AUTOMATIC TRANSMISSION

1. General Description

A: SPECIFICATION

1. TORQUE CONVERTER

Model	Non-turbo	Turbo
Type	Symmetric, 3 element, single stage, 2 phase torque converter	
Stall torque ratio	2.05 — 2.35	
Nominal diameter mm (in)	246 (9.69)	
Stall speed (at sea level)	2,200 — 2,700 rpm	2,800 — 3,300 rpm
One-way clutch	Sprague type one-way clutch	

2. OIL PUMP

Type	Parachoid constant-displacement pump	
Driving method	Driven by engine	
Number of teeth	Inner rotor	9
	Outer rotor	10

3. TRANSMISSION CONTROL ELEMENT

Type	4-forward, 1-reverse, double-row planetary gears
Multi-plate clutch	3 sets
Multi-plate brake	2 sets
One-way clutch (sprague type)	1 set

4. TRANSMISSION GEAR RATIO

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

5. PLANETARY GEAR AND PLATE

Model	Non-turbo	Turbo
Number of front sun gear teeth	33	
Number of front pinion teeth	21	
Number of front internal gear teeth	75	
Number of rear sun gear teeth	42	
Number of rear pinion teeth	17	
Number of rear internal gear teeth	75	
Number of high clutch drive plates	4	5
Number of low clutch drive plates	5	7
Number of reverse clutch drive plates	2	
Number of drive plates for the 2-4 brake	3	4
Number of drive plates for low & reverse brake	5	7

6. SELECTOR POSITION

P (Park)	Transmission is in neutral, output member is fixed, engine start is possible
R (Reverse)	Transmission is in reverse.
N (Neutral)	Transmission is in neutral and engine start is possible
D (Drive)	4-forward automatic gear change 1st ← → 2nd ←→ 3rd ←→ 4th
SPORT mode	4-forward automatic gear change 1st ←→ 2nd ←→ 3rd ←→ 4th
Manual mode (+)	4-forward manual gear change (shift up) 1st → 2nd → 3rd → 4th
Manual mode (–)	4-forward manual gear change (shift down) 1st ← 2nd ← 3rd ← 4th
Control method	Wire cable type

7. HYDRAULIC CONTROL AND LUBRICATION

Type		Electronic hydraulic control [4 forward gear changes made by electronic signals of vehicle speed and accelerator (throttle) opening]
Fluid	Recommended materials	SUBARU ATF HP
	Alternative	Idemitsu “AFT HP”, CASTROL“Transmax J”
Fluid capacity ℓ (US qt, Imp qt)		9.3 — 9.6 (9.8 — 10.1, 8.2 — 8.4)
Lubrication system		Forced feed lubrication with oil pump
Oil		Automatic transmission fluid (see above)

8. COOLING AND HARNESS

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

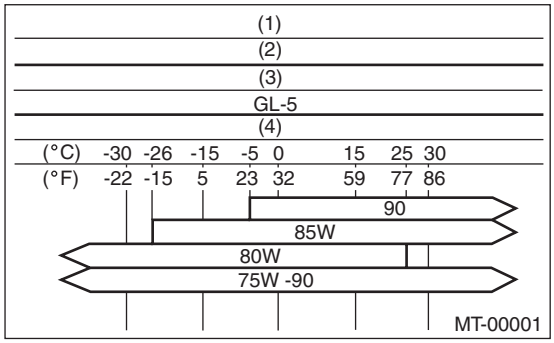
9. TRANSFER

Model	Non-turbo	Turbo
Transfer type	Multi-plate transfer (MPT)	
Number of transfer clutch drives & driven plates	5	6
Control method	Electronic hydraulic type	
Lubricant	Same automatic transmission fluid as used in the automatic transmission	
Reduction gear ratio	1.000 (53/53)	

10.FINAL REDUCTION GEAR

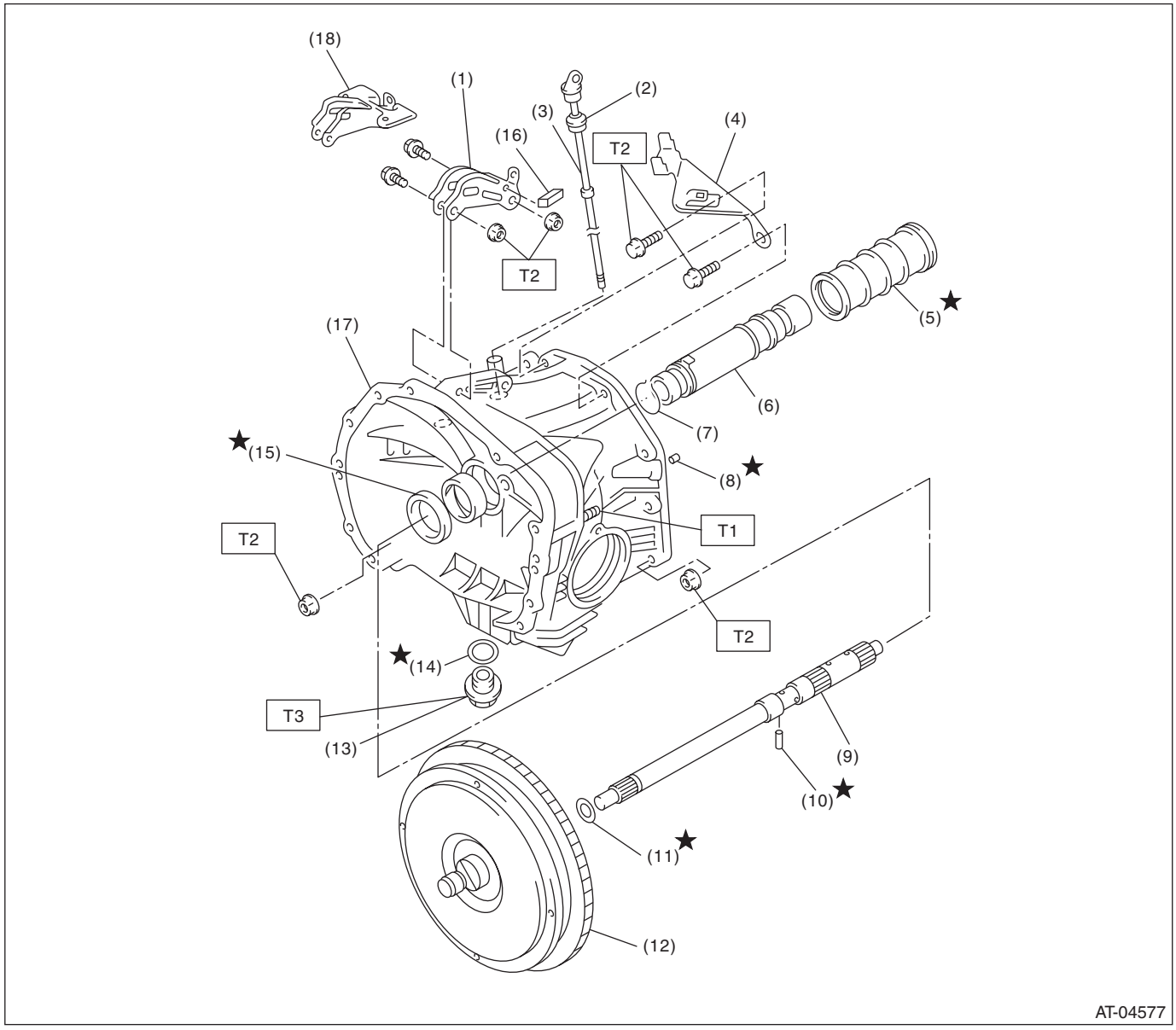
Model	Non-turbo	Turbo
Front final reduction gear ratio	4.111 (37/9)	3.900 (39/10)

11.RECOMMENDED GEAR OIL

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

B: COMPONENT

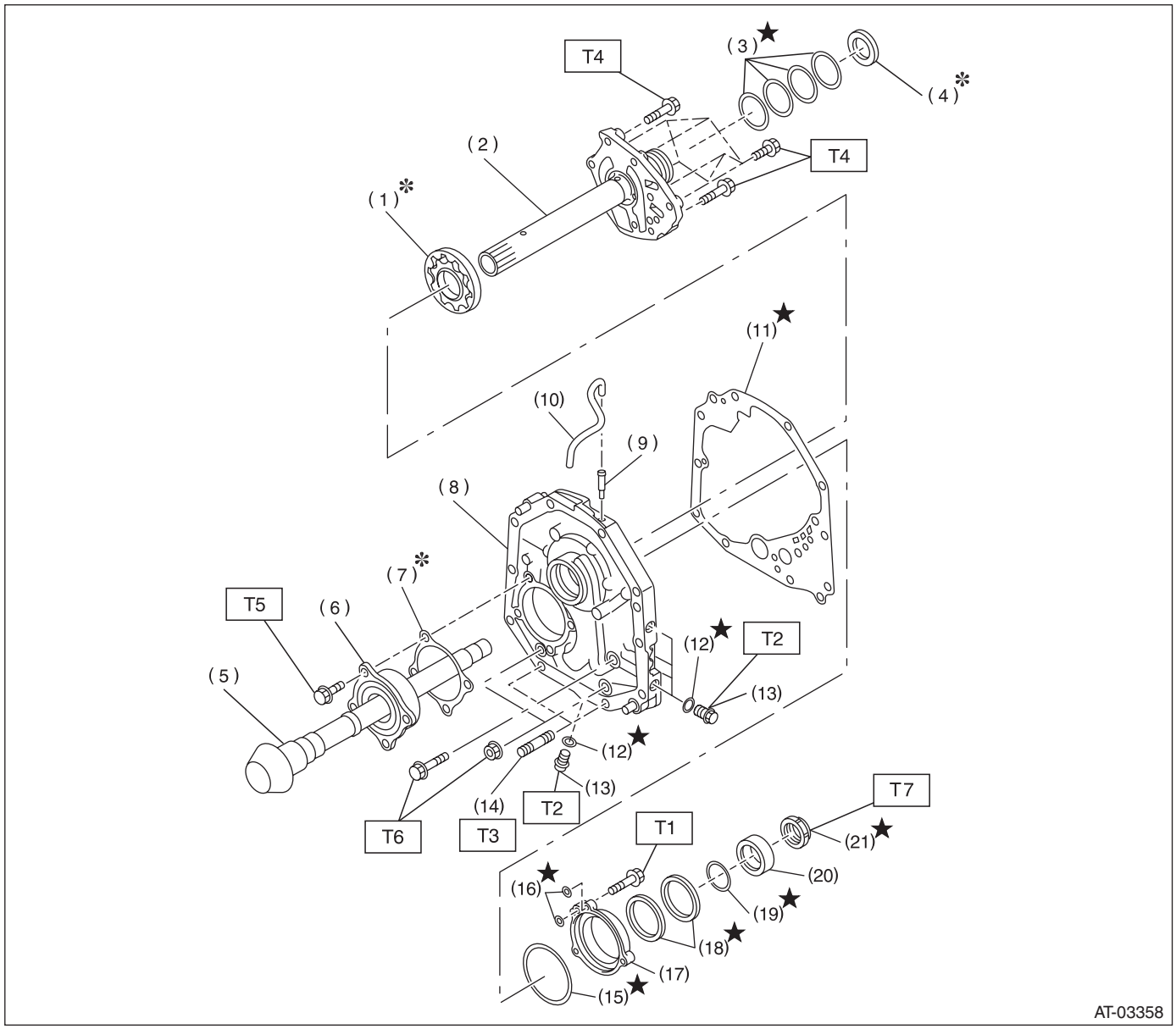
1. TORQUE CONVERTER AND CASE



(1) Pitching stopper bracket (turbo model)
(2) O-ring
(3) Differential oil level gauge
(4) Stay
(5) Seal pipe
(6) Oil pump shaft
(7) Clip
(8) Oil drain pipe
(9) Input shaft
(10) Spring pin
(11) O-ring
(12) Torque converter clutch ASSY
(13) Differential gear oil drain plug
(14) Gasket
(15) Oil seal
(16) Clip (turbo model)
(17) Converter case
(18) Pitching stopper bracket (non-turbo model)

Tightening torque:N·m (kgf-m, ft-lb)
T1: 18 (1.8, 13.3)
T2: 41 (4.2, 30.2)
T3: 44 (4.5, 32.5) (Aluminum gasket)
70 (7.1, 51.6) (Copper gasket)

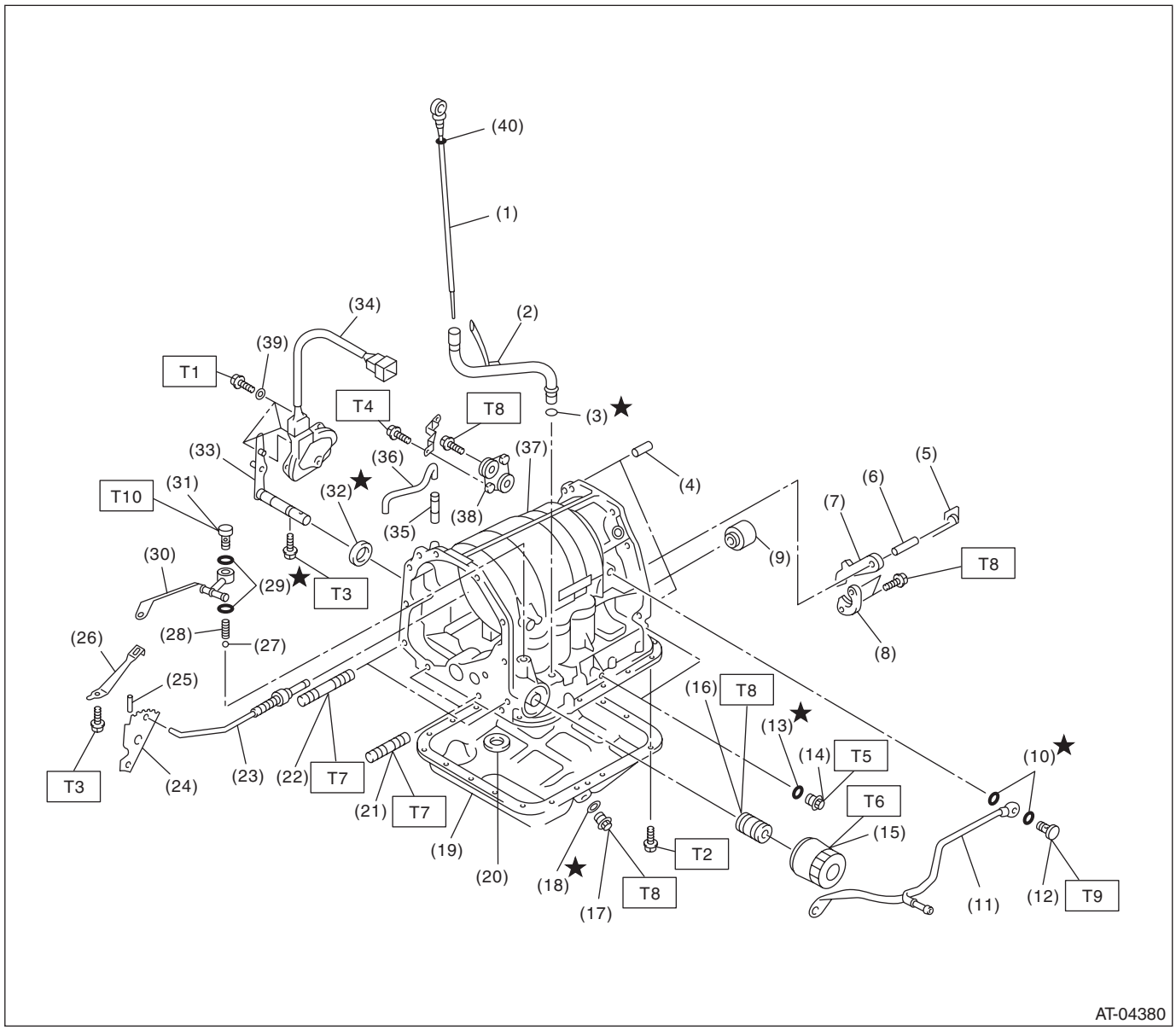
2. OIL PUMP



(1) Oil pump rotor
(2) Oil pump cover
(3) Seal ring
(4) Thrust needle bearing
(5) Drive pinion shaft
(6) Roller bearing
(7) Shim
(8) Oil pump housing
(9) Nipple
(10) Air breather hose
(11) Gasket
(12) O-ring
(13) Test plug
(14) Stud bolt
(15) O-ring
(16) O-ring
(17) Oil seal retainer
(18) Oil seal
(19) O-ring
(20) Drive pinion collar
(21) Lock nut

Tightening torque:N·m (kgf-m, ft-lb)
T1: 7 (0.7, 5.1)
T2: 13 (1.3, 9.6)
T3: 18 (1.8, 13.3)
T4: 25 (2.5, 18.4)
T5: 40 (4.1, 29.5)
T6: 42 (4.3, 31.0)
T7: 116 (11.8, 85.6)

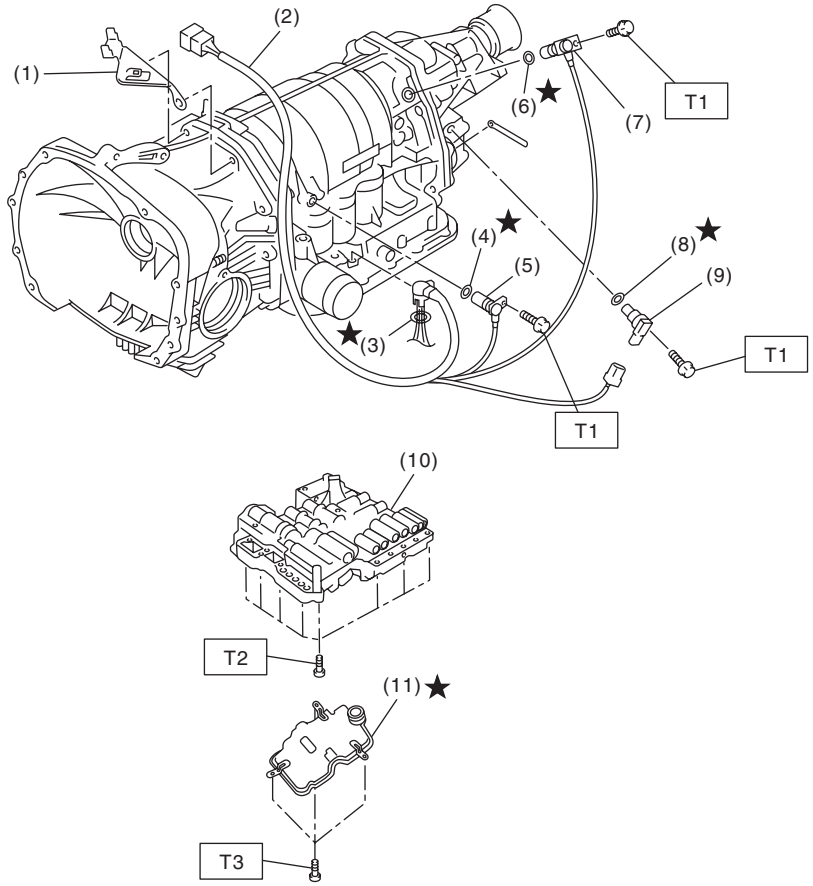
3. TRANSMISSION CASE AND CONTROL DEVICE



(1) ATF level gauge
(2) Oil charge pipe
(3) O-ring
(4) Straight pin
(5) Return spring
(6) Shaft
(7) Parking pawl
(8) Parking support
(9) Bushing
(10) Gasket
(11) ATF inlet pipe
(12) Union screw
(13) O-ring
(14) Test plug
(15) Oil filter
(16) Oil filter stud bolt
(17) Drain plug (ATF)
(18) Gasket
(19) Oil pan
(20) Magnet
(21) Stud bolt (short)
(22) Stud bolt (long)
(23) Parking rod
(24) Manual plate
(25) Spring pin
(26) Detent spring
(27) Ball
(28) Spring
(29) Gasket
(30) ATF outlet pipe
(31) Union screw
(32) Oil seal
(33) Range select lever
(34) Inhibitor switch ASSY
(35) Nipple
(36) Air breather hose
(37) Transmission case
(38) Plate ASSY
(39) Washer
(40) O-ring

Tightening torque:N·m (kgf-m, ft-lb)	
T1:	***3.4 (0.35, 2.5)***
T2:	***5 (0.5, 3.6)***
T3:	***6 (0.6, 4.4)***
T4:	***12 (1.2, 8.7)***
T5:	***13 (1.3, 9.6)***
T6:	***14 (1.4, 10.3)***
T7:	***18 (1.8, 13.3)***
T8:	***25 (2.5, 18.4)***
T9:	***40 (4.1, 29.5)***
T10:	***45 (4.6, 33.2)***

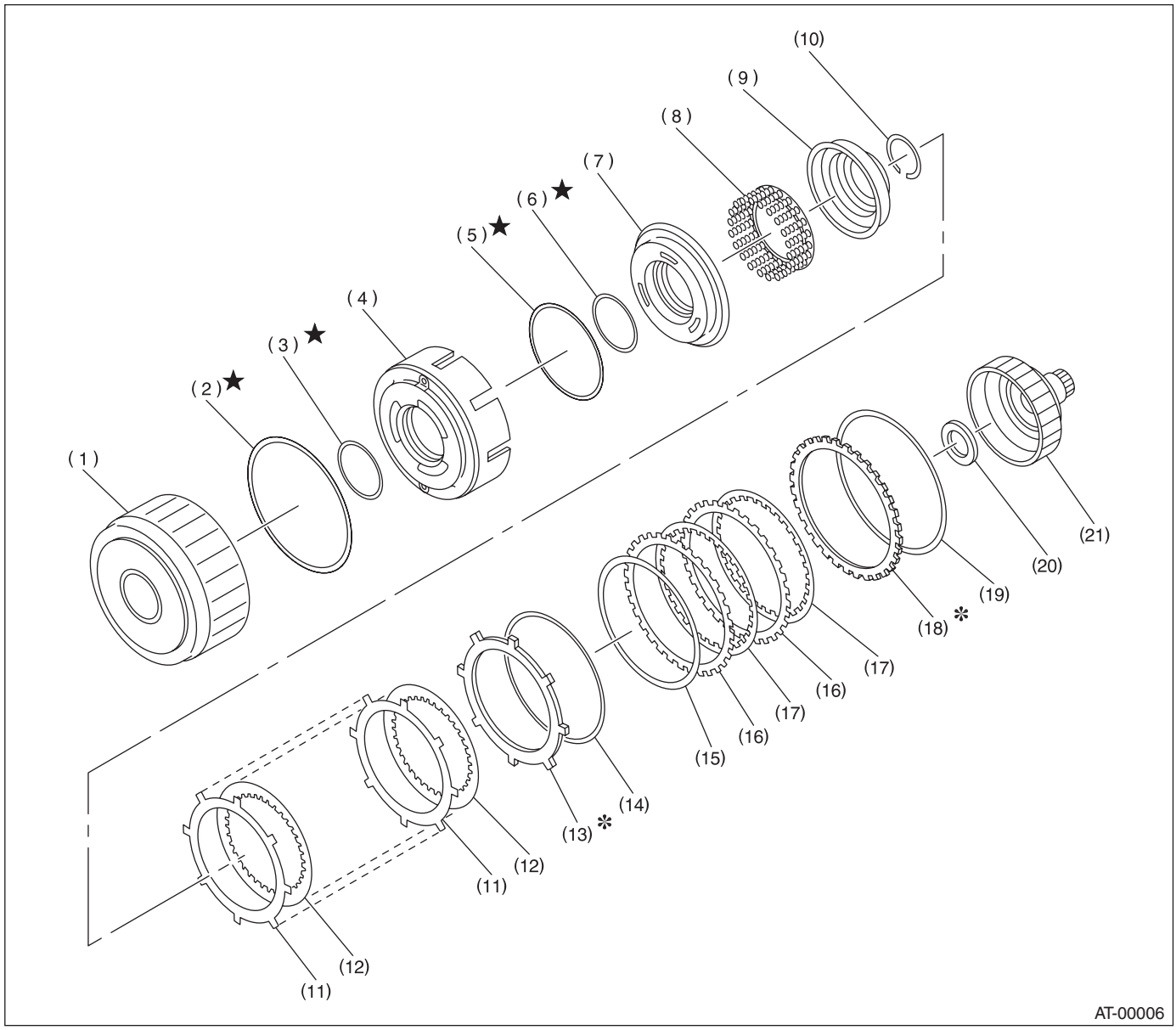
4. CONTROL VALVE AND HARNESS ROUTING



(1) Stay
(2) Transmission harness
(3) O-ring
(4) O-ring
(5) Torque converter turbine speed sensor
(6) O-ring
(7) Front vehicle speed sensor
(8) O-ring
(9) Rear vehicle speed sensor
(10) Control valve body
(11) Control valve strainer

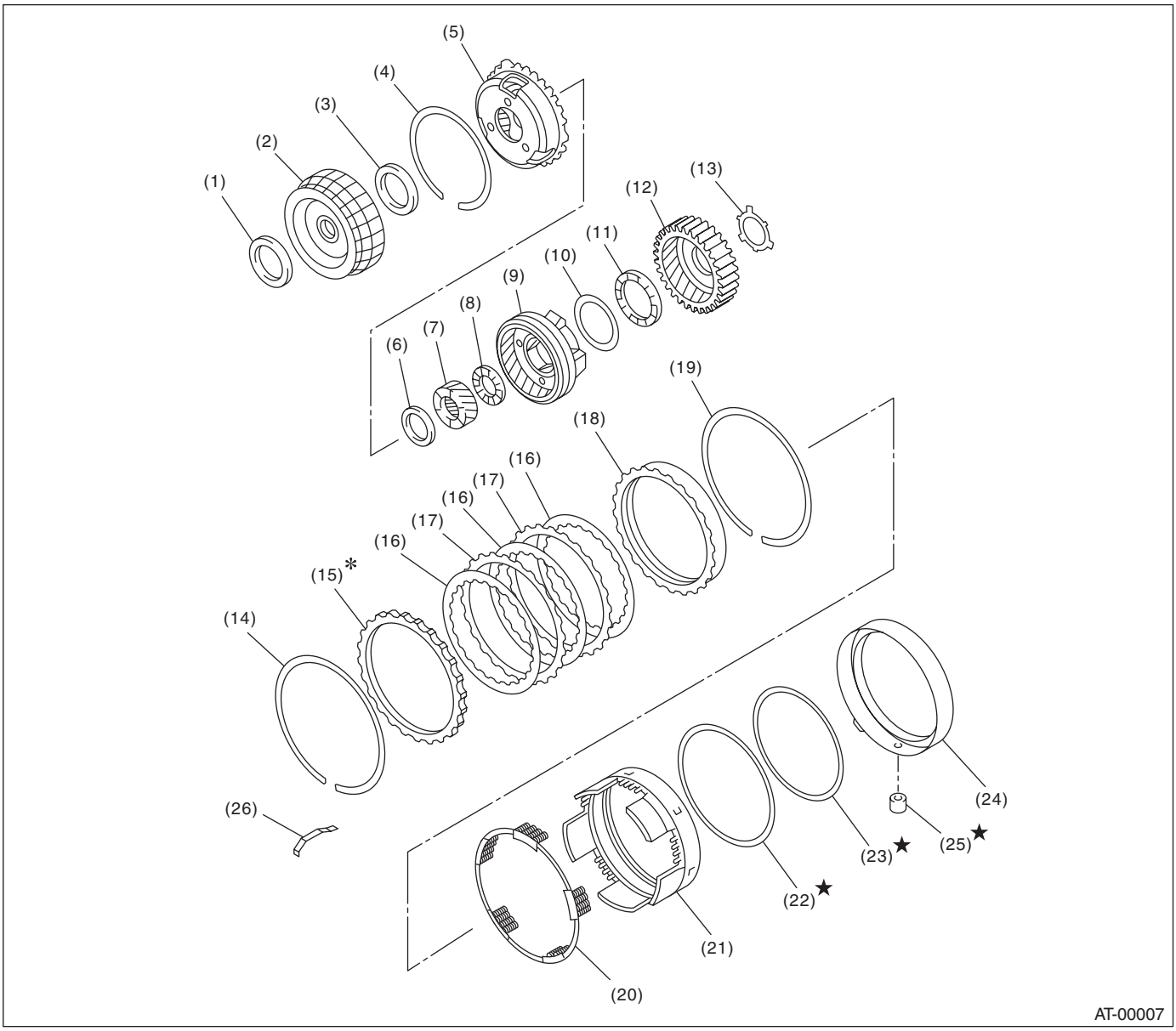
Tightening torque:N·m (kgf-m, ft-lb)
T1: 7 (0.7, 5.1)
T2: 8 (0.8, 5.9)
T3: 10 (1.0, 7.4)

5. HIGH CLUTCH AND REVERSE CLUTCH



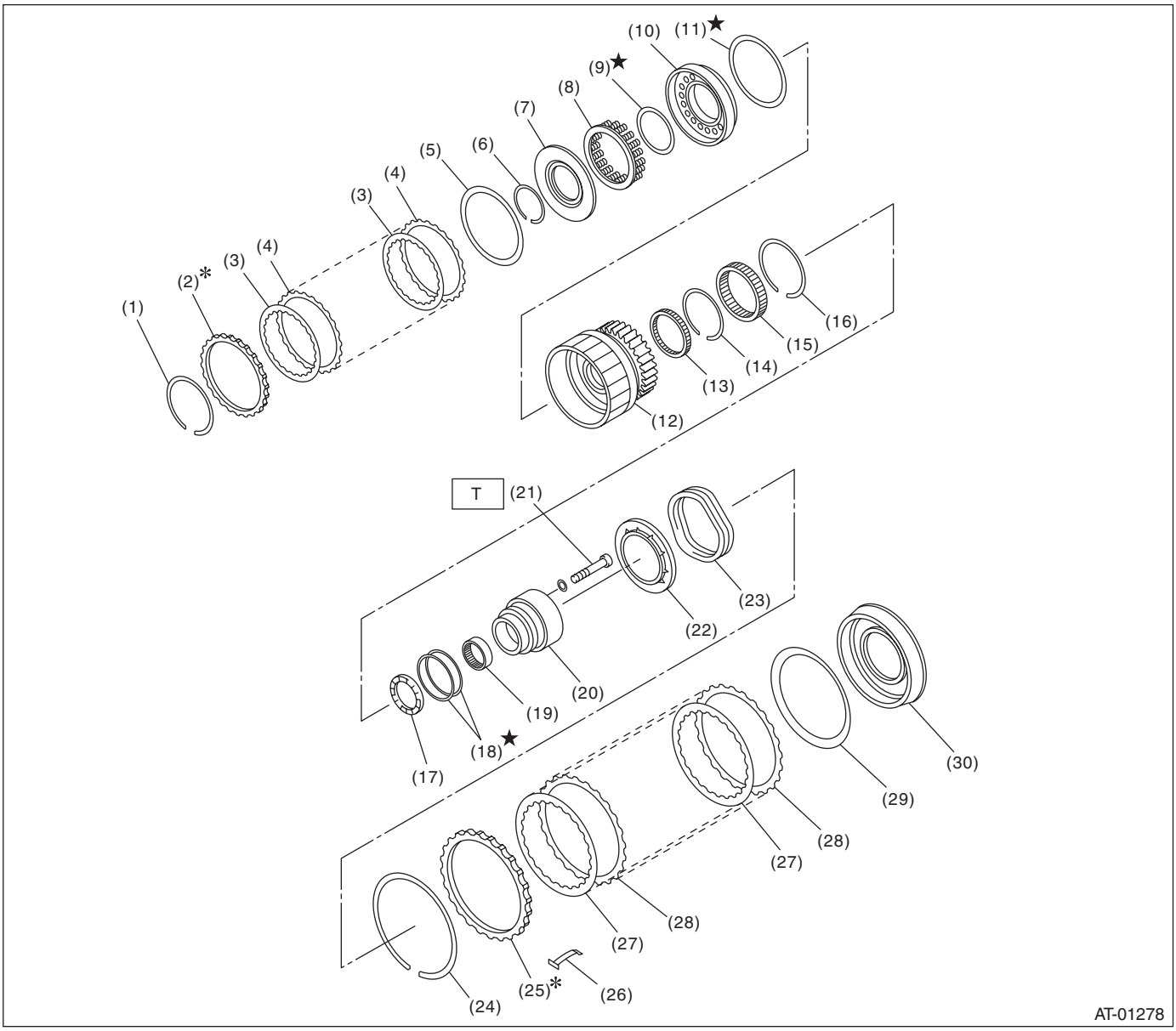
(1) High clutch drum
(2) Lip seal
(3) D-ring
(4) Reverse clutch piston
(5) D-ring
(6) D-ring
(7) High clutch piston
(8) Spring retainer
(9) Clutch cover
(10) Snap ring
(11) Driven plate (high clutch)
(12) Drive plate (high clutch)
(13) Retaining plate (high clutch)
(14) Snap ring
(15) Dish plate
(16)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

6. PLANETARY GEAR AND 2-4 BRAKE



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

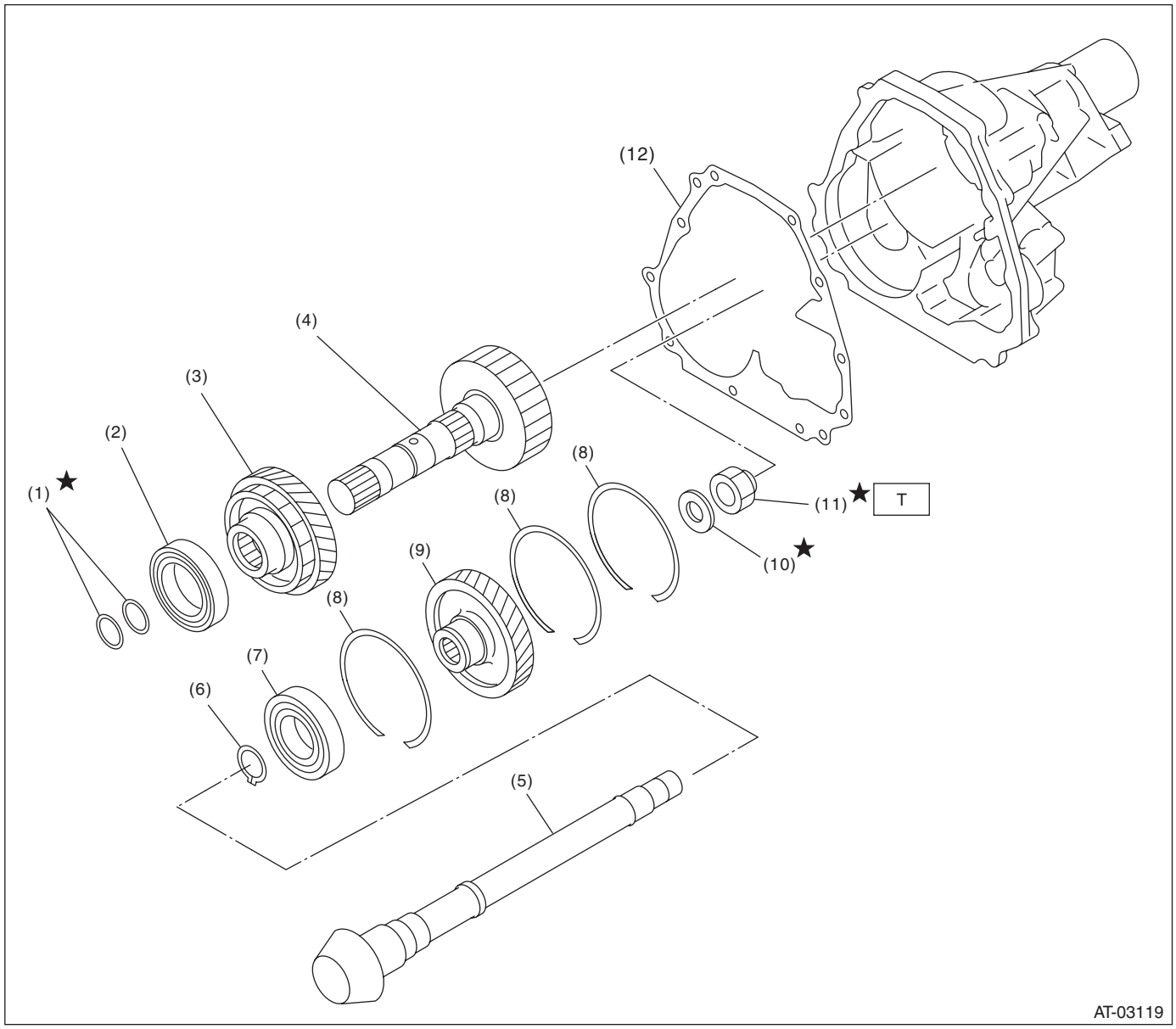
7. LOW CLUTCH AND LOW & REVERSE BREAK



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

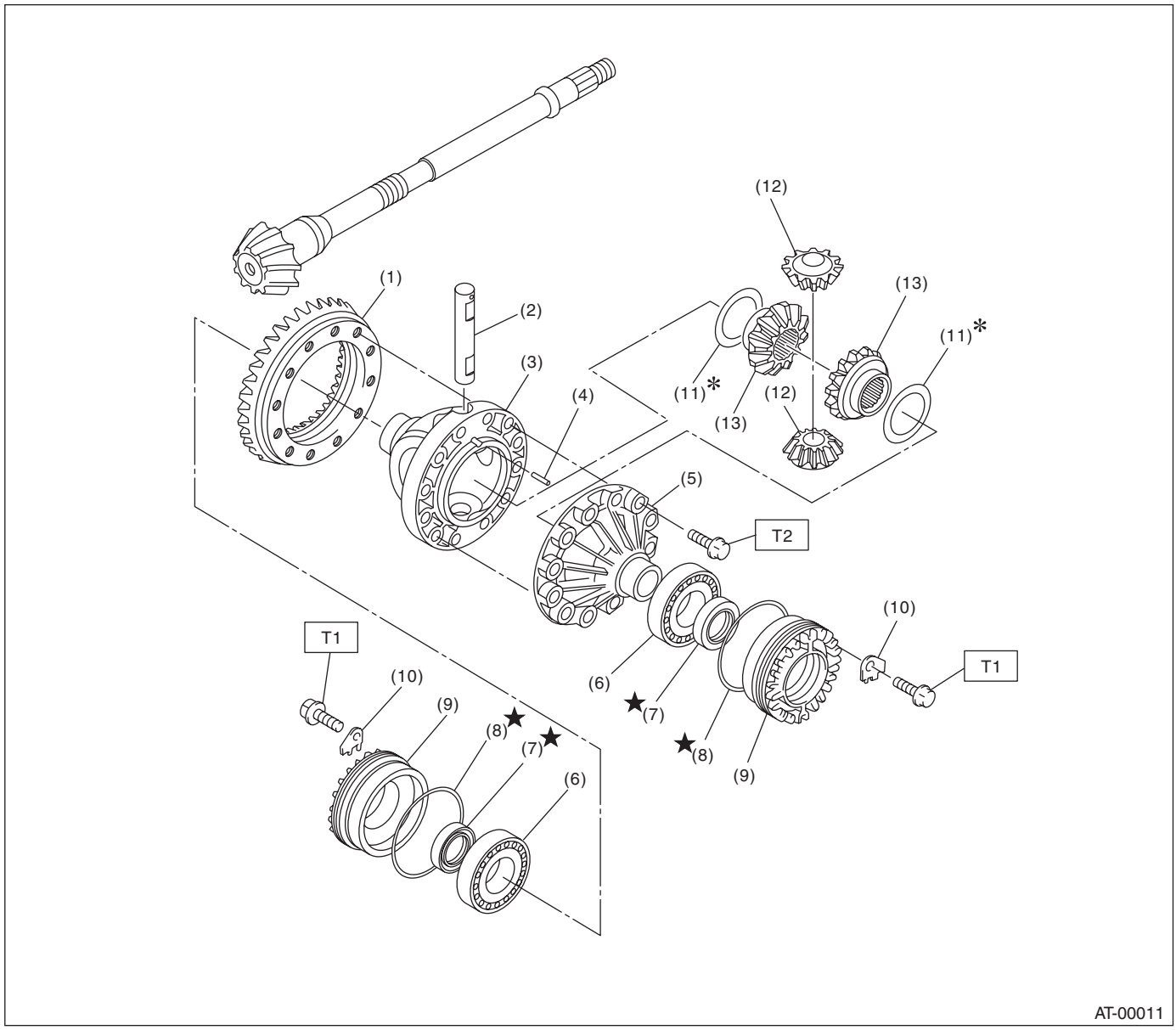
Tightening torque:N·m (kgf-m, ft-lb)
T: 25 (2.5, 18.4)

8. REDUCTION GEAR



(1)	Seal ring	(6)	Snap ring	(11)	Lock nut
(2)	Ball bearing	(7)	Ball bearing	(12)	Gasket
(3)	Reduction drive gear	(8)	Snap ring		
(4)	Reduction drive shaft	(9)	Reduction driven gear	***Tightening torque:N·m (kgf-m, ft-lb)***	
(5)	Drive pinion shaft	(10)	Washer	***T: 100 (10.2, 73.8)***	

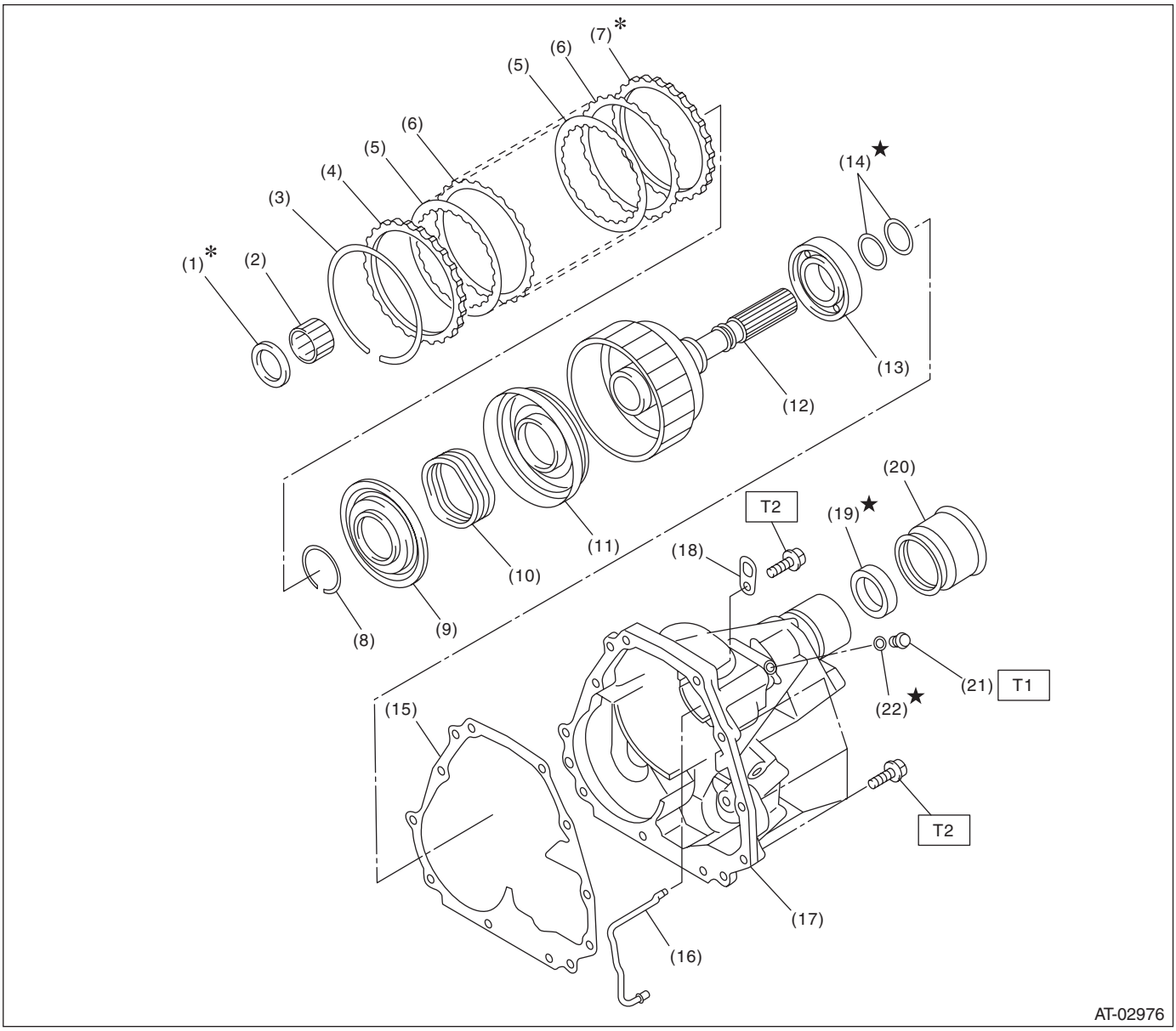
9. DIFFERENTIAL GEAR



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

Tightening torque:N·m (kgf-m, ft-lb)
T1: 25 (2.5, 18.4)
T2: 62 (6.3, 45.7)

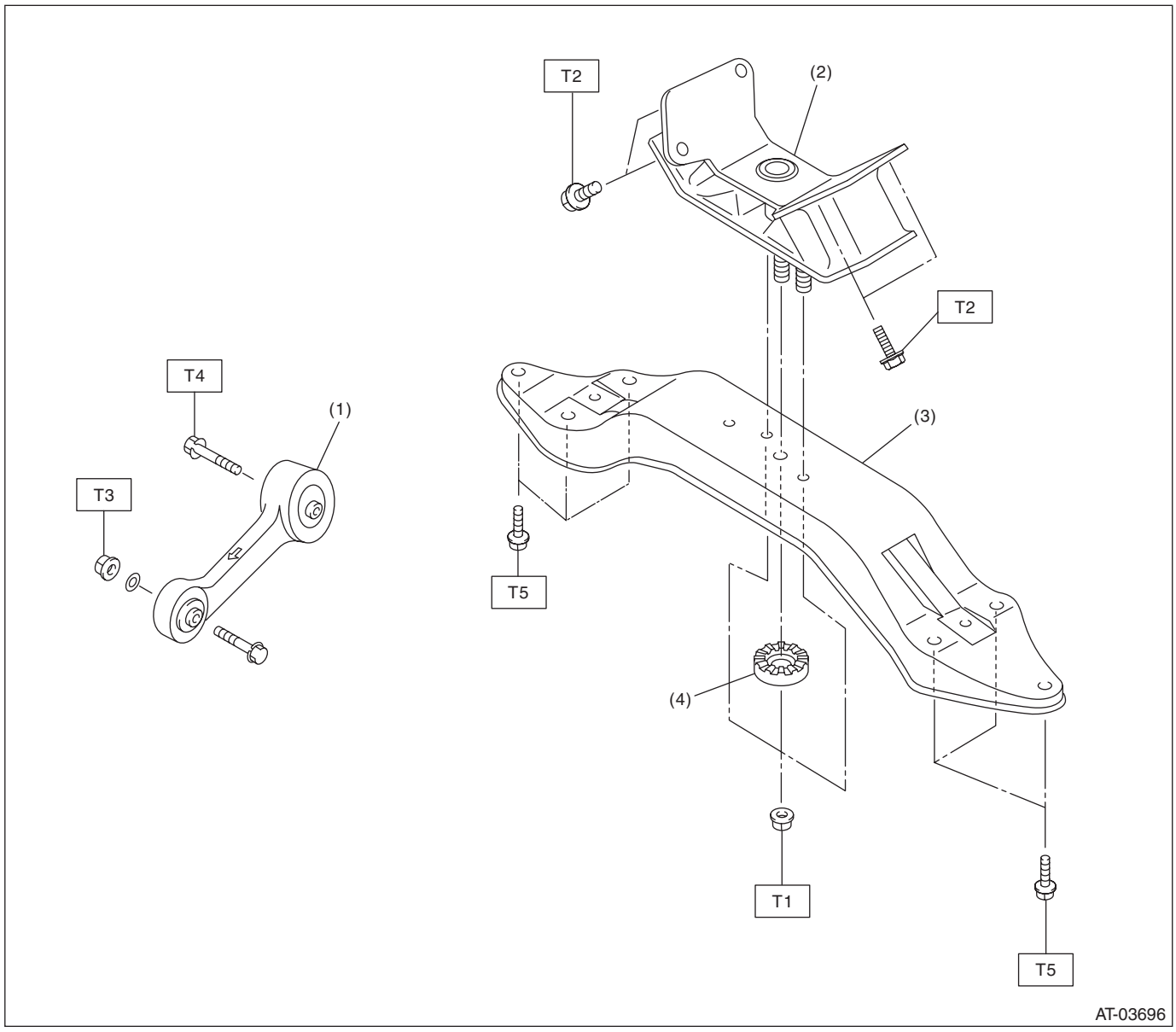
10.TRANSFER AND EXTENSION CASE



(1) Thrust needle bearing
(2) Needle bearing
(3) Snap ring
(4) Driven plate (thick)
(5) Drive plate
(6) Driven plate (thin)
(7) Retaining plate
(8) Snap ring
(9) Transfer clutch piston seal
(10) Return spring
(11) Transfer clutch piston
(12) Rear drive shaft
(13) Ball bearing
(14) Seal ring
(15) Gasket
(16) Transfer clutch pipe
(17) Extension case
(18) Transmission hanger
(19) Oil seal
(20) Dust cover
(21) Test plug
(22) O-ring

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

11.TRANSMISSION MOUNTING



(1) Pitching stopper
(2) Rear cushion rubber
(3) Transmission rear crossmember
(4) Stopper

Tightening torque:N·m (kgf-m, ft-lb)
T1: 35 (3.6, 25.8)
T2: 40 (4.1, 29.5)
T3: 50 (5.1, 36.9)
T4: 58 (5.9, 42.8)
T5: 70 (7.1, 51.6)

C: CAUTION

- Wear appropriate work clothing, including a cap, protective goggles and protective shoes when performing any work.
- Remove contamination including dirt and corrosion before removal, installation or disassembly.
- Keep the disassembled parts in order and protect them from dust and dirt.
- Do not place the oil pan with its inner side facing up until it is installed, to prevent intrusion of foreign matter into the valve body.
- Before removal, installation or disassembly, be sure to clarify the failure. Avoid unnecessary removal, installation, disassembly and replacement.
- When disassembling the case and other light alloy parts, use a plastic hammer to force it apart. Do not pry apart with screwdrivers or other tools.
- Vehicle components are extremely hot after driving. Be wary of receiving burns from heated parts.
- Use SUBARU genuine gear oil, grease or the equivalent. Do not mix gear oil, grease, etc. of different grades or manufacturers.
- Be sure to tighten bolts and nuts to the specified torque.
- Place lifts, shop jacks or rigid racks at the specified points.
- Apply gear oil or ATF onto sliding or revolution surfaces before installation in view of components usage.
- Replace deformed or damaged snap rings with new parts.
- Before installing O-rings or oil seals, apply sufficient amount of ATF fluid to avoid damage and deformation.
- Be careful not to incorrectly install or fail to install O-rings, snap rings and other such parts.
- Before securing a part on a vise, place cushioning material such as wood blocks, aluminum plate, or cloth between the part and the vise.
- Avoid damaging the mating surface of the case.
- Before applying liquid gasket, completely remove the old seal.
- When disassembling the AT, be sure to use nylon gloves and paper towels. Do not use cloth gloves or waste cloth.

