

TRANSMISSION 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.

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

AUTOMATIC TRANSMISSION

5AT

	Page
1. General Description	2
2. Automatic Transmission Fluid	27
3. Differential Gear Oil.....	29
4. Road Test.....	30
5. Stall Test	31
6. Time Lag Test	33
7. Line Pressure Test	34
8. Transfer Clutch Pressure Test	36
9. Automatic Transmission Assembly	38
10. Transmission Mounting System	47
11. Extension Case Oil Seal	49
12. Differential Side Retainer Oil Seal.....	50
13. Inhibitor Switch.....	51
14. Front Vehicle Speed Sensor	52
15. Rear Vehicle Speed Sensor.....	54
16. Turbine speed sensor 1	57
17. Control Valve Body	58
18. ATF Filter	60
19. Transmission Control Module (TCM)	61
20. Lateral G Sensor	63
21. ATF Cooler Pipe & Hose.....	64
22. Air Breather Hose.....	69
23. Oil Charge Pipe.....	70
24. Torque Converter Assembly	71
25. Extension Case & Intermediate Case	72
26. Transfer Clutch.....	74
27. Multi-Plate Clutch	76
28. Rear Drive Shaft.....	77
29. Reduction Driven Gear.....	78
30. Center Differential Carrier	80
31. Parking Pawl	82
32. Converter Case	84
33. Oil Pump Cover	86
34. Drive Pinion Shaft Assembly.....	89
35. Front Differential.....	94
36. AT Main Case	99
37. Transmission Control Device	108

General Description

AUTOMATIC TRANSMISSION

1. General Description

A: SPECIFICATION

1. TORQUE CONVERTER CLUTCH

Model	Turbo	Non-turbo
Type	Symmetric, 3 element, single stage, 2 phase torque converter	
Stall torque ratio	2.1	
Nominal diameter	250 mm (9.84 in)	
Stall speed (at sea level)	3,100 — 3,500 rpm	2,400 — 2,800 rpm
One-way clutch	Sprague type one-way clutch	

2. OIL PUMP

Type	Internal gear fixed displacement pump	
Driving method	Driven by engine	
Number of teeth	Inner rotor	9
	Outer rotor	10

3. TRANSMISSION CONTROL ELEMENT

Type	5-forward, 1-reverse, double-row planetary gears
Multi-plate clutch	3 sets
Multi-plate brake	4 sets
One-way clutch (sprague type)	3 sets

4. TRANSMISSION GEAR RATIO

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

5. PLANETARY GEAR AND PLATE

Model	Turbo	Non-turbo
Tooth number of front internal gear	106	
Tooth number of front carrier	28	
Tooth number of front sun gear	50	
Tooth number of mid internal gear	78	
Tooth number of mid carrier	18	
Tooth number of mid sun gear	42	
Tooth number of rear internal gear	110	
Tooth number of rear carrier	24	
Tooth number of rear sun gear	62	
Drive plate number of front brake	2	
Drive plate number of input clutch	6	5

Model	Turbo	Non-turbo
Drive plate number of high & low reverse clutch	4	4
Drive plate number of direct clutch	5	
Drive plate number of reverse brake	5	6
Drive plate number of forward brake	5	4
Drive plate number of low coast brake	3	

6. SELECTOR POSITION

P (Park)	Transmission in neutral, output member immovable, and engine start possible
R (Reverse)	Transmission in reverse for backing
N (Neutral)	Transmission in neutral and engine start possible
D (Drive)	Automatic gear change 1st ← → 2nd ← → 3rd ← → 4th ← → 5th
Manual mode (+)	Manual gear change 1st → 2nd → 3rd → 4th → 5th
Manual mode (-)	Manual gear change 1st ← 2nd ← 3rd ← 4th ← 5th
Control method	Wire cable type

7. HYDRAULIC CONTROL & LUBRICATION

Type	Electronic/hydraulic control [5 forward speed changes by electrical signals of vehicle speed and accelerator (throttle) opening]
Fluid	Specified fluid: SUBARU ATF (Part No. K0140Y0700) Recommended fluid: IDEMITSU ATF HP Castrol Transmax J NOTE: Using of recommended fluid is permitted only on the area where the specified is not available.
Fluid capacity ℓ (US qt, Imp qt)	9.6 — 10.0 (10.1 — 10.6, 8.4 — 8.8)
Lubrication system	Forced feed lubrication with oil pump

8. COOLING & HARNESS

Cooling system	Liquid-cooled cooler incorporated in radiator or ATF liquid-cooled cooler
Transmission harness	20+ 8 poles

9. TRANSFER

Model	Turbo	Non-turbo
Transfer type	Variable torque distribution (VTD)	
Drive & driven plate number of transfer clutch	4	3
Reduction gear ratio	1.000 (41/41)	

10.FINAL REDUCTION

Model	Turbo	NA (OUTBACK)	NA (except for OUTBACK)
Front final reduction gear ratio	3.272		3.083

11.RECOMMENDED GEAR OIL

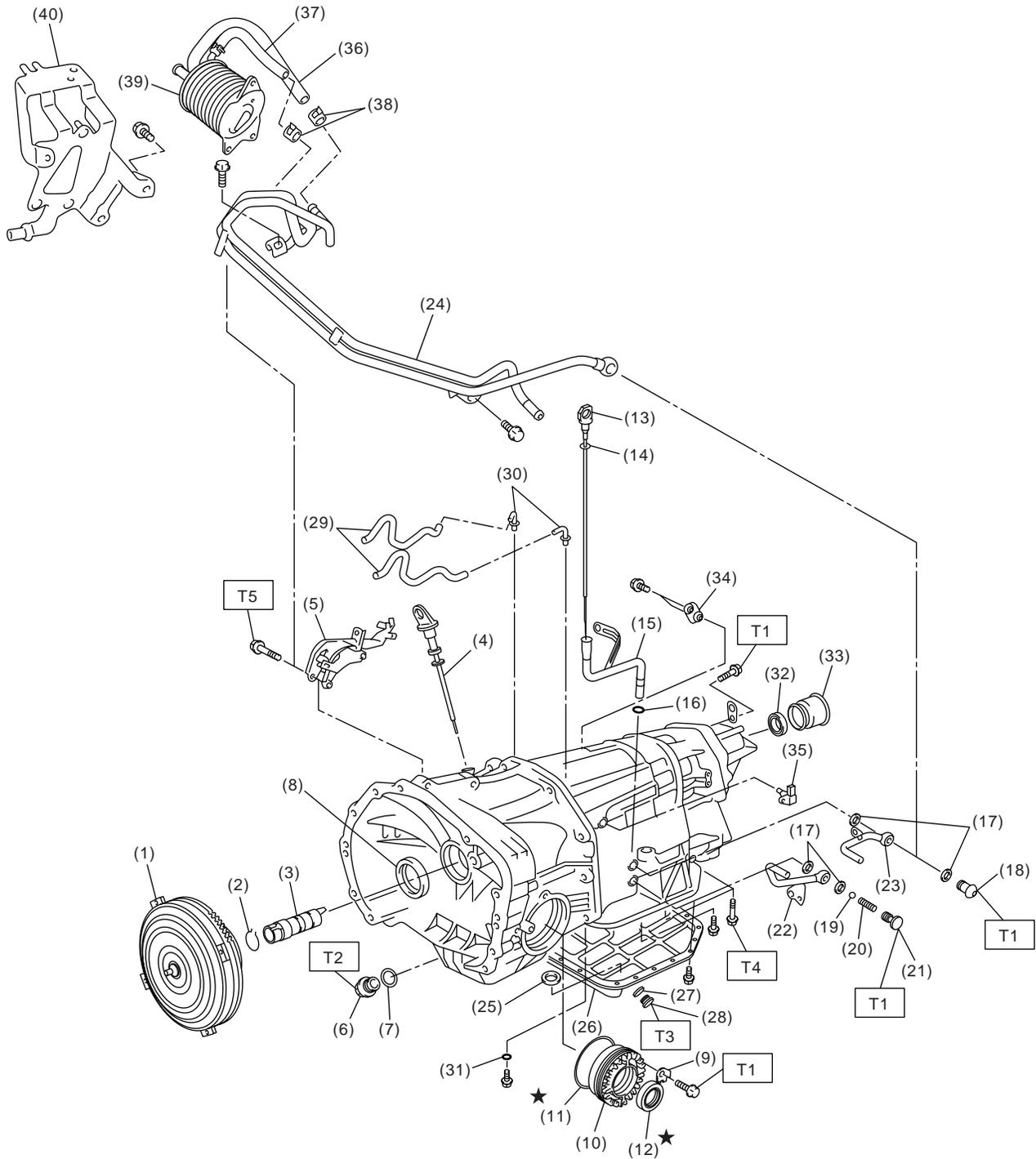
Lubrication oil	<p style="text-align: center;">(1) Item (2) Front differential gear oil (3) API classification (4) SAE viscosity No. and applicable temperature</p>
Front differential gear oil capacity ℓ (US qt, Imp qt)	1.3 — 1.5 (1.4 — 1.6, 1.1 — 1.3)

General Description

AUTOMATIC TRANSMISSION

B: COMPONENT

1. TORQUE CONVERTER CLUTCH & TRANSMISSION ASSEMBLY



AT-02024

General Description

AUTOMATIC TRANSMISSION

(1) Torque converter ASSY	(19) Ball	(35) Turbine speed sensor 1
(2) Circlip	(20) Spring	(36) ATF cooler inlet hose
(3) Oil pump shaft	(21) Union screw	(37) ATF cooler outlet hose
(4) Differential oil level gauge	(22) ATF outlet pipe	(38) Hose clamp (model with ATF warmer)
(5) Pitching stopper bracket	(23) ATF inlet pipe (model without ATF warmer)	(39) ATF cooler ASSY (model with ATF warmer)
(6) Differential oil drain plug	(24) ATF inlet pipe (model with ATF warmer)	(40) ATF cooler bracket (model with ATF warmer)
(7) Gasket	(25) Magnet	
(8) Oil seal	(26) Oil pan	
(9) Lock plate	(27) Gasket	
(10) Side retainer	(28) ATF drain plug	
(11) O-ring	(29) Breather hose	
(12) Oil seal	(30) Nipple	
(13) ATF level gauge	(31) O-ring	
(14) O-ring	(32) Oil seal	
(15) Oil charge pipe	(33) Dust cover	
(16) O-ring	(34) Floating bracket	
(17) Gasket		
(18) Union screw		

Tightening torque: N·m (kgf-m, ft-lb)

T1: 25 (2.5, 18.1)

T2: 70 (7.1, 51.6)

T3: 20 (2.0, 14.8)

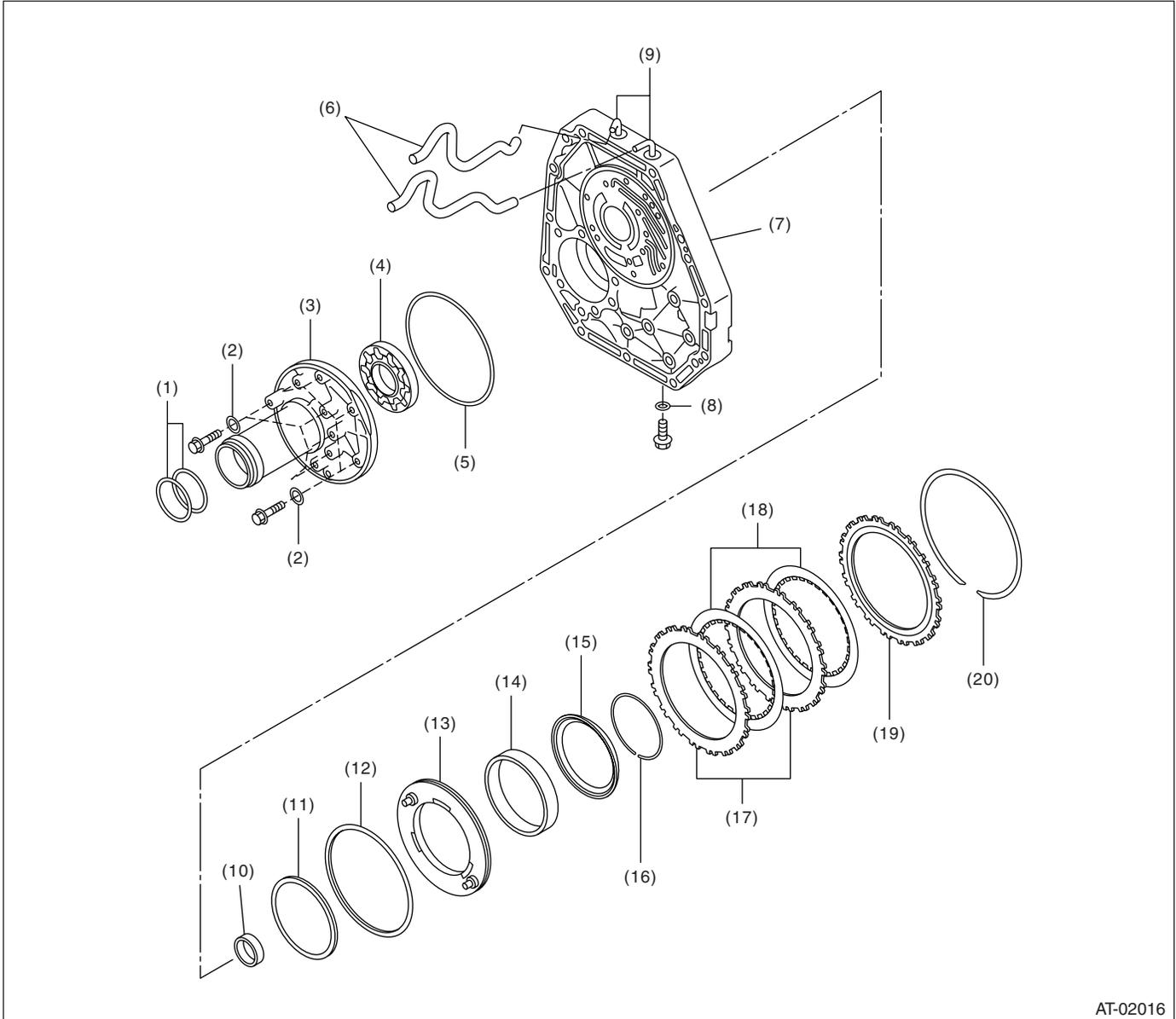
T4: 5 (0.5, 3.7)

T5: 40 (4.1, 29.5)

