

General Description

CONTINUOUSLY VARIABLE TRANSMISSION

1. General Description

A: SPECIFICATION

1. TORQUE CONVERTER

Model	DOHC non-turbo
Type	Symmetric, 3-element, single stage, 2-phase torque converter
Stall torque ratio	2.07
Nominal mm (in)	236 (9.29)
Stall speed (at sea level)	2,000 — 2,700 (D range) 1,900 — 2,600 (R range)
One-way clutch	Sprag type one-way clutch

2. OIL PUMP

Type	Internal gear pump	
Driving method	Driven by chain	
Number of teeth	Inner rotor	8
	Outer rotor	9

3. TRANSMISSION CONTROL ELEMENT

Type	Forward continuously variable speed change, 1 reverse, planetary gear
Multi-plate clutch	1 set
Multi-plate brake	1 set

4. TRANSMISSION GEAR RATIO

Forward	3.581 — 0.570
Rev	3.667

5. PLATE

Number of forward clutch drive plates	3
Number of reverse brake drive plates	4

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6. SELECTOR POSITION

P (Park)	Transmission neutral, output shaft locked, engine start enabled
R (Reverse)	Rev
N (Neutral)	Transmission neutral, engine start enabled
D (Drive)	Forward continuously variable speed change
M (Manual mode) (paddle shift +side)	Manual gear change 1st → 2nd → 3rd → 4th → 5th → 6th
M (Manual mode) (paddle shift -side)	Manual gear change 1st ← 2nd ← 3rd ← 4th ← 5th ← 6th
L (Low)	Forward continuously variable speed change (engine brake)

7. HYDRAULIC CONTROL AND LUBRICATION

Type	Electronic hydraulic control (gear ratio is changed by signals of vehicle speed and accelerator opening angle.)
Fluid	Specified fluid: SUBARU CVT OIL FOR LINEARTRONIC CAUTION: Always use specified CVTF. Using other fluid will cause malfunction.
Fluid capacity L (US qt, Imp qt)	11.93 — 12.43 (12.6 — 13.1, 10.5 — 10.9)
Lubrication system	Forced feed lubrication with oil pump

8. COOLING AND HARNESS

Cooling system	CVTF cooler (with warmer feature)
Inhibitor switch harness	16 poles
Transmission harness	12 poles

9. TRANSFER

Transfer type	Multi-plate transfer (MP-T)
Number of transfer clutch drives & driven plates	5
Control method	Electronic hydraulic type
Reduction gear ratio	1.000 (43/43)

10. REDUCTION GEAR RATIO

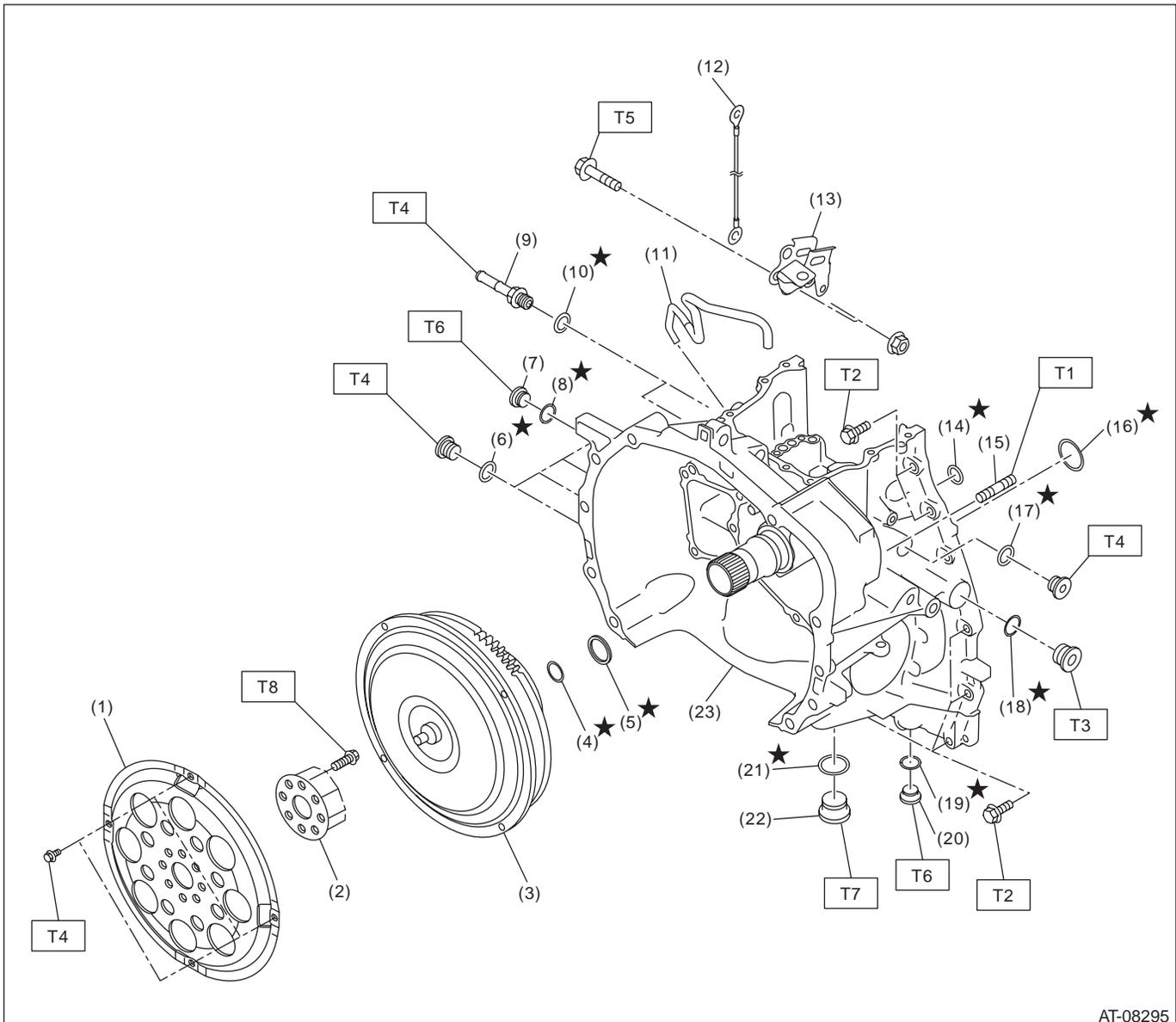
Front final reduction gear ratio	3.700
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11. FRONT DIFFERENTIAL GEAR OIL

Fluid	Recommended fluid: SUBARU GEAR OIL EXTRA MT CAUTION: If an alternative transmission oil is used, you may not have expected functionality and performance. Alternative fluid: GL-5 (75W-90)
Fluid capacity L (US qt, Imp qt)	1.3 — 1.4 (1.4 — 1.5, 1.1 — 1.2)

B: COMPONENT

1. TORQUE CONVERTER ASSEMBLY AND CONVERTER CASE



AT-08295

- | | |
|---|---|
| (1) Drive plate | (13) Pitching stopper bracket |
| (2) Reinforcement drive plate | (14) O-ring |
| (3) Torque converter ASSY | (15) Stud bolt |
| (4) O-ring | (16) O-ring |
| (5) Seal ring | (17) O-ring |
| (6) O-ring | (18) O-ring |
| (7) Front differential gear oil filler plug | (19) Gasket |
| (8) O-ring | (20) Overflow drain plug |
| (9) Oil cooler pipe | (21) Gasket |
| (10) O-ring | (22) Front differential gear oil drain plug |
| (11) Air breather hose | (23) Converter case |
| (12) Transmission radio ground cord | |

Tightening torque:N·m (kgf·m, ft·lb)

T1: 18 (1.8, 13.3)

T2: 22 (2.2, 16.2)

T3: 22.5 (2.3, 16.6)

T4: 25 (2.5, 18.4)

T5: 41 (4.2, 30.2)

T6: 50 (5.1, 36.9)

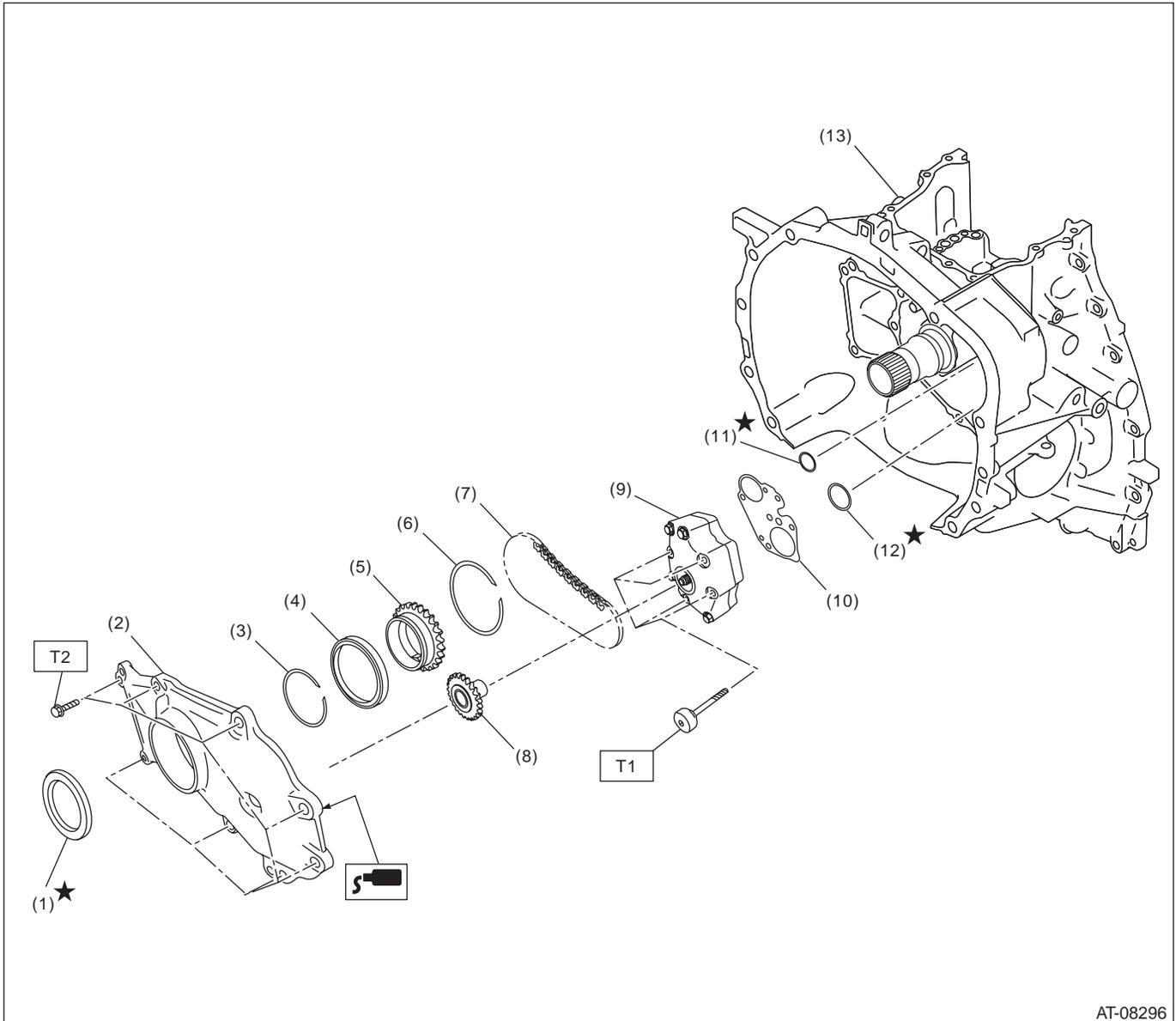
T7: 70 (7.1, 51.6)

T8: <Ref. to CVT(TR580)-159, INSTALLATION, Drive Plate.>

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2. OIL PUMP ASSY



AT-08296

- | | |
|--------------------------|---------------------|
| (1) Oil seal | (7) Oil pump chain |
| (2) Oil pump chain cover | (8) Driven sprocket |
| (3) Snap ring | (9) Oil pump ASSY |
| (4) Ball bearing | (10) Plate |
| (5) Drive sprocket | (11) O-ring (small) |
| (6) Snap ring | (12) O-ring (large) |

- (13) Converter case

Tightening torque: N·m (kgf·m, ft·lb)

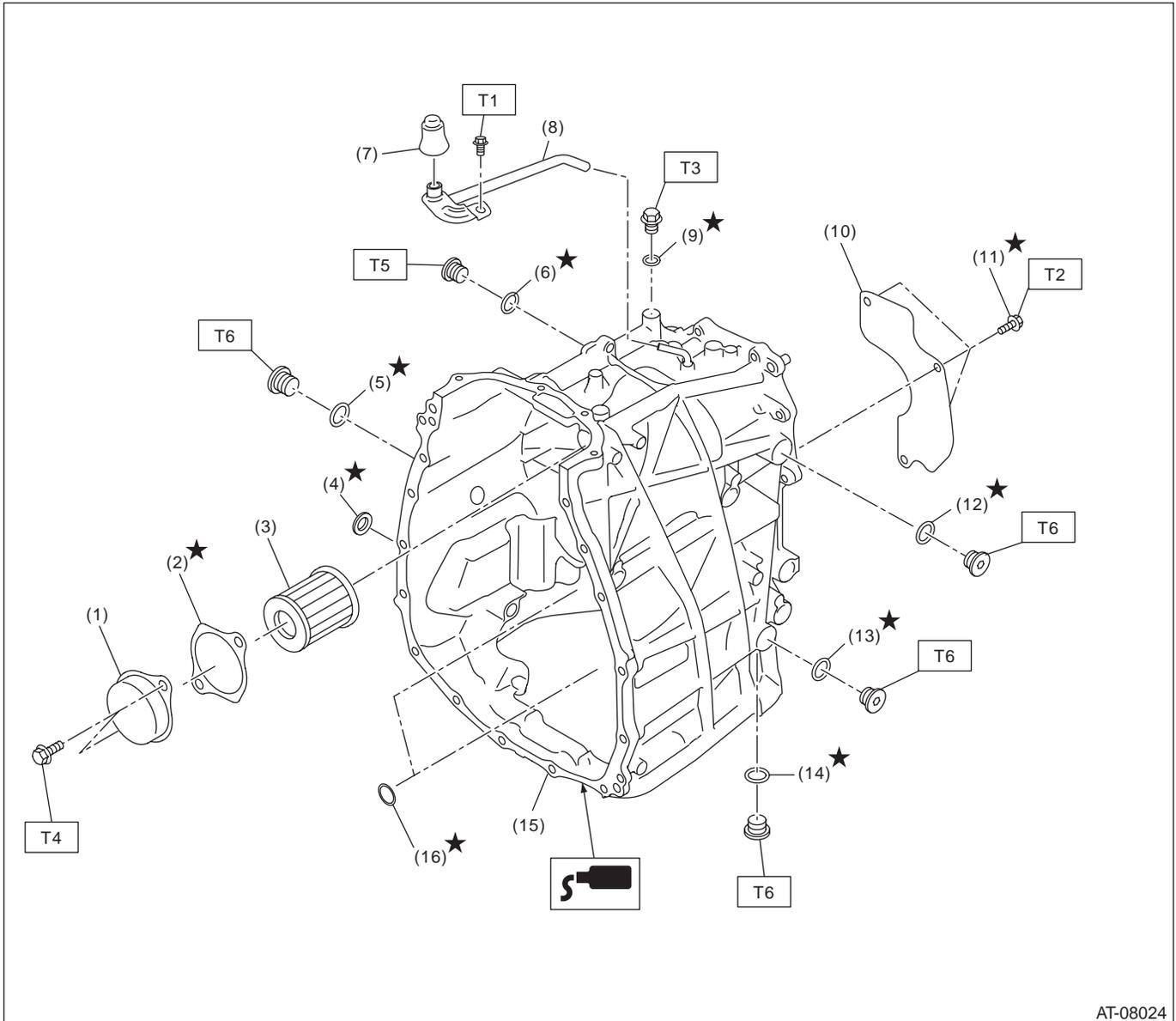
T1: 8.5 (0.9, 6.3)

T2: 21 (2.1, 15.5)

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3. TRANSMISSION CASE



AT-08024

- | | |
|-----------------------|------------------------------|
| (1) CVTF filter cover | (9) O-ring |
| (2) Gasket | (10) Oil stopper plate |
| (3) CVTF filter | (11) Micro-encapsulated bolt |
| (4) Oil seal | (12) O-ring |
| (5) Gasket | (13) Gasket |
| (6) O-ring | (14) O-ring |
| (7) Air breather cap | (15) Transmission case |
| (8) Air breather hose | (16) Seal ring |

Tightening torque: N·m (kgf·m, ft·lb)

T1: 5 (0.5, 3.7)

T2: 9 (0.9, 6.6)

T3: 13 (1.3, 9.6)

T4: 17 (1.7, 12.5)

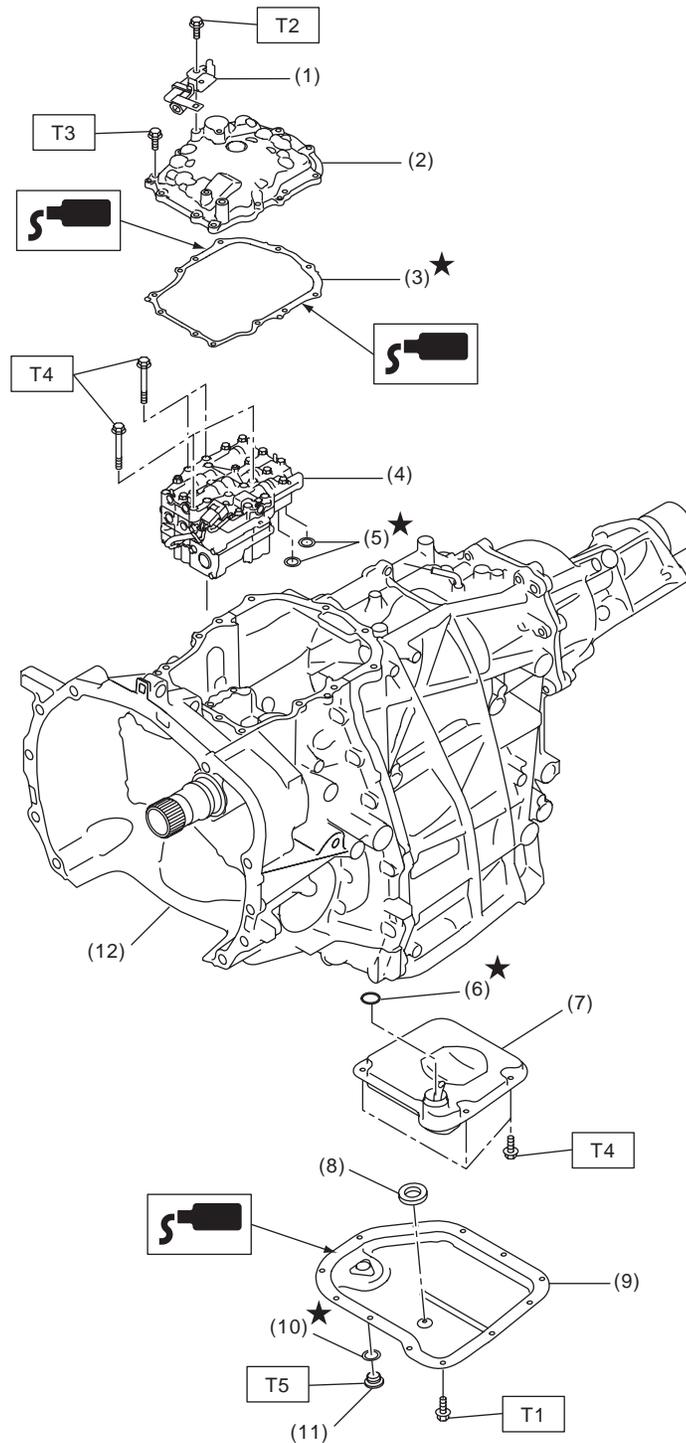
T5: 25 (2.5, 18.4)

T6: 50 (5.1, 25.8)

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4. CONTROL VALVE BODY



AT-08297

- (1) Transmission harness stay
- (2) Valve cover
- (3) Gasket
- (4) Control valve body
- (5) O-ring
- (6) O-ring

- (7) Oil strainer
- (8) Magnet
- (9) Oil pan
- (10) Gasket
- (11) CVTF drain plug
- (12) Transmission ASSY

Tightening torque: N·m (kgf·m, ft·lb)

T1: 5 (0.5, 3.7)

T2: 7 (0.7, 5.2)

T3: 8 (0.8, 5.9)

T4: 9 (0.9, 6.6)

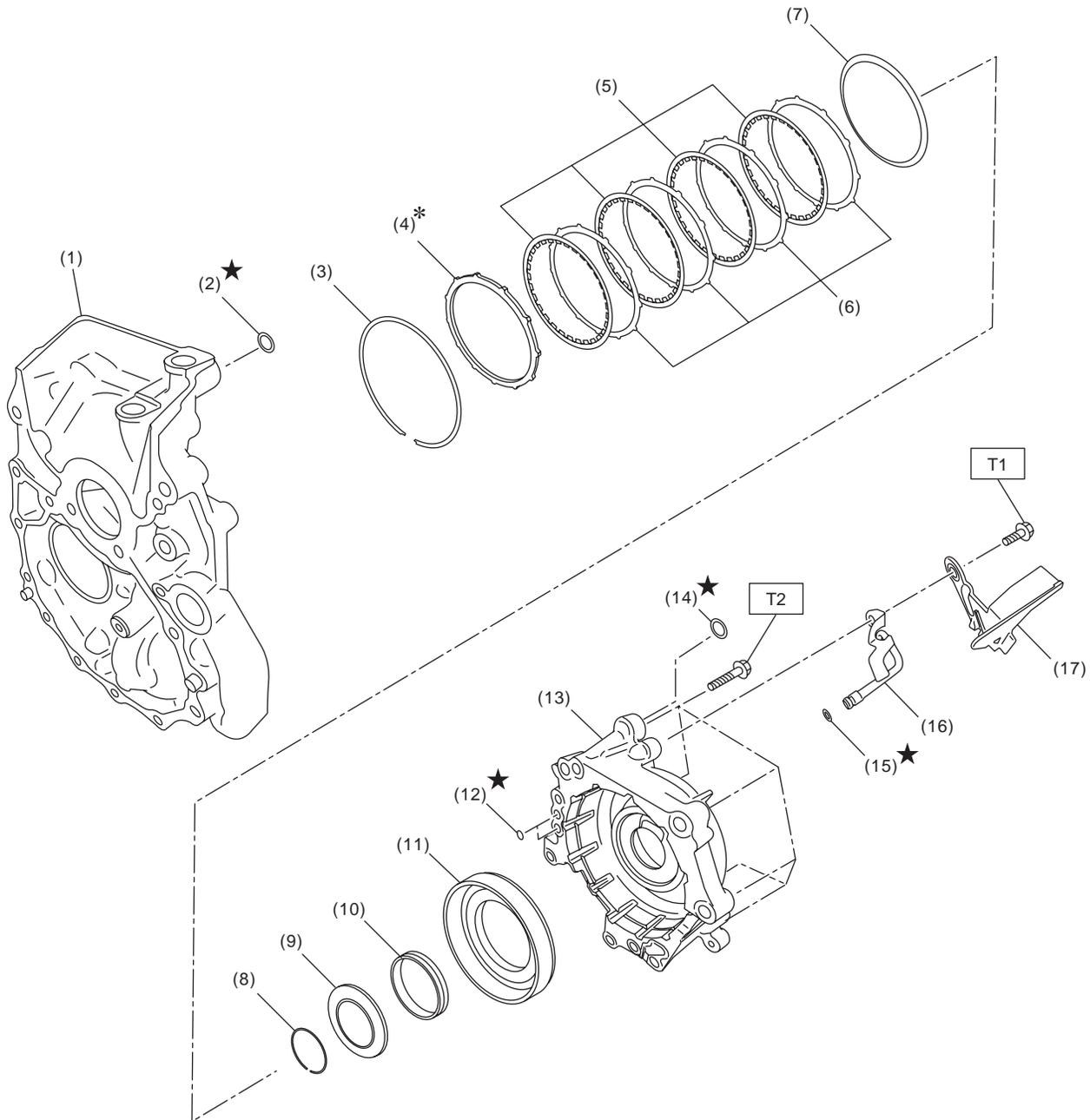
T5: 31 (3.2, 22.9)

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5. REVERSE BRAKE ASSEMBLY



AT-07555

- (1) Drive pinion retainer
- (2) O-ring
- (3) Snap ring
- (4) Retaining plate
- (5) Drive plate
- (6) Driven plate
- (7) Dish plate

- (8) Snap ring
- (9) Spring retainer
- (10) Return spring
- (11) Reverse brake piston
- (12) O-ring
- (13) Reverse brake housing
- (14) O-ring

- (15) O-ring
- (16) Lubrication pipe
- (17) Oil guide

Tightening torque: N·m (kgf·m, ft·lb)

T1: 16 (1.6, 11.8)

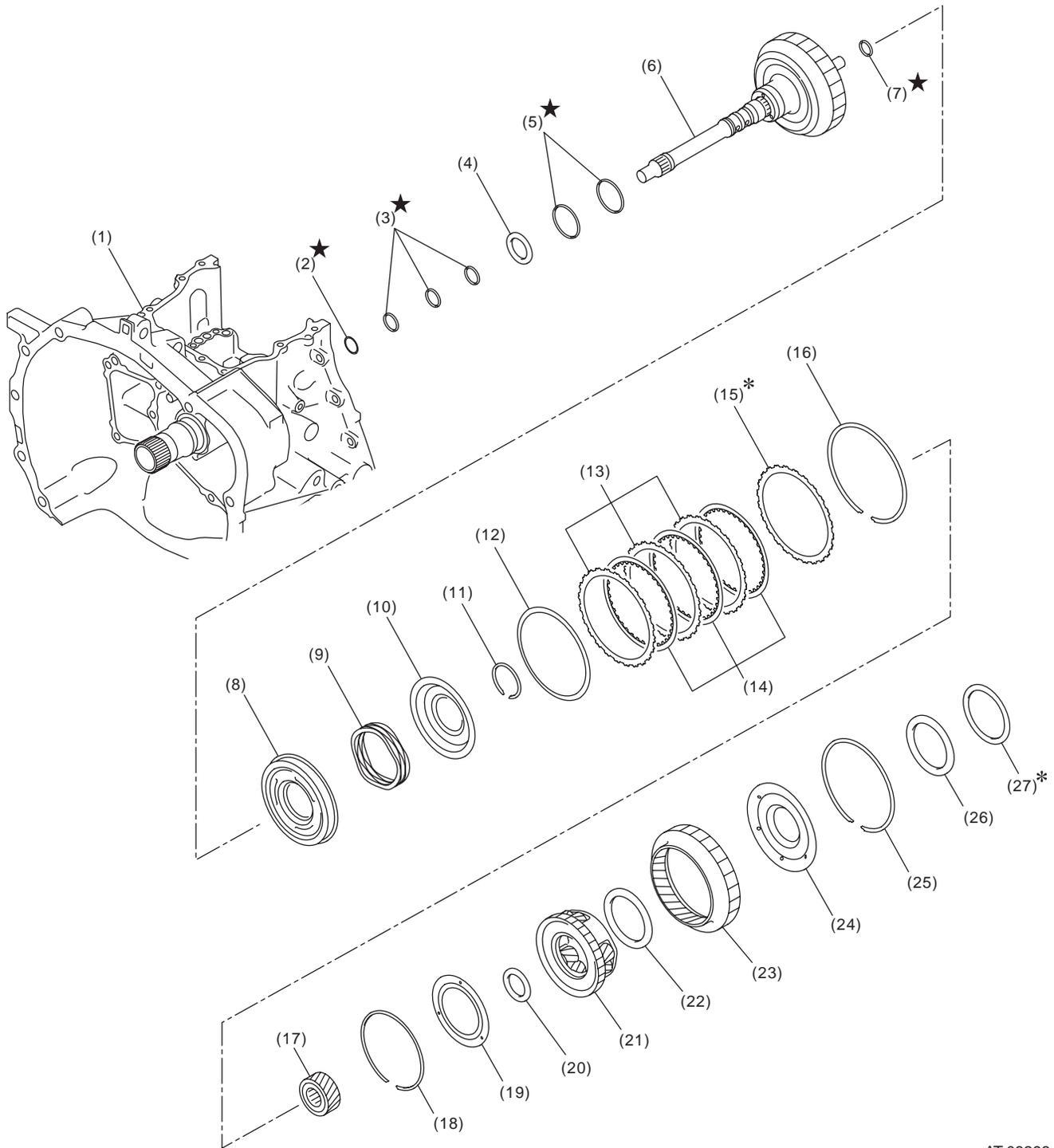
T2: 37 (3.8, 27.3)

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6. FORWARD CLUTCH ASSEMBLY



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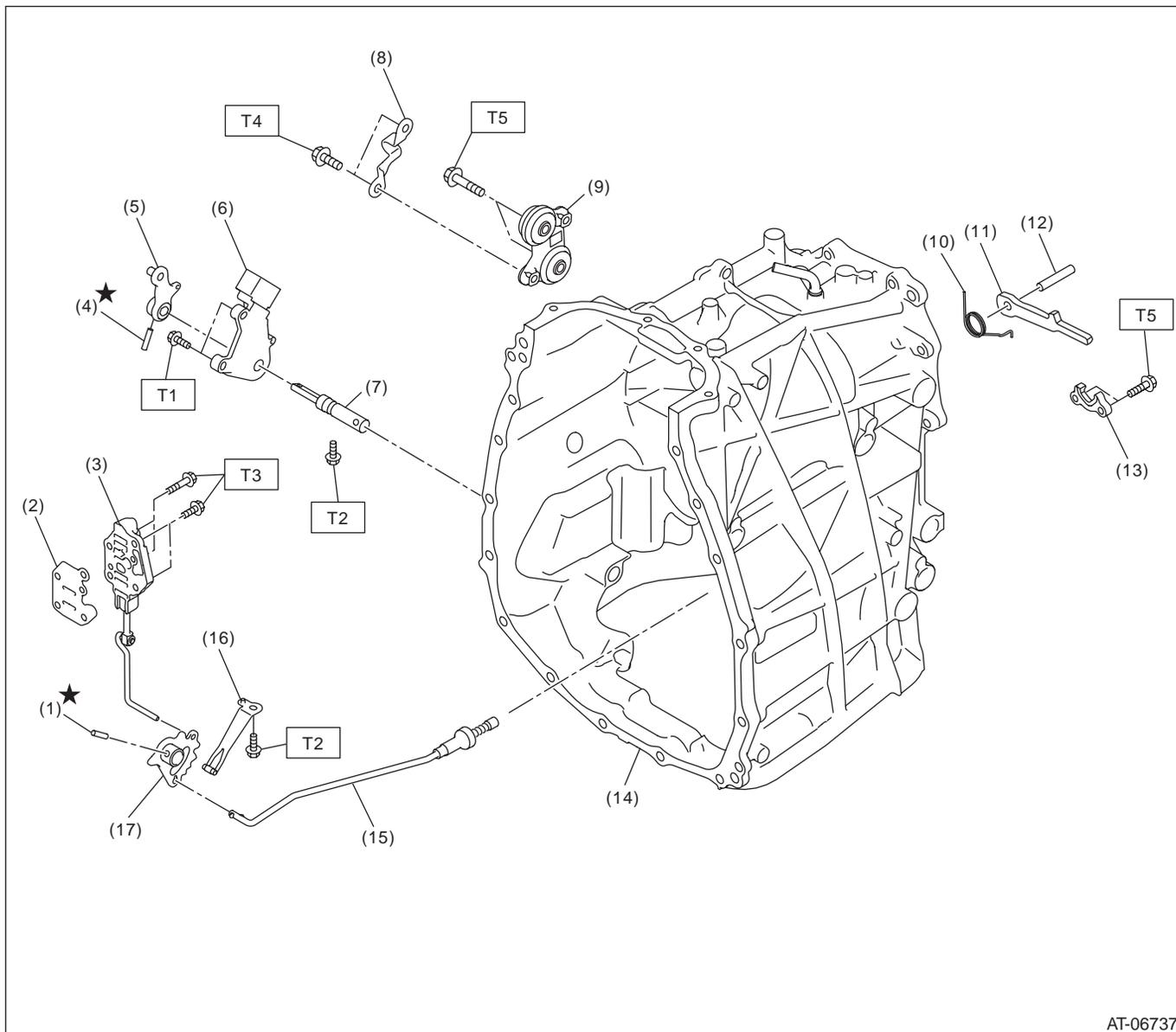
CONTINUOUSLY VARIABLE TRANSMISSION

- | | | |
|------------------------------|----------------------|-----------------------------|
| (1) Converter case | (10) Chamber COMPL | (19) Balance oil guide |
| (2) O-ring | (11) Snap ring | (20) Thrust bearing |
| (3) Seal ring | (12) Dish plate | (21) Planetary carrier ASSY |
| (4) Thrust bearing | (13) Driven plate | (22) Thrust bearing |
| (5) Seal ring | (14) Drive plate | (23) Internal gear |
| (6) Forward clutch drum ASSY | (15) Retaining plate | (24) Thrust gear plate |
| (7) Seal ring | (16) Snap ring | (25) Snap ring |
| (8) Forward clutch piston | (17) Sun gear | (26) Thrust bearing |
| (9) Return spring | (18) Snap ring | (27) Washer |

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7. TRANSMISSION CONTROL DEVICE



AT-06737

- | | |
|-----------------------|------------------------|
| (1) Spring pin | (10) Return spring |
| (2) Separator plate | (11) Parking pawl |
| (3) Manual valve ASSY | (12) Shaft |
| (4) Spring pin | (13) Parking support |
| (5) Shifter arm | (14) Transmission case |
| (6) Inhibitor switch | (15) Parking rod |
| (7) Shifter arm shaft | (16) Detent spring |
| (8) Cable bracket | (17) Manual plate |
| (9) Plate ASSY | |

Tightening torque: N·m (kgf·m, ft·lb)

T1: 5 (0.5, 3.7)

T2: 7 (0.7, 5.2)

T3: 9 (0.9, 6.6)

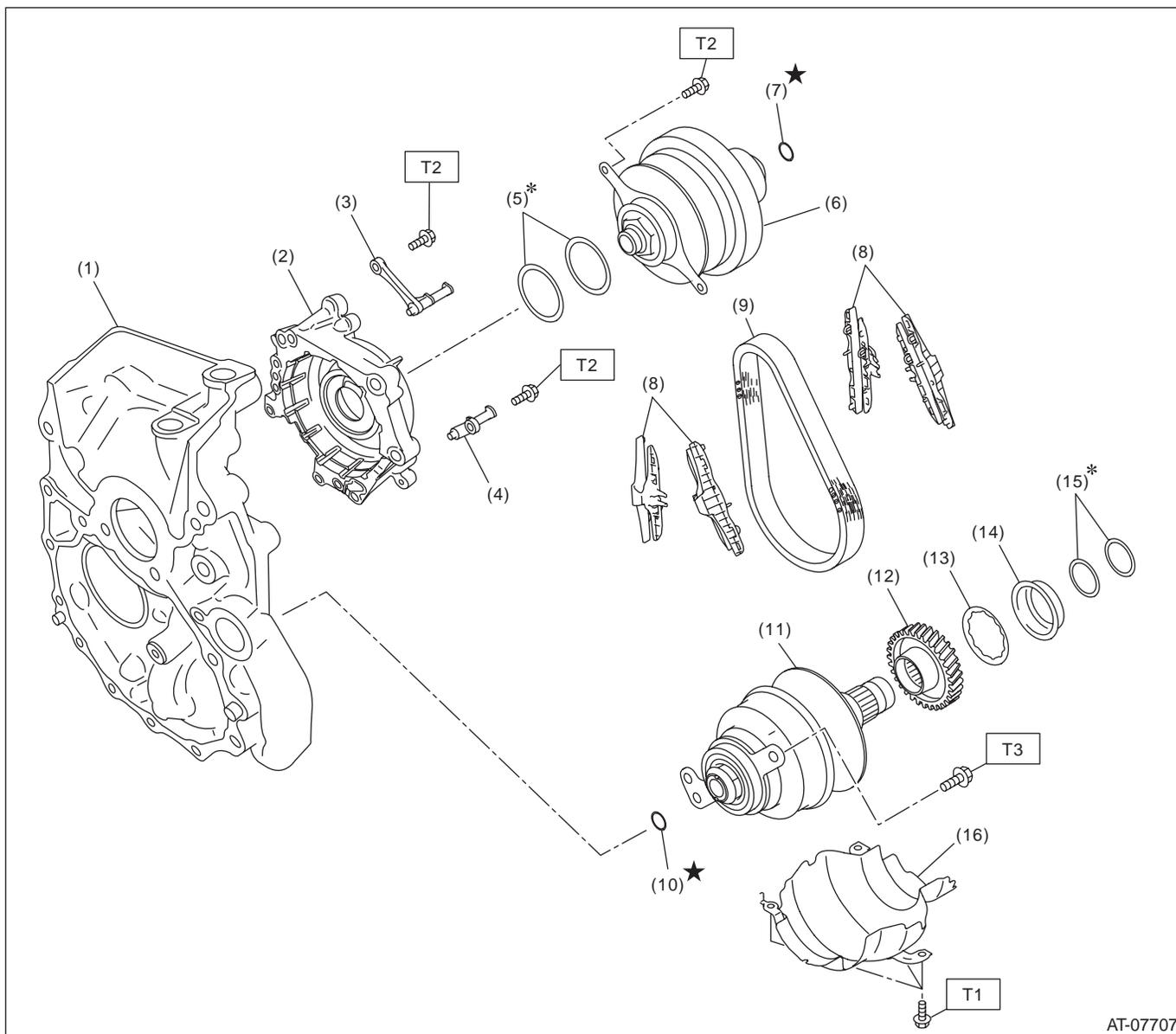
T4: 18 (1.8, 13.3)

T5: 25 (2.5, 18.4)

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8. PRIMARY PULLEY, SECONDARY PULLEY & VARIATOR CHAIN AND REDUCTION DRIVE GEAR



- (1) Drive pinion retainer
- (2) Reverse brake housing
- (3) Support rod
- (4) Lubrication pipe
- (5) Primary pulley shim
- (6) Primary pulley ASSY
- (7) Seal ring

- (8) Chain guide
- (9) Variator chain
- (10) Seal ring
- (11) Secondary pulley ASSY
- (12) Reduction drive gear
- (13) Dish plate
- (14) Spring retainer

- (15) Reduction gear shim
- (16) Oil baffle

Tightening torque: N·m (kgf·m, ft·lb)

T1: 16 (1.6, 11.8)

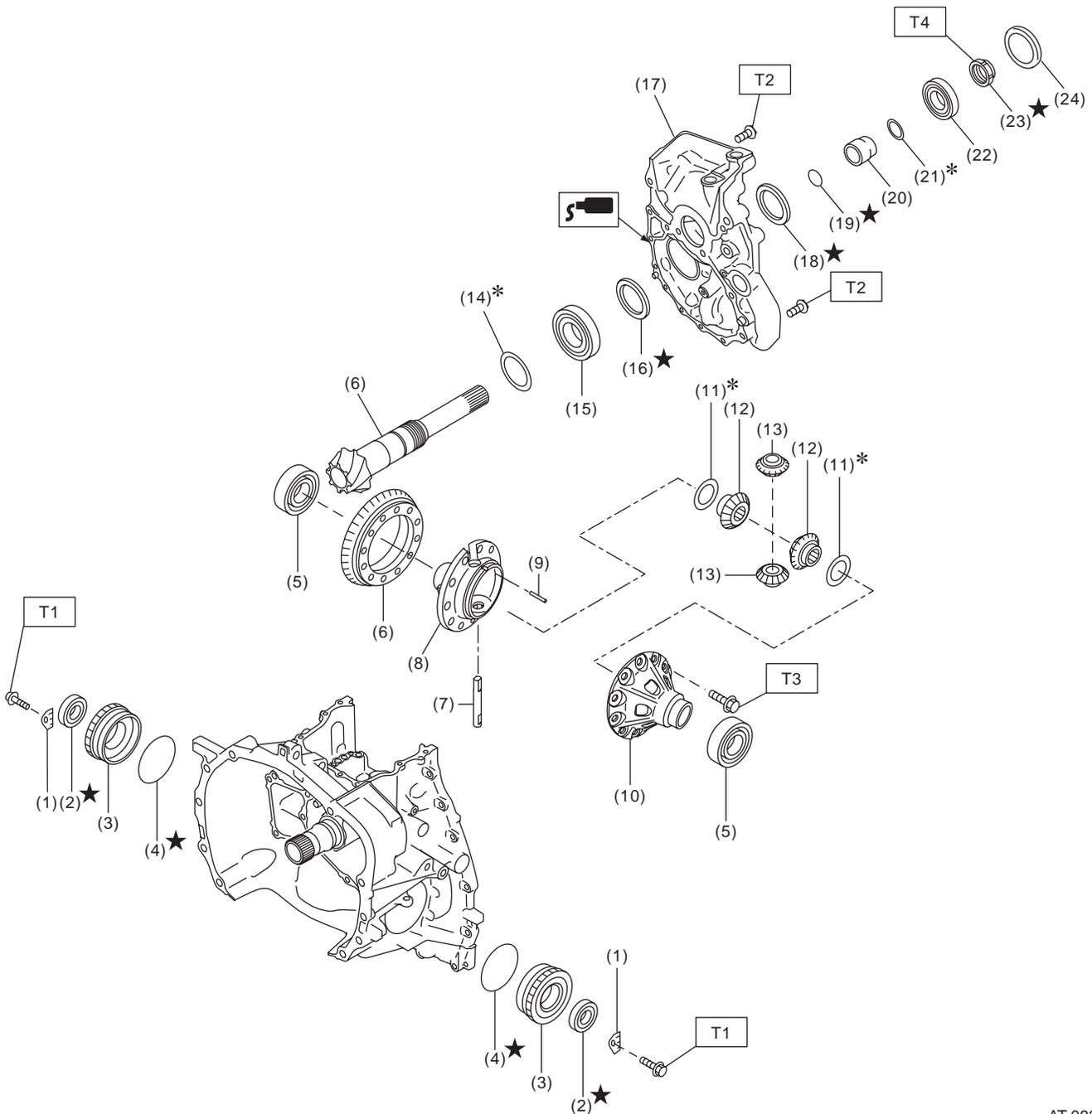
T2: 21 (2.1, 15.5)

T3: 67.5 (6.9, 49.8)

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9. FRONT DIFFERENTIAL GEAR



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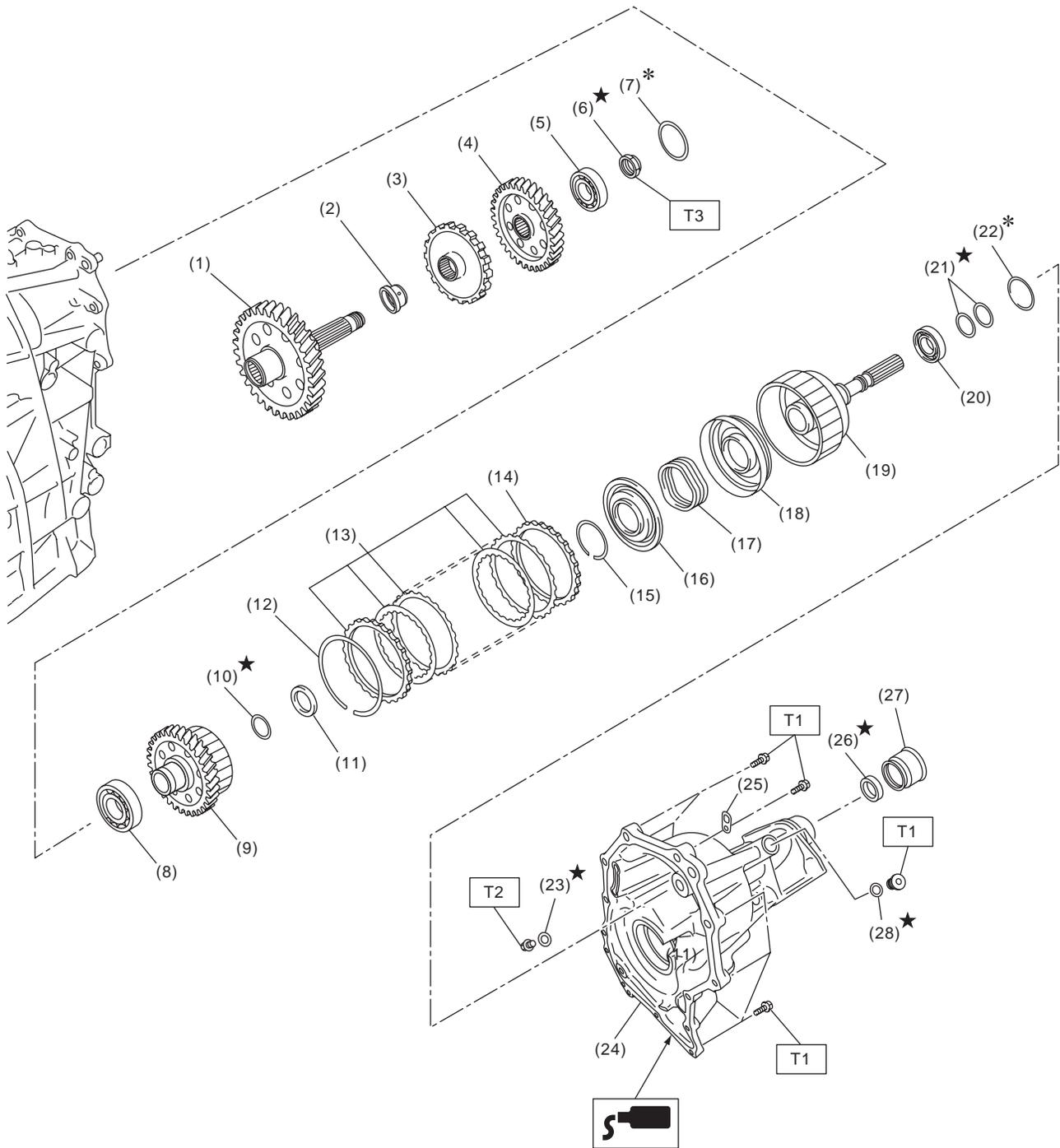
- | | | |
|--------------------------------|--------------------------------|---------------------------|
| (1) Lock plate | (11) Washer | (21) Drive pinion washer |
| (2) Oil seal | (12) Differential bevel gear | (22) Taper roller bearing |
| (3) Differential side retainer | (13) Differential bevel pinion | (23) Lock nut |
| (4) O-ring | (14) Drive pinion shim | (24) Plug |
| (5) Taper roller bearing | (15) Taper roller bearing | |
| (6) Drive pinion gear set | (16) Oil seal | |
| (7) Pinion shaft | (17) Drive pinion retainer | |
| (8) Differential case RH | (18) Oil seal | |
| (9) Straight pin | (19) O-ring | |
| (10) Differential case LH | (20) Drive pinion spacer | |

Tightening torque:N-m (kgf-m, ft-lb)**T1: 25 (2.5, 18.4)****T2: 43 (4.4, 31.7)****T3: 64 (6.5, 47.2)****T4: <Ref. to CVT(TR580)-285,
ASSEMBLY, Drive Pinion Shaft
Assembly.>**

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10. TRANSFER AND EXTENSION CASE



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AT-06868

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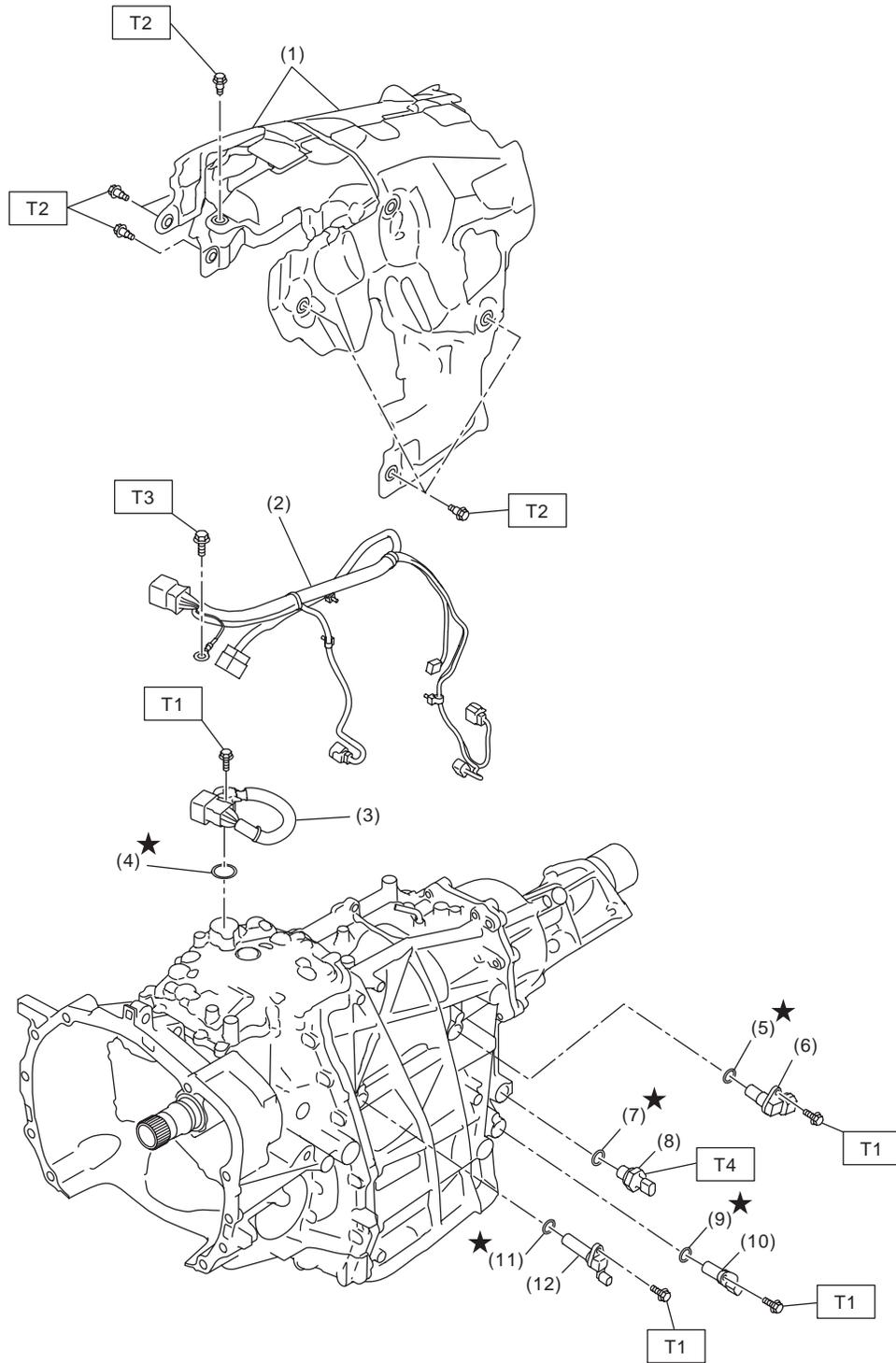
(1) Reduction driven gear COMPL	(12) Snap ring	(23) Gasket
(2) Collar	(13) Transfer clutch plate set	(24) Extension case
(3) Parking gear	(14) Pressure plate	(25) Transmission hanger
(4) Transfer drive gear	(15) Snap ring	(26) Oil seal
(5) Ball bearing	(16) Transfer clutch piston seal	(27) Dust cover
(6) Lock nut	(17) Transfer clutch piston return spring	(28) O-ring
(7) Transfer drive gear shim	(18) Transfer clutch piston	
(8) Ball bearing	(19) Rear drive shaft	
(9) Transfer driven gear	(20) Ball bearing	
(10) Seal ring	(21) Seal ring	
(11) Thrust bearing	(22) Transfer driven gear shim	

Tightening torque: N·m (kgf·m, ft·lb)**T1: 25 (2.5, 18.4)****T2: 35 (3.6, 25.8)****T3: 95 (9.7, 70.1)**

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11. TRANSMISSION HARNESS AND SENSOR



AT-08301

- | | |
|-----------------------------|-------------------------------|
| (1) Transmission case cover | (7) O-ring |
| (2) Inhibitor harness | (8) Secondary pressure sensor |
| (3) Transmission harness | (9) O-ring |
| (4) O-ring | (10) Secondary speed sensor |
| (5) O-ring | (11) O-ring |
| (6) Primary speed sensor | (12) Turbine speed sensor |

Tightening torque: N·m (kgf·m, ft·lb)

T1: 7 (0.7, 3.7)

T2: 8 (0.8, 5.9)

T3: 14 (1.4, 10.3)

T4: 39 (4.0, 28.8)

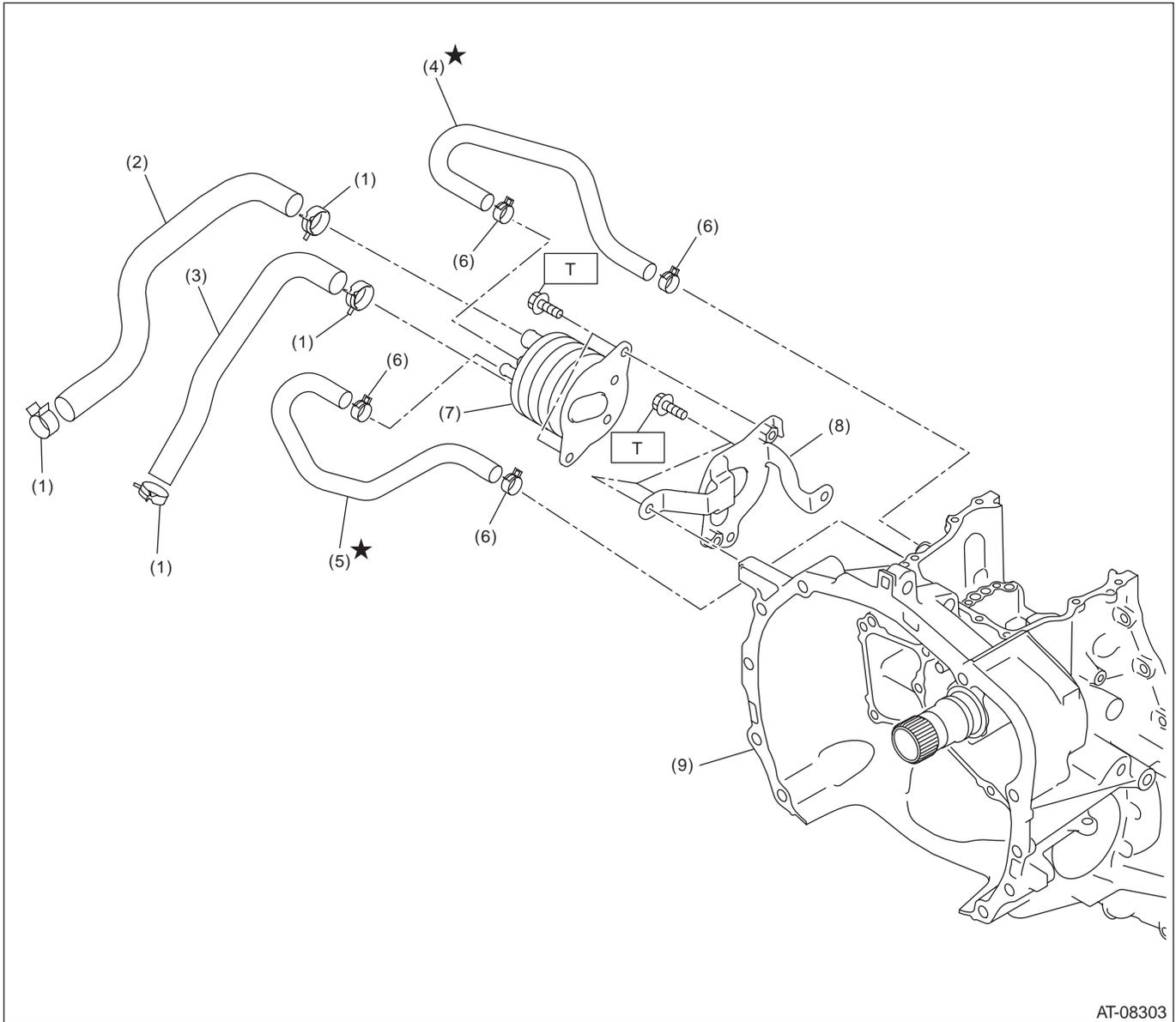
CVT(TR580)-18

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CONTINUOUSLY VARIABLE TRANSMISSION

12. CVTF COOLER (WITH WARMER FEATURE)



AT-08303

- | | |
|--------------------------------|---------------------------------------|
| (1) Hose clamp | (6) Hose clamp |
| (2) Engine coolant outlet hose | (7) CVTF cooler (with warmer feature) |
| (3) Engine coolant inlet hose | (8) CVTF cooler bracket |
| (4) CVTF cooler inlet hose | (9) Converter case |
| (5) CVTF cooler outlet hose | |

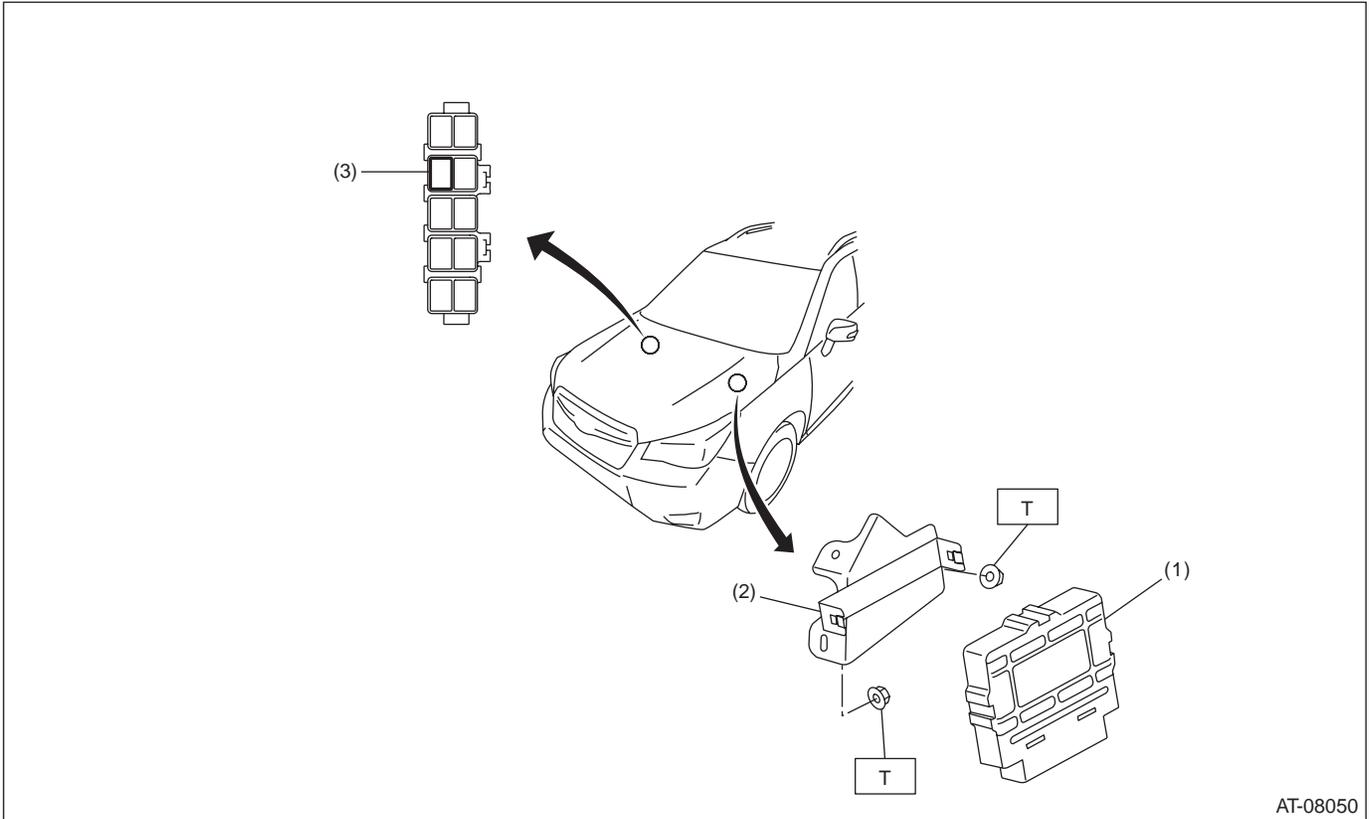
Tightening torque: N·m (kgf·m, ft·lb)

T: 23 (2.3, 17.0)

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13. TRANSMISSION CONTROL MODULE



AT-08050

- (1) Transmission control module (TCM)
- (2) TCM bracket
- (3) Relay

Tightening torque: N·m (kgf·m, ft·lb)

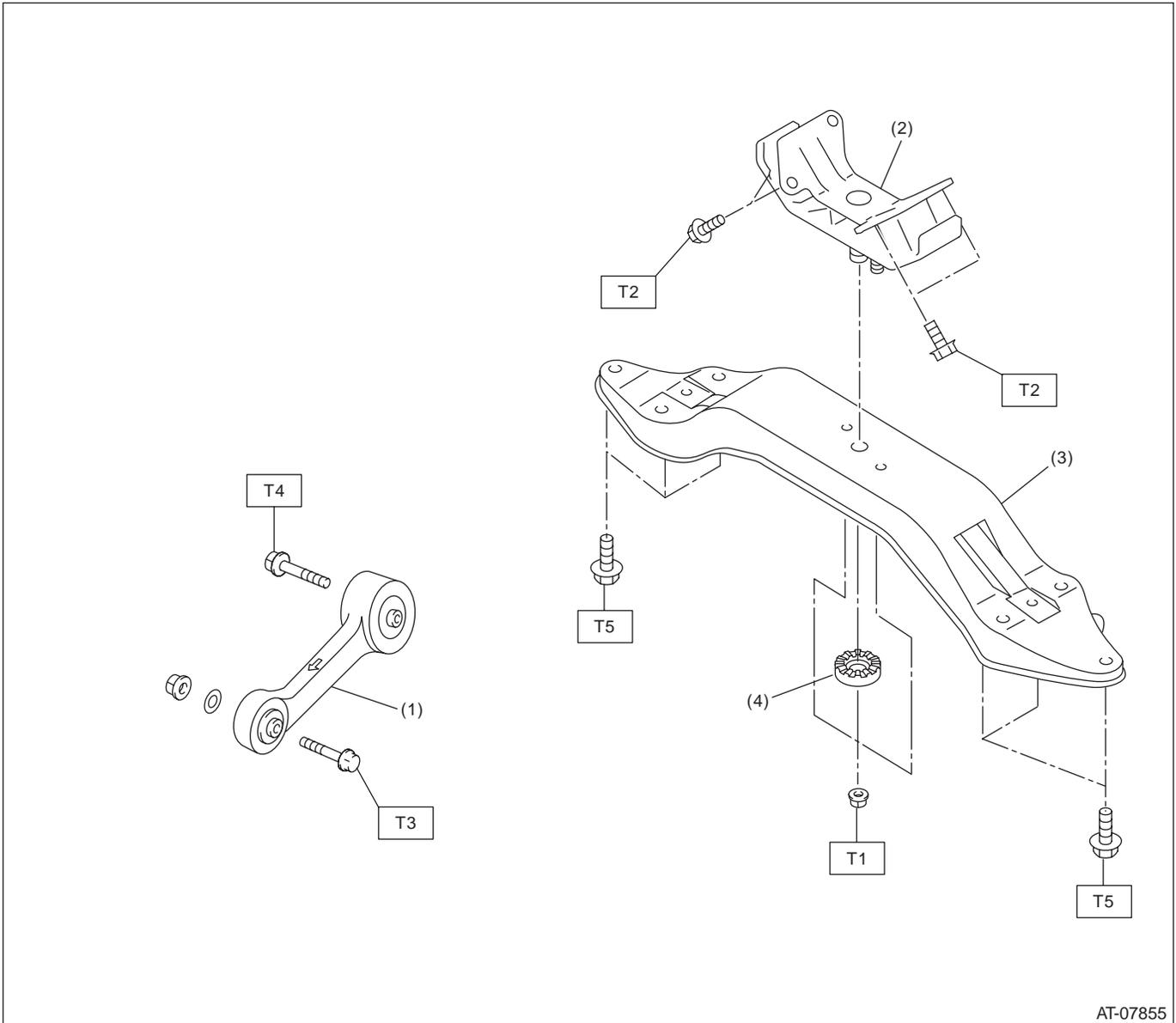
T: 7.5 (0.8, 5.5)

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14. 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)

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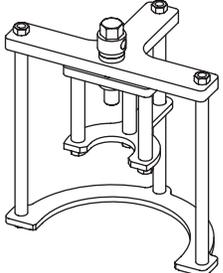
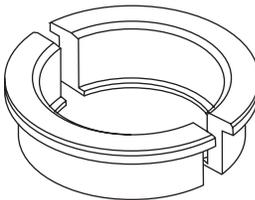
CONTINUOUSLY VARIABLE TRANSMISSION

C: CAUTION

- Wear appropriate work clothing, including a cap, protective goggles and protective shoes when performing any work.
- Remove contamination including dirt and corrosion before removal, installation or disassembly.
- Keep the disassembled parts in order and protect them from dust and dirt.
- Do not place the valve cover with its inner side facing up until it is installed, to prevent intrusion of foreign matter into the control 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 CVTF and recommended grease. Do not mix CVTF, 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 specified locations.
- Apply CVTF onto sliding or revolving surfaces before installation.
- Replace deformed or damaged snap rings with new parts.
- Before installing O-rings or oil seals, apply sufficient amount of CVTF or gear oil to appropriate locations in order to avoid damage and deformation.
- Be careful not to incorrectly install or fail to install O-rings, snap rings and other such parts.
- Before securing a part on a vise, place cushioning material such as wood blocks, aluminum plate, or cloth between the part and the vise.
- Avoid damaging the mating surface of the case.
- Before applying liquid gasket, completely remove the old liquid gasket.
- After removing the sensors, breather hose and plugs, plug the holes to avoid foreign materials intruding as necessary.
- During disassembly or assembly, be sure to use nylon gloves or paper towels. Do not use cloth gloves or waste cloth.

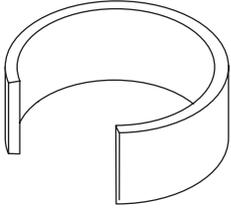
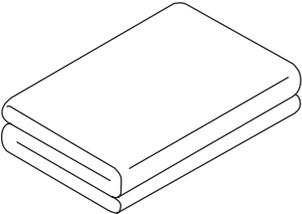
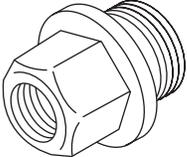
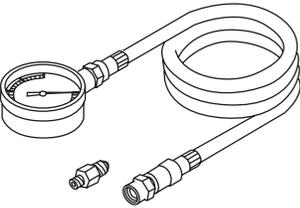
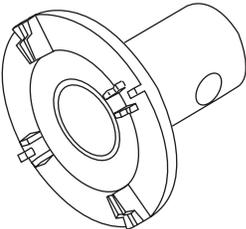
D: PREPARATION TOOL

1. SPECIAL TOOL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST18769AA010	18769AA010	EXPANDER PULLEY	Used for removing and installing the secondary pulley assembly.
 ST18767AA010	18767AA010	BEARING REMOVER	Used for removing the ball bearing of transfer clutch assembly.

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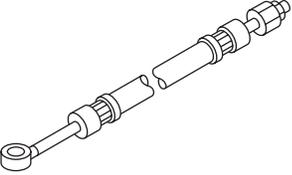
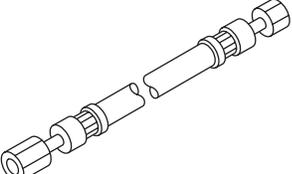
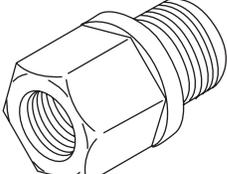
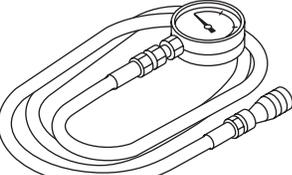
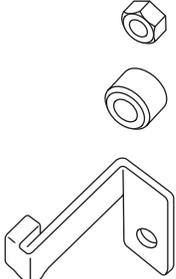
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ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p>ST18762AA010</p>	18762AA010	COMPRESSOR SPECIAL TOOL	Used for removing and installing snap ring of forward clutch assembly.
 <p>ST18761AA010</p>	18761AA010	SHEET SPECIAL TOOL	<ul style="list-style-type: none"> • Used for removing and installing control valve body. • Used for removing and installing valve cover. • Used for removing and installing transmission harness.
 <p>ST18681AA010</p>	18681AA010	PRESSURE GAUGE ADAPTER	Used for measuring the secondary pressure (line pressure). NOTE: Used together with the genuine O-ring (part No. 806916050).
 <p>ST18801AA000</p>	18801AA000	OIL PRESSURE GAUGE ASSY	Used for measuring the secondary pressure (line pressure).
 <p>ST18658AA020</p>	18658AA020	WRENCH COMPL RETAINER	Used for removing and installing the differential side retainer.

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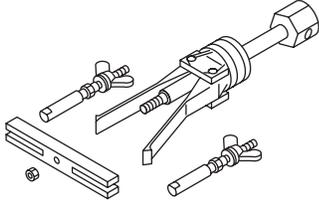
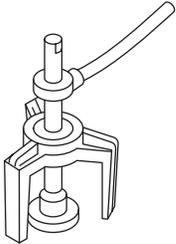
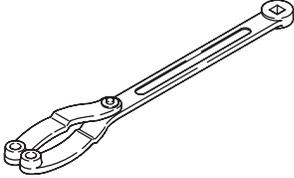
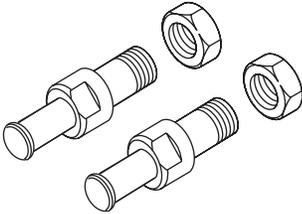
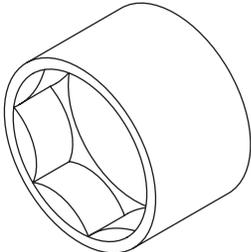
General Description

CONTINUOUSLY VARIABLE TRANSMISSION

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p style="text-align: center;">ST34099AC020</p>	34099AC020	ADAPTER HOSE B	Used for measuring the transfer clutch hydraulic pressure. NOTE: Used with genuine union screw (Part No. 801914010) and gasket (Part No. 803914060).
 <p style="text-align: center;">ST34099AC010</p>	34099AC010	ADAPTER HOSE A	Used for measuring the transfer clutch hydraulic pressure.
 <p style="text-align: center;">ST18681AA000</p>	18681AA000	PRESSURE GAUGE ADAPTER	Used for measuring the transfer clutch hydraulic pressure. NOTE: Used together with the genuine O-ring (part No. 806911080).
 <p style="text-align: center;">ST-498575400</p>	498575400	OIL PRESSURE GAUGE ASSY	Used for measuring the transfer clutch hydraulic pressure.
 <p style="text-align: center;">ST-498277200</p>	498277200	STOPPER SET	<ul style="list-style-type: none"> • Used for removing and installing transmission assembly to engine. • Used for preventing the torque converter from dropping off.

General Description

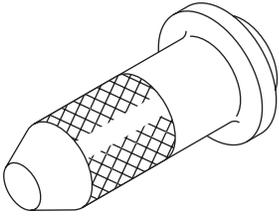
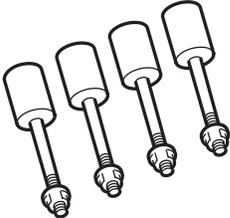
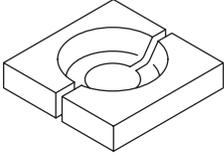
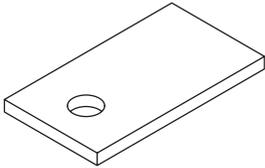
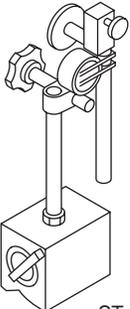
CONTINUOUSLY VARIABLE TRANSMISSION

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p>ST-398527700</p>	398527700	PULLER ASSY	<ul style="list-style-type: none"> Used for removing the extension case oil seal. Used for removing the bearing outer race of the drive pinion shaft.
 <p>ST-398673600</p>	398673600	COMPRESSOR	Used for removing and installing snap ring of forward clutch assembly.
 <p>ST18355AA000</p>	18355AA000	PULLEY WRENCH	<ul style="list-style-type: none"> Used for removing and installing the lock nut of reduction driven gear. Used together with PIN SET (18334AA000).
 <p>ST18334AA000</p>	18334AA000	PIN SET	<ul style="list-style-type: none"> Used for removing and installing the lock nut of reduction driven gear. Used together with PULLEY WRENCH (18355AA000).
 <p>ST-499987003</p>	499987003	SOCKET WRENCH (35)	Used for removing and installing the lock nut of reduction driven gear.

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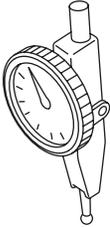
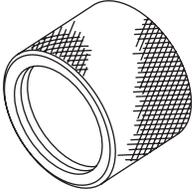
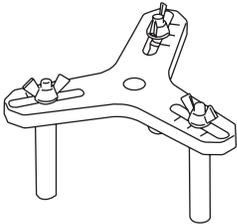
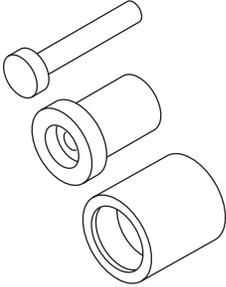
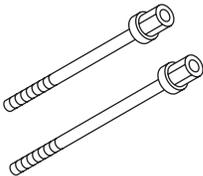
General Description

CONTINUOUSLY VARIABLE TRANSMISSION

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p style="text-align: center;">ST-498057300</p>	498057300	OIL SEAL INSTALLER	Used for installing the extension case oil seal.
 <p style="text-align: center;">ST18632AA000</p>	18632AA000	STAND ASSY	Used for disassembling and assembling the transmission.
 <p style="text-align: center;">ST-498515500</p>	498515500	REMOVER	Used for removing the bearing inner race of the drive pinion shaft.
 <p style="text-align: center;">ST-498255400</p>	498255400	PLATE	Used for measuring the backlash of hypoid gear.
 <p style="text-align: center;">ST-498247001</p>	498247001	MAGNET BASE	<ul style="list-style-type: none"> • Used for measuring the backlash of differential bevel pinion gear. • Used for measuring the backlash of hypoid gear. • Used together with DIAL GAUGE (498247100).

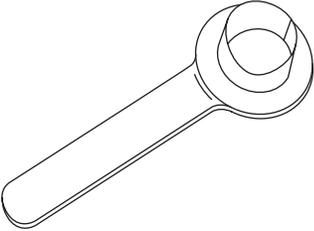
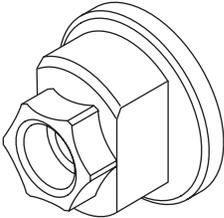
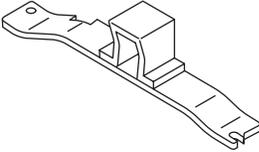
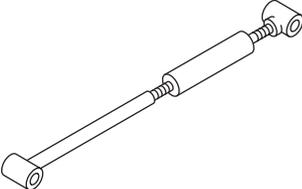
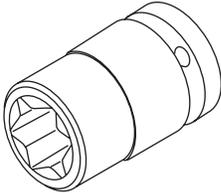
General Description

CONTINUOUSLY VARIABLE TRANSMISSION

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p>ST-498247100</p>	498247100	DIAL GAUGE	<ul style="list-style-type: none"> • Used for measuring the backlash of differential bevel pinion gear. • Used for measuring the backlash of hypoid gear. • Used together with DIAL GAUGE (498247101).
 <p>ST18675AA000</p>	18675AA000	DIFFERENTIAL SIDE OIL SEAL INSTALLER	Used for installing the differential side retainer oil seal.
 <p>ST18762AA001</p>	18762AA001	COMPRESSOR SPECIAL TOOL	<ul style="list-style-type: none"> • Used for disassembling and installing the multi-plate clutch piston. • COMPRESSOR SPECIAL TOOL (18762AA000) can also be used.
 <p>ST-927720000</p>	927720000	HOUSING BUSHING INSTALLER AND REMOVER	<ul style="list-style-type: none"> • Used for installing the oil seal. • Use BUSHING SHAFT (927880000).
 <p>ST18763AA000</p>	18763AA000	COMPRESSOR SHAFT	Used for measuring the backlash of hypoid gear.

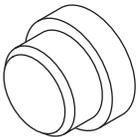
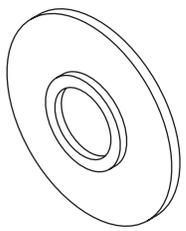
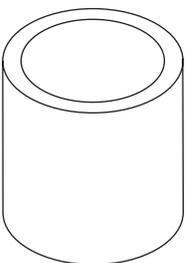
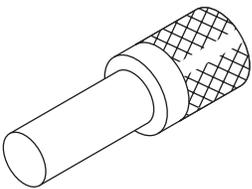
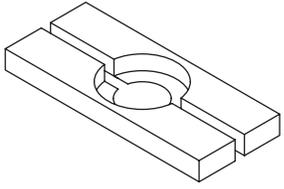
General Description

CONTINUOUSLY VARIABLE TRANSMISSION

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p style="text-align: center;">ST28399SA010</p>	28399SA010	OIL SEAL PROTECTOR	Used for protecting oil seal when installing front drive shaft.
 <p style="text-align: center;">ST-498937110</p>	498937110	HOLDER	<ul style="list-style-type: none"> • Used for removing and installing the drive pinion lock nut. • Used as a holder to rotate gear when checking tooth contact.
 <p style="text-align: center;">ST41099AA011</p>	41099AA011	ENGINE SUPPORT BRACKET	<ul style="list-style-type: none"> • Used for supporting the engine. • ENGINE SUPPORT BRACKET (41099AA010) can also be used.
 <p style="text-align: center;">ST41099AA020</p>	41099AA020	ENGINE SUPPORT	Used for supporting the engine.
 <p style="text-align: center;">ST18270KA020</p>	18270KA020	SOCKET (E20)	<ul style="list-style-type: none"> • Used for removing and installing the hypoid driven gear. • Used for removing and installing the drive pinion shaft retainer.

General Description

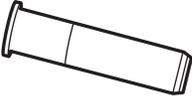
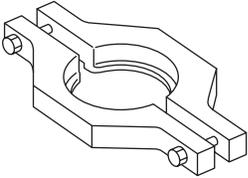
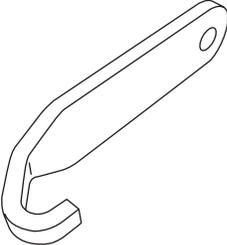
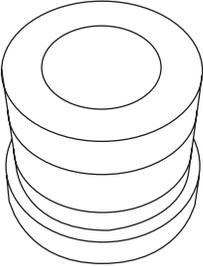
CONTINUOUSLY VARIABLE TRANSMISSION

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p>ST-398497701</p>	398497701	SEAT	Used for removing and installing the bearing.
 <p>ST-398177700</p>	398177700	INSTALLER	<ul style="list-style-type: none"> • Used for installing the ball bearing. • Used for installing the parking gear. • Used for installing the bearing outer race. • Used for installing the plug.
 <p>ST28499TC010</p>	28499TC010	PRESS SNAP RING	<ul style="list-style-type: none"> • Used for installing the ball bearing of the transmission case. • Used for installing the bearing outer race of drive pinion shaft.
 <p>ST-899864100</p>	899864100	REMOVER	<ul style="list-style-type: none"> • Used for removing and installing the ball bearing. • Used for removing the parking gear and transfer drive gear. • Used for removing the bearing inner race of the front differential.
 <p>ST-498077000</p>	498077000	REMOVER	Used for removing the bearing inner race of the front differential.

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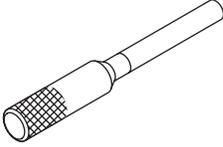
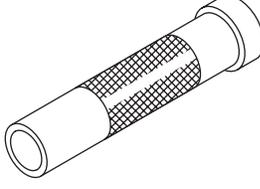
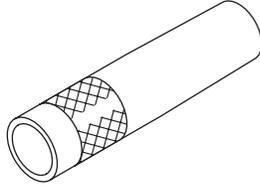
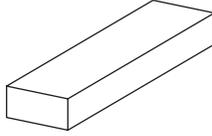
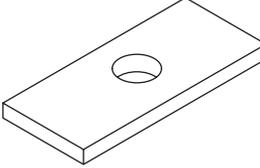
General Description

CONTINUOUSLY VARIABLE TRANSMISSION

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p style="text-align: center;">ST18657AA010</p>	18657AA010	INSTALLER	Used for installing the oil seal at shifter arm shaft portion.
 <p style="text-align: center;">ST-498077600</p>	498077600	REMOVER	Used for removing the ball bearing of drive sprocket.
 <p style="text-align: center;">ST18720AA000</p>	18720AA000	REMOVER	Used for removing the ball bearing of transfer clutch assembly.
 <p style="text-align: center;">ST-498497300</p>	498497300	CRANKSHAFT STOPPER	Used for stopping the drive plate rotation when removing and installing the drive plate.
 <p style="text-align: center;">ST-399513600</p>	399513600	INSTALLER	Used for removing the ball bearing of drive sprocket.

General Description

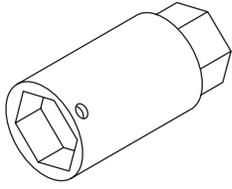
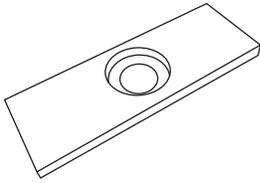
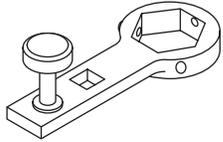
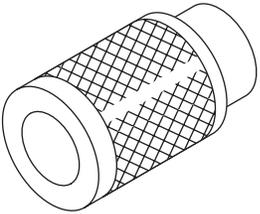
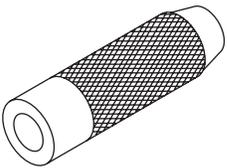
CONTINUOUSLY VARIABLE TRANSMISSION

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p>ST-499267300</p>	499267300	STOPPER PIN	Used for adjusting the inhibitor switch.
 <p>ST-499277100</p>	499277100	BUSHING 1-2 INSTALLER	<ul style="list-style-type: none"> • Used for installing the bearing of the transmission case. • Used for installing the ball bearing. • Used for installing the bearing inner race.
 <p>ST-499277200</p>	499277200	INSTALLER	Used for installing the ball bearing of the transfer clutch assembly.
 <p>ST-499575400</p>	499575400	GAUGE	Used for measuring height of end play.
 <p>ST-499575500</p>	499575500	GAUGE	Used for measuring height of end play.

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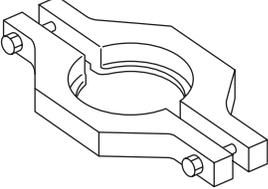
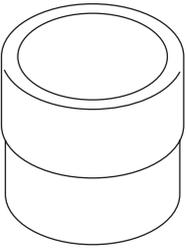
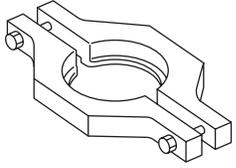
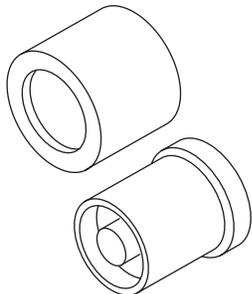
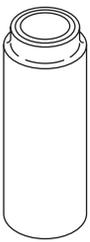
General Description

CONTINUOUSLY VARIABLE TRANSMISSION

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p style="text-align: center;">ST-499787500</p>	499787500	ADAPTER	<ul style="list-style-type: none"> • Used for removing and installing the drive pinion shaft lock nut. • Used for measuring the preload of the drive pinion shaft. • Used for measuring the backlash of hypoid gear.
 <p style="text-align: center;">ST-499575600</p>	499575600	GAUGE	Used for measuring height of end play.
 <p style="text-align: center;">ST-499787700</p>	499787700	WRENCH	<ul style="list-style-type: none"> • Used for removing and installing the drive pinion shaft lock nut. • Used for measuring the preload of the drive pinion shaft. • Used for measuring the backlash of hypoid gear.
 <p style="text-align: center;">ST-499757002</p>	499757002	INSTALLER	<ul style="list-style-type: none"> • Used for removing the bearing of reduction driven gear. • Used for installing the parking gear. • Used for installing the transfer drive gear.
 <p style="text-align: center;">ST-899580100</p>	899580100	INSTALLER	<ul style="list-style-type: none"> • Used for installing the collar of reduction driven gear. • Used for installing the ball bearing of the transfer driven gear. • Used for installing the bearing inner race of drive pinion shaft.

General Description

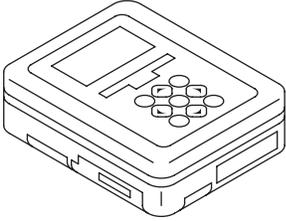
CONTINUOUSLY VARIABLE TRANSMISSION

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p>ST-498077300</p>	498077300	REMOVER	Used for installing the ball bearing of reduction driven gear.
 <p>ST-499755602</p>	499755602	PRESS SNAP RING	<ul style="list-style-type: none"> • Used for installing the oil seal. • Used for installing the ball bearing and roller bearing. • Used for installing the plug.
 <p>ST-498077400</p>	498077400	REMOVER	Used for removing the ball bearing of transfer driven gear.
 <p>ST20099AE020</p>	20099AE020	INSTALLER	Used for installing the bearing outer race of drive pinion shaft.
 <p>ST-927130000</p>	927130000	EXTENSION DRIVE SHAFT	Used for installing the bearing inner race of drive pinion shaft.

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General Description

CONTINUOUSLY VARIABLE TRANSMISSION

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

2. GENERAL TOOL

TOOL NAME	REMARKS
Circuit tester	Used for measuring resistance and voltage.
Thickness gauge	Used for measuring the clearance in reverse brake, forward clutch and transfer clutch.
Caliper	Used for measuring the dimension.
Spring scale	Used for measuring the starting torque of the drive pinion.
TORX® bit T70	Used for removing and installing differential gear oil drain plug.
Straight pin remover	Used for removing and installing the straight pin.
Push/pull gauge	Used for measuring clutch clearance.
Angle gauge	Used for installing the drive plate.

2. CVTF

A: INSPECTION

Check for leakage of CVTF from transmission.

B: ADJUSTMENT

CAUTION:

- CVTF level changes along with CVTF temperature. When inspecting CVTF level, observe the specified CVTF temperature.

- Always use specified CVTF. Using other fluid will cause malfunction.

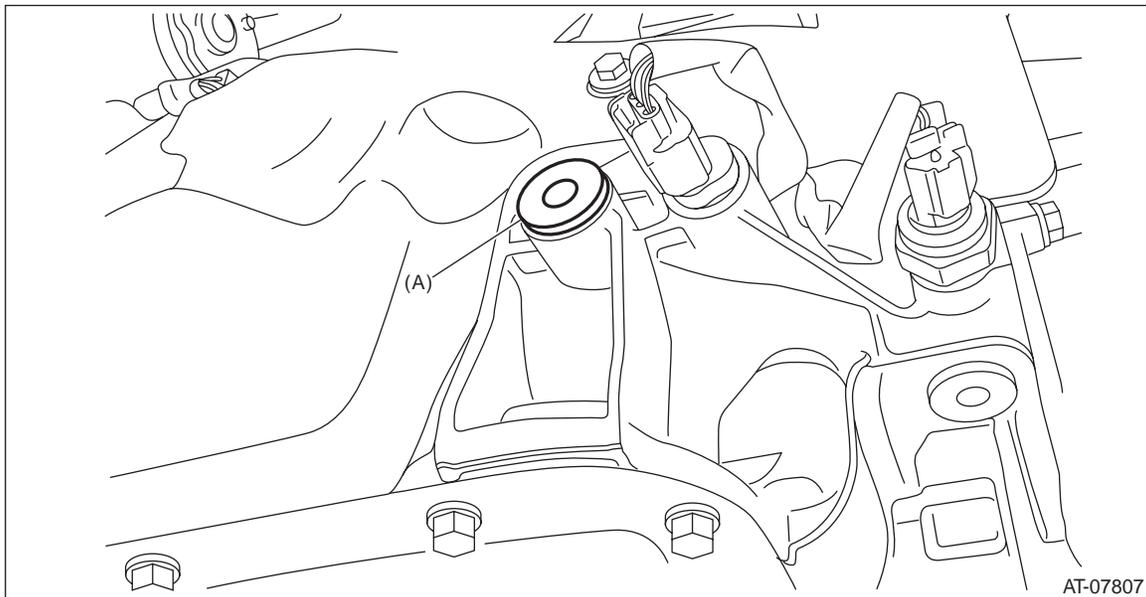
- 1) Idle the engine to raise CVTF temperature to 35 — 45°C (95 — 113°F) on Subaru Select Monitor.
- 2) Operate the select lever in P → R → N → D and D → N → R → P to circulate CVTF with the engine idling.
- 3) Lift up the vehicle while the engine is running.
- 4) Remove the under cover front - transmission.
- 5) Remove the filler plug.

CAUTION:

Pay special attention to the following operations as the engine is at idle.

NOTE:

CVTF is at the specified level when it is up to the filler plug hole lower section.



(A) Filler plug

CVTF

CONTINUOUSLY VARIABLE TRANSMISSION

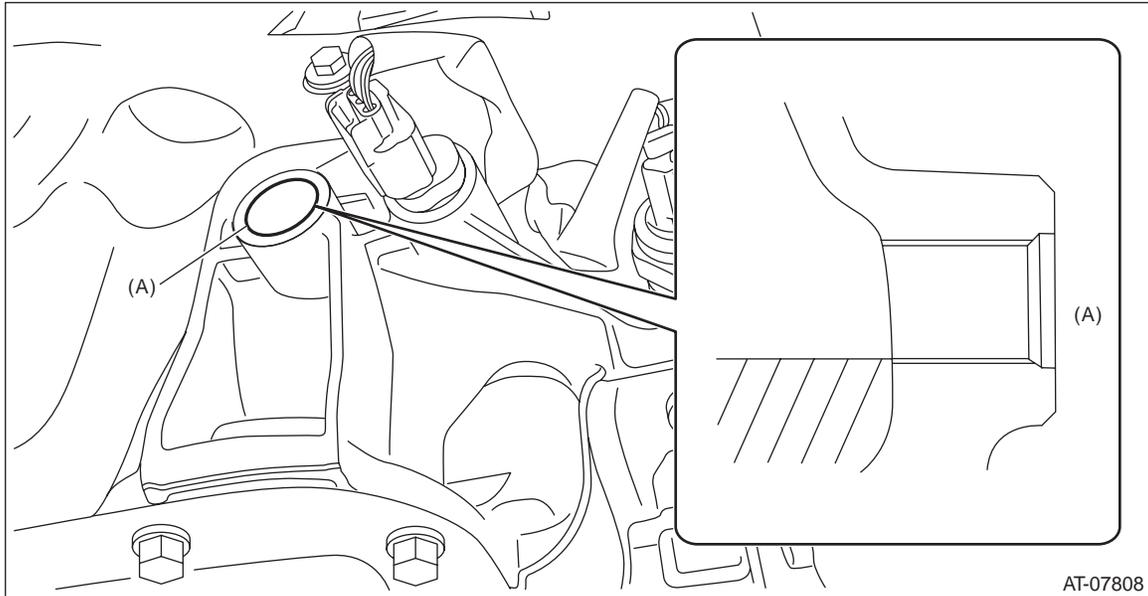
6) When there is no CVTF leakage from the transmission, add the specified fluid up to the filler plug hole lower section.

Specified fluid:

<Ref. to CVT(TR580)-4, HYDRAULIC CONTROL AND LUBRICATION, SPECIFICATION, General Description.>

CAUTION:

Note that when CVTF is added up to the lower section of filler plug while the transmission is in cold condition, overfilling of CVTF occurs, causing the oil to spill out.



(A) Filler plug hole

7) Install the filler plug.

NOTE:

Use a new gasket.

Tightening torque:

50 N·m (5.1 kgf·m, 36.9 ft·lb)

8) Install the under cover front - transmission.

Tightening torque:

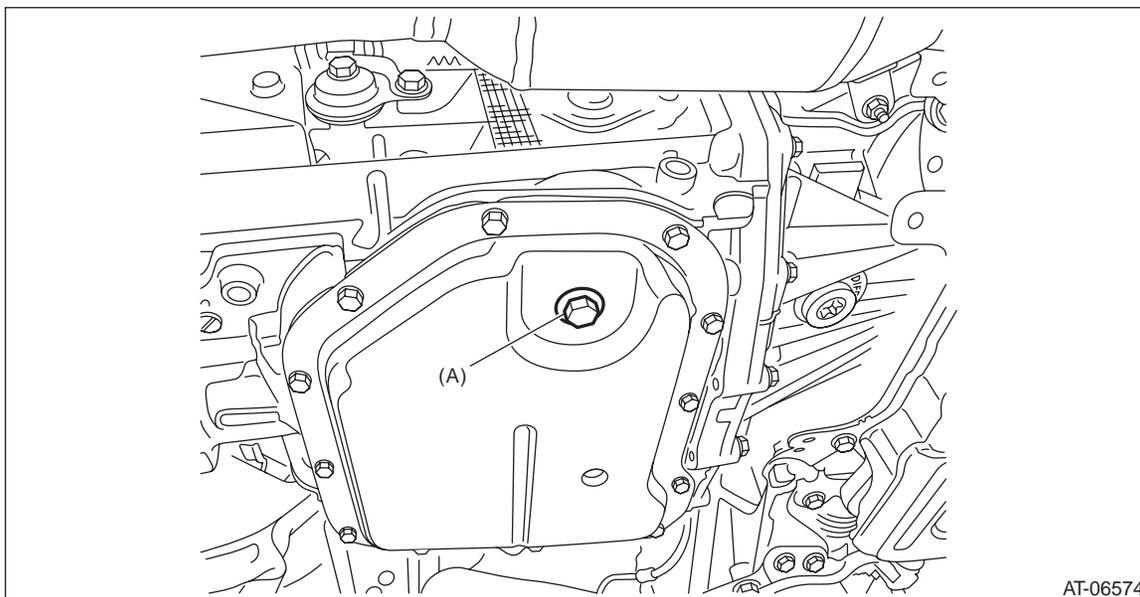
18 N·m (1.8 kgf·m, 13.3 ft·lb)

C: REPLACEMENT

CAUTION:

- Directly after the vehicle has been running or the engine has been idling for a long time, the CVTF is hot. Be careful not to burn yourself.
- Be careful not to spill the CVTF on exhaust pipe to prevent it from emitting smoke or causing fires. If CVTF adheres, wipe it off completely.
- Always use specified CVTF. Using other fluid will cause malfunction.

- 1) Lift up the vehicle.
- 2) Remove the under cover front - transmission.
- 3) Remove the CVTF drain plug.



(A) CVTF drain plug

- 4) Check the CVTF condition. <Ref. to CVT(TR580)-39, CONDITION CHECK, CVTF.>
- 5) Install the CVTF drain plug and gasket.

NOTE:

- Use a new gasket.

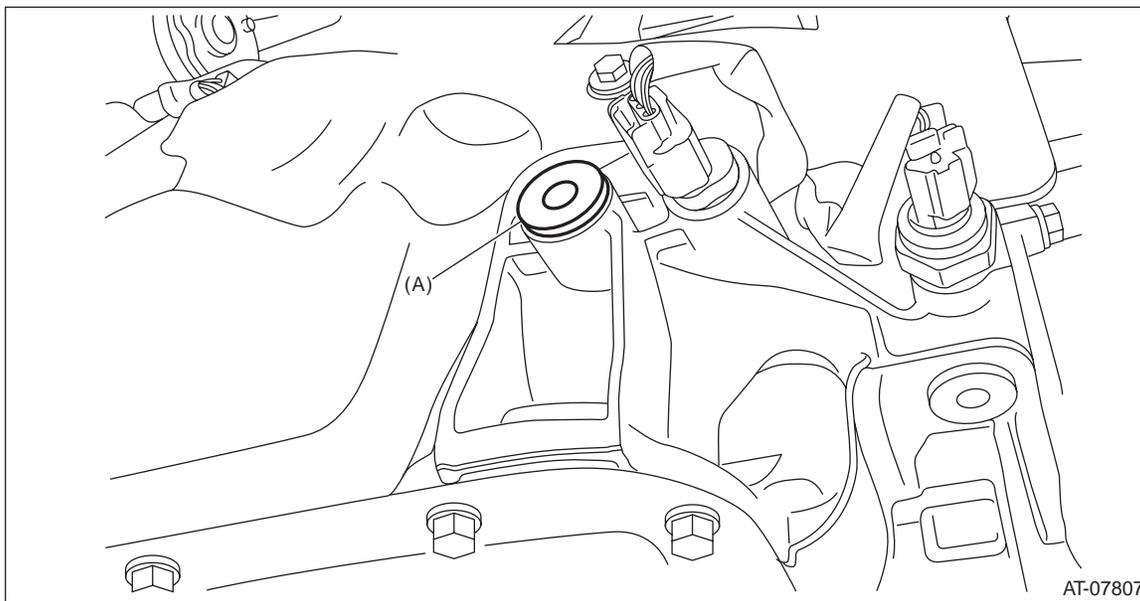
Tightening torque:

31 N·m (3.2 kgf·m, 22.9 ft·lb)

CVTF

CONTINUOUSLY VARIABLE TRANSMISSION

6) Remove the filler plug.



(A) Filler plug

7) Add the specified fluid up to the filler plug hole lower section.

Specified fluid:

<Ref. to CVT(TR580)-4, HYDRAULIC CONTROL AND LUBRICATION, SPECIFICATION, General Description.>

8) Temporarily tighten the filler plug.

9) Idle the engine to raise CVTF temperature to 35 — 45°C (95 — 113°F) on Subaru Select Monitor.

10) Operate the select lever in P → R → N → D and D → N → R → P to circulate CVTF with the engine idling.

CAUTION:

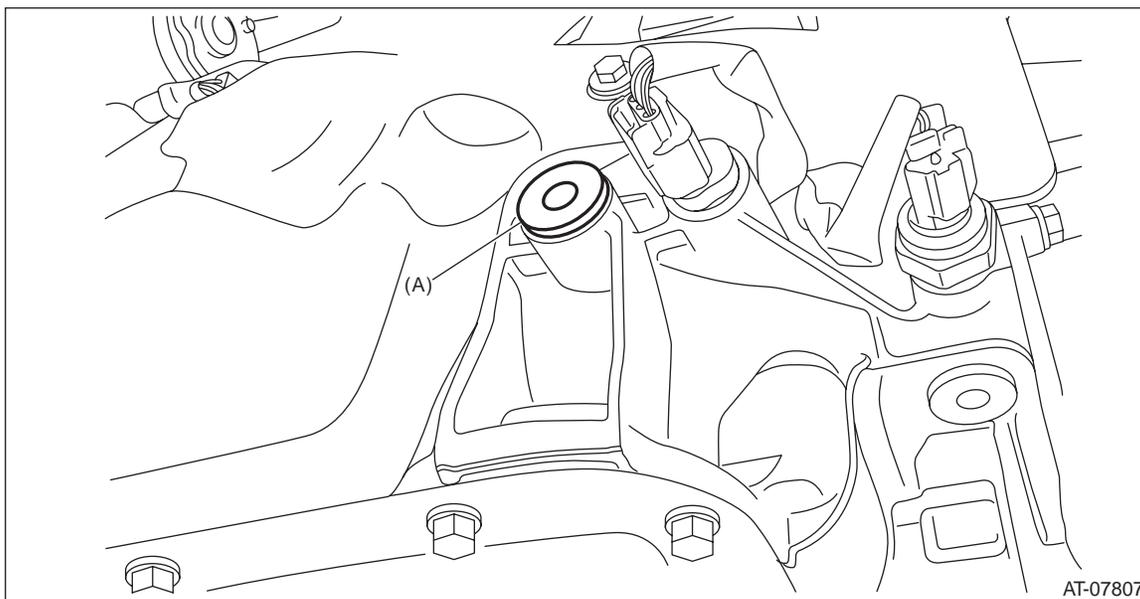
Pay special attention to the following operations as the engine is at idle.

11) With the select lever shifted to “P” range and the engine started, lift up the vehicle. Adjust the CVTF level and check for leakage. <Ref. to CVT(TR580)-35, ADJUSTMENT, CVTF.>

12) Replace with a new gasket, and attach the filler plug.

Tightening torque:

50 N·m (5.1 kgf·m, 36.9 ft·lb)



(A) Filler plug

13) Install the under cover front - transmission.

Tightening torque:

18 N·m (1.8 kgf·m, 13.3 ft·lb)

D: CONDITION CHECK

NOTE:

When replacing CVTF, determine the condition inside the transmission body by inspecting the drained CVTF.

Fluid condition	Trouble and possible cause	Corrective action
Metal particles.	Excessive wear of the internal of the transmission body.	Replace CVTF and check if CVT operates correctly.
Thick and varnish-form fluid.	Burnt clutches	Replace CVTF and check the CVT body or vehicle for faulty.
Clouded CVTF or bubbles.	Water mixed in fluid.	Replace CVTF and check the water entering point.

Differential Gear Oil

CONTINUOUSLY VARIABLE TRANSMISSION

3. Differential Gear Oil

A: INSPECTION

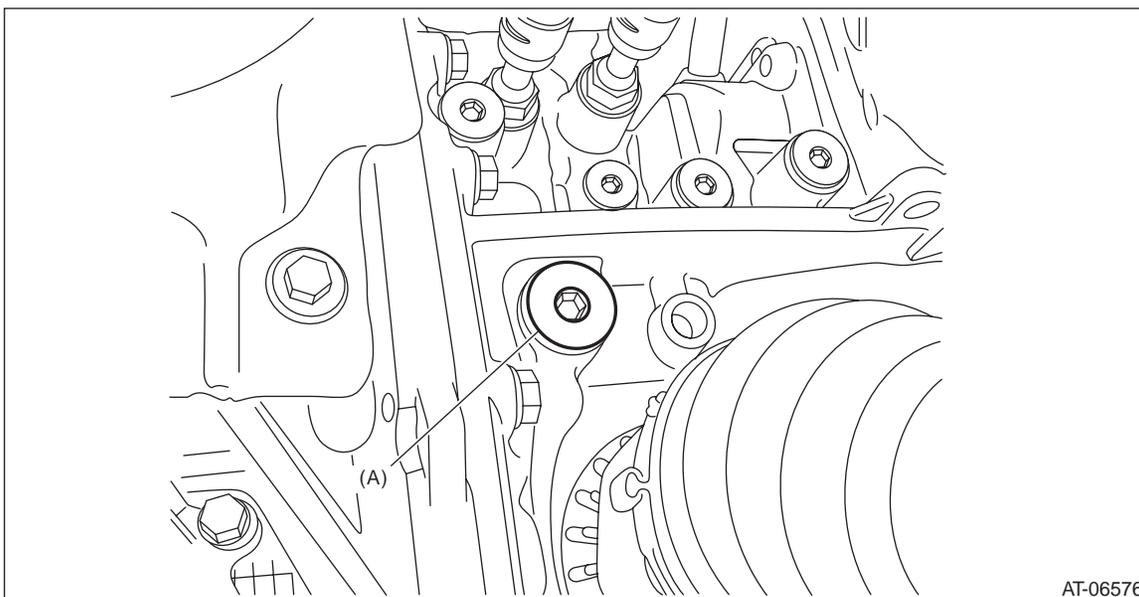
Check that there is no leakage of differential gear oil from the converter case.

B: ADJUSTMENT

NOTE:

Immediately after removing the overflow drain plug, remaining gear oil (approx. 8 cc) may come out of the overflow pipe. This is not included in the specified amount. When removing the overflow drain plug, make sure the gear oil flows out of the overflow drain plug hole by filling with gear oil.

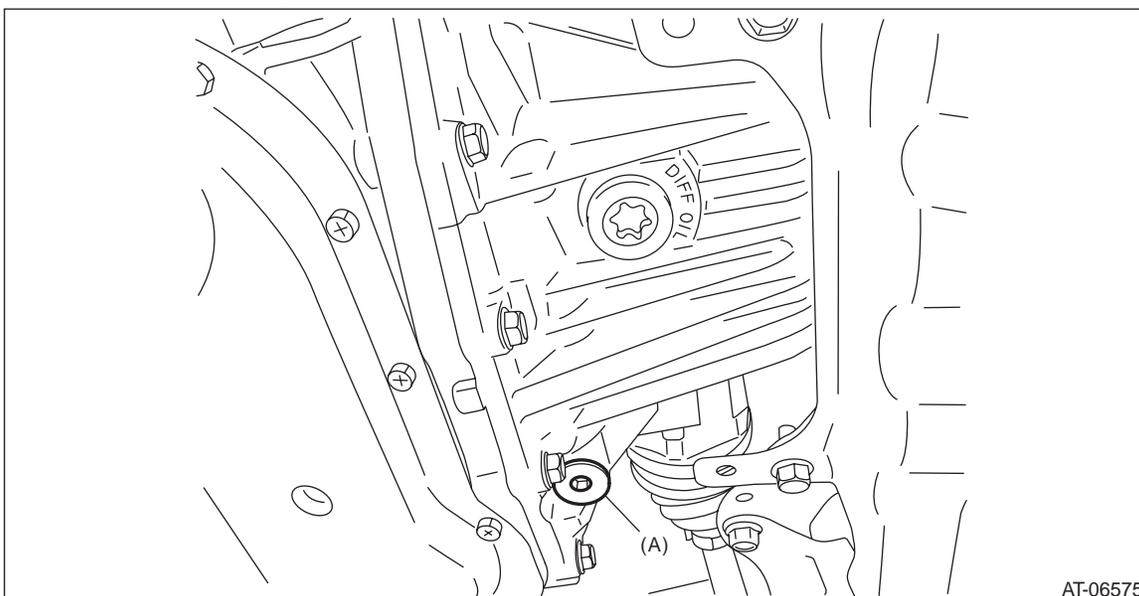
- 1) Lift up the vehicle.
- 2) Remove the under cover front - transmission.
- 3) Remove the filler plug.



AT-06576

(A) Filler plug

- 4) Remove the overflow drain plug.



AT-06575

(A) Overflow drain plug

Differential Gear Oil

CONTINUOUSLY VARIABLE TRANSMISSION

5) Fill in the differential gear oil through the filler plug hole up to where the oil flows out of the overflow drain plug.

Recommended gear oil:

<Ref. to CVT(TR580)-4, FRONT DIFFERENTIAL GEAR OIL, SPECIFICATION, General Description.>

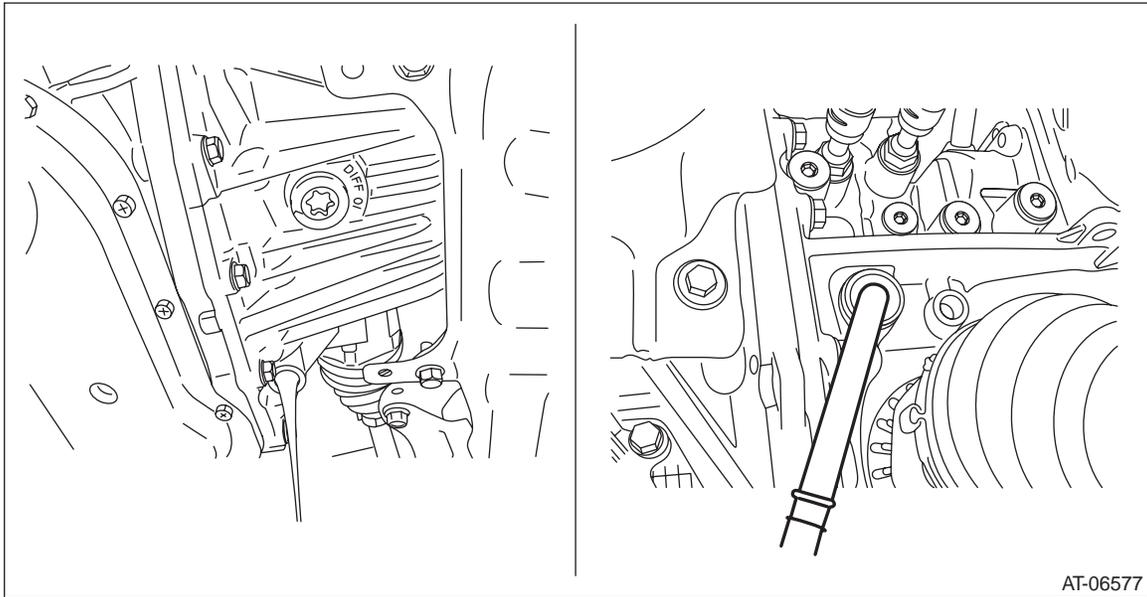
6) When the flow of the differential gear oil turns into a narrow stream, install the overflow drain plug.

NOTE:

Use a new gasket.

Tightening torque:

50 N·m (5.1 kgf·m, 36.9 ft·lb)



7) Install the filler plug.

NOTE:

Use a new gasket.

Tightening torque:

50 N·m (5.1 kgf·m, 36.9 ft·lb)

8) Install the under cover front - transmission.

Tightening torque:

18 N·m (1.8 kgf·m, 13.3 ft·lb)

Differential Gear Oil

CONTINUOUSLY VARIABLE TRANSMISSION

C: REPLACEMENT

CAUTION:

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

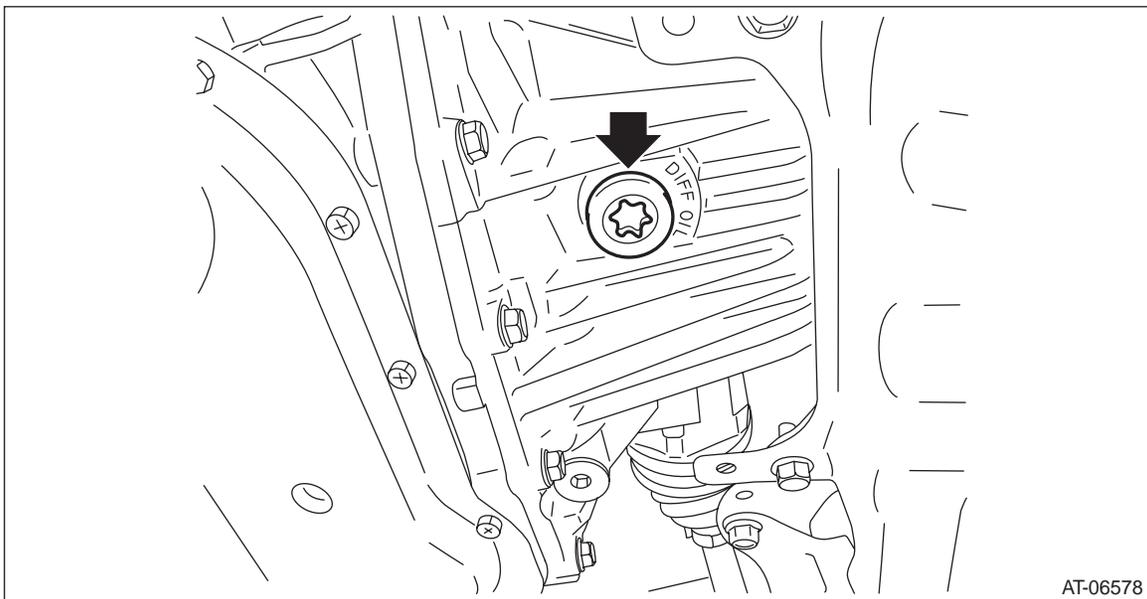
- 1) Lift up the vehicle.
- 2) Remove the under cover front - transmission.
- 3) Remove the differential gear oil drain plug using TORX® bit T70. Drain differential gear oil.
- 4) Install the differential gear oil drain plug using TORX® bit T70.

NOTE:

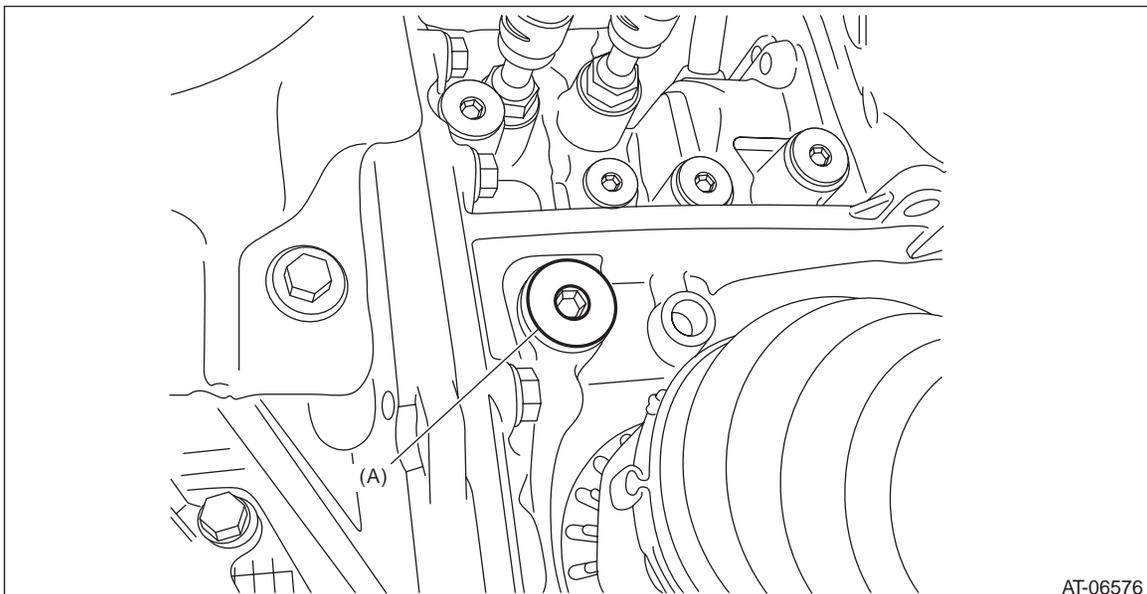
Use a new gasket.

Tightening torque:

70 N-m (7.1 kgf-m, 51.6 ft-lb)



- 5) Remove the filler plug.



(A) Filler plug

Differential Gear Oil

CONTINUOUSLY VARIABLE TRANSMISSION

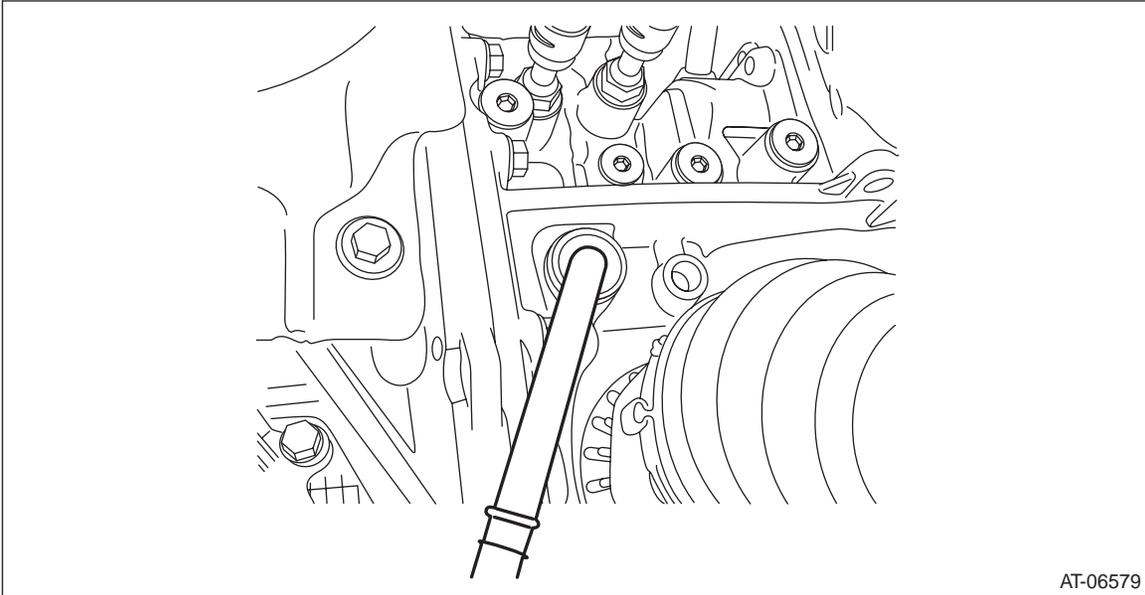
6) Pour gear oil into the filler plug hole.

Recommended gear oil:

<Ref. to CVT(TR580)-4, FRONT DIFFERENTIAL GEAR OIL, SPECIFICATION, General Description.>

Gear oil capacity:

<Ref. to CVT(TR580)-4, FRONT DIFFERENTIAL GEAR OIL, SPECIFICATION, General Description.>



AT-06579

7) Adjust the level of differential gear oil. <Ref. to CVT(TR580)-40, ADJUSTMENT, Differential Gear Oil.>

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AWD ON/OFF Switching Mode

CONTINUOUSLY VARIABLE TRANSMISSION

4. AWD ON/OFF Switching Mode

A: GENERAL DESCRIPTION

- Follow the messages displayed on the Subaru Select Monitor when working.
- Perform as necessary in FWD mode.
- When switched to FWD, AWD light illuminates.

B: PROCEDURE

CAUTION:

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

- **On completing the work in FWD, switch back in AWD.**

- 1) Shift the select lever to “P” range.
- 2) Connect the Subaru Select Monitor to data link connector.
- 3) Turn the ignition switch to ON. (For model with push button start, press the push button ignition switch twice without depressing brake pedal.)
- 4) Turn off all switches causing an electrical load, such as headlights, A/C, seat heater and rear defogger.
- 5) Select {Work Support} in the «Transmission Diagnosis» display screen of the Subaru Select Monitor.
- 6) Select {Maintenance mode} in the «Work Support» screen of Subaru Select Monitor.
- 7) Select {AWD ON/OFF switching mode} in the «Maintenance mode» screen of the Subaru Select Monitor.
- 8) Follow the messages displayed on the Subaru Select Monitor screen when working.

Switching completes successfully if any of the following messages is displayed.

- When switching from AWD to FWD: {Switched to FF. To return to AWD, perform basic mode again.}
- When switching from FWD to AWD: {Switched to AWD. To return to FF, perform basic mode again.}

NOTE:

- If communication error occurs during switching mode, start in the “AWD ON/OFF switching mode” again.
- If operation is interrupted before the successful end message is displayed, perform the {AWD ON/OFF switching mode} from the beginning until confirming the operation is successfully ended. If this mode fails to complete successfully, the cause is as follows.
 - Select lever is not in “P” range.
 - Engine is running.
- For detailed operation procedures, refer to “PC application help for Subaru Select Monitor”.

5. Road Test

A: INSPECTION

NOTE:

For models with X MODE switch, turn OFF the switch for inspection.

1. GENERAL PRECAUTION

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

CAUTION:

Always observe the local traffic laws when performing the test.

2. D RANGE SHIFT FUNCTION

Make sure the engine speed is 1,100 — 1,300 rpm while driving on the level road at 50 km/h (31 MPH) after accelerating from halting to 1/4 of accelerator opening angle. Then stop the vehicle. Check normal gear change has occurred while the vehicle speed changes from a constant speed to zero.

3. KICK-DOWN FUNCTION

Check if engine speed will rise by operating the accelerator opening angle to the full from a constant speed of 50 km/h (31 MPH) or more.

4. ENGINE BRAKE OPERATION

• Model with manual mode

- Drive in “6th speed of manual mode” [70 — 80 km/h (43 — 50 MPH)], and shift down from 6th to 5th. Check if the indicator of combination meter switches “6” → “5”. At the same time, check the engine brake in 5th gear.
- Drive in “5th speed of manual mode” [60 — 70 km/h (37 — 43 MPH)], and shift down from 5th to 4th. Check if the indicator of combination meter switches “5” → “4”. At the same time, check the engine brake in 4th gear.
- Drive in “4th speed of manual mode” [50 — 60 km/h (31 — 37 MPH)], and shift down from 4th to 3rd. Check if the indicator of combination meter switches “4” → “3”. At the same time, check the engine brake in 3rd gear.
- Drive in “3rd speed of manual mode” [40 — 50 km/h (25 — 31 MPH)], and shift down from 3rd to 2nd. Check if the indicator of combination meter switches “3” → “2”. At the same time, check the engine brake in 2nd gear.
- Drive in “2nd speed of manual mode” [20 — 30 km/h (12 — 19 MPH)], and shift down from 2nd to 1st. Check if the indicator of combination meter switches “2” → “1”. At the same time, check the engine brake in 1st gear.

• Model without manual mode

Drive in D range at [50 — 60 km/h (31 — 37 MPH)], and shift to “L” range. Check if the indicator of combination meter switches “D” → “L”. At the same time, check the engine brake in L range.

5. 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.

6. P RANGE OPERATION

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

7. NOISE AND VIBRATION

Check for noise and vibration during driving at a constant speed, accelerating, decelerating and manual shift operation.

8. OIL LEAKAGE

After the driving test, inspect for leakage of CVTF and differential gear oil from the transmission body.

Stall Test

CONTINUOUSLY VARIABLE TRANSMISSION

6. Stall Test

A: INSPECTION

CAUTION:

Make sure no other person is around the vehicle during stall test measurement.

NOTE:

Stall test is extremely important in diagnosing the condition of CVT and engine. The test is necessary to measure the engine stall speeds in “R” and “D” range.

Purposes of the stall test:

- Operational check of forward clutch and reverse brake
 - Operational check of the torque converter assembly
 - Engine performance check
- 1) Place wheel chocks at the front and rear of all wheels and engage the parking brake.
 - 2) Turn the A/C OFF.
 - 3) Using the Subaru Select Monitor, check if the throttle valve operates when you depress the accelerator pedal. <Ref. to EN(H4DO)(diag)-41, DISPLAY OF ENGINE FREEZE FRAME DATA, OPERATION, Subaru Select Monitor.>
 - 4) Check the engine oil level. <Ref. to LU(H4DO)-12, Engine Oil.>
 - 5) Check the coolant level. <Ref. to CO(H4DO)-14, Engine Coolant.>
 - 6) Adjust the CVTF level. <Ref. to CVT(TR580)-35, ADJUSTMENT, CVTF.>
 - 7) Increase the CVTF temperature to 60 — 80°C (140 — 176°F) with the engine running and the select lever shifted to “N” or “P” range.
 - 8) Shift the select lever to “D” range.
 - 9) Depress the accelerator pedal to the full while fully depressing the foot brake pedal with your left foot.
 - 10) When the engine speed stabilizes, quickly record the engine speed and release accelerator pedal. Shift the select lever to “N” range. Let the engine idle for one minute or more to cool it down.
 - 11) Shift to “R” range and perform the same stall test.

NOTE:

- Do not perform a stall test for over 5 seconds at a time. (From closed throttle, fully open throttle to stall speed reading.) Failure to follow this instruction will cause the engine oil and CVTF 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 CVT from sustaining damage.

Stall speed standard:

D range: 2,000 — 2,700 rpm

R range: 1,900 — 2,600 rpm

Stall test judgment

Range	Range	Probable cause
Lower than standard value	D, R	<ul style="list-style-type: none">• Insufficient engine output• Torque converter malfunction
Higher than standard value	D	<ul style="list-style-type: none">• Forward clutch slippage• Secondary pressure (line pressure) is low.• Variator chain malfunction
	R	<ul style="list-style-type: none">• Reverse brake slippage• Secondary pressure (line pressure) is low.• Variator chain malfunction
	D, R	<ul style="list-style-type: none">• Torque converter malfunction• Control valve body malfunction• TCM malfunction• Damaged harness and harness connector

7. 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 symptom helps to check the condition of forward clutch and reverse brake.

- Perform the test at normal operation CVTF temperature of 60 — 80°C (140 — 176°F).
- Be sure to allow one minute or more interval between tests.
- Make three measurements and take the average value.

1) 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 elapsed from shifting the lever until the shock is felt.

Time lag standard:

1.5 seconds or less

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

- Secondary pressure (line pressure) is too low.
- Forward clutch worn
- Forward clutch piston malfunction
- Control valve body malfunction
- Learning incomplete

4) In the same manner, measure the time lag when shifting from “N” range to “R” range.

Time lag standard:

1.5 seconds or less

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

- Secondary pressure (line pressure) is too low.
- Reverse brake worn
- Reverse brake piston malfunction
- Control valve body malfunction
- Learning incomplete

Secondary Pressure (Line Pressure) Test

CONTINUOUSLY VARIABLE TRANSMISSION

8. Secondary Pressure (Line Pressure) Test

A: INSPECTION

CAUTION:

- Directly after the vehicle has been running or the engine has been idling for a long time, the CVTF is hot. Be careful not to burn yourself.
- Make sure no other person is around the vehicle during secondary pressure (line pressure) test measurement.
- After performing the secondary pressure (line pressure) test measurement, adjust the CVTF level.

NOTE:

- If the pulley and variator chain, clutch or brake show signs of slipping or shift feel is not correct, check the secondary pressure (line pressure).
- Connect Subaru Select Monitor to vehicle so as to measure the engine speed and actual secondary pressure (secondary pressure (line pressure)).
- In many cases, slippage or inability to operate the vehicle may be due to insufficient oil pressure for the operation of clutch, brake or control valve.

Secondary Pressure (Line Pressure) Test

CONTINUOUSLY VARIABLE TRANSMISSION

- 1) Lift up the vehicle.
- 2) Remove the secondary pressure (line pressure) test plug, and install ST1 and ST2.

CAUTION:

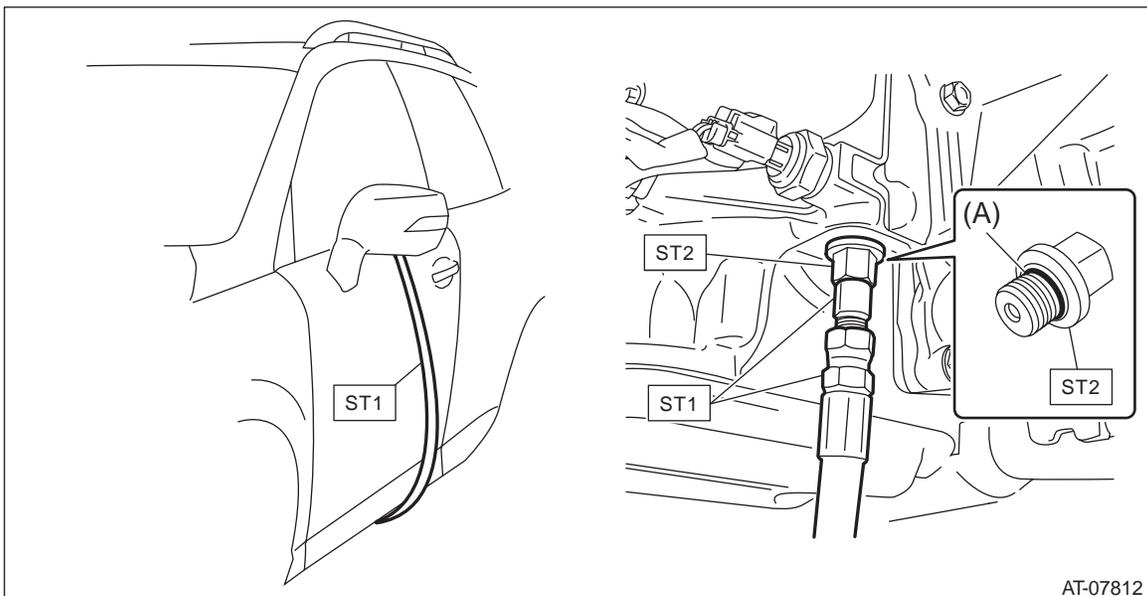
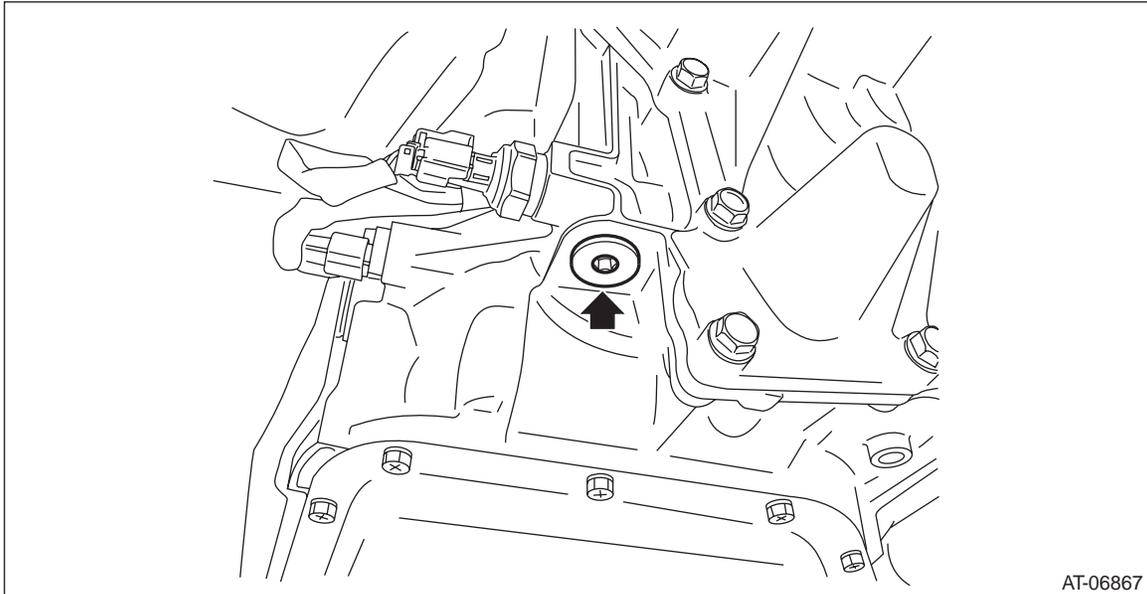
Removal of the test plug and installation of the ST shall be both performed quickly.

NOTE:

Use ST2 PRESSURE GAUGE ADAPTER with genuine O-ring (part No. 806916050) attached.

ST1 18801AA000 OIL PRESSURE GAUGE ASSY

ST2 18681AA010 PRESSURE GAUGE ADAPTER



(A) O-ring (genuine part)

- 3) Lower the vehicle.
- 4) Set the gauge so that it can be seen from the driver's seat.
- 5) Using the Subaru Select Monitor, check if the throttle valve operates when you depress the accelerator pedal.<Ref. to EN(H4DO)(diag)-41, DISPLAY OF ENGINE FREEZE FRAME DATA, OPERATION, Subaru Select Monitor.>
- 6) Check the engine oil level.<Ref. to LU(H4DO)-12, Engine Oil.>
- 7) Check the coolant level.<Ref. to CO(H4DO)-14, Engine Coolant.>

Secondary Pressure (Line Pressure) Test

CONTINUOUSLY VARIABLE TRANSMISSION

- 8) Adjust the CVTF level.<Ref. to CVT(TR580)-35, ADJUSTMENT, CVTF.>
- 9) Increase the CVTF temperature to 60 — 80°C (140 — 176°F) with the engine running and the select lever shifted to “N” or “P” range.
- 10) Shift the select lever to “D” range.
- 11) Depress the accelerator pedal to the full while fully depressing the foot brake pedal with your left foot.
- 12) Immediately after the engine speed becomes steady, record the reading of the secondary pressure (line pressure), engine speed and actual secondary pressure on Subaru Select Monitor. And then release the accelerator pedal. Shift the select lever to “N” range. Let the engine idle for one minute or more to cool it down.

NOTE:

- Do not continue the stall test for 5 seconds or more at a time (from fully closed throttle, fully open throttle to secondary pressure (line pressure) reading). Failure to follow this instruction will cause the engine oil and CVTF to deteriorate and the clutch and brake to be adversely affected.
- After performing the secondary pressure (line pressure) test, be sure to cool down the engine for at least one minute with the select lever set in “P” or “N” range and with the idle speed at 1,200 rpm or less.
- Under each condition, check that the measured pressure matches almost totally with actual secondary pressure.
- When both measured pressure and actual secondary pressure are out of specification, judge as control valve malfunction.
- The value at stall is for reference because the pressure changes under different conditions or circumstances.
- The value at idling is steady because it is not affected by any condition or circumstance.

Secondary pressure (line pressure) standard				
	Range	Throttle	Brake	Secondary pressure (line pressure) (MPa (kgf/cm ² , psi))
Stall	D, R	Full open	ON	4.5 — 6.0 (45.9 — 61.2, 652 — 870)
Idling	P, N	Full closed	OFF	0.5 — 1.5 (5.1 — 15.3, 72 — 218)

- 13) Remove the ST and install the plug after measurement.

CAUTION:

Removal of the ST and installation of the test plug shall be both performed quickly.

NOTE:

- Use new O-rings.
- Apply CVTF to the O-rings.

Tightening torque:

50 N·m (5.1 kgf·m, 36.9 ft·lb)

- 14) Adjust the CVTF level.<Ref. to CVT(TR580)-35, ADJUSTMENT, CVTF.>

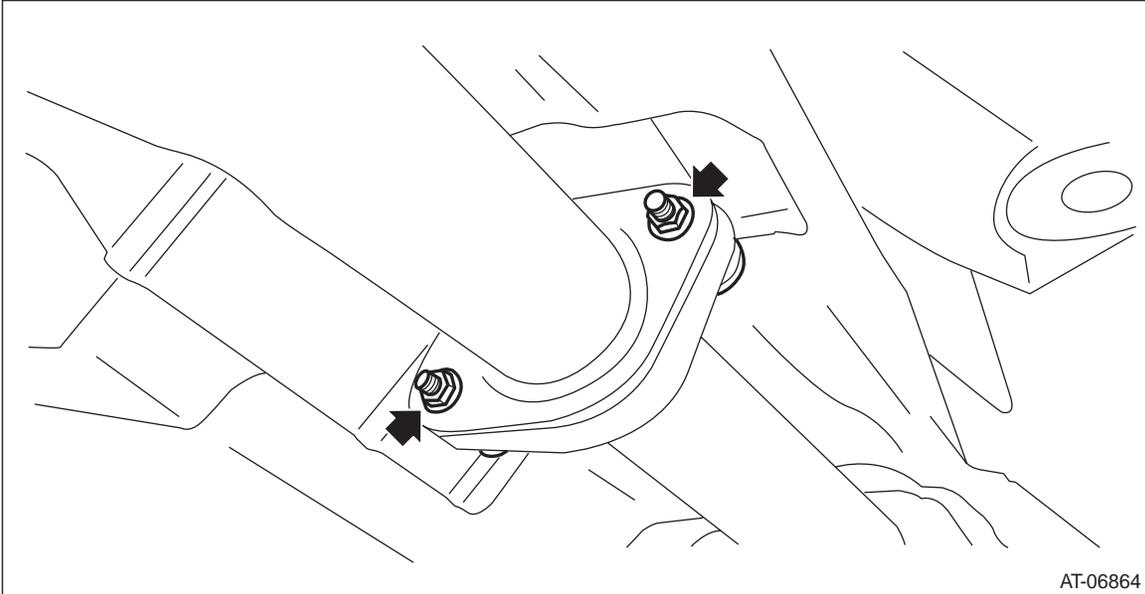
Transfer Clutch Pressure Test

CONTINUOUSLY VARIABLE TRANSMISSION

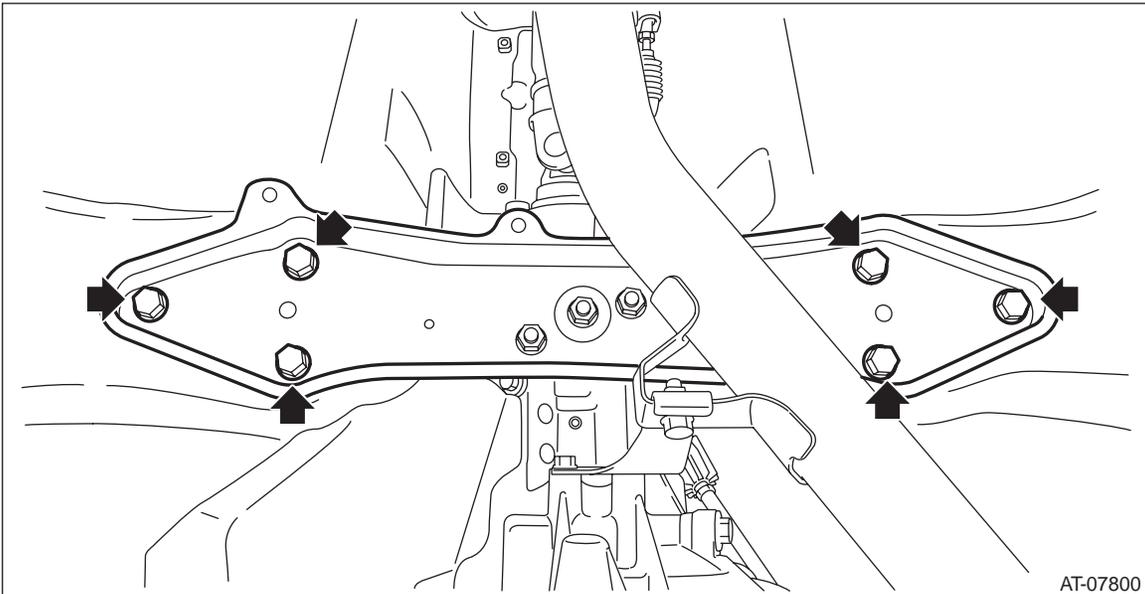
9. Transfer Clutch Pressure Test

A: INSPECTION

- 1) Lift up the vehicle.
- 2) Remove the under cover front - transmission.
- 3) Remove the rear exhaust pipe from center exhaust pipe.



- 4) Remove the center exhaust cover.
- 5) Set the transmission jack under the transmission.
- 6) Remove the mounting bolt of rear crossmember.



- 7) Lower the rear side of transmission until the transfer clutch pressure test plug can be removed.
- 8) Remove the transfer clutch pressure test plug.

Transfer Clutch Pressure Test

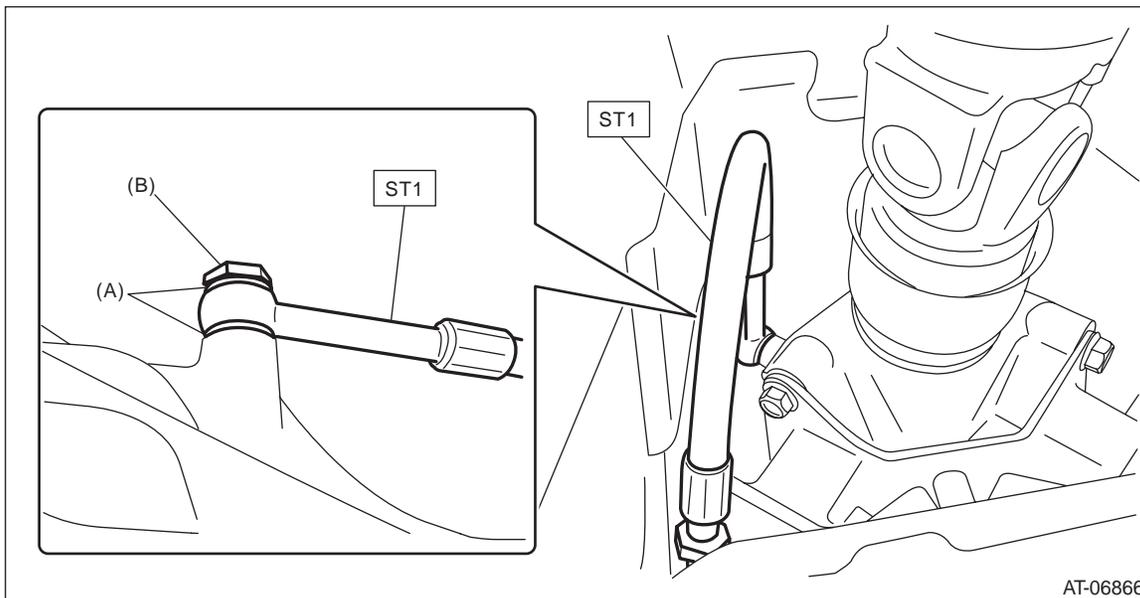
CONTINUOUSLY VARIABLE TRANSMISSION

9) Set the ST1, ST2, ST3 and ST4 to the transmission.

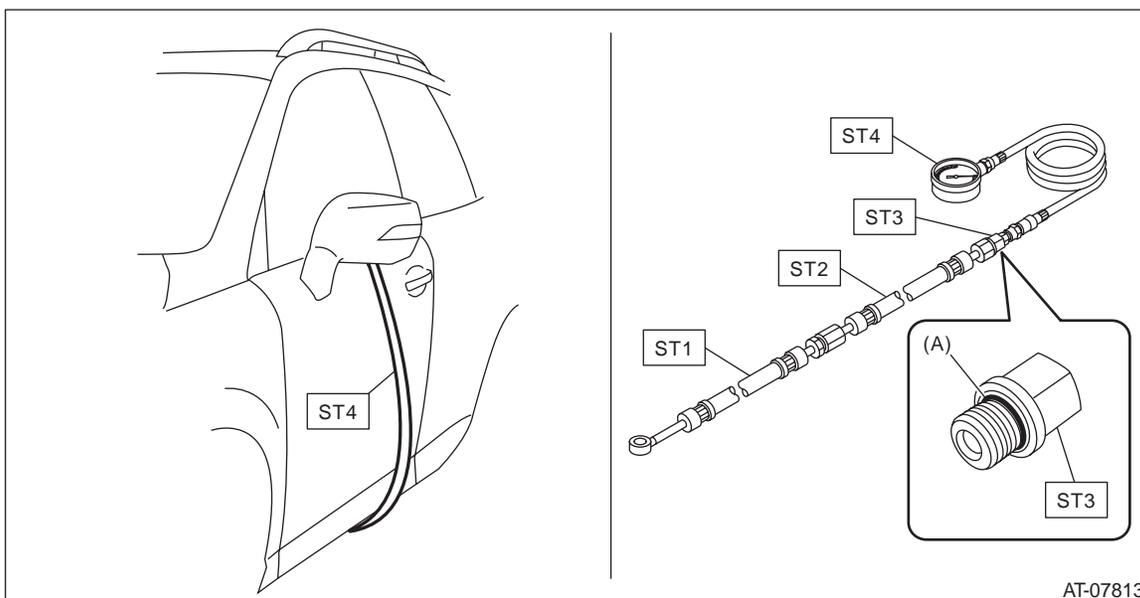
NOTE:

- Use ST1 ADAPTER HOSE B with genuine union screw (part No. 801914010) and gasket (part No. 803914060) attached.
- Use ST3 PRESSURE GAUGE ADAPTER with genuine O-ring (part No. 806911080) attached.

ST1 34099AC020 ADAPTER HOSE B
ST2 34099AC010 ADAPTER HOSE A
ST3 18681AA000 PRESSURE GAUGE ADAPTER
ST4 498575400 OIL PRESSURE GAUGE ASSY



- (A) Gasket (genuine part)
(B) Union screw (genuine part)



- (A) O-ring (genuine part)

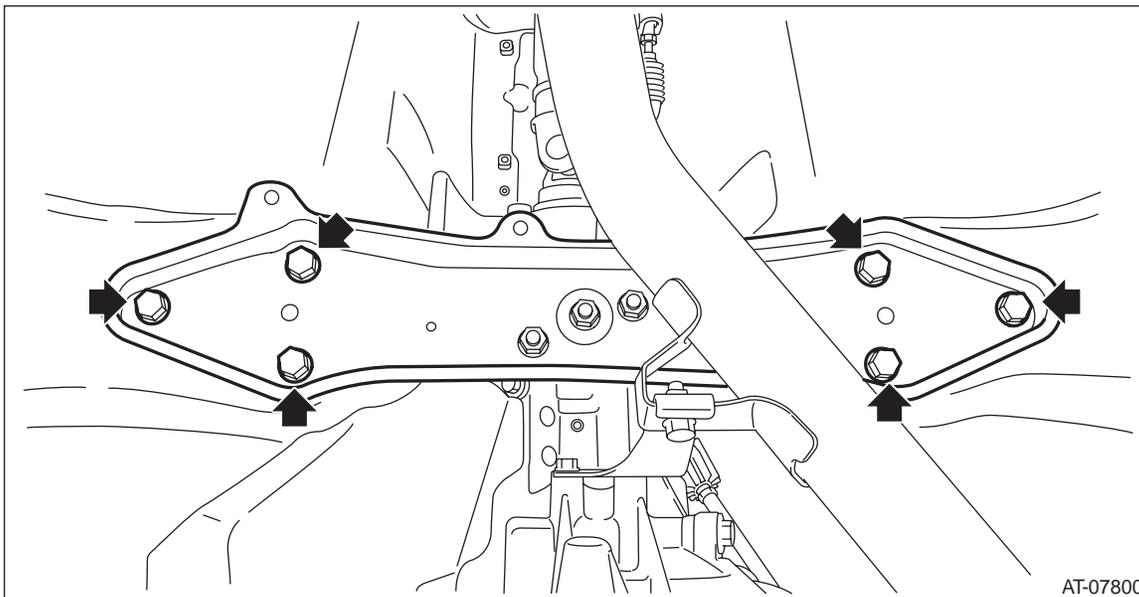
Transfer Clutch Pressure Test

CONTINUOUSLY VARIABLE TRANSMISSION

10) Raise the transmission, and install the rear crossmember.

Tightening torque:

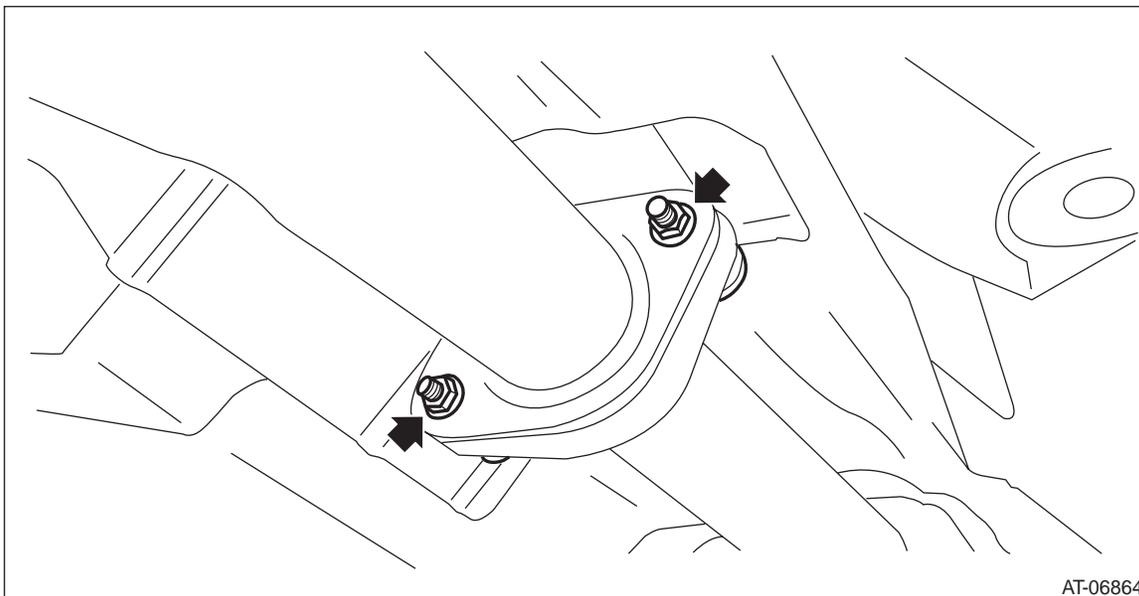
70 N·m (7.1 kgf·m, 51.6 ft·lb)



11) Install the rear exhaust pipe to center exhaust pipe.

Tightening torque:

18 N·m (1.8 kgf·m, 13.3 ft·lb)



12) Lower the vehicle.

13) Connect the Subaru Select Monitor to the data link connector and read the current data.

Transfer Clutch Pressure Test

CONTINUOUSLY VARIABLE TRANSMISSION

14) Check the transfer clutch pressure as in secondary pressure (line pressure) test. <Ref. to CVT(TR580)-48, Secondary Pressure (Line Pressure) Test.>

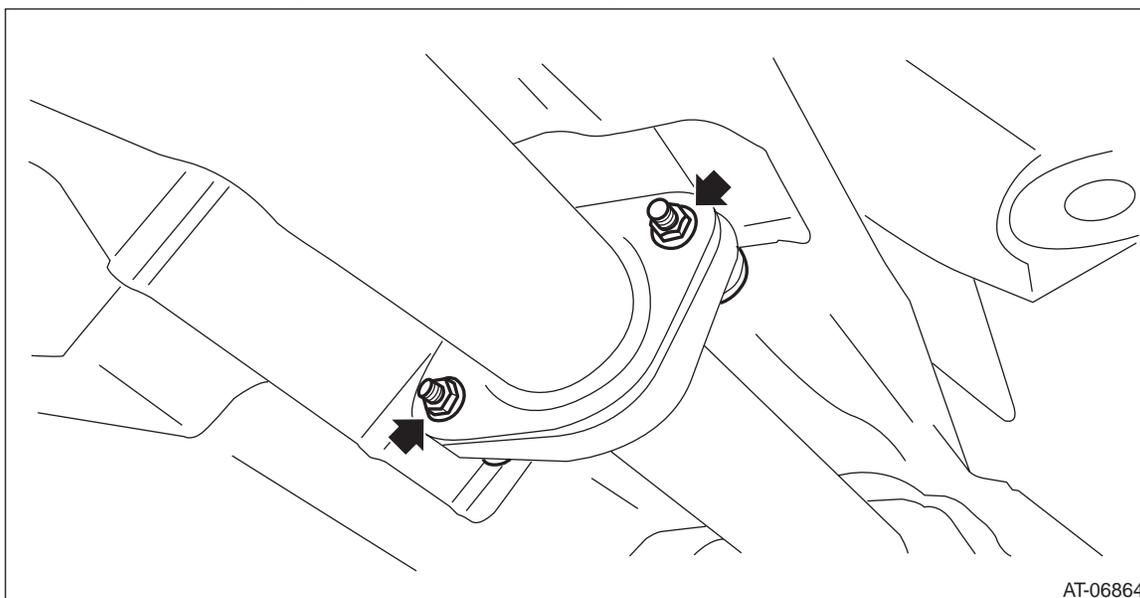
NOTE:

- For models with X MODE switch, turn OFF the switch for inspection.
- Use Subaru Select Monitor for switching to FWD mode. <Ref. to CVT(TR580)-44, AWD ON/OFF Switching Mode.>
- If no oil pressure is produced, if it does not change in AWD mode or if oil pressure is produced in FWD mode, there may be a problem in the control valve body.

Range position	ON Duty ratio (%)	Accelerator pedal opening angle (%)	Standard transfer clutch pressure kPa (kgf/cm ² , psi)	
			AWD mode	FWD mode
D	95 — 100	Fully opened (100)	1,000 — 1,200 (10.2 — 12.2, 145 — 174)	—
	60	Adjust ON Duty ratio to 60%.	400 — 700 (4.1 — 7.1, 58 — 102)	—
	0	Fully closed (0)	—	0 (0, 0)
N or P	0	Fully closed (0)	0	—

15) Lift up the vehicle.

16) Remove the rear exhaust pipe from center exhaust pipe.



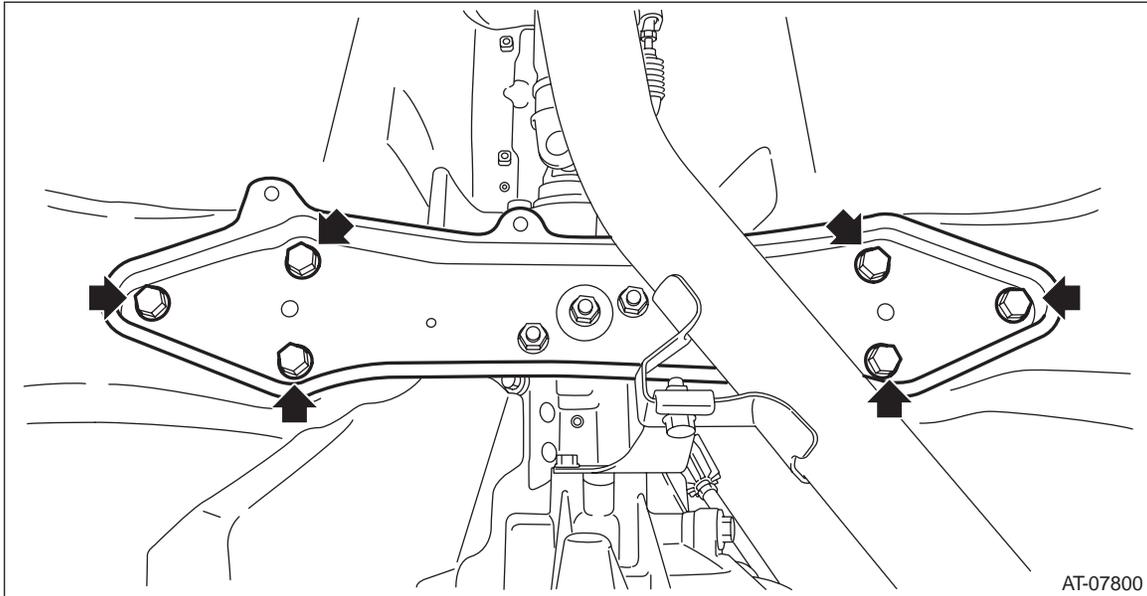
AT-06864

17) Set the transmission jack under the transmission.

Transfer Clutch Pressure Test

CONTINUOUSLY VARIABLE TRANSMISSION

18) Remove the mounting bolt of rear crossmember.



19) Lower the rear side of transmission until the ST can be removed.

20) Remove the ST and install the plug.

NOTE:

- Use new O-rings.
- Apply CVTF to the O-ring.

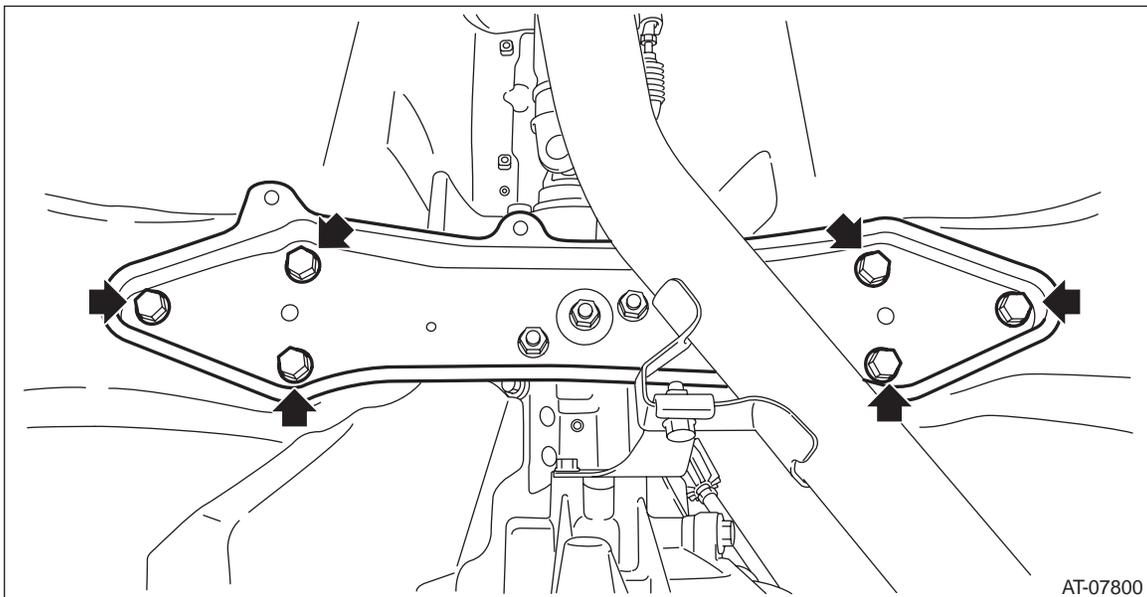
Tightening torque:

25 N·m (2.5 kgf·m, 18.4 ft·lb)

21) Raise the transmission, and install the rear crossmember.

Tightening torque:

70 N·m (7.1 kgf·m, 51.6 ft·lb)



22) Install the center exhaust cover.

Tightening torque:

18 N·m (1.8 kgf·m, 13.3 ft·lb)

Transfer Clutch Pressure Test

CONTINUOUSLY VARIABLE TRANSMISSION

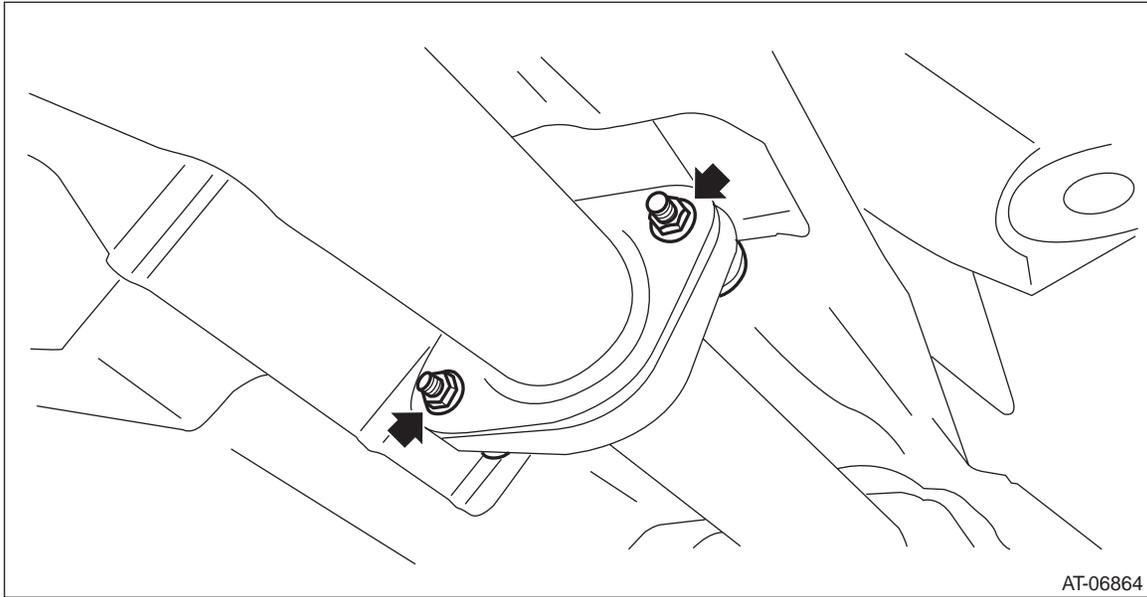
23) Install the rear exhaust pipe to center exhaust pipe.

NOTE:

Use a new gasket.

Tightening torque:

18 N·m (1.8 kgf-m, 13.3 ft-lb)



24) Install the under cover front - transmission.

Tightening torque:

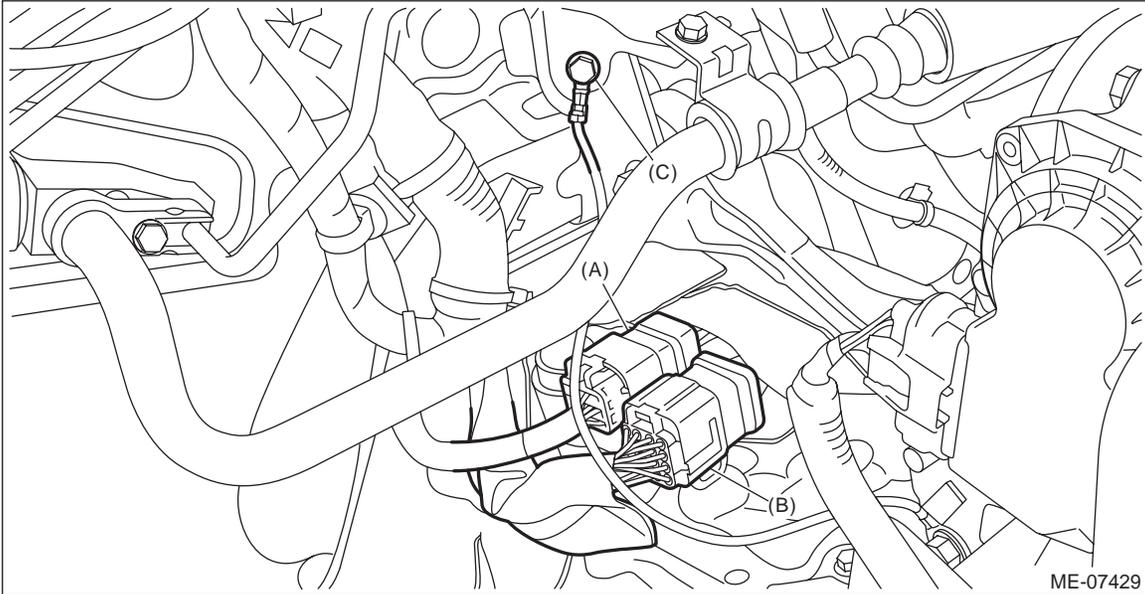
18 N·m (1.8 kgf-m, 13.3 ft-lb)

25) Lower the vehicle.

10. Automatic Transmission Assembly

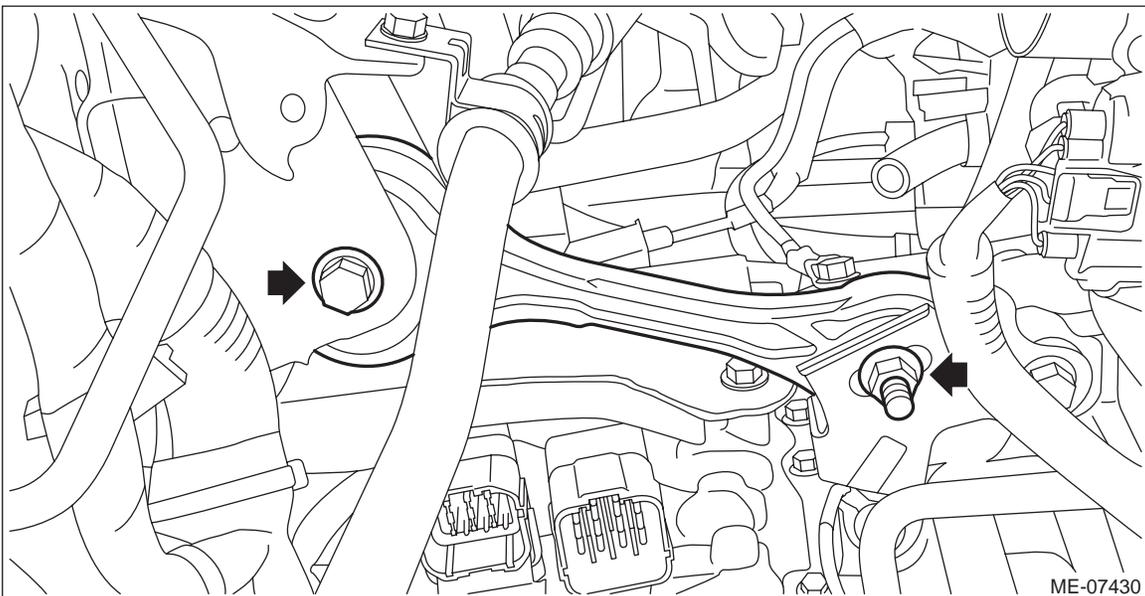
A: REMOVAL

- 1) Disconnect the ground cable from battery.
- 2) Remove the air intake boot assembly. <Ref. to IN(H4DO)-11, REMOVAL, Air Intake Boot.>
- 3) Disconnect the following connectors.
 - Transmission harness connectors
 - Inhibitor harness connector
 - Transmission radio ground terminal



- (A) Transmission harness connectors
- (B) Inhibitor harness connector
- (C) Transmission radio ground terminal

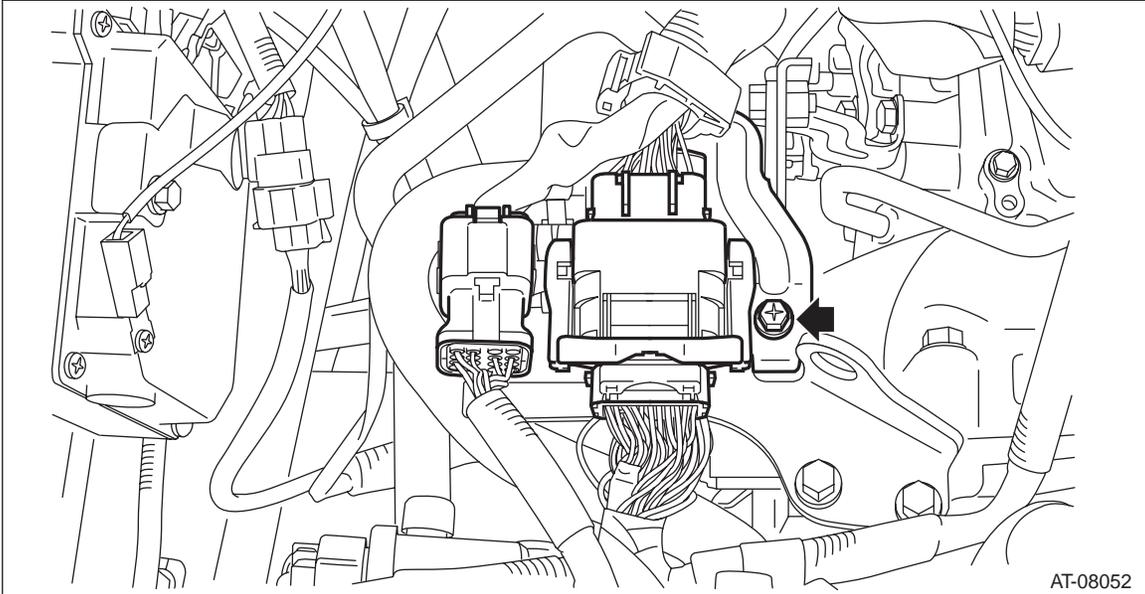
- 4) Remove the starter. <Ref. to SC(H4DO)-8, REMOVAL, Starter.>
- 5) Remove the pitching stopper.



Automatic Transmission Assembly

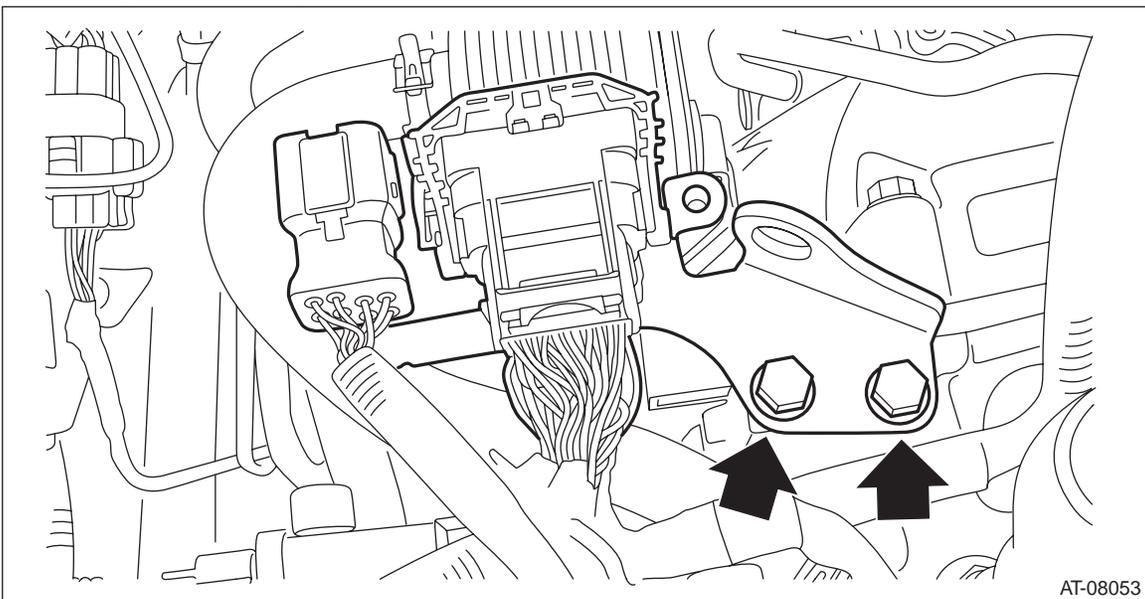
CONTINUOUSLY VARIABLE TRANSMISSION

6) Remove the harness bracket, and then remove the engine harness connector.



7) Disconnect the EGR control valve harness connector, throttle position sensor harness connector and manifold absolute pressure sensor harness connector.

