

General Description

CONTINUOUSLY VARIABLE TRANSMISSION

1. General Description

A: SPECIFICATION

1. TORQUE CONVERTER

Model	2.0 L DOHC turbo	
Type	Symmetric, 3-element, single stage, 2-phase torque converter	
Stall torque ratio	2.09	
Nominal	mm (in)	246 (9.69)
Stall speed (at sea level)	2,080 — 2,600	
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	3.505 — 0.544	
Rev	2.345	

5. PLATE

Number of input clutch drive plates	5	
Number of forward clutch drive plates	6	
Number of reverse brake drive plates	5	

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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 and 8 speed step change ^{*1}
M (Manual mode) (paddle shift +side)	Manual gear change 1st → 2nd → 3rd → 4th → 5th → 6th → 7th ^{*1} → 8th ^{*1}
M (Manual mode) (paddle shift -side)	Manual gear change 1st ← 2nd ← 3rd ← 4th ← 5th ← 6th → 7th ^{*1} → 8th ^{*1}

*1: Only when in S# mode

7. HYDRAULIC CONTROL AND LUBRICATION

Type	Electronic hydraulic control (speed changed by signals of vehicle speed and accelerator opening angle)
Fluid	Specified fluid: SUBARU HIGH TORQUE CVT FLUID FOR LINEARTRONIC CAUTION: Always use specified CVTF. Using other fluid will cause malfunction.
Fluid capacity L (US qt, Imp qt)	12.11 — 12.61 (12.8 — 13.3, 10.7 — 11.1)
Lubrication system	Forced feed lubrication with oil pump

8. COOLING AND HARNESS

Cooling system	CVTF cooler (with warmer feature)
Inhibitor switch harness	12 poles
Transmission harness	20 poles

9. TRANSFER

Transfer type	Multi-plate transfer (MP-T)
Number of transfer clutch drives & driven plates	6
Control method	Electronic hydraulic type
Reduction gear ratio	1.000 (37/37)

10. REDUCTION GEAR RATIO

Front final reduction gear ratio	4.111
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11. FRONT DIFFERENTIAL GEAR OIL

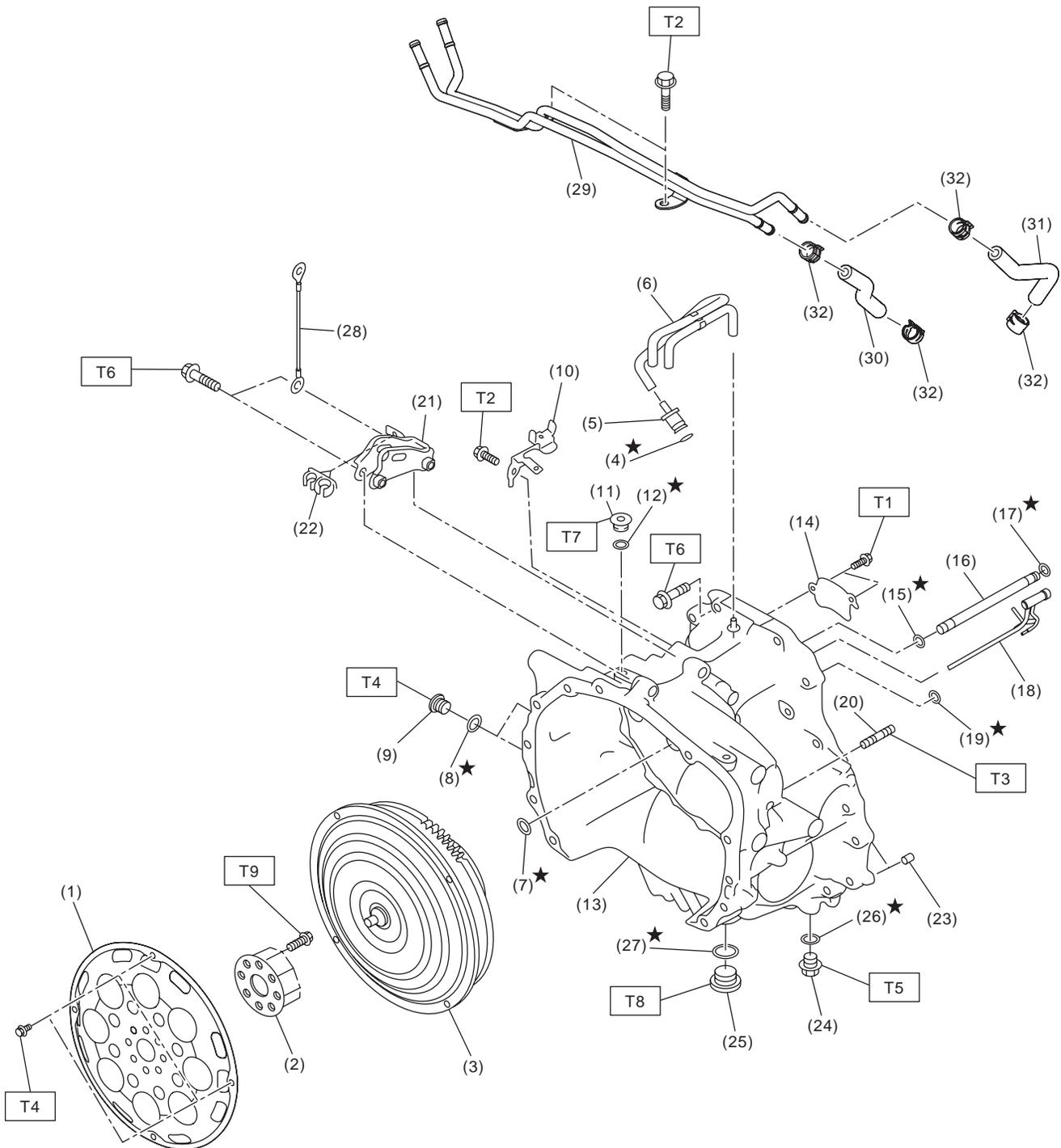
Fluid	Recommended fluid: SUBARU GEAR OIL EXTRA MT CAUTION: If an alternative transmission oil is used, you may not have expected functionality and performance. Alternative fluid: GL-5 (75W-90)
Fluid capacity L (US qt, Imp qt)	1.3 — 1.5 (1.4 — 1.6, 1.1 — 1.3)

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B: COMPONENT

1. TORQUE CONVERTER ASSEMBLY AND CONVERTER CASE



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AT-07858

General Description

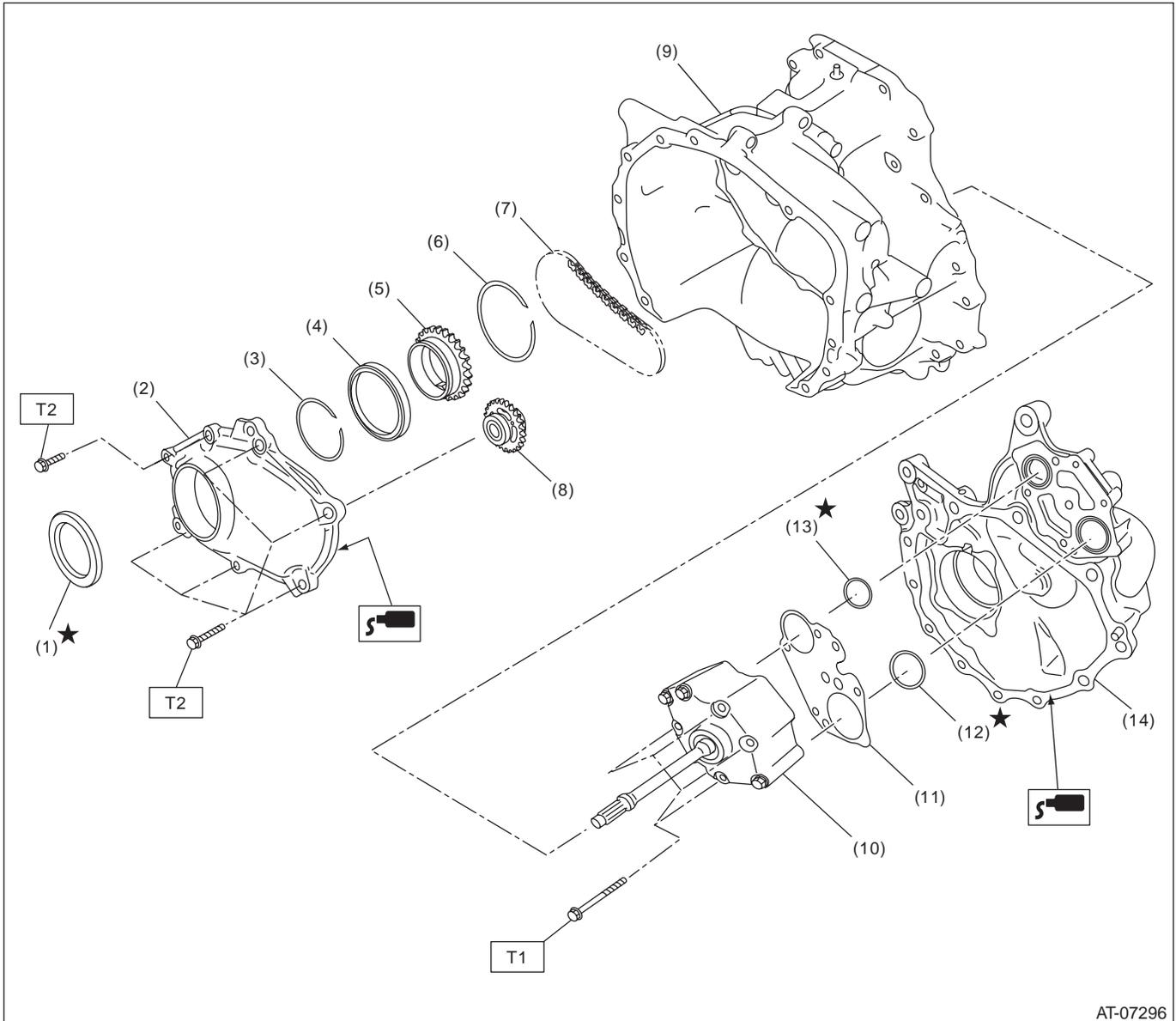
CONTINUOUSLY VARIABLE TRANSMISSION

(1) Drive plate	(16) Lubrication pipe	(31) CVTF hose
(2) Reinforcement drive plate	(17) O-ring	(32) Clamp
(3) Torque converter ASSY	(18) Lubrication pipe	
(4) O-ring	(19) O-ring	<hr/>
(5) Oil charge pipe cap	(20) Stud bolt	Tightening torque: N·m (kgf·m, ft·lb)
(6) Air breather hose ASSY	(21) Pitching stopper bracket	T1: 9 (0.9, 6.6)
(7) O-ring	(22) Clip	T2: 16 (1.6, 11.8)
(8) O-ring	(23) Straight pin	T3: 18 (1.8, 13.3)
(9) Plug	(24) Overflow drain plug	T4: 25 (2.5, 18.4)
(10) Transmission harness stay	(25) Front differential gear oil drain plug	T5: 35 (3.6, 25.8)
(11) Plug	(26) Gasket	T6: 41 (4.2, 30.2)
(12) O-ring	(27) Gasket	T7: 50 (5.1, 36.9)
(13) Converter case	(28) Transmission radio ground cord	T8: 70 (7.1, 51.6)
(14) Oil stopper plate	(29) CVT cooler pipe COMPL	T9: <Ref. to CVT(TR690)-136, INSTALLATION, Drive Plate.>
(15) O-ring	(30) CVTF hose	<hr/>

General Description

CONTINUOUSLY VARIABLE TRANSMISSION

2. OIL PUMP ASSY



AT-07296

- (1) Oil seal
- (2) Oil pump chain cover
- (3) Snap ring
- (4) Ball bearing
- (5) Drive sprocket
- (6) Snap ring

- (7) Oil pump chain
- (8) Driven sprocket
- (9) Converter case
- (10) Oil pump ASSY
- (11) Plate
- (12) O-ring (large)

- (13) O-ring (small)
- (14) Drive pinion retainer

Tightening torque: N·m (kgf·m, ft·lb)

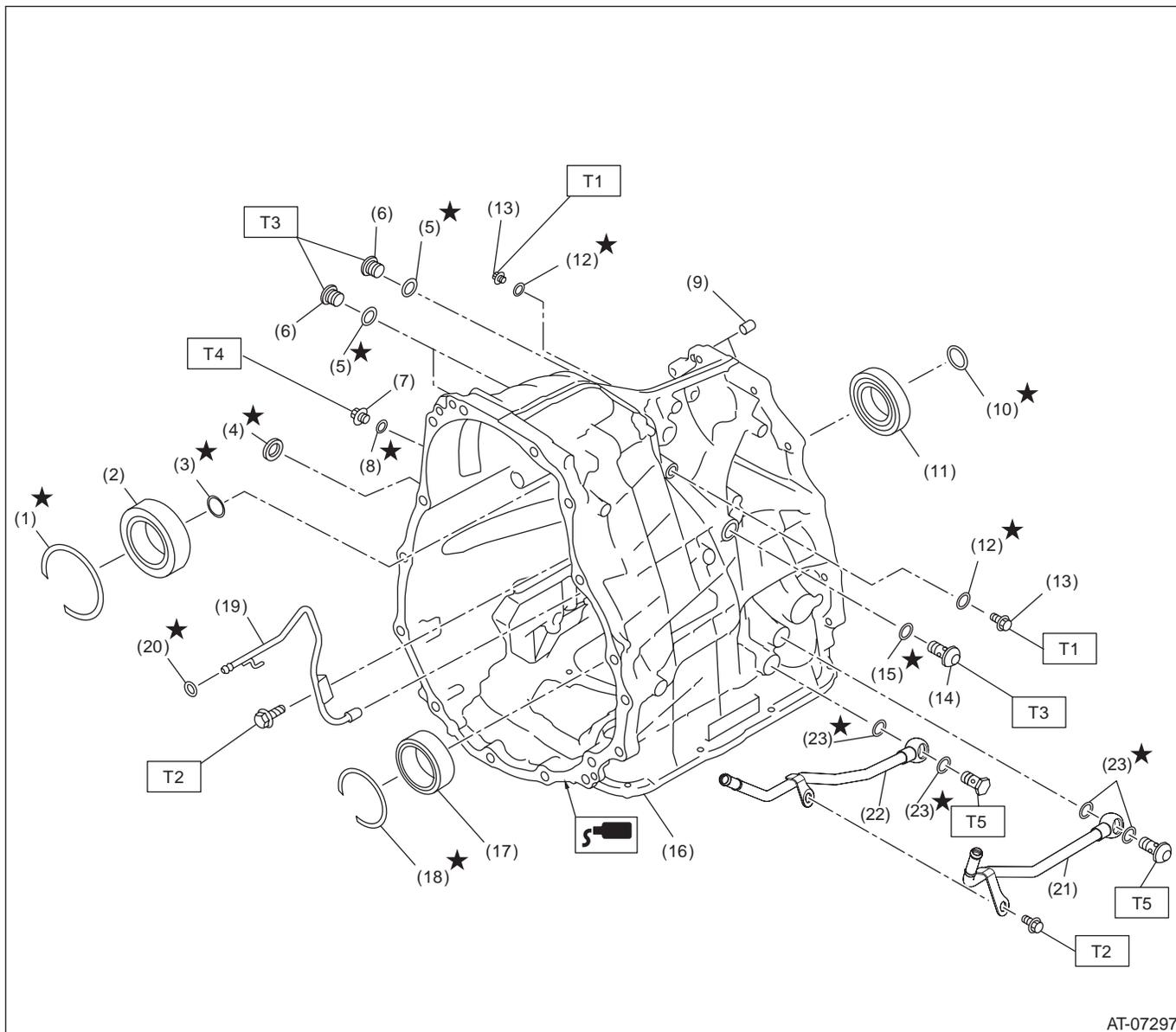
T1: 8.5 (0.9, 6.3)

T2: 24 (2.4, 17.7)

General Description

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3. TRANSMISSION CASE



AT-07297

- | | | |
|--------------------|------------------------|-----------------------|
| (1) Snap ring | (11) Ball bearing | (21) CVTF outlet pipe |
| (2) Roller bearing | (12) O-ring | (22) CVTF inlet pipe |
| (3) Seal ring | (13) Plug | (23) Gasket |
| (4) Oil seal | (14) Plug | |
| (5) O-ring | (15) O-ring | |
| (6) Plug | (16) Transmission case | |
| (7) Plug | (17) Roller bearing | |
| (8) Gasket | (18) Snap ring | |
| (9) Straight pin | (19) Lubrication pipe | |
| (10) Seal ring | (20) O-ring | |

Tightening torque: N·m (kgf·m, ft·lb)

T1: 13 (1.3, 9.6)

T2: 16 (1.6, 11.8)

T3: 25 (2.5, 18.4)

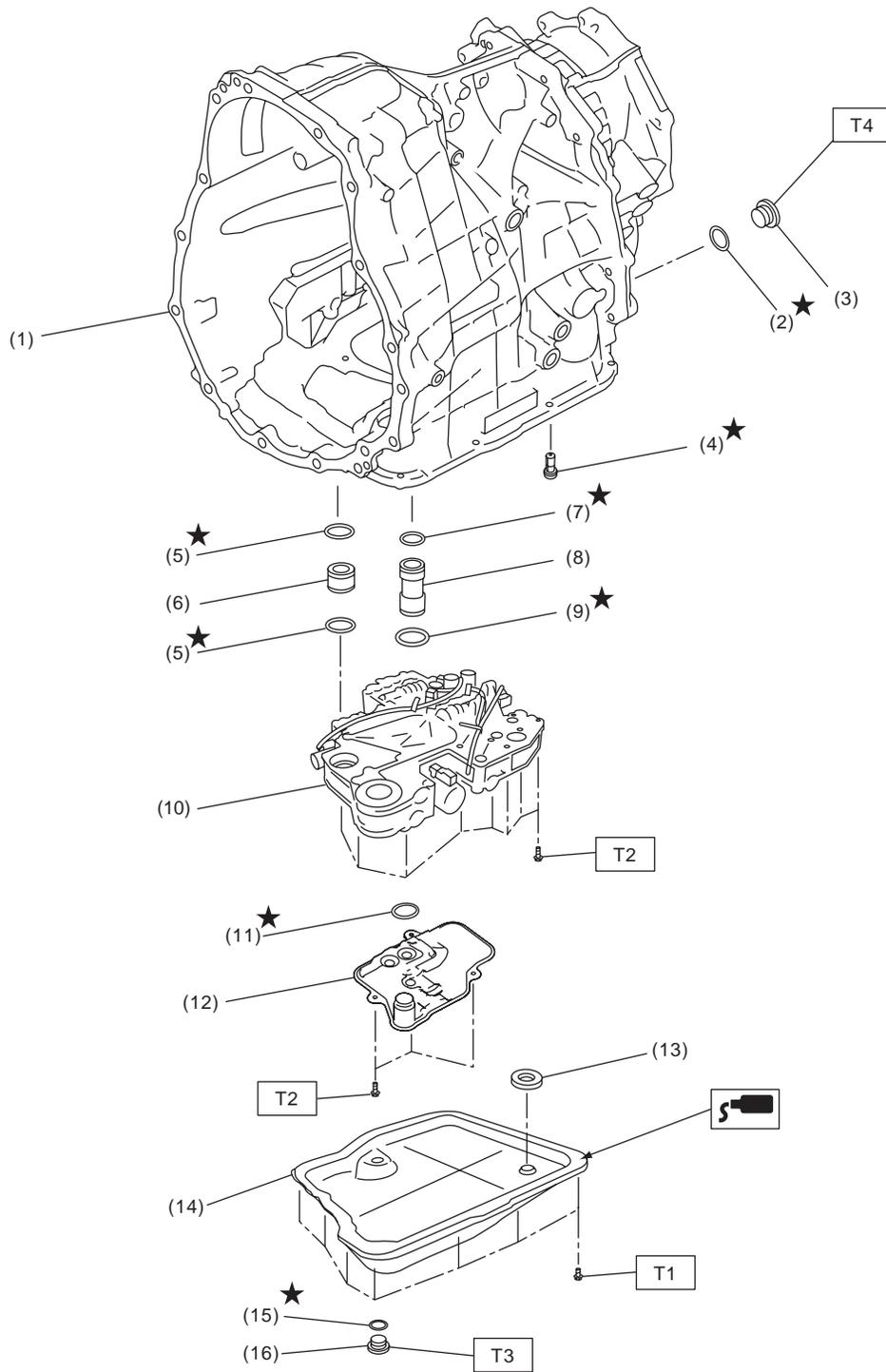
T4: 35 (3.6, 25.8)

T5: 40 (4.1, 29.5)

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4. CONTROL VALVE BODY



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CVT00580

General Description

CONTINUOUSLY VARIABLE TRANSMISSION

- (1) Transmission case
- (2) Gasket
- (3) Filler plug
- (4) CVTF filter
- (5) O-ring
- (6) Pressure pipe
- (7) O-ring (small)
- (8) CVTF pipe

- (9) O-ring (large)
- (10) Control valve body
- (11) O-ring
- (12) Oil strainer
- (13) Magnet
- (14) Oil pan
- (15) Gasket

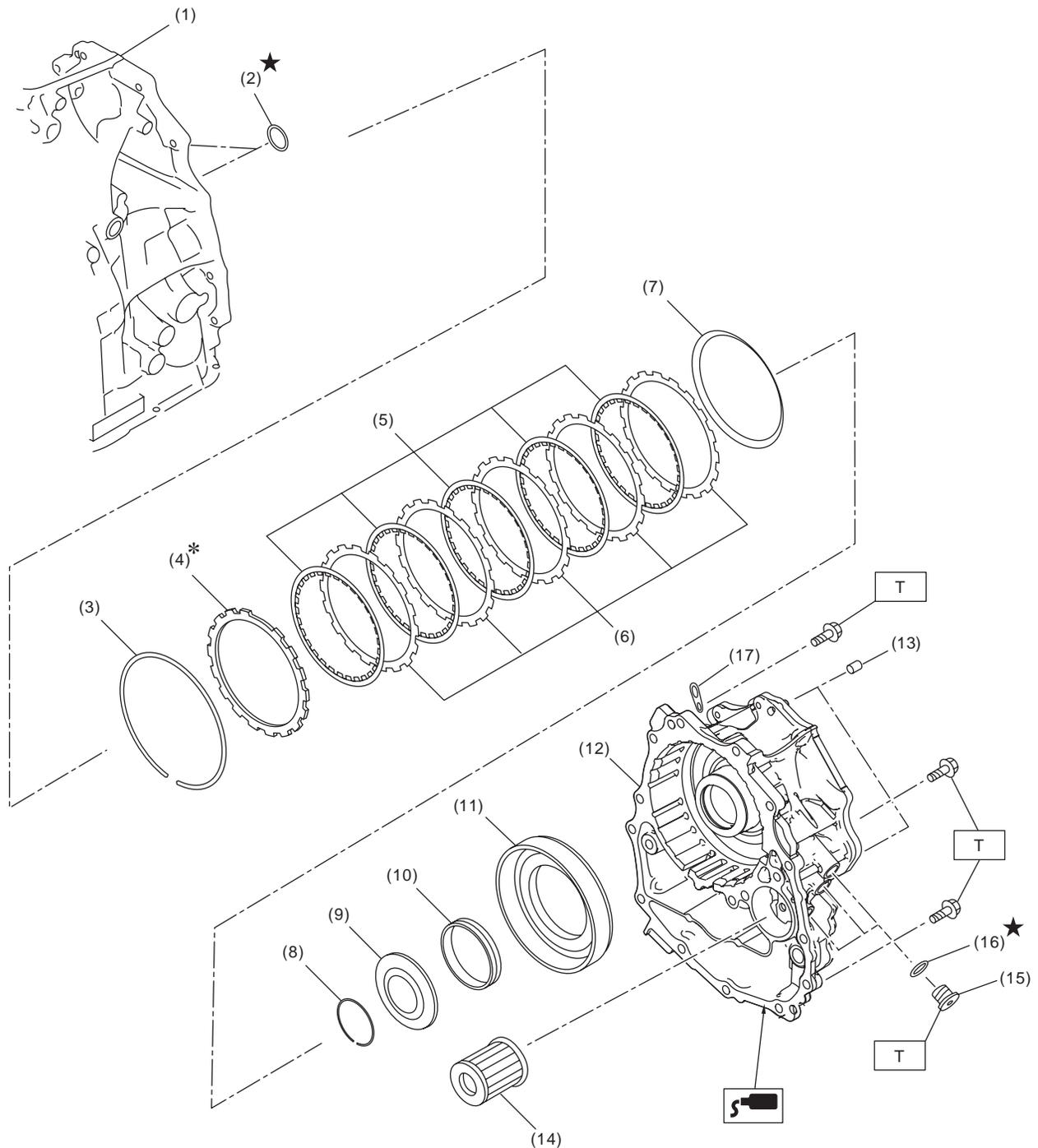
- (16) CVTF drain plug

Tightening torque:N·m (kgf-m, ft-lb)***T1: 5 (0.5, 3.7)******T2: 9 (0.9, 6.6)******T3: 39.2 (4.0, 28.9)******T4: 50 (5.1, 36.9)***

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5. REVERSE BRAKE ASSEMBLY AND INTERMEDIATE CASE



- | | | |
|-----------------------|---------------------------|--------------------------|
| (1) Transmission case | (8) Snap ring | (15) Plug |
| (2) O-ring | (9) Spring retainer | (16) O-ring |
| (3) Snap ring | (10) Return spring | (17) Transmission hanger |
| (4) Retaining plate | (11) Reverse brake piston | |
| (5) Drive plate | (12) Intermediate case | |
| (6) Driven plate | (13) Straight pin | |
| (7) Dish plate | (14) CVTF filter | |

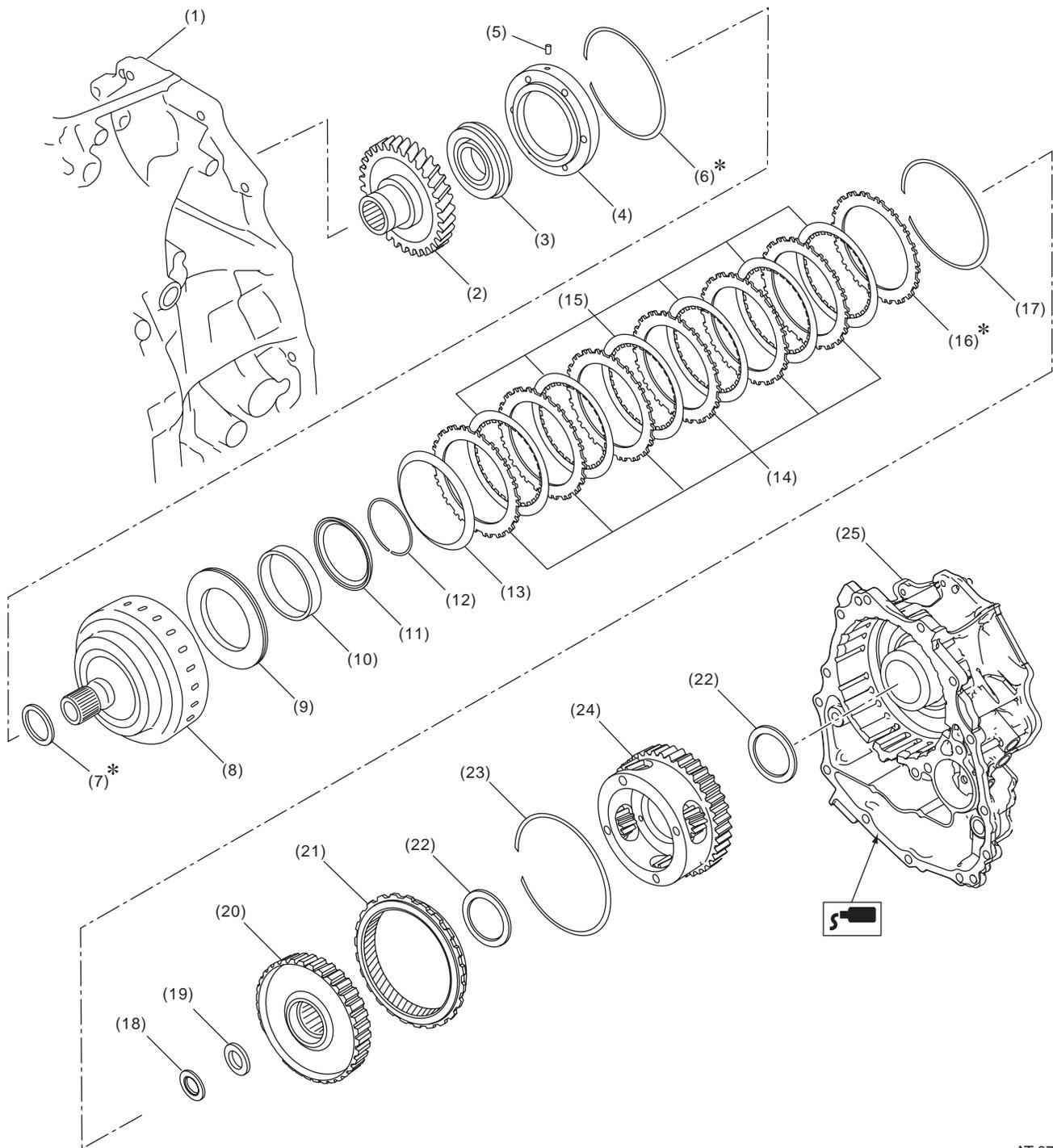
Tightening torque: N·m (kgf·m, ft·lb)
T: 25 (2.5, 18.4)

AT-07299

General Description

CONTINUOUSLY VARIABLE TRANSMISSION

6. FORWARD CLUTCH ASSEMBLY AND REDUCTION DRIVEN GEAR



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AT-07300

CVT(TR690)-12

General Description

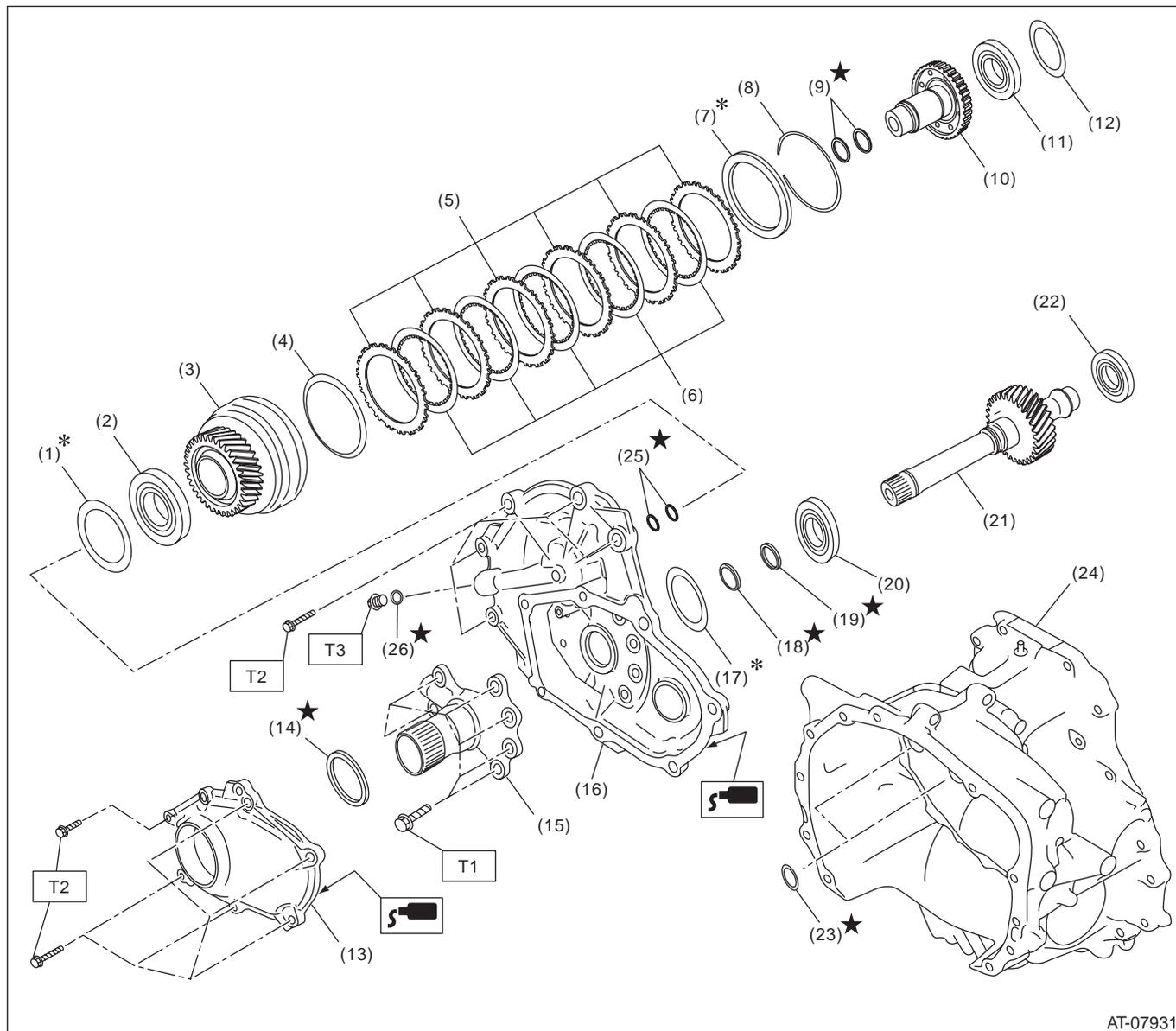
CONTINUOUSLY VARIABLE TRANSMISSION

- | | | |
|------------------------------------|-------------------------------------|-----------------------------|
| (1) Transmission case | (10) Return spring | (19) Washer |
| (2) Reduction driven gear | (11) Forward clutch piston retainer | (20) Sun gear ASSY |
| (3) Ball bearing | (12) Snap ring | (21) Internal gear |
| (4) Reduction driven gear retainer | (13) Dish plate | (22) Thrust needle bearing |
| (5) Straight pin | (14) Driven plate | (23) Snap ring |
| (6) Snap ring | (15) Drive plate | (24) Planetary carrier ASSY |
| (7) Washer | (16) Retaining plate | (25) Intermediate case |
| (8) Forward clutch drum | (17) Snap ring | |
| (9) Forward clutch piston | (18) Thrust needle bearing | |

General Description

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7. FRONT REDUCTION DRIVE GEAR AND FRONT REDUCTION DRIVEN GEAR



AT-07931

- | | |
|-----------------------------------|---------------------------------|
| (1) Shim | (12) Shim |
| (2) Ball bearing | (13) Oil pump chain cover |
| (3) Front reduction driven gear | (14) Seal ring |
| (4) Dish plate | (15) Center support COMPL |
| (5) Driven plate | (16) Converter case cover |
| (6) Drive plate | (17) Shim |
| (7) Retaining plate | (18) O-ring |
| (8) Snap ring | (19) Seal ring |
| (9) Seal ring | (20) Ball bearing |
| (10) Front reduction driven shaft | (21) Front reduction drive gear |
| (11) Ball bearing | (22) Ball bearing |

- | |
|---------------------|
| (23) O-ring |
| (24) Converter case |
| (25) Seal ring |
| (26) O-ring |

Tightening torque: N·m (kgf·m, ft·lb)

T1: 21.5 (2.2, 15.9)

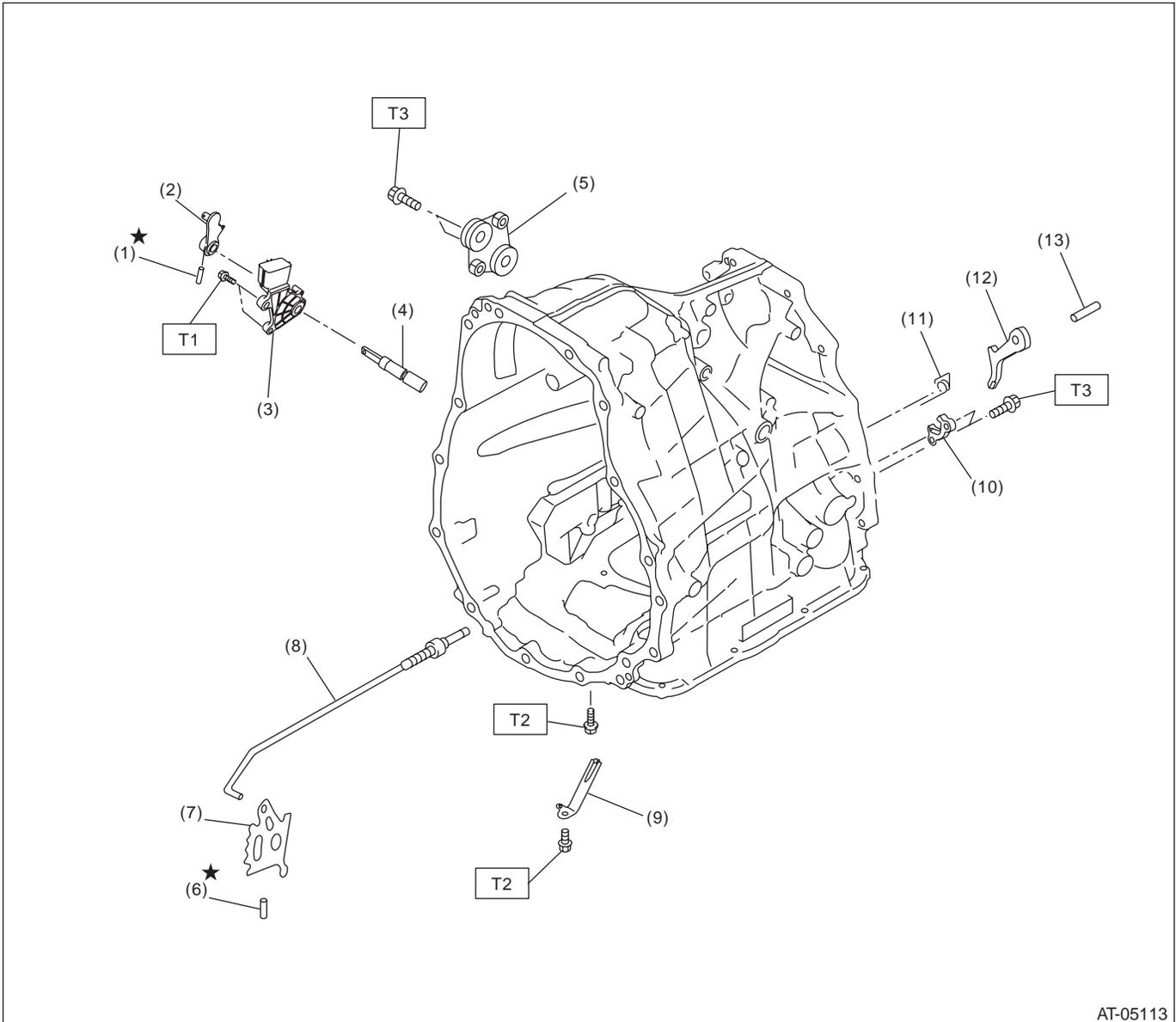
T2: 24 (2.4, 17.7)

T3: 25 (2.5, 18.4)

General Description

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8. TRANSMISSION CONTROL DEVICE



AT-05113

- | | |
|-----------------------|----------------------|
| (1) Spring pin | (8) Parking rod |
| (2) Shifter arm | (9) Detent spring |
| (3) Inhibitor switch | (10) Parking support |
| (4) Shifter arm shaft | (11) Return spring |
| (5) Plate ASSY | (12) Parking pawl |
| (6) Spring pin | (13) Shaft |
| (7) Manual plate | |

Tightening torque: N·m (kgf·m, ft·lb)

T1: 5 (0.5, 3.7)

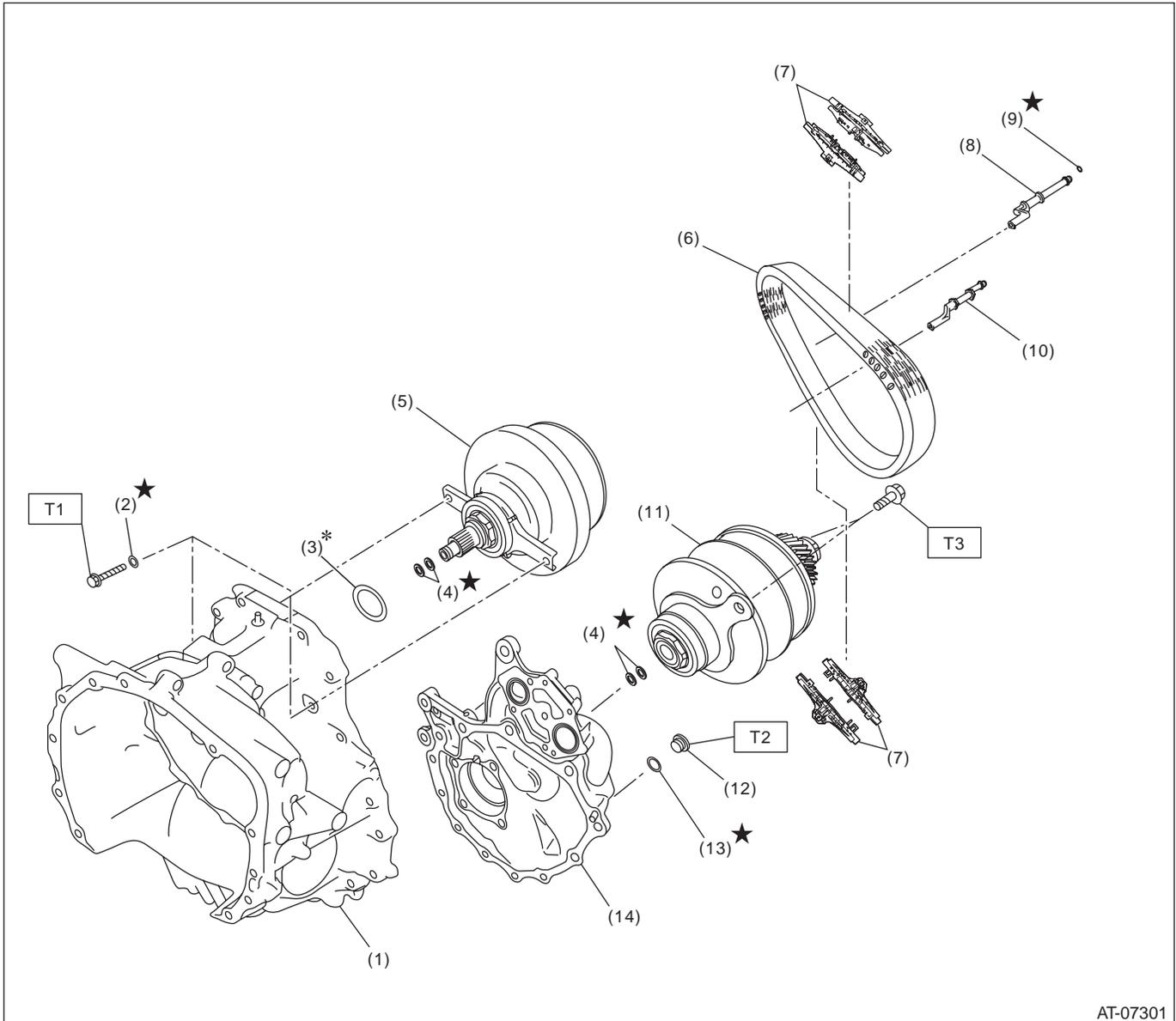
T2: 7 (0.7, 5.2)

T3: 25 (2.5, 18.4)

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9. PRIMARY PULLEY, SECONDARY PULLEY AND VARIATOR CHAIN



AT-07301

- | | |
|-------------------------|----------------------------|
| (1) Converter case | (8) Lubrication pipe |
| (2) Seal washer | (9) O-ring |
| (3) Shim | (10) Support rod |
| (4) Seal ring | (11) Secondary pulley ASSY |
| (5) Primary pulley ASSY | (12) Plug |
| (6) Variator chain | (13) O-ring |
| (7) Chain guide | (14) Drive pinion retainer |

Tightening torque: N·m (kgf·m, ft·lb)

T1: 21 (2.1, 15.5)

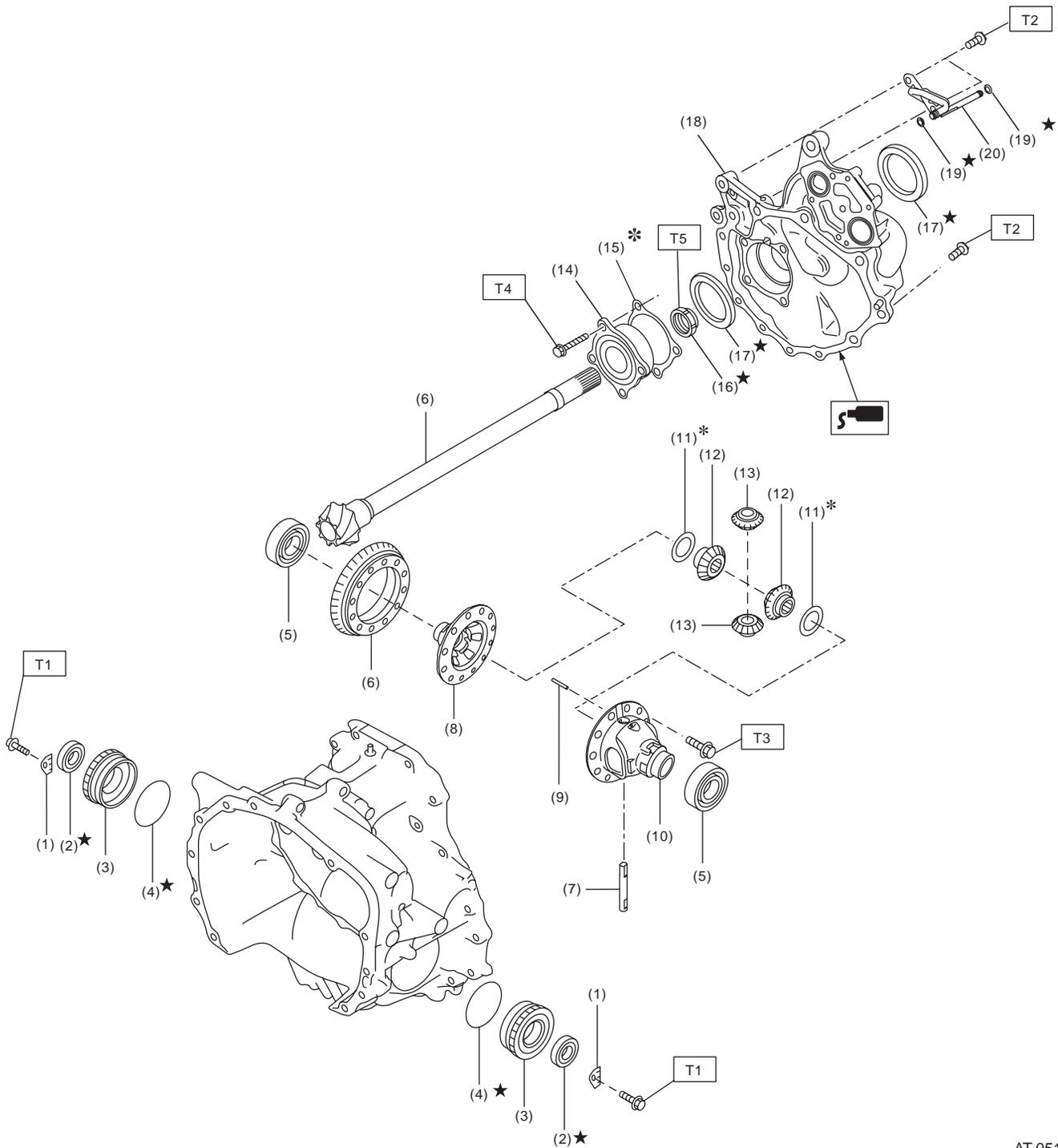
T2: 25 (2.5, 18.4)

T3: 33 (3.4, 24.3)