General Description

AUTOMATIC TRANSMISSION

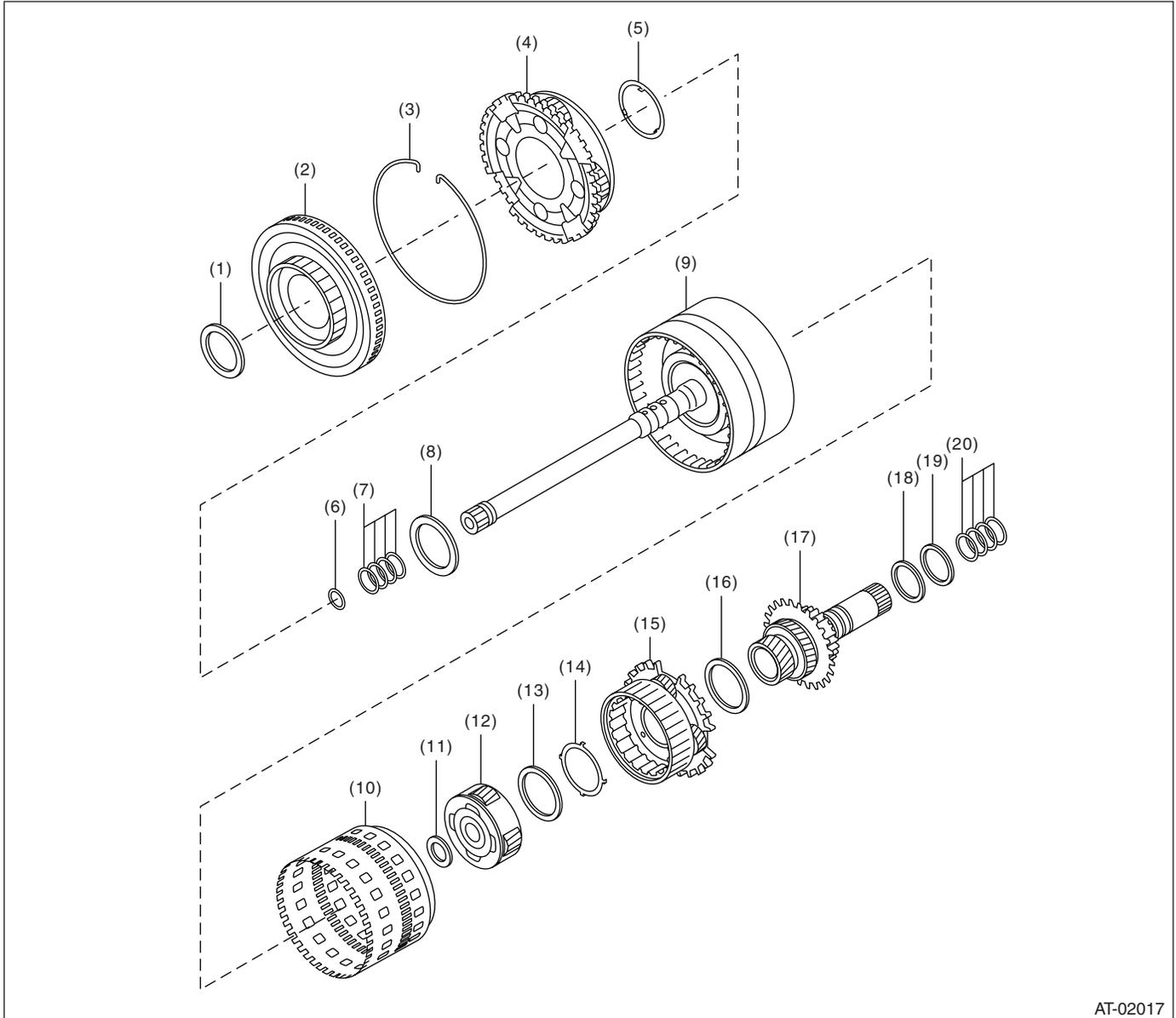
2. OIL PUMP & FRONT BRAKE



AT-02016

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

3. FRONT PLANETARY CARRIER and MIDDLE & REAR PLANETARY CARRIER



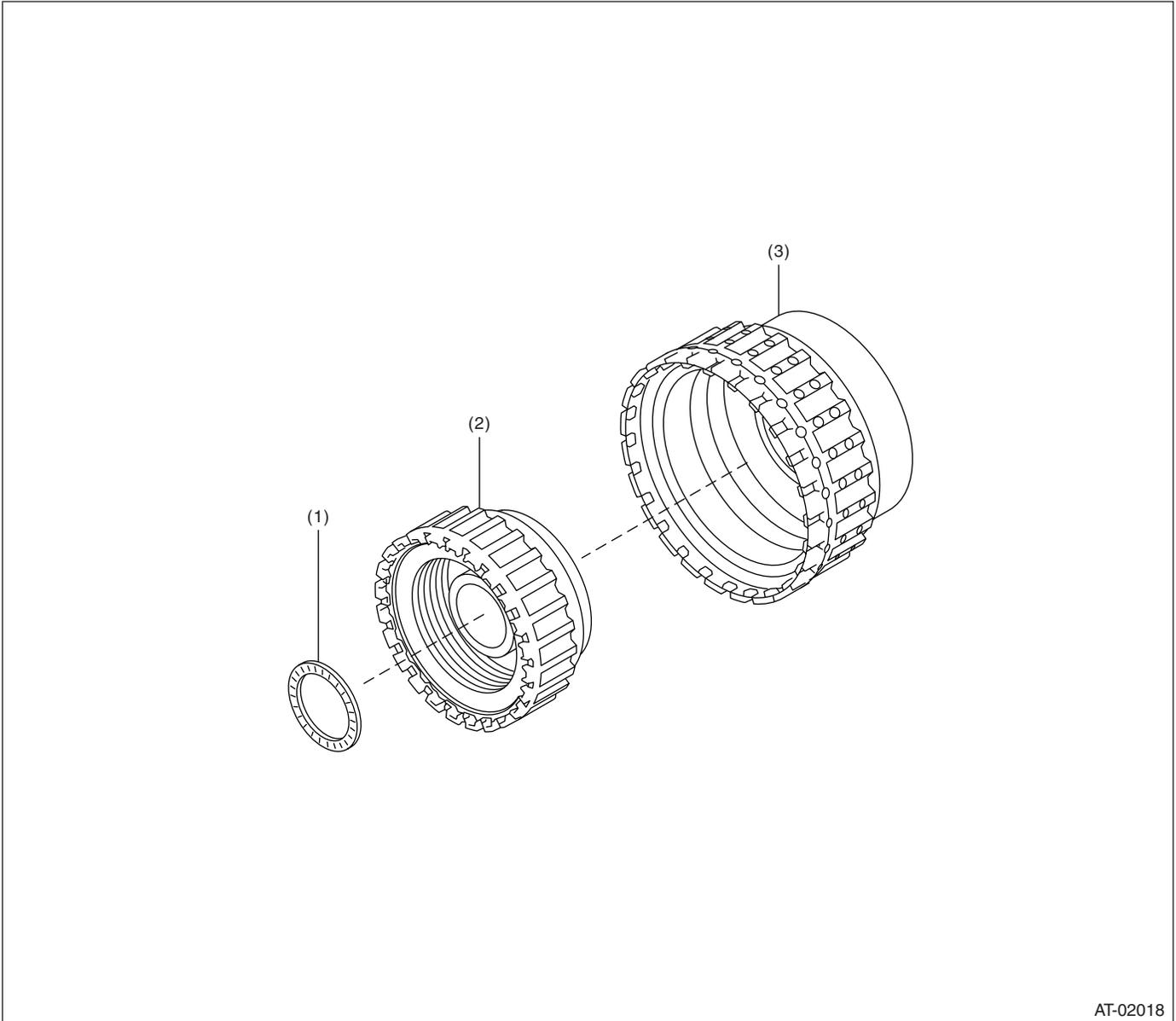
AT-02017

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

General Description

AUTOMATIC TRANSMISSION

4. DIRECT CLUTCH and HIGH & LOW REVERSE CLUTCH



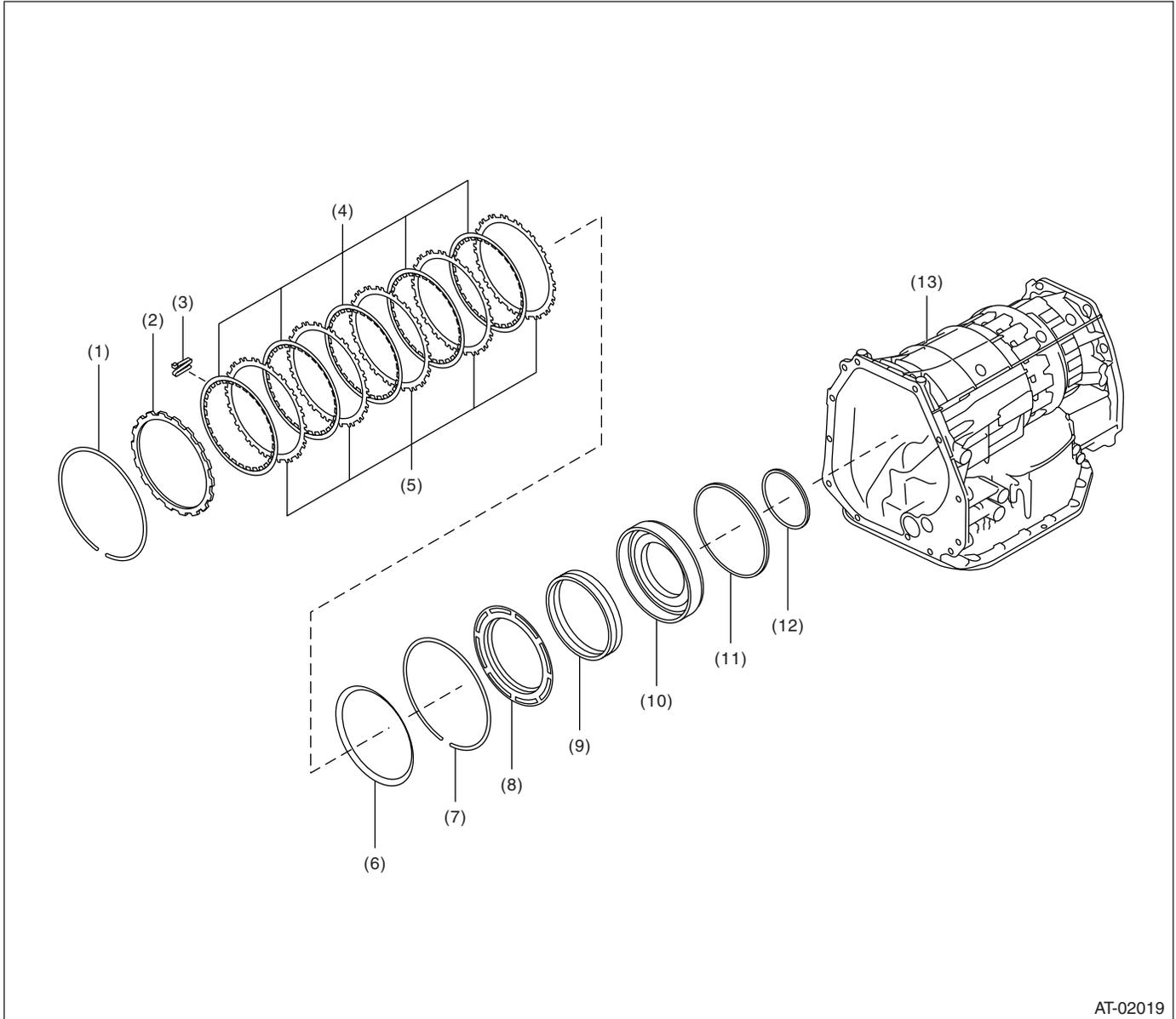
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(1) Thrust bearing

(2) High & low reverse clutch ASSY

(3) Direct clutch ASSY

5. REVERSE BRAKE



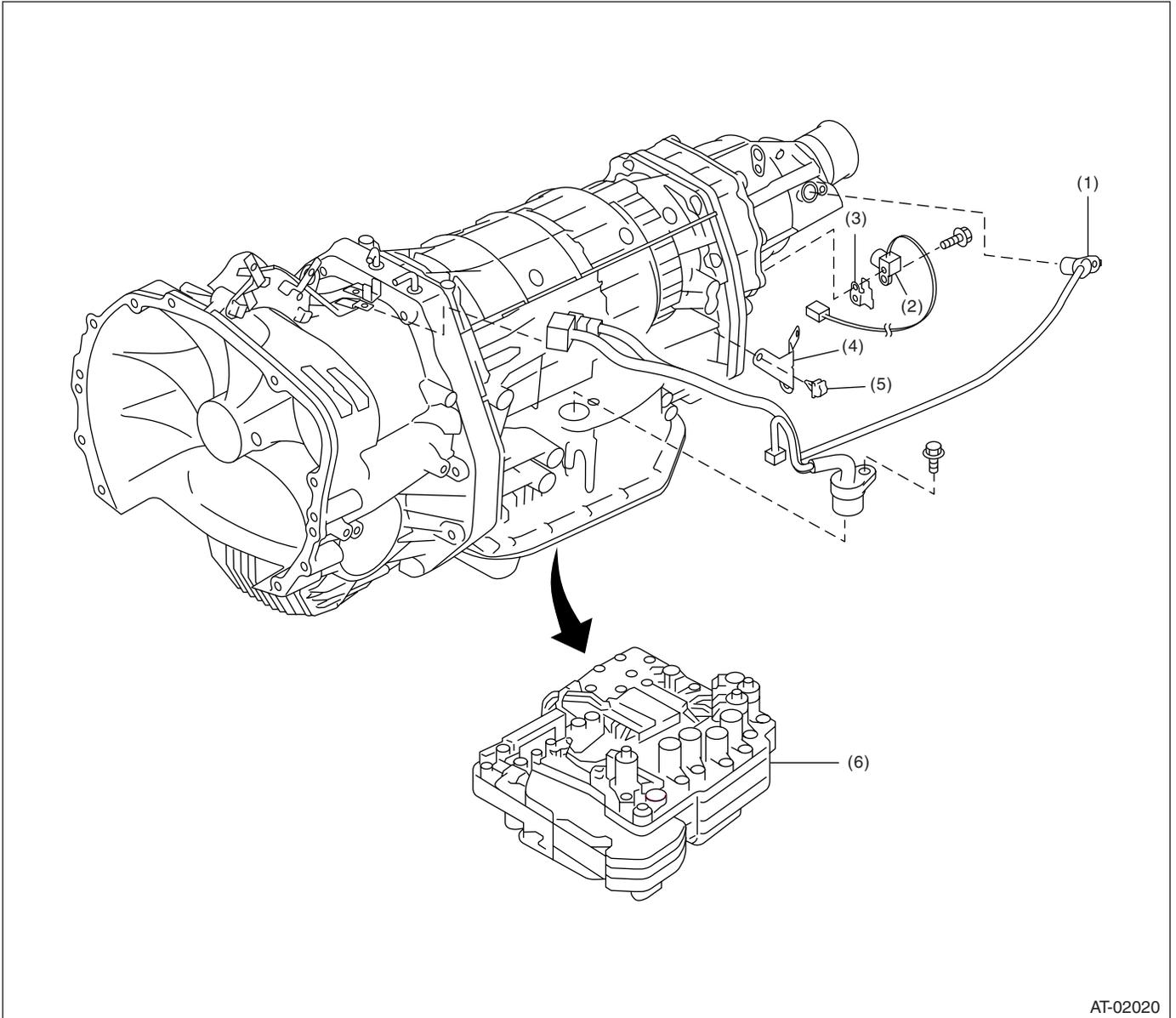
AT-02019

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

General Description

AUTOMATIC TRANSMISSION

6. CONTROL VALVE & TRANSMISSION HARNESS



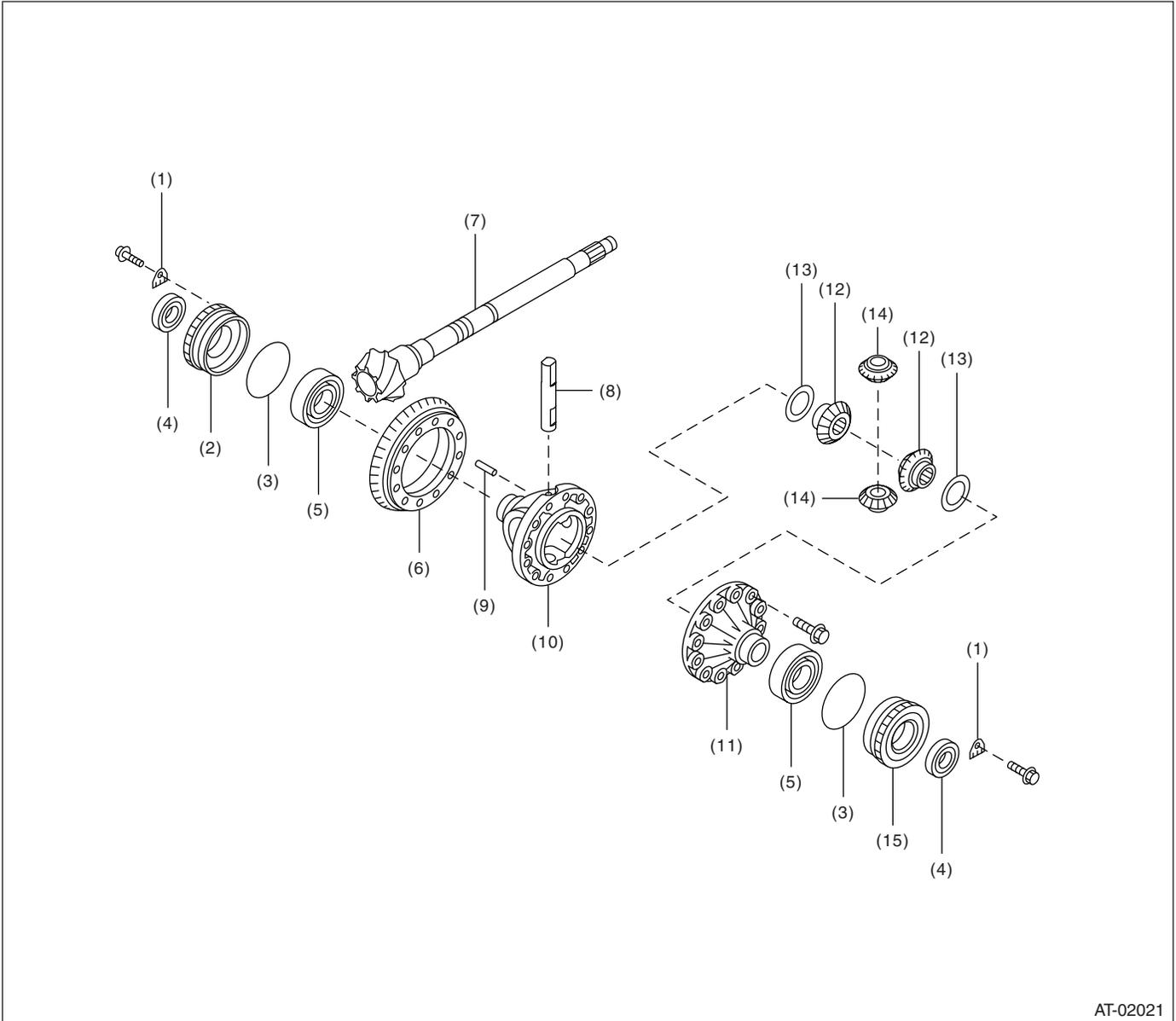
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(1) Transmission harness ASSY
(2) Front vehicle speed sensor

(3) Sensor cover
(4) Harness bracket

(5) Clip
(6) Control valve ASSY

7. DIFFERENTIAL GEAR

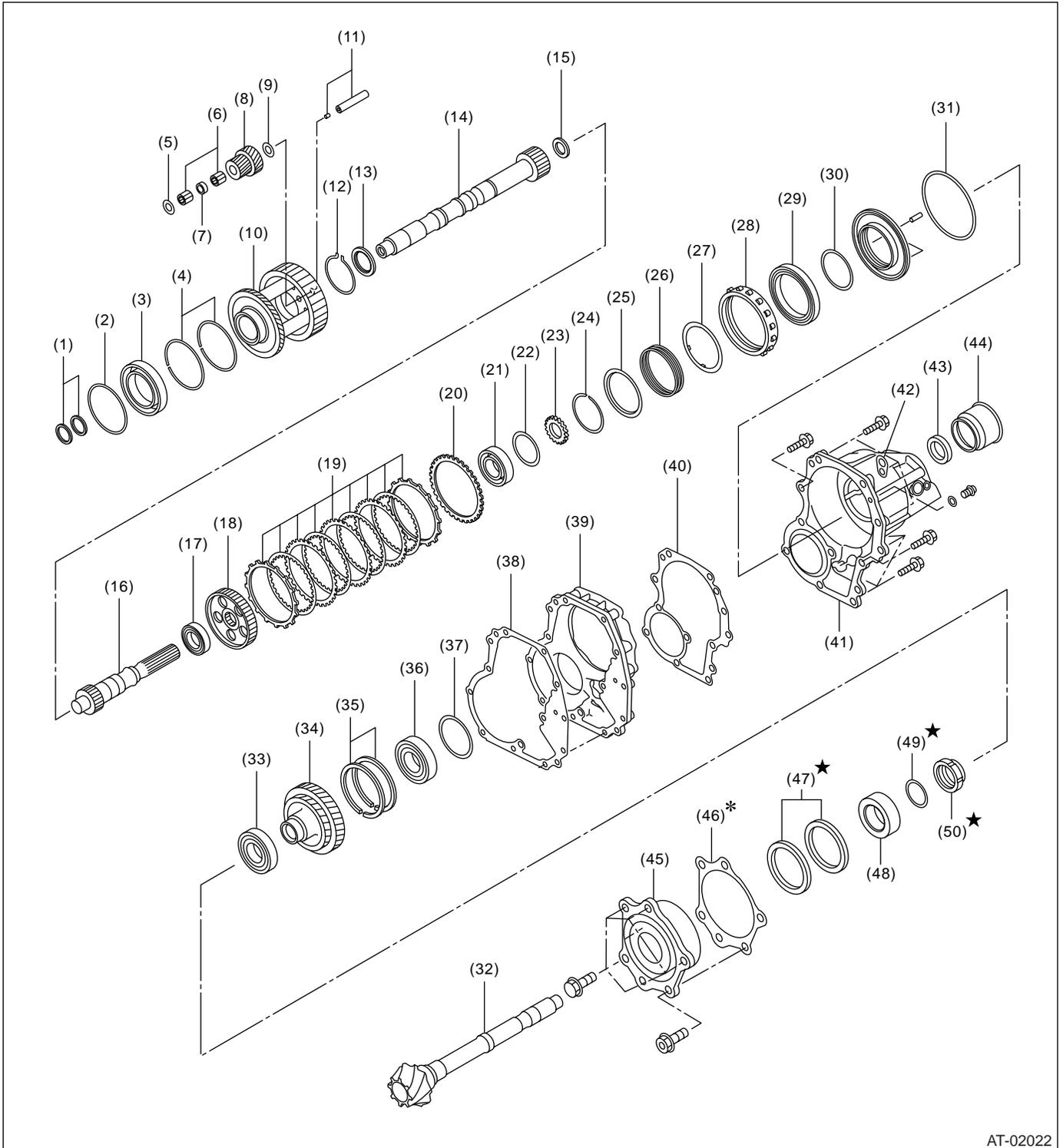


- | | | |
|-----------------------------------|---------------------------|------------------------------------|
| (1) Retainer plate RH | (6) Hypoid driven gear | (11) Differential case LH |
| (2) Differential side retainer RH | (7) Drive pinion shaft | (12) Differential bevel gear |
| (3) O-ring |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

General Description

AUTOMATIC TRANSMISSION

8. TRANSFER CASE, EXTENSION CASE & REDUCTION GEAR



AT-02022

General Description

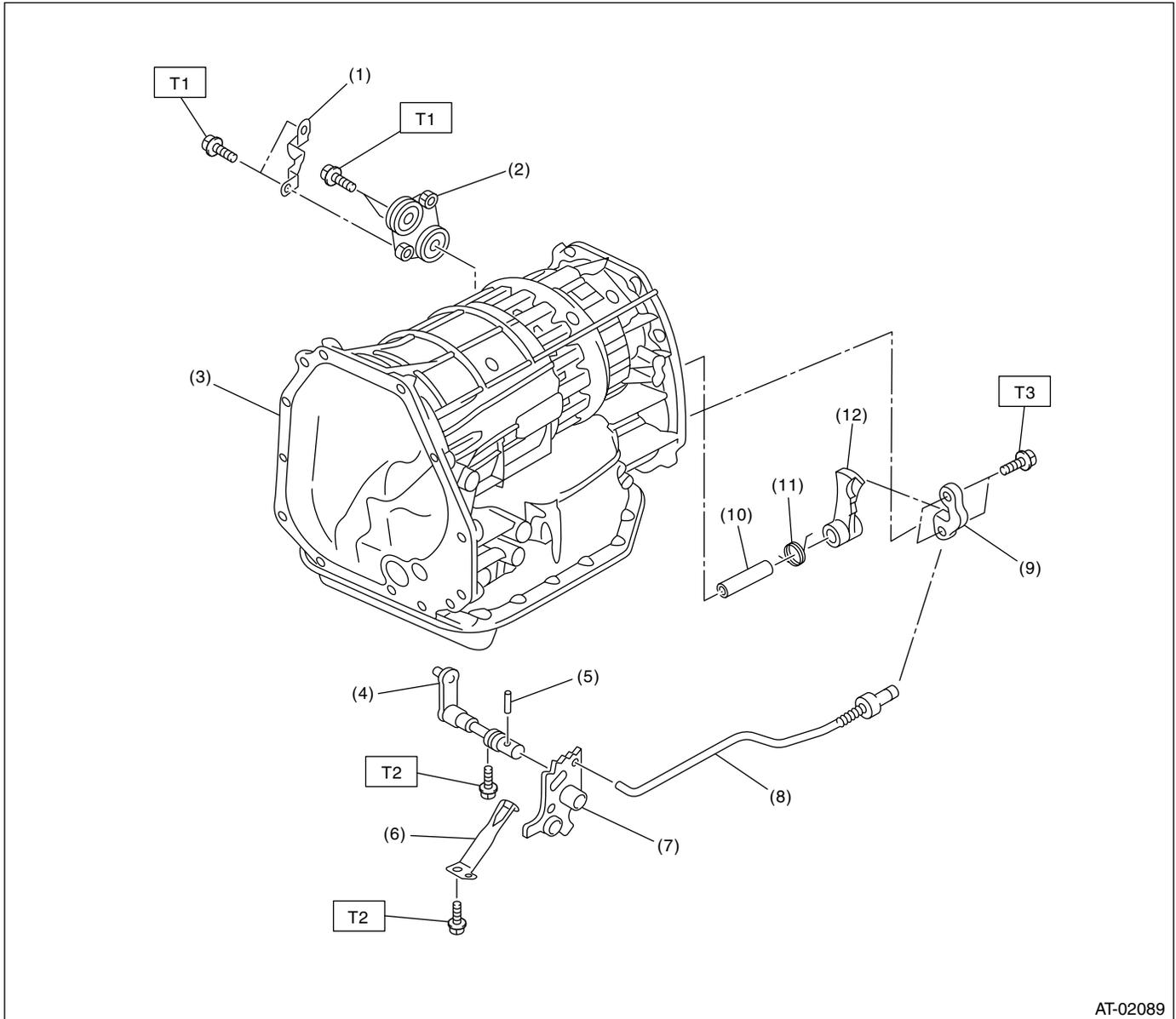
AUTOMATIC TRANSMISSION

(1) Seal ring	(18) Transfer clutch hub	(35) Snap ring
(2) Reduction gear shim	(19) Transfer clutch plate	(36) Ball bearing
(3) Ball bearing	(20) Driven plate No. 3.	(37) Shim
(4) Snap ring	(21) Ball bearing	(38) Gasket
(5) Planetary pinion washer	(22) Rear drive shaft shim	(39) Intermediate case
(6) Needle bearing	(23) Revolution gear	(40) Shim
(7) Spacer	(24) Snap ring	(41) Extension case
(8) Pinion gear	(25) Clutch spring retainer	(42) Transmission hanger
(9) Washer	(26) Return spring	(43) Oil seal
(10) Planetary carrier ASSY	(27) Spring retainer	(44) Dust cover
(11) Planetary pinion shaft ASSY	(28) Pressure plate	(45) Taper roller bearing
(12) Snap ring	(29) Ball bearing	(46) Drive pinion shim
(13) Thrust bearing	(30) O-ring	(47) Oil seal
(14) Intermediate shaft	(31) C-ring	(48) Drive pinion collar
(15) Thrust washer	(32) Drive pinion shaft	(49) O-ring
(16) Rear drive shaft	(33) Ball bearing	(50) Lock nut
(17) Ball bearing	(34) Reduction driven gear	