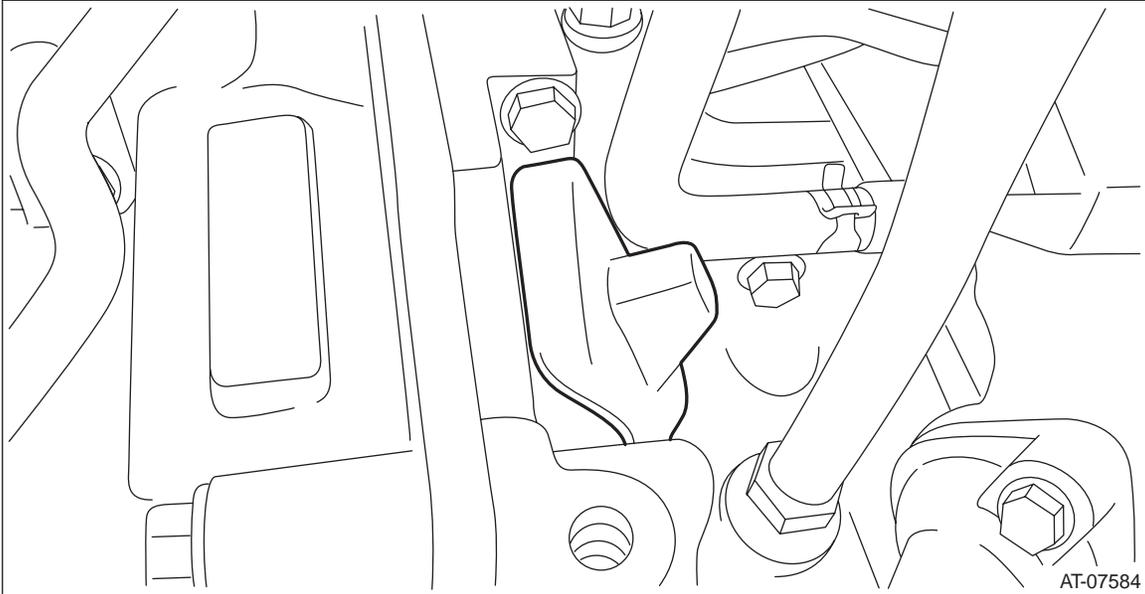
8) Remove the engine rear hanger.



Automatic Transmission Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

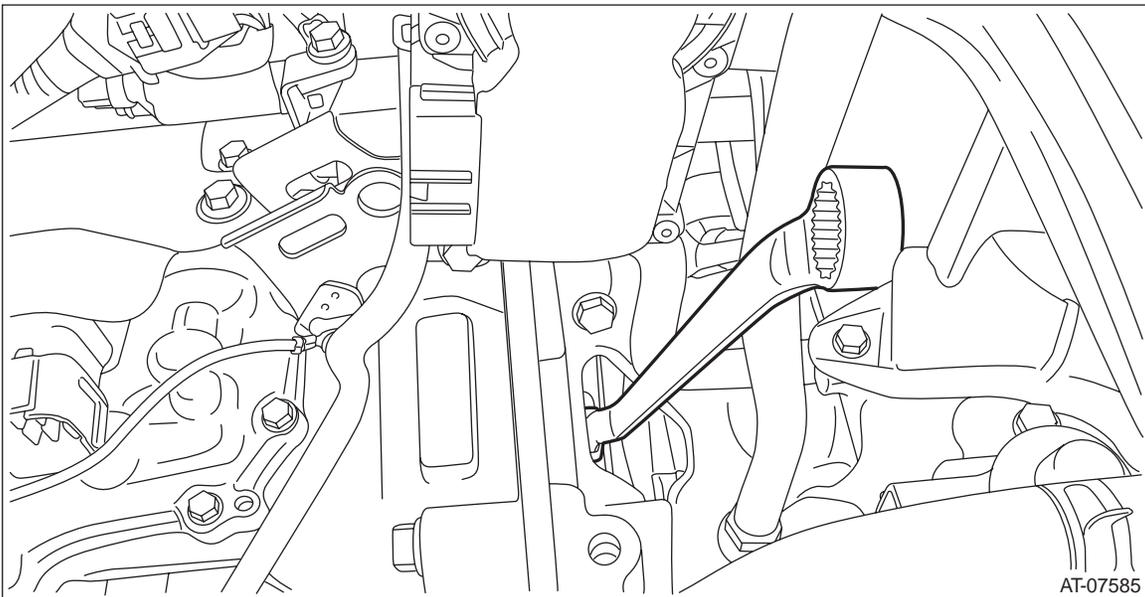
9) Remove the service hole plug.



10) Remove the four bolts combining the torque converter and drive plate while rotating the crank pulley a little at a time in the same direction as engine revolution.

CAUTION:

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



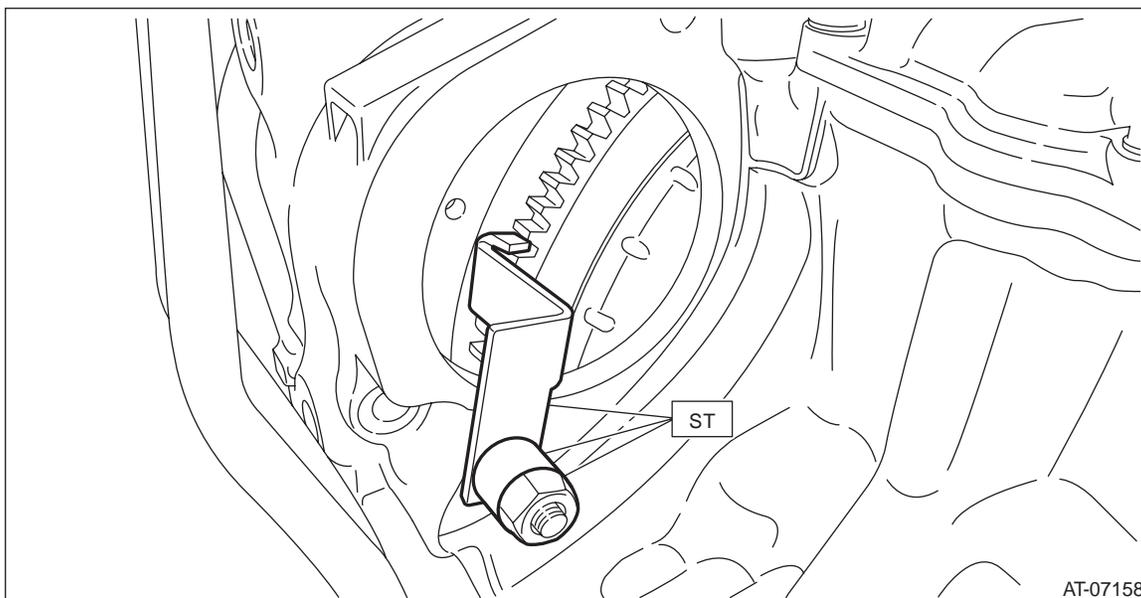
11) Make sure the torque converter moves freely by rotating with finger through the starter installation hole.

Automatic Transmission Assembly

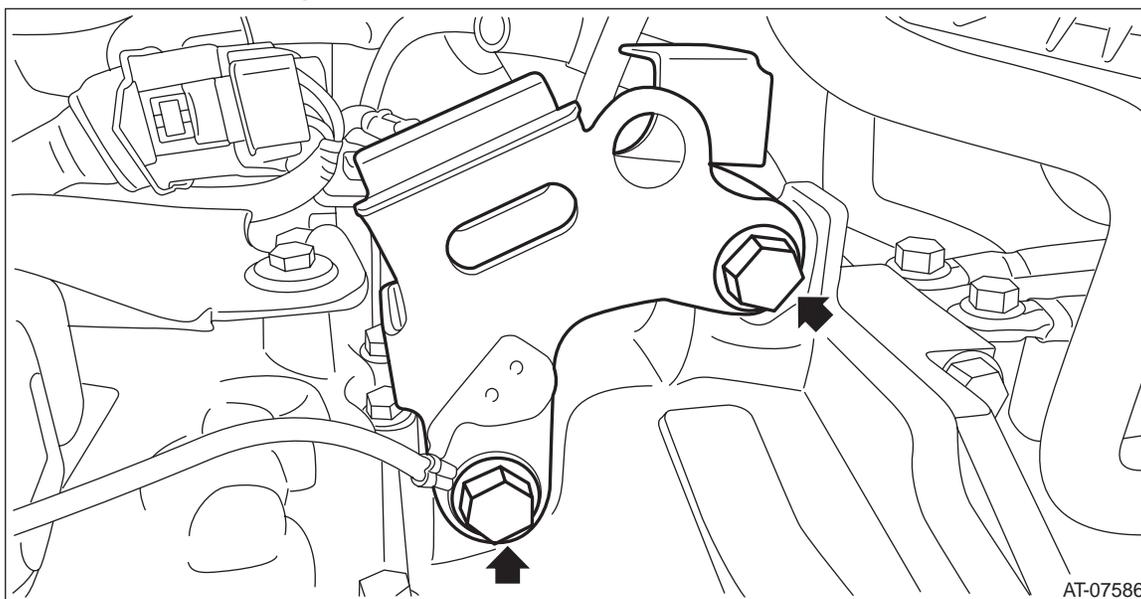
CONTINUOUSLY VARIABLE TRANSMISSION

12) Attach the ST to the converter case.

ST 498277200 STOPPER SET



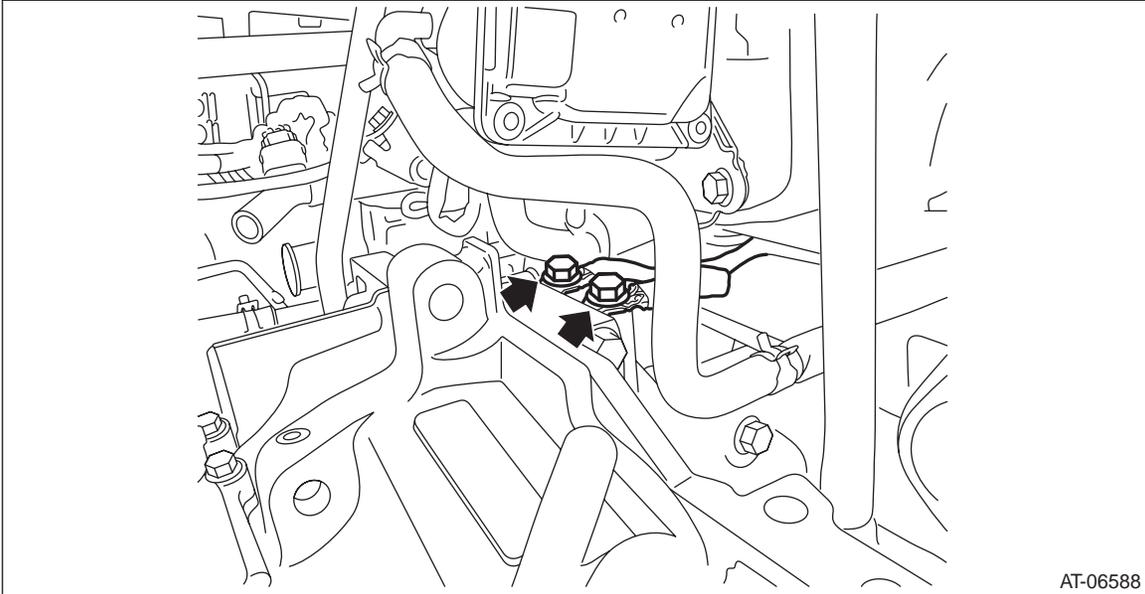
13) Remove the air breather hose from the pitching stopper bracket, and then remove the pitching stopper bracket and transmission radio ground cord.



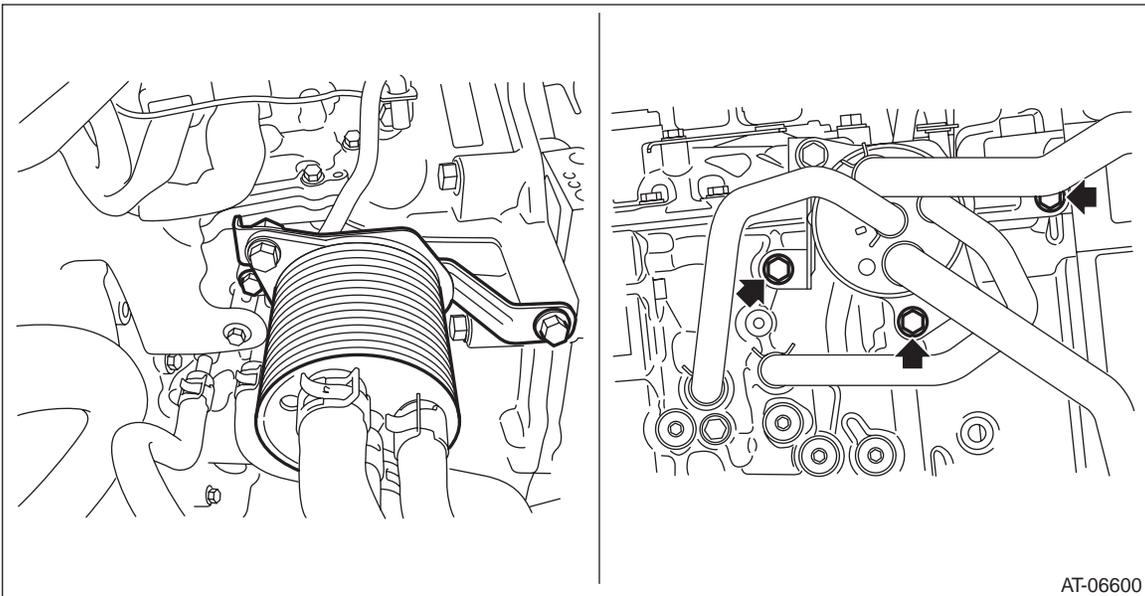
Automatic Transmission Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

14) Remove the engine ground terminal.



15) Remove the CVTF cooler (with warmer feature) from the transmission, and using a piece of wire, affix to a location of the body where it will not interfere with the removal of the transmission.

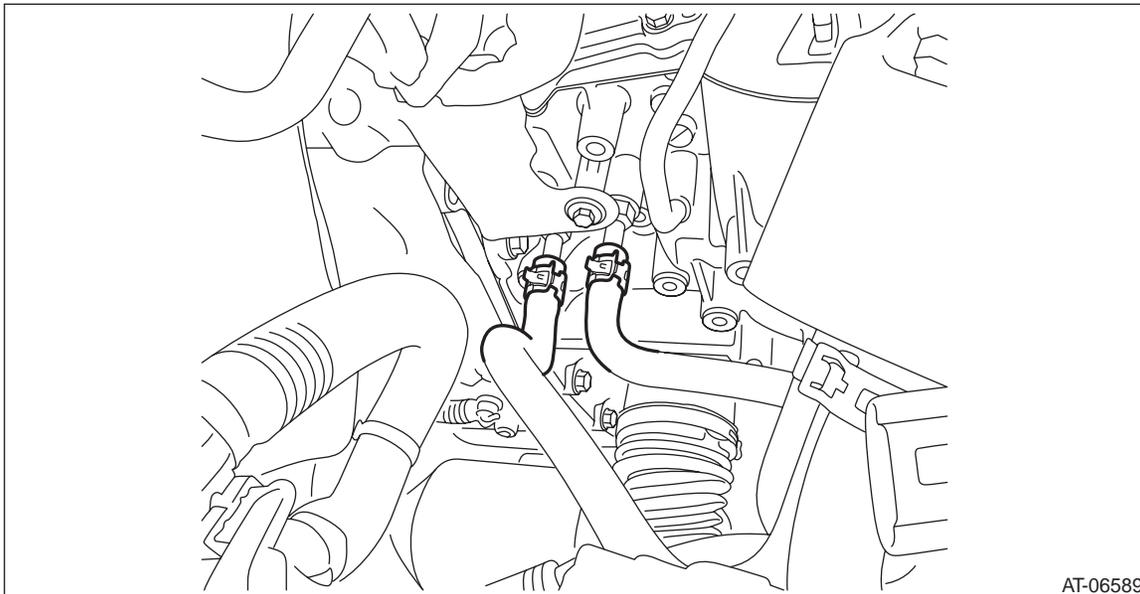


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Automatic Transmission Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

16) Remove the CVTF inlet hose and outlet hose from the pipe.

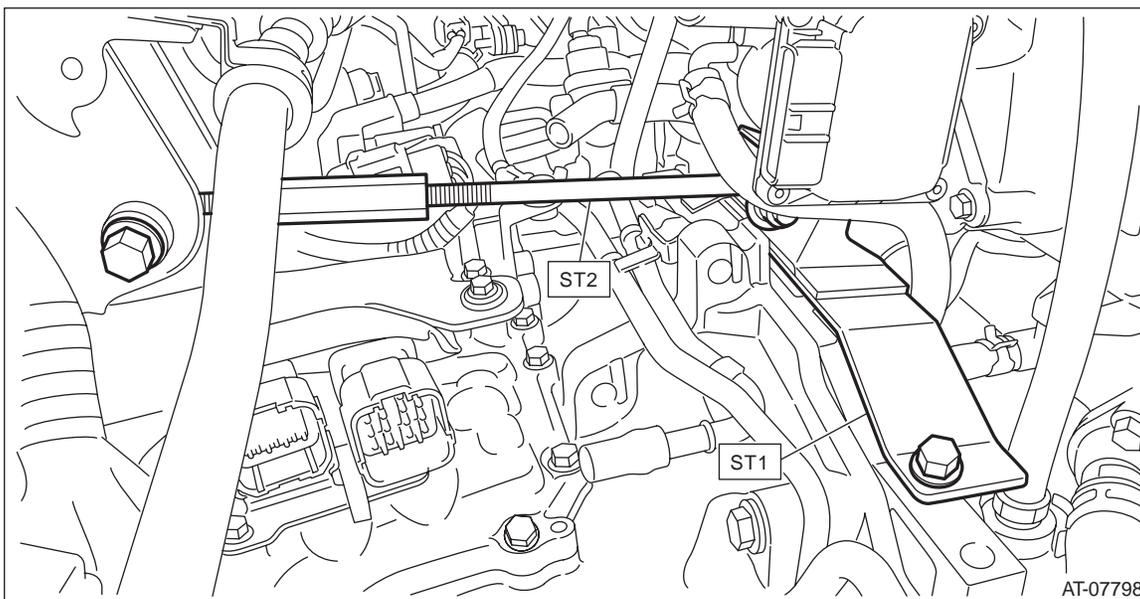


AT-06589

17) Set the ST.

ST1 41099AA010 or 41099AA011 ENGINE SUPPORT BRACKET

ST2 41099AA020 ENGINE SUPPORT

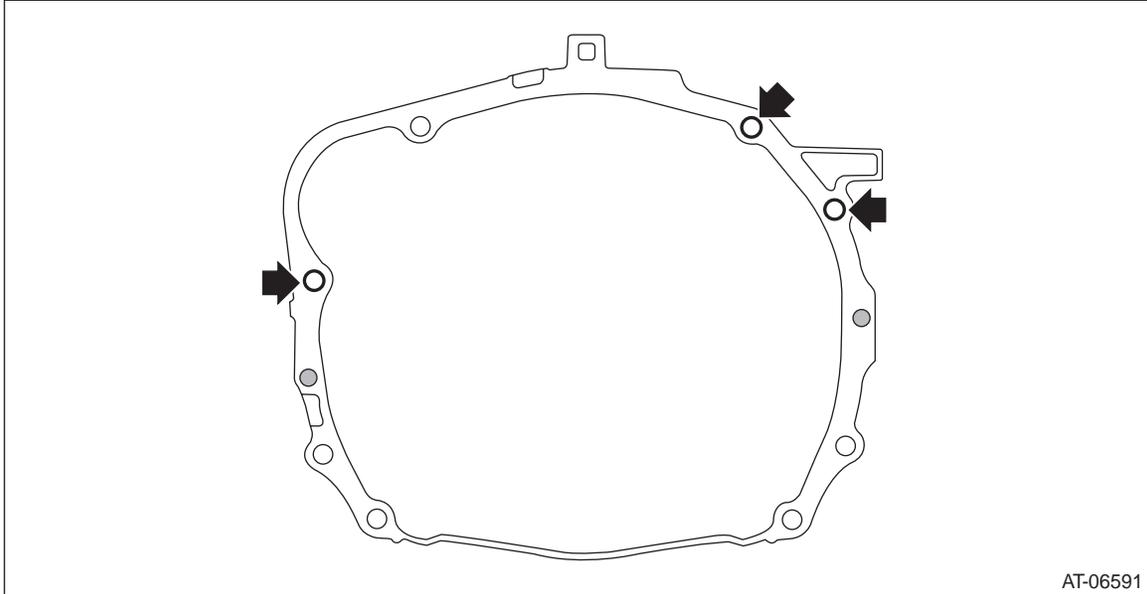


AT-07798

Automatic Transmission Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

18) Remove the three transmission connecting bolts.



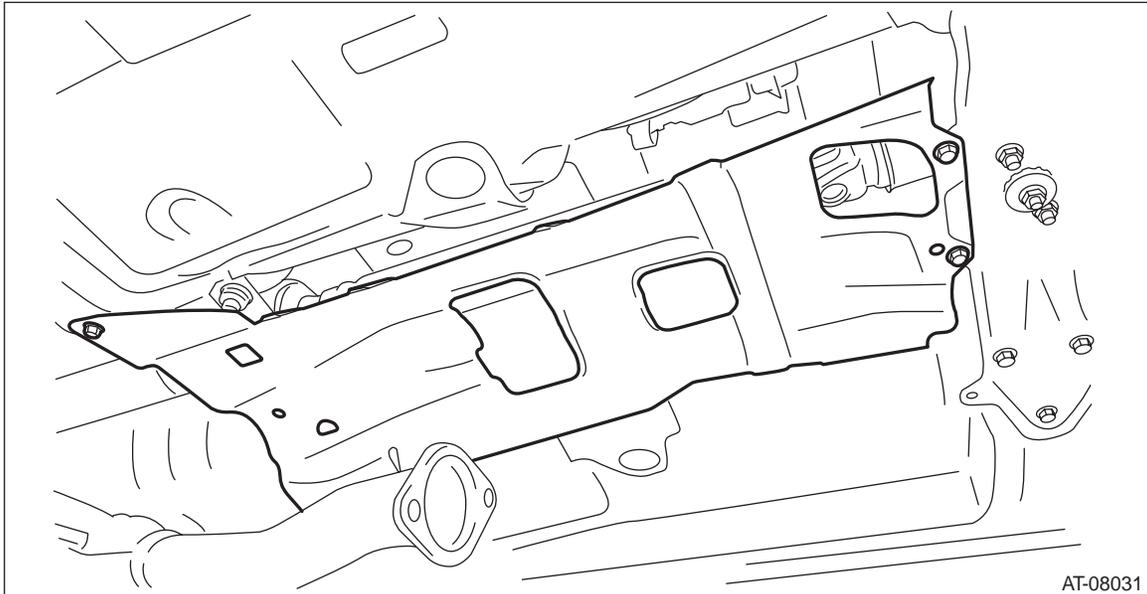
19) Lift up the vehicle.

20) Remove the front wheels.<Ref. to WT-5, REMOVAL, Tire and Wheel.>

21) Remove the under cover - front and the under cover front - transmission.

22) Remove the center exhaust pipe.<Ref. to EX(H4DO)-14, REMOVAL, Center Exhaust Pipe.>

23) Remove the center exhaust cover.



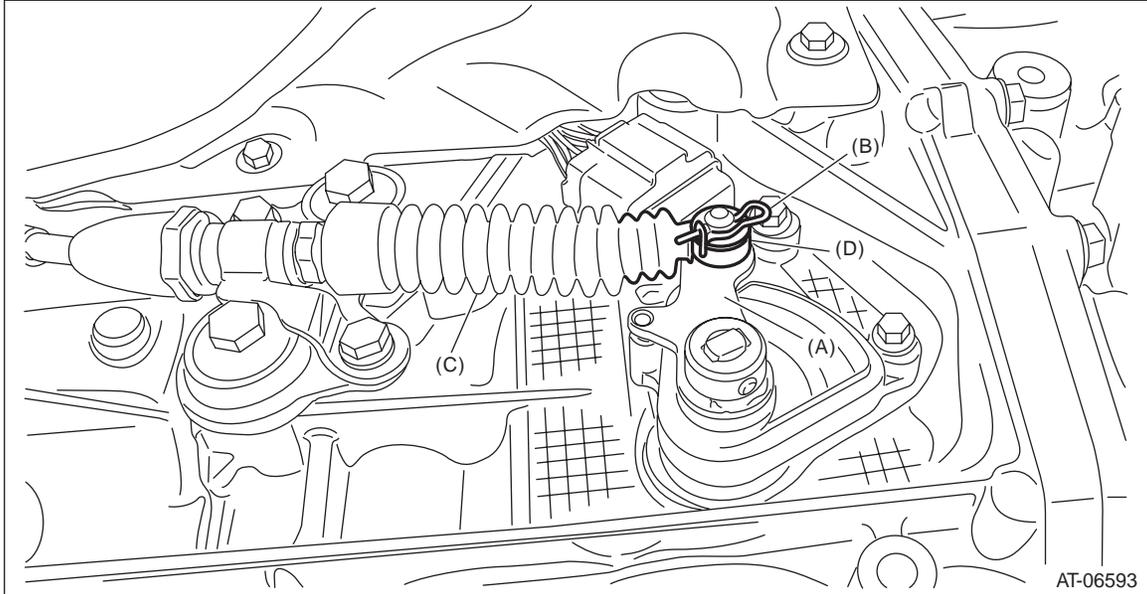
24) Remove the CVTF drain plug to drain CVTF.<Ref. to CVT(TR580)-37, REPLACEMENT, CVTF.>

25) Drain differential gear oil.<Ref. to CVT(TR580)-42, REPLACEMENT, Differential Gear Oil.>

Automatic Transmission Assembly

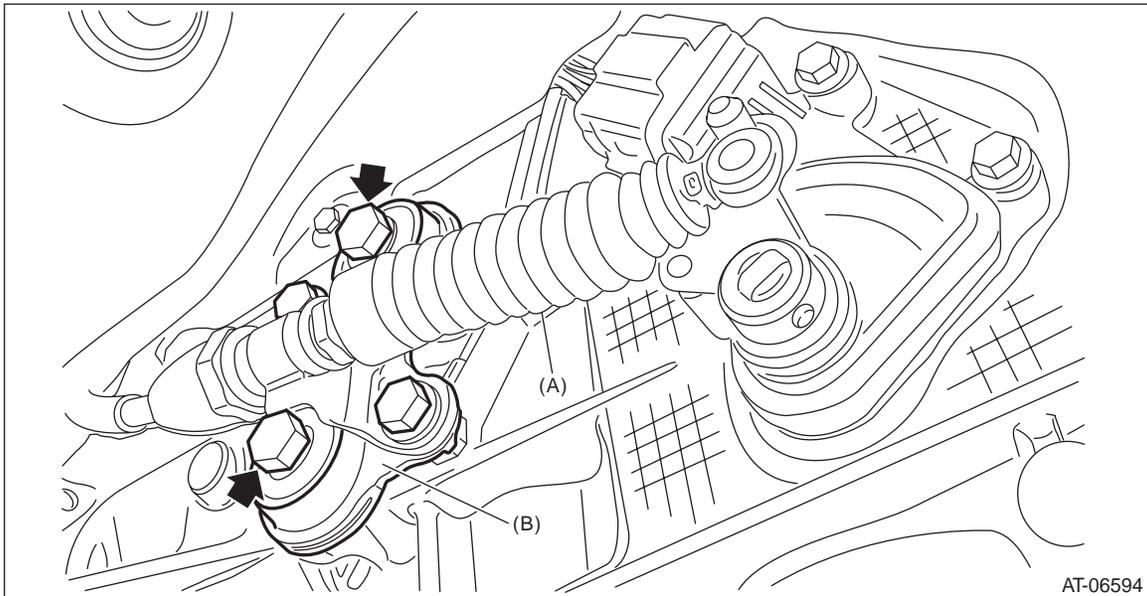
CONTINUOUSLY VARIABLE TRANSMISSION

26) Remove the snap pin and washer from shifter arm and remove the select cable from shifter arm.



- (A) Shifter arm
- (B) Snap pin
- (C) Select cable
- (D) Washer

27) Remove the plate assembly from the transmission case.



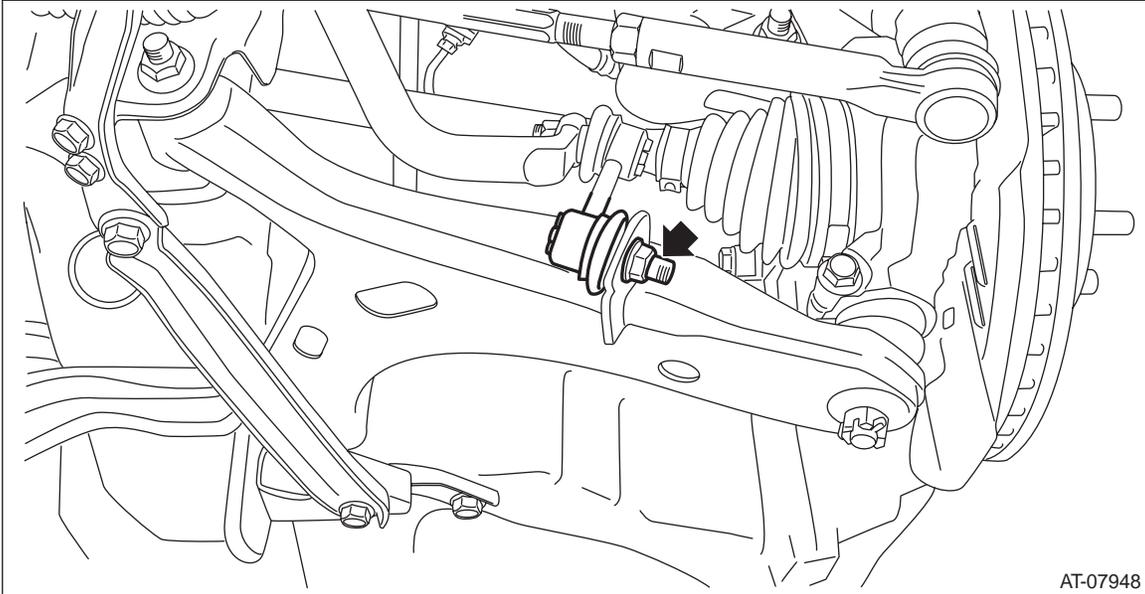
- (A) Select cable
- (B) Plate ASSY

28) Remove the propeller shaft.<Ref. to DS-11, REMOVAL, Propeller Shaft.>

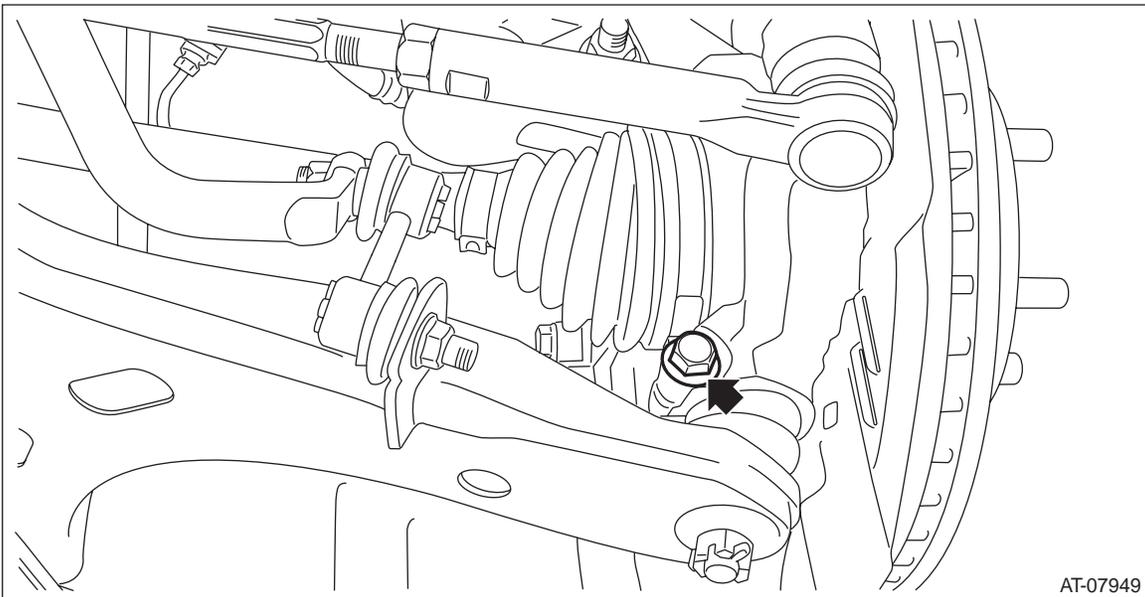
Automatic Transmission Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

29) Disconnect the stabilizer link from the front arm.



30) Remove the bolts which secure to the front housing, and separate the front arm and housing.



31) 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.

32) 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.

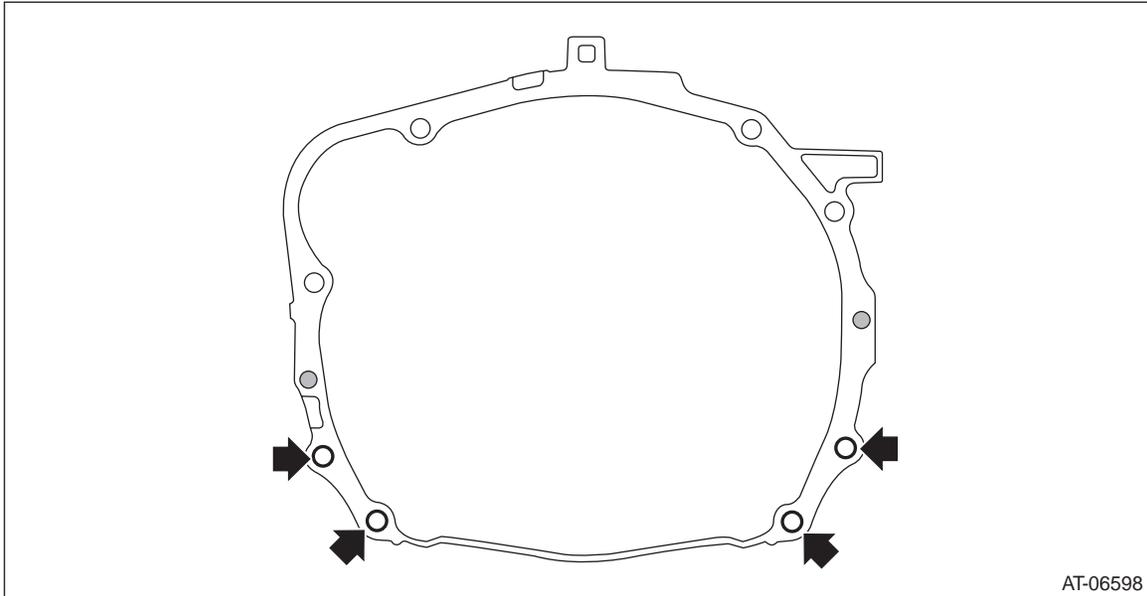
NOTE:

- Before pulling RH front drive shaft from transmission, turn the steering wheel to left hand full lock.
- Before pulling LH front drive shaft from transmission, turn the steering wheel to right hand full lock.

Automatic Transmission Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

33) Remove the two transmission connecting bolts and two nuts (lower side).

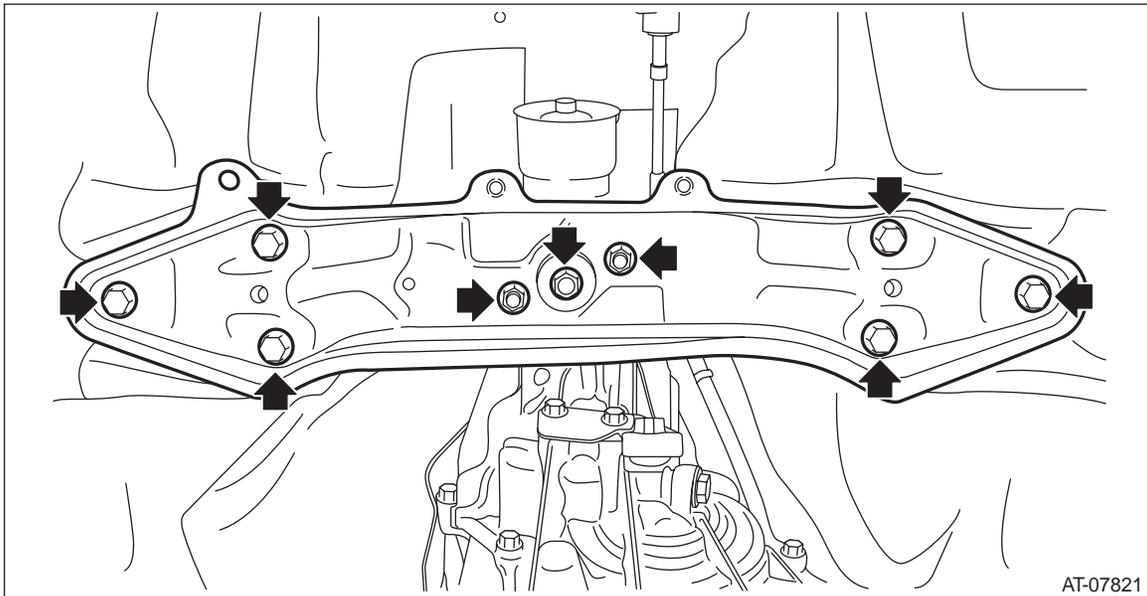


34) Set the transmission jack under the transmission.

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.



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

37) Remove the transmission assembly.

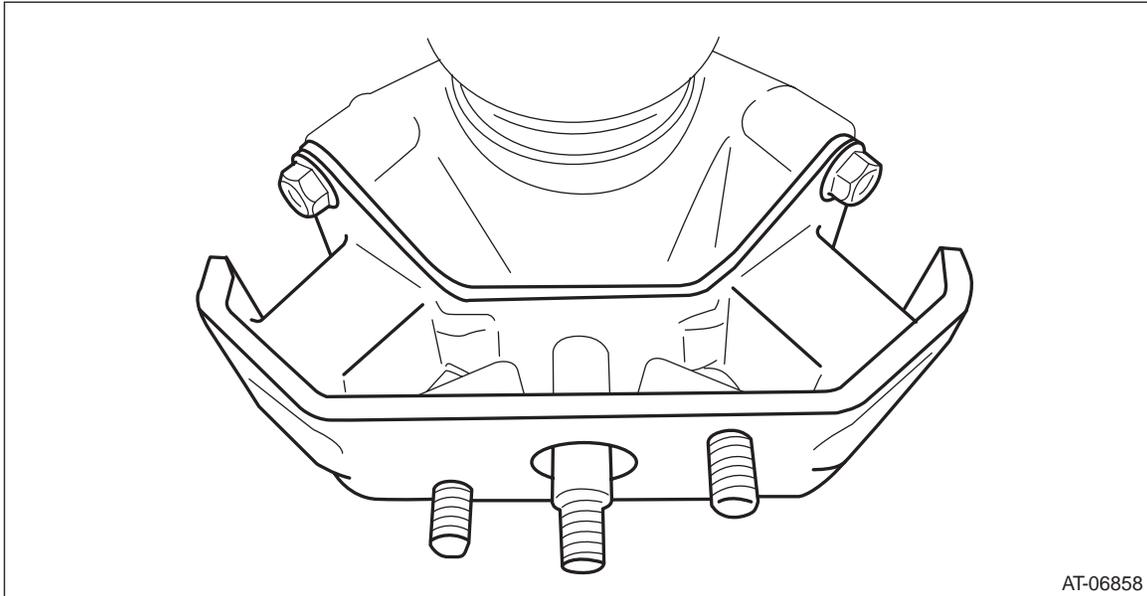
NOTE:

Remove it while moving the transmission jack up and down so that the engine and transmission remain directly aligned.

Automatic Transmission Assembly

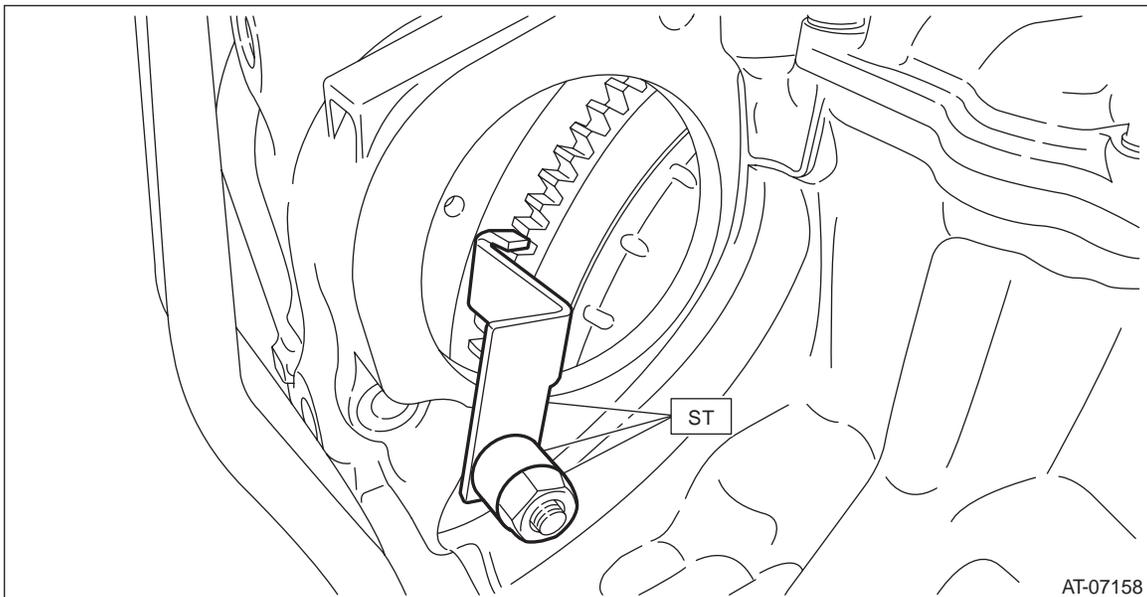
CONTINUOUSLY VARIABLE TRANSMISSION

38) Remove the rear cushion rubber.



B: INSTALLATION

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



2) When completely overhauling the transmission, refill CVTF through the transmission right side plug.<Ref. to CVT(TR580)-163, Preparation for Overhaul.>

3) Replace the front differential side retainer oil seal.<Ref. to CVT(TR580)-85, REPLACEMENT, Differential Side Retainer Oil Seal.>

NOTE:

- Be sure to replace the differential side retainer oil seal with a new part whenever the front drive shaft is removed from the transmission.
- When a new differential side retainer oil seal has been installed, replacement is not required.

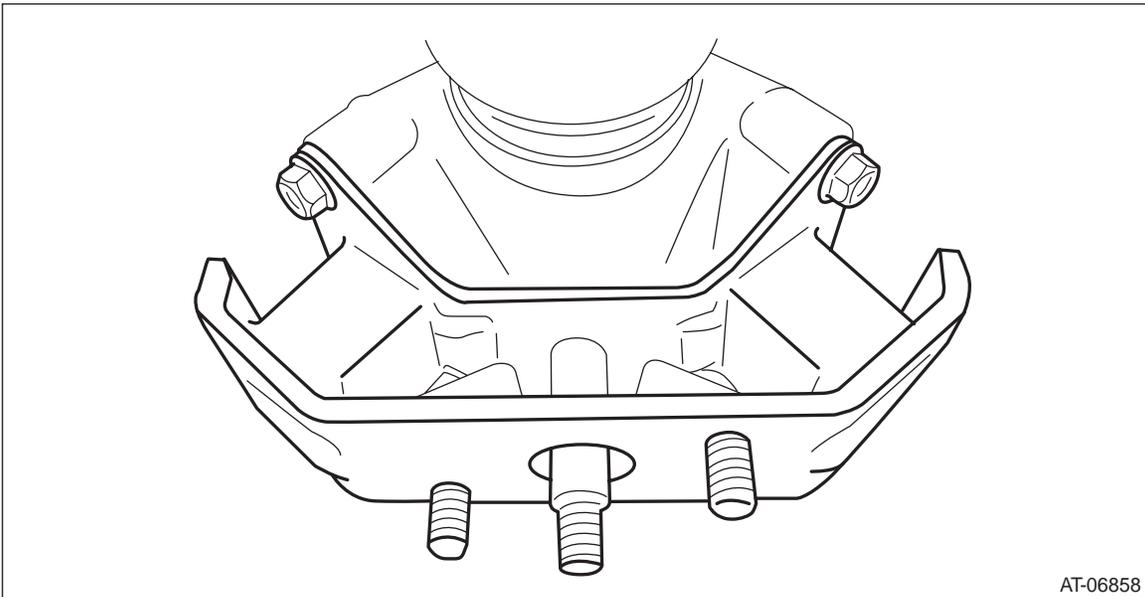
Automatic Transmission Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

4) Install the rear cushion rubber on the transmission.

Tightening torque:

40 N·m (4.1 kgf-m, 29.5 ft-lb)

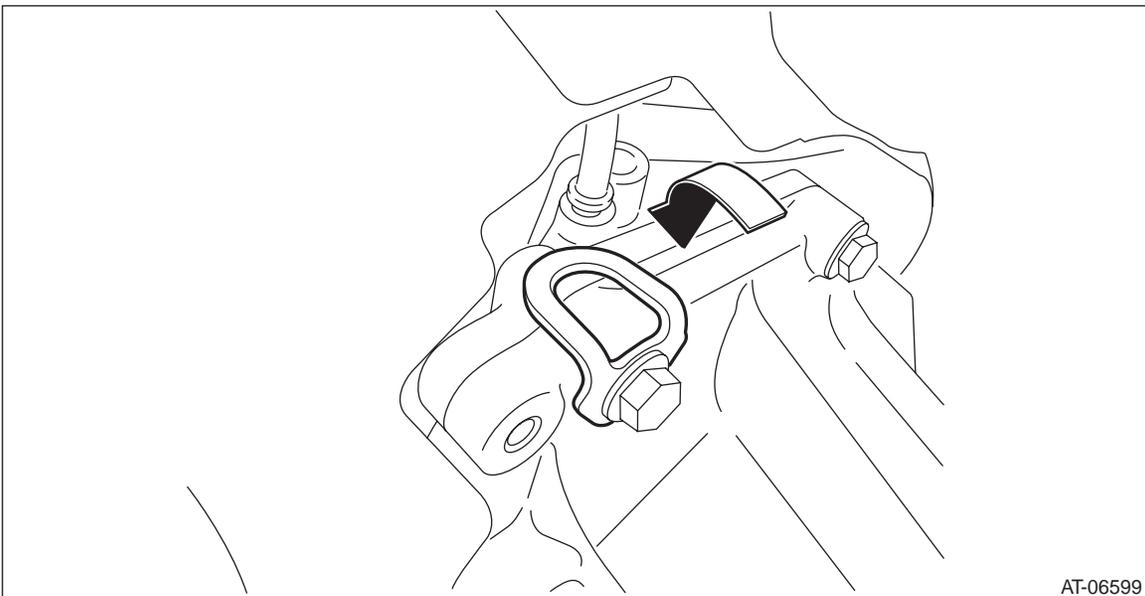


5) Mount the transmission onto the transmission jack.

6) Strike and bend the transmission hanger of transmission rear with a rubber hammer etc. so that it gets in contact with the transmission case.

CAUTION:

Do not apply extra overload or impact to the transmission case.



7) Remove the pitching stopper bracket, if mounted.

8) Install the transmission onto the engine.

NOTE:

- While raising the transmission jack gradually, turn the screw of engine support, then tilt the engine forward.
- Temporarily attach the two engine connecting bolts and two nuts (lower side).

Automatic Transmission Assembly

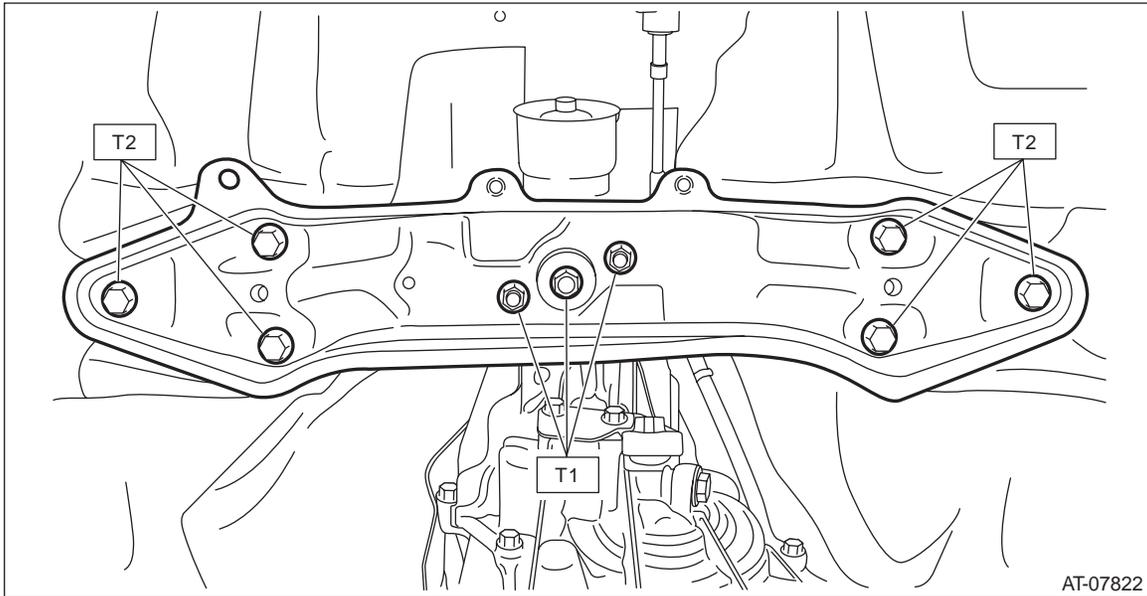
CONTINUOUSLY VARIABLE TRANSMISSION

9) Install the transmission rear crossmember.

Tightening torque:

T1: 35 N·m (3.6 kgf-m, 25.8 ft-lb)

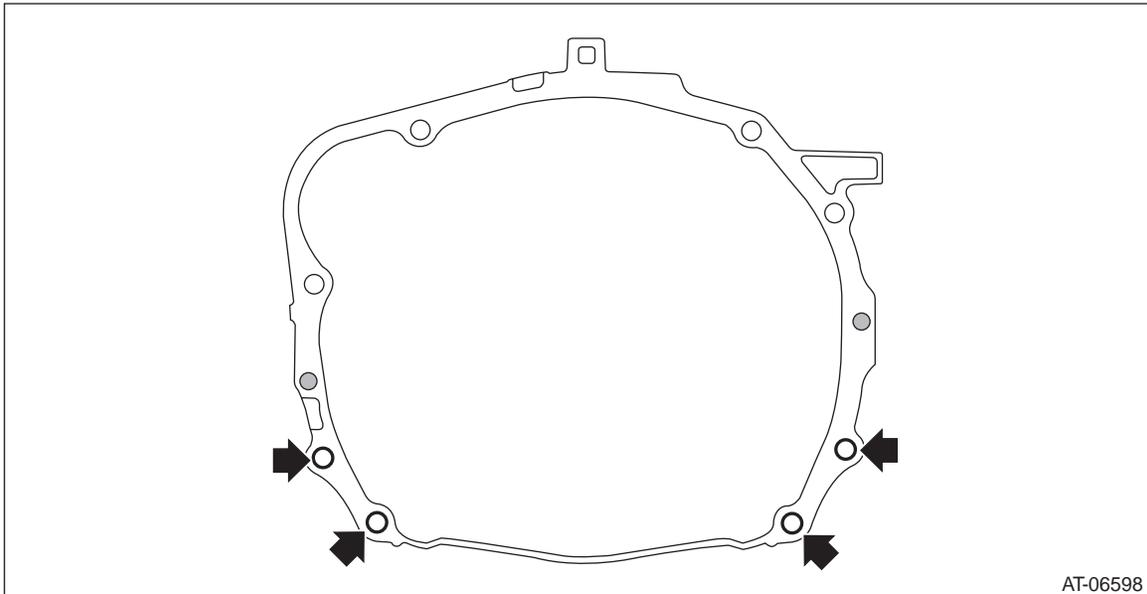
T2: 70 N·m (7.1 kgf-m, 51.6 ft-lb)



10) Tighten the two engine connecting bolts and two nuts (lower side).

Tightening torque:

50 N·m (5.1 kgf-m, 36.9 ft-lb)



11) Remove the transmission jack.

12) Lower the vehicle.

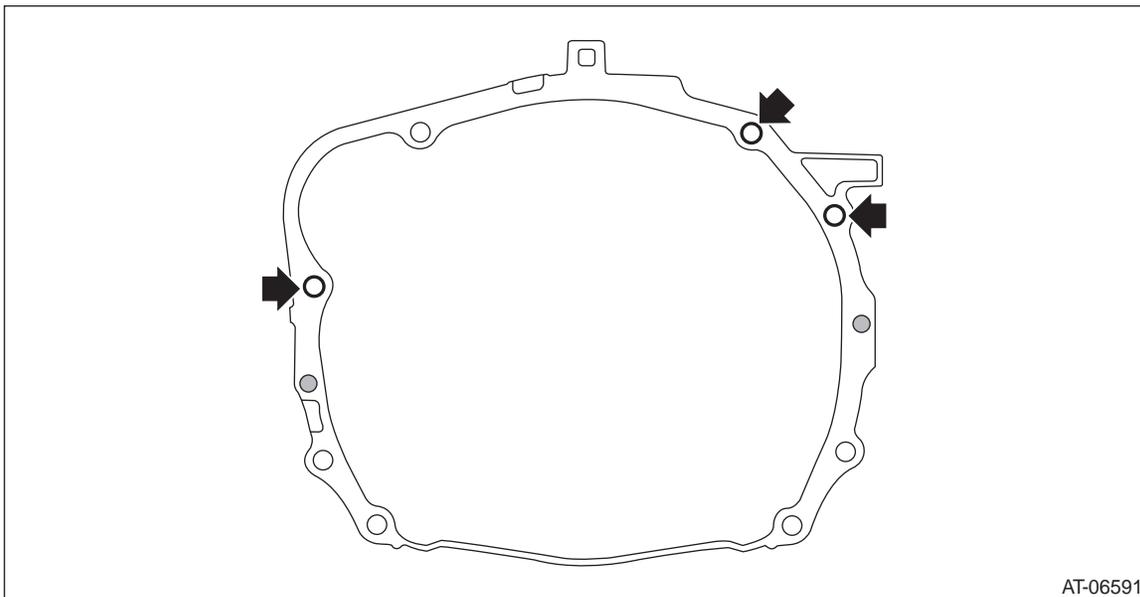
Automatic Transmission Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

13) Install the three engine mounting bolts (upper side).

Tightening torque:

50 N·m (5.1 kgf·m, 36.9 ft·lb)



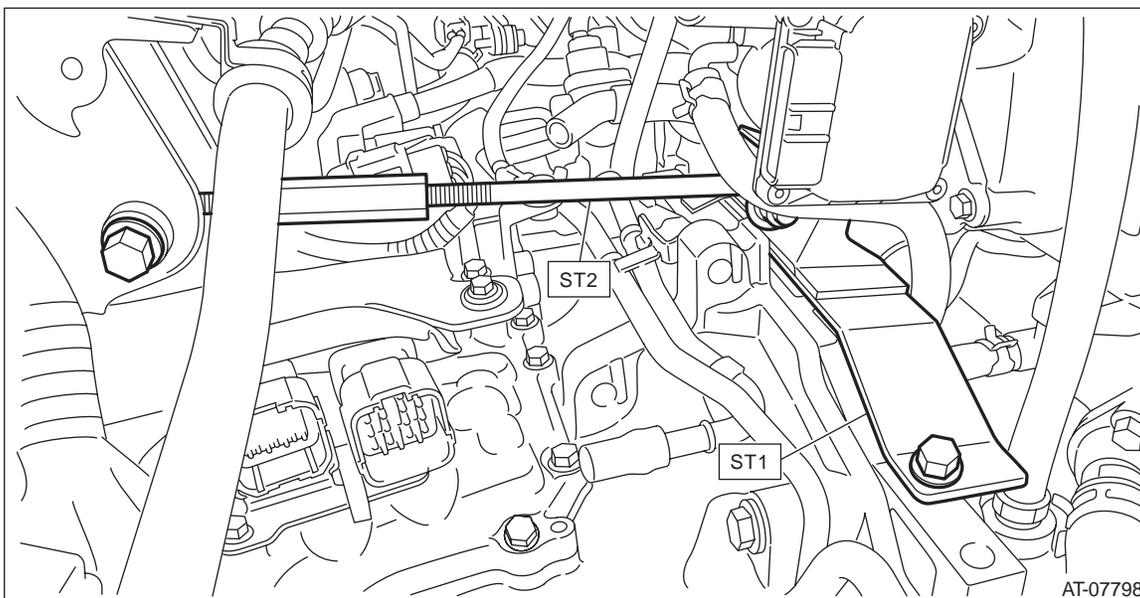
AT-06591

14) Remove the ST (STOPPER SET) from converter case.

15) Remove the ST (ENGINE SUPPORT BRACKET and ENGINE SUPPORT).

ST1 41099AA010 or 41099AA011 ENGINE SUPPORT BRACKET

ST2 41099AA020 ENGINE SUPPORT



AT-07798

16) Match the torque converter screw hole with drive plate hole to install the bolt.

CAUTION:

- Do not drop the mounting bolt in the converter housing.
- Do not damage the mounting bolt.

Tightening torque:

25 N·m (2.5 kgf·m, 18.4 ft·lb)

Automatic Transmission Assembly

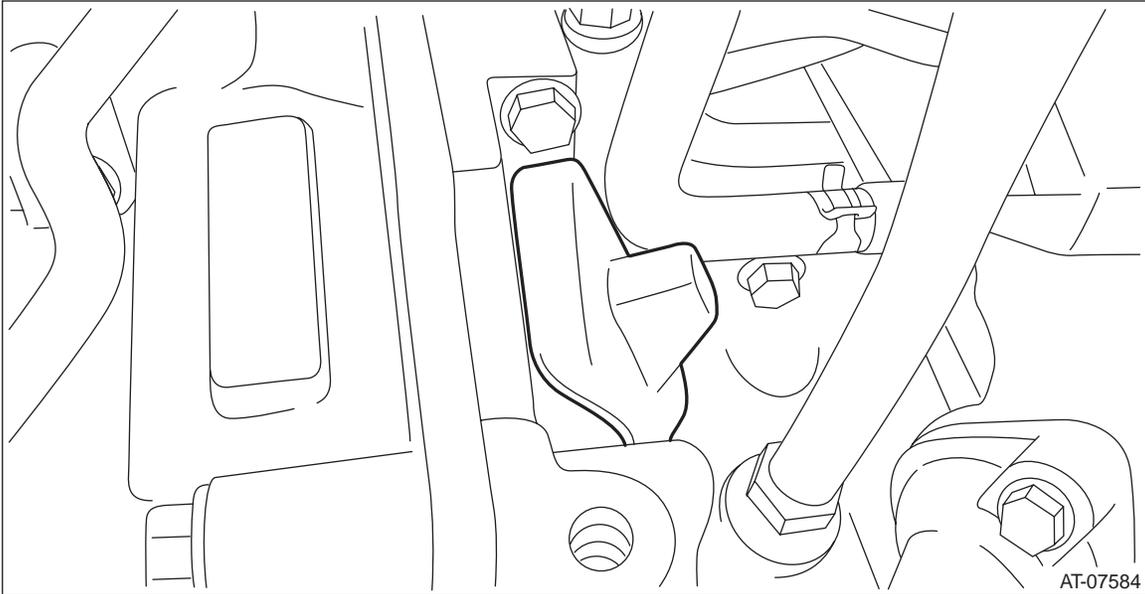
CONTINUOUSLY VARIABLE TRANSMISSION

17) Install the remaining three bolts by rotating the crank pulley a little at a time in the same direction as engine revolution.

Tightening torque:

25 N·m (2.5 kgf-m, 18.4 ft-lb)

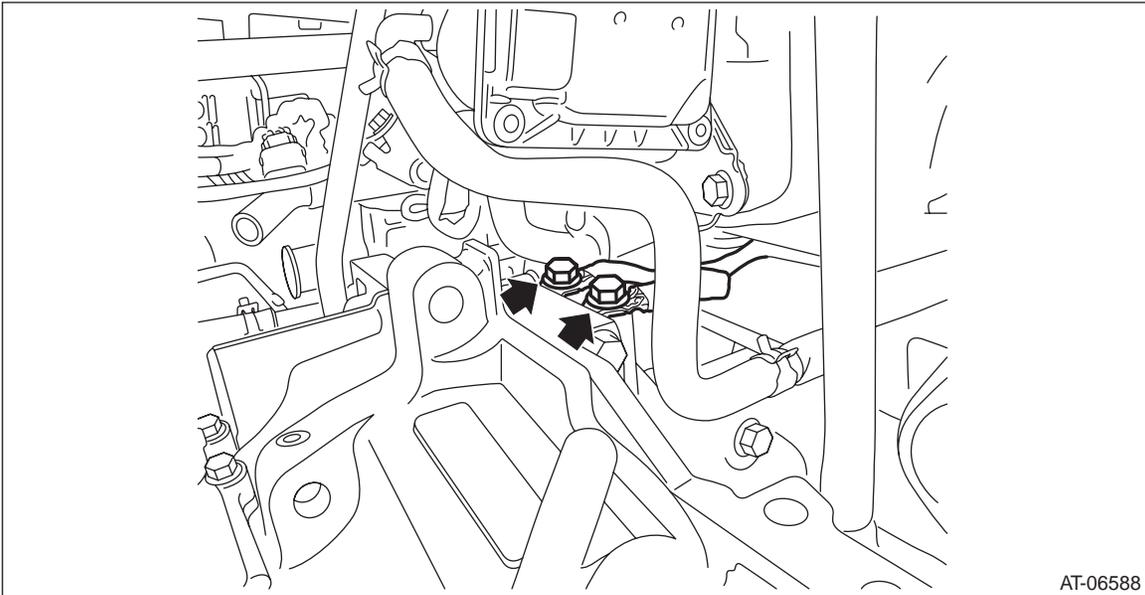
18) Install the service hole plug.



19) Install the engine ground terminals.

Tightening torque:

19 N·m (1.9 kgf-m, 14.0 ft-lb)

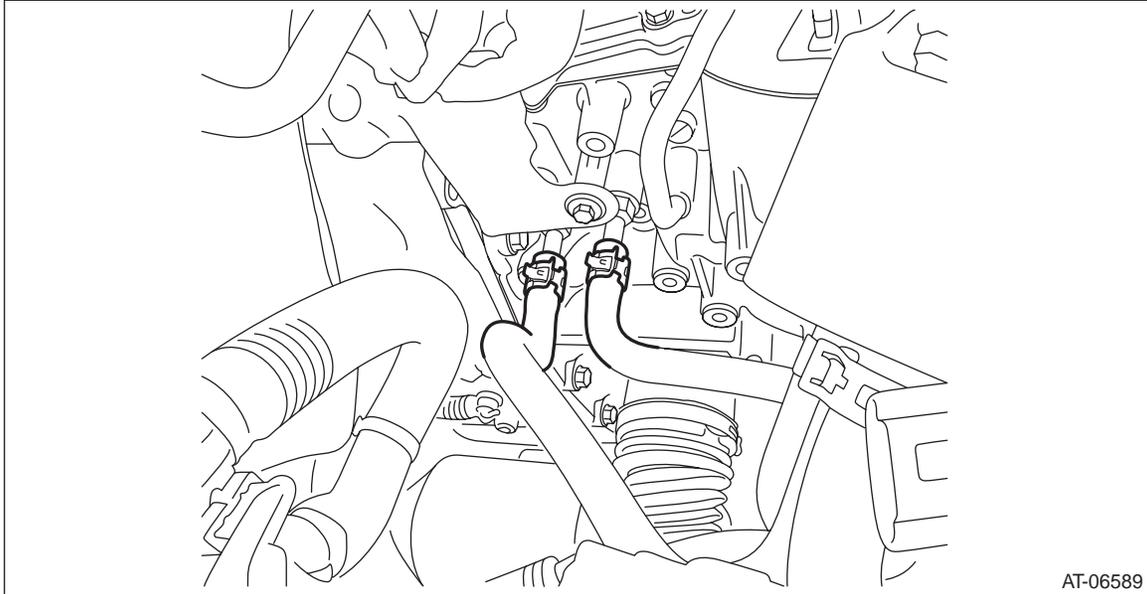


20) Replace the CVTF inlet hose and CVTF outlet hose.<Ref. to CVT(TR580)-145, CVTF Cooler (With Warmer Function).>

Automatic Transmission Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

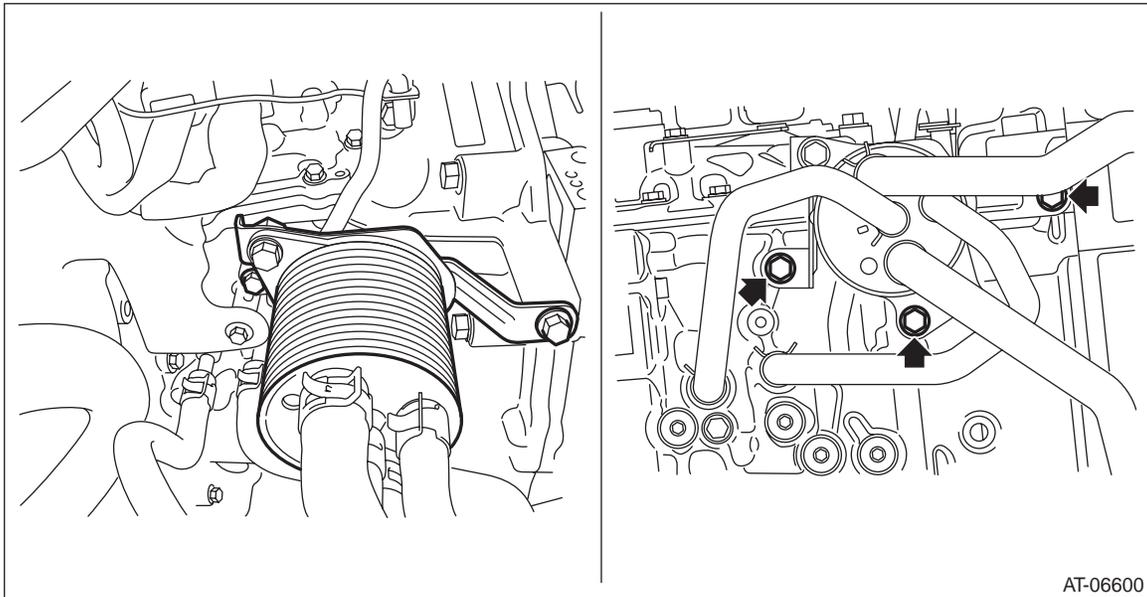
21) Install the CVTF inlet hose and CVTF outlet hose to transmission.



22) Install the CVTF cooler (with warmer feature) to the transmission.

Tightening torque:

23 N·m (2.3 kgf-m, 17.0 ft-lb)



23) Install the starter.<Ref. to SC(H4DO)-12, INSTALLATION, Starter.>

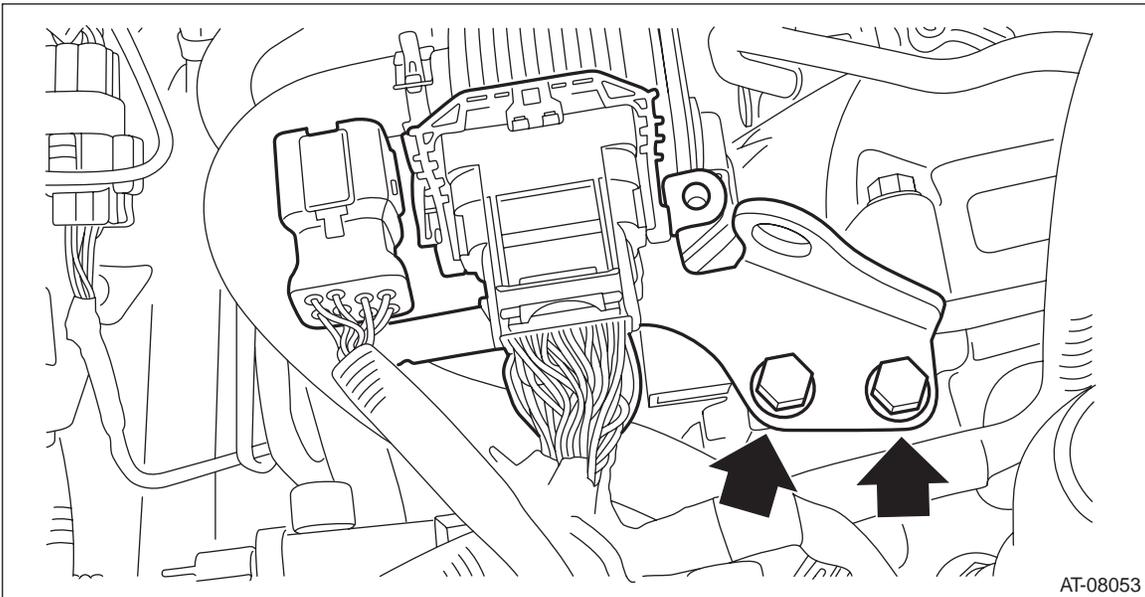
Automatic Transmission Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

24) Install the engine rear hanger.

Tightening torque:

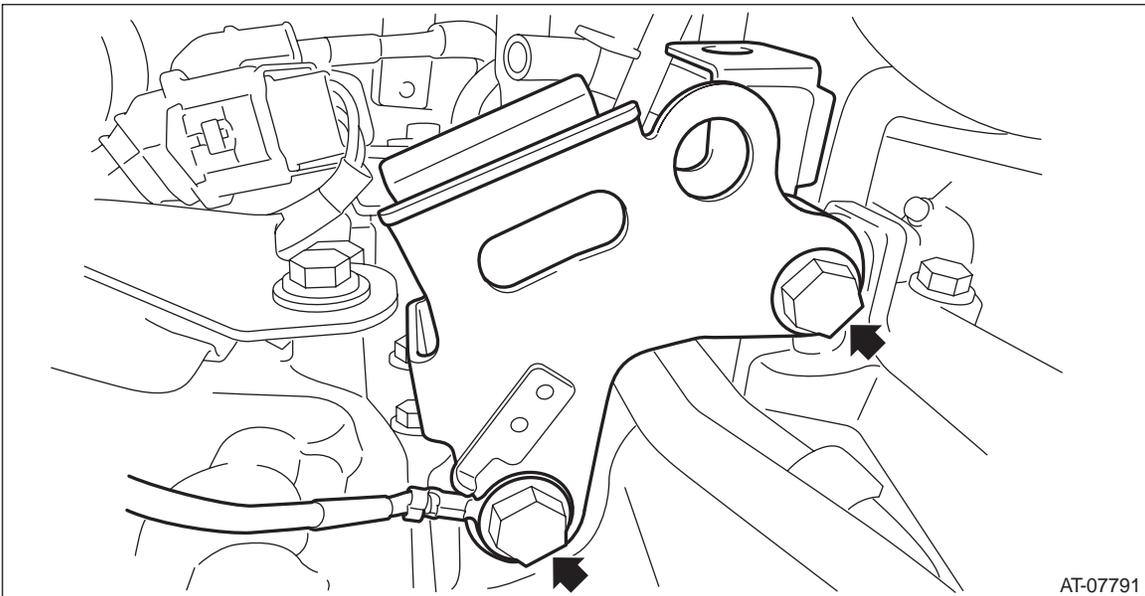
21 N·m (2.1 kgf·m, 15.5 ft·lb)



25) Install the pitching stopper bracket and transmission radio ground cord.

Tightening torque:

41 N·m (4.2 kgf·m, 30.2 ft·lb)



26) Install the air breather hose to the pitching stopper bracket.

Automatic Transmission Assembly

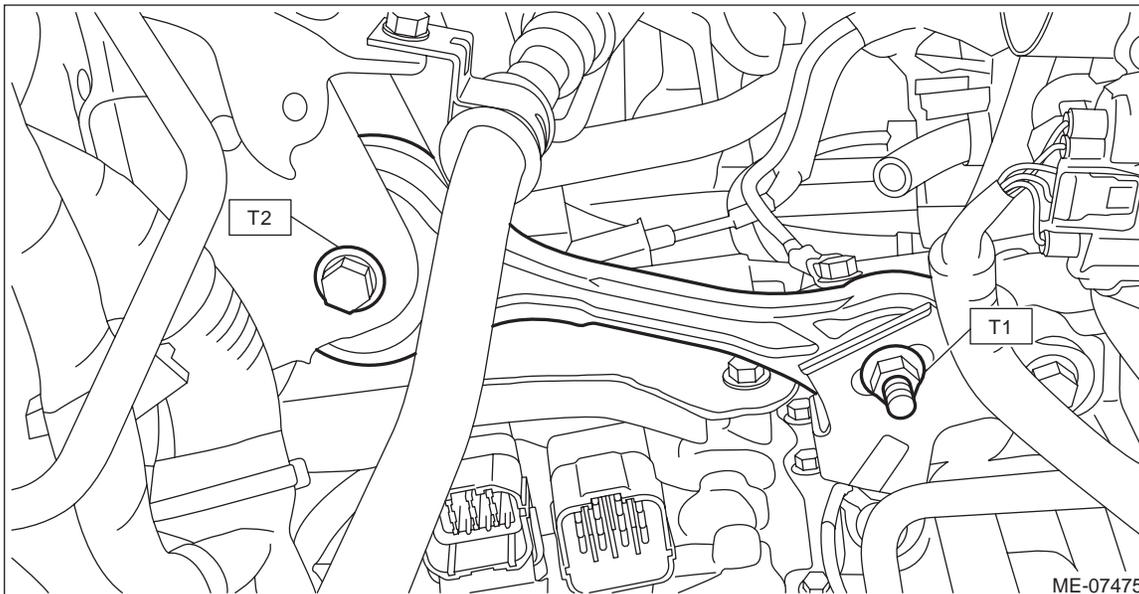
CONTINUOUSLY VARIABLE TRANSMISSION

27) 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)



28) Connect the EGR control valve harness connector, throttle position sensor harness connector and manifold absolute pressure sensor harness connector.

29) Connect the engine harness connectors, then install the harness connector bracket.

Tightening torque:

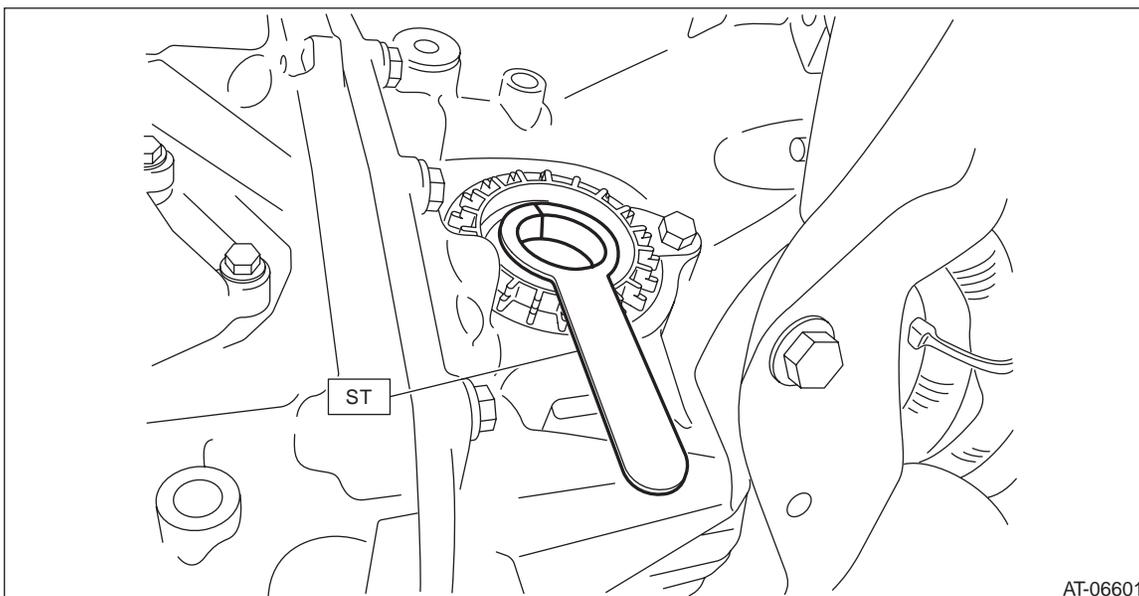
7.5 N·m (0.8 kgf·m, 5.5 ft·lb)

30) Lift up the vehicle.

31) Apply grease to the side retainer oil seal lip.

32) Set the ST to side retainer.

ST 28399SA010 OIL SEAL PROTECTOR



33) Replace the circlip of the drive shaft with a new part.

Automatic Transmission Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

34) Insert the front drive shaft spline section into transmission and remove the ST (OIL SEAL PROTECTOR).

NOTE:

- Before inserting RH front drive shaft into transmission, turn the steering wheel to left hand full lock.
- Before inserting LH front drive shaft into transmission, turn the steering wheel to right hand full lock.

35) Insert the drive shaft into the transmission securely by pressing the housing from outside of the vehicle.

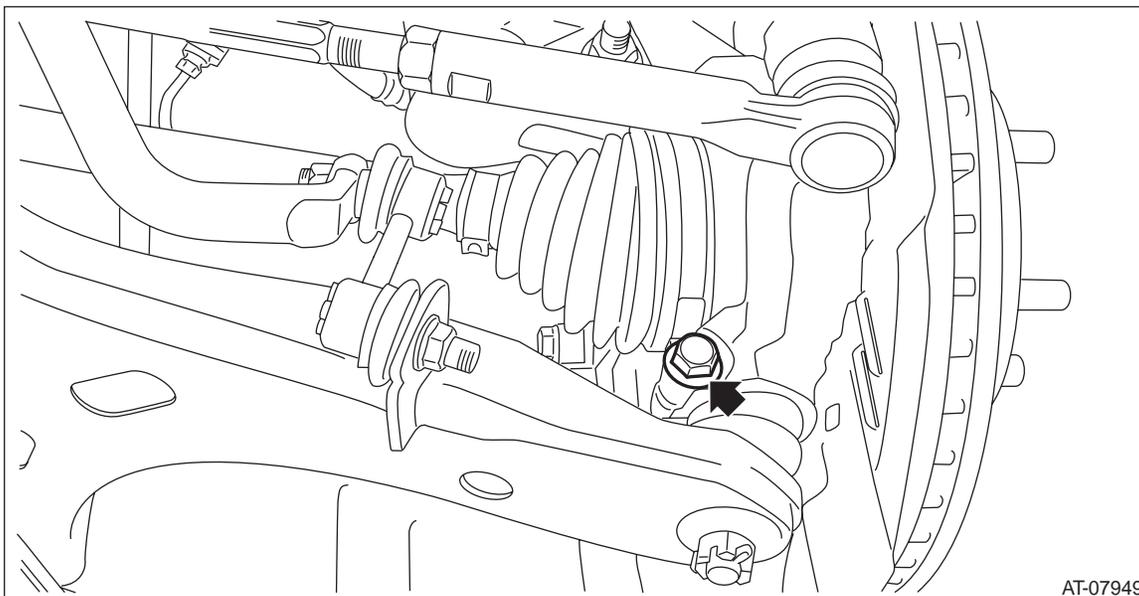
36) Insert the ball joint into housing and secure with bolt.

Tightening torque:

50 N·m (5.1 kgf·m, 36.9 ft·lb)

CAUTION:

- Do not apply grease to the tapered portion of ball stud.
- Before tightening, make sure the lower side of housing and stepped section of ball joint are in contact.

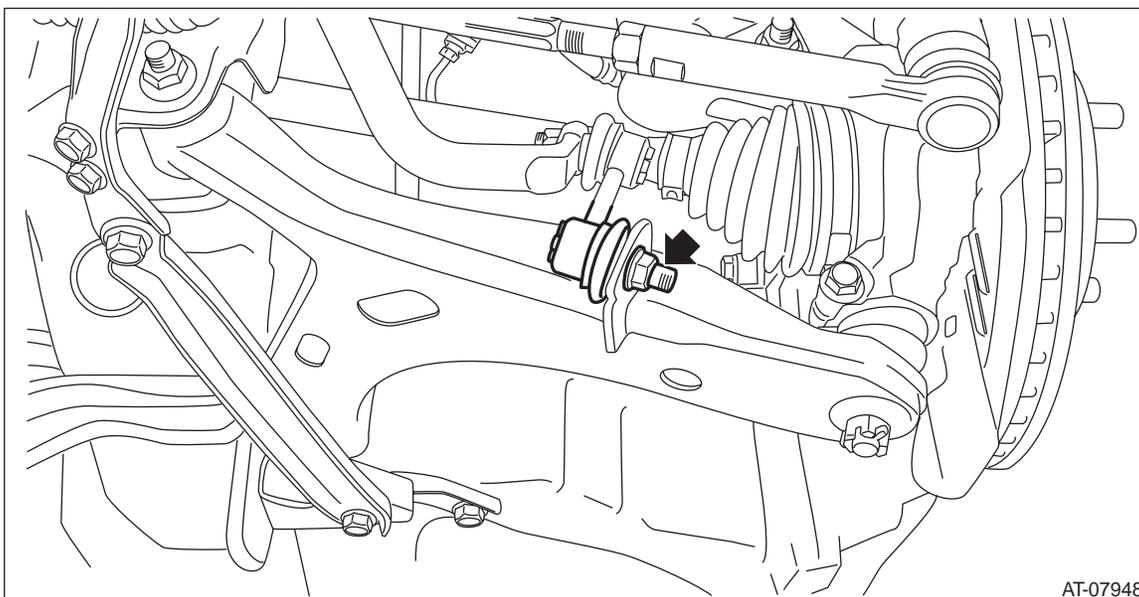


AT-07949

37) Attach the stabilizer link to the front arm.

Tightening torque:

60 N·m (6.1 kgf·m, 44.3 ft·lb)



AT-07948

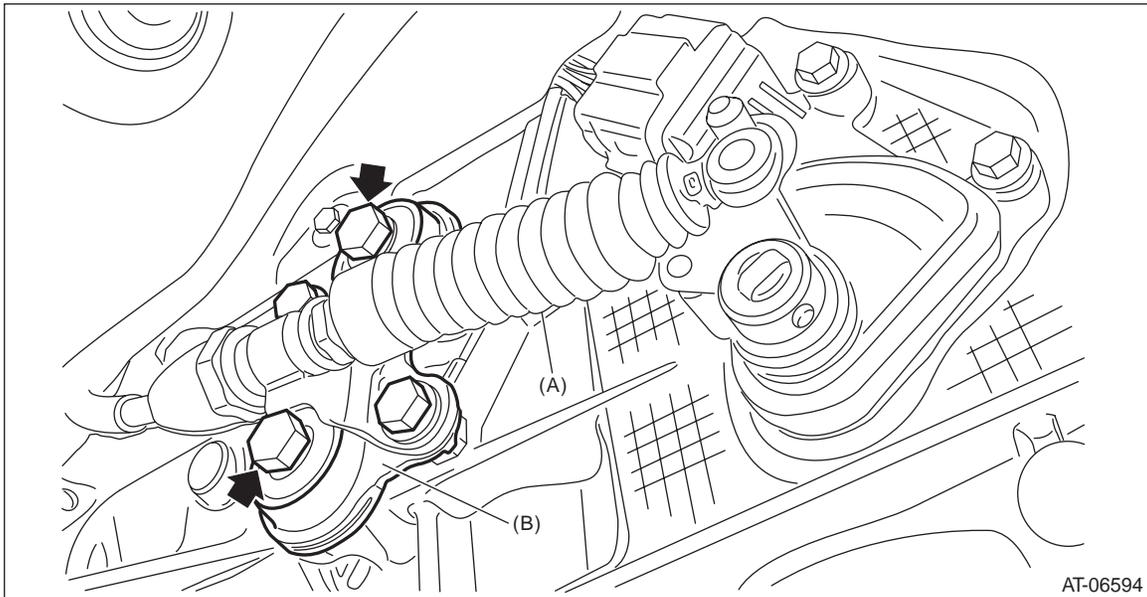
Automatic Transmission Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

38) Install the plate assembly to transmission.

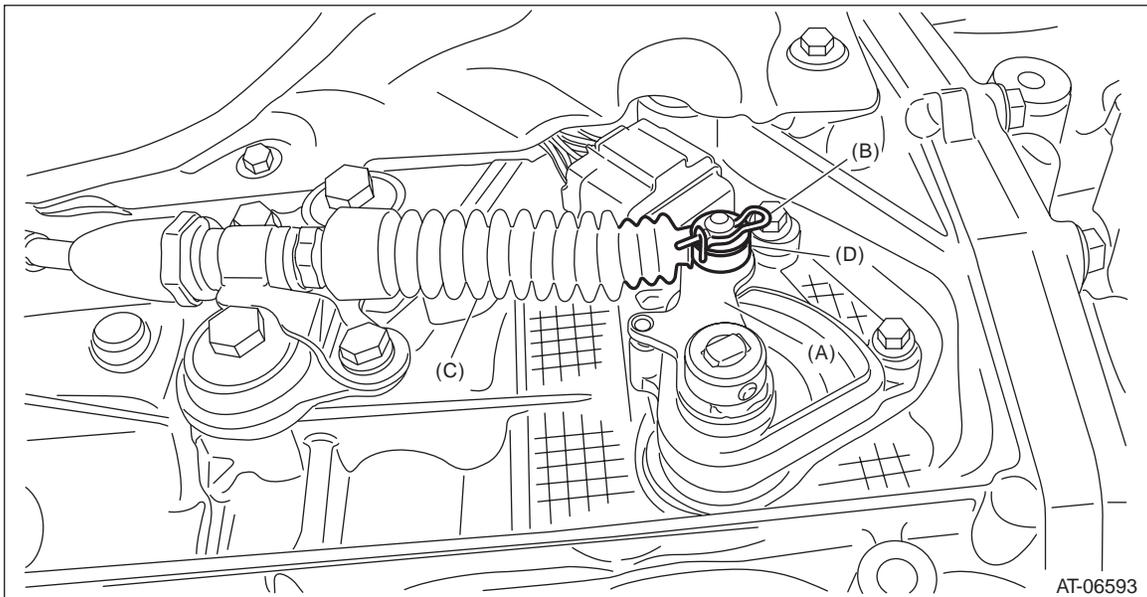
Tightening torque:

25 N·m (2.5 kgf-m, 18.4 ft-lb)



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

39) Install the washer and snap pin to the shifter arm.



- (A) Shifter arm
- (B) Snap pin
- (C) Select cable
- (D) Washer

40) Install the propeller shaft.<Ref. to DS-14, INSTALLATION, Propeller Shaft.>

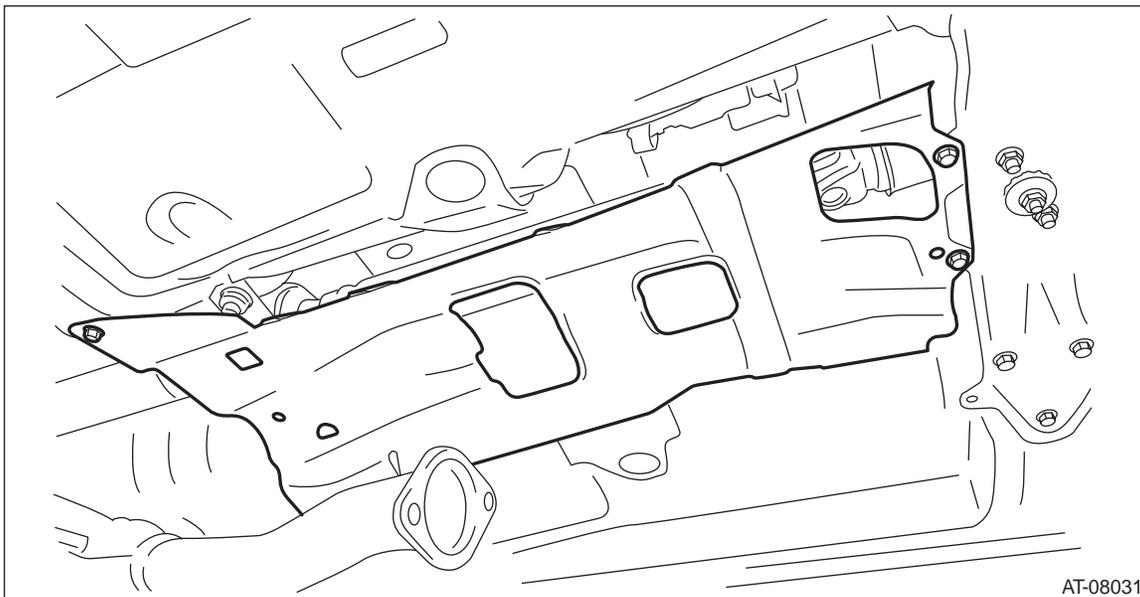
Automatic Transmission Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

41) Install the center exhaust cover.

Tightening torque:

18 N·m (1.8 kgf-m, 13.3 ft-lb)



42) Install the center exhaust pipe.<Ref. to EX(H4DO)-15, INSTALLATION, Center Exhaust Pipe.>

43) Install the under cover - front.

44) Install the under cover front - transmission.

Tightening torque:

18 N·m (1.8 kgf-m, 13.3 ft-lb)

45) Lower the vehicle.

Automatic Transmission Assembly

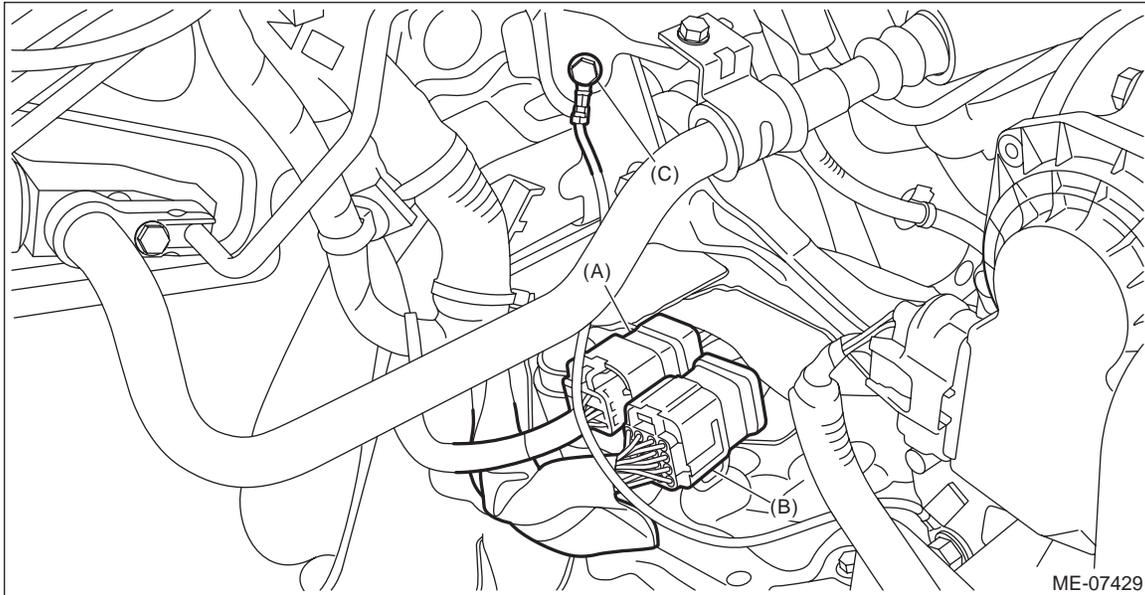
CONTINUOUSLY VARIABLE TRANSMISSION

46) Connect the following harness connectors.

- Transmission harness connectors
- Inhibitor harness connector
- Transmission radio ground terminal

Tightening torque:

13 N·m (1.3 kgf·m, 9.6 ft·lb)



- (A) Transmission harness connectors
- (B) Inhibitor harness connector
- (C) Transmission radio ground terminal

47) Install the air intake boot assembly.<Ref. to IN(H4DO)-11, INSTALLATION, Air Intake Boot.>

48) Install the front tires.<Ref. to WT-5, INSTALLATION, Tire and Wheel.>

49) Connect the battery ground terminal.

50) Refill differential gear oil to adjust the differential gear oil amount.<Ref. to CVT(TR580)-40, Differential Gear Oil.>

51) Refill CVTF to adjust the CVTF level.<Ref. to CVT(TR580)-35, CVTF.>

52) Perform the operation for clearing AT learning value.<Ref. to CVT(diag)-24, Clear Memory Mode.>

53) Perform the operation of AT learning mode.<Ref. to CVT(diag)-30, Learning Control.>

54) Execute the rear differential inspection mode.<Ref. to DI-64, Rear Differential Inspection Mode.>

CAUTION:

Always execute the rear differential inspection mode at the replacement of the following.

- Replacement of transmission assembly
- Replacement of front differential hypoid gear set

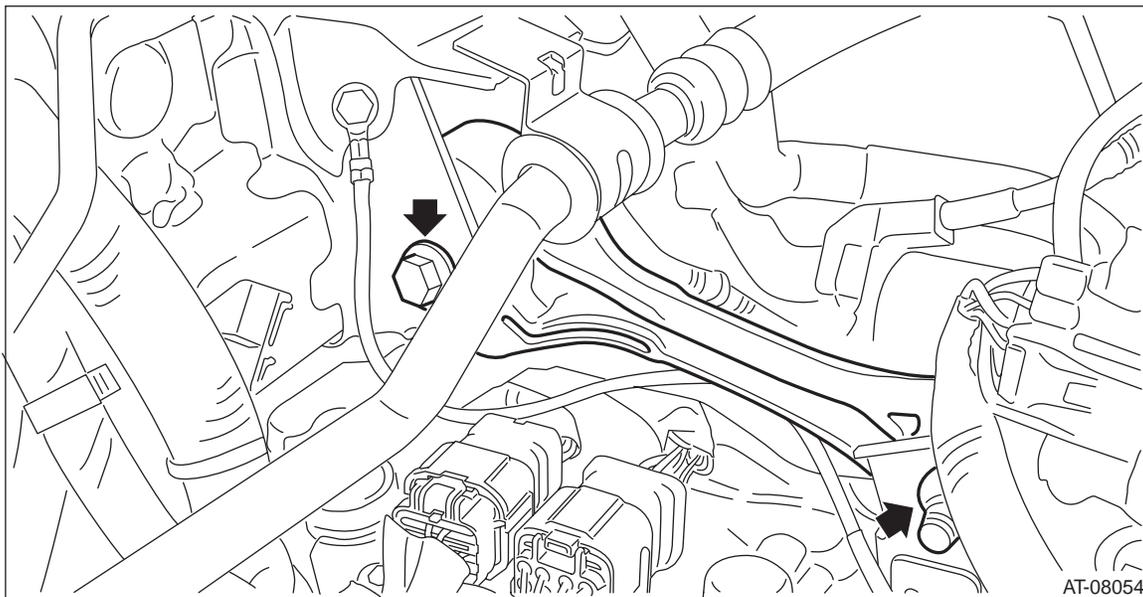
55) Perform the road test to make sure there is no fault.<Ref. to CVT(TR580)-45, INSPECTION, Road Test.>

11. Transmission Mounting System

A: REMOVAL

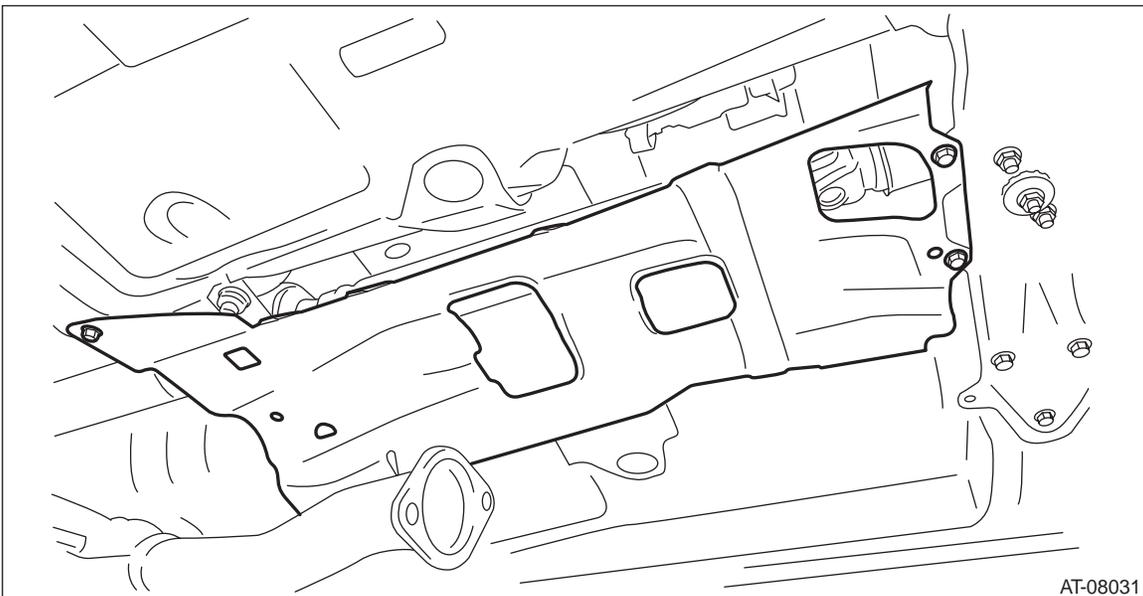
1. PITCHING STOPPER

- 1) Disconnect the ground cable from battery.
- 2) Remove the air intake boot assembly.<Ref. to IN(H4DO)-11, REMOVAL, Air Intake Boot.>
- 3) Remove the pitching stopper.



2. TRANSMISSION REAR CROSSMEMBER AND REAR CUSHION RUBBER

- 1) Disconnect the ground cable from battery.
- 2) Lift up the vehicle.
- 3) Remove the under cover front - transmission.
- 4) Remove the center exhaust pipe.<Ref. to EX(H4DO)-14, REMOVAL, Center Exhaust Pipe.>
- 5) Remove the center exhaust cover.

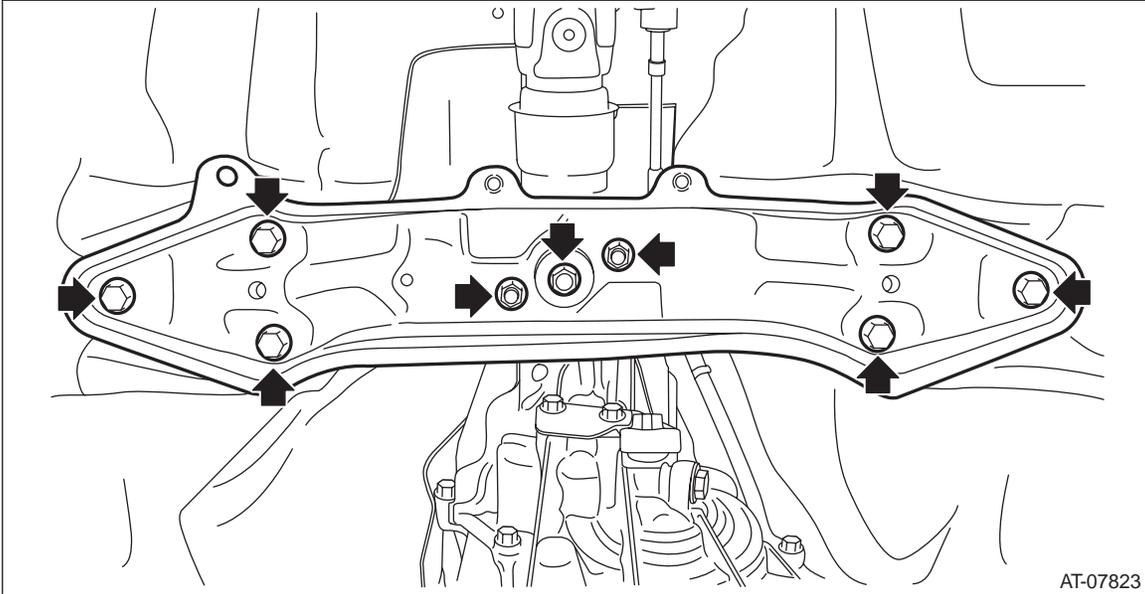


- 6) Set the transmission jack under the transmission. Make sure that the support plate of transmission jack does not touch the oil pan.

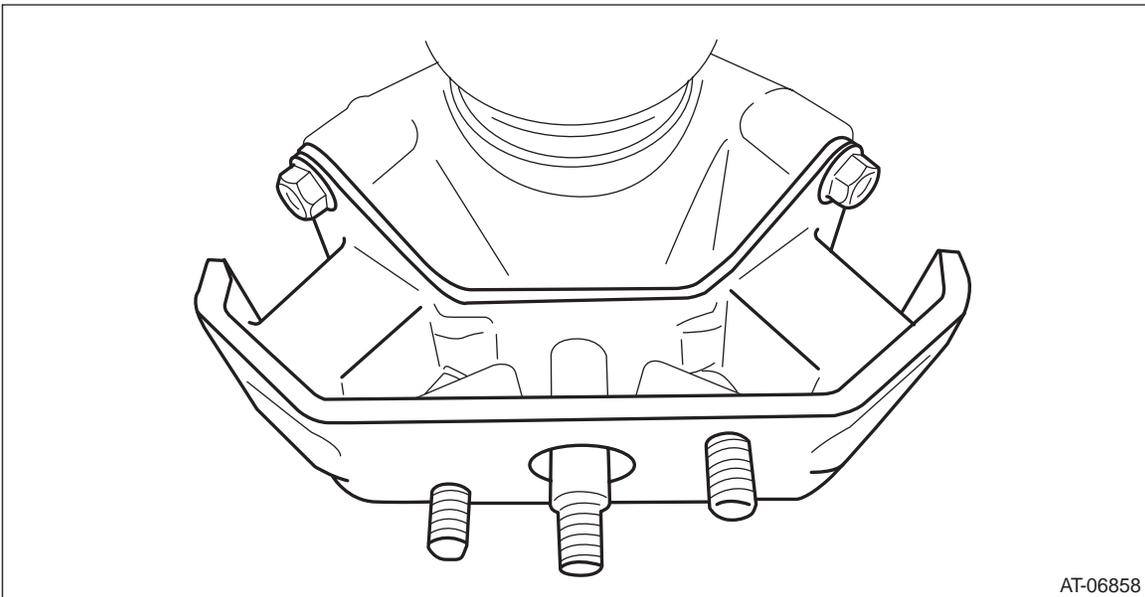
Transmission Mounting System

CONTINUOUSLY VARIABLE TRANSMISSION

7) Remove the transmission rear crossmember.



8) Remove the rear cushion rubber.



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Transmission Mounting System

CONTINUOUSLY VARIABLE TRANSMISSION

B: INSTALLATION

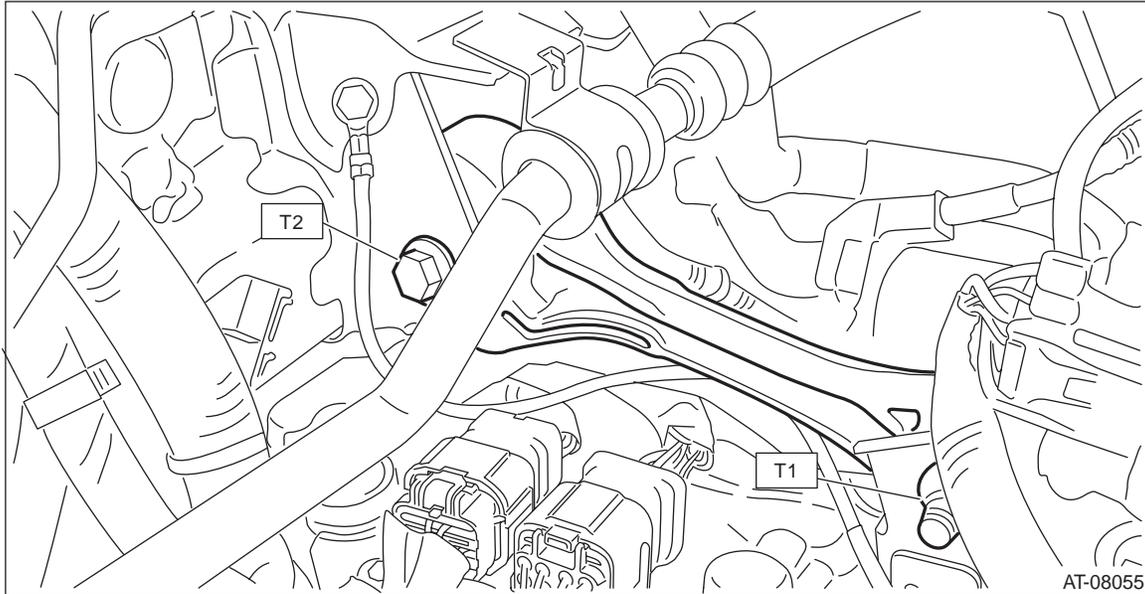
1. PITCHING STOPPER

1) Install the pitching stopper.

Tightening torque:

T1: 50 N·m (5.1 kgf-m, 36.9 ft-lb)

T2: 58 N·m (5.9 kgf-m, 42.8 ft-lb)



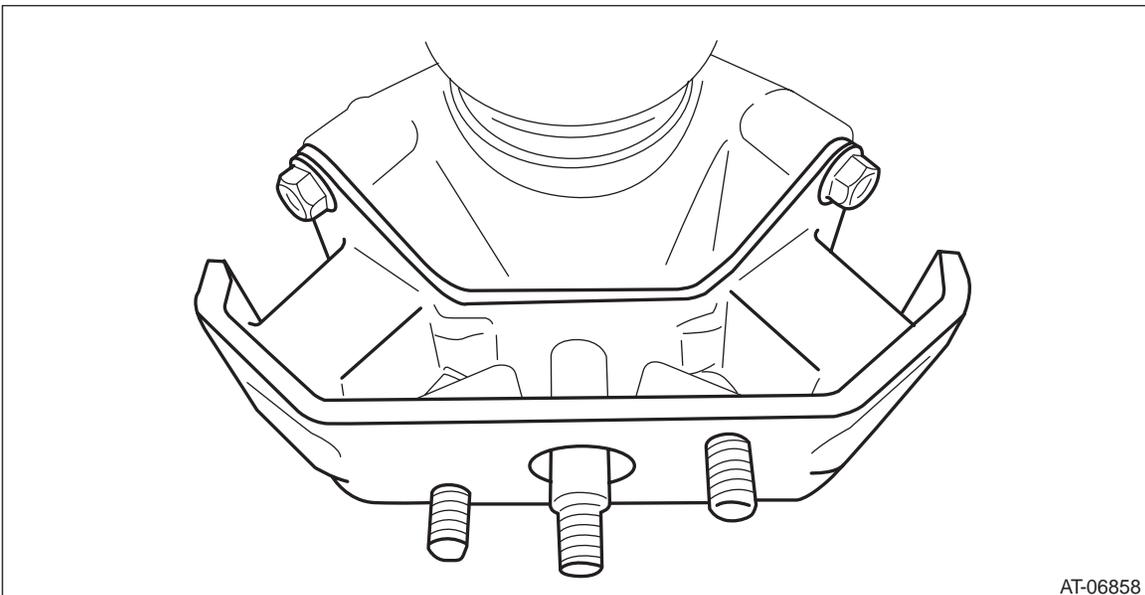
- 2) Install the air intake boot assembly. <Ref. to IN(H4DO)-11, INSTALLATION, Air Intake Boot.>
- 3) Connect the battery ground terminal.

2. TRANSMISSION REAR CROSSMEMBER AND REAR CUSHION RUBBER

1) Attach the rear cushion rubber to the transmission.

Tightening torque:

40 N·m (4.1 kgf-m, 29.5 ft-lb)



Transmission Mounting System

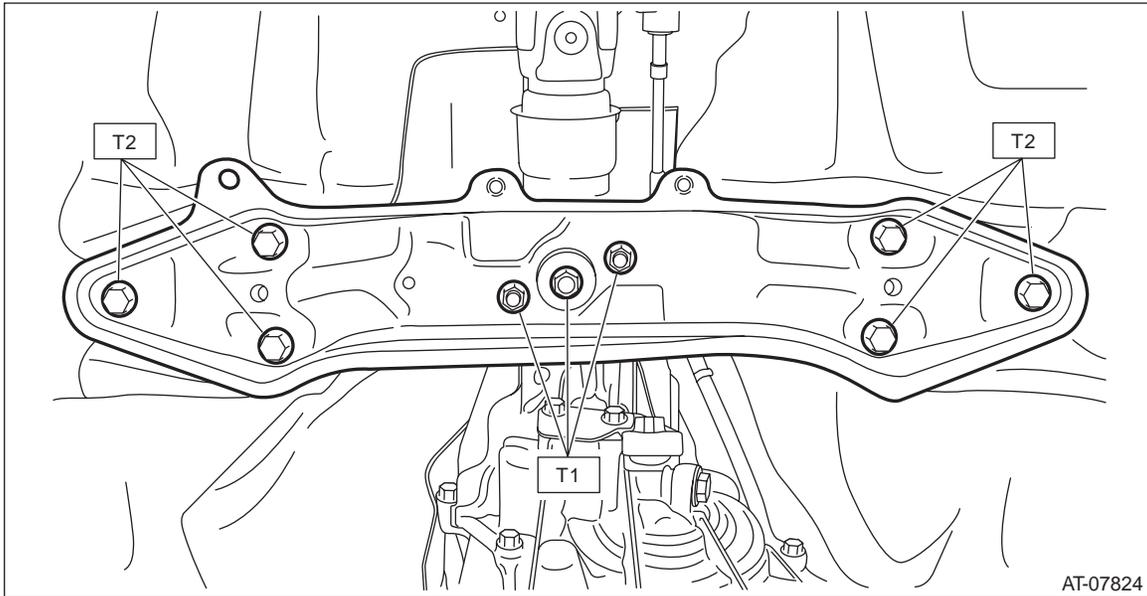
CONTINUOUSLY VARIABLE TRANSMISSION

2) Install the 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)

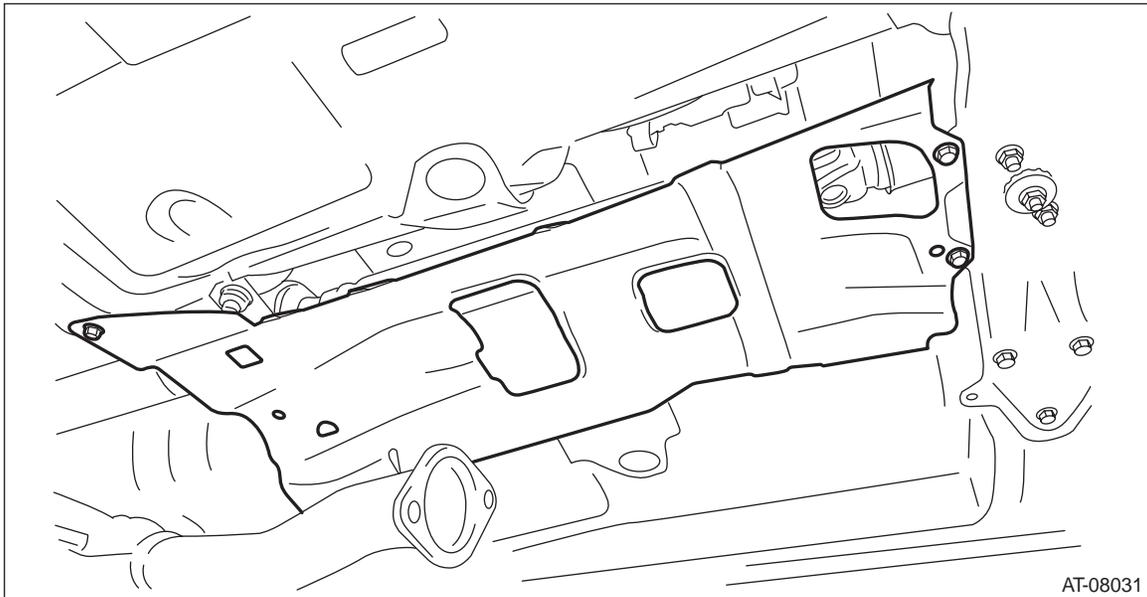


3) Remove the transmission jack.

4) Install the center exhaust cover.

Tightening torque:

18 N·m (1.8 kgf-m, 13.3 ft-lb)



5) Install the center exhaust pipe.<Ref. to EX(H4DO)-15, INSTALLATION, Center Exhaust Pipe.>

6) Install the under cover front - transmission.

Tightening torque:

18 N·m (1.8 kgf-m, 13.3 ft-lb)

7) Connect the battery ground terminal.

C: INSPECTION

- Check the crossmember for bends or damage.
- Check that the cushion rubber is not stiff, cracked or otherwise damaged.

12.Extension Case Oil Seal

A: INSPECTION

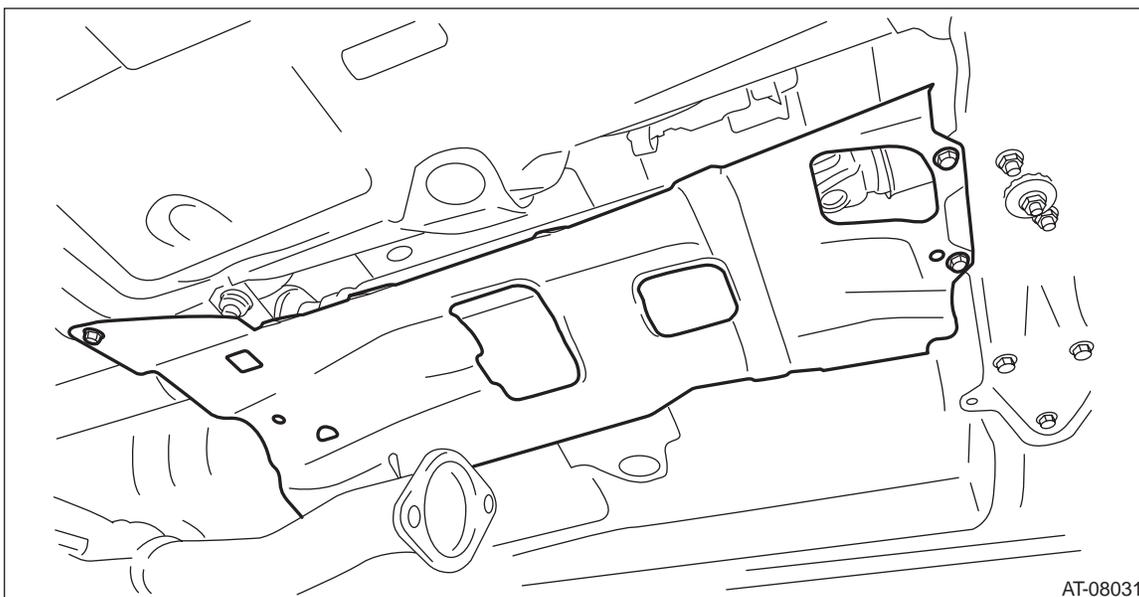
Check for leakage of CVTF from the joint section of transmission and propeller shaft. If a leak is found, inspect the propeller shaft and replace the oil seal.

B: REPLACEMENT

CAUTION:

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

- 1) Lift up the vehicle.
- 2) Remove the center exhaust pipe.<Ref. to EX(H4DO)-14, REMOVAL, Center Exhaust Pipe.>
- 3) Remove the center exhaust cover.



- 4) Clean the transmission exterior.
- 5) Remove the propeller shaft.<Ref. to DS-11, REMOVAL, Propeller Shaft.>
- 6) Using a screwdriver or ST, remove the oil seal trying not to damage the extension case.
ST 398527700 PULLER ASSY
- 7) Using the ST, install the oil seal.

NOTE:

- Use a new oil seal.
- Apply CVTF to the oil seal lip and press-fitting surface.

ST 498057300 OIL SEAL INSTALLER

- 8) Install the propeller shaft.<Ref. to DS-14, INSTALLATION, Propeller Shaft.>

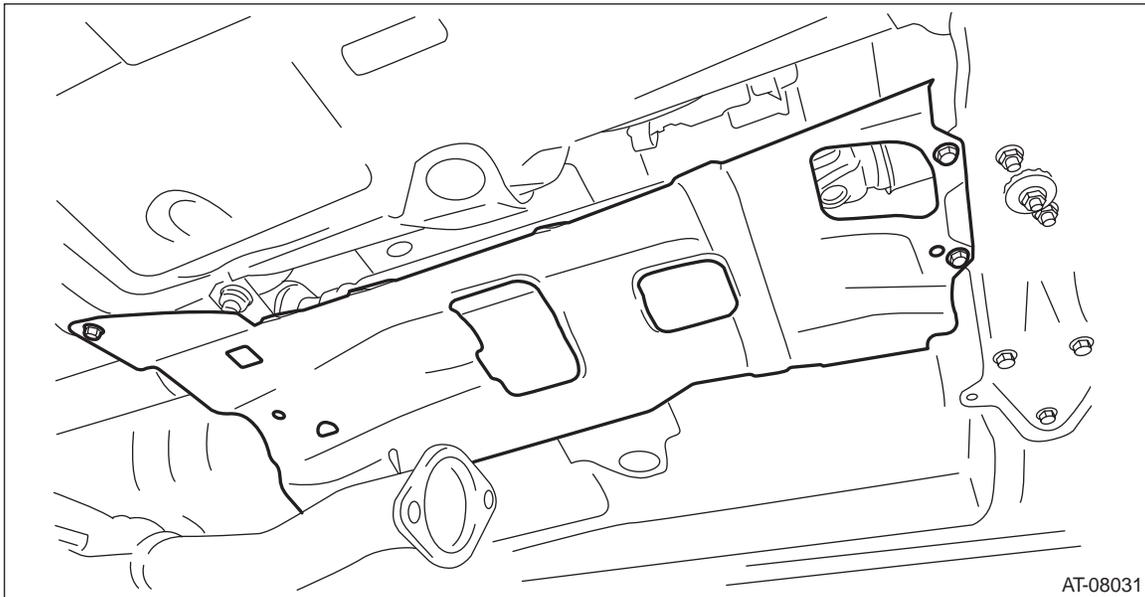
Extension Case Oil Seal

CONTINUOUSLY VARIABLE TRANSMISSION

9) Install the center exhaust cover.

Tightening torque:

18 N·m (1.8 kgf-m, 13.3 ft-lb)



10) Install the center exhaust pipe.<Ref. to EX(H4DO)-15, INSTALLATION, Center Exhaust Pipe.>

11) Adjust the CVTF level and check there is no leakage.<Ref. to CVT(TR580)-35, ADJUSTMENT, CVTF.>

13. Differential Side Retainer Oil Seal

A: INSPECTION

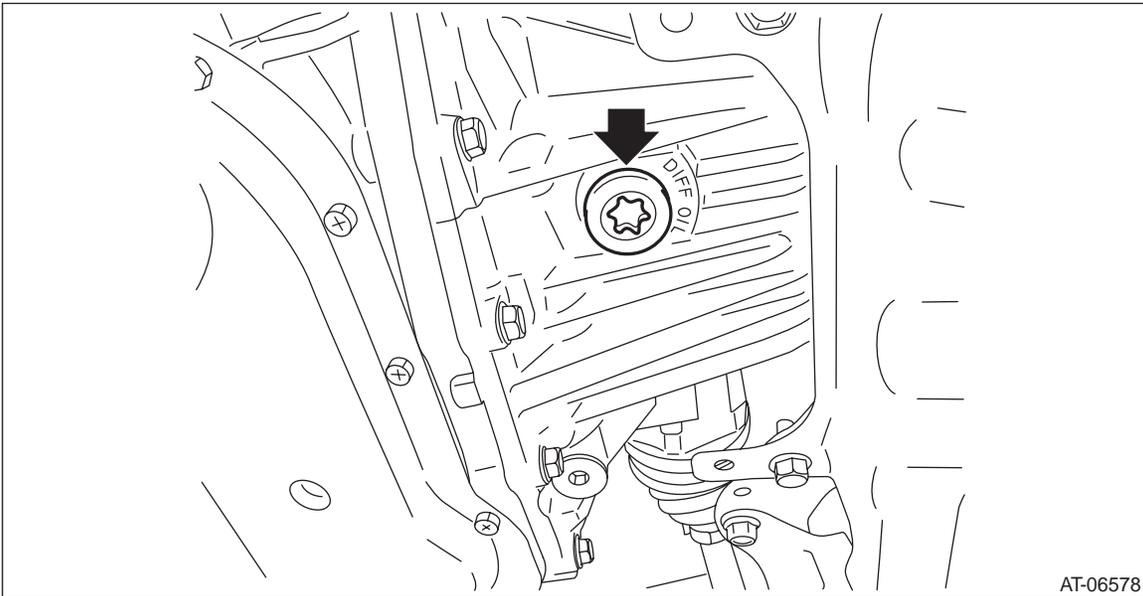
Check for leakage of gear oil from differential side retainer oil seal part. If there is an oil leak, inspect the front drive shaft and replace the oil seal.

B: REPLACEMENT

CAUTION:

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

- 1) Remove the front wheels.<Ref. to WT-5, REMOVAL, Tire and Wheel.>
- 2) Remove the center exhaust pipe.<Ref. to EX(H4DO)-14, REMOVAL, Center Exhaust Pipe.>
- 3) Remove the differential gear oil drain plug using TORX® bit T70, and then drain differential gear oil.



- 4) Tighten the differential gear oil drain plug.

NOTE:

Use a new gasket.

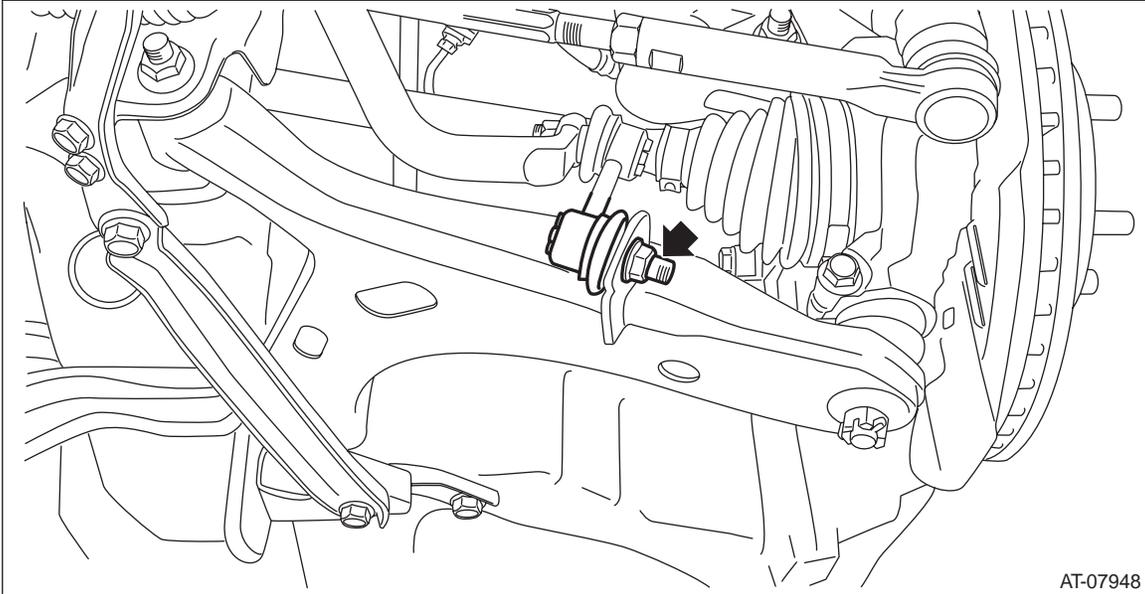
Tightening torque:

70 N·m (7.1 kgf·m, 51.6 ft·lb)

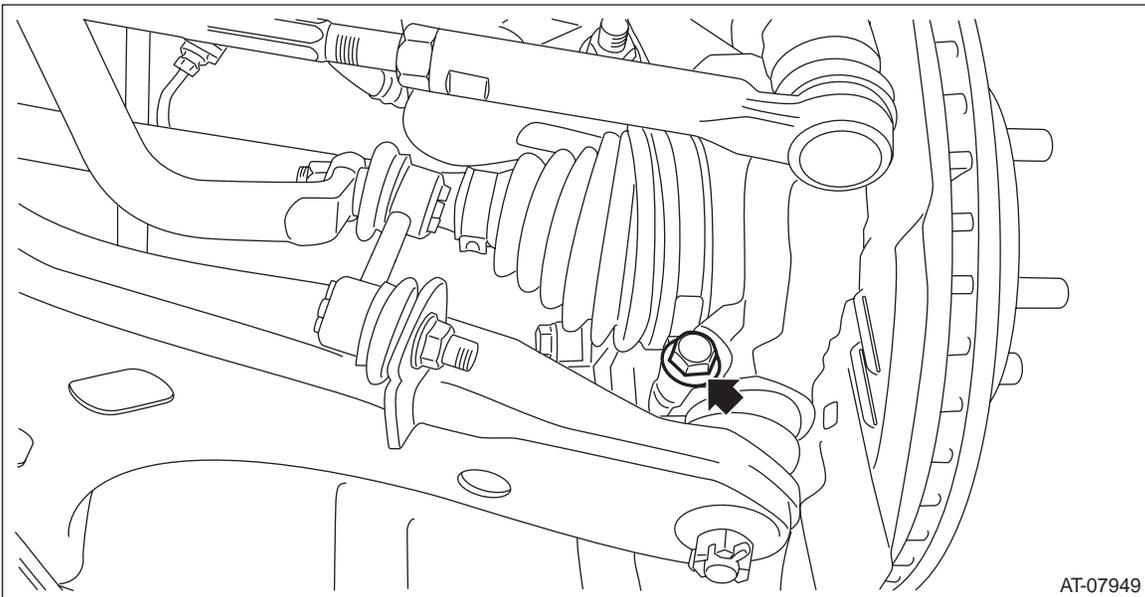
Differential Side Retainer Oil Seal

CONTINUOUSLY VARIABLE TRANSMISSION

5) Disconnect the stabilizer link from the front arm.



6) Remove the bolts which secure to the front housing, and separate the front arm and housing.



7) Using a crowbar, etc., pull out until the front drive shaft transmission side joint slides move smoothly.

NOTE:

Place cloth between the crowbar and the transmission in order to avoid damaging the transmission side retainer.

8) 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.

NOTE:

- Before pulling RH front drive shaft from transmission, turn the steering wheel to left hand full lock.
- Before pulling LH front drive shaft from transmission, turn the steering wheel to right hand full lock.

9) Remove the differential side retainer oil seal using driver wrapped with vinyl tape etc.

Differential Side Retainer Oil Seal

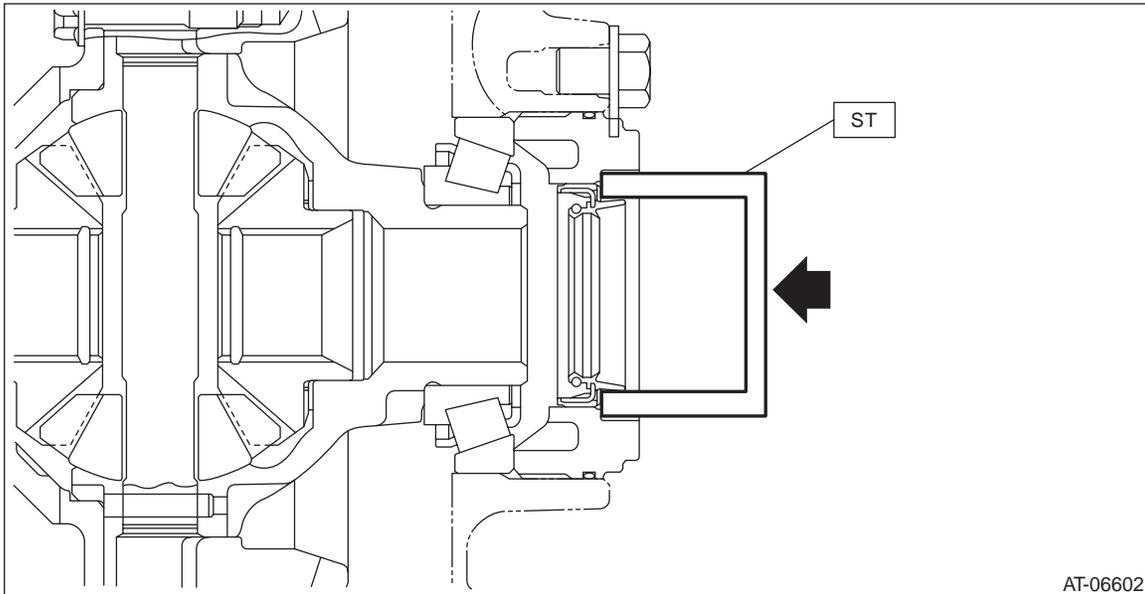
CONTINUOUSLY VARIABLE TRANSMISSION

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

NOTE:

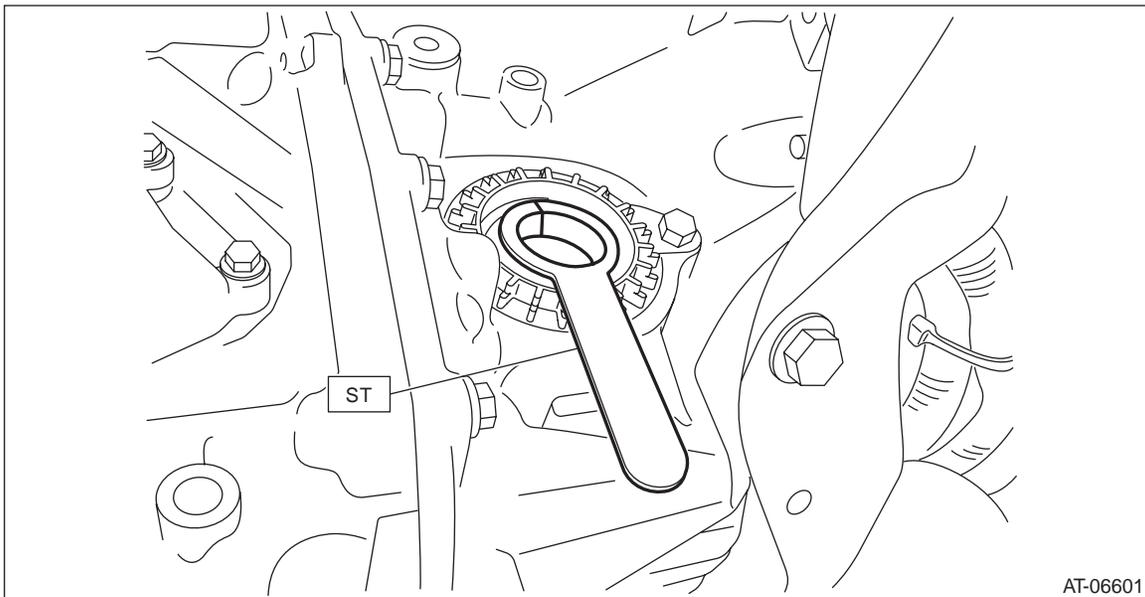
- Apply differential gear oil to the lip surface, so that the oil seal lip is not deformed.
- Apply differential gear oil to the press-fitting surface of oil seal and the differential side retainer.
- Oil seal has an identification mark (R, L). When installing oil seals, do not confuse the left and right.

ST 18675AA000 DIFFERENTIAL SIDE OIL SEAL INSTALLER



11) Set the ST to side retainer.

ST 28399SA010 OIL SEAL PROTECTOR



Differential Side Retainer Oil Seal

CONTINUOUSLY VARIABLE TRANSMISSION

12) Replace the circlip of the drive shaft with a new part.

13) Insert the front drive shaft spline section into transmission and remove the ST (DIFFERENTIAL SIDE OIL SEAL INSTALLER).

NOTE:

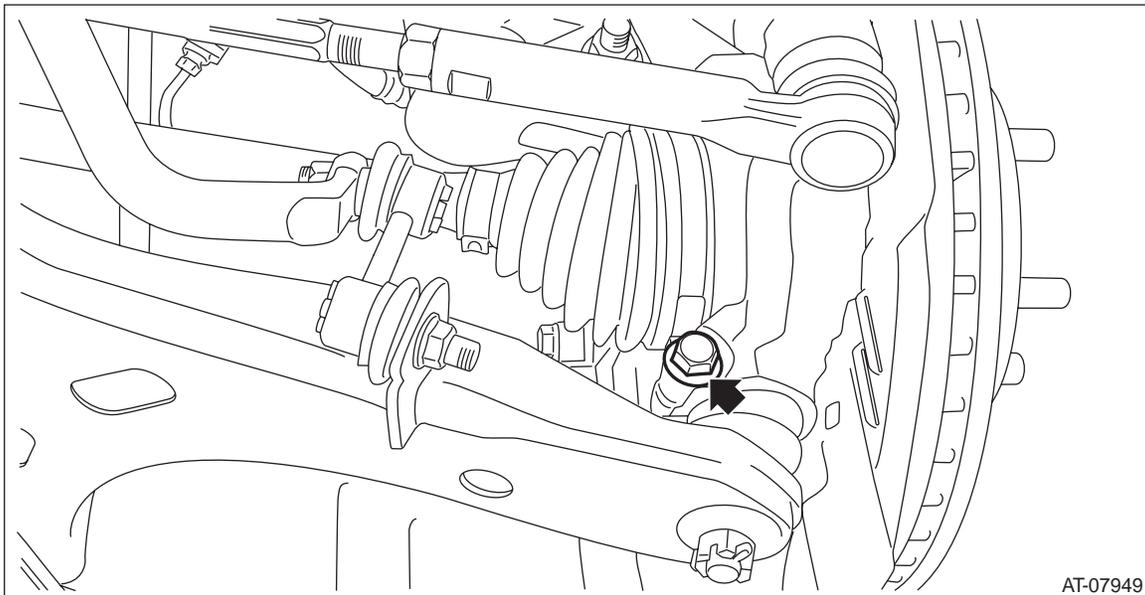
- Apply grease to the side retainer oil seal lip.
 - Before inserting RH front drive shaft into transmission, turn the steering wheel to left hand full lock.
 - Before inserting LH front drive shaft into transmission, turn the steering wheel to right hand full lock.
- 14) Insert the drive shaft into the transmission securely by pressing the housing from outside of the vehicle.
15) Insert the ball joint into housing and secure with bolt.

Tightening torque:

50 N·m (5.1 kgf·m, 36.9 ft·lb)

CAUTION:

- Do not apply grease to the tapered portion of ball stud.
- Before tightening, make sure the lower side of housing and stepped section of ball joint are in contact.



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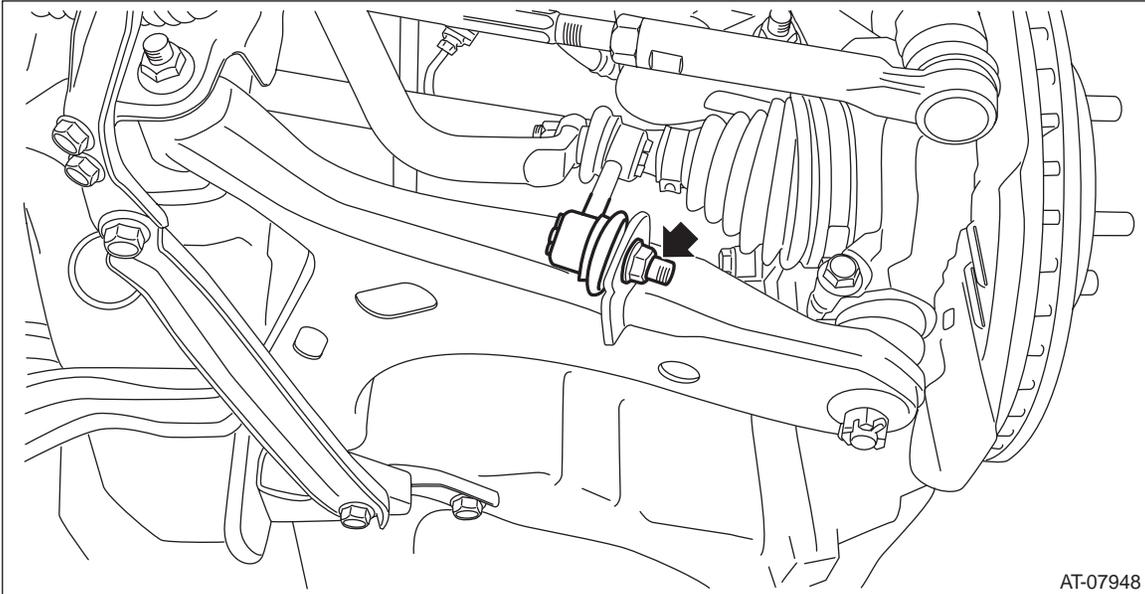
Differential Side Retainer Oil Seal

CONTINUOUSLY VARIABLE TRANSMISSION

16) Attach the stabilizer link to the front arm.

Tightening torque:

60 N·m (6.1 kgf·m, 44.3 ft·lb)



17) Install the center exhaust pipe.<Ref. to EX(H4DO)-15, INSTALLATION, Center Exhaust Pipe.>

18) Fill differential gear oil.<Ref. to CVT(TR580)-40, Differential Gear Oil.>

19) Adjust the differential gear oil level, and check for leakage.<Ref. to CVT(TR580)-40, ADJUSTMENT, Differential Gear Oil.>

20) Install the under cover front - transmission.

Tightening torque:

18 N·m (1.8 kgf·m, 13.3 ft·lb)

21) Install the front tires.<Ref. to WT-5, INSTALLATION, Tire and Wheel.>

Inhibitor Switch

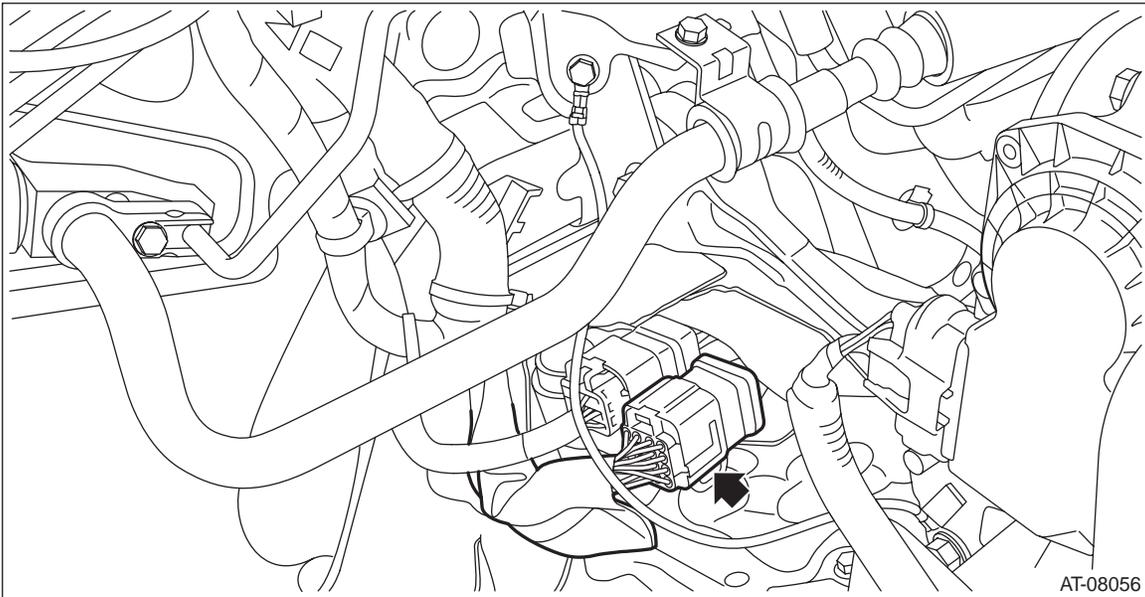
CONTINUOUSLY VARIABLE TRANSMISSION

14. 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) Remove the air intake boot assembly. <Ref. to IN(H4DO)-11, REMOVAL, Air Intake Boot.>
- 2) Disconnect the inhibitor harness connector.



Inhibitor Switch

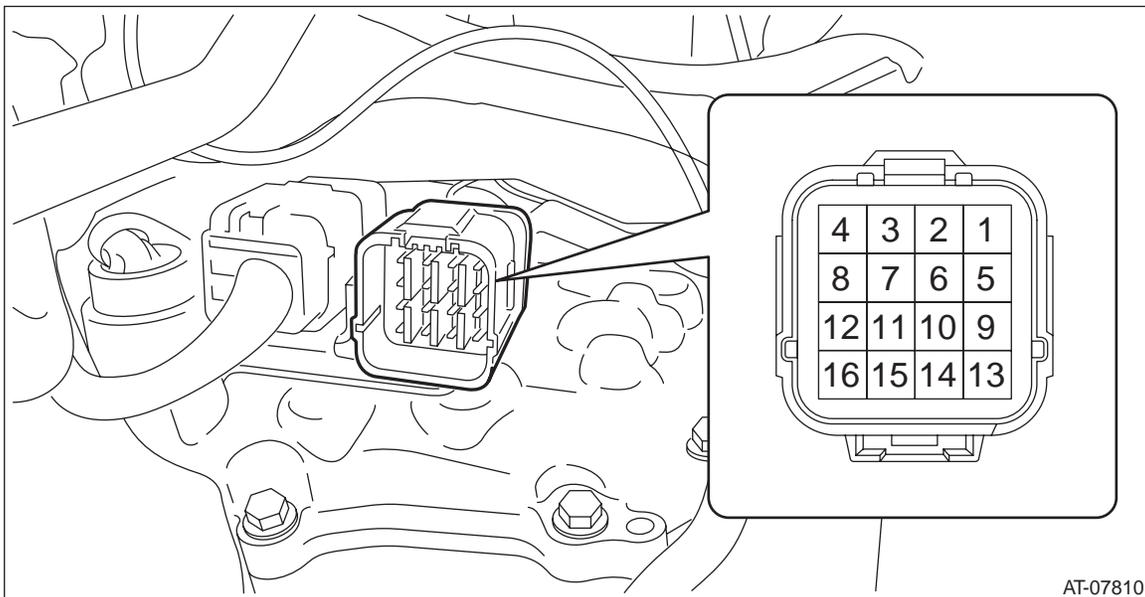
CONTINUOUSLY VARIABLE TRANSMISSION

3) Check for continuity in inhibitor switch circuit by shifting the select lever in “P”, “R”, “N” and “D” respectively.

NOTE:

- Check that there is no continuity in the starter circuit when the select lever is in the “R” and “D” ranges.
- When inhibitor switch is normal, check there is no poor contact in vehicle side connector and no open circuit in harness.

	Range	Terminal No.
Signal sent to TCM	P	1 — 7
	R	2 — 7
	N	3 — 7
	D	4 — 7
Starter circuit	P/N	15 — 16
Back-up light circuit	R	13 — 14

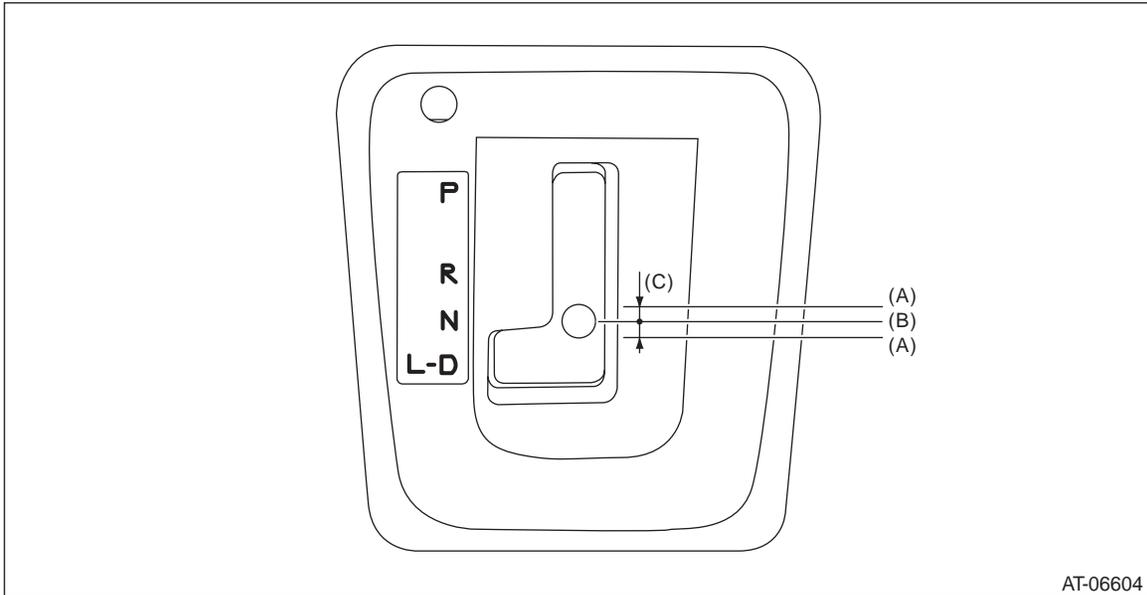


Inhibitor Switch

CONTINUOUSLY VARIABLE TRANSMISSION

4) 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 CVT(TR580)-93, ADJUSTMENT, Inhibitor Switch.>



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

5) Repeat the above inspection in other gear ranges. If there is fault, adjust the inhibitor switch and select cable. <Ref. to CVT(TR580)-93, ADJUSTMENT, Inhibitor Switch.> <Ref. to CS-56, ADJUSTMENT, Select Cable.>

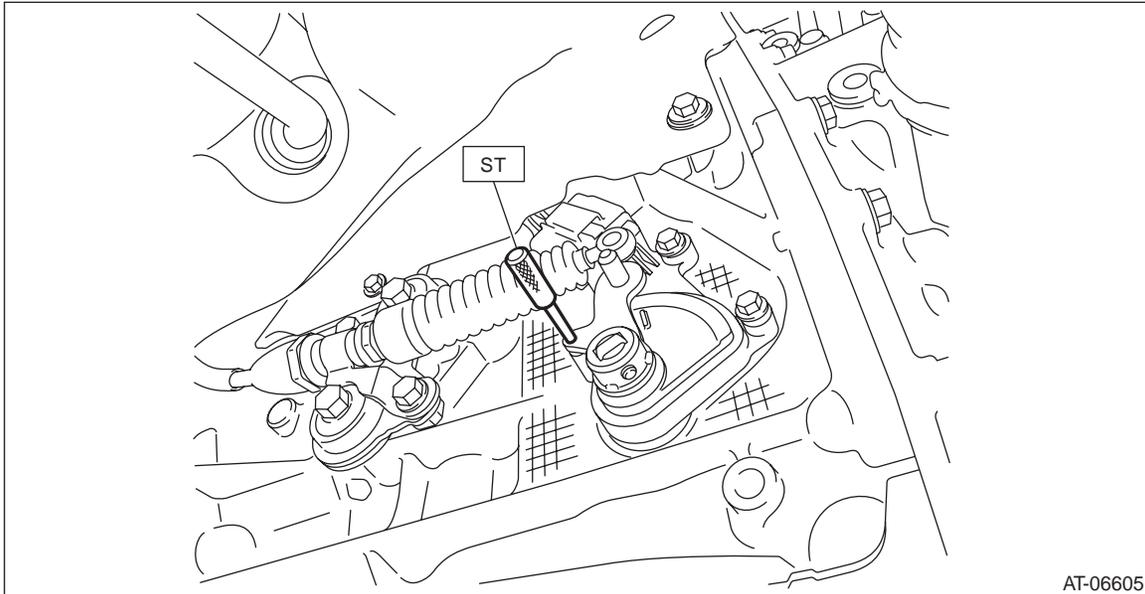
Inhibitor Switch

CONTINUOUSLY VARIABLE TRANSMISSION

B: ADJUSTMENT

- 1) Shift the select lever to "N" range.
- 2) Loosen the two bolts holding the inhibitor switch.
- 3) Insert the ST vertically into the holes of the shifter arm and switch body.

ST 499267300 STOPPER PIN



- 4) Tighten the two bolts holding the inhibitor switch.

Tightening torque:

5 N·m (0.5 kgf·m, 3.7 ft·lb)

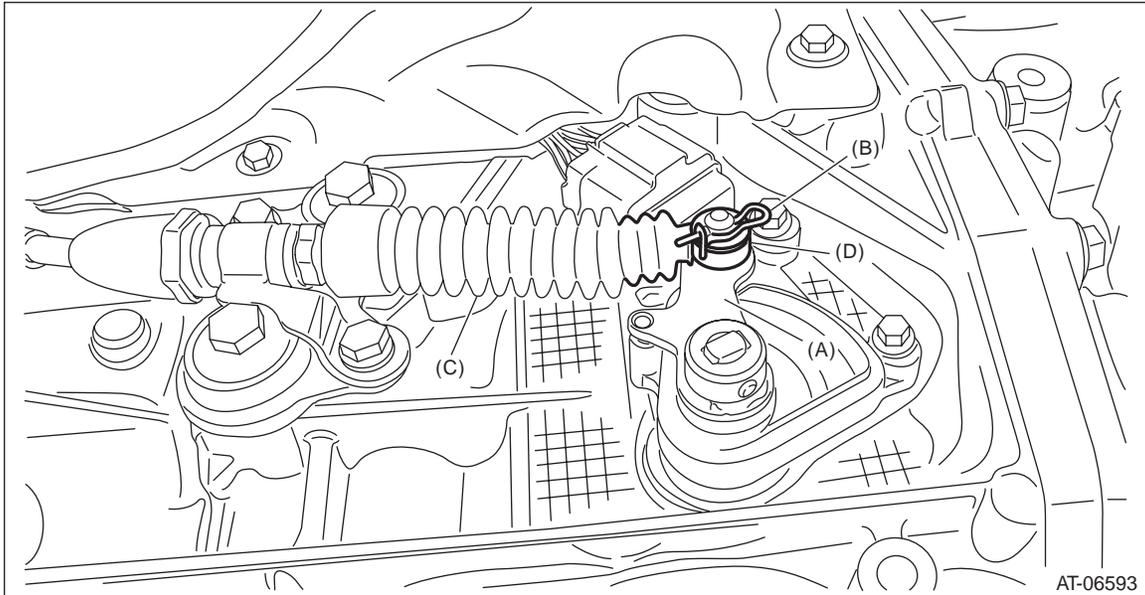
- 5) Repeat the inspection of the inhibitor switch. If the inhibitor switch is determined to be "faulty", replace it.

Inhibitor Switch

CONTINUOUSLY VARIABLE TRANSMISSION

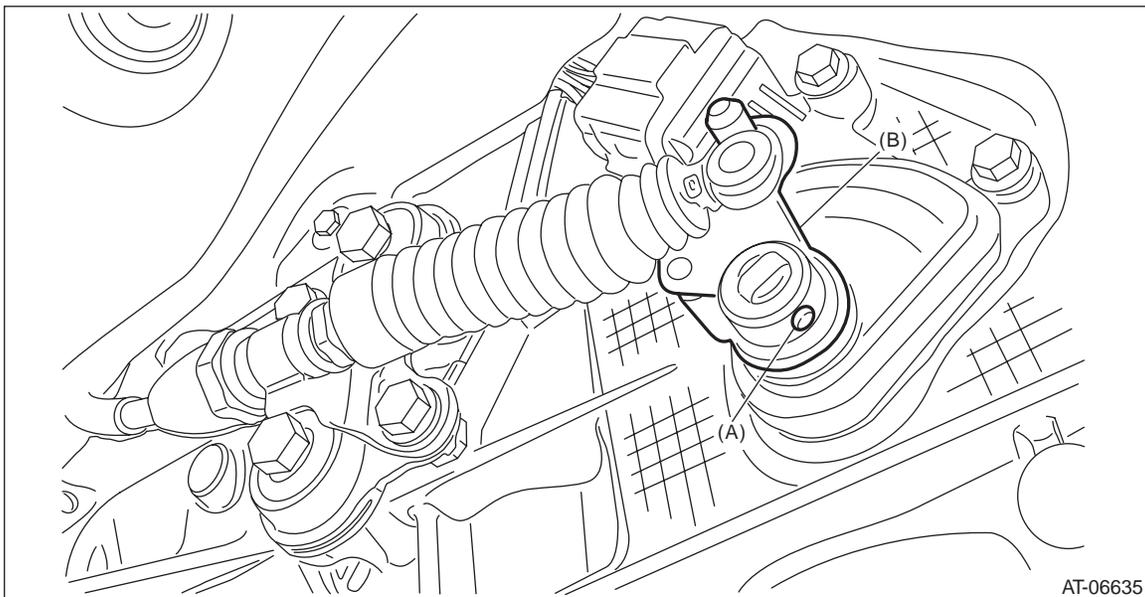
C: REMOVAL

- 1) Shift the select lever to "N" range.
- 2) Disconnect the ground cable from battery.
- 3) Lift up the vehicle.
- 4) Remove the center exhaust pipe.<Ref. to EX(H4DO)-14, REMOVAL, Center Exhaust Pipe.>
- 5) Remove the snap pin and washer from the shifter arm.



- (A) Shifter arm
- (B) Snap pin
- (C) Select cable
- (D) Washer

- 6) Remove the spring pin and shifter arm.



- (A) Spring pin
- (B) Shifter arm

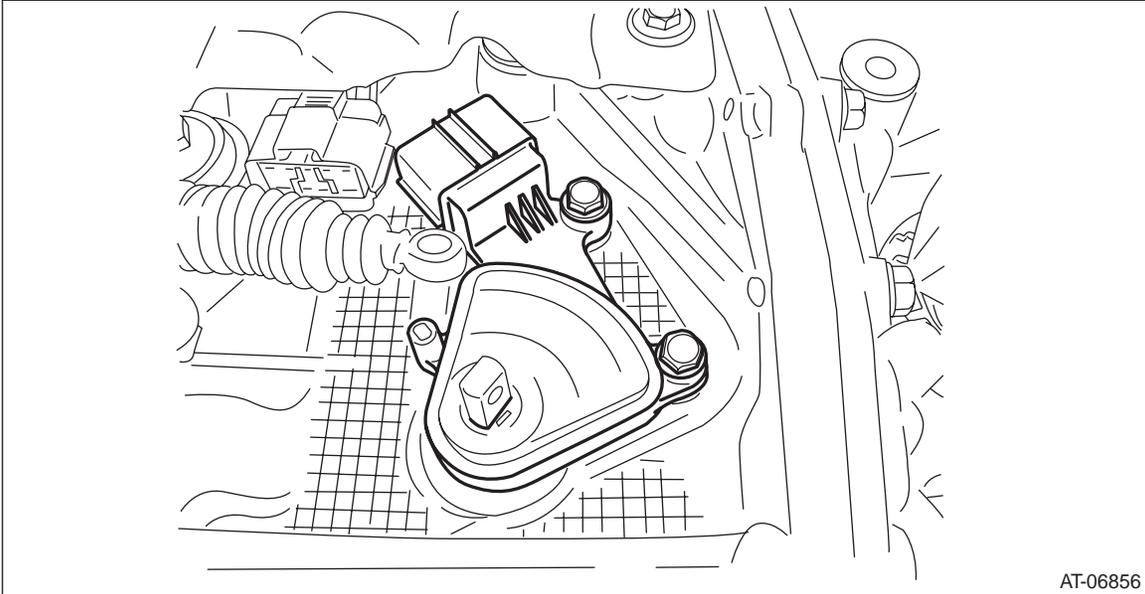
- 7) Remove the inhibitor harness connector from inhibitor switch.

CVT(TR580)-94

Inhibitor Switch

CONTINUOUSLY VARIABLE TRANSMISSION

8) Remove the two inhibitor switch securing bolts.

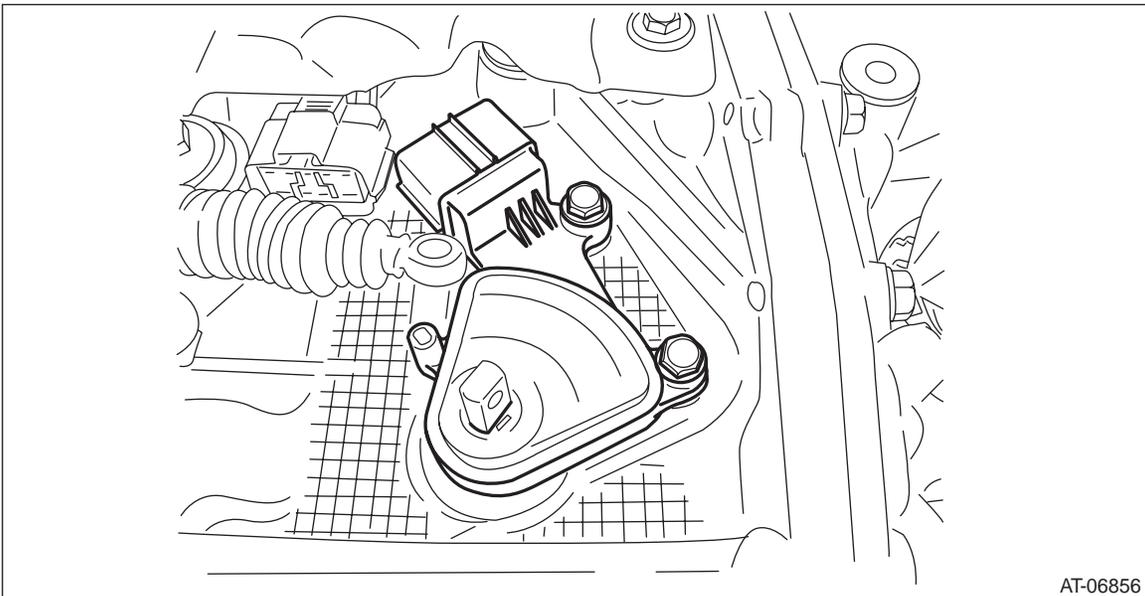


AT-06856

9) Remove the inhibitor switch from the transmission case.

D: INSTALLATION

1) Install the inhibitor switch to the transmission case temporarily.



AT-06856

2) Connect the inhibitor harness connector to the inhibitor switch.

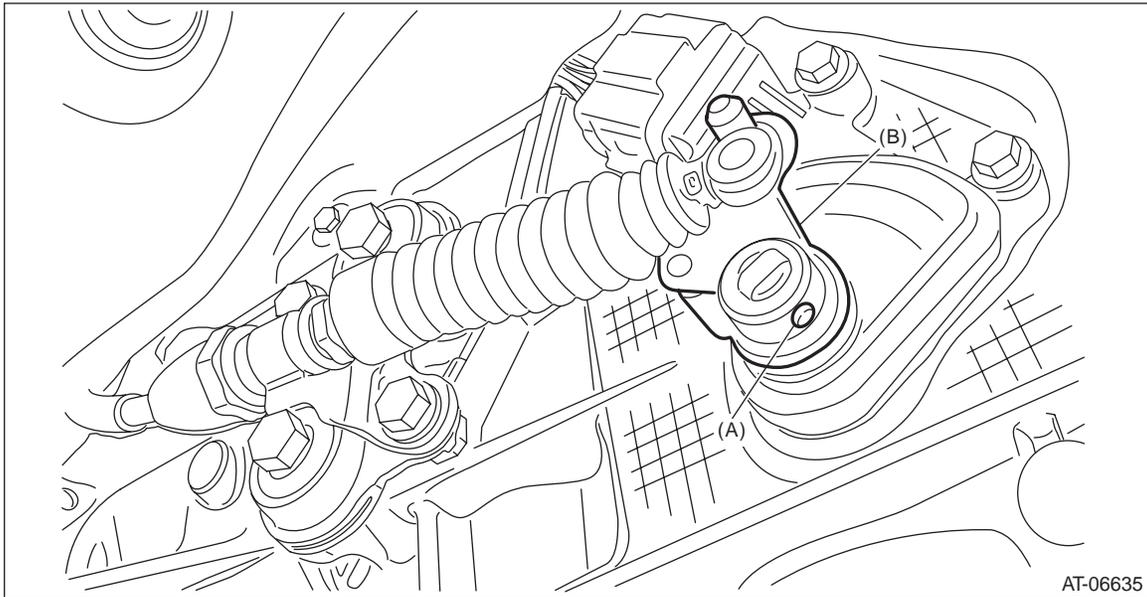
Inhibitor Switch

CONTINUOUSLY VARIABLE TRANSMISSION

3) Install the shifter arm and fix with the spring pin.

NOTE:

Use new spring pin.

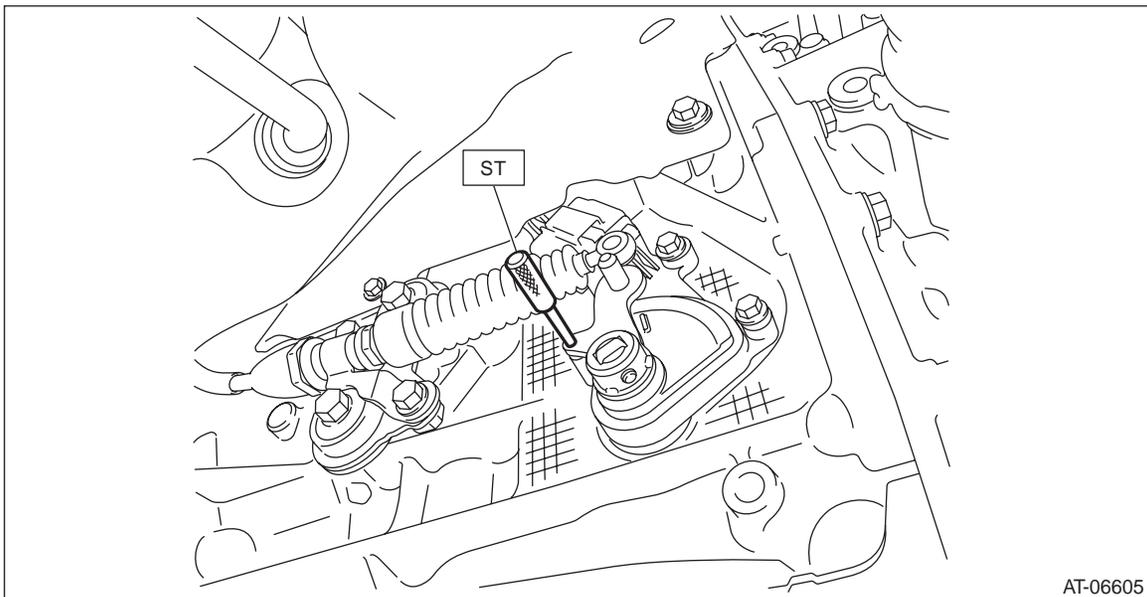


- (A) Spring pin
- (B) Shifter arm

4) Shift the shifter arm to “N” range.

5) Install the ST vertically in the cutout of shifter arm and the hole of switch body.

ST 499267300 STOPPER PIN



6) Tighten the two bolts holding the inhibitor switch.

Tightening torque:

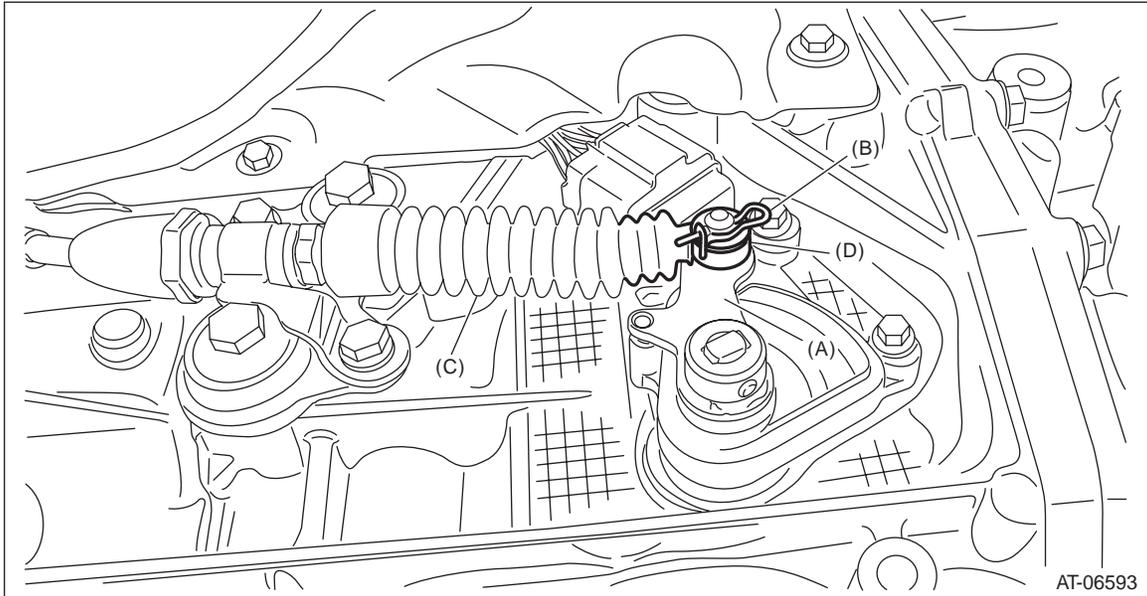
5 N·m (0.5 kgf·m, 3.7 ft·lb)

7) Install the select cable to the shifter arm.

Inhibitor Switch

CONTINUOUSLY VARIABLE TRANSMISSION

8) Install the washer and snap pin to the shifter arm.



- (A) Shifter arm
- (B) Snap pin
- (C) Select cable
- (D) Washer

9) Install the center exhaust pipe.<Ref. to EX(H4DO)-15, INSTALLATION, Center Exhaust Pipe.>

10) Lower the vehicle.

11) Connect the battery ground terminal.

12) Check the inhibitor switch.<Ref. to CVT(TR580)-90, INSPECTION, Inhibitor Switch.>

Turbine Speed Sensor

CONTINUOUSLY VARIABLE TRANSMISSION

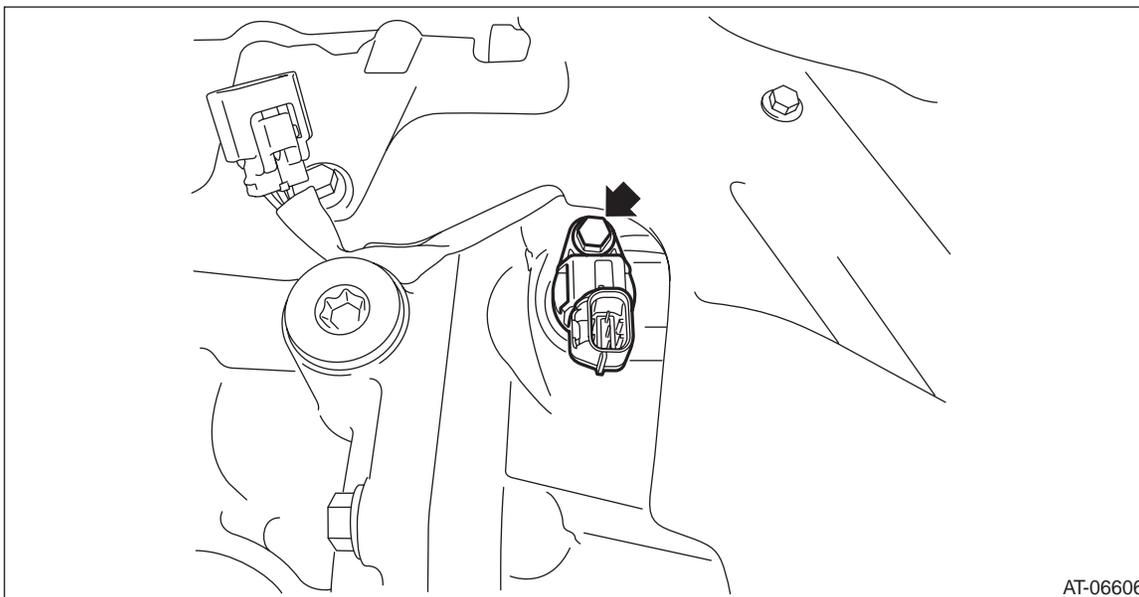
15. Turbine Speed Sensor

A: REMOVAL

CAUTION:

Be sure to prevent water or oil from contacting the connector terminal of turbine speed sensor. If adhesion occurs, replace with a new part.

- 1) Lift up the vehicle.
- 2) Remove the under cover front - transmission.
- 3) Remove the harness connector from turbine speed sensor.
- 4) Remove the turbine speed sensor.



B: INSTALLATION

CAUTION:

Be sure to prevent water or oil from contacting the connector terminal of turbine speed sensor. If adhesion occurs, replace with a new part.

Install in the reverse order of removal.

NOTE:

- Use new O-rings.
- Apply CVTF to the O-ring.