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10.FRONT DIFFERENTIAL GEAR



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AT-05115

CVT(TR690)-17

General Description

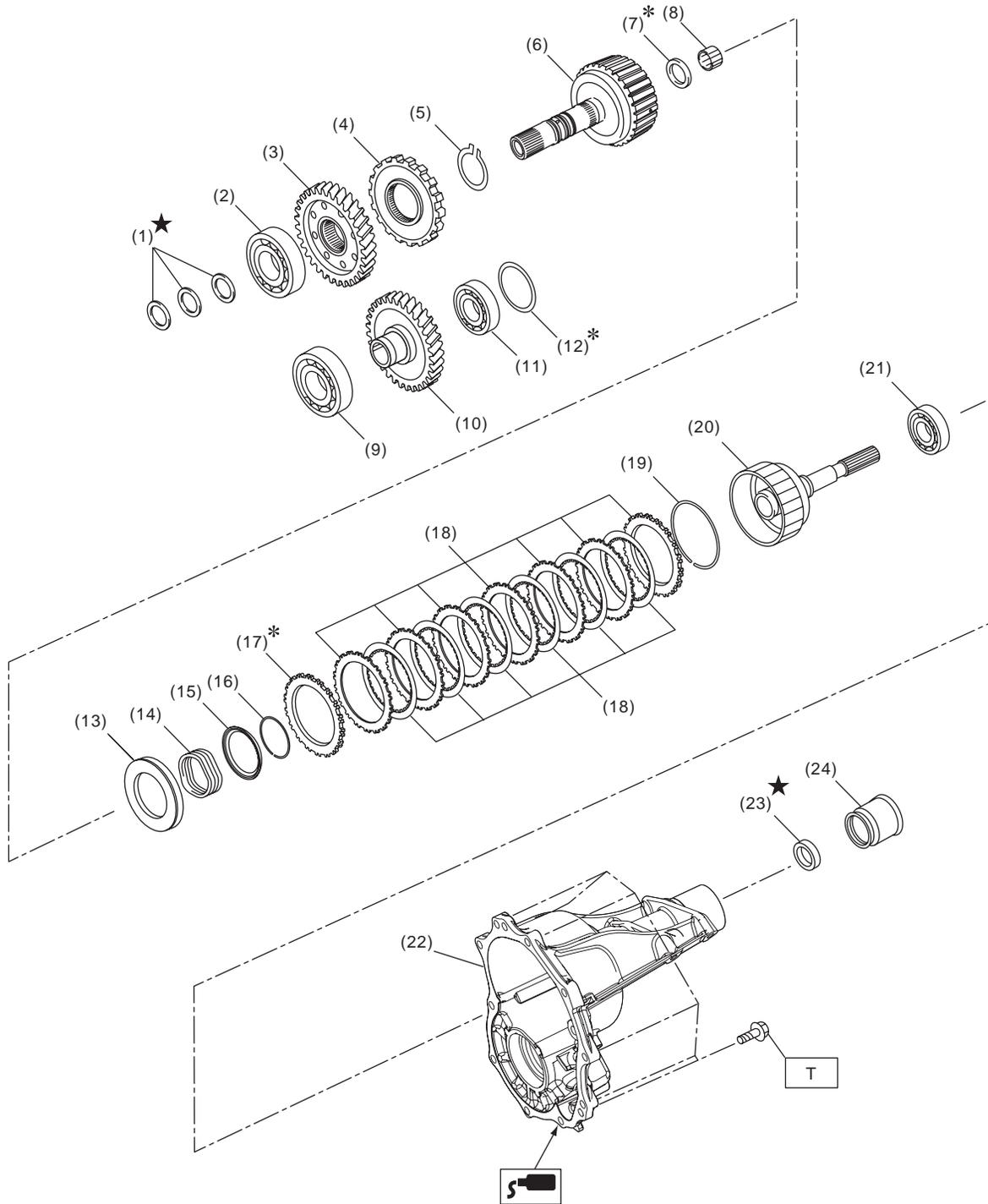
CONTINUOUSLY VARIABLE TRANSMISSION

(1) Lock plate	(10) Differential case LH	(19) O-ring
(2) Oil seal	(11) Washer	(20) Lubrication pipe
(3) Differential side retainer	(12) Differential bevel gear	
(4) O-ring	(13) Differential bevel pinion	<hr/>
(5) Taper roller bearing	(14) Taper roller bearing	Tightening torque: N·m (kgf·m, ft·lb)
(6) Drive pinion gear set	(15) Shim	T1: 25 (2.5, 18.4)
(7) Pinion shaft	(16) Lock nut	T2: 43 (4.4, 31.7)
		T3: <Ref. to CVT(TR690)-277, DIF- FERENTIAL CASE ASSEMBLY, ASSEMBLY, Front Differential Assembly.>
(8) Differential case RH	(17) Oil seal	T4: 70 (7.1, 51.6)
(9) Straight pin	(18) Drive pinion retainer	T5: 130 (13.3, 95.9)

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11. TRANSFER AND EXTENSION CASE



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AT-07860

General Description

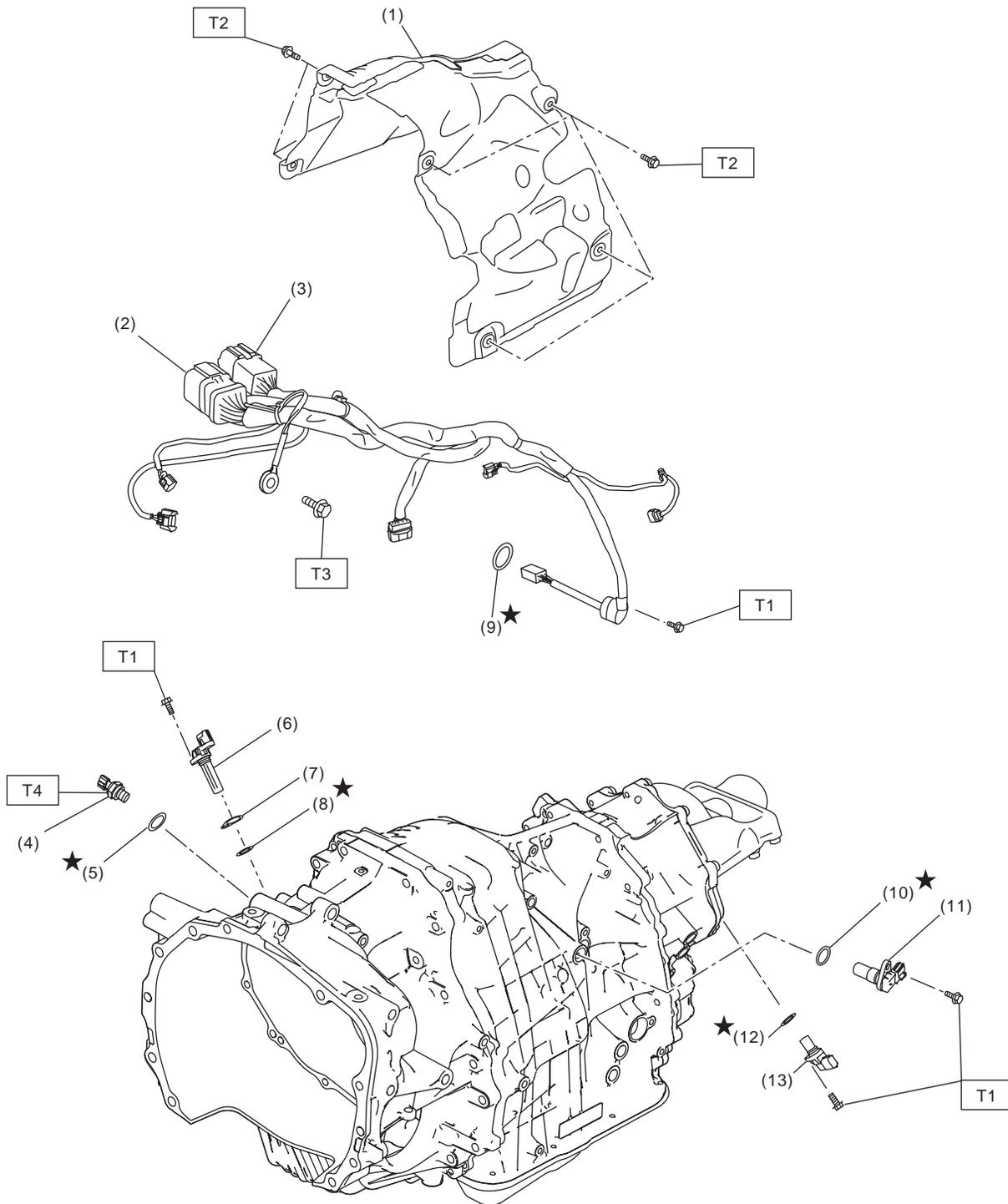
CONTINUOUSLY VARIABLE TRANSMISSION

(1) Seal ring	(10) Transfer reduction driven gear	(19) Snap ring
(2) Ball bearing	(11) Ball bearing	(20) Rear drive shaft
(3) Transfer drive gear	(12) Shim	(21) Ball bearing
(4) Parking gear	(13) Transfer piston	(22) Extension case
(5) Snap ring	(14) Return spring	(23) Oil seal
(6) Reduction drive gear shaft	(15) Transfer piston seal	(24) Dust cover
(7) Thrust needle bearing	(16) Snap ring	
(8) Needle bearing	(17) Pressure plate	<hr/> Tightening torque: N·m (kgf·m, ft·lb)
(9) Ball bearing	(18) Transfer clutch plate set	T: 25 (2.5, 18.4) <hr/>

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CONTINUOUSLY VARIABLE TRANSMISSION

12. TRANSMISSION HARNESS AND SENSOR



AT-07861

- | | |
|-------------------------------|-------------------------------|
| (1) Transmission cover | (8) O-ring |
| (2) Transmission harness | (9) O-ring |
| (3) Inhibitor harness | (10) O-ring |
| (4) Secondary pressure sensor | (11) Secondary speed sensor |
| (5) O-ring | (12) O-ring |
| (6) Primary speed sensor | (13) Front wheel speed sensor |
| (7) Spacer | |

Tightening torque: N·m (kgf·m, ft·lb)

T1: 5 (0.5, 3.7)

T2: 8 (0.8, 5.9)

T3: 16 (1.6, 11.8)

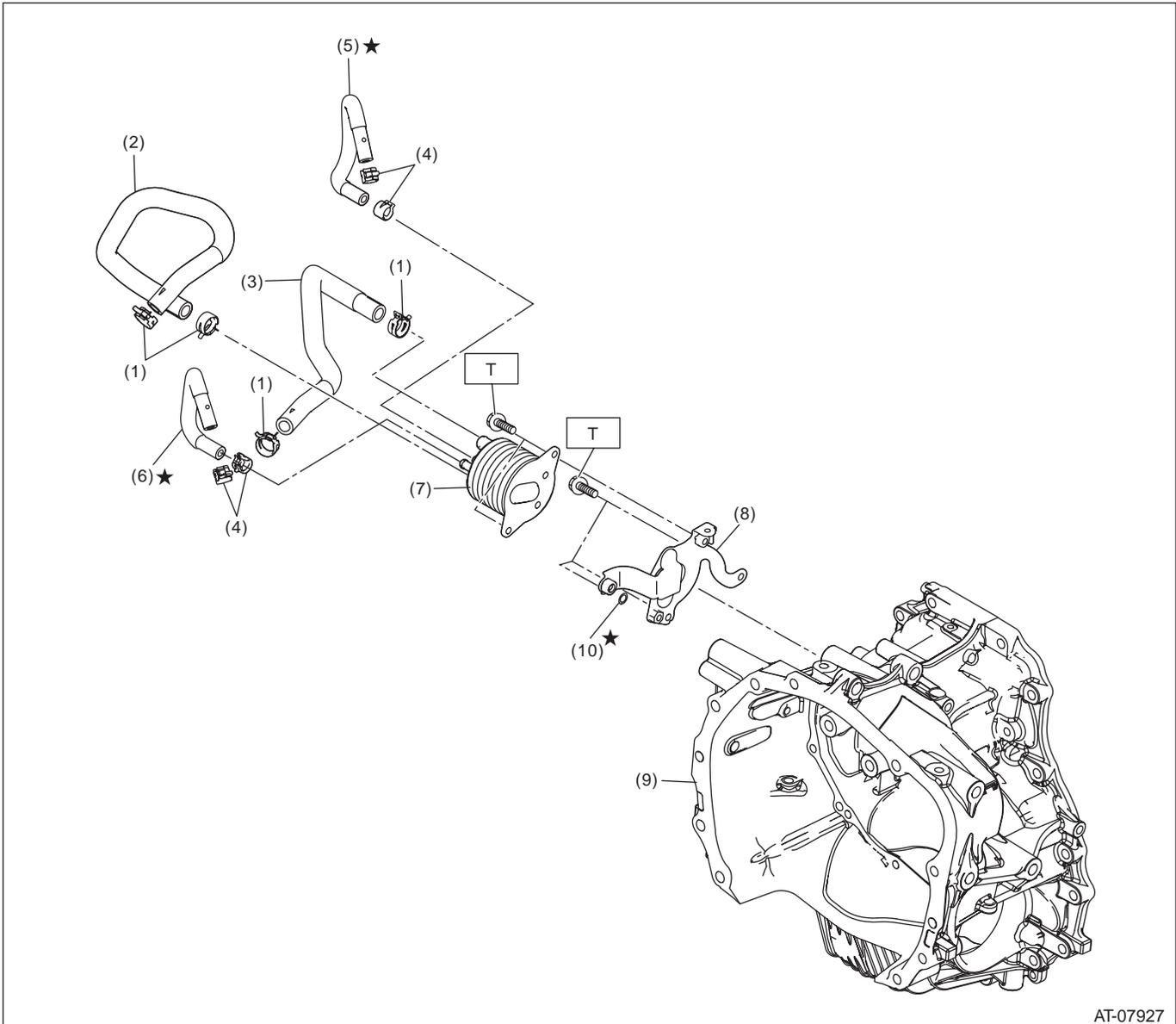
T4: 39 (4.0, 28.8)

CVT(TR690)-21

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13.CVTF COOLER (WITH WARMER FEATURE)



AT-07927

- | | |
|--------------------------------|---------------------------------------|
| (1) Hose clamp | (6) CVTF cooler outlet hose |
| (2) Engine coolant outlet hose | (7) CVTF cooler (with warmer feature) |
| (3) Engine coolant inlet hose | (8) CVTF cooler bracket |
| (4) Hose clamp | (9) Converter case |
| (5) CVTF cooler inlet hose | (10) O-ring |

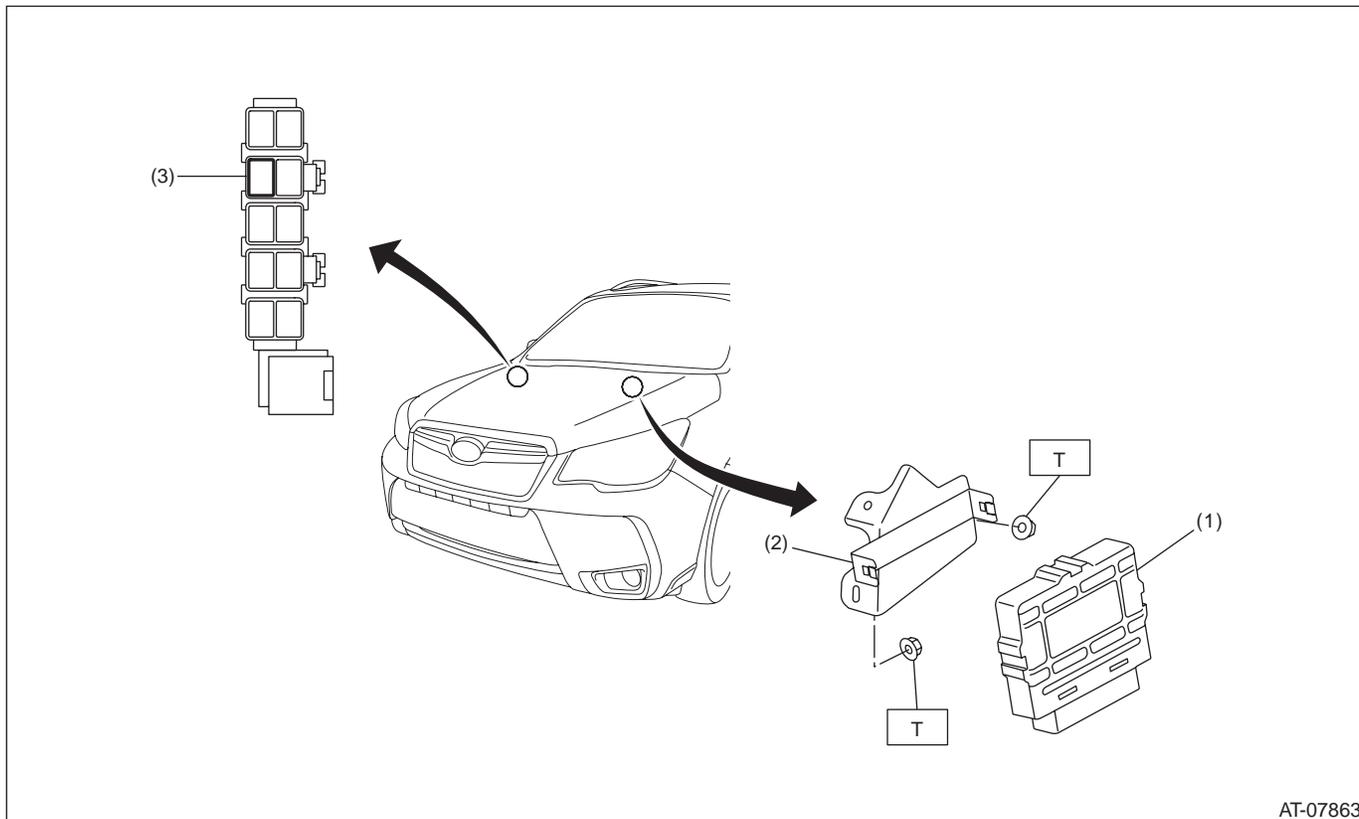
Tightening torque: N·m (kgf·m, ft·lb)

T: 23 (2.3, 17.0)

General Description

CONTINUOUSLY VARIABLE TRANSMISSION

14. TRANSMISSION CONTROL MODULE



AT-07863

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

Tightening torque: N·m (kgf·m, ft·lb)

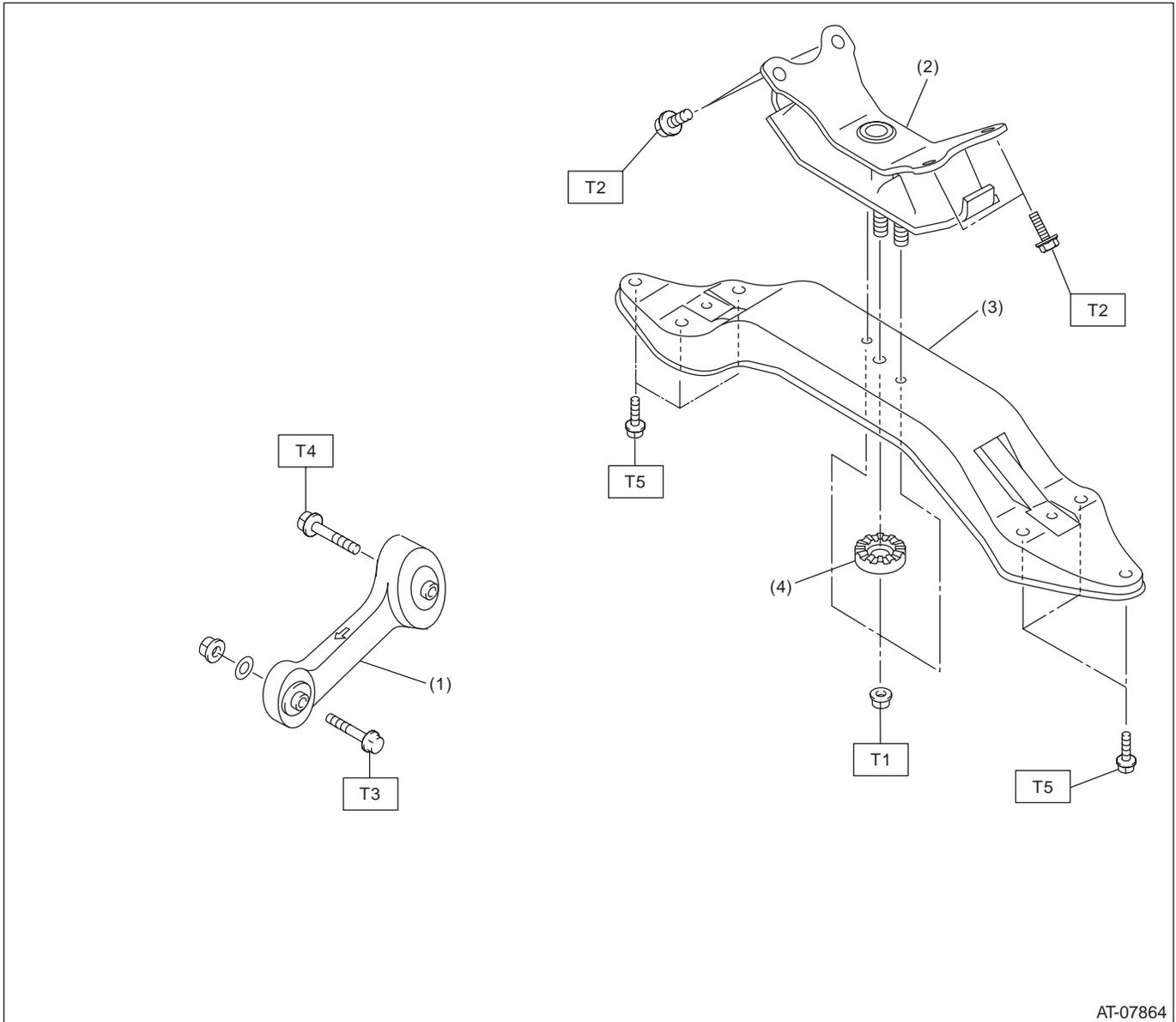
T: 7.5 (0.8, 5.5)

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General Description

CONTINUOUSLY VARIABLE TRANSMISSION

15. 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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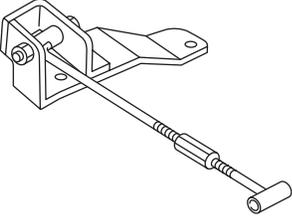
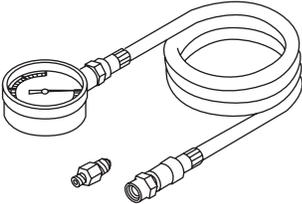
CONTINUOUSLY VARIABLE TRANSMISSION

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 oil pan 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.
- Apply CVTF onto the press-fitting surface of the part before press-fitting the part using a press.
- Replace deformed or damaged snap rings with new parts.
- Before installing O-rings or oil seals, apply sufficient amount of CVTF 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.

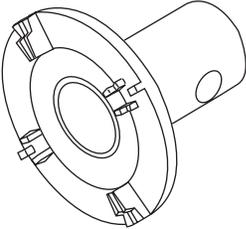
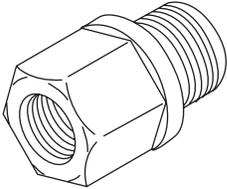
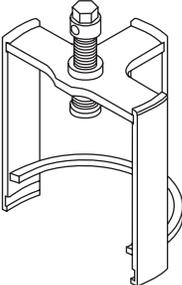
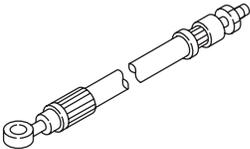
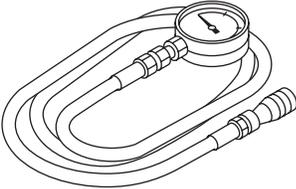
D: PREPARATION TOOL

1. SPECIAL TOOL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p>ST41099AC000</p>	41099AC000	ENGINE SUPPORT ASSY	Used for supporting engine.
 <p>ST18801AA000</p>	18801AA000	OIL PRESSURE GAUGE ASSY	Used for measuring the secondary pressure (line pressure).

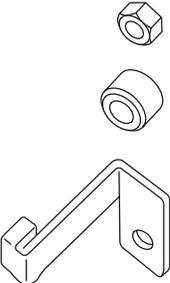
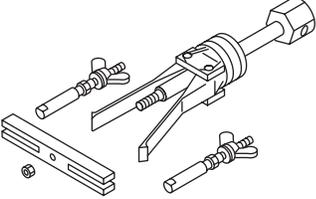
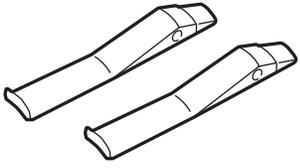
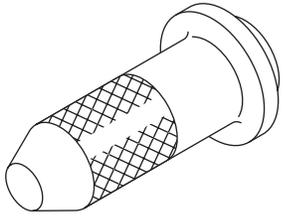
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ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p style="text-align: center;">ST18658AA020</p>	18658AA020	WRENCH COMPL RETAINER	Used for removing and installing the differential side retainer.
 <p style="text-align: center;">ST18681AA000</p>	18681AA000	PRESSURE GAUGE ADAPTER	Used for measuring oil pressure. NOTE: Used together with the genuine O-ring (part No. 806911080).
 <p style="text-align: center;">ST18769AA000</p>	18769AA000	EXPANDER PULLEY	Used for removing and installing the secondary pulley assembly.
 <p style="text-align: center;">ST-498897700</p>	498897700	OIL PRESSURE ADAPTER SET	Used for measuring the secondary pressure (line pressure) and transfer clutch hydraulic pressure.
 <p style="text-align: center;">ST-498575400</p>	498575400	OIL PRESSURE GAUGE ASSY	Used for measuring the transfer clutch hydraulic pressure.

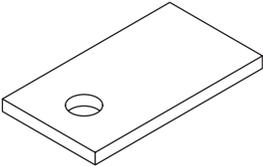
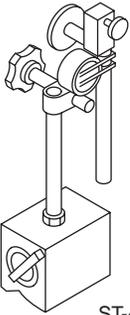
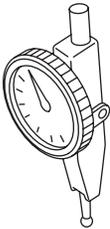
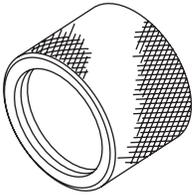
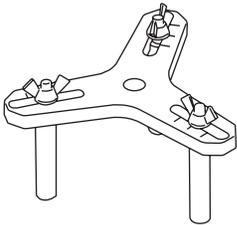
General Description

CONTINUOUSLY VARIABLE TRANSMISSION

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p>ST-498277200</p>	498277200	STOPPER SET	<ul style="list-style-type: none"> • Used for removing and installing automatic transmission assembly to engine. • Used for preventing the torque converter from dropping off.
 <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 roller bearing of the primary pulley and secondary pulley. • Used for removing the bearing of reduction driven gear. • Used for removing the differential side retainer bearing outer race.
 <p>ST18760AA000</p>	18760AA000	CLAW	<ul style="list-style-type: none"> • Used for removing ball bearing of front reduction driven gear. • Used together with PULLER ASSY (398527700).
 <p>ST-498057300</p>	498057300	INSTALLER	Used for installing the extension case oil seal.
 <p>ST18632AA000</p>	18632AA000	TRANSMISSION STAND	Used for disassembling and assembling the transmission.

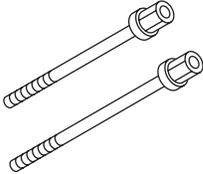
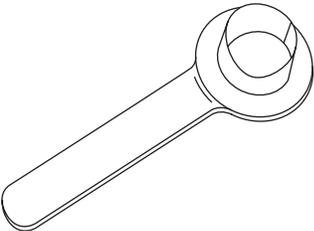
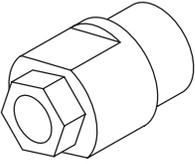
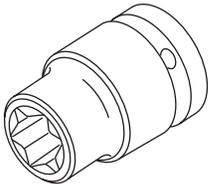
General Description

CONTINUOUSLY VARIABLE TRANSMISSION

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

General Description

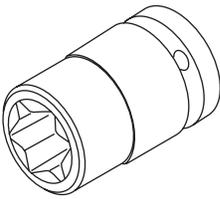
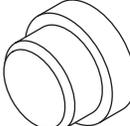
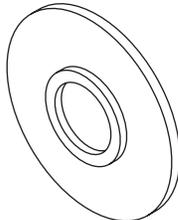
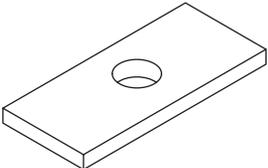
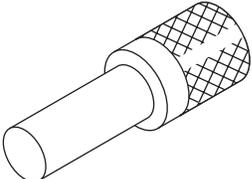
CONTINUOUSLY VARIABLE TRANSMISSION

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p>ST18765AA000</p>	18765AA000	COMPRESSOR SUPPORT	Used for disassembling and installing the multi-plate clutch for shifting.
 <p>ST18763AA000</p>	18763AA000	COMPRESSOR SHAFT	Used for disassembling and installing the multi-plate clutch for shifting.
 <p>ST28399SA010</p>	28399SA010	OIL SEAL PROTECTOR	Used for protecting oil seal when installing front drive shaft.
 <p>ST18667AA010</p>	18667AA010	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>ST18270KA010</p>	18270KA010	SOCKET (E16)	Used for removing and installing the center support COMPL.

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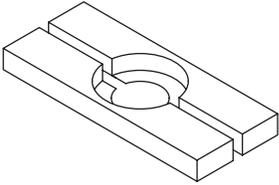
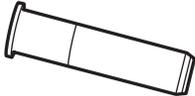
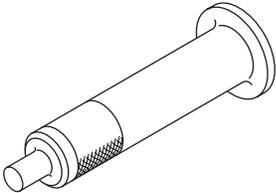
General Description

CONTINUOUSLY VARIABLE TRANSMISSION

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p>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.
 <p>ST-398497701</p>	398497701	SEAT	Used for removing and installing the ball bearing.
 <p>ST-398177700</p>	398177700	INSTALLER	<ul style="list-style-type: none"> • Used for removing and installing the ball bearing and tapered roller bearing. • Used for installing the parking gear.
 <p>ST-398643600</p>	398643600	GAUGE	Used for measuring the total end play, extension end play and drive pinion height.
 <p>ST-899864100</p>	899864100	REMOVER	Used for removing and installing the ball bearing.

General Description

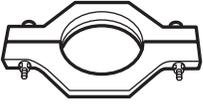
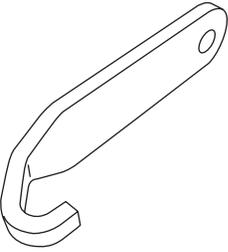
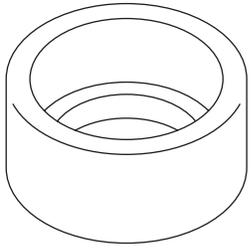
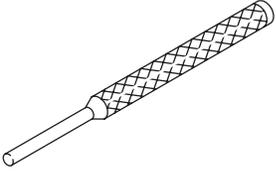
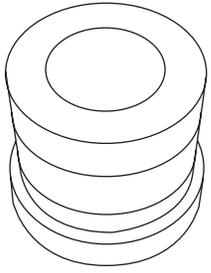
CONTINUOUSLY VARIABLE TRANSMISSION

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p>ST-498077000</p>	498077000	REMOVER	<ul style="list-style-type: none"> • Used for removing ball bearing of front reduction drive gear. • Used for removing the inner bearing inner race of the drive pinion shaft. • Used for removing the differential taper roller bearing.
 <p>ST18657AA010</p>	18657AA010	INSTALLER	Used for installing the oil seal of inhibitor switch.
 <p>ST18657AA020</p>	18657AA020	OIL SEAL INSTALLER	Used for installing the oil seal.
 <p>ST18621AA000</p>	18621AA000	ADAPTER WRENCH	Used for removing and installing the drive pinion shaft lock nut.
 <p>ST18651AA000</p>	18651AA000	INSTALLER	Used for installing the bearing of front reduction drive gear.

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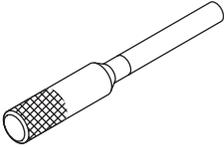
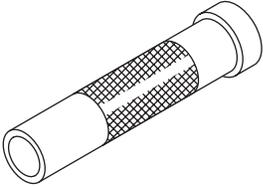
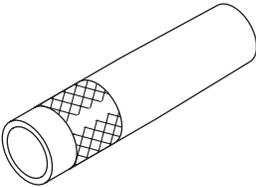
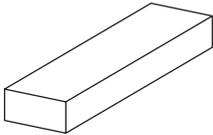
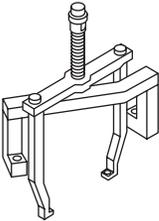
General Description

CONTINUOUSLY VARIABLE TRANSMISSION

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p style="text-align: center;">ST18720AA000</p>	18720AA000	REMOVER	Used for removing ball bearing of reduction driven gear.
 <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;">ST20299AG010</p>	20299AG010	PRESS SNAP RING	Used for installing the bearing on primary pulley side.
 <p style="text-align: center;">ST-398791600</p>	398791600	REMOVER	Used for removing and installing the shifter arm spring pin.
 <p style="text-align: center;">ST-399513600</p>	399513600	INSTALLER	<ul style="list-style-type: none"> • Used to install the rear drive shaft ball bearing. • Used for removing the bearing of the oil pump chain sprocket.

General Description

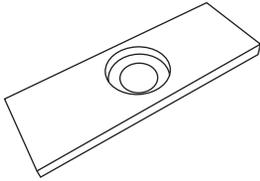
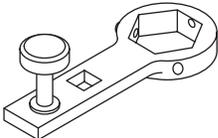
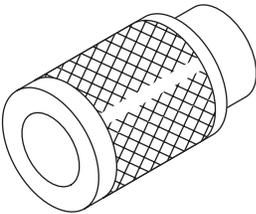
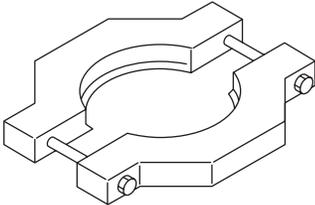
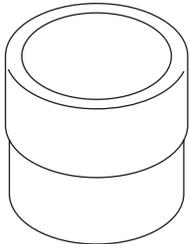
CONTINUOUSLY VARIABLE TRANSMISSION

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 front differential taper roller bearing. • Used for removing and installing the transfer reduction drive gear. • Used for installing the ball bearing of the transfer reduction drive gear. • Used for installing the oil seal. • Used for installing the ball bearing of the transfer reduction driven gear.
 <p>ST-499277200</p>	499277200	INSTALLER	<ul style="list-style-type: none"> • Used for installing the inner bearing inner race of drive pinion shaft. • Used for installing the reduction driven gear.
 <p>ST-499575400</p>	499575400	GAUGE	Used for measuring height of end play.
 <p>ST-499737100</p>	499737100	PULLER SET	<ul style="list-style-type: none"> • Used for measuring the transfer end play. • Use the rack only.

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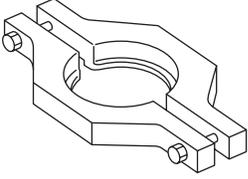
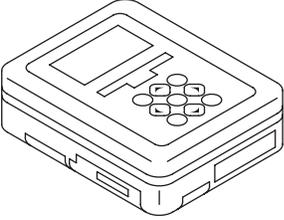
General Description

CONTINUOUSLY VARIABLE TRANSMISSION

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <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	Used for measuring the differential pinion shaft backlash.
 <p style="text-align: center;">ST-499757002</p>	499757002	INSTALLER	Used for removing the bearing of front reduction driven gear.
 <p style="text-align: center;">ST18767AA000</p>	18767AA000	BEARING REMOVER	<ul style="list-style-type: none"> • Used for removing the transfer reduction drive gear. • Used for removing the reduction driven gear bearing retainer.
 <p style="text-align: center;">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 ball bearing of the front reduction driven gear.

General Description

CONTINUOUSLY VARIABLE TRANSMISSION

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p>ST-498077600</p>	498077600	REMOVER	<ul style="list-style-type: none"> • Used for removing the ball bearing of the rear drive shaft. • Used for removing the ball bearing of transfer reduction driven gear. • Used for removing ball bearing of reduction driven gear. • Used for removing the ball bearing of drive sprocket.
 <p>ST1B022XU0</p>	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 the clearance in reverse brake, forward clutch, transfer clutch and input clutch.
Caliper	Used for measuring the clearance at the parts.
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 spring pin.
Deep socket	Used for removing and installing the secondary pressure sensor. NOTE: Use Ko-ken 3/8 12-point 27 mm (manufacturer product No. 3305M-27).
Push/pull gauge	Used for measuring clutch clearance.
Angle gauge	<ul style="list-style-type: none"> • Used for installing the hypoid driven gear. • Used for installing the drive plate.

CVTF

CONTINUOUSLY VARIABLE TRANSMISSION

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.

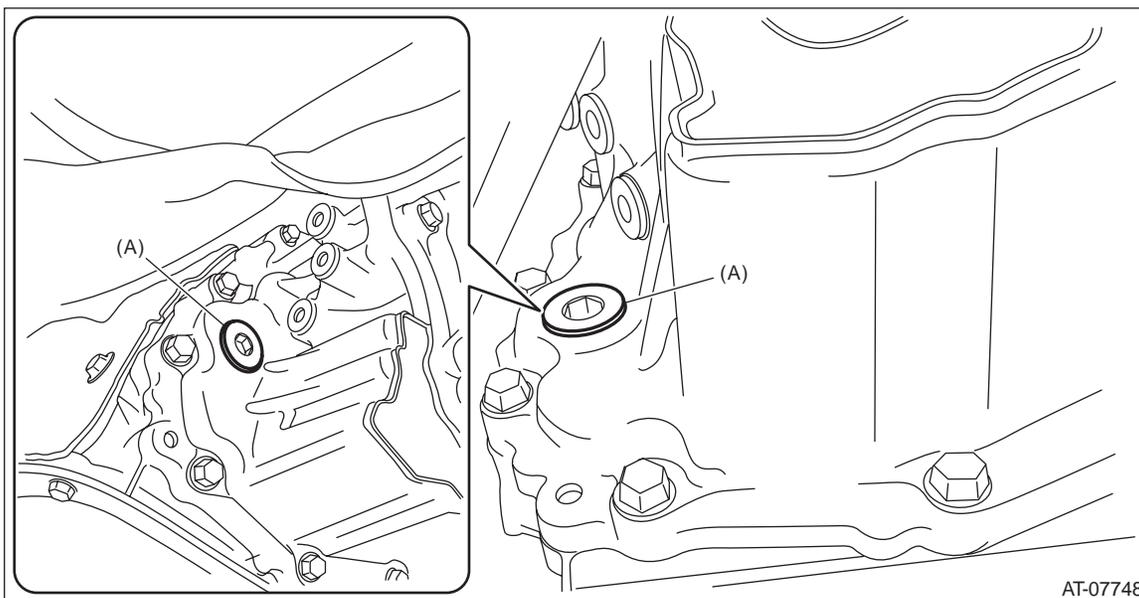
3) With the engine running, lift up the vehicle and remove the filler plug.

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

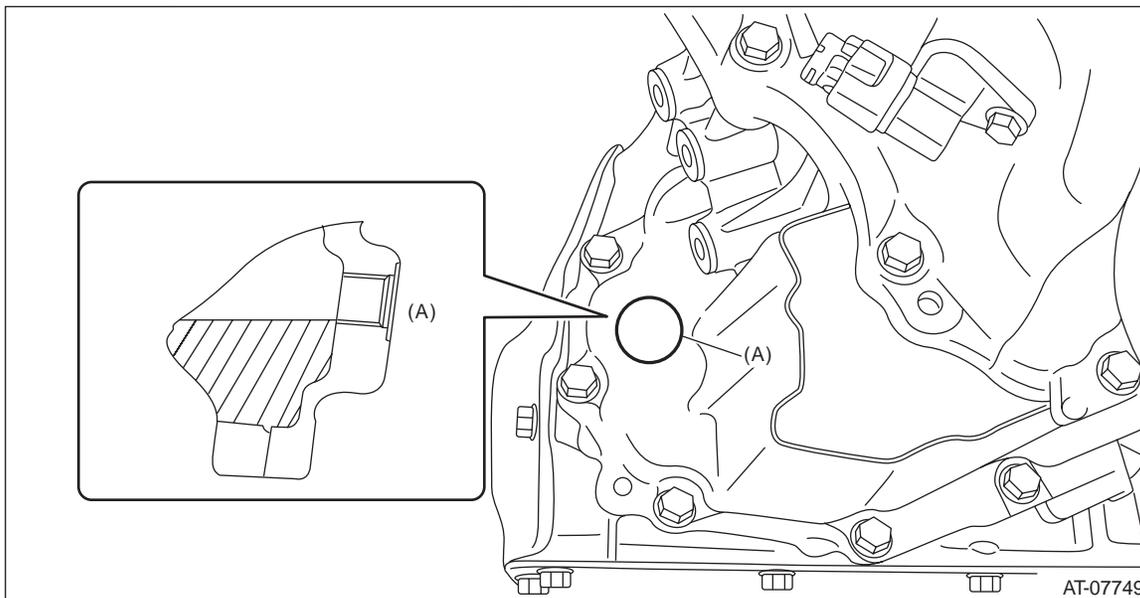
4) When there is no CVTF leakage from the transmission, add the specified fluid up to the filler plug hole lower section.

Specified fluid:

<Ref. to CVT(TR690)-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

5) Install the filler plug.

NOTE:

Use a new gasket.

Tightening torque:

50 N·m (5.1 kgf·m, 36.9 ft·lb)

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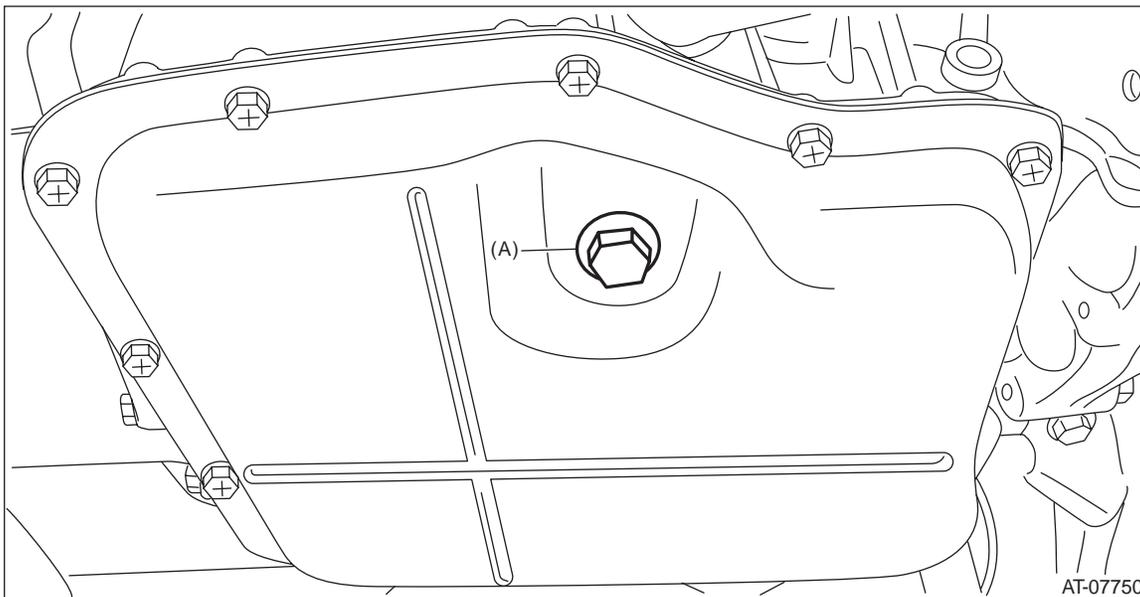
CVTF

CONTINUOUSLY VARIABLE TRANSMISSION

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, and remove the CVTF drain plug.



(A) CVTF drain plug

- 2) Check the CVTF condition. <Ref. to CVT(TR690)-40, CONDITION CHECK, CVTF.>
3) Install the CVTF drain plug and gasket.

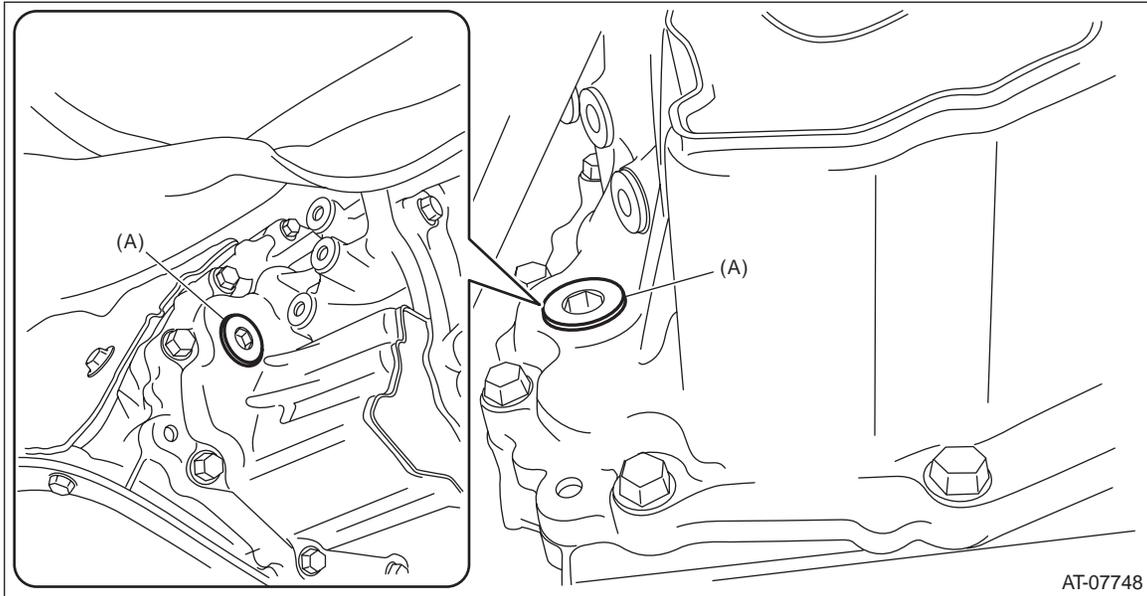
NOTE:

- Use a new gasket.

Tightening torque:

39.2 N·m (4.0 kgf·m, 28.9 ft·lb)

4) Remove the filler plug.



(A) Filler plug

5) Fill in the specified fluid through the filler plug.

Specified fluid:

<Ref. to CVT(TR690)-4, HYDRAULIC CONTROL AND LUBRICATION, SPECIFICATION, General Description.>

Capacity:

Fill with the same amount of CVTF as drained.

6) Temporarily tighten the filler plug.

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

8) 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.

9) Place the select lever in “P” range. Then lift up the vehicle with the engine at idle to adjust the CVTF level and check for leakage. <Ref. to CVT(TR690)-36, ADJUSTMENT, CVTF.>

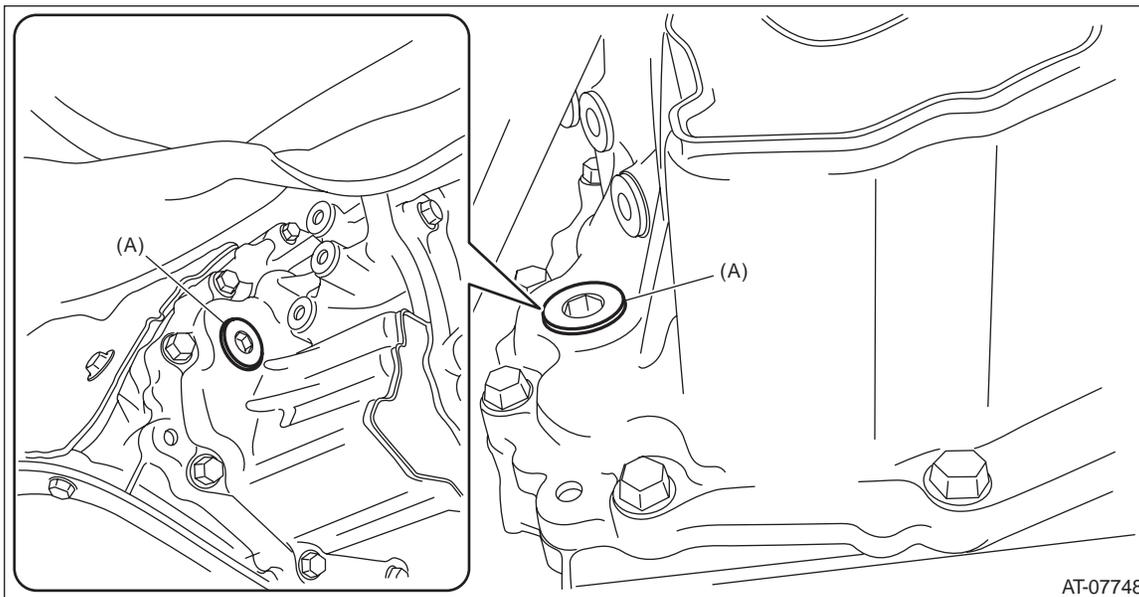
CVTF

CONTINUOUSLY VARIABLE TRANSMISSION

10) 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

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.

3. Differential Gear Oil

A: INSPECTION

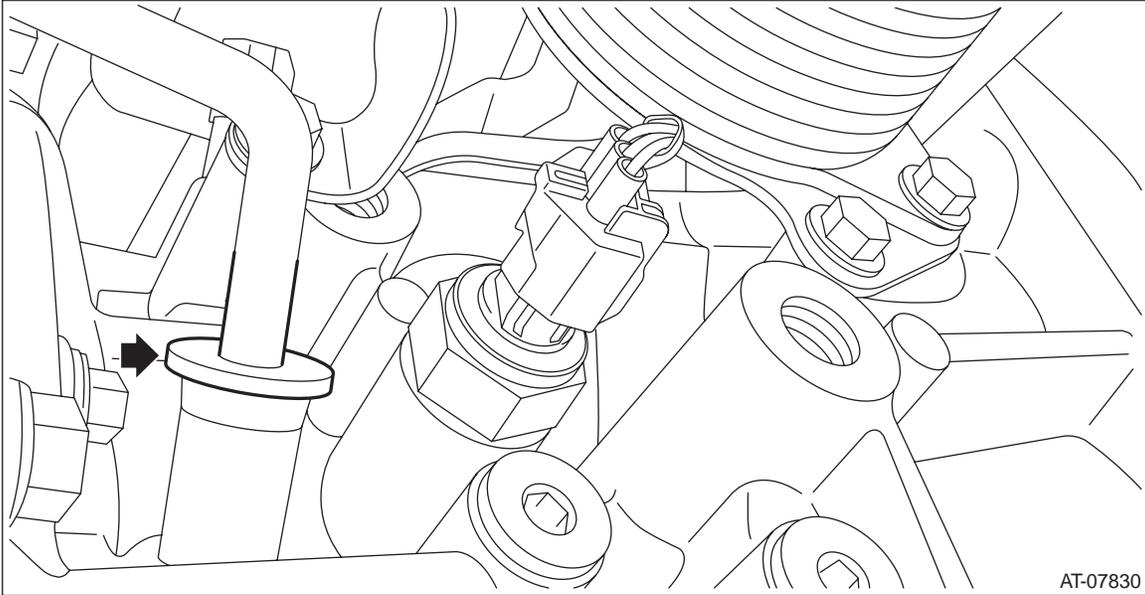
Check that there is no leakage of differential gear oil from the converter case.