General Description

AUTOMATIC TRANSMISSION

9. TRANSMISSION CONTROL DEVICE & PARKING SUPPORT



- | | |
|------------------------|------------------------------|
| (1) Bracket | (7) Manual plate |
| (2) Floating bracket | (8) Parking rod |
| (3) AT main case | (9) Parking support actuator |
| (4) Range select lever | (10) Parking pawl shaft |
| (5) Straight pin | (11) Return spring |
| (6) Dimension spring | (12) Parking pawl |

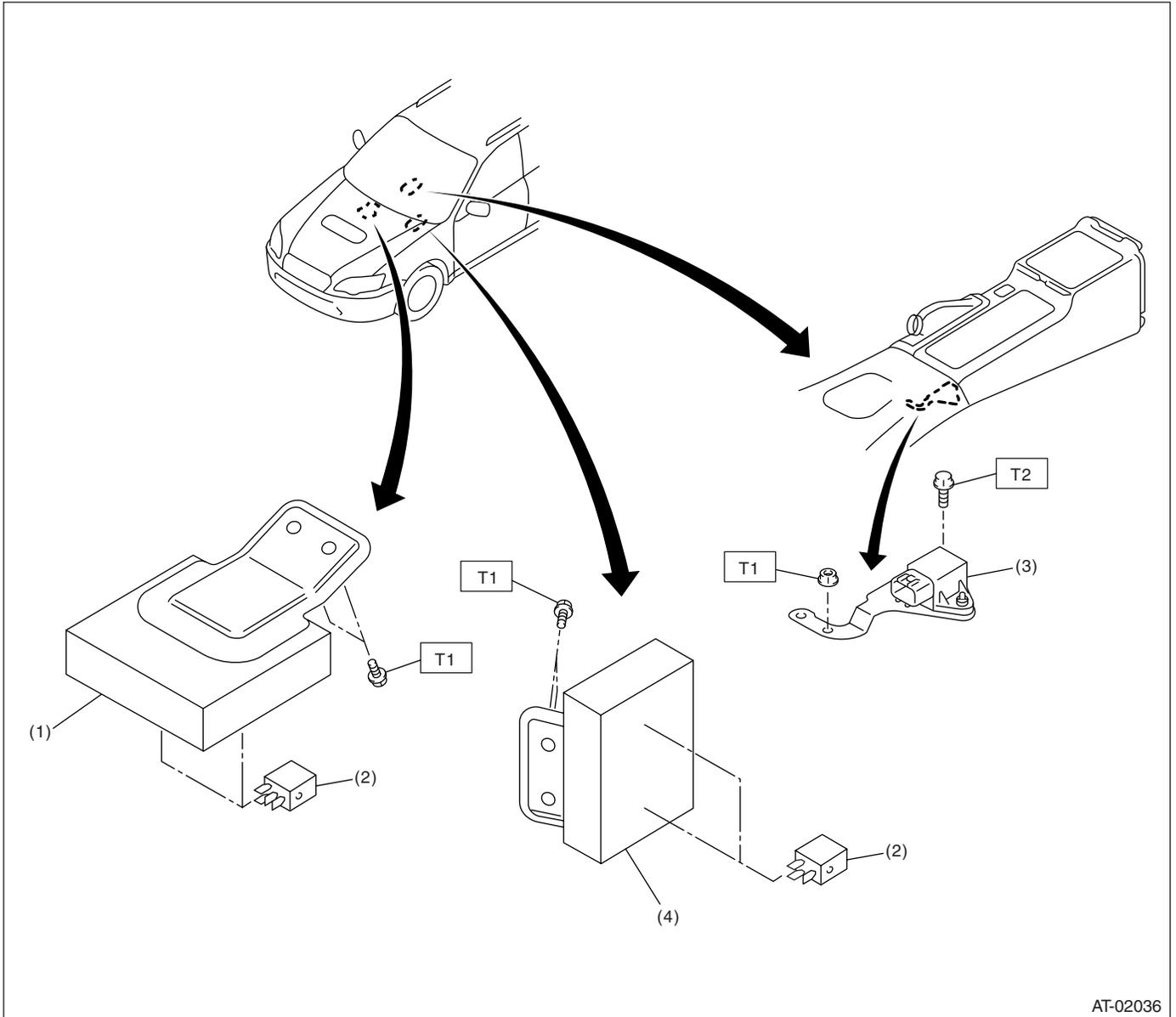
Tightening torque: N·m (kgf·m, ft·lb)

T1: 25 (2.5, 18.4)

T2: 6 (0.6, 4.4)

T3: <Ref. to 5AT-82, Parking Pawl.>

10. TRANSMISSION CONTROL MODULE



- (1) Transmission control module (TCM) (RHD model)
- (2) Relay

- (3) Lateral G sensor
- (4) Transmission control module (TCM) (LHD model)

Tightening torque: N·m (kgf·m, ft·lb)

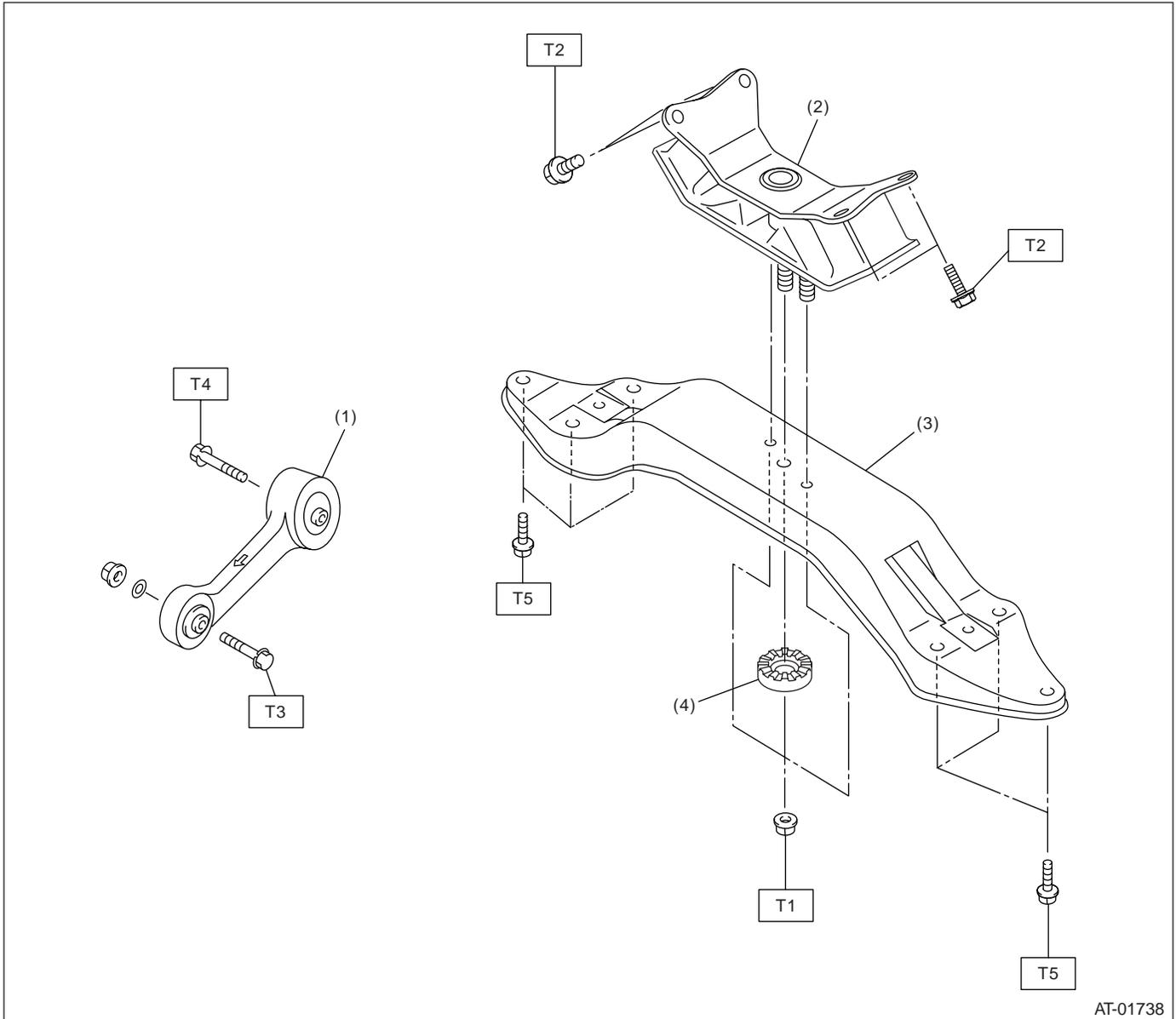
T1: 7.5 (0.76, 5.5)

T2: 24.5 (2.5, 18.1)

General Description

AUTOMATIC TRANSMISSION

11. TRANSMISSION MOUNTING



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

Tightening torque: N·m (kgf·m, ft·lb)

T1: 35 (3.6, 26)

T2: 40 (4.1, 29.5)

T3: 50 (5.1, 36.9)

T4: 58 (5.9, 42.8)

T5: 70 (7.1, 51.6)

C: CAUTION

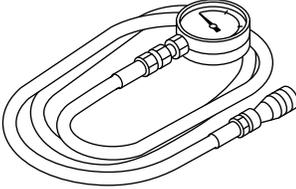
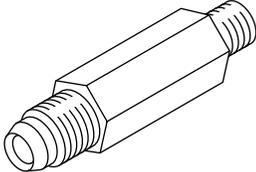
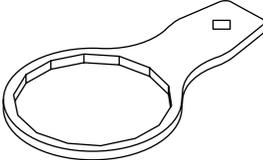
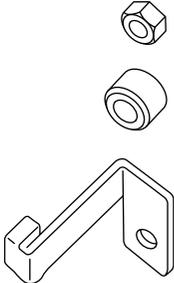
- Wear work clothing, including a cap, protective goggles, and protective shoes during operation.
- Remove contamination including dirt and corrosion before removal, installation or disassembly.
- Keep the disassembled parts in order and protect them from dust and dirt.
- Until the oil pan is removed, do not place with the oil pan side facing up to prevent foreign matter from entering the valve body.
- Before removal, installation or disassembly, be sure to clarify the failure. Avoid unnecessary removal, disassembly and replacement.
- When disassembling the case and other light alloy parts, disassemble them by slightly tapping with a plastic hammer. Do not pry it apart with a screwdriver or other tool.
- Be careful not to burn yourself, because each part on the vehicle is hot after running.
- Use SUBARU genuine gear oil, grease etc. or the equivalent. Do not mix them with that of another grade or from other manufacturers.
- Be sure to tighten fasteners including bolts and nuts to the specified torque.
- Place shop jacks or rigid racks at the specified points.
- Apply gear oil onto sliding or revolution surfaces before installation.
- Replace deformed or otherwise damaged snap rings with new ones.
- Before installing O-rings or oil seals, apply sufficient amount of ATF fluid to avoid damage and deformation.
- Be careful not to incorrectly install or fail to install O-rings, snap rings and other such parts.
- Before securing a part on a vice, place cushioning material such as wood blocks, aluminum plate, or cloth between the part and the vice.
- Avoid damaging the mating surface of the case.
- Before applying liquid gasket, completely remove the old seal.

General Description

AUTOMATIC TRANSMISSION

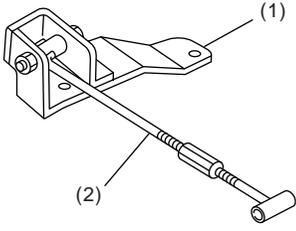
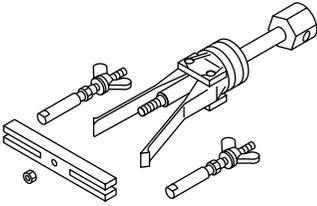
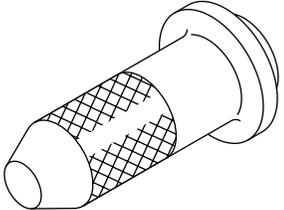
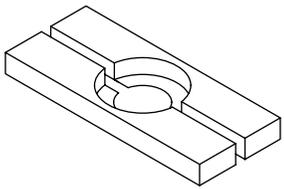
D: PREPARATION TOOL

1. SPECIAL TOOL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p style="text-align: center;">ST-498575400</p>	498575400	OIL PRESSURE GAUGE ASSY	Used for measuring oil pressure.
 <p style="text-align: center;">ST-498897200</p>	498897200	ADAPTER	<ul style="list-style-type: none"> • Used with oil pump cover installed on when measuring line pressure. • Used with extension case installed on when measuring transfer clutch pressure.
 <p style="text-align: center;">ST-498545400</p>	498545400	FILTER WRENCH	Used for removing and installing ATF filter.
 <p style="text-align: center;">ST-498277200</p>	498277200	STOPPER SET	Used for removing and installing automatic transmission assembly to engine.

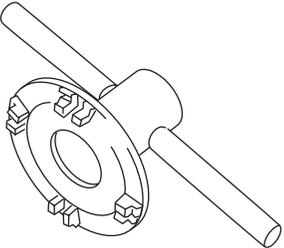
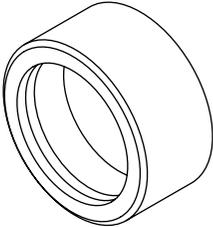
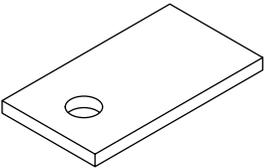
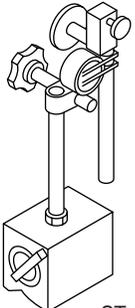
General Description

AUTOMATIC TRANSMISSION

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p>ST41099AC000</p>	41099AC000	ENGINE SUPPORT ASSEMBLY	Used for supporting engine. (1) ENGINE SUPPORT BRACKET (41099AC010) (2) ENGINE SUPPORT ROD (41099AC020)
 <p>ST-398527700</p>	398527700	PULLER ASSY	<ul style="list-style-type: none"> • Used for removing extension case roller bearing. • Used for removing extension oil seal. • Used for removing front differential side retainer bearing outer race. • Used for removing front differential side retainer oil seal.
 <p>ST-498057300</p>	498057300	INSTALLER	Used for installing extension oil seal.
 <p>ST-498077000</p>	498077000	REMOVER	Used for removing differential taper roller bearing.

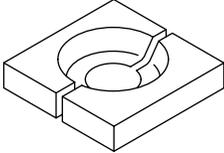
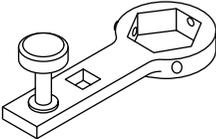
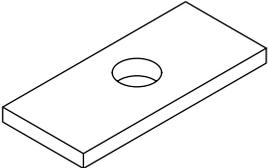
General Description

AUTOMATIC TRANSMISSION

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p style="text-align: center;">ST18630AA010</p>	<p style="text-align: center;">18630AA010 (Newly adopted tool)</p>	<p style="text-align: center;">WRENCH COMPL RETAINER</p>	<p>Used for removing and installing differential side retainer.</p>
 <p style="text-align: center;">ST-398487700</p>	<p style="text-align: center;">398487700</p>	<p style="text-align: center;">DRIFT</p>	<p>Used for installing front differential taper roller bearing.</p>
 <p style="text-align: center;">ST-498255400</p>	<p style="text-align: center;">498255400</p>	<p style="text-align: center;">PLATE</p>	<p>Used for measuring backlash of hypoid gear.</p>
 <p style="text-align: center;">ST-498247001</p>	<p style="text-align: center;">498247001</p>	<p style="text-align: center;">MAGNET BASE</p>	<ul style="list-style-type: none"> • Used for measuring gear backlash. • Used with DIAL GAUGE (498247100).

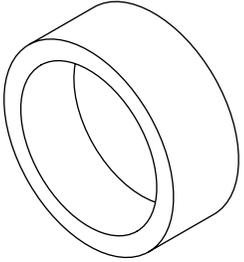
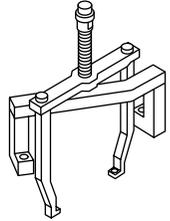
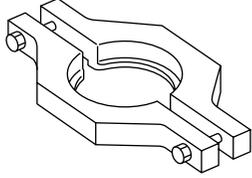
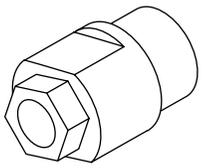
General Description

AUTOMATIC TRANSMISSION

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p>ST-498247100</p>	498247100	DIAL GAUGE	<ul style="list-style-type: none"> • Used for measuring gear backlash. • Used with MAGNET BASE (498247001).
 <p>ST-498517000</p>	498517000	REPLACER	Used for removing front roller bearing.
 <p>ST-499787700</p>	499787700	WRENCH	Used for removing and installing drive pinion lock nut.
 <p>ST-398643600</p>	398643600	GAUGE	Used for measuring total end play, extension end play and drive pinion height.

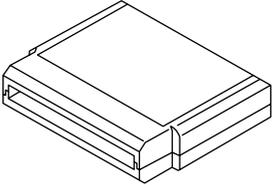
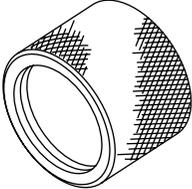
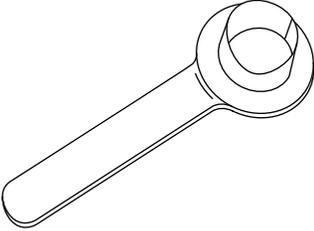
General Description

AUTOMATIC TRANSMISSION

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p style="text-align: center;">ST-398744300</p>	398744300	GAUGE	Used for measuring contact surface between multi-plate clutch end and transmission.
 <p style="text-align: center;">ST-499737100</p>	499737100	PULLER SET	Used for removing reduction drive gear assembly.
 <p style="text-align: center;">ST-498077600</p>	498077600	REMOVER	Used for removing ball bearing.
 <p style="text-align: center;">ST18667AA010</p>	18667AA010 (Newly adopted tool)	HOLDER	<ul style="list-style-type: none"> • Used for removing and installing drive pinion lock nut. • Used as a handle to rotate gear when checking tooth contact.

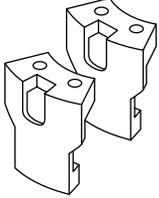
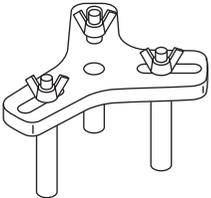
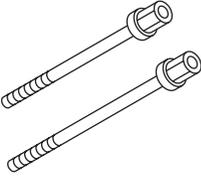
General Description

AUTOMATIC TRANSMISSION

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p>ST24082AA230</p>	<p>24082AA230</p>	<p>CARTRIDGE</p>	<p>Troubleshooting for electrical system.</p>
 <p>ST22771AA030</p>	<p>22771AA030</p>	<p>SUBARU SELECT MONITOR KIT</p>	<p>Troubleshooting for electrical system.</p> <ul style="list-style-type: none"> • English: 22771AA030 (Without printer) • German: 22771AA070 (Without printer) • French: 22771AA080 (Without printer) • Spanish: 22771AA090 (Without printer)
 <p>ST18675AA000</p>	<p>18675AA000</p>	<p>DIFFERENTIAL SIDE OIL SEAL INSTALLER</p>	<p>Used for installing differential side retainer oil seal.</p>
 <p>ST28399SA010</p>	<p>28399SA010</p>	<p>OIL SEAL PROTEC- TOR</p>	<p>Used for protecting oil seal when installing front drive shaft.</p>

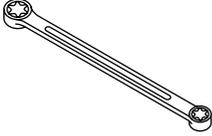
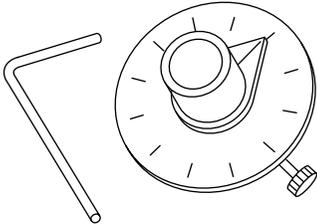
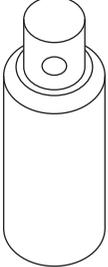
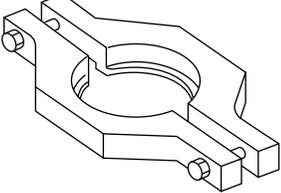
General Description

AUTOMATIC TRANSMISSION

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p style="text-align: center;">ST18680AA000</p>	<p style="text-align: center;">18680AA000 (Newly adopted tool)</p>	<p>HOLDER GEAR</p>	<p>Used for removing reduction driven gear assembly. (2-piece)</p>
 <p style="text-align: center;">ST18762AA000</p>	<p style="text-align: center;">18762AA000 (Newly adopted tool)</p>	<p>COMPRESSOR SPECIAL TOOL</p>	<p>Used for disassembling multiplate clutch for shift transmission.</p>
 <p style="text-align: center;">ST18673AA000</p>	<p style="text-align: center;">18673AA000 (Newly adopted tool)</p>	<p>COMPRESSOR SHAFT</p>	<p>Used for disassembling multiplate clutch for shift transmission.</p>
 <p style="text-align: center;">ST18765AA000</p>	<p style="text-align: center;">18765AA000 (Newly adopted tool)</p>	<p>COMPRESSOR SUPPORT</p>	<p>Used for disassembling multiplate clutch for shift transmission.</p>

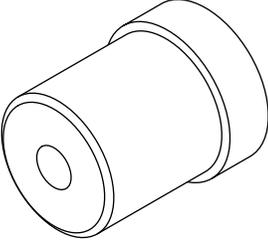
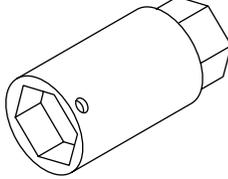
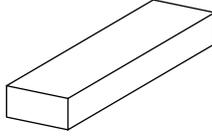
General Description

AUTOMATIC TRANSMISSION

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p>ST18676AA020</p>	<p>18676AA020 (Newly adopted tool)</p>	<p>TORX® WRENCH</p>	<p>Used for disassembling torque converter case.</p>
 <p>ST18854AA000</p>	<p>18854AA000 (Newly adopted tool)</p>	<p>ANGLE GAUGE</p>	<p>Used for tightening parking support.</p>
 <p>ST18679AA000</p>	<p>18679AA000 (Newly adopted tool)</p>	<p>ADJUSTER</p>	<p>Used for adjusting position when tightening parking support.</p>
 <p>ST-498077310</p>	<p>498077310</p>	<p>REMOVER</p>	<p>Used for removing ball bearing of reduction driven gear.</p>

General Description

AUTOMATIC TRANSMISSION

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p style="text-align: center;">ST-499587100</p>	499587100	OIL SEAL INSTALLER	Used for installing oil seal.
 <p style="text-align: center;">ST-499787500</p>	499787500	ADAPTER	Used for removing and installing drive pinion lock nut.
 <p style="text-align: center;">ST-499575400</p>	499575400	GAUGE	Used for measuring height of total end play.