Tightening torque:

Turbine speed sensor

7 N·m (0.7 kgf·m, 5.2 ft·lb)

Under cover front - transmission

18 N·m (1.8 kgf·m, 13.3 ft·lb)

Turbine Speed Sensor

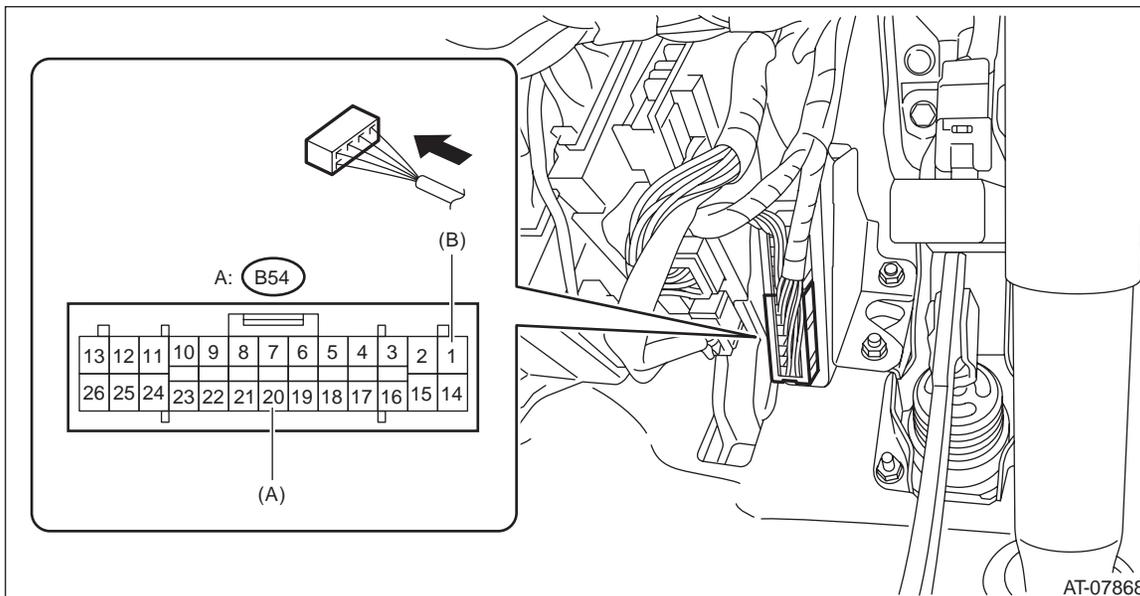
CONTINUOUSLY VARIABLE TRANSMISSION

C: INSPECTION

1) Set the probe of oscilloscope to TCM harness connector.

Connector & terminal

(B54) No. 20 (+) — No. 1 (-):



(A) + probe

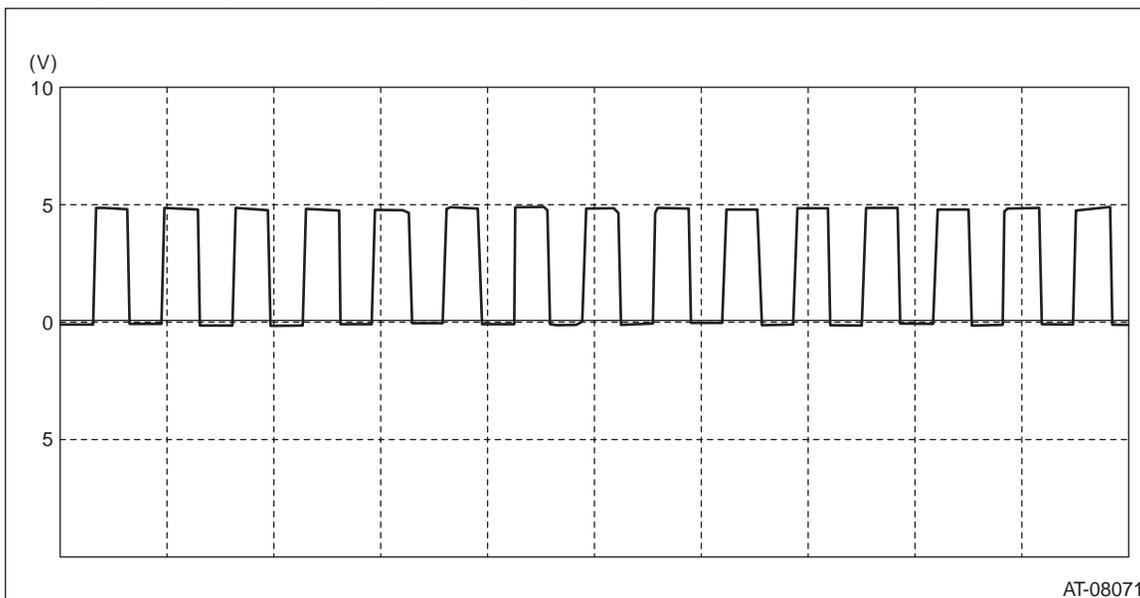
(B) - probe

2) Start and warm up the engine.

3) Check the waveform and output voltage of the turbine speed sensor with engine idling.

NOTE:

The waveform cycle changes as the speed changes.



Secondary Speed Sensor

CONTINUOUSLY VARIABLE TRANSMISSION

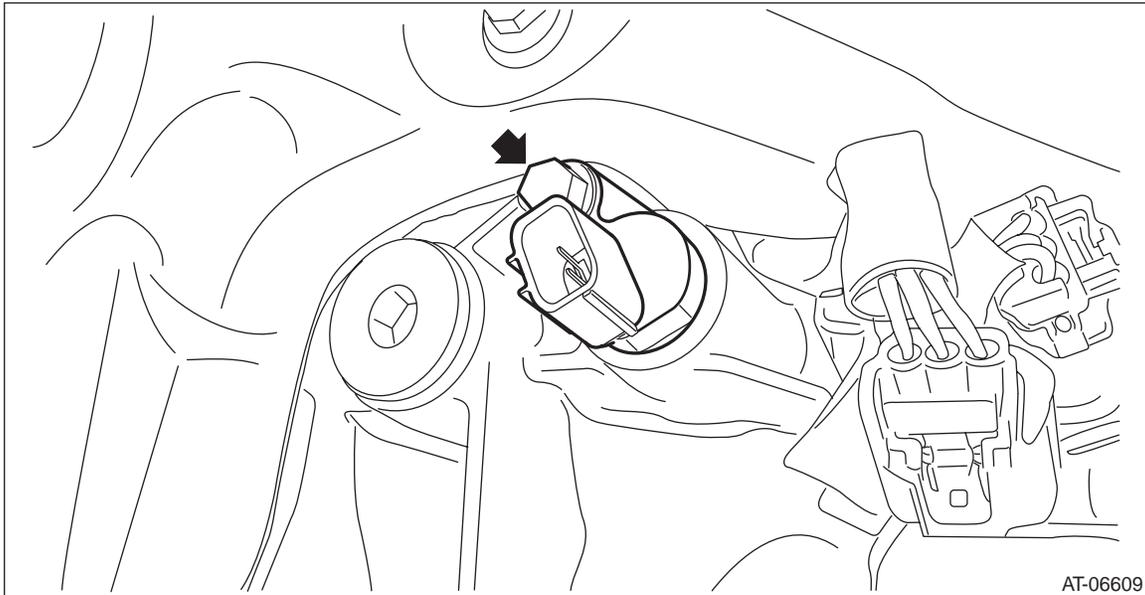
16. Secondary Speed Sensor

A: REMOVAL

CAUTION:

- Be sure to prevent water or oil from contacting the connector terminal of secondary speed sensor. If adhesion occurs, replace with a new part.
- When secondary speed sensor is removed, CVTF leaks. After installing the secondary speed sensor, adjust the CVTF level.

- 1) Lift up the vehicle.
- 2) Remove the under cover front - transmission.
- 3) Remove the harness connector from secondary speed sensor.
- 4) Remove the secondary speed sensor.



B: INSTALLATION

CAUTION:

- Be sure to prevent water or oil from contacting the connector terminal of secondary speed sensor. If adhesion occurs, replace with a new part.
- After installing the secondary speed sensor, adjust the CVTF level.

Install in the reverse order of removal.

NOTE:

- Use new O-rings.
- Apply CVTF to the O-ring.

Tightening torque:

Secondary speed sensor

7 N·m (0.7 kgf·m, 5.2 ft·lb)

Under cover front - transmission

18 N·m (1.8 kgf·m, 13.3 ft·lb)

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Secondary Speed Sensor

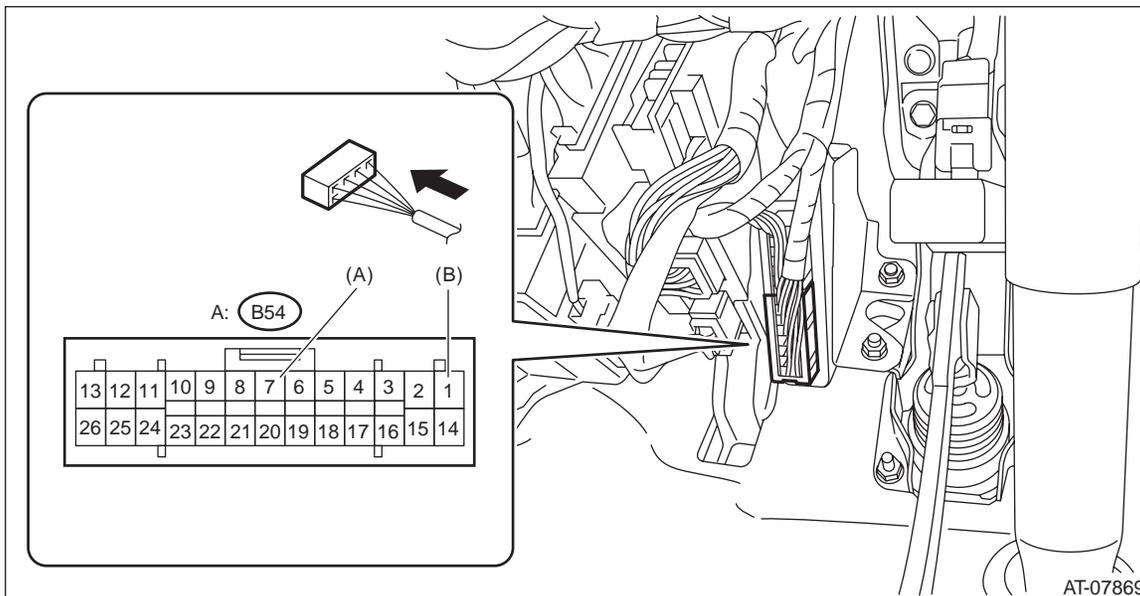
CONTINUOUSLY VARIABLE TRANSMISSION

C: INSPECTION

1) Set the probe of oscilloscope to TCM harness connector.

Connector & terminal

(B54) No. 7 (+) — No. 1 (-):



(A) + probe

(B) - probe

2) Start and warm up the engine.

3) Lift up the vehicle.

CAUTION:

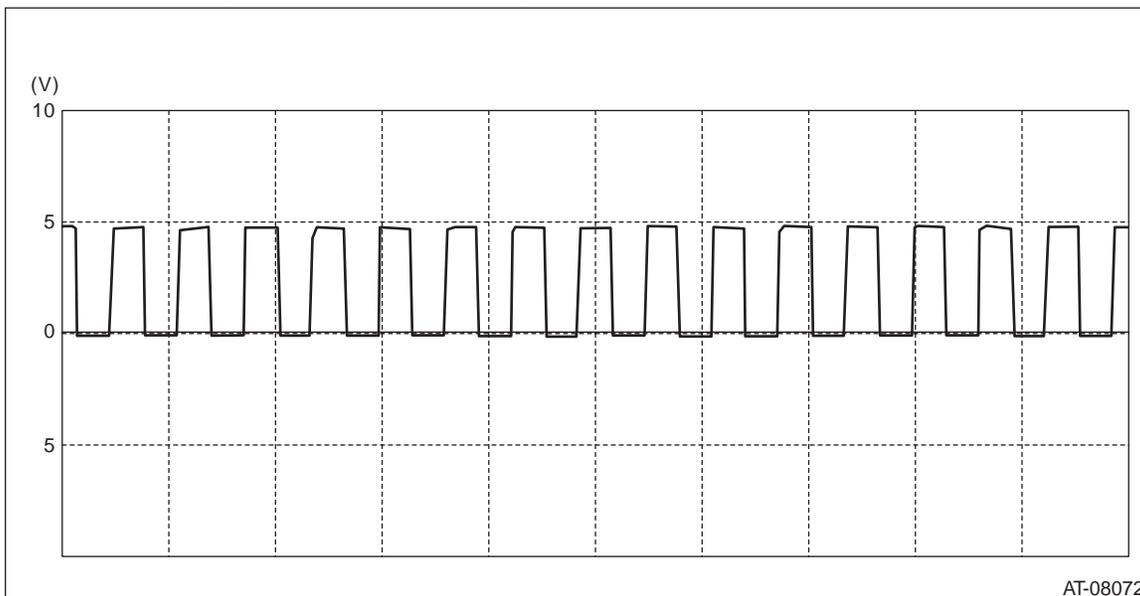
Lift up the vehicle until the tire bottom is 0.3 m (0.98 ft) or more above the ground.

4) Shift the select lever to "D" range.

5) Check the waveform and output voltage of the secondary speed sensor with engine idling.

NOTE:

The waveform cycle changes as the speed changes.



Primary Speed Sensor

CONTINUOUSLY VARIABLE TRANSMISSION

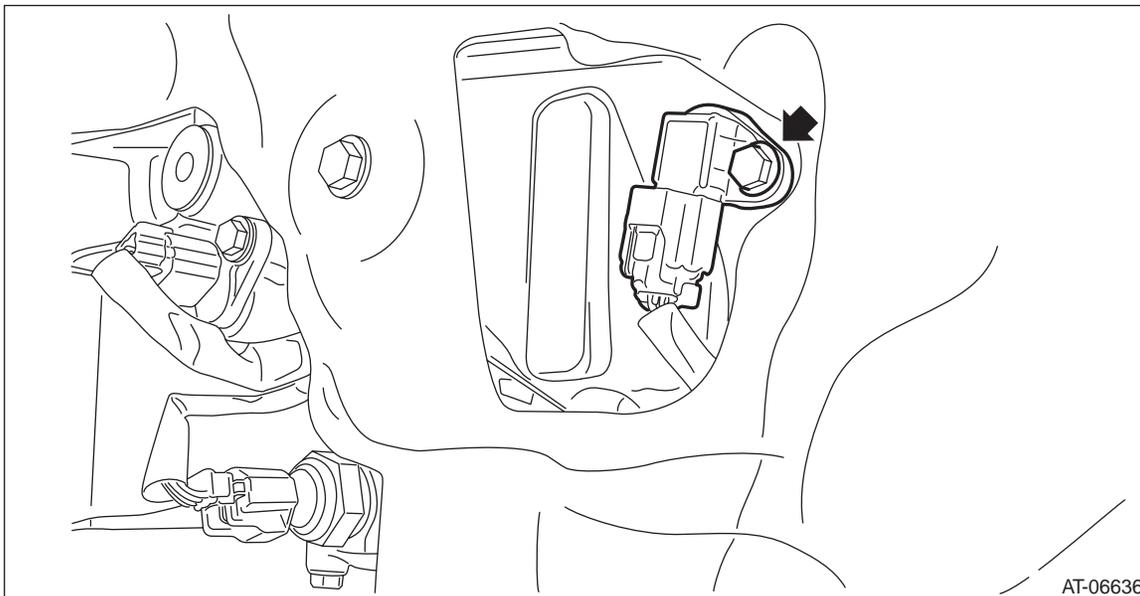
17. Primary Speed Sensor

A: REMOVAL

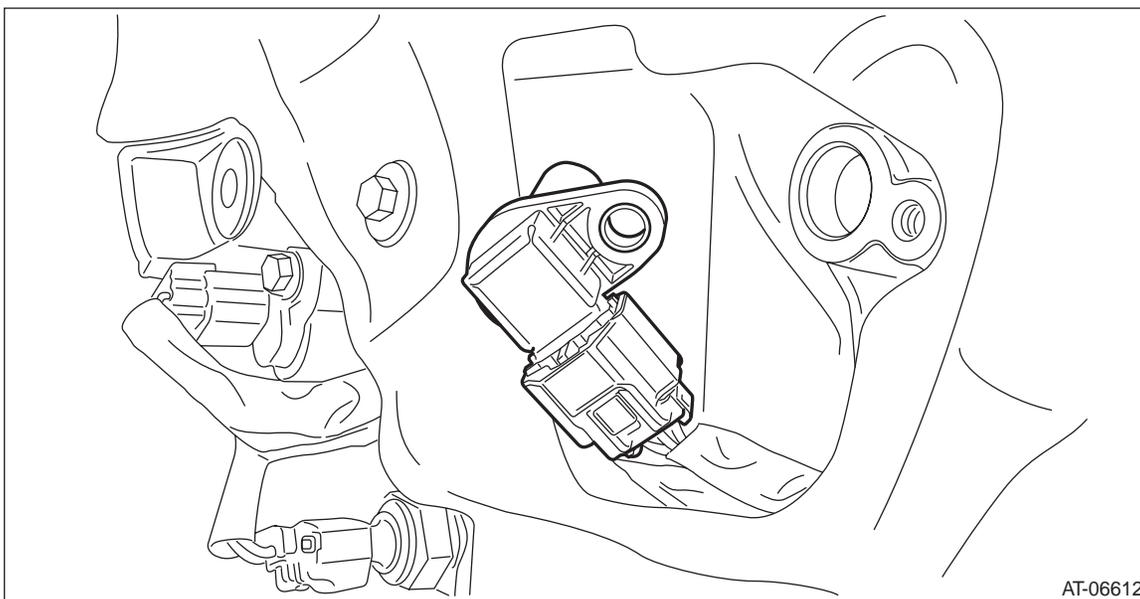
CAUTION:

Be sure to prevent water or oil from contacting the connector terminal of primary speed sensor. If adhesion occurs, replace with a new part.

- 1) Remove the transmission assembly. <Ref. to CVT(TR580)-57, REMOVAL, Automatic Transmission Assembly.>
- 2) Remove the primary speed sensor.



- 3) Remove the harness connector from primary speed sensor.



B: INSTALLATION

CAUTION:

Be sure to prevent water or oil from contacting the connector terminal of primary speed sensor. If adhesion occurs, replace with a new part.

Install in the reverse order of removal.

NOTE:

- Use new O-rings.
- Apply CVTF to the O-ring.

Tightening torque:

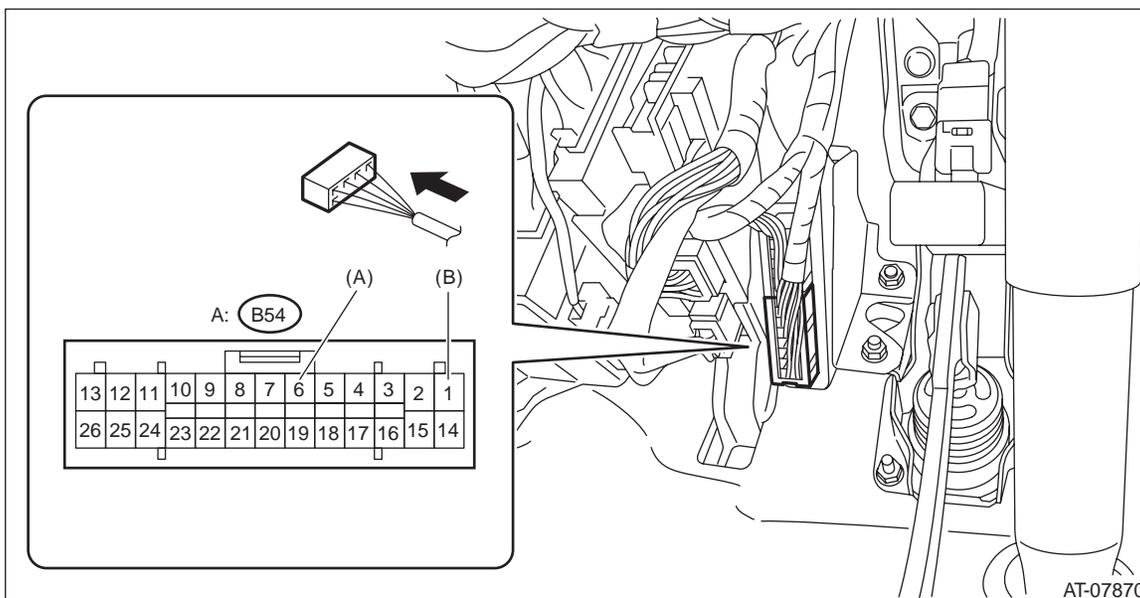
7 N·m (0.7 kgf-m, 5.2 ft-lb)

C: INSPECTION

1) Set the probe of oscilloscope to TCM harness connector.

Connector & terminal

(B54) No. 6 (+) — No. 1 (-):



(A) + probe

(B) - probe

2) Start and warm up the engine.

Primary Speed Sensor

CONTINUOUSLY VARIABLE TRANSMISSION

3) Lift up the vehicle.

CAUTION:

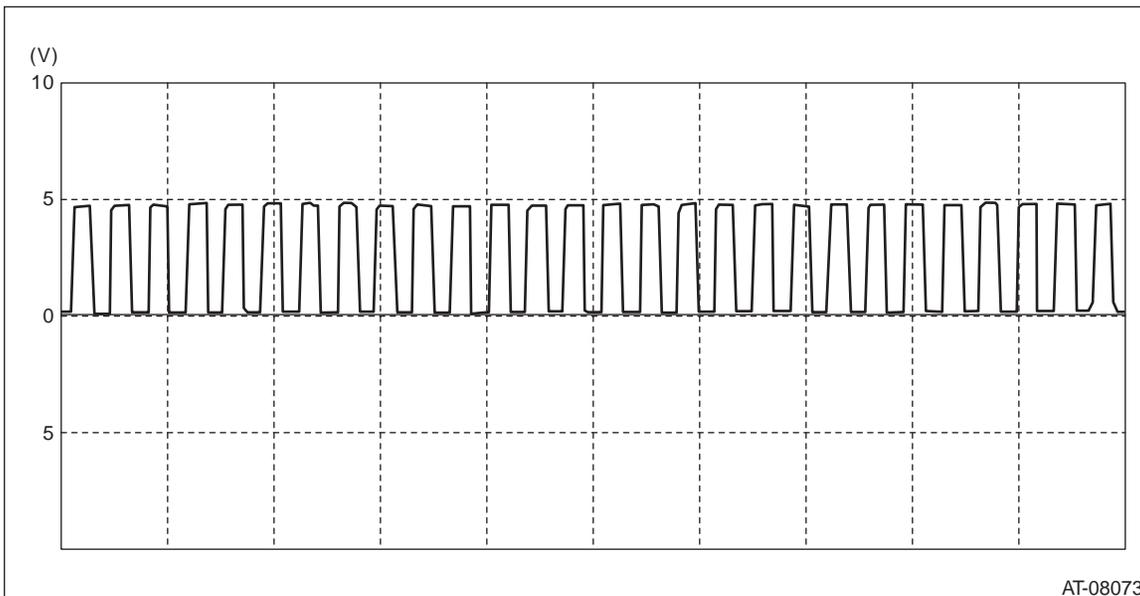
Lift up the vehicle until the tire bottom is 0.3 m (0.98 ft) or more above the ground.

4) Shift the select lever to "D" range.

5) Check the waveform and output voltage of the primary speed sensor with engine idling.

NOTE:

The waveform cycle changes as the speed changes.



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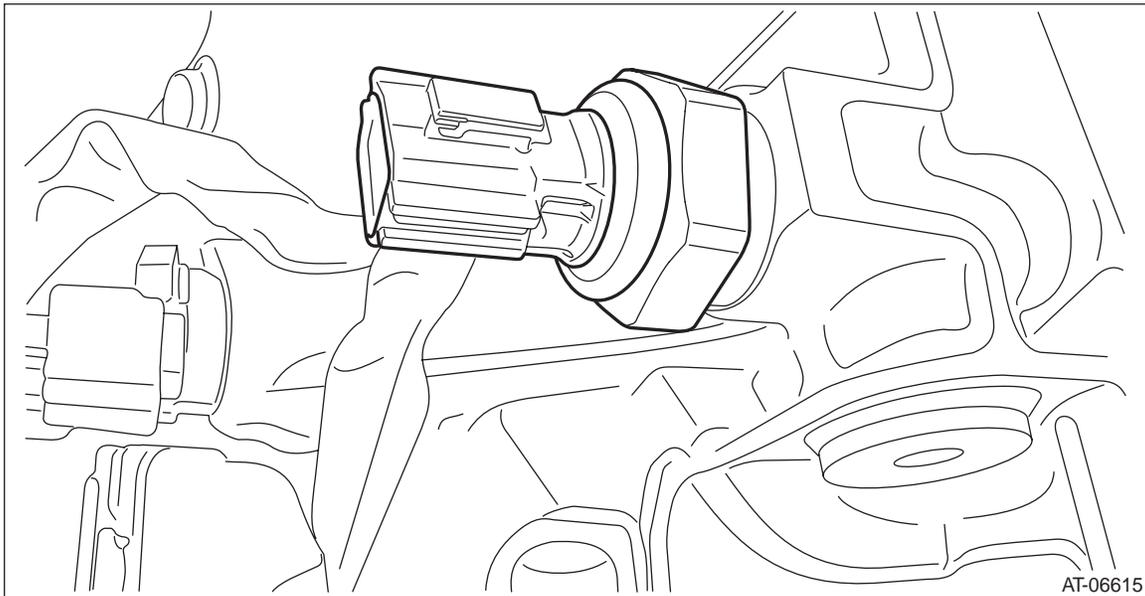
18. Secondary Pressure Sensor

A: REMOVAL

CAUTION:

- Be sure to prevent water or oil from contacting the connector terminal of secondary pressure sensor. If adhesion occurs, replace with a new part.
- When secondary pressure sensor is removed, CVTF leaks. After installing the secondary pressure sensor, adjust the CVTF level.

- 1) Disconnect the ground cable from battery.
- 2) Lift up the vehicle.
- 3) Remove the under cover front - transmission.
- 4) Remove the secondary pressure sensor connector.
- 5) Remove the secondary pressure sensor.



B: INSTALLATION

CAUTION:

- Be sure to prevent water or oil from contacting the connector terminal of secondary pressure sensor. If adhesion occurs, replace with a new part.
- After installing the secondary pressure sensor, adjust the CVTF level.

Install in the reverse order of removal.

NOTE:

Use new O-rings.

Tightening torque:

Secondary pressure sensor

39 N·m (4.0 kgf·m, 28.8 ft·lb)

Under cover front - transmission

18 N·m (1.8 kgf·m, 13.3 ft·lb)

Secondary Pressure Sensor

CONTINUOUSLY VARIABLE TRANSMISSION

C: INSPECTION

- 1) Start and warm up the engine.
- 2) Shift the select lever to "P" or "N" range.
- 3) Depress the brake pedal and hold it.
- 4) Check "secondary pressure sensor voltage" by using Subaru Select Monitor while the engine is idling. <Ref. to CVT(diag)-19, OPERATION, Subaru Select Monitor.>

Standard

Approx. 0.8 V

- 5) Check "secondary pressure sensor voltage" by using Subaru Select Monitor while the engine is stopped and the ignition switch is turned on. <Ref. to CVT(diag)-19, OPERATION, Subaru Select Monitor.>

Specification:

Approx. 0.5 V

19.Oil Pan and Strainer

A: REMOVAL

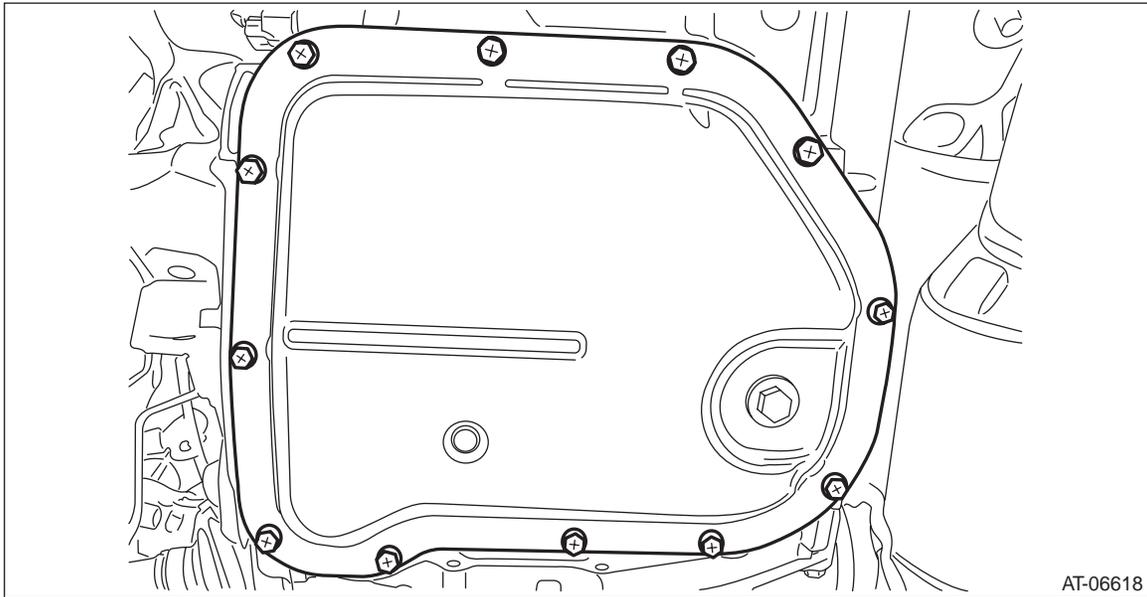
CAUTION:

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

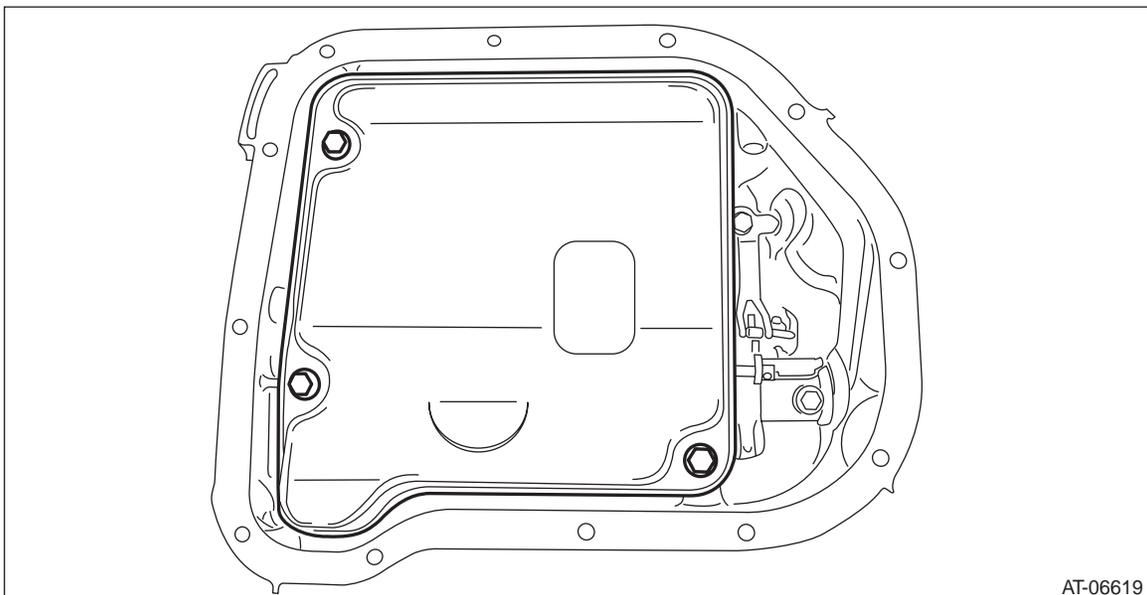
- 1) Lift up the vehicle.
- 2) Clean the transmission exterior.
- 3) Remove the CVTF drain plug to drain CVTF.
- 4) Remove the oil pan.

CAUTION:

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



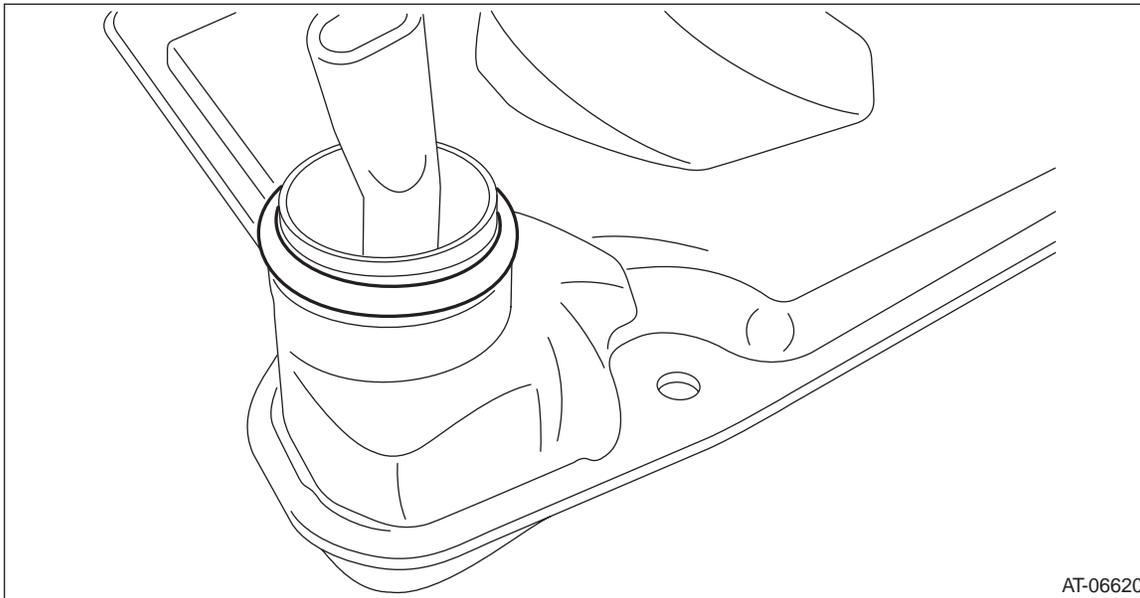
- 5) Remove the magnet.
- 6) Remove the oil strainer.



Oil Pan and Strainer

CONTINUOUSLY VARIABLE TRANSMISSION

7) Remove the O-ring from oil strainer.

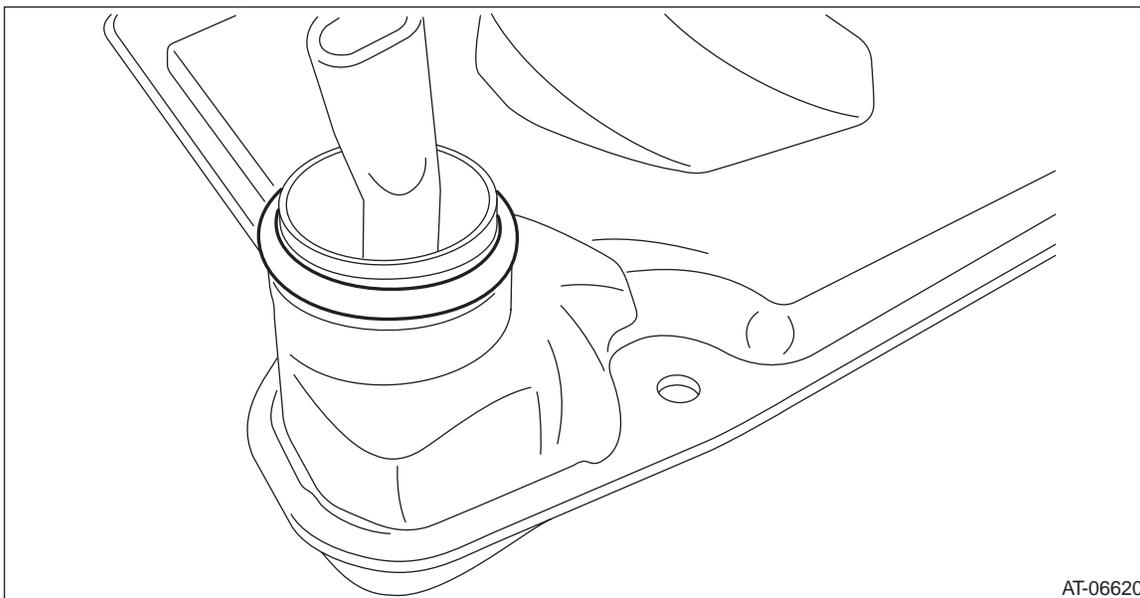


B: INSTALLATION

- 1) Clean the mating surface of oil pan and transmission case.
- 2) Install the O-ring to the oil strainer.

NOTE:

- Use new O-rings.
- Apply CVTF to the O-ring.



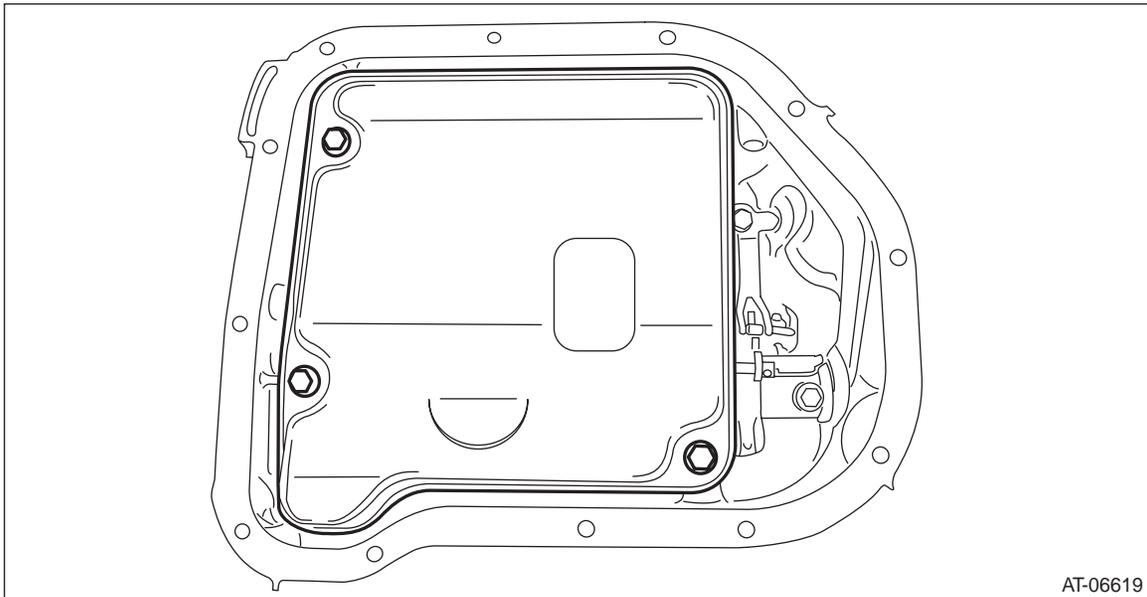
Oil Pan and Strainer

CONTINUOUSLY VARIABLE TRANSMISSION

3) Install the oil strainer.

Tightening torque:

9 N·m (0.9 kgf·m, 6.6 ft·lb)



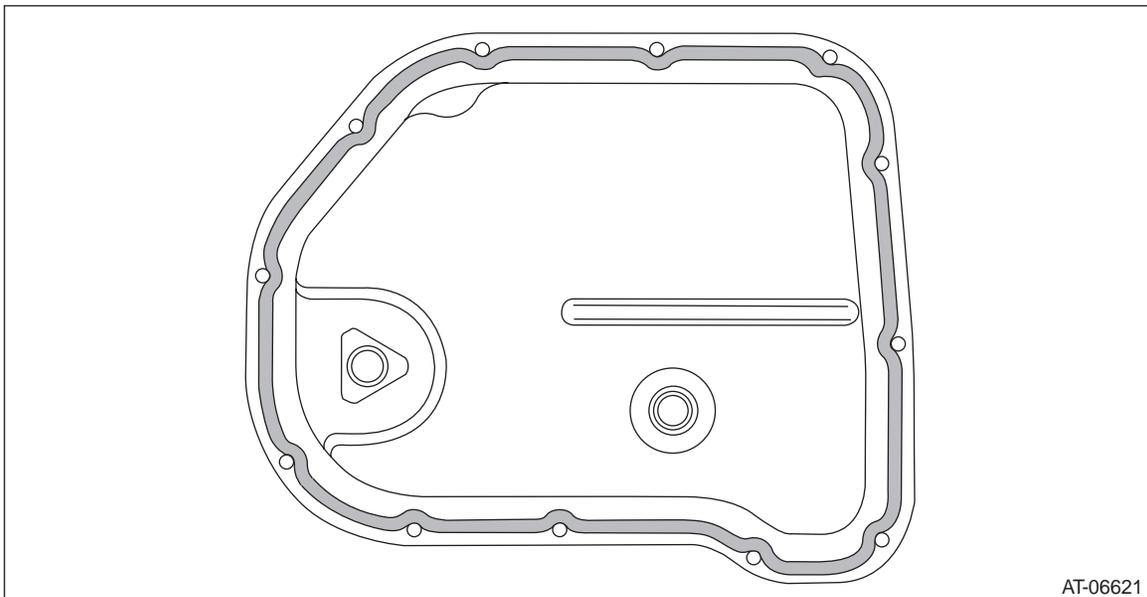
4) Clean the magnet.

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

6) Apply liquid gasket all around the oil pan mating surface seamlessly.

Liquid gasket:

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



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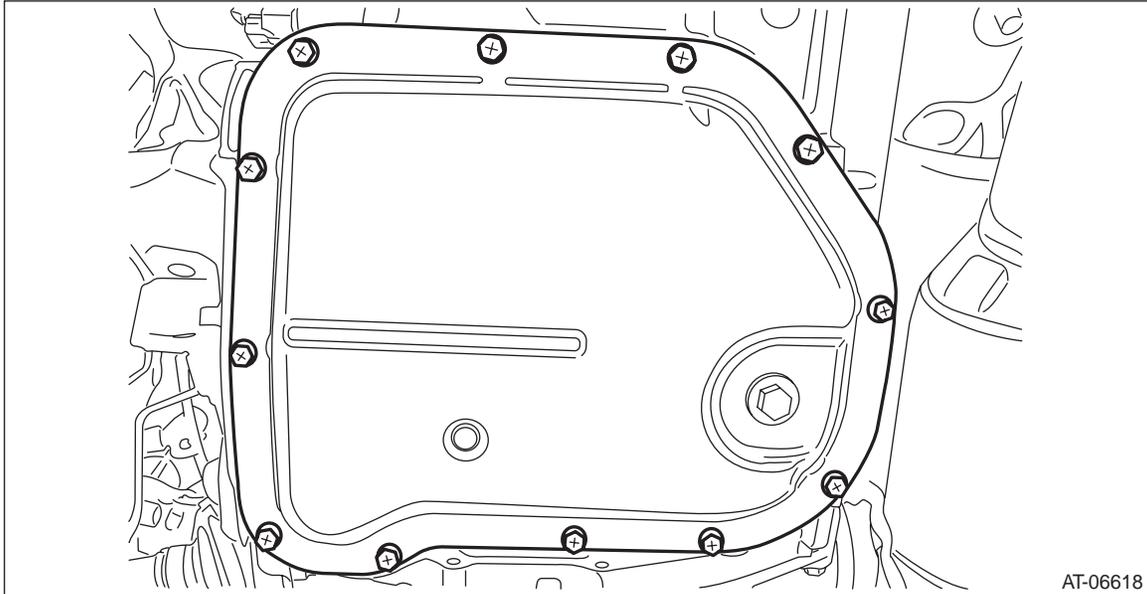
Oil Pan and Strainer

CONTINUOUSLY VARIABLE TRANSMISSION

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

Tightening torque:

5 N·m (0.5 kgf-m, 3.7 ft-lb)



8) Refill CVTF and adjust the level. <Ref. to CVT(TR580)-37, REPLACEMENT, CVTF.>

C: INSPECTION

- Check each part for damage or dust.
- Check oil strainer for clogging.

20. Control Valve Body

A: REMOVAL

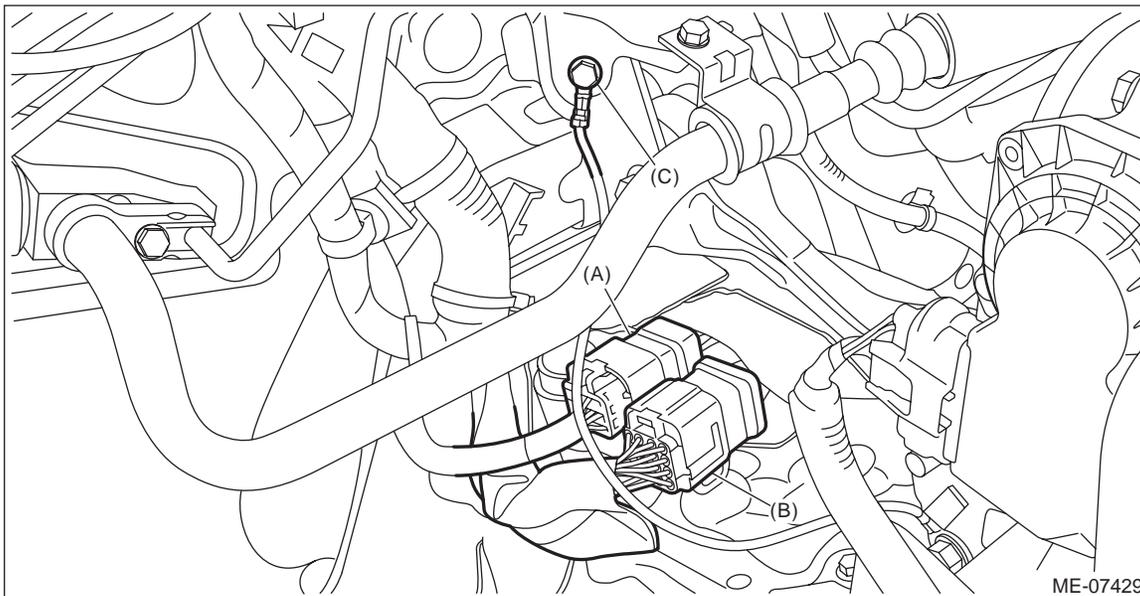
CAUTION:

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

NOTE:

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

- 1) Disconnect the ground cable from battery.
- 2) Remove the air intake boot assembly. <Ref. to IN(H4DO)-11, REMOVAL, Air Intake Boot.>
- 3) Disconnect the following connectors.
 - Transmission harness connectors
 - Inhibitor harness connector
 - Transmission radio ground terminal

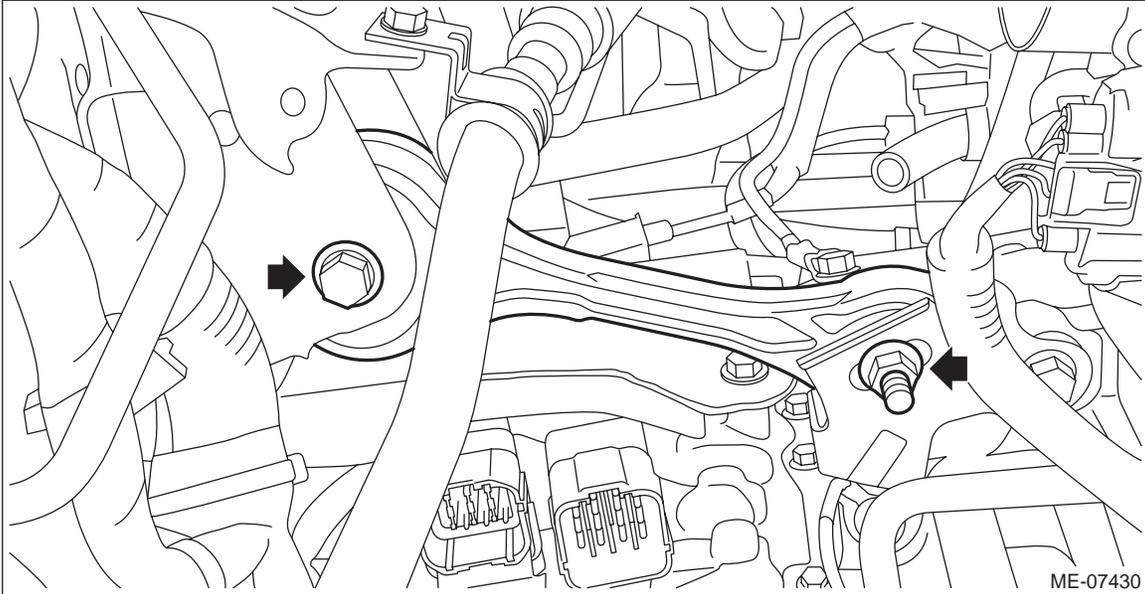


- (A) Transmission harness connectors
- (B) Inhibitor harness connector
- (C) Transmission radio ground terminal

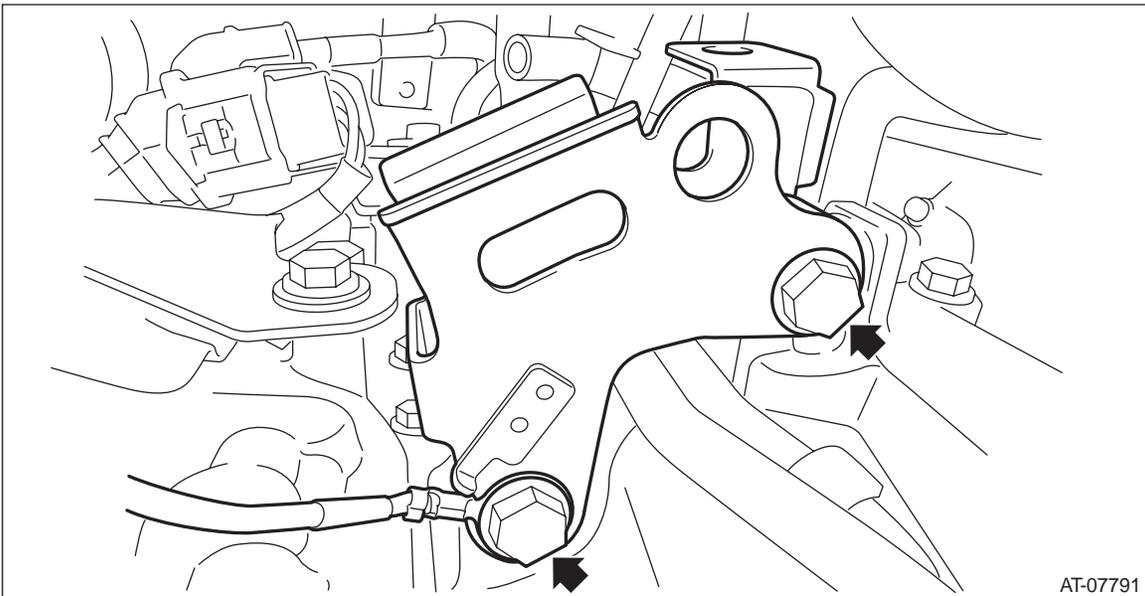
Control Valve Body

CONTINUOUSLY VARIABLE TRANSMISSION

4) Remove the pitching stopper.



5) Remove the air breather hose from the pitching stopper bracket, and then remove the pitching stopper bracket and transmission radio ground cord.

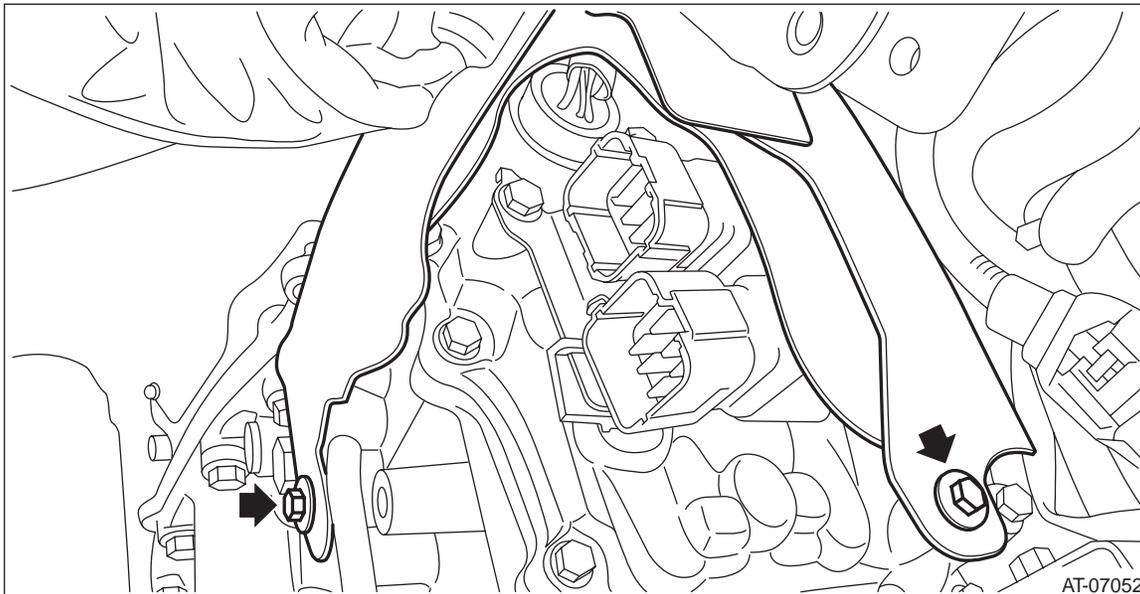


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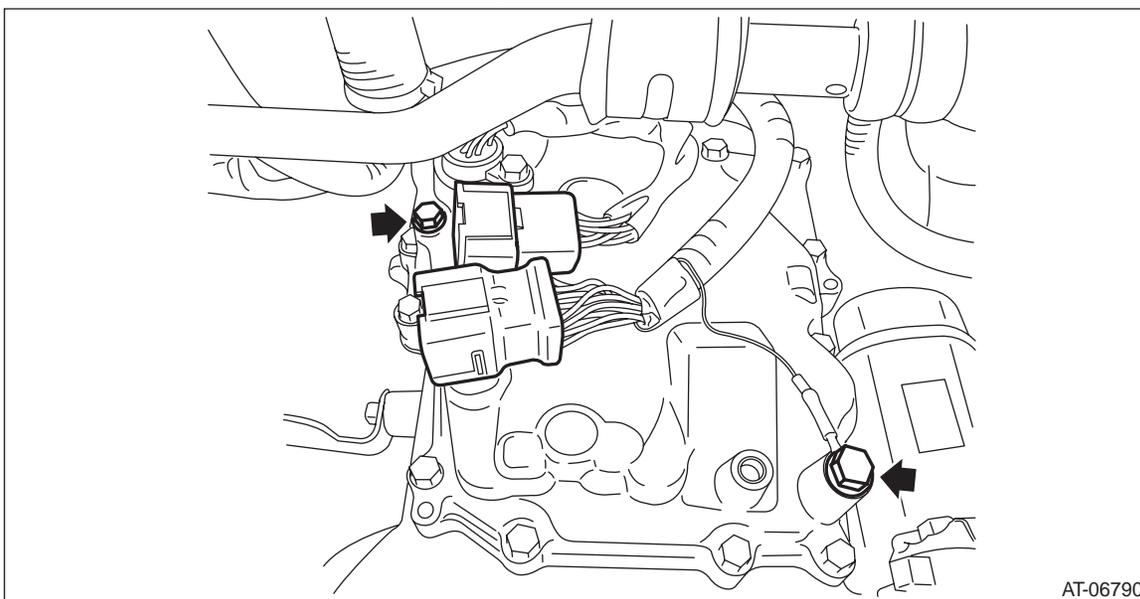
Control Valve Body

CONTINUOUSLY VARIABLE TRANSMISSION

6) Remove the transmission case cover.



7) Remove the transmission harness stay and ground terminal.



8) Remove the transmission harness connector from the harness stay.

9) Remove the throttle body, and move it aside so that it will not interfere with the removal of the control valve.<Ref. to FU(H4DO)-14, REMOVAL, Throttle Body.>

NOTE:

Do not remove the preheater hose.

10) Clean the transmission exterior.

Control Valve Body

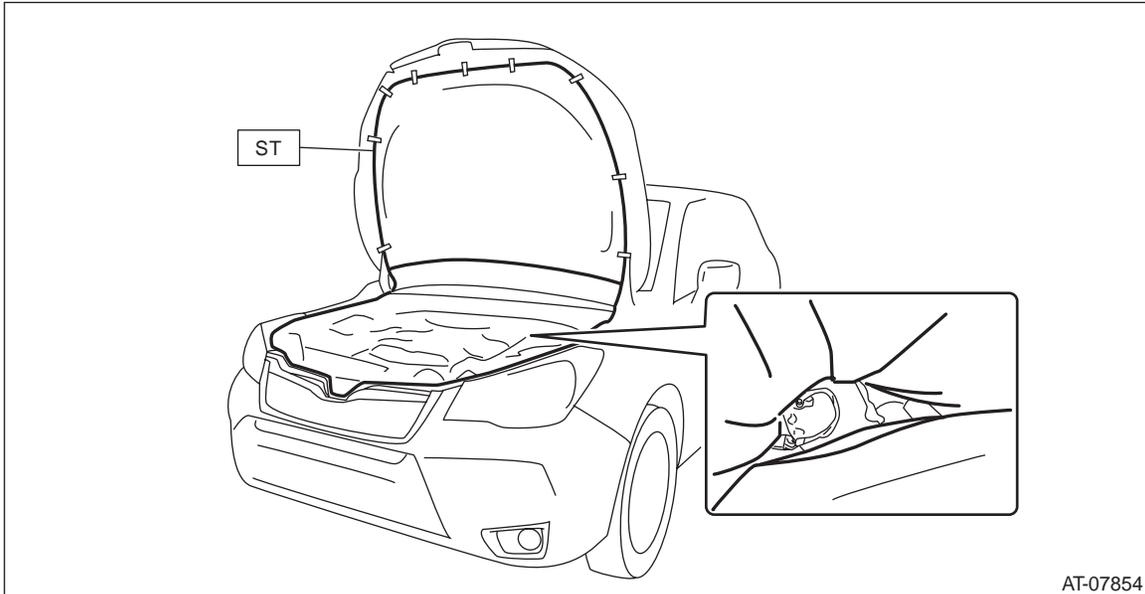
CONTINUOUSLY VARIABLE TRANSMISSION

11) Fix the ST with tape, and set the ST to the vehicle.

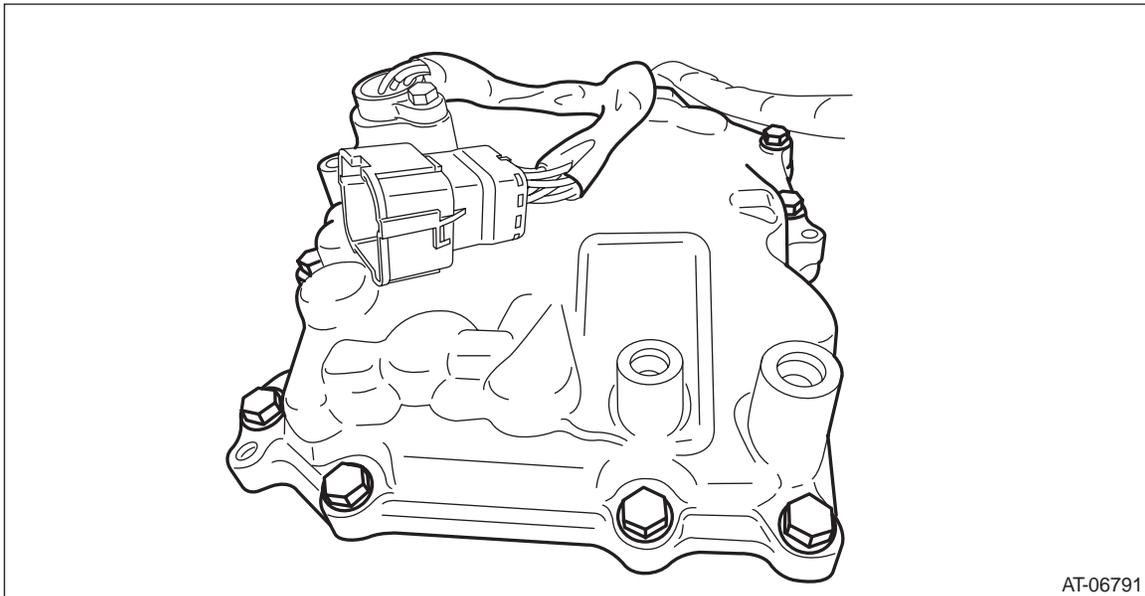
NOTE:

When replacing the control valve body, the sheet is included in the control valve body for repairs.

ST 18761AA010 SHEET SPECIAL TOOL



12) Remove the valve cover and gasket.

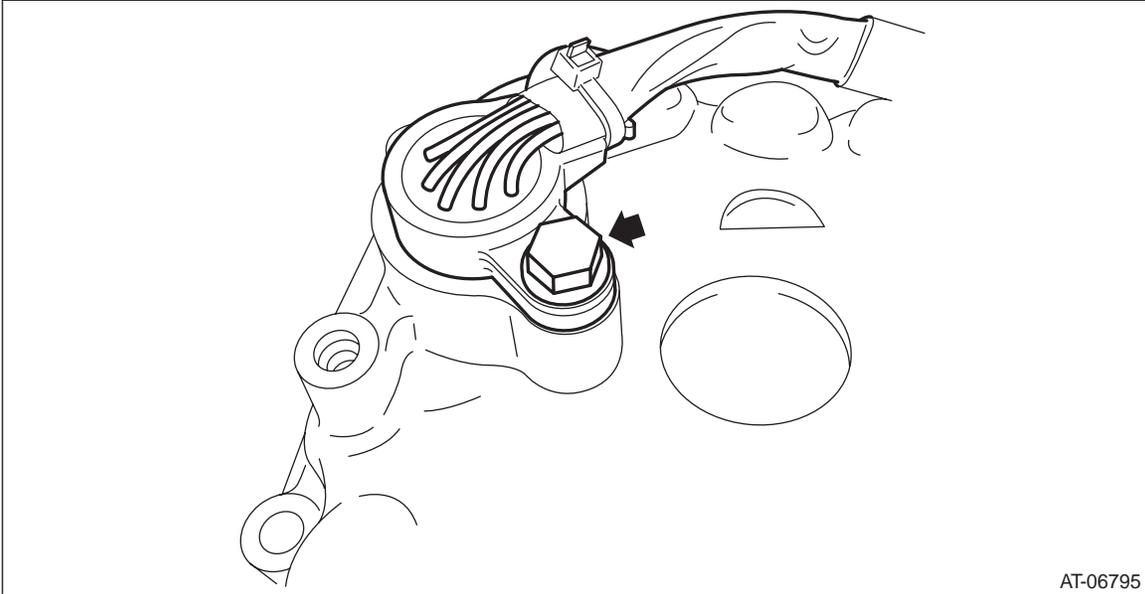


13) Disconnect the harness connector from the control valve body.

Control Valve Body

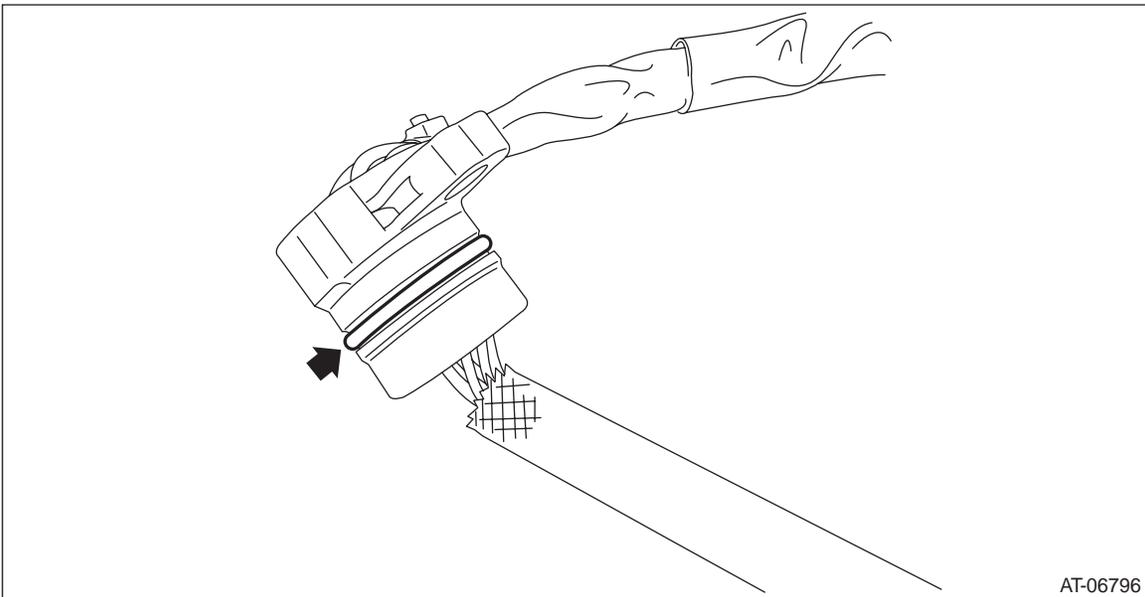
CONTINUOUSLY VARIABLE TRANSMISSION

14) Remove the transmission harness from the valve cover.



AT-06795

15) Remove the O-ring from the transmission harness.



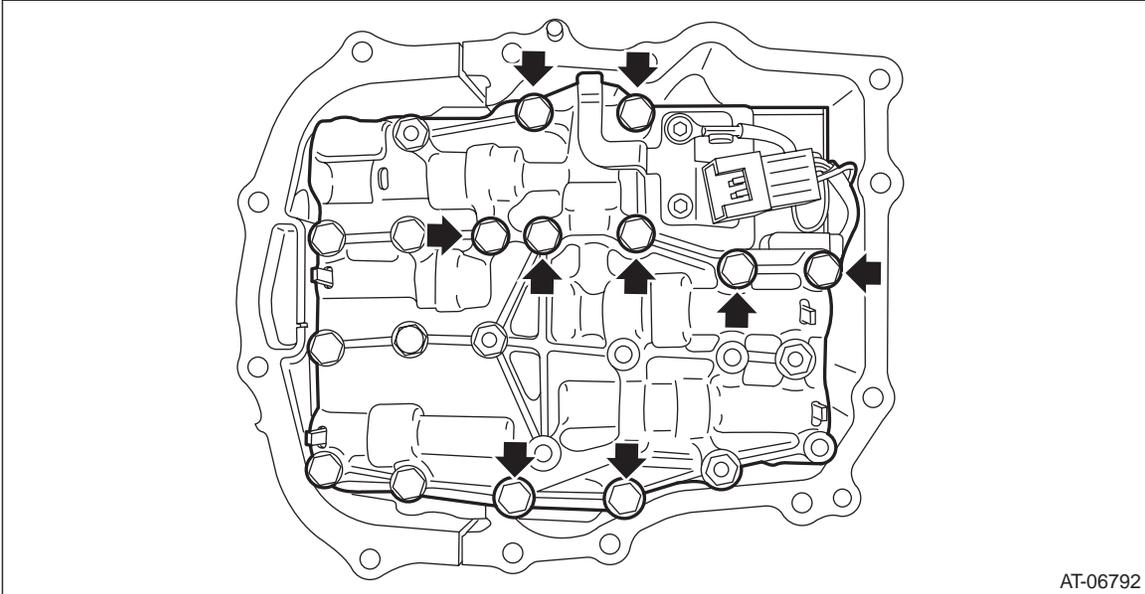
AT-06796

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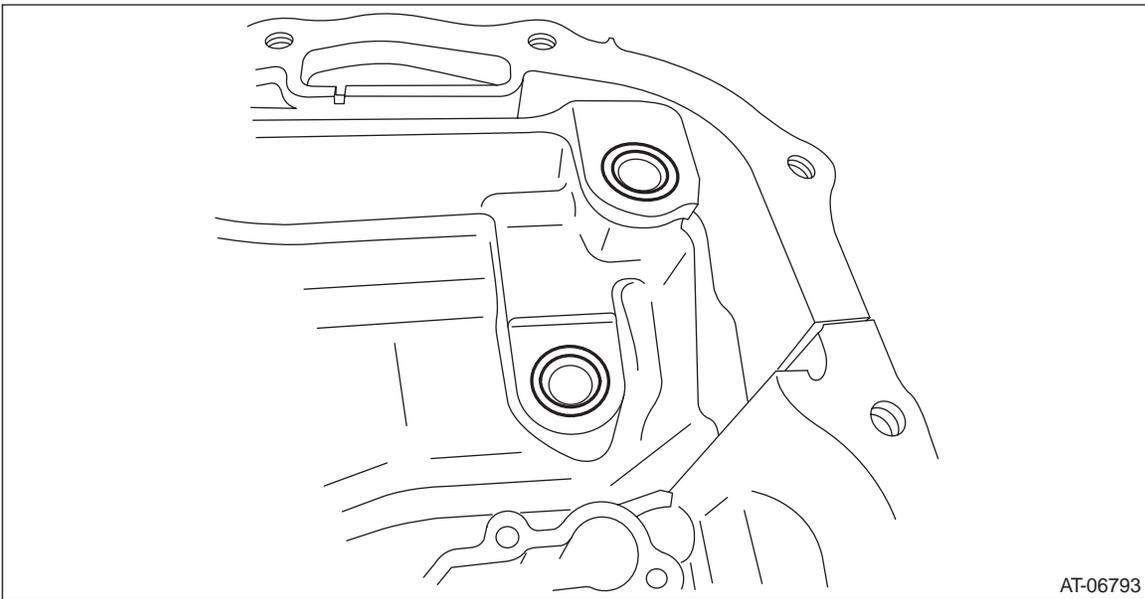
Control Valve Body

CONTINUOUSLY VARIABLE TRANSMISSION

16) Remove the control valve body.



17) Remove the O-ring from the transmission.



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Control Valve Body

CONTINUOUSLY VARIABLE TRANSMISSION

B: INSTALLATION

1) Clean the mating surface of valve cover and transmission side.

CAUTION:

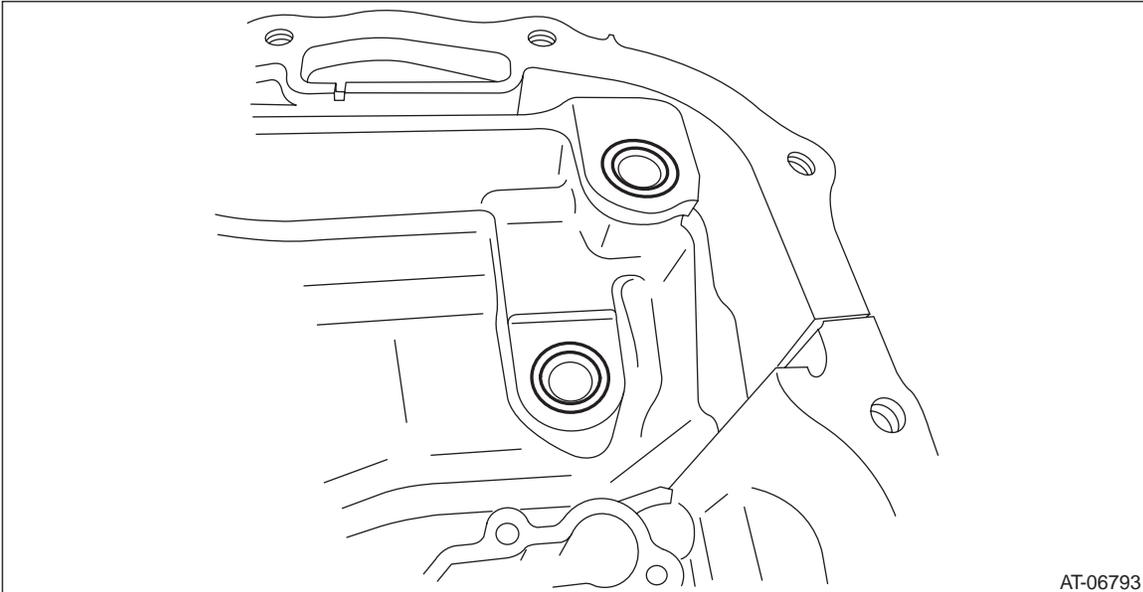
When cleaning the mating surface of the transmission side, be careful not to allow any dust, foreign matter and used liquid gasket to enter the transmission.

2) Check the control valve body for dust and other foreign matter.

3) Install the O-rings.

NOTE:

- Use new O-rings.
- Apply CVTF to the O-rings.



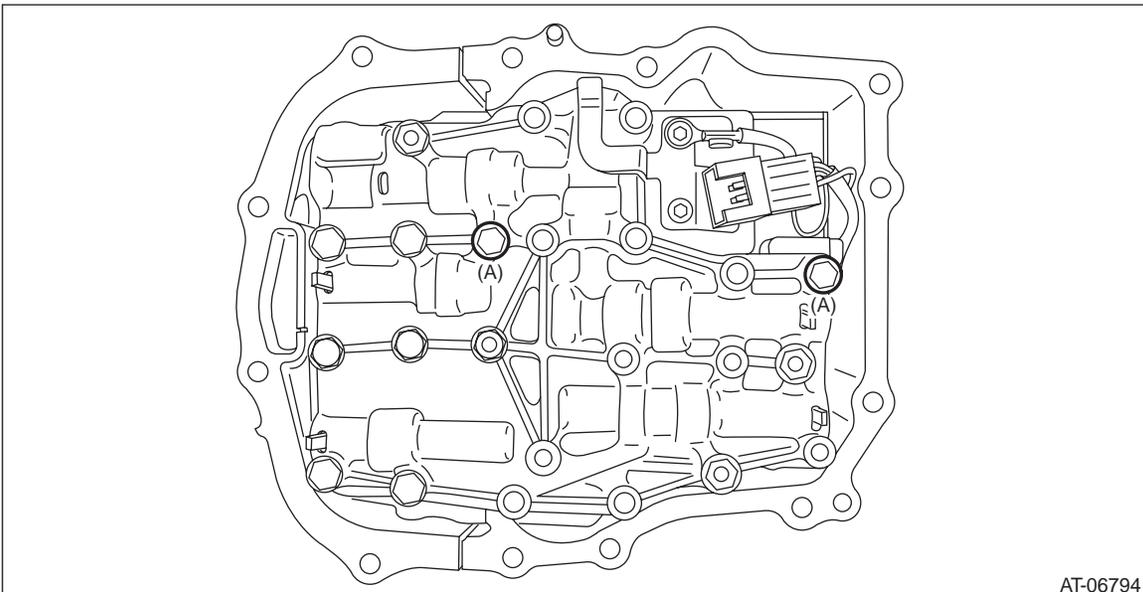
4) Install the control valve body.

(1) Install the control valve body to the transmission.

CAUTION:

- **Do not damage the O-ring.**
- **Perform installation so that the O-ring is not displaced.**

(2) Temporarily tighten the bolt (A: silver).



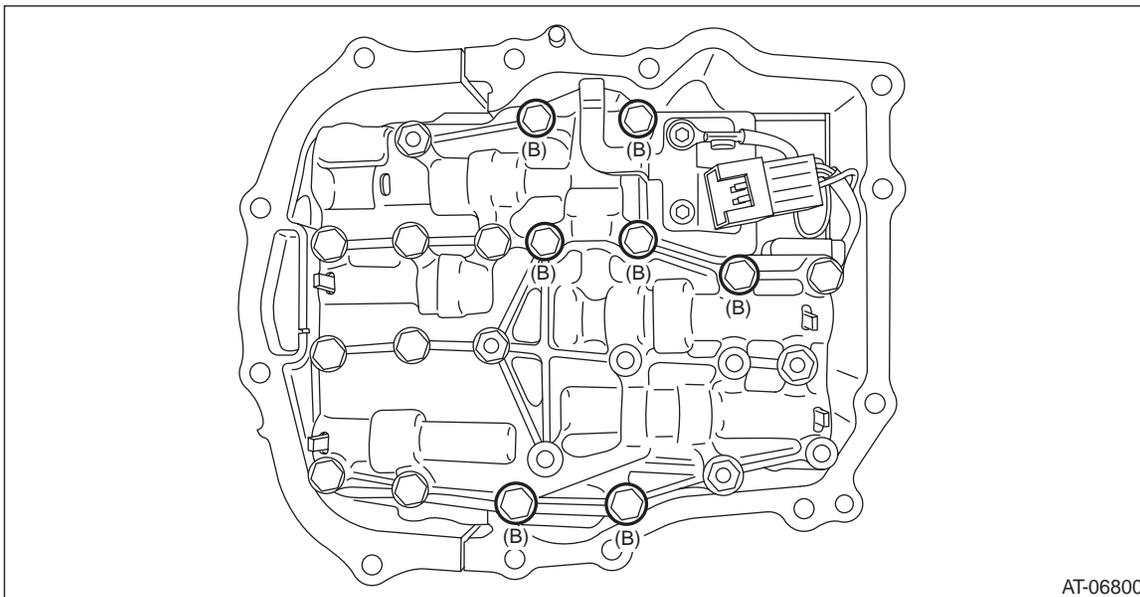
Control Valve Body

CONTINUOUSLY VARIABLE TRANSMISSION

(3) Attach the bolt (B).

Tightening torque:

9 N·m (0.9 kgf·m, 6.6 ft·lb)

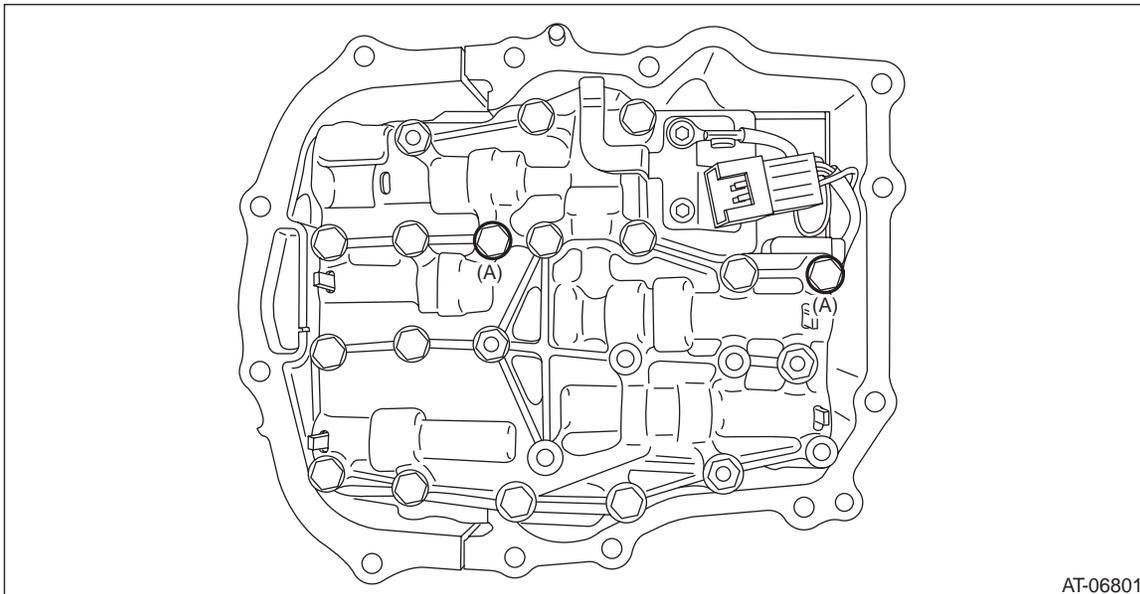


AT-06800

(4) Tighten the bolt (A: silver).

Tightening torque:

9 N·m (0.9 kgf·m, 6.6 ft·lb)



AT-06801

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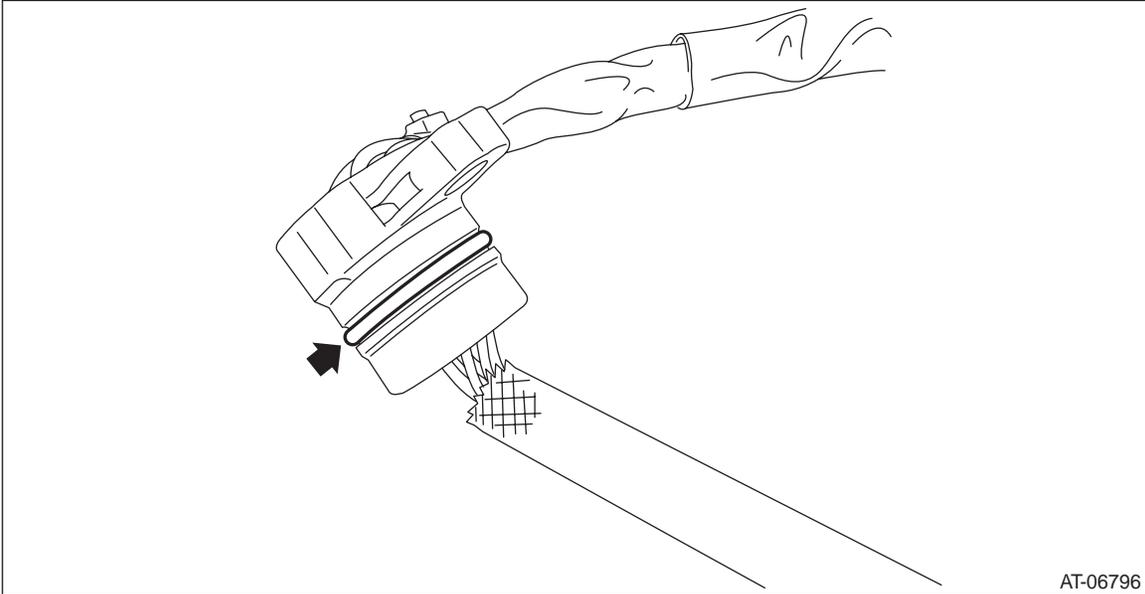
Control Valve Body

CONTINUOUSLY VARIABLE TRANSMISSION

5) Install the O-ring to the transmission harness.

NOTE:

- Use new O-rings.
- Apply CVTF to the O-rings.

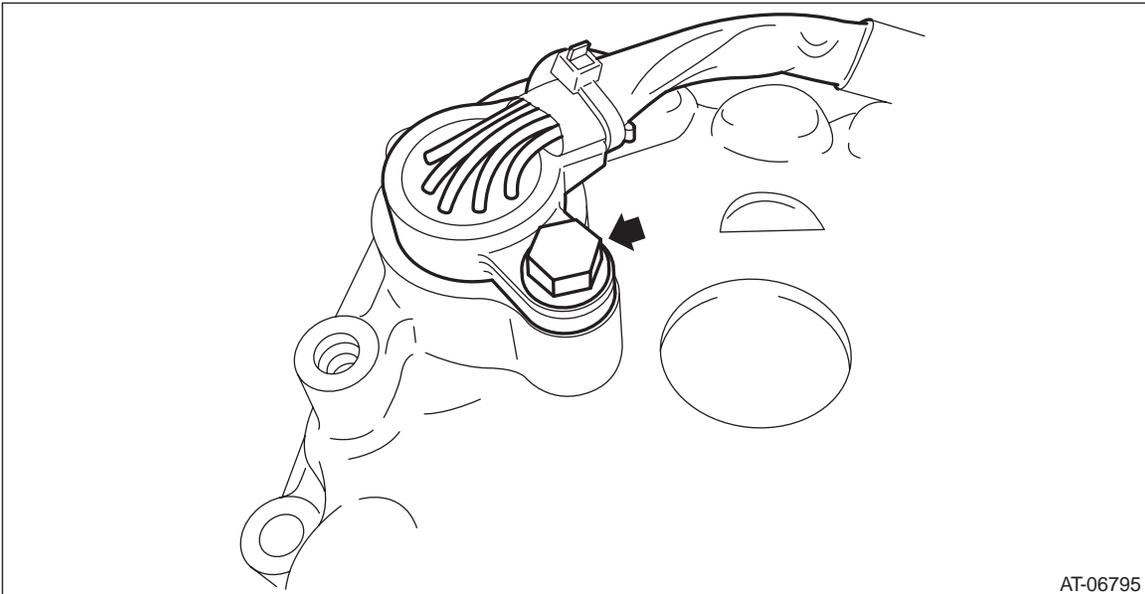


AT-06796

6) Install the transmission harness to the valve cover.

Tightening torque:

7 N·m (0.7 kgf-m, 5.2 ft-lb)



AT-06795

7) Install the gasket to the transmission.

NOTE:

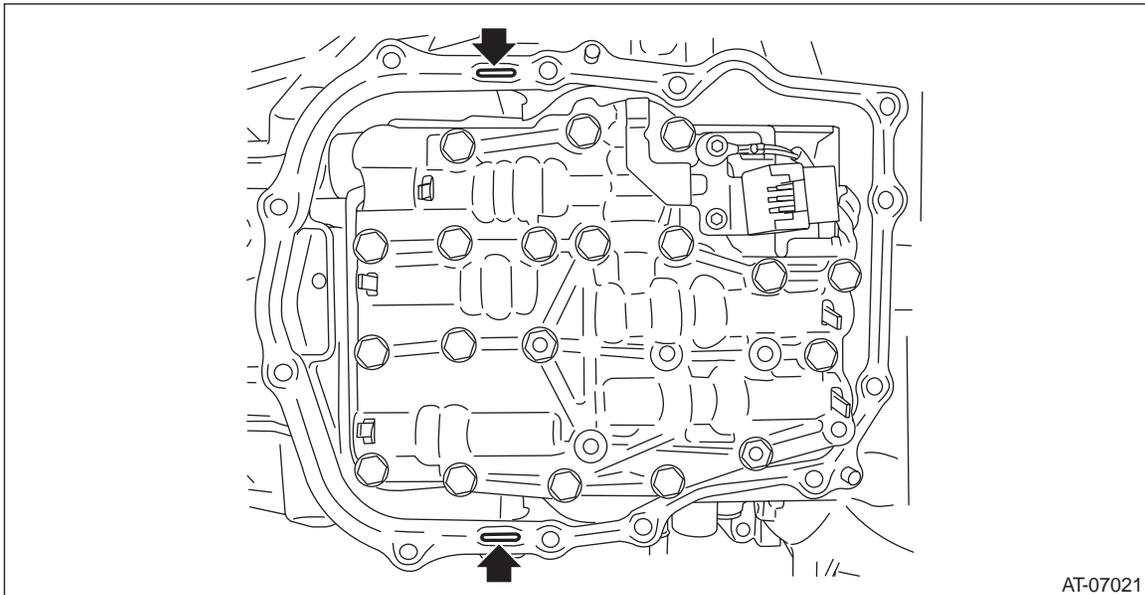
Use a new gasket.

Control Valve Body

CONTINUOUSLY VARIABLE TRANSMISSION

8) Apply liquid gasket to the oval hole of gasket.

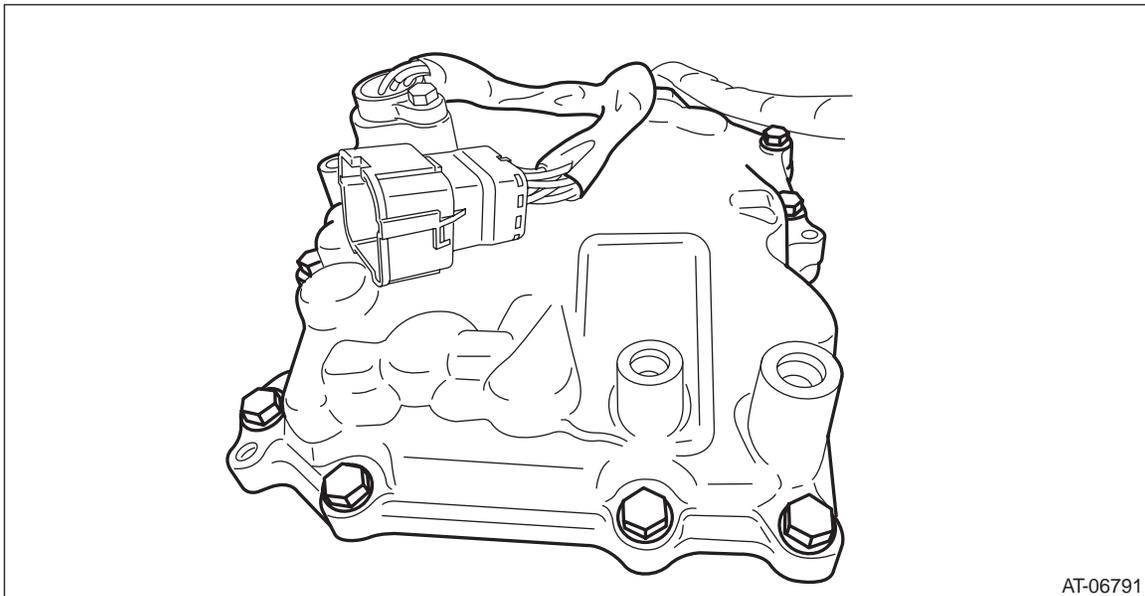
Liquid gasket:
THREE BOND 1215B or equivalent



9) Connect the transmission harness connector to the control valve body, and install the valve cover.

CAUTION:
Be careful not to catch the sheet of the ST.

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



10) Remove the ST (SHEET SPECIAL TOOL).

11) Install the throttle body.<Ref. to FU(H4DO)-15, INSTALLATION, Throttle Body.>

12) Install the transmission harness connector to the harness stay.

Control Valve Body

CONTINUOUSLY VARIABLE TRANSMISSION

13) Install the transmission harness stay and transmission ground terminal.

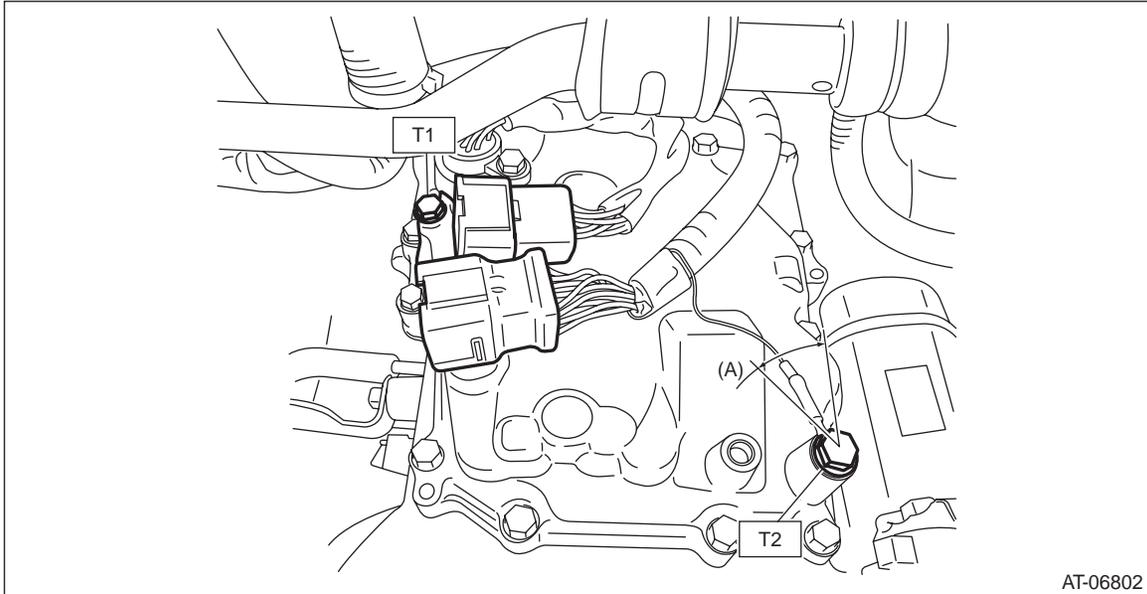
NOTE:

Install the transmission ground terminal in the direction within the range of approx. 30° (A).

Tightening torque:

T1: 7 N·m (0.7 kgf-m, 5.2 ft-lb)

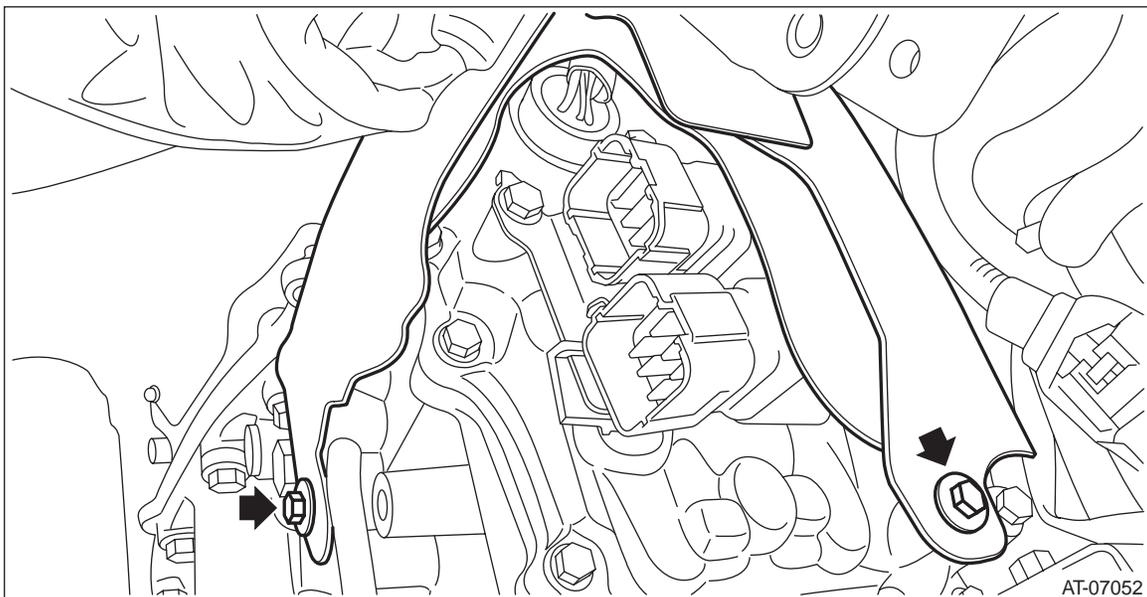
T2: 14 N·m (1.4 kgf-m, 10.3 ft-lb)



14) Install the transmission case cover.

Tightening torque:

8 N·m (0.8 kgf-m, 5.9 ft-lb)



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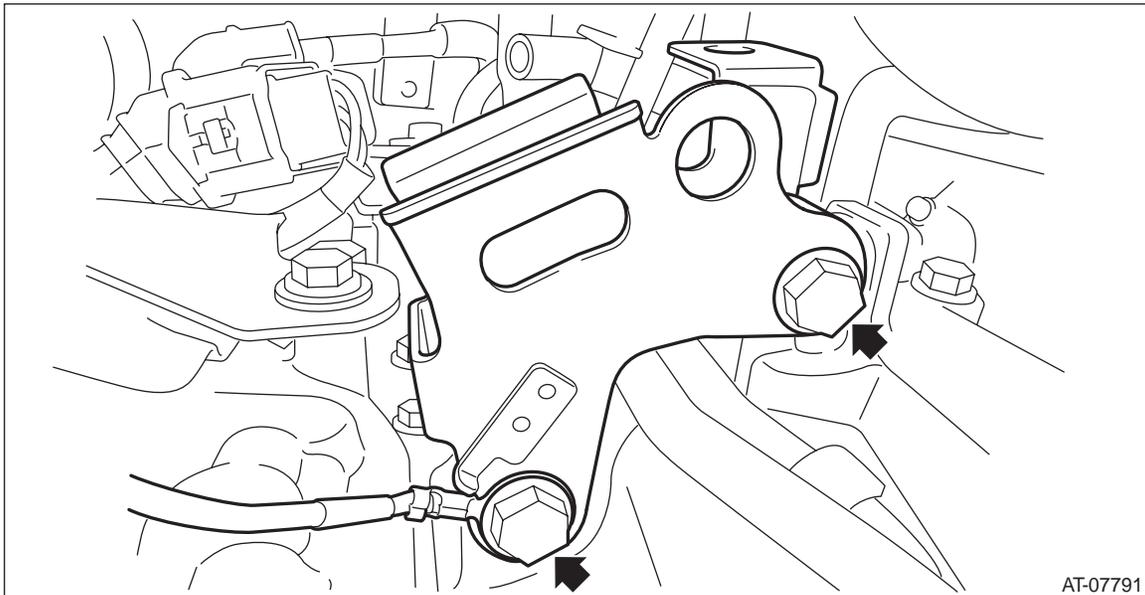
Control Valve Body

CONTINUOUSLY VARIABLE TRANSMISSION

15) Install the pitching stopper bracket and transmission radio ground cord.

Tightening torque:

41 N·m (4.2 kgf-m, 30.2 ft-lb)



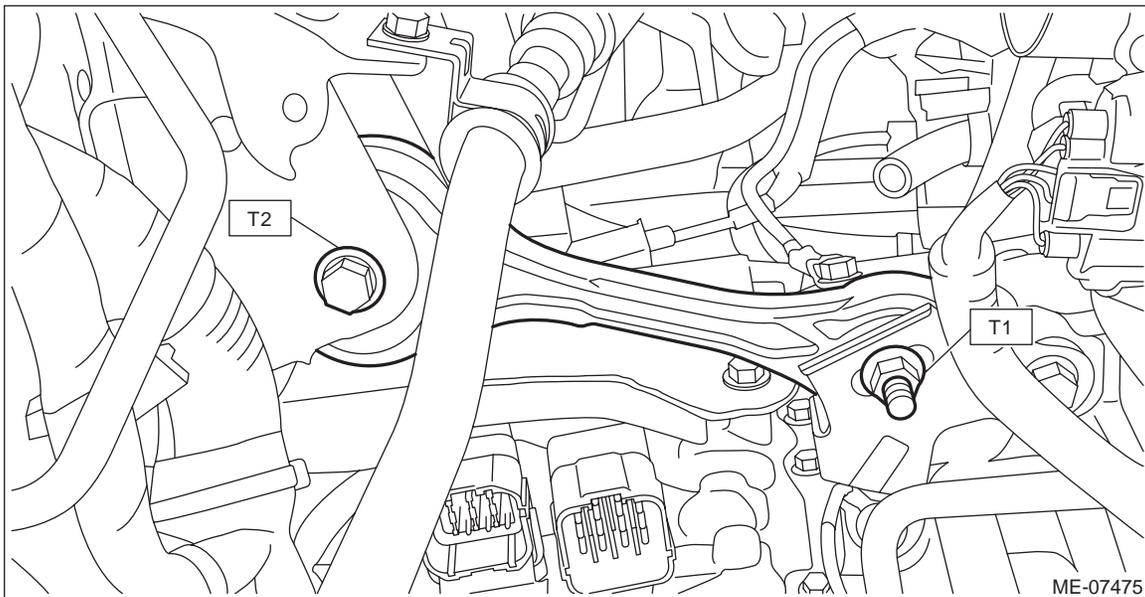
16) Install the air breather hose to the pitching stopper bracket.

17) 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)



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Control Valve Body

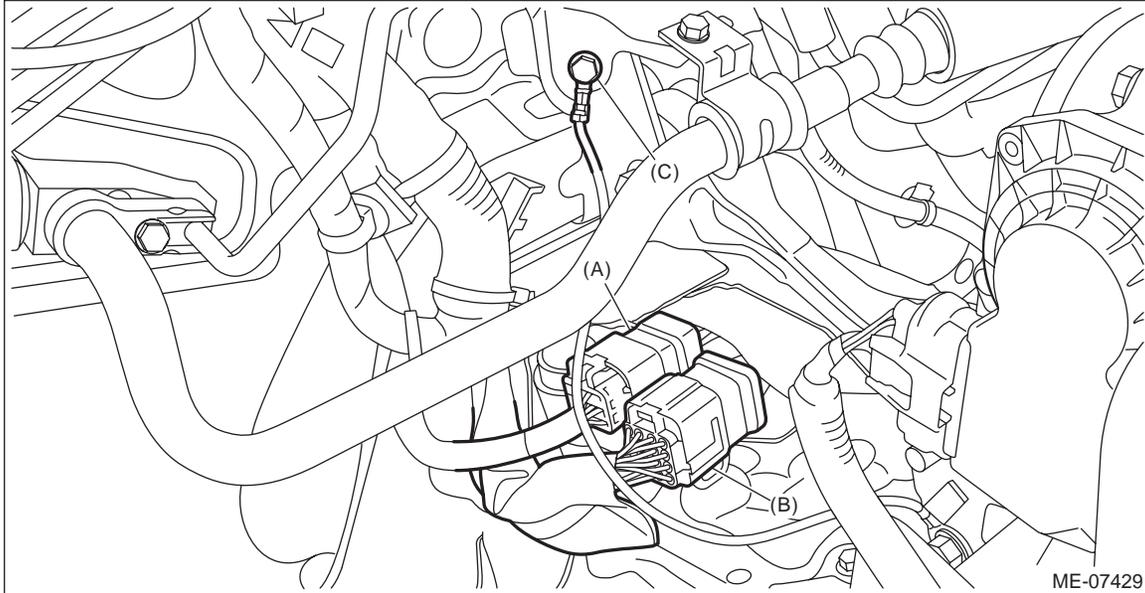
CONTINUOUSLY VARIABLE TRANSMISSION

18) Connect the following harness connectors.

- Transmission harness connectors
- Inhibitor harness connector
- Transmission radio ground terminal

Tightening torque:

13 N·m (1.3 kgf-m, 9.6 ft-lb)



- (A) Transmission harness connectors
- (B) Inhibitor harness connector
- (C) Transmission radio ground terminal

19) Install the air intake boot assembly.<Ref. to IN(H4DO)-11, INSTALLATION, Air Intake Boot.>
20) Adjust the CVTF level.<Ref. to CVT(TR580)-35, ADJUSTMENT, CVTF.>

Control Valve Body

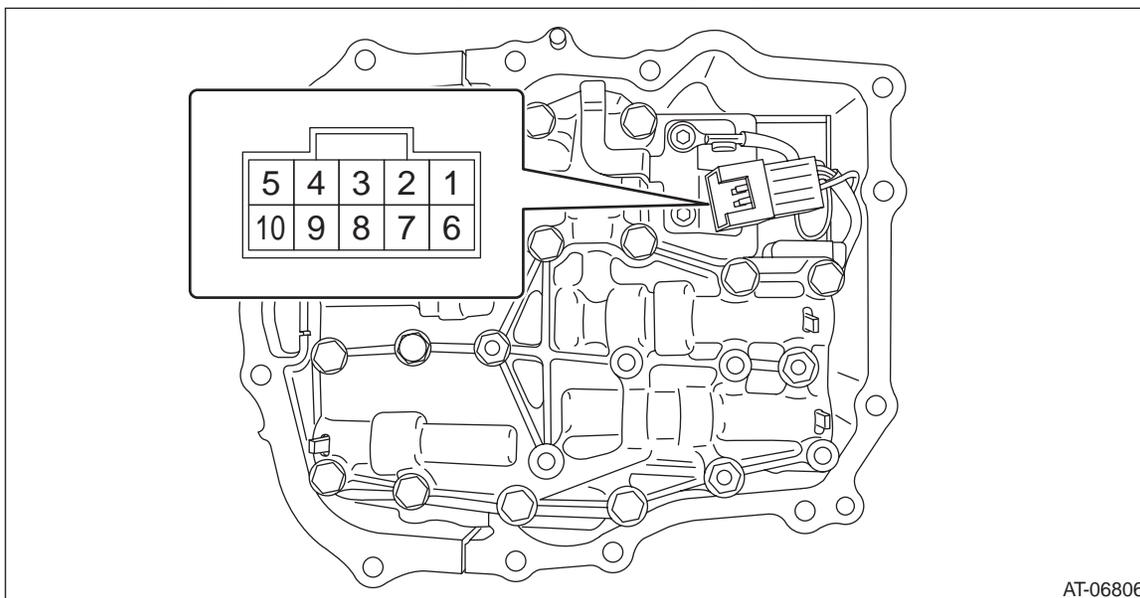
CONTINUOUSLY VARIABLE TRANSMISSION

C: INSPECTION

- Check each part for damage or dust.
- Measure the resistance of each solenoid, sensor and ground wire.

NOTE:

Measurement should be performed at a temperature of 20°C (68°F).



AT-06806

• Solenoid

Solenoid	Terminal No.	Standard
Primary UP solenoid	No. 2 — control valve body	Approx. 10 — 13.5 Ω
Secondary solenoid	No. 3 — control valve body	Approx. 5 — 7 Ω
F&R clutch solenoid	No. 4 — control valve body	Approx. 4 — 6 Ω
Primary DOWN solenoid	No. 7 — control valve body	Approx. 10 — 13.5 Ω
Lock-up duty solenoid	No. 9 — control valve body	Approx. 10 — 13.5 Ω
AWD solenoid	No. 10 — control valve body	Approx. 2 — 4.5 Ω

• Oil temperature sensor

Sensor	Terminal No.	Standard At 20°C (68°F)
Oil temperature sensor	No. 1 — No. 6	Approx. 2.5 k Ω

• Transmission ground

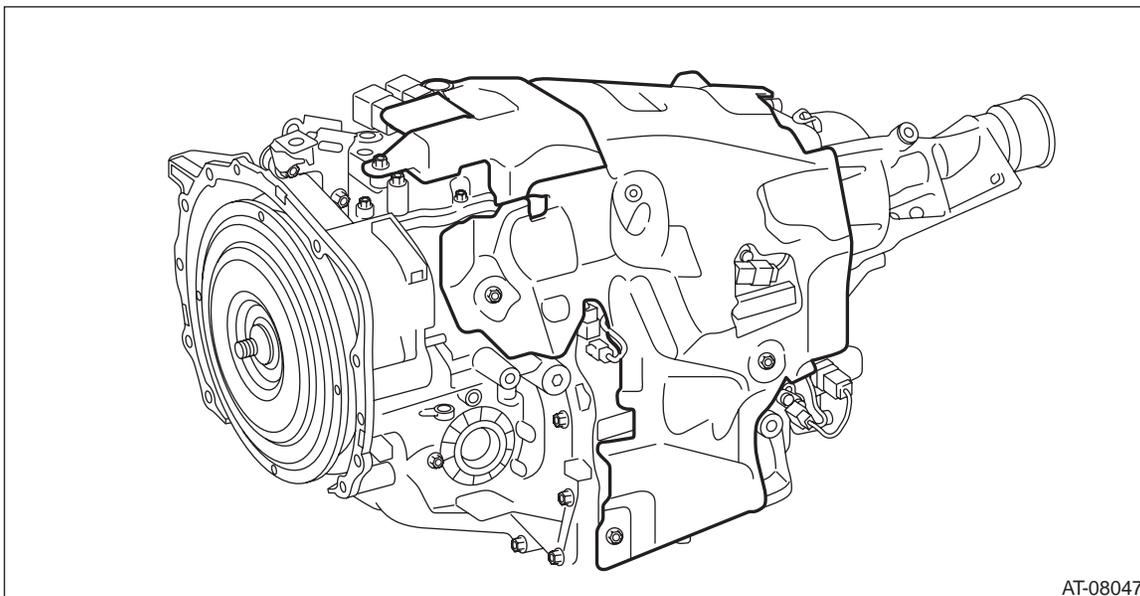
Terminal No.	Standard
No. 8 — control valve body	Less than 1 Ω

21. Transmission Harness

A: REMOVAL

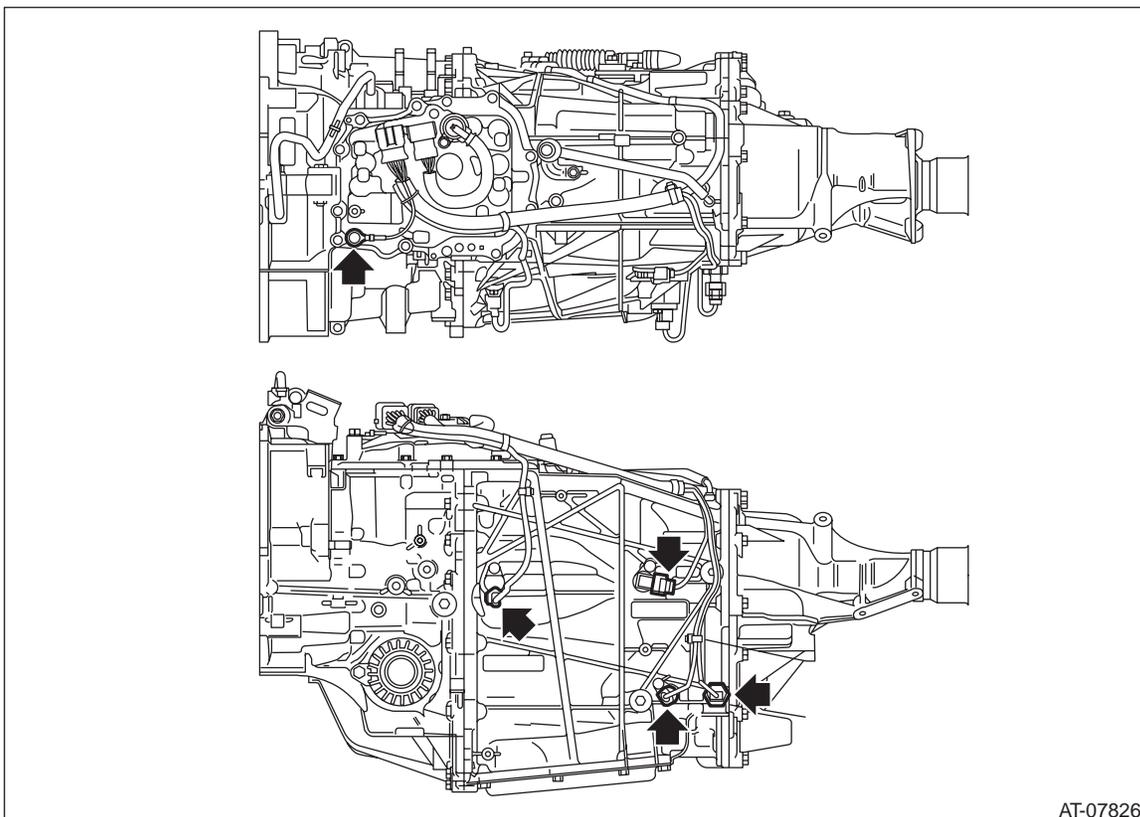
1. INHIBITOR HARNESS

- 1) Remove the transmission from the vehicle. <Ref. to CVT(TR580)-57, REMOVAL, Automatic Transmission Assembly.>
- 2) Remove the transmission case cover.



AT-08047

- 3) Remove the harness connector from the ground terminal, turbine speed sensor, primary speed sensor, secondary speed sensor and secondary pressure sensor.

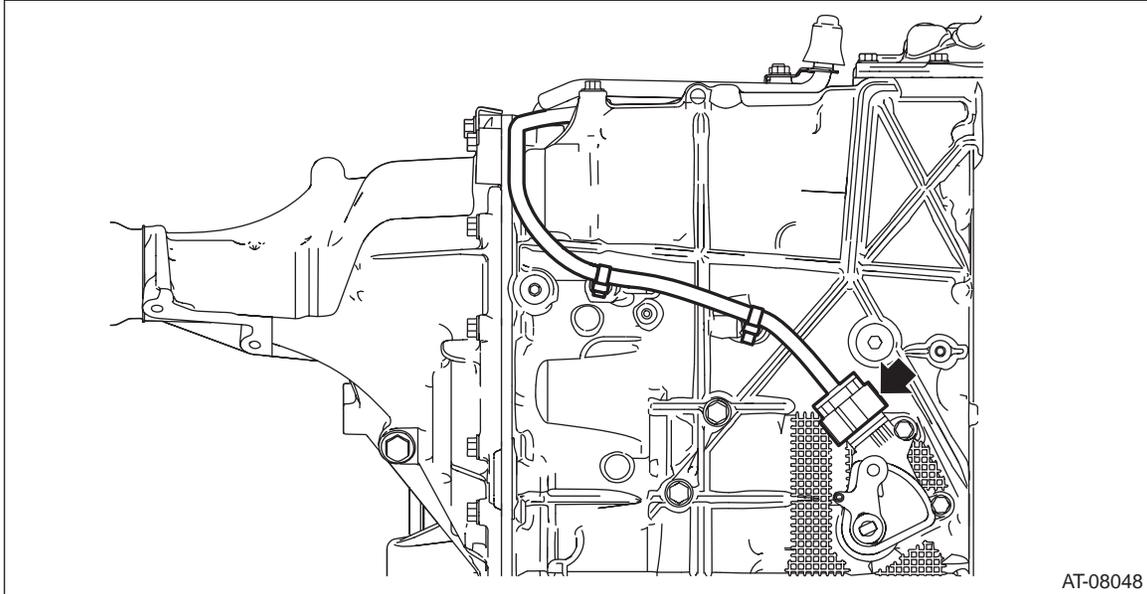


AT-07826

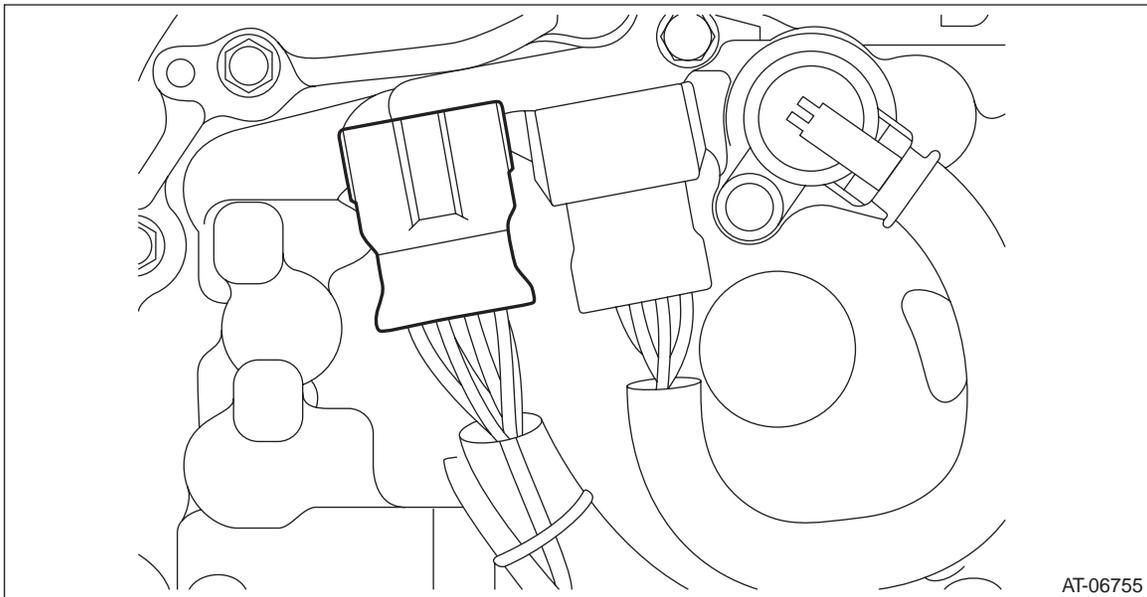
Transmission Harness

CONTINUOUSLY VARIABLE TRANSMISSION

- 4) Remove the harness connector from inhibitor switch.



- 5) Remove the inhibitor harness connector from the transmission harness stay.



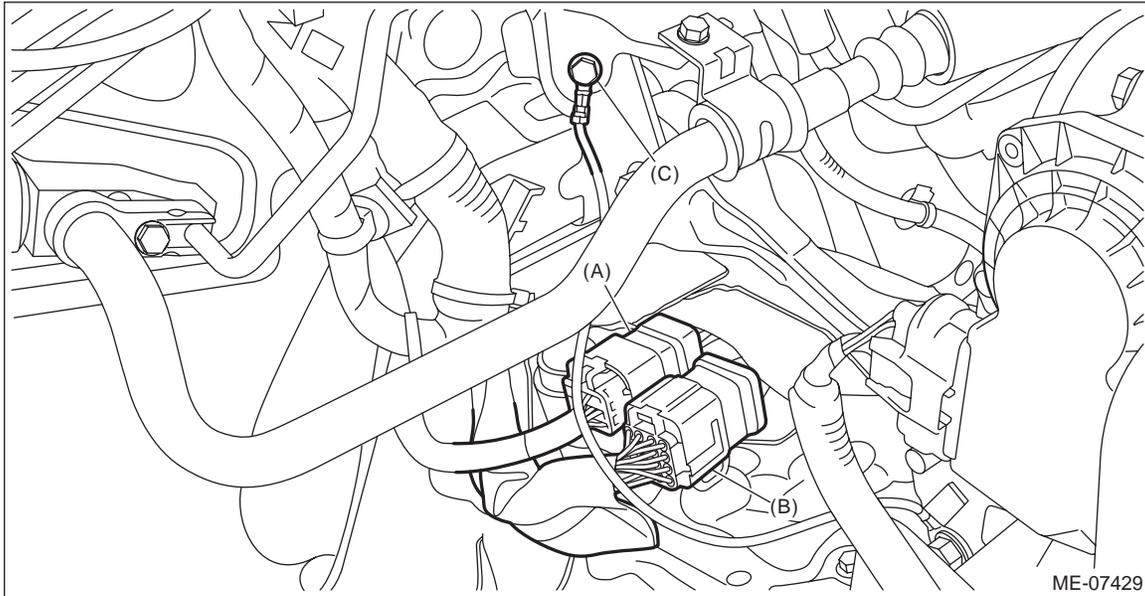
- 6) Remove the harness clip from the transmission, and remove the inhibitor harness.

Transmission Harness

CONTINUOUSLY VARIABLE TRANSMISSION

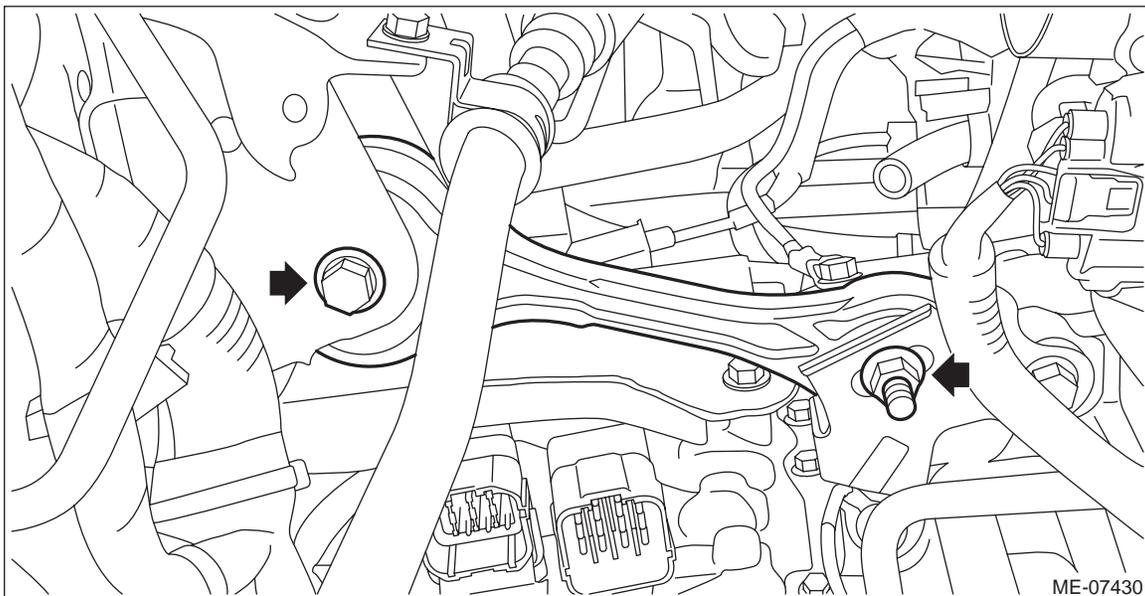
2. TRANSMISSION HARNESS

- 1) Disconnect the ground cable from battery.
- 2) Remove the air intake boot assembly.<Ref. to IN(H4DO)-11, REMOVAL, Air Intake Boot.>
- 3) Disconnect the following connectors.
 - Transmission harness connectors
 - Inhibitor harness connector
 - Transmission radio ground terminal



- (A) Transmission harness connectors
- (B) Inhibitor harness connector
- (C) Transmission radio ground terminal

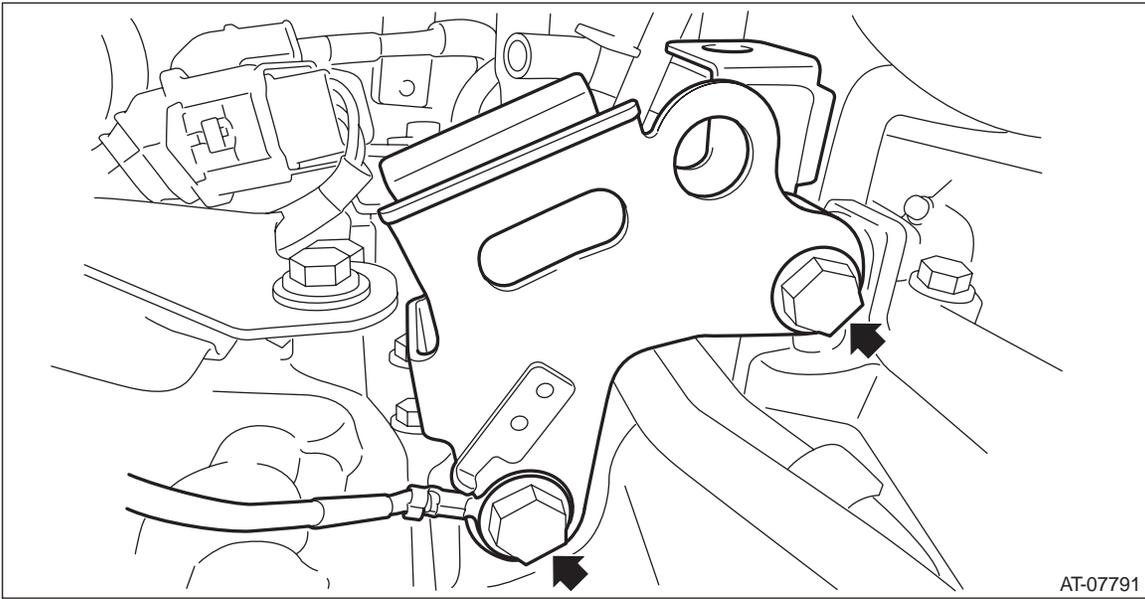
- 4) Remove the pitching stopper.



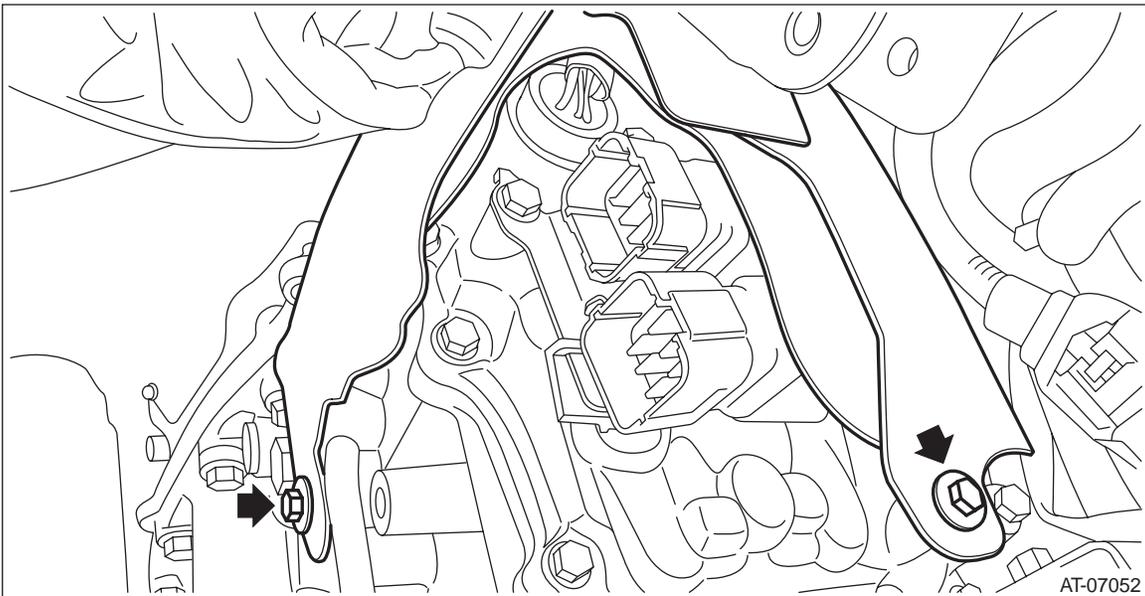
Transmission Harness

CONTINUOUSLY VARIABLE TRANSMISSION

5) Remove the air breather hose from the pitching stopper bracket, and then remove the pitching stopper bracket and transmission radio ground cord.



6) Remove the transmission case cover.

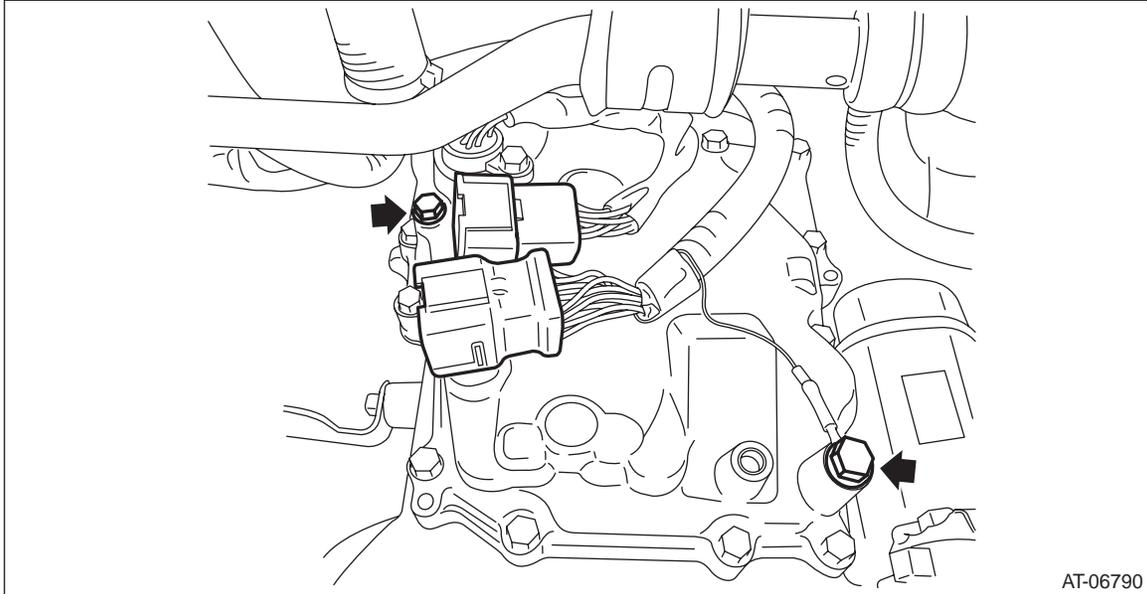


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Transmission Harness

CONTINUOUSLY VARIABLE TRANSMISSION

7) Remove the transmission harness stay and ground terminal.

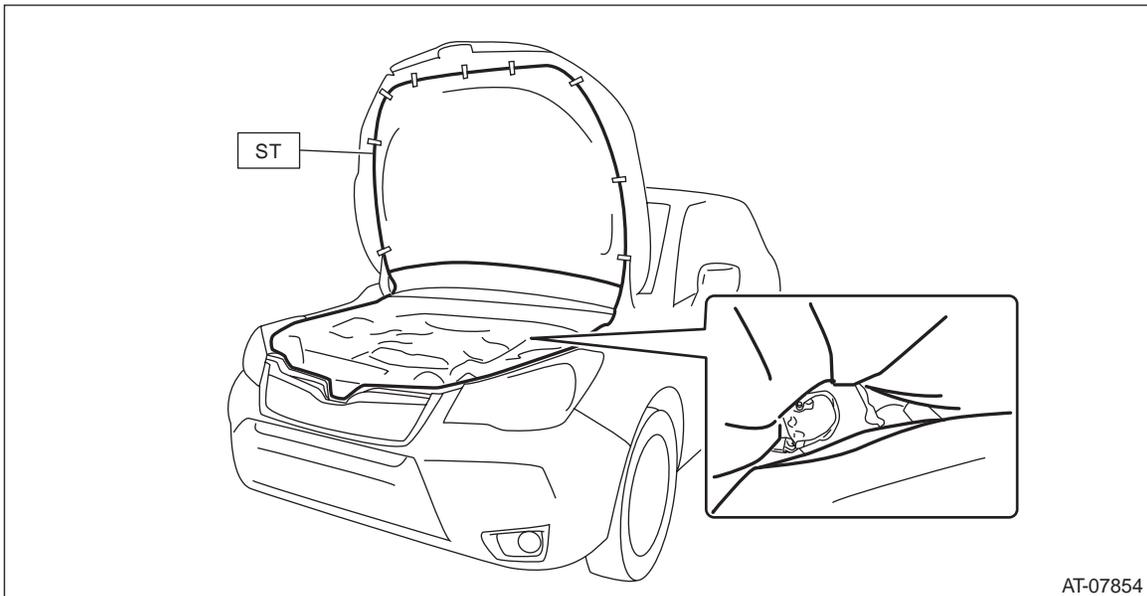


8) Remove the transmission harness connector from the harness stay.

9) Clean the transmission exterior.

10) Set the ST on the vehicle.

ST 18761AA010 SHEET SPECIAL TOOL

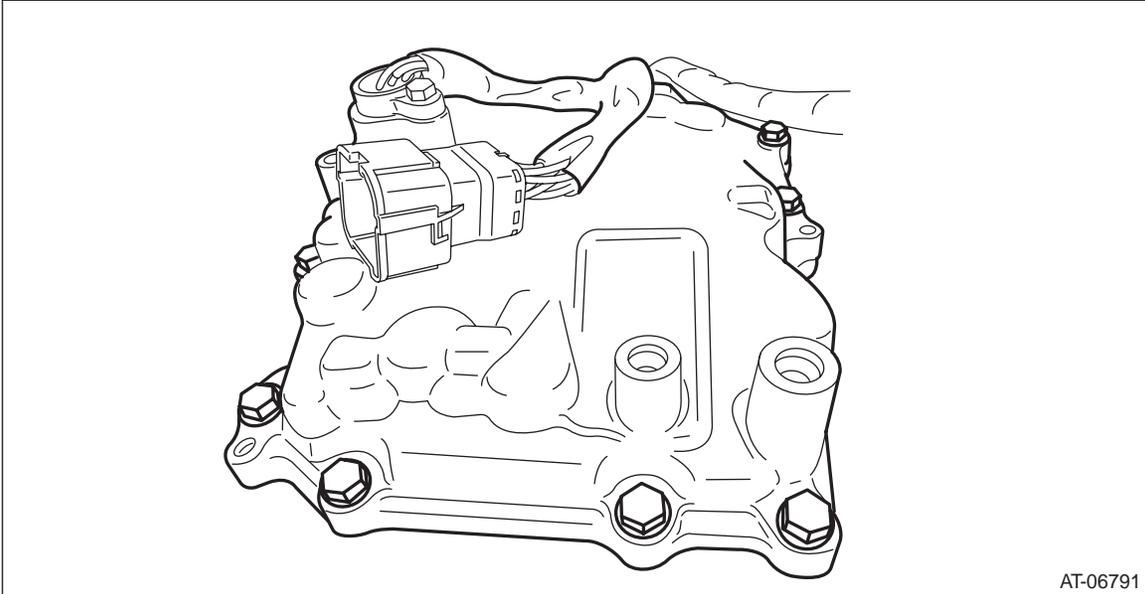


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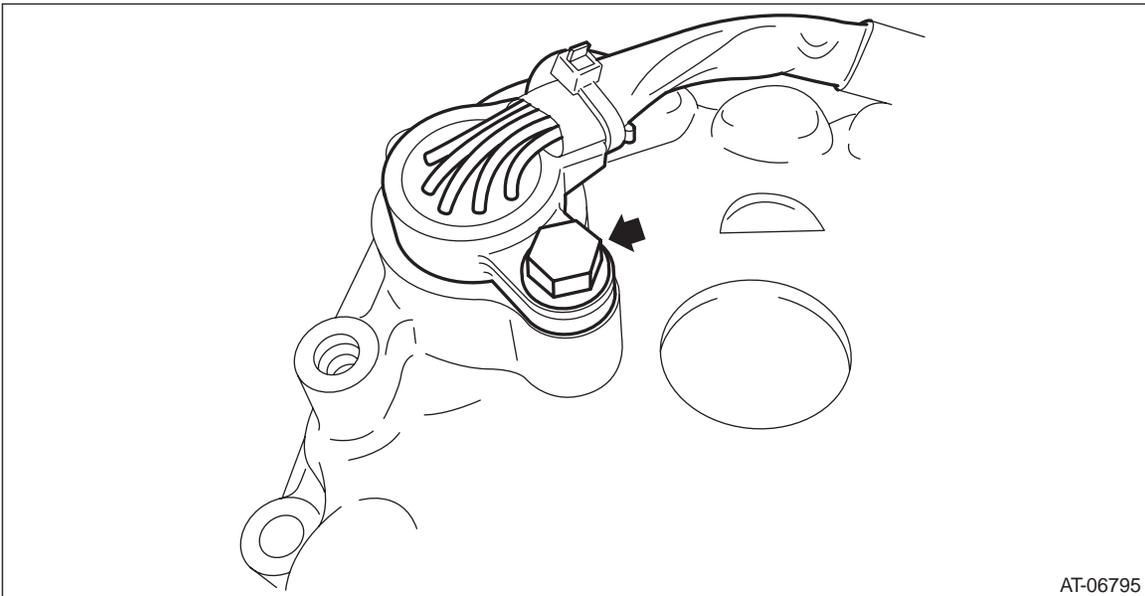
Transmission Harness

CONTINUOUSLY VARIABLE TRANSMISSION

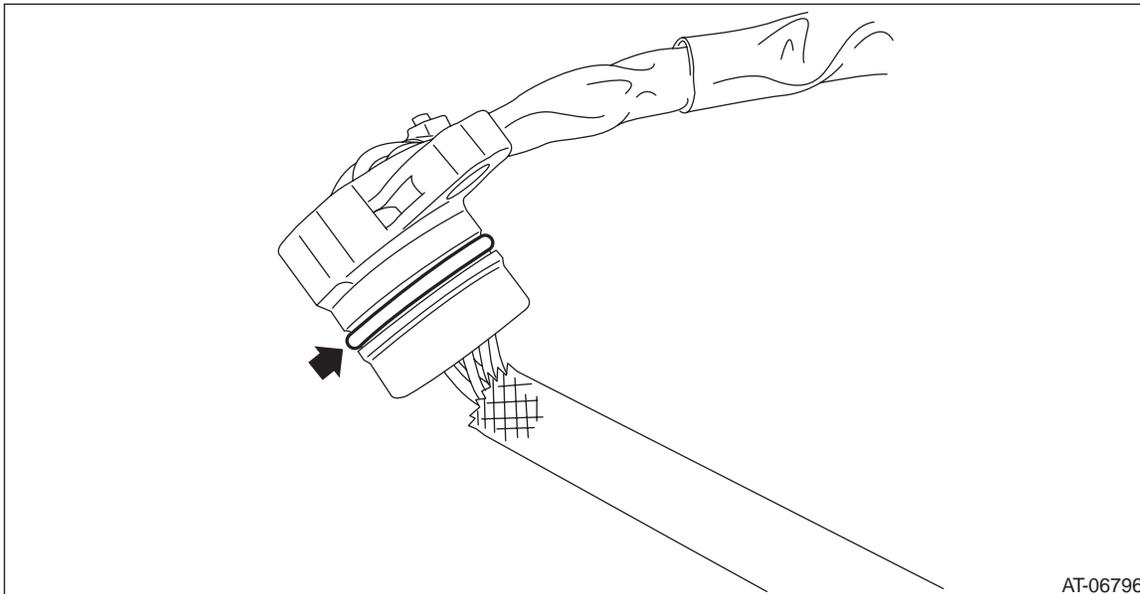
11) Remove the valve cover and gasket.



12) Remove the transmission harness connector from the control valve body.
13) Remove the transmission harness from the valve cover.



14) Remove the O-ring from the transmission harness.



AT-06796

B: INSTALLATION

1. INHIBITOR HARNESS

Install in the reverse order of removal.

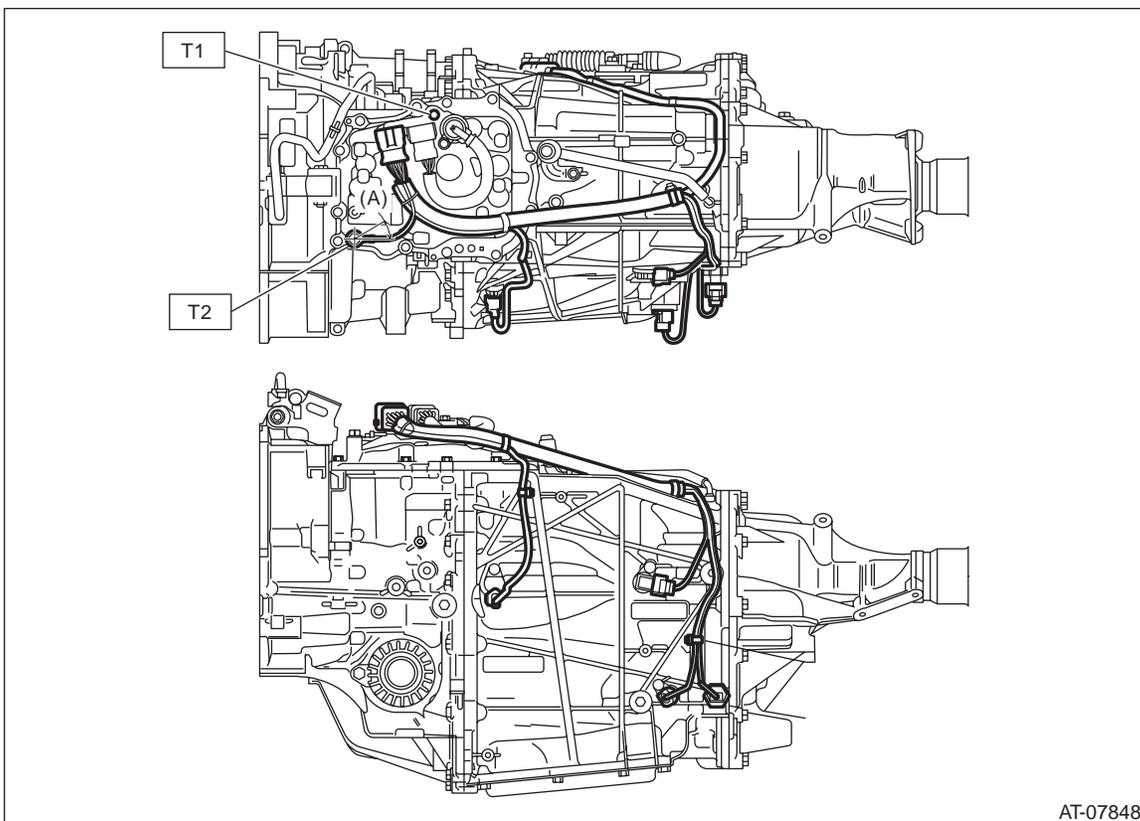
NOTE:

Install the transmission ground terminal in the direction within the range of approx. 30° (A).

Tightening torque:

T1: 7 N·m (0.7 kgf-m, 3.7 ft-lb)

T2: 14 N·m (1.4 kgf-m, 10.3 ft-lb)



AT-07848

Transmission Harness

CONTINUOUSLY VARIABLE TRANSMISSION

2. TRANSMISSION HARNESS

1) Clean the mating surface of valve cover and transmission side.

CAUTION:

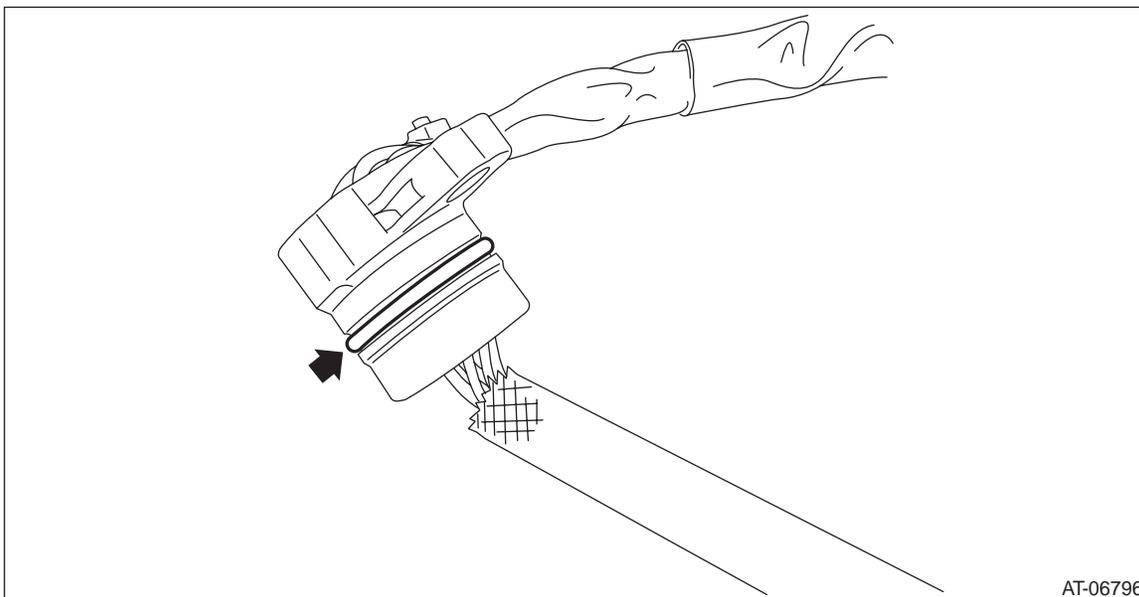
When cleaning the mating surface of the transmission side, be careful not to allow any dust, foreign matter and used liquid gasket to enter the transmission.

2) Check the control valve body for dust and other foreign matter.

3) Install the O-ring to the transmission harness.

NOTE:

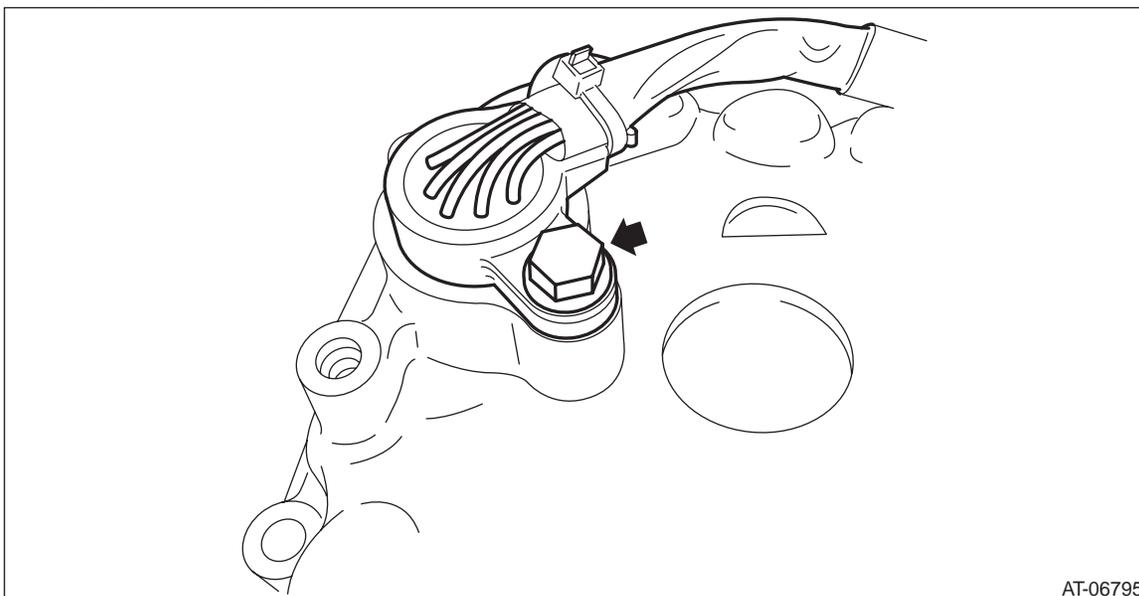
- Use new O-rings.
- Apply CVTF to the O-rings.



4) Install the transmission harness to the valve cover.

Tightening torque:

7 N·m (0.7 kgf-m, 5.2 ft-lb)



5) Install the gasket to the transmission.

NOTE:

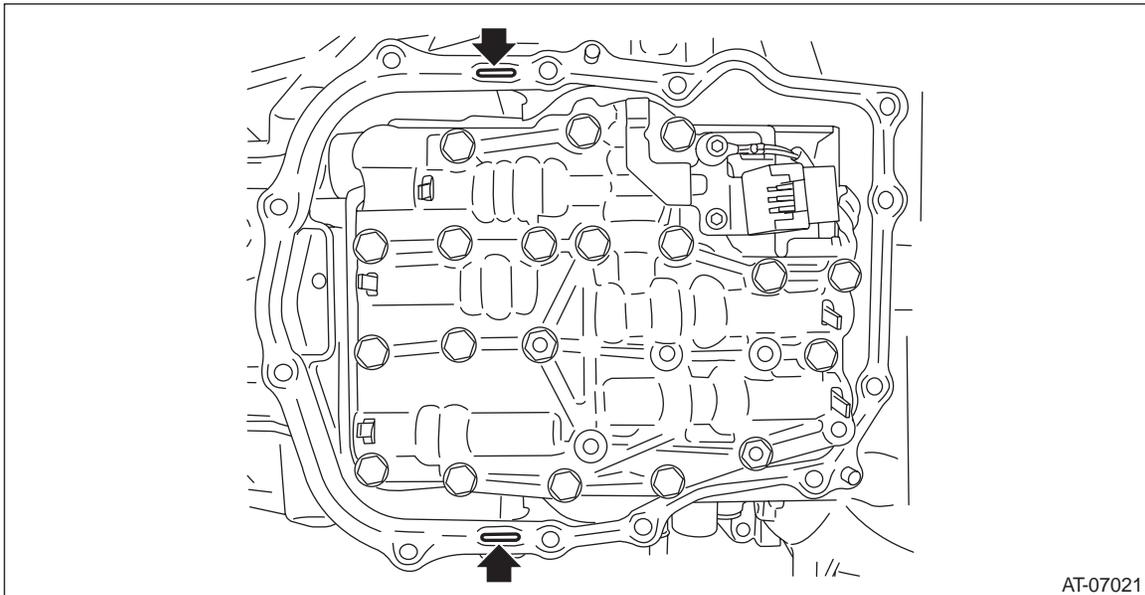
Use a new gasket.

Transmission Harness

CONTINUOUSLY VARIABLE TRANSMISSION

6) Apply liquid gasket to the oval hole of gasket.

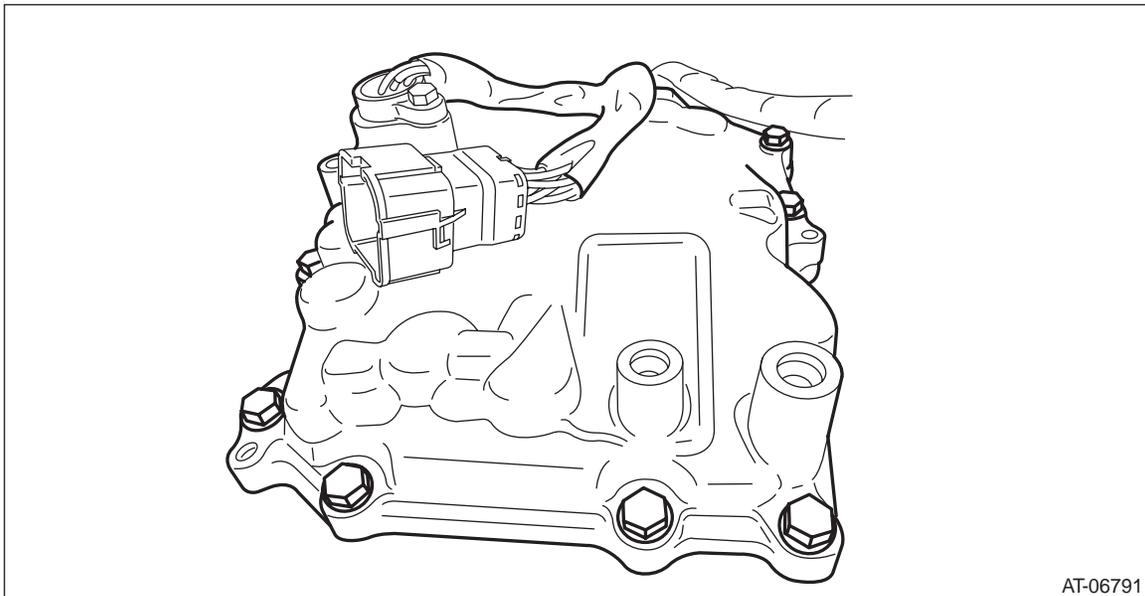
Liquid gasket:
THREE BOND 1215B or equivalent



7) Connect the transmission harness connector to the control valve body, and install the valve cover.

CAUTION:
Be careful not to catch the sheet of the ST.

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



8) Remove the ST (SHEET SPECIAL TOOL).

9) Install the transmission harness connector to the harness stay.

Transmission Harness

CONTINUOUSLY VARIABLE TRANSMISSION

10) Install the transmission harness stay and transmission ground terminal.

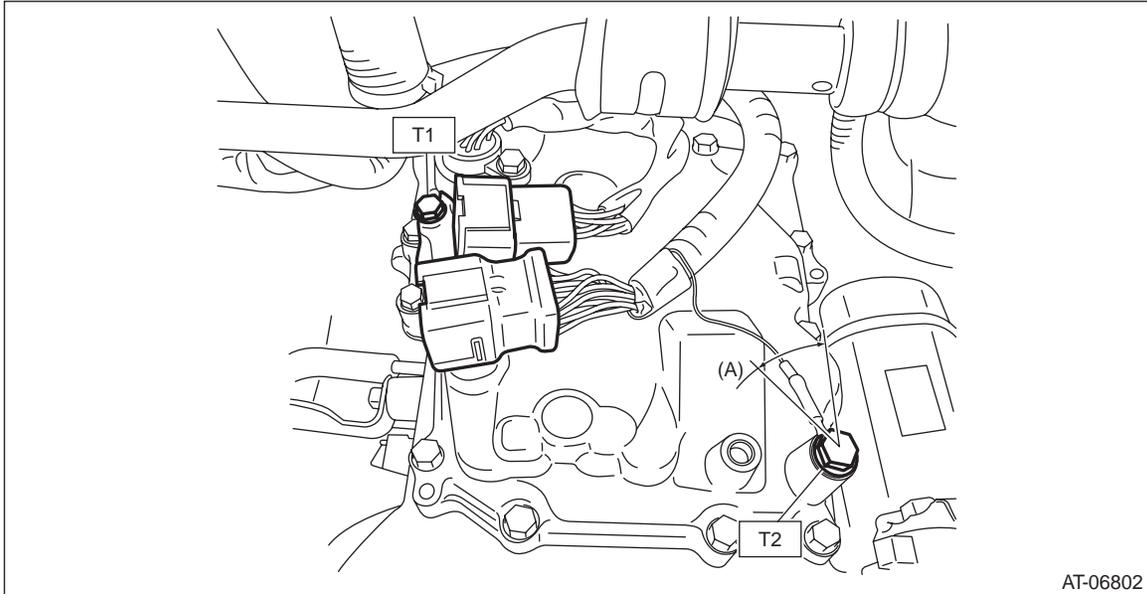
NOTE:

Install the transmission ground terminal in the direction within the range of approx. 30° (A).

Tightening torque:

T1: 7 N·m (0.7 kgf-m, 5.2 ft-lb)

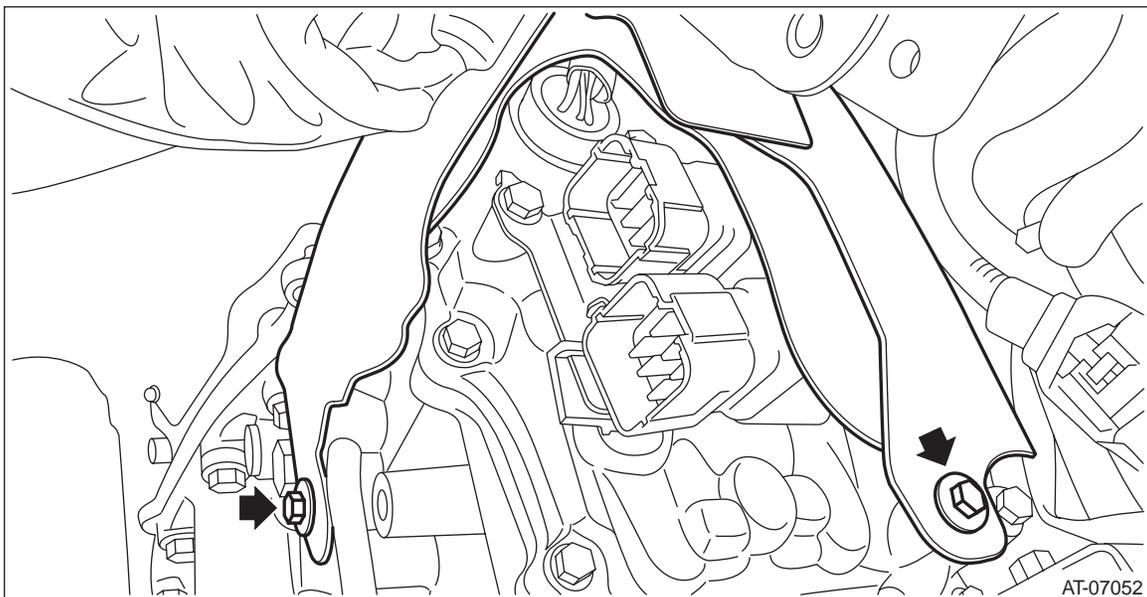
T2: 14 N·m (1.4 kgf-m, 10.3 ft-lb)



11) Install the transmission case cover.

Tightening torque:

8 N·m (0.8 kgf-m, 5.9 ft-lb)



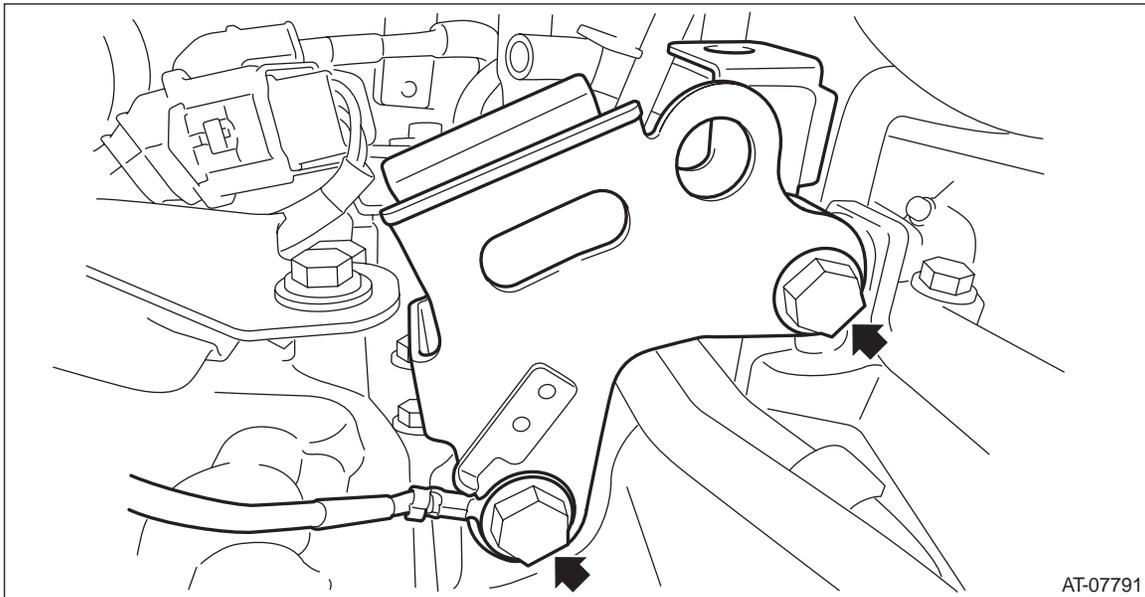
Transmission Harness

CONTINUOUSLY VARIABLE TRANSMISSION

12) Install the pitching stopper bracket and transmission radio ground cord.

Tightening torque:

41 N·m (4.2 kgf·m, 30.2 ft·lb)



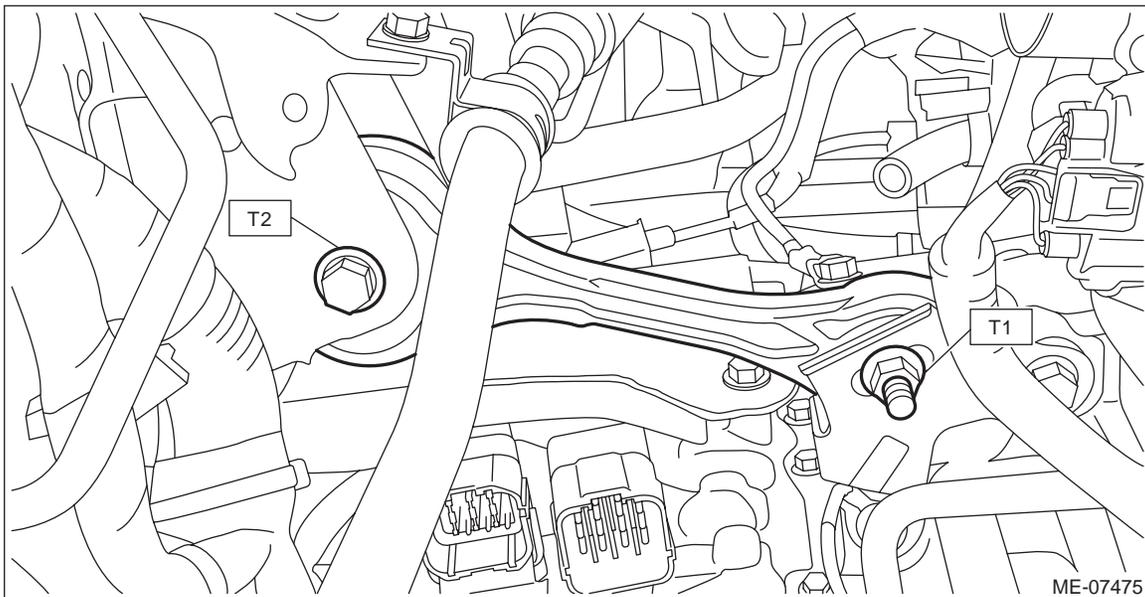
13) Install the air breather hose to the pitching stopper bracket.

14) 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)



Transmission Harness

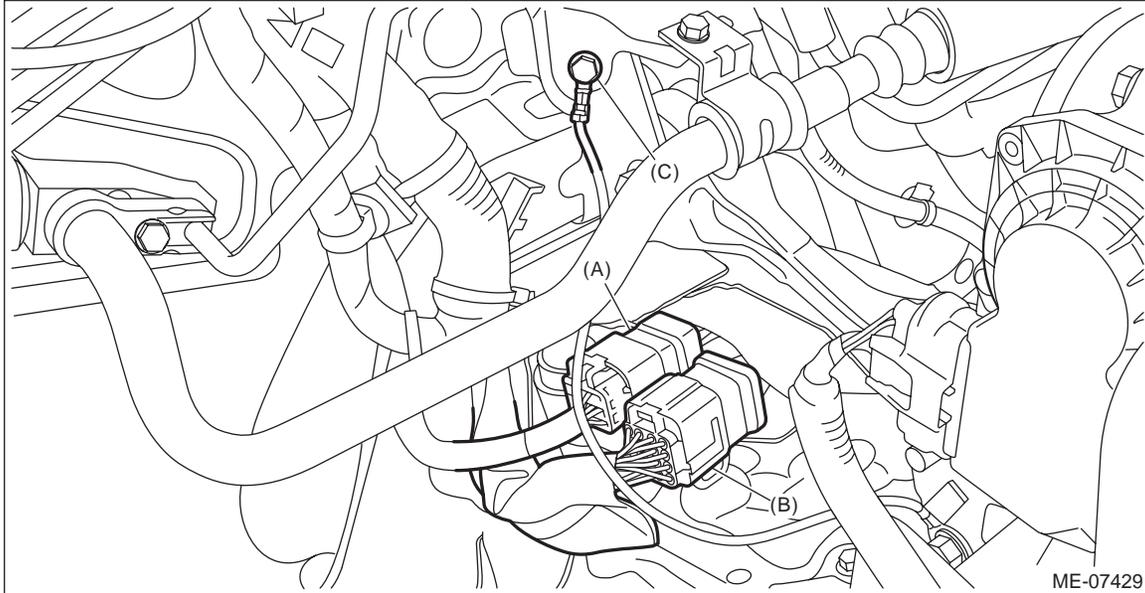
CONTINUOUSLY VARIABLE TRANSMISSION

15) Connect the following harness connectors.

- Transmission harness connectors
- Inhibitor harness connector
- Transmission radio ground terminal

Tightening torque:

13 N·m (1.3 kgf-m, 9.6 ft-lb)



- (A) Transmission harness connectors
(B) Inhibitor harness connector
(C) Transmission radio ground terminal

16) Install the air intake boot assembly. <Ref. to IN(H4DO)-11, INSTALLATION, Air Intake Boot.>

17) Adjust the CVTF level. <Ref. to CVT(TR580)-35, ADJUSTMENT, CVTF.>

C: INSPECTION

- 1) Visually check the harness and connector for damage or crack.
- 2) Check the harness terminal for rust, disconnection or poor contact.
- 3) Check the continuity between harness terminals.

NOTE:

For details of transmission harness circuit, refer to wiring diagram. <Ref. to WI-138, WIRING DIAGRAM, CVT Control System.>

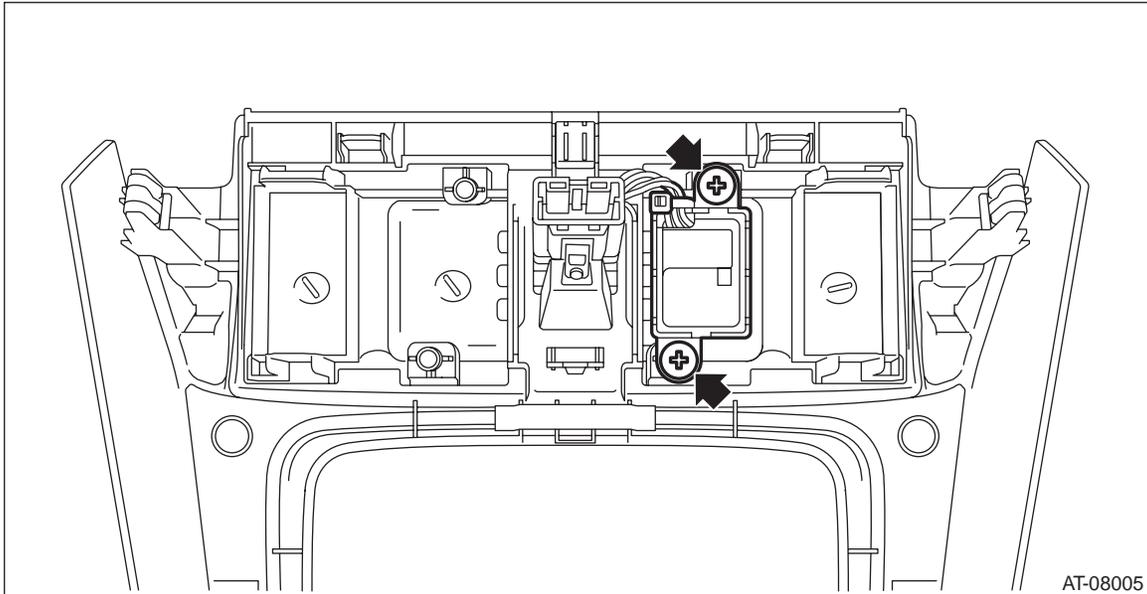
Harness continuity standard

Less than 1 Ω

22.X MODE Switch

A: REMOVAL

- 1) Disconnect the ground cable from battery.
- 2) Remove the cover - shift lever. <Ref. to EI-65, REMOVAL, Console Box.>
- 3) Remove the X MODE switch from the cover - shift lever.



- 4) Remove the X MODE switch connector from the cover - shift lever.

B: INSTALLATION

Install in the reverse order of removal.

X MODE Switch

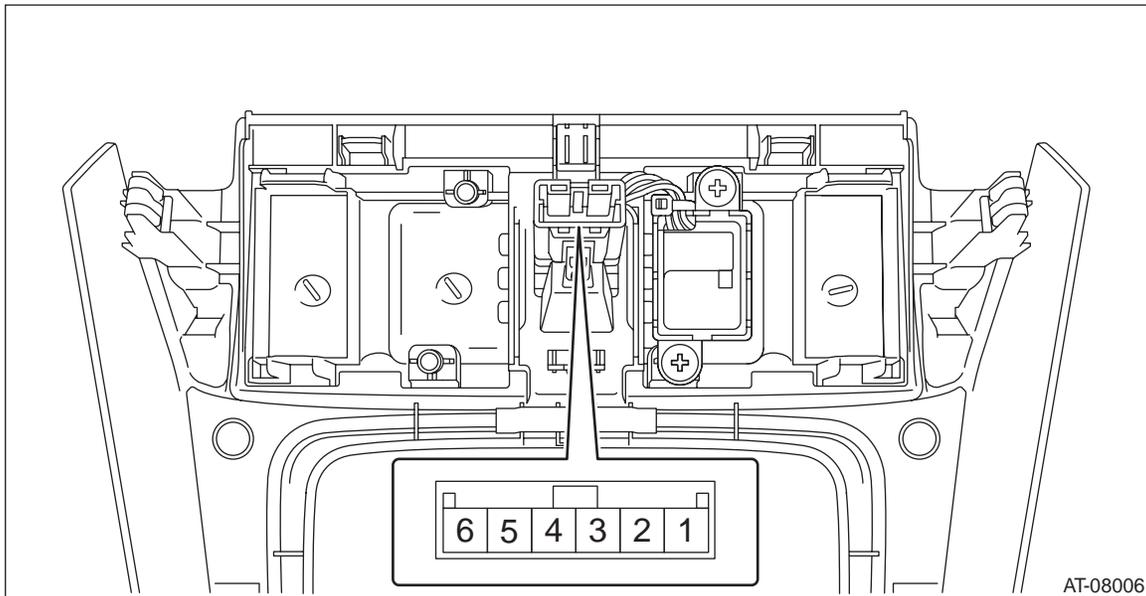
CONTINUOUSLY VARIABLE TRANSMISSION

C: INSPECTION

1. CHECK SWITCH UNIT

Measure the resistance between harness connector terminals of the X MODE switch.

	Terminal No.	Standard
OFF (when measured without operating the switch)	No. 4 — No. 5	1 M Ω or more
ON (when measured with the switch held down)		Less than 1 Ω



2. CHECK X MODE SYSTEM

DIAGNOSIS:

It does not switch to X MODE.

CAUTION:

Note that the system performs the following controls when switching to X MODE.

1. When turning the engine OFF and then ON again, it switches to I (intelligent) mode although in the mode prior to engine OFF.
2. Switches to S (Sport) when the malfunction indicator light illuminates while the engine is running. In this case, switching to S# (Sport Sharp), I (Intelligent) or X is not available.
3. If there is a possible engine coolant or engine oil temperature overheat condition, it will not be possible to switch to X MODE. Switches to S (Sport) while driving in X MODE.
4. If the ignition switch is in ON position before starting engine, switching to X MODE is not available.