D: PREPARATION TOOL

1. SPECIAL TOOL

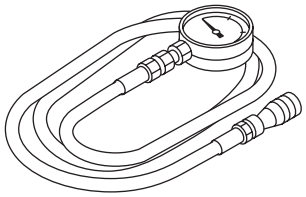
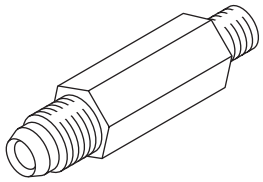
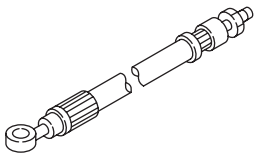
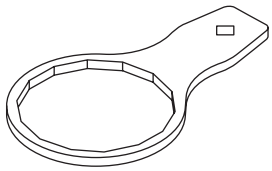
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-498575400	498575400	OIL PRESSURE GAUGE ASSY	Used for measuring oil pressure.
 ST-498897200	498897200	OIL PRESSURE GAUGE ADAPTER	Used at the oil pump housing when measuring reverse clutch pressure and line pressure.
 ST-498897700	498897700	ADAPTER SET	Used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

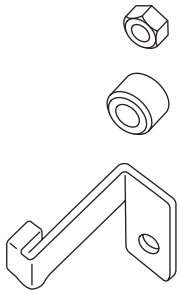
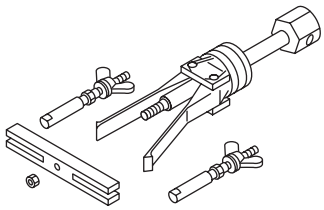
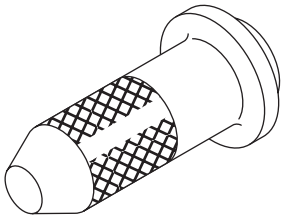
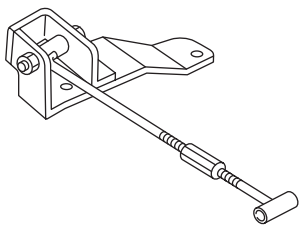
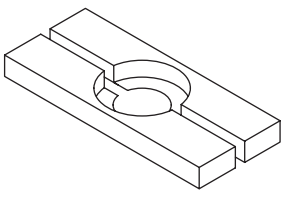
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-498277200	498277200	STOPPER SET	Used for removing and installing automatic transmission assembly to engine.
 ST-398527700	398527700	PULLER ASSY	• Used for removing the extension case roller bearing. • Used for removing the extension oil seal. • Used for removing the front differential side retainer bearing outer race. • Used for removing the front differential side retainer oil seal.
 ST-498057300	498057300	INSTALLER	Used for installing the extension oil seal.
 ST41099AC000	41099AC000	ENGINE SUPPORT ASSY	Used for supporting the engine.
 ST-498077000	498077000	REMOVER	Used for removing the differential taper roller bearing.

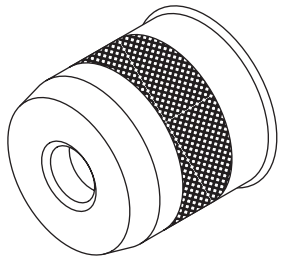
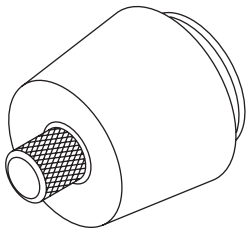
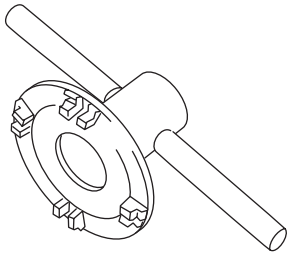
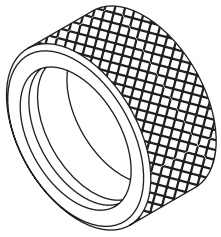
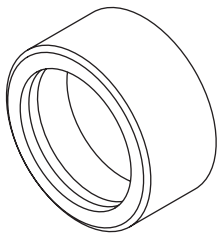
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-499247400	499247400	INSTALLER	• Used for installing the transfer outer snap ring. • Used together with the GUIDE (499257300).
 ST-499257300	499257300	SNAP RING OUTER GUIDE	• Used for installing the transfer outer snap ring. • Used together with the INSTALLER (499247400).
 ST18630AA010	18630AA010	WRENCH COMPL RETAINER	• Used for removing and installing the differential side retainer. • WRENCH ASSEMBLY (499787000) can also be used.
 ST-398437700	398437700	DRIFT	Used for installing the converter case oil seal.
 ST-398487700	398487700	INSTALLER	Used for installing the front differential taper roller bearing.

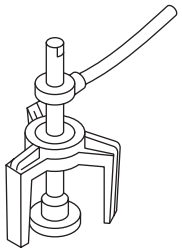
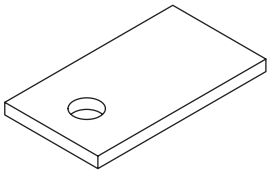
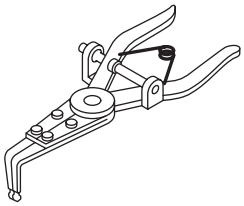
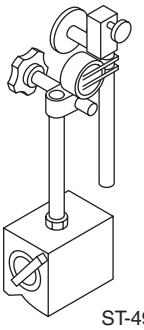
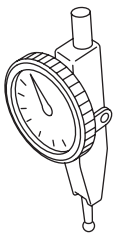
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-398673600	398673600	COMPRESSOR	Used for removing and installing the clutch spring.
 ST-498255400	498255400	PLATE	Used for measuring the backlash of hypoid gear.
 ST-399893600	399893600	PLIERS	Used for removing and installing the clutch spring.
 ST-498247001	498247001	MAGNET BASE	• Used for measuring the gear backlash. • Used together with DIAL GAUGE (498247100).
 ST-498247100	498247100	DIAL GAUGE	• Used for measuring the gear backlash. • Used together with MAGNET BASE (498247001).

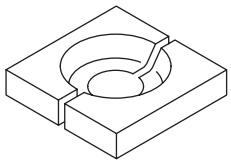
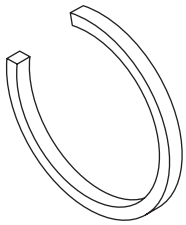
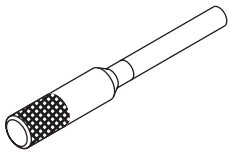
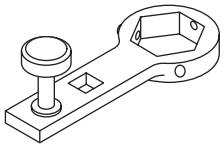
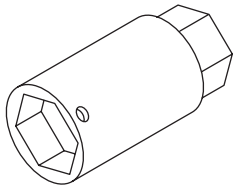
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-498517000	498517000	REPLACER	Used for removing the front roller bearing.
 ST-398623600	398623600	SEAT	Used for removing the spring of the transfer clutch piston.
 ST-499267300	499267300	STOPPER PIN	Used for installing the inhibitor switch.
 ST-499787700	499787700	WRENCH	Used for removing and installing the drive pinion lock nut.
 ST-499787500	499787500	ADAPTER	Used for removing and installing the drive pinion lock nut.

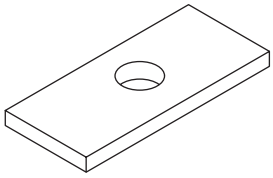
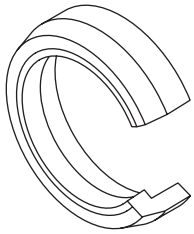
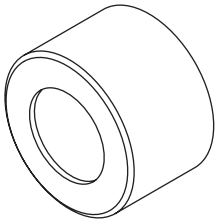
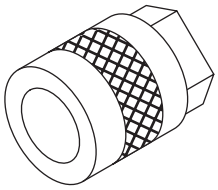
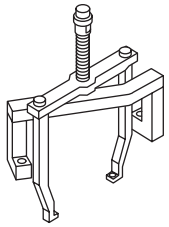
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-398643600	398643600	GAUGE	Used for measuring the total end play, extension end play and drive pinion height.
 ST-498627100	498627100	SEAT	Used for holding the low clutch piston retainer spring when installing snap ring.
 ST-499577000	499577000	GAUGE	Used for measuring the mating surface of the transmission to the end face of the reduction gear.
 ST-499737000	499737000	PULLER	Used for removing the reduction driven gear assembly.
 ST-499737100	499737100	PULLER SET	Used for removing the reduction drive gear assembly.

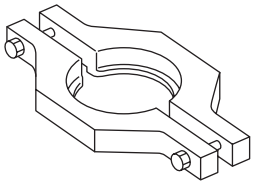
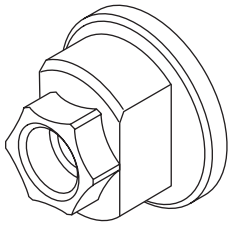
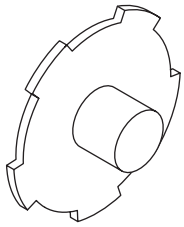
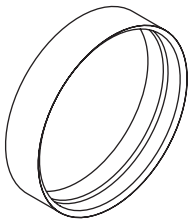
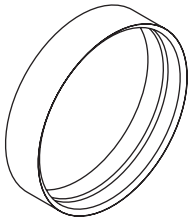
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-498077600	498077600	REMOVER	Used for removing the ball bearing.
 ST-498937110	498937110	HOLDER	Used for removing and installing the drive pinion lock nut.
 ST-498677100	498677100	COMPRESSOR	Used for installing the 2-4 brake snap ring.
 ST-498437000	498437000	HIGH CLUTCH PISTON GUIDE	Used for installing the high clutch piston.
 ST-498437100	498437100	LOW CLUTCH PISTON GUIDE	Used for installing the low clutch piston.

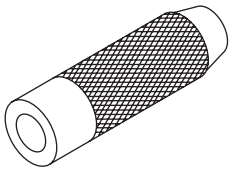
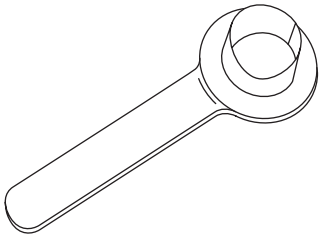
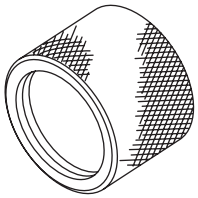
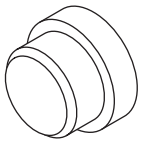
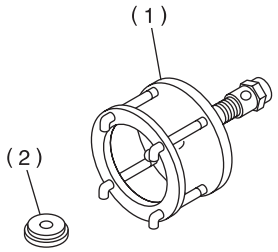
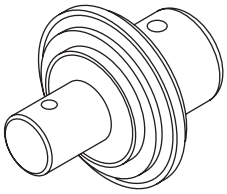
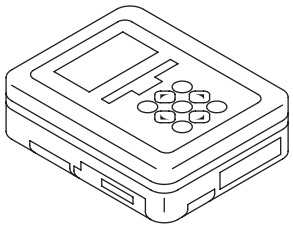
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-899580100	899580100	INSTALLER	Used for press-fitting the ball bearing of the transfer clutch.
 ST28399SA010	28399SA010	OIL SEAL PROTECTOR	Used for installing the axle shaft.
 ST18675AA000	18675AA000	DIFFERENTIAL SIDE OIL SEAL INSTALLER	Used for installing the differential side retainer oil seal.
 ST-398497701	398497701	INSTALLER	Used for installing the needle bearing.
 ST-899524100	899524100	PULLER SET	Use only the bolt. • Used together with the PULLER SET (499737100). • Used together with the PULLER (499737000). 1. Puller 2. Cap

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-499247300	499247300	INSTALLER	Used for installing the oil pump housing retainer oil seal.
 ST1B021XU0	1B021XU0	SUBARU SELECT MONITOR III KIT	Troubleshooting for electrical system

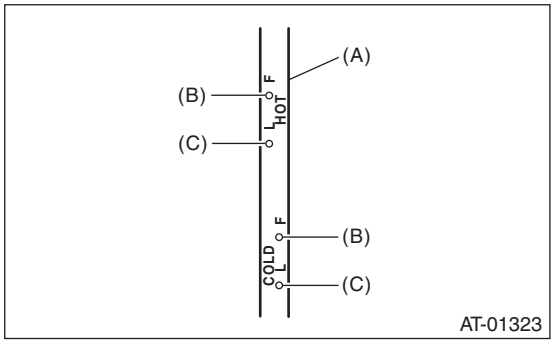
2. GENERAL TOOL

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

2. Automatic Transmission Fluid

A: INSPECTION

NOTE:
The level of ATF varies with fluid temperature. Pay attention to the ATF temperature when checking ATF level.
1) Raise the ATF temperature by driving a distance of 5 to 10 km (3 to 6 miles). Otherwise, idle the engine to raise ATF temperature to 70 — 80°C (158 — 176°F) displayed on Subaru Select Monitor. <Ref. to 4AT(diag)-16, READ CURRENT DATA, OPERATION, Subaru Select Monitor.>
2) Park the vehicle on a level surface.
3) After selecting all positions (P, R, N, D), set the select lever in "P" range. Idle the engine for 1 or 2 minutes, and measure the ATF level.



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

4) Make sure that the ATF level is higher than the center point between upper and lower marks of the HOT side.
If the fluid level is below the lower mark, check the transmission for leaks. If there are leaks, it is necessary to repair or replace gaskets, oil seals, plugs or other parts.
5) If the ATF level is below the center point between upper and lower level marks, add the recommended ATF until the fluid level is above the center point between the upper and lower level marks.

CAUTION:
- **Be careful not to exceed the upper level.**
- **When the transmission is cold, be careful not to add ATF to the upper level. Overfilling of ATF may cause oil splashing.**

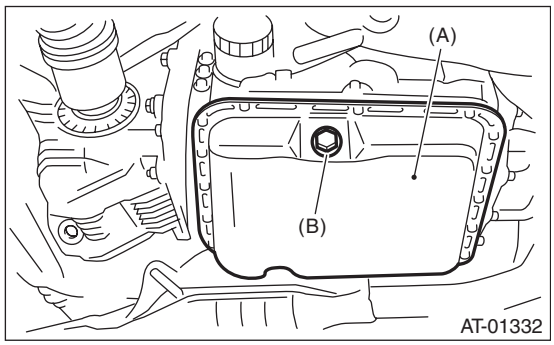
6) Check ATF level after raising ATF temperature to 70 — 80°C (158 — 176°F) by running the vehicle again or by idling the engine.

B: REPLACEMENT

1) Lift up the vehicle.
2) Remove the drain plug (ATF) and completely drain the ATF.

CAUTION:
Immediately after the vehicle has been running or after idling for a long time, the ATF will be hot. Be careful not to receive burns.
3) Check the condition of ATF. <Ref. to 4AT-27, CONDITION CHECK, Automatic Transmission Fluid.>
4) Perform replacement with a new gasket, and tighten the drain plug (ATF).

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



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

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

Recommended fluid:
<Ref. to RM-4, FLUID, RECOMMENDED MATERIALS, Recommended Materials.>

Capacity:
Refill with the same amount of ATF drained from the drain plug hole.

Capacity when transmission is overhauled:
9.3 — 9.6 ℓ (9.8 — 10.1 US qt, 8.2 — 8.4 Imp qt)
7) Bleed the air of control valve.
<Ref. to 4AT-61, Air Bleeding of Control Valve.>
8) Check the level and leaks of ATF.
<Ref. to 4AT-26, INSPECTION, Automatic Transmission Fluid.>

C: CONDITION CHECK

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

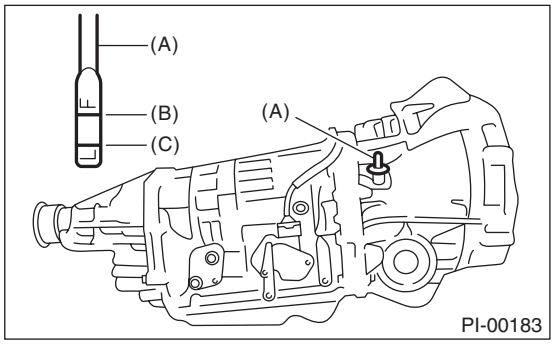
Fluid condition	Trouble and possible cause	Corrective action
Large amount of metallic pieces are found.	Excessive wear of the internal of the transmission body.	Replace ATF and check if AT operates correctly.
Thick and varnish-form fluid.	Burned clutch, etc.	Replace ATF and check the AT body or vehicle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

3. Differential Gear Oil

A: INSPECTION

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

NOTE:
To prevent overfilling the differential gear oil, do not fill oil to the “F” line or more.



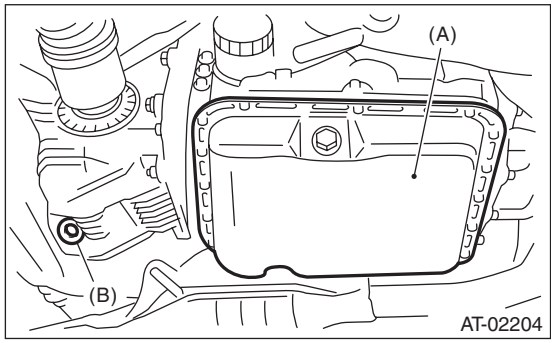
(A) Oil level gauge
(B) Upper level
(C) Lower level

B: REPLACEMENT

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

CAUTION:
• Immediately after the vehicle has been running or after idling for a long time, the differential gear oil will be hot. Be careful not to receive burns.
• Be careful not to spill differential gear oil on the exhaust pipe to prevent it from emitting smoke or causing a fire. If differential gear oil is spilled on the exhaust pipe, wipe it off completely.
3) Replace the gasket with a new part and tighten the differential gear oil drain plug using the TORX® bit T70.

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



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

4) Lower the vehicle.
5) Fill the differential with differential gear oil from the level gauge hole.

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

Gear oil capacity:
1.1 — 1.3 ℓ (1.2 — 1.4 US qt, 1.0 — 1.1 Imp qt)
6) Check the level of differential gear oil.
<Ref. to 4AT-28, INSPECTION, Differential Gear Oil.>

4. Road Test

A: INSPECTION

1. GENERAL PRECAUTION

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

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

2. D RANGE SHIFT FUNCTION

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

3. D RANGE SHIFT SHOCK

Check the shock level when shifting up during normal driving.

4. KICK-DOWN FUNCTION

Check kick-down for each gear. Check the shock level during kick-down at the same time.

5. ENGINE BRAKE OPERATION

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

6. LOCK-UP FUNCTION

• When the accelerator is lightly depressed while driving on a flat road in “D” range, check that rpm does not change abruptly.
• Check slip lock-up with following procedure. Subaru Select Monitor is required for judgment.
Before starting the check, make sure that no DTC is displayed using the Subaru Select Monitor. If there is a DTC, perform the corrective action according to the DTC. Recheck to see that the DTC has been cleared, then start the slip lock-up check.
1) The check is to be performed on a flat and straight road or on a free roller.

NOTE:
• Slip lock-up will not operate when the vehicle is lifted up off of its wheels, since there is no surface resistance.
• When checking on the free roller, the driving resistance will be slightly inadequate. It will be easier to judge if the foot brake is lightly applied while performing the check.
2) Connect the Subaru Select Monitor.
3) Check the ATF temperature using the Subaru Select Monitor.

NOTE:
• Make sure that the ATF temperature is between 50 — 100°C (122 — 212°F).
• If the temperature is low, warm-up the ATF by running the vehicle.
4) Start the engine, and set so that the lock-up duty can be read on the data display of the Subaru Select Monitor.
5) Drive the vehicle at a constant speed of 35 — 40 km/h (22 — 25 MPH).
6) Read the lock-up duty while vehicle is running.

Standard
25 — 45%

NOTE:
• The reading may be slightly lower on a free roller.
• Slip lock-up control is not operating if the lock-up duty is 5% or less, or when the lock-up duty goes down immediately after starting to rise. In these cases, improper ATF or deterioration of the ATF may be the cause. Check the amount of ATF or replace the fluid, then recheck.

7. P RANGE OPERATION

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

8. NOISE AND VIBRATION

Check for noise and vibration while driving and during shifting.

9. TRANSFER CLUTCH

Check for tight corner braking phenomenon when the vehicle is moved forward with the steering fully turned.

10.OIL LEAKAGE

After the driving test, inspect for oil leaks.

5. Stall Test

A: INSPECTION

NOTE:
The stall test is extremely important in diagnosing the condition of an automatic transmission and engine. The test is necessary to measure the engine stall speeds in “R” and “2nd of manual mode”.
Purposes of the stall test:

- Operational check of the automatic transmission clutch
- Operational check of the torque converter clutch
- Engine performance check

1) Check that the throttle valve fully opens.
2) Check that the engine oil level is correct.
3) Check that the coolant level is correct.
4) Check that the ATF level is correct.
5) Check that the differential gear oil level is correct.
6) Increase the ATF temperature to 70 to 80°C (158 to 176°F) by idling the engine for approximately 30 minutes (with select lever set to “N” or “P”).
7) Place the wheel chocks at the front and rear of all wheels and apply the parking brake.
8) Move the select lever to ensure it operates properly, then set to “2nd gear of manual mode”.
9) While stepping hard on the brake pedal, slowly depress the accelerator pedal to full throttle.
10) When the engine speed is stabilized, quickly record the engine speed and release accelerator pedal.
11) Shift the select lever to “N” range, and cool down the engine by idling it for one minute or more.
12) If the stall speed in “2nd gear of manual mode” is higher than specifications, low clutch slipping and 2-4 brake slipping may occur. To identify this, conduct the same test as above in “R” range.

13) Perform the stall tests with the select lever in "D" range.

NOTE:
• Do not continue the stall test for 5 seconds or more at a time (from closed throttle, fully open throttle to stall speed reading). Failure to follow this instruction will cause the engine oil and ATF to deteriorate and the clutch and brake to be adversely affected.
• Be sure to cool down the engine for at least one minute after each stall test with the select lever set in the "P" or "N" range and with the idle speed of 1,200 rpm or less.
• If the stall speed is higher than the specified range, attempt to finish the stall test in as short a time as possible, in order to prevent the automatic transmission from sustaining damage.

Stall speed (at sea level):
Non-turbo model
2,200 — 2,700 rpm
Turbo model
2,800 — 3,300 rpm

Stall speed (at sea level)	Range	Cause
Below specified value	2nd gear on manual mode, R	• Throttle valve is not fully open • Engine malfunction • One-way clutch of the torque converter is slipping
Over specified value	D	• Line pressure too low • Low clutch slipping • One-way clutch malfunctioning
	R	• Line pressure too low • Reverse clutch slipping • Low & reverse brake slipping
	2nd gear of manual mode	• Line pressure too low • Low clutch slipping • 2-4 brake slipping

6. Time Lag Test

A: INSPECTION

NOTE:
When the select lever is shifted while the engine is idling, there will be a certain time elapse or lag before shock is felt. This is used for checking the condition of the low clutch, reverse clutch, low & reverse brake and one-way clutch.

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

1) Fully apply the parking brake.
2) Start the engine.
Check the idle speed (A/C OFF).
3) Shift the select lever from “N” to “D” range.
Using a stop watch, measure the time which takes from shifting the lever until the shock is felt.
Time lag: 1.2 seconds or less
If “N” → “D” time lag is longer than specified:

- Line pressure too low
- Low clutch worn
- One-way clutch not operating properly
- D-ring worn

4) In the same manner, measure the time lag of “N” → “R”.
Time lag: 1.5 seconds or less
If “N” → “R” time lag is longer than specified:

- Line pressure too low
- Reverse clutch worn
- Low & reverse brake worn
- D-ring worn

7. Line Pressure Test

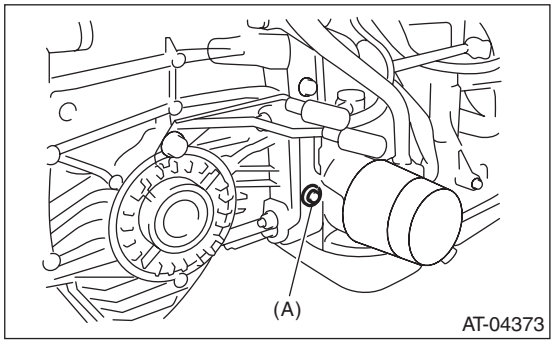
A: MEASUREMENT

NOTE:
If the clutch or brake shows a signs of slipping or shift feel is not correct, check the line pressure.

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

1) Line pressure measurement (under no load):
   (1) Before measuring line pressure, raise the vehicle on a lift.
   (2) Maintain the ATF temperature at approx. 70 — 80°C (158 — 176°F) during measurement.
   (ATF will reach the temperature above after idling the engine for approx. 30 minutes with the select lever in “N” or “P”.)
2) Line pressure measurement (under heavy load)
   (1) Before measuring line pressure, apply both the foot and parking brakes with all wheels chocked on both front and rear of each wheel (same as for stall test conditions).
   (2) Measure the line pressure when the select lever is in “R” or 2nd of manual mode with engine under stall conditions.
   (3) Measure the line pressure within 5 seconds after shifting the select lever to each position.
   (If the line pressure needs to be measured again, allow the engine to idle and cool it down for more than 1 minute.)
   (4) Maintain the ATF temperature at approx. 70 — 80°C (158 — 176°F) during measurement.
   (ATF will reach the above temperature after idling the engine for approx. 30 minutes with the select lever in “N” or “P”.)
3) Remove the test plug and attach the ST instead.

ST 498897200 OIL PRESSURE GAUGE ADAPTER



(A) Test plug

4) Connect the ST1 with ST2.

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

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

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

6) Remove the ST and install the test plug.

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

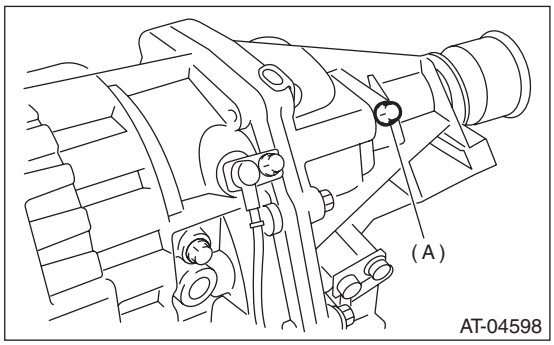
8. Transfer Clutch Pressure Test

A: INSPECTION

Check the transfer clutch pressure in accordance with the following chart in the same manner as line pressure. <Ref. to 4AT-33, Line Pressure Test.>

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

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



(A) Test plug

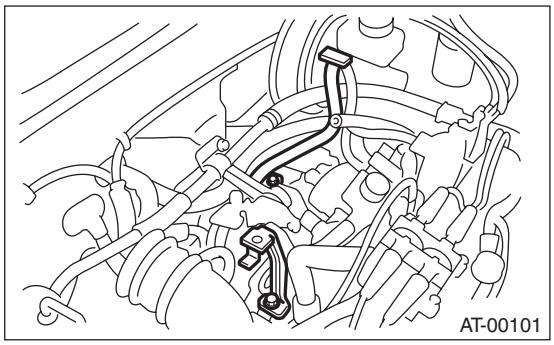
• If no oil pressure is produced or if it does not change in AWD mode, there may be a problem in the transfer duty solenoid or control valve body.
• If oil pressure is produced in FWD mode, there is the same problem as the AWD mode.

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

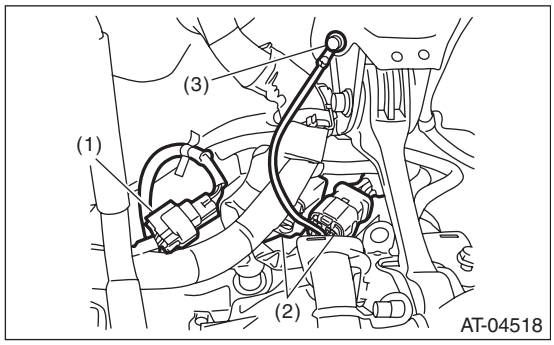
9. Automatic Transmission Assembly

A: REMOVAL

1) Set the vehicle on a lift.
2) Open the front hood.
3) Disconnect the ground cable from the battery.
4) Remove the air intake chamber and intake boot. (Non-turbo model) <Ref. to IN(H4SO)-7, REMOVAL, Air Intake Chamber.>
5) Remove the intercooler. (Turbo model) <Ref. to IN(H4DOTC)-11, REMOVAL, Intercooler.>
6) Remove the air intake chamber stay. (Non-turbo model)


AT-00101

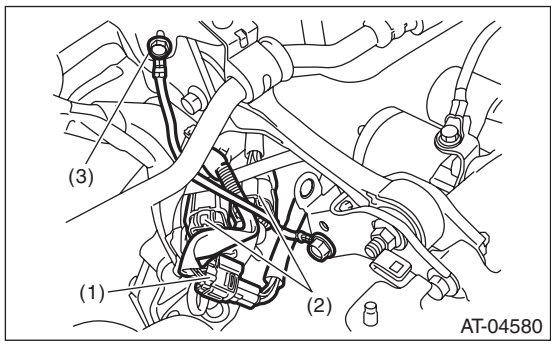
7) Disconnect the following connectors and terminals.
- Non-turbo model



AT-04518

(1) Rear oxygen sensor connector
(2) Transmission harness connectors
(3) Transmission ground terminal

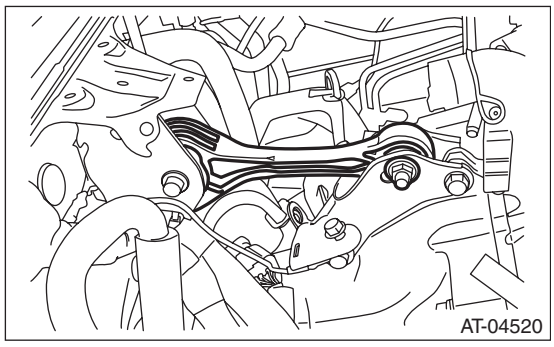
- Turbo model



AT-04580

(1) Rear oxygen sensor connector
(2) Transmission harness connectors
(3) Transmission ground terminal

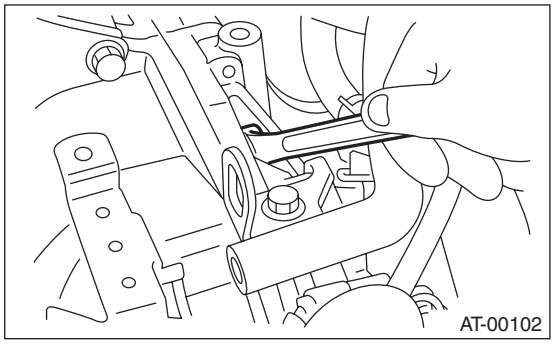
8) Remove the starter. <Ref. to SC(H4SO)-6, REMOVAL, Starter.>
9) Remove the pitching stopper.


AT-04520

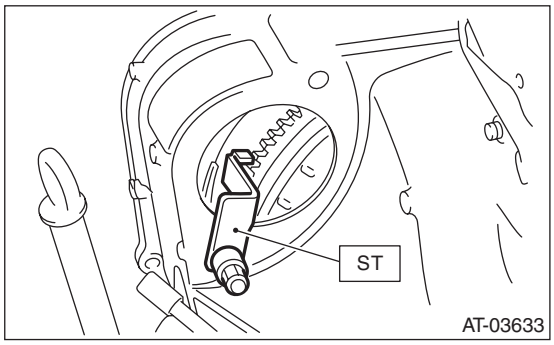
10) Remove the throttle body. (Non-turbo model) <Ref. to FU(H4SO)-13, REMOVAL, Throttle Body.>
11) Separate the torque converter clutch from the drive plate.

CAUTION:
- **Be careful not to damage the mounting bolts.**
- **Be careful not to drop bolts into the converter case.**

(1) Remove the V-belt covers.
(2) Remove the service hole plug.
(3) Remove the bolts which hold torque converter clutch assembly to drive plate.
(4) Place the wrench on the crank pulley bolt, and remove all the bolts while rotating the crank pulley a little bit at a time.
(5) Make sure the torque converter moves freely by rotating with finger through the starter installation hole.


AT-00102

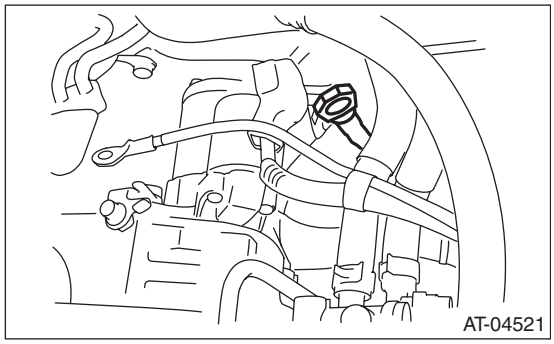
12) Attach the ST to the converter case.
ST 498277200 STOPPER SET



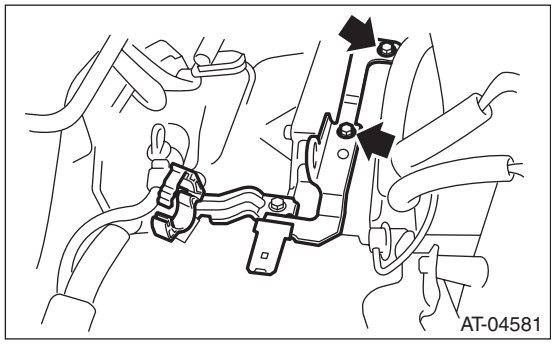
AT-03633

13) Remove the ATF level gauge.

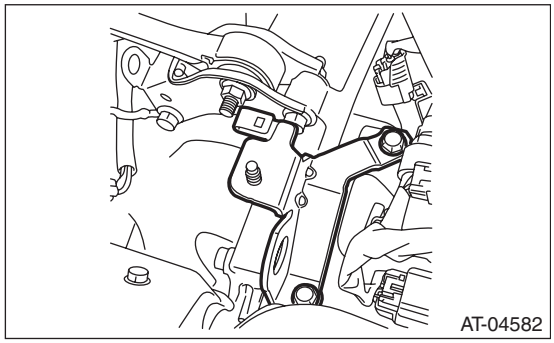
NOTE:
Plug the opening to prevent entry of foreign particles into the transmission fluid.


AT-04521

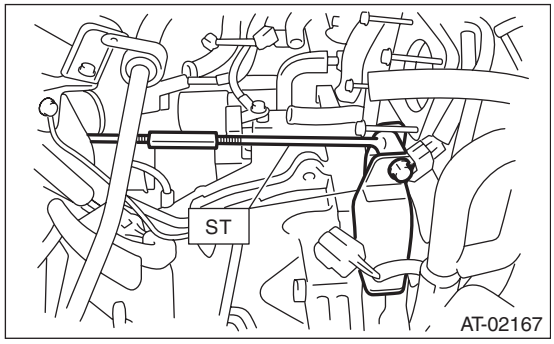
14) Remove the pitching stopper bracket.
15) Disconnect the engine harness, then remove the harness connector from the engine harness bracket. (Non-turbo model)
16) Remove the engine harness bracket. (Non-turbo model)


AT-04581

17) Remove the engine hanger. (Turbo model)

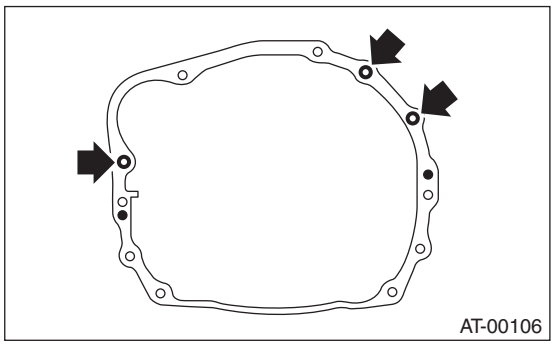

AT-04582

18) Set the ST.
ST 41099AC000 ENGINE SUPPORT ASSY

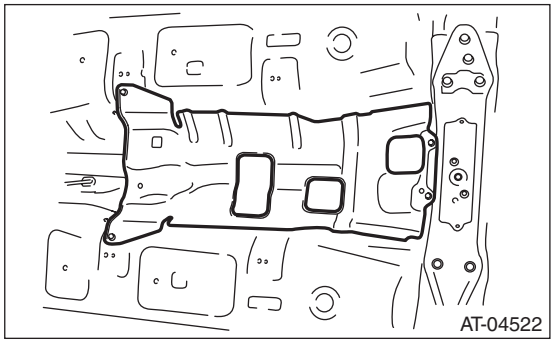


AT-02167

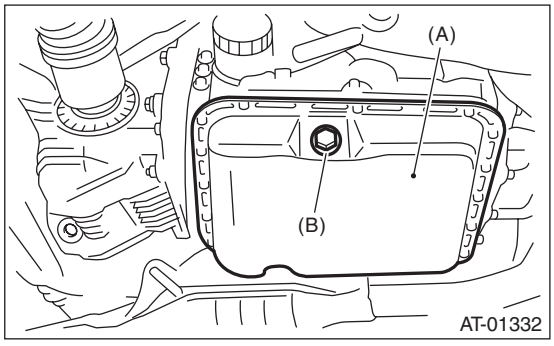
19) Remove the bolts which hold upper side of transmission to engine.



20) Lift up the vehicle.
21) Remove the under cover.
22) Remove the front, center and rear exhaust pipes and the muffler. (Non-turbo model)
<Ref. to EX(H4SO)-6, REMOVAL, Front Exhaust Pipe.> <Ref. to EX(H4SO)-10, REMOVAL, Rear Exhaust Pipe.> <Ref. to EX(H4SO)-12, REMOVAL, Muffler.>
23) Remove the center and rear exhaust pipes and the muffler. (Turbo model)
<Ref. to EX(H4DOTC)-8, REMOVAL, Center Exhaust Pipe.> <Ref. to EX(H4DOTC)-13, REMOVAL, Rear Exhaust Pipe.> <Ref. to EX(H4DOTC)-15, REMOVAL, Muffler.>
24) Remove the heat shield cover.

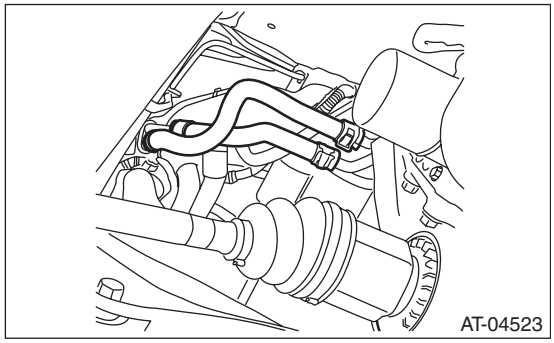


25) Remove the drain plug (ATF) to drain the ATF.

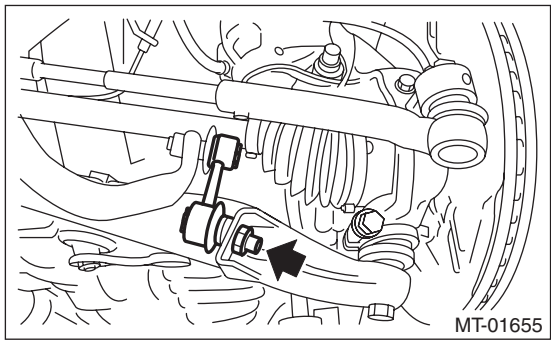


(A) Oil pan
(B) Drain plug (ATF)

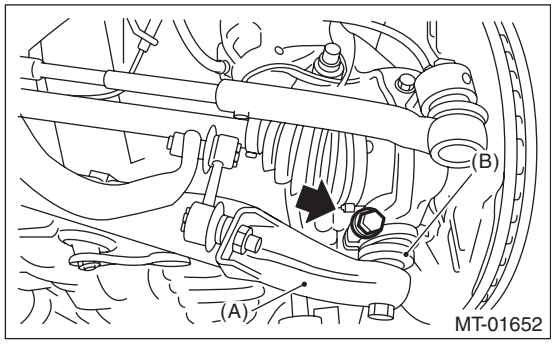
26) Disconnect the ATF cooler hoses from the pipes of the transmission side, and remove the oil charge pipe.



27) Remove the propeller shaft. <Ref. to DS-10, REMOVAL, Propeller Shaft.>
28) Remove the shift select cable from the inhibitor switch and transmission. <Ref. to CS-29, REMOVAL, Select Cable.>
29) Disconnect the stabilizer link from the front arm.



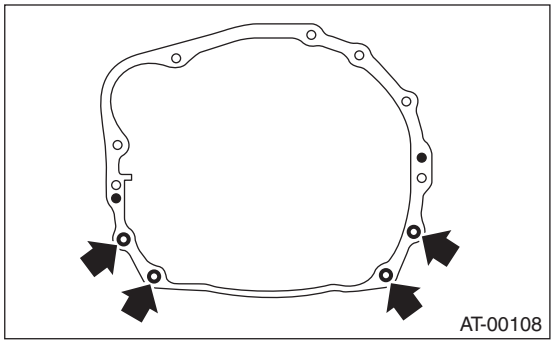
30) Remove the bolt securing the ball joint of the front arm to the front housing, then separate the front arms and the housing.



(A) Front arm
(B) Ball joint

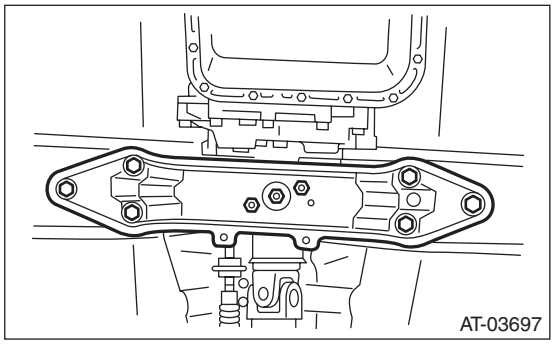
31) Pull out the front drive shaft from the transmission.
(1) Using a tire lever or a crow bar, etc., pull out until the front drive shaft transmission side joint slides move smoothly.

NOTE:
Place cloth between the tire lever or bar and the transmission in order to avoid damaging the transmission side retainer.
(2) Hold the transmission side joint of the front drive shaft by hand and extract the housing from the transmission while pressing the housing outward, so as not to stretch the boot.
32) Remove the bolts which hold the clutch housing cover.
33) Remove the bolts and nuts which hold lower side of transmission to engine.


AT-00108

34) Place a transmission jack below the transmission.

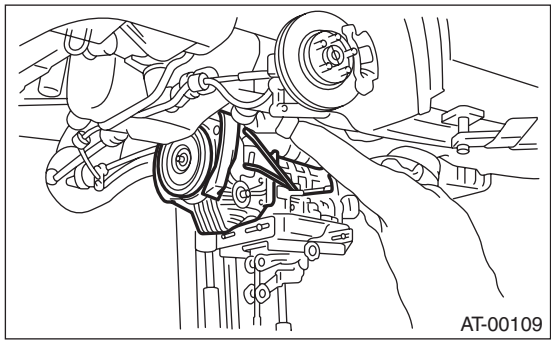
NOTE:
Make sure that the support plates of transmission jack do not touch the oil pan.
35) Remove the transmission rear crossmember from the vehicle.


AT-03697

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

37) Remove the transmission.

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


AT-00109

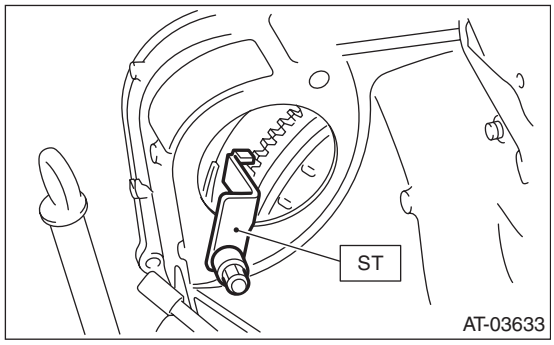
38) Remove the rear cushion rubber from the transmission assembly.

B: INSTALLATION

1) Replace the differential side oil seal with a new part. <Ref. to 4AT-46, Differential Side Retainer Oil Seal.>

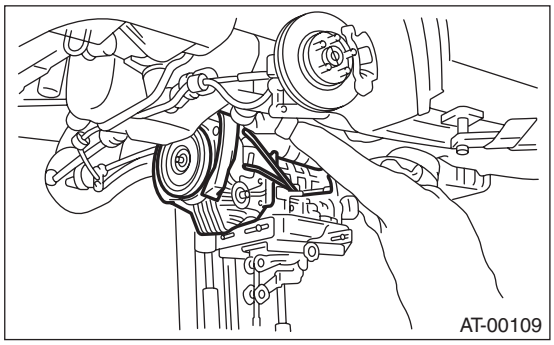
NOTE:
When a new oil seal has been installed, replacement is not required.
2) Install the rear cushion rubber to the transmission assembly.

Tightening torque:
40 N·m (4.1 kgf-m, 29.5 ft-lb)
3) Attach the ST to the converter case.
ST 498277200 STOPPER SET



AT-03633

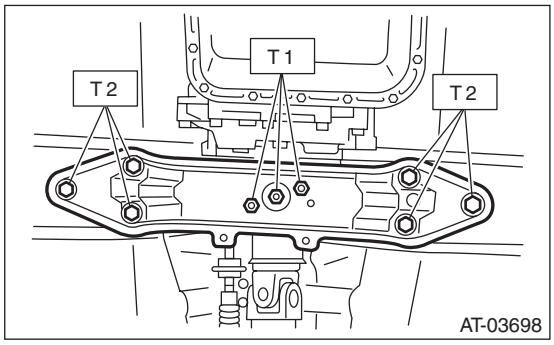
4) Install the transmission onto the engine.
(1) Lift up the transmission gradually using transmission jack.



(2) Insert the engine side stud bolt into the transmission bolt hole.
(3) While raising the transmission jack gradually, turn the screw of engine support, then tilt the engine forward and connect.

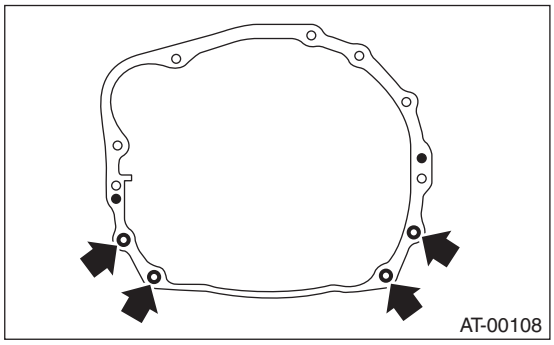
5) Install the transmission rear crossmember.

Tightening torque:
T1: 35 N·m (3.6 kgf-m, 25.8 ft-lb)
T2: 70 N·m (7.1 kgf-m, 51.6 ft-lb)



6) Remove the transmission jack.
7) Tighten the bolts and nuts which hold the lower side of transmission to the engine.

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



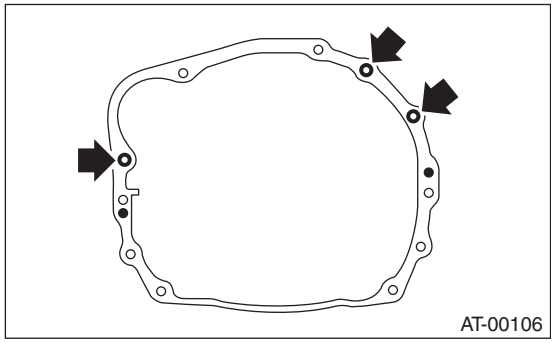
8) Install the clutch housing cover bolts.
9) Lower the lift.

10) Connect the engine and transmission.
(1) Remove the ST from converter case.

NOTE:
When removing the ST, be careful not to drop it into converter case.
ST 498277200 STOPPER SET

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

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

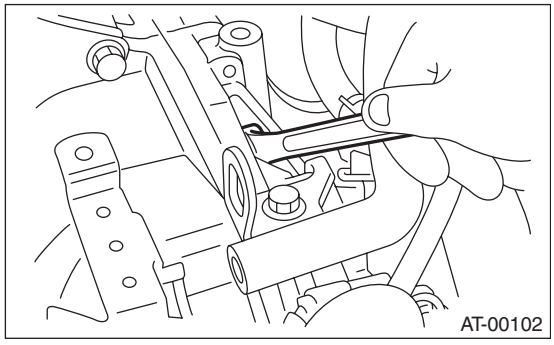


11) Install the torque converter clutch assembly to the drive plate.

CAUTION:
- **Be careful not to damage the mounting bolts.**
- **Be careful not to drop bolts into the converter case.**

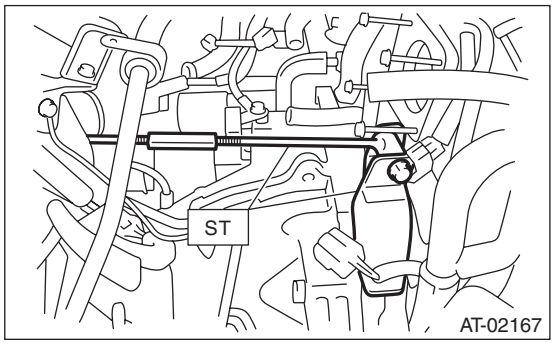
(1) Tighten the bolts which hold the torque converter clutch to the drive plate.
(2) Place the wrench on the crank pulley bolt, and remove all the bolts while rotating the crank pulley a little bit at a time.

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



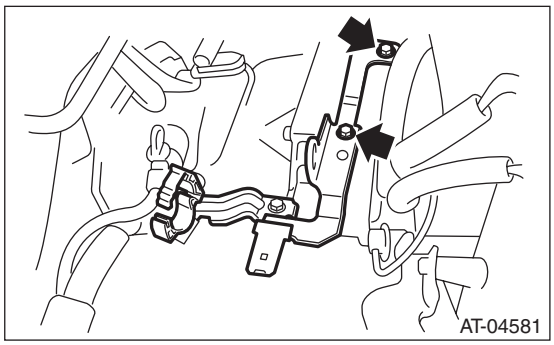
(3) Fit the plug to service hole.
(4) Install the V-belt cover.

12) Remove the ST.

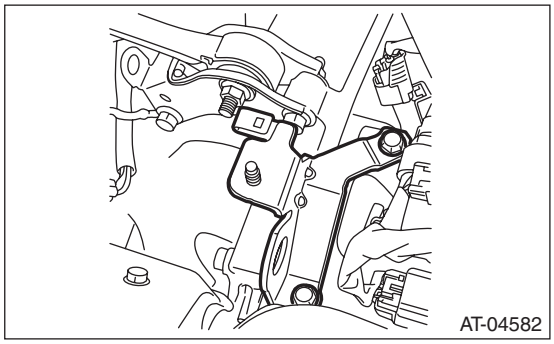


13) Install the engine harness bracket. (Non-turbo model)

Tightening torque:
T: 16 N·m (1.6 kgf-m, 11.8 ft-lb)



14) Install the harness connector to engine harness bracket, then connect the harness. (Non-turbo model)
15) Install the engine hanger. (Turbo model)

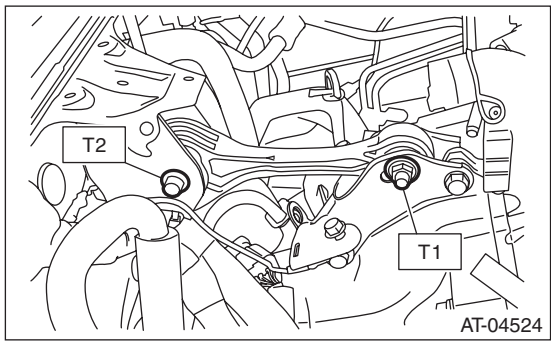


16) Install the pitching stopper bracket.

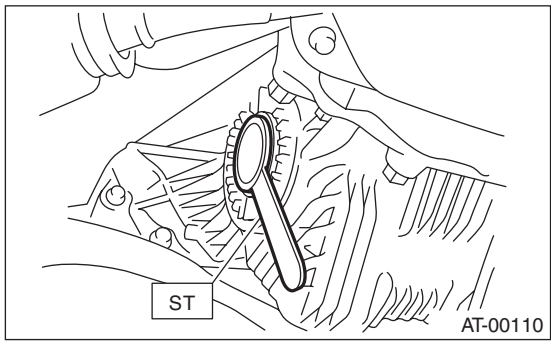
Tightening torque:
41 N·m (4.2 kgf-m, 30.2 ft-lb)
17) Install the throttle body. (Non-turbo model) <Ref. to FU(H4SO)-13, INSTALLATION, Throttle Body.>

18) Install the pitching stopper.