2. GENERAL TOOL

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

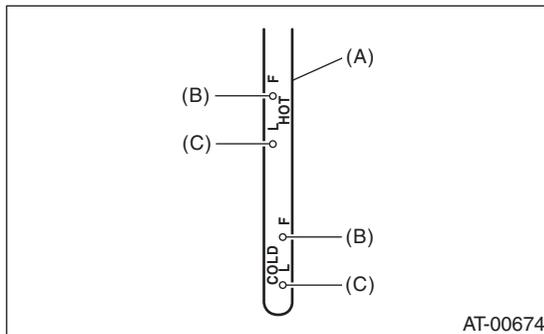
2. Automatic Transmission Fluid

A: INSPECTION

NOTE:

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

- 1) Raise the ATF temperature by driving a distance of 5 to 10 km (3 to 6 miles). Otherwise, idle the engine to raise ATF temperature to 70 to 80°C (158 to 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. Measure the ATF level with engine idling for one or two minutes.



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

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

CAUTION:

- Use care not to exceed the upper level.
- When the transmission is cold, be careful not to add ATF to the upper level on HOT side. Overfilling of ATF may cause oil splashing.

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

- 7) Check the ATF for leaks.

Visually check for leaks in the transmission. If there are leaks, replace the gasket, oil seals, plugs or other parts.

B: REPLACEMENT

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

CAUTION:

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

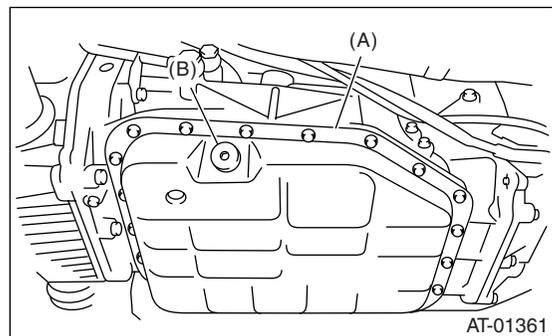
- 3) Check the condition of ATF.
 <Ref. to 5AT-28, CONDITION CHECK, Automatic Transmission Fluid.>
- 4) Tighten the ATF drain plug.

NOTE:

Use a new gasket.

Tightening torque:

20 N·m (2.0 kgf-m, 14.8 ft-lb)



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

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

Specified fluid:

SUBARU ATF (Part No. K0140Y0700)

Recommended fluid:

**IDEMITSU ATF HP
 Castrol Transmax J**

NOTE:

Using of recommended fluid is permitted only on the area where the specified is not available.

Capacity:

Fill the same amount of ATF 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-27, 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.	Excessive wear of the internal of the transmission body	Replace ATF and check if AT operates correctly.
Thick and varnish-form fluid.	Burned clutch and etc.	Replace ATF and check if AT or vehicle for faulty.
Clouded fluid or bubbles are found in fluid.	Water mixed in fluid	Replace ATF and check the water entering point.

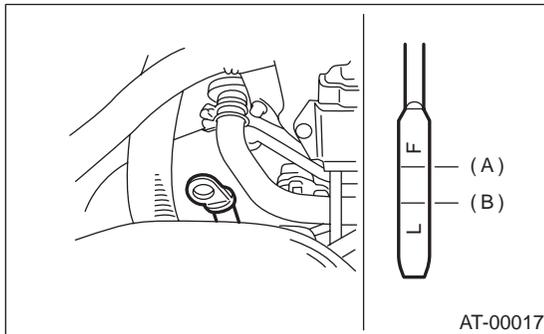
3. Differential Gear Oil

A: INSPECTION

- 1) Park the vehicle on a level surface.
- 2) Remove the collector cover.
- 3) Remove the oil level gauge and wipe it clean.
- 4) Reinsert the level gauge all the way. Be sure that the level gauge is correctly inserted and in the proper orientation.
- 5) Remove the oil level gauge again, and check the level of differential gear oil. If the differential gear oil level is below "L" line, add oil to bring the level up to "F" line.

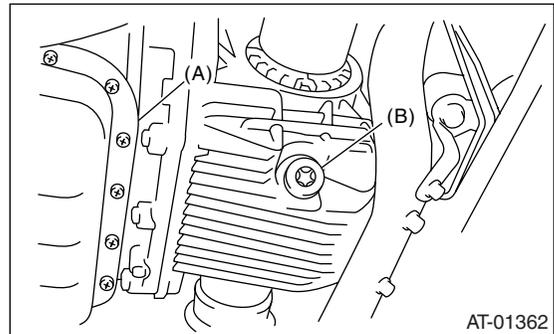
NOTE:

To prevent overfilling the differential gear oil, do not add oil above "F" line.



- (A) Upper level
- (B) Lower level

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



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

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

Recommended gear oil:

<Ref. to 5AT-3, RECOMMENDED GEAR OIL, SPECIFICATION, General Description.>

Gear oil capacity:

1.3 — 1.5 ℓ (1.3 — 1.6 US qt, 1.1 — 1.3 Imp qt)

- 6) Check the level of differential gear oil.
 <Ref. to 5AT-29, INSPECTION, Differential Gear Oil.>

B: REPLACEMENT

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

CAUTION:

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

- 3) Tighten the differential gear oil drain plug using TORX® BIT T70.

NOTE:

Use a new gasket.

4. Road Test

A: INSPECTION

1. GENERAL PRECAUTION

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

NOTE:

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

2. D RANGE SHIFT FUNCTION

Check shifting between 1st ↔ 2nd ↔ 3rd ↔ 4th ↔ 5th while driving on normal city streets.

3. D RANGE SHIFT SHOCK

Check the shock level when shifting up during normal driving.

4. KICK-DOWN FUNCTION

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

5. ENGINE BRAKE OPERATION

- Check the 4th gear engine brake when shifting down from 5th to 4th range while driving in 5th gear of manual mode [50 to 60 km/h (31 to 37 MPH)].
- Check the 3rd gear engine brake when shifting down from 4th to 3rd range while driving in 4th gear of manual mode [50 to 60 km/h (31 to 37 MPH)].
- Check the 2nd gear engine brake when shifting down from 3rd to 2nd range while driving in 3rd gear of manual mode [40 to 50 km/h (25 to 31 MPH)].
- Check the 1st gear engine brake when shifting down from 2nd to 1st range while driving in 2nd gear of manual mode [20 to 30 km/h (12 to 19 MPH)].

6. LOCK-UP FUNCTION

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

7. P RANGE OPERATION

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

8. NOISE & VIBRATION

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

9. OIL LEAKAGE

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

5. Stall Test

A: INSPECTION

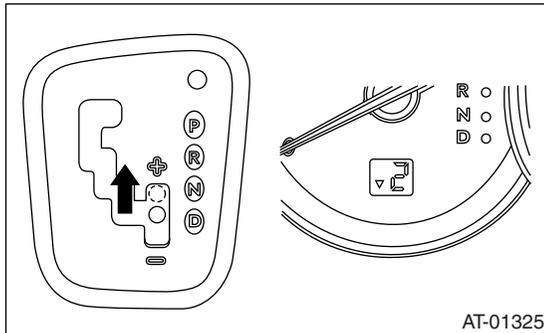
NOTE:

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

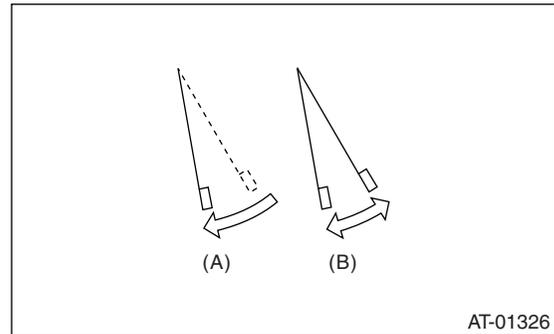
Purposes of the stall test:

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

- 1) Check that the throttle valve opens fully.
- 2) Check that the engine oil level is correct.
- 3) Check that the coolant level is correct.
- 4) Check that the ATF level is correct.
- 5) Check that the differential gear oil level is correct.
- 6) 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 to 80°C (158 to 176°F) 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 engage the parking brake.
- 8) Move the manual linkage to ensure it operates properly, and then set "2nd on manual mode".



- 9) While forcibly depressing the foot brake pedal, gradually depress the accelerator pedal until the engine operates at full throttle.



- (A) Brake pedal
(B) Accelerator pedal

- 10) When the engine speed is stabilized, quickly record that speed and release the accelerator pedal.
- 11) Shift the select lever to "N" range, and cool down the engine by idling it for more than one minute.
- 12) Perform the procedure for "R" range in the same way as "2nd on manual mode".

NOTE:

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

Stall speed (at sea level):

TURBO MODEL

3,100 — 3,500 rpm

NON-TURBO MODEL

2,400 — 2,800 rpm

Stall Test

AUTOMATIC TRANSMISSION

Stall speed (at sea level)	Range	Possible faulty part
Less than standard	R	<ul style="list-style-type: none"> • Engine • One-way clutch of the torque converter clutch
More than standard	2nd gear of manual mode	<ul style="list-style-type: none"> • Line pressure too low • Forward brake • Forward brake one-way clutch • Direct clutch • 3rd one-way clutch
	R	<ul style="list-style-type: none"> • Line pressure too low • Reverse clutch
Within specifications	2nd gear of manual mode	<ul style="list-style-type: none"> • Reverse clutch • One-way clutch of the torque converter
	R	<ul style="list-style-type: none"> • Forward brake • Forward brake one-way clutch • Direct clutch • 3rd one-way clutch • One-way clutch of the torque converter

6. Time Lag Test

A: INSPECTION

NOTE:

When the select lever is shifted while the engine is idling, there will be a certain time elapse or lag before the shock can be felt. Using this, check the condition of forward brake, reverse brake, 1st one-way clutch, forward one-way clutch and 3rd one-way clutch.

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

1) Fully apply the parking brake.

2) Start the engine.

Check the idling speed (A/C OFF).

3) Shift the select lever from “N” to “D” range. Using a stop watch, measure the time-lag which takes from shifting the lever until the shock is felt.

Time-lag

Standard: 1.2 sec. or less

If “N” → “D” time-lag is longer than specified:

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

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

Time-lag

Standard: 1.5 sec. or less

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

- Line pressure too low
- Reverse brake worn

7. Line Pressure Test

A: MEASUREMENT

NOTE:

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

- Excessive shocks during up-shift or shifting takes place at a higher point than under normal circumstances, may be due to the line pressure being too high.

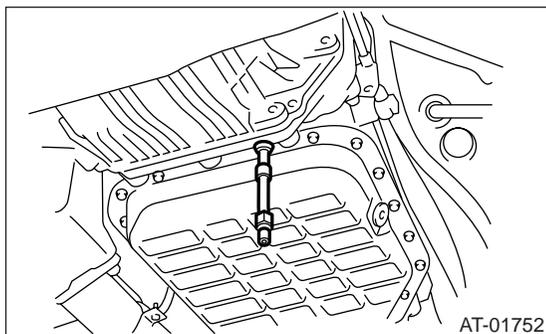
- Slippage or inability to operate the vehicle may, in most cases, be due to loss of oil pressure for the operation of the clutch, brake or control valve.

1) Set the vehicle on a lift.

2) Remove the under cover.

3) Remove the test plug and install the ST.

ST 498897200 OIL PRESSURE ADAPTER



4) Set the ST1 and ST2.

ST1 498897200 OIL PRESSURE ADAPTER

ST2 498575400 OIL PRESSURE GAUGE
ASSY

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

ST1 498897200 OIL PRESSURE ADAPTER

ST2 498575400 OIL PRESSURE GAUGE
ASSY

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

(1) Start the engine.

(2) Turn the Subaru Select Monitor switch to ON.

(3) On the «Main Menu» display screen, select the {Each System Check} and press the [YES] key.

(4) On the «System Selection Menu» display screen, select the {Transmission} and press the [YES] key.

(5) Press the [YES] key after the information of transmission type has been displayed.

(6) On the «Transmission Diagnosis» display screen, select the {Current Data Display/Save}, and then press the [YES] key.

(7) On the «Transmission Diagnosis» display screen, select the {Data Display} and press the [YES] key.

(8) Using the scroll key, display the “P/L solenoid target oil pressure”.

Line Pressure Test

AUTOMATIC TRANSMISSION

7) Perform the line pressure test.

NOTE:

- Do not perform the line pressure test for more than 5 seconds at a time. It makes engine oil and ATF deteriorate and the clutch and brake to be adversely affected.
- Be sure to cool down the engine for at least one minute with the select lever set in “P” or “N” range and with the idle speed lower than 1,200 rpm after performing line pressure test.
- Adjust the throttle valve angle in order to obtain the “P/L solenoid target pressure” displayed on the Subaru Select Monitor.

Range of the selector lever	Throttle valve angle	ATF temperature condition	“P/L Solenoid Target Pressure” displayed on the Subaru Select Monitor kPa	Standard line pressure kPa (kg/cm ² , psi)
D	Full closed	45 — 55°C (104 — 131 °F)	490	385 — 555 (3.93 — 5.66, 55.8 — 80.5)
	Full open		1,370	1,235 — 1,475 (12.59 — 15.04, 179.1 — 213.9)
R	Full closed		1,370	1,530 — 1,925 (15.60 — 19.6, 221.9 — 279.2)

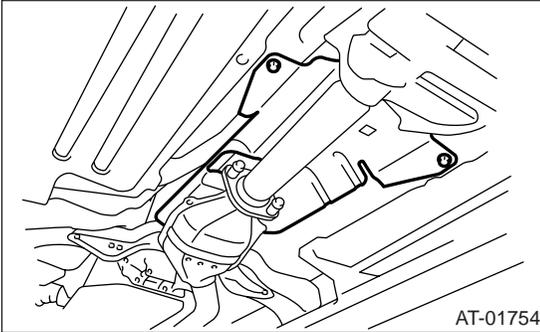
Transfer Clutch Pressure Test

AUTOMATIC TRANSMISSION

8. Transfer Clutch Pressure Test

A: INSPECTION

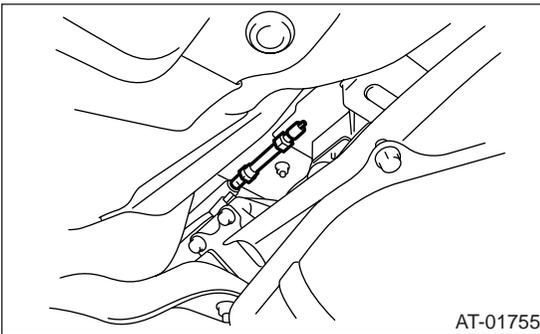
- 1) Lift-up the vehicle.
- 2) Remove the heat shield cover securing bolts to slide the heat shield cover.



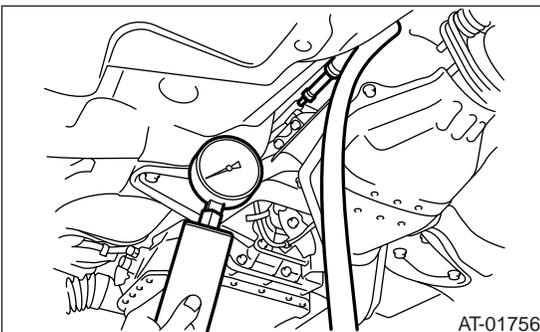
- 3) Remove the test plug and install the ST.
ST 498897200 OIL PRESSURE ADAPTER

CAUTION:

Be careful not to cut your arm with the heat shield cover when removing the test plug and installing the ST.



- 4) Set the ST1 and ST2.
ST1 498897200 OIL PRESSURE ADAPTER
ST2 498575400 OIL PRESSURE GAUGE ASSY



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

ST1 498897200 OIL PRESSURE ADAPTER
ST2 498575400 OIL PRESSURE GAUGE ASSY

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

- (1) Start the engine.
- (2) Turn the Subaru Select Monitor switch to ON.
- (3) On the «Main Menu» display screen, select the {Each System Check} and press the [YES] key.
- (4) On the «System Selection Menu» display screen, select the {Transmission} and press the [YES] key.
- (5) Press the [YES] key after the information of transmission type has been displayed.
- (6) On the «Transmission Diagnosis» display screen, select the {Current Data Display/Save}, and then press the [YES] key.
- (7) On the «Transmission Diagnosis» display screen, select the {Data Display} and press the [YES] key.
- (8) Using the scroll key, display the "T/F solenoid target oil pressure".

Transfer Clutch Pressure Test

AUTOMATIC TRANSMISSION

7) Perform the transfer clutch pressure test.

NOTE:

- Do not perform the transfer clutch pressure test for more than 5 seconds at a time. It makes engine oil and ATF deteriorate and the clutch and brake to be adversely affected.
- Be sure to cool down the engine for at least one minute with the select lever set in “P” or “N” range and with the idle speed lower than 1,200 rpm after performing transfer clutch pressure test.
- Adjust the throttle valve angle in order to obtain the “T/F solenoid target pressure” displayed on the Subaru Select Monitor.

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

Automatic Transmission Assembly

AUTOMATIC TRANSMISSION

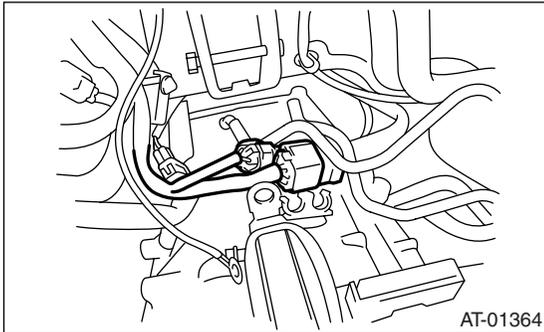
9. Automatic Transmission Assembly

A: REMOVAL

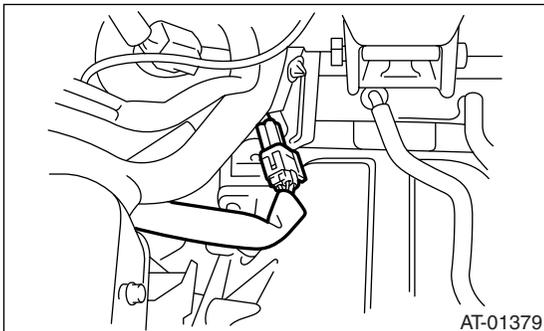
- 1) Set the vehicle on a lift.
- 2) Fully open the front hood and support with the hood stay.
- 3) Disconnect the ground cable from battery.
- 4) Remove the collector cover.
- 5) Remove the intercooler. (Turbo model)
<Ref. to IN(H4DOTC)-12, REMOVAL, Intercooler.>
- 6) Remove the air intake chamber. (Non-turbo model) <Ref. to IN(H6DO)-7, REMOVAL, Air Intake Chamber.>
- 7) Remove the air cleaner case. (Non-turbo model) <Ref. to IN(H6DO)-5, REMOVAL, Air Cleaner Case.>
- 8) Remove the air breather hose. <Ref. to 5AT-69, REMOVAL, Air Breather Hose.>
- 9) Remove the starter. <Ref. to SC(H4SO 2.0)-6, REMOVAL, Starter.>
- 10) Disconnect the following connectors.