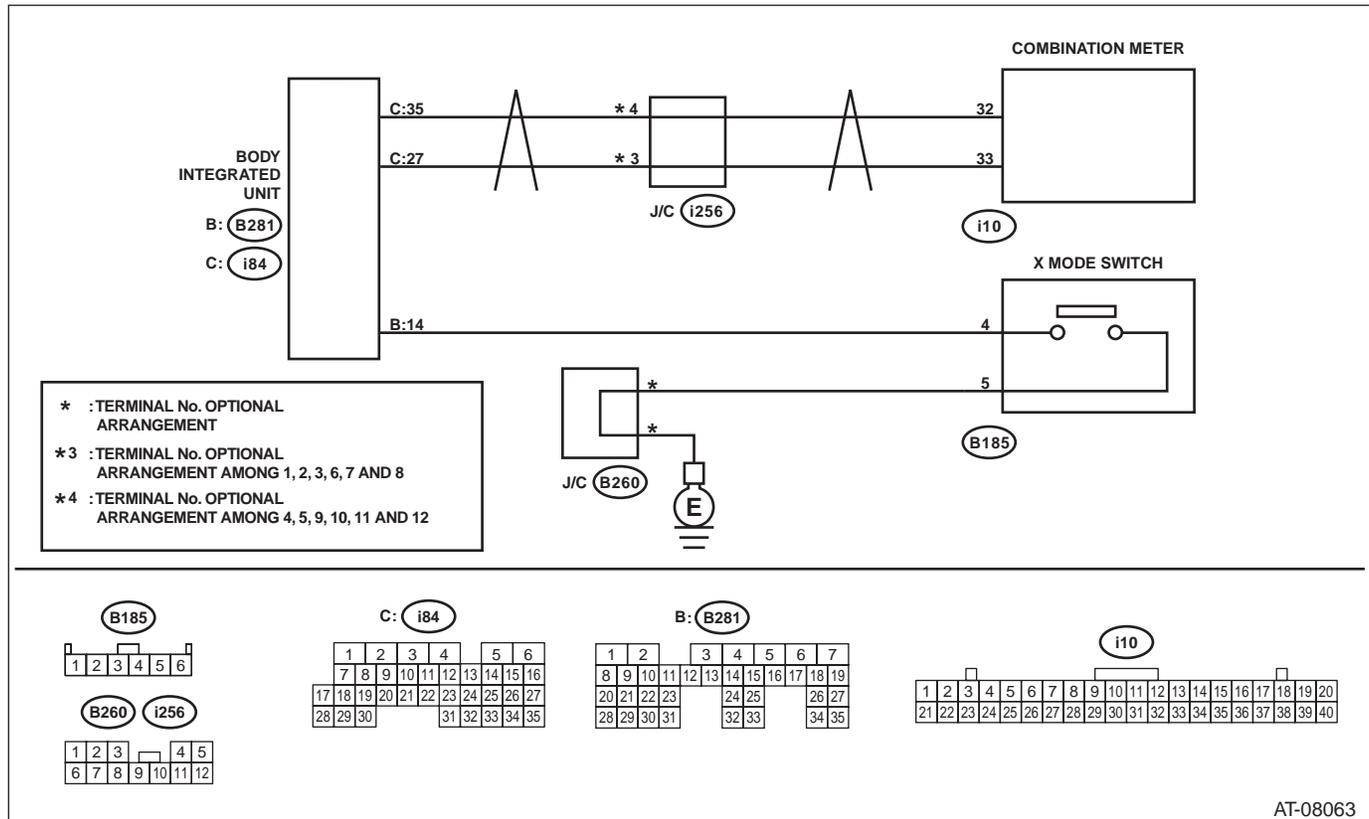
X MODE Switch

CONTINUOUSLY VARIABLE TRANSMISSION

3. PRESSING X MODE SWITCH DOES NOT CHANGE THE X MODE DISPLAY IN THE COMBINATION METER AND MODE DOES NOT SWITCH TO X MODE

WIRING DIAGRAM:

<Ref. to WI-138, WIRING DIAGRAM, CVT Control System.>



Step	Check	Yes	No
1 CHECK X MODE SWITCH. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from body integrated unit. 3) Measure the resistance when the X MODE switch is operated. Connector & terminal (B281) No. 14 — Chassis ground:	Does the resistance change as below? 1 MΩ or more → less than 10 Ω	Go to step 5.	Go to step 2.
2 CHECK HARNESS BETWEEN BODY INTEGRATED UNIT AND X MODE SWITCH CONNECTOR. Measure the resistance of harness between the body integrated unit connector and X MODE switch connector. Connector & terminal (B281) No. 14 — (B185) No. 4:	Is the resistance less than 10 Ω?	Go to step 3.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between the body integrated unit connector and X MODE switch connector • Poor contact of connector

X MODE Switch

CONTINUOUSLY VARIABLE TRANSMISSION

Step	Check	Yes	No
3 CHECK HARNESS BETWEEN BODY INTEGRATED UNIT AND X MODE SWITCH CONNECTOR. Measure the resistance of harness between X MODE switch connector and chassis ground. <i>Connector & terminal</i> <i>(B185) No. 4 — Chassis ground:</i>	Is the resistance 1 M Ω or more?	Go to step 4.	Repair the ground short circuit of harness between body integrated unit and X MODE switch connector.
4 CHECK HARNESS BETWEEN X MODE SWITCH CONNECTOR AND CHASSIS GROUND. Measure the resistance between body integrated unit connector and chassis ground. <i>Connector & terminal</i> <i>(B185) No. 5 — Chassis ground:</i>	Is the resistance less than 10 Ω ?	Repair the poor contact of X MODE switch connector. Replace the X MODE switch if faulty. <Ref. to CVT(TR580)-137, X MODE Switch.> <Ref. to CVT(TR690)-123, X MODE Switch.>	Repair the harness and connector. NOTE: In this case, repair the following item: <ul style="list-style-type: none"> • Open circuit in harness between X MODE switch connector and chassis ground • Poor contact of joint connector
5 RECHECK FAULT. 1) Connect all connectors. 2) Switch to X MODE.	Is there any fault?	Repair poor contact in the body integrated unit connector. Replace the meter case assembly if defective.	The circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.

X MODE Switch

CONTINUOUSLY VARIABLE TRANSMISSION

4. WHEN SWITCHED TO X MODE, "S", "I", "S#" OR "X" MODE DISPLAY IN COMBINATION METER FLASHES IN APPROX. 5 SECONDS

Step	Check	Yes	No
1 CHECK DTC.	Is DTC displayed?	Check the appropriate DTC using the "List of Diagnostic Trouble Code (DTC)" concerning the respective units.	Go to step 2.
2 CHECK COMBINATION METER AND CLOCK DISPLAY. Check for abnormal displays other than "S", "I", "S#" or "X" flashing. Examples: <ul style="list-style-type: none"> • Malfunction indicator light illuminates. • Fuel economy display area is not ON. NOTE: The system enters into fail mode with ignition ON and engine OFF.	Is there an abnormal display other than "S", "I", "S#" or "X" flashing?	For the diagnostic procedure, refer to LAN section.<Ref. to LAN(diag)-2, Basic Diagnostic Procedure.>	Go to step 3.
3 CHECK ECM AND COMBINATION METER.	Is the part number of ECM and combination meter correct?	Replace the meter case assembly.<Ref. to IDI-18, Combination Meter.>	Replace ECM or meter case assembly with the one with the correct part number.<Ref. to FU(H4DOTC)-135, Engine Control Module (ECM).> <Ref. to FU(H4DO)-91, Engine Control Module (ECM).> <Ref. to IDI-18, Combination Meter.>

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X MODE Switch

CONTINUOUSLY VARIABLE TRANSMISSION

5. WHEN SWITCHED TO X MODE, “S”, “I”, “S#” OR “X” MODE DISPLAY IN COMBINATION METER FLASHES

NOTE:

In this case, there may be a fault other than in X MODE system.

Step	Check	Yes	No
1 CHECK MALFUNCTION INDICATOR LIGHT. 1) Start the engine. 2) Check if malfunction indicator light illuminates.	Does the malfunction indicator light illuminate?	Read the DTC using Subaru Select Monitor and check the indicated DTC. <Ref. to EN(H4DOTC)(diag)-44, Read Diagnostic Trouble Code (DTC).> <Ref. to EN(H4DO)(diag)-43, Read Diagnostic Trouble Code (DTC).>	Go to step 2.
2 CHECK COOLANT TEMPERATURE WARNING LIGHT. 1) Turn the ignition switch to ON. 2) Check the coolant temperature warning light.	Does it indicate overheating?	Inspect for the cause of overheating and repair.	Go to step 3.
3 CHECK ENGINE OIL TEMPERATURE. 1) Turn the ignition switch to ON. 2) Check the value of «Oil Temperature» using Subaru Select Monitor. NOTE: For detailed operation procedures, refer to “Current Data Display For Engine”. <Ref. to EN(H4DOTC)(diag)-37, Subaru Select Monitor.> <Ref. to EN(H4DO)(diag)-36, Subaru Select Monitor.>	Is the value of «Oil Temperature» 117°C (243°F) or more?	Inspect and repair the cause of engine oil temperature rise. NOTE: Ask the customer whether the vehicle has experienced a long drive in low gear or towing of heavy load. If not, drive the vehicle again after the engine oil temperature lowers, and check if the engine oil temperature rises.	Go to step 4.
4 CHECK COMBINATION METER INDICATION. 1) Start the engine. 2) Switch to X MODE. 3) Check X MODE display in the combination meter.	Does “S”, “I”, “S#” or “X” display in the combination meter flash?	Replace the meter case assembly. <Ref. to IDI-18, Combination Meter.>	Perform test operation and check the malfunction indicator light, engine coolant temperature warning light, and engine oil temperature. If they are normal, finish the diagnosis.

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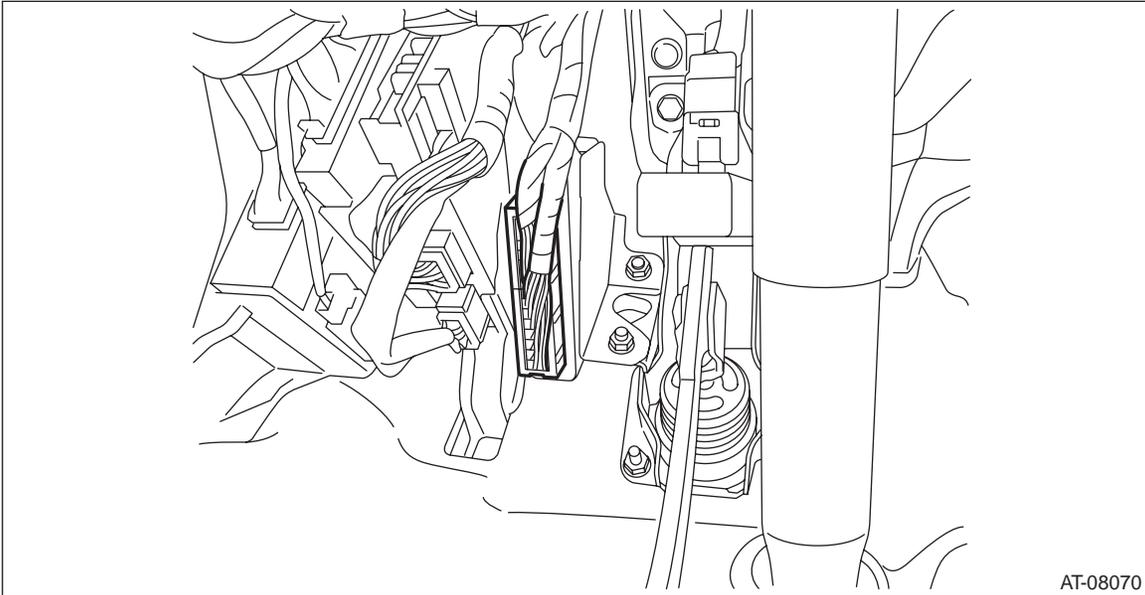
Transmission Control Module (TCM)

CONTINUOUSLY VARIABLE TRANSMISSION

23. Transmission Control Module (TCM)

A: REMOVAL

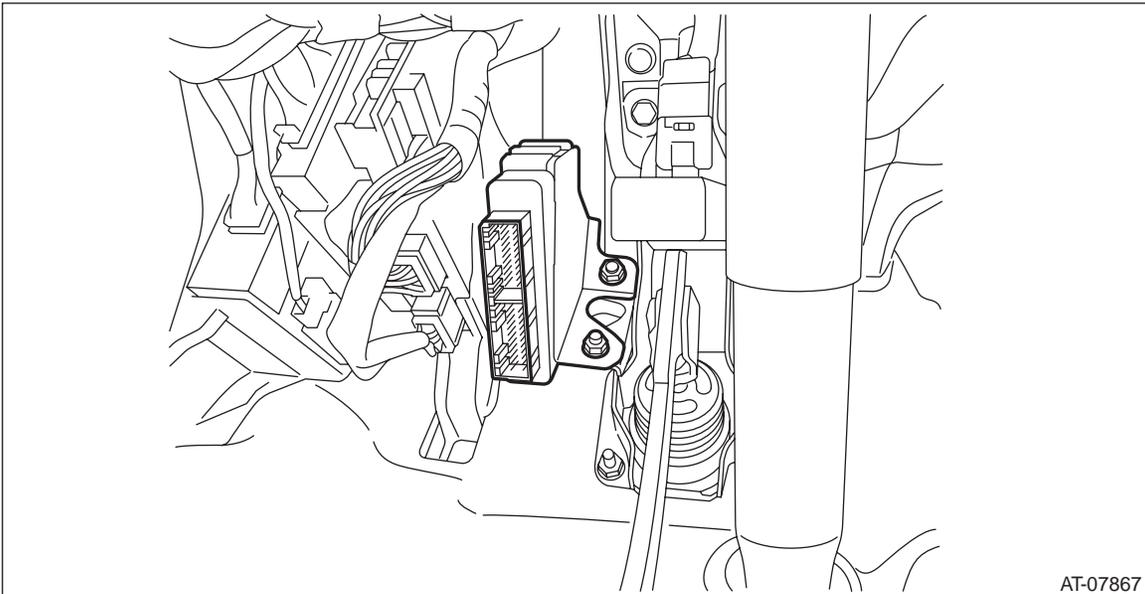
- 1) Disconnect the ground cable from battery.
- 2) Remove the bulkhead harness connector from TCM.



- 3) Remove the TCM.

NOTE:

Replace the TCM and bracket as a set.



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Transmission Control Module (TCM)

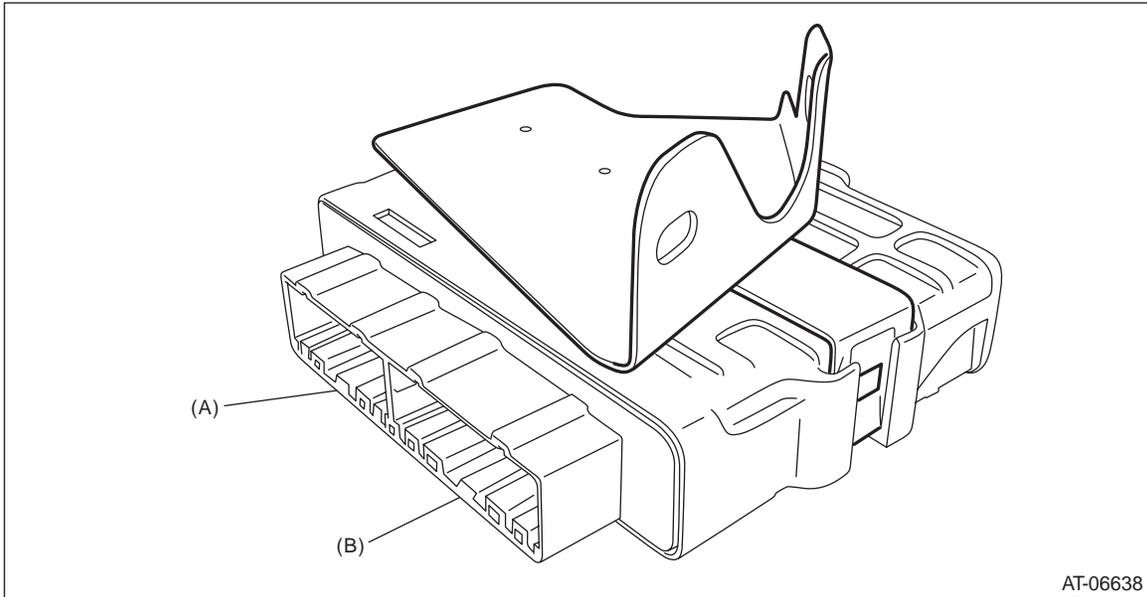
CONTINUOUSLY VARIABLE TRANSMISSION

B: INSTALLATION

1) Install the TCM to the bracket.

CAUTION:

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



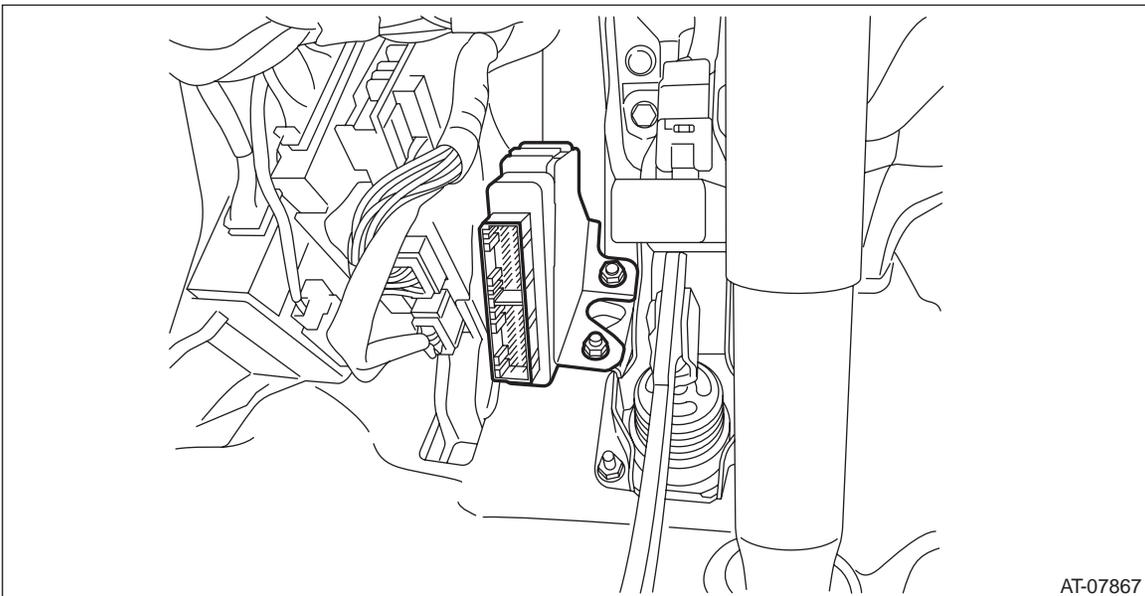
(A) 22-pin connector side

(B) 26-pin connector side

2) Install the TCM.

Tightening torque:

7.5 N·m (0.8 kgf·m, 5.5 ft·lb)



3) Install the harness connector to TCM.

4) Perform AT learning mode. <Ref. to CVT(diag)-30, Learning Control.>

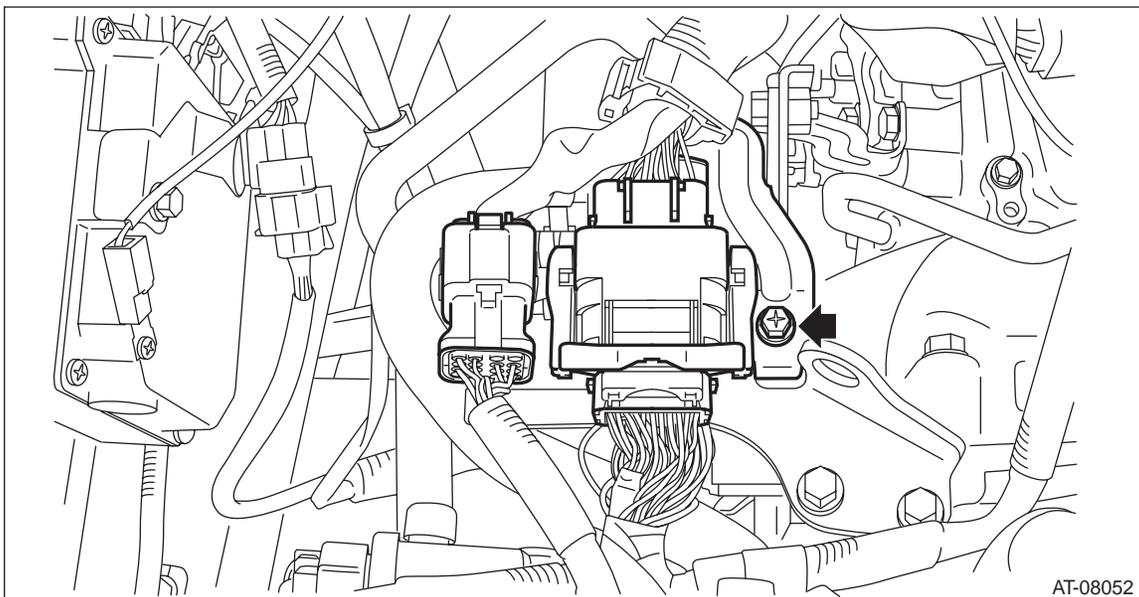
24.CVTF Cooler (With Warmer Function)

A: REMOVAL

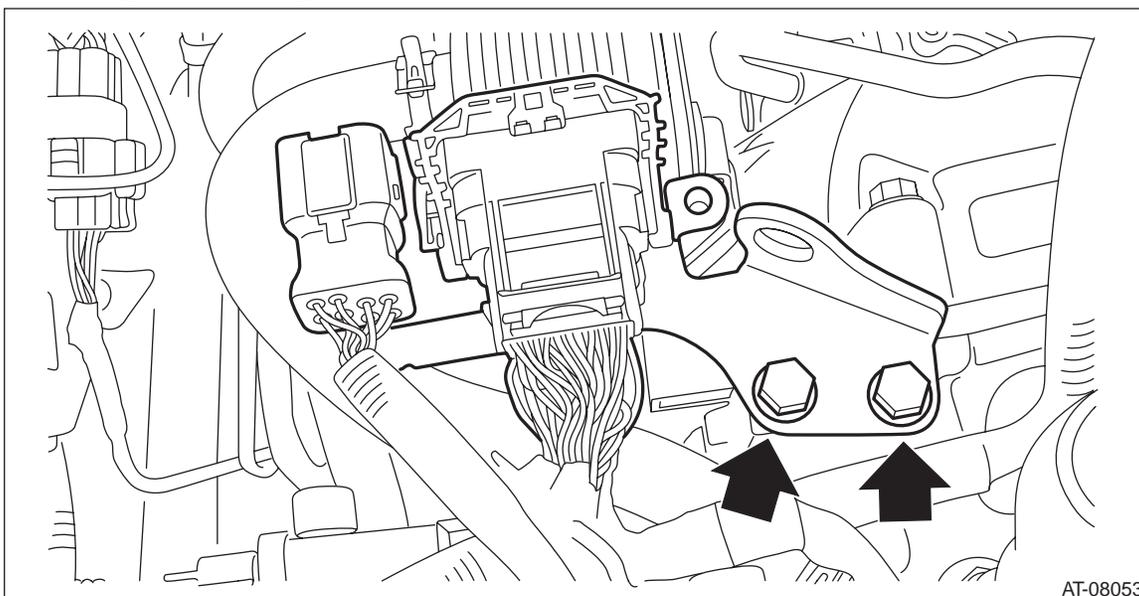
CAUTION:

If the CVTF and engine coolant is spilt over exhaust pipe, wipe it off with cloth to avoid emitting smoke or causing a fire.

- 1) Disconnect the ground cable from battery.
- 2) Drain engine coolant.<Ref. to CO(H4DO)-14, REPLACEMENT, Engine Coolant.>
- 3) Remove the air intake boot assembly.<Ref. to IN(H4DO)-11, REMOVAL, Air Intake Boot.>
- 4) Remove the harness bracket, and then remove the engine harness connector.



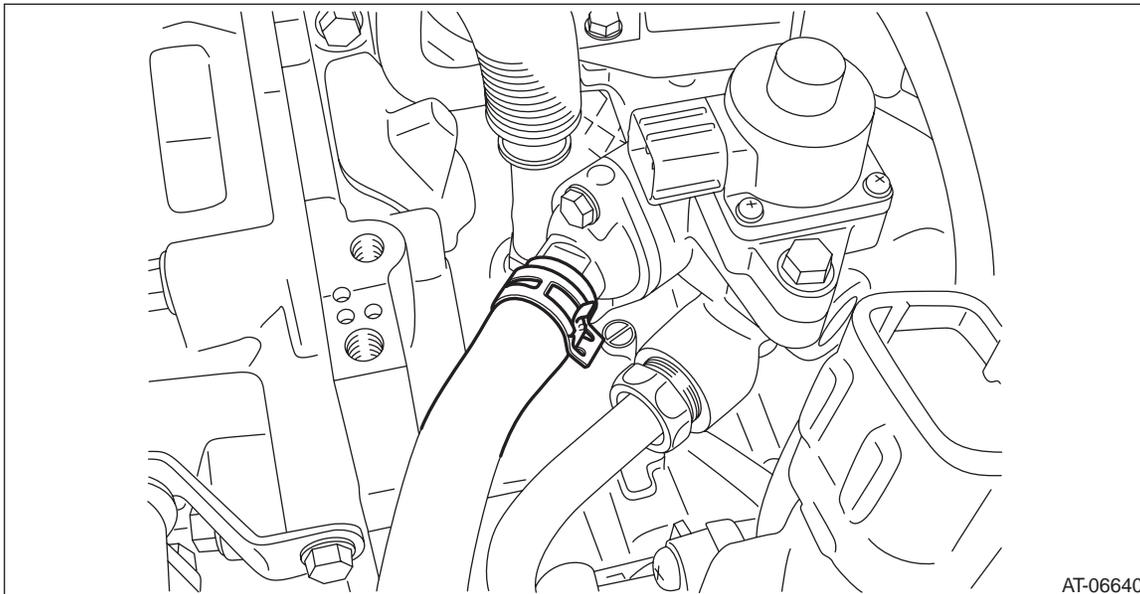
- 5) Disconnect the EGR control valve harness connector, throttle position sensor harness connector and manifold absolute pressure sensor harness connector.
- 6) Remove the engine rear hanger.



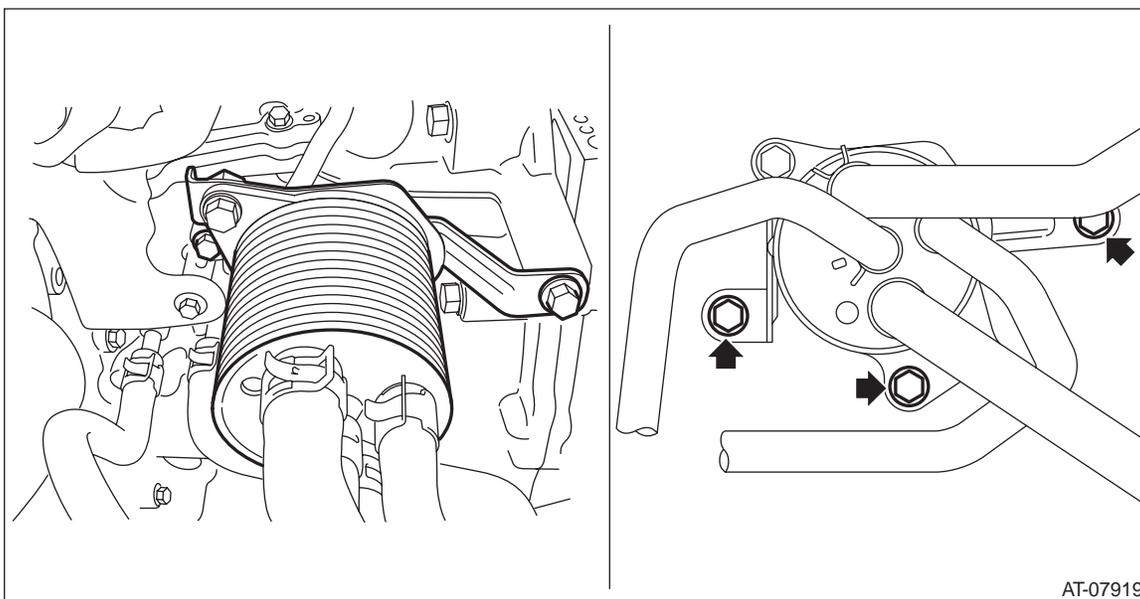
CVTF Cooler (With Warmer Function)

CONTINUOUSLY VARIABLE TRANSMISSION

7) Disconnect the engine coolant outlet hose.



8) Remove the CVTF cooler (with warmer feature) from the transmission.

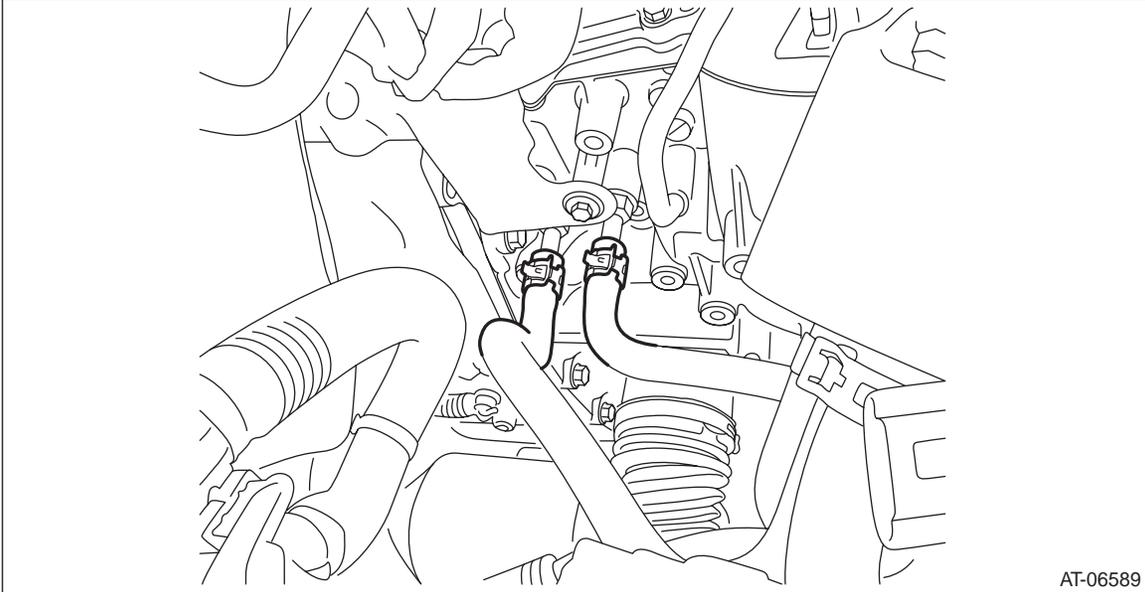


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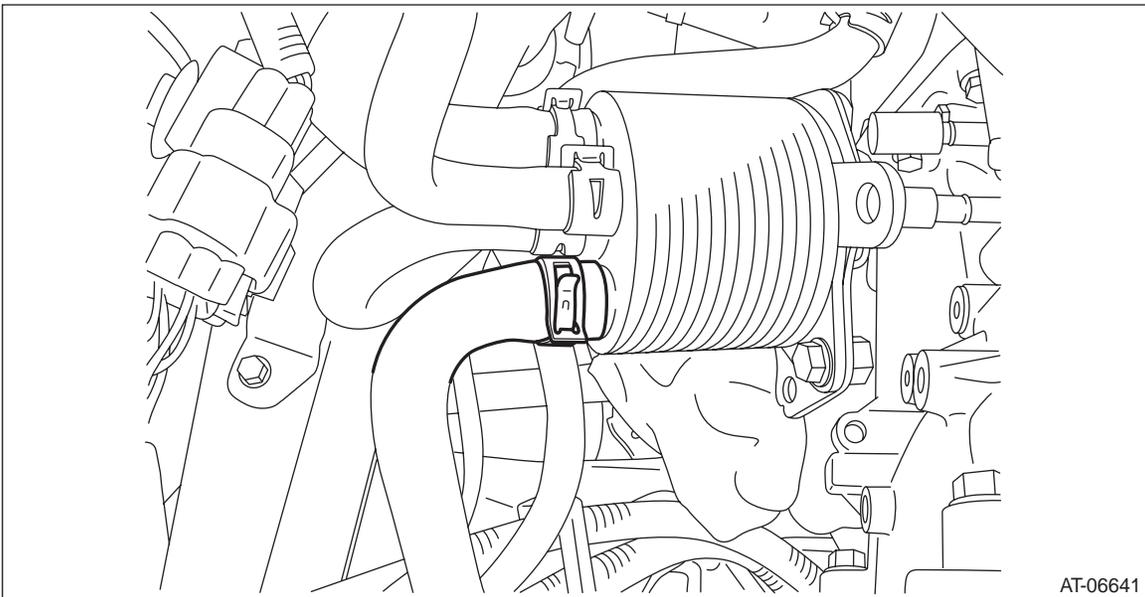
CVTF Cooler (With Warmer Function)

CONTINUOUSLY VARIABLE TRANSMISSION

- 9) Remove the CVTF inlet hose and outlet hose from the pipe on the transmission side.



- 10) Disconnect the engine coolant inlet hose from the CVTF cooler (with warmer feature) assembly.

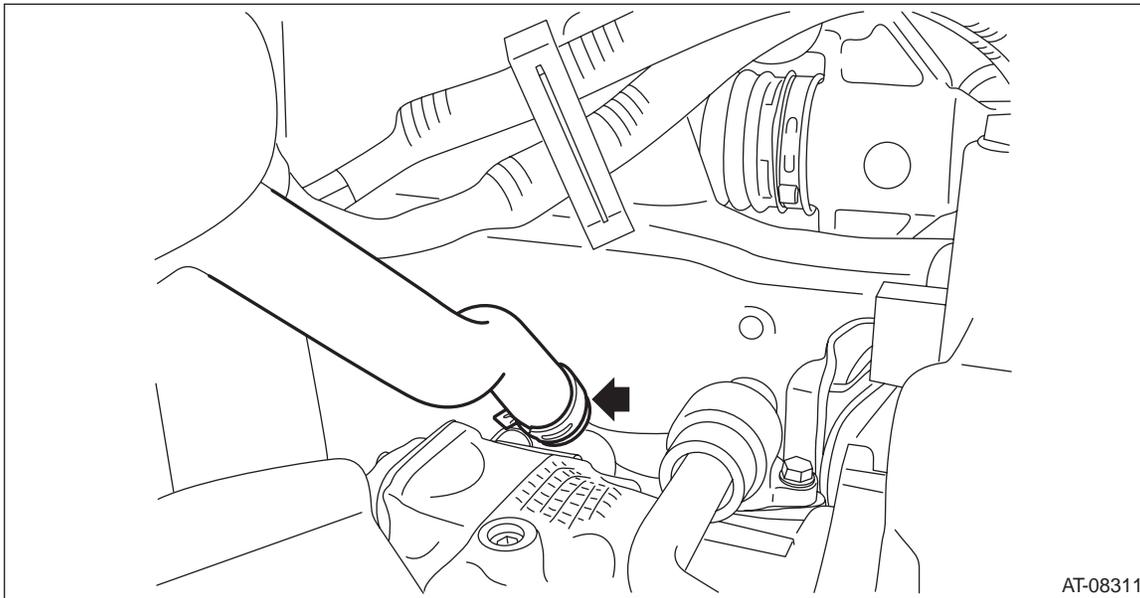


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CVTF Cooler (With Warmer Function)

CONTINUOUSLY VARIABLE TRANSMISSION

11) Remove the engine coolant inlet hose from the engine coolant pipe.

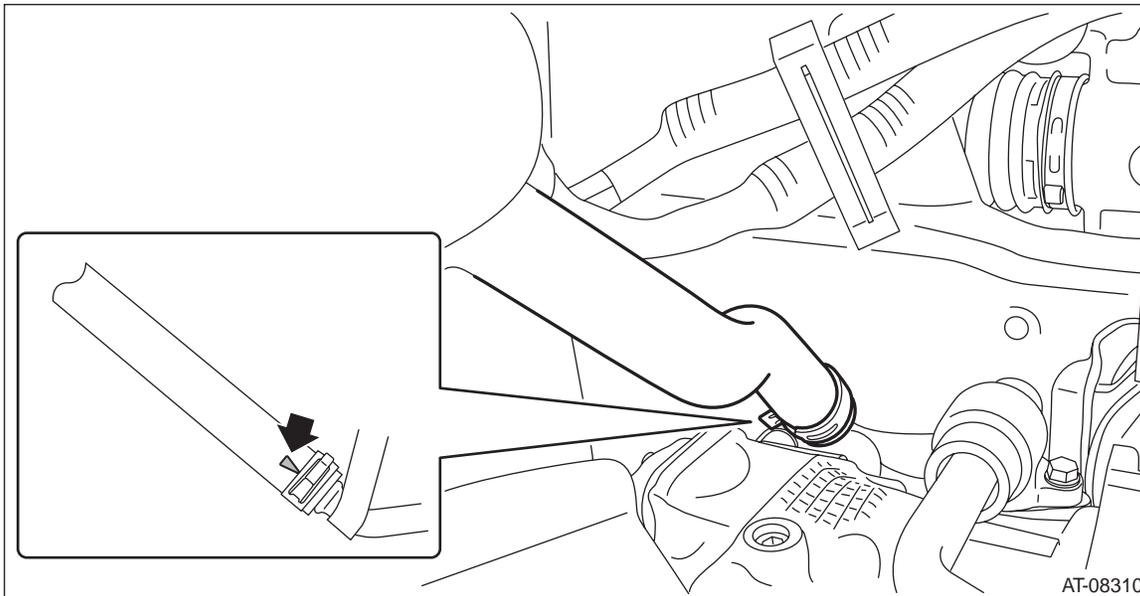


B: INSTALLATION

1) Install the engine coolant inlet hose to the engine coolant pipe.

NOTE:

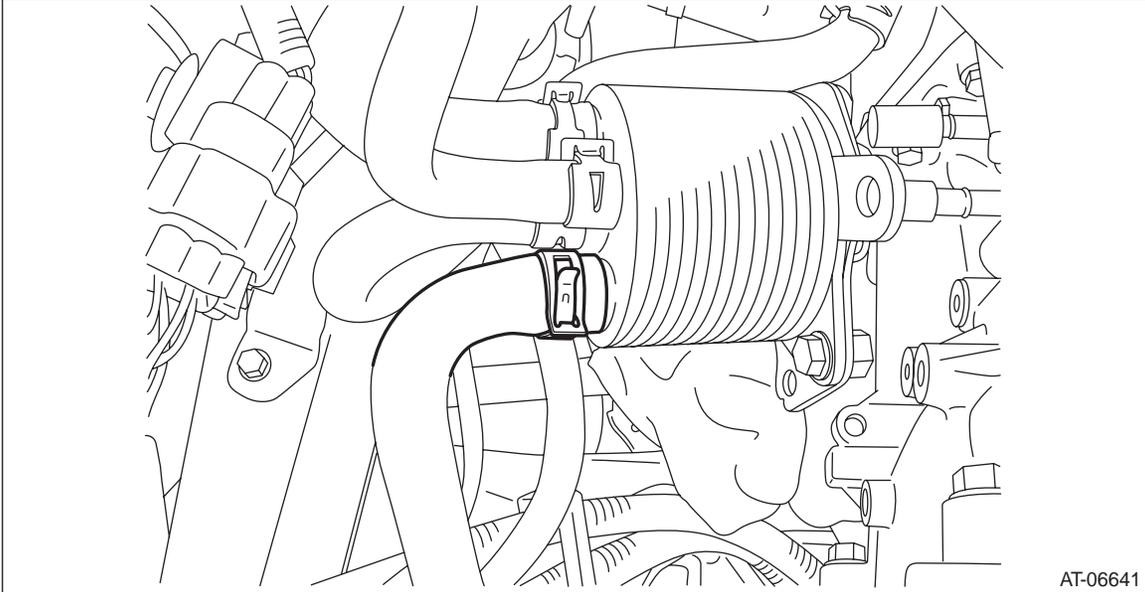
With the triangle mark on the engine coolant inlet hose facing the vehicle outside, install the hose to the engine side pipe.



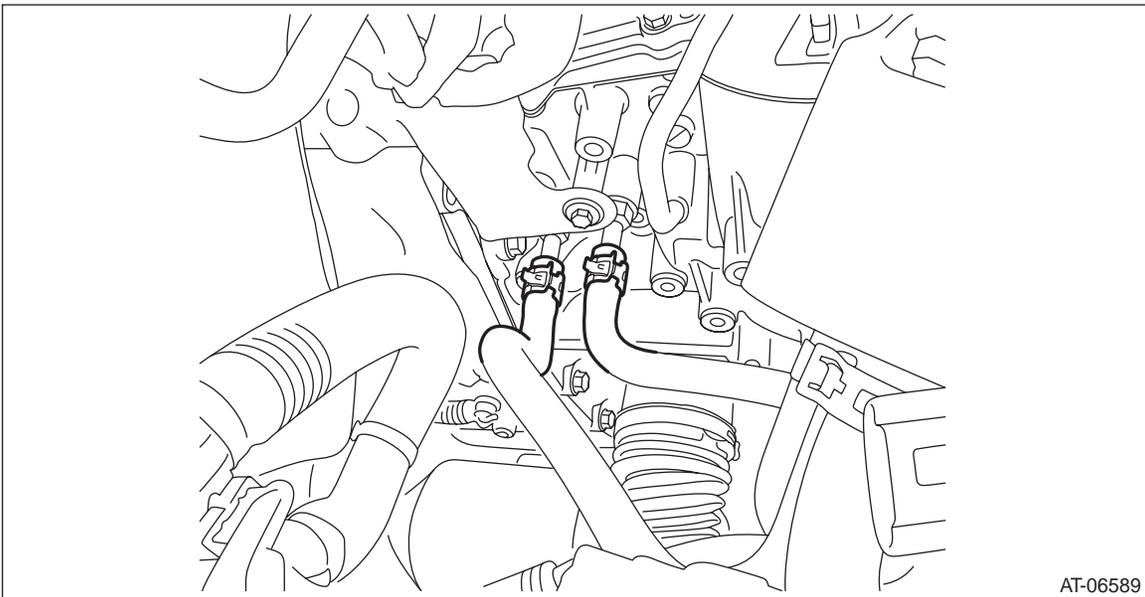
CVTF Cooler (With Warmer Function)

CONTINUOUSLY VARIABLE TRANSMISSION

- 2) Install the engine coolant inlet hose to the CVTF cooler (with warmer feature) assembly.



- 3) Install the CVTF inlet hose and CVTF outlet hose to transmission.



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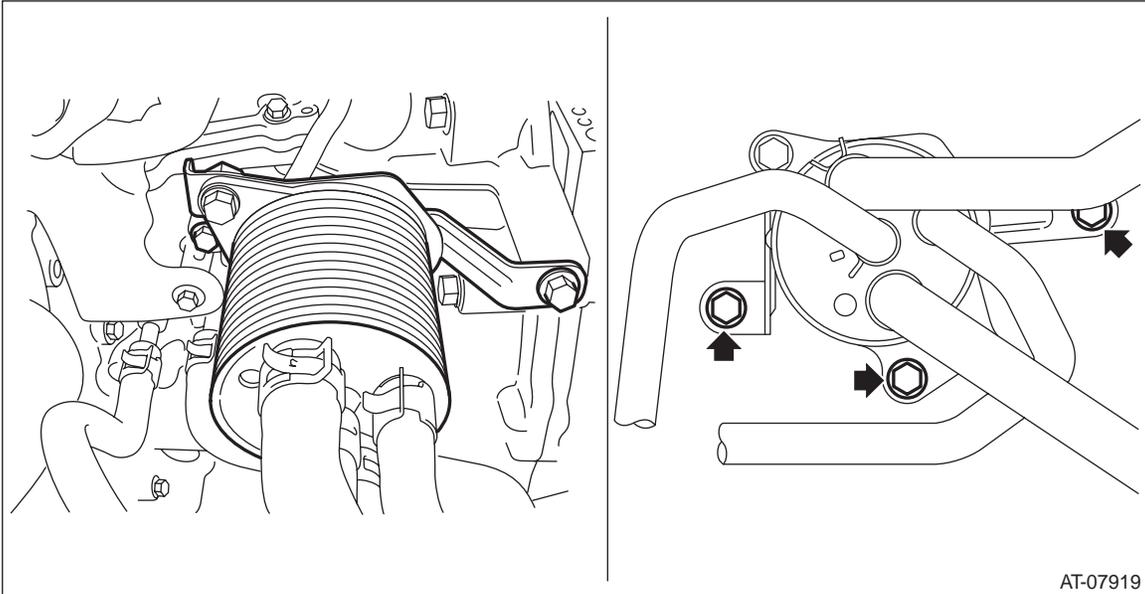
CVTF Cooler (With Warmer Function)

CONTINUOUSLY VARIABLE TRANSMISSION

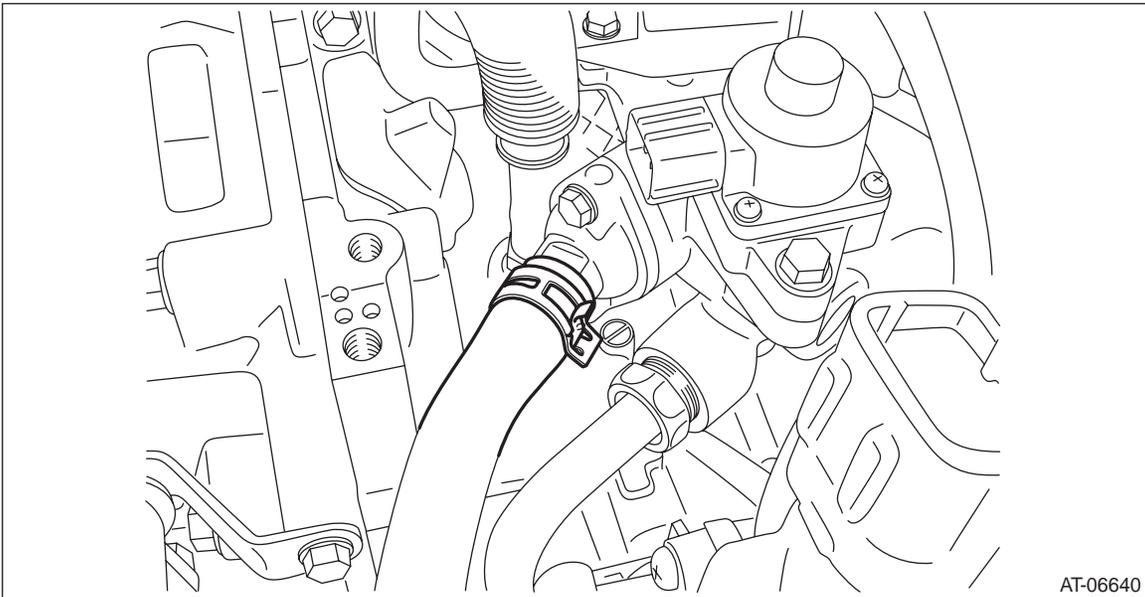
4) Install the CVTF cooler (with warmer feature) to the transmission.

Tightening torque:

23 N·m (2.3 kgf·m, 17.0 ft·lb)



5) Connect the engine coolant outlet hose.



6) Check installation condition of each hose.

- Make sure the hoses do not interfere with each other or with other components.
- Check each hose for bent, excess curve, and twisting conditions.

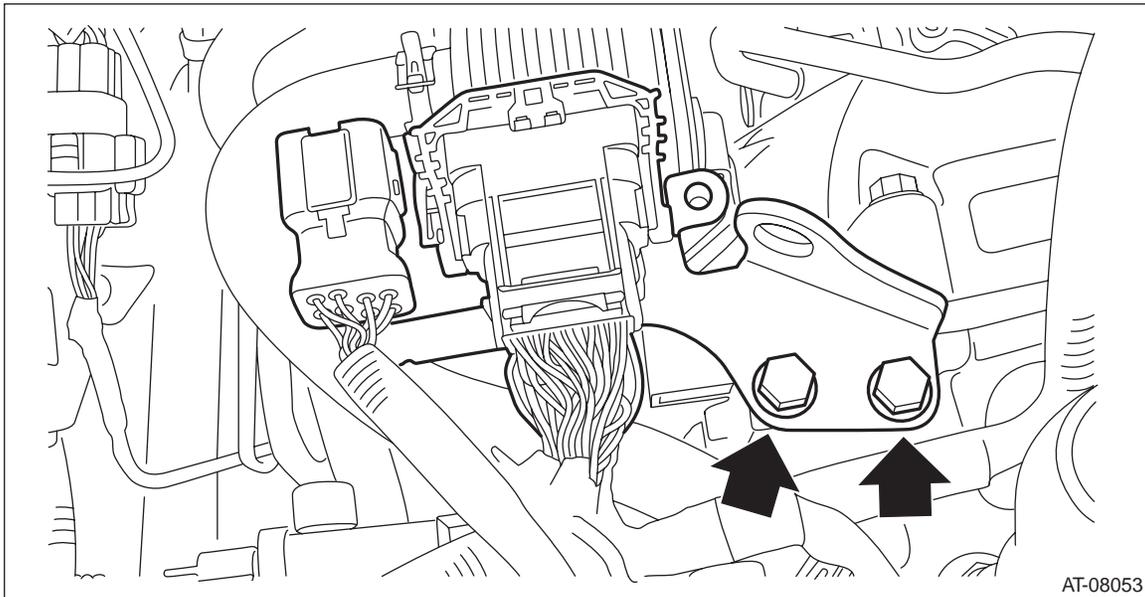
CVTF Cooler (With Warmer Function)

CONTINUOUSLY VARIABLE TRANSMISSION

7) Install the engine rear hanger.

Tightening torque:

21 N·m (2.1 kgf-m, 15.5 ft-lb)



8) Connect the EGR control valve harness connector, throttle position sensor harness connector and manifold absolute pressure sensor harness connector.

9) Connect the engine harness connectors, then install the harness connector bracket.

Tightening torque:

7.5 N·m (0.8 kgf-m, 5.5 ft-lb)

10) Install the air intake boot assembly.<Ref. to IN(H4DO)-11, INSTALLATION, Air Intake Boot.>

11) Connect the battery ground terminal.

12) Fill engine coolant.<Ref. to CO(H4DO)-14, REPLACEMENT, Engine Coolant.>

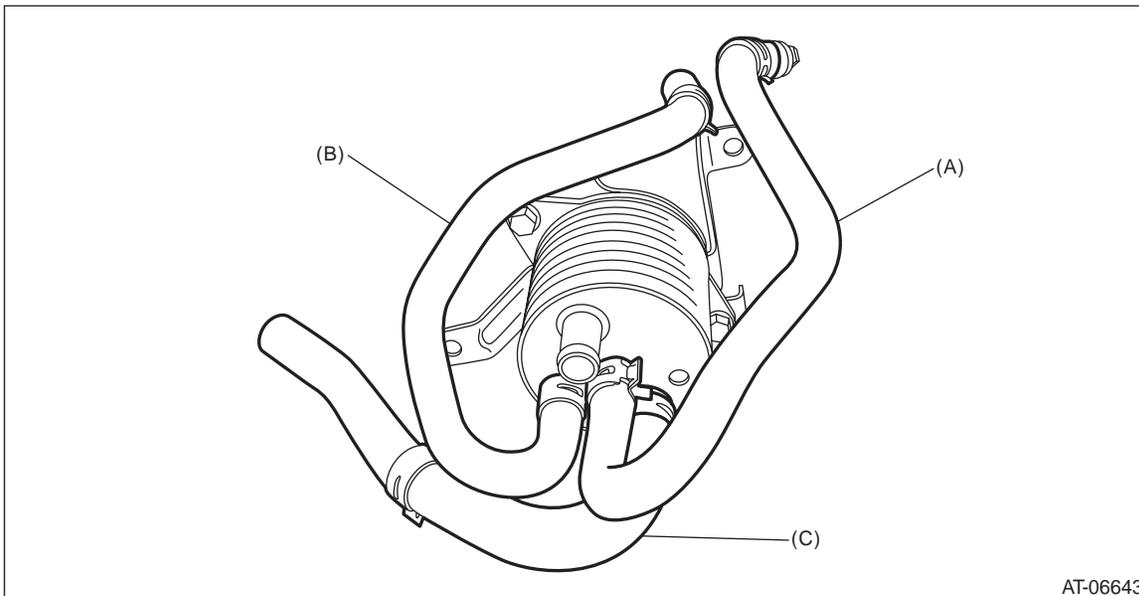
13) Adjust the CVTF level.<Ref. to CVT(TR580)-35, ADJUSTMENT, CVTF.>

CVTF Cooler (With Warmer Function)

CONTINUOUSLY VARIABLE TRANSMISSION

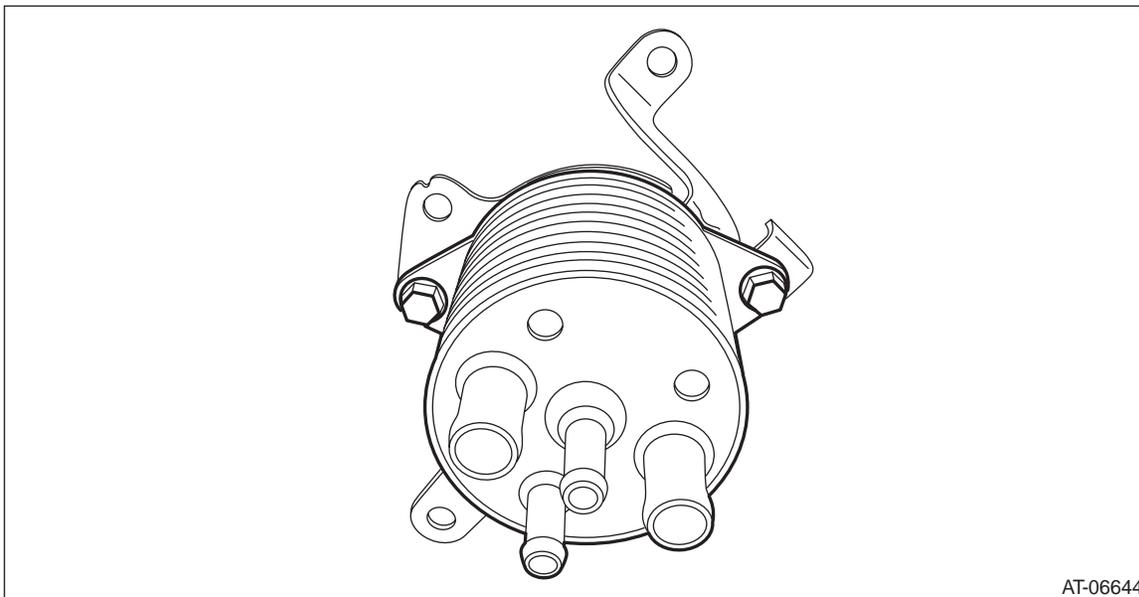
C: DISASSEMBLY

1) Remove the hoses from the CVTF cooler (with warmer feature).



- (A) CVTF cooler inlet hose
- (B) CVTF cooler outlet hose
- (C) Engine coolant outlet hose

2) Remove the bracket from the CVTF cooler (with warmer feature).



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CVTF Cooler (With Warmer Function)

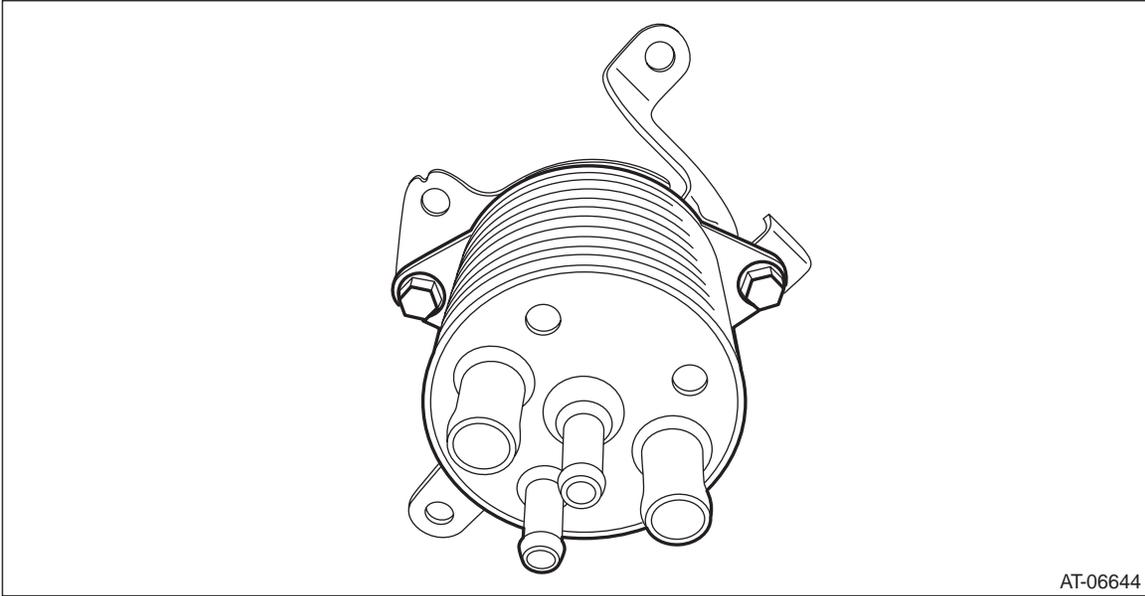
CONTINUOUSLY VARIABLE TRANSMISSION

D: ASSEMBLY

1) Attach the bracket.

Tightening torque:

23 N·m (2.3 kgf·m, 17.0 ft·lb)



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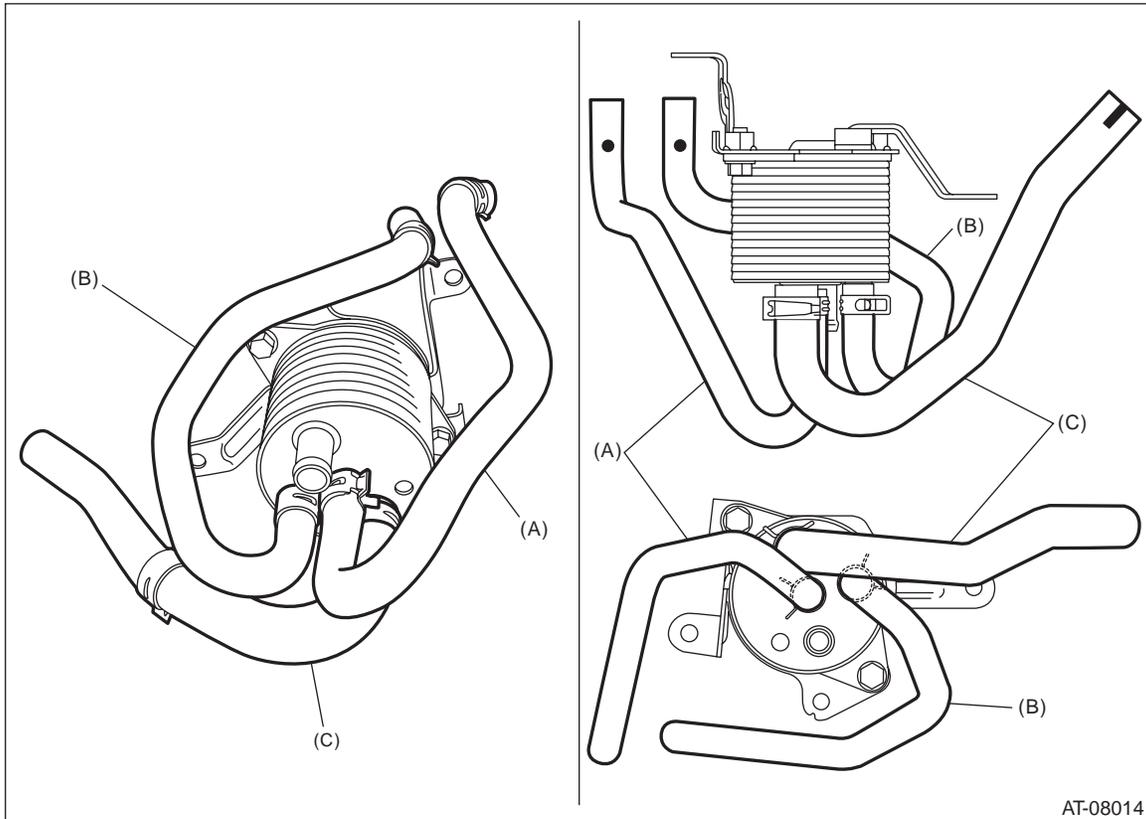
CVTF Cooler (With Warmer Function)

CONTINUOUSLY VARIABLE TRANSMISSION

2) Attach hoses to the CVTF cooler (with warmer feature).

NOTE:

- Use a new CVTF cooler hose.
- Install so that the CVTF cooler hose is not folded over, excessively bent or twisted.
- Insert the CVTF cooler hose to the specified position in the proper direction.



- (A) CVTF cooler inlet hose
- (B) CVTF cooler outlet hose
- (C) Engine coolant outlet hose

E: INSPECTION

Replace any faulty CVTF cooler hoses, CVTF cooler pipes and clamps found in the inspection below.

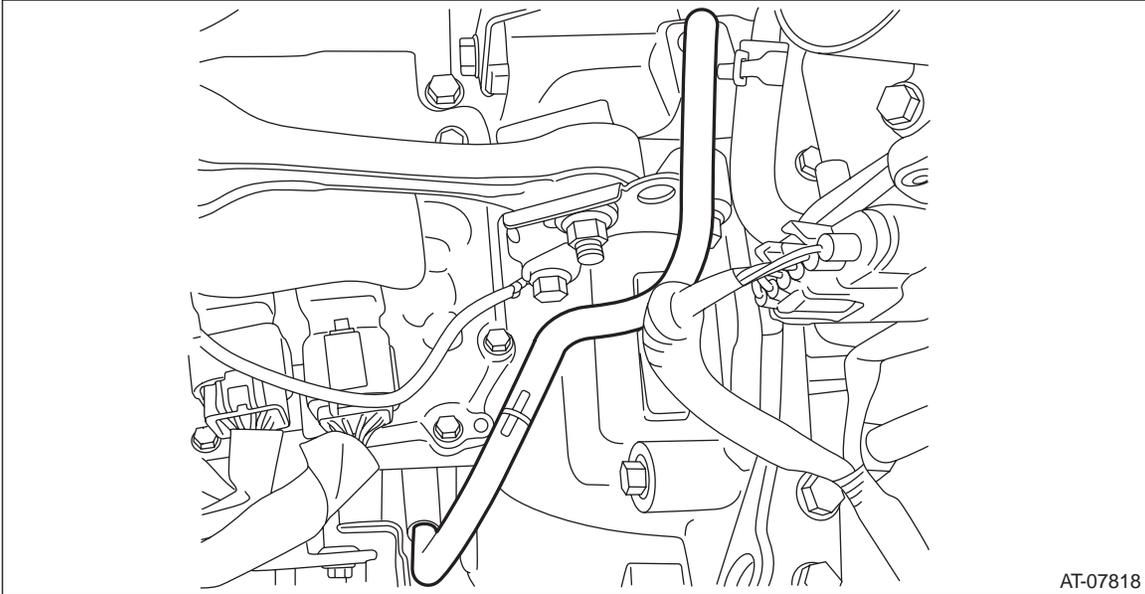
- 1) Check that there are no CVTF or engine coolant leaks from the connections.
- 2) Check the clamp for deformation.
- 3) Lightly bend the CVTF cooler hose and check for cracks in the surface or other damages.
- 4) Pinch the CVTF cooler hose with your fingers and check for poor elasticity. Also check for poor elasticity in the parts where the clamp was installed by pressing with your fingernail.
- 5) Check for peeling, cracks, and deformation at the tip of the hose.
- 6) Check the CVTF cooler (with warmer feature) for any damage.

25. Air Breather Hose

A: REMOVAL

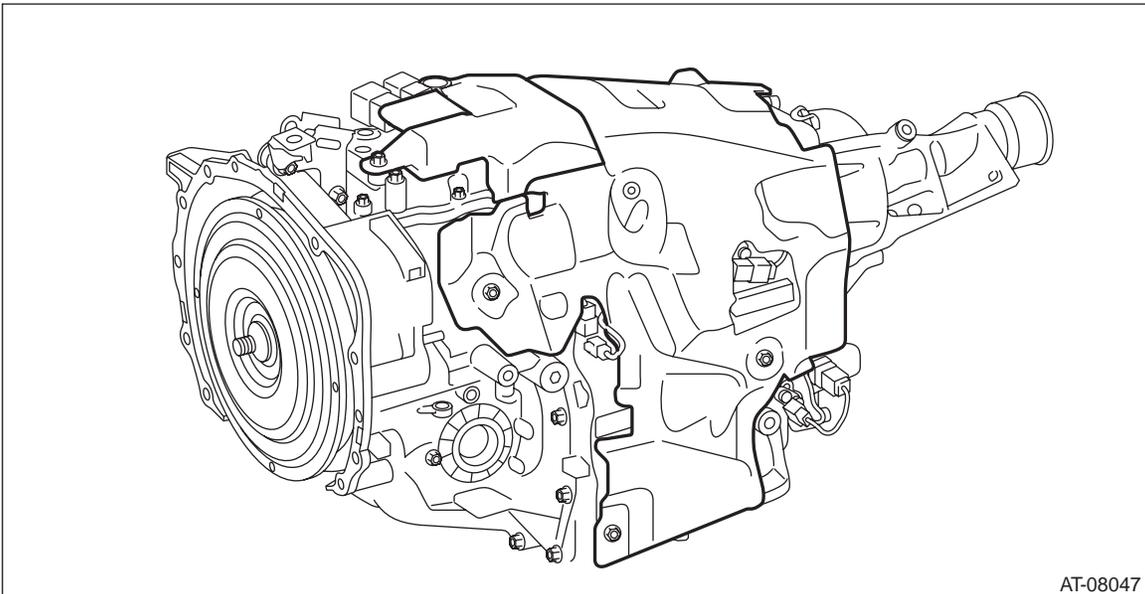
1. FRONT DIFFERENTIAL SIDE

- 1) Remove the air intake boot assembly. <Ref. to IN(H4DO)-11, REMOVAL, Air Intake Boot.>
- 2) Remove the air breather hose.



2. TRANSMISSION CASE SIDE

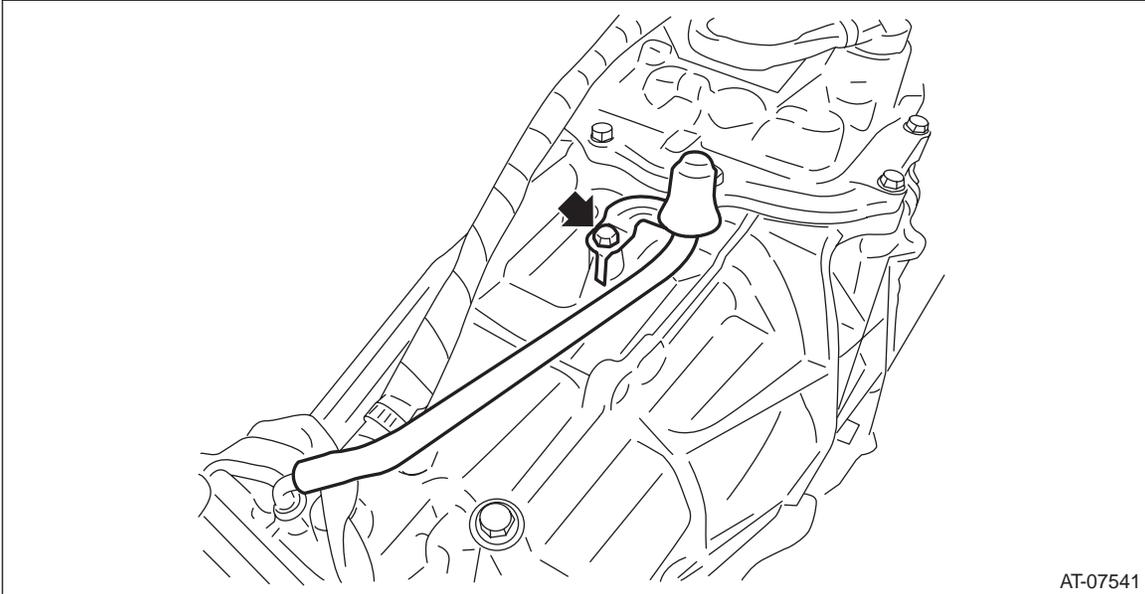
- 1) Remove the transmission assembly. <Ref. to CVT(TR580)-57, REMOVAL, Automatic Transmission Assembly.>
- 2) Remove the transmission case cover.



Air Breather Hose

CONTINUOUSLY VARIABLE TRANSMISSION

3) Remove the air breather hose.



AT-07541

4) Remove the air breather cap.

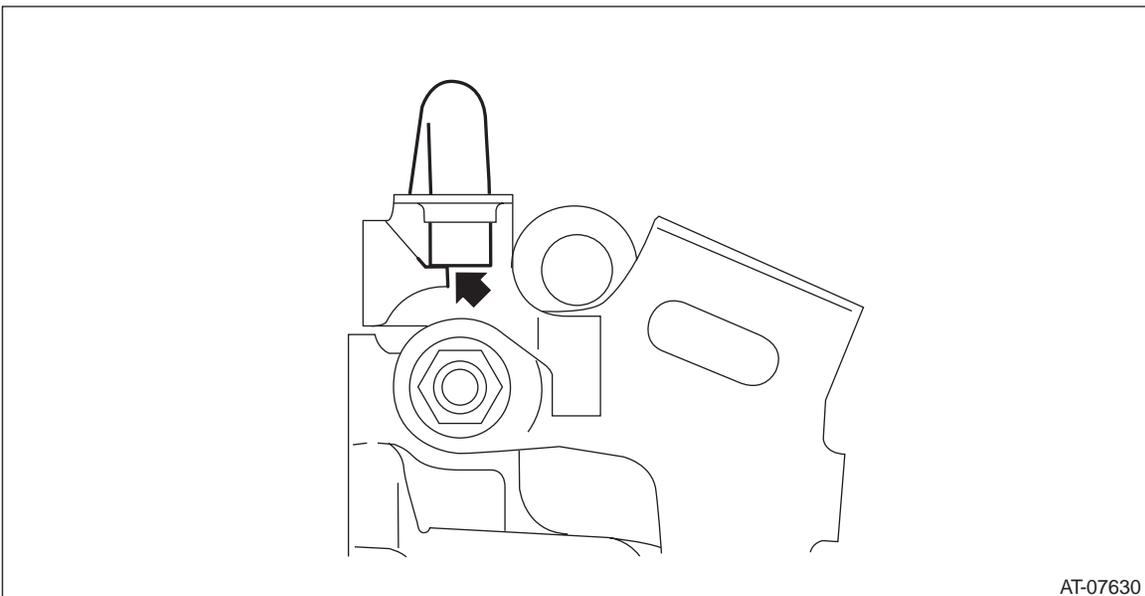
B: INSTALLATION

1. FRONT DIFFERENTIAL SIDE

Install in the reverse order of removal.

NOTE:

Securely insert the air breather hose until the hose end contacts the catch of the pitching stopper bracket.



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2. TRANSMISSION CASE SIDE

Install in the reverse order of removal.

Tightening torque:

Transmission case cover

8 N·m (0.8 kgf-m, 5.9 ft-lb)

Air breather hose

5 N·m (0.5 kgf-m, 3.7 ft-lb)

C: INSPECTION

Check the hose for peeling, crack or clogging.

Drive Plate

CONTINUOUSLY VARIABLE TRANSMISSION

26. Drive Plate

A: REMOVAL

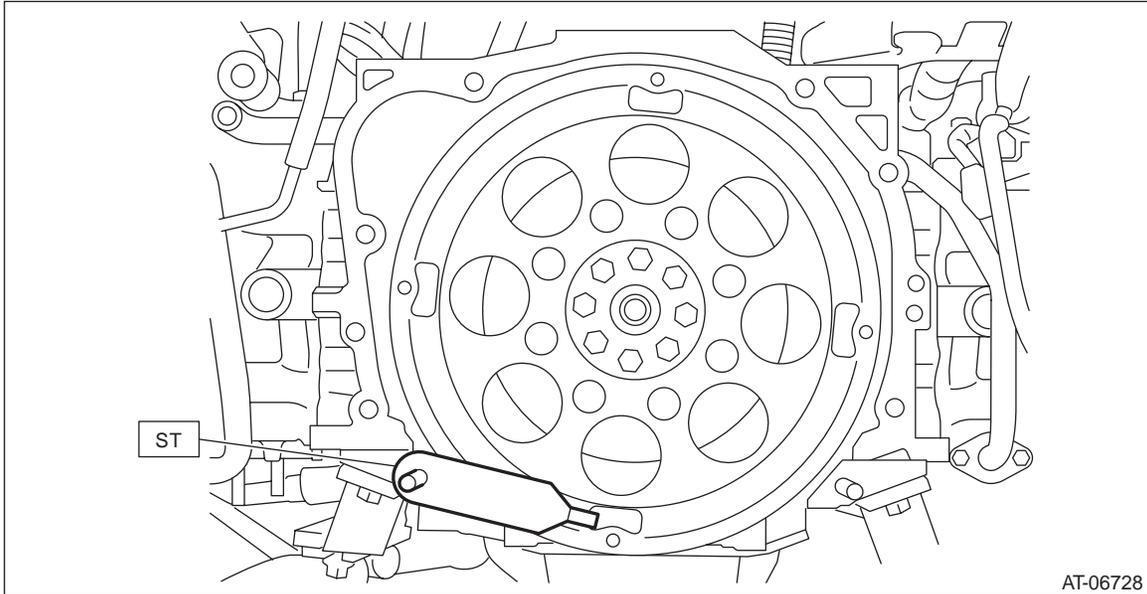
1) Remove the transmission assembly from the vehicle.<Ref. to CVT(TR580)-57, REMOVAL, Automatic Transmission Assembly.>

2) Set the ST.

NOTE:

Set the ST to the drive plate referring to the illustration.

ST 498497300 CRANKSHAFT STOPPER



3) Remove the drive plate and reinforcement drive plate.

B: INSTALLATION

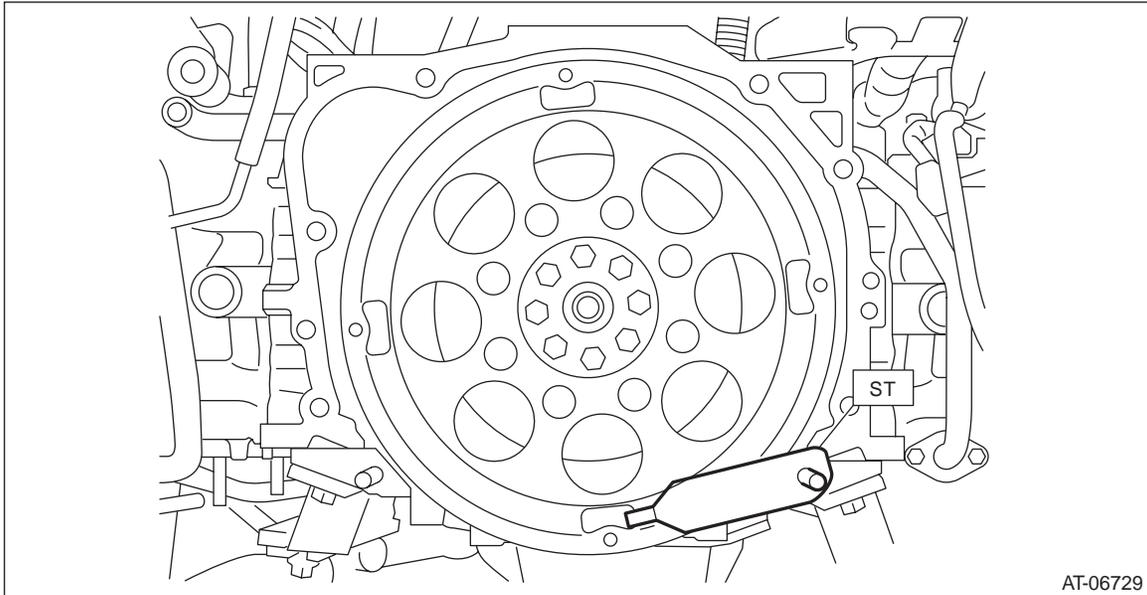
1) Temporarily install the drive plate and reinforcement drive plate.

NOTE:

Align the knock pin hole of the crankshaft position sensor plate to the knock pin of the crankshaft to secure the knock pin.

2) Set the ST.

ST 498497300 CRANKSHAFT STOPPER



Drive Plate

CONTINUOUSLY VARIABLE TRANSMISSION

3) Tighten the drive plate mounting bolt in two stages.

(1) Tighten the drive plate mounting bolt.

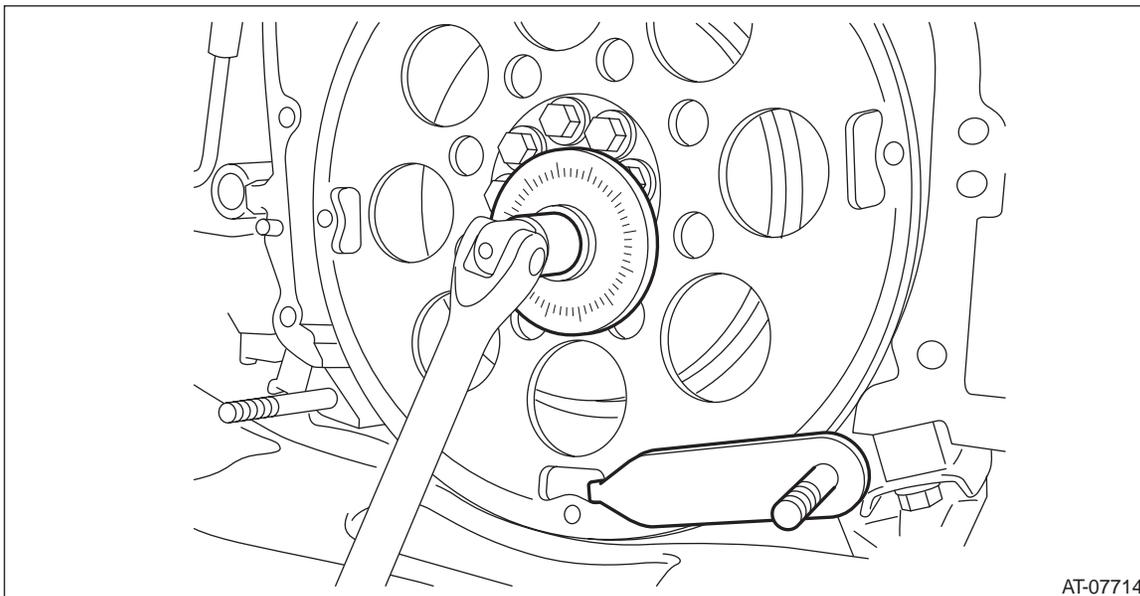
Tightening torque:

30 N·m (3.1 kgf-m, 22.1 ft-lb)

(2) While checking the tightening angle with the angle gauge, tighten the drive plate mounting bolts to the specified angle.

Tightening angle:

30° — 35°



4) Install the transmission assembly to the vehicle. <Ref. to CVT(TR580)-67, INSTALLATION, Automatic Transmission Assembly.>

C: INSPECTION

Check the drive cable for damage.

Torque Converter Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

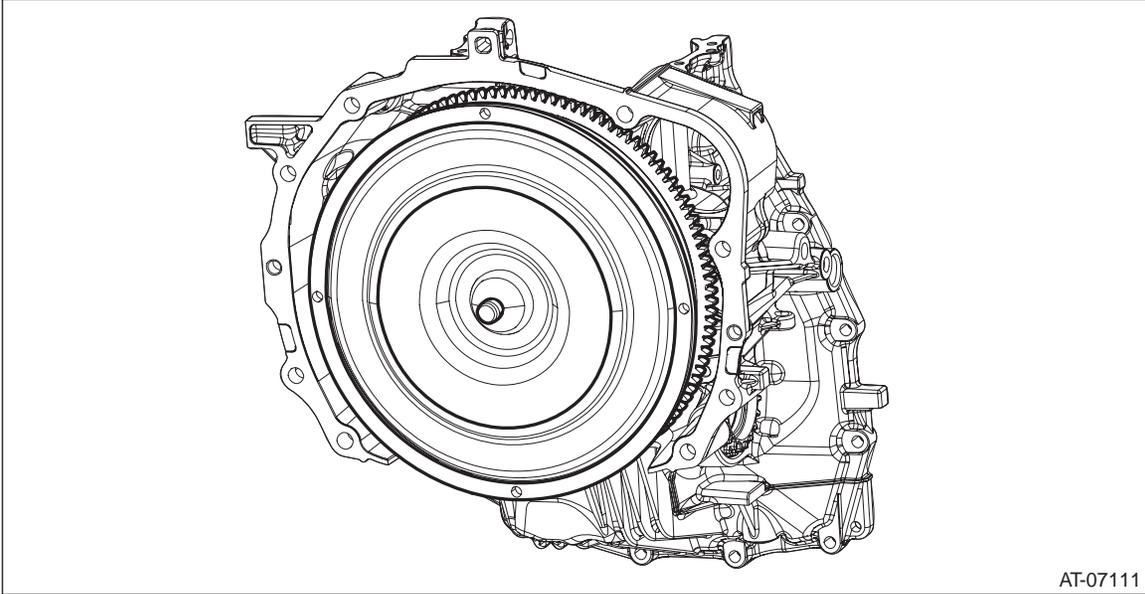
27. Torque Converter Assembly

A: REMOVAL

- 1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TR580)-57, REMOVAL, Automatic Transmission Assembly.>
- 2) Pull out the torque converter assembly horizontally.

CAUTION:

Do not scratch the inside of engaging parts.



AT-07111

- 3) Remove the O-ring from the input shaft.

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Torque Converter Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

B: INSTALLATION

1) Install the O-ring to the input shaft.

NOTE:

- Use new O-rings.
- Apply CVTF to the O-ring.

2) While holding the torque converter assembly by hand, carefully install it into the torque converter case.

NOTE:

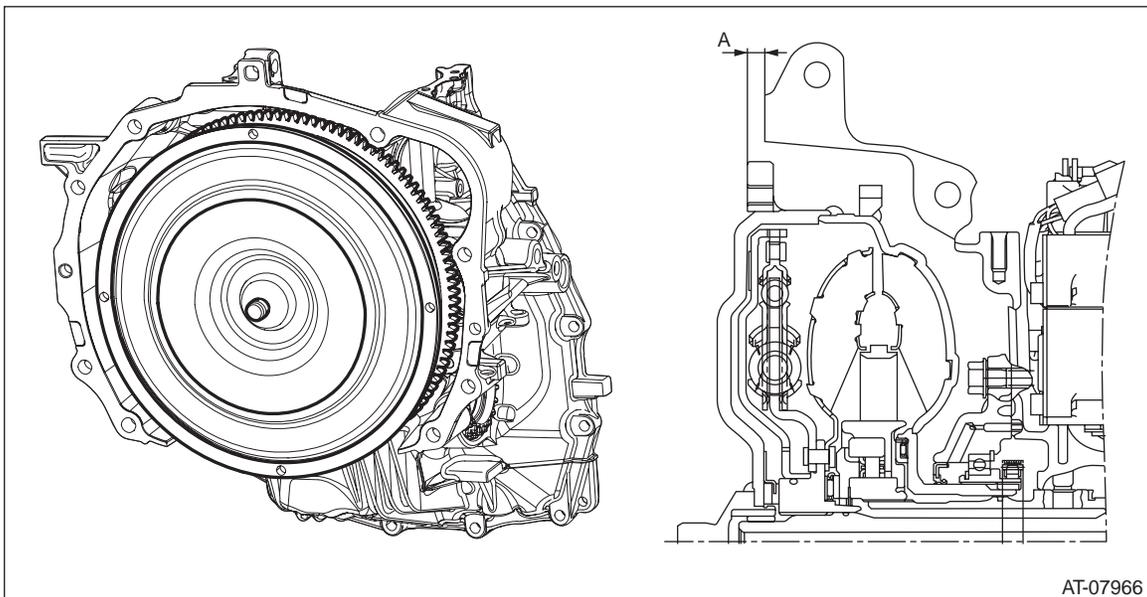
- Apply CVTF to the oil seal lip.
- Do not damage the oil seal and O-ring.

3) Engage the splines while gently rotating the torque converter assembly by hand, and securely insert the assembly.

4) Measure depth "A", from converter case end surface to drive plate contacting surface.

Standard (reference):

6.8 mm (0.268 in) or less



5) Install the transmission assembly to the vehicle. <Ref. to CVT(TR580)-67, INSTALLATION, Automatic Transmission Assembly.>

C: INSPECTION

- Check the protrusion of torque converter center (front boss) is not deformed or damaged.
- Check the ring gear and exterior for break or damage.

28. Preparation for Overhaul

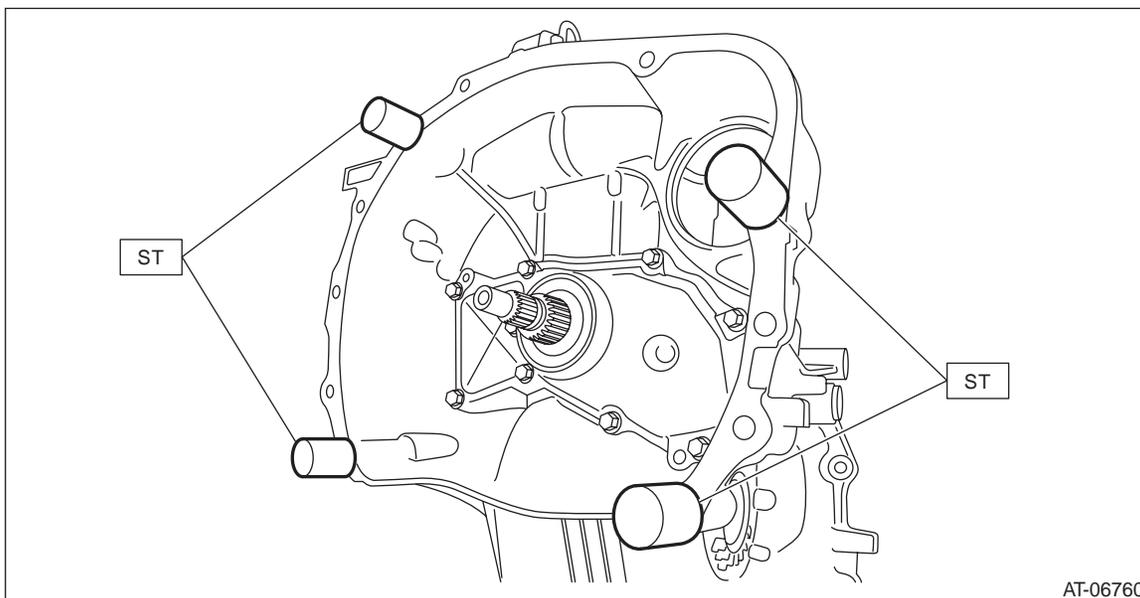
A: GENERAL DESCRIPTION

Before disassembling and assembling the transmission, follow the following procedures to prepare.

B: PROCEDURE

- 1) Clean the transmission exterior.
- 2) Remove the torque converter assembly. <Ref. to CVT(TR580)-161, Torque Converter Assembly.>
- 3) Attach the ST on the transmission.

ST 18632AA000 STAND ASSY



AT-06760

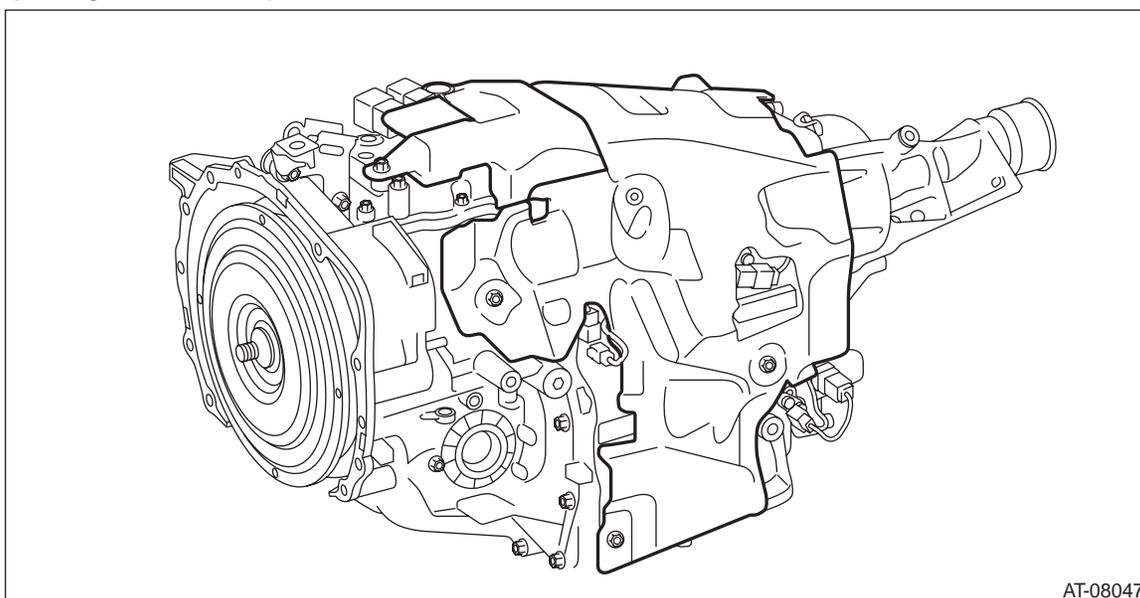
- 4) Remove the transmission case cover on the transmission upper side.

NOTE:

Install using the following tightening torque.

Tightening torque:

8 N·m (0.8 kgf·m, 5.9 ft·lb)



AT-08047

Preparation for Overhaul

CONTINUOUSLY VARIABLE TRANSMISSION

5) Place the transmission assembly on end.

6) When completely overhauling the transmission, refill approx. 10 L (2.6 US qt, 8.8 Imp qt) of CVTF through the transmission right side plug, and install the plug. Finally, install the transmission case cover.

CAUTION:

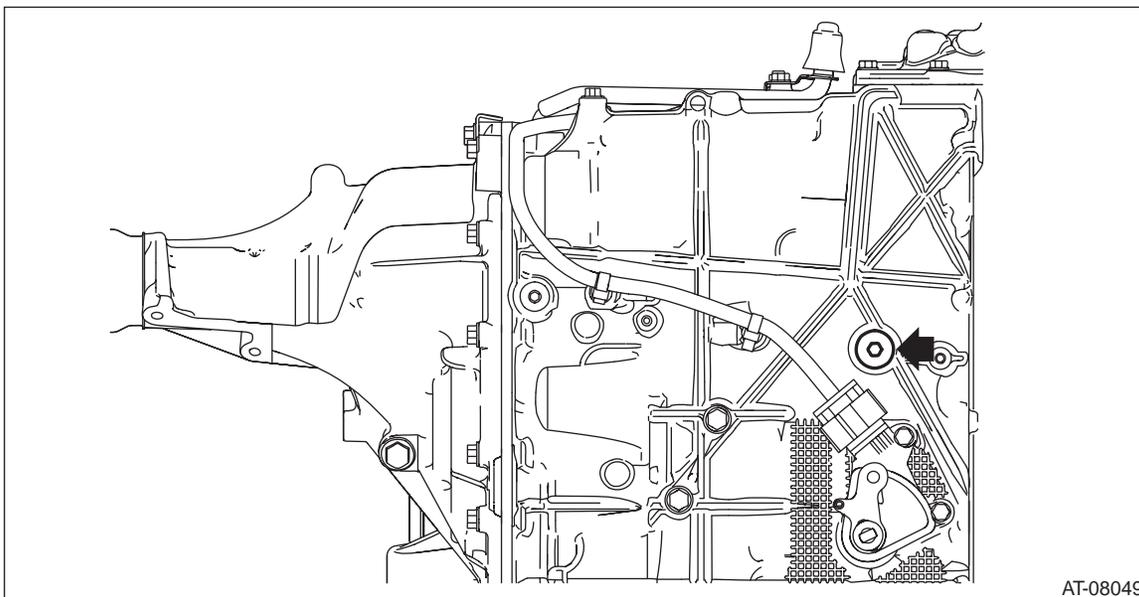
Always use specified CVTF. Using other fluid will cause malfunction. <Ref. to CVT(TR580)-4, HYDRAULIC CONTROL AND LUBRICATION, SPECIFICATION, General Description.>

NOTE:

Use a new gasket.

Tightening torque:

50 N·m (5.1 kgf·m, 36.9 ft·lb)



29.Extension Case

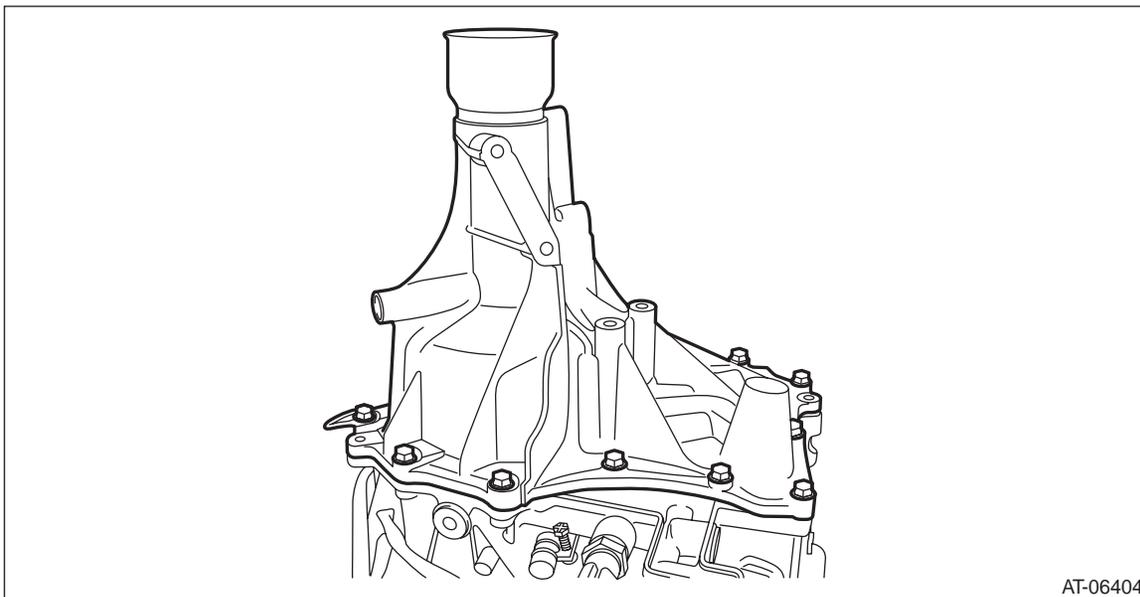
A: REMOVAL

1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TR580)-57, REMOVAL, Automatic Transmission Assembly.>

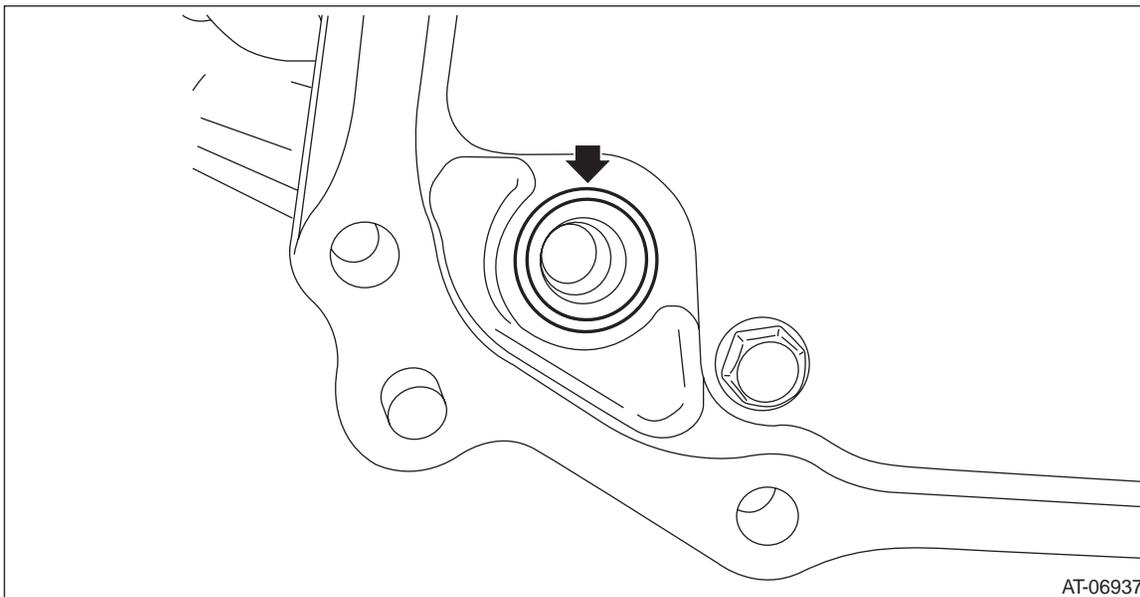
2) Remove the extension case and transmission hanger.

NOTE:

The total number of extension case mounting bolts is 13.



3) Remove the O-ring.



Extension Case

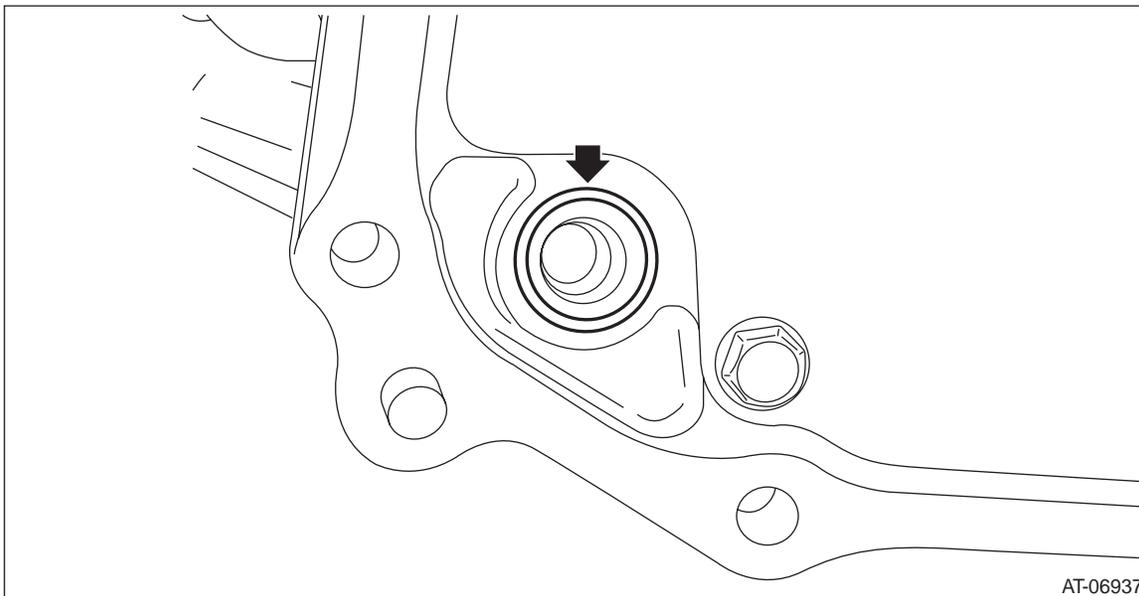
CONTINUOUSLY VARIABLE TRANSMISSION

B: INSTALLATION

- 1) Clean the mating surface of extension case and transmission case.
- 2) Select the transfer drive gear shim.<Ref. to CVT(TR580)-219, ADJUSTMENT, Reduction Drive Gear.>
- 3) Select the transfer driven gear shim.<Ref. to CVT(TR580)-181, ADJUSTMENT, Transfer Clutch.>
- 4) Attach the selected transfer drive gear shim to extension case with vaseline.
- 5) Attach the selected transfer driven gear shim to extension case with vaseline.
- 6) Install the O-ring to the transmission case.

NOTE:

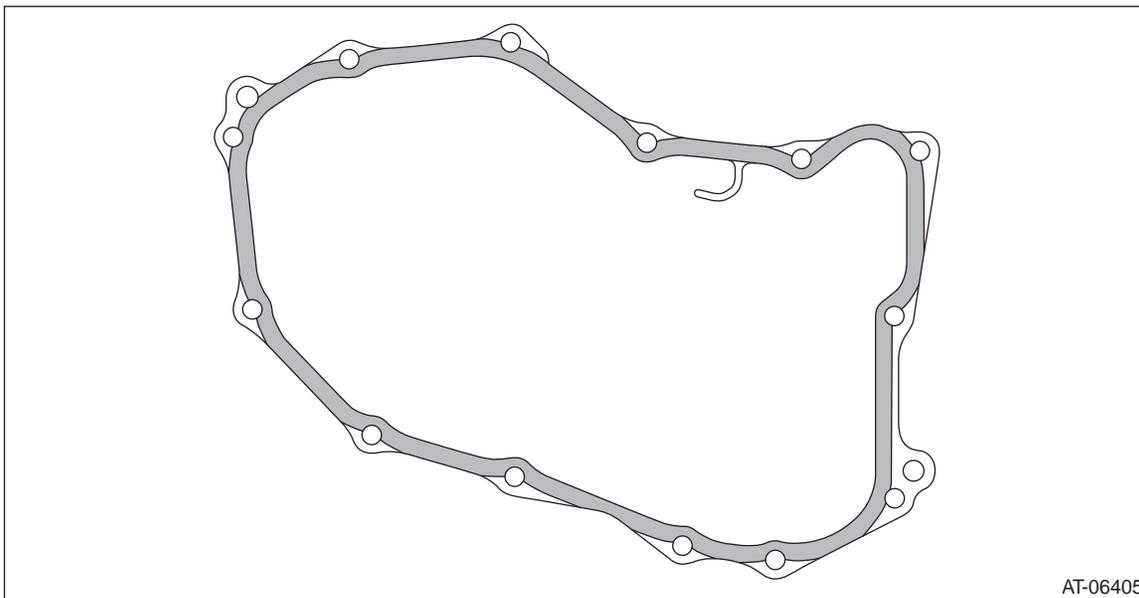
- Use new O-rings.
- Apply CVTF to the O-rings.



- 7) Apply liquid gasket to extension case seamlessly.

Liquid gasket:

THREE BOND 1215B or equivalent



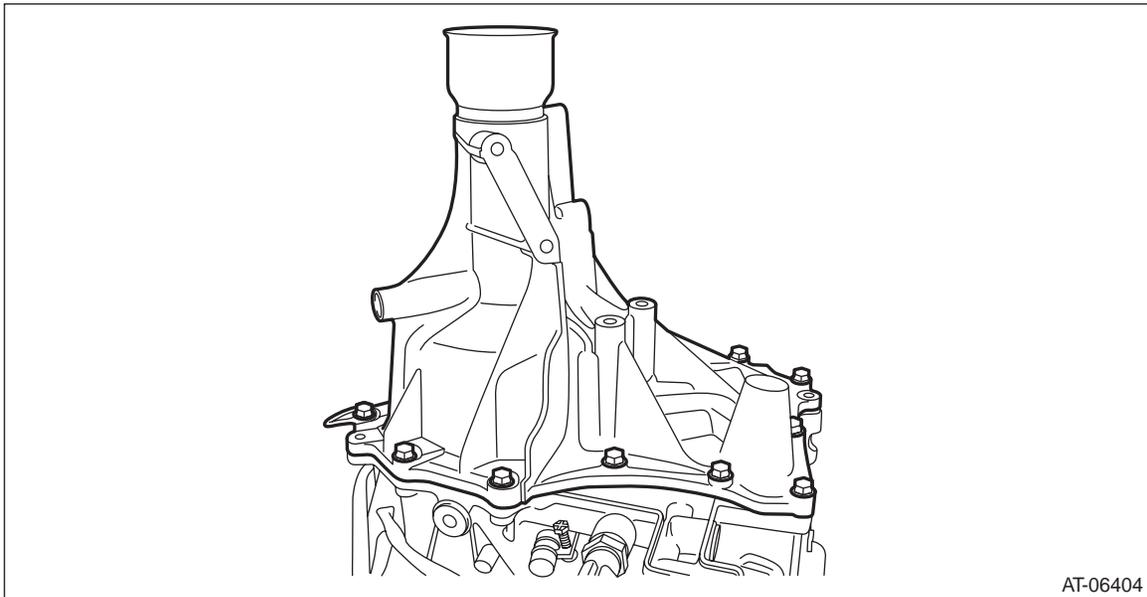
Extension Case

CONTINUOUSLY VARIABLE TRANSMISSION

8) Install the extension case to transmission hanger.

Tightening torque:

25 N·m (2.5 kgf·m, 18.4 ft·lb)



9) Install the transmission assembly. <Ref. to CVT(TR580)-67, INSTALLATION, Automatic Transmission Assembly.>

C: DISASSEMBLY

- 1) Remove the dust cover from extension case.
- 2) Remove the extension case oil seal from the extension case. <Ref. to CVT(TR580)-83, REPLACEMENT, Extension Case Oil Seal.>
- 3) Remove all plugs.

Extension Case

CONTINUOUSLY VARIABLE TRANSMISSION

D: ASSEMBLY

- 1) Press-fit the dust cover into extension case.
- 2) Install the extension case oil seal to extension case. <Ref. to CVT(TR580)-83, REPLACEMENT, Extension Case Oil Seal.>
- 3) Install all plugs.

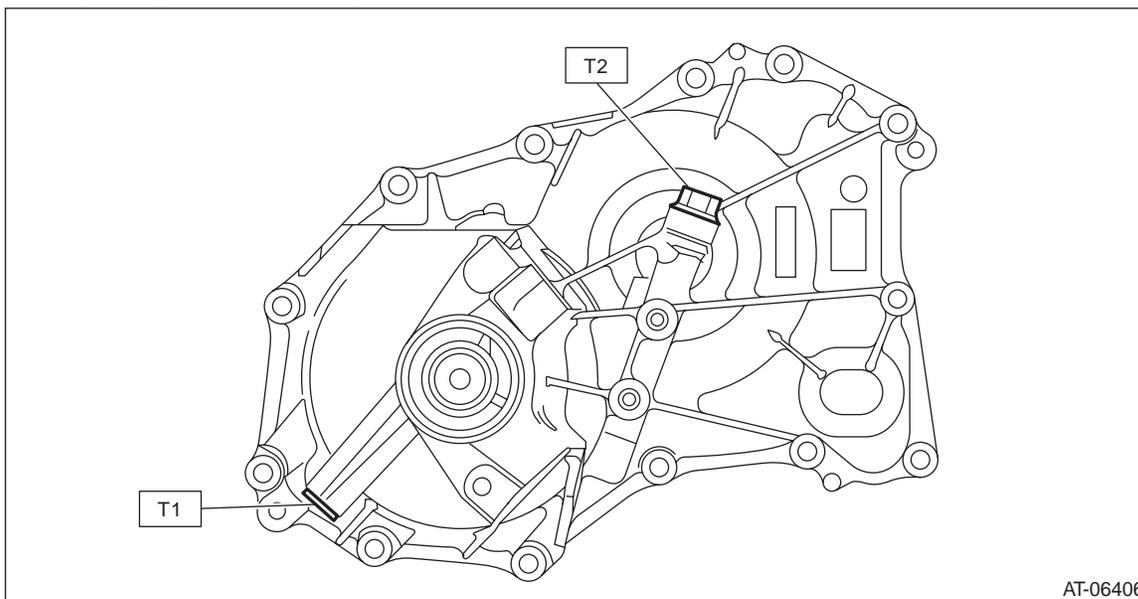
NOTE:

- Use a new O-ring or a gasket.
- Apply CVTF to the O-ring.

Tightening torque:

T1: 25 N·m (2.5 kgf-m, 18.4 ft-lb)

T2: 35 N·m (3.6 kgf-m, 25.8 ft-lb)



AT-06406

E: INSPECTION

- Check there is no leak of CVTF from the joint between extension case and transmission case.
- Check there is no damage or cracks on the extension case and other parts.

F: ADJUSTMENT

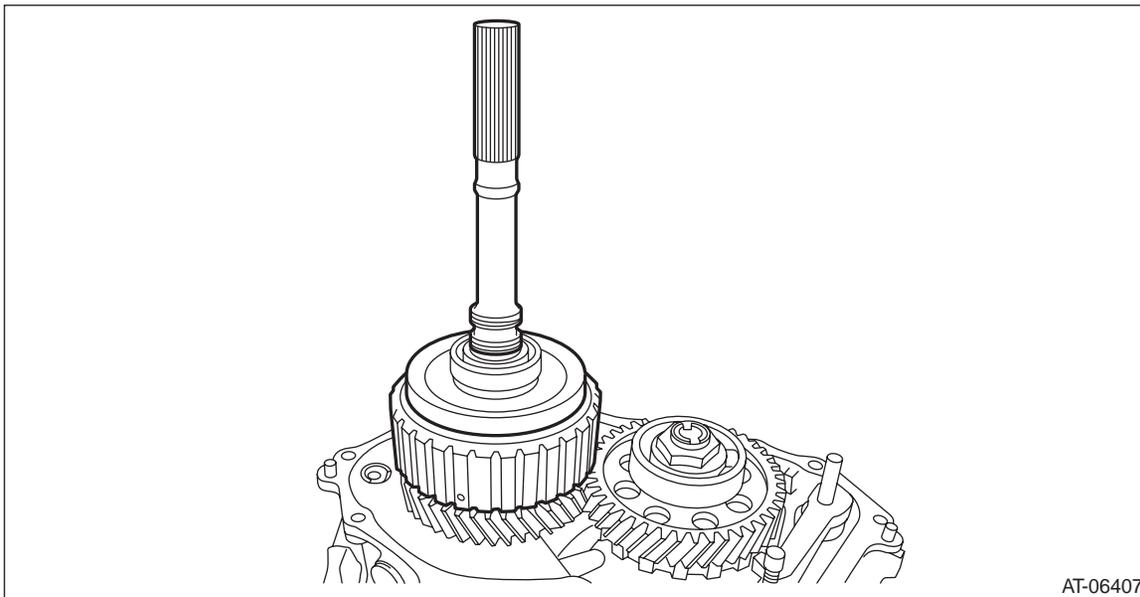
NOTE:

When replacing the extension case, select the transfer drive gear shim and transfer driven gear shim. <Ref. to CVT(TR580)-219, ADJUSTMENT, Reduction Drive Gear.> <Ref. to CVT(TR580)-181, ADJUSTMENT, Transfer Clutch.>

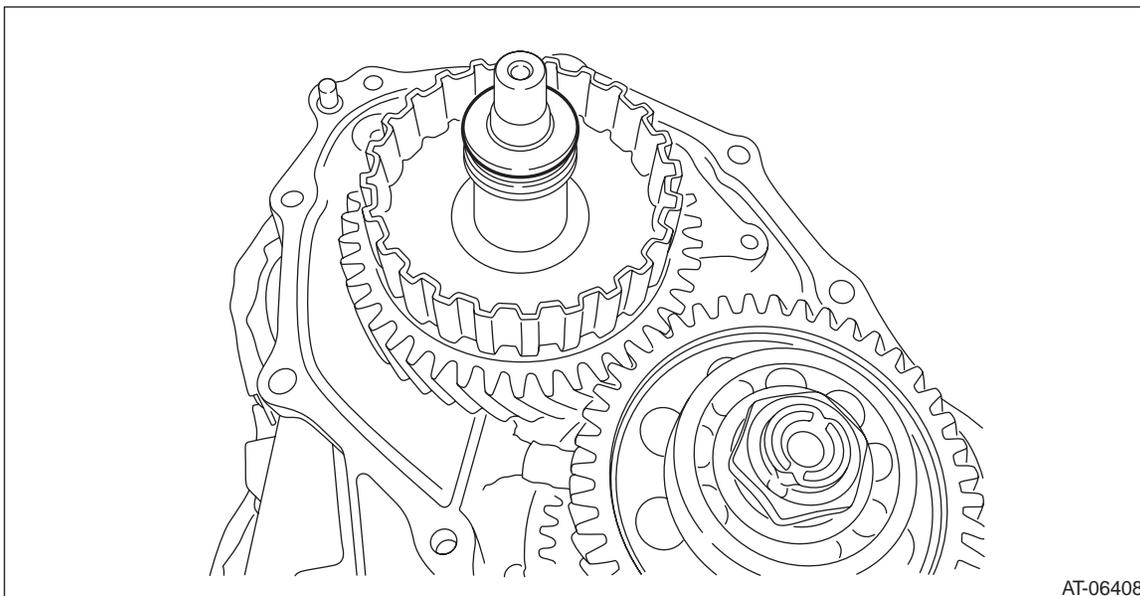
30. Transfer Clutch

A: REMOVAL

- 1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TR580)-57, REMOVAL, Automatic Transmission Assembly.>
- 2) Remove the extension case. <Ref. to CVT(TR580)-165, REMOVAL, Extension Case.>
- 3) Remove the transfer clutch assembly.



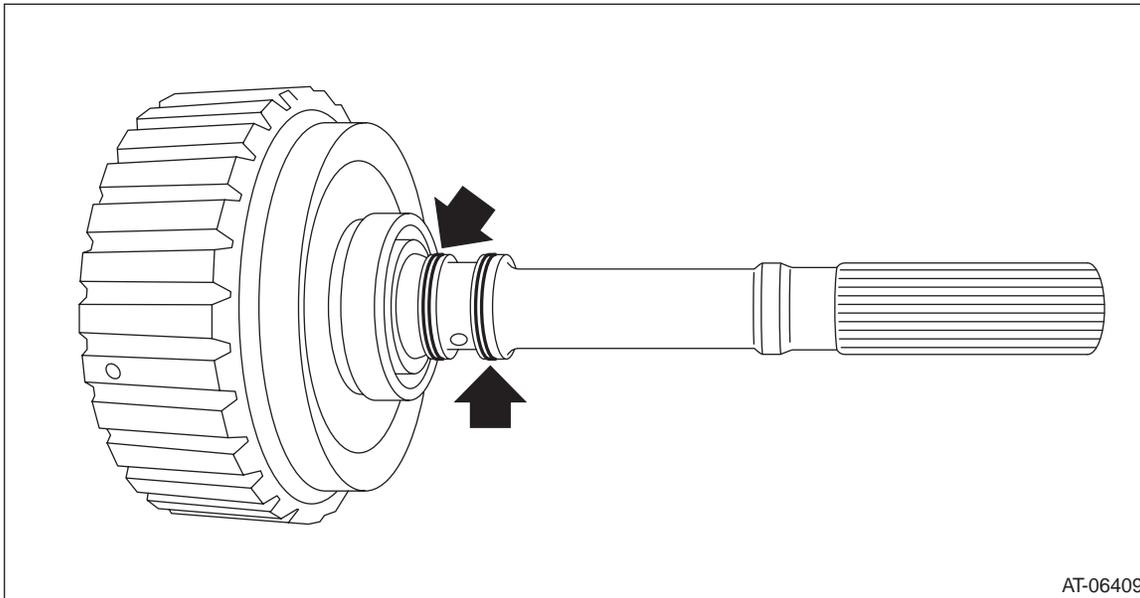
- 4) Remove the thrust bearing.



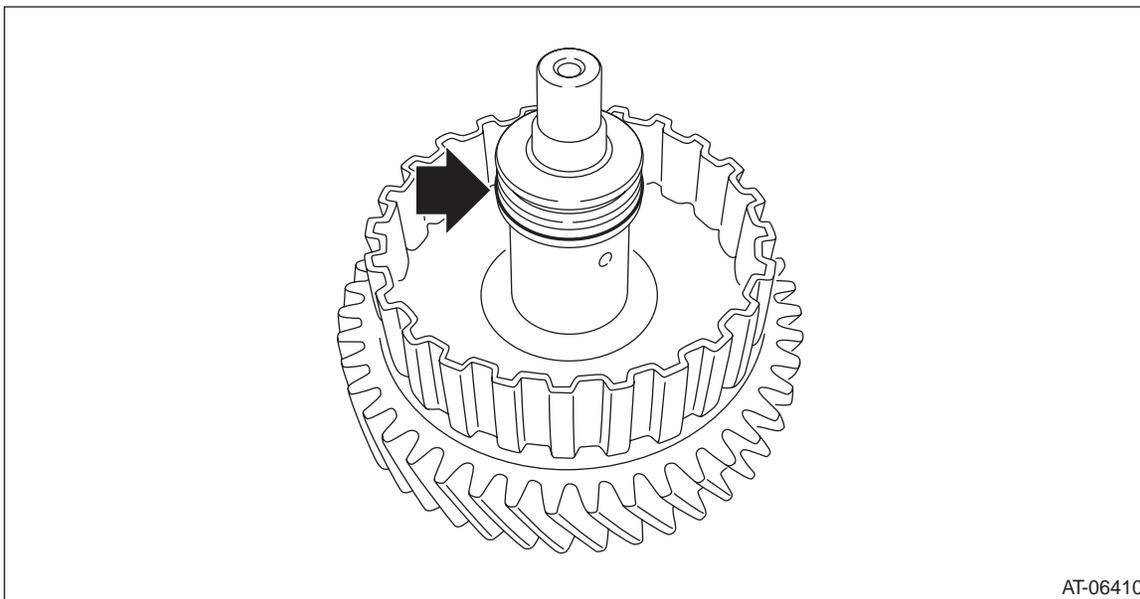
Transfer Clutch

CONTINUOUSLY VARIABLE TRANSMISSION

5) Remove the seal ring from transfer clutch assembly.



6) Remove the seal ring from the transfer driven gear assembly.



Transfer Clutch

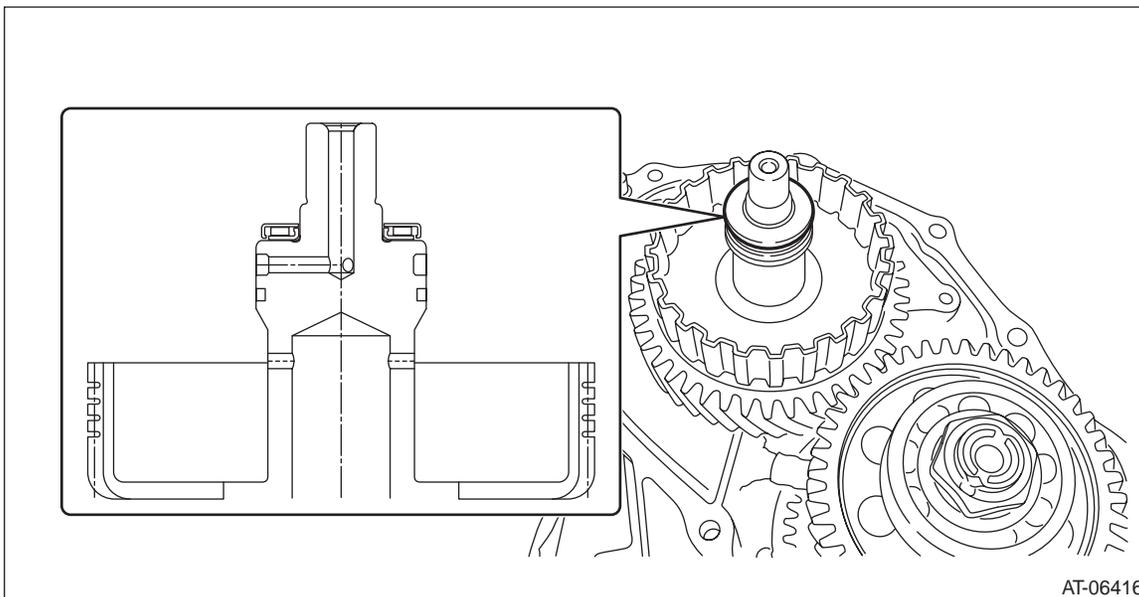
CONTINUOUSLY VARIABLE TRANSMISSION

B: INSTALLATION

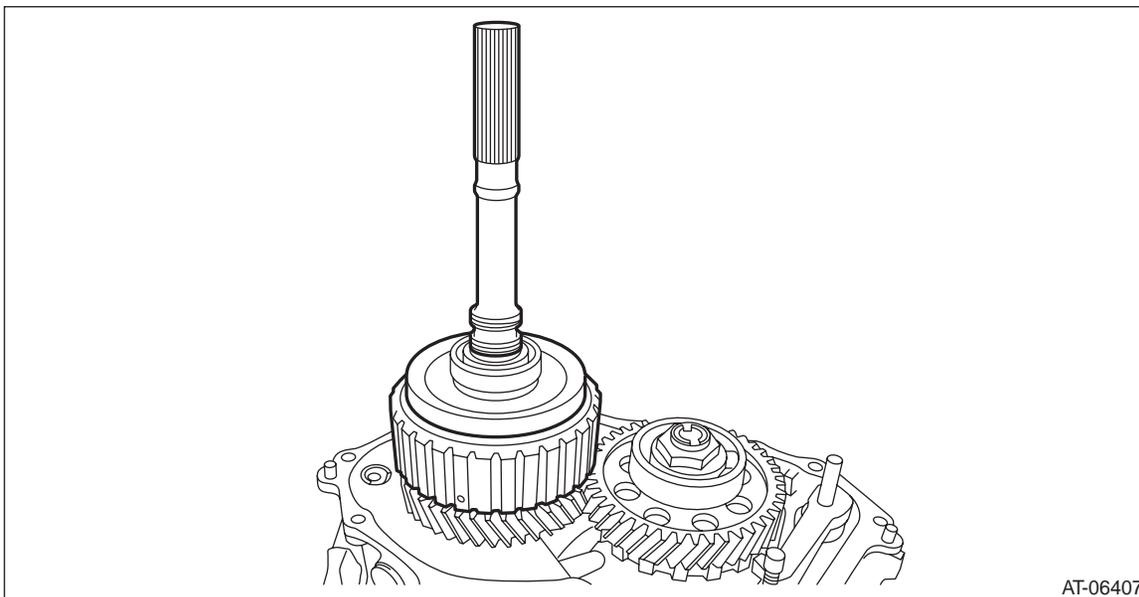
1) Install the thrust bearing.

NOTE:

Make sure to install in the right direction.



2) Install the transfer clutch assembly.



3) Select the transfer driven gear shim. <Ref. to CVT(TR580)-181, ADJUSTMENT, Transfer Clutch.>

4) Attach the selected transfer driven gear shim to extension case with vaseline.

5) Remove the transfer clutch assembly.

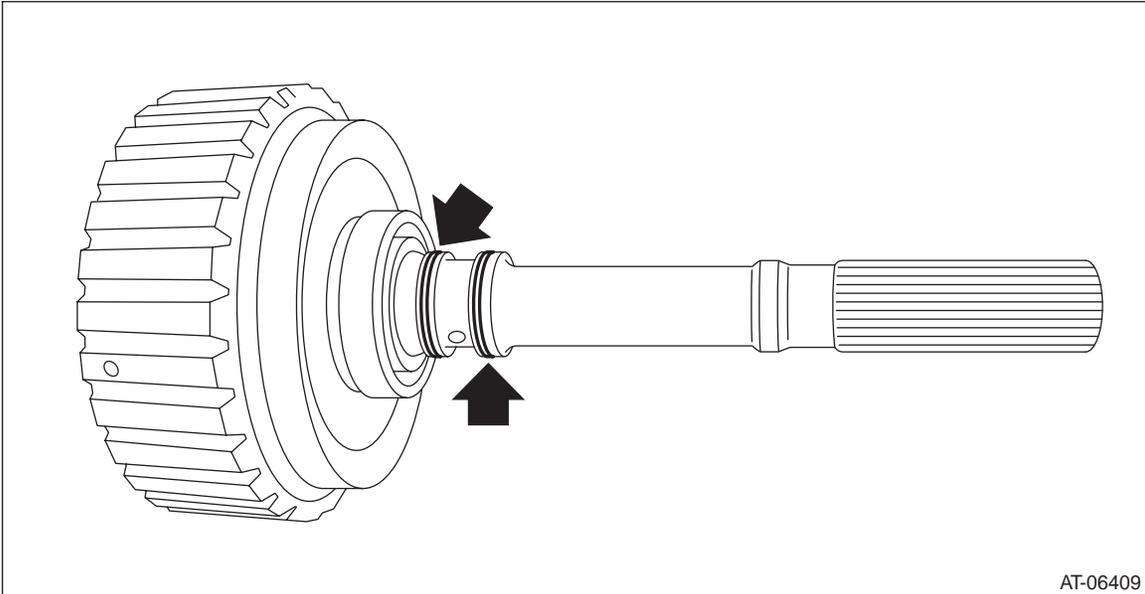
Transfer Clutch

CONTINUOUSLY VARIABLE TRANSMISSION

6) Install the seal ring to the transfer clutch assembly.

NOTE:

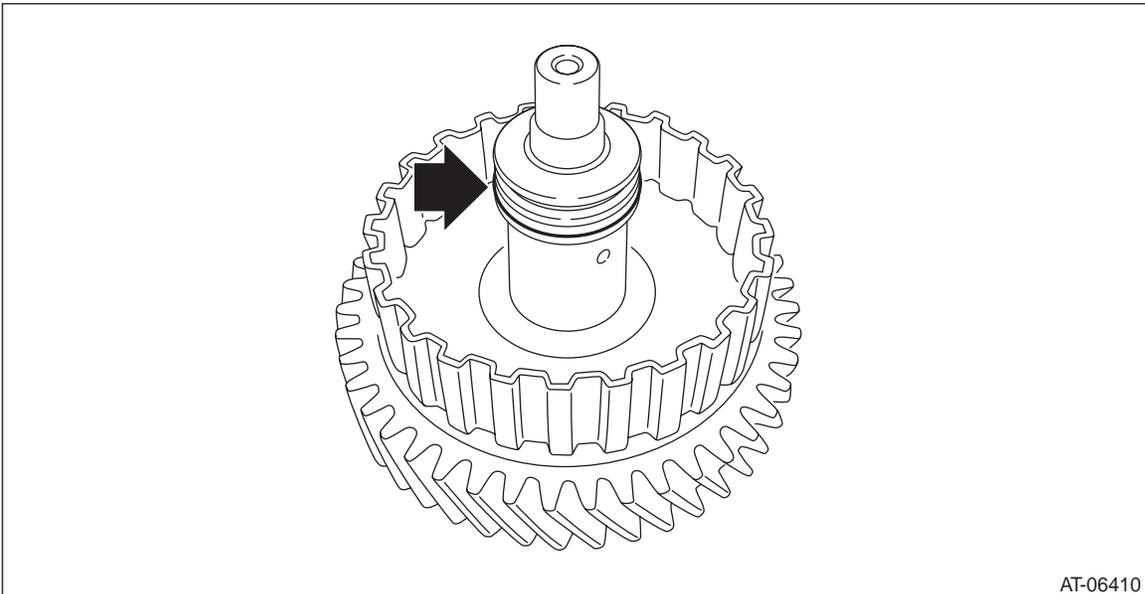
- Use a new seal ring.
- When installing the seal ring, do not expand the seal ring too much.
- Apply CVTF to the seal rings.



7) Install the seal ring to the transfer driven gear assembly.

NOTE:

- Use a new seal ring.
- When installing the seal ring, do not expand the seal ring too much.
- Apply CVTF to the seal rings.



8) Install the transfer clutch assembly.

9) Install the extension case. <Ref. to CVT(TR580)-166, INSTALLATION, Extension Case.>

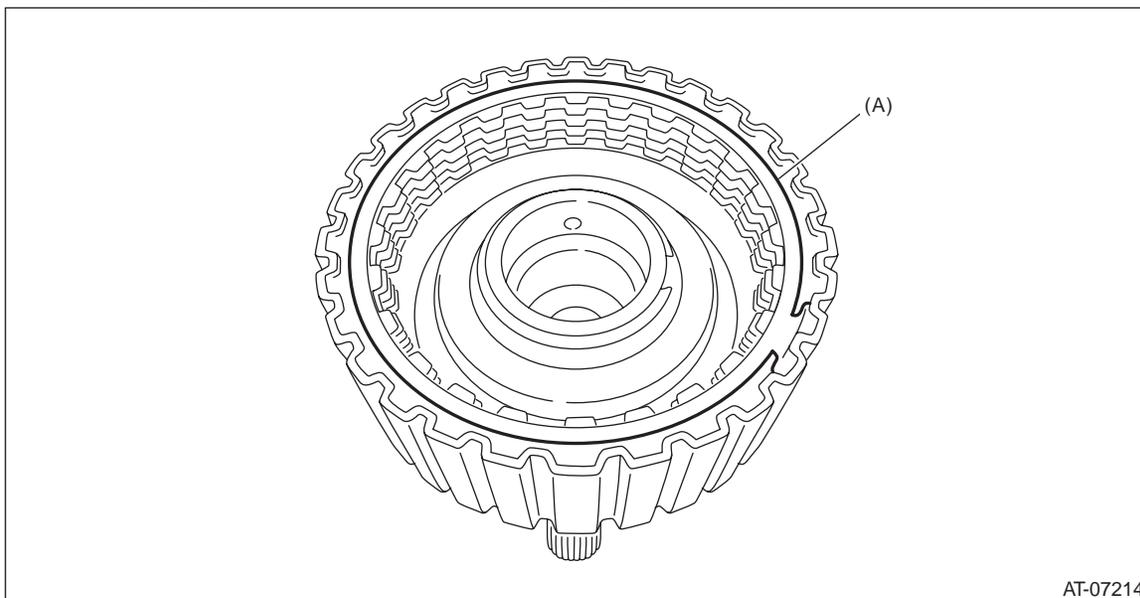
10) Install the transmission assembly to the vehicle. <Ref. to CVT(TR580)-67, INSTALLATION, Automatic Transmission Assembly.>

Transfer Clutch

CONTINUOUSLY VARIABLE TRANSMISSION

C: DISASSEMBLY

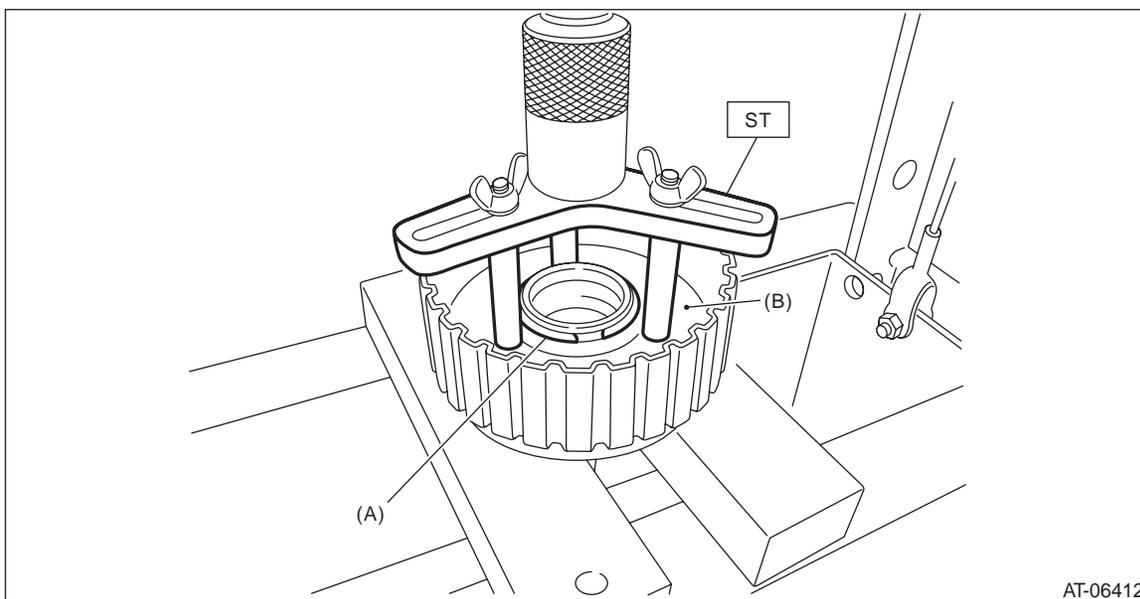
1) Remove the snap ring, and then remove the retaining plate, drive plate and driven plate.



AT-07214

(A) Snap ring

2) Compress the return spring using the ST to remove the snap ring.
ST 18762AA000 or 18762AA001 COMPRESSOR SPECIAL TOOL



AT-06412

(A) Snap ring

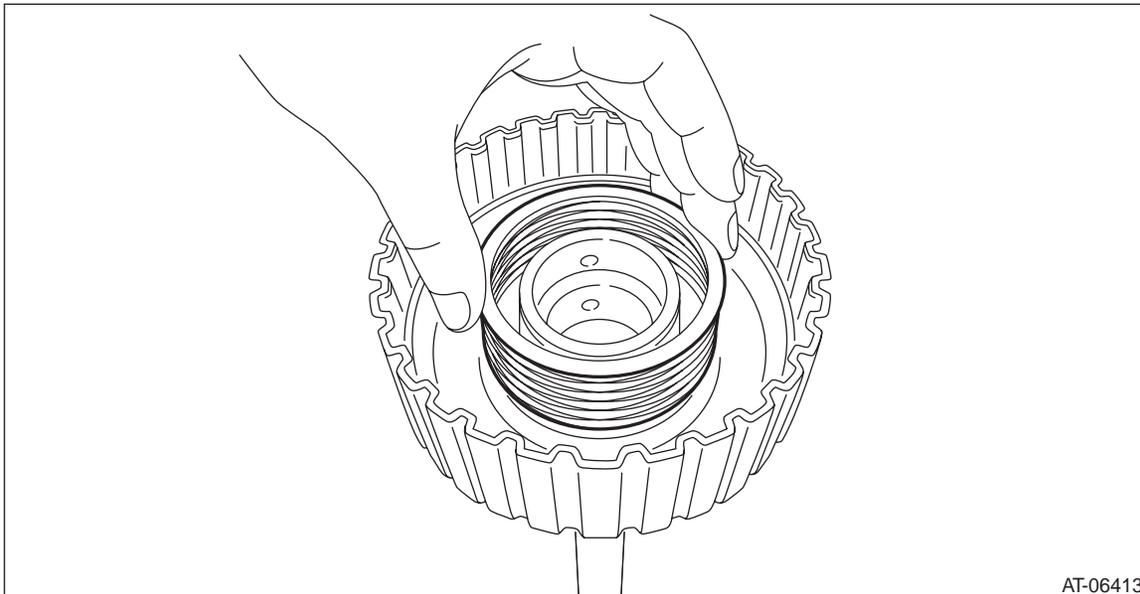
(B) Transfer clutch piston seal

3) Remove the transfer clutch piston seal.

Transfer Clutch

CONTINUOUSLY VARIABLE TRANSMISSION

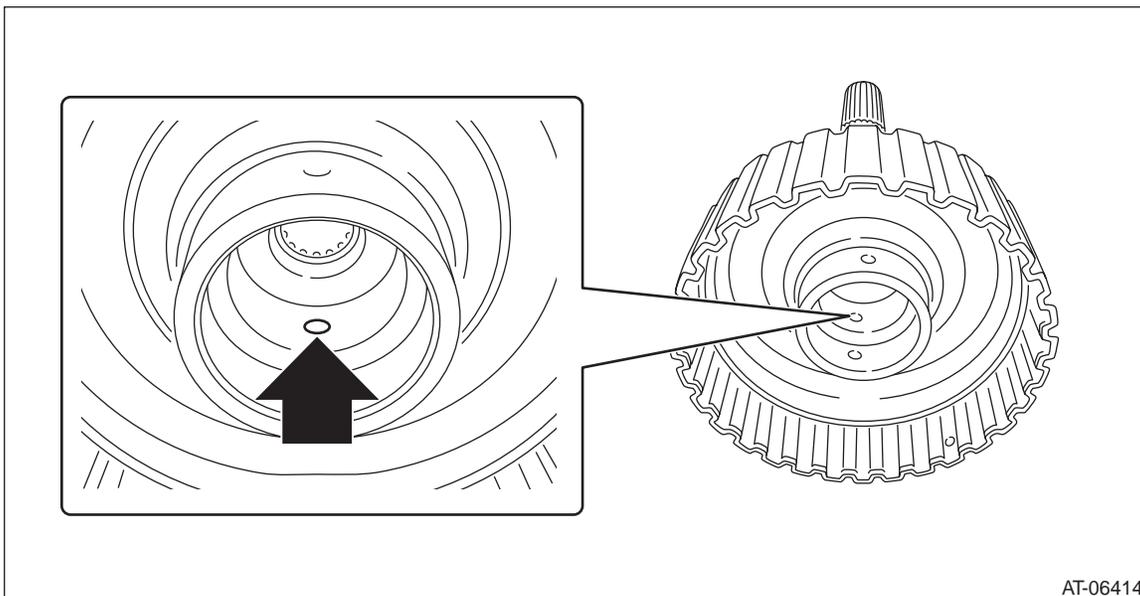
4) Remove the return spring.



5) Remove the transfer clutch piston by blowing compressed air through transfer clutch assembly hole.

NOTE:

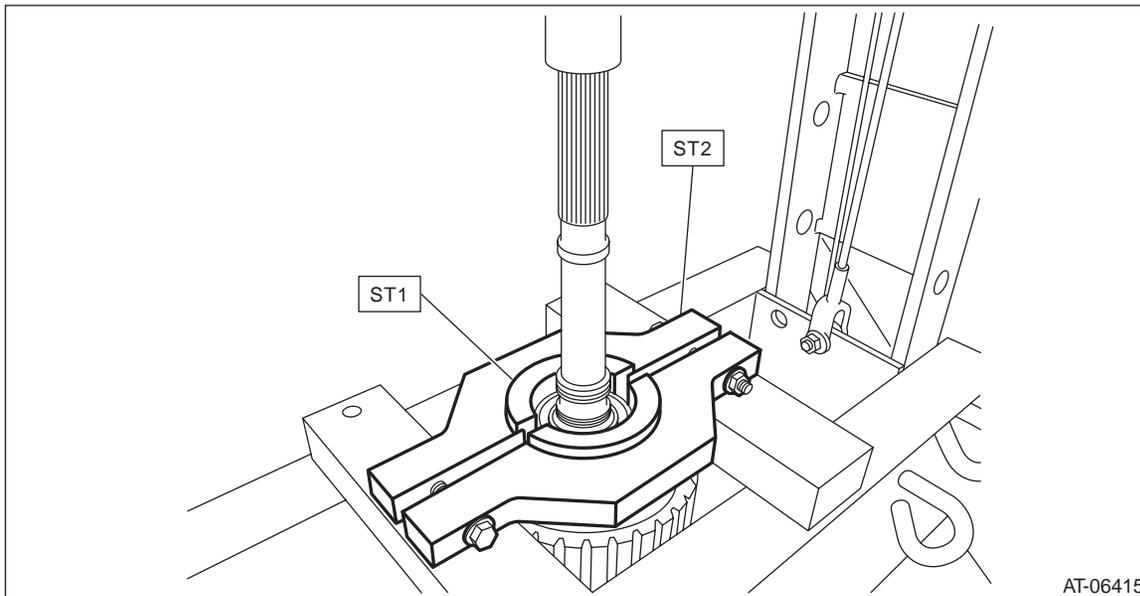
Plug the holes through which the compressed air is not blown.



Transfer Clutch

CONTINUOUSLY VARIABLE TRANSMISSION

- 6) Remove the ball bearing using ST.
ST1 18767AA010 BEARING REMOVER
ST2 18723AA000 REMOVER



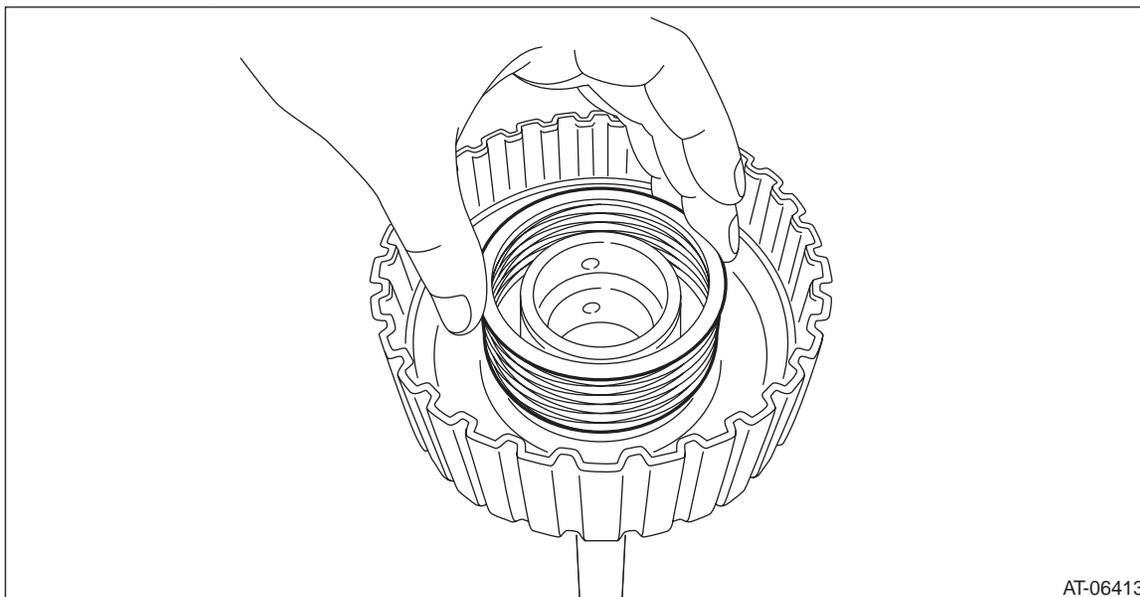
D: ASSEMBLY

- 1) Install the transfer clutch piston.

NOTE:

Apply CVTF to the transfer clutch piston lip.

- 2) Install the return spring.



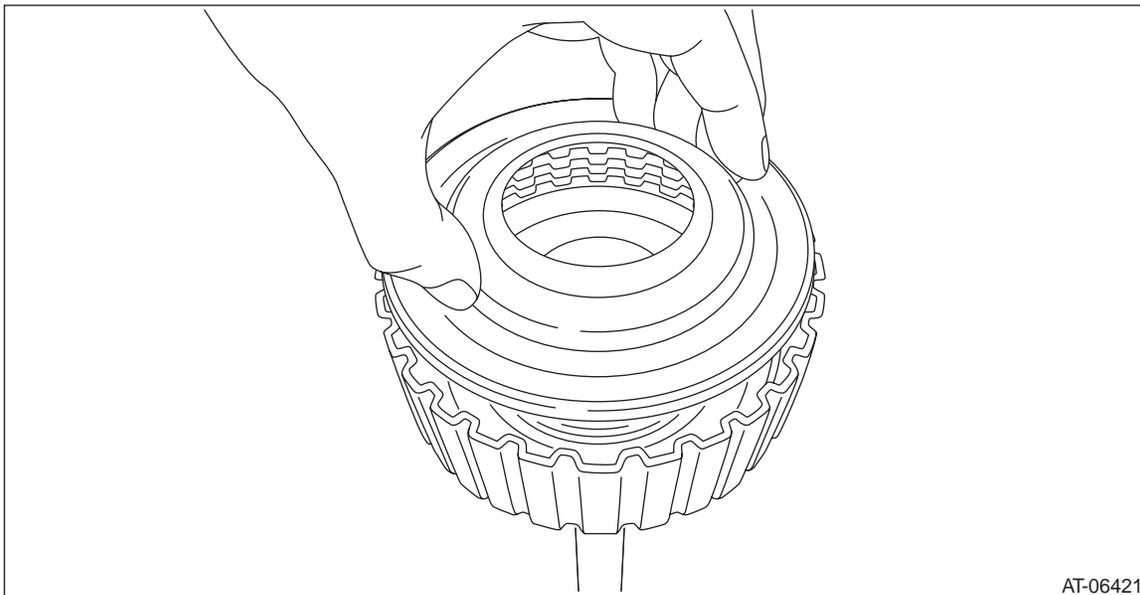
Transfer Clutch

CONTINUOUSLY VARIABLE TRANSMISSION

3) Install the transfer clutch piston seal.

NOTE:

Apply CVTF to the lip section of transfer clutch piston seal.

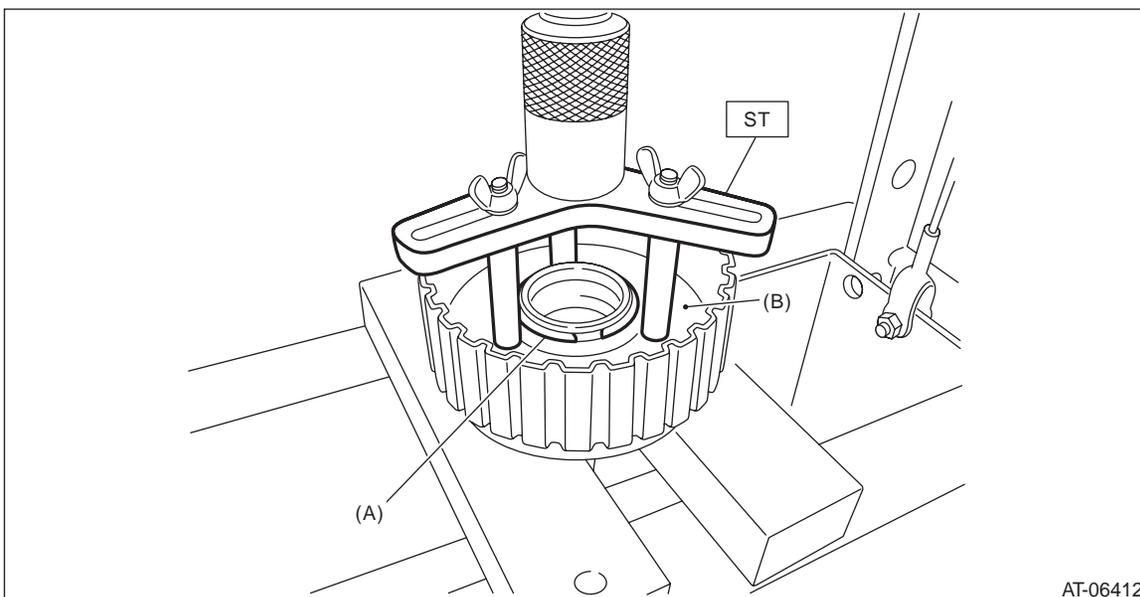


AT-06421

4) Compress the return spring using the ST to install the snap ring.

ST 18762AA000 or 18762AA001

COMPRESSOR SPECIAL TOOL



AT-06412

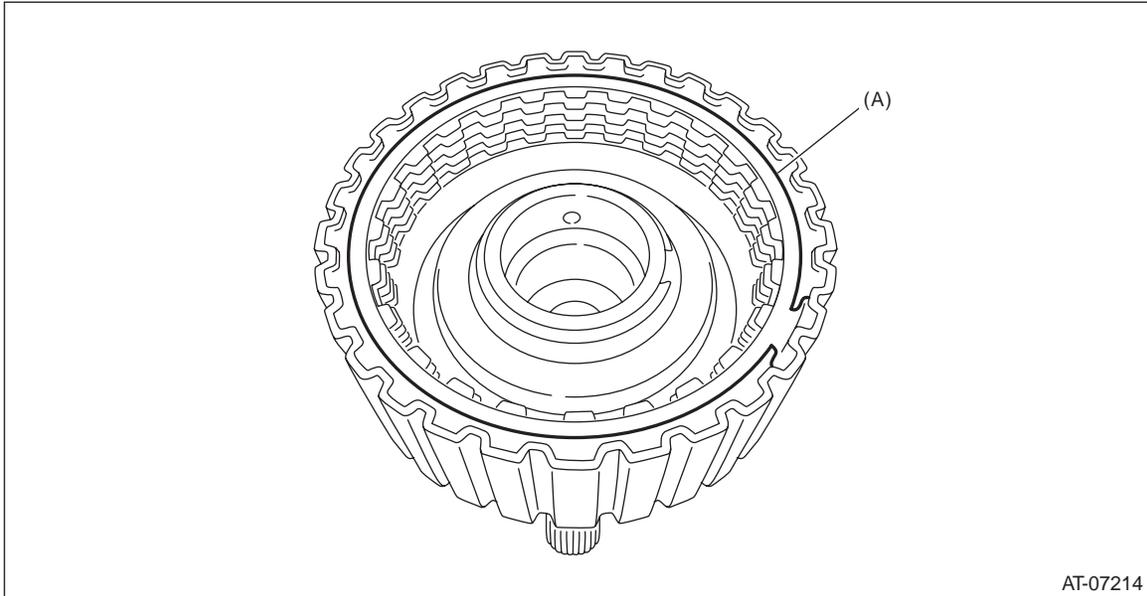
(A) Snap ring

(B) Transfer clutch piston seal

Transfer Clutch

CONTINUOUSLY VARIABLE TRANSMISSION

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

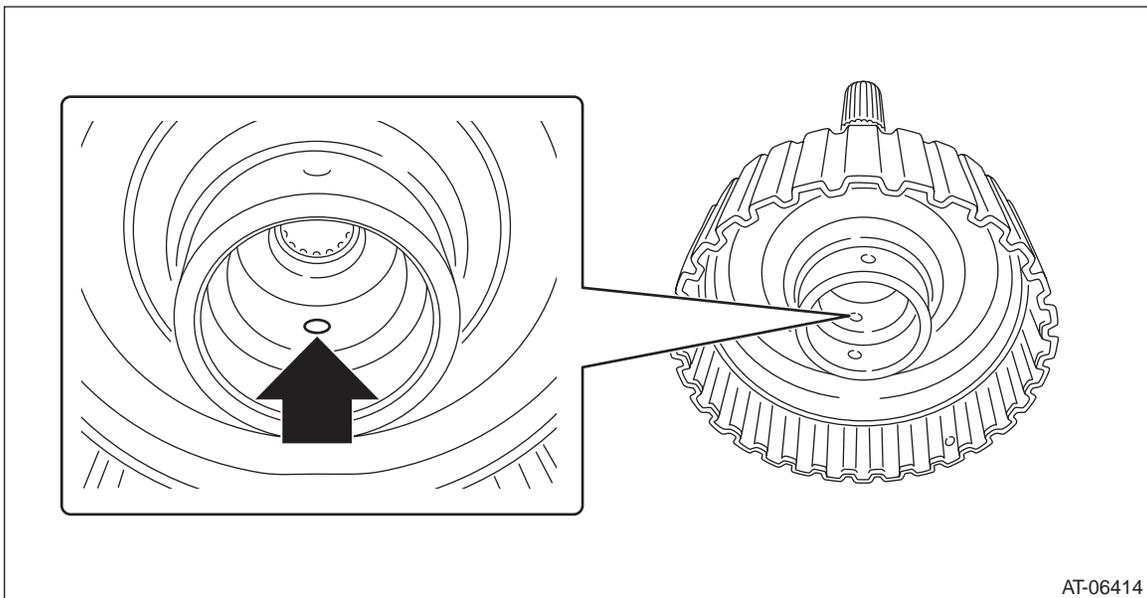


(A) Snap ring

6) Blow compressed air through transfer clutch assembly hole, and check the transfer clutch piston operation.

NOTE:

Plug the holes through which the compressed air is not blown.



7) Before measuring clearance "A", place same thickness shims on both sides to prevent the plate from tilting.

Transfer Clutch

CONTINUOUSLY VARIABLE TRANSMISSION

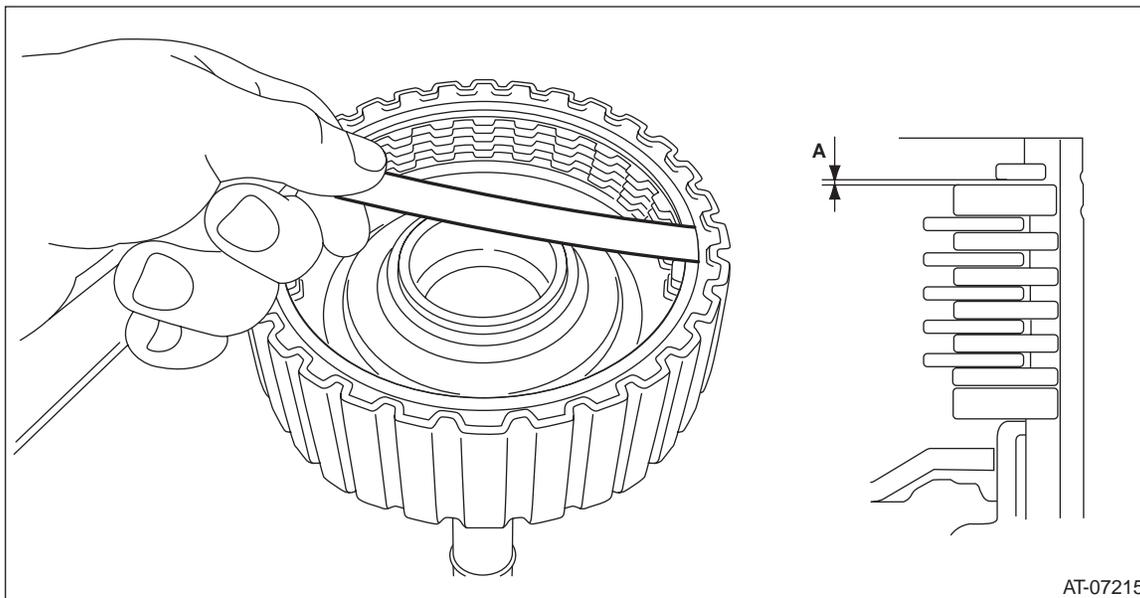
8) When clearance "A" exceeds the limit for use, replace the drive plate and driven plate as a set, and select and adjust the pressure plate within the initial specified value.

Initial standard:

0.7 — 1.1 mm (0.028 — 0.043 in)

Limit thickness:

1.45 mm (0.057 in)



Pressure plate	
Part No.	Thickness mm (in)
31593AA151	3.3 (0.130)
31593AA161	3.7 (0.146)

9) Recheck the clearance.<Ref. to CVT(TR580)-180, INSPECTION, Transfer Clutch.>

Transfer Clutch

CONTINUOUSLY VARIABLE TRANSMISSION

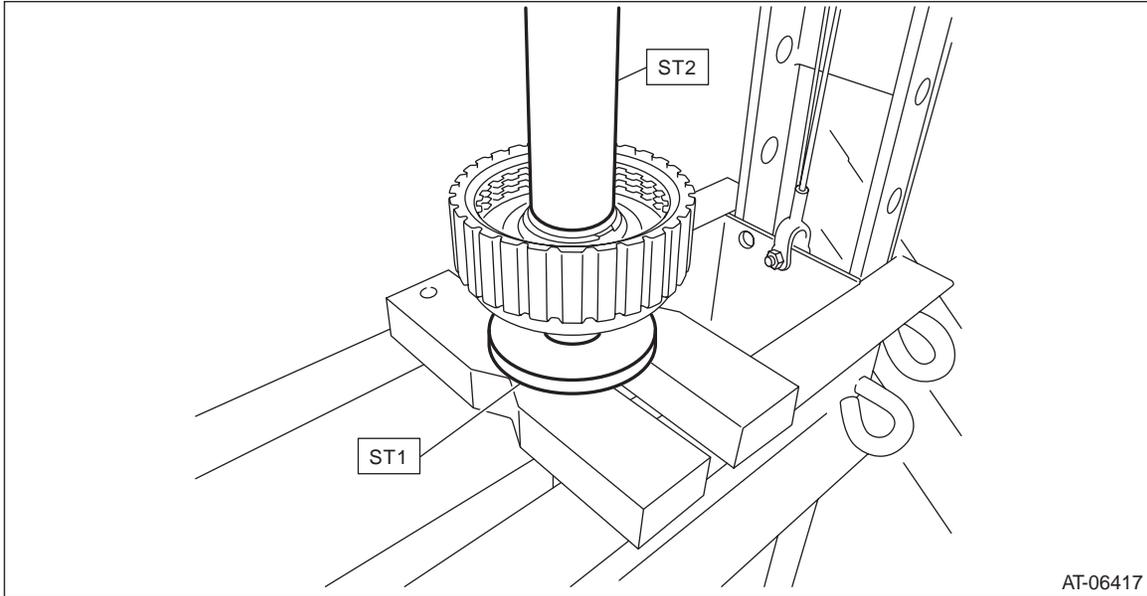
10) Using the ST, install the ball bearing.

NOTE:

Use a new ball bearing.

ST1 398177700 INSTALLER

ST2 499277000 INSTALLER



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Transfer Clutch

CONTINUOUSLY VARIABLE TRANSMISSION

E: INSPECTION

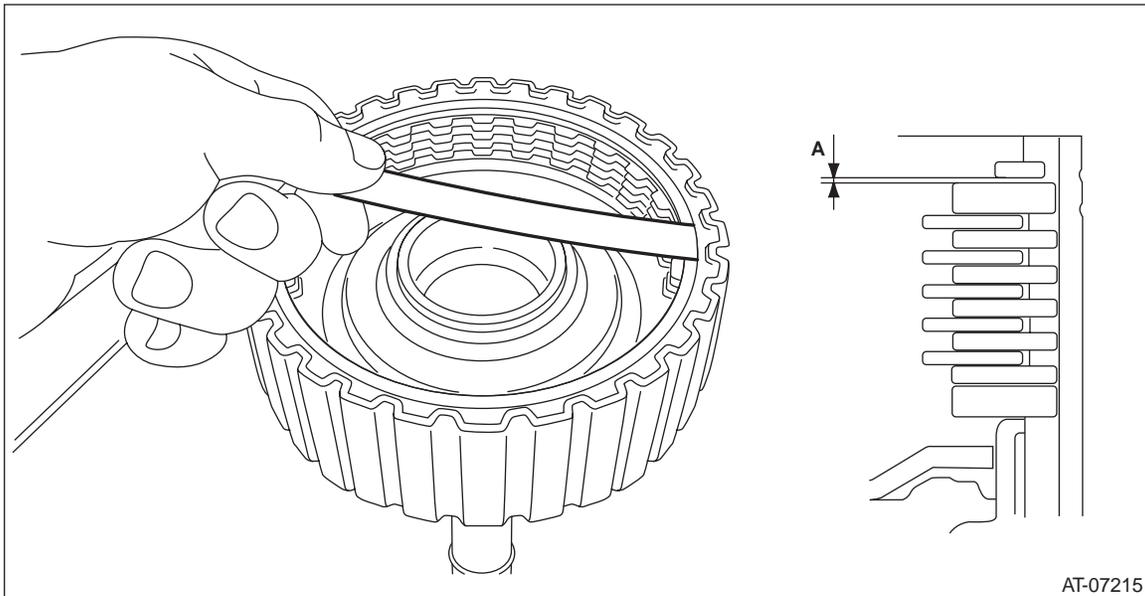
- Inspect the drive plate facing for wear and damage.
 - Driven plate for discoloration (burned color)
 - Make sure the snap ring is not worn and the return spring has no permanent distortion, damage, or deformation.
 - Check the lip seal for damage.
 - Inspect the extension end play, and adjust it to within the standard value. <Ref. to CVT(TR580)-181, ADJUSTMENT, Transfer Clutch.>
- 1) Before measuring clearance “A” between snap ring and driven plate, place same thickness shims on both sides to prevent the plate from tilting.
 - 2) When clearance “A” exceeds the limit for use, replace the drive plate and driven plate as a set, and select the pressure plate within the initial specified value.

Initial standard:

0.7 — 1.1 mm (0.028 — 0.043 in)

Limit thickness:

1.45 mm (0.057 in)



- 3) 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.

NOTE:

For models with X MODE switch, turn OFF the switch for inspection.

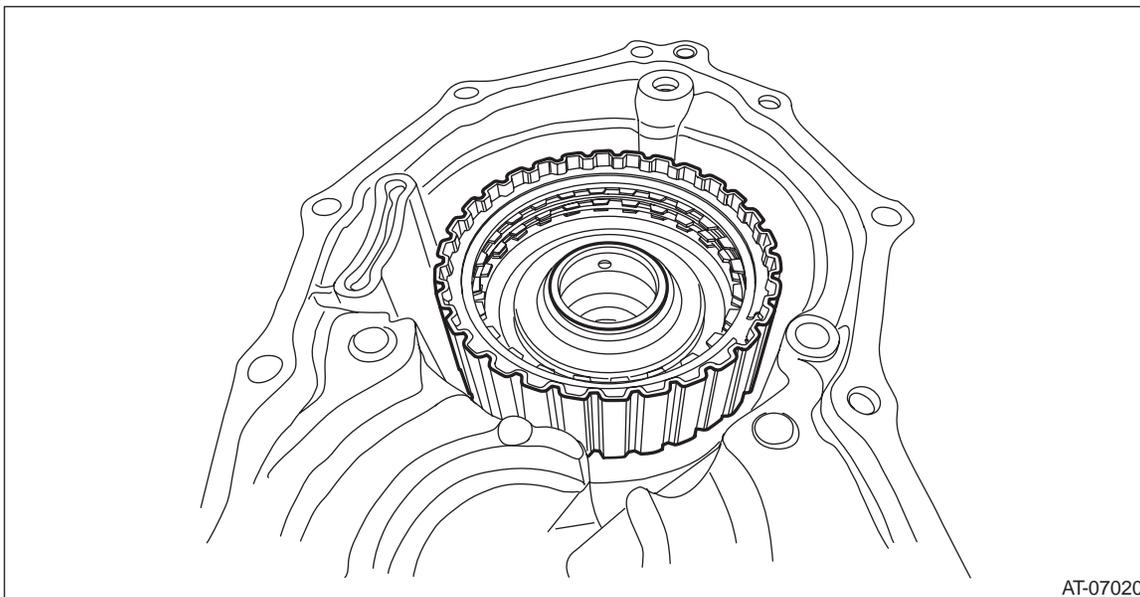
- (1) With the steering wheel held at fully turned position, drive the vehicle in “D” range and with vehicle speed at approx. 5 km/h (3 MPH) in both clockwise and counterclockwise directions for approx. ten times each, while repeating acceleration and braking intermittently.
- (2) If the tight corner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

Transfer Clutch

CONTINUOUSLY VARIABLE TRANSMISSION

F: ADJUSTMENT

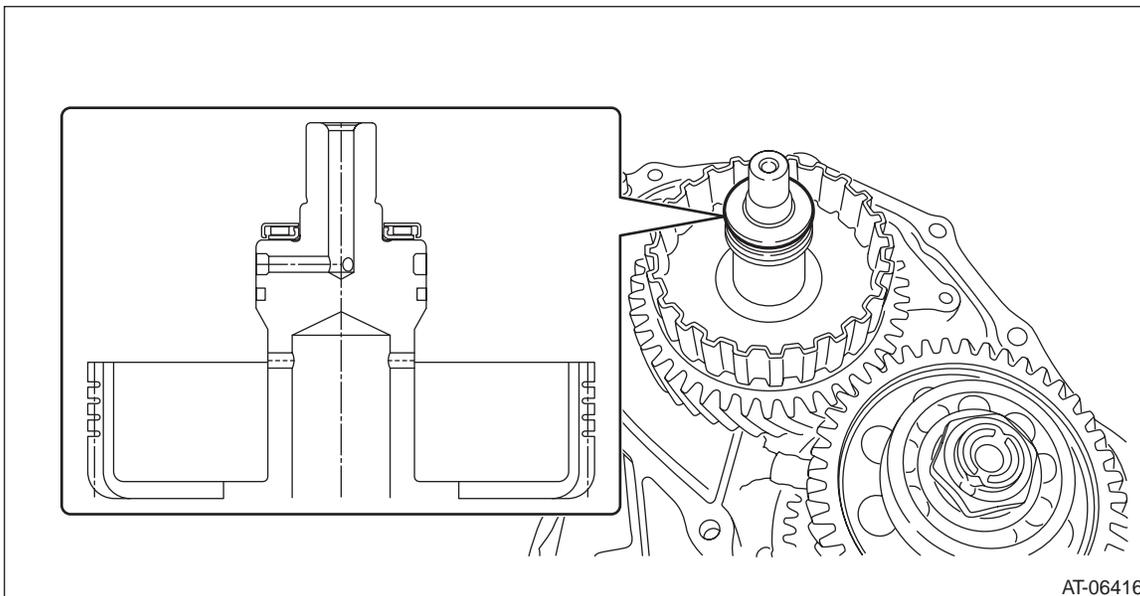
1) Install the transfer clutch assembly to the extension case with the transfer driven gear shims and thrust bearings removed.



2) Install the thrust bearing to the transfer driven gear.

NOTE:

Make sure to install in the right direction.



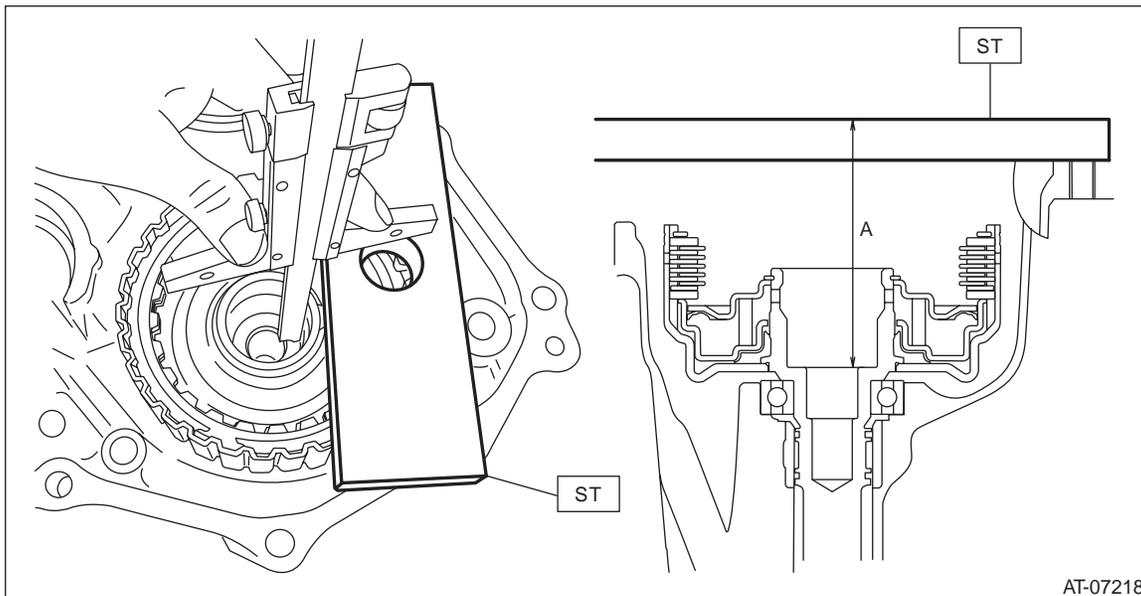
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Transfer Clutch

CONTINUOUSLY VARIABLE TRANSMISSION

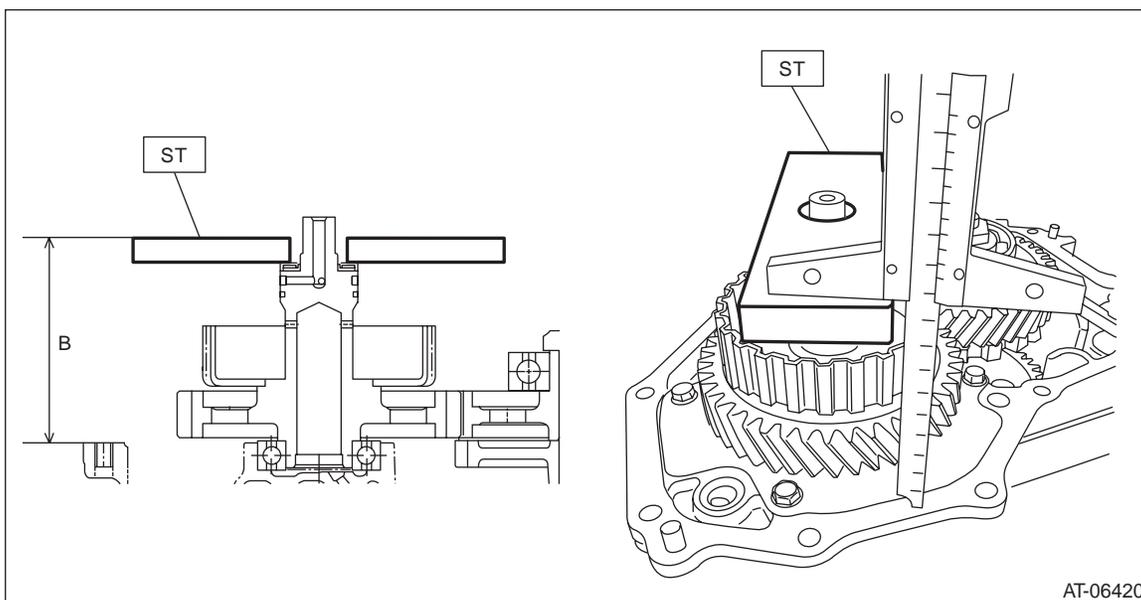
3) Using the ST, measure the height "A" from the ST end face to the thrust bearing catch surface of the transfer clutch assembly.

ST 499575500 GAUGE



4) Using the ST, measure the height "B" from the transmission case mating surface to the end of ST.