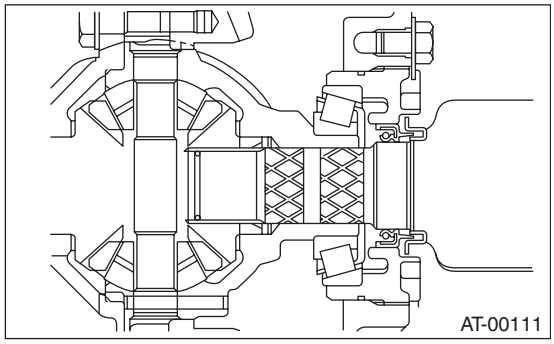
Tightening torque:
T1: 50 N·m (5.1 kgf-m, 36.9 ft-lb)
T2: 58 N·m (5.9 kgf-m, 42.8 ft-lb)



19) Lift up the vehicle.
20) Replace the circlip of the front drive shaft with a new part.
21) Apply grease to the oil seal lip.
22) Attach the ST to side retainer.
ST 28399SA010 OIL SEAL PROTECTOR



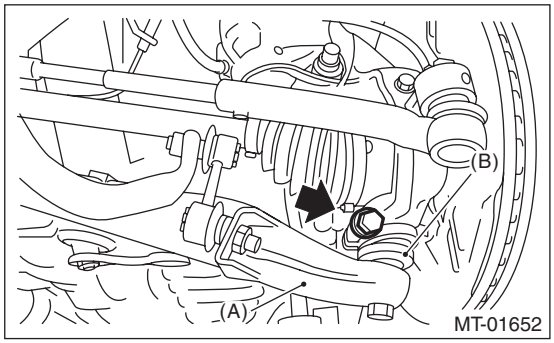
23) Align and insert the spline of the front drive shaft to the splines of the differential bevel gear, and remove the ST.
ST 28399SA010 OIL SEAL PROTECTOR
24) Insert the front drive shaft into the transmission securely by pressing the front housing from the outside.



25) Install the ball joint into the front housing.

26) Tighten the attachment bolts.

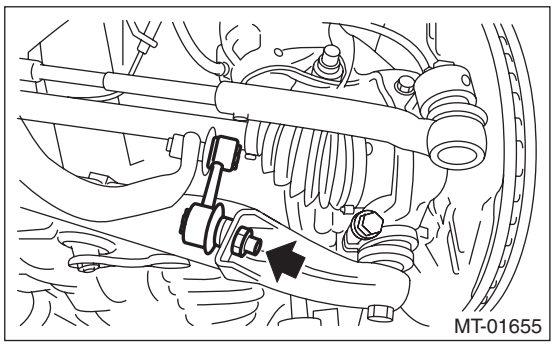
Tightening torque:
50 N·m (5.1 kgf-m, 36.9 ft-lb)



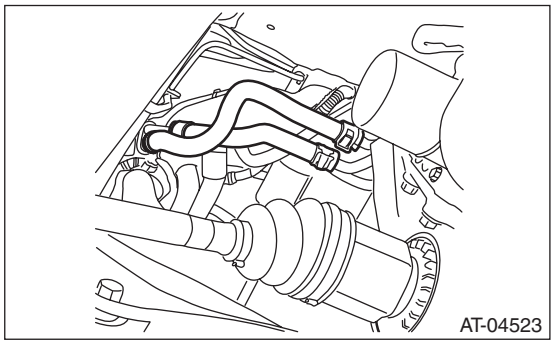
(A) Front arm
(B) Ball joint

27) Attach the stabilizer link to the front arm.

Tightening torque:
45 N·m (4.6 kgf-m, 33.2 ft-lb)

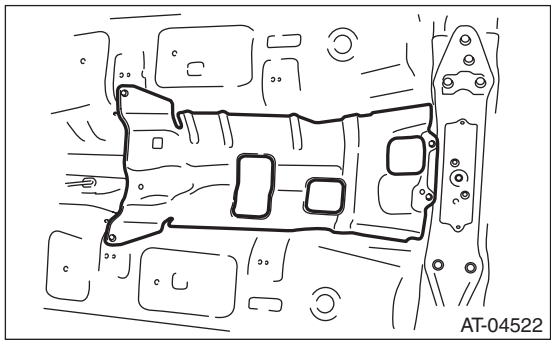


28) Install the shift select cable onto select lever. <Ref. to CS-30, INSTALLATION, Select Cable.>
29) Install the oil charge pipe, and connect the ATF cooler hoses to the pipe.



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

31) Install the heat shield cover.

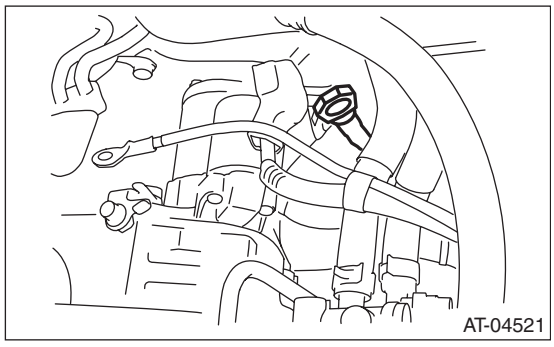


32) Install the rear exhaust pipe and muffler assembly.
- Non-turbo model

<Ref. to EX(H4SO)-10, INSTALLATION, Rear Exhaust Pipe.> <Ref. to EX(H4SO)-13, INSTALLATION, Muffler.>
- Turbo model

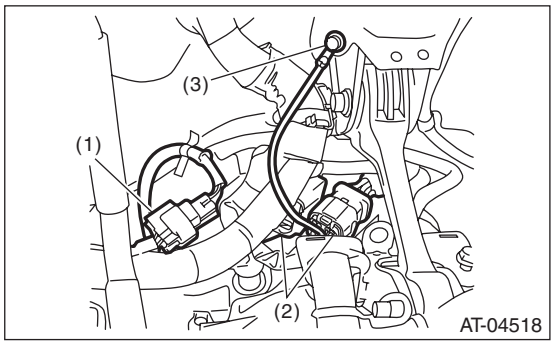
<Ref. to EX(H4DOTC)-14, INSTALLATION, Rear Exhaust Pipe.> <Ref. to EX(H4DOTC)-16, INSTALLATION, Muffler.>

33) Install the front and center exhaust pipe. (Non-turbo model)
<Ref. to EX(H4SO)-7, INSTALLATION, Front Exhaust Pipe.>
34) Install the center exhaust pipe. (Turbo model)
<Ref. to EX(H4DOTC)-9, INSTALLATION, Center Exhaust Pipe.>
35) Install the under cover.
36) Lower the lift.
37) Install the ATF level gauge.



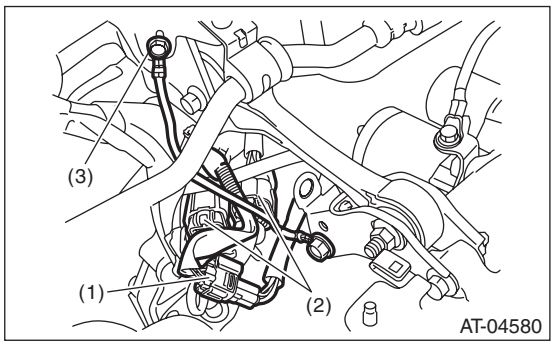
38) Connect the following connectors and terminals.

- Non-turbo model



(1) Rear oxygen sensor connector
(2) Transmission harness connectors
(3) Transmission ground terminal

- Turbo model



(1) Rear oxygen sensor connector
(2) Transmission harness connectors
(3) Transmission ground terminal

39) Install the air intake chamber stay. (Non-turbo model)

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

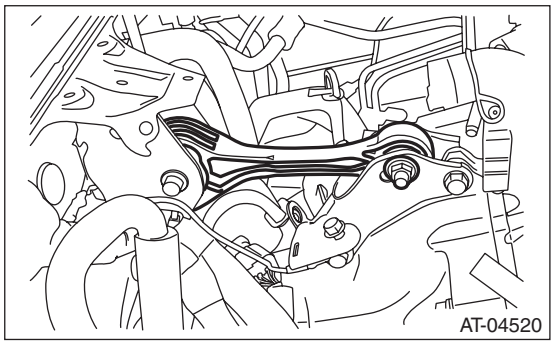
40) Install the air intake chamber and intake boot. (Non-turbo model) <Ref. to IN(H4SO)-7, INSTALLATION, Air Intake Chamber.>
41) Install the intercooler. (Turbo model) <Ref. to IN(H4DOTC)-12, INSTALLATION, Intercooler.>
42) Connect the ground cable to the battery.
43) Fill transmission with ATF through the oil charge pipe until the fluid level is between the upper and lower level on the “COLD” side of the level gauge. <Ref. to 4AT-26, Automatic Transmission Fluid.>
44) Lower the vehicle from the lift.
45) Check the differential gear oil level. <Ref. to 4AT-28, INSPECTION, Differential Gear Oil.>
46) Check the select lever operation. <Ref. to 4AT-47, INSPECTION, Inhibitor Switch.>
47) Bleed the air of control valve. (Turbo model) <Ref. to 4AT-61, PROCEDURE, Air Bleeding of Control Valve.>
48) Check the ATF level. <Ref. to 4AT-26, Automatic Transmission Fluid.>
49) Execute learning control promotion. <Ref. to 4AT(diag)-17, FACILITATION OF LEARNING CONTROL, OPERATION, Subaru Select Monitor.>
50) Perform the road test. <Ref. to 4AT-29, Road Test.>

10. Transmission Mounting System

A: REMOVAL

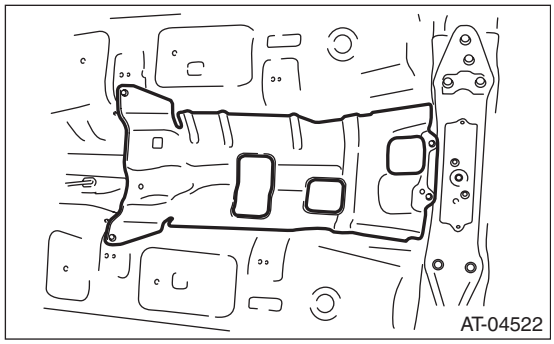
1. PITCHING STOPPER

1) Disconnect the ground cable from the battery.
2) Remove the air intake chamber and intake boot. (Non-turbo model)
<Ref. to IN(H4SO)-7, REMOVAL, Air Intake Chamber.>
3) Remove the intercooler. (Turbo model)
<Ref. to IN(H4DOTC)-11, REMOVAL, Intercooler.>
4) Remove the pitching stopper.


AT-04520

2. TRANSMISSION REAR CROSSMEMBER AND REAR CUSHION RUBBER

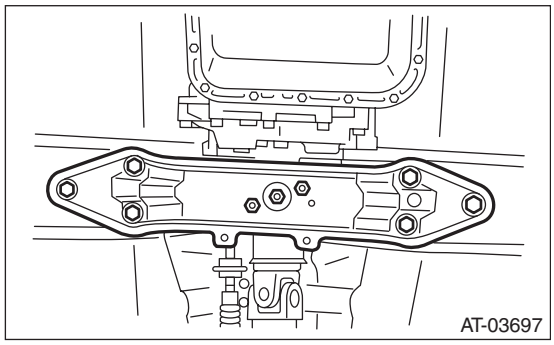
1) Disconnect the ground cable from the battery.
2) Lift up the vehicle.
3) Remove the front, center and rear exhaust pipes and the muffler. (Non-turbo model)
<Ref. to EX(H4SO)-6, REMOVAL, Front Exhaust Pipe.> <Ref. to EX(H4SO)-10, REMOVAL, Rear Exhaust Pipe.> <Ref. to EX(H4SO)-12, REMOVAL, Muffler.>
4) Remove the center and rear exhaust pipes and the muffler. (Turbo model)
<Ref. to EX(H4DOTC)-8, REMOVAL, Center Exhaust Pipe.> <Ref. to EX(H4DOTC)-13, REMOVAL, Rear Exhaust Pipe.> <Ref. to EX(H4DOTC)-15, REMOVAL, Muffler.>
5) Remove the heat shield cover.


AT-04522

6) Set the transmission jack under transmission.

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

7) Remove the transmission rear crossmember.


AT-03697

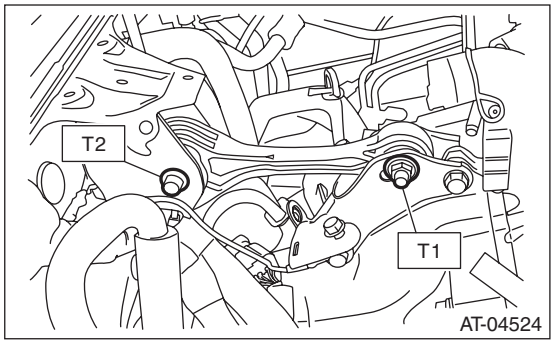
8) Remove the rear cushion rubber.

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 air intake chamber and intake boot. (Non-turbo model)
<Ref. to IN(H4SO)-7, INSTALLATION, Air Intake Chamber.>
3) Install the intercooler. (Turbo model)
<Ref. to IN(H4DOTC)-12, INSTALLATION, Intercooler.>

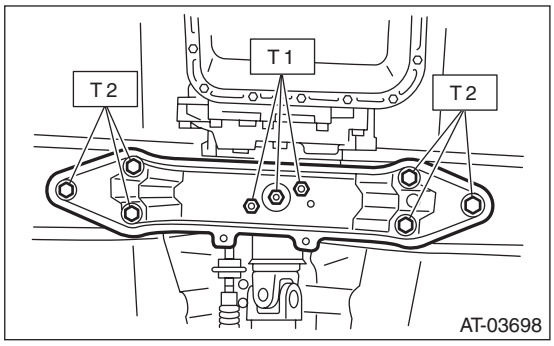
2. TRANSMISSION REAR CROSSMEMBER AND REAR CUSHION RUBBER

1) Install the rear cushion rubber.

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

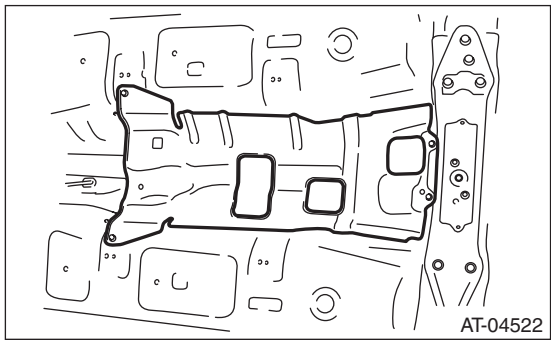
2) Install the transmission rear crossmember.

Tightening torque:
T1: 35 N·m (3.6 kgf-m, 25.8 ft-lb)
T2: 70 N·m (7.1 kgf-m, 51.6 ft-lb)



3) Remove the transmission jack.

4) Install the heat shield cover.



5) Install the front, center and rear exhaust pipes, and the muffler. (Non-turbo model)
<Ref. to EX(H4SO)-7, INSTALLATION, Front Exhaust Pipe.> <Ref. to EX(H4SO)-10, INSTALLATION, Rear Exhaust Pipe.> <Ref. to EX(H4SO)-13, INSTALLATION, Muffler.>
6) Install the center, rear exhaust pipes and the muffler. (Turbo model)
<Ref. to EX(H4DOTC)-9, INSTALLATION, Center Exhaust Pipe.> <Ref. to EX(H4DOTC)-14, INSTALLATION, Rear Exhaust Pipe.> <Ref. to EX(H4DOTC)-16, INSTALLATION, Muffler.>

C: INSPECTION

If problems are found in the following inspection, repair or replace the part.

1. PITCHING STOPPER

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

2. TRANSMISSION REAR CROSSMEMBER AND REAR CUSHION RUBBER

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

11.Extension Case Oil Seal

A: INSPECTION

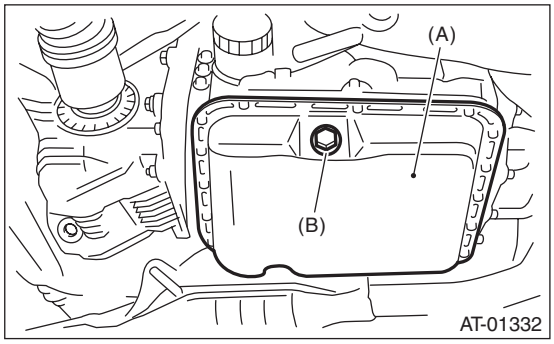
Inspect there is no ATF leakage from the joint of transmission and propeller shaft. If a leak is found, replace the oil seal and inspect the propeller shaft. <Ref. to 4AT-45, REPLACEMENT, Extension Case Oil Seal.>

B: REPLACEMENT

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

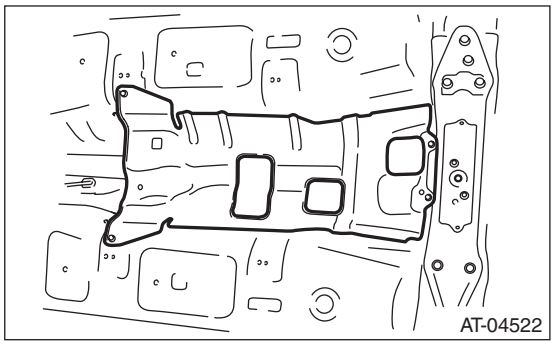
CAUTION:
Because the AFT will be very hot after driving, be very careful not be receive burns.
4) Perform replacement with a new gasket, and tighten the drain plug (ATF).

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

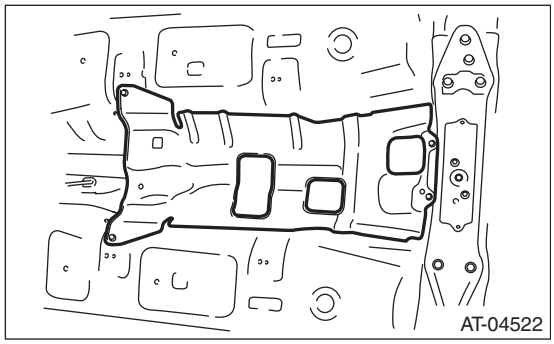


(A) Oil pan
(B) Drain plug (ATF)

5) Remove the rear exhaust pipe and muffler.
• Non-turbo model
<Ref. to EX(H4SO)-10, REMOVAL, Rear Exhaust Pipe.> <Ref. to EX(H4SO)-12, REMOVAL, Muffler.>
• Turbo model
<Ref. to EX(H4DOTC)-13, REMOVAL, Rear Exhaust Pipe.> <Ref. to EX(H4DOTC)-15, REMOVAL, Muffler.>
6) Remove the heat shield cover.



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



12) Install the rear exhaust pipe and muffler.
• Non-turbo model
<Ref. to EX(H4SO)-10, INSTALLATION, Rear Exhaust Pipe.> <Ref. to EX(H4SO)-13, INSTALLATION, Muffler.>
• Turbo model
<Ref. to EX(H4DOTC)-14, INSTALLATION, Rear Exhaust Pipe.> <Ref. to EX(H4DOTC)-16, INSTALLATION, Muffler.>
13) Fill with ATF. <Ref. to 4AT-26, Automatic Transmission Fluid.>
14) Bleed the air of control valve.
<Ref. to 4AT-61, Air Bleeding of Control Valve.>
15) Check the level and leaks of the ATF. <Ref. to 4AT-26, Automatic Transmission Fluid.>

12. Differential Side Retainer Oil Seal

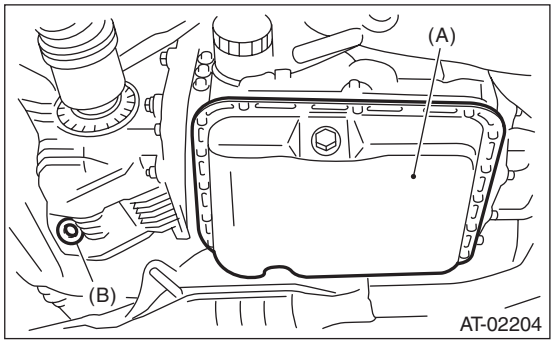
A: INSPECTION

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

B: REPLACEMENT

1) Lift up the vehicle.
2) Remove the front exhaust pipe and center exhaust pipe.
• Non-turbo model
<Ref. to EX(H4SO)-6, REMOVAL, Front Exhaust Pipe.>
• Turbo model
<Ref. to EX(H4DOTC)-8, REMOVAL, Center Exhaust Pipe.>
3) Remove the differential gear oil drain plug using TORX® bit T70, and then drain differential gear oil.

CAUTION:
• Because the differential gear will be very hot after driving, be very careful not be receive burns.
• Be careful not to spill the differential gear oil on exhaust pipe to prevent it from emitting smoke or causing fires. If differential gear oil is spilled on the exhaust pipe, wipe it off completely.

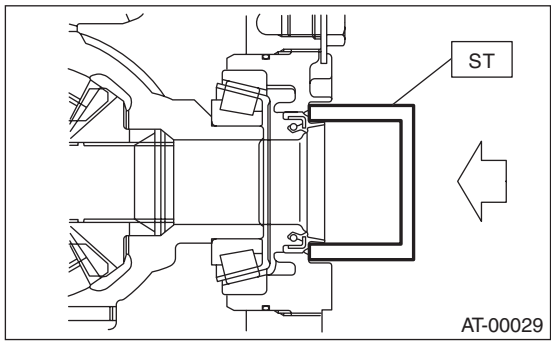


(A) Oil pan
(B) Differential gear oil drain plug

4) Perform replacement with a new gasket, and tighten the differential gear oil drain plug.

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

5) Separate the front drive shaft from the transmission. <Ref. to DS-25, REMOVAL, Front Drive Shaft.>
6) Remove the differential side retainer oil seal using a screw driver wrapped with vinyl tape etc.
7) Using the ST, install the differential side retainer oil seal by lightly tapping with a hammer.
ST 18675AA000 DIFFERENTIAL SIDE OIL SEAL INSTALLER



8) Apply gear oil to the oil seal lips.
9) Install the front drive shaft using the ST. <Ref. to DS-25, INSTALLATION, Front Drive Shaft.>
ST 28399SA010 OIL SEAL PROTECTOR
10) Install the front exhaust pipe and the center exhaust pipe.
• Non-turbo model
<Ref. to EX(H4SO)-7, INSTALLATION, Front Exhaust Pipe.>
• Turbo model
<Ref. to EX(H4DOTC)-9, INSTALLATION, Center Exhaust Pipe.>
11) Lower the vehicle.
12) Fill with differential gear oil through the oil level gauge hole.

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

Gear oil capacity:
1.1 — 1.3 ℓ (1.3 — 1.4 US qt, 1.0 — 1.1 Imp qt)
13) Check the level of differential gear oil. <Ref. to 4AT-28, INSPECTION, Differential Gear Oil.>

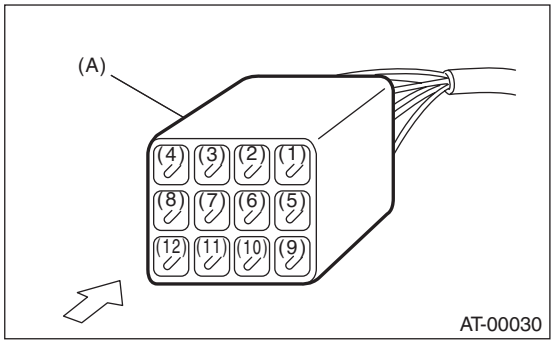
13.Inhibitor Switch

A: INSPECTION

When the driving condition or starter motor operation is improper, first check the shift linkage for improper operation. If the shift linkage is functioning properly, check the inhibitor switch.
1) Disconnect the inhibitor switch connector.
2) Check continuity in inhibitor switch circuits with the select lever moved to each position.

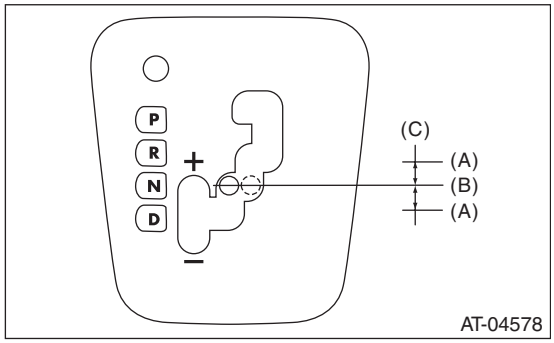
NOTE:
• Also check that there is no continuity in the ignition circuit when the select lever is in the “R” and “D” ranges.
• If the inhibitor switch does not operate, check for poor contact of the connector on transmission side.

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



(A) Inhibitor switch connector

3) Check that there is continuity at equal points when the select lever is moved 1.5° in both directions from the “N” range.
If there is continuity in only one direction or in other points, adjust the inhibitor switch. <Ref. to 4AT-47, ADJUSTMENT, Inhibitor Switch.>

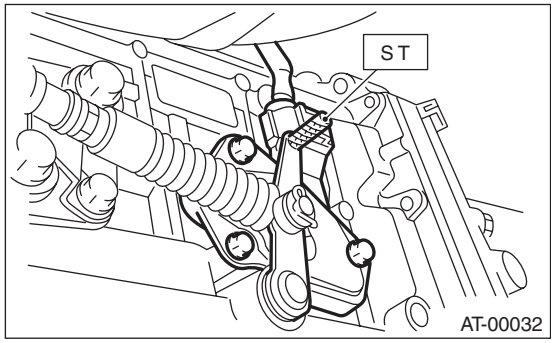


(A) Continuity does not exist.
(B) Continuity exists.
(C) 1.5°

4) Repeat the above inspection in other gear ranges. If there are abnormalities, adjust the select cable. <Ref. to CS-31, ADJUSTMENT, Select Cable.>

B: ADJUSTMENT

1) Set the select lever to “N” range.
2) Loosen the three inhibitor switch securing bolts.
3) Insert the ST as vertical as possible into the holes in the inhibitor switch lever and switch body.
ST 499267300 STOPPER PIN



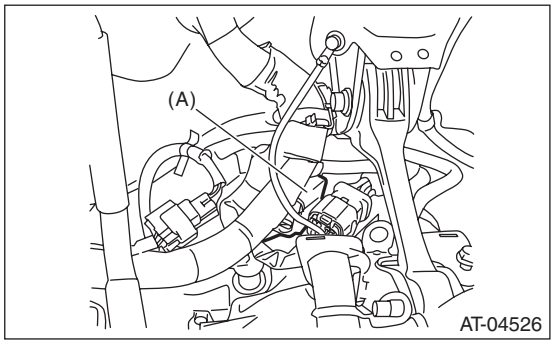
4) Tighten the three inhibitor switch securing bolts.

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

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

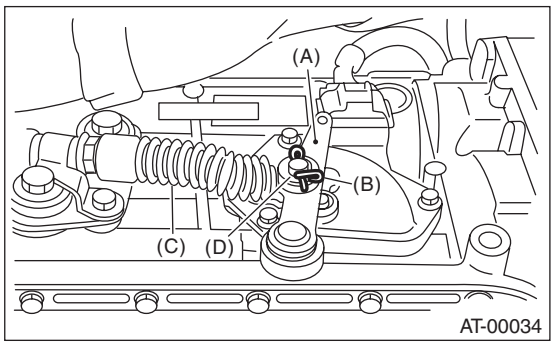
C: REMOVAL

1) Set the vehicle on a lift.
2) Set the select lever to “N” range.
3) Remove the air intake chamber. (Non-turbo model)
<Ref. to IN(H4SO)-7, REMOVAL, Air Intake Chamber.>
4) Remove the intercooler. (Turbo model)
<Ref. to IN(H4DOTC)-11, REMOVAL, Intercooler.>
5) Disconnect the inhibitor switch connector.



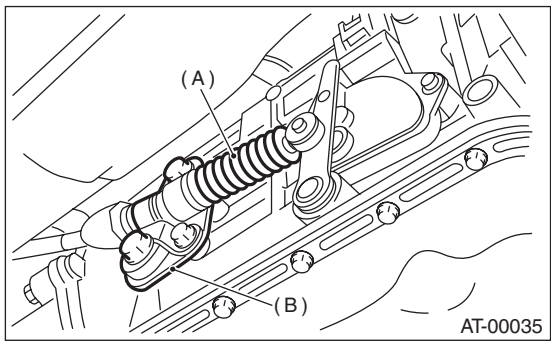
(A) Inhibitor switch connector

6) Remove the inhibitor switch connector from the stay.
7) Lift up the vehicle.
8) Remove the front and center exhaust pipes. (Non-turbo model)
<Ref. to EX(H4SO)-6, REMOVAL, Front Exhaust Pipe.>
9) Remove the center exhaust pipe. (Turbo model)
<Ref. to EX(H4DOTC)-8, REMOVAL, Center Exhaust Pipe.>
10) Remove the snap pin and washer from the range select lever.



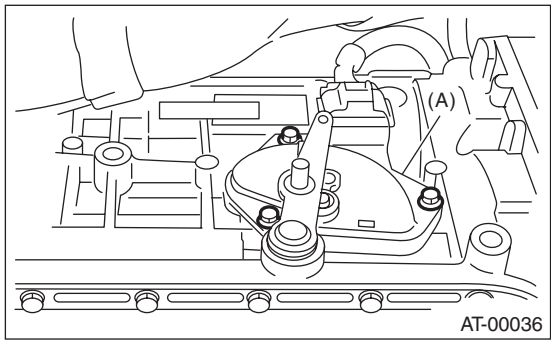
(A) Range select lever
(B) Snap pin
(C) Select cable
(D) Washer

11) Remove the plate assembly from the transmission case.



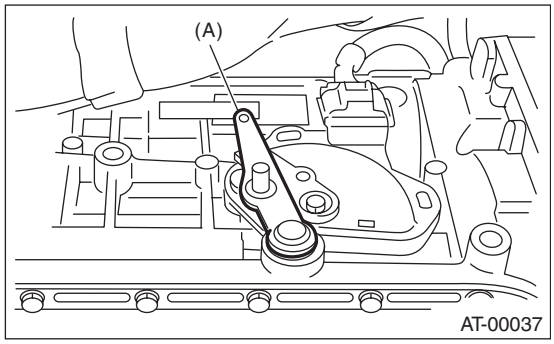
(A) Select cable
(B) Plate ASSY

12) Remove the three inhibitor switch securing bolts.



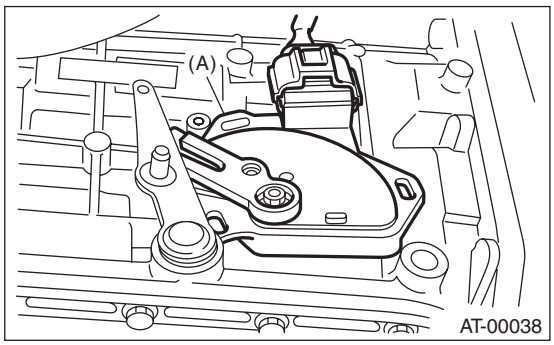
(A) Inhibitor switch

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



(A) Range select lever

14) Remove the inhibitor switch from the transmission.

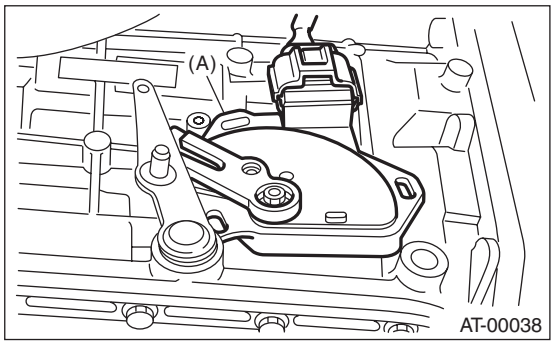


(A) Inhibitor switch

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

D: INSTALLATION

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

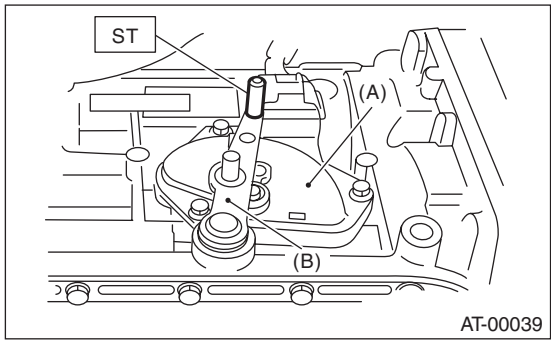


(A) Inhibitor switch

3) Move the range select lever to the neutral position.

4) Tighten the three inhibitor switch securing bolts using the ST.
ST 499267300 STOPPER PIN

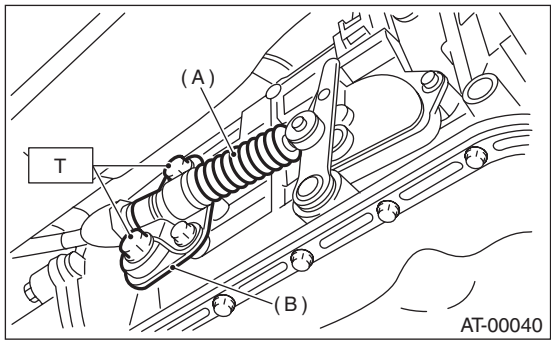
Tightening torque:
3.4 N·m (0.35 kgf-m, 2.5 ft-lb)



(A) Inhibitor switch
(B) Range select lever

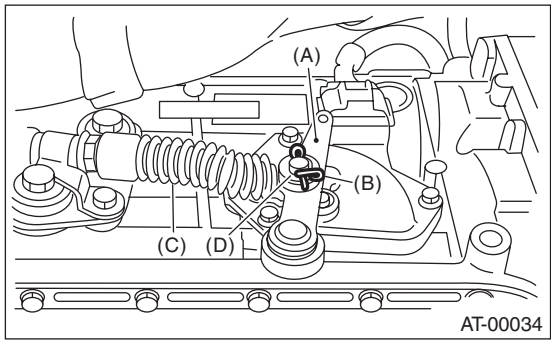
5) Install the select cable to the range select lever.
6) Install the plate assembly to the transmission.

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



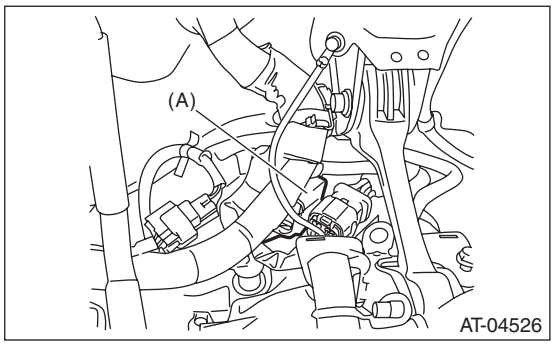
(A) Select cable
(B) Plate ASSY

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



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

8) Install the front and center exhaust pipe. (Non-turbo model)
<Ref. to EX(H4SO)-7, INSTALLATION, Front Exhaust Pipe.>
9) Install the center exhaust pipe. (Turbo model)
<Ref. to EX(H4DOTC)-9, INSTALLATION, Center Exhaust Pipe.>
10) Lower the vehicle.
11) Install the inhibitor switch connector to the stay.
12) Connect the inhibitor switch connector.



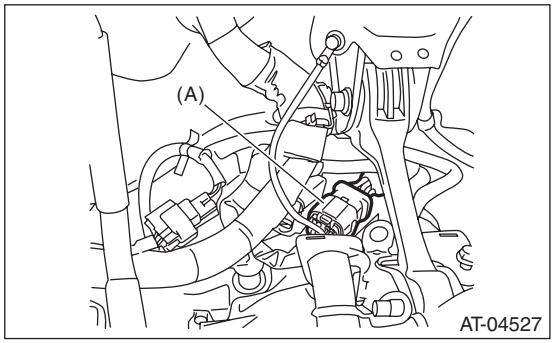
(A) Inhibitor switch connector

13) Install the air intake chamber. (Non-turbo model)
<Ref. to IN(H4SO)-7, INSTALLATION, Air Intake Chamber.>
14) Install the intercooler. (Turbo model)
<Ref. to IN(H4DOTC)-12, INSTALLATION, Intercooler.>
15) Inspect the inhibitor switch. <Ref. to 4AT-47, INSPECTION, Inhibitor Switch.>

14.Front Vehicle Speed Sensor

A: REMOVAL

1) Set the vehicle on a lift.
2) Disconnect the ground cable from the battery.
3) Remove the air intake chamber. (Non-turbo model)
<Ref. to IN(H4SO)-7, REMOVAL, Air Intake Chamber.>
4) Remove the intercooler. (Turbo model)
<Ref. to IN(H4DOTC)-11, REMOVAL, Intercooler.>
5) Disconnect the transmission harness connector.

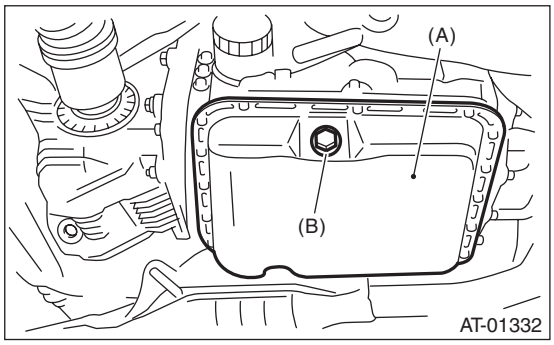


(A) Transmission harness connectors

6) Remove the pitching stopper. <Ref. to 4AT-43, REMOVAL, Transmission Mounting System.>
7) Remove the transmission harness connector from stay.
8) Lift up the vehicle.
9) Clean the transmission exterior.
10) Remove the drain plug (ATF) to drain the ATF.

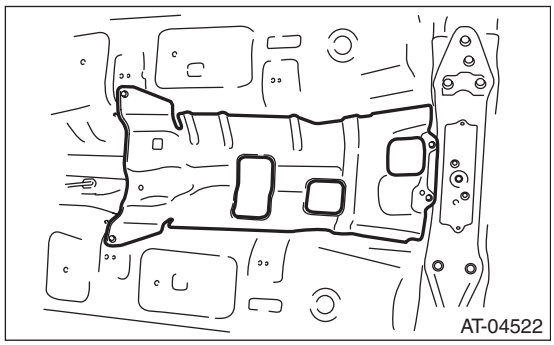
CAUTION:
Because the AFT will be very hot after driving, be very careful not be receive burns.
11) Perform replacement with a new gasket, and tighten the drain plug (ATF).

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



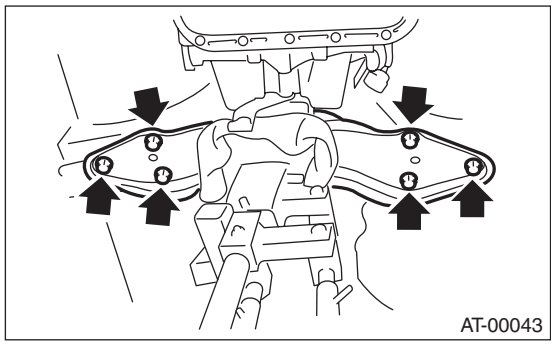
(A) Oil pan
(B) Drain plug (ATF)

12) Remove the front, center and rear exhaust pipes and the muffler. (Non-turbo model)
<Ref. to EX(H4SO)-6, REMOVAL, Front Exhaust Pipe.> <Ref. to EX(H4SO)-10, REMOVAL, Rear Exhaust Pipe.> <Ref. to EX(H4SO)-12, REMOVAL, Muffler.>
13) Remove the center and rear exhaust pipes and the muffler. (Turbo model)
<Ref. to EX(H4DOTC)-8, REMOVAL, Center Exhaust Pipe.> <Ref. to EX(H4DOTC)-13, REMOVAL, Rear Exhaust Pipe.> <Ref. to EX(H4DOTC)-15, REMOVAL, Muffler.>
14) Remove the heat shield cover.



15) Remove the propeller shaft. <Ref. to DS-10, REMOVAL, Propeller Shaft.>
16) Place the transmission jack under the transmission.

NOTE:
Make sure that the support plate of transmission jack does not touch the cross.
17) Remove the transmission rear crossmember bolt.

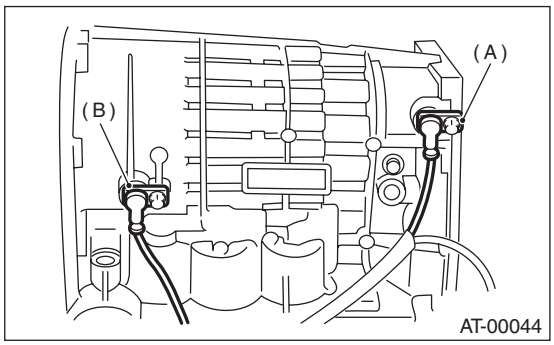


18) Lower the transmission jack.

NOTE:
Do not separate the transmission jack and transmission.
19) Remove the ATF inlet and outlet pipes.

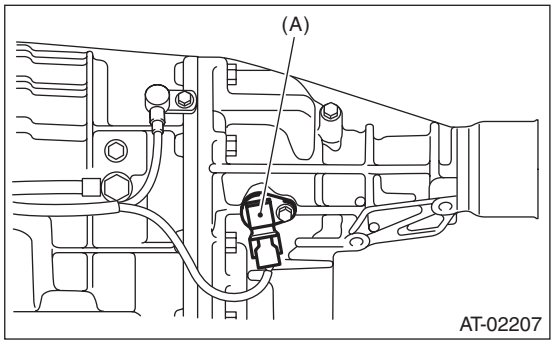
CAUTION:
When removing the outlet pipe, be careful not to lose the ball and spring used together with the retaining screw.

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



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

21) Disconnect the connector from the rear vehicle speed sensor.

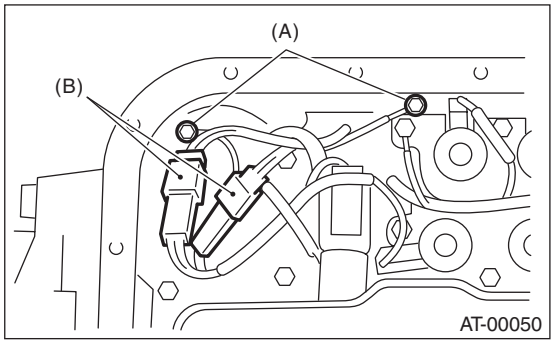


(A) Rear vehicle speed sensor

22) Remove the oil pan.

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

23) Disconnect the control valve connector and transmission ground terminal.

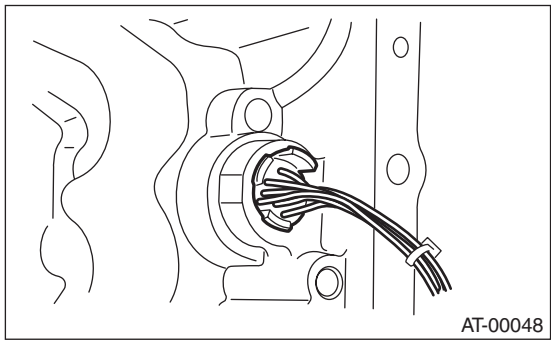


(A) Transmission ground
(B) Control valve connector

24) Remove the transmission harness assembly.

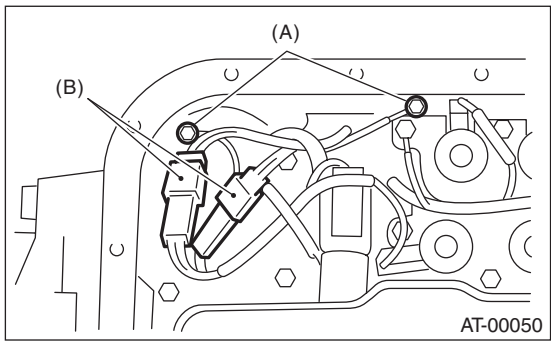
B: INSTALLATION

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



2) Connect the control valve connector and transmission ground.

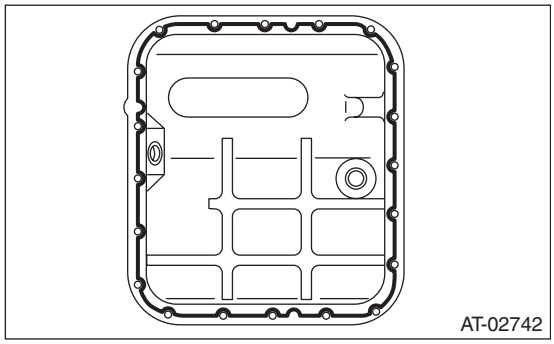
Tightening torque:
8 N·m (0.8 kgf-m, 5.9 ft-lb)



(A) Transmission ground
(B) Control valve connector

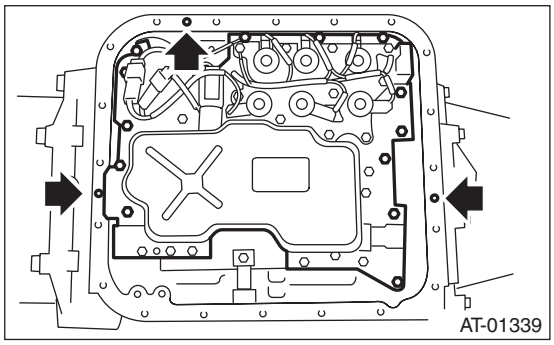
3) Apply proper amount of liquid gasket to the entire oil pan mating surface.

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



4) Fill the 3 locations of the transmission case excluding the bolt holes with an ample amount of liquid gasket.

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



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

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

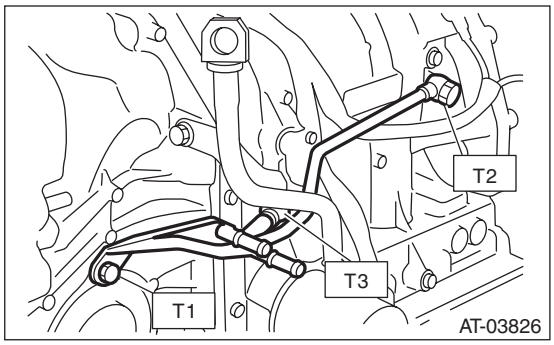
6) Install the front vehicle speed sensor and torque converter turbine speed sensor.

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

7) Connect the connector to the rear vehicle speed sensor.
8) Install the ATF inlet and outlet pipes.

NOTE:
Use a new copper washer.

Tightening torque:
T1: 25 N·m (2.5 kgf-m, 18.4 ft-lb)
T2: 40 N·m (4.1 kgf-m, 29.5 ft-lb)
T3: 45 N·m (4.6 kgf-m, 33.2 ft-lb)

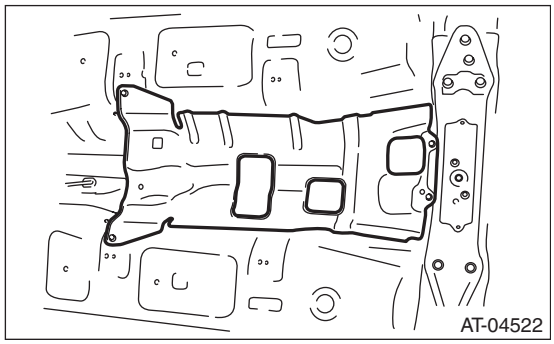


9) Install the transmission rear crossmember bolt.

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

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

11) Install the heat shield cover.

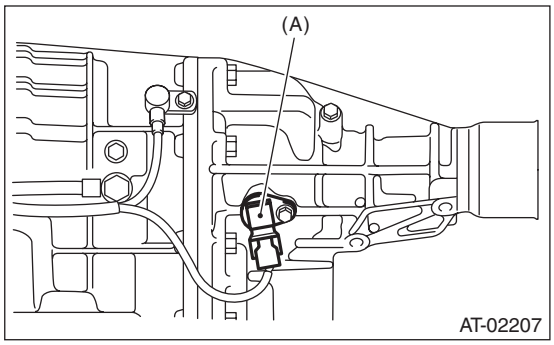


12) Install the front, center and rear exhaust pipes, and the muffler. (Non-turbo model)
<Ref. to EX(H4SO)-7, INSTALLATION, Front Exhaust Pipe.> <Ref. to EX(H4SO)-10, INSTALLATION, Rear Exhaust Pipe.> <Ref. to EX(H4SO)-13, INSTALLATION, Muffler.>
13) Install the center, rear exhaust pipes and the muffler. (Turbo model)
<Ref. to EX(H4DOTC)-9, INSTALLATION, Center Exhaust Pipe.> <Ref. to EX(H4DOTC)-14, INSTALLATION, Rear Exhaust Pipe.> <Ref. to EX(H4DOTC)-16, INSTALLATION, Muffler.>
14) Lower the vehicle.
15) Install the transmission harness connector to the stay.
16) Install the pitching stopper. <Ref. to 4AT-44, INSTALLATION, Transmission Mounting System.>
17) Install the air intake chamber. (Non-turbo model)
<Ref. to IN(H4SO)-7, INSTALLATION, Air Intake Chamber.>
18) Install the intercooler. (Turbo model)
<Ref. to IN(H4DOTC)-12, INSTALLATION, Intercooler.>
19) Fill with the same amount of ATF as drained.
20) Bleed the air of control valve.
<Ref. to 4AT-61, Air Bleeding of Control Valve.>
21) Inspect the level of ATF. <Ref. to 4AT-26, Automatic Transmission Fluid.>
22) Execute the learning control promotion. <Ref. to 4AT(diag)-17, FACILITATION OF LEARNING CONTROL, OPERATION, Subaru Select Monitor.>

15.Rear Vehicle Speed Sensor

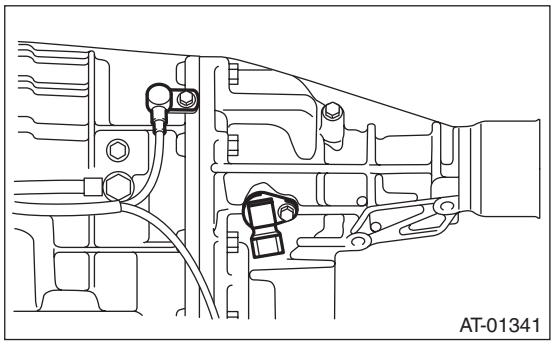
A: REMOVAL

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



(A) Rear vehicle speed sensor

5) Remove the rear vehicle speed sensor.



B: INSTALLATION

Install in the reverse order of removal.

NOTE:
Replace the O-ring with a new part.

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

16. Torque Converter Turbine Speed Sensor

A: REMOVAL

When removing the torque converter turbine speed sensor, refer to “Front Vehicle Speed Sensor”. <Ref. to 4AT-51, REMOVAL, Front Vehicle Speed Sensor.>

B: INSTALLATION

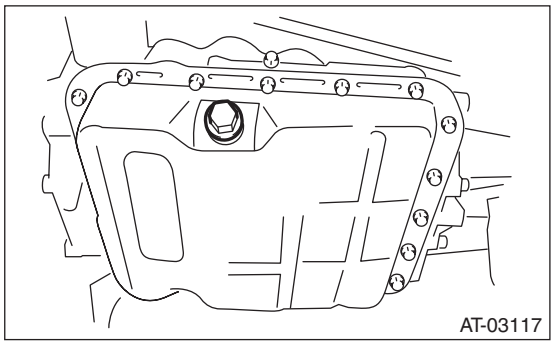
When installing the torque converter turbine speed sensor, refer to “Front Vehicle Speed Sensor”. <Ref. to 4AT-52, INSTALLATION, Front Vehicle Speed Sensor.>

17.Control Valve Strainer

A: REMOVAL

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

CAUTION:
Because the AFT will be very hot after driving, be very careful not be receive burns.

