

General Description

AUTOMATIC TRANSMISSION

1. General Description

A: SPECIFICATION

1. TORQUE CONVERTER CLUTCH

Model	3.6 L non-turbo
Type	Symmetric, 3-element, single stage, 2-phase torque converter
Stall torque ratio	1.8
Nominal diameter	246 mm (9.69 in)
Stall speed (at sea level)	2,100 — 2,600 rpm
One-way clutch	Sprag 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	3 sets
One-way clutch (sprag type)	2 sets

4. TRANSMISSION GEAR RATIO

1st	3.540
2nd	2.264
3rd	1.471
4th	1.000
5th	0.834
Rev.	2.370

5. PLANETARY GEAR AND PLATE

Model	3.6 L non-turbo
Number of front internal gear teeth	106
Number of front carrier teeth	28
Number of front sun gear teeth	50
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	110
Number of rear carrier teeth	24
Number of rear sun gear teeth	62
Number of front brake drive plates	2
Number of input clutch drive plates	6
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	5

6. SELECTOR POSITION

P (Park)	Transmission is in neutral, output member is immovable, engine start is possible
R (Reverse)	Transmission is in reverse
N (Neutral)	Transmission is in neutral and engine start is possible
D (Drive)	Automatic gear change 1st ↔ 2nd ↔ 3rd ↔ 4th ↔ 5th
M (Manual mode)	Manual gear change 1st → 2nd → 3rd → 4th → 5th
M (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	Recommended materials	SUBARU ATF
	Alternative	IDEMITSU: ATF HP CAUTION: Be sure to use the recommended or equivalent ATF. Using material except recommended one or substitute would cause trouble.
Fluid capacity	L (US qt, Imp qt)	9.6 — 10.0 (10.1 — 10.6, 8.4 — 8.8)
Lubrication system	Forced feed lubrication with oil pump	

8. COOLING 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

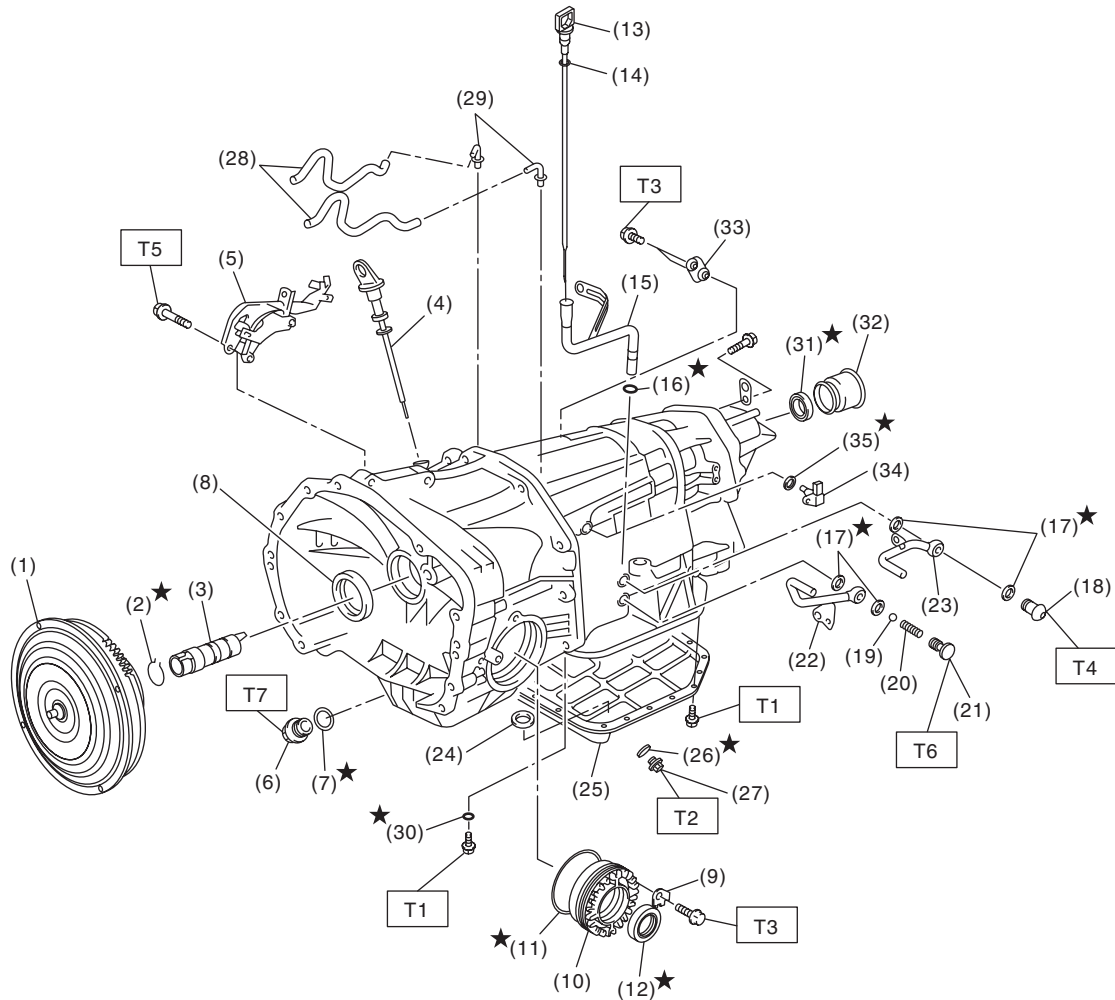
Model	3.6 L non-turbo
Front final reduction gear ratio	3.583

AUTOMATIC TRANSMISSION

Lubrication oil	(1) (2) (3) GL-5 (4) (°C) -30 -15 0 15 30 (°F) -22 5 32 59 86 75W-90 90 MT-03000 (1) Item (3) API standard (2) Front differential gear oil (4) SAE viscosity No. and applicable temperature
Front differential oil capacity	L (US qt, Imp qt) 1.3 — 1.5 (1.4 — 1.6, 1.1 — 1.3)

B: COMPONENT

1. TORQUE CONVERTER CLUTCH & TRANSMISSION ASSEMBLY



AT-05725

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(1) Torque converter ASSY	(16) O-ring	(31) Oil seal
(2) Circlip	(17) Gasket	(32) Dust cover
(3) Oil pump shaft	(18) Union screw	(33) Floating bracket
(4) Differential oil level gauge	(19) Ball	(34) Turbine speed sensor 1
(5) Pitching stopper bracket	(20) Spring	(35) O-ring
(6) Drain plug	(21) Union screw	
(7) Gasket	(22) ATF AT outlet pipe	
(8) Oil seal	(23) ATF AT inlet pipe	
(9) Lock plate	(24) Magnet	
(10) Side retainer	(25) Oil pan	
(11) O-ring	(26) Gasket	
(12) Oil seal	(27) ATF drain plug	
(13) ATF level gauge	(28) Breather hose	
(14) O-ring	(29) Nipple	
(15) Oil charge pipe	(30) O-ring	

Tightening torque: N·m (kgf-m, ft-lb)

T1: 5 (0.5, 3.7)

T2: 20 (2.0, 14.8)

T3: 25 (2.5, 18.4)

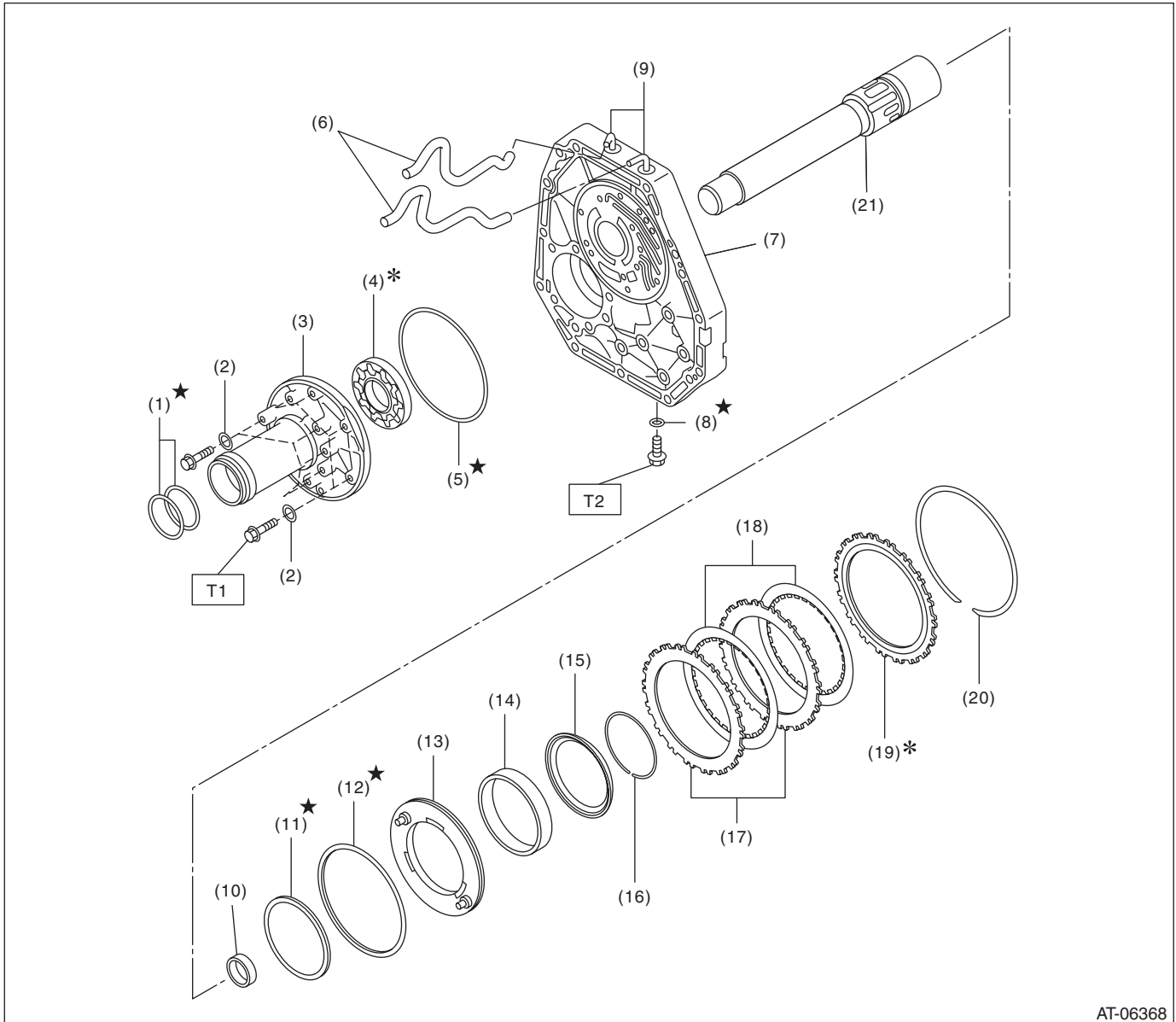
T4: 40 (4.1, 29.5)

T5: 41 (4.2, 30.2)

T6: 45 (4.6, 33.2)

T7: 70 (7.1, 51.6)

2. OIL PUMP & FRONT BRAKE



AT-06368

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

Tightening torque: N·m (kgf-m, ft-lb)

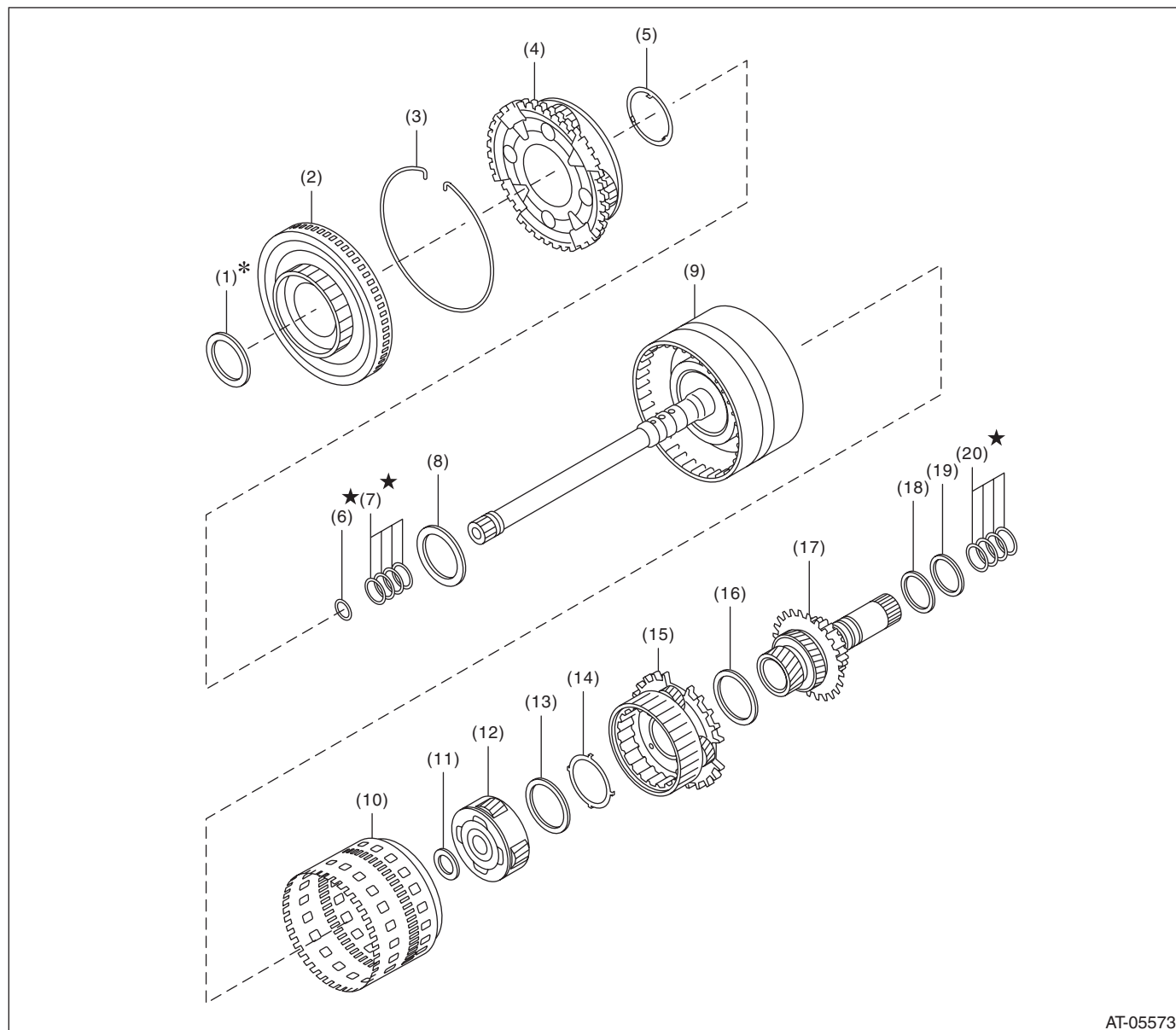
T1: 10 (1.0, 7.4)

T2: 13 (1.3, 9.6)

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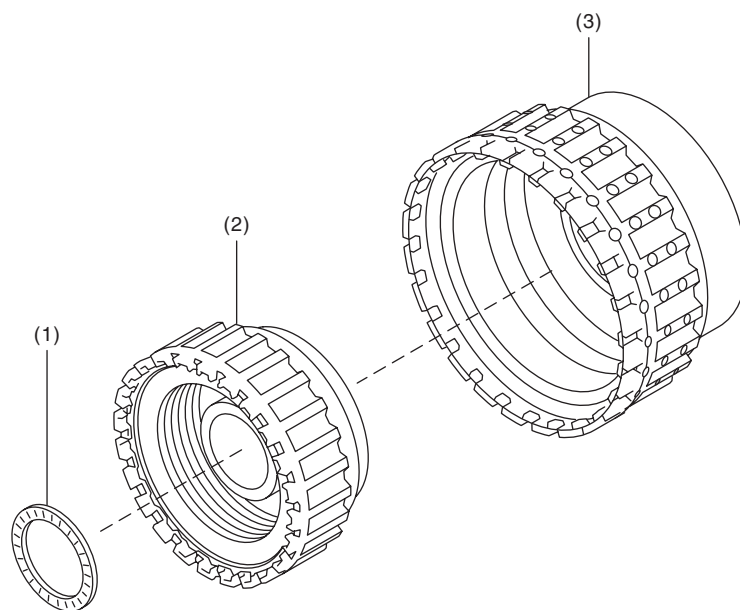
3. FRONT PLANETARY CARRIER AND MIDDLE & REAR PLANETARY CARRIER



AT-05573

- | | | |
|-------------------------|------------------------------|----------------------------------|
| (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 | |

4. DIRECT CLUTCH AND HIGH & LOW REVERSE CLUTCH



AT-02018

(1) Thrust bearing

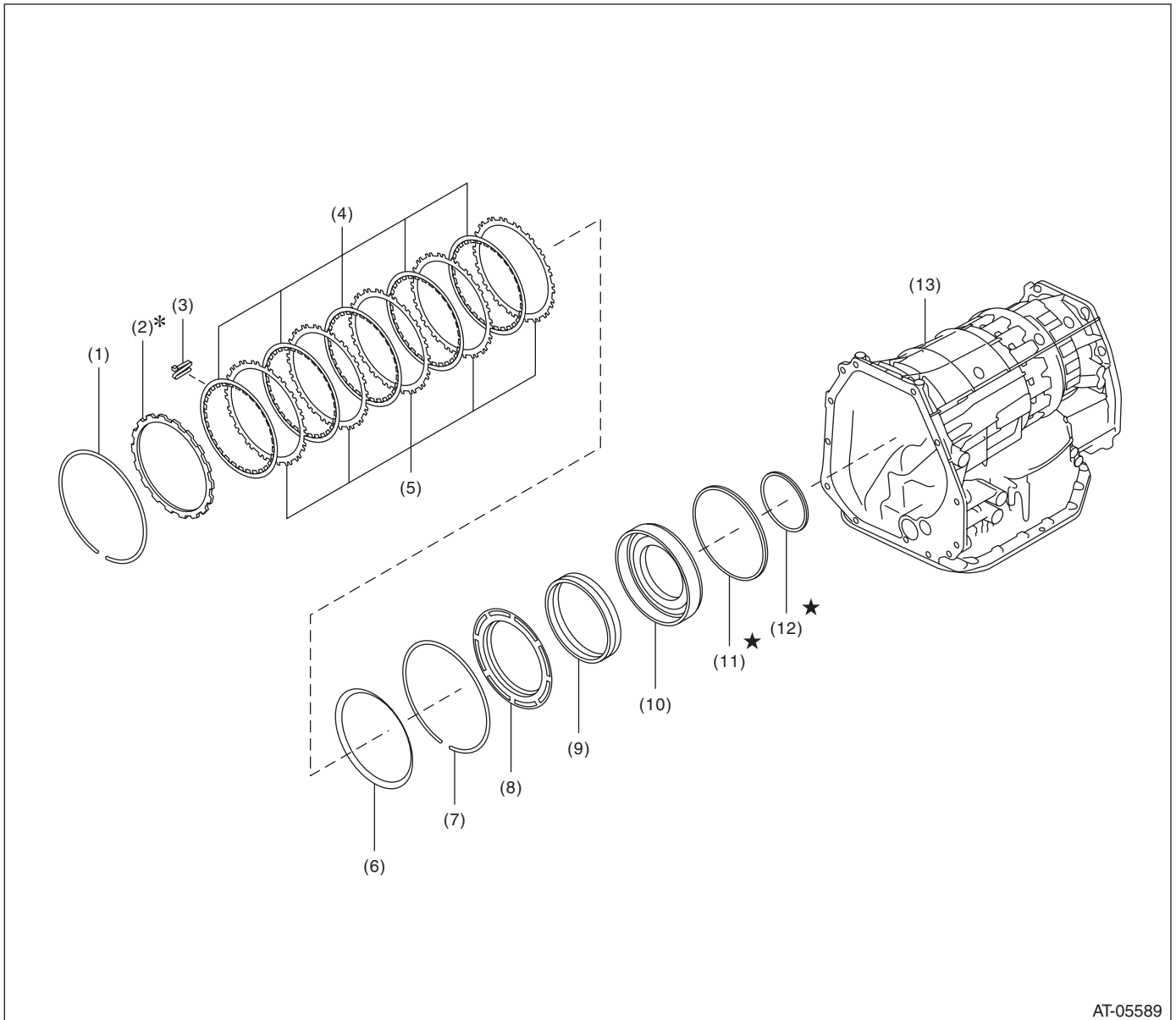
(2) High & low reverse clutch ASSY

(3) Direct clutch ASSY

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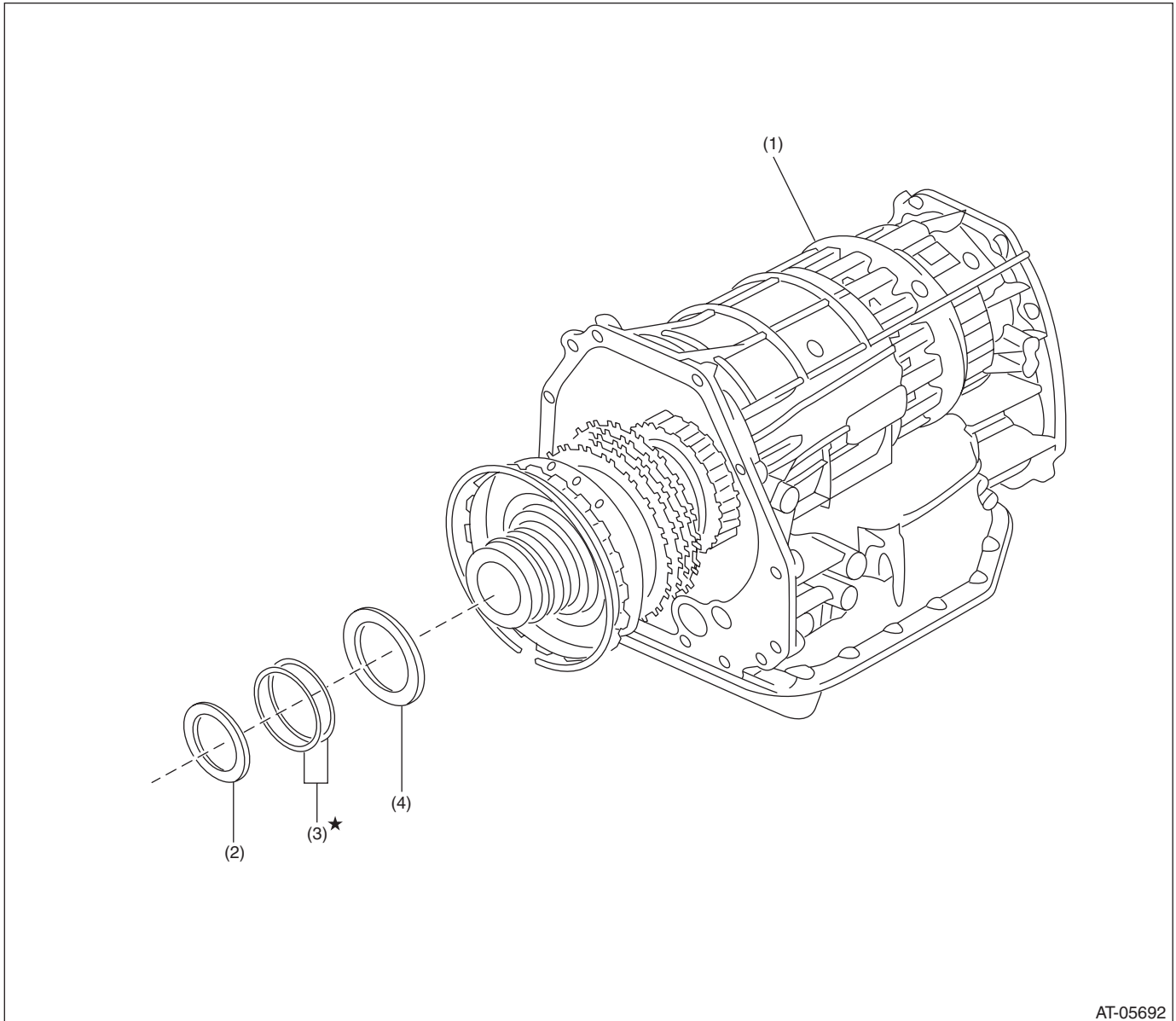
5. REVERSE BRAKE



AT-05589

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

6. SHORT AT ASSEMBLY



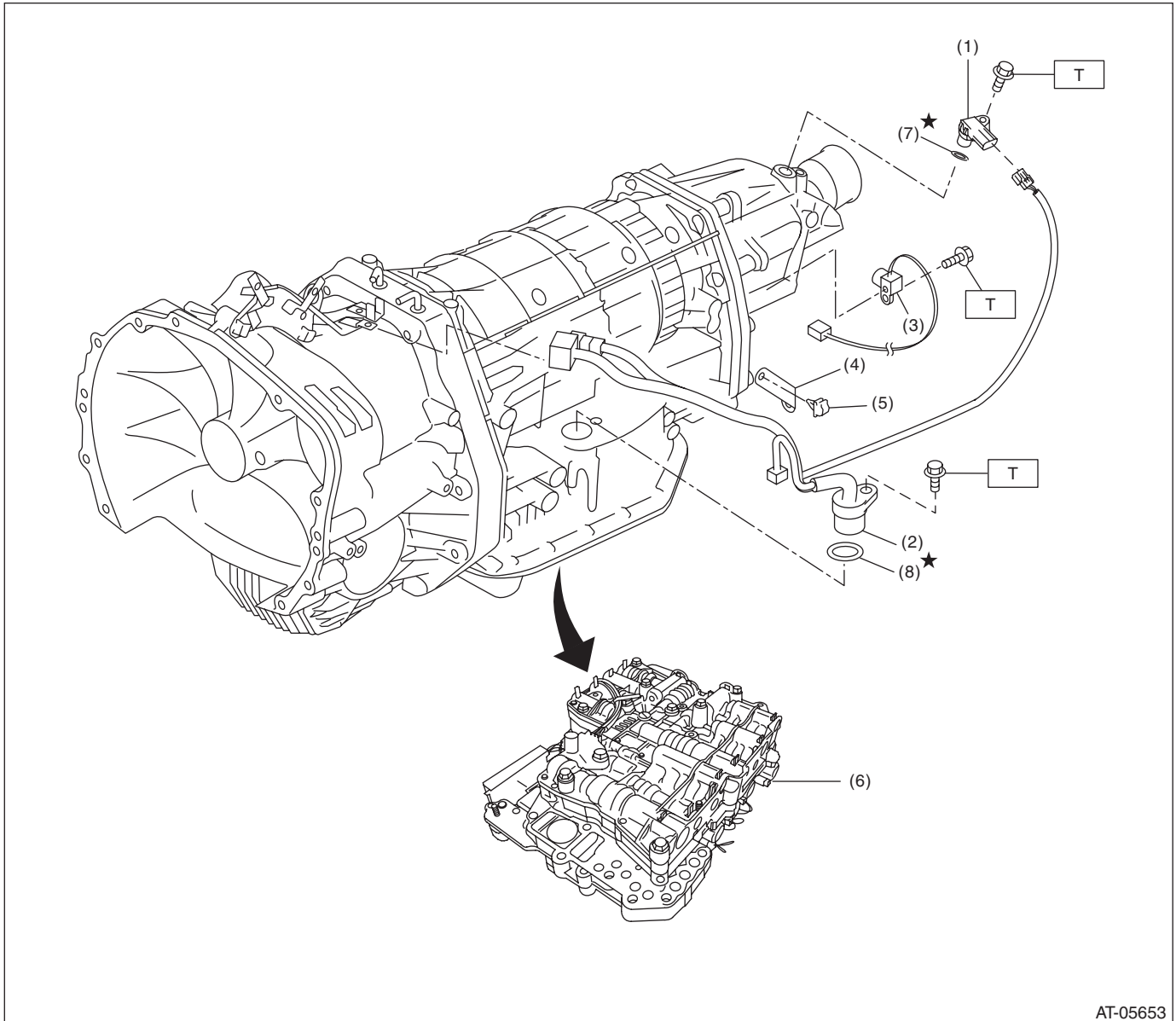
AT-05692

- | | | |
|-------------------------------------|---------------|--------------------|
| (1) Short AT ASSY (non-disassembly) | (3) Seal ring | (4) Thrust bearing |
| (2) Thrust bearing | | |

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7. CONTROL VALVE & TRANSMISSION HARNESS

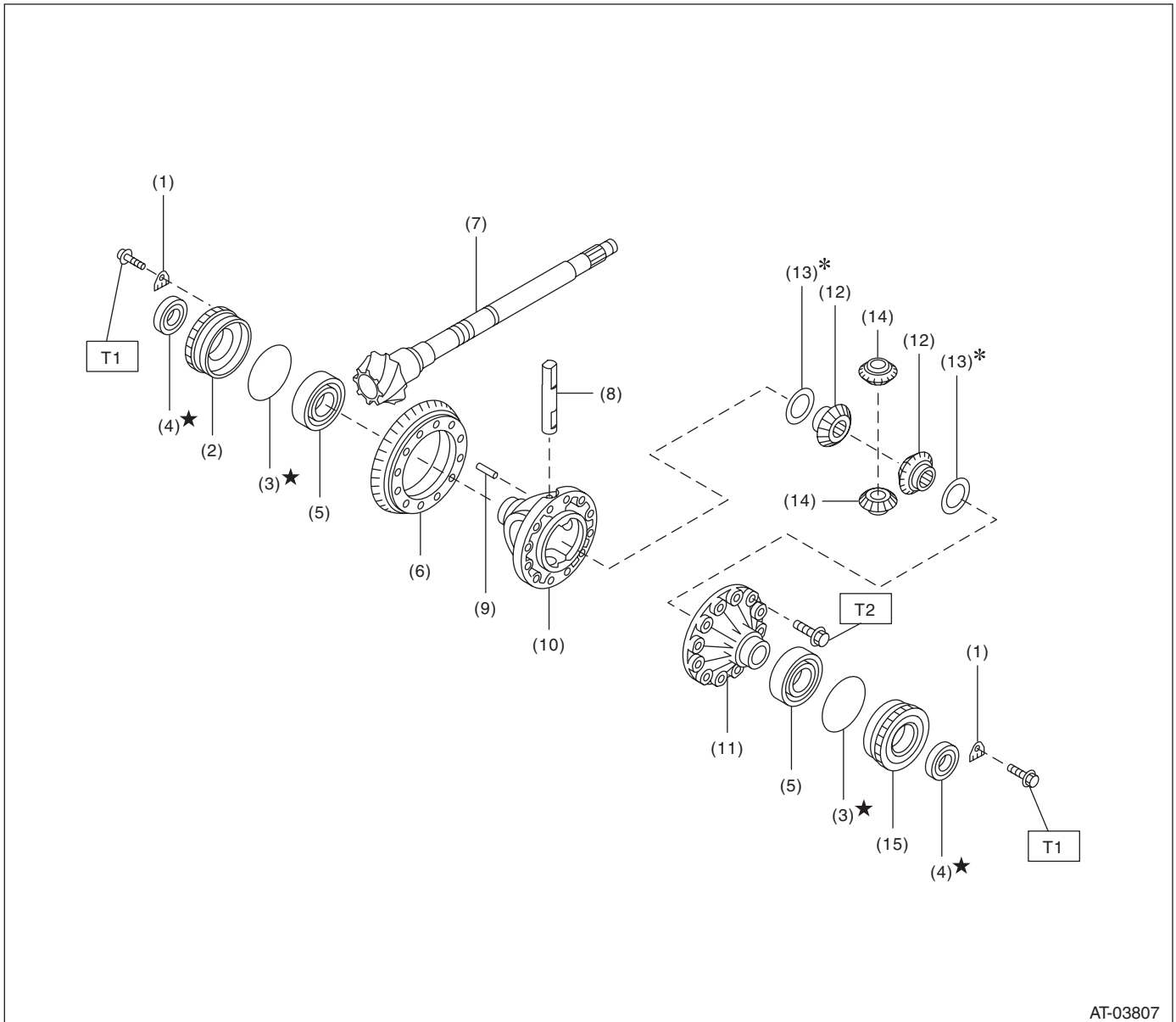


- | | |
|--------------------------------|------------------------|
| (1) Rear vehicle speed sensor | (5) Clip |
| (2) Transmission harness ASSY | (6) Control valve ASSY |
| (3) Front vehicle speed sensor | (7) O-ring |
| (4) Harness bracket | (8) O-ring |

Tightening torque: N·m (kgf-m, ft-lb)

T: 7 (0.7, 5.2)

8. DIFFERENTIAL GEAR



AT-03807

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

Tightening torque: N·m (kgf-m, ft-lb)

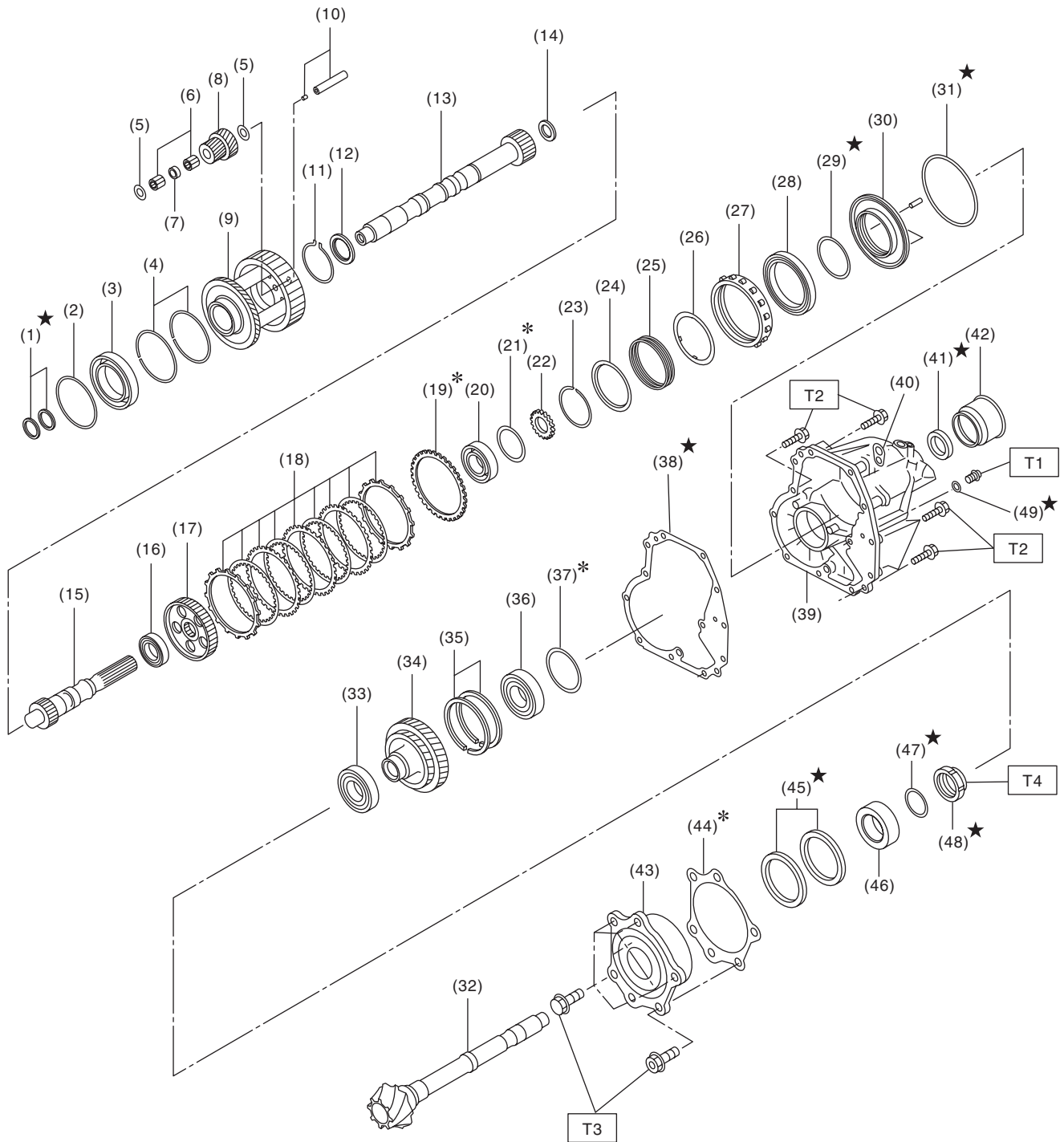
T1: 25 (2.5, 18.4)

T2: 70 (7.1, 51.6)

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9. TRANSFER CASE AND EXTENSION CASE & REDUCTION GEAR



AT-05726

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

Tightening torque: N·m (kgf-m, ft-lb)

T1: 13 (1.3, 9.6)

T2: 25 (2.5, 18.4)

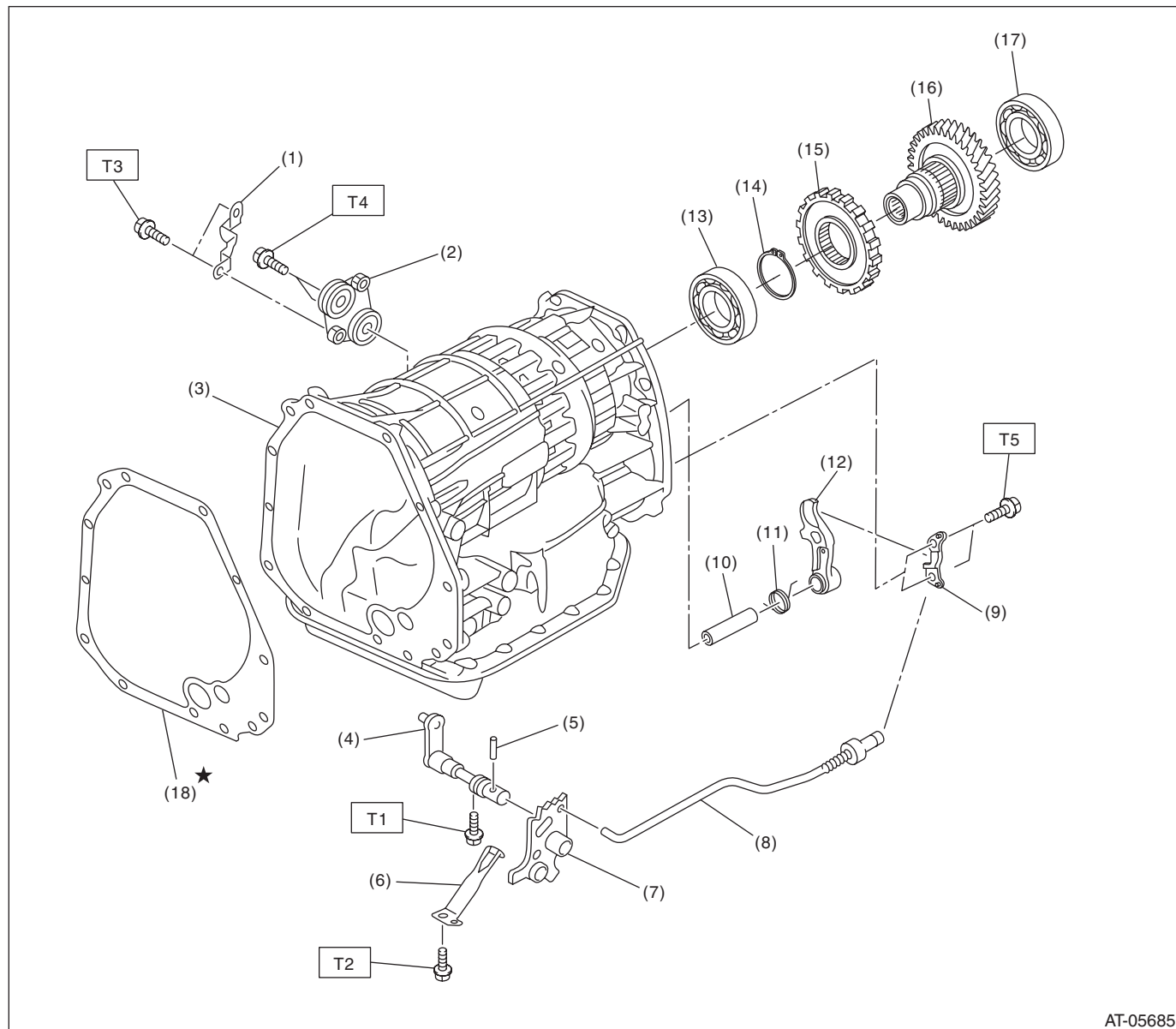
T3: 70 (7.1, 51.6)

T4: 116 (11.8, 85.6)

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10.TRANSMISSION CONTROL DEVICE & PARKING SUPPORT



AT-05685

- | | |
|------------------------------|----------------------------|
| (1) Bracket | (10) Parking pawl shaft |
| (2) Floating bracket | (11) Return spring |
| (3) AT main case | (12) Parking pawl |
| (4) Range select lever | (13) Ball bearing |
| (5) Straight pin | (14) Snap ring |
| (6) Detent spring | (15) Parking gear |
| (7) Manual plate | (16) Reduction driven gear |
| (8) Parking rod | (17) Ball bearing |
| (9) Parking support actuator | (18) Gasket |

Tightening torque: N·m (kgf-m, ft-lb)

T1: 6 (0.6, 4.4)

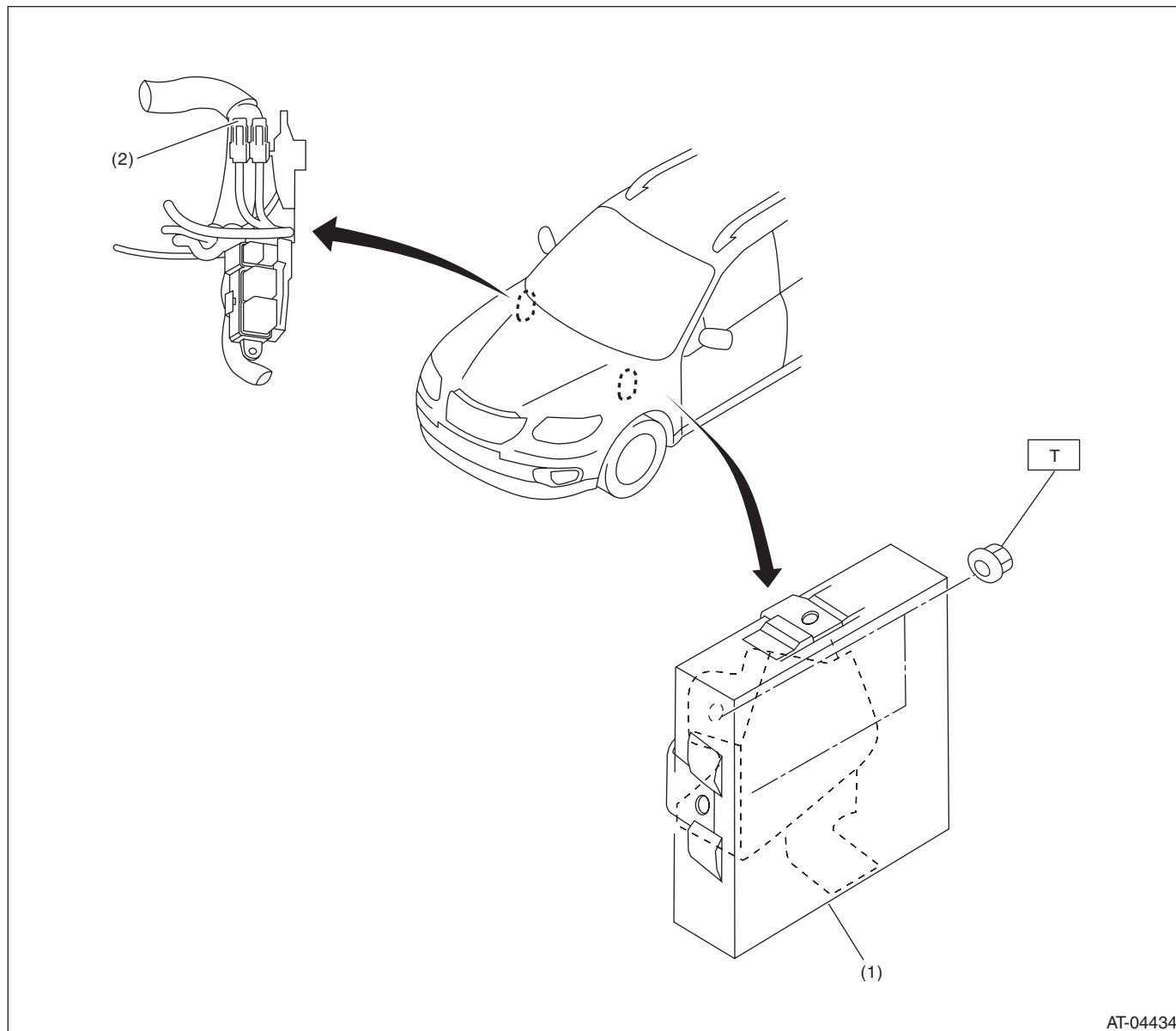
T2: 7 (0.7, 5.2)

T3: 18 (1.8, 13.3)

T4: 25 (2.5, 18.4)

T5: <Ref. to 5AT-74, Parking Pawl.>

11.TRANSMISSION CONTROL MODULE



AT-04434

(1) Transmission control module (TCM)

(2) Back-up light relay

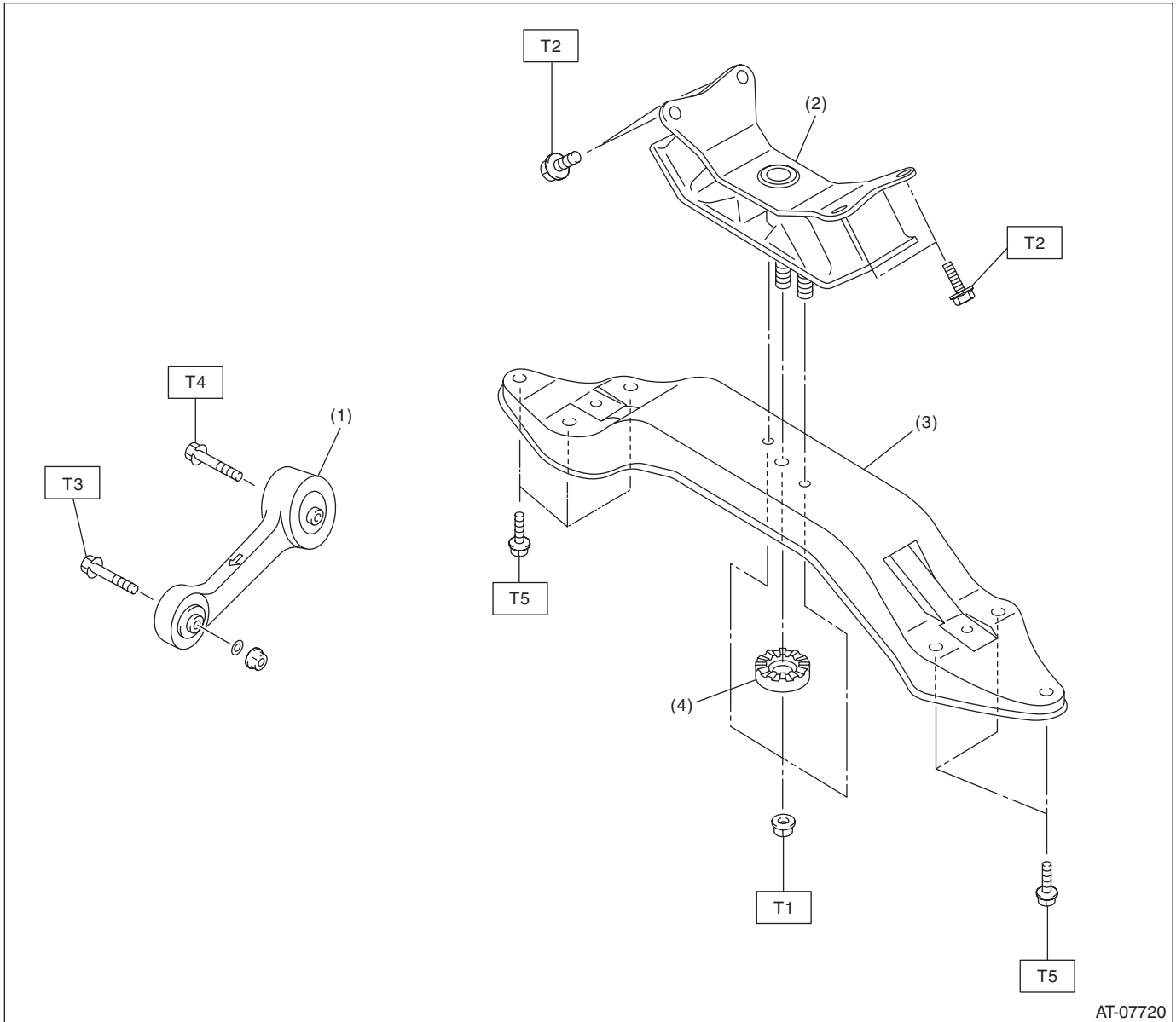
Tightening torque: N·m (kgf·m, ft·lb)

T: 7.5 (0.8, 5.5)

AUTOMATIC TRANSMISSION

- Tightening torque: N·m (kgf-m, ft-lb)**
T: 7.5 (0.8, 5.5)

13.TRANSMISSION MOUNTING



AT-07720

- | | |
|-------------------------|-----------------|
| (1) Pitching stopper | (3) Crossmember |
| (2) Rear cushion rubber | (4) Stopper |

Tightening torque: N·m (kgf·m, ft·lb)

T1: 35 (3.6, 25.8)

T2: 40 (4.1, 29.5)

T3: 50 (5.1, 36.9)

T4: 58 (5.9, 42.8)

T5: 75 (7.6, 55.3)

General Description

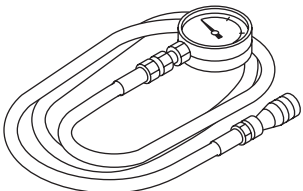
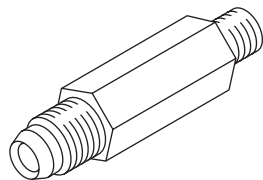
AUTOMATIC TRANSMISSION

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 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 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.
- During disassembly or assembly, be sure to use nylon gloves or paper towels. Do not use cloth gloves or waste cloth.

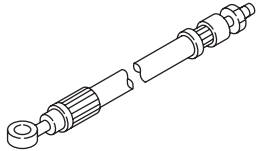
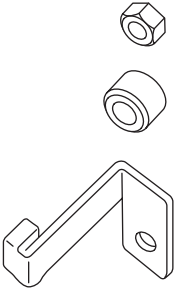
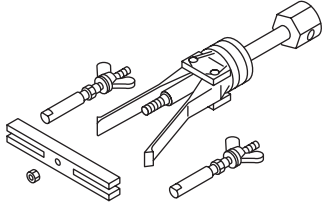
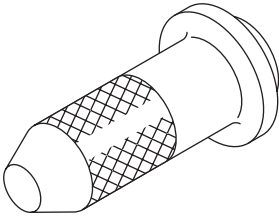
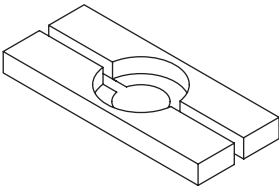
D: PREPARATION TOOL

1. SPECIAL TOOL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-498575400	498575400	OIL PRESSURE GAUGE ASSY	Used for measuring oil pressure.
 ST-498897200	498897200	OIL PRESSURE ADAPTER	Used together with oil pump cover installed on when measuring line pressure.

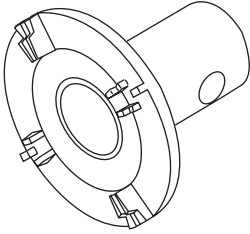
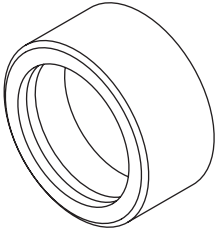
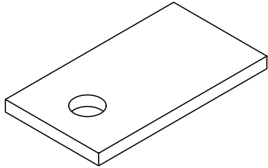
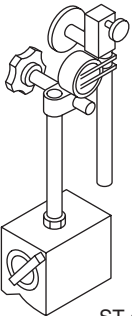
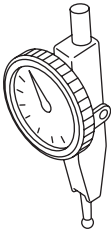
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ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-498897800	498897800	OIL PRESSURE ADAPTER SET	Used for measuring the transfer clutch pressure.
 ST-498277200	498277200	STOPPER SET	• Used for removing and installing the automatic transmission assembly. • Used for preventing the torque converter from dropping off.
 ST-398527700	398527700	PULLER ASSY	• Used for removing the extension oil seal. • Used for removing the front differential side retainer bearing outer race.
 ST-498057300	498057300	INSTALLER	Used for installing the extension oil seal.
 ST-498077000	498077000	REMOVER	• Used for removing the front differential taper roller bearing. • Used for installing the center differential ball bearing.

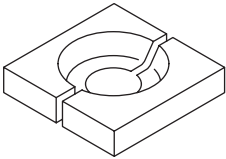
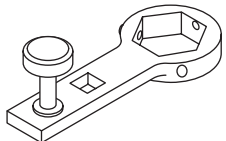
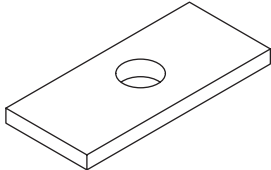
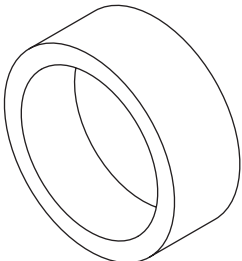
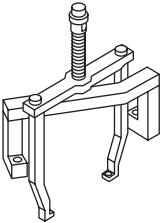
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ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST18658AA020	18658AA020	WRENCH COMPL RETAINER	- Used for removing and installing the differential side retainer. - WRENCH COMPL RETAINER (18630AA010) can also be used.
 ST-398487700	398487700	DRIFT	Used 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).
 ST-498247100	498247100	DIAL GAUGE	- Used for measuring the gear backlash. - Used together with MAGNET BASE (498247001).

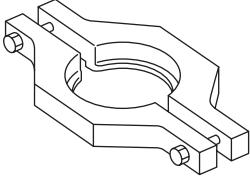
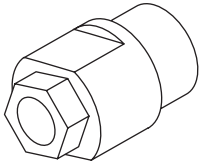
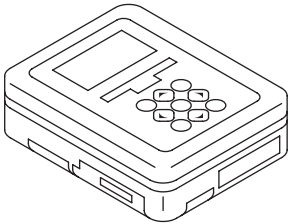
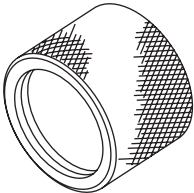
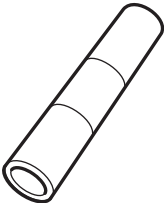
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ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-498517000	498517000	REPLACER	Used for removing the drive pinion shaft front roller bearing.
 ST-499787700	499787700	WRENCH	• Used for removing and installing the drive pinion shaft lock nut. • Used for adjusting the front differential hypoid gear backlash.
 ST-398643600	398643600	GAUGE	Used for measuring 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.
 ST-499737100	499737100	PULLER SET	• Used for removing the reduction driven gear assembly. • Used together with GEAR HOLDER (18680AA010) and SUPPORT PULLER (18766AA000).

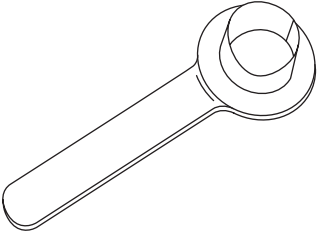
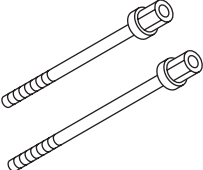
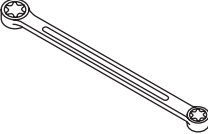
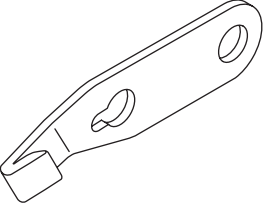
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ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-498077600	498077600	REMOVER	Used for removing the center differential ball bearing.
 ST18667AA010	18667AA010	HOLDER	• Used for removing and installing the drive pinion lock nut. • Used as a handle to rotate gear when checking tooth contact. • Used for adjusting preload on the front differential side bearing.
 ST1B022XU0	1B022XU0	SUBARU SELECT MONITOR III 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 installing the reduction driven gear ball bearing.

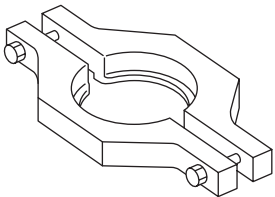
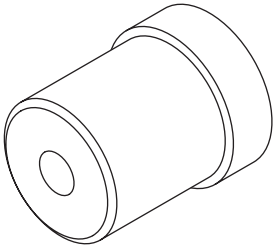
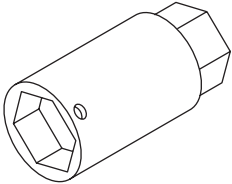
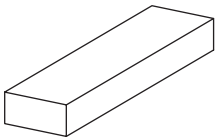
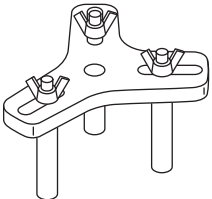
General Description

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 and assembling front brake clutch and reverse brake clutch.
 ST18765AA000	18765AA000	COMPRESSOR SUPPORT	Used for disassembling and assembling front brake clutch and reverse brake clutch.
 ST18676AA020	18676AA020	TORX® WRENCH	Used for removing and installing the torque converter case.
 ST-498497100	498497100	CRANKSHAFT STOPPER	Used for stopping the drive plate rotation when removing and installing the drive plate.

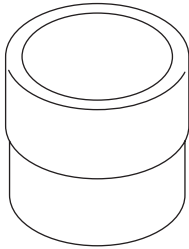
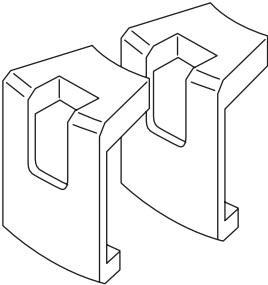
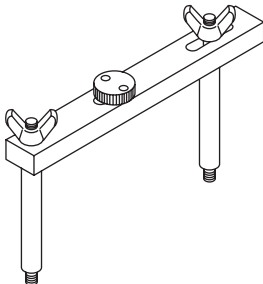
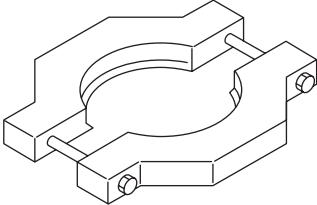
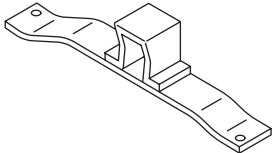
General Description

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 converter case oil seal.
 ST-499787500	499787500	ADAPTER	• Used for installing and removing drive pinion shaft lock nut. • Used for adjusting preload on the front differential side bearing.
 ST-499575400	499575400	GAUGE	Used for adjusting the total end play (selecting the reduction driven gear shim).
 ST18762AA000	18762AA000	COMPRESSOR SPECIAL TOOL	• Used for disassembling and assembling front brake clutch and reverse brake clutch. • Used together with COMPRESSOR SHAFT (18763AA000) and COMPRESSOR SUPPORT (18765AA000).

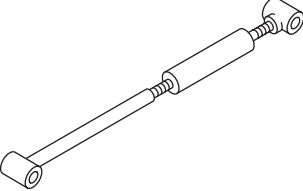
General Description

AUTOMATIC TRANSMISSION

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-499755602	499755602	PRESS	Used for installing the parking gear.
 ST18680AA010	18680AA010	GEAR HOLDER	Used for removing the reduction driven gear assembly. (2-piece set)
 ST18766AA000	18766AA000	SUPPORT PULLER	Used for removing the reduction driven gear assembly.
 ST18767AA000	18767AA000	REMOVER	Used for removing the parking gear.
 ST41099AA010	41099AA010	ENGINE SUPPORT BRACKET	Used for supporting engine.

General Description

AUTOMATIC TRANSMISSION

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST41099AA020	41099AA020	ENGINE SUPPORT	Used for supporting engine.

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 the differential gear oil drain plug.
Snap ring pliers	Used for removing and installing each snap ring.
Angle gauge	Used for tightening parking support.

2. Automatic Transmission Fluid

A: INSPECTION

NOTE:

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

1) Raise the ATF temperature by driving a distance of 5 to 10 km (3 to 6 miles). Otherwise, idle the engine to raise ATF temperature to 70 — 80°C (158 — 176°F) on Subaru Select Monitor. <Ref. to 5AT(diag)-16, READ CURRENT DATA, OPERATION, Subaru Select Monitor.>

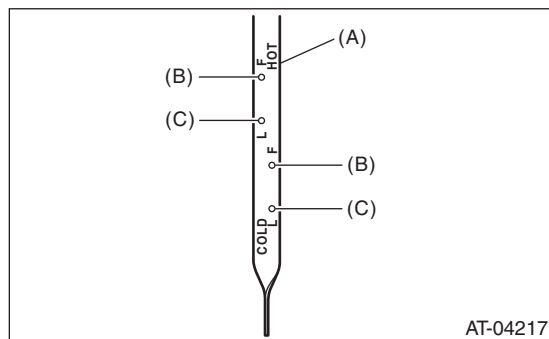
2) Park the vehicle on a level surface.

3) After selecting all positions (P, R, N, D), set the select lever in "P" range. Idle the engine for 1 to 2 minutes.

4) Remove the oil level gauge and wipe it clean.

5) Reinsert the level gauge all the way. Make sure the level gauge is inserted correctly and in the proper orientation.

6) Remove the oil level gauge again and make sure that the ATF level is between upper and lower marks of the HOT side.



(A) ATF level gauge

(B) Upper level

(C) Lower level

7) 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.

8) 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 idling for a long time, the ATF is hot. Be careful not to burn yourself.

• Be careful not to spill the ATF on the exhaust pipe to prevent it from emitting smoke or causing fire. If ATF is spilled on the exhaust pipe, wipe it off completely.

3) Check the ATF condition. <Ref. to 5AT-30, CONDITION CHECK, Automatic Transmission Fluid.>

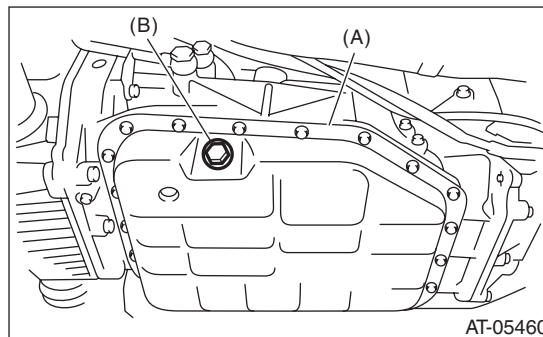
4) Tighten the ATF drain plug.

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.

Recommended fluid:

<Ref. to 5AT-3, HYDRAULIC CONTROL AND LUBRICATION, SPECIFICATION, General Description.>

CAUTION:

Be sure to use the recommended or equivalent ATF. Using material except recommended one or substitute would cause trouble.

Capacity:

Fill with the same amount of ATF as 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-29, INSPECTION, Automatic Transmission Fluid.>

Automatic Transmission Fluid

AUTOMATIC TRANSMISSION

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.

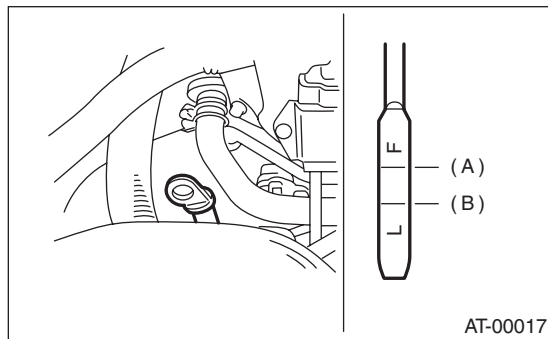
3. Differential Gear Oil

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 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) Drain the differential gear oil by removing drain plug using TORX® bit T70.

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.

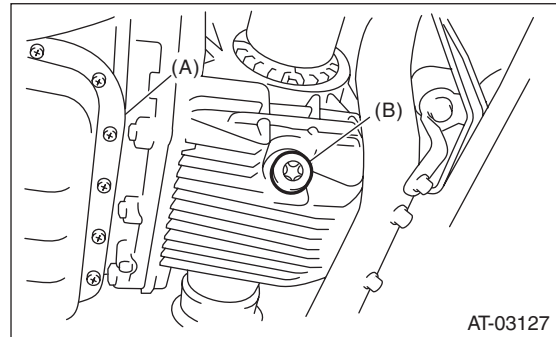
- 3) Tighten the drain plug using TORX® bit T70.

NOTE:

Use a new gasket.

Tightening torque:

70 N·m (7.1 kgf-m, 51.6 ft-lb)



- (A) Oil pan
(B) Drain plug

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

Recommended gear oil:

<Ref. to 5AT-4, 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-31, 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 — 60 km/h (31 — 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. LOCK-UP FUNCTION

When the accelerator is lightly depressed while driving on a flat road in the lock-up range, check that rpm does not change abruptly.

7. 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.

8. NOISE & VIBRATION

Check for noise and vibration while driving and during shifting.

9. OIL LEAKAGE

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

5. Stall Test

A: INSPECTION

NOTE:

The stall test is extremely important in diagnosing the condition of an automatic transmission and engine. The test is necessary to measure the engine stall speeds in "2nd gear 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, then set to "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 one minute or more.

NOTE:

- Do not perform a stall test for over 5 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.
- When depressing the accelerator pedal again after performing the stall test for 5 seconds or more, the electronic throttle control remains closed for approx. 60 seconds.
- When the stall test is performed for 15 seconds or more continuously, the test is completed forcibly to protect the transmission unit.

When depressing the accelerator pedal again, the electronic throttle control remains closed for approx. 60 seconds.

Stall speed (at sea level):

2,100 — 2,600 rpm

Stall speed (at sea level)	Range	Possible faulty parts
Over specified value	2nd gear of manual mode	• Line pressure too low • Forward brake • Direct clutch • 3rd one-way 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 and 3rd one-way clutch.

- Perform the test at normal operation fluid temperature of 70 — 80°C (158 — 176°F).
- Be sure to allow one minute or more 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

Standard: 1.2 seconds 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

Standard: 1.5 seconds or less

If “N” → “R” time lag is longer than specification:

- Line pressure too low
- Reverse brake worn

7. Line Pressure Test

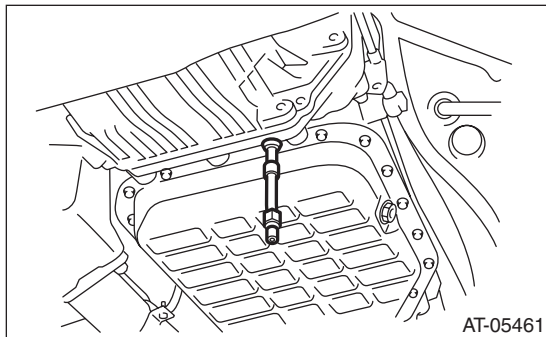
A: MEASUREMENT

NOTE:

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

- Excessive shock during up-shift may be due to the line pressure being too high.
- In many cases, slippage or inability to operate the vehicle may be due to insufficient oil pressure for the operation of clutch, brake or control valve.

- 1) Lift up the vehicle.
 - 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 ST2, which was set in step 3), into the vehicle.
 - 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 line pressure test in the same manner as the stall test.

NOTE:

- Do not perform the line pressure test for 5 seconds or more 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.

Range of the select lever	Accelerator pedal opening angle	ATF temperature condition	"P/L Solenoid Pressure" displayed on the Subaru Select Monitor kPa	Standard line pressure kPa (kg/cm ² , psi)
2nd gear of manual mode	Full closed	45 — 55°C (113 — 131°F)	350 — 500	Target pressure (displayed on Subaru Select Monitor) -10 — +190 (Target pressure -0.10 — +1.94, Target pressure -1.45 — +27.5)
	Full open		2,000 or more	1,320 — 1,520 (13.46 — 15.50, 191.4 — 220.4)
R	Full open		1,600 or more	1,660 — 1,860 (16.93 — 18.97, 240.7 — 269.7)

- 8) Remove the ST and install the test plug.

NOTE:

Use new O-rings.

Tightening torque:

13 N·m (1.3 kgf·m, 9.6 ft·lb)

Transfer Clutch Pressure Test

AUTOMATIC TRANSMISSION

8. Transfer Clutch Pressure Test

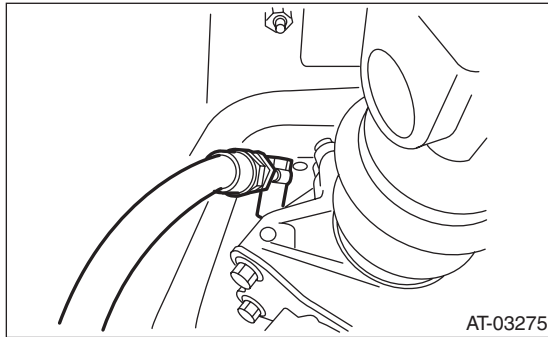
A: INSPECTION

- 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 498897800 OIL PRESSURE ADAPTER SET



- 4) Set the ST.
ST 498575400 OIL PRESSURE GAUGE ASSY
- 5) Lower the vehicle, and pull ST, which were set in step 4), into the vehicle.
- 6) Connect the Subaru Select Monitor to the data link connector and read the current data. <Ref. to 5AT(di-ag)-16, READ CURRENT DATA, OPERATION, Subaru Select Monitor.>
- 7) Perform the transfer clutch pressure test in the same manner as the line pressure test.

NOTE:

- Do not perform the transfer clutch pressure test for 5 seconds or more 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 accelerator pedal opening angle in order to obtain the “T/F solenoid target pressure” displayed on the Subaru Select Monitor.

Range of the select lever	Accelerator pedal opening angle	ATF temperature condition	“T/F Solenoid Target Pressure” displayed on the Subaru Select Monitor kPa	Standard transfer clutch pressure kPa (kg/cm ² , psi)
2nd gear of manual mode	Partial throttle	45 — 55°C (113 — 131°F)	400	300 — 500 (3.06 — 5.10, 43.5 — 72.5)
N	Full closed		0	0 — 50 (0 — 0.51, 0 — 7.2)

- 8) Remove the ST and install the test plug.

NOTE:

Use new O-rings.

Tightening torque:

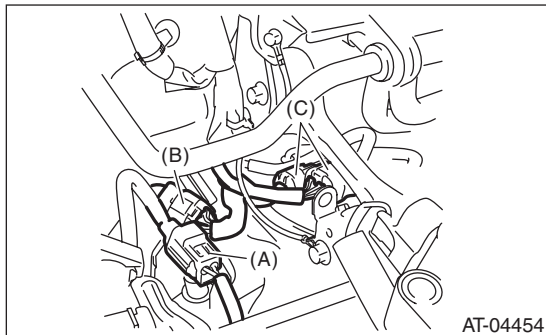
13 N·m (1.3 kgf-m, 9.6 ft-lb)

- 9) Install the heat shield cover. <Ref. to EI-54, INSTALLATION, Heat Shield Cover.>

9. Automatic Transmission Assembly

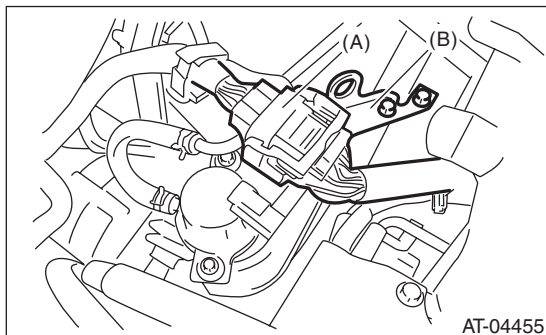
A: REMOVAL

- 1) Open the front hood and support with the hood stay.
- 2) Disconnect the ground cable from battery.
- 3) Remove the collector cover.
- 4) Remove the air intake chamber and intake boot. <Ref. to IN(H6DO)-8, REMOVAL, Air Intake Chamber.>
- 5) Remove the air breather hose. <Ref. to 5AT-59, REMOVAL, Air Breather Hose.>
- 6) Remove the starter. <Ref. to SC(H6DO)-6, REMOVAL, Starter.>
- 7) Disconnect the front oxygen (A/F) sensor, rear oxygen sensor and transmission harness connector.



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

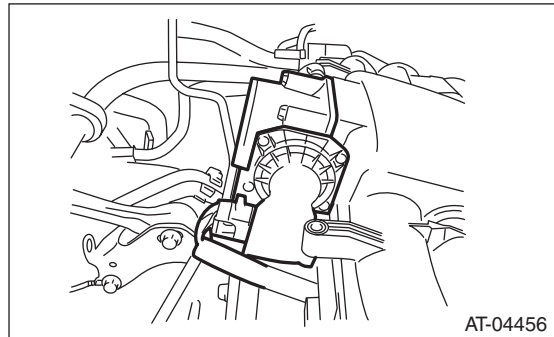
- 8) Disconnect the engine harness connectors, and then remove the engine hanger rear.



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

- 9) Remove the vacuum pipe & hose assembly and the brake vacuum pump. <Ref. to BR-41, REMOVAL, Brake Vacuum Pump.>

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



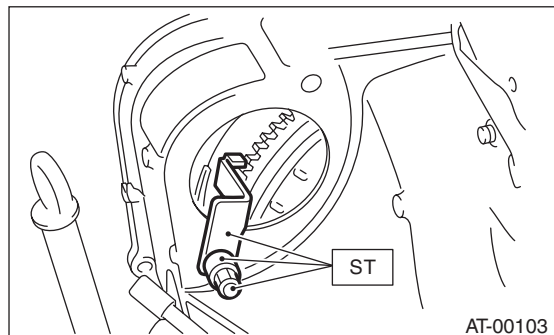
- 11) Separate the torque converter from drive plate.
 - (1) Remove the service hole plug.
 - (2) Remove the bolts which hold torque converter to drive plate.
 - (3) Remove the four bolts by rotating the crank pulley a little at a time.
 - (4) Make sure the torque converter moves freely by rotating with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

CAUTION:

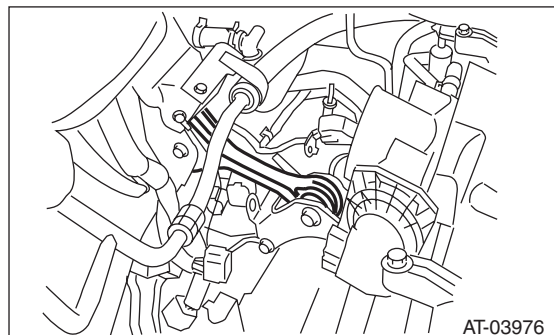
Be careful not to drop bolts into the converter housing.

- 12) Attach the ST to the converter case.

ST 498277200 STOPPER SET



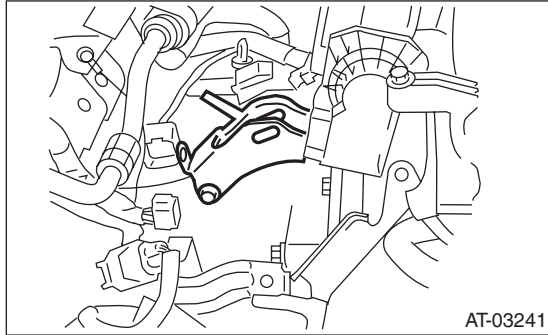
- 13) Remove the pitching stopper.



Automatic Transmission Assembly

AUTOMATIC TRANSMISSION

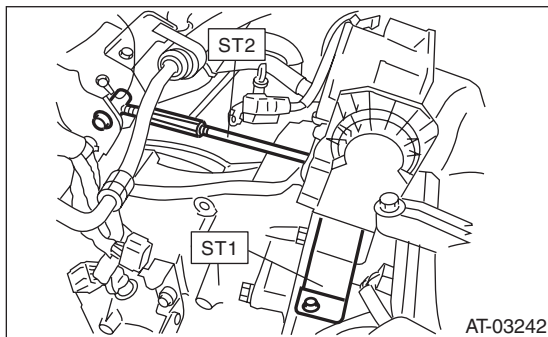
14) Remove the pitching stopper bracket.



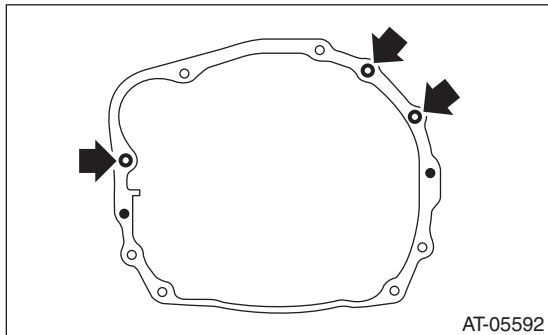
15) Set the ST.

ST1 41099AA010 ENGINE SUPPORT BRACKET

ST2 41099AA020 ENGINE SUPPORT



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

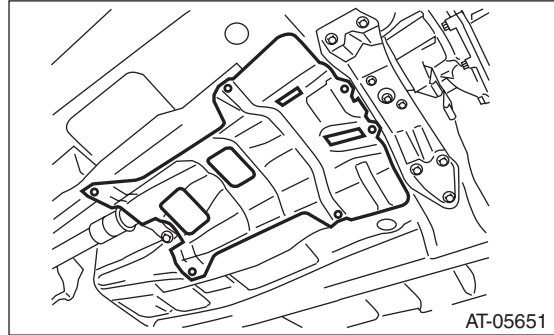


17) Lift up the vehicle.

18) Remove the under cover.

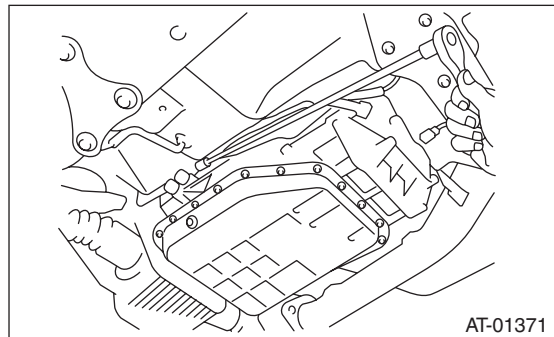
19) Remove the front exhaust pipe, rear exhaust pipe and muffler. <Ref. to EX(H6DO)-5, REMOVAL, Front Exhaust Pipe.> <Ref. to EX(H6DO)-7, REMOVAL, Rear Exhaust Pipe.> <Ref. to EX(H6DO)-9, REMOVAL, Muffler.>

20) Remove the heat shield cover.