B: ADJUSTMENT

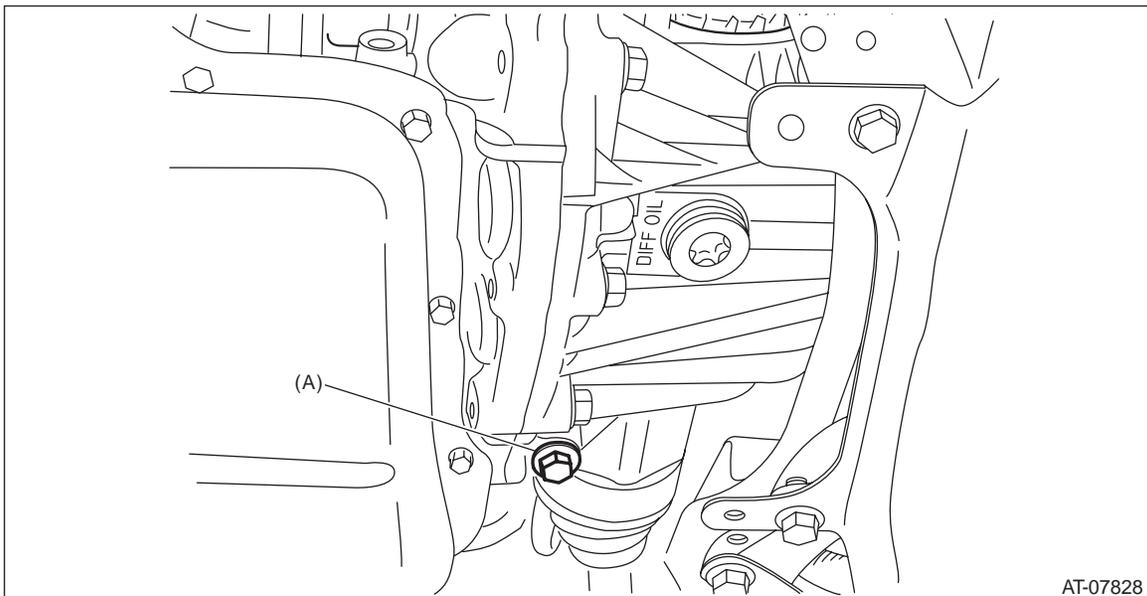
NOTE:

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 air breather cap.



- 3) Remove the overflow drain plug.



(A) Overflow drain plug

Differential Gear Oil

CONTINUOUSLY VARIABLE TRANSMISSION

4) Fill in the differential gear oil through the charge pipe up to where the oil flows out of the overflow drain plug.

Recommended gear oil:

<Ref. to CVT(TR690)-4, FRONT DIFFERENTIAL GEAR OIL, SPECIFICATION, General Description.>

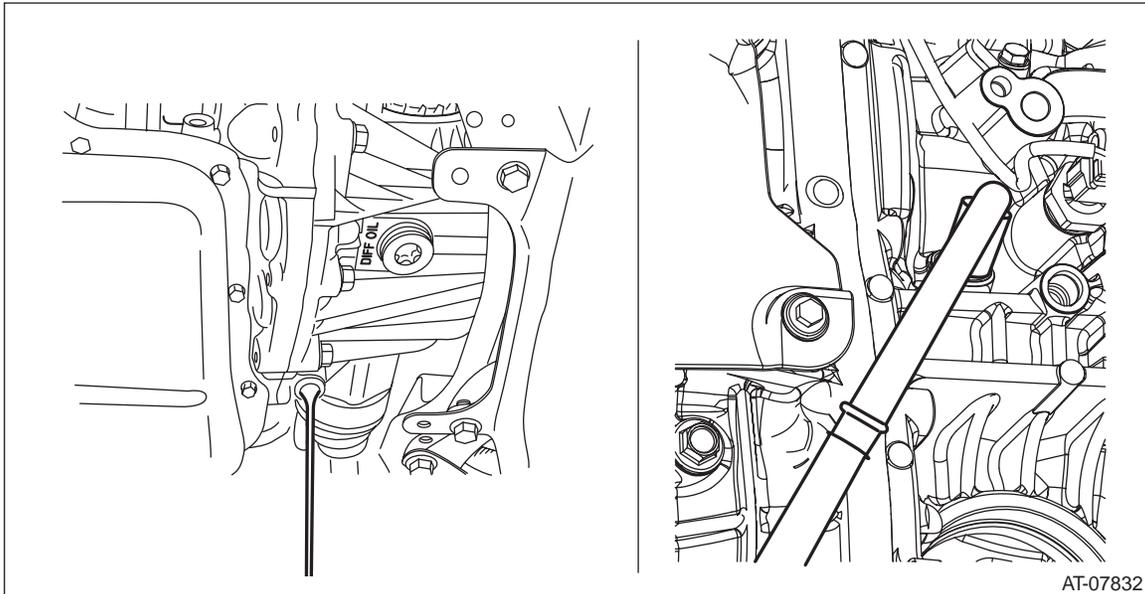
5) When the flow of the differential gear oil turns into a narrow stream, install the overflow drain plug.

NOTE:

Use a new gasket.

Tightening torque:

35 N·m (3.6 kgf·m, 25.8 ft·lb)



6) Install the air breather cap.

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.

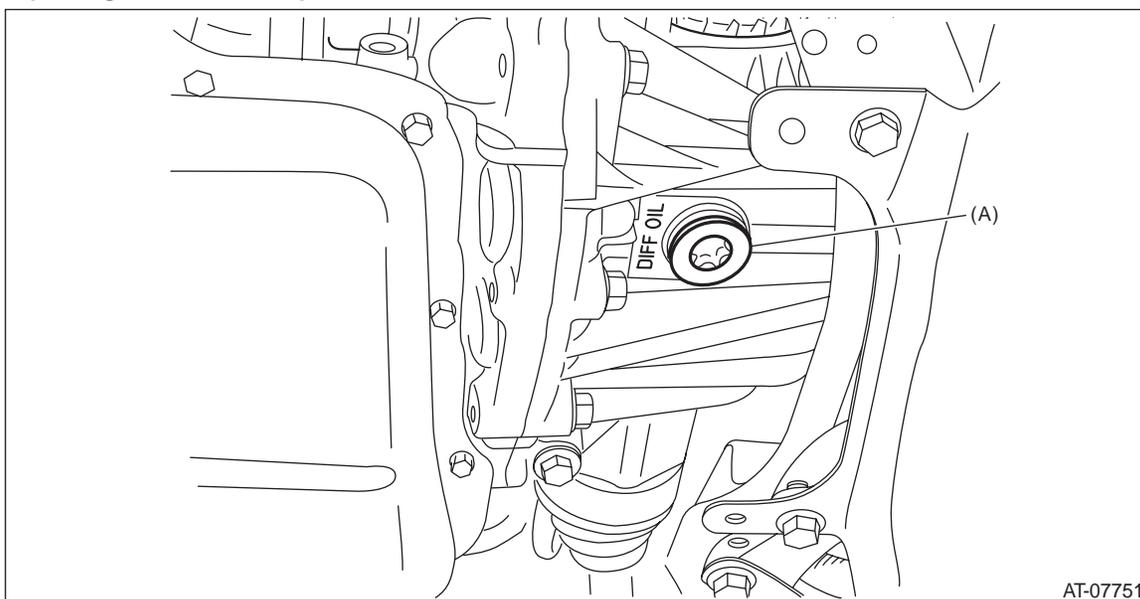
- 1) Lift up the vehicle.
- 2) Remove the differential gear oil drain plug using TORX[®] bit T70. Drain differential gear oil.
- 3) Install the differential gear oil drain plug using TORX[®] bit T70.

NOTE:

Use a new gasket.

Tightening torque:

70 N·m (7.1 kgf-m, 51.6 ft-lb)



(A) Differential gear oil drain plug

AT-07751

Differential Gear Oil

CONTINUOUSLY VARIABLE TRANSMISSION

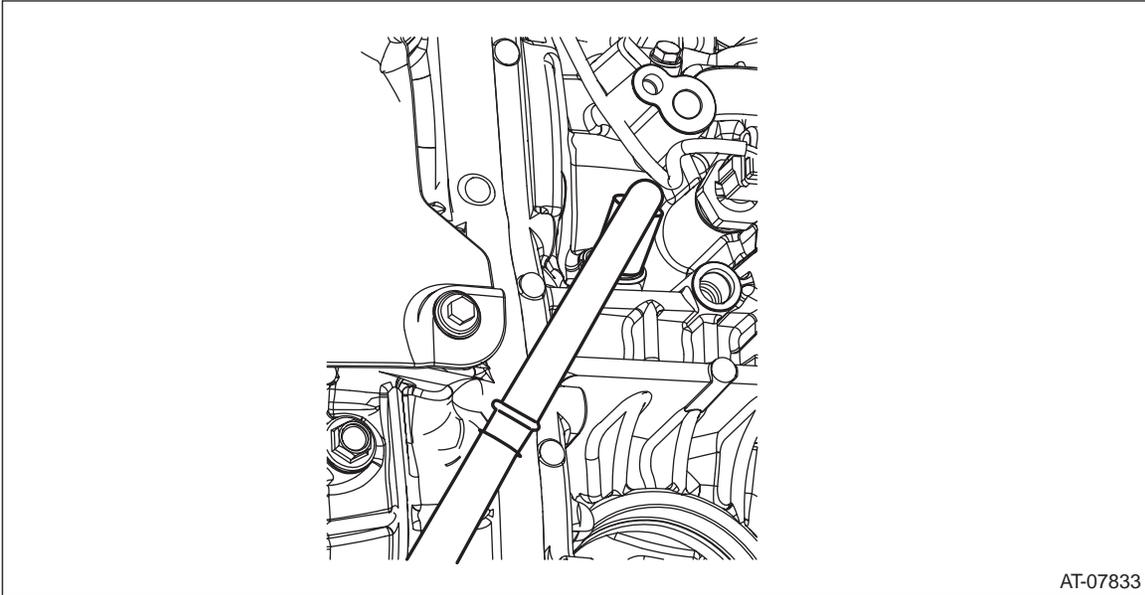
4) Pour gear oil from the charge pipe.

Recommended gear oil:

<Ref. to CVT(TR690)-4, FRONT DIFFERENTIAL GEAR OIL, SPECIFICATION, General Description.>

Gear oil capacity:

<Ref. to CVT(TR690)-4, FRONT DIFFERENTIAL GEAR OIL, SPECIFICATION, General Description.>



AT-07833

5) Adjust the level of differential gear oil. <Ref. to CVT(TR690)-41, ADJUSTMENT, Differential Gear Oil.>

4. Variator Chain Break-in

A: GENERAL DESCRIPTION

Perform Variator Chain Break-in when the following work has been performed.

- Variator chain replacement
- Primary pulley and secondary pulley replacement

B: PROCEDURE

NOTE:

- During variator chain break-in, VDC warning light illuminate because of the difference between the vehicle speed value and G sensor value. This is not a malfunction. If the warning light illuminates, clear the VDC memory after the variator chain break-in is finished. <Ref. to VDC(diag)-23, Clear Memory Mode.>
- If the above malfunction code is detected during variator chain break-in, the system enters into fail mode, and the vehicle shows symptom such as engine speed rapid increases even if the accelerator pedal is gradually depressed.

1) 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.

2) Shift the select lever to "P" or "N" range.

3) Apply the parking brake.

4) Connect the Subaru Select Monitor to data link connector.

5) Idle the engine to raise the CVTF temperature to 40 — 50°C (104 — 122°F) displayed on the Subaru Select Monitor.

NOTE:

When CVTF temperature does not rise easily or if you want to rise CVTF temperature faster, maintain the engine speed within 2,000 — 2,500 rpm at "P" or "N" range to raise the CVTF temperature.

6) With the select lever in "P" or "N" range, increase the engine speed to 3,000 — 3,500 rpm from the idling condition, and maintain the speed for approximately five seconds, then release the accelerator pedal.

7) Depress the accelerator pedal gradually again from idling condition to increase the engine speed to 3,000 — 3,500 rpm, maintain the speed for approximately five seconds, then release the accelerator pedal.

8) Release the parking brake.

9) Shift the select lever into manual mode and set to 1st.

10) Depress the accelerator pedal gradually, and increase the engine speed to 5,300 rpm from engine idling condition.

NOTE:

Increase the engine speed while taking care that the engine speed does not become too high.

11) Release the accelerator pedal to fully closed position to lower the engine speed to 4,000 rpm.

12) Depress the accelerator pedal gradually again, and increase the engine speed to 5,300 rpm.

13) Repeat the step 11) and 12) for 40 times.

14) Release the accelerator pedal to return the engine speed to idling.

15) Shift the select lever to "P" range, and then turn the engine to OFF.

AWD ON/OFF Switching Mode

CONTINUOUSLY VARIABLE TRANSMISSION

5. 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”.

6. Road Test

A: INSPECTION

NOTE:

Turn OFF the X MODE switch and perform 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

In intelligent mode, 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

In each mode of SI-DRIVE, check down shifting operation, engine braking, and indicators inside the meters.

When in S# mode

- Drive in “8th speed of manual mode” [90 — 100 km/h (56 — 62 MPH)], and shift down from 8th to 7th. Check if the indicator of combination meter switches “8” → “7”. At the same time, check engine braking in 7th gear.
- Drive in “7th speed of manual mode” [80 — 90 km/h (50 — 56 MPH)], and shift down from 7th to 6th. Check if the indicator of combination meter switches “7” → “6”. At the same time, check engine braking in 6th gear.
- 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” [30 — 40 km/h (19 — 25 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.

Other than in S# 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.

Road Test

CONTINUOUSLY VARIABLE TRANSMISSION

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.

7. 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(H4DOTC)(diag)-37, DISPLAY CURRENT ENGINE DATA, OPERATION, Subaru Select Monitor.>
 - 4) Check the engine oil level.<Ref. to LU(H4DOTC)-2, General Description.>
 - 5) Check the coolant level.<Ref. to CO(H4DOTC)-13, Engine Coolant.>
 - 6) Adjust the CVTF level.<Ref. to CVT(TR690)-36, ADJUSTMENT, CVTF.>
 - 7) Increase the CVTF temperature to 60 — 80°C (140 — 176°F) by idling the engine with 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:

2,080 — 2,600 rpm

Stall test judgment

Range	Range	Probable cause
Lower than standard value	D, R	<ul style="list-style-type: none"> • Throttle valve is not fully open. • 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 • Input clutch slippage
	R	<ul style="list-style-type: none"> • Reverse brake slippage • Secondary pressure (line pressure) is low. • Variator chain malfunction • Input clutch slippage
	D, R	<ul style="list-style-type: none"> • Torque converter malfunction • Control valve body malfunction • TCM malfunction • Damaged harness and harness connector

Time Lag Test

CONTINUOUSLY VARIABLE TRANSMISSION

8. 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:

1.2 seconds or less

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

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

Secondary Pressure (Line Pressure) Test

CONTINUOUSLY VARIABLE TRANSMISSION

9. Secondary Pressure (Line Pressure) Test

A: INSPECTION

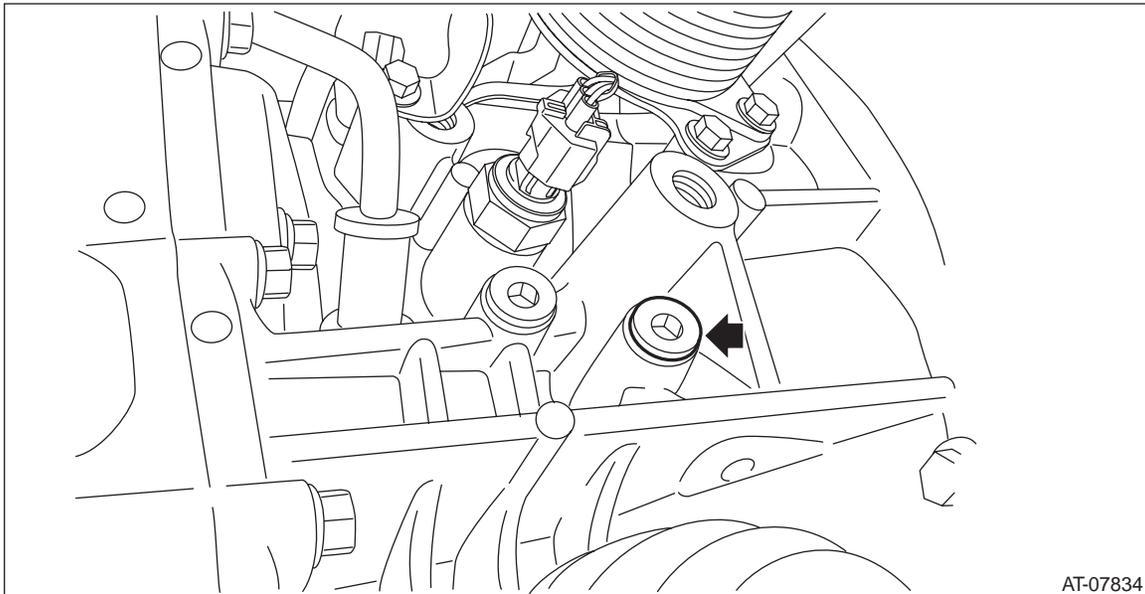
CAUTION:

Make sure no other person is around the vehicle during secondary pressure (line pressure) test measurement.

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.

- 1) Remove the front wheel RH.<Ref. to WT-5, REMOVAL, Tire and Wheel.>
- 2) Lift up the vehicle.
- 3) Remove the test plug for secondary pressure (line pressure).



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Secondary Pressure (Line Pressure) Test

CONTINUOUSLY VARIABLE TRANSMISSION

4) Attach ST1, ST2 and ST3 to transmission.

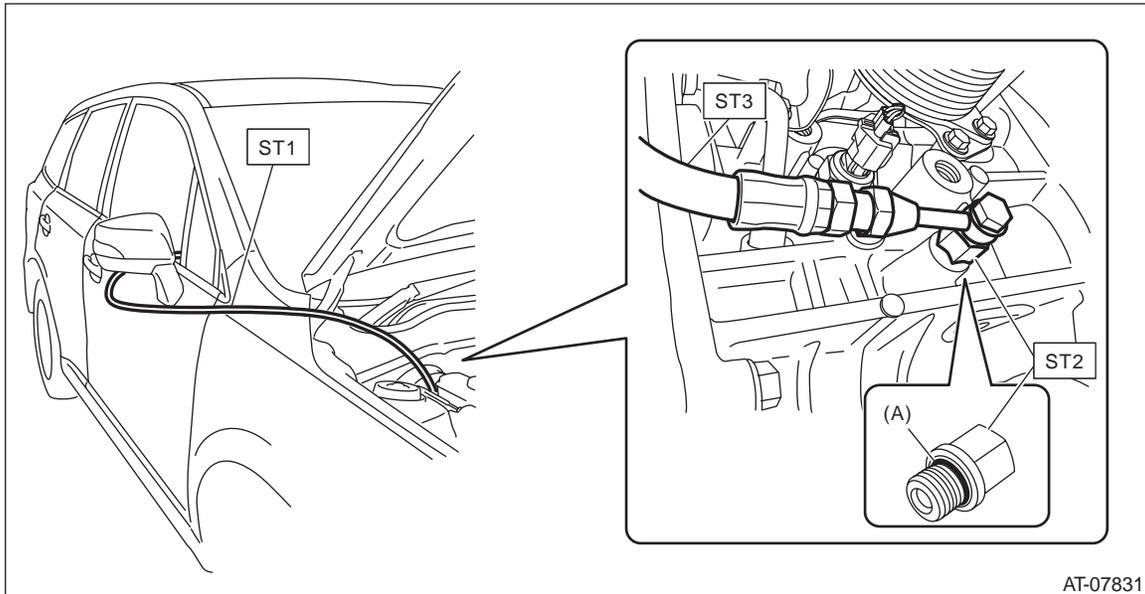
ST1 18801AA000 OIL PRESSURE GAUGE ASSY

ST2 18681AA000 PRESSURE GAUGE ADAPTER

ST3 498897700 OIL PRESSURE ADAPTER SET

NOTE:

Use ST2 PRESSURE GAUGE ADAPTER with genuine O-ring (part No. 806911080) attached.



(A) O-ring (genuine part)

5) Set the gauge so that it can be seen from the driver's seat.

6) Install the front wheel RH.<Ref. to WT-5, INSTALLATION, Tire and Wheel.>

7) Using the Subaru Select Monitor, check if the throttle valve operates when you depress the accelerator pedal.<Ref. to EN(H4DOTC)(diag)-37, DISPLAY CURRENT ENGINE DATA, OPERATION, Subaru Select Monitor.>

8) Check the engine oil level.<Ref. to LU(H4DOTC)-2, General Description.>

9) Check the coolant level.<Ref. to CO(H4DOTC)-13, Engine Coolant.>

10) Adjust the CVTF level.<Ref. to CVT(TR690)-36, ADJUSTMENT, CVTF.>

11) Increase the CVTF temperature to 60 — 80°C (140 — 176°F) by idling the engine with the select lever shifted to "N" or "P" range.

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

13) Depress the accelerator pedal to the full while fully depressing the foot brake pedal with your left foot.

Secondary Pressure (Line Pressure) Test

CONTINUOUSLY VARIABLE TRANSMISSION

14) 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 (45.9 — 61.2, 652 — 870)
Idling	P, N	Full closed	OFF	0.5 — 1.5 (5.1 — 15.3, 72 — 218)

15) Remove the ST and install the plug after measurement.

NOTE:

Use new O-rings.

Tightening torque:

25 N·m (2.5 kgf·m, 18.4 ft·lb)

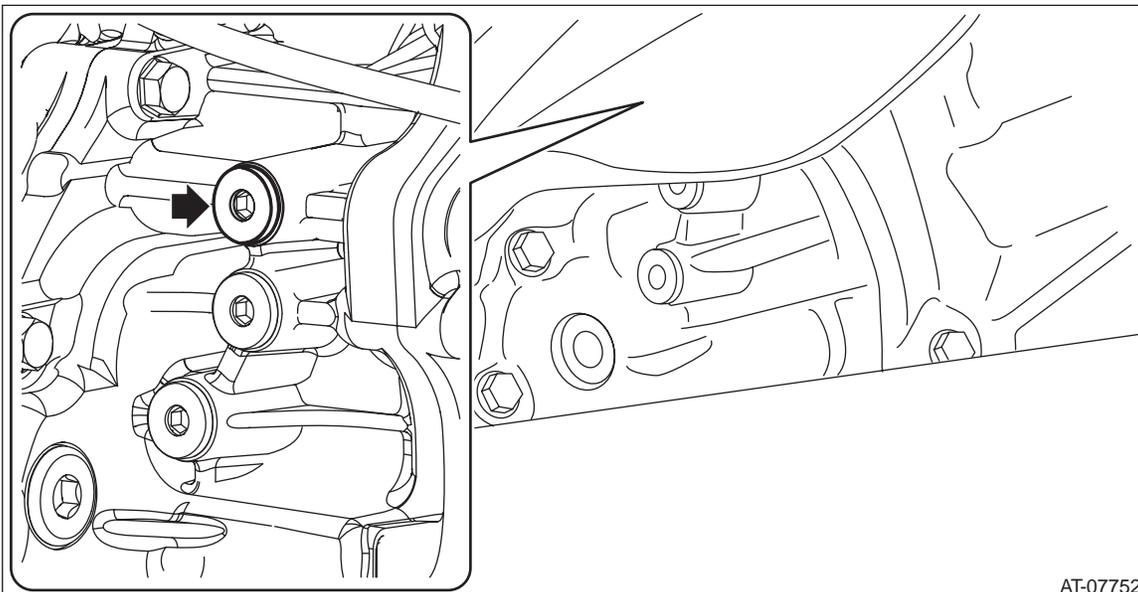
Transfer Clutch Pressure Test

CONTINUOUSLY VARIABLE TRANSMISSION

10. Transfer Clutch Pressure Test

A: INSPECTION

- 1) Lift up the vehicle.
- 2) Remove the test plug.



AT-07752

- 3) Set the ST1, ST2 and ST3 to transmission.

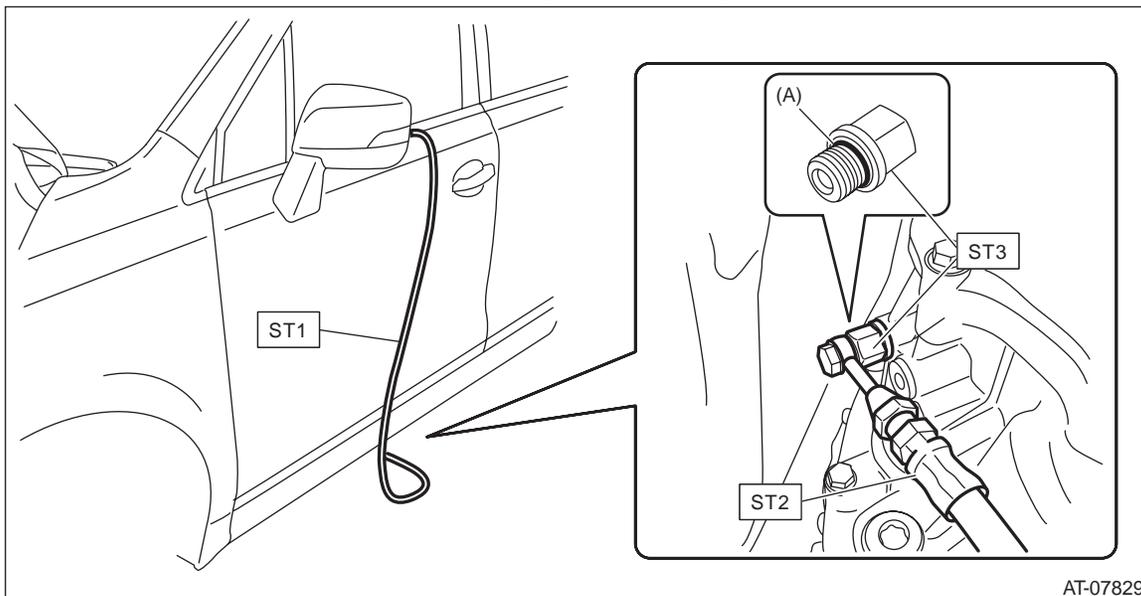
CAUTION:

Be careful when setting tools so that the hoses do not touch the exhaust pipes.

- | | | |
|-----|------------|--------------------------|
| ST1 | 498575400 | OIL PRESSURE GAUGE ASSY |
| ST2 | 498897700 | OIL PRESSURE ADAPTER SET |
| ST3 | 18681AA000 | PRESSURE GAUGE ADAPTER |

NOTE:

Use ST3 (PRESSURE GAUGE ADAPTER) with genuine O-ring (part No. 806911080) attached.



AT-07829

(A) O-ring (genuine part)

Transfer Clutch Pressure Test

CONTINUOUSLY VARIABLE TRANSMISSION

- 4) Lower the vehicle.
- 5) Connect the Subaru Select Monitor to the data link connector and read the current data.
- 6) Check the transfer clutch pressure as in secondary pressure (line pressure) test. <Ref. to CVT(TR690)-51, Secondary Pressure (Line Pressure) Test.>

NOTE:

- Turn OFF the X MODE switch and perform inspection.
- If oil pressure is not produced or it does not change, the control valve body may be malfunctioning.

Range position	ON Duty ratio (%)	Accelerator pedal opening angle (%)	Standard transfer clutch pressure kPa (kgf/cm ² , psi)
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)	—
N or P	0	Fully closed (0)	0

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

NOTE:

Use new O-rings.

Tightening torque:

25 N·m (2.5 kgf·m, 18.4 ft·lb)

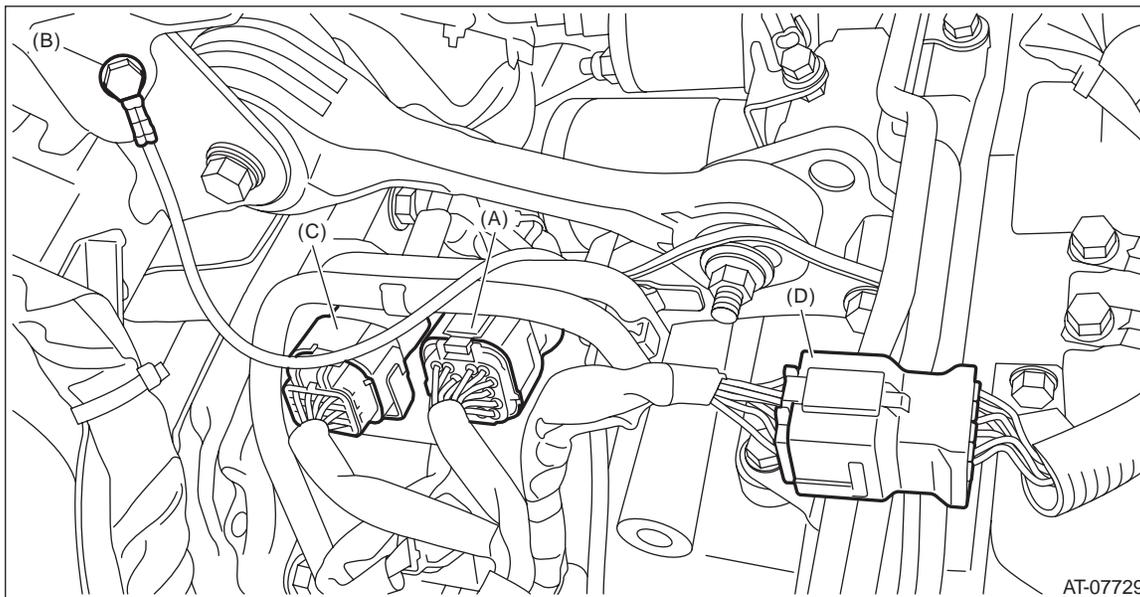
Automatic Transmission Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

11. Automatic Transmission Assembly

A: REMOVAL

- 1) Remove the front wheels.
- 2) Disconnect the ground cable from battery.
- 3) Remove the air intake duct. <Ref. to IN(H4DOTC)-19, REMOVAL, Air Intake Duct.>
- 4) Remove the intercooler. <Ref. to IN(H4DOTC)-35, REMOVAL, Intercooler.>
- 5) Disconnect the following connectors.
 - Transmission harness connectors
 - Transmission radio ground terminal
 - Inhibitor harness connector
 - Engine harness connectors

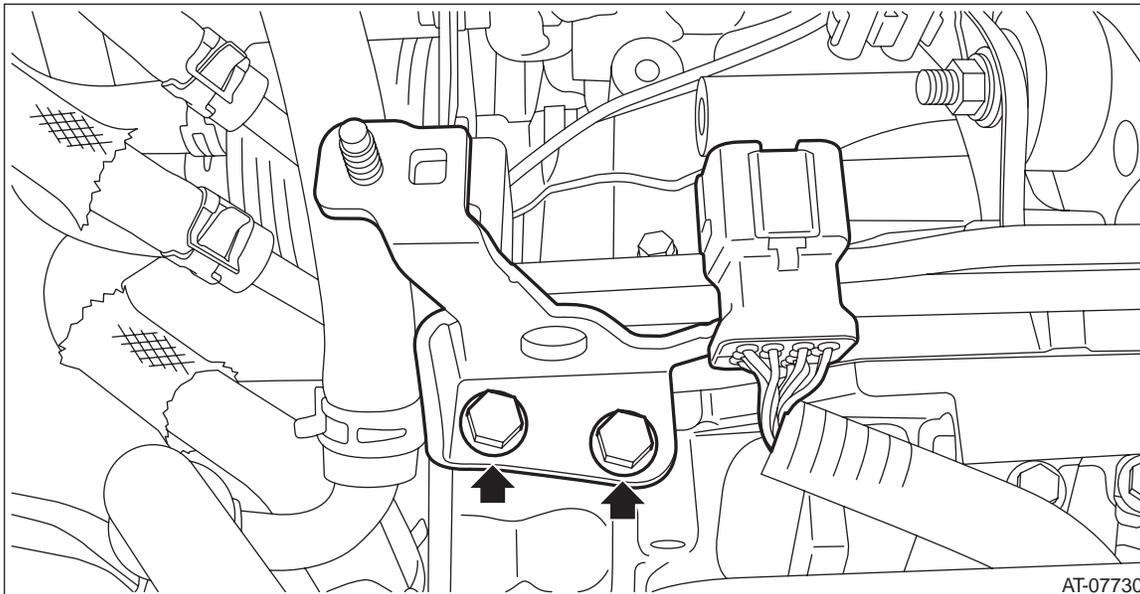


- (A) Transmission harness connectors
- (B) Transmission radio ground terminal
- (C) Inhibitor harness connector
- (D) Engine harness connectors

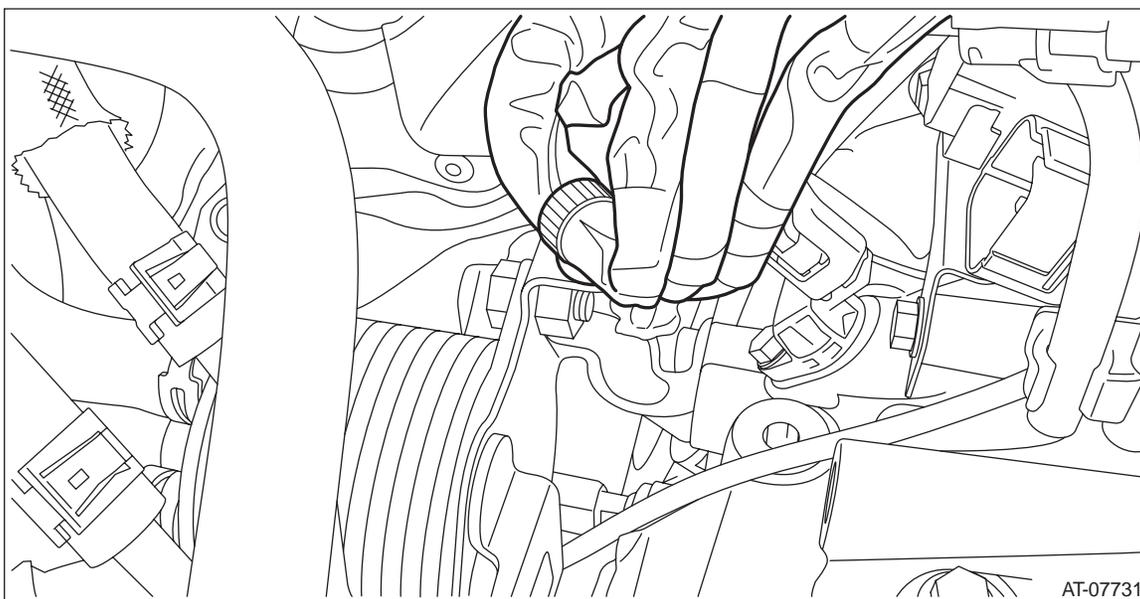
Automatic Transmission Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

6) Remove the engine hanger rear.



7) Remove the harness clip from the CVTF cooler bracket.

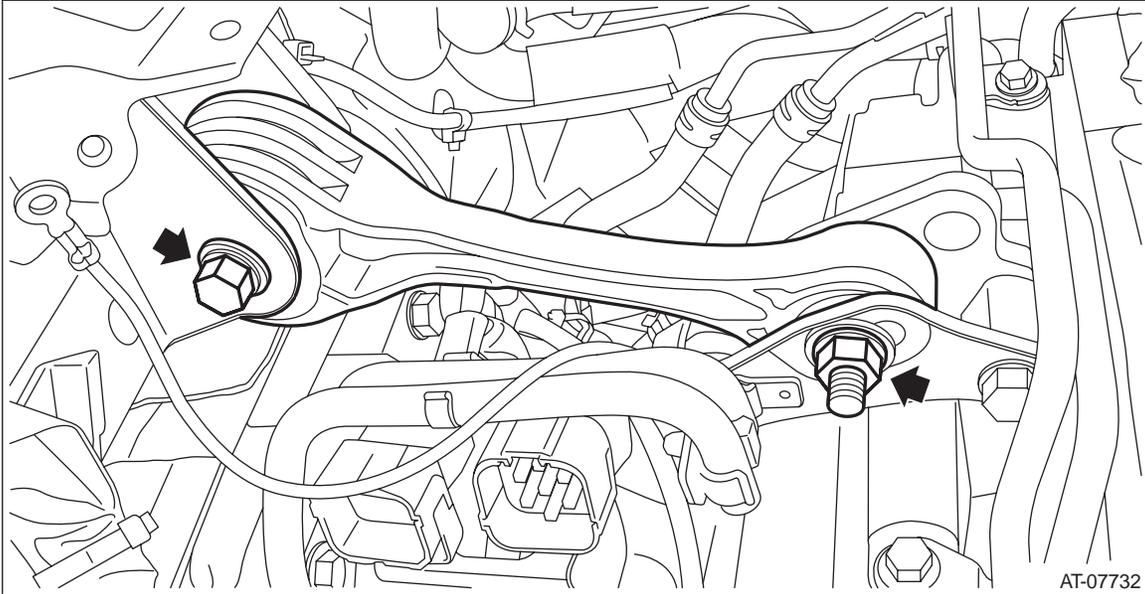


8) Remove the starter.<Ref. to SC(H4DOTC)-2, General Description.>

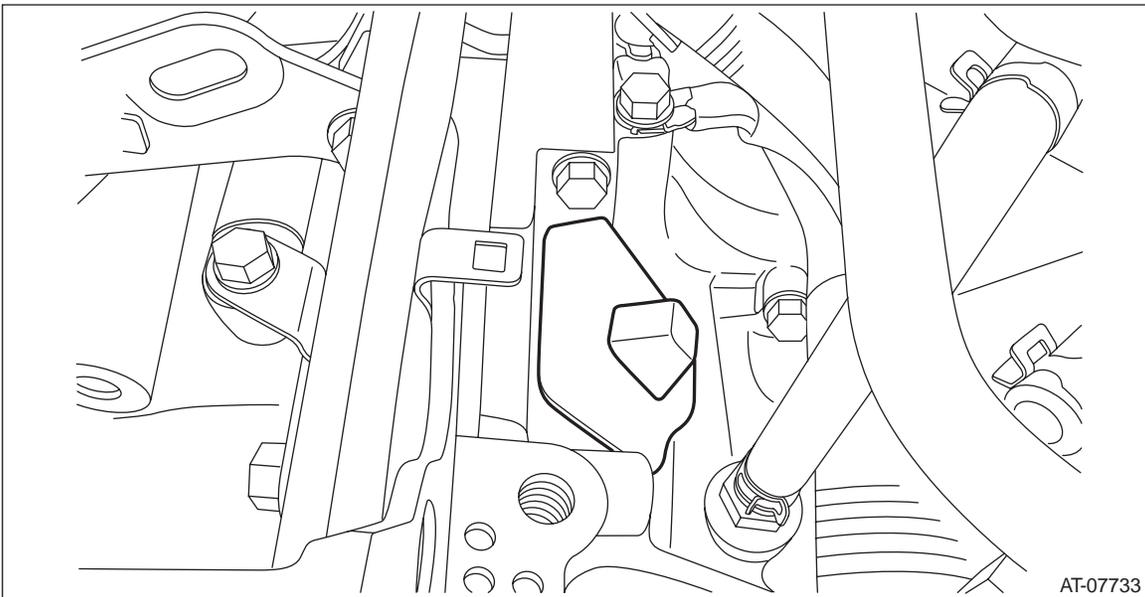
Automatic Transmission Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

9) Remove the pitching stopper.



10) Remove the service hole plug.



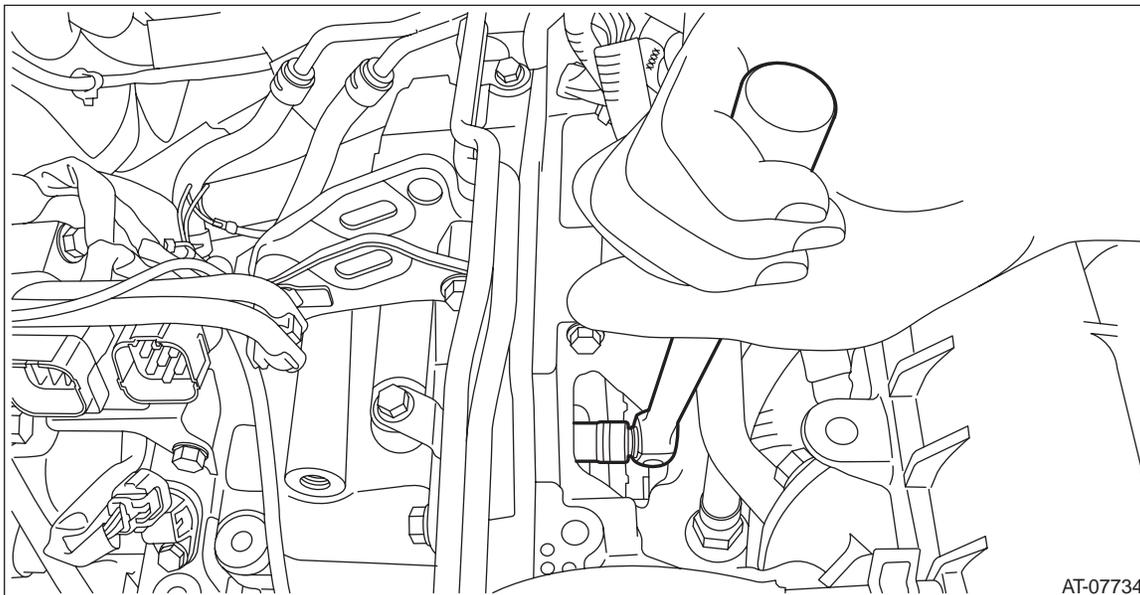
Automatic Transmission Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

11) 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:

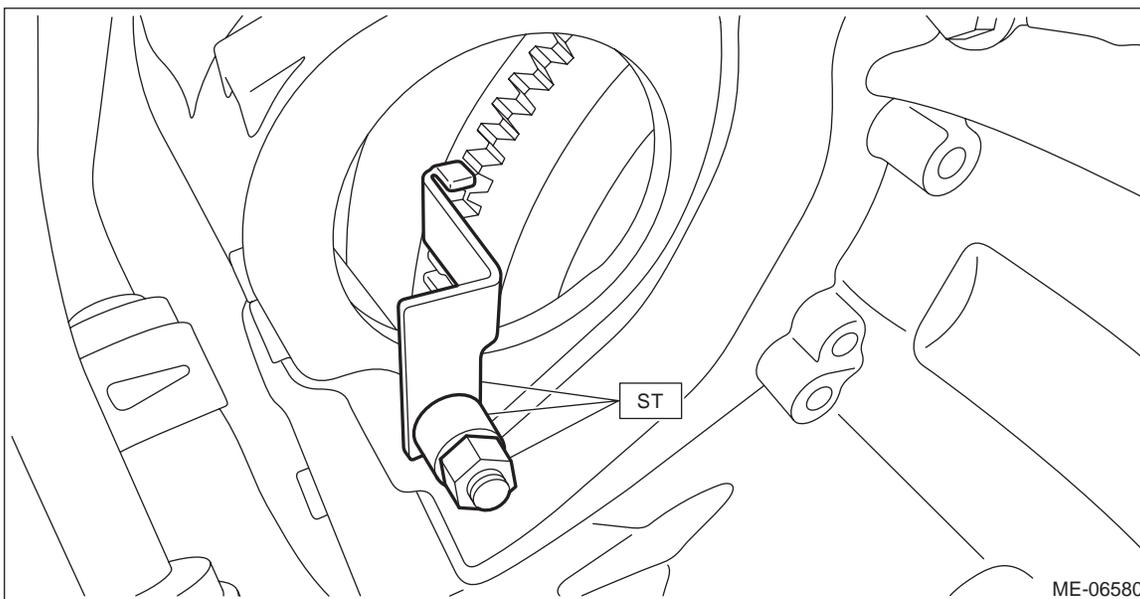
- Be careful not to drop bolts into the converter housing.
- Be careful not to damage the mounting bolts.



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

13) Attach the ST to the converter case.

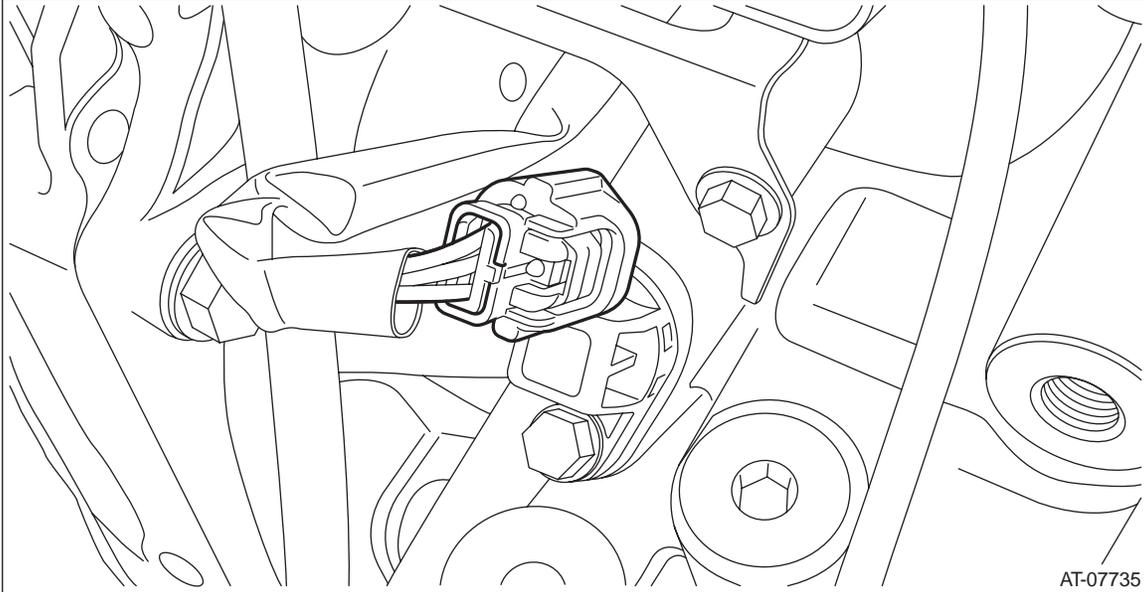
ST 498277200 STOPPER SET



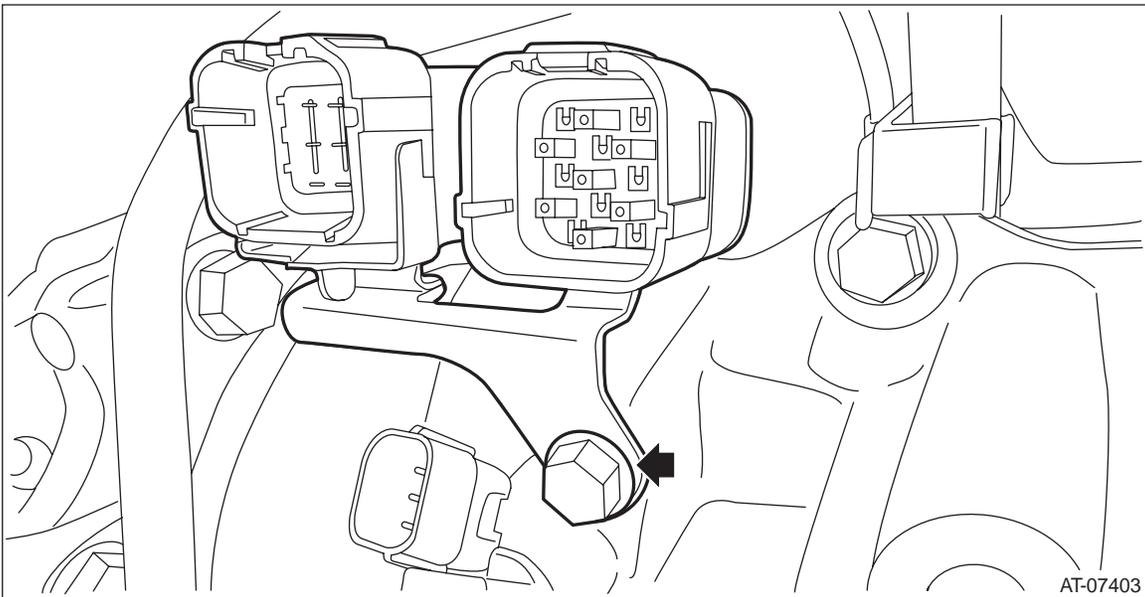
Automatic Transmission Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

14) Remove the primary speed sensor harness connector.