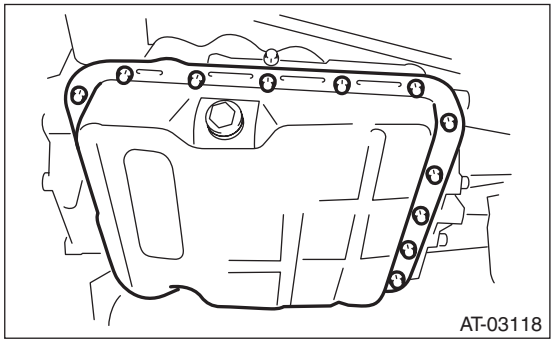

AT-03117

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

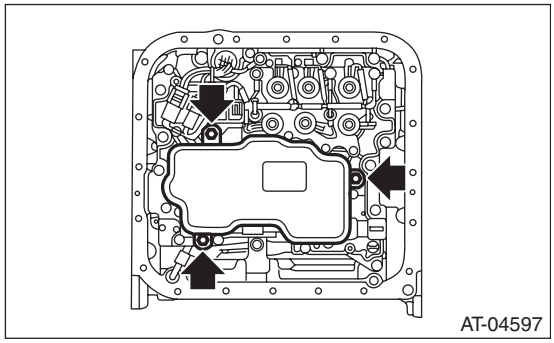
Tightening torque:
25 N·m (2.5 kgf-m, 18.4 ft-lb)

7) Remove the oil pan.

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


AT-03118

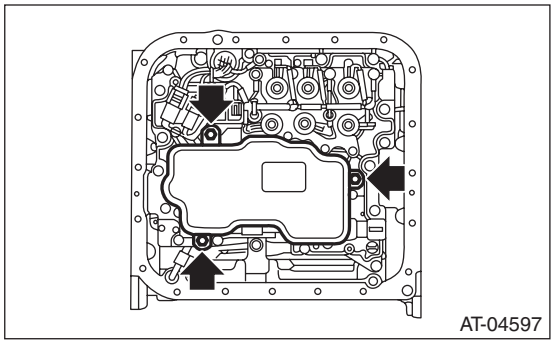
8) Remove the magnet.
9) Clean the magnet.
10) Completely remove the remaining liquid gasket on the transmission case and oil pan.
11) Remove the control valve strainer attaching bolts, and remove the control valve strainer from the control valve body.


AT-04597

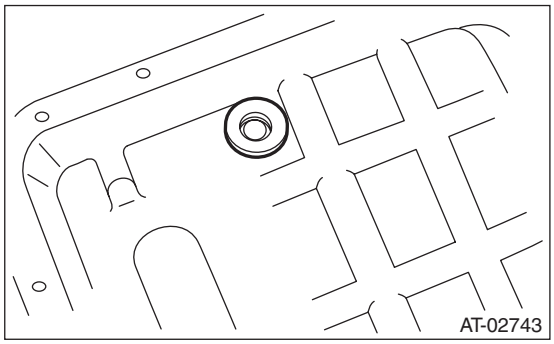
B: INSTALLATION

1) Check the control valve body for dust and other foreign matter.
2) Install a new control valve strainer to the control valve body and tighten the bolts.

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

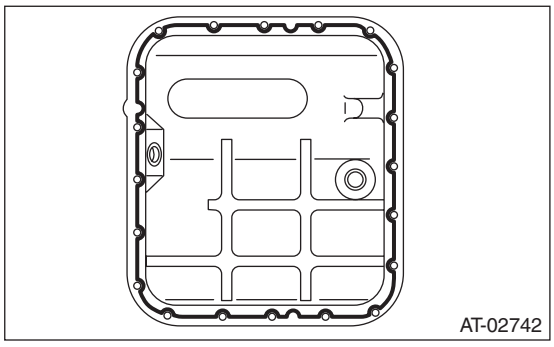


3) Attach the magnet at the specified position of the oil pan.



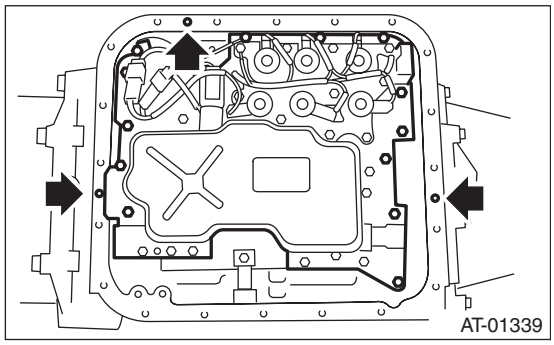
4) Apply proper amount of liquid gasket to the entire oil pan mating surface.

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



5) Fill the 3 holes aside from the bolt holes in the transmission case, with liquid gasket.

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



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

Tightening torque:
5 N·m (0.5 kgf-m, 3.6 ft-lb)
7) Fill ATF from the oil charger pipe.

Recommended fluid:
<Ref. to 4AT-2, HYDRAULIC CONTROL AND LUBRICATION, SPECIFICATION, General Description.>

Capacity:
Fill with the same amount of ATF as drained.
8) Bleed the air of control valve. <Ref. to 4AT-61, Air Bleeding of Control Valve.>
9) Check the ATF level. <Ref. to 4AT-26, Automatic Transmission Fluid.>

C: INSPECTION

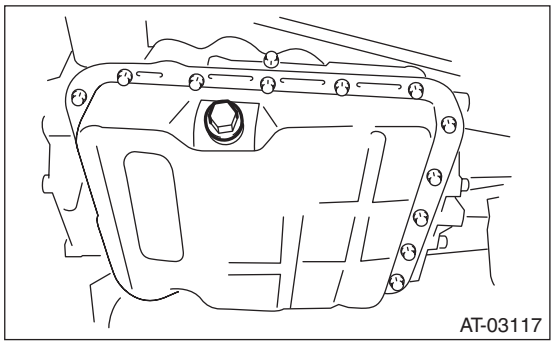
Check the control valve strainer for holes, damages or adhesion of dust and other foreign particles.

18.Control Valve Body

A: REMOVAL

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

CAUTION:
Because the AFT will be very hot after driving, be very careful not be receive burns.

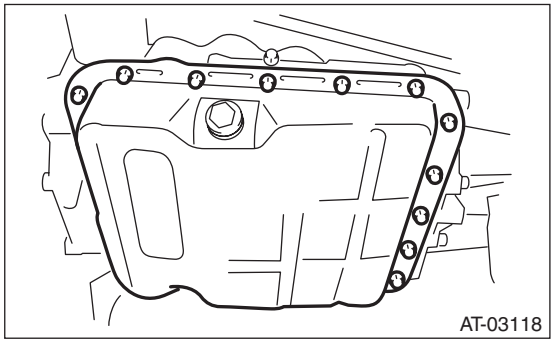


6) Perform replacement with a new gasket, and tighten the drain plug (ATF).

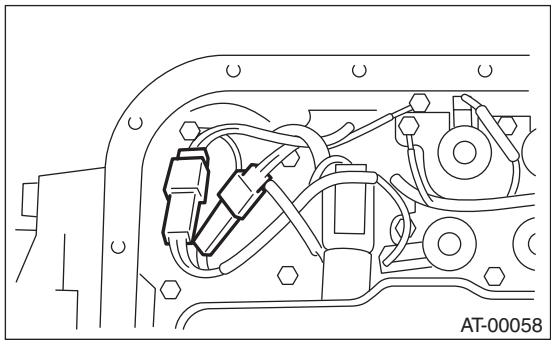
Tightening torque:
25 N·m (2.5 kgf-m, 18.4 ft-lb)

7) Remove the oil pan.

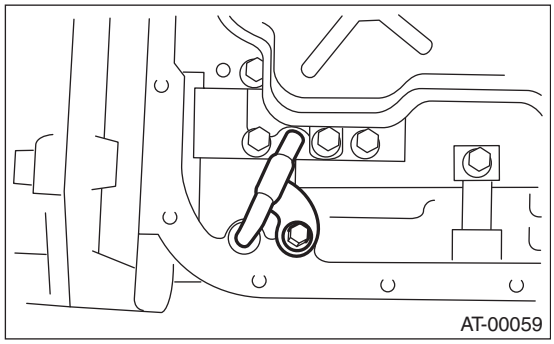
CAUTION:
Be careful not to allow foreign matter such as dust or dirt to enter the oil pan.



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.

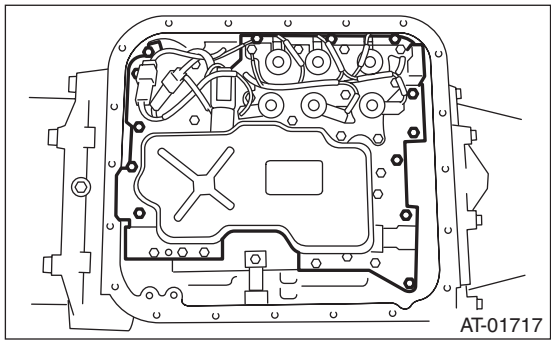


12) Remove the oil cooler pipe.



13) Remove the control valve body.

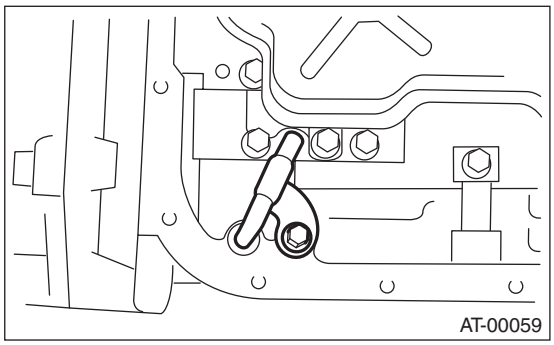
NOTE:
The control valve body is replaced as an assembly only, because it is a non-disassembly part.



B: INSTALLATION

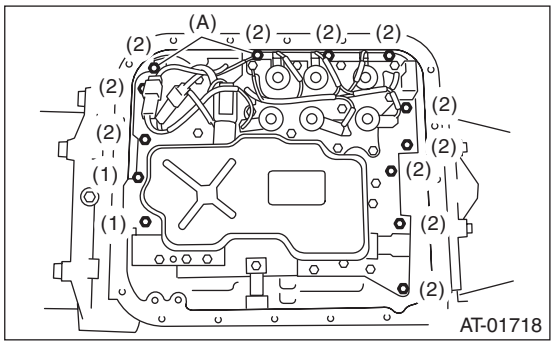
1) Check the control valve body for dust and other foreign matter.
2) Temporarily tighten the control valve body to the transmission.
3) Install the oil cooler pipe.

Tightening torque:
8 N·m (0.8 kgf-m, 5.9 ft-lb)



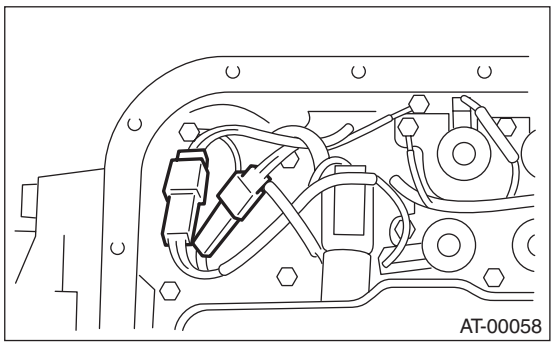
4) Tighten the bolts equally.

Tightening torque:
8 N·m (0.8 kgf-m, 5.9 ft-lb)

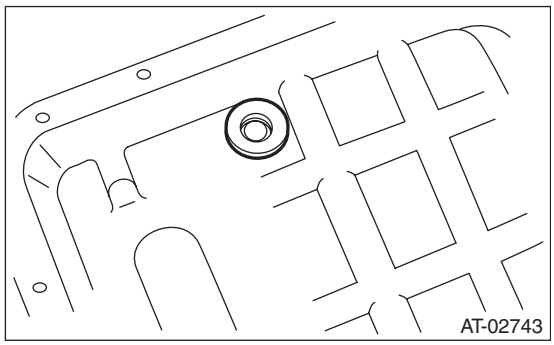


(A) Transmission ground
Bolt length mm (in)
(1) 35 (1.38)
(2) 30 (1.18)

5) Connect the control valve connector.

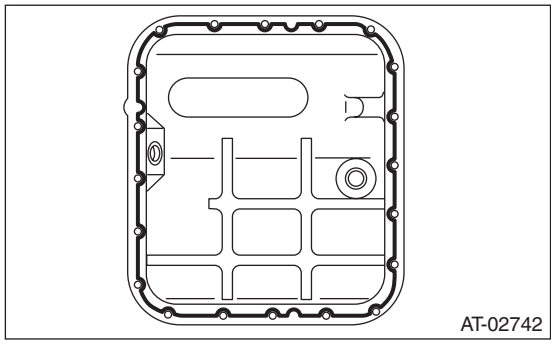


6) Attach the magnet at the specified position of the oil pan.



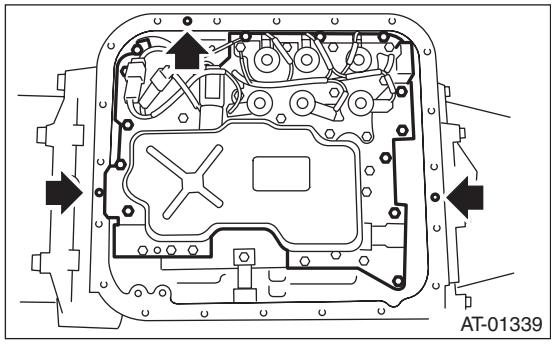
7) Apply proper amount of liquid gasket to the entire oil pan mating surface.

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



8) Fill the 3 holes aside from the bolt holes in the transmission case, with liquid gasket.

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



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

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

10) Fill ATF from the oil charger pipe.

Recommended fluid:
<Ref. to 4AT-2, HYDRAULIC CONTROL AND LUBRICATION, SPECIFICATION, General Description.>

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

11) Bleed the air of control valve. <Ref. to 4AT-61, Air Bleeding of Control Valve.>
12) Check the ATF level.
<Ref. to 4AT-26, Automatic Transmission Fluid.>
13) Execute the learning control promotion. <Ref. to 4AT(diag)-17, FACILITATION OF LEARNING CONTROL, OPERATION, Subaru Select Monitor.>

C: INSPECTION

Check parts for holes, damages or adhesion of dust and other foreign particles.

19.Air Bleeding of Control Valve

A: GENERAL DESCRIPTION

• When ATF is drained from the automatic transmission, make sure to bleed air from the control valve after filling with the specified amount of ATF.
• Perform the procedures according to the message displayed on the Subaru Select Monitor.

B: PROCEDURE

1. PREPARATION FOR AIR BLEEDING

1) Cool down until the ATF temperature displayed on the Subaru Select Monitor reaches to 60°C (140° F) or lower.
2) Shift the select lever to “P” range.
3) Fully apply the parking brake.
4) Lift up the vehicle.

CAUTION:
Be sure to keep the lowest edge of the tires 30 cm or more off the ground because the vehicle vibrates during the work.

5) Connect the Subaru Select Monitor to the data link connector.
6) Turn the ignition switch to ON.
7) Turn OFF all switches, which produce an electrical load, including headlight, air conditioner, seat heater, rear defogger, etc.

2. AIR BLEEDING

CAUTION:
Do not turn the power of the Subaru Select Monitor to OFF or disconnect the data link connector during the operation.

1) Select {Learning and inspection mode related to AT} on the «Transmission Diagnosis» display screen of Subaru Select Monitor.
2) Select {AT air bleeding mode} on the «Learning and inspection mode related to AT» display screen of Subaru Select Monitor.
3) Perform the procedures according to the message displayed on the Subaru Select Monitor.

NOTE:
During air bleeding in progress, AT OIL TEMP light in the combination meter starts flashing at a cycle of 2 Hz and air bleeding starts. The following message is displayed on the screen when the indicator light turns off.

4) When “AT air bleeding normally ended.” is displayed, air bleeding is completed.

NOTE:
• If communication error occurs during air bleeding, retry AT air bleeding from the beginning.
• If “Execute AT learning again after fixing troubles of the vehicle” is displayed during air bleeding, select [OK] to display the “List of Diagnostics Trouble Code”. Retry AT air bleeding from the beginning after repairing the DTC detecting portion.
• If “AT air bleeding ended abnormally.” is displayed, retry AT air bleeding from the beginning.

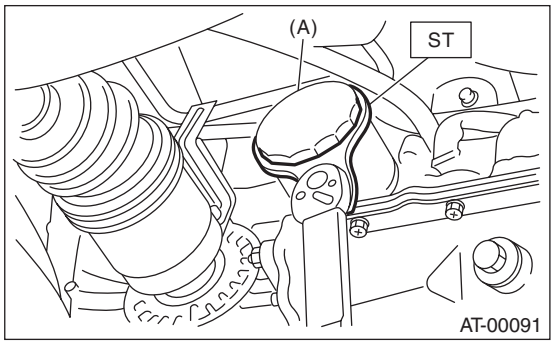
Message	Primary cause of abnormal end
“AT air bleeding ended abnormally.”	• Fault is detected during AT air bleeding. • The accelerator pedal is depressed during AT air bleeding. • Operation which is not directed is performed during AT air bleeding. • The brake pedal is not depressed fully. • The parking brake is not applied fully. • Abnormal idle rise occurs. Other similar causes are probable.

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

20.ATF Filter

A: REMOVAL

NOTE:
The ATF filter is maintenance free.
1) Lift up the vehicle.
2) Using the ST, remove the ATF filter.
ST 498545400 OIL FILTER WRENCH



(A) ATF filter

B: INSTALLATION

1) Apply a thin coat of ATF to the oil seal part of new ATF filter.
2) Install the ATF filter. Turn it by hand, being careful not to damage oil seal.
3) Tighten the ATF filter using ST.
Calculate the ATF filter tightening torque using following formula.
$T2 = L2/(L1 + L2) \times T1$
T1: 14 N·m (1.4 kgf-m, 10.3 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 the torque wrench while tightening the ATF filter.
ST 498545400 OIL FILTER WRENCH
4) Fill ATF.
5) Inspect the level of ATF. <Ref. to 4AT-26, Automatic Transmission Fluid.>

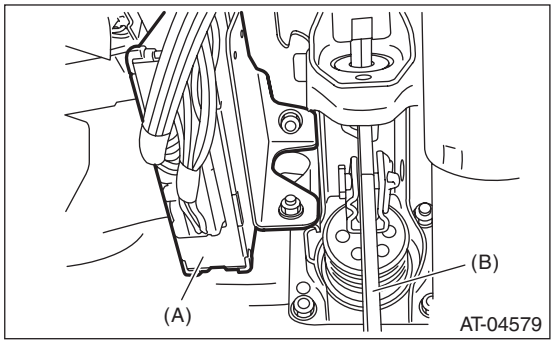
C: INSPECTION

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

21.Transmission Control Module (TCM)

A: REMOVAL

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



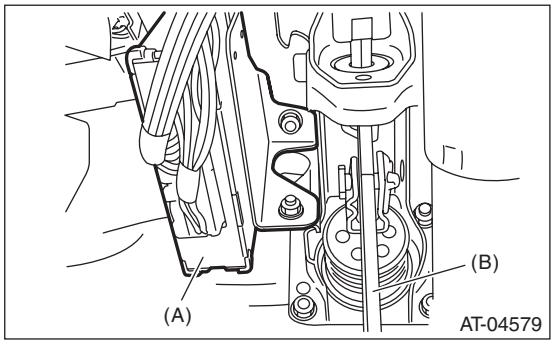
(A) Transmission control module (TCM)
(B) Brake pedal

4) Remove the TCM.

B: INSTALLATION

1) Install the TCM.

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



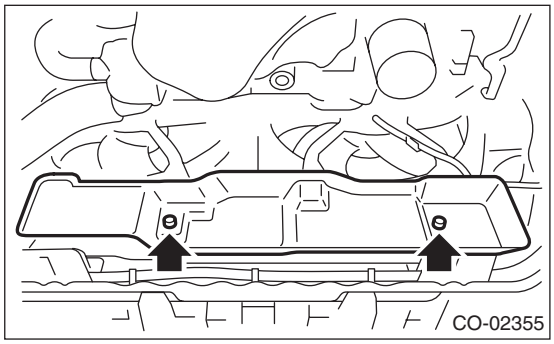
(A) Transmission control module (TCM)
(B) Brake pedal

2) Connect the connector to the TCM.
3) Install in the reverse order of removal.
4) Execute the learning control promotion. <Ref. to 4AT(diag)-17, FACILITATION OF LEARNING CONTROL, OPERATION, Subaru Select Monitor.>

22.ATF Cooler Pipe and Hose

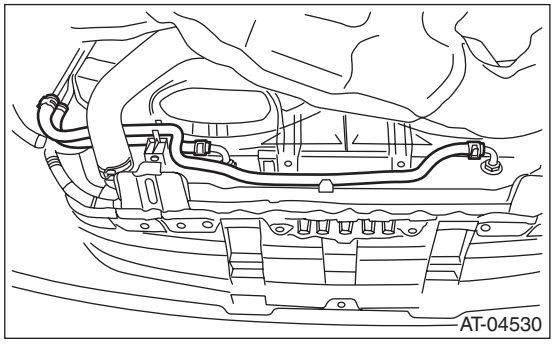
A: REMOVAL

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



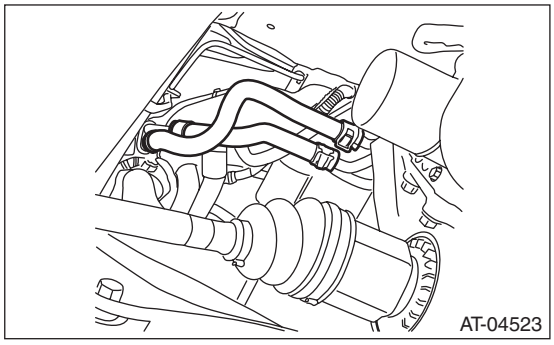
6) Disconnect the ATF cooler hose from the radiator.

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

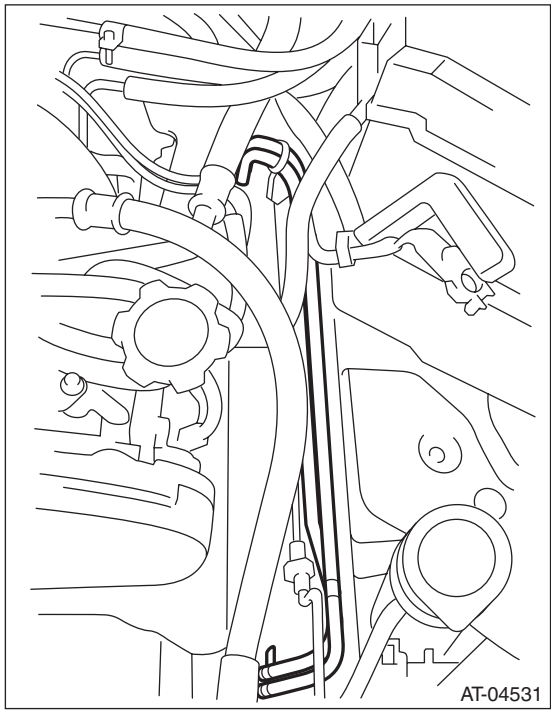


7) Disconnect the ATF cooler hoses from the pipes.

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

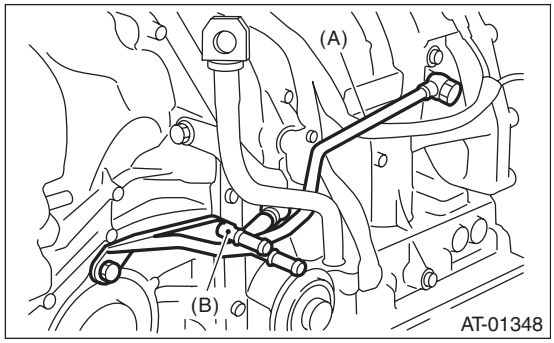


8) Disconnect the ATF cooler pipe from frame.



9) Remove the ATF inlet pipe and outlet pipe.

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

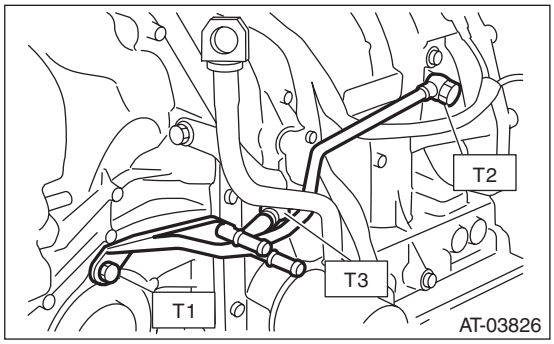


(A) ATF inlet pipe
(B) ATF outlet pipe

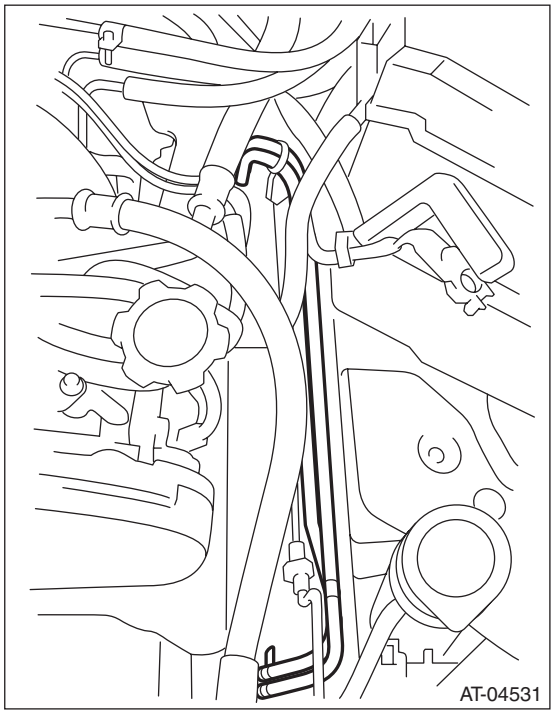
B: INSTALLATION

1) Install the ATF inlet pipe and outlet pipe along with new washers.

Tightening torque:
T1: 25 N·m (2.5 kgf-m, 18.4 ft-lb)
T2: 40 N·m (4.1 kgf-m, 29.5 ft-lb)
T3: 45 N·m (4.6 kgf-m, 33.2 ft-lb)

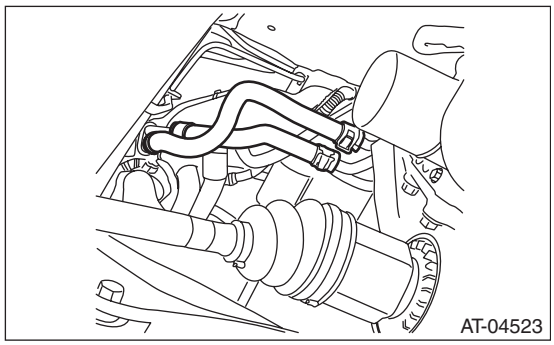


2) Install the ATF cooler pipe to frame.



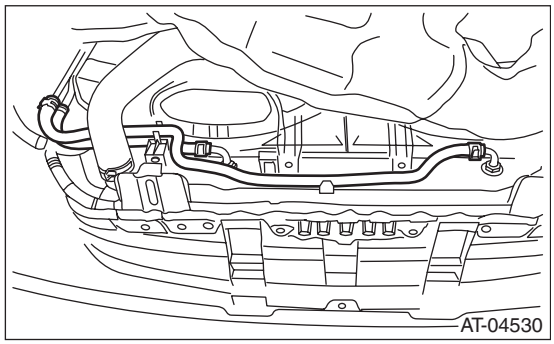
3) Connect the ATF cooler hose to the pipe on the transmission side.

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



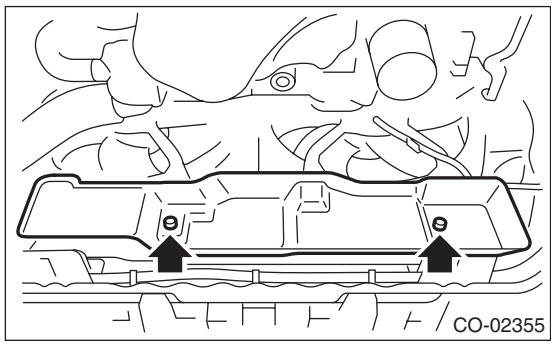
4) Connect the ATF cooler hose to the pipe on the radiator side.

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



5) Install the heat shield cover.

Tightening torque:
3 N·m (0.3 kgf-m, 2.2 ft-lb)



6) Install the under cover.
7) Install the battery.
8) Fill ATF. <Ref. to 4AT-26, Automatic Transmission Fluid.>

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

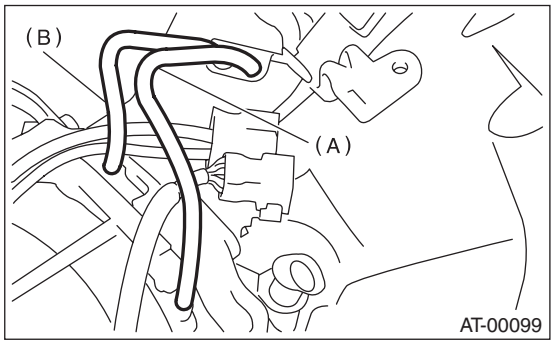
C: INSPECTION

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

23.Air Breather Hose

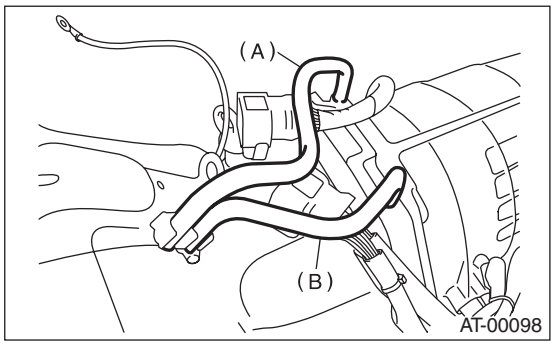
A: REMOVAL

1) Remove the air intake chamber. (Non-turbo model)
<Ref. to IN(H4SO)-7, REMOVAL, Air Intake Chamber.>
2) Remove the intercooler. (Turbo model)
<Ref. to IN(H4DOTC)-11, REMOVAL, Intercooler.>
3) Disconnect the air breather hose.
- Non-turbo model



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

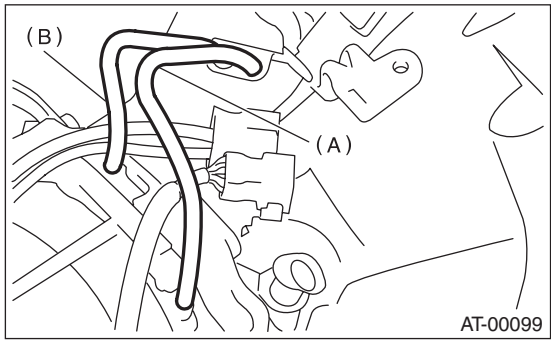
- Turbo model



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

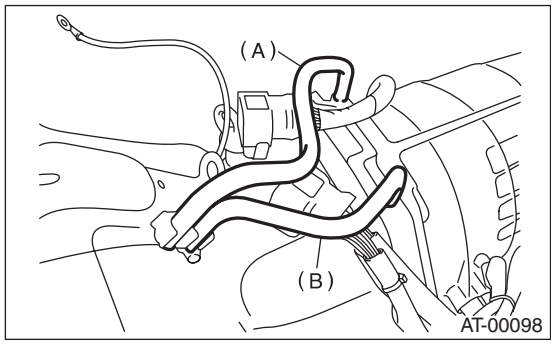
B: INSTALLATION

1) Install the air breather hose.
- Non-turbo model



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

- Turbo model



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

2) Install the air intake chamber. (Non-turbo model)
<Ref. to IN(H4SO)-7, INSTALLATION, Air Intake Chamber.>
3) Install the intercooler. (Turbo model)
<Ref. to IN(H4DOTC)-12, INSTALLATION, Intercooler.>

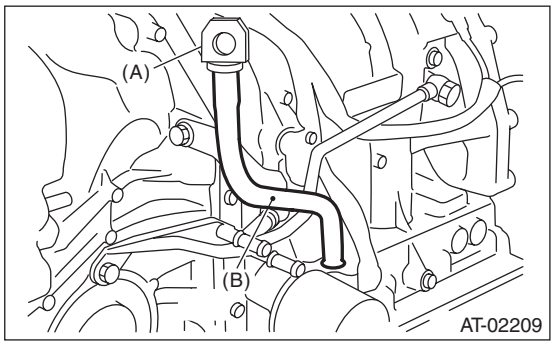
C: INSPECTION

Make sure the hose is not cracked or clogged.

24.Oil Charge Pipe

A: REMOVAL

1) Remove the air intake chamber. (Non-turbo model)
<Ref. to IN(H4SO)-7, REMOVAL, Air Intake Chamber.>
2) Remove the intercooler. (Turbo model)
<Ref. to IN(H4DOTC)-11, REMOVAL, Intercooler.>
3) Remove the oil charge pipe, and then remove the O-ring from the flange side.



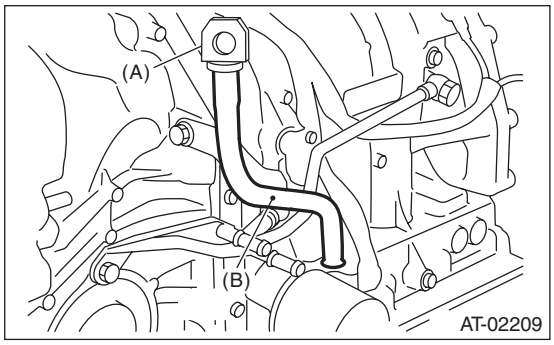
(A) ATF level gauge
(B) Oil charge pipe

B: INSTALLATION

1) Apply ATF on a new O-ring and install together with the oil charge pipe.

NOTE:
Use a new bolt.

Tightening torque:
38 N·m (3.9 kgf-m, 28.0 ft-lb)



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

2) Install the air intake chamber. (Non-turbo model)
<Ref. to IN(H4SO)-7, INSTALLATION, Air Intake Chamber.>
3) Install the intercooler. (Turbo model)
<Ref. to IN(H4DOTC)-12, INSTALLATION, Intercooler.>

C: INSPECTION

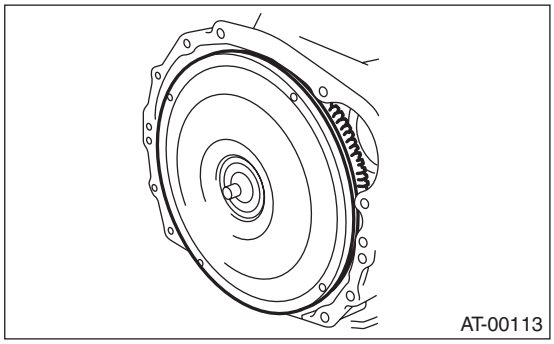
Make sure the oil charge pipe is not deformed or damaged.

25.Torque Converter Clutch Assembly

A: REMOVAL

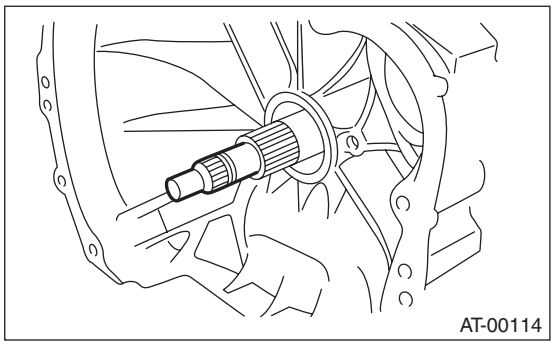
1) Remove the transmission assembly from vehicle body. <Ref. to 4AT-35, REMOVAL, Automatic Transmission Assembly.>
2) Pull out the torque converter clutch assembly and oil pump shaft horizontally.

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



3) Remove the input shaft.

NOTE:
When the torque converter clutch assembly is removed, the input shaft will also come off.

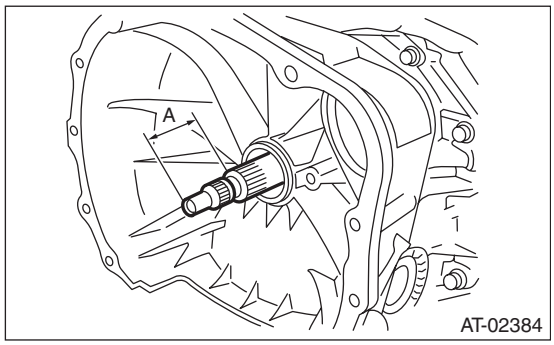


4) Remove the oil pump shaft from torque converter clutch assembly as necessary.

B: INSTALLATION

1) When the oil pump shaft is removed, install the shaft to converter case.
2) Install the oil pump shaft to the torque converter clutch assembly, and make sure the clip is secured on the groove.
3) Apply ATF to the O-ring and insert on the input shaft while rotating the shaft slowly by hand.

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



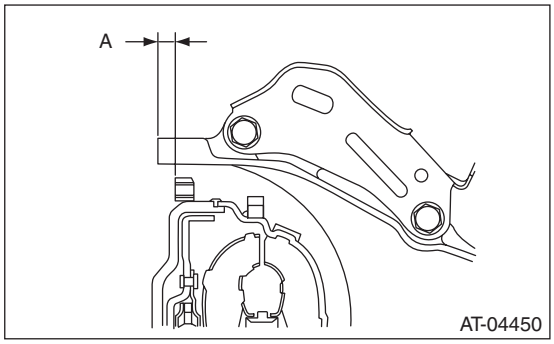
4) While holding the torque converter clutch assembly by hand, carefully install it to the torque converter case. Take care not to damage the bushing. Do not allow the oil pump shaft bushing to touch the stator shaft section of the oil pump cover inappropriately.

5) Slowly rotate the shaft by hand to engage the splines securely, then check that dimension A is within the specified range.

Dimension A:

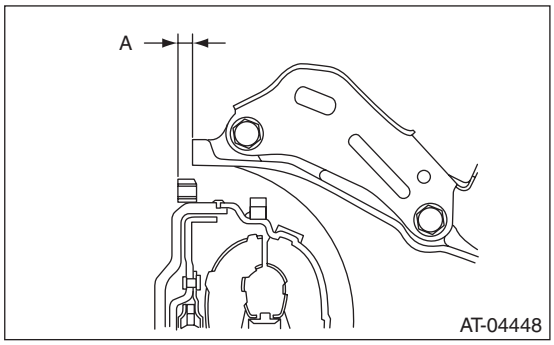
Non-turbo model

1.1 — 1.3 mm (0.043 — 0.051 in)



Turbo model

2.7 — 2.9 mm (0.106 — 0.114 in)



6) Install the transmission assembly to the vehicle. <Ref. to 4AT-38, INSTALLATION, Automatic Transmission Assembly.>

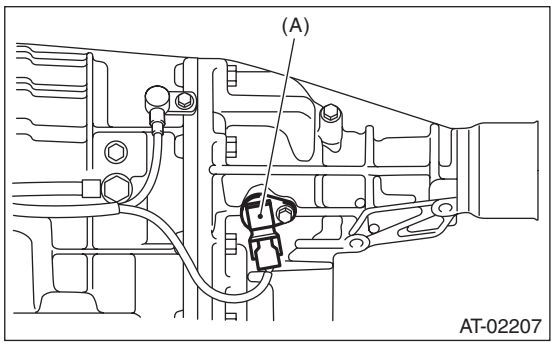
C: INSPECTION

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

26.Extension Case

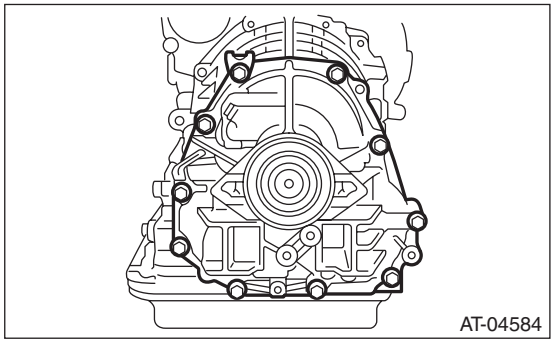
A: REMOVAL

1) Remove the transmission assembly.
<Ref. to 4AT-35, REMOVAL, Automatic Transmission Assembly.>
2) Remove the rear vehicle speed sensor.



(A) Rear vehicle speed sensor

3) Separate the transmission case and extension case section.

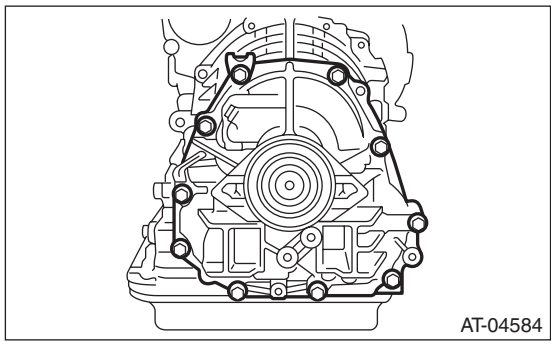


B: INSTALLATION

1) Apply vaseline to the contact surface, and attach the selected thrust needle bearing to the end surface of the reduction drive gear.

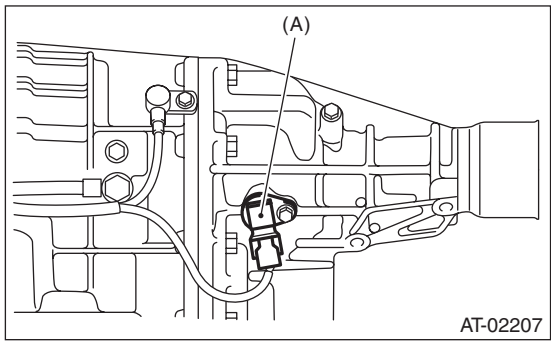
NOTE:
Install the thrust needle bearing in the correct direction.
2) Install a new gasket.
3) Install the extension case to transmission case.
4) Tighten bolts to secure the extension case.

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



5) Install the rear vehicle speed sensor.

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



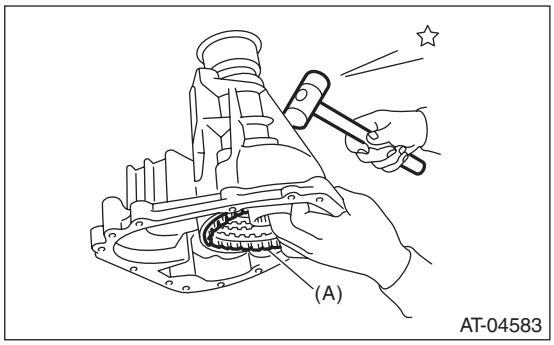
(A) Rear vehicle speed sensor

6) Install the transmission assembly.
<Ref. to 4AT-38, INSTALLATION, Automatic Transmission Assembly.>

C: DISASSEMBLY

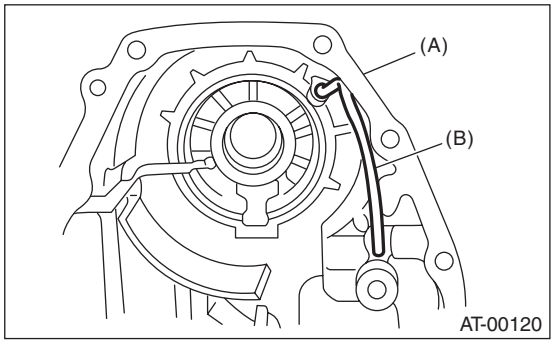
1) Hit the extension case lightly with a plastic hammer, and take out the transfer clutch.

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



(A) Transfer clutch

2) Remove the transfer clutch pipe while being careful not to deform the pipe.

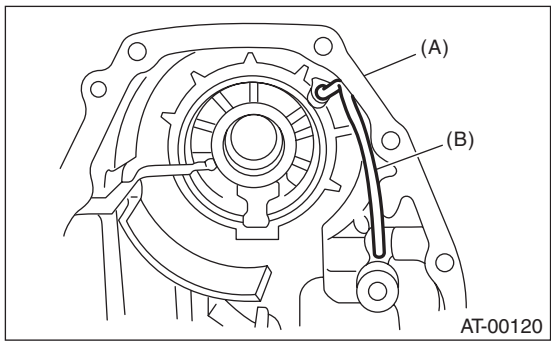


(A) Extension case
(B) Transfer clutch pipe

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

D: ASSEMBLY

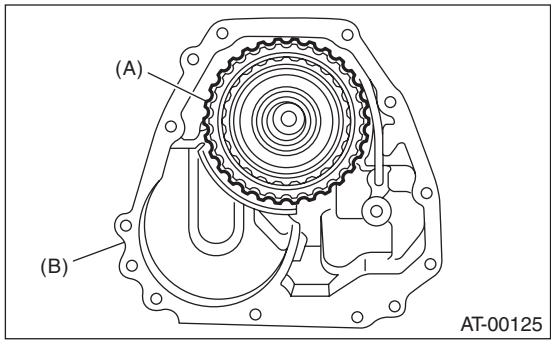
1) Press-fit the new oil seal using ST and the press.
ST 498057300 INSTALLER
2) Press-fit the dust cover.
3) Install the transfer clutch pipe to the extension case while being careful not to deform the pipe.



(A) Extension case
(B) Transfer clutch pipe

4) Install the transfer clutch assembly to the case.

NOTE:
- Be careful not to damage the seal ring.
- Insert the transfer clutch assembly all the way to the bottom of the bearing shoulder.



(A) Transfer clutch ASSY
(B) Extension case

E: INSPECTION

- Blow with compressed air to make sure the transfer clutch pipe and extension case routes are not clogged or leaking.
- Inspect the extension end play, and adjust it to within the standard value. <Ref. to 4AT-78, ADJUSTMENT, Transfer Clutch.>

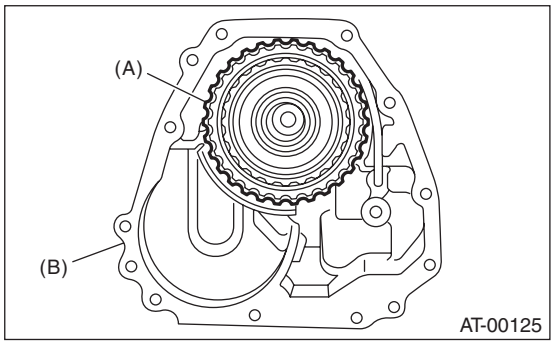
27.Transfer Clutch

A: REMOVAL

1) Remove the transmission assembly from vehicle body. <Ref. to 4AT-35, REMOVAL, Automatic Transmission Assembly.>
2) Remove the extension case, and then remove the transfer clutch. <Ref. to 4AT-72, REMOVAL, Extension Case.> <Ref. to 4AT-73, DISASSEMBLY, Extension Case.>

B: INSTALLATION

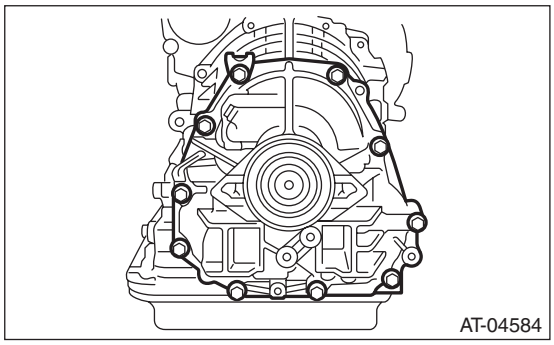
1) Select the thrust needle bearing. <Ref. to 4AT-78, ADJUSTMENT, Transfer Clutch.>
2) Install the transfer clutch assembly to the case.



(A) Transfer clutch ASSY
(B) Extension case

3) Tighten the bolts to secure the case.

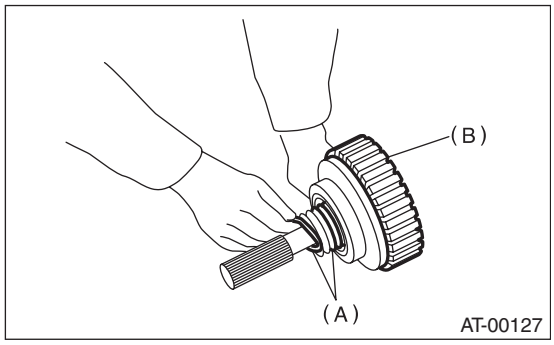
Tightening torque:
25 N·m (2.5 kgf-m, 18.4 ft-lb)



4) Install the transmission assembly to the vehicle. <Ref. to 4AT-38, INSTALLATION, Automatic Transmission Assembly.>

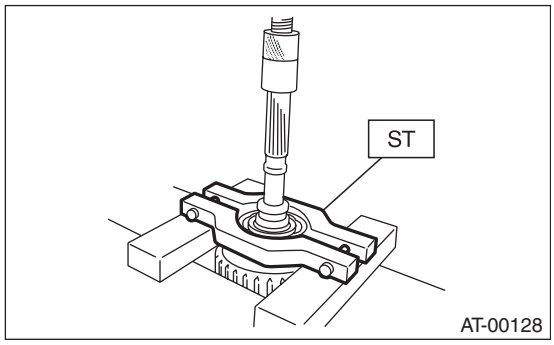
C: DISASSEMBLY

1) Remove the seal ring.

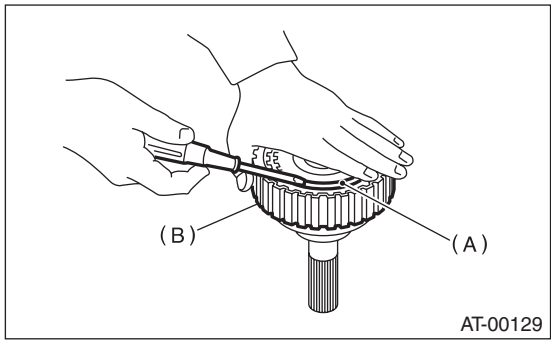


(A) Seal ring
(B) Rear drive shaft

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



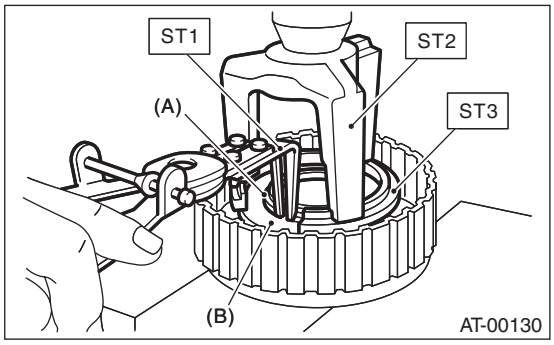
3) Using a flat tip screwdriver, etc. remove the snap ring, and take out the retaining plate, drive plate and driven plate.



(A) Snap ring
(B) Rear drive shaft

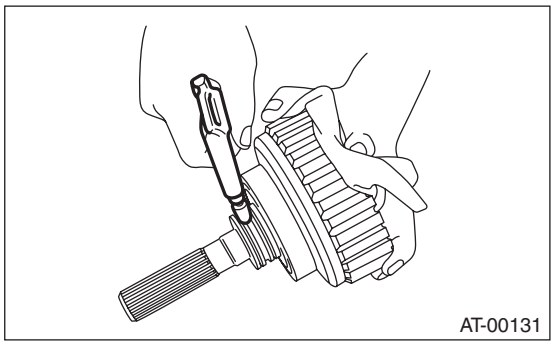
4) Using the ST1, ST2 and ST3, remove the snap ring, then take out the return spring and transfer clutch piston seal.