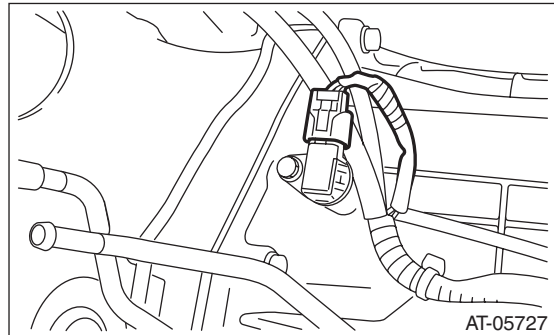


21) Remove the ATF drain plug to drain ATF. <Ref. to 5AT-29, REPLACEMENT, Automatic Transmission Fluid.>

22) Remove the oil charge pipe.



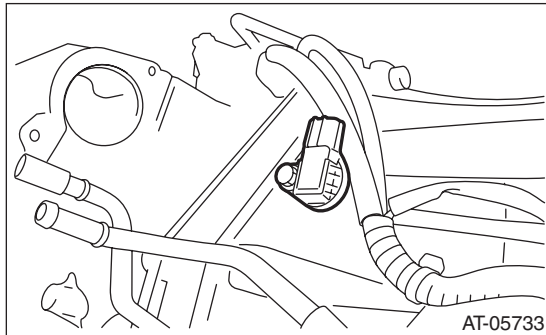
23) Disconnect the connector from turbine speed sensor 1.



24) 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.

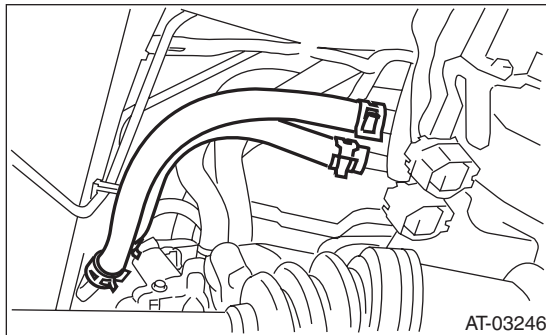


25) To prevent contamination by foreign objects, cover the attachment hole for turbine speed sensor 1 with vinyl tape.

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

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

28) Disconnect the ATF AT inlet and outlet hoses from the ATF AT inlet and outlet pipes.



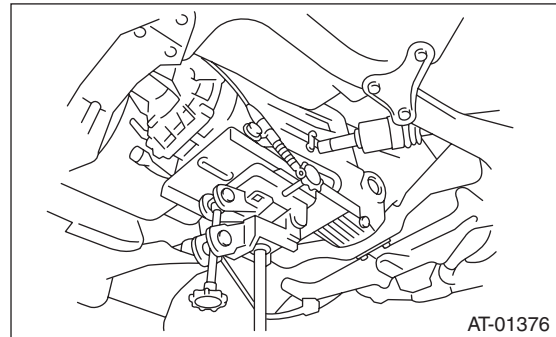
29) Remove the front crossmember support plate. <Ref. to FS-13, REMOVAL, Front Crossmember Support Plate.>

30) Remove the front stabilizer clamp. <Ref. to FS-14, REMOVAL, Front Stabilizer.>

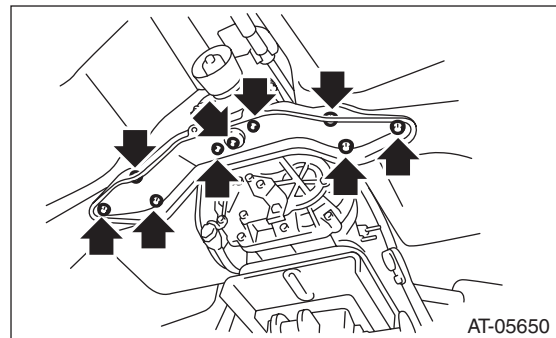
31) Remove the bolts which secure front ball joint to the housing. <Ref. to FS-15, REMOVAL, Front Ball Joint.>

32) Pull out the drive shaft from transmission.

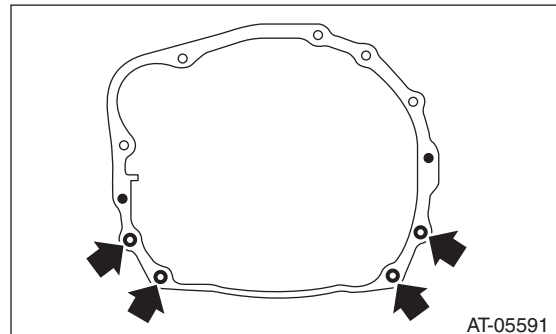
33) Set the transmission jack under the transmission.



34) Remove the rear crossmember from the vehicle.



35) Remove the transmission mounting bolt and nut (lower side).



36) 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.

37) Remove the rear cushion rubber from the transmission.

Automatic Transmission Assembly

AUTOMATIC TRANSMISSION

B: INSTALLATION

1) Replace the front differential side retainer oil seal.

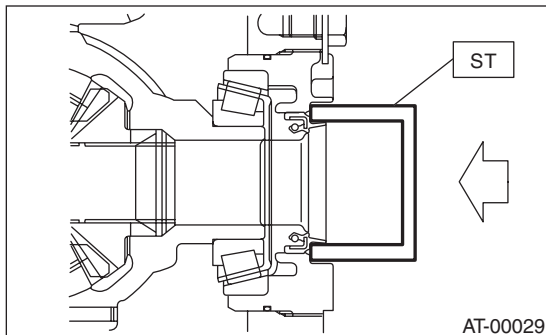
(1) Remove the oil seal by using flat tip screwdriver etc.

(2) Install a new oil seal using ST.

ST 18675AA000 DIFFERENTIAL SIDE OIL SEAL INSTALLER

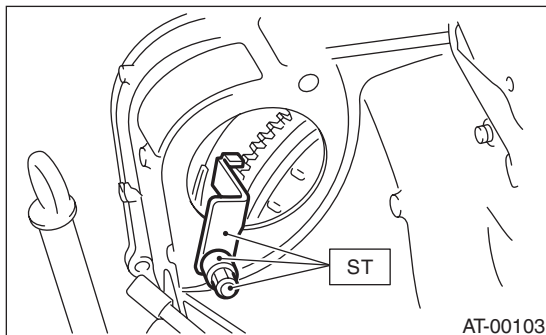
NOTE:

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



2) Attach the ST to converter case.

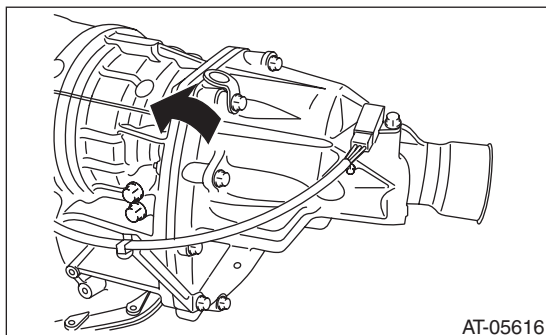
ST 498277200 STOPPER SET



3) Tap the transmission hanger in the rear side of transmission with a rubber hammer to bend it until it is in close contact with the transmission case.

CAUTION:

Do not apply excessive load or impact to the transmission case.



4) Install the rear cushion rubber.

Tightening torque:

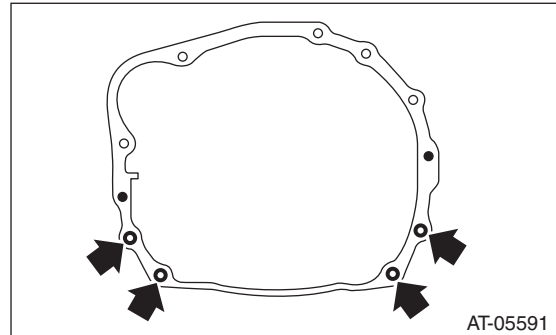
40 N·m (4.1 kgf-m, 29.5 ft-lb)

5) Install the transmission onto the engine.

6) Install the engine mounting bolt and nut (lower side).

Tightening torque:

50 N·m (5.1 kgf-m, 36.9 ft-lb)

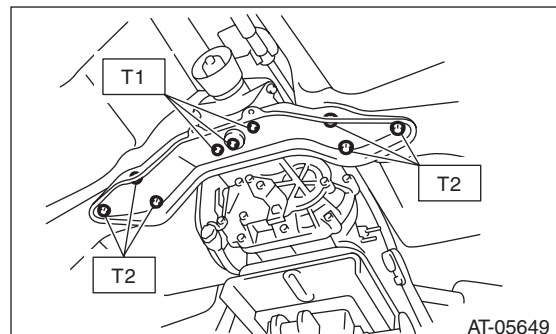


7) Install the transmission rear crossmember.

Tightening torque:

T1: 35 N·m (3.6 kgf-m, 25.8 ft-lb)

T2: 75 N·m (7.6 kgf-m, 55.3 ft-lb)



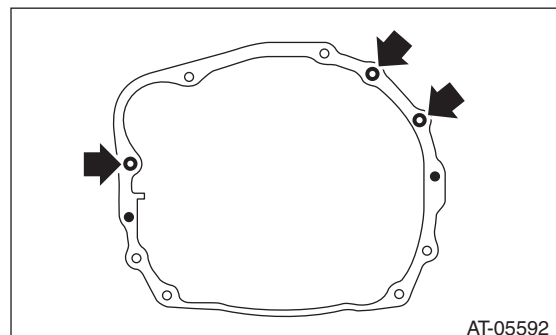
8) Remove the transmission jack.

9) Lower the vehicle.

10) Install the engine mounting bolt (upper side).

Tightening torque:

50 N·m (5.1 kgf-m, 36.9 ft-lb)



11) Remove the ST from converter case.

12) Install the torque converter to drive plate.

CAUTION:

- Be careful not to drop bolts into the converter housing.
- Be careful not to damage the mounting bolts.
 - (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.

Tightening torque:

25 N·m (2.5 kgf-m, 18.4 ft-lb)

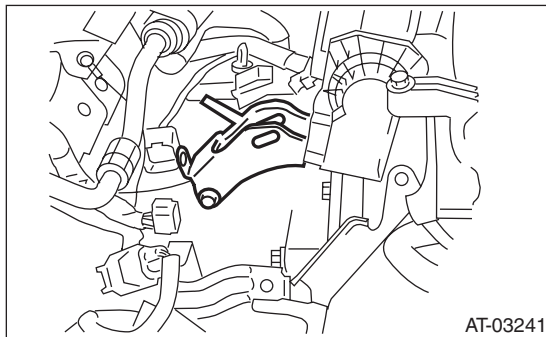
(3) Install the service hole plug.

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

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

Tightening torque:

41 N·m (4.2 kgf-m, 30.2 ft-lb)

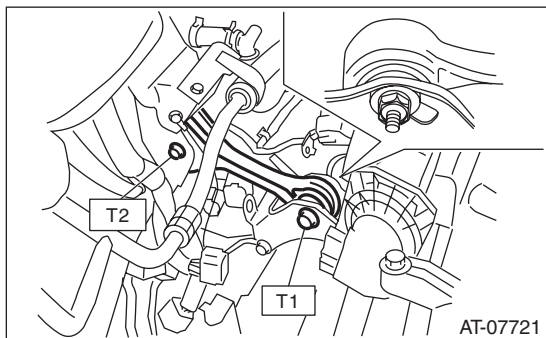


15) Install the pitching stopper.

Tightening torque:

T1: 50 N·m (5.1 kgf-m, 36.9 ft-lb)

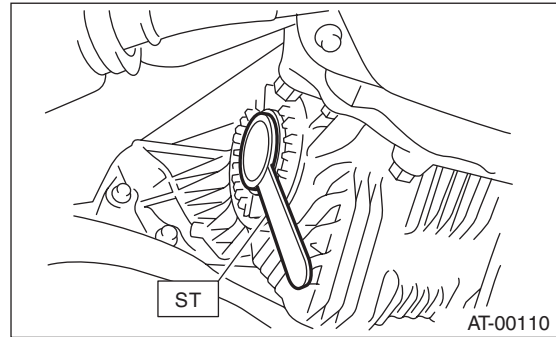
T2: 58 N·m (5.9 kgf-m, 42.8 ft-lb)



16) Lift up the vehicle.

17) Set the ST to side retainer.

ST 28399SA010 OIL SEAL PROTECTOR



18) Install the front drive shaft into the transmission.

NOTE:

Replace the circlip of drive shaft with a new part.

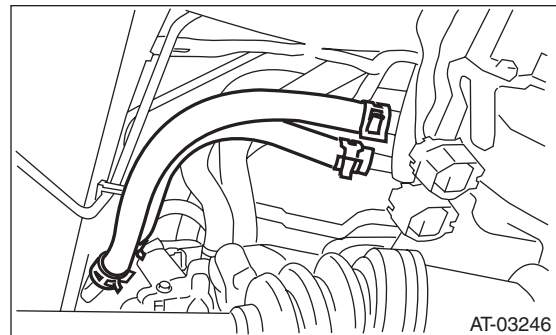
19) Install the front drive shaft into transmission, remove the ST and insert the drive shaft securely.

ST 28399SA010 OIL SEAL PROTECTOR

20) Connect the ATF AT inlet and outlet hoses to the ATF AT inlet and outlet pipes.

NOTE:

Use a new ATF hose.



21) Insert the ball joint into housing. <Ref. to FS-15, INSTALLATION, Front Ball Joint.>

22) Install the front stabilizer clamp. <Ref. to FS-14, INSTALLATION, Front Stabilizer.>

23) Install the front crossmember support plate. <Ref. to FS-13, 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.>

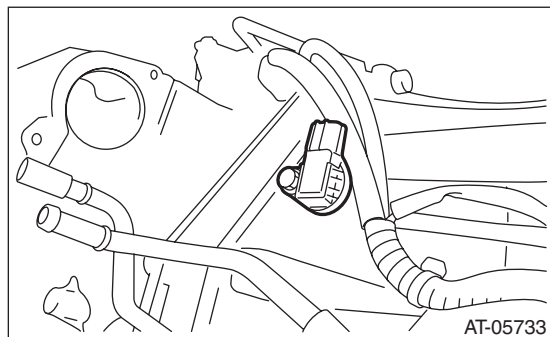
Automatic Transmission Assembly

AUTOMATIC TRANSMISSION

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)



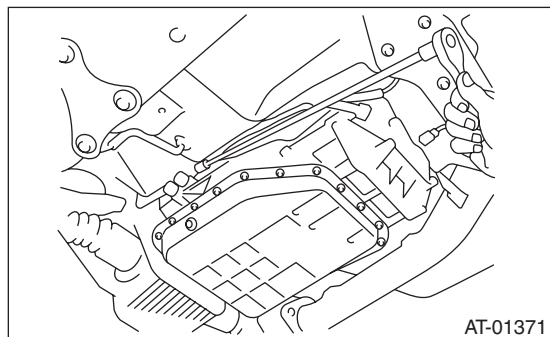
27) Install the oil charge pipe.

NOTE:

Use a new bolt.

Tightening torque:

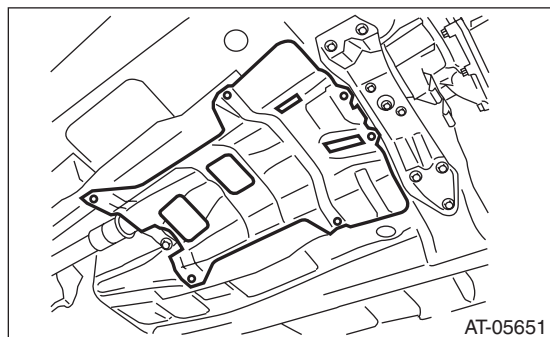
38 N·m (3.9 kgf-m, 28.0 ft-lb)



28) Install the heat shield cover.

Tightening torque:

18 N·m (1.8 kgf-m, 13.3 ft-lb)

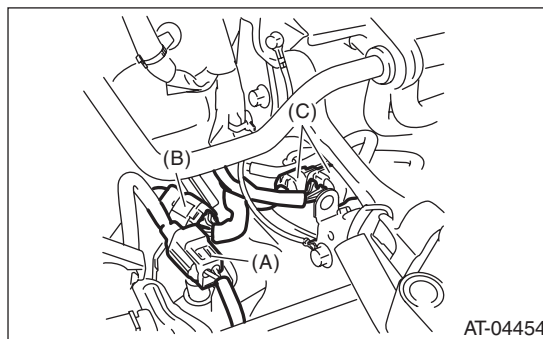


29) Install the front exhaust pipe, rear exhaust pipe and muffler. <Ref. to EX(H6DO)-5, INSTALLATION, Front Exhaust Pipe.> <Ref. to EX(H6DO)-7, INSTALLATION, Rear Exhaust Pipe.> <Ref. to EX(H6DO)-9, INSTALLATION, Muffler.>

30) Install the under cover.

31) Lower the vehicle.

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



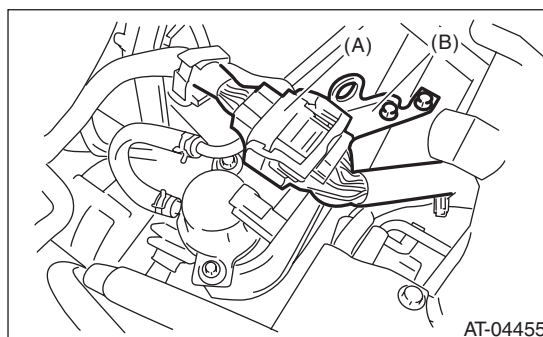
(A) Front oxygen (A/F) sensor connector

(B) Rear oxygen sensor connector

(C) Transmission harness connectors

33) Install the vacuum pump and vacuum pipe & hose. <Ref. to BR-41, INSTALLATION, Brake Vacuum Pump.>

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-29, REPLACEMENT, Automatic Transmission Fluid.>

36) Install the air breather hose. <Ref. to 5AT-59, 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 and intake boot. <Ref. to IN(H6DO)-8, INSTALLATION, Air Intake Chamber.>

39) Install the collector cover.

40) Connect the battery ground terminal.

41) Perform Clear Memory 2 operation. <Ref. to 5AT(diag)-18, CLEAR MEMORY MODE, OPERATION, Subaru Select Monitor.>

42) Perform the diagnosis again. <Ref. to 5AT(diag)-22, PROCEDURE, Learning Control.>

43) Perform the inspection 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.

Transmission Mounting System

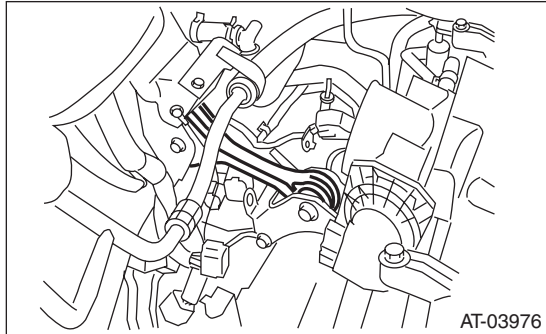
AUTOMATIC TRANSMISSION

10. Transmission Mounting System

A: REMOVAL

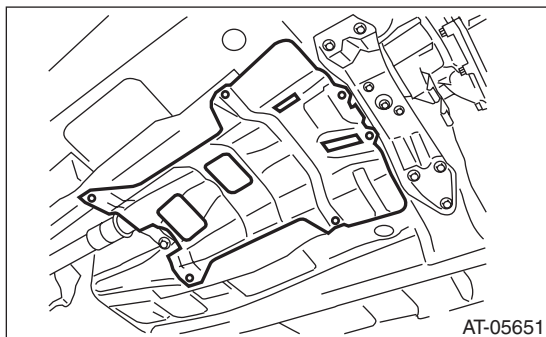
1. PITCHING STOPPER

- 1) Disconnect the ground cable from battery.
- 2) Remove the air intake chamber and intake boot. <Ref. to IN(H6DO)-8, REMOVAL, Air Intake Chamber.>
- 3) Remove the pitching stopper.



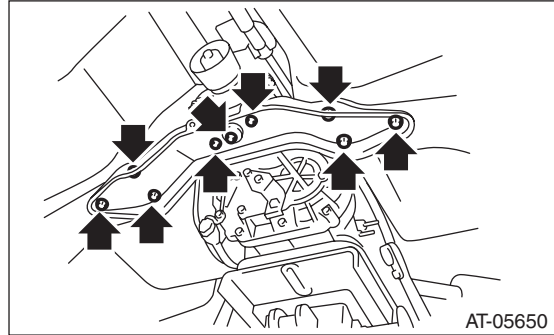
2. TRANSMISSION REAR CROSSMEMBER & REAR CUSHION RUBBER

- 1) Disconnect the ground cable from battery.
- 2) Lift up the vehicle.
- 3) Remove the front exhaust pipe, rear exhaust pipe and muffler. <Ref. to EX(H6DO)-5, REMOVAL, Front Exhaust Pipe.> <Ref. to EX(H6DO)-7, REMOVAL, Rear Exhaust Pipe.> <Ref. to EX(H6DO)-9, REMOVAL, Muffler.>
- 4) Remove the heat shield cover.



- 5) Set the transmission jack under transmission. 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

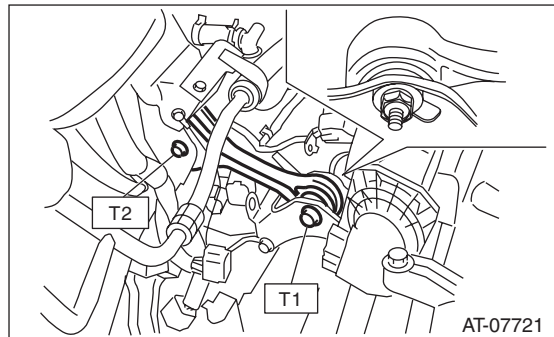
1. PITCHING STOPPER

- 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 and intake boot. <Ref. to IN(H6DO)-8, INSTALLATION, Air Intake Chamber.>
- 3) Connect the battery ground terminal.

2. TRANSMISSION REAR CROSSMEMBER & REAR CUSHION RUBBER

1) Install the rear cushion rubber to the transmission.

Tightening torque:

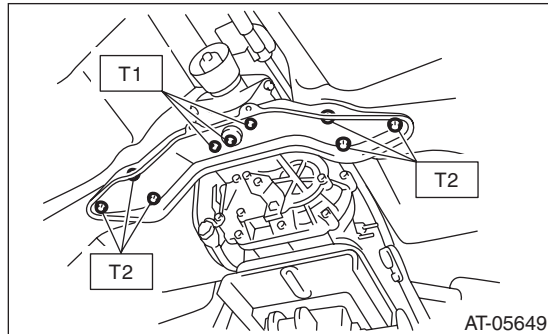
40 N·m (4.1 kgf-m, 29.5 ft-lb)

2) Install the crossmember.

Tightening torque:

T1: 35 N·m (3.6 kgf-m, 25.8 ft-lb)

T2: 75 N·m (7.6 kgf-m, 55.3 ft-lb)

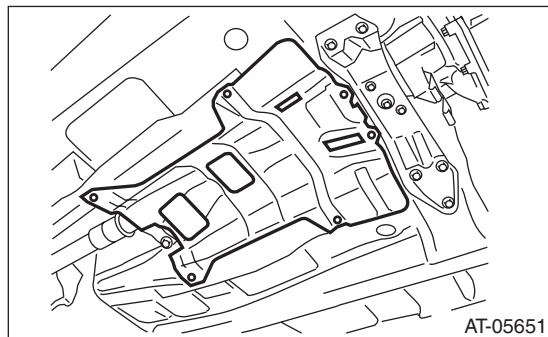


3) Remove the transmission jack.

4) Install the heat shield cover.

Tightening torque:

18 N·m (1.8 kgf-m, 13.3 ft-lb)



5) Install the front exhaust pipe, rear exhaust pipe and muffler. <Ref. to EX(H6DO)-5, INSTALLATION, Front Exhaust Pipe.> <Ref. to EX(H6DO)-7, INSTALLATION, Rear Exhaust Pipe.> <Ref. to EX(H6DO)-9, INSTALLATION, Muffler.>

6) Connect the battery ground terminal.

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 AND REAR CUSHION RUBBER

Check crossmember 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-46, REPLACEMENT, Extension Case Oil Seal.>

B: REPLACEMENT

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

CAUTION:

- Directly after the vehicle has been running or the engine has been idling for a long time, the ATF is hot. Be careful not to burn yourself.
- Be careful not to spill the ATF on the exhaust pipe to prevent it from emitting smoke or causing fire. If ATF is spilled on the exhaust pipe, wipe it off completely.

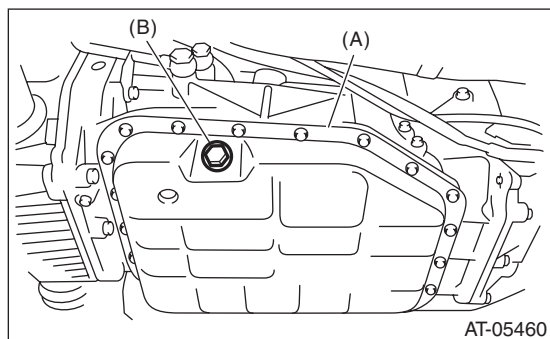
- 4) Tighten the ATF drain plug.

NOTE:

Use a new gasket.

Tightening torque:

20 N·m (2.0 kgf-m, 14.8 ft-lb)

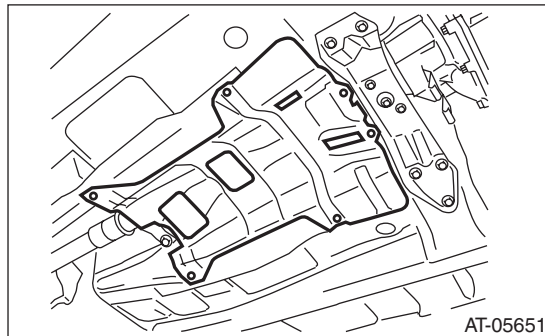


(A) Oil pan

(B) ATF drain plug

- 5) Remove the rear exhaust pipe and muffler. <Ref. to EX(H6DO)-7, REMOVAL, Rear Exhaust Pipe.> <Ref. to EX(H6DO)-9, REMOVAL, Muffler.>
- 6) Remove the front exhaust pipe. <Ref. to EX(H6DO)-5, REMOVAL, 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.

Tightening torque:

18 N·m (1.8 kgf-m, 13.3 ft-lb)

- 13) Install the front exhaust pipe. <Ref. to EX(H6DO)-5, INSTALLATION, Front Exhaust Pipe.>
- 14) Install the rear exhaust pipe and muffler. <Ref. to EX(H6DO)-7, INSTALLATION, Rear Exhaust Pipe.> <Ref. to EX(H6DO)-9, REMOVAL, Muffler.>
- 15) Lower the vehicle.
- 16) Pour ATF from the oil charge pipe. <Ref. to 5AT-29, Automatic Transmission Fluid.>
- 17) Check the level and leaks of the ATF. <Ref. to 5AT-29, INSPECTION, Automatic Transmission Fluid.>

12. Differential Side Retainer Oil Seal

A: INSPECTION

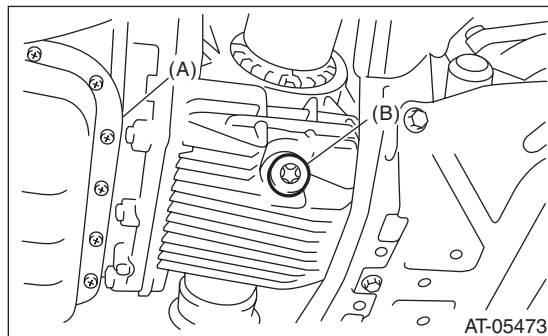
Check for leakage of gear oil from differential side retainer oil seal part. If there is an oil leak, replace the oil seal.

B: REPLACEMENT

- 1) Disconnect the ground cable from battery.
- 2) Lift up the vehicle.
- 3) Remove the front exhaust pipe. <Ref. to EX(H6DO)-5, REMOVAL, Front Exhaust Pipe.>
- 4) Drain the differential gear oil by removing drain plug using TORX® bit T70.

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) Drain plug

- 5) Tighten the drain plug.

NOTE:

Use a new gasket.

Tightening torque:

70 N·m (7.1 kgf-m, 51.6 ft-lb)

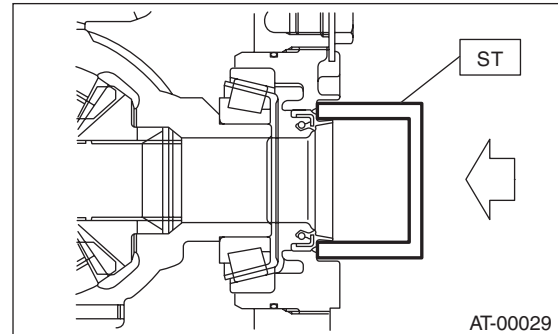
- 6) Separate the front drive shaft from the transmission. <Ref. to DS-25, REMOVAL, Front Drive Shaft.>
- 7) Remove the differential side retainer oil seal using driver wrapped with vinyl tape etc.

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

NOTE:

- Use a new oil seal.
- Apply differential gear oil to the oil seal lip.
- Check the identification marks (L, R) during installation not to mix up the oil seal RH and LH.

ST 18675AA000 DIFFERENTIAL SIDE OIL SEAL INSTALLER



- 9) Install the front drive shaft. <Ref. to DS-25, INSTALLATION, Front Drive Shaft.>
- 10) Install the front exhaust pipe. <Ref. to EX(H6DO)-5, INSTALLATION, Front Exhaust Pipe.>
- 11) Lower the vehicle.
- 12) Connect the battery ground terminal.
- 13) Pour differential gear oil into the level gauge hole. <Ref. to 5AT-31, Differential Gear Oil.>
- 14) Check the level of differential gear oil. <Ref. to 5AT-31, INSPECTION, Differential Gear Oil.>

13.Inhibitor Switch

A: INSPECTION

Inhibitor switch cannot be checked, because the inhibitor switch is installed on control valve assembly. When a malfunction occurs, refer to 5AT (diag) section. <Ref. to 5AT(diag)-35, DTC P0705 TRANSMISSION RANGE SENSOR CIRCUIT (PRNDL INPUT), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

14. Front Vehicle Speed Sensor

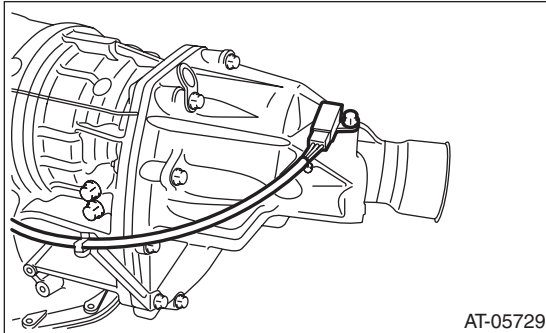
A: REMOVAL

1) Remove the transmission assembly from the vehicle. <Ref. to 5AT-37, REMOVAL, Automatic Transmission Assembly.>

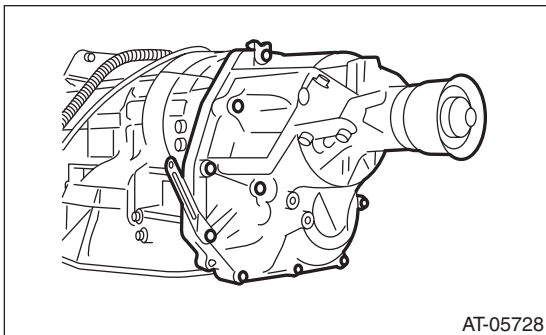
2) Disconnect the rear vehicle speed sensor connector.

NOTE:

Secure the transmission harness to the transmission body using wire etc.



3) Remove the extension case.

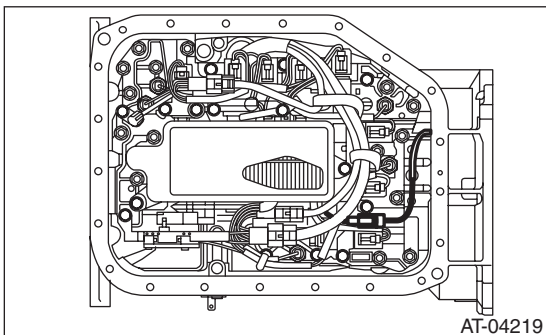


4) Remove the center differential carrier. <Ref. to 5AT-72, REMOVAL, Center Differential Carrier.>

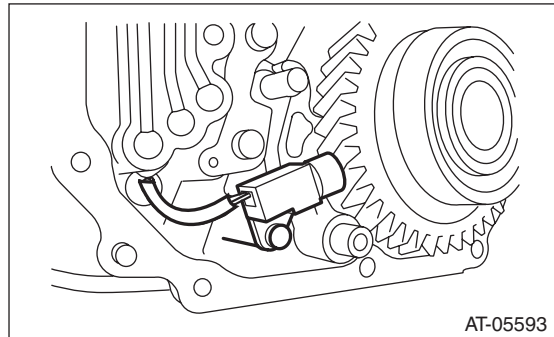
5) Lay along the transmission case, and then remove the oil pan.

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.



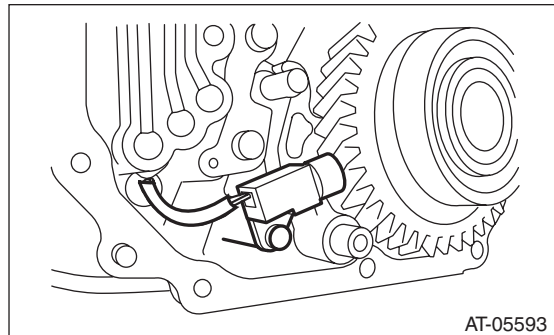
9) Remove the front vehicle speed sensor through the hole of AT transmission main case.

B: INSTALLATION

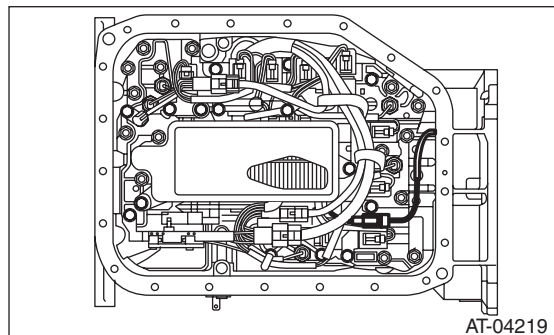
1) Install the front vehicle speed sensor.

Tightening torque:

7 N·m (0.7 kgf-m, 5.2 ft-lb)



2) Connect the front vehicle speed sensor connector.



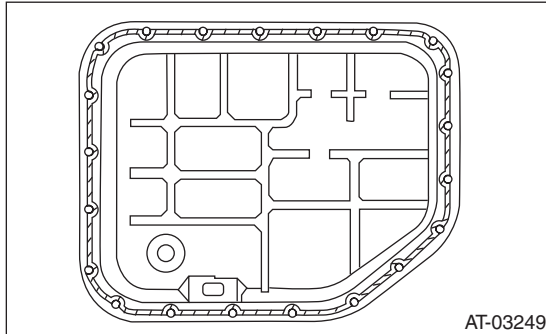
Front Vehicle Speed Sensor

AUTOMATIC TRANSMISSION

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

Liquid gasket:

**THREE BOND 1217B (Part No. K0877YA020)
or equivalent**



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-72, INSTALLATION, Center Differential Carrier.>

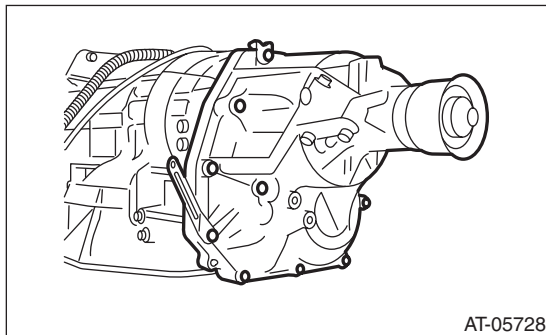
6) Install the extension case.

NOTE:

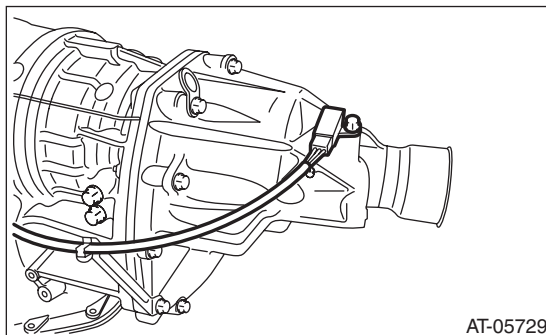
Use a new gasket.

Tightening torque:

25 N·m (2.5 kgf-m, 18.4 ft-lb)



7) Connect the rear vehicle speed sensor connector.



8) Install the transmission assembly to the vehicle.
<Ref. to 5AT-40, INSTALLATION, Automatic Transmission Assembly.>

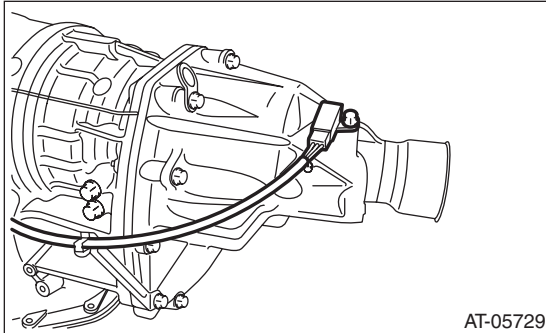
9) Pour ATF from the oil charge pipe. <Ref. to 5AT-29, Automatic Transmission Fluid.>

10) Check the level and leaks of ATF. <Ref. to 5AT-29, INSPECTION, Automatic Transmission Fluid.>

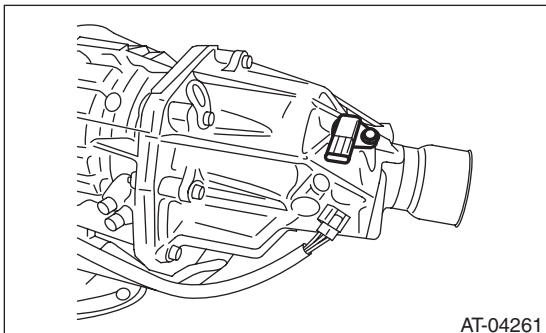
15.Rear Vehicle Speed Sensor

A: REMOVAL

- 1) Disconnect the ground cable from battery.
- 2) Lift up the vehicle.
- 3) Clean the transmission exterior.
- 4) Remove the bolts which connect the front exhaust pipe and rear exhaust pipe.
- 5) Remove the bolts holding the heat shield cover, and move the heat shield cover to the rear.
- 6) Disconnect the rear vehicle speed sensor connector.



- 7) Remove the rear vehicle speed sensor.



B: INSTALLATION

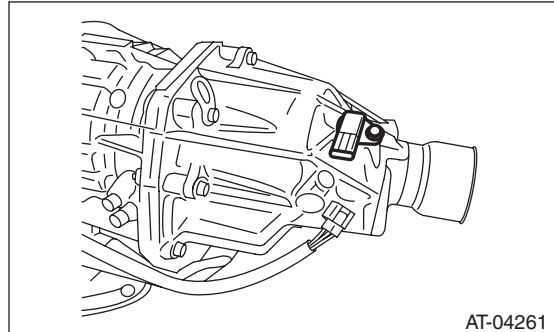
- 1) Install the rear vehicle speed sensor.

NOTE:

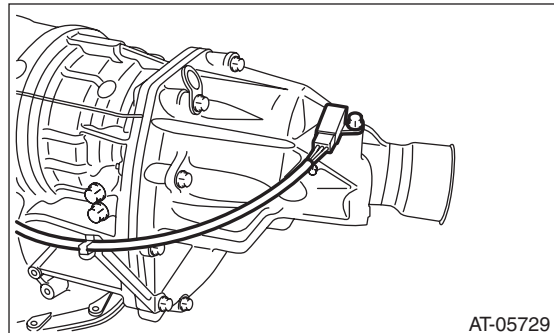
Use new O-rings.

Tightening torque:

7 N·m (0.7 kgf-m, 5.2 ft-lb)



- 2) Connect the rear vehicle speed sensor connector.



- 3) Install the heat shield cover. <Ref. to EI-54, INSTALLATION, Heat Shield Cover.>

- 4) Tighten the bolts which connect the front exhaust pipe and rear exhaust pipe.

Tightening torque:

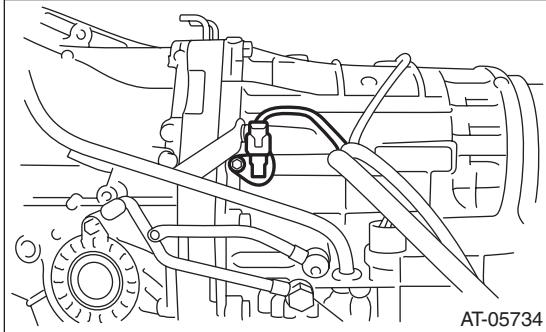
18 N·m (1.8 kgf-m, 13.3 ft-lb)

- 5) Lower the vehicle.

16. Turbine Speed Sensor 1

A: REMOVAL

- 1) Disconnect the ground cable from battery.
- 2) Lift up the vehicle.
- 3) Remove the front exhaust pipe. <Ref. to EX(H6DO)-5, REMOVAL, Front Exhaust Pipe.>
- 4) Disconnect the turbine speed sensor 1 connector.



- 5) Remove the turbine speed sensor 1.

B: INSTALLATION

- 1) Install the turbine speed sensor 1.

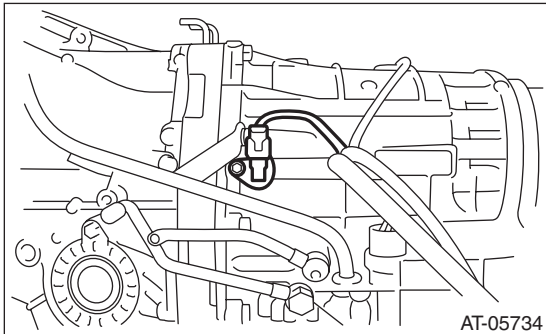
NOTE:

Use new O-rings.

Tightening torque:

7 N·m (0.7 kgf-m, 5.2 ft-lb)

- 2) Connect the turbine speed sensor 1 connector.



- 3) Install the front exhaust pipe. <Ref. to EX(H6DO)-5, INSTALLATION, Front Exhaust Pipe.>
- 4) Lower the vehicle.
- 5) Connect the battery ground terminal.

17. Control Valve Body

A: REMOVAL

- 1) Disconnect the ground cable from battery.
- 2) Lift up the vehicle.
- 3) Clean the transmission exterior.
- 4) Remove the ATF drain plug to drain ATF.

CAUTION:

Directly after the vehicle has been running or the engine has been idling for a long time, the ATF is hot. Be careful not to burn yourself.

- 5) Tighten the ATF drain plug.

NOTE:

Use a new gasket.

Tightening torque:

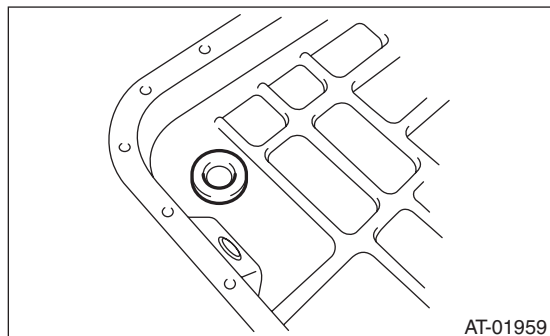
20 N·m (2.0 kgf-m, 14.8 ft-lb)

- 6) Remove the oil pan.

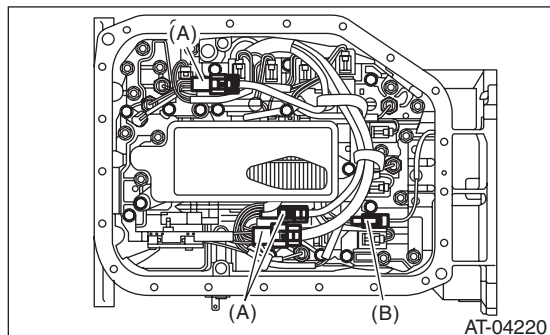
CAUTION:

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

- 7) Remove the magnet.



- 8) Clean the magnet.
- 9) Completely remove the remaining liquid gasket on the transmission case and oil pan.
- 10) Disconnect the control valve connector and front vehicle speed sensor connector.

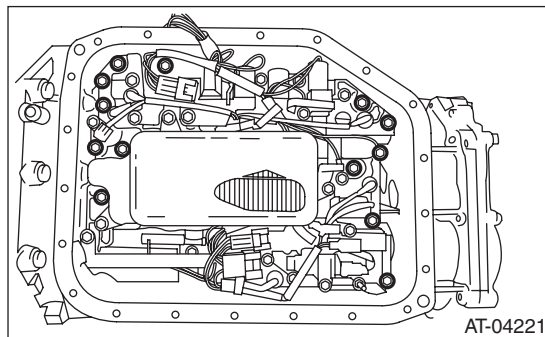


- (A) Control valve connector
(B) Front vehicle speed sensor connector

- 11) Remove the control valve body.

NOTE:

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

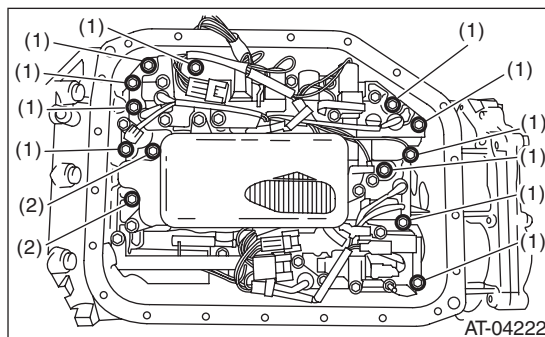


B: INSTALLATION

- 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.

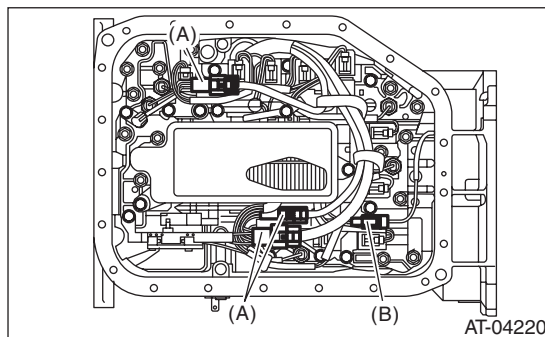
Tightening torque:

8 N·m (0.8 kgf-m, 5.9 ft-lb)



- (1) 30 mm (1.18 in)
(2) 40 mm (1.57 in)

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

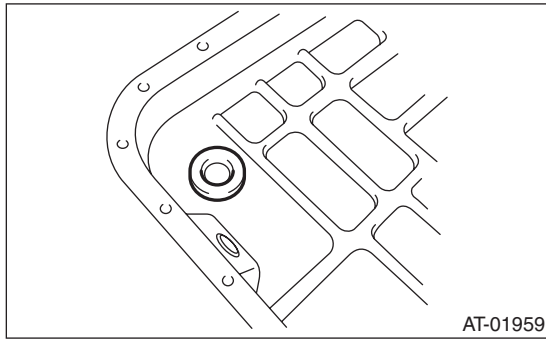


- (A) Control valve connector
(B) Front vehicle speed sensor connector

Control Valve Body

AUTOMATIC TRANSMISSION

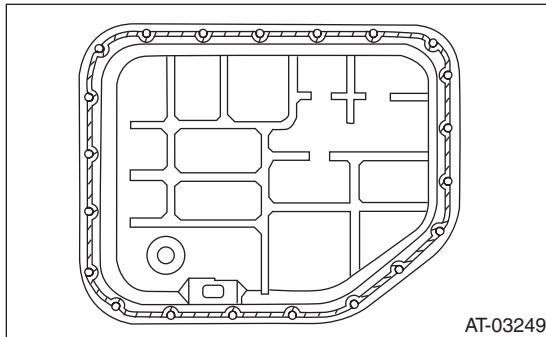
- 4) Attach the magnet at the specified position of the oil pan.



- 5) Apply liquid gasket to the oil pan.

Liquid gasket:

**THREE BOND 1217B (Part No. K0877YA020)
or equivalent**



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

Tightening torque:

5 N·m (0.5 kgf-m, 3.7 ft-lb)

- 7) Lower the vehicle.
8) Connect the battery ground terminal.
9) Pour ATF through the oil charge pipe. <Ref. to 5AT-29, Automatic Transmission Fluid.>
10) Check the ATF level. <Ref. to 5AT-29, INSPECTION, Automatic Transmission Fluid.>
11) Perform Clear Memory 2 operation. <Ref. to 5AT(diag)-18, CLEAR MEMORY MODE, OPERATION, Subaru Select Monitor.>
12) Perform the diagnosis again. <Ref. to 5AT(diag)-22, PROCEDURE, Learning Control.>
13) Perform the inspection 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.

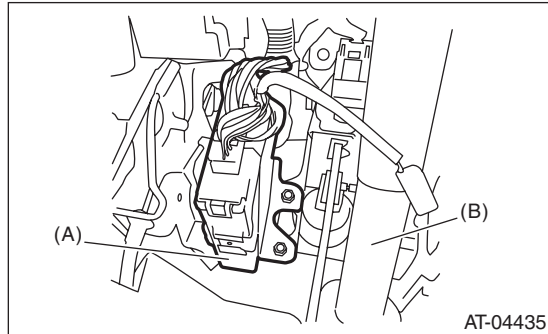
C: INSPECTION

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

18. Transmission Control Module (TCM)

A: REMOVAL

- 1) Disconnect the ground cable from 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 TCM.

NOTE:

Replace the TCM and bracket as a set.

B: INSTALLATION

- 1) Install the TCM to the bracket.

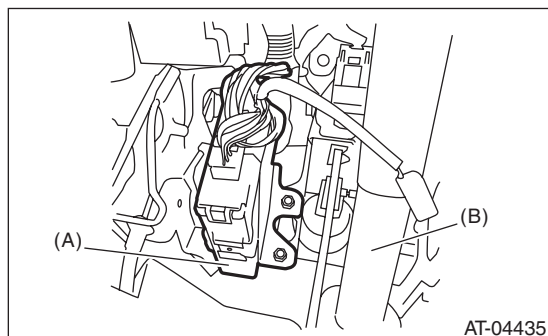
CAUTION:

To avoid the damage to bracket and TCM, do not remove after installing TCM to bracket. If installed by mistake, the part must be replaced with a new part.

- 2) Install the TCM.

Tightening torque:

7.5 N·m (0.8 kgf-m, 5.5 ft-lb)



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

- 3) Connect the connector to TCM.
- 4) Install in the reverse order of removal.

- 5) Perform Clear Memory 2 operation. <Ref. to 5AT(diag)-18, CLEAR MEMORY MODE, OPERATION, Subaru Select Monitor.>

- 6) Perform the diagnosis again. <Ref. to 5AT(diag)-22, PROCEDURE, Learning Control.>

- 7) Perform the inspection 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.

19.ATF Cooler Pipe and Hose

A: REMOVAL

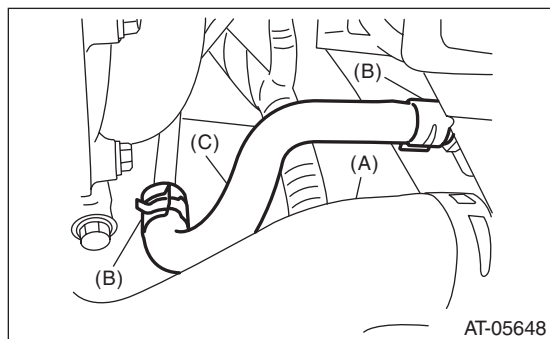
CAUTION:

Be careful not to spill ATF on the exhaust pipe to prevent it from emitting smoke or causing a fire. If ATF is spilled on the exhaust pipe, wipe it off completely.

- 1) Lift up the vehicle.
- 2) Remove the under cover.
- 3) Remove the ATF radiator inlet hose from under 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 protect it from damage, turn it with pliers, and pull it straight out by hand.

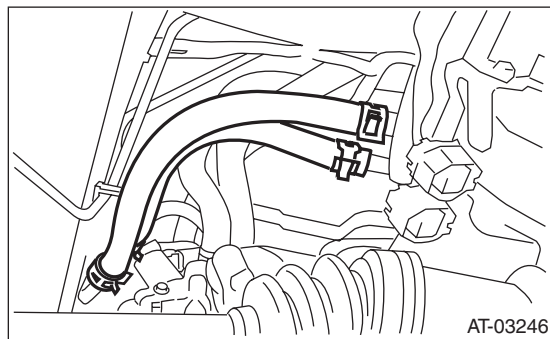


- (A) Radiator hose
(B) Clip
(C) ATF radiator inlet hose

- 4) Remove the front exhaust pipe.
- 5) Remove the ATF AT inlet and outlet hoses from the ATF AT inlet and outlet pipes.

NOTE:

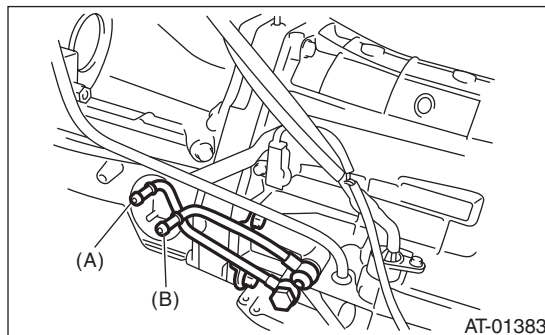
- Do not use a screwdriver or other pointed tools.
- If it is hard to remove the hose, wrap the hose with cloth to protect it from damage, turn it with pliers, and pull it straight out by hand.



- 6) Remove the ATF AT inlet pipe and outlet pipe.

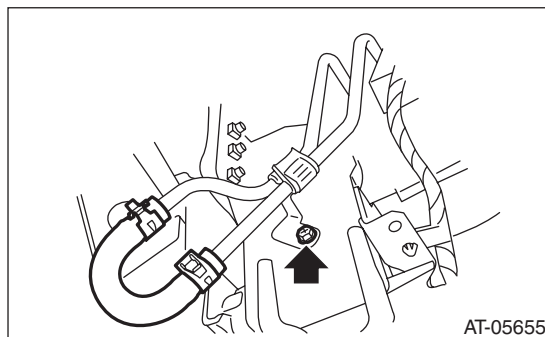
NOTE:

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



- (A) ATF AT outlet pipe
(B) ATF AT inlet pipe

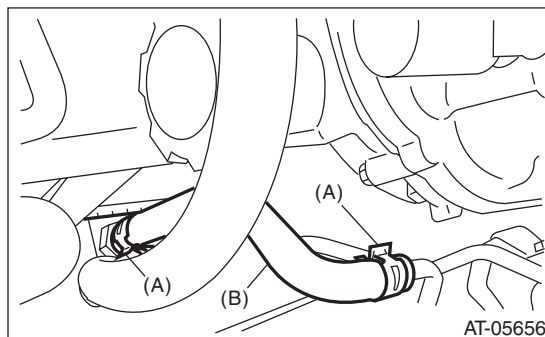
- 7) Lower the vehicle.
- 8) Remove the front bumper. <Ref. to EI-22, REMOVAL, Front Bumper.>
- 9) Remove the ATF cooler pipe hose, and remove the bolts securing the ATF cooler pipe assembly.



- 10) Remove the ATF radiator outlet hose from the upper side of the radiator.

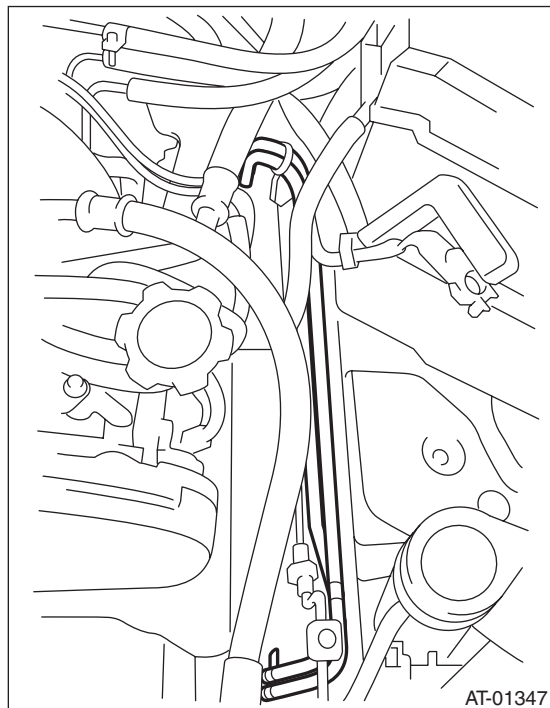
NOTE:

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



- (A) Clip
(B) ATF radiator outlet hose

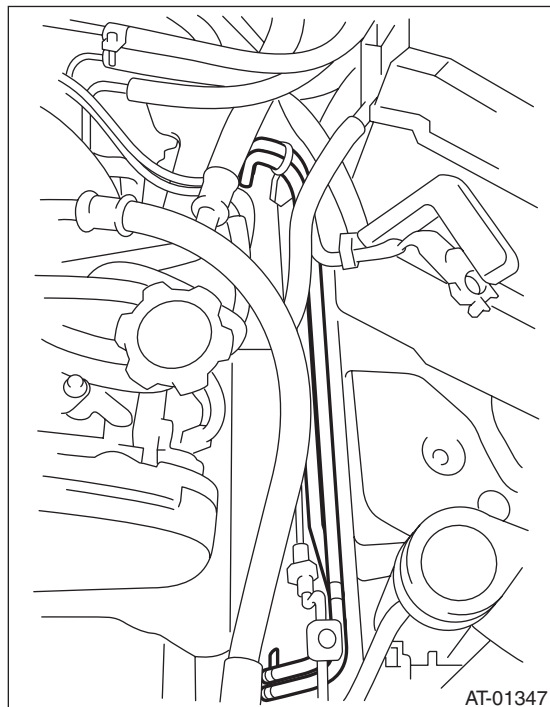
- 11) Disconnect the harness connector from the A/C pressure sensor.
- 12) Disconnect the ATF cooler pipe assembly from frame.



B: INSTALLATION

- 1) Install the ATF cooler pipe assembly to frame.

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



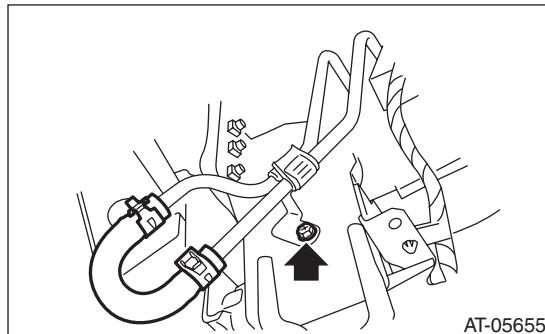
- 2) Attach the bolts securing the ATF cooler pipe assembly, and attach the ATF cooler pipe hose.

NOTE:

Use a new ATF hose.

Tightening torque:

7.5 N·m (0.76 kgf-m, 5.5 ft-lb)

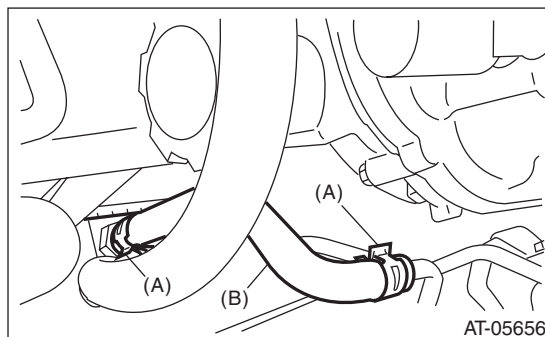


- 3) Connect the harness connector to the A/C pressure sensor.

- 4) Connect the ATF radiator outlet hose to the upper side of the radiator.

NOTE:

Use a new ATF hose.



(A) Clip

(B) ATF radiator outlet hose

- 5) Install the front bumper. <Ref. to EI-23, INSTALLATION, Front Bumper.>

- 6) Lift up the vehicle.

ATF Cooler Pipe and Hose

AUTOMATIC TRANSMISSION

7) Install the ATF AT inlet pipes and outlet pipes with new washer.

NOTE:

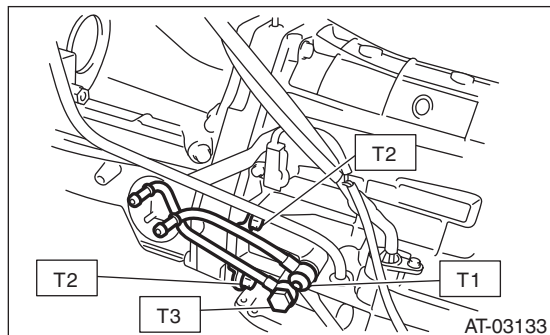
Use a new bolt for the converter case joint.

Tightening torque:

T1: 40 N·m (4.1 kgf-m, 29.5 ft-lb)

T2: 38 N·m (3.9 kgf-m, 28.0 ft-lb)

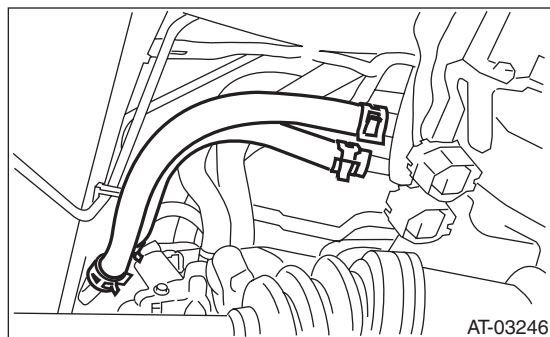
T3: 45 N·m (4.6 kgf-m, 33.2 ft-lb)



8) Connect the ATF AT inlet and outlet hoses to the pipe on the transmission side.

NOTE:

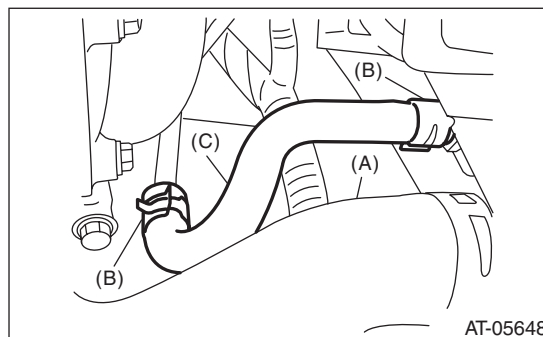
- Install so that the hose is not folded over, excessively bent or twisted.
- Insert the hose to the specified position.
- Use a new ATF hose.



9) Connect the ATF radiator inlet hose under the radiator.

NOTE:

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



- (A) Radiator hose
- (B) Clip
- (C) ATF radiator inlet hose

10) Install the front exhaust pipe.

11) Install the under cover.

12) Fill with the ATF and check the level. <Ref. to 5AT-29, Automatic Transmission Fluid.>

NOTE:

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

C: INSPECTION

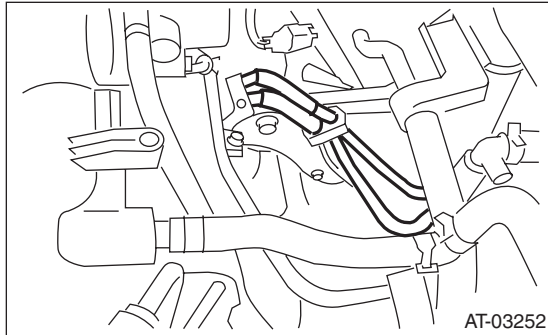
Repair or replace any faulty hoses, pipes, clips, and washers found in the inspection below.

- 1) Check for ATF leaks in joints between the transmission, radiator, ATF pipes and each ATF hose.
- 2) Check clips for deformation.
- 3) Lightly bend each ATF hose and check for cracks in the surface or other damages.
- 4) Pinch each ATF 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 each ATF hose.

20. Air Breather Hose

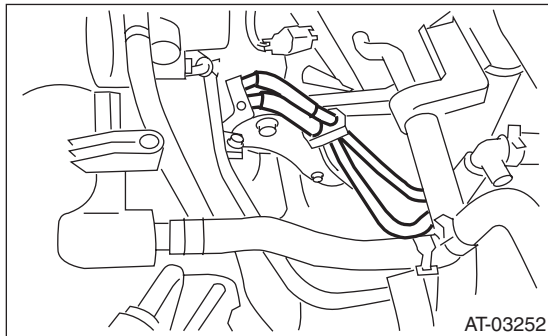
A: REMOVAL

- 1) Remove the collector cover.
- 2) Remove the air intake chamber and intake boot.
<Ref. to IN(H6DO)-8, REMOVAL, Air Intake Chamber.>
- 3) Disconnect the air breather hose.



B: INSTALLATION

- 1) Connect the air breather hose.



- 2) Install the air intake chamber and intake boot.
<Ref. to IN(H6DO)-8, INSTALLATION, Air Intake Chamber.>
- 3) Install the collector cover.

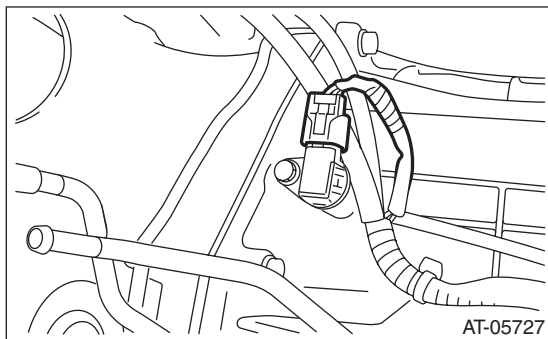
C: INSPECTION

Check that the air breather hose is not cracked or clogged.

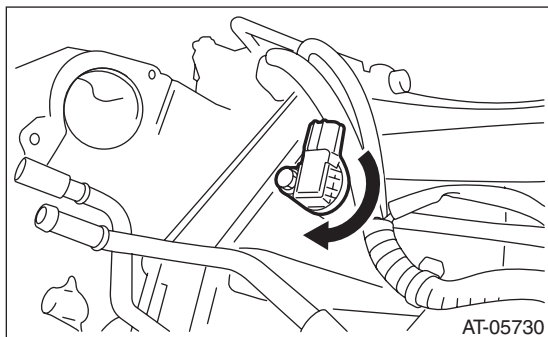
21.Oil Charge Pipe

A: REMOVAL

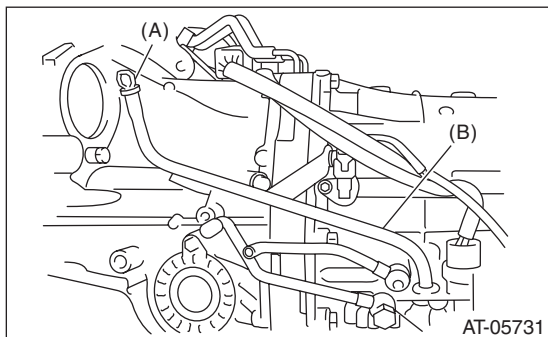
- 1) Disconnect the ground cable from battery.
- 2) Lift up the vehicle.
- 3) Remove the under cover.
- 4) Remove the front exhaust pipe. <Ref. to EX(H6DO)-5, REMOVAL, Front Exhaust Pipe.>
- 5) Disconnect the connector from turbine speed sensor 1.



- 6) Remove the turbine speed sensor 1 connector mounting bolt and rotate the sensor by 180°.



- 7) Remove the oil charge pipe, and then remove the O-ring from flange side.



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

B: INSTALLATION

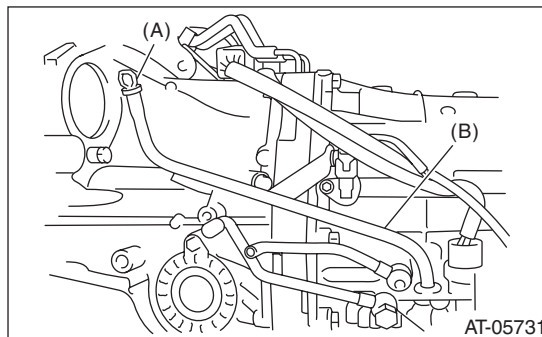
- 1) Install the oil charge pipe.

NOTE:

Use new bolts and O-rings.

Tightening torque:

38 N·m (3.9 kgf-m, 28.0 ft-lb)

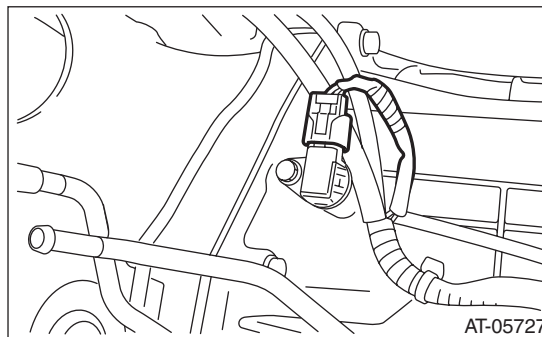


- (A) ATF level gauge
(B) Oil charge pipe

- 2) 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)



- 3) Install the front exhaust pipe. <Ref. to EX(H6DO)-5, INSTALLATION, Front Exhaust Pipe.>

- 4) Install the under cover.
- 5) Lower the vehicle.
- 6) Connect the battery ground terminal.

C: INSPECTION

- Make sure the oil charge pipe is not deformed or damaged.
- Check that there are no ATF leaks from the O-ring.

22.Torque Converter Assembly

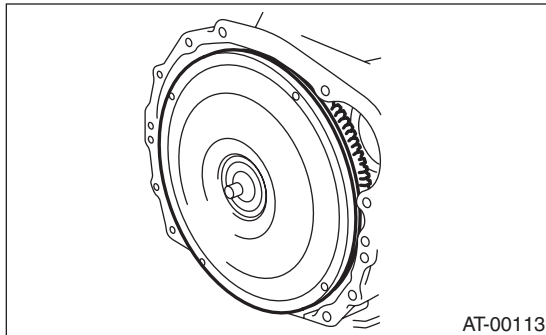
A: REMOVAL

1) Remove the transmission assembly from vehicle body. <Ref. to 5AT-37, 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

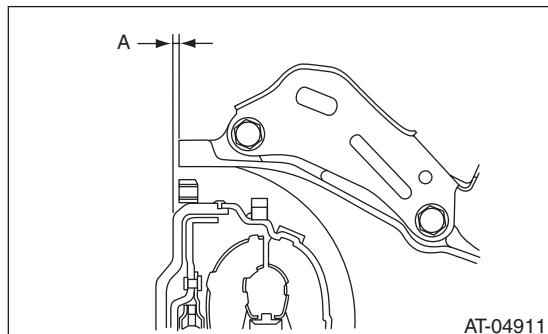
1) When the oil pump shaft is removed, install the shaft to torque converter.

NOTE:

- Use a new circlip.
 - Make sure the circlip 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



6) Install the transmission assembly to the vehicle. <Ref. to 5AT-40, INSTALLATION, Automatic Transmission Assembly.>

C: INSPECTION

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

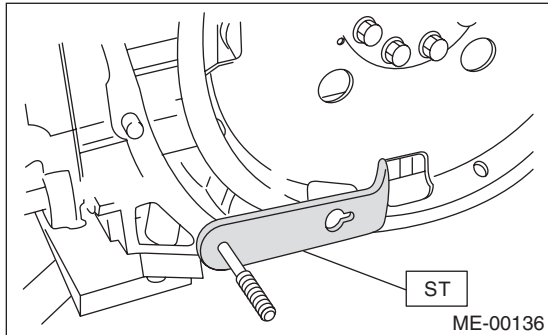
23. Drive Plate

A: REMOVAL

1) Remove the transmission assembly from the vehicle. <Ref. to 5AT-37, REMOVAL, Automatic Transmission Assembly.>

2) Use the ST to lock the crankshaft, and remove the drive plate and reinforcement drive plate.

ST 498497100 CRANKSHAFT STOPPER

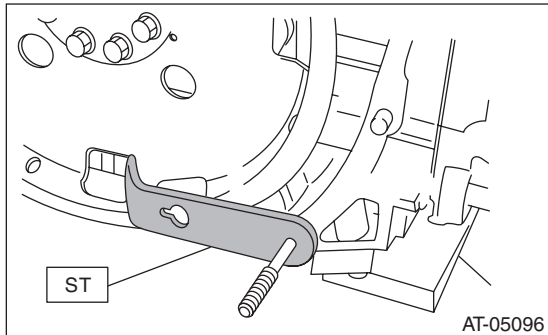


B: INSTALLATION

1) Temporarily install the drive plate and reinforcement drive plate.

2) Using the ST, lock the crankshaft.

ST 498497100 CRANKSHAFT STOPPER



3) Tighten the drive plate mounting bolt.

NOTE:

Tighten the drive plate mounting bolts gradually. Each bolt should be tightened in a crisscross order.

Tightening torque:

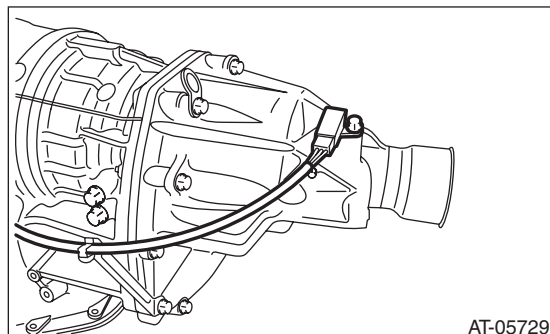
90 N·m (9.2 kgf-m, 66.4 ft-lb)

4) Install the transmission assembly to the vehicle. <Ref. to 5AT-40, INSTALLATION, Automatic Transmission Assembly.>

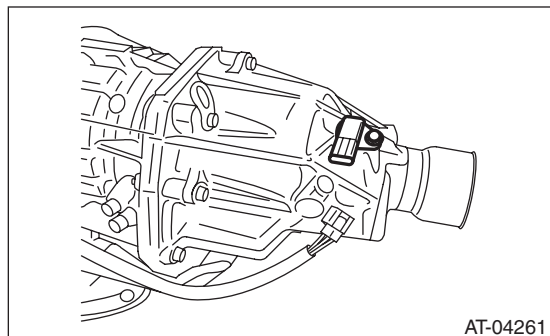
24.Extension Case

A: REMOVAL

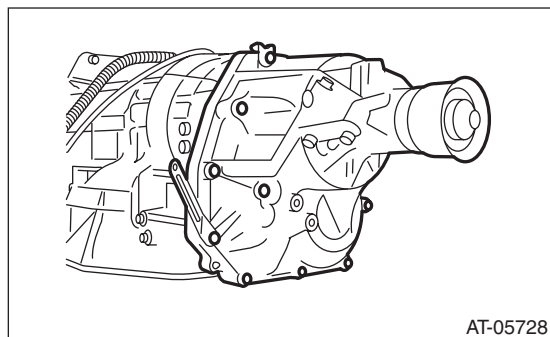
- 1) Remove the transmission assembly. <Ref. to 5AT-37, REMOVAL, Automatic Transmission Assembly.>
- 2) Disconnect the rear vehicle speed sensor connector.



- 3) Remove the rear vehicle speed sensor.



- 4) Remove the extension case.



B: INSTALLATION

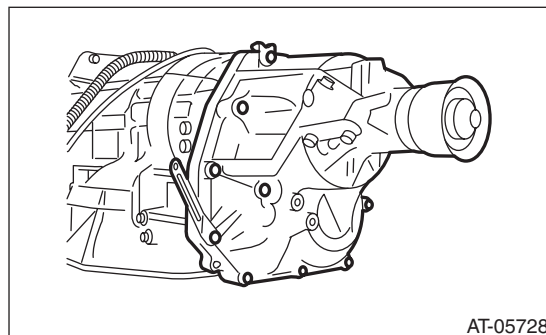
- 1) Attach the selected reduction driven gear shim to end surface of reduction driven gear with vase-line. <Ref. to 5AT-70, ADJUSTMENT, Reduction Driven Gear.>
- 2) Install the extension case.

NOTE:

Use a new gasket.

Tightening torque:

25 N·m (2.5 kgf-m, 18.4 ft-lb)



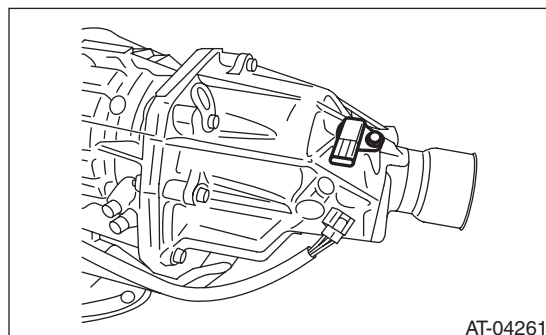
- 3) Install the rear vehicle speed sensor.

NOTE:

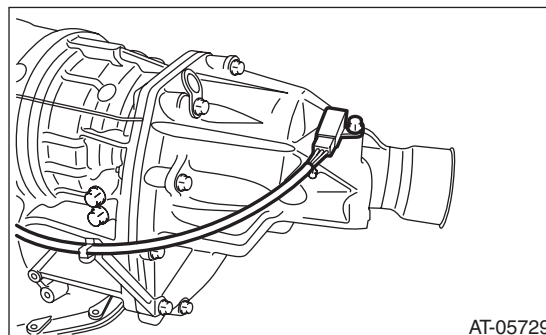
Use new O-rings.

Tightening torque:

7 N·m (0.7 kgf-m, 5.2 ft-lb)



- 4) Connect the rear vehicle speed sensor connector.



- 5) Install the transmission assembly. <Ref. to 5AT-40, INSTALLATION, Automatic Transmission Assembly.>

Extension Case

AUTOMATIC TRANSMISSION

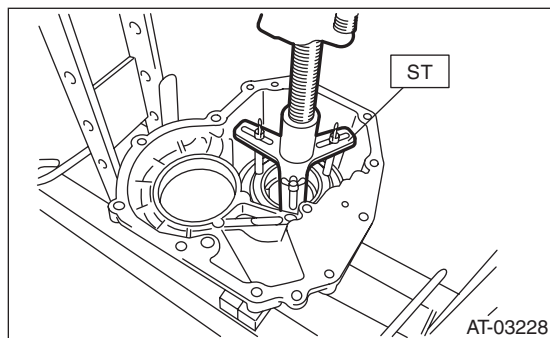
C: DISASSEMBLY

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

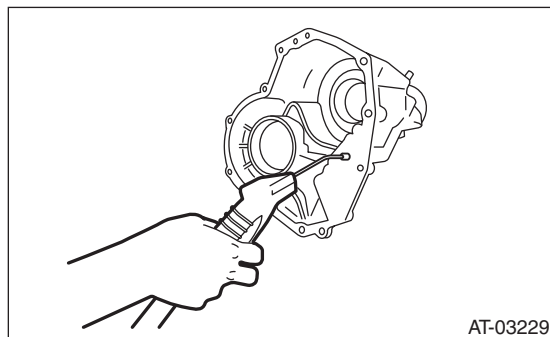
NOTE:

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 oil seal using the ST and press.