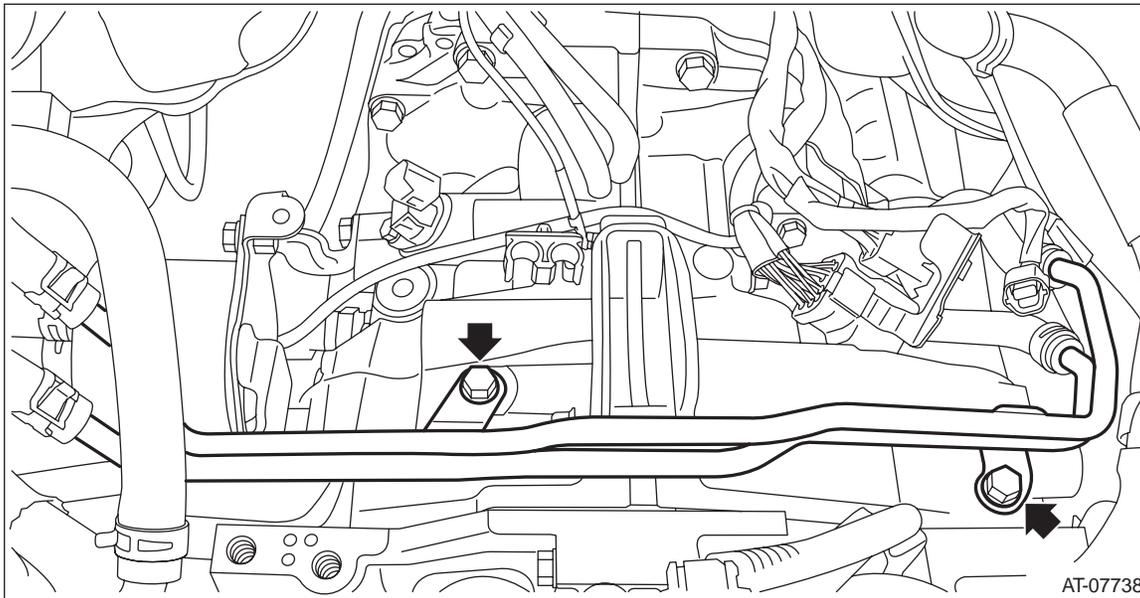
15) Remove the transmission harness stay.



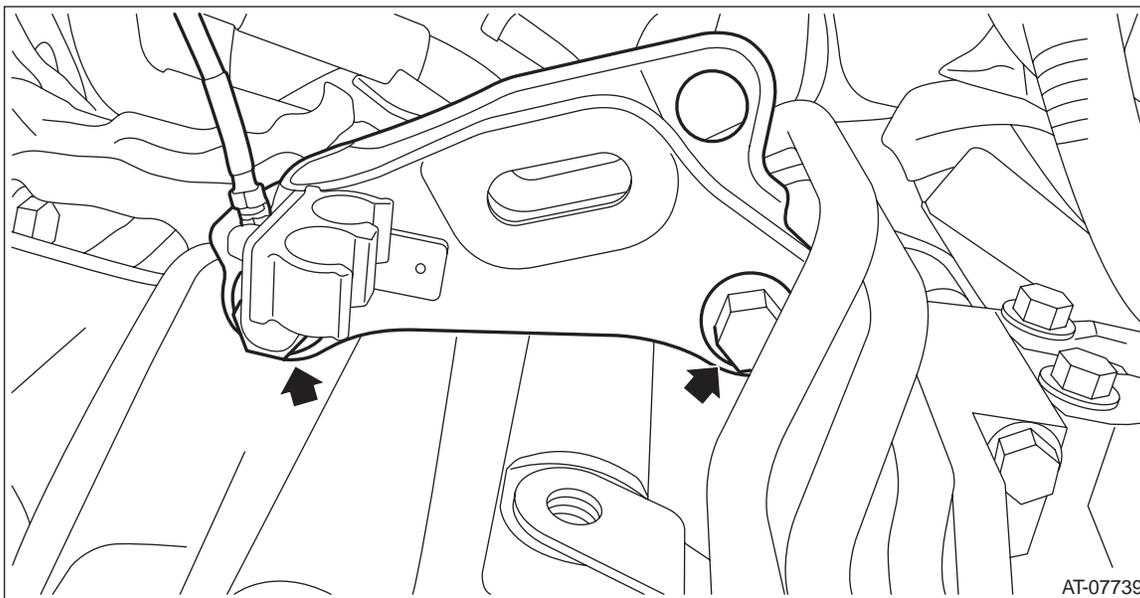
Automatic Transmission Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

16) Remove the CVTF cooler pipe COMPL mounting bolt.



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

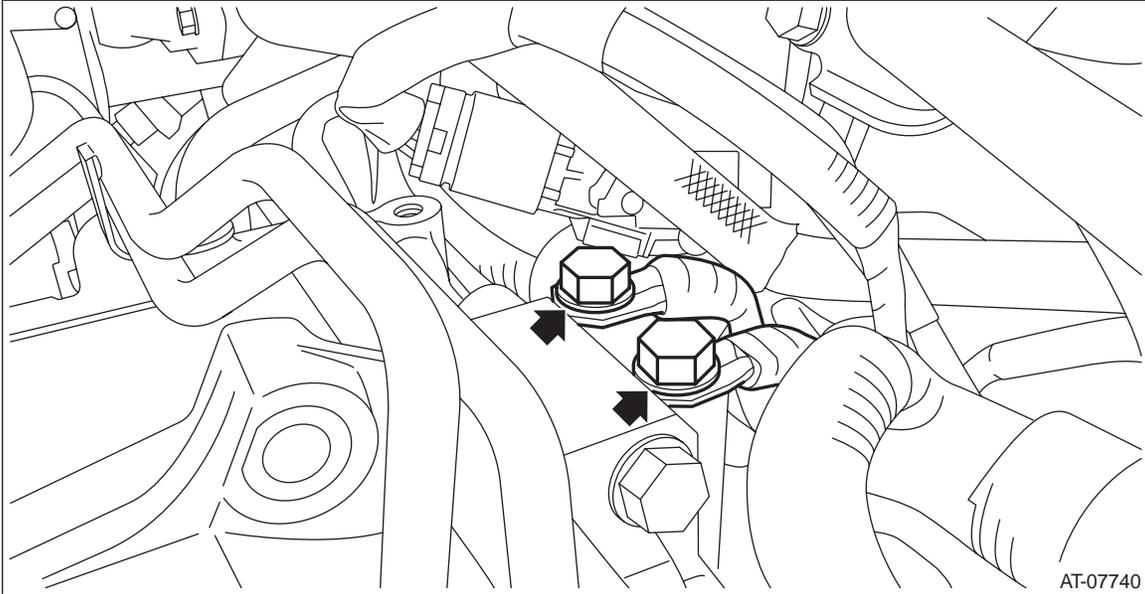


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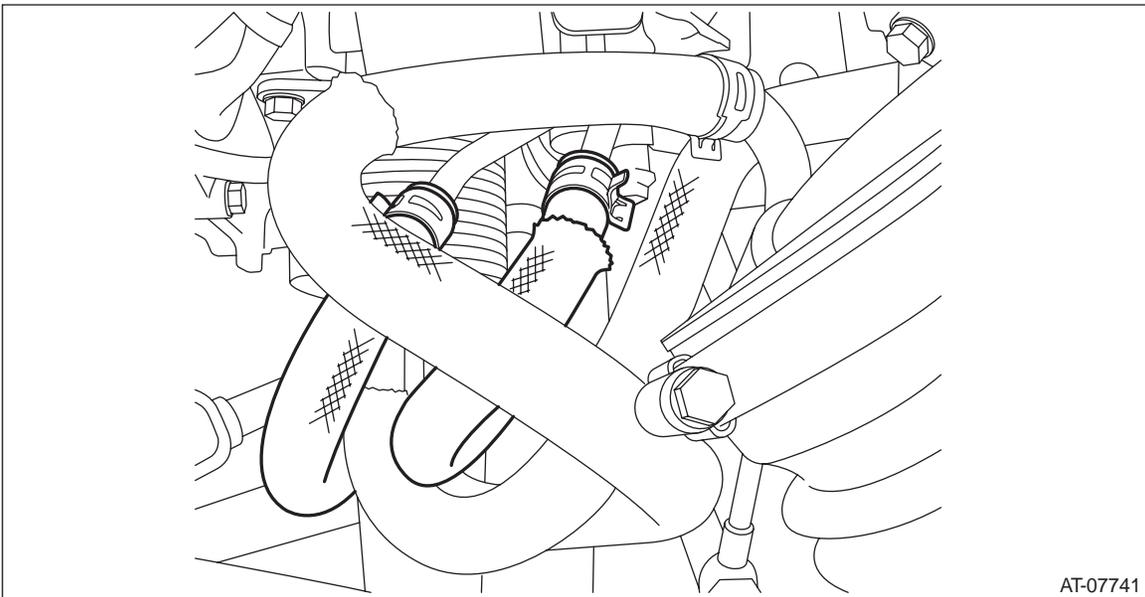
Automatic Transmission Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

18) Remove the engine ground terminal.



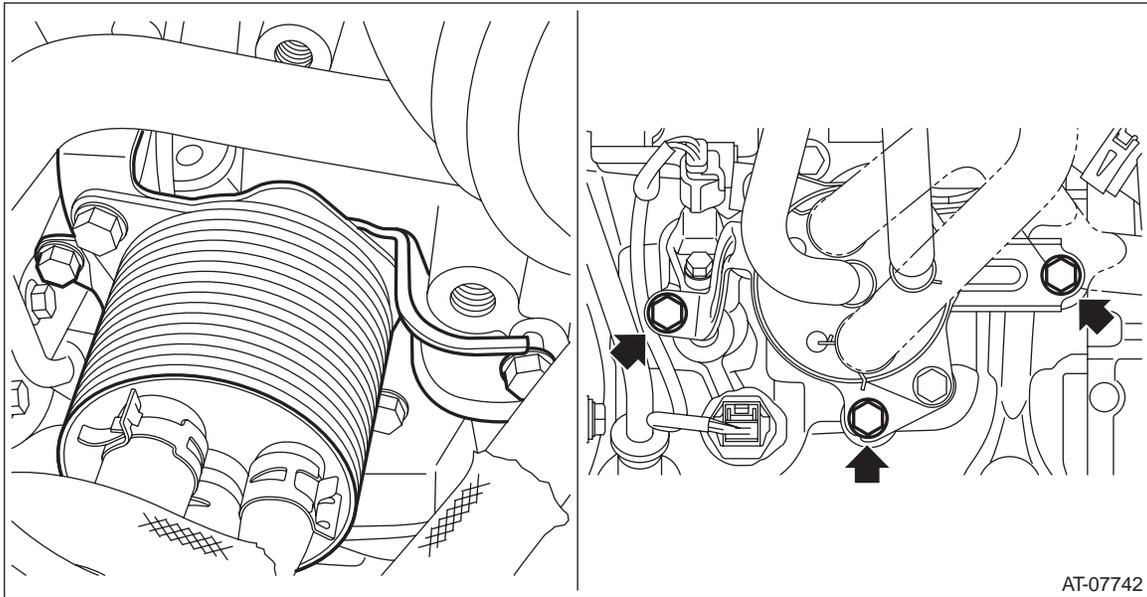
19) Remove the CVTF inlet hose and outlet hose from the CVTF cooler pipe COMPL.



Automatic Transmission Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

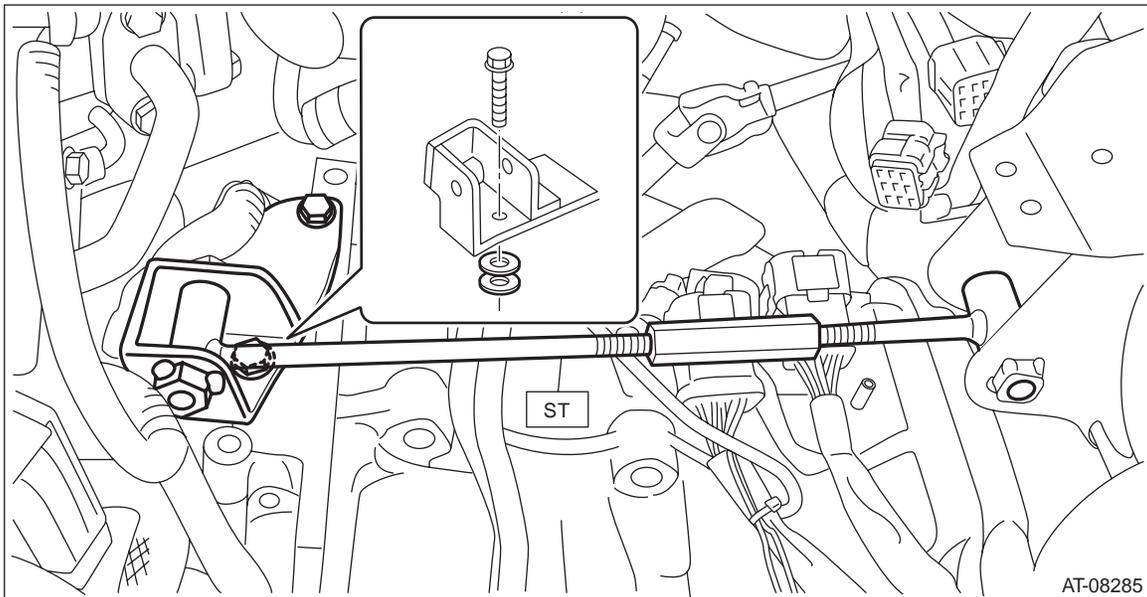
20) Remove the CVTF cooler (with warmer feature) from the transmission, and using a piece of wire, affix to a location of the body where it will not interfere with the removal of the transmission.



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

NOTE:

Place a washer with 4 mm (0.16 in) thickness into the gap between the engine block and ST.

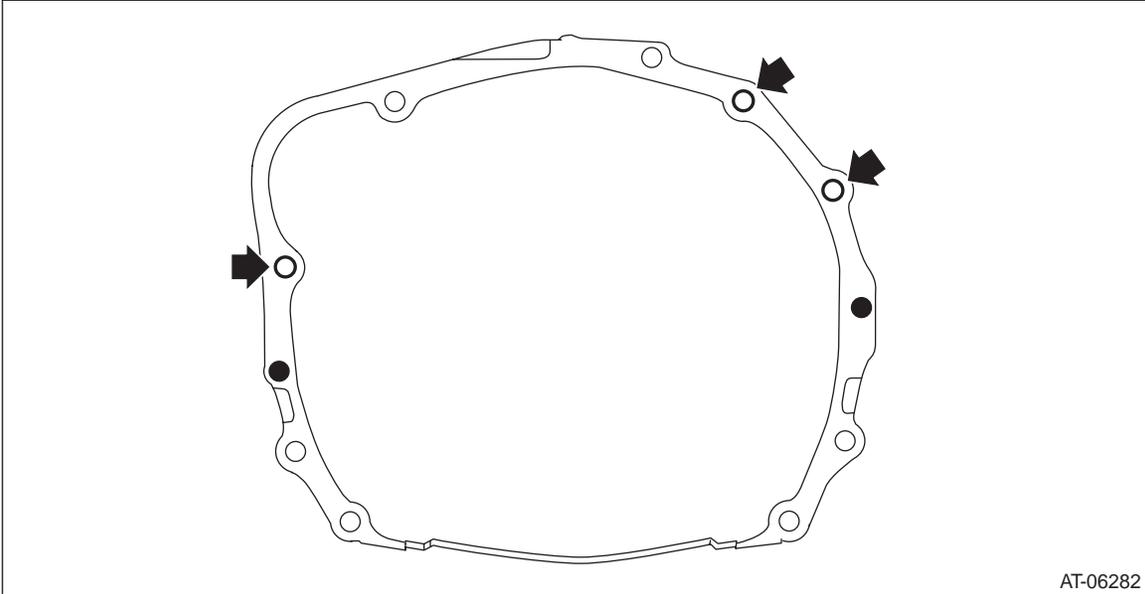


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Automatic Transmission Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

22) Remove the three transmission connecting bolts.



23) Lift up the vehicle.

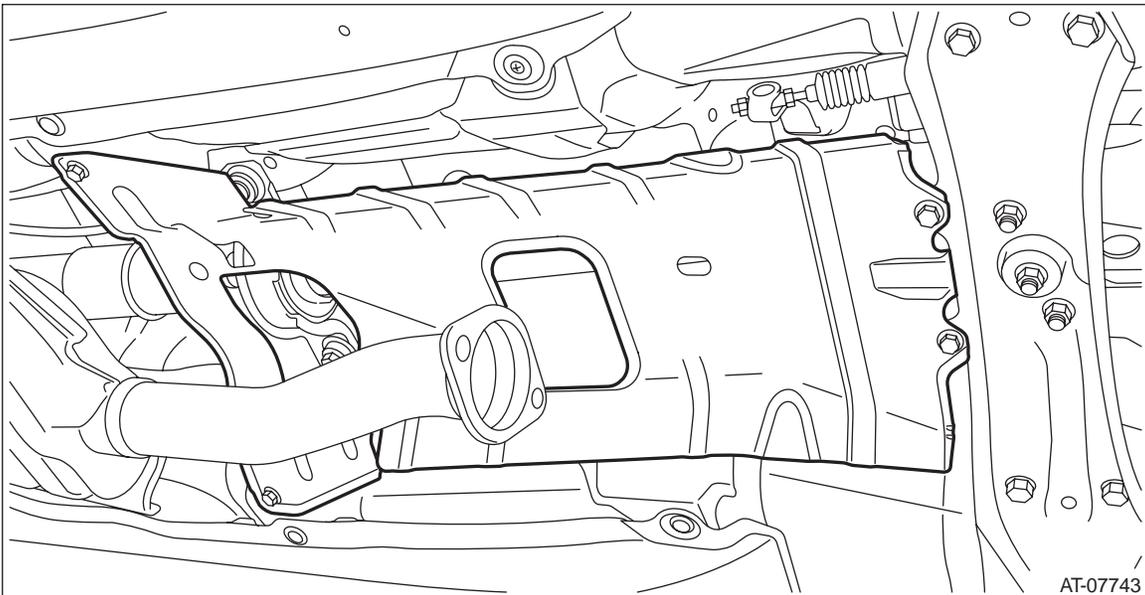
24) Remove the under cover.

25) Remove the center exhaust pipe.<Ref. to EX(H4DOTC)-30, REMOVAL, Center Exhaust Pipe.>

26) Remove the exhaust hanger bracket.

27) Remove the CVTF drain plug to drain CVTF.<Ref. to CVT(TR690)-38, REPLACEMENT, CVTF.>

28) Remove the center exhaust cover.

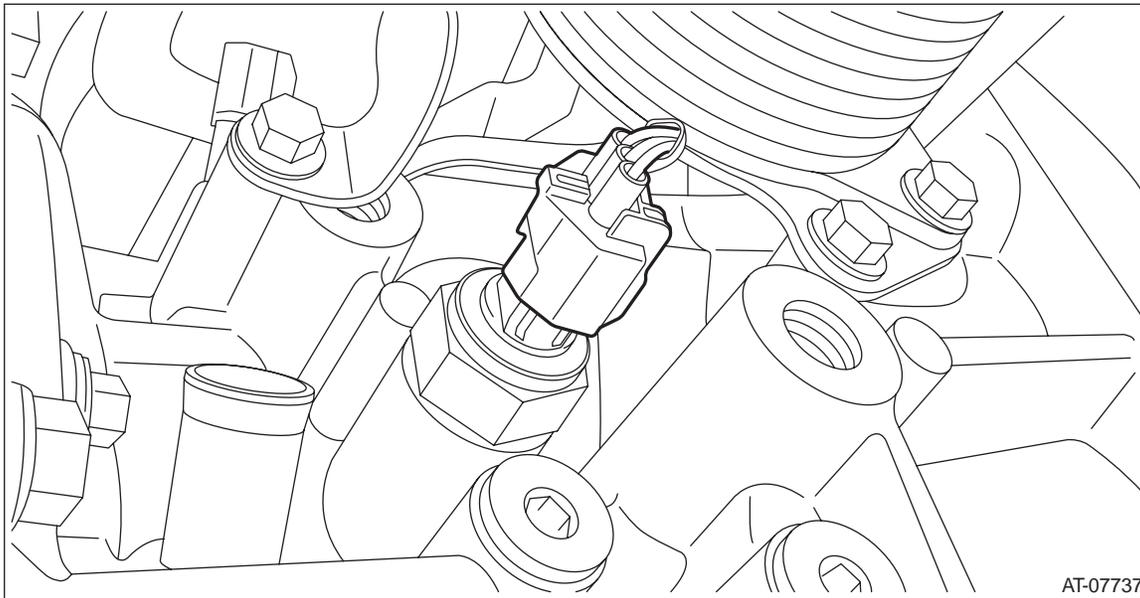


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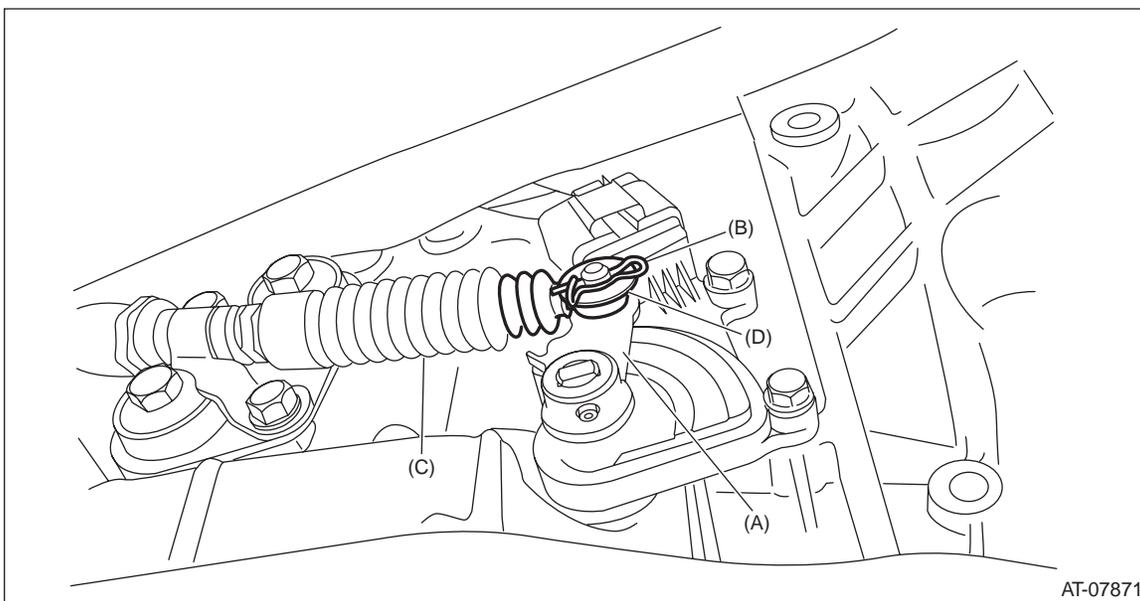
Automatic Transmission Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

29) Remove the secondary pressure sensor harness connector.



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

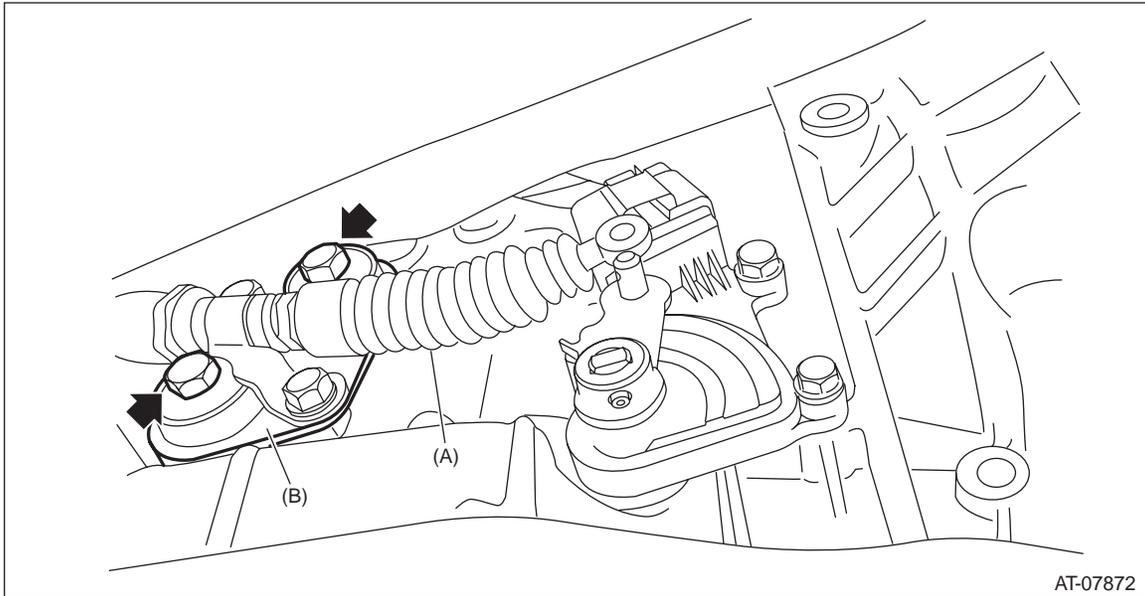


- (A) Shifter arm
- (B) Snap pin
- (C) Select cable
- (D) Washer

Automatic Transmission Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

31) Remove the plate assembly from the transmission case.



- (A) Select cable
(B) Plate ASSY

32) Drain differential gear oil.<Ref. to CVT(TR690)-43, REPLACEMENT, Differential Gear Oil.>

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

34) Remove the stabilizer link.<Ref. to FS-29, REMOVAL, Front Stabilizer.>

35) Disconnect the lower arm ball joint and housing.

36) Pull out the front drive shaft from transmission using a crowbar.

NOTE:

Place cloth between the tire lever or bar and the transmission in order to avoid damaging the transmission side retainer.

37) Holding the joint of front drive shaft from transmission side, pull out the drive shaft from transmission with care not to stretch the boot.

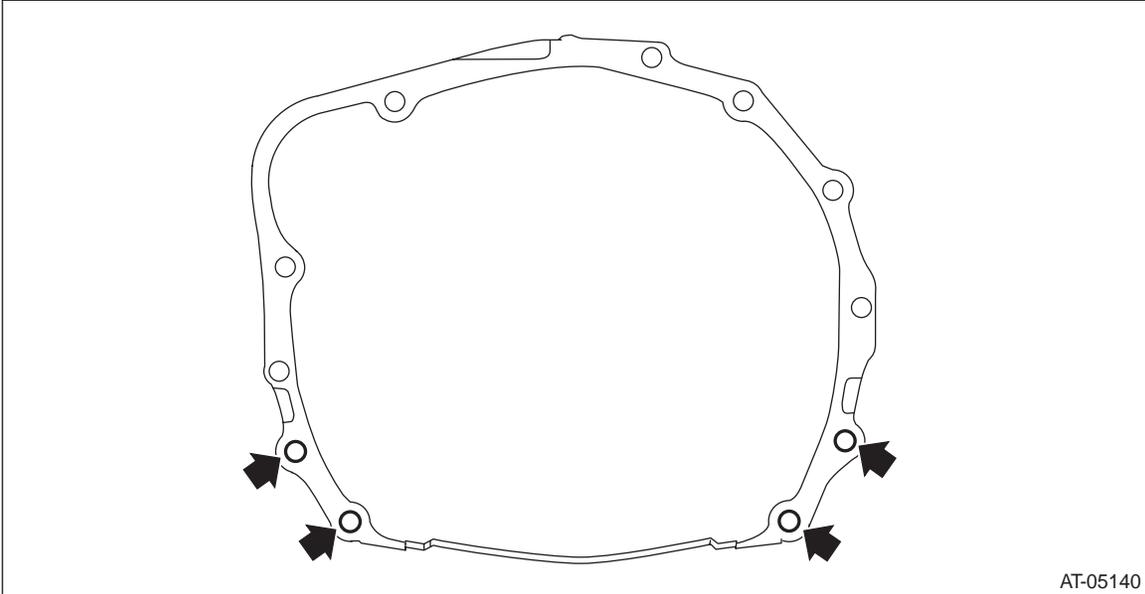
NOTE:

- 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

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



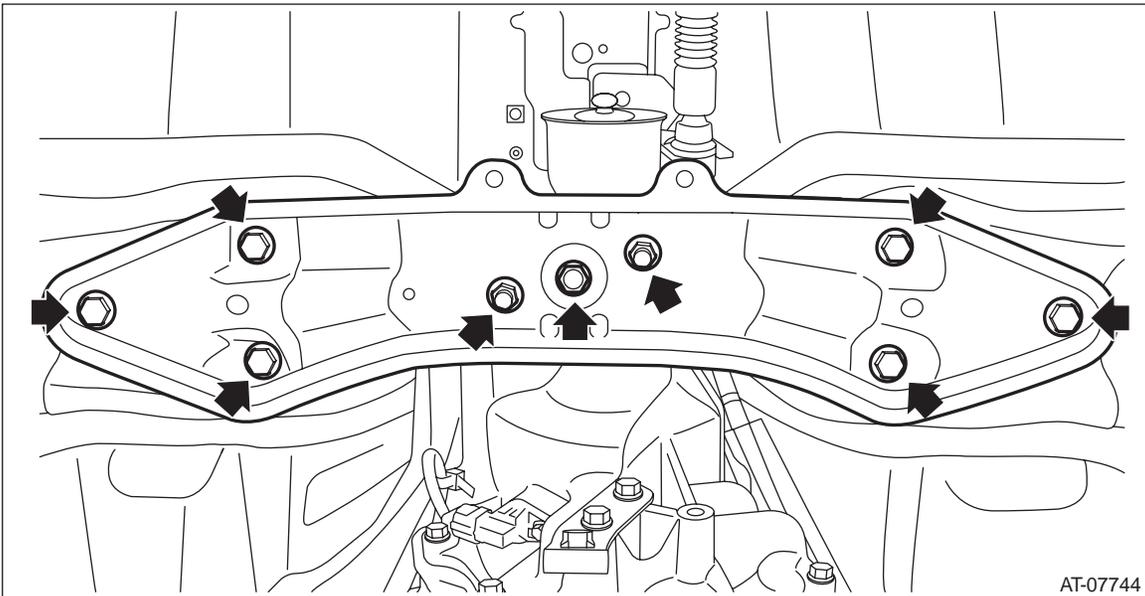
AT-05140

39) Set the transmission jack under the transmission.

NOTE:

Make sure that the support plates of transmission jack do not touch the oil pan.

40) Remove the transmission rear crossmember from the vehicle.



AT-07744

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

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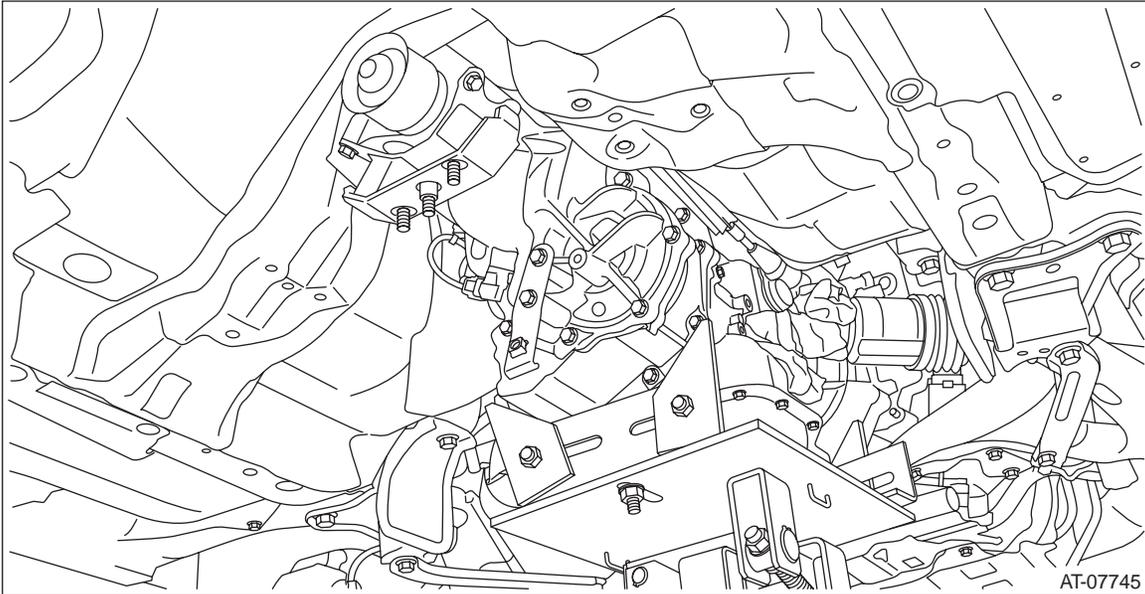
Automatic Transmission Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

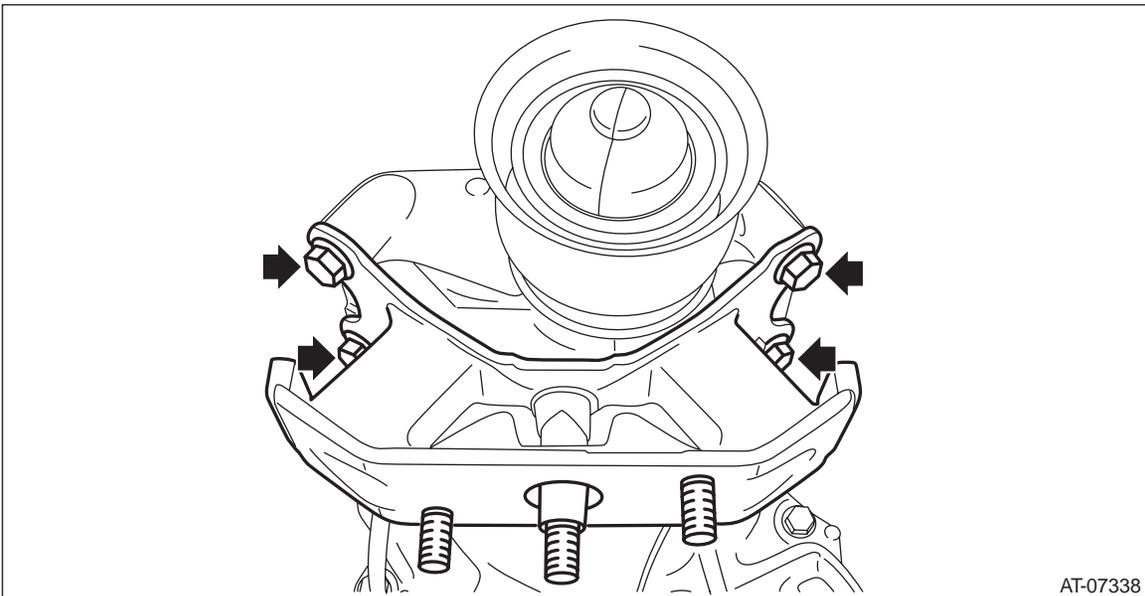
42) Remove the transmission assembly.

NOTE:

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



43) Remove the cushion rubber.

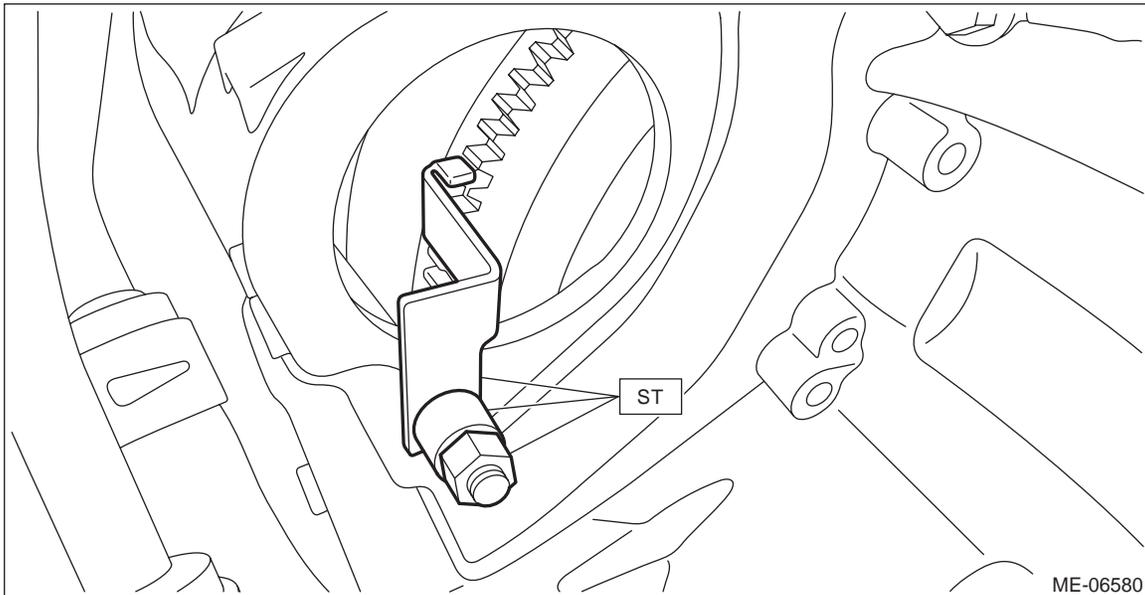


Automatic Transmission Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

B: INSTALLATION

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



- 2) 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.

CAUTION:

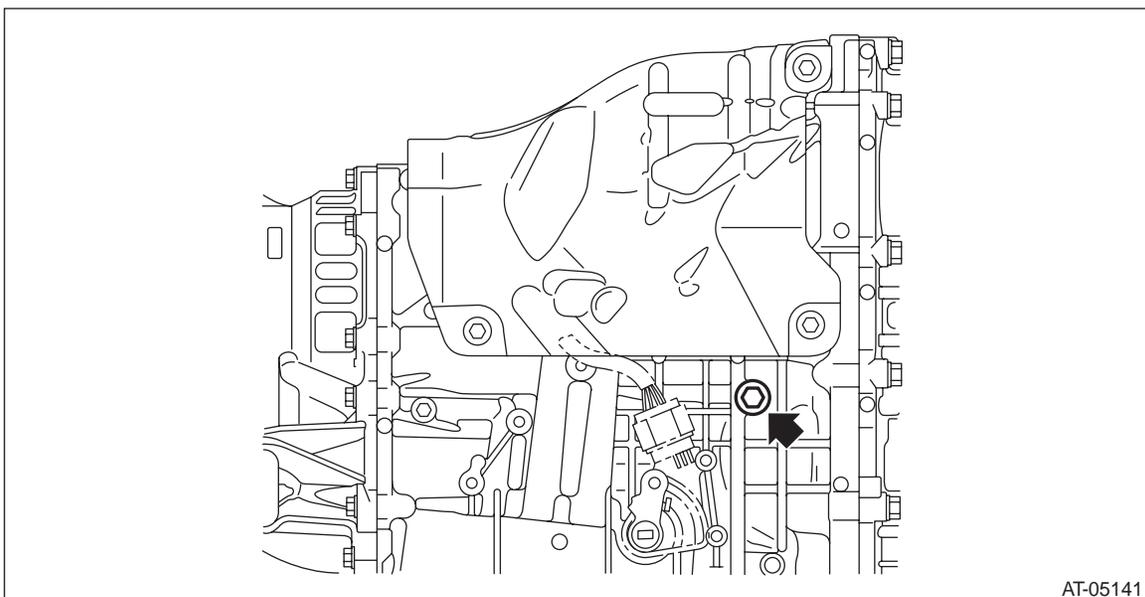
Always use specified CVTF. Using other fluid will cause malfunction.<Ref. to CVT(TR690)-4, HYDRAULIC CONTROL AND LUBRICATION, SPECIFICATION, General Description.>

NOTE:

Use a new gasket.

Tightening torque:

35 N·m (3.6 kgf-m, 25.8 ft-lb)



Automatic Transmission Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

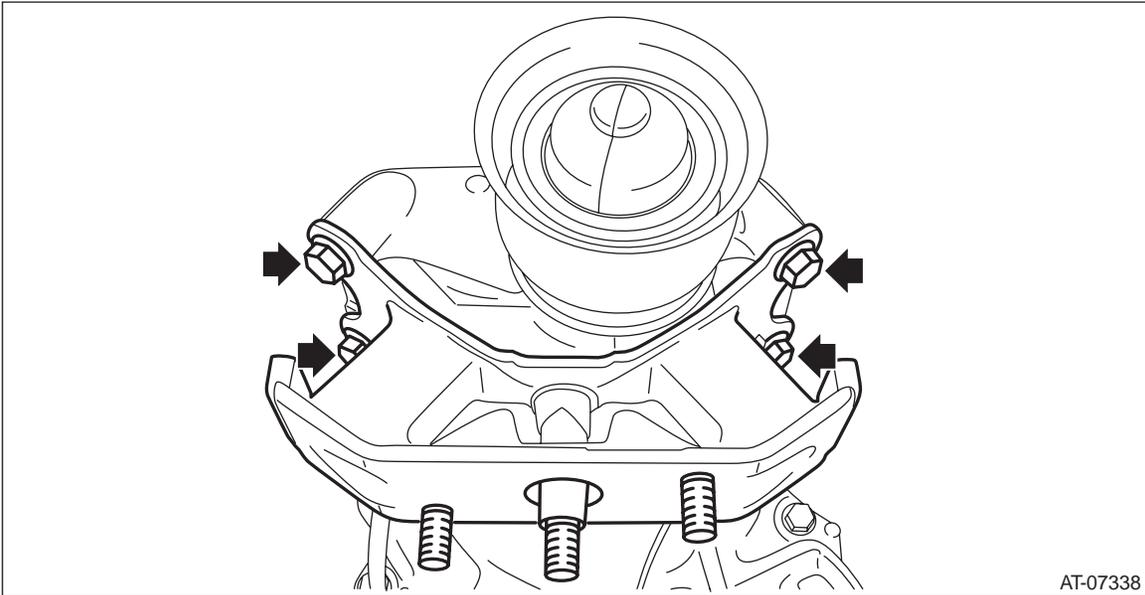
3) Replace the front differential side retainer oil seal.<Ref. to CVT(TR690)-89, REPLACEMENT, Differential Side Retainer Oil Seal.>

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.
- 4) Install the cushion rubber on the transmission.

Tightening torque:

40 N·m (4.1 kgf·m, 29.5 ft·lb)

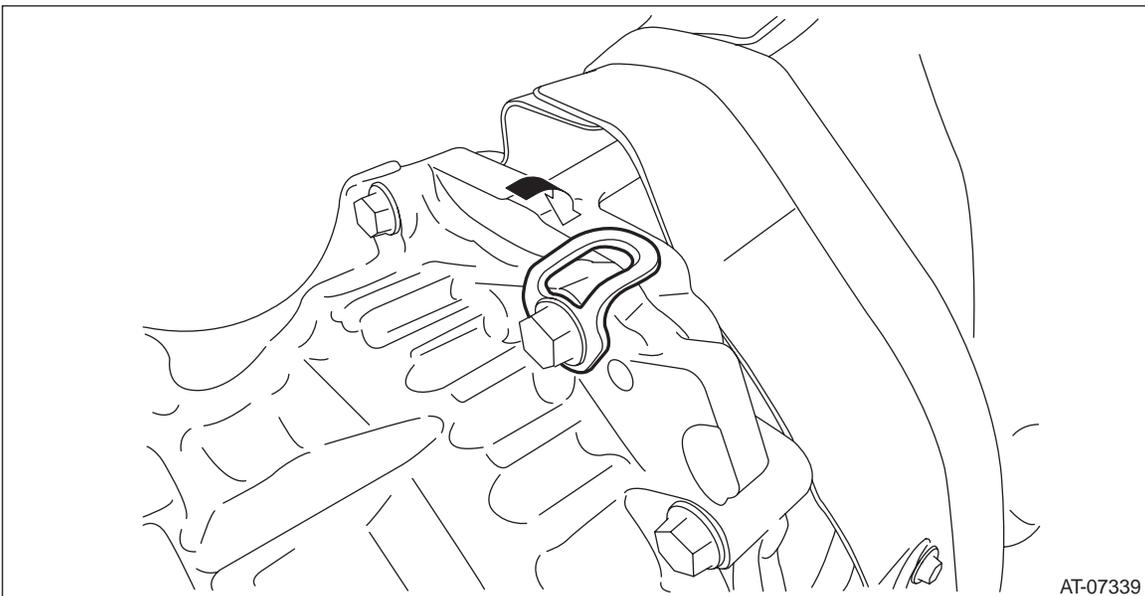


5) Mount the transmission onto the transmission jack.

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.

Automatic Transmission Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

8) Install the transmission onto the engine.

NOTE:

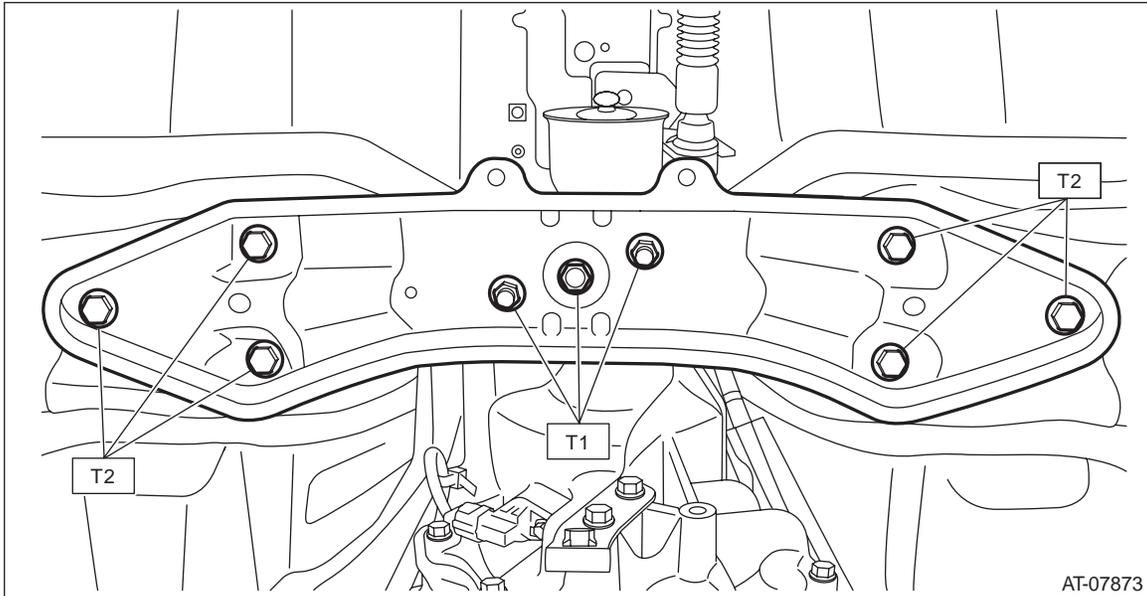
- While raising the transmission jack gradually, turn the screw of engine support, then tilt the engine forward.
- Temporarily attach the two engine connecting bolts and two nuts (lower side).

9) Install the transmission rear crossmember.

Tightening torque:

T1: 35 N·m (3.6 kgf-m, 25.8 ft-lb)

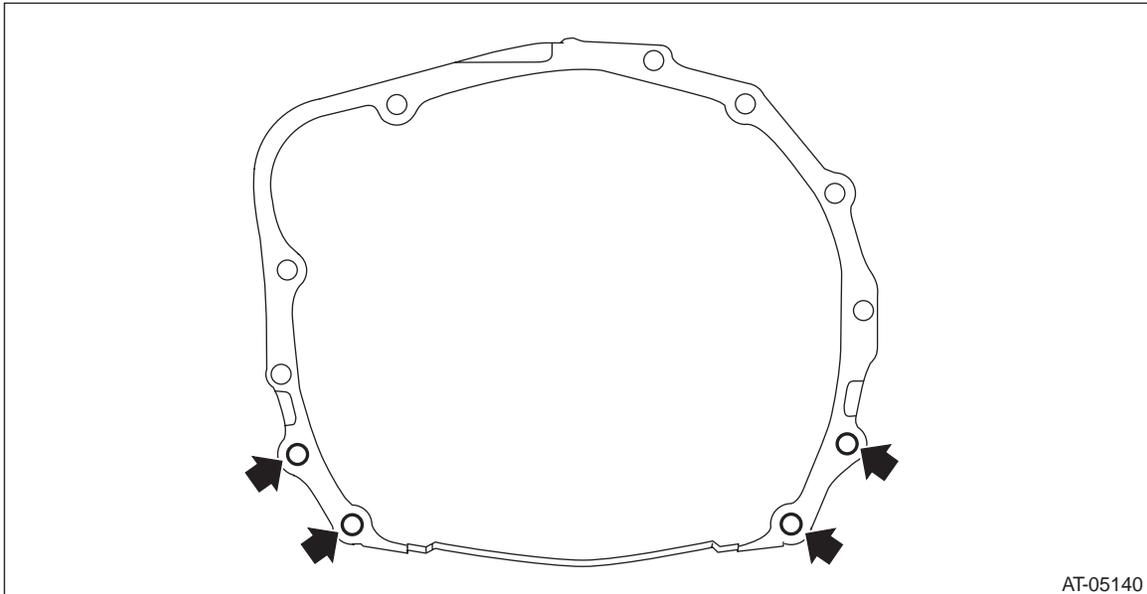
T2: 70 N·m (7.1 kgf-m, 51.6 ft-lb)



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.