ST1 399893600 PLIERS
ST2 398673600 COMPRESSOR
ST3 398623600 SEAT



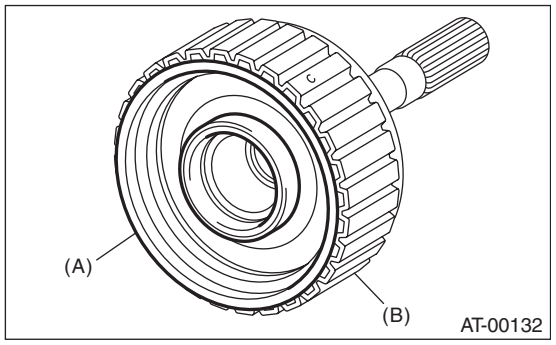
(A) Snap ring
(B) Transfer clutch piston seal

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



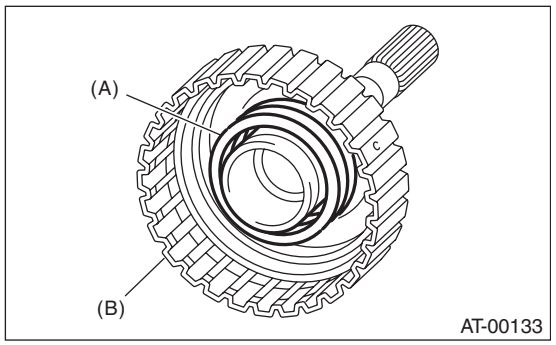
D: ASSEMBLY

1) Install the transfer clutch piston.



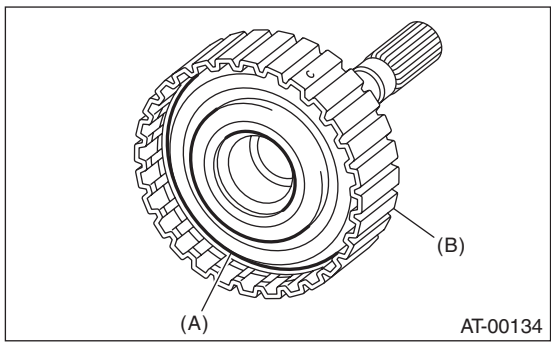
(A) Transfer clutch piston
(B) Rear drive shaft

2) Install the return spring to transfer clutch piston.



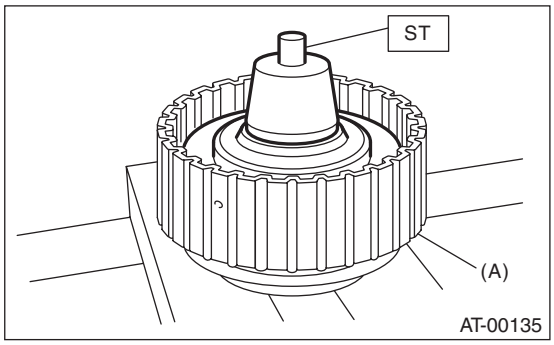
(A) Return spring
(B) Rear drive shaft

3) Apply ATF to the lip of transfer clutch piston seal, then install.



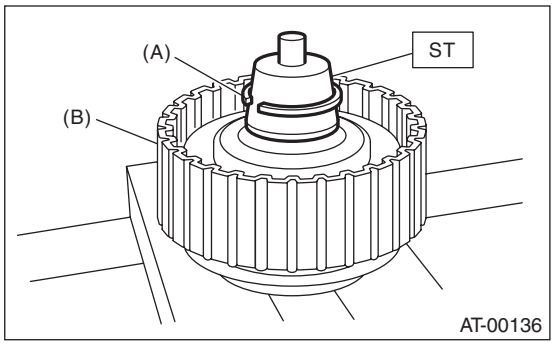
(A) Transfer clutch piston seal
(B) Rear drive shaft

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



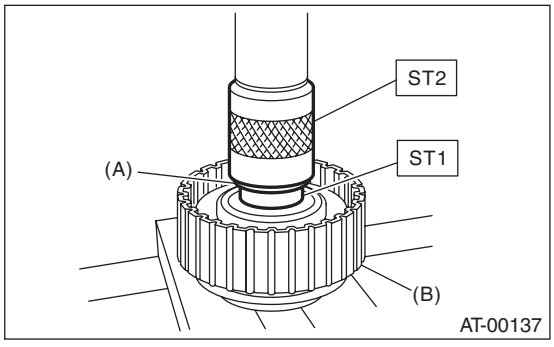
(A) Rear drive shaft

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



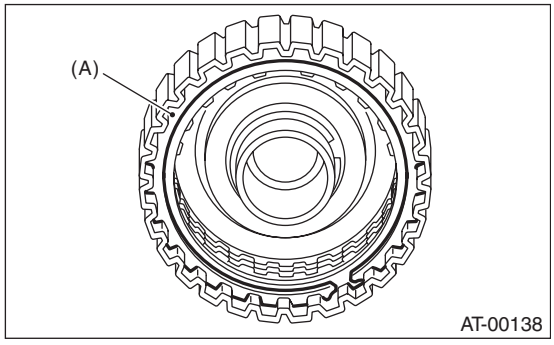
(A) Snap ring
(B) Rear drive shaft

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



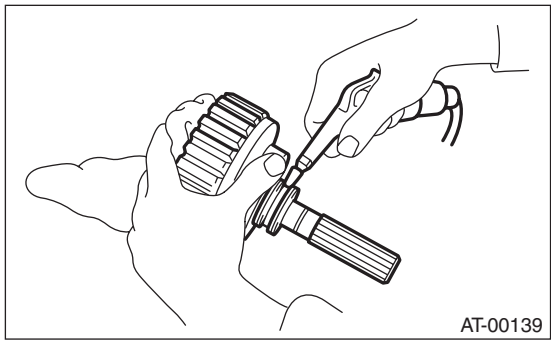
(A) Snap ring
(B) Rear drive shaft

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

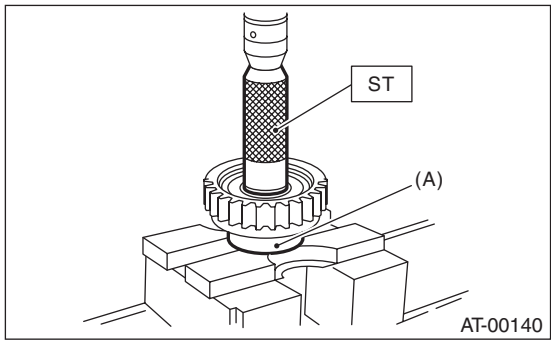


(A) Snap ring

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



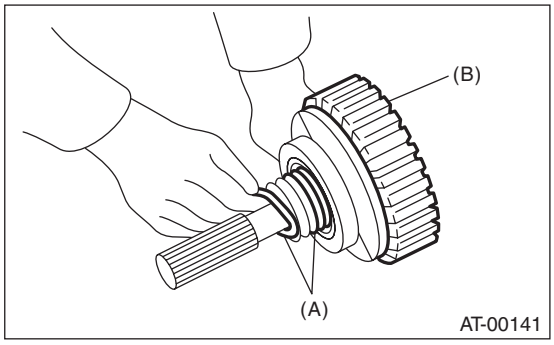
9) Check the clearance between the snap ring and retaining plate. <Ref. to 4AT-77, INSPECTION, Transfer Clutch.>
10) Press-fit new ball bearing using ST.
ST 899580100 INSTALLER



(A) Ball bearing

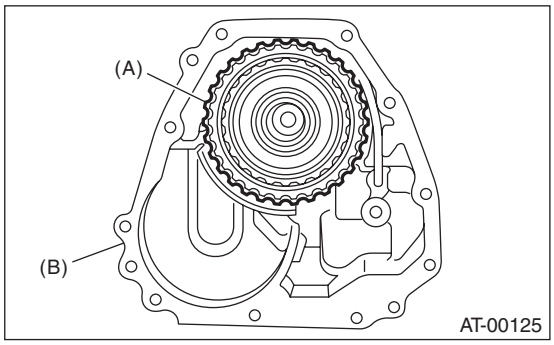
11) Apply Vaseline to a new seal ring and attach to the seal ring groove of the rear drive shaft.

NOTE:
While installing the seal ring, not to stretch the seal ring excessively.



(A) Seal ring
(B) Rear drive shaft

12) Install the transfer clutch assembly while taking care not to damage the seal ring.



(A) Transfer clutch ASSY
(B) Extension case

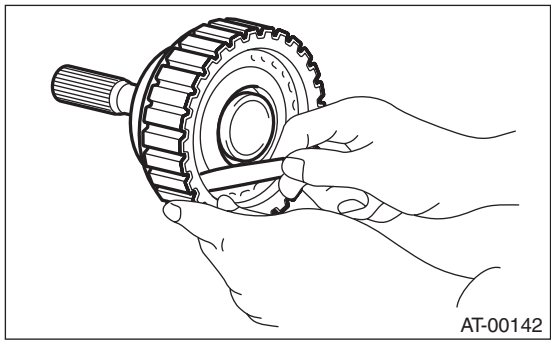
E: INSPECTION

- Inspect the drive plate facing for wear and damage.
- Make sure the snap ring is not worn and the return spring has no permanent distortion, damage, or deformation.
- Inspect the D-ring for damage.
- Inspect the extension end play, and adjust it to within the standard value. <Ref. to 4AT-78, ADJUSTMENT, Transfer Clutch.>

1) Check the clearance between the snap ring and retaining plate.
2) Before measuring clearance, place same thickness shims on both sides to prevent the retaining plate from tilting.
3) If the clearance exceeds the service limits, replace the plate set (drive plate and driven plate), and select and adjust a retaining plate to be within the initial standard value.

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

Limit thickness:
1.6 mm (0.063 in)

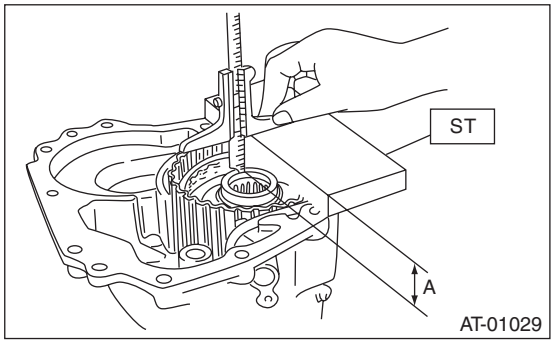


Retaining plate	
Part number	Thickness mm (in)
31593AA151	3.3 (0.130)
31593AA161	3.7 (0.146)
31593AA171	4.1 (0.161)
31593AA181	4.5 (0.177)

4) Check for tight corner braking phenomenon when the vehicle is moved forward with the steering fully turned. If tight corner braking occurs, perform the following procedures.
(1) With the steering wheel held at fully turned position, drive the vehicle in “D” range and with vehicle speed at approx. 5 km/h (3 MPH) in both clockwise and counterclockwise directions for approx. ten times each, while repeating acceleration and braking intermittently.
(2) If the tight corner braking phenomenon still persists, drive the vehicle again in a circle for several laps.

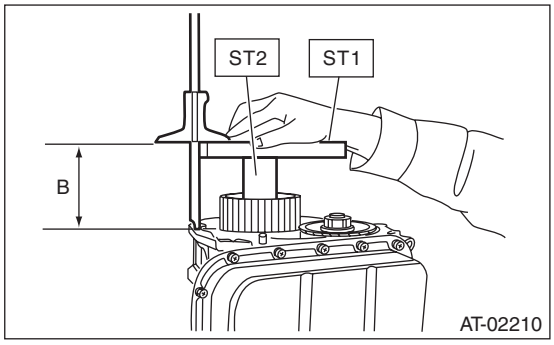
F: ADJUSTMENT

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



A Measured value

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



B Measured value

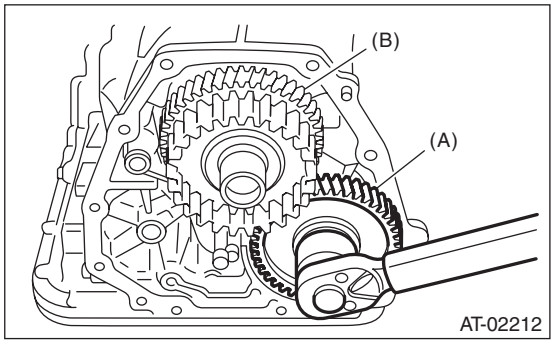
3) Calculation formula:
T = A – B + 35.4 mm
[T = A – B + 1.3937 in]
T: Thrust needle bearing thickness
A: Distance from the end of the ST to end of rear drive shaft
B: Distance from the mating surface of the transmission case to the end of the ST

Thrust needle bearing	
Part number	Thickness mm (in)
806536020	3.8 (0.150)
806535030	4.0 (0.157)
806535040	4.2 (0.165)
806535050	4.4 (0.173)
806535060	4.6 (0.181)
806535070	4.8 (0.189)
806535090	5.0 (0.197)

28.Reduction Driven Gear

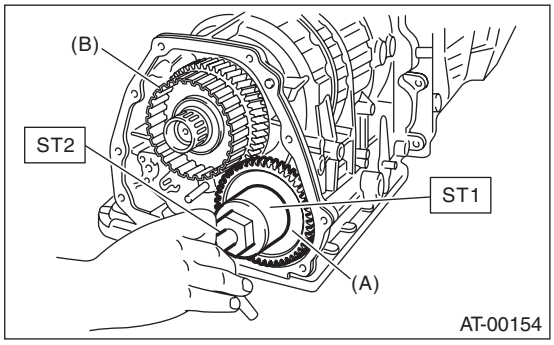
A: REMOVAL

1) Remove the transmission assembly from vehicle body. <Ref. to 4AT-35, REMOVAL, Automatic Transmission Assembly.>
2) Remove the rear wheel speed sensor, and separate the extension case from transmission case. <Ref. to 4AT-72, REMOVAL, Extension Case.>
3) Set the range select lever to the “P” range.
4) Lift the crimped section, and then remove the lock nut.



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

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

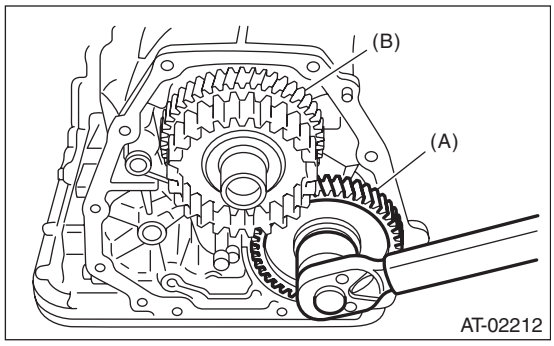


(A) Reduction driven gear
(B) Reduction drive gear

B: INSTALLATION

1) Set the range select lever to the “P” range.
2) Using a plastic hammer, install the reduction driven gear assembly and the new washer, and tighten the new drive pinion lock nut.

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

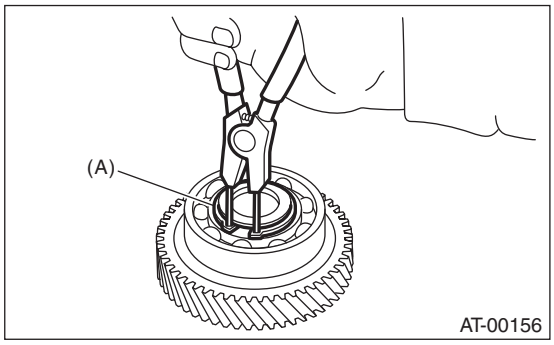


(A) Reduction driven gear
(B) Reduction drive gear

3) After tightening, stake the lock nut securely.
4) Join the transmission case and the extension case, and then install the rear vehicle speed sensor. <Ref. to 4AT-72, INSTALLATION, Extension Case.>
5) Install the transmission assembly to the vehicle. <Ref. to 4AT-38, INSTALLATION, Automatic Transmission Assembly.>

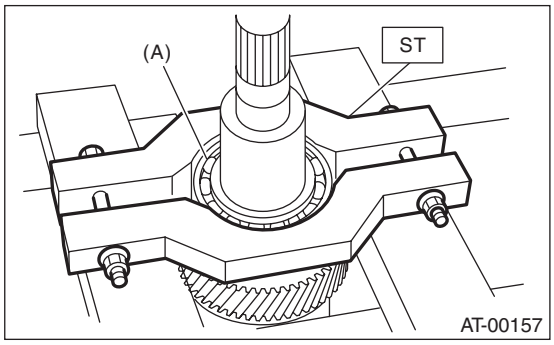
C: DISASSEMBLY

1) Remove the snap ring from reduction driven gear.



(A) Snap ring

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

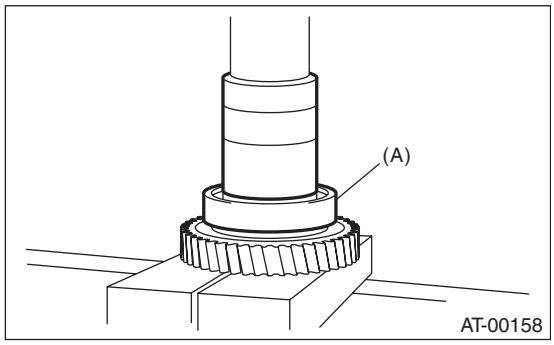


(A) Ball bearing

3) Remove the gear inner groove snap ring from the reduction driven gear.

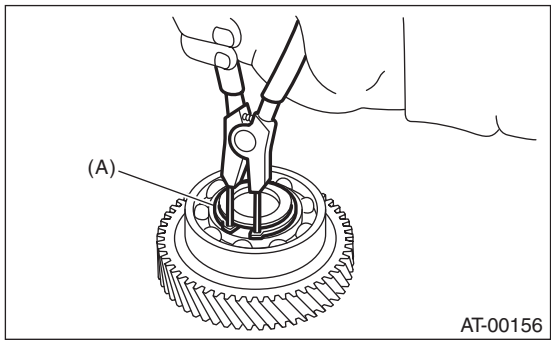
D: ASSEMBLY

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



(A) Ball bearing

3) Install the snap ring to reduction driven gear.



(A) Snap ring

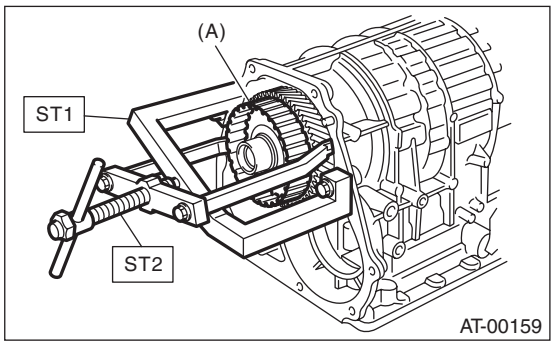
E: INSPECTION

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

29.Reduction Drive Gear

A: REMOVAL

1) Remove the transmission assembly from vehicle body. <Ref. to 4AT-35, REMOVAL, Automatic Transmission Assembly.>
2) Remove the rear wheel speed sensor, and separate the extension case from transmission case. <Ref. to 4AT-72, REMOVAL, Extension Case.>
3) Remove the reduction driven gear. <Ref. to 4AT-79, REMOVAL, Reduction Driven Gear.>
4) Using the ST, extract the reduction drive gear assembly.
ST1 499737100 PULLER
ST2 899524100 PULLER SET

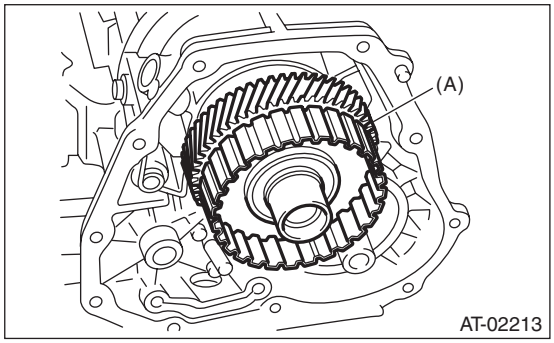


(A) Reduction drive gear ASSY

B: INSTALLATION

1) Install the reduction drive gear assembly.

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

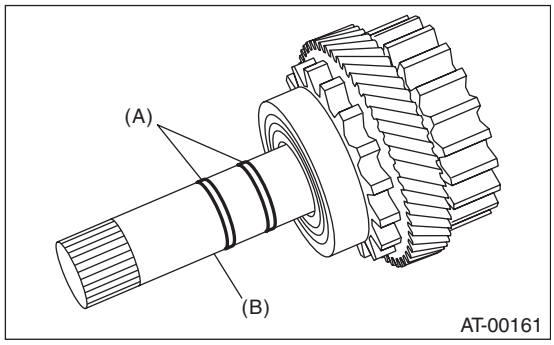


(A) Reduction drive gear ASSY

2) Install the reduction driven gear. <Ref. to 4AT-79, INSTALLATION, Reduction Driven Gear.>
3) Join the transmission case and the extension case, and then install the rear vehicle speed sensor. <Ref. to 4AT-72, INSTALLATION, Extension Case.>
4) Install the transmission assembly to the vehicle. <Ref. to 4AT-38, INSTALLATION, Automatic Transmission Assembly.>

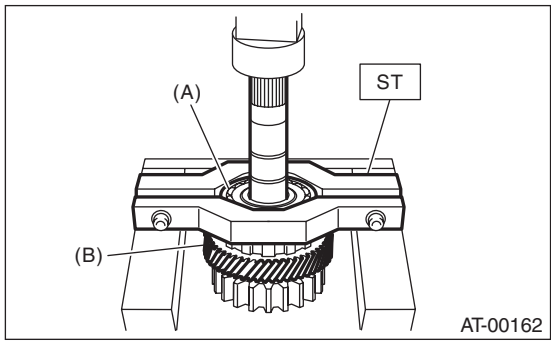
C: DISASSEMBLY

1) Take out the seal ring.



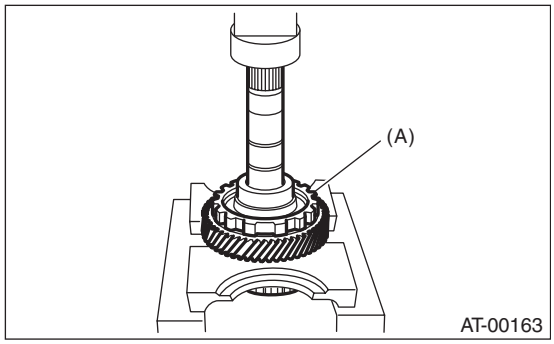
(A) Seal ring
(B) Reduction drive shaft

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



(A) Ball bearing
(B) Reduction drive gear

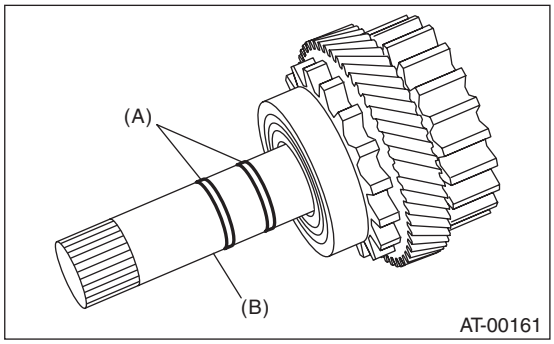
3) Apply vaseline to the outer surface of seal ring and shaft groove.



(A) Reduction drive gear

D: ASSEMBLY

1) Press-fit the reduction drive gear to shaft.
2) Press-fit the new ball bearing into reduction drive gear.
3) Apply vaseline onto the seal ring outer surface and shaft grooves.
4) Apply ATF to new seal rings, then install.



(A) Seal ring
(B) Reduction drive shaft

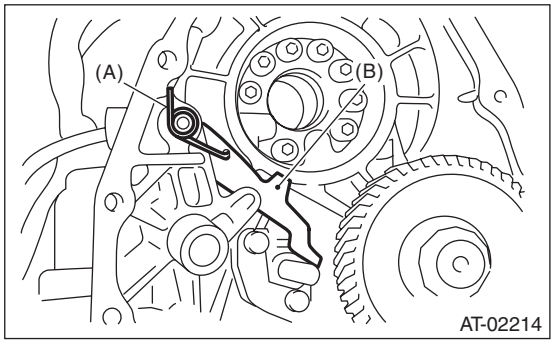
E: INSPECTION

- Rotate the bearing by hand, and check that it rotates smoothly.
- Check parts for holes, damage or adhesion of dust and other foreign particles.
- Inspect the extension end play, and adjust it to the standard value. <Ref. to 4AT-78, ADJUSTMENT, Transfer Clutch.>

30.Parking Pawl

A: REMOVAL

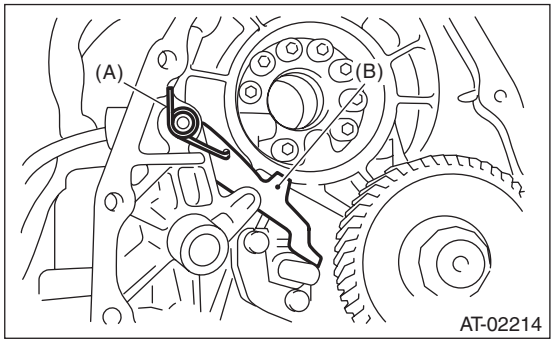
1) Remove the transmission assembly from vehicle body. <Ref. to 4AT-35, REMOVAL, Automatic Transmission Assembly.>
2) Remove the rear wheel speed sensor, and separate the extension case from transmission case. <Ref. to 4AT-72, REMOVAL, Extension Case.>
3) Remove the reduction drive gear. <Ref. to 4AT-81, REMOVAL, Reduction Drive Gear.>
4) Remove the parking pawl, return spring and shaft.



(A) Return spring
(B) Parking pawl

B: INSTALLATION

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



(A) Return spring
(B) Parking pawl

2) Install the reduction drive gear. <Ref. to 4AT-81, INSTALLATION, Reduction Drive Gear.>
3) Install the rear vehicle speed sensor and extension case. <Ref. to 4AT-72, INSTALLATION, Extension Case.>
4) Install the transmission assembly to the vehicle. <Ref. to 4AT-38, INSTALLATION, Automatic Transmission Assembly.>

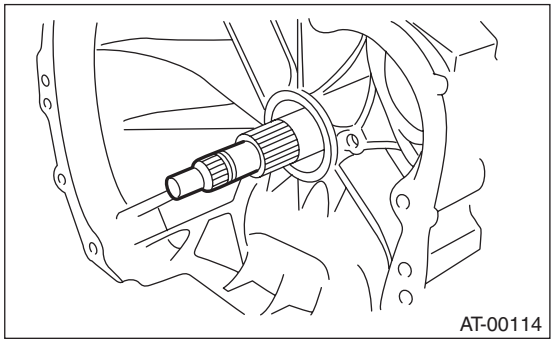
C: INSPECTION

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

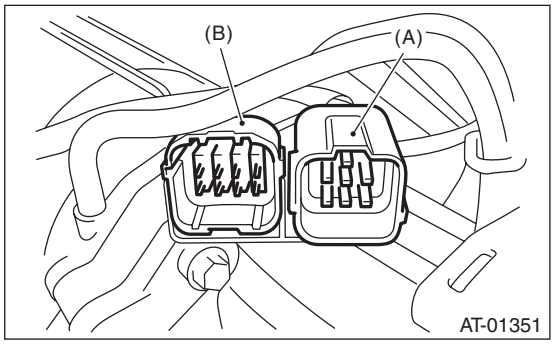
31.Converter Case

A: REMOVAL

1) Remove the transmission assembly from vehicle body. <Ref. to 4AT-35, REMOVAL, Automatic Transmission Assembly.>
2) Pull out the torque converter clutch assembly. <Ref. to 4AT-70, REMOVAL, Torque Converter Clutch Assembly.>
3) Remove the input shaft.



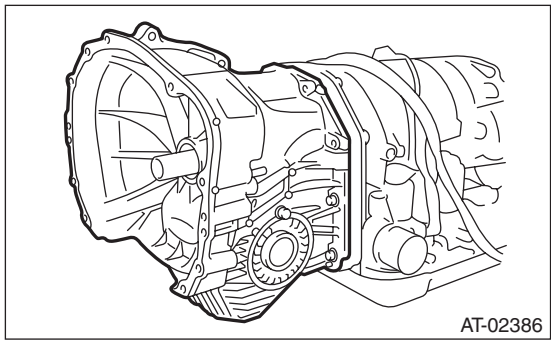
4) Lift up the lever on the rear side of transmission harness connector, and then disconnect it from the stay.
5) Disconnect the inhibitor switch connector from the stay.



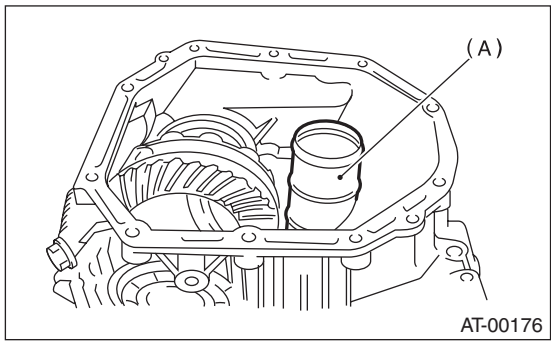
(A) Transmission harness connectors
(B) Inhibitor switch connector

6) Remove the air breather hose. <Ref. to 4AT-68, REMOVAL, Air Breather Hose.>
7) Remove the oil charge pipe. <Ref. to 4AT-69, REMOVAL, Oil Charge Pipe.>
8) Remove the ATF inlet and outlet pipes. <Ref. to 4AT-65, REMOVAL, ATF Cooler Pipe and Hose.>
9) Remove the converter case alignment bolt, and then separate the transmission case and converter case by lightly tapping with a plastic hammer.

NOTE:
- Be careful not to damage the oil seal and bushing in the converter case with the oil pump cover.
- Be careful not to loosen the rubber seal.



10) Remove the seal pipe.

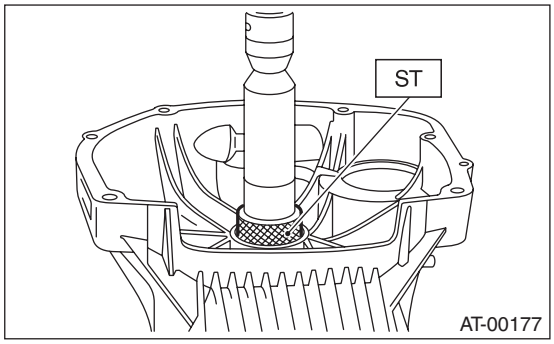


(A) Seal pipe

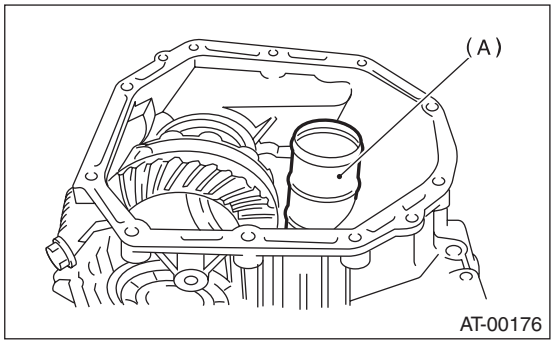
11) Remove the front differential assembly. <Ref. to 4AT-99, REMOVAL, Front Differential Assembly.>
12) Remove the oil seal from converter case.

B: INSTALLATION

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

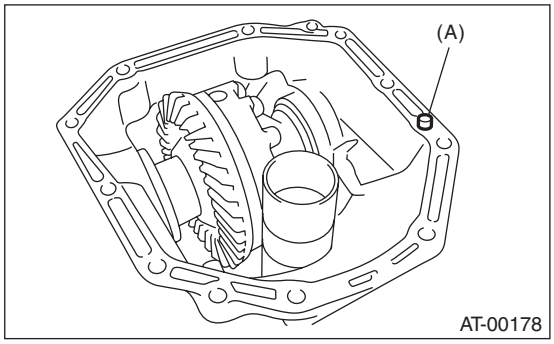


3) Install the front differential assembly to the case. <Ref. to 4AT-99, INSTALLATION, Front Differential Assembly.>
4) Install the right and left side retainers. <Ref. to 4AT-103, ADJUSTMENT, Front Differential Assembly.>
5) Install new seal pipe to converter case.



(A) Seal pipe

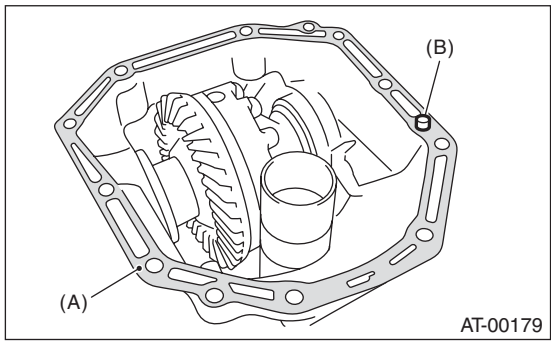
6) Install new rubber seal to converter case.



(A) Rubber seal

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

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

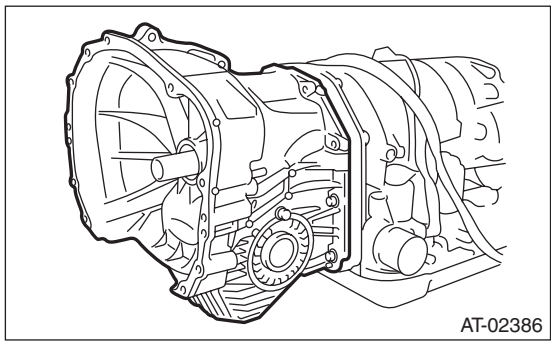


(A) THREE BOND 1215
(B) Rubber seal

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

NOTE:
Use new bolts for the oil charge pipe.

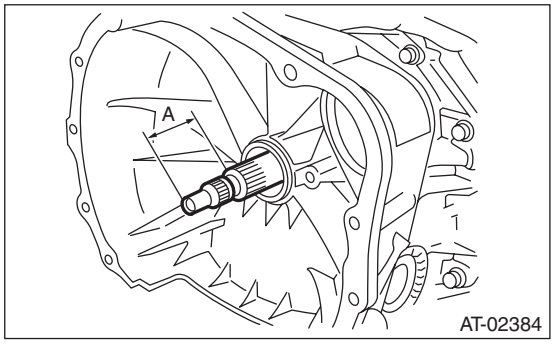
Tightening torque:
Oil charge pipe section
38 N·m (3.9 kgf-m, 28.0 ft-lb)
Excluding the oil charge pipe section
41 N·m (4.2 kgf-m, 30.2 ft-lb)



9) Insert the inhibitor switch and transmission harness connector to the stay.
10) Install the air breather hose. <Ref. to 4AT-68, INSTALLATION, Air Breather Hose.>
11) Install the ATF cooler pipe. <Ref. to 4AT-66, INSTALLATION, ATF Cooler Pipe and Hose.>
12) Install the oil charge pipe with O-ring. <Ref. to 4AT-69, INSTALLATION, Oil Charge Pipe.>

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

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



14) Install the torque converter clutch assembly. <Ref. to 4AT-70, INSTALLATION, Torque Converter Clutch Assembly.>
15) Install the transmission assembly to the vehicle. <Ref. to 4AT-38, INSTALLATION, Automatic Transmission Assembly.>

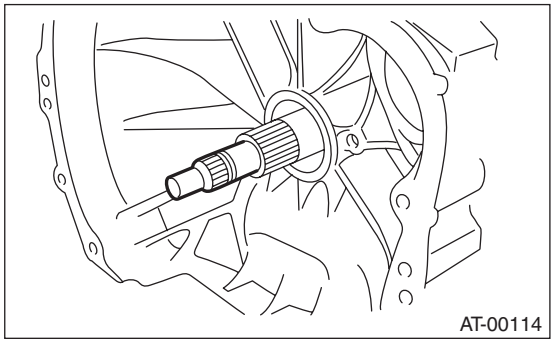
C: INSPECTION

Measure the backlash, and then adjust it to be within standard values. <Ref. to 4AT-96, ADJUSTMENT, Drive Pinion Shaft Assembly.>

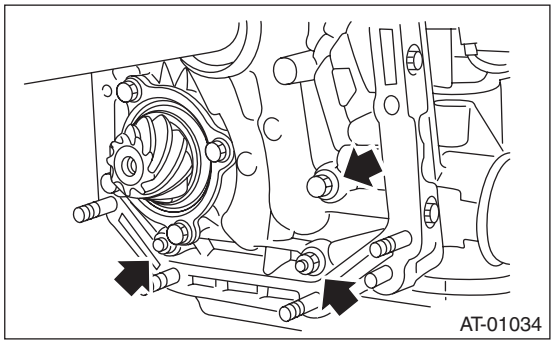
32.Oil Pump Housing

A: REMOVAL

1) Remove the transmission assembly from vehicle body. <Ref. to 4AT-35, REMOVAL, Automatic Transmission Assembly.>
2) Pull out the torque converter clutch assembly. <Ref. to 4AT-70, REMOVAL, Torque Converter Clutch Assembly.>
3) Remove the input shaft.

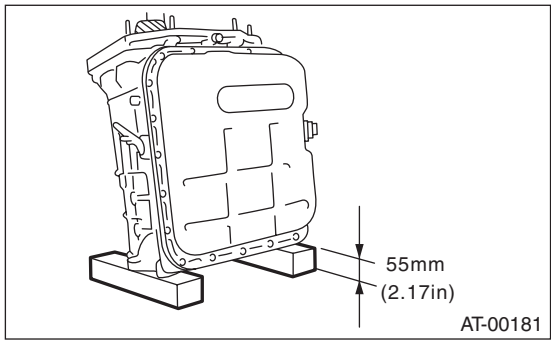


4) Lift up the lever on the rear side of transmission harness connector, and then remove it from the stay.
5) Remove the inhibitor switch connector from the stay.
6) Remove the oil charge pipe. <Ref. to 4AT-69, REMOVAL, Oil Charge Pipe.>
7) Remove the ATF inlet and outlet pipes. <Ref. to 4AT-65, REMOVAL, ATF Cooler Pipe and Hose.>
8) Separate the converter case and transmission case. <Ref. to 4AT-84, REMOVAL, Converter Case.>
9) Separate the transmission case and extension case section. <Ref. to 4AT-72, REMOVAL, Extension Case.>
10) Remove the reduction drive gear. <Ref. to 4AT-81, REMOVAL, Reduction Drive Gear.>
11) Remove the reduction driven gear. <Ref. to 4AT-79, REMOVAL, Reduction Driven Gear.>
12) Loosen the oil pump housing mounting bolts.

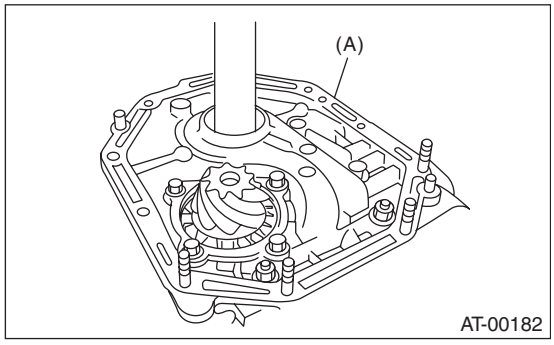


13) Place two wooden blocks on the workbench, and stand the transmission case with the rear end facing down.

NOTE:
- Be careful not to scratch the rear mating surface of the transmission case.
- Check the height of the wooden blocks to avoid damaging the parking rod and drive pinion that are protruding from the mating surface.



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

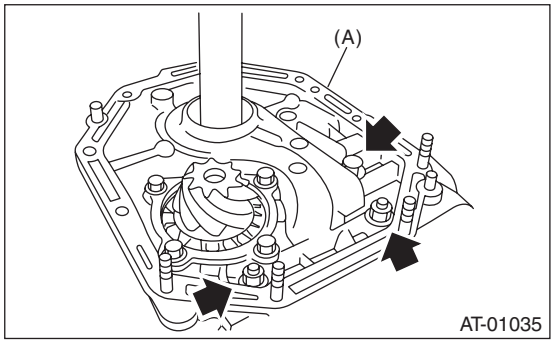


(A) Oil pump housing

B: INSTALLATION

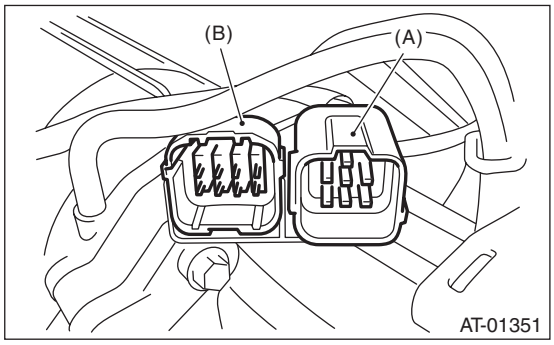
1) Secure the oil pump housing with two nuts and a bolt.

Tightening torque:
42 N·m (4.3 kgf-m, 31.0 ft-lb)



(A) Oil pump housing

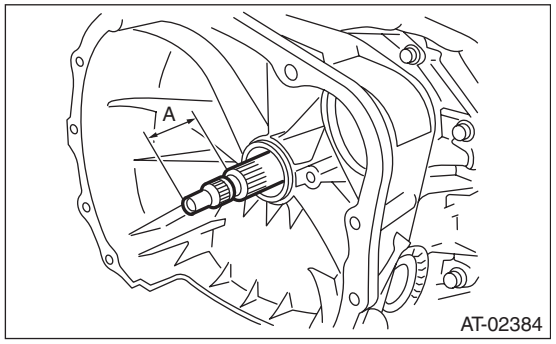
2) Install the converter case to the transmission case assembly. <Ref. to 4AT-85, INSTALLATION, Converter Case.>
3) Install the reduction driven gear. <Ref. to 4AT-79, INSTALLATION, Reduction Driven Gear.>
4) Install the reduction drive gear. <Ref. to 4AT-81, INSTALLATION, Reduction Drive Gear.>
5) Join the transmission case and the extension case, and then install the rear vehicle speed sensor. <Ref. to 4AT-72, INSTALLATION, Extension Case.>
6) Insert the inhibitor switch and transmission harness connector to the stay.



(A) Transmission harness connectors
(B) Inhibitor switch connector

7) Install the ATF cooler pipe. <Ref. to 4AT-66, INSTALLATION, ATF Cooler Pipe and Hose.>
8) Install the oil charge pipe together with an O-ring. <Ref. to 4AT-69, INSTALLATION, Oil Charge Pipe.>
9) Insert the input shaft while rotating it lightly by hand, and then check the amount of protrusion.

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

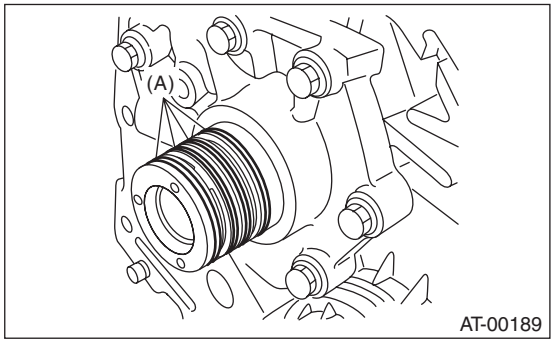


10) Install the torque converter clutch assembly. <Ref. to 4AT-70, INSTALLATION, Torque Converter Clutch Assembly.>
11) Install the transmission assembly to the vehicle. <Ref. to 4AT-38, INSTALLATION, Automatic Transmission Assembly.>

C: DISASSEMBLY

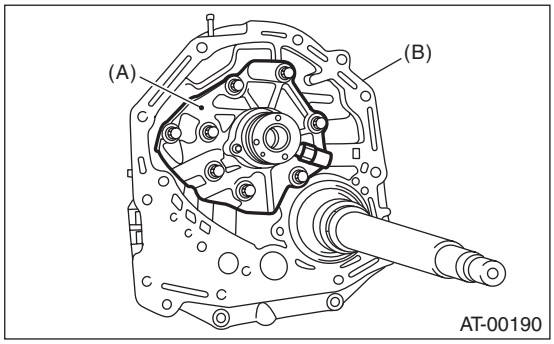
1. OIL PUMP COVER

1) Remove the four seal rings.



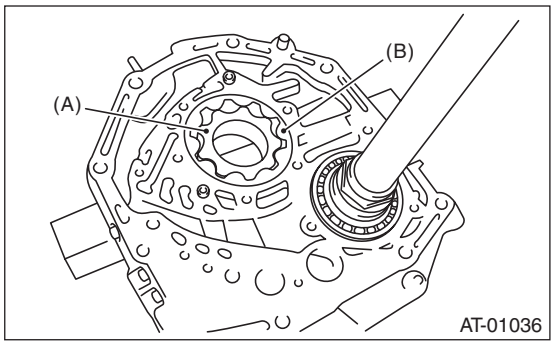
(A) Seal ring

2) Remove attachment bolts, then remove the oil pump cover by lightly tapping the end of the stator shaft.



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

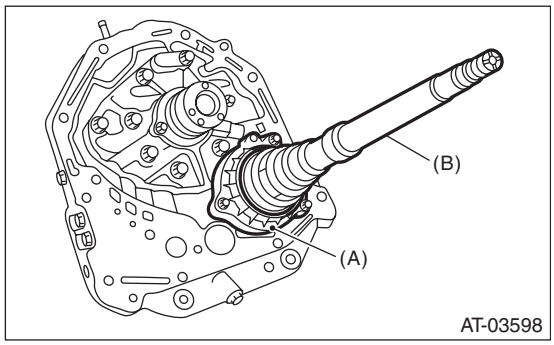
3) Remove the oil pump inner rotor and outer rotor.



(A) Inner rotor
(B) Outer rotor

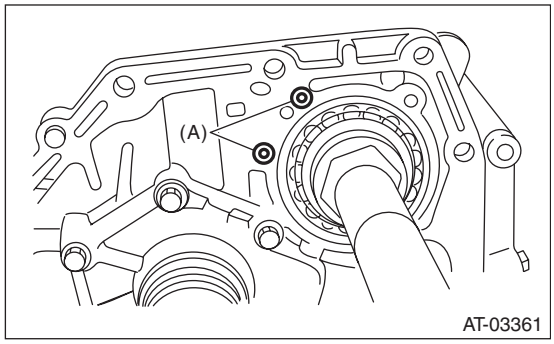
2. OIL SEAL RETAINER

1) Remove the oil seal retainer.



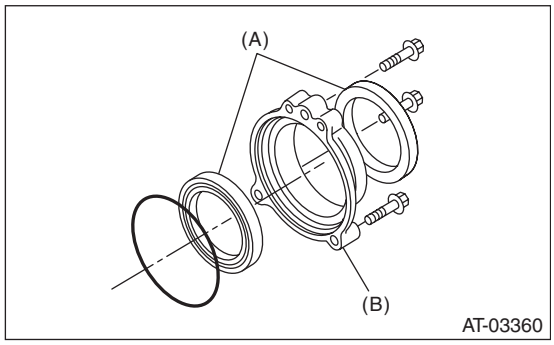
(A) Oil seal retainer
(B) Drive pinion shaft

2) Remove the O-ring.



(A) O-ring

3) Remove the oil seal from the oil seal retainer.

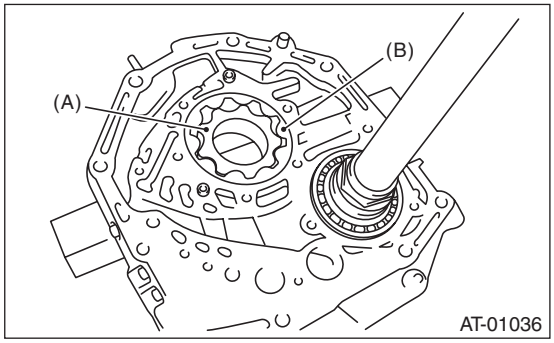


(A) Oil seal
(B) Oil seal retainer

D: ASSEMBLY

1. OIL PUMP COVER

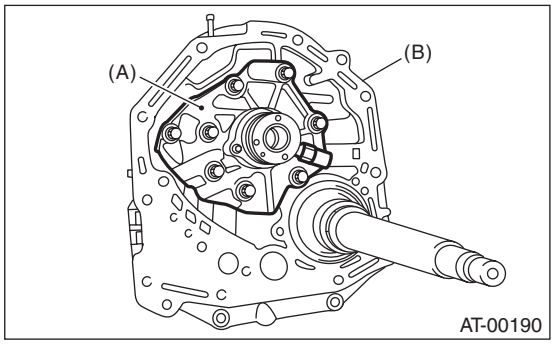
1) Install the oil pump rotor assembly to oil pump housing.



(A) Inner rotor
(B) Outer rotor

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

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

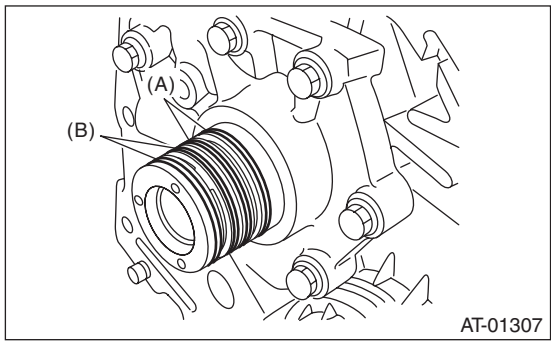


(A) Oil pump cover
(B) Oil pump housing

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

4) Apply vaseline to the oil seal retainer and new seal rings, and install them. After installing, adjust the tooth contact with the drive pinion backlash. <Ref. to 4AT-92, ADJUSTMENT, Oil Pump Housing.>

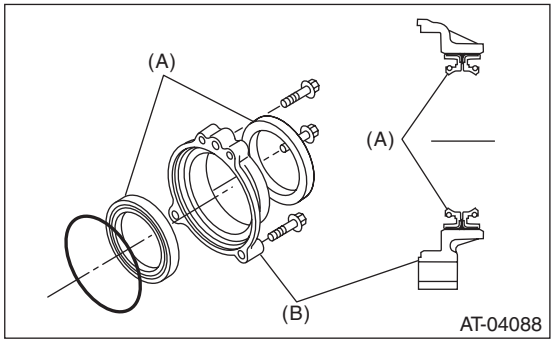
NOTE:
There are two types of seals. They are identified by color. Install at the proper positions by referring to the figure.



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

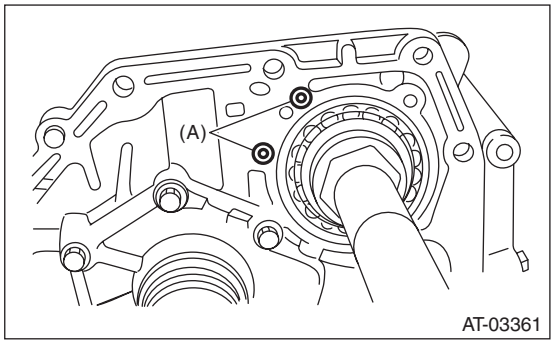
2. OIL SEAL RETAINER

1) Apply ATF to two new oil seals and install them to the oil seal retainer in the proper direction using the ST.
ST 499247300 INSTALLER



(A) Oil seal
(B) Oil seal retainer

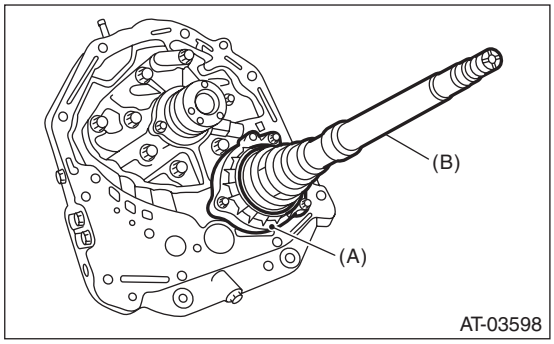
2) Apply ATF to a new O-ring and attach to the oil seal retainer. Install the seal to the oil pump housing bore.



(A) O-ring

3) Install the oil seal being careful not to damage oil seal lip, and secure it using three bolts.