- Turbo model

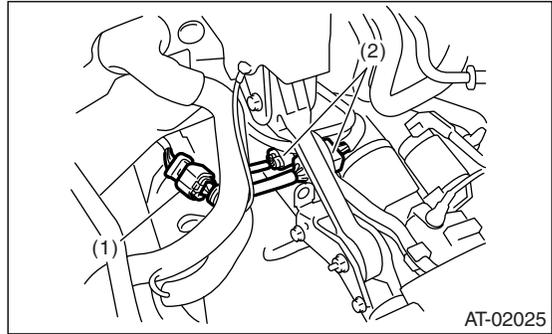
- (1) Transmission harness connectors



- (2) Front oxygen (A/F) sensor

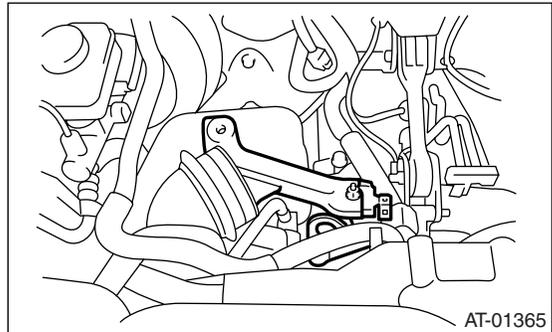


- Non-turbo model

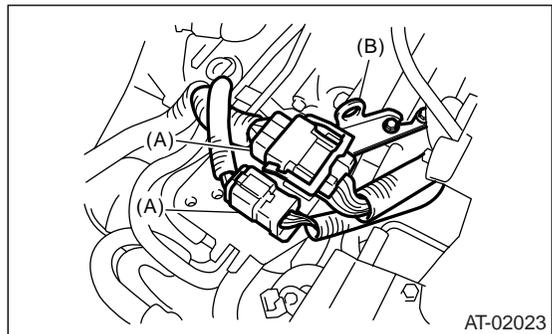


- (1) Front oxygen (A/F) sensor
- (2) Transmission harness connector

- 11) Remove the intercooler stay and engine hanger rear. (Turbo model)



- 12) Disconnect the engine harness connectors, and then remove the engine hanger rear. (Non-turbo model)

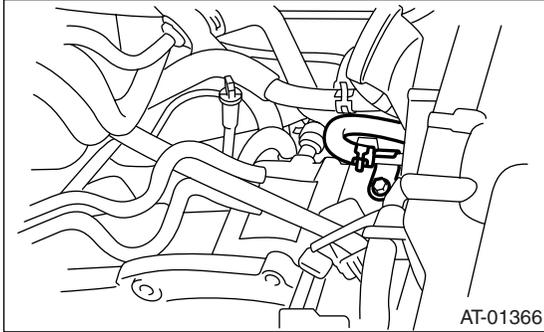


- (A) Engine harness connectors
- (B) Engine hanger rear

Automatic Transmission Assembly

AUTOMATIC TRANSMISSION

- 13) Remove the water by-pass pipe. (Turbo model)



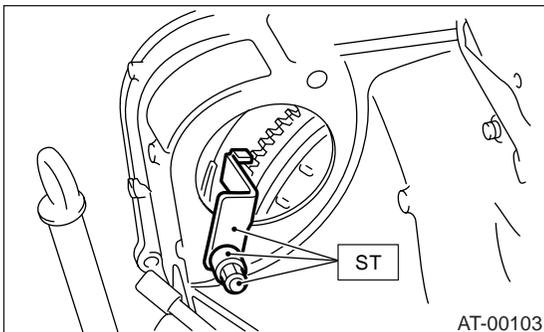
- 14) Separate the torque converter from drive plate.
(1) Remove the service hole plug.
(2) Remove the bolts which hold torque converter to drive plate.
(3) Remove the four bolts by rotating the clamp pulley a little at a time.
(4) Make sure the torque converter moves freely by rotating with finger through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

CAUTION:

Be careful not to drop bolts into converter housing.

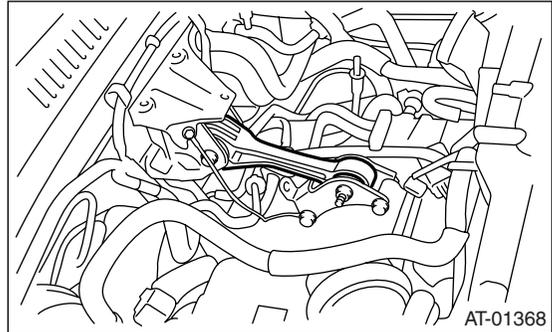


- 15) Install the ST to converter case.
ST 498277200 STOPPER SET

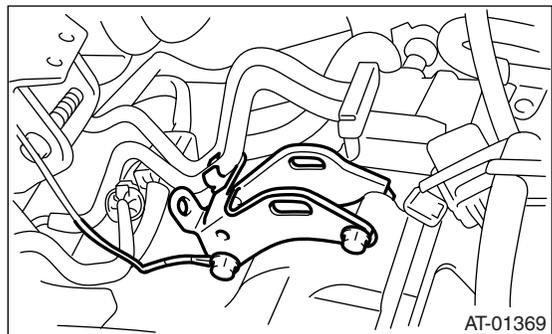


- 16) Lift-up the vehicle.
17) Remove the under cover. (Non-turbo model)
18) Remove the front exhaust pipe, rear exhaust pipe and muffler. (Non-turbo model) <Ref. to EX(H6DO)-5, REMOVAL, Front Exhaust Pipe.>

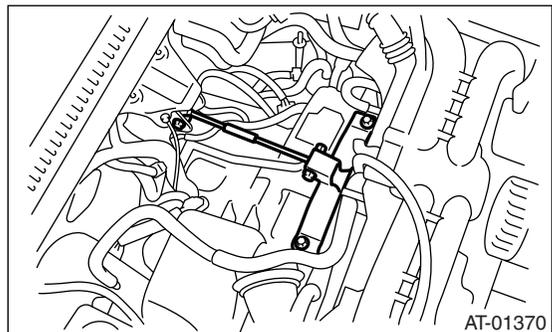
- 19) Remove the ATF cooler inlet and outlet pipes. (Non-turbo model) <Ref. to 5AT-64, REMOVAL, ATF Cooler Pipe & Hose.>
20) Remove the pitching stopper.



- 21) Remove the pitching stopper bracket.



- 22) Set the ST.
ST 41099AC000 ENGINE SUPPORT ASSEMBLY

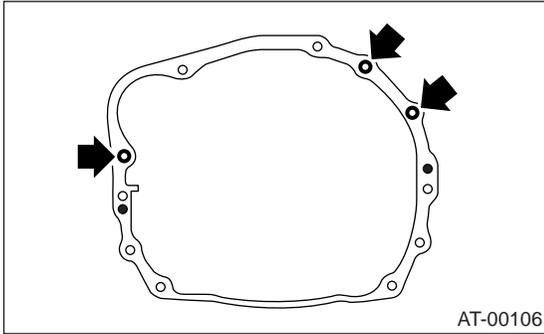


- 23) Remove the air intake duct. (Turbo model) <Ref. to IN(H4DOTC)-9, REMOVAL, Air Intake Duct.>
24) Remove the air cleaner case. (Turbo model) <Ref. to IN(H4DOTC)-8, REMOVAL, Air Cleaner Case.>
25) Remove the linear motion mounting. (Turbo model) <Ref. to ME(H4DOTC)-37, REMOVAL, Linear Motion Mounting.>

Automatic Transmission Assembly

AUTOMATIC TRANSMISSION

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



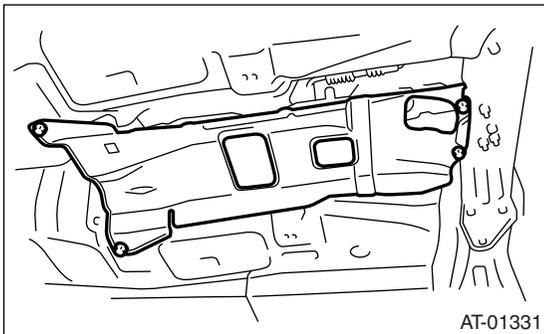
27) Lift-up the vehicle. (Turbo model)

28) Remove the under cover. (Turbo model)

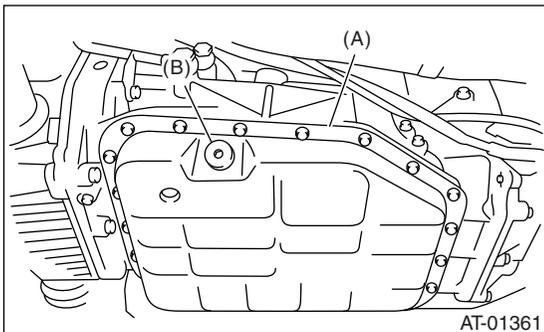
29) Remove the center exhaust pipe, rear exhaust pipe and muffler. (Turbo model) <Ref. to EX(H4DOTC)-6, REMOVAL, Center Exhaust Pipe.> <Ref. to EX(H4DOTC)-11, REMOVAL, Rear Exhaust Pipe.> <Ref. to EX(H4DOTC)-12, REMOVAL, Muffler.>

30) Remove the front exhaust pipe, rear exhaust pipe and muffler. (Non-turbo model) <Ref. to EX(H6DO)-5, REMOVAL, Front Exhaust Pipe.> <Ref. to EX(H6DO)-8, REMOVAL, Rear Exhaust Pipe.> <Ref. to EX(H6DO)-10, REMOVAL, Muffler.>

31) Remove the heat shield cover.

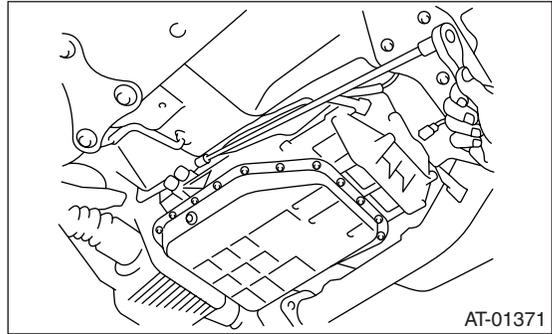


32) Remove the ATF drain plug to drain ATF.

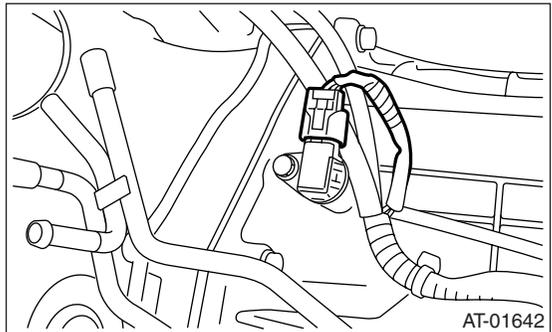


- (A) Oil pan
- (B) Drain plug

33) Remove the oil charge pipe.



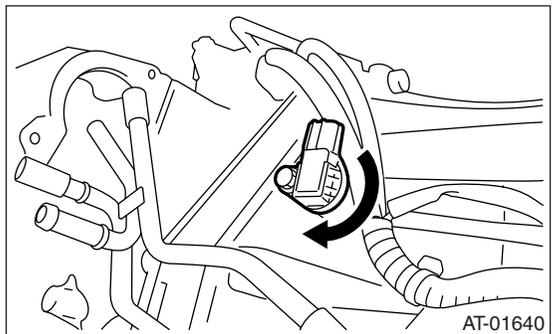
34) Disconnect the connector from turbine speed sensor 1.



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

CAUTION:

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



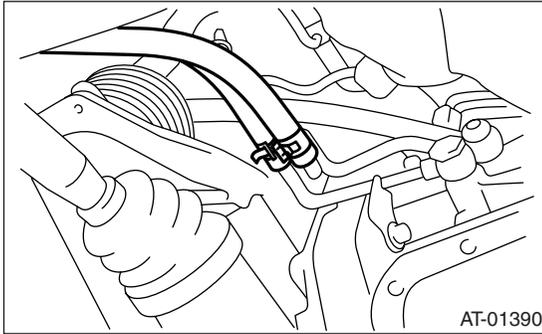
36) Remove the propeller shaft. <Ref. to DS-10, REMOVAL, Propeller Shaft.>

37) Remove the shift select cable. <Ref. to CS-12, REMOVAL, Select Cable.>

Automatic Transmission Assembly

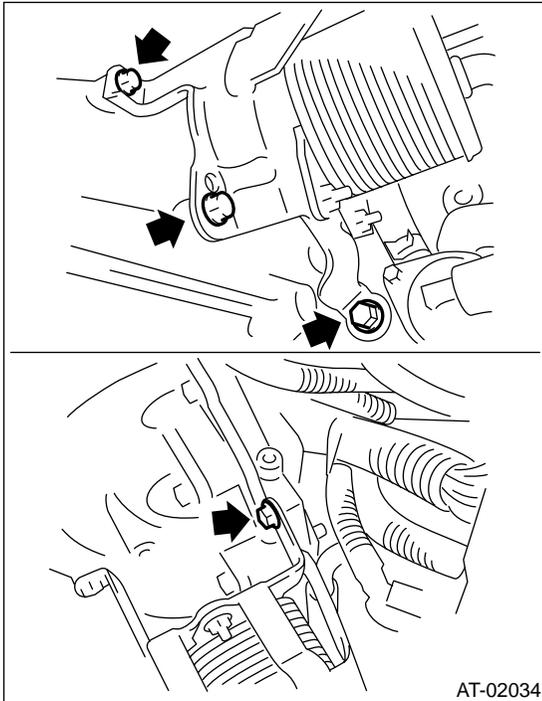
AUTOMATIC TRANSMISSION

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



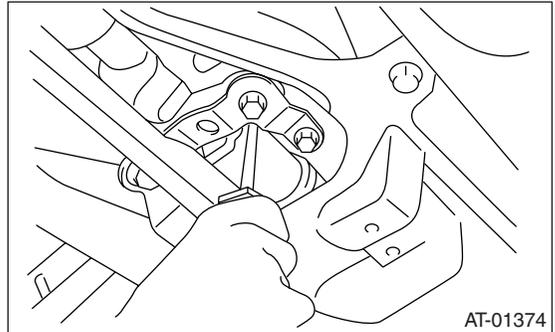
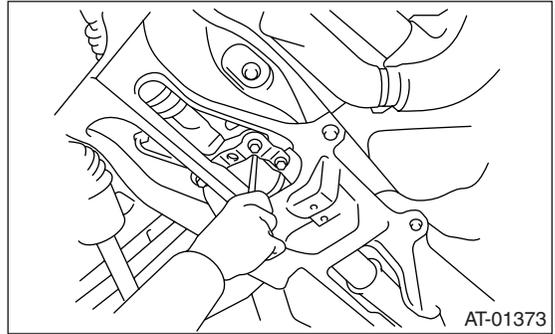
39) Remove the ATF cooler bracket from transmission body. (ATF cooler model with warmer function)

- Non-turbo model



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

41) Remove the two clutch housing cover securing bolts.

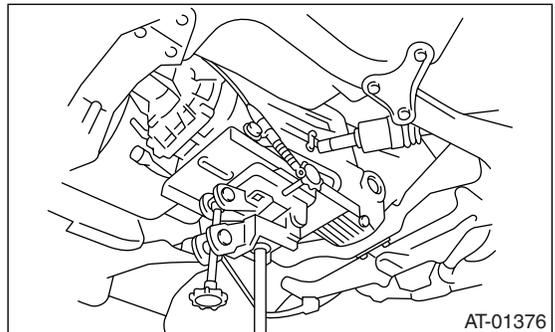


42) Remove the front stabilizer bracket. <Ref. to FS-16, REMOVAL, Front Stabilizer.>

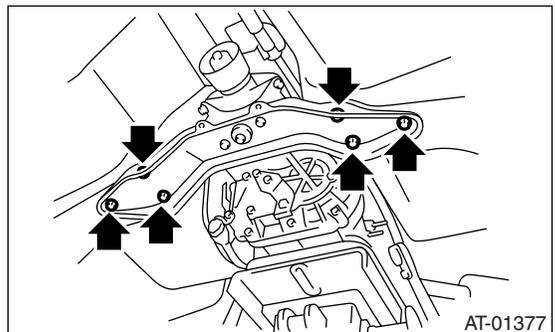
43) Remove the bolts which secure front ball joint to the housing. <Ref. to FS-17, REMOVAL, Front Ball Joint.>

44) Pull out the drive shaft from transmission.

45) Set the transmission jack under the transmission.



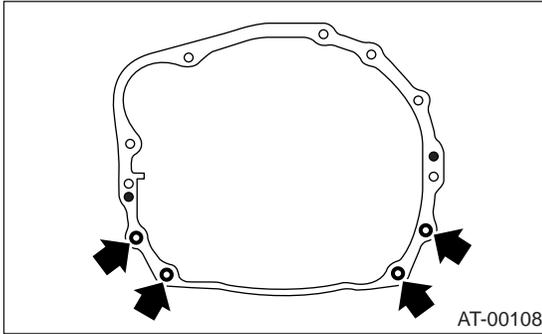
46) Remove the rear crossmember.



Automatic Transmission Assembly

AUTOMATIC TRANSMISSION

- 47) Remove the transmission mounting bolt (lower side).



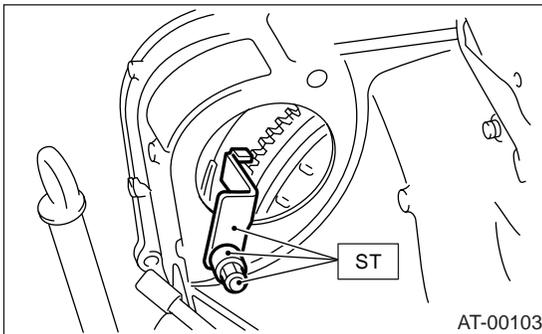
- 48) Remove the transmission.

NOTE:

- Turn the engine support assembly from the vehicle under body to the left (to shorten the engine support length), and lower the rear of the engine for easy disassembly.
- Be careful not to allow breather pipe and etc. to touch the vehicle body when detaching the automatic transmission assembly by pulling it backward.

B: INSTALLATION

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



- 2) Install the transmission onto engine.
(1) Lift up the transmission gradually using a transmission jack.
(2) Engage them at splines.
3) Install the engine mounting bolt (lower side).

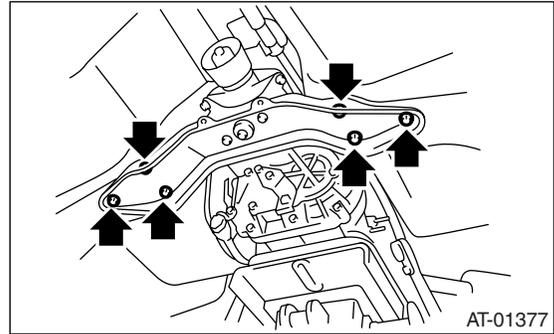
Tightening torque:

50 N·m (5.1 kgf-m, 36.9 ft-lb)

- 4) Install the transmission rear crossmember.

Tightening torque:

70 N·m (7.1 kgf-m, 51.6 ft-lb)



- 5) Take off the transmission jack.
6) Lower the vehicle.
7) Install the engine mounting bolt (upper side).

Tightening torque:

50 N·m (5.1 kgf-m, 36.9 ft-lb)

- 8) Remove the ST from converter case.
ST 498277200 STOPPER SET
9) Install the starter. <Ref. to SC(H4SO 2.0)-6, INSTALLATION, Starter.>
10) Install the torque converter to drive plate.
(1) Install the bolts which hold torque converter to drive plate.
(2) Install all four bolts by rotating the crank pulley a little at a time.
(3) Install the service hole.

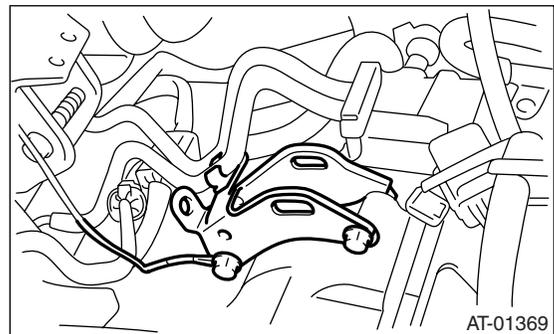
Tightening torque:

25 N·m (2.5 kgf-m, 18.4 ft-lb)

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

Tightening torque:

40 N·m (4.1 kgf-m, 29.5 ft-lb)

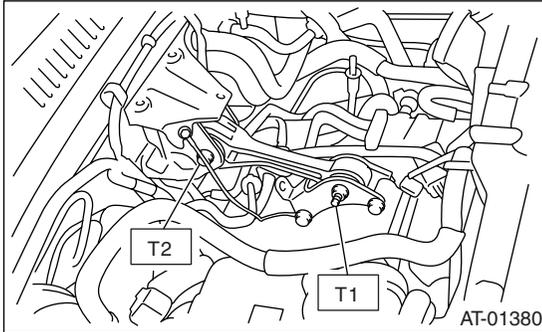


12) Install the pitching stopper.

Tightening torque:

T1: 50 N·m (5.1 kgf·m, 36.9 ft·lb)

T2: 58 N·m (5.9 kgf·m, 42.8 ft·lb)



13) Lift-up the vehicle.

14) Replace the front differential side retainer oil seal.

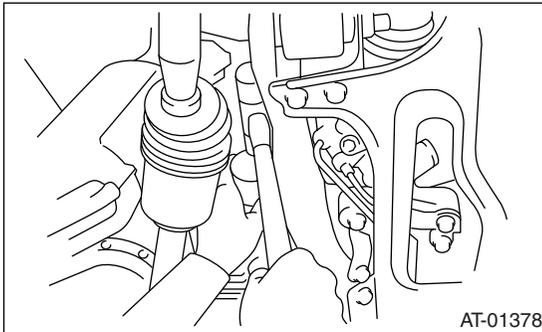
(1) Remove the oil seal by using flat tip screw-driver and etc.

(2) Fit a new oil seal using ST.