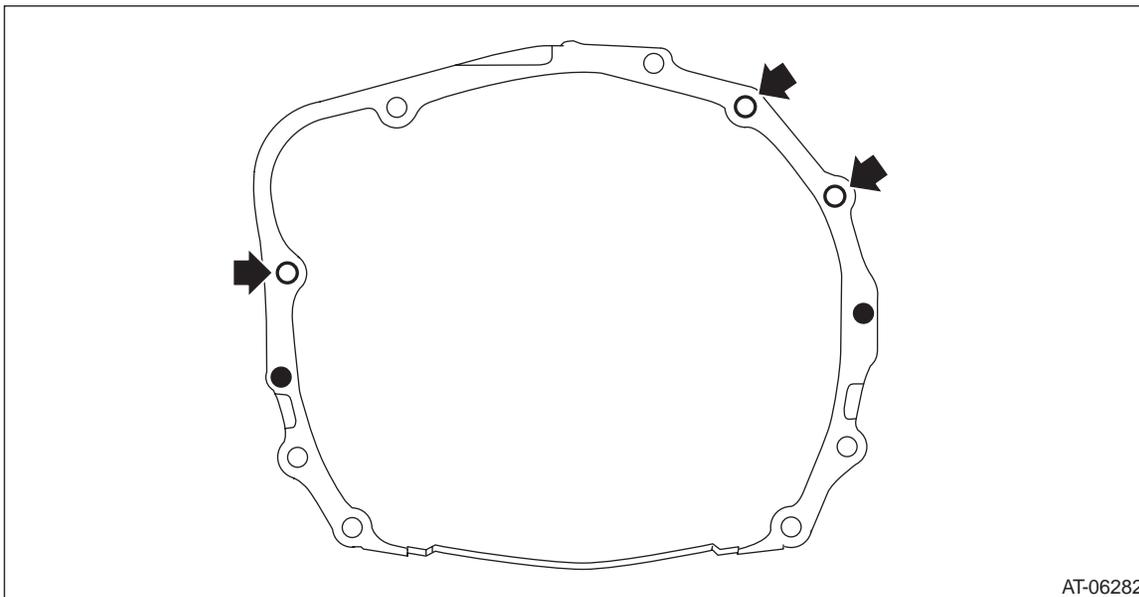
Automatic Transmission Assembly

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)

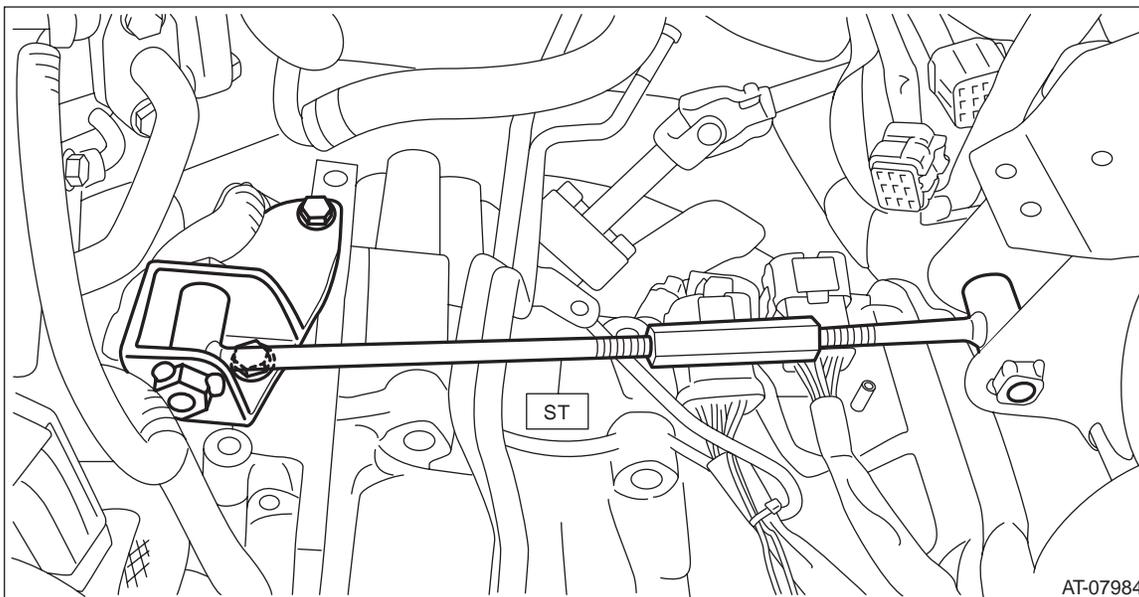


AT-06282

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

15) Remove the ST (ENGINE SUPPORT ASSY).

ST 41099AC000 ENGINE SUPPORT ASSY



AT-07984

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)

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

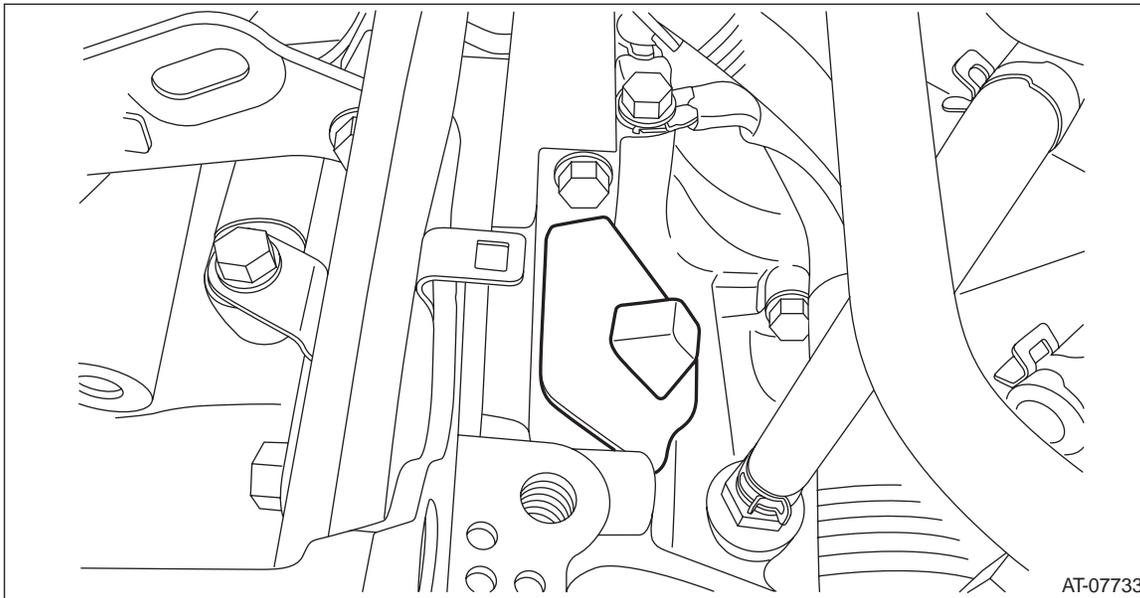
Tightening torque:

25 N·m (2.5 kgf·m, 18.4 ft·lb)

Automatic Transmission Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

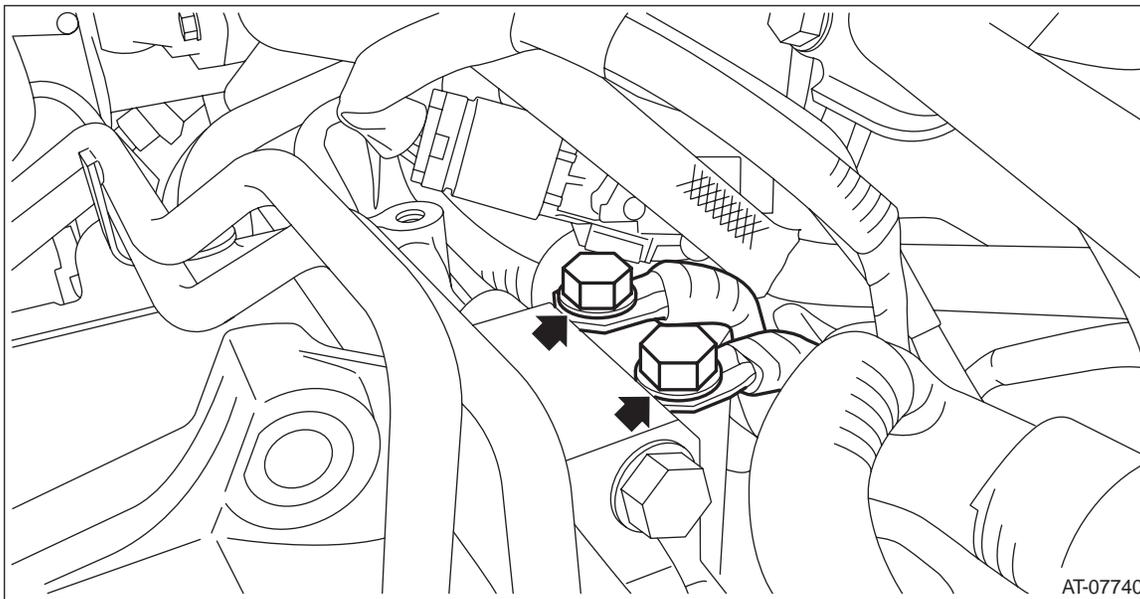
18) Install the service hole plug.



19) Install the engine ground terminals.

Tightening torque:

19 N·m (1.9 kgf-m, 14.0 ft-lb)



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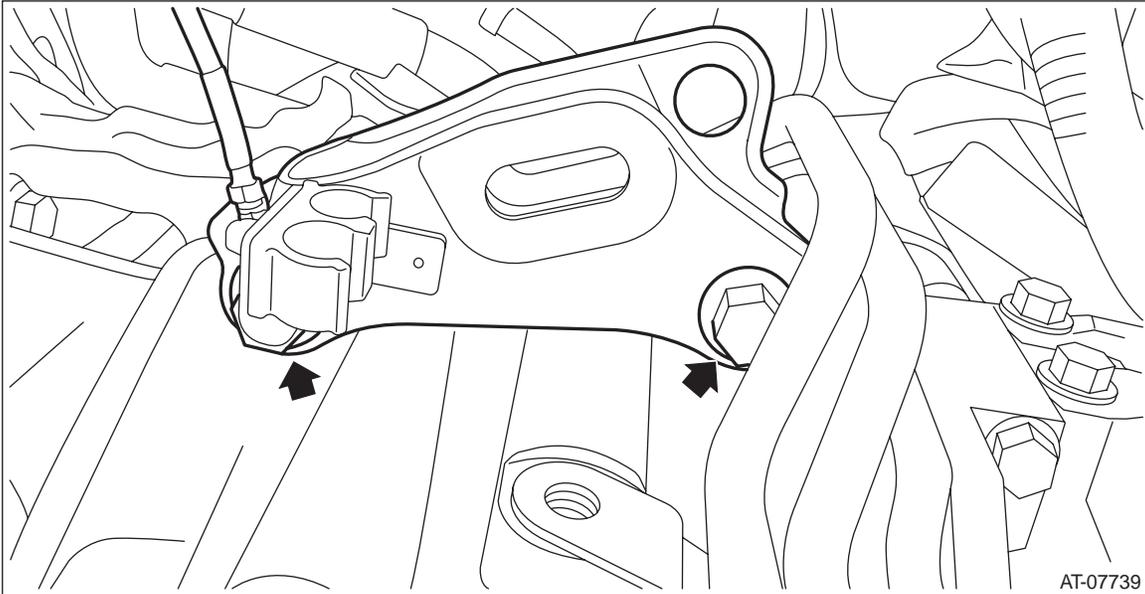
Automatic Transmission Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

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

Tightening torque:

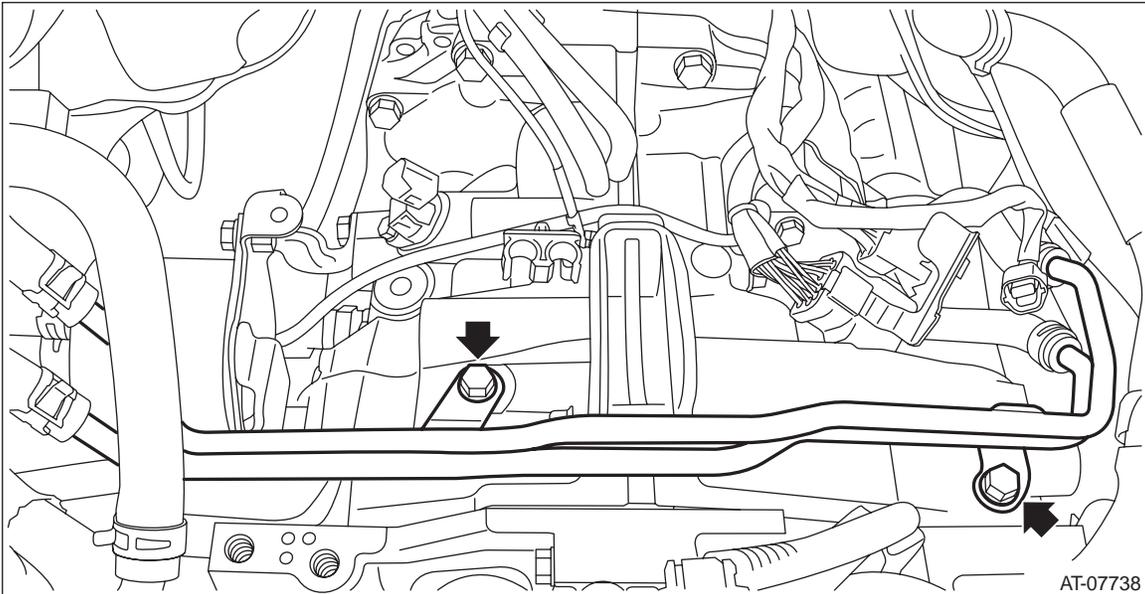
41 N·m (4.2 kgf·m, 30.2 ft·lb)



21) Install the CVTF cooler pipe COMPL.

Tightening torque:

16 N·m (1.6 kgf·m, 11.8 ft·lb)



22) Install the starter. <Ref. to SC(H4DOTC)-2, General Description.>

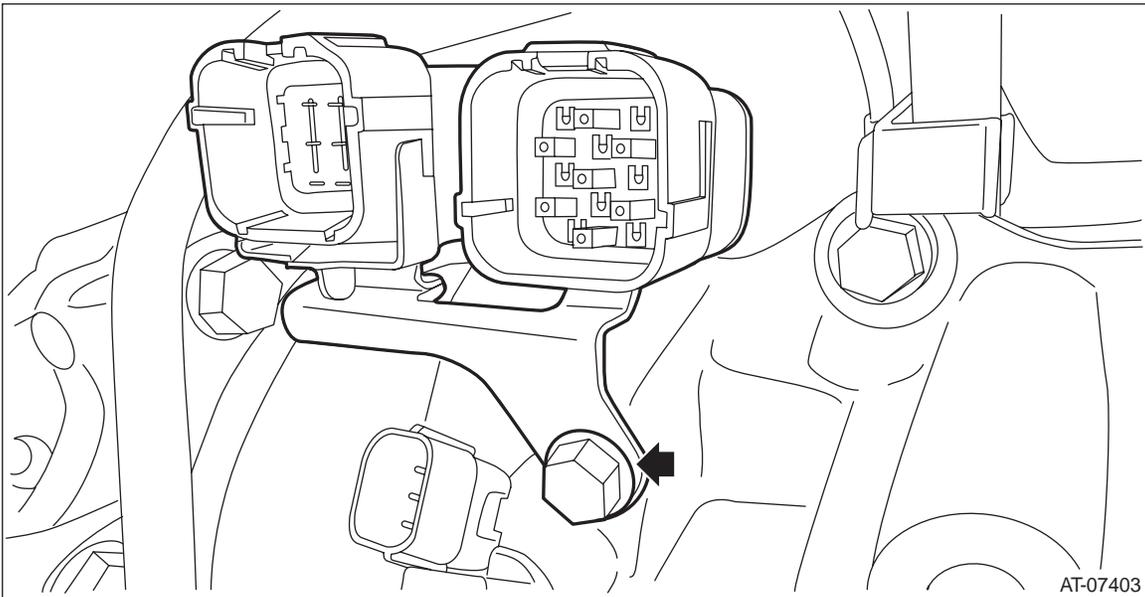
Automatic Transmission Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

23) Install the transmission harness stay.

Tightening torque:

16 N·m (1.6 kgf-m, 11.8 ft-lb)

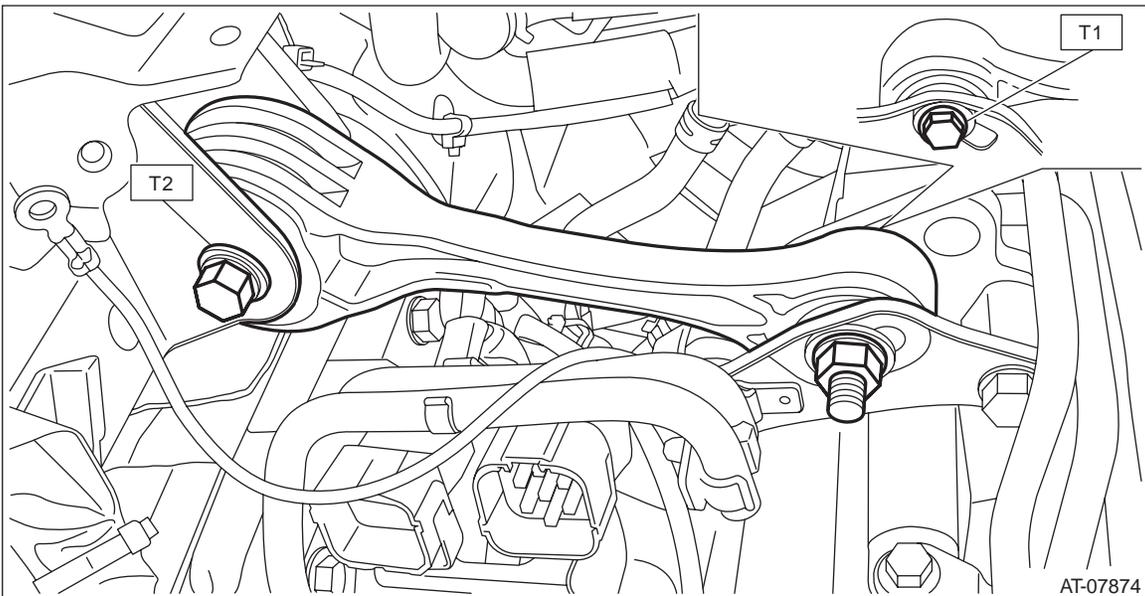


24) Install the pitching stopper.

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)



25) Lift up the vehicle.

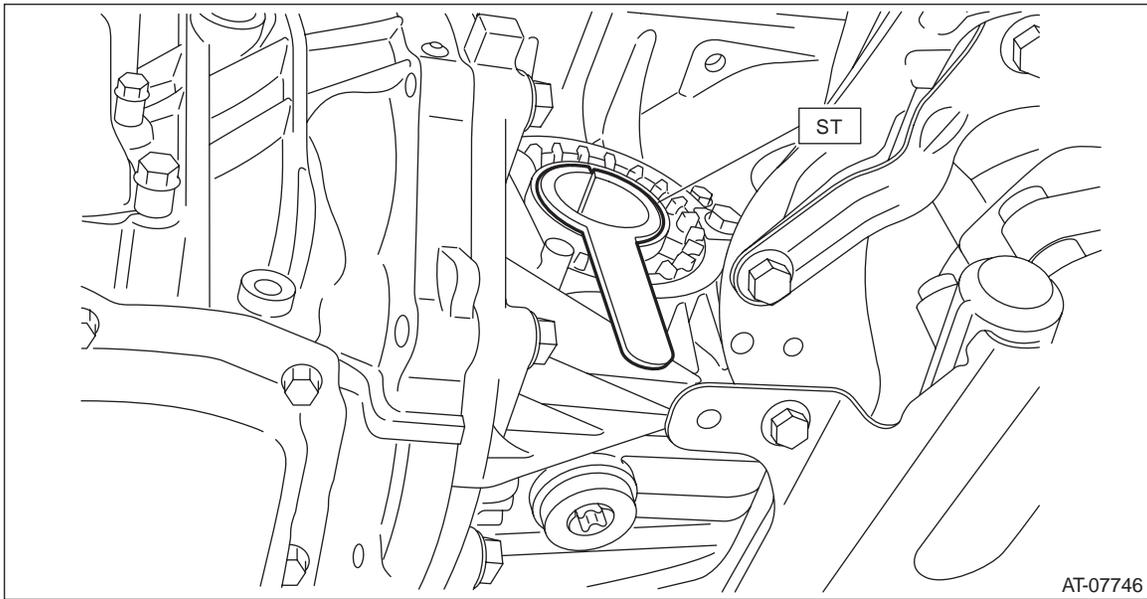
26) Apply grease to the side retainer oil seal lip.

Automatic Transmission Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

27) Set the ST to side retainer.

ST 28399SA010 OIL SEAL PROTECTOR



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

29) 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.

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

31) 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.

32) Install the stabilizer link.

Tightening torque:

60 N·m (6.1 kgf·m, 44.3 ft·lb)

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

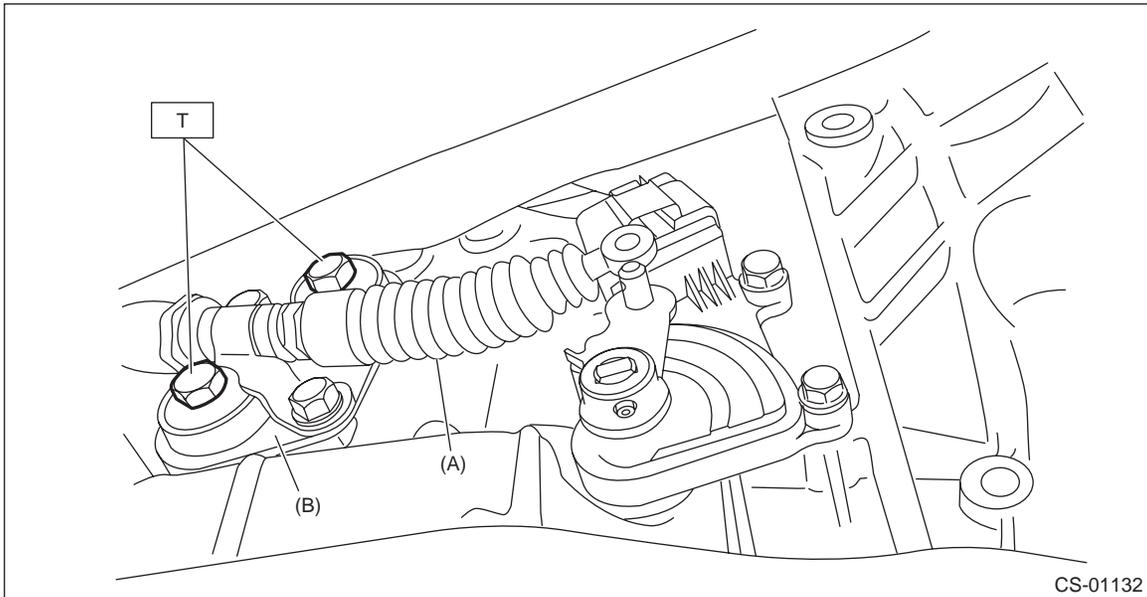
Automatic Transmission Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

34) Install the plate assembly to transmission.

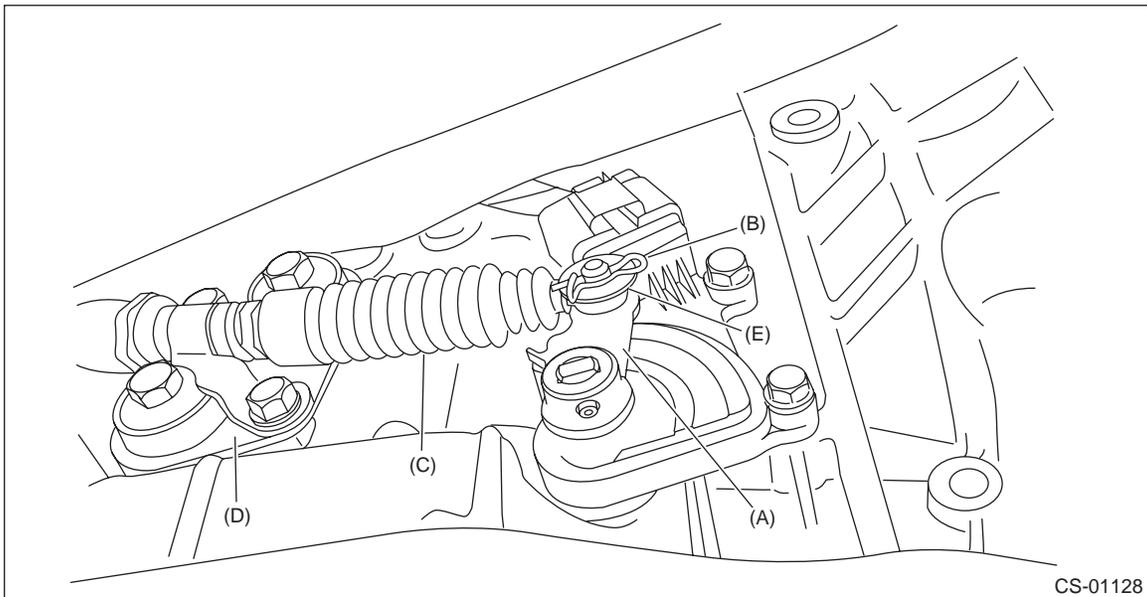
Tightening torque:

T: 25 N·m (2.5 kgf·m, 18.4 ft·lb)



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

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

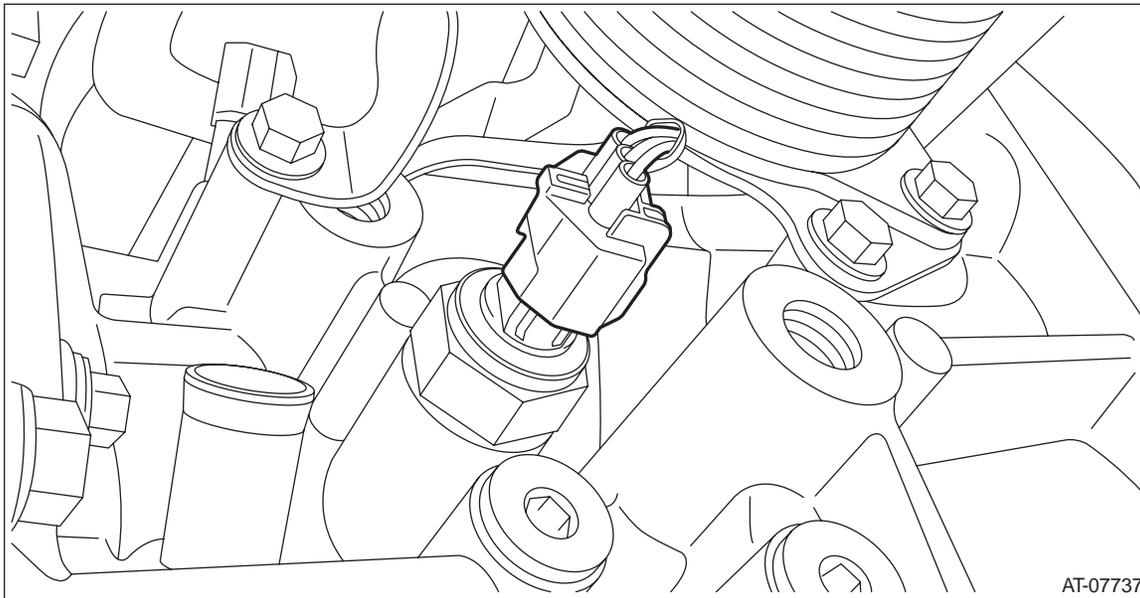


- (A) Shifter arm
- (B) Snap pin
- (C) Select cable
- (D) Plate ASSY
- (E) Washer

Automatic Transmission Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

36) Connect the secondary pressure sensor harness connector.



37) Install the exhaust hanger bracket.

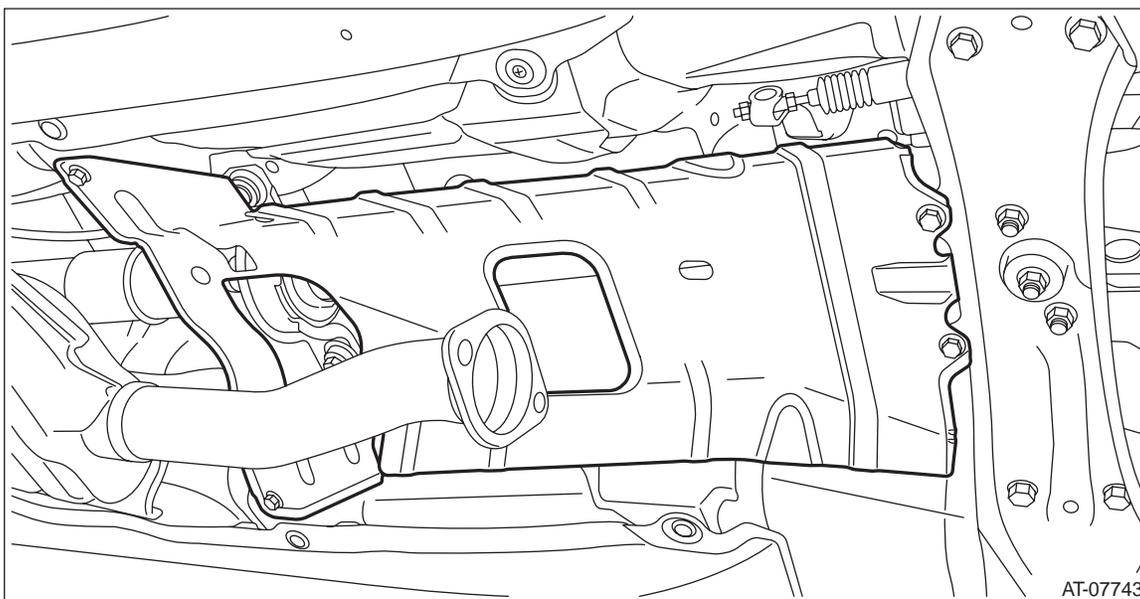
Tightening torque:

23 N·m (2.3 kgf·m, 17.0 ft·lb)

38) Install the center exhaust cover.

Tightening torque:

18 N·m (1.8 kgf·m, 13.3 ft·lb)



39) Install the center exhaust pipe.<Ref. to EX(H4DOTC)-35, INSTALLATION, Center Exhaust Pipe.>

40) Install the under cover.

41) Lower the vehicle.

42) Replace the CVTF inlet hose and CVTF outlet hose.<Ref. to CVT(TR690)-132, ASSEMBLY, CVTF Cooler (With Warmer Function).>

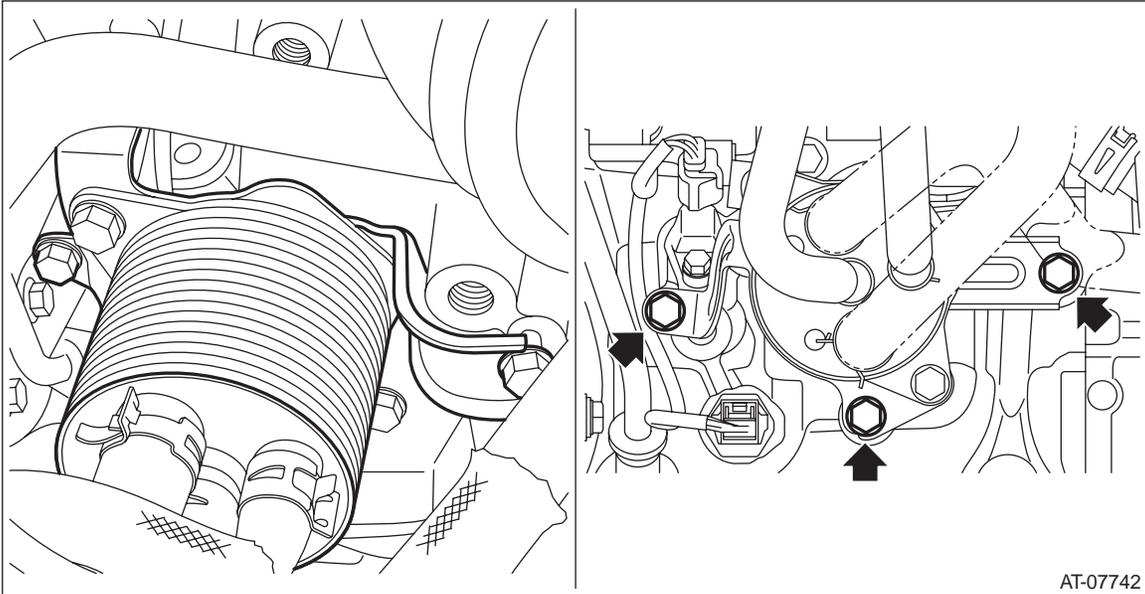
Automatic Transmission Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

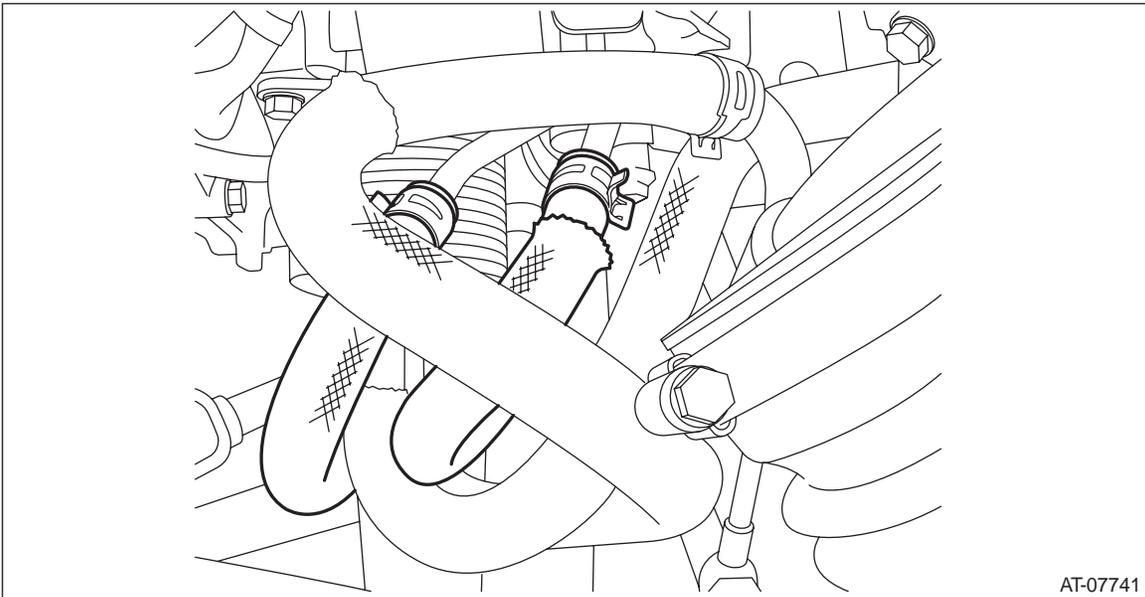
43) Install the CVTF cooler (with warmer feature) to the transmission.

Tightening torque:

23 N·m (2.3 kgf-m, 17.0 ft-lb)



44) Connect the CVTF inlet hose and the outlet hose.

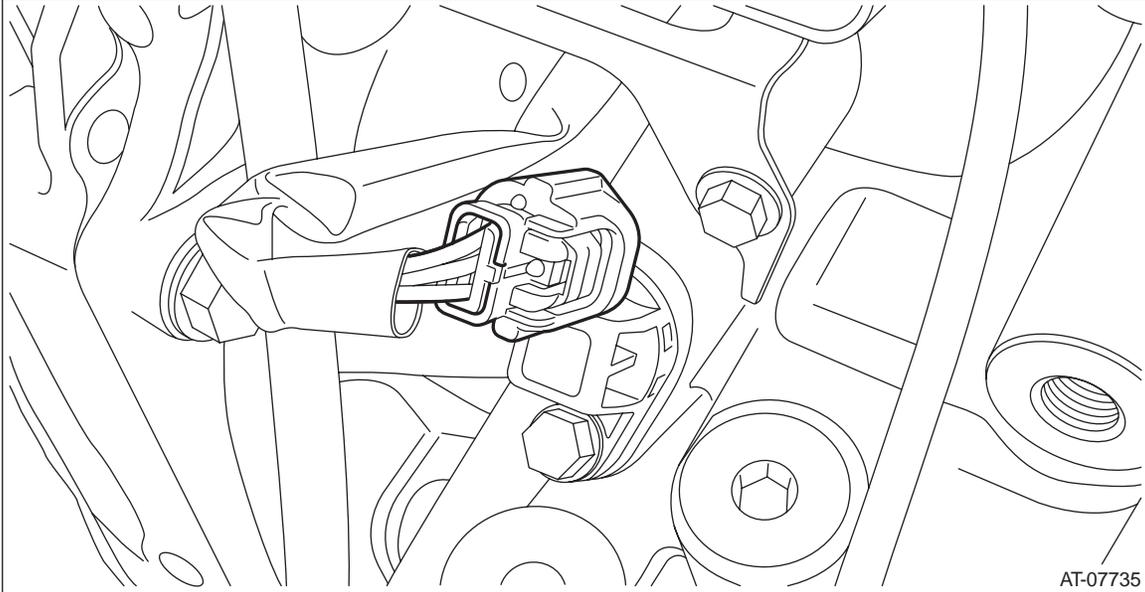


45) Install the air breather hose to the pitching stopper bracket.

Automatic Transmission Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

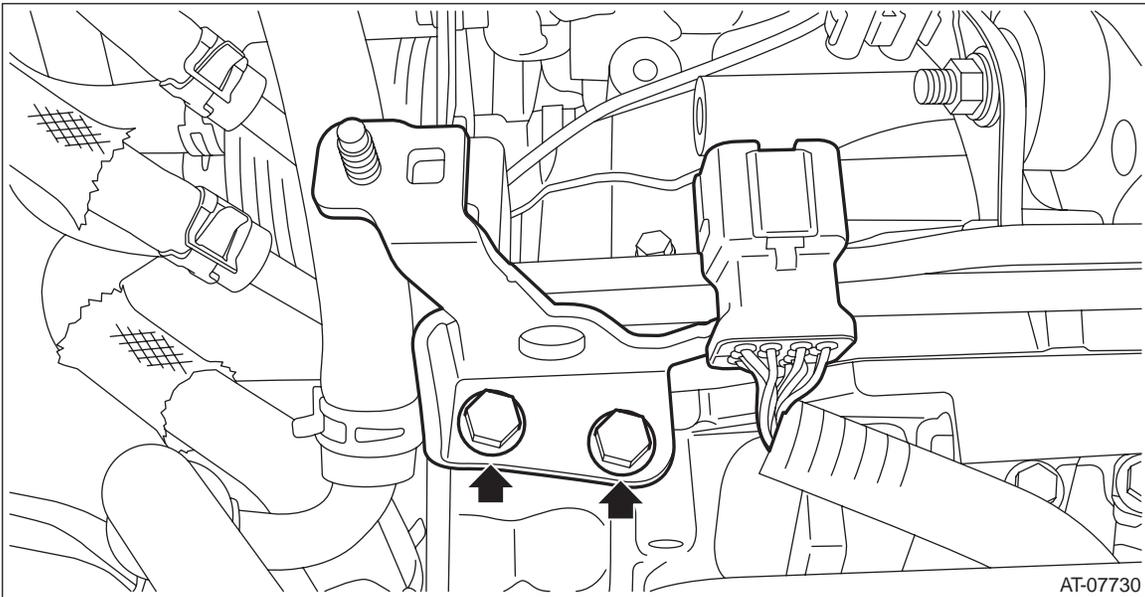
46) Connect the primary pressure sensor harness connector.



47) Install the engine hanger rear.

Tightening torque:

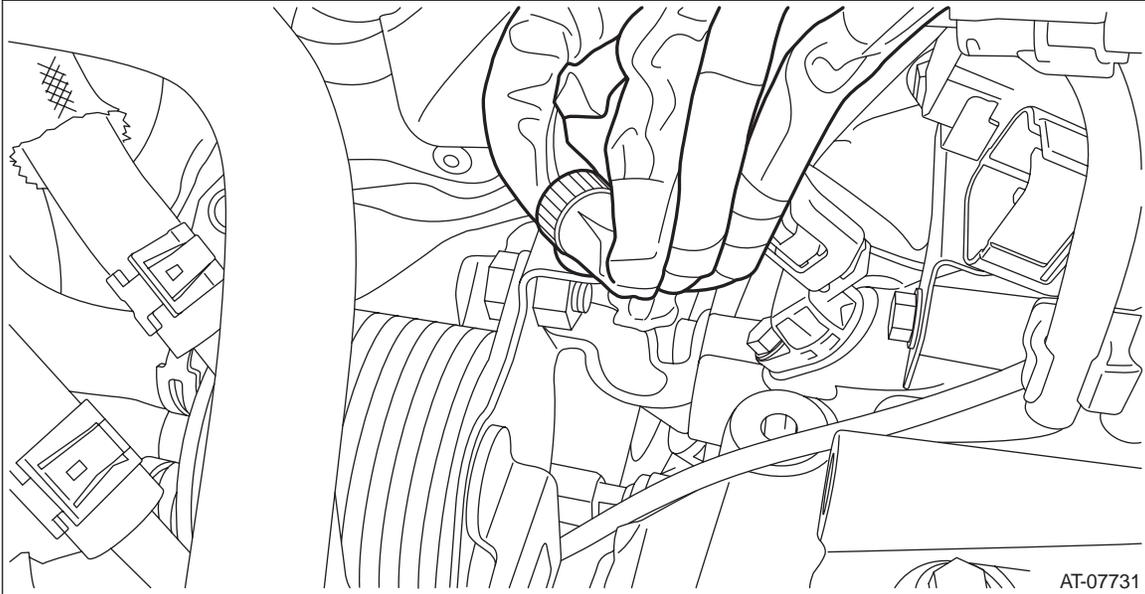
21 N·m (2.1 kgf-m, 15.5 ft-lb)



Automatic Transmission Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

48) Install the harness clip to the CVTF cooler bracket.

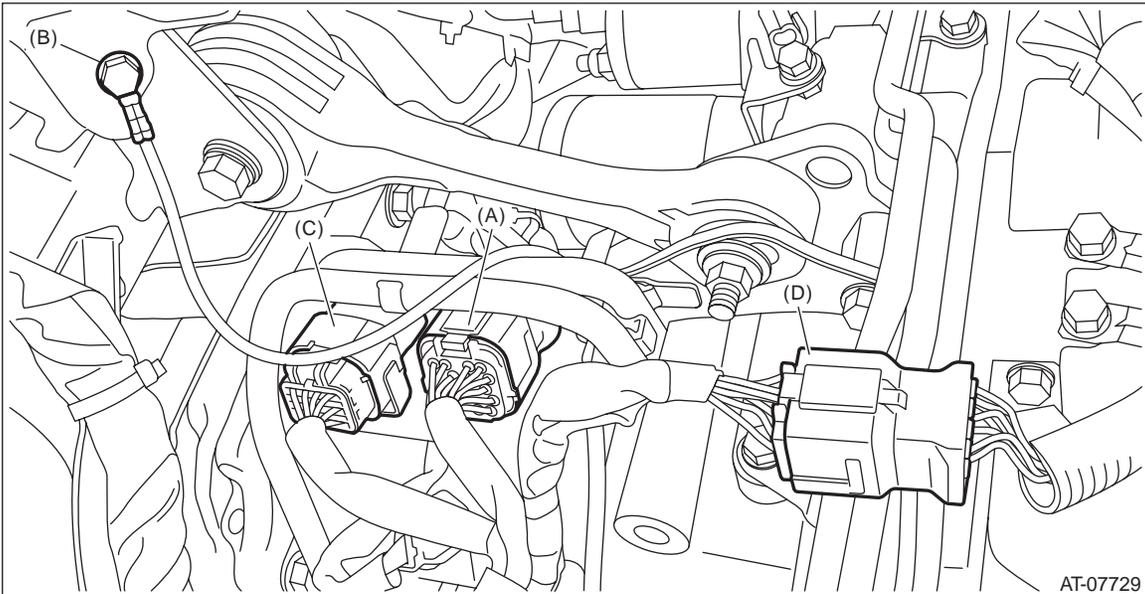


49) Connect the following harness connectors.

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

Tightening torque:

13 N·m (1.3 kgf·m, 9.6 ft·lb)



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

50) Install the intercooler.<Ref. to IN(H4DOTC)-37, INSTALLATION, Intercooler.>

51) Install the air intake duct.<Ref. to IN(H4DOTC)-19, INSTALLATION, Air Intake Duct.>

52) Install the front tires.

53) Connect the battery ground terminal.

CVT(TR690)-81

Automatic Transmission Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

54) Refill differential gear oil to adjust the differential gear oil amount.<Ref. to CVT(TR690)-41, Differential Gear Oil.>

55) Refill CVTF to adjust the CVTF amount.<Ref. to CVT(TR690)-36, CVTF.>

56) Perform the variator chain break-in.

CAUTION:

Always execute the variator chain break-in after the replacement of the following.

- Variator chain replacement
- Primary pulley and secondary pulley replacement

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

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

59) 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

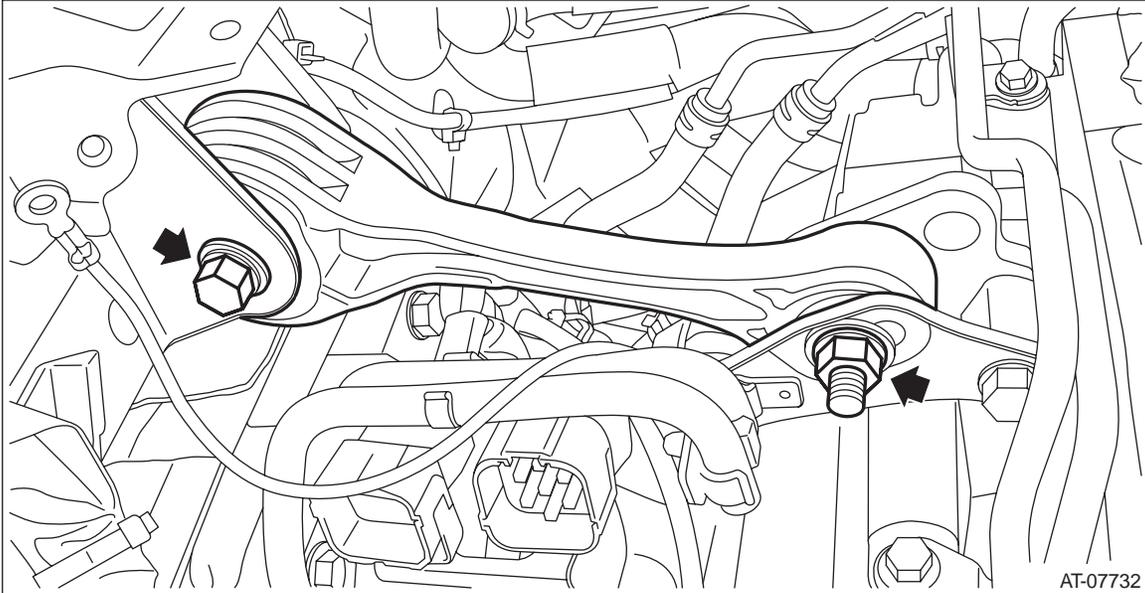
60) Perform the road test to make sure there is no fault.<Ref. to CVT(TR690)-47, INSPECTION, Road Test.>

12. Transmission Mounting System

A: REMOVAL

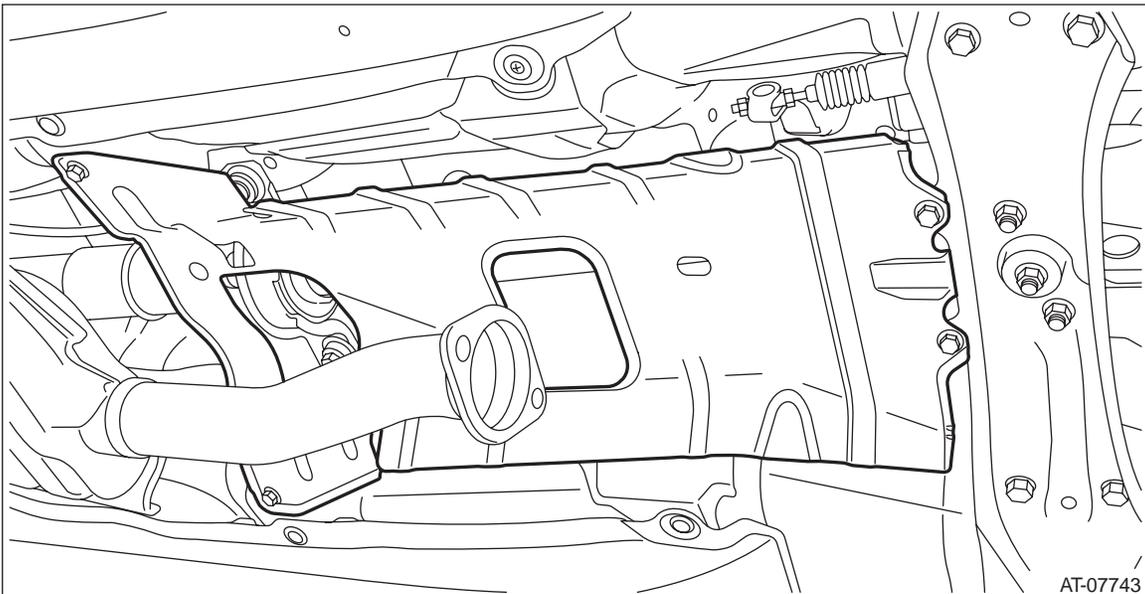
1. PITCHING STOPPER

- 1) Disconnect the ground cable from battery.
- 2) Remove the intercooler. <Ref. to IN(H4DOTC)-35, REMOVAL, Intercooler.>
- 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 center exhaust pipe. <Ref. to EX(H4DOTC)-30, REMOVAL, Center Exhaust Pipe.>
- 4) Remove the center exhaust cover.