ST 499575500 GAUGE



Transfer Clutch

CONTINUOUSLY VARIABLE TRANSMISSION

5) Obtain the thickness of transfer driven gear shim using the following formula to select one to three transfer driven gear shims.

$$T \text{ (mm)} = A - B - (0.05 \text{ — } 0.25)$$

$$[T \text{ (in)} = A - B - (0.002 \text{ — } 0.01)]$$

T: Transfer driven gear shim thickness

A: Height from the ST end face to the transfer clutch assembly thrust bearing catch surface

B: Height from the mating surface of the transmission case to the end of the ST

0.05 — 0.25 mm (0.002 — 0.01 in): Clearance

Transfer driven gear shim	
Part No.	Thickness mm (in)
33280AA030	0.3 (0.012)
33280AA040	0.4 (0.016)
33280AA050	0.5 (0.020)

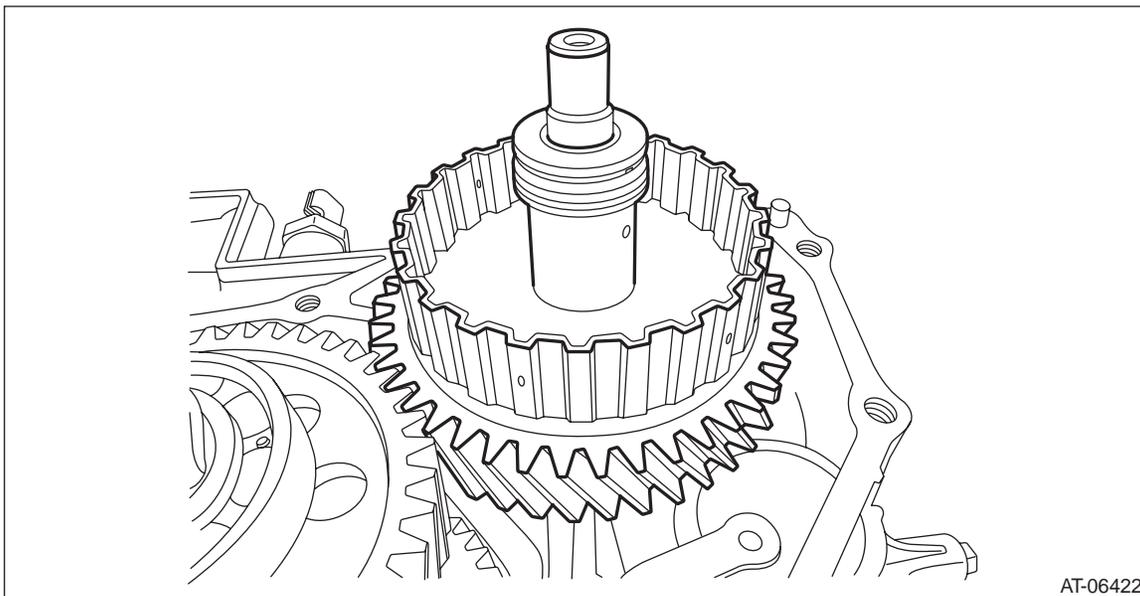
Transfer Driven Gear

CONTINUOUSLY VARIABLE TRANSMISSION

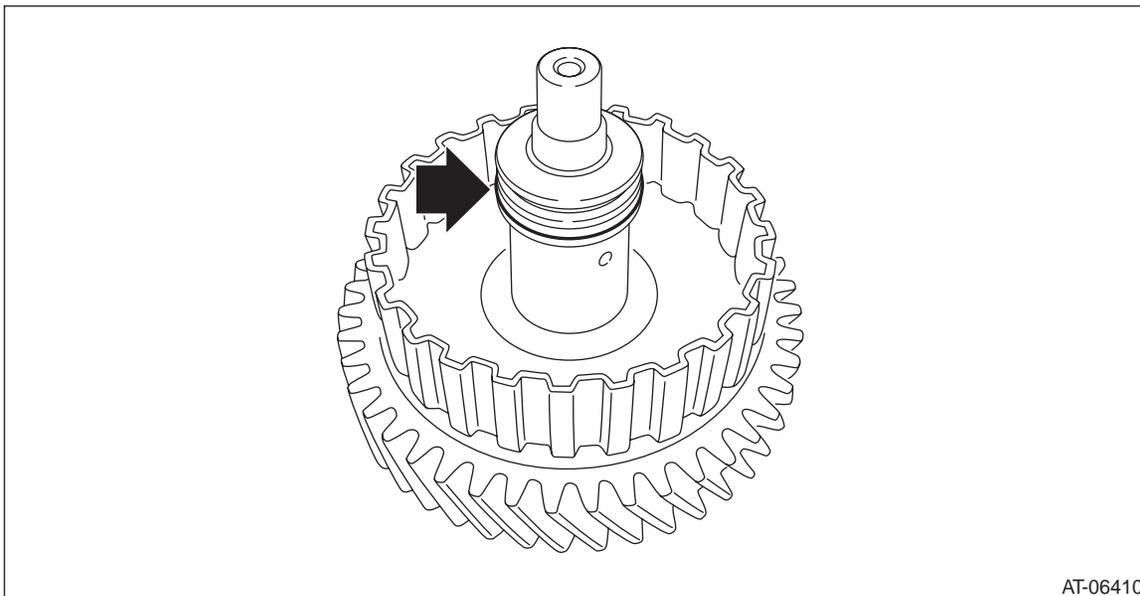
31. Transfer Driven Gear

A: REMOVAL

- 1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TR580)-57, REMOVAL, Automatic Transmission Assembly.>
- 2) Remove the extension case. <Ref. to CVT(TR580)-165, REMOVAL, Extension Case.>
- 3) Remove the transfer clutch assembly. <Ref. to CVT(TR580)-169, REMOVAL, Transfer Clutch.>
- 4) Remove the transfer driven gear assembly.



- 5) Remove the seal ring from the transfer driven gear assembly.

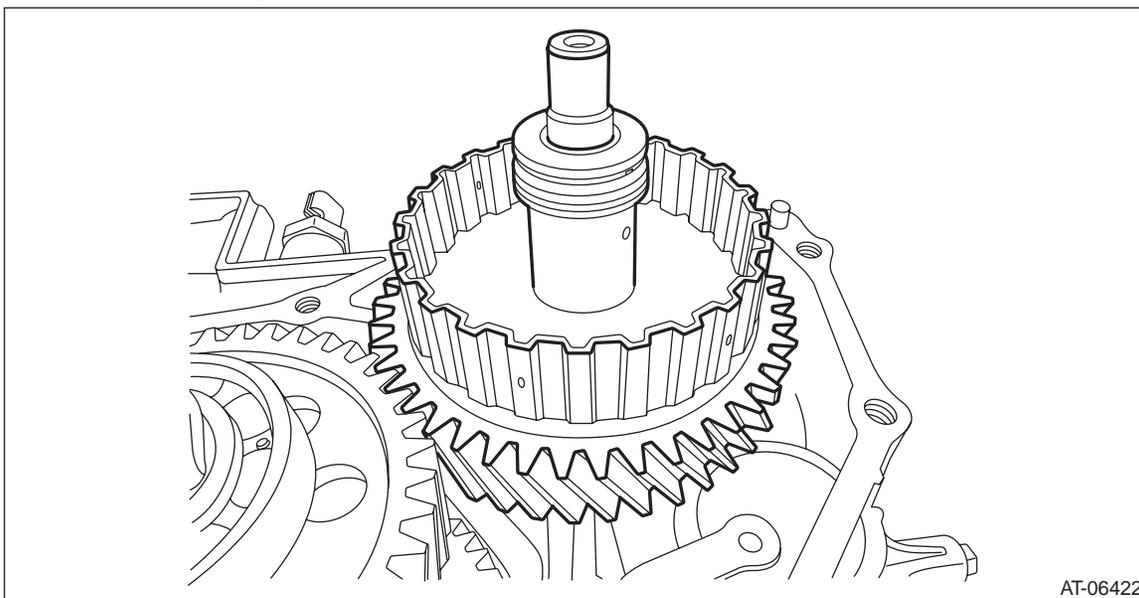


Transfer Driven Gear

CONTINUOUSLY VARIABLE TRANSMISSION

B: INSTALLATION

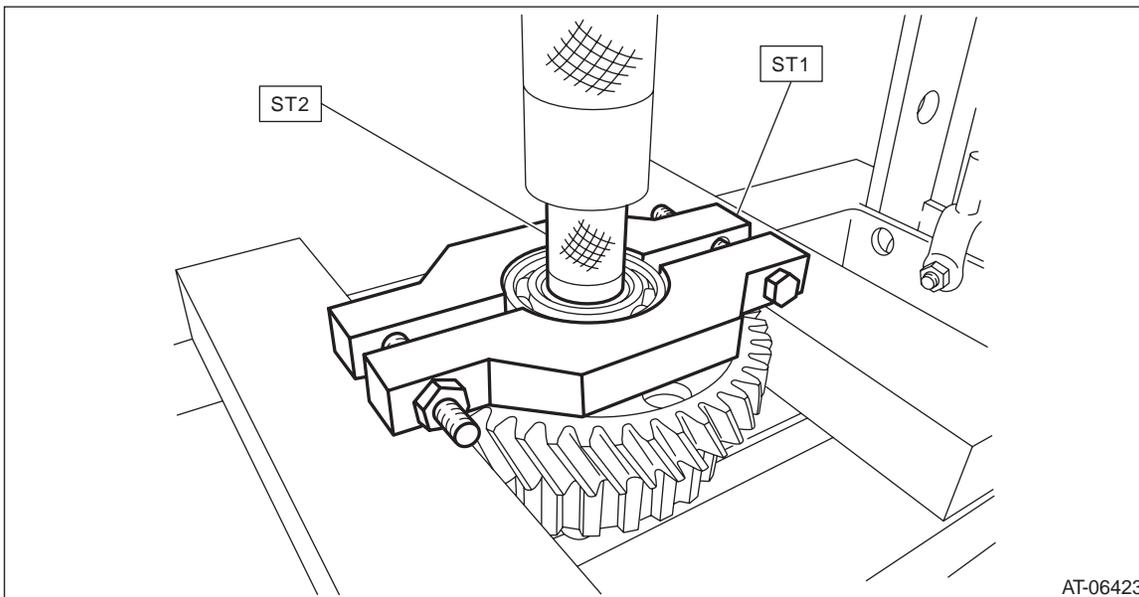
- 1) Install the transfer driven gear assembly.



- 2) Install the transfer clutch assembly. <Ref. to CVT(TR580)-171, INSTALLATION, Transfer Clutch.>
- 3) Select the transfer driven gear shim. <Ref. to CVT(TR580)-181, ADJUSTMENT, Transfer Clutch.>
- 4) Install the extension case. <Ref. to CVT(TR580)-166, INSTALLATION, Extension Case.>
- 5) Install the transmission assembly to the vehicle. <Ref. to CVT(TR580)-67, INSTALLATION, Automatic Transmission Assembly.>

C: DISASSEMBLY

- 1) Remove the ball bearing using ST.
ST1 498077400 BEARING REMOVER
ST2 899864100 REMOVER



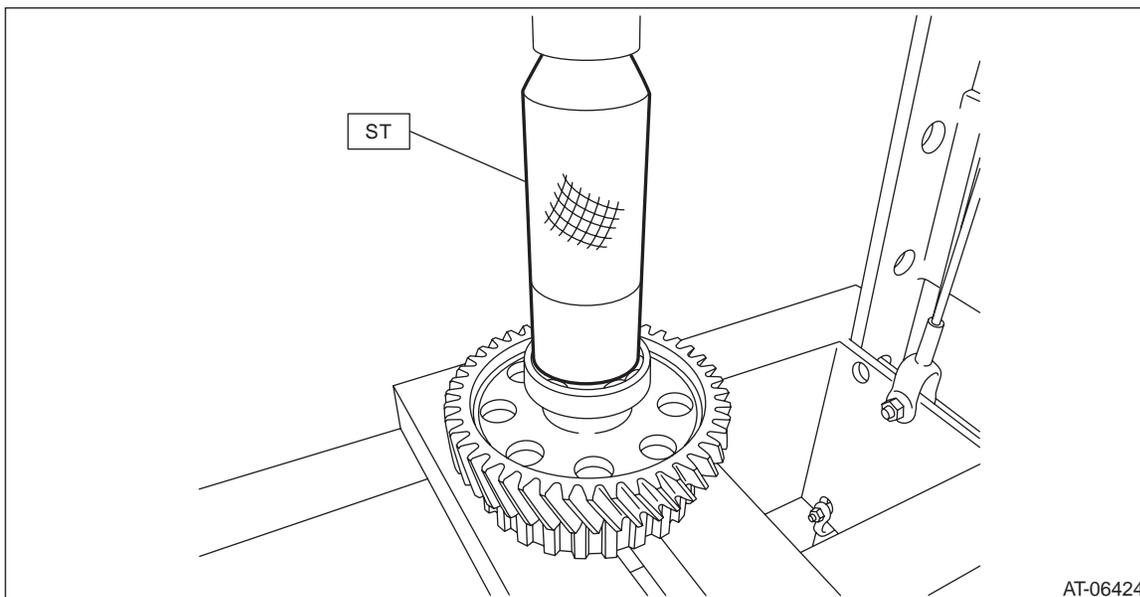
CVT(TR580)-185

Transfer Driven Gear

CONTINUOUSLY VARIABLE TRANSMISSION

D: ASSEMBLY

- 1) Using the ST, install the ball bearing.
ST 899580100 INSTALLER



E: INSPECTION

- Check the ball bearing for smooth rotation.
- Check the ball bearing for excessive looseness.
- Check the transfer driven gear for breakage or damage.

F: ADJUSTMENT

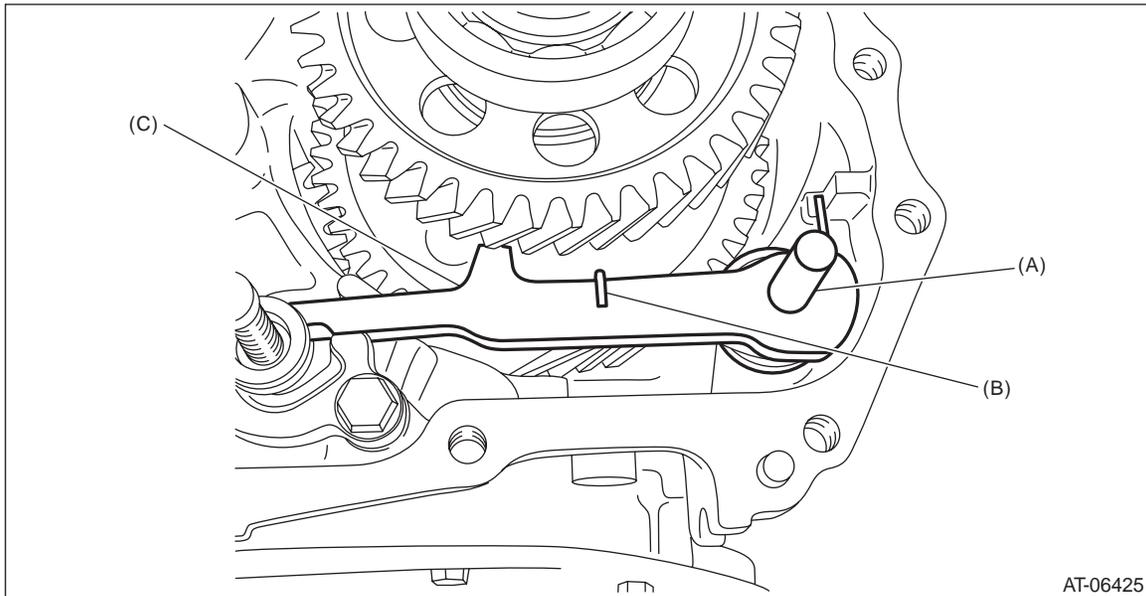
NOTE:

When the transfer driven gear or bearing is replaced, select the transfer driven gear shim. <Ref. to CVT(TR580)-181, ADJUSTMENT, Transfer Clutch.>

32. Parking Pawl

A: REMOVAL

- 1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TR580)-57, REMOVAL, Automatic Transmission Assembly.>
- 2) Shift the range select lever to "N" range.
- 3) Remove the extension case. <Ref. to CVT(TR580)-165, REMOVAL, Extension Case.>
- 4) Remove the parking pawl shaft, return spring and parking pawl.



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

Parking Pawl

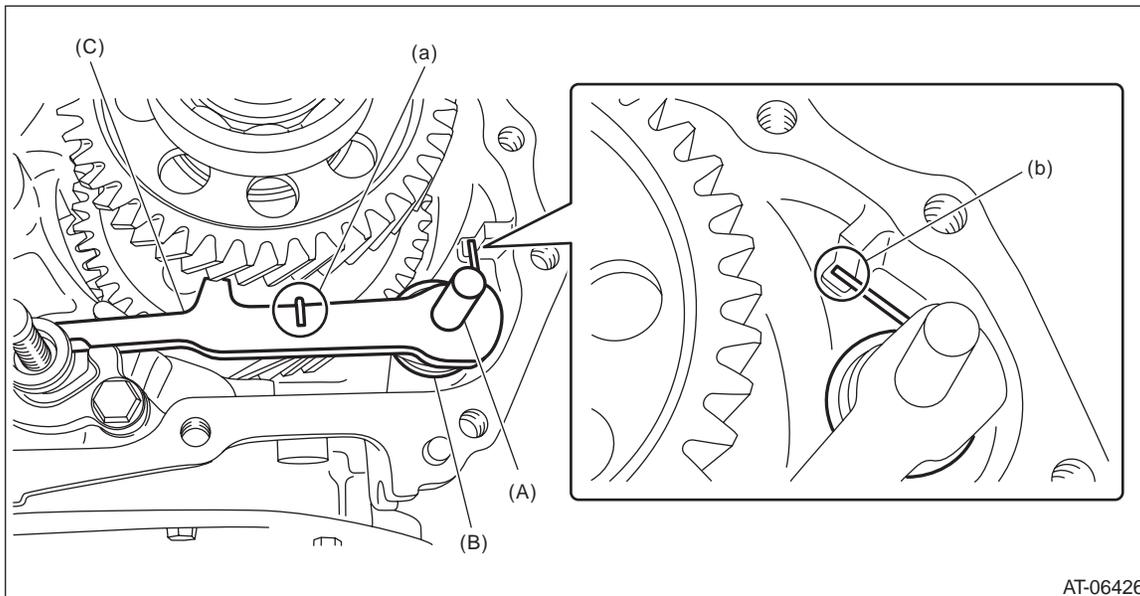
CONTINUOUSLY VARIABLE TRANSMISSION

B: INSTALLATION

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

NOTE:

Make sure that the end of return spring sticks out of parking pawl as shown in (a). Make sure that the other end contacts the rib of transmission case as shown in (b).



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

- 3) Install the extension case. <Ref. to CVT(TR580)-166, INSTALLATION, Extension Case.>
- 4) Install the transmission assembly to the vehicle. <Ref. to CVT(TR580)-67, INSTALLATION, Automatic Transmission Assembly.>

C: INSPECTION

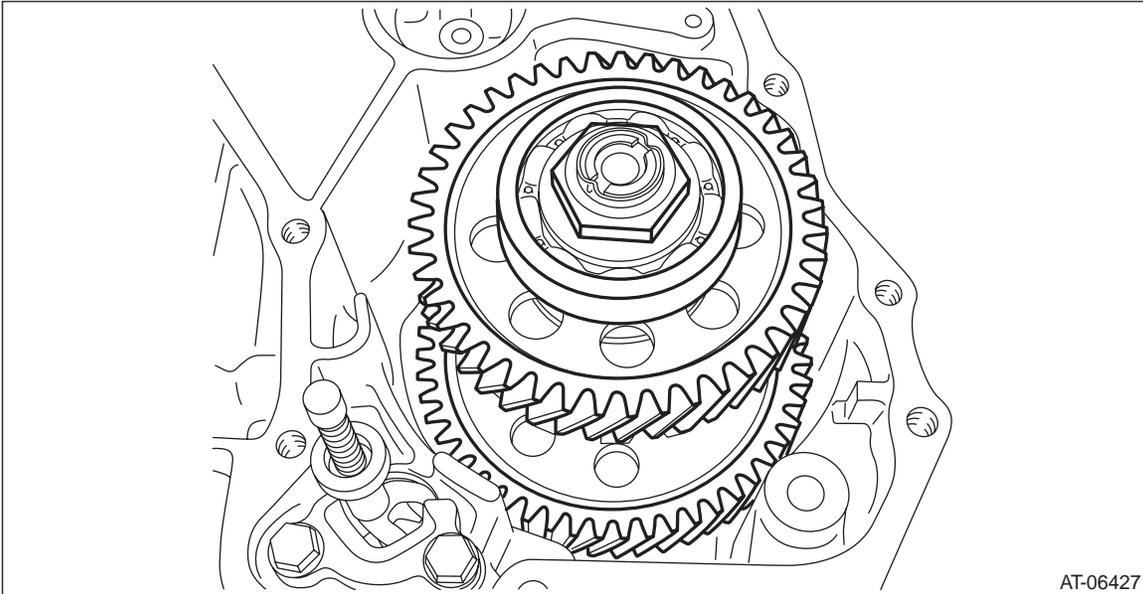
- Check the parking pawl for breakage or damage.
- Check for worn, broken and/or damaged return spring.

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33.Reduction Driven Gear

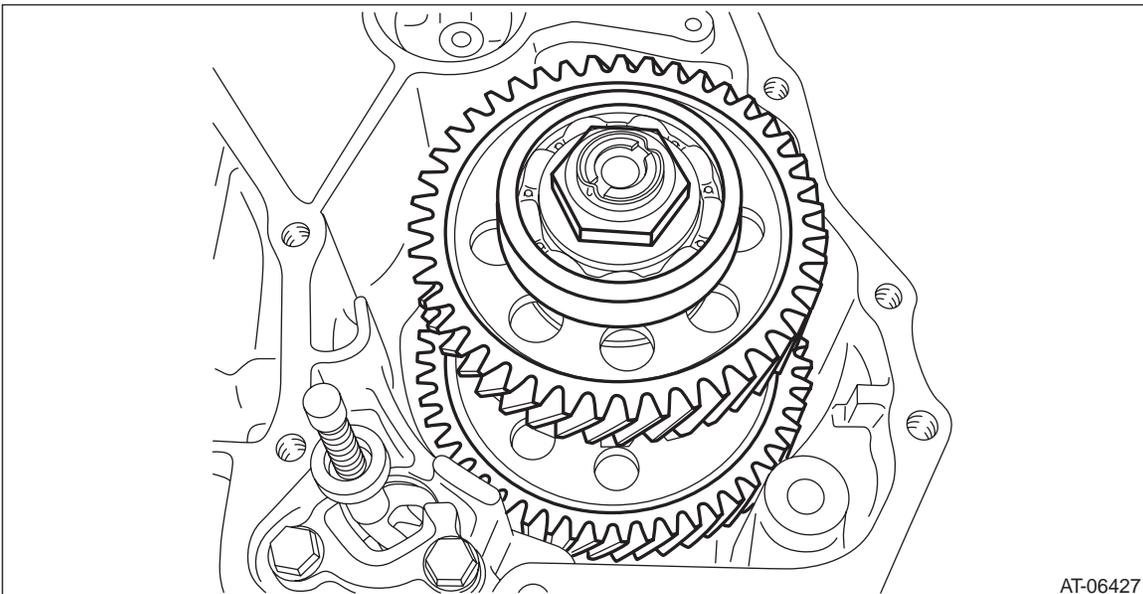
A: REMOVAL

- 1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TR580)-57, REMOVAL, Automatic Transmission Assembly.>
- 2) Remove the extension case. <Ref. to CVT(TR580)-165, REMOVAL, Extension Case.>
- 3) Remove the transfer clutch assembly. <Ref. to CVT(TR580)-169, REMOVAL, Transfer Clutch.>
- 4) Remove the transfer driven gear assembly. <Ref. to CVT(TR580)-184, REMOVAL, Transfer Driven Gear.>
- 5) Remove the parking pawl. <Ref. to CVT(TR580)-187, REMOVAL, Parking Pawl.>
- 6) Remove the reduction driven gear assembly.



B: INSTALLATION

- 1) Install the reduction driven gear assembly.



- 2) Select the transfer drive gear shim. <Ref. to CVT(TR580)-219, ADJUSTMENT, Reduction Drive Gear.>
- 3) Install the parking pawl. <Ref. to CVT(TR580)-188, INSTALLATION, Parking Pawl.>
- 4) Attach the selected transfer drive gear shim to extension case with vaseline.

Reduction Driven Gear

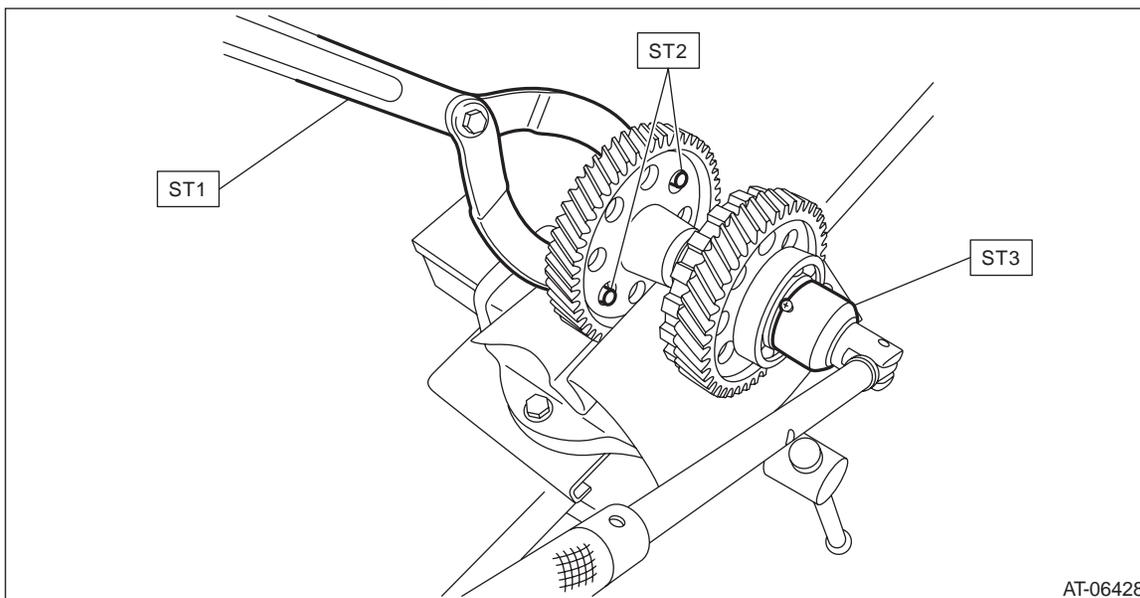
CONTINUOUSLY VARIABLE TRANSMISSION

- 5) Install the transfer driven gear assembly.<Ref. to CVT(TR580)-185, INSTALLATION, Transfer Driven Gear.>
- 6) Install the transfer clutch assembly.<Ref. to CVT(TR580)-171, INSTALLATION, Transfer Clutch.>
- 7) Install the extension case.<Ref. to CVT(TR580)-166, INSTALLATION, Extension Case.>
- 8) Install the transmission assembly to the vehicle.<Ref. to CVT(TR580)-67, INSTALLATION, Automatic Transmission Assembly.>

C: DISASSEMBLY

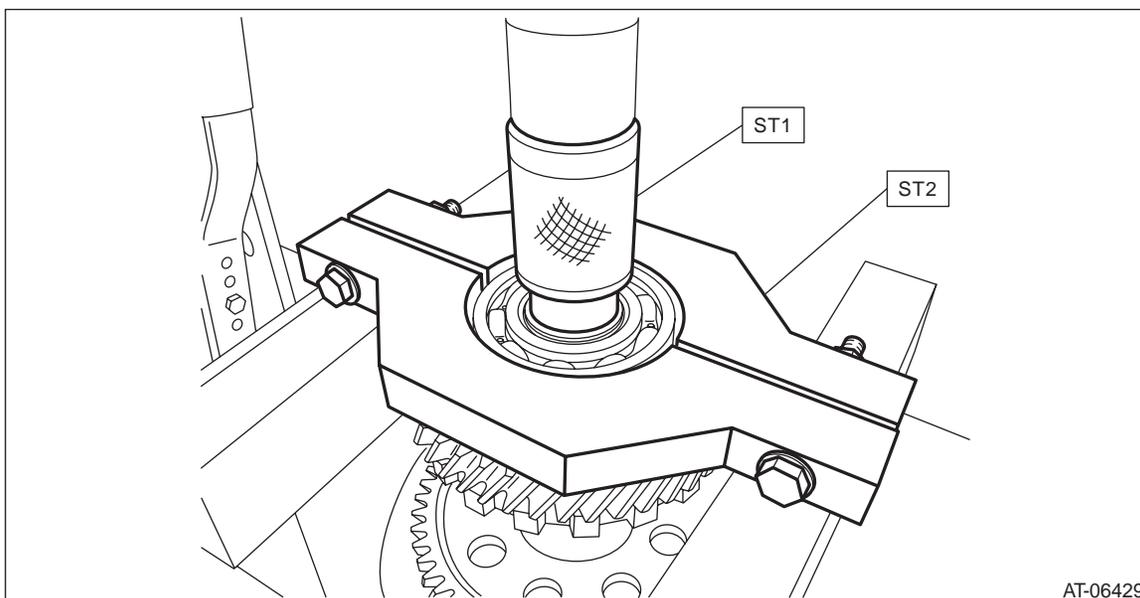
- 1) Flatten the tab of the lock nut.
- 2) Using the ST, counter the rotation of the reduction driven gear assembly, and remove the lock nut.

ST1 18355AA000 PULLEY WRENCH
ST2 18334AA000 PIN SET
ST3 499987003 SOCKET WRENCH (35)



- 3) Remove the ball bearing using ST.

ST1 499757002 INSTALLER
ST2 498077300 REMOVER

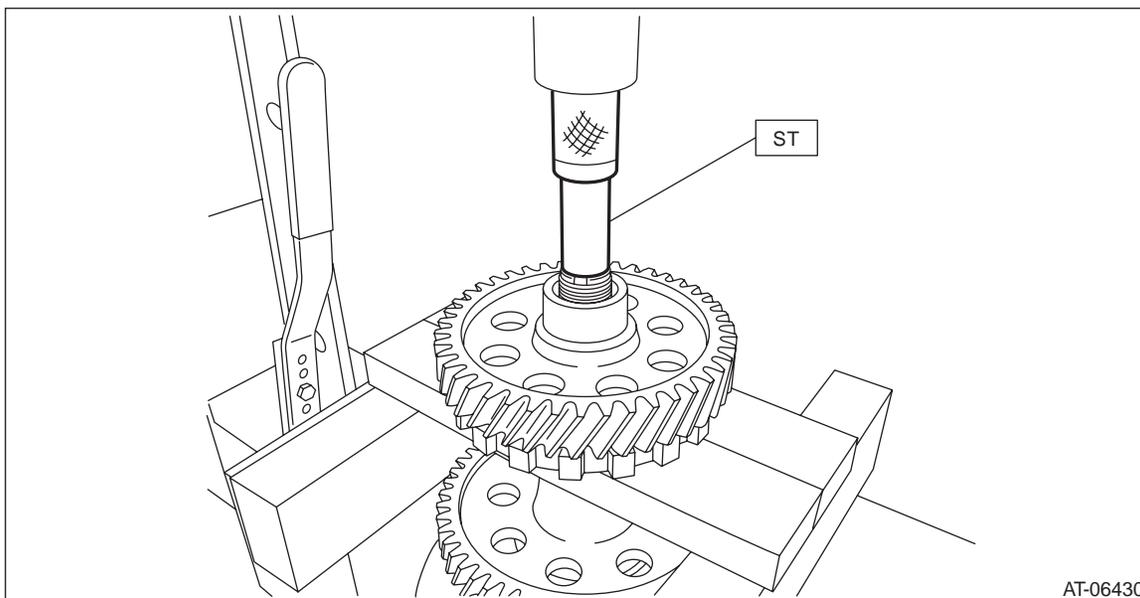


Reduction Driven Gear

CONTINUOUSLY VARIABLE TRANSMISSION

4) Using the ST, remove the parking gear and transfer drive gear.

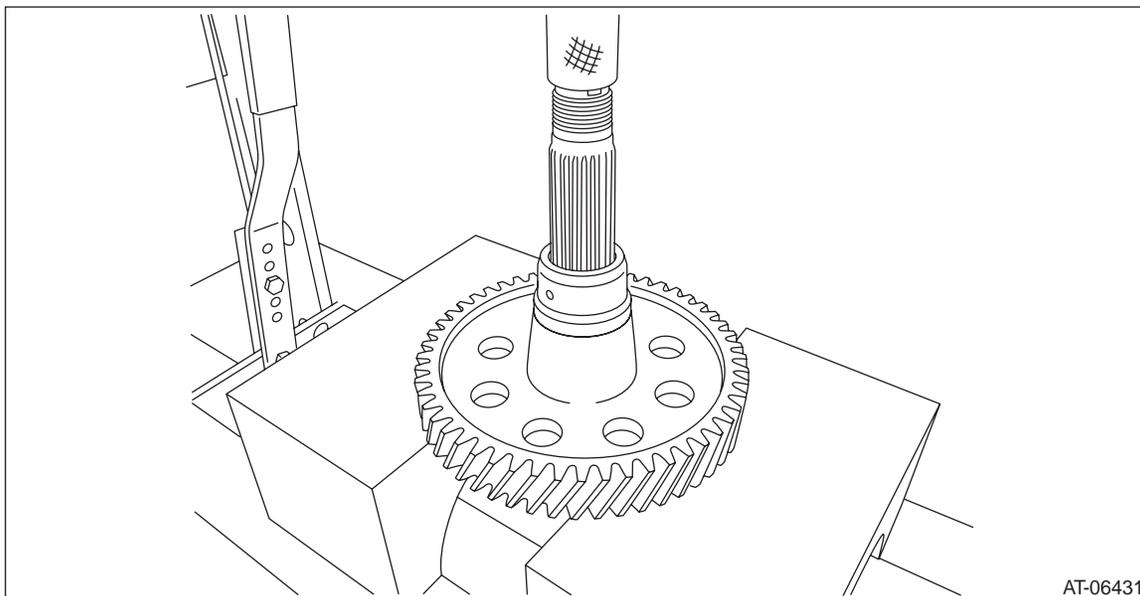
ST 899864100 REMOVER



5) Remove the collar.

NOTE:

When collar has been removed, do not reuse the reduction driven gear and/or shaft, and replace it with reduction driven gear COMPL.



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Reduction Driven Gear

CONTINUOUSLY VARIABLE TRANSMISSION

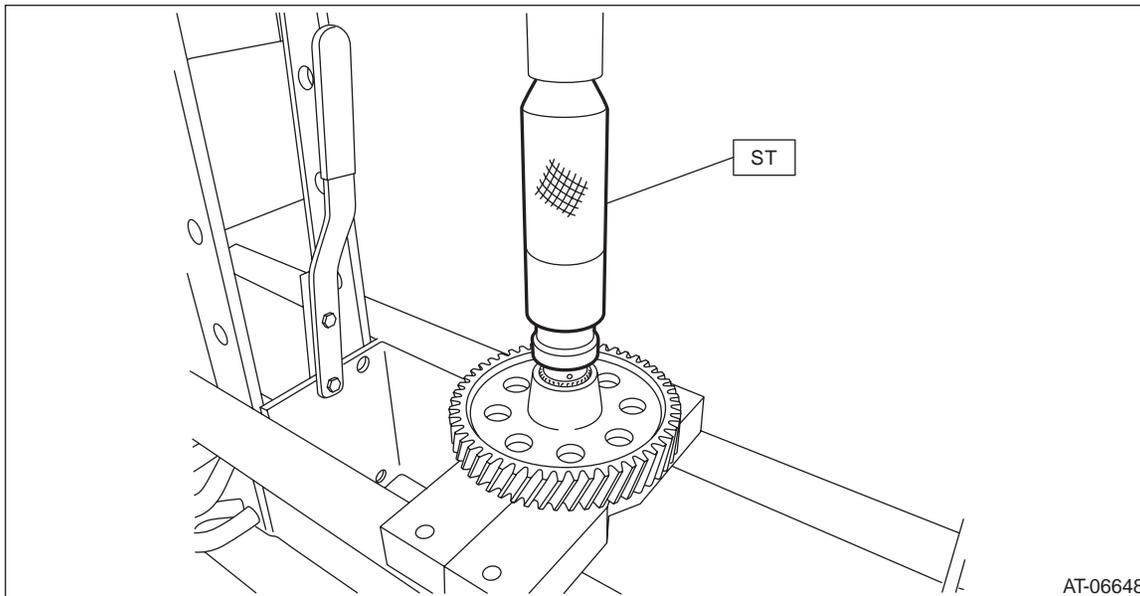
D: ASSEMBLY

1) Using the ST, attach the collar.

NOTE:

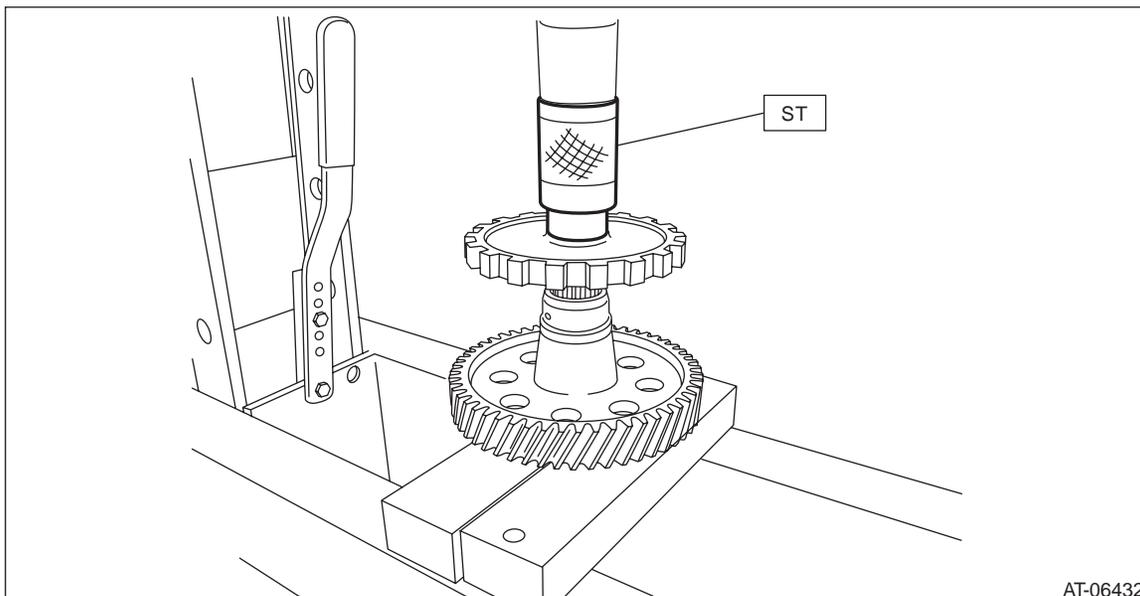
- Attach the collar in the correct direction.
- Use a new reduction driven gear COMPL.

ST 899580100 INSTALLER



2) Using the ST, install the parking gear.

ST 499757002 INSTALLER

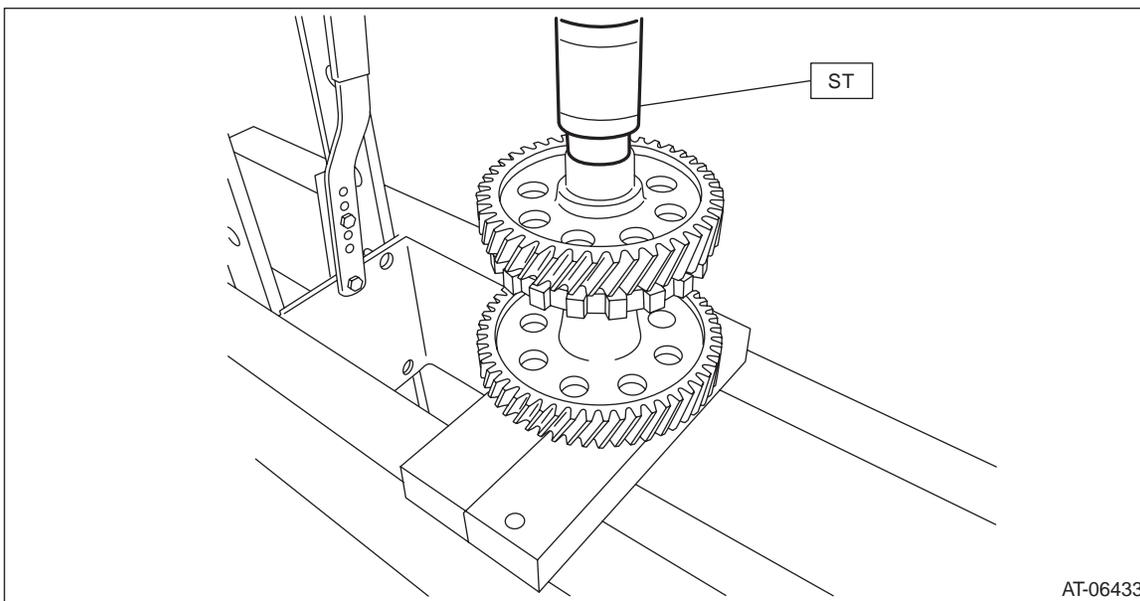


Reduction Driven Gear

CONTINUOUSLY VARIABLE TRANSMISSION

3) Using the ST, install the transfer drive gear.

ST 499757002 INSTALLER

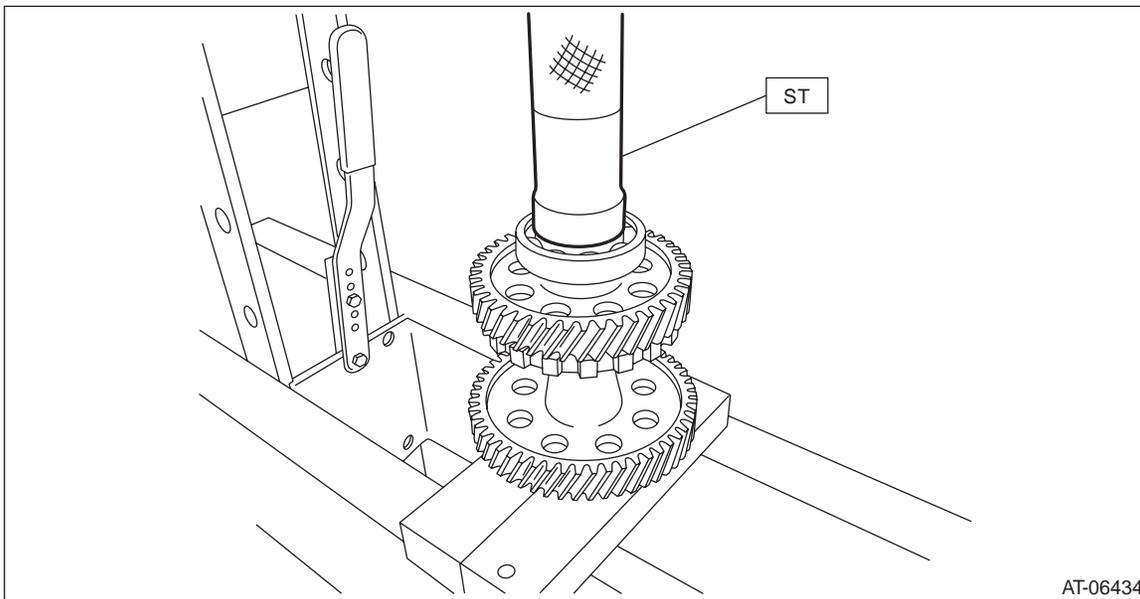


4) Using the ST, install the ball bearing.

NOTE:

Use a new ball bearing.

ST 499277100 BUSHING 1-2 INSTALLER



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Reduction Driven Gear

CONTINUOUSLY VARIABLE TRANSMISSION

5) Using the ST, counter the rotation of the reduction drive gear assembly, and install the lock nut.

NOTE:

Use a new lock nut.

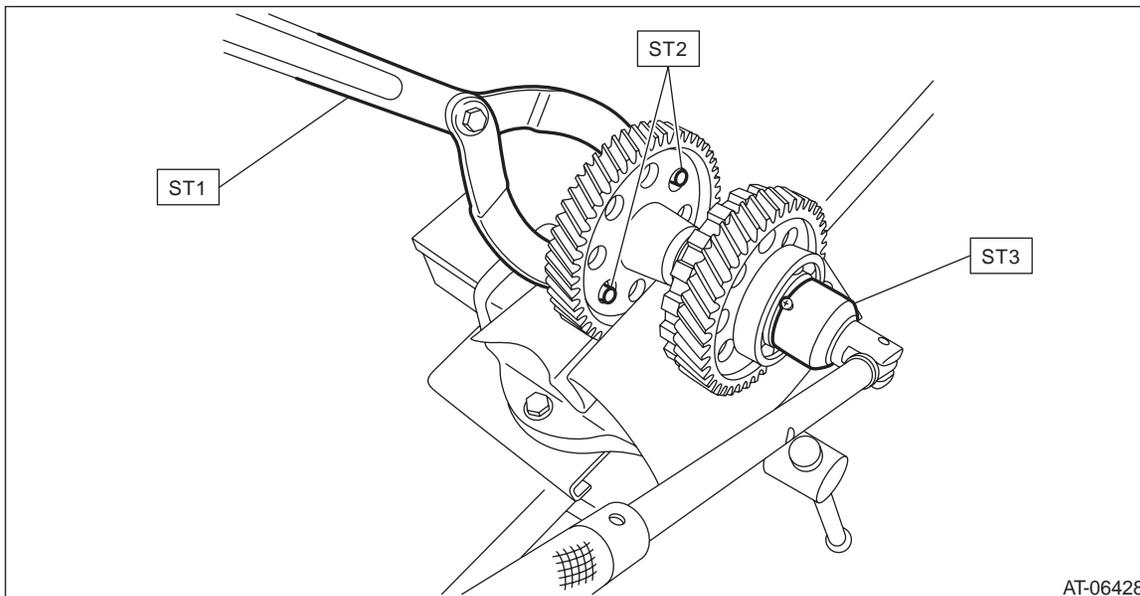
ST1 18355AA000 PULLEY WRENCH

ST2 18334AA000 PIN SET

ST3 499987003 SOCKET WRENCH (35)

Tightening torque:

95 N·m (9.7 kgf·m, 70.1 ft·lb)



6) Crimp the lock nut in 4 locations.

CAUTION:

Do not allow the lock nut to be cracked during crimping operation.

E: INSPECTION

- Check the ball bearing for smooth rotation.
- Check the ball bearing for excessive looseness.
- Make sure each gear is not broken or damaged.

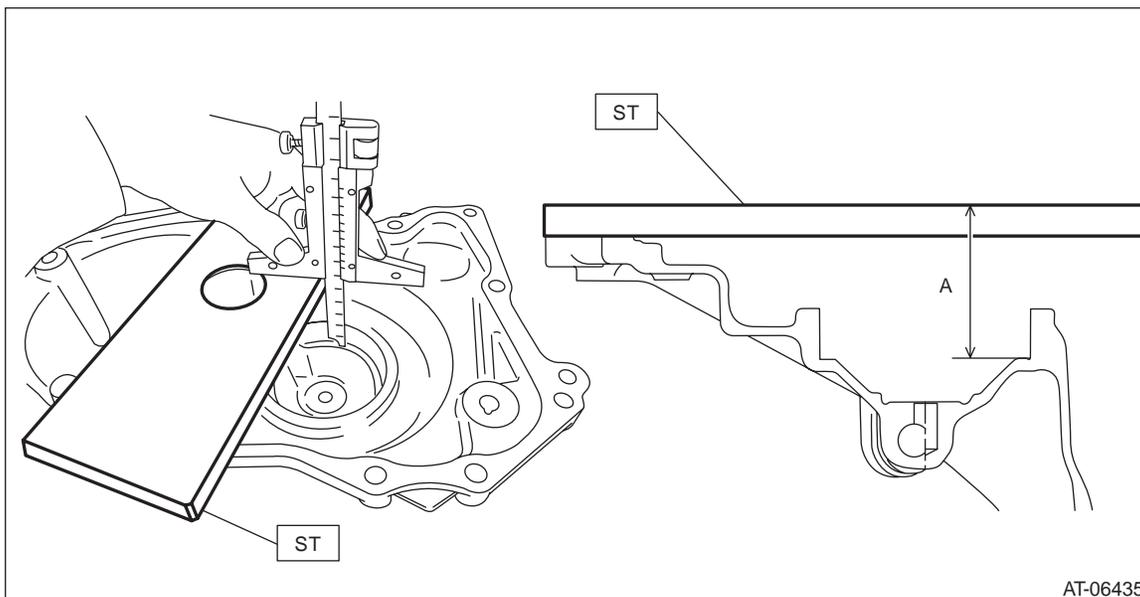
Reduction Driven Gear

CONTINUOUSLY VARIABLE TRANSMISSION

F: ADJUSTMENT

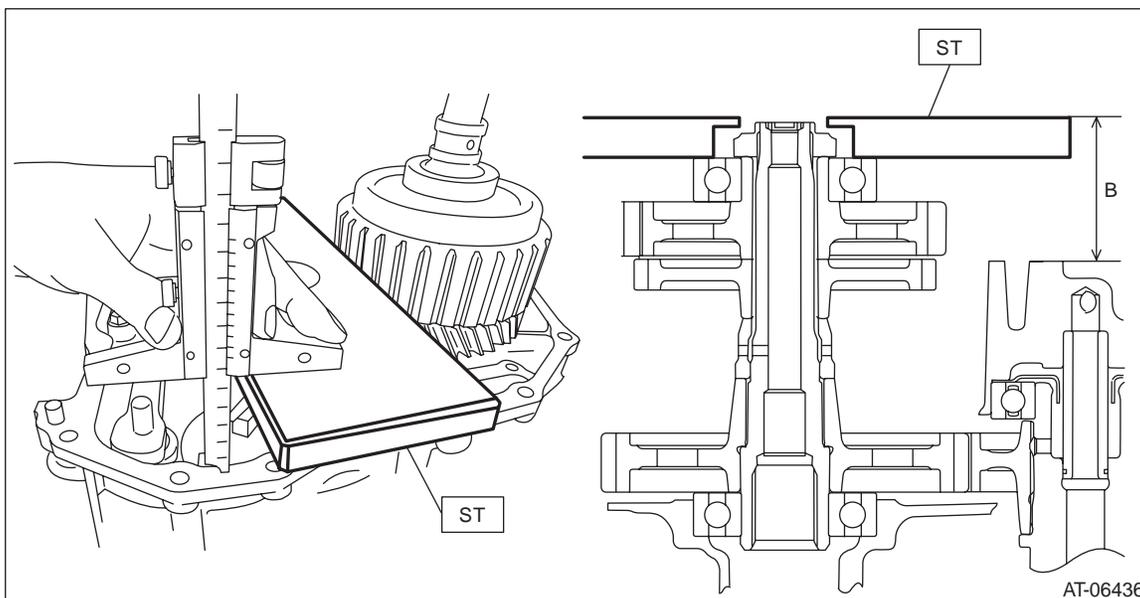
1) Measure the height "A" from the ST upper face to the ball bearing catch surface.

ST 499575600 GAUGE



2) Measure the height "B" from the ST to the mating surface of the transmission case.

ST 499575600 GAUGE



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Reduction Driven Gear

CONTINUOUSLY VARIABLE TRANSMISSION

3) Obtain the thickness of transfer drive gear shim using the following formula to select one to three transfer drive gear shims.

$$T \text{ (mm)} = A - B - (0.05 \text{ — } 0.25)$$

$$[T \text{ (in)} = A - B - (0.002 \text{ — } 0.01)]$$

T: Shim thickness

A: Height from the ST upper face to the ball bearing catch surface

B: Height from ST to transmission case mating surface

0.05 — 0.25 mm (0.002 — 0.01 in): Clearance

Transfer drive gear shim	
Part No.	Thickness mm (in)
33279AA090	0.3 (0.012)
33279AA100	0.4 (0.016)
33279AA110	0.5 (0.020)

34. Transmission Control Device

A: REMOVAL

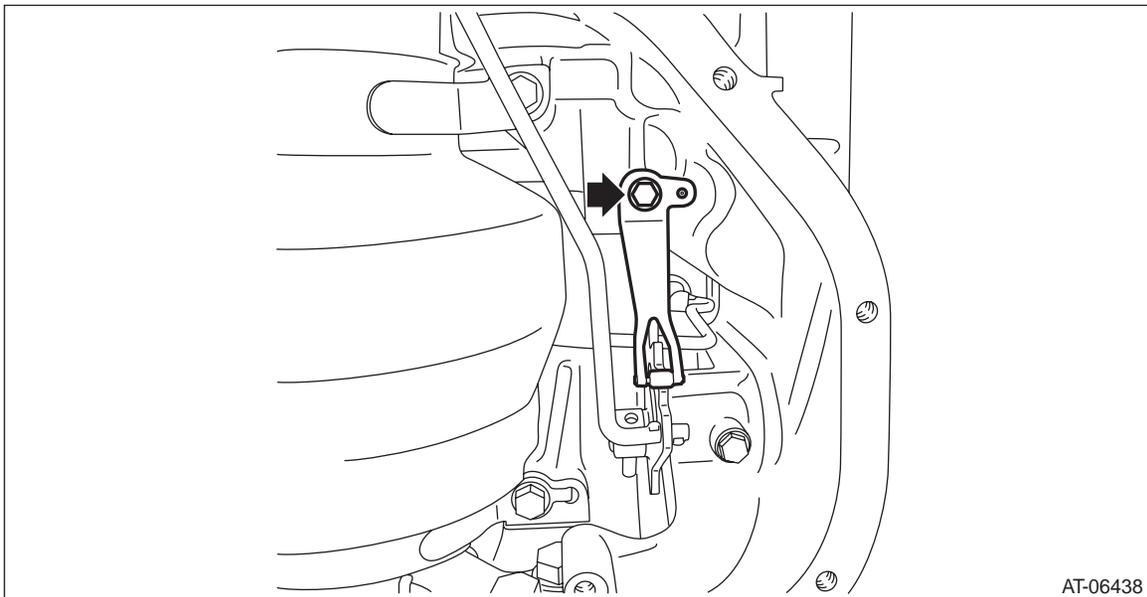
- 1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TR580)-57, REMOVAL, Automatic Transmission Assembly.>
- 2) Remove the inhibitor switch. <Ref. to CVT(TR580)-94, REMOVAL, Inhibitor Switch.>
- 3) Remove the oil pan and oil strainer. <Ref. to CVT(TR580)-107, REMOVAL, Oil Pan and Strainer.>
- 4) Shift the manual plate to "N" range, and remove the spring pin.

NOTE:

Prevent the spring pin from dropping in the transmission using paper towel etc.



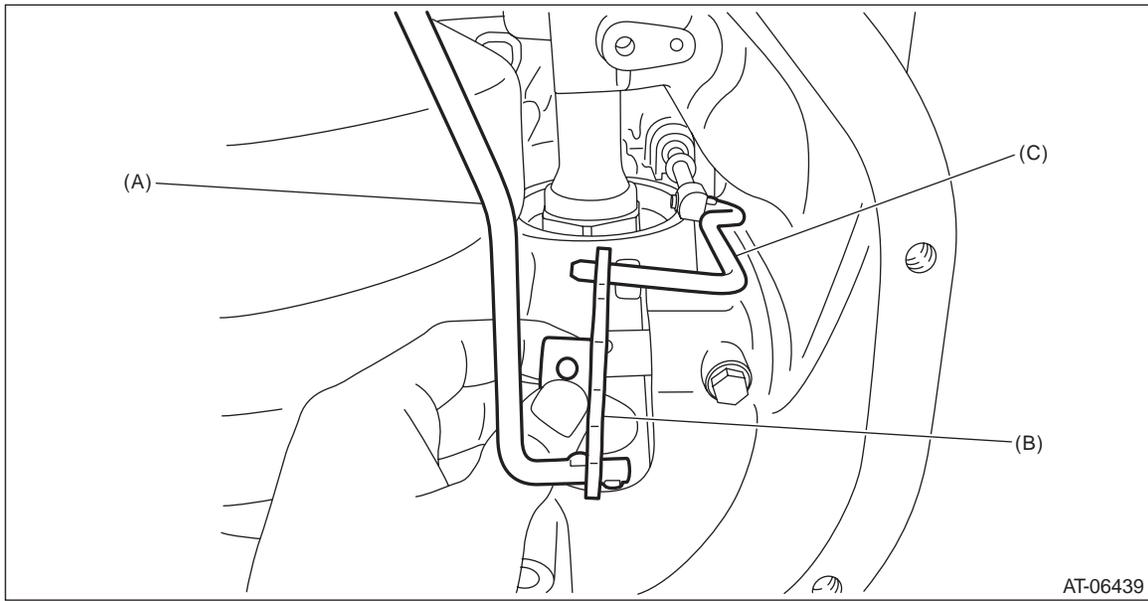
- 5) Remove the detent spring.



Transmission Control Device

CONTINUOUSLY VARIABLE TRANSMISSION

6) Remove the manual plate from the shifter arm shaft, and remove the shift connecting rod of the manual valve.



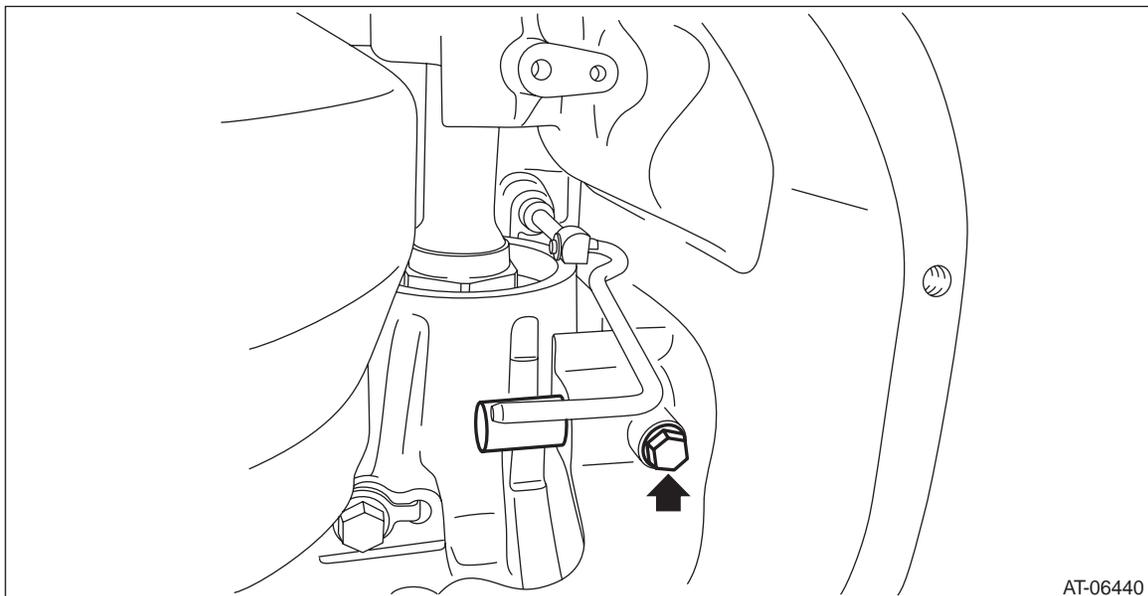
- (A) Parking rod
- (B) Manual plate
- (C) Shift connecting rod

7) Remove the manual plate and parking rod.

8) Remove the bolt, and remove the shifter arm shaft.

NOTE:

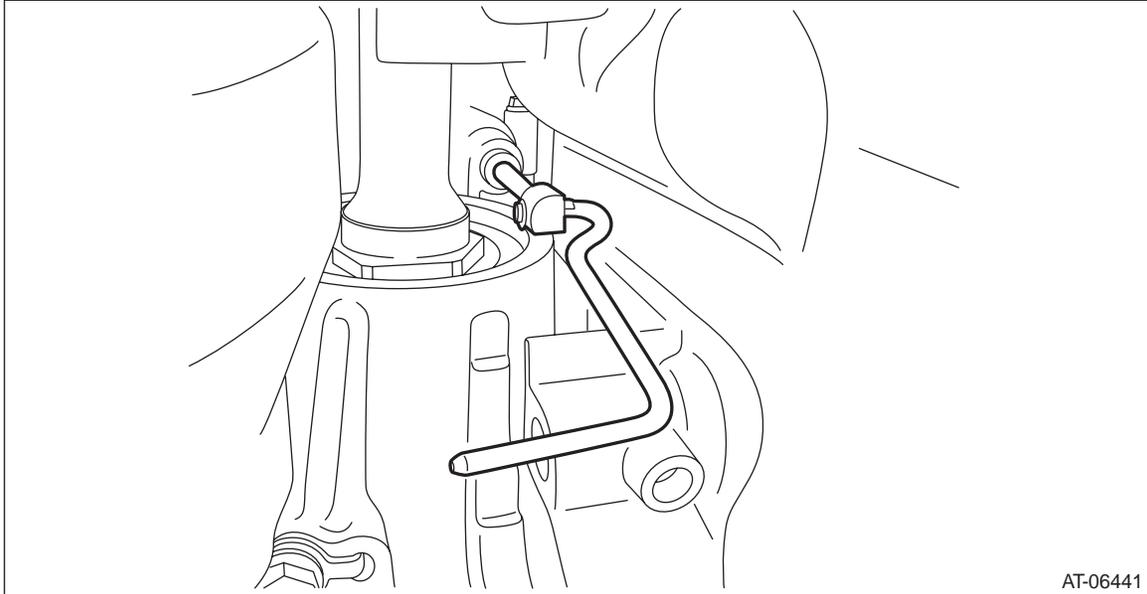
Do not damage the lip of oil seal press-fitted in the case.



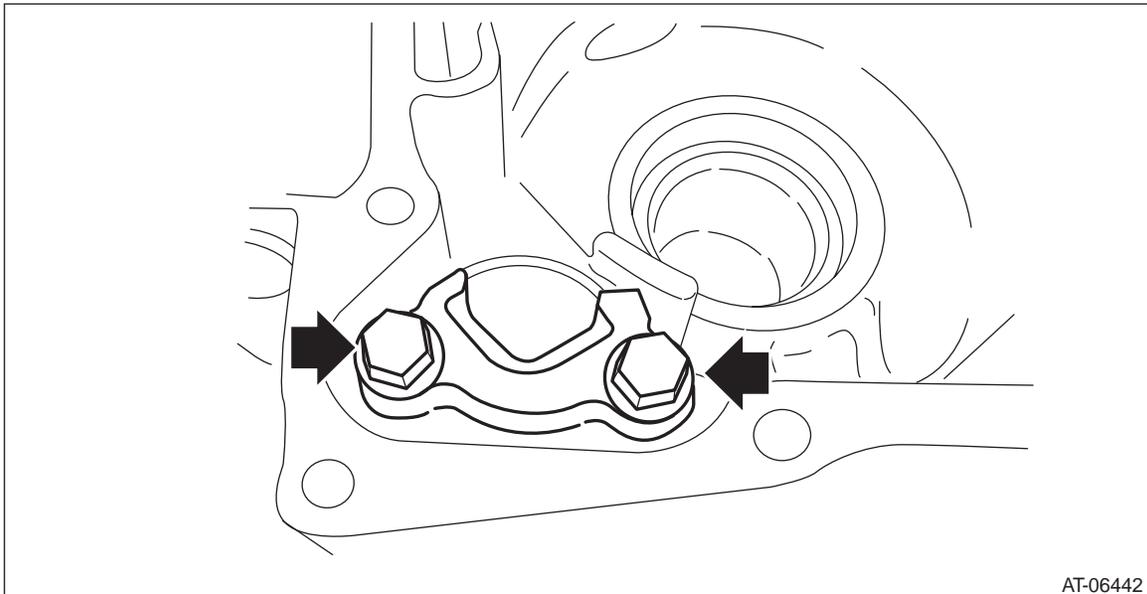
Transmission Control Device

CONTINUOUSLY VARIABLE TRANSMISSION

9) Remove the manual valve.



10) Remove the extension case. <Ref. to CVT(TR580)-165, REMOVAL, Extension Case.>
11) Remove the parking support.



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Transmission Control Device

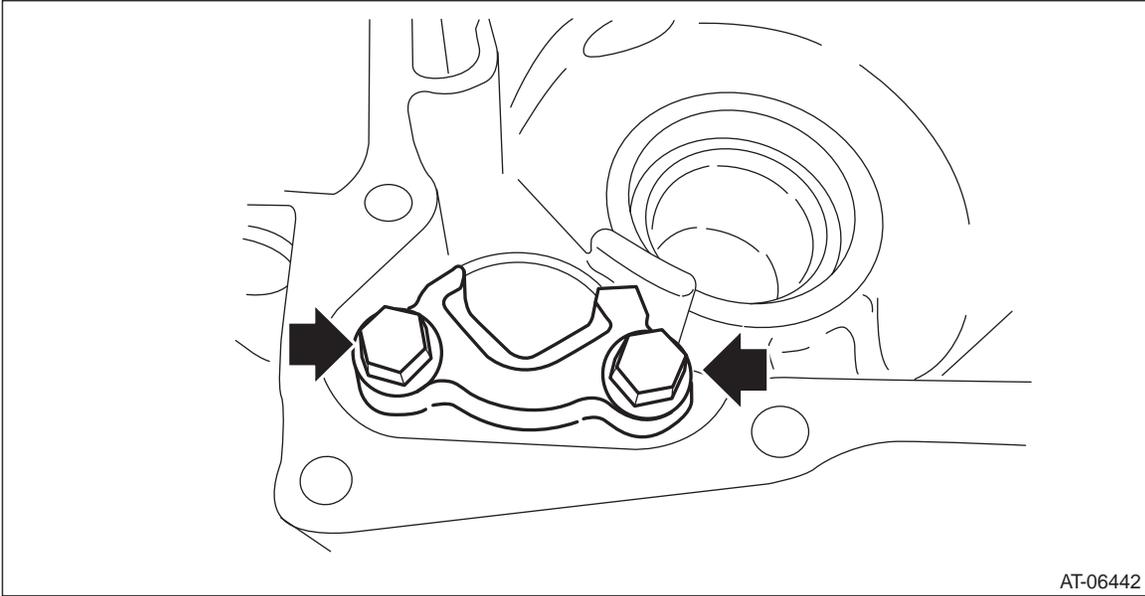
CONTINUOUSLY VARIABLE TRANSMISSION

B: INSTALLATION

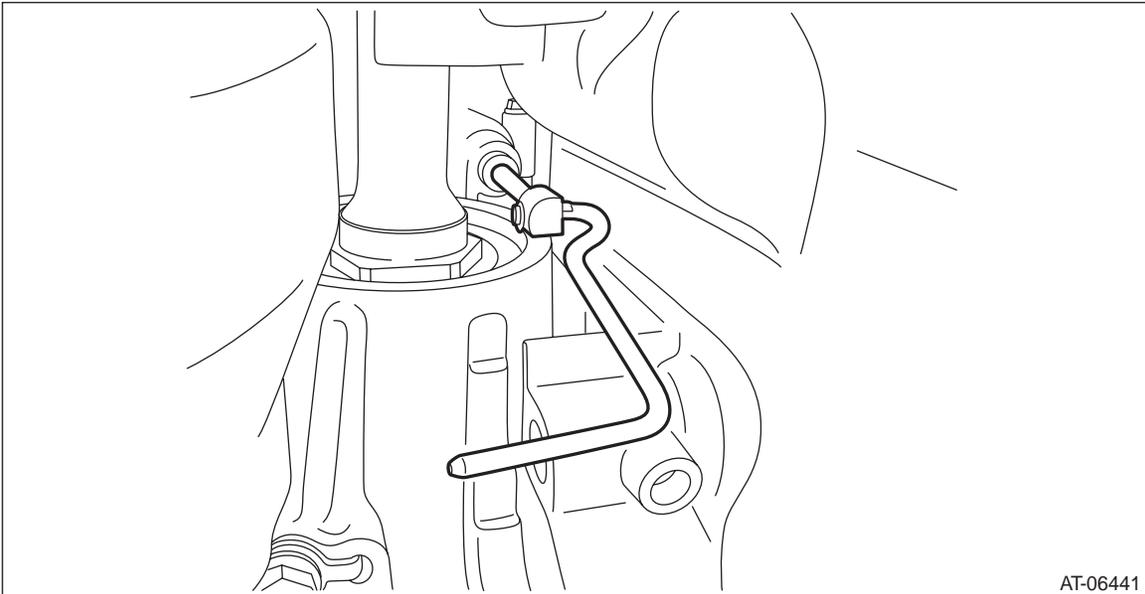
1) Install the parking support.

Tightening torque:

25 N·m (2.5 kgf·m, 18.4 ft·lb)



2) Install the extension case. <Ref. to CVT(TR580)-166, INSTALLATION, Extension Case.>
3) Install the manual valve.



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Transmission Control Device

CONTINUOUSLY VARIABLE TRANSMISSION

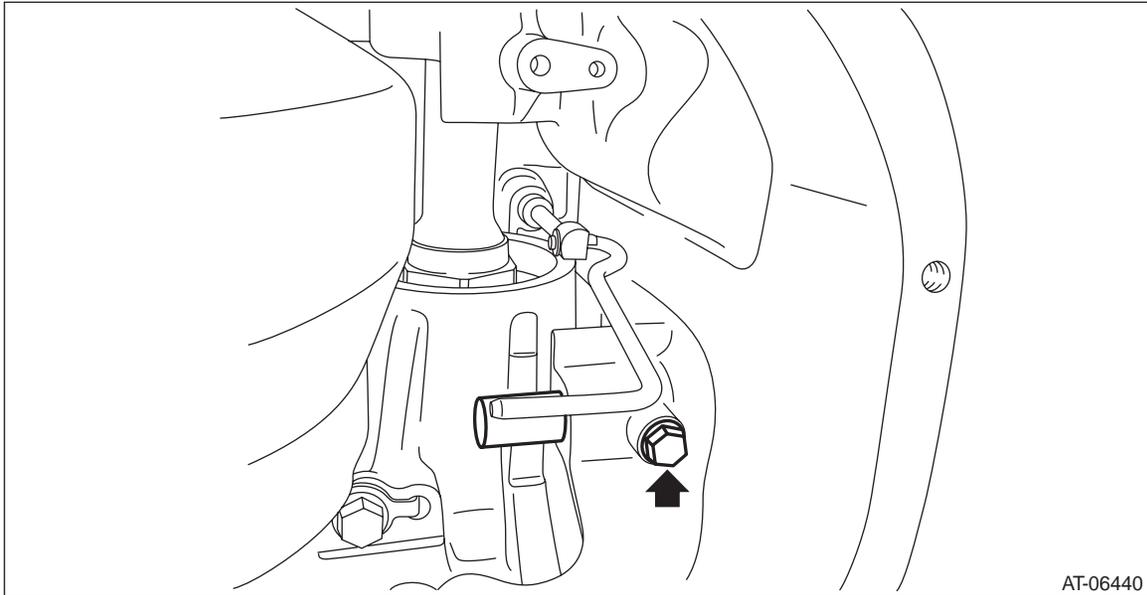
4) Install the shifter arm shaft and bolt.

NOTE:

Do not damage the lip of oil seal press-fitted in the case.

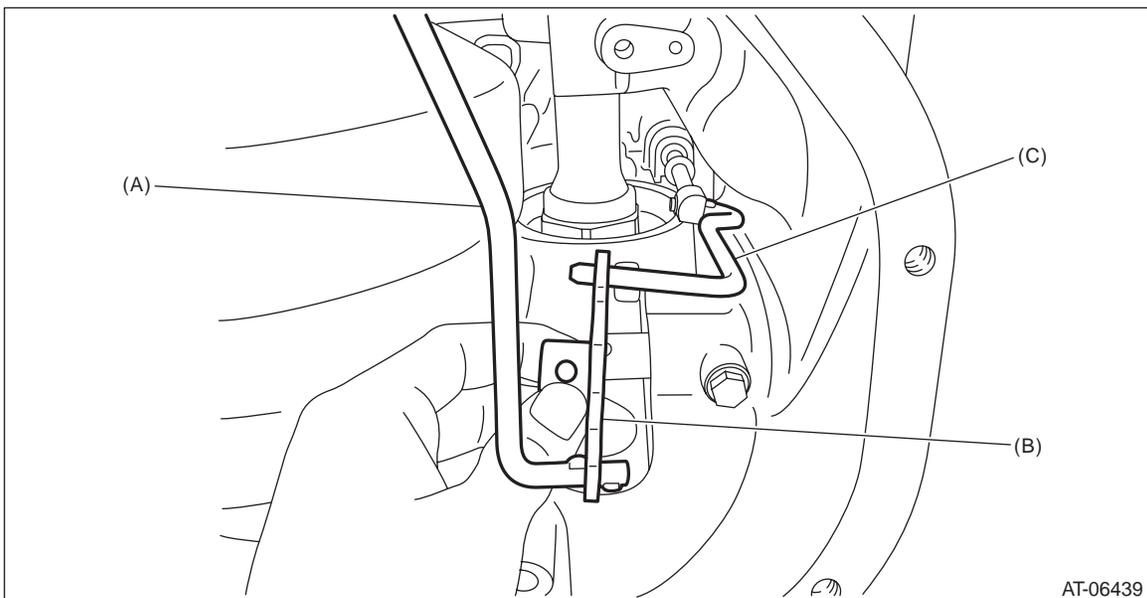
Tightening torque:

7 N·m (0.7 kgf·m, 5.2 ft·lb)



5) Install the parking rod to the manual plate.

6) Insert the parking rod into the transmission case, and install the shift connecting rod of the manual valve to the manual plate.



- (A) Parking rod
- (B) Manual plate
- (C) Shift connecting rod

7) Install the manual plate to the shifter arm shaft.

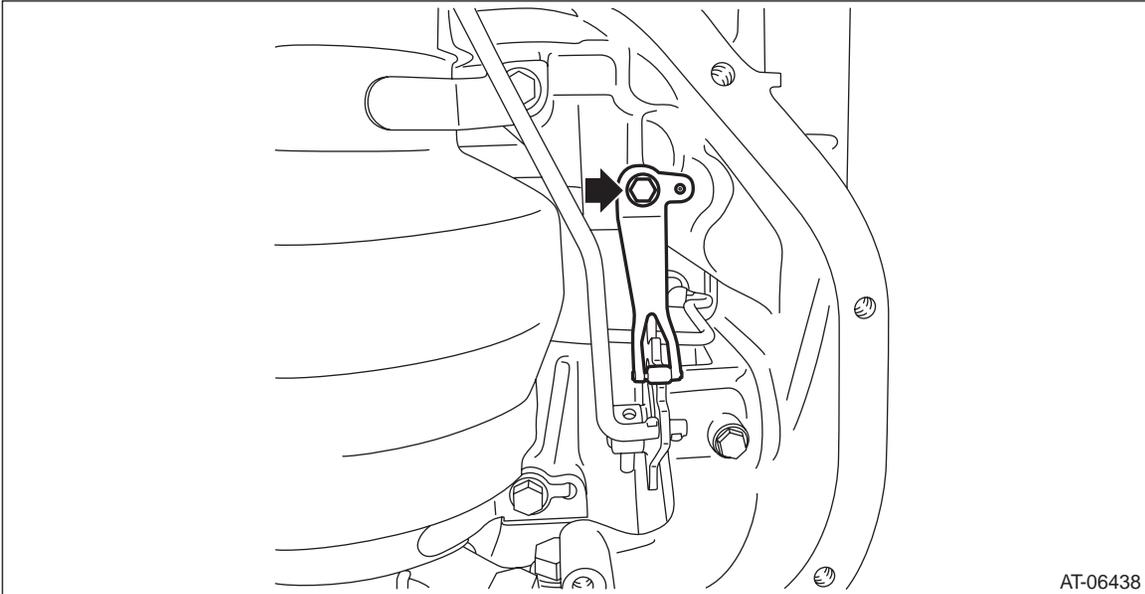
Transmission Control Device

CONTINUOUSLY VARIABLE TRANSMISSION

8) Install the detent spring to the transmission case.

Tightening torque:

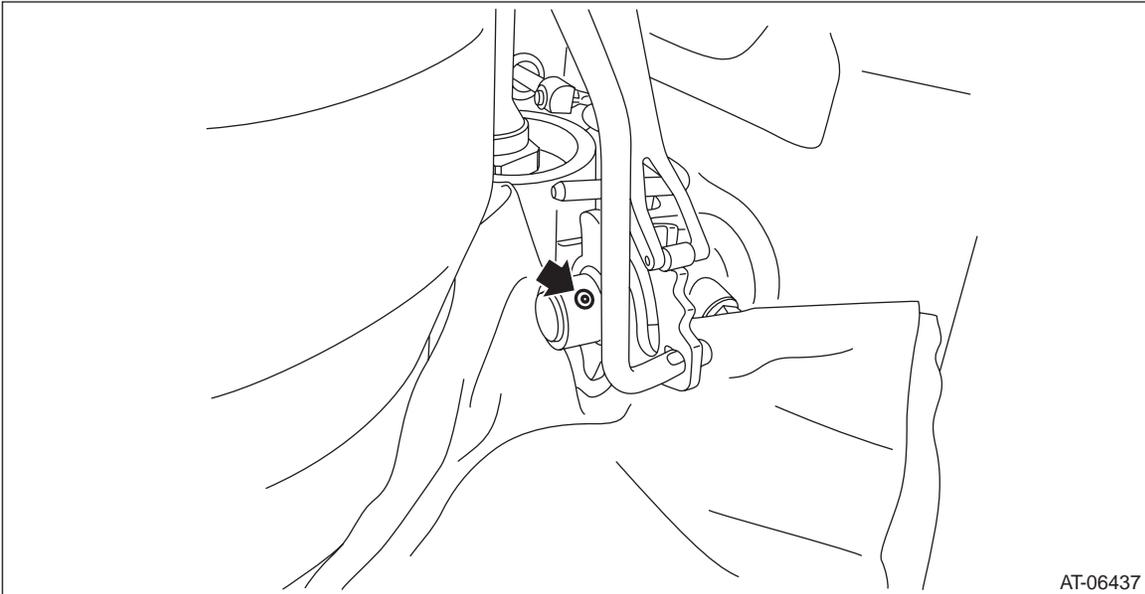
7 N·m (0.7 kgf·m, 5.2 ft·lb)



9) Install the spring pin.

NOTE:

Use new spring pin.



10) Install the inhibitor switch. <Ref. to CVT(TR580)-95, INSTALLATION, Inhibitor Switch.>

11) Adjust the inhibitor switch. <Ref. to CVT(TR580)-93, ADJUSTMENT, Inhibitor Switch.>

12) Install the oil strainer and oil pan. <Ref. to CVT(TR580)-108, INSTALLATION, Oil Pan and Strainer.>

13) Install the transmission assembly to the vehicle. <Ref. to CVT(TR580)-67, INSTALLATION, Automatic Transmission Assembly.>

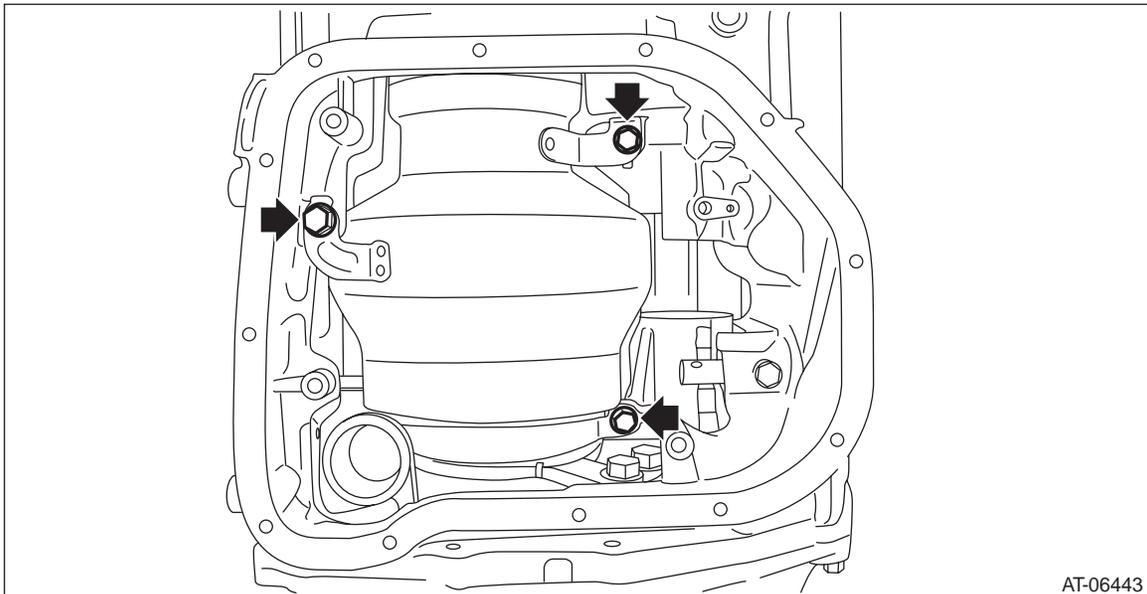
C: INSPECTION

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

35. Transmission Case

A: REMOVAL

- 1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TR580)-57, REMOVAL, Automatic Transmission Assembly.>
- 2) Remove the air breather hose. <Ref. to CVT(TR580)-155, REMOVAL, Air Breather Hose.>
- 3) Remove the control valve body. <Ref. to CVT(TR580)-111, REMOVAL, Control Valve Body.>
- 4) Remove the transmission harness. <Ref. to CVT(TR580)-125, REMOVAL, Transmission Harness.>
- 5) Remove the turbine speed sensor. <Ref. to CVT(TR580)-98, REMOVAL, Turbine Speed Sensor.>
- 6) Remove the secondary speed sensor. <Ref. to CVT(TR580)-100, REMOVAL, Secondary Speed Sensor.>
- 7) Remove the primary speed sensor. <Ref. to CVT(TR580)-102, REMOVAL, Primary Speed Sensor.>
- 8) Remove the inhibitor switch. <Ref. to CVT(TR580)-94, REMOVAL, Inhibitor Switch.>
- 9) Remove the extension case. <Ref. to CVT(TR580)-165, REMOVAL, Extension Case.>
- 10) Remove the transfer clutch assembly. <Ref. to CVT(TR580)-169, REMOVAL, Transfer Clutch.>
- 11) Remove the transfer driven gear assembly. <Ref. to CVT(TR580)-184, REMOVAL, Transfer Driven Gear.>
- 12) Remove the parking pawl. <Ref. to CVT(TR580)-187, REMOVAL, Parking Pawl.>
- 13) Remove the reduction driven gear assembly. <Ref. to CVT(TR580)-189, REMOVAL, Reduction Driven Gear.>
- 14) Remove the oil pan and oil strainer. <Ref. to CVT(TR580)-107, REMOVAL, Oil Pan and Strainer.>
- 15) Remove the transmission control device. <Ref. to CVT(TR580)-197, REMOVAL, Transmission Control Device.>
- 16) Remove the oil baffle securing bolt.

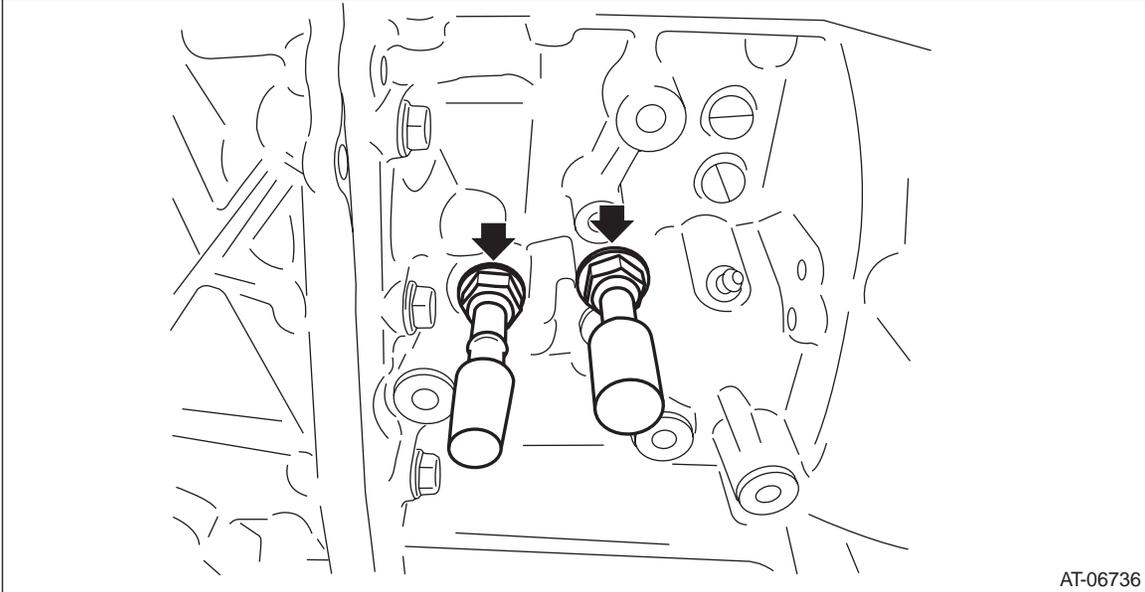


AT-06443

Transmission Case

CONTINUOUSLY VARIABLE TRANSMISSION

17) Remove the oil cooler pipe.



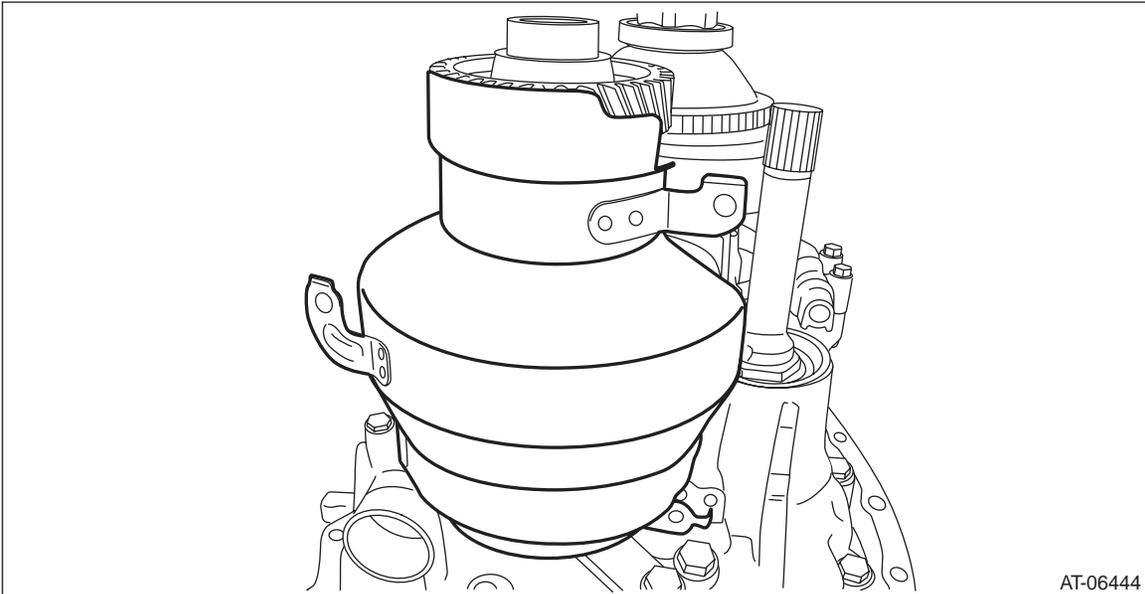
AT-06736

18) Remove the transmission case.

NOTE:

The total number of transmission case mounting bolts is 15.

19) Remove the oil baffle.

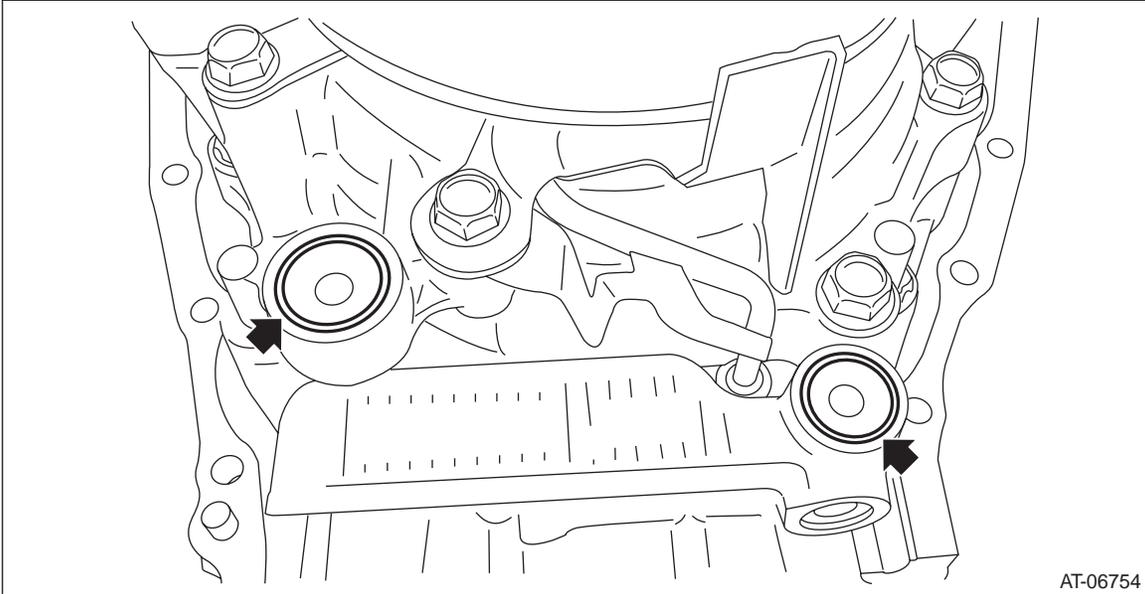


AT-06444

Transmission Case

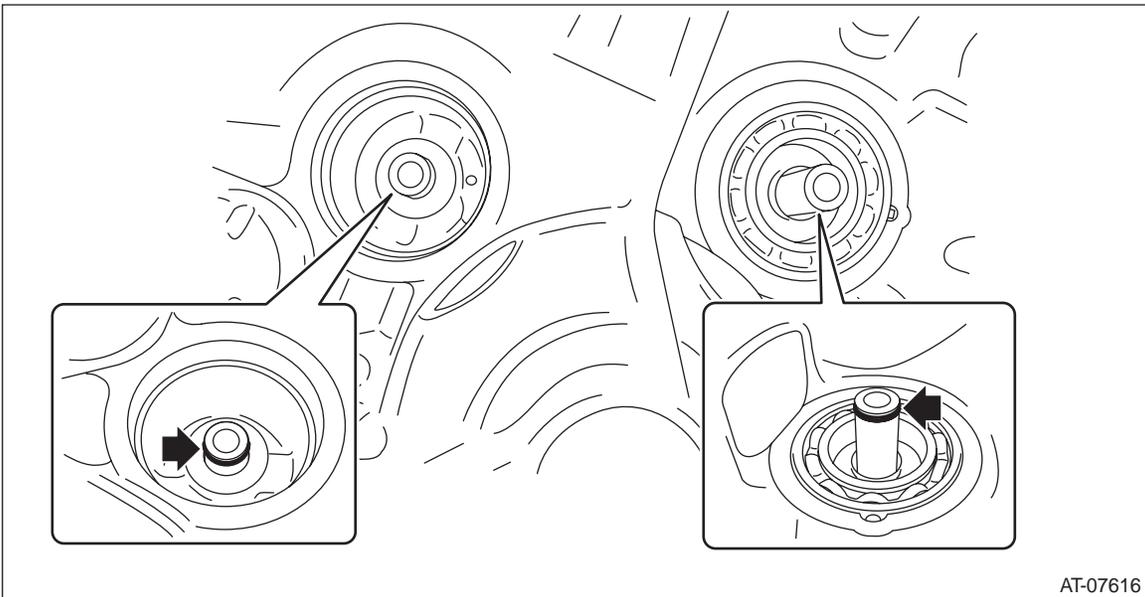
CONTINUOUSLY VARIABLE TRANSMISSION

20) Remove the O-ring.



AT-06754

21) Remove the seal ring from the transmission case.



AT-07616

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Transmission Case

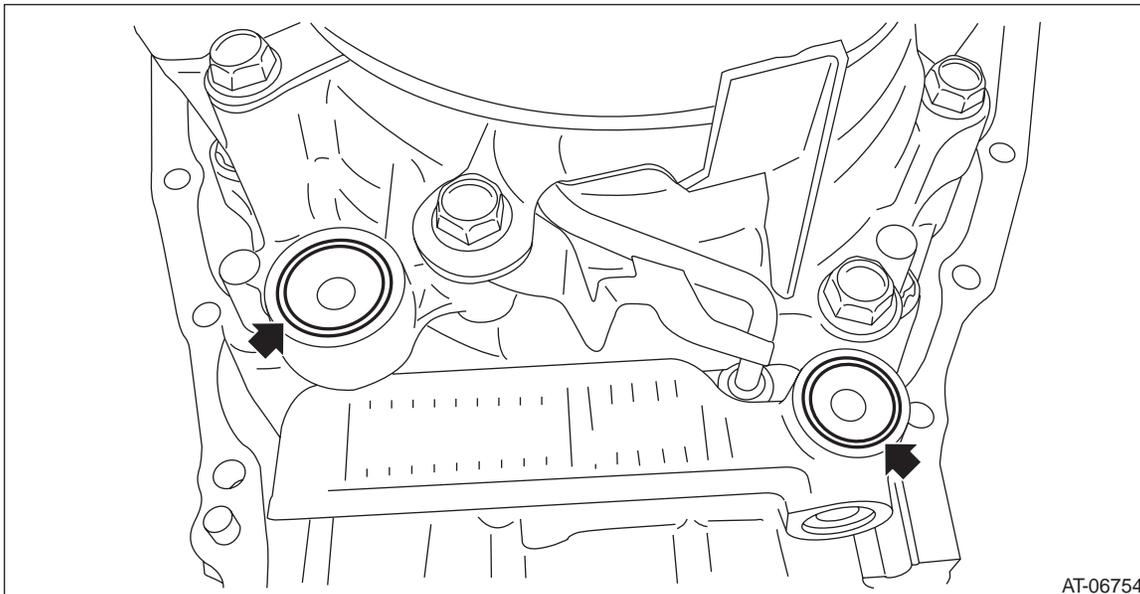
CONTINUOUSLY VARIABLE TRANSMISSION

B: INSTALLATION

- 1) Clean the mating surface of transmission case and converter case.
- 2) Select the reduction gear shim.<Ref. to CVT(TR580)-219, ADJUSTMENT, Reduction Drive Gear.>
- 3) Remove the transmission case, and install the selected reduction gear shim to the reduction drive gear.
- 4) Install the O-rings to the reverse clutch housing and drive pinion retainer.

NOTE:

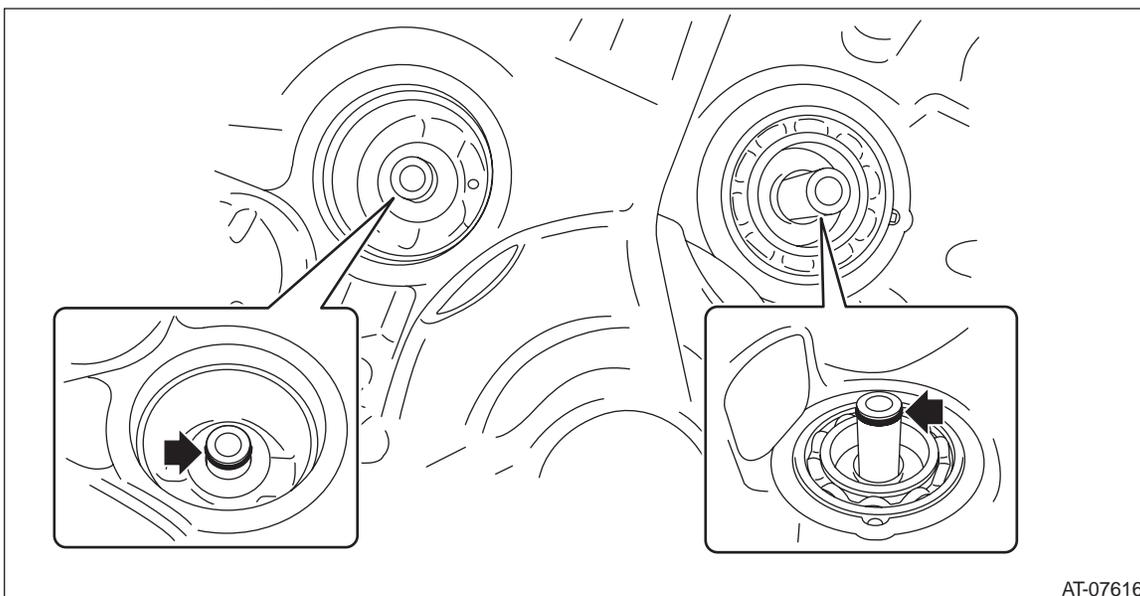
- Use new O-rings.
- Apply CVTF to the O-rings.



- 5) Install the seal ring to the transmission case.

NOTE:

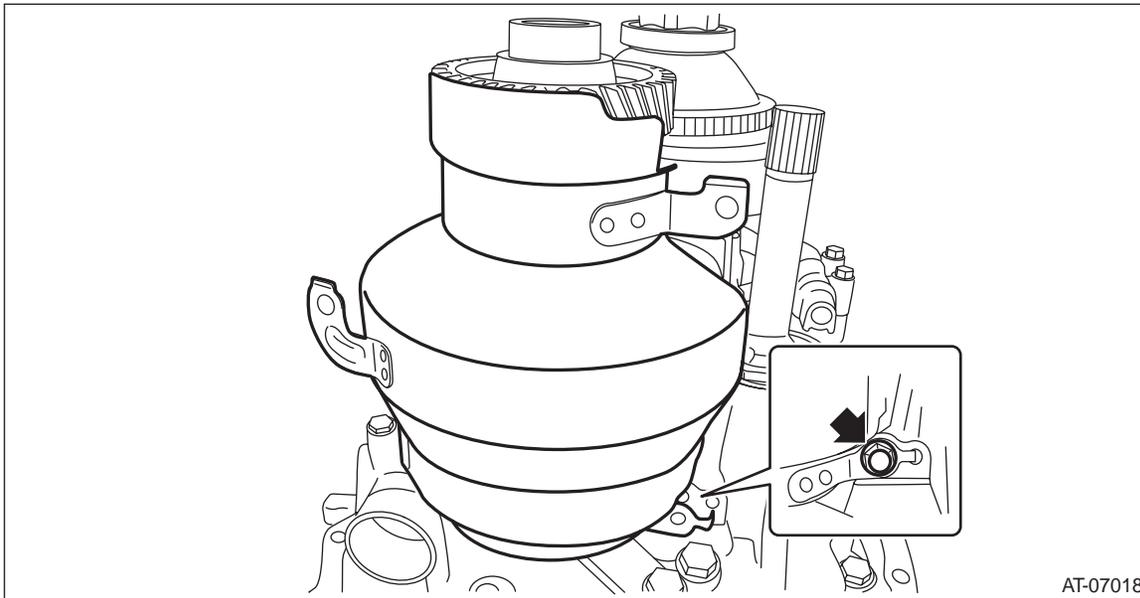
- Use new seal rings.
- Apply CVTF to the seal rings.



Transmission Case

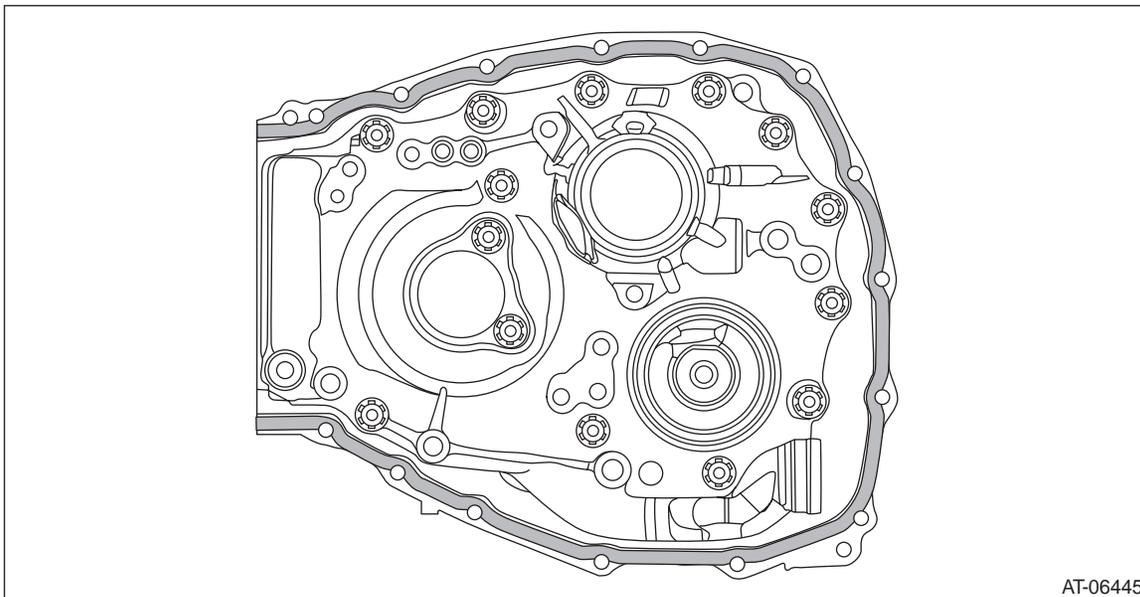
CONTINUOUSLY VARIABLE TRANSMISSION

6) Cover the secondary pulley with the oil baffle, and temporarily install it with bolts.



7) Apply liquid gasket seamlessly to the mating surface of transmission case.

Liquid gasket:
THREE BOND 1215B or equivalent



8) Install the transmission case.

NOTE:

The total number of transmission case mounting bolts is 15.

Tightening torque:
22 N·m (2.2 kgf·m, 16.2 ft·lb)

Transmission Case

CONTINUOUSLY VARIABLE TRANSMISSION

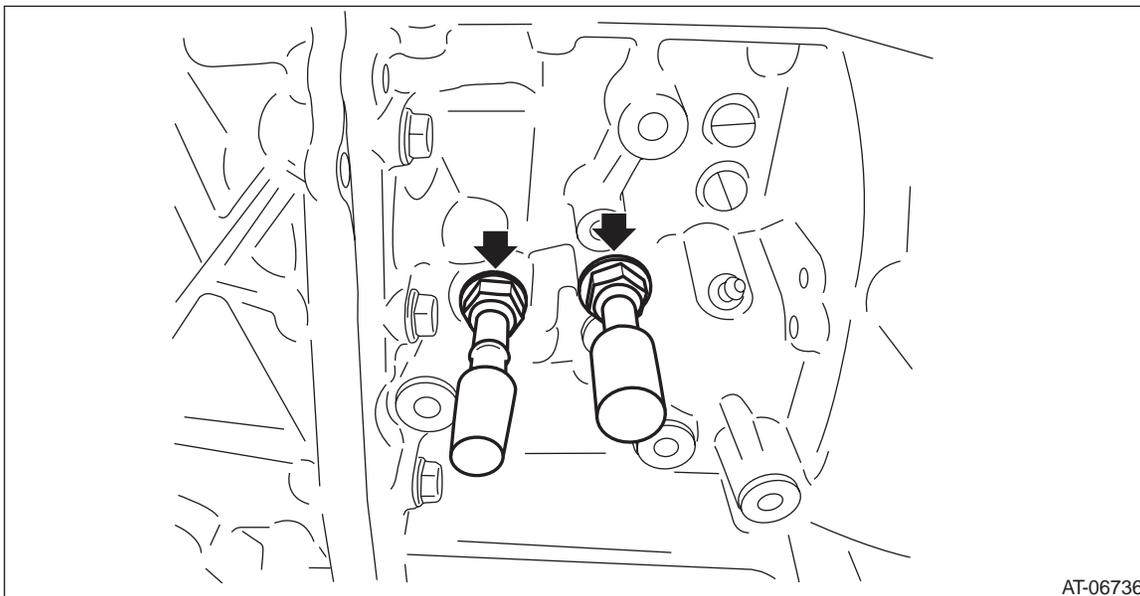
9) Install the oil cooler pipe.

NOTE:

Use new O-rings.

Tightening torque:

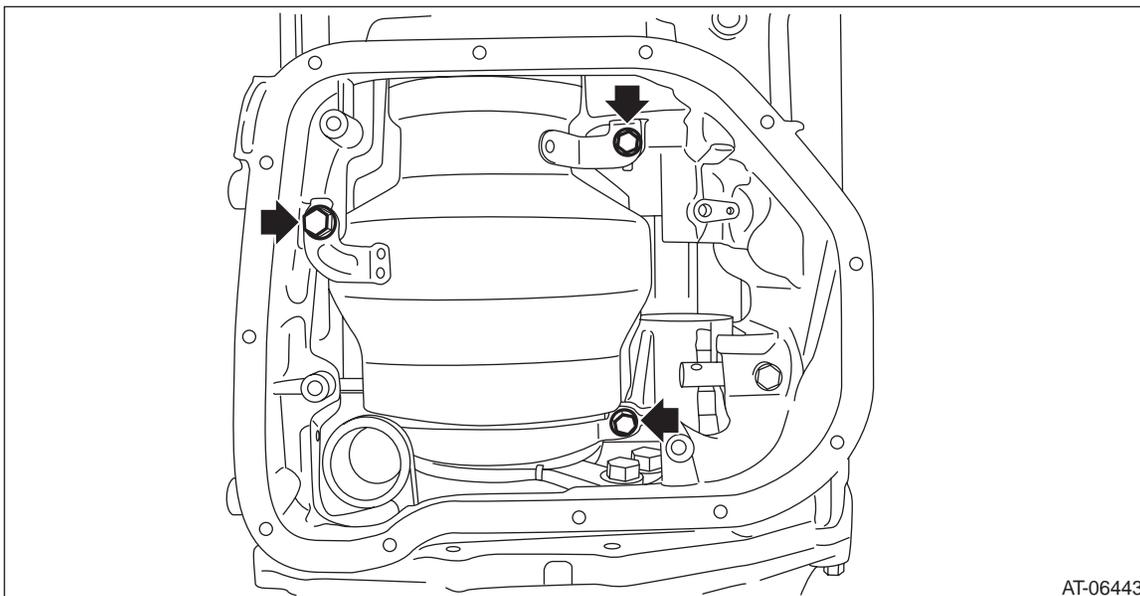
25 N·m (2.5 kgf·m, 18.4 ft·lb)



10) Install the oil baffle securing bolt.

Tightening torque:

16 N·m (1.6 kgf·m, 11.8 ft·lb)



11) Install the transmission control device.<Ref. to CVT(TR580)-200, INSTALLATION, Transmission Control Device.>

12) Install the oil pan and oil strainer.<Ref. to CVT(TR580)-108, INSTALLATION, Oil Pan and Strainer.>

13) Install the reduction driven gear assembly.<Ref. to CVT(TR580)-189, INSTALLATION, Reduction Driven Gear.>

14) Install the parking pawl.<Ref. to CVT(TR580)-188, INSTALLATION, Parking Pawl.>

15) Install the transfer driven gear assembly.<Ref. to CVT(TR580)-185, INSTALLATION, Transfer Driven Gear.>

16) Install the transfer clutch assembly.<Ref. to CVT(TR580)-171, INSTALLATION, Transfer Clutch.>

CVT(TR580)-208

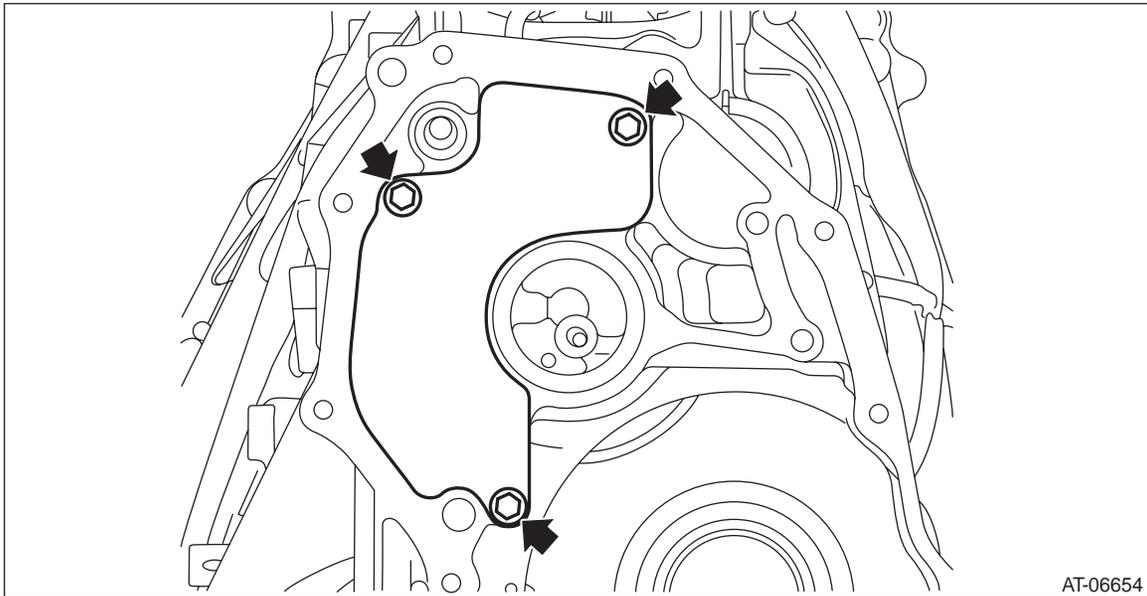
Transmission Case

CONTINUOUSLY VARIABLE TRANSMISSION

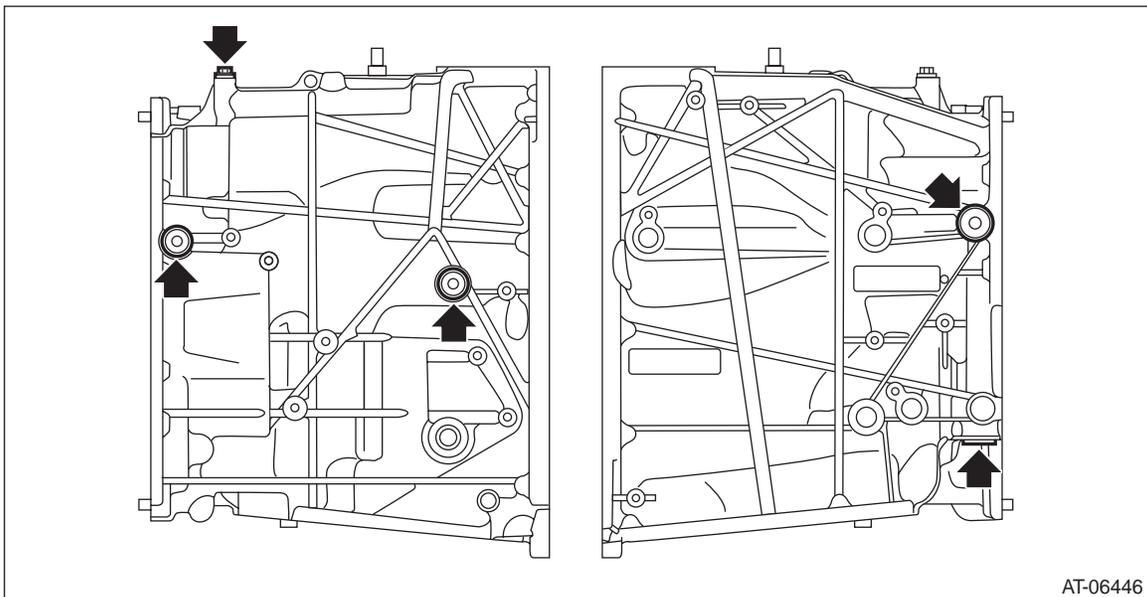
- 17) Install the extension case.<Ref. to CVT(TR580)-166, INSTALLATION, Extension Case.>
- 18) Install the inhibitor switch.<Ref. to CVT(TR580)-95, INSTALLATION, Inhibitor Switch.>
- 19) Install the secondary speed sensor.<Ref. to CVT(TR580)-100, INSTALLATION, Secondary Speed Sensor.>
- 20) Install the primary speed sensor.<Ref. to CVT(TR580)-103, INSTALLATION, Primary Speed Sensor.>
- 21) Install the turbine speed sensor.<Ref. to CVT(TR580)-98, INSTALLATION, Turbine Speed Sensor.>
- 22) Install the transmission harness.<Ref. to CVT(TR580)-131, INSTALLATION, Transmission Harness.>
- 23) Install the control valve body.<Ref. to CVT(TR580)-117, INSTALLATION, Control Valve Body.>
- 24) Install the air breather hose.<Ref. to CVT(TR580)-156, INSTALLATION, Air Breather Hose.>
- 25) Install the transmission assembly to the vehicle.<Ref. to CVT(TR580)-67, INSTALLATION, Automatic Transmission Assembly.>

C: DISASSEMBLY

- 1) Remove the oil stopper plate.



- 2) Remove all plugs from the transmission case.

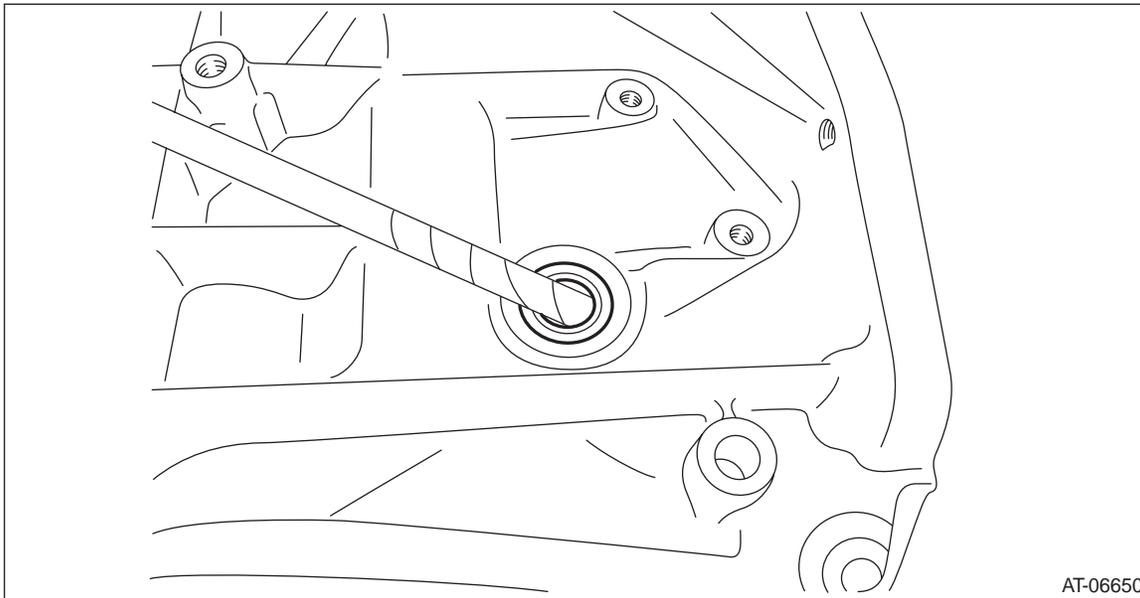


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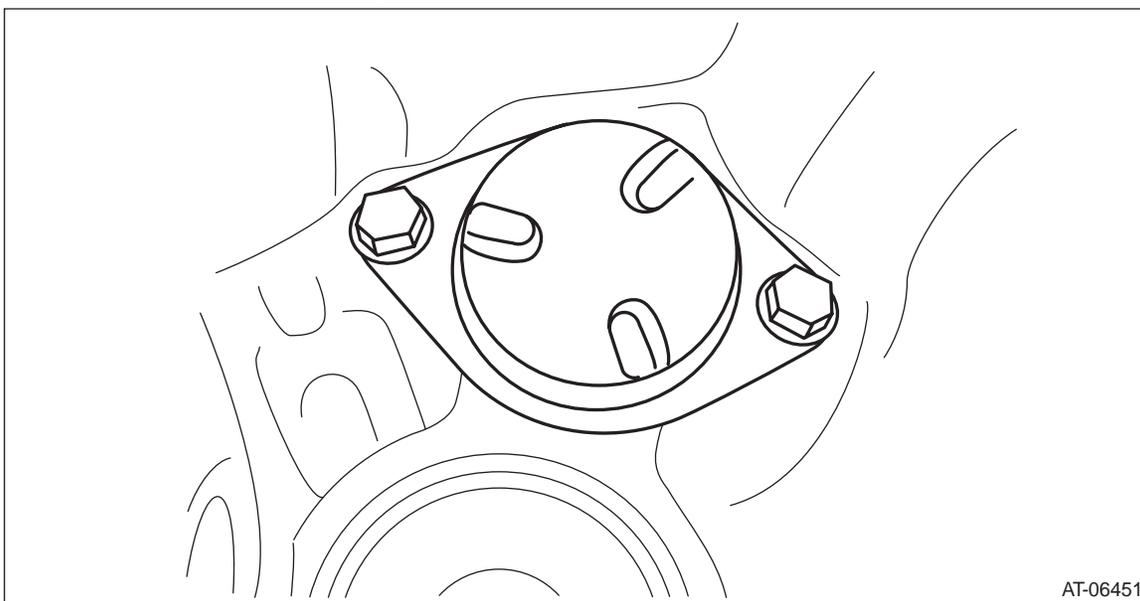
Transmission Case

CONTINUOUSLY VARIABLE TRANSMISSION

3) Remove the oil seal using a screwdriver wrapped with cloth etc.



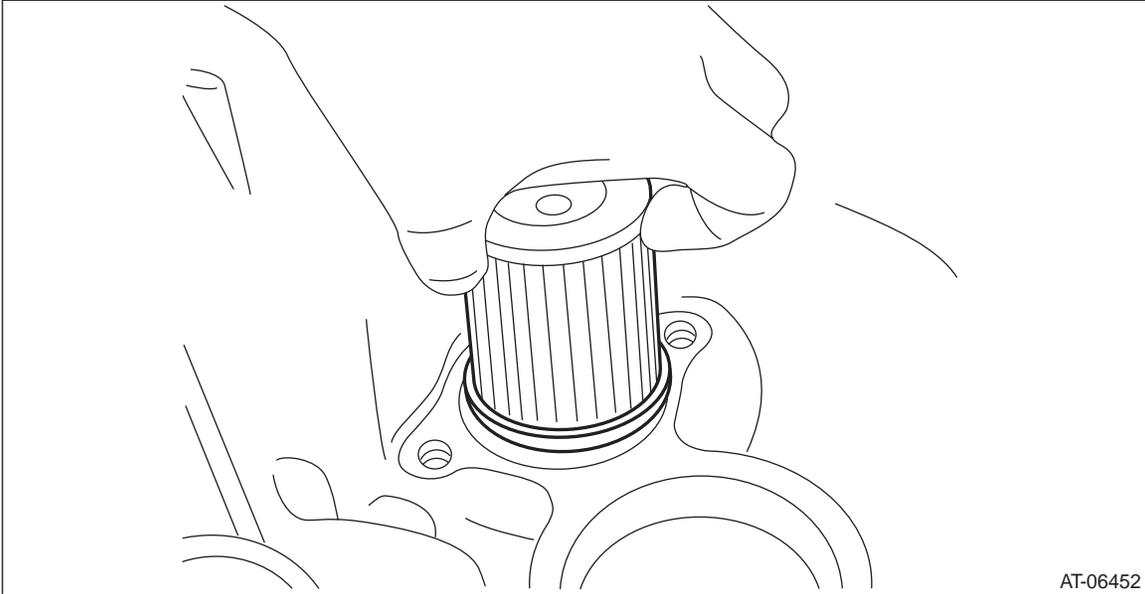
4) Remove the CVTF filter cover and gasket.



Transmission Case

CONTINUOUSLY VARIABLE TRANSMISSION

5) Remove the CVTF filter.

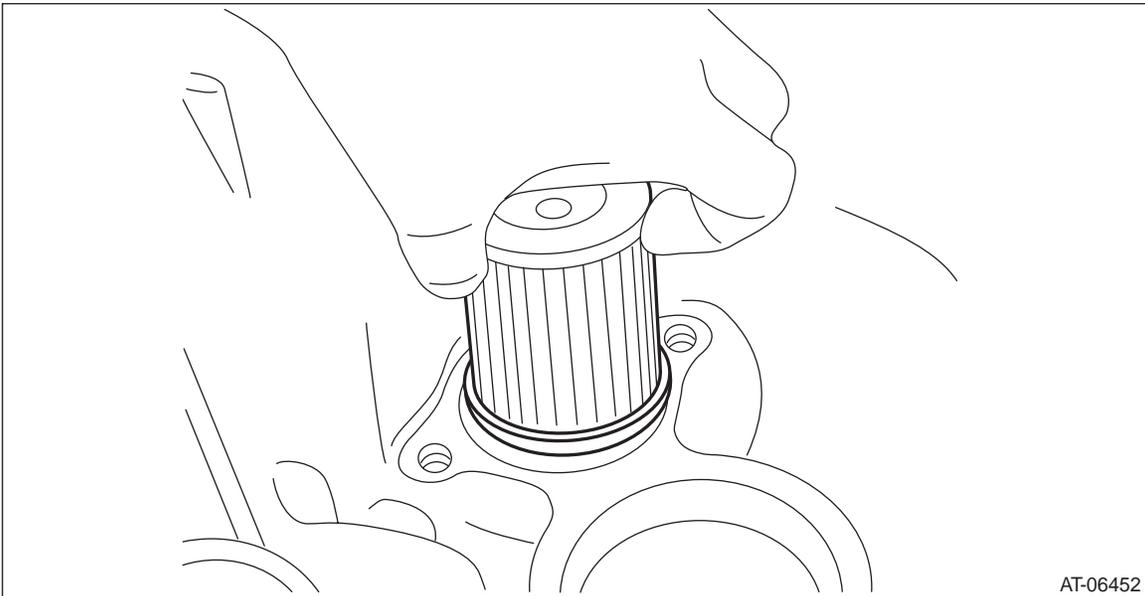


D: ASSEMBLY

1) Face the O-ring side of the CVTF filter to the transmission case side, and install the CVTF filter.

NOTE:

Apply CVTF to the O-ring of CVTF filter.



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Transmission Case

CONTINUOUSLY VARIABLE TRANSMISSION

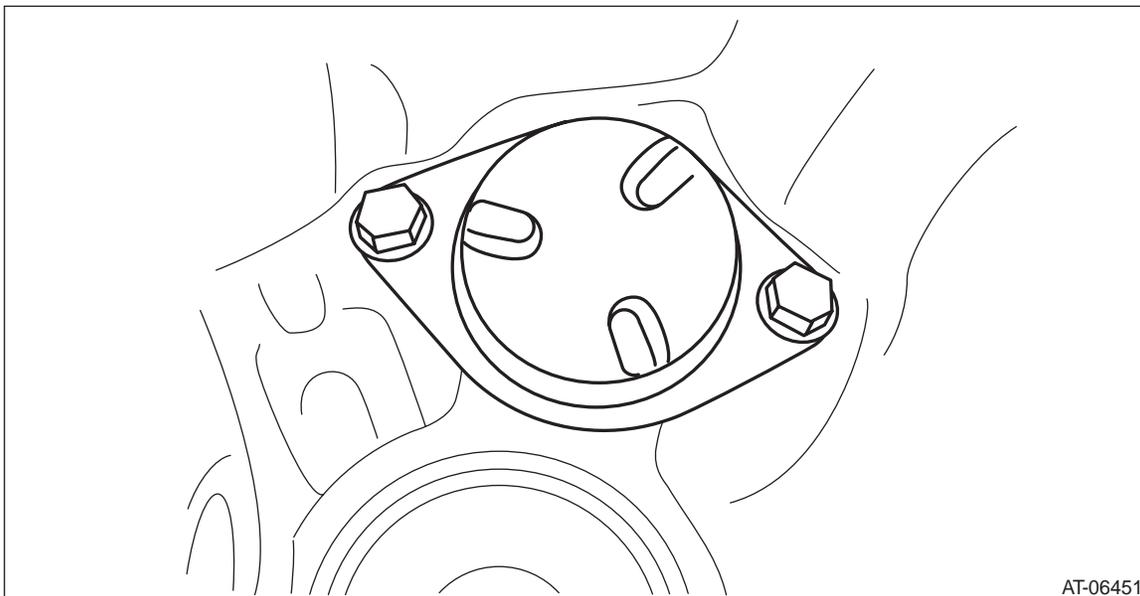
2) Install the CVTF filter cover and gasket.

NOTE:

Use a new gasket.

Tightening torque:

17 N·m (1.7 kgf·m, 12.5 ft·lb)

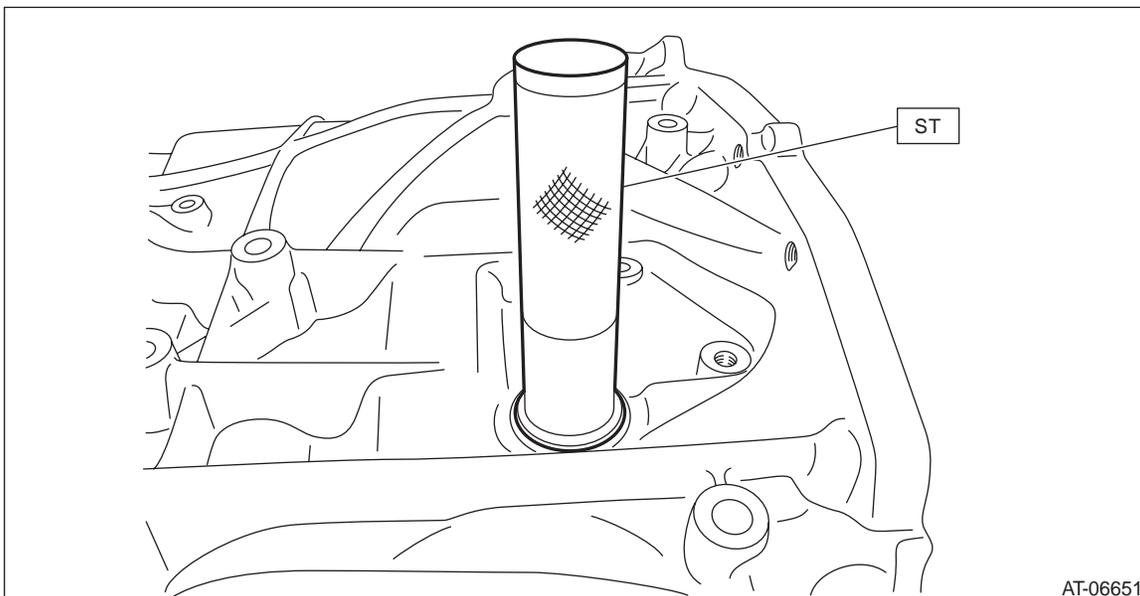


3) Using the ST, install the oil seal.

NOTE:

- Use a new oil seal.
- Apply CVTF to the oil seal lip and press-fitting surface.

ST 18657AA000 INSTALLER



Transmission Case

CONTINUOUSLY VARIABLE TRANSMISSION

4) Install all plugs.

NOTE:

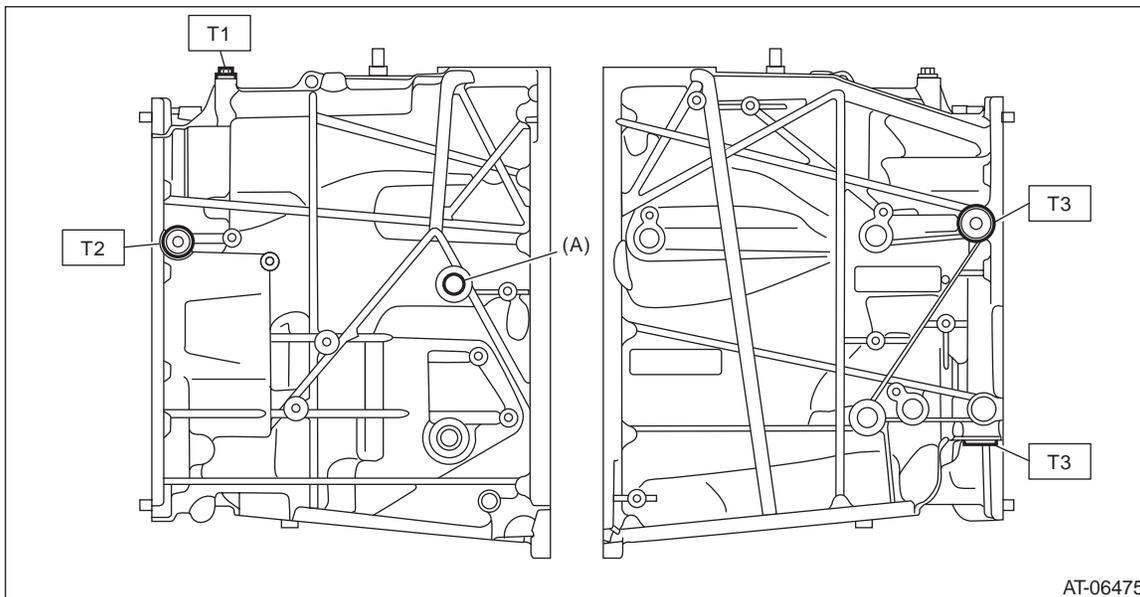
- Use new O-rings.
- Apply CVTF to the O-ring.
- For the plug (A), fill the CVTF, and then tighten the plug using a new O-ring.

Tightening torque:

T1: 13 N·m (1.3 kgf-m, 9.6 ft-lb)

T2: 25 N·m (2.5 kgf-m, 18.4 ft-lb)

T3: 50 N·m (5.1 kgf-m, 36.9 ft-lb)



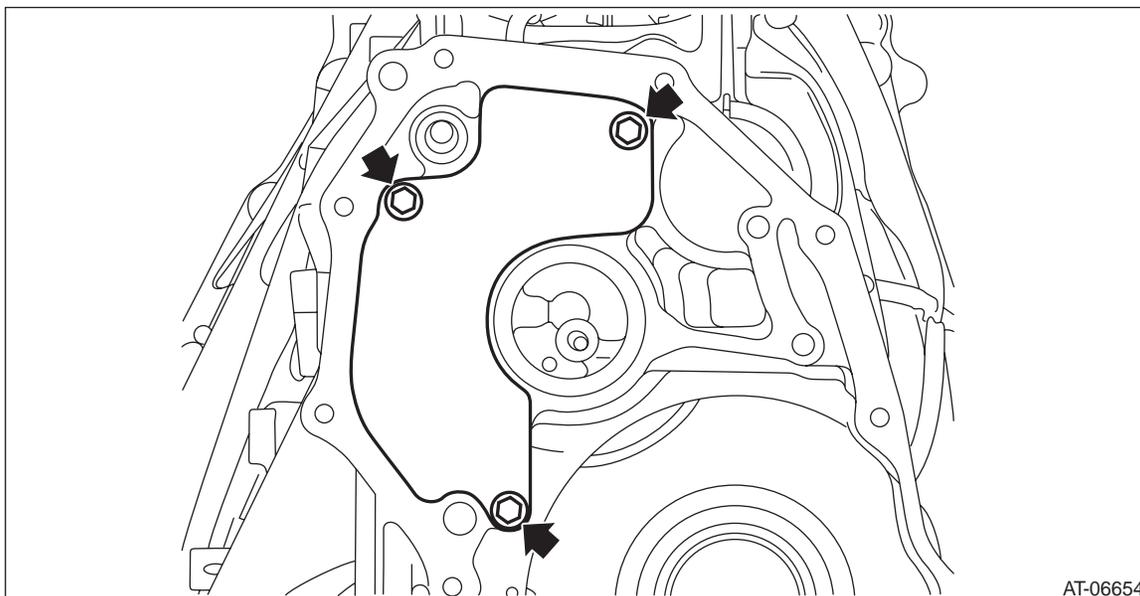
5) Install the oil stopper plate.

NOTE:

Use a new bolt.

Tightening torque:

9 N·m (0.9 kgf-m, 6.6 ft-lb)



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Transmission Case

CONTINUOUSLY VARIABLE TRANSMISSION

E: INSPECTION

- Check the transmission case for damage.
- Check for leakage of CVTF from the connection between converter case and transmission case.
- Check the bearing for smooth operation.
- Check the bearing for seizure or wear.
- Check each part for damage.

F: ADJUSTMENT

NOTE:

When replacing the transmission case with a new part, perform the following check and adjustment for the selection.

- Select the transfer driven gear shim. <Ref. to CVT(TR580)-181, ADJUSTMENT, Transfer Clutch.>
- Select the transfer drive gear shim. <Ref. to CVT(TR580)-195, ADJUSTMENT, Reduction Driven Gear.>
- Select the reduction drive gear shim. <Ref. to CVT(TR580)-219, ADJUSTMENT, Reduction Drive Gear.>

36. CVTF Filter

A: REMOVAL

NOTE:

- Although CVTF filter is a maintenance-free part, replace it if a large quantity of wear debris and metal particles are found in CVTF and CVTF filter.
- For removal of CVTF filter, refer to “Transmission Case”. <Ref. to CVT(TR580)-203, REMOVAL, Transmission Case.> <Ref. to CVT(TR580)-209, DISASSEMBLY, Transmission Case.>

B: INSTALLATION

NOTE:

For installation of CVTF filter, refer to “Transmission Case”. <Ref. to CVT(TR580)-211, ASSEMBLY, Transmission Case.> <Ref. to CVT(TR580)-206, INSTALLATION, Transmission Case.>

C: INSPECTION

- Check if a large quantity of wear debris or metal particles are in CVTF and CVTF filter.
- Check for broken part or damaged O-ring.

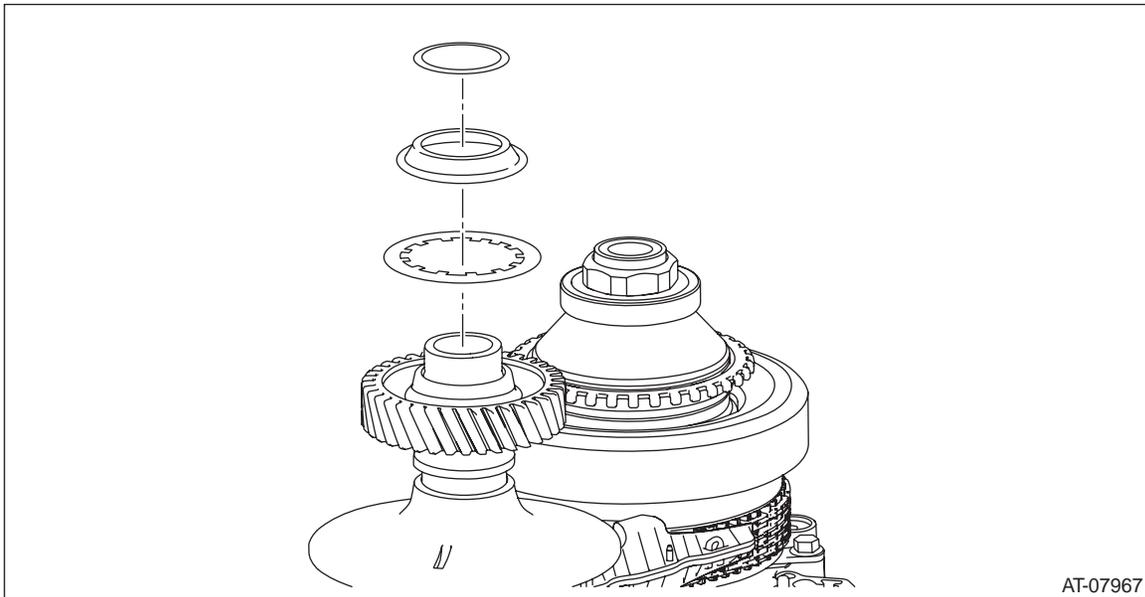
Reduction Drive Gear

CONTINUOUSLY VARIABLE TRANSMISSION

37.Reduction Drive Gear

A: REMOVAL

- 1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TR580)-57, REMOVAL, Automatic Transmission Assembly.>
- 2) Remove the air breather hose. <Ref. to CVT(TR580)-155, REMOVAL, Air Breather Hose.>
- 3) Remove the control valve body. <Ref. to CVT(TR580)-111, REMOVAL, Control Valve Body.>
- 4) Remove the transmission harness. <Ref. to CVT(TR580)-125, REMOVAL, Transmission Harness.>
- 5) Remove the turbine speed sensor. <Ref. to CVT(TR580)-98, REMOVAL, Turbine Speed Sensor.>
- 6) Remove the secondary speed sensor. <Ref. to CVT(TR580)-100, REMOVAL, Secondary Speed Sensor.>
- 7) Remove the primary speed sensor. <Ref. to CVT(TR580)-102, REMOVAL, Primary Speed Sensor.>
- 8) Remove the inhibitor switch. <Ref. to CVT(TR580)-94, REMOVAL, Inhibitor Switch.>
- 9) Remove the extension case. <Ref. to CVT(TR580)-165, REMOVAL, Extension Case.>
- 10) Remove the transfer clutch assembly. <Ref. to CVT(TR580)-169, REMOVAL, Transfer Clutch.>
- 11) Remove the transfer driven gear assembly. <Ref. to CVT(TR580)-184, REMOVAL, Transfer Driven Gear.>
- 12) Remove the parking pawl. <Ref. to CVT(TR580)-187, REMOVAL, Parking Pawl.>
- 13) Remove the reduction driven gear assembly. <Ref. to CVT(TR580)-189, REMOVAL, Reduction Driven Gear.>
- 14) Remove the oil pan and oil strainer. <Ref. to CVT(TR580)-107, REMOVAL, Oil Pan and Strainer.>
- 15) Remove the transmission control device. <Ref. to CVT(TR580)-197, REMOVAL, Transmission Control Device.>
- 16) Remove the transmission case. <Ref. to CVT(TR580)-203, REMOVAL, Transmission Case.>
- 17) Remove the reduction drive gear shims, spring retainers, and dish plates.



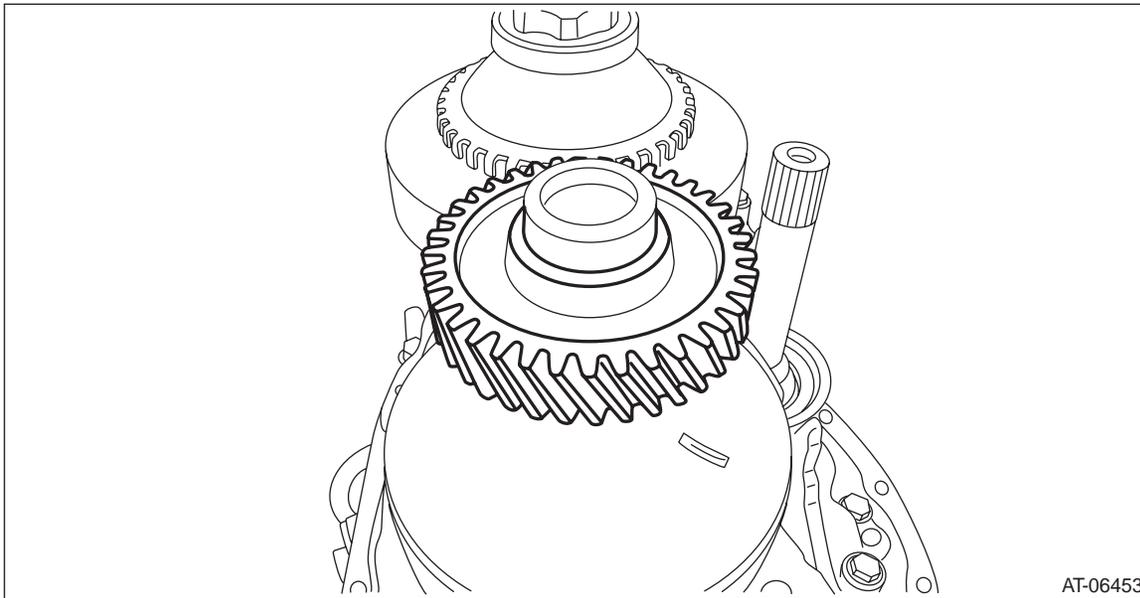
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Reduction Drive Gear

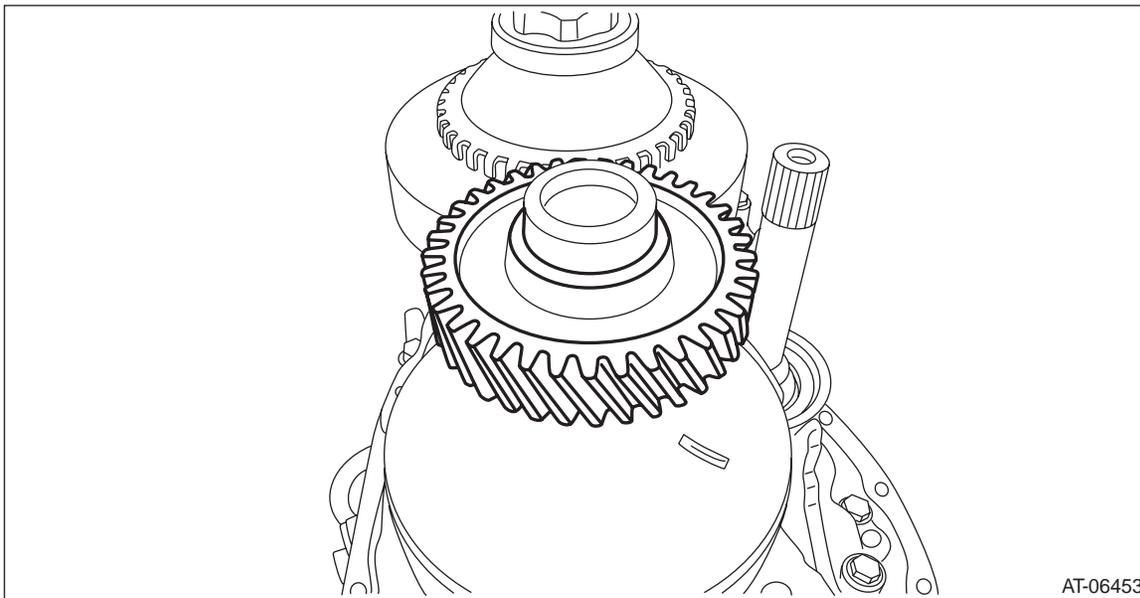
CONTINUOUSLY VARIABLE TRANSMISSION

18) Remove the reduction drive gear.



B: INSTALLATION

1) Install the reduction drive gear to secondary pulley.



2) Select the reduction drive gear shim. <Ref. to CVT(TR580)-219, ADJUSTMENT, Reduction Drive Gear.>

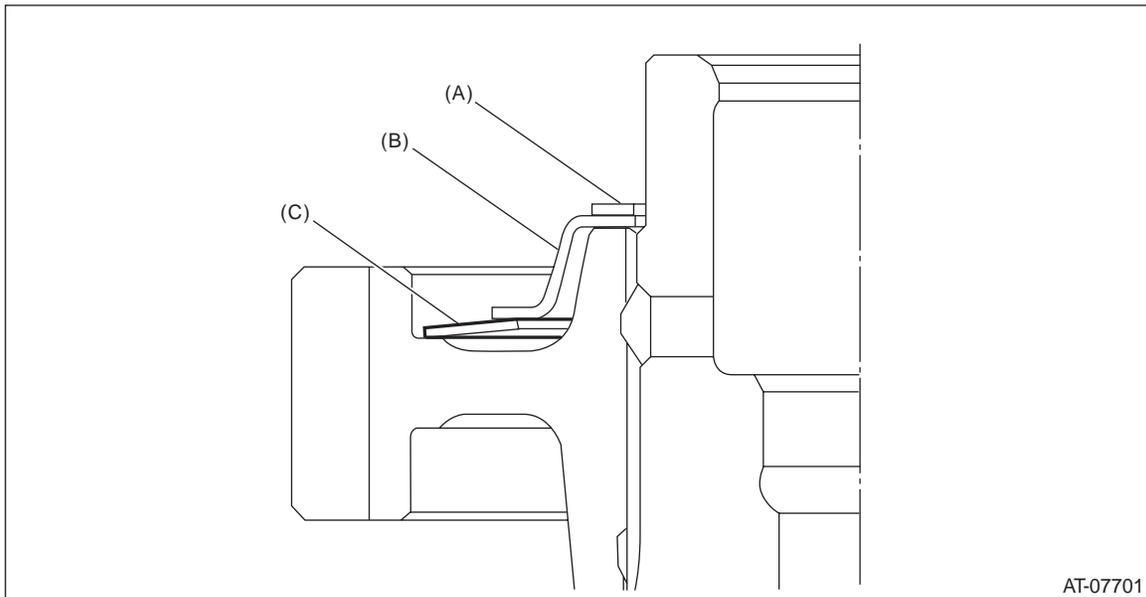
Reduction Drive Gear

CONTINUOUSLY VARIABLE TRANSMISSION

3) Install the dish plates, spring retainers, and selected reduction drive gear shims.

NOTE:

Install the dish plate in the correct direction.



- (A) Reduction drive gear shim
- (B) Spring retainer
- (C) Dish plate

4) Install the transmission case. <Ref. to CVT(TR580)-206, INSTALLATION, Transmission Case.>

5) Install the transmission control device. <Ref. to CVT(TR580)-200, INSTALLATION, Transmission Control Device.>

6) Install the oil strainer and oil pan. <Ref. to CVT(TR580)-108, INSTALLATION, Oil Pan and Strainer.>

7) Install the reduction driven gear assembly. <Ref. to CVT(TR580)-189, INSTALLATION, Reduction Driven Gear.>

8) Install the parking pawl. <Ref. to CVT(TR580)-188, INSTALLATION, Parking Pawl.>

9) Install the transfer driven gear assembly. <Ref. to CVT(TR580)-185, INSTALLATION, Transfer Driven Gear.>

10) Install the transfer clutch assembly. <Ref. to CVT(TR580)-171, INSTALLATION, Transfer Clutch.>

11) Install the extension case. <Ref. to CVT(TR580)-166, INSTALLATION, Extension Case.>

12) Install the inhibitor switch. <Ref. to CVT(TR580)-95, INSTALLATION, Inhibitor Switch.>

13) Install the secondary speed sensor. <Ref. to CVT(TR580)-100, INSTALLATION, Secondary Speed Sensor.>

14) Install the primary speed sensor. <Ref. to CVT(TR580)-103, INSTALLATION, Primary Speed Sensor.>

15) Install the turbine speed sensor. <Ref. to CVT(TR580)-98, INSTALLATION, Turbine Speed Sensor.>

16) Install the transmission harness. <Ref. to CVT(TR580)-131, INSTALLATION, Transmission Harness.>

17) Install the control valve body. <Ref. to CVT(TR580)-117, INSTALLATION, Control Valve Body.>

18) Install the air breather hose. <Ref. to CVT(TR580)-156, INSTALLATION, Air Breather Hose.>

19) Install the transmission assembly to the vehicle. <Ref. to CVT(TR580)-67, INSTALLATION, Automatic Transmission Assembly.>

Reduction Drive Gear

CONTINUOUSLY VARIABLE TRANSMISSION

C: INSPECTION

Check the reduction drive gear for breakage or damage.

D: ADJUSTMENT

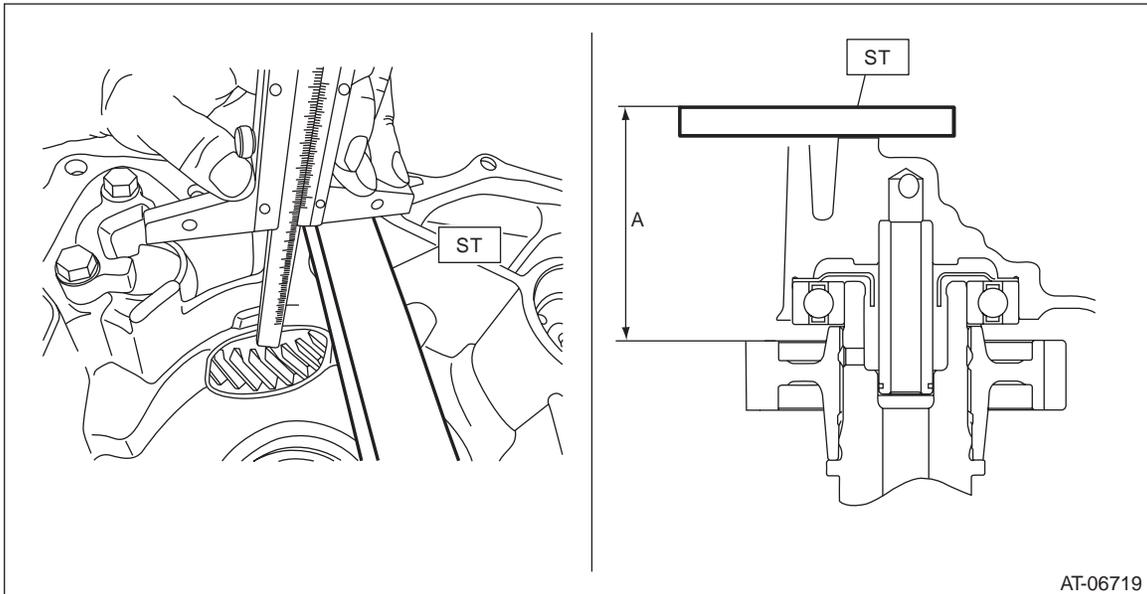
- 1) Remove the spring retainers and reduction drive gear shims.
- 2) Install the transmission case, and secure it with four or five bolts.

Tightening torque:

22 N·m (2.2 kgf·m, 16.2 ft·lb)

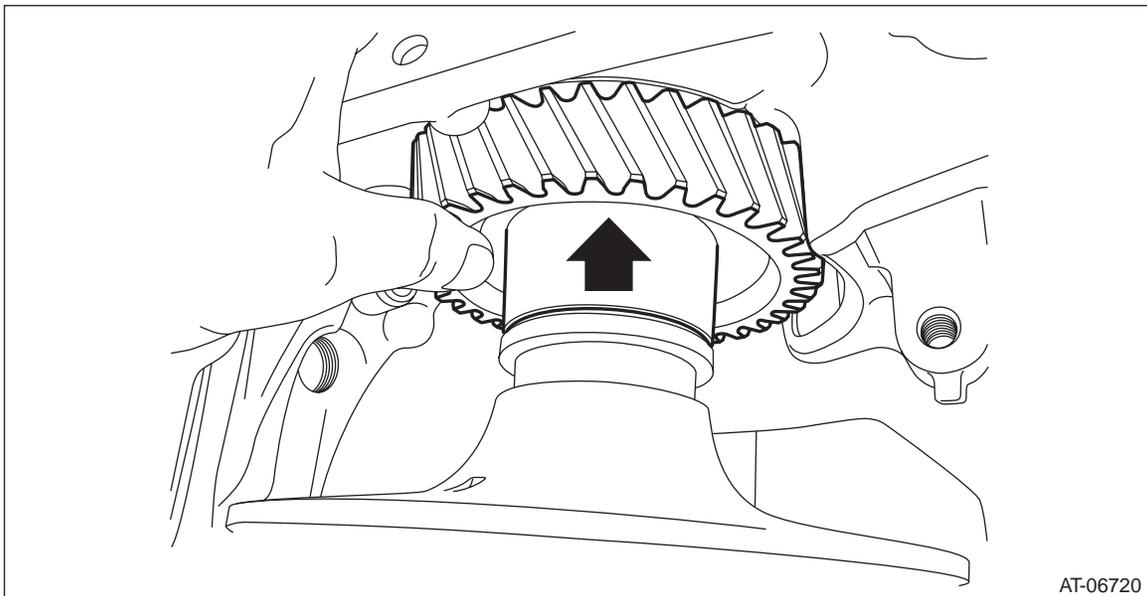
- 3) Measure depth "A" from the ST upper face to the reduction drive gear end face.

ST 499575400 GAUGE



AT-06719

- 4) Raise and hold the reduction drive gear.



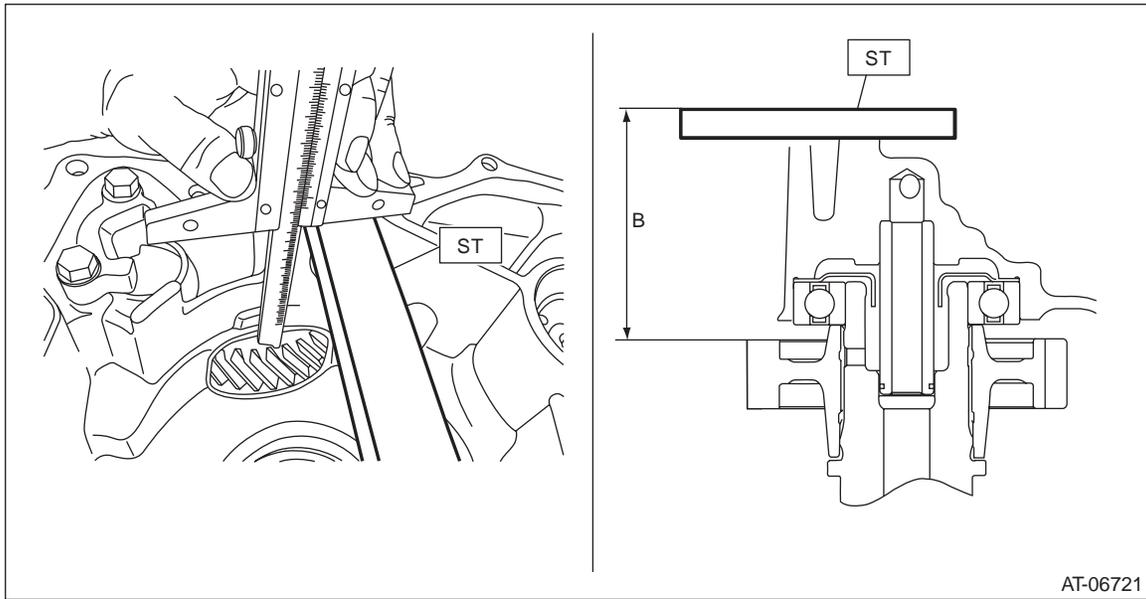
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Reduction Drive Gear

CONTINUOUSLY VARIABLE TRANSMISSION

5) Measure depth "B" from the ST upper face to the reduction drive gear end face.
ST 499575400 GAUGE



6) Calculate the following formula.

$$T \text{ mm} = A - B - 1.0$$

$$[T \text{ in} = A - B - 0.039]$$

T: Moving distance of reduction drive gear

A: Depth from the ST upper face to the reduction drive gear end surface

B: Depth from the ST upper face to the reduction drive gear end surface

1.0 mm (0.039 in): Thickness of spring retainer

Moving distance of transfer drive gear [T]	Total shim thickness mm (in)
0.420 — 0.519(0.0165 — 0.0204)	0.3 (0.012)
0.520 — 0.619(0.0205 — 0.0242)	0.4 (0.016)
0.620 — 0.719(0.0244 — 0.0283)	0.5 (0.020)
0.720 — 0.819(0.0283 — 0.0322)	0.6 (0.024)
0.820 — 0.919(0.0323 — 0.0362)	0.7 (0.028)
0.920 — 1.019(0.0362 — 0.0401)	0.8 (0.031)
1.020 — 1.119(0.0402 — 0.0441)	0.9 (0.035)
1.120 — 1.219(0.0441 — 0.0480)	1.0 (0.039)
1.220 — 1.319(0.0480 — 0.0519)	1.1 (0.043)
1.320 — 1.419(0.0520 — 0.0559)	1.2 (0.047)
1.420 — 1.519(0.0559 — 0.0598)	1.3 (0.051)
1.520 — 1.619(0.0598 — 0.0637)	1.4 (0.055)
1.620 — 1.719(0.0638 — 0.0677)	1.5 (0.059)
1.720 — 1.819(0.0677 — 0.0716)	1.6 (0.063)
1.820 — 1.920(0.0717 — 0.0756)	1.7 (0.067)

7) Select one to three reduction drive gear shims so that the total thickness meets the value obtained from step 6).

Part No.	Reduction drive gear shim thickness mm (in)
31288AA260	0.3 (0.012)
31288AA270	0.4 (0.016)
31288AA280	0.5 (0.020)
31288AA290	0.6 (0.024)

38.Primary Pulley and Secondary Pulley

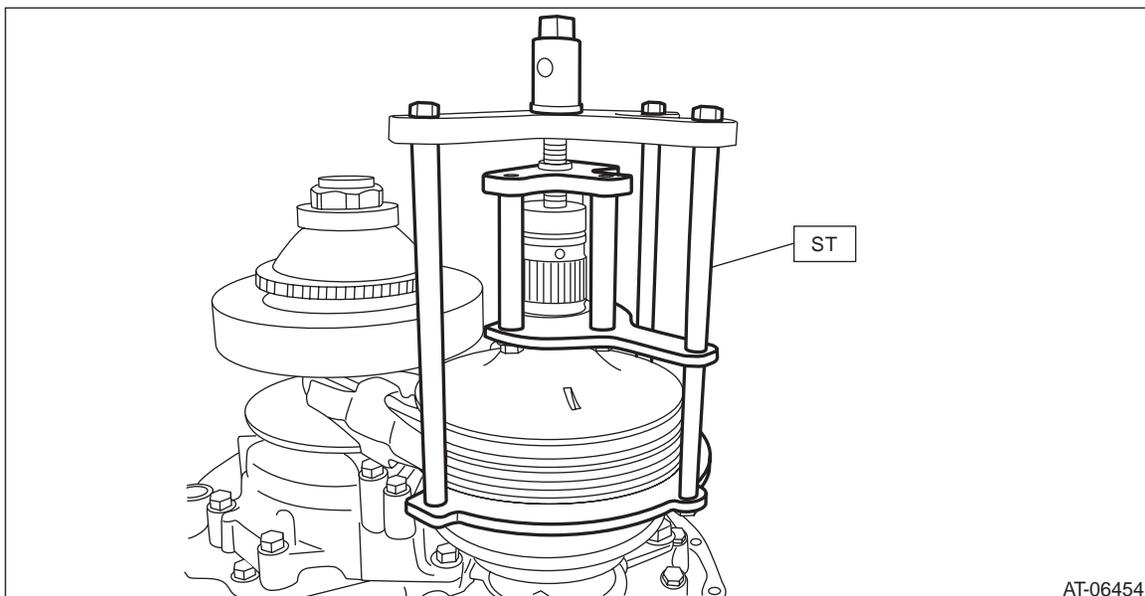
A: REMOVAL

NOTE:

Always replace primary pulley and secondary pulley as an assembly because they are non-disassembled parts.

- 1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TR580)-57, REMOVAL, Automatic Transmission Assembly.>
- 2) Remove the air breather hose. <Ref. to CVT(TR580)-155, REMOVAL, Air Breather Hose.>
- 3) Remove the control valve body. <Ref. to CVT(TR580)-111, REMOVAL, Control Valve Body.>
- 4) Remove the transmission harness. <Ref. to CVT(TR580)-125, REMOVAL, Transmission Harness.>
- 5) Remove the turbine speed sensor. <Ref. to CVT(TR580)-98, REMOVAL, Turbine Speed Sensor.>
- 6) Remove the secondary speed sensor. <Ref. to CVT(TR580)-100, REMOVAL, Secondary Speed Sensor.>
- 7) Remove the primary speed sensor. <Ref. to CVT(TR580)-102, REMOVAL, Primary Speed Sensor.>
- 8) Remove the inhibitor switch. <Ref. to CVT(TR580)-94, REMOVAL, Inhibitor Switch.>
- 9) Remove the extension case. <Ref. to CVT(TR580)-165, REMOVAL, Extension Case.>
- 10) Remove the transfer clutch assembly. <Ref. to CVT(TR580)-169, REMOVAL, Transfer Clutch.>
- 11) Remove the transfer driven gear assembly. <Ref. to CVT(TR580)-184, REMOVAL, Transfer Driven Gear.>
- 12) Remove the parking pawl. <Ref. to CVT(TR580)-187, REMOVAL, Parking Pawl.>
- 13) Remove the reduction driven gear assembly. <Ref. to CVT(TR580)-189, REMOVAL, Reduction Driven Gear.>
- 14) Remove the oil pan and oil strainer. <Ref. to CVT(TR580)-107, REMOVAL, Oil Pan and Strainer.>
- 15) Remove the transmission control device. <Ref. to CVT(TR580)-197, REMOVAL, Transmission Control Device.>
- 16) Remove the transmission case. <Ref. to CVT(TR580)-203, REMOVAL, Transmission Case.>
- 17) Remove the reduction drive gear. <Ref. to CVT(TR580)-216, REMOVAL, Reduction Drive Gear.>
- 18) Set the ST to secondary pulley, expand the V groove of pulley, and then completely loosen the variator chain.

ST 18769AA010 EXPANDER PULLEY

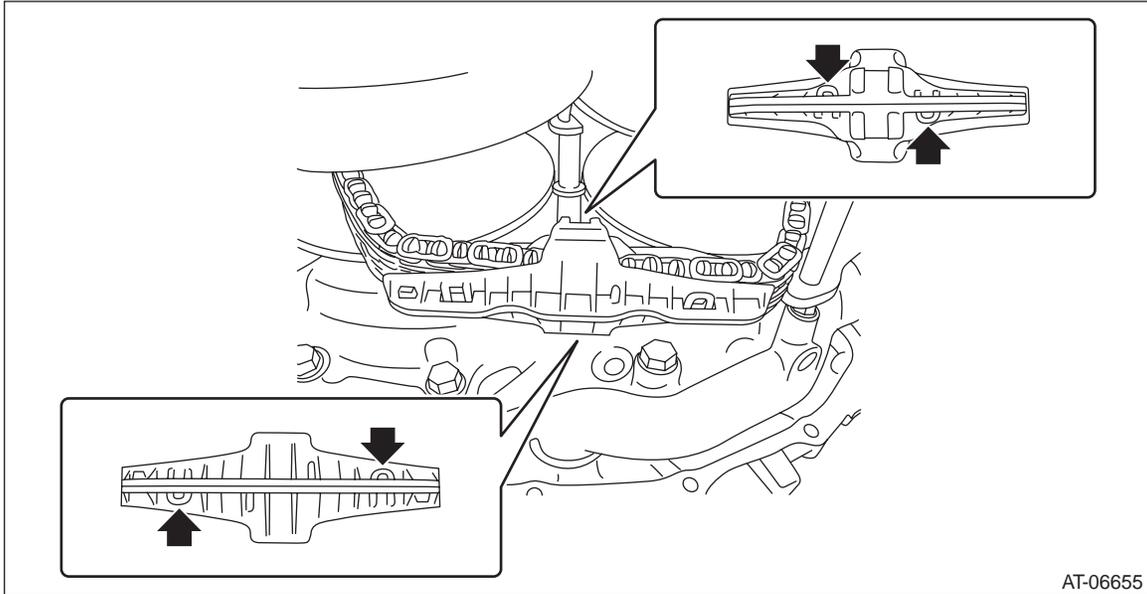


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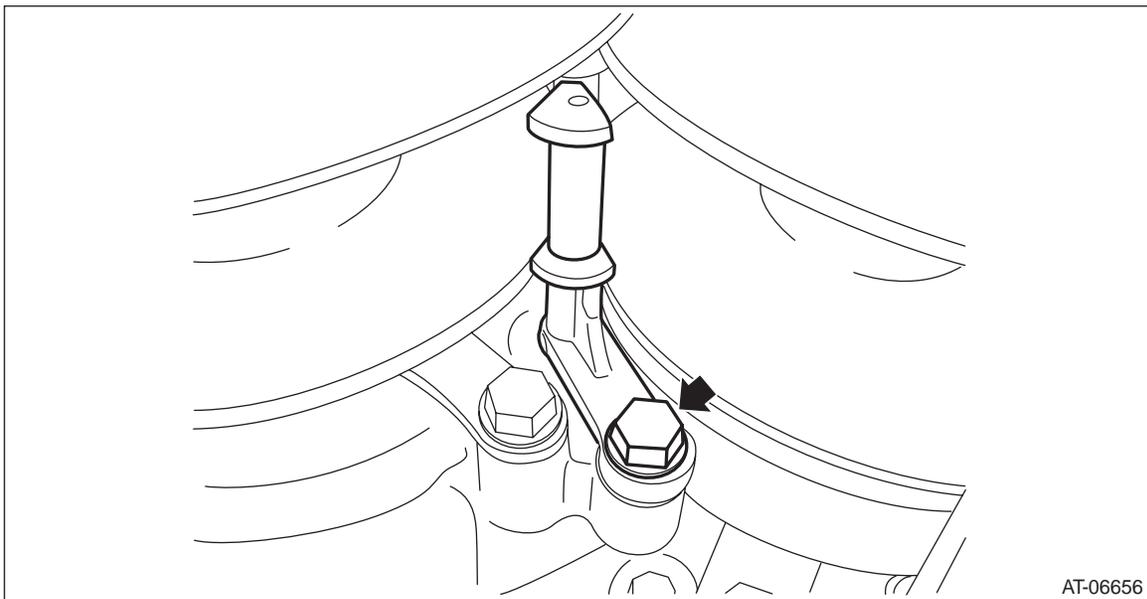
Primary Pulley and Secondary Pulley

CONTINUOUSLY VARIABLE TRANSMISSION

- 19) Remove the chain guide.
- (1) Remove the chain guide from lubrication pipe.
 - (2) Detach the four claws to remove the chain guide.



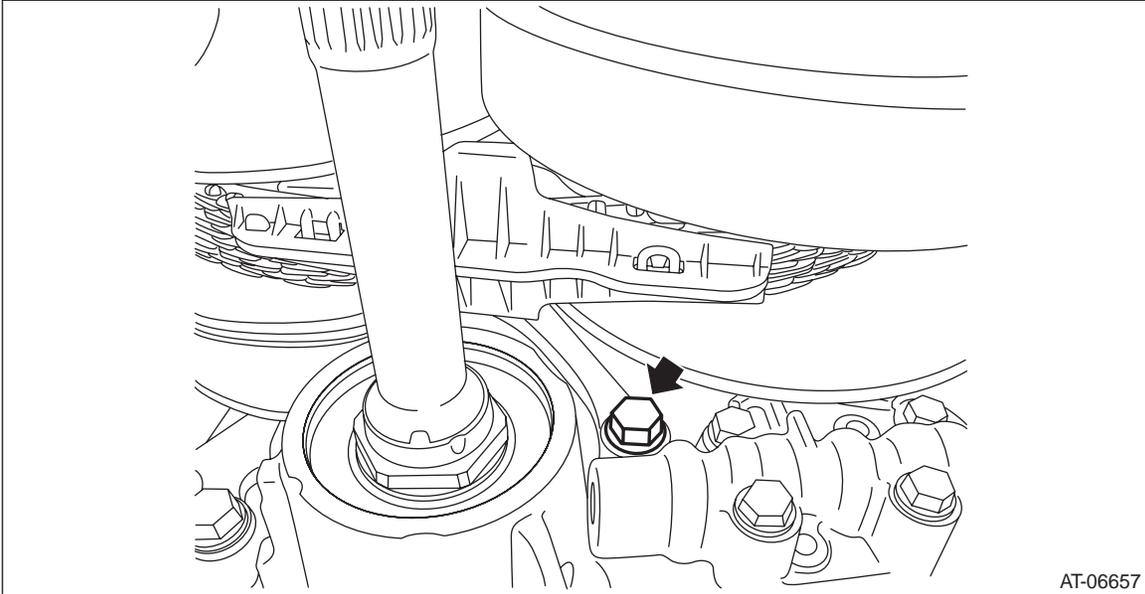
- (3) Remove the lubrication pipe.



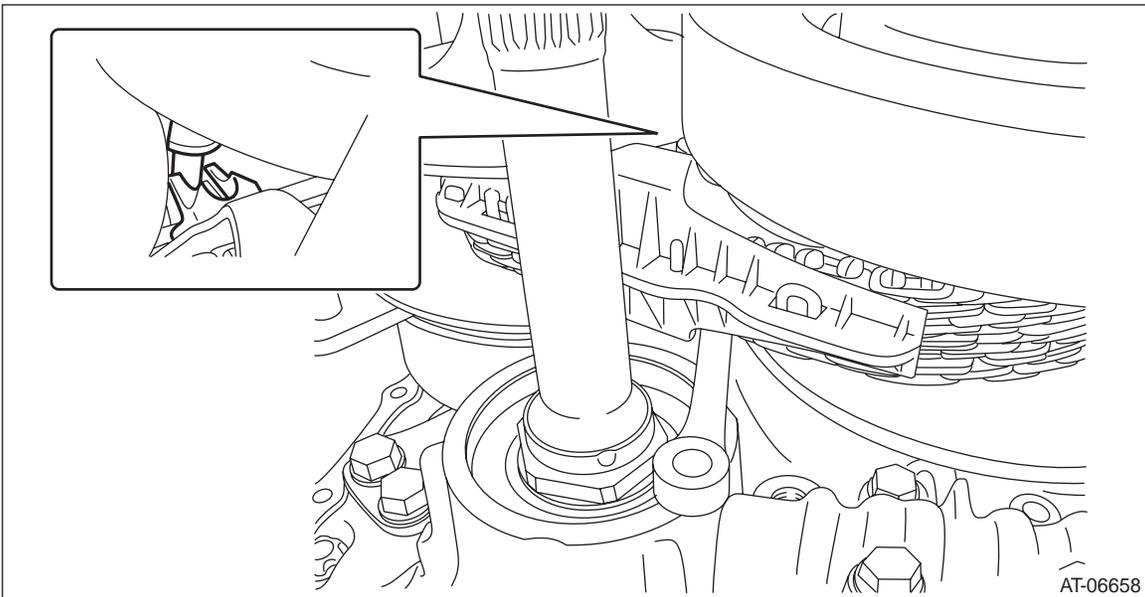
Primary Pulley and Secondary Pulley

CONTINUOUSLY VARIABLE TRANSMISSION

- (4) Remove the support rod mounting bolts.



- (5) Raise the support rod to remove the chain guide.