ST 18675AA000 DIFFERENTIAL SIDE OIL SEAL INSTALLER

NOTE:

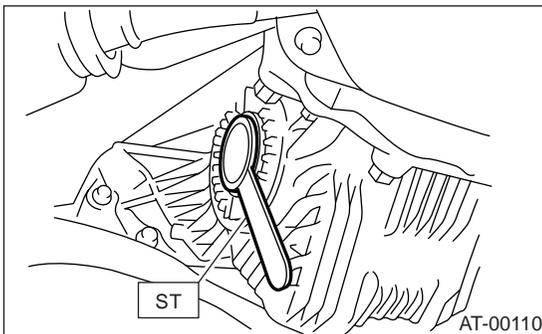
- Apply oil to the oil seal lips.
- Always replace the differential side oil seal after extracting front drive shaft from the transmission.



15) Apply grease to the oil seal lips.

16) Set the ST to the side retainer.

ST 28399SA000 OIL SEAL PROTECTOR



17) Install the front drive shaft into transmission.

NOTE:

Replace the circlip of drive shaft with a new one.

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

ST 28399SA000 OIL SEAL PROTECTOR

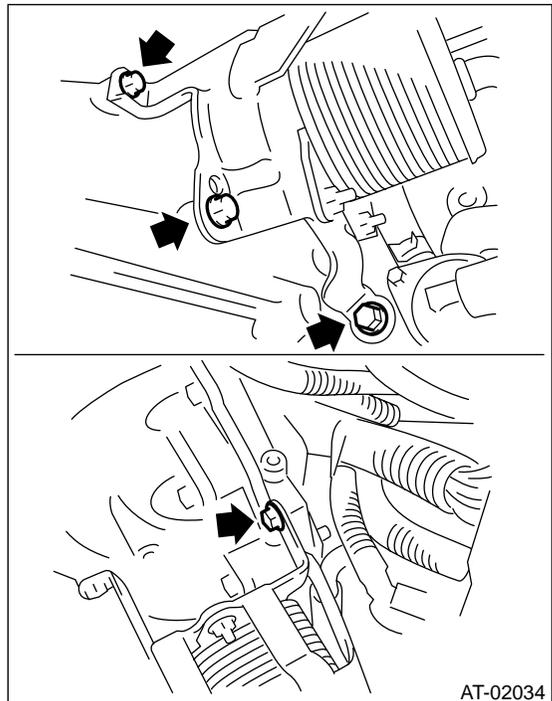
19) Install the ATF cooler inlet and outlet pipes. (Non-turbo model) <Ref. to 5AT-66, INSTALLATION, ATF Cooler Pipe & Hose.>

20) Install the ATF cooler bracket to transmission proper. (ATF cooler model with warmer function)

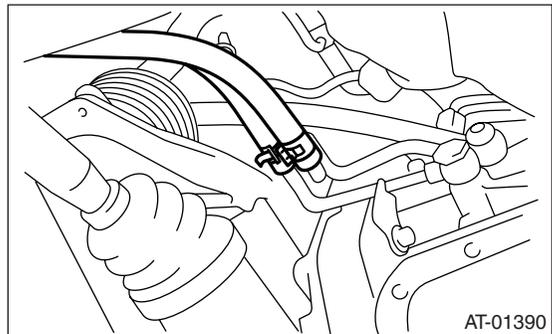
Tightening torque:

25 N·m (2.5 kgf·m, 18.1 ft·lb)

- Non-turbo model



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



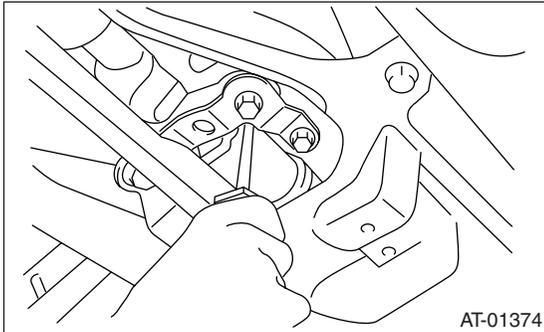
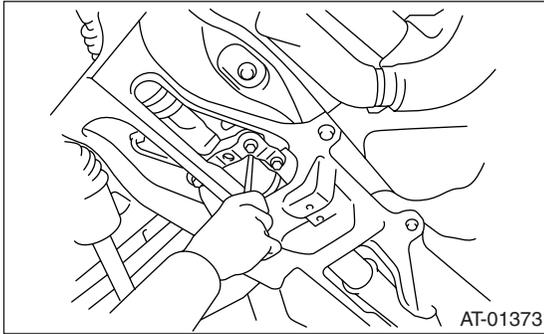
22) Insert the ball joint into housing. <Ref. to FS-17, INSTALLATION, Front Ball Joint.>

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

Automatic Transmission Assembly

AUTOMATIC TRANSMISSION

24) Screw the securing bolts for clutch housing cover.



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

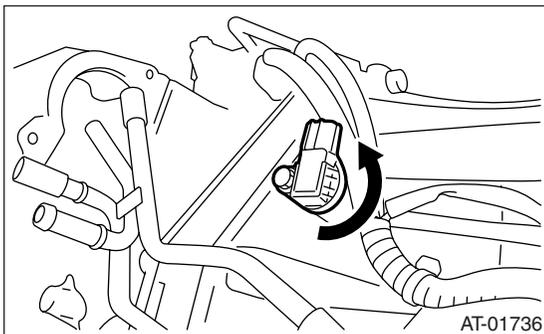
26) Install the propeller shaft. <Ref. to DS-11, INSTALLATION, Propeller Shaft.>

27) Install the shift select cable. <Ref. to CS-13, INSTALLATION, Select Cable.>

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

Tightening torque:

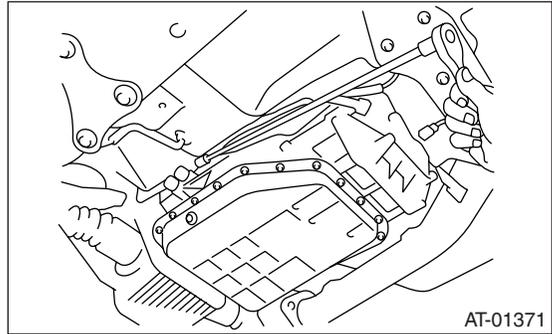
7 N·m (0.7 kgf·m, 5.2 ft·lb)



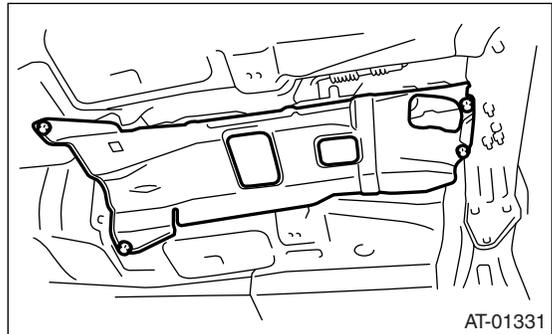
29) Install the oil charge pipe.

Tightening torque:

41 N·m (4.2 kgf·m, 30.2 ft·lb)



30) Install the heat shield cover.



31) Install the center exhaust pipe, rear exhaust pipe and muffler. (Turbo model) <Ref. to EX(H4DOTC)-7, INSTALLATION, Center Exhaust Pipe.> <Ref. to EX(H4DOTC)-11, INSTALLATION, Rear Exhaust Pipe.> <Ref. to EX(H4DOTC)-12, INSTALLATION, Muffler.>

32) Install the front exhaust pipe, rear exhaust pipe and muffler. (Non-turbo model) <Ref. to EX(H6DO)-6, INSTALLATION, Front Exhaust Pipe.> <Ref. to EX(H6DO)-8, INSTALLATION, Rear Exhaust Pipe.> <Ref. to EX(H6DO)-10, INSTALLATION, Muffler.>

33) Install the under cover.

34) Lower the vehicle.

35) Install the linear motion mounting. (Turbo model) <Ref. to ME(H4DOTC)-37, INSTALLATION, Linear Motion Mounting.>

36) Install the air cleaner hose.

<Ref. to IN(H4DOTC)-8, INSTALLATION, Air Cleaner Case.>

37) Install the air intake duct.

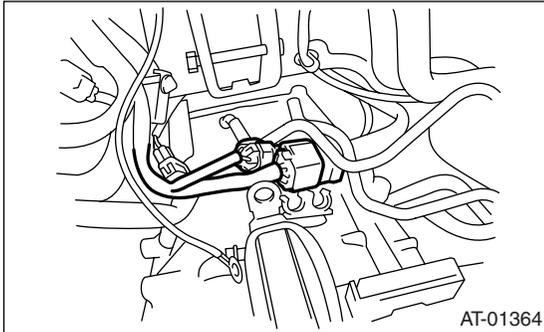
<Ref. to IN(H4DOTC)-9, INSTALLATION, Air Intake Duct.>

Automatic Transmission Assembly

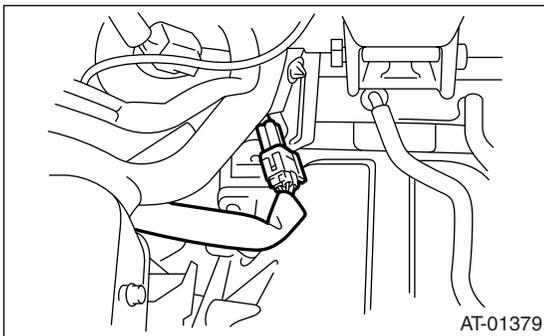
AUTOMATIC TRANSMISSION

38) Connect the following connectors.

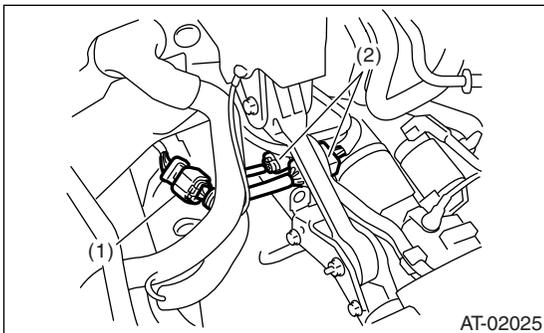
- Turbo model
- (1) Transmission harness connectors



(2) Front oxygen (A/F) sensor

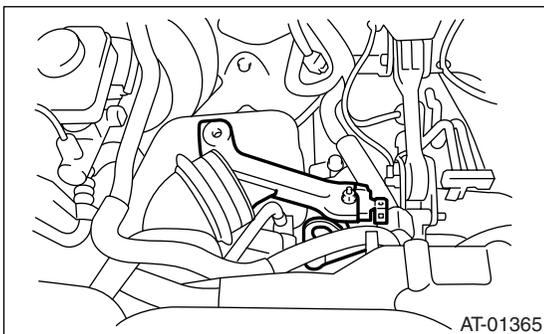


- Non-turbo model

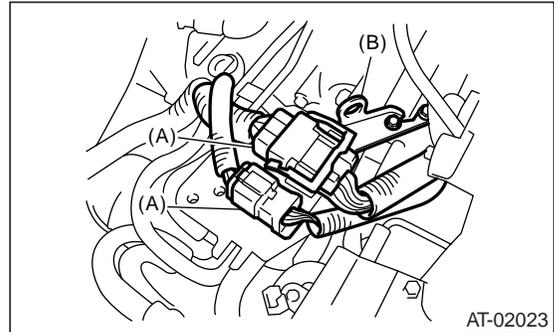


- (1) Front oxygen (A/F) sensor
- (2) Transmission harness connector

39) Install the intercooler stay RH and engine hanger rear. (Turbo model)

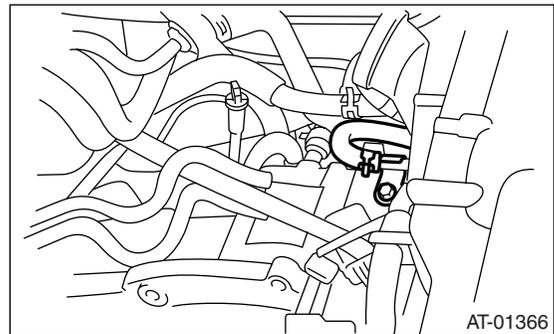


40) Install the engine hanger rear, and then connect the engine harness connector. (Non-turbo model)



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

41) Install the water by-pass pipe. (Turbo model)



42) Pour ATF from the oil charge pipe. <Ref. to 5AT-27, REPLACEMENT, Automatic Transmission Fluid.>

43) Install the air breather hose. <Ref. to 5AT-69, INSTALLATION, Air Breather Hose.>

44) Install the intercooler. (Turbo model) <Ref. to IN(H4DOTC)-12, INSTALLATION, Intercooler.>

45) Install the air intake chamber. (Non-turbo model) <Ref. to IN(H6DO)-7, INSTALLATION, Air Intake Chamber.>

46) Install the air cleaner case. (Non-turbo model) <Ref. to IN(H6DO)-6, INSTALLATION, Air Cleaner Case.>

47) Install the collector cover.

48) Connect the battery ground cable to battery.

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

- (1) Connect the Subaru Select Monitor to data link connector.
- (2) Turn the ignition switch to ON (engine OFF) and turn Subaru Select Monitor switch to ON.
- (3) Ensure that the select lever is in "P" range.
- (4) On the «Main Menu» display screen, select the {Each System Check} and press the [YES] key.

Automatic Transmission Assembly

AUTOMATIC TRANSMISSION

(5) On the «System Selection Menu» display screen, select the {Transmission} and press the [YES] key.

(6) Press the [YES] key after the information of transmission type has been displayed.

(7) On the «Transmission Diagnosis» display screen, select the {Clear Memory 2} and press the [YES] key.

50) Perform the inspection with driving the vehicle at the end of repair work and make sure there is no faulty as below;

- Excessive shift shock
- Oil leakage from transmission proper and etc.
- Occurrence of noise caused by interference etc.

NOTE:

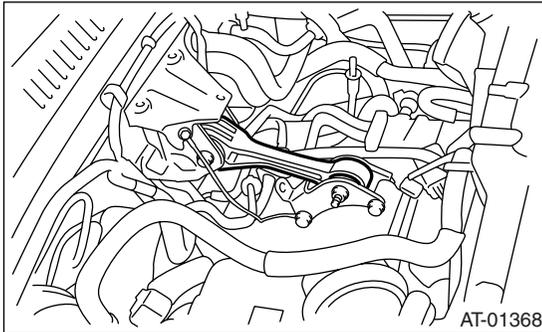
If excessive shift shock is felt, execute the advance operation of learning control. <Ref. to 5AT(diag)-22, PROCEDURE, Learning Control.>

10. Transmission Mounting System

A: REMOVAL

1. PITCHING STOPPER

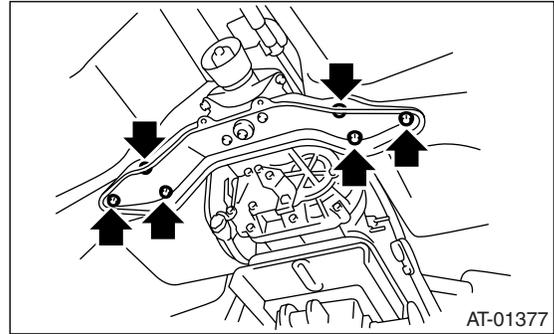
- 1) Disconnect the ground cable from battery.
- 2) Remove the intercooler. (Turbo model)
<Ref. to IN(H4DOTC)-12, REMOVAL, Intercooler.>
- 3) Remove the air intake chamber. (Non-turbo model)
<Ref. to IN(H6DO)-7, REMOVAL, Air Intake Chamber.>
- 4) Remove the pitching stopper.



2. TRANSMISSION REAR CROSSMEMBER & REAR CUSHION RUBBER

- 1) Disconnect the ground cable from battery.
- 2) Jack-up the vehicle and support it with rigid racks.
- 3) Remove the center exhaust pipe, rear exhaust pipe and muffler. (Turbo model)
<Ref. to EX(H4DOTC)-6, REMOVAL, Center Exhaust Pipe.> <Ref. to EX(H4DOTC)-11, REMOVAL, Rear Exhaust Pipe.> <Ref. to EX(H4DOTC)-12, REMOVAL, Muffler.>
- 4) Remove the front exhaust pipe, rear exhaust pipe and muffler. (Non-turbo model)
<Ref. to EX(H6DO)-5, REMOVAL, Front Exhaust Pipe.> <Ref. to EX(H6DO)-8, REMOVAL, Rear Exhaust Pipe.> <Ref. to EX(H6DO)-10, REMOVAL, Muffler.>
- 5) Remove the heat shield cover.
- 6) Set the transmission jack under the transmission. Make sure that the support plate of transmission jack does not touch the oil pan.

- 7) Remove the transmission rear crossmember.



- 8) Remove the rear cushion rubber.

B: INSTALLATION

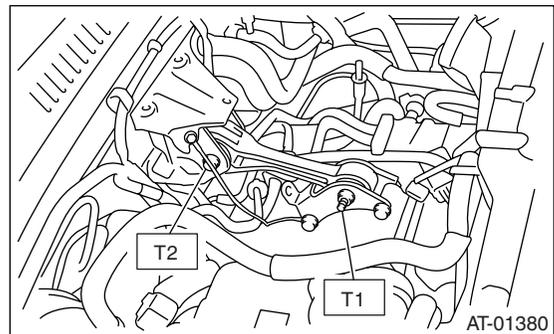
1. PITCHING STOPPER

- 1) Install the pitching stopper.

Tightening torque:

T1: 50 N·m (5.1 kgf·m, 36.9 ft·lb)

T2: 58 N·m (5.9 kgf·m, 42.8 ft·lb)



- 2) Install the intercooler. (Turbo model)
<Ref. to IN(H4DOTC)-12, INSTALLATION, Intercooler.>
- 3) Install the air intake chamber. (Non-turbo model)
<Ref. to IN(H6DO)-7, INSTALLATION, Air Intake Chamber.>
- 4) Connect the battery ground cable to battery.

Transmission Mounting System

AUTOMATIC TRANSMISSION

2. TRANSMISSION REAR CROSSMEMBER & REAR CUSHION RUBBER

1) Install the rear cushion rubber.

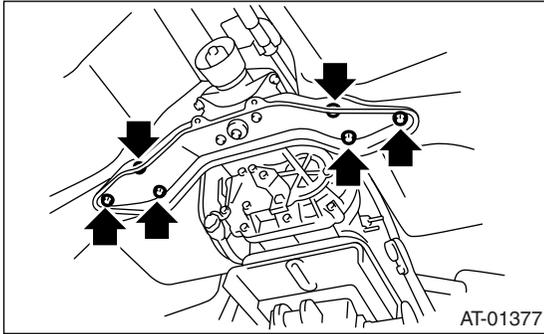
Tightening torque:

35 N·m (3.6 kgf-m, 26 ft-lb)

2) Install the crossmember.

Tightening torque:

70 N·m (7.1 kgf-m, 51.6 ft-lb)



3) Remove the transmission jack.

4) Install the heat shield cover.

5) Install the center exhaust pipe, rear exhaust pipe and muffler. (Turbo model)

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

6) Install the front exhaust pipe, rear exhaust pipe and muffler. (Non-turbo model) <Ref. to EX(H6DO)-6, INSTALLATION, Front Exhaust Pipe.> <Ref. to EX(H6DO)-8, INSTALLATION, Rear Exhaust Pipe.> <Ref. to EX(H6DO)-10, INSTALLATION, Muffler.>

7) Connect the battery ground cable to battery.

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. Ensure there are no cracks, hardening or damage on rubbers.

2. TRANSMISSION REAR CROSSMEMBER & REAR CUSHION RUBBER

Check the crossmember for bends or damage. Ensure there are no cracks, hardening, or damage on cushion rubbers.

11. Extension Case Oil Seal

A: INSPECTION

Inspect there is no ATF leakage from the joint of transmission and propeller shaft. If so, replace the oil seal. <Ref. to 5AT-49, REPLACEMENT, Extension Case Oil Seal.>

B: REPLACEMENT

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

CAUTION:

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

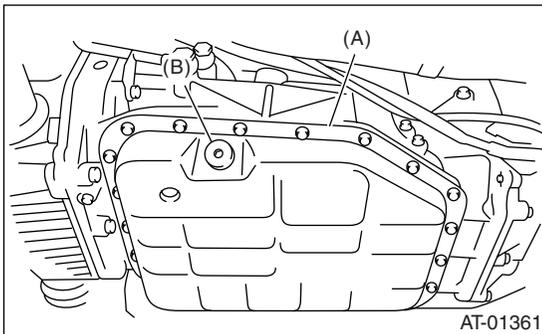
- 4) Tighten the ATF drain plug.

NOTE:

Use a new gasket.

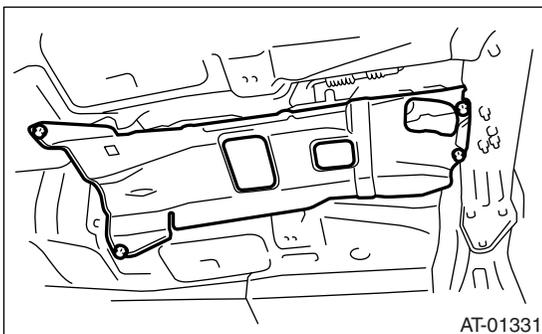
Tightening torque:

20 N·m (2.0 kgf·m, 14.8 ft·lb)

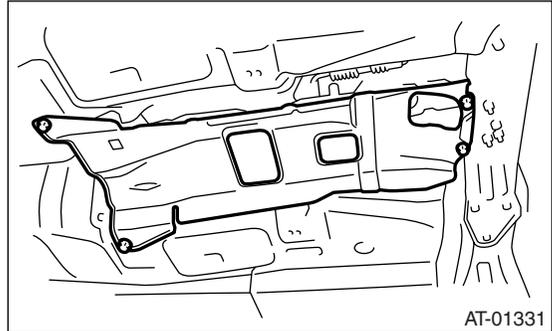


- (A) Oil pan
- (B) ATF drain plug

- 5) Remove the rear exhaust pipe and muffler. (Turbo model) <Ref. to EX(H4DOTC)-11, REMOVAL, Rear Exhaust Pipe.> <Ref. to EX(H4DOTC)-12, REMOVAL, Muffler.>
- 6) Remove the rear exhaust pipe and muffler. (Non-turbo model) <Ref. to EX(H6DO)-8, REMOVAL, Rear Exhaust Pipe.> <Ref. to EX(H6DO)-10, REMOVAL, Muffler.>
- 7) Remove the heat shield cover.