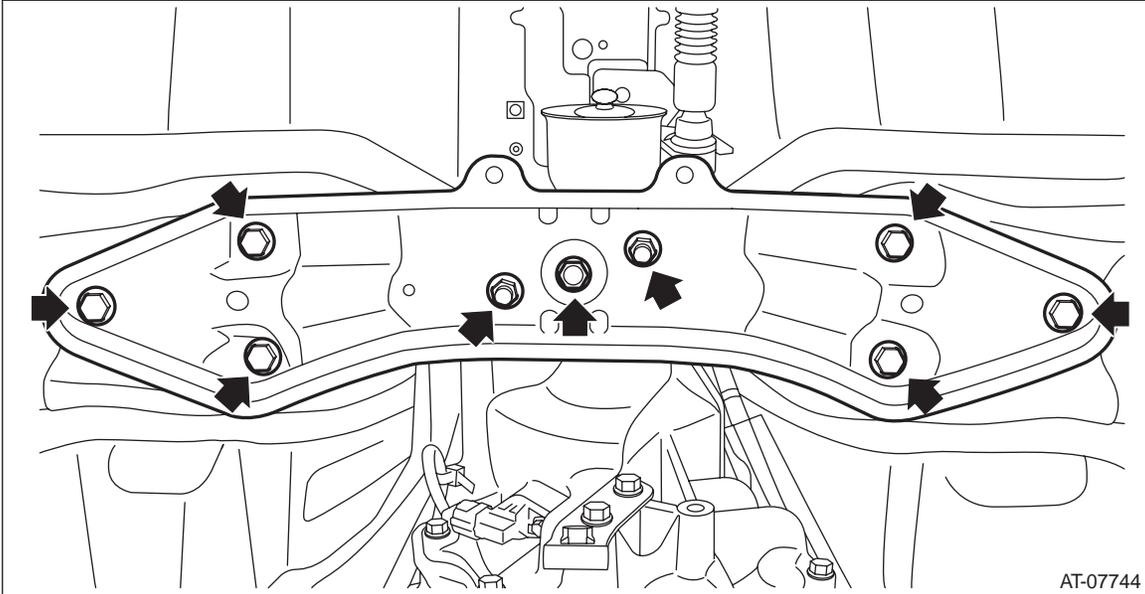


- 5) Set the transmission jack under the transmission. Make sure that the support plate of transmission jack does not touch the oil pan.

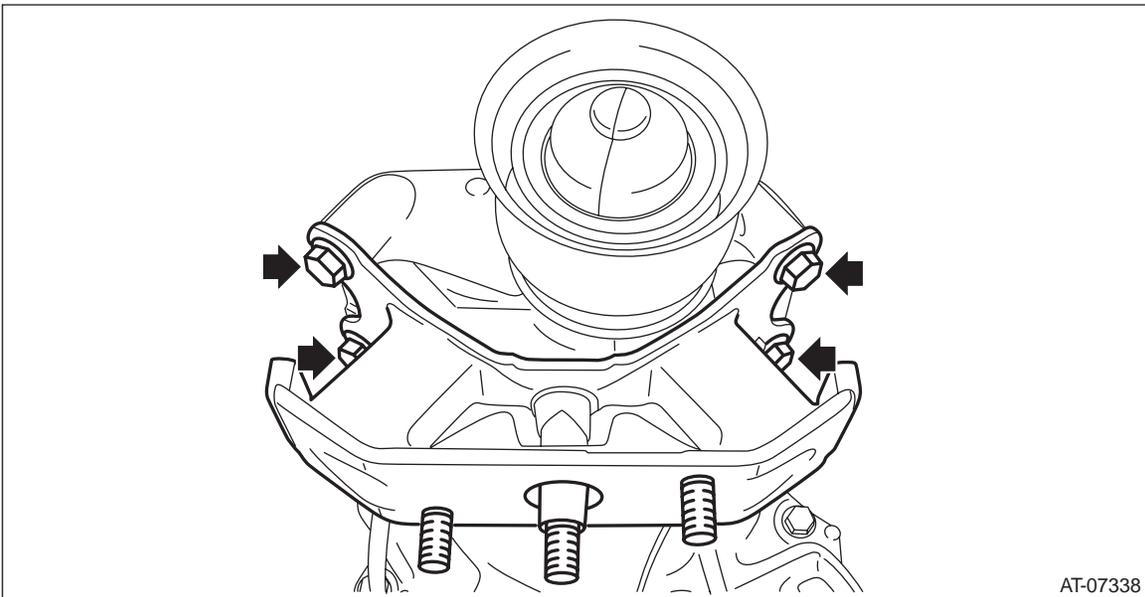
Transmission Mounting System

CONTINUOUSLY VARIABLE TRANSMISSION

6) Remove the transmission rear crossmember.



7) Remove the rear cushion rubber.



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Transmission Mounting System

CONTINUOUSLY VARIABLE TRANSMISSION

B: INSTALLATION

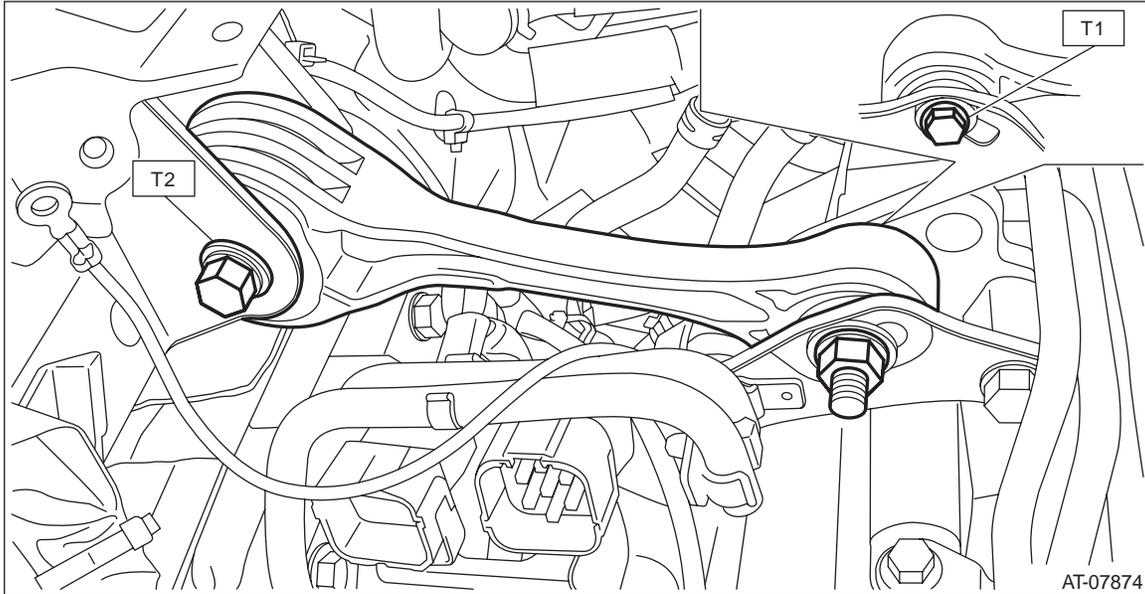
1. PITCHING STOPPER

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)



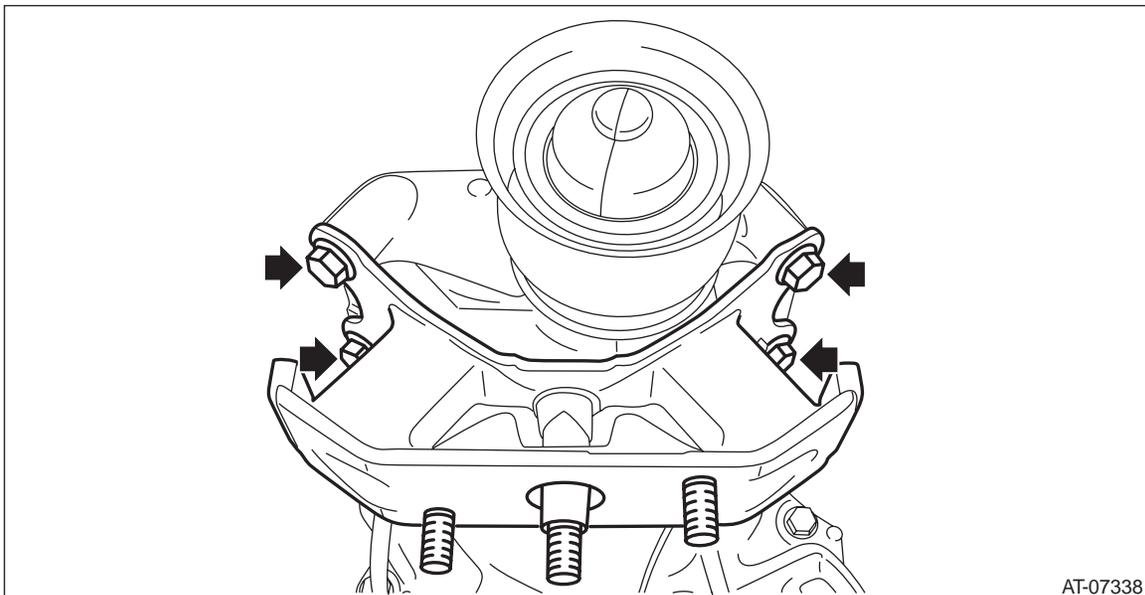
- 2) Install the intercooler. <Ref. to IN(H4DOTC)-37, INSTALLATION, Intercooler.>
- 3) Connect the battery ground terminal.

2. TRANSMISSION REAR CROSSMEMBER AND REAR CUSHION RUBBER

1) Install the rear cushion rubber on the transmission.

Tightening torque:

40 N·m (4.1 kgf-m, 29.5 ft-lb)



Transmission Mounting System

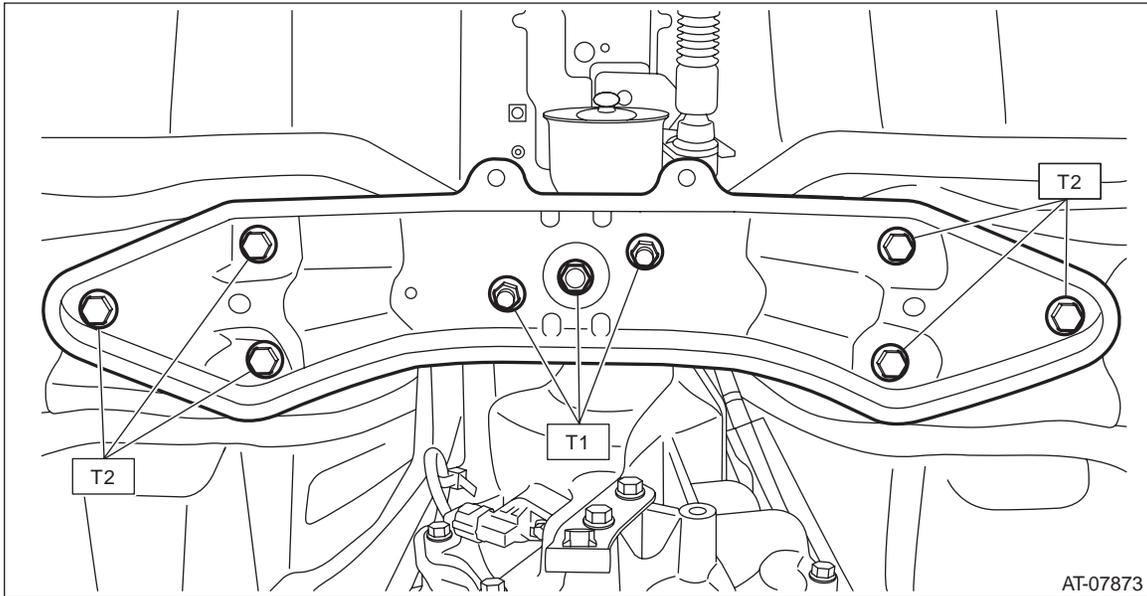
CONTINUOUSLY VARIABLE TRANSMISSION

2) Install the transmission rear crossmember.

Tightening torque:

T1: 35 N·m (3.6 kgf·m, 25.8 ft·lb)

T2: 70 N·m (7.1 kgf·m, 51.6 ft·lb)

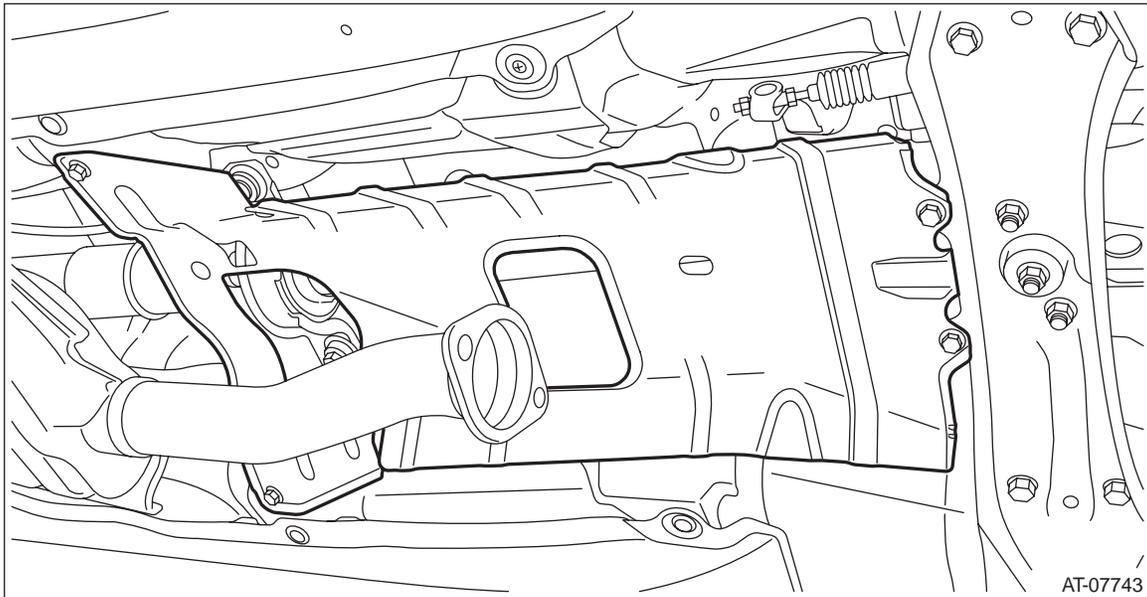


3) Remove the transmission jack.

4) Install the 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(H4DOTC)-35, INSTALLATION, Center Exhaust Pipe.>

6) 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.

13.Extension Case Oil Seal

A: INSPECTION

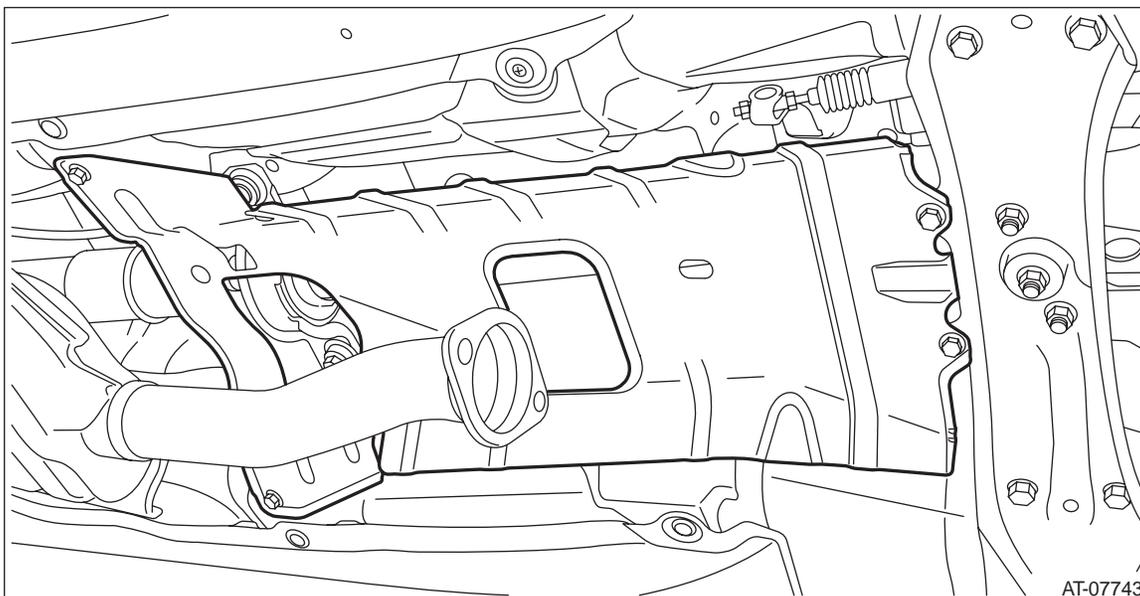
Check for leakage of CVTF from the joint section of transmission and propeller shaft. If a leak is found, inspect the propeller shaft and replace the oil seal.

B: REPLACEMENT

CAUTION:

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

- 1) Lift up the vehicle.
- 2) Clean the transmission exterior.
- 3) Remove the center exhaust pipe. <Ref. to EX(H4DOTC)-30, REMOVAL, Center Exhaust Pipe.>
- 4) Remove the center exhaust cover.



- 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.

ST 498057300 OIL SEAL DRIFT

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

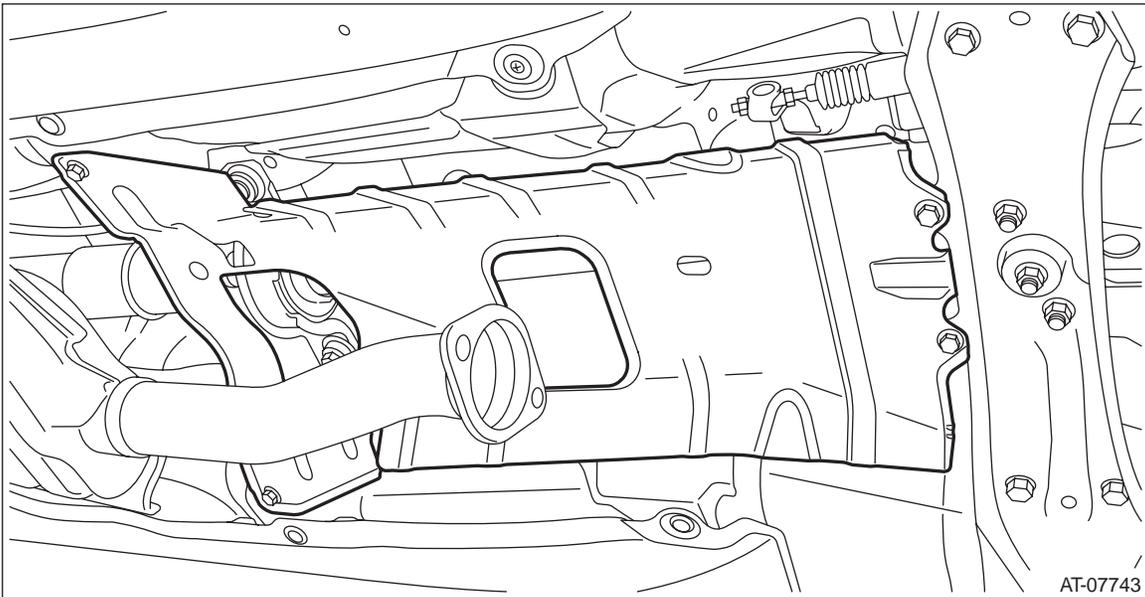
Extension Case Oil Seal

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(H4DOTC)-35, INSTALLATION, Center Exhaust Pipe.>

11) Adjust the CVTF level and check there is no leakage. <Ref. to CVT(TR690)-36, ADJUSTMENT, CVTF.>

14. Differential Side Retainer Oil Seal

A: INSPECTION

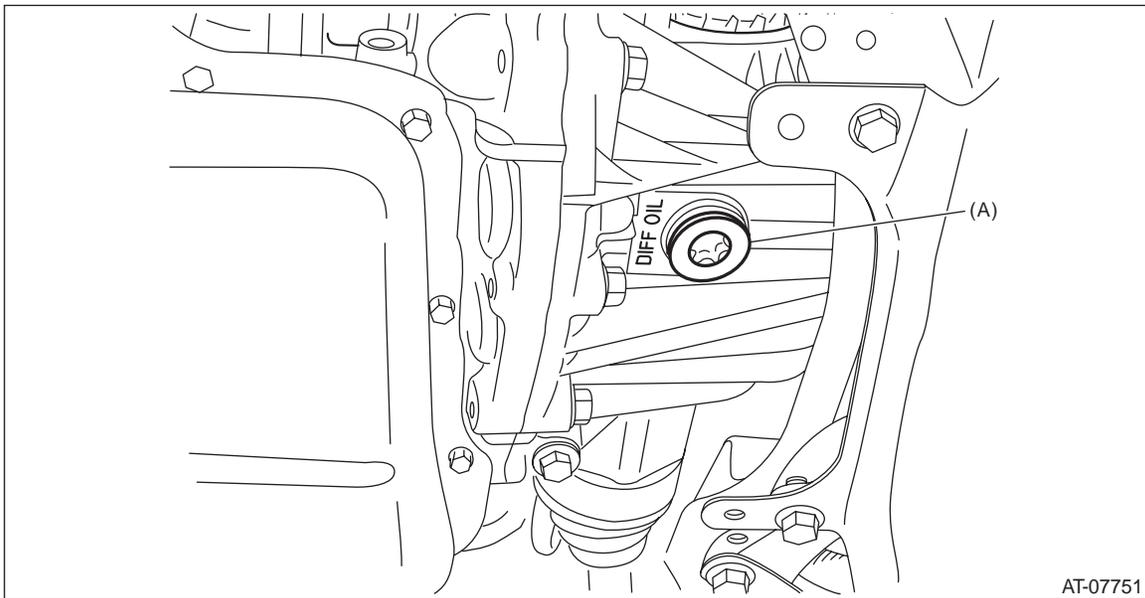
Check for leakage of gear oil from differential side retainer oil seal part. If there is an oil leak, inspect the front drive shaft and replace the oil seal.

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.
- 2) Remove the center exhaust pipe. <Ref. to EX(H4DOTC)-30, REMOVAL, Center Exhaust Pipe.>
- 3) Remove the differential gear oil drain plug using TORX® bit T70, and then drain differential gear oil.



(A) Differential gear oil drain plug

- 4) Tighten the differential gear oil drain plug.

NOTE:

Use a new gasket.

Tightening torque:

70 N·m (7.1 kgf-m, 51.6 ft-lb)

- 5) Remove the stabilizer link. <Ref. to FS-29, REMOVAL, Front Stabilizer.>
- 6) Disconnect the lower arm ball joint and housing.
- 7) Pull out the front drive shaft from transmission using a crowbar.

NOTE:

Place cloth between the tire lever or bar and the transmission in order to avoid damaging the transmission side retainer.

- 8) Holding the joint of front drive shaft from transmission side, pull out the drive shaft from transmission with care 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.

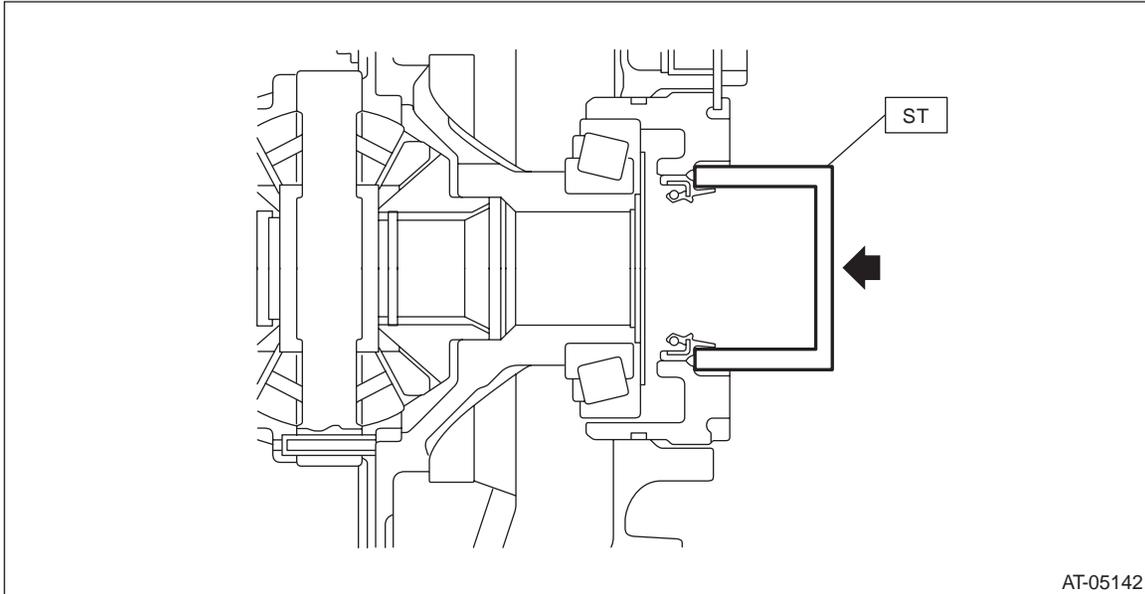
Differential Side Retainer Oil Seal

CONTINUOUSLY VARIABLE TRANSMISSION

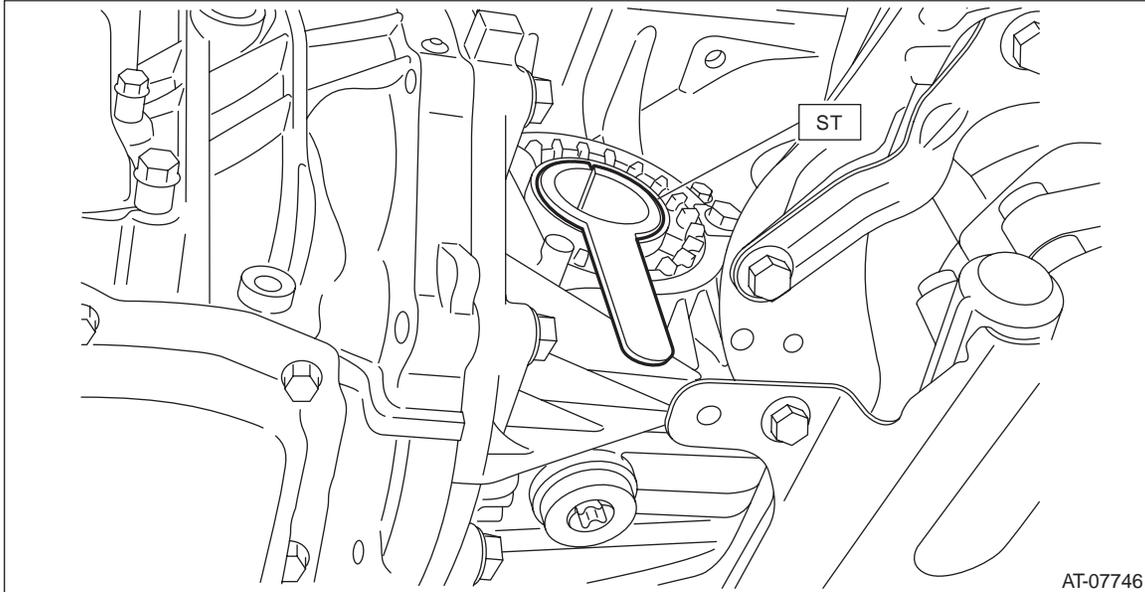
10) Using the ST, install the differential side retainer oil seal by lightly tapping with a hammer.
ST 18675AA000 DIFFERENTIAL SIDE OIL SEAL INSTALLER

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.



11) Set the ST to side retainer.
ST 28399SA010 OIL SEAL PROTECTOR



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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 (OIL SEAL PROTECTOR).
- 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.

- 16) Install the stabilizer link.

Tightening torque:

60 N·m (6.1 kgf-m, 44.3 ft-lb)

- 17) Install the center exhaust pipe. <Ref. to EX(H4DOTC)-35, INSTALLATION, Center Exhaust Pipe.>
- 18) Lower the vehicle.
- 19) Refill differential gear oil from the charge pipe. <Ref. to CVT(TR690)-41, Differential Gear Oil.>
- 20) Adjust the differential gear oil level, and check for leakage. <Ref. to CVT(TR690)-41, ADJUSTMENT, Differential Gear Oil.>
- 21) Install the front wheels.

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Inhibitor Switch

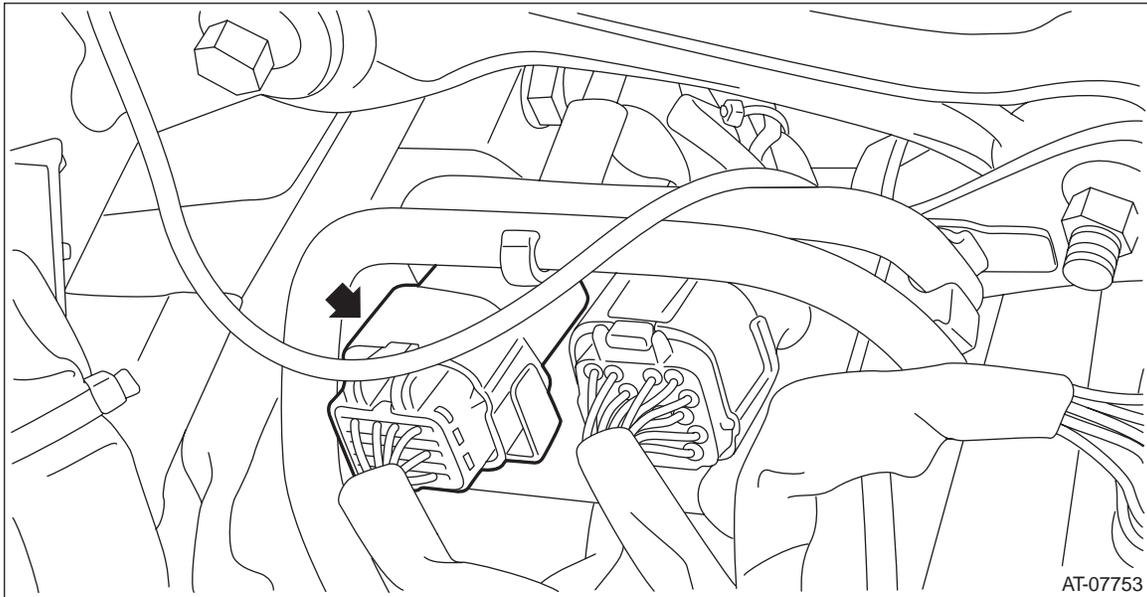
CONTINUOUSLY VARIABLE TRANSMISSION

15. 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 intercooler. <Ref. to IN(H4DOTC)-35, REMOVAL, Intercooler.>
- 2) Disconnect the inhibitor harness connector.



Inhibitor Switch

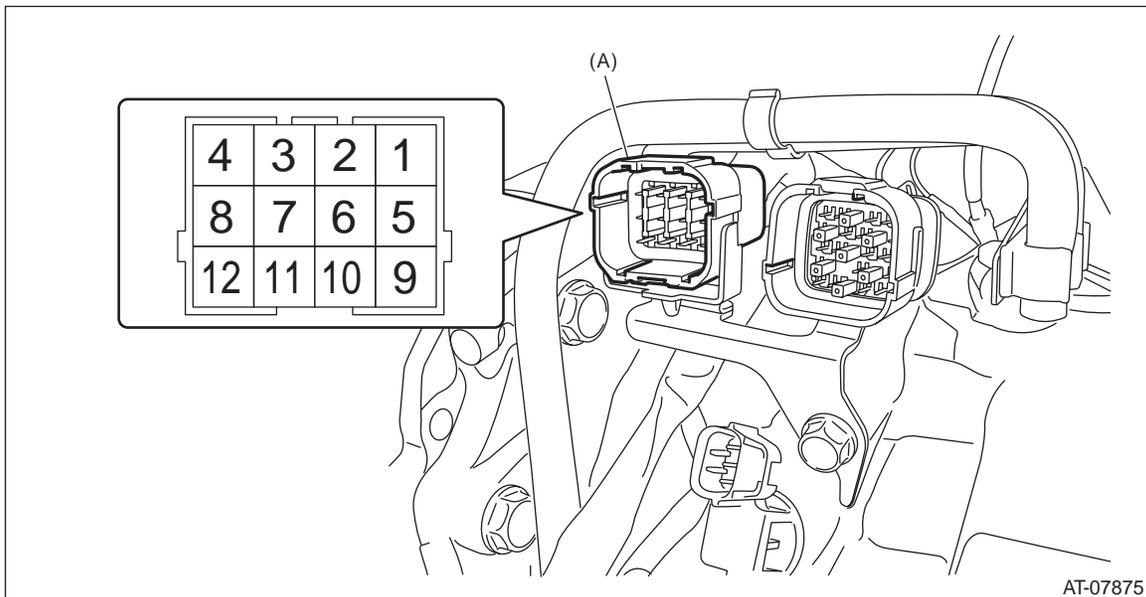
CONTINUOUSLY VARIABLE TRANSMISSION

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	4 — 3
	R	4 — 2
	N	4 — 1
	D	4 — 8
Starter circuit	P/N	12 — 11
Back-up light circuit	R	10 — 9



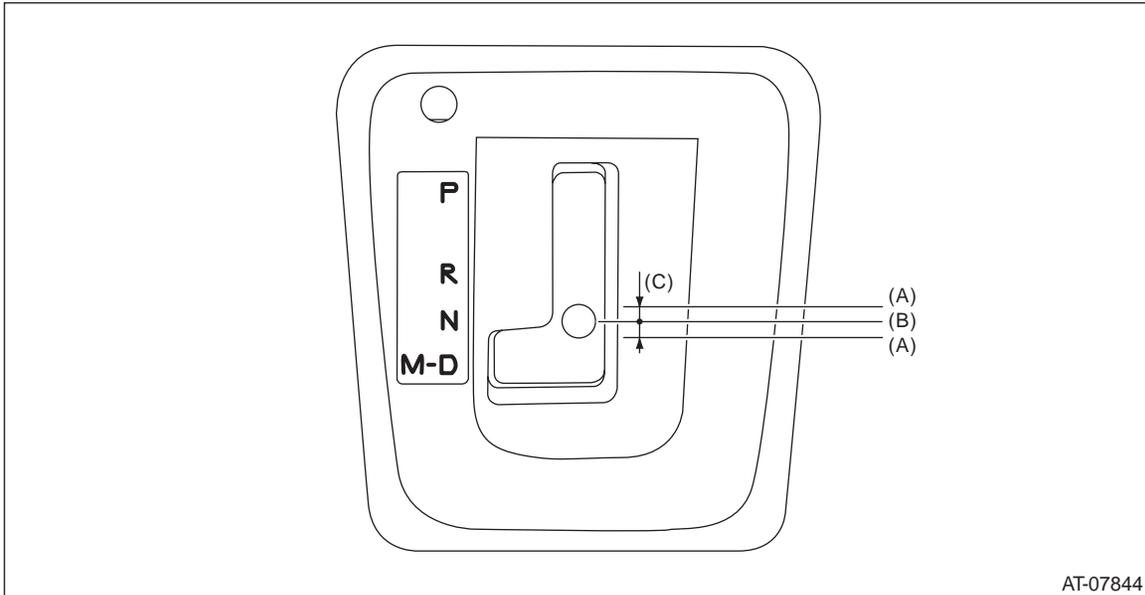
(A) Inhibitor harness connector

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(TR690)-94, ADJUSTMENT, Inhibitor Switch.>

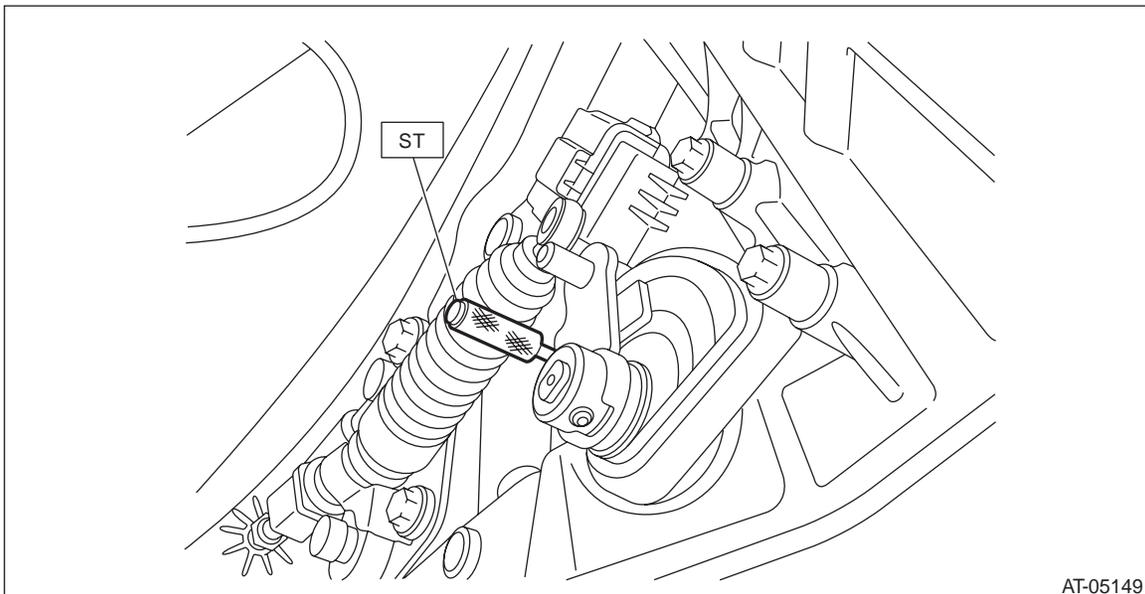


- (A) Continuity does not exist.
- (B) Continuity exists.
- (C) 1.5°

5) Repeat the above inspection in other gear ranges. If there is fault, adjust the inhibitor switch and select cable. <Ref. to CVT(TR690)-94, ADJUSTMENT, Inhibitor Switch.> <Ref. to CS-56, ADJUSTMENT, Select Cable.>

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



Inhibitor Switch

CONTINUOUSLY VARIABLE TRANSMISSION

4) Tighten the two bolts holding the inhibitor switch.

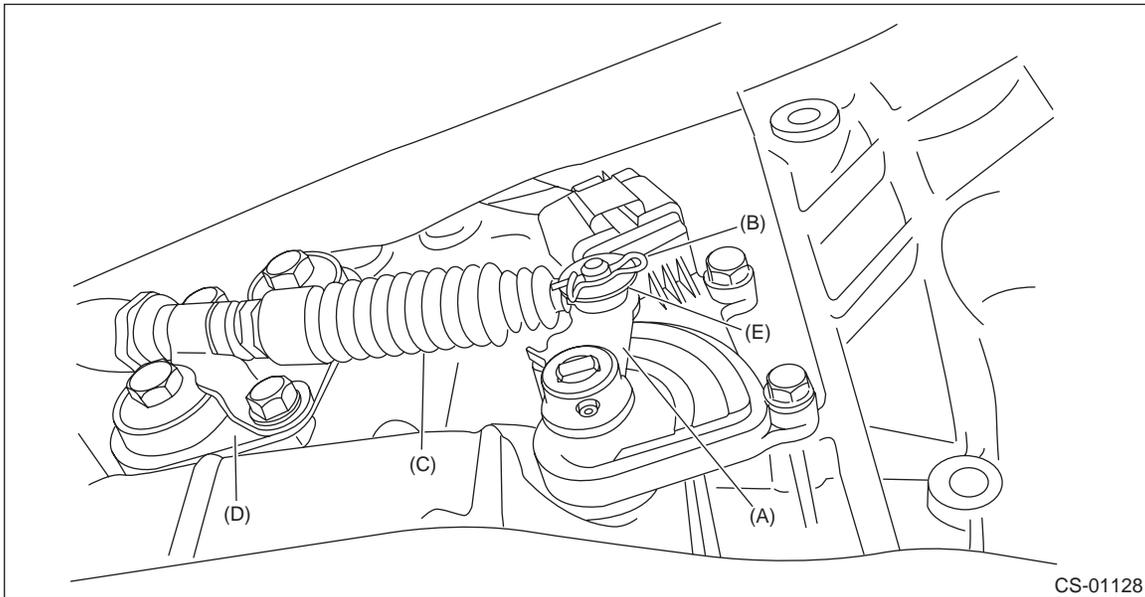
Tightening torque:

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.

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 snap pin and washer from the shifter arm.

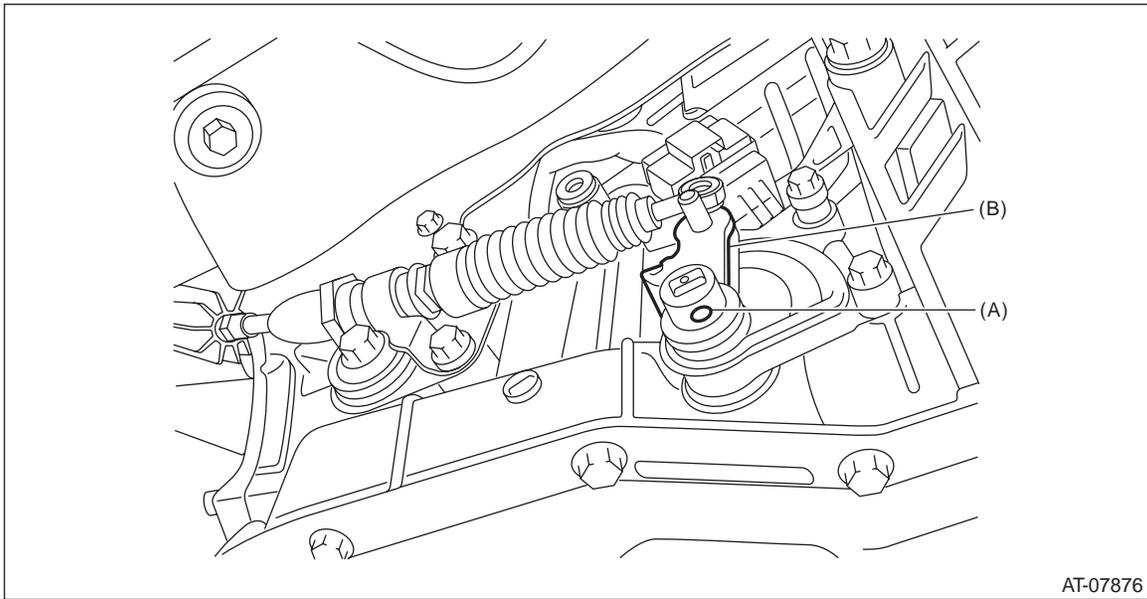


- (A) Shifter arm
- (B) Snap pin
- (C) Select cable
- (D) Plate ASSY
- (E) Washer

Inhibitor Switch

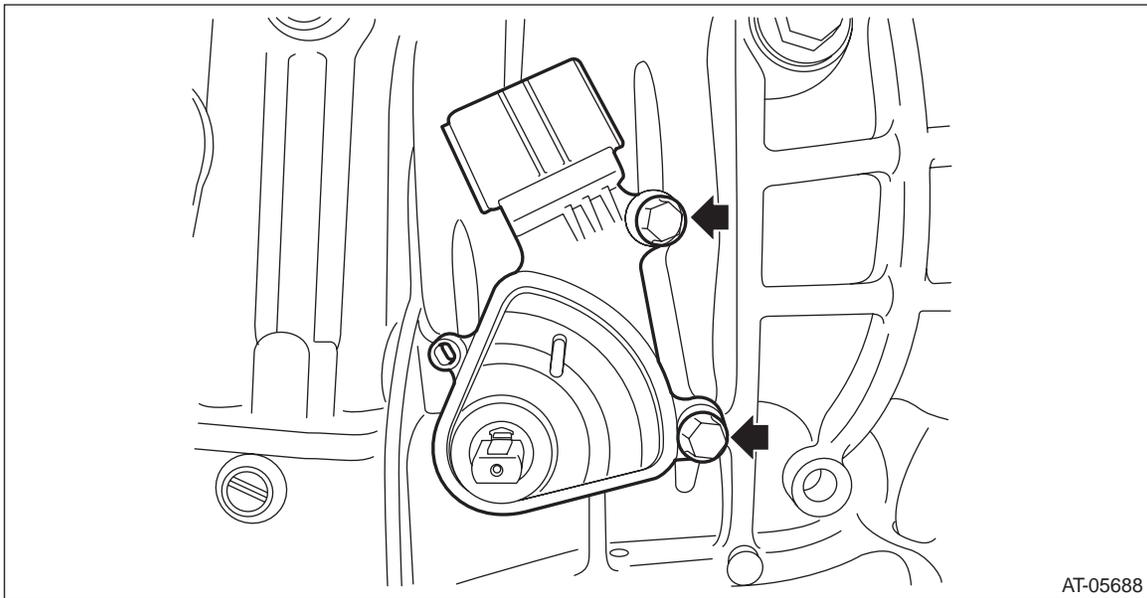
CONTINUOUSLY VARIABLE TRANSMISSION

- 5) Using the ST, remove the spring pin and shifter arm.
ST 398791600 REMOVER



- (A) Spring pin
(B) Shifter arm

- 6) Remove the inhibitor harness connector from inhibitor switch.
7) Remove the two inhibitor switch securing bolts.



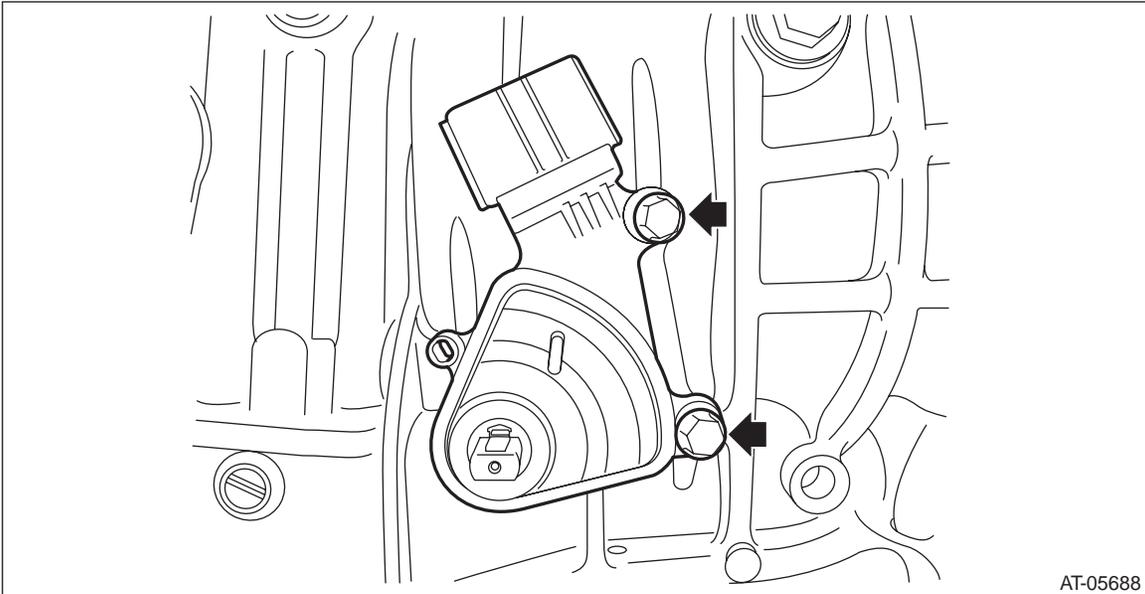
- 8) Remove the inhibitor switch from the transmission case.