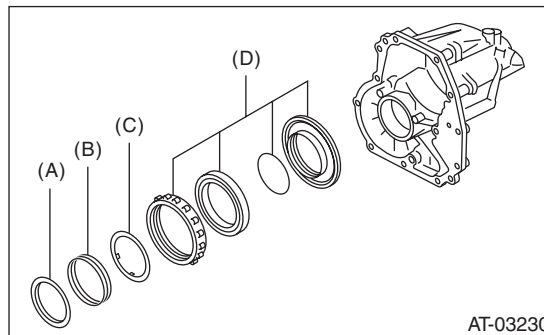
NOTE:

Use a new oil seal.

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

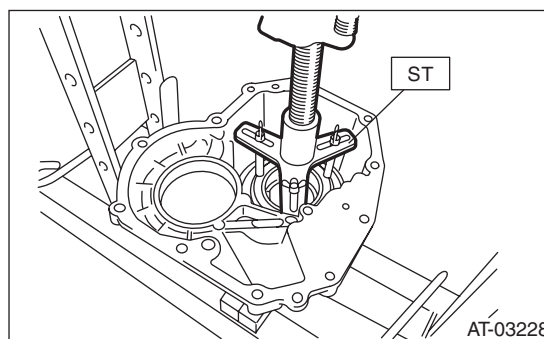
(B) Return spring

(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-65, INSTALLATION, Transfer Clutch.>

6) Install the rear drive shaft.

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-65, ADJUSTMENT, Transfer Clutch.>

25. Transfer Clutch

A: REMOVAL

- 1) Remove the transmission assembly from vehicle body. <Ref. to 5AT-37, REMOVAL, Automatic Transmission Assembly.>
- 2) Remove the extension case, and then remove the transfer clutch. <Ref. to 5AT-63, REMOVAL, Extension Case.> <Ref. to 5AT-64, DISASSEMBLY, Extension Case.>

B: INSTALLATION

- 1) Select the rear drive shaft shim. <Ref. to 5AT-65, ADJUSTMENT, Transfer Clutch.>
- 2) Select driven plate No. 3 <Ref. to 5AT-65, ADJUSTMENT, Transfer Clutch.>
- 3) Install the extension case. <Ref. to 5AT-63, INSTALLATION, Extension Case.>
- 4) Install the transmission assembly to the vehicle. <Ref. to 5AT-40, INSTALLATION, Automatic Transmission Assembly.>

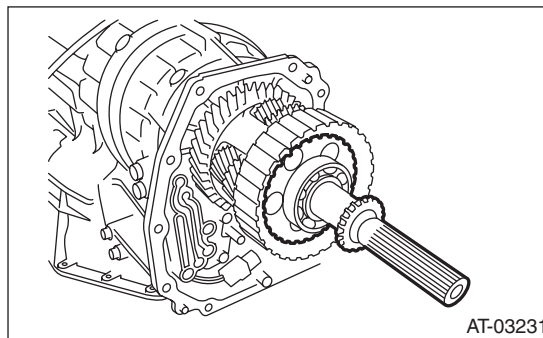
C: INSPECTION

- 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-65, ADJUSTMENT, Transfer Clutch.>

D: ADJUSTMENT

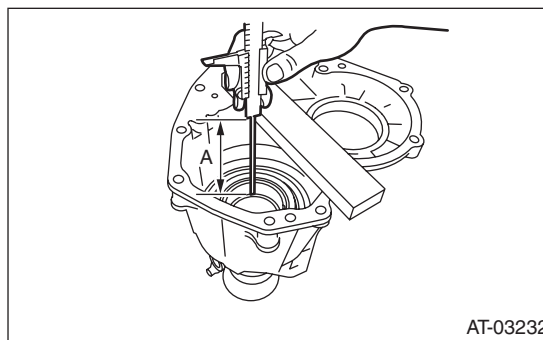
1. REAR DRIVE SHAFT SHIM SELECTION

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



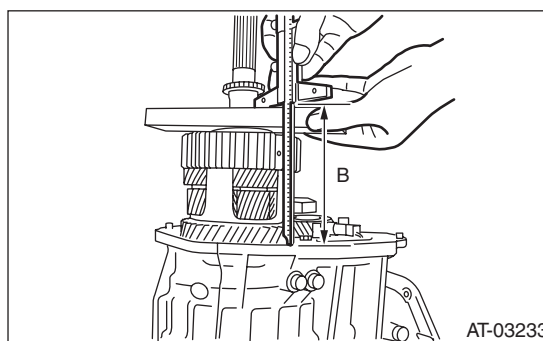
- 2) Using the ST, measure the depth "A", which is from mating surface of extension case to ball bearing outer ring contact surface.

ST 398643600 GAUGE



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

ST 398643600 GAUGE



Transfer Clutch

AUTOMATIC TRANSMISSION

4) Calculation formula:

When clearances are 0.05 mm (0.0020 in):

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

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

When clearances are 0.25 mm (0.0098 in):

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

$$[T \text{ (in)} = A - B + 0.0012]$$

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))

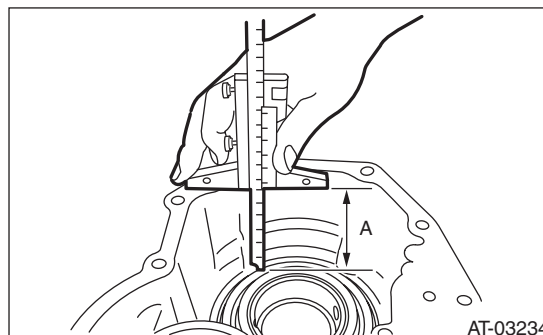
5) Select the rear drive shaft shim so that the clearance is within the specified range.

Rear drive shaft 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

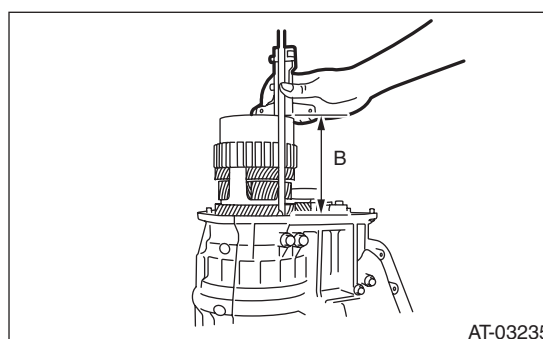
1) Install the drive plate and driven plate to the center differential carrier.

2) Measure the depth “A” from the mating surface of the extension case to the transfer clutch piston.



3) Using the ST, measure the height “B” from the AT main case mating surface to the end of ST.

ST 398744300 PISTON GUIDE



4) Calculation formula:

When clearances are 0.2 mm (0.008 in):

$$T \text{ (mm)} = A - (B - 50) + 0.08$$

$$[T \text{ (in)} = A - (B - 1.97) + 0.0031]$$

When clearances are 0.6 mm (0.024 in):

$$T \text{ (mm)} = A - (B - 50) - 0.32$$

$$[T \text{ (in)} = A - (B - 1.97) - 0.0126]$$

T: Thickness of driven plate No. 3

A: Depth from mating surface of the extension case to the transfer clutch piston

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

50 mm (1.97 in): Thickness of ST

Specification:

0.2 — 0.6 mm (0.008 — 0.024 in)

NOTE:

Calculation formula for “T” above is applied when measuring with the ST (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 the extension case to the transfer clutch 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.

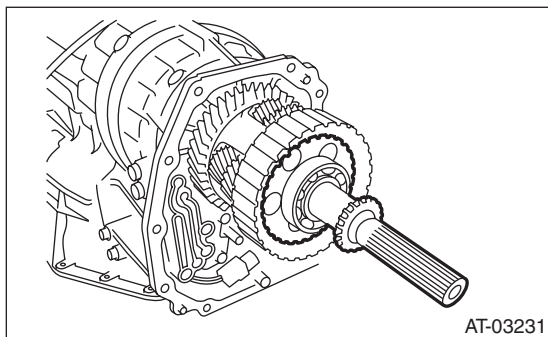
5) Select the driven plate No. 3 so that the clearance is within the specified range.

Driven plate No. 3	
Part No.	Thickness mm (in)
31589AA041 or 31589AA150	1.6 (0.063)
31589AA050 or 31589AA160	2.0 (0.079)
31589AA060 or 31589AA170	2.4 (0.094)
31589AA070 or 31589AA180	2.8 (0.110)

26.Rear Drive Shaft

A: REMOVAL

- 1) Remove the transmission assembly from the vehicle. <Ref. to 5AT-37, REMOVAL, Automatic Transmission Assembly.>
- 2) Remove the rear vehicle speed sensor, and then remove the extension case. <Ref. to 5AT-63, REMOVAL, Extension Case.>
- 3) Pull out the rear drive shaft from center differential assembly.



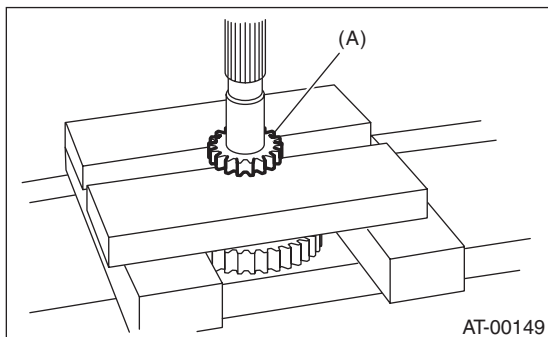
- 4) Remove the drive plate and driven plate.

B: INSTALLATION

- 1) Select shims. <Ref. to 5AT-65, ADJUSTMENT, Transfer Clutch.>
- 2) Install the drive plate and driven plate.
- 3) Insert the rear drive shaft into the center differential assembly.
- 4) Combine the extension case, and then install the rear vehicle speed sensor. <Ref. to 5AT-63, INSTALLATION, Extension Case.>
- 5) Install the transmission assembly to the vehicle. <Ref. to 5AT-40, INSTALLATION, Automatic Transmission Assembly.>

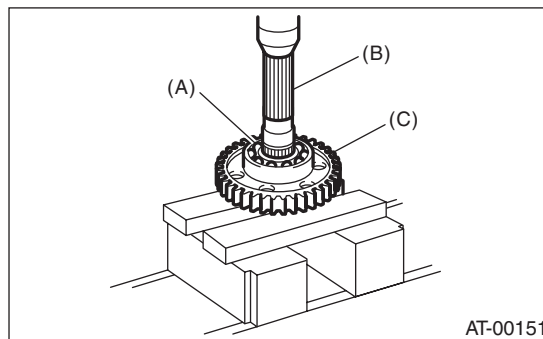
C: DISASSEMBLY

- 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.



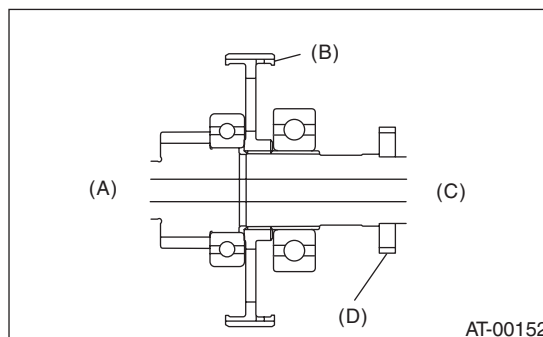
- (A) Rear ball bearing
(B) Rear drive shaft
(C) Clutch hub

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-65, ADJUSTMENT, Transfer Clutch.>

27.Reduction Driven Gear

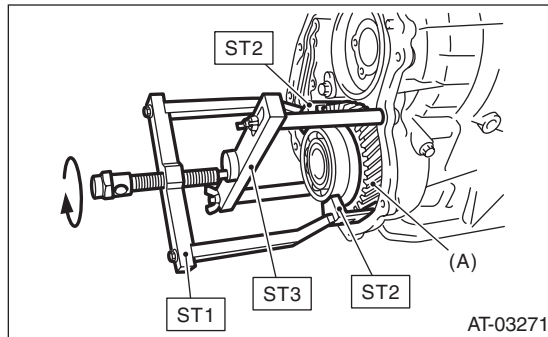
A: REMOVAL

- 1) Remove the transmission assembly from vehicle body. <Ref. to 5AT-37, REMOVAL, Automatic Transmission Assembly.>
- 2) Remove the rear vehicle speed sensor, and separate the extension case from transmission case. <Ref. to 5AT-63, REMOVAL, Extension Case.>
- 3) Remove the center differential carrier. <Ref. to 5AT-72, 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

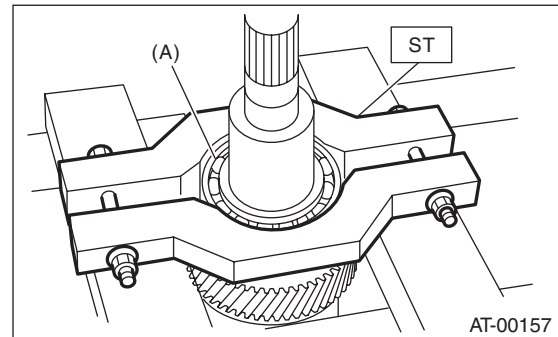
B: INSTALLATION

- 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-70, ADJUSTMENT, Reduction Driven Gear.>
- 4) Join the transmission case and the extension case, and then install the rear vehicle speed sensor. <Ref. to 5AT-63, INSTALLATION, Extension Case.>
- 5) Install the transmission assembly to the vehicle. <Ref. to 5AT-40, INSTALLATION, Automatic Transmission Assembly.>

C: DISASSEMBLY

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

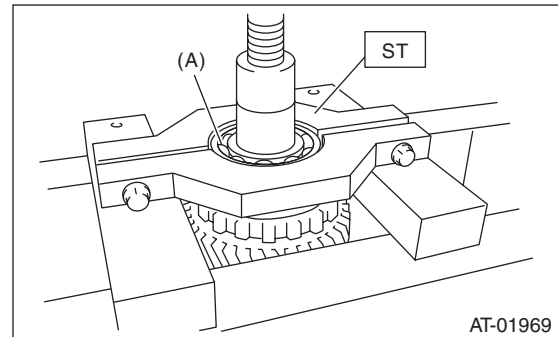
ST 498077300 REMOVER



(A) Ball bearing

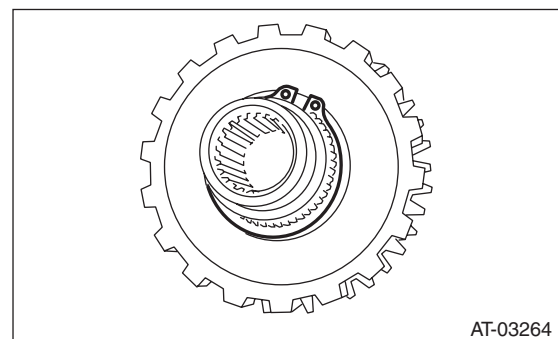
- 2) Remove the ball bearing on the reverse side with the same procedure as step 1).

ST 498077300 REMOVER



(A) Ball bearing

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

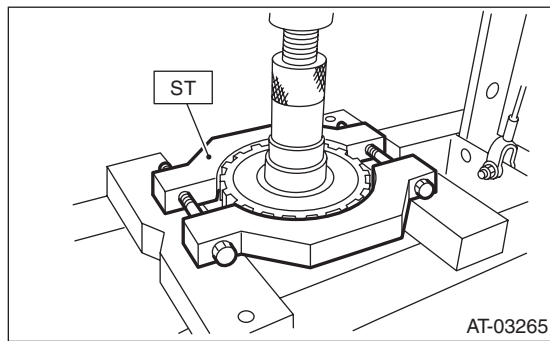


AT-03264

Reduction Driven Gear

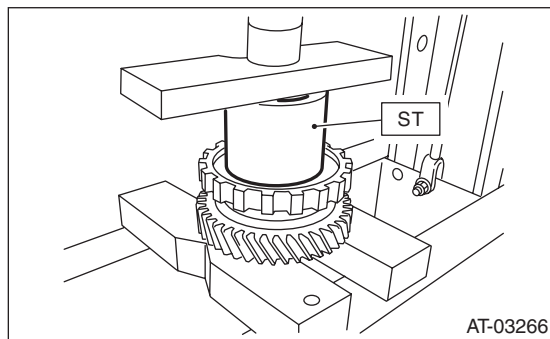
AUTOMATIC TRANSMISSION

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

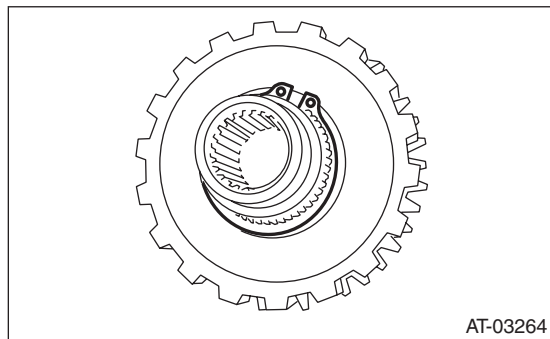


D: ASSEMBLY

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



- 2) Install the snap ring.

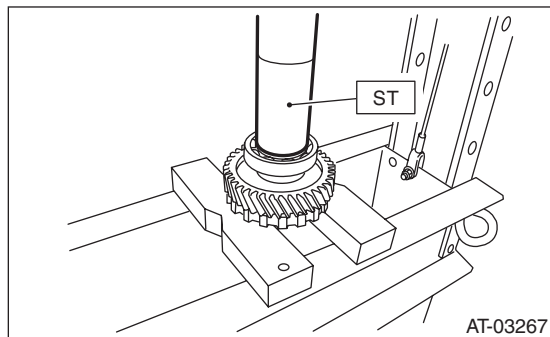


- 3) Install the ball bearing to the reduction driven gear using a press.

NOTE:

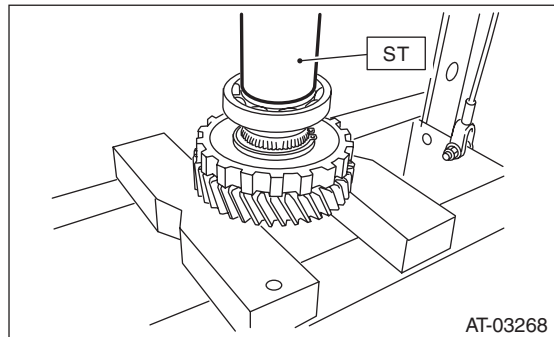
Use a new ball bearing.

ST 18654AA000 INSTALLER



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

ST 18654AA000 INSTALLER



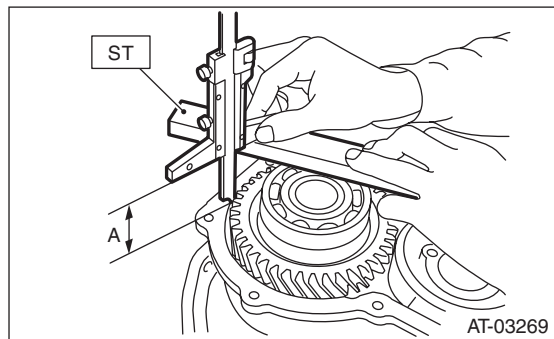
E: INSPECTION

Check the ball bearing and gear for break or damage.

F: ADJUSTMENT

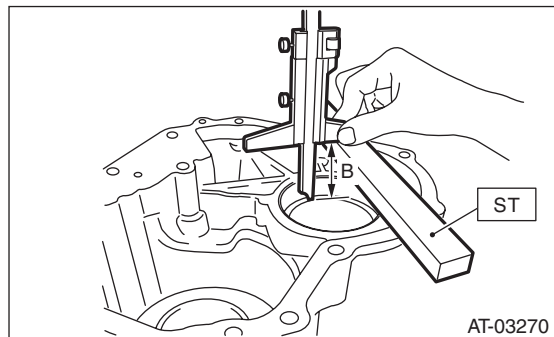
- 1) Using the ST, measure the height "A" from the AT main case mating surface to the ball bearing outer ring contact surface.

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:

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):

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

$$[T \text{ (in)} = B - A + 0.0012]$$

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

Specification:

0.05 — 0.25 mm (0.0020 — 0.0098 in)

4) Select the reduction gear shim so that the clearance is within the specified range.

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

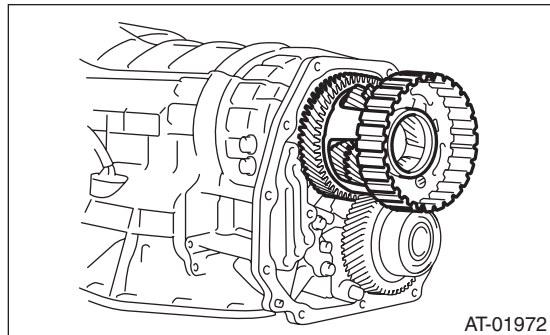
Center Differential Carrier

AUTOMATIC TRANSMISSION

28.Center Differential Carrier

A: REMOVAL

- 1) Remove the transmission assembly from the vehicle. <Ref. to 5AT-37, REMOVAL, Automatic Transmission Assembly.>
- 2) Remove the rear vehicle speed sensor, and separate the extension case from transmission case. <Ref. to 5AT-63, REMOVAL, Extension Case.>
- 3) Extract the rear drive shaft. <Ref. to 5AT-68, REMOVAL, Rear Drive Shaft.>
- 4) Pull out the center differential carrier assembly.



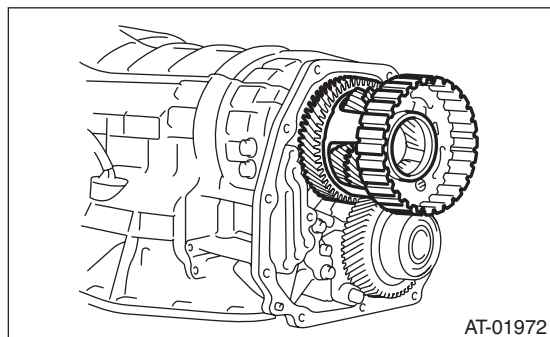
- 5) Remove the shim from the transmission case.

B: INSTALLATION

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

NOTE:

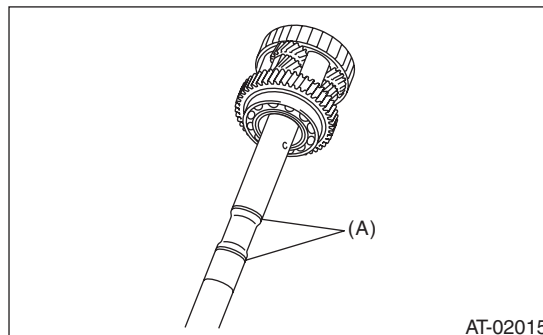
Press-fit it to the bottom of bearing shoulder completely.



- 2) Insert the rear drive shaft. <Ref. to 5AT-68, INSTALLATION, Rear Drive Shaft.>
- 3) Join the transmission case and the extension case, and then install the rear vehicle speed sensor. <Ref. to 5AT-63, INSTALLATION, Extension Case.>
- 4) Install the transmission assembly to the vehicle. <Ref. to 5AT-40, INSTALLATION, Automatic Transmission Assembly.>

C: DISASSEMBLY

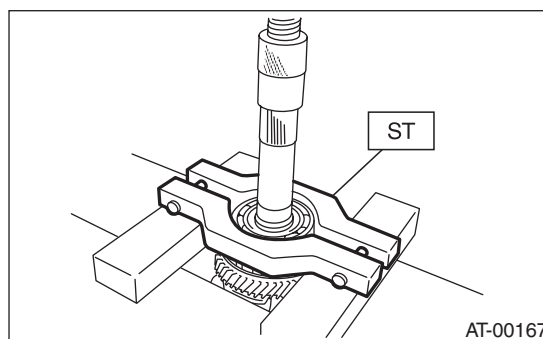
- 1) Remove the seal ring.



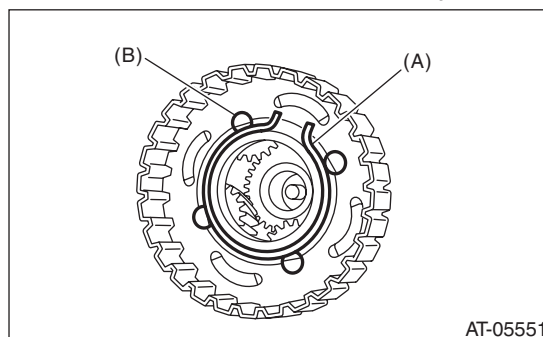
(A) Seal ring

- 2) Remove the ball bearing using the ST and the press.

ST 498077600 REMOVER



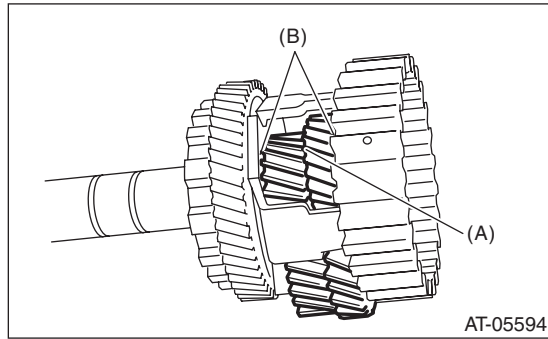
- 3) Remove the snap ring, and pull out the pinion shaft from center differential assembly.



(A) Snap ring

(B) Pinion shaft

- 4) Remove the pinion gear and washers from center differential assembly.



- (A) Pinion gear
(B) Washer

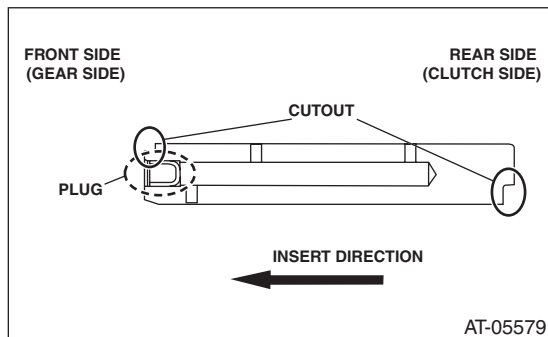
- 5) Pull out the intermediate shaft and thrust bearing.

D: ASSEMBLY

- 1) Install the thrust bearing onto intermediate shaft.
- 2) Insert the intermediate shaft into the center differential assembly.
- 3) Install the pinion gears and washers.
- 4) Insert the pinion shaft into the center differential assembly.

NOTE:

- Insert the pinion shaft with the side with the plug side facing the front side (gear side).
- After inserting the pinion shaft, adjust its position so that the cutout portion on the front side is on the inner side.



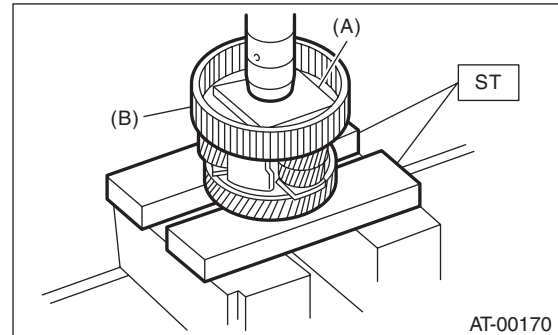
- 5) Install the snap ring.

- 6) Using a press, press-fit the ball bearing into the center differential assembly.

NOTE:

Use a new ball bearing.

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.

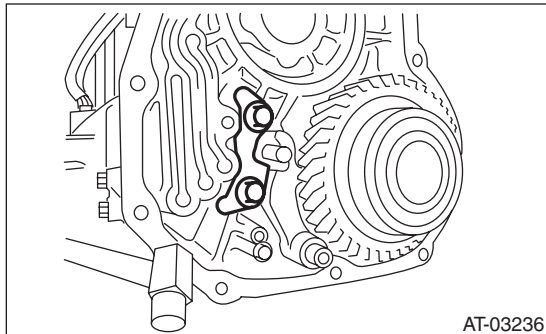
E: INSPECTION

- 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-65, ADJUSTMENT, Transfer Clutch.>

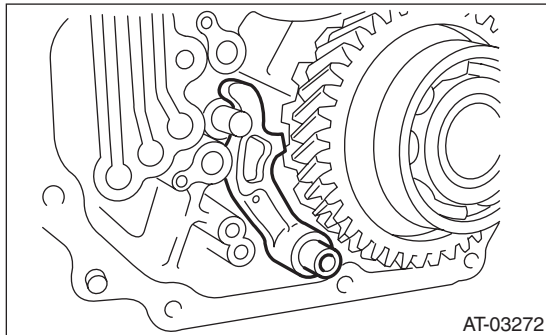
29. Parking Pawl

A: REMOVAL

- 1) Remove the transmission assembly from vehicle body. <Ref. to 5AT-37, REMOVAL, Automatic Transmission Assembly.>
- 2) Remove the extension case. <Ref. to 5AT-63, REMOVAL, Extension Case.>
- 3) Remove the center differential carrier. <Ref. to 5AT-72, 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.

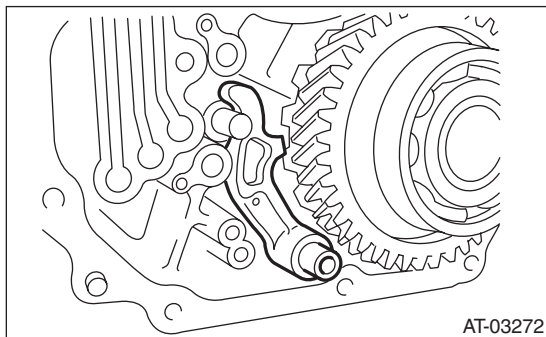


- 6) Remove the parking pawl, parking pawl shaft and return spring.



B: INSTALLATION

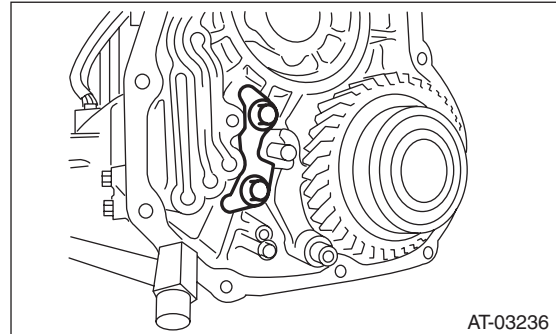
- 1) Set the transmission to the "N" range.
- 2) Install the parking pawl, parking pawl shaft and return spring.



- 3) Install the parking support actuator.

Tightening torque:

10 N·m (1.0 kgf-m, 7.4 ft-lb)



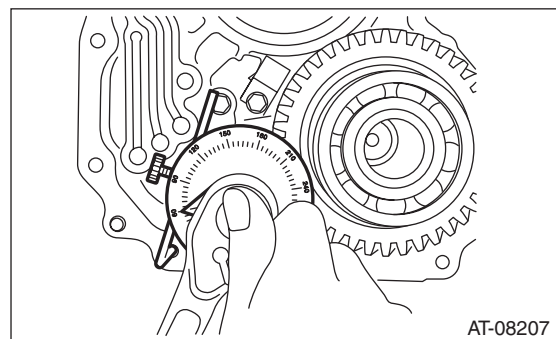
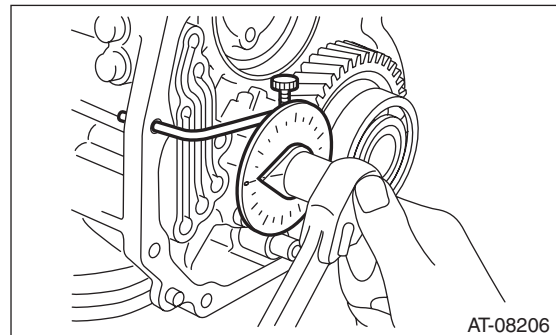
- 4) Using the angle gauge, perform the angle tightening to the bolts that were tightened in step 3).

NOTE:

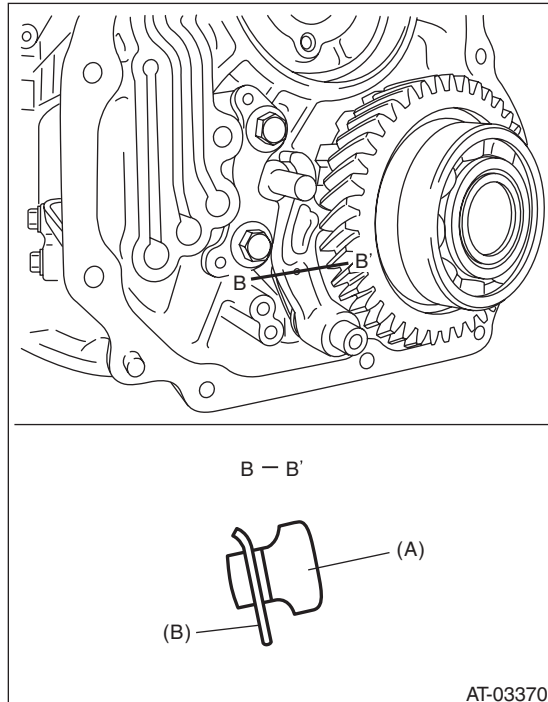
Do not use extension as much as possible.

Tightening angle:

17°±2°



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-72, INSTALLATION, Center Differential Carrier.>

8) Install the extension case. <Ref. to 5AT-63, INSTALLATION, Extension Case.>

9) Install the transmission assembly to the vehicle. <Ref. to 5AT-40, INSTALLATION, Automatic Transmission Assembly.>

C: INSPECTION

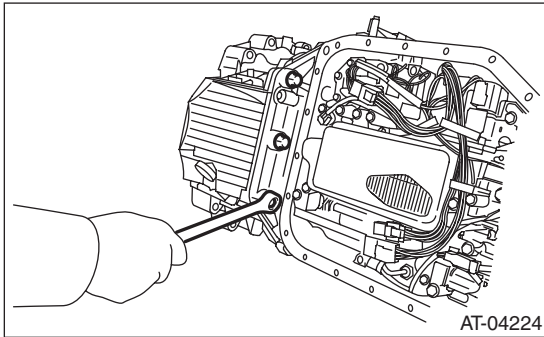
Make sure that the tab of parking pawl on reduction driven gear is not worn or otherwise damaged.

30. Converter Case

A: REMOVAL

- 1) Remove the transmission assembly from the vehicle. <Ref. to 5AT-37, REMOVAL, Automatic Transmission Assembly.>
- 2) Remove the torque converter assembly. <Ref. to 5AT-61, REMOVAL, Torque Converter Assembly.>
- 3) Remove the transmission harness connector from stay.
- 4) Remove the turbine speed sensor 1. <Ref. to 5AT-52, REMOVAL, Turbine Speed Sensor 1.>
- 5) Remove the air breather hose. <Ref. to 5AT-59, REMOVAL, Air Breather Hose.>
- 6) Remove the oil charge pipe. <Ref. to 5AT-60, REMOVAL, Oil Charge Pipe.>
- 7) Remove the ATF AT inlet and outlet pipes. <Ref. to 5AT-56, REMOVAL, ATF Cooler Pipe and Hose.>
- 8) Remove the converter case attachment bolts.
- 9) Lay along the transmission body, and then remove the oil pan.
- 10) Remove the three converter case mounting bolts (TORX®).

ST 18676AA020 TORX® WRENCH



- 11) Separate the converter case by lightly tapping with plastic hammer.
- 12) Remove the front differential assembly. <Ref. to 5AT-87, REMOVAL, Front Differential Assembly.>
- 13) Remove the oil seal from converter case.

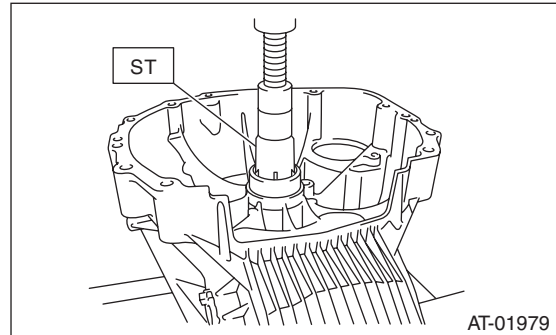
B: INSTALLATION

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

NOTE:

Use a new oil seal.

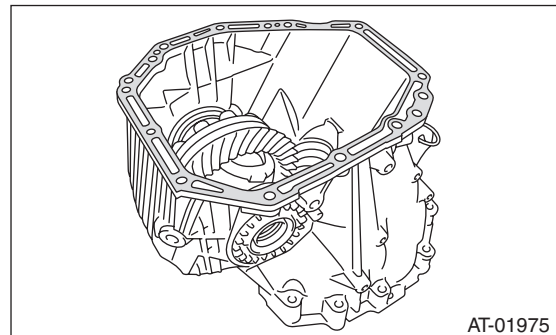
ST 499587100 OIL SEAL INSTALLER



- 3) Install the front differential assembly and left and right side retainers to the case. <Ref. to 5AT-87, INSTALLATION, Front Differential Assembly.>
- 4) Remove the oil pump cover from the AT main case, and then adjust and check the backlash and tooth contact of the front differential. <Ref. to 5AT-78, REMOVAL, Oil Pump Cover.> <Ref. to 5AT-91, ADJUSTMENT, Front Differential Assembly.> <Ref. to 5AT-84, ADJUSTMENT, Drive Pinion Shaft Assembly.>
- 5) Apply proper amount of liquid gasket to the entire matching surface of converter case.

Liquid gasket:

THREE BOND 1215 (Part No. 004403007) or equivalent



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

NOTE:

Use a new bolt for the oil charge pipe and ATF AT pipe portions.

Tightening torque:

Oil charge pipe and ATF AT pipe portions

38 N·m (3.9 kgf-m, 28.0 ft-lb)

Other than above

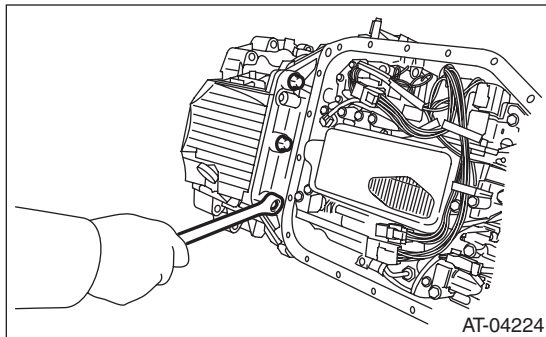
41 N·m (4.2 kgf-m, 30.2 ft-lb)

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

Tightening torque:

41 N·m (4.2 kgf-m, 30.2 ft-lb)

ST 18676AA020 TORX® WRENCH



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

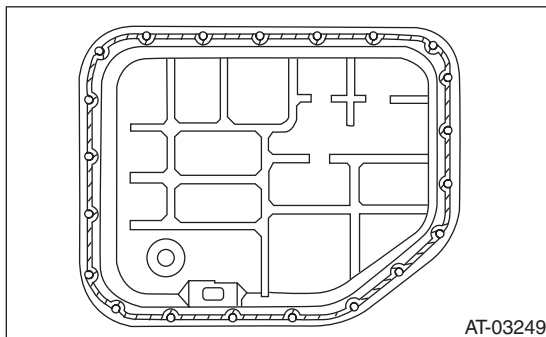
Liquid gasket:

THREE BOND 1217B (Part No. K0877YA020)

or equivalent

Tightening torque:

5 N·m (0.5 kgf-m, 3.7 ft-lb)



9) Install the turbine speed sensor 1. <Ref. to 5AT-52, INSTALLATION, Turbine Speed Sensor 1.>

10) Install the ATF AT pipe. <Ref. to 5AT-57, INSTALLATION, ATF Cooler Pipe and Hose.>

Tightening torque:

41 N·m (4.2 kgf-m, 30.2 ft-lb)

11) Install the transmission harness connector to the stay.

12) Install the oil charge pipe. <Ref. to 5AT-60, INSTALLATION, Oil Charge Pipe.>

13) Install the air breather hose. <Ref. to 5AT-59, INSTALLATION, Air Breather Hose.>

14) Install the torque converter assembly. <Ref. to 5AT-61, INSTALLATION, Torque Converter Assembly.>

15) Install the transmission assembly to the vehicle. <Ref. to 5AT-40, INSTALLATION, Automatic Transmission Assembly.>

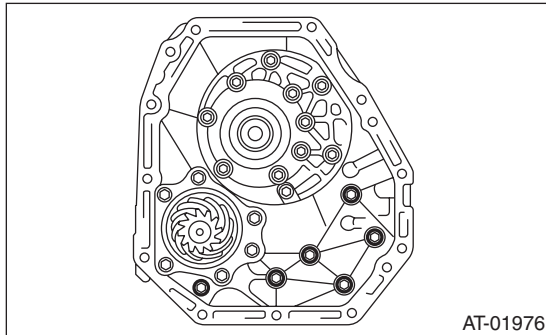
C: INSPECTION

Measure the backlash, and then adjust it to be within specification. <Ref. to 5AT-84, ADJUSTMENT, Drive Pinion Shaft Assembly.>

31.Oil Pump Cover

A: REMOVAL

- 1) Remove the transmission assembly from the vehicle. <Ref. to 5AT-37, REMOVAL, Automatic Transmission Assembly.>
- 2) Pull out the torque converter assembly. <Ref. to 5AT-61, REMOVAL, Torque Converter Assembly.>
- 3) Remove the transmission harness connector from stay.
- 4) Remove the ATF AT inlet and outlet pipes. <Ref. to 5AT-56, REMOVAL, ATF Cooler Pipe and Hose.>
- 5) Separate the converter case and transmission case. <Ref. to 5AT-76, REMOVAL, Converter Case.>
- 6) 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

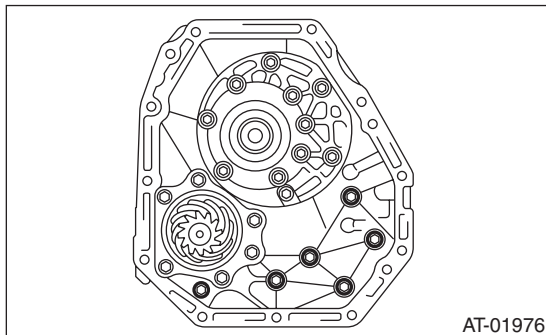
- 1) Secure the oil pump cover.

NOTE:

Use a new gasket.

Tightening torque:

41 N·m (4.2 kgf-m, 30.2 ft-lb)



- 2) Install the converter case assembly to the transmission case assembly. <Ref. to 5AT-61, INSTALLATION, Torque Converter Assembly.>
- 3) Install the transmission harness connector to the stay.
- 4) Install the ATF AT pipe. <Ref. to 5AT-57, INSTALLATION, ATF Cooler Pipe and Hose.>

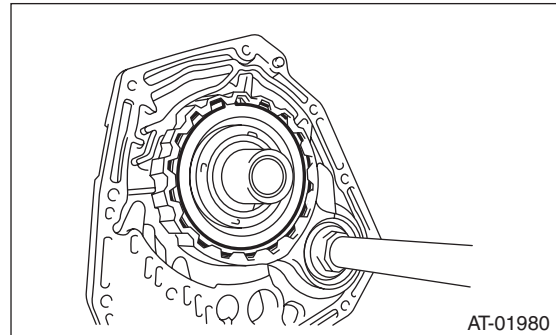
- 5) Install the torque converter assembly. <Ref. to 5AT-61, INSTALLATION, Torque Converter Assembly.>

- 6) Install the transmission assembly to the vehicle. <Ref. to 5AT-40, INSTALLATION, Automatic Transmission Assembly.>

C: DISASSEMBLY

1. FRONT BRAKE

- 1) Remove the snap ring.



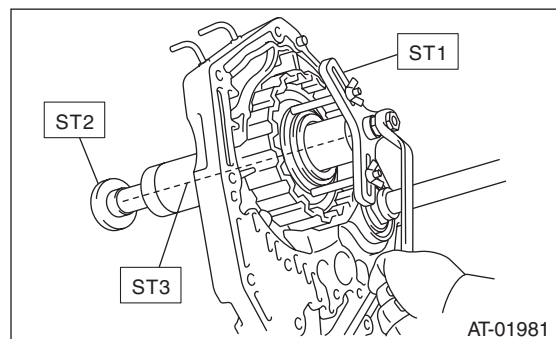
- 2) Remove the retaining plate, drive plate and driven plate.

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

ST1 18762AA000 COMPRESSOR SPECIAL TOOL

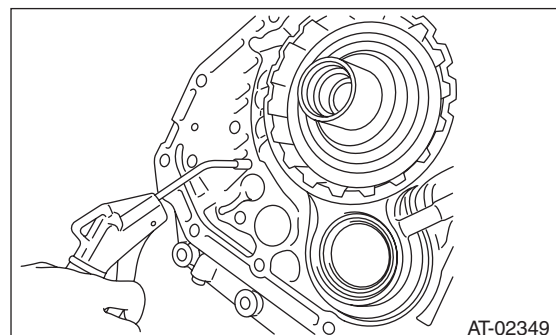
ST2 18765AA000 COMPRESSOR SUPPORT

ST3 18763AA000 COMPRESSOR SHAFT



- 4) Remove the retainer and return spring.

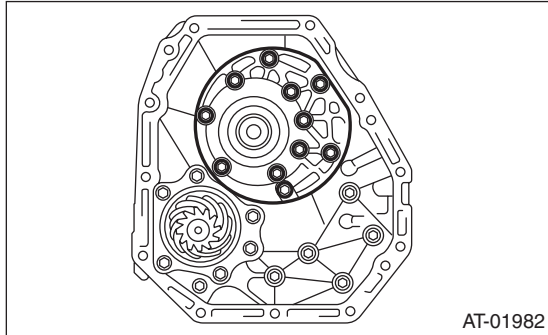
- 5) Remove the front brake piston using compressed air.



- 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.

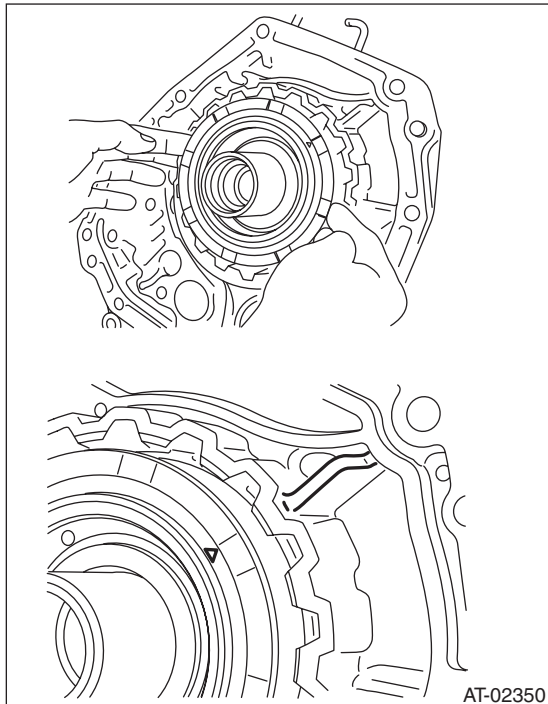
NOTE:

Use a new D-ring.

2) Install the front brake piston to oil pump cover.

NOTE:

Install by aligning the “▲” mark on front brake piston surface with the oil pump cover rib.



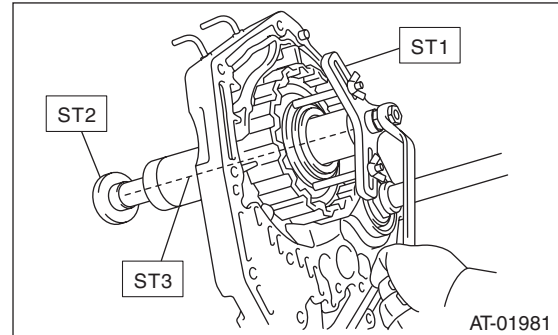
3) Install the retainer and return spring.

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

ST1 18762AA000 COMPRESSOR SPECIAL TOOL

ST2 18765AA000 COMPRESSOR SUPPORT

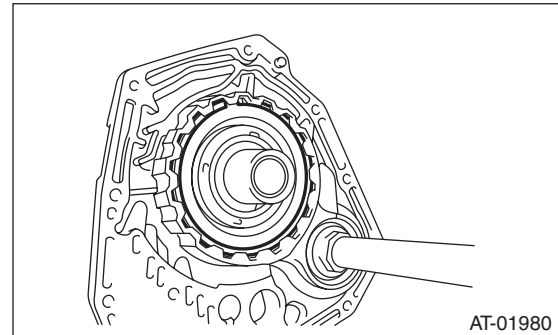
ST3 18763AA000 COMPRESSOR SHAFT



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

Part No. 31536AA290 Driven plate

6) Install the snap ring.



Oil Pump Cover

AUTOMATIC TRANSMISSION

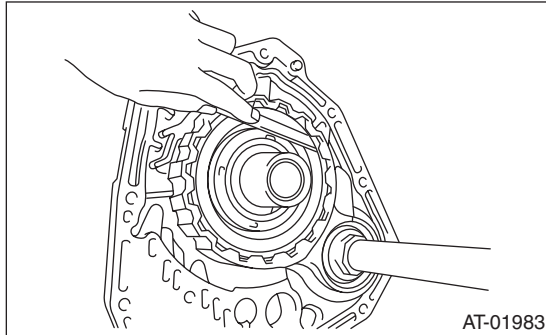
7) Measure the clearance between the retaining plate and snap ring. If the value exceeds the specification, replace the drive plate and driven plate as a set and select the retaining plate so that the value is within the specification.

NOTE:

The thickness of the genuine drive plate is 2.8 ± 0.05 mm (0.11 ± 0.002 in).

Front brake clearance specification:

0.7 — 1.1 mm (0.028 — 0.043 in)



Front brake retaining 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 retaining 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.

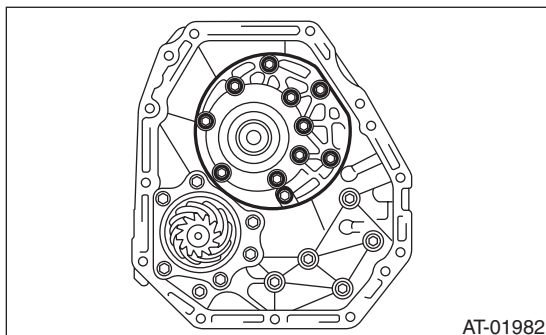
NOTE:

Use new O-rings.

- 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 or 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.

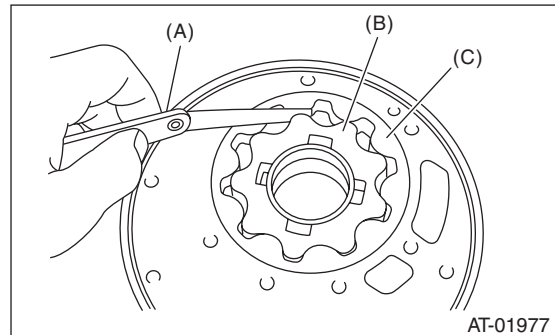
- Oil pump cover and oil seal for breakage or damage
 - Oil pump body for scratch or damage
- 1) Check the seal ring and oil seal for breaks and damage.
 - 2) Check other parts for dents or faults.
 - 3) Oil pump rotor assembly selection

(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)



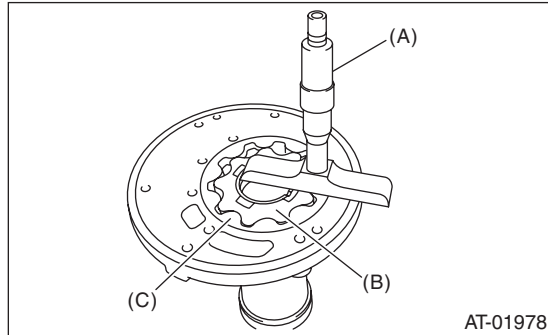
- (A) Thickness gauge
- (B) Inner rotor
- (C) Outer rotor

(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 tip and/or side clearance are not within the specification, replace the rotor assembly.

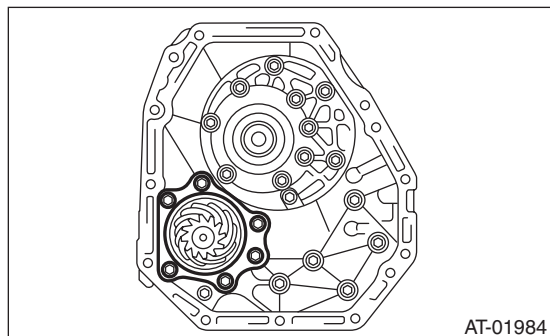
Oil pump rotor assembly	
Part No.	Thickness mm (in)
15008AA130	11.37 — 11.38 (0.4476 — 0.4480)
15008AA140	11.38 — 11.39 (0.4480 — 0.4484)
15008AA150	11.39 — 11.40 (0.4484 — 0.4488)

Check the total end play and adjust it to be within specifications. <Ref. to 5AT-102, ADJUSTMENT, AT Main Case.>

32. Drive Pinion Shaft Assembly

A: REMOVAL

- 1) Remove the transmission assembly from the vehicle. <Ref. to 5AT-37, REMOVAL, Automatic Transmission Assembly.>
- 2) Pull out the torque converter assembly. <Ref. to 5AT-61, REMOVAL, Torque Converter Assembly.>
- 3) Remove the transmission harness connector from stay.
- 4) Remove the ATF AT inlet and outlet pipes. <Ref. to 5AT-56, REMOVAL, ATF Cooler Pipe and Hose.>
- 5) Separate the converter case and transmission case. <Ref. to 5AT-76, REMOVAL, Converter Case.>
- 6) Remove the drive pinion shaft mounting bolts, and then remove the drive pinion shaft assembly from oil pump cover.



- 7) Remove the oil pump cover from AT main case. <Ref. to 5AT-78, Oil Pump Cover.>

B: INSTALLATION

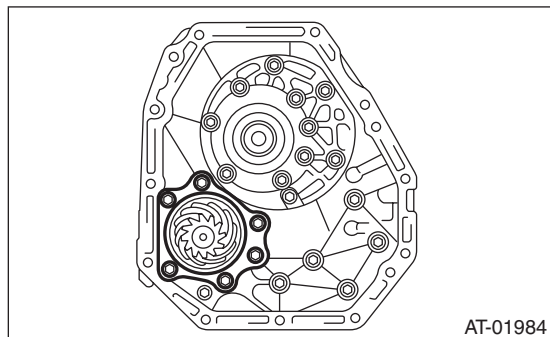
- 1) Assemble the drive pinion assembly to oil pump cover.

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-84, ADJUSTMENT, Drive Pinion Shaft Assembly.>

- 3) Join the converter case with the transmission case. <Ref. to 5AT-76, INSTALLATION, Converter Case.>

- 4) Install the transmission harness connector to the stay.

- 5) Install the ATF AT pipe. <Ref. to 5AT-57, INSTALLATION, ATF Cooler Pipe and Hose.>

- 6) Install the torque converter assembly. <Ref. to 5AT-61, INSTALLATION, Torque Converter Assembly.>

- 7) Install the transmission assembly to the vehicle. <Ref. to 5AT-40, INSTALLATION, Automatic Transmission Assembly.>

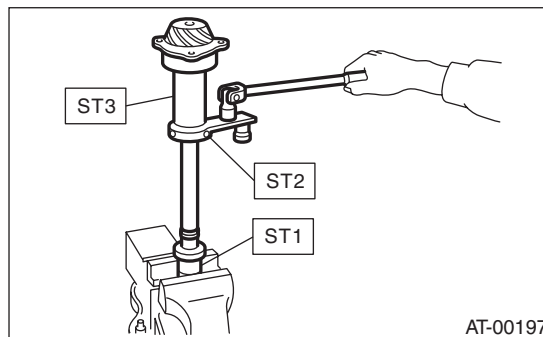
C: DISASSEMBLY

- 1) Flatten the lock nut tab, then remove the lock nut while holding the rear spline part of the shaft using ST1, ST2 and ST3. Pull out the drive pinion collar.

ST1 18667AA010 HOLDER

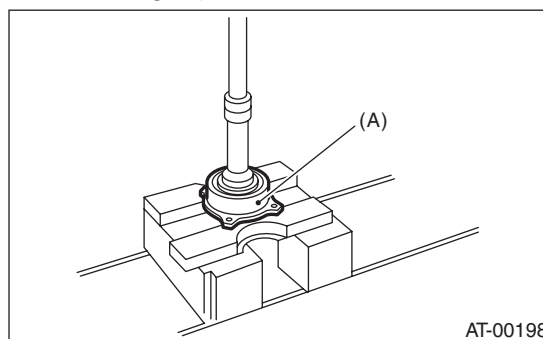
ST2 499787700 WRENCH

ST3 499787500 ADAPTER



- 2) Remove the O-ring.

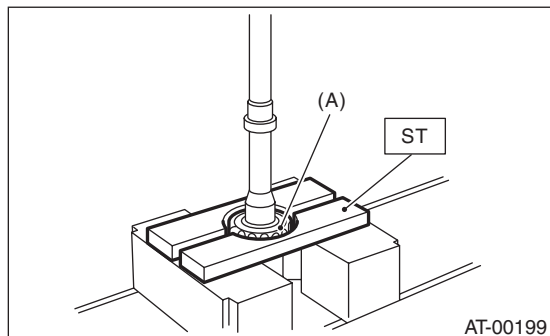
- 3) Separate the rear roller bearing and outer race from shaft using a press.



(A) Outer race

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

ST 498517000 REPLACER

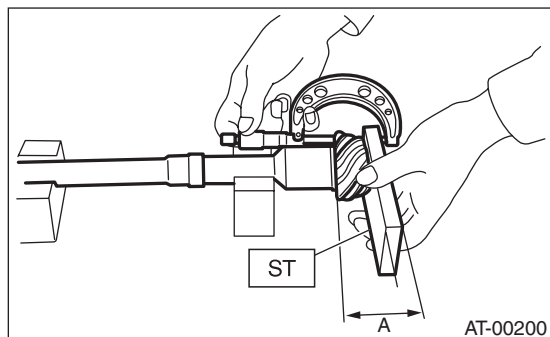


(A) Front roller bearing

D: ASSEMBLY

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

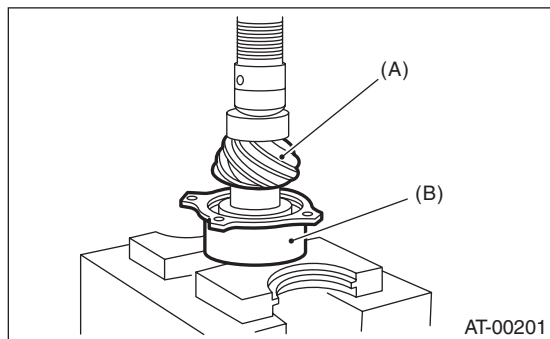
ST 398643600 GAUGE



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

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

Calculate the tightening torque using following formula.

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

T1: 116 N·m (11.8 kgf-m, 85.6 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, 72.3)
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, 75.2)

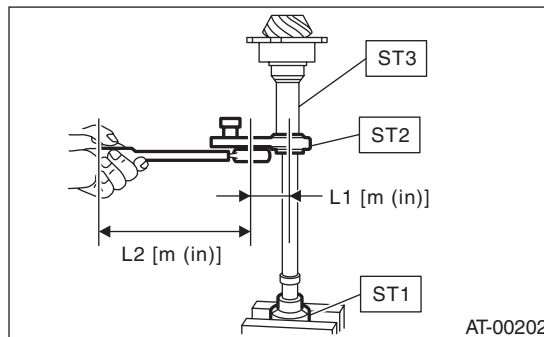
ST1 18667AA010 HOLDER

ST2 499787700 WRENCH

ST3 499787500 ADAPTER

NOTE:

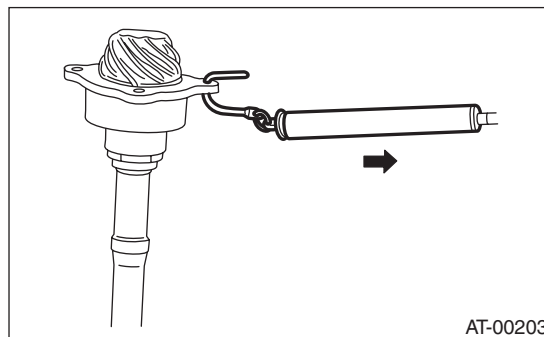
Attach ST2 to torque wrench as straight as possible.



- 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 (0.775 — 3.88 kgf, 1.7 — 8.6 lbf)



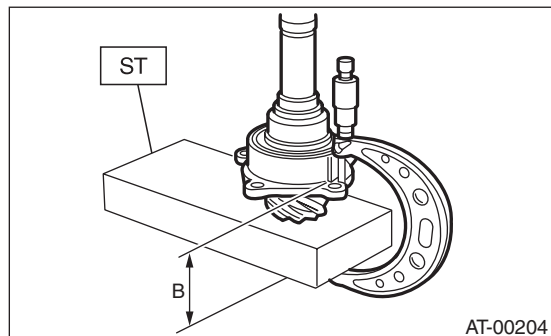
- 6) Crimp the locknut in 2 locations.

Drive Pinion Shaft Assembly

AUTOMATIC TRANSMISSION

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

ST 398643600 GAUGE



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

$$t = 6.5 \pm 0.0625 \text{ (0.256} \pm 0.0025) - (B - A)$$

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-84, ADJUSTMENT, Drive Pinion Shaft Assembly.>

F: ADJUSTMENT

- 1) Assemble the drive pinion shaft assembly to oil pump cover.
- 2) Remove the liquid gasket from the mating surface completely.
- 3) 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.

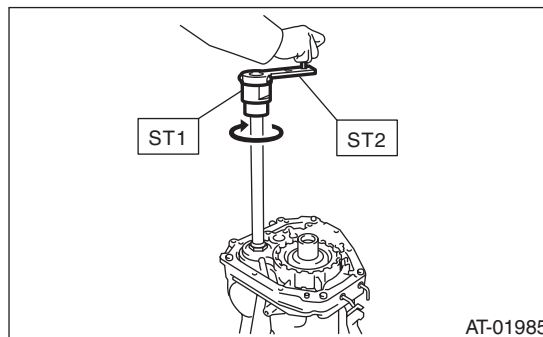
Tightening torque:

41 N·m (4.2 kgf·m, 30.2 ft·lb)

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

ST1 18667AA010 HOLDER

ST2 499787700 WRENCH



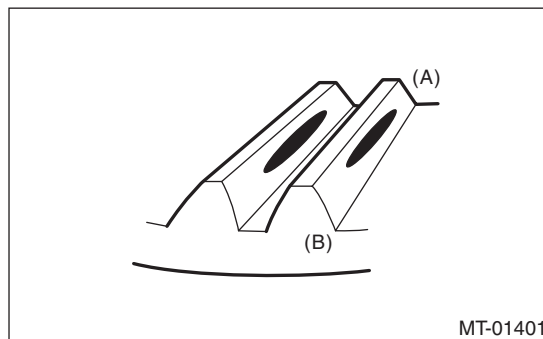
5) Adjust the drive pinion and hypoid driven gear backlash. <Ref. to 5AT-91, ADJUSTMENT, Front Differential Assembly.>

6) Apply lead-free red dye evenly on the surface of three to four teeth of the 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 thickness of the shim. <Ref. to 5AT-91, 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 moves towards the heel side.)



(A) Toe side

(B) Heel side

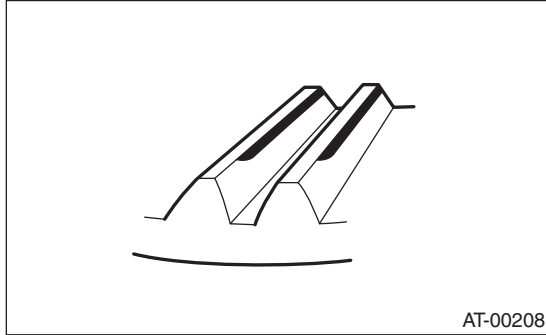
Drive Pinion Shaft Assembly

AUTOMATIC TRANSMISSION

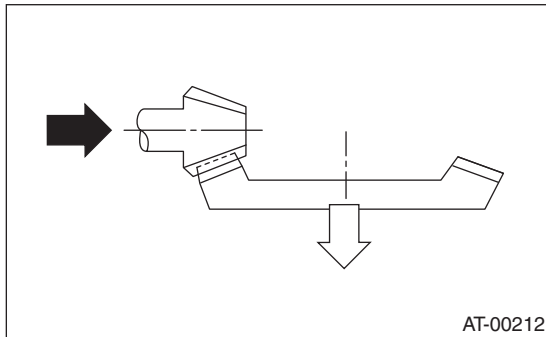
- Face contact

Check item: Backlash is too large.

Contact pattern



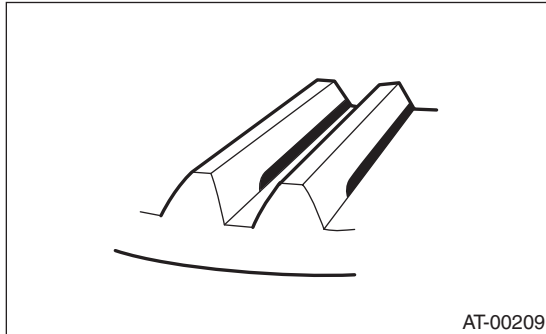
Adjustment: Increase the thickness of the shim according to the procedures for moving the drive pinion closer to the driven gear.



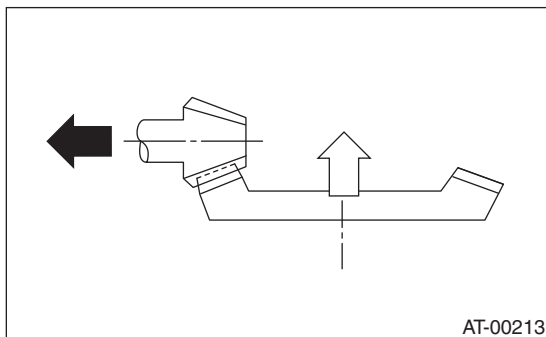
- Flank contact

Check item: Backlash is too small.

Contact pattern



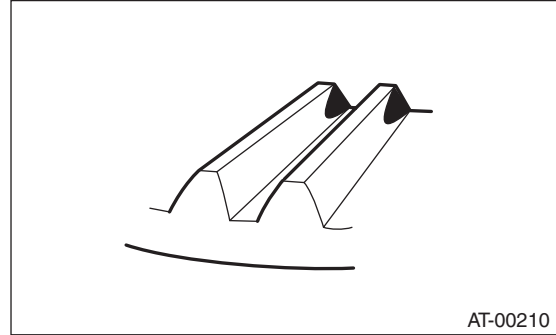
Adjustment: Reduce the thickness of the shim according to the procedure for moving the drive pinion away from the driven gear.



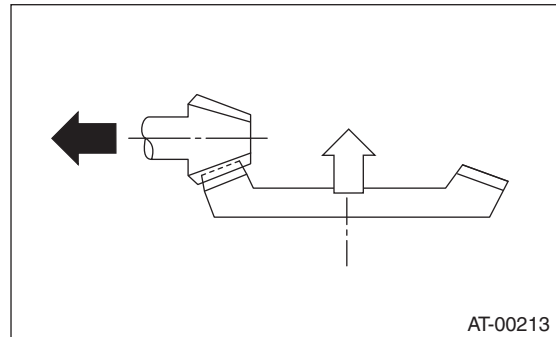
- Toe contact (inside contact)

Check item: Teeth contact area is too small.

Contact pattern



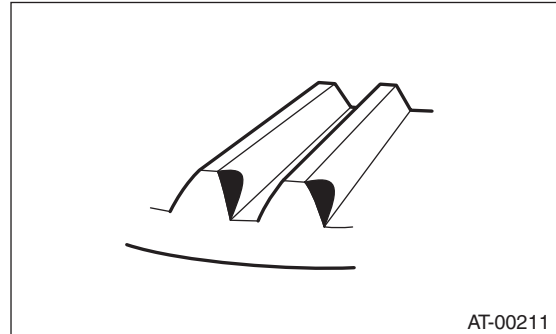
Adjustment: Reduce the thickness of the shim according to the procedure for moving the drive pinion away from the driven gear.



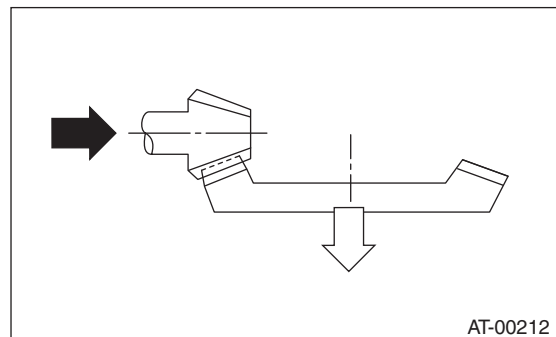
- Heel contact (outside end contact)

Check item: Teeth contact area is too small.

Contact pattern



Adjustment: Increase the thickness of the shim according to the procedures for moving the drive pinion closer to the driven gear.



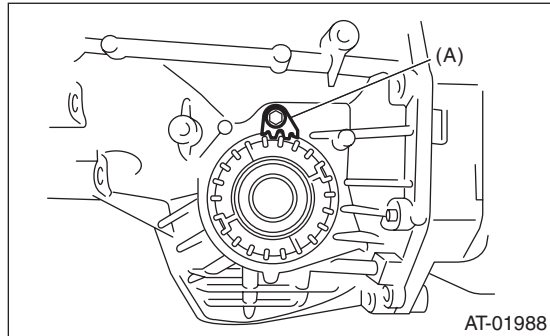
Drive Pinion Shaft Assembly

AUTOMATIC TRANSMISSION

7) 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. Install the lock plate, and tighten the bolts to the specified torque.

Tightening torque:

25 N·m (2.5 kgf-m, 18.4 ft-lb)



(A) Lock plate

33.Front Differential Assembly

A: REMOVAL

- 1) Remove the transmission assembly from the vehicle. <Ref. to 5AT-37, REMOVAL, Automatic Transmission Assembly.>
- 2) Pull out the torque converter assembly. <Ref. to 5AT-61, REMOVAL, Torque Converter Assembly.>
- 3) Remove the transmission harness connector from stay.
- 4) Remove the ATF AT inlet and outlet pipes. <Ref. to 5AT-56, REMOVAL, ATF Cooler Pipe and Hose.>
- 5) Separate the converter case from the transmission case. <Ref. to 5AT-76, REMOVAL, Converter Case.>
- 6) Remove the differential side retainers using ST.

NOTE:

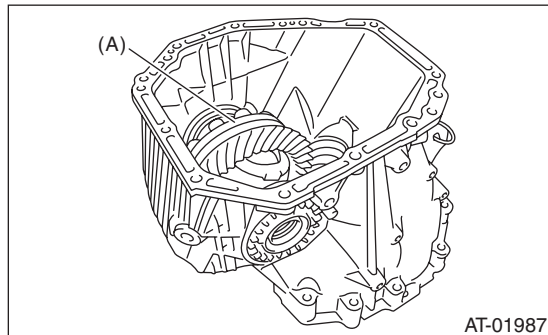
Hold the differential case assembly by hand to avoid damaging the differential side retainer mounting hole of the converter case.

ST 18630AA010 WRENCH COMPL RETAINER

- 7) Remove the front differential assembly while being careful not to damage the attachment part of the retainer.

B: INSTALLATION

- 1) When installing the front differential assembly to the case, be careful not to damage the inside of case (particularly, the differential side retainer mating surface).



(A) Front differential ASSY

- 2) Install the O-ring to left and right side retainers.

NOTE:

Use new O-rings.

- 3) Using the ST, install the side retainer. <Ref. to 5AT-91, ADJUSTMENT, Front Differential Assembly.>

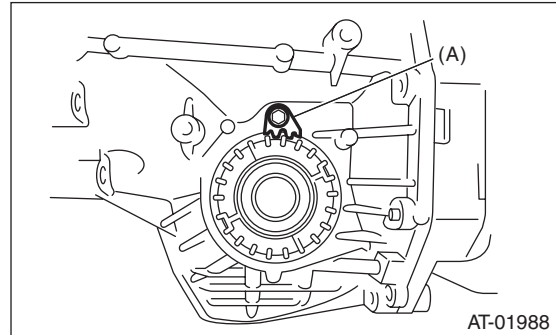
ST 18630AA010 WRENCH COMPL RETAINER

- 4) Adjust the backlash of the front differential. <Ref. to 5AT-91, ADJUSTMENT, Front Differential Assembly.>

- 5) Install the lock plate.

Tightening torque:

25 N·m (2.5 kgf-m, 18.4 ft-lb)



(A) Lock plate

- 6) Install the converter case to the transmission case. <Ref. to 5AT-76, INSTALLATION, Converter Case.>

- 7) Install the transmission harness connector to the stay.

- 8) Install the ATF AT pipe. <Ref. to 5AT-57, INSTALLATION, ATF Cooler Pipe and Hose.>

- 9) Install the torque converter assembly. <Ref. to 5AT-61, INSTALLATION, Torque Converter Assembly.>

- 10) Install the transmission assembly to the vehicle. <Ref. to 5AT-40, INSTALLATION, Automatic Transmission Assembly.>

Front Differential Assembly

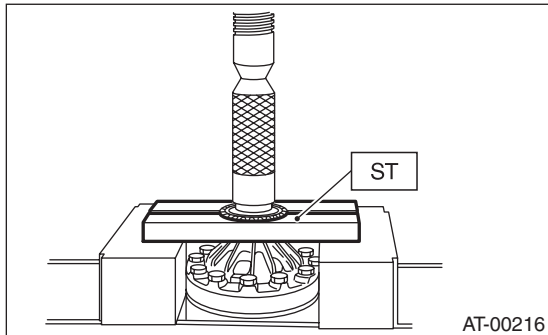
AUTOMATIC TRANSMISSION

C: DISASSEMBLY

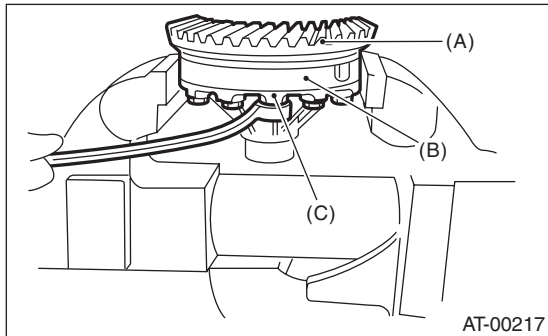
1. DIFFERENTIAL CASE ASSEMBLY

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

ST 498077000 REMOVER

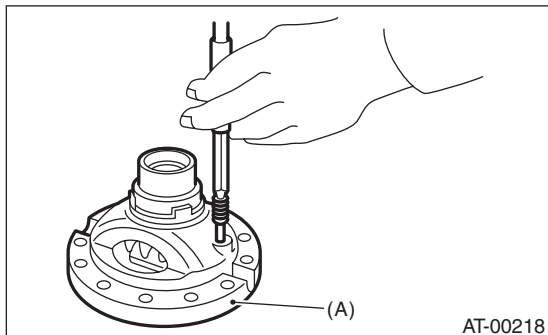


2) Secure the case in a vise, remove the hypoid driven gear tightening bolts, and then separate the hypoid driven gear into case (RH) and case (LH).



- (A) Hypoid driven gear
- (B) Differential case (RH)
- (C) Differential case (LH)

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



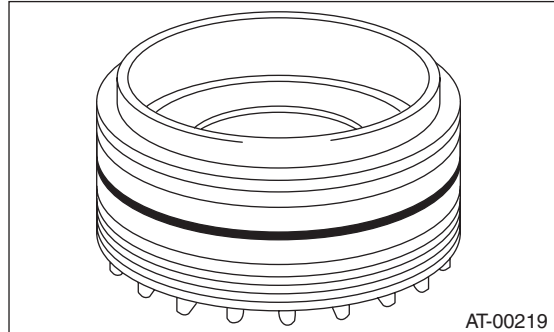
- (A) Differential case (RH)

2. SIDE RETAINER

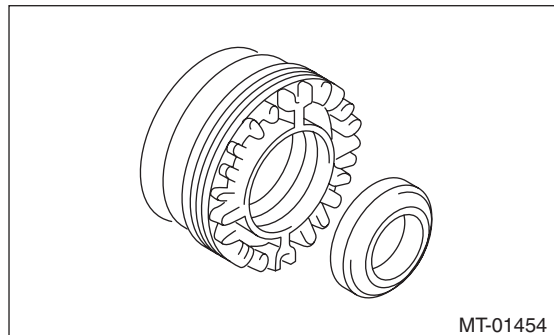
NOTE:

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

1) Remove the O-ring.



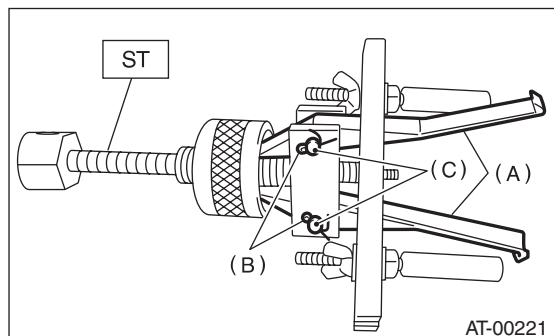
2) Remove the oil seal.



3) Remove the bearing outer race.

(1) Remove the split pin, and then remove the claw.

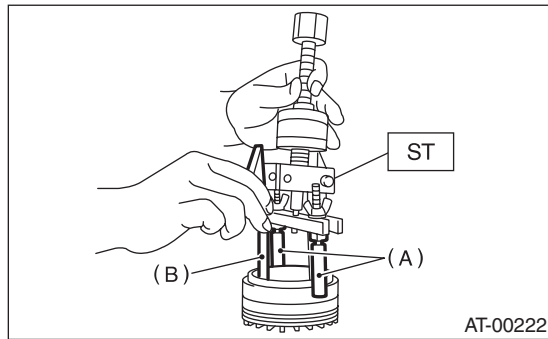
ST 398527700 PULLER ASSY



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

(2) Attach two claws to the outer race, and set the ST to side retainer.

ST 398527700 PULLER ASSY



- (A) Shaft
- (B) Claw

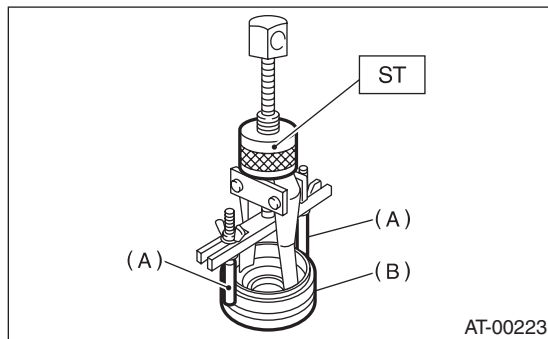
(3) Restore the removed claws to original position, and install the pin and split pin.

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

NOTE:

Replace the bearing inner and outer races as a single unit.

ST 398527700 PULLER ASSY



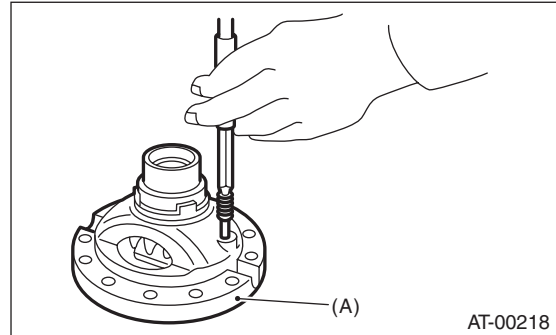
- (A) Shaft
- (B) Side retainer

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.



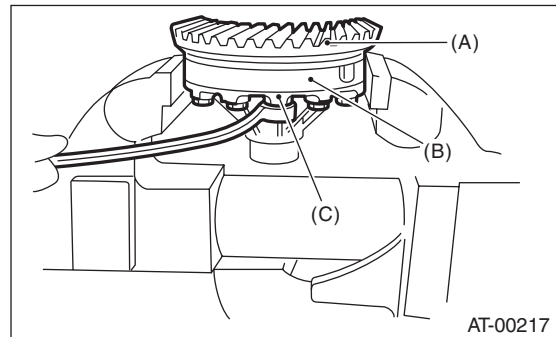
- (A) Differential case (RH)

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

Front Differential Assembly

AUTOMATIC TRANSMISSION

- 5) Measurement of backlash (Selection of washer)
(1) Install the SUBARU genuine axle shaft to differential case.

Part No. 38415AA070 Axle shaft

- (2) Measure the gear backlash with ST1 and ST2. Insert ST2 from the access window of the differential case.

NOTE:

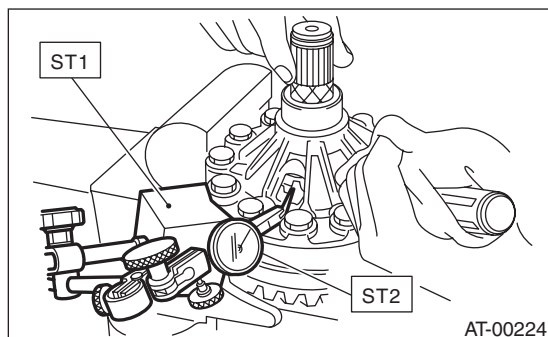
- Measure the backlash by applying a differential bevel pinion tooth between two differential bevel gear teeth.
- When measuring, fix the differential bevel pinion gear in place with a screwdriver covered with cloth, or a similar tool.

Specification:

0.13 — 0.18 mm (0.0051 — 0.0071 in)

ST1 498247001 MAGNET BASE

ST2 498247100 DIAL GAUGE



- (3) If the backlash is not within specification, select a washer from the table below.

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

- 6) Using the ST, install the taper roller bearing.
ST 398487700 DRIFT

2. SIDE RETAINER

NOTE:

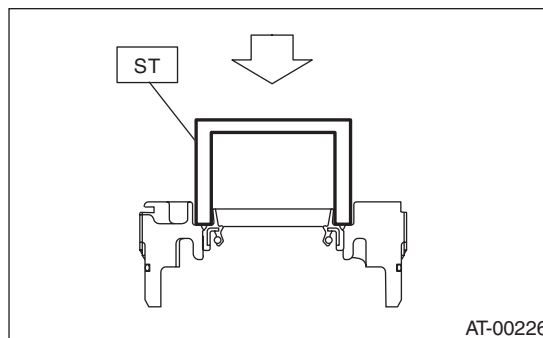
Install the oil seal and O-ring of side retainer after the adjustment of backlash and tooth contact.

- 1) Install the bearing outer race to side retainer.
- 2) Using the ST, install the oil seal.

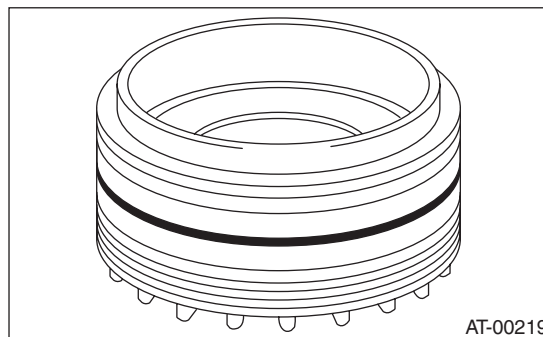
NOTE:

- Use a new oil seal.
- Apply gear oil to the oil seal lips, and install the oil seal while being careful not to deform the lip.
- Check the identification marks (L, R) during installation not to mix up the oil seal RH and LH.

ST 18675AA000 DIFFERENTIAL SIDE OIL SEAL INSTALLER



- 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-91, ADJUSTMENT, Front Differential Assembly.>

F: ADJUSTMENT

1) Using the ST, screw-in the retainer until resistance is felt.

NOTE:

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

ST 18658AA020 WRENCH COMPL RETAINER

2) Remove the oil pump cover.

3) Remove the liquid gasket from the mating surface completely.

4) Install the oil pump cover to converter case, and secure them with tightening four bolts evenly.

NOTE:

Use an old gasket or aluminum washer to prevent damaging the mating surface of the housing.

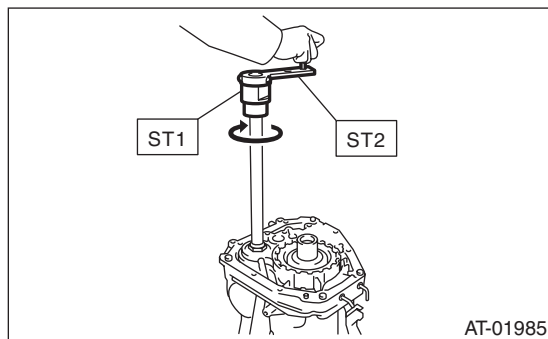
Tightening torque:

41 N·m (4.2 kgf-m, 30.2 ft-lb)

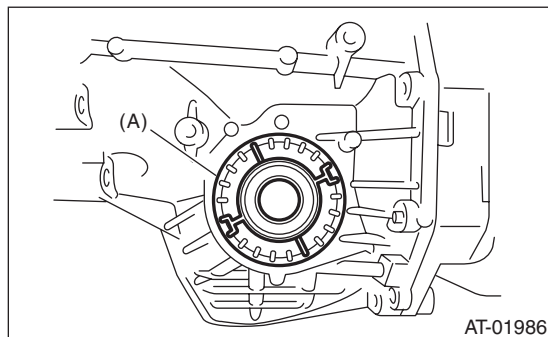
5) Rotate the drive pinion ten times or more using ST1 and ST2.

ST1 18667AA010 HOLDER

ST2 499787700 WRENCH

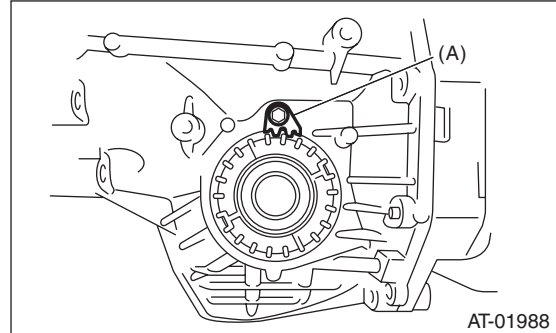


6) Tighten the LH retainer by rotating the shaft until resistance is felt. Then loosen the retainer RH. Keep tightening the retainer LH and loosening the retainer RH until the shaft can't be turned anymore. This is the "zero" state.



(A) Retainer

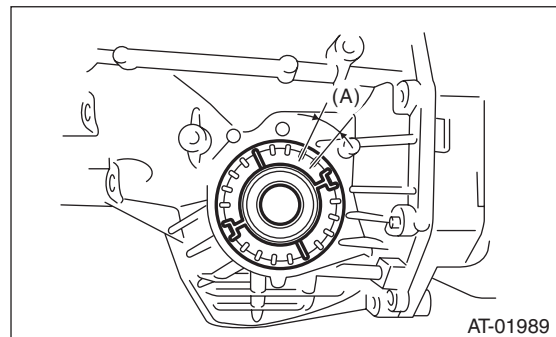
7) After the "zero" state is established, loosen the retainer LH by 3 notches and secure it with the lock plate. Then loosen the retainer RH and retighten until it stops. Rotate the drive pinion 2 or 3 times. Tighten the retainer RH further 1-3/4 notches. This sets the preload. Finally, secure the retainer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



(A) Lock plate

NOTE:

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



8) Install the SUBARU genuine axle shaft to the left and right sides of the front differential.

Front Differential Assembly

AUTOMATIC TRANSMISSION

9) Turn the drive pinion a few times with ST1 and check to see if the backlash is within the specified value, using ST2, ST3, ST4 and ST5.

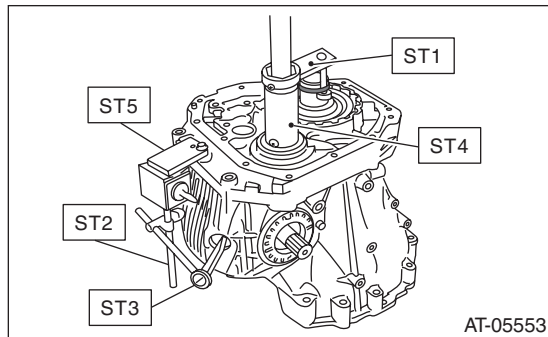
NOTE:

Secure the ST1 and stator shaft with the tie-wrap.

Backlash:

0.13 — 0.18 mm (0.0051 — 0.0071 in)

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



10) Adjust the teeth contact of the front differential and drive shaft. <Ref. to 5AT-84, ADJUSTMENT, Drive Pinion Shaft Assembly.>

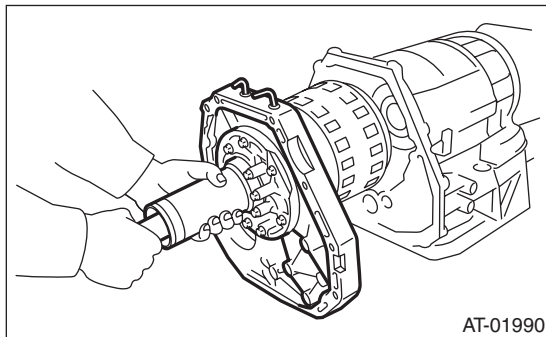
34.AT Main Case

A: REMOVAL

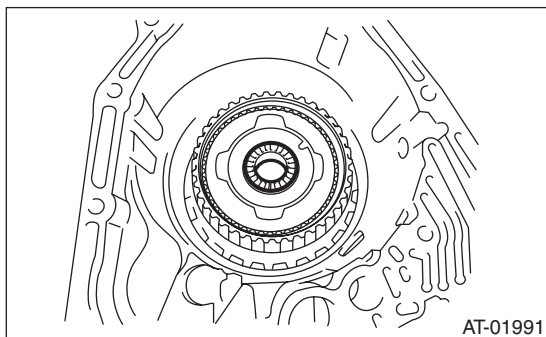
- 1) Remove the transmission assembly from the vehicle. <Ref. to 5AT-37, REMOVAL, Automatic Transmission Assembly.>
- 2) Pull out the torque converter assembly. <Ref. to 5AT-61, REMOVAL, Torque Converter Assembly.>
- 3) Remove the transmission harness connector from stay.
- 4) Remove the ATF AT inlet and outlet pipes. <Ref. to 5AT-56, REMOVAL, ATF Cooler Pipe and Hose.>
- 5) Remove the extension case. <Ref. to 5AT-63, REMOVAL, Extension Case.>
- 6) Remove the center differential carrier. <Ref. to 5AT-72, REMOVAL, Center Differential Carrier.>
- 7) Remove the reduction driven gear. <Ref. to 5AT-69, REMOVAL, Reduction Driven Gear.>
- 8) Separate the converter case from the transmission case. <Ref. to 5AT-76, REMOVAL, Converter Case.>
- 9) Remove the control valve body. <Ref. to 5AT-53, REMOVAL, Control Valve Body.>
- 10) Remove the oil pump cover. <Ref. to 5AT-78, REMOVAL, Oil Pump Cover.>

NOTE:

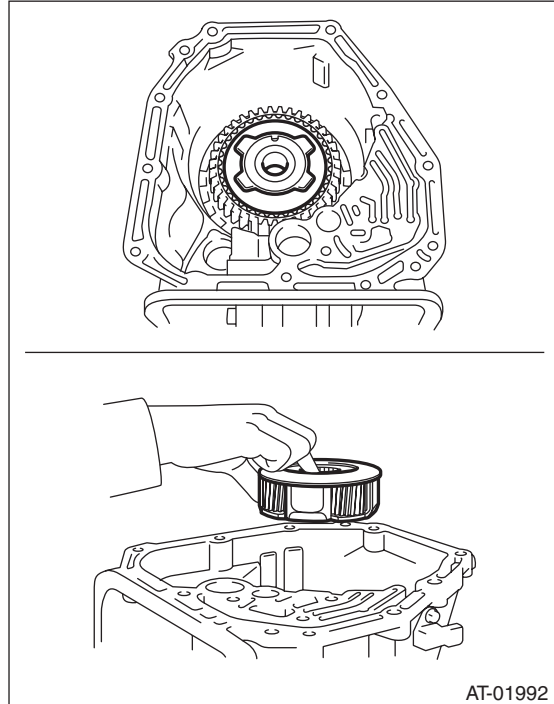
The input clutch pack assembly and front sun gear assembly are also removed together.



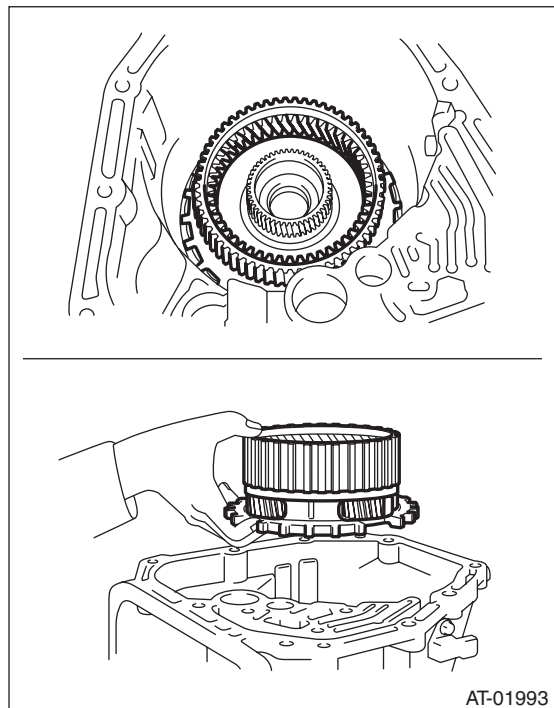
- 11) Remove the needle bearing of the middle carrier assembly.



- 12) Remove the middle carrier assembly.



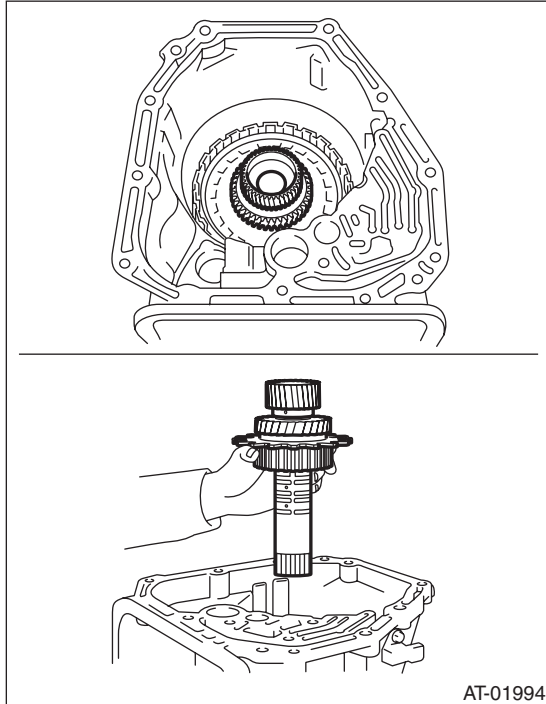
- 13) Remove the rear carrier assembly.



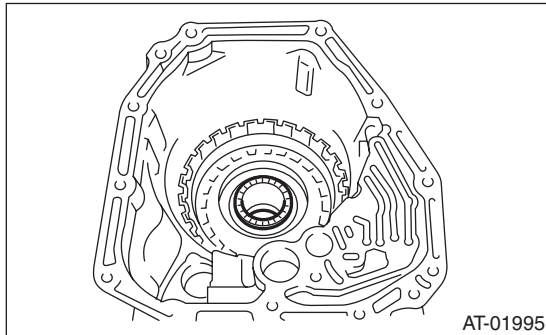
AT Main Case

AUTOMATIC TRANSMISSION

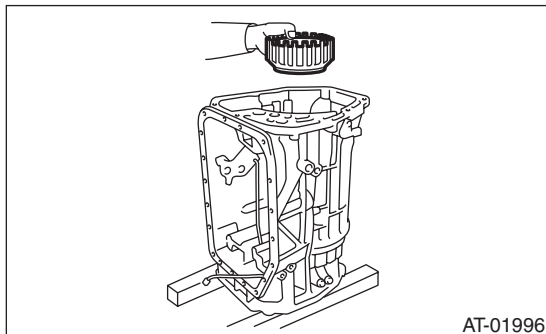
14) Remove the middle & rear sun gear assembly.



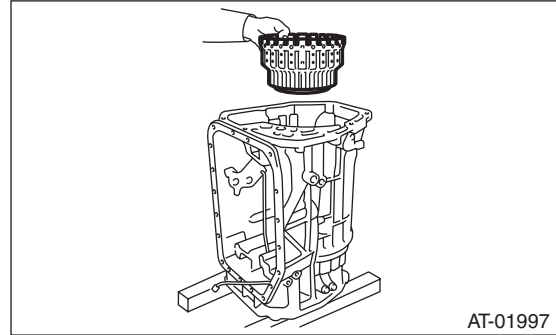
15) Remove the thrust needle bearing of high & low reverse clutch.



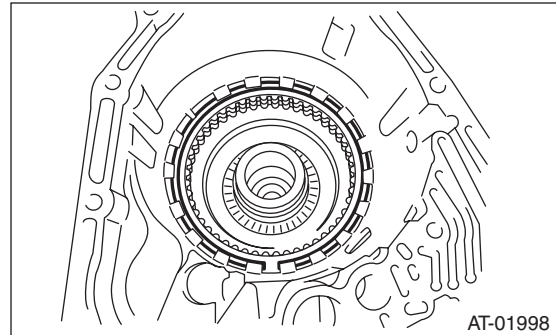
16) Remove the high & low reverse clutch assembly.



17) Remove the direct clutch assembly.

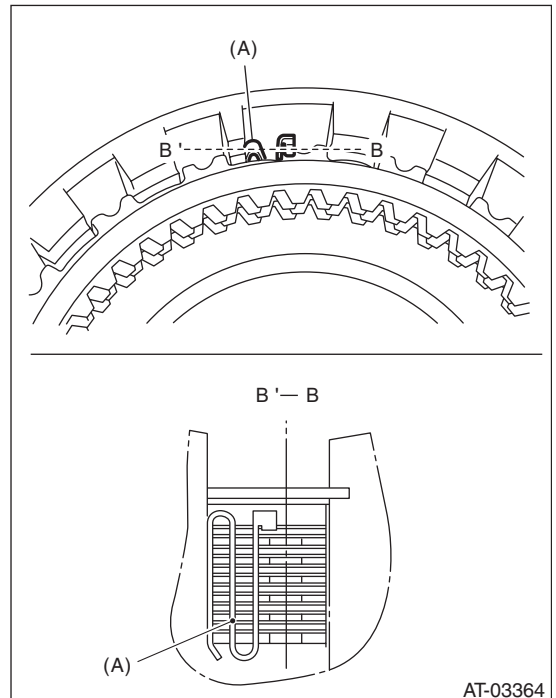


18) Remove the snap ring of reverse brake.



19) Remove the retaining plate.

20) Remove the leaf spring.



(A) Leaf spring

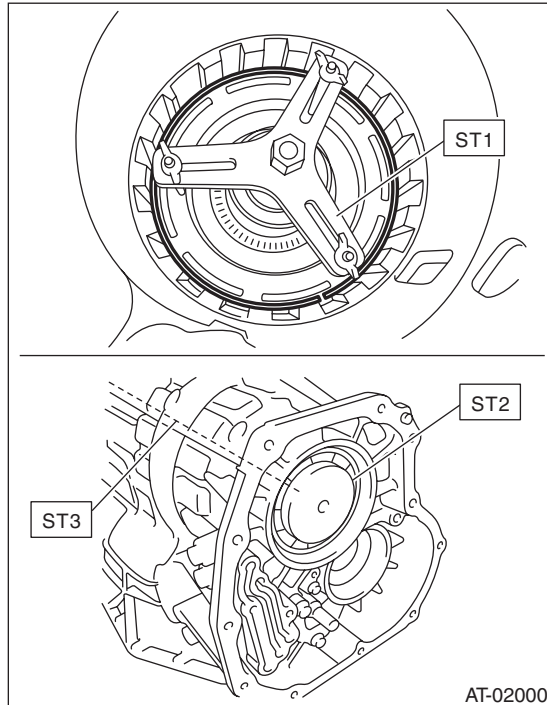
21) Take out the drive plate, driven plate and dish plate.

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

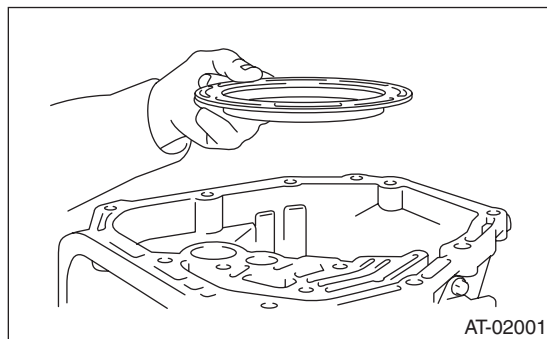
ST1 18762AA000 COMPRESSOR SPECIAL TOOL

ST2 18765AA000 COMPRESSOR SUPPORT

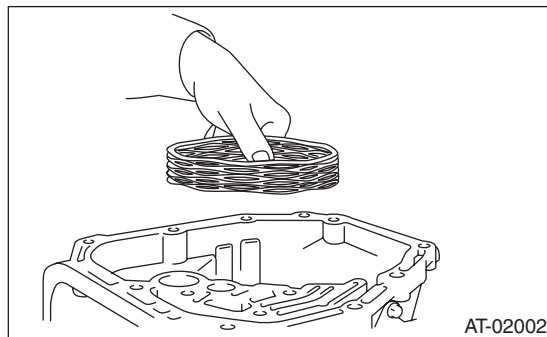
ST3 18763AA000 COMPRESSOR SHAFT



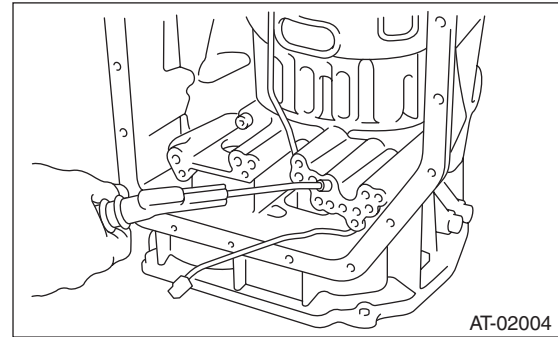
23) Remove the spring retainer.



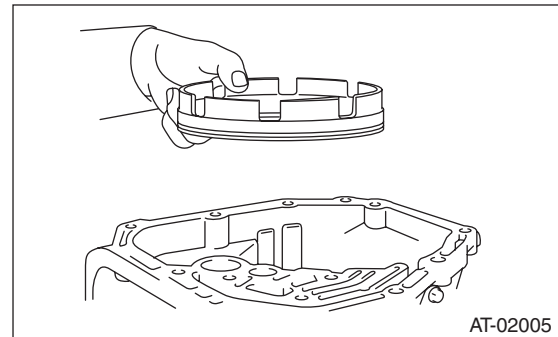
24) Remove the return spring.



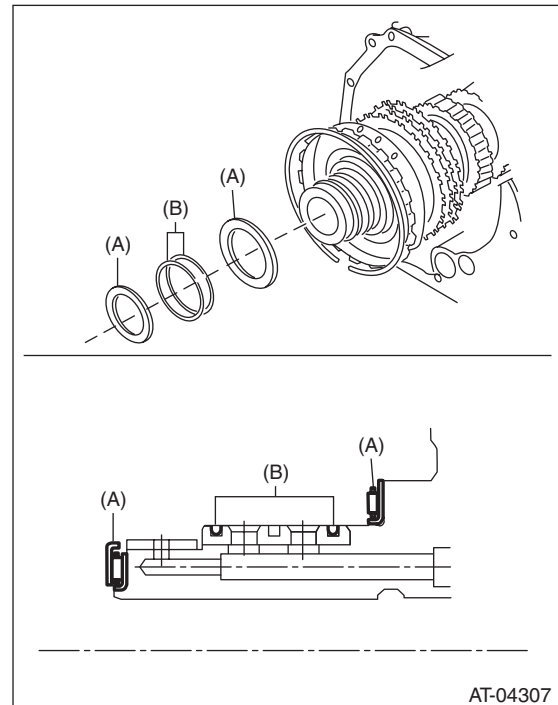
25) Apply compressed air.



26) Remove the reverse brake piston.



27) Remove the thrust bearing and seal ring.

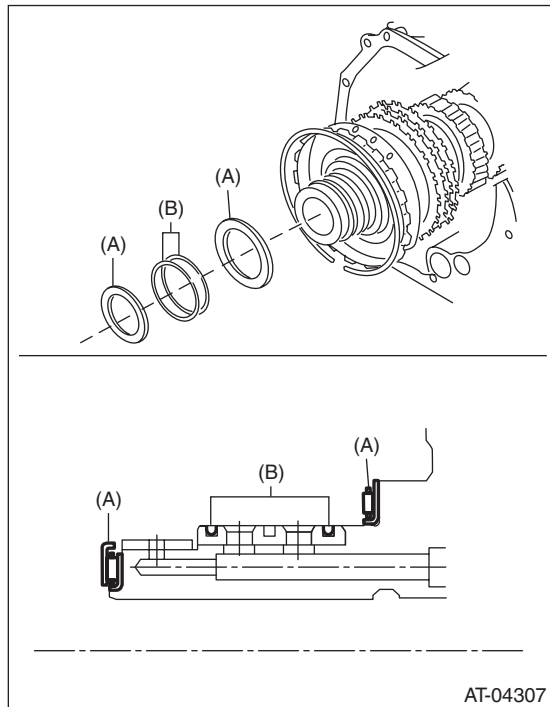


(A) Thrust bearing

(B) Seal ring

B: INSTALLATION

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



- (A) Thrust bearing
(B) Seal ring

- 3) Install the reverse brake piston.

NOTE:

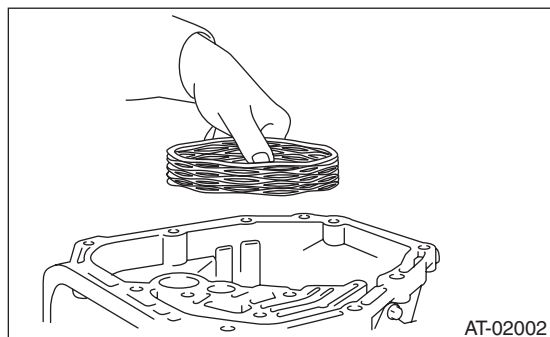
Apply ATF onto the piston sliding surface.

ST1 18762AA000 COMPRESSOR SPECIAL TOOL

ST2 18765AA000 COMPRESSOR SUPPORT

ST3 18763AA000 COMPRESSOR SHAFT

- 4) Install the return spring.

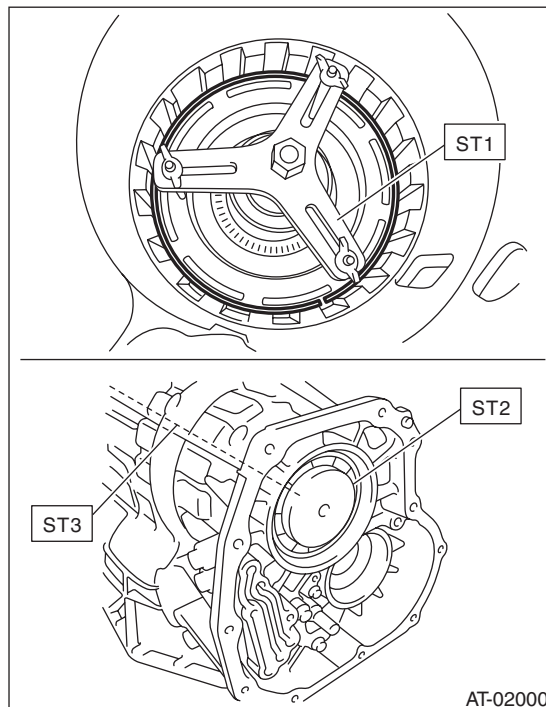


- 5) Install the spring retainer and snap ring.

ST1 18762AA000 COMPRESSOR SPECIAL TOOL

ST2 18765AA000 COMPRESSOR SUPPORT

ST3 18763AA000 COMPRESSOR SHAFT



- 6) Install the dish plate.

NOTE:

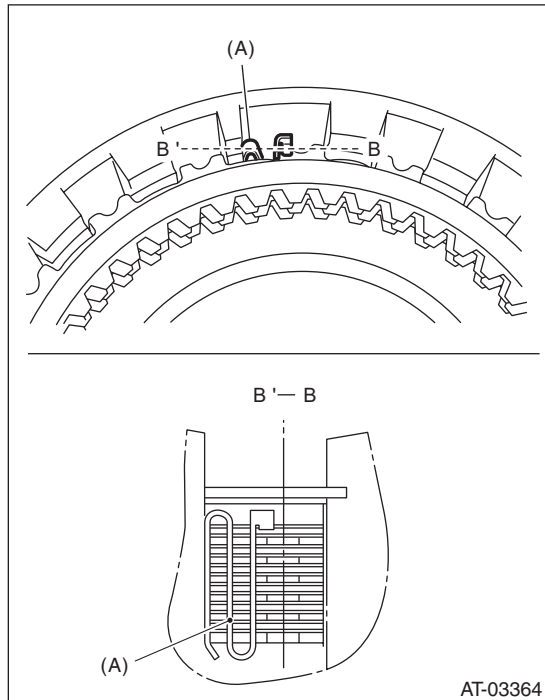
When installing, make sure that the identification mark is facing the rear side of transmission.

- 7) Install the drive plate and driven plate.

NOTE:

When the reverse brake is disassembled, use a new drive plate and driven plate set.

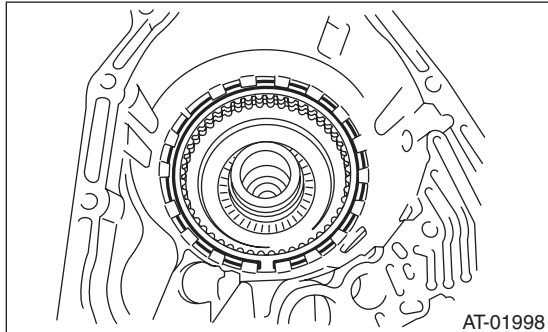
8) Install the leaf spring.



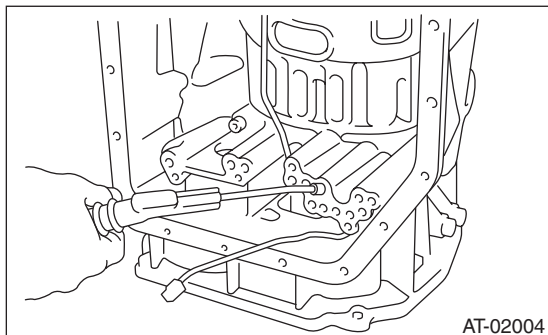
(A) Leaf spring

9) Install the retaining plate.

10) Install the snap ring of the reverse brake.

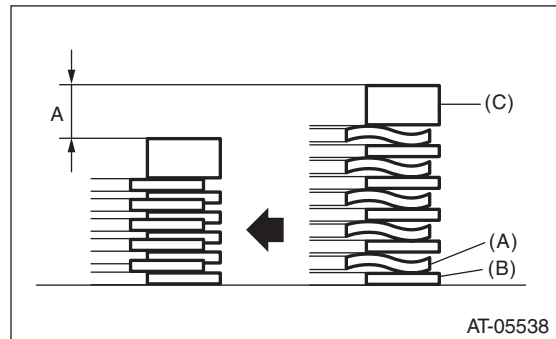


11) Apply compressed air intermittently to check for operation.



12) Check the piston stroke.

(1) Check the amount of drive plate compression "A" described in the wave clutch set of repair parts.



A Amount of drive plate compression

(A) Drive plate

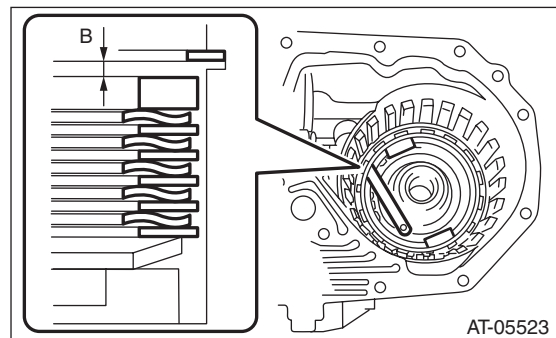
(B) Driven plate

(C) Retaining plate

(2) Measure the clearance "B" between the retaining plate and snap ring using a thickness gauge.

NOTE:

- Set shims of the same thickness on both sides so that the retaining plate will not tilt.
- Do not push the shim down with force to a point where the waves on the drive plate will become crushed.



B Clearance between retaining plate and snap ring

AT Main Case

AUTOMATIC TRANSMISSION

(3) Select and install a retaining plate so that the pin stroke calculated from the dimensions A and B is within the standard.

$$T = A + B$$

T: Piston stroke

A: Amount of drive plate compression

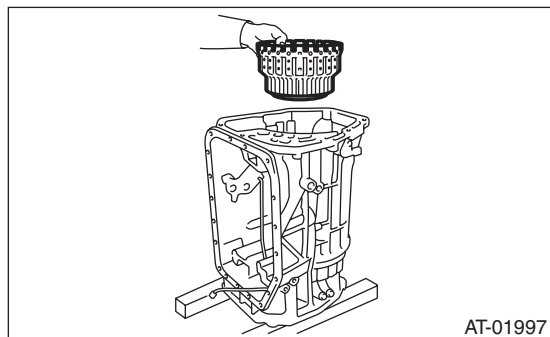
B: Clearance between retaining plate and snap ring

Initial standard:

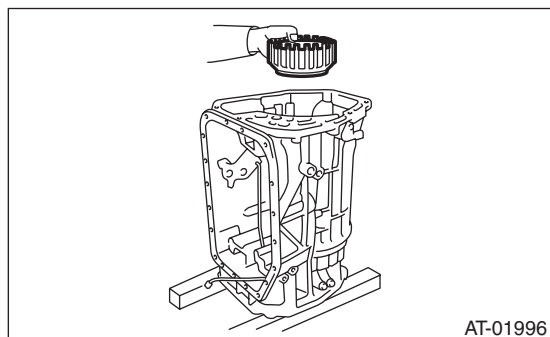
2.0 — 2.4 mm (0.08 — 0.09 in)

Retaining 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)

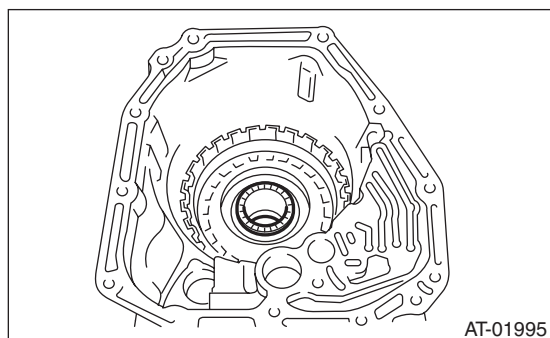
13) Install the direct clutch assembly.



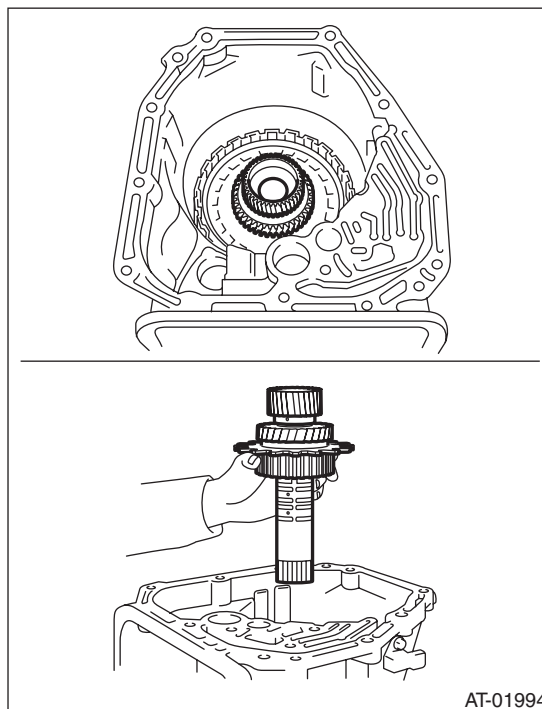
14) Install the high & low reverse clutch assembly.



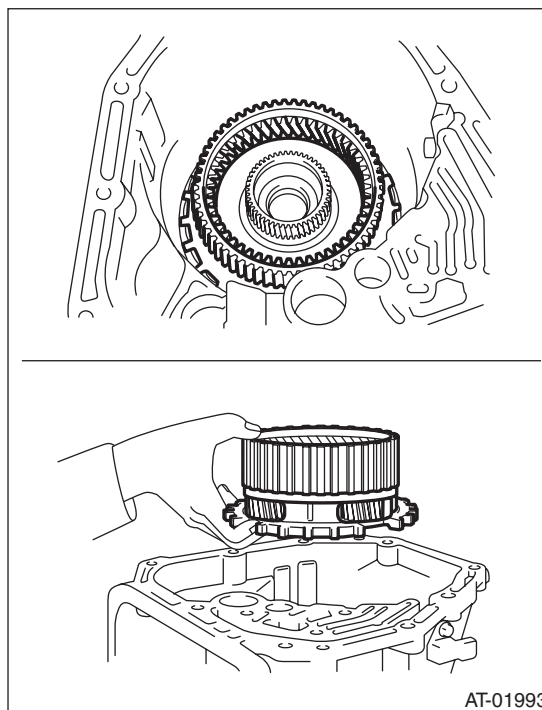
15) Install the thrust needle bearing of the high & low reverse clutch.



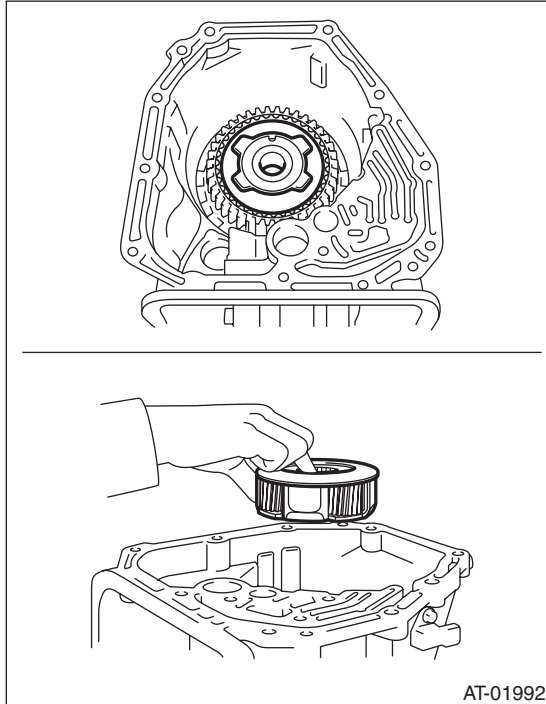
16) Install the middle & rear sun gear assembly.



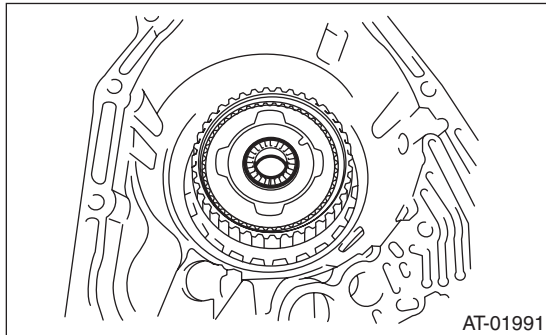
17) Install the rear carrier assembly.



18) Install the middle carrier assembly.

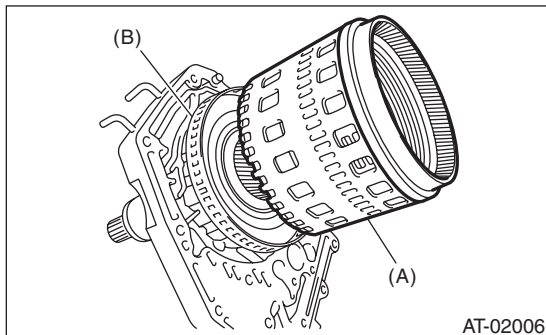


19) Install the thrust needle bearing of middle carrier assembly.



20) Measure the total end play, and select the bearing. <Ref. to 5AT-102, ADJUSTMENT, AT Main Case.>

21) Install the input clutch pack assembly to oil pump cover.



- (A) Input clutch pack ASSY
- (B) Front sun gear ASSY

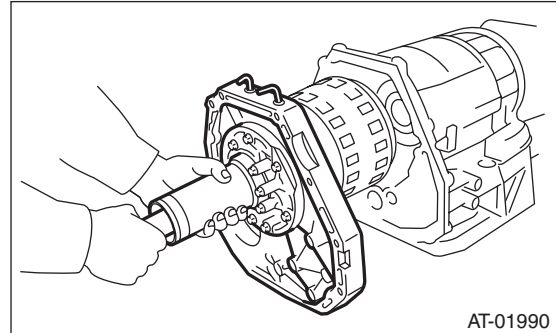
22) Turn the transmission sideways.

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.

NOTE:

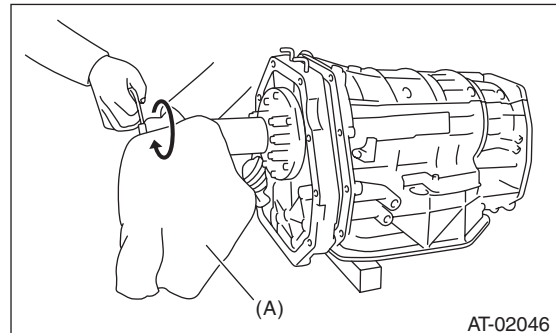
Use a new gasket.



- (3) 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.

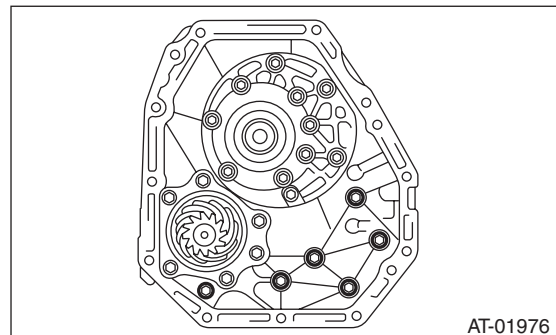


(A) Cloth

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

Tightening torque:

41 N·m (4.2 kgf-m, 30.2 ft-lb)



24) Install the center differential carrier. <Ref. to 5AT-72, INSTALLATION, Center Differential Carrier.>

AT Main Case

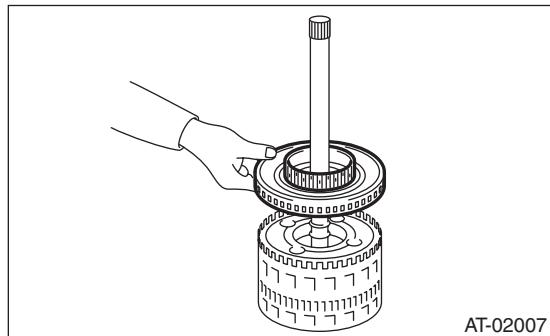
AUTOMATIC TRANSMISSION

- 25) Install the reduction driven gear. <Ref. to 5AT-69, INSTALLATION, Reduction Driven Gear.>
- 26) Install the extension case. <Ref. to 5AT-63, INSTALLATION, Extension Case.>
- 27) Install the control valve body. <Ref. to 5AT-53, INSTALLATION, Control Valve Body.>
- 28) Install the converter case assembly to the transmission case assembly. <Ref. to 5AT-76, INSTALLATION, Converter Case.>
- 29) Install the ATF AT pipe. <Ref. to 5AT-57, INSTALLATION, ATF Cooler Pipe and Hose.>
- 30) Install the torque converter assembly. <Ref. to 5AT-61, INSTALLATION, Torque Converter Assembly.>
- 31) Install the transmission assembly to the vehicle. <Ref. to 5AT-40, INSTALLATION, Automatic Transmission Assembly.>
- 32) Perform Clear Memory 2 operation. <Ref. to 5AT(diag)-18, CLEAR MEMORY MODE, OPERATION, Subaru Select Monitor.>
- 33) Perform the diagnosis again. <Ref. to 5AT(diag)-22, PROCEDURE, Learning Control.>
- 34) Perform the inspection 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.

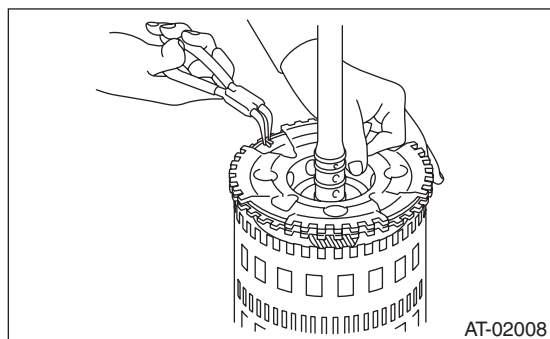
C: DISASSEMBLY

1. INPUT CLUTCH PACK ASSEMBLY

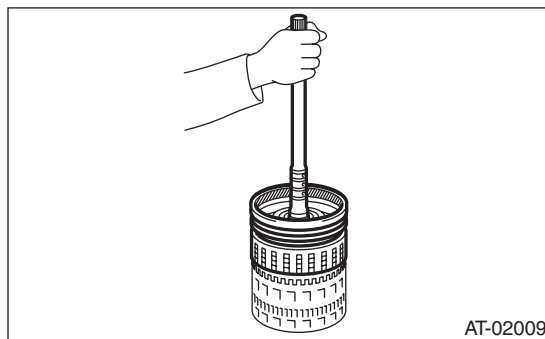
- 1) Remove the front sun gear.



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



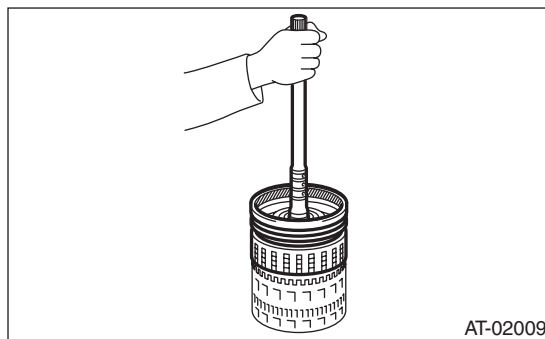
- 4) Remove the input clutch assembly from rear internal gear.



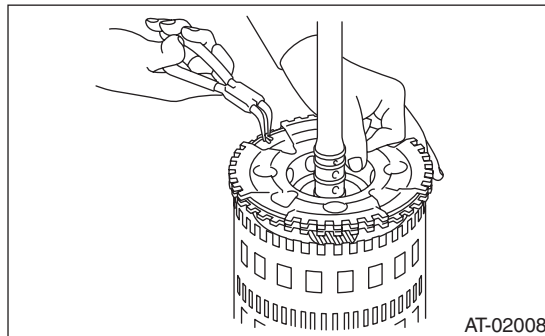
D: ASSEMBLY

1. INPUT CLUTCH PACK ASSEMBLY

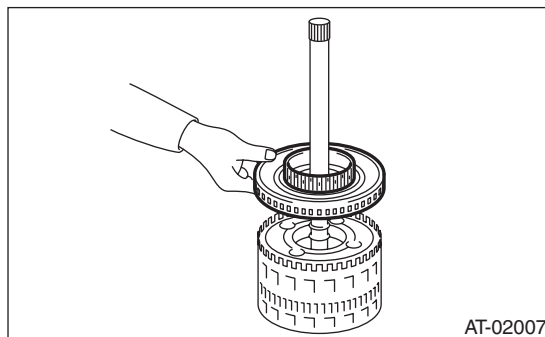
- 1) Assemble the input clutch assembly to rear internal gear.



- 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.

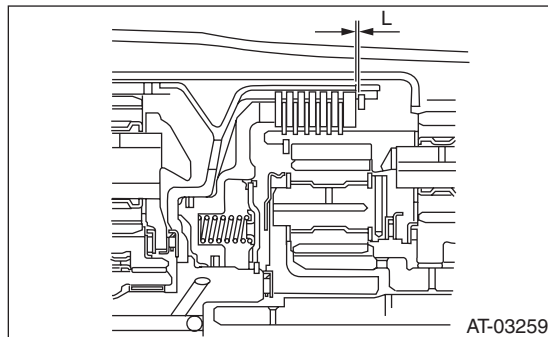
- Visually inspect the tooth surface of planetary gear, and replace with new part if damaged, broken or excessively worn.
- Inspect the planetary carrier body for damage or breakage.

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

Standard:

0.7 — 1.1 mm (0.028 — 0.043 in)



3. HIGH & LOW REVERSE CLUTCH ASSY

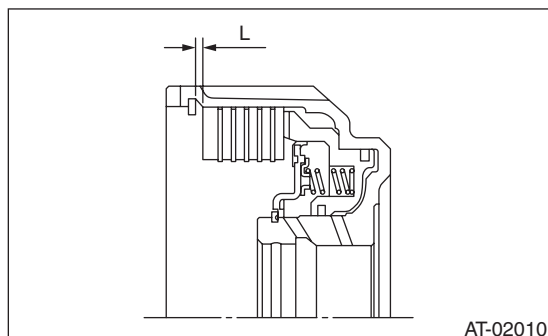
- Check the clearance of the high & low reverse clutch.

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.

Standard:

1.8 — 2.2 mm (0.071 — 0.087 in)



4. DIRECT CLUTCH ASSEMBLY

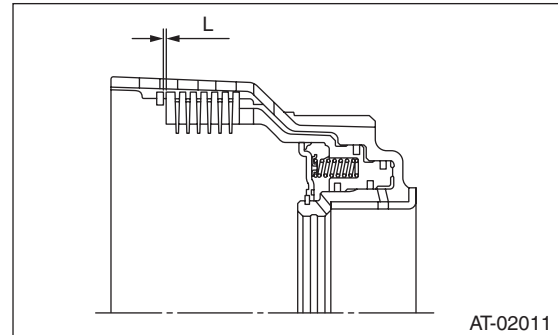
- Check the clearance of direct clutch.

Measure the clearance "L" between snap ring and retaining plate using a thickness gauge. If it is out of specification, replace the entire direct clutch assembly.

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

Standard:

0.6 — 1.0 mm (0.024 — 0.039 in)



5. REVERSE BRAKE

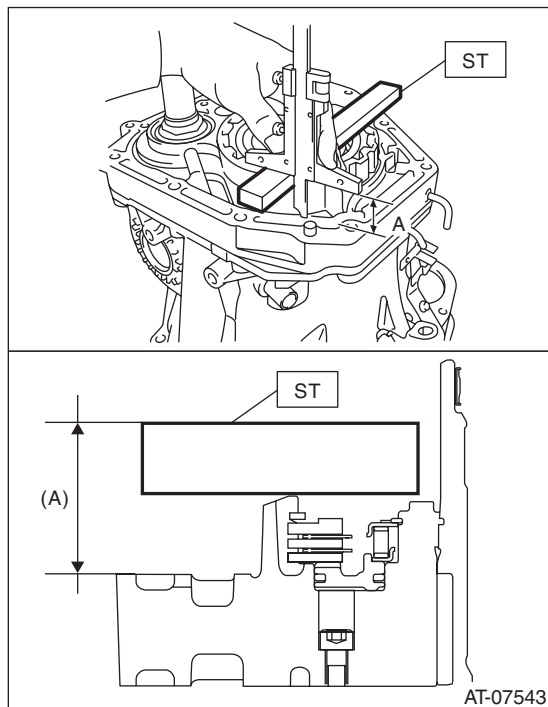
Check the following items.

- Snap ring for wear, return spring for breakage, and spring retainer for deformation
- Lip seal and D-ring for damage
- Piston operation
- Piston stroke

F: ADJUSTMENT

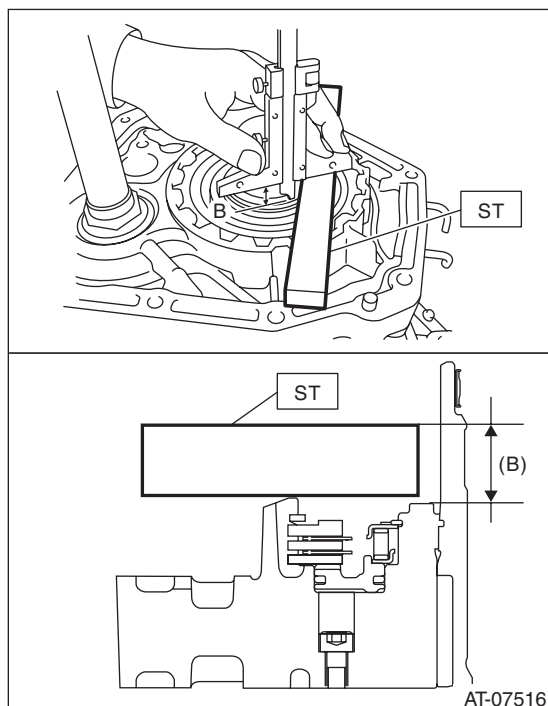
1) Using the ST, measure the height "A" from the AT main case mating surface to the convex surface of oil pump cover.

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

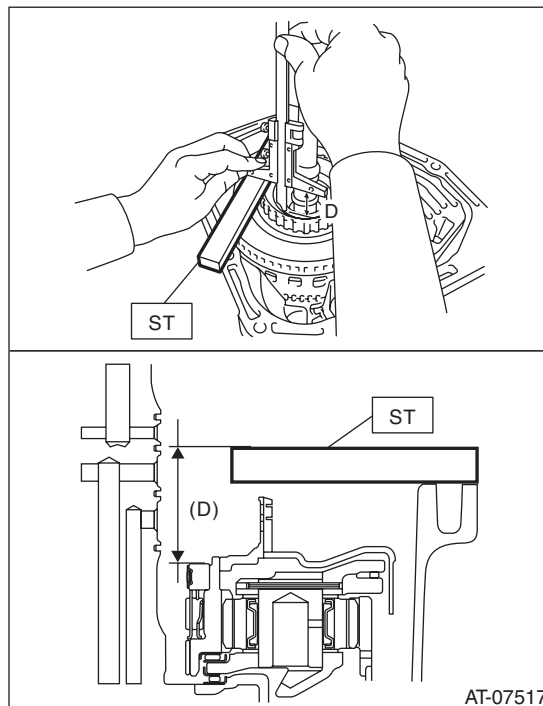


3) Calculate the measured value from step 1) and 2), and then set the calculated value as "C".

Calculation formula: $C = A - B$

4) Using the ST, measure the depth "D" from the AT main case mating surface to the thrust bearing transferring surface of front sun gear.

ST 499575400 GAUGE



5) Set the value as "E" which subtract the thickness of ST (499575400 GAUGE) from the measured value on step 4).

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

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

6) Calculation formula:

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 (0.0217 in):

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

$[T \text{ (in)} = E - C - 0.0106]$

T: Thrust 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

Specification:

0.25 — 0.55 mm (0.0098 — 0.0217 in)

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).

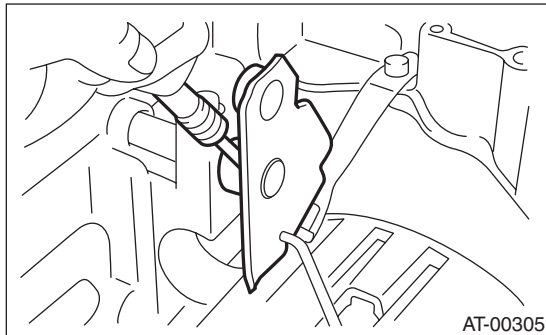
7) Select the thrust bearing so that the clearance is within the specified range.

Thrust bearing	
Part No.	Thickness mm (in)
806548020	3.2 (0.126)
806548030	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

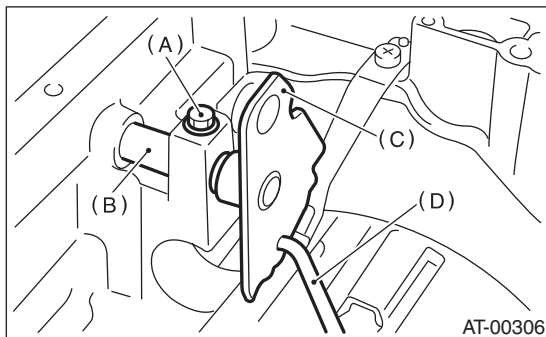
- 1) Remove the transmission assembly from the vehicle. <Ref. to 5AT-37, REMOVAL, Automatic Transmission Assembly.>
- 2) Pull out the torque converter assembly. <Ref. to 5AT-61, REMOVAL, Torque Converter Assembly.>
- 3) Lift up the lever on the rear side of transmission harness connector, and then disconnect it from the stay.
- 4) Remove the air breather hose. <Ref. to 5AT-59, 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-53, REMOVAL, Control Valve Body.>
- 8) Pull out the straight pin of manual plate.



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

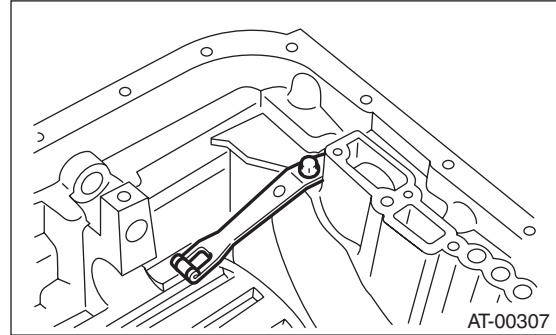
NOTE:

Be careful not to damage the lips of press-fitted oil seal in the case.



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

- 10) Remove the detent spring.

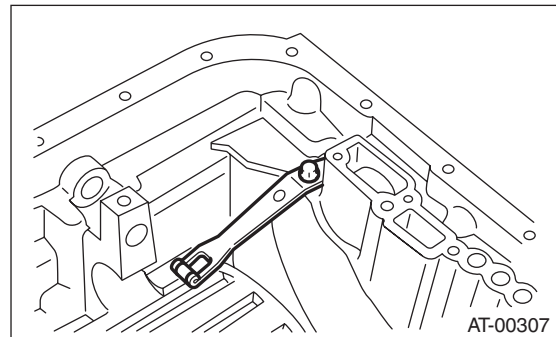


B: INSTALLATION

- 1) Install the detent spring to the transmission case.

Tightening torque:

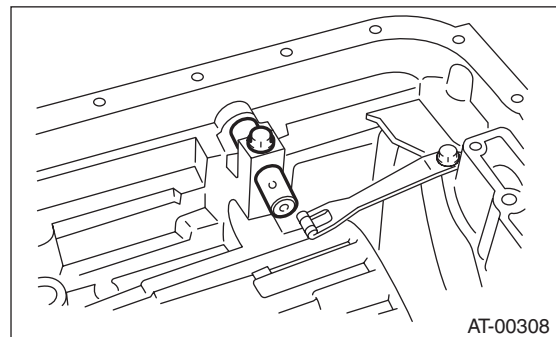
7 N·m (0.7 kgf-m, 5.2 ft-lb)



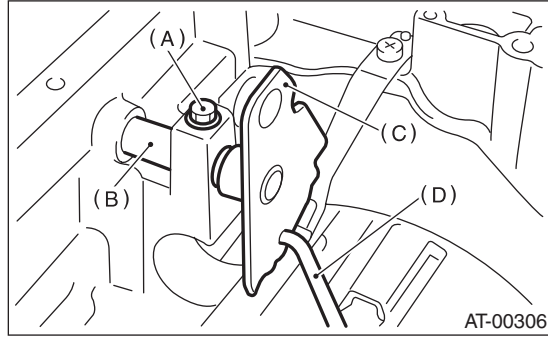
- 2) Insert the range select lever, and tighten the bolts.

Tightening torque:

6 N·m (0.6 kgf-m, 4.4 ft-lb)

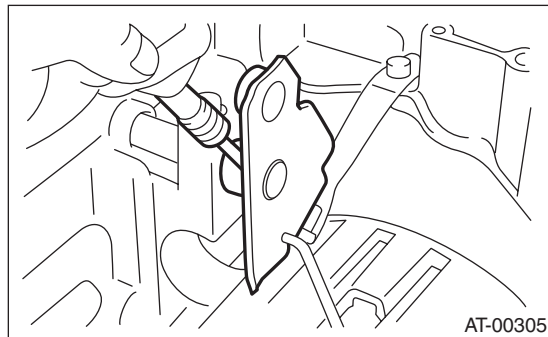


3) Insert the manual plate and parking rod.



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

4) Insert the straight pin to the manual plate.



5) Install the oil pan and the control valve body assembly. <Ref. to 5AT-53, INSTALLATION, Control Valve Body.>

6) Install the pitching stopper bracket.

Tightening torque:

41 N·m (4.2 kgf-m, 30.2 ft-lb)

7) Insert the transmission connector to the stay.

8) Install the air breather hose. <Ref. to 5AT-59, INSTALLATION, Air Breather Hose.>

9) Install the torque converter assembly. <Ref. to 5AT-61, INSTALLATION, Torque Converter Assembly.>

10) Install the transmission assembly to the vehicle. <Ref. to 5AT-40, INSTALLATION, Automatic Transmission Assembly.>

C: INSPECTION

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

36. Diagnostics with Phenomenon

A: INSPECTION

Symptoms	Faulty parts
Engine does not start when the select lever is in “N” and “P” range.	• Select cable • Inhibitor switch • TCM
Engine starts when the select lever is in a range other than “N” or “P” range.	• Select cable • Inhibitor switch • TCM
The vehicle is not switched to parting mode when the select lever is in “P” range.	• Inhibitor switch • Select cable • Parking mechanism
Parking mode is not canceled even if the select lever is shifted from “P” range to another range.	• Inhibitor switch • Select cable • Parking mechanism
Excessive shock when the select lever is shifted from “N” range to “D” range or from “N” range to “R” range.	• ATF • Turbine speed sensor • Line pressure solenoid • Line pressure circuit
Engine stalls when the select lever is shifted from “N” range to “D” range or from “N” range to “R” range.	• ATF • Turbine speed sensor • Line pressure circuit • Lock-up solenoid • Lock-up pressure circuit • Engine speed signal • TCM
Excessive shift shock while driving with the select lever in “D” range.	• ATF • Vehicle speed sensor • Turbine speed sensor • Line pressure circuit • Engine speed signal • TCM
Excessive shock at lock-up or lock-up does not occur when the select lever is in “D” range.	• Vehicle speed sensor • Turbine speed sensor • Line pressure circuit • Lock-up solenoid • Lock-up pressure circuit • Engine speed signal • TCM
Cannot drive in all ranges.	• ATF • Select cable • Inhibitor switch • Line pressure solenoid • Line pressure circuit • Engine speed signal • TCM • Gear and clutch
The vehicle can run when the select lever is in “P” and “N” range.	• Inhibitor switch • Select cable
Excessively poor acceleration when the select lever is in “D” range.	• ATF • Line pressure solenoid • Line pressure circuit • Vehicle speed sensor • Engine speed signal • TCM • Gear and clutch

Diagnostics with Phenomenon

AUTOMATIC TRANSMISSION

Symptoms	Faulty parts
Noise emitted from transmission	• ATF • Gear, clutch and bearing • Control valve

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

5AT(diag)

	Page
1. Basic Diagnostic Procedure	2
2. Check List for Interview	4
3. General Description	5
4. Electrical Component Location	7
5. Transmission Control Module (TCM) I/O Signal	12
6. Subaru Select Monitor	16
7. Read Diagnostic Trouble Code (DTC)	19
8. Inspection Mode	20
9. Clear Memory Mode	21
10. Learning Control	22
11. AT OIL TEMP Warning Light Display	24
12. AWD Warning Light Display	27
13. Diagnostic Procedure for Subaru Select Monitor Communication	29
14. List of Diagnostic Trouble Code (DTC)	32
15. Diagnostic Procedure with Diagnostic Trouble Code (DTC)	35
16. Diagnostic Procedure without Diagnostic Trouble Code (DTC)	101
17. General Diagnostic Table	106

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 check list. <Ref. to 5AT(diag)-4, Check List for Interview.> 2) Check the following items which may be affecting the AT trouble. • General inspection <Ref. to 5AT(diag)-5, INSPECTION, General Description.> • Oil leakage • Stall speed test <Ref. to 5AT-33, Stall Test.> • Line pressure test <Ref. to 5AT-35, Line Pressure Test.> • Transfer clutch pressure test <Ref. to 5AT-36, Transfer Clutch Pressure Test.> • Time lag test <Ref. to 5AT-34, Time Lag Test.> • Road test <Ref. to 5AT-32, Road Test.> • Inhibitor switch <Ref. to 5AT-48, Inhibitor Switch.>	Is the item that might influence the AT problem normal?	Go to step 2.	Repair or replace items which might affect the AT problem.
2 CHECK AT OIL TEMP LIGHT. Turn the ignition switch to ON and wait for at least 2 seconds.	Does the AT OIL TEMP light illuminate?	Go to step 3.	Check the AT OIL TEMP light.
3 CHECK AT OIL TEMP LIGHT. Start the engine and wait for 2 seconds or more.	Does the AT OIL TEMP light blink?	Go to step 4.	Go to step 6.
4 CHECK DTC. Read the DTC. <Ref. to 5AT(diag)-19, 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)-29, COMMUNICATION FOR INITIALIZING IMPOSSIBLE, Diagnostic Procedure for Subaru Select Monitor Communication.>	Is DTC displayed on Subaru Select Monitor?	Record all DTC. Go to step 5.	Go to step 6.
5 CHECK FREEZE FRAME DATA. Using the Subaru Select Monitor, check the Freeze Frame Data.	Are freeze frame data recorded?	Record the freeze frame data. Go to step 7.	Go to step 7.
6 PERFORM GENERAL DIAGNOSTICS. 1) Inspect using "Diagnostic Procedure without Diagnostic Trouble Code (DTC)". <Ref. to 5AT(diag)-101, Diagnostic Procedure without Diagnostic Trouble Code (DTC).> 2) Perform the Clear Memory Mode. 3) Perform the Inspection Mode. <Ref. to 5AT(diag)-20, Inspection Mode.> 4) Display the DTC.	Is DTC displayed on Subaru Select Monitor?	Go to step 7.	Finish the diagnosis.

Basic Diagnostic Procedure

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step	Check	Yes	No
7 PERFORM DIAGNOSIS. 1) Inspect using "Diagnostic Procedure with Diagnostic Trouble Code (DTC)". <Ref. to 5AT(diag)-35, Diagnostic Procedure with Diagnostic Trouble Code (DTC).> NOTE: For the DTC table, refer to "List of Diagnostic Trouble Code (DTC)". <Ref. to 5AT(diag)-32, 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)-20, Inspection Mode.> 5) Display the DTC.	Is DTC displayed on Subaru Select Monitor?	Inspect using "Diagnostic Procedure with Diagnostic Trouble Code (DTC)". <Ref. to 5AT(diag)-35, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>	Finish the diagnosis.

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Use copies of this page for interviewing customers.

5AT(diag)-4

3. General Description

A: CAUTION

1. 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.

2. 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:

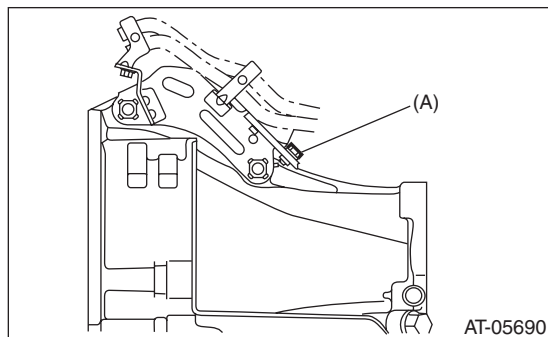
1.260 or more

2. TRANSMISSION GROUND

Make sure that the ground terminal bolt is tightened securely.

Tightening torque:

7 N·m (0.7 kgf-m, 5.2 ft-lb)



(A) Ground bolt

3. ATF LEVEL

Make sure that ATF level is the specified amount. <Ref. to 5AT-29, INSPECTION, Automatic Transmission Fluid.>

4. FRONT DIFFERENTIAL OIL LEVEL

Make sure the front differential oil level is the specified amount. <Ref. to 5AT-31, INSPECTION, Differential Gear Oil.>

5. OPERATION OF SHIFT SELECT LEVER

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

WARNING:

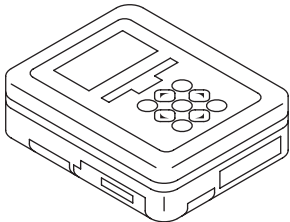
Stop the engine while checking operation of the select lever.

General Description

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

C: PREPARATION TOOL

1. SPECIAL TOOL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST1B022XU0	1B022XU0	SUBARU SELECT MONITOR III KIT	Used for troubleshooting the electrical system.

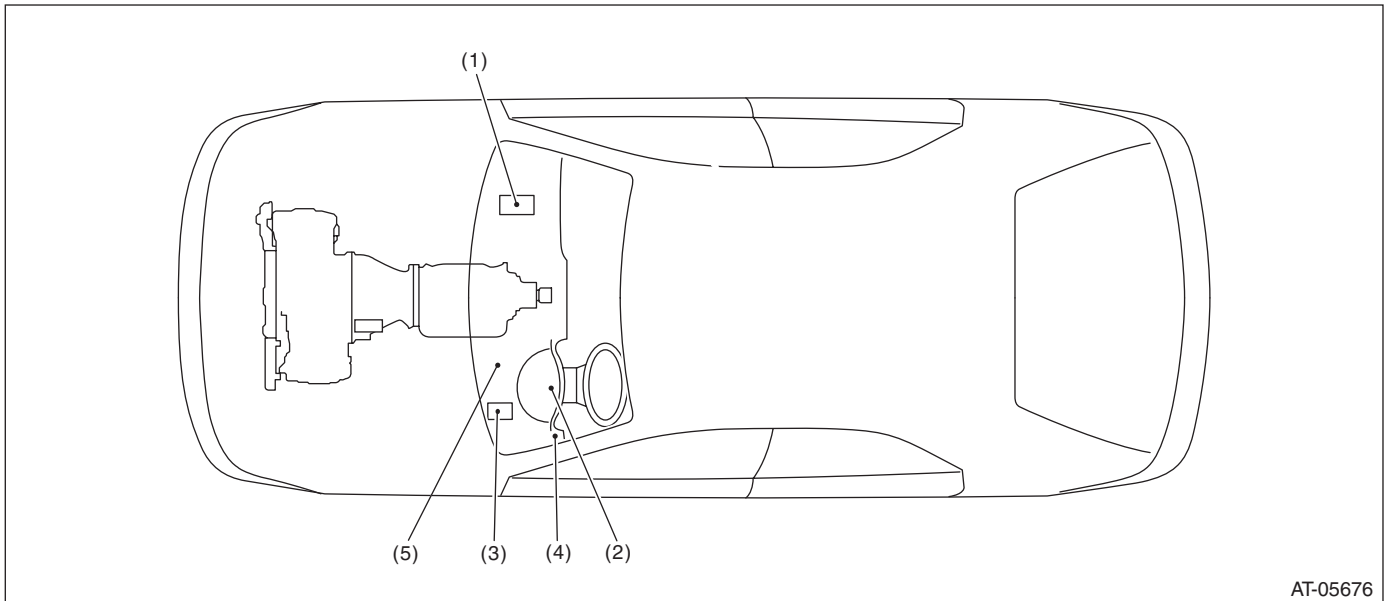
2. GENERAL TOOL

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

4. Electrical Component Location

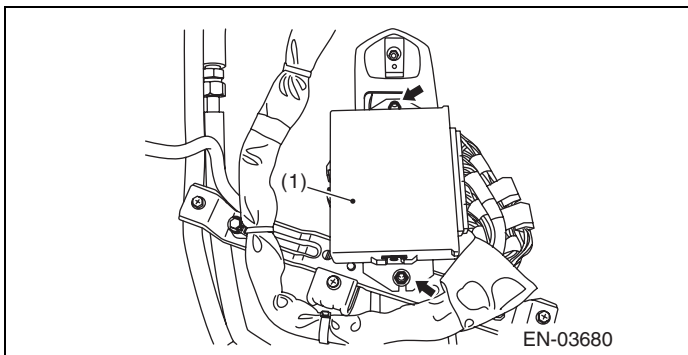
A: LOCATION

1. CONTROL MODULE

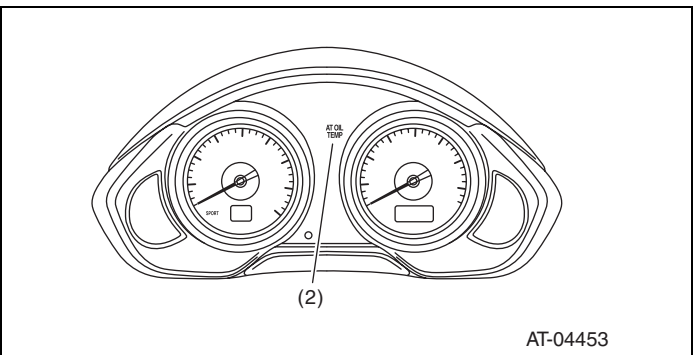


AT-05676

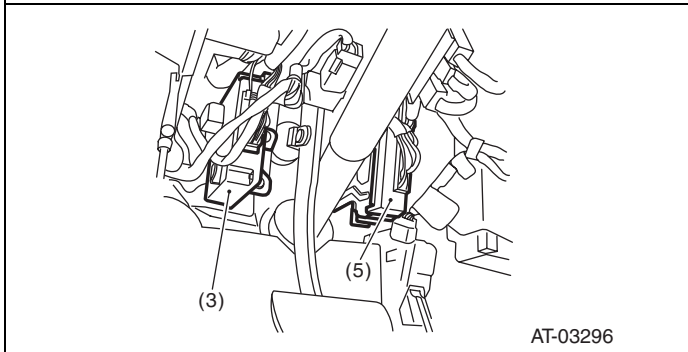
- | | | |
|--|---------------------------------------|--------------------------|
| (1) Engine control module (ECM) | (3) Transmission control module (TCM) | (5) Body integrated unit |
| (2) AT OIL TEMP light (AT warning light) | (4) Data link connector | |



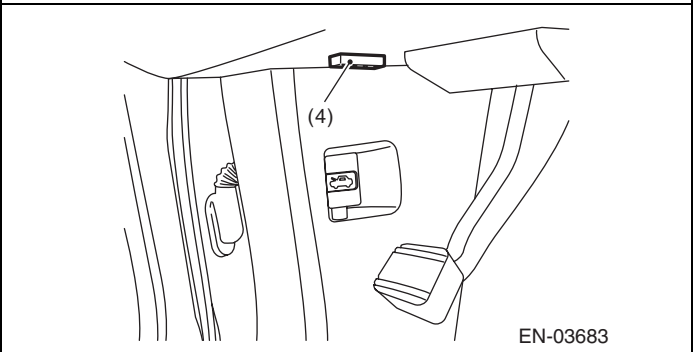
EN-03680



AT-04453



AT-03296

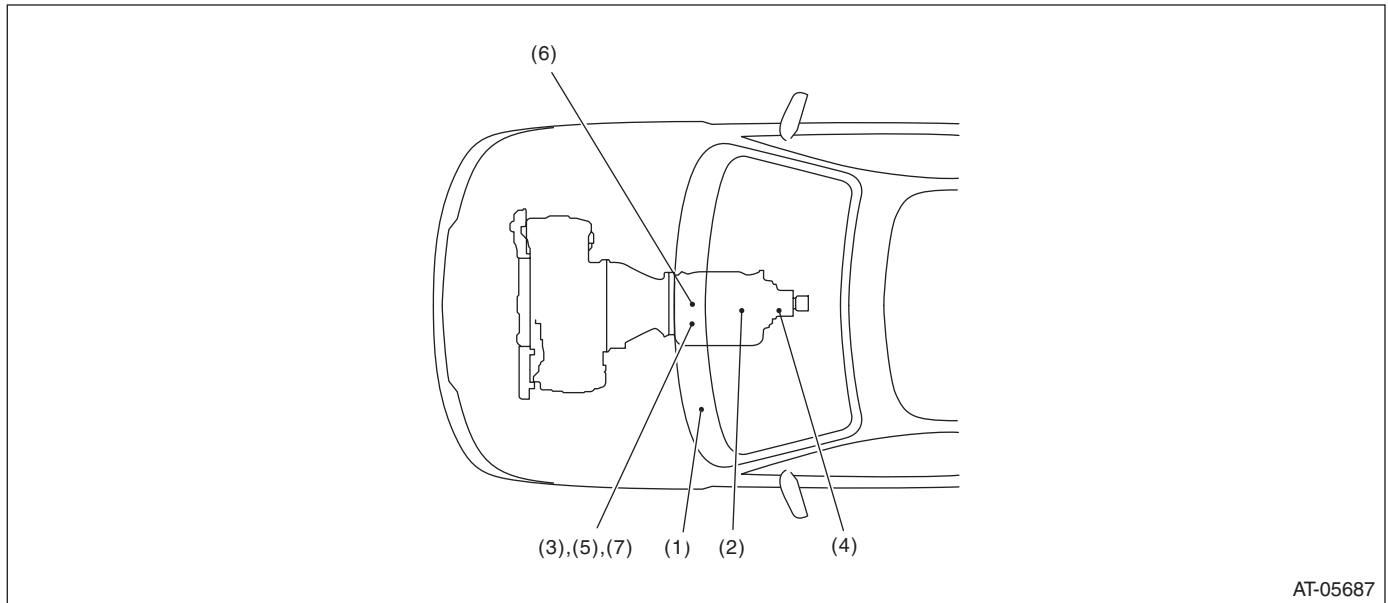


EN-03683

Electrical Component Location

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

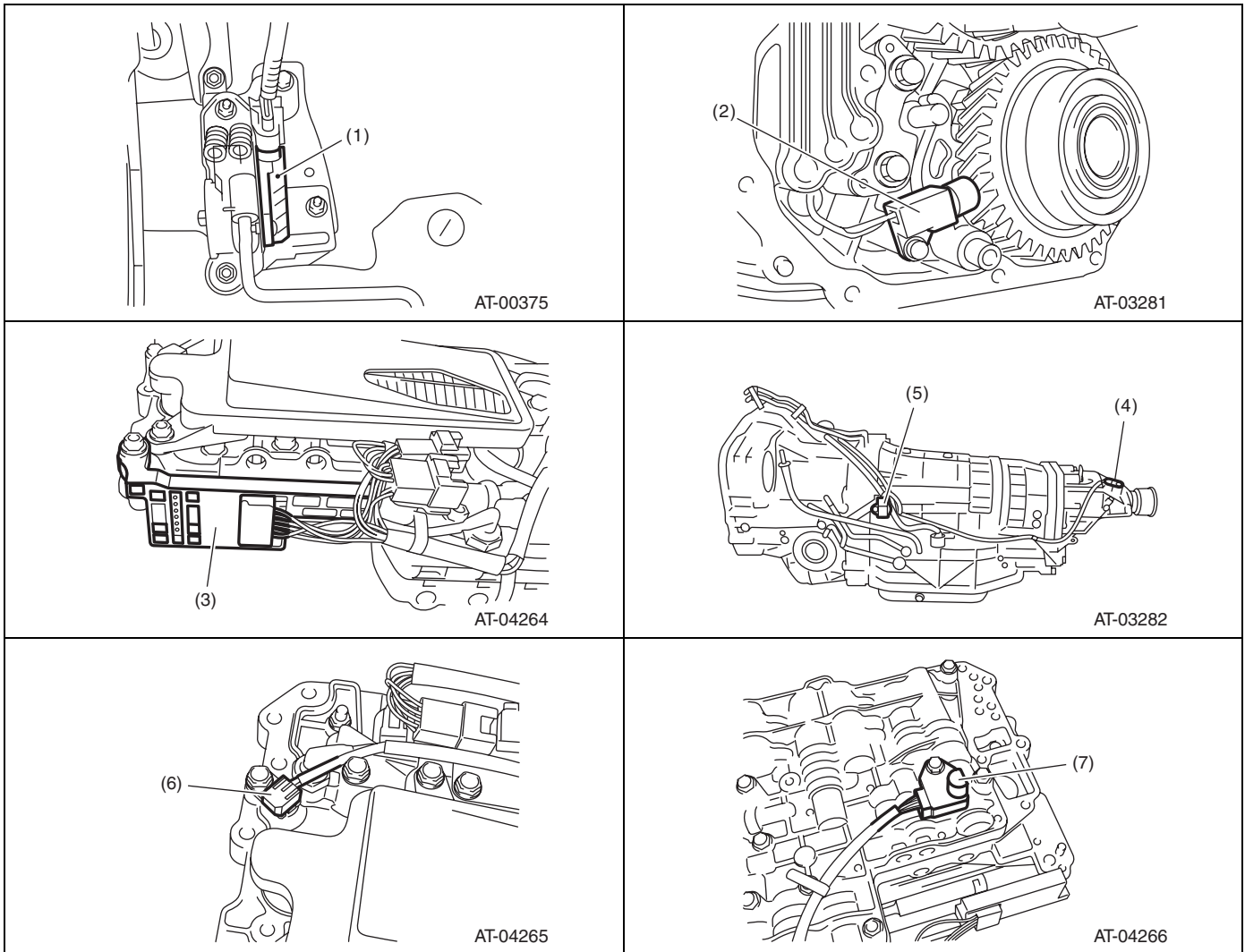
2. SENSOR



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

Electrical Component Location

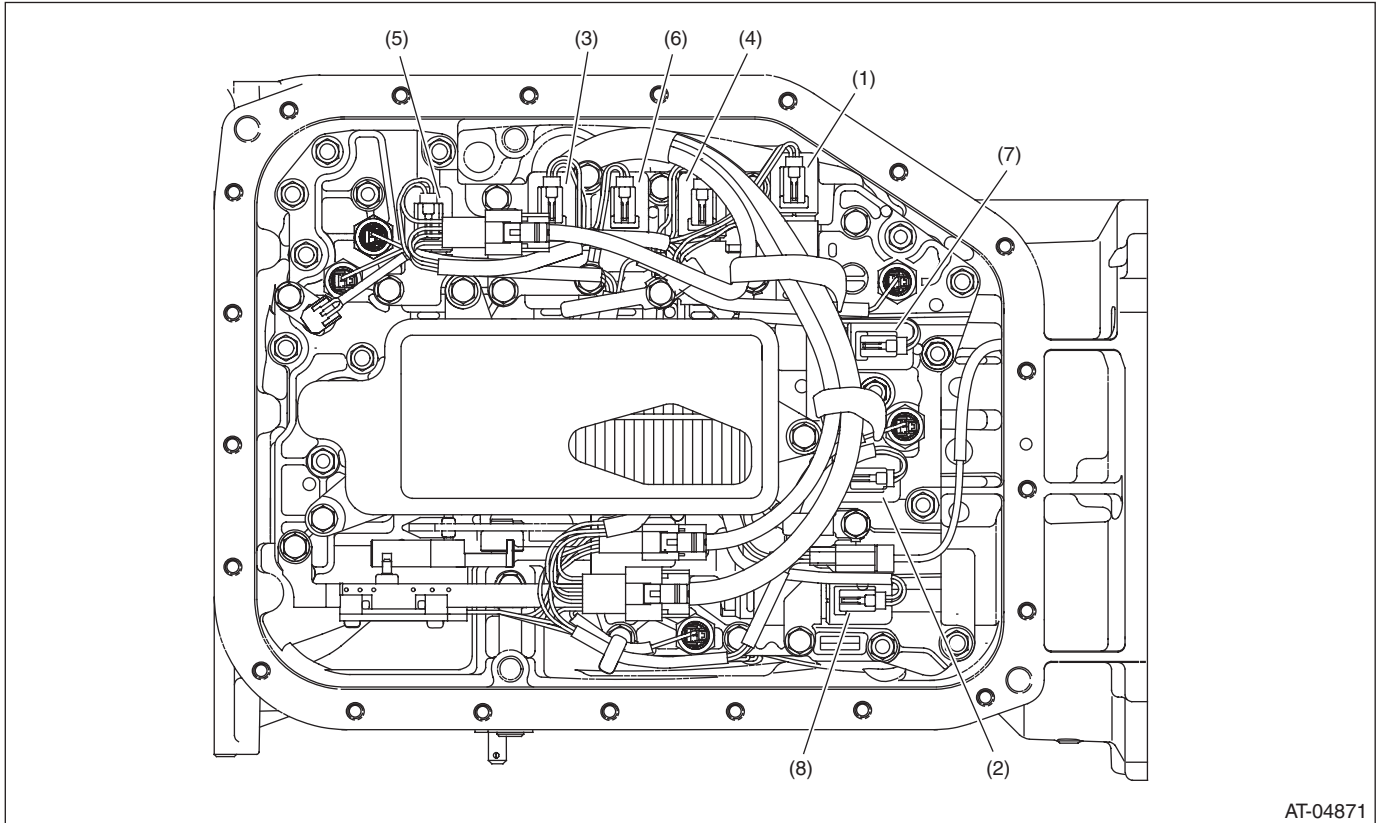
AUTOMATIC TRANSMISSION (DIAGNOSTICS)



Electrical Component Location

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

3. SOLENOID

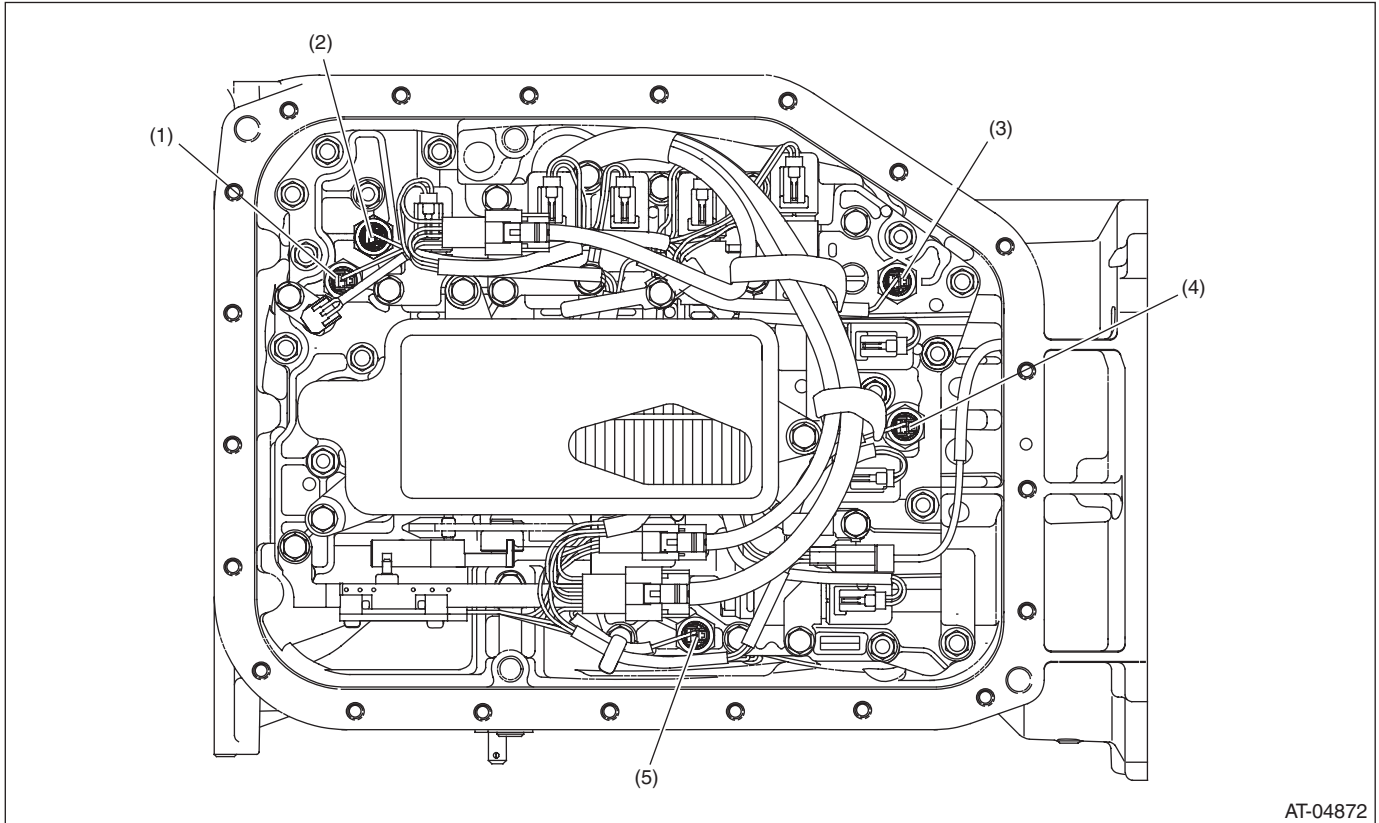


- | | | |
|--|----------------------------|----------------------------|
| (1) High & low reverse clutch solenoid | (4) Input clutch solenoid | (7) Transfer solenoid |
| (2) Direct clutch solenoid | (5) Line pressure solenoid | (8) Forward brake solenoid |
| (3) Front brake solenoid | (6) Lock up solenoid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

Electrical Component Location

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

4. OIL PRESSURE SWITCH



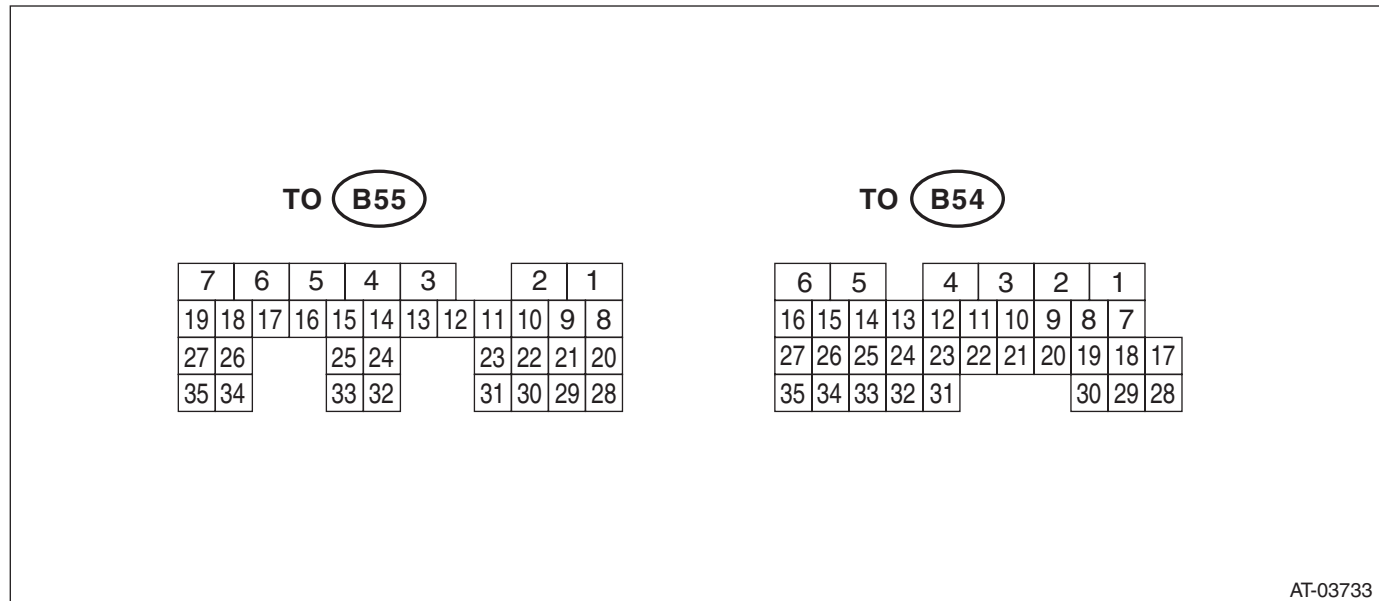
- | | | |
|--------------------------------------|---|---------------------------------------|
| (1) Front brake oil pressure switch | (3) High & low reverse clutch oil pressure switch | (5) Forward brake oil pressure switch |
| (2) Input clutch oil pressure switch | (4) Direct clutch oil pressure switch | |

Transmission Control Module (TCM) I/O Signal

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

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

A: ELECTRICAL SPECIFICATION



AT-03733

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	6	Engine ON, "P" range, accelerator OFF, brake ON	3.5 — 7.5 V	3 — 9 Ω (ATF temperature 20°C (68°F))	Drive frequency: 300 Hz
I/C oil pressure switch input	B54	20	While driving at 1st-3rd of manual mode	6 V or more		
			While driving at 4th or 5th of manual mode	Less than 1.5 V		
Power GND	B54	12	Always	Approx. 0 V	—	
CAN communication line (+)	B55	21	—	—	—	
CAN communication line (-)	B55	20	—	—	—	
ATF temperature sensor input	B54	17	Ignition switch ON ATF oil temperature 20°C (68°F)	3.5 — 4.3 V	2.5 — 7.0 kΩ	Measure the resistance with the connector disconnected.
			Ignition switch ON ATF oil temperature 80°C (176°F)	1 — 2.2 V	0.3 — 0.8 kΩ	
Backup power supply	B55	24	Ignition switch ON	8 V or more	—	
			Ignition switch OFF			
I/C solenoid output	B54	3	While driving at 1st-3rd of manual mode	5 V or more	3 — 9 Ω (ATF temperature 20°C (68°F))	Drive frequency: 300 Hz
			While driving at 4th or 5th of manual mode	Less than 1.5 V		
H & LR/C solenoid output	B54	5	While driving at 2nd of manual mode	5 V or more	3 — 9 Ω (ATF temperature 20°C (68°F))	Drive frequency: 300 Hz
			While driving at 1st, 3rd-5th of manual mode	Less than 1.5 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
Power GND	B54	13	Always	Approx. 0 V	—	
Analog GND	B54	18	Always	Approx. 0 V	—	
Fr/B solenoid output	B54	4	While driving at other than 4th of manual mode	5 V or more	3 — 9 Ω (ATF temperature 20°C (68°F))	Drive frequency: 300 Hz
			While driving at 4th of manual mode	Less than 1.5 V		
L/U solenoid output	B54	7	When lock-up	3 V or more	3 — 9 Ω (ATF temperature 20°C (68°F))	Drive frequency: 300 Hz
			When not lock-up	Less than 1 V		
D/C solenoid output	B54	1	While driving at 1st or 5th of manual mode	5 V or more	3 — 9 Ω (ATF temperature 20°C (68°F))	Drive frequency: 300 Hz
			While driving at 2nd-4th of manual mode	Less than 1.5 V		
D/C oil pressure switch input	B54	22	While driving at 1st or 5th of manual mode	6 V or more	—	
			While driving at 2nd-4th of manual mode	Less than 1.5 V		
Subaru Select Monitor communication line	B55	8	Ignition switch ON	8 V or more	—	
			Ignition switch OFF	Less than 1 V		
Sensor GND (analog)	B54	16	Always	Approx. 0 V	—	
H&LR/C oil pressure switch input	B54	14	While driving at 2nd of manual mode	6 V or more	—	
			While driving at 3rd-5th of manual mode	Less than 1.5 V		
Fwd/B solenoid output	B54	19	While driving at 1st or 2nd of manual mode	5 V or more		Drive frequency: 300 Hz
			While driving at 3rd-5th of manual mode	Less than 1.5 V		
Fwd/B oil pressure switch input	B54	21	While driving at 1st or 2nd of manual mode	Less than 1.5 V		
			While driving at 3rd-5th of manual mode	6 V or more		
Front vehicle speed sensor input	B54	24	While driving at 2nd and 20 km/h (12 MPH) of manual mode	Approx. 500 — 700 rpm	—	Use the Subaru Select Monitor.
			While driving at 4th and 80 km/h (50 MPH) of manual mode	Approx. 2,000 — 2,500 rpm		Use the Subaru Select Monitor.
Inhibitor switch 1 input	B54	8	Ignition switch ON, "P" range	Less than 0.5 V	—	
			Ignition switch ON, "N" range	5 V or more		
Inhibitor switch 2 input	B54	9	Ignition switch ON, "P" range	5 V or more	—	
			Ignition switch ON, "D" range	Less than 0.5 V		
Ignition power supply	B54	27	Ignition switch ON	8 V or more	—	
			Ignition switch OFF	Less than 1 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
Rear vehicle speed sensor input	B54	23	While driving at 2nd and 20 km/h (12 MPH) of manual mode	Approx. 500 — 700 rpm	—	Use the Subaru Select Monitor.
			While driving at 4th and 80 km/h (50 MPH) of manual mode	Approx. 2,000 — 2,500 rpm		Use the Subaru Select Monitor.
Fr/B oil pressure switch input	B54	15	While driving at other than 4th of manual mode	Less than 1.5 V	—	
			While driving at 4th of manual mode	6 V or more		
Turbine speed sensor 1 input	B54	26	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.
Inhibitor switch 3 input	B54	10	Ignition switch ON, "R" range	5 V or more	—	
			Ignition switch ON, "D" range	Less than 0.5 V		
Control GND1	B55	23	Ignition switch ON	Approx. 0 V		
			Ignition switch OFF			
Control GND2	B55	22	Ignition switch ON	Approx. 0 V		
			Ignition switch OFF			
Inhibitor switch 4 input	B54	11	Ignition switch ON, "P" range	Less than 0.5 V	—	
			Ignition switch ON, "D" range	5 V or more		
Back-up light relay output	B55	13	Ignition switch ON, "R" range	Less than 1 V	90 — 110 Ω (ATF temperature 25°C (77°F))	
			Ignition switch ON, other than "R" range	8 V or more		
AWD solenoid output	B54	2	Engine ON, "P" range or "N" range, accelerator OFF	Less than 1 V	3 — 9 Ω (ATF temperature 20°C (68°F))	Drive frequency: 300 Hz
			Engine ON, "D" range, accelerator OFF, brake ON	2 V or more		
Turbine speed sensor 2 input	B54	25	2nd gear of manual mode, turbine speed sensor is 2,000 rpm (Read from Subaru Select Monitor)	Approx. 1,200 — 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.
PN signal output	B55	11	Ignition switch ON, Other than "P" range or "N" range	8 V or more	—	
			Ignition switch ON, "P" range or "N" range	Less than 1 V	—	
Ignition power supply 1	B55	26	Ignition switch ON	8 V or more		
			Ignition switch OFF	Less than 1 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
Ignition power supply 2	B55	19	Ignition switch ON	8 V or more		
			Ignition switch OFF	Less than 1 V		
Ignition power supply 3	B55	18	Ignition switch ON	8 V or more		
			Ignition switch OFF	Less than 1 V		
Ignition power supply 4	B55	25	Ignition switch ON	8 V or more		
			Ignition switch OFF	Less than 1 V		

6. Subaru Select Monitor

A: OPERATION

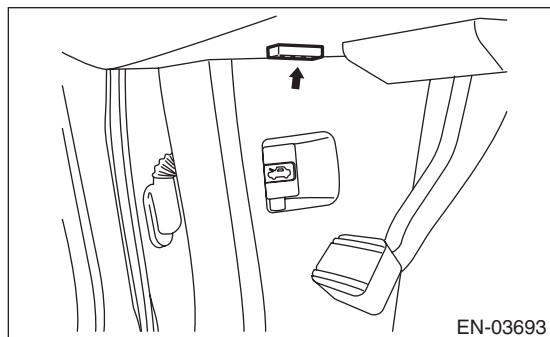
1. READ DIAGNOSTIC TROUBLE CODE (DTC)

- 1) Prepare the Subaru Select Monitor kit. <Ref. to 5AT(diag)-6, PREPARATION TOOL, General Description.>
- 2) Prepare PC with Subaru Select Monitor installed.
- 3) Connect the USB cable to the SDI (Subaru Diagnostic Interface) and the USB port of the personal computer (port for Subaru Select Monitor).

NOTE:

The dedicated port for the Subaru Select Monitor means the USB port which was used to install the Subaru Select Monitor.

- 4) Connect the diagnosis cable to SDI.
- 5) Connect the SDI to the data link connector located in the lower portion of the instrument panel (on the driver's side).



CAUTION:

Do not connect scan tools other than the Subaru Select Monitor.

- 6) Start the PC.
- 7) Turn the ignition switch to ON (engine OFF).
- 8) Run the "PC application for Subaru Select Monitor".
- 9) On the «Main Menu» display screen, select the {Each System Check}.
- 10) On the «System Selection Menu», select {Transmission Control System}.
- 11) After transmission type information pops up, select [OK].
- 12) On the «Transmission Diagnosis» display screen, select {Diagnostic Code(s) Display}.
- 13) On the «Diagnostic Code(s) Display» screen, select the {Temporary Diagnostic Code(s)} or {Memorized Diagnostic Code(s)}

2. READ CURRENT DATA

- 1) On «Main Menu» display, select {Each System Check}.
 - 2) On «System Selection Menu» display, select {Transmission Control System}.
 - 3) After transmission type information pops up, select [OK].
 - 4) On «Transmission Diagnosis» display, select {Current Data Display & Save}.
 - 5) On «Current Data Display & Save» display, select {Normal sampling}.
 - 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 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

Subaru Select Monitor

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Item	Display	Unit of measure
G sensor	Lateral G Sensor	V
ATF temperature sensor signal	ATF Temp.	°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 set current	H&LR/C Solenoid Current	A
Direct clutch solenoid set current	D/C Solenoid Current	A
Front brake solenoid set current	F/B Solenoid Current	A
Input clutch solenoid set current	I/C Solenoid Current	A
Line pressure solenoid set current	P/L Solenoid Current	A
Lock-up solenoid set current	L/U Solenoid Current	A
Transfer solenoid set current	AWD Sol. Current	A
High & low reverse clutch solenoid pressure	H&LR/C Solenoid Pressure	kPa
Direct clutch solenoid pressure	D/C Solenoid Pressure	kPa
Front brake solenoid pressure	F/B Solenoid Pressure	kPa
Input clutch solenoid pressure	I/C Solenoid Pressure	kPa
Line pressure solenoid pressure	P/L Solenoid Pressure	kPa
Lock-up solenoid pressure	L/U Solenoid Pressure	kPa
Transfer solenoid pressure	AWD Solenoid Pressure	kPa
Forward brake set current	Fwd/B solenoid current	A
Forward brake solenoid pressure	Fwd/B solenoid target pressure	kPa
Ignition switch	Ignition Switch	ON input or OFF input
Manual mode switch signal	Tiptronic Mode Switch	ON or OFF
Cruise control set signal	Cruise Control Signal	ON or OFF
Down shift signal	Down Switch	ON or OFF
Stop light switch signal	Stop Light Switch	ON or OFF
Up shift signal	Up Switch	ON or OFF
Drive range signal	D Range Signal	ON or OFF
Reverse range signal	R Range Signal	ON or OFF
Diagnosis light output signal	Diagnosis Lamp	ON or OFF
ATF temperature light signal	ATF Temperature Lamp	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 SW 1	High or Low
Inhibitor switch 2 input signal	Inhibitor SW 2	High or Low
Inhibitor switch 3 input signal	Inhibitor SW 3	High or Low
Inhibitor switch 4 input signal	Inhibitor SW 4	High or Low
Back-up light relay output signal	Back Lamp Relay	ON or OFF
High & low reverse clutch fluid pressure switch input signal	H&LR/C Fluid Pressure	ON or OFF
Direct clutch fluid pressure switch input signal	D/C Fluid Pressure	ON or OFF
Front brake fluid pressure switch input signal	F/B Fluid Pressure	ON or OFF
Input clutch fluid pressure switch input signal	I/C Fluid Pressure	ON or OFF
Forward brake fluid pressure switch input signal	Fwd/B hydraulic pressure SW	ON or OFF
AT learning mode	AT learning	Completed or not completed

NOTE:

For details concerning the operation procedure, refer to “PC application help for Subaru Select Monitor”.

3. CLEAR MEMORY MODE

- 1) Shift the select lever to “P” range.
- 2) On the «Main Menu» display screen, select the {Each System Check}.
- 3) On the «System Selection Menu», select {Transmission Control System}.
- 4) After transmission type information pops up, select [OK].
- 5) On the «Transmission Diagnosis» display screen, select {Clear Memory}.
- 6) When “Done. Turn ignition switch to OFF” pops up, select [OK].
- 7) Turn the Subaru Select Monitor and ignition switch to OFF. To turn the ignition switch to ON again, wait for more than 10 seconds.

NOTE:

- To clear the previous DTC, use {Clear Memory}, and to clear the learned value, use {Clear Memories 2}.
- For details concerning the operation procedure, refer to the “PC application help for Subaru Select Monitor”.

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)-16, OPERATION, Subaru Select Monitor.>

8. Inspection Mode

A: PROCEDURE

WARNING:

Observe the traffic law when driving on public 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 2 seconds or more.

9. Clear Memory Mode

A: OPERATION

Use "Subaru Select Monitor" to clear DTC. <Ref. to 5AT(diag)-18, CLEAR MEMORY MODE, OPERATION, Subaru Select Monitor.>

NOTE:

DTC cannot be cleared without using Subaru Select Monitor.

10.Learning Control

A: GENERAL DESCRIPTION

- Follow the messages displayed on the Subaru Select Monitor when working.
- When the following work is performed, perform learning work for the transmission.

Replacement of TCM/Replacement or disassembly of transmission assembly/Replacement of control valve body/Performing "Clear Memories 2" is executed.

B: PROCEDURE

1. PREPARATION FOR LEARNING

- 1) Warm up or cool down the vehicle until the ATF temperature displayed on the Subaru Select Monitor is 60 — 80°C (140 — 176°F).
- 2) Shift the select lever to "P" range.
- 3) Fully apply the parking brake.
- 4) Lift up the vehicle.

CAUTION:

While working, be sure to keep the lower edge of the tires 30 cm or more above the ground as vehicle will vibrate.

- 5) Connect the Subaru Select Monitor to data link connector.
- 6) Turn the ignition switch to ON. (For model with push button start, press the push button ignition switch twice without depressing brake pedal.)
- 7) Turn off all switches causing an electrical load, such as headlights, A/C, seat heater and rear defogger.

2. SIMPLE LEARNING

NOTE:

Simple learning is performed with the vehicle lifted, without actually running the vehicle.

CAUTION:

Do not turn the power of the Subaru Select Monitor OFF during work, and do not disconnect the data link connector.

- 1) Select {AT related learning & inspecting mode} in the «Transmission Diagnosis» display screen of the Subaru Select Monitor.
- 2) Select {AT learning mode} in the «AT related learning & inspecting mode» screen of the Subaru Select Monitor.
- 3) Follow the messages displayed on the Subaru Select Monitor screen when working.

NOTE:

For the messages "SHIFT control system learning in progress" and "AWD control system learning in progress", AT OIL TEMP light in the combination meter blinks at a cycle of 2 Hz before learning operation starts. When AT OIL TEMP light in the combination meter goes off, the following message is displayed on the screen. When operation ends abnormally during the learning, AT OIL TEMP light blinks at a cycle of 4 Hz.

Learning Control

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

4) When «AT learning normally ended.» is displayed, simple AT learning is completed.

NOTE:

- If communication error occurs during learning, retry the “AT learning mode” from the beginning.
- If the message «Execute AT learning again after fixing troubles of the vehicle» is displayed during learning, select [OK] to display the List of Diagnostics Trouble Code. After repairing the locations indicated by the DTC, start the “AT learning mode” over from the beginning.
- If the message «AT learning ended abnormally.» is displayed, start the “AT learning mode” over from the beginning.

Display	Main reasons for abnormal termination
AT learning ended abnormally.	• Fault is detected during AT learning. • The accelerator pedal is depressed during AT learning. • An unspecified operation was performed during AT learning • Brake pedal is not fully depressed. • Parking brake not applied strongly enough. • Abnormal idle speed increase, etc.

- For detailed operation procedures, refer to “PC application help for Subaru Select Monitor”.

3. DRIVING CHECK

Drive the vehicle to check that there is no malfunction such as shifting shock.

When shifting shock is felt, perform learning again.

When reducing of shifting shock is not felt, check that other parts are normal.

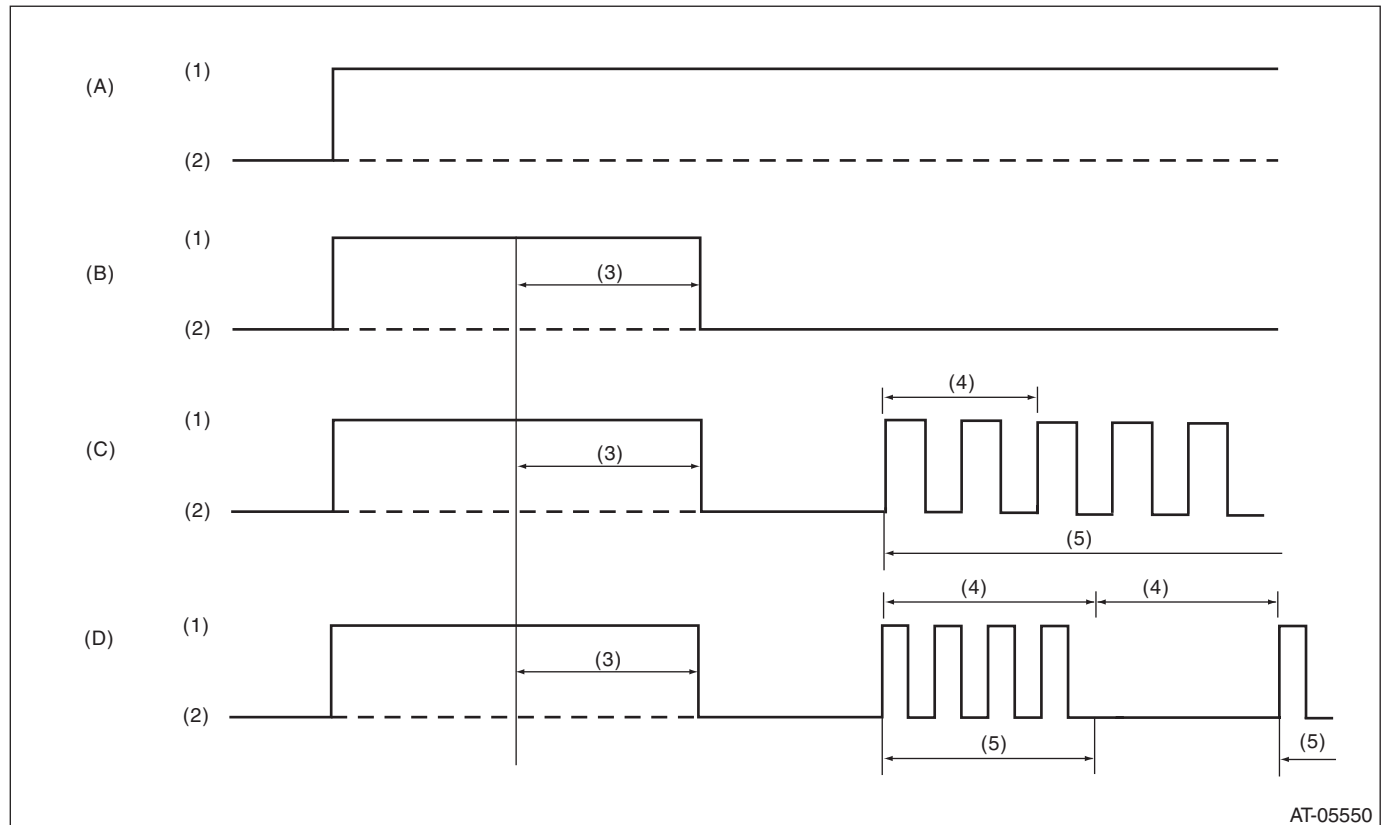
AT OIL TEMP Warning Light Display

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

11.AT OIL TEMP Warning Light Display

A: OPERATION

When any on-board diagnostics item is malfunctioning, or the learning has not yet completed, AT OIL TEMP light blinks. Blinking continues from the engine start to the ignition switch OFF. The faulty parts or unit can be identified by reading DTCs. Problems which occurred previously can also be identified through the memory function. If the AT OIL TEMP light does not blink although a problem is occurring, the problem can be determined by checking the performance characteristics of each sensor using the Subaru Select Monitor. If the learning has not yet completed, «AT learning not completed» is displayed when the Subaru Select Monitor is connected while AT OIL TEMP light is blinking. The AT OIL TEMP light blinking will go off, when the learning is performed. Indicator light signal patterns are as shown in the figure.



(A) Ignition switch (engine OFF)
(D) Learning not completed (engine ON)

(B) Normal (engine ON)

(C) Faulty (engine ON)

(1) ON
(2) OFF

(3) 2 seconds
(4) 1 second

(5) Blink

When the AT OIL TEMP light does not operate normally, check the AT OIL TEMP light circuit. <Ref. to 5AT(diag)-25, INSPECTION, AT OIL TEMP Warning Light Display.>

AT OIL TEMP Warning Light Display

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

B: INSPECTION

DIAGNOSIS:

AT OIL TEMP light circuit is open or shorted.

TROUBLE SYMPTOM:

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

Step	Check	Yes	No
1 CHECK AT OIL TEMP LIGHT. Turn the ignition switch to ON.	Does the AT OIL TEMP light illuminate?	Go to step 2.	Perform the self-diagnosis of combination meter.
2 CHECK AT OIL TEMP LIGHT. Turn the ignition switch to ON and wait for at least 2 seconds.	Does the AT OIL TEMP light illuminate?	Go to step 3.	Go to step 4.
3 CHECK AT OIL TEMP LIGHT. Start the engine.	Does the AT OIL TEMP 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)-29, Diagnostic Procedure for Subaru Select Monitor Communication.>
5 CHECK TCM. 1) Display the current data of TCM using Subaru Select Monitor. <Ref. to 5AT(diag)-16, OPERATION, Subaru Select Monitor.> 2) Read the data of «Diagnosis Lamp» using Subaru Select Monitor.	Is «ON» displayed?	Go to step 6.	Replace the TCM. <Ref. to 5AT-55, Transmission Control Module (TCM).>
6 CHECK BODY INTEGRATED UNIT. 1) Connect the Subaru Select Monitor, and display the current data of the body integrated unit. <Ref. to LAN(diag)-12, OPERATION, Subaru Select Monitor.> 2) Read the data of «ATF Temperature Lamp» using the Subaru Select Monitor.	Is «ON» displayed?	Replace the combination meter assembly. <Ref. to IDI-11, Combination Meter.>	Check DTC of body integrated unit. <Ref. to LAN(diag)-27, Read Diagnostic Trouble Code (DTC).>
7 CHECK TCM. NOTE: If the ATF temperature is 138°C or more, cool down till the temperature is 137°C or less. 1) Start the engine. 2) Display the current data of TCM using Subaru Select Monitor. <Ref. to 5AT(diag)-16, OPERATION, Subaru Select Monitor.> 3) Read the data of «Diagnosis Lamp» using Subaru Select Monitor.	Is «ON» displayed?	Replace the TCM. <Ref. to 5AT-55, Transmission Control Module (TCM).>	Go to step 8.

AT OIL TEMP Warning Light Display

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step		Check	Yes	No
8	CHECK BODY INTEGRATED UNIT. 1) Connect the Subaru Select Monitor, and display the current data of the body integrated unit. <Ref. to LAN(diag)-12, OPERATION, Subaru Select Monitor.> 2) Read the data of «ATF Temperature Lamp» using the Subaru Select Monitor.	Is “ON” displayed?	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.AWD Warning Light Display

A: OPERATION

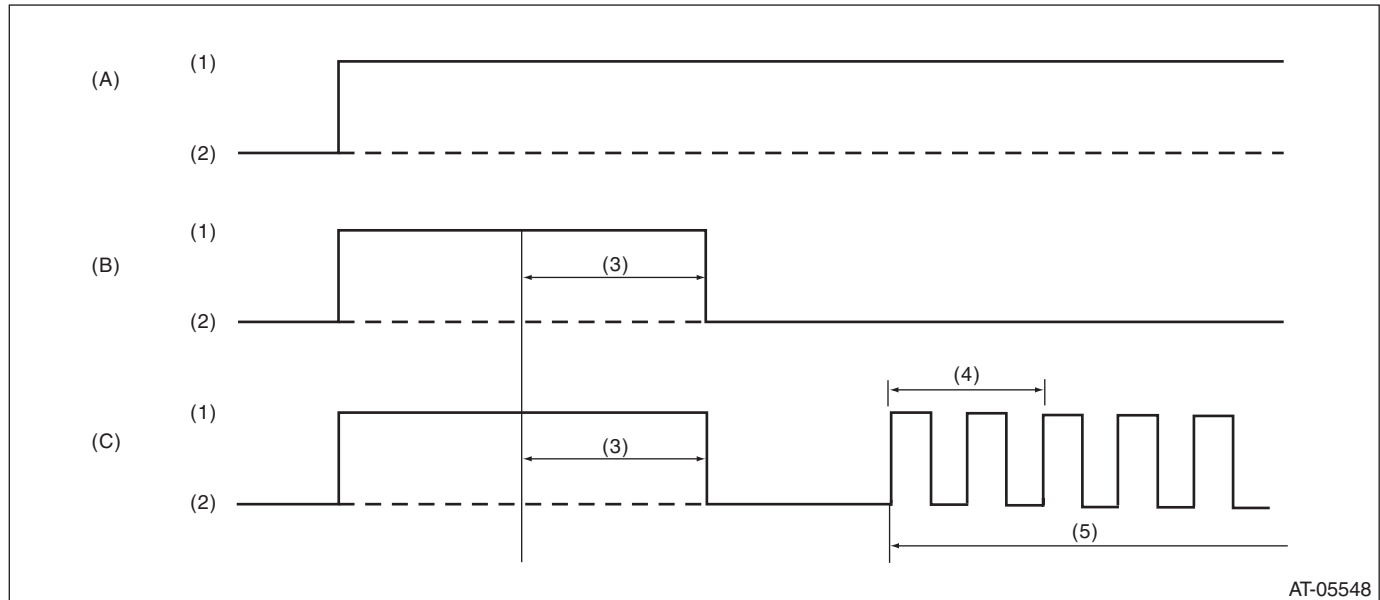
AWD warning light illuminates or blinks at start, or when AWD is faulty.

- If normal

AWD light always illuminates when the ignition switch is ON (engine OFF). Light goes off after two seconds from engine ON.

- Faulty

AWD warning light blinks at 2 Hz, when tires with different diameters are installed, or when the vehicle is driven with air pressure of any of the four tires significantly low.



(A) Ignition switch (engine OFF)

(B) Normal (engine ON)

(C) Faulty (engine ON)

(1) ON

(3) 2 seconds

(5) Blink

(2) OFF

(4) 1 second

If the AWD light does not illuminate, or illumination patterns are not as above, check the AWD light circuit.
<Ref. to 5AT(diag)-28, INSPECTION, AWD Warning Light Display.>

AWD Warning Light Display

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

B: INSPECTION

DIAGNOSIS:

- AWD light circuit is open or shorted.
- Combination meter malfunction
- TCM malfunction

TROUBLE SYMPTOM:

- When the ignition switch is turned to ON, the AWD light does not illuminate.
- AWD light remains lit after engine start.

Step	Check	Yes	No
1 CHECK AWD LIGHT. Turn the ignition switch to ON.	Does the AWD light illuminate?	Go to step 2.	Perform the self-diagnosis of combination meter. <Ref. to IDI-4, INSPECTION, Combination Meter System.>
2 CHECK AWD LIGHT. Start the engine.	Does AWD light go off after two seconds from engine start?	Current condition is normal. Go back to Basic Diagnostic Procedure. <Ref. to 5AT(diag)-2, Basic Diagnostic Procedure.>	Go to step 3.
3 CHECK DTC.	Is DTC of CAN communication displayed?	Perform the diagnosis according to DTC.	Go to step 4.
4 CHECK COMBINATION METER. Perform the self-diagnosis of combination meter. <Ref. to IDI-4, INSPECTION, Combination Meter System.>	Is there any trouble with the combination meter?	Repair the combination meter.	Replace the TCM. <Ref. to 5AT-55, Transmission Control Module (TCM).>

13. Diagnostic Procedure for Subaru Select Monitor Communication

A: COMMUNICATION FOR INITIALIZING IMPOSSIBLE

DIAGNOSIS:

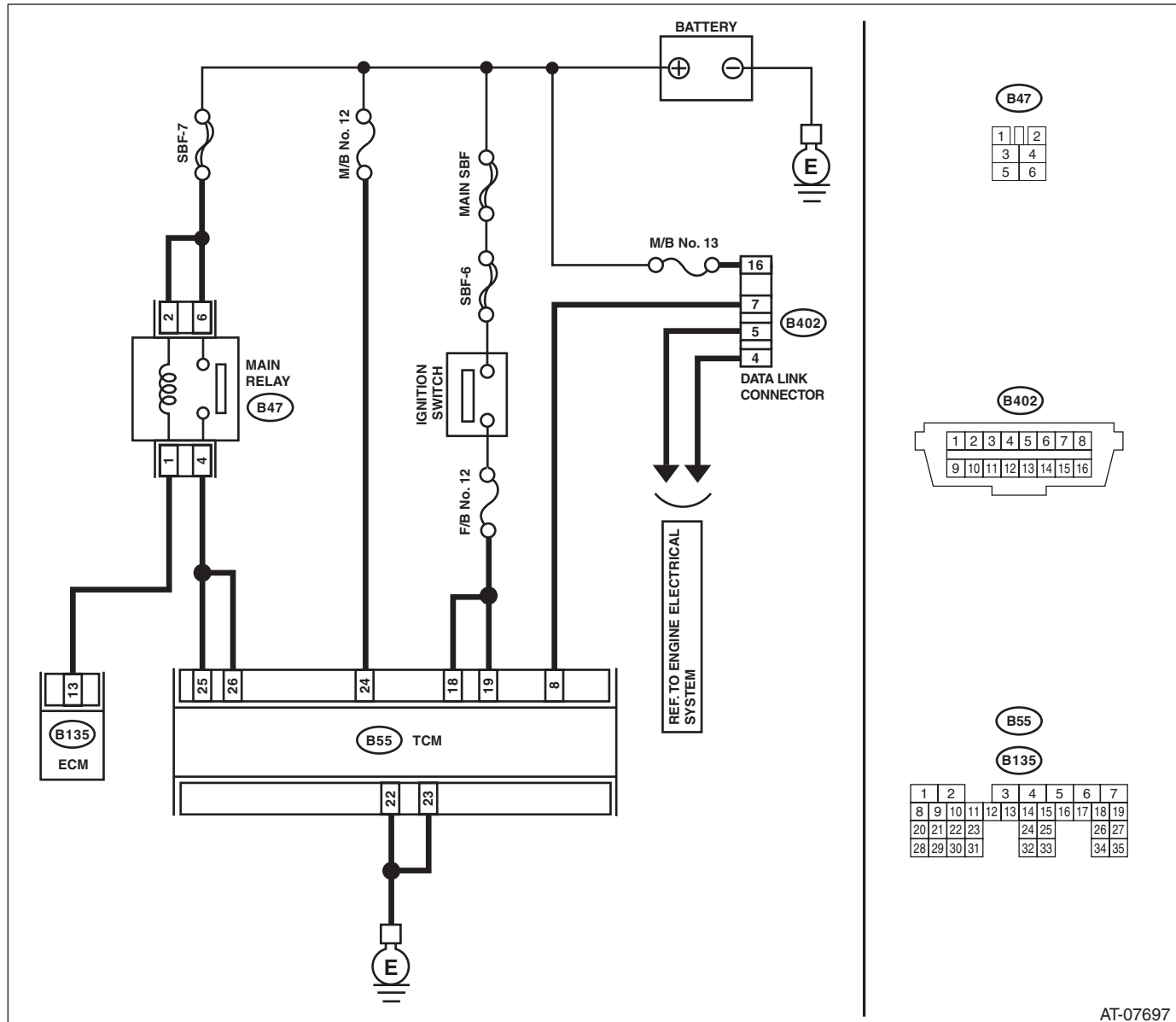
Defective harness connector

TROUBLE SYMPTOM:

Subaru Select Monitor communication failure

WIRING DIAGRAM:

AT control system <Ref. to WI-50, AT Control System.>



AT-07697

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. 16 (+) — Chassis ground (-):	Is the voltage 10 V or more?	Go to step 2.	Repair harness connector between the battery and data link connector, and poor contact of the connector.

Diagnostic Procedure for Subaru Select Monitor Communication

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step	Check	Yes	No
2 CHECK SUBARU SELECT MONITOR GROUND CIRCUIT. Measure the resistance of harness between data link connector and chassis ground. Connector & terminal (B402) No. 4 — Chassis ground: (B402) No. 5 — 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) Check communication with the transmission system using the Subaru Select Monitor.	Is the name 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 communication with the engine system.	Is the name of system displayed on Subaru Select Monitor?	Go to step 6.	Go to step 5.
5 CHECK COMMUNICATION OF SUBARU SELECT MONITOR. 1) Turn the ignition switch to OFF. 2) Connect the TCM connector. 3) Disconnect the ECM connector. 4) Turn the ignition switch to ON. 5) Check communication with the transmission system.	Is the name of system displayed on Subaru Select Monitor?	Inspect the ECM.	Go to step 6.
6 CHECK HARNESS CONNECTOR BETWEEN EACH CONTROL MODULE AND DATA LINK CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the TCM and ECM connector. 3) Measure the resistance between TCM connector and chassis ground. Connector & terminal (B402) No. 7 — Chassis ground:	Is the resistance 1 M Ω or more?	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. 7 (+) — 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 (B55) No. 8 — (B402) No. 7:	Is the resistance less than 1 Ω ?	Go to step 9.	Check 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.
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 of control module power supply and data link connector?	Repair the poor contact.	Go to step 12.

Diagnostic Procedure for Subaru Select Monitor Communication

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step	Check	Yes	No
12 CHECK POWER SUPPLY OF TCM. 1) Disconnect the connector from TCM. 2) Turn the ignition switch to ON. 3) Measure the voltage between TCM connector and chassis ground. Connector & terminal (B55) No. 24 (+) — Chassis ground (-): (B55) No. 25 (+) — Chassis ground (-): (B55) No. 26 (+) — Chassis ground (-):	Is the voltage 10 — 13 V?	Go to step 15.	Go to step 13.
13 CHECK FUSE (M/B NO. 12). 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).	Go to step 14.
14 CHECK HARNESS. Measure the resistance between TCM connector and chassis ground. Connector & terminal (B55) No. 24 — Chassis ground: (B55) No. 25 — Chassis ground: (B55) No. 26 — Chassis ground:	Is the resistance 10 Ω or less?	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 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. 18 (+) — Chassis ground (-): (B55) No. 19 (+) — Chassis ground (-):	Is the voltage 10 — 13 V?	Go to step 17.	Go to step 16.
16 CHECK FUSE (F/B NO. 12). Remove the fuse (F/B No. 12).	Is the fuse (F/B No. 12) blown out?	Replace the fuse (F/B No. 12). If the replaced fuse (F/B No. 12) blows out easily, repair the short circuit of harness between fuse (F/B 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 (B55) No. 22 — Transmission ground: (B55) No. 23 — Transmission ground:	Is the resistance 1 M Ω or more?	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 of TCM power supply, ground and data link connector?	Repair the connector.	Replace the TCM. <Ref. to 5AT-55, Transmission Control Module (TCM).>

List of Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

14. List of Diagnostic Trouble Code (DTC)

A: LIST

DTC	Item	Content of diagnosis	Reference
P0705	Transmission Range Sensor Circuit (PRNDL Input)	Inhibitor switch malfunction, open or short circuit	<Ref. to 5AT(diag)-35, DTC P0705 TRANSMISSION RANGE SENSOR CIRCUIT (PRNDL INPUT), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0711	ATF Temp. Sensor Circuit Range/Performance	ATF temperature sensor is faulty or input signal circuit is faulty.	<Ref. to 5AT(diag)-39, DTC P0711 ATF TEMP. SENSOR CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0712	Transmission Fluid Temperature Sensor Circuit Low Input	ATF temperature sensor is faulty or input signal circuit is shorted.	<Ref. to 5AT(diag)-41, DTC P0712 TRANSMISSION FLUID TEMPERATURE SENSOR CIRCUIT LOW INPUT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0713	Transmission Fluid Temperature Sensor Circuit High Input	ATF temperature sensor is faulty or input signal circuit is open.	<Ref. to 5AT(diag)-43, 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, open or short in input signal circuit	<Ref. to 5AT(diag)-45, DTC P0715 INPUT/TURBINE SPEED SENSOR CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0719	Brake Switch Circuit Low	Brake switch malfunction, open circuit in input signal, body integrated unit malfunction, or CAN communication error	<Ref. to 5AT(diag)-48, DTC P0719 BRAKE SWITCH CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0720	Output Speed Sensor Circuit	Front vehicle speed sensor malfunction, open or short in input signal circuit, ground or power supply	<Ref. to 5AT(diag)-50, DTC P0720 OUTPUT SPEED SENSOR CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0724	Brake Switch Circuit High	Brake switch malfunction, short circuit in input signal, body integrated unit malfunction, or CAN communication error	<Ref. to 5AT(diag)-53, DTC P0724 BRAKE SWITCH CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0731	Gear 1 Incorrect Ratio	Vehicle speed sensor, turbine speed sensor, control valve, or gear shift clutch malfunction	<Ref. to 5AT(diag)-55, DTC P0731 GEAR 1 INCORRECT RATIO, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0732	Gear 2 Incorrect Ratio	Vehicle speed sensor, turbine speed sensor, control valve, or gear shift clutch malfunction	<Ref. to 5AT(diag)-55, DTC P0732 GEAR 2 INCORRECT RATIO, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0733	Gear 3 Incorrect Ratio	Vehicle speed sensor, turbine speed sensor or gear shift clutch malfunction	<Ref. to 5AT(diag)-55, DTC P0733 GEAR 3 INCORRECT RATIO, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0734	Gear 4 Incorrect Ratio	Vehicle speed sensor, turbine speed sensor or gear shift clutch malfunction	<Ref. to 5AT(diag)-55, DTC P0734 GEAR 4 INCORRECT RATIO, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0735	Gear 5 Incorrect Ratio	Vehicle speed sensor, turbine speed sensor or gear shift clutch malfunction	<Ref. to 5AT(diag)-55, DTC P0735 GEAR 5 INCORRECT RATIO, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0736	Reverse Incorrect Ratio	Vehicle speed sensor, turbine speed sensor or gear shift clutch malfunction	<Ref. to 5AT(diag)-56, DTC P0736 REVERSE INCORRECT RATIO, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0741	Torque Converter Clutch Circuit Performance or Stuck Off	Lock-up clutch is faulty or valve is stuck.	<Ref. to 5AT(diag)-57, DTC P0741 TORQUE CONVERTER CLUTCH CIRCUIT PERFORMANCE OR STUCK OFF, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

List of Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

DTC	Item	Content of diagnosis	Reference
P0743	Torque Converter Clutch Circuit Electrical	L/U solenoid circuit or L/U solenoid unit malfunction	<Ref. to 5AT(diag)-58, DTC P0743 TORQUE CONVERTER CLUTCH CIRCUIT ELECTRICAL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0748	Pressure Control Solenoid "A" Electrical	Line pressure solenoid circuit or line pressure solenoid unit malfunction	<Ref. to 5AT(diag)-60, DTC P0748 PRESSURE CONTROL SOLENOID "A" ELECTRICAL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0751	Shift Solenoid "A" Performance or Stuck Off	Fr/B solenoid malfunction	<Ref. to 5AT(diag)-62, DTC P0751 SHIFT SOLENOID "A" PERFORMANCE OR STUCK OFF, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0753	Shift Solenoid "A" Electrical	Fr/B solenoid circuit or Fr/B solenoid unit malfunction	<Ref. to 5AT(diag)-64, DTC P0753 SHIFT SOLENOID "A" ELECTRICAL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0756	Shift Solenoid "B" Performance or Stuck Off	I/C solenoid malfunction	<Ref. to 5AT(diag)-66, 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 or I/C solenoid unit 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 or H&LR/C solenoid unit malfunction	<Ref. to 5AT(diag)-72, 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)-74, 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 or D/C solenoid unit malfunction	<Ref. to 5AT(diag)-76, DTC P0768 SHIFT SOLENOID "D" ELECTRICAL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0771	Shift Solenoid "E" Performance or Stuck Off	Fwd/B solenoid malfunction	<Ref. to 5AT(diag)-78, DTC P0771 SHIFT SOLENOID "E" PERFORMANCE OR STUCK OFF, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0773	Shift Solenoid "E" Electrical	Fwd/B solenoid circuit or Fwd/B solenoid unit malfunction	<Ref. to 5AT(diag)-80, 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. - TCM+B fuse is blown.	<Ref. to 5AT(diag)-82, DTC P0801 REVERSE INHIBIT CONTROL CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0817	Starter Disable Circuit	- Open or short in PN signal output circuit - ECM power supply malfunction - TCM+B fuse is blown.	<Ref. to 5AT(diag)-84, DTC P0817 STARTER DISABLE CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0957	Backup Light Relay Circuit Low	Open or short in back-up light relay output circuit, or relay OFF malfunction	<Ref. to 5AT(diag)-86, DTC P0957 BACKUP LIGHT RELAY CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0958	Backup Light Relay Circuit High	Short circuit in back-up light relay output, or relay ON malfunction	<Ref. to 5AT(diag)-88, DTC P0958 BACKUP LIGHT RELAY CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

List of Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

DTC	Item	Content of diagnosis	Reference
P1706	AT Vehicle Speed Sensor Circuit Malfunction (Rear Wheel)	Rear vehicle speed sensor malfunction, open or short in input circuit, ground or power supply	<Ref. to 5AT(diag)-90, 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 or AWD solenoid unit malfunction	<Ref. to 5AT(diag)-92, DTC P1707 AT AWD SOLENOID VALVE CIRCUIT MALFUNCTION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1710	Torque Converter Turbine 2 Speed Signal Circuit Malfunction	Turbine speed sensor 2 malfunction, open or short in input circuit, ground or power supply	<Ref. to 5AT(diag)-94, DTC P1710 TORQUE CONVERTER TURBINE 2 SPEED SIGNAL CIRCUIT MALFUNCTION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1718	AT CAN Communication Circuit	Open circuit in CAN communication bus off, shorted ECM, ABS/VDCCM, body integrated unit malfunction	<Ref. to 5AT(diag)-96, DTC P1718 AT CAN COMMUNICATION CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1724	AT EEPROM Error	TCM EEPROM malfunction	<Ref. to 5AT(diag)-97, DTC P1724 AT EEPROM ERROR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1817	Sports Mode Switch Circuit (Manual Switch)	Open or short in manual mode switch circuit, or switch malfunction	<Ref. to 5AT(diag)-98, DTC P1817 SPORTS MODE SWITCH CIRCUIT (MANUAL SWITCH), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1840	Transmission Fluid Pressure Sensor Switch A Circuit	Open or short in Fr/B fluid pressure switch circuit, or switch malfunction	<Ref. to 5AT(diag)-100, DTC P1840 TRANSMISSION FLUID PRESSURE SENSOR SWITCH A CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1841	Transmission Fluid Pressure Sensor Switch B Circuit	Open or short in Fwd/B fluid pressure switch circuit, or switch malfunction	<Ref. to 5AT(diag)-100, DTC P1841 TRANSMISSION FLUID PRESSURE SENSOR SWITCH B CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1842	Transmission Fluid Pressure Sensor Switch C Circuit	Open or short in I/O fluid pressure switch circuit, or switch malfunction	<Ref. to 5AT(diag)-100, DTC P1842 TRANSMISSION FLUID PRESSURE SENSOR SWITCH C CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1843	Transmission Fluid Pressure Sensor Switch D Circuit	Open or short circuit in D/C fluid pressure switch circuit, or switch malfunction	<Ref. to 5AT(diag)-100, DTC P1843 TRANSMISSION FLUID PRESSURE SENSOR SWITCH D CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1844	Transmission Fluid Pressure Sensor Switch E Circuit	Open or short in H&LR/C fluid pressure switch circuit, or switch malfunction	<Ref. to 5AT(diag)-100, DTC P1844 TRANSMISSION FLUID PRESSURE SENSOR SWITCH E CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

15. Diagnostic Procedure with Diagnostic Trouble Code (DTC)

A: DTC P0705 TRANSMISSION RANGE SENSOR CIRCUIT (PRNDL INPUT)

DTC DETECTING CONDITION:

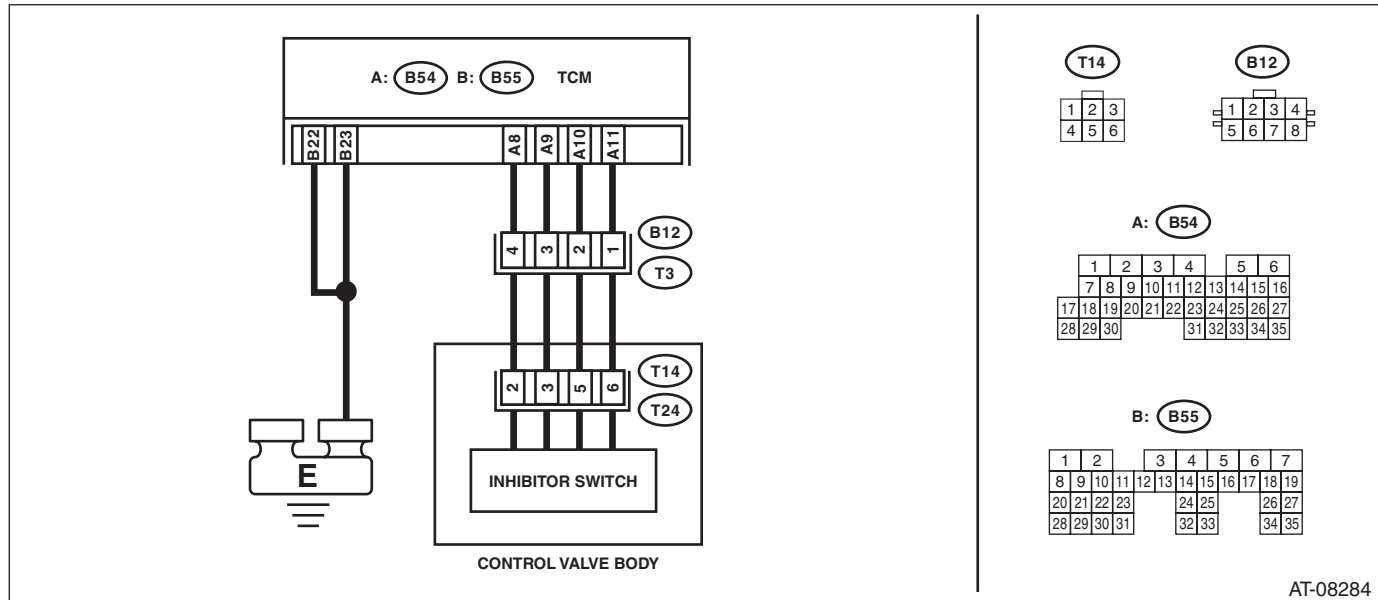
The inhibitor switch is open or short.

TROUBLE SYMPTOM:

- Shift characteristics are erroneous.
- Shift indicator does not match with select lever.
- Shift indicator does not illuminate.
- N-D, N-R shock occur.

WIRING DIAGRAM:

AT control system <Ref. to WI-50, AT Control System.>



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. Using Subaru Select Monitor, read the data of «Inhibitor SW 1» — «Inhibitor SW 4» for each range. <table border="1"><tr><td></td><td>SW1</td><td>SW2</td><td>SW3</td><td>SW4</td></tr><tr><td>P</td><td>○</td><td></td><td></td><td>○</td></tr><tr><td>R</td><td></td><td>○</td><td></td><td></td></tr><tr><td>N</td><td></td><td></td><td>○</td><td>○</td></tr><tr><td>D</td><td>○</td><td>○</td><td>○</td><td></td></tr></table> ○=High AT-05083		SW1	SW2	SW3	SW4	P	○			○	R		○			N			○	○	D	○	○	○		Is the display as in the table of step 2?	Go to step 9.	Go to step 3.
	SW1	SW2	SW3	SW4																								
P	○			○																								
R		○																										
N			○	○																								
D	○	○	○																									
3 CHECK INHIBITOR SWITCH. Using Subaru Select Monitor, read the data of «Inhibitor SW 1» for “P” and “D” ranges.	Is the display “High” for both “P” and “D”?	Go to step 4.	Go to step 7.																									
4 CHECK INHIBITOR SWITCH. Using Subaru Select Monitor, read the data of «Inhibitor SW 2» for “R” and “D” ranges.	Is the display “High” for both “R” and “D”?	Go to step 5.	Go to step 7.																									

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step	Check	Yes	No
5 CHECK INHIBITOR SWITCH. Using Subaru Select Monitor, read the data of «Inhibitor SW 3» for “N” and “D” ranges.	Is the display “High” for both “N” and “D”?	Go to step 6.	Go to step 7.
6 CHECK INHIBITOR SWITCH. Using Subaru Select Monitor, read the data of «Inhibitor SW 4» for “P” and “N” ranges.	Is the display “High” for both “P” and “N”?	Go to step 8.	Go to step 7.
7 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. 8 — (B12) No. 4: (B54) No. 9 — (B12) No. 3: (B54) No. 10 — (B12) No. 2: (B54) No. 11 — (B12) No. 1:	Is the resistance less than 1 Ω ?	Go to step 8.	Repair the open circuit of harness between TCM connector and transmission connector.
8 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. Connector & terminal (B54) No. 8 — Chassis ground: (B54) No. 9 — Chassis ground: (B54) No. 10 — Chassis ground: (B54) No. 11 — Chassis ground:	Is the resistance 1 M Ω or more?	Go to step 9.	Repair the short circuit of harness between TCM connector and chassis ground.
9 CHECK INPUT SIGNAL FOR TCM. 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 (B54) No. 8 (+) — (B55) No. 23 (-): (B54) No. 9 (+) — (B55) No. 23 (-): (B54) No. 10 (+) — (B55) No. 23 (-): (B54) No. 11 (+) — (B55) No. 23 (-):	Is the voltage of «Inhibitor SW 1» — «Inhibitor SW 4» 8 V or more?	Go to step 11.	Go to step 10.
10 CHECK TCM I/O SIGNAL. Check the power supply and ground I/O signals. <Ref. to 5AT(diag)-12, ELECTRICAL SPECIFICATION, Transmission Control Module (TCM) I/O Signal.>	Is TCM I/O signal OK?	Replace the TCM. <Ref. to 5AT-55, Transmission Control Module (TCM).>	Repair the open or short circuit for power supply and ground.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step	Check	Yes	No
11 CHECK INPUT SIGNAL FOR TCM. 1) Connect all connectors. 2) Lift up the vehicle. 3) Start the engine. 4) Read the data of «Front Wheel Speed» and «AT Turbine Speed 2» 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 lights the ABS warning light or the VDC warning light, but this does not indicate a malfunction. If the warning light is illuminated, clear the memory of ABS or VDC after completing AT control diagnosis. <Ref. to VDC(diag)-27, Clear Memory Mode.>	Does the speedometer indication increase as «Front Wheel Speed» and «AT Turbine Speed 2» values increase?	Go to step 12.	Replace the control valve body. <Ref. to 5AT-53, Control Valve Body.>
12 CHECK INPUT SIGNAL FOR TCM. 1) Drive at 4th of manual mode. NOTE: Turbine speed sensor 1 signal can be measured only on 4th speed. 2) Read the data of «Rear Wheel Speed» and «AT Turbine Speed 1» 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 lights the ABS warning light or the VDC warning light, but this does not indicate a malfunction. If the warning light is illuminated, clear the memory of ABS or VDC after completing AT control diagnosis. <Ref. to VDC(diag)-27, Clear Memory Mode.>	Does the speedometer indication increase as «Rear Wheel Speed» and «AT Turbine Speed 1» values increase?	Go to step 13.	Repair the open circuit of harness or poor contact of connector between TCM and rear vehicle speed sensor and turbine speed sensor 1.
13 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. 5) Drain the ATF. CAUTION: Do not drain ATF until it cools down. 6) Remove the oil pan. 7) Disconnect the control valve body connector. 8) Measure the resistance between transmission connector and control valve body connector. Connector & terminal (T3) No. 4 — (T14) No. 2: (T3) No. 3 — (T14) No. 3: (T3) No. 2 — (T14) No. 5: (T3) No. 1 — (T14) No. 6:	Is the resistance less than 1 Ω ?	Go to step 14.	Repair the open circuit between control valve body connector and transmission connector.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step	Check	Yes	No
14 CHECK HARNESS CONNECTOR BETWEEN TRANSMISSION AND CONTROL VALVE BODY. Measure the resistance between transmission ground and control valve body connector. Connector & terminal (T14) No. 2 — Transmission ground: (T14) No. 3 — Transmission ground: (T14) No. 5 — Transmission ground: (T14) No. 6 — Transmission ground:	Is the resistance 1 M Ω or more?	Go to step 15.	Repair the short circuit between control valve body connector and transmission connector.
15 CHECK FOR POOR CONTACT.	Is there any poor contact of «Inhibitor SW 1» — «Inhibitor SW 4» monitor circuit?	Repair the poor contact.	Replace the control valve body. <Ref. to 5AT-53, Control Valve Body.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

B: DTC P0711 ATF TEMP. SENSOR CIRCUIT RANGE/PERFORMANCE

DTC DETECTING CONDITION:

ATF temperature does not reach 20°C (68°F). (ATF temperature does not increase.)

TROUBLE SYMPTOM:

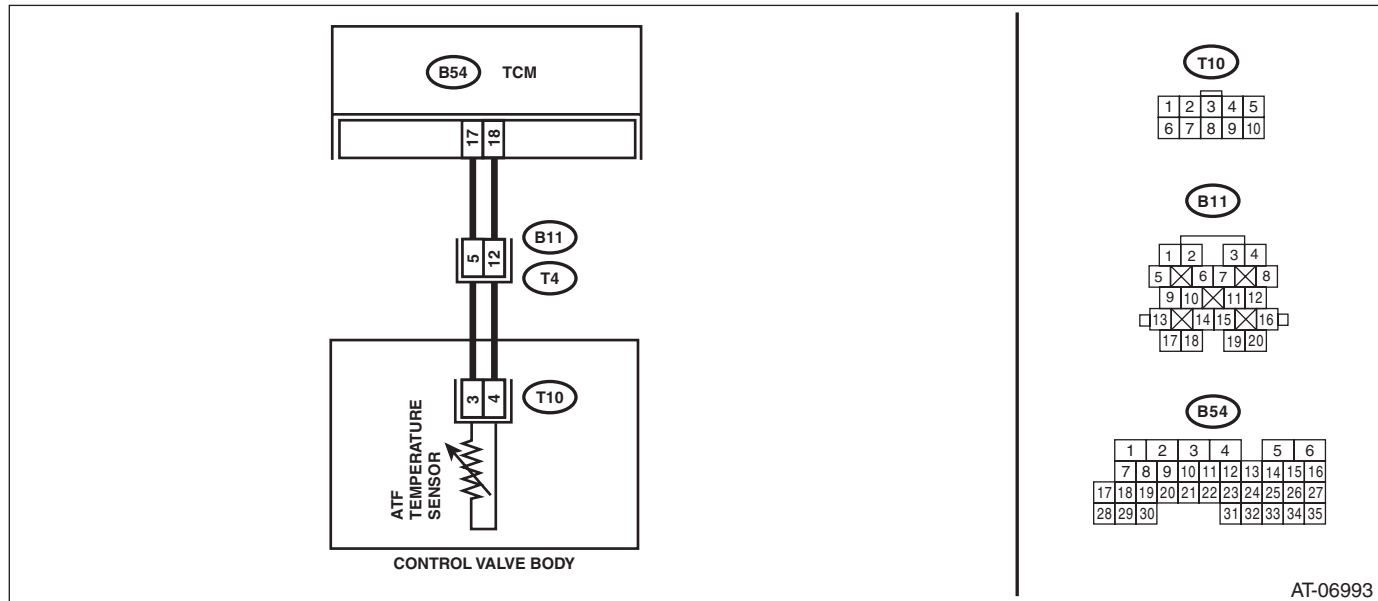
Excessive shift shock

CAUTION:

After diagnosis, perform Clear Memory Mode for each system.

WIRING DIAGRAM:

AT control system <Ref. to WI-50, AT Control System.>



Step	Check	Yes	No	
1	CHECK DTC. Check the DTC using Subaru Select Monitor.	Is DTC P0712 or P0713 displayed?	Perform the diagnosis according to DTC.	Go to step 2.
2	CHECK TRANSMISSION FLUID. Check the amount of ATF. <Ref. to 5AT-29, INSPECTION, Automatic Transmission Fluid.>	Is the ATF amount correct?	Go to step 3.	Adjust the amount of ATF. <Ref. to 5AT-29, INSPECTION, Automatic Transmission Fluid.>
3	CHECK INPUT SIGNAL FOR TCM. Check «ATF Temp.» using the Subaru Select Monitor.	Is «ATF Temp.» less than 20°C (68°F)?	Go to step 4.	Reconfirm after the ATF temperature drops below 20°C (68°F).
4	CHECK INPUT SIGNAL FOR TCM. 1) Lift up the vehicle. 2) Apply the parking brake. 3) Start the engine. 4) Set the select lever to “D” range. 5) Warm up the engine until the ATF temperature reaches 20°C (68°F). 6) Read the data of «ATF Temp.» using the Subaru Select Monitor.	Does «ATF Temp.» increase by 1°C (1.8°F) within 3 minutes?	Current condition is normal.	Go to step 5.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step	Check	Yes	No
5 CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION. 1) Turn the ignition switch to OFF. 2) Disconnect the TCM and transmission connectors. 3) Measure the resistance between TCM connector and transmission connectors. Connector & terminal (B54) No. 17 — (B11) No. 5: (B54) No. 18 — (B11) No. 12:	Is the resistance less than 1 Ω ?	Go to step 6.	Check for poor contact of the harness between the ATF temperature sensor and transmission connector, and repair the defective part.
6 CHECK INPUT SIGNAL FOR TCM. 1) Connect the connector to TCM. (with the transmission connector disconnected) 2) Turn the ignition switch to ON. 3) Read the data of «ATF Temp.» using the Subaru Select Monitor.	Is -40°C (-40°F) displayed in «ATF Temp.»?	Replace the control valve body. <Ref. to 5AT-53, Control Valve Body.>	Replace the TCM. <Ref. to 5AT-55, Transmission Control Module (TCM).>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

C: DTC P0712 TRANSMISSION FLUID TEMPERATURE SENSOR CIRCUIT LOW INPUT

DTC DETECTING CONDITION:

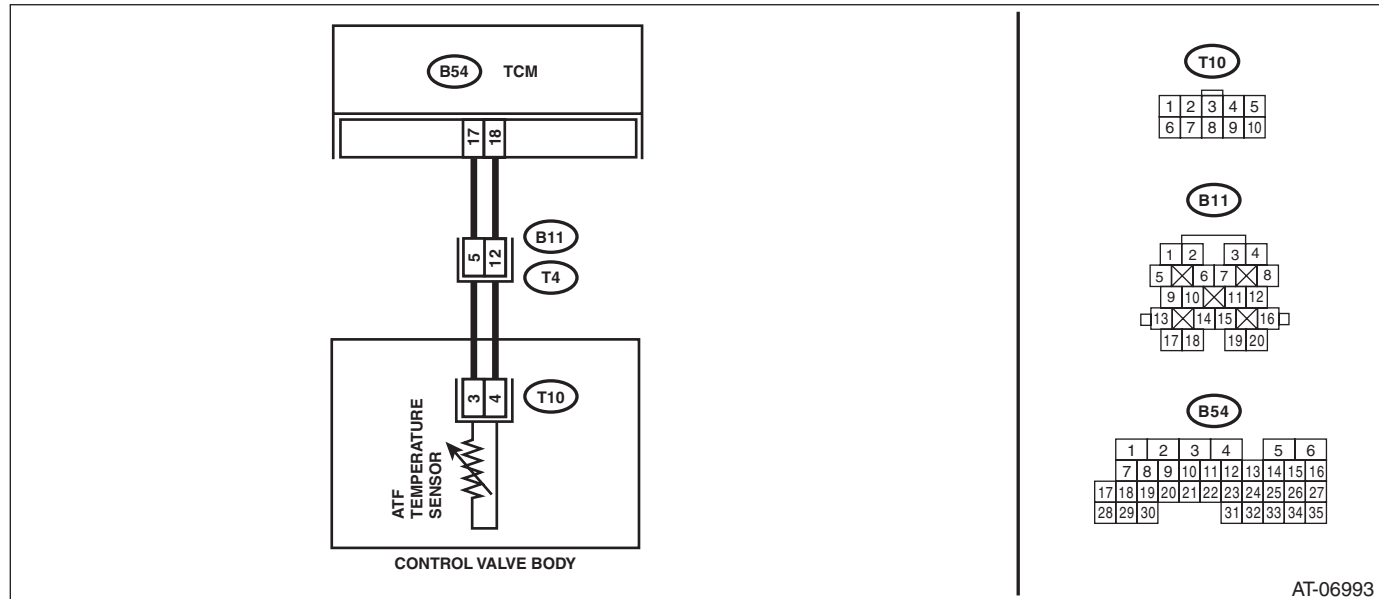
Input signal circuit to ATF temperature sensor is shorted.

TROUBLE SYMPTOM:

Excessive shift shock

WIRING DIAGRAM:

AT control system <Ref. to WI-50, AT Control System.>



AT-06993

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. 17 — Chassis ground: (B54) No. 18 — Chassis ground:	Is the resistance 1 M Ω or more?	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) Start the engine. 4) Warm up the transmission until the ATF temperature exceeds 80°C (176°F). 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 300 — 800 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.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step	Check	Yes	No
4 CHECK INPUT SIGNAL FOR TCM. 1) Connect the connector. 2) Turn the ignition switch to ON. (engine OFF) 3) Read the data of «ATF Temp.» using the Subaru Select Monitor.	Does the ATF temperature gradually decrease?	Check for poor contact of the harness between the ATF temperature sensor and transmission connector, and repair the defective part.	Go to step 6.
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. 5) Drain the ATF. CAUTION: Do not drain ATF until it cools down. 6) Remove the oil pan. 7) Disconnect the connector from the control valve body. 8) Measure the resistance between chassis ground and control valve body connector. Connector & terminal (T10) No. 3 — Chassis ground: (T10) No. 4 — Chassis ground:	Is the resistance 1 MΩ or more?	Replace the control valve body. <Ref. to 5AT-53, Control Valve Body.>	Repair the short circuit of harness between transmission connector and control valve body connector.
6 CHECK FOR POOR CONTACT.	Is there poor contact of ATF temperature sensor circuit?	Repair the poor contact.	Replace the TCM. <Ref. to 5AT-55, Transmission Control Module (TCM).>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

D: DTC P0713 TRANSMISSION FLUID TEMPERATURE SENSOR CIRCUIT HIGH INPUT

DTC DETECTING CONDITION:

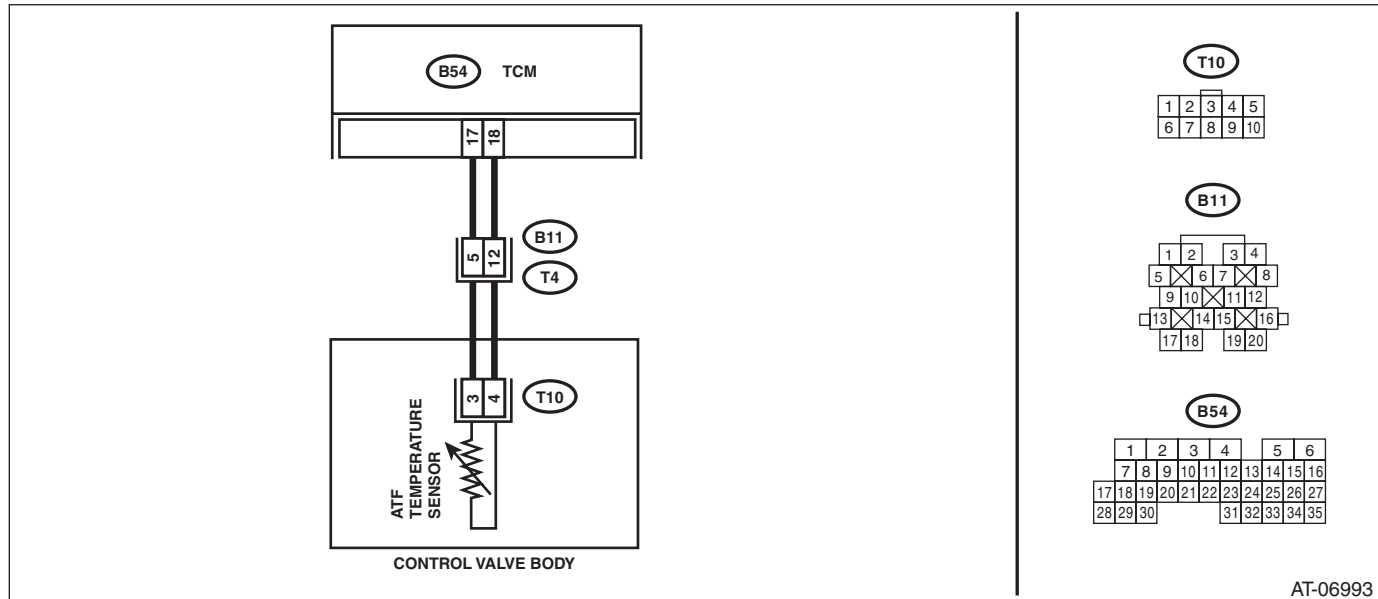
Input signal circuit to ATF temperature sensor is open.

TROUBLE SYMPTOM:

Excessive shift shock

WIRING DIAGRAM:

AT control system <Ref. to WI-50, AT Control System.>



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. 17 — (B11) No. 5: (B54) No. 18 — (B11) No. 12:	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) Start the engine. 4) Warm up the transmission until the ATF temperature exceeds 80°C (176°F). 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 300 — 800 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.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step	Check	Yes	No
4 CHECK INPUT SIGNAL FOR TCM. 1) Connect the connector. 2) Turn the ignition switch to ON. (engine OFF) 3) Read the data of «ATF Temp.» using the Subaru Select Monitor.	Does the ATF temperature gradually decrease?	Check for poor contact of the harness between the ATF temperature sensor and transmission connector, and repair the defective part.	Go to step 6.
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. 5) Drain the ATF. CAUTION: Do not drain ATF until it cools down. 6) Remove the oil pan. 7) Disconnect the connector from the control valve body. 8) Measure the resistance between transmission connector and control valve body connector. <i>Connector & terminal</i> <i>(T4) No. 5 — (T10) No. 3:</i> <i>(T4) No. 12 — (T10) No. 4:</i>	Is the resistance less than 1 Ω ?	Replace the control valve body. <Ref. to 5AT-53, Control Valve Body.>	Repair the open circuit of harness between transmission connector and control valve body connector.
6 CHECK FOR POOR CONTACT.	Is there poor contact of ATF temperature sensor circuit?	Repair the poor contact.	Replace the TCM. <Ref. to 5AT-55, Transmission Control Module (TCM).>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

E: DTC P0715 INPUT/TURBINE SPEED SENSOR CIRCUIT

DTC DETECTING CONDITION:

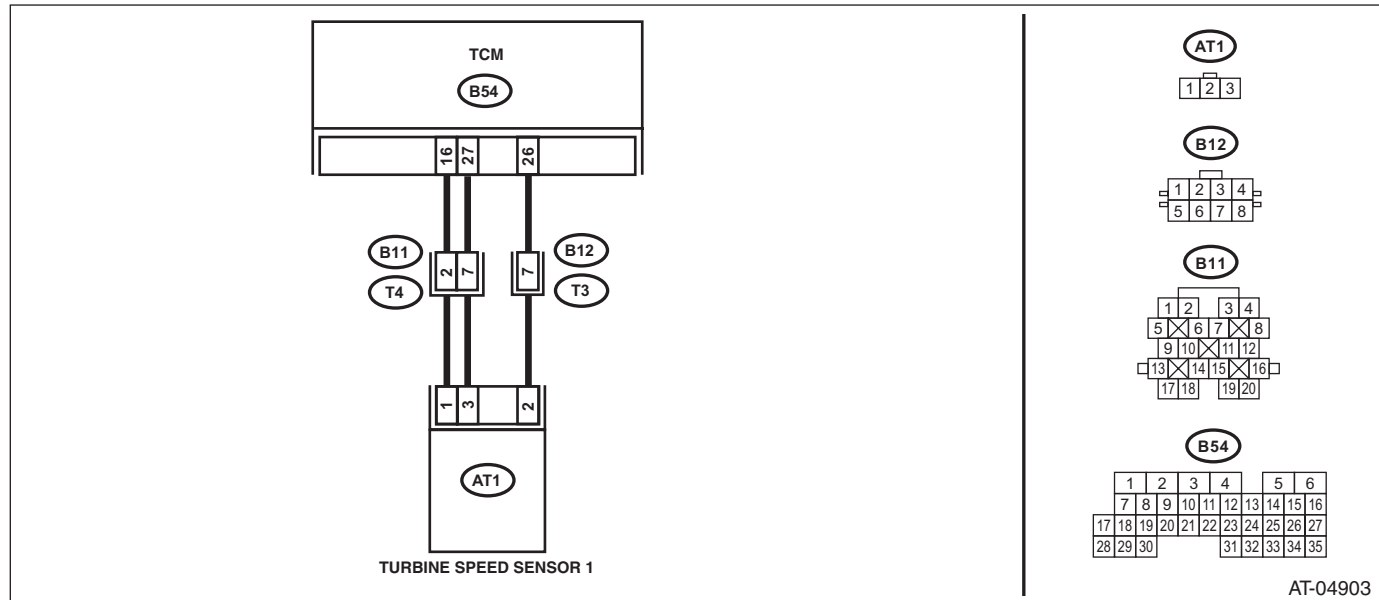
Input signal circuit of TCM is open or shorted.

TROUBLE SYMPTOM:

- Excessive shift shock
- Does not shift to 5th.

WIRING DIAGRAM:

AT control system <Ref. to WI-50, AT Control System.>



Step	Check	Yes	No
1	CHECK TCM I/O SIGNAL. Check the power supply and ground I/O signals. <Ref. to 5AT(diag)-12, ELECTRICAL SPECIFICATION, Transmission Control Module (TCM) I/O Signal.>	Go to step 2.	Repair the open or short circuit for power supply and ground.
2	CHECK TCM AND TRANSMISSION HARNESS CONNECTOR. 1) Disconnect the connectors from TCM and transmission. 2) Measure the resistance of harness between TCM connector and transmission connector. Connector & terminal (B54) No. 16 — (B11) No. 2: (B54) No. 26 — (B12) No. 7: (B54) No. 27 — (B11) No. 7:	Go to step 3.	Repair the open circuit of harness between TCM and transmission connector.
3	CHECK TCM AND TRANSMISSION HARNESS CONNECTOR. Measure the resistance of harness between TCM connector and chassis ground. Connector & terminal (B54) No. 16 — Chassis ground: (B54) No. 26 — Chassis ground: (B54) No. 27 — Chassis ground:	Go to step 4.	Repair the short circuit of harness between TCM and transmission connector.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step	Check	Yes	No
4 CHECK TCM POWER SUPPLY OUTPUT. 1) Connect the connector to TCM. (Transmission connector is disconnected) 2) Turn the ignition switch to ON. (engine OFF) 3) Measure the voltage between transmission connector and chassis ground. Connector & terminal (B11) No. 7 (+) — Chassis ground (-):	Is the voltage 10 — 13 V?	Go to step 5.	Replace the TCM. <Ref. to 5AT-55, Transmission Control Module (TCM).>
5 CHECK INPUT CIRCUIT OF TCM TURBINE SPEED SENSOR. Measure the voltage between TCM connector terminals. Connector & terminal (B12) No. 7 (+) — (B11) No. 2 (-):	Is the voltage 4 — 6 V?	Go to step 6.	Replace the TCM. <Ref. to 5AT-55, Transmission Control Module (TCM).>
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 to transmission body correctly, with their harnesses and connector terminals not damaged?	Go to step 7.	When poor installation of ground occurs, install it securely. Replace the transmission assembly if the harness or terminal is damaged. <Ref. to 5AT-37, Automatic Transmission Assembly.>
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 (T3) No. 7 — (AT1) No. 2: (T4) No. 7 — (AT1) No. 3: (T4) No. 2 — (AT1) No. 1: (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 (T3) No. 7 — Chassis ground: (T4) No. 7 — Chassis ground: (T4) No. 2 — Chassis ground:	Is the resistance 1 M Ω or more?	Go to step 9.	Repair the short circuit of harness between TCM and transmission connector.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step	Check	Yes	No
9 CHECK INPUT SIGNAL FOR TCM. 1) Connect all connectors. 2) Lift up the vehicle. 3) Start the engine. 4) Set the vehicle in 4th speed driving condition of manual mode. NOTE: Turbine speed sensor 1 signal can be measured only on 4th speed. 5) Read the data of «AT Turbine Speed 1» and «AT Turbine Speed 2» 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 lights the ABS warning light or the VDC warning light, but this does not indicate a malfunction. If the warning light illuminates, delete the ABS or VDC memory after completing the AT control diagnosis. <Ref. to VDC(diag)-27, Clear Memory Mode.>	Are the values of «AT Turbine Speed 1» and «AT Turbine Speed 2» almost the same?	Check for poor contact of the harness of the turbine speed sensor 1 circuit, and repair the faulty part.	Replace the turbine speed sensor 1. <Ref. to 5AT-52, Turbine Speed Sensor 1.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

F: DTC P0719 BRAKE SWITCH CIRCUIT LOW

DTC DETECTING CONDITION:

Brake switch malfunction, open input signal circuit

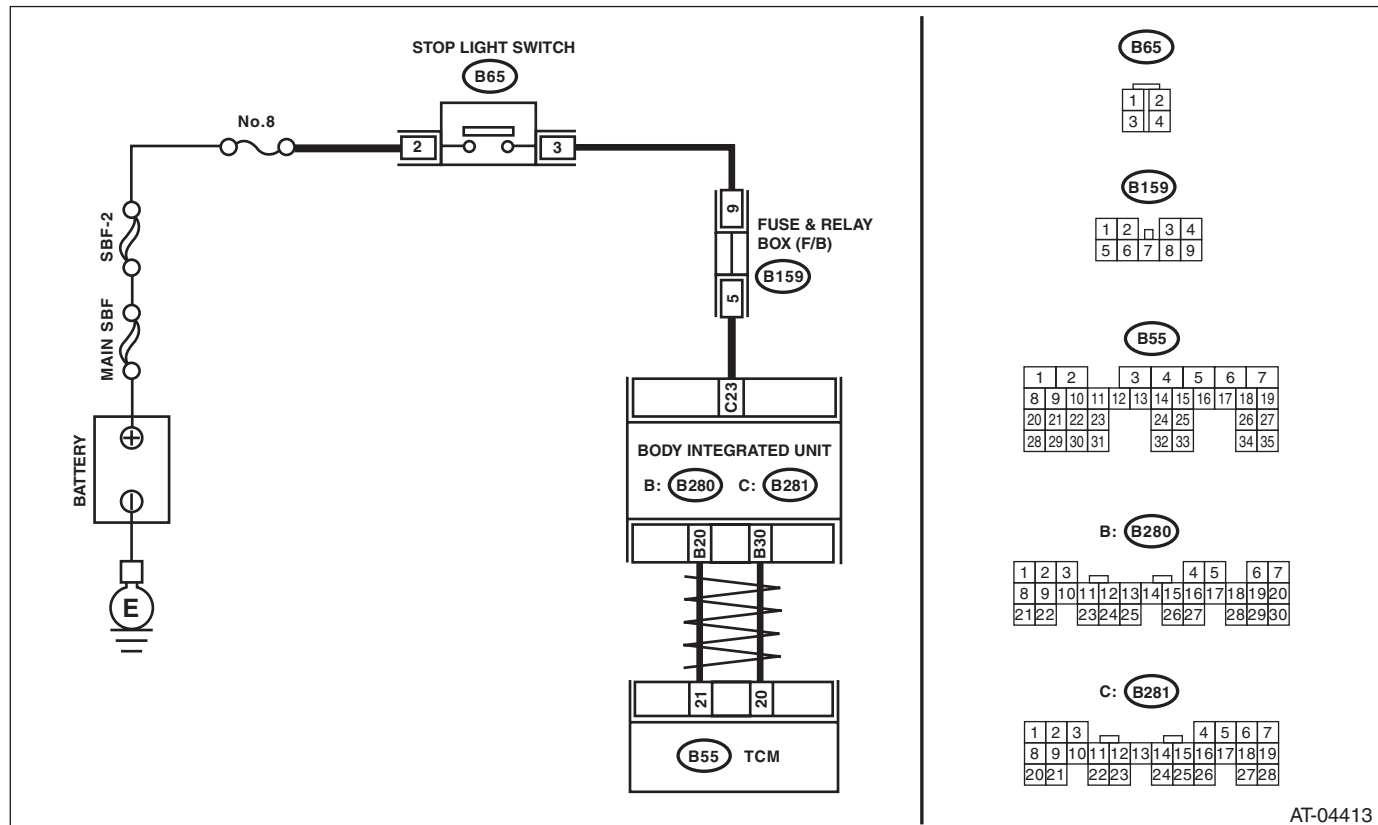
TROUBLE SYMPTOM:

Gear is not shifted down when climbing a hill or driving down a hill.

WIRING DIAGRAM:

Stop light system <Ref. to WI-97, Stop Light System.>

CAN communication system <Ref. to WI-78, CAN Communication System.>



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Step	Check	Yes	No
1	CHECK DTC.	Is any of following DTC displayed? / AT CAN Communication Circuit / Output Speed Sensor Circuit / AT Vehicle Speed Sensor Circuit Malfunction (Rear Wheel) / VDC Brake SW Circuit	Perform the diagnosis according to DTC.
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 «Stop Light Switch» using Subaru Select Monitor. <Ref. to LAN(diag)-13, DISPLAY OF CURRENT DATA, OPERATION, Subaru Select Monitor.>	Is "ON" displayed?	Go to step 2.
		Go to step 3.	Go to step 4.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step	Check	Yes	No
3 CHECK TCM. Read the data of «Stop Light Switch» using Subaru Select Monitor. <Ref. to 5AT(diag)-16, READ CURRENT DATA, 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-55, 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 — (B65) No. 3:	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 1 M Ω or more?	Go to step 7.	Repair the short circuit of harness between body integrated unit and stop light switch.
7 CHECK FOR POOR CONTACT.	Is there poor contact of input signal of brake switch?	Repair the poor contact.	Check body integrated unit.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

G: DTC P0720 OUTPUT SPEED SENSOR CIRCUIT

DTC DETECTING CONDITION:

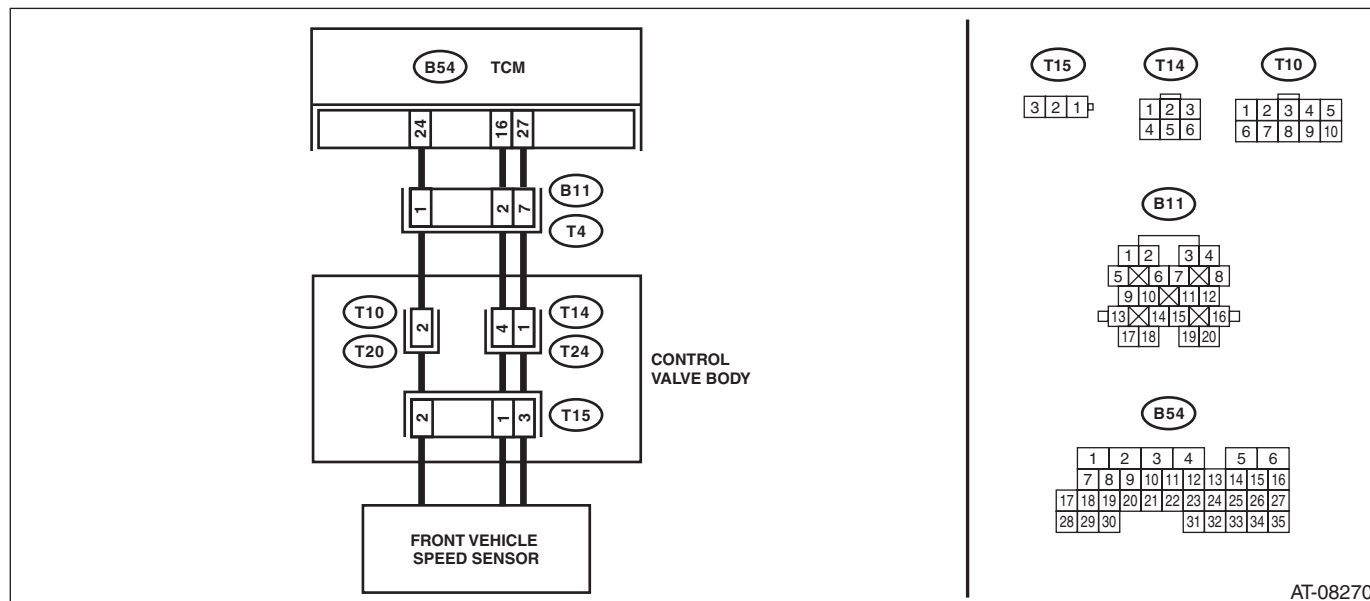
- AT vehicle speed signal is abnormal.
- The harness connector between TCM and vehicle speed sensor is shorted or open.

TROUBLE SYMPTOM:

- Shifting quality malfunction
- Driving performance is poor.

WIRING DIAGRAM:

AT control system <Ref. to WI-50, AT Control System.>



Step	Check	Yes	No	
1	CHECK TCM I/O SIGNAL. Check the power supply and ground I/O signals. <Ref. to 5AT(diag)-12, ELECTRICAL SPECIFICATION, Transmission Control Module (TCM) I/O Signal.>	Is TCM I/O signal OK?	Go to step 2.	Repair the open or short circuit for power supply and ground.
2	CHECK TCM AND TRANSMISSION HARNESS CONNECTOR. 1) Disconnect the connectors from TCM and transmission. 2) Measure the resistance of harness between TCM connector and transmission connector. Connector & terminal (B54) No. 16 — (B11) No. 2: (B54) No. 24 — (B11) No. 1: (B54) No. 27 — (B11) No. 7:	Is the resistance less than 1 Ω?	Go to step 3.	Repair the open circuit of harness between TCM and transmission connector.
3	CHECK TCM AND TRANSMISSION HARNESS CONNECTOR. Measure the resistance of harness between TCM connector and chassis ground. Connector & terminal (B54) No. 24 — Chassis ground:	Is the resistance less than 1 MΩ?	Go to step 4.	Repair the short circuit of harness between TCM and transmission connector.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step	Check	Yes	No
4 CHECK TCM POWER SUPPLY OUTPUT. 1) Connect the connector to TCM. (Transmission connector is disconnected) 2) Turn the ignition switch to ON. (engine OFF) 3) Measure the voltage between transmission connector and chassis ground. Connector & terminal (B11) No. 7 (+) — Chassis ground (-):	Is the voltage 10 — 13 V?	Go to step 5.	Replace the TCM. <Ref. to 5AT-55, Transmission Control Module (TCM).>
5 CHECK INPUT CIRCUIT OF TCM TURBINE SPEED SENSOR. Measure the voltage variation between TCM connector terminals. Connector & terminal (B11) No. 1 (+) — (B11) No. 2 (-):	Is the voltage 4 — 6 V?	Go to step 6.	Replace the TCM. <Ref. to 5AT-55, Transmission Control Module (TCM).>
6 CHECK INPUT SIGNAL FOR TCM. 1) Connect all connectors. 2) Lift up the vehicle. 3) Start the engine. 4) Read the 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 lights the ABS warning light or the VDC warning light, but this does not indicate a malfunction. If the warning light illuminates, delete the ABS or VDC memory after completing the AT control diagnosis. <Ref. to VDC(diag)-27, Clear Memory Mode.>	Does the speedometer indication increase as the «Front Wheel Speed» data increases?	Check the harness of the front vehicle speed sensor circuit, and repair the defective part.	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. 5) Drain the ATF. CAUTION: Do not drain ATF until it cools down. 6) Remove the oil pan. 7) Disconnect the connector from the control valve body. 8) Measure the resistance between transmission connector and control valve body connector. Connector & terminal (T4) No. 1 — (T10) No. 2:	Is the resistance less than 1 Ω ?	Go to step 8.	Repair the open circuit of harness between control valve body connector and transmission connector.
8 CHECK HARNESS CONNECTOR BETWEEN TRANSMISSION AND CONTROL VALVE BODY. Measure the resistance between transmission ground and control valve body connector. Connector & terminal (T10) No. 2 — Transmission ground:	Is the resistance 1 M Ω or more?	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 (T20) No. 2 — (T15) No. 2: (T24) No. 1 — (T15) No. 3: (T24) No. 4 — (T15) No. 1:	Is the resistance less than 1 Ω ?	Go to step 10.	Replace the control valve body. <Ref. to 5AT-53, 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 (T20) No. 2 — Transmission ground:	Is the resistance 1 M Ω or more?	Replace the front vehicle speed sensor.	Replace the control valve body. <Ref. to 5AT-53, Control Valve Body.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

H: DTC P0724 BRAKE SWITCH CIRCUIT HIGH

DTC DETECTING CONDITION:

Brake switch malfunction, open input signal circuit

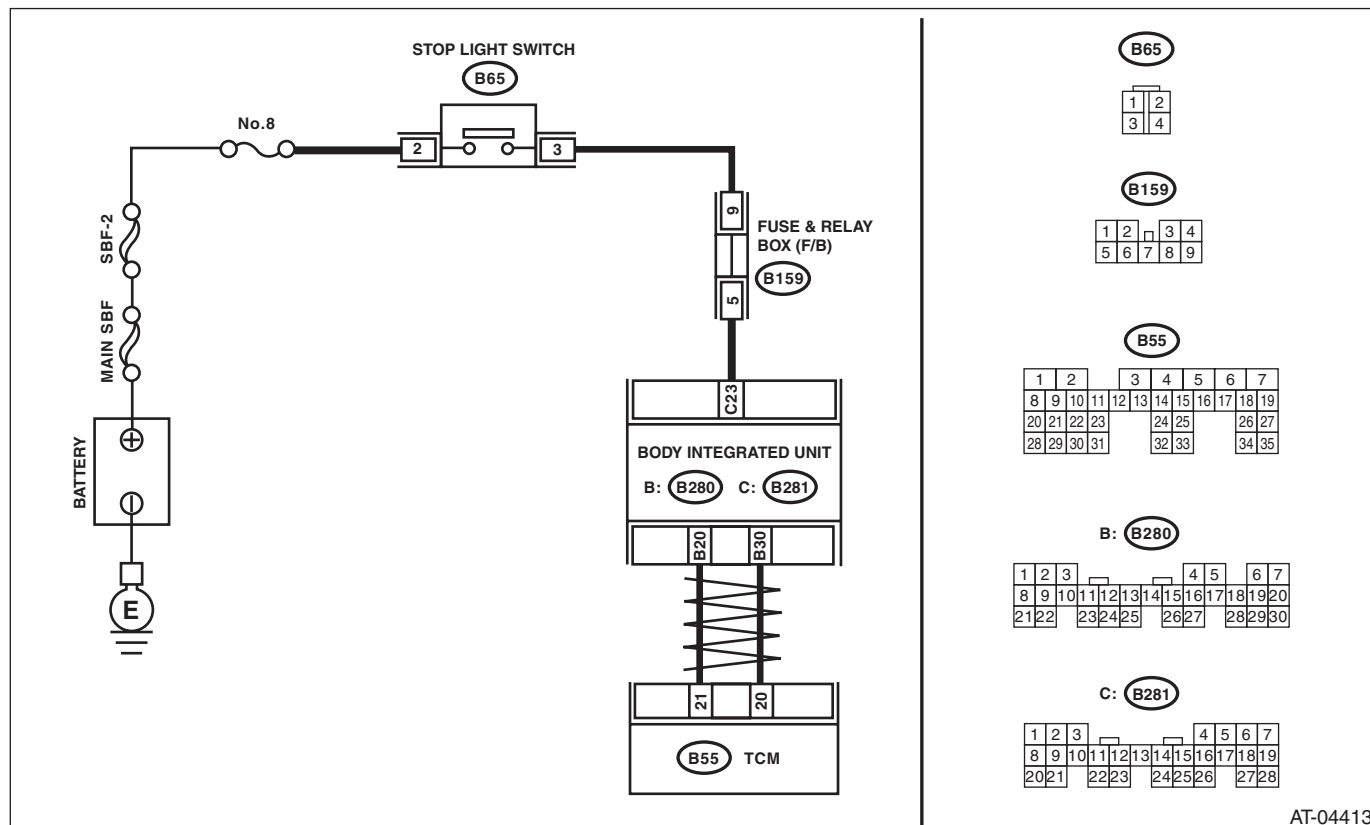
TROUBLE SYMPTOM:

Gear is not shifted down when climbing a hill.

WIRING DIAGRAM:

Stop light system <Ref. to WI-97, Stop Light System.>

CAN communication system <Ref. to WI-78, CAN Communication System.>



AT-04413

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) / VDC Brake SW Circuit	Perform the diagnosis according to DTC.
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 «Stop Light Switch» using Subaru Select Monitor. <Ref. to LAN(diag)-13, DISPLAY OF CURRENT DATA, OPERATION, Subaru Select Monitor.>	Is "OFF" displayed?	Go to step 2.
		Go to step 3.	Go to step 4.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step	Check	Yes	No
3 CHECK TCM. Read the data of «Stop Light Switch» using Subaru Select Monitor. <Ref. to 5AT(diag)-16, READ CURRENT DATA, 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-55, 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. Connector & terminal (B65) No. 3 — (B65) No. 2:	Is the resistance 1 MΩ or more?	Go to step 6.	Replace the stop light switch. <Ref. to BR-39, 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 body integrated unit and stop light switch.
7 CHECK FOR POOR CONTACT.	Is there poor contact of input signal of stop light switch?	Repair the poor contact.	Check body integrated unit.

I: DTC P0731 GEAR 1 INCORRECT RATIO

NOTE:

Refer to DTC P0736 for diagnostic procedure. <Ref. to 5AT(diag)-56, DTC P0736 REVERSE INCORRECT RATIO, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

J: DTC P0732 GEAR 2 INCORRECT RATIO

NOTE:

Refer to DTC P0736 for diagnostic procedure. <Ref. to 5AT(diag)-56, DTC P0736 REVERSE INCORRECT RATIO, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

K: DTC P0733 GEAR 3 INCORRECT RATIO

NOTE:

Refer to DTC P0736 for diagnostic procedure. <Ref. to 5AT(diag)-56, DTC P0736 REVERSE INCORRECT RATIO, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

L: DTC P0734 GEAR 4 INCORRECT RATIO

NOTE:

Refer to DTC P0736 for diagnostic procedure. <Ref. to 5AT(diag)-56, DTC P0736 REVERSE INCORRECT RATIO, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

M: DTC P0735 GEAR 5 INCORRECT RATIO

NOTE:

Refer to DTC P0736 for diagnostic procedure. <Ref. to 5AT(diag)-56, DTC P0736 REVERSE INCORRECT RATIO, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

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. Is any of the following DTCs displayed? P0751, P0753, P0756, P0758, P0761, P0763, P0766, P0768, P0771, P0773	Perform the diagnosis according to DTC.	Go to step 2.
2	CHECK DTC. Is DTC P1718 displayed?	Perform the diagnosis according to DTC.	Go to step 3.
3	CHECK AT TURBINE SPEED SENSOR CIRCUIT. Perform diagnosis according to DTC P0715. <Ref. to 5AT(diag)-45, DTC P0715 INPUT/ TURBINE SPEED SENSOR CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>	Check the turbine speed sensor 1 circuit.	Go to step 4.
4	CHECK AT TURBINE SPEED SENSOR CIRCUIT. Perform diagnosis according to DTC P1710. <Ref. to 5AT(diag)-94, DTC P1710 TORQUE CONVERTER TURBINE 2 SPEED SIGNAL CIRCUIT MALFUNCTION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>	Check the turbine speed sensor 2 circuit.	Go to step 5.
5	CHECK AT VEHICLE SPEED SENSOR CIRCUIT. Perform diagnosis according to DTC P0720. <Ref. to 5AT(diag)-50, DTC P0720 OUTPUT SPEED SENSOR CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>	Check for poor contact of the front vehicle speed sensor circuit harness and repair the fault location.	Go to step 6.
6	CHECK AT VEHICLE SPEED SENSOR CIRCUIT. Perform diagnosis according to DTC P1706. <Ref. to 5AT(diag)-90, DTC P1706 AT VEHICLE SPEED SENSOR CIRCUIT MALFUNCTION (REAR WHEEL), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>	Check for poor contact of the rear vehicle speed sensor circuit harness and repair the fault location.	Go to step 7.
7	CHECK TRANSMISSION RANGE SENSOR CIRCUIT (PRNDL INPUT). Perform diagnosis according to DTC P0705. <Ref. to 5AT(diag)-35, DTC P0705 TRANSMISSION RANGE SENSOR CIRCUIT (PRNDL INPUT), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>	Check the inhibitor switch circuit.	There are malfunctions in TCM, TCM connector poor contact, or transmission assembly mechanical malfunction.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

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

DTC DETECTING CONDITION:

- Lock up clutch malfunction
- Defective 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, P0720, P0753, P0758, P0763, P0768, P0773, P0751, P0756, P0761, P0766, P0771, P1710, P1718	Perform the diagnosis according to each DTC.	Go to step 2.
2 DRIVING CHECK FOR LOCK-UP CONDITION. 1) Perform the Clear Memory Mode. 2) Maintain the value of «Accel. Opening Angle» displayed on Subaru Select Monitor and drive the vehicle at 85 km/h or more. 3) Make sure that «L/U Solenoid Current» is 0.6 A or more using Subaru Select Monitor. 4) Read the data of «Engine Speed» and «Turbine Revolution Speed» using Subaru Select Monitor.	Is the difference between «Engine Speed» and «Turbine Revolution Speed» within 100 rpm?	Temporary poor contact or open circuit occurs. Recheck that the harness connector has no faulty.	Replace the transmission assembly when the speed difference becomes 100 rpm or more or DTC P0741 is displayed. When DTC other than P0741 is displayed, perform the diagnosis corresponding to the DTC.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

P: DTC P0743 TORQUE CONVERTER CLUTCH CIRCUIT ELECTRICAL

DTC DETECTING CONDITION:

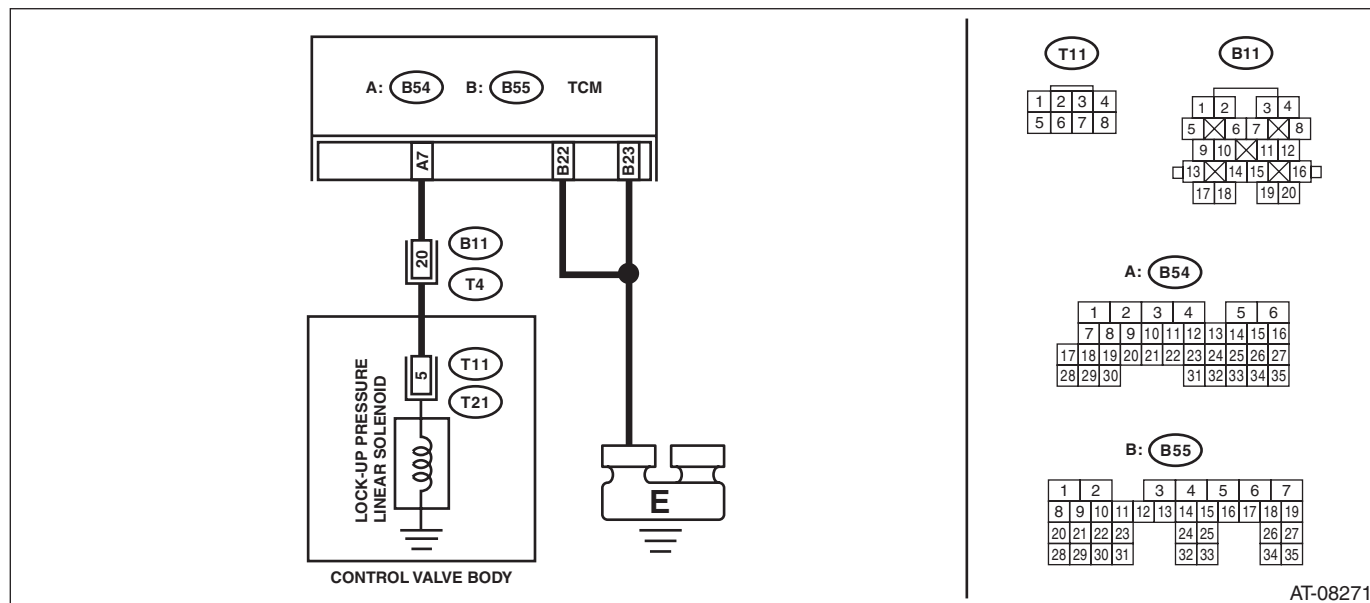
The output signal circuit of lock up solenoid is open or shorted.

TROUBLE SYMPTOM:

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

WIRING DIAGRAM:

AT control system <Ref. to WI-50, AT Control System.>



AT-08271

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. 7 — (B11) No. 20: (B55) No. 22 — Chassis ground: (B55) No. 23 — 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. 7 — Chassis ground:	Is the resistance 1 MΩ or more?	Go to step 3.	Repair the short circuit of harness between TCM connector and transmission connector.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step	Check	Yes	No
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. 5) Drain the ATF. NOTE: Do not drain ATF until it cools down. 6) Remove the oil pan. 7) Disconnect the connector from the control valve body. 8) Measure the resistance between transmission connector and control valve body connector. Connector & terminal (T4) No. 20 — (T11) No. 5:	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 (T11) No. 5 — Transmission ground:	Is the resistance 1 M Ω or more?	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 (T21) No. 5 — Transmission ground:	Is the resistance 3 — 9 Ω ?	Go to step 6.	Replace the control valve body. <Ref. to 5AT-53, Control Valve Body.>
6 CHECK FOR POOR CONTACT. Check the TCM connector, transmission connector and control valve body connector.	Is there poor contact (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 and read DTC.	Is DTC displayed?	Replace the TCM. <Ref. to 5AT-55, 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:

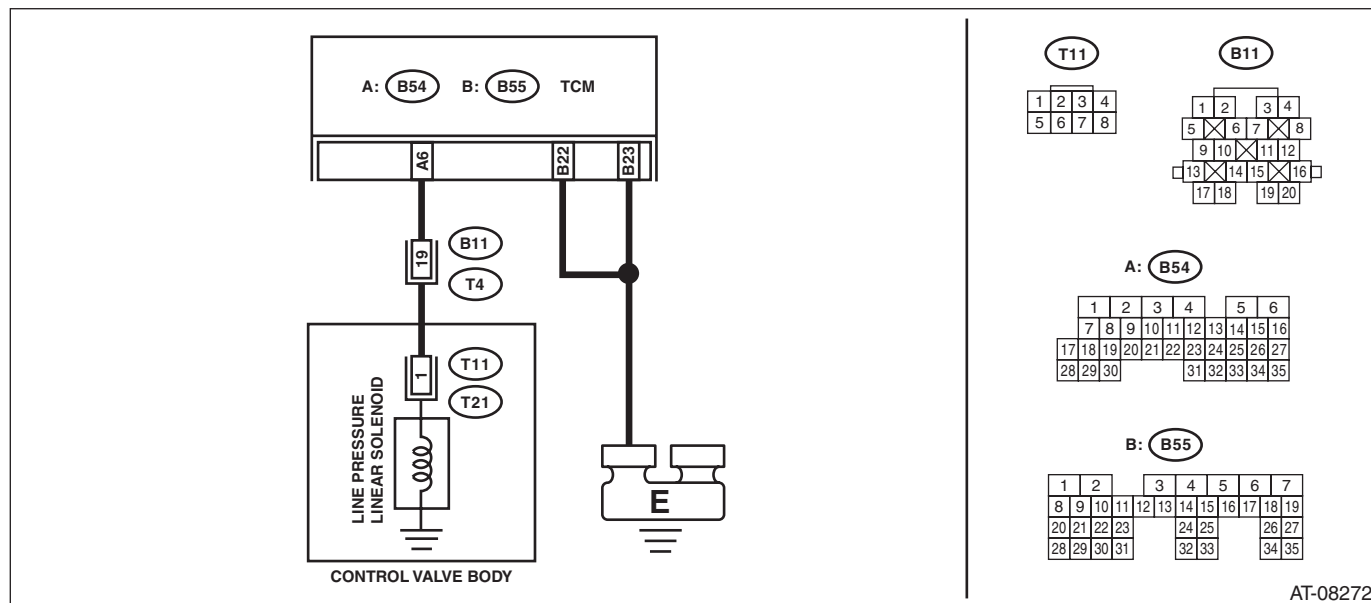
Output signal circuit of line pressure solenoid is open or shorted.

TROUBLE SYMPTOM:

Excessive shift shock

WIRING DIAGRAM:

AT control system <Ref. to WI-50, AT Control System.>



AT-08272

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. 6 — (B11) No. 19: (B55) No. 22 — Chassis ground: (B55) No. 23 — 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. 6 — Chassis ground:	Is the resistance 1 MΩ or more?	Go to step 3.	Repair the short circuit of harness between TCM connector and transmission connector.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step	Check	Yes	No
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. 5) Drain the ATF. CAUTION: Do not drain ATF until it cools down. 6) Remove the oil pan. 7) Disconnect the connector from the control valve body. 8) Measure the resistance between transmission connector and control valve body connector. Connector & terminal (T4) No. 19 — (T11) No. 1:	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 (T11) No. 1 — Transmission ground:	Is the resistance 1 M Ω or more?	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 (T21) No. 1 — Transmission ground:	Is the resistance 3 — 9 Ω ?	Go to step 6.	Replace the control valve body. <Ref. to 5AT-53, Control Valve Body.>
6 CHECK FOR POOR CONTACT. Check the TCM connector, transmission connector and control valve body connector.	Is there poor contact (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 and read DTC.	Is DTC displayed?	Replace the TCM. <Ref. to 5AT-55, 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:

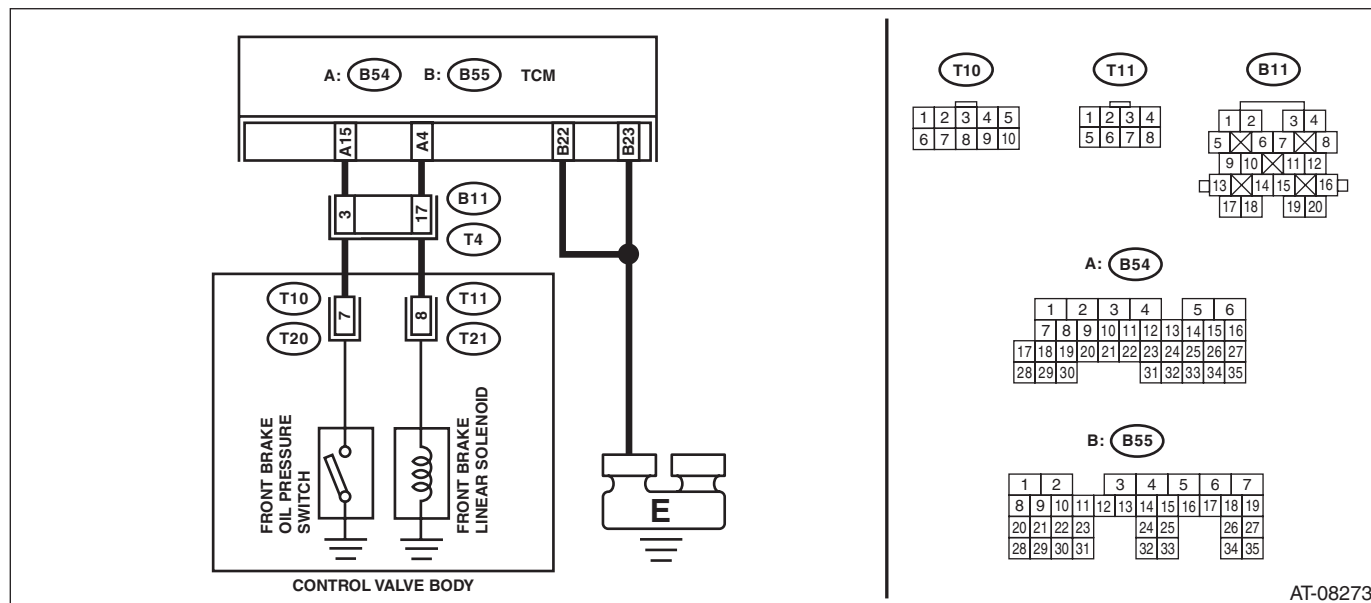
Output signal of front brake solenoid does not match with oil pressure.

TROUBLE SYMPTOM:

Locked to 1st gear.

WIRING DIAGRAM:

AT control system <Ref. to WI-50, AT Control System.>



AT-08273

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. 4 — (B11) No. 17: (B54) No. 15 — (B11) No. 3: (B55) No. 22 — Chassis ground: (B55) No. 23 — 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. 4 — Chassis ground:	Is the resistance 1 MΩ or more?	Go to step 3.	Repair the short circuit of harness between TCM and transmission connector.
3 CHECK INPUT SIGNAL FOR TCM. 1) Connect all connectors. 2) Turn the ignition switch to ON. (engine OFF) 3) Read the data of «F/B Fluid Pressure» using Subaru Select Monitor.	Is “OFF” displayed?	Go to step 4.	Go to step 6.
4 CHECK INPUT SIGNAL FOR TCM. 1) Turn the ignition switch to OFF. 2) Start the engine. 3) Shift to 1st speed while checking the current gear position using Subaru Select Monitor. 4) Read the data of «F/B Fluid Pressure» using Subaru Select Monitor.	Is “ON” displayed?	Check for poor contact of harness in the solenoid output and oil pressure SW input, and repair the defective part.	Go to step 5.

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. 5) Drain the ATF. CAUTION: Do not drain ATF until it cools down. 6) Remove the oil pan. 7) Disconnect the connector from the control valve body. 8) Measure the resistance between transmission connector and control valve body connector. Connector & terminal (T4) No. 3 — (T10) No. 7: (T4) No. 17 — (T11) No. 8:	Is the resistance less than 1 Ω ?	Replace the control valve body. <Ref. to 5AT-53, Control Valve Body.>	Replace the transmission harness assembly.
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. 5) Drain the ATF. CAUTION: Do not drain ATF until it cools down. 6) Remove the oil pan. 7) Disconnect the connector from the control valve body. 8) Measure the resistance between transmission ground and control valve body connector. Connector & terminal (T10) No. 7 — Transmission ground:	Is the resistance 1 M Ω or more?	Replace the control valve body. <Ref. to 5AT-53, Control Valve Body.>	Replace the transmission harness assembly.

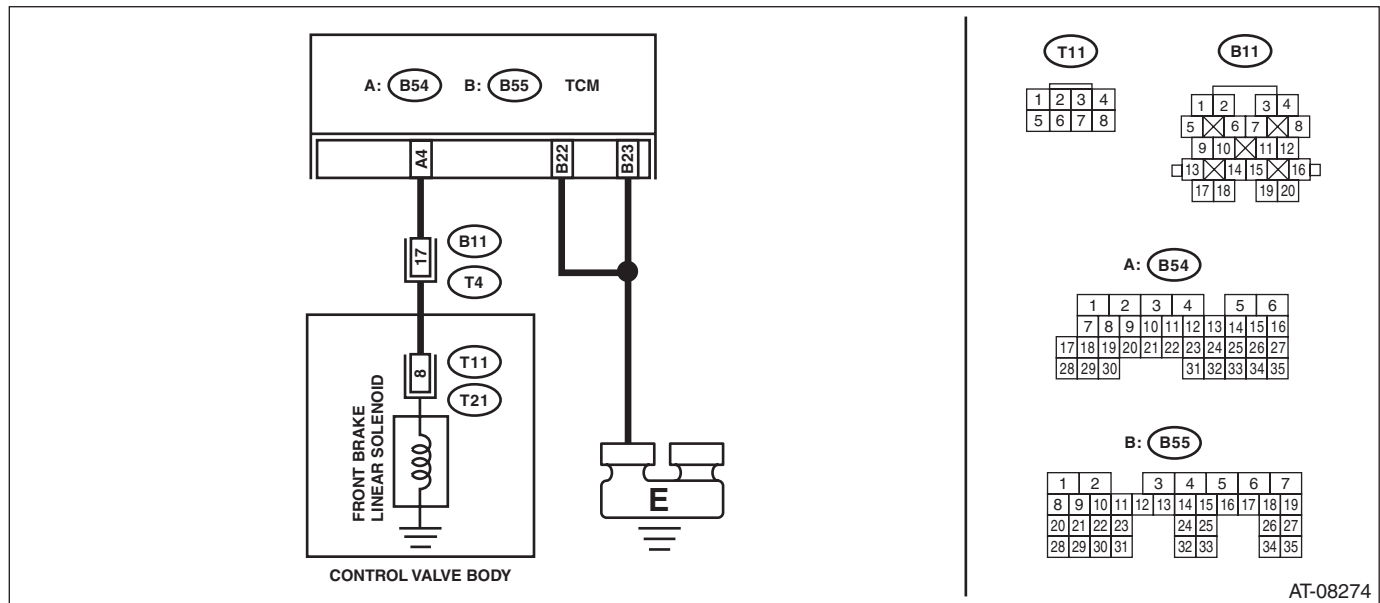
AUTOMATIC TRANSMISSION (DIAGNOSTICS)

DTC DETECTING CONDITION:

TROUBLE SYMPTOM:

WIRING DIAGRAM:

AT control system <Ref. to WI-50, AT Control System.>



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. 4 — (B11) No. 17: (B55) No. 22 — Chassis ground: (B55) No. 23 — 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. 4 — Chassis ground:	Is the resistance 1 M Ω or more?	Go to step 3.	Repair the short circuit of harness between TCM connector and transmission connector.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step	Check	Yes	No
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. 5) Drain the ATF. CAUTION: Do not drain ATF until it cools down. 6) Remove the oil pan. 7) Disconnect the connector from the control valve body. 8) Measure the resistance between transmission connector and control valve body connector. Connector & terminal (T4) No. 17 — (T11) 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 transmission ground and control valve body connector. Connector & terminal (T11) No. 8 — Transmission ground:	Is the resistance 1 M Ω or more?	Go to step 5.	Repair the short circuit of harness between control valve body connector and transmission ground.
5 CHECK FRONT BRAKE SOLENOID. Measure the resistance between transmission ground and control valve body connector. Connector & terminal (T21) No. 8 — Transmission ground:	Is the resistance 3 — 9 Ω ?	Go to step 6.	Replace the control valve body. <Ref. to 5AT-53, Control Valve Body.>
6 CHECK FOR POOR CONTACT. Check the TCM connector, transmission connector and control valve body connector.	Is there poor contact (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 and read DTC.	Is DTC displayed?	Replace the TCM. <Ref. to 5AT-55, 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:

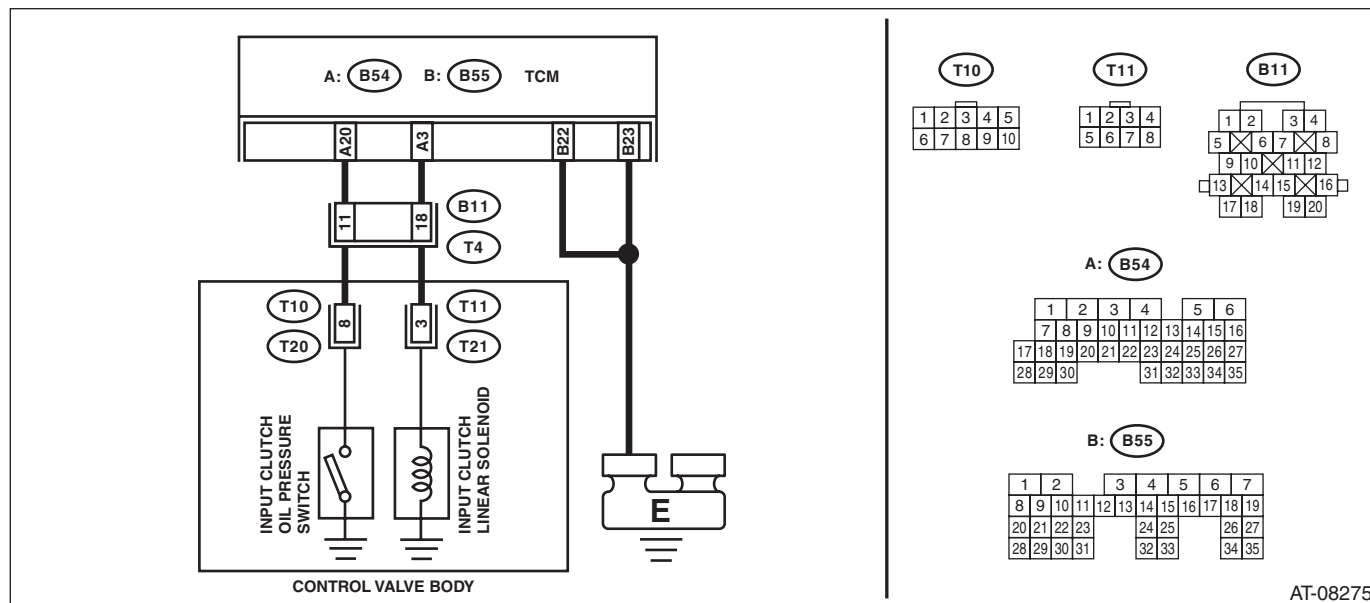
Output signal value of input clutch solenoid and oil pressure does not match.

TROUBLE SYMPTOM:

Locked to 1st or 4th gear.

WIRING DIAGRAM:

AT control system <Ref. to WI-50, AT Control System.>



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. 3 — (B11) No. 18: (B54) No. 20 — (B11) No. 11: (B55) No. 22 — Chassis ground: (B55) No. 23 — 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. 20 — Chassis ground:	Is the resistance 1 MΩ or more?	Go to step 3.	Repair the short circuit of harness between TCM and transmission connector.
3 CHECK INPUT SIGNAL FOR TCM. 1) Connect all connectors. 2) Turn the ignition switch to ON. (engine OFF) 3) Read the data of «I/C Fluid Pressure» using Subaru Select Monitor.	Is “OFF” displayed?	Go to step 4.	Go to step 6.
4 CHECK INPUT SIGNAL FOR TCM. 1) Turn the ignition switch to OFF. 2) Start the engine. 3) Drive the vehicle on 4th speed of manual mode with checking current gear position using Subaru Select Monitor. 4) Read the data of «I/C Fluid Pressure» using Subaru Select Monitor.	Is “ON” displayed?	Check for poor contact of harness in the solenoid output and oil pressure SW input, and repair the defective part.	Go to step 5.

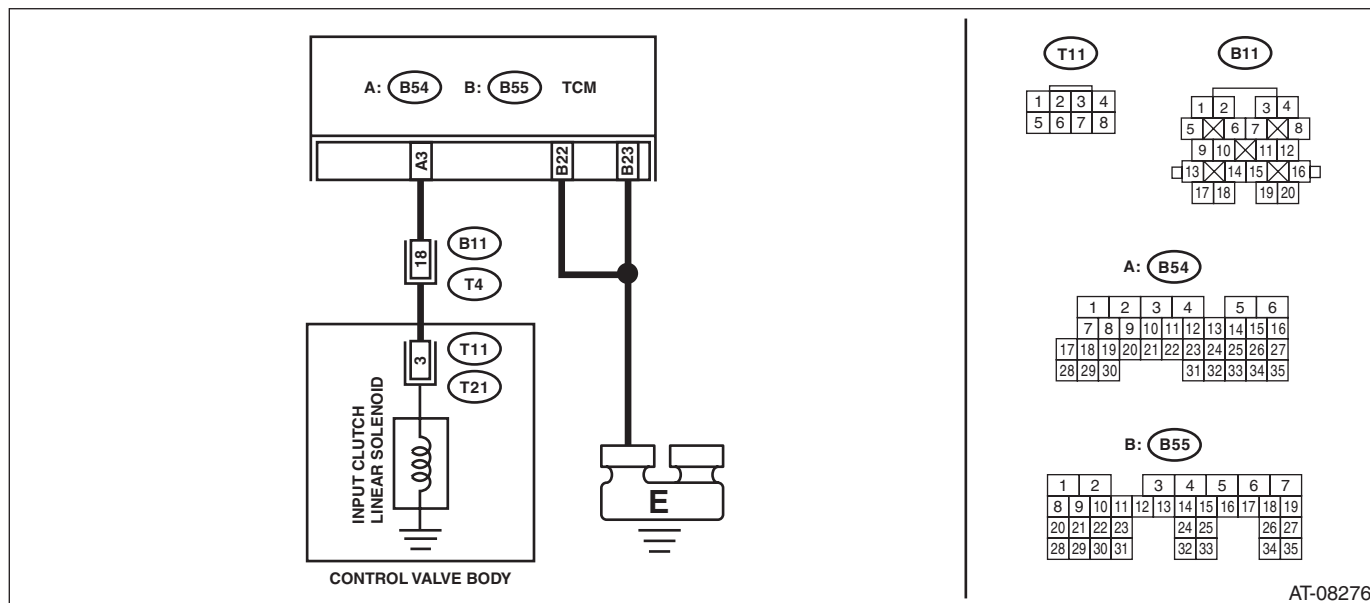
Diagnostic Procedure with Diagnostic Trouble Code (DTC)

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. 5) Drain the ATF. CAUTION: Do not drain ATF until it cools down. 6) Remove the oil pan. 7) Disconnect the connector from the control valve body. 8) Measure the resistance between transmission connector and control valve body connector. Connector & terminal (T4) No. 11 — (T10) No. 8: (T4) No. 18 — (T11) No. 3:	Is the resistance less than 1 Ω ?	Replace the control valve body. <Ref. to 5AT-53, Control Valve Body.>	Replace the transmission harness assembly.
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. 5) Drain the ATF. CAUTION: Do not drain ATF until it cools down. 6) Remove the oil pan. 7) Disconnect the connector from the control valve body. 8) Measure the resistance between transmission ground and control valve body connector. Connector & terminal (T10) No. 8 — Transmission ground:	Is the resistance 1 M Ω or more?	Replace the control valve body. <Ref. to 5AT-53, Control Valve Body.>	Replace the transmission harness assembly.

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

AT control system <Ref. to WI-50, AT Control System.>



	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. 3 — (B11) No. 18: (B55) No. 22 — Chassis ground: (B55) No. 23 — 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. 3 — Chassis ground:	Is the resistance 1 MΩ or more?	Go to step 3.	Repair the short circuit of harness between TCM and transmission connector.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step	Check	Yes	No
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. 5) Drain the ATF. CAUTION: Do not drain ATF until it cools down. 6) Remove the oil pan. 7) Disconnect the connector from the control valve body. 8) Measure the resistance between transmission connector and control valve body connector. Connector & terminal (T4) No. 18 — (T11) No. 3:	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 (T11) No. 3 — Transmission ground:	Is the resistance 1 M Ω or more?	Go to step 5.	Repair the short circuit of harness between control valve body connector and transmission ground.
5 CHECK INPUT CLUTCH SOLENOID. Measure the resistance between transmission ground and control valve body connector. Connector & terminal (T21) No. 3 — Transmission ground:	Is the resistance 3 — 9 Ω ?	Go to step 6.	Replace the control valve body. <Ref. to 5AT-53, Control Valve Body.>
6 CHECK FOR POOR CONTACT. Check the TCM connector, transmission connector and control valve body connector.	Is there poor contact (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 and read DTC.	Is DTC displayed?	Replace the TCM. <Ref. to 5AT-55, 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:

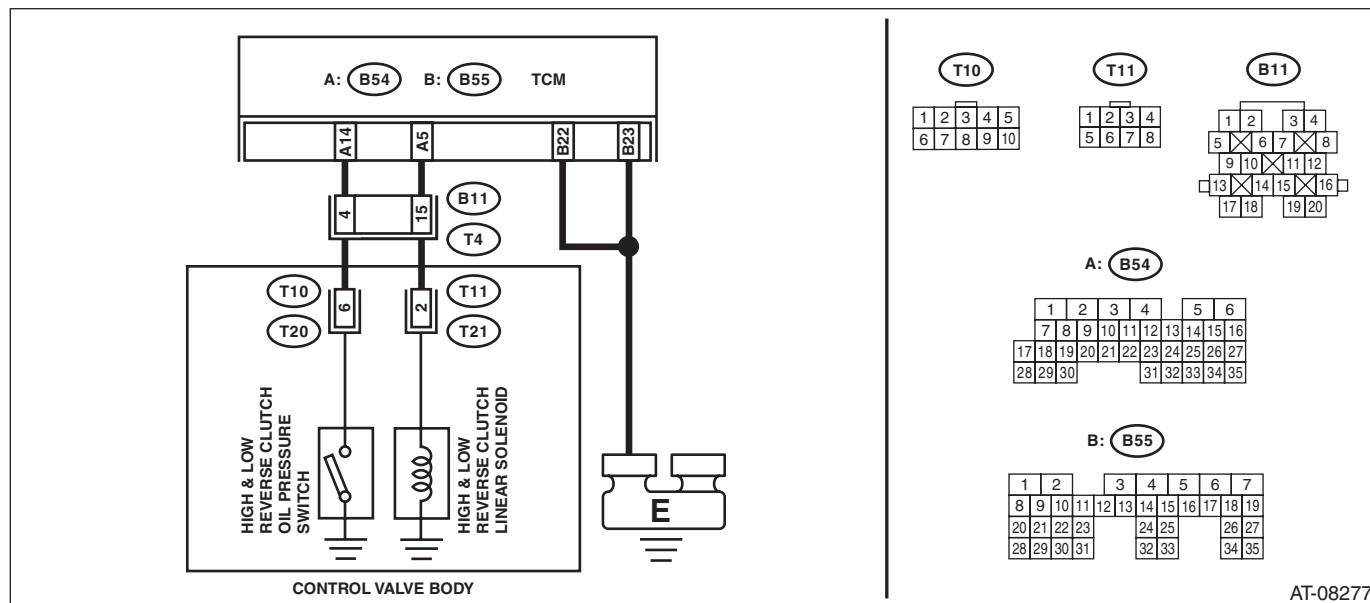
Output signal value of high & low reverse clutch solenoid and oil pressure does not match.

TROUBLE SYMPTOM:

Locked to 1st gear.

WIRING DIAGRAM:

AT control system <Ref. to WI-50, AT Control System.>



AT-08277

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. 5 — (B11) No. 15: (B54) No. 14 — (B11) No. 4: (B55) No. 22 — Chassis ground: (B55) No. 23 — 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. 14 — Chassis ground:	Is the resistance 1 MΩ or more?	Go to step 3.	Repair the short circuit of harness between TCM and transmission connector.
3 CHECK INPUT SIGNAL FOR TCM. 1) Connect all connectors. 2) Turn the ignition switch to ON. (engine OFF) 3) Read the data of «H&LR/C Oil Pressure Switch» using Subaru Select Monitor.	Is “OFF” displayed?	Go to step 4.	Go to step 6.
4 CHECK INPUT SIGNAL FOR TCM. 1) Turn the ignition switch to OFF. 2) Start the engine. 3) Set the select lever to “N” range while depressing the brake pedal. 4) Read the data of «H&LR/C Oil Pressure Switch» using Subaru Select Monitor.	Does the display show “OFF”?	Check for poor contact of harness in the solenoid output and oil pressure SW input, and repair the defective part.	Go to step 5.

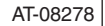
Diagnostic Procedure with Diagnostic Trouble Code (DTC)

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. 5) Drain the ATF. CAUTION: Do not drain ATF until it cools down. 6) Remove the oil pan. 7) Disconnect the connector from the control valve body. 8) Measure the resistance between transmission connector and control valve body connector. Connector & terminal (T4) No. 4 — (T10) No. 6: (T4) No. 15 — (T11) No. 2:	Is the resistance less than 1 Ω ?	Replace the control valve body. <Ref. to 5AT-53, Control Valve Body.>	Replace the transmission harness assembly.
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. 5) Drain the ATF. CAUTION: Do not drain ATF until it cools down. 6) Remove the oil pan. 7) Disconnect the connector from the control valve body. 8) Measure the resistance between transmission ground and control valve body connector. Connector & terminal (T10) No. 6 — Transmission ground:	Is the resistance 1 M Ω or more?	Replace the control valve body. <Ref. to 5AT-53, Control Valve Body.>	Replace the transmission harness assembly.

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

AT control system <Ref. to WI-50, AT Control System.>



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Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step	Check	Yes	No
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. 5) Drain the ATF. CAUTION: Do not drain ATF until it cools down. 6) Remove the oil pan. 7) Disconnect the connector from the control valve body. 8) Measure the resistance between transmission connector and control valve body connector. Connector & terminal (T4) No. 15 — (T11) No. 2:	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 (T11) No. 2 — Transmission ground:	Is the resistance 1 M Ω or more?	Go to step 5.	Repair the short 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 (T21) No. 2 — Transmission ground:	Is the resistance 3 — 9 Ω ?	Go to step 6.	Replace the control valve body. <Ref. to 5AT-53, Control Valve Body.>
6 CHECK FOR POOR CONTACT. Check the TCM connector, transmission connector and control valve body connector.	Is there poor contact (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 and read DTC.	Is DTC displayed?	Replace the TCM. <Ref. to 5AT-55, 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:

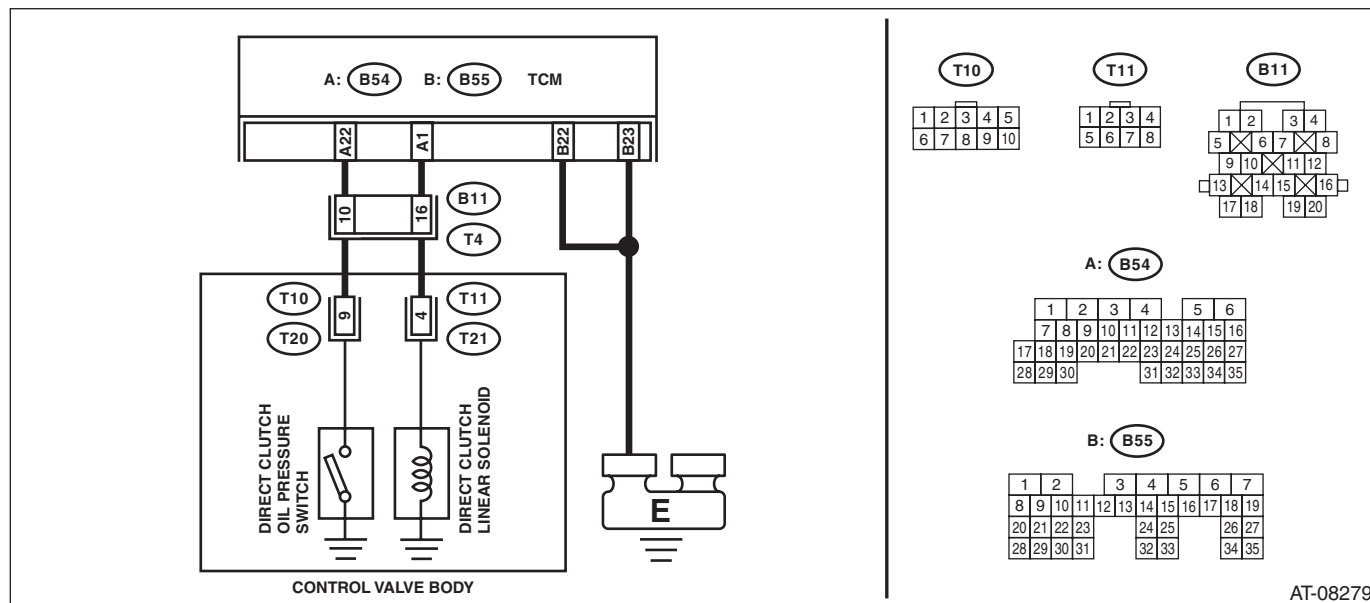
Output signal value of direct clutch solenoid and oil pressure does not match.

TROUBLE SYMPTOM:

Locked to 1st or 4th gear.

WIRING DIAGRAM:

AT control system <Ref. to WI-50, AT Control System.>



AT-08279

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. 1 — (B11) No. 16: (B54) No. 22 — (B11) No. 10: (B55) No. 22 — Chassis ground: (B55) No. 23 — Chassis ground:	Is the resistance less than 1 Ω?	Go to step 2.	Repair the open circuit of harness between TCM and transmission connector.
2	CHECK HARNESS CONNECTOR BETWEEN TCM AND BODY HARNESS. Measure the resistance of harness between TCM connector and body harness. Connector & terminal (B54) No. 22 — Chassis ground:	Is the resistance 1 MΩ or more?	Go to step 3.	Repair the short circuit of harness between TCM and transmission connector.
3	CHECK INPUT SIGNAL FOR TCM. 1) Connect all connectors. 2) Turn the ignition switch to ON. (engine OFF) 3) Read the data of «D/C Fluid Pressure» using Subaru Select Monitor.	Is “OFF” displayed?	Go to step 4.	Go to step 6.
4	CHECK INPUT SIGNAL FOR TCM. 1) Turn the ignition switch to OFF. 2) Start the engine. 3) Shift to 2nd speed of manual mode and depress the brake pedal while checking the current gear position using Subaru Select Monitor. 4) Read the data of «D/C Fluid Pressure» using Subaru Select Monitor.	Is “ON” displayed?	Check for poor contact of harness in the solenoid output and oil pressure SW input, and repair the defective part.	Go to step 5.

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. 5) Drain the ATF. CAUTION: Do not drain ATF until it cools down. 6) Remove the oil pan. 7) Disconnect the connector from the control valve body. 8) Measure the resistance between transmission connector and control valve body connector. Connector & terminal (T4) No. 10 — (T10) No. 9: (T4) No. 16 — (T11) No. 4:	Is the resistance less than 1 Ω ?	Replace the control valve body. <Ref. to 5AT-53, Control Valve Body.>	Replace the transmission harness assembly.
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. 5) Drain the ATF. CAUTION: Do not drain ATF until it cools down. 6) Remove the oil pan. 7) Disconnect the connector from the control valve body. 8) Measure the resistance between transmission ground and control valve body connector. Connector & terminal (T10) No. 9 — Transmission ground:	Is the resistance 1 M Ω or more?	Replace the control valve body. <Ref. to 5AT-53, Control Valve Body.>	Replace the transmission harness assembly.

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

AT control system <Ref. to WI-50, AT Control System.>



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Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step	Check	Yes	No
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. 5) Drain the ATF. CAUTION: Do not drain ATF until it cools down. 6) Remove the oil pan. 7) Disconnect the connector from the control valve body. 8) Measure the resistance between transmission connector and control valve body connector. Connector & terminal (T4) No. 16 — (T11) No. 4:	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 (T11) No. 4 — Transmission ground:	Is the resistance 1 M Ω or more?	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 between transmission ground and control valve body connector. Connector & terminal (T21) No. 4 — Transmission ground:	Is the resistance 3 — 9 Ω ?	Go to step 6.	Replace the control valve body. <Ref. to 5AT-53, Control Valve Body.>
6 CHECK FOR POOR CONTACT. Check the TCM connector, transmission connector and control valve body connector.	Is there poor contact (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 and read DTC.	Is DTC displayed?	Replace the TCM. <Ref. to 5AT-55, 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:

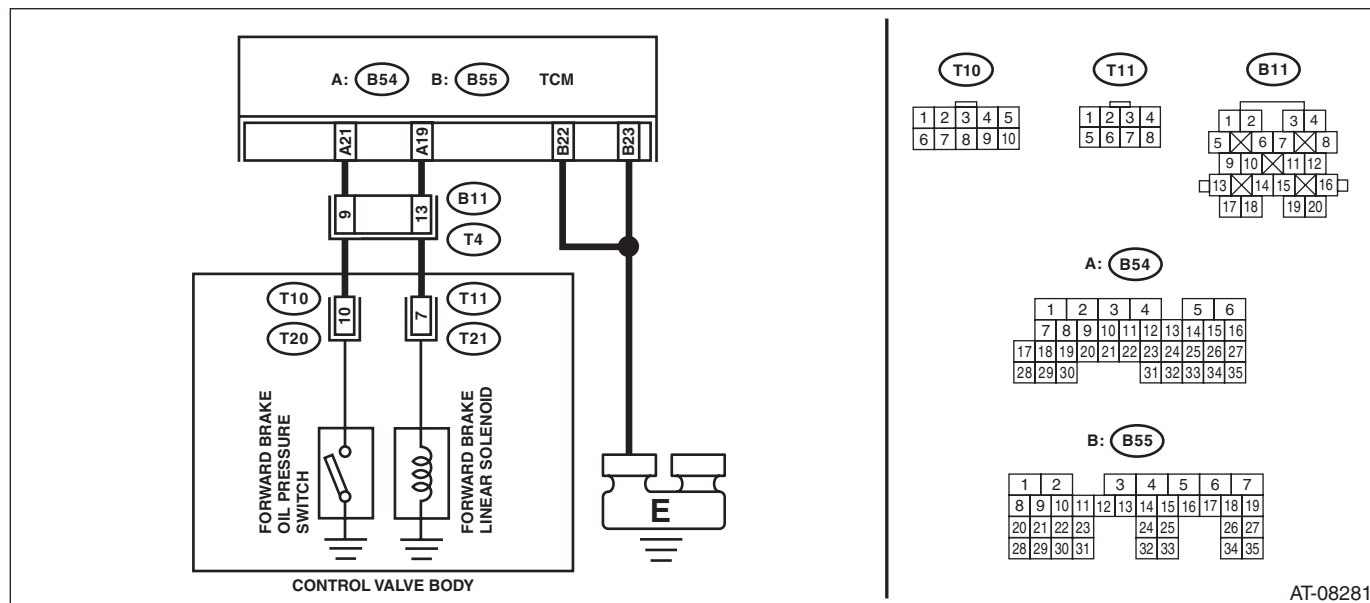
Output signal of forward brake solenoid does not match the oil pressure.

TROUBLE SYMPTOM:

Locked to 2nd, 3rd or 4th gear.

WIRING DIAGRAM:

AT control system <Ref. to WI-50, AT Control System.>



AT-08281

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. 19 — (B11) No. 13: (B54) No. 21 — (B11) No. 9: (B55) No. 22 — Chassis ground: (B55) No. 23 — 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. 21 — Chassis ground:	Is the resistance 1 MΩ or more?	Go to step 3.	Repair the short circuit of harness between TCM and transmission connector.
3	CHECK INPUT SIGNAL FOR TCM. 1) Connect all connectors. 2) Turn the ignition switch to ON. (engine OFF) 3) Read the data of «Fwd/B hydraulic pressure SW» using Subaru Select Monitor.	Is “OFF” displayed?	Go to step 4.	Go to step 6.
4	CHECK INPUT SIGNAL FOR TCM. 1) Turn the ignition switch to OFF. 2) Start the engine. 3) Drive the vehicle on 2nd speed of manual mode at 15 km/h (9 MPH) with checking current gear position using Subaru Select Monitor. 4) Read the data of «Fwd/B hydraulic pressure SW» using Subaru Select Monitor.	Is “ON” displayed?	Check for poor contact of harness in the solenoid output and oil pressure SW input, and repair the defective part.	Go to step 5.

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. 5) Drain the ATF. CAUTION: Do not drain ATF until it cools down. 6) Remove the oil pan. 7) Disconnect the connector from the control valve body. 8) Measure the resistance between transmission connector and control valve body connector. Connector & terminal (T4) No. 9 — (T10) No. 10: (T4) No. 13 — (T11) No. 7:	Is the resistance less than 1 Ω ?	Replace the control valve body. <Ref. to 5AT-53, Control Valve Body.>	Replace the transmission harness assembly.
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. 5) Drain the ATF. CAUTION: Do not drain ATF until it cools down. 6) Remove the oil pan. 7) Disconnect the connector from the control valve body. 8) Measure the resistance between transmission ground and control valve body connector. Connector & terminal (T10) No. 10 — Transmission ground:	Is the resistance 1 M Ω or more?	Replace the control valve body. <Ref. to 5AT-53, Control Valve Body.>	Replace the transmission harness assembly.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

AA:DTC P0773 SHIFT SOLENOID “E” ELECTRICAL

DTC DETECTING CONDITION:

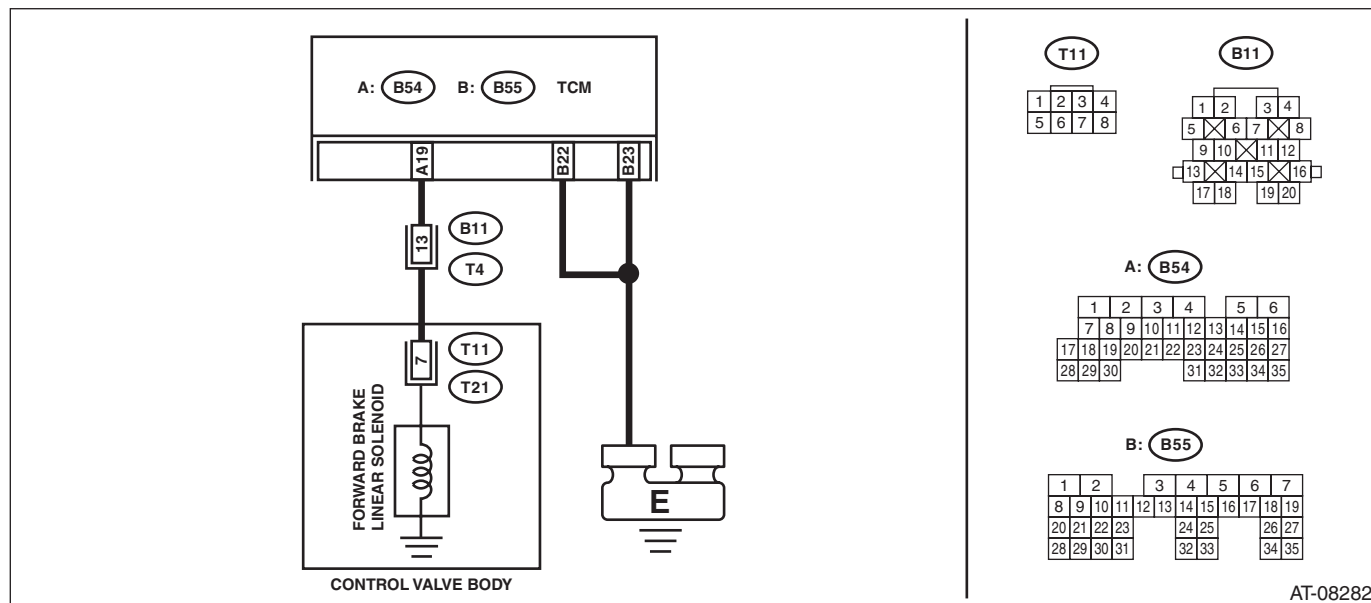
Output signal circuit of forward brake solenoid is open or shorted.

TROUBLE SYMPTOM:

Locked to 2nd, 3rd or 4th gear.

WIRING DIAGRAM:

AT control system <Ref. to WI-50, AT Control System.>



AT-08282

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. 19 — (B11) No. 13: (B55) No. 22 — Chassis ground: (B55) No. 23 — Chassis ground:	Is the resistance less than 1 Ω?	Go to step 2.	Repair the open circuit of harness between TCM connector and transmission connector.
2 CHECK HARNESS CONNECTOR BETWEEN TCM AND BODY HARNESS. Measure the resistance of harness between TCM connector and body harness. Connector & terminal (B54) No. 19 — Chassis ground:	Is the resistance 1 MΩ or more?	Go to step 3.	Repair the short circuit of harness between TCM connector and transmission connector.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step	Check	Yes	No
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. 5) Drain the ATF. CAUTION: Do not drain ATF until it cools down. 6) Remove the oil pan. 7) Disconnect the connector from the control valve body. 8) Measure the resistance between transmission connector and control valve body connector. Connector & terminal (T4) No. 13 — (T11) 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 (T11) No. 7 — Transmission ground:	Is the resistance 1 M Ω or more?	Go to step 5.	Repair the short circuit of harness between control valve body connector and transmission ground.
5 CHECK FORWARD BRAKE SOLENOID. Measure the resistance between transmission ground and control valve body connector. Connector & terminal (T21) No. 7 — Transmission ground:	Is the resistance 3 — 9 Ω ?	Go to step 6.	Replace the control valve body. <Ref. to 5AT-53, Control Valve Body.>
6 CHECK FOR POOR CONTACT. Check the TCM connector, transmission connector and control valve body connector.	Is there poor contact (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 and read DTC.	Is DTC displayed?	Replace the TCM. <Ref. to 5AT-55, Transmission Control Module (TCM).>	Temporary poor contact occurs. Recheck that the harness connector has no faulty.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

AB:DTC P0801 REVERSE INHIBIT CONTROL CIRCUIT

DTC DETECTING CONDITION:

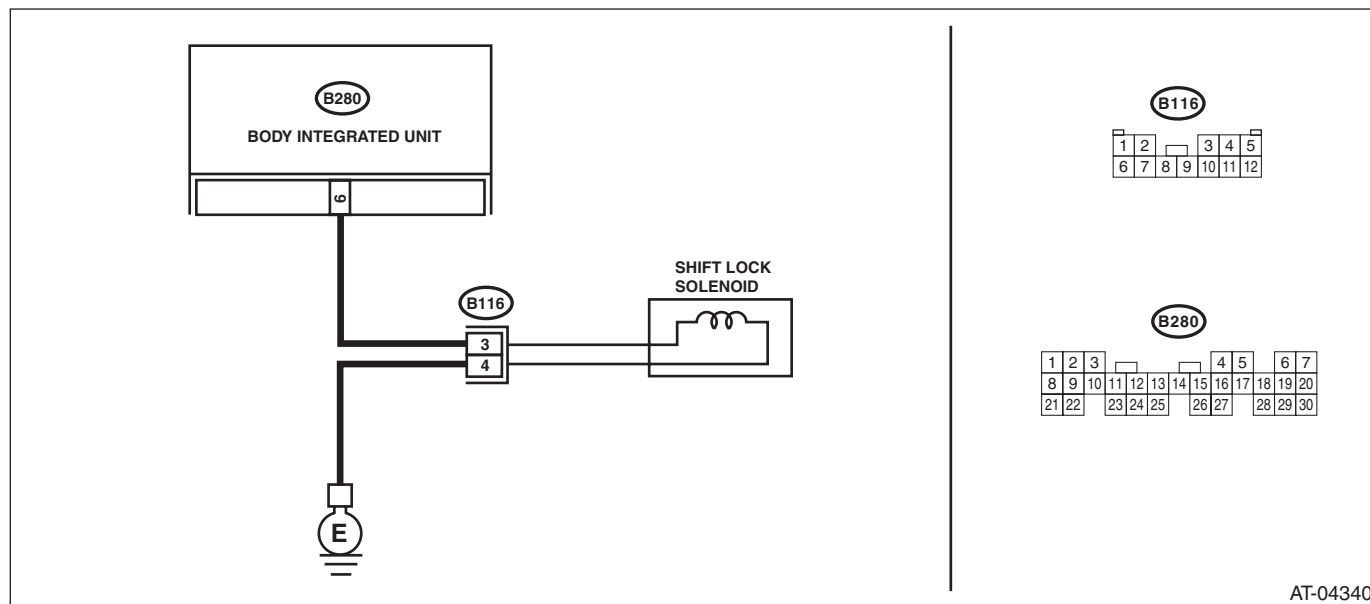
Shift lock solenoid malfunction, open or short reverse inhibitor control circuit

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 shift lock control system <Ref. to WI-57, AT Shift Lock Control System.>



AT-04340

Step	Check	Yes	No
1 CHECK SHIFT LOCK SOLENOID. 1) Forcibly activate the body integrated unit to check the operation of shift lock solenoid. (<Ref. to LAN(diag)-12, OPERATION, Subaru Select Monitor.>) 2) Move the select lever without depressing the brake pedal.	Does the select lever shift?	Go to step 2.	Go to step 3.
2 CHECK OUTPUT SIGNAL OF BODY INTEGRATED UNIT. 1) Display the following items using Subaru Select Monitor. <Ref. to LAN(diag)-29, Read Current Data.> • Key-lock warning SW • Shift position • P SW • Stop light switch 2) With the brake pedal depressed, shift the select lever to “P” range.	Do the units of measure of items displayed change?	Go to step 3.	Check the circuits of the items whose values do not change.
3 CHECK HARNESS CONNECTOR BETWEEN BODY INTEGRATED UNIT AND SHIFT LOCK SOLENOID. Measure the harness resistance between the body integrated unit and chassis ground. Connector & terminal (B280) No. 6 — Chassis ground:	Is the resistance 1 MΩ or more?	Go to step 4.	Repair the short circuit of harness between body integrated unit and shift lock solenoid connector.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step	Check	Yes	No
4 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 5.	Repair the open circuit of harness between chassis ground and shift lock solenoid connector.
5 CHECK SHIFT LOCK SOLENOID. Measure the resistance of shift lock solenoid terminals. Connector & terminal (B116) No. 3 — No. 4:	Is the resistance 7 — 21 Ω ?	Go to step 6.	Replace the shift lock solenoid.
6 CHECK OUTPUT SIGNAL OF BODY INTEGRATED UNIT. 1) Connect all connectors. 2) Turn the ignition switch to ON. 3) With the brake pedal depressed, shift the select lever to "D" range. 4) Measure the voltage between body integrated unit and chassis ground. Connector & terminal (B280) No. 6 (+) — Chassis ground (-):	Is the voltage 10.5 V or more?	Go to step 7.	Go to step 8.
7 CHECK OUTPUT SIGNAL OF BODY INTEGRATED UNIT. 1) Lift up the vehicle. 2) Start the engine. 3) Shift the select lever to "D" range and slowly increase the vehicle speed to more than 20 km/h (12 MPH). NOTE: The speed difference between front and rear wheels lights the ABS warning light or the VDC warning light, but this does not indicate a malfunction. If the warning light illuminates, delete the ABS or VDC memory after completing the AT control diagnosis. <Ref. to VDC(diag)-27, Clear Memory Mode.> 4) Measure the voltage between body integrated unit and chassis ground. Connector & terminal (B280) No. 6 (+) — Chassis ground (-):	Is the voltage less than 1 V?	Check the harnesses or connectors in reverse inhibitor control circuit, and repair the defective part.	Go to step 8.
8 CHECK FOR POOR CONTACT.	Is there poor contact of the reverse inhibitor control circuit?	Repair the poor contact.	Replace the body integrated unit. <Ref. to SL-48, Body Integrated Unit.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

AC:DTC P0817 STARTER DISABLE CIRCUIT

DTC DETECTING CONDITION:

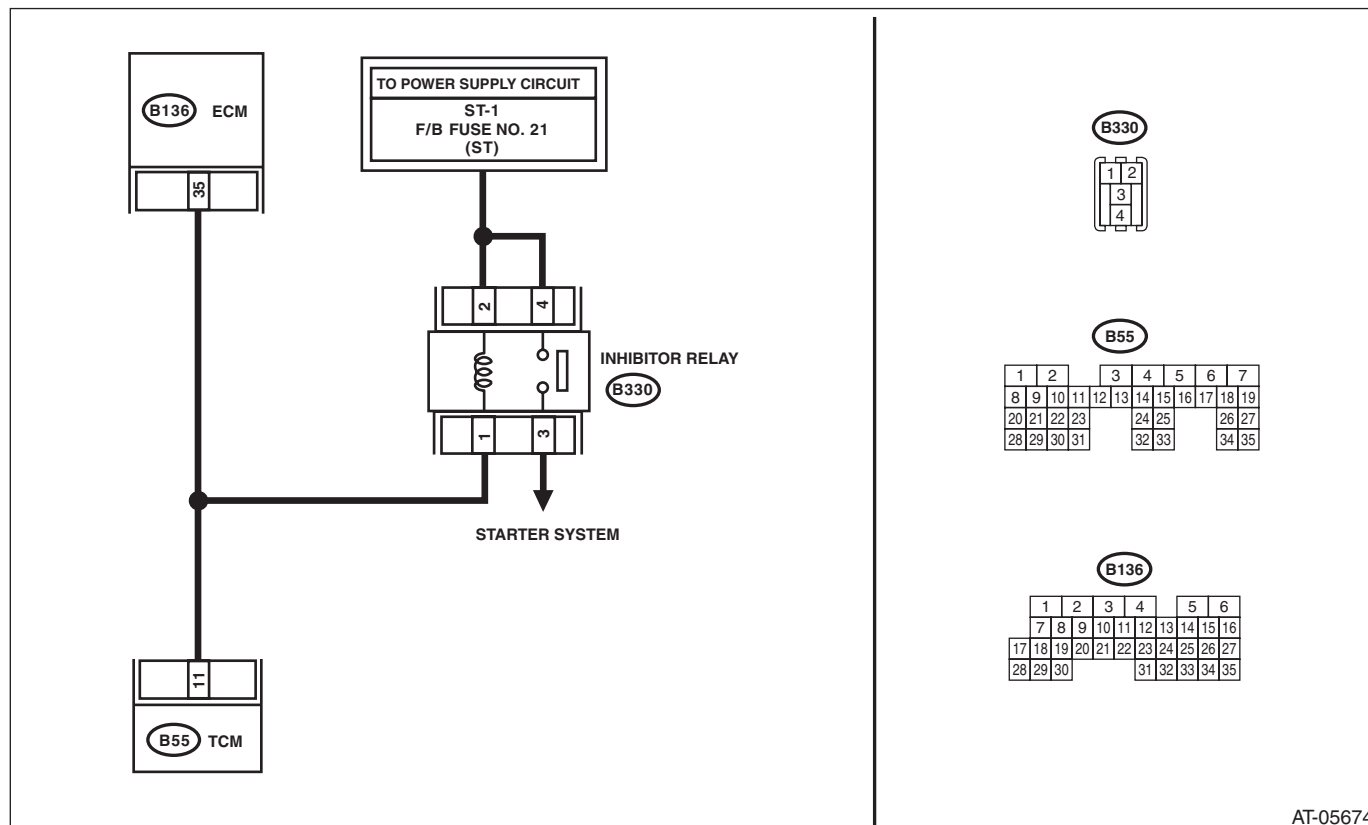
Open or short in P/N signal output circuit

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:

Engine electrical system <Ref. to WI-32, Engine Electrical System.>



AT-05674

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 of ECM.
3 CHECK FUSE (NO. 21). 1) Turn the ignition switch to OFF. 2) Remove the fuse.	Is the fuse (No. 21) blown out?	Replace the fuse (No. 21). If the replaced fuse (No. 21) has blown out easily, repair the short circuit of harness between fuse (No. 21) and inhibitor relay.	Go to step 4.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step	Check	Yes	No
4 CHECK HARNESS CONNECTOR BETWEEN TCM AND ECM. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from TCM, ECM and inhibitor relay. 3) Measure the resistance of harness between TCM connector and ECM connector. Connector & terminal (B55) No. 11 — (B136) No. 35	Is the resistance less than 1 Ω ?	Go to step 5.	Repair the open circuit of harness between TCM and ECM connector, or poor contact of connector.
5 CHECK HARNESS CONNECTOR BETWEEN TCM AND INHIBITOR RELAY. Measure the resistance of the harness between TCM and inhibitor relay. Connector & terminal (B55) No. 11 — (B330) No. 1:	Is the resistance less than 1 Ω ?	Go to step 6.	Repair the open circuit of harness between TCM and inhibitor relay, or poor contact of connector.
6 CHECK HARNESS CONNECTOR BETWEEN TCM AND CHASSIS GROUND. Measure the resistance of harness between TCM connector and chassis ground. Connector & terminal (B55) No. 11 — Chassis ground:	Is the resistance 1 M Ω or more?	Go to step 7.	Repair the short circuit of harness between transmission connector and chassis ground.
7 CHECK OUTPUT SIGNAL OF TCM. 1) Connect the TCM, ECM, and inhibitor relay connector. 2) Turn the ignition switch to ON. 3) Shift the select lever to "P" range. 4) Measure the voltage between TCM connector and chassis ground. Connector & terminal (B55) No. 11 (+) — Chassis ground (-):	Is the voltage 1 V or less?	Go to step 8.	Replace the TCM. <Ref. to 5AT-55, Transmission Control Module (TCM).>
8 CHECK OUTPUT SIGNAL OF TCM. 1) Set the select lever to "D" range. 2) Measure the voltage between TCM connector and chassis ground. Connector & terminal (B55) No. 11 (+) — Chassis ground (-):	Is the voltage 8 V or more?	Go to step 9.	Replace the TCM. <Ref. to 5AT-55, Transmission Control Module (TCM).>
9 CHECK FOR POOR CONTACT.	Is there any open or poor contact of connector (loosing terminal, entering foreign matter, damaging connector body)?	Repair the poor contact.	Check the neutral position switch circuit of ECM.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

AD:DTC P0957 BACKUP LIGHT RELAY CIRCUIT LOW

DTC DETECTING CONDITION:

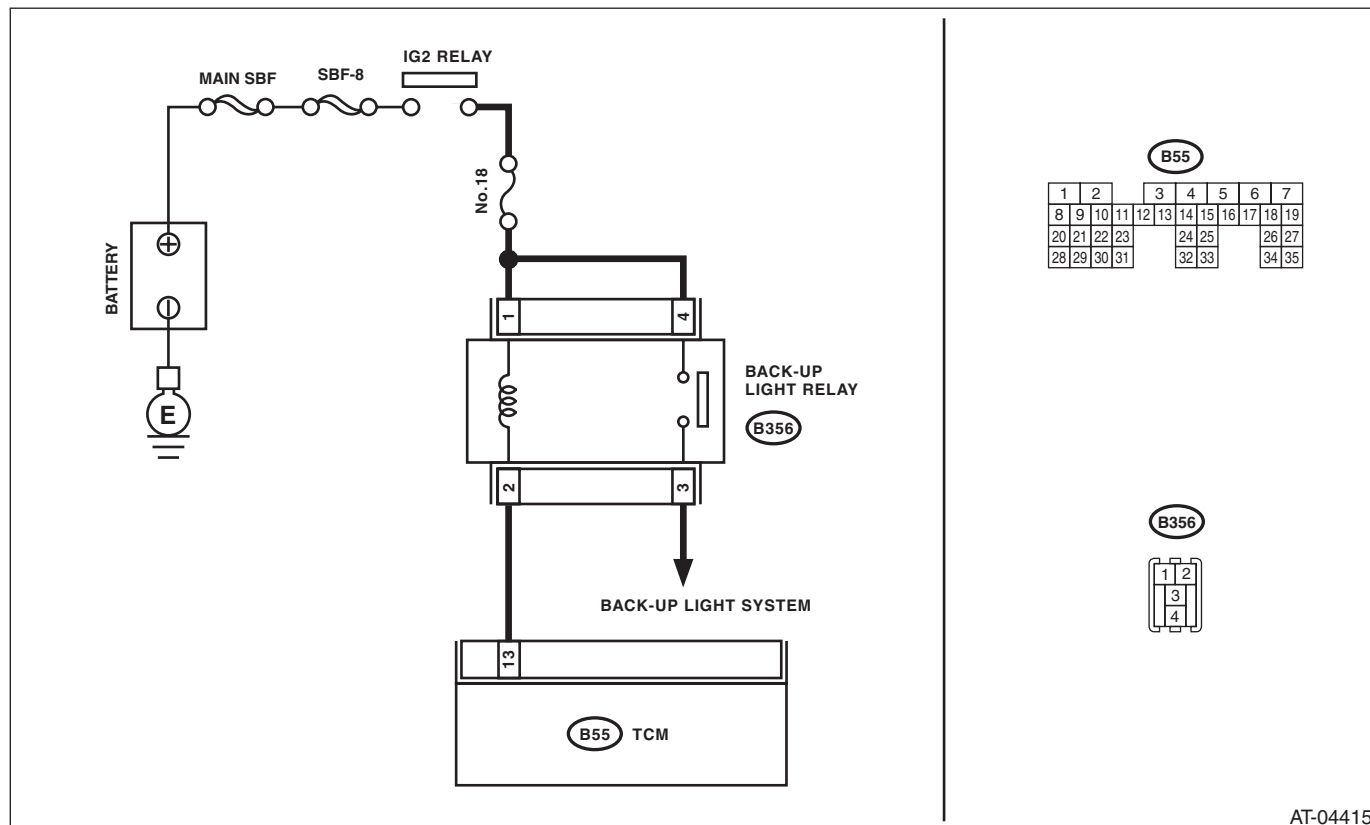
Output circuit of the back-up light relay is open or shorted

TROUBLE SYMPTOM:

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

WIRING DIAGRAM:

AT control system <Ref. to WI-50, AT Control System.>



AT-04415

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. <i>Connector & terminal (B55) No. 13 — (B356) No. 2:</i>	Is the resistance less than 1 Ω?	Go to step 3.	Repair the open circuit of the harness or poor contact of the connector between TCM and back-up light relay connector.
3	CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION. Measure the resistance of harness between TCM connector and chassis ground. <i>Connector & terminal (B55) No. 13 — Chassis ground:</i>	Is the resistance 1 MΩ or more?	Go to step 4.	Repair the short circuit of the harness between TCM and back-up light relay connector.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step	Check	Yes	No
4 CHECK OUTPUT SIGNAL OF TCM. 1) Turn the ignition switch to ON. (engine OFF) 2) Shift the select lever to "P" range. 3) Measure the voltage between TCM connector and chassis ground. Connector & terminal (B55) No. 13 (+) — Chassis ground (-):	Is the voltage 8 V or more?	Go to step 5.	Replace the TCM. <Ref. to 5AT-55, Transmission Control Module (TCM).>
5 CHECK OUTPUT SIGNAL OF TCM. 1) Set the select lever to "R" range. 2) Measure the voltage between TCM connector and chassis ground. Connector & terminal (B55) No. 13 (+) — Chassis ground (-):	Is the voltage 1 V or less?	Go to step 6.	Replace the TCM. <Ref. to 5AT-55, 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)

AE:DTC P0958 BACKUP LIGHT RELAY CIRCUIT HIGH

DTC DETECTING CONDITION:

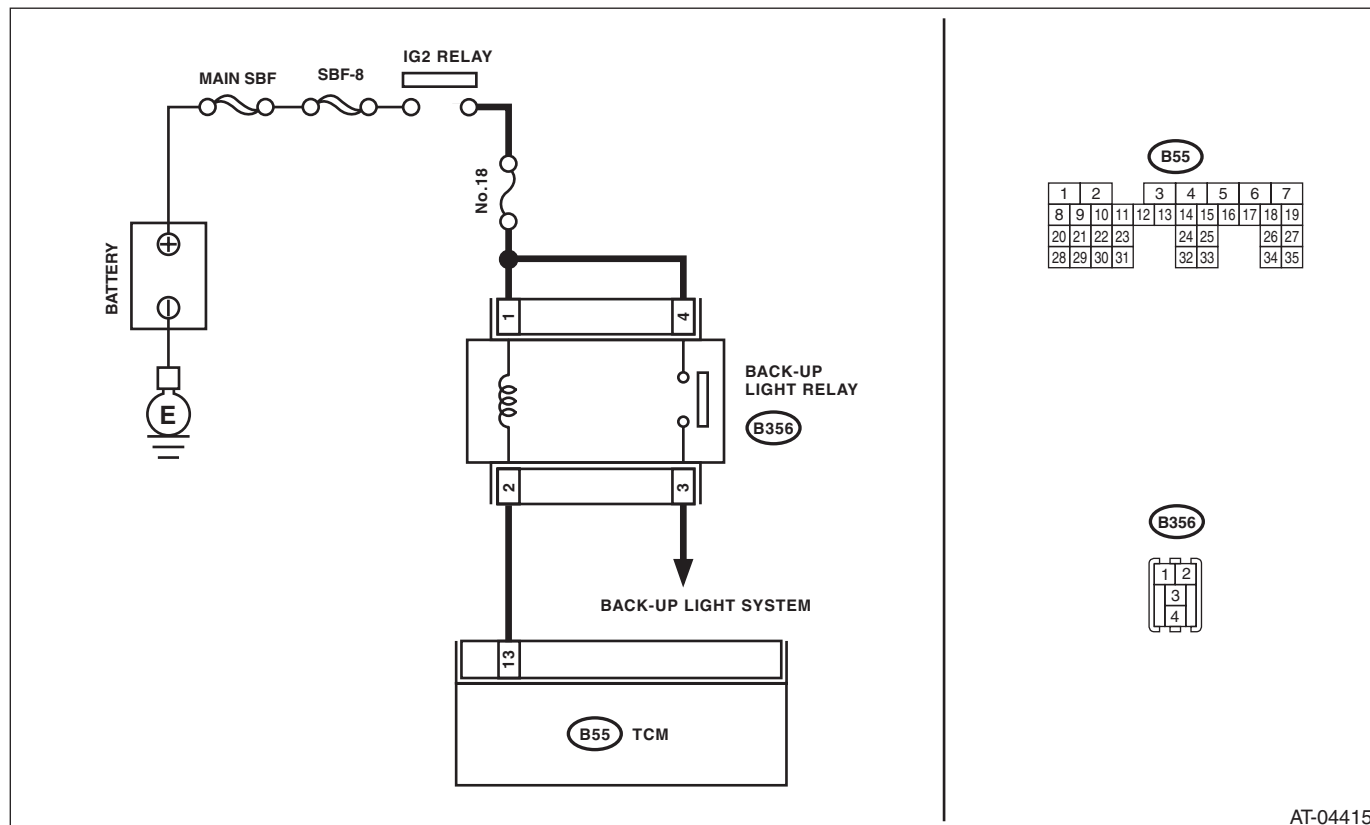
Output circuit of the back-up light relay is open or shorted

TROUBLE SYMPTOM:

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

WIRING DIAGRAM:

AT control system <Ref. to WI-50, AT Control System.>



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.
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. 13 — (B356) No. 2:	Is the resistance less than 1 Ω?	Go to step 3.
3	CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION. Measure the resistance of harness between TCM connector and chassis ground. Connector & terminal (B55) No. 13 — Chassis ground:	Is the resistance 1 MΩ or more?	Go to step 4.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step	Check	Yes	No
4 CHECK OUTPUT SIGNAL OF TCM. 1) Turn the ignition switch to ON. (engine OFF) 2) Shift the select lever to "P" range. 3) Measure the voltage between TCM connector and chassis ground. Connector & terminal (B55) No. 13 (+) — Chassis ground (-):	Is the voltage 8 V or more?	Go to step 5.	Replace the TCM. <Ref. to 5AT-55, Transmission Control Module (TCM).>
5 CHECK OUTPUT SIGNAL OF TCM. 1) Set the select lever to "R" range. 2) Measure the voltage between TCM connector and chassis ground. Connector & terminal (B55) No. 13 (+) — Chassis ground (-):	Is the voltage 1 V or less?	Go to step 6.	Replace the TCM. <Ref. to 5AT-55, 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 P1706 AT VEHICLE SPEED SENSOR CIRCUIT MALFUNCTION (REAR WHEEL)

DTC DETECTING CONDITION:

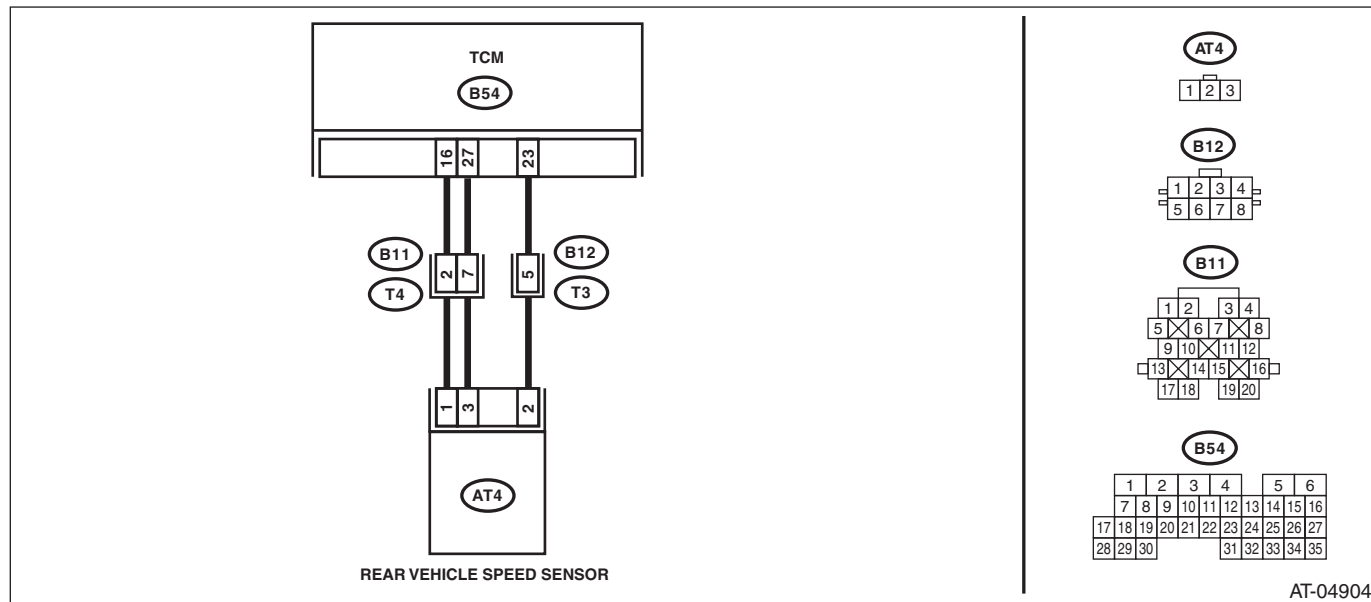
Input signal circuit of TCM is open or shorted.

TROUBLE SYMPTOM:

- Shifting quality malfunction
- Tight corner braking phenomenon occurs.

WIRING DIAGRAM:

AT control system <Ref. to WI-50, AT Control System.>



Step	Check	Yes	No
1	CHECK TCM I/O SIGNAL. Check the power supply and ground I/O signals. <Ref. to 5AT(diag)-12, ELECTRICAL SPECIFICATION, Transmission Control Module (TCM) I/O Signal.>	Go to step 2.	Repair the open or short circuit for power supply and ground.
2	CHECK TCM AND TRANSMISSION HARNESS CONNECTOR. 1) Disconnect the connectors from TCM and transmission. 2) Measure the resistance of harness between TCM connector and transmission connector. Connector & terminal (B54) No. 16 — (B11) No. 2: (B54) No. 23 — (B12) No. 5: (B54) No. 27 — (B11) No. 7:	Go to step 3.	Repair the open circuit of harness between TCM and transmission connector.
3	CHECK TCM AND TRANSMISSION HARNESS CONNECTOR. Measure the resistance of harness between TCM connector and chassis ground. Connector & terminal (B54) No. 16 — Chassis ground: (B54) No. 23 — Chassis ground: (B54) No. 27 — Chassis ground:	Go to step 4.	Repair the short circuit of harness between TCM and transmission connector.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step	Check	Yes	No
4 CHECK TCM POWER SUPPLY OUTPUT. 1) Connect the connector to TCM. (Transmission connector is disconnected) 2) Turn the ignition switch to ON. (engine OFF) 3) Measure the voltage between transmission connector and chassis ground. Connector & terminal (B11) No. 7 (+) — Chassis ground (-):	Is the voltage 10 — 13 V?	Go to step 5.	Replace the TCM. <Ref. to 5AT-55, Transmission Control Module (TCM).>
5 CHECK INPUT CIRCUIT OF TCM TURBINE SPEED SENSOR. Measure the voltage variation between TCM connector terminals. Connector & terminal (B12) No. 5 (+) — (B11) No. 2 (-):	Is the voltage 4 — 6 V?	Go to step 7.	Go to step 6.
6 CHECK HARNESS ASSEMBLY (TURBINE SPEED SENSOR GROUND). Check the installing condition of ground connecting harness (used for both of turbine speed sensor 1, rear vehicle speed sensor).	Is the ground connecting harness installed to transmission body correctly, or the harness and connector terminals not damaged?	Go to step 7.	When the poor installation of ground connecting harness, install it securely. Replace the transmission assembly when the harness is damaged. <Ref. to 5AT-37, Automatic Transmission Assembly.>
7 CHECK INPUT SIGNAL FOR TCM. 1) Connect all connectors. 2) Lift up the vehicle. 3) Start the engine. 4) Read the data of «Rear 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 lights the ABS warning light or the VDC warning light, but this does not indicate a malfunction. If the warning light illuminates, delete the ABS or VDC memory after completing the AT control diagnosis. <Ref. to VDC(diag)-27, Clear Memory Mode.>	Does the speedometer indication in the combination meter change according to «Rear Wheel Speed» data?	Check for poor contact of rear vehicle speed sensor circuit harness, and repair the defective part.	Replace the transmission harness.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

AG:DTC P1707 AT AWD SOLENOID VALVE CIRCUIT MALFUNCTION

DTC DETECTING CONDITION:

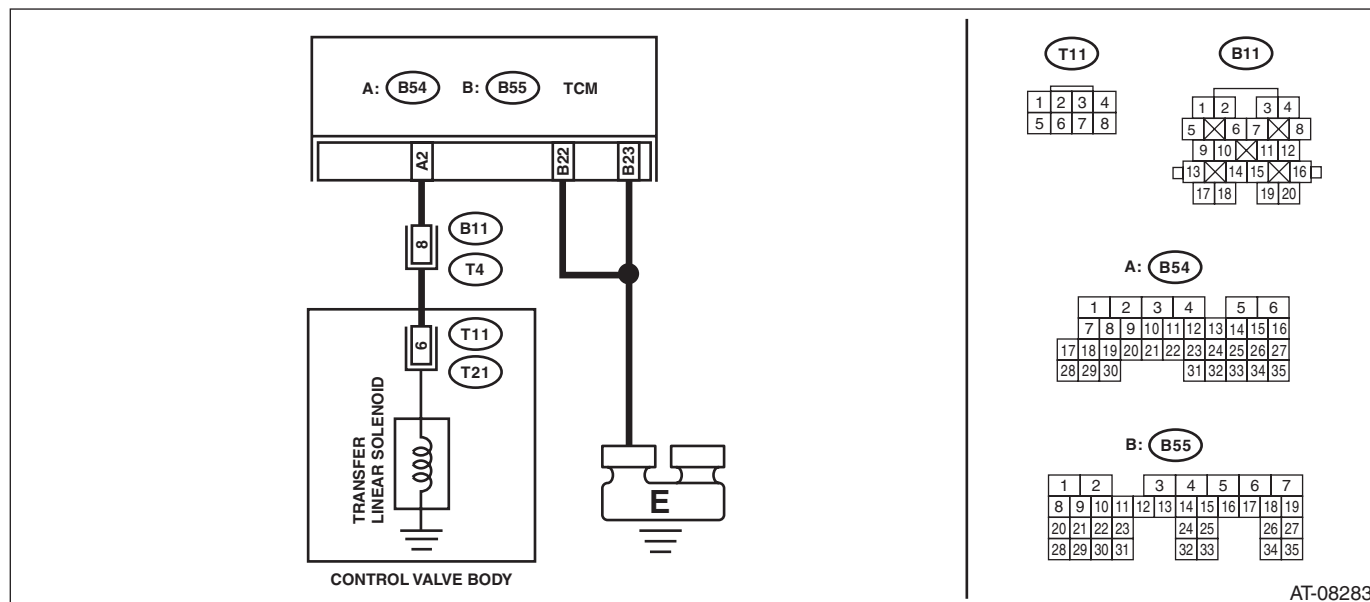
Output signal circuit of transfer solenoid is open or shorted.

TROUBLE SYMPTOM:

- Tight corner braking phenomenon occurs.
- Drivability getting worse.

WIRING DIAGRAM:

AT control system <Ref. to WI-50, AT Control System.>



AT-08283

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. 2 — (B11) No. 8: (B55) No. 22 — Chassis ground: (B55) No. 23 — 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 1 MΩ or more?	Go to step 3.	Repair the short circuit of harness between TCM connector and transmission connector.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step	Check	Yes	No
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. 5) Drain the ATF. CAUTION: Do not drain ATF until it cools down. 6) Remove the oil pan. 7) Disconnect the connector from the control valve body. 8) Measure the resistance between transmission connector and control valve body connector. Connector & terminal (T4) No. 8 — (T11) 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 transmission ground and control valve body connector. Connector & terminal (T11) No. 6 — Transmission ground:	Is the resistance 1 M Ω or more?	Go to step 5.	Repair the short circuit of harness between control valve body connector and transmission ground.
5 CHECK TRANSFER SOLENOID. Measure the resistance between transmission ground and control valve body connector. Connector & terminal (T21) No. 6 — Transmission ground:	Is the resistance 3 — 9 Ω ?	Go to step 6.	Replace the control valve body. <Ref. to 5AT-53, Control Valve Body.>
6 CHECK FOR POOR CONTACT. Check the TCM connector, transmission connector and control valve body connector.	Is there poor contact (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 and read DTC.	Is DTC displayed?	Replace the TCM. <Ref. to 5AT-55, 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)

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

DTC DETECTING CONDITION:

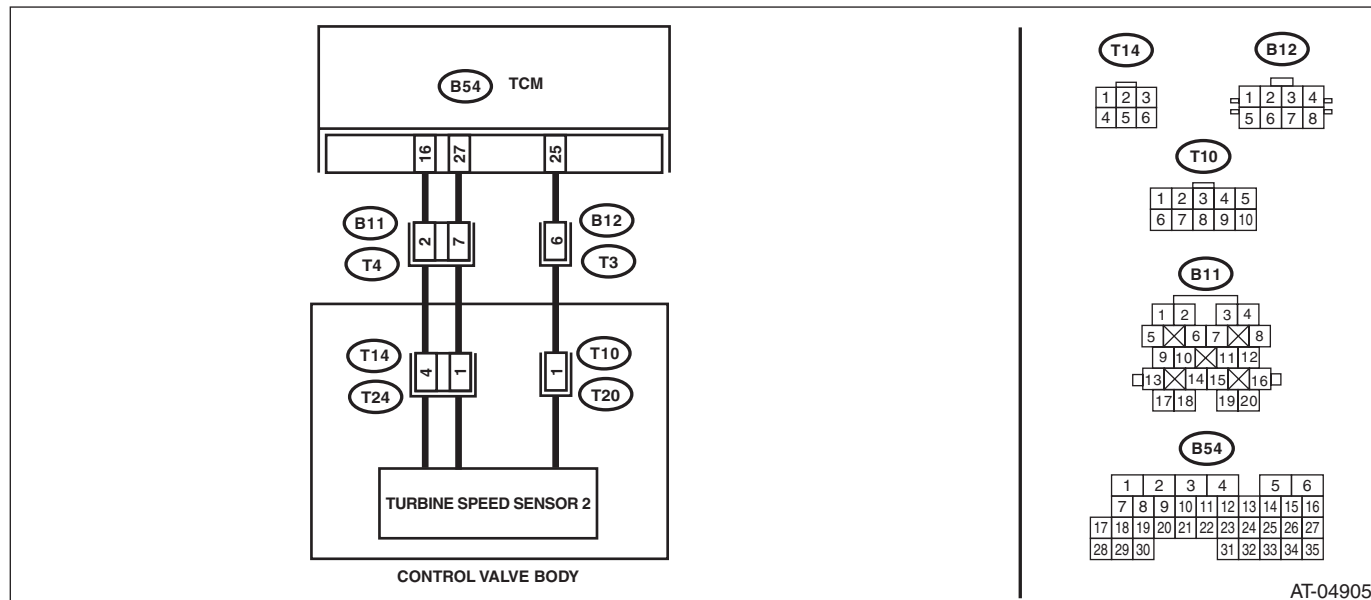
Input signal circuit of TCM is open or shorted.

TROUBLE SYMPTOM:

- Excessive shift shock
- Does not shift to 5th.

WIRING DIAGRAM:

AT control system <Ref. to WI-50, AT Control System.>



AT-04905

Step	Check	Yes	No
1 CHECK TCM I/O SIGNAL. Check the power supply and ground I/O signals. <Ref. to 5AT(diag)-12, ELECTRICAL SPECIFICATION, Transmission Control Module (TCM) I/O Signal.>	Is TCM I/O signal OK?	Go to step 2.	Repair the open or short circuit for power supply and ground.
2 CHECK TCM AND TRANSMISSION HARNESS CONNECTOR. 1) Disconnect the connectors from TCM and transmission. 2) Measure the resistance of harness between TCM connector and transmission connector. Connector & terminal (B54) No. 16 — (B11) No. 2: (B54) No. 25 — (B12) No. 6: (B54) No. 27 — (B11) No. 7:	Is the resistance less than 1 Ω?	Go to step 3.	Repair the open circuit of harness between TCM and transmission connector.
3 CHECK TCM AND TRANSMISSION HARNESS CONNECTOR. Measure the resistance of harness between TCM connector and chassis ground. Connector & terminal (B54) No. 25 — Chassis ground:	Is the resistance less than 1 MΩ?	Go to step 4.	Repair the short circuit of harness between TCM and transmission connector.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step	Check	Yes	No
4 CHECK TCM POWER SUPPLY OUTPUT. 1) Connect the connector to TCM. (Transmission connector is disconnected) 2) Turn the ignition switch to ON. (engine OFF) 3) Measure the voltage between transmission connector and chassis ground. Connector & terminal (B11) No. 7 (+) — Chassis ground (-):	Is the voltage 10 — 13 V?	Go to step 5.	Replace the TCM. <Ref. to 5AT-55, Transmission Control Module (TCM).>
5 CHECK INPUT CIRCUIT OF TCM TURBINE SPEED SENSOR 2. Measure the voltage between TCM connector terminals. Connector & terminal (B12) No. 6 (+) — (B11) No. 2 (-):	Is the voltage 4 — 6 V?	Go to step 6.	Replace the TCM. <Ref. to 5AT-55, Transmission Control Module (TCM).>
6 CHECK INPUT SIGNAL FOR TCM. 1) Connect all connectors. 2) Lift up the vehicle. 3) Start the engine. 4) Drive at 1st of manual mode. 5) Read the data of «AT Turbine Speed 2» 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 lights the ABS warning light or the VDC warning light, but this does not indicate a malfunction. If the warning light illuminates, delete the ABS or VDC memory after completing the AT control diagnosis. <Ref. to VDC(diag)-27, Clear Memory Mode.>	Does the speedometer indication in the combination meter change according to «AT Turbine Speed 2» data?	Check for poor contact of the harness between the turbine speed sensor 2 and transmission connector, and repair the defective part.	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. 5) Drain the ATF. CAUTION: Do not drain ATF until it cools down. 6) Remove the oil pan. 7) Disconnect the connector from the control valve body. 8) Measure the resistance between transmission connector and control valve body connector. Connector & terminal (T3) No. 6 — (T10) No. 1:	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 (T10) No. 1 — Transmission ground:	Is the resistance 1 M Ω or more?	Replace the control valve body. <Ref. to 5AT-53, 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)

AI: DTC P1718 AT CAN COMMUNICATION CIRCUIT

NOTE:

Refer to “LAN SYSTEM” for diagnostic procedure. <Ref. to LAN(diag)-2, Basic Diagnostic Procedure.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

AJ:DTC P1724 AT EEPROM ERROR

DTC DETECTING CONDITION:

TCM EEPROM malfunction

TROUBLE SYMPTOM:

- AT learning is not finished.
- Shock occurs when selecting N → D, N → R.

Step		Check	Yes	No
1	CHECK BATTERY. 1) Turn the ignition switch to ON. 2) Read the data of «Battery voltage» using Subaru Select Monitor.	Is the «Battery voltage» 10 V or more?	Go to step 2.	Check the battery.
2	CHECK DTC. 1) Turn the ignition switch to OFF. 2) Turn the ignition switch to ON after one minute.	Is DTC P1724 displayed as a temporary code?	Replace the TCM. <Ref. to 5AT-55, Transmission Control Module (TCM).>	Current condition is normal. Check for poor contact of TCM connector or harness.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

AK:DTC P1817 SPORTS MODE SWITCH CIRCUIT (MANUAL SWITCH)

DTC DETECTING CONDITION:

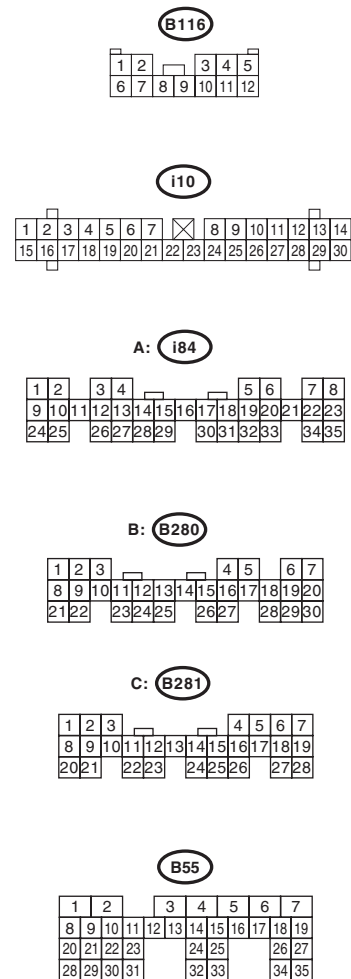
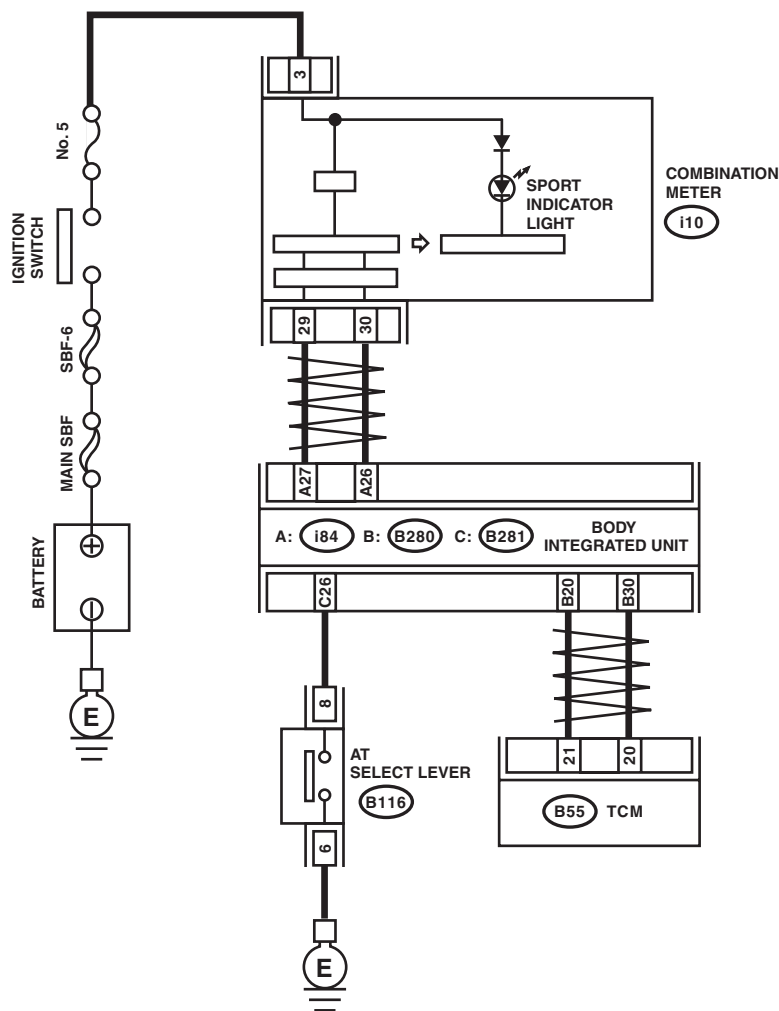
Input signal circuit of manual mode switch is open or shorted.

TROUBLE SYMPTOM:

- Manual mode can not be set.
- Shift indicator light illuminates when shifting "N" → "D".

WIRING DIAGRAM:

AT control system <Ref. to WI-50, AT Control System.>



AT-05670

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)-27, OPERATION, Read Diagnostic Trouble Code (DTC).>	Is DTC displayed?	Perform the diagnosis according to DTC.	Go to step 2.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step	Check	Yes	No
2 CHECK BODY INTEGRATED UNIT INPUT SIGNAL. 1) Shift the select lever to "P" range. 2) Read the «Tiptronic Mode Switch» data of the body integrated unit using the Subaru Select Monitor. <Ref. to LAN(diag)-13, DISPLAY OF CURRENT DATA, OPERATION, Subaru Select Monitor.>	Is "OFF" displayed?	Go to step 3.	Go to step 7.
3 CHECK BODY INTEGRATED UNIT INPUT SIGNAL. 1) Move the select lever from "P" to "D" range. 2) Read the «Tiptronic Mode Switch» data of the body integrated unit using the Subaru Select Monitor. <Ref. to LAN(diag)-13, DISPLAY OF CURRENT DATA, 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 «Tiptronic Mode Switch» data of the body integrated unit using the Subaru Select Monitor. <Ref. to LAN(diag)-13, DISPLAY OF CURRENT DATA, 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 FOR TCM. 1) Move the select lever from "P" to "D" range. 2) Read the «Tiptronic Mode Switch» data of the TCM using the Subaru Select Monitor. <Ref. to 5AT(diag)-16, READ CURRENT DATA, OPERATION, Subaru Select Monitor.>	Is the indication on each range OFF?	Check for poor contact in connectors or harnesses, and repair the defective part.	Replace the TCM. <Ref. to 5AT-55, 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 (i84) No. 27 — Chassis ground:	Is the resistance 1 MΩ or more?	Go to step 8.	Repair the short circuit of the harness between the body integrated unit and manual mode switch.
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. Connector & terminal (B116) No. 6 — No. 8	Is the resistance 1 MΩ or more?	Check body integrated unit.	Replace the select lever assembly. <Ref. to CS-19, Select Lever.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

AL:DTC P1840 TRANSMISSION FLUID PRESSURE SENSOR SWITCH A CIRCUIT

DTC DETECTING CONDITION:

Front brake oil pressure switch malfunction

TROUBLE SYMPTOM:

Excessive shift shock

NOTE:

Refer to DTC P0751 for diagnostic procedure. <Ref. to 5AT(diag)-62, DTC P0751 SHIFT SOLENOID "A" PERFORMANCE OR STUCK OFF, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

AM:DTC P1841 TRANSMISSION FLUID PRESSURE SENSOR SWITCH B CIRCUIT

DTC DETECTING CONDITION:

Forward brake oil pressure switch malfunction

TROUBLE SYMPTOM:

Excessive shift shock

NOTE:

Refer to DTC P0771 for diagnostic procedure. <Ref. to 5AT(diag)-78, DTC P0771 SHIFT SOLENOID "E" PERFORMANCE OR STUCK OFF, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

AN: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)-66, DTC P0756 SHIFT SOLENOID "B" PERFORMANCE OR STUCK OFF, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

AO: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)-74, DTC P0766 SHIFT SOLENOID "D" PERFORMANCE OR STUCK OFF, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

AP: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)

16. Diagnostic Procedure without Diagnostic Trouble Code (DTC)

A: CHECK MANUAL MODE SWITCH

DIAGNOSIS:

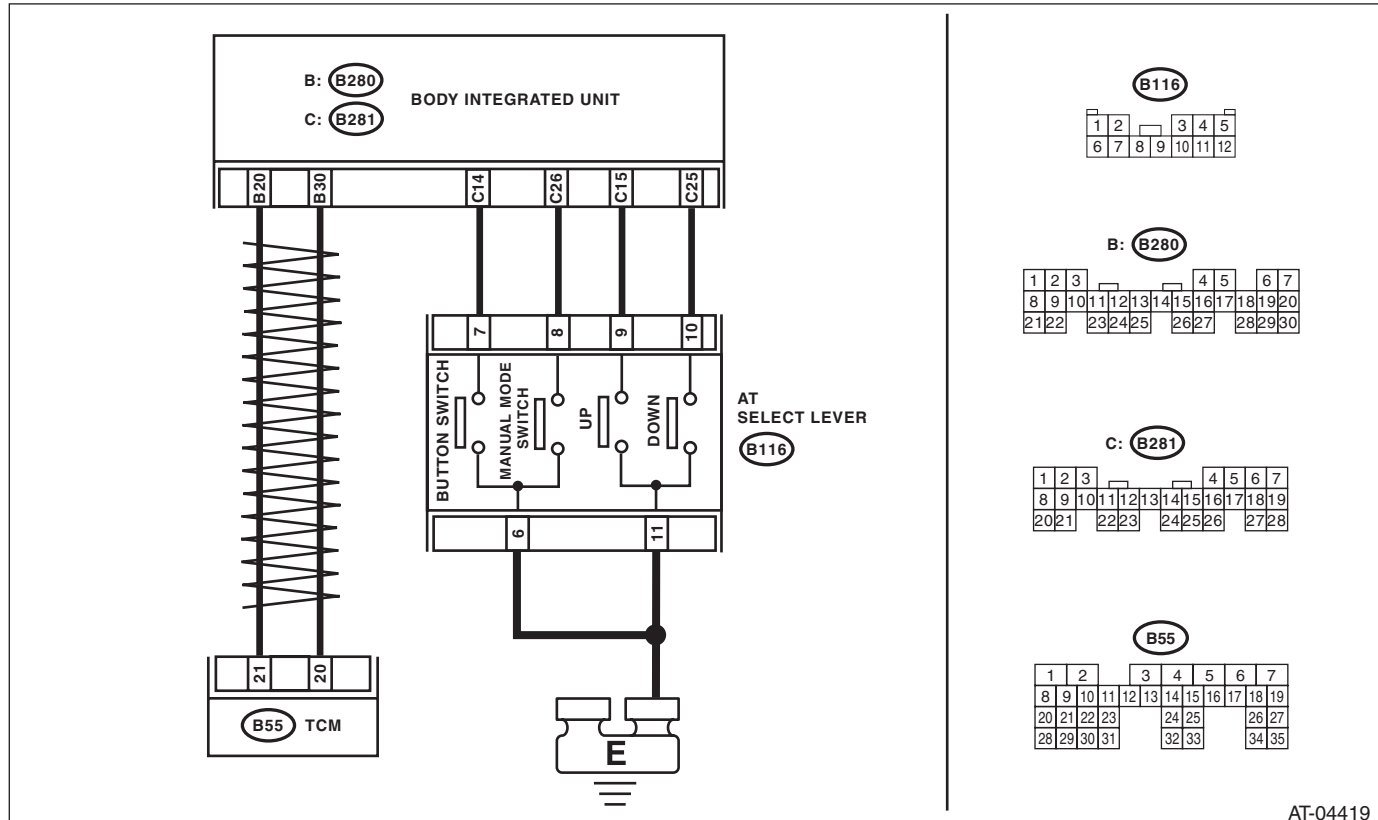
Input signal circuit of manual mode switch is open or shorted.

TROUBLE SYMPTOM:

Does not shift on manual mode.

WIRING DIAGRAM:

AT control system <Ref. to WI-50, AT Control System.>



AT-04419

Step	Check	Yes	No
1 CHECK BODY INTEGRATED UNIT. 1) Perform ON/OFF operation on the manual mode switch. 2) Read the data of «Tiptronic Mode Switch» using Subaru Select Monitor.	Is the ON/OFF normally detected?	Go to step 2.	Go to step 7.
2 CHECK BODY INTEGRATED UNIT DTC.	Is DTC of CAN detected?	Perform the diagnosis according to DTC.	Go to step 3.
3 CHECK TCM. 1) Perform ON/OFF operation on the manual mode switch. 2) Read the data of «Tiptronic Mode Switch» using Subaru Select Monitor.	Is the ON/OFF normally detected?	Go to step 4.	Go to step 5.
4 CHECK SHIFT INDICATOR OF COMBINATION METER.	Is the shift indicator light OK?	Go to step 6.	Replace the combination meter assembly. <Ref. to IDI-11, Combination Meter.>

Diagnostic Procedure without Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step	Check	Yes	No
5 CHECK DTC OF TCM.	Is DTC of CAN detected?	Perform the diagnosis according to DTC.	Replace the TCM. <Ref. to 5AT-55, Transmission Control Module (TCM).>
6 CHECK METER DTC.	Is DTC of CAN detected?	Perform the diagnosis according to DTC.	Replace the meter.
7 CHECK GROUND CIRCUIT OF MANUAL MODE SWITCH. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from manual mode switch. 3) Measure the resistance of the harness between the manual mode switch connector and chassis ground. Connector & terminal (B116) No. 11 — Chassis ground:	Is the resistance less than 1 Ω ?	Go to step 8.	Repair the open circuit of the harness between the manual mode switch and chassis ground.
8 CHECK MANUAL MODE SWITCH. Measure the resistance between manual mode switch terminals. Connector & terminal (B116) No. 9 — No. 11: (B116) No. 10 — No. 11:	Is the resistance 1 M Ω or more?	Go to step 9.	Replace the guide plate assembly.
9 CHECK MANUAL MODE SWITCH. 1) Move the select lever to manual mode. 2) Measure the resistance between manual mode switch terminals. Connector & terminal (B116) No. 9 — No. 11: (B116) No. 10 — No. 11:	Is the resistance less than 1 Ω ?	Go to step 10.	Replace the guide plate assembly.
10 CHECK HARNESS CONNECTOR BETWEEN BODY INTEGRATED UNIT AND MANUAL MODE SWITCH. 1) Disconnect the connector from body integrated unit. 2) Measure the resistance of harness between body integrated unit connector and manual mode switch connector. Connector & terminal (B116) No. 9 — (B281) No. 15: (B116) No. 10 — (B281) No. 25:	Is the resistance less than 1 Ω ?	Go to step 11.	Repair the open circuit of harness between the manual mode switch connector and body integrated unit connector, or poor contact of connector.
11 CHECK HARNESS CONNECTOR BETWEEN BODY INTEGRATED UNIT AND MANUAL MODE SWITCH. 1) Disconnect the connector from body integrated unit. 2) Measure the resistance of the harness between the manual mode switch connector and chassis ground. Connector & terminal (B116) No. 9 — Chassis ground: (B116) No. 10 — Chassis ground:	Is the resistance 1 M Ω or more?	Go to step 12.	Repair the short circuit of harness between manual mode switch connector and body integrated unit connector.

Diagnostic Procedure without Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Step	Check	Yes	No
12 CHECK INPUT SIGNAL TO BODY INTEGRATED UNIT. 1) Connect all connectors. 2) Turn the ignition switch to ON. (engine OFF) 3) Measure the voltage of signal to TCM. Connector & terminal (B281) No. 15 (+) — Chassis ground (-): (B281) No. 25 (+) — Chassis ground (-):	Is the voltage 9 V or more?	Go to step 13.	Replace the body integrated unit. <Ref. to SL-48, Body Integrated Unit.>
13 CHECK INPUT SIGNAL TO BODY INTEGRATED UNIT. 1) Shift up and hold the select lever. 2) Measure the voltage of signal to TCM. Connector & terminal (B281) No. 15 (+) — Chassis ground (-): (B281) No. 25 (+) — Chassis ground (-):	Is the voltage less than 1 V?	Go to step 14.	Replace the body integrated unit. <Ref. to SL-48, Body Integrated Unit.>
14 CHECK GROUND CIRCUIT OF MANUAL MODE SWITCH. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from manual mode switch. 3) Measure the resistance of the harness between the manual mode switch connector and chassis ground. Connector & terminal (B116) No. 11 — Chassis ground:	Is the resistance less than 1 Ω ?	Go to step 15.	Repair the open circuit of the harness between the manual mode switch and chassis ground.
15 CHECK FOR POOR CONTACT.	Is there poor contact of the manual mode switch circuit?	Repair the poor contact.	Temporary poor contact of the manual mode switch circuit connector or harness.

Diagnostic Procedure without Diagnostic Trouble Code (DTC)

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

B: CHECK SHIFT INDICATOR

DIAGNOSIS:

Output signal circuit of shift indicator is open or shorted.

TROUBLE SYMPTOM:

- Shift indicator is not displayed.
- Shift indicator display does not change.
- Shift indicator remains displayed.

Step	Check	Yes	No
1 CHECK BODY INTEGRATED UNIT. Check DTC of 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 the manual mode side, and then downshift with the select lever. 6) Read the shift indicator.	Is the gear position at 1 and "▲" displayed?	Go to step 4.	Replace the TCM. <Ref. to 5AT-55, Transmission Control Module (TCM).>
4 CHECK TCM. 1) Shift up the select lever. 2) Read the shift indicator.	Is the gear position at 2 and "▼" displayed?	Go to step 5.	Replace the TCM. <Ref. to 5AT-55, Transmission Control Module (TCM).>
5 CHECK BODY INTEGRATED UNIT. Read the data of «Shift Position» using Subaru Select Monitor.	Is "2" displayed?	Go to step 6.	Check body integrated unit. <Ref. to SL-48, Body Integrated Unit.>
6 CHECK COMBINATION METER.	Is the shift indicator OK?	Refer to "General Diagnostic Table". <Ref. to 5AT(diag)-106, General Diagnostic Table.>	Replace the combination meter assembly. <Ref. to IDI-11, 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.

Step	Check	Yes	No
1 CHECK BODY INTEGRATED UNIT. Check DTC of 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 (B55).	Does the buzzer stop?	Replace the TCM. <Ref. to 5AT-55, 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 «SPORT Shift (buzzer 1)» and «SPORT Shift (buzzer 2)» data using Subaru Select Monitor.	Is «ON» displayed?	Replace the body integrated unit. <Ref. to SL-48, Body Integrated Unit.>	Go to step 5.
5 CHECK COMBINATION METER.	Is the buzzer OK?	Refer to «General Diagnostic Table». <Ref. to 5AT(diag)-106, General Diagnostic Table.>	Replace the combination meter assembly. <Ref. to IDI-11, Combination Meter.>

General Diagnostic Table

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

17.General Diagnostic Table

A: INSPECTION

Symptoms	Faulty parts
Shifting vehicle speed is low on "D" range.	• Front and rear vehicle speed sensors • Accelerator pedal position sensor • Throttle position sensor • ATF temperature sensor • CAN communication signal
Shifting vehicle speed is high on "D" range.	• Front and rear vehicle speed sensors • Accelerator pedal position sensor • Throttle position sensor • CAN communication signal • Brake switch signal • ATF temperature sensor
Excessive shift 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
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 • Front and rear vehicle speed sensors • 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 • Front and rear vehicle speed sensors • 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 • Front and rear vehicle speed sensors • Fluid level and condition

General Diagnostic Table

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Symptoms	Faulty 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 • Front and rear vehicle speed sensors • 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 • Front and rear vehicle speed sensors • 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 • Front and rear vehicle speed sensors • 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 • Front and rear vehicle speed sensors • 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 • Forward 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 • Front and rear vehicle speed sensors • Accelerator pedal position sensor • Throttle position sensor • Lock up solenoid valve • ATF temperature sensor
Noise at "R", "N" and "D" range.	• Fluid level and condition • Engine speed signal • ATF temperature sensor
Hold at "D" range or 1st on manual mode.	• Fluid level and condition • Front and rear vehicle speed sensors • Direct clutch solenoid valve • Line pressure • Up switch signal • CAN communication signal • Accelerator pedal position sensor

General Diagnostic Table

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Symptoms	Faulty parts
Hold at "D" range or 2nd on manual mode.	• Fluid level and condition • Front and rear vehicle speed sensors • Forward 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 • Front and rear vehicle speed sensors • 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 • Front and rear vehicle speed sensors • 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 • Forward 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
Hold at "D" range or 5th on manual mode.	• Fluid level and condition • Front and rear vehicle speed sensors • 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 • Front and rear vehicle speed sensors • Oil pressure switch 4 and direct clutch solenoid valve • Line pressure • Up switch signal • 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 • Front and rear vehicle speed sensors • 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 • Front and rear vehicle speed sensors • 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)

Symptoms	Faulty 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 • Front and rear vehicle speed sensors • 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 • Front and rear vehicle speed sensors • 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 • Front and rear vehicle speed sensors • 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
Gear does not shift down to 2nd on "D" range or manual mode.	• Fluid level and condition • Front and rear vehicle speed sensors • 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 • Front and rear vehicle speed sensors • 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 • 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 • Front and rear vehicle speed sensors • Oil pressure switch 4 and direct clutch solenoid valve • Line pressure • CAN communication signal

General Diagnostic Table

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

Symptoms	Faulty 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 • Front and rear vehicle speed sensors • 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 • Front and rear vehicle speed sensors • 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 • Front and rear vehicle speed sensors • 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 • Front and rear vehicle speed sensors • 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 • Front and rear vehicle speed sensors • 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 • Front and rear vehicle speed sensors • 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 • Front and rear vehicle speed sensors • 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)

Symptoms	Faulty 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 • Forward 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 • Forward 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 • Front and rear vehicle speed sensors
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 • Front and rear vehicle speed sensors
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)

Symptoms	Faulty 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 • Front and rear vehicle speed sensors
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)

Symptoms	Faulty parts
Engine cannot start on “N” or “P” range	• Push engine switch and starter • Control cable adjustment • Inhibitor switch • CAN communication line • TCM
Engine start other than “N” or “P” range	• Push engine 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

General Diagnostic Table

AUTOMATIC TRANSMISSION (DIAGNOSTICS)

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

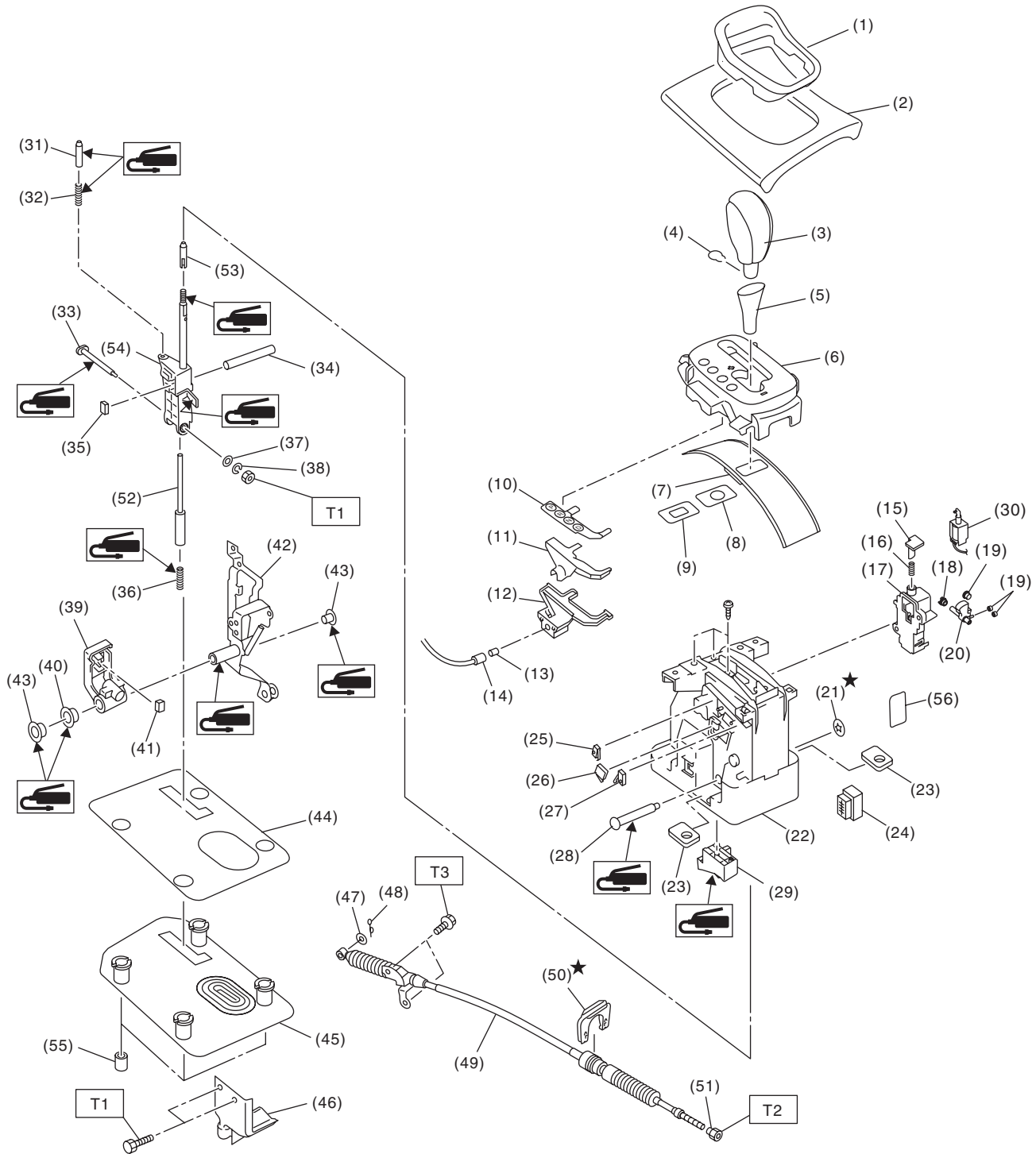
FS

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1. General Description	2
2. Wheel Alignment	6
3. Front Crossmember Support Plate	13
4. Front Stabilizer	14
5. Front Ball Joint	15
6. Front Arm	16
7. Front Strut	19
8. Front Crossmember	23
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1. General Description

A: COMPONENT

1. AT SELECT LEVER



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) Solenoid unit	(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) Sheet
(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) Mode change switch	
(21) Clamp	(42) Arm ASSY	

Tightening torque: N·m (kgf-m, ft-lb)

T1: 5.1 (0.5, 3.8)

T2: 7.5 (0.8, 5.5)

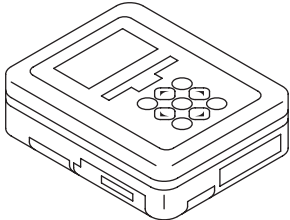
T3: 18 (1.8, 13.3)

General Description

CONTROL SYSTEMS

B: PREPARATION TOOL

1. SPECIAL TOOL

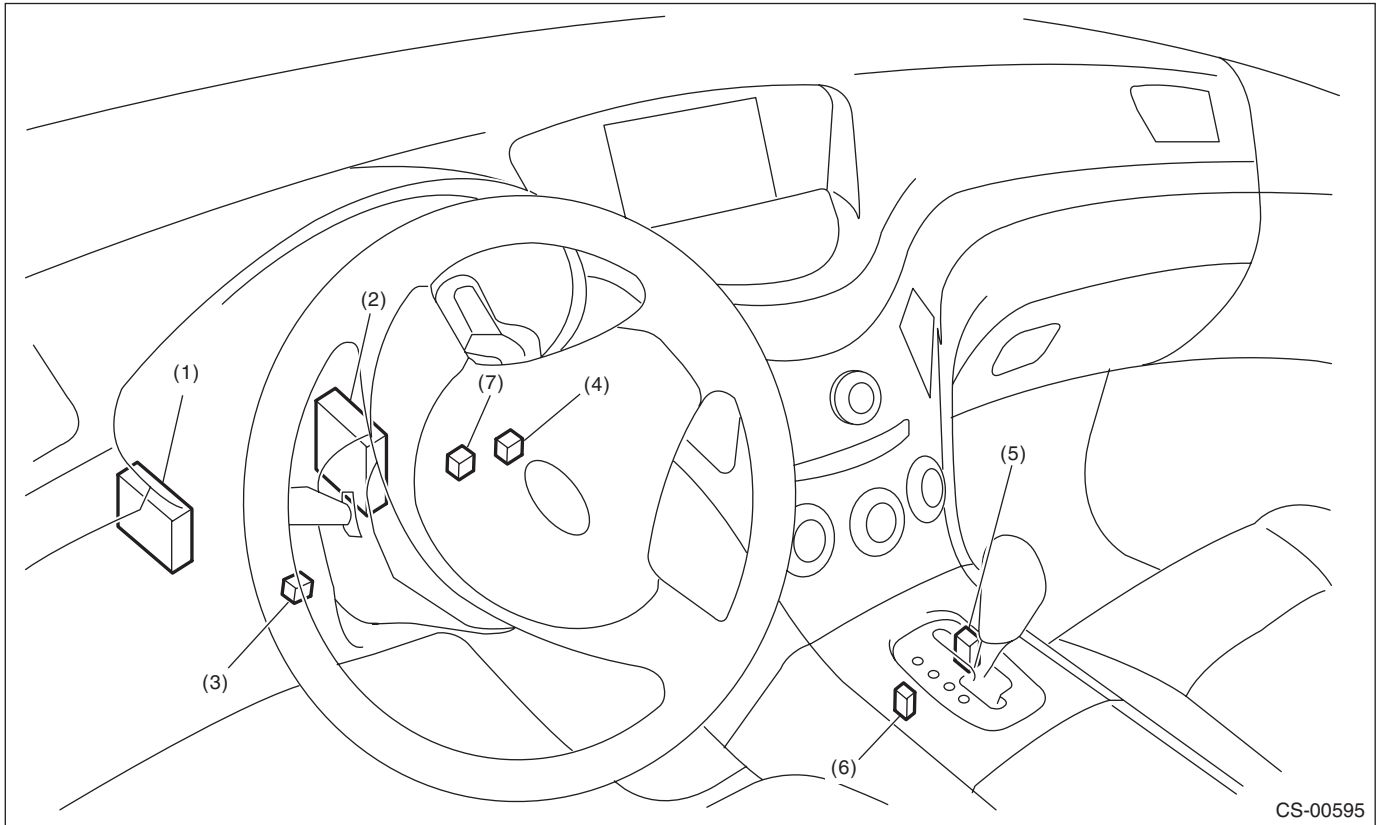
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST1B022XU0	1B022XU0	SUBARU SELECT MONITOR III KIT	Troubleshooting for the electrical system.

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

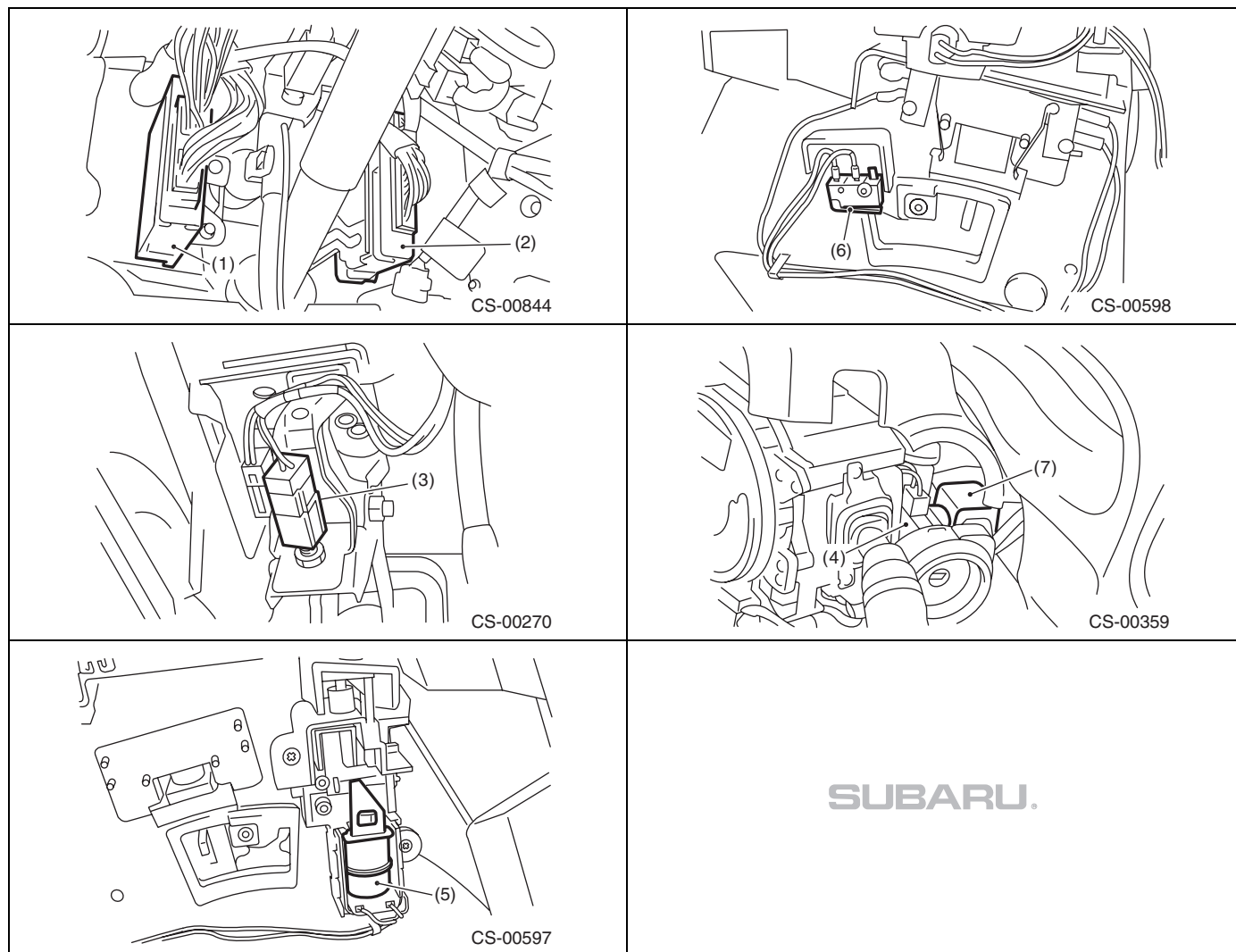
A: LOCATION



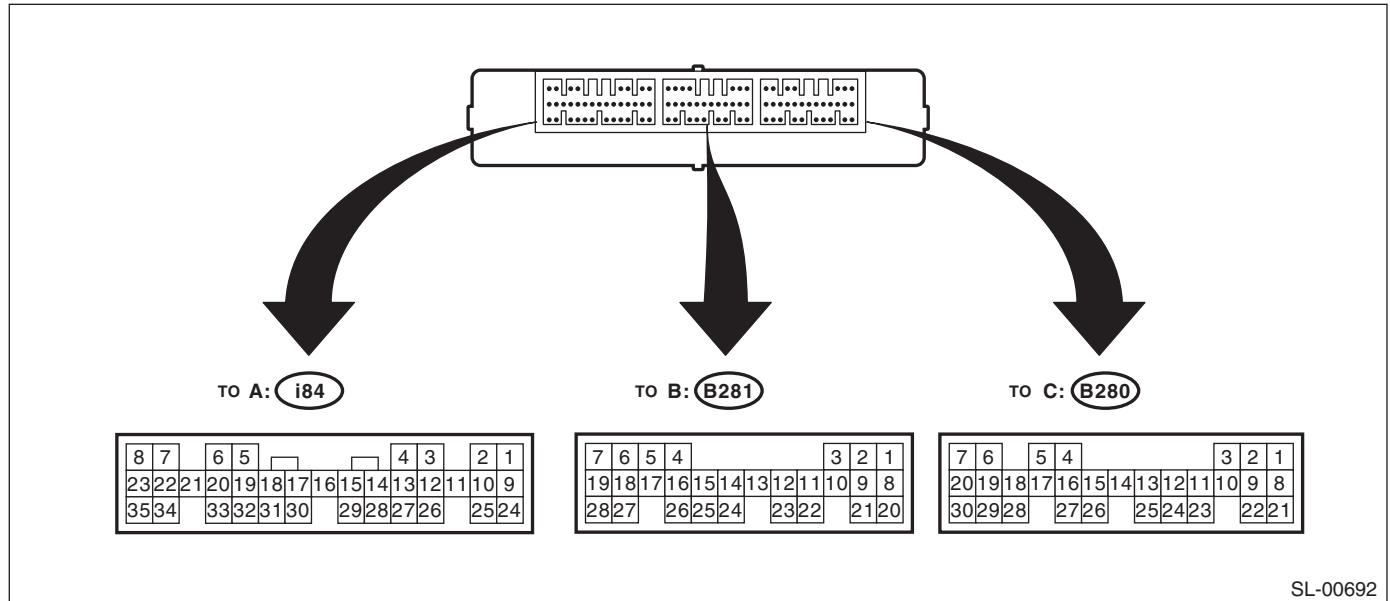
- | | | |
|--------------------------|---|-----------------------|
| (1) TCM ("P" range) | (4) Key cylinder (with built-in key warning switch) | (6) "P" range switch |
| (2) Body integrated unit | (5) Solenoid unit | (7) Key lock solenoid |
| (3) Stop light switch | | |

AT Shift Lock Control System

CONTROL SYSTEMS



B: ELECTRICAL SPECIFICATION



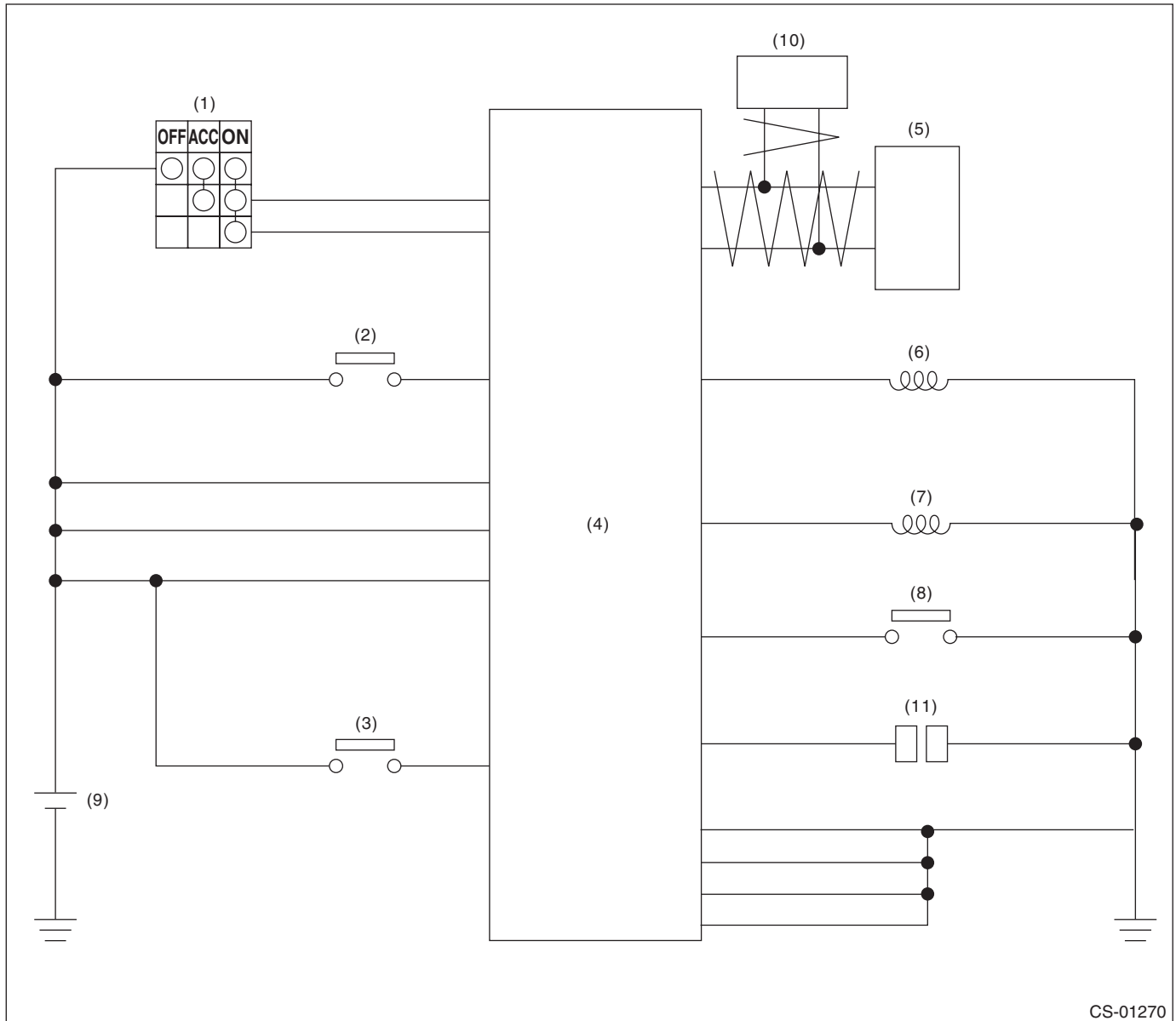
SL-00692

Item	To connector No.	Terminal No.	Input/Output signal
			Measured value and measuring conditions
Battery power supply	B281	1	9 — 16 V
	B280	7	
Ignition power supply	i84	1	9 — 16 V when ignition switch is at ON or START.
ACC power supply	i84	24	9 — 16 V when ignition switch is at ACC.
TCM ("P" range)	B280	20	Can not be measured because of digital communication
	B280	30	
Stop light switch	B281	23	8 V or more 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	9 — 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	6 — 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	
Delivery (test) mode connector	i84	3	When the delivery (test) mode connector is disconnected: 9 — 16 V When the delivery (test) mode connector is connected: 0 V

AT Shift Lock Control System

CONTROL SYSTEMS

C: WIRING DIAGRAM



- (1) Ignition switch
- (2) Stop light switch
- (3) Key warning switch
- (4) Body integrated unit

- (5) TCM (shift range information)
- (6) Key lock solenoid
- (7) Shift lock solenoid
- (8) "P" range switch

- (9) Battery
- (10) VDC (vehicle speed signal)
- (11) Delivery (test) mode connector

D: INSPECTION**1. SHIFT LOCK OPERATION**

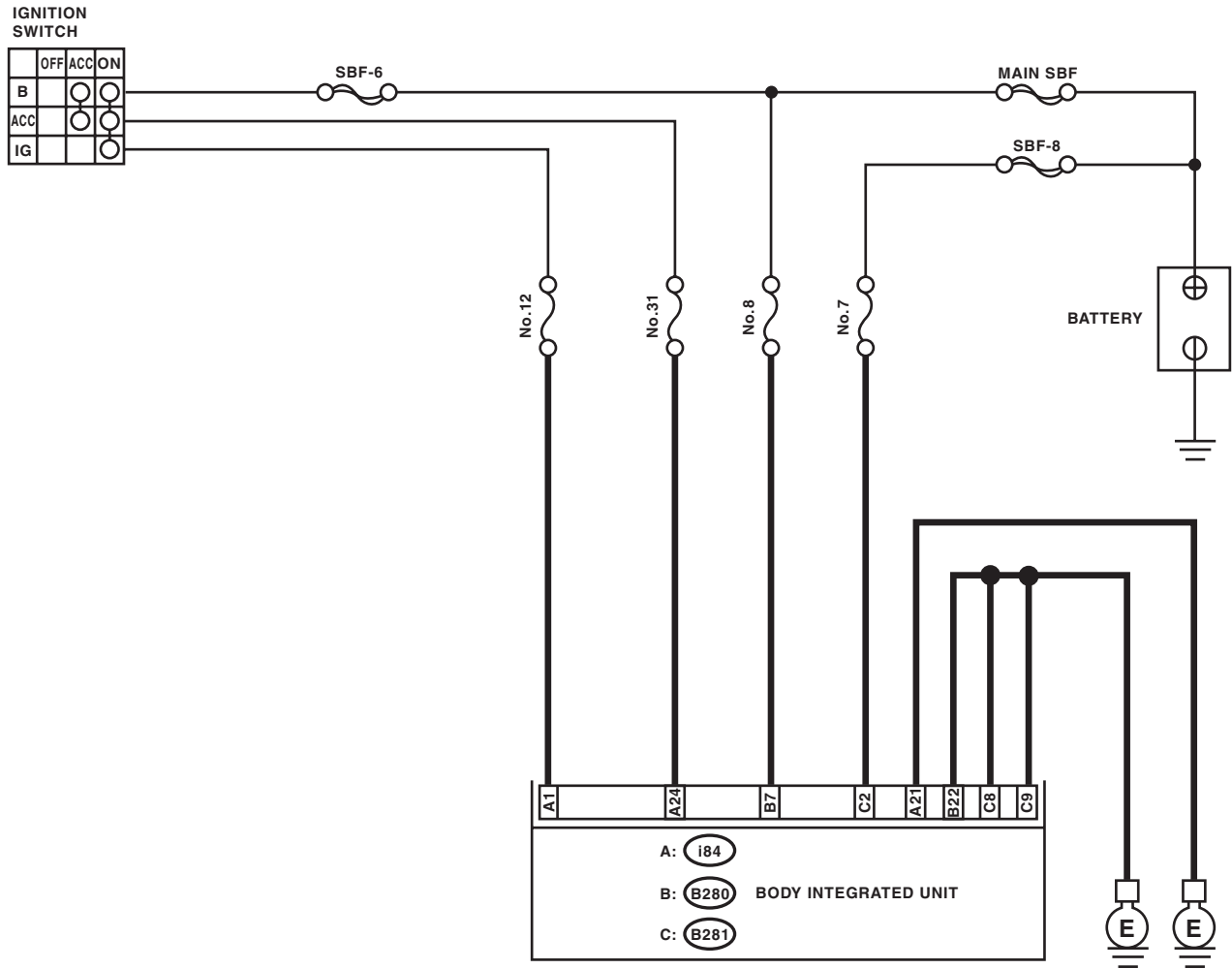
Step	Check	Yes	No
1 CHECK COMMUNICATION OF SUBARU SELECT MONITOR. 1) Turn the ignition switch to ON. 2) Using the Subaru Select Monitor, check whether communication to all systems can be executed normally.	Is the system name displayed?	Go to step 2.	Perform the inspection following the diagnostic procedure in the LAN section. <Ref. to LAN(diag)-2, Basic Diagnostic Procedure.>
2 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?	Perform the inspection of "SELECT LEVER CANNOT BE LOCKED OR RELEASED". <Ref. to CS-13, SELECT LEVER CANNOT BE LOCKED OR RELEASED, INSPECTION, AT Shift Lock Control System.>	Go to step 3.
3 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 4.	Perform the inspection of "SELECT LEVER CANNOT BE LOCKED OR RELEASED". <Ref. to CS-13, SELECT LEVER CANNOT BE LOCKED OR RELEASED, INSPECTION, AT Shift Lock Control System.>
4 CHECK SHIFT LOCK. Shift the select lever to "N" range.	Is it possible to move the select lever from the "N" range to the "P" range?	Go to step 5.	Perform the inspection of "SELECT LEVER CANNOT BE LOCKED OR RELEASED". <Ref. to CS-13, SELECT LEVER CANNOT BE LOCKED OR RELEASED, INSPECTION, AT Shift Lock Control System.>

AT Shift Lock Control System

CONTROL SYSTEMS

Step	Check	Yes	No
5 CHECK SHIFT LOCK. 1) Shift the select lever to "N" range. 2) Turn the ignition switch to ACC.	While brake pedal is depressed, is it possible to move the select lever from the "N" range to the "P" range?	Go to step 6.	Perform the inspection of "SELECT LEVER CANNOT BE LOCKED OR RELEASED". <Ref. to CS-13, SELECT LEVER CANNOT BE LOCKED OR RELEASED, INSPECTION, AT Shift Lock Control System.>
6 CHECK KEY INTERLOCK. 1) Turn the ignition switch to OFF. 2) Shift the select lever to other than "P" range.	Can the ignition key be removed?	Perform the inspection of "KEY INTERLOCK CANNOT BE LOCKED OR RELEASED". <Ref. to CS-16, KEY INTERLOCK DOES NOT LOCK OR RELEASE, INSPECTION, AT Shift Lock Control System.>	Go to step 7.
7 CHECK KEY INTERLOCK. Shift the select lever to "P" range.	Can the ignition key be removed?	AT shift lock system is normal.	Perform the inspection of "KEY INTERLOCK CANNOT BE LOCKED OR RELEASED". <Ref. to CS-16, KEY INTERLOCK DOES NOT LOCK OR RELEASE, INSPECTION, AT Shift Lock Control System.>

2. BODY INTEGRATED UNIT POWER SUPPLY AND GROUND CIRCUIT



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					

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					

C: 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

CS-00599

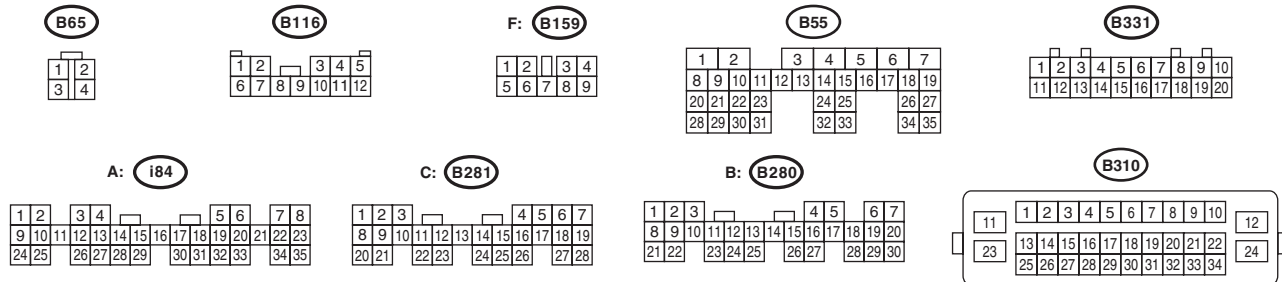
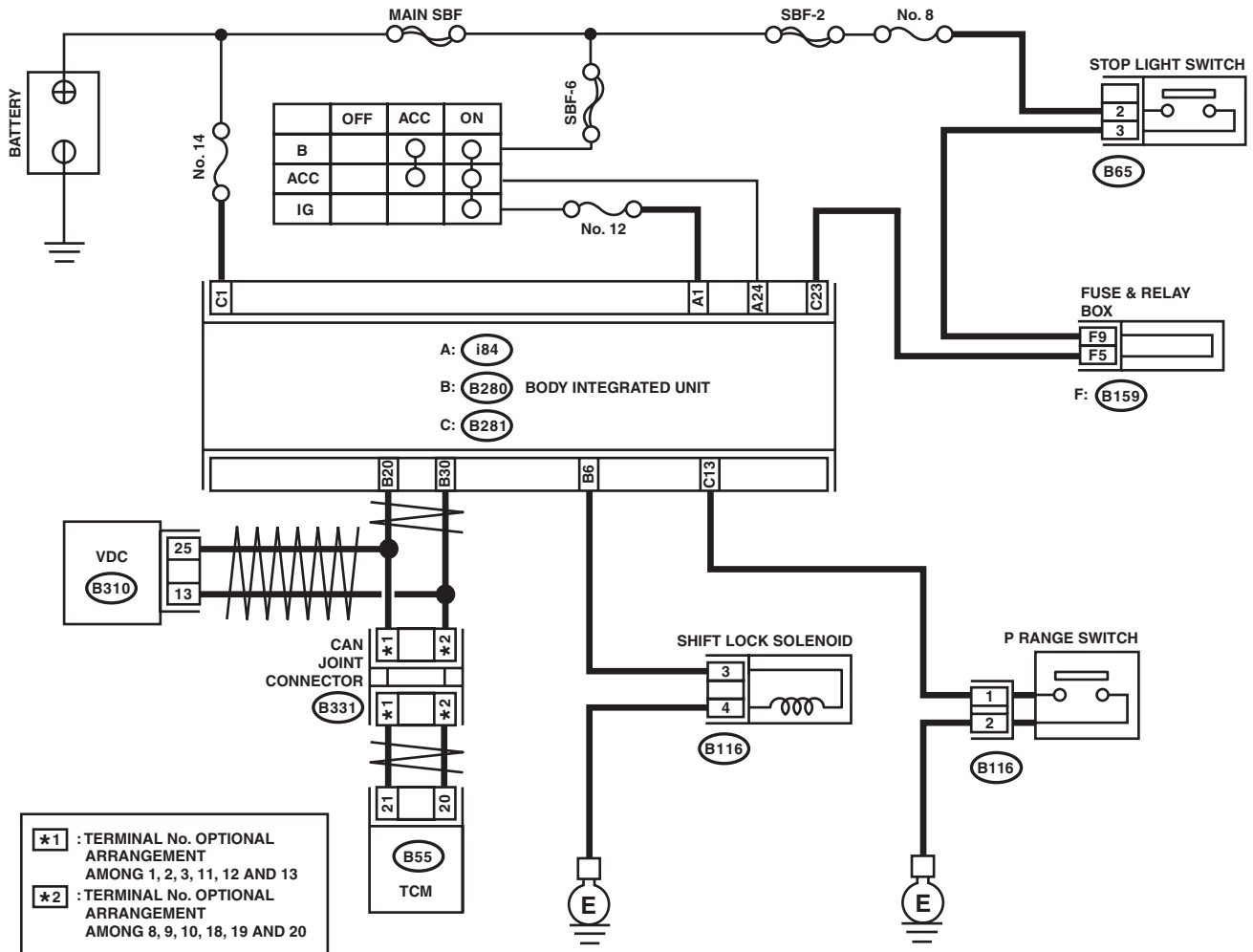
Step	Check	Yes	No
1	CHECK DTC OF BODY INTEGRATED UNIT. Check DTC of body integrated unit. <Ref. to LAN(diag)-12, OPERATION, Subaru Select Monitor.>	Is the DTC of power line displayed on body integrated unit? Repair or replace it according to the DTC.	Go to step 2.

AT Shift Lock Control System

CONTROL SYSTEMS

Step	Check	Yes	No
2 CHECK HARNESS BETWEEN BODY INTEGRATED UNIT AND BATTERY. 1) Turn the ignition switch to ON. 2) Measure the voltage between body integrated unit and chassis ground. Connector & terminal <i>(i84) No. 1 (+) — Chassis ground (-):</i> <i>(i84) No. 24 (+) — Chassis ground (-):</i> <i>(B280) No. 7 (+) — Chassis ground (-):</i> <i>(B281) No. 2 (+) — Chassis ground (-):</i>	Is the voltage 9 — 16 V?	Go to step 3.	Check harness for open circuit between the body integrated unit and the battery or a blown fuse.
3 CHECK HARNESS 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 4.	Repair the open circuit of harness between the body integrated unit and chassis ground.
4 CHECK FOR POOR CONTACT.	Is there poor contact of connector?	Repair the poor contact.	Check body integrated unit.

3. SELECT LEVER CANNOT BE LOCKED OR RELEASED



CS-01631

Step	Check	Yes	No
1	CHECK BODY INTEGRATED UNIT POWER SUPPLY AND GROUND CIRCUIT. <Ref. to CS-11, BODY INTEGRATED UNIT POWER SUPPLY AND GROUND CIRCUIT, INSPECTION, AT Shift Lock Control System.>	Follow the procedures to perform inspection and repair.	Go to step 2.

AT Shift Lock Control System

CONTROL SYSTEMS

Step	Check	Yes	No
2 CHECK CURRENT DATA. 1) Connect the Subaru Select Monitor. 2) Shift the select lever to "P" range. 3) Turn the ignition switch to ON. 4) Select the current data display and display «P SW». <Ref. to LAN(diag)-12, OPERATION, Subaru Select Monitor.>	Is the display "ON" in the P range and "OFF" in ranges other than P?	Go to step 3.	Go to step 8.
3 CHECK CURRENT DATA. Select the current data display and display «Stop Light Switch». <Ref. to LAN(diag)-12, OPERATION, Subaru Select Monitor.>	Is "ON" displayed when the brake pedal is depressed and "OFF" displayed when the brake pedal is released?	Go to step 4.	Go to step 11.
4 CHECK BODY INTEGRATED UNIT DTC. Check the DTC of the body integrated unit when the brake pedal is pressed and when it is released. (Hold each condition for 5 seconds or more.)	Is there a DTC of a current malfunction?	Follow the DTC to perform inspection and repair.	Go to step 5.
5 CHECK CURRENT DATA. Select the current data display and display «Shift Lock Solenoid». <Ref. to LAN(diag)-12, OPERATION, Subaru Select Monitor.>	Is "ON" displayed when the brake pedal is depressed and "OFF" displayed when the brake pedal is released?	Go to step 6.	Replace the body integrated unit.
6 CHECK CURRENT DATA. Select the current data display and display «Shift Position». <Ref. to LAN(diag)-12, OPERATION, Subaru Select Monitor.>	Is the display "7" in the "P" range and other than "7" in ranges other than "P"?	Go to step 7.	Check the following items. • Inhibitor switch • Harness between inhibitor switch and TCM • TCM input signal • TCM CAN communication • Body integrated unit CAN receive
7 CHECK CURRENT DATA. 1) Select the current data display and display «Front Wheel Speed». <Ref. to LAN(diag)-12, OPERATION, Subaru Select Monitor.> 2) Start the engine. 3) Raise vehicle speed gradually up to approximately 20 km/h (12 MPH).	Is a figure equivalent to the speedometer being indicated?	Go to step 12.	Check the following items. • Wheel speed sensor • VDC CM CAN communication • Body integrated unit CAN receive Replace the wheel speed sensor, VDC CM or body integrated unit, or both.
8 CHECK HARNESS BETWEEN BODY INTEGRATED UNIT AND "P" RANGE SWITCH. 1) Disconnect the connector from body integrated unit. 2) Disconnect the connector of "P" range switch. 3) Check for open circuit of harness, short circuit to battery or short circuit to ground between the body integrated unit and "P" range switch. Connector & terminal (B281) No. 13 — (B116) No. 1:	Is there any fault in the harness?	Repair or replace the harness between the body integrated unit and the "P" range switch.	Go to step 9.

AT Shift Lock Control System

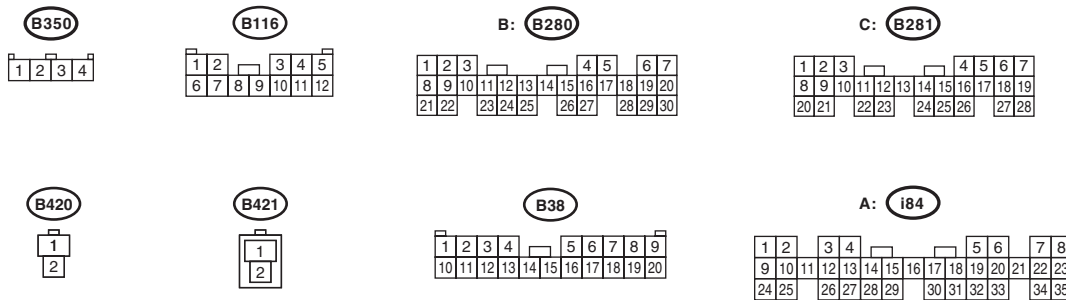
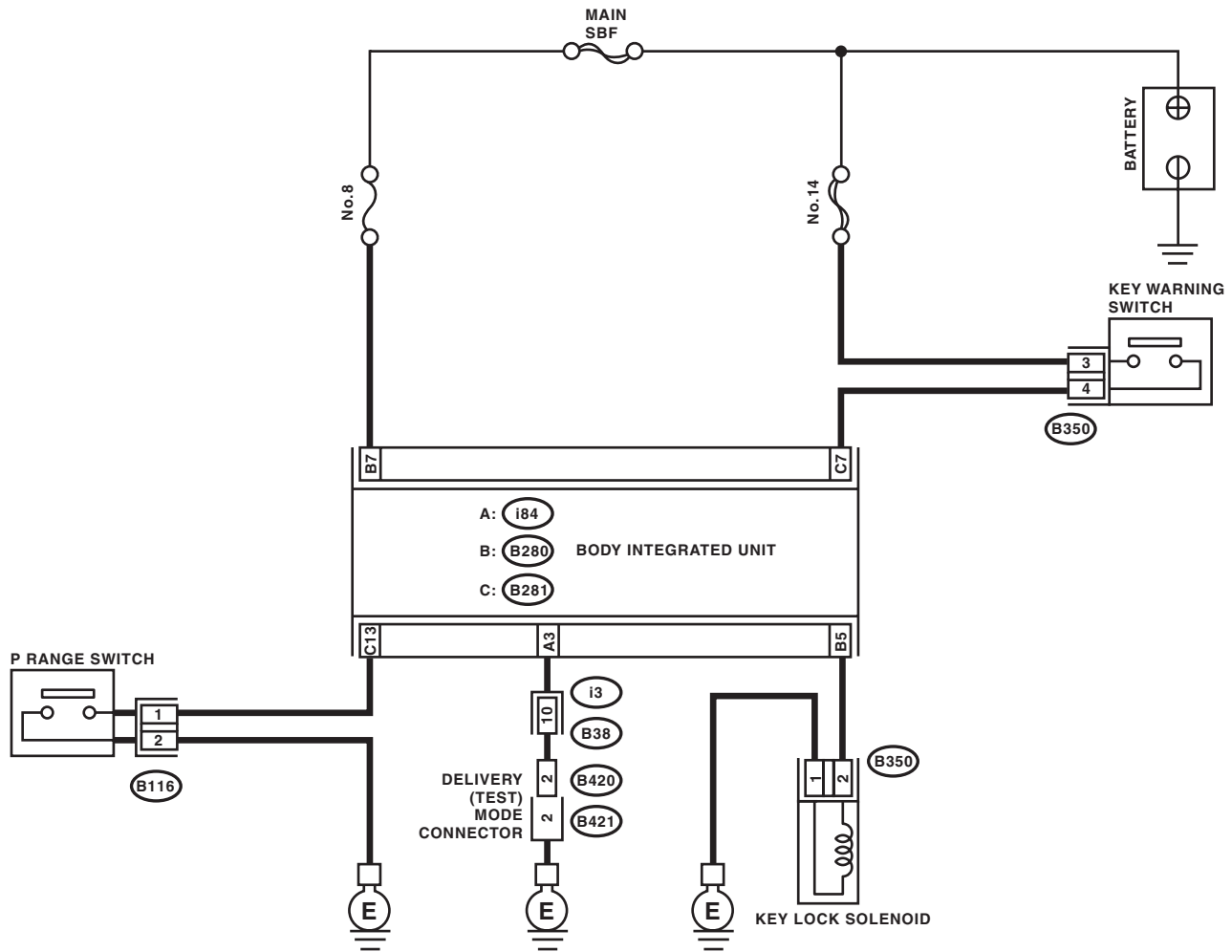
CONTROL SYSTEMS

Step	Check	Yes	No
9 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 it less than 10 Ω ?	Go to step 10.	Repair the harness between the “P” range switch and chassis ground.
10 CHECK “P” RANGE SWITCH. Measure the resistance between “P” range switch connector terminals. Terminals No. 2 — No. 1:	Is it less than 10 Ω in the “P” range, and 1 M Ω or more in ranges other than “P”?	Replace the body integrated unit.	Replace the “P” range switch.
11 CHECK STOP LIGHT SWITCH INPUT SIGNAL. 1) Disconnect the connector from body integrated unit. 2) Measure the voltage between the body integrated unit connector terminal and chassis ground. Connector & terminal (B281) No. 23 (+) — Chassis ground (-):	Is the voltage 8 V or more when the brake pedal is depressed, and less than approximately 1.5 V when not pressed?	Replace the body integrated unit.	Check the stop light system.
12 CHECK SOLENOID UNIT OPERATION. Connect the battery to the solenoid unit connector terminal, and operate the solenoid unit. Terminals No. 3 (+) — No. 4 (-):	Does the solenoid unit operate normally?	Check the lock mechanism of the select lever body.	Replace the solenoid unit.

AT Shift Lock Control System

CONTROL SYSTEMS

4. KEY INTERLOCK DOES NOT LOCK OR RELEASE



CS-00847

Step	Check	Yes	No
1	CHECK DELIVERY (TEST) MODE CONNECTOR. Check that the delivery (test) mode connector is disconnected.	Go to step 2.	Disconnect the delivery (test) mode connector.

AT Shift Lock Control System

CONTROL SYSTEMS

Step	Check	Yes	No	
2	CHECK BODY INTEGRATED UNIT POWER SUPPLY AND GROUND CIRCUIT. <Ref. to CS-11, BODY INTEGRATED UNIT POWER SUPPLY AND GROUND CIRCUIT, INSPECTION, AT Shift Lock Control System.>	Is there any fault?	Follow the procedures to inspect and repair.	Go to step 3.
3	CHECK CURRENT DATA. 1) Connect the Subaru Select Monitor. 2) Shift the select lever to "P" range. 3) Turn the ignition switch to ON. 4) Select the current data display and display «P SW». <Ref. to LAN(diag)-12, OPERATION, Subaru Select Monitor.>	Is the display "ON" in the P range and "OFF" in ranges other than P?	Go to step 4.	Go to step 7.
4	CHECK CURRENT DATA. 1) Select the current data display and display the «key-lock warning SW». <Ref. to LAN(diag)-12, OPERATION, Subaru Select Monitor.> 2) Turn the ignition switch to OFF.	Does the display change from "ON" ↔ "OFF" when the key is inserted and removed?	Go to step 5.	Go to step 10.
5	CHECK CURRENT DATA. 1) Turn the ignition switch to ON. 2) Select the current data display and display «Key locking output». <Ref. to LAN(diag)-12, OPERATION, Subaru Select Monitor.>	Is the display "ON" in the P range and "OFF" in ranges other than P?	Go to step 12.	Go to step 6.
6	CHECK DTC OF BODY INTEGRATED UNIT. 1) Set the select lever to other than "P" range. 2) Check DTC of body integrated unit.	Is B1105 (key interlock circuit abnormal) a current malfunction?	Follow the DTC to perform inspection and repair.	Go to step 12.
7	CHECK HARNESS BETWEEN BODY INTEGRATED UNIT AND "P" RANGE SWITCH. 1) Disconnect the connector from body integrated unit. 2) Disconnect the connector of "P" range switch. 3) Check for open circuit of harness, short circuit to battery or short circuit to ground between the body integrated unit and "P" range switch. Connector & terminal (B281) No. 13 — (B116) No. 1:	Is there any fault in the harness?	Repair or replace the harness between the body integrated unit and the "P" range switch.	Go to step 8.
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. 2 — Chassis ground:	Is it less than 10 Ω?	Go to step 9.	Repair the harness between the "P" range switch and chassis ground.
9	CHECK "P" RANGE SWITCH. Measure the resistance between "P" range switch connector terminals. Terminals No. 2 — No. 1:	Is it less than 10 Ω in the "P" range, and 1 MΩ or more in ranges other than "P"?	Replace the body integrated unit.	Replace the "P" range switch.
10	CHECK HARNESS BETWEEN BATTERY AND KEY WARNING SWITCH AND BODY INTEGRATED UNIT. 1) Disconnect the connector from body integrated unit. 2) Measure the voltage between body integrated unit and chassis ground. Connector & terminal (B281) No. 7 (+) — Chassis ground (-):	Is the display 9 V or more when the key is inserted, and less than 1.5 V with the key removed?	Replace the body integrated unit.	Check the following items. • Key warning switch • Harness/fuse • Ignition circuit

AT Shift Lock Control System

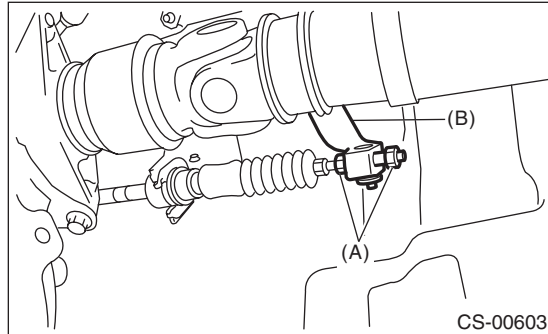
CONTROL SYSTEMS

Step	Check	Yes	No
11 CHECK DELIVERY (TEST) MODE CONNECTOR HARNESS. 1) Disconnect the connector of body integrated unit. 2) Measure the resistance between body integrated unit connector and the delivery (test) mode connector. Connector & terminal (i84) No. 3 — (B420) No. 2:	Is it less than 10 Ω ?	Go to step 12.	Repair or replace the harness between the body integrated unit and delivery (test) mode connector.
12 CHECK HARNESS BETWEEN BODY INTEGRATED UNIT AND KEY LOCK SOLENOID. 1) Disconnect the connector from body integrated unit. 2) Disconnect the connector of key lock solenoid. 3) Check for open circuit of harness, short circuit to battery or short circuit to ground between the body integrated unit and key lock solenoid. Connector & terminal (B280) No. 5 — (B350) No. 2:	Is there any fault in the harness?	Repair or replace the harness between the body integrated unit and the key lock solenoid.	Go to step 13.
13 CHECK HARNESS BETWEEN KEY LOCK SOLENOID AND CHASSIS GROUND. Measure the resistance of harness between key lock solenoid and chassis ground. Connector & terminal (B350) No. 1 — Chassis ground:	Is it less than 10 Ω ?	Go to step 14.	Repair or replace the harness between the key lock solenoid and chassis ground.
14 CHECK KEY LOCK SOLENOID OPERATION. Connect the battery to the key lock solenoid connector terminal, and operate the solenoid. Terminals No. 2 (+) — No. 1 (-):	Does the key lock solenoid operate normally?	Go to step 15.	Replace the key lock solenoid.
15 CHECK OUTPUT OF BODY INTEGRATED UNIT. 1) Connect all connectors. 2) Insert the key. 3) Measure the voltage between body integrated unit and chassis ground. Connector & terminal (B280) No. 5 — Chassis ground:	Is it 6 V to 16 V in ranges other than "P", and less than 1.5 V in the "P" range?	Check the lock mechanism of the steering lock body.	Replace the body integrated unit.

3. Select Lever

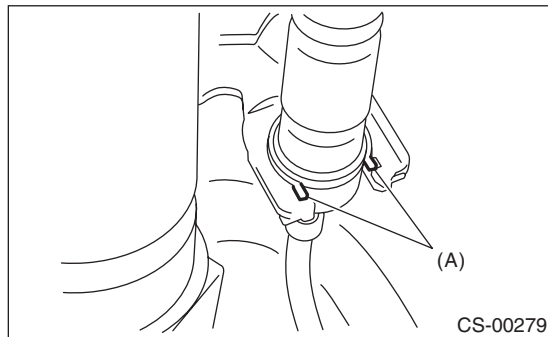
A: REMOVAL

- 1) Disconnect the ground cable from battery.
- 2) Shift the select lever to "N" range.
- 3) Lift up the vehicle.
- 4) Remove the rear exhaust pipe and muffler. <Ref. to EX(H6DO)-7, REMOVAL, Rear Exhaust Pipe.> <Ref. to EX(H6DO)-9, REMOVAL, Muffler.>
- 5) Remove the heat shield cover.
- 6) Remove the cable from arm assembly.



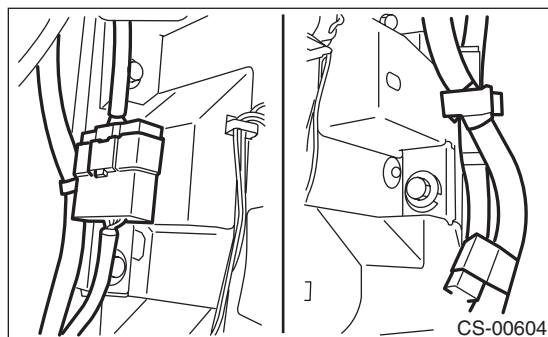
- (A) Adjusting nut
(B) Arm ASSY

- 7) Raise the claw of clamp and remove the cable.

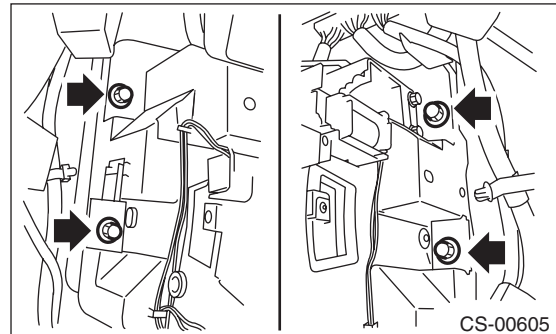


- (A) Claw

- 8) Lower the vehicle.
- 9) Remove the console box. <Ref. to EI-40, REMOVAL, Console Box.>
- 10) Remove the center console. <Ref. to EI-41, REMOVAL, Center Console.>
- 11) Remove all harnesses from the select lever.



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

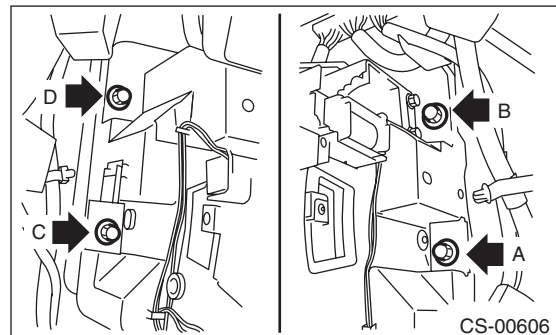


B: INSTALLATION

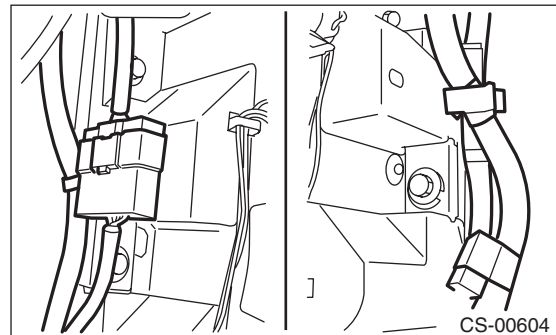
- 1) Set the select lever to vehicle body.
- 2) Tighten the four bolts to install the select lever to vehicle body, and then connect the connector.
 - (1) Temporarily tighten the bolt A.
 - (2) Tighten the bolt B.
 - (3) Tighten the bolt A.
 - (4) Tighten the bolts C and D.

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-41, INSTALLATION, Center Console.>
- 5) Install the console box. <Ref. to EI-40, 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.

Select Lever

CONTROL SYSTEMS

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

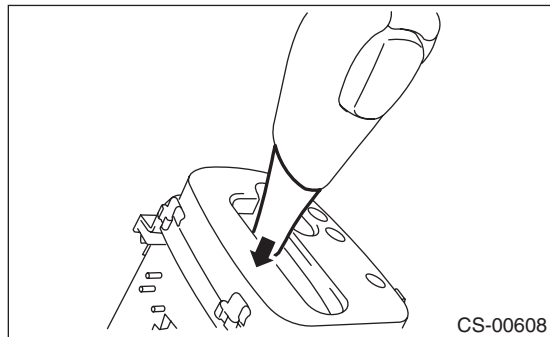
(2) Back-up light illuminates when the select lever is in the "R" range, but not in other ranges.

(3) Select lever and indicator positions are matched.

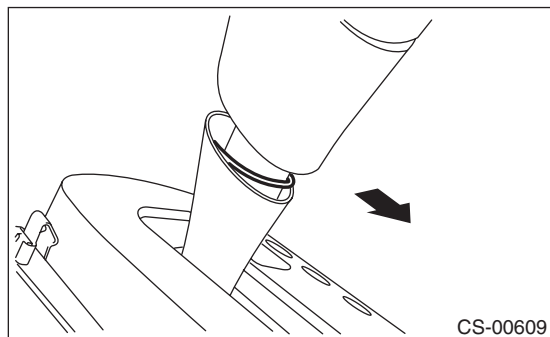
C: DISASSEMBLY

1) Shift the select lever to "N" range.

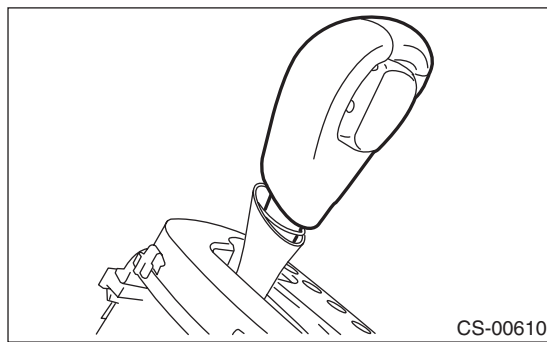
2) Lower the grip cover.



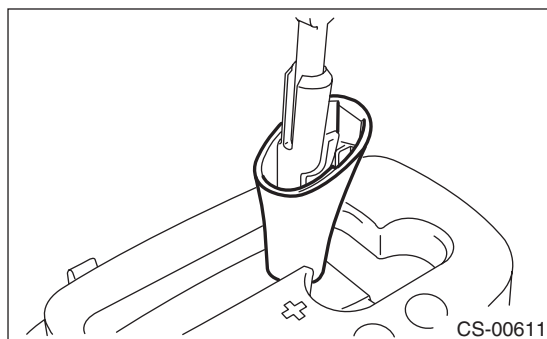
3) Remove the grip pin.



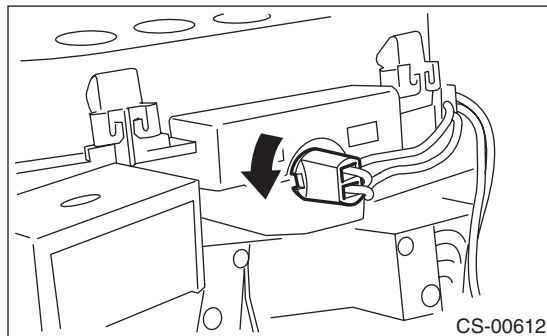
4) Remove the grip assembly.



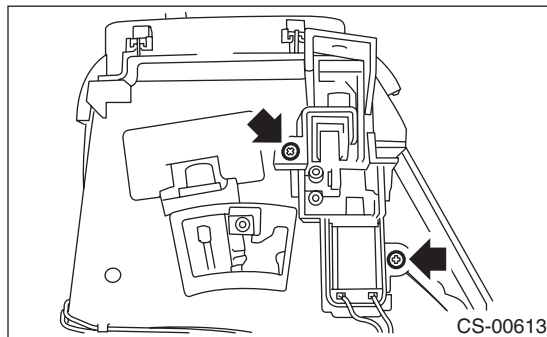
5) Remove the grip cover.



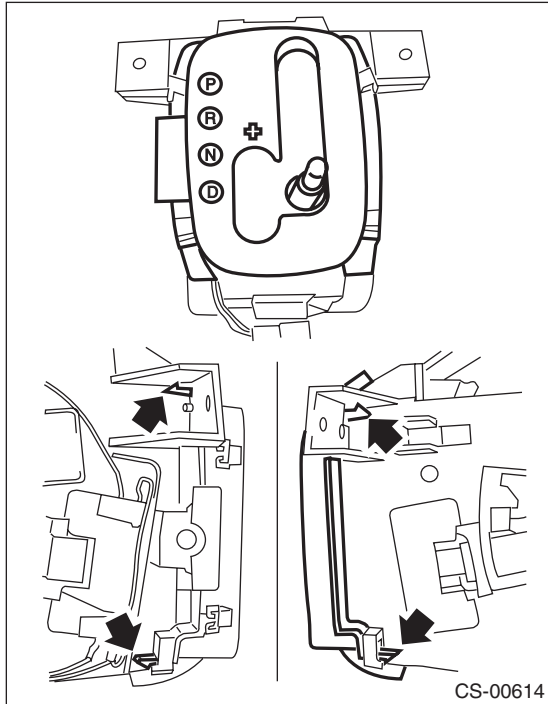
6) Remove the indicator light and then remove the bulb.



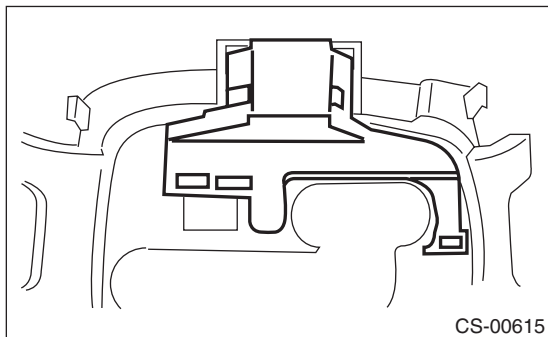
7) Remove the shift lock solenoid assembly.



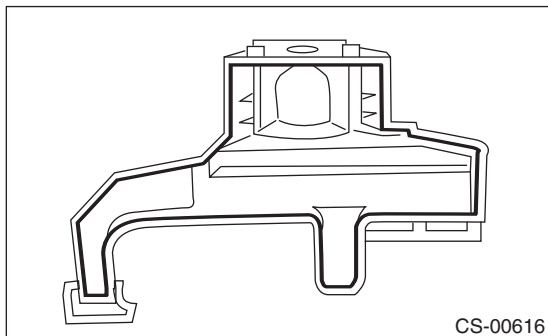
8) Remove the indicator assembly.



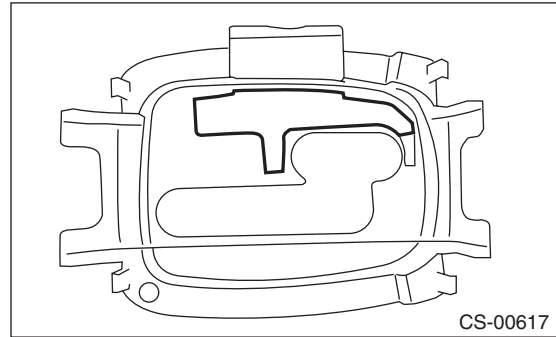
9) Remove the bulb case.



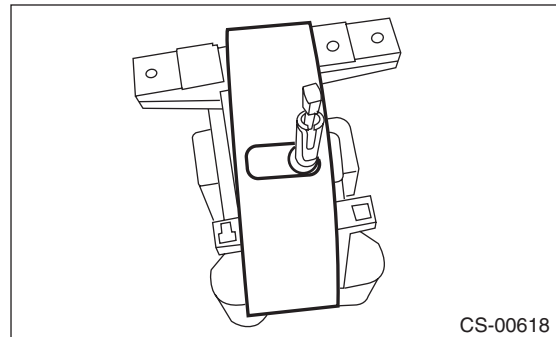
10) Remove the plate light guide.



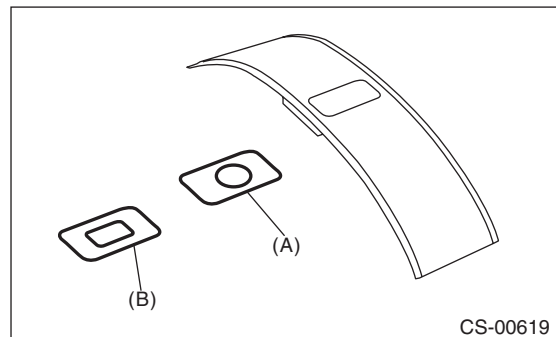
11) Remove the position plate.



12) Remove the blind assembly.



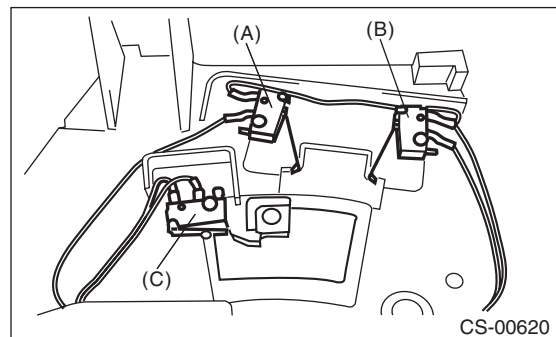
13) Remove blind A and B.



(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

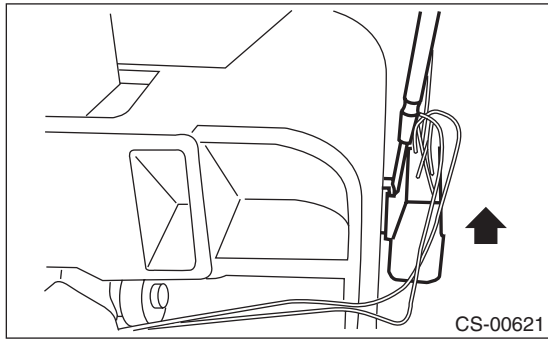
(B) Shift-down switch

(C) "P" range switch

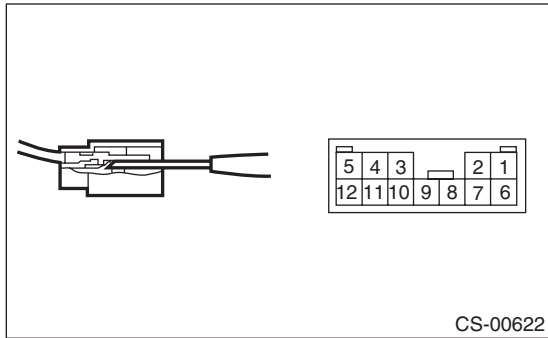
Select Lever

CONTROL SYSTEMS

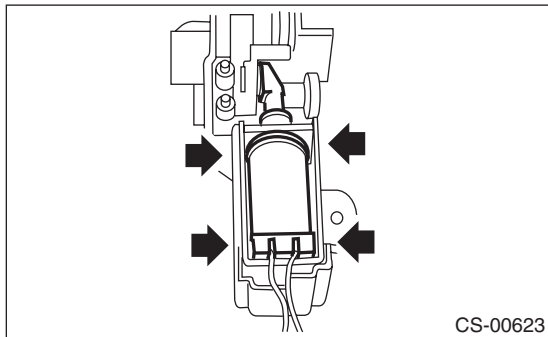
15) Remove the connector from the base assembly using a flat tip screwdriver.



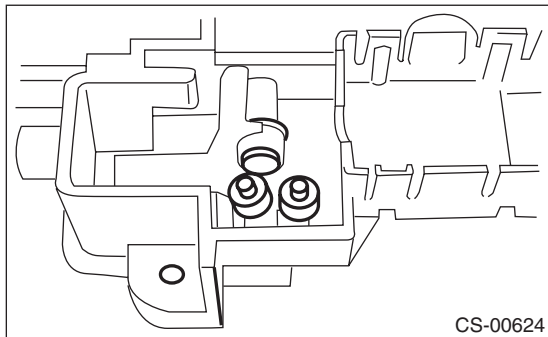
16) Remove all terminals from the connectors using a flat tip screwdriver.



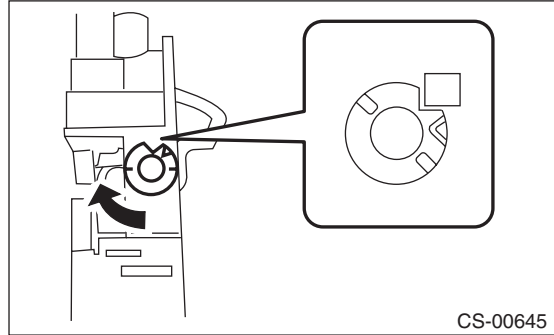
17) Remove the solenoid unit from the lock lever bracket.



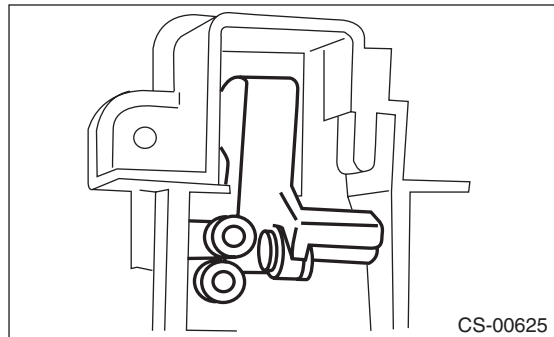
18) Remove the bushing.



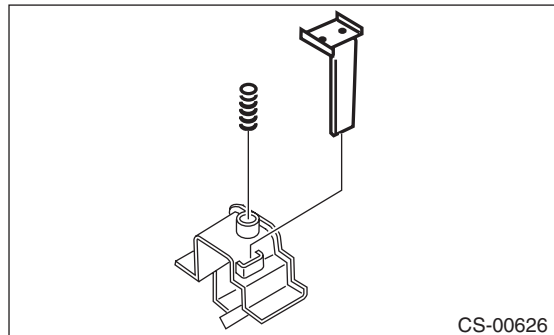
19) Remove the lock lever bushing.



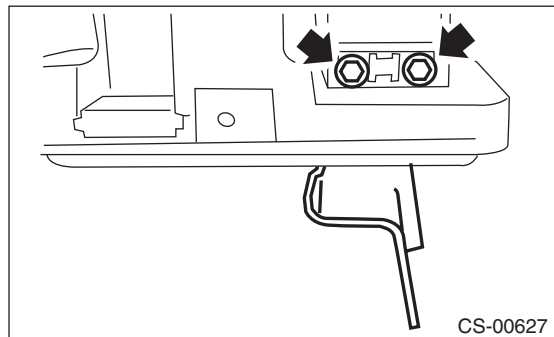
20) Remove the lock lever.



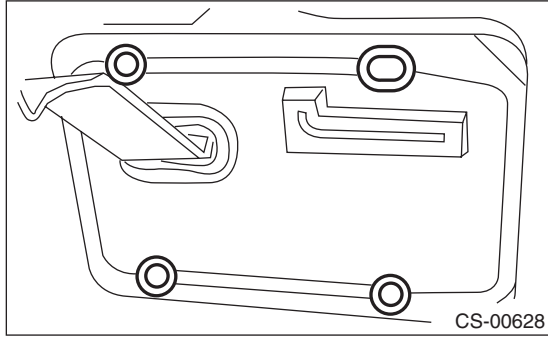
21) Remove the release rod and spring.



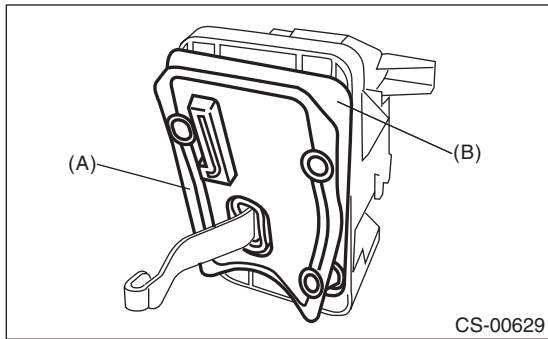
22) Remove the cable bracket.



23) Remove the spacer.



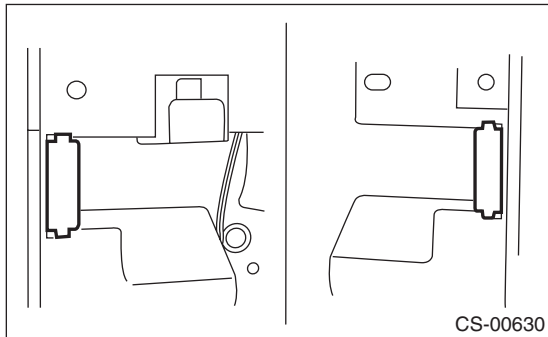
24) Remove the dust cover and dust cover bracket.



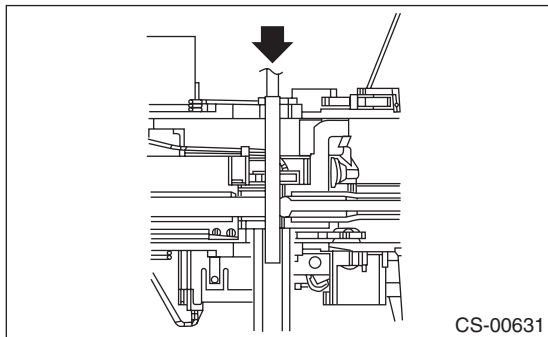
(A) Dust cover

(B) Dust cover bracket

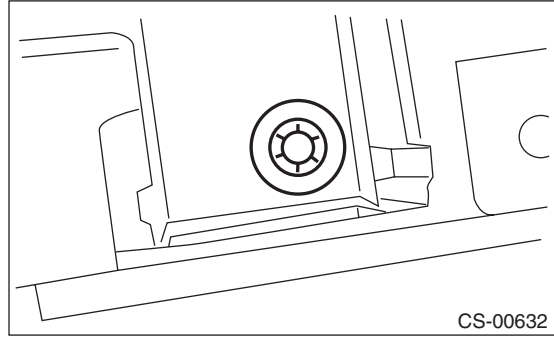
25) Remove the spacer.



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

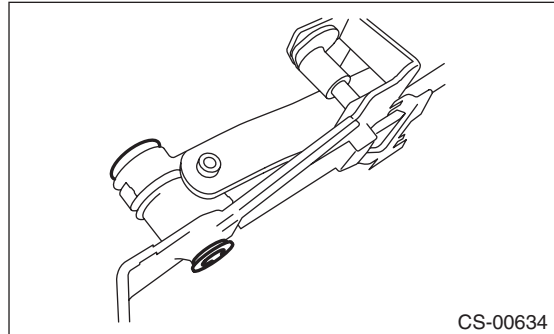


27) Remove the clips, then remove the shaft.

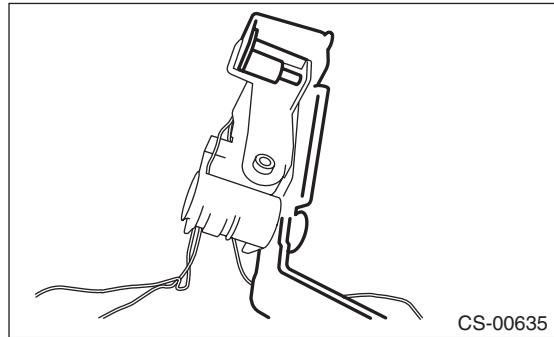


28) Remove the arm assembly.

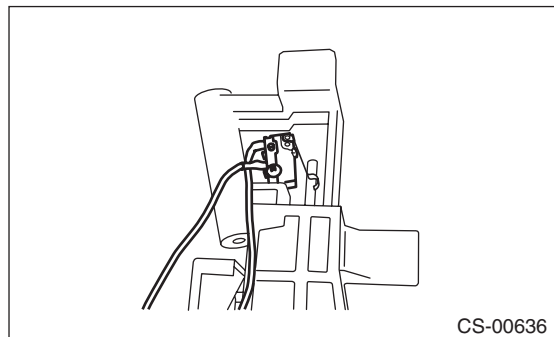
29) Remove the bushing.



30) Remove the selector arm assembly.



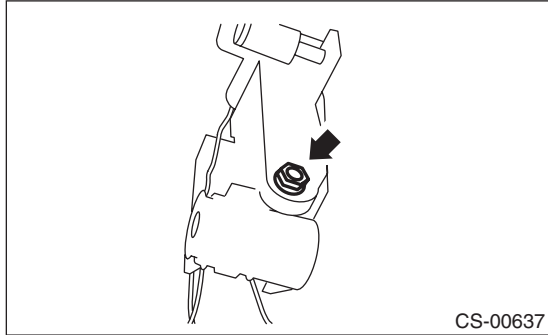
31) Remove the clip while being careful not to break the pin, then remove the shift button switch.



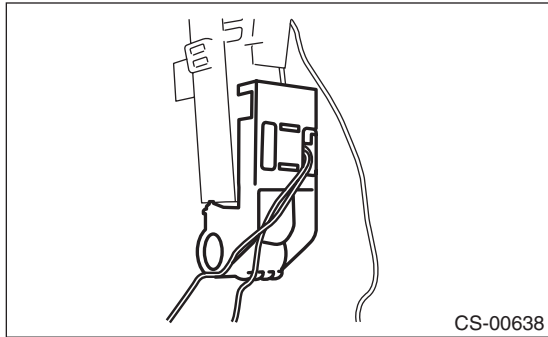
Select Lever

CONTROL SYSTEMS

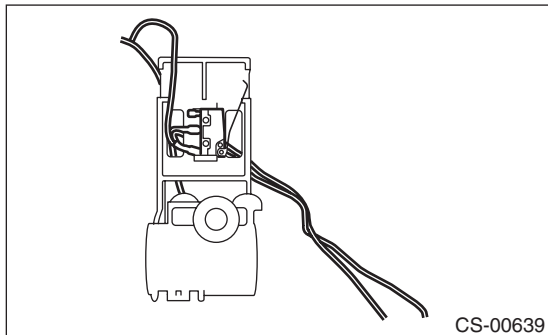
32) Remove the select shaft.



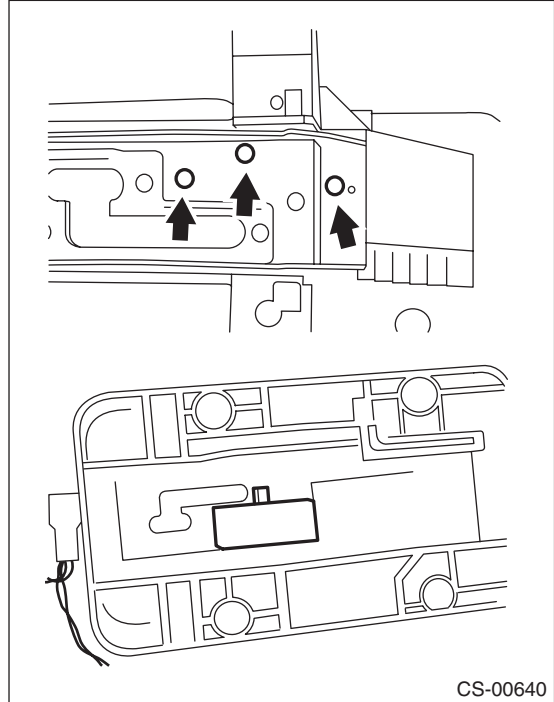
33) Remove the tube cross plate.



34) Remove the mode change switch.



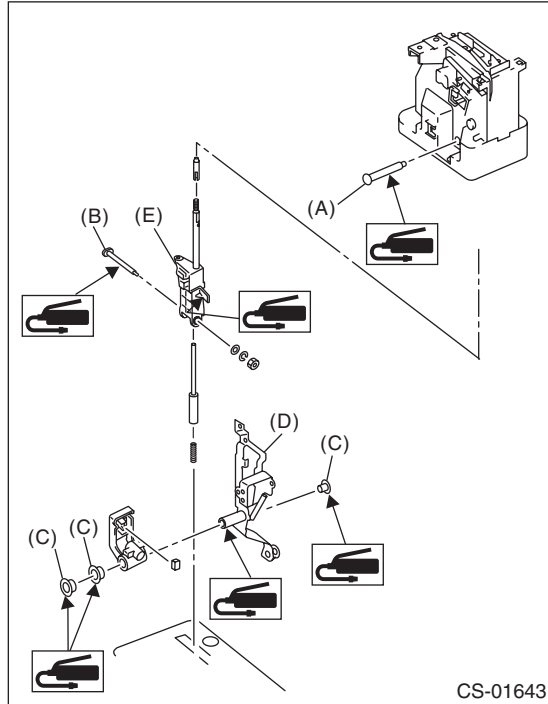
35) Remove the detent check block.



D: ASSEMBLY

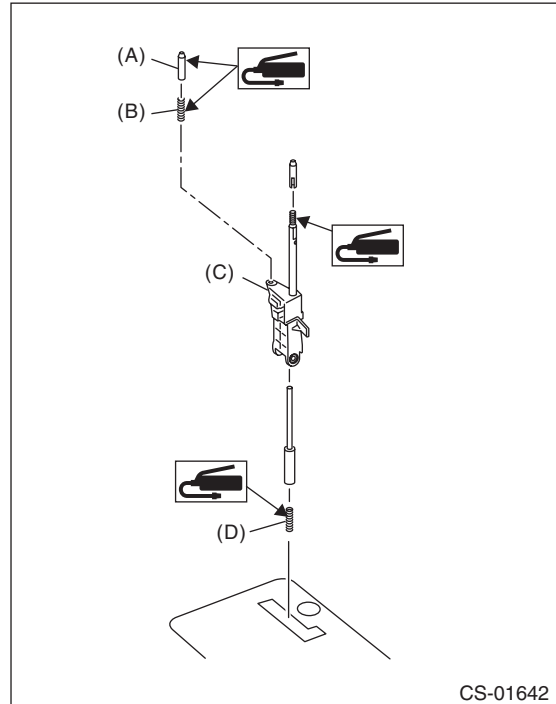
- 1) Clean all the parts before assembly.
- 2) Apply specified greases or equivalent to each part.

- Multemp AC-D or equivalent



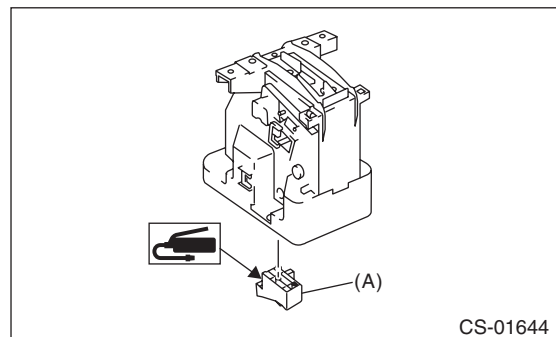
- (A) Shaft
- (B) Select shaft
- (C) Bushing
- (D) Arm ASSY
- (E) Selector arm ASSY

- Multemp SH-W or equivalent



- (A) Check sheet pole
- (B) Spring
- (C) Selector arm ASSY
- (D) Spring

- Permalube BAN-5 or equivalent



- (A) Detent check block

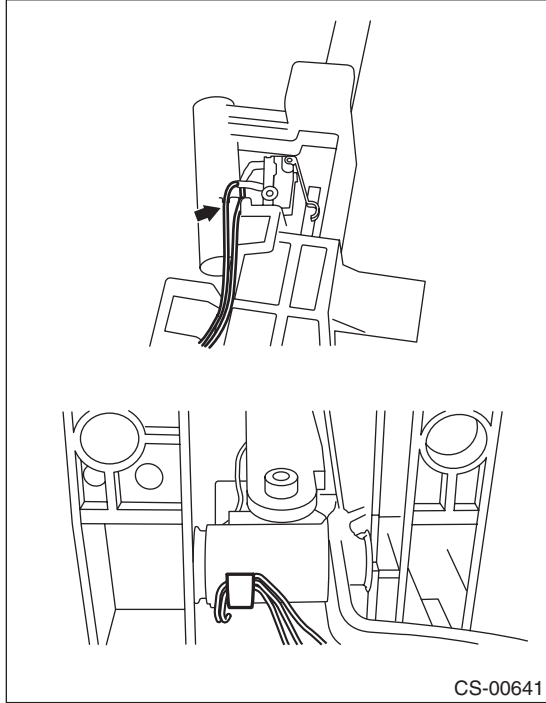
Select Lever

CONTROL SYSTEMS

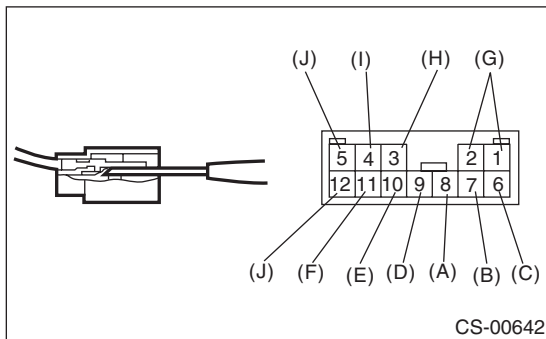
3) Assemble in the reverse order of disassembly.

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 (color code: Red)
- (H) Solenoid unit (color code: Blue)
- (I) Solenoid unit (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

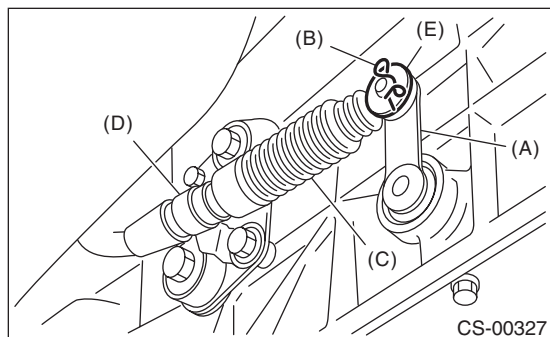
1) Inspect the removed parts by comparing with new parts for deformation, damage and wear. Repair or replace if defective.

2) Confirm the select lever operating condition before assembly. Normal if it operates smoothly.

4. Select Cable

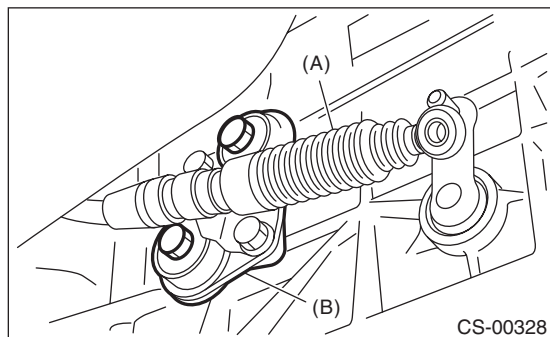
A: REMOVAL

- 1) Shift the select lever to "N" range.
- 2) Disconnect the ground cable from battery.
- 3) Lift up the vehicle.
- 4) Remove the front and rear exhaust pipes and the muffler. <Ref. to EX(H6DO)-5, REMOVAL, Front Exhaust Pipe.> <Ref. to EX(H6DO)-7, REMOVAL, Rear Exhaust Pipe.> <Ref. to EX(H6DO)-9, REMOVAL, Muffler.>
- 5) Remove the heat shield cover.
- 6) Remove the snap pin and washer from range select lever.



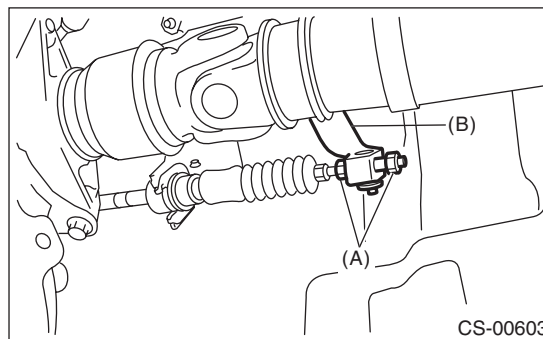
- (A) Range select lever
- (B) Snap pin
- (C) Select cable
- (D) Bracket
- (E) Washer

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



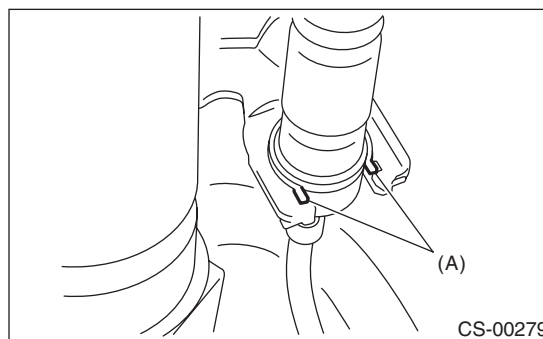
- (A) Select cable
- (B) Plate ASSY

- 8) Disconnect the cable from arm assembly.



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

- 9) Raise the claw of clamp to remove the cable from bracket.



- (A) Claw

- 10) Remove the select cable from plate assembly.

Select Cable

CONTROL SYSTEMS

B: INSTALLATION

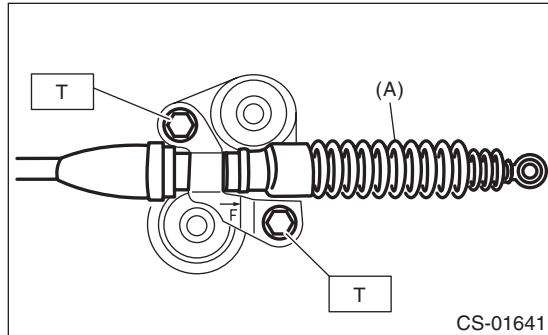
1) Position the select cable as shown in the figure, and install it to the plate assembly.

CAUTION:

- If the cable is installed in the wrong direction, loosen the bracket bolts, and then reinstall the cable in the correct direction.
- Do not forcibly turn the cable (wire side) to align the direction correctly.

Tightening torque:

T: 18 N·m (1.8 kgf-m, 13.3 ft-lb)

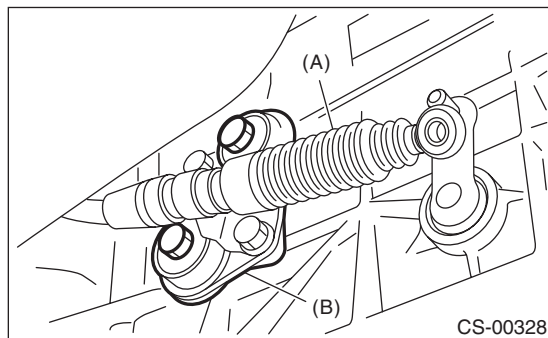


(A) Select cable

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

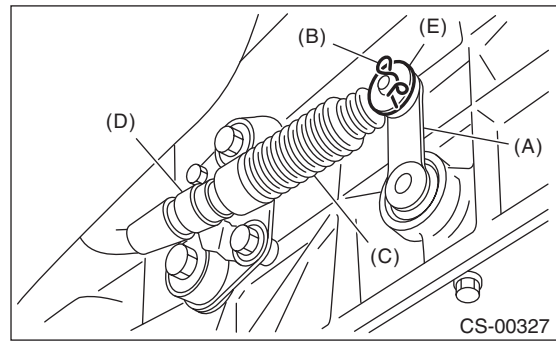
Tightening torque:

24.5 N·m (2.5 kgf-m, 18.1 ft-lb)



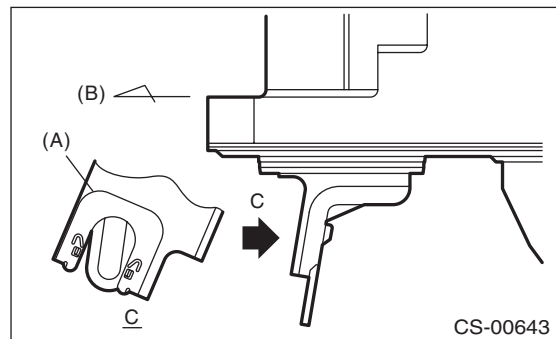
(A) Select cable
(B) Plate ASSY

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



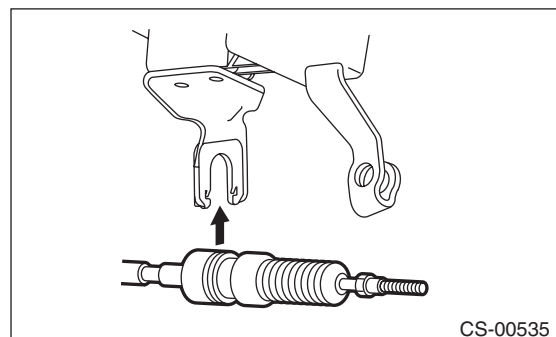
(A) Range select lever
(B) Snap pin
(C) Select cable
(D) Bracket
(E) Washer

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 and rear exhaust pipes and the muffler. <Ref. to EX(H6DO)-5, INSTALLATION, Front Exhaust Pipe.> <Ref. to EX(H6DO)-7, INSTALLATION, Rear Exhaust Pipe.> <Ref. to EX(H6DO)-9, INSTALLATION, Muffler.>

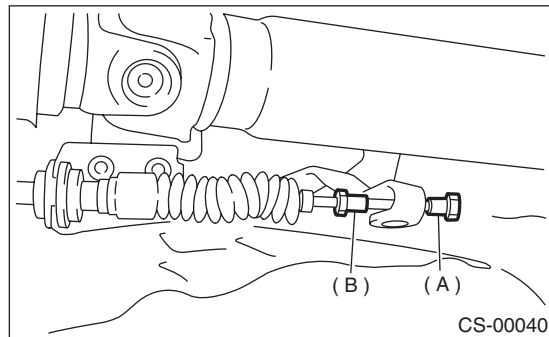
C: INSPECTION

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.

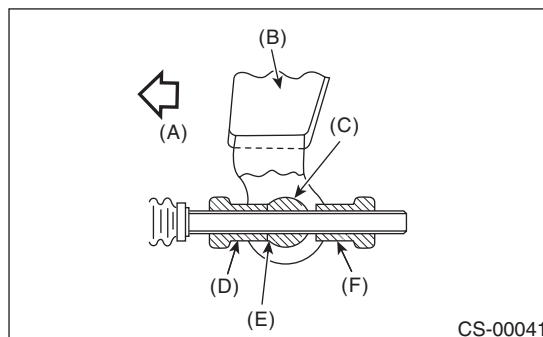
D: ADJUSTMENT

- 1) Shift the select lever to "N" range.
- 2) Remove the rear exhaust pipe and muffler. <Ref. to EX(H6DO)-7, REMOVAL, Rear Exhaust Pipe.> <Ref. to EX(H6DO)-9, 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.

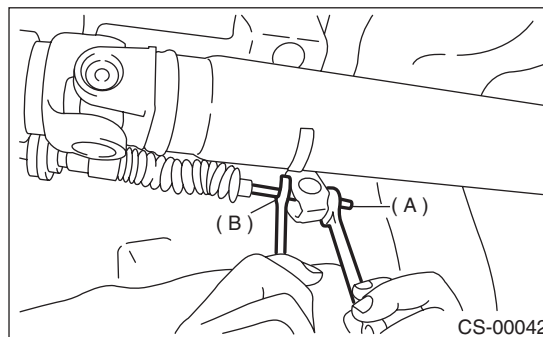


- (A) Forward side
(B) Select lever
(C) Connector
(D) Adjusting nut B
(E) Contact point
(F) Adjusting nut A

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 (0.8 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

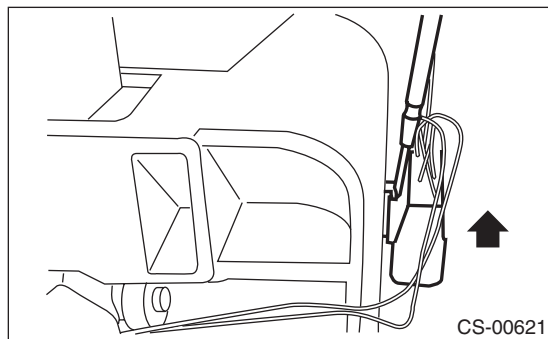
A: REMOVAL

NOTE:

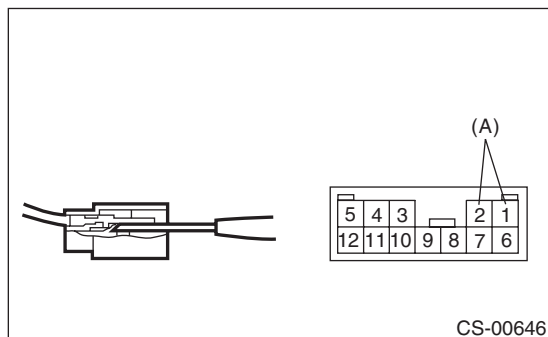
For removal of the mode change switch and the shift button switch, refer to the section on Select Levers. <Ref. to CS-20, DISASSEMBLY, Select Lever.>

1. “P” RANGE SWITCH

- 1) Remove the console box. <Ref. to EI-40, REMOVAL, Console Box.>
- 2) Disconnect the connector.
- 3) Remove the connector from the base plate using a flat tip screwdriver.

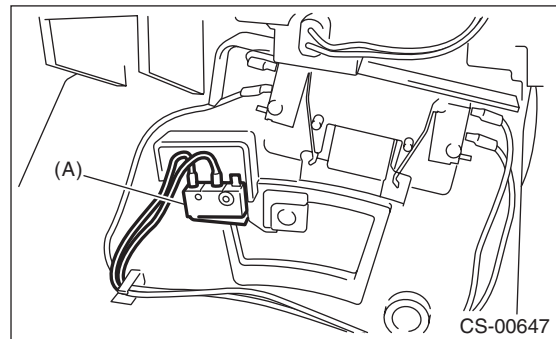


- 4) Disconnect the terminal of “P” range switch from connector, using a flat-tip screwdriver with thin tip.



(A) “P” range switch

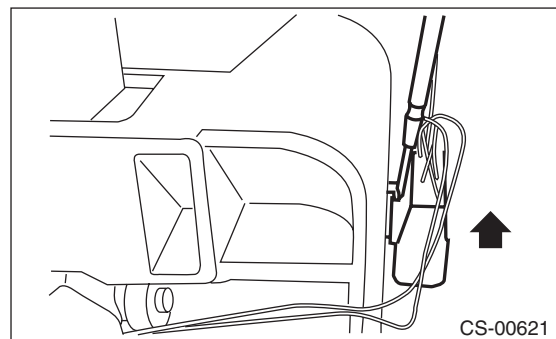
- 5) Remove the clip while being careful not to break the pin, then remove the P range switch.



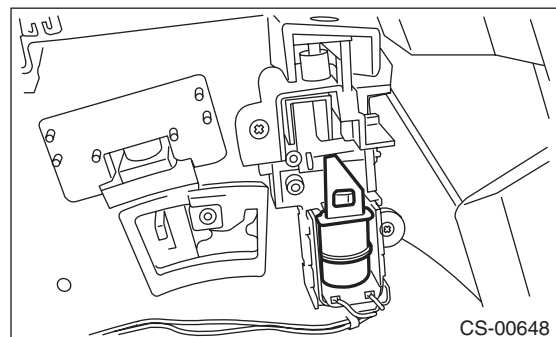
(A) “P” range switch

2. AT SHIFT LOCK SOLENOID

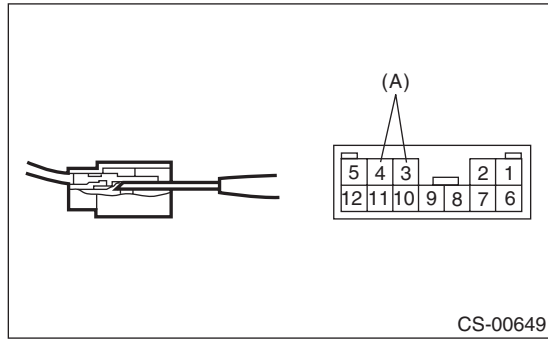
- 1) Remove the console box. <Ref. to EI-40, REMOVAL, Console Box.>
- 2) Disconnect the connector.
- 3) Remove the connector from the base plate using a flat tip screwdriver.



- 4) Remove the solenoid unit.



5) Remove the terminal of the solenoid unit, using a flat tip screwdriver.



(A) Solenoid unit

B: INSTALLATION

NOTE:

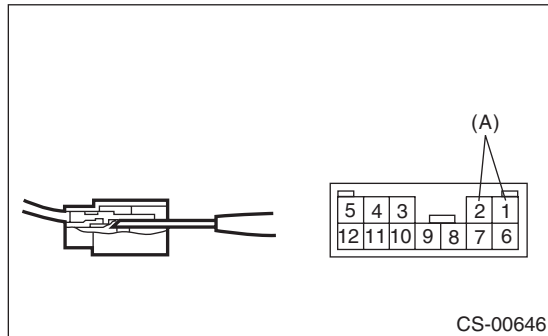
For installation of the mode change switch and the shift button switch, refer to the section on Select Levers. <Ref. to CS-25, ASSEMBLY, Select Lever.>

1. “P” RANGE SWITCH

Install in the reverse order of removal.

NOTE:

Connect the “P” range switch terminal to connector.



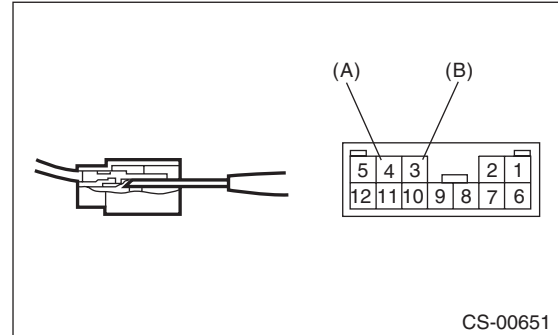
(A) “P” range switch (color code: Red)

2. AT SHIFT LOCK SOLENOID

Install in the reverse order of removal.

NOTE:

Connect the solenoid unit terminals to the connector.



(A) Solenoid unit (color code: Black)

(B) Solenoid unit (color code: Blue)

AT Shift Lock Solenoid and “P” Range Switch

CONTROL SYSTEMS

C: INSPECTION

	Step	Check	Yes	No
1	CHECK SOLENOID UNIT. Measure the resistance of solenoid unit connector terminals. Terminals No. 4 — No. 3:	Is the resistance 19.8 — 24.2 Ω ?	Go to step 2.	Replace the solenoid unit.
2	CHECK SOLENOID UNIT. Connect the battery to the solenoid unit connector terminals, and then operate the solenoid unit. Terminals No. 3 (+) — No. 4 (-):	Does the solenoid unit operate normally?	Go to step 3.	Replace the solenoid unit.
3	CHECK “P” RANGE SWITCH. 1) Shift 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 other than “P” range. 2) Measure the resistance between “P” range switch connector terminals. Terminals No. 1 — No. 2:	Is the resistance 1 M Ω or more?	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-48, 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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