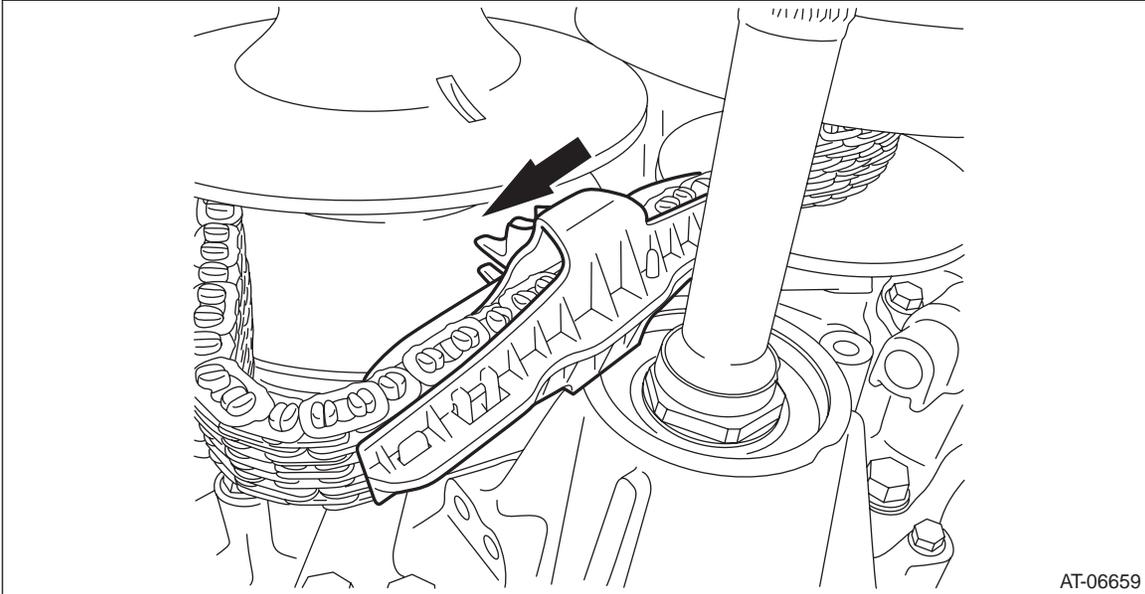


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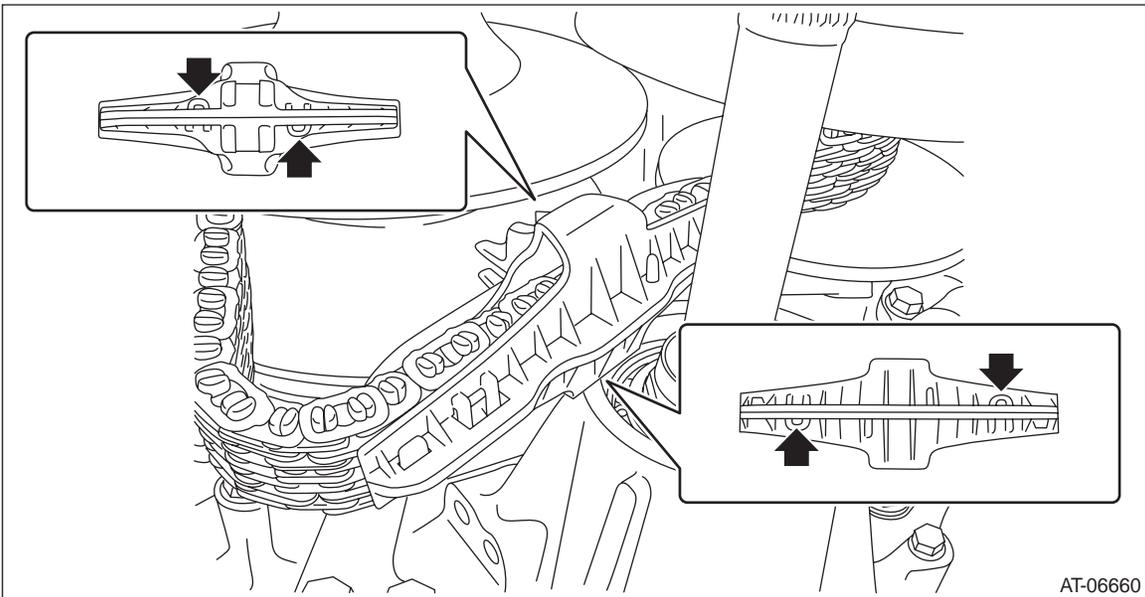
Primary Pulley and Secondary Pulley

CONTINUOUSLY VARIABLE TRANSMISSION

(6) Move the chain guide to the secondary pulley side.



(7) Detach the four claws to remove the chain guide.



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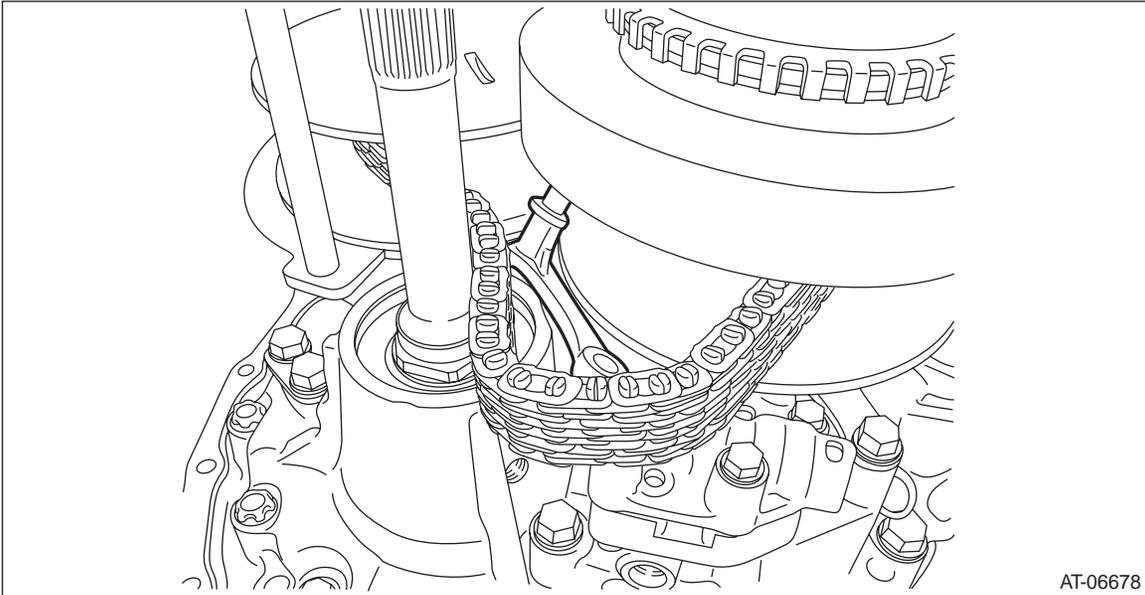
Primary Pulley and Secondary Pulley

CONTINUOUSLY VARIABLE TRANSMISSION

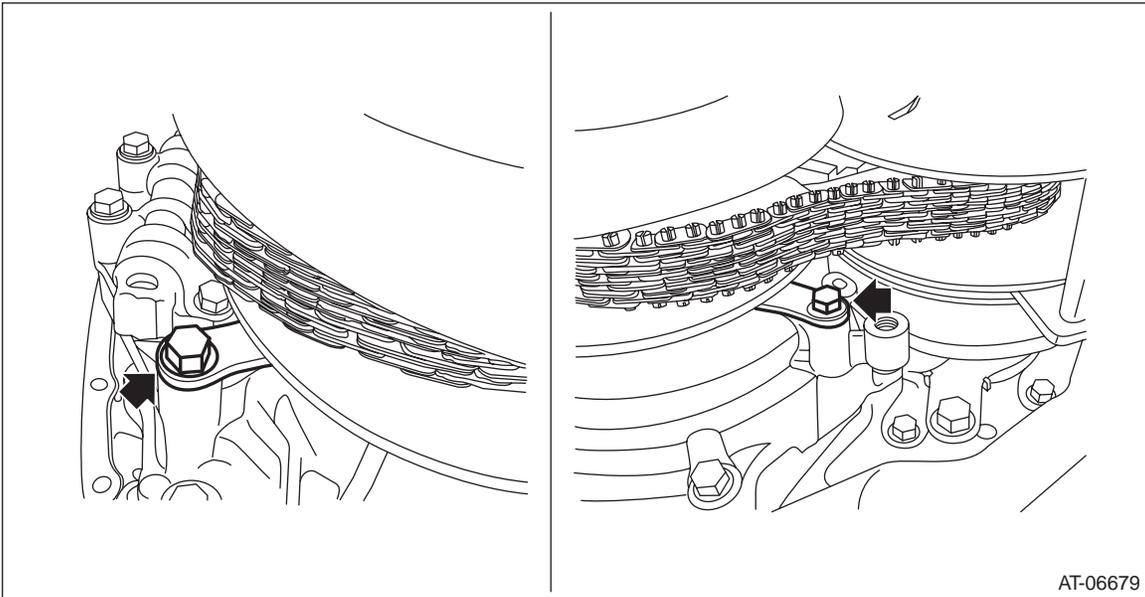
(8) Remove the support rod.

CAUTION:

Protect the both pulleys and variator chain from scratching.



20) Remove the primary pulley mounting bolt.



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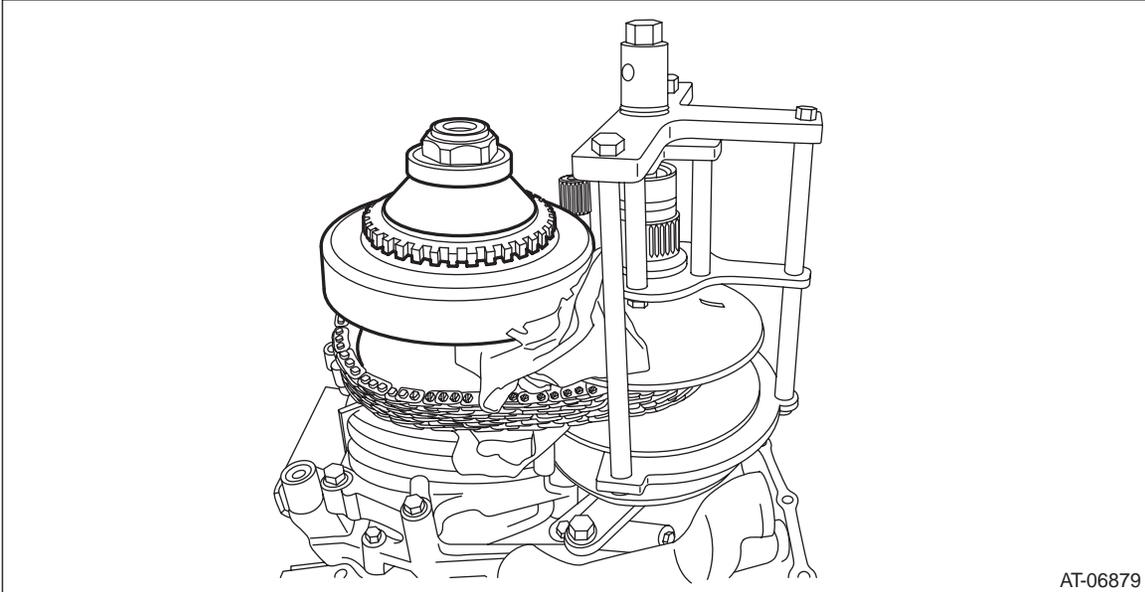
Primary Pulley and Secondary Pulley

CONTINUOUSLY VARIABLE TRANSMISSION

21) Remove the primary pulley from the reverse brake housing and intersect the V groove of secondary pulley and the V groove of primary pulley. Remove the variator chain from primary pulley, and remove the primary pulley.

CAUTION:

Cover the V grooves of secondary pulley and primary pulley with cloth to protect the both pulleys and variator chain from scratching.

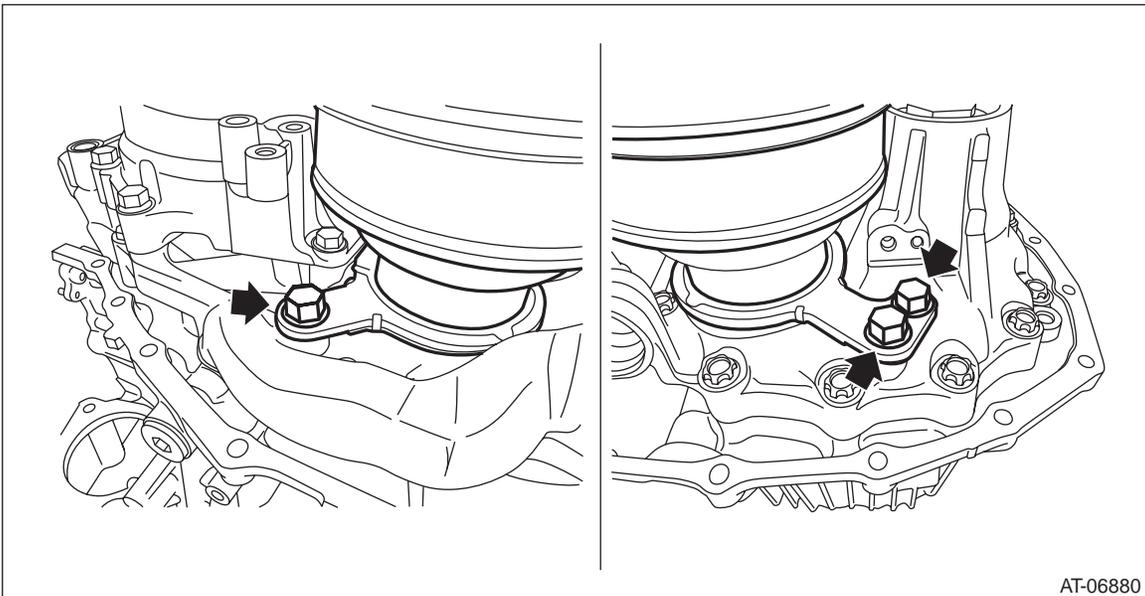


AT-06879

22) Remove the ST (EXPANDER PULLEY) from the secondary pulley.

23) Remove the variator chain from secondary pulley.

24) Remove the secondary pulley mounting bolts, and remove the secondary pulley.

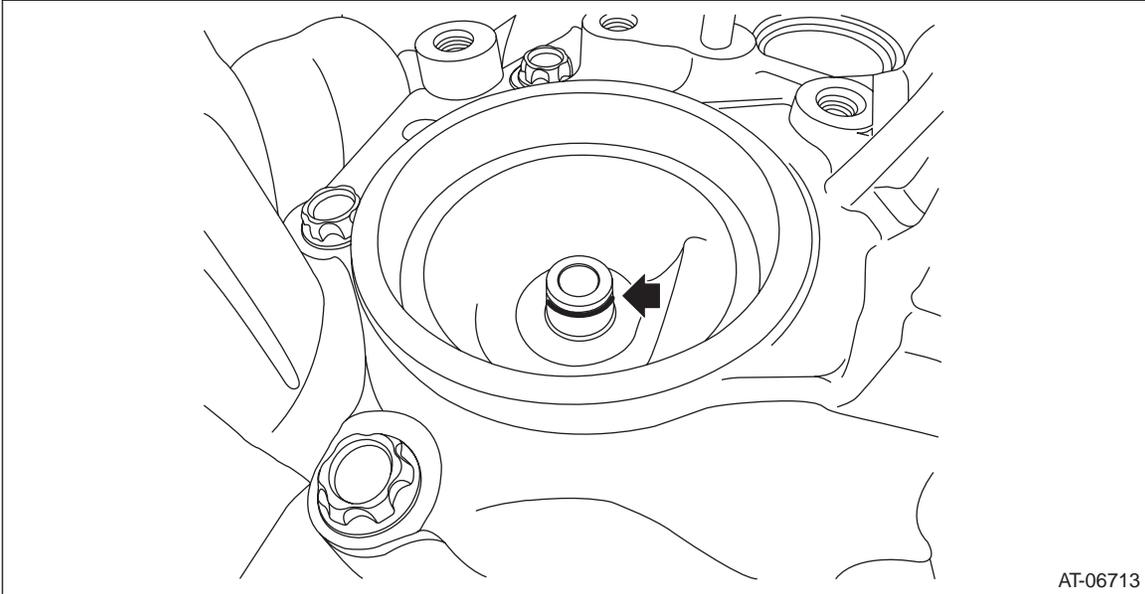


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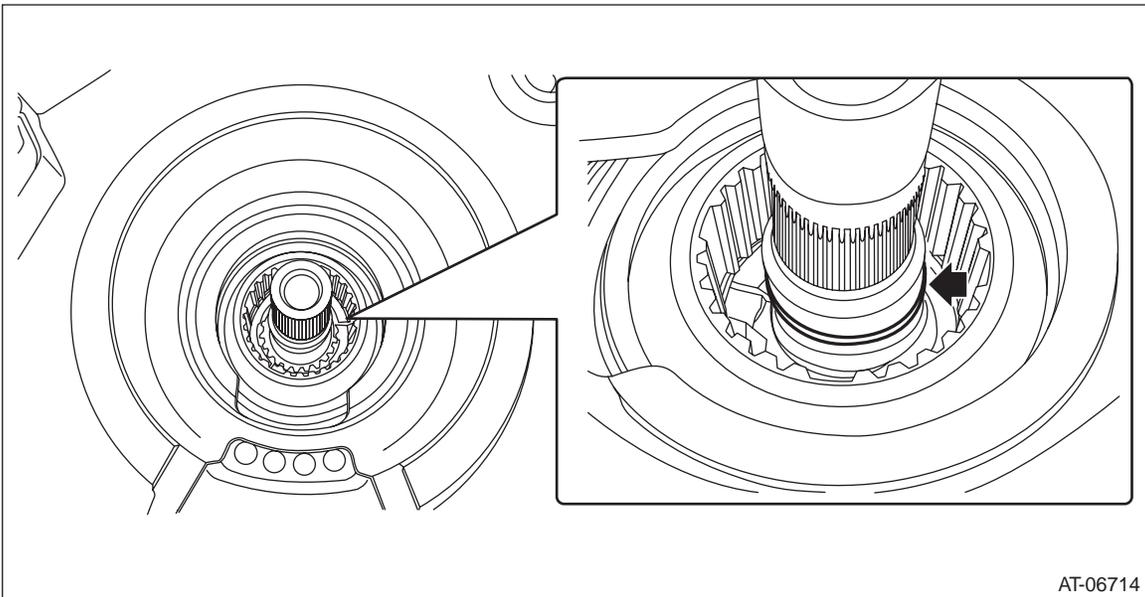
Primary Pulley and Secondary Pulley

CONTINUOUSLY VARIABLE TRANSMISSION

25) Remove the seal ring from drive pinion retainer.



26) Remove the seal ring from the input shaft.



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Primary Pulley and Secondary Pulley

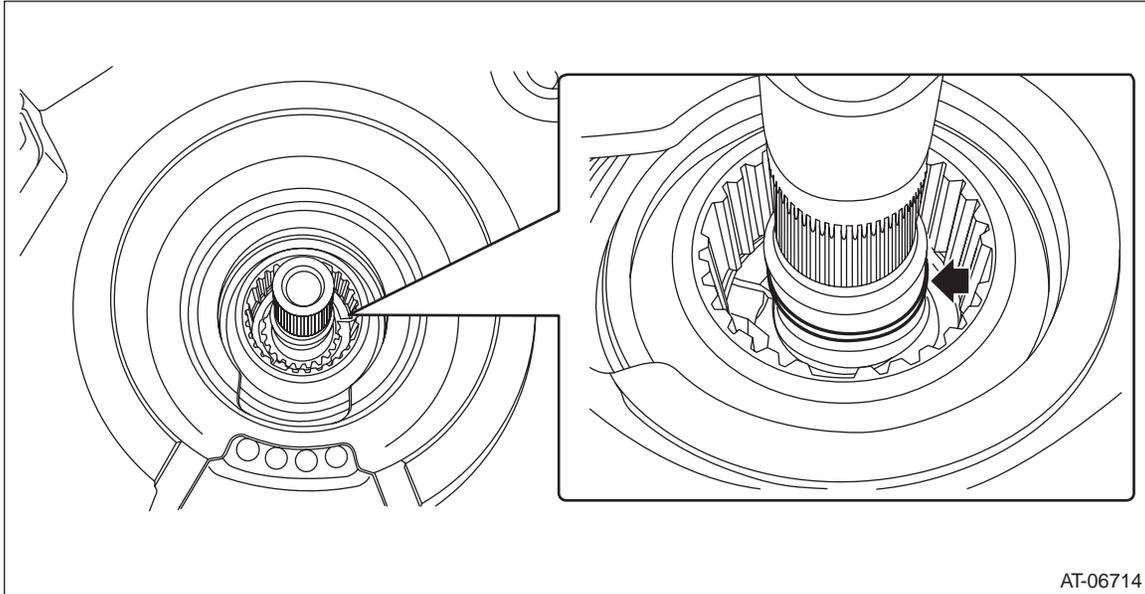
CONTINUOUSLY VARIABLE TRANSMISSION

B: INSTALLATION

- 1) Select shims for pulley alignment.<Ref. to CVT(TR580)-235, ADJUSTMENT, Primary Pulley and Secondary Pulley.>
- 2) Install the seal ring to the input shaft.

NOTE:

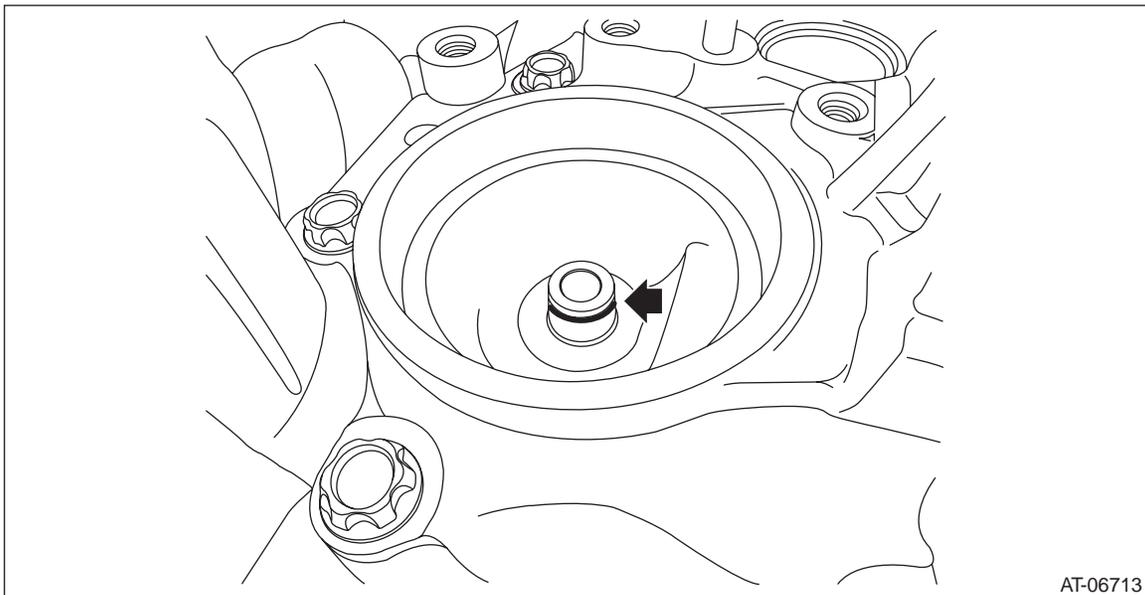
- Use new seal rings.
- When installing the seal rings, do not expand the seal rings too much.
- Apply CVTF to the seal rings.



- 3) Install the seal ring to drive pinion retainer.

NOTE:

- Use new seal rings.
- When installing the seal rings, do not expand the seal rings too much.
- Apply CVTF to the seal rings.

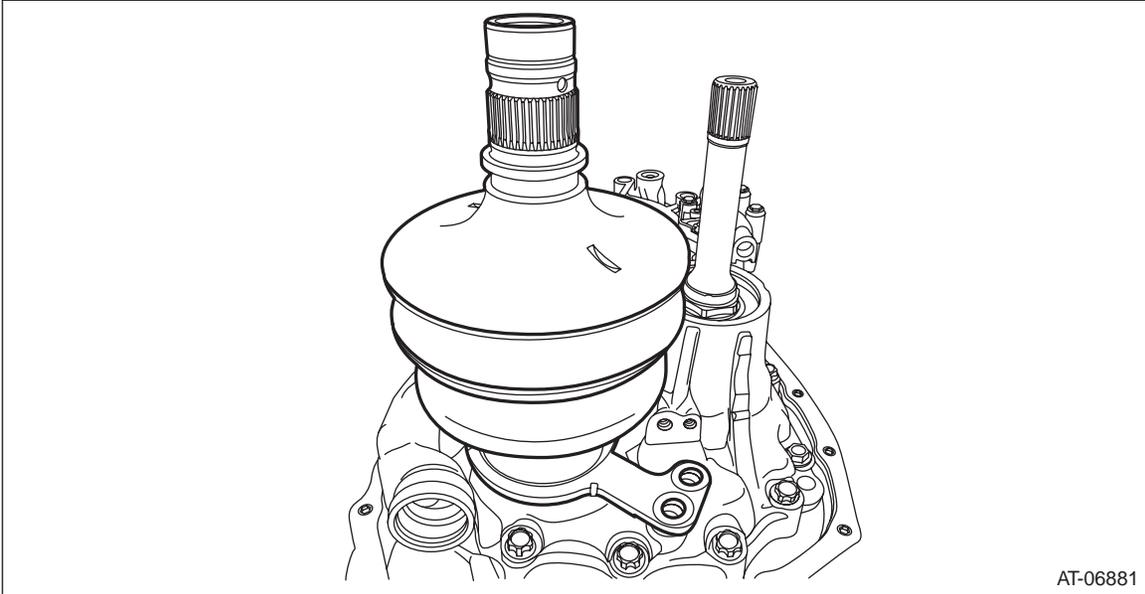


- 4) Install the selected shims to the primary pulley bearing catch surface.

Primary Pulley and Secondary Pulley

CONTINUOUSLY VARIABLE TRANSMISSION

5) Install the secondary pulley to the drive pinion retainer.



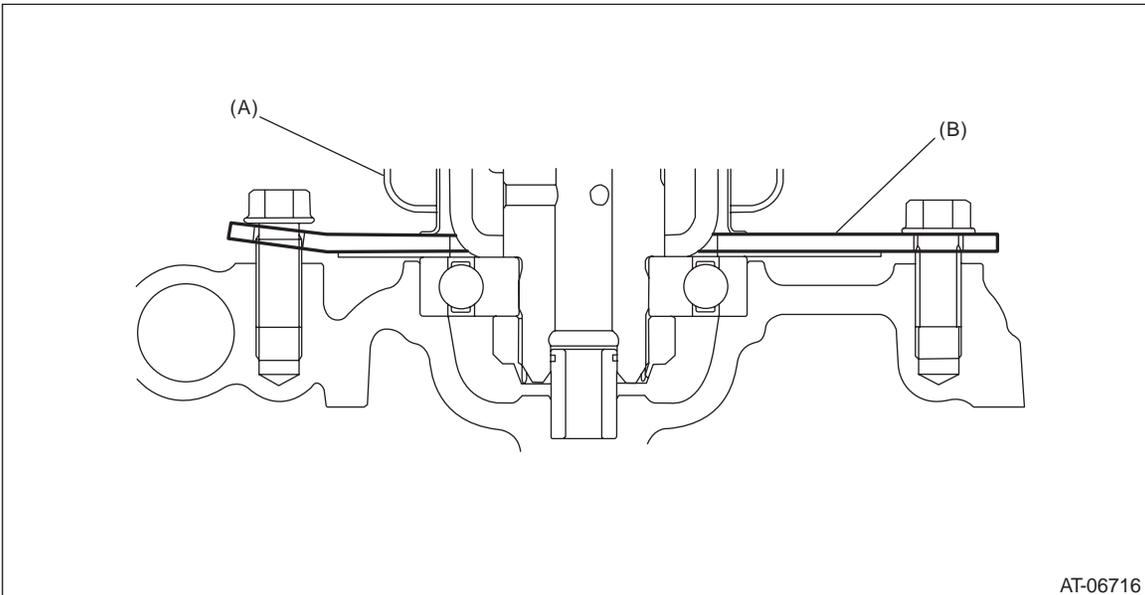
AT-06881

6) Install and tighten the secondary pulley securing bolts.

(1) Tighten the three bolts until the seating surfaces contact the bearing retainer.

NOTE:

- Be careful not to tilt the bearing retainer of the secondary pulley.
- Apply CVTF to the bolt.



AT-06716

(A) Secondary pulley

(B) Bearing retainer

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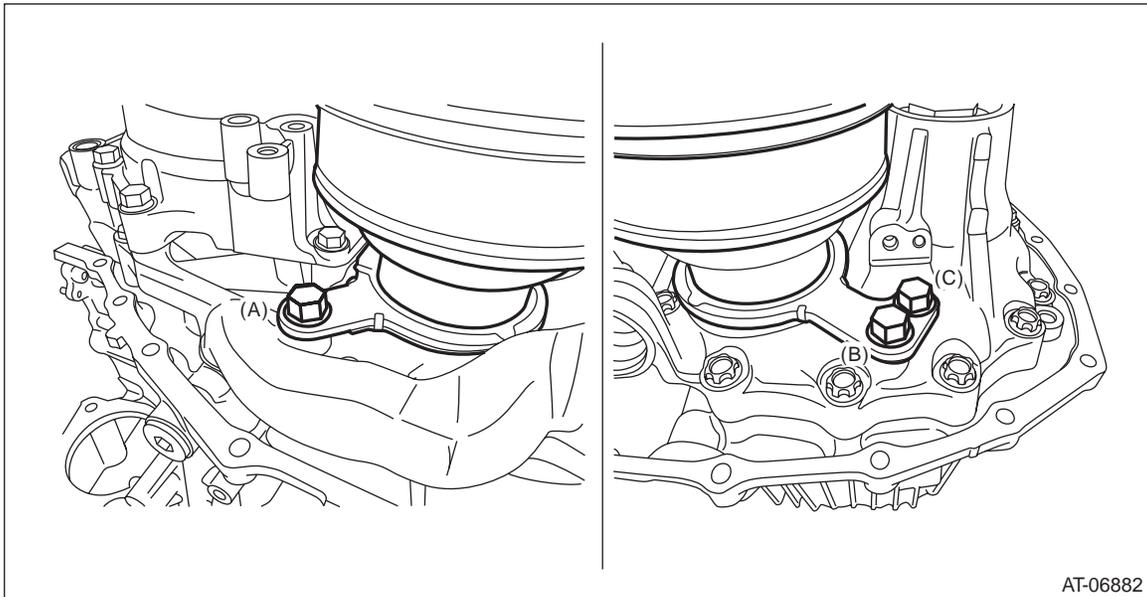
Primary Pulley and Secondary Pulley

CONTINUOUSLY VARIABLE TRANSMISSION

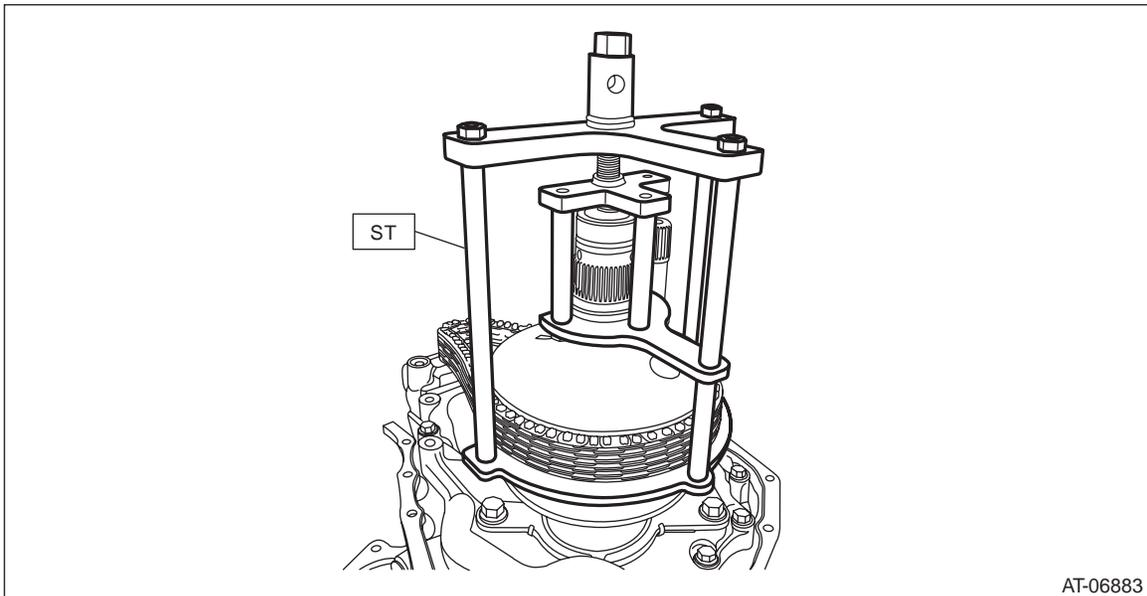
(2) Tighten the bolts in the order of (A) → (B) → (C) → (B).

Tightening torque:

67.5 N·m (6.9 kgf·m, 49.8 ft·lb)



7) Place the variator chain on the V groove of the secondary pulley, and set the ST.
ST 18769AA010 EXPANDER PULLEY



8) Expand the V groove of the secondary pulley.

Primary Pulley and Secondary Pulley

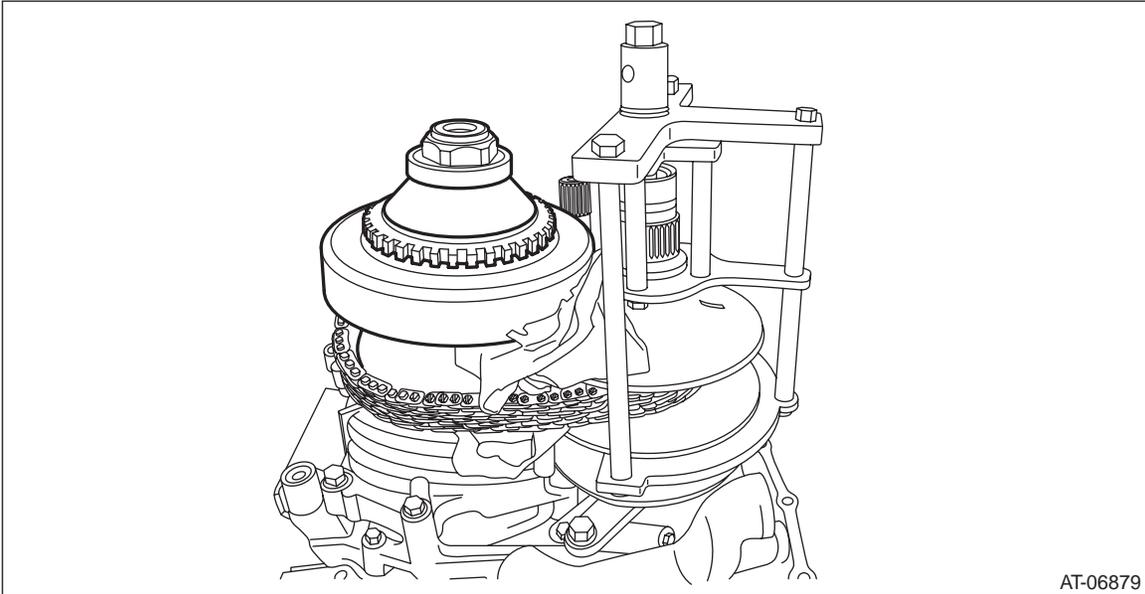
CONTINUOUSLY VARIABLE TRANSMISSION

9) Install the primary pulley to the reverse brake housing together with the variator chain.

CAUTION:

Cover the V grooves of primary pulley and secondary pulley with cloth to protect the both pulleys and variator chain from scratching.

(1) Intersect the V groove of primary pulley and the V groove of secondary pulley and install the secondary pulley while placing the variator chain on secondary pulley.

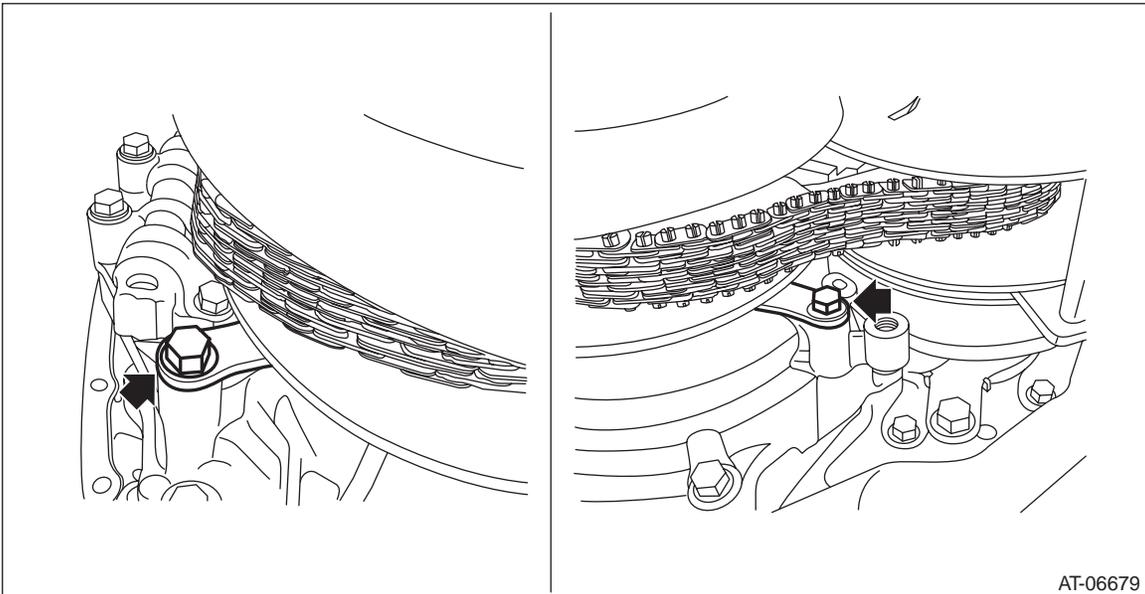


(2) Install the primary pulley to the reverse brake housing so that the bolt hole of primary bearing retainer and the bolt hole of reverse brake housing are aligned.

10) Install the primary pulley bolt.

Tightening torque:

21 N·m (2.1 kgf·m, 24.3 ft·lb)



Primary Pulley and Secondary Pulley

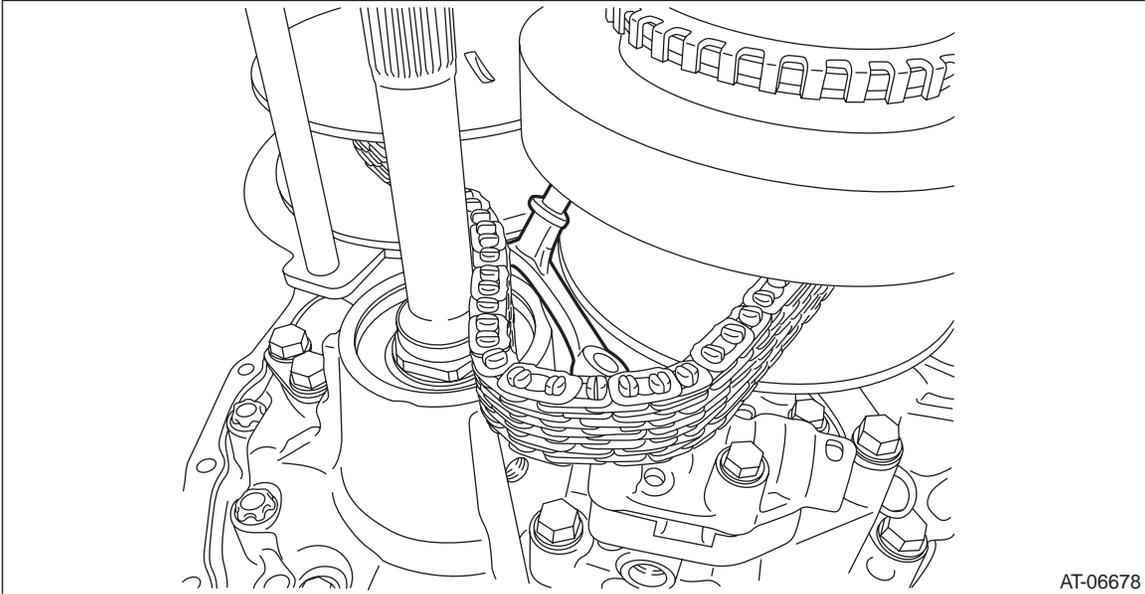
CONTINUOUSLY VARIABLE TRANSMISSION

11) Install the chain guide.

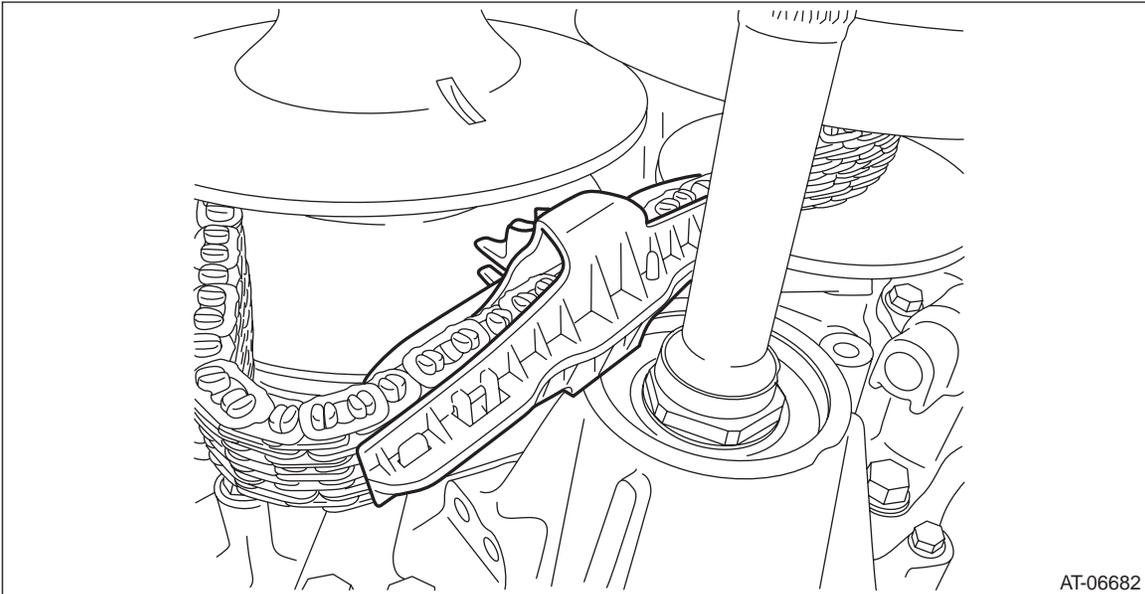
(1) Place the support rod inside of the variator chain.

CAUTION:

Protect the both pulleys and variator chain from scratching.



(2) Install the chain guide to the variator chain.



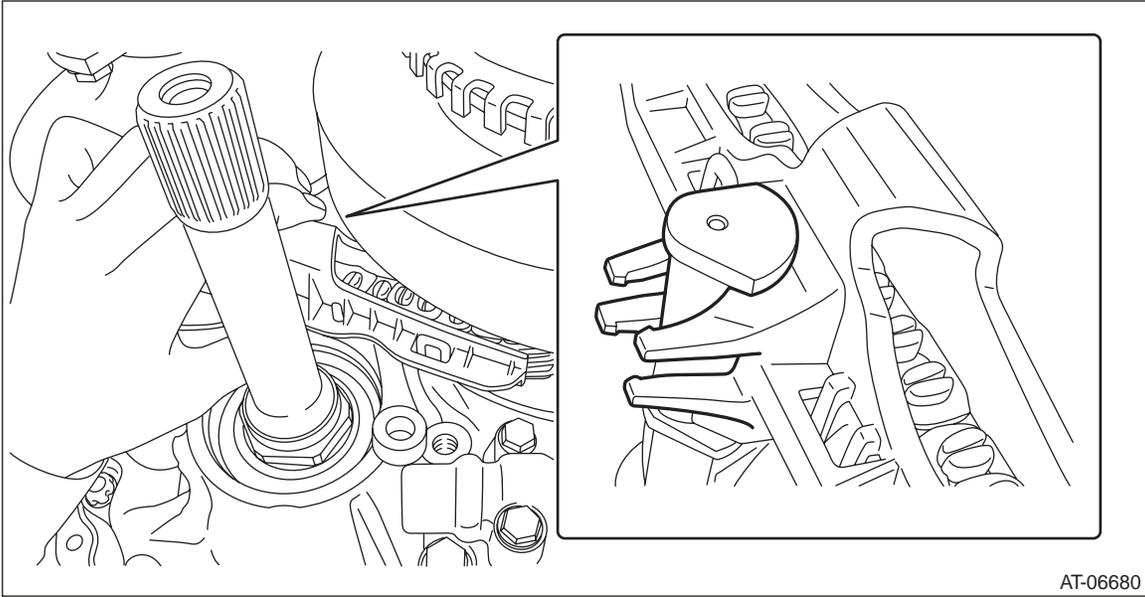
(3) Move the chain guide to the support rod side.

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Primary Pulley and Secondary Pulley

CONTINUOUSLY VARIABLE TRANSMISSION

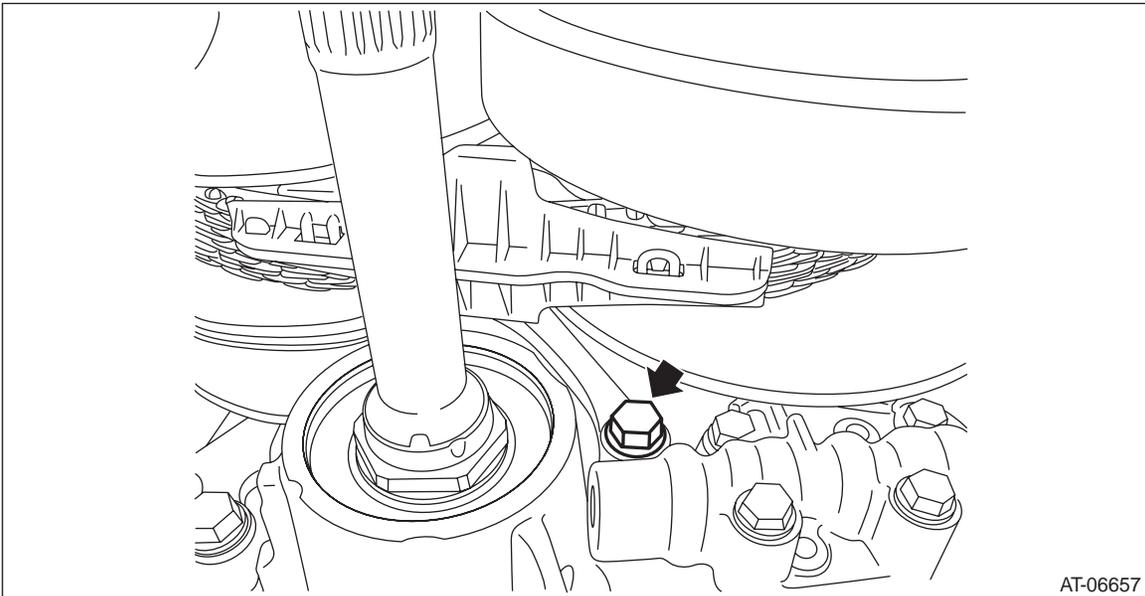
(4) While holding the support rod, press the chain guide so that the support rod runs through between the protrusions of chain guide and install the chain guide to the support rod.



(5) Install the support rod.

Tightening torque:

21 N·m (2.1 kgf·m, 15.5 ft·lb)



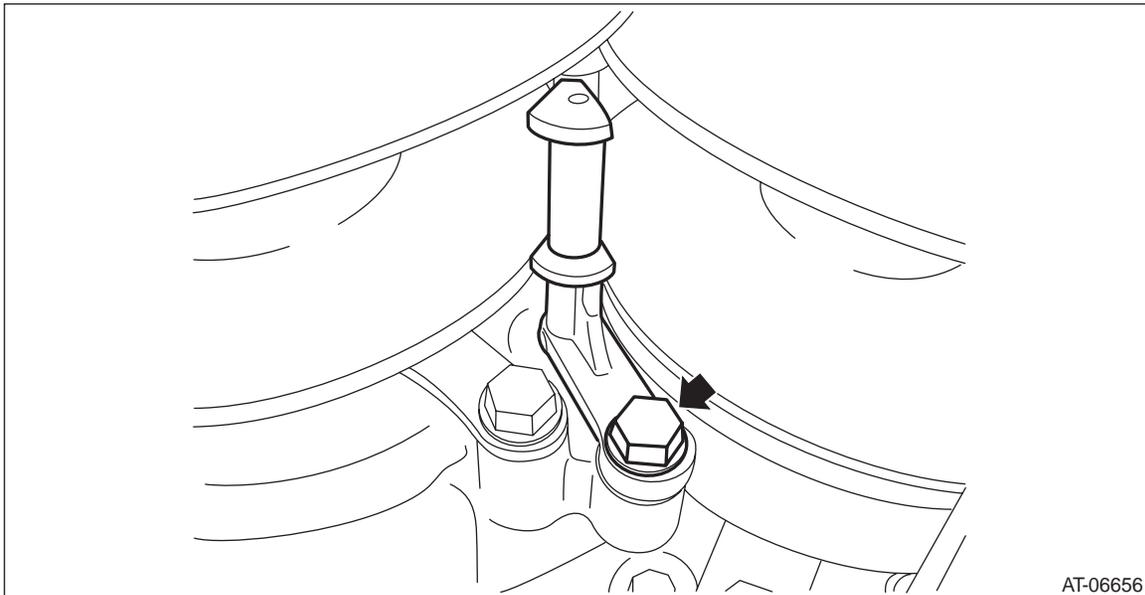
Primary Pulley and Secondary Pulley

CONTINUOUSLY VARIABLE TRANSMISSION

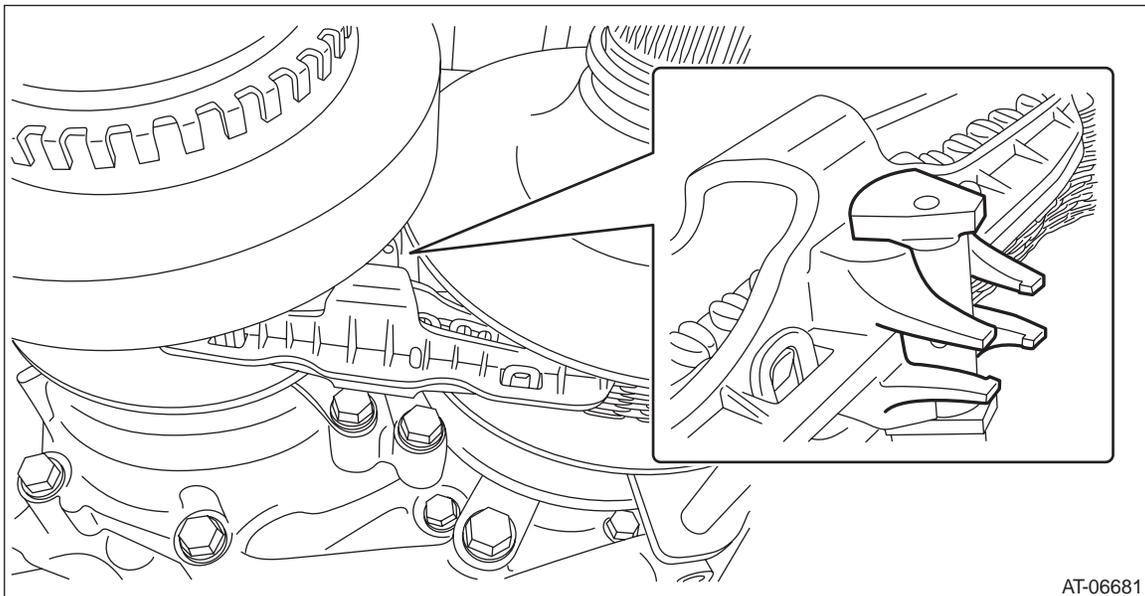
(6) Install the lubrication pipe.

Tightening torque:

21 N·m (2.1 kgf·m, 15.5 ft·lb)



(7) Install the chain guide so that the lubrication pipe runs through between the protrusions of each chain guide. Then remove the ST (PULLEY EXPANDER).



- 12) Install the reduction drive gear.<Ref. to CVT(TR580)-217, INSTALLATION, Reduction Drive Gear.>
- 13) Select the reduction drive gear shim.<Ref. to CVT(TR580)-219, ADJUSTMENT, Reduction Drive Gear.>
- 14) Install the transmission case.<Ref. to CVT(TR580)-206, INSTALLATION, Transmission Case.>
- 15) Install the transmission control device.<Ref. to CVT(TR580)-200, INSTALLATION, Transmission Control Device.>
- 16) Install the oil strainer and oil pan.<Ref. to CVT(TR580)-108, INSTALLATION, Oil Pan and Strainer.>
- 17) Install the reduction driven gear assembly.<Ref. to CVT(TR580)-189, INSTALLATION, Reduction Driven Gear.>
- 18) Install the parking pawl.<Ref. to CVT(TR580)-188, INSTALLATION, Parking Pawl.>
- 19) Install the transfer driven gear assembly.<Ref. to CVT(TR580)-185, INSTALLATION, Transfer Driven Gear.>
- 20) Install the transfer clutch assembly.<Ref. to CVT(TR580)-171, INSTALLATION, Transfer Clutch.>
- 21) Install the extension case.<Ref. to CVT(TR580)-166, INSTALLATION, Extension Case.>

Primary Pulley and Secondary Pulley

CONTINUOUSLY VARIABLE TRANSMISSION

- 22) Install the inhibitor switch.<Ref. to CVT(TR580)-95, INSTALLATION, Inhibitor Switch.>
- 23) Install the secondary speed sensor.<Ref. to CVT(TR580)-100, INSTALLATION, Secondary Speed Sensor.>
- 24) Install the primary speed sensor.<Ref. to CVT(TR580)-103, INSTALLATION, Primary Speed Sensor.>
- 25) Install the turbine speed sensor.<Ref. to CVT(TR580)-98, INSTALLATION, Turbine Speed Sensor.>
- 26) Install the transmission harness.<Ref. to CVT(TR580)-131, INSTALLATION, Transmission Harness.>
- 27) Install the control valve body.<Ref. to CVT(TR580)-117, INSTALLATION, Control Valve Body.>
- 28) Install the air breather hose.<Ref. to CVT(TR580)-156, INSTALLATION, Air Breather Hose.>
- 29) Install the transmission assembly to the vehicle.<Ref. to CVT(TR580)-67, INSTALLATION, Automatic Transmission Assembly.>

C: INSPECTION

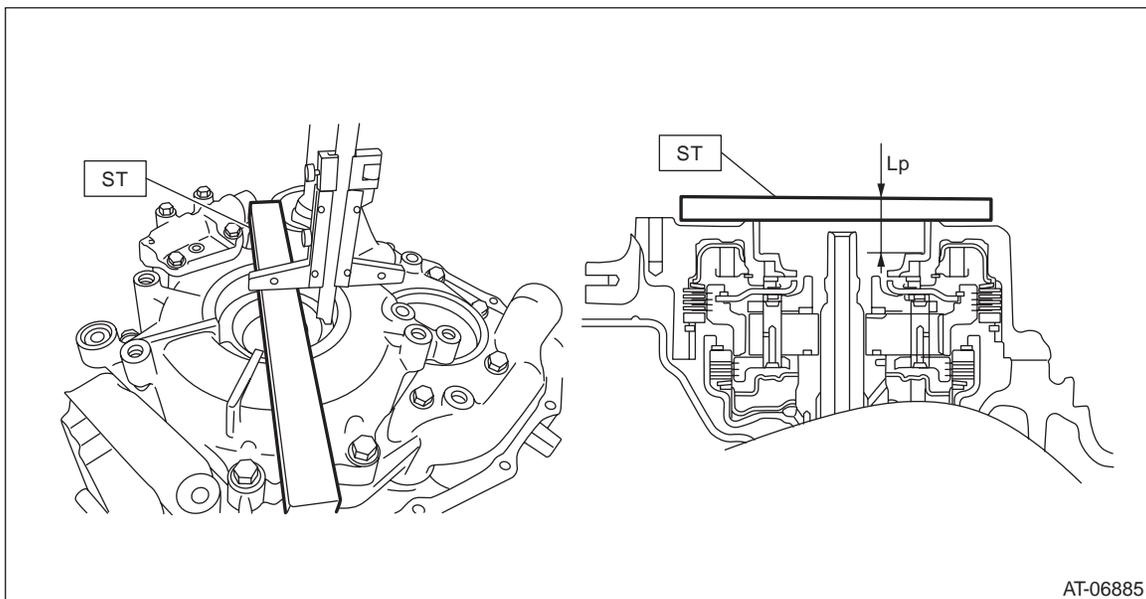
- Check the surface of primary and secondary pulley cones for damage or wear.
- Check the primary and secondary pulley for damage.
- Check the bearing for seizure or wear.
- Apply CVTF to bearing and rotate the bearing to check for noise or dragging etc.

D: ADJUSTMENT

1. PROCEDURE IN REPLACEMENT OF PRIMARY AND SECONDARY PULLEY, OR IN REPLACEMENT OF PRIMARY PULLEY, SECONDARY PULLEY AND VARIATOR CHAIN

- 1) Measure depth "Lp" from the ST upper face to the primary pulley bearing catch surface at several points and calculate the average.

ST 499575400 GAUGE



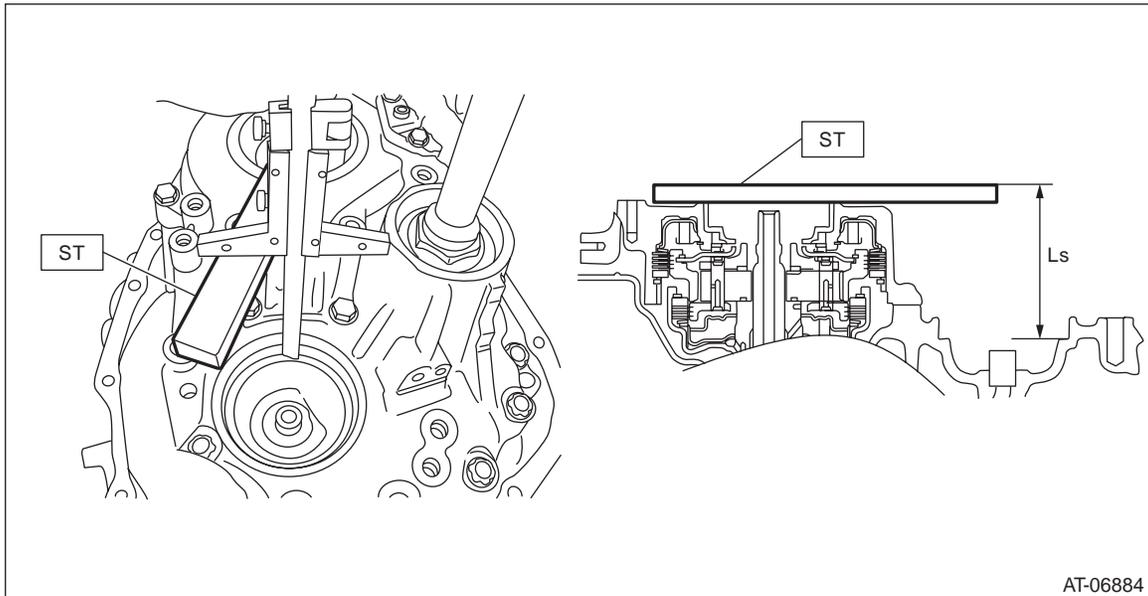
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Primary Pulley and Secondary Pulley

CONTINUOUSLY VARIABLE TRANSMISSION

2) Measure the depth "Ls" from the ST upper face to the secondary pulley bearing catch surface at several points and calculate the average.

ST 499575400 GAUGE



3) Calculate the following formula.

Calculation formula:

$$T \text{ (mm)} = B - A + L_p - L_s - 28.602$$

$$[T \text{ (in)} = B - A + L_p - L_s - 1.126]$$

T: Pulley alignment

A: Specified primary pulley dimension

B: Specified secondary pulley dimension

L_p: Depth from the ST upper face to the primary pulley bearing catch surface

L_s: Depth from the ST upper face to the secondary pulley bearing catch surface

28.602 mm (1.126 in): Constant

Pulley alignment T mm (in)	Thickness of shim mm (in)
-0.05 — 0.049(-0.002 — 0.002)	No shims
0.050 — 0.149(0.002 — 0.006)	0.1 (0.004)
0.150 — 0.249(0.006 — 0.010)	0.2 (0.008)
0.250 — 0.349(0.010 — 0.014)	0.3 (0.012)
0.350 — 0.449(0.014 — 0.018)	0.4 (0.016)
0.450 — 0.549(0.018 — 0.022)	0.5 (0.020)
0.550 — 0.649(0.022 — 0.026)	0.6 (0.024)
0.650 — 0.749(0.026 — 0.029)	0.7 (0.028)
0.750 — 0.849(0.029 — 0.033)	0.8 (0.031)
0.850 — 0.949(0.033 — 0.037)	0.9 (0.035)
0.950 — 1.049(0.037 — 0.041)	1.0 (0.039)
1.050 — 1.149(0.041 — 0.045)	1.1 (0.043)

Primary Pulley and Secondary Pulley

CONTINUOUSLY VARIABLE TRANSMISSION

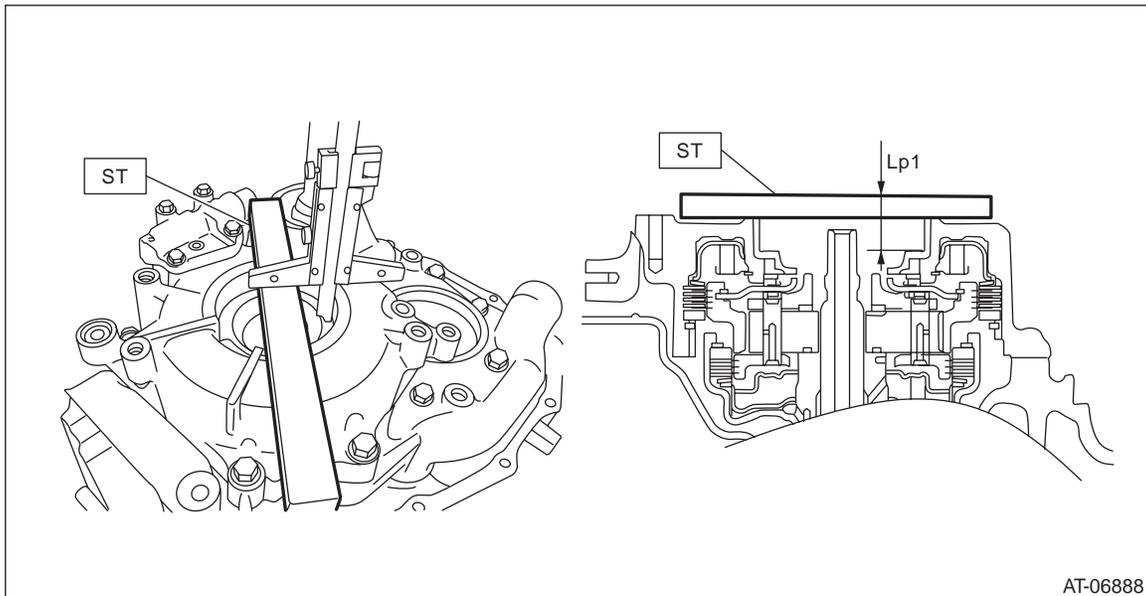
4) Select one to two shims so that the total thickness meets the value obtained from step 3).

Part No.	Shim thickness mm (in)
32451AA050	0.1 (0.004)
32451AA060	0.2 (0.008)
32451AA070	0.3 (0.012)
32451AA080	0.4 (0.016)
32451AA090	0.5 (0.020)
32451AA100	0.6 (0.024)

2. PROCEDURE WHEN REPLACING ONLY DRIVE PINION RETAINER OR REVERSE BRAKE HOUSING

- 1) Clean the mating surface of current drive pinion retainer and converter case.
- 2) Measure and record the shim thickness that is attached on the current reverse brake housing.
- 3) Using the current drive pinion retainer, measure depth "Lp1" from the ST upper face to the primary pulley bearing catch surface at several points and calculate the average.

ST 499575400 GAUGE



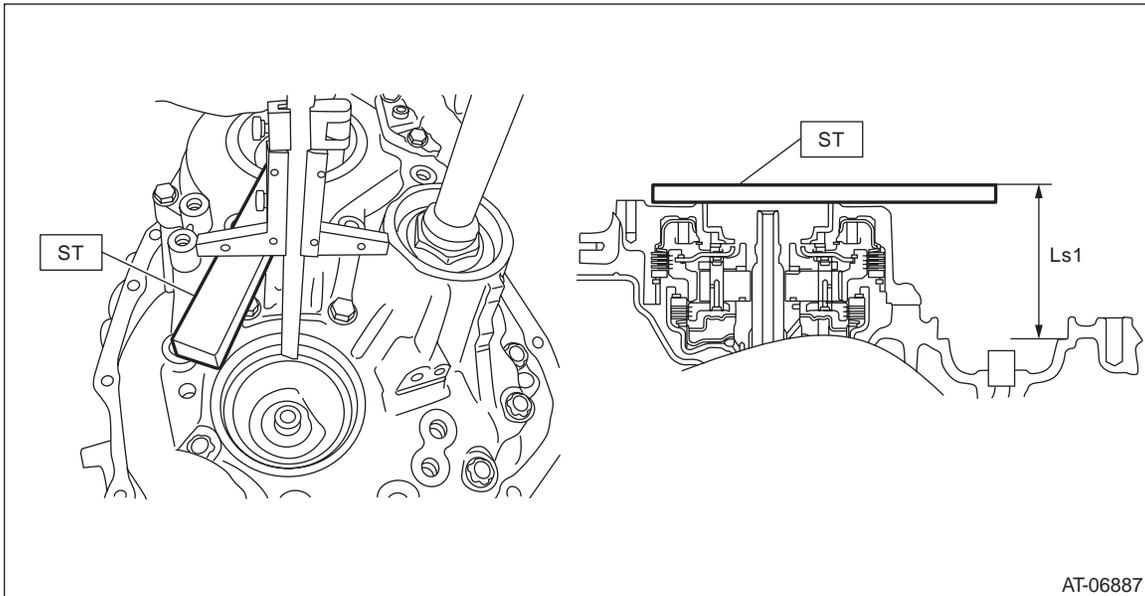
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Primary Pulley and Secondary Pulley

CONTINUOUSLY VARIABLE TRANSMISSION

4) Using the current drive pinion retainer or current reverse brake housing, measure the depth “Ls1” from the ST upper face to the secondary pulley bearing catch surface at several points and calculate the average.

ST 499575400 GAUGE



5) Calculate the “LD1” using the following formula and record it.

Calculation formula:

$$LD1 \text{ mm (in)} = Ls1 - Lp1$$

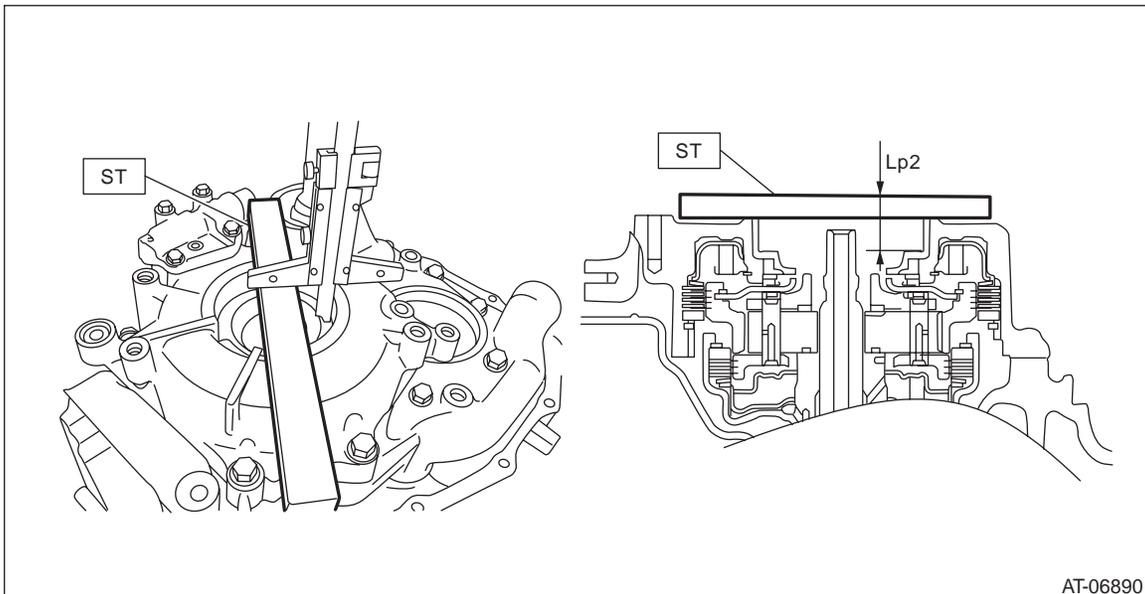
LD1: Height from the primary pulley bearing catch surface to the secondary pulley bearing catch surface

Lp1: Depth from the ST upper face to the primary pulley bearing catch surface

Ls1: Depth from the ST upper face to the secondary pulley bearing catch surface

6) Using the new drive pinion retainer or new reverse brake housing, measure the depth “Lp2” from the ST upper face to the primary pulley bearing catch surface at several points and calculate the average.

ST 499575400 GAUGE

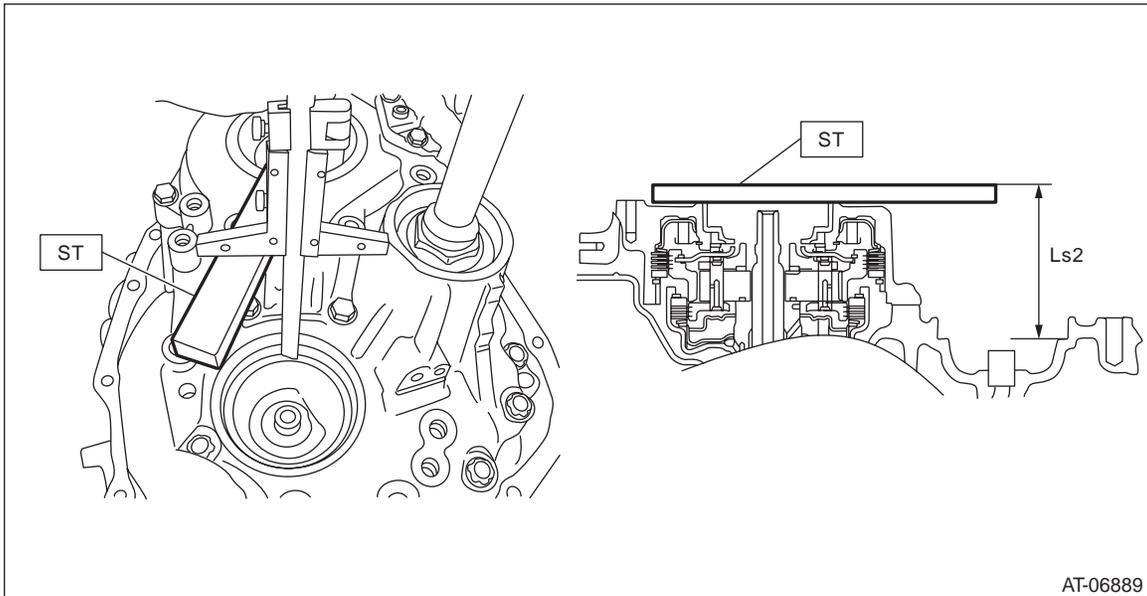


Primary Pulley and Secondary Pulley

CONTINUOUSLY VARIABLE TRANSMISSION

7) Using the new drive pinion retainer or new reverse brake housing, measure the depth "Ls2" from the ST upper face to the secondary pulley bearing catch surface at several points and calculate the average.

ST 499575400 GAUGE



8) Calculate the "LD2" using the following formula and record it.

Calculation formula:

$$LD2 \text{ mm (in)} = Ls2 - Lp2$$

LD2: Height from the primary pulley bearing catch surface to the secondary pulley bearing catch surface

Lp2: Depth from the ST upper face to the primary pulley bearing catch surface

Ls2: Depth from the ST upper face to the secondary pulley bearing catch surface

Primary Pulley and Secondary Pulley

CONTINUOUSLY VARIABLE TRANSMISSION

9) Calculate the recorded values of “LD1” and “LD2” to obtain the positive number to select the shims.

Calculation formula: $T1 \text{ mm (in)} = LD1 - LD2$ or $T2 \text{ mm (in)} = LD2 - LD1$

T1, T2: Difference between new drive pinion retainer or new reverse brake housing and current drive pinion retainer or current reverse brake housing

LD1: Calculated value of current drive pinion retainer or current reverse brake housing

LD2: Calculated value of new drive pinion retainer or new reverse brake housing

Difference of the case (T1) mm (in)	Shim selection procedure
0 — 0.050 (0 — 0.00197)	Select a new shim of the same thickness with the shim that is used on the primary pulley side of the current reverse brake housing.
0.051 — 0.150 (0.00201 — 0.00591)	Select a shim which is 0.1 mm (0.004 in) thicker than the shim that is used on the primary pulley side of the current reverse brake housing.
0.151 — 0.250 (0.00594 — 0.00984)	Select a shim which is 0.2 mm (0.008 in) thicker than the shim that is used on the primary pulley side of the current reverse brake housing.
0.251 — 0.350 (0.00988 — 0.01378)	Select a shim which is 0.3 mm (0.012 in) thicker than the shim that is used on the primary pulley side of the current reverse brake housing.
0.351 — 0.450 (0.01382 — 0.01772)	Select a shim which is 0.4 mm (0.016 in) thicker than the shim that is used on the primary pulley side of the current reverse brake housing.
0.451 — 0.550 (0.01776 — 0.02165)	Select a shim which is 0.5 mm (0.020 in) thicker than the shim that is used on the primary pulley side of the current reverse brake housing.
0.551 — 0.600 (0.02169 — 0.02362)	Select a shim which is 0.6 mm (0.024 in) thicker than the shim that is used on the primary pulley side of the current reverse brake housing.

Difference of the case (T2) mm (in)	Shim selection procedure
0 — 0.050 (0 — 0.00197)	Select a new shim of the same thickness with the shim that is used on the primary pulley side of the current reverse brake housing.
0.051 — 0.150 (0.00201 — 0.00591)	Select a shim which is 0.1 mm (0.004 in) thinner than the shim that is used on the primary pulley side of the current reverse brake housing.
0.151 — 0.250 (0.00594 — 0.00984)	Select a shim which is 0.2 mm (0.008 in) thinner than the shim that is used on the primary pulley side of the current reverse brake housing.
0.251 — 0.350 (0.00988 — 0.01378)	Select a shim which is 0.3 mm (0.012 in) thinner than the shim that is used on the primary pulley side of the current reverse brake housing.
0.351 — 0.450 (0.01382 — 0.01772)	Select a shim which is 0.4 mm (0.016 in) thinner than the shim that is used on the primary pulley side of the current reverse brake housing.
0.451 — 0.550 (0.01776 — 0.02165)	Select a shim which is 0.5 mm (0.020 in) thinner than the shim that is used on the primary pulley side of the current reverse brake housing.
0.551 — 0.600 (0.02169 — 0.02362)	Select a shim which is 0.6 mm (0.024 in) thinner than the shim that is used on the primary pulley side of the current reverse brake housing.

Part No.	Shim thickness mm (in)
32451AA050	0.1 (0.004)
32451AA060	0.2 (0.008)
32451AA070	0.3 (0.012)
32451AA080	0.4 (0.016)
32451AA090	0.5 (0.020)
32451AA100	0.6 (0.024)

39. Variator Chain

A: REMOVAL

For removal of variator chain, refer to “Primary Pulley and Secondary Pulley”. <Ref. to CVT(TR580)-221, REMOVAL, Primary Pulley and Secondary Pulley.>

B: INSTALLATION

For installation of variator chain, refer to “Primary Pulley and Secondary Pulley”. <Ref. to CVT(TR580)-228, INSTALLATION, Primary Pulley and Secondary Pulley.>

C: INSPECTION

Check the variator chain for damage and wear.

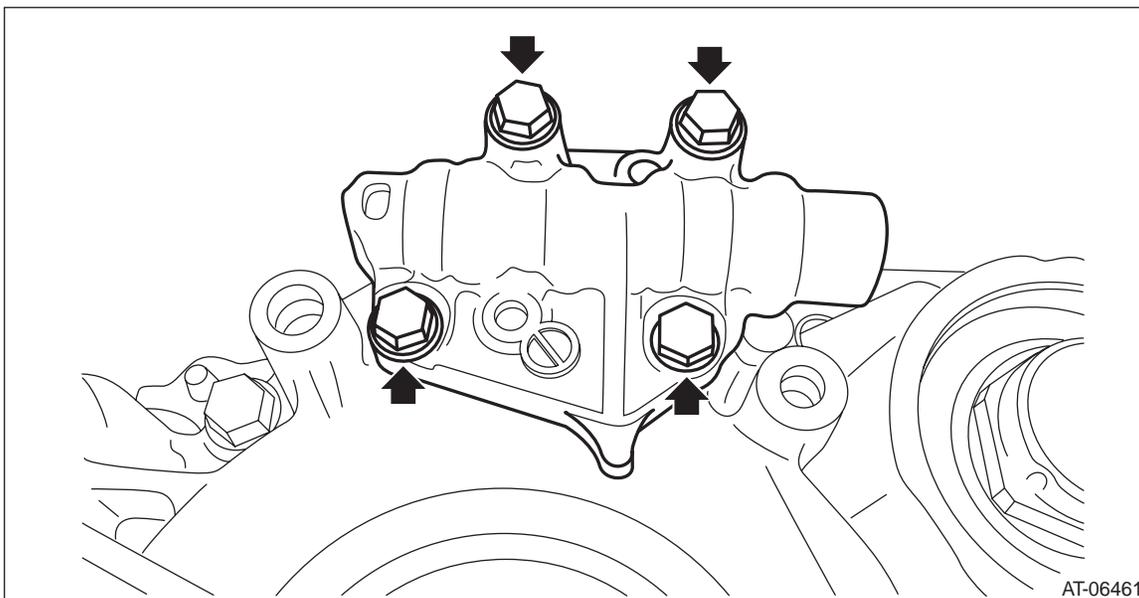
Reverse Brake Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

40.Reverse Brake Assembly

A: REMOVAL

- 1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TR580)-57, REMOVAL, Automatic Transmission Assembly.>
- 2) Remove the air breather hose. <Ref. to CVT(TR580)-155, REMOVAL, Air Breather Hose.>
- 3) Remove the control valve body. <Ref. to CVT(TR580)-111, REMOVAL, Control Valve Body.>
- 4) Remove the transmission harness. <Ref. to CVT(TR580)-125, REMOVAL, Transmission Harness.>
- 5) Remove the turbine speed sensor. <Ref. to CVT(TR580)-98, REMOVAL, Turbine Speed Sensor.>
- 6) Remove the secondary speed sensor. <Ref. to CVT(TR580)-100, REMOVAL, Secondary Speed Sensor.>
- 7) Remove the primary speed sensor. <Ref. to CVT(TR580)-102, REMOVAL, Primary Speed Sensor.>
- 8) Remove the inhibitor switch. <Ref. to CVT(TR580)-94, REMOVAL, Inhibitor Switch.>
- 9) Remove the extension case. <Ref. to CVT(TR580)-165, REMOVAL, Extension Case.>
- 10) Remove the transfer clutch assembly. <Ref. to CVT(TR580)-169, REMOVAL, Transfer Clutch.>
- 11) Remove the transfer driven gear assembly. <Ref. to CVT(TR580)-184, REMOVAL, Transfer Driven Gear.>
- 12) Remove the parking pawl. <Ref. to CVT(TR580)-187, REMOVAL, Parking Pawl.>
- 13) Remove the reduction driven gear assembly. <Ref. to CVT(TR580)-189, REMOVAL, Reduction Driven Gear.>
- 14) Remove the oil pan and oil strainer. <Ref. to CVT(TR580)-107, REMOVAL, Oil Pan and Strainer.>
- 15) Remove the transmission control device. <Ref. to CVT(TR580)-197, REMOVAL, Transmission Control Device.>
- 16) Remove the transmission case. <Ref. to CVT(TR580)-203, REMOVAL, Transmission Case.>
- 17) Remove the reduction drive gear. <Ref. to CVT(TR580)-216, REMOVAL, Reduction Drive Gear.>
- 18) Remove the primary pulley, secondary pulley and variator chain. <Ref. to CVT(TR580)-221, REMOVAL, Primary Pulley and Secondary Pulley.>
- 19) Remove the manual valve assembly.

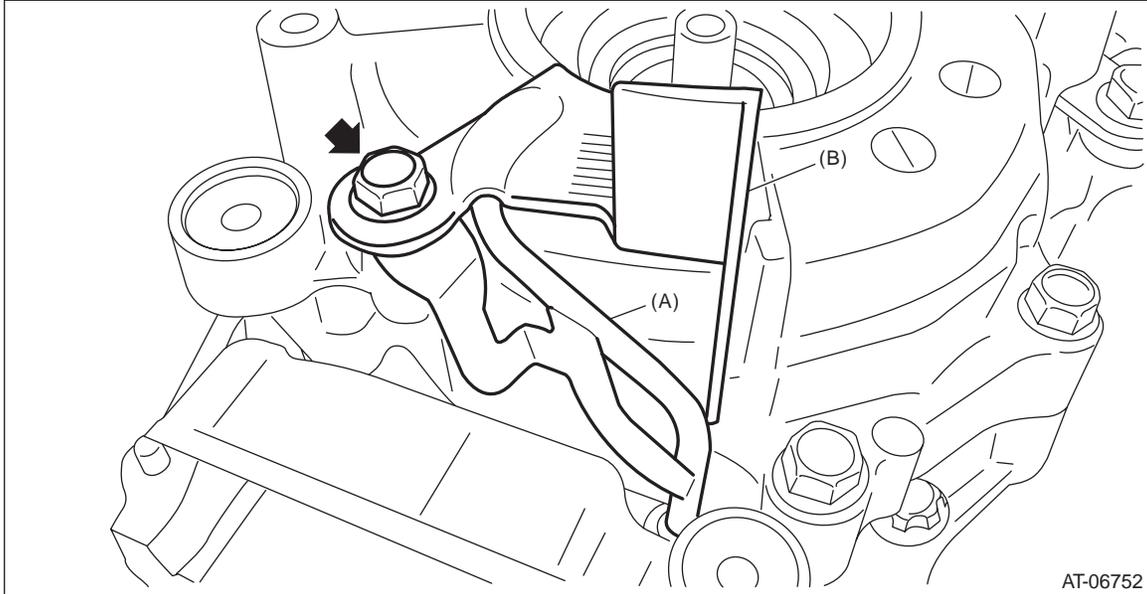


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Reverse Brake Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

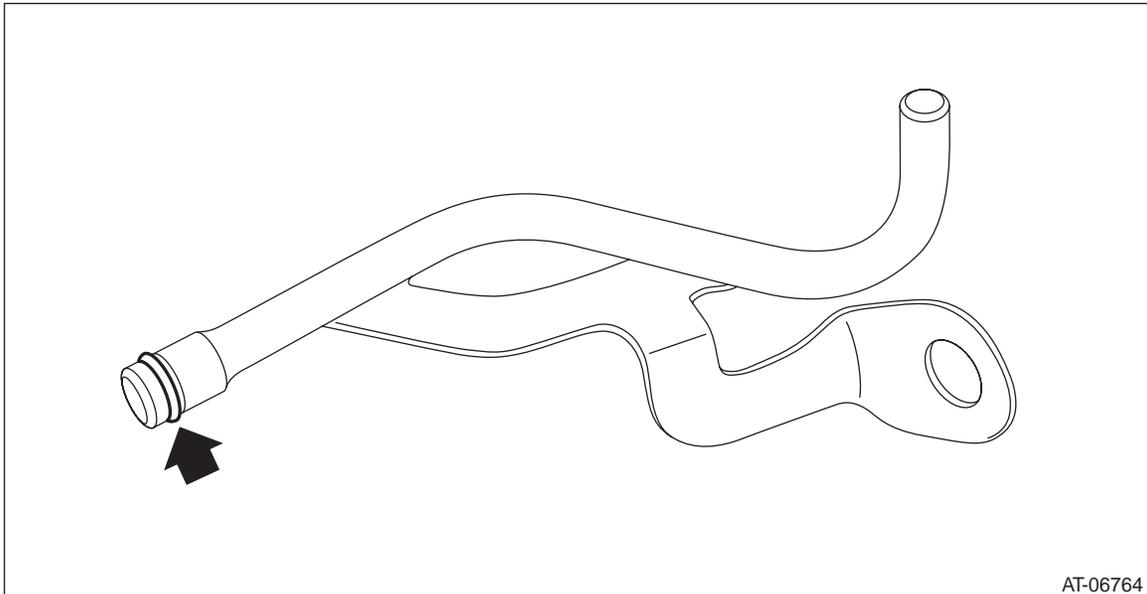
20) Remove the oil guide and lubrication pipe.



(A) Lubrication pipe

(B) Oil guide

21) Remove the O-ring from lubrication pipe.

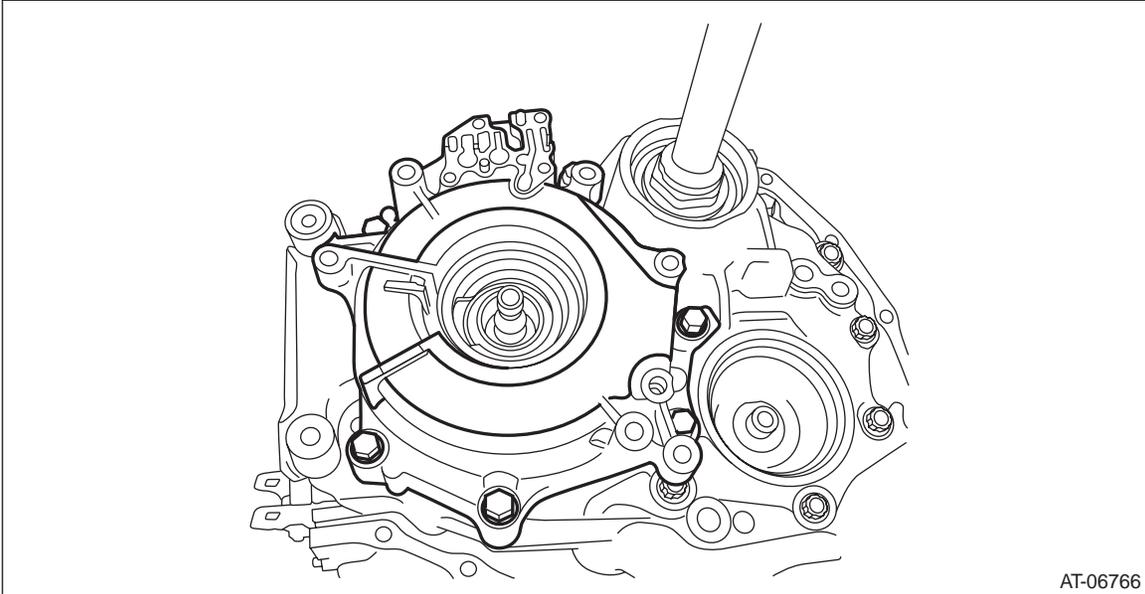


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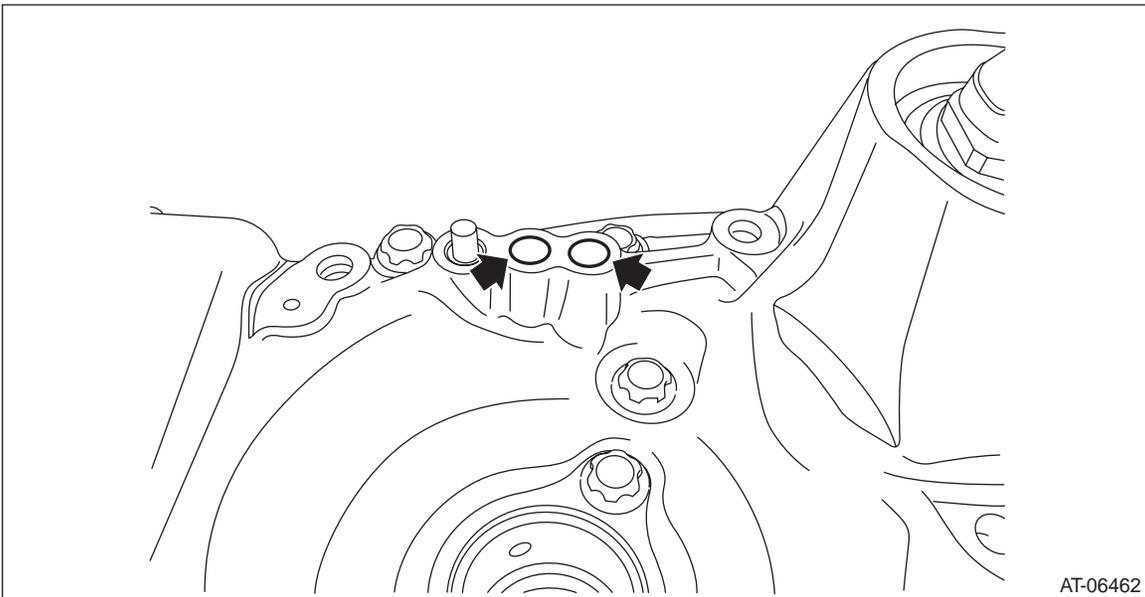
Reverse Brake Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

22) Remove the reverse brake assembly.



23) Remove the O-ring.



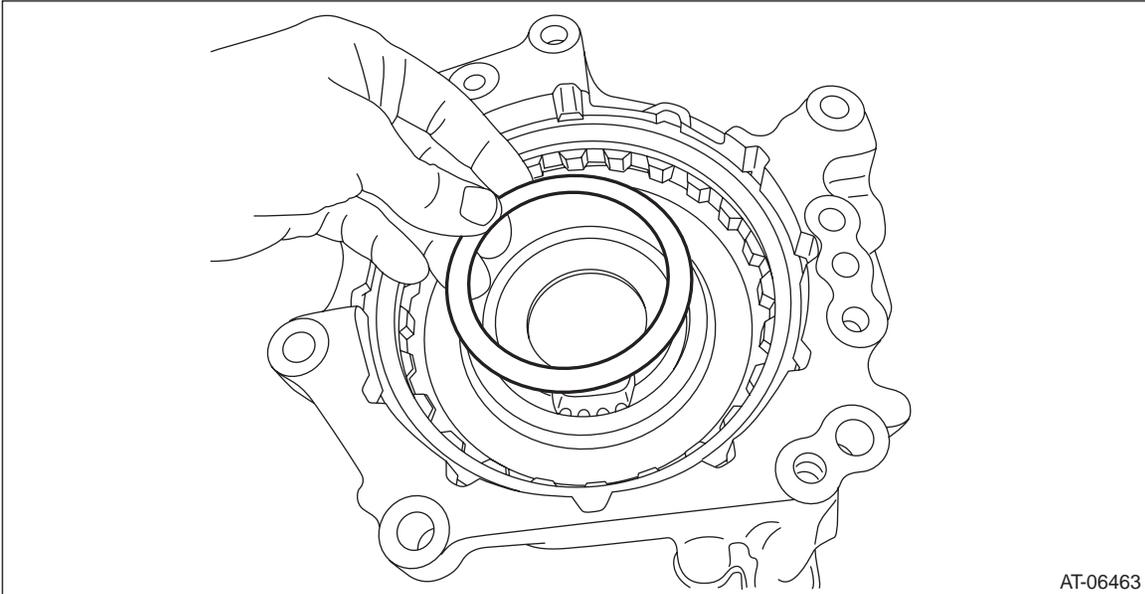
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Reverse Brake Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

B: INSTALLATION

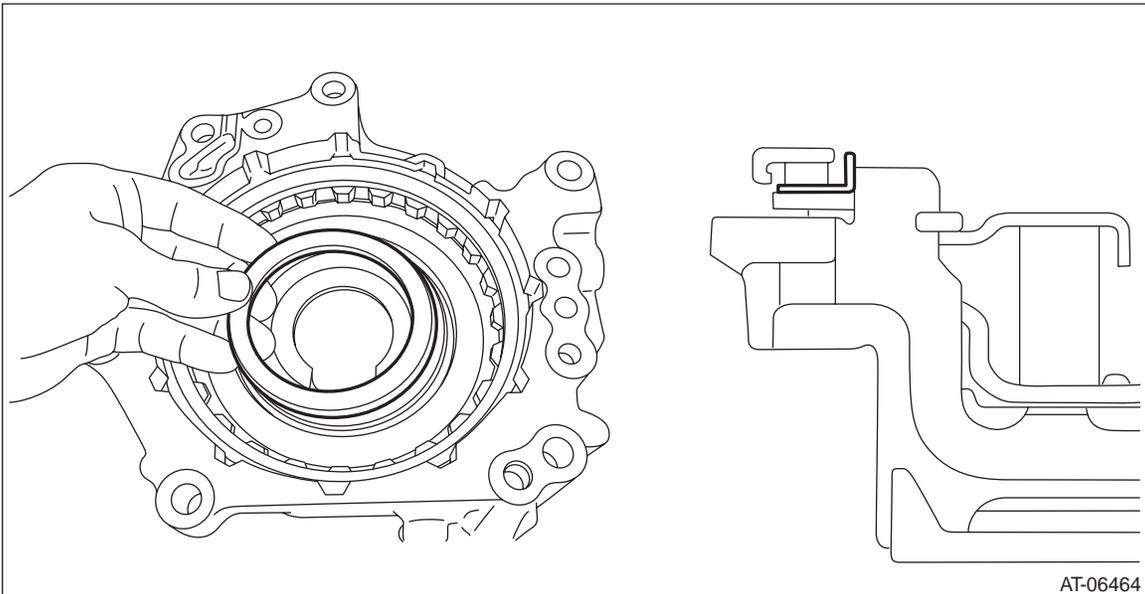
- 1) Select a washer.<Ref. to CVT(TR580)-275, ADJUSTMENT, Forward Clutch Assembly.>
- 2) Install the selected washer to the reverse brake housing.



- 3) Install the thrust bearing to the reverse brake housing.

NOTE:

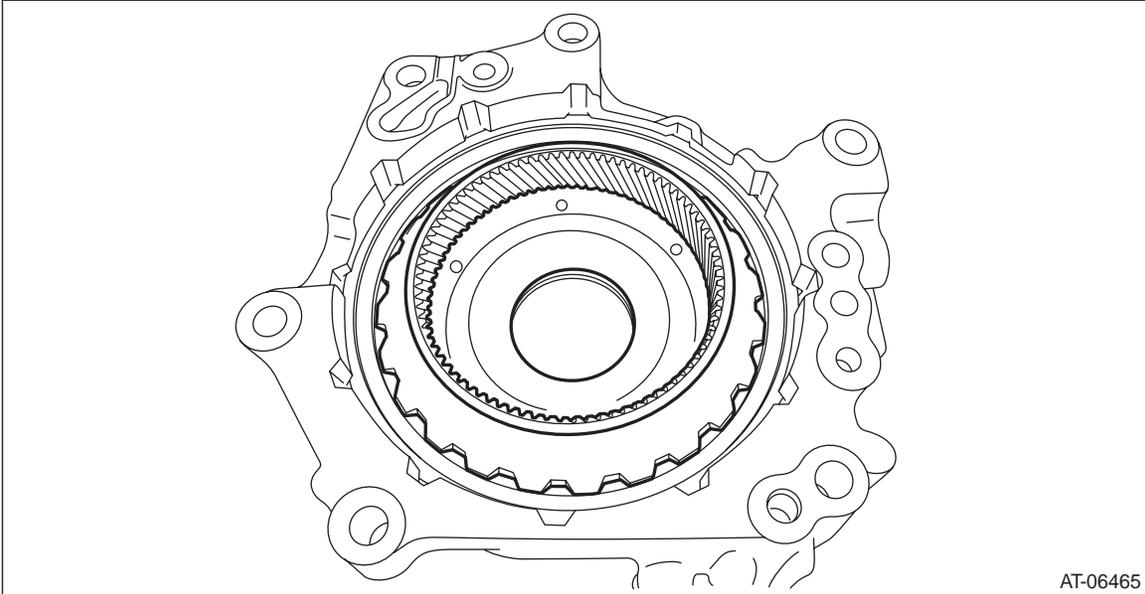
Face the temper color surface to the reverse brake side.



Reverse Brake Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

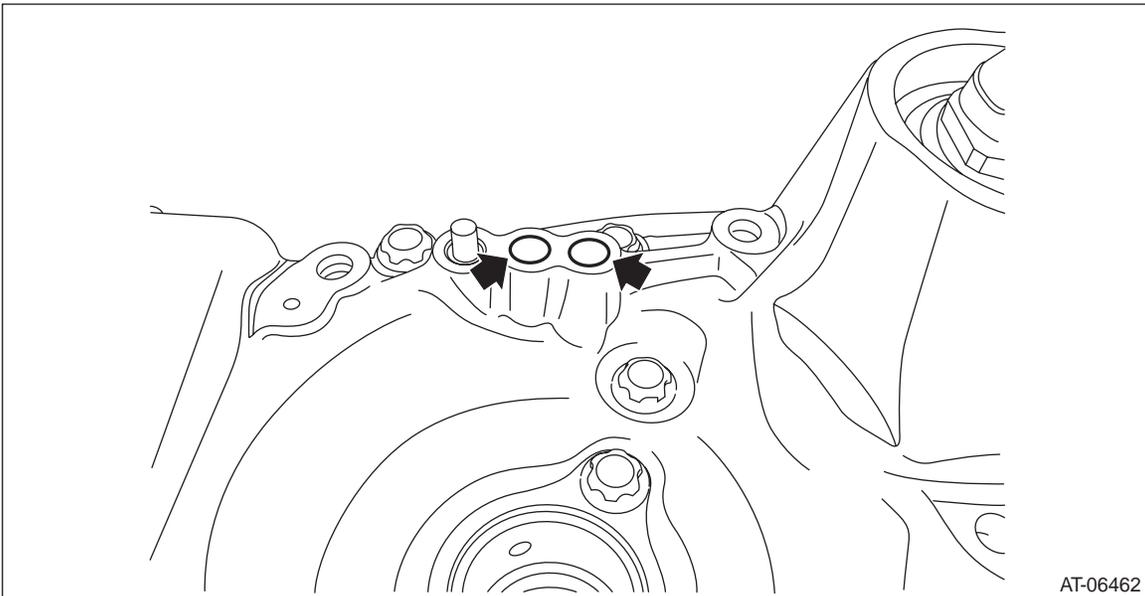
4) Remove the internal gear from the forward clutch assembly, and install it to the reverse brake housing.



5) Install the O-rings.

NOTE:

- Install a new O-ring.
- Apply CVTF to the O-rings.



Reverse Brake Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

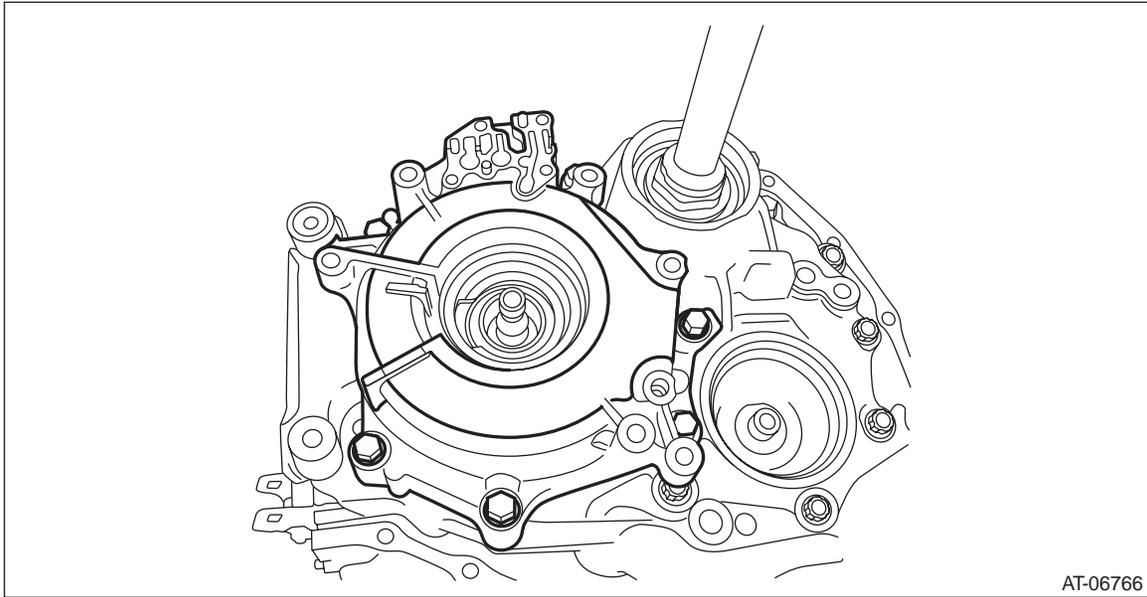
6) Install the reverse brake assembly and internal gear as a unit to the drive pinion retainer.

NOTE:

Slowly rotate the input shaft by hand to engage the internal gear and pinion gear of planetary carrier.

Tightening torque:

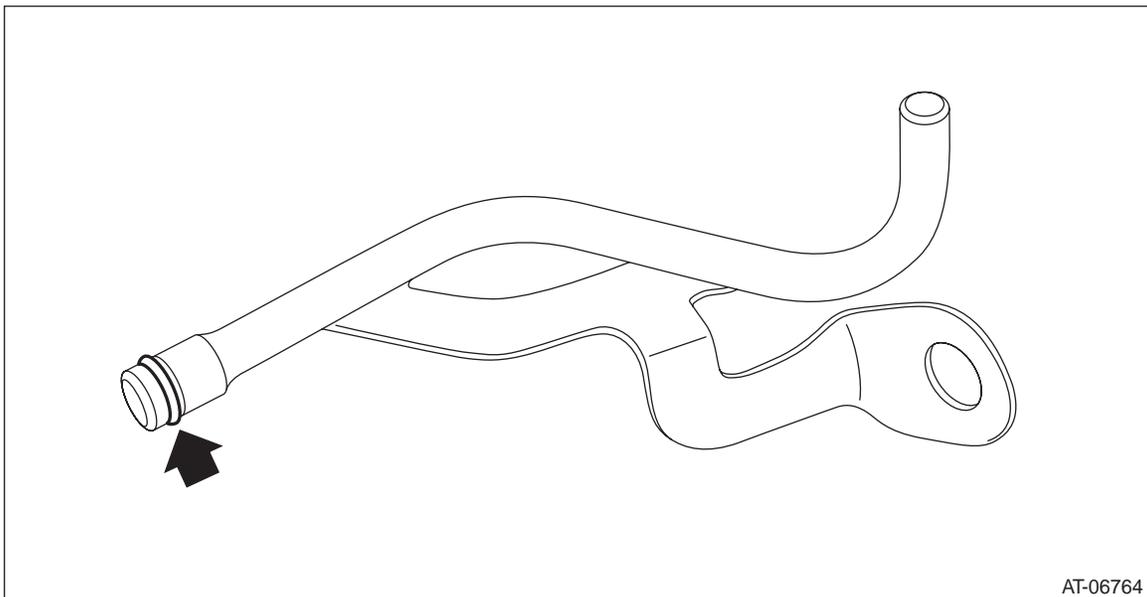
37 N·m (3.8 kgf·m, 27.3 ft·lb)



7) Install the O-ring to the lubrication pipe.

NOTE:

- Install a new O-ring.
- Apply CVTF to the O-rings.



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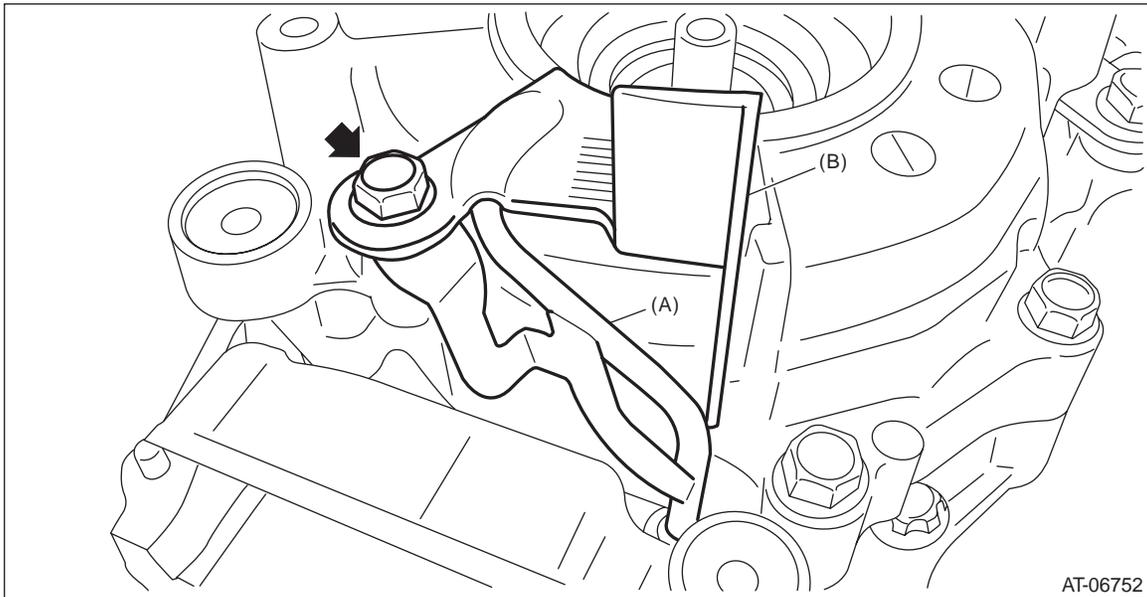
Reverse Brake Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

8) Install the lubrication pipe and oil guide.

Tightening torque:

16 N·m (1.6 kgf·m, 11.8 ft·lb)



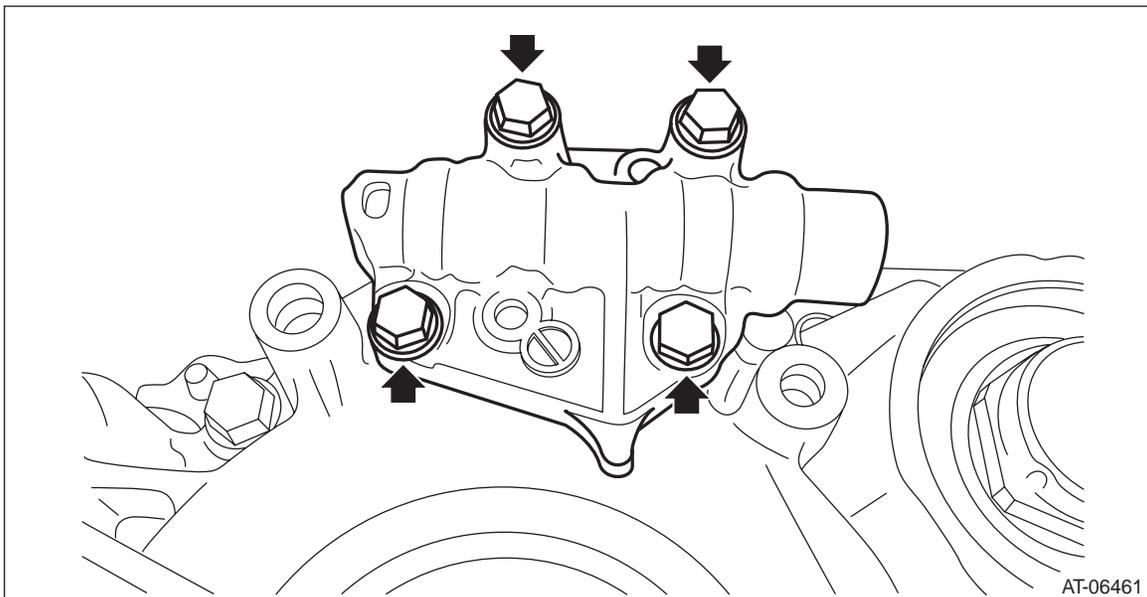
(A) Lubrication pipe

(B) Oil guide

9) Install the manual valve assembly and separator plate.

Tightening torque:

9 N·m (0.9 kgf·m, 6.6 ft·lb)



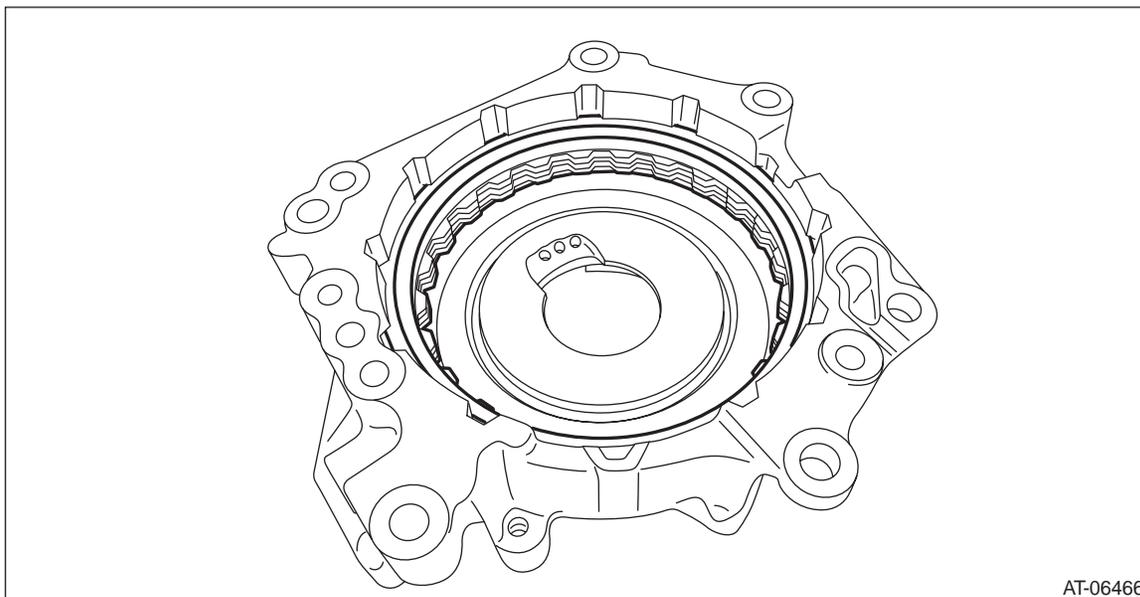
Reverse Brake Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

- 10) Install the primary pulley, secondary pulley and variator chain.<Ref. to CVT(TR580)-228, INSTALLATION, Primary Pulley and Secondary Pulley.>
- 11) Install the reduction drive gear.<Ref. to CVT(TR580)-217, INSTALLATION, Reduction Drive Gear.>
- 12) Install the transmission case.<Ref. to CVT(TR580)-206, INSTALLATION, Transmission Case.>
- 13) Install the transmission control device.<Ref. to CVT(TR580)-200, INSTALLATION, Transmission Control Device.>
- 14) Install the oil strainer and oil pan.<Ref. to CVT(TR580)-108, INSTALLATION, Oil Pan and Strainer.>
- 15) Install the reduction driven gear assembly.<Ref. to CVT(TR580)-189, INSTALLATION, Reduction Driven Gear.>
- 16) Install the parking pawl.<Ref. to CVT(TR580)-188, INSTALLATION, Parking Pawl.>
- 17) Install the transfer driven gear assembly.<Ref. to CVT(TR580)-185, INSTALLATION, Transfer Driven Gear.>
- 18) Install the transfer clutch assembly.<Ref. to CVT(TR580)-171, INSTALLATION, Transfer Clutch.>
- 19) Install the extension case.<Ref. to CVT(TR580)-166, INSTALLATION, Extension Case.>
- 20) Install the inhibitor switch.<Ref. to CVT(TR580)-95, INSTALLATION, Inhibitor Switch.>
- 21) Install the secondary speed sensor.<Ref. to CVT(TR580)-100, INSTALLATION, Secondary Speed Sensor.>
- 22) Install the primary speed sensor.<Ref. to CVT(TR580)-103, INSTALLATION, Primary Speed Sensor.>
- 23) Install the turbine speed sensor.<Ref. to CVT(TR580)-98, INSTALLATION, Turbine Speed Sensor.>
- 24) Install the transmission harness.<Ref. to CVT(TR580)-131, INSTALLATION, Transmission Harness.>
- 25) Install the control valve body.<Ref. to CVT(TR580)-117, INSTALLATION, Control Valve Body.>
- 26) Install the air breather hose.<Ref. to CVT(TR580)-156, INSTALLATION, Air Breather Hose.>
- 27) Install the transmission assembly to the vehicle.<Ref. to CVT(TR580)-67, INSTALLATION, Automatic Transmission Assembly.>

C: DISASSEMBLY

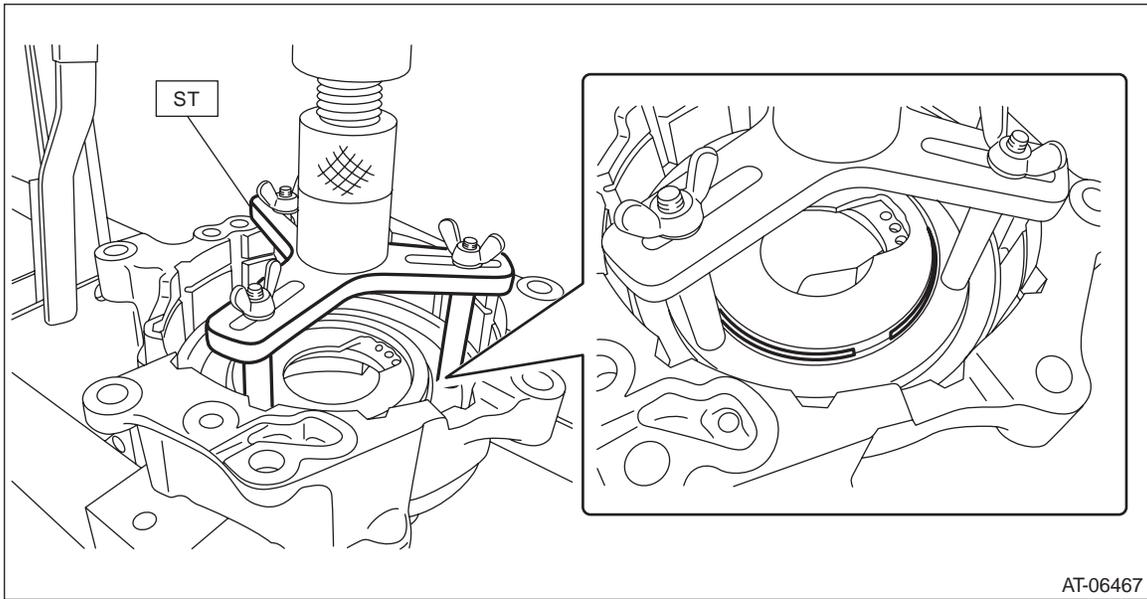
- 1) Remove the snap ring.
- 2) Remove the retaining plate, drive plate, driven plate and dish plate.



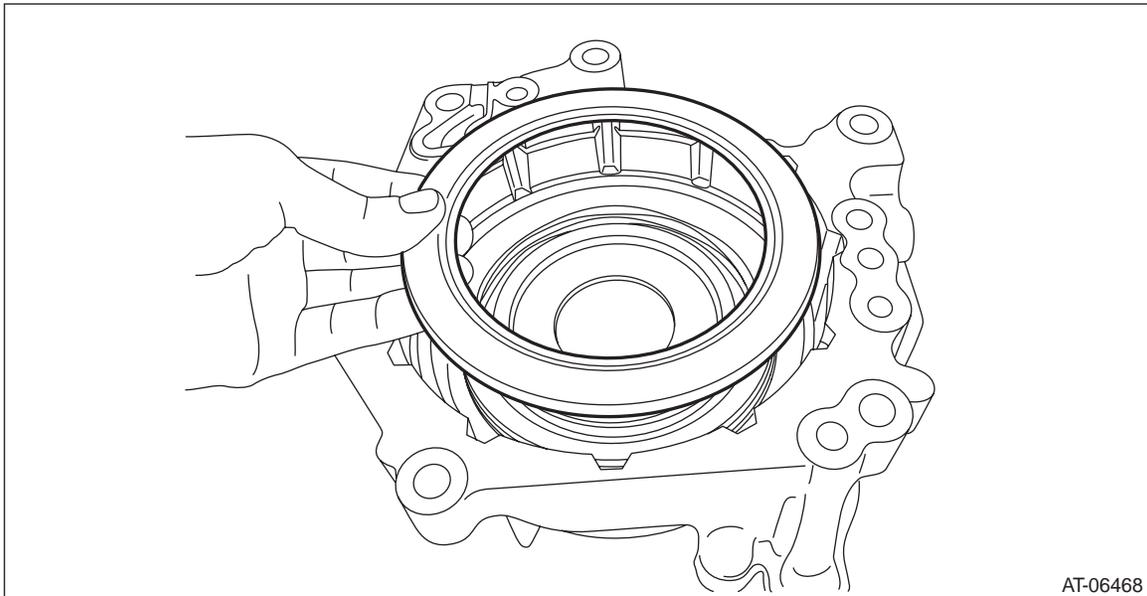
Reverse Brake Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

- 3) Compress the return spring using the ST to remove the snap ring.
ST 18762AA000 or 18762AA001 COMPRESSOR SPECIAL TOOL



- 4) Using the ST, remove the snap ring and spring retainer.

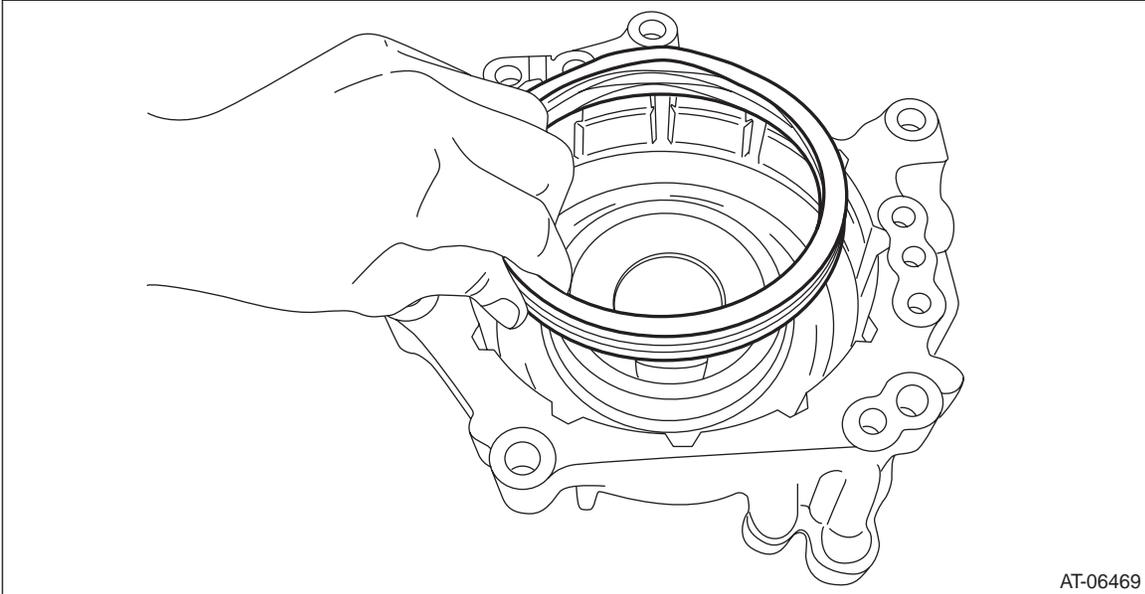


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Reverse Brake Assembly

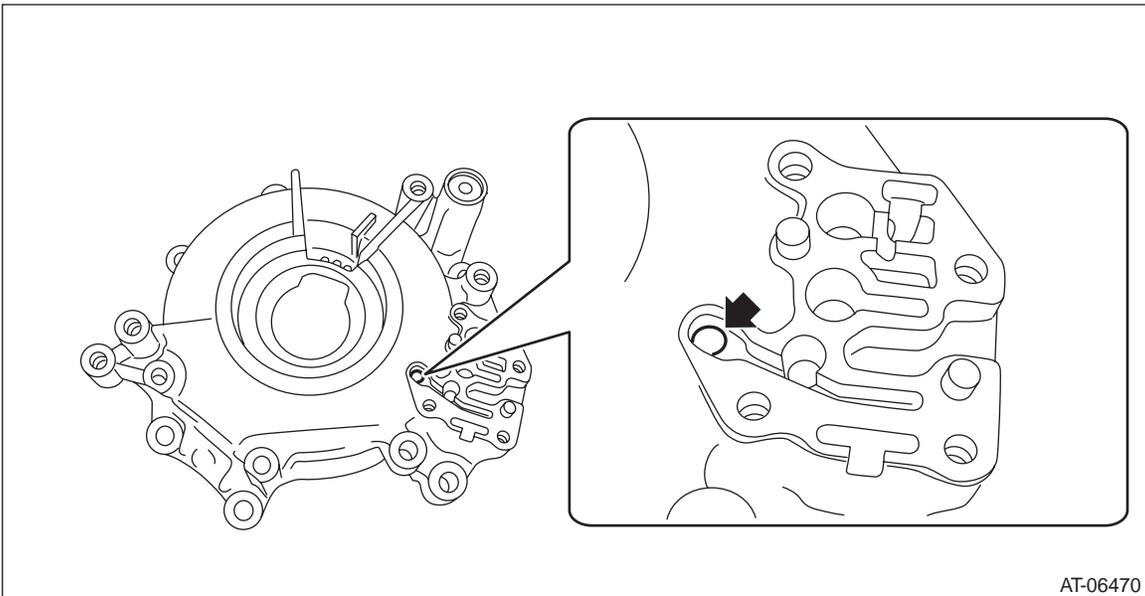
CONTINUOUSLY VARIABLE TRANSMISSION

5) Remove the return spring.



AT-06469

6) Remove the reverse brake piston by blowing compressed air intermittently from reverse brake housing hole.



AT-06470

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Reverse Brake Assembly

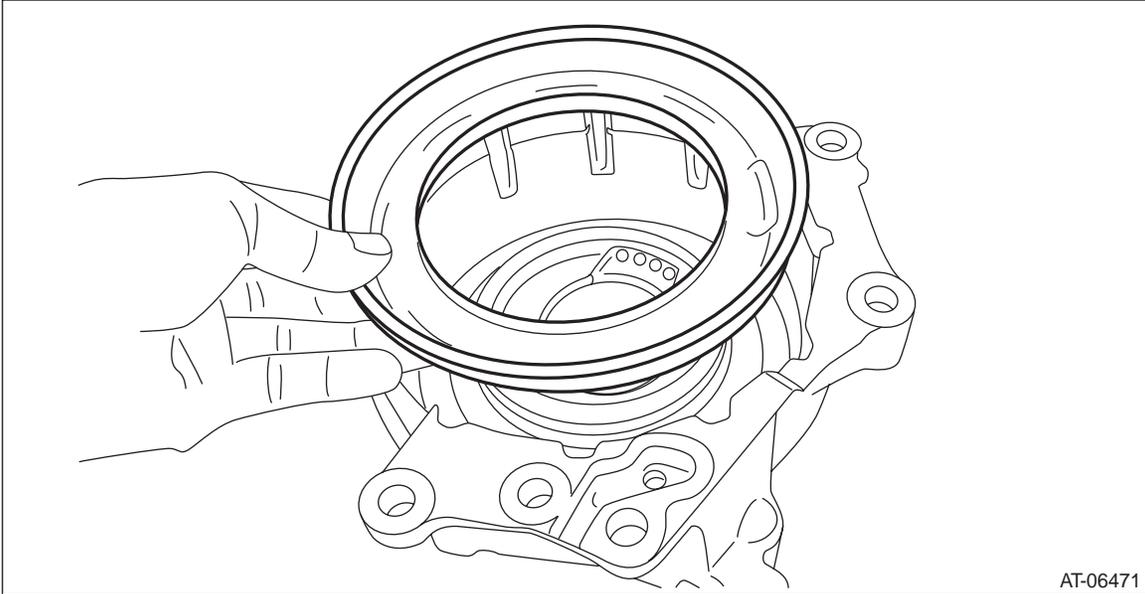
CONTINUOUSLY VARIABLE TRANSMISSION

D: ASSEMBLY

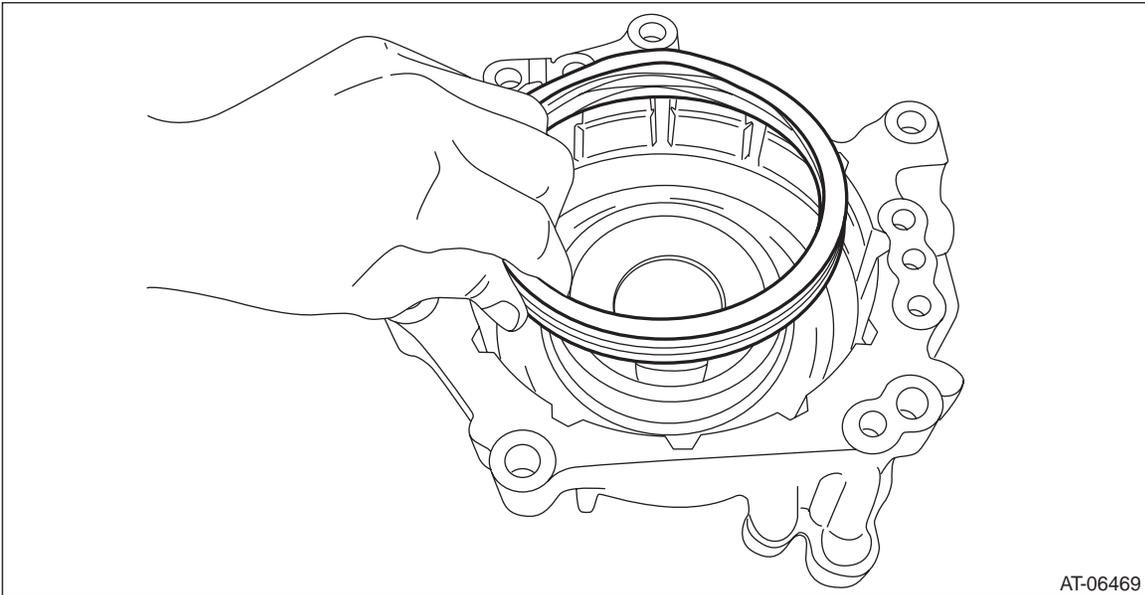
1) Install the reverse brake piston.

NOTE:

Apply CVTF to the sealing area of reverse brake piston.



2) Install the return spring.

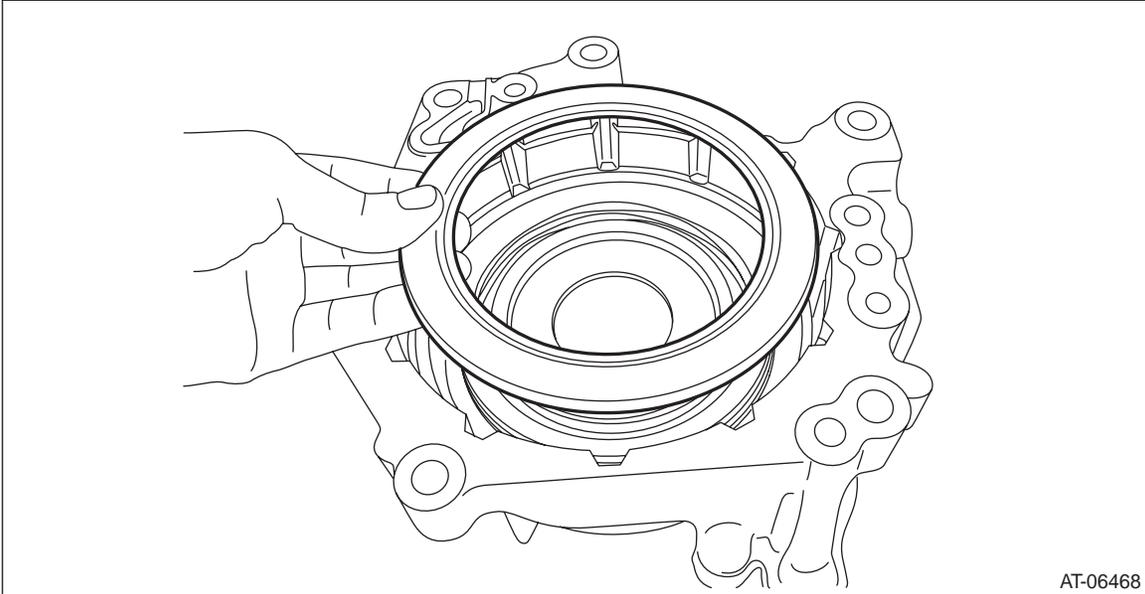


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Reverse Brake Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

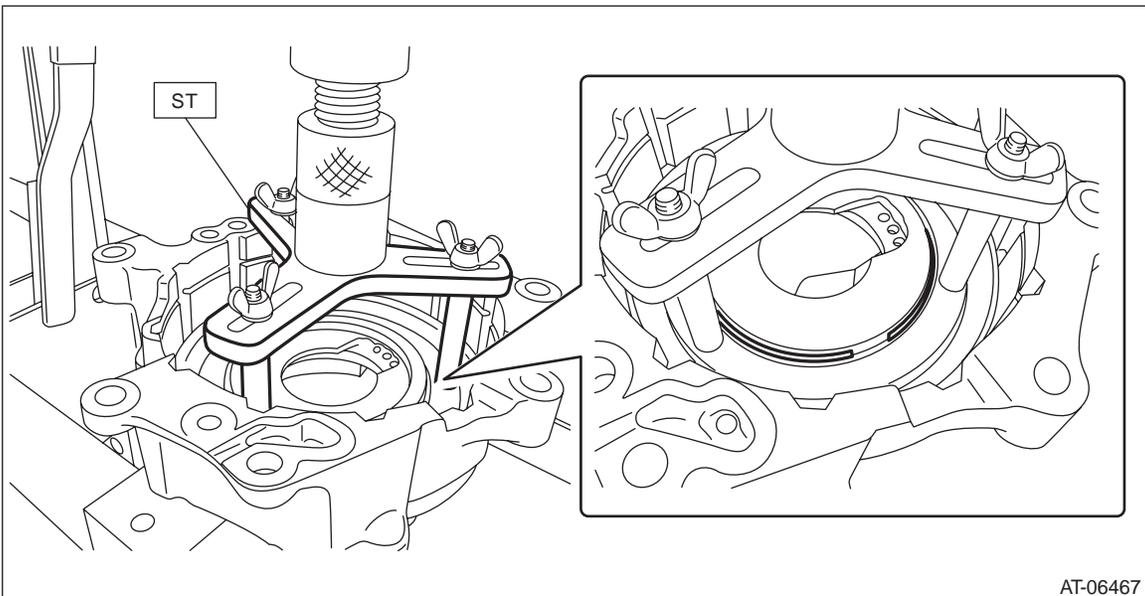
3) Install the spring retainer.



AT-06468

4) Compress the return spring using the ST to install the snap ring.

ST1 18762AA000 or 18762AA001 COMPRESSOR SPECIAL TOOL



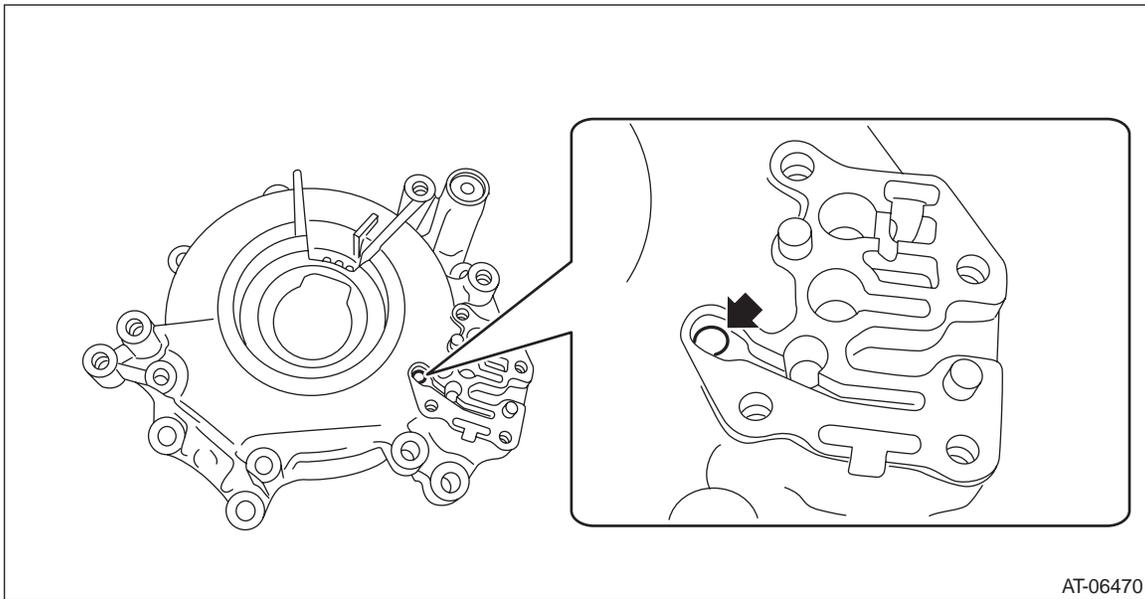
AT-06467

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Reverse Brake Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

5) Check the operation of reverse brake piston by blowing compressed air intermittently from reverse brake housing hole.



AT-06470

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

7) Set the dial gauge to retaining plate, and read its scale.

NOTE:

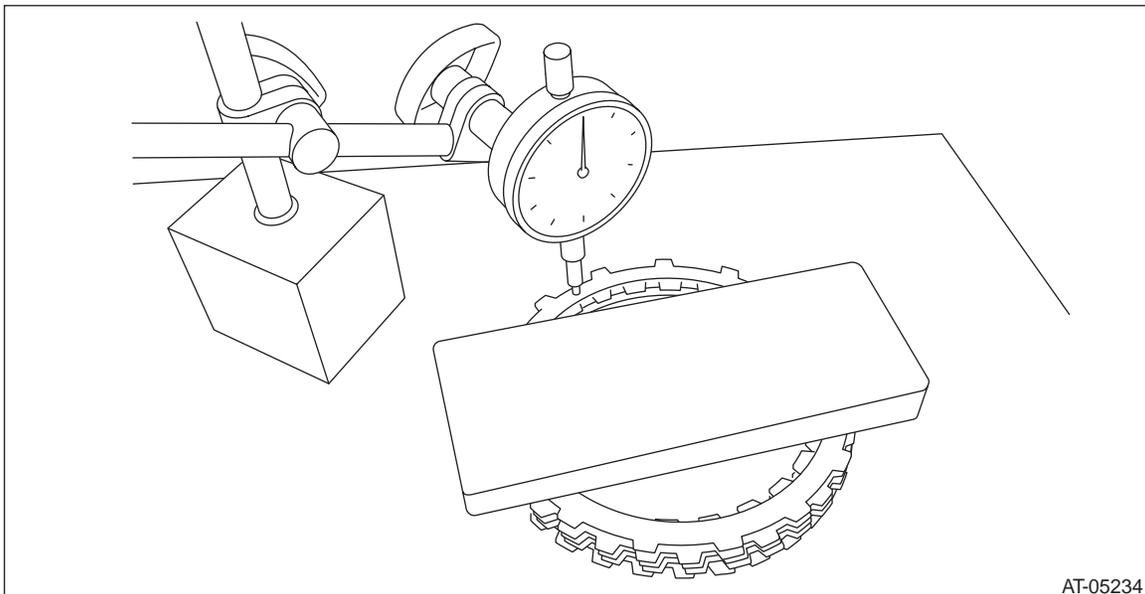
The value, which is read in the gauge at this time, is zero point.

8) 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 29 N (3.0 kgf, 6.5 lb).

9) Put the flat board on retaining plate.



AT-05234

10) Using the following formula, read the push/pull gauge and calculate "N".

$$N = 29 \text{ N (3.0 kgf, 6.5 lb)} - Z$$

29 N (3.0 kgf, 6.5 lb) : Load applied to clutch plate

Z: Flat board weight

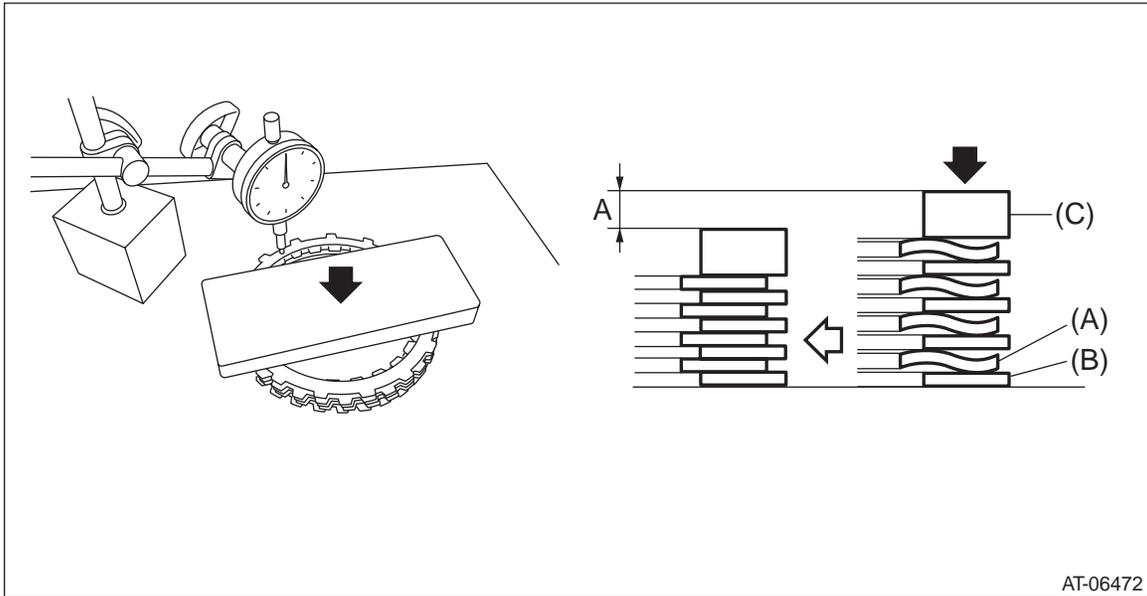
Reverse Brake Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

11) Press the center of retaining plate by applying a force of “N” using push/pull gauge, and then measure and record the compression amount “A”.

NOTE:

Measure at four points with a 90° interval and calculate the average.

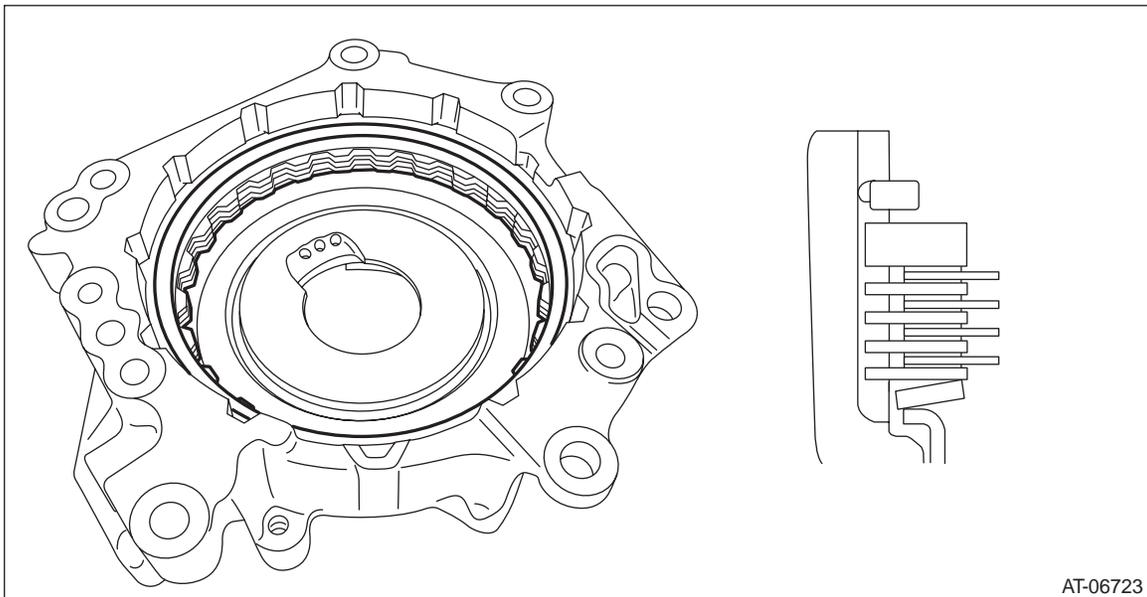


- (A) Drive plate
- (B) Driven plate
- (C) Retaining plate

12) Install the dish plate, drive plate, driven plate, retaining plate and snap ring to the reverse brake housing.

NOTE:

Install the dish plate in the correct direction.

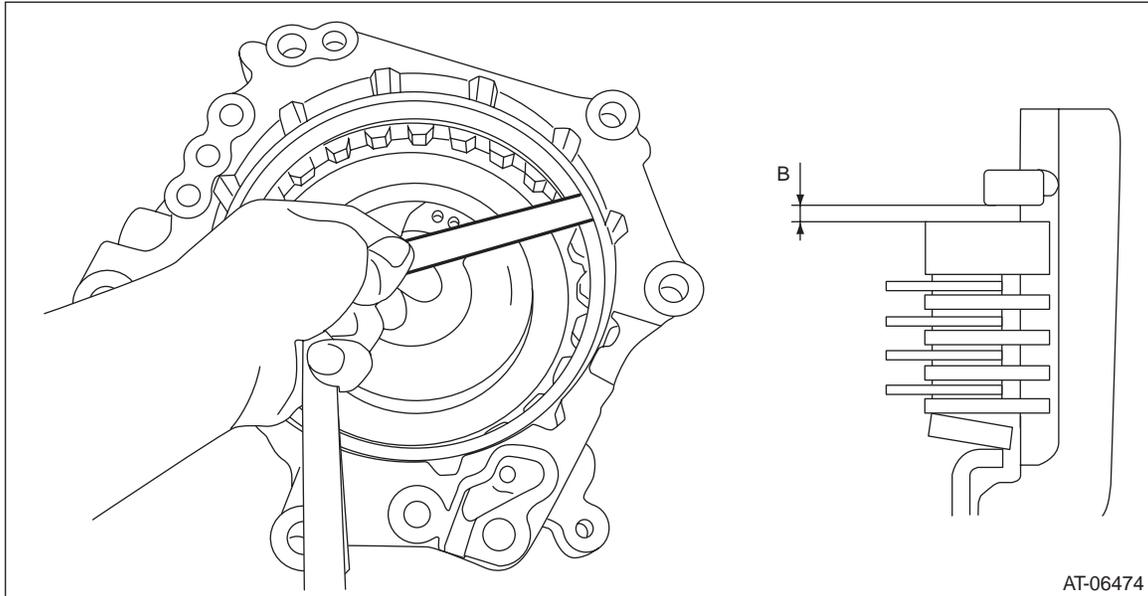


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Reverse Brake Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

13) Measure and record the clearance “B” between the retaining plate and snap ring.



14) Piston stroke calculation

Calculate with A and B dimensions recorded before. If it exceeds the limit, replace with a new drive plate and adjust within the initial standard value.

$$S \text{ mm (in)} = A + B$$

S: Piston stroke

A: Compression amount of drive plate and dish plate

B: Clearance between retaining plate and snap ring

Initial standard:

2.3 — 2.7 mm (0.091 — 0.106 in)

Limit thickness:

2.9 mm (0.114 in)

Retaining plate	
Part No.	Thickness mm (in)
31567AB750	4.2 (0.165)
31567AB800	4.4 (0.173)
31567AB810	4.6 (0.181)
31567AB820	4.8 (0.189)

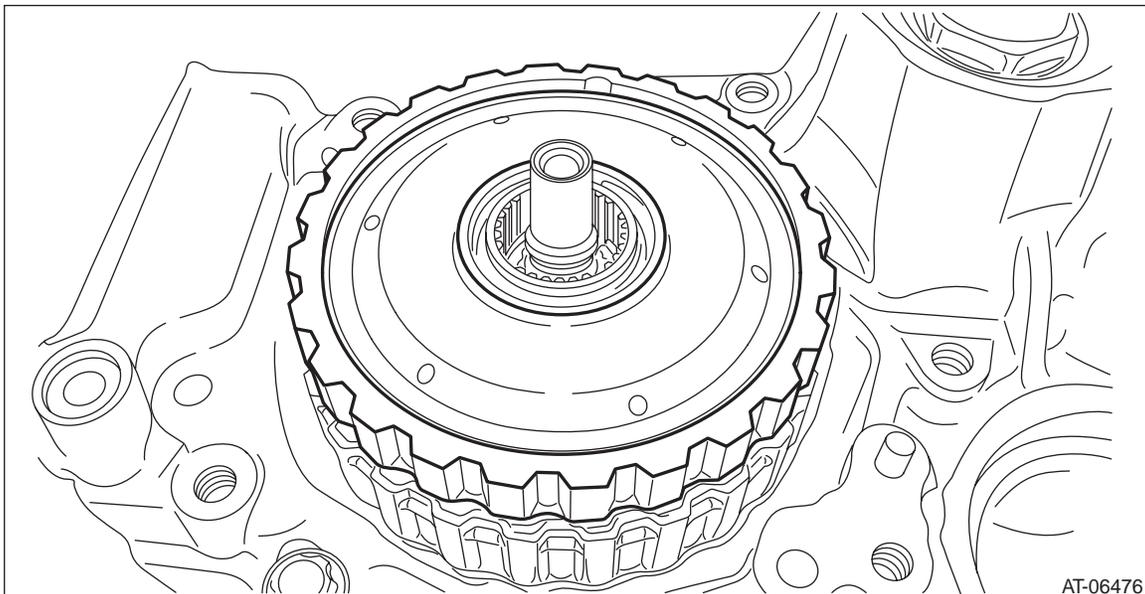
E: INSPECTION

- Inspect the drive plate facing for wear and damage.
- Check the driven plate for discoloration (burnt color).
- Check for worn snap ring, fatigue or damaged return spring or deformed spring retainer.
- Make sure the clearance between retaining plate and snap ring of reverse brake is within the limit. If it exceeds the limit, replace with a new drive plate and select and adjust the retaining plate within the initial standard value. <Ref. to CVT(TR580)-252, ASSEMBLY, Reverse Brake Assembly.>

41. Forward Clutch Assembly

A: REMOVAL

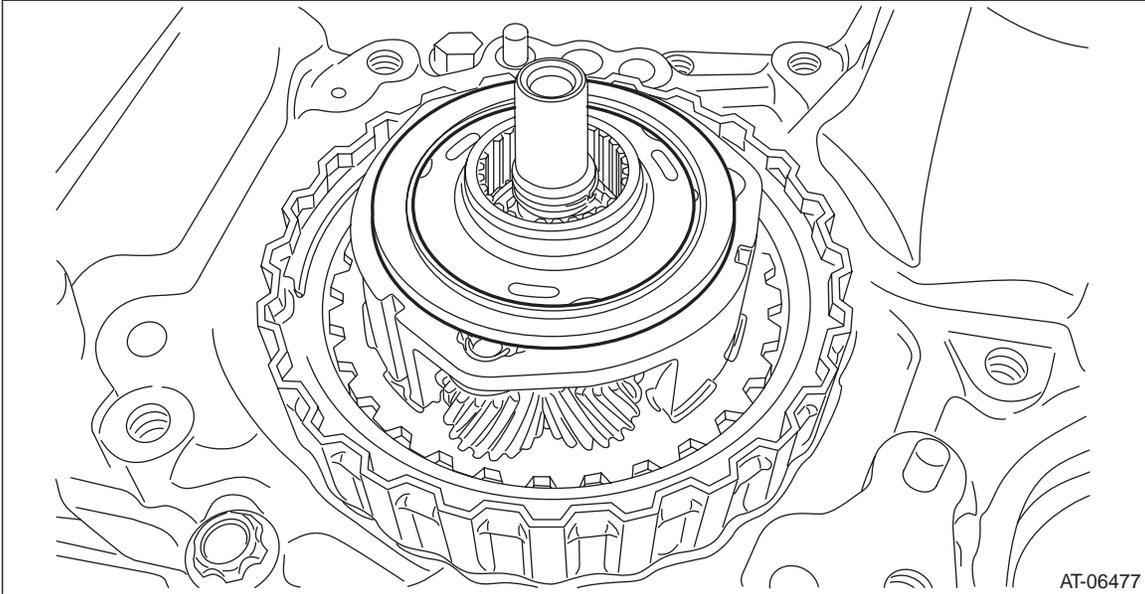
- 1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TR580)-57, REMOVAL, Automatic Transmission Assembly.>
- 2) Remove the air breather hose. <Ref. to CVT(TR580)-155, REMOVAL, Air Breather Hose.>
- 3) Remove the control valve body. <Ref. to CVT(TR580)-111, REMOVAL, Control Valve Body.>
- 4) Remove the transmission harness. <Ref. to CVT(TR580)-125, REMOVAL, Transmission Harness.>
- 5) Remove the turbine speed sensor. <Ref. to CVT(TR580)-98, REMOVAL, Turbine Speed Sensor.>
- 6) Remove the secondary speed sensor. <Ref. to CVT(TR580)-100, REMOVAL, Secondary Speed Sensor.>
- 7) Remove the primary speed sensor. <Ref. to CVT(TR580)-102, REMOVAL, Primary Speed Sensor.>
- 8) Remove the inhibitor switch. <Ref. to CVT(TR580)-94, REMOVAL, Inhibitor Switch.>
- 9) Remove the extension case. <Ref. to CVT(TR580)-165, REMOVAL, Extension Case.>
- 10) Remove the transfer clutch assembly. <Ref. to CVT(TR580)-169, REMOVAL, Transfer Clutch.>
- 11) Remove the transfer driven gear assembly. <Ref. to CVT(TR580)-184, REMOVAL, Transfer Driven Gear.>
- 12) Remove the parking pawl. <Ref. to CVT(TR580)-187, REMOVAL, Parking Pawl.>
- 13) Remove the reduction driven gear assembly. <Ref. to CVT(TR580)-189, REMOVAL, Reduction Driven Gear.>
- 14) Remove the oil pan and oil strainer. <Ref. to CVT(TR580)-107, REMOVAL, Oil Pan and Strainer.>
- 15) Remove the transmission control device. <Ref. to CVT(TR580)-197, REMOVAL, Transmission Control Device.>
- 16) Remove the transmission case. <Ref. to CVT(TR580)-203, REMOVAL, Transmission Case.>
- 17) Remove the reduction drive gear. <Ref. to CVT(TR580)-216, REMOVAL, Reduction Drive Gear.>
- 18) Remove the primary pulley, secondary pulley and variator chain. <Ref. to CVT(TR580)-221, REMOVAL, Primary Pulley and Secondary Pulley.>
- 19) Remove the reverse brake assembly. <Ref. to CVT(TR580)-242, REMOVAL, Reverse Brake Assembly.>
- 20) Remove the internal gear.



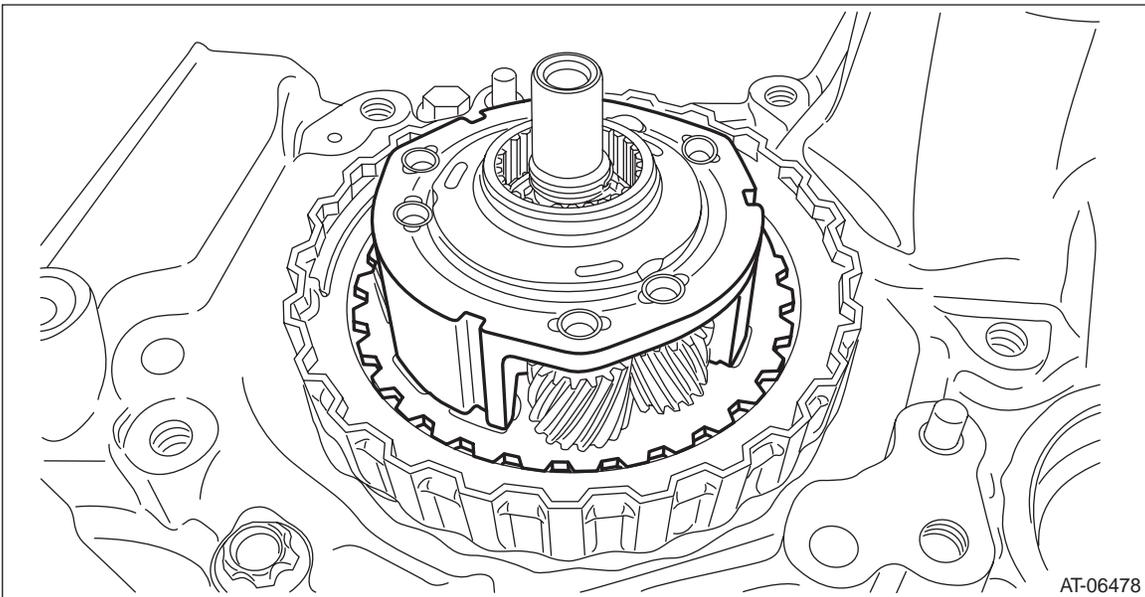
Forward Clutch Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

21) Remove the thrust bearing.



22) Remove the planetary carrier.

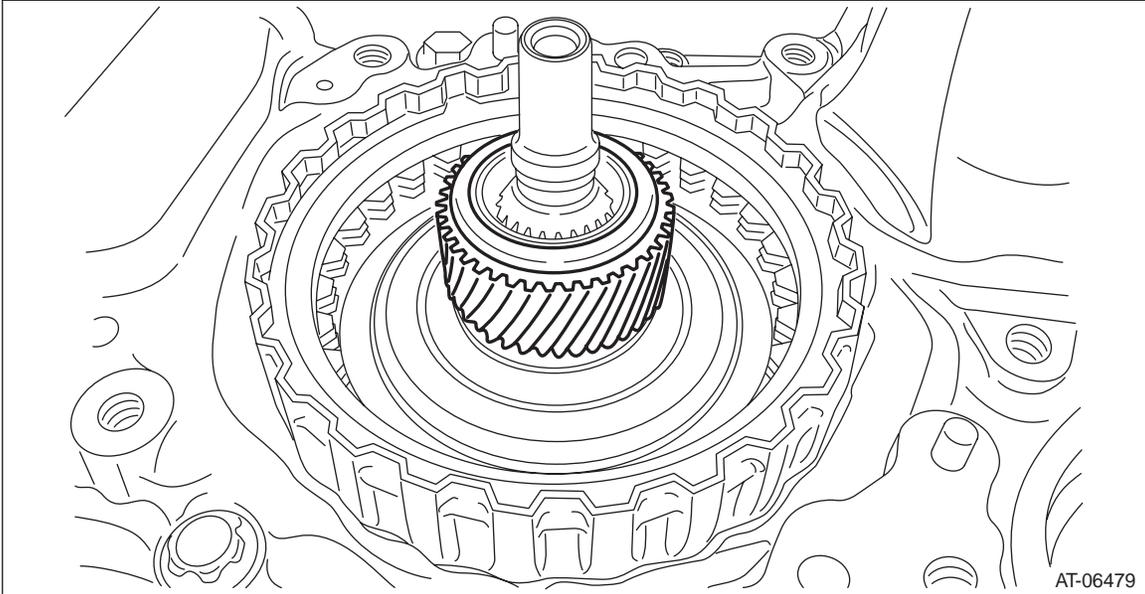


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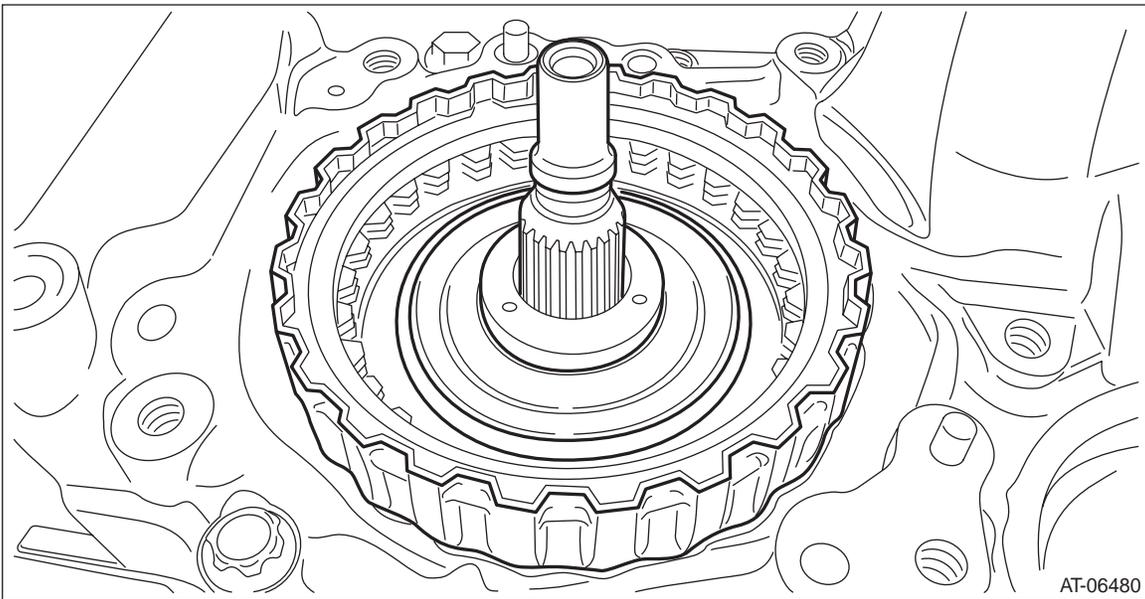
Forward Clutch Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

23) Remove the thrust bearing and sun gear.



24) Remove the forward clutch assembly.

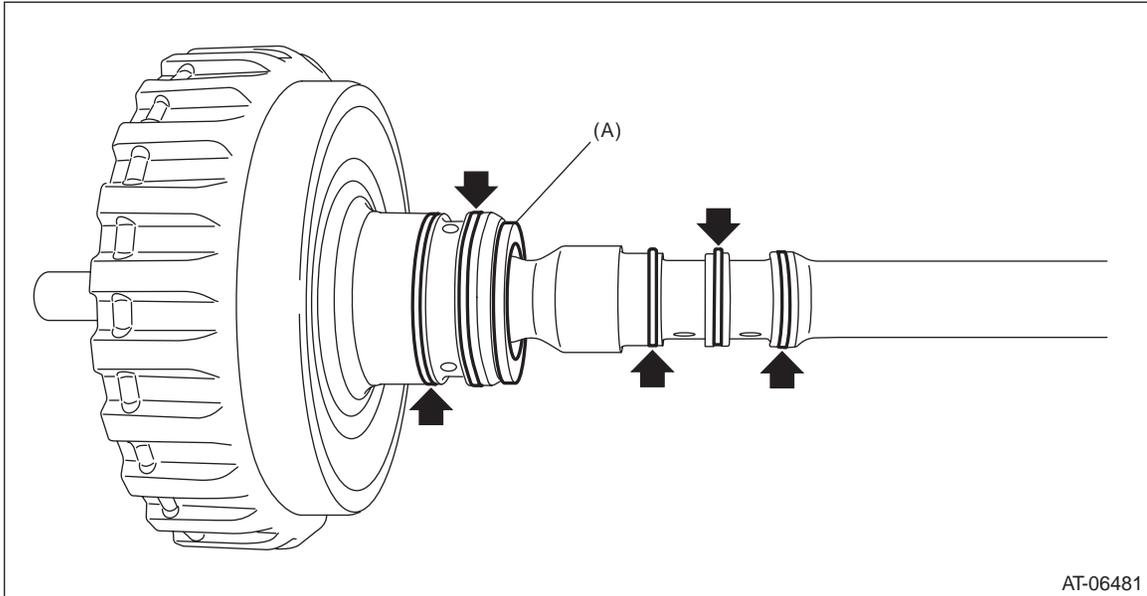


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Forward Clutch Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

25) Remove the thrust bearing and seal ring.



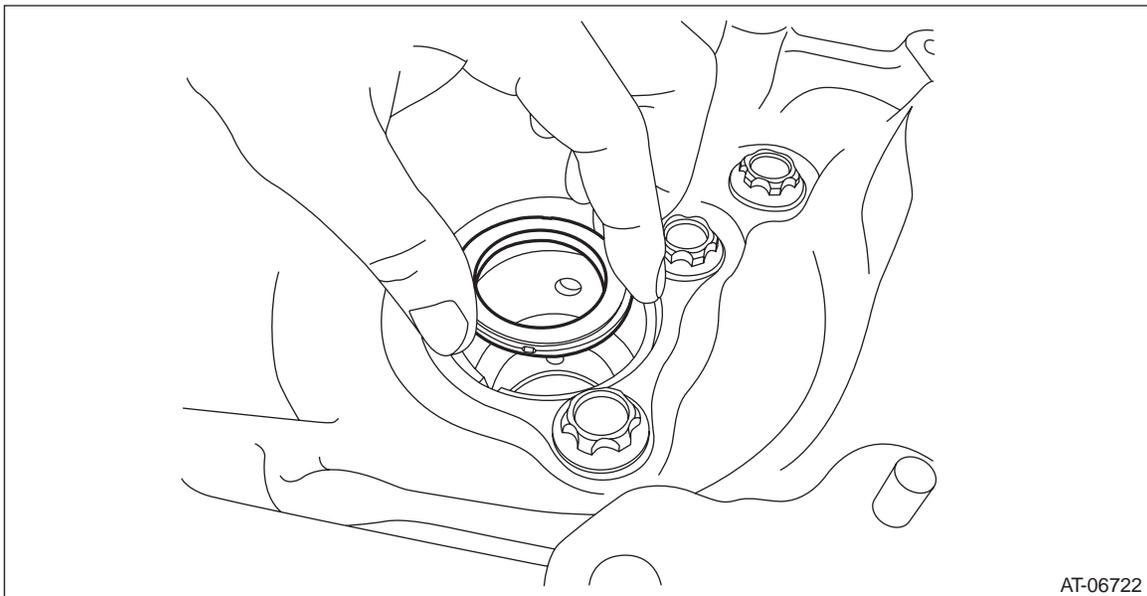
(A) Thrust bearing

B: INSTALLATION

1) Install the thrust bearing to the converter case.

NOTE:

Face the temper color surface to the converter case side.



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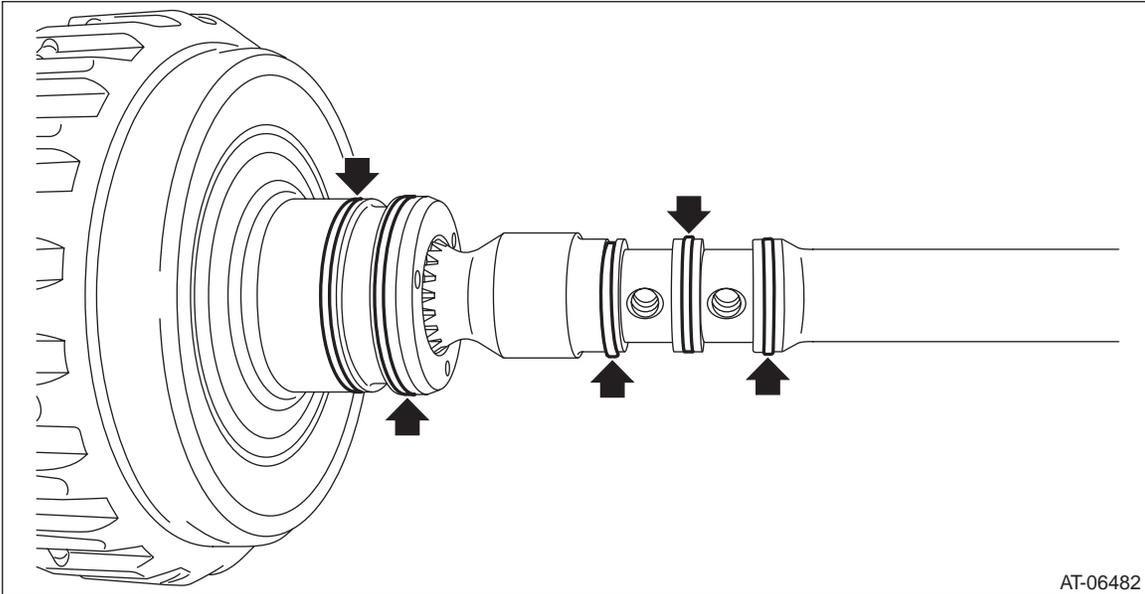
Forward Clutch Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

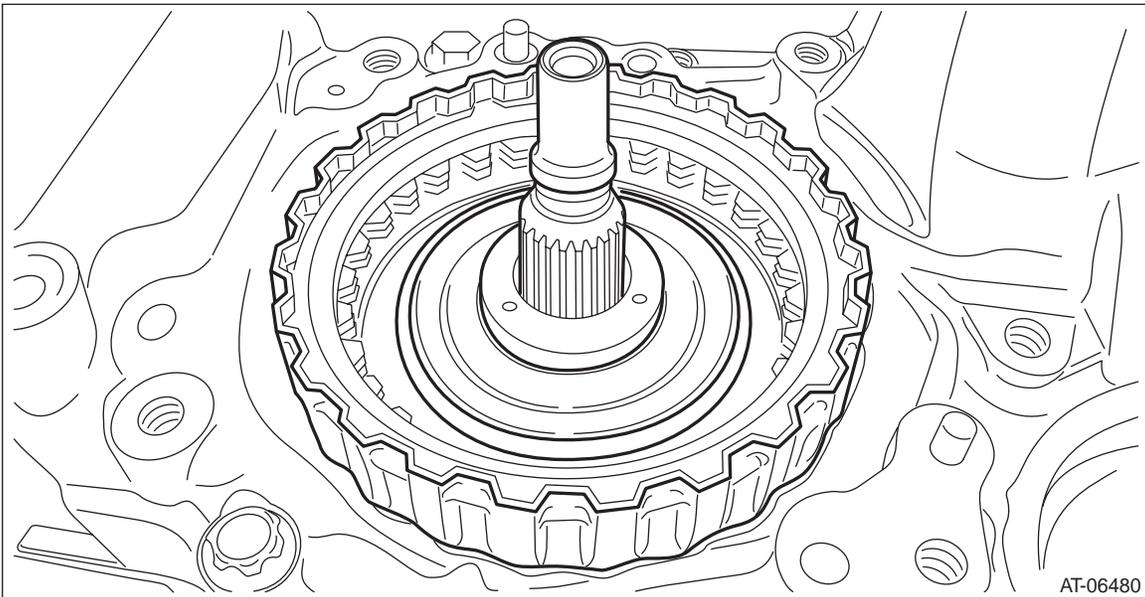
2) Install the seal ring to the input shaft.

NOTE:

- Use new seal rings.
- When installing the seal rings, do not expand the seal rings too much.
- Apply CVTF to the seal rings.



3) Install the forward clutch assembly to the converter case.



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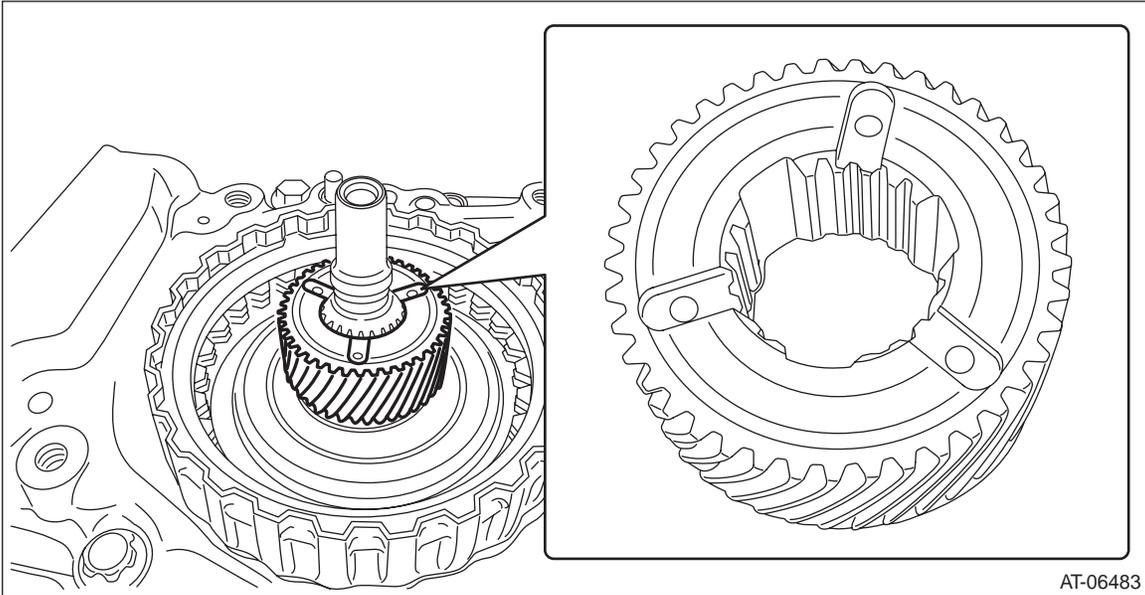
Forward Clutch Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

4) Install the sun gear.

NOTE:

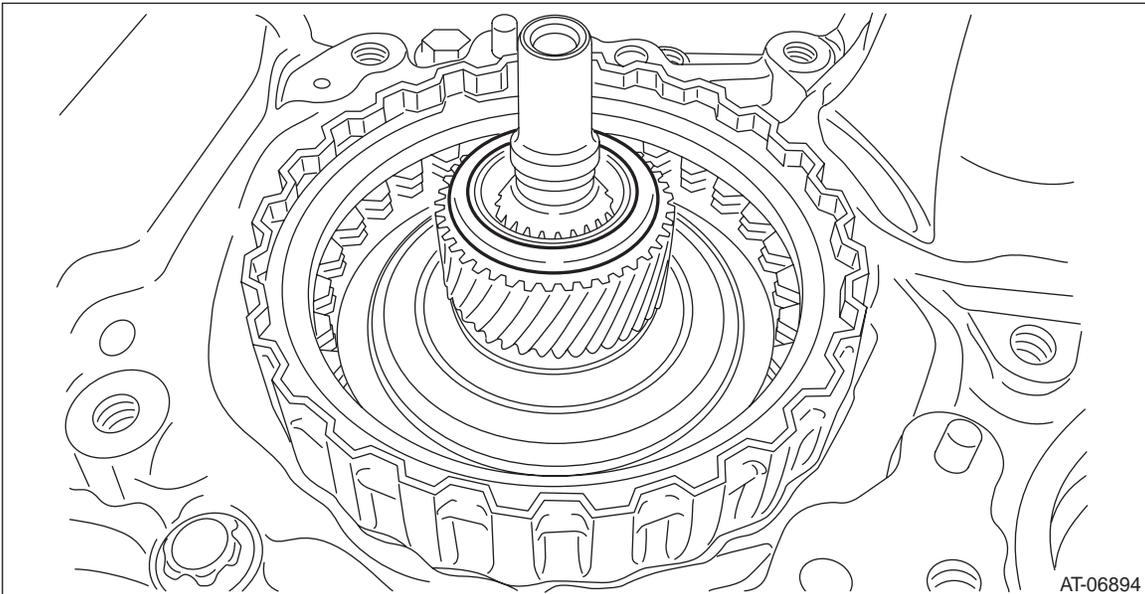
Face the end face of the sun gear to the reverse brake side as shown in the figure.



5) Install the thrust bearing to the sun gear.

NOTE:

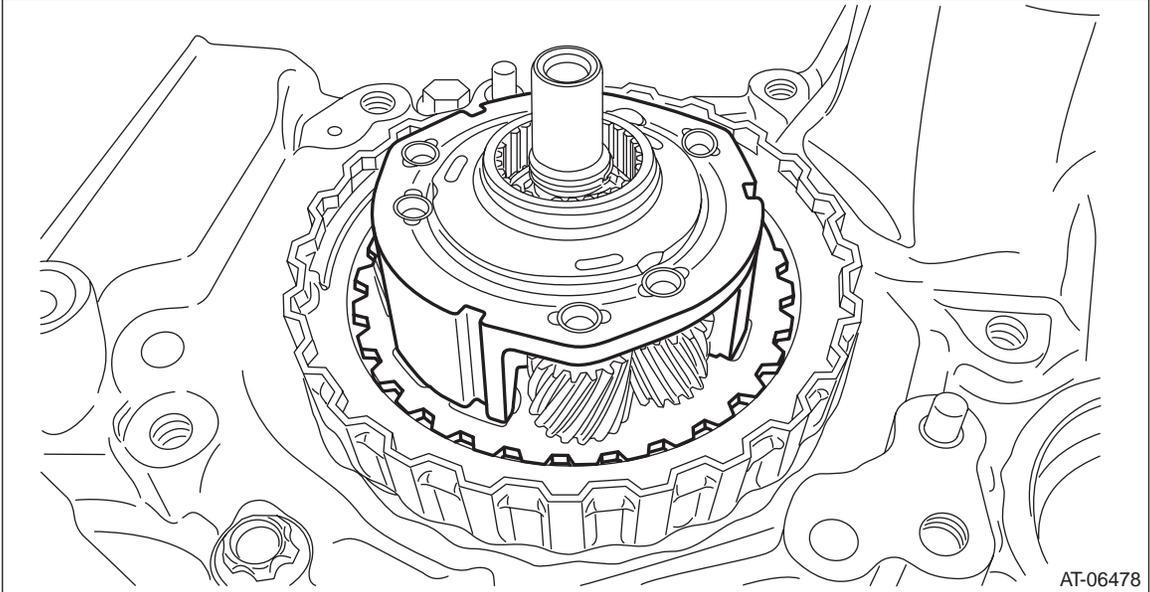
Face the temper color surface to the reverse brake side.



Forward Clutch Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

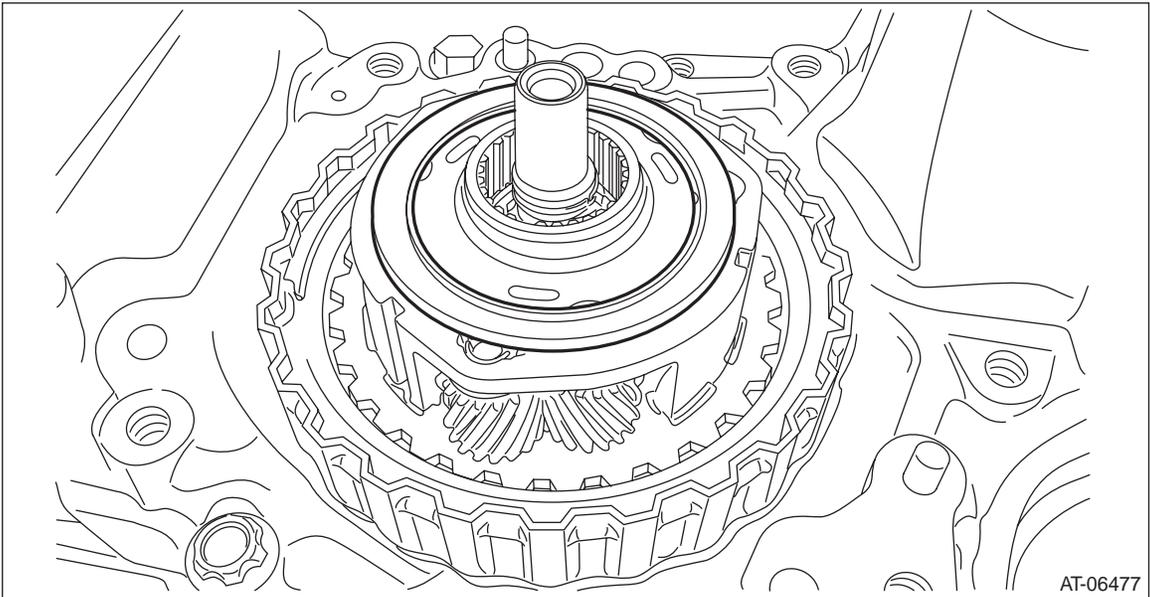
6) Install the planetary carrier.



7) Install the thrust bearing.

NOTE:

Face the temper color surface to the reverse brake side.

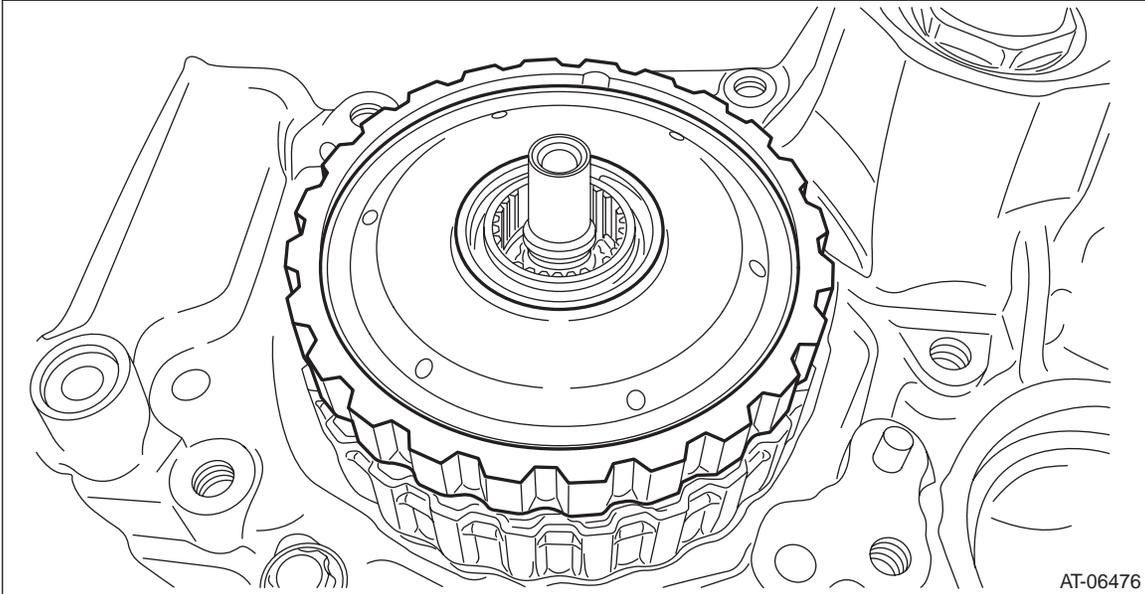


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Forward Clutch Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

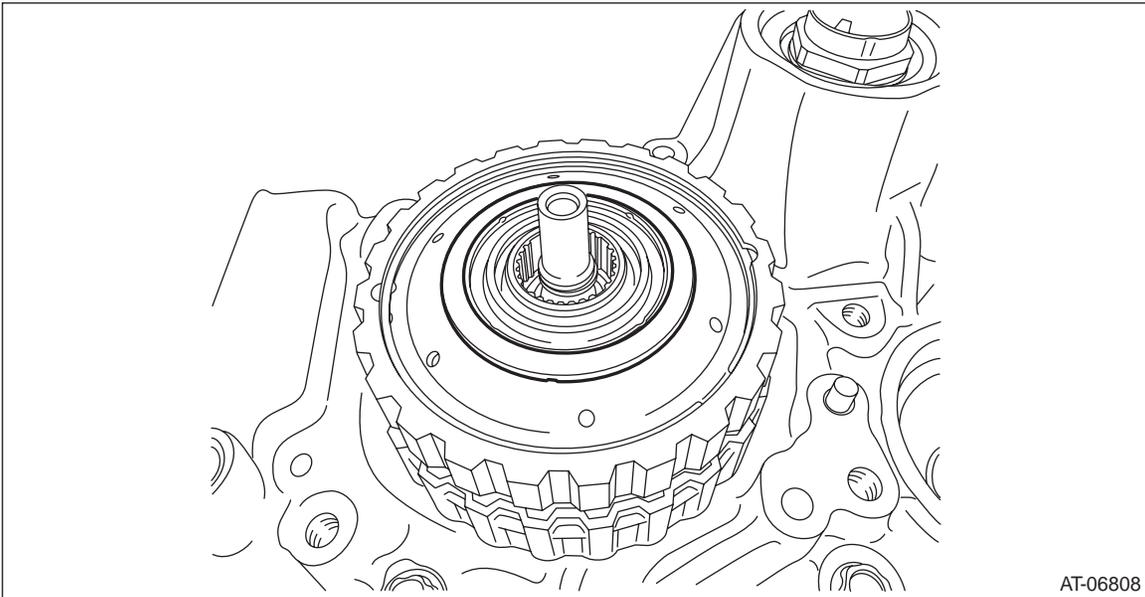
8) Install the internal gear.



9) Install the thrust bearing to the internal gear.

NOTE:

Face the temper color surface to the reverse brake side.



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Forward Clutch Assembly

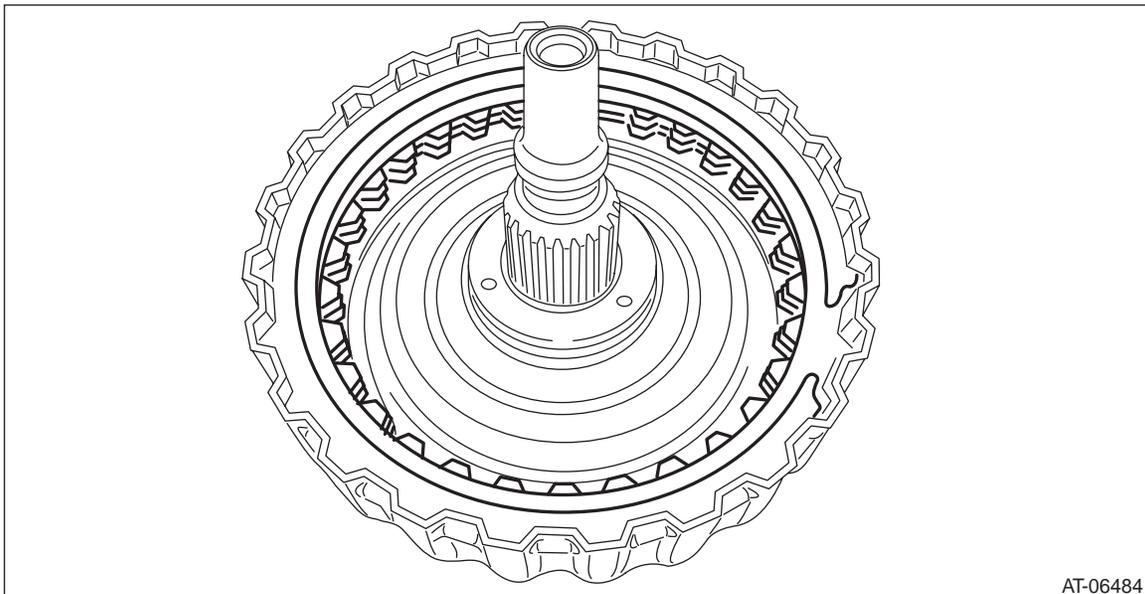
CONTINUOUSLY VARIABLE TRANSMISSION

- 10) Select a washer.<Ref. to CVT(TR580)-275, ADJUSTMENT, Forward Clutch Assembly.>
- 11) Install the reverse brake assembly.<Ref. to CVT(TR580)-245, INSTALLATION, Reverse Brake Assembly.>
- 12) Install the primary pulley, secondary pulley and variator chain.<Ref. to CVT(TR580)-228, INSTALLATION, Primary Pulley and Secondary Pulley.>
- 13) Install the reduction drive gear.<Ref. to CVT(TR580)-217, INSTALLATION, Reduction Drive Gear.>
- 14) Install the transmission case.<Ref. to CVT(TR580)-206, INSTALLATION, Transmission Case.>
- 15) Install the transmission control device.<Ref. to CVT(TR580)-200, INSTALLATION, Transmission Control Device.>
- 16) Install the oil strainer and oil pan.<Ref. to CVT(TR580)-108, INSTALLATION, Oil Pan and Strainer.>
- 17) Install the reduction driven gear assembly.<Ref. to CVT(TR580)-189, INSTALLATION, Reduction Driven Gear.>
- 18) Install the parking pawl.<Ref. to CVT(TR580)-188, INSTALLATION, Parking Pawl.>
- 19) Install the transfer driven gear assembly.<Ref. to CVT(TR580)-185, INSTALLATION, Transfer Driven Gear.>
- 20) Install the transfer clutch assembly.<Ref. to CVT(TR580)-171, INSTALLATION, Transfer Clutch.>
- 21) Install the extension case.<Ref. to CVT(TR580)-166, INSTALLATION, Extension Case.>
- 22) Install the inhibitor switch.<Ref. to CVT(TR580)-95, INSTALLATION, Inhibitor Switch.>
- 23) Install the secondary speed sensor.<Ref. to CVT(TR580)-100, INSTALLATION, Secondary Speed Sensor.>
- 24) Install the primary speed sensor.<Ref. to CVT(TR580)-103, INSTALLATION, Primary Speed Sensor.>
- 25) Install the turbine speed sensor.<Ref. to CVT(TR580)-98, INSTALLATION, Turbine Speed Sensor.>
- 26) Install the transmission harness.<Ref. to CVT(TR580)-131, INSTALLATION, Transmission Harness.>
- 27) Install the control valve body.<Ref. to CVT(TR580)-117, INSTALLATION, Control Valve Body.>
- 28) Install the air breather hose.<Ref. to CVT(TR580)-156, INSTALLATION, Air Breather Hose.>
- 29) Install the transmission assembly to the vehicle.<Ref. to CVT(TR580)-67, INSTALLATION, Automatic Transmission Assembly.>

C: DISASSEMBLY

1. FORWARD CLUTCH ASSEMBLY

- 1) Remove the snap ring.
- 2) Remove the retaining plate, drive plate, driven plate and dish plate.



AT-06484

CVT(TR580)-265

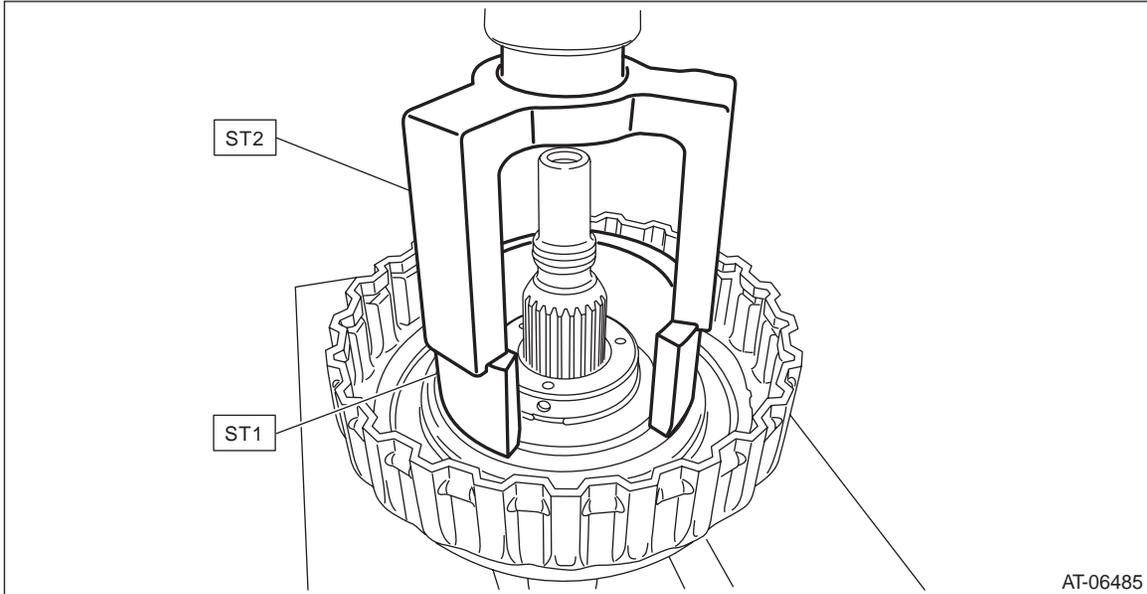
Forward Clutch Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

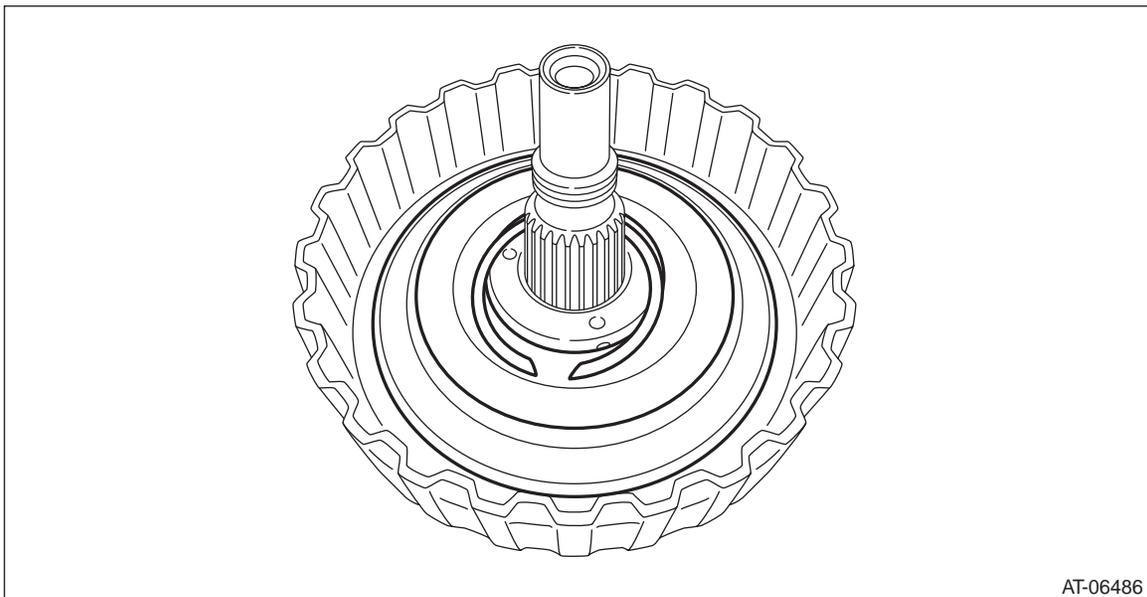
3) Compress the return spring using the ST to remove the snap ring.

ST1 18762AA010 COMPRESSOR SPECIAL TOOL

ST2 398673600 COMPRESSOR



4) Remove the chamber COMPL and snap ring.

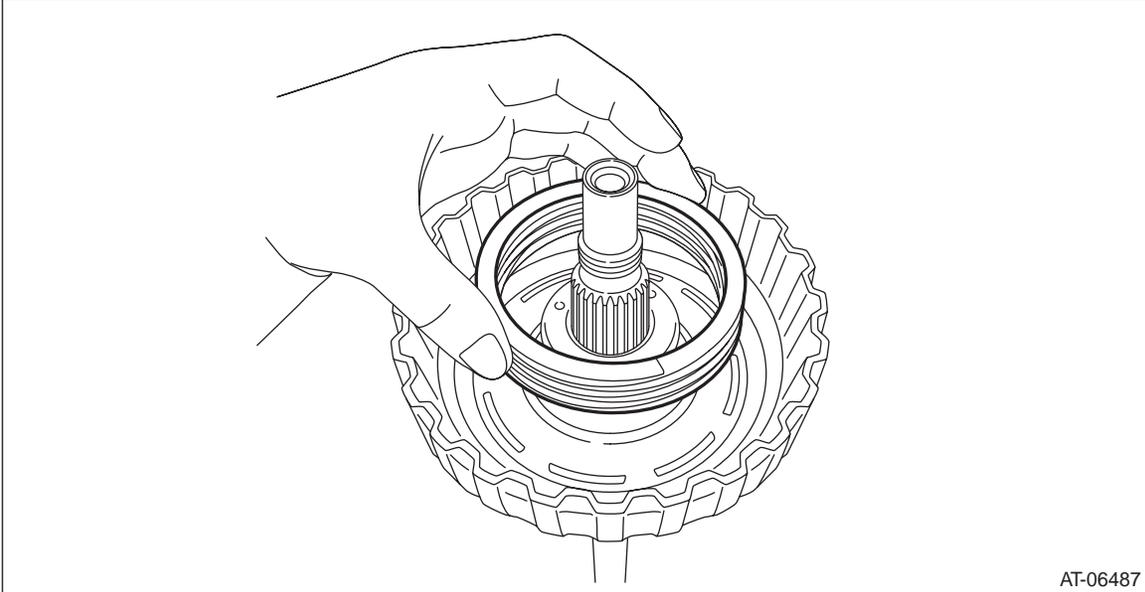


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Forward Clutch Assembly

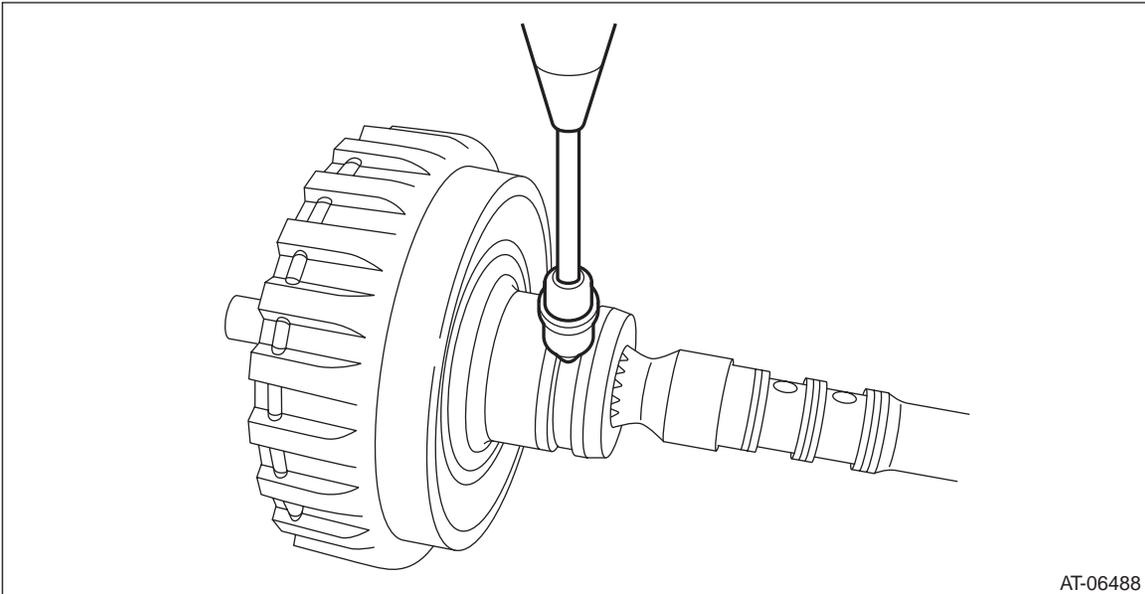
CONTINUOUSLY VARIABLE TRANSMISSION

5) Remove the return spring.



AT-06487

6) Remove the forward clutch piston by blowing compressed air intermittently from the forward clutch carrier hole.



AT-06488

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Forward Clutch Assembly

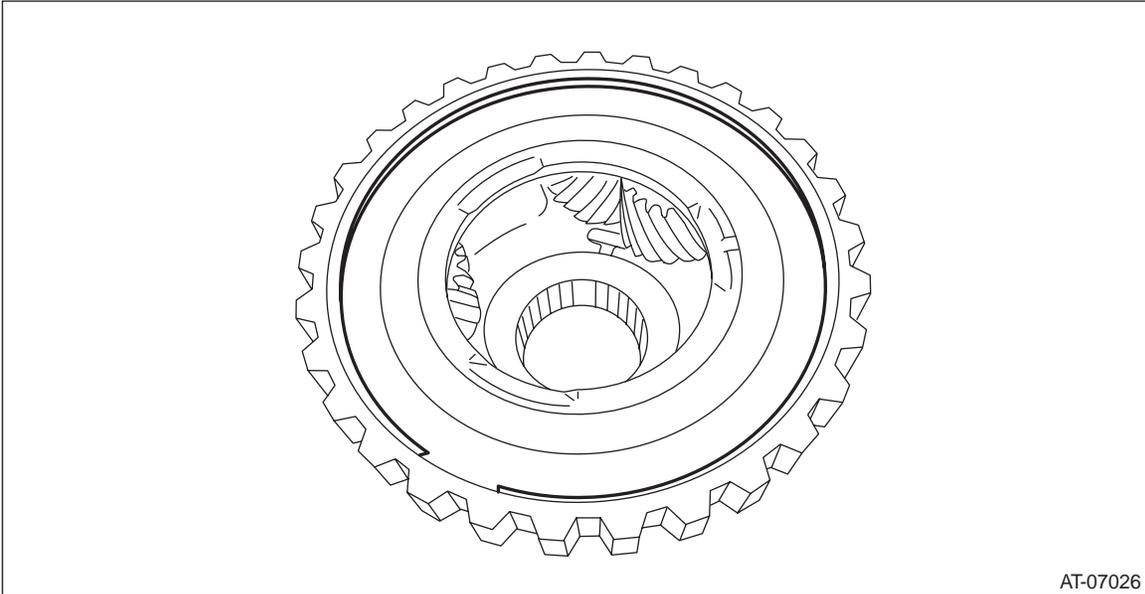
CONTINUOUSLY VARIABLE TRANSMISSION

2. PLANETARY CARRIER ASSY

NOTE:

Disassemble the balance oil guide only.

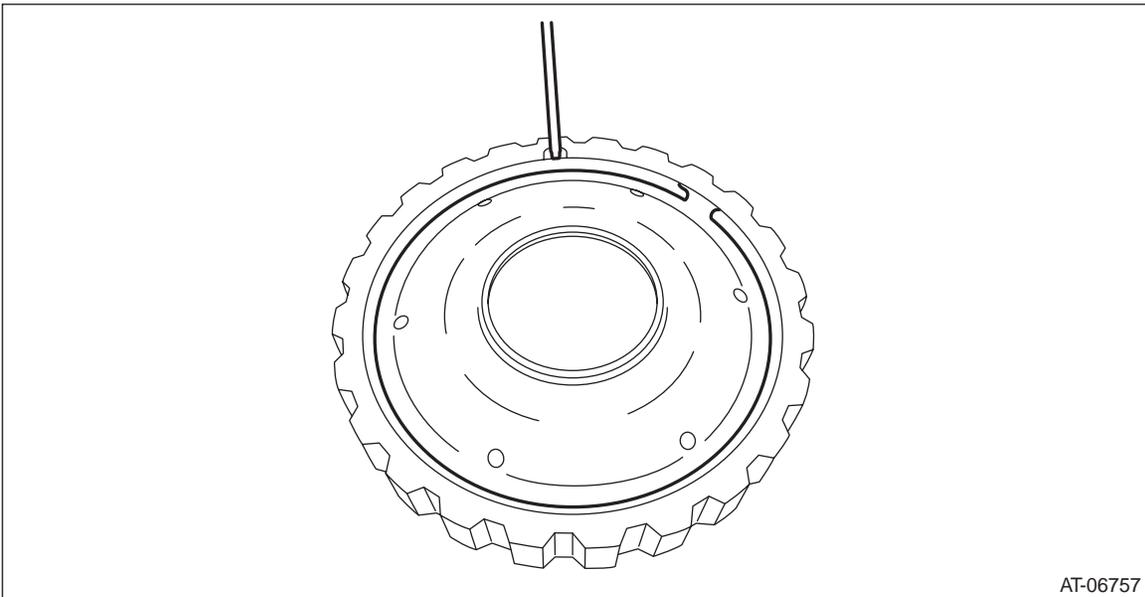
- 1) Remove the snap ring.



- 2) Remove the balance oil guide.

3. INTERNAL GEAR

- 1) Remove the snap ring.

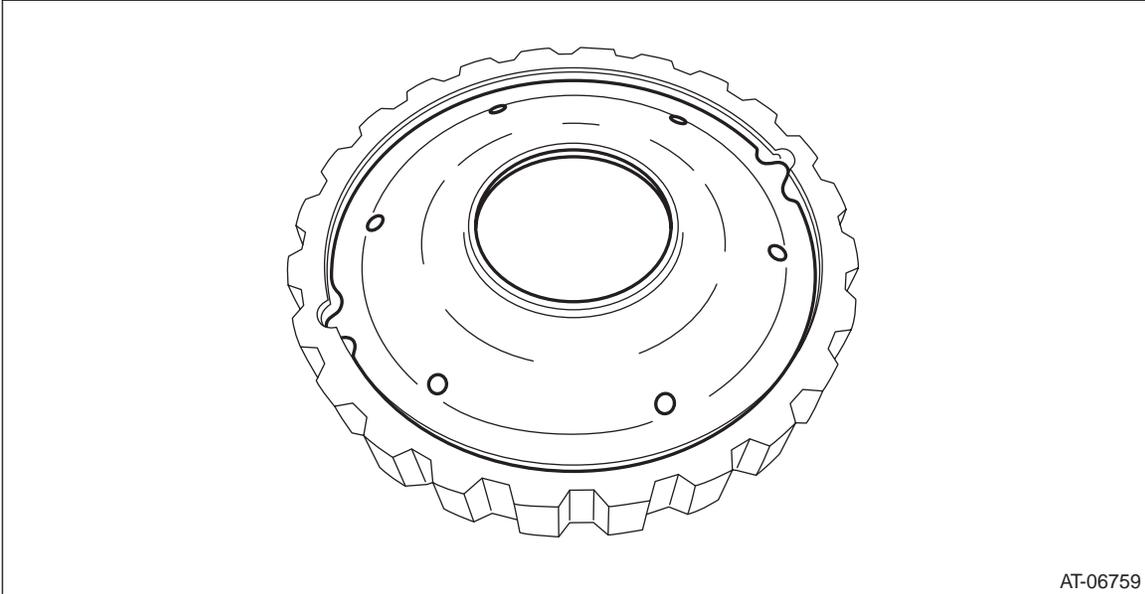


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Forward Clutch Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

2) Remove the thrust gear plate.



AT-06759

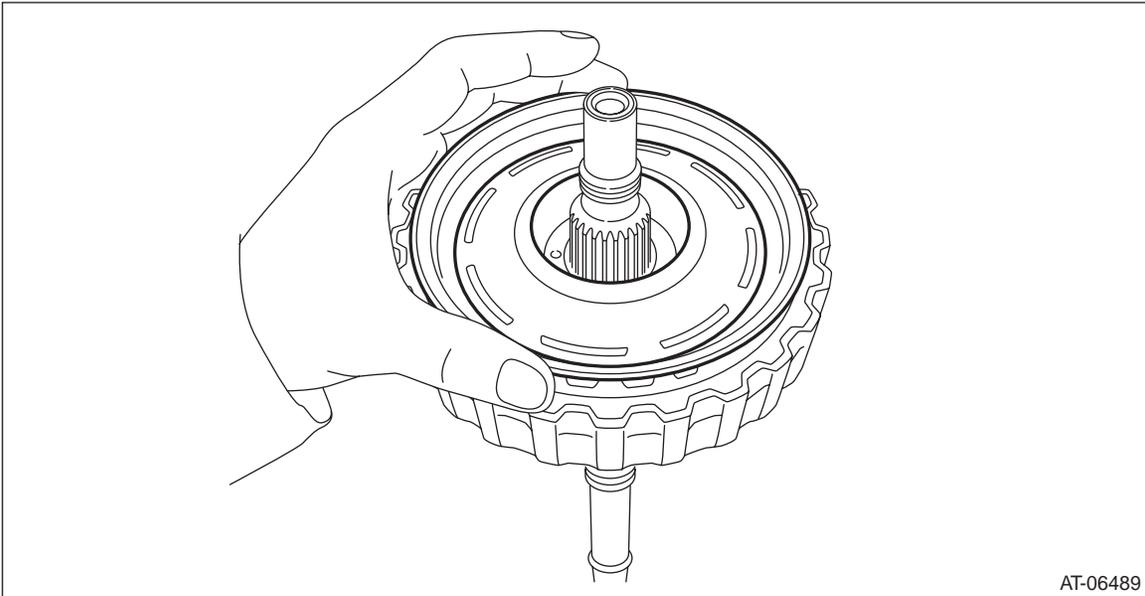
D: ASSEMBLY

1. FORWARD CLUTCH ASSEMBLY

1) Install the forward clutch piston to forward clutch drum.

NOTE:

- Apply CVTF to the seal of forward clutch piston.
- Insert it all the way to the end.



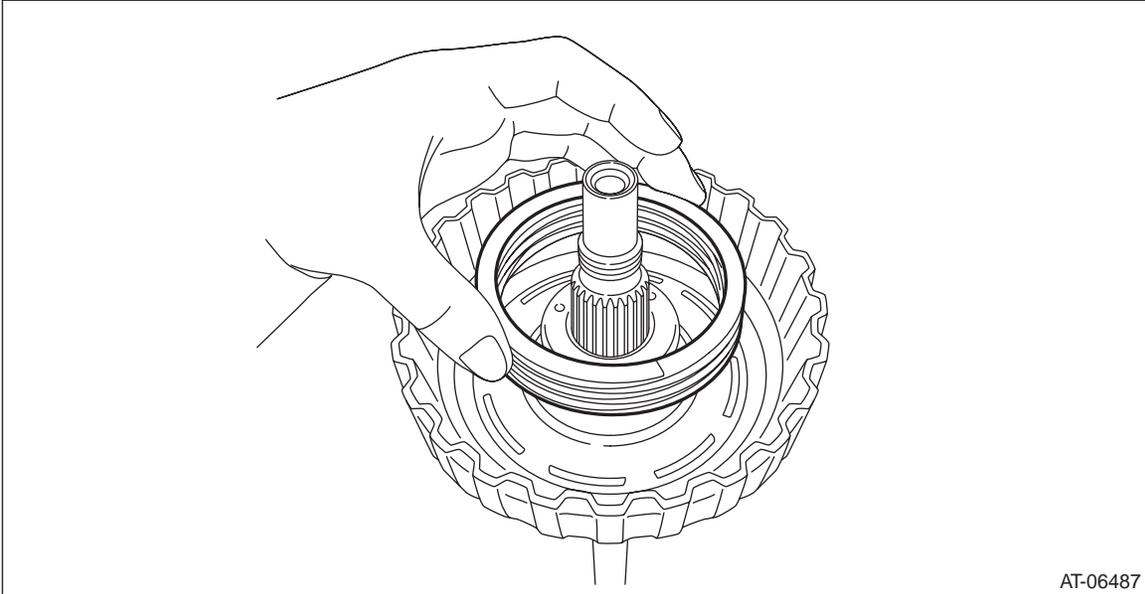
AT-06489

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Forward Clutch Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

2) Install the return spring.

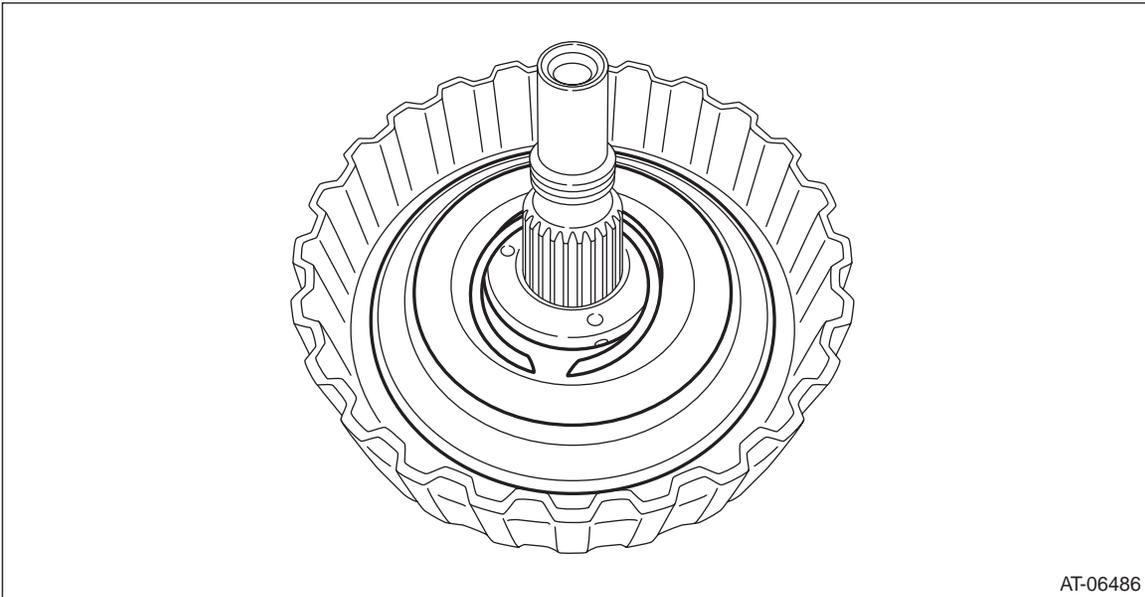


AT-06487

3) Install the chamber COMPL.

NOTE:

Apply CVTF to the sealing area of chamber COMPL.



AT-06486

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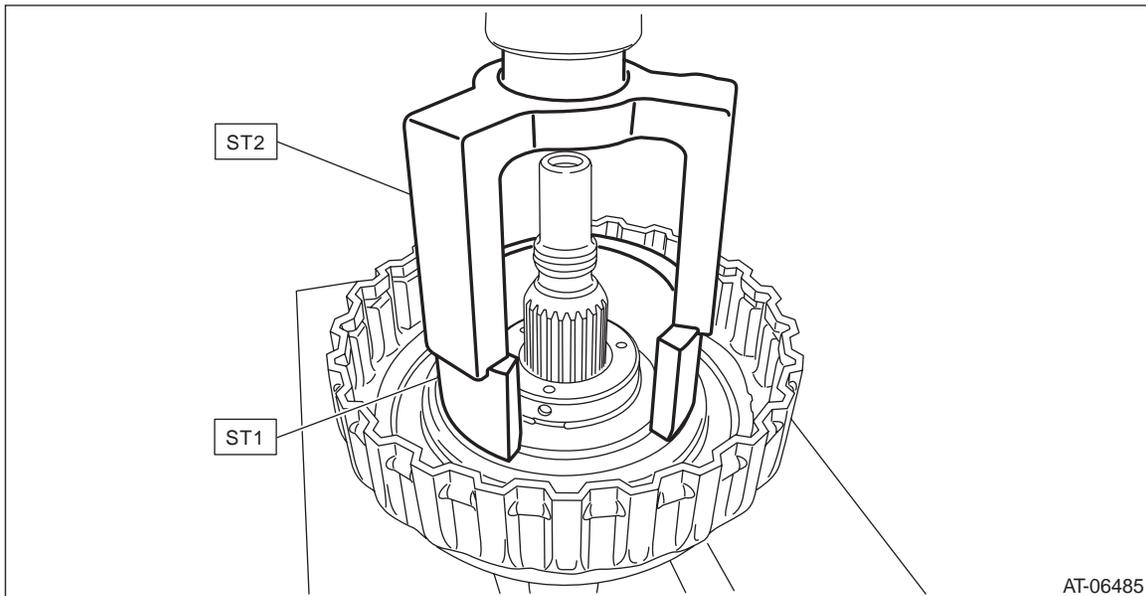
Forward Clutch Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

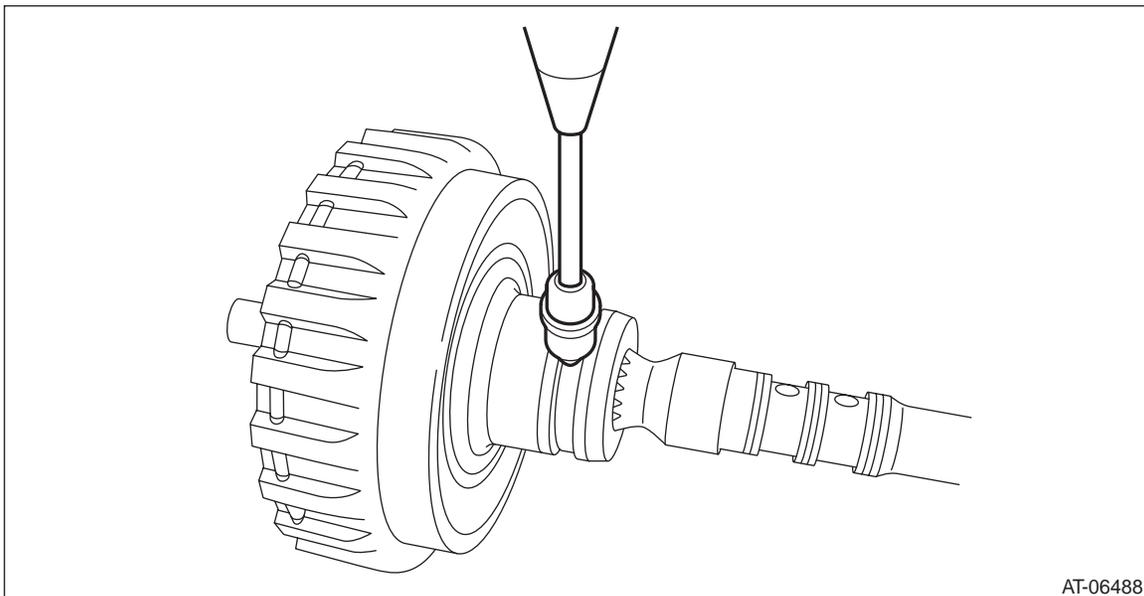
4) Compress the return spring using the ST to install the snap ring.

ST1 18762AA010 COMPRESSOR SPECIAL TOOL

ST2 398673600 COMPRESSOR



5) Check the operation of forward clutch piston by blowing compressed air intermittently from forward clutch carrier hole.



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

7) Set the dial gauge to retaining plate, and read its scale.

NOTE:

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

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

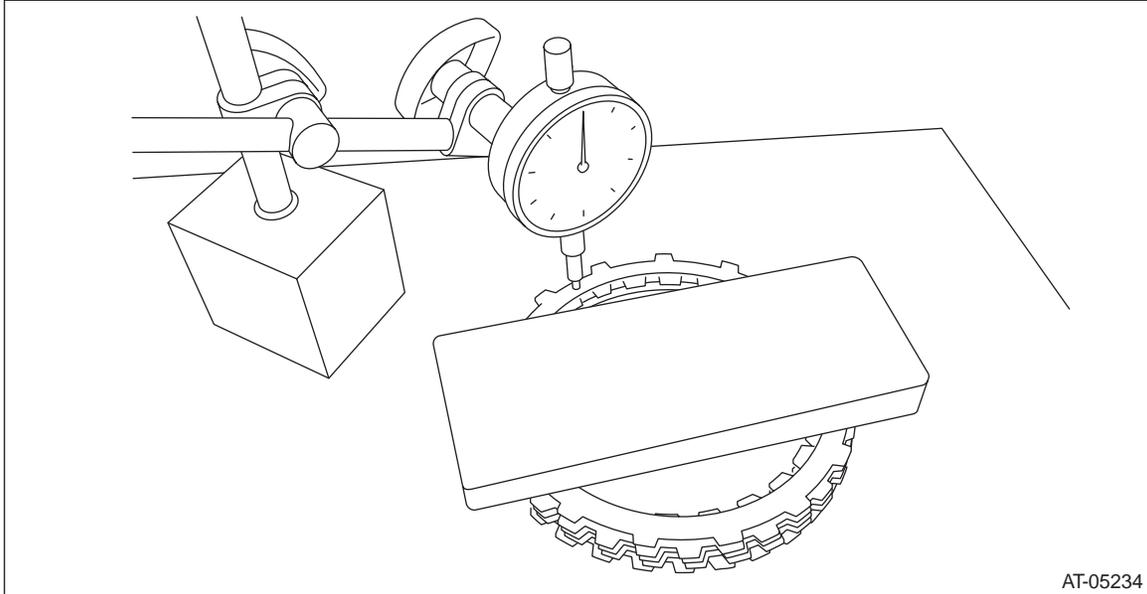
NOTE:

- 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 52 N (5.3 kgf, 11.7 lb).

Forward Clutch Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

9) Put the flat board on retaining plate.



10) Using the following formula, read the push/pull gauge and calculate "N".

$$N = 52 \text{ N (5.3 kgf, 11.7 lb)} - Z$$

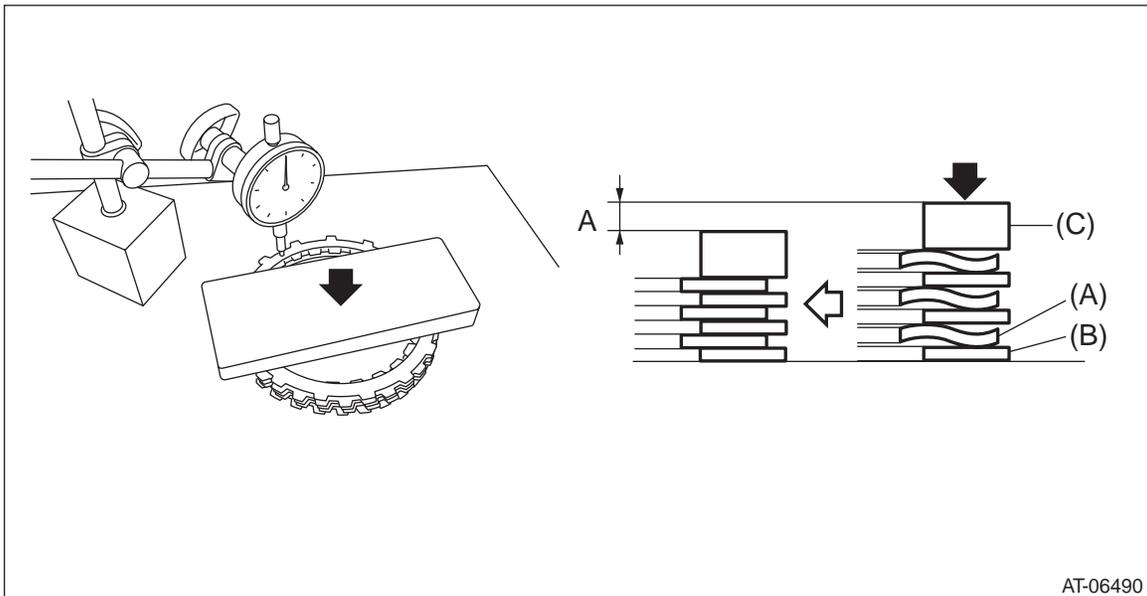
52 N (5.3 kgf, 11.7 lb) : Load applied to clutch plate

Z: Flat board weight

11) Press the center of retaining plate by applying a force of "N" using push/pull gauge, and then measure and record the compression amount "A".

NOTE:

Measure at four points with a 90° interval and calculate the average.



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

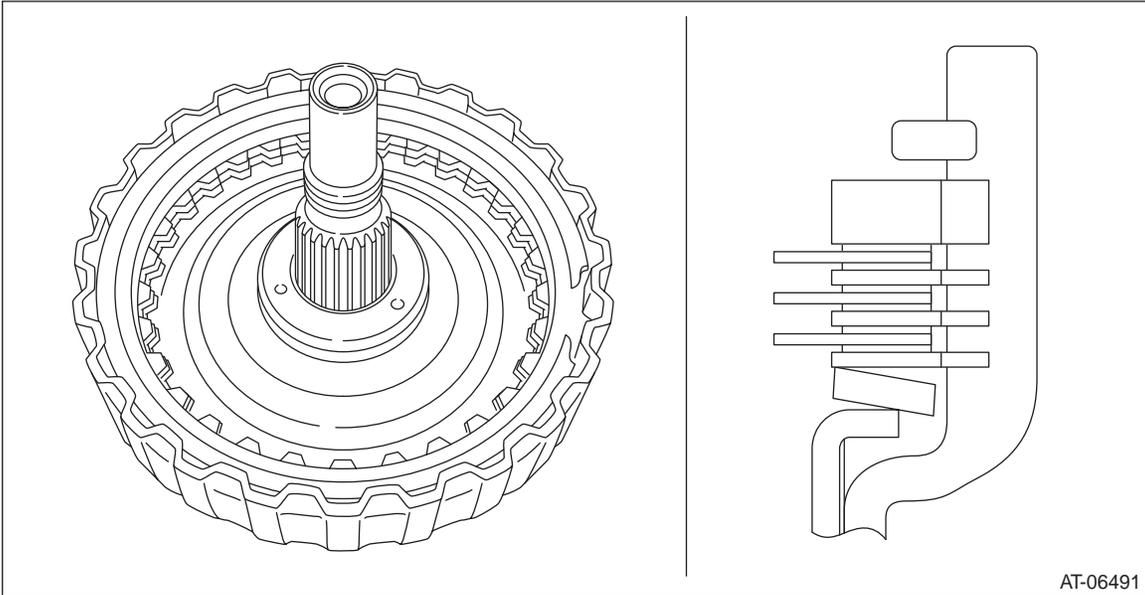
Forward Clutch Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

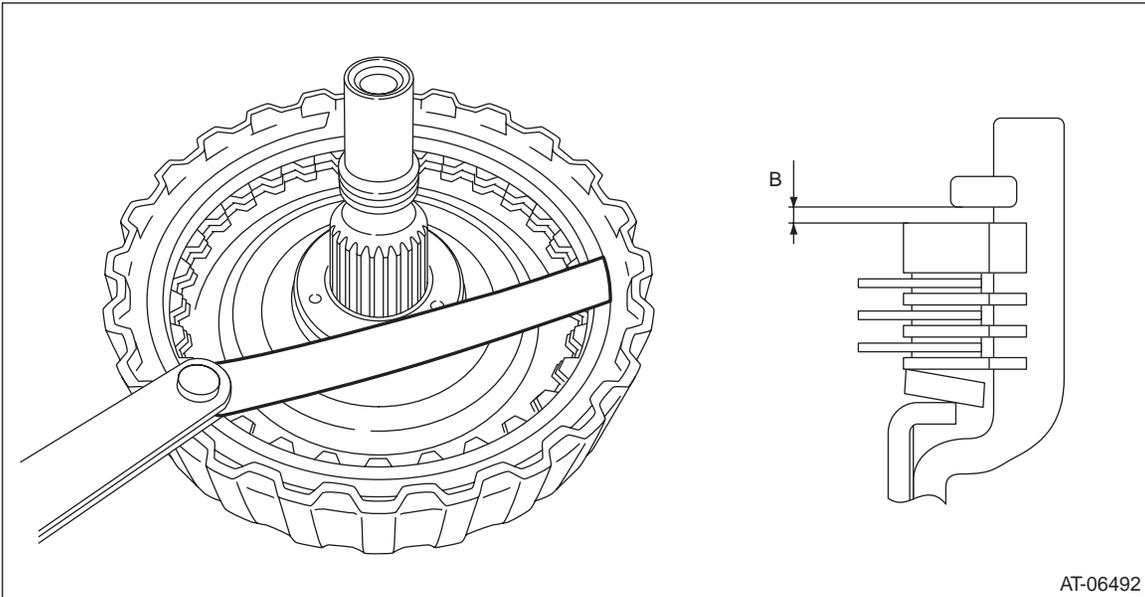
12) Install the dish plate, drive plate, driven plate, retaining plate and snap ring to the forward clutch carrier.

NOTE:

Install the dish plate in the correct direction.



13) Measure and record the clearance "B" between the retaining plate and snap ring.



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Forward Clutch Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

14) Piston stroke calculation

Calculate with A and B dimensions recorded before.

If it exceeds the limit, replace with a new drive plate and adjust within the initial standard value.

$$S \text{ mm (in)} = A + B$$

S: Piston stroke

A: Compression amount of drive plate and dish plate

B: Clearance between retaining plate and snap ring

Initial standard:

1.0 — 1.4 mm (0.040 — 0.055 in)

Limit thickness:

1.6 mm (0.063 in)

Retaining plate	
Item number	Thickness mm (in)
31567AB760	4.2 (0.165)
31567AB770	4.4 (0.173)
31567AB780	4.6 (0.181)
31567AB790	4.8 (0.189)
31567AB830	5.0 (0.197)

2. PLANETARY CARRIER ASSY

NOTE:

Assemble in the reverse order of disassembly.

3. INTERNAL GEAR

NOTE:

Assemble in the reverse order of disassembly.

E: INSPECTION

- Check the forward clutch drum, internal gear, sun gear and forward clutch piston lip for wear or damage.
- Inspect the drive plate facing for wear and damage.
- Check the driven plate for discoloration (burnt color).
- Check for worn snap ring, fatigue or damaged return spring or deformed spring retainer.
- Make sure the clearance between retaining plate and internal gear of forward clutch is within the limit. If it exceeds the standard, replace the forward clutch. <Ref. to CVT(TR580)-269, ASSEMBLY, Forward Clutch Assembly.>

Forward Clutch Assembly

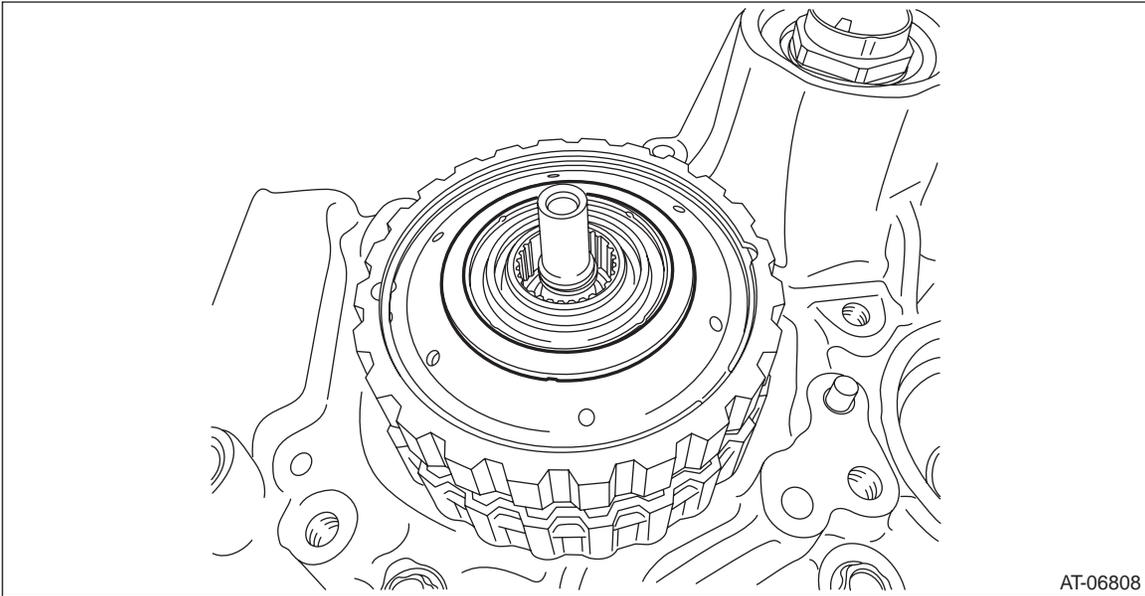
CONTINUOUSLY VARIABLE TRANSMISSION

F: ADJUSTMENT

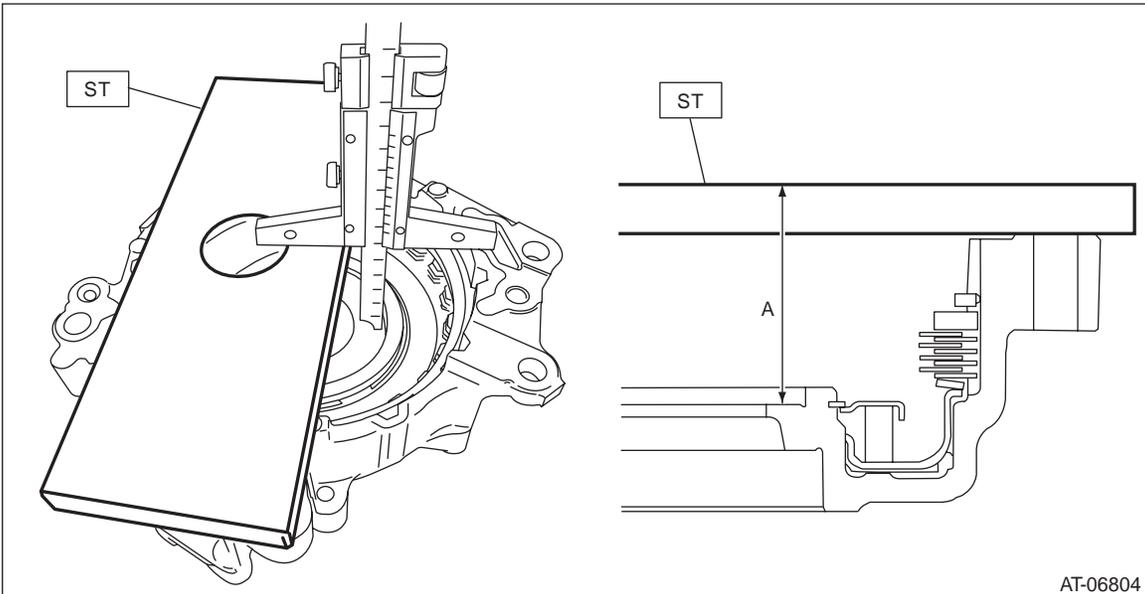
1) Install the thrust bearing to the internal gear.

NOTE:

Face the temper color surface to the reverse brake side.



2) Measure depth "A" from the ST upper face to the washer mounting surface.
ST 499575600 GAUGE

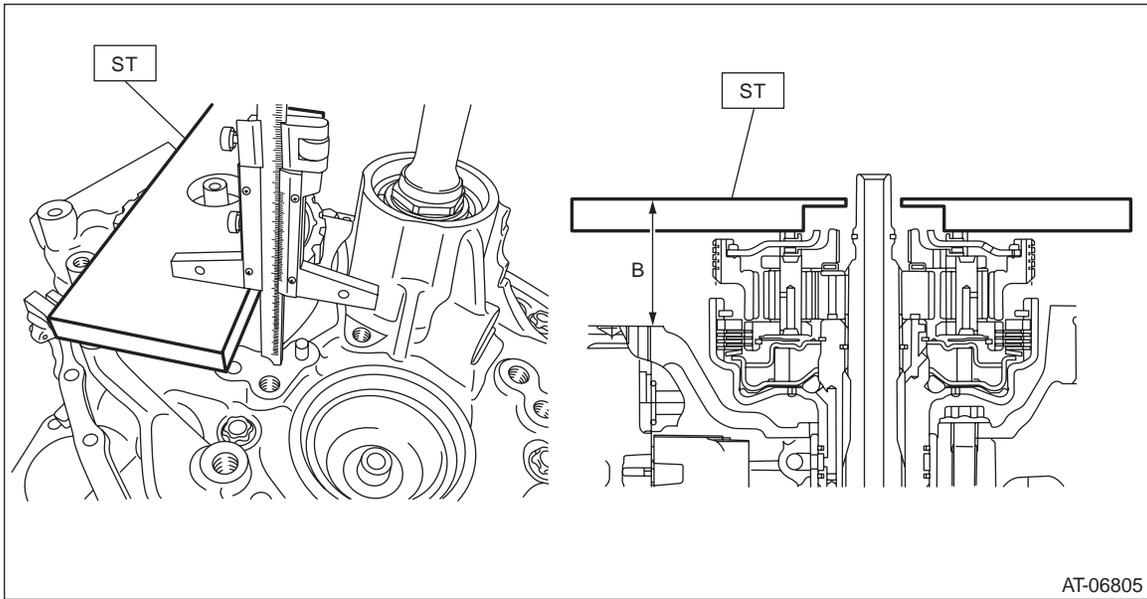


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Forward Clutch Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

3) Measure the height "B" from the ST upper face to the mating surface of the drive pinion retainer.
ST 499575600 GAUGE



4) Obtain the thickness of washer using the following formula to select the washer.

$$T \text{ (mm)} = A - B - (0.35 - 0.70)$$

$$[T \text{ (in)} = A - B - (0.014 - 0.028)]$$

T: Shim thickness

A: Depth from the ST upper face to the washer mounting surface

B: Height from ST upper face to the drive pinion retainer mating surface

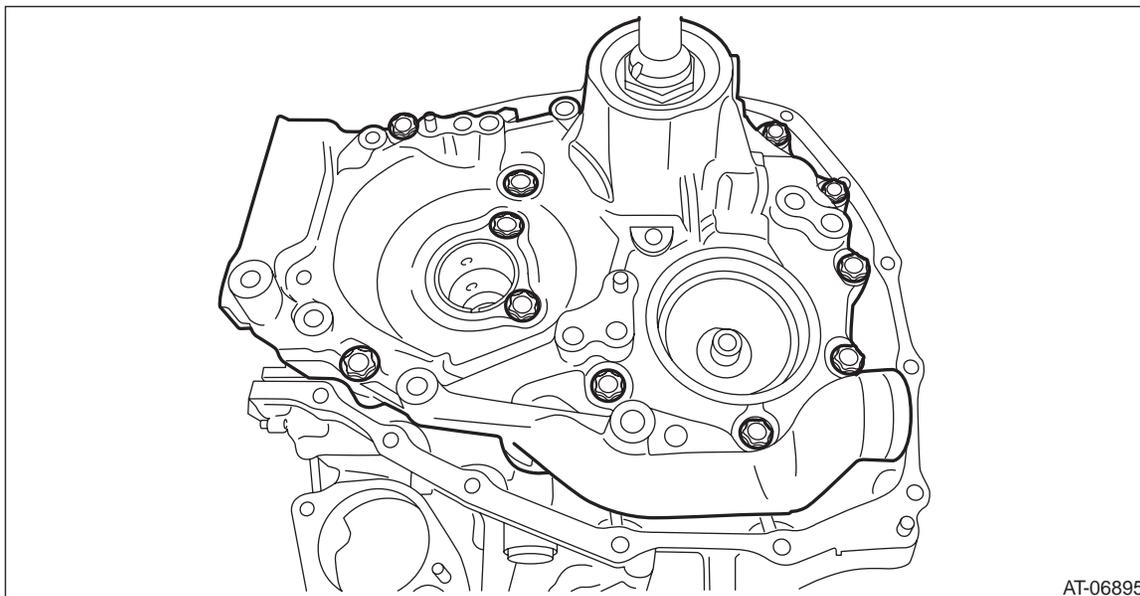
0.35 — 0.70 mm (0.014 — 0.028 in): Clearance

Washer	
Part No.	Thickness mm (in)
803064020	1.3 (0.051)
803064021	1.55 (0.061)
803064022	1.8 (0.071)
803064023	2.05 (0.081)
803064024	2.3 (0.091)
803064025	2.55 (0.100)

42. Drive Pinion Shaft Assembly

A: REMOVAL

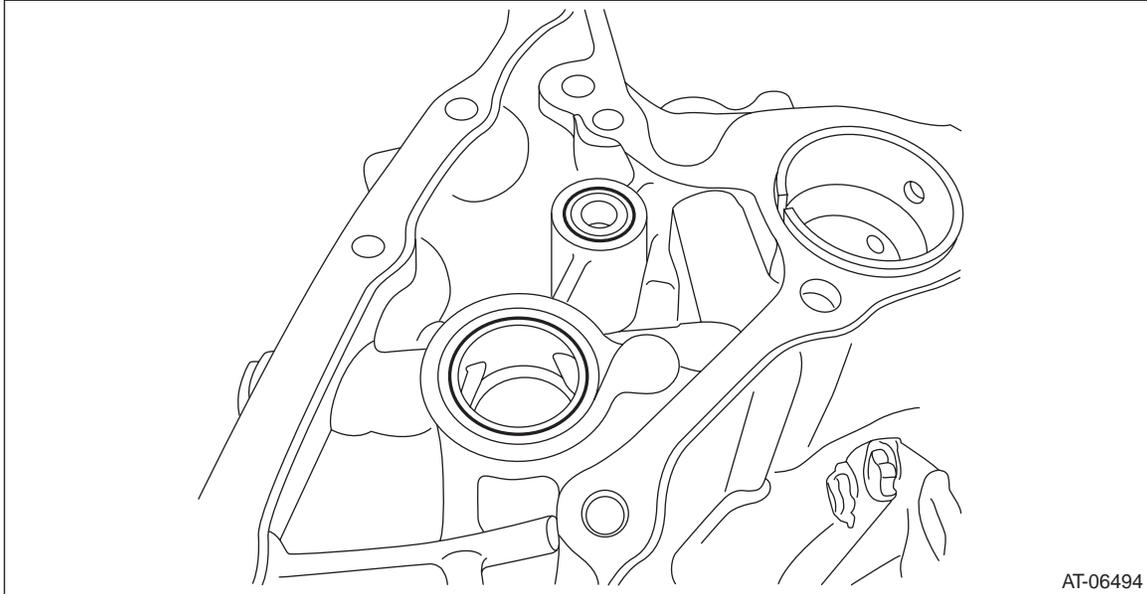
- 1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TR580)-57, REMOVAL, Automatic Transmission Assembly.>
- 2) Remove the air breather hose. <Ref. to CVT(TR580)-155, REMOVAL, Air Breather Hose.>
- 3) Remove the control valve body. <Ref. to CVT(TR580)-111, REMOVAL, Control Valve Body.>
- 4) Remove the transmission harness. <Ref. to CVT(TR580)-125, REMOVAL, Transmission Harness.>
- 5) Remove the turbine speed sensor. <Ref. to CVT(TR580)-98, REMOVAL, Turbine Speed Sensor.>
- 6) Remove the secondary speed sensor. <Ref. to CVT(TR580)-100, REMOVAL, Secondary Speed Sensor.>
- 7) Remove the primary speed sensor. <Ref. to CVT(TR580)-102, REMOVAL, Primary Speed Sensor.>
- 8) Remove the inhibitor switch. <Ref. to CVT(TR580)-94, REMOVAL, Inhibitor Switch.>
- 9) Remove the extension case. <Ref. to CVT(TR580)-165, REMOVAL, Extension Case.>
- 10) Remove the transfer clutch assembly. <Ref. to CVT(TR580)-169, REMOVAL, Transfer Clutch.>
- 11) Remove the transfer driven gear assembly. <Ref. to CVT(TR580)-184, REMOVAL, Transfer Driven Gear.>
- 12) Remove the parking pawl. <Ref. to CVT(TR580)-187, REMOVAL, Parking Pawl.>
- 13) Remove the reduction driven gear assembly. <Ref. to CVT(TR580)-189, REMOVAL, Reduction Driven Gear.>
- 14) Remove the oil pan and oil strainer. <Ref. to CVT(TR580)-107, REMOVAL, Oil Pan and Strainer.>
- 15) Remove the transmission control device. <Ref. to CVT(TR580)-197, REMOVAL, Transmission Control Device.>
- 16) Remove the transmission case. <Ref. to CVT(TR580)-203, REMOVAL, Transmission Case.>
- 17) Remove the reduction drive gear. <Ref. to CVT(TR580)-216, REMOVAL, Reduction Drive Gear.>
- 18) Remove the primary pulley, secondary pulley and variator chain. <Ref. to CVT(TR580)-221, REMOVAL, Primary Pulley and Secondary Pulley.>
- 19) Remove the reverse brake assembly. <Ref. to CVT(TR580)-242, REMOVAL, Reverse Brake Assembly.>
- 20) Remove the forward clutch assembly. <Ref. to CVT(TR580)-257, REMOVAL, Forward Clutch Assembly.>
- 21) Using the ST, remove the drive pinion retainer.
ST 18270KA020 SOCKET (E20)



Drive Pinion Shaft Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

22) Remove the O-ring.

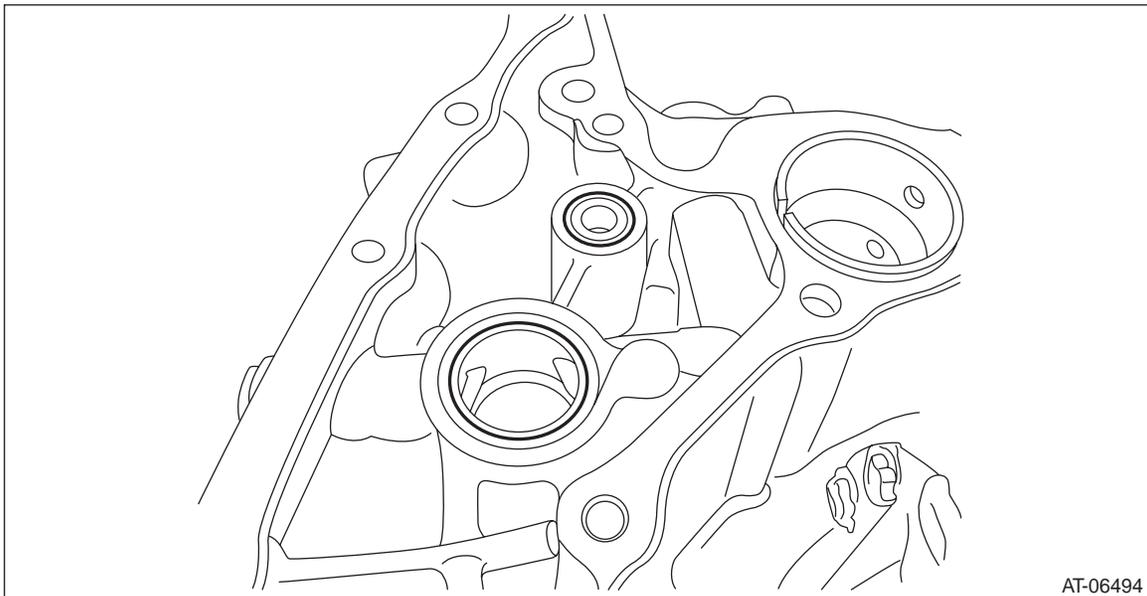


B: INSTALLATION

- 1) Clean the mating surface of drive pinion retainer and converter case.
- 2) Adjust the backlash and tooth contact between drive pinion shaft assembly and the front differential side gear.<Ref. to CVT(TR580)-299, ADJUSTMENT, Drive Pinion Shaft Assembly.>
- 3) Install O-rings in two locations to the converter case.

NOTE:

- Use new O-rings.
- Apply CVTF to the O-rings.



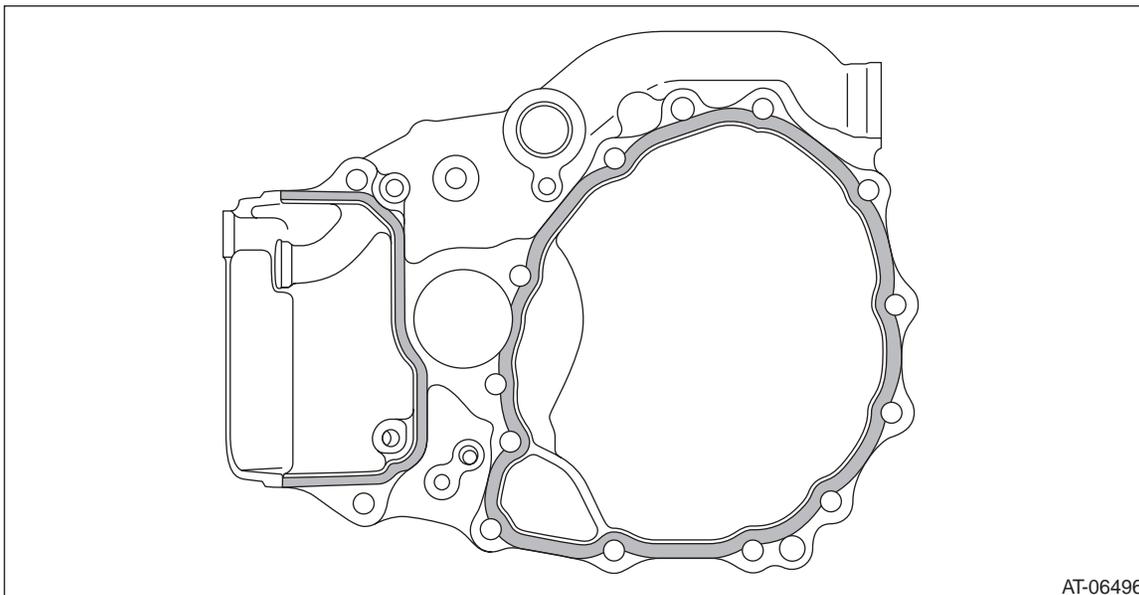
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Drive Pinion Shaft Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

4) Apply liquid gasket seamlessly to the mating surface of drive pinion retainer.

Liquid gasket:
THREE BOND 1215B or equivalent

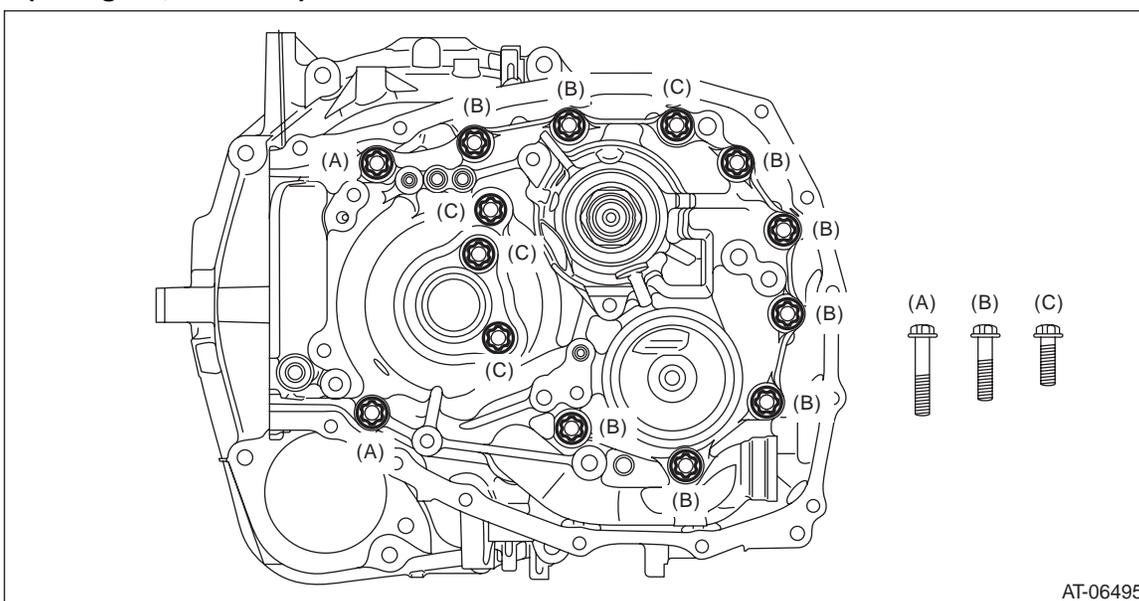


5) Install the drive pinion retainer to converter case, and tighten the bolt using the ST. ST 18270KA020 SOCKET (E20)

NOTE:

Do not confuse the three different-length bolts when installing.

Tightening torque:
43 N·m (4.4 kgf·m, 31.7 ft·lb)



6) Install the forward clutch assembly.<Ref. to CVT(TR580)-260, INSTALLATION, Forward Clutch Assembly.>

7) Install the reverse brake assembly.<Ref. to CVT(TR580)-245, INSTALLATION, Reverse Brake Assembly.>

8) Install the primary pulley, secondary pulley and variator chain.<Ref. to CVT(TR580)-228, INSTALLATION, Primary Pulley and Secondary Pulley.>

9) Install the reduction drive gear.<Ref. to CVT(TR580)-217, INSTALLATION, Reduction Drive Gear.>

10) Install the transmission case.<Ref. to CVT(TR580)-206, INSTALLATION, Transmission Case.>

CVT(TR580)-279

Drive Pinion Shaft Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

- 11) Install the transmission control device.<Ref. to CVT(TR580)-200, INSTALLATION, Transmission Control Device.>
- 12) Install the oil strainer and oil pan.<Ref. to CVT(TR580)-108, INSTALLATION, Oil Pan and Strainer.>
- 13) Install the reduction driven gear assembly.<Ref. to CVT(TR580)-189, INSTALLATION, Reduction Driven Gear.>
- 14) Install the parking pawl.<Ref. to CVT(TR580)-188, INSTALLATION, Parking Pawl.>
- 15) Install the transfer driven gear assembly.<Ref. to CVT(TR580)-185, INSTALLATION, Transfer Driven Gear.>
- 16) Install the transfer clutch assembly.<Ref. to CVT(TR580)-171, INSTALLATION, Transfer Clutch.>
- 17) Install the extension case.<Ref. to CVT(TR580)-166, INSTALLATION, Extension Case.>
- 18) Install the inhibitor switch.<Ref. to CVT(TR580)-95, INSTALLATION, Inhibitor Switch.>
- 19) Install the secondary speed sensor.<Ref. to CVT(TR580)-100, INSTALLATION, Secondary Speed Sensor.>
- 20) Install the primary speed sensor.<Ref. to CVT(TR580)-103, INSTALLATION, Primary Speed Sensor.>
- 21) Install the turbine speed sensor.<Ref. to CVT(TR580)-98, INSTALLATION, Turbine Speed Sensor.>
- 22) Install the transmission harness.<Ref. to CVT(TR580)-131, INSTALLATION, Transmission Harness.>
- 23) Install the control valve body.<Ref. to CVT(TR580)-117, INSTALLATION, Control Valve Body.>
- 24) Install the air breather hose.<Ref. to CVT(TR580)-156, INSTALLATION, Air Breather Hose.>
- 25) Install the transmission assembly to the vehicle.<Ref. to CVT(TR580)-67, INSTALLATION, Automatic Transmission Assembly.>

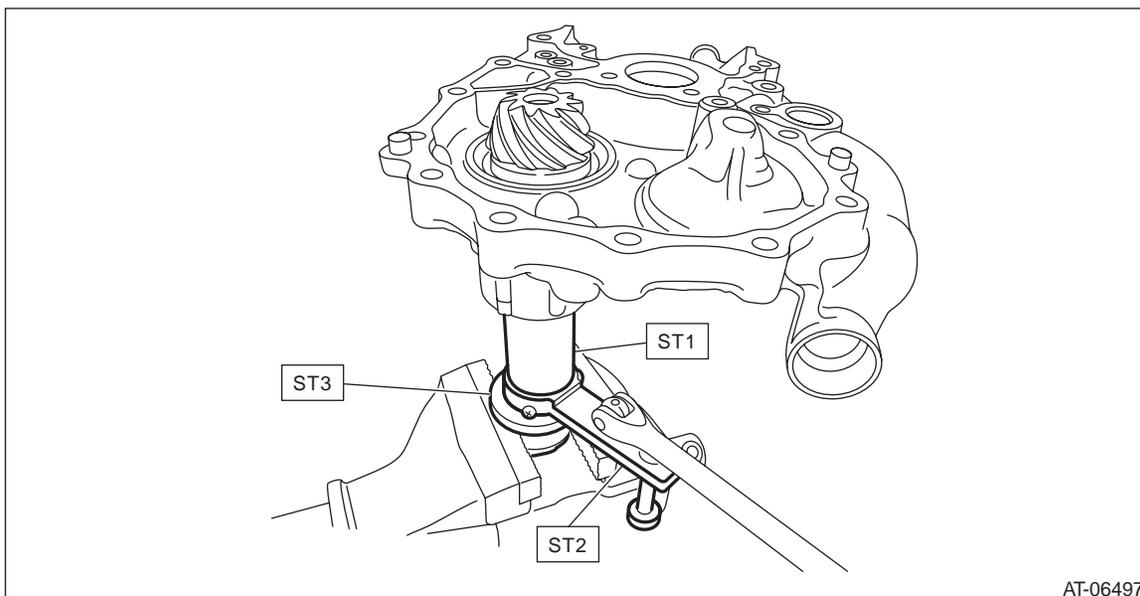
C: DISASSEMBLY

- 1) Flatten the tab of the lock nut.
- 2) Using ST1, ST2 and ST3, fix at the spline portion of drive pinion shaft to remove the lock nut.

ST1 499787500 ADAPTER

ST2 499787700 WRENCH

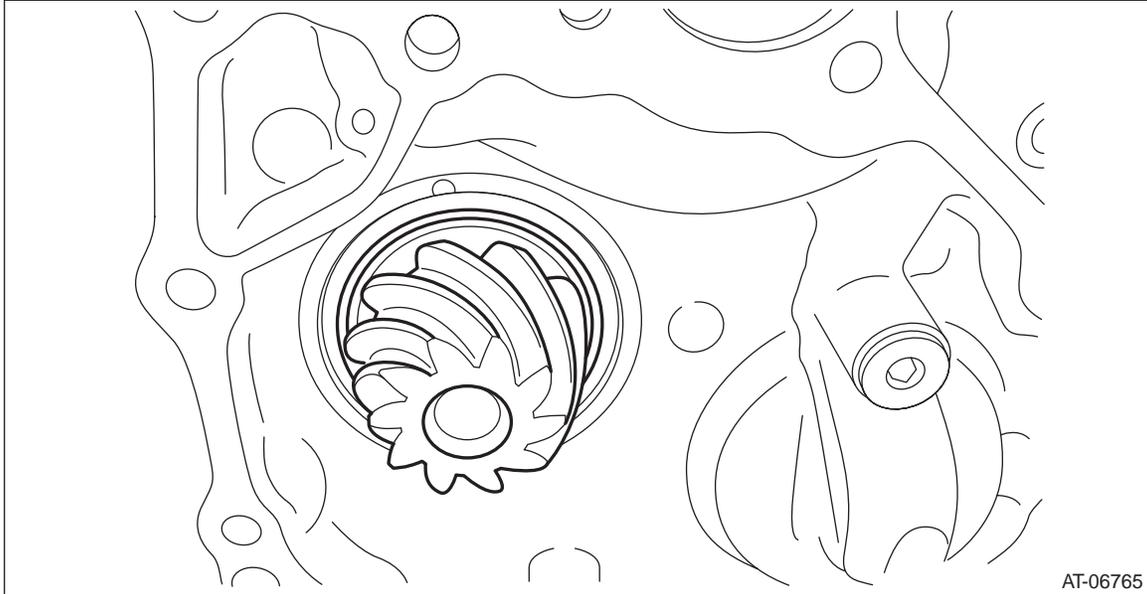
ST3 498937110 HOLDER



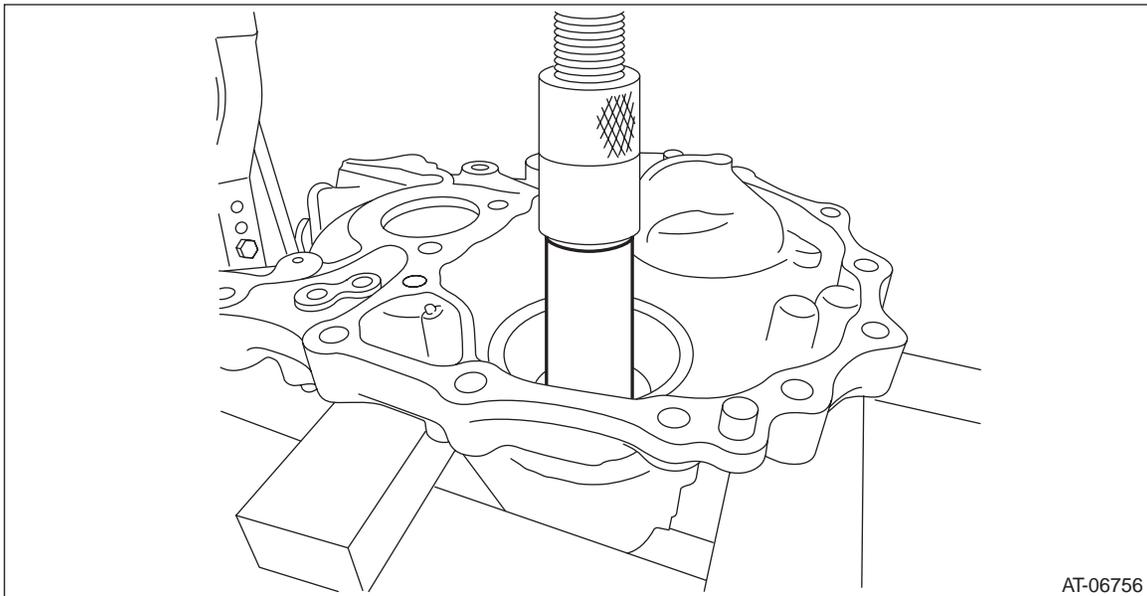
Drive Pinion Shaft Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

3) Remove the drive pinion shaft from the drive pinion retainer.



4) Using the round bar with diameter of 36 mm (1.42 in) or 37 mm (1.46 in), remove the bearing inner race and plug.

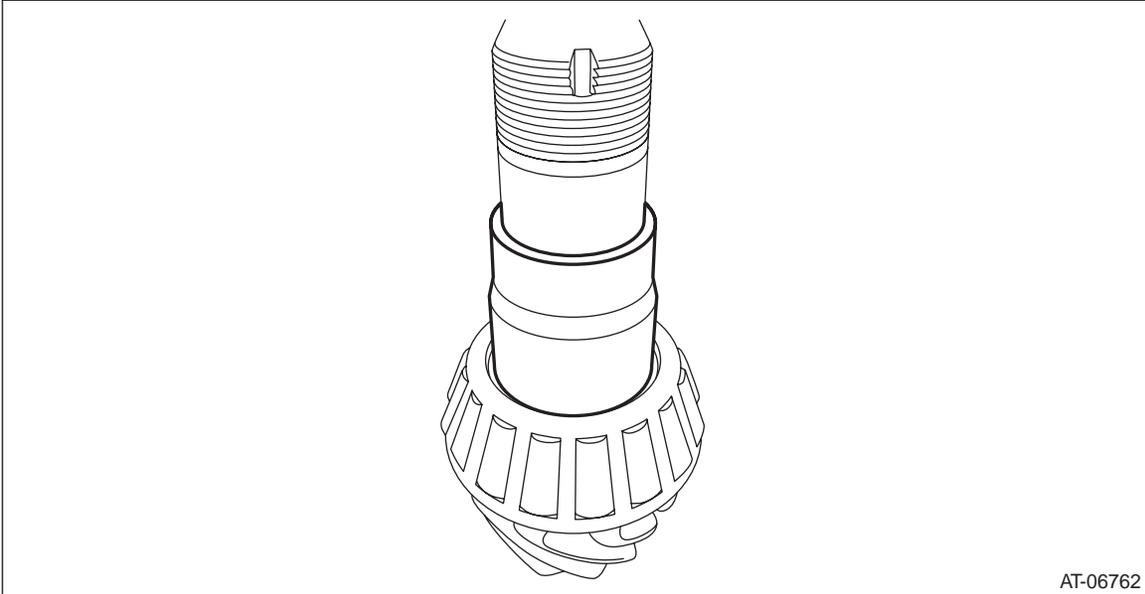


5) Remove the drive pinion washer.

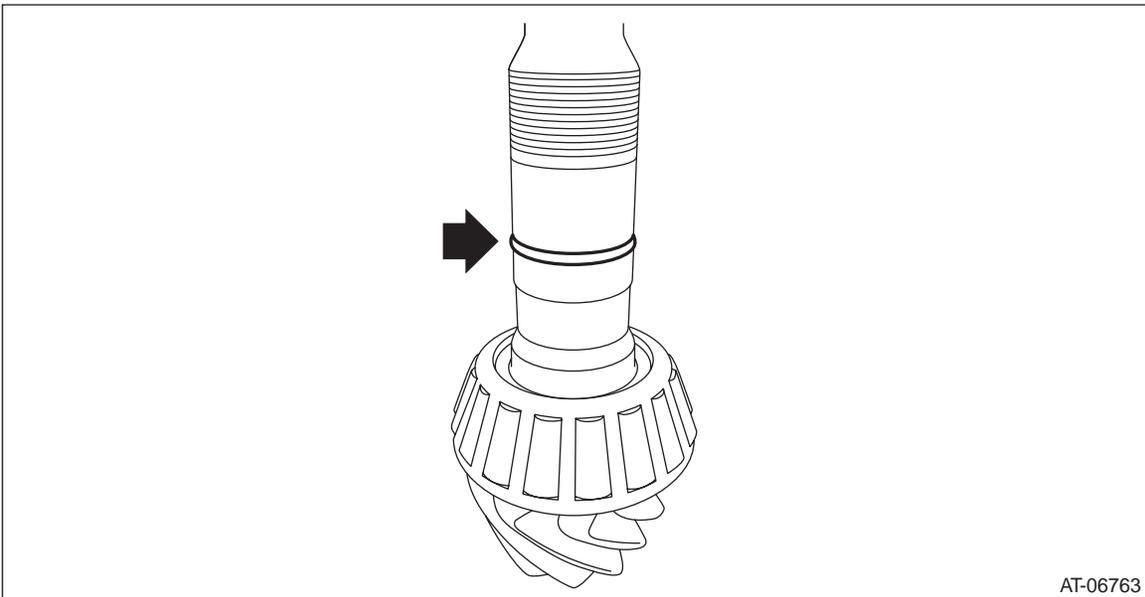
Drive Pinion Shaft Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

6) Remove the drive pinion spacer.



7) Remove the O-ring.

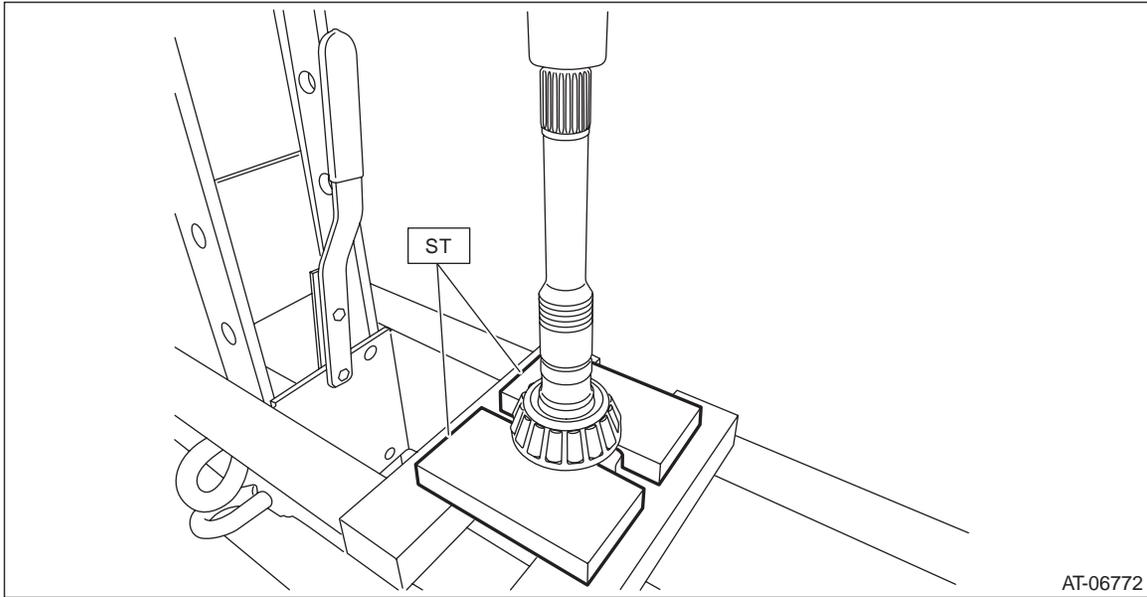


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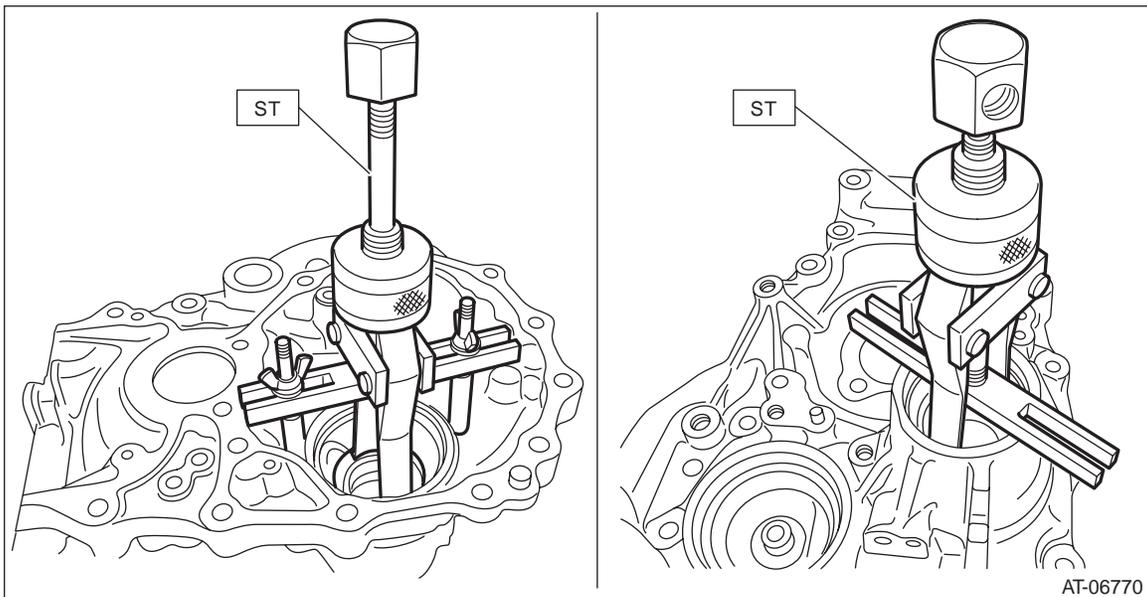
Drive Pinion Shaft Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

- 8) Remove the inner race and drive pinion shim from drive pinion shaft using ST.
ST 498515500 REMOVER



- 9) Using the ST, remove the outer race.
ST 398527700 PULLER ASSY



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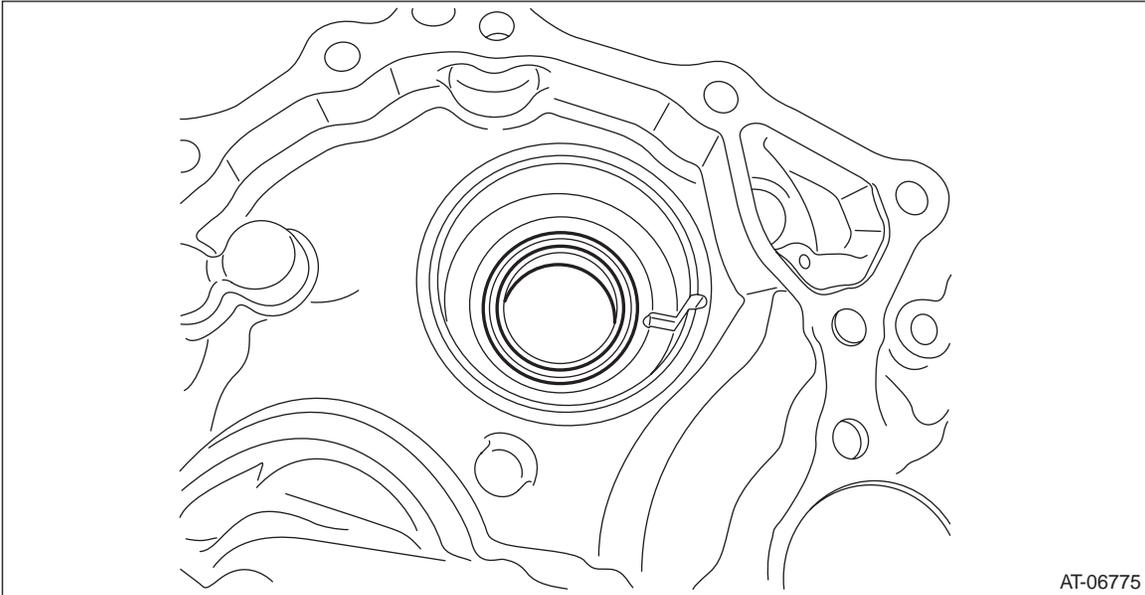
Drive Pinion Shaft Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

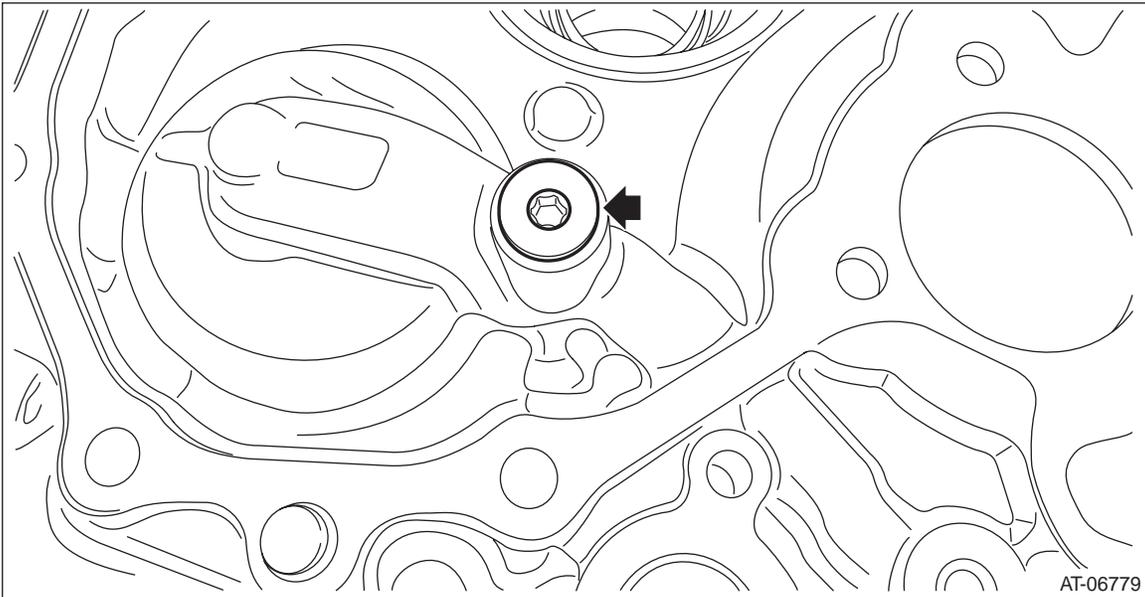
10) Remove the two oil seals using a screwdriver wrapped with cloth, etc.

CAUTION:

Do not damage the fitting surface of oil seal.



11) Remove the plug from drive pinion retainer.



Drive Pinion Shaft Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

D: ASSEMBLY

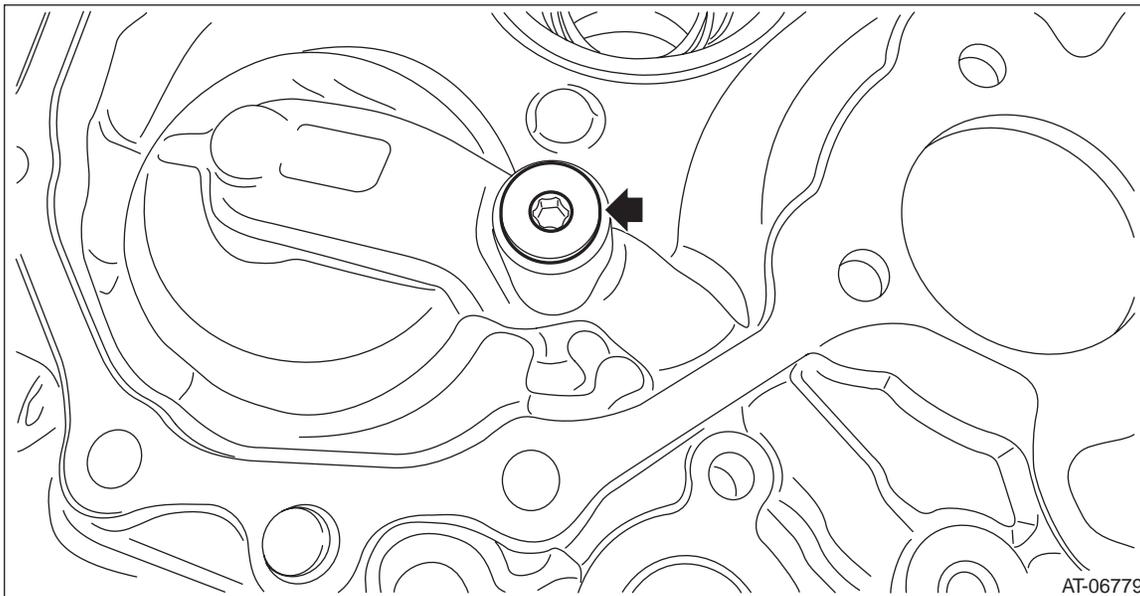
1) Install the plug to drive pinion retainer.

NOTE:

- Use new O-rings.
- Apply CVTF to the O-ring.

Tightening torque:

25 N·m (2.5 kgf·m, 18.4 ft·lb)

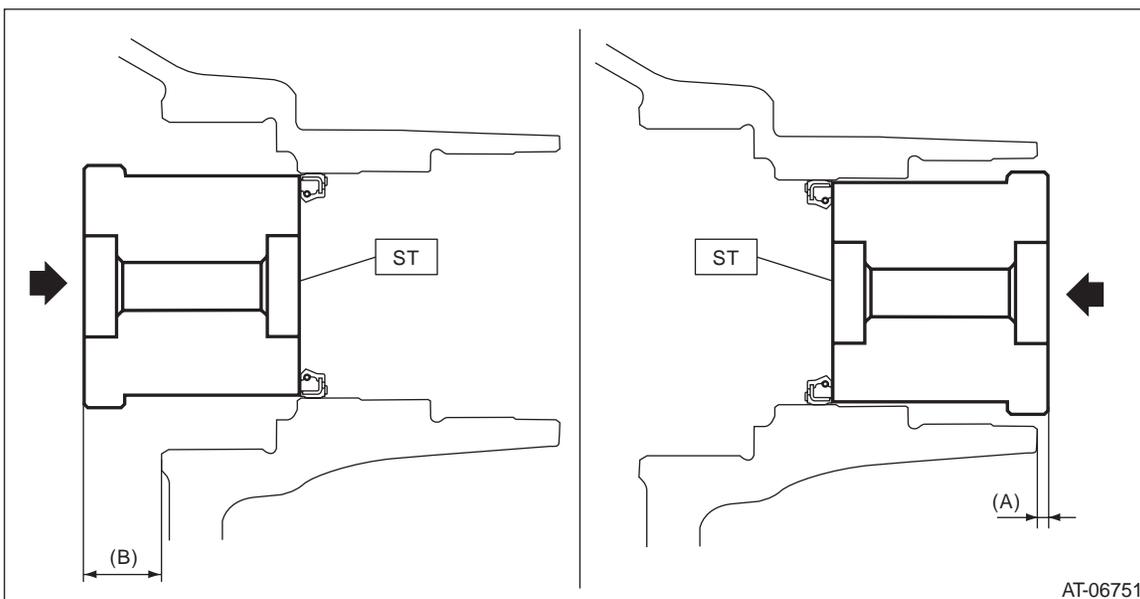


2) Using the ST, install the oil seal to drive pinion retainer.

NOTE:

- Apply CVTF to the oil seal press-fitting surface and lip.
- Install the oil seal in the correct direction.

ST 927720000 HOUSING BUSHING INSTALLER AND REMOVER



(A) 2.8 mm (0.11 in)

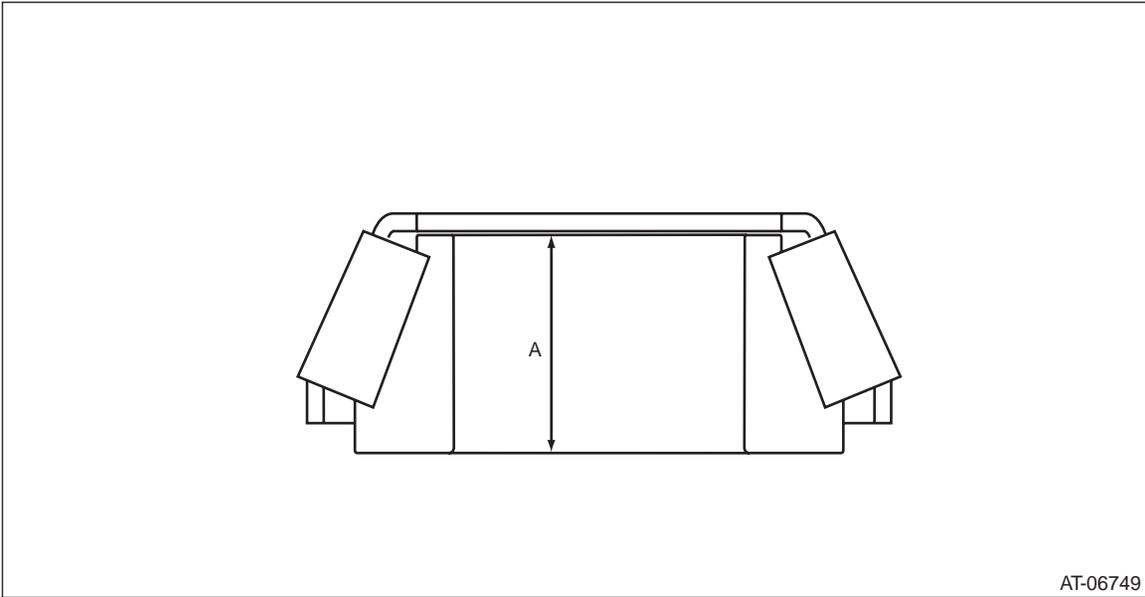
(B) 18.7 mm (0.74 in)

Drive Pinion Shaft Assembly

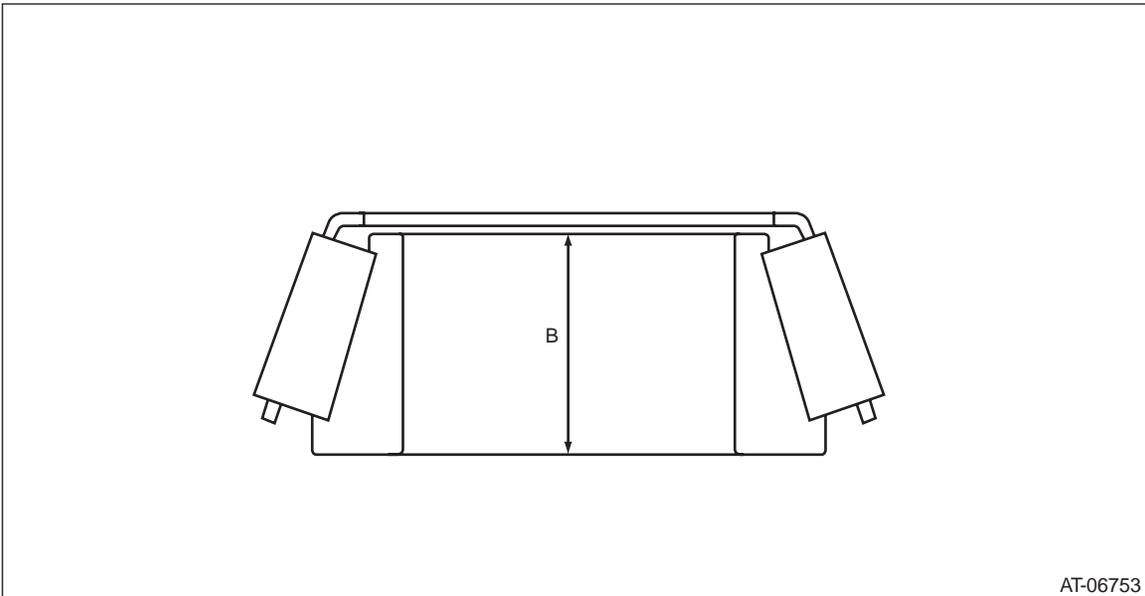
CONTINUOUSLY VARIABLE TRANSMISSION

3) Select the drive pinion washer.

(1) Measure the roller bearing inner race width "A" on the front side.



(2) Measure the roller bearing inner race width "B" on the rear side.

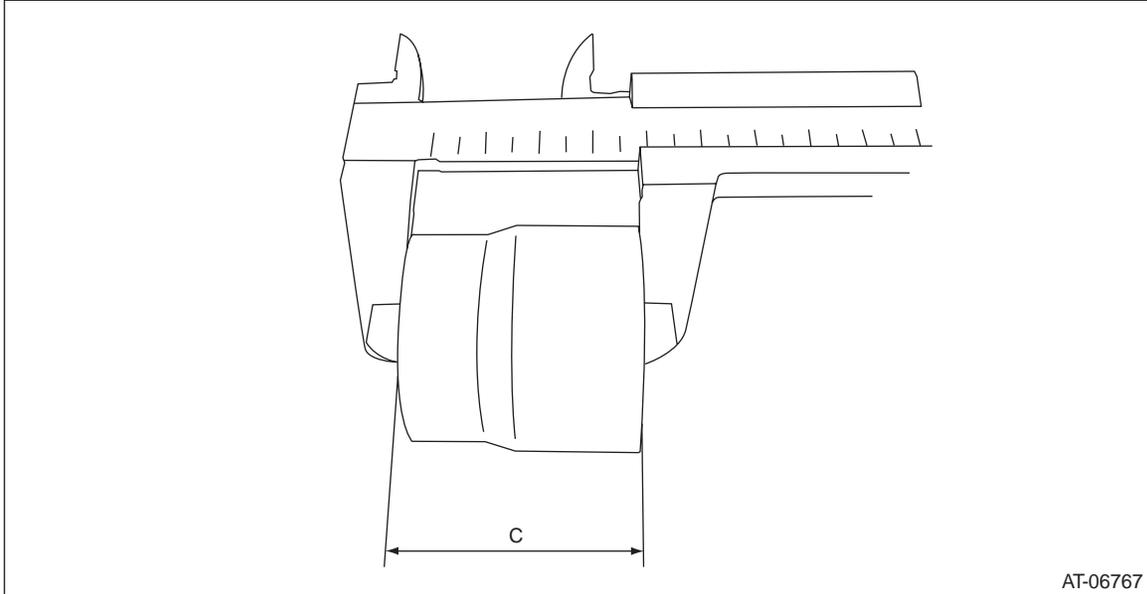


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Drive Pinion Shaft Assembly

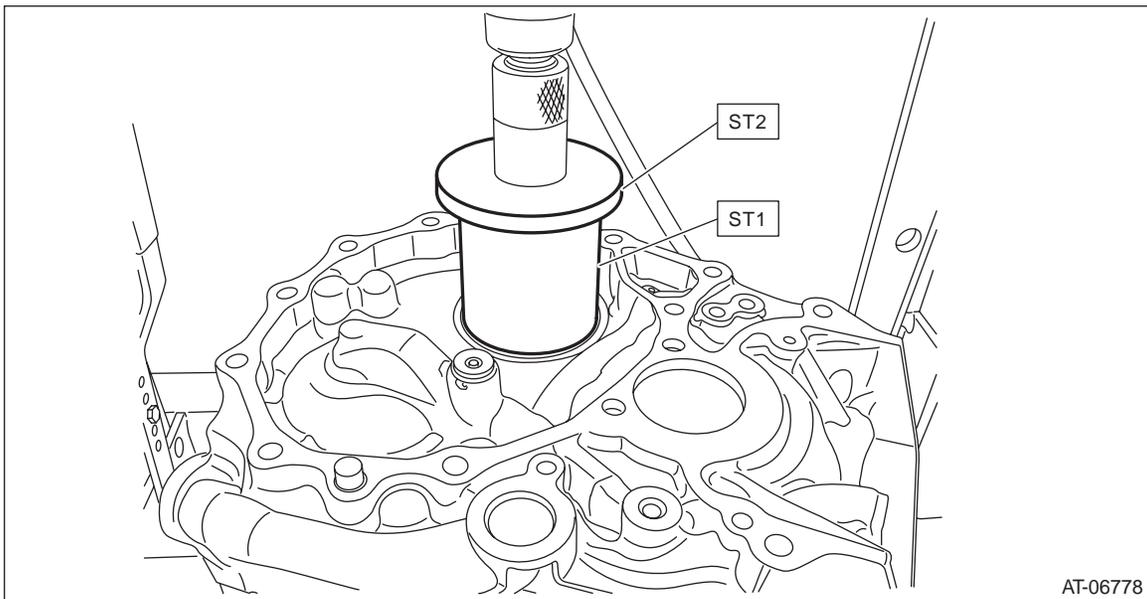
CONTINUOUSLY VARIABLE TRANSMISSION

(3) Measure the spacer width "C".



(4) Using the ST, install the front roller bearing outer race to the drive pinion retainer.

ST1 28499TC010 INSTALLER
ST2 398177700 INSTALLER

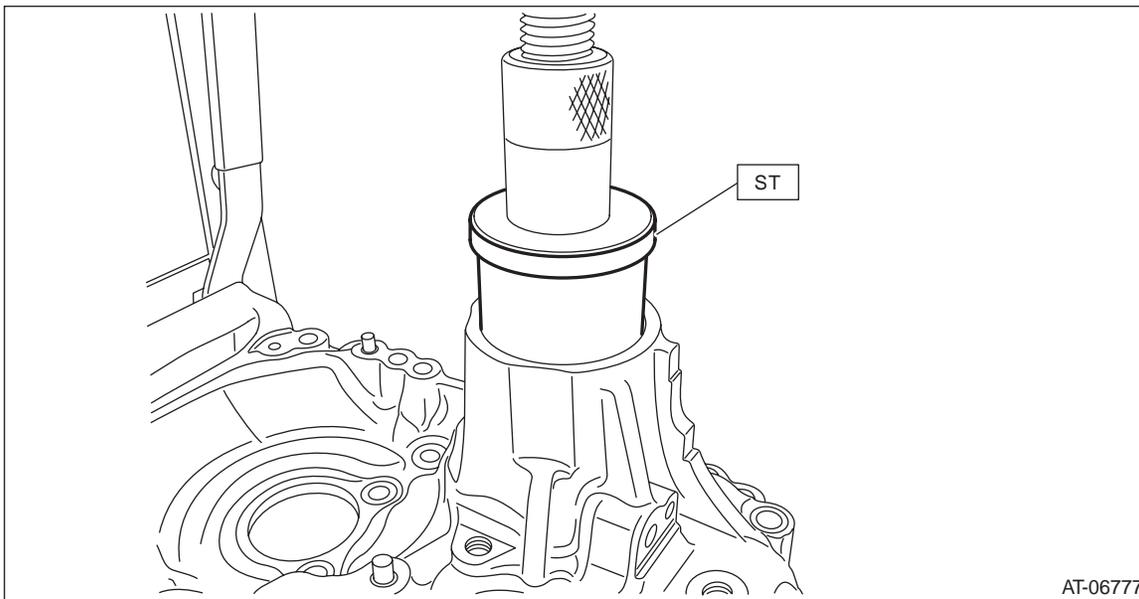


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Drive Pinion Shaft Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

- (5) Using the ST, install the rear roller bearing outer race to the drive pinion retainer.
ST 20099AE020 INSTALLER

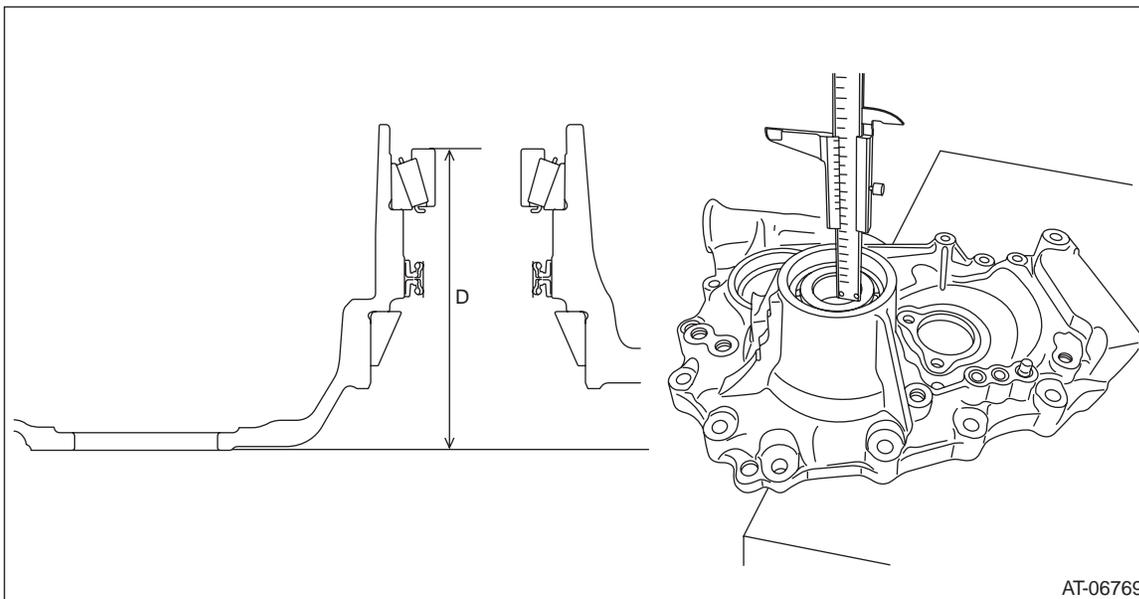


- (6) Place the drive pinion retainer on the surface plate, and install the inner race to the rear roller bearing outer race.

NOTE:

Place the drive pinion retainer so that the mating surface of the drive pinion retainer (mating surface with the converter case) contacts the surface plate.

- (7) Measure the height "D" from the end face of the rear roller bearing inner race to the surface plate.

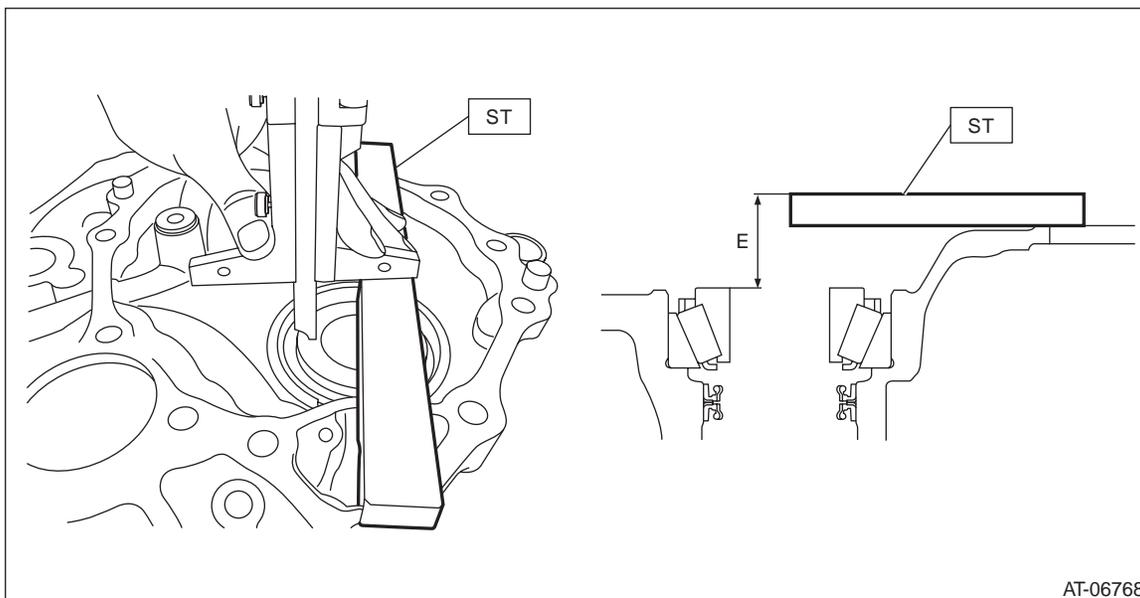


- (8) Install the inner race to the front roller bearing outer race.

Drive Pinion Shaft Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

(9) Measure the depth "E" from the end face of the front roller bearing inner race to the end face of the ST.
ST 499575400 GAUGE



AT-06768

(10) Using following formula, select one to three drive pinion washers.

$$T \text{ (mm)} = D - (A + B + C + E - 15) - (0 \pm 0.0125)$$

$$[T \text{ (in)} = D - (A + B + C + E - 0.591) - (0 \pm 0.0005)]$$

A: Front roller bearing width

B: Rear roller bearing width

C: Spacer width

D: Height from end face of rear roller bearing inner race to surface plate

E: Depth from end face of front roller bearing inner race to end face of ST

15 mm (0.591 in): Thickness of ST

T: Drive pinion washer thickness

0 ± 0.0125 mm (0 ± 0.0005 in): Clearance

Drive pinion washer	
Part No.	Thickness mm (in)
38336AA750	0.150 (0.0059)
38336AA760	0.175 (0.0069)
38336AA770	0.200 (0.0079)
38336AA780	0.225 (0.0089)
38336AA790	0.250 (0.0098)
38336AA800	0.275 (0.0108)
38336AA810	0.300 (0.0118)
38336AA820	0.400 (0.0157)

4) Measure and record the drive pinion shim thickness to be reused.

5) Install the drive pinion shim that is reused for the drive pinion shaft.

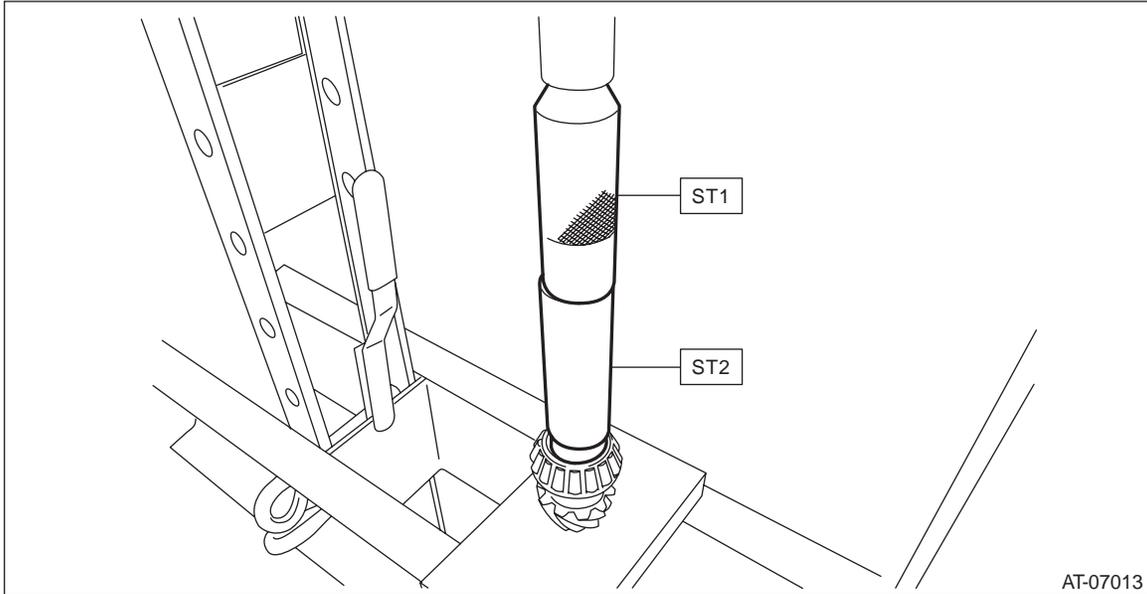
Drive Pinion Shaft Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

6) Using the ST1 and ST2, press-fit the inner race to the drive pinion shaft.

ST1 899580100 INSTALLER

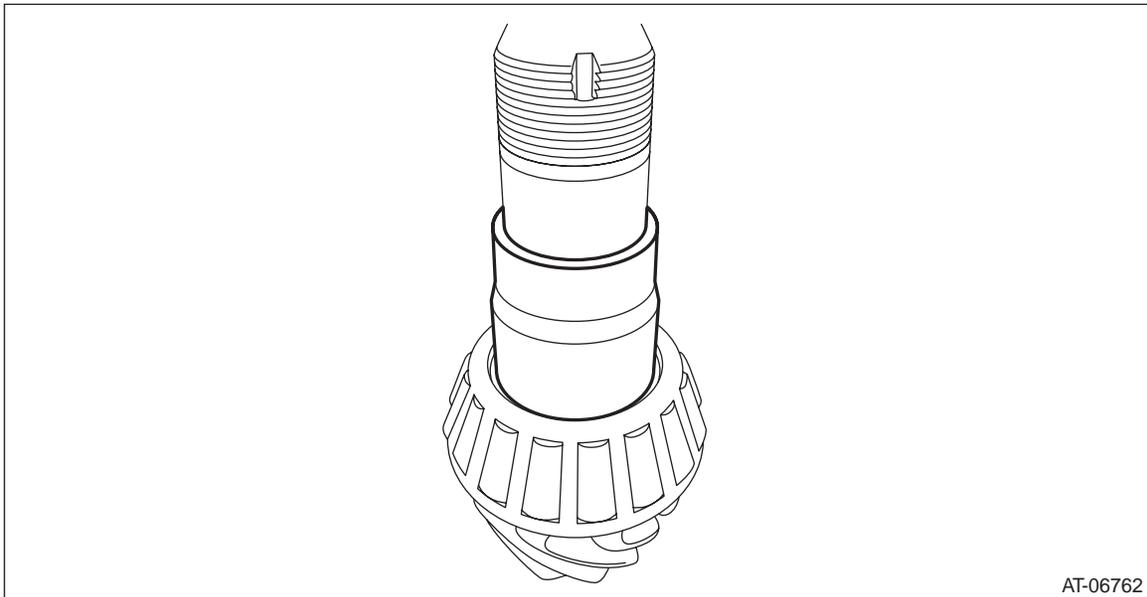
ST2 927130000 EXTENSION DRIVE SHAFT



7) Install the drive pinion spacer.

NOTE:

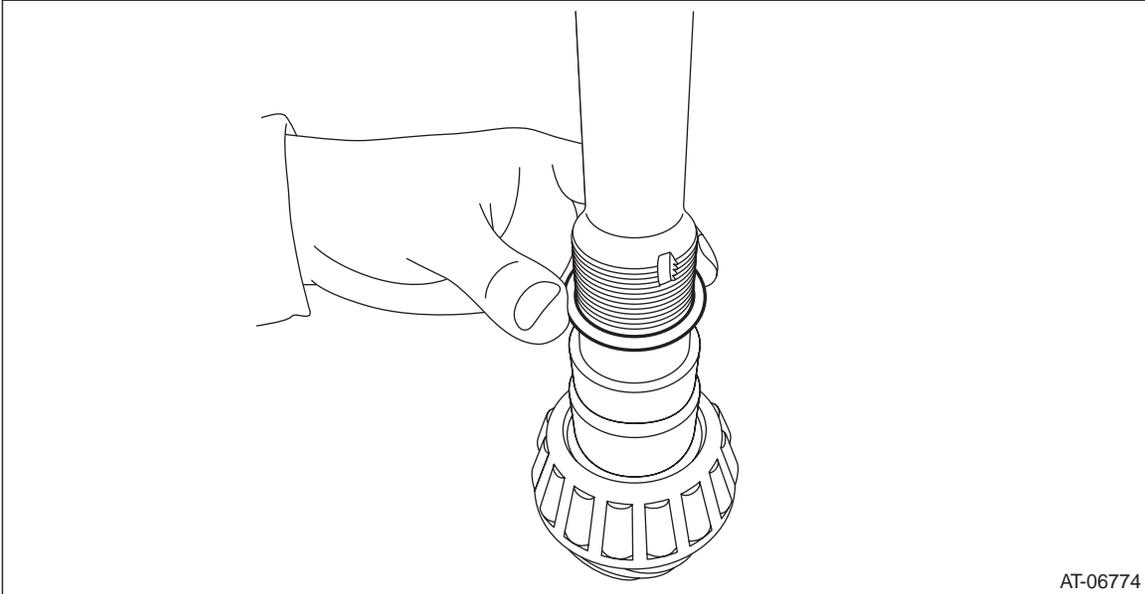
Replace the O-ring with a new part after tooth contact inspection.



Drive Pinion Shaft Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

8) Install the selected drive pinion washer.



9) Insert the drive pinion shaft into the drive pinion retainer.

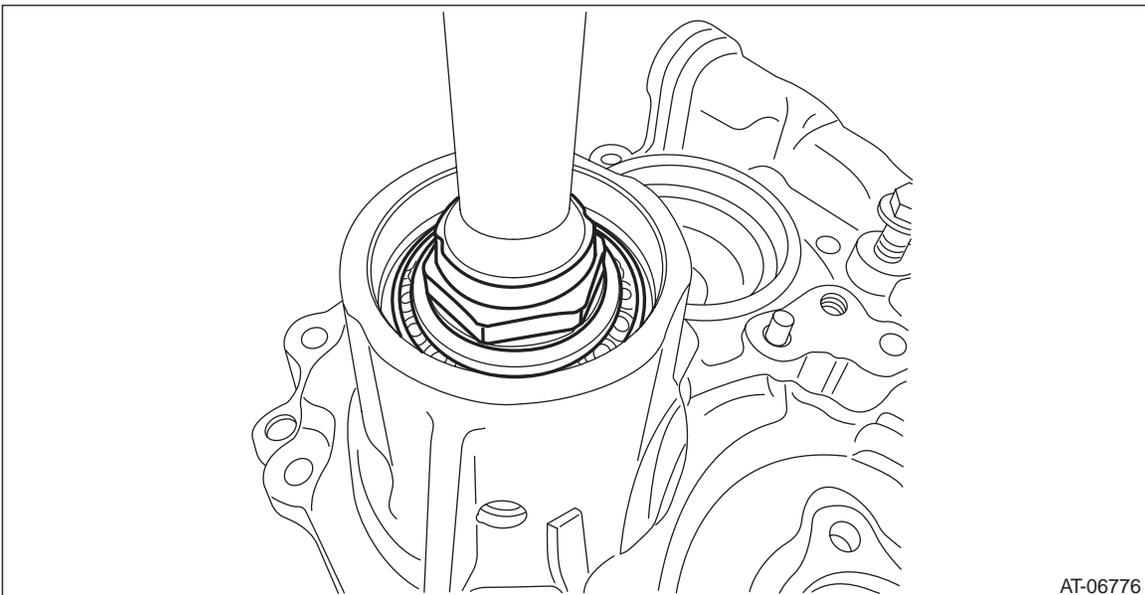
CAUTION:

Be careful not to damage the oil seal.

10) Install the inner bearing and lock nut.

NOTE:

Use a new lock nut.



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Drive Pinion Shaft Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

11) Using the ST, tighten the lock nut to the specified torque so that the starting torque of the drive pinion shaft is within the specified range.

CAUTION:

Before inspecting the starting torque, apply differential gear oil to roller of bearing and rotate the bearing several times.

NOTE:

- Tighten the lock nut while directly aligning ST2 and torque wrench.
- If the starting torque is not within the specified range, select the drive pinion washer, and repeat the step until the starting torque is within the specified range.
- When a thicker drive pinion washer is selected, the starting torque decreases. When a thinner drive pinion washer is selected, the starting torque increases.

Starting torque:

5.1 — 17.1 N (0.5 — 1.7 kgf, 1.1 — 3.8 lbf)

ST1 499787500 ADAPTER

ST2 499787700 WRENCH

ST3 498937110 HOLDER

Using the following formula, calculate the tightening torque for a torque wrench.

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

T1: 170 — 250 N·m (17.3 — 25.5 kgf·m, 125.4 — 184.4 ft·lb) [Specified tightening torque range]

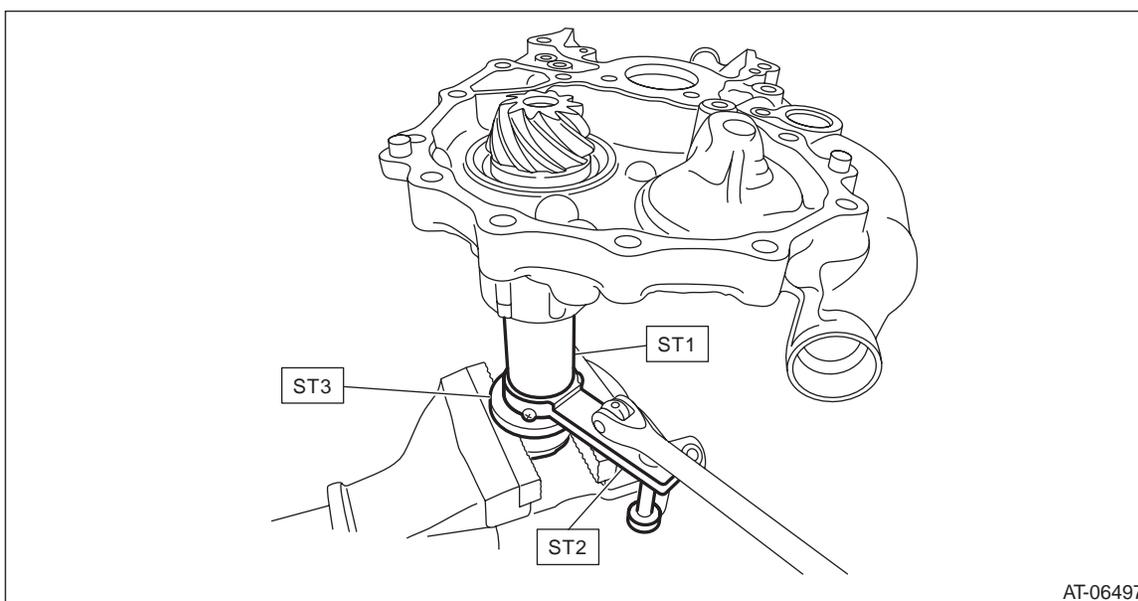
T2: Tightening torque

L1: ST1 length 0.072 m (2.83 in)

L2: Torque wrench length

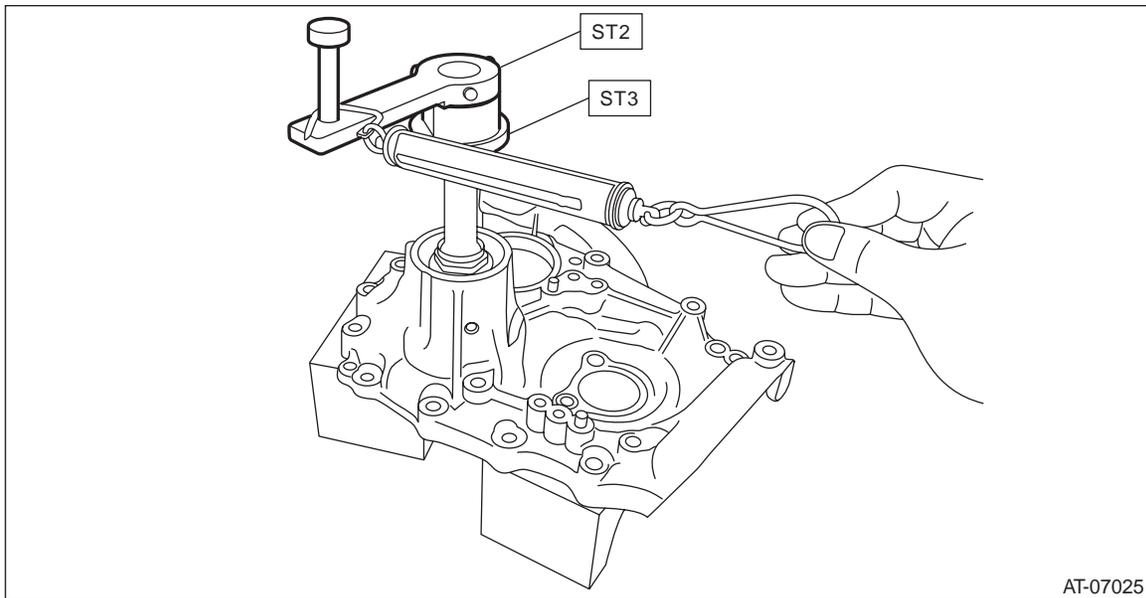
Example:

Torque wrench length m (in)	Tightening torque N·m (kgf·m, ft·lb)
0.4 (15.75)	144 — 211 (14.7 — 21.5, 106.2 — 155.6)
0.45 (17.72)	147 — 215 (15.0 — 21.9, 108.4 — 158.6)
0.5 (19.69)	149 — 218 (15.2 — 22.2, 109.9 — 160.8)
0.55 (21.65)	150 — 221 (15.3 — 22.5, 110.6 — 163.0)



Drive Pinion Shaft Assembly

CONTINUOUSLY VARIABLE TRANSMISSION



12) Install the drive pinion retainer to the converter case, and check the backlash and tooth contact. <Ref. to CVT(TR580)-299, ADJUSTMENT, Drive Pinion Shaft Assembly.> <Ref. to CVT(TR580)-321, ADJUSTMENT, Front Differential Assembly.>

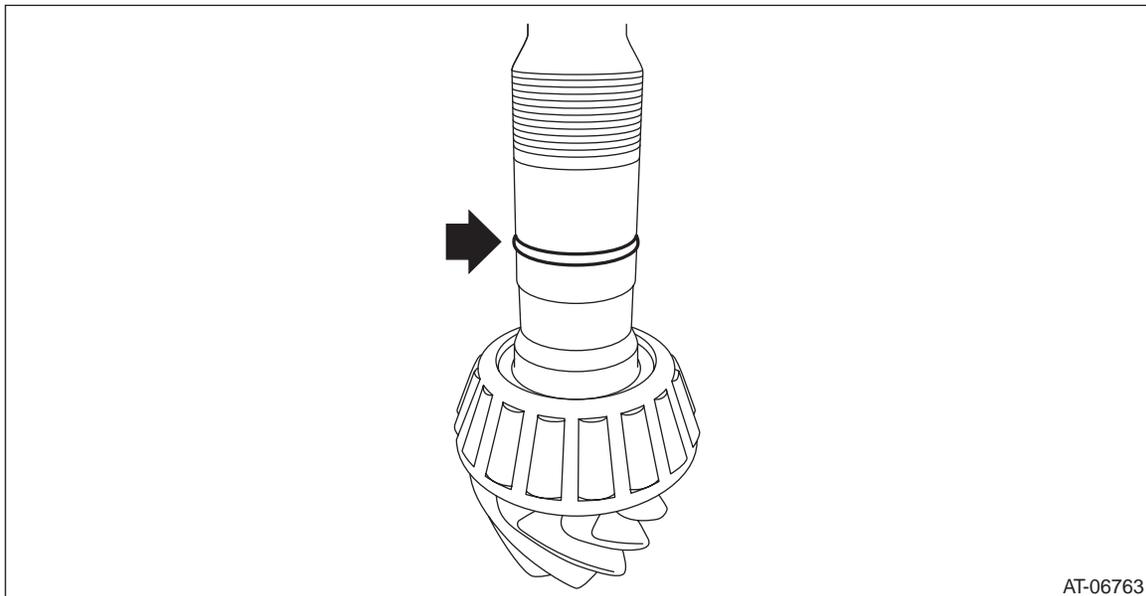
13) Remove the drive pinion retainer from converter case. <Ref. to CVT(TR580)-277, REMOVAL, Drive Pinion Shaft Assembly.>

14) Remove the drive pinion spacer from the drive pinion shaft. <Ref. to CVT(TR580)-280, DISASSEMBLY, Drive Pinion Shaft Assembly.>

15) Install the O-ring to the drive pinion shaft.

NOTE:

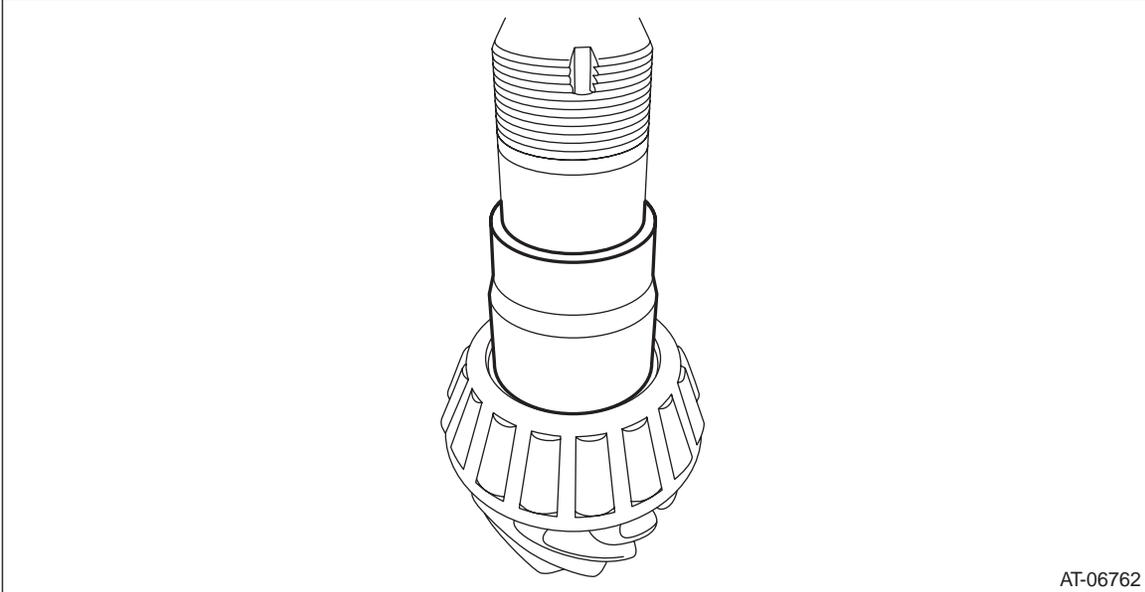
- Use new O-rings.
- Apply CVTF to the O-ring.



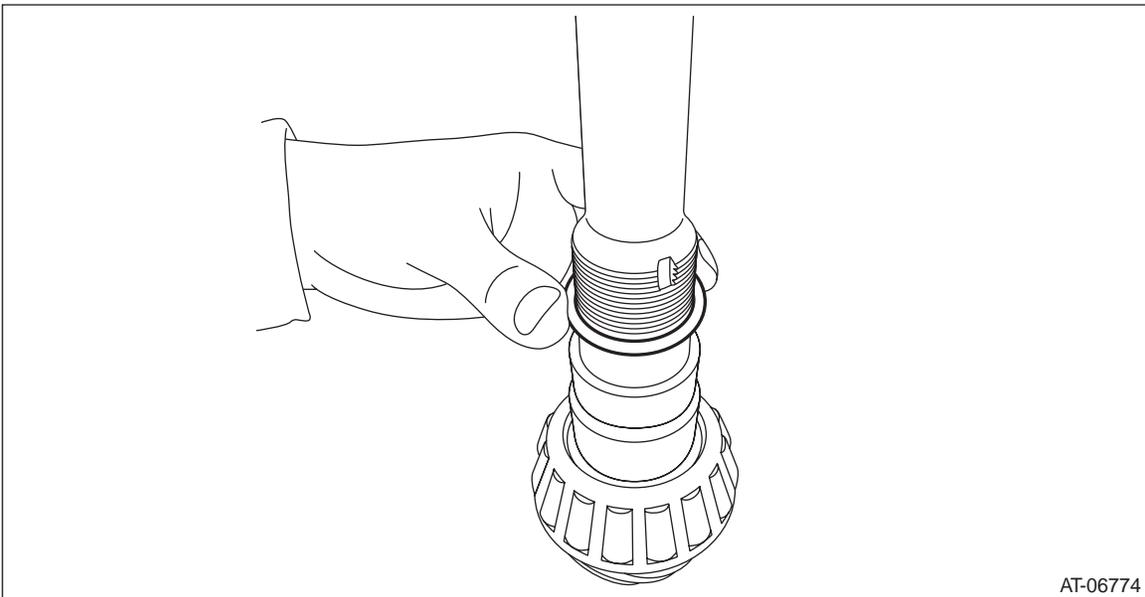
Drive Pinion Shaft Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

16) Install the drive pinion spacer to the drive pinion shaft.



17) Install the drive pinion washer.



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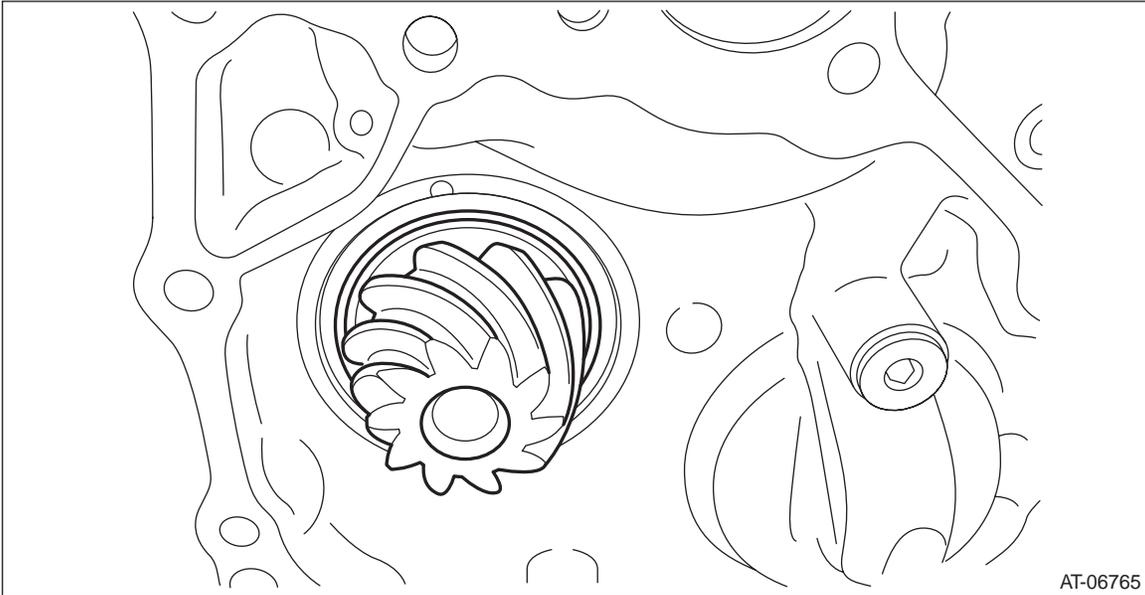
Drive Pinion Shaft Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

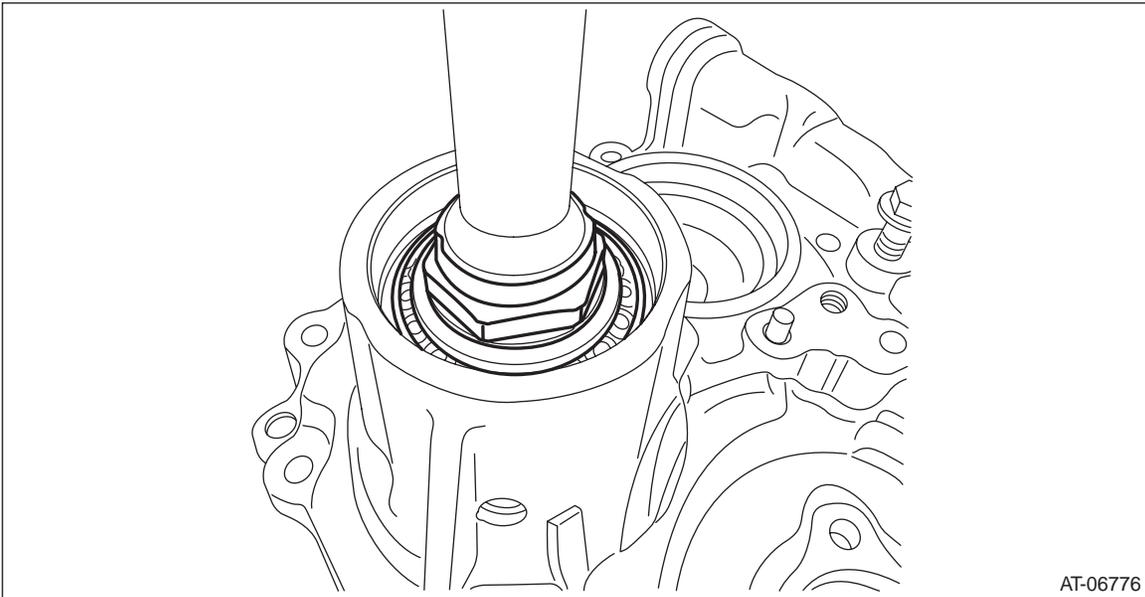
18) Insert the drive pinion shaft into the drive pinion retainer.

CAUTION:

Be careful not to damage the oil seal.



19) Install the inner bearing and lock nut.



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Drive Pinion Shaft Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

20) Using the ST, tighten the lock nut to the specified torque so that the starting torque of the drive pinion shaft is within the specified range.

CAUTION:

Before inspecting the starting torque, apply differential gear oil to roller of bearing and rotate the bearing several times.

NOTE:

- Tighten the lock nut while directly aligning ST2 and torque wrench.
- If the starting torque is not within the specified range, select the drive pinion washer, and repeat the step until the starting torque is within the specified range.
- When a thicker drive pinion washer is selected, the starting torque decreases. When a thinner drive pinion washer is selected, the starting torque increases.

Starting torque:

5.1 — 17.1 N (0.5 — 1.7 kgf, 1.1 — 3.8 lbf)

ST1 499787500 ADAPTER

ST2 499787700 WRENCH

ST3 498937110 HOLDER

Using the following formula, calculate the tightening torque for a torque wrench.

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

T1: 170 — 250 N·m (17.3 — 25.5 kgf·m, 125.4 — 184.4 ft·lb) [Specified tightening torque range]

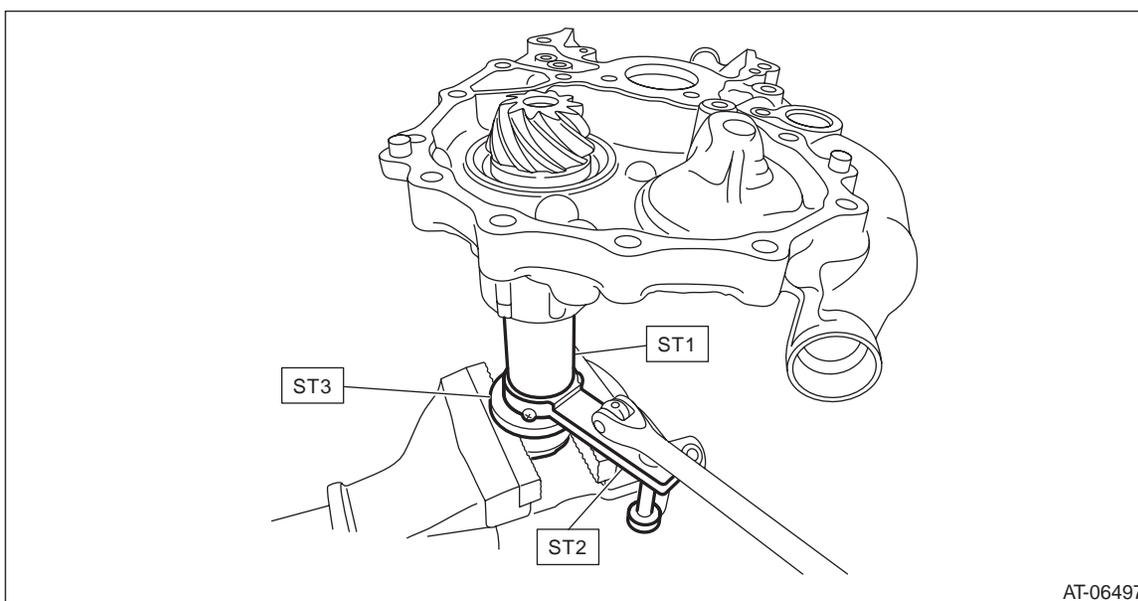
T2: Tightening torque

L1: ST1 length 0.072 m (2.83 in)

L2: Torque wrench length

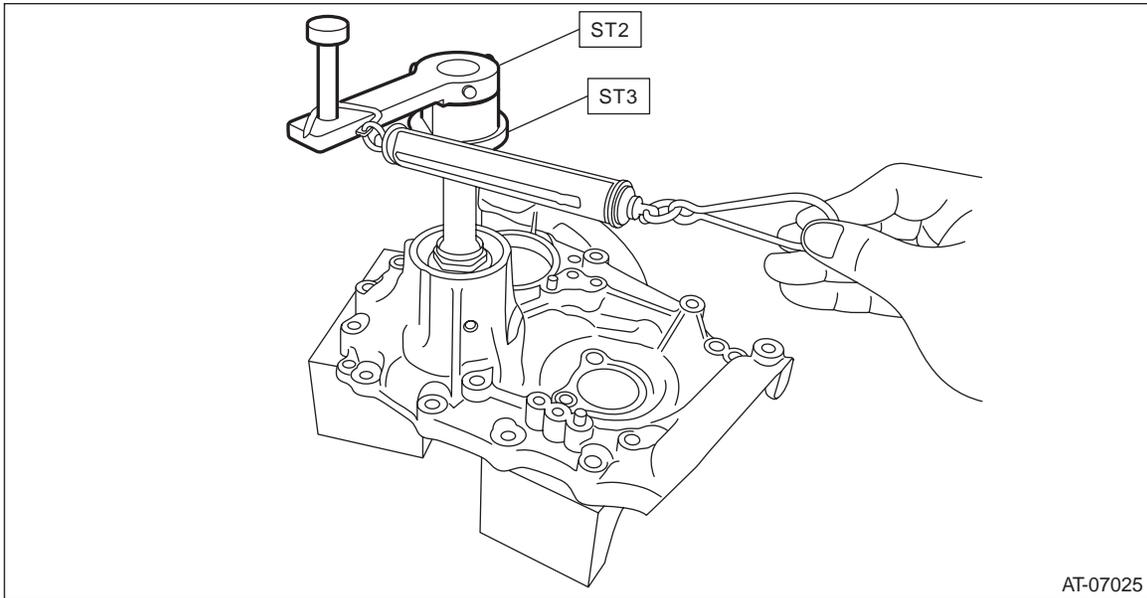
Example:

Torque wrench length m (in)	Tightening torque N·m (kgf·m, ft·lb)
0.4 (15.75)	144 — 211 (14.7 — 21.5, 106.2 — 155.6)
0.45 (17.72)	147 — 215 (15.0 — 21.9, 108.4 — 158.6)
0.5 (19.69)	149 — 218 (15.2 — 22.2, 109.9 — 160.8)
0.55 (21.65)	150 — 221 (15.3 — 22.5, 110.6 — 163.0)



Drive Pinion Shaft Assembly

CONTINUOUSLY VARIABLE TRANSMISSION



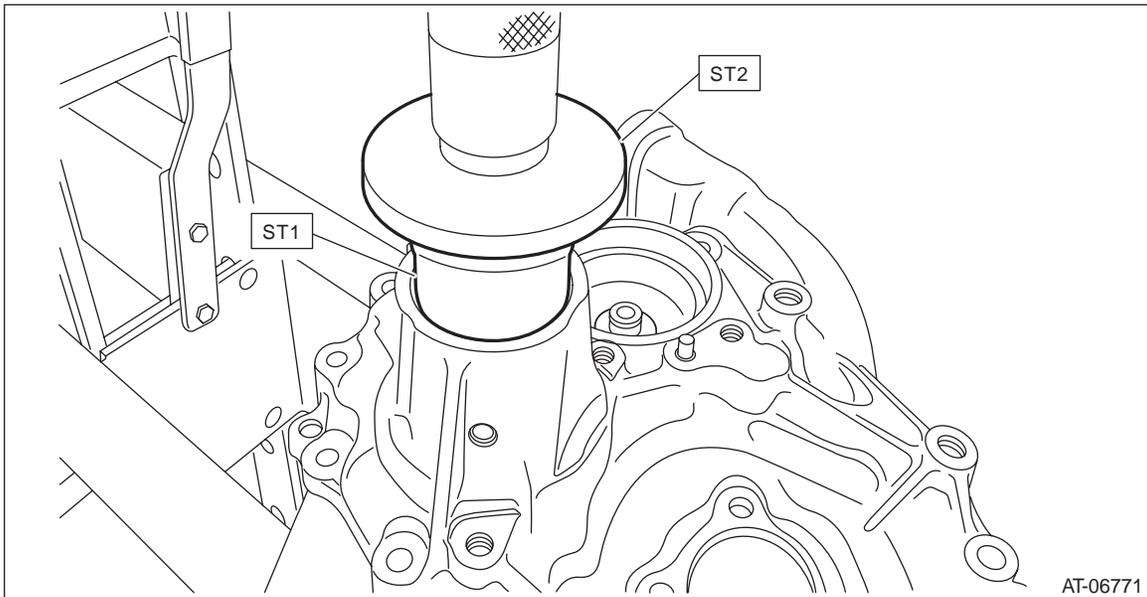
AT-07025

21) Crimp the lock nut in 2 locations.

22) Using the ST, install the plug.

ST1 499755602 PRESS SNAP RING

ST2 398177700 INSTALLER



AT-06771

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Drive Pinion Shaft Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

E: INSPECTION

- Make sure that all component parts are free of scratches, holes and other faults.
- Check the tooth contact. <Ref. to CVT(TR580)-299, ADJUSTMENT, Drive Pinion Shaft Assembly.>
- Apply CVTF to bearing and rotate the bearing to check for noise or dragging etc.
- Check the starting torque of drive pinion shaft.

CAUTION:

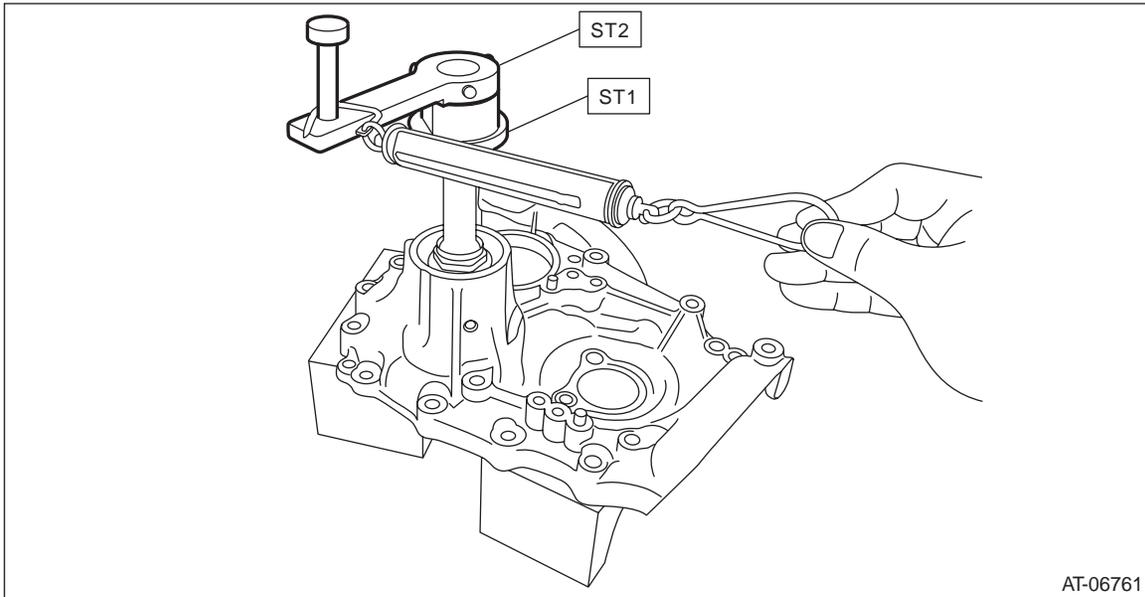
Before measuring, apply differential gear oil to roller of bearing and rotate the bearing several times.

ST1 498937110 HOLDER

ST2 499787700 WRENCH

Starting torque:

5.1 — 17.1 N (0.5 — 1.7 kgf, 1.1 — 3.8 lbf)



Drive Pinion Shaft Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

F: ADJUSTMENT

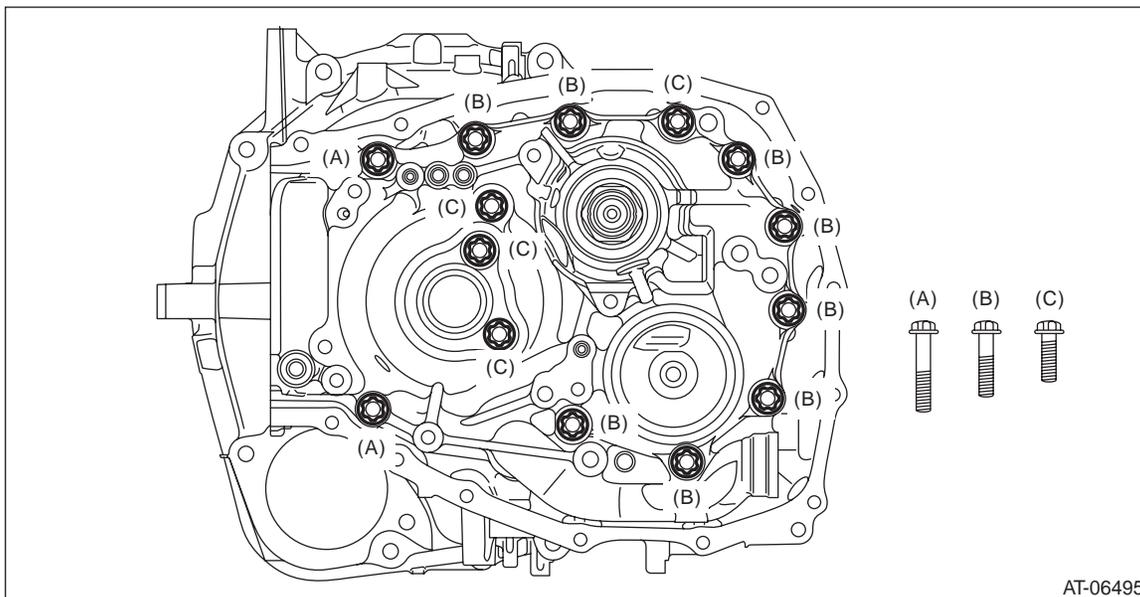
- 1) Remove the liquid gasket from the mating surface completely.
- 2) Using the ST, install the drive pinion retainer to converter case.
ST 18270KA020 SOCKET (E20)

NOTE:

Do not confuse the three different-length bolts when installing.

Tightening torque:

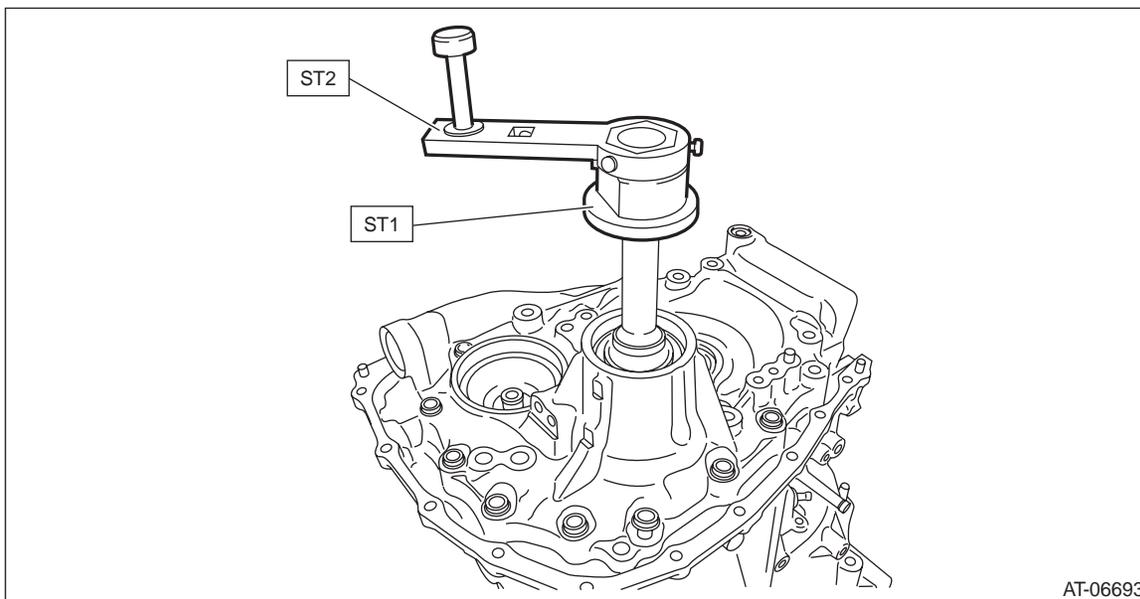
43 N·m (4.4 kgf·m, 31.7 ft·lb)



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

ST1 498937110 HOLDER

ST2 499787700 WRENCH



- 4) Adjust the drive pinion and hypoid driven gear backlash.<Ref. to CVT(TR580)-321, ADJUSTMENT, Front Differential Assembly.>

- 5) Using the ST, remove the drive pinion retainer from converter case.

ST 18270KA020 SOCKET (E20)

Drive Pinion Shaft Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

6) Apply lead-free red dye evenly on the both sides of three to four teeth of the hypoid driven gear. Then install the drive pinion retainer and rotate the drive pinion in both directions several times. Remove the drive pinion retainer and check the tooth contact pattern.

If the teeth contact is inappropriate, readjust the backlash and shim thickness (Select 1 — 3 shims.) <Ref. to CVT(TR580)-321, ADJUSTMENT, Front Differential Assembly.>

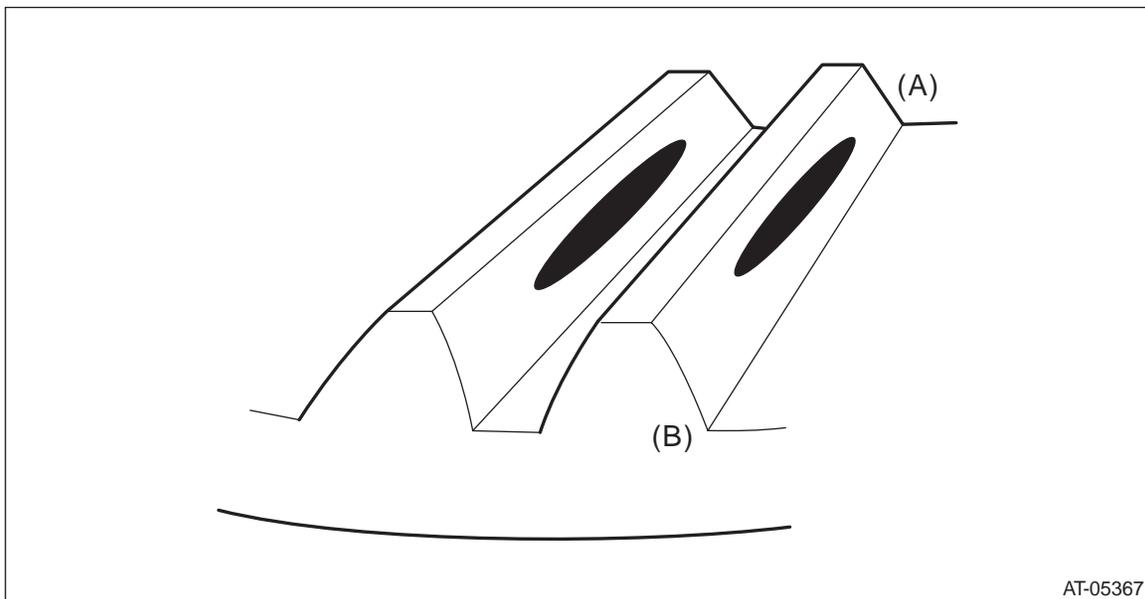
NOTE:

After correction, wipe off the lead-free red dye.

Drive pinion shim	
Part No.	Thickness mm (in)
31451AA320	0.150 (0.0059)
31451AA330	0.175 (0.0069)
31451AA340	0.200 (0.0079)
31451AA350	0.225 (0.0089)
31451AA360	0.250 (0.0098)
31451AA370	0.275 (0.0108)

- Correct tooth contact

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



- (A) Toe side
- (B) Heel side

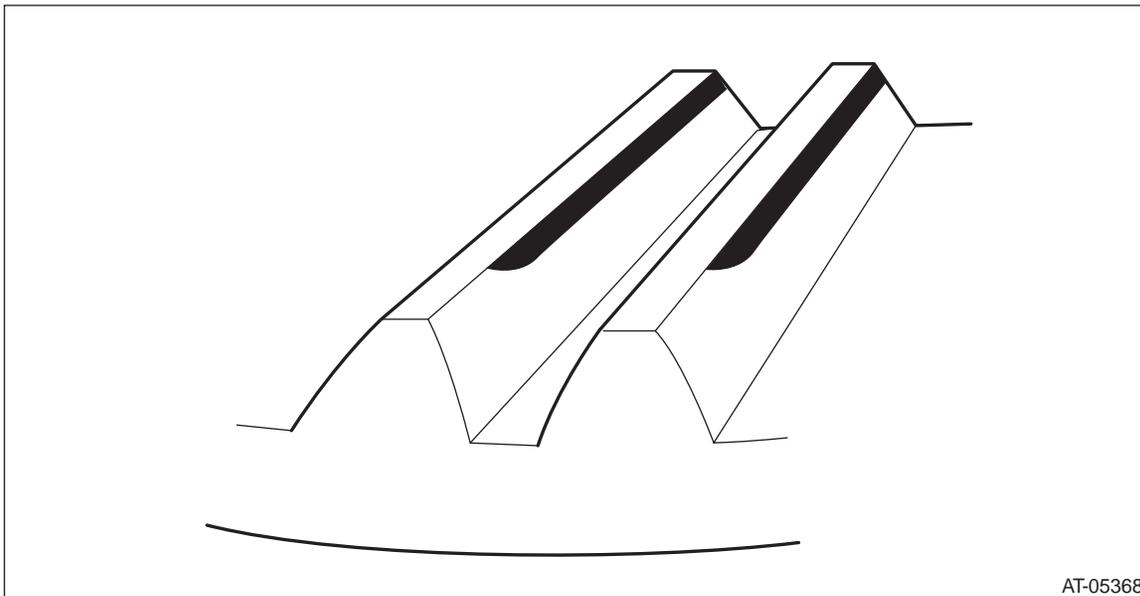
Drive Pinion Shaft Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

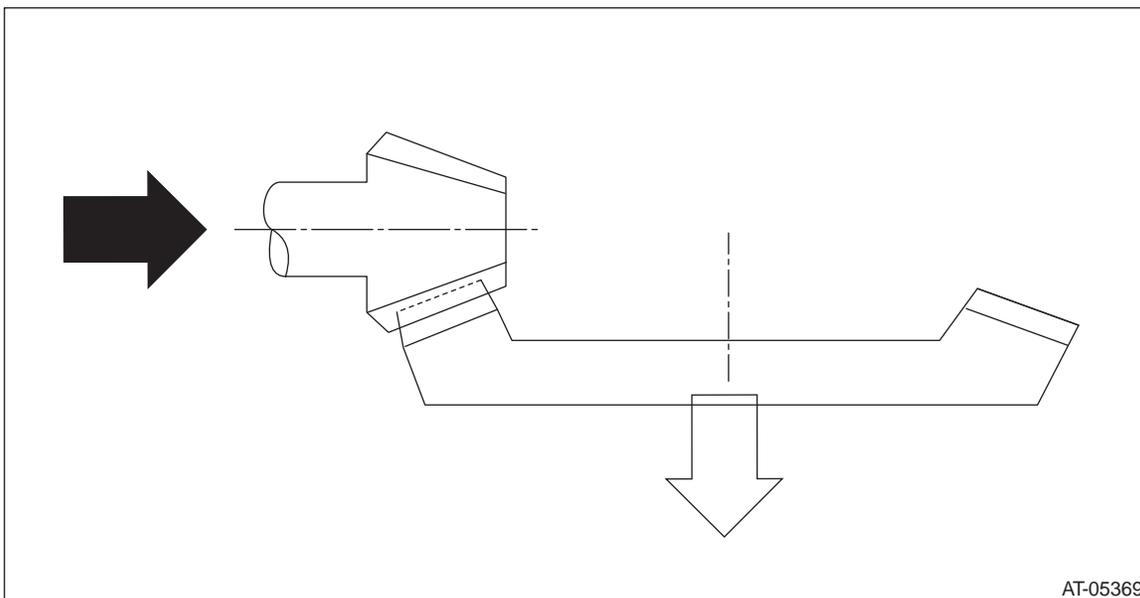
- Face contact

Check item: Backlash is too large.

Contact pattern



Corrective action: Increase thickness of drive pinion shim according to the procedures for moving the drive pinion close to hypoid driven gear.



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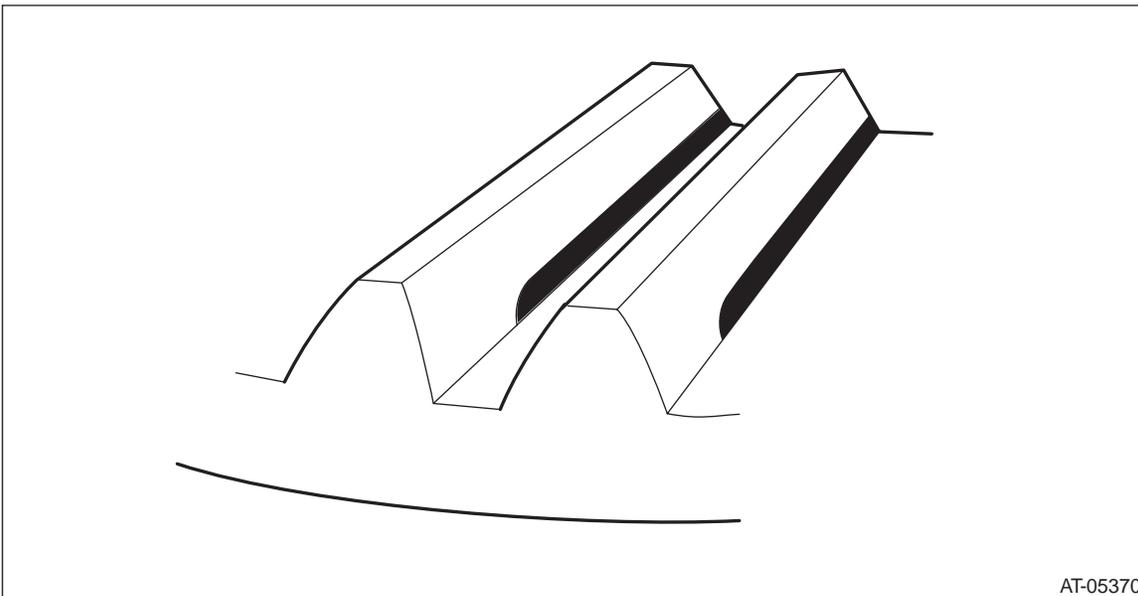
Drive Pinion Shaft Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

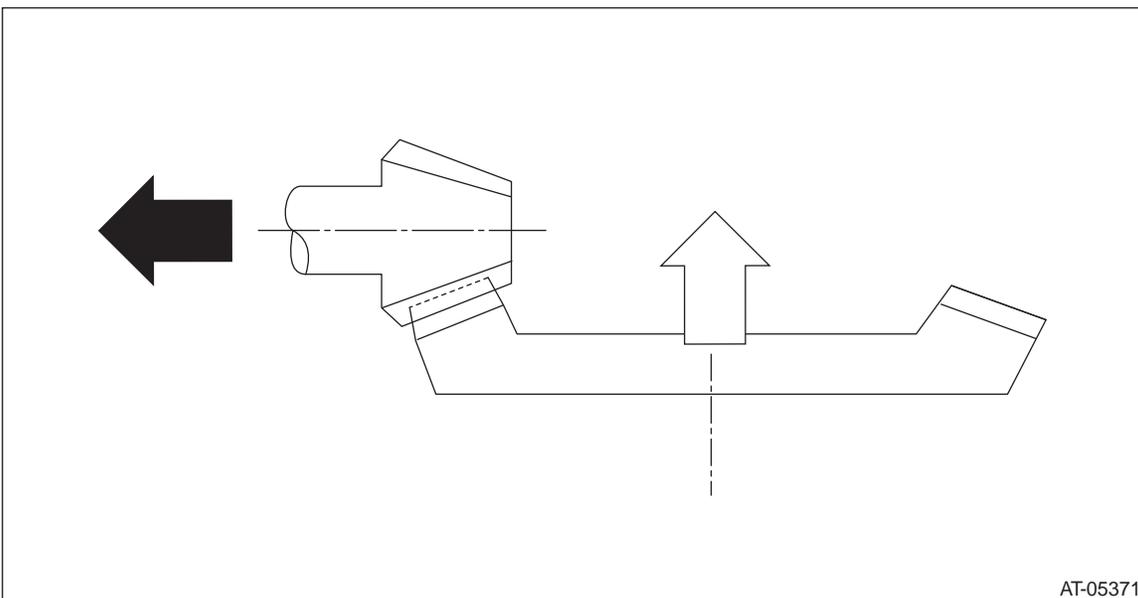
- Flank contact

Check item: Backlash is too small.

Contact pattern



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



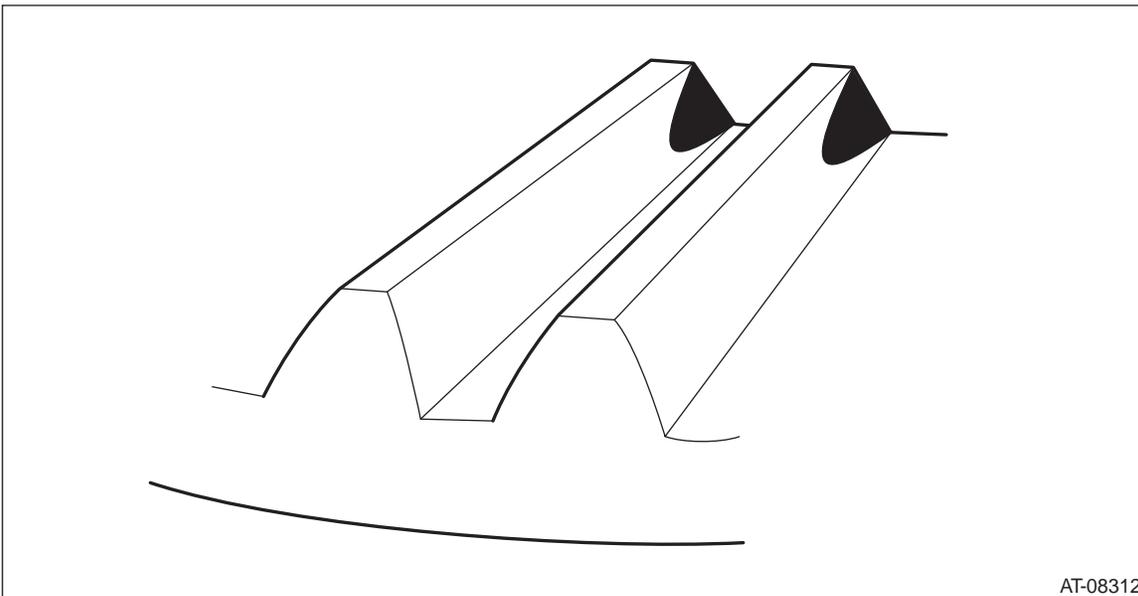
Drive Pinion Shaft Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

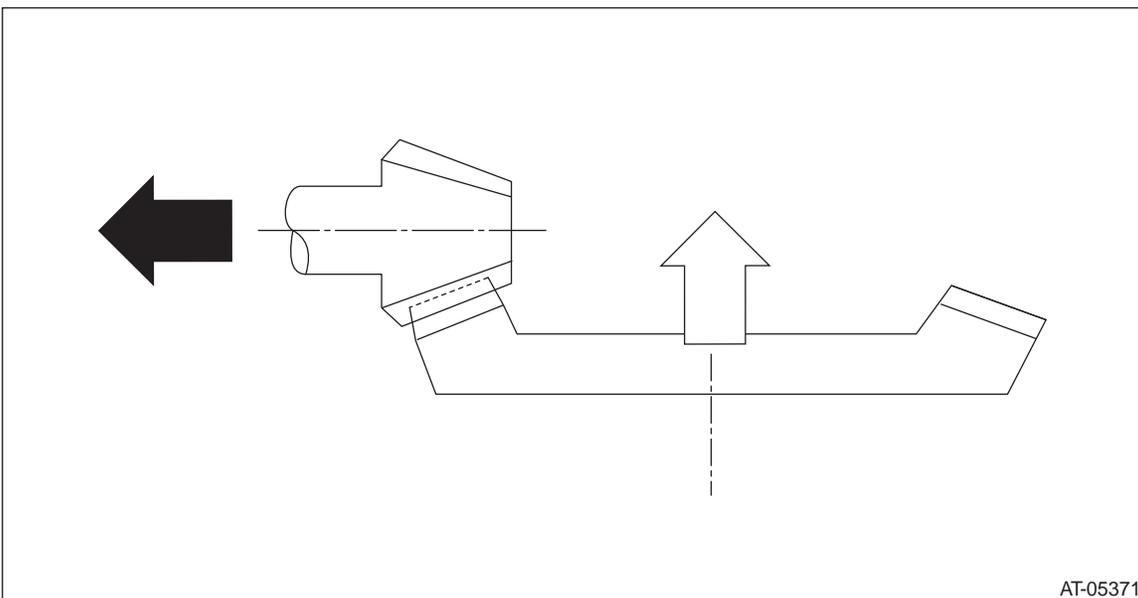
- Toe contact (inside contact)

Check item: Teeth contact area is too small.

Contact pattern



Corrective action: Reduce the thickness of the drive pinion shim according to the procedures for moving the drive pinion away from the hypoid driven gear side.



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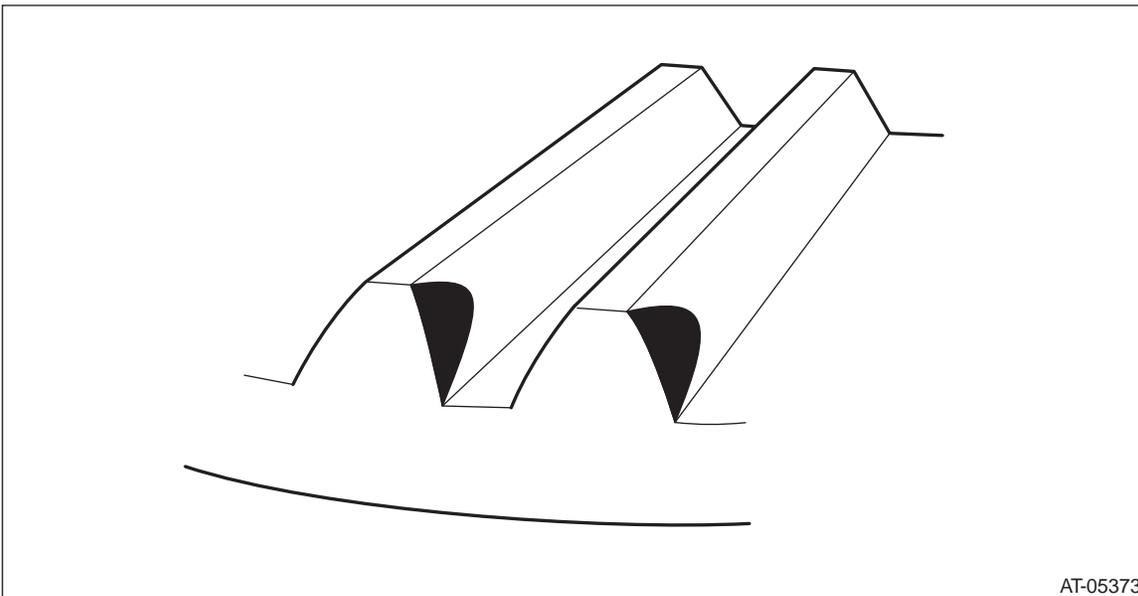
Drive Pinion Shaft Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

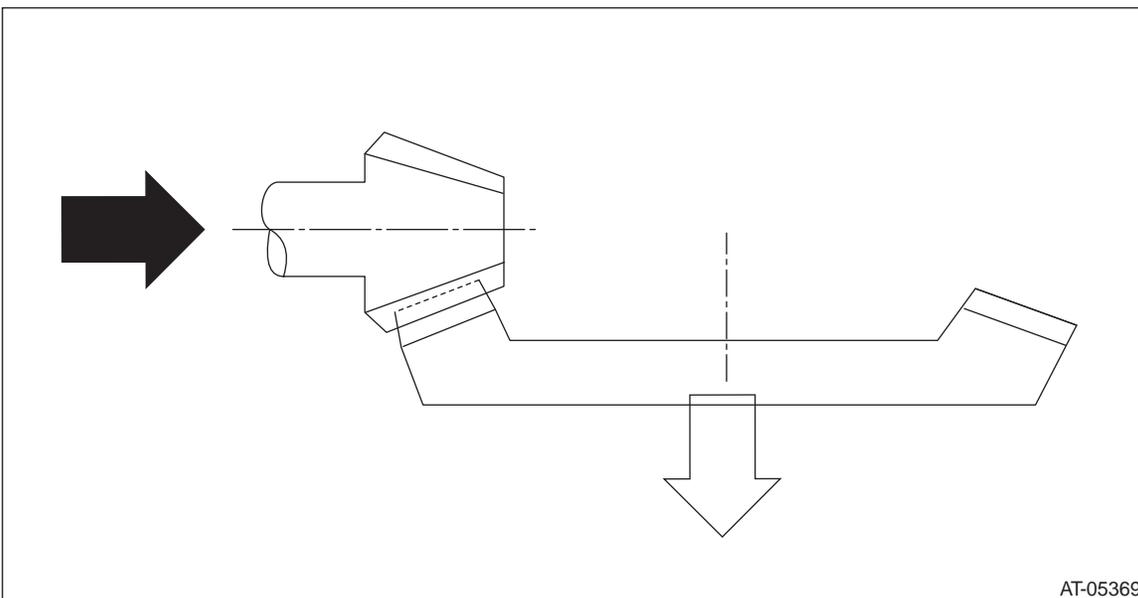
- Heel contact (outside end contact)

Check item: Teeth contact area is too small.

Contact pattern



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



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Drive Pinion Shaft Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

7) Using the ST, loosen the differential side retainer until the mounting groove of the O-ring appears, and then install the O-ring.

NOTE:

- When loosening the differential side retainer, record the number of the turns made.
- Perform this for both left and right differential side retainers.
- Use new O-rings.
- Apply the differential gear oil to O-ring.

ST 18658AA020 WRENCH COMPL RETAINER

8) Using the ST, tighten the retainer to the position before it is loosened.

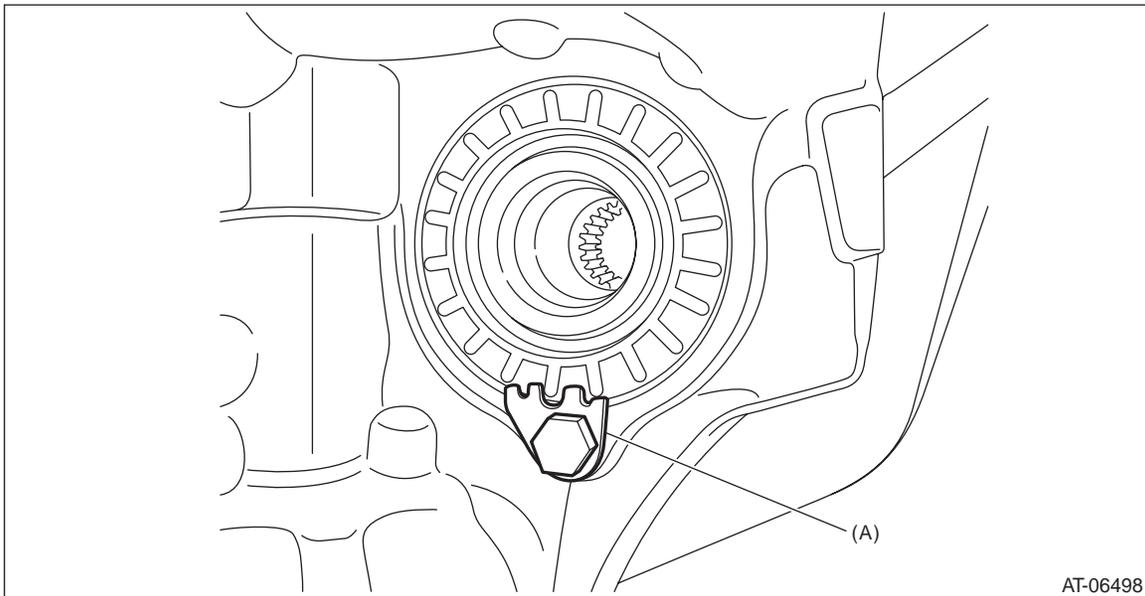
ST 18658AA020 WRENCH COMPL RETAINER

9) Replace the differential side retainer oil seal with a new part.<Ref. to CVT(TR580)-85, Differential Side Retainer Oil Seal.>

10) Install the lock plate.

Tightening torque:

25 N·m (2.5 kgf·m, 18.4 ft·lb)



(A) Lock plate

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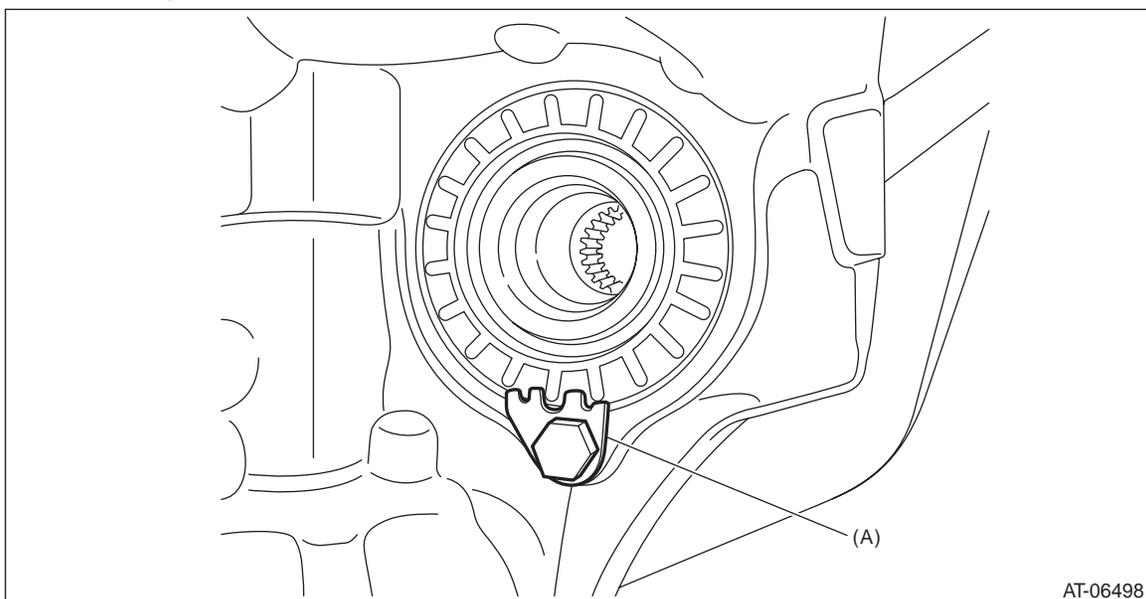
Front Differential Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

43. Front Differential Assembly

A: REMOVAL

- 1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TR580)-57, REMOVAL, Automatic Transmission Assembly.>
- 2) Remove the air breather hose. <Ref. to CVT(TR580)-155, REMOVAL, Air Breather Hose.>
- 3) Remove the control valve body. <Ref. to CVT(TR580)-111, REMOVAL, Control Valve Body.>
- 4) Remove the transmission harness. <Ref. to CVT(TR580)-125, REMOVAL, Transmission Harness.>
- 5) Remove the turbine speed sensor. <Ref. to CVT(TR580)-98, REMOVAL, Turbine Speed Sensor.>
- 6) Remove the secondary speed sensor. <Ref. to CVT(TR580)-100, REMOVAL, Secondary Speed Sensor.>
- 7) Remove the primary speed sensor. <Ref. to CVT(TR580)-102, REMOVAL, Primary Speed Sensor.>
- 8) Remove the inhibitor switch. <Ref. to CVT(TR580)-94, REMOVAL, Inhibitor Switch.>
- 9) Remove the extension case. <Ref. to CVT(TR580)-165, REMOVAL, Extension Case.>
- 10) Remove the transfer clutch assembly. <Ref. to CVT(TR580)-169, REMOVAL, Transfer Clutch.>
- 11) Remove the transfer driven gear assembly. <Ref. to CVT(TR580)-184, REMOVAL, Transfer Driven Gear.>
- 12) Remove the parking pawl. <Ref. to CVT(TR580)-187, REMOVAL, Parking Pawl.>
- 13) Remove the reduction driven gear assembly. <Ref. to CVT(TR580)-189, REMOVAL, Reduction Driven Gear.>
- 14) Remove the oil pan and oil strainer. <Ref. to CVT(TR580)-107, REMOVAL, Oil Pan and Strainer.>
- 15) Remove the transmission control device. <Ref. to CVT(TR580)-197, REMOVAL, Transmission Control Device.>
- 16) Remove the transmission case. <Ref. to CVT(TR580)-203, REMOVAL, Transmission Case.>
- 17) Remove the reduction drive gear. <Ref. to CVT(TR580)-216, REMOVAL, Reduction Drive Gear.>
- 18) Remove the primary pulley, secondary pulley and variator chain. <Ref. to CVT(TR580)-221, REMOVAL, Primary Pulley and Secondary Pulley.>
- 19) Remove the reverse brake assembly. <Ref. to CVT(TR580)-242, REMOVAL, Reverse Brake Assembly.>
- 20) Remove the forward clutch assembly. <Ref. to CVT(TR580)-257, REMOVAL, Forward Clutch Assembly.>
- 21) Remove the drive pinion shaft assembly. <Ref. to CVT(TR580)-277, REMOVAL, Drive Pinion Shaft Assembly.>
- 22) Remove the lock plates on both sides.



(A) Lock plate

Front Differential Assembly

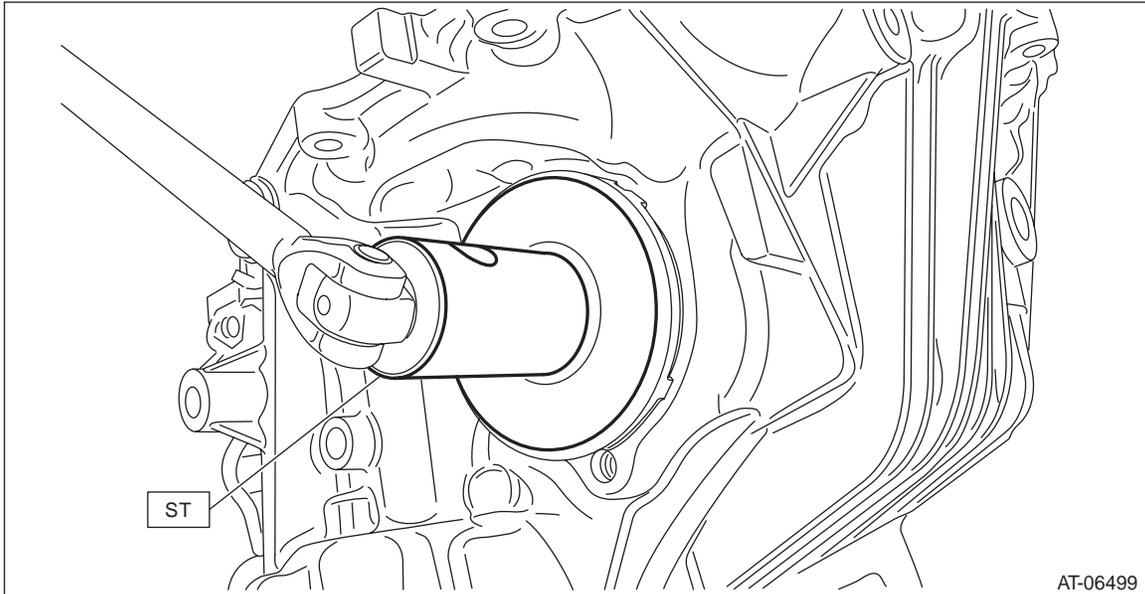
CONTINUOUSLY VARIABLE TRANSMISSION

23) Remove the differential side retainers using ST.

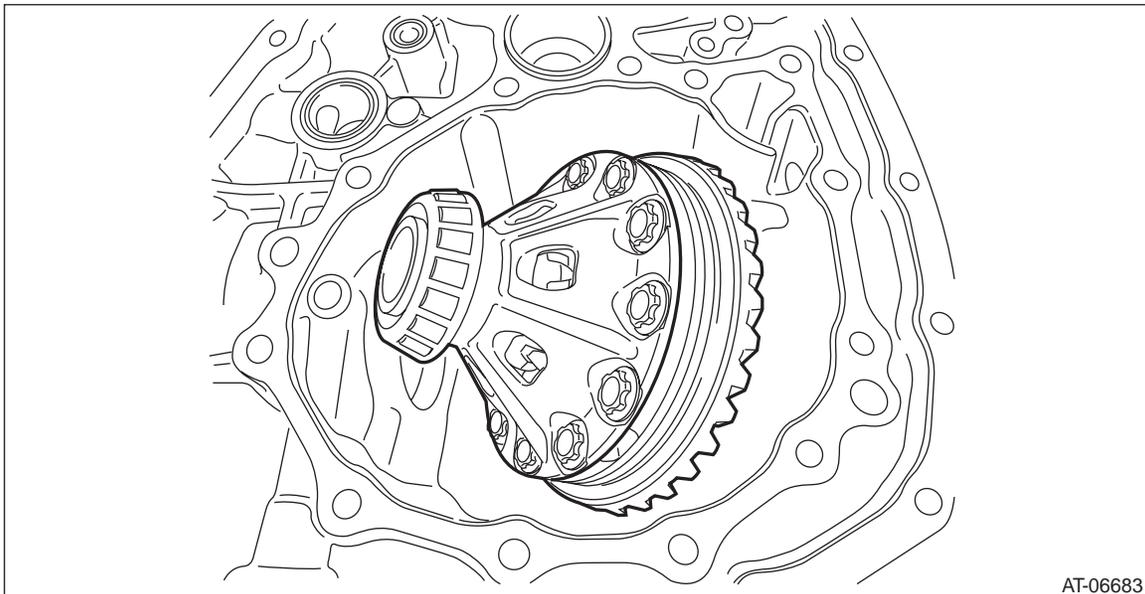
NOTE:

- When the wrench COMPL retainer interferes with the converter case, align the cutout portion with the interference part.
- Support the differential case assembly by hand to avoid damaging the retainer mounting hole of the converter case.
- Keep the left and right differential side retainers and left and right bearing outer races by attaching tags or in similar ways to make it possible to identify RH and LH sides.

ST 18658AA020 WRENCH COMPL RETAINER



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



25) Remove the oil seals and O-rings from both differential side retainers. <Ref. to CVT(TR580)-313, SIDE RETAINER, DISASSEMBLY, Front Differential Assembly.>

Front Differential Assembly

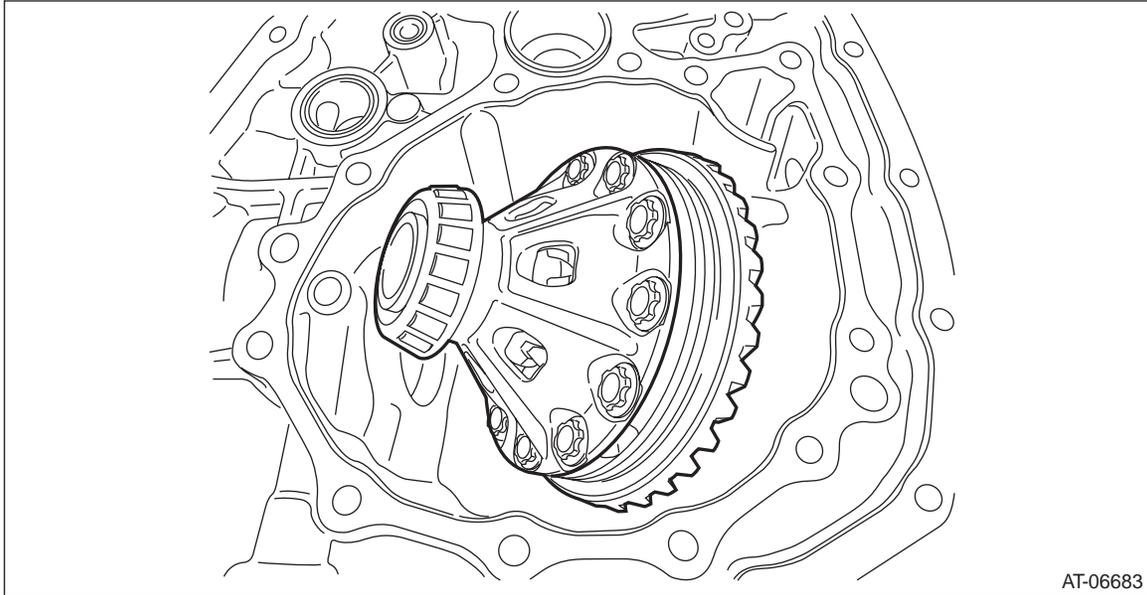
CONTINUOUSLY VARIABLE TRANSMISSION

B: INSTALLATION

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

NOTE:

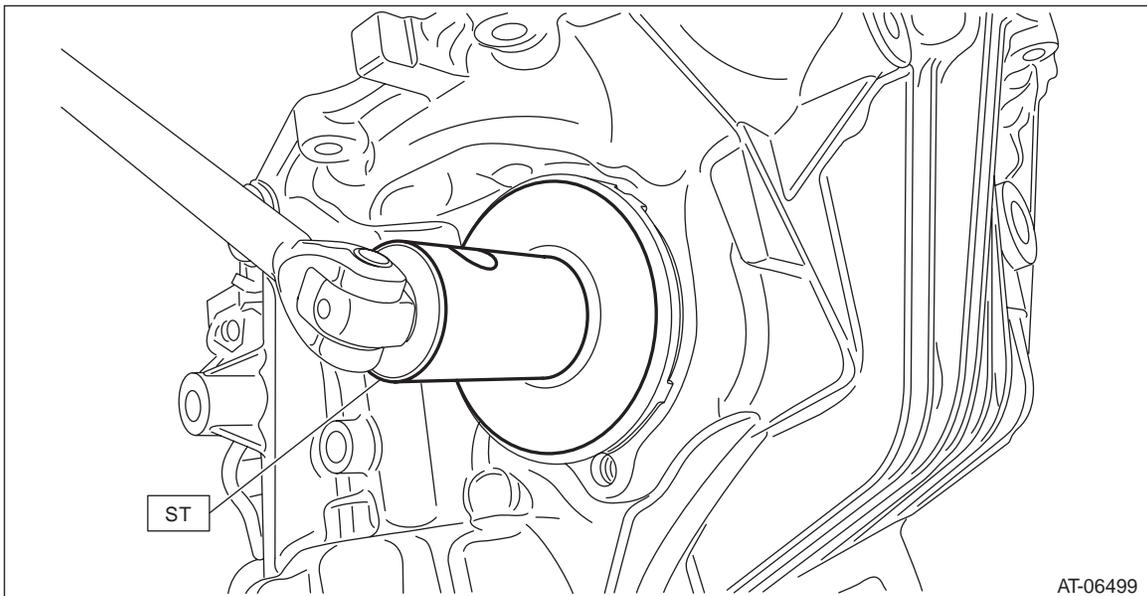
Be careful not to damage the inside of the case (especially the mounting surface of the differential side retainers).



2) Install the bearing outer race.

3) Temporarily install the differential side retainers using ST.

ST 18658AA020 WRENCH COMPL RETAINER



4) Adjust the backlash of the front differential. <Ref. to CVT(TR580)-321, ADJUSTMENT, Front Differential Assembly.>

5) Inspect and adjust the tooth contact. <Ref. to CVT(TR580)-299, ADJUSTMENT, Drive Pinion Shaft Assembly.>

Front Differential Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

6) Using the ST, loosen the differential side retainer until the mounting groove of the O-ring appears, and then install the O-ring.

NOTE:

- When loosening the differential side retainer, record the number of the turns made.
- Perform this for both left and right differential side retainers.
- Use new O-rings.
- Apply the differential gear oil to O-ring.

ST 18658AA020 WRENCH COMPL RETAINER

7) Using the ST, tighten the retainer to the position before it is loosened.

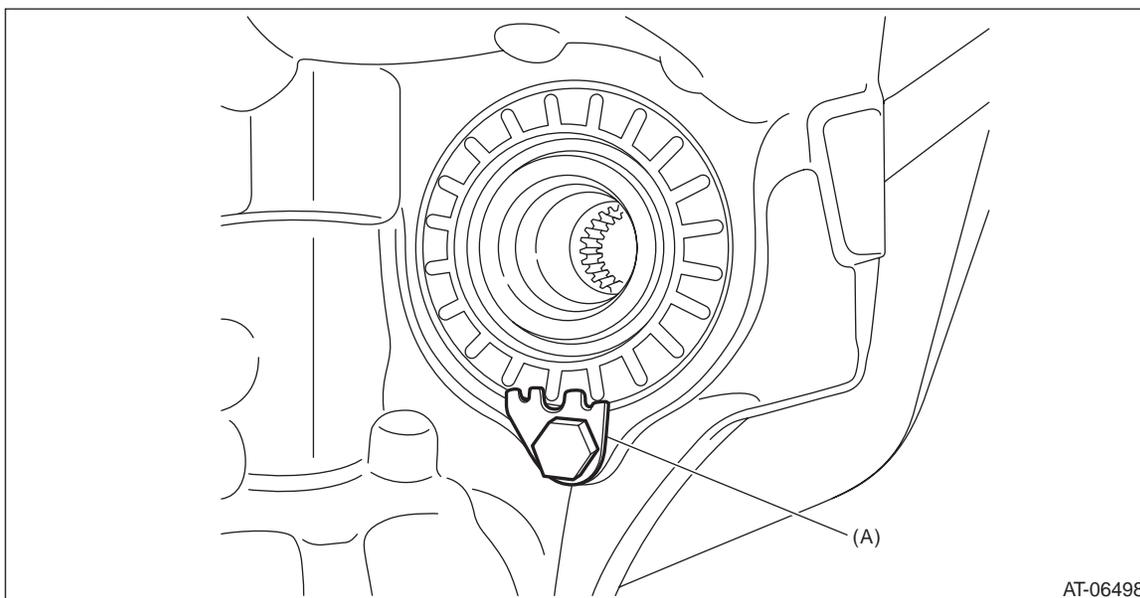
ST 18658AA020 WRENCH COMPL RETAINER

8) Install the oil seal to the differential side retainer. <Ref. to CVT(TR580)-85, Differential Side Retainer Oil Seal.>

9) Install the lock plate.

Tightening torque:

25 N·m (2.5 kgf·m, 18.4 ft·lb)



(A) Lock plate

10) Install the drive pinion shaft assembly. <Ref. to CVT(TR580)-278, INSTALLATION, Drive Pinion Shaft Assembly.>

11) Install the forward clutch assembly. <Ref. to CVT(TR580)-260, INSTALLATION, Forward Clutch Assembly.>

12) Install the reverse brake assembly. <Ref. to CVT(TR580)-245, INSTALLATION, Reverse Brake Assembly.>

13) Install the primary pulley, secondary pulley and variator chain. <Ref. to CVT(TR580)-228, INSTALLATION, Primary Pulley and Secondary Pulley.>

14) Install the reduction drive gear. <Ref. to CVT(TR580)-217, INSTALLATION, Reduction Drive Gear.>

15) Install the transmission case. <Ref. to CVT(TR580)-206, INSTALLATION, Transmission Case.>

16) Install the transmission control device. <Ref. to CVT(TR580)-200, INSTALLATION, Transmission Control Device.>

17) Install the oil strainer and oil pan. <Ref. to CVT(TR580)-108, INSTALLATION, Oil Pan and Strainer.>

18) Install the reduction driven gear assembly. <Ref. to CVT(TR580)-189, INSTALLATION, Reduction Driven Gear.>

19) Install the parking pawl. <Ref. to CVT(TR580)-188, INSTALLATION, Parking Pawl.>

20) Install the transfer driven gear assembly. <Ref. to CVT(TR580)-185, INSTALLATION, Transfer Driven Gear.>

21) Install the transfer clutch assembly. <Ref. to CVT(TR580)-171, INSTALLATION, Transfer Clutch.>

Front Differential Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

- 22) Install the extension case. <Ref. to CVT(TR580)-166, INSTALLATION, Extension Case.>
- 23) Install the inhibitor switch. <Ref. to CVT(TR580)-95, INSTALLATION, Inhibitor Switch.>
- 24) Install the secondary speed sensor. <Ref. to CVT(TR580)-100, INSTALLATION, Secondary Speed Sensor.>
- 25) Install the primary speed sensor. <Ref. to CVT(TR580)-103, INSTALLATION, Primary Speed Sensor.>
- 26) Install the turbine speed sensor. <Ref. to CVT(TR580)-98, INSTALLATION, Turbine Speed Sensor.>
- 27) Install the transmission harness. <Ref. to CVT(TR580)-131, INSTALLATION, Transmission Harness.>
- 28) Install the control valve body. <Ref. to CVT(TR580)-117, INSTALLATION, Control Valve Body.>
- 29) Install the air breather hose. <Ref. to CVT(TR580)-156, INSTALLATION, Air Breather Hose.>
- 30) Install the transmission assembly to the vehicle. <Ref. to CVT(TR580)-67, INSTALLATION, Automatic Transmission Assembly.>

C: DISASSEMBLY

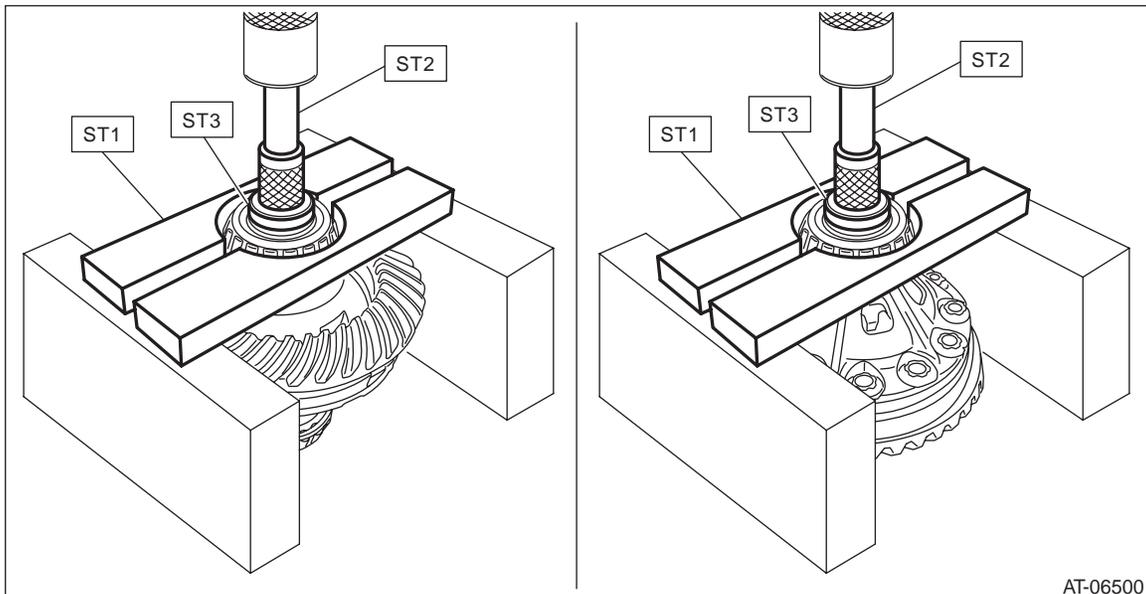
1. DIFFERENTIAL CASE ASSEMBLY

1) Remove the taper roller bearing using the ST.

ST1 498077000 REMOVER

ST2 899864100 REMOVER

ST3 398497701 SEAT

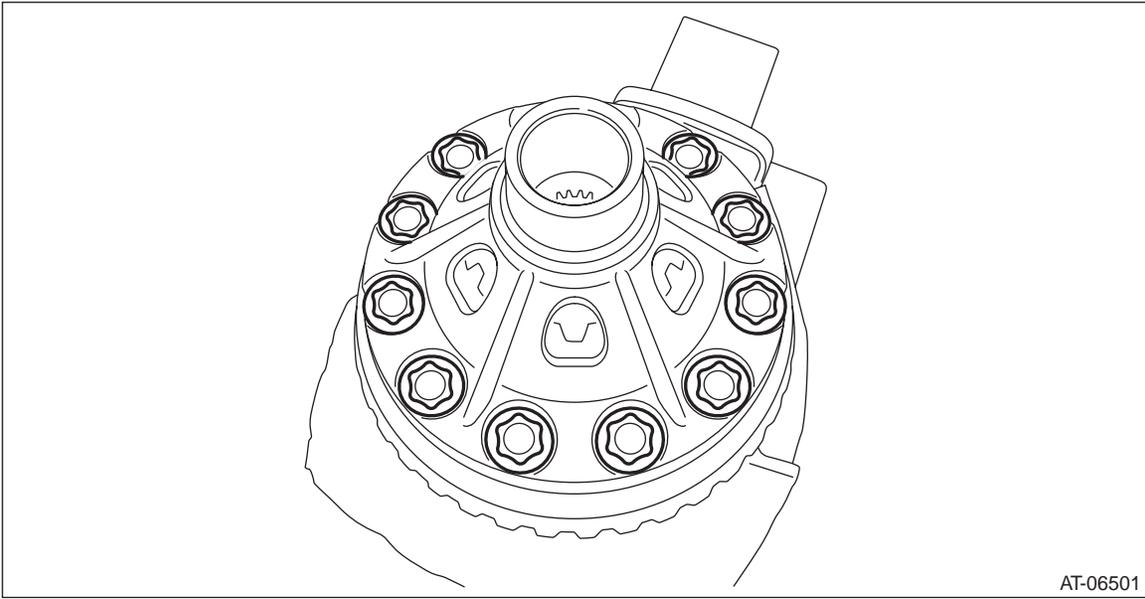


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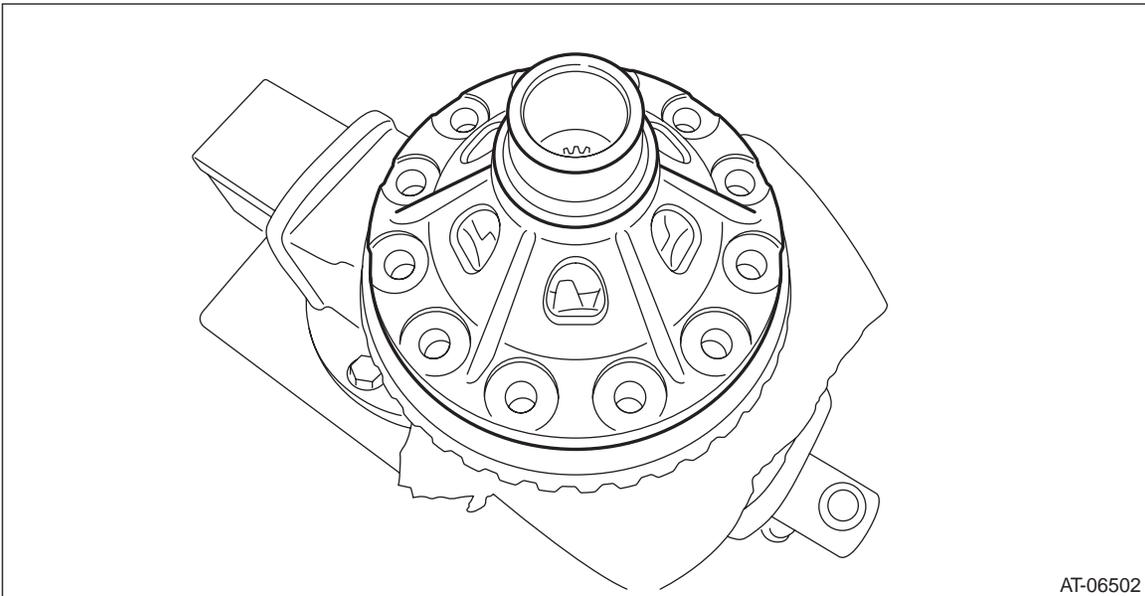
Front Differential Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

- 2) Remove the hypoid driven gear mounting bolt using the ST.
ST 18270KA020 SOCKET (E20)



- 3) Remove the differential case (LH).

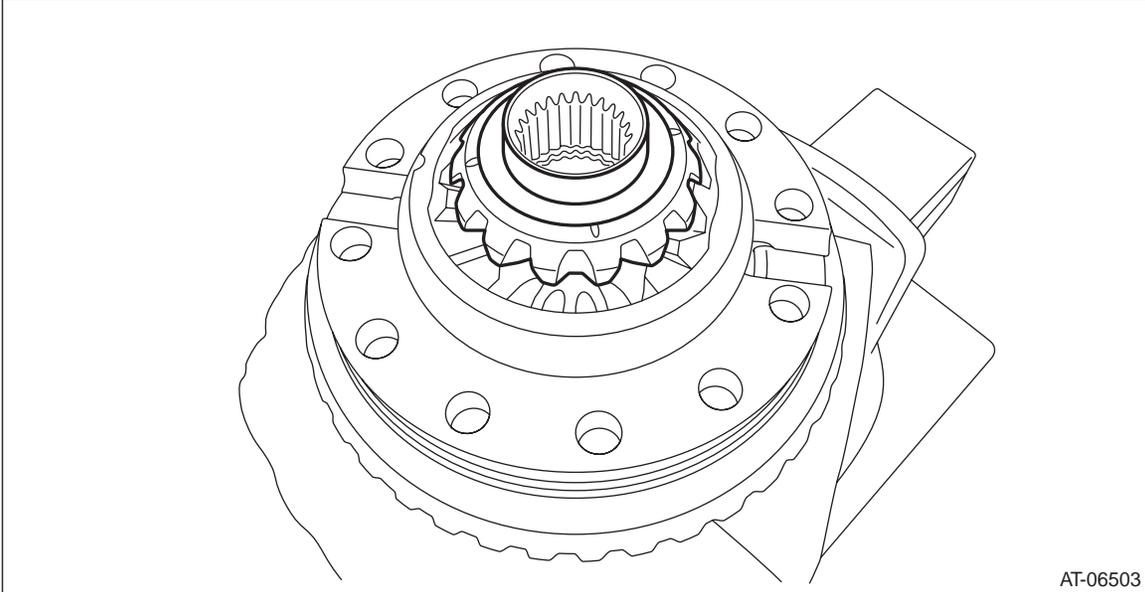


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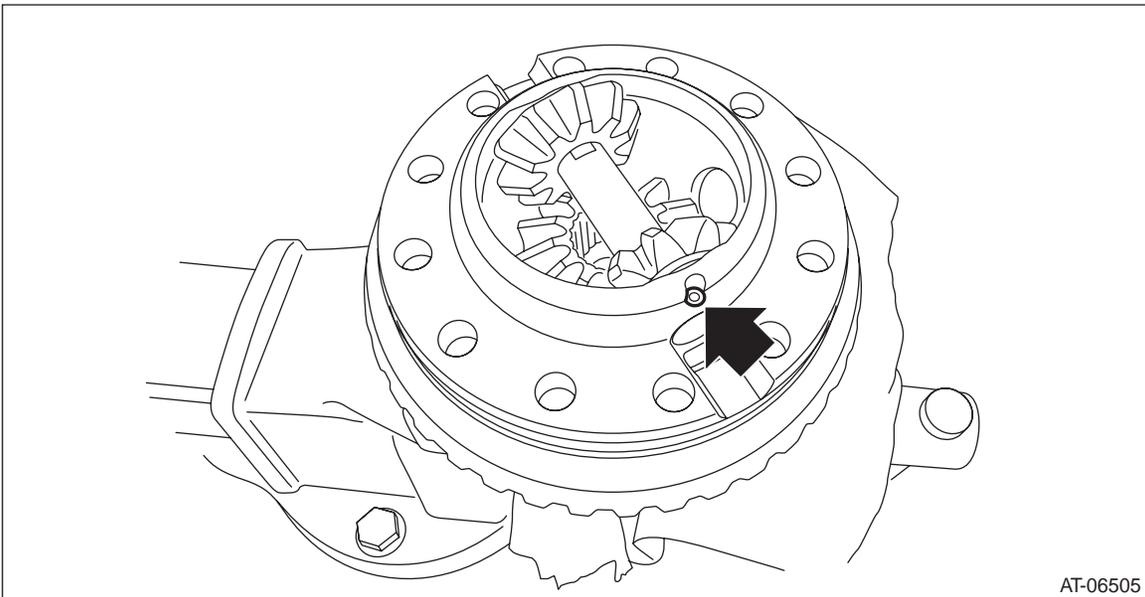
Front Differential Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

4) Remove the differential bevel gear and washer from differential case.



5) Remove the straight pin.

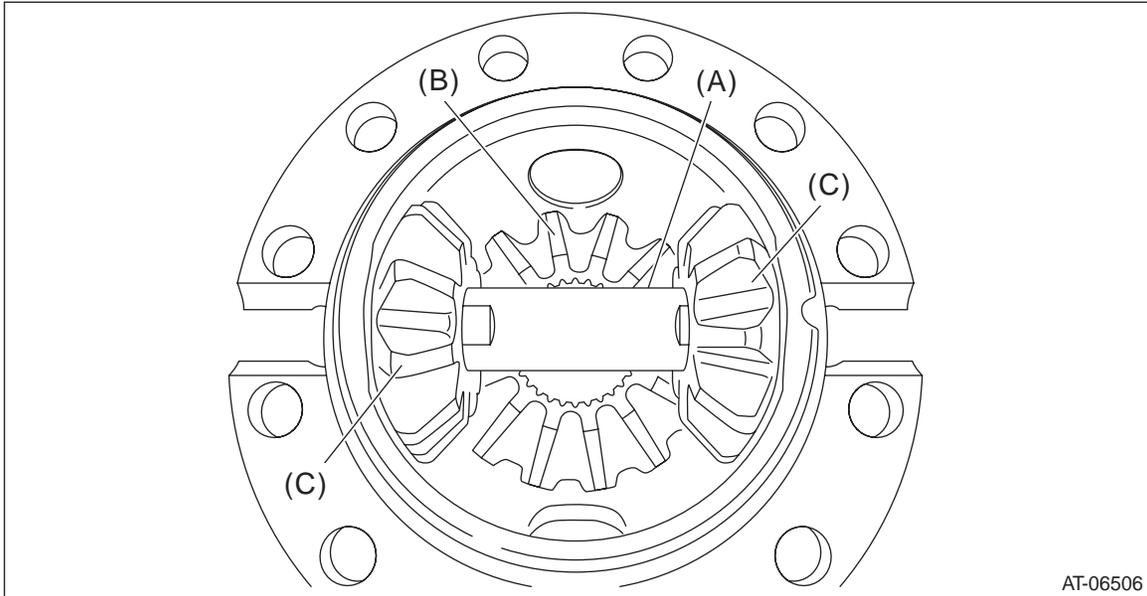


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Front Differential Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

6) Remove the pinion shaft, then remove the differential bevel gear, washer and differential bevel pinion.



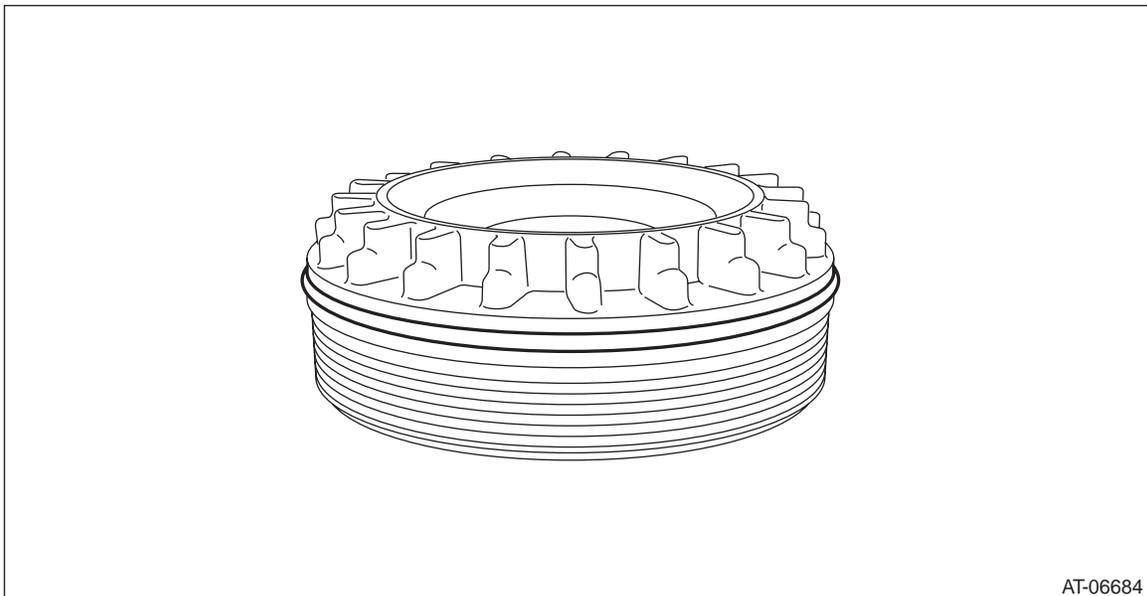
- (A) Pinion shaft
- (B) Differential bevel gear
- (C) Differential bevel pinion

2. SIDE RETAINER

NOTE:

After adjusting the drive pinion backlash and tooth contact, replace the oil seal and O-ring with new parts.

1) Remove the O-ring.

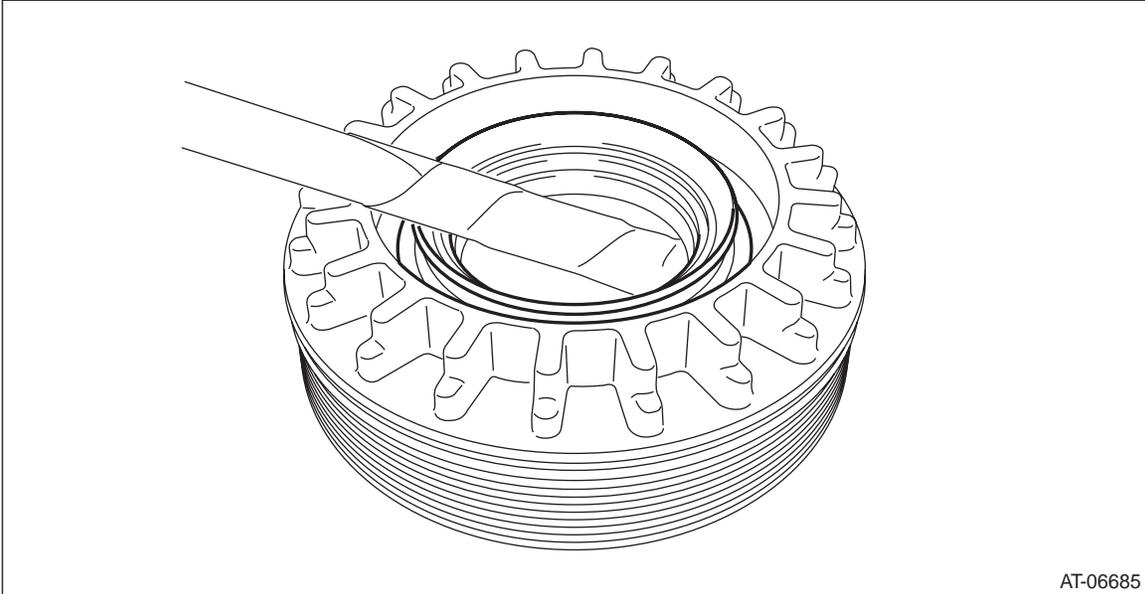


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Front Differential Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

2) Remove the oil seal.

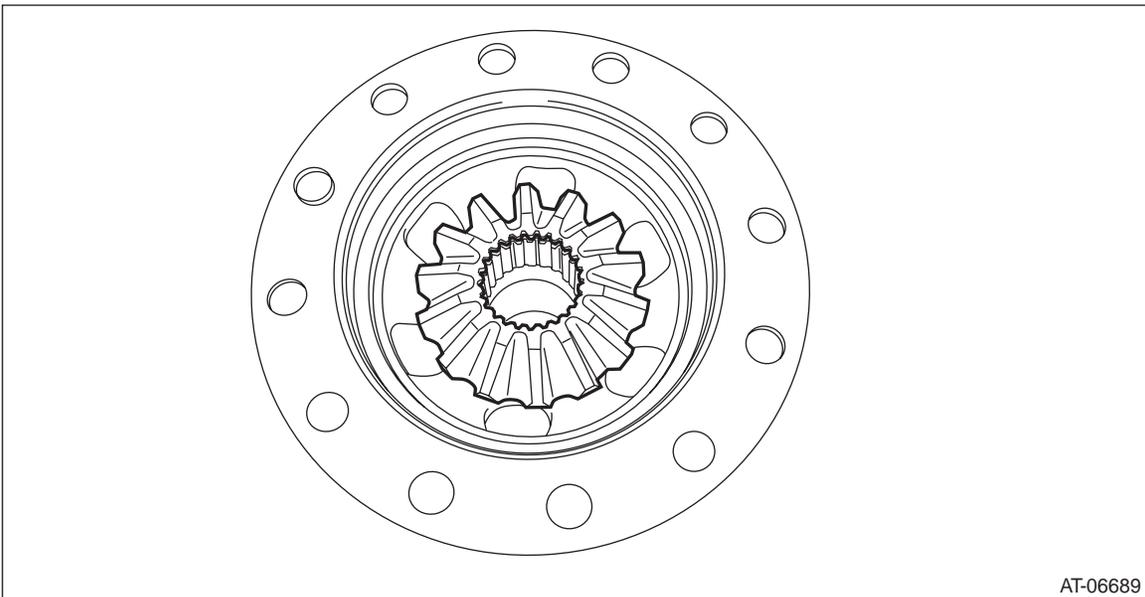


AT-06685

D: ASSEMBLY

1. DIFFERENTIAL CASE ASSEMBLY

1) Install the washer and differential bevel gear into the differential case (RH).



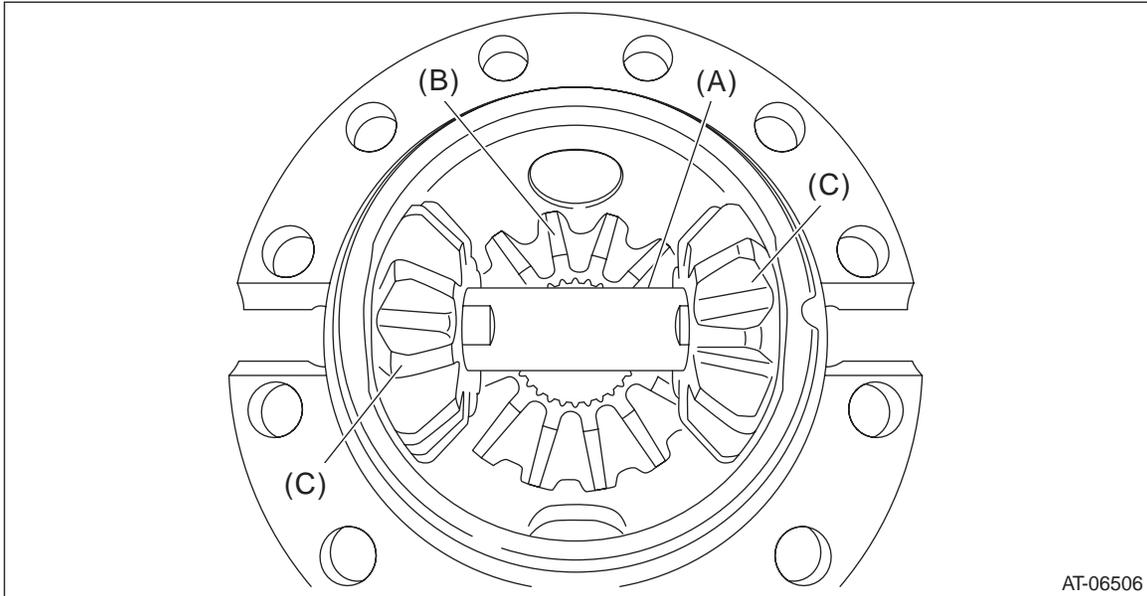
AT-06689

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Front Differential Assembly

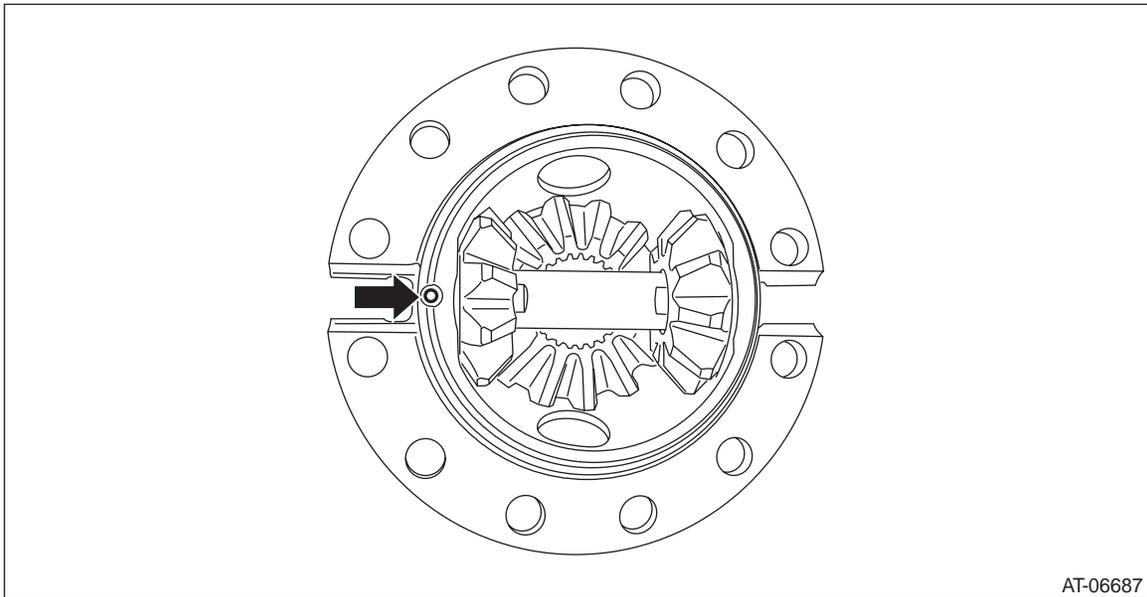
CONTINUOUSLY VARIABLE TRANSMISSION

2) Install the differential bevel pinions into differential case (RH) and install the pinion shaft.



- (A) Pinion shaft
- (B) Differential bevel gear
- (C) Differential bevel pinion

3) Install the straight pin.

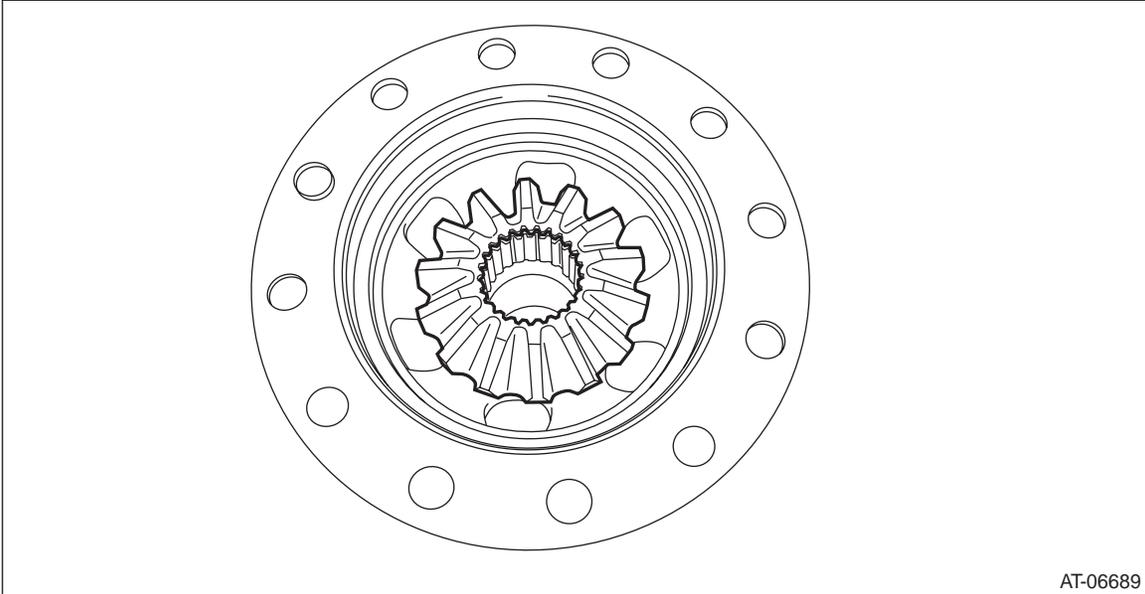


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Front Differential Assembly

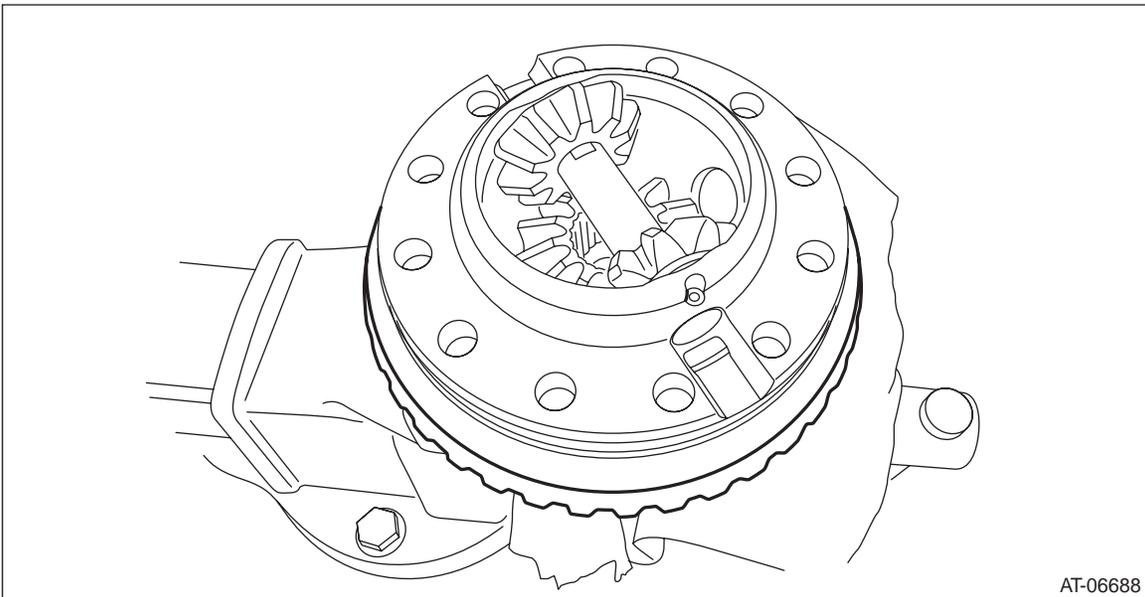
CONTINUOUSLY VARIABLE TRANSMISSION

4) Install the washer and differential bevel gear to the differential case (LH).



AT-06689

5) Install the differential case (RH) to the hypoid driven gear.



AT-06688

6) Install the differential case (LH) to the differential case (RH).

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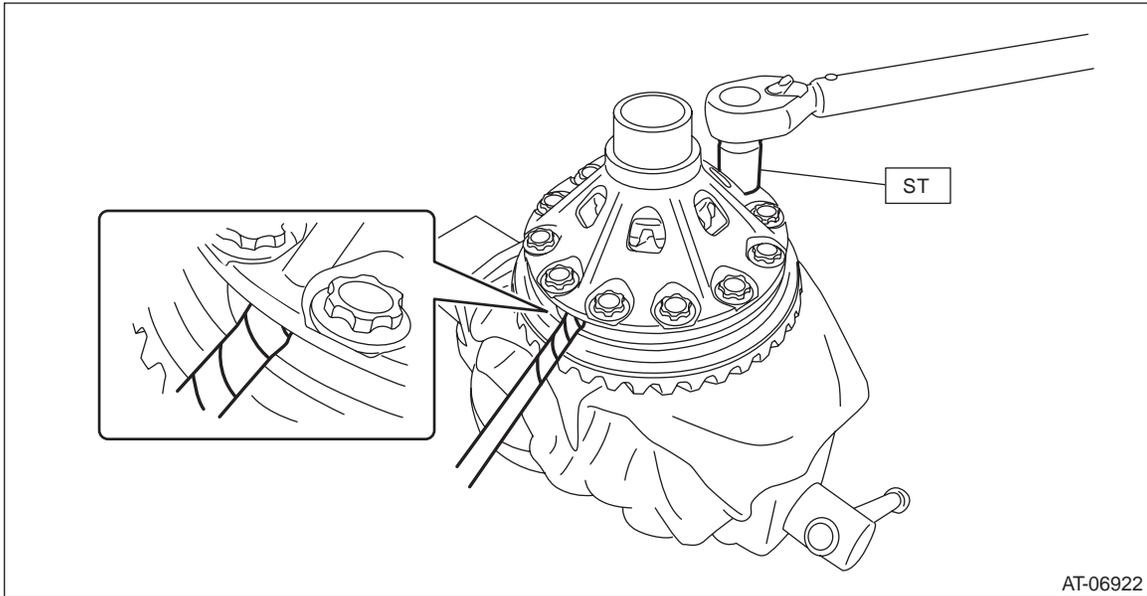
Front Differential Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

7) Using the ST, install the hypoid driven gear by tightening the installation bolt.
ST 18270KA020 SOCKET (E20)

Tightening torque:

64 N·m (6.5 kgf·m, 47.2 ft·lb)



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Front Differential Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

8) Measure the backlash, and select the washer.

(1) Install the SUBARU genuine axle shaft to differential case.

Part No. 38415AA070 Axle shaft

(2) Using ST1 and ST2, insert the ST2 through the window of differential case. Measure the backlash of the gear.

NOTE:

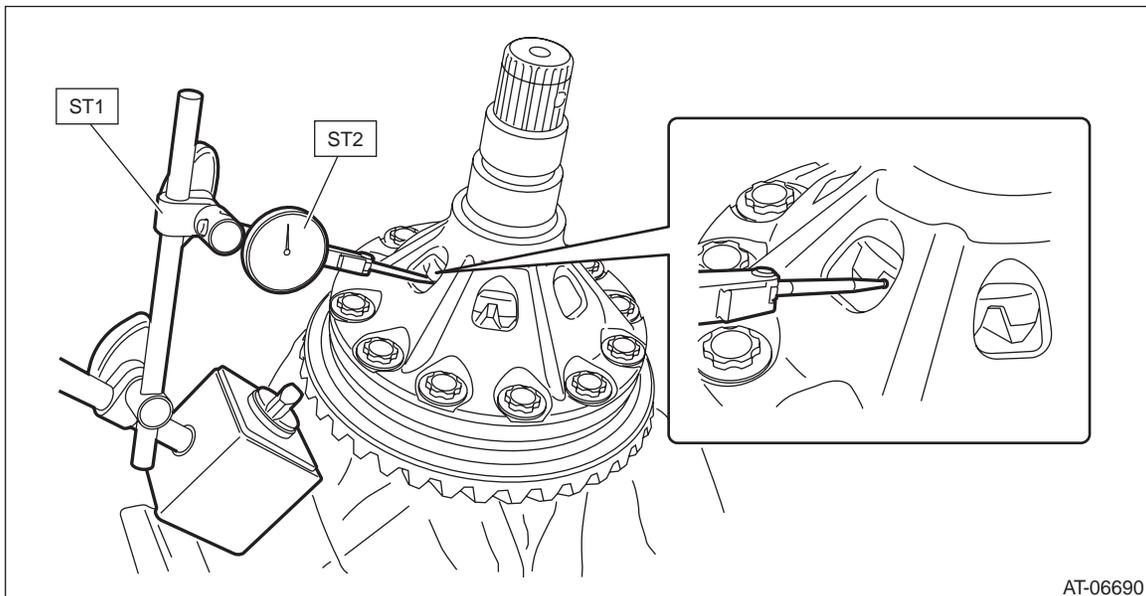
- Measure the backlash by applying a differential bevel pinion tooth between two differential bevel gear teeth.
- When measuring, fix the differential bevel pinion in place with a screwdriver covered with cloth, or a similar tool.

ST1 498247001 MAGNET BASE

ST2 498247100 DIAL GAUGE

Specification:

0.13 — 0.18 mm (0.0051 — 0.0071 in)



AT-06690

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

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

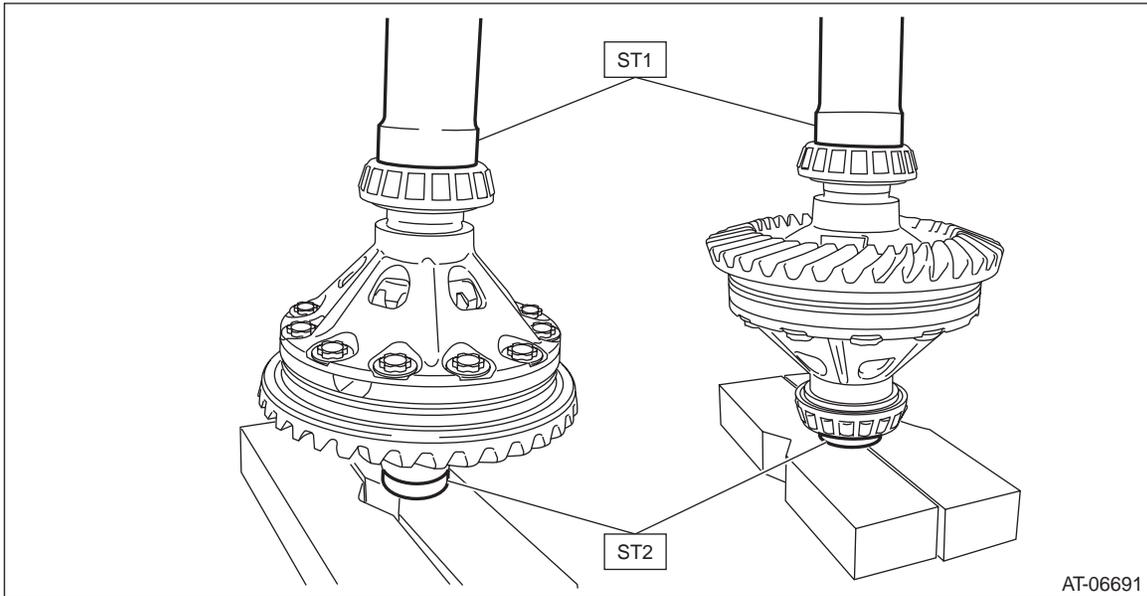
Front Differential Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

9) Using the ST, install the left and right taper roller bearings.

ST1 499277100 BUSHING 1-2 INSTALLER

ST2 398497701 SEAT



2. SIDE RETAINER

NOTE:

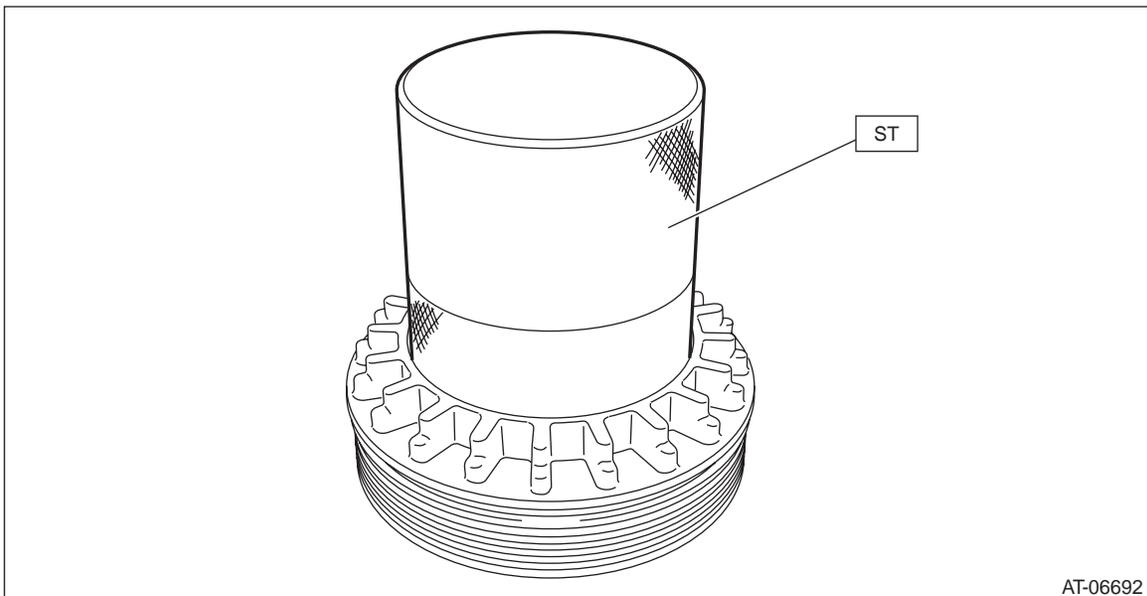
After adjusting the backlash and tooth contact, replace the oil seal and O-ring of side retainer with new parts.

1) Using the ST, install the oil seal.

NOTE:

- Use a new oil seal.
- Apply differential gear oil to the oil seal lip and press-fitting surface.
- Oil seal has an identification mark (R, L). When installing oil seals, do not confuse the left and right.

ST 18675AA000 DIFFERENTIAL SIDE OIL SEAL INSTALLER



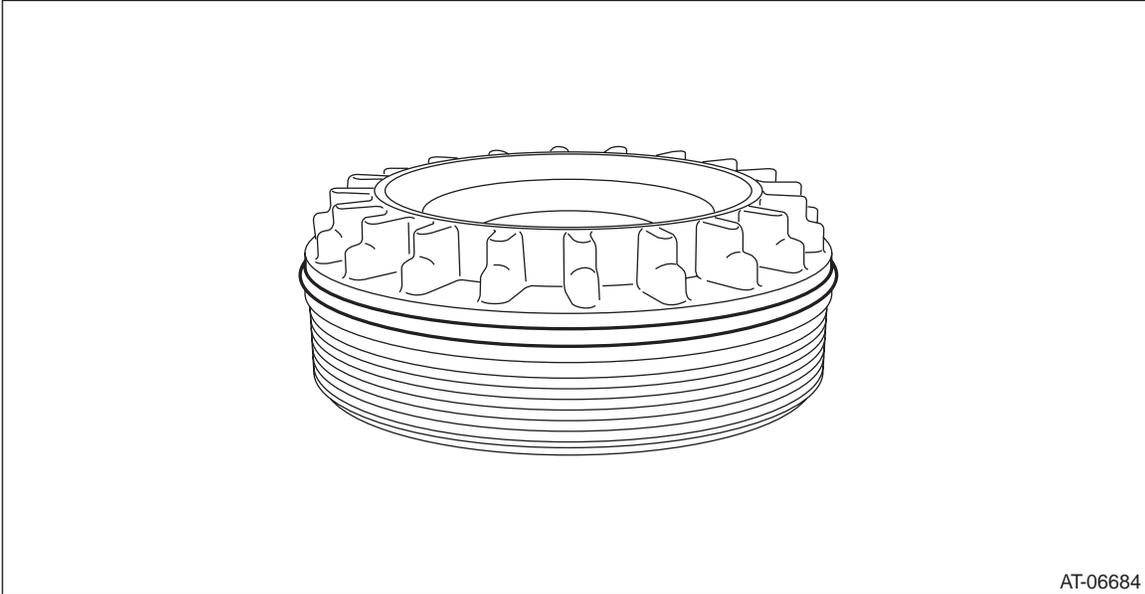
Front Differential Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

2) Install the O-ring.

NOTE:

- Use new O-rings.
- Apply the differential gear oil to O-ring.



AT-06684

E: INSPECTION

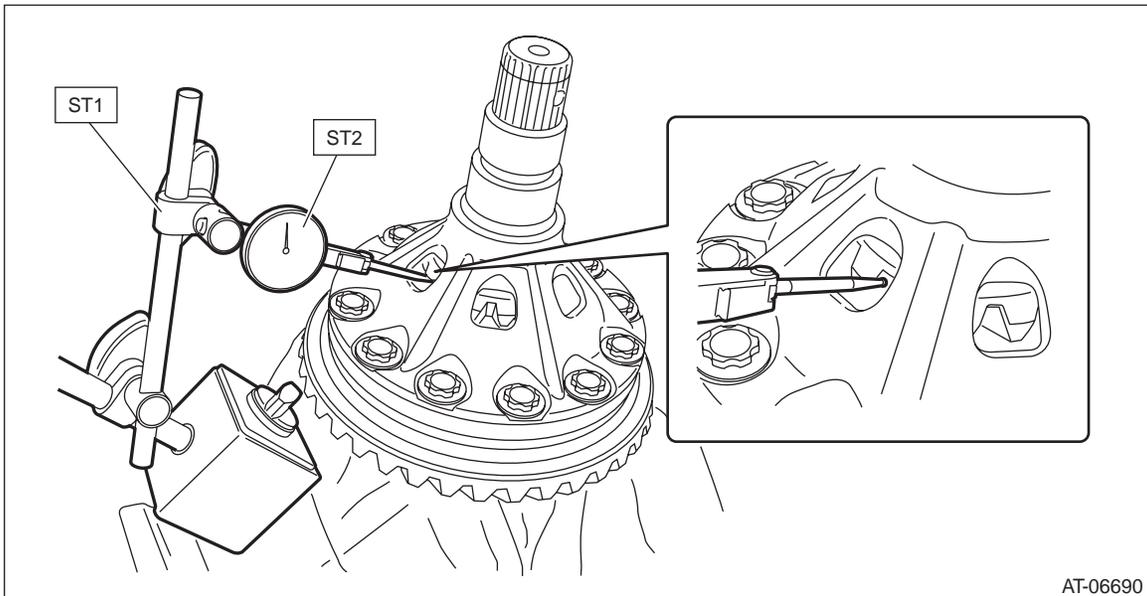
- Check each component for scratches, damage or other faults.
- Using the ST, check the backlash of pinion gear.

ST1 498247001 MAGNET BASE

ST2 498247100 DIAL GAUGE

Specification:

0.13 — 0.18 mm (0.0051 — 0.0071 in)



AT-06690

- Measure the hypoid gear backlash, and then adjust it to be within specification. <Ref. to CVT(TR580)-321, ADJUSTMENT, Front Differential Assembly.>

Front Differential Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

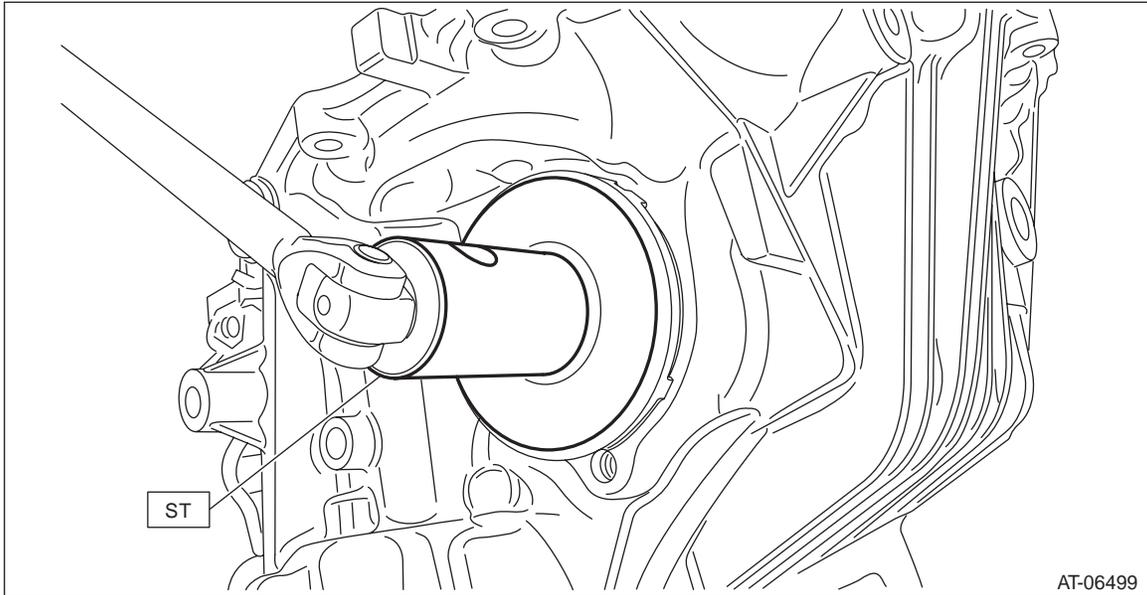
F: ADJUSTMENT

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

NOTE:

RH side should be screwed-in more than LH side.

ST 18658AA020 WRENCH COMPL RETAINER



2) Remove the remaining liquid gasket from the mating surface completely.

3) Using the ST, install the drive pinion assembly to converter case.

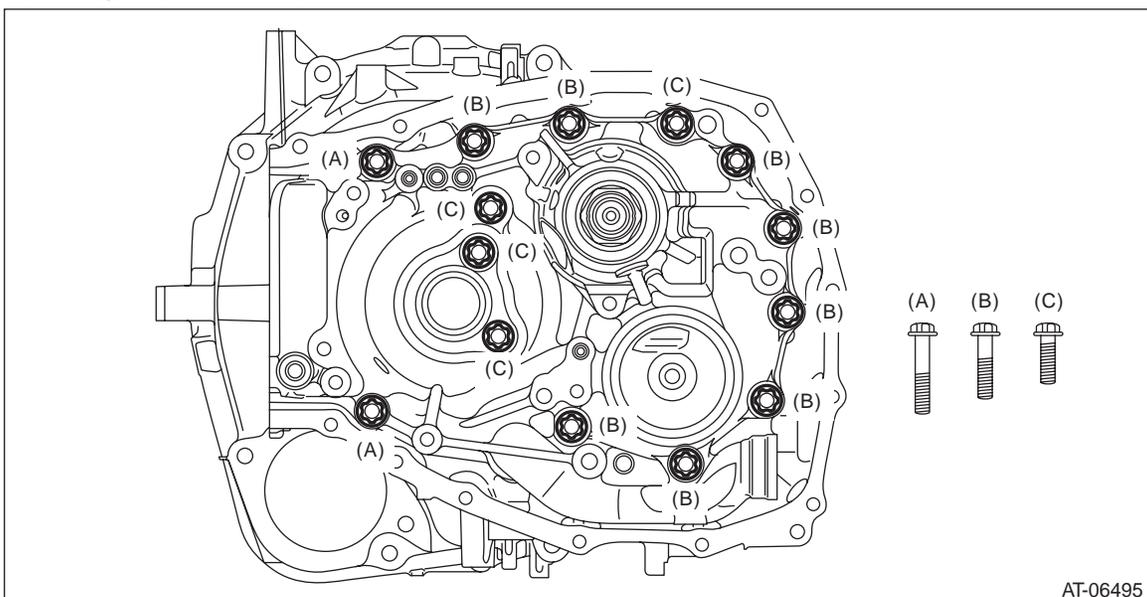
ST 18270KA020 SOCKET (E20)

NOTE:

Do not confuse the three different-length bolts when installing.

Tightening torque:

43 N·m (4.4 kgf·m, 31.7 ft·lb)



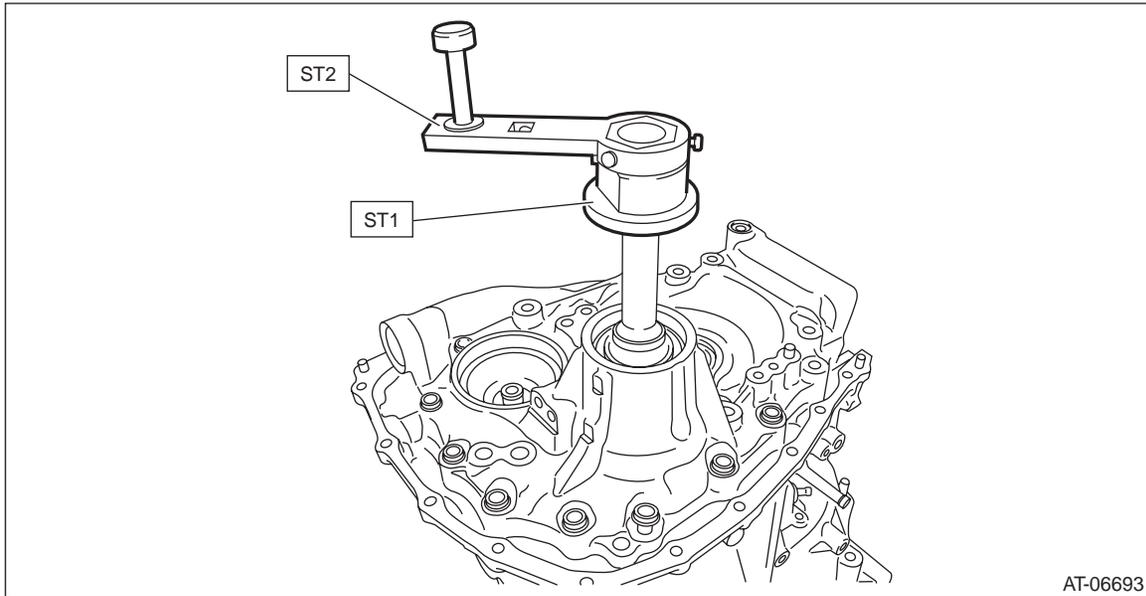
Front Differential Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

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

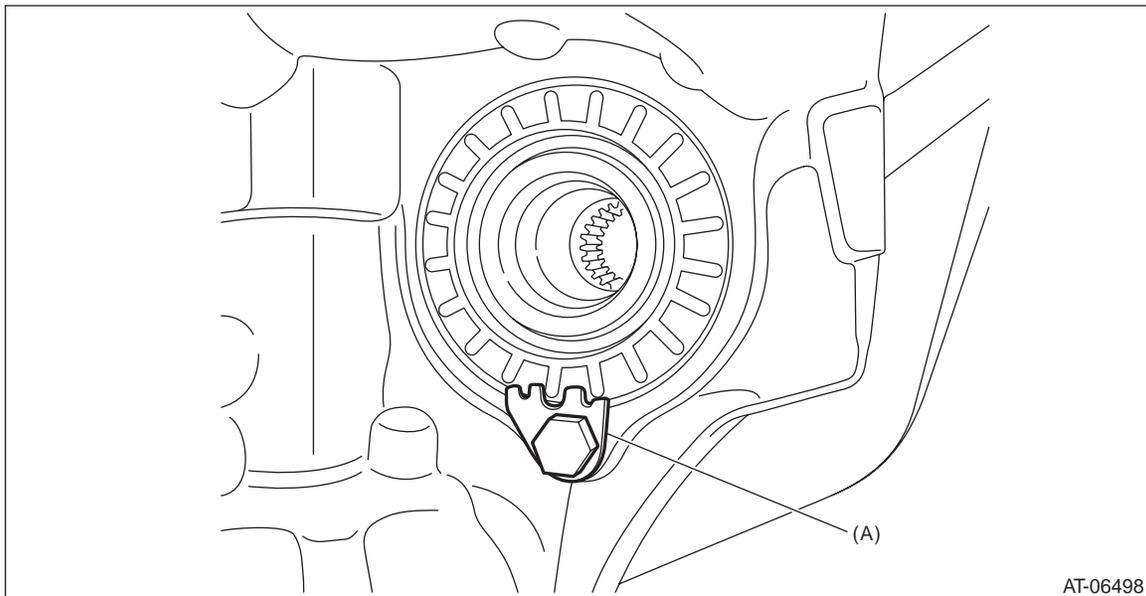
ST1 18667AA010 HOLDER

ST2 499787700 WRENCH



5) While rotating the pinion shaft, tighten the retainer LH and loosen the retainer RH until the shaft can't be turned anymore. The backlash is "zero" when the pinion shaft comes to the point where it doesn't rotate.

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



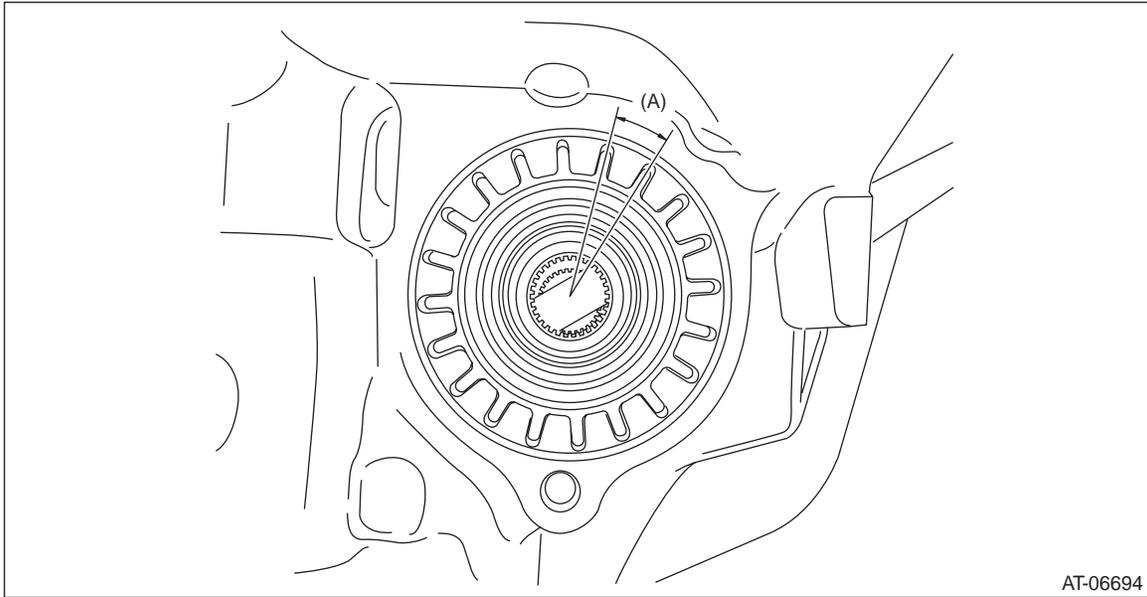
(A) Lock plate

Front Differential Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

NOTE:

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



AT-06694

(A) 1 tooth

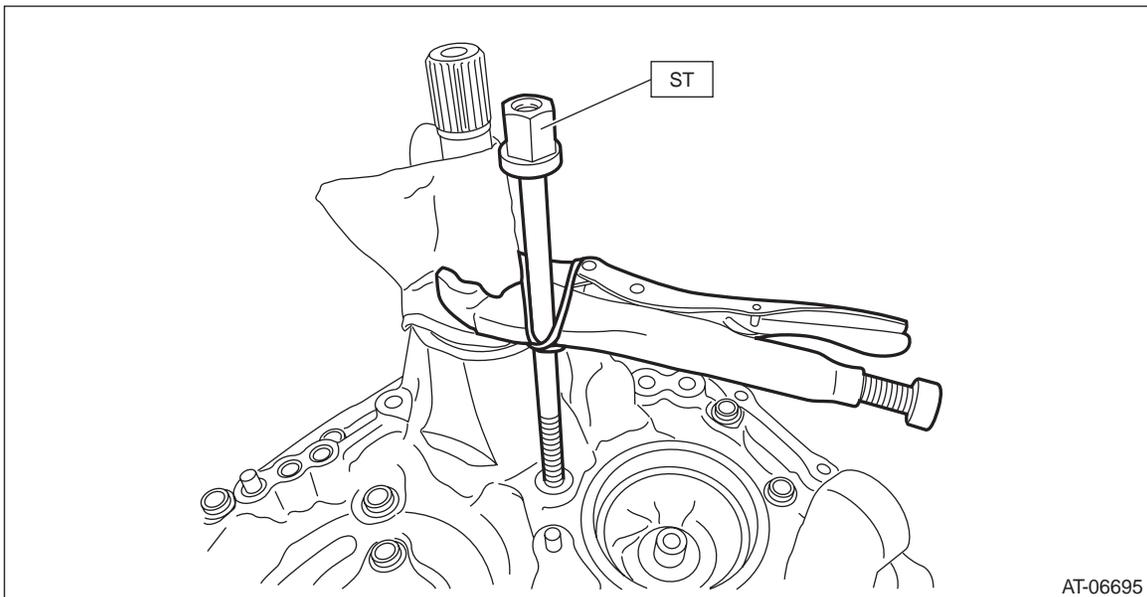
7) Insert the two SUBARU genuine axle shafts into differential case.

Part No. 38415AA070 Axle shaft

8) Install the ST to the drive pinion retainer, and wrap the drive pinion shaft with cloth and pinch with vise pliers. Using a tie-wrap or a wire, fix the vise pliers to the ST.

Make sure the drive pinion shaft does not move.

ST 18763AA000 COMPRESSOR SHAFT



AT-06695

Front Differential Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

9) Check the backlash is within specification using ST1, ST2 and ST3.

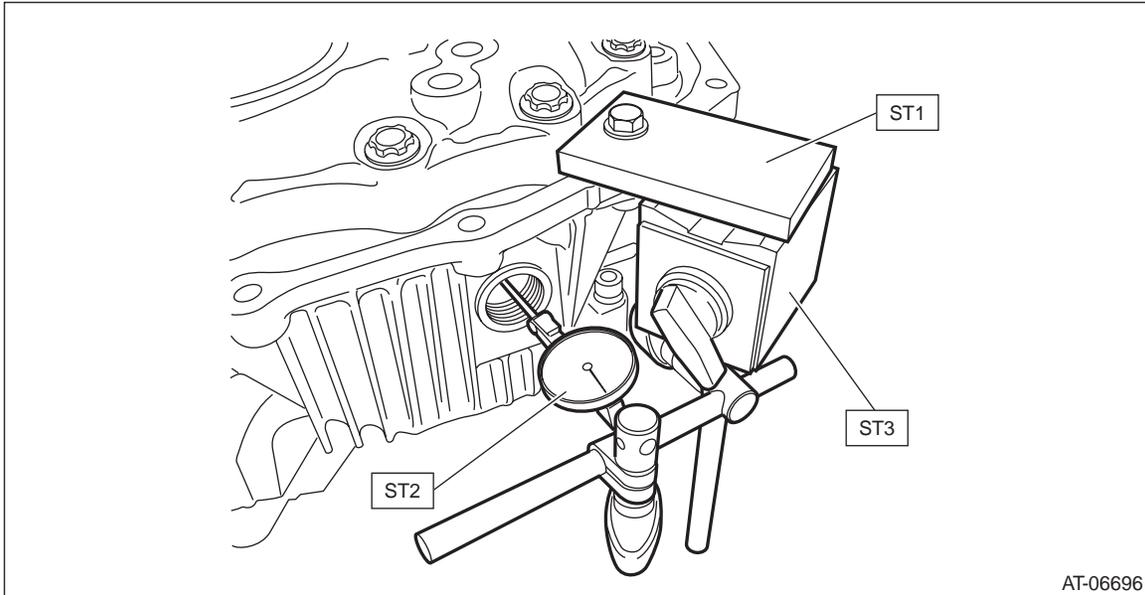
ST1 498255400 PLATE

ST2 498247100 DIAL GAUGE

ST3 498247001 MAGNET BASE

Backlash:

0.13 — 0.18 mm (0.005 — 0.007 in)



10) Adjust the teeth contact of the front differential and drive shaft. <Ref. to CVT(TR580)-299, ADJUSTMENT, Drive Pinion Shaft Assembly.>

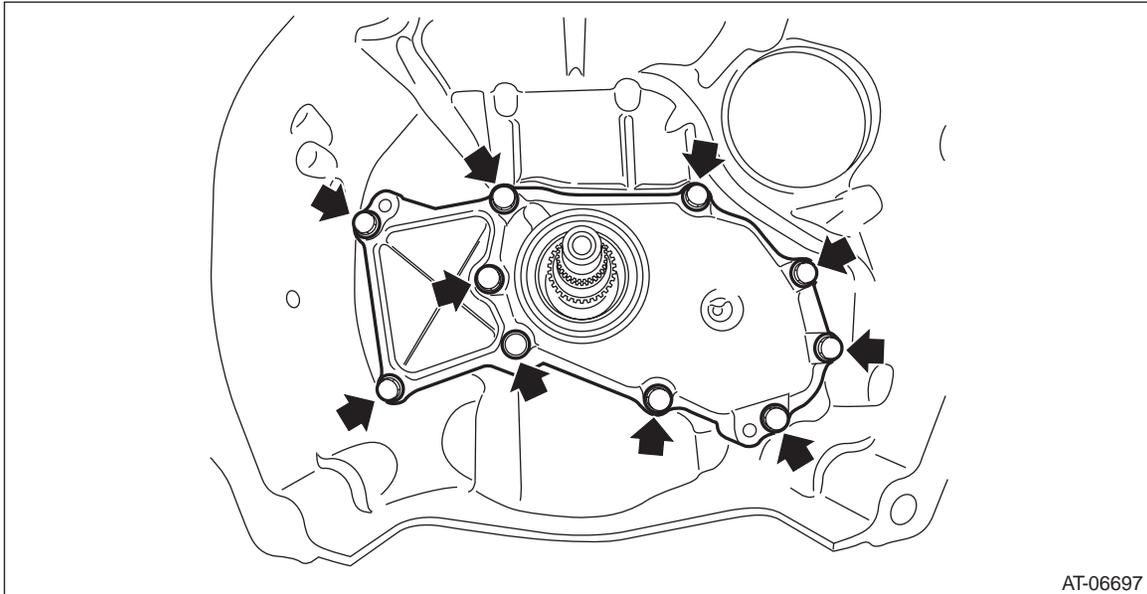
44.Oil Pump Chain

A: REMOVAL

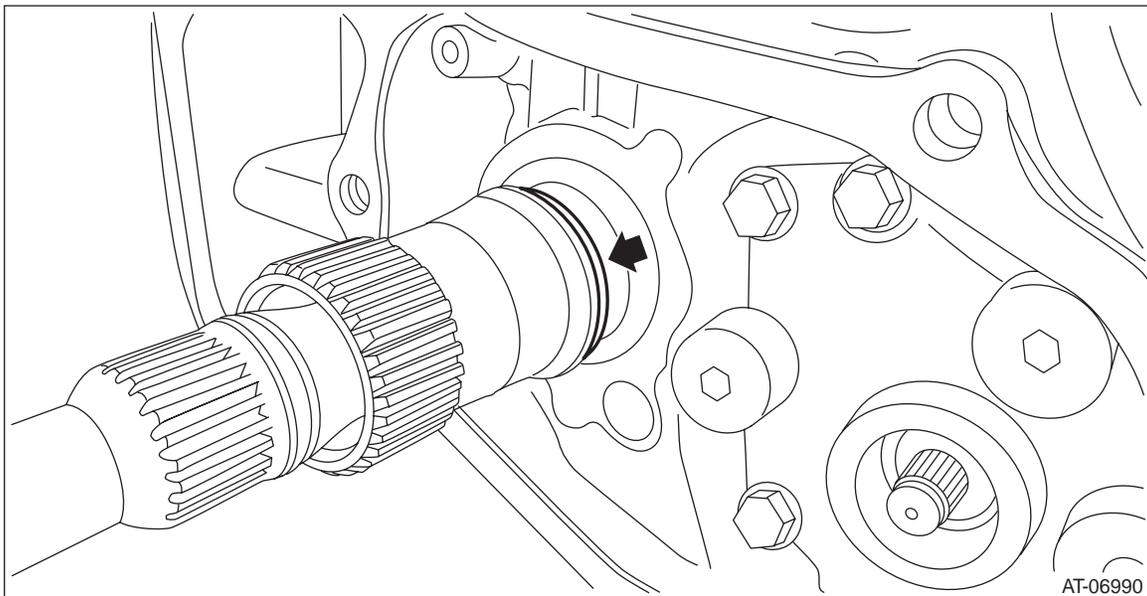
- 1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TR580)-57, REMOVAL, Automatic Transmission Assembly.>
- 2) Remove the torque converter assembly. <Ref. to CVT(TR580)-161, REMOVAL, Torque Converter Assembly.>
- 3) Remove the oil pump chain cover.

NOTE:

Oil pump chain cover may be hard to remove because the driven sprocket is installed to the shaft side of the oil pump. In this case, do not apply excessive force to remove it.



- 4) Remove the seal ring.



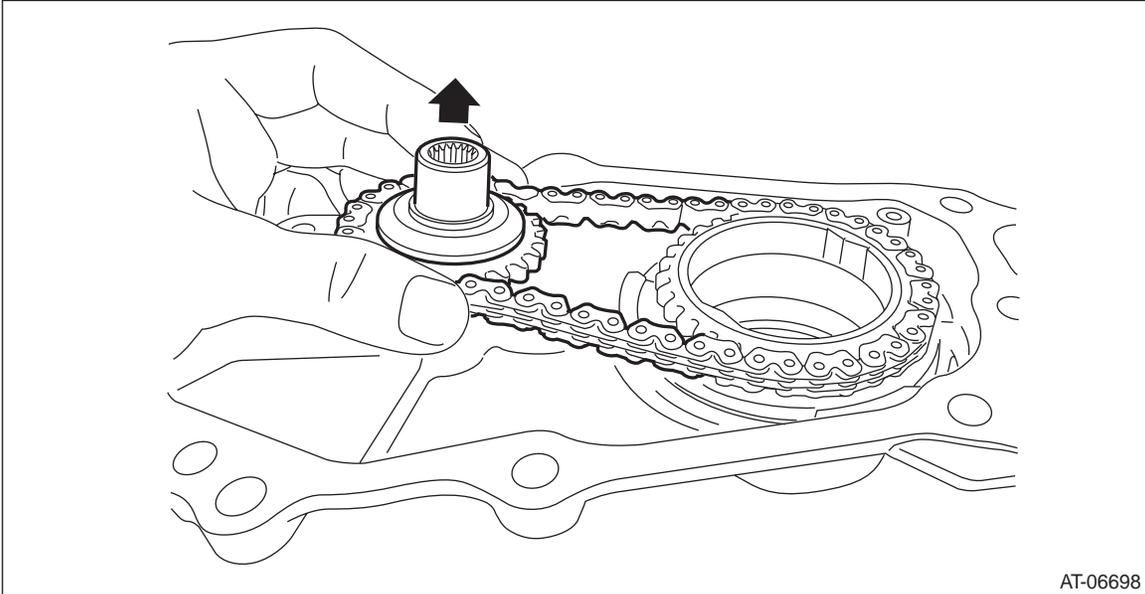
Oil Pump Chain

CONTINUOUSLY VARIABLE TRANSMISSION

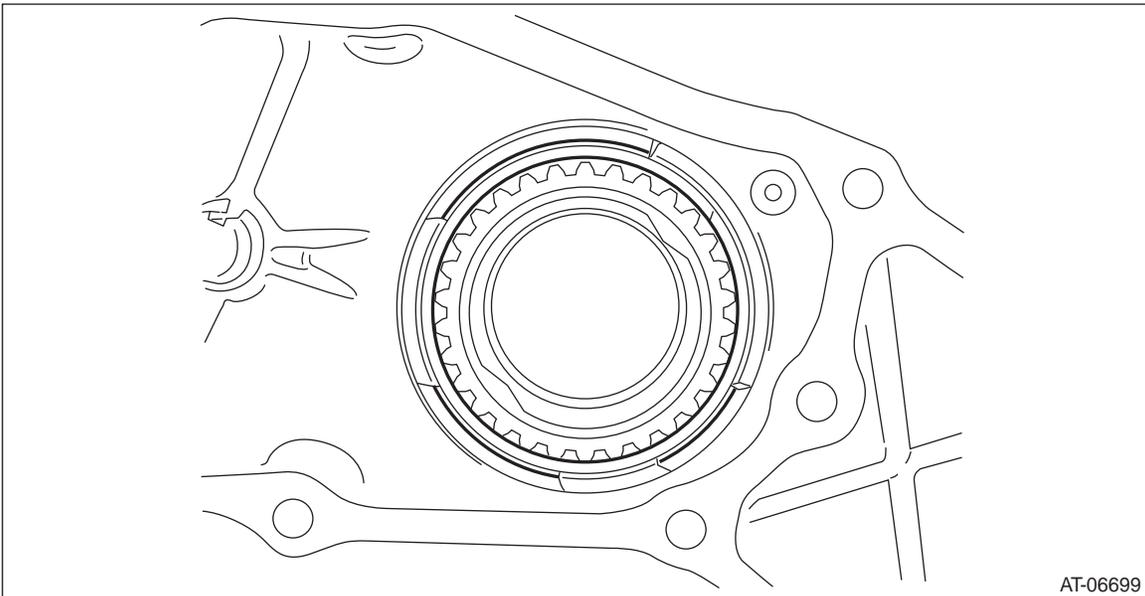
5) Remove the driven sprocket from oil pump chain cover to remove the oil pump chain.

NOTE:

- The driven sprocket is replaced as an assembly only, because it is a non-disassembly part.
- If the ball bearing is removed from the driven sprocket, replace with a new part.



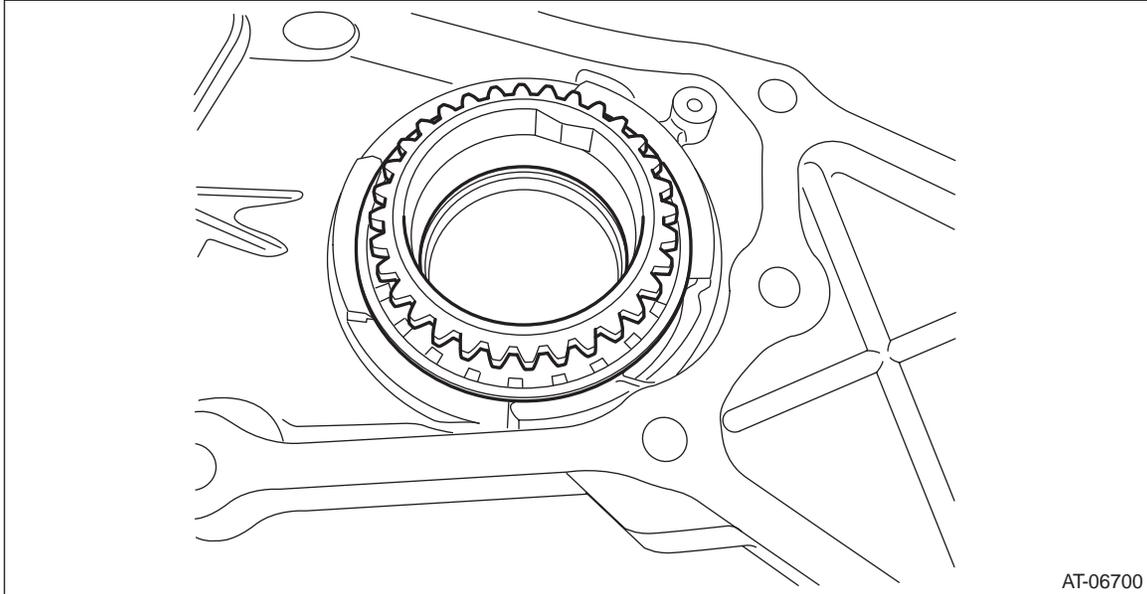
6) Remove the snap ring.



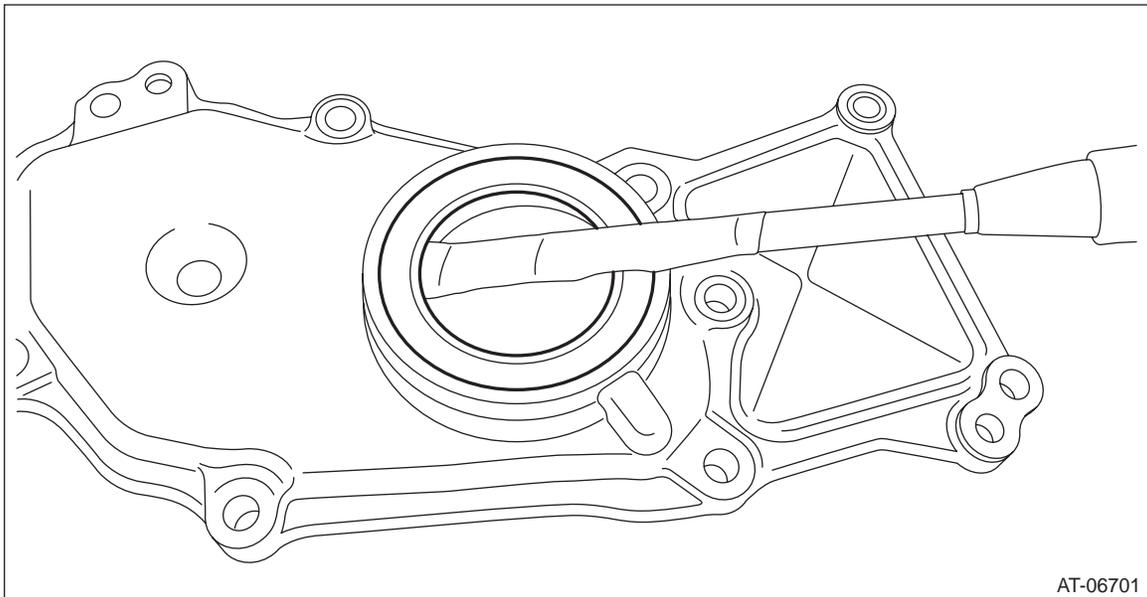
Oil Pump Chain

CONTINUOUSLY VARIABLE TRANSMISSION

7) Remove the drive sprocket.



8) Remove the oil seal from the oil pump chain cover.



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Oil Pump Chain

CONTINUOUSLY VARIABLE TRANSMISSION

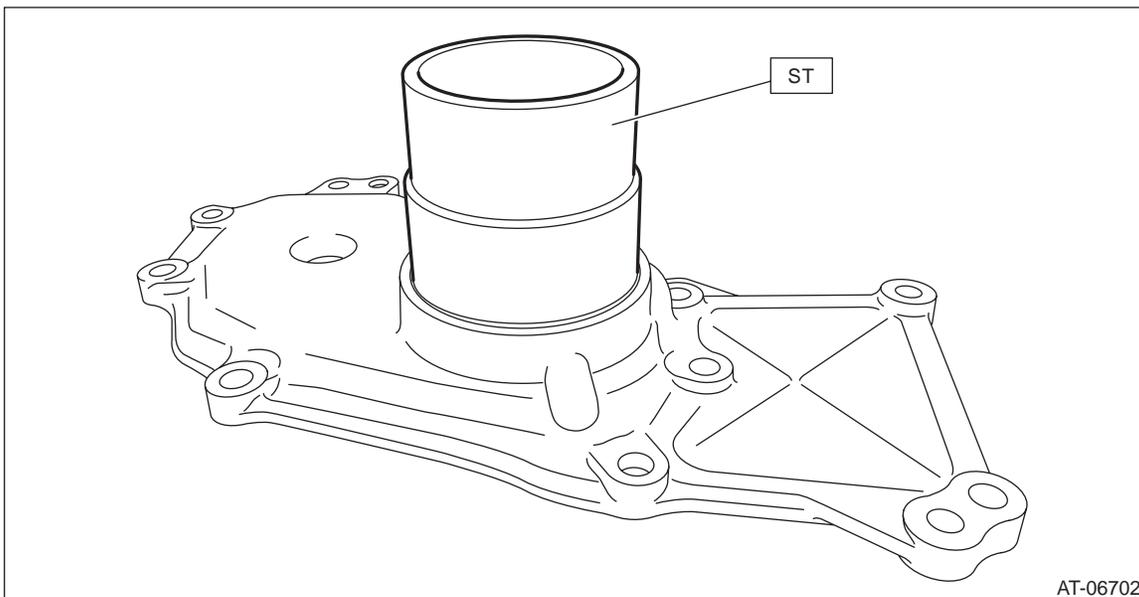
B: INSTALLATION

- 1) Clean the mating surface of oil pump chain cover and converter case.
- 2) Using the ST, install the oil seal.

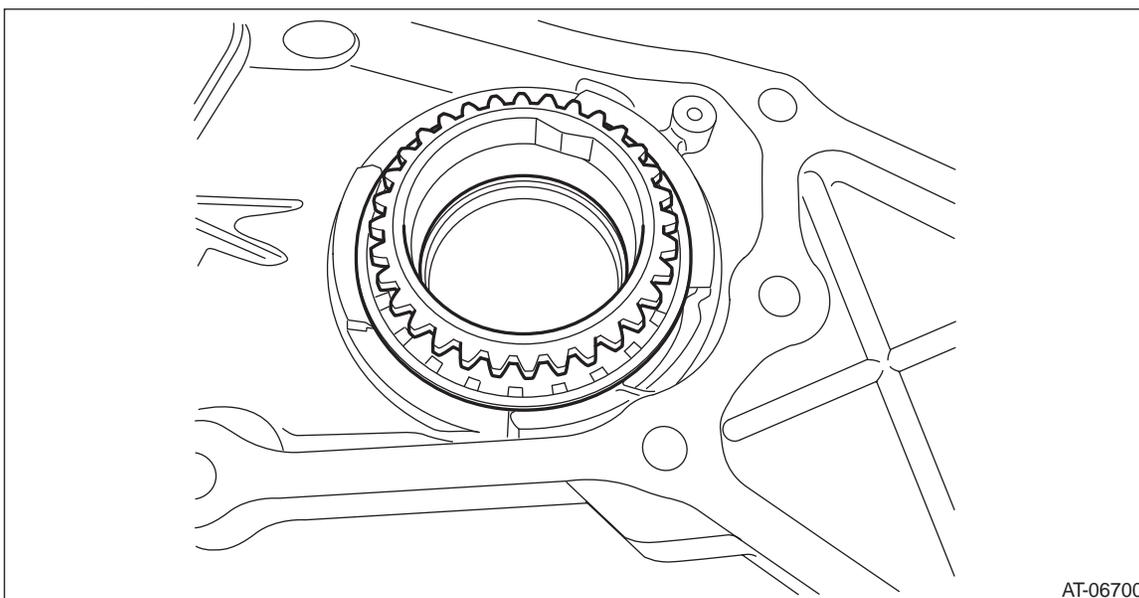
NOTE:

- Use a new oil seal.
- Apply CVTF to the oil seal lip and press-fitting surface.

ST 499755602 PRESS SNAP RING



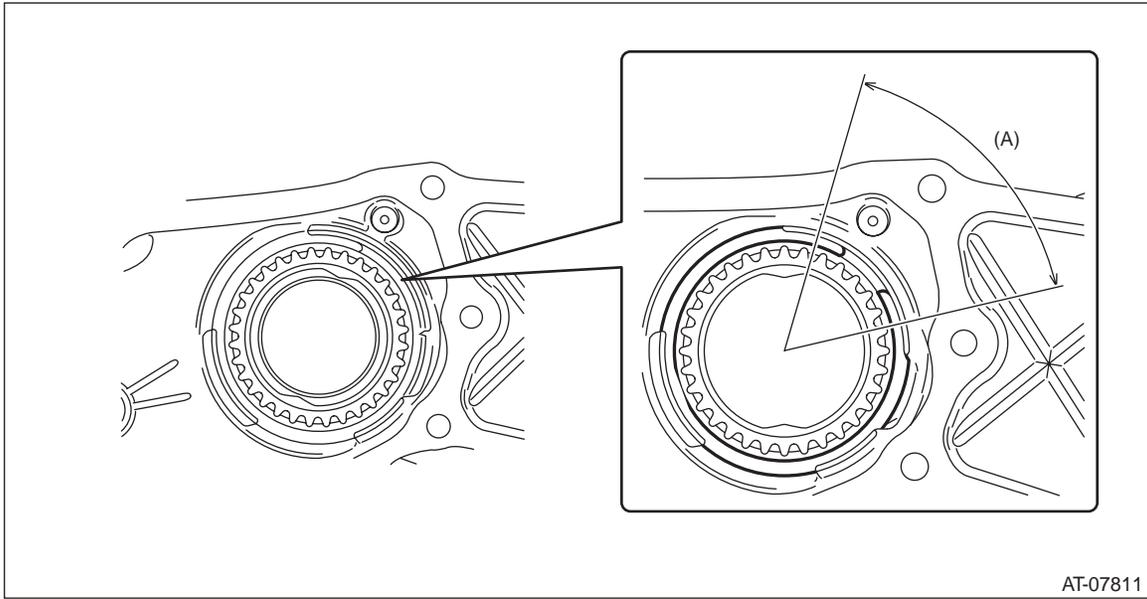
- 3) Install the drive sprocket.



Oil Pump Chain

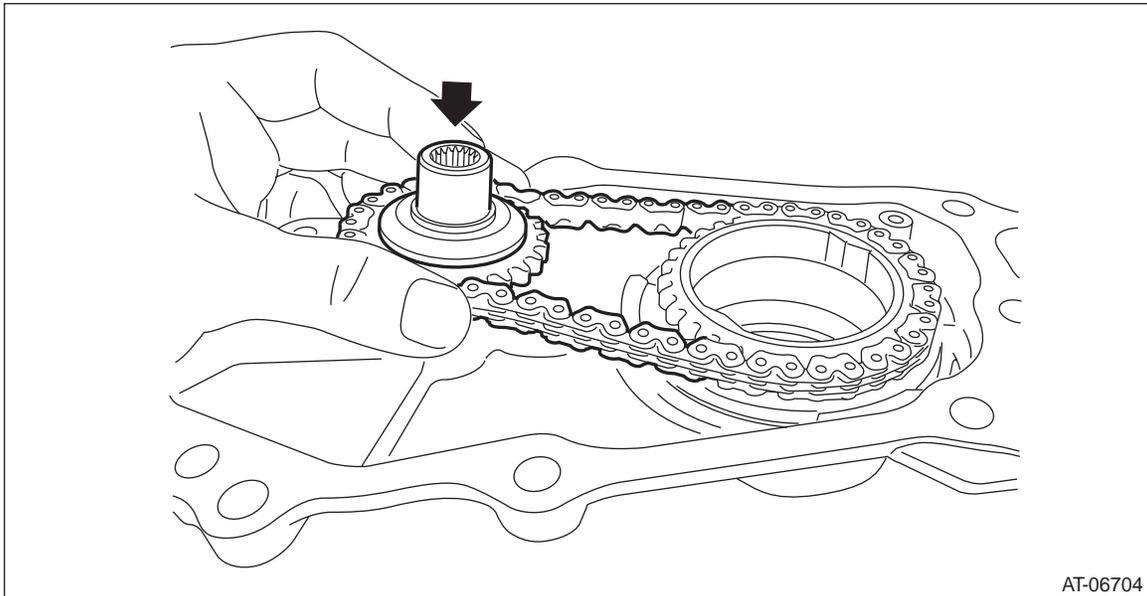
CONTINUOUSLY VARIABLE TRANSMISSION

- 4) Install the snap ring so that its cutout portion is securely fitted into the snap ring groove of the oil pump chain cover.



(A) Installation range of cutout portion for snap ring

- 5) Place the oil pump chain on drive sprocket.
6) Place the oil pump chain on driven sprocket and install the driven sprocket to oil pump chain cover.



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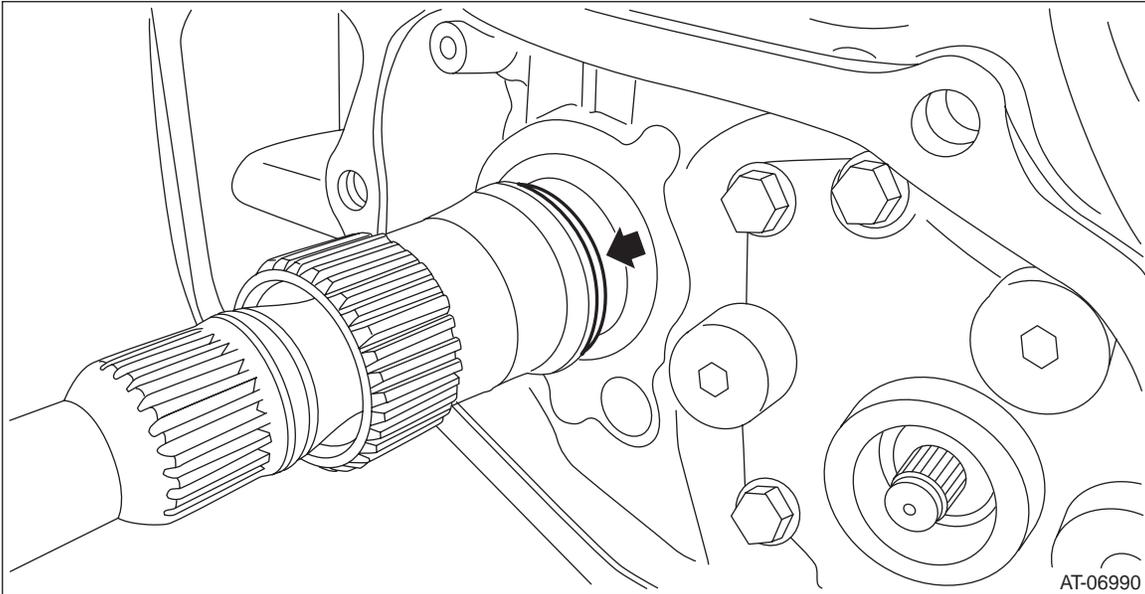
Oil Pump Chain

CONTINUOUSLY VARIABLE TRANSMISSION

7) Install the seal rings.

NOTE:

- Use new seal rings.
- Apply CVTF to the seal rings.
- When installing the seal rings, do not expand the seal rings too much.



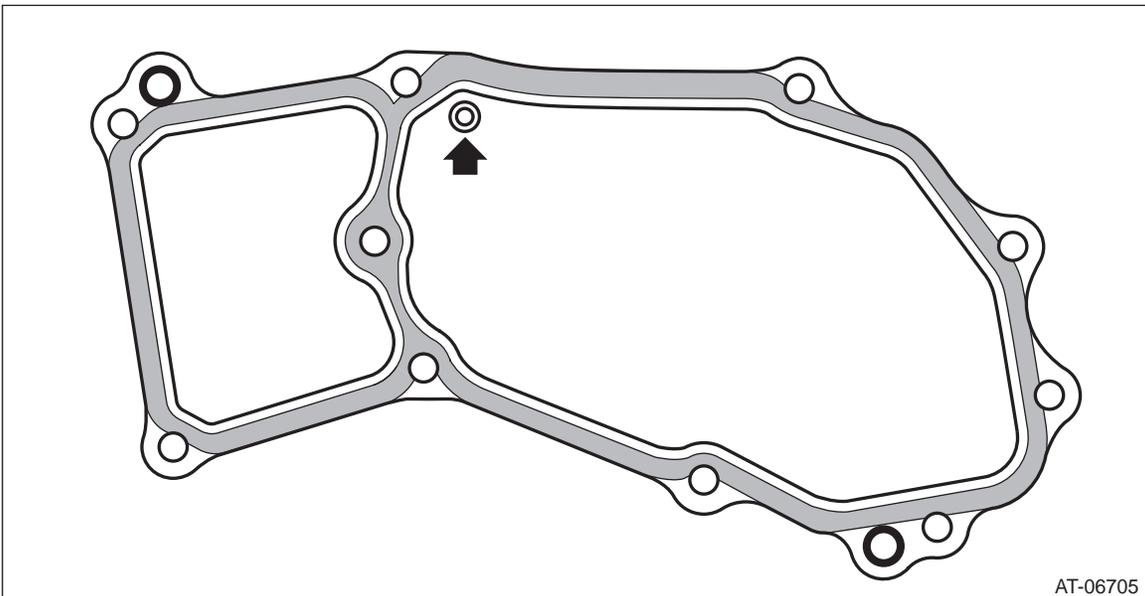
8) Apply liquid gasket seamlessly to the mating surface of oil pump chain cover.

CAUTION:

Do not apply liquid gasket at the arrowed hole.

Liquid gasket:

THREE BOND 1215B or equivalent



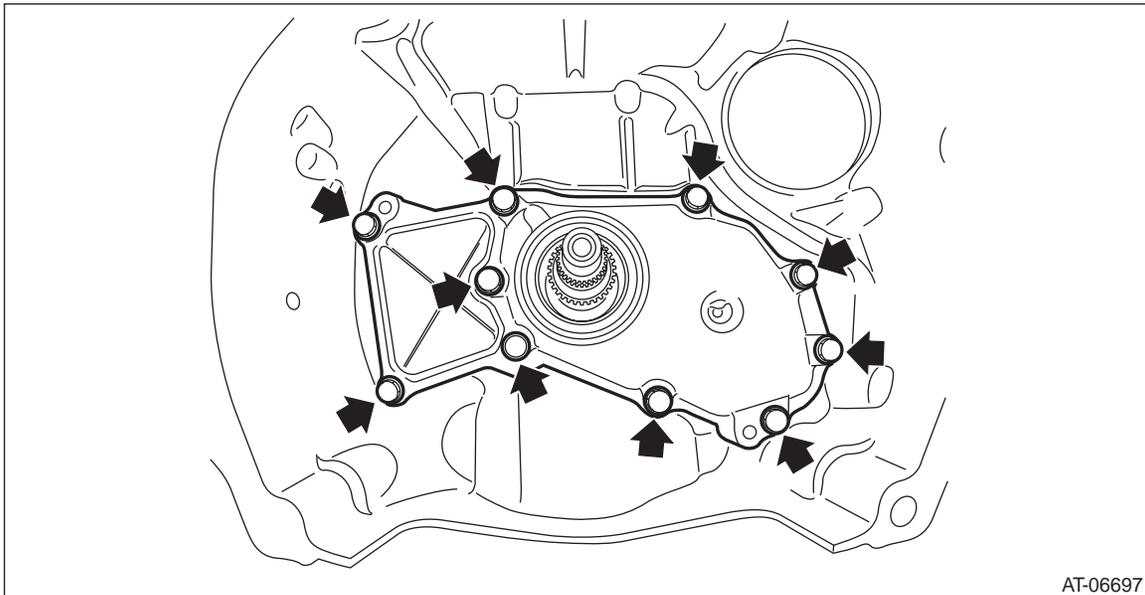
Oil Pump Chain

CONTINUOUSLY VARIABLE TRANSMISSION

9) Install the oil pump chain cover.

Tightening torque:

21 N·m (2.1 kgf-m, 15.5 ft-lb)



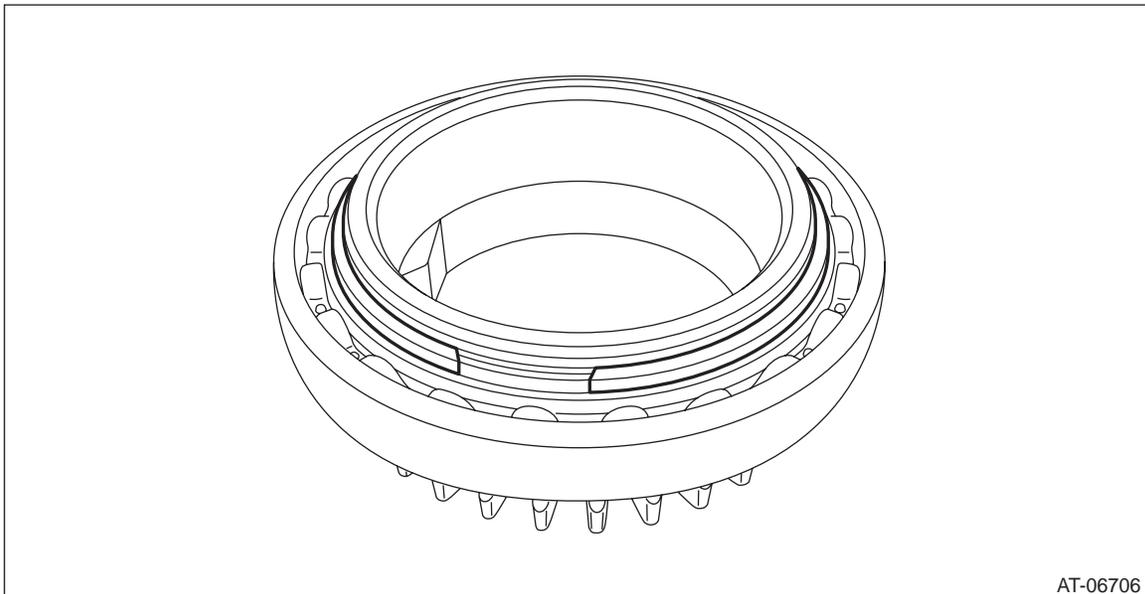
10) Install the torque converter assembly.<Ref. to CVT(TR580)-162, INSTALLATION, Torque Converter Assembly.>

11) Install the transmission assembly to the vehicle.<Ref. to CVT(TR580)-67, INSTALLATION, Automatic Transmission Assembly.>

C: DISASSEMBLY

1. DRIVE SPROCKET

1) Remove the snap ring.



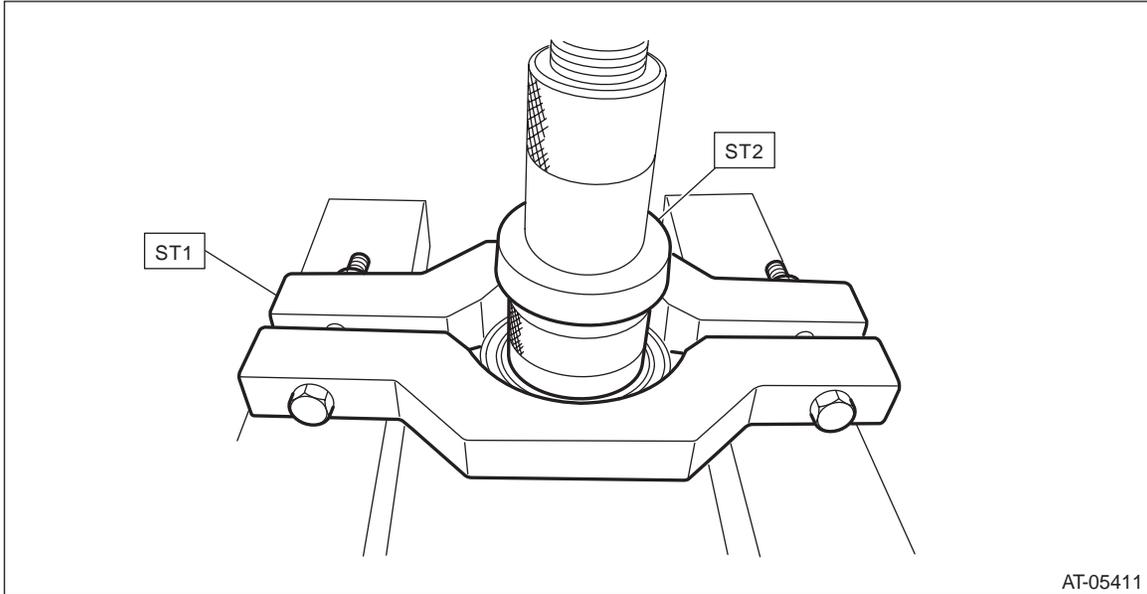
Oil Pump Chain

CONTINUOUSLY VARIABLE TRANSMISSION

2) Remove the ball bearing using ST.

ST1 498077600 REMOVER

ST2 399513600 INSTALLER



D: ASSEMBLY

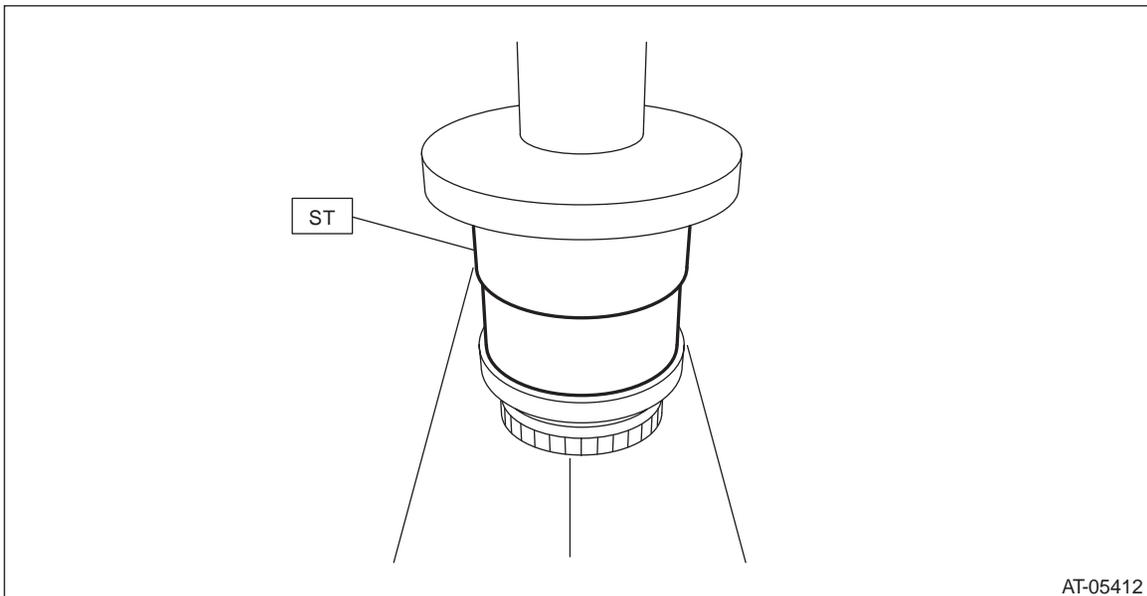
1. DRIVE SPROCKET

1) Using the ST, install the ball bearing.

NOTE:

Use a new ball bearing.

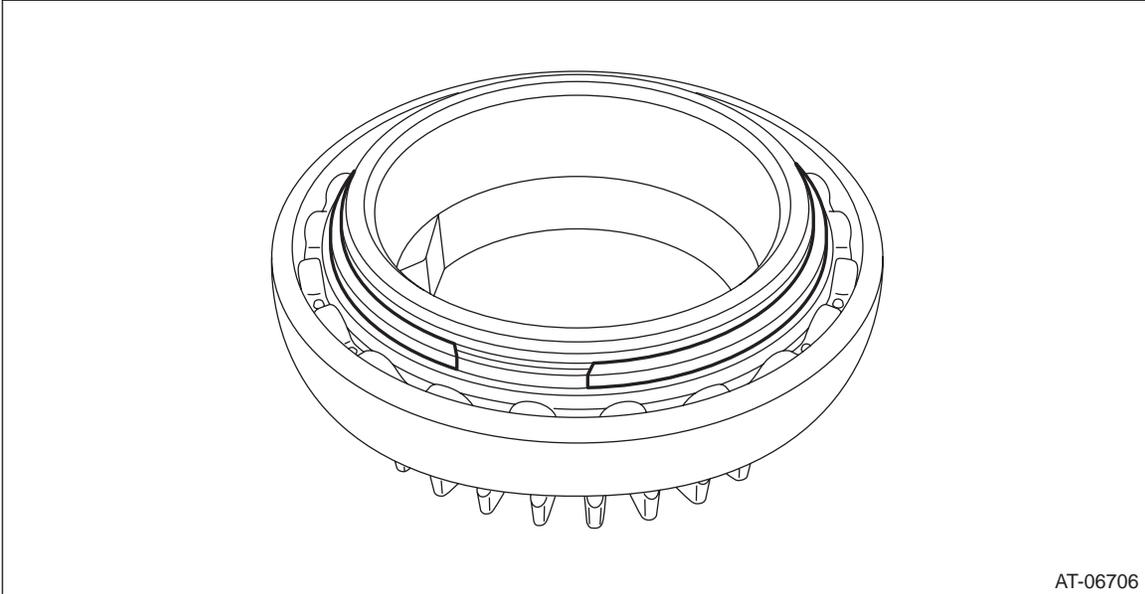
ST 499755502 PRESS SNAP RING



Oil Pump Chain

CONTINUOUSLY VARIABLE TRANSMISSION

2) Install the snap ring.



AT-06706

E: INSPECTION

- Check the oil pump chain for damage.
- Replace if gear teeth are broken, damaged, sharpen or excessively worn.
- Check the bearing for seizure or wear.
- Apply CVTF to bearing and rotate the bearing to check for noise or dragging etc.
- Check the oil pump chain cover for damage.
- Check for leakage of CVTF from the mating surface of oil pump chain cover.
- Check the oil seal for damage.

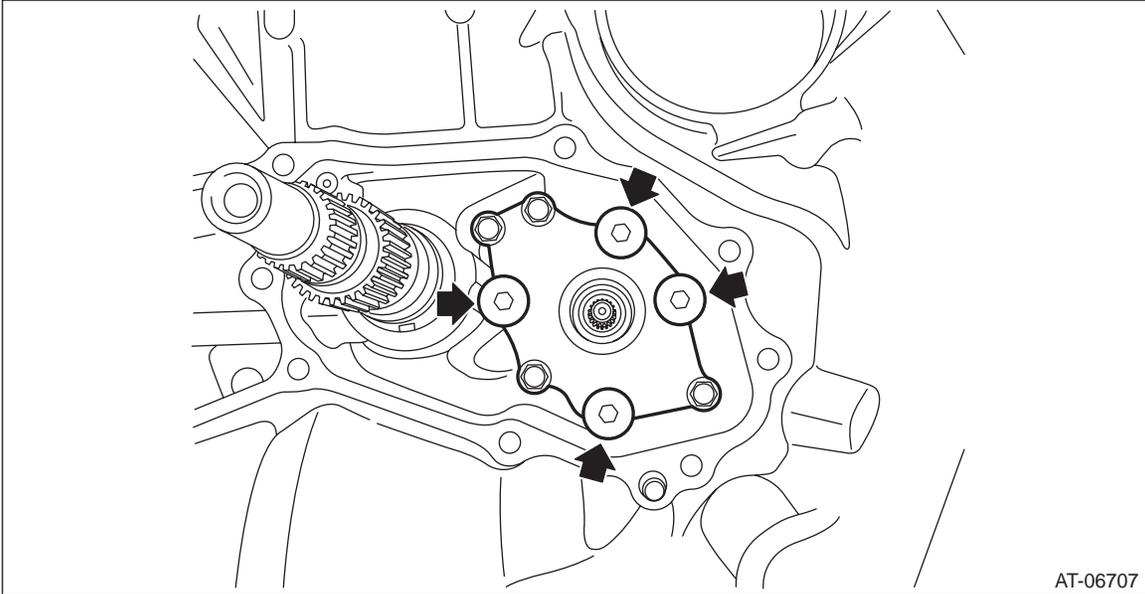
Oil Pump

CONTINUOUSLY VARIABLE TRANSMISSION

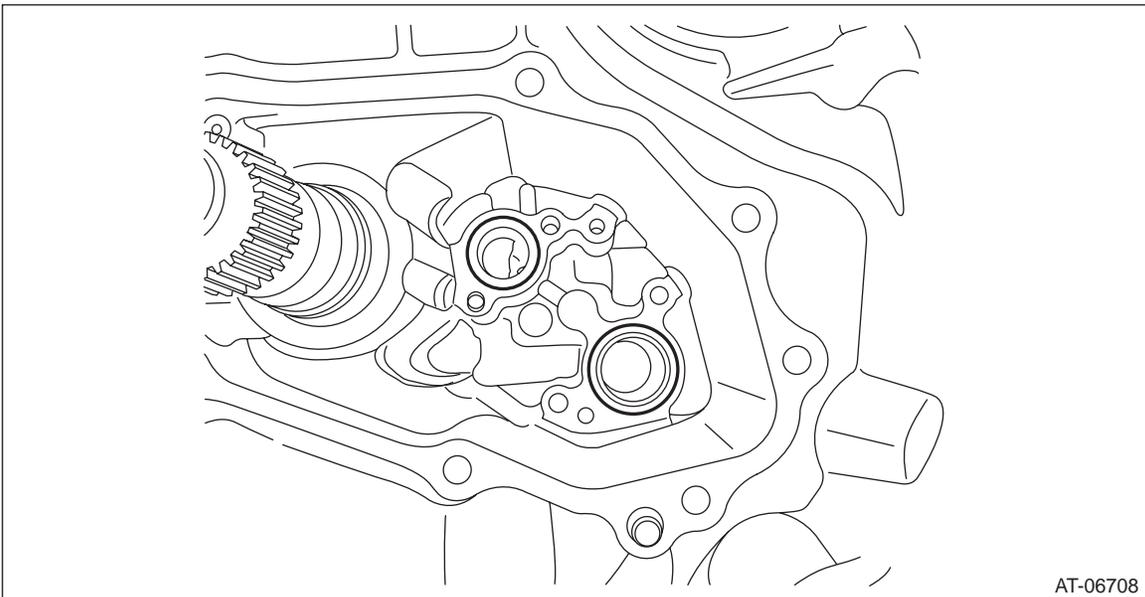
45.Oil Pump

A: REMOVAL

- 1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TR580)-57, REMOVAL, Automatic Transmission Assembly.>
- 2) Remove the torque converter assembly. <Ref. to CVT(TR580)-161, REMOVAL, Torque Converter Assembly.>
- 3) Remove the oil pump chain cover. <Ref. to CVT(TR580)-325, REMOVAL, Oil Pump Chain.>
- 4) Remove the oil pump and the plate.



- 5) Remove the O-ring.

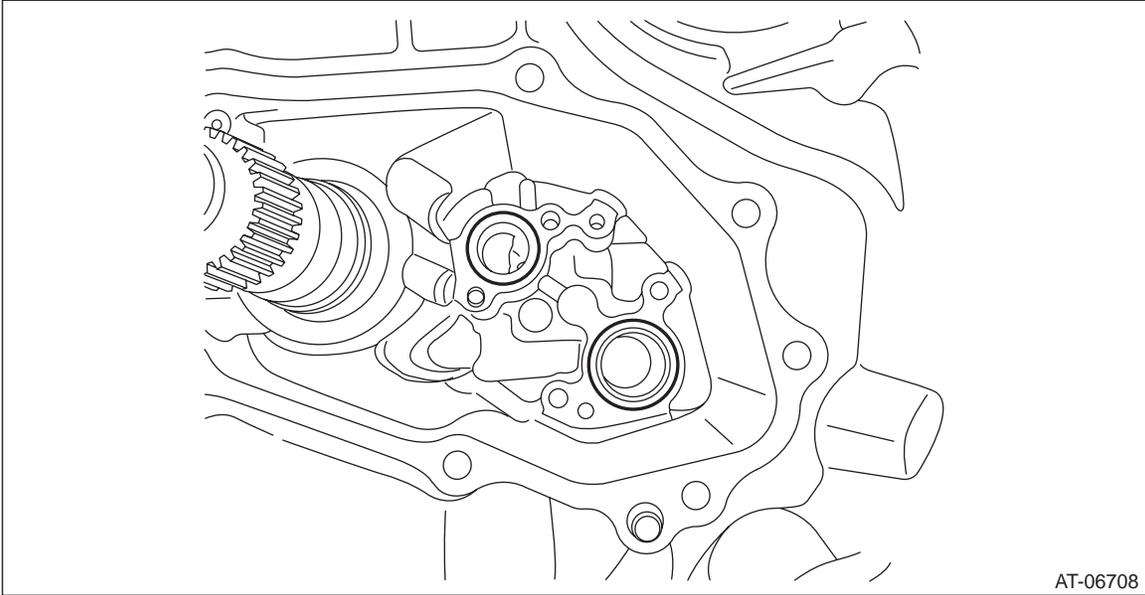


B: INSTALLATION

1) Install the O-ring.

NOTE:

- Use new O-rings.
- Apply CVTF to the O-ring.



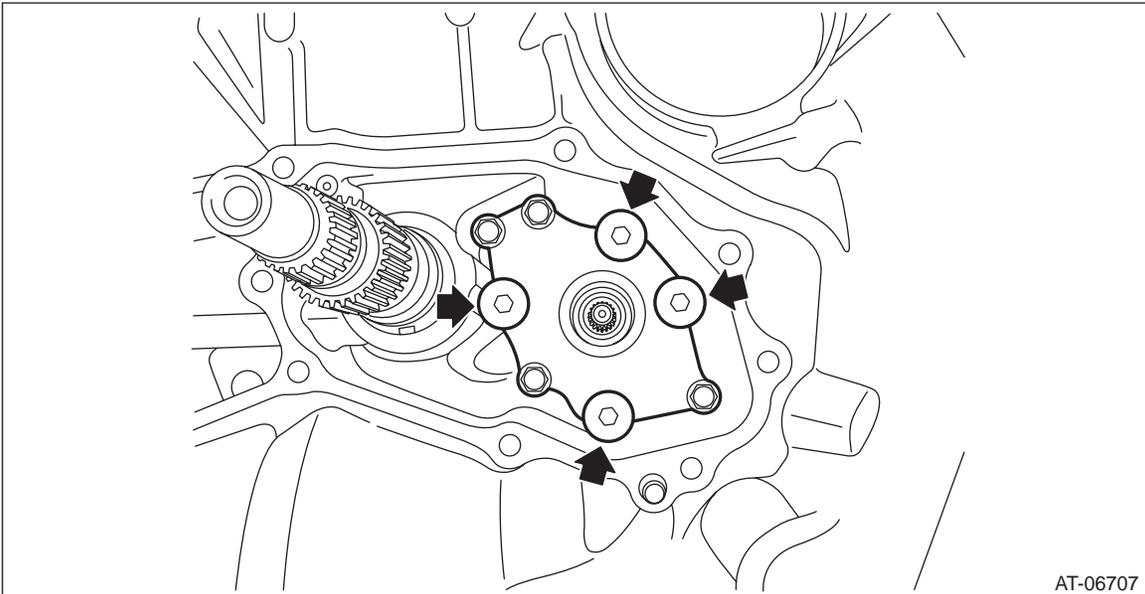
2) Install the plate and the oil pump.

NOTE:

Apply CVTF to the bolt.

Tightening torque:

8.5 N·m (0.9 kgf·m, 6.3 ft·lb)



3) Install the oil pump chain cover. <Ref. to CVT(TR580)-328, INSTALLATION, Oil Pump Chain.>

4) Install the torque converter assembly. <Ref. to CVT(TR580)-162, INSTALLATION, Torque Converter Assembly.>

5) Install the transmission assembly to the vehicle. <Ref. to CVT(TR580)-67, INSTALLATION, Automatic Transmission Assembly.>

Oil Pump

CONTINUOUSLY VARIABLE TRANSMISSION

C: INSPECTION

Check the following items.

- Check the oil pump for damage and wear.
 - Rotate the oil pump by hand, and check that it rotates smoothly.
- 1) Measure the secondary pressure. <Ref. to CVT(TR580)-48, INSPECTION, Secondary Pressure (Line Pressure) Test.>
 - 2) Remove the oil pan and oil strainer. <Ref. to CVT(TR580)-111, REMOVAL, Control Valve Body.>
 - 3) Check oil strainer for clogging.
- When oil strainer has no clogging, replace the oil pump.

46. Converter Case

A: REMOVAL

- 1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TR580)-57, REMOVAL, Automatic Transmission Assembly.>
- 2) Remove the air breather hose. <Ref. to CVT(TR580)-155, REMOVAL, Air Breather Hose.>
- 3) Remove the control valve body. <Ref. to CVT(TR580)-111, REMOVAL, Control Valve Body.>
- 4) Remove the transmission harness. <Ref. to CVT(TR580)-125, REMOVAL, Transmission Harness.>
- 5) Remove the turbine speed sensor. <Ref. to CVT(TR580)-98, REMOVAL, Turbine Speed Sensor.>
- 6) Remove the secondary speed sensor. <Ref. to CVT(TR580)-100, REMOVAL, Secondary Speed Sensor.>
- 7) Remove the primary speed sensor. <Ref. to CVT(TR580)-102, REMOVAL, Primary Speed Sensor.>
- 8) Remove the inhibitor switch. <Ref. to CVT(TR580)-94, REMOVAL, Inhibitor Switch.>
- 9) Remove the extension case. <Ref. to CVT(TR580)-165, REMOVAL, Extension Case.>
- 10) Remove the transfer clutch assembly. <Ref. to CVT(TR580)-169, REMOVAL, Transfer Clutch.>
- 11) Remove the transfer driven gear assembly. <Ref. to CVT(TR580)-184, REMOVAL, Transfer Driven Gear.>
- 12) Remove the parking pawl. <Ref. to CVT(TR580)-187, REMOVAL, Parking Pawl.>
- 13) Remove the reduction driven gear assembly. <Ref. to CVT(TR580)-189, REMOVAL, Reduction Driven Gear.>
- 14) Remove the oil pan and oil strainer. <Ref. to CVT(TR580)-107, REMOVAL, Oil Pan and Strainer.>
- 15) Remove the transmission control device. <Ref. to CVT(TR580)-197, REMOVAL, Transmission Control Device.>
- 16) Remove the transmission case. <Ref. to CVT(TR580)-203, REMOVAL, Transmission Case.>
- 17) Remove the reduction drive gear. <Ref. to CVT(TR580)-216, REMOVAL, Reduction Drive Gear.>
- 18) Remove the primary pulley, secondary pulley and variator chain. <Ref. to CVT(TR580)-221, REMOVAL, Primary Pulley and Secondary Pulley.>
- 19) Remove the reverse brake assembly. <Ref. to CVT(TR580)-242, REMOVAL, Reverse Brake Assembly.>
- 20) Remove the forward clutch assembly. <Ref. to CVT(TR580)-257, REMOVAL, Forward Clutch Assembly.>
- 21) Remove the drive pinion shaft assembly. <Ref. to CVT(TR580)-277, REMOVAL, Drive Pinion Shaft Assembly.>
- 22) Remove the front differential assembly. <Ref. to CVT(TR580)-306, REMOVAL, Front Differential Assembly.>
- 23) Remove the oil pump chain cover. <Ref. to CVT(TR580)-325, REMOVAL, Oil Pump Chain.>
- 24) Remove the oil pump. <Ref. to CVT(TR580)-334, REMOVAL, Oil Pump.>

B: INSTALLATION

- 1) Install the oil pump.<Ref. to CVT(TR580)-335, INSTALLATION, Oil Pump.>
- 2) Install the oil pump chain cover.<Ref. to CVT(TR580)-328, INSTALLATION, Oil Pump Chain.>
- 3) Install the front differential assembly.<Ref. to CVT(TR580)-308, INSTALLATION, Front Differential Assembly.>
- 4) Install the drive pinion shaft assembly.<Ref. to CVT(TR580)-278, INSTALLATION, Drive Pinion Shaft Assembly.>
- 5) Install the forward clutch assembly.<Ref. to CVT(TR580)-260, INSTALLATION, Forward Clutch Assembly.>
- 6) Install the reverse brake assembly.<Ref. to CVT(TR580)-245, INSTALLATION, Reverse Brake Assembly.>
- 7) Install the primary pulley, secondary pulley and variator chain.<Ref. to CVT(TR580)-228, INSTALLATION, Primary Pulley and Secondary Pulley.>
- 8) Install the reduction drive gear.<Ref. to CVT(TR580)-217, INSTALLATION, Reduction Drive Gear.>
- 9) Install the transmission case.<Ref. to CVT(TR580)-206, INSTALLATION, Transmission Case.>
- 10) Install the transmission control device.<Ref. to CVT(TR580)-200, INSTALLATION, Transmission Control Device.>
- 11) Install the oil strainer and oil pan.<Ref. to CVT(TR580)-108, INSTALLATION, Oil Pan and Strainer.>

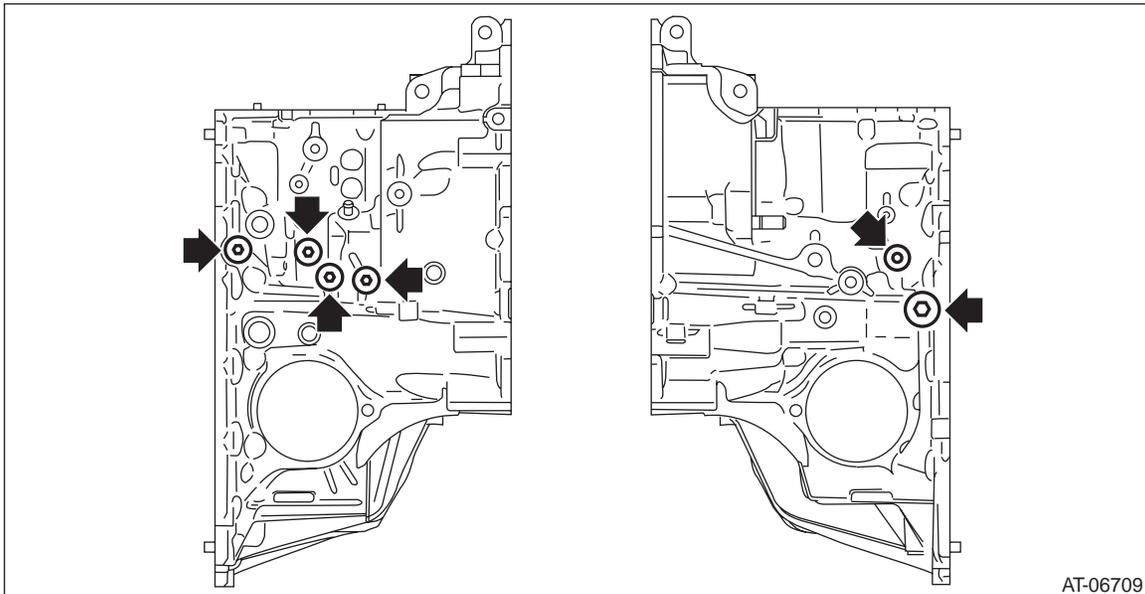
Converter Case

CONTINUOUSLY VARIABLE TRANSMISSION

- 12) Install the reduction driven gear assembly.<Ref. to CVT(TR580)-189, INSTALLATION, Reduction Driven Gear.>
- 13) Install the parking pawl.<Ref. to CVT(TR580)-188, INSTALLATION, Parking Pawl.>
- 14) Install the transfer driven gear assembly.<Ref. to CVT(TR580)-185, INSTALLATION, Transfer Driven Gear.>
- 15) Install the transfer clutch assembly.<Ref. to CVT(TR580)-171, INSTALLATION, Transfer Clutch.>
- 16) Install the extension case.<Ref. to CVT(TR580)-166, INSTALLATION, Extension Case.>
- 17) Install the inhibitor switch.<Ref. to CVT(TR580)-95, INSTALLATION, Inhibitor Switch.>
- 18) Install the secondary speed sensor.<Ref. to CVT(TR580)-100, INSTALLATION, Secondary Speed Sensor.>
- 19) Install the primary speed sensor.<Ref. to CVT(TR580)-103, INSTALLATION, Primary Speed Sensor.>
- 20) Install the turbine speed sensor.<Ref. to CVT(TR580)-98, INSTALLATION, Turbine Speed Sensor.>
- 21) Install the transmission harness.<Ref. to CVT(TR580)-131, INSTALLATION, Transmission Harness.>
- 22) Install the control valve body.<Ref. to CVT(TR580)-117, INSTALLATION, Control Valve Body.>
- 23) Install the air breather hose.<Ref. to CVT(TR580)-156, INSTALLATION, Air Breather Hose.>
- 24) Install the transmission assembly to the vehicle.<Ref. to CVT(TR580)-67, INSTALLATION, Automatic Transmission Assembly.>

C: DISASSEMBLY

- 1) Remove the pitching stopper bracket and transmission radio ground cord, if mounted.
- 2) Remove the filler plug, oil drain plug and overflow drain plug.<Ref. to CVT(TR580)-42, REPLACEMENT, Differential Gear Oil.>
- 3) Remove all plugs.



D: ASSEMBLY

1) Install the oil drain plug.

Tightening torque:

70 N·m (7.1 kgf·m, 51.6 ft·lb)

2) Install the overflow drain plug.

NOTE:

Overflow drain plug of differential gear oil is temporarily attached.

3) Install all plugs.

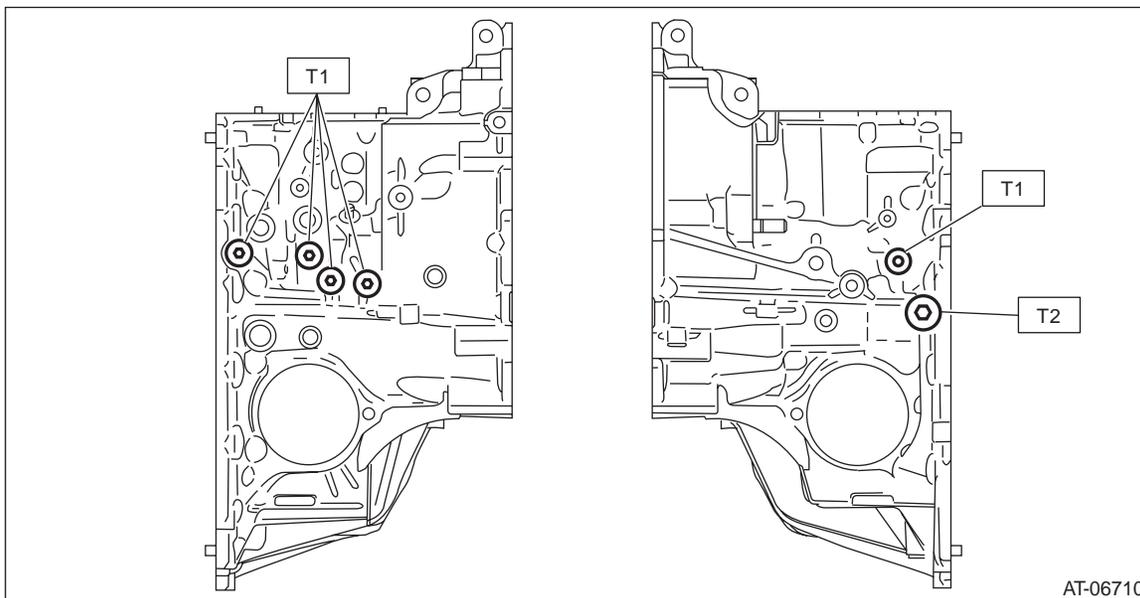
NOTE:

Use new O-rings.

Tightening torque:

T1: 25 N·m (2.5 kgf·m, 18.4 ft·lb)

T2: 22.5 N·m (2.3 kgf·m, 16.6 ft·lb)



AT-06710

4) Install the pitching stopper bracket and transmission radio ground cord.

Tightening torque:

41 N·m (4.2 kgf·m, 30.2 ft·lb)

E: INSPECTION

- Check for leakage of CVTF from the connection between converter case and transmission case.
- Check there is no damage or cracks on the converter case.

Diagnostics with Phenomenon

CONTINUOUSLY VARIABLE TRANSMISSION

47. Diagnostics with Phenomenon

A: INSPECTION

Symptoms	Faulty parts
Stall speed is low after warming-up, with select lever in "D" or "R" range.	Engine control system
Vehicle does not move despite engine speed rising up, with select lever in "D" or "R" range.	<ul style="list-style-type: none"> • Engine control system • Select cable • CVTF • Secondary pressure circuit • Pulley, gear and variator chain • Forward/reverse changeover section • TCM • Control valve body • Inhibitor switch
Vehicle does not move by engine stall, with select lever in "D" or "R" range.	<ul style="list-style-type: none"> • Parking mechanism • Select cable • Bearing • Forward/reverse changeover section
Excessive shock occurs at starting, with select lever in "D" or "R" range.	<ul style="list-style-type: none"> • Secondary pressure circuit • Pulley, gear and variator chain
Acceleration speed from standstill is insufficient, with select lever in "D" or "R" range.	<ul style="list-style-type: none"> • Control valve body • Forward/reverse changeover section
Engine speed suddenly rises up during driving, with select lever in "D" or "R" range.	<ul style="list-style-type: none"> • Control valve body • Secondary pressure circuit • Primary pressure circuit
Vibration occurs during driving, with select lever in "D" or "R" range.	<ul style="list-style-type: none"> • Secondary pressure circuit • Primary pressure circuit • Forward/reverse changeover section • Pulley and variator chain • Torque converter assembly • Hydraulic pressure circuit to torque converter • Control valve body
Sudden braking occurs during driving, with select lever in "D" or "R" range.	<ul style="list-style-type: none"> • Secondary pressure circuit • Primary pressure circuit • Control valve body
During deceleration, lockup clutch does not disengage until just before halting, with select lever in "D" or "R" range.	<ul style="list-style-type: none"> • Control valve body • Torque converter assembly
Engine stalls with vehicle at a standstill, with select lever in "D" or "R" range.	<ul style="list-style-type: none"> • Engine control system • Control valve body
Excessive lockup shock occurs during driving, with select lever in "D" range.	Control valve body
Slipping occurs at lockup, or lockup does not occur during driving, with select lever in "D" range.	<ul style="list-style-type: none"> • Control valve body • Lockup hydraulic line • Torque converter assembly
Excessive shift shock occurs when shifting the select lever from "N" range to "D" range, or from "N" range to "R" range.	<ul style="list-style-type: none"> • Inhibitor switch • Control valve body • Forward/reverse changeover section
Vehicle does not keep at standstill with select lever in "P" range, or parking cannot be released when shifting from "P" range to another range.	<ul style="list-style-type: none"> • Select cable • Parking mechanism
Select lever does not shift smoothly.	<ul style="list-style-type: none"> • Select cable • Inhibitor switch • Detent spring • Manual plate

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