Inhibitor Switch

CONTINUOUSLY VARIABLE TRANSMISSION

D: INSTALLATION

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

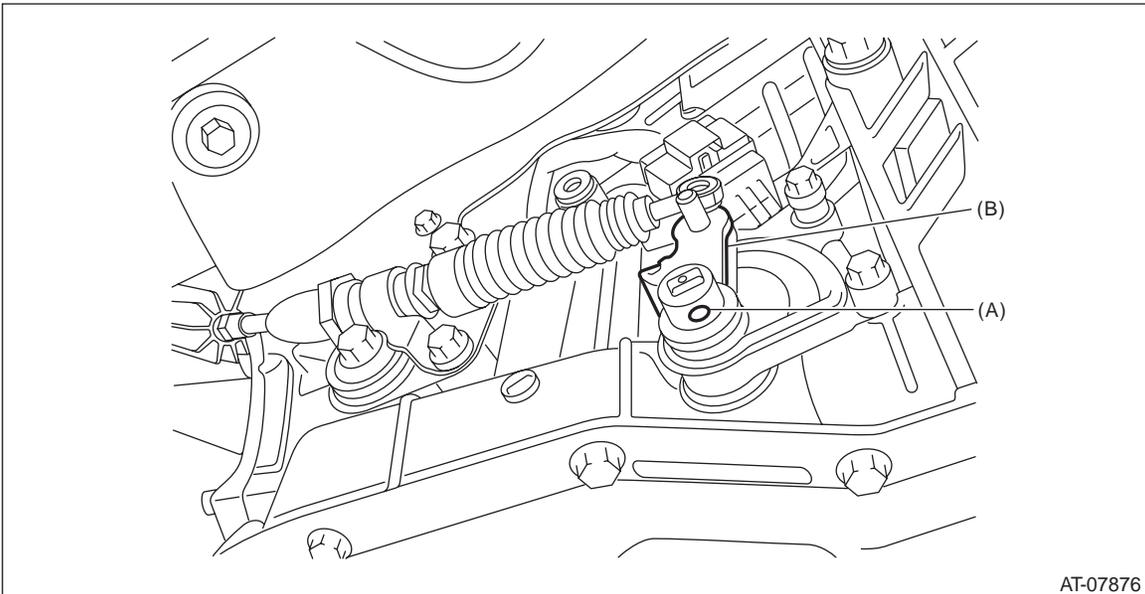


2) Connect the inhibitor harness connector to the inhibitor switch.

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

NOTE:

Use new spring pin.



(A) Spring pin

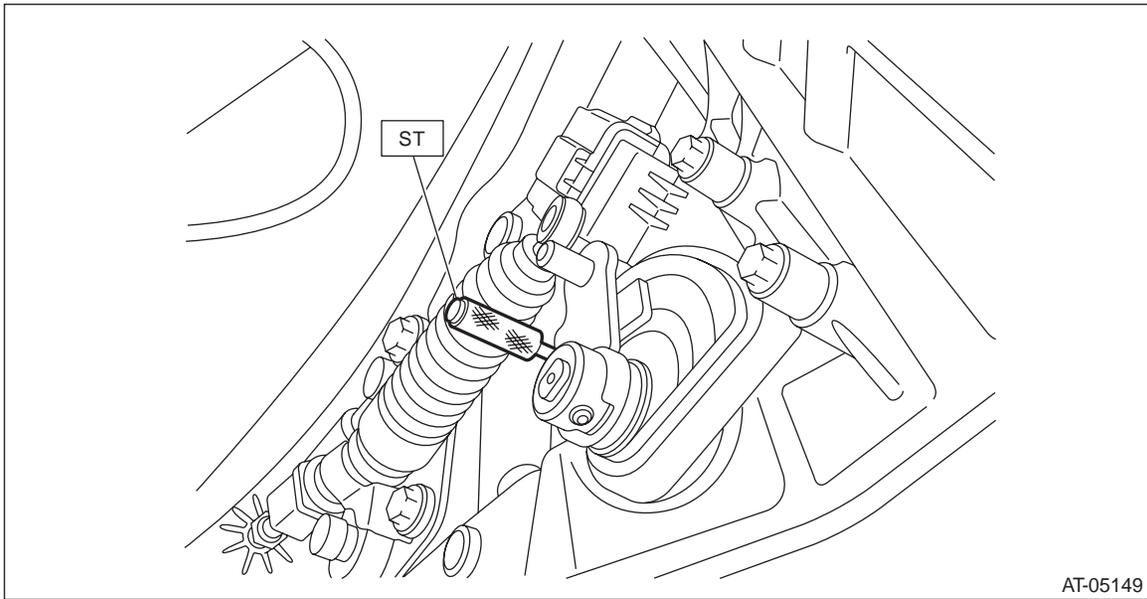
(B) Shifter arm

4) Shift the shifter arm to "N" range.

Inhibitor Switch

CONTINUOUSLY VARIABLE TRANSMISSION

- 5) Install the ST vertically in the cutout of shifter arm and the hole of switch body.
ST 499267300 STOPPER PIN

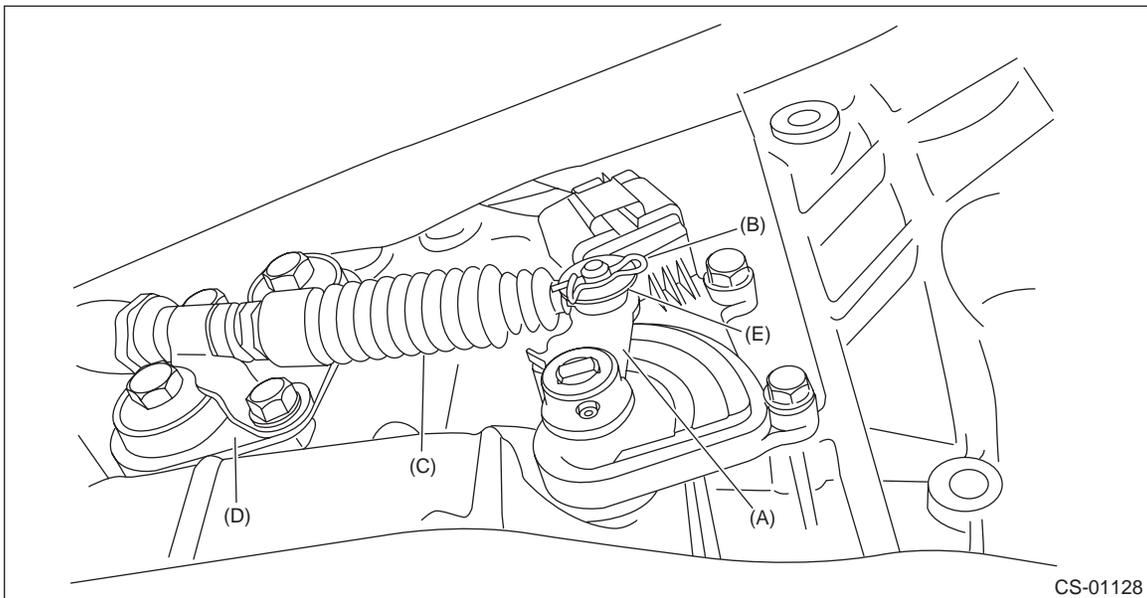


- 6) Tighten the two bolts holding the inhibitor switch.

Tightening torque:

5 N·m (0.5 kgf-m, 3.7 ft-lb)

- 7) Install the select cable to the shifter arm.
8) Install the washer and snap pin to the shifter arm.



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

- 9) Lower the vehicle.
10) Connect the battery ground terminal.
11) Check the inhibitor switch. <Ref. to CVT(TR690)-92, INSPECTION, Inhibitor Switch.>

Secondary Speed Sensor

CONTINUOUSLY VARIABLE TRANSMISSION

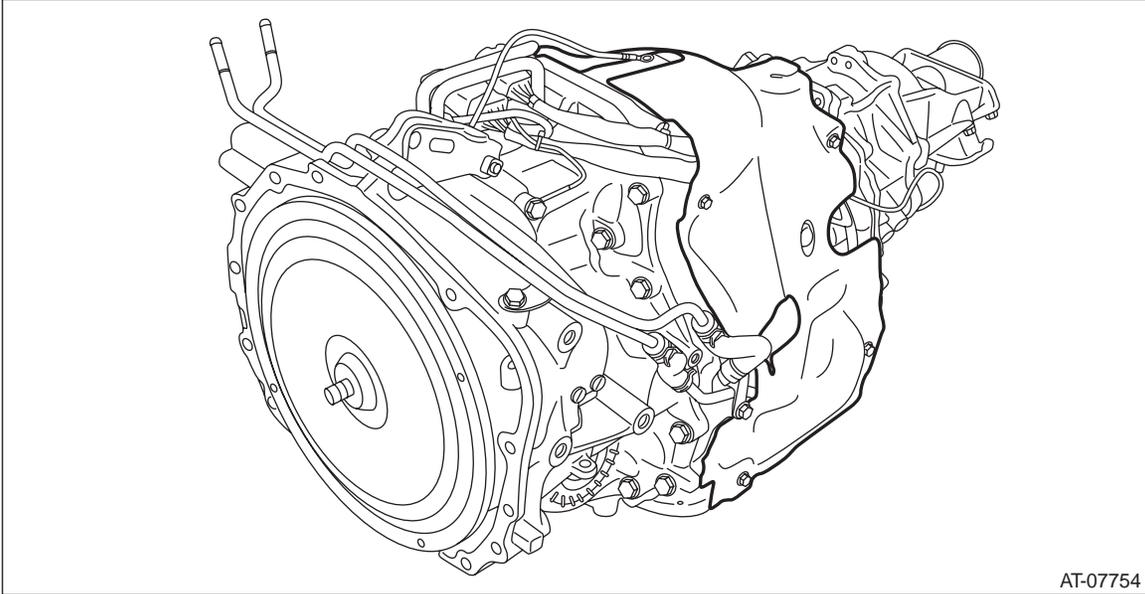
16.Secondary Speed Sensor

A: REMOVAL

CAUTION:

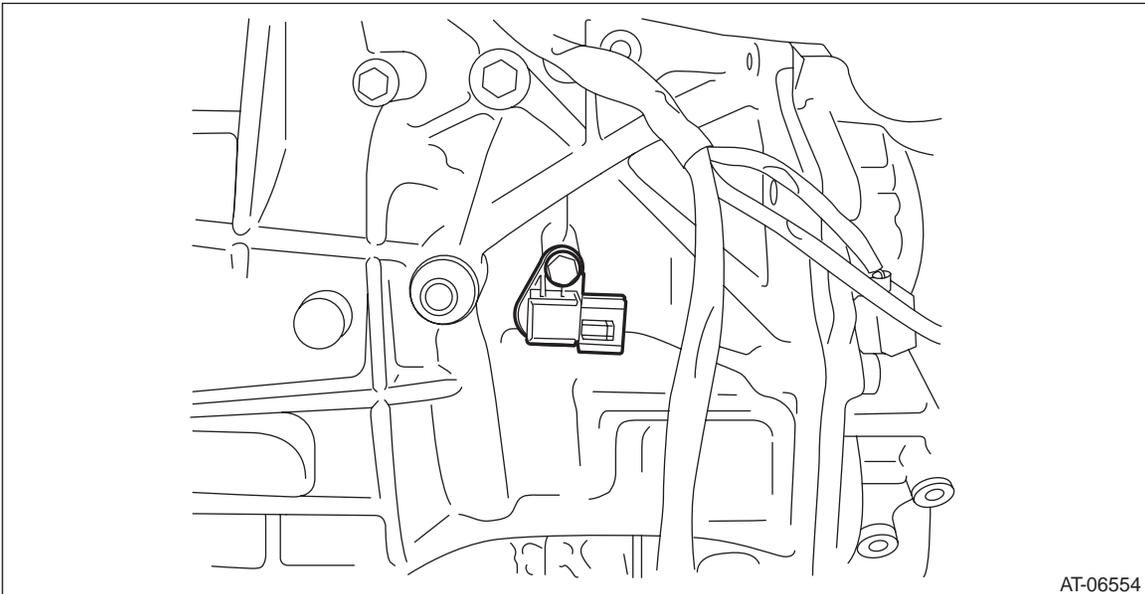
Be sure to prevent water or oil from contacting the connector terminal of secondary speed sensor. If adhesion occurs, replace with a new part.

- 1) Remove the transmission from the vehicle. <Ref. to CVT(TR690)-56, REMOVAL, Automatic Transmission Assembly.>
- 2) Remove the transmission cover on the transmission upper side.



AT-07754

- 3) Remove the secondary speed sensor harness connector.
- 4) Remove the secondary speed sensor.



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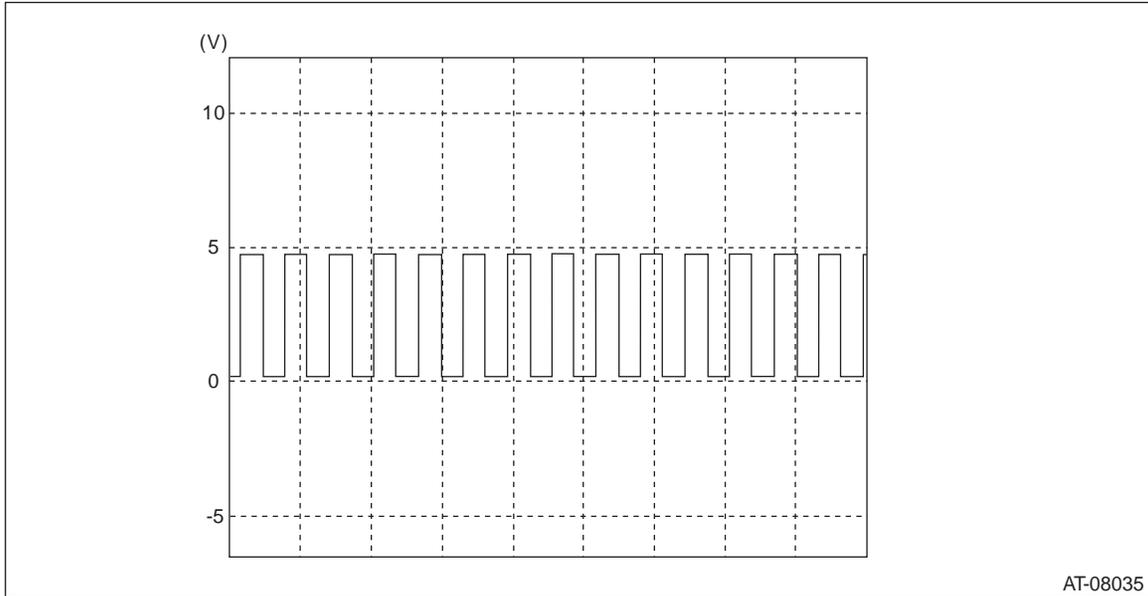
Secondary Speed Sensor

CONTINUOUSLY VARIABLE TRANSMISSION

- 2) Start and warm up the engine.
- 3) Check the waveform of secondary speed sensor with engine idling.

NOTE:

The waveform cycle changes as the speed changes.



Primary Speed Sensor

CONTINUOUSLY VARIABLE TRANSMISSION

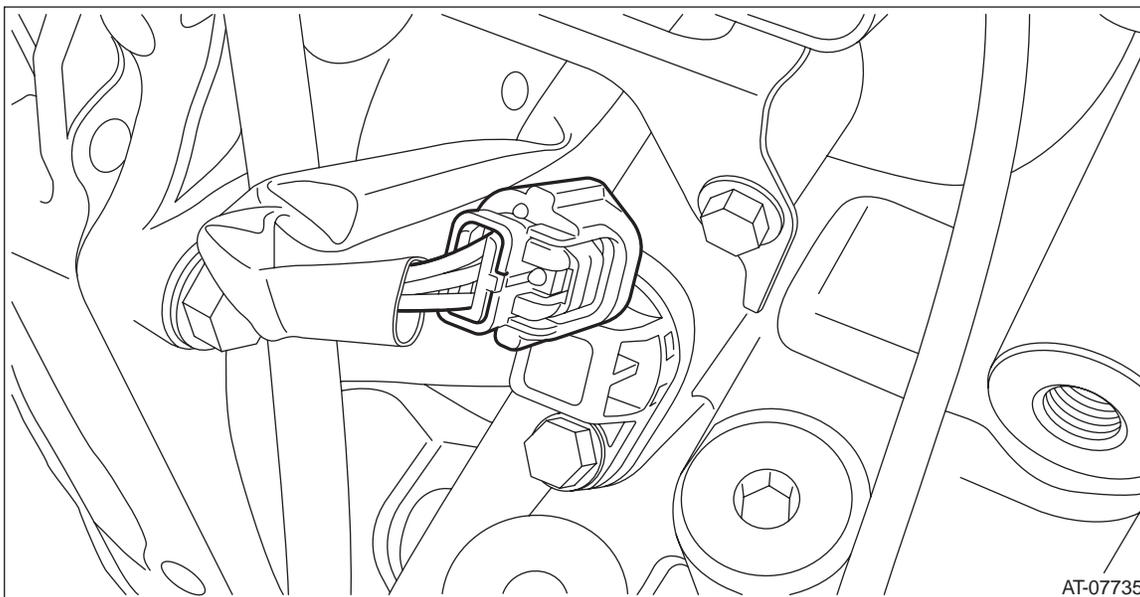
17.Primary Speed Sensor

A: REMOVAL

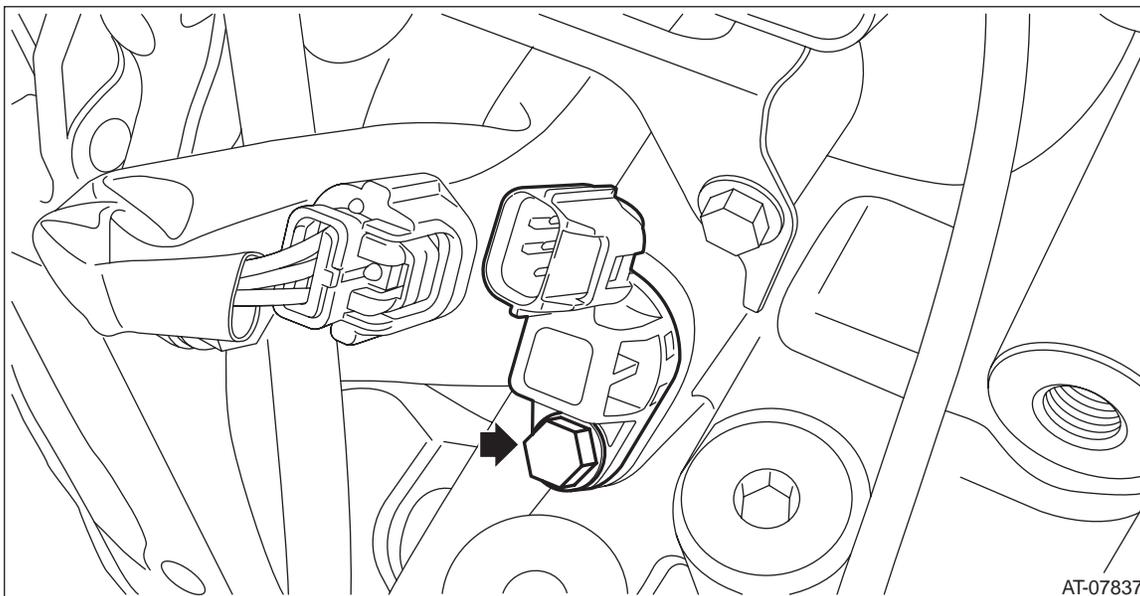
CAUTION:

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) Disconnect the ground cable from battery.
- 2) Remove the intercooler. <Ref. to IN(H4DOTC)-35, REMOVAL, Intercooler.>
- 3) Clean the transmission exterior.
- 4) Remove the primary speed sensor harness connector.



- 5) Remove the primary speed sensor and the spacer.



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.

CAUTION:

Do not forget to install the spacer.

NOTE:

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

Tightening torque:

Primary speed sensor

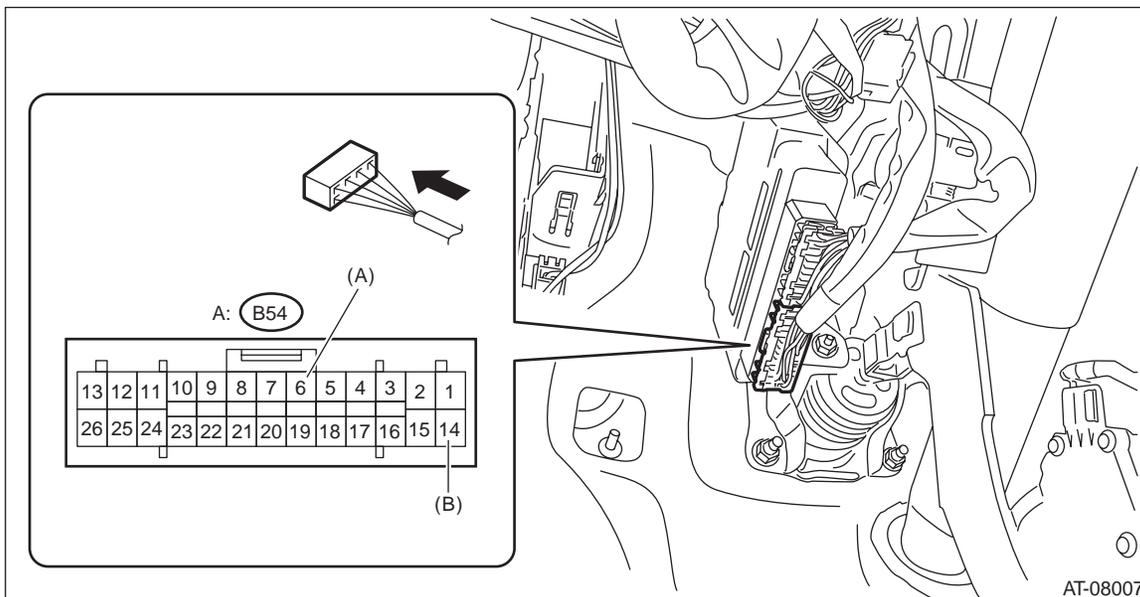
5 N·m (0.5 kgf-m, 3.7 ft-lb)

C: INSPECTION

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

Connector & terminal

(B54) No. 6 (+) — No. 14 (-):



- (A) + probe
(B) - probe

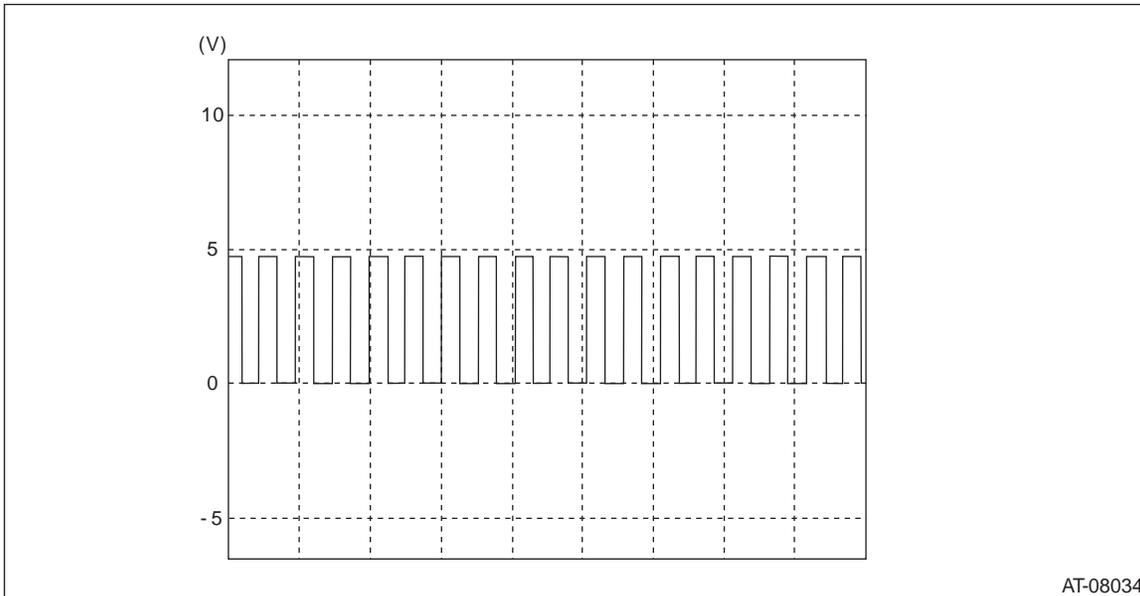
Primary Speed Sensor

CONTINUOUSLY VARIABLE TRANSMISSION

- 2) Start and warm up the engine.
- 3) Check the waveform of primary speed sensor with engine idling.

NOTE:

The waveform cycle changes as the speed changes.



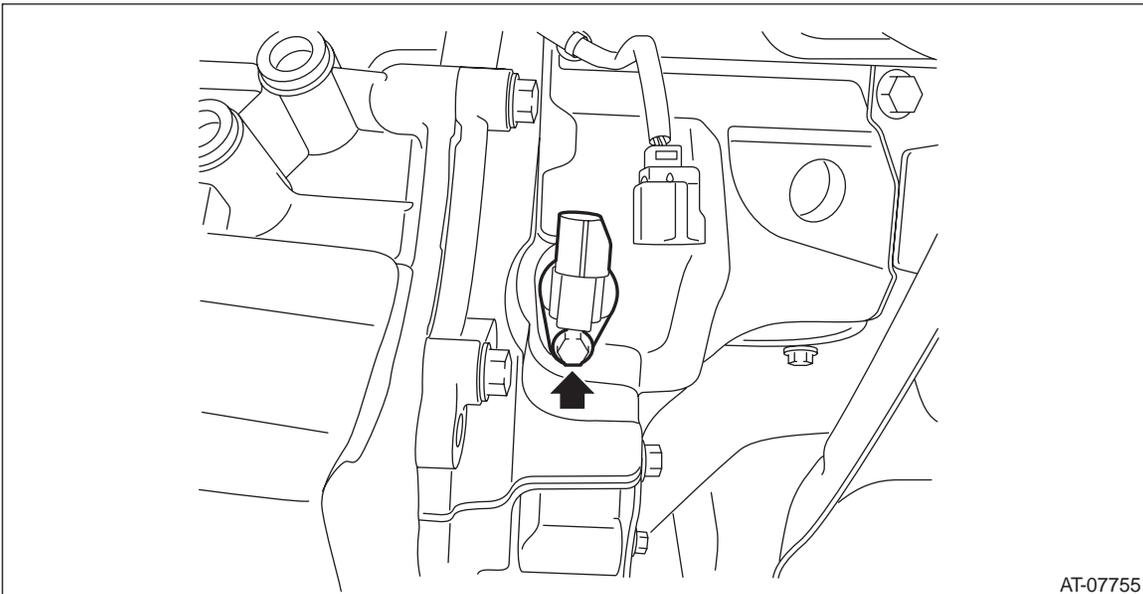
18. Front Wheel Speed Sensor

A: REMOVAL

CAUTION:

- Be sure to prevent water or oil from contacting the connector terminal of front wheel speed sensor. If adhesion occurs, replace with a new part.
- When removing front wheel speed sensor, CVTF may let out. If CVTF has leaked, adjust the CVTF level after installing the front wheel speed sensor.

- 1) Disconnect the ground cable from battery.
- 2) Lift up the vehicle.
- 3) Clean the transmission exterior.
- 4) Remove the front wheel speed sensor harness connector.
- 5) Remove the front wheel speed sensor.



B: INSTALLATION

CAUTION:

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

5 N·m (0.5 kgf·m, 3.7 ft·lb)

Front Wheel Speed Sensor

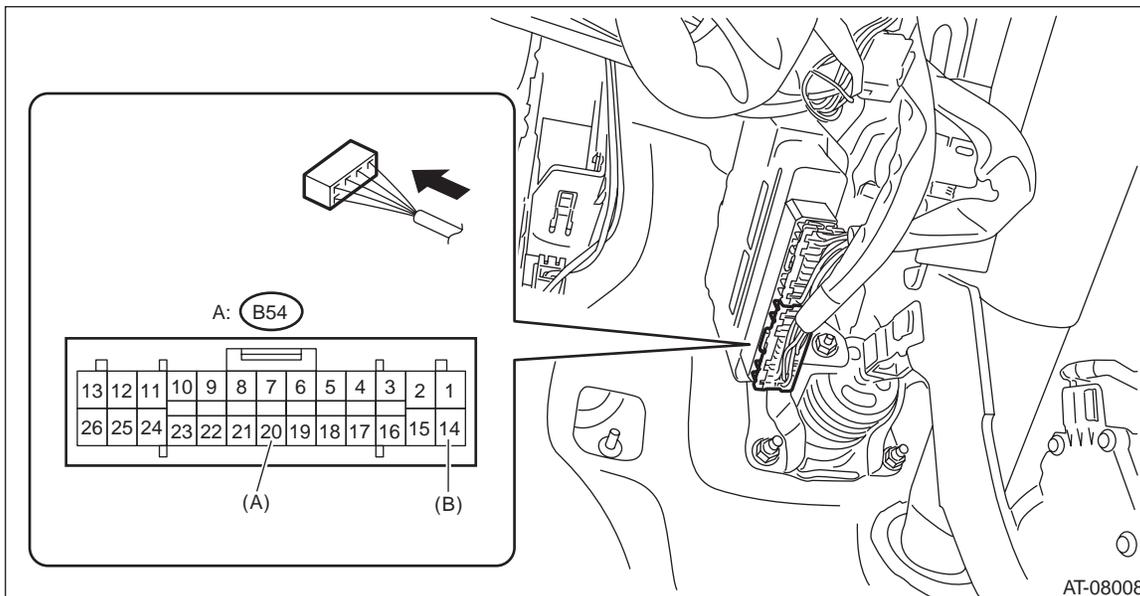
CONTINUOUSLY VARIABLE TRANSMISSION

C: INSPECTION

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

Connector & terminal

(B54) No. 20 (+) — No. 14 (-):



(A) + probe

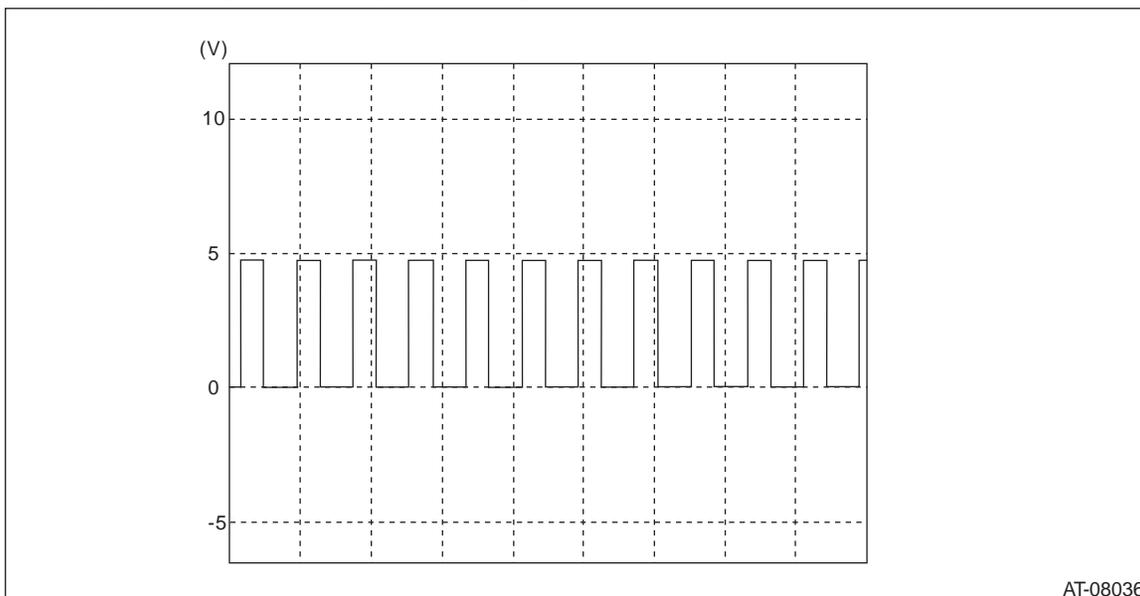
(B) - probe

2) Lift up the vehicle and raise the vehicle speed up to 20 km/h (12 MPH).

3) Check the waveform of front wheel speed sensor when vehicle speed is at 20 km/h (12 MPH).

NOTE:

The waveform cycle changes as the speed changes.



19. Secondary Pressure Sensor

A: REMOVAL

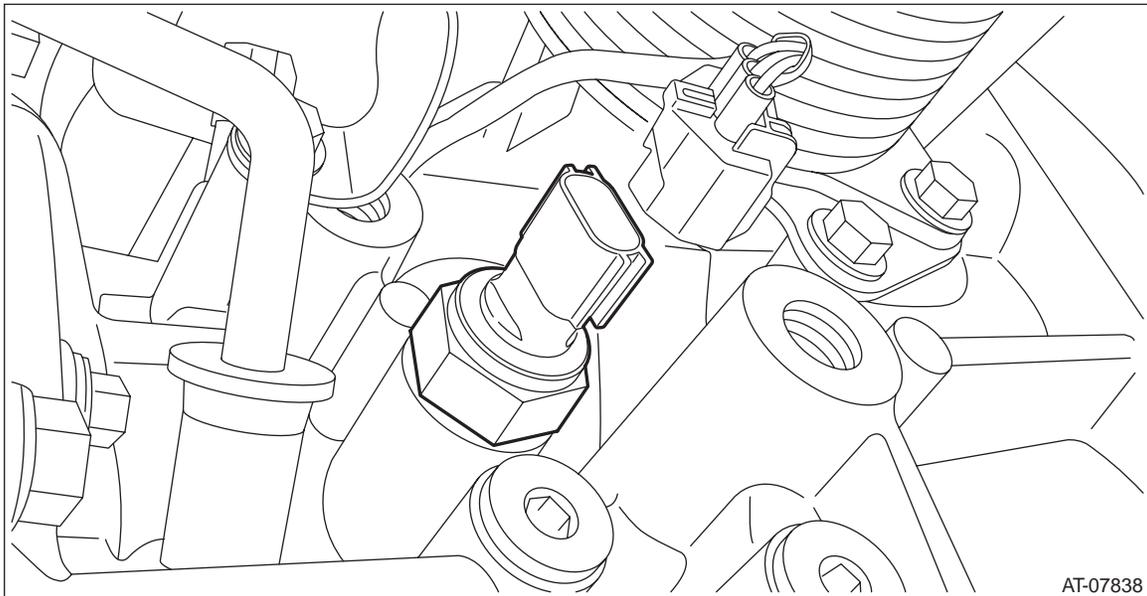
CAUTION:

- 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 removing secondary pressure sensor, CVTF may let out. If CVTF has leaked, adjust the CVTF level after installing the secondary pressure sensor.

- 1) Disconnect the ground cable from battery.
- 2) Lift up the vehicle.
- 3) Clean the transmission exterior.
- 4) Remove the secondary pressure sensor harness connector.
- 5) Remove the secondary pressure sensor.

NOTE:

Use Ko-ken 3/8 12-point 27 mm (manufacturer product No. 3305M-27) deep socket.



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:

39 N·m (4.0 kgf·m, 28.8 ft·lb)

Secondary Pressure Sensor

CONTINUOUSLY VARIABLE TRANSMISSION

C: INSPECTION

NOTE:

Leave it for 10 minutes or more after the engine stops, and then perform the inspection.

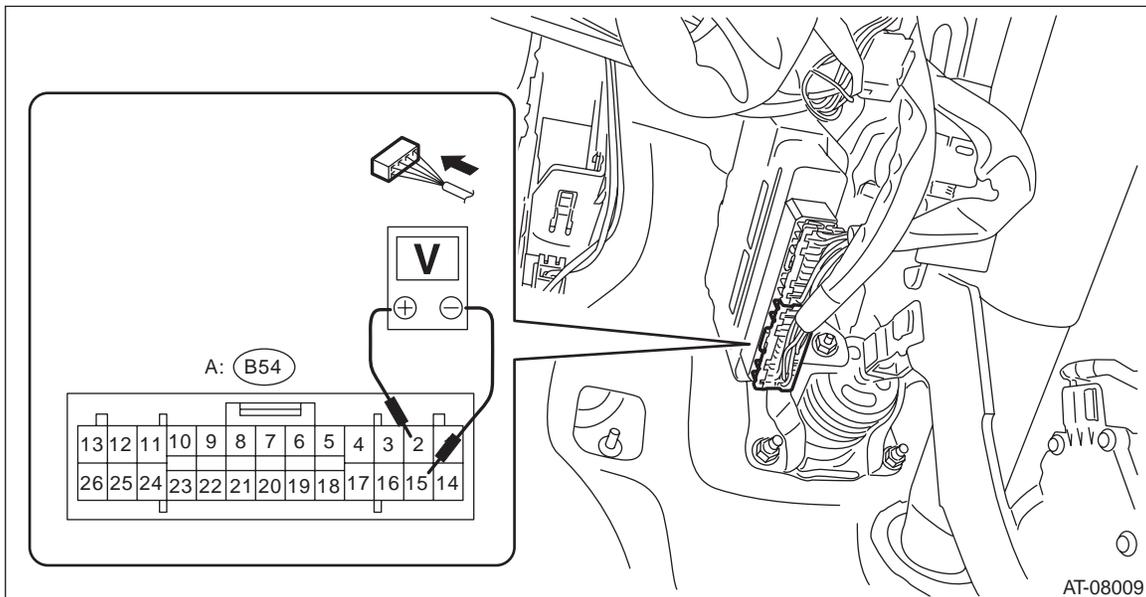
- 1) Check that the CVTF temperature is 10 — 80°C (50 — 176°F) using the Subaru Select Monitor.
- 2) Check the power supply voltage of the secondary pressure sensor.

Connector & terminal

(B54) No. 2 (+) — No. 15 (-):

Standard

4.8 — 5.2 V



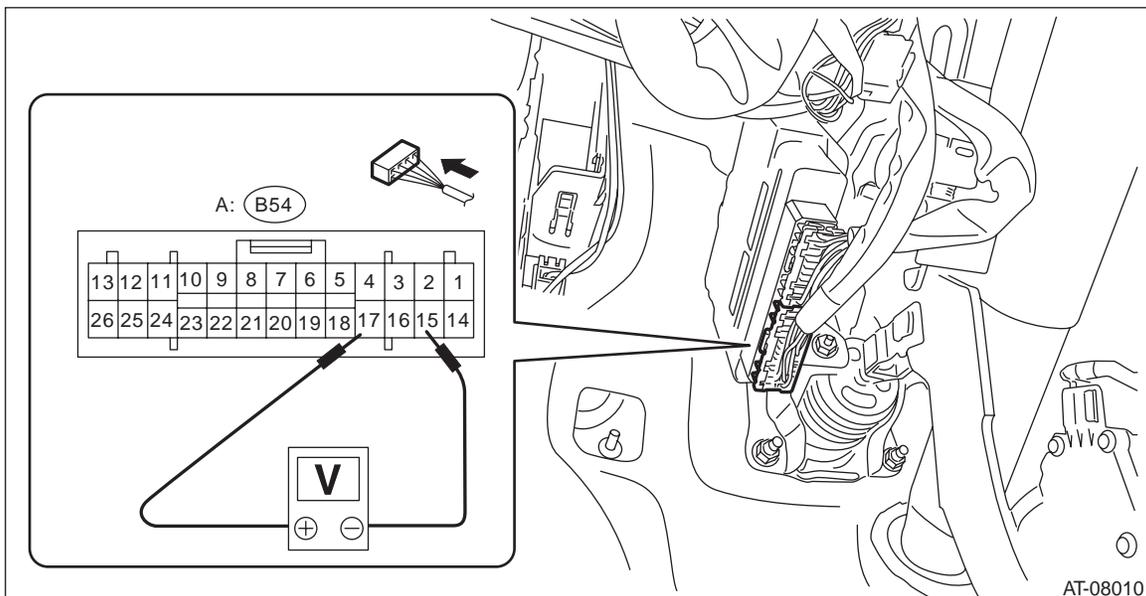
- 3) Check the voltage of the secondary pressure sensor.

Connector & terminal

(B54) No. 17 (+) — No. 15 (-):

Standard

0.45 — 0.55 V



20. Control Valve Body

A: REMOVAL

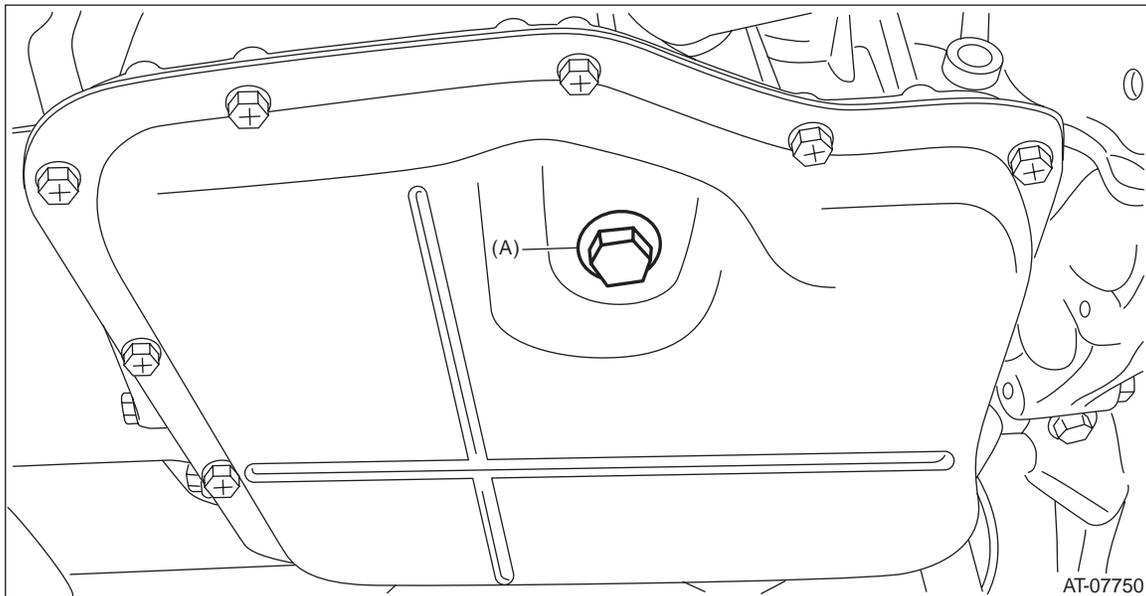
CAUTION:

- 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.

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



(A) CVTF drain plug

- 5) Install the CVTF drain plug.

NOTE:

Use a new gasket.

Tightening torque:

39.2 N·m (4.0 kgf·m, 28.9 ft·lb)

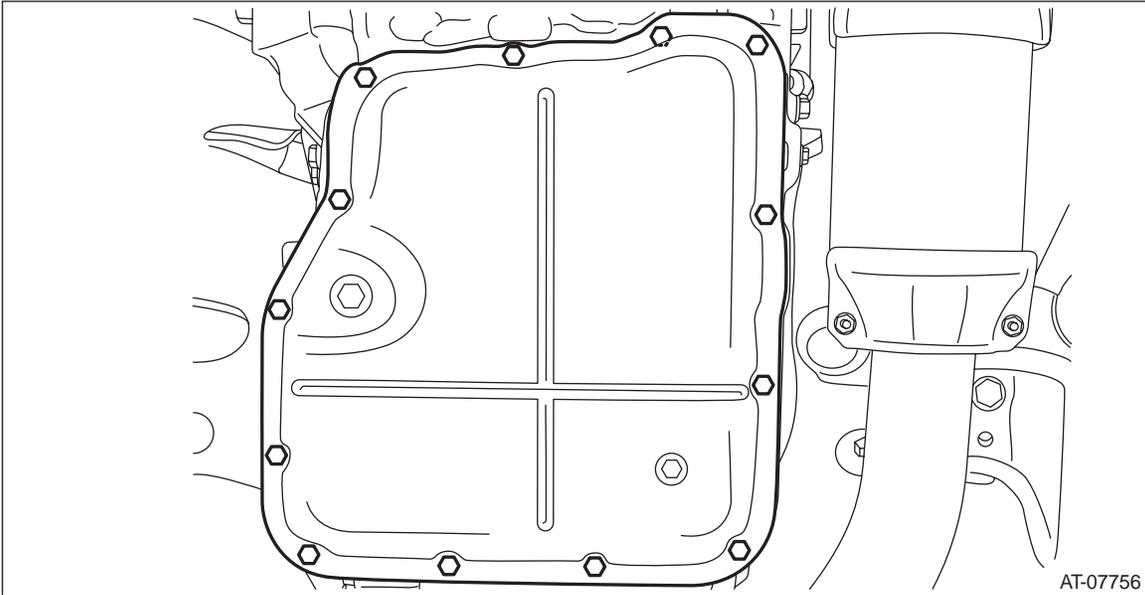
Control Valve Body

CONTINUOUSLY VARIABLE TRANSMISSION

6) Remove the oil pan.

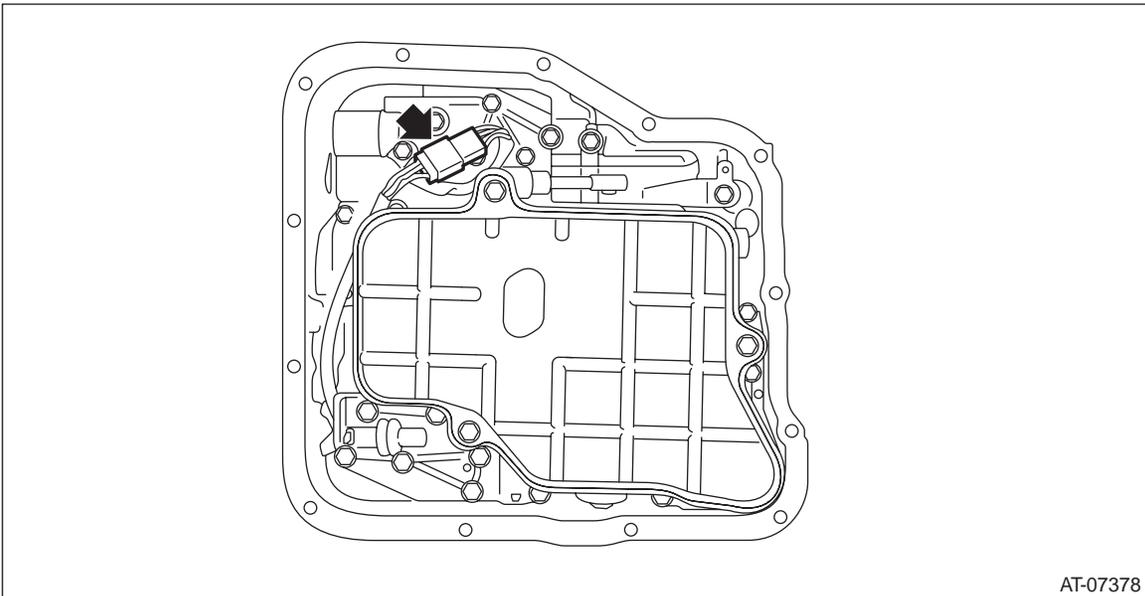
CAUTION:

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



7) Remove the magnet.

8) Disconnect the control valve harness connector.

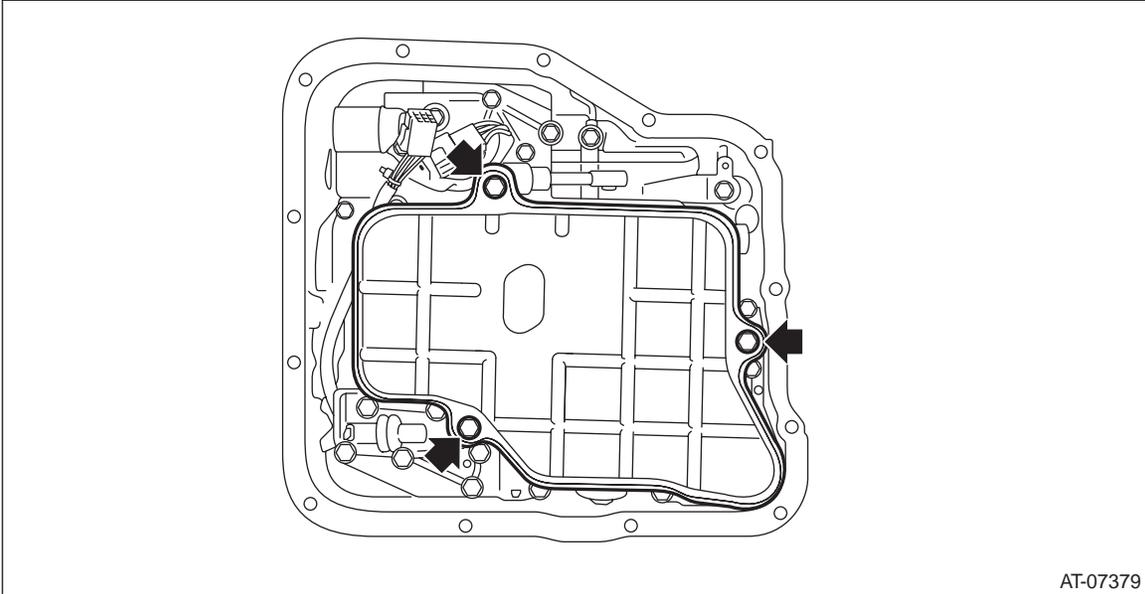


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Control Valve Body

CONTINUOUSLY VARIABLE TRANSMISSION

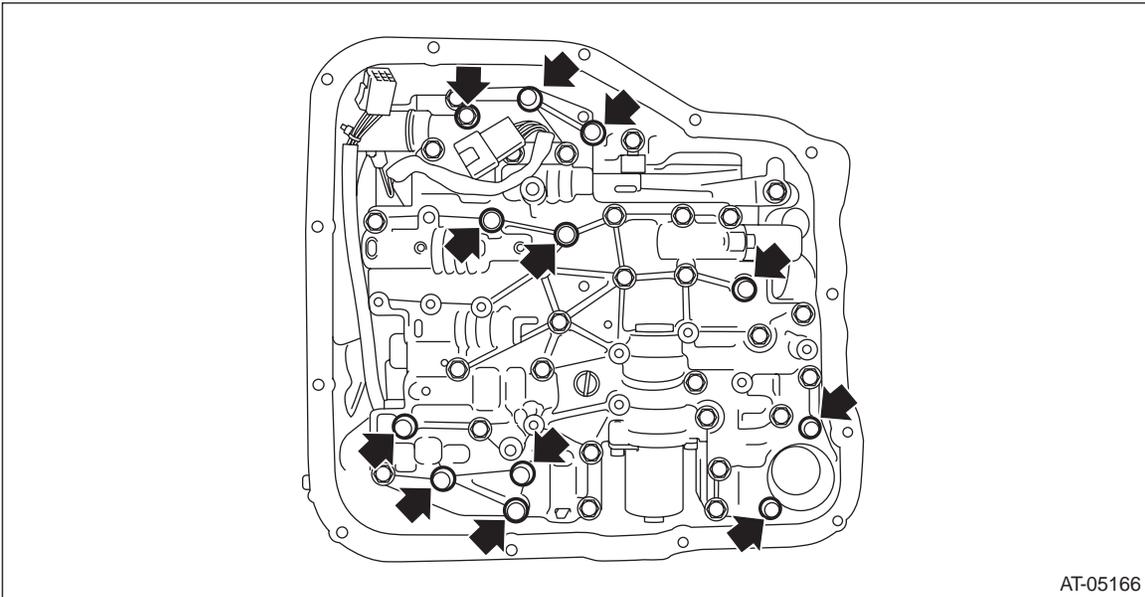
9) Remove the oil strainer.



AT-07379

10) Remove the control valve body.

CAUTION:
Do not let the manual valve drop off.



AT-05166

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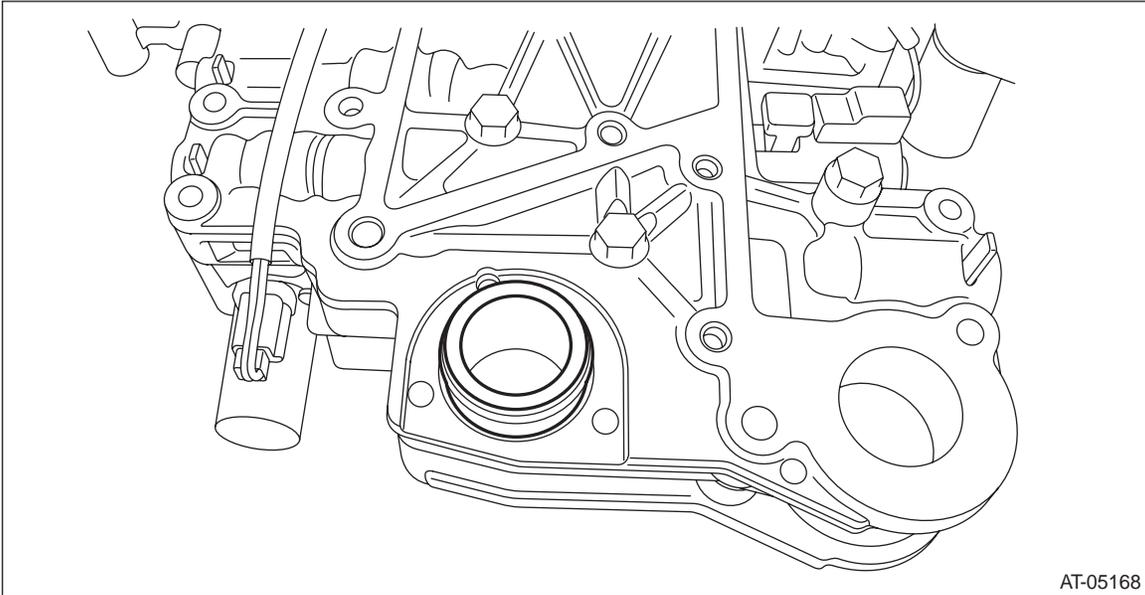
Control Valve Body

CONTINUOUSLY VARIABLE TRANSMISSION

11) Remove the pressure pipe.

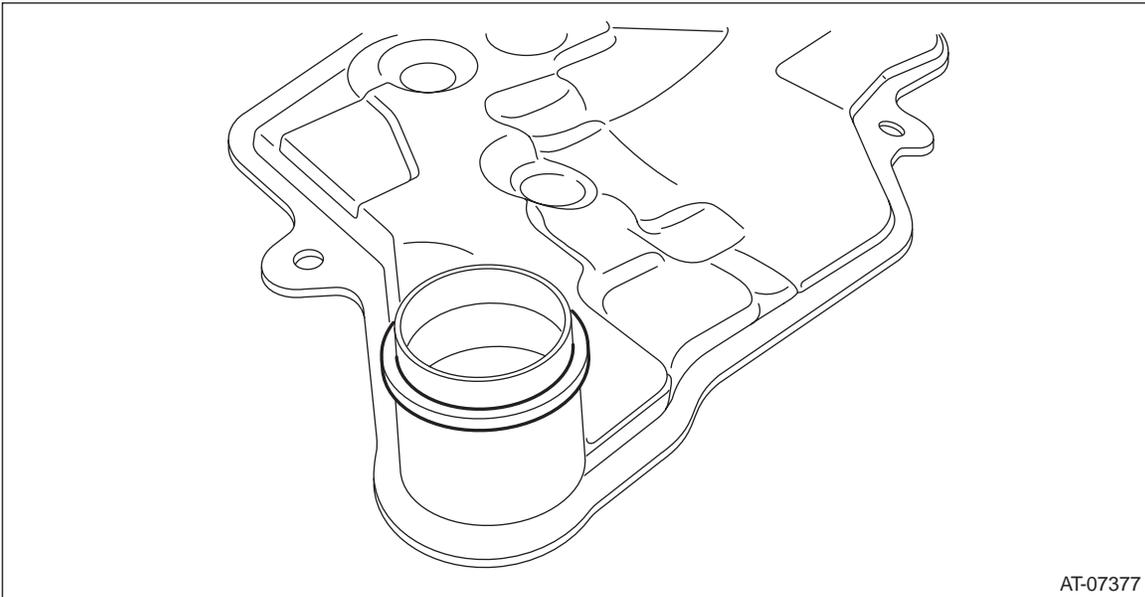
NOTE:

It may be located in transmission case side.



AT-05168

12) Remove the O-ring from oil strainer.



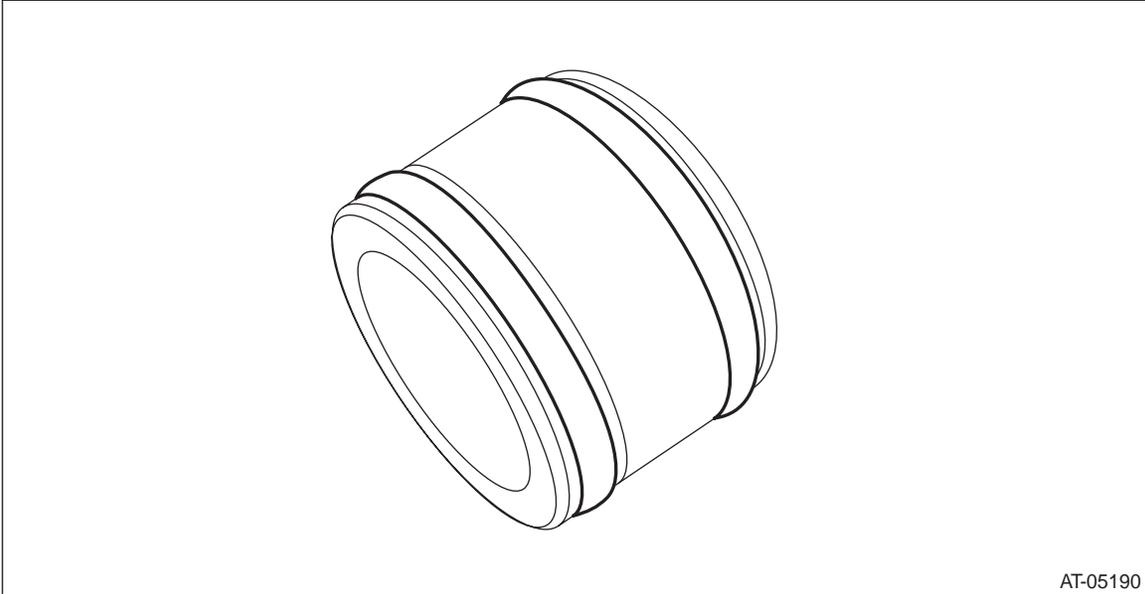
AT-07377

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Control Valve Body

CONTINUOUSLY VARIABLE TRANSMISSION

13) Remove the O-ring from pressure pipe.



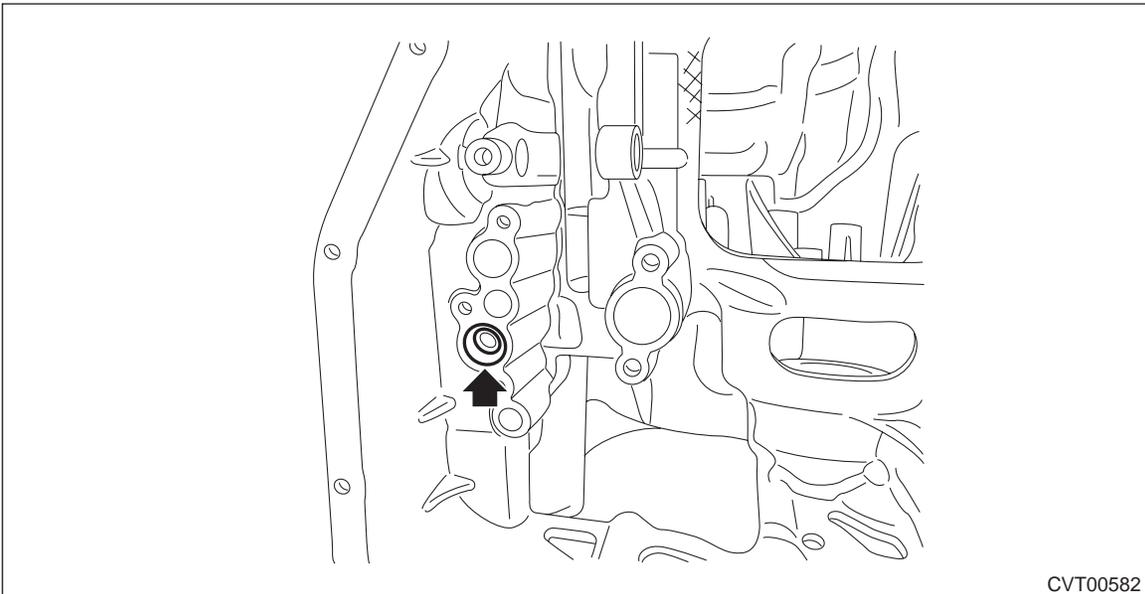
AT-05190

B: INSTALLATION

- 1) Clean the mating surface of oil pan and transmission case.
- 2) Make sure that the CVTF filter is installed to the transmission case.

NOTE:

Make sure that the CVTF filter does not protrude from the transmission case.



CVT00582

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

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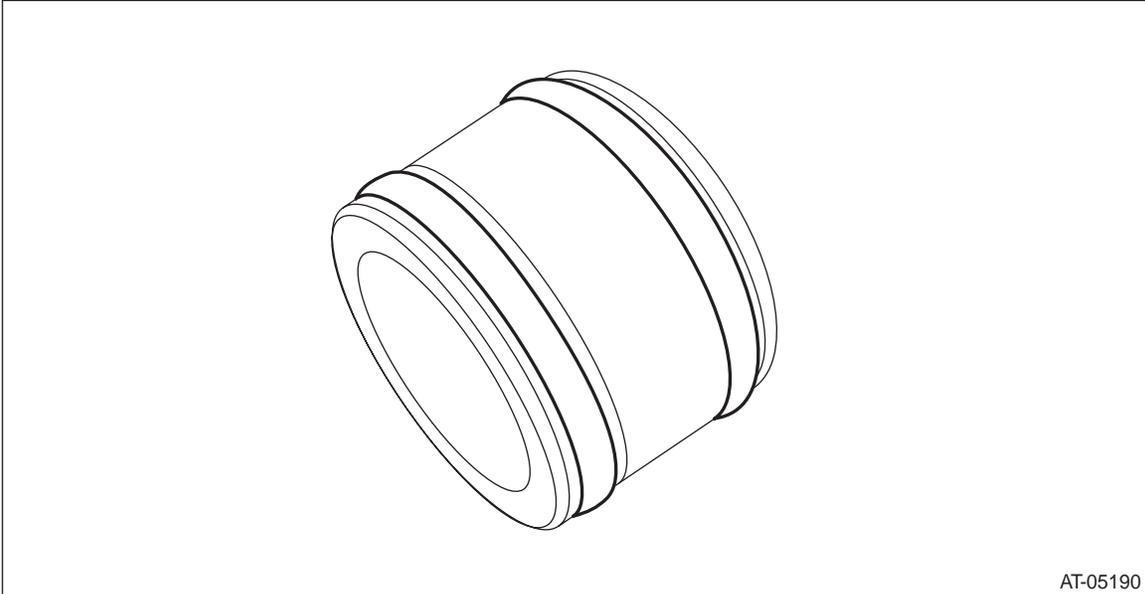
Control Valve Body

CONTINUOUSLY VARIABLE TRANSMISSION

4) Install the O-ring to the pressure pipe.

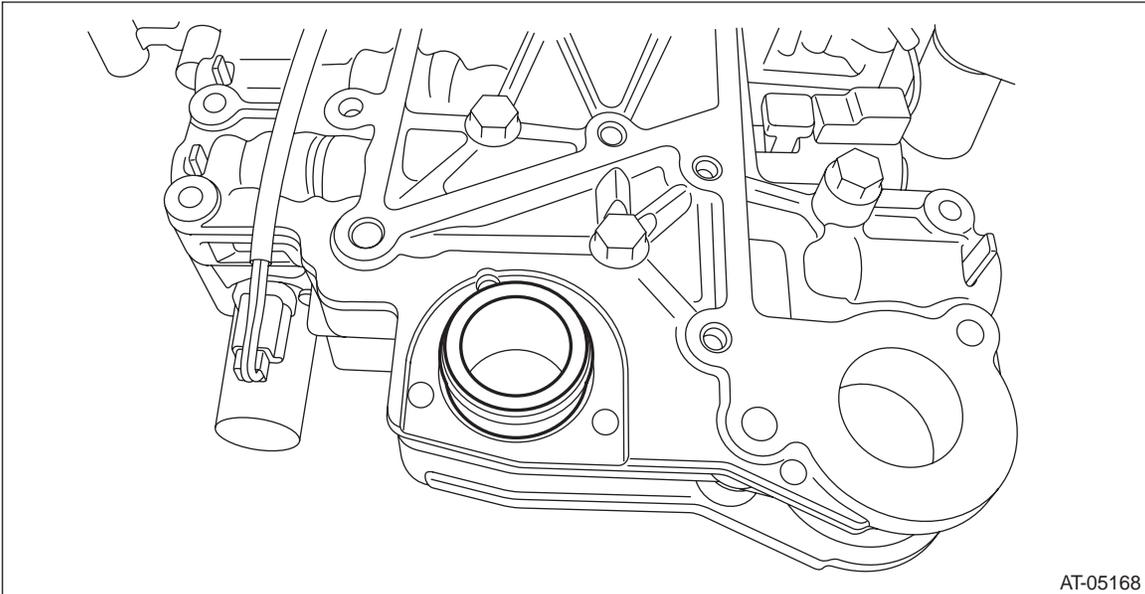
NOTE:

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



AT-05190

5) Install the pressure pipe.



AT-05168

Control Valve Body

CONTINUOUSLY VARIABLE TRANSMISSION

6) Install the control valve body to the transmission.

CAUTION:

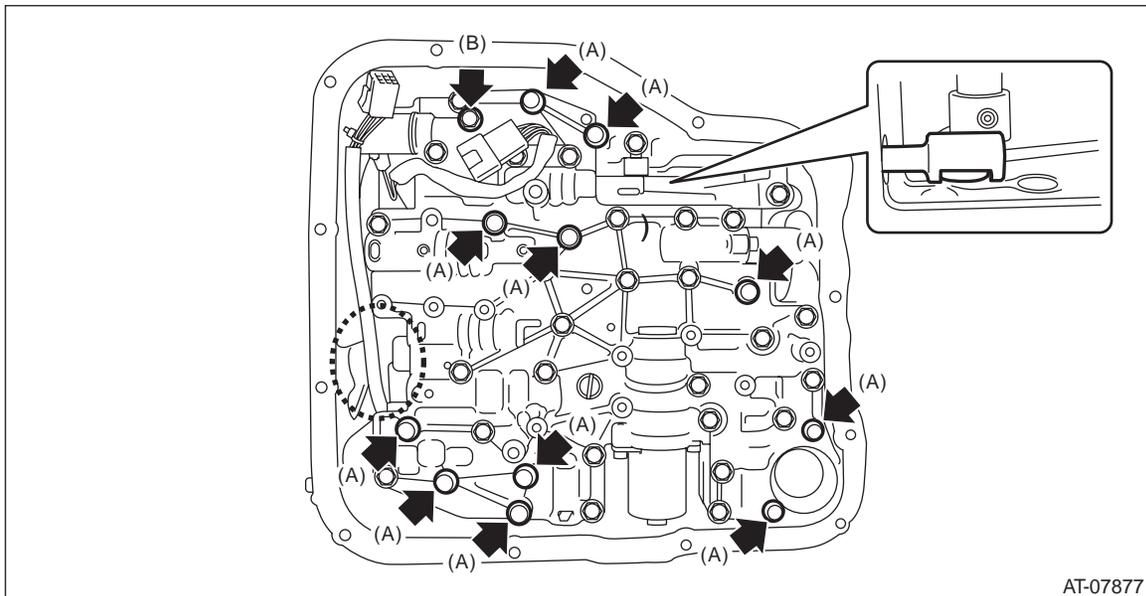
- Beware of the transmission harness getting caught in between.
- Do not impact or bend the transmission harness because it has the oil temperature sensor inside.

NOTE:

- Engage the manual valve to the manual plate.
- Lead the transmission harness through from the point indicated by dashed line in the figure.

Tightening torque:

9 N·m (0.9 kgf·m, 6.6 ft·lb)



- (A) Short bolt (11 pcs)
- (B) Long bolt (1 pc)

Control Valve Body

CONTINUOUSLY VARIABLE TRANSMISSION

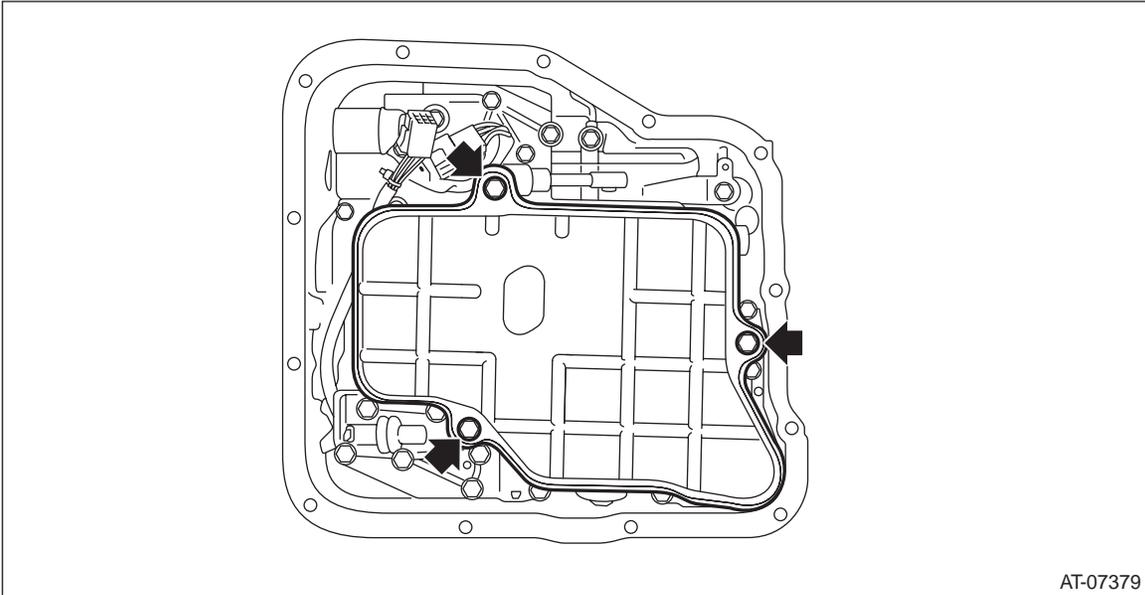
7) Install the O-ring to oil strainer and install the oil strainer.

NOTE:

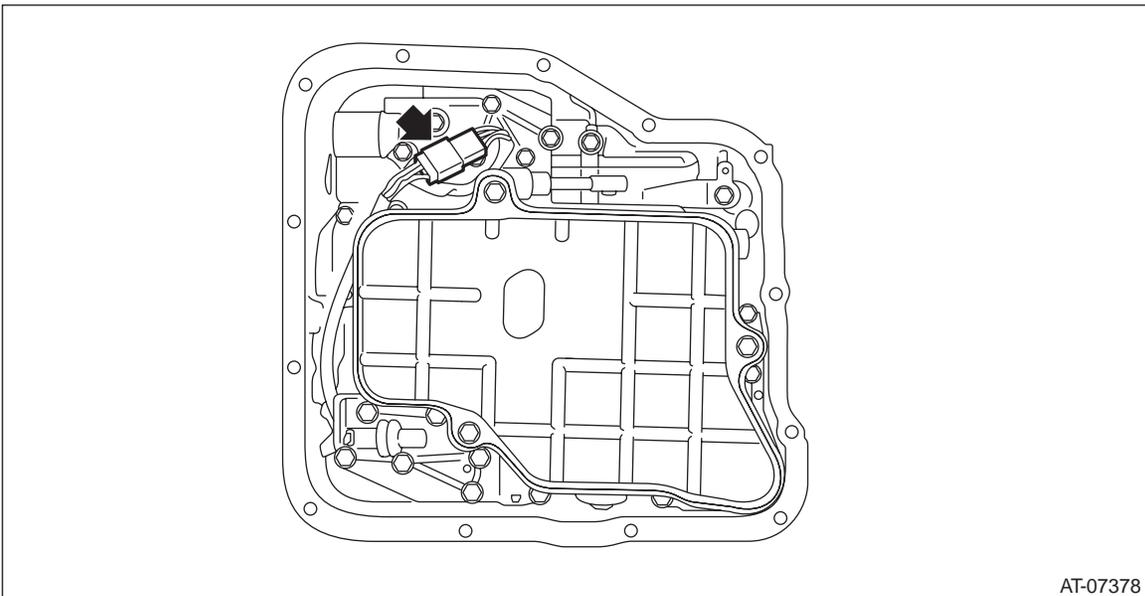
- Use new O-rings.
- Apply CVTF to the O-rings.
- Let the transmission harness run between control valve body and oil strainer.

Tightening torque:

9 N·m (0.9 kgf·m, 6.6 ft·lb)



8) Connect the control valve harness connector.

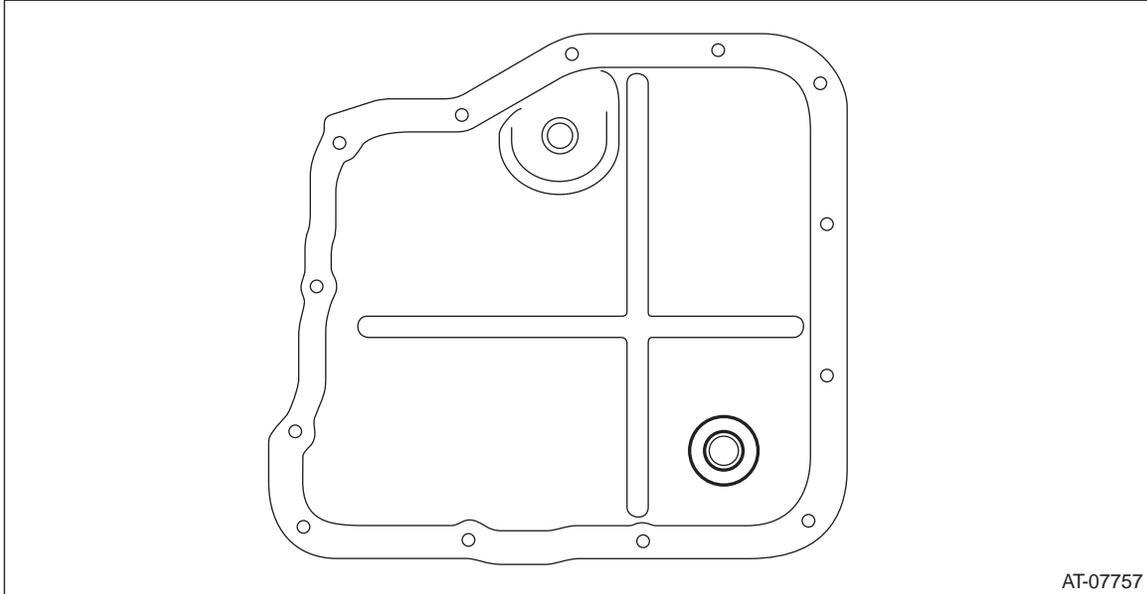


9) Clean the magnet.

Control Valve Body

CONTINUOUSLY VARIABLE TRANSMISSION

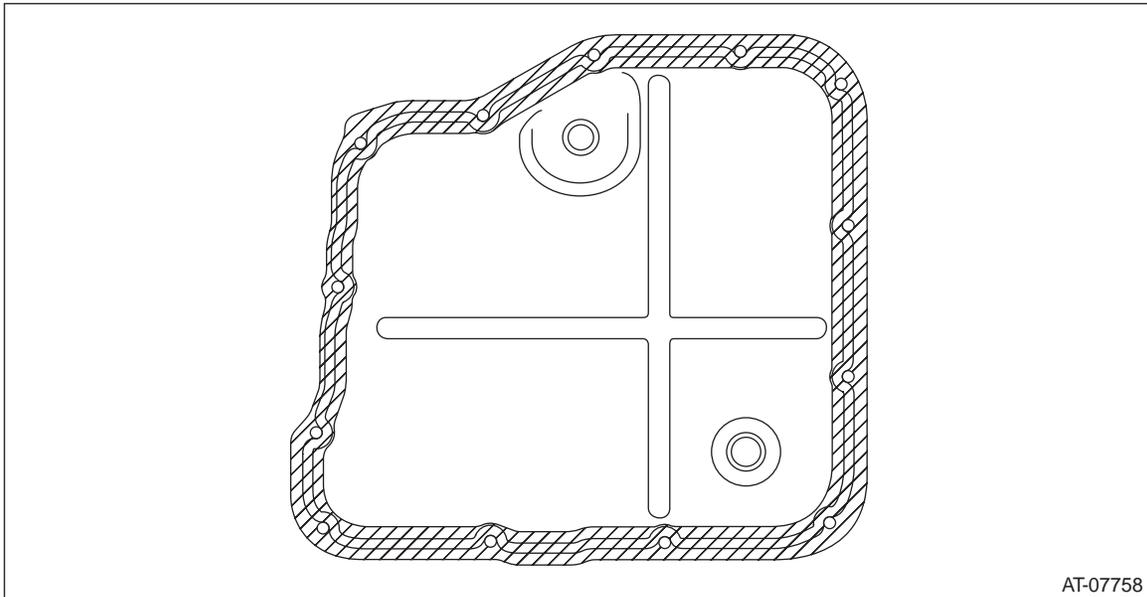
10) Attach the magnet at the specified position of the oil pan.



11) 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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Control Valve Body

CONTINUOUSLY VARIABLE TRANSMISSION

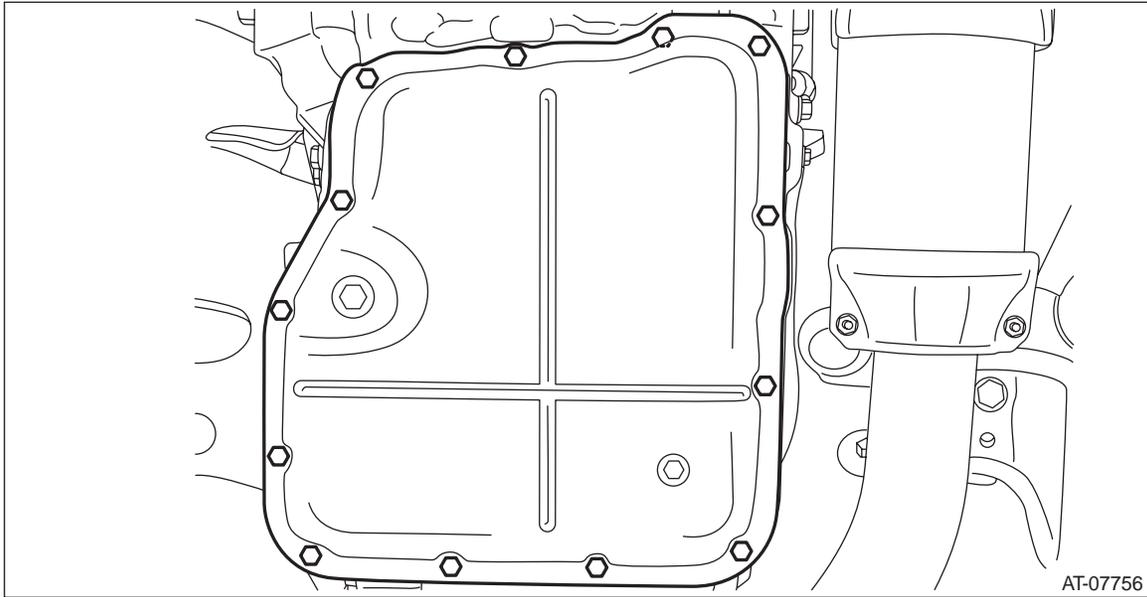
12) Install the oil pan by equally tightening the bolts.

CAUTION:

Beware of the transmission harness getting caught in between.

Tightening torque:

5 N·m (0.5 kgf·m, 3.7 ft·lb)



13) Connect the battery ground terminal.

14) Fill with CVTF.<Ref. to CVT(TR690)-38, REPLACEMENT, CVTF.>

15) Adjust the CVTF level.<Ref. to CVT(TR690)-36, ADJUSTMENT, CVTF.>

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

Control Valve Body

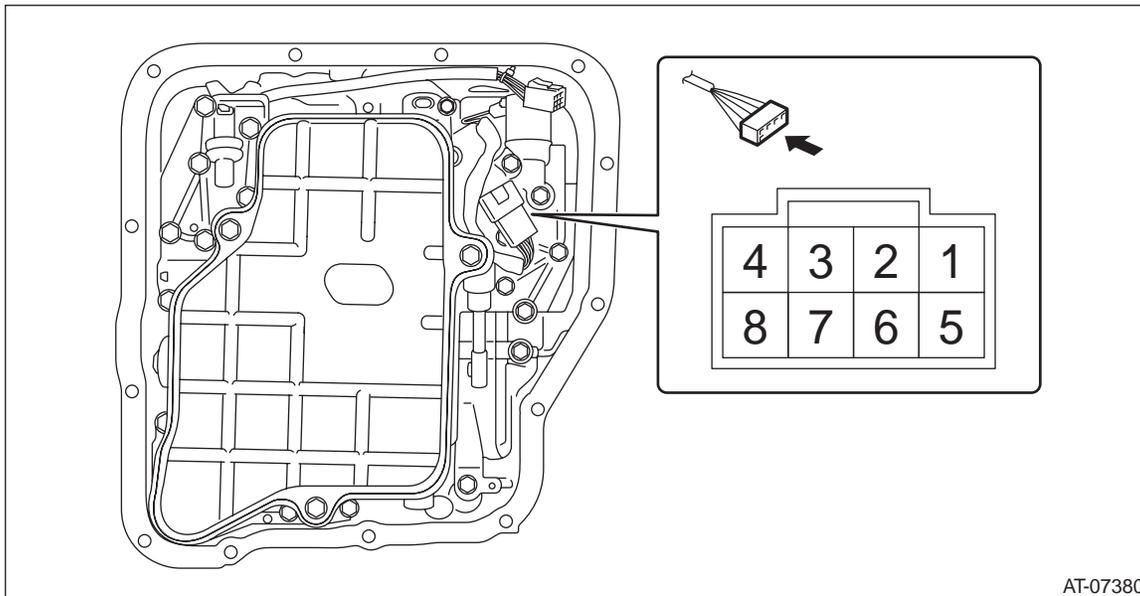
CONTINUOUSLY VARIABLE TRANSMISSION

C: INSPECTION

- Check each part for damage or dust.
- Check oil strainer for clogging.
- Measure the resistance of each solenoid.

NOTE:

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



Solenoid	Terminal No.	Standard (Ω)
Secondary solenoid	No. 1 — control valve body	Approx. 6.6 Ω
Lock-up duty solenoid	No. 2 — control valve body	Approx. 12 Ω
F&R solenoid	No. 3 — control valve body	Approx. 5.3 Ω
Lock-up ON/OFF solenoid	No. 5 — control valve body	Approx. 16 Ω
Primary DOWN solenoid	No. 6 — control valve body	Approx. 12 Ω
Primary UP solenoid	No. 7 — control valve body	Approx. 12 Ω
AWD solenoid	No. 8 — control valve body	Approx. 3.2 Ω

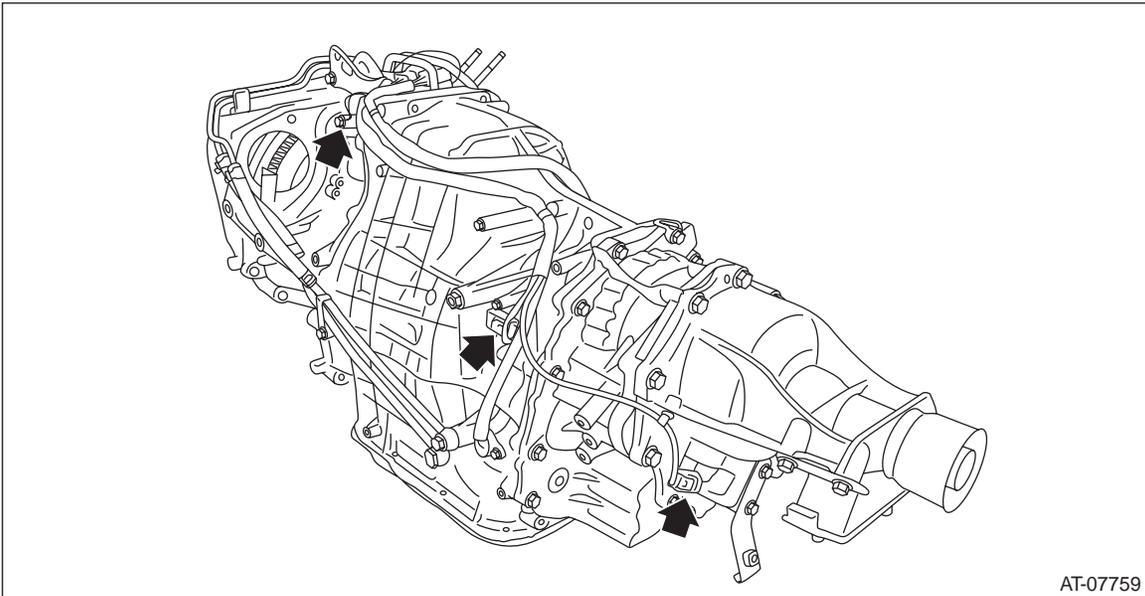
Transmission Harness

CONTINUOUSLY VARIABLE TRANSMISSION

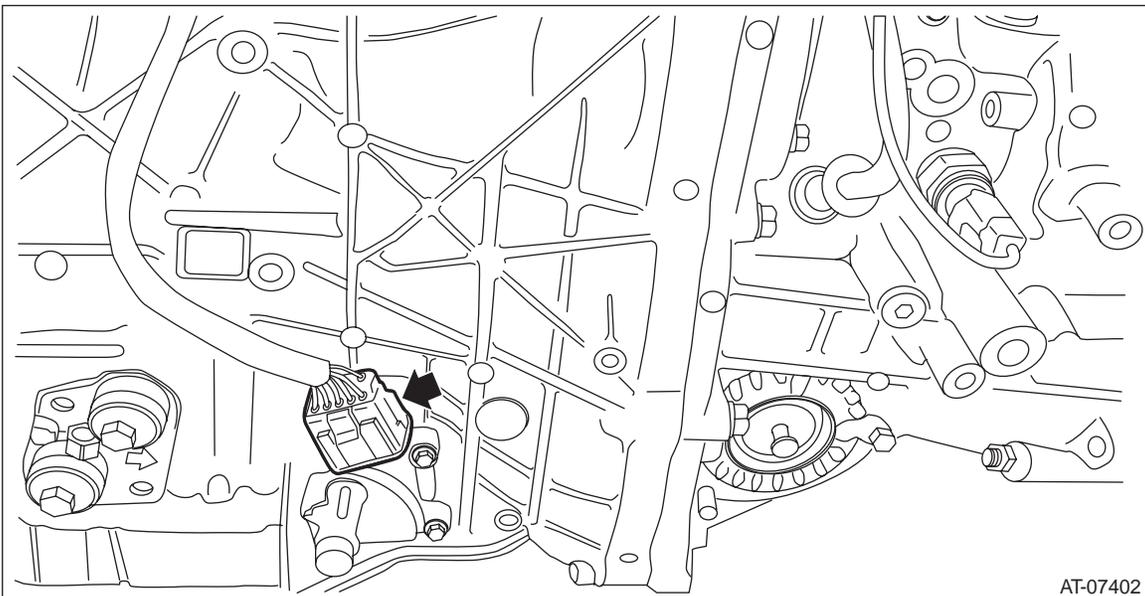
21. Transmission Harness

A: REMOVAL

- 1) Remove the transmission from the vehicle. <Ref. to CVT(TR690)-56, REMOVAL, Automatic Transmission Assembly.>
- 2) Prepare for overhaul. <Ref. to CVT(TR690)-137, Preparation for Overhaul.>
- 3) Remove the transmission harness ground terminal and remove the harness connectors from front wheel speed sensor and secondary speed sensor.



- 4) Remove the harness connectors from inhibitor switch, primary speed sensor and secondary pressure sensor.

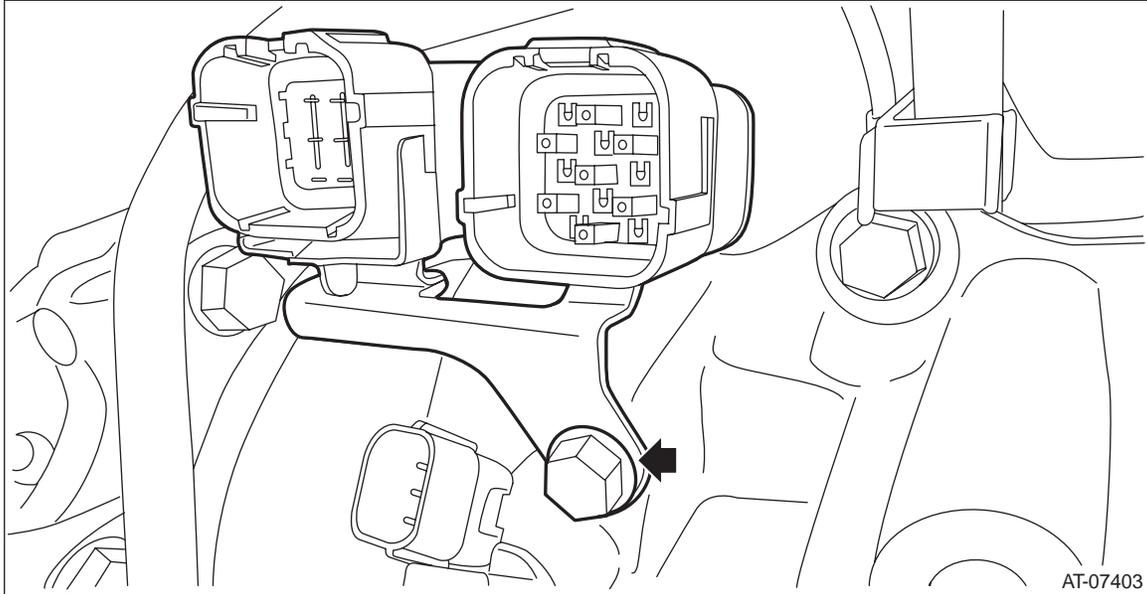


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Transmission Harness

CONTINUOUSLY VARIABLE TRANSMISSION

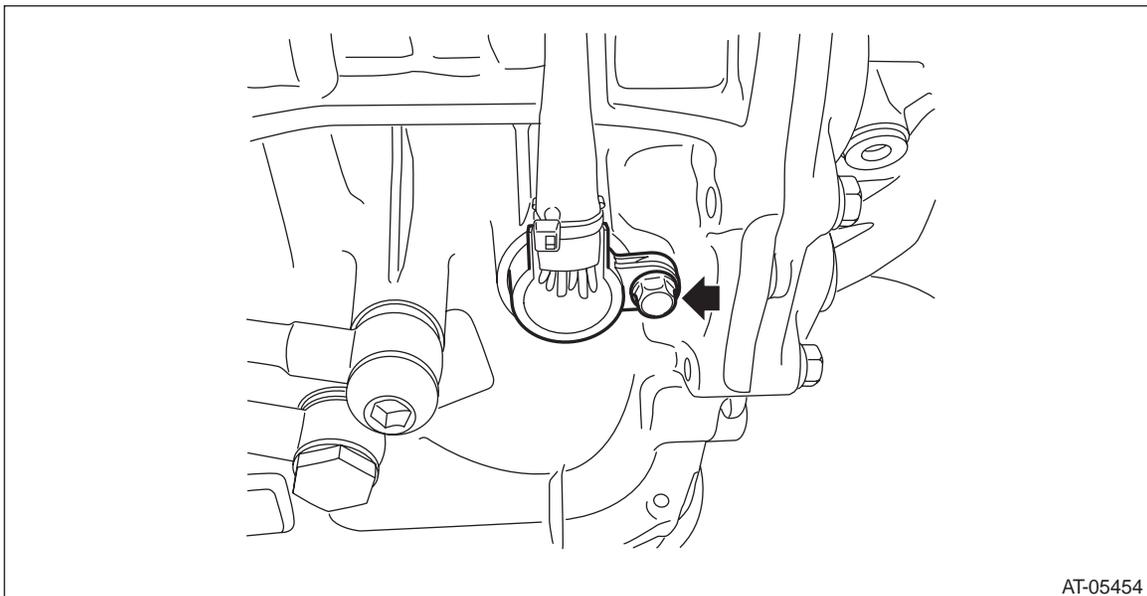
5) Remove the transmission harness stay.



6) Remove transmission harness connector and inhibitor harness connector from harness stay.

7) Remove the control valve body. <Ref. to CVT(TR690)-109, REMOVAL, Control Valve Body.>

8) Remove the mounting bolt to pull out the bushing of transmission harness from transmission case round hole.



9) Remove the harness clip from transmission assembly.

Transmission Harness

CONTINUOUSLY VARIABLE TRANSMISSION

B: INSTALLATION

Install in the reverse order of removal.

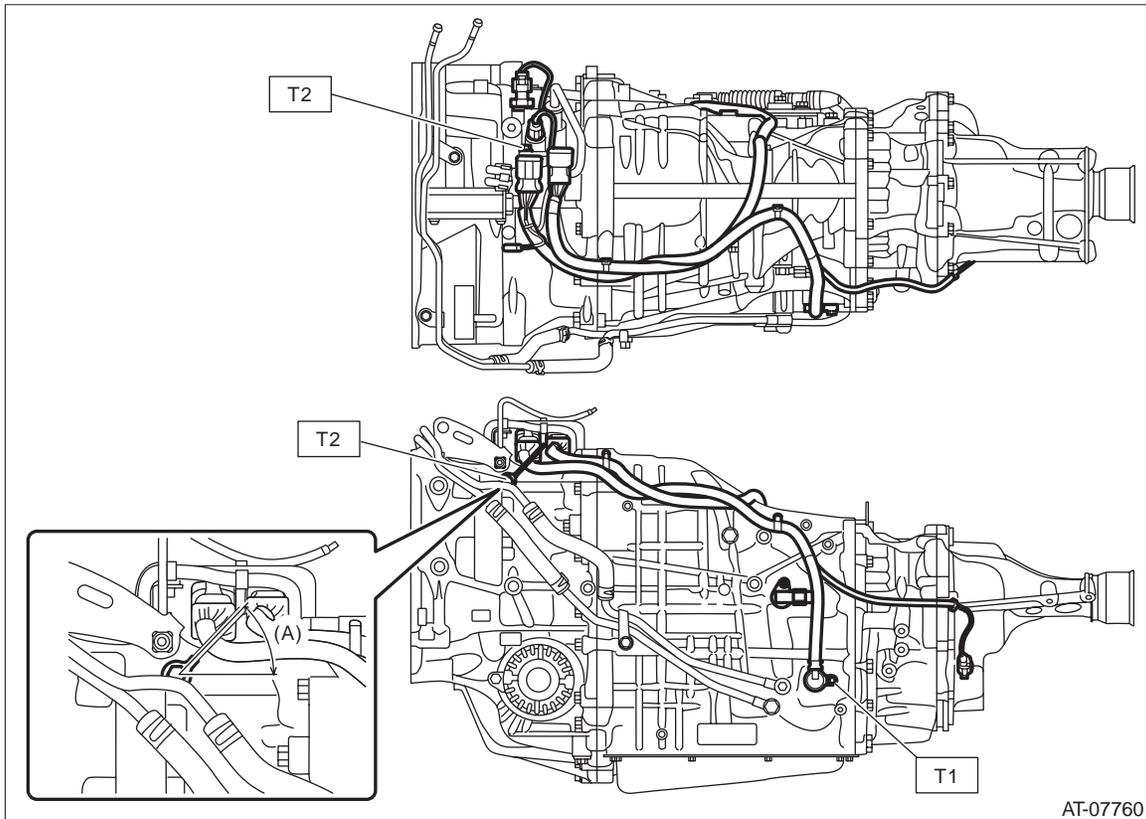
NOTE:

- Use new O-rings.
- Do not impact or bend the transmission harness because it has the oil temperature sensor inside.
- Install the transmission ground terminal at an approximately 45° angle (A).

Tightening torque:

T1: 5 N·m (0.5 kgf·m, 3.7 ft·lb)

T2: 16 N·m (1.6 kgf·m, 11.8 ft·lb)



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 and oil temperature sensor.

NOTE:

Refer to WIRING SECTION for transmission harness terminal and oil temperature sensor terminal. <Ref. to WI-138, WIRING DIAGRAM, CVT Control System.>

Harness continuity standard

Less than 1 Ω

Oil temperature sensor standard

Approx. 2.6 k Ω (at 20°C)

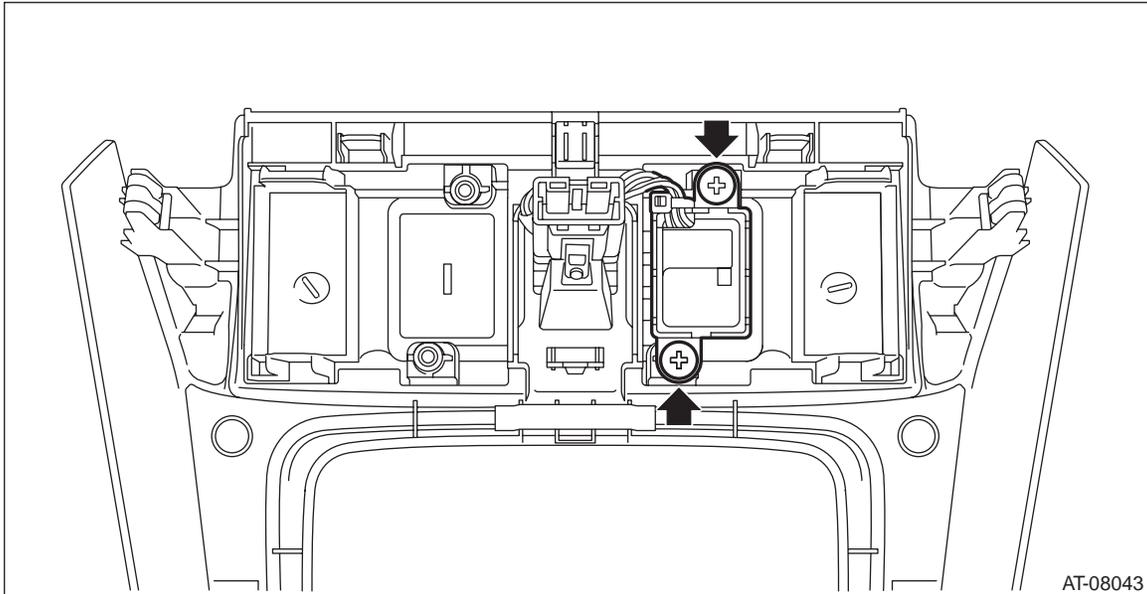
X MODE Switch

CONTINUOUSLY VARIABLE TRANSMISSION