- 8) Remove the propeller shaft. <Ref. to DS-10, REMOVAL, Propeller Shaft.>
- 9) Using the ST, remove the oil seal.
ST 398527700 PULLER ASSY
- 10) Using the ST, install the oil seal.
ST 498057300 INSTALLER
- 11) Install the propeller shaft. <Ref. to DS-11, INSTALLATION, Propeller Shaft.>
- 12) Install the heat shield cover.



- 13) Install the rear exhaust pipe and muffler. (Turbo model) <Ref. to EX(H4DOTC)-11, INSTALLATION, Rear Exhaust Pipe.> <Ref. to EX(H4DOTC)-12, INSTALLATION, Muffler.>
- 14) Install the rear exhaust pipe and muffler. (Non-turbo model) <Ref. to EX(H6DO)-8, INSTALLATION, Rear Exhaust Pipe.> <Ref. to EX(H6DO)-10, INSTALLATION, Muffler.>
- 15) Pour ATF into the oil charge pipe.

Specified fluid:

SUBARU ATF (Part No. K0140Y0700)

Recommended fluid:

**IDEMITSU ATF HP
Castrol Transmax J**

NOTE:

Use of recommended fluid is permitted only on the area where the specified is not available.

Capacity:

Fill the same amount of ATF drained.

- 16) Check the level and leaks of ATF. <Ref. to 5AT-27, Automatic Transmission Fluid.>

Differential Side Retainer Oil Seal

AUTOMATIC TRANSMISSION

12. Differential Side Retainer Oil Seal

A: INSPECTION

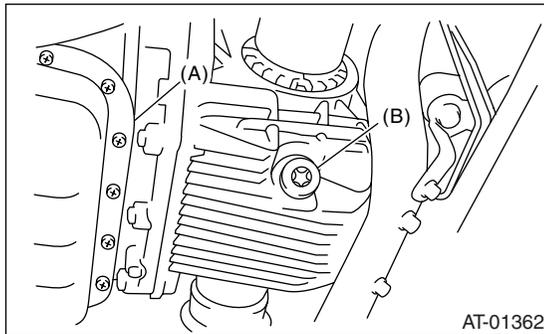
Check the leakage of gear oil from differential side retainer oil seal part. If there is oil leakage, replace the oil seal.

B: REPLACEMENT

- 1) Lift-up the vehicle.
- 2) Remove the front exhaust pipe and center exhaust pipe. (Turbo model) <Ref. to EX(H4DOTC)-5, REMOVAL, Front Exhaust Pipe.> <Ref. to EX(H4DOTC)-6, REMOVAL, Center Exhaust Pipe.>
- 3) Remove the front exhaust pipe. (Non-turbo model) <Ref. to EX(H6DO)-5, REMOVAL, Front Exhaust Pipe.>
- 4) Remove the differential gear oil drain plug using TORX® BIT T70 to drain differential gear oil.

CAUTION:

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



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

- 5) Tighten the differential gear oil drain plug.

NOTE:

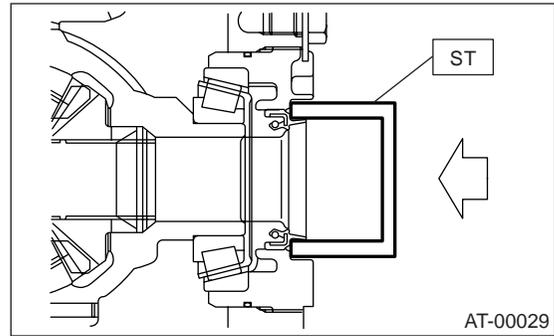
Use a new gasket.

Tightening torque:

44 N·m (4.5 kgf·m, 32.5 ft·lb)

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

ST 18675AA000 DIFFERENTIAL SIDE OIL SEAL INSTALLER



- 9) Apply oil to the oil seal lips.
- 10) Install the front drive shaft. <Ref. to DS-22, INSTALLATION, Front Drive Shaft.>
- 11) Install the front and center exhaust pipes. (Turbo model) <Ref. to EX(H4DOTC)-5, INSTALLATION, Front Exhaust Pipe.> <Ref. to EX(H4DOTC)-7, INSTALLATION, Center Exhaust Pipe.>
- 12) Install the front exhaust pipe. (Non-turbo model) <Ref. to EX(H6DO)-6, INSTALLATION, Front Exhaust Pipe.>
- 13) Lower the vehicle.
- 14) Pour gear oil into the gauge hole.

Recommended gear oil:

<Ref. to 5AT-3, RECOMMENDED GEAR OIL, SPECIFICATION, General Description.>

Gear oil capacity:

1.3 — 1.5 ℓ (1.4 — 1.6 US qt, 1.1 — 1.3 Imp qt)

- 15) Check the level of differential gear oil. <Ref. to 5AT-29, 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 the malfunction occurs, refer to 5AT (Diagnosis) section. <Ref. to 5AT(diag)-34, DTC P0705 TRANSMISSION RANGE SENSOR CIRCUIT (PRNDL INPUT), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

Front Vehicle Speed Sensor

AUTOMATIC TRANSMISSION

14. Front Vehicle Speed Sensor

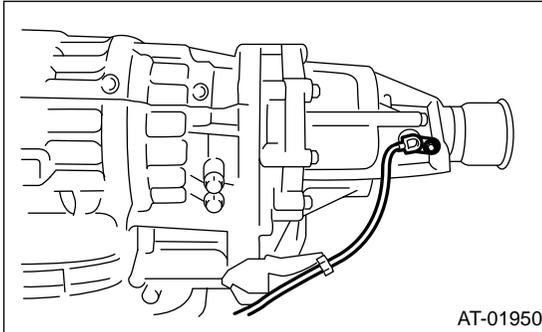
A: REMOVAL

1) Remove the transmission assembly from vehicle. <Ref. to 5AT-38, REMOVAL, Automatic Transmission Assembly.>

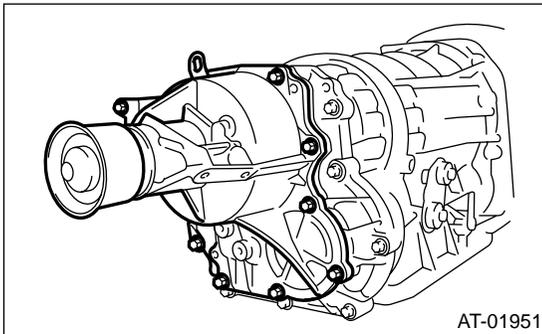
2) Remove the rear vehicle speed sensor.

NOTE:

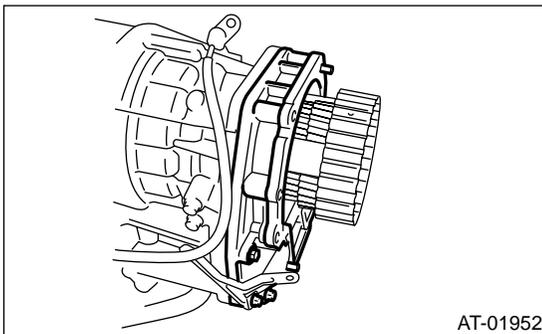
Secure the harness of the rear vehicle speed sensor to the transmission proper using wire etc.



3) Remove the extension case.



4) Remove the intermediate case.

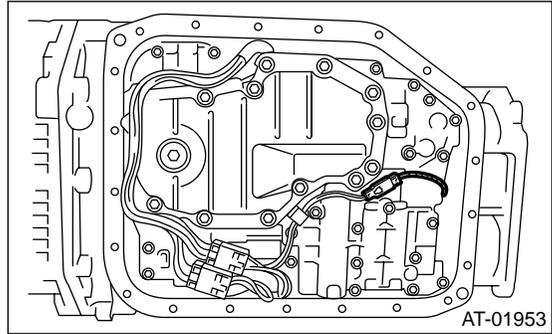


5) Remove the center differential carrier. <Ref. to 5AT-80, REMOVAL, Center Differential Carrier.>

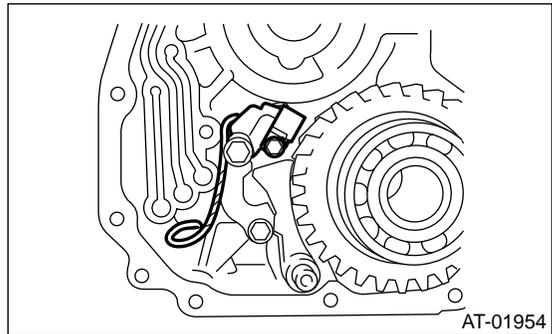
6) Lay along the transmission case, and then remove the oil pan.

7) Remove the old gasket on the oil pan and transmission case completely.

8) Disconnect the front vehicle speed sensor connector.



9) Remove the front vehicle speed sensor securing bolt.



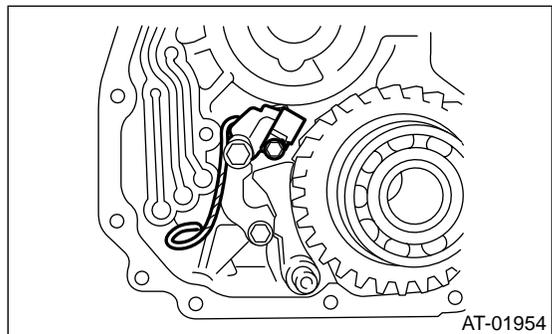
10) Remove the front vehicle speed sensor through the hole of the AT transmission main case.

B: INSTALLATION

1) Install the front vehicle speed sensor.

Tightening torque:

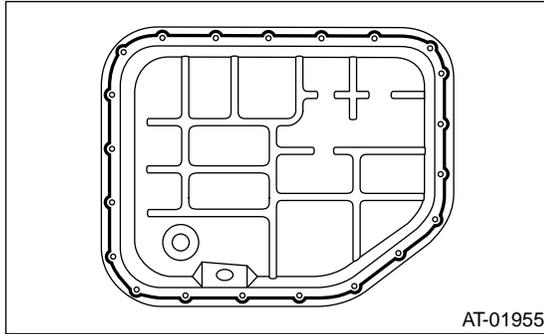
7 N·m (0.7 kgf-m, 5.2 ft-lb)



2) Connect the front vehicle speed sensor connector.

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

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



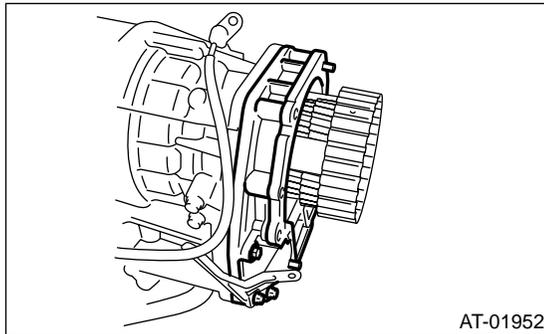
4) Install the oil pan by equally tightening the bolts.

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

5) Install the center differential carrier. <Ref. to 5AT-80, INSTALLATION, Center Differential Carrier.>

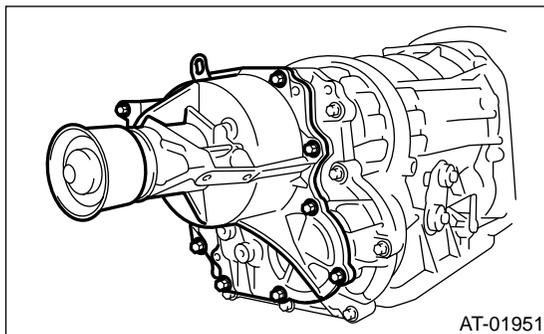
6) Install the intermediate case.

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



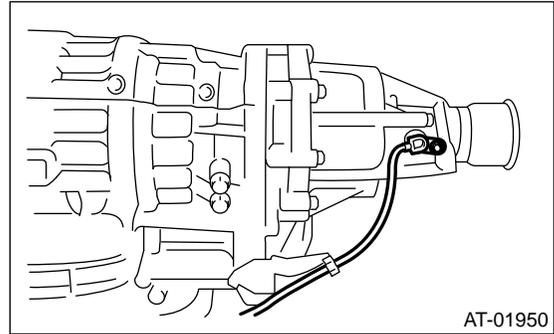
7) Install the extension case.

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



8) Install the rear vehicle speed sensor.

Tightening torque:
7 N·m (0.7 kgf·m, 5.2 ft·lb)



9) Install the transmission assembly into the vehicle. <Ref. to 5AT-42, INSTALLATION, Automatic Transmission Assembly.>

10) Pour ATF from the oil charge pipe. <Ref. to 5AT-27, REPLACEMENT, Automatic Transmission Fluid.>

11) Check the level and leaks of the ATF. <Ref. to 5AT-27, INSPECTION, Automatic Transmission Fluid.>

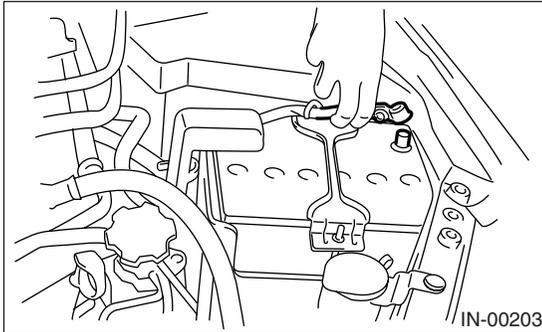
Rear Vehicle Speed Sensor

AUTOMATIC TRANSMISSION

15.Rear Vehicle Speed Sensor

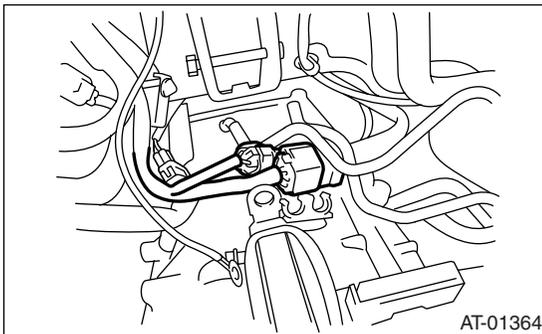
A: REMOVAL

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

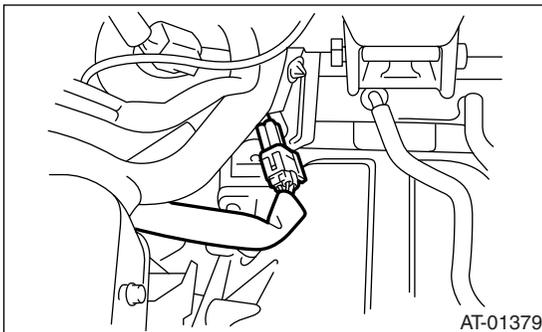


- 3) Remove the intercooler. (Turbo model) <Ref. to IN(H4DOTC)-12, REMOVAL, Intercooler.>
- 4) Remove the air intake chamber. (Non-turbo model) <Ref. to IN(H6DO)-7, REMOVAL, Air Intake Chamber.>
- 5) Disconnect the following connectors.

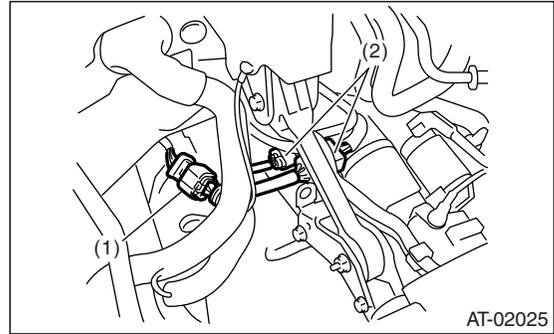
- Turbo model
 - (1) Transmission harness connectors



- (2) Front oxygen (A/F) sensor



- Non-turbo model



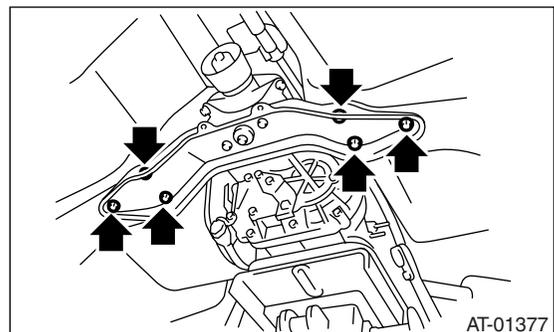
- (1) Front oxygen (A/F) sensor
- (2) Transmission harness connector

- 6) Remove the transmission harness connector and front oxygen (A/F) sensor connector from the stay.
- 7) Lift-up the vehicle.
- 8) Clean the transmission exterior.
- 9) Drain ATF completely. <Ref. to 5AT-27, REPLACEMENT, Automatic Transmission Fluid.>
- 10) Remove the center exhaust pipe, rear exhaust pipe and muffler. (Turbo model) <Ref. to EX(H4DOTC)-6, REMOVAL, Center Exhaust Pipe.> <Ref. to EX(H4DOTC)-11, REMOVAL, Rear Exhaust Pipe.> <Ref. to EX(H4DOTC)-12, REMOVAL, Muffler.>
- 11) Remove the rear exhaust pipe and muffler. (Non-turbo model) <Ref. to EX(H6DO)-8, REMOVAL, Rear Exhaust Pipe.> <Ref. to EX(H6DO)-10, REMOVAL, Muffler.>
- 12) Remove the heat shield cover.
- 13) Remove the propeller shaft. <Ref. to DS-10, REMOVAL, Propeller Shaft.>
- 14) Place the transmission jack under transmission.

NOTE:

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

- 15) Remove the transmission rear crossmember bolt.



16) Lower the transmission jack.

NOTE:

Do not separate the transmission jack and transmission.

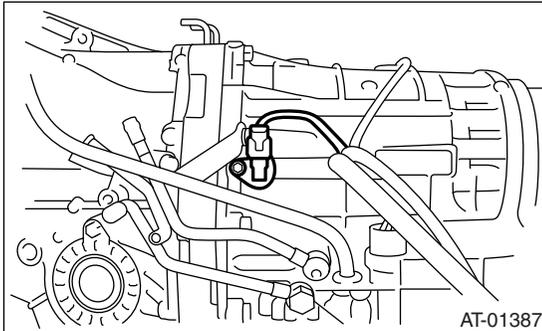
17) Remove the oil charge pipe. <Ref. to 5AT-70, REMOVAL, Oil Charge Pipe.>

18) Remove the ATF cooler inlet and outlet pipes.

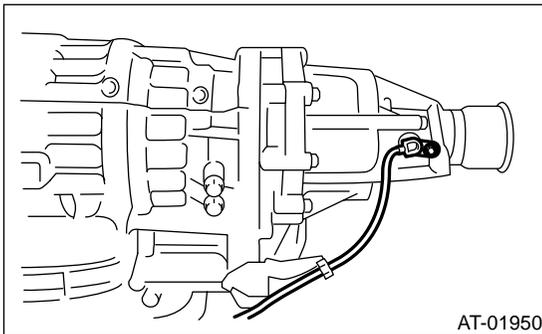
NOTE:

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

19) Disconnect the connector from turbine speed sensor 1.

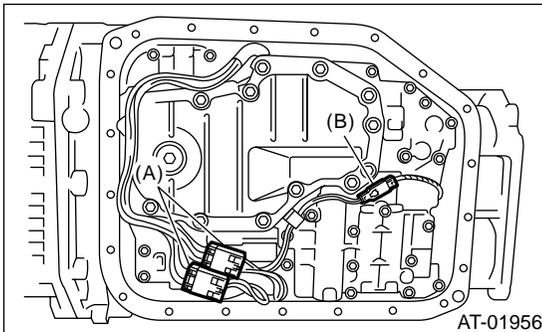


20) Remove the rear vehicle speed sensor.



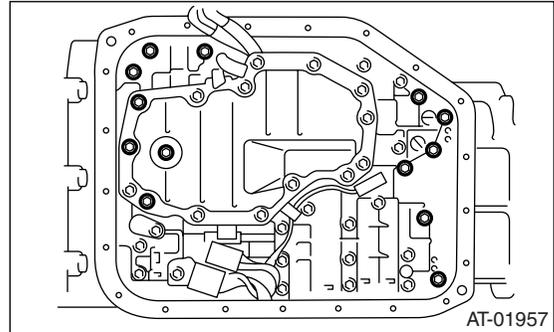
21) Remove the oil pan.

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

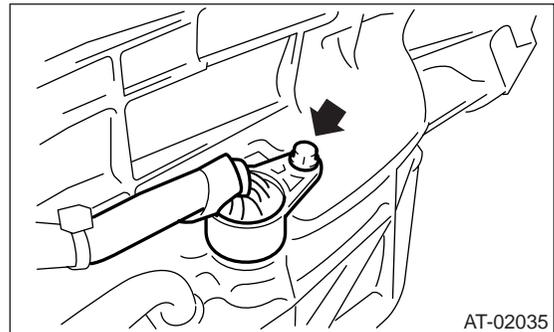


- (A) Control valve connector
- (B) Front vehicle speed sensor connector

23) Remove the control valve body.



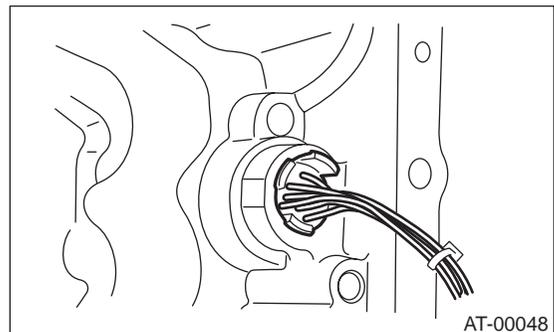
24) Remove the bolt securing harness of transmission main case.



25) Remove the harness assembly.

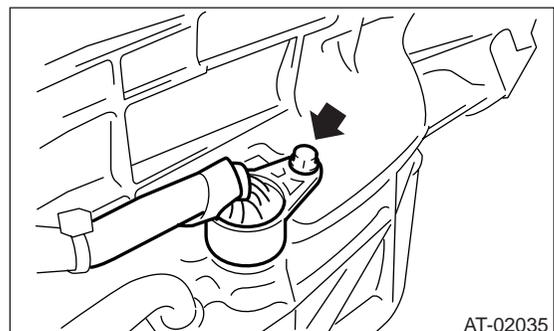
B: INSTALLATION

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



2) Install the securing bolt of transmission main case.

Tightening torque:
7 N·m (0.7 kgf·m, 5.2 ft·lb)



Rear Vehicle Speed Sensor

AUTOMATIC TRANSMISSION

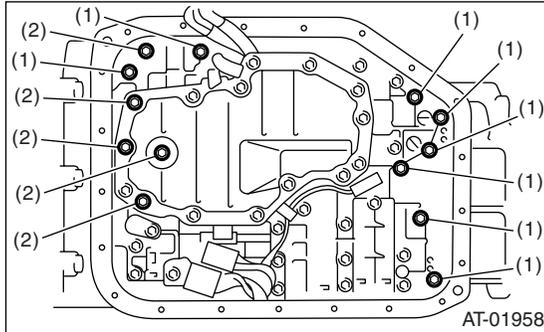
3) Install the control valve body.

Tightening torque:

8 N·m (0.8 kgf·m, 58 ft·lb)

NOTE:

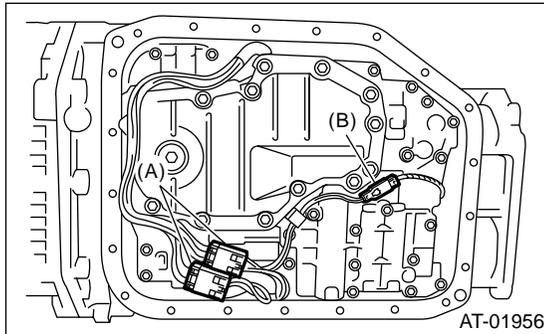
Be careful not to catch harness in.



(1) 58 mm (2.28 in)

(2) 65 mm (2.56 in)

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



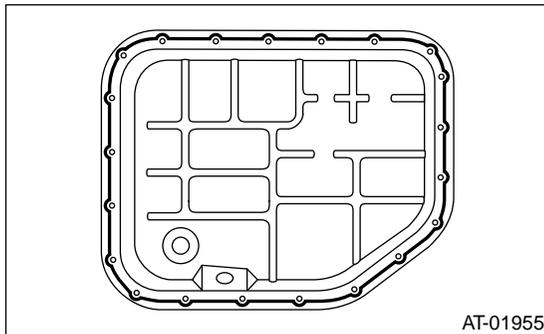
(A) Control valve connector

(B) Front vehicle speed sensor connector

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

Liquid gasket

THREE BOND 1217B (Part No. K0877YA020)



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

Tightening torque:

5 N·m (0.5 kgf·m, 3.6 ft·lb)

7) Install the rear vehicle speed sensor and turbine speed sensor 1, and then fasten the harness.

Tightening torque:

7 N·m (0.7 kgf·m, 5.1 ft·lb)

8) Install a new aluminum washer and oil cooler pipe.

Tightening torque:

T: 25 N·m (2.5 kgf·m, 18.1 ft·lb)

9) Install the oil charge pipe. <Ref. to 5AT-70, INSTALLATION, Oil Charge Pipe.>

10) Install the transmission rear crossmember bolt.

Tightening torque:

70 N·m (7.1 kgf·m, 51 ft·lb)

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

12) Install the heat shield cover.

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

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

14) Install the rear exhaust pipe and muffler. (Non-turbo model) <Ref. to EX(H6DO)-8, INSTALLATION, Rear Exhaust Pipe.> <Ref. to EX(H6DO)-10, INSTALLATION, Muffler.>

15) Lower the vehicle.

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

17) Install the intercooler. (Turbo model) <Ref. to IN(H4DOTC)-12, INSTALLATION, Intercooler.>

18) Install the air intake chamber. (Non-turbo model) <Ref. to IN(H6DO)-7, INSTALLATION, Air Intake Chamber.>

19) Pour ATF through the oil charge pipe. <Ref. to 5AT-27, REPLACEMENT, Automatic Transmission Fluid.>

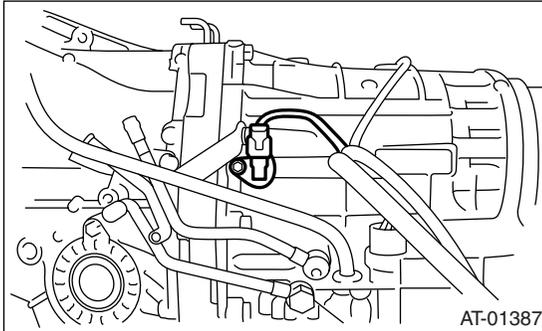
20) Check the level and leaks of ATF. <Ref. to 5AT-27, INSPECTION, Automatic Transmission Fluid.>

21) Execute the learning control promotion. <Ref. to 5AT(diag)-22, PROCEDURE, Learning Control.>

16. Turbine speed sensor 1

A: REMOVAL

- 1) Lift-up the vehicle.
- 2) Remove the intercooler. (Turbo model) <Ref. to IN(H4DOTC)-12, REMOVAL, Intercooler.>
- 3) Remove the air intake chamber. (Non-turbo model) <Ref. to IN(H6DO)-7, REMOVAL, Air Intake Chamber.>
- 4) Disconnect the turbine speed sensor 1 connector.



- 5) Remove the turbine speed sensor 1.

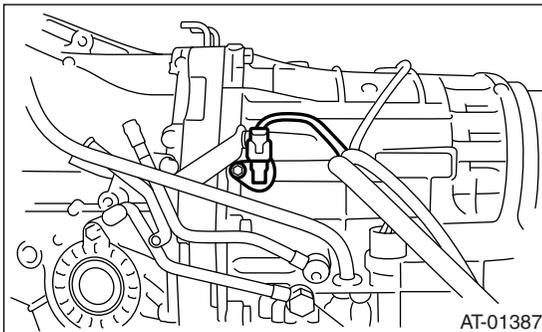
B: INSTALLATION

- 1) Install the turbine speed sensor 1.

Tightening torque:

7 N·m (0.7 kgf-m, 5.2 ft-lb)

- 2) Connect the turbine speed sensor 1 connector.



- 3) Install the intercooler. (Turbo model) <Ref. to IN(H4DOTC)-12, INSTALLATION, Intercooler.>
- 4) Install the air intake chamber. (Non-turbo model) <Ref. to IN(H6DO)-7, INSTALLATION, Air Intake Chamber.>

Control Valve Body

AUTOMATIC TRANSMISSION

17. Control Valve Body

A: REMOVAL

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

CAUTION:

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

- 6) Tighten the ATF drain plug.

NOTE:

Use a new gasket.

Tightening torque:

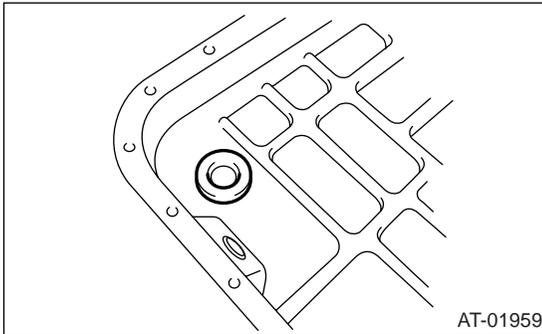
25 N·m (2.5 kgf·m, 18.1 ft·lb)

- 7) Remove the oil pan.

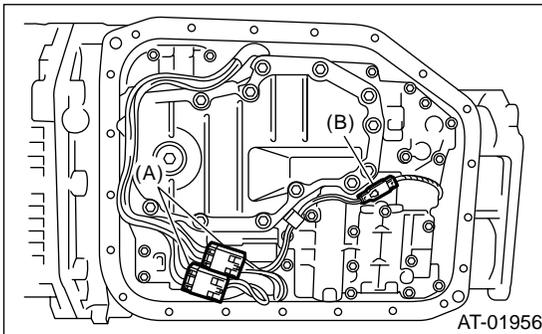
CAUTION:

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

- 8) Remove the magnet.



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

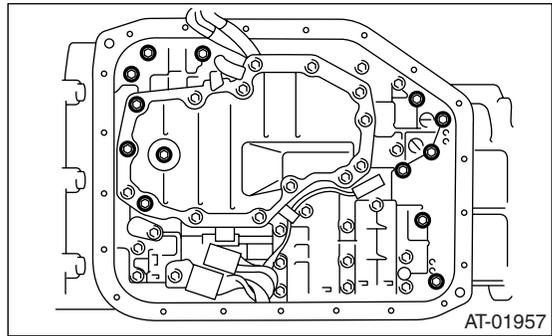


- (A) Control valve connector
- (B) Front vehicle speed sensor connector

- 12) Remove the control valve body.

NOTE:

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

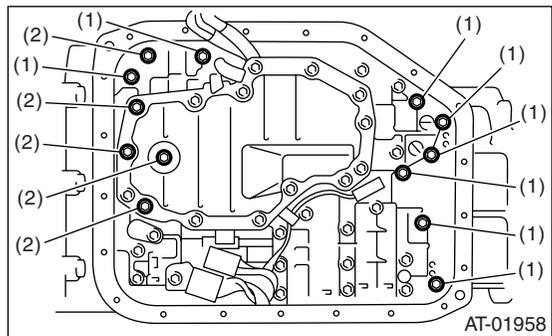


B: INSTALLATION

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

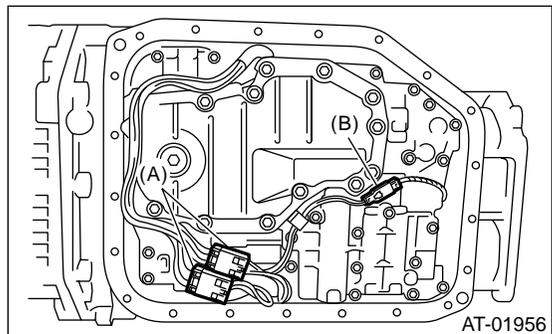
Tightening torque:

8 N·m (0.8 kgf·m, 5.8 ft·lb)



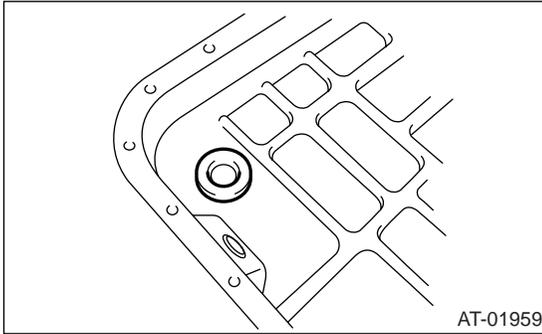
- (1) 58 mm (2.28 in)
- (2) 65 mm (2.56 in)

- 3) Connect the control valve connector.



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

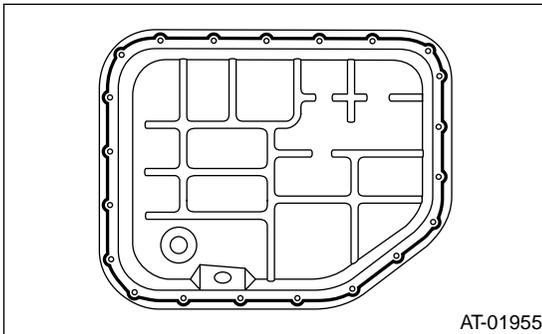
- 4) Attach the magnet at the specified position of oil pan.



- 5) Apply liquid gasket to the oil pan.

Liquid gasket:

THREE BOND 1217B (Part No. K0877YA020)



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

Tightening torque:

5 N·m (0.5 kgf·m, 3.6 ft·lb)

- 7) Pour ATF through the oil charge pipe.

Specified and recommended fluid:

<Ref. to 5AT-2, SPECIFICATION, General Description.>

Capacity:

Fill the same amount of the drained ATF.

- 8) Check the ATF level.

<Ref. to 5AT-27, Automatic Transmission Fluid.>

- 9) Execute the learning control promotion. <Ref. to 5AT(diag)-22, PROCEDURE, Learning Control.>

C: INSPECTION

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

ATF Filter

AUTOMATIC TRANSMISSION

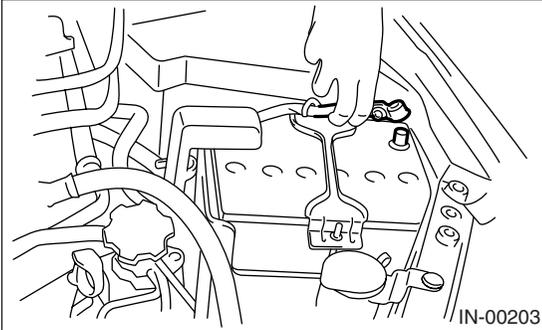
18.ATF Filter

A: REMOVAL

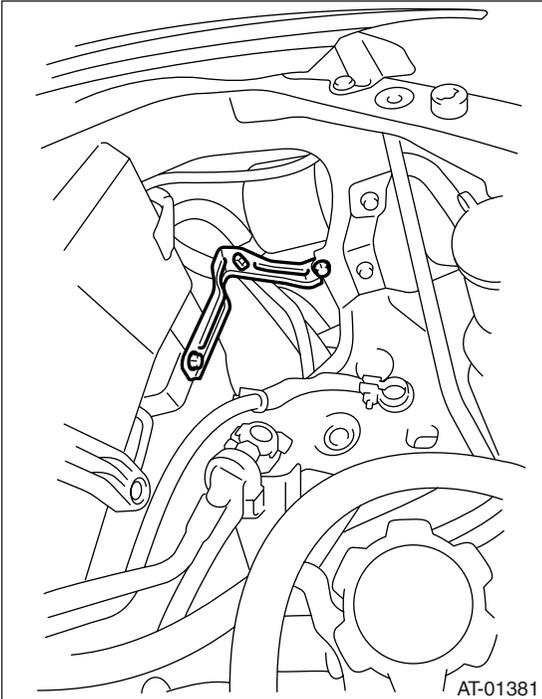
NOTE:

ATF filter is maintenance free.

- 1) Disconnect the ground cable from battery and remove the battery from vehicle.



- 2) Remove the harness securing bracket.



- 3) Using the ST, remove the ATF filter.
ST 498545400 OIL FILTER WRENCH

B: INSTALLATION

- 1) Apply a thin coat of ATF to the oil seal part of new ATF filter.
- 2) Install the ATF filter. Turn it by hand, being careful not to damage oil seal.
- 3) Tighten the ATF filter using ST.

Calculate the ATF filter tightening torque using following formula.

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

T1: 14 N·m (1.4 kgf·m, 10.1 ft·lb)

[Required torque setting]

T2: Tightening torque

L1: ST length 78 mm (3.07 in)

L2: Torque wrench length

Example:

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

NOTE:

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

ST 498545400 OIL FILTER WRENCH

- 4) Fill ATF.

5) Inspect the level of ATF. <Ref. to 5AT-27, Automatic Transmission Fluid.>

- 6) Install the harness securing bracket.

- 7) Install the battery.

C: INSPECTION

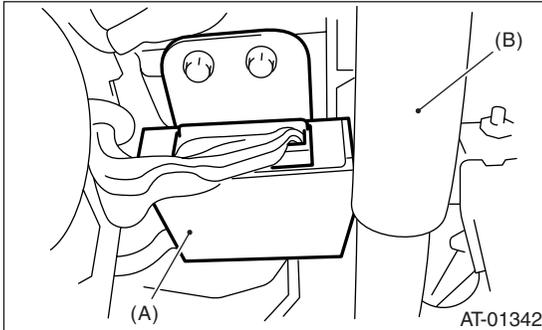
Check for rust, hole, ATF leaks and other damage. Replace the part if any defect is found from the inspection.

19. Transmission Control Module (TCM)

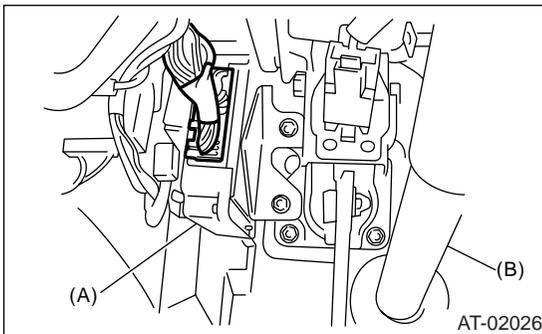
A: REMOVAL

- 1) Disconnect the ground cable from battery.
- 2) Remove the lower cover and then disconnect the connector.
- 3) Remove the body integrated unit. (RHD model)
<Ref. to SL-46, REMOVAL, Body Integrated Unit.>
- 4) Disconnect the connector from TCM.

- RHD model



- LHD model



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

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

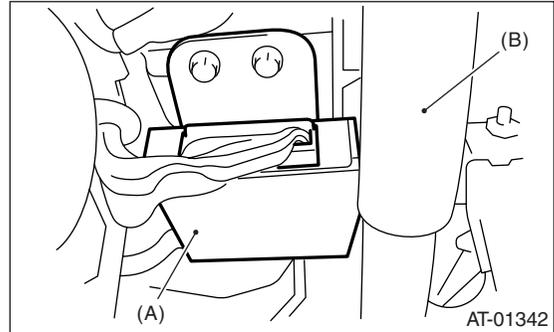
B: INSTALLATION

- 1) Install the relay to TCM body.
- 2) Install the TCM.

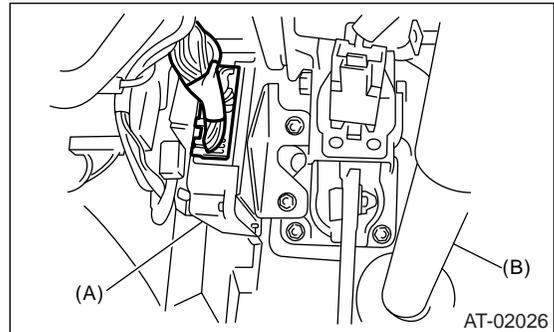
Tightening torque:

7.5 N·m (0.76 kgf-m, 5.5 ft-lb)

- RHD model



- LHD model



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

- 3) Connect the connector to TCM.
- 4) Install in the reverse order of removal.
- 5) Perform the Clear Memory 2. <Ref. to 5AT(diag)-18, CLEAR MEMORY MODE, OPERATION, Subaru Select Monitor.>

- (1) Connect the Subaru Select Monitor to data link connector.
- (2) Turn ignition switch to ON (engine OFF) and turn Subaru Select Monitor switch to ON.
- (3) Ensure that the select lever is in "P" range.
- (4) On the «Main Menu» display screen, select the {Each System Check} and press the [YES] key.
- (5) On the «System Selection Menu» display screen, select the {Transmission} and press the [YES] key.
- (6) Press the [YES] key after the information of transmission type has been displayed.
- (7) On the «Transmission Diagnosis» display screen, select the {Clear Memory 2} and press the [YES] key.

- 6) Perform the inspection with driving the vehicle at the end of repair work, and make sure there is no faulty as below;

- Excessive shift shock
- Oil leakage from transmission proper and etc.
- Occurrence of noise caused by interference etc.

Transmission Control Module (TCM)

AUTOMATIC TRANSMISSION

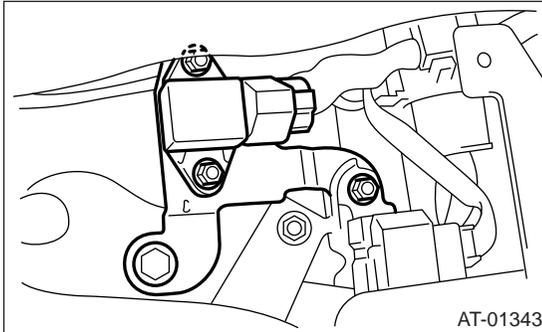
NOTE:

If excessive shift shock is felt, execute the advance operation of learning control. <Ref. to 5AT(diag)-22, PROCEDURE, Learning Control.>

20. Lateral G Sensor

A: REMOVAL

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



- 3) Remove the lateral G sensor.

B: INSTALLATION

Install in the reverse order of removal.

Tightening torque:

T1: 7.5 N·m (0.76 kgf-m, 5.5 ft-lb)

T2: 24.5 N·m (2.5 kgf-m, 18.1 ft-lb)