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

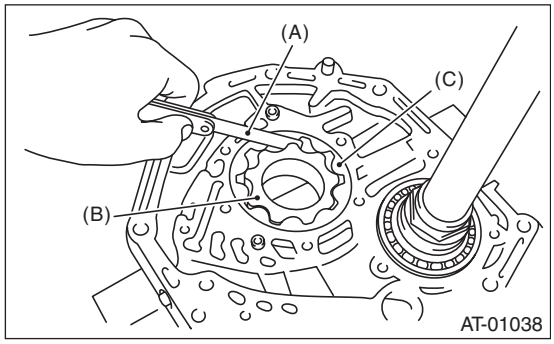


(A) Oil seal retainer
(B) Drive pinion shaft

E: INSPECTION

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

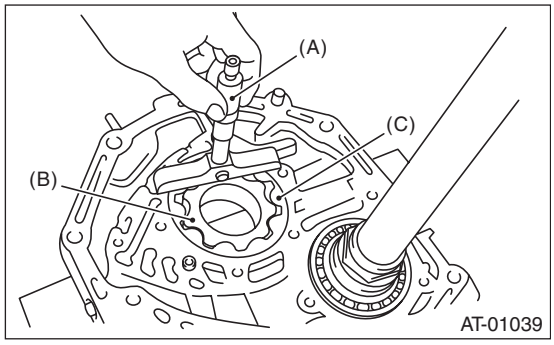
Tip clearance:
0.02 — 0.15 mm (0.0008 — 0.0059 in)



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

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

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



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

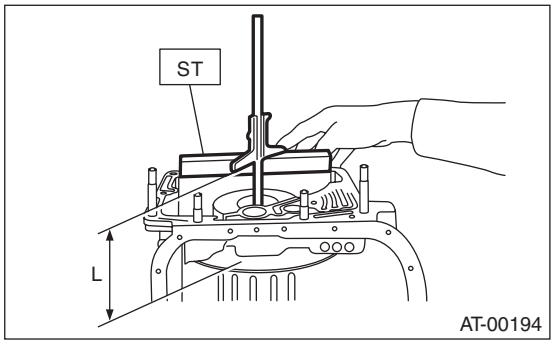
(3) If the depth and side clearance are out of specification, replace the oil pump rotor assembly.

Oil pump rotor assembly	
Part number	Thickness mm (in)
15008AA060	11.37 — 11.38 (0.4476 — 0.4480)
15008AA070	11.38 — 11.39 (0.4480 — 0.4484)
15008AA080	11.39 — 11.40 (0.4484 — 0.4488)

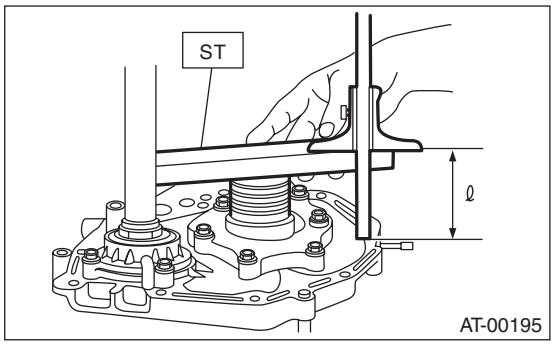
Measure the total end play and adjust it to be within specifications. <Ref. to 4AT-92, ADJUSTMENT, Oil Pump Housing.>

F: ADJUSTMENT

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

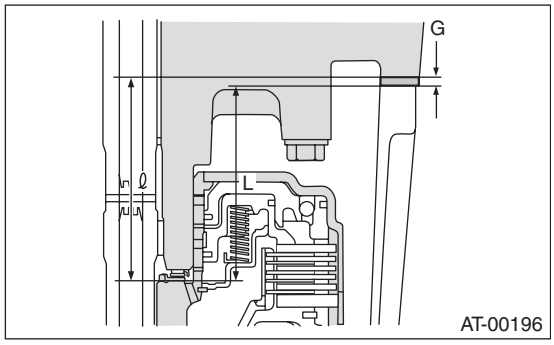


2) Using the ST, measure the length “ ℓ ” from the oil pump housing mating surface to the top surface of the oil pump cover with the thrust needle bearing.
ST 398643600 GAUGE



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

C	Clearance between concave section of high clutch and end of clutch drum support
L	Length from case mating surface to the concave portion of the high clutch
G	Gasket thickness [0.28 mm (0.0110 in)]
ℓ	Height from the oil pump housing mating surface to the upper surface of the oil pump cover with the thrust needle bearing.



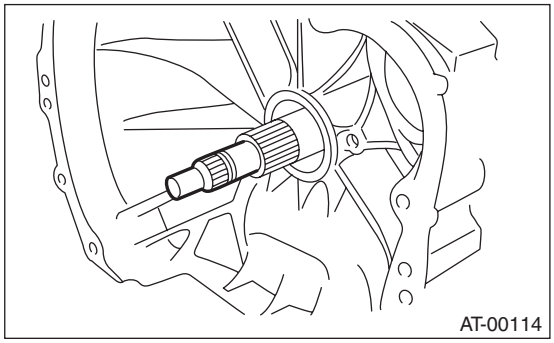
Thrust needle bearing	
Part number	Thickness mm (in)
806528050	4.1 (0.161)
806528060	4.3 (0.169)
806528070	4.5 (0.177)
806528080	4.7 (0.185)
806528090	4.9 (0.193)
806528100	5.1 (0.201)

4) After completing the end play adjustment, insert the bearing race into the high clutch race. Apply vaseline, and install the thrust needle bearing to the oil pump cover.
5) After correctly installing the new gasket to the case mating surface, carefully install the oil pump housing assembly. Be careful to avoid hitting the drive pinion against the inside of case.
6) Install both parts with dowel pins aligned. Make sure there is no clearance at the mating surface.

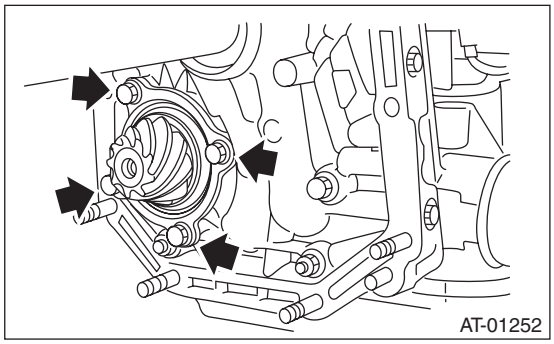
33.Drive Pinion Shaft Assembly

A: REMOVAL

1) Remove the transmission assembly from vehicle body. <Ref. to 4AT-35, REMOVAL, Automatic Transmission Assembly.>
2) Pull out the torque converter clutch assembly. <Ref. to 4AT-70, REMOVAL, Torque Converter Clutch Assembly.>
3) Remove the input shaft.


AT-00114

4) Lift up the lever on the rear side of transmission harness connector, and then disconnect it from the stay.
5) Disconnect the inhibitor switch connector from the stay.
6) Disconnect the air breather hose. <Ref. to 4AT-68, REMOVAL, Air Breather Hose.>
7) Remove the oil charge pipe. <Ref. to 4AT-69, REMOVAL, Oil Charge Pipe.>
8) Remove the ATF inlet and outlet pipes. <Ref. to 4AT-65, REMOVAL, ATF Cooler Pipe and Hose.>
9) Separate the converter case and transmission case. <Ref. to 4AT-84, REMOVAL, Converter Case.>
10) Separate the transmission case and extension case section. <Ref. to 4AT-72, REMOVAL, Extension Case.>
11) Remove the reduction drive gear. <Ref. to 4AT-81, REMOVAL, Reduction Drive Gear.>
12) Remove the reduction driven gear. <Ref. to 4AT-79, REMOVAL, Reduction Driven Gear.>
13) Remove the drive pinion shaft mounting bolt and remove the drive shaft assembly from oil pump housing.

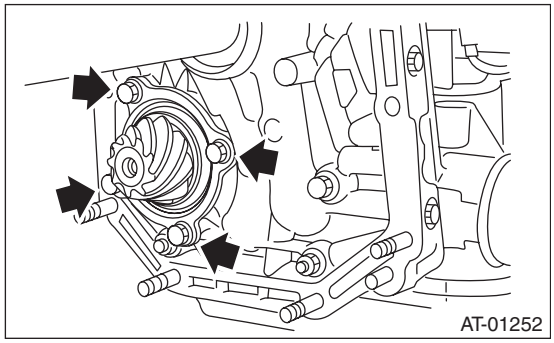

AT-01252

B: INSTALLATION

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

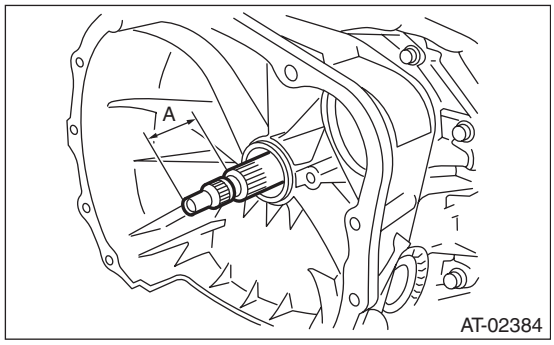
NOTE:
- Be careful not to bend the shim.
- Be careful not to press-fit the pinion into housing bore.

Tightening torque:
40 N·m (4.0 kgf-m, 29.5 ft-lb)


AT-01252

2) Join the converter case with the transmission case. <Ref. to 4AT-85, INSTALLATION, Converter Case.>
3) Install the reduction driven gear. <Ref. to 4AT-79, INSTALLATION, Reduction Driven Gear.>
4) Install the reduction drive gear. <Ref. to 4AT-81, INSTALLATION, Reduction Drive Gear.>
5) Join the transmission case and the extension case, and then install the rear vehicle speed sensor. <Ref. to 4AT-72, INSTALLATION, Extension Case.>
6) Insert the inhibitor switch and transmission harness connector to the stay.
7) Install the air breather hose. <Ref. to 4AT-68, INSTALLATION, Air Breather Hose.>
8) Install the ATF inlet and outlet pipes. <Ref. to 4AT-66, INSTALLATION, ATF Cooler Pipe and Hose.>
9) Install the oil charge pipe with O-ring.
10) Insert the input shaft while rotating it lightly by hand, and then check the amount of protrusion.

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



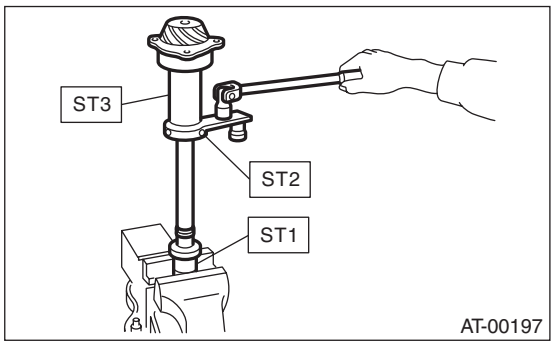
AT-02384

11) Install the torque converter clutch assembly. <Ref. to 4AT-70, INSTALLATION, Torque Converter Clutch Assembly.>

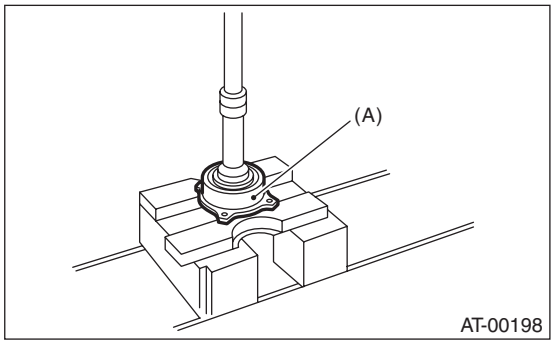
12) Install the transmission assembly to the vehicle. <Ref. to 4AT-38, INSTALLATION, Automatic Transmission Assembly.>

C: DISASSEMBLY

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

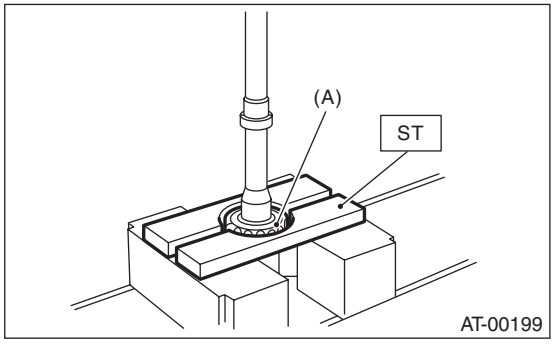


2) Remove the O-ring.
3) Separate the rear roller bearing and outer race from the drive pinion shaft using a press.



(A) Outer race

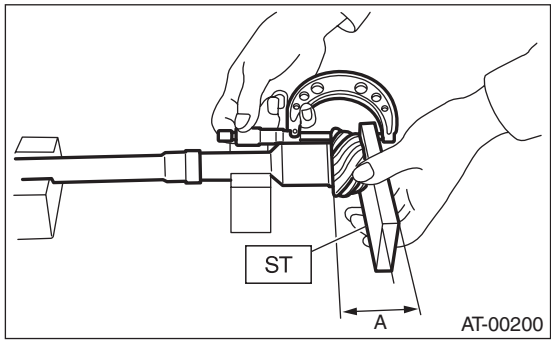
4) Separate the front roller bearing from the drive pinion shaft using a press and the ST.
ST 498517000 REPLACER



(A) Front roller bearing

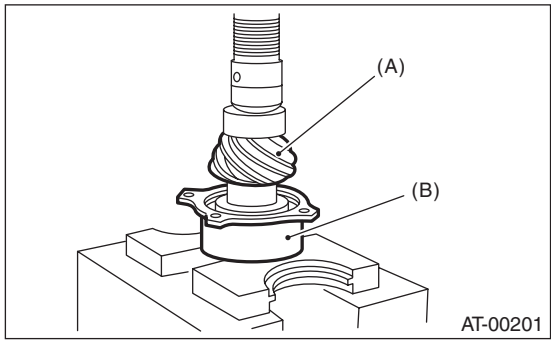
D: ASSEMBLY

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



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

CAUTION:
Damage may result if too much force is applied to the roller bearing.



(A) Drive pinion shaft
(B) Roller bearing

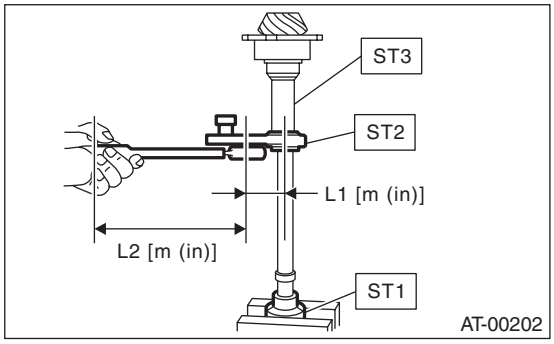
3) After applying ATF to a new O-ring and attaching it to the drive pinion shaft, attach the drive pinion collar to the drive pinion shaft.
4) Install the lock washer to drive pinion shaft in the proper direction.

5) Tighten a new lock nut using the ST.
Calculate the lock washer and lock nut specifications using following formula.
T2 = L2/(L1 + L2) × T1
T1: 116 N·m (11.8 kgf-m, 85.3 ft-lb)
[Required torque setting]
T2: Tightening torque
L1: ST2 length 0.072 m (2.83 in)
L2: Torque wrench length
Example:

Torque wrench length m (in)	Tightening torque N·m (kgf-m, ft-lb)
0.4 (15.75)	98 (10.0, 72.3)
0.45 (17.72)	100 (10.2, 73.8)
0.5 (19.69)	101 (10.3, 74.5)
0.55 (21.65)	102 (10.4, 75.2)

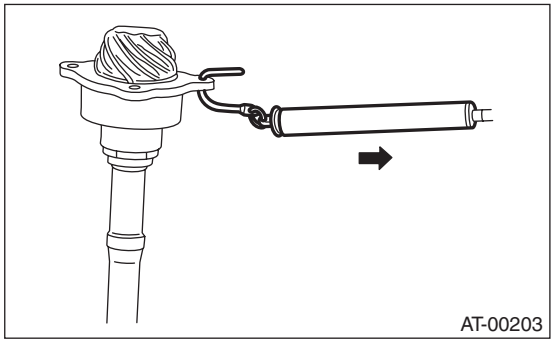
ST1 498937110 HOLDER
ST2 499787700 WRENCH
ST3 499787500 ADAPTER

NOTE:
Attach ST2 to torque wrench as straight as possible.



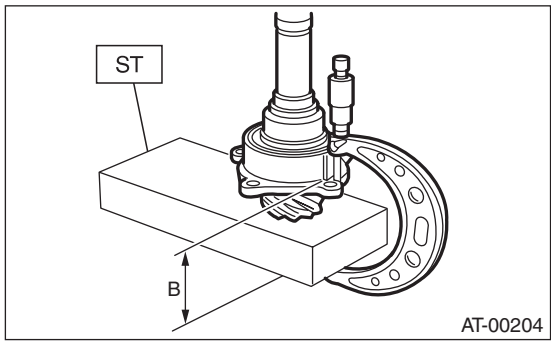
6) Measure the starting torque of the bearing. Make sure the starting torque is within the specified range. If the torque is not within specified range, replace the roller bearing.

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



7) Crimp the locknut in 2 locations.

8) Measure the dimension “B” of the drive pinion shaft.
ST 398643600 GAUGE



9) Calculate the thickness “t” (mm) of the drive pinion shim.
t = 6.5±0.0625 – (B – A)
10) Select three or less shims from following table.

Drive pinion shim	
Part number	Thickness mm (in)
31451AA050	0.150 (0.0059)
31451AA060	0.175 (0.0069)
31451AA070	0.200 (0.0079)
31451AA080	0.225 (0.0089)
31451AA090	0.250 (0.0098)
31451AA100	0.275 (0.0108)

E: INSPECTION

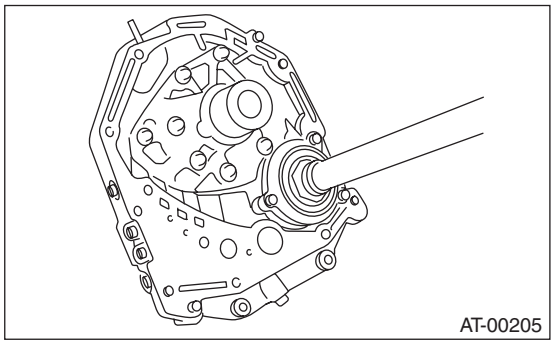
- Make sure that all component parts are free of scratches, holes and other faults.
- Adjust the tooth alignment. <Ref. to 4AT-96, ADJUSTMENT, Drive Pinion Shaft Assembly.>

F: ADJUSTMENT

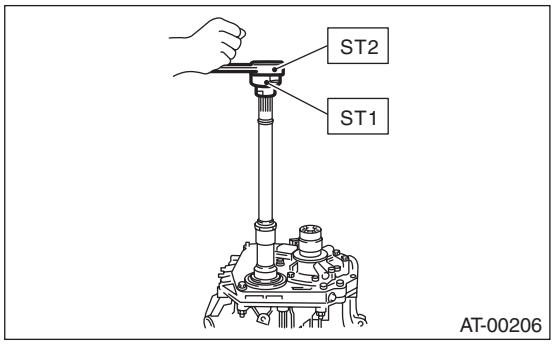
1) Remove the liquid gasket from the mating surface completely.
2) Install the oil pump housing assembly to the converter case, and secure them by tightening the four bolts evenly.

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

Tightening torque:
41 N·m (4.2 kgf-m, 30.2 ft-lb)


AT-00205

3) Rotate the drive pinion a few times using ST1 and ST2.
ST1 498937110 HOLDER
ST2 499787700 WRENCH

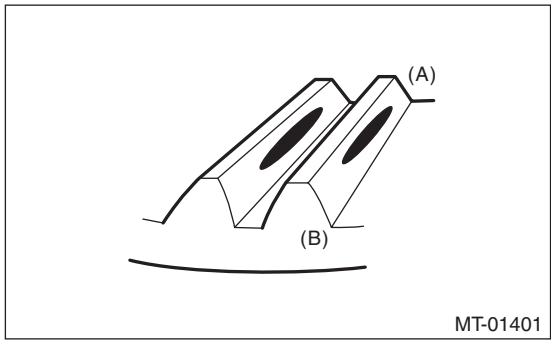


AT-00206

4) Adjust the drive pinion and hypoid driven gear backlash. <Ref. to 4AT-103, ADJUSTMENT, Front Differential Assembly.>

5) Apply lead-free red dye evenly on the surface of three to four teeth of the hypoid driven gear. Rotate the drive pinion back and forward several times. Remove the oil pump housing, and check the teeth contact pattern.
When the contact pattern is not correct, change shim thickness to adjust backlash. <Ref. to 4AT-103, ADJUSTMENT, Front Differential Assembly.>
- Correct tooth contact

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

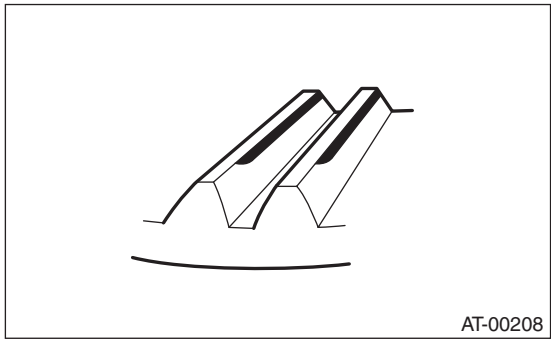


MT-01401

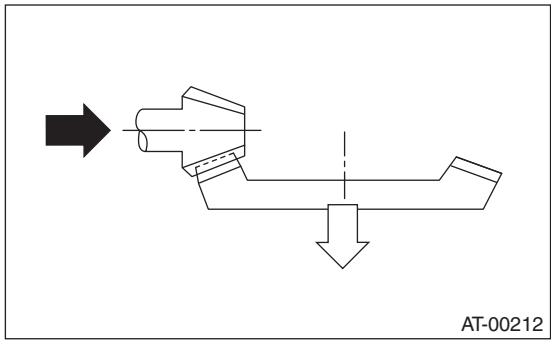
(A) Toe side
(B) Heel side

- Face contact

Check item: Backlash is too large.
Contact pattern


AT-00208

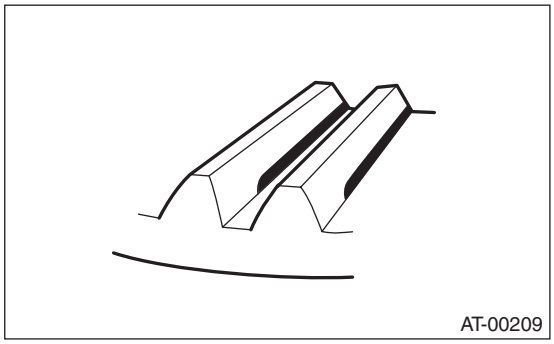
Corrective action: Increase thickness of drive pinion height adjusting washer in order to bring drive pinion shaft close to hypoid driven gear.


AT-00212

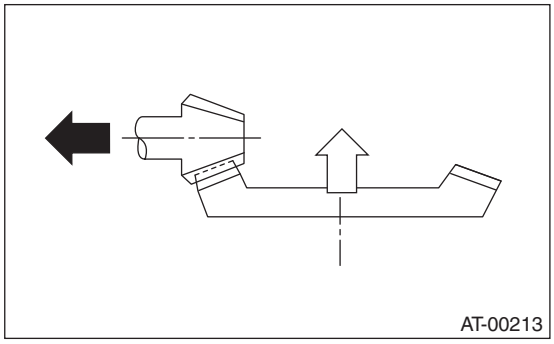
- Flank contact

Check item: Backlash is too small.

Contact pattern



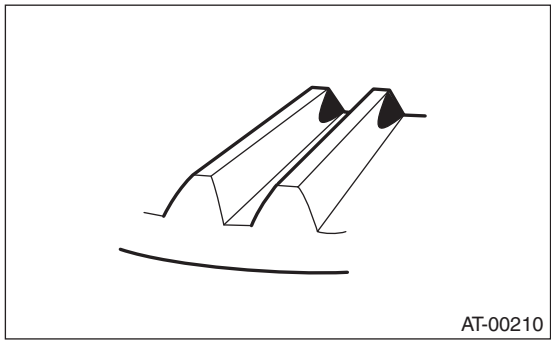
Corrective action: Reduce the thickness of the pinion height adjusting washer according to the procedures for moving the drive pinion shaft away from the hypoid driven gear.



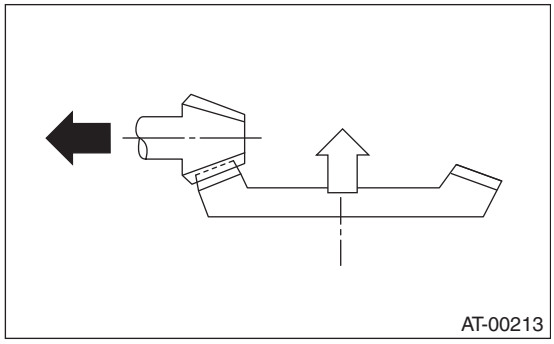
- Toe contact (inside contact)

Check item: Teeth contact area is too small.

Contact pattern



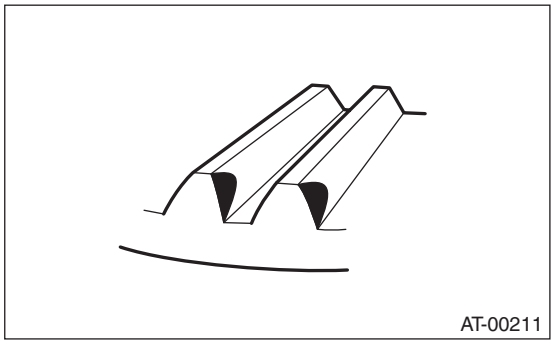
Corrective action: Reduce the thickness of the pinion height adjusting washer according to the procedures for moving the drive pinion shaft away from the hypoid driven gear.



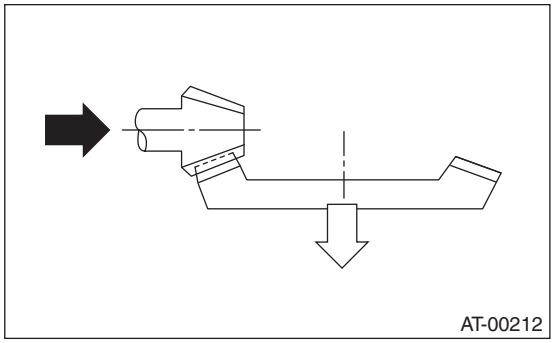
- Heel contact (outside end contact)

Check item: Teeth contact area is too small.

Contact pattern

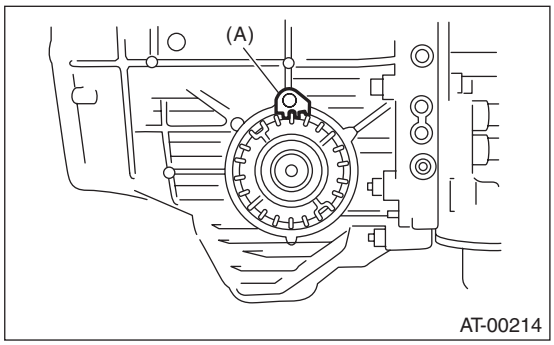


Corrective action: Increase the thickness of the pinion height adjusting washer according to the procedures for moving the drive pinion shaft closer to the hypoid driven gear.



6) If tooth contact is correct, mark the differential side retainer position and loosen. After fitting a new O-ring and oil seal, screw in the differential side retainer to the marked position. Tighten the lock plate with specified torque.

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

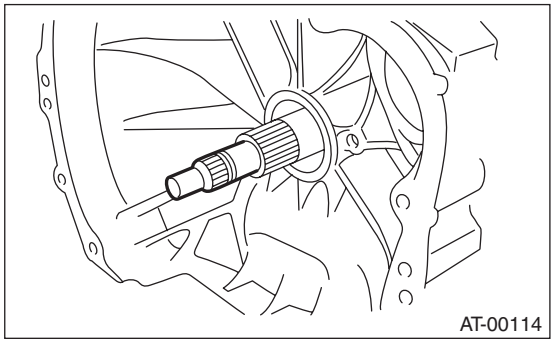


(A) Lock plate

34.Front Differential Assembly

A: REMOVAL

1) Remove the transmission assembly from vehicle body. <Ref. to 4AT-35, REMOVAL, Automatic Transmission Assembly.>
2) Pull out the torque converter clutch assembly. <Ref. to 4AT-70, REMOVAL, Torque Converter Clutch Assembly.>
3) Remove the input shaft.



4) Lift up the lever on the rear side of transmission harness connector, and then remove it from the stay.
5) Remove the inhibitor switch from the stay.
6) Remove the oil charge pipe. <Ref. to 4AT-69, REMOVAL, Oil Charge Pipe.>
7) Remove the ATF inlet and outlet pipes. <Ref. to 4AT-65, REMOVAL, ATF Cooler Pipe and Hose.>
8) Separate the converter case from the transmission case. <Ref. to 4AT-84, REMOVAL, Converter Case.>
9) Remove the seal pipe.
10) Remove the differential side retainers using ST.
ST 18630AA010 WRENCH COMPL RETAINER

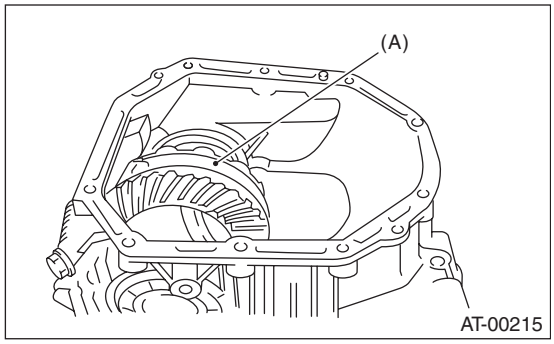
NOTE:
• ST WRENCH ASSEMBLY (499787000) can also be used.
• Hold the differential case assembly by hand to avoid damaging the retainer mounting hole of the converter case.

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

B: INSTALLATION

1) Install the front differential assembly to the converter case.

NOTE:
Be careful not to damage the inside of the converter case (especially the mating surface of the differential side retainer).



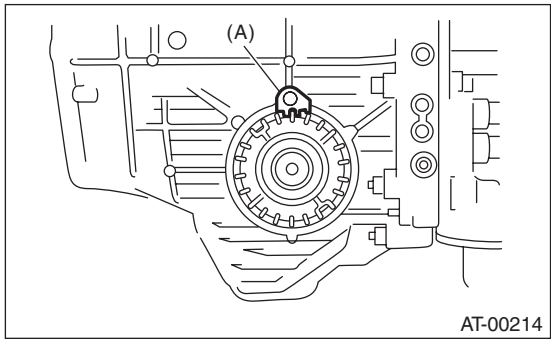
(A) Front differential ASSY

2) Install the O-ring to left and right side differential retainers.
3) Install the differential side retainers using ST. <Ref. to 4AT-103, ADJUSTMENT, Front Differential Assembly.>
ST 18630AA010 WRENCH COMPL RETAINER

NOTE:
ST WRENCH ASSEMBLY (499787000) can also be used.

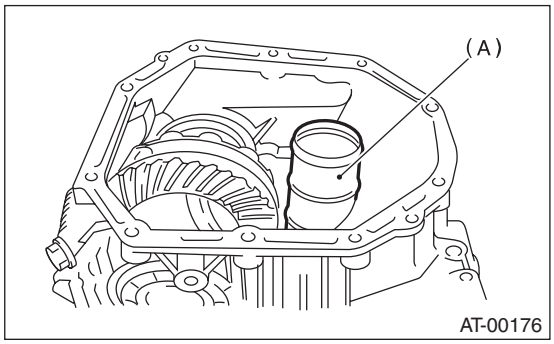
4) Adjust the backlash of the front differential. <Ref. to 4AT-103, ADJUSTMENT, Front Differential Assembly.>
5) Install the lock plate.

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



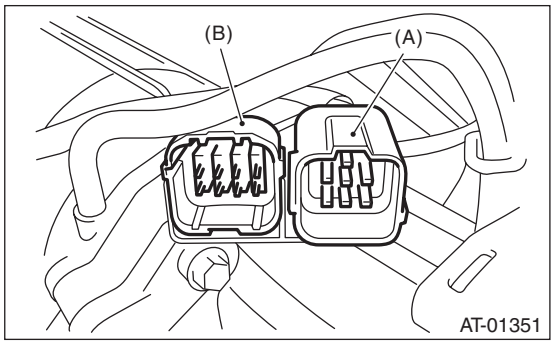
(A) Lock plate

6) Install new seal pipe to converter case.



(A) Seal pipe

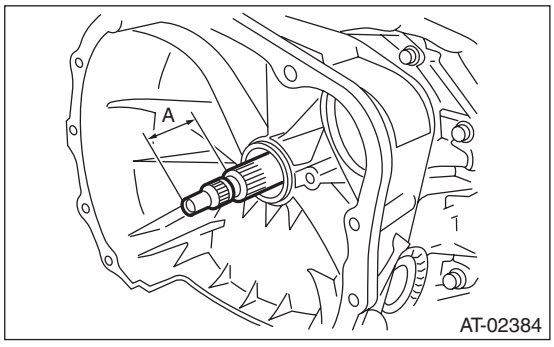
7) Install the converter case to the transmission case. <Ref. to 4AT-85, INSTALLATION, Converter Case.>
8) Insert the inhibitor switch and transmission harness connector to the stay.



(A) Transmission harness connectors
(B) Inhibitor switch connector

9) Install the ATF cooler pipe. <Ref. to 4AT-66, INSTALLATION, ATF Cooler Pipe and Hose.>
10) Install the oil charge pipe together with an O-ring. <Ref. to 4AT-69, INSTALLATION, Oil Charge Pipe.>
11) Insert the input shaft while rotating it lightly by hand, and then check the amount of protrusion.

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

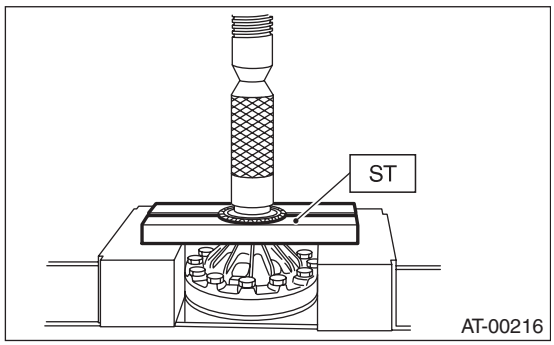


12) Install the torque converter clutch assembly. <Ref. to 4AT-70, INSTALLATION, Torque Converter Clutch Assembly.>
13) Install the transmission assembly to the vehicle. <Ref. to 4AT-38, INSTALLATION, Automatic Transmission Assembly.>

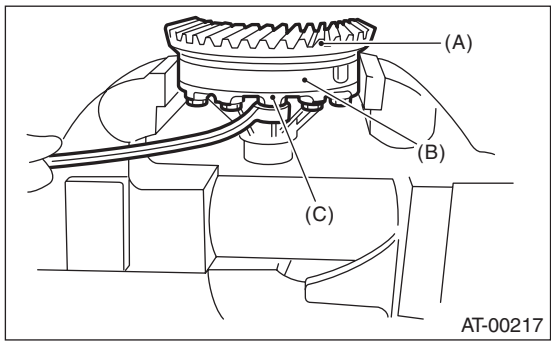
C: DISASSEMBLY

1. DIFFERENTIAL CASE ASSEMBLY

1) Remove the taper roller bearing using the ST and a press.
ST 498077000 REMOVER

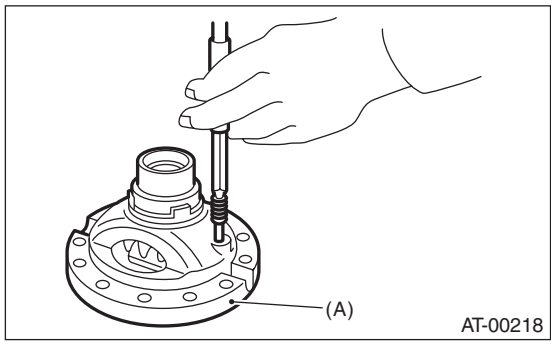


2) Secure the case in a vise, remove the hypoid driven gear tightening bolts, and then separate the hypoid driven gear into differential case (RH) and differential case (LH).



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

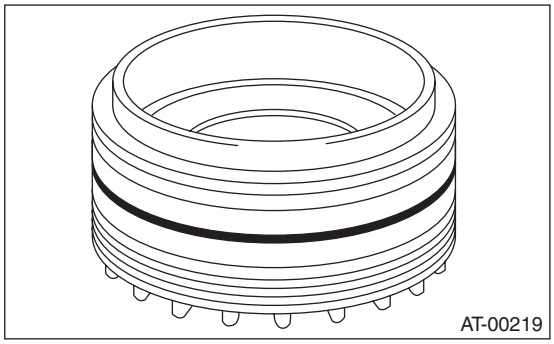
3) Pull out the straight pin and pinion shaft, then remove the differential bevel gear, washer and differential bevel pinion.



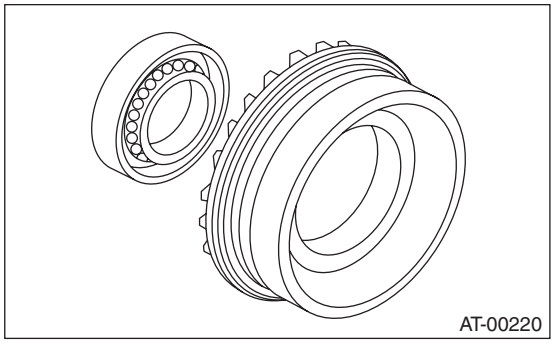
(A) Differential case (RH)

2. SIDE RETAINER

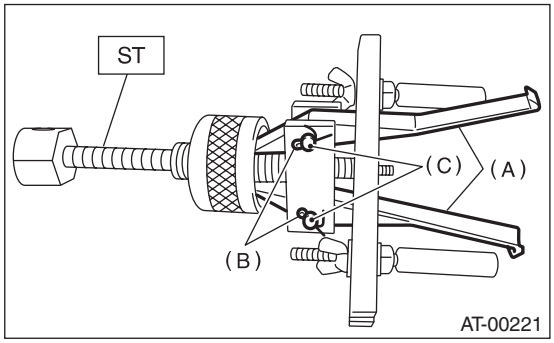
NOTE:
After adjusting the drive pinion backlash and tooth contact, remove and install the oil seal and O-ring.
1) Remove the O-ring.



2) Remove the oil seal.

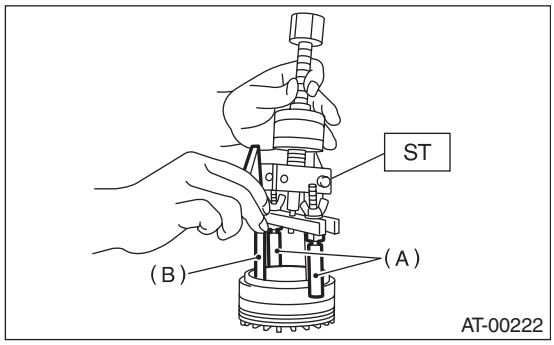


3) Remove the split pin, and then remove the claw.
ST 398527700 PULLER ASSY



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

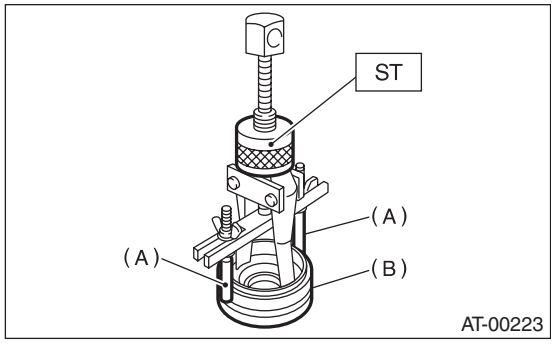
4) Attach the two claws to the outer race, and set the ST on the differential side retainer.
ST 398527700 PULLER ASSY



(A) Shaft
(B) Claw

5) Restore the removed claws to original position, and install the pin and split pin.
6) Hold the shaft of ST to avoid detachment from the differential side retainer, and remove the bearing outer race.
ST 398527700 PULLER ASSY

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

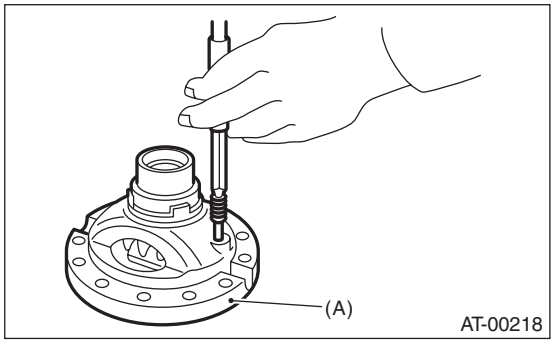


(A) Shaft
(B) Side retainer

D: ASSEMBLY

1. DIFFERENTIAL CASE ASSEMBLY

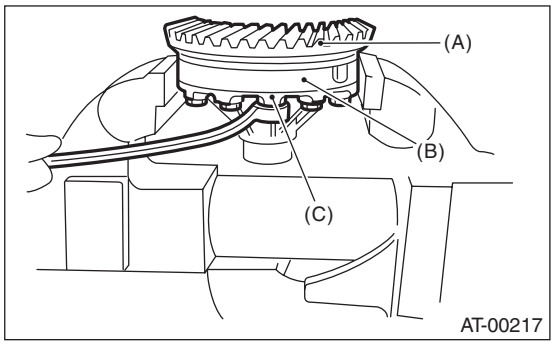
1) Install the washer, differential bevel gear and differential bevel pinion in the differential case (RH). Insert the pinion shaft.
2) Attach the straight pin in the reverse direction.



(A) Differential case (RH)

3) Install the washer and differential bevel gear to the differential case (LH). Put the differential case (RH) on the case, and assemble two cases.
4) Install the hypoid driven gear and secure by tightening the bolt.

Tightening torque:
62 N·m (6.3 kgf-m, 45.7 ft-lb)

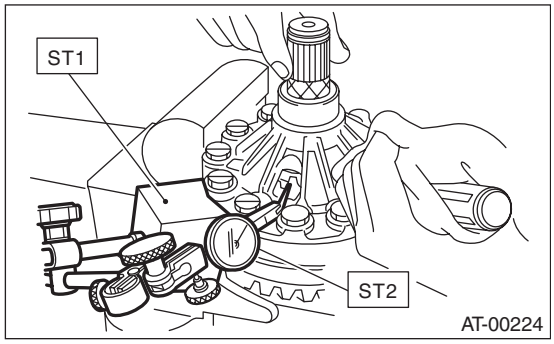


(A) Hypoid driven gear
(B) Differential case (RH)
(C) Differential case (LH)

5) Measurement of backlash (Selection of washer)
(1) Install the SUBARU genuine axle shaft to differential case.
Part No. 38415AA070 AXLE SHAFT
(2) Measure the gear backlash using ST1 and ST2, and then insert the ST2 though the access window of case.
ST1 498247001 MAGNET BASE
ST2 498247100 DIAL GAUGE

NOTE:
• Place the tooth of the differential bevel pinion against 2 teeth of the differential bevel gear, and measure the backlash.
• Fix the differential bevel pinion gear in place with a screwdriver covered with cloth or similar tool when measuring.

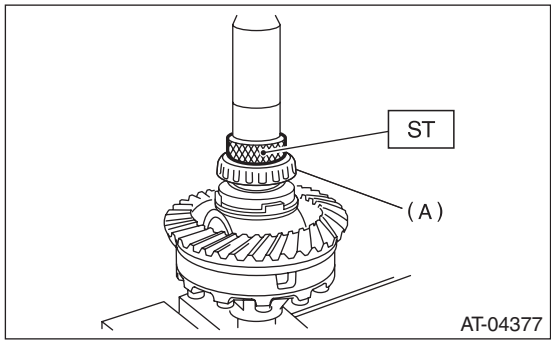
Standard:
0.13 — 0.18 mm (0.0051 — 0.0071 in)



(3) If the backlash is out of specification, select a washer from the table below.

Washer	
Part number	Thickness mm (in)
803038021	0.95 (0.037)
803038022	1.00 (0.039)
803038023	1.05 (0.041)

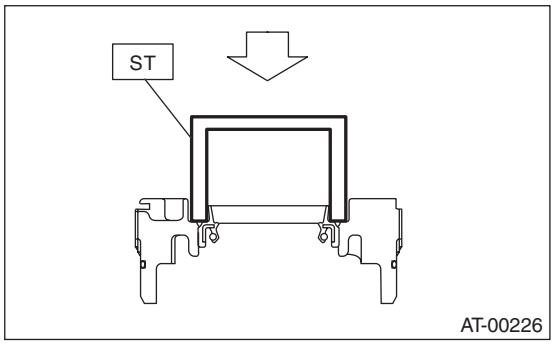
6) Using the ST, install the taper roller bearing.
ST 398487700 INSTALLER



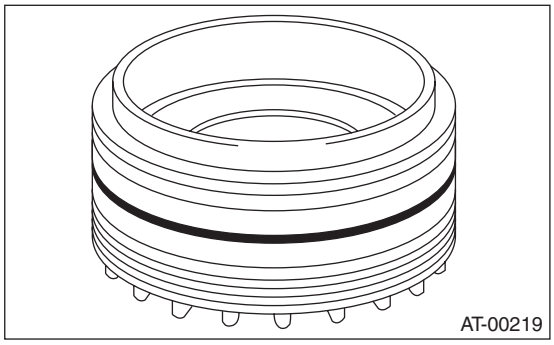
(A) Taper roller bearing

2. SIDE RETAINER

1) Install the bearing outer race to the differential side retainer.
2) Install a new oil seal using the ST and a hammer.
ST 18675AA000 DIFFERENTIAL SIDE OIL SEAL INSTALLER



3) Apply gear oil to a new O-ring and install.



E: INSPECTION

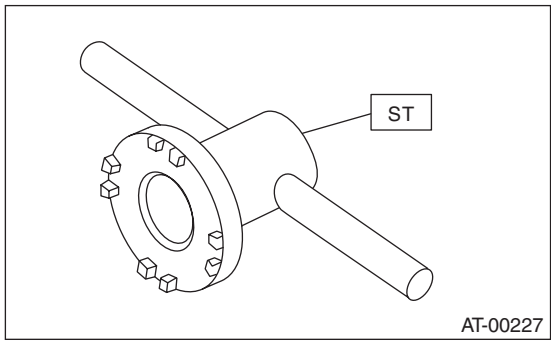
- Check each component for scratches, damage or other faults.
- Measure the backlash, and then adjust it to be within specification.

<Ref. to 4AT-103, ADJUSTMENT, Front Differential Assembly.>

F: ADJUSTMENT

1) Using the ST, screw-in the differential side retainer until resistance is felt.
ST 18630AA010 WRENCH COMPL RETAINER

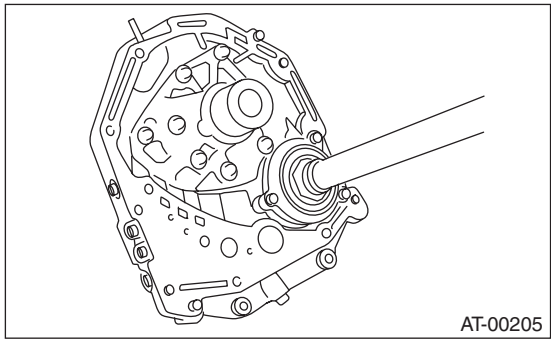
NOTE:
- Screw-in the RH side slightly deeper than the LH side.
- ST WRENCH ASSEMBLY (499787000) can also be used.



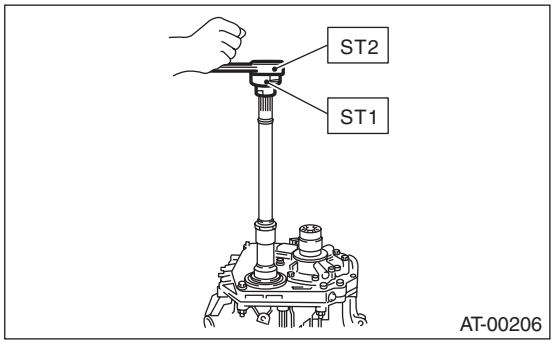
2) Remove the oil pump housing.
3) Remove the liquid gasket from the mating surface completely.
4) Install the oil pump housing assembly to the converter case, and secure them by tightening the four bolts evenly.

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

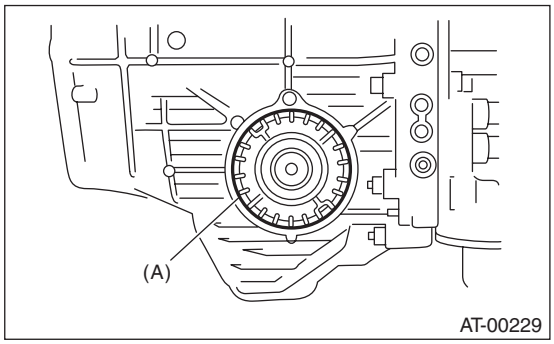
Tightening torque:
41 N·m (4.2 kgf-m, 30.2 ft-lb)



5) Rotate the drive pinion a few times using ST1 and ST2.
ST1 498937110 HOLDER
ST2 499787700 WRENCH

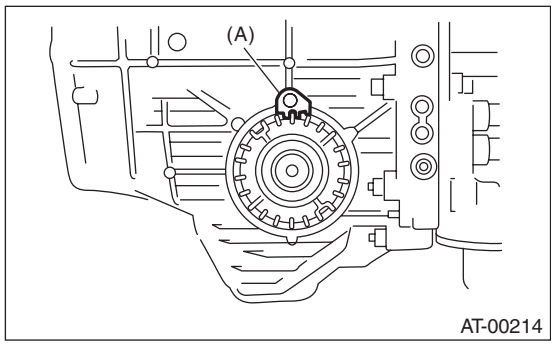


6) Tighten the LH differential side retainer by rotating the shaft until resistance is felt. Then loosen the RH side differential side retainer. Tighten the LH differential side retainer until the pinion shaft no longer turns, and continue to loosen the RH side. This is the “zero” state.



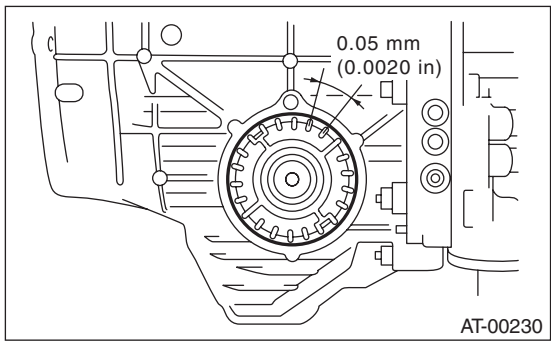
(A) Differential side retainer

7) After reaching the “zero” state, loosen the LH differential side retainer by 3 notches and secure it with the lock plate. Then after returning the RH differential side retainer, retighten until it stops. Rotate the drive pinion 2 or 3 times. Tighten the RH differential side retainer further by 1-3/4 notches. This sets the preload. Finally, secure the differential side retainer with the lock plate.



(A) Lock plate

NOTE:
Turning the differential side retainer by one notch changes the backlash approx. 0.05 mm (0.0020 in).

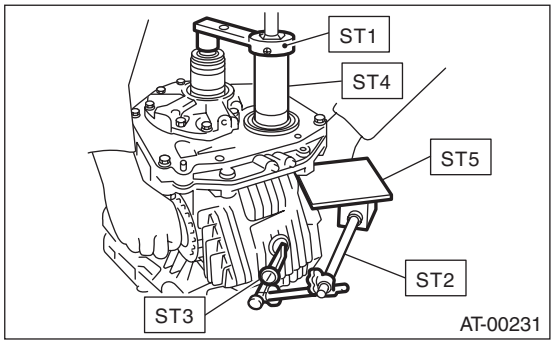


8) Install the Subaru genuine axle shafts to the right and left sides of the front differential.
Install the axle shaft to both sides of the front differential section.
Part No. 38415AA000 AXLE SHAFT

9) Turn the drive pinion several times using ST1, and check to see if the backlash is within the specification using ST2, ST3, ST4 and ST5.

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

Backlash:
0.13 — 0.18 mm (0.0051 — 0.0071 in)

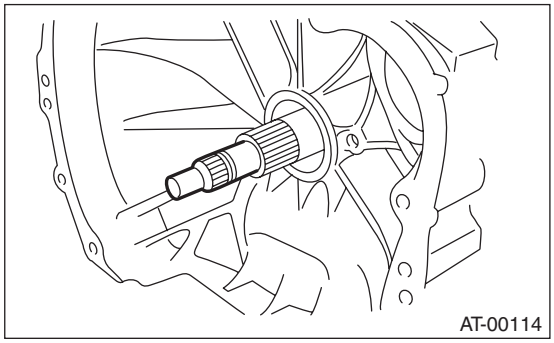


10) Adjust the teeth contact of the front differential and drive pinion shaft. <Ref. to 4AT-96, ADJUSTMENT, Drive Pinion Shaft Assembly.>

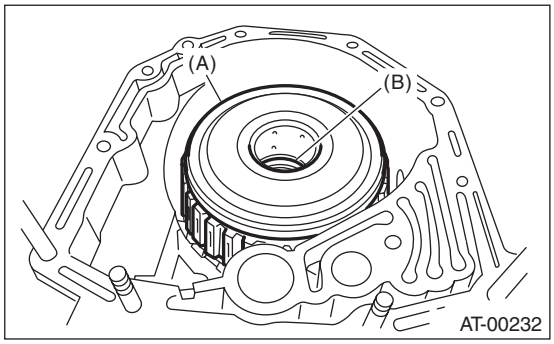
35.AT Main Case

A: REMOVAL

1) Remove the transmission assembly from vehicle body. <Ref. to 4AT-35, REMOVAL, Automatic Transmission Assembly.>
2) Pull out the torque converter clutch assembly. <Ref. to 4AT-70, REMOVAL, Torque Converter Clutch Assembly.>
3) Remove the input shaft.

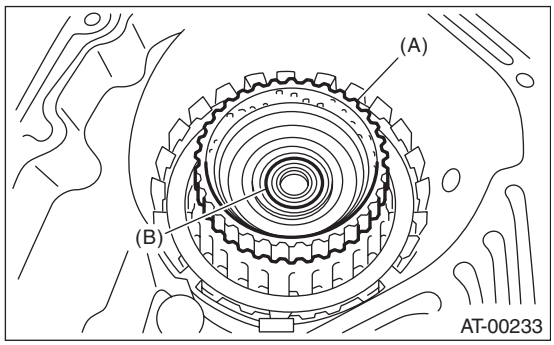


4) Lift up the lever on the rear side of transmission harness connector, and then disconnect it from the stay.
5) Disconnect the inhibitor switch connector from the stay.
6) Disconnect the air breather hose.
7) Remove the oil charge pipe. <Ref. to 4AT-69, REMOVAL, Oil Charge Pipe.>
8) Remove the ATF inlet and outlet pipes. <Ref. to 4AT-65, REMOVAL, ATF Cooler Pipe and Hose.>
9) Separate the converter case from the transmission case. <Ref. to 4AT-84, REMOVAL, Converter Case.>
10) Remove the oil pump housing.
<Ref. to 4AT-87, REMOVAL, Oil Pump Housing.>
11) Take out the high clutch, thrust needle bearing and reverse clutch assembly.



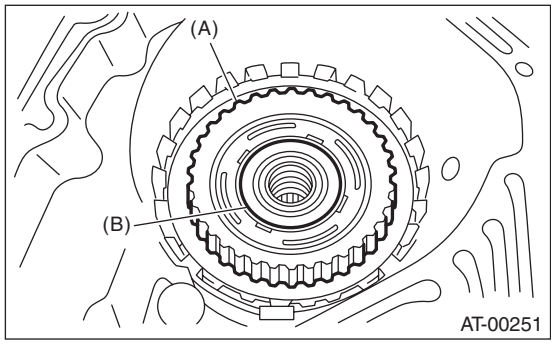
(A) High clutch and reverse clutch ASSY
(B) Thrust needle bearing

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



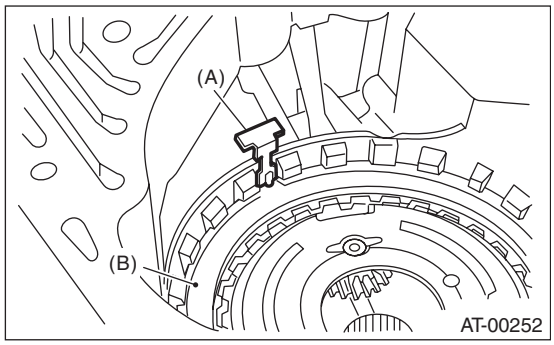
(A) High clutch hub
(B) Thrust needle bearing

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



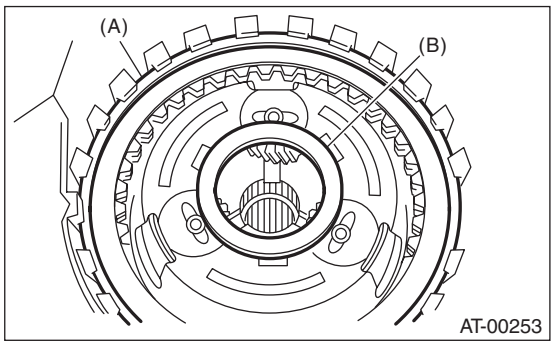
(A) Front sun gear
(B) Thrust needle bearing

14) Pull out while being careful not to break the leaf spring of the 2-4 brake.



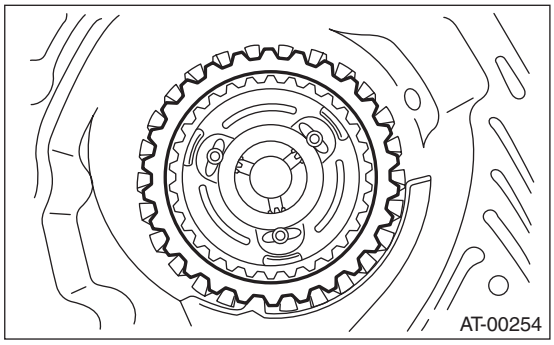
(A) Leaf spring
(B) Retaining plate

15) Remove the snap ring and thrust needle bearing.

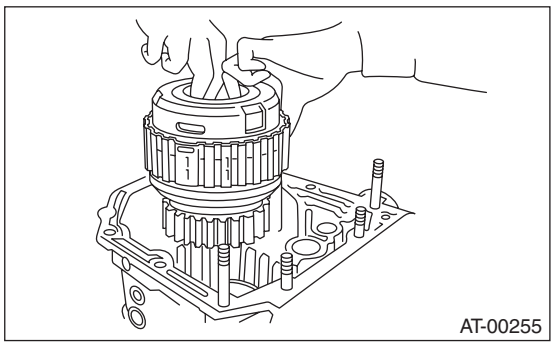


(A) Snap ring
(B) Thrust needle bearing

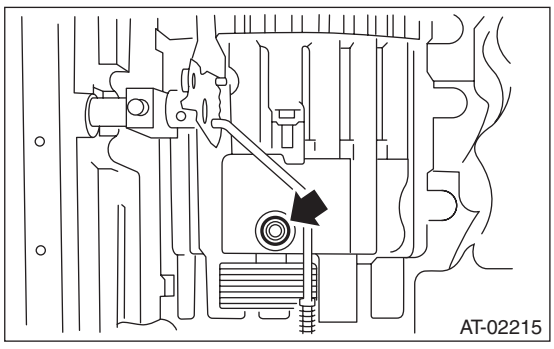
16) Take out the retaining plate, drive plate and driven plate of the 2-4 brake.



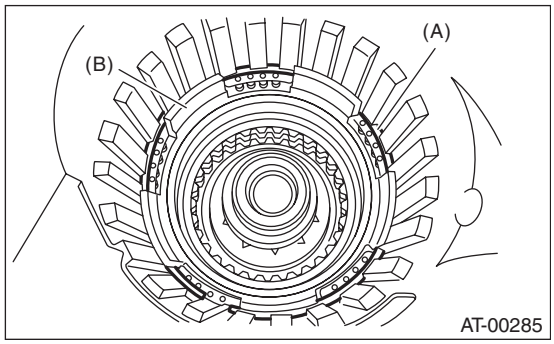
17) Take out the thrust needle bearing, planetary gear assembly and low clutch assembly.



18) Remove the 2-4 brake seal.

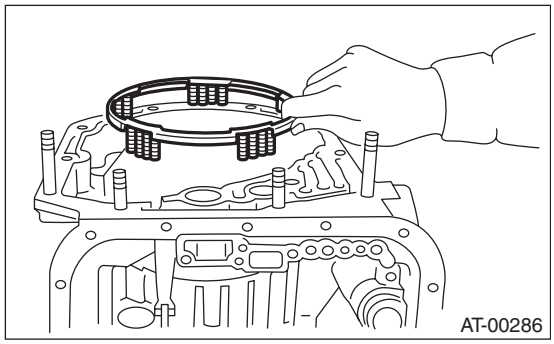


19) Remove the snap ring.

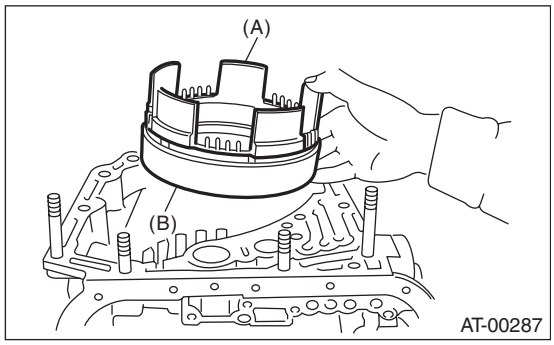


(A) Snap ring
(B) 2-4 brake piston

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

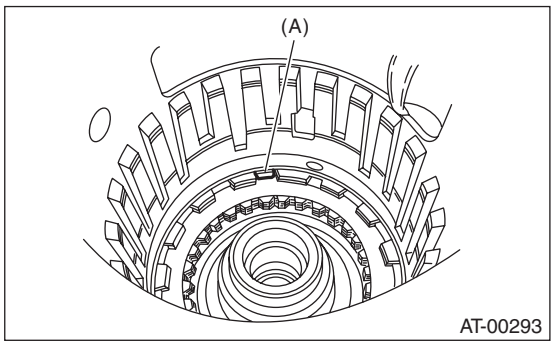


21) Remove the 2-4 brake piston and 2-4 brake piston retainer while taking care not to damage them.



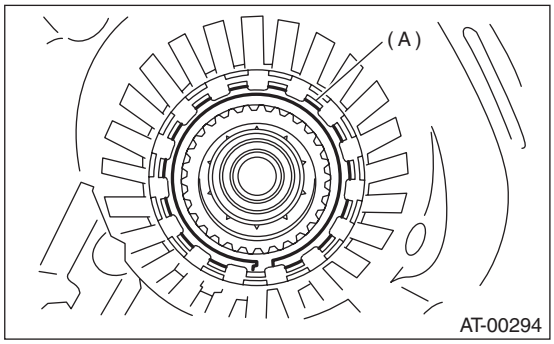
(A) 2-4 brake piston
(B) 2-4 brake piston retainer

22) Pull out the leaf spring of the low & reverse brake while being careful not to bend it.



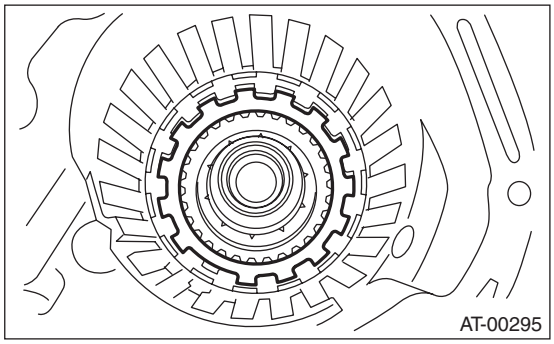
(A) Leaf spring

23) Remove the snap ring.

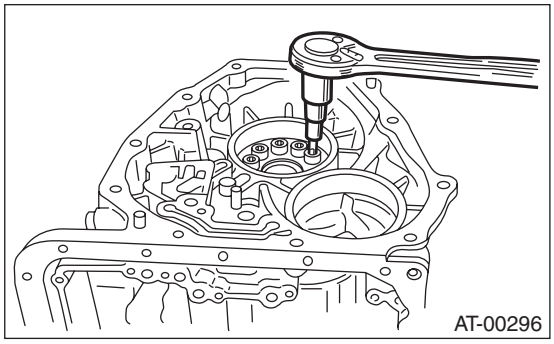


(A) Snap ring

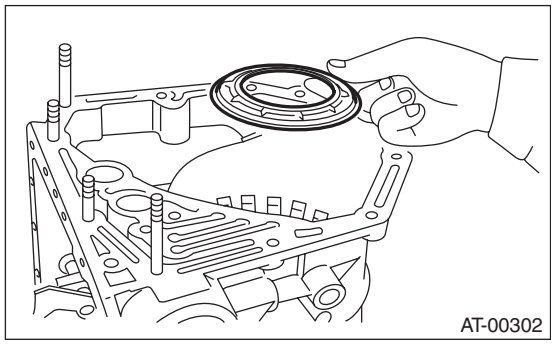
24) Take out the retaining plate, drive plate, driven plate and dish plate of the low & reverse brake.



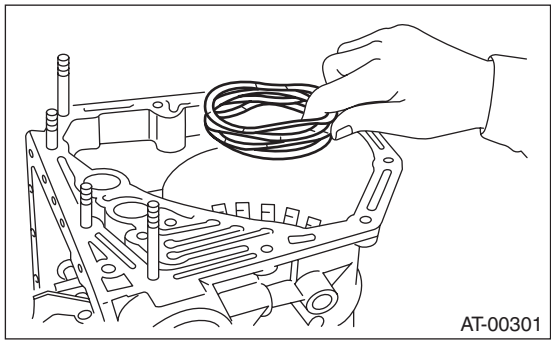
25) Turn the transmission case upside down, and then take out the socket bolts while holding the one-way clutch inner race by hand.



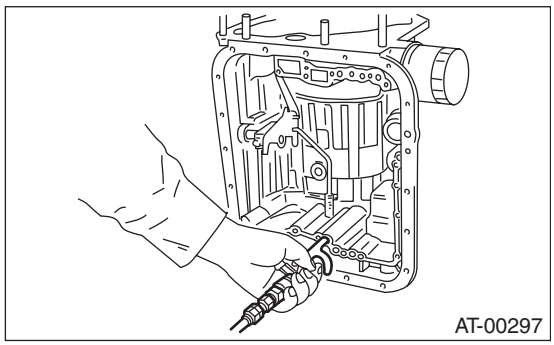
26) Remove the spring retainer.



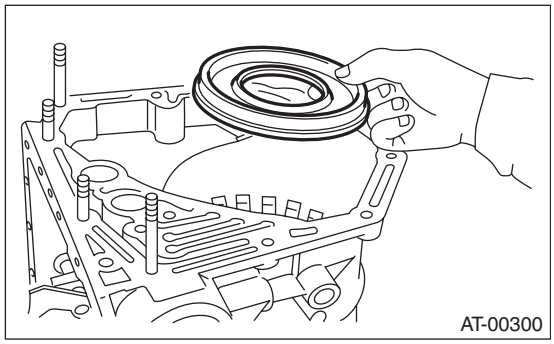
27) Take out the return spring.



28) Apply compressed air.



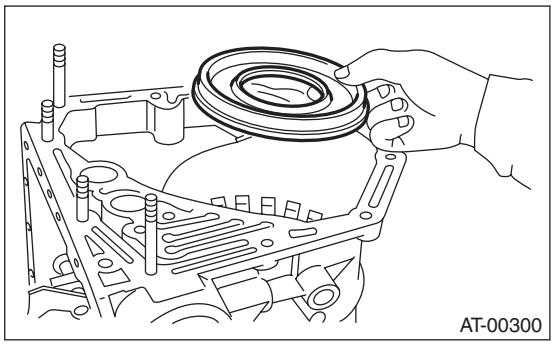
29) Take out the low & reverse brake piston.



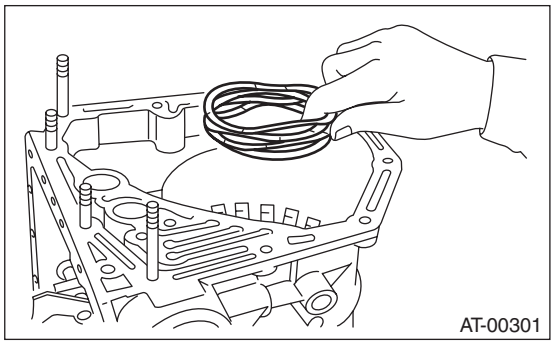
B: INSTALLATION

1) Apply ATF to the lips of the low & reverse brake piston, and install the piston.

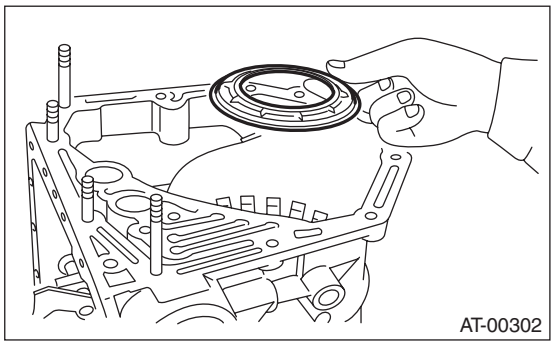
NOTE:
Take care not to damage the lip seal.


AT-00300

2) Install the return spring.

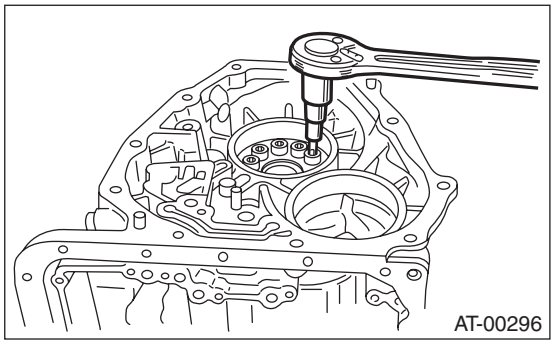

AT-00301

3) Install the spring retainer.


AT-00302

4) Install the one-way clutch inner race.
5) Tighten the socket head bolts evenly from the rear side of transmission case.

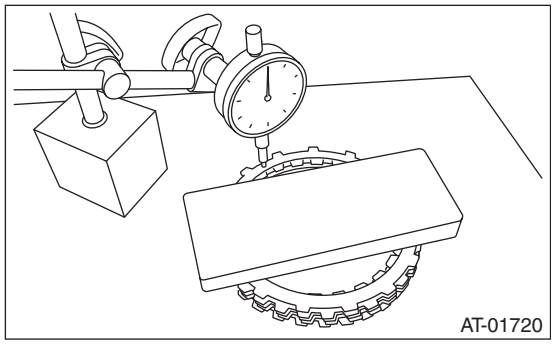
Tightening torque:
25 N·m (2.5 kgf-m, 18.4 ft-lb)


AT-00296

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

NOTE:
The value, which is read in the gauge at this time, is zero point.
10) Scale and record the weight “Z” of a flat board which will be put on retaining plate.

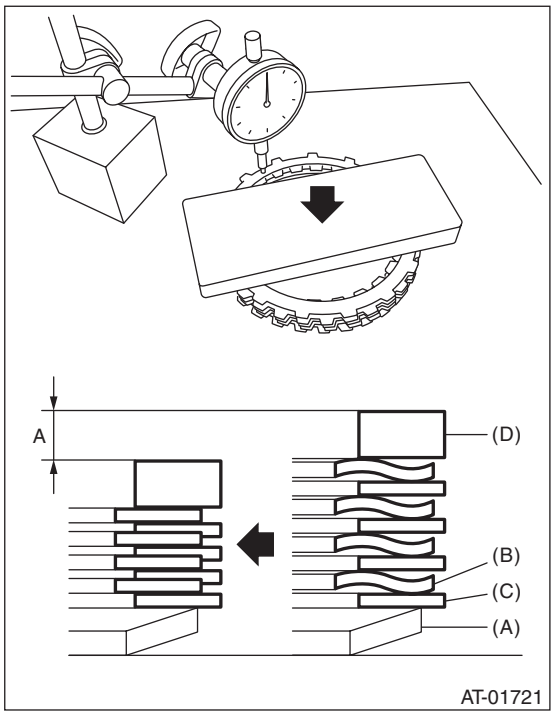
NOTE:
• Use a stiff board which does not bend against load as a flat board to be put on retaining plate.
• Use a flat board weighing less than 8.5 kgf (18.7 lb).
11) Put the flat board on retaining plate.


AT-01720

12) Using the following formula, read the push/pull gauge, and calculate “N”.
N = 83 N (8.5 kgf, 18.7 lb) – Z
N: Value indicated on push/pull gauge
83 N (8.5 kgf, 18.7 lb) : Load applied to clutch plate
Z: Flat board weight

13) Press the center of retaining plate by applying a force of N using push/pull gauge, and then measure and record the height “A”. Measure at three or more locations spaced by equal distances and take the average value.

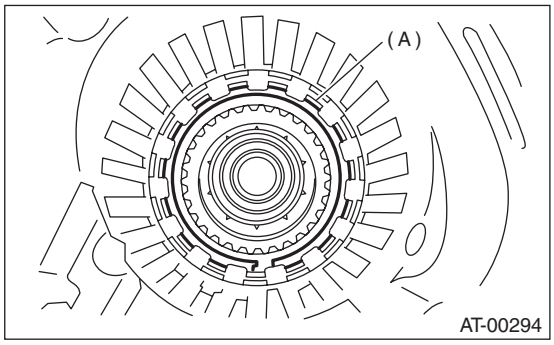
NOTE:
If measuring in three locations, measure every 120°.
If measuring in four locations, measure every 90°.



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

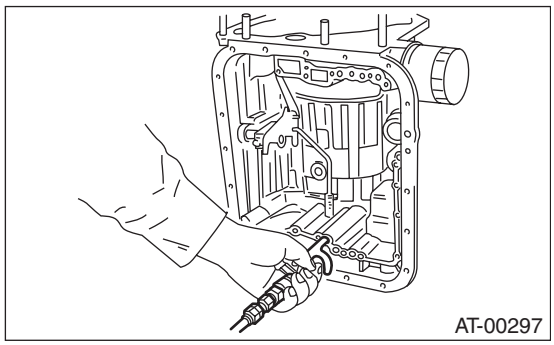
14) Installation of the low & reverse brake:
Install the dish plate, driven plate, drive plate and retaining plate, and then secure them with a snap ring.

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



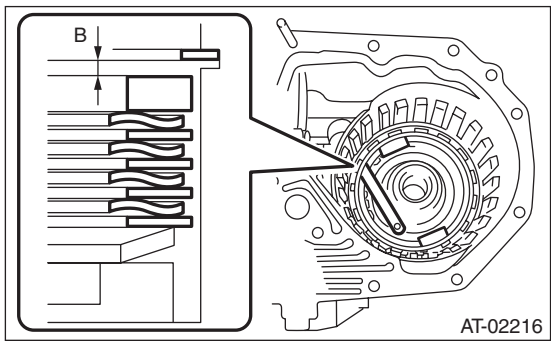
(A) Snap ring

15) Apply compressed air intermittently to check for operation.



16) Place same thickness shims on both sides to prevent plate from tilting, then measure and record the clearance “B”.

NOTE:
Do not push in the shim down with force to a point where the waves on the drive plate will be crushed.



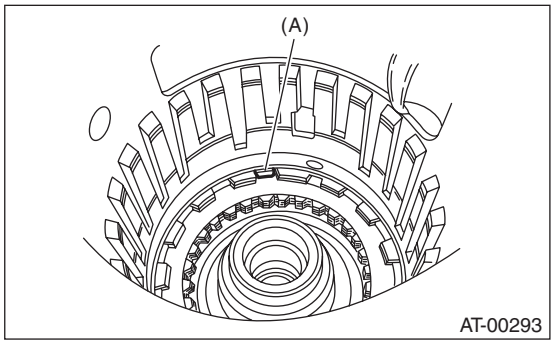
17) Piston stroke calculation
Calculate from the recorded dimension A and B, and if the service limit is exceeded, replace the drive plate with a new part, and select a retaining plate to make an adjustment so that it is within standard.
T = A + B
T: Piston stroke
A: Amount of drive plate compression
B: Clearance between retaining plate and snap ring

Non-turbo model
Initial standard:
2.15 — 2.65 mm (0.085 — 0.104 in)
Limit thickness:
2.95 mm (0.116 in)

Turbo model
Initial standard:
2.70 — 3.20 mm (0.106 — 0.126 in)
Limit thickness:
3.90 mm (0.154 in)

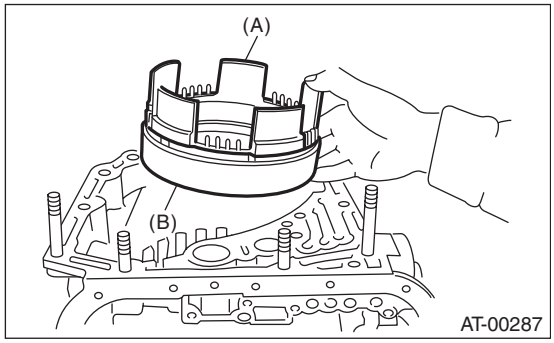
Retaining plate	
Part number	Thickness mm (in)
31667AA420	3.8 (0.150)
31667AA320	4.1 (0.161)
31667AA330	4.4 (0.173)
31667AA340	4.7 (0.185)
31667AA350	5.0 (0.197)
31667AA360	5.3 (0.209)
31667AA370	5.6 (0.220)
31667AA380	5.9 (0.232)

18) Install the leaf spring of the low & reverse brake.



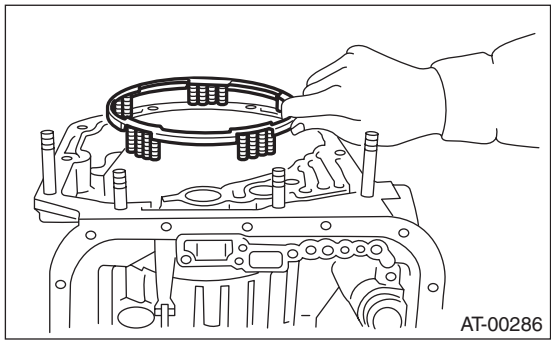
(A) Leaf spring

19) Install the 2-4 brake piston and 2-4 brake retainer by aligning the hole of the 2-4 brake retainer with the hole on the transmission case.

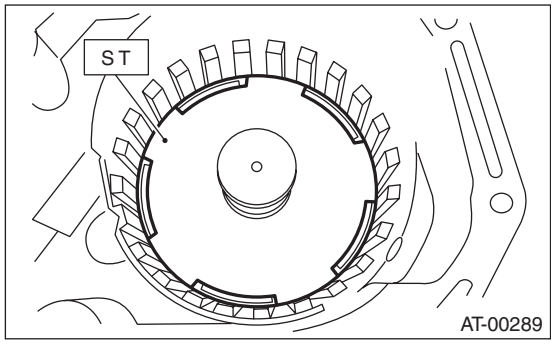


(A) 2-4 brake piston
(B) 2-4 brake piston retainer

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

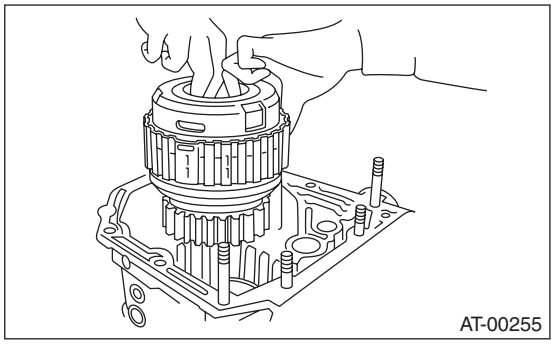


21) Position the snap ring in the transmission. Using ST, press the snap ring into the specified location.
ST 498677100 COMPRESSOR



22) Install the planetary gear and low clutch assembly to the transmission case.

NOTE:
Install carefully while rotating the low clutch and planetary gear assembly slowly, being careful not to damage the seal ring.



23) Measure and record a amount of drive plate compression. (Non-turbo model)

(1) Place the dish plate, driven plate, drive plate and retaining plate neatly in this order on surface table.

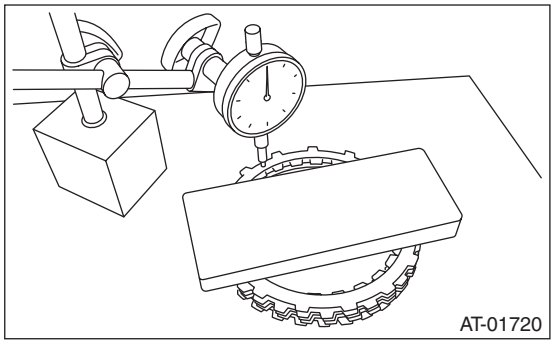
(2) Set the micro gauge to clutch, and read its scale.

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

(3) Scale and record the weight "Z" of a flat board which will be put on retaining plate.

NOTE:
• Use a stiff board which does not bend against load as a flat board to be put on retaining plate.
• Use a flat board weighing less than 10.2 kg (22.5 lb).

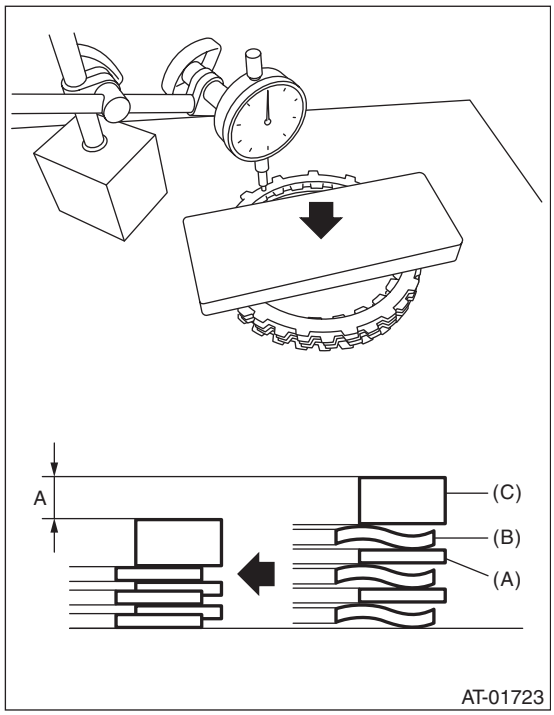
(4) Put the flat board on retaining plate.



(5) Using the following formula, read the push/pull gauge, and calculate "N".
N = 100 N (10.2 kgf, 22.5 lb) – Z
N: Value indicated on push/pull gauge
100 N (10.2 kgf, 22.5 lb) : Load applied to clutch plate
Z: Flat board weight

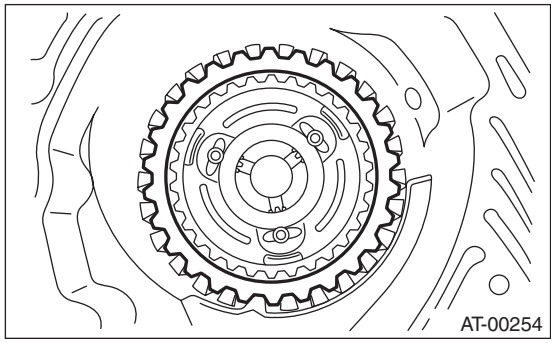
(6) Press the center of retaining plate by applying a force of N using push/pull gauge, and then measure and record the height "A". Measure at three or more locations spaced by equal distances and take the average value.

NOTE:
If measuring in three locations, measure every 120°.
If measuring in four locations, measure every 90°.

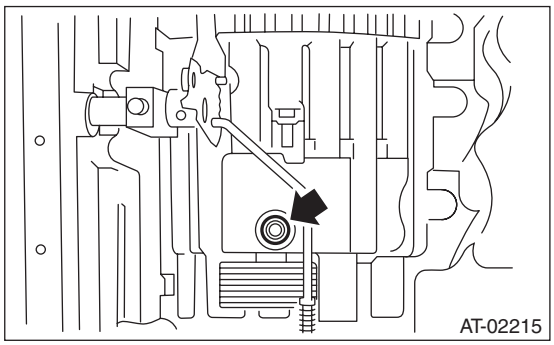


(A) Driven plate
(B) Drive plate
(C) Retaining plate

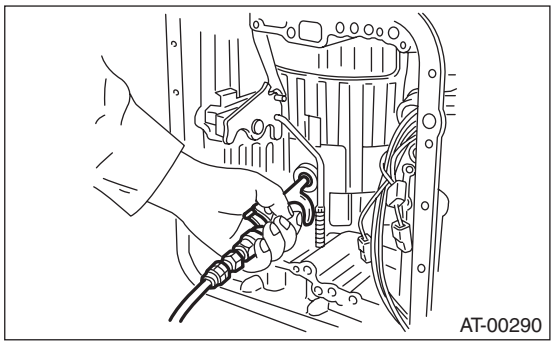
24) Install pressure rear plate, drive plate of 2-4 brake, driven plate, retaining plate, and snap ring.



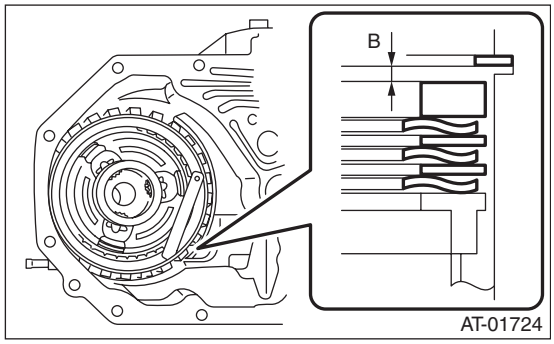
25) Install a new 2-4 brake seal to the transmission case.



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



27) Check the piston stroke. (Non-turbo model)
(1) Measure clearance “B” between the retaining plate and snap ring.
At this time, do not press down the retaining plate.



(2) Piston stroke calculation
Calculate with A and B dimensions recorded before. If the calculated value exceeds the service limits, replace the drive plate and select and adjust the retaining plate to be within standard values.
T = A + B
T: Piston stroke
A: Amount of drive plate compression
B: Clearance between retaining plate and snap ring

Initial standard:
1.7 — 2.1 mm (0.067 — 0.083 in)
Limit thickness:
2.3 mm (0.091 in)

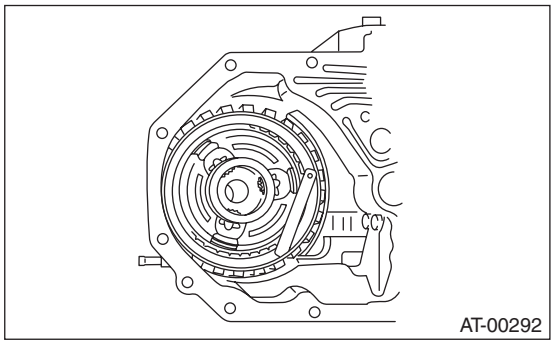
Retaining plate	
Part number	Thickness mm (in)
31567AA991	5.6 (0.220)
31567AB001	5.8 (0.228)
31567AB011	6.0 (0.236)
31567AB021	6.2 (0.244)
31567AB031	6.4 (0.252)
31567AB041	6.6 (0.260)

28) Check the clearance between the retaining plate and snap ring. (Turbo model)

NOTE:
If the clearance exceeds the service limits, replace the driven plate and select and adjust the retaining plate to make the clearance fall within initial standard values.

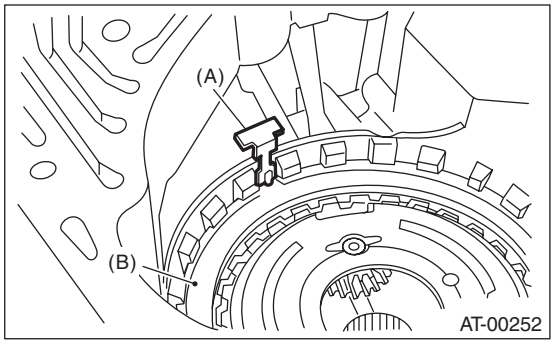
Initial standard:
0.8 — 1.2 mm (0.031 — 0.047 in)

Limit thickness:
1.5 mm (0.059 in)



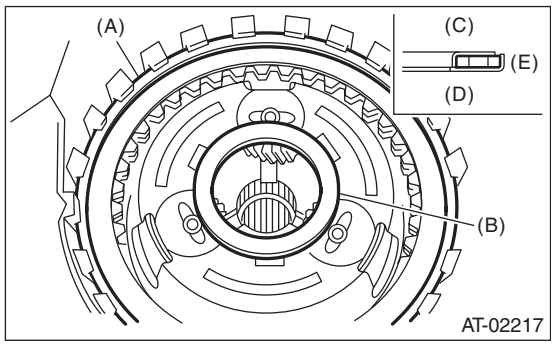
Retaining plate	
Part No.	Thickness mm (in)
31567AA991	5.6 (0.220)
31567AB001	5.8 (0.228)
31567AB011	6.0 (0.236)
31567AB021	6.2 (0.244)
31567AB031	6.4 (0.252)
31567AB041	6.6 (0.260)

29) Be careful not to mistake the location of the leaf spring to be installed.



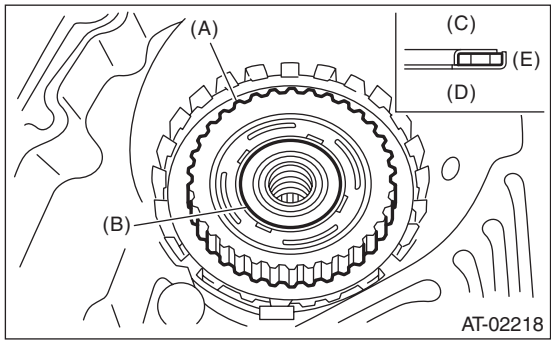
(A) Leaf spring
(B) Retaining plate

30) Install the thrust needle bearing in the correct direction.



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

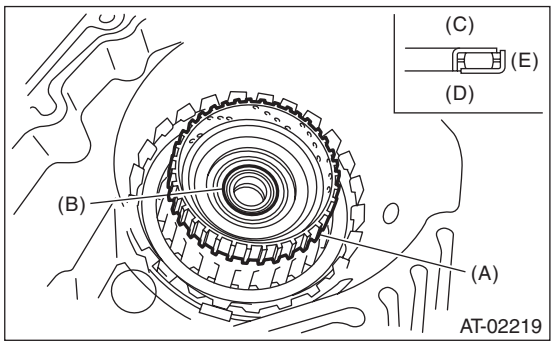
31) Install the front sun gear and the thrust needle bearing.



(A) Front sun gear
(B) Thrust needle bearing
(C) Upside
(D) Downside
(E) Outside

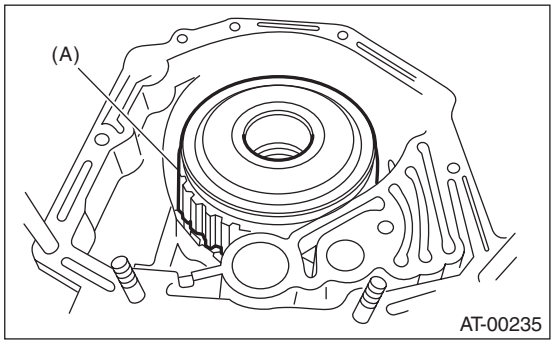
32) Apply vaseline, and attach the thrust needle bearing to the high clutch hub, then engage the splines of the front planetary carrier correctly to install the high clutch hub.

33) Install the thrust needle bearing in the correct direction.



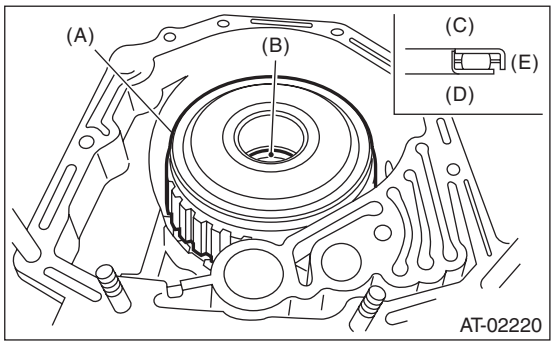
(A) High clutch hub
(B) Thrust needle bearing
(C) Upside
(D) Downside
(E) Outside

34) Install the high clutch assembly and reverse clutch assembly.



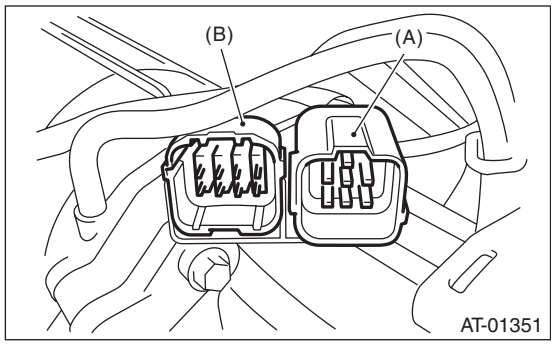
(A) High clutch ASSY and reverse clutch ASSY

35) Adjust the total end play. <Ref. to 4AT-92, ADJUSTMENT, Oil Pump Housing.>
36) Install the thrust needle bearing in the correct direction.



(A) High clutch ASSY and reverse clutch ASSY
(B) Thrust needle bearing
(C) Upside
(D) Downside
(E) Outside

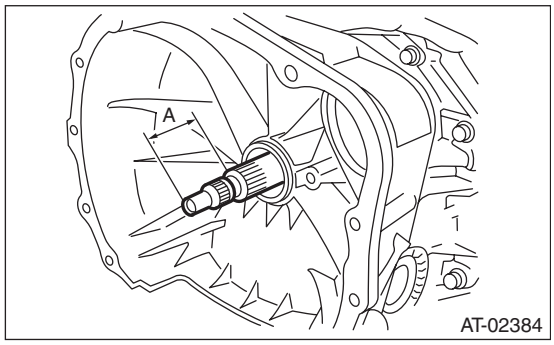
37) Install a new gasket along with the oil pump housing assembly. <Ref. to 4AT-88, INSTALLATION, Oil Pump Housing.>
38) Install the converter case to the transmission case assembly. <Ref. to 4AT-85, INSTALLATION, Converter Case.>
39) Insert the inhibitor switch and transmission harness connector to the stay.



(A) Transmission harness connectors
(B) Inhibitor switch connector

40) Install the air breather hose. <Ref. to 4AT-68, INSTALLATION, Air Breather Hose.>
41) Install the ATF cooler pipe. <Ref. to 4AT-66, INSTALLATION, ATF Cooler Pipe and Hose.>
42) Install the oil charge pipe together with an O-ring. <Ref. to 4AT-69, INSTALLATION, Oil Charge Pipe.>
43) Insert the input shaft while rotating it lightly by hand, and then check the amount of protrusion.

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

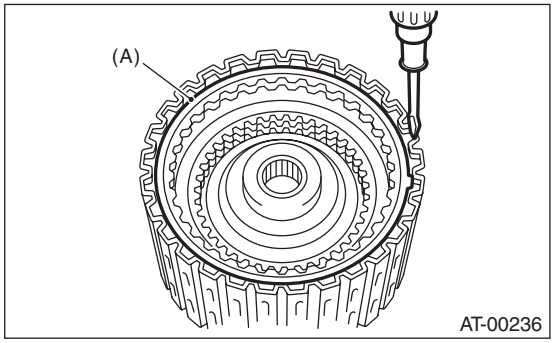


44) Install the torque converter clutch assembly. <Ref. to 4AT-70, INSTALLATION, Torque Converter Clutch Assembly.>
45) Install the transmission assembly to the vehicle. <Ref. to 4AT-38, INSTALLATION, Automatic Transmission Assembly.>

C: DISASSEMBLY

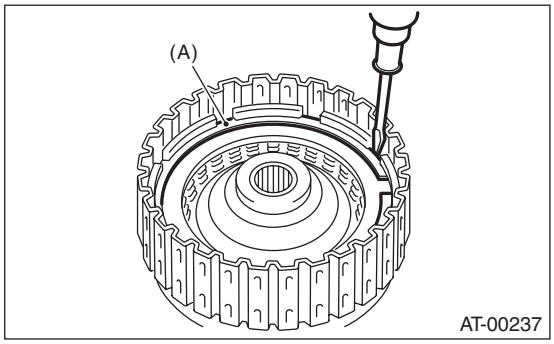
1. HIGH CLUTCH AND REVERSE CLUTCH

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



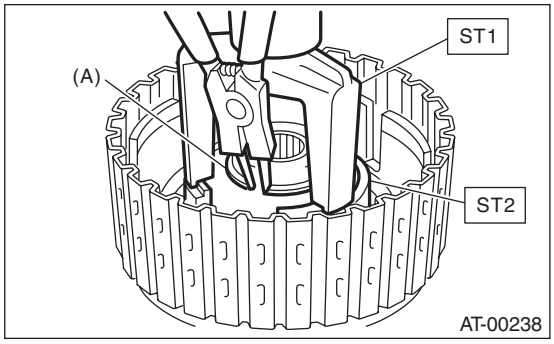
(A) Snap ring

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



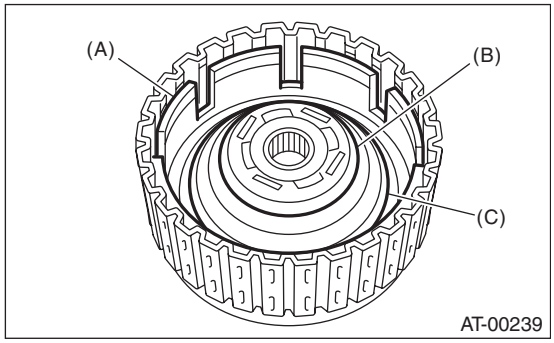
(A) Snap ring

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



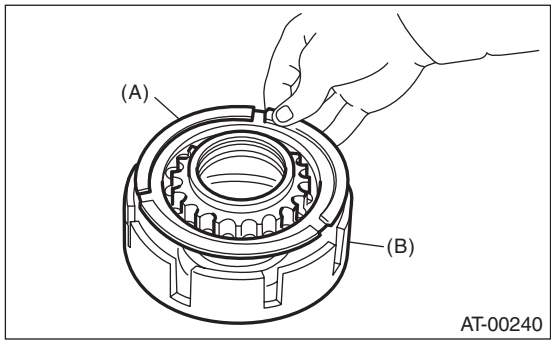
(A) Snap ring

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



(A) Reverse clutch piston
(B) Clutch cover
(C) Return spring

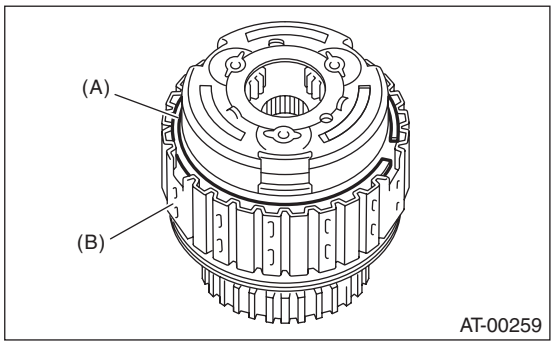
5) Remove the seal ring and lip seal from the high clutch piston and reverse clutch piston.



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

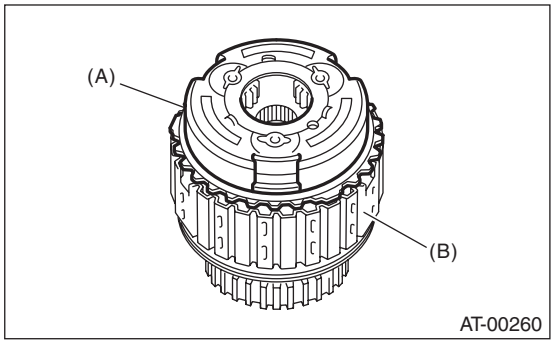
2. PLANETARY GEAR AND LOW CLUTCH

1) Remove the snap ring from low clutch drum.



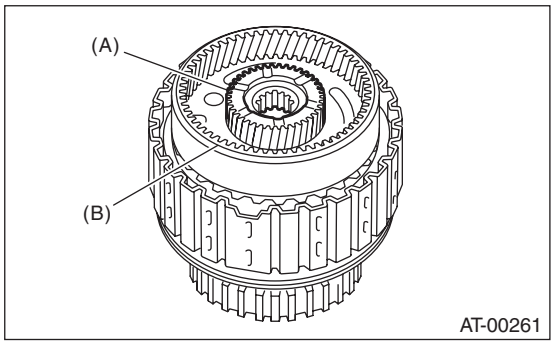
(A) Snap ring
(B) Low clutch drum

2) Take out the front planetary carrier.



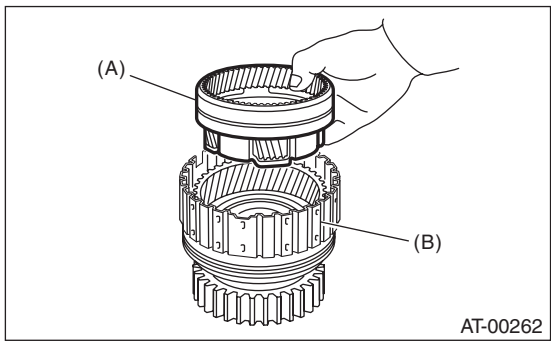
(A) Front planetary carrier
(B) Low clutch drum

3) Take out the rear sun gear.



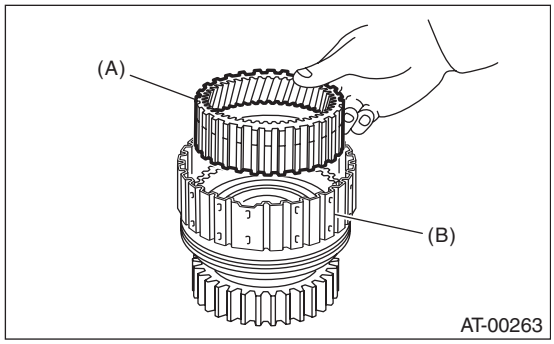
(A) Rear sun gear
(B) Rear planetary carrier

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



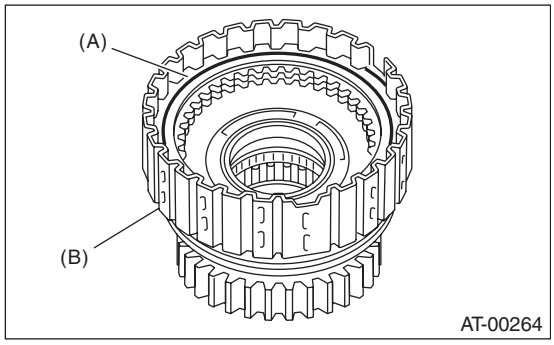
(A) Rear planetary carrier
(B) Low clutch drum

5) Take out the rear internal gear.



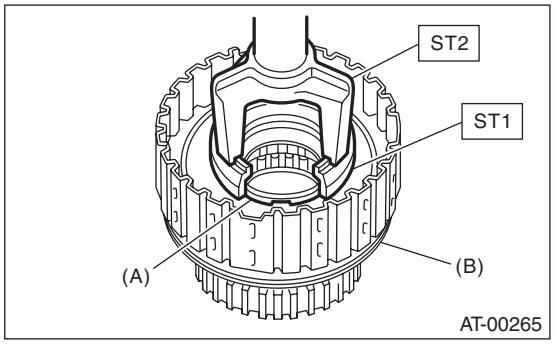
(A) Rear internal gear
(B) Low clutch drum

6) Remove the snap ring from low clutch drum.



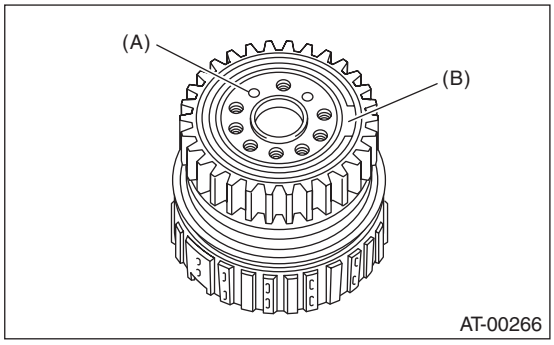
(A) Snap ring
(B) Low clutch drum

7) Compress the spring retainer of the low & reverse brake, and remove the snap ring from the low clutch drum using ST1 and ST2.
ST1 498627100 SEAT
ST2 398673600 COMPRESSOR



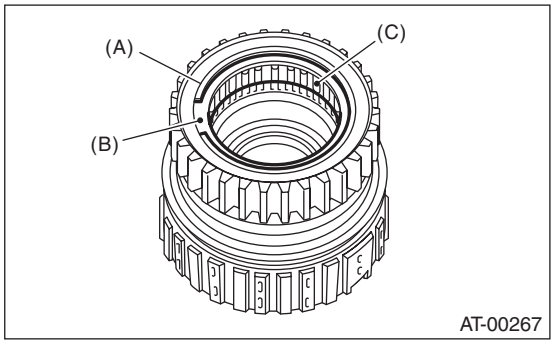
(A) Snap ring
(B) Low clutch drum

8) Remove the one-way clutch. <Ref. to 4AT-106, REMOVAL, AT Main Case.>
9) Install the one-way clutch inner race to the low clutch drum, and then apply compressed air to remove the low clutch piston.



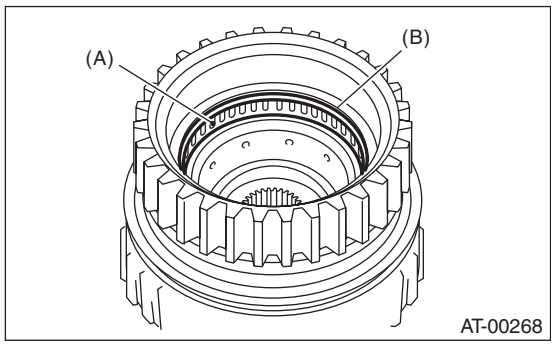
(A) Apply compressed air.
(B) One-way clutch inner race

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



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

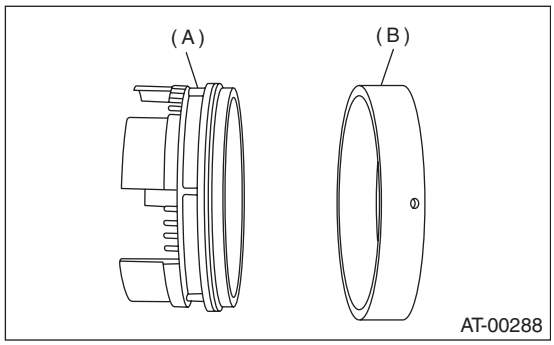
12) Remove the needle bearing after taking out the snap ring.



(A) Needle bearing
(B) Snap ring

3. 2-4 BRAKE

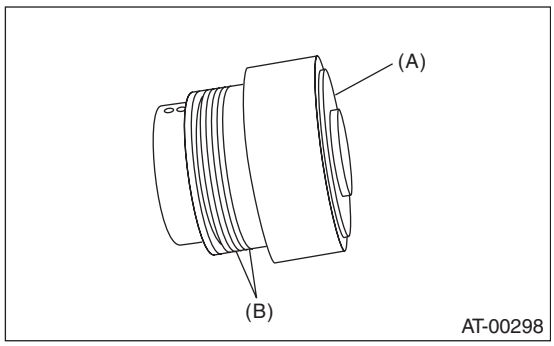
Separate the 2-4 brake piston and piston retainer.



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

4. ONE-WAY CLUTCH INNER RACE

1) Remove the seal ring.

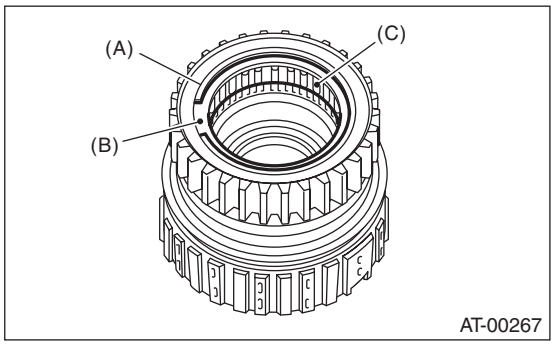


(A) One-way clutch inner race
(B) Seal ring

2) Remove the needle bearing using ST.
ST 398527700 PULLER ASSY

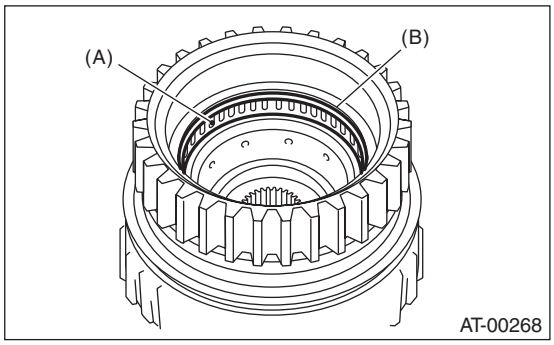
5. ONE-WAY CLUTCH OUTER RACE

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



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

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



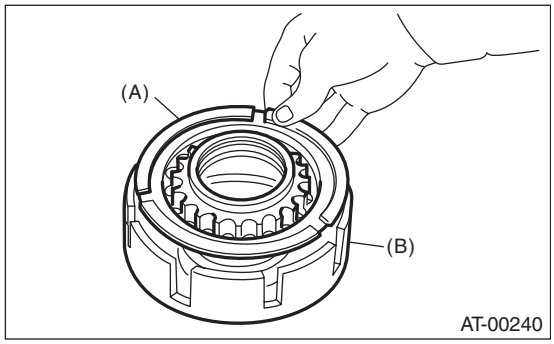
(A) Needle bearing
(B) Snap ring

D: ASSEMBLY

1. HIGH CLUTCH AND REVERSE CLUTCH

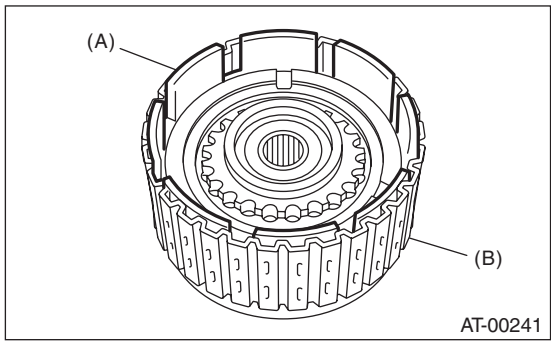
1) Install a new seal ring and lip seal to the high clutch piston and reverse clutch piston.
2) Install the high clutch piston to the reverse clutch piston.

NOTE:
Be careful not to damage the seal ring and lip seal.



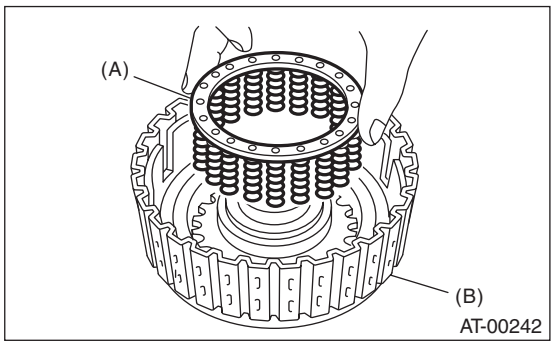
(A) High clutch piston
(B) Reverse clutch piston

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



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

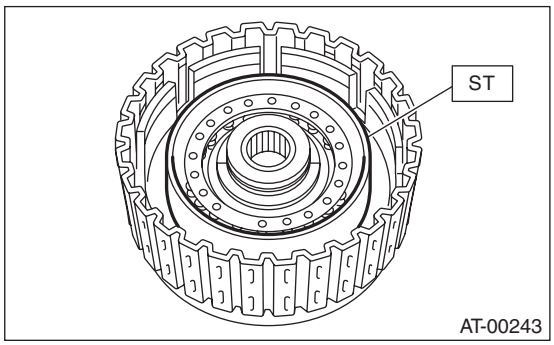
4) Install the spring retainer to the high clutch piston.



(A) Spring retainer
(B) High clutch drum

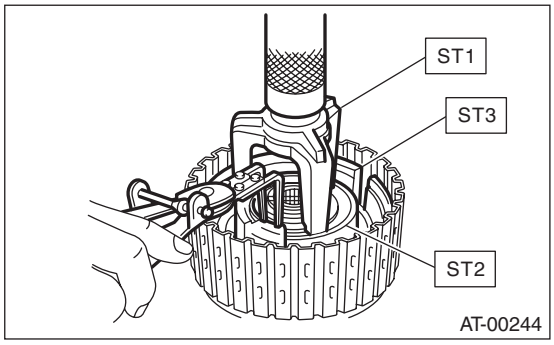
5) Attach the ST to the high clutch piston.

ST 498437000 HIGH CLUTCH PISTON GUIDE



6) Install the high clutch piston cover while making sure not to bend the high clutch piston seal.
7) Using the ST1, ST2 and ST3, install the snap ring.

ST1 398673600 COMPRESSOR
ST2 498627100 SEAT
ST3 498437000 HIGH CLUTCH PISTON GUIDE



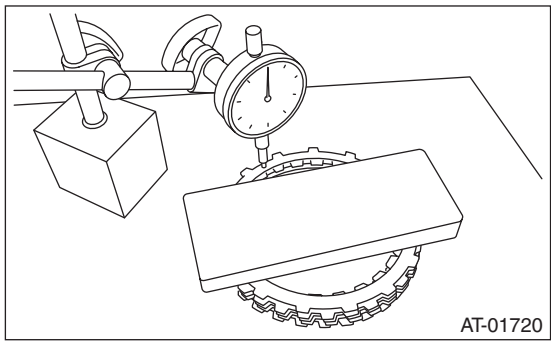
8) Measure and record a amount of drive plate compression. (Non-turbo model)
(1) Place the dish plate, driven plate, drive plate and retaining plate neatly in this order on surface table.
(2) Set the micro gauge to clutch, and read its scale.

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

(3) Scale and record the weight “Z” of a flat board which will be put on retaining plate.

NOTE:
• Use a stiff board which does not bend against load as a flat board to be put on retaining plate.
• Use a flat board weighing less than 25.5 kg (56.2 lb).

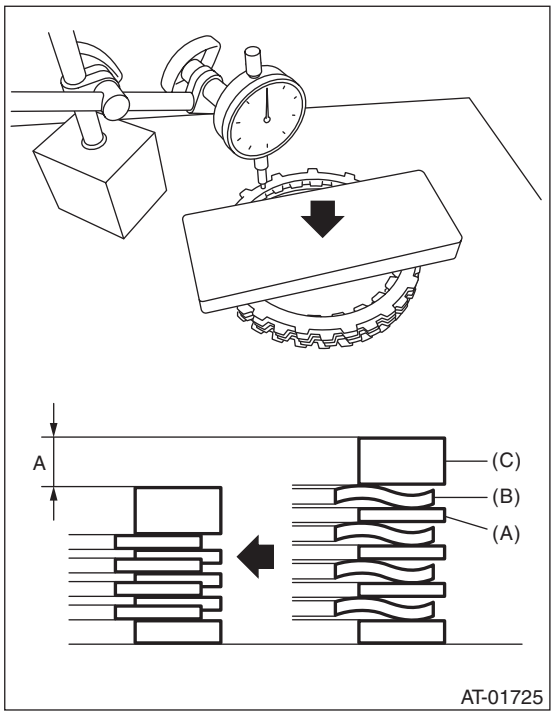
(4) Put the flat board on retaining plate.



(5) Using the following formula, read the push/pull gauge, and calculate “N”.
N = 250 N (25.5 kgf, 56.2 lb) – Z
N: Value indicated on push/pull gauge
250 N (25.5 kgf, 56.2 lb) : Load applied to clutch plate
Z: Flat board weight

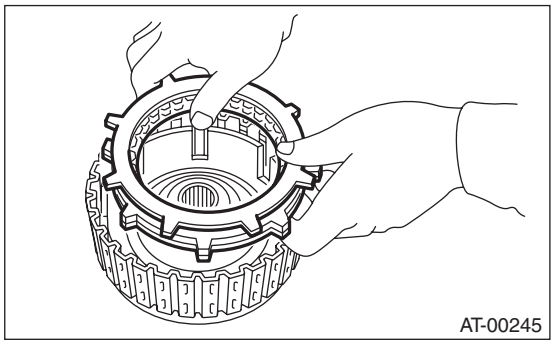
(6) Press the center of retaining plate by applying a force of N using push/pull gauge, and then measure and record the height “A”. Measure at three or more locations spaced by equal distances and take the average value.

NOTE:
If measuring in three locations, measure every 120°.
If measuring in four locations, measure every 90°.



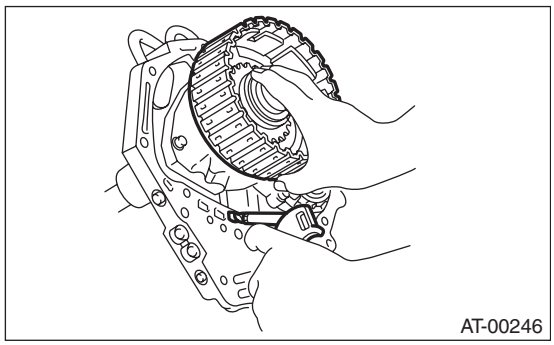
(A) Driven plate
(B) Drive plate
(C) Retaining plate

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

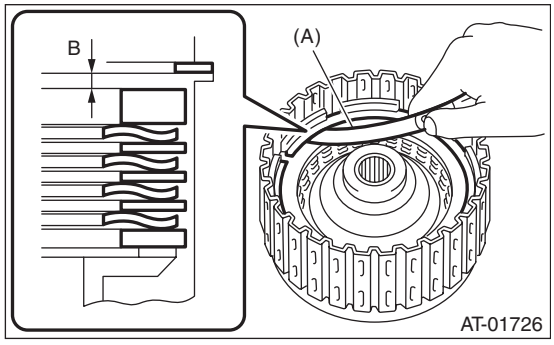


10) Install the snap ring to high clutch drum.

11) Apply compressed air intermittently to check for operation.



12) Check the piston stroke. (Non-turbo model)
(1) Measure clearance “B” between the retaining plate and snap ring. (High clutch)
At this time, do not press down the retaining plate.



(A) Thickness gauge

(2) Piston stroke calculation
Calculate with A and B dimensions recorded before. If the calculated value exceeds the service limits, replace the drive plate and select and adjust the retaining plate to be within initial standard values.
T = A + B
T: Piston stroke
A: Amount of drive plate compression
B: Clearance between retaining plate and snap ring

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

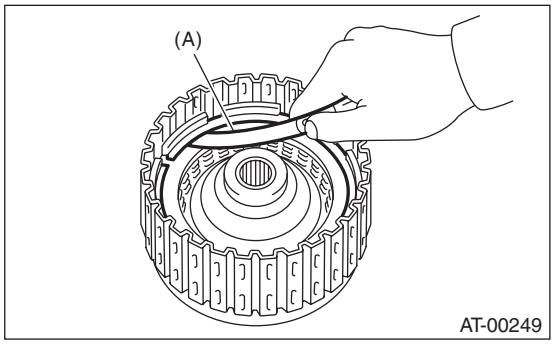
Limit thickness:
2.6 mm (0.102 in)

Retaining plate	
Part No.	Thickness mm (in)
31567AA710	4.7 (0.185)
31567AA720	4.8 (0.189)
31567AA730	4.9 (0.193)
31567AA740	5.0 (0.197)
31567AA670	5.1 (0.201)
31567AA680	5.2 (0.205)
31567AA690	5.3 (0.209)
31567AA700	5.4 (0.213)

13) Measure the clearance between the high clutch retaining plate and snap ring. (Turbo model)
At this time, do not press down the retaining plate.

Initial standard:
0.8 — 1.1 mm (0.031 — 0.043 in)

Limit thickness:
1.5 mm (0.059 in)



(A) Thickness gauge

If the clearance exceeds the service limits, replace the drive plate and select and adjust the retaining plate to make the clearance fall within initial standard values.

High clutch retaining plate	
Part number	Thickness mm (in)
31567AA710	4.7 (0.185)
31567AA720	4.8 (0.189)
31567AA730	4.9 (0.193)
31567AA740	5.0 (0.197)
31567AA670	5.1 (0.201)
31567AA680	5.2 (0.205)
31567AA690	5.3 (0.209)
31567AA700	5.4 (0.213)

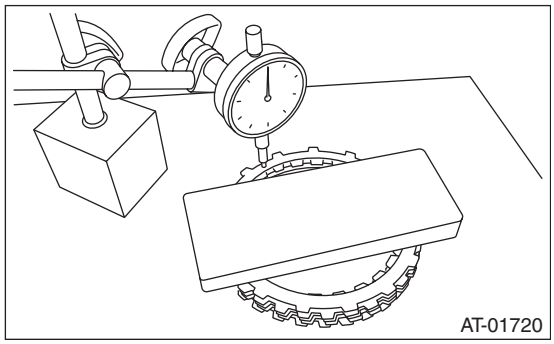
14) Selection of the reverse clutch retaining plate
(1) Place the dish plate, driven plate, drive plate and retaining plate neatly in this order on surface table.
(2) Set the micro gauge to retaining plate, and read its scale.

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

(3) Scale and record the weight “Z” of a flat board which will be put on retaining plate.

NOTE:
• Use a stiff board which does not bend against load as a flat board to be put on retaining plate.
• Use a flat board weighing less than 15.3 kg (33.7 lb).

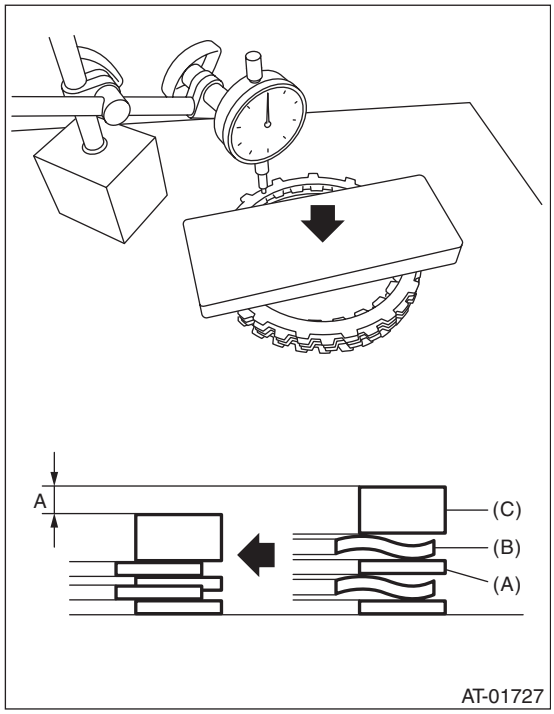
(4) Put the flat board on retaining plate.



(5) Using the following formula, read the push/pull gauge, and calculate “N”.
N = 150 N (15.3 kgf, 33.7 lbf) – Z
N: Value indicated on push/pull gauge
150 N (15.3 kgf, 33.7 lbf): Load applied to the clutch plate
Z: Flat board weight

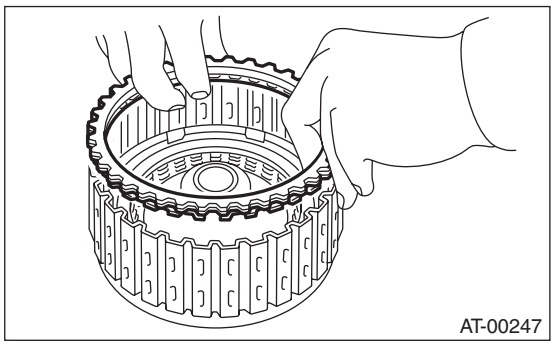
(6) Press the center of retaining plate by applying a force of N using push/pull gauge, and then measure and record the height “A”. Measure at three or more locations spaced by equal distances and take the average value.

NOTE:
If measuring in three locations, measure every 120°.
If measuring in four locations, measure every 90°.

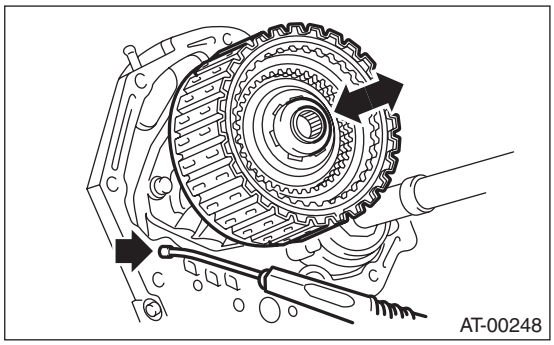


(A) Driven plate
(B) Drive plate
(C) Retaining plate

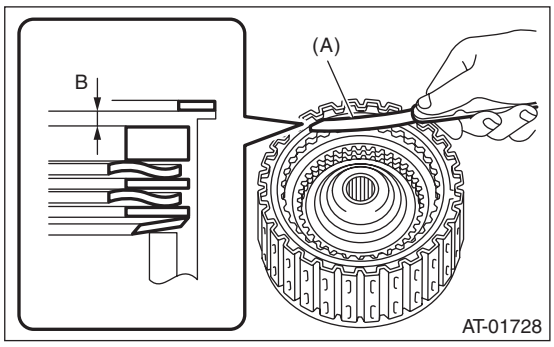
(7) Install the driven plate, drive plate, retaining plate and snap ring.



(8) Apply compressed air intermittently to check for operation.



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



(A) Thickness gauge

(10) Piston stroke calculation
Calculate with A and B dimensions recorded before. If the calculated value exceeds the service limits, replace the drive plate and select and adjust the retaining plate to be within initial standard values.
T = A + B
T: Piston stroke
A: Amount of drive plate compression
B: Clearance between retaining plate and snap ring

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

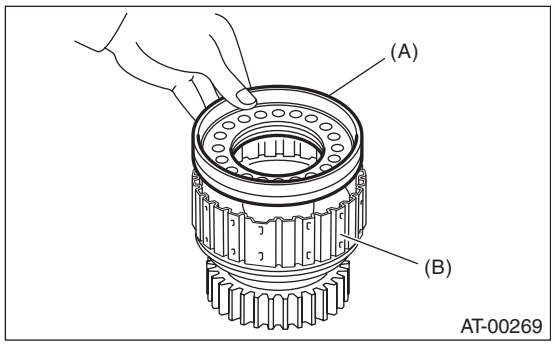
Limit thickness:
1.6 mm (0.063 in)

Retaining plate	
Part number	Thickness mm (in)
31567AA910	4.0 (0.157)
31567AA920	4.2 (0.165)
31567AA930	4.4 (0.173)
31567AA940	4.6 (0.181)
31567AA950	4.8 (0.189)
31567AA960	5.0 (0.197)
31567AA970	5.2 (0.205)
31567AA980	5.4 (0.213)

2. PLANETARY GEAR AND LOW CLUTCH

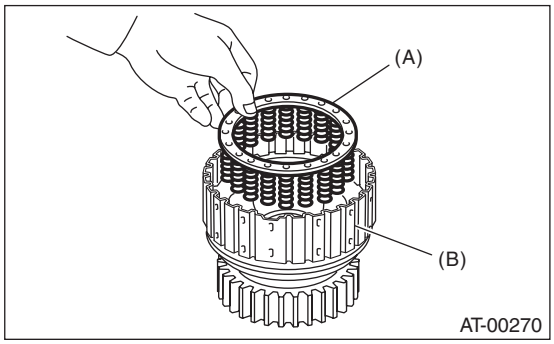
1) Apply ATF to a new D-ring, and install it to the low clutch piston.
2) Install the low clutch piston to low clutch drum.

NOTE:
Be careful not to damage the D-ring.



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

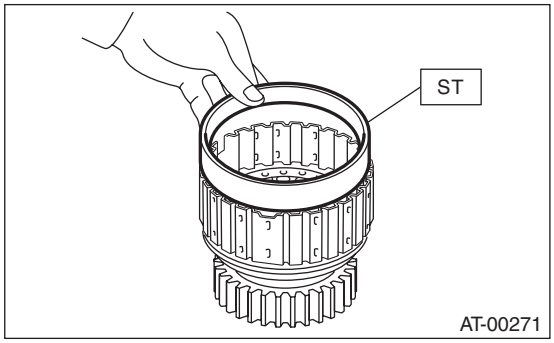
3) Install the spring retainer to low clutch piston.



(A) Spring retainer
(B) Low clutch drum

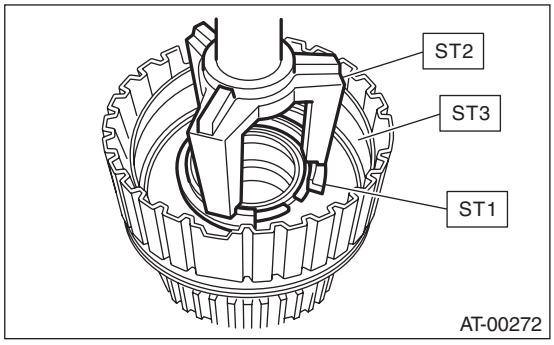
4) Attach the ST to the low clutch drum.

ST 498437100 LOW CLUTCH PISTON GUIDE

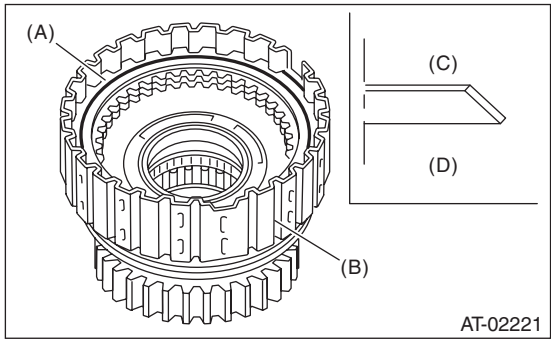


5) Using ST1, ST2, and ST3, set the cover on the piston and press against it, and attach the snap ring. At this time, be careful not to bend the cover seal.

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

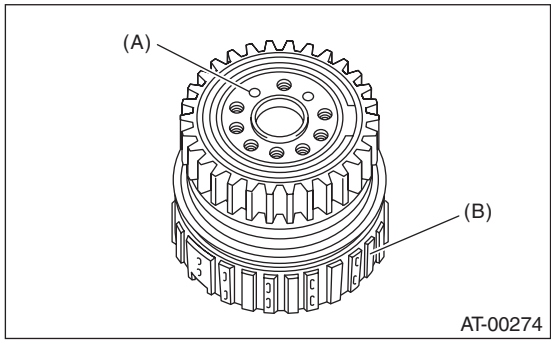


6) Install the dish plate, driven plate, drive plate and retaining plate, and then secure them with a snap ring.



(A) Snap ring
(B) Low clutch drum
(C) Dish plate
(D) Low clutch piston side

7) Check the low clutch for operation.
(1) Remove the one-way clutch. <Ref. to 4AT-106, REMOVAL, AT Main Case.>
(2) Set the one-way clutch inner race, and apply compressed air for checking.

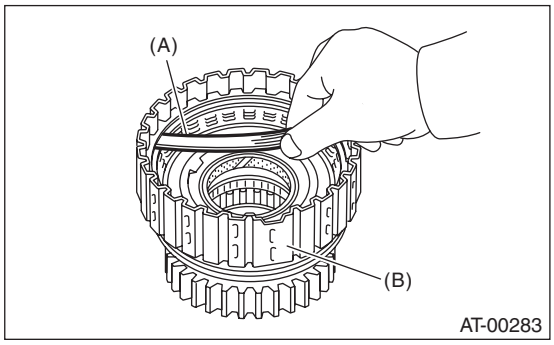


(A) Apply compressed air.
(B) Low clutch drum

8) Check the low clutch clearance.
(1) Place same thickness shims on both sides to prevent plate from tilting.
(2) Check the clearance between retaining plate and low clutch operation.

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

Limit thickness:
1.6 mm (0.063 in)

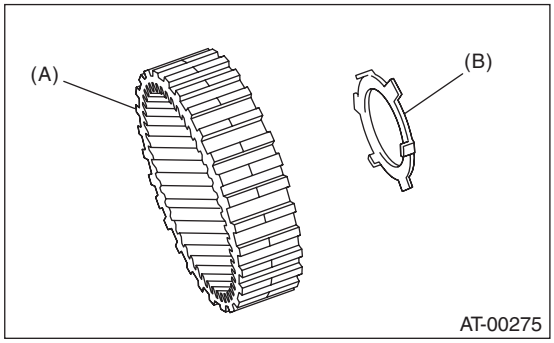


(A) Thickness gauge
(B) Low clutch drum

If the clearance exceeds the service limits, replace the drive plate and select and adjust the retaining plate to make the clearance fall within initial standard values.

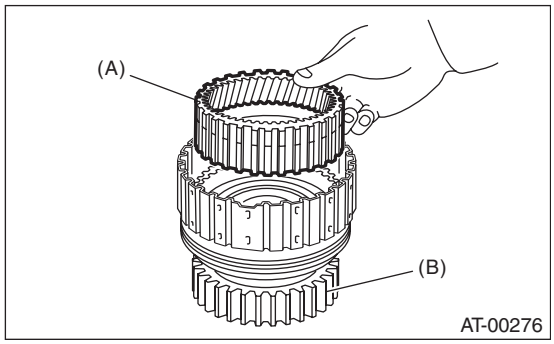
Retaining plate	
Part number	Thickness mm (in)
31567AB050	3.8 (0.150)
31567AB060	4.0 (0.157)
31567AB070	4.2 (0.165)
31567AB080	4.4 (0.173)
31567AB090	4.6 (0.181)

9) Install the washer to the rear internal gear.



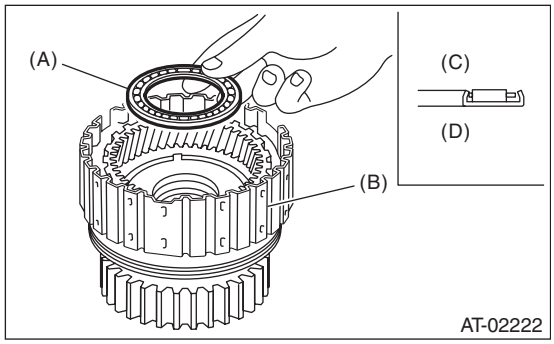
(A) Rear internal gear
(B) Washer

10) Install the rear internal gear.



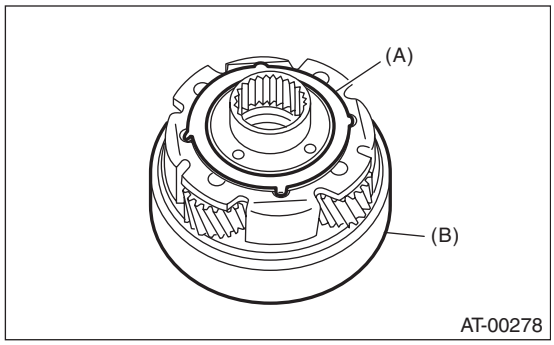
(A) Rear internal gear
(B) Low clutch drum

11) Install the thrust needle bearing in the correct direction.



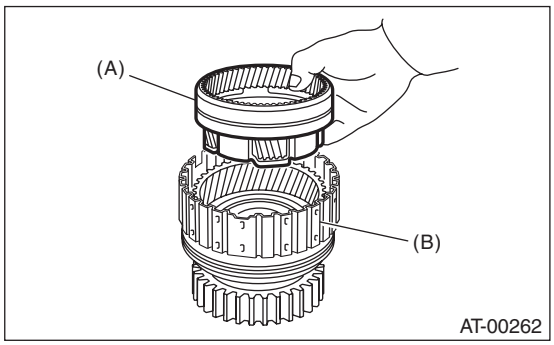
(A) Thrust needle bearing
(B) Low clutch drum
(C) Rear planetary, carrier side
(D) Low clutch drum side

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



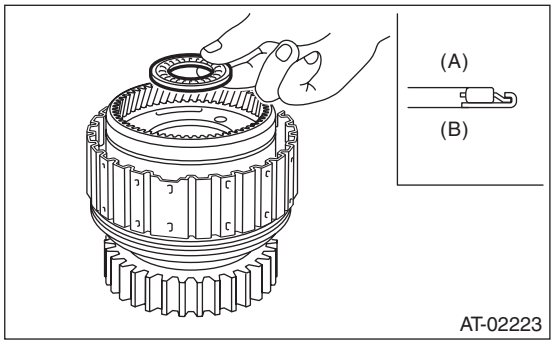
(A) Washer
(B) Rear planetary carrier

13) Install the rear planetary carrier to the low clutch drum.



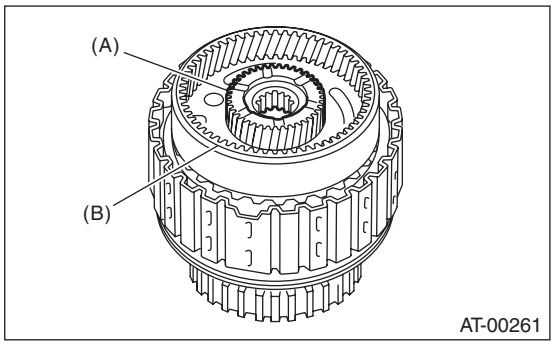
(A) Rear planetary carrier
(B) Low clutch drum

14) Install the thrust needle bearing in the correct direction.



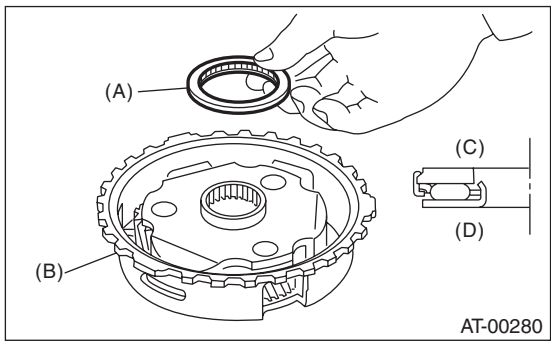
(A) Rear sun gear side
(B) Low clutch drum side

15) Install the rear sun gear in the correct direction.



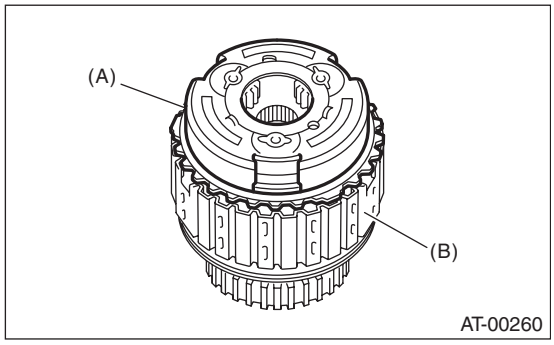
(A) Rear sun gear
(B) Rear planetary carrier

16) Install the thrust needle bearing in the correct direction.



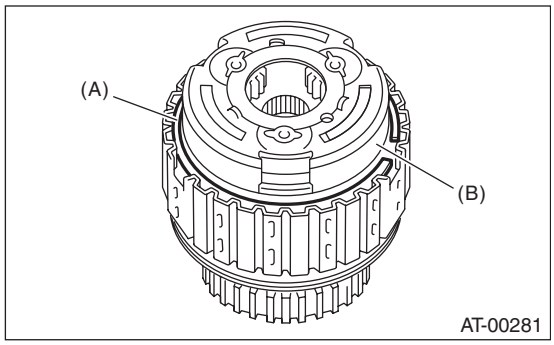
(A) Thrust needle bearing
(B) Front planetary carrier
(C) Rear sun, gear side
(D) Front planetary carrier side

17) Install the front planetary carrier to the low clutch drum.



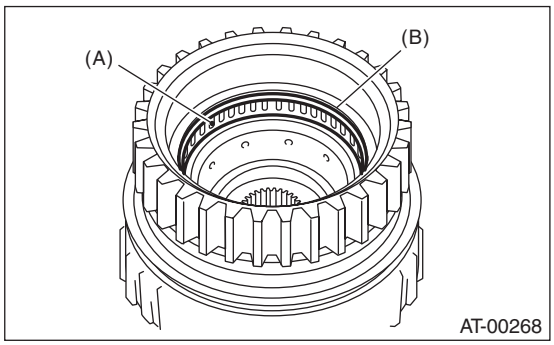
(A) Front planetary carrier
(B) Low clutch drum

18) Install the snap ring to the low clutch drum.



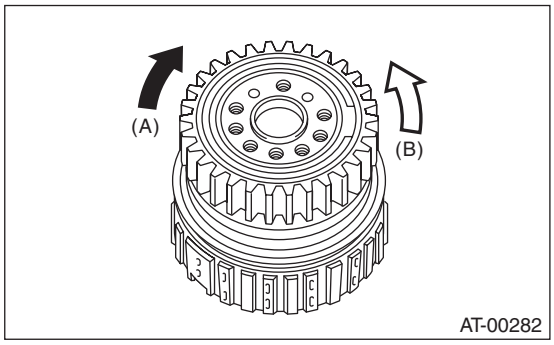
(A) Snap ring
(B) Front planetary carrier

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



(A) Needle bearing
(B) Snap ring

20) Install the one-way clutch and one-way clutch inner race, then secure with the snap ring.
21) Set the inner race. Make sure that the clutch locks in the clockwise direction and rotates freely in the counterclockwise direction.

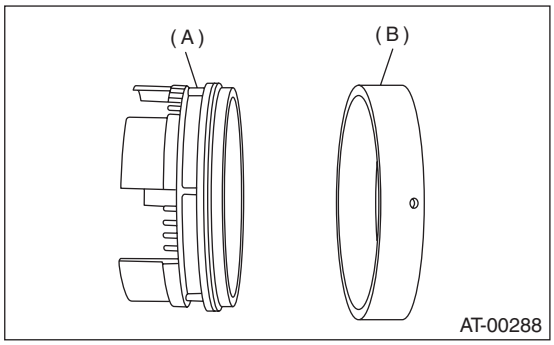


(A) Lock
(B) Free

3. 2-4 BRAKE

1) Apply ATF to the new D-ring, then install to the 2-4 brake piston.
2) Install 2-4 brake piston to 2-4 brake piston retainer.

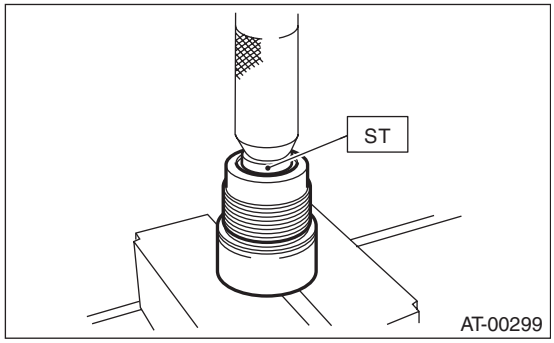
NOTE:
Be careful not to damage the D-ring.



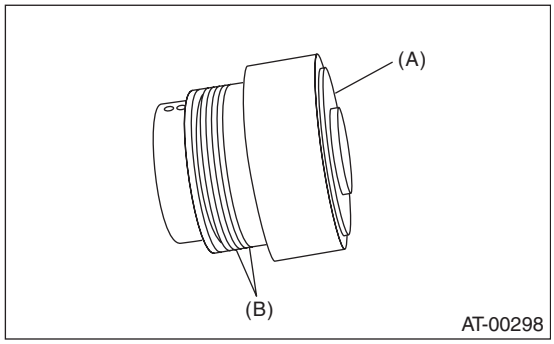
(A) 2-4 brake piston
(B) 2-4 brake piston retainer

4. ONE-WAY CLUTCH INNER RACE

1) Install the needle bearing to inner race using ST and a press.
ST 398497701 INSTALLER



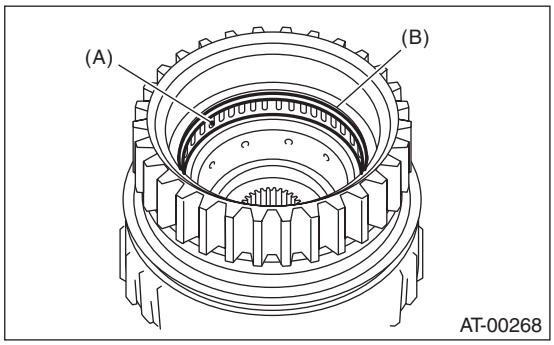
2) Apply vaseline to the groove of the inner race and to the new seal ring.
3) Install two seal rings to the one-way clutch inner race.



(A) One-way clutch inner race
(B) Seal ring

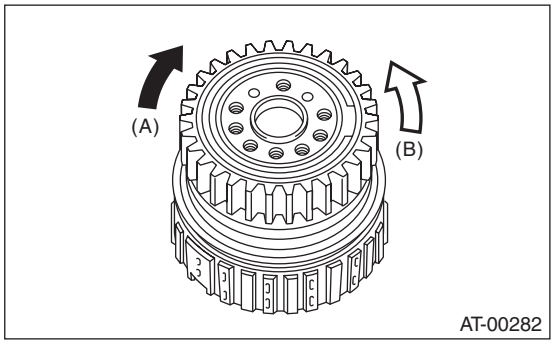
5. ONE-WAY CLUTCH OUTER RACE

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



(A) Needle bearing
(B) Snap ring

2) Install the one-way clutch and one-way clutch inner race, then secure with the snap ring.
3) Set the inner race. Make sure that the clutch locks in the clockwise direction and rotates freely in the counterclockwise direction.



(A) Lock
(B) Free

E: INSPECTION

1. HIGH CLUTCH AND REVERSE CLUTCH

Check the following items.
- Drive plate facing for wear or damage
- Driven plate for discoloration (burned color)
- Snap ring wear and spring retainer deformation
- Wear and damage of the lip seal and D-ring
- Piston and piston check ball operation
- Adjust the total end play. <Ref. to 4AT-92, ADJUSTMENT, Oil Pump Housing.>

2. PLANETARY GEAR AND LOW CLUTCH

Check the following items.
- Drive plate facing for wear or damage
- Driven plate for discoloration (burned color)
- Snap ring wear and spring retainer deformation
- Wear and damage of the lip seal and D-ring
- Measure the total end play and adjust it to be within specifications. <Ref. to 4AT-92, ADJUSTMENT, Oil Pump Housing.>

3. 2-4 BRAKE

Check the following items.
- Drive plate facing for wear or damage
- Driven plate for discoloration (burned color)
- Snap ring wear, leaf spring setting and breakage, and spring retainer deformation
- Wear and damage of the lip seal and D-ring
- Measure the total end play and adjust it to be within specifications. <Ref. to 4AT-92, ADJUSTMENT, Oil Pump Housing.>

4. ONE-WAY CLUTCH

- Check that the snap ring is not damaged and the seal ring is not deformed.
- Measure the total end play and adjust it to be within specifications. <Ref. to 4AT-92, ADJUSTMENT, Oil Pump Housing.>

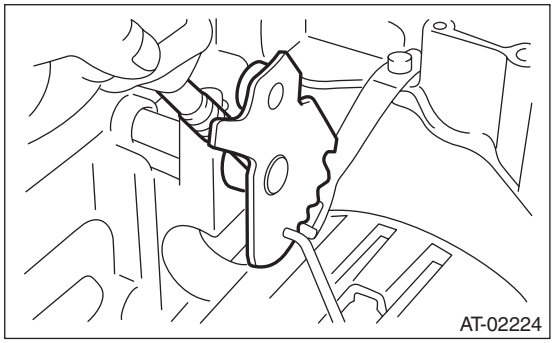
5. LOW & REVERSE BRAKE

Check the following items.
- Drive plate facing for wear or damage
- Driven plate for discoloration (burned color)
- Snap ring wear, leaf spring setting and breakage, and spring retainer deformation
- Lip seal wear and damage

36.Transmission Control Device

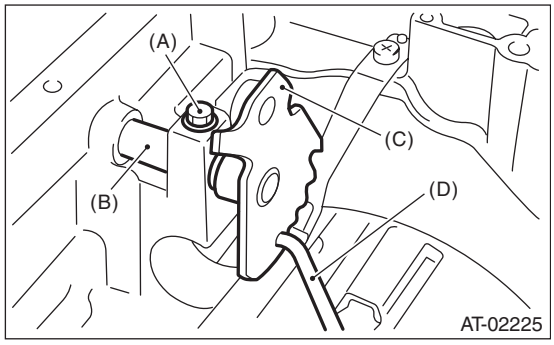
A: REMOVAL

1) Remove the transmission assembly from vehicle body. <Ref. to 4AT-35, REMOVAL, Automatic Transmission Assembly.>
2) Pull out the torque converter clutch assembly. <Ref. to 4AT-70, REMOVAL, Torque Converter Clutch Assembly.>
3) Remove the input shaft.
4) Lift up the lever on the rear side of transmission harness connector, and then remove it from the stay.
5) Disconnect the air breather hose. <Ref. to 4AT-68, REMOVAL, Air Breather Hose.>
6) Remove the inhibitor switch connector from the stay.
7) Wrap vinyl tape around the nipple attached to the air breather hose.
8) Remove the pitching stopper bracket.
9) Remove the inhibitor switch. <Ref. to 4AT-48, REMOVAL, Inhibitor Switch.>
10) Remove the control valve body assembly. <Ref. to 4AT-58, REMOVAL, Control Valve Body.>
11) Pull out the spring pin of manual plate.



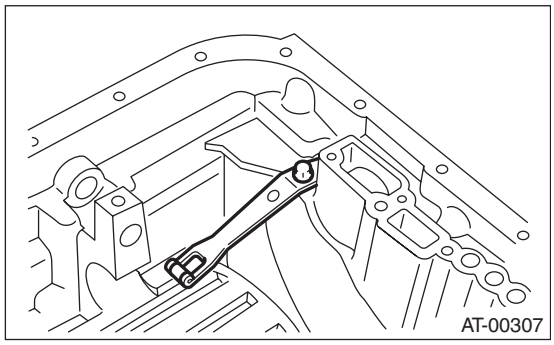
12) Remove the bolts securing select lever, and then remove the select lever, manual plate and parking rod.

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



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

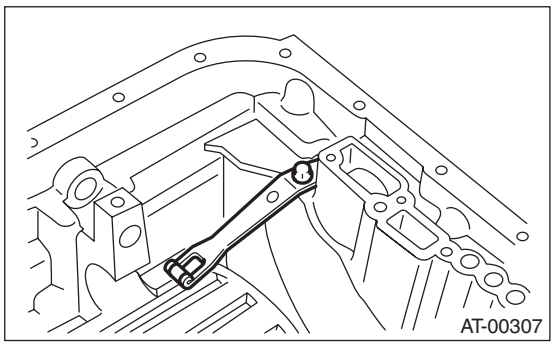
13) Remove the detent spring.



B: INSTALLATION

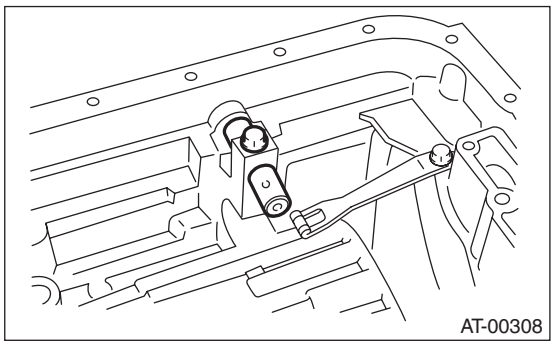
1) Install the detent spring to the transmission case.

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

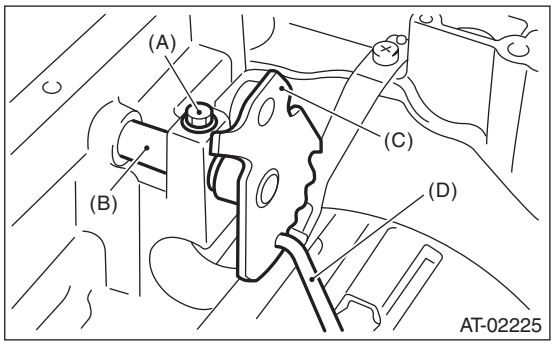


2) Insert the range select lever, then tighten the bolts.

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

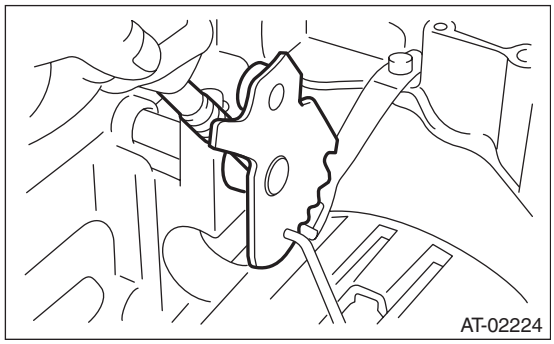


3) Insert the manual plate and parking rod.



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

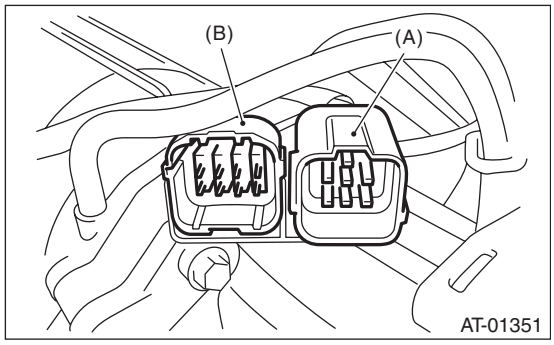
4) Insert a new spring pin to manual plate.



5) Install the oil pan and the control valve assembly. <Ref. to 4AT-59, INSTALLATION, Control Valve Body.>
6) Turn over the transmission case to its original position.
7) Install the pitching stopper bracket.

Tightening torque:
41 N·m (4.2 kgf-m, 30.2 ft-lb)

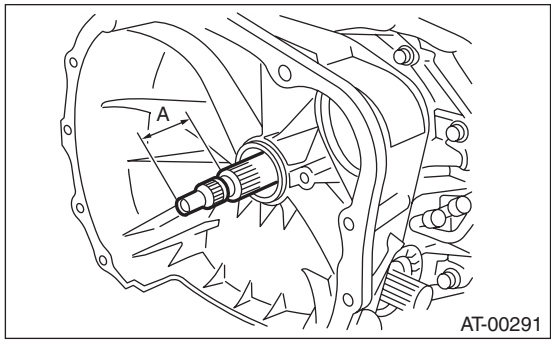
8) Install and adjust the inhibitor switch. <Ref. to 4AT-47, Inhibitor Switch.>
9) Insert the inhibitor switch and transmission harness connector to the stay.



(A) Transmission harness connectors
(B) Inhibitor switch connector

10) Install the air breather hose. <Ref. to 4AT-68, INSTALLATION, Air Breather Hose.>
11) Insert the input shaft while rotating it lightly by hand, and then check the amount of protrusion.

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



12) Install the torque converter clutch assembly. <Ref. to 4AT-70, INSTALLATION, Torque Converter Clutch Assembly.>
13) Install the transmission assembly to the vehicle. <Ref. to 4AT-38, INSTALLATION, Automatic Transmission Assembly.>

C: INSPECTION

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