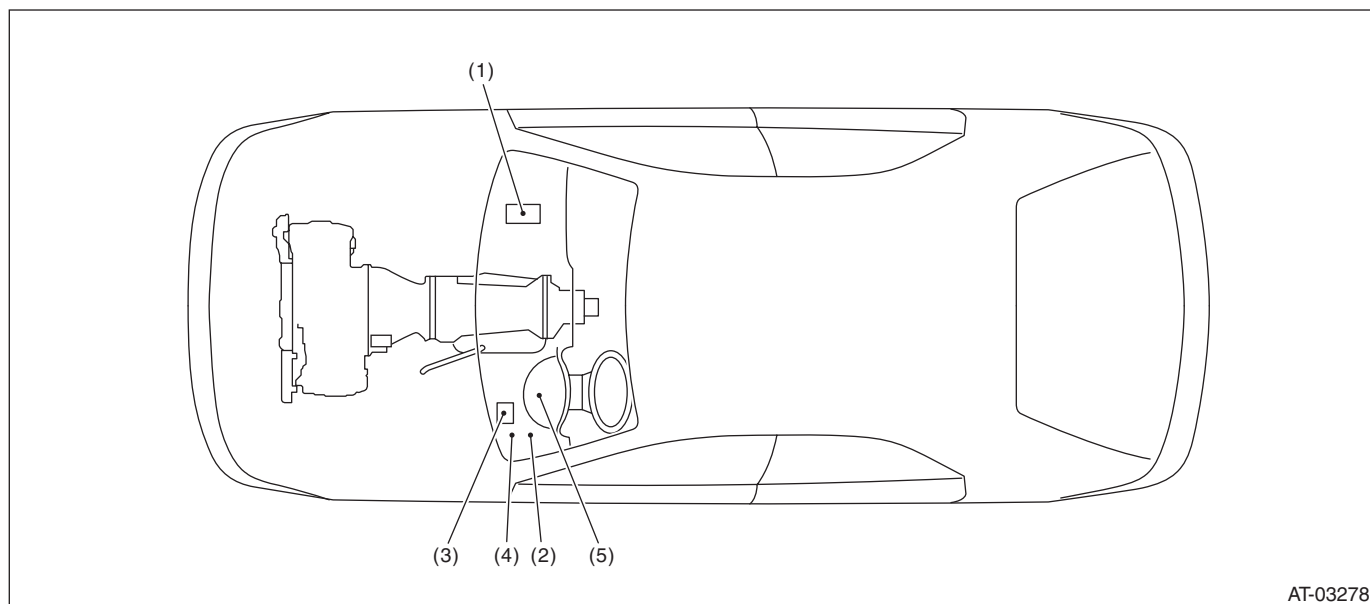
2. GENERAL TOOL

TOOL NAME	REMARKS
Circuit tester	Used for measuring resistance, voltage and current.
Oscilloscope	Used for measuring the sensor.

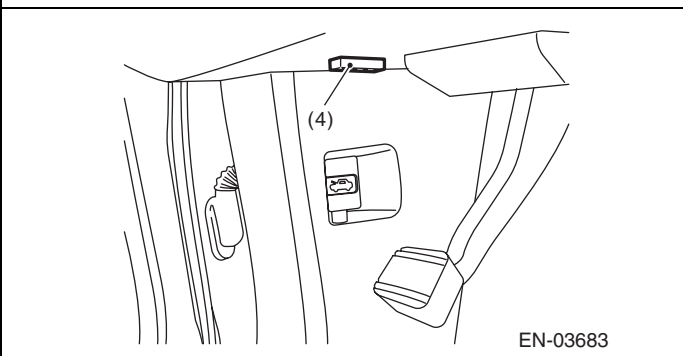
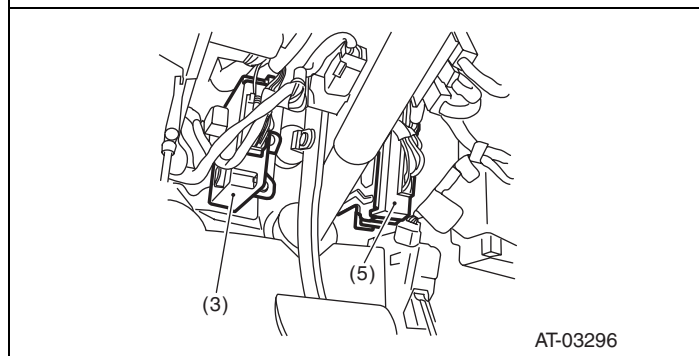
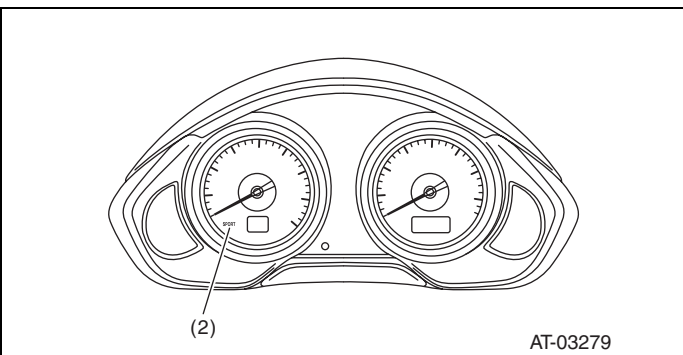
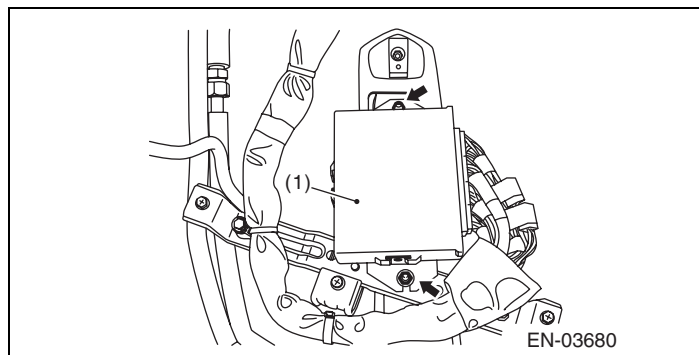
4. Electrical Component Location

A: LOCATION

1. CONTROL MODULE



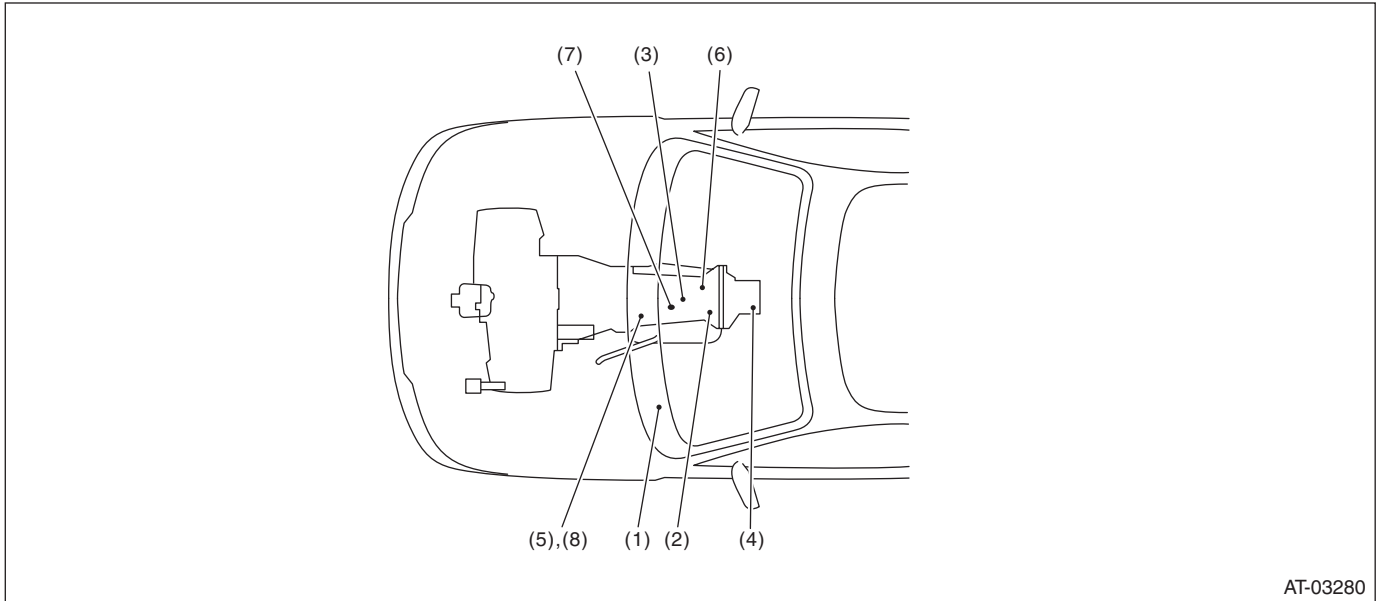
- | | | |
|--|---------------------------------------|--------------------------|
| (1) Engine control module (ECM) | (3) Transmission control module (TCM) | (4) Data link connector |
| (2) SPORT indicator light (AT warning light) | | (5) Body integrated unit |



Electrical Component Location

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

2. SENSOR

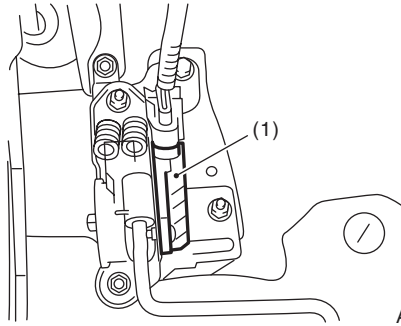


AT-03280

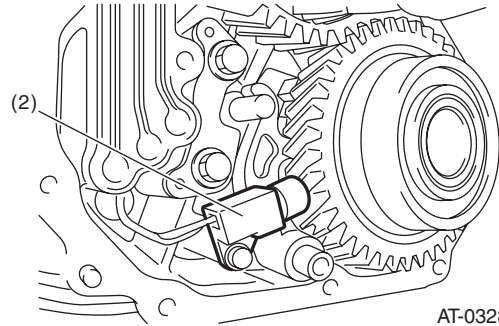
- | | | |
|---------------------------------------|-------------------------------|------------------------------|
| (1) Accelerator pedal position sensor | (4) Rear vehicle speed sensor | (7) Turbine speed sensor 2 |
| (2) Front vehicle speed sensor | (5) Turbine speed sensor 1 | (8) ATF temperature sensor 2 |
| (3) Inhibitor switch | (6) ATF temperature sensor 1 | |

Electrical Component Location

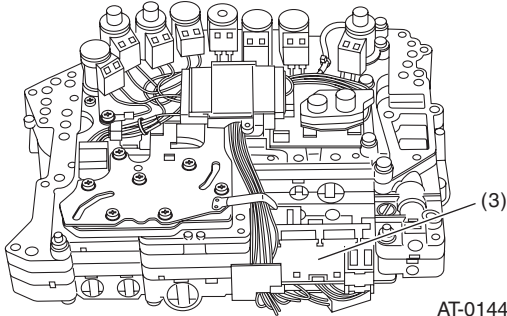
AUTOMATIC TRANSMISSION (DIAGNOSTICS)



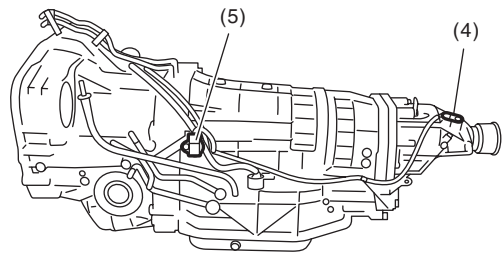
AT-00375



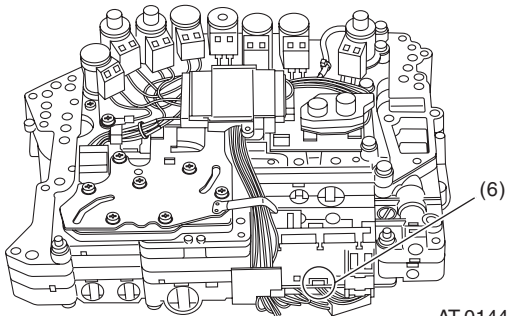
AT-03281



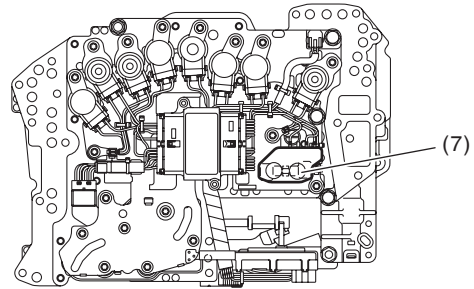
AT-01445



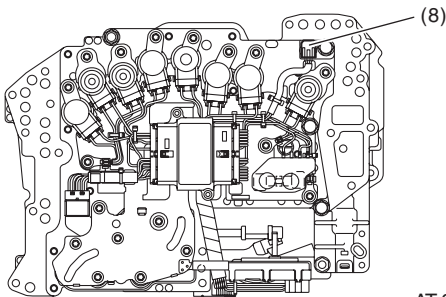
AT-03282



AT-01446



AT-03371



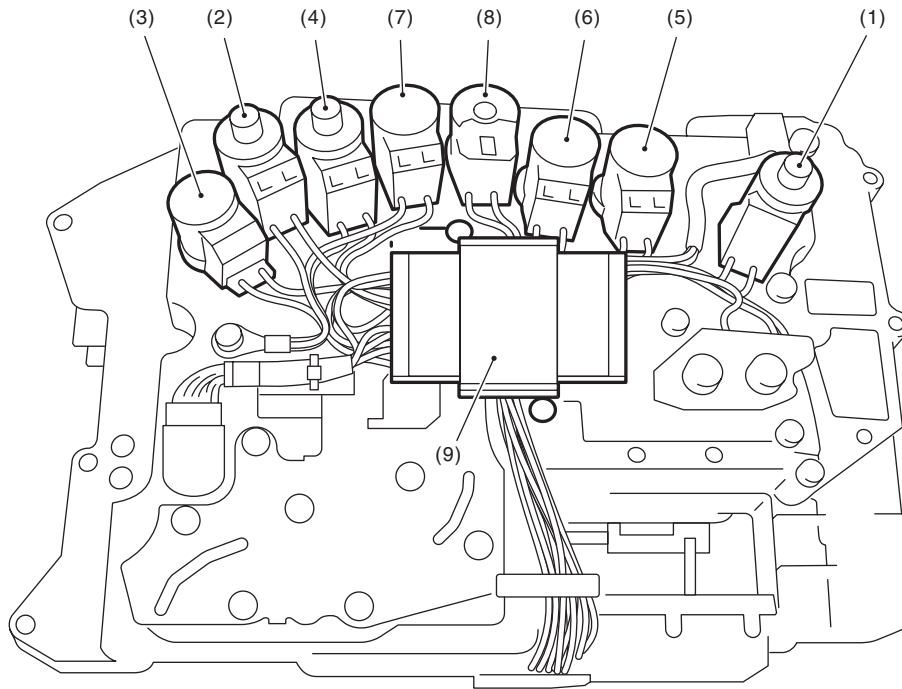
AT-03372

SUBARU.

Electrical Component Location

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

3. SOLENOID



AT-01449

- | | | |
|--|----------------------------|------------------------------|
| (1) High & low reverse clutch solenoid | (4) Input clutch solenoid | (7) Transfer solenoid |
| (2) Direct clutch solenoid | (5) Line pressure solenoid | (8) Low coast brake solenoid |
| (3) Front brake solenoid | (6) Lock up solenoid | (9) Memory box |

Transmission Control Module (TCM) I/O Signal

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

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

A: ELECTRICAL SPECIFICATION



AT-01451

NOTE:

The measurement should be performed after warming up.

Item	Connector No.	Terminal No.	Measuring condition	Measured value	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 be 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 k Ω (ATF temperature 20°C (68°F)) 0.7 — 0.9 k Ω (ATF temperature 80°C (176°F))	
Battery power supply	B54	1	Always	Power supply voltage	—	

Transmission Control Module (TCM) I/O Signal

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Item	Connector No.	Terminal No.	Measuring condition	Measured value	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 be 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 k Ω (ATF temperature 20°C (68°F)) 0.4 — 0.6 k Ω (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 be read by the tester.
Subaru Select Monitor communication line	B54	20	—	—	—	
Control GND	B54	19	Always	Approx. 0 V	—	

Transmission Control Module (TCM) I/O Signal

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Item	Connector No.	Terminal No.	Measuring condition	Measured value	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. 530 — 610 rpm	—	Use the Subaru Select Monitor.
			While driving at 4th and 80 km/h (50 MPH) of manual mode	Approx. 2160 — 2410 rpm		Use the Subaru Select Monitor.
Inhibitor switch 1 input	B55	4	Ignition switch ON, "P" range	4.0 — 5.0 V	—	
			Ignition switch ON, "N" range	Less than 1.5 V		
Inhibitor switch 2 input	B55	3	Ignition switch ON, "P" range	4.0 — 5.0 V	—	
			Ignition switch ON, "D" range	Less than 1.5 V		
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. 530 — 610 rpm	—	Use the Subaru Select Monitor.
			While driving at 4th and 80 km/h (50 MPH) of manual mode	Approx. 2160 — 2410 rpm		Use the Subaru Select Monitor.
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		

Transmission Control Module (TCM) I/O Signal

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Item	Connector No.	Terminal No.	Measuring condition	Measured value	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	Less than 1.5 V		
Inhibitor switch 4 input	B55	13	Ignition switch ON, "P" range	4.0 — 5.0 V	—	
			Ignition switch ON, "D" range	Less than 1.5 V		
Control valve communication line	B55	12	—	—	—	
Back-up light relay output	B55	11	Ignition switch ON, "R" range	1.5 V	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	Less than 1.5 V		
PN signal output	B55	19	Ignition switch ON, Other than "P" range or "N" range	Power supply voltage	—	ECM should be connected correctly.
			Ignition switch ON, "P" range or "N" range	0 — 1.0 V	—	

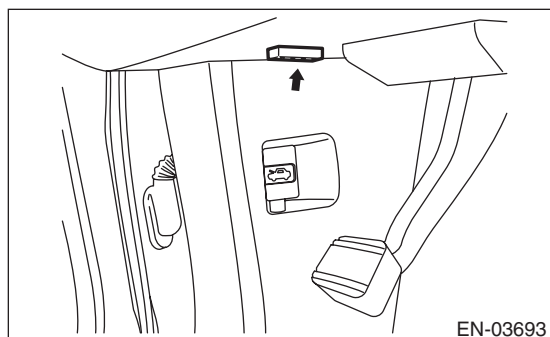
6. Subaru Select Monitor

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) 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).



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

NOTE:

Do not connect scan tools except for Subaru Select Monitor.

- 4) Turn the ignition switch to ON (engine OFF) and run the Subaru Select Monitor.
- 5) On the «Main Menu» display screen, select the {Each System Check}.
- 6) On the «System Selection Menu» display screen, select the {Transmission}.
- 7) Select the [OK] after the information of transmission type is displayed.
- 8) On the «Transmission Diagnosis» screen, select the {DTC Display}.

NOTE:

- For details concerning operation procedure, refer to the "SUBARU SELECT MONITOR OPERATION MANUAL".
- For details concerning the diagnostic trouble codes (DTC), refer to the List of DTC. <Ref. to 5AT(diag)-28, List of Diagnostic Trouble Code (DTC).>

Subaru Select Monitor

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

2. READ CURRENT DATA

- 1) On the «Main Menu» display screen, select the {Each System Check}.
 - 2) On the «System Selection Menu» display screen, select the {Transmission}.
 - 3) Select the [OK] after the information of transmission type is displayed.
 - 4) On the «Transmission Diagnosis» display screen, select the {Current Data Display & Save}.
 - 5) On the «Transmission Diagnosis» display screen, select the {Data Display}.
 - 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
Accelerator 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
ATF temperature sensor 1 signal	ATF Temp.	°C
ATF temperature sensor 2 signal	ATF Temp. 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	4WD 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	Tiptronic 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	ON or OFF
Reverse range signal	R Range	ON or OFF
Diagnosis light output signal	Diagnosis Lamp	ON or OFF
ATF temperature light signal	ATF Temperature 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

Subaru Select Monitor

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Item	Display	Unit of measure
Inhibitor switch 4 input signal	Inhibitor SW4	High or Low
Inhibitor switch 3 monitor input signal	Inhibitor SW3 Monitor	High or Low
Backup light relay output signal	Back-up light relay	ON or OFF
High & low reverse clutch oil pressure switch input signal	H&LR/C Fluid Pressure	ON or OFF
Direct clutch oil pressure switch input signal	D/C Fluid Pressure	ON or OFF
Front brake oil pressure switch input signal	F/B Fluid Pressure	ON or OFF
Input clutch oil pressure switch input signal	I/C Fluid Pressure	ON or OFF
Low coast brake oil 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}.
- 3) On the «System Selection Menu» display screen, select the {Transmission}.
- 4) Select the [OK] after the information of transmission type is displayed.
- 5) On the «Transmission Diagnosis» display screen, select the {Clear Memory}.

NOTE:

If {Clear Memory 2} is selected and performed, DTC are not cleared.

- 6) When ‘Done’ and ‘Turn ignition switch OFF’ are shown on the display screen, turn the ignition switch to OFF and close the Subaru Select Monitor. To turn the ignition switch to ON again, wait for more than 10 seconds.

NOTE:

For details concerning operation procedure, refer to the “SUBARU SELECT MONITOR OPERATION MANUAL”.

Read Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

7. Read Diagnostic Trouble Code (DTC)

A: OPERATION

Refer to “Subaru Select Monitor” for information about how to obtain and understand DTC. <Ref. to 5AT(diag)-15, 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 driving on roads.

- 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 by downshifting using “–” of the select lever from 5th → 4th, 4th → 3rd, 3rd → 2nd, and 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.

Clear Memory Mode

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

9. Clear Memory Mode

A: OPERATION

Use "Subaru Select Monitor" to clear DTC. <Ref. to 5AT(diag)-17, 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 have been performed. And when the shift shock can be felt during the general road test, perform learning with following procedures. <Ref. to 5AT(diag)-17, CLEAR MEMORY MODE, OPERATION, Subaru Select Monitor.>

- Replacement of TCM
- Replacement of transmission assembly
- Simultaneous replacement of TCM and 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 A/C 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 miles) to warm up ATF temperature more than 70°C (158°F).
- 8) While checking that the throttle opening angle on Subaru Select Monitor is within the specified range, shift the gear from 1st → 2nd, 2nd → 3rd, and 3rd → 4th on the road test while driving the vehicle at “D” range. <Ref. to 5AT(diag)-16, READ CURRENT DATA, OPERATION, Subaru Select Monitor.>

Acceleration opening angle:

12.5%±2%

- 9) While checking that the throttle opening angle on Subaru Select Monitor is within the specified range, upshift the gear from 4th → 5th while driving the vehicle at “D” range.

Acceleration opening angle:

15.5%±2%

- 10) Repeat the steps 8) and 9) until the reducing effect of the shifting shock is 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.

SPORT Indicator Light Display

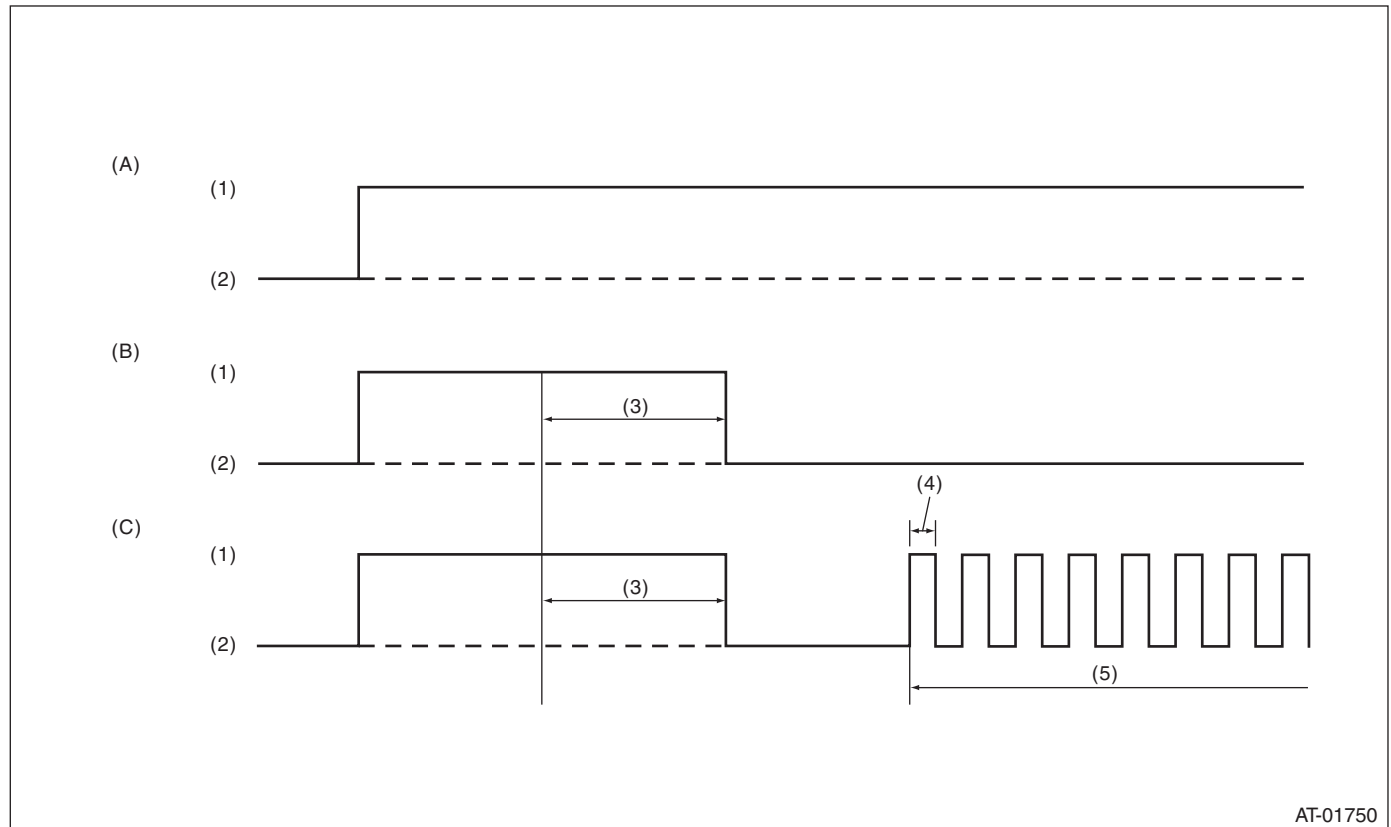
AUTOMATIC TRANSMISSION (DIAGNOSTICS)

11.SPORT Indicator Light Display

A: OPERATION

When any on-board diagnostics item is malfunctioning, 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 shown in the figure.

When the SPORT indicator light does not operate normally but no DTC is stored, perform the SPORT indicator light inspection. <Ref. to 5AT(diag)-23, INSPECTION, SPORT Indicator Light Display.>



AT-01750

(A) Ignition switch (Engine OFF)

(B) Normal (Engine ON)

(C) Faulty (Engine ON)

(1) ON

(3) 2 seconds

(5) Blink

(2) OFF

(4) 0.25 seconds

SPORT Indicator Light Display

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

B: INSPECTION

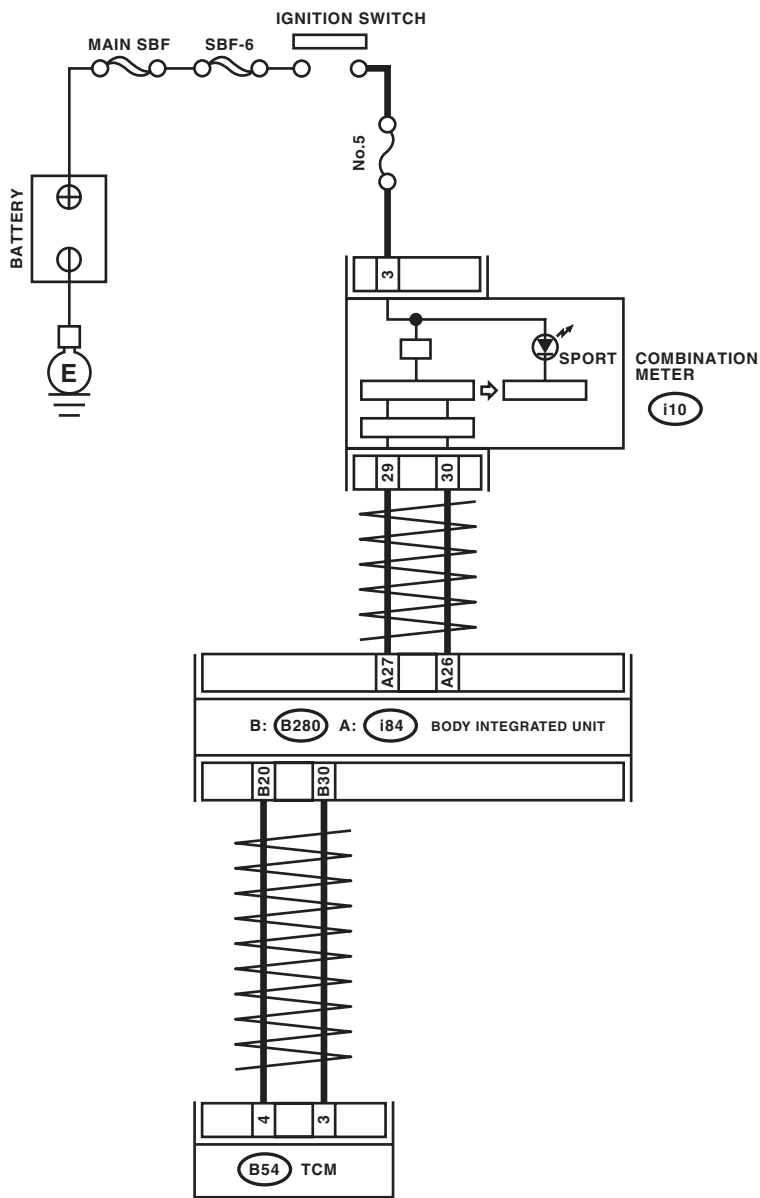
DIAGNOSIS:

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:



i10																													
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30

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B54																							
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24

SPORT Indicator Light Display

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

	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)-25, Diagnostic Procedure for Subaru Select Monitor Communication.>
5	CHECK TCM. Display the current data of TCM using Subaru Select Monitor.	Is the "Diagnosis Light" output signal "ON"?	Go to step 6.	Replace the TCM. <Ref. to 5AT-58, Transmission Control Module (TCM).>
6	CHECK BODY INTEGRATED UNIT. Display the current data of body integrated unit using Subaru Select Monitor. <Ref. to LAN(diag)-12, OPERATION, Subaru Select Monitor.>	Is the "SPORT Light" input signal "Illuminate"?	Replace the combination meter assembly. <Ref. to IDI-12, Combination Meter.>	Check DTC of body integrated unit. <Ref. to LAN(diag)-12, 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)-15, OPERATION, Subaru Select Monitor.>	Is the "Diagnosis Light" output signal "ON"?	Replace the TCM. <Ref. to 5AT-58, Transmission Control Module (TCM).>	Go to step 8.
8	CHECK BODY INTEGRATED UNIT. Display the current data of body integrated unit using Subaru Select Monitor. <Ref. to LAN(diag)-12, OPERATION, Subaru Select Monitor.>	Is the "SPORT Light" input signal "Illuminate"?	Check DTC of body integrated unit. Perform the diagnosis according to DTC. <Ref. to LAN(diag)-12, OPERATION, Subaru Select Monitor.>	Perform the self-diagnosis of combination meter. <Ref. to IDI-4, INSPECTION, Combination Meter System.>

12. Diagnostic Procedure for Subaru Select Monitor Communication

A: COMMUNICATION FOR INITIALIZING IMPOSSIBLE

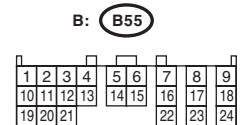
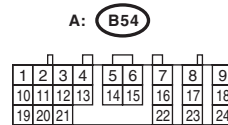
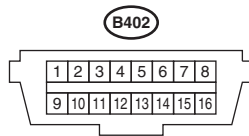
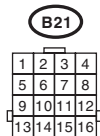
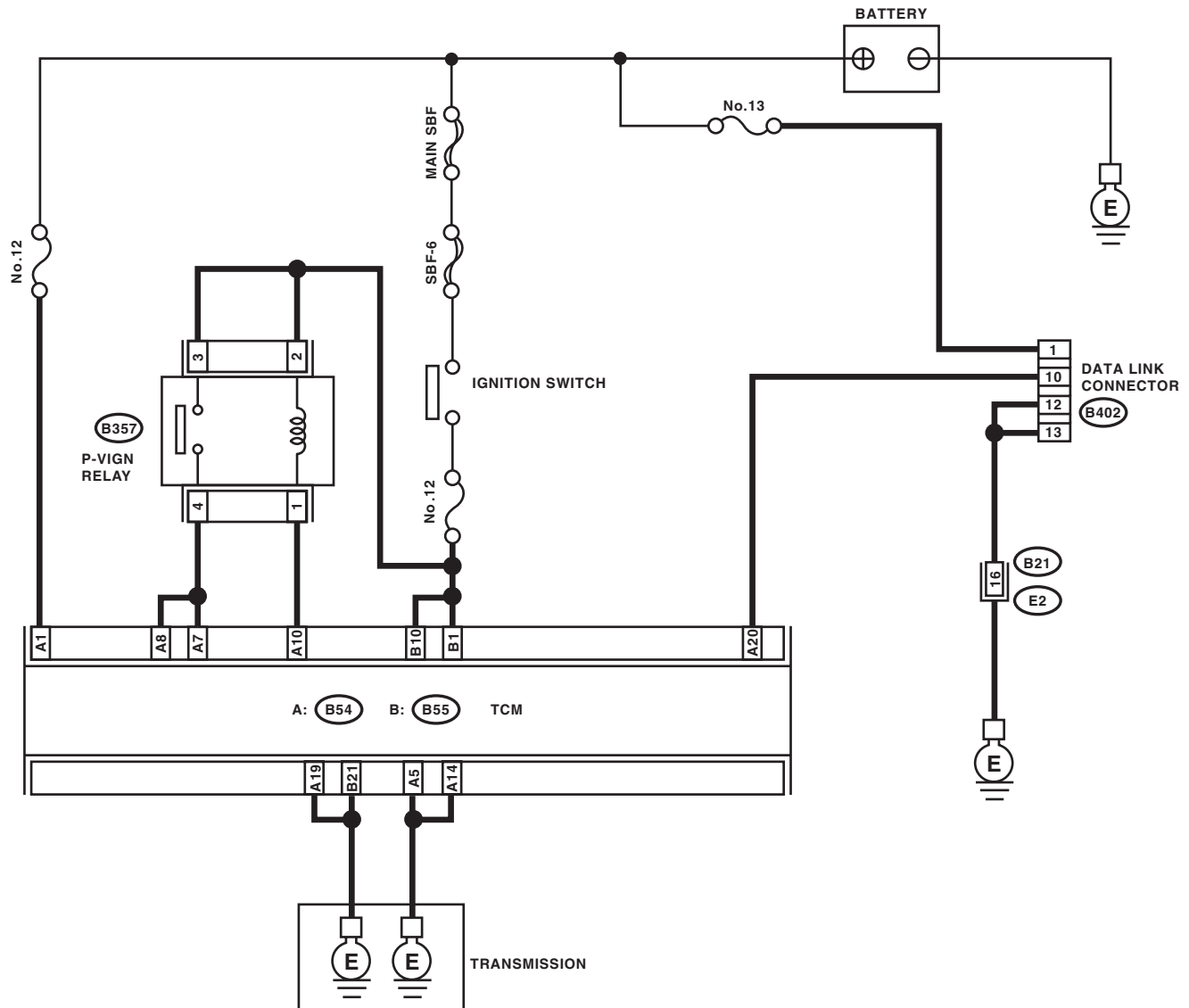
DIAGNOSIS:

Defective harness connector

TROUBLE SYMPTOM:

Subaru Select Monitor communication failure

WIRING DIAGRAM:



Diagnostic Procedure for Subaru Select Monitor Communication

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK SUBARU SELECT MONITOR POWER SUPPLY CIRCUIT. Measure the voltage between data link connector and chassis ground. Connector & terminal (B402) No. 1 (+) — Chassis ground (-):	Is the voltage 10 V or more?	Go to step 2.	Repair the harness connector between battery and data link connector, and poor contact of connector.
2 CHECK SUBARU SELECT MONITOR GROUND CIRCUIT. Measure the resistance of harness between data link connector and chassis ground. Connector & terminal (B402) No. 12 — Chassis ground: (B402) 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 of 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 system 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 system 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 connector from ECM. 4) Turn the ignition switch to ON. 5) Check whether communication to transmission system 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 (B402) No. 10 — Chassis ground:	Is the resistance more than 1 M Ω ?	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 (B402) No. 10 (+) — Chassis ground (-):	Is the voltage 1 V or more?	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 — (B402) No. 10:	Is the resistance less than 1 Ω ?	Go to step 9.	Repair the harness and connector between TCM and data link connector.
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.

Diagnostic Procedure for Subaru Select Monitor Communication

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step	Check	Yes	No
10 CHECK INSTALLATION OF TRANSMISSION HARNESS CONNECTOR.	Is the transmission harness connector connected to bulk-head harness connector?	Go to step 11.	Connect the bulk-head harness connector to transmission harness connector.
11 CHECK POOR CONTACT OF 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 (No. 12). 1) Turn the ignition switch to OFF. 2) Remove the fuse (No. 12).	Is the fuse (No. 12) blown out?	Replace the fuse (No. 12).	Go to step 14.
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 (No. 32). If the replaced fuse (No. 32) blows out easily, repair the short circuit of harness between fuse (No. 32) and TCM.	Go to step 15.
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 (No. 12). Remove the fuse (No. 12).	Is the fuse (No. 12) blown out?	Replace the fuse (No. 12). If the replaced fuse (No. 12) blows out easily, repair the short circuit of harness between fuse (No. 12) and TCM.	Go to step 17.
17 CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from TCM. 3) Measure the resistance of the 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 M Ω ?	Repair the short circuit of harness between TCM and transmission harness connector, and poor contact of connector.	Go to step 18.
18 CHECK POOR CONTACT OF CONNECTORS.	Is there poor contact in TCM power supply, ground and data link connector?	Repair the connector.	Replace the TCM. <Ref. to 5AT-58, Transmission Control Module (TCM).>

List of Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

13.List of Diagnostic Trouble Code (DTC)

A: LIST

DTC	Item	Content of diagnosis	Reference target
P0705	Transmission Range Sensor Circuit (PRNDL Input)	Inhibitor switch malfunction, open or short circuit	<Ref. to 5AT(diag)-31, 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, or open input signal circuit	<Ref. to 5AT(diag)-35, 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)-38, 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)-41, 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 unit malfunction, CAN communication failure	<Ref. to 5AT(diag)-44, 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)-46, 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 unit, CAN communication failure	<Ref. to 5AT(diag)-50, 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 failure	<Ref. to 5AT(diag)-52, 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)-52, 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)-52, DTC P0732 GEAR 2 INCORRECT RATIO, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0733	Gear 3 Incorrect Ratio	Vehicle sensor, turbine speed sensor or shift clutch malfunction	<Ref. to 5AT(diag)-52, DTC P0733 GEAR 3 INCORRECT RATIO, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0734	Gear 4 Incorrect Ratio	Vehicle sensor, turbine speed sensor or shift clutch malfunction	<Ref. to 5AT(diag)-52, DTC P0734 GEAR 4 INCORRECT RATIO, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0735	Gear 5 Incorrect Ratio	Vehicle sensor, turbine speed sensor or shift clutch malfunction	<Ref. to 5AT(diag)-52, DTC P0735 GEAR 5 INCORRECT RATIO, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0736	Reverse Incorrect Ratio	Vehicle sensor, turbine speed sensor or shift clutch malfunction	<Ref. to 5AT(diag)-53, 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)-54, DTC P0741 TORQUE CONVERTER CLUTCH CIRCUIT PERFORMANCE OR STUCK OFF, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

List of Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

DTC	Item	Content 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)-56, 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)-58, DTC P0748 PRESSURE CONTROL SOLENOID "A" ELECTRICAL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0751	Shift Solenoid "A" Performance or Stuck Off	Fr/B Solenoid Function Malfunction	<Ref. to 5AT(diag)-60, 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)-63, 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)-65, 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)-68, 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)-70, 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)-73, 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)-75, 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)-78, 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)-80, 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)-83, 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)-86, 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)-88, 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)-90, DTC P0882 TCM POWER INPUT SIGNAL LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0957	Backup Light Relay Circuit Low	Back-up relay output circuit is open, shorted or relay OFF malfunction	<Ref. to 5AT(diag)-92, DTC P0957 BACKUP LIGHT RELAY CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

List of Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

DTC	Item	Content of diagnosis	Reference target
P0958	Backup Light Relay Circuit High	Back-up relay output circuit is open, shorted or relay ON malfunction	<Ref. to 5AT(diag)-94, 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)-96, 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)-98, 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)-101, 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)-103, 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, or open input signal circuit	<Ref. to 5AT(diag)-106, 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)-109, 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, ECM short circuit, ABS/VDCCM, integrated CU malfunction	<Ref. to 5AT(diag)-112, DTC P1718 AT CAN COMMUNICATION CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1761	Lateral Acceleration Sensor Circuit Low	CAN communication failure	<Ref. to 5AT(diag)-112, DTC P1761 LATERAL ACCELERATION SENSOR CIRCUIT LOW, 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)-112, 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)-113, DTC P1799 INTERLOCK, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1817	SPORT Mode Switch Circuit (Manual Switch)	Manual mode switch is open or shorted, or switch malfunction	<Ref. to 5AT(diag)-114, 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)-116, DTC P1840 TRANSMISSION FLUID PRESSURE SENSOR/SWITCH A CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1842	Transmission Fluid Pressure Sensor/Switch C Circuit	I/C oil pressure switch is open or shorted, or switch malfunction.	<Ref. to 5AT(diag)-116, 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)-116, 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)-116, 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.

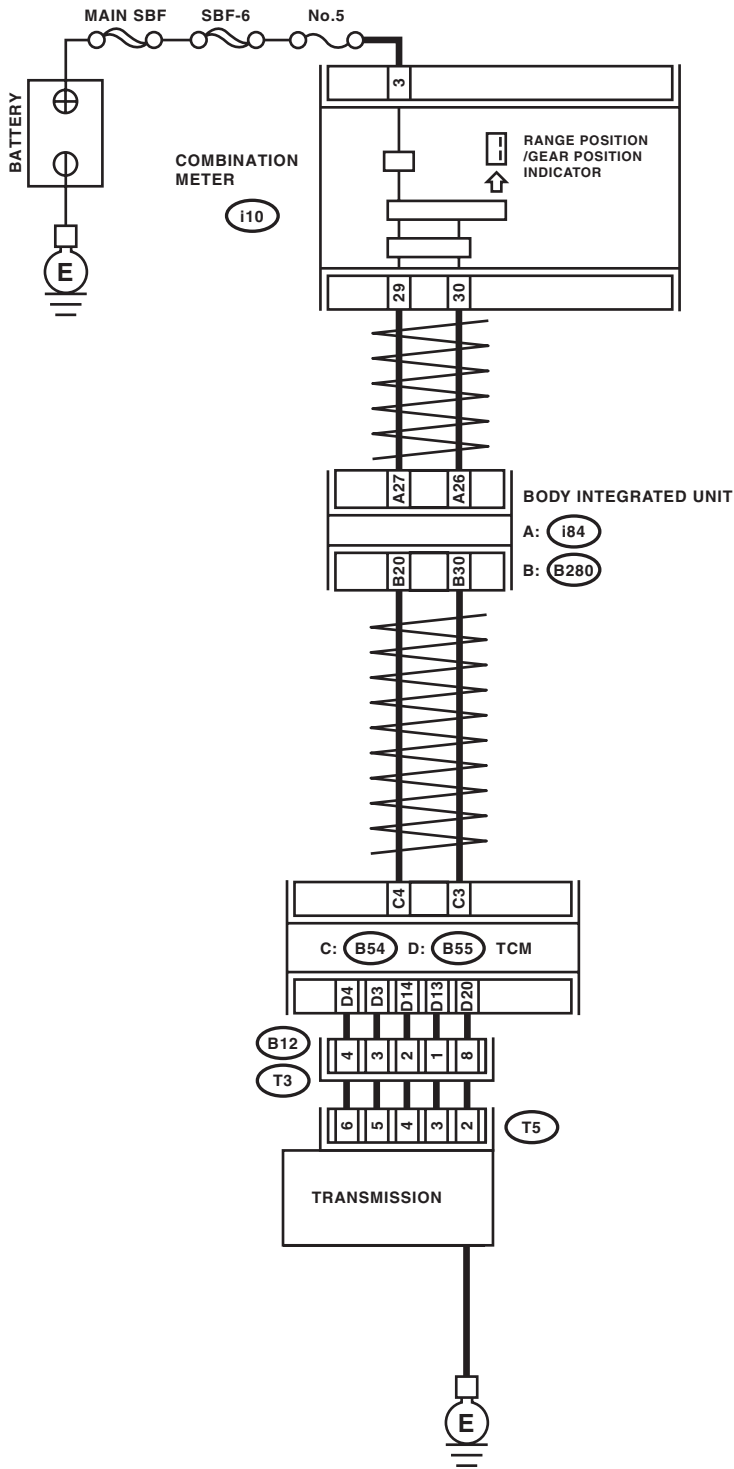
TROUBLE SYMPTOM:

- 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.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

WIRING DIAGRAM:



B12

1	2	3	4
5	6	7	8

T5

1	2	3		4	5	6
7	8	9	10	11	12	13
14	15	16				

C: B54

1	2	3	4	5	6	7	8	9
10	11	12	13	14	15	16	17	18
19	20	21				22	23	24

D: B55

1	2	3	4	5	6	7	8	9
10	11	12	13	14	15	16	17	18
19	20	21				22	23	24

B: B280

1	2	3				4	5	6	7
8	9	10	11	12	13	14	15	16	17
18	19	20	21	22	23	24	25	26	27
28	29	30							

i10

1	2	3	4	5	6	7	8	9	10	11	12	13	14
15	16	17	18	19	20	21	22	23	24	25	26	27	28
29	30												

A: i84

1	2		3	4				5	6	7	8
9	10	11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30	31	32
33	34	35									

AT-03691

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

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 3. 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 5. 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.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

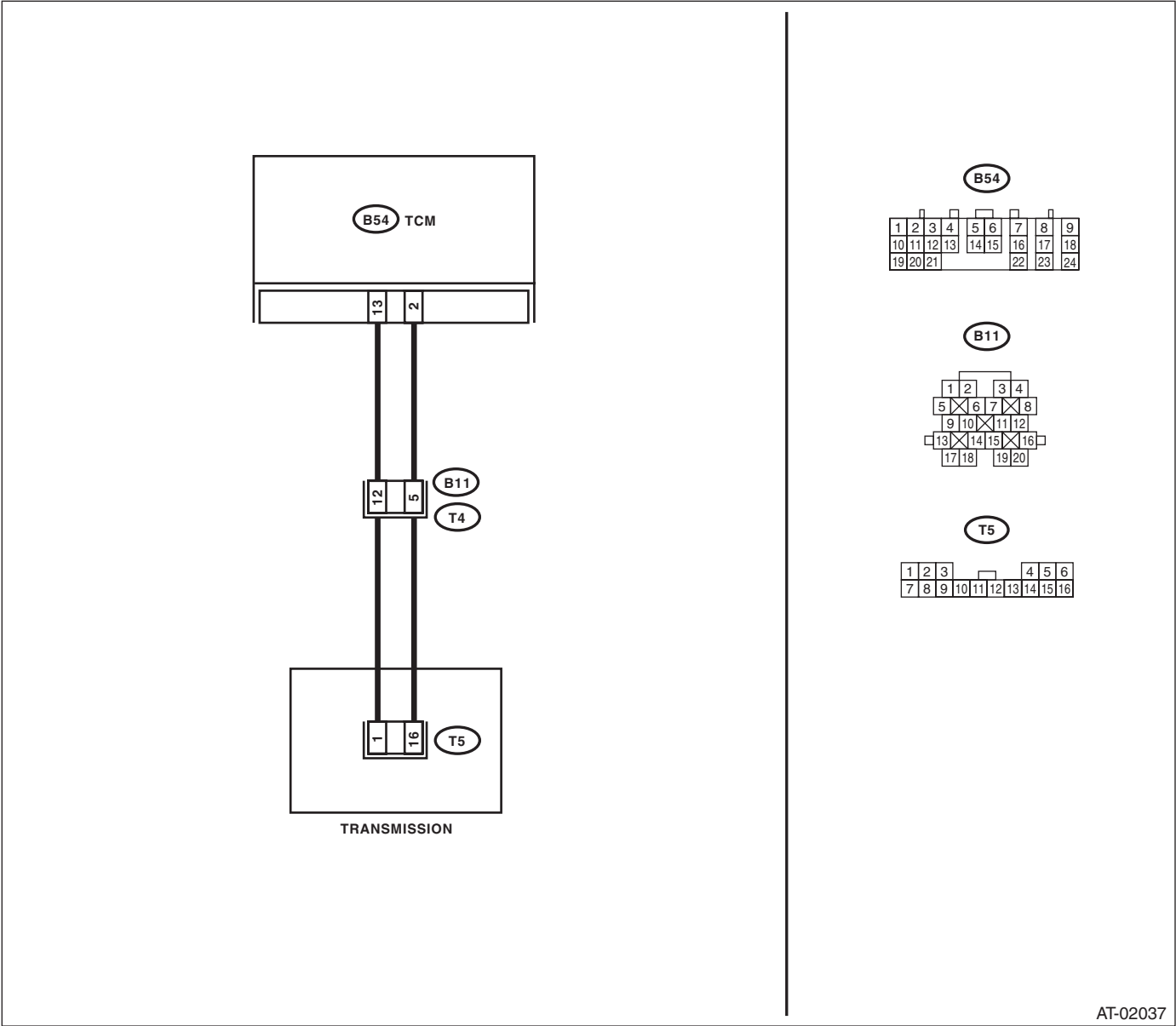
Step	Check	Yes	No
7 CHECK TCM I/O SIGNAL. Check I/O signal of power supply, ground and PVIGN power supply relay. <Ref. to 5AT(diag)-11, ELECTRICAL SPECIFICATION, Transmission Control Module (TCM) I/O Signal.>	Is TCM I/O signal OK?	Replace the TCM. <Ref. to 5AT-58, Transmission Control Module (TCM).>	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) Lift-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 connector from control valve body connector. 7) Measure the resistance between transmission connector and control valve body connector. Connector & terminal (T3) No. 4 — (T5) No. 6: (T3) No. 3 — (T5) No. 5: (T3) No. 2 — (T5) No. 4: (T3) No. 1 — (T5) No. 3: (T3) No. 8 — (T5) 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 (T5) No. 6 — Transmission ground: (T5) No. 5 — Transmission ground: (T5) No. 4 — Transmission ground: (T5) No. 3 — Transmission ground: (T5) No. 2 — Transmission ground:	Is the resistance more than 1 M Ω ?	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-55, Control Valve Body.>

B: DTC P0712 TRANSMISSION FLUID TEMPERATURE SENSOR CIRCUIT LOW INPUT

DTC DETECTING CONDITION:
Input signal circuit to ATF temperature sensor 1 is open.

TROUBLE SYMPTOM:
Excessive shift shock

WIRING DIAGRAM:



AT-02037

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION. 1) Turn the ignition switch to OFF. 2) Disconnect the 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 reaches to 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 between 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 light 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.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

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) Lift-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 connector from control valve body connector. 7) Measure the resistance between transmission connector and control valve body connector. Connector & terminal (T4) No. 12 — (T5) No. 1: (T4) No. 5 — (T5) No. 16:	Is the resistance less than 1 Ω ?	Replace the control valve body. <Ref. to 5AT-55, Control Valve Body.>	Repair the open circuit of harness between transmission connector and control valve body connector.
6 CHECK POOR CONTACT.	Is there poor contact in ATF temperature sensor 1 circuit?	Repair the poor contact.	Replace the TCM. <Ref. to 5AT-58, Transmission Control Module (TCM).>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

C: DTC P0713 TRANSMISSION FLUID TEMPERATURE SENSOR CIRCUIT HIGH INPUT

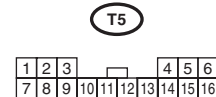
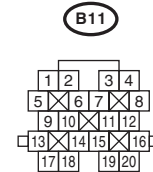
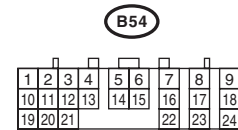
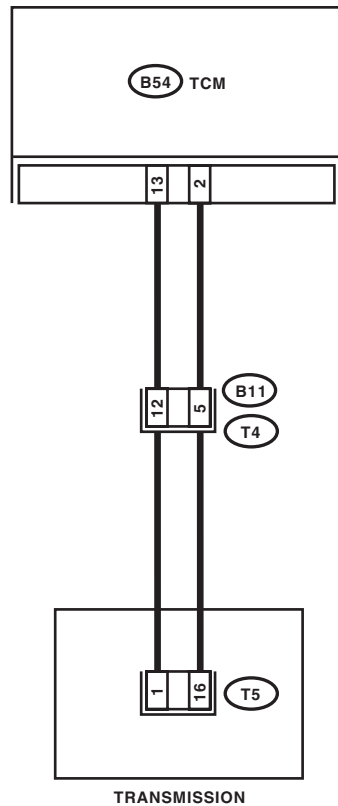
DTC DETECTING CONDITION:

Input signal circuit to ATF temperature sensor 1 is shorted.

TROUBLE SYMPTOM:

Excessive shift shock

WIRING DIAGRAM:



AT-02037

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION. 1) Turn the ignition switch to OFF. 2) Disconnect the 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 M Ω ?	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 reaches to 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 between 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 light 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.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

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) Lift-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 connector from control valve body connector. 7) Measure the resistance between chassis ground and control valve body connector. Connector & terminal (T5) No. 1 — Chassis ground: (T5) No. 16 — Chassis ground:	Is the resistance more than 1 MΩ?	Replace the control valve body. <Ref. to 5AT-55, Control Valve Body.>	Repair the short circuit of harness between transmission connector and control valve body connector.
6 CHECK POOR CONTACT.	Is there poor contact in ATF temperature sensor 1 circuit?	Repair the poor contact.	Replace the TCM. <Ref. to 5AT-58, Transmission Control Module (TCM).>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

D: DTC P0715 INPUT/TURBINE SPEED SENSOR CIRCUIT

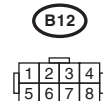
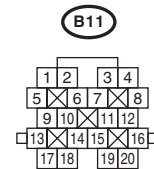
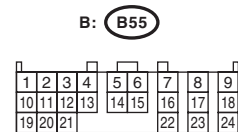
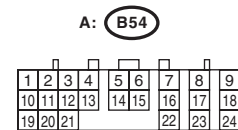
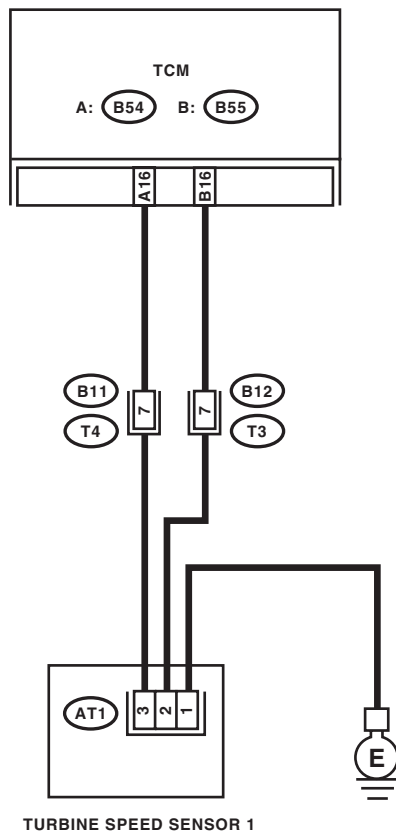
DTC DETECTING CONDITION:

Input signal circuit of TCM is open or shorted.

TROUBLE SYMPTOM:

- Excessive shift shock
- Does not shift to 5th

WIRING DIAGRAM:



AT-02074

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from TCM and transmission. 3) Measure the resistance of harness between TCM connector 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 M Ω ?	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)-11, ELECTRICAL SPECIFICATION, Transmission Control Module (TCM) I/O Signal.>	Is TCM I/O signal OK?	Replace the TCM. <Ref. to 5AT-58, 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 installed securely to the transmission body? Is there any serious damage in the harness and terminal?	Go to step 7.	When poor installation of ground occurs, install it securely. Replace the harness assembly if the harness or terminal is damaged. <Ref. to 5AT-51, Rear Vehicle Speed Sensor.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

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, or poor contact of 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 M Ω ?	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) Lift-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 turbine speed sensor 1 using the Subaru Select Monitor. <Ref. to 5AT(diag)-16, 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 VDC memory clear procedure of on-board diagnostics system. <Ref. to VDC(diag)-23, Clear Memory Mode.>	Does the value of the turbine speed sensor 1 change depending on the acceleration, deceleration and shifting range of the vehicle?	Even if the SPORT indicator light 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-54, Turbine Speed Sensor 1.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

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

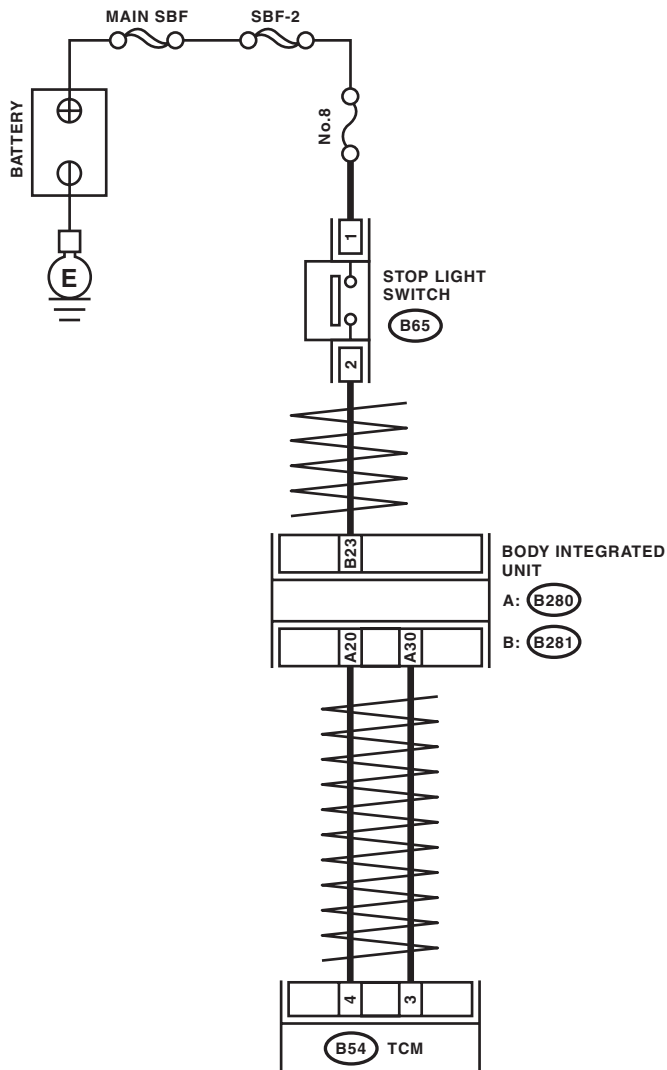
DTC DETECTING CONDITION:

Brake switch malfunction, open input signal circuit

TROUBLE SYMPTOM:

Brake down control is not operated at SPORT mode.

WIRING DIAGRAM:



B65

1	2
3	4

B159

1	2	3	4
5	6	7	8
9			

B54

1	2	3	4	5	6	7	8	9
10	11	12	13	14	15	16	17	18
19	20	21				22	23	24

A: B280

1	2	3			4	5	6	7
8	9	10	11	12	13	14	15	16
17	18	19	20					
21	22	23	24	25	26	27	28	29
30								

B: B281

1	2	3			4	5	6	7
8	9	10	11	12	13	14	15	16
17	18	19						
20	21	22	23	24	25	26	27	28

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

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 UNIT. 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) Run the Subaru Select Monitor. 5) Depress the brake pedal. 6) Read the data of brake pedal switch using Subaru Select Monitor. <Ref. to LAN(diag)-12, 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)-15, 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-58, Transmission Control Module (TCM).>
4 CHECK BODY INTEGRATED UNIT INPUT SIGNAL. 1) Disconnect the connector from body integrated unit. 2) Depress the brake pedal. 3) Measure the voltage between body integrated unit connector and chassis ground. Connector & terminal (B281) No. 23 (+) — Chassis ground (-):	Is the voltage 10 V or more?	Go to step 7.	Go to step 5.
5 CHECK HARNESS CONNECTOR BETWEEN BODY INTEGRATED UNIT 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 unit and stop light switch. Connector & terminal (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 unit and stop light switch.
6 CHECK HARNESS CONNECTOR BETWEEN BODY INTEGRATED UNIT AND STOP LIGHT SWITCH. Measure the resistance of harness between body integrated unit connector and stop light switch. Connector & terminal (B281) No. 23 — Chassis ground:	Is the resistance more than 1 M Ω ?	Go to step 7.	Repair the short circuit of harness between body integrated unit 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 unit.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

F: DTC P0720 OUTPUT SPEED SENSOR CIRCUIT

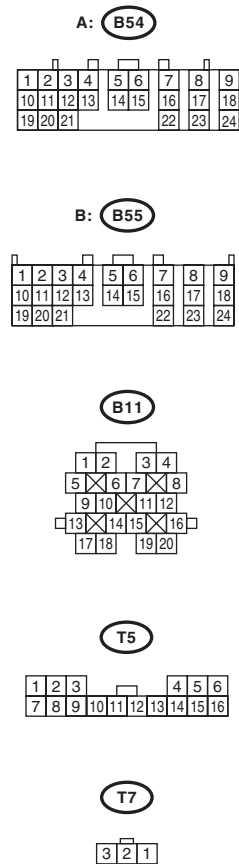
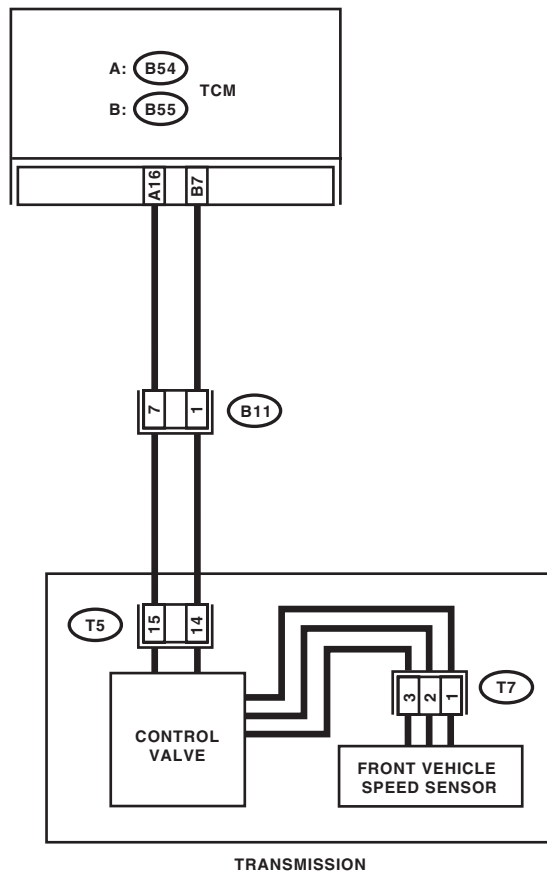
DTC DETECTING CONDITION:

- AT vehicle speed signal is abnormal.
- The harness connector between TCM and vehicle speed sensor is shorted or open.

TROUBLE SYMPTOM:

- Deterioration of shifting quality.
- Driving performance is poor.

WIRING DIAGRAM:



AT-02075

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from TCM and transmission. 3) Measure the resistance of harness between TCM connector 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 M Ω ?	Go to step 3.	Repair the short circuit of harness between TCM and chassis ground.
3 CHECK TCM POWER SUPPLY OUTPUT. 1) Connect connector to the 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. 1) Lift-up the vehicle and rotate the propeller shaft slowly by hand. 2) Measure the voltage between the TCM connector terminals while rotating. Connector & terminal (B55) No. 7 (+) — (B54) No. 19 (-):	Does the voltage repeat indicating 0 V $\leftrightarrow$ 4 — 6 V while the propeller shaft is rotating?	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)-11, ELECTRICAL SPECIFICATION, Transmission Control Module (TCM) I/O Signal.>	Is TCM I/O signal OK?	Replace the TCM. <Ref. to 5AT-58, 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.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step	Check	Yes	No
6 CHECK INPUT SIGNAL FOR TCM USING SUBARU SELECT MONITOR. 1) Connect all the connectors. 2) Lift-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)-16, 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 VDC memory clear procedure of on-board diagnostics system. <Ref. to VDC(diag)-17, CLEAR MEMORY MODE, OPERATION, Subaru Select Monitor.>	Does the value of the front wheel speed change depending on the acceleration and deceleration of the vehicle?	Even if the SPORT indicator light 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.
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) Lift-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 connector from control valve body connector. 7) Measure the resistance between transmission connector and control valve body connector. Connector & terminal (B11) No. 7 — (T5) No. 15: (B11) No. 1 — (T5) 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 (T5) No. 15 — Transmission ground: (T5) 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.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step	Check	Yes	No
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 (T5) No. 15 — (T7) No. 3: (T5) 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-55, 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 (T5) No. 15 — Transmission ground: (T5) No. 14 — Transmission ground:	Is the resistance more than 1 M Ω ?	Replace the vehicle speed sensor.	Replace the control valve body. <Ref. to 5AT-55, Control Valve Body.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

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

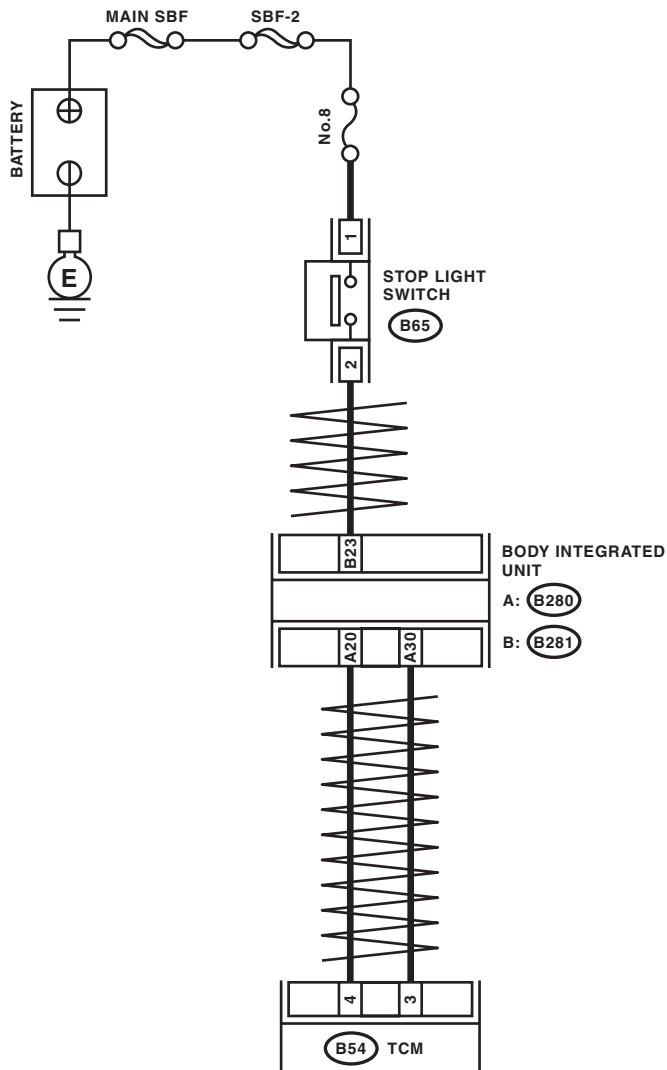
DTC DETECTING CONDITION:

Brake switch malfunction, open input signal circuit

TROUBLE SYMPTOM:

Gear is not shifted down when climbing a hill.

WIRING DIAGRAM:



B65

1	2
3	4

B159

1	2		3	4
5	6	7	8	9

B54

1	2	3	4	5	6	7	8	9
10	11	12	13	14	15	16	17	18
19	20	21				22	23	24

A: B280

1	2	3							4	5			6	7
8	9	10	11	12	13	14	15	16	17	18	19	20		
21	22		23	24	25		26	27		28	29	30		

B: B281

1	2	3					4	5	6	7				
8	9	10	11	12	13	14	15	16	17	18	19			
20	21			22	23			24	25	26			27	28

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

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 UNIT. 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) Run the Subaru Select Monitor. 5) Read the data of brake pedal switch using Subaru Select Monitor. <Ref. to LAN(diag)-12, 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)-15, 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-58, Transmission Control Module (TCM).>
4 CHECK BODY INTEGRATED UNIT INPUT SIGNAL. 1) Disconnect the connector from body integrated unit. 2) Measure the voltage between body integrated unit connector and chassis ground. Connector & terminal (B281) No. 23 (+) — Chassis ground (-):	Is the voltage 10 V or more?	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 connectors. Terminals 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 UNIT AND STOP LIGHT SWITCH. 1) Turn the ignition switch to ON. 2) Measure the voltage of harness between body integrated unit 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 unit.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

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 occurs. (After engine is warmed-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-58, Transmission Control Module (TCM).>

I: DTC P0731 GEAR 1 INCORRECT RATIO

NOTE:

Refer to DTC P0736 for diagnostic procedure. <Ref. to 5AT(diag)-53, 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)-53, 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)-53, 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)-53, 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)-53, DTC P0736 REVERSE INCORRECT RATIO, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

N: DTC P0736 REVERSE INCORRECT RATIO

DTC DETECTING CONDITION:

Target gear ratio and actual gear ratio do not match.

TROUBLE SYMPTOM:

- Shift point is too high or too low.
- Excessive shift shock.
- Gear is not changed.
- The vehicle does not move in D or R range with the engine running at high speed.

Step	Check	Yes	No
1 CHECK DTC OF TCM.	Is any DTC of the followings detected? P0715, P0720, P0753, P0758, P0763, P0768, P0773, P0751, P0756, P0761, P0766, P0771, P1706, P1710, P1798, P1799.	Perform the diagnosis according to DTC.	Go to step 2.
2 CHECK TURBINE SPEED SENSOR USING SUBARU SELECT MONITOR. 1) Lift-up the vehicle and support with rigid racks. NOTE: Raise all wheels off floor. 2) Start the engine, and drive it. 3) Read the current data of turbine speed using Subaru Select Monitor. <Ref. to 5AT(diag)-16, 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 VDC memory clear procedure of on-board diagnostics system. <Ref. to VDC(diag)-17, CLEAR MEMORY MODE, OPERATION, Subaru Select Monitor.>	Does the displayed value of the Subaru Select Monitor change according to engine speed and shifting gear range?	Go to step 3.	Perform the diagnosis according to DTC P0715, P1710.
3 CHECK FRONT AND REAR VEHICLE SPEED SENSORS.	Do the values displayed for each of the Subaru Select Monitor and the speedometer substantially match?	Go to step 4.	Perform the diagnosis according to DTC P0720, P1706.
4 CHECK INHIBITOR SWITCH.	Do the values displayed for the Subaru Select Monitor and the meter indicator match?	Go to step 5.	Perform the diagnosis according to DTC P0705.
5 DRIVING CHECK. 1) Turn the ignition switch to OFF. 2) After restarting the engine, check that the SPORT indicator light is not blinking, and perform a drive check based on the Inspection Mode. <Ref. to 5AT(diag)-19, PROCEDURE, Inspection Mode.>	Is DTC displayed again?	Check the DTC. Then, when proceeded again to step 5, go to step 6.	Go to step 6.
6 CHECK AFTER REPAIR.	Is the trouble symptom inrepairable (malfunction in shifting such as excessive shift shock, engine speed increases excessively when shifting)?	Replace the transmission assembly.	Temporary poor contact occurs. Check that the harness connector is not faulty.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

O: DTC P0741 TORQUE CONVERTER CLUTCH CIRCUIT PERFORMANCE OR STUCK OFF

DTC DETECTING CONDITION:

- Defective lock-up clutch or torque converter assembly
- Defective control valve
- Defective turbine speed sensor 1 or 2

TROUBLE SYMPTOM:

No lock-up occurs. (After engine is warmed-up)

Step	Check	Yes	No
1 CHECK DTC OF TCM.	Is any DTC of the followings detected? P0715, P0725, P0753, P0758, P0763, P0768, P0773, P0751, P0756, P0761, P0766, P0771, P1710, P1718, P1798, P1799.	Perform the diagnosis according to each DTC.	Go to step 2.
2 DRIVING CHECK FOR LOCK-UP CONDITION 1) Perform a drive check based on the Inspection Mode with the following conditions. <Ref. to 5AT(diag)-19, PROCEDURE, Inspection Mode.> (1) Read the current data of throttle opening angle using Subaru Select Monitor. <Ref. to 5AT(diag)-16, READ CURRENT DATA, OPERATION, Subaru Select Monitor.> (2) Keep the same vehicle speed at 60 km/h with 10% or less throttle opening angle which is read currently on Subaru Select Monitor. <Ref. to 5AT(diag)-16, READ CURRENT DATA, OPERATION, Subaru Select Monitor.> (3) Read the current data of L/U solenoid target pressure using Subaru Select Monitor. <Ref. to 5AT(diag)-16, READ CURRENT DATA, OPERATION, Subaru Select Monitor.> (4) Check the engine speed and turbine speed when the L/U solenoid target value displayed on Subaru Select Monitor is 500 kPa or more.	Are the engine speed and turbine speed almost the same?	Temporary poor contact or open circuit occurs. Recheck that the harness connector has no faulty.	Go to step 3.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step	Check	Yes	No
3 DRIVING CHECK FOR LOCK-UP CONDITION 1) Clear the memory. <Ref. to 5AT(diag)-17, CLEAR MEMORY MODE, OPERATION, Subaru Select Monitor.> 2) Perform a drive check based on the Inspection Mode with the following conditions. <Ref. to 5AT(diag)-19, PROCEDURE, Inspection Mode.> (1) Read the current data of throttle opening angle using Subaru Select Monitor. <Ref. to 5AT(diag)-16, READ CURRENT DATA, OPERATION, Subaru Select Monitor.> (2) Keep the same vehicle speed at 60 km/h with 10% or less throttle opening angle which is read currently on Subaru Select Monitor. <Ref. to 5AT(diag)-16, READ CURRENT DATA, OPERATION, Subaru Select Monitor.> (3) Read the current data of L/U solenoid target pressure using Subaru Select Monitor. <Ref. to 5AT(diag)-16, READ CURRENT DATA, OPERATION, Subaru Select Monitor.> (4) Drive the vehicle continuously for one minutes or more with the L/U solenoid target value displayed on Subaru Select Monitor at 500 kPa or more. 3) Turn the ignition switch to OFF. 4) Turn the ignition switch to ON. (engine ON) 5) Perform the step 2) again.	Is DTC P0741 displayed with the SPORT indicator light blinking?	Replace the transmission assembly when DTC P0741 is displayed. When DTC other than P0741 is displayed, perform the diagnosis corresponding to the DTC.	Temporary poor contact or open circuit occurs. Recheck that the harness connector has no faulty.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

P: DTC P0743 TORQUE CONVERTER CLUTCH CIRCUIT ELECTRICAL

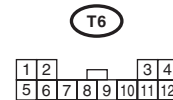
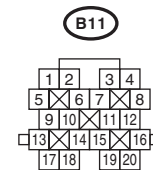
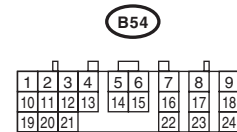
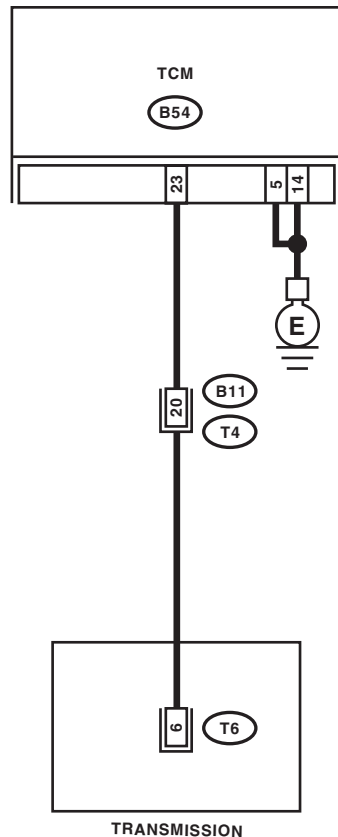
DTC DETECTING CONDITION:

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

TROUBLE SYMPTOM:

No lock-up occurs. (After engine is warmed-up)

WIRING DIAGRAM:



AT-02076

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from TCM and transmission. 3) Measure the resistance of harness between TCM connector 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.
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 M Ω ?	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) Lift-up the vehicle and place it on rigid racks. NOTE: Raise all wheels off floor. 5) Drain the ATF. NOTE: 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 — (T6) No. 6:	Is the resistance less than 1 Ω ?	Go to step 4.	Repair the open circuit of harness between transmission connector and control valve body connector.
4 CHECK HARNESS CONNECTOR BETWEEN TRANSMISSION AND CONTROL VALVE BODY. Measure the resistance between chassis ground and control valve body connector. Connector & terminal (T6) No. 6 — Chassis ground:	Is the resistance more than 1 M Ω ?	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 (T6) No. 6 — Transmission ground:	Is the resistance between 3 — 9 Ω ?	Go to step 6.	Replace the control valve body. <Ref. to 5AT-55, 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 losing 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 check that there is no faulty.	Is DTC displayed?	Replace the TCM. <Ref. to 5AT-58, Transmission Control Module (TCM).>	Temporary poor contact or open circuit occurs. Recheck that the harness connector has no faulty.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Q: DTC P0748 PRESSURE CONTROL SOLENOID “A” ELECTRICAL

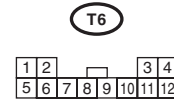
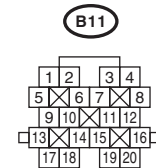
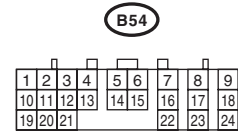
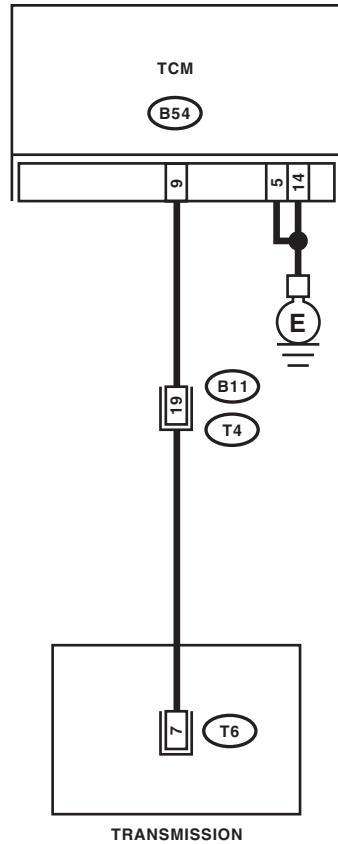
DTC DETECTING CONDITION:

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

TROUBLE SYMPTOM:

Excessive shift shock

WIRING DIAGRAM:



AT-02077

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from TCM and transmission. 3) Measure the resistance of harness between TCM connector 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.
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 M Ω ?	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) Lift-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. 19 — (T6) No. 7:	Is the resistance less than 1 Ω ?	Go to step 4.	Repair the open circuit of harness between transmission connector and control valve body connector.
4 CHECK HARNESS CONNECTOR BETWEEN TRANSMISSION AND CONTROL VALVE BODY. Measure the resistance between transmission ground and control valve body connector. Connector & terminal (T6) No. 7 — Chassis ground:	Is the resistance more than 1 M Ω ?	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 (T6) No. 7 — Transmission ground:	Is the resistance between 3 — 9 Ω ?	Go to step 6.	Replace the control valve body. <Ref. to 5AT-55, 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 losing 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 check that there is no faulty.	Is DTC displayed?	Replace the TCM. <Ref. to 5AT-58, Transmission Control Module (TCM).>	Temporary poor contact or open circuit occurs. Recheck that the harness connector has no faulty.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

R: DTC P0751 SHIFT SOLENOID “A” PERFORMANCE OR STUCK OFF

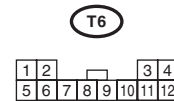
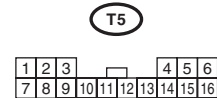
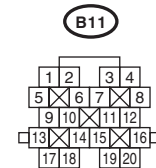
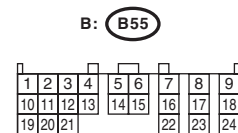
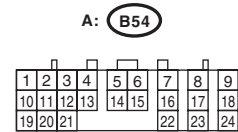
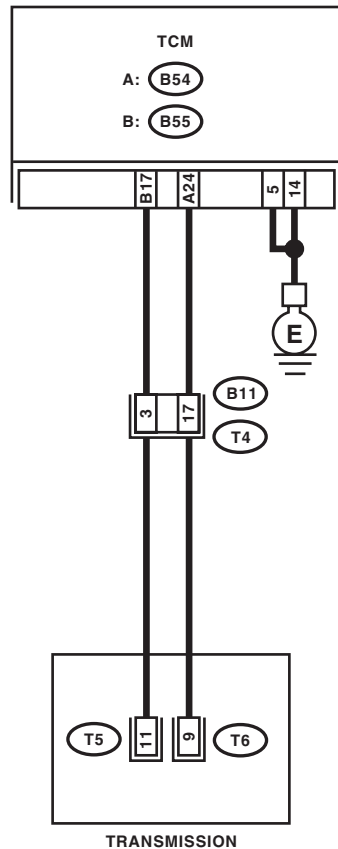
DTC DETECTING CONDITION:

Output signal of front brake solenoid does not match with oil pressure.

TROUBLE SYMPTOM:

Locked to 4th or 5th gear.

WIRING DIAGRAM:



AT-02937

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION. 1) Turn the ignition switch to OFF. 2) Disconnect the 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 (B55) No. 17 — Chassis ground:	Is the resistance more than 1 M Ω ?	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 6.
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 1st speed while checking the 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 light 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 5.
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) Lift-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 (B11) No. 17 — (T6) No. 9: (B11) No. 3 — (T5) No. 11:	Is the resistance less than 1 Ω ?	Replace the control valve body. <Ref. to 5AT-55, Control Valve Body.>	Replace the transmission harness assembly.

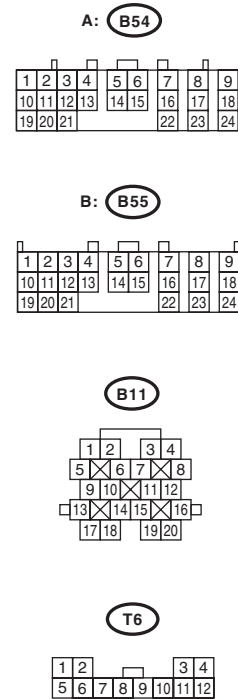
Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

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) Lift-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 ground and control valve body connector. Connector & terminal (T4) No. 3 — Transmission ground:	Is the resistance more than 1 MΩ?	Replace the control valve body. <Ref. to 5AT-55, Control Valve Body.>	Replace the transmission harness assembly.

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

WIRING DIAGRAM:



5AT(diag)-63

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from TCM and transmission. 3) Measure the resistance of harness between TCM connector 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.
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 M Ω ?	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) Lift-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. 17 — (T6) No. 9:	Is the resistance less than 1 Ω ?	Go to step 4.	Repair the open circuit of harness between transmission connector and control valve body connector.
4 CHECK HARNESS CONNECTOR BETWEEN TRANSMISSION AND CONTROL VALVE BODY. Measure the resistance between transmission ground and control valve body connector. Connector & terminal (T6) No. 9 — Transmission ground:	Is the resistance more than 1 M Ω ?	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 (T6) No. 9 — Transmission ground:	Is the resistance between 3 — 9 Ω ?	Go to step 6.	Replace the control valve body. <Ref. to 5AT-55, 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 losing 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 check that there is no faulty.	Is DTC displayed?	Replace the TCM. <Ref. to 5AT-58, Transmission Control Module (TCM).>	Temporary poor contact or open circuit occurs. Recheck that the harness connector has no faulty.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

T: DTC P0756 SHIFT SOLENOID “B” PERFORMANCE OR STUCK OFF

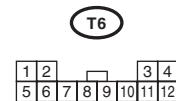
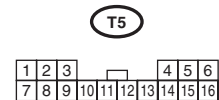
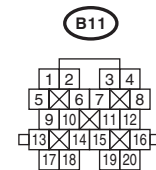
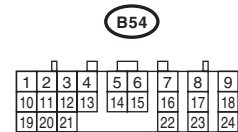
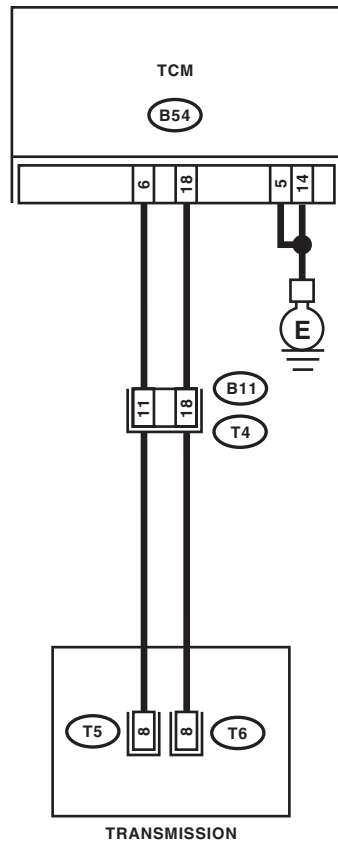
DTC DETECTING CONDITION:

Output signal value of input clutch solenoid and oil pressure does not match.

TROUBLE SYMPTOM:

Locked to 4th gear.

WIRING DIAGRAM:



AT-02995

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from TCM and transmission. 3) Measure the resistance of harness between TCM connector 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. 6 — Chassis ground:	Is the resistance more than 1 M Ω ?	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 6.
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 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 light 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 5.
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) Lift-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. 18 — (T6) No. 8: (T4) No. 11 — (T5) No. 8:	Is the resistance less than 1 Ω ?	Replace the control valve body. <Ref. to 5AT-55, Control Valve Body.>	Replace the transmission harness assembly.

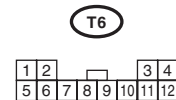
Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

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) Lift-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) Check the insulation of transmission harness assembly. Connector & terminal (T4) No. 11 — Transmission ground:	Is the resistance more than 1 MΩ?	Replace the control valve body. <Ref. to 5AT-55, Control Valve Body.>	Replace the transmission harness assembly.

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

WIRING DIAGRAM:



5AT(diag)-68

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION. 1) Turn the ignition switch to OFF. 2) Disconnect the 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.
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 M Ω ?	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) Lift-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. 18 — (T6) No. 8:	Is the resistance less than 1 Ω ?	Go to step 4.	Repair the open circuit of harness between transmission connector and control valve body connector.
4 CHECK HARNESS CONNECTOR BETWEEN TRANSMISSION AND CONTROL VALVE BODY. Measure the resistance between chassis ground and control valve body connector. Connector & terminal (T6) No. 8 — Chassis ground:	Is the resistance more than 1 M Ω ?	Go to step 5.	Repair the short circuit of harness between transmission connector and control valve body connector.
5 CHECK INPUT CLUTCH SOLENOID. Measure the resistance between transmission ground and control valve body connector. Connector & terminal (T6) No. 8 — Transmission ground:	Is the resistance between 3 — 9 Ω ?	Go to step 6.	Replace the control valve body. <Ref. to 5AT-55, 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 losing 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 check that there is no faulty.	Is DTC displayed?	Replace the TCM. <Ref. to 5AT-58, Transmission Control Module (TCM).>	Temporary poor contact or open circuit occurs. Recheck that the harness connector has no faulty.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

V: DTC P0761 SHIFT SOLENOID “C” PERFORMANCE OR STUCK OFF

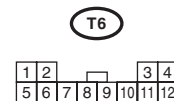
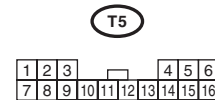
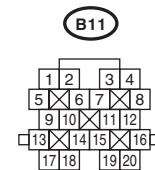
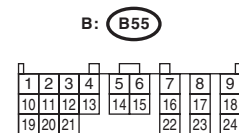
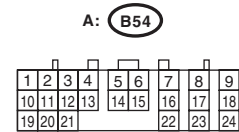
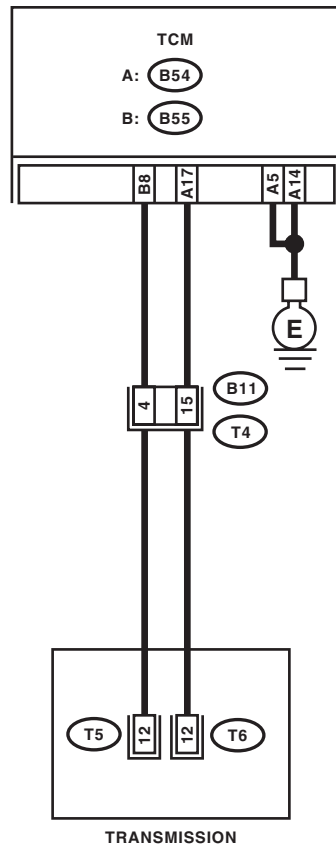
DTC DETECTING CONDITION:

Output signal value of high & low reverse clutch solenoid and oil pressure does not match.

TROUBLE SYMPTOM:

Locked to 4th gear.

WIRING DIAGRAM:



AT-02996

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION. 1) Turn the ignition switch to OFF. 2) Disconnect the 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 (B55) No. 8 — Chassis ground:	Is the resistance more than 1 M Ω ?	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 the input signal of the H&LR/C oil pressure SW.	Is OFF displayed?	Go to step 4.	Go to step 6.
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 the input signal of the H&LR/C oil pressure SW.	Is ON displayed?	Even if the SPORT indicator light 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 5.
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) Lift-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. 15 — (T6) No. 12: (T4) No. 4 — (T5) No. 12:	Is the resistance less than 1 Ω ?	Replace the control valve body. <Ref. to 5AT-55, Control Valve Body.>	Replace the transmission harness assembly.

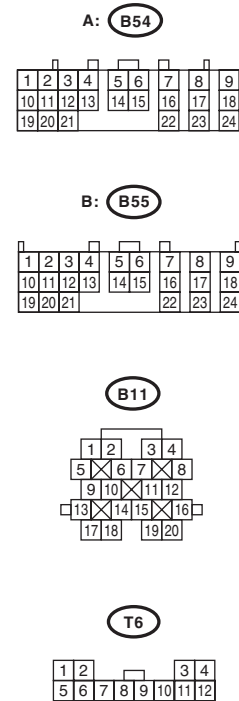
Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

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) Lift-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) Check the insulation of transmission harness assembly. Connector & terminal (T4) No. 4 — Transmission ground:	Is the resistance more than 1 MΩ?	Replace the control valve body. <Ref. to 5AT-55, Control Valve Body.>	Replace the transmission harness assembly.

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

WIRING DIAGRAM:



AT-02989

	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.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

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 M Ω ?	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) Lift-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. 15 — (T6) No. 12:	Is the resistance less than 1 Ω ?	Go to step 4.	Repair the open circuit of harness between transmission connector and control valve body 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 (T6) No. 12 — Chassis ground:	Is the resistance more than 1 M Ω ?	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 (T6) No. 12 — Transmission ground:	Is the resistance between 3 — 9 Ω ?	Go to step 6.	Replace the control valve body. <Ref. to 5AT-55, 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 check that there is no faulty.	Is DTC displayed?	Replace the TCM. <Ref. to 5AT-58, Transmission Control Module (TCM).>	Temporary poor contact or open circuit occurs. Recheck that the harness connector has no faulty.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

X: DTC P0766 SHIFT SOLENOID “D” PERFORMANCE OR STUCK OFF

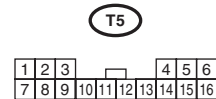
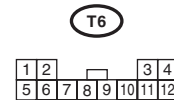
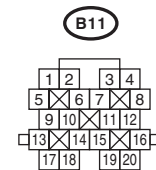
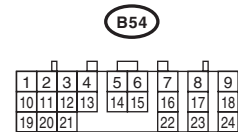
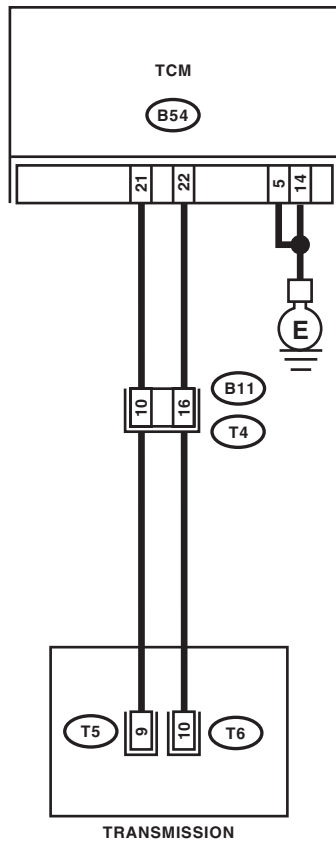
DTC DETECTING CONDITION:

Output signal value of direct clutch solenoid and oil pressure does not match.

TROUBLE SYMPTOM:

Locked to 4th gear.

WIRING DIAGRAM:



AT-02938

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION. 1) Turn the ignition switch to OFF. 2) Disconnect the 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. 21 — Chassis ground:	Is the resistance more than 1 M Ω ?	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 6.
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 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 light 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 5.
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) Lift-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. 16 — (T6) No. 10: (T4) No. 10 — (T5) No. 9:	Is the resistance less than 1 Ω ?	Replace the control valve body. <Ref. to 5AT-55, Control Valve Body.>	Replace the transmission harness assembly.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

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) Lift-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) Check the insulation of transmission harness assembly. Connector & terminal (T4) No. 10 — Transmission ground:	Is the resistance more than 1 MΩ?	Replace the control valve body. <Ref. to 5AT-55, Control Valve Body.>	Replace the transmission harness assembly.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Y: DTC P0768 SHIFT SOLENOID “D” ELECTRICAL

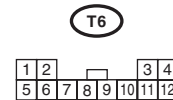
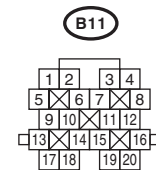
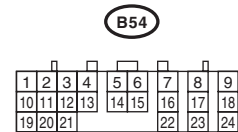
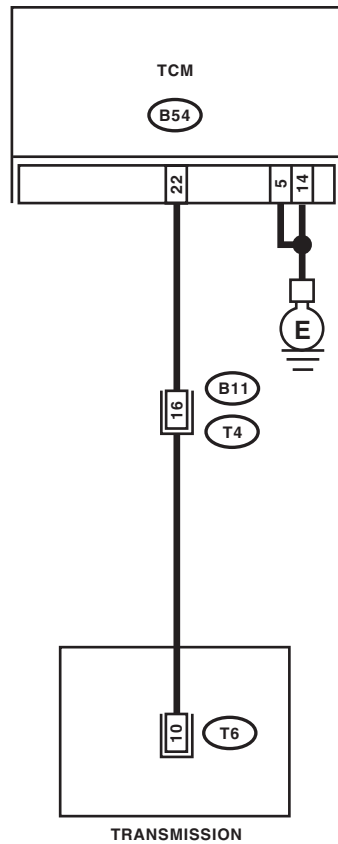
DTC DETECTING CONDITION:

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

TROUBLE SYMPTOM:

Locked to 4th gear.

WIRING DIAGRAM:



AT-02990

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION. 1) Turn the ignition switch to OFF. 2) Disconnect the 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.
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 M Ω ?	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) Lift-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. 16 — (T6) No. 10:	Is the resistance less than 1 Ω ?	Go to step 4.	Repair the open circuit of harness between transmission connector and control valve body connector.
4 CHECK HARNESS CONNECTOR BETWEEN TRANSMISSION AND CONTROL VALVE BODY. Measure the resistance between chassis ground and control valve body connector. Connector & terminal (T6) No. 10 — Chassis ground:	Is the resistance more than 1 M Ω ?	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 (T6) No. 10 — Transmission ground:	Is the resistance between 3 — 9 Ω ?	Go to step 6.	Replace the control valve body. <Ref. to 5AT-55, 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 losing 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 check that there is no faulty.	Is DTC displayed?	Replace the TCM. <Ref. to 5AT-58, Transmission Control Module (TCM).>	Temporary poor contact or open circuit occurs. Recheck that the harness connector has no faulty.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Z: DTC P0771 SHIFT SOLENOID “E” PERFORMANCE OR STUCK OFF

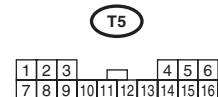
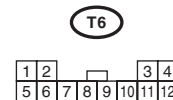
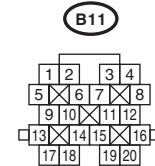
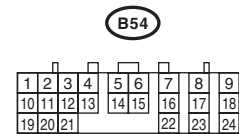
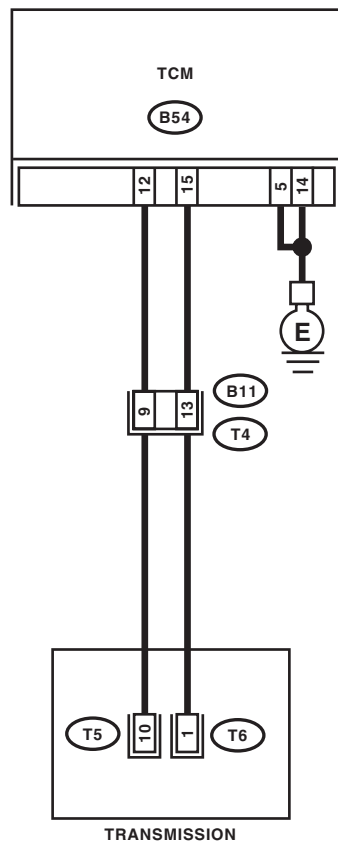
DTC DETECTING CONDITION:

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:



AT-02939

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION. 1) Turn the ignition switch to OFF. 2) Disconnect the 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. 12 — Chassis ground:	Is the resistance more than 1 M Ω ?	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 6.
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 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 light 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 5.
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) Lift-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. 13 — (T6) No. 1: (T4) No. 9 — (T5) No. 10:	Is the resistance less than 1 Ω ?	Replace the control valve body. <Ref. to 5AT-55, Control Valve Body.>	Replace the transmission harness assembly.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

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) Lift-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) Check the insulation of transmission harness assembly. Connector & terminal (T4) No. 9 — Transmission ground:	Is the resistance more than 1 MΩ?	Replace the control valve body. <Ref. to 5AT-55, Control Valve Body.>	Repair the short circuit of harness between transmission connector and control valve body connector.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

AA:DTC P0773 SHIFT SOLENOID “E” ELECTRICAL

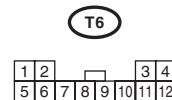
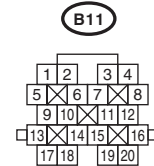
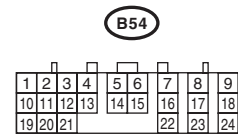
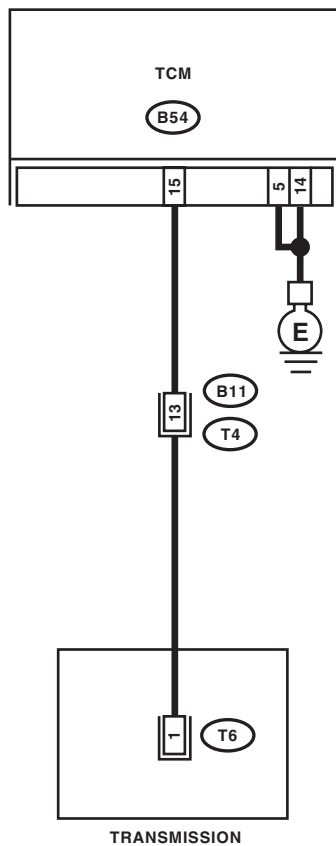
DTC DETECTING CONDITION:

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:



AT-02991

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK DTC OF TCM.	Is DTC (P0802) of the PVIGN relay detected?	Perform the diagnosis according to DTC.	Go to step 2.
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 (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 3.	Repair the open circuit of harness between TCM connector and transmission connector.
3 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 M Ω ?	Go to step 4.	Repair the short circuit of harness between TCM connector and transmission connector.
4 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) Lift-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. 13 — (T6) No. 1:	Is the resistance less than 1 Ω ?	Go to step 5.	Repair the open circuit of harness between transmission connector and control valve body connector.
5 CHECK HARNESS CONNECTOR BETWEEN TRANSMISSION AND CONTROL VALVE BODY. Measure the resistance between chassis ground and control valve body connector. Connector & terminal (T6) No. 1 — Chassis ground:	Is the resistance more than 1 M Ω ?	Go to step 6.	Repair the short circuit of harness between control valve body connector and transmission ground.
6 CHECK LOW COAST BRAKE SOLENOID. Measure the resistance of harness connector between control valve body connector and transmission ground. Connector & terminal (T6) No. 1 — Transmission ground:	Is the resistance between 5 — 17 Ω ?	Go to step 7.	Replace the control valve body. <Ref. to 5AT-55, Control Valve Body.>
7 CHECK POOR CONTACT. Check that there are no poor contact in TCM connector, transmission connector and control valve body connector.	Is there any loosening terminal, entering foreign matter, damaging connector body?	Repair the poor contact.	Go to step 8.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step		Check	Yes	No
8	CHECK AFTER REPAIR. 1) Perform the Clear Memory Mode. 2) Drive for a while, read the DTC, and check that there is no faulty.	Is DTC displayed?	Replace the TCM. <Ref. to 5AT-58, Transmission Control Module (TCM).>	Perform the P0882 diagnosis. <Ref. to 5AT(diag)-90, DTC P0882 TCM POWER INPUT SIGNAL LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

AB:DTC P0801 REVERSE INHIBIT CONTROL CIRCUIT

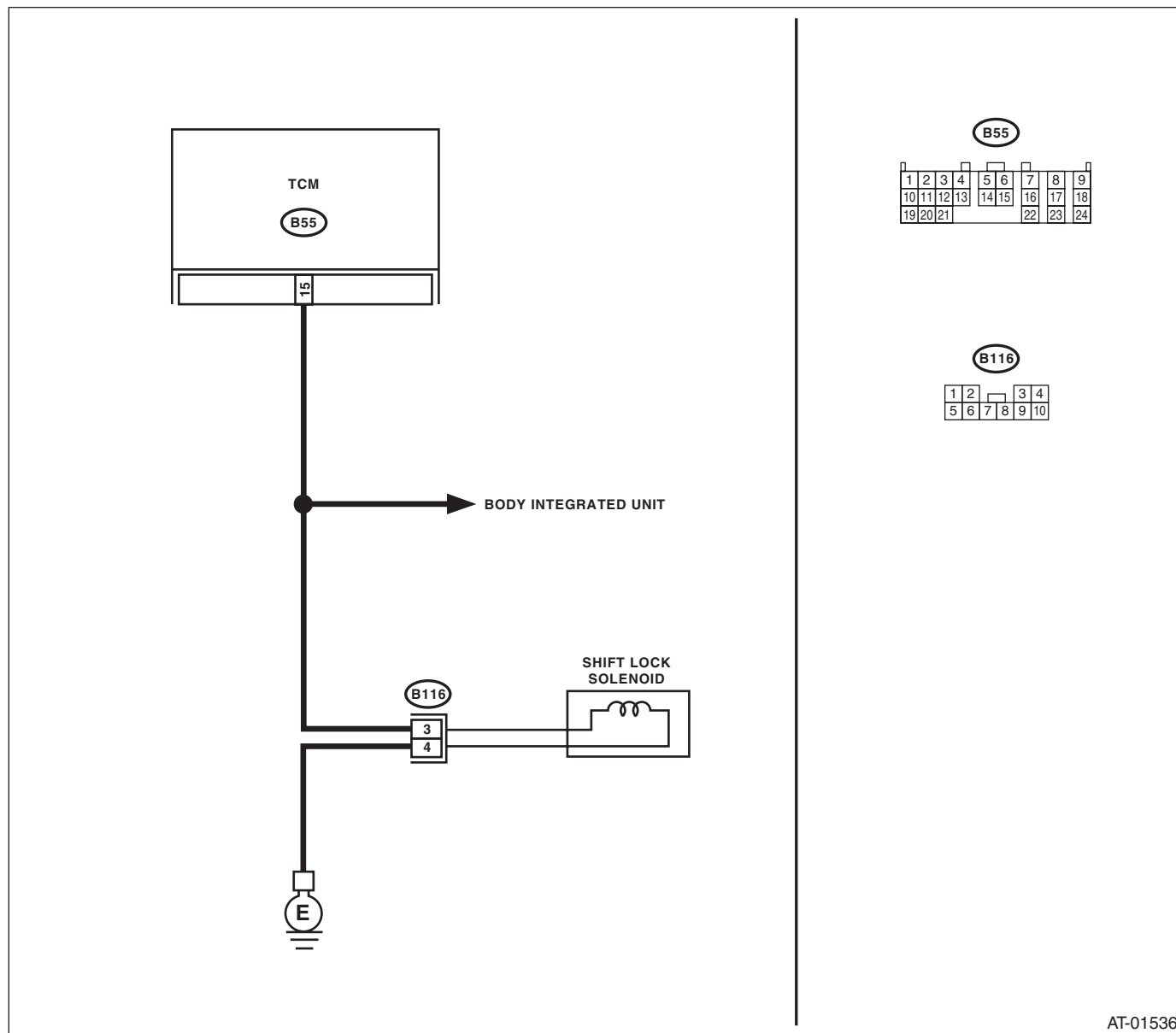
DTC DETECTING CONDITION:

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:



AT-01536

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 short circuit of harness between fuse M/B (No. 12) and TCM.	Go to step 2.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step	Check	Yes	No
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 10.5 V or more?	Go to step 3.	Replace the TCM. <Ref. to 5AT-58, 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 M Ω ?	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 between 7 — 21 Ω ?	Go to step 7.	Replace the shift lock solenoid.
7 CHECK OUTPUT SIGNAL OF TCM. 1) Lift-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 VDC memory clear procedure of on-board diagnostics system. <Ref. to VDC(diag)-17, CLEAR MEMORY MODE, OPERATION, Subaru Select Monitor.> 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 light 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-58, Transmission Control Module (TCM).>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

AC:DTC P0817 STARTER DISABLE CIRCUIT

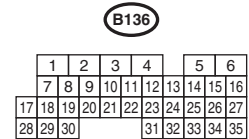
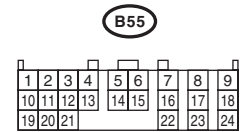
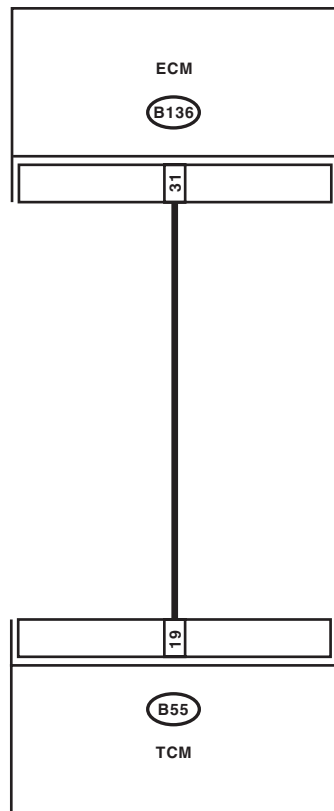
DTC DETECTING CONDITION:

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:



AT-03288

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

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 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 (No. 32). 1) Turn the ignition switch to OFF. 2) Remove the fuse.	Is the fuse (No. 32) blown out?	Replace the fuse (No. 32). If the replaced fuse (No. 32) blows out easily, repair the short circuit of harness between fuse (No. 32) 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 connector and transmission connector. Connector & terminal (B55) No. 19 — (B136) No. 31:	Is the resistance less than 1 Ω ?	Go to step 5.	Repair the open circuit of harness between TCM and transmission connector, or poor contact of 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 M Ω ?	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 less than 1 V?	Go to step 7.	Replace the TCM. <Ref. to 5AT-58, 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 10 V or more?	Go to step 8.	Replace the TCM. <Ref. to 5AT-58, 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 switch of ECM.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

AD:DTC P0882 TCM POWER INPUT SIGNAL LOW

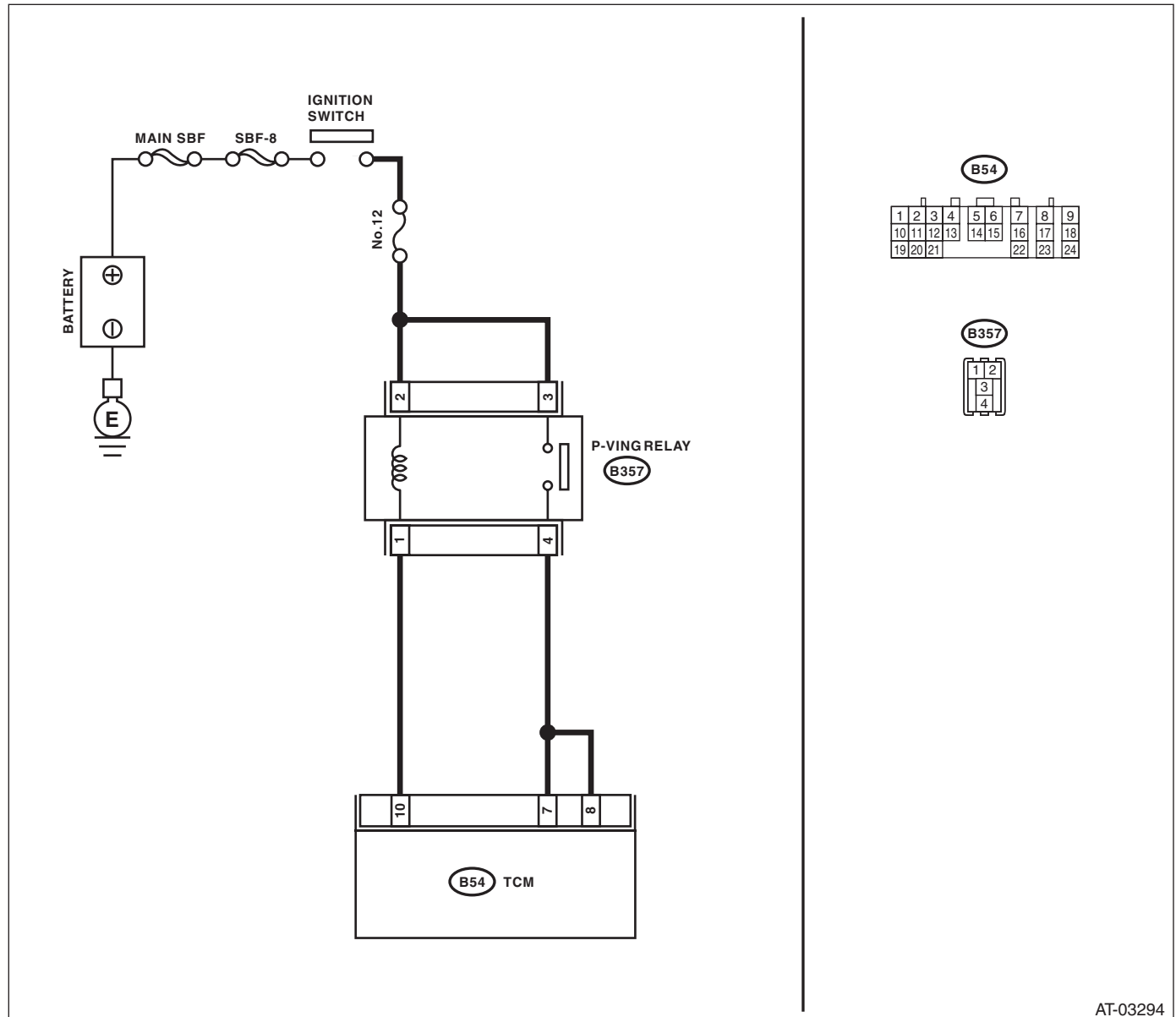
DTC DETECTING CONDITION:

Malfunction of PVIGN power supply relay or open, short circuit of PVIGN power supply circuit.

TROUBLE SYMPTOM:

Gear is not changed.

WIRING DIAGRAM:



AT-03294

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

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 <i>(B357) No. 2 (+) — Chassis ground (-):</i> <i>(B357) No. 3 (+) — Chassis ground (-):</i>	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 <i>(B54) No. 10 — (B357) No. 1:</i> <i>(B54) No. 7 — (B357) No. 4:</i> <i>(B54) No. 8 — (B357) No. 4:</i>	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 <i>(B54) No. 7 (+) — Chassis ground (-):</i> <i>(B54) No. 8 (+) — Chassis ground (-):</i>	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 <i>(B55) No. 11 (+) — Chassis ground (-):</i>	Is the voltage less than 1.5 V?	Replace the PVIGN relay.	Replace the TCM. <Ref. to 5AT-58, Transmission Control Module (TCM).>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

AE:DTC P0957 BACKUP LIGHT RELAY CIRCUIT LOW

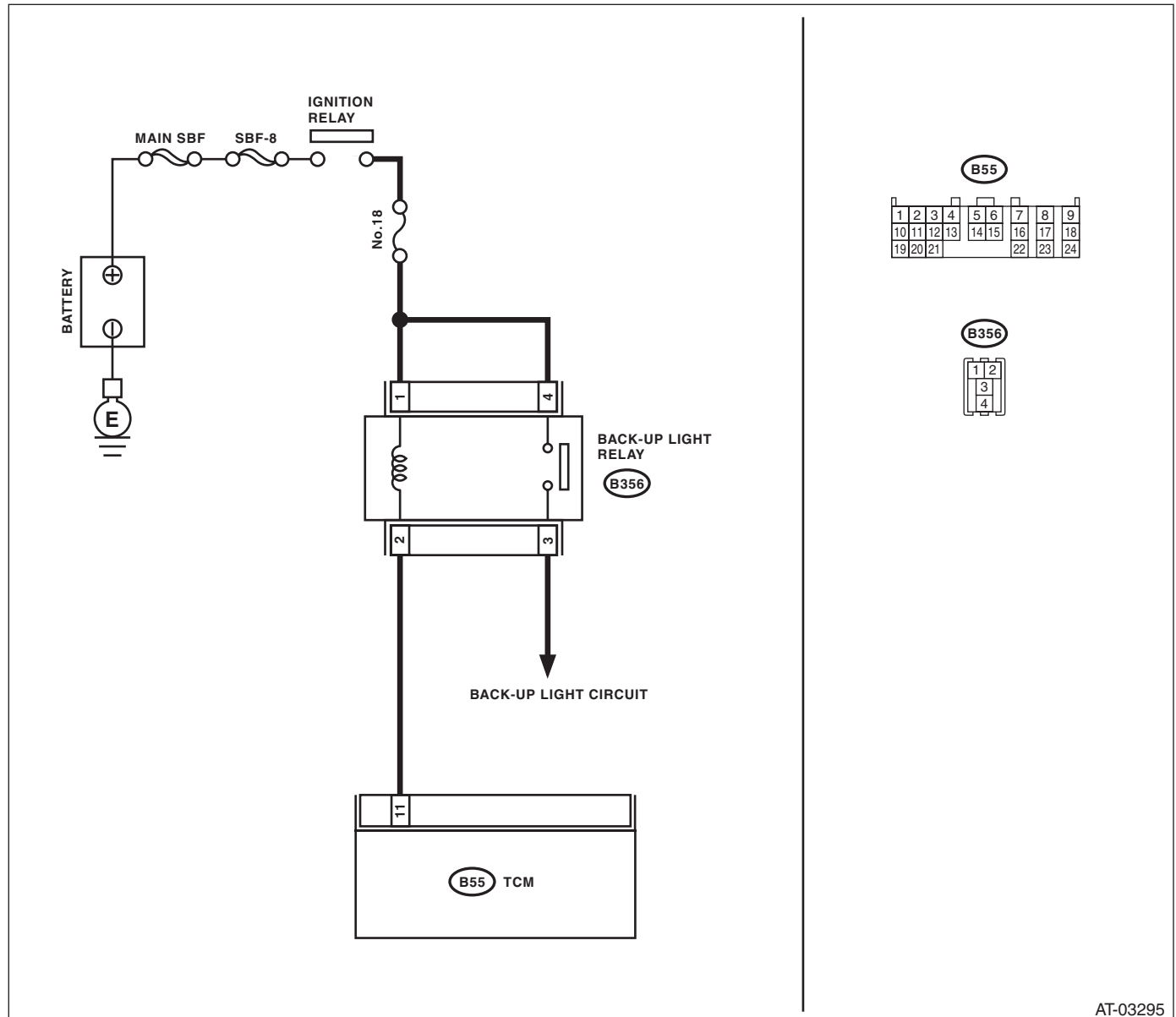
DTC DETECTING CONDITION:

Short circuit of back-up light relay output circuit

TROUBLE SYMPTOM:

Back-up light does not illuminate in "R" range.

WIRING DIAGRAM:



AT-03295

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

	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 connector 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, or poor contact of 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 M Ω ?	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) Move the select lever to "P" range. 3) Measure the voltage between TCM connector and chassis ground. Connector & terminal (B55) No. 11 (+) — Chassis ground (-):	Is the voltage 10 V or more?	Go to step 5.	Replace the TCM. <Ref. to 5AT-58, Transmission Control Module (TCM).>
5	CHECK TCM OUTPUT SIGNAL. 1) Set the select lever to "R" range. 2) Is the voltage less than 1 V? 3) Measure the voltage between TCM connector and chassis ground. Connector & terminal (B55) No. 11 (+) — Chassis ground (-):	Is the voltage 1.0 — 2.0 V?	Go to step 6.	Replace the TCM. <Ref. to 5AT-58, 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.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

AF:DTC P0958 BACKUP LIGHT RELAY CIRCUIT HIGH

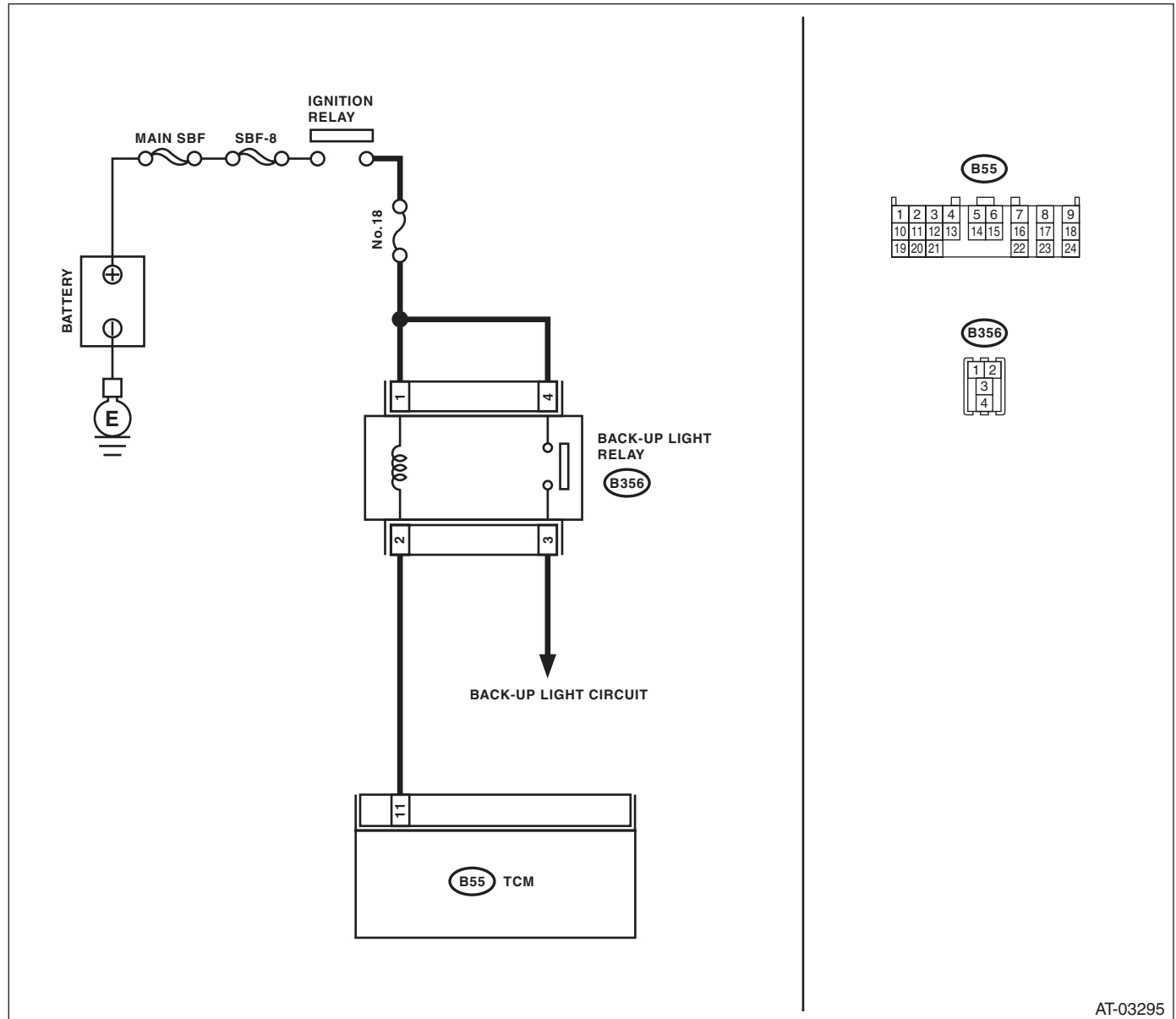
DTC DETECTING CONDITION:

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:



AT-03295

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

	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 connector 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, or poor contact of 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 M Ω ?	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) Move the select lever to "P" range. 3) Measure the voltage between TCM connector and chassis ground. Connector & terminal (B55) No. 11 (+) — Chassis ground (-):	Is the voltage 10 V or more?	Go to step 5.	Replace the TCM. <Ref. to 5AT-58, Transmission Control Module (TCM).>
5	CHECK TCM OUTPUT SIGNAL. 1) Set the select lever to "R" range. 2) Measure the voltage between TCM connector and chassis ground. Connector & terminal (B55) No. 11 (+) — Chassis ground (-):	Is the voltage 1.0 — 2.0 V or less?	Go to step 6.	Replace the TCM. <Ref. to 5AT-58, 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.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

AG:DTC P1601 TCM DATA COMMUNICATION FAILURE

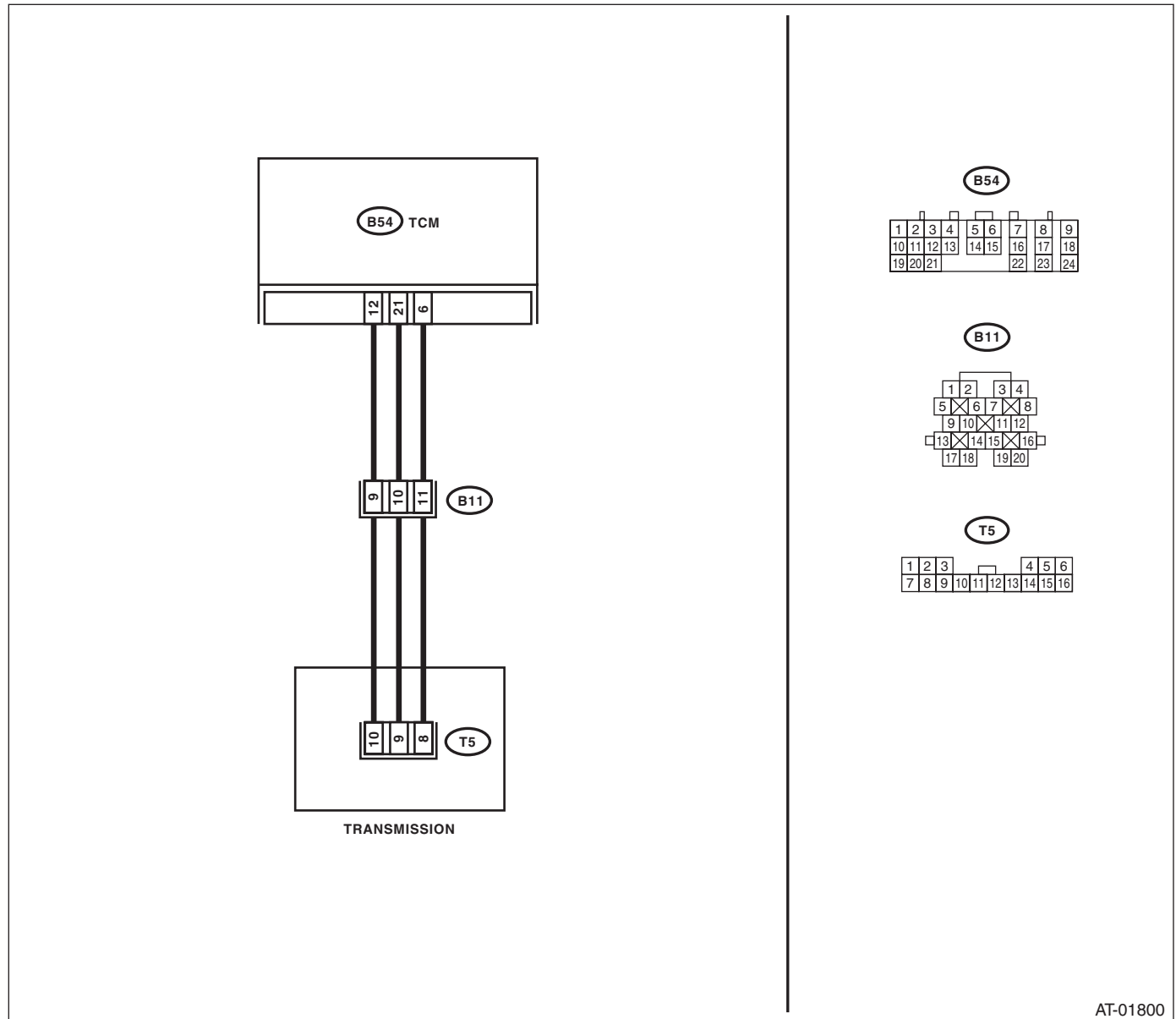
DTC DETECTING CONDITION:

Communication does not complete between control valve memory box.

TROUBLE SYMPTOM:

Shifting quality malfunction

WIRING DIAGRAM:



AT-01800

Step	Check	Yes	No
1	CHECK IMPROPER CONNECTION OF TRANSMISSION CONNECTOR. Check loose connection on TCM connector (B54).	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.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

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 connector 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, or poor contact of 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 M Ω ?	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 — (T5) No. 10: (B11) No. 10 — (T5) No. 9: (B11) No. 11 — (T5) No. 8:	Is the resistance less than 1 Ω ?	Go to step 7.	Repair the open circuit of harness between transmission connector and control valve body 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 M Ω ?	Go to step 8.	Repair the short circuit of harness between transmission connector and control valve body 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-36, Automatic Transmission Assembly.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

AH:DTC P1706 AT VEHICLE SPEED SENSOR CIRCUIT MALFUNCTION (REAR WHEEL)

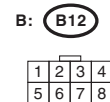
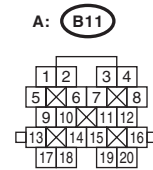
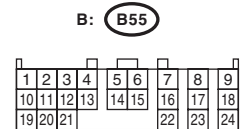
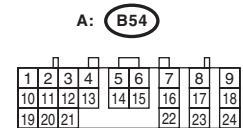
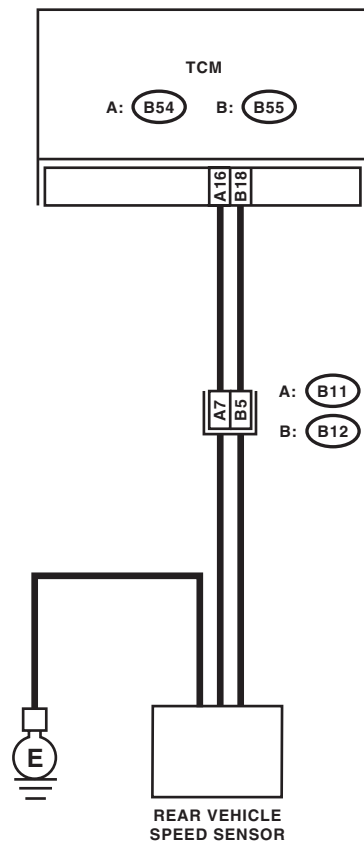
DTC DETECTING CONDITION:

Input signal circuit of TCM is open or shorted.

TROUBLE SYMPTOM:

- Shifting quality malfunction
- Tight corner braking phenomenon is occurred.

WIRING DIAGRAM:



AT-03298

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from TCM and transmission. 3) Measure the resistance of harness between TCM connector 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 M Ω ?	Go to step 3.	Repair the short circuit of harness between TCM and chassis ground.
3 CHECK TCM POWER SUPPLY OUTPUT. 1) Connect connector to the 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. 1) Lift-up the vehicle and rotate the propeller shaft slowly by hand. 2) Measure the voltage between the TCM connector terminals while rotating. Connector & terminal (B55) No. 18 (+) — (B54) No. 19 (-):	Does the voltage repeat indicating 0 V $\leftrightarrow$ 4 — 6 V while the propeller shaft is rotating?	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)-11, ELECTRICAL SPECIFICATION, Transmission Control Module (TCM) I/O Signal.>	Is TCM I/O signal OK?	Replace the TCM. <Ref. to 5AT-58, 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 if the harness is damaged. <Ref. to 5AT-36, Automatic Transmission Assembly.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step	Check	Yes	No
7 CHECK INPUT SIGNAL FOR TCM USING SUBARU SELECT MONITOR. 1) Connect all the connectors. 2) Lift-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)-15, 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 VDC memory clear procedure of on-board diagnostics system. <Ref. to VDC(diag)-17, CLEAR MEMORY MODE, OPERATION, Subaru Select Monitor.>	Does the value of the front wheel speed depending on the acceleration and deceleration of the vehicle?	Even if the SPORT indicator light 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.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

AI: DTC P1707 AT AWD SOLENOID VALVE CIRCUIT MALFUNCTION

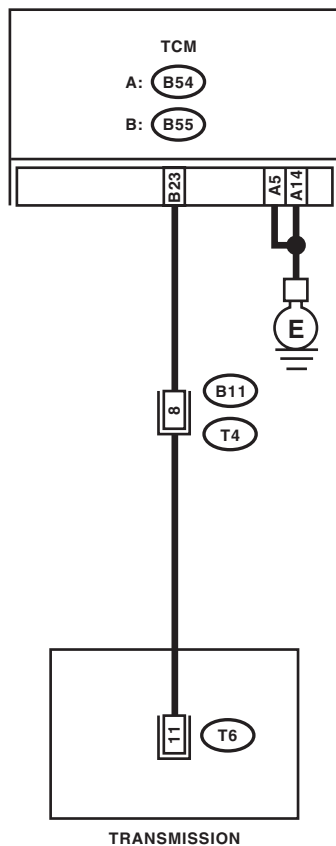
DTC DETECTING CONDITION:

Output signal circuit of transfer solenoid is open or shorted.

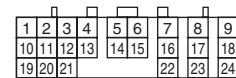
TROUBLE SYMPTOM:

- Tight corner braking phenomenon is occurred.
- Drivability getting worse.

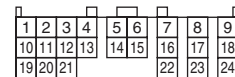
WIRING DIAGRAM:



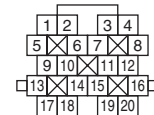
A: B54



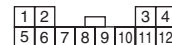
B: B55



B11



T6



AT-02083

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION. 1) Turn the ignition switch to OFF. 2) Disconnect the 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 M Ω ?	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) Lift-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. 8 — (T6) No. 11:	Is the resistance less than 1 Ω ?	Go to step 4.	Repair the open circuit of harness between transmission connector and control valve body connector.
4 CHECK HARNESS CONNECTOR BETWEEN TRANSMISSION AND CONTROL VALVE BODY. Measure the resistance between transmission ground and control valve body connector. Connector & terminal (T6) No. 11 — Transmission ground:	Is the resistance more than 1 M Ω ?	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 (T6) No. 11 — Transmission ground:	Is the resistance between 3 — 9 Ω ?	Go to step 6.	Replace the control valve body. <Ref. to 5AT-55, 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 check that there is no faulty.	Is DTC displayed?	Replace the TCM. <Ref. to 5AT-58, Transmission Control Module (TCM).>	Temporary poor contact or open circuit occurs. Recheck that the harness connector has no faulty.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

AJ:DTC P1710 TORQUE CONVERTER TURBINE 2 SPEED SIGNAL CIRCUIT 2 MALFUNCTION

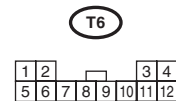
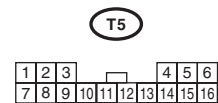
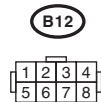
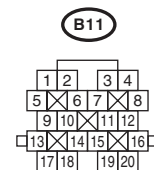
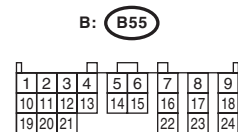
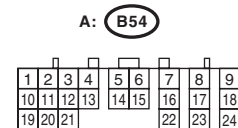
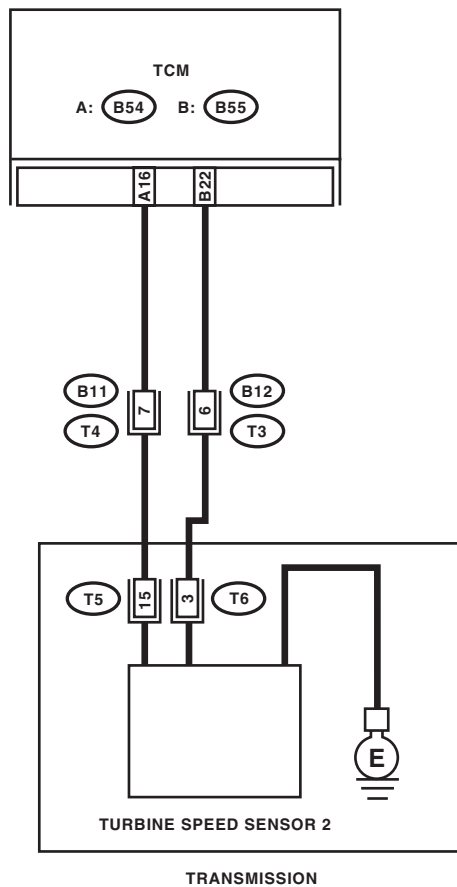
DTC DETECTING CONDITION:

Input signal circuit of TCM is open or shorted.

TROUBLE SYMPTOM:

- Excessive shift shock
- Does not shift to 5th

WIRING DIAGRAM:



AT-02997

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from TCM and transmission. 3) Measure the resistance of harness between TCM connector 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 M Ω ?	Go to step 3.	Repair the short circuit of harness between TCM and transmission connector.
3 CHECK TCM POWER SUPPLY OUTPUT. 1) Connect connector to the 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 (+) — (B54) No. 19 (-):	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)-11, ELECTRICAL SPECIFICATION, Transmission Control Module (TCM) I/O Signal.>	Is I/O signal OK?	Replace the TCM. <Ref. to 5AT-58, 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) Lift-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 turbine speed 2 using Subaru Select Monitor. <Ref. to 5AT(diag)-15, 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 VDC memory clear procedure of on-board diagnostics system. <Ref. to VDC(diag)-17, CLEAR MEMORY MODE, OPERATION, Subaru Select Monitor.>	Does the value of the turbine speed sensor 2 change depending on the acceleration, deceleration and shifting gear of the vehicle?	Even if the SPORT indicator light 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 of turbine speed sensor 2 and transmission connector.	Go to step 7.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

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) Lift-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 connector from control valve body connector. 7) Measure the resistance between transmission connector and control valve body connector. Connector & terminal (T3) No. 6 — (T6) No. 3: (T4) No. 7 — (T5) No. 15:	Is the resistance less than 1 Ω ?	Go to step 8.	Repair the open circuit of harness between transmission connector and control valve body connector.
8 CHECK HARNESS CONNECTOR BETWEEN TRANSMISSION AND CONTROL VALVE BODY. Measure the resistance between transmission ground and control valve body connector. Connector & terminal (T6) No. 3 — Transmission ground: (T5) No. 15 — Transmission ground:	Is the resistance more than 1 M Ω ?	Replace the control valve body. <Ref. to 5AT-55, Control Valve Body.>	Repair the short circuit of harness between transmission connector and transmission ground.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

AK:DTC P1716 ATF TEMP. SENSOR 2 CIRCUIT LOW

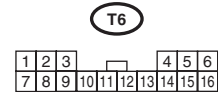
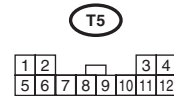
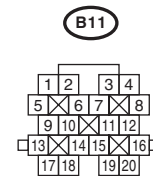
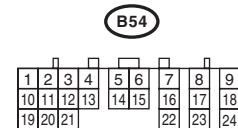
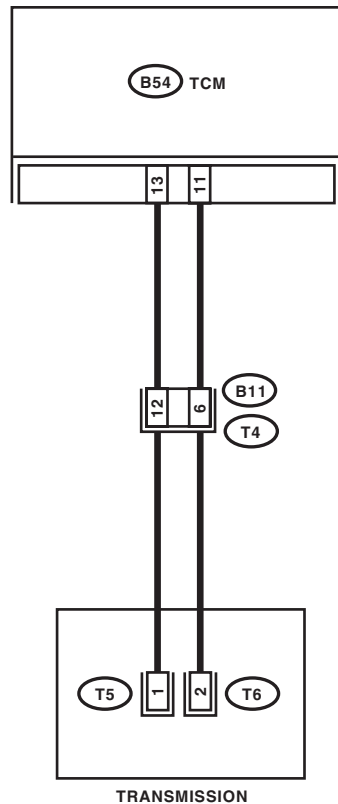
DTC DETECTING CONDITION:

Input signal circuit to ATF temperature sensor 2 is open or shorted.

TROUBLE SYMPTOM:

Excessive shift shock

WIRING DIAGRAM:



AT-01628

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION. 1) Turn the ignition switch to OFF. 2) Disconnect the 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 reaches to 80°C (176°F). NOTE: If the ambient temperature falls 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 between 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 light blinks, the system is in normal condition. A temporary poor contact of connector or harness may be the cause. Repair the poor contacts of harnesses of ATF temperature sensor and transmission connector.	Go to step 6.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

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) Lift-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 connector from control valve body connector. 7) Measure the resistance between transmission connector and control valve body connector. Connector & terminal (T4) No. 12 — (T5) No. 1: (T4) No. 6 — (T6) No. 2:	Is the resistance less than 1 Ω ?	Replace the control valve body. <Ref. to 5AT-55, Control Valve Body.>	Repair the open circuit of harness between transmission connector and control valve body 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-58, Transmission Control Module (TCM).>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

AL:DTC P1717 ATF TEMP. SENSOR 2 CIRCUIT HIGH

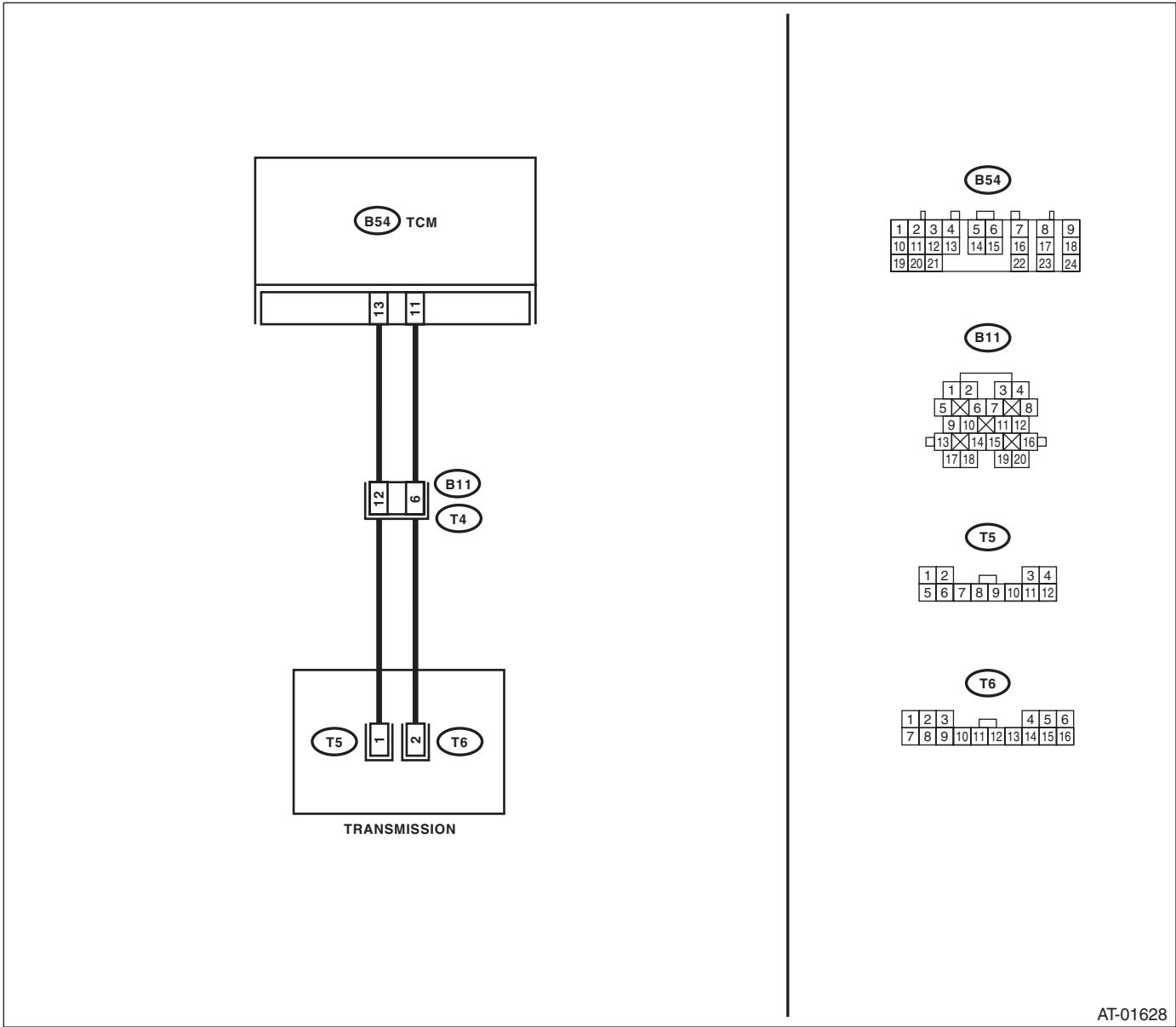
DTC DETECTING CONDITION:

Input signal circuit to ATF temperature sensor 2 is open or shorted.

TROUBLE SYMPTOM:

Excessive shift shock

WIRING DIAGRAM:



AT-01628

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from TCM and transmission. 3) Measure the resistance of harness between TCM connector and chassis ground. Connector & terminal (B54) No. 13 — (B11) No. 12: (B54) No. 11 — (B11) No. 6:	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 reaches to 80°C (176°F). NOTE: If the ambient temperature falls 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 between 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 light blinks, the system is in normal condition. A temporary poor contact of connector or harness may be the cause. Repair the poor contacts of harnesses of ATF temperature sensor and transmission connector.	Go to step 6.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

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) Lift-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 connector from control valve body connector. 7) Measure the resistance between transmission ground and control valve body connector. Connector & terminal (T5) No. 1 — Chassis ground: (T6) No. 2 — Chassis ground:	Is the resistance more than 1 MΩ?	Replace the control valve body. <Ref. to 5AT-55, Control Valve Body.>	Repair the short circuit of harness between transmission connector and control valve body 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-58, Transmission Control Module (TCM).>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

AM:DTC P1718 AT CAN COMMUNICATION CIRCUIT

NOTE:

DTC P1718 AT CAN communication circuit, refer to “LAN System”. <Ref. to LAN(diag)-12, READ DIAGNOSTIC TROUBLE CODE (DTC), OPERATION, Subaru Select Monitor.>

AN:DTC P1761 LATERAL ACCELERATION SENSOR CIRCUIT LOW

DTC DETECTING CONDITION:

CAN communication failure.

Step	Check	Yes	No
1 CHECK DTC OF TCM.	Is DTC regarding AT CAN communication detected?	Perform the diagnosis according to DTC.	Go to step 2.
2 CHECK DTC OF ABS.	Is DTC of ABS detected?	Perform the diagnosis according to DTC concerning ABS.	Temporary poor contact occurs. Recheck for defective parts in harness and connectors.

AO:DTC P1798 GEAR 1 ENGINE BRAKE

NOTE:

Refer to DTC P0771 for diagnostic procedure. <Ref. to 5AT(diag)-80, DTC P0771 SHIFT SOLENOID “E” PERFORMANCE OR STUCK OFF, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

AP: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 or 4th gear depending on the vehicle condition at the time of diagnosis.

Step	Check	Yes	No
1 CHECK DTC OF TCM.	Is any DTC of the followings detected? P0751, P0753, P0756, P0758, P0761, P0763, P0766, P0768, P0771, P0773, P1798	Perform the diagnosis according to DTC.	Go to step 2.
2 DRIVING CHECK. 1) Turn the ignition switch to OFF. 2) After starting the engine again, perform a drive check with the following conditions. (1) Keep the speed at 20 km/h with SPORT shift mode in 1st. (2) Read the I/C oil pressure switch data of TCM while driving using Subaru Select Monitor.	Is OFF displayed?	Go to step 3.	Perform the diagnosis according to DTC P0756.
3 DRIVING CHECK. 1) Turn the ignition switch to OFF. 2) After starting the engine again, perform a drive check based on the Inspection Mode with the following conditions. <Ref. to 5AT(diag)-19, PROCEDURE, Inspection Mode.> (1) Keep the speed at 20 km/h with manual mode in 1st. (2) Read the D/C oil pressure switch data while driving using Subaru Select Monitor.	Is OFF displayed?	Go to step 4.	Perform the diagnosis according to DTC P0766.
4 DRIVING CHECK. 1) Turn the ignition switch to OFF. 2) After starting the engine again, perform a drive check with the following conditions. (1) Drive the vehicle at the same speed with manual mode in 3rd, 4th and 5th. (2) Read the LC/B oil pressure switch data while driving using Subaru Select Monitor.	Is OFF displayed?	Go to step 5.	Perform the diagnosis according to DTC P0771.
5 DRIVING CHECK. 1) Turn the ignition switch to OFF. 2) After restarting the engine, perform a drive check based on the Inspection Mode. <Ref. to 5AT(diag)-19, PROCEDURE, Inspection Mode.>	Is DTC displayed?	Replace the control valve body.	Temporary poor contact occurs. Check that the harness connector is not faulty.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

AQ:DTC P1817 SPORT MODE SWITCH CIRCUIT (MANUAL SWITCH)

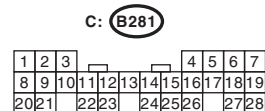
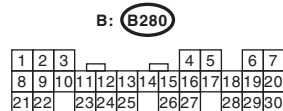
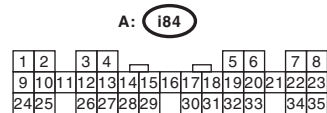
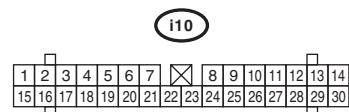
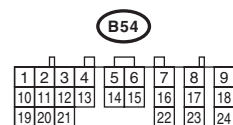
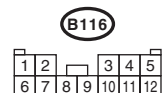
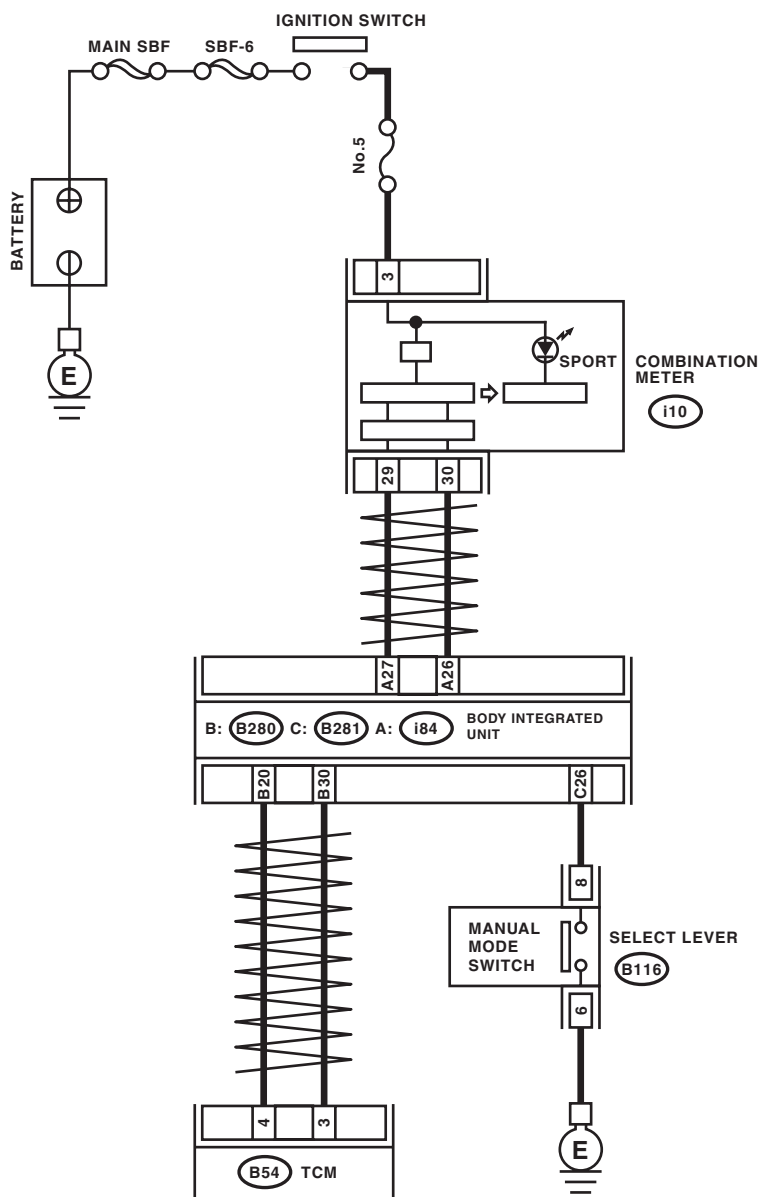
DTC DETECTING CONDITION:

Input signal circuit of 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:



Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK BODY INTEGRATED UNIT. 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 unit using Subaru Select Monitor. <Ref. to LAN(diag)-12, OPERATION, Subaru Select Monitor.>	Is DTC displayed?	Perform the diagnosis according to DTC.	Go to step 2.
2 CHECK BODY INTEGRATED UNIT INPUT SIGNAL. 1) Shift the select lever to "P" range. 2) Read the TIP mode SW data of body integrated unit using Subaru Select Monitor. <Ref. to LAN(diag)-12, OPERATION, Subaru Select Monitor.>	Is OFF displayed?	Go to step 3.	Go to step 7.
3 CHECK BODY INTEGRATED UNIT INPUT SIGNAL. 1) Shift the select lever from "P" to "D" range. 2) Read the TIP mode SW data of body integrated unit using Subaru Select Monitor. <Ref. to LAN(diag)-12, OPERATION, Subaru Select Monitor.>	Is the indication on each range OFF?	Go to step 4.	Replace the select lever assembly. <Ref. to CS-19, Select Lever.>
4 CHECK BODY INTEGRATED UNIT 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 unit using Subaru Select Monitor. <Ref. to LAN(diag)-12, OPERATION, Subaru Select Monitor.>	Is OFF displayed?	Go to step 5.	Replace the select lever assembly. <Ref. to CS-19, 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 INPUT SIGNAL FROM TCM. 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)-15, OPERATION, Subaru Select Monitor.>	Is the indication on each range OFF?	Even if the SPORT indicator light 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-58, Transmission Control Module (TCM).>
7 CHECK HARNESS BETWEEN BODY INTEGRATED UNIT AND MANUAL MODE SWITCH. 1) Turn the ignition switch to OFF. 2) Disconnect harness connector from body integrated unit and select lever. 3) Measure the harness resistance between the body integrated unit and chassis ground. Connector & terminal (B281) No. 27 — Chassis ground:	Is the resistance more than 1 MΩ?	Go to step 8.	Repair the short circuit of harness between body integrated unit and manual mode.
8 CHECK MANUAL MODE SWITCH. 1) Shift the select lever to "P" range. 2) Measure the resistance between harness connector terminals of manual mode switch. Terminals (B116) No. 7 — No. 8	Is the resistance more than 1 MΩ?	Check the body integrated unit.	Replace the select lever assembly. <Ref. to CS-19, Select Lever.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

AR: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)-60, DTC P0751 SHIFT SOLENOID "A" PERFORMANCE OR STUCK OFF, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

AS:DTC P1842 TRANSMISSION FLUID PRESSURE SENSOR/SWITCH C CIRCUIT

DTC DETECTING CONDITION:

Input clutch oil pressure switch is malfunction.

TROUBLE SYMPTOM:

Excessive shift shock

NOTE:

Refer to DTC P0756 for diagnostic procedure. <Ref. to 5AT(diag)-65, DTC P0756 SHIFT SOLENOID "B" PERFORMANCE OR STUCK OFF, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

AT: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)-75, DTC P0766 SHIFT SOLENOID "D" PERFORMANCE OR STUCK OFF, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

AU: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)-70, DTC P0761 SHIFT SOLENOID "C" PERFORMANCE OR STUCK OFF, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

Diagnostic Procedure without Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

15. Diagnostic Procedure without Diagnostic Trouble Code (DTC)

A: CHECK SPORT SHIFT SWITCH

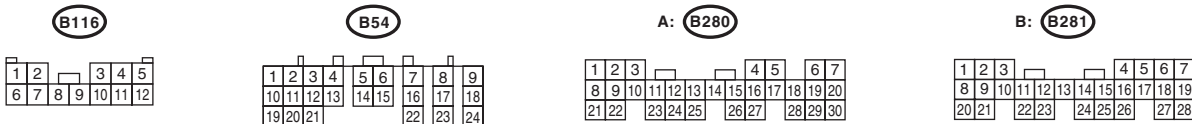
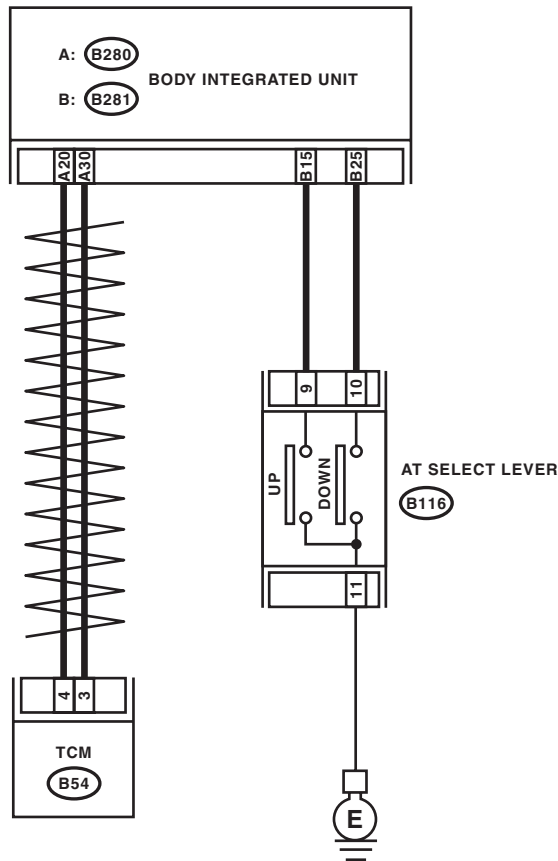
DIAGNOSIS:

Input signal circuit of the UP/DOWN switch is open or shorted.

TROUBLE SYMPTOM:

Does not shift on manual mode.

WIRING DIAGRAM:



AT-03289

Diagnostic Procedure without Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK UP/DOWN SWITCH. 1) Move 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 5AT(diag)-16, READ CURRENT DATA, OPERATION, Subaru Select Monitor.>	Is ON displayed?	Go to step 2.	Go to step 3.
2 CHECK UP/DOWN SWITCH. 1) Move the select lever to manual mode. 2) Shift and hold the select lever to down side. 3) Read the "Down Switch" data of TCM using Subaru Select Monitor. <Ref. to 5AT(diag)-16, READ CURRENT DATA, OPERATION, Subaru Select Monitor.>	Is ON displayed?	Go to the procedure for "CHECK RANGE POSITION/GEAR POSITION INDICATOR LIGHT". <Ref. to 5AT(diag)-121, CHECK SPORT SHIFT INDICATOR LIGHT, Diagnostic Procedure without Diagnostic Trouble Code (DTC).>	Go to step 12.
3 CHECK BODY INTEGRATED UNIT. 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 unit using Subaru Select Monitor.	Is ON displayed?	Go to step 4.	Go to step 5.
4 CHECK BODY INTEGRATED UNIT. Check DTC of body integrated unit.	Is DTC of CAN communication displayed?	Perform the diagnosis according to DTC.	Check the TCM.
5 CHECK UP/DOWN SWITCH GROUND CIRCUIT. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from the up/down switch. 3) Measure the resistance of harness between the up/down switch connector and chassis ground. Connector & terminal (B116) No. 11 — Chassis ground:	Is the resistance less than 1 Ω ?	Go to step 6.	Repair the open circuit of harness between the up/down switch connector and chassis ground.
6 CHECK UP/DOWN SWITCH. Measure the up/down switch resistance. Connector & terminal (B116) No. 10 — No. 11:	Is the resistance more than 1 M Ω ?	Go to step 7.	Replace the guide plate assembly.
7 CHECK UP/DOWN SWITCH. 1) Shift and hold the select lever to up side. 2) Measure the up/down switch resistance. Connector & terminal (B116) No. 10 — No. 11:	Is the resistance less than 1 Ω ?	Go to step 8.	Replace the guide plate assembly.
8 CHECK HARNESS CONNECTOR BETWEEN BODY INTEGRATED UNIT AND UP/DOWN SWITCH. 1) Disconnect the connector from body integrated unit. 2) Measure the resistance of the harness between body integrated unit and up/down switch connector. Connector & terminal (B116) No. 10 — (B281) No. 25: (B116) No. 9 — (B281) No. 15:	Is the resistance less than 1 Ω ?	Go to step 9.	Repair the open circuit of harness between the up/down switch connector and body integrated unit connector, or poor contact of connector.

Diagnostic Procedure without Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step	Check	Yes	No
9 CHECK INPUT SIGNAL TO BODY INTEGRATED UNIT. 1) Connect all the connectors. 2) Turn the ignition switch to ON (engine OFF). 3) Check the signal voltage for body integrated unit. Connector & terminal (B281) No. 25 (+) — Chassis ground (-):	Is the voltage 1.5 — 8 V?	Go to step 11.	Go to step 10.
10 CHECK INPUT SIGNAL TO BODY INTEGRATED UNIT. 1) Hold the select lever to the up side. 2) Check the signal voltage for body integrated unit. Connector & terminal (B281) No. 25 (+) — Chassis ground (-):	Is the voltage less than 1 V?	Go to step 20.	Replace the body integrated unit.
11 CHECK BODY INTEGRATED UNIT. 1) Turn the ignition switch to ON. 2) Shift and hold the select lever to down side. 3) Read the "TIP DOWN SW" data of body integrated unit using Subaru Select Monitor.	Is ON displayed?	Go to step 12.	Go to step 13.
12 CHECK BODY INTEGRATED UNIT. Check DTC of body integrated unit.	Is DTC of CAN communication displayed?	Perform the diagnosis according to DTC.	Check the TCM.
13 CHECK UP/DOWN SWITCH GROUND CIRCUIT 1) Turn the ignition switch to OFF. 2) Disconnect the connector from the up/down switch. 3) Measure the resistance of harness between the up/down switch connector and chassis ground. Connector & terminal (B116) No. 9 — Chassis ground:	Is the resistance less than 1 Ω ?	Go to step 14.	Repair the open circuit of harness between the up/down switch and chassis ground.
14 CHECK UP/DOWN SWITCH. Measure the up/down switch terminal resistance. Connector & terminal (B116) No. 11 — No. 9:	Is the resistance more than 1 M Ω ?	Go to step 15.	Replace the guide plate assembly.
15 CHECK UP/DOWN SWITCH. 1) Shift and hold the select lever to down side. 2) Measure the up/down switch terminal resistance. Connector & terminal (B116) No. 11 — No. 9:	Is the resistance less than 1 Ω ?	Go to step 16.	Replace the guide plate assembly.
16 CHECK HARNESS CONNECTOR BETWEEN BODY INTEGRATED UNIT AND UP/DOWN SWITCH. 1) Disconnect the connector from body integrated unit. 2) Measure the resistance of the harness between body integrated unit and up/down switch connector. Connector & terminal (B116) No. 11 — (B281) No. 15:	Is the resistance less than 1 Ω ?	Go to step 17.	Repair the open circuit of harness between the up/down switch connector and body integrated unit connector, or poor contact of connector.

Diagnostic Procedure without Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step	Check	Yes	No
17 CHECK HARNESS CONNECTOR BETWEEN BODY INTEGRATED UNIT AND UP/DOWN SWITCH. Measure the resistance of harness connector between the up/down switch and chassis ground. <i>Connector & terminal (B116) No. 9 — Chassis ground:</i>	Is the resistance more than 1 MΩ?	Go to step 18.	Repair the short circuit of the harness between the up/down switch connector and TCM connector.
18 CHECK INPUT SIGNAL TO BODY INTEGRATED UNIT. 1) Connect all the connectors. 2) Turn the ignition switch to ON (engine OFF). 3) Check the signal voltage for body integrated unit. <i>Connector & terminal (B281) No. 15 (+) — Chassis ground (-):</i>	Is the voltage 1.5 — 8 V?	Go to step 19.	Go to step 20.
19 CHECK INPUT SIGNAL TO BODY INTEGRATED UNIT. 1) Shift and hold the select lever to down side. 2) Check the signal voltage for body integrated unit. <i>Connector & terminal (B281) No. 15 (+) — Chassis ground (-):</i>	Is the voltage less than 1 V?	Go to step 20.	Replace the body integrated unit. <Ref. to SL-51, Body Integrated Unit.>
20 CHECK POOR CONTACT.	Is there poor contact in the up/down switch circuit?	Repair the poor contact.	A temporary poor contact of the up/down switch circuit connector or harness

Diagnostic Procedure without Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

B: CHECK SPORT SHIFT INDICATOR LIGHT

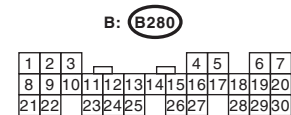
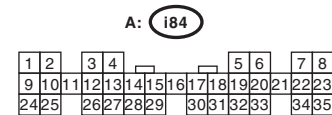
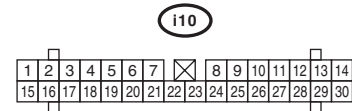
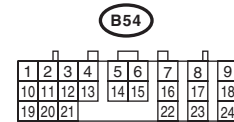
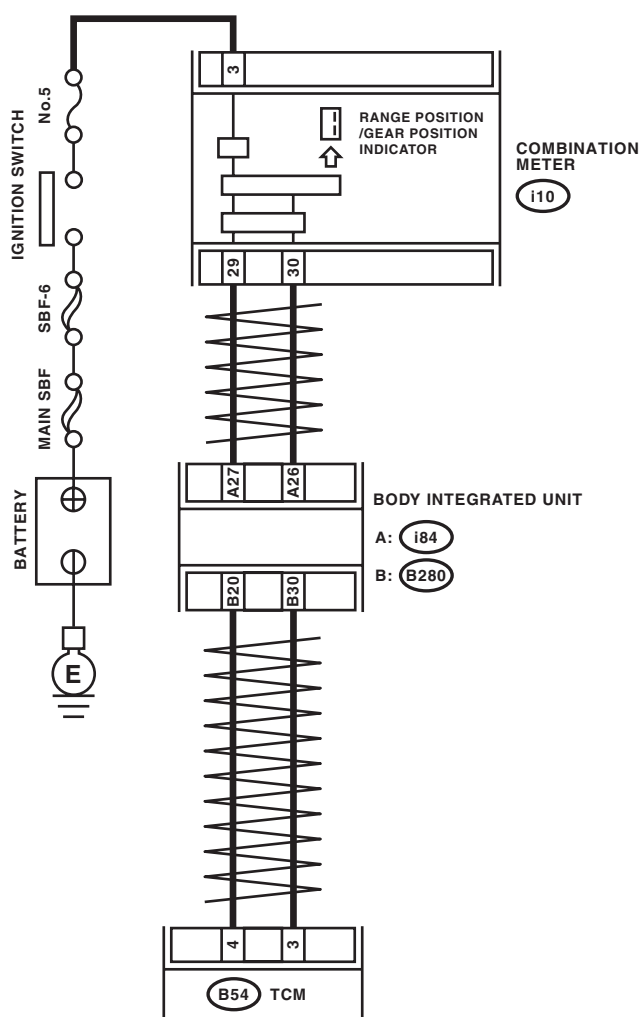
DIAGNOSIS:

Output signal circuit of the range position/gear position indicator light is open or shorted.

TROUBLE SYMPTOM:

- Range position/gear position indicator light does not illuminate or remains illuminated.
- Cannot understand range position/gear position indicator light display.

WIRING DIAGRAM:



AT-03693

Diagnostic Procedure without Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

	Step	Check	Yes	No
1	CHECK BODY INTEGRATED UNIT. Check DTC of the body integrated unit.	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) Run the Subaru Select Monitor. 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-58, 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-58, Transmission Control Module (TCM).>
5	CHECK BODY INTEGRATED UNIT. Read the data of gear position using Subaru Select Monitor.	Is SPORT shift gear position 2?	Go to step 6.	Check the body integrated unit. <Ref. to SL-51, Body Integrated Unit.>
6	CHECK COMBINATION METER.	Is the range position/gear position indicator light normal?	Refer to “General Diagnostic Table”. <Ref. to 5AT(diag)-125, General Diagnostic Table.>	Replace the combination meter assembly. <Ref. to IDI-12, Combination Meter.>

Diagnostic Procedure without Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

C: CHECK BUZZER

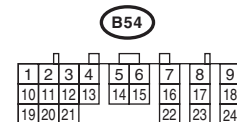
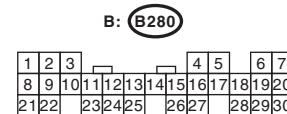
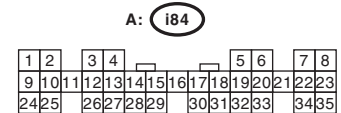
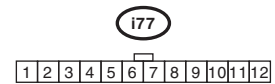
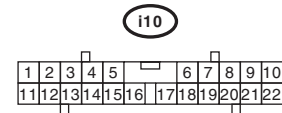
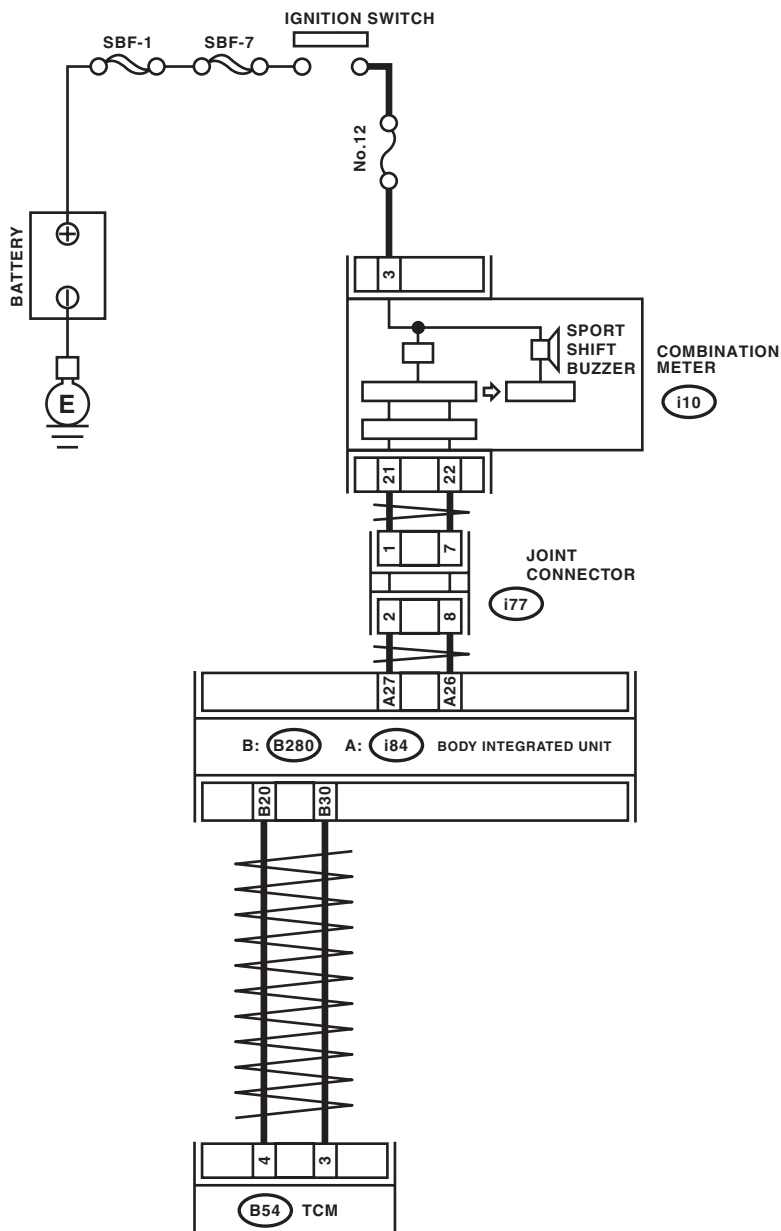
DIAGNOSIS:

Output signal circuit of buzzer is open or shorted.

TROUBLE SYMPTOM:

Buzzer remains beeping.

WIRING DIAGRAM:



AT-03694

Diagnostic Procedure without Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

	Step	Check	Yes	No
1	CHECK BODY INTEGRATED UNIT. Check DTC of the body integrated unit.	Is DTC of CAN communication displayed?	Perform the diagnosis according to DTC.	Go to step 2.
2	CHECK TCM. Check DTC of TCM.	Is DTC of CAN communication 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-58, Transmission Control Module (TCM).>	Go to step 4.
4	CHECK BODY INTEGRATED UNIT. 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) Run the Subaru Select Monitor. 5) Read the data of SPORT shift buzzer using Subaru Select Monitor.	Is the SPORT shift buzzer display "ON"?	Replace the body integrated unit. <Ref. to SL-51, Body Integrated Unit.>	Go to step 5.
5	CHECK COMBINATION METER.	Is the buzzer OK?	Refer to "General Diagnostic Table". <Ref. to 5AT(diag)-125, General Diagnostic Table.>	Replace the combination meter assembly. <Ref. to IDI-12, Combination Meter.>

General Diagnostic Table

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

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 • 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 • Turbine speed sensor 1 and turbine speed sensor 2 • 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 • Turbine speed sensor 1 and turbine speed sensor 2 • 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 • Turbine speed sensor 1 and turbine speed sensor 2 • Vehicle speed sensor 1 and vehicle speed sensor 2 • Fluid level and condition

General Diagnostic Table

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

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 • Turbine speed sensor 1 and turbine speed sensor 2 • 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 • Turbine speed sensor 1 and turbine speed sensor 2 • 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 • Turbine speed sensor 1 and turbine speed sensor 2 • 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 • Turbine speed sensor 1 and turbine speed sensor 2 • 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 • Turbine speed sensor 1 and turbine speed sensor 2 • 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

General Diagnostic Table

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

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

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

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 • Turbine speed sensor 1 and turbine speed sensor 2 • 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 • Turbine speed sensor 1 and turbine speed sensor 2 • 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

General Diagnostic Table

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

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

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

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 in “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

General Diagnostic Table

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

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 • Turbine speed sensor 1 and turbine speed sensor 2 • 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

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

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 • Turbine speed sensor 1 and turbine speed sensor 2 • Lock up solenoid valve • Line pressure
Engine stalls when shifting to "N" → "D" and "R" range.	• Fluid level and condition • Engine speed signal • Turbine speed sensor 1 and turbine speed sensor 2 • Lock up solenoid valve • Line pressure

CHASSIS SECTION

This service manual has been prepared to provide SUBARU service personnel with the necessary information and data for the correct maintenance and repair of SUBARU vehicles.

This manual includes the procedures for maintenance, disassembling, reassembling, inspection and adjustment of components and diagnostics for guidance of experienced mechanics.

Please peruse and utilize this manual fully to ensure complete repair work for satisfying our customers by keeping their vehicle in optimum condition. When replacement of parts during repair work is needed, be sure to use SUBARU genuine parts.

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

FRONT SUSPENSION**FS****REAR SUSPENSION****RS****WHEEL AND TIRE SYSTEM****WT****TIRE PRESSURE MONITORING SYSTEM
(DIAGNOSTICS)****TPM(diag)****DIFFERENTIALS****DI****TRANSFER CASE****TC****DRIVE SHAFT SYSTEM****DS****VEHICLE DYNAMICS CONTROL (VDC)****VDC****VEHICLE DYNAMICS CONTROL (VDC)
(DIAGNOSTICS)****VDC(diag)****BRAKE****BR****BRAKE VACUUM CONTROL (BVC)
(DIAGNOSTICS)****BVC(diag)****PARKING BRAKE****PB****POWER ASSISTED SYSTEM
(POWER STEERING)****PS**

FRONT SUSPENSION



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3. Front Crossmember Support Plate	15
4. Front Stabilizer	16
5. Front Ball Joint	17
6. Front Arm	18
7. Front Strut	21
8. Front Crossmember	25
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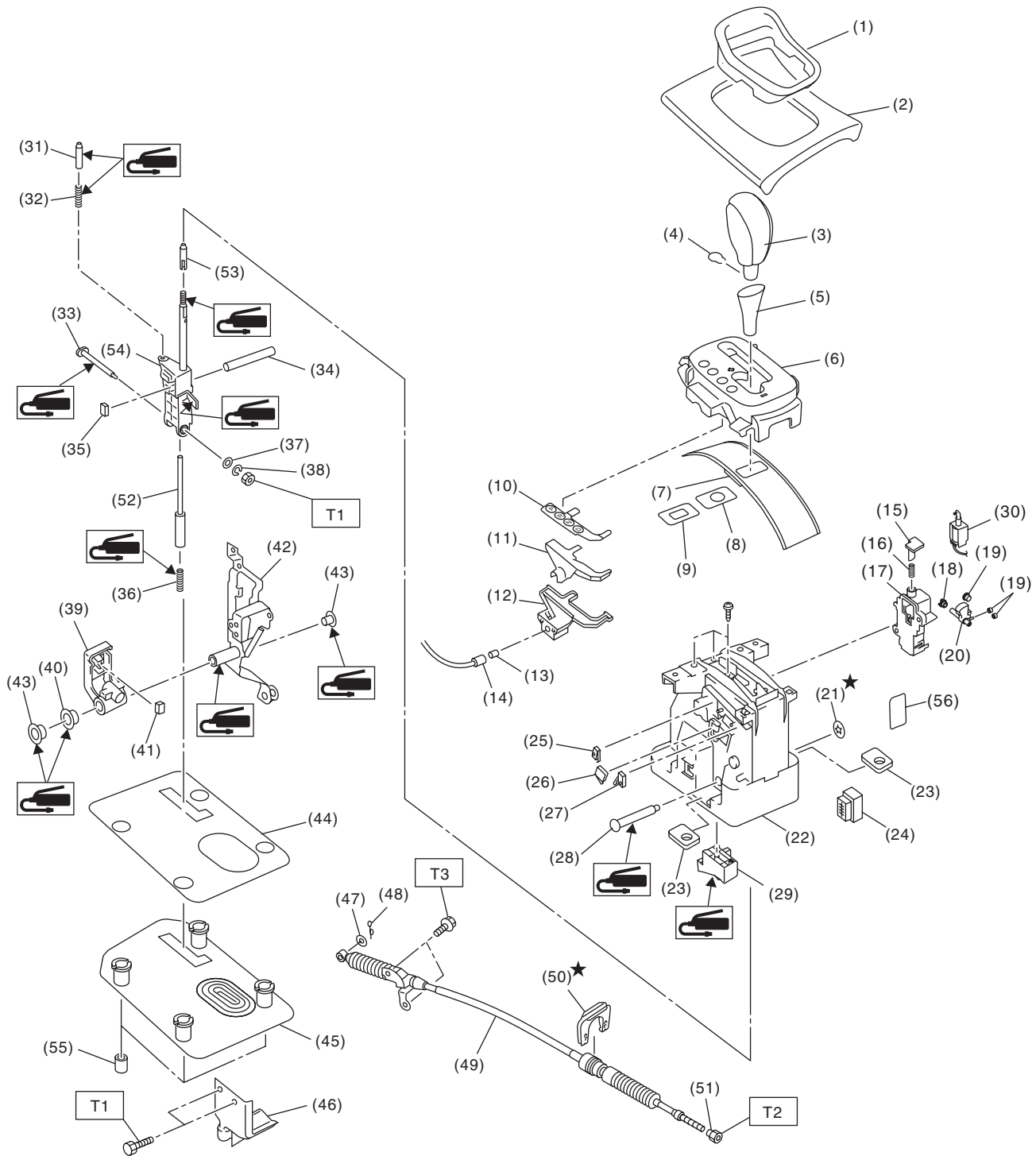
General Description

CONTROL SYSTEMS

1. General Description

A: COMPONENT

1. AT SELECT LEVER



CS-00710

General Description

CONTROL SYSTEMS

- | | | |
|-------------------------|------------------------------|-------------------------|
| (1) Ring indicator | (22) Base ASSY | (43) Bushing |
| (2) Front cover | (23) Spacer | (44) Dust cover bracket |
| (3) Grip ASSY | (24) Harness connector | (45) Dust cover |
| (4) Grip pin | (25) Shift-up switch | (46) Cable bracket |
| (5) Grip cover | (26) "P" range switch | (47) Washer |
| (6) Indicator ASSY | (27) Shift-down switch | (48) Cotter pin |
| (7) Shift blind | (28) Shaft | (49) Select cable |
| (8) Blind A | (29) Detent check block | (50) Clamp |
| (9) Blind B | (30) Shift lock solenoid | (51) Adjusting nut A |
| (10) Position plate | (31) Check sheet pole | (52) Button rod |
| (11) Plate light guide | (32) Spring | (53) Pusher |
| (12) Valve case | (33) Select shaft | (54) Selector arm ASSY |
| (13) Indicator bulb | (34) Shift position pin | (55) Spacer |
| (14) Valve harness | (35) Shift button switch | (56) Seat |
| (15) Release rod | (36) Spring | |
| (16) Spring | (37) Washer | |
| (17) Lock lever bracket | (38) Spring washer | |
| (18) Lock lever bushing | (39) Tube cross plate | |
| (19) Bushing | (40) Bushing | |
| (20) Lock lever | (41) Air flow control switch | |
| (21) Clamp | (42) Arm ASSY | |

Tightening torque:N·m (kgf-m, ft-lb)

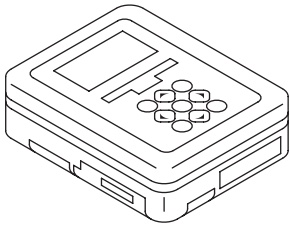
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T2: 7.5 (0.76, 5.5)

T3: 18 (1.8, 13.3)

B: PREPARATION TOOL

1. SPECIAL TOOL

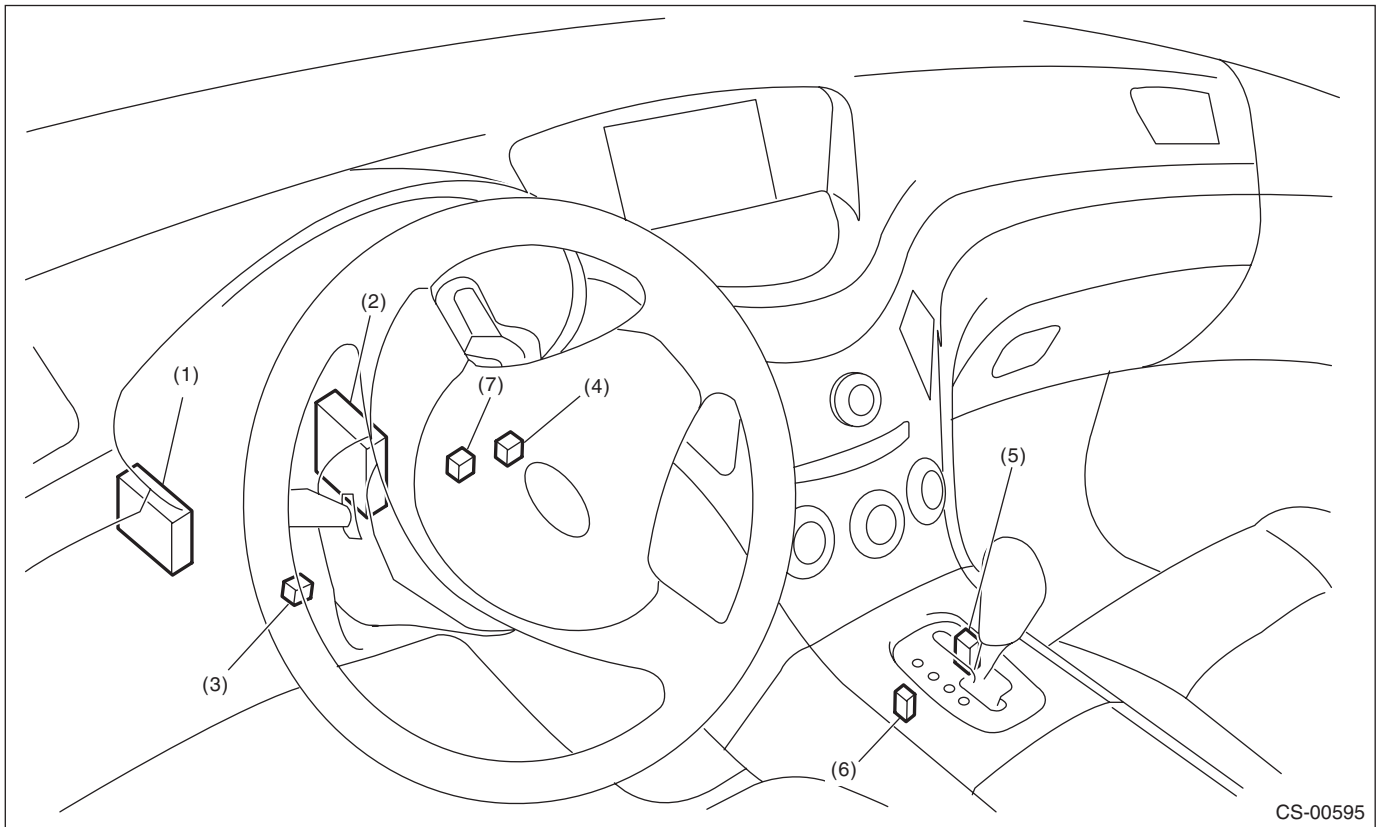
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST1B020XU0	1B020XU0	SUBARU SELECT MONITOR KIT	Troubleshooting for the electrical system.

C: CAUTION

- Wear appropriate work clothing, including a cap, protective goggles and protective shoes when performing any work.
- 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. of different grades or 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 revolving surfaces before installation.
- Before installing the O-ring or snap ring, apply a 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.
- Before disconnecting electrical connectors, be sure to disconnect the negative terminal from battery.

2. AT Shift Lock Control System

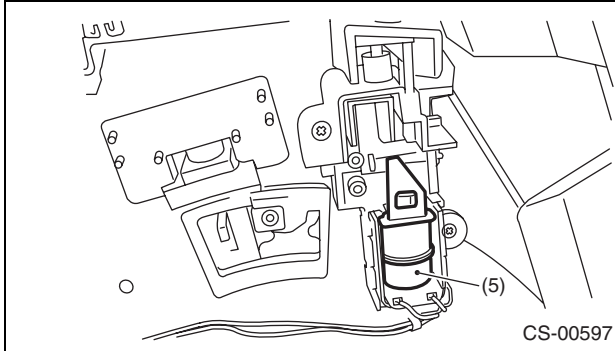
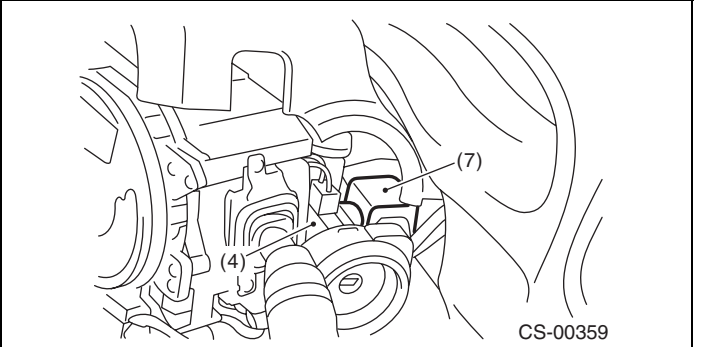
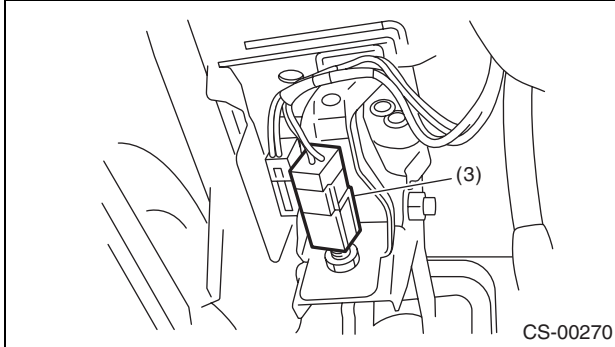
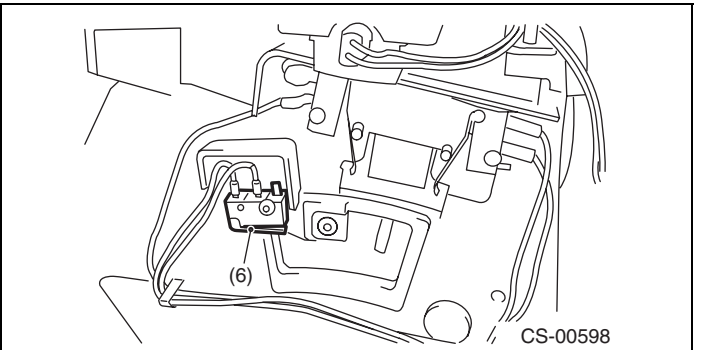
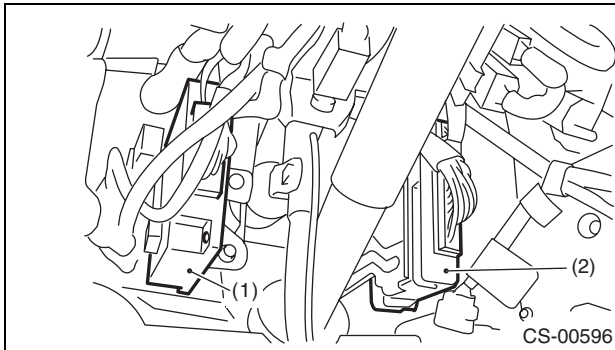
A: LOCATION



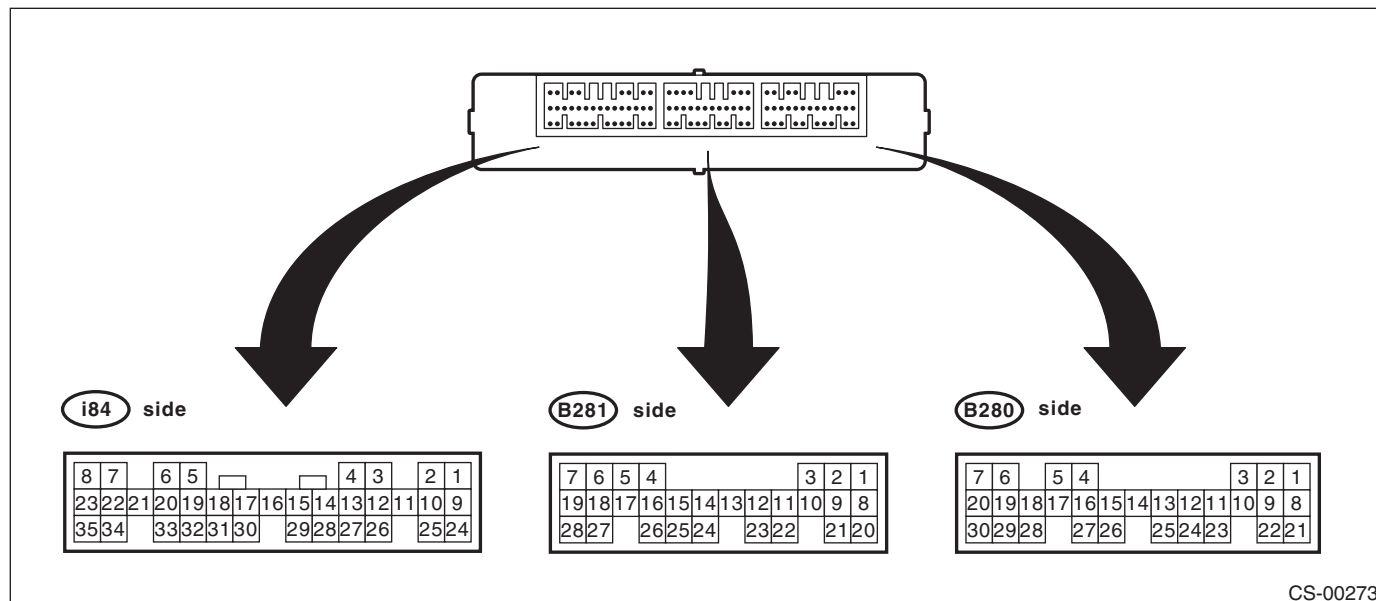
- | | | |
|--------------------------|---|-----------------------|
| (1) TCM ("P" range) | (4) Key cylinder (with built-in key warning switch) | (6) "P" range switch |
| (2) Body integrated unit | (5) Shift lock solenoid ASSY | (7) Key lock solenoid |
| (3) Stop light switch | | |

AT Shift Lock Control System

CONTROL SYSTEMS



B: ELECTRICAL SPECIFICATION



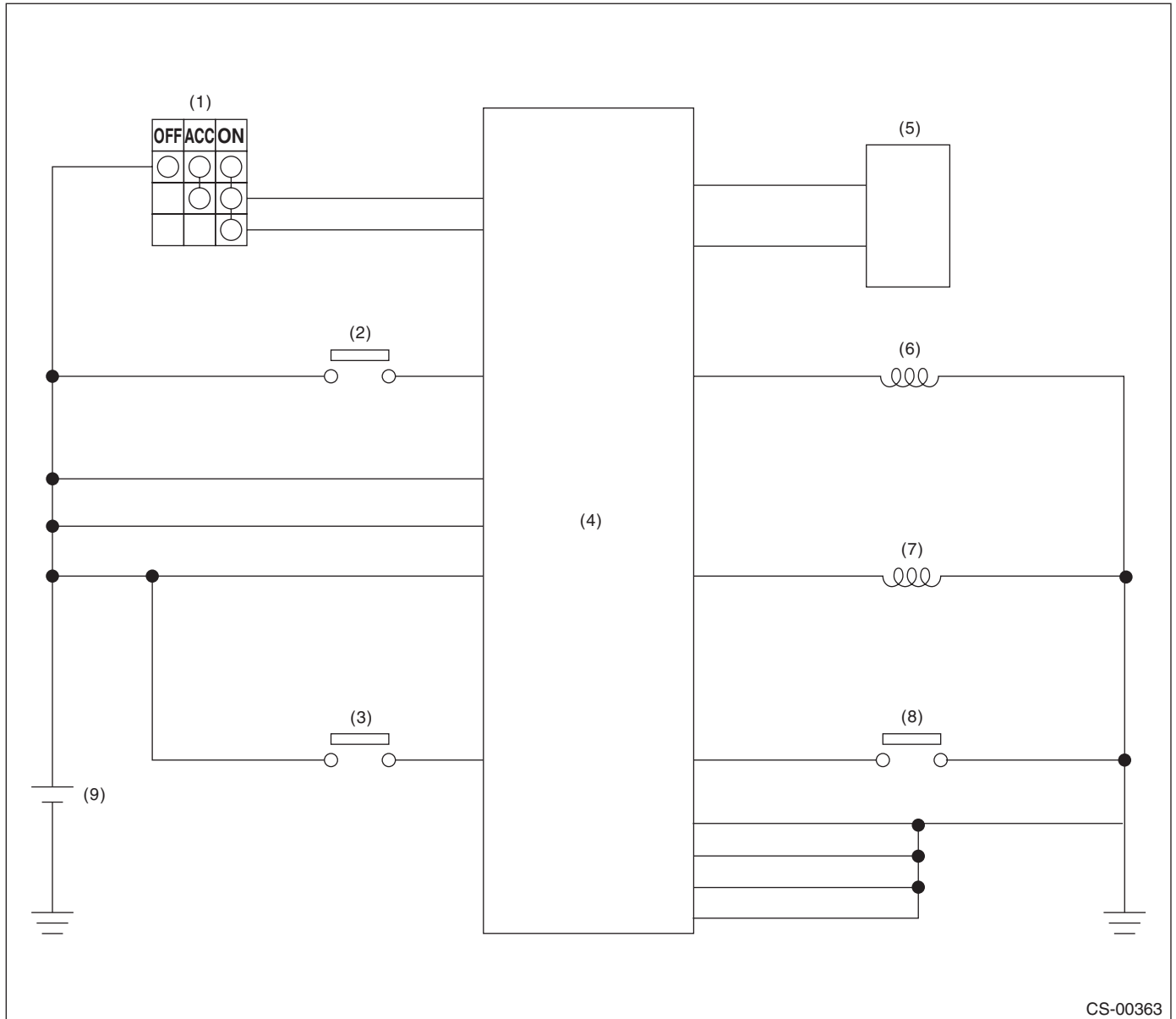
CS-00273

Item	To connector No.	Terminal No.	Input/Output signal
			Measured value and measuring condition
Battery power supply	B281	1	9 — 16 V
	B280	7	
Ignition power supply	i84	1	10 — 15 V when ignition switch is at ON or START.
ACC power supply	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 turned ON, with select lever in "P" range and brake switch ON. 0 V at other conditions than above.
Ground	B280	22	—
	i84	21	
	B281	8	
		9	

AT Shift Lock Control System

CONTROL SYSTEMS

C: WIRING DIAGRAM



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, is it possible to move the select lever from the "P" range to other ranges?	Inspect "SELECT LEVER CANNOT BE SHIFT LOCKED". <Ref. to CS-12, SELECT LEVER CANNOT BE LOCKED, INSPECTION, AT Shift Lock Control System.>	Go to step 2.
2 CHECK SHIFT LOCK.	While brake pedal is depressed, is it possible to move the select lever from the "P" range to other ranges?	Go to step 3.	Inspect "SELECT LEVER SHIFT LOCK CANNOT BE RELEASED". <Ref. to CS-14, SHIFT LOCK OF SELECT LEVER CANNOT BE RELEASED, INSPECTION, AT Shift Lock Control System.>
3 CHECK KEY INTERLOCK.	Can the ignition switch be turned to the "LOCK" position when the select lever is set to other than "P" range?	Go to step 4.	Go to step 5.
4 CHECK BACKUP POWER SUPPLY. Inspect the backup power supply circuit. <Ref. to CS-10, BODY INTEGRATED UNIT POWER SUPPLY AND GROUND CIRCUIT, INSPECTION, AT Shift Lock Control System.>	Is the backup power supply circuit operating properly?	Inspect for "KEY INTERLOCK CANNOT BE LOCKED OR RELEASED". <Ref. to CS-14, SHIFT LOCK OF SELECT LEVER CANNOT BE RELEASED, INSPECTION, AT Shift Lock Control System.>	Repair the backup power supply circuit.
5 CHECK KEY INTERLOCK.	Can the ignition switch be turned to the LOCK position when the select lever is set to the "P" range?	AT shift lock system is normal.	Inspect for "KEY INTERLOCK CANNOT BE LOCKED OR RELEASED". <Ref. to CS-14, SHIFT LOCK OF SELECT LEVER CANNOT BE RELEASED, INSPECTION, AT Shift Lock Control System.>

CONTROL SYSTEMS

IGNITION SWITCH

	OFF	ACC	ON
B		○	○
ACC		○	○
IG			○

SBF-6

MAIN SBF

SBF-8

BATTERY

No.12

No.31

No.8

No.7

A1

A24

B7

C2

A21

B22

C8

C9

A: i84

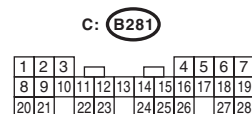
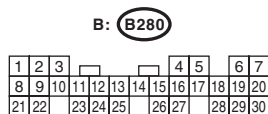
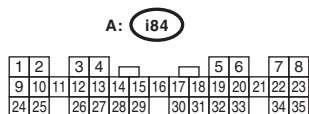
B: B280

C: B281

BODY INTEGRATED UNIT

E

E

**CS-10**

AT Shift Lock Control System

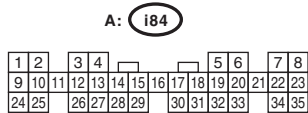
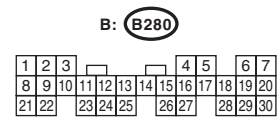
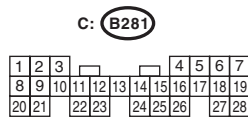
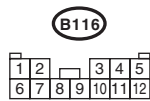
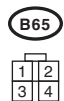
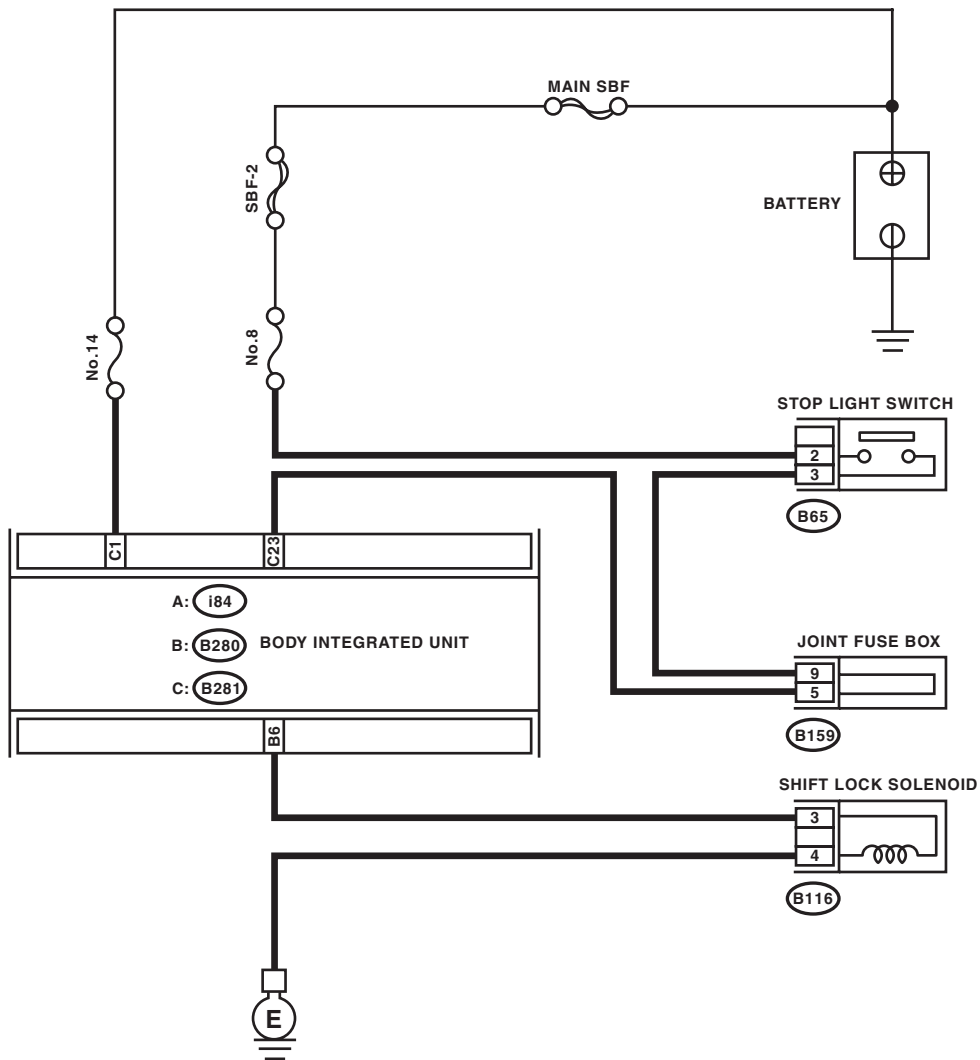
CONTROL SYSTEMS

Step	Check	Yes	No
1 CHECK DTC OF BODY INTEGRATED UNIT. Check DTC of the body integrated unit. <Ref. to LAN(diag)-24, OPERATION, Read Diagnostic Trouble Code (DTC).>	Is the DTC of power line displayed on body integrated unit?	Repair or replace it according to the DTC.	Go to step 2.
2 CHECK HARNESS CONNECTOR BETWEEN BODY INTEGRATED UNIT AND CHASSIS GROUND. 1) Turn the ignition switch to OFF. 2) Measure the harness resistance between the body integrated unit and chassis ground. Connector & terminal <i>(i84) No. 21 — Chassis ground:</i> <i>(B280) No. 22 — Chassis ground:</i> <i>(B281) No. 8 — Chassis ground:</i> <i>(B281) No. 9 — Chassis ground:</i>	Is the resistance less than 1 Ω ?	Go to step 3.	Repair the open circuit of harness between the body integrated unit and chassis ground.
3 CHECK POOR CONTACT.	Is there poor contact in connector?	Repair the poor contact.	Check the body integrated unit.

AT Shift Lock Control System

CONTROL SYSTEMS

3. SELECT LEVER CANNOT BE SHIFTED



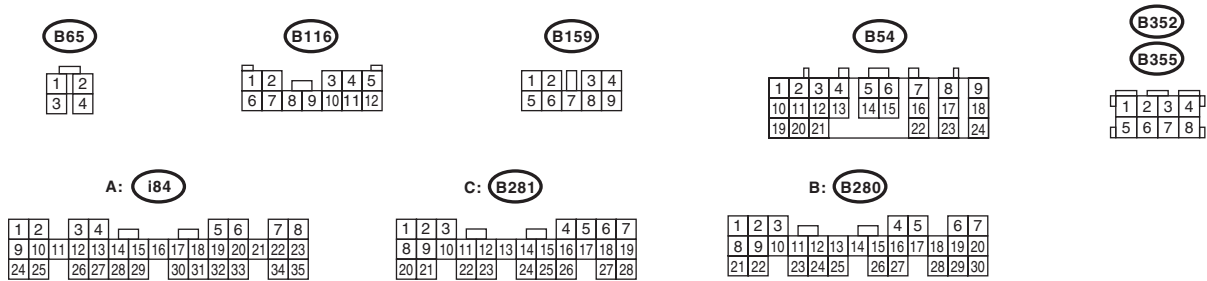
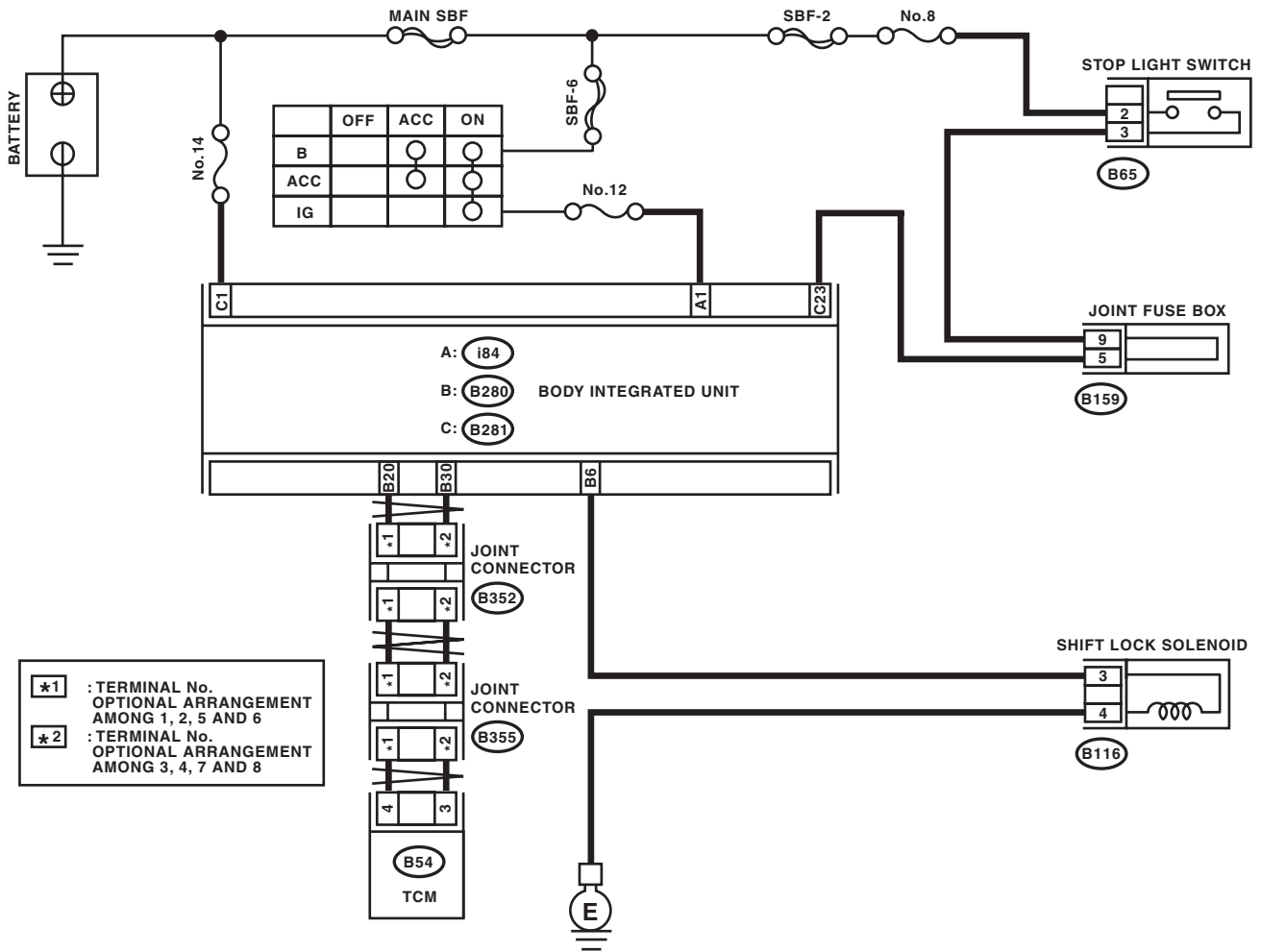
CS-00600

Step	Check	Yes	No
1 CHECK INPUT SIGNAL OF BODY INTEGRATED UNIT 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 to ON and run the Subaru Select Monitor. 4) Depress the brake pedal. 5) Read the input signal of stop light switch from Subaru Select Monitor. <Ref. to LAN(diag)-12, OPERATION, Subaru Select Monitor.>	Is "ON" displayed?	Go to step 2.	Go to step 3.
2 CHECK DTC OF BODY INTEGRATED UNIT. Check DTC of the body integrated unit. <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 UNIT. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors of body integrated unit and stop light switch. 3) Measure the resistance of harness between stop light switch and body integrated unit. Connector & terminal (B65) No. 3 — (B281) No. 23:	Is the resistance more than 1 MΩ?	Repair the open circuit of harness between the body integrated unit and stop light switch.	Go to step 5.
5 CHECK HARNESS BETWEEN STOP LIGHT SWITCH AND BODY INTEGRATED UNIT. Measure the resistance of harness between stop light switch and chassis ground. Connector & terminal (B65) No. 3 — Chassis ground:	Is the resistance less than 1 Ω?	Repair the short circuit of harness between the body integrated unit 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. Terminals 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 unit.	A temporary poor contact of connector or harness may be the cause.

AT Shift Lock Control System

CONTROL SYSTEMS

4. SELECT LEVER CANNOT BE LOCKED



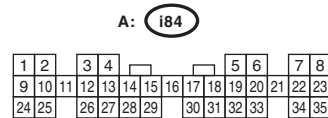
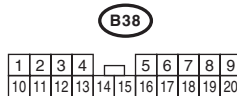
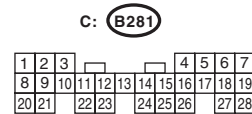
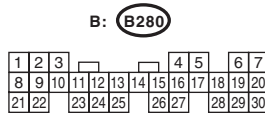
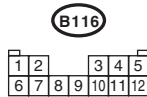
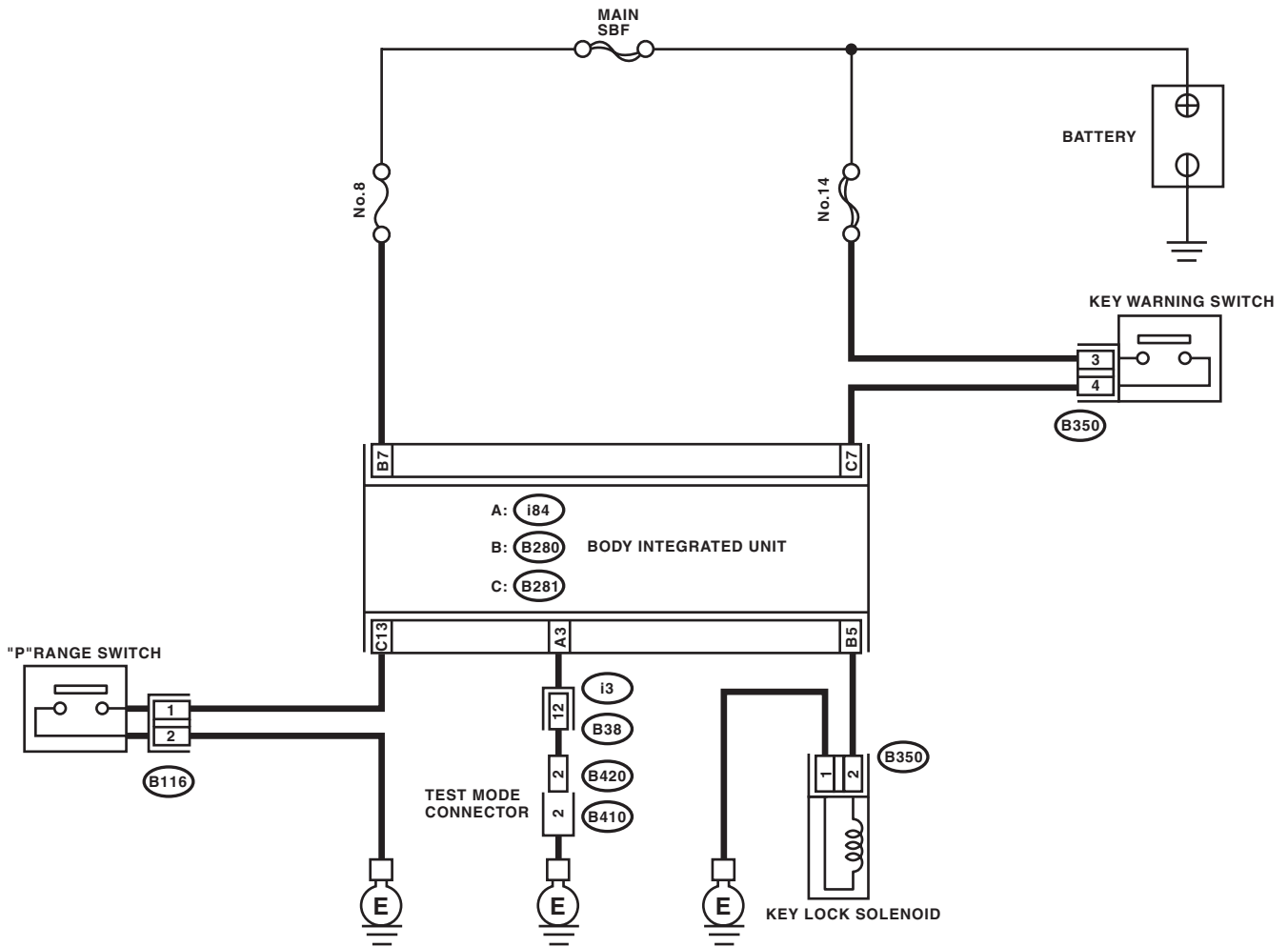
CS-00601

Step	Check	Yes	No
1 CHECK INPUT SIGNAL OF BODY INTEGRATED UNIT 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 to ON and run the Subaru Select Monitor. 4) Read the input signal of shift position from Subaru Select Monitor. <Ref. to LAN(diag)-12, OPERATION, Subaru Select Monitor.>	Is "7" displayed?	Go to step 2.	Check the TCM and body integrated unit.
2 CHECK INPUT SIGNAL OF BODY INTEGRATED UNIT USING SUBARU SELECT MONITOR. Read the input signal of stop light switch from Subaru Select Monitor. <Ref. to LAN(diag)-12, 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 UNIT. 1) Depress the brake pedal. 2) Measure the voltage between body integrated unit and chassis ground. Connector & terminal (B281) No. 23 (+) — Chassis ground (-):	Is the voltage more than 9 V?	Go to step 5.	Repair the open or short circuit of harness between the body integrated unit and stop light switch.
5 CHECK DTC OF BODY INTEGRATED UNIT. Check DTC of the body integrated unit. <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. Terminals 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 unit.

AT Shift Lock Control System

CONTROL SYSTEMS

5. KEY INTERLOCK DOES NOT LOCK OR RELEASE



CS-00602

Step	Check	Yes	No
1 CHECK INPUT SIGNAL OF BODY INTEGRATED UNIT 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 to ON and run the Subaru Select Monitor. 4) Read the input signal of the key warning switch from the Subaru Select Monitor. <Ref. to LAN(diag)-12, OPERATION, Subaru Select Monitor.>	Is "ON" displayed?	Go to step 2.	Go to step 4.
2 CHECK INPUT SIGNAL OF BODY INTEGRATED UNIT 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)-12, OPERATION, Subaru Select Monitor.>	Is "ON" displayed?	Go to step 3.	Go to step 8.
3 CHECK DTC OF BODY INTEGRATED UNIT. Check DTC of the body integrated unit. <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 unit.
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 the open or short circuit of harness between battery and key warning switch.
5 CHECK KEY WARNING SWITCH. Measure the resistance between connector terminals of key warning switch. Terminals 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. Terminals No. 3 — No. 4:	Is the resistance more than 1 MΩ?	Go to step 7.	Replace the key warning switch.
7 CHECK HARNESS BETWEEN AT SHIFT LOCK CONTROL MODULE AND KEY WARNING SWITCH. 1) Disconnect the connector of body integrated unit. 2) Measure the voltage between body integrated unit and chassis ground. Connector & terminal (B281) No. 7 (+) — Chassis ground (-):	Is the voltage more than 9 V?	Go to step 8.	Repair the open circuit of harness between body integrated unit and key warning switch.
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?	Go to step 9.	Repair the short circuit of harness between "P" range switch and body integrated unit.

AT Shift Lock Control System

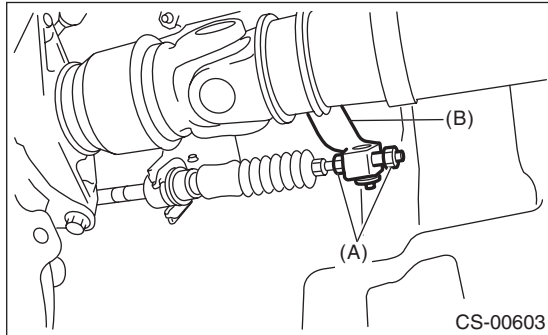
CONTROL SYSTEMS

Step	Check	Yes	No
9 CHECK HARNESS BETWEEN BODY INTEGRATED UNIT AND “P” RANGE SWITCH. 1) Disconnect the connector of the “P” range switch. 2) Measure the resistance of harness between the body integrated unit and the “P” range switch. Connector & terminal (B116) No. 1 — (B281) No. 13:	Is the resistance more than 1 MΩ?	Repair the open circuit of harness between the body integrated unit and the “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 the open circuit of 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. Terminals 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. Terminals No. 2 — No. 1:	Is the resistance more than 1 MΩ?	Go to step 13.	Replace the “P” range switch.
13 CHECK OPERATION. Inspect the backup power supply circuit. <Ref. to CS-10, BODY INTEGRATED UNIT POWER SUPPLY AND GROUND CIRCUIT, INSPECTION, AT Shift Lock Control System.>	Is the backup power supply circuit operating properly?	Go to step 14.	Check the body integrated unit.
14 CHECK TEST MODE CONNECTOR. 1) Check that the test mode connector is disconnected. 2) Measure the resistance between body integrated unit and chassis ground. Connector & terminal (B281) No. 11 — Chassis ground:	Is the resistance more than 1 MΩ?	Go to step 15.	Repair the short circuit of the harness between body integrated unit and test mode connector.
15 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 unit.

3. Select Lever

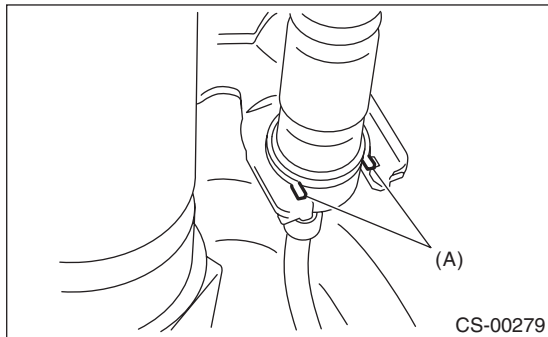
A: REMOVAL

- 1) Set the vehicle on a lift.
- 2) Disconnect the ground cable from the battery.
- 3) Shift the select lever to "N" range.
- 4) Lift-up the vehicle.
- 5) Remove the rear exhaust pipe and muffler. <Ref. to EX(H6DO)-6, REMOVAL, Rear Exhaust Pipe.> <Ref. to EX(H6DO)-8, REMOVAL, Muffler.>
- 6) Remove the heat shield cover.
- 7) Remove the cable from arm assembly.



- (A) Adjusting nut
(B) Arm ASSY

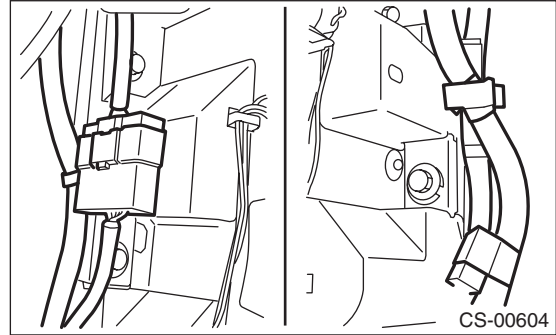
- 8) Raise the pawl of clamp to remove the cable.



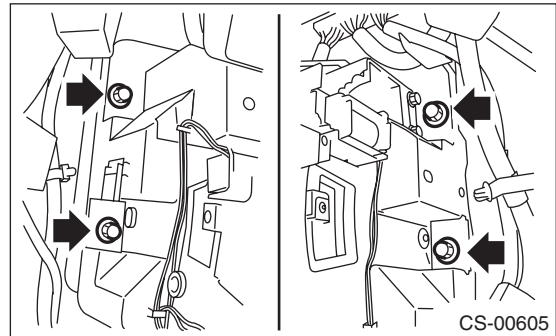
- (A) Claw

- 9) Lower the vehicle.
- 10) Remove the console box. <Ref. to EI-38, REMOVAL, Console Box.>
- 11) Remove the center console. <Ref. to EI-39, REMOVAL, Center Console.>

- 12) Remove all harnesses from the select lever.



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

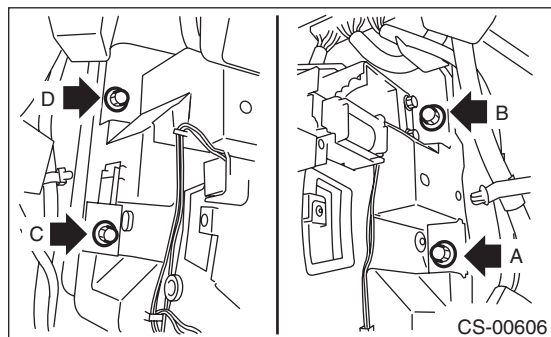


B: INSTALLATION

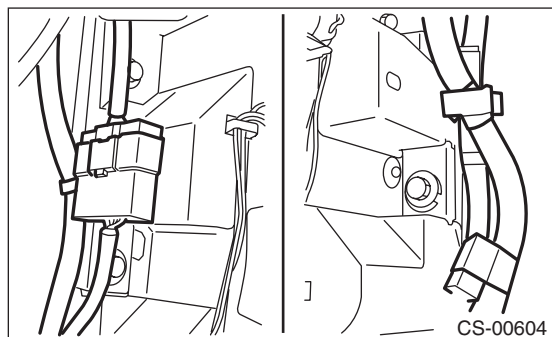
- 1) Set the select lever to vehicle body.
- 2) Tighten the four bolts to install the select lever to vehicle body, and then connect the connector.
 - (1) Temporarily tighten the bolt A.
 - (2) Tighten the bolt B.
 - (3) Tighten the bolt A.
 - (4) Tighten the bolts C and D.

Tightening torque:

18 N·m (1.8 kgf-m, 13.3 ft-lb)



- 3) Install the shift select cable onto select lever.



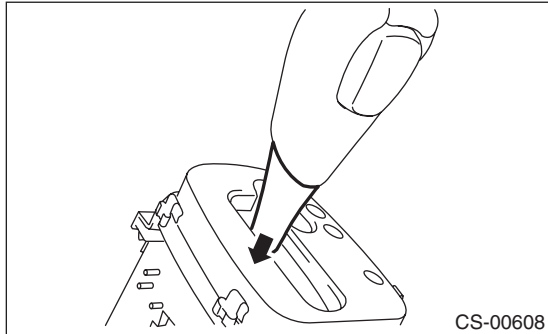
- 4) Install the center console. <Ref. to EI-39, INSTALLATION, Center Console.>
- 5) Install the console box. <Ref. to EI-38, INSTALLATION, Console Box.>
- 6) Shift the select lever to "N" range.
- 7) Lift-up the vehicle.
- 8) Shift the range select lever to the "N" range.
- 9) Secure the cable to the bracket. <Ref. to CS-28, INSTALLATION, Select Cable.>
- 10) Adjust the select cable position. <Ref. to CS-29, 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. <Ref. to EX(H6DO)-6, INSTALLATION, Rear Exhaust Pipe.> <Ref. to EX(H6DO)-8, INSTALLATION, Muffler.>

- 14) Inspect the following items. When a malfunction is found in the inspection, adjust the select cable. <Ref. to CS-29, ADJUSTMENT, Select Cable.>

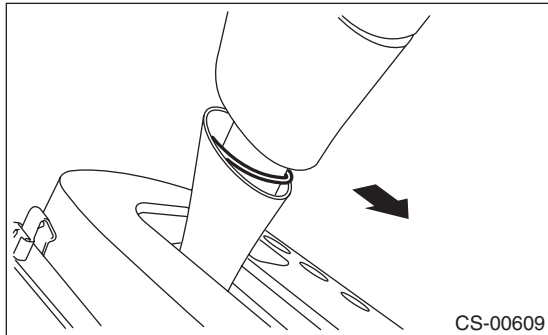
- (1) Engine starts when the select lever is in "P" and "N" range, but not in other ranges.
- (2) Back-up light illuminates when the select lever is in the "R" range, but not in other ranges.
- (3) Select lever and indicator positions are matched.

C: DISASSEMBLY

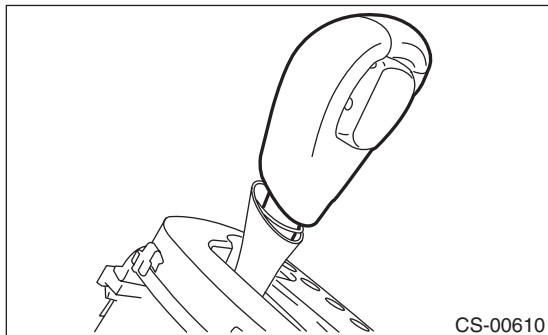
- 1) Shift the select lever to "N" range.
- 2) Lower the grip cover.



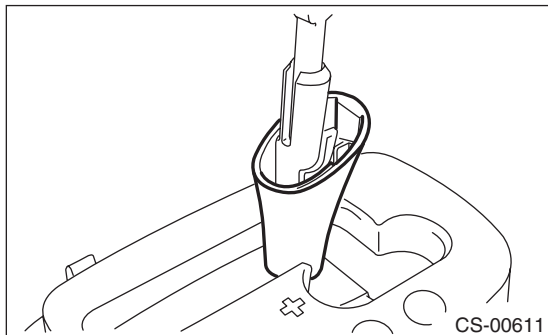
- 3) Remove the grip pin.



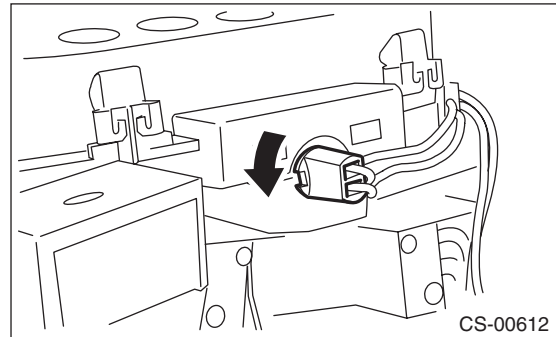
- 4) Remove the grip assembly.



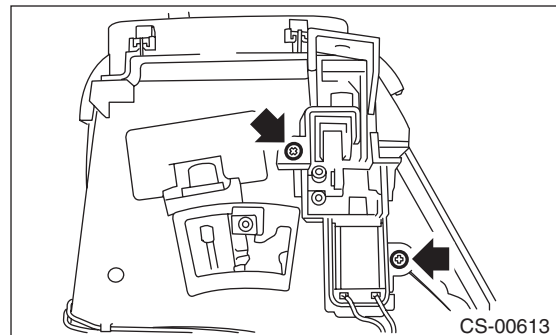
- 5) Remove the grip cover.



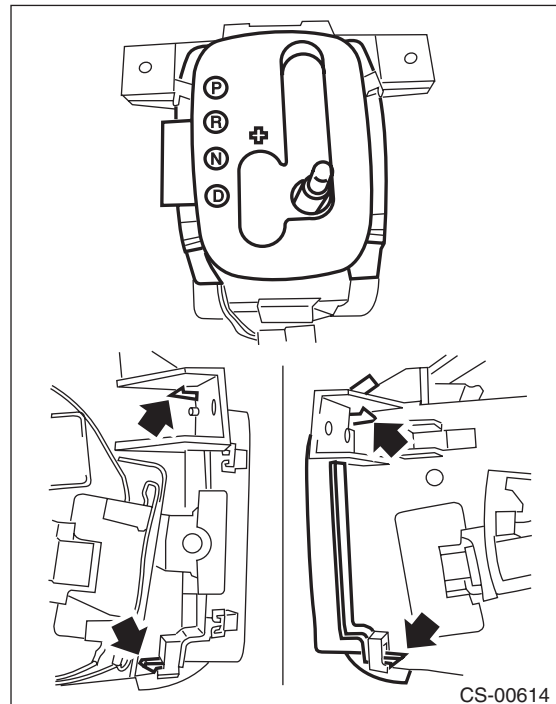
- 6) Remove the indicator light and then remove the bulb.



- 7) Remove the shift lock solenoid assembly.



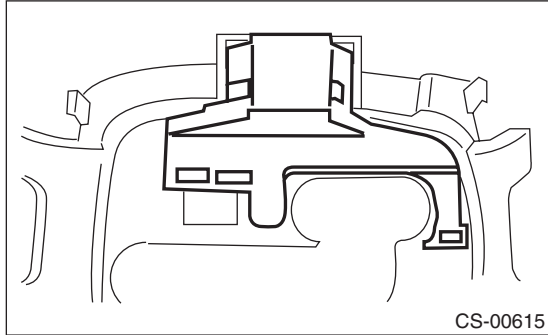
- 8) Remove the indicator assembly.



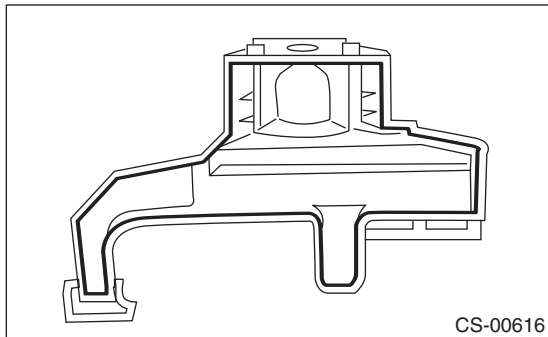
Select Lever

CONTROL SYSTEMS

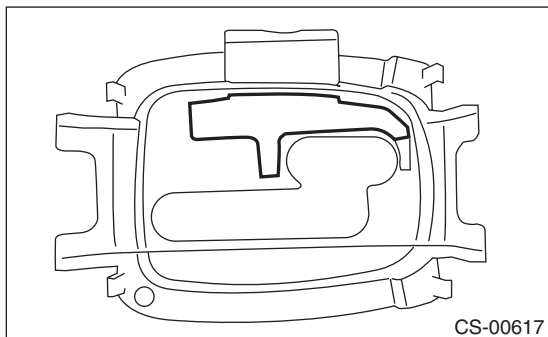
9) Remove the bulb case.



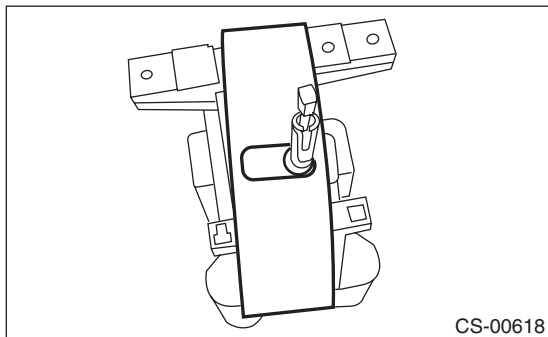
10) Remove the plate light guide.



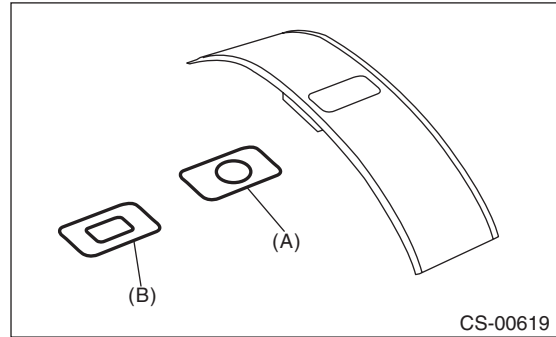
11) Remove the position plate.



12) Remove the blind assembly.



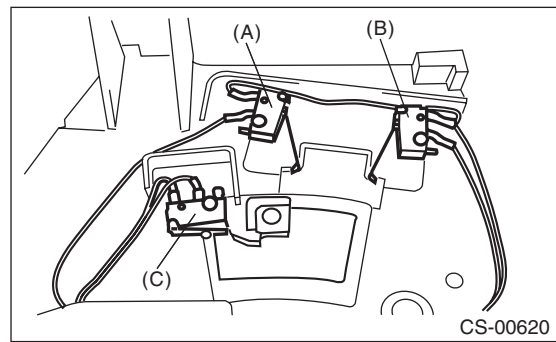
13) Remove blind A and B.



(A) Blind A

(B) Blind B

14) Remove the clip while being careful not to break the pin, and remove all switches.

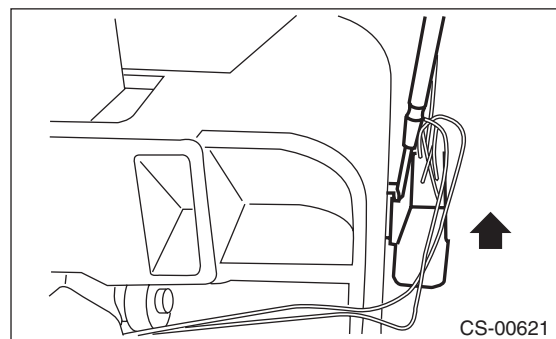


(A) Shift-up switch

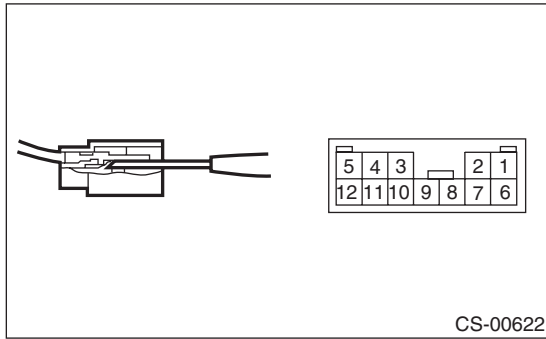
(B) Shift-down switch

(C) "P" range switch

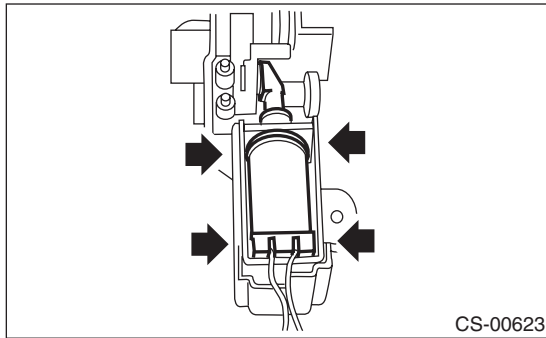
15) Remove the connector from the base assembly using a flat-tip screwdriver.



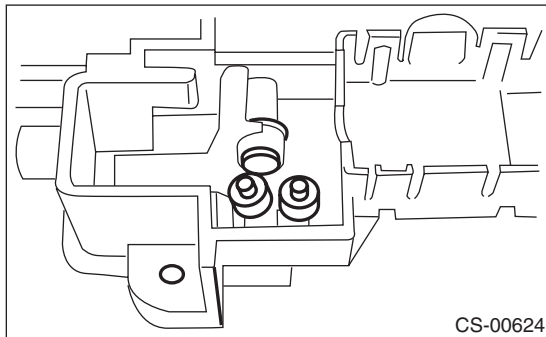
16) Remove all terminals from the connectors using a flat-tip screwdriver.



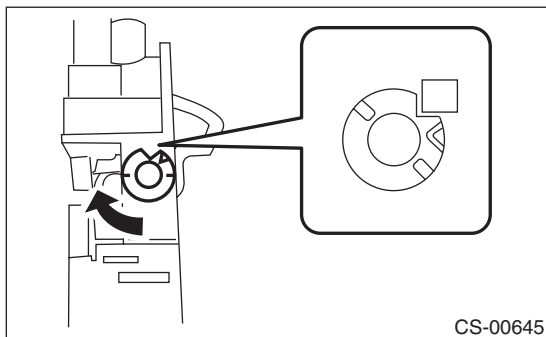
17) Remove the shift lock solenoid from the lock lever bracket.



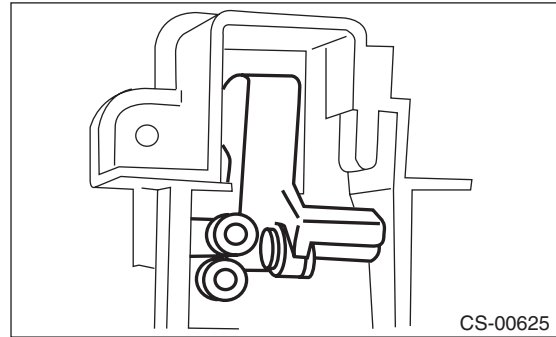
18) Remove the bushing.



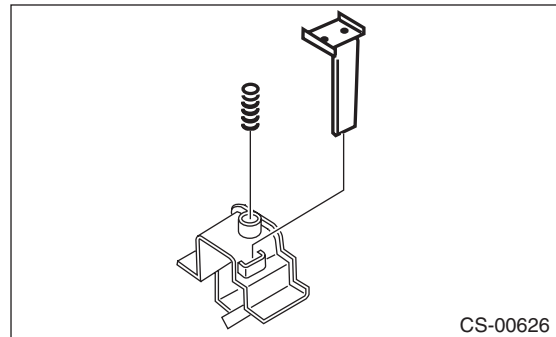
19) Remove the lock lever bushing.



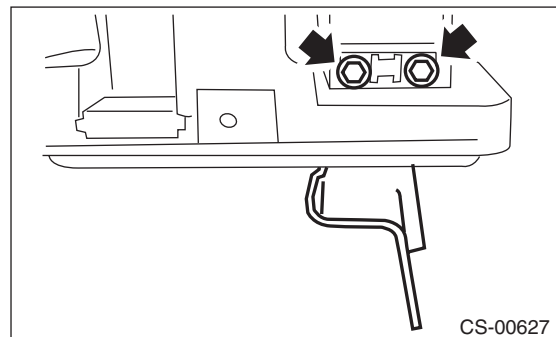
20) Remove the lock lever.



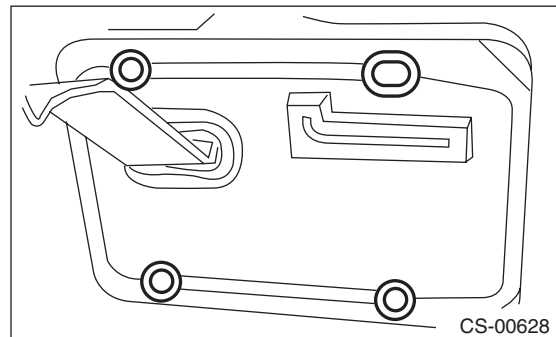
21) Remove the release rod and spring.



22) Remove the cable bracket.



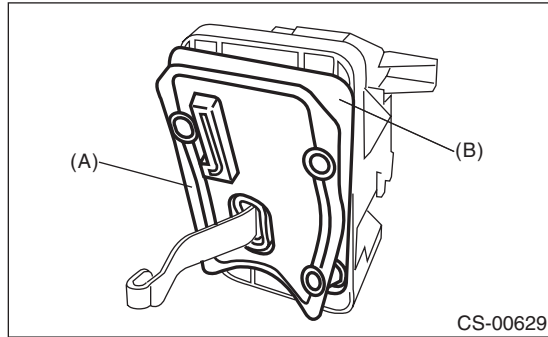
23) Remove the spacer.



Select Lever

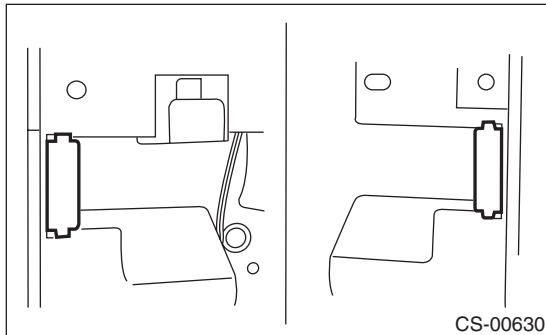
CONTROL SYSTEMS

24) Remove the dust cover and dust cover bracket.

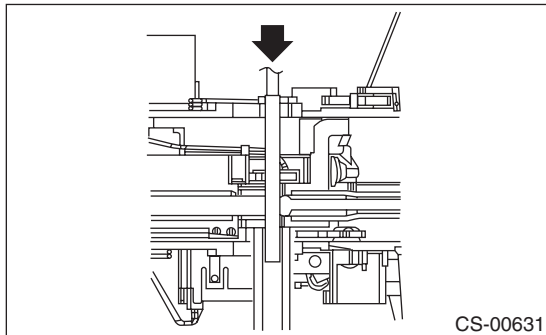


- (A) Dust cover
(B) Dust cover bracket

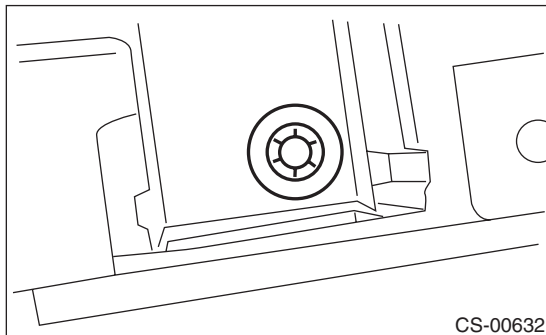
25) Remove the spacer.



26) Using a press, remove the shift position pin.

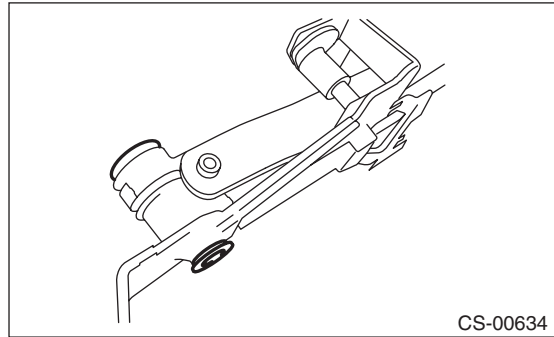


27) Remove the clips, then remove the shaft.

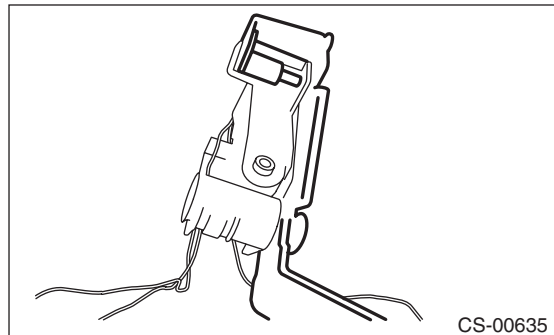


28) Remove the arm assembly.

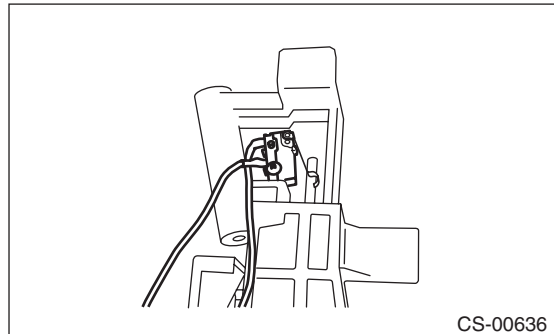
29) Remove the bushing.



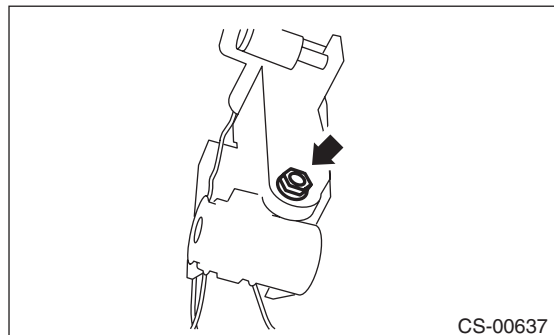
30) Remove the selector arm assembly.



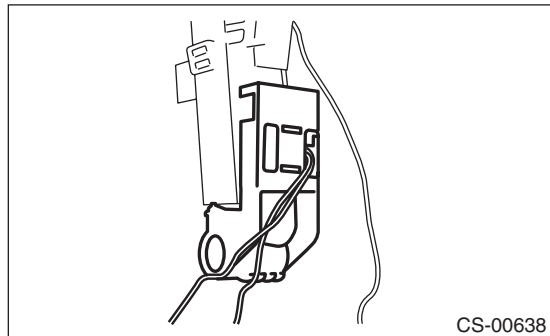
31) Remove the clip while being careful not to break the pin, then remove the shift button switch.



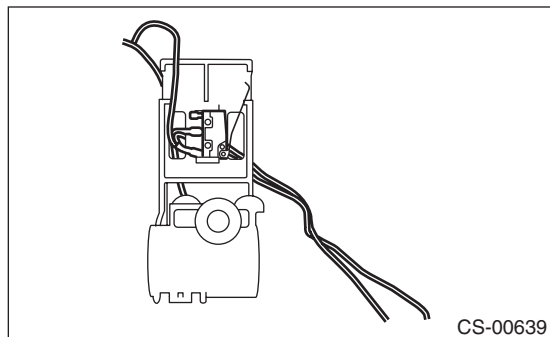
32) Remove the select shaft.



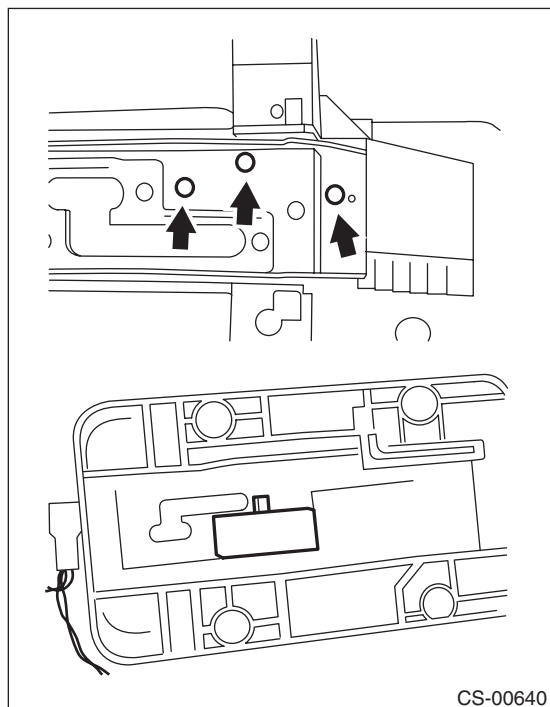
33) Remove the tube cross plate.



34) Remove the mode change switch.



35) Remove the detent check block.

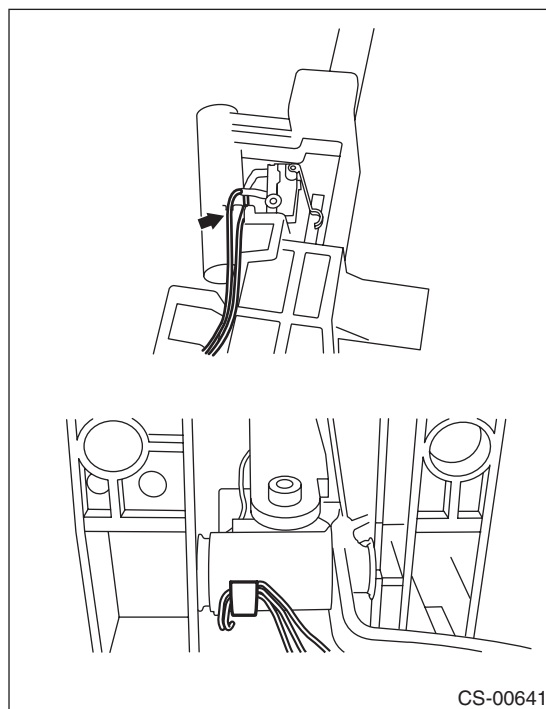


D: ASSEMBLY

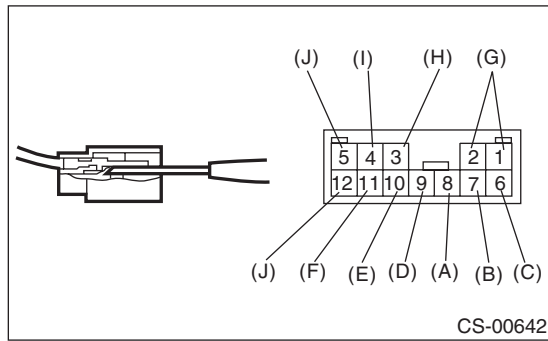
- 1) Clean all the parts before assembly.
- 2) Apply grease [Multemp AC-D, and SH-W or equivalent] to each part. <Ref. to CS-2, AT SELECT LEVER, COMPONENT, General Description.>
- 3) Assemble in the reverse order of disassembly.

NOTE:

- Refer to "COMPONENT" for each tightening torque. <Ref. to CS-2, AT SELECT LEVER, COMPONENT, General Description.>
- When pressing in the shift position pin, insert from the left side of the vehicle.
- Affix the harness of the shift button switch and the mode change switch at the marked positions.



- Connect the terminals of all switches to the respective connectors.



- (A) Mode change switch (color code: Yellow)
- (B) Shift button switch (color code: Brown)
- (C) Mode change switch and shift button switch ground (color code: White)
- (D) Shift up switch (color code: Green)
- (E) Shift up switch (color code: Gray)
- (F) Shift up/down switch ground (color code: Blue)
- (G) "P" range switch (wire color: Red)
- (H) Shift lock solenoid (color code: Blue)
- (I) Shift lock solenoid (color code: Black)
- (J) indicator light (color code: Blue)

4) After completing installation, shift the select lever from the "P" range to the "D" range, then check whether or not the selection indicator in the combination meter and the select lever position matches. Also check whether the pointer and position mark matches, and what the operating force is.

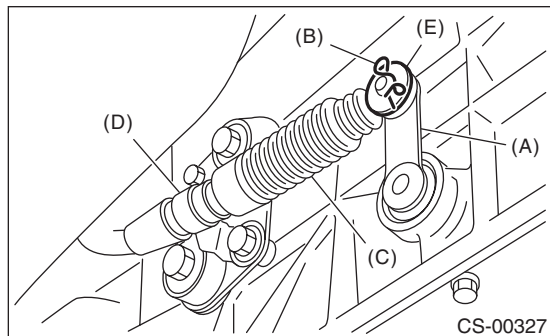
E: INSPECTION

- 1) Inspect the removed parts by comparing with new parts 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

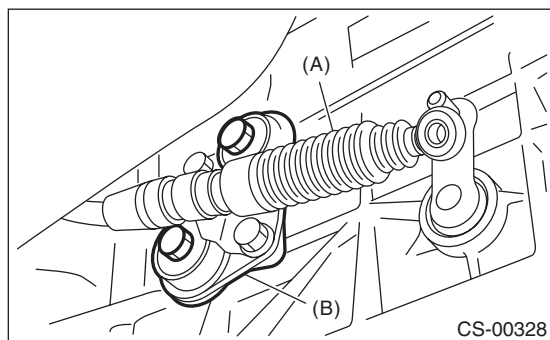
A: REMOVAL

- 1) Set the vehicle on a lift.
- 2) Shift the select lever to "N" range.
- 3) Disconnect the ground cable from the battery.
- 4) Lift-up the vehicle.
- 5) Remove the front, center and rear exhaust pipes and muffler. <Ref. to EX(H6DO)-4, REMOVAL, Front Exhaust Pipe.> <Ref. to EX(H6DO)-6, REMOVAL, Rear Exhaust Pipe.> <Ref. to EX(H6DO)-8, REMOVAL, Muffler.>
- 6) Remove the heat shield cover.
- 7) Remove the snap pin and washer from range select lever.



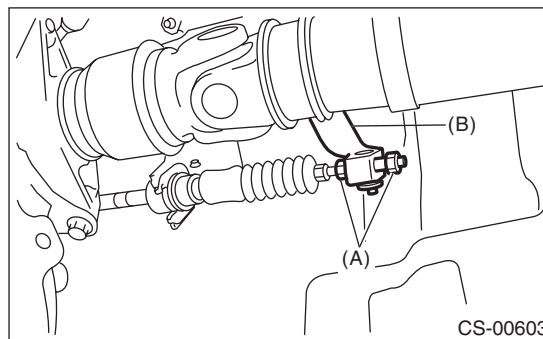
- (A) Range select lever
- (B) Snap pin
- (C) Select cable
- (D) Bracket
- (E) Washer

- 8) Remove the plate assembly from the transmission case.



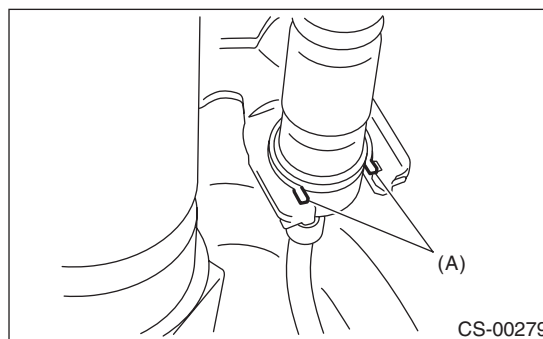
- (A) Select cable
- (B) Plate ASSY

- 9) Disconnect the cable from arm assembly.



- (A) Adjusting nut
- (B) Arm ASSY

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



- (A) Claw

- 11) Remove the select cable from plate assembly.

Select Cable

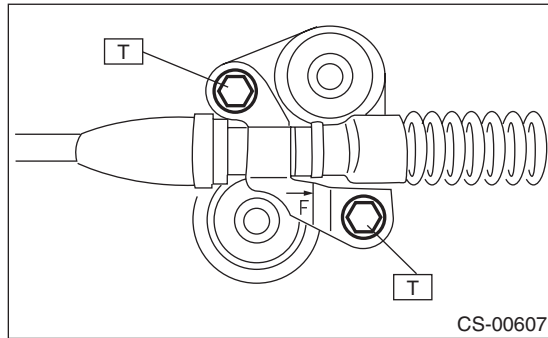
CONTROL SYSTEMS

B: INSTALLATION

1) Install the select cable to plate assembly.

Tightening torque:

T: 18 N·m (1.8 kgf-m, 13.3 ft-lb)

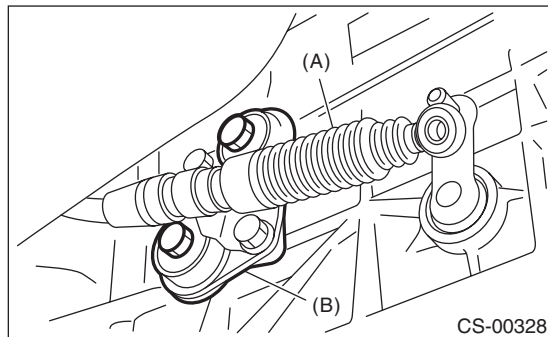


2) Install the select cable to range select lever.

3) Install the plate assembly to transmission.

Tightening torque:

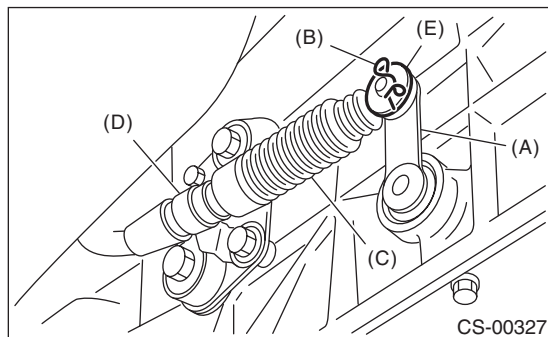
24.5 N·m (2.5 kgf-m, 18.1 ft-lb)



(A) Select cable

(B) Plate ASSY

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



(A) Range select lever

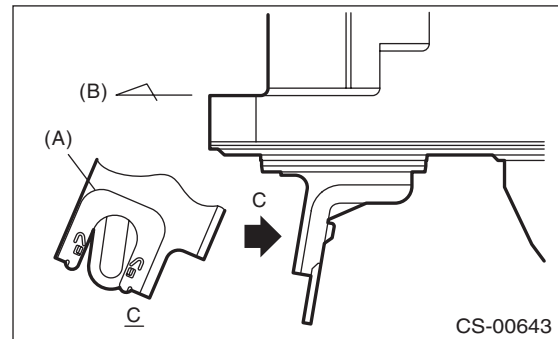
(B) Snap pin

(C) Select cable

(D) Bracket

(E) Washer

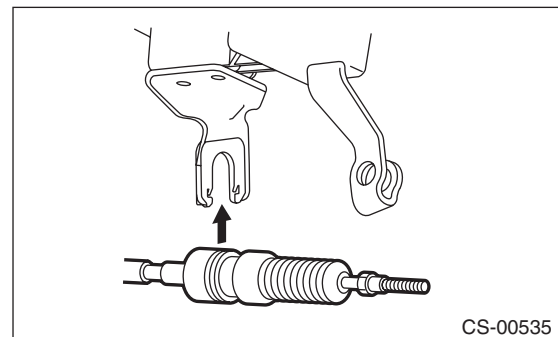
5) Install new clamp paying attention to the installing direction.



(A) Clamp

(B) Forward

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



7) Shift the select lever to the "N" range, and then adjust the select cable position. <Ref. to CS-29, ADJUSTMENT, Select Cable.>

8) Install the heat shield cover.

9) Install the front, center and rear exhaust pipe, and the muffler. <Ref. to EX(H6DO)-5, INSTALLATION, Front Exhaust Pipe.> <Ref. to EX(H6DO)-6, INSTALLATION, Rear Exhaust Pipe.> <Ref. to EX(H6DO)-8, INSTALLATION, Muffler.>

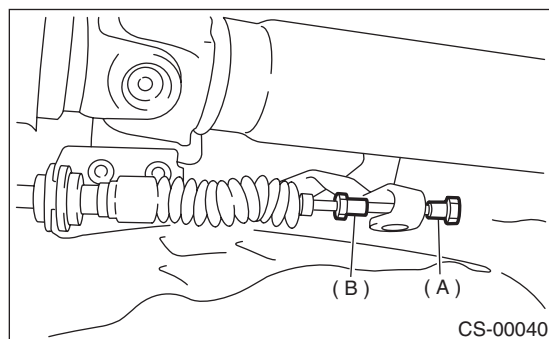
C: INSPECTION

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

- 1) Check the cable for smooth operation.
- 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.
- 9) Check that the AT shift lock system operates normally.

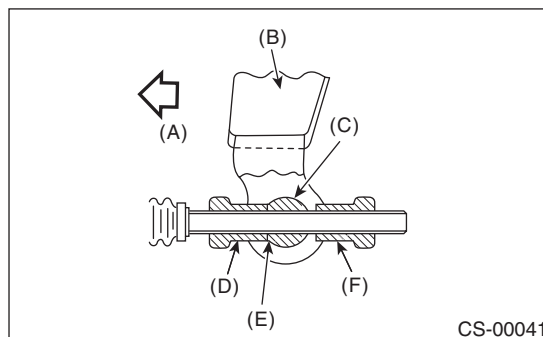
D: ADJUSTMENT

- 1) Shift the select lever to "N" range.
- 2) Remove the rear exhaust pipe and muffler. <Ref. to EX(H6DO)-6, REMOVAL, Rear Exhaust Pipe.> <Ref. to EX(H6DO)-8, 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) With the select lever pushed towards the rear of the vehicle, turn the adjustment nut B until it just contacts the connector. Then loosen the nut for a half a turn.

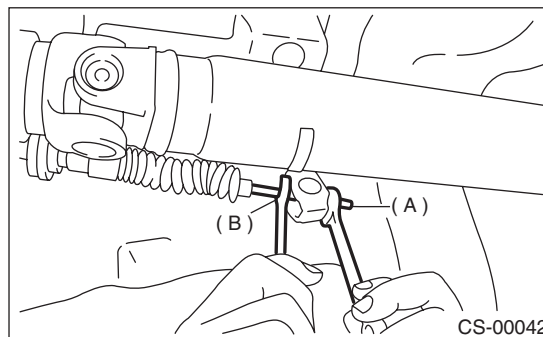


- (A) Forward side
(B) Select lever
(C) Connector
(D) Adjusting nut B
(E) Contact point
(F) Adjusting nut A

- 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.

AT Shift Lock Solenoid and “P” Range Switch

CONTROL SYSTEMS

5. AT Shift Lock Solenoid and “P” Range Switch

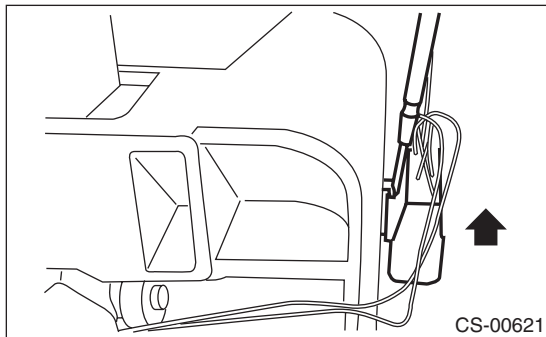
A: REMOVAL

NOTE:

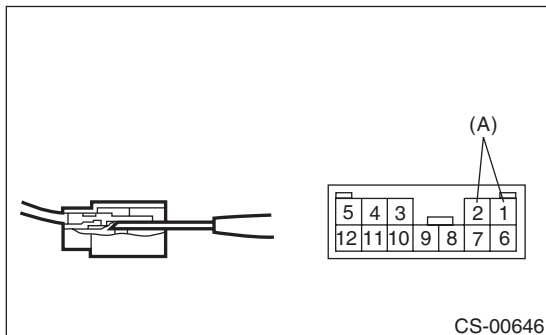
For removal of the mode change switch and the shift button switch, refer to the section on Select Levers. <Ref. to CS-21, DISASSEMBLY, Select Lever.>

1. “P” RANGE SWITCH

- 1) Remove the console box. <Ref. to EI-38, REMOVAL, Console Box.>
- 2) Disconnect the connector.
- 3) Remove the connector from the base plate using a flat-tip screwdriver.

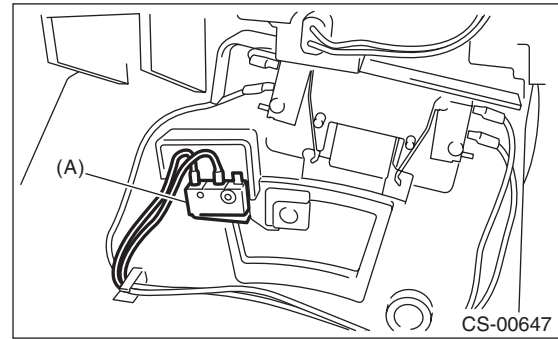


- 4) Disconnect the terminal of “P” range switch from connector, using a flat-tip screwdriver with thin tip.



(A) “P” range switch

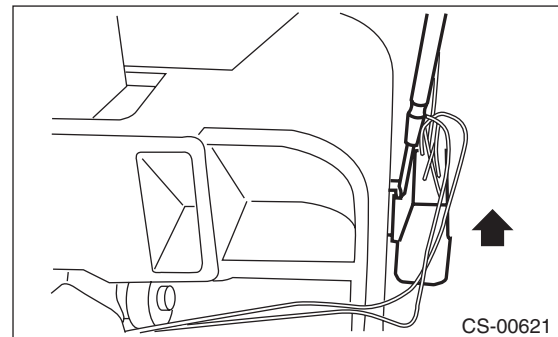
- 5) Remove the clip while being careful not to break the pin, then remove the P range switch.



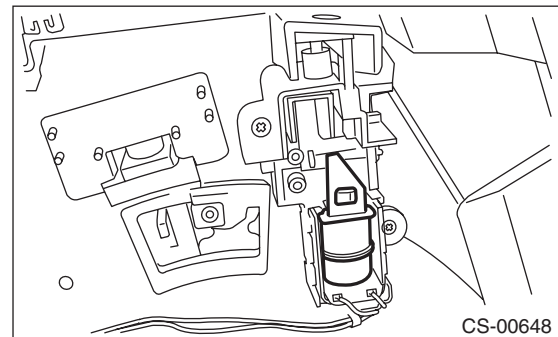
(A) “P” range switch

2. AT SHIFT LOCK SOLENOID

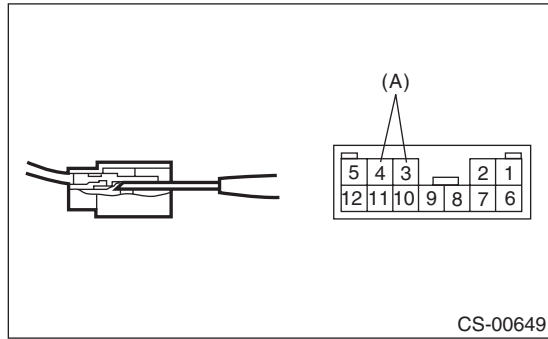
- 1) Remove the console box. <Ref. to EI-38, REMOVAL, Console Box.>
- 2) Disconnect the connector.
- 3) Remove the connector from the base plate using a flat-tip screwdriver.



- 4) Remove the AT shift lock solenoid.



5) Disconnect the terminal of AT shift lock solenoid from the connector, using a flat-tip screwdriver.



(A) AT shift lock solenoid

B: INSTALLATION

NOTE:

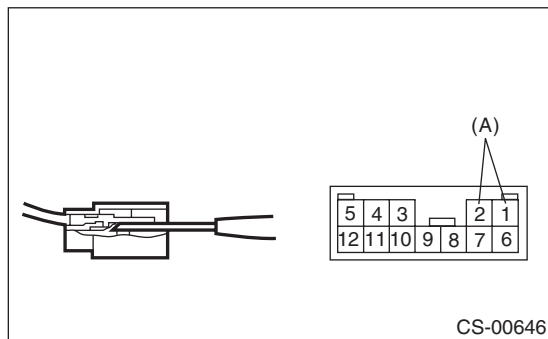
For installation of the mode change switch and the shift button switch, refer to the section on Select Levers. <Ref. to CS-25, ASSEMBLY, Select Lever.>

1. “P” RANGE SWITCH

Install in the reverse order of removal.

NOTE:

Connect the “P” range switch terminal to connector.



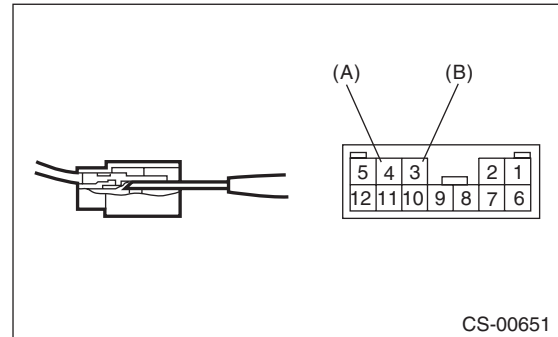
(A) “P” range switch (wire color: Red)

2. AT SHIFT LOCK SOLENOID

Install in the reverse order of removal.

NOTE:

Connect the AT shift lock solenoid switch terminal to connector.



(A) AT shift lock solenoid (color code: Black)

(B) AT shift lock solenoid (wire color: Blue)

AT Shift Lock Solenoid and “P” Range Switch

CONTROL SYSTEMS

C: INSPECTION

	Step	Check	Yes	No
1	CHECK SHIFT LOCK SOLENOID. Measure the resistance of shift lock solenoid connector terminals. Terminals No. 4 — No. 3:	Is the resistance between 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. Terminals 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) Move the select lever to “P” range. 2) Measure the resistance between “P” range switch connector terminals. Terminals 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 a range other than the “P” range. 2) Measure the resistance between “P” range switch connector terminals. Terminals No. 1 — No. 2:	Is the resistance more than 1 M Ω ?	Normal	Replace the “P” range switch.

6. Body Integrated Unit

A: NOTE

Refer to “Body Integrated Unit” for removal and installation procedure. <Ref. to SL-51, Body Integrated Unit.>

General Diagnostic Table

CONTROL SYSTEMS

7. General Diagnostic Table

A: INSPECTION

Symptom	Possible cause	Corrective action
Select lever	Starter does not run.	Adjust the select cable, or inspect circuit.
	Back-up light does not illuminate.	Adjust the select cable, or inspect circuit.
	AT shift lock system does not operate normally.	Adjust the select cable, or inspect circuit.
	Will not change to manual or sports mode.	Inspect the mode change switch and select lever, or inspect the 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.

AUTOMATIC TRANSMISSION

5AT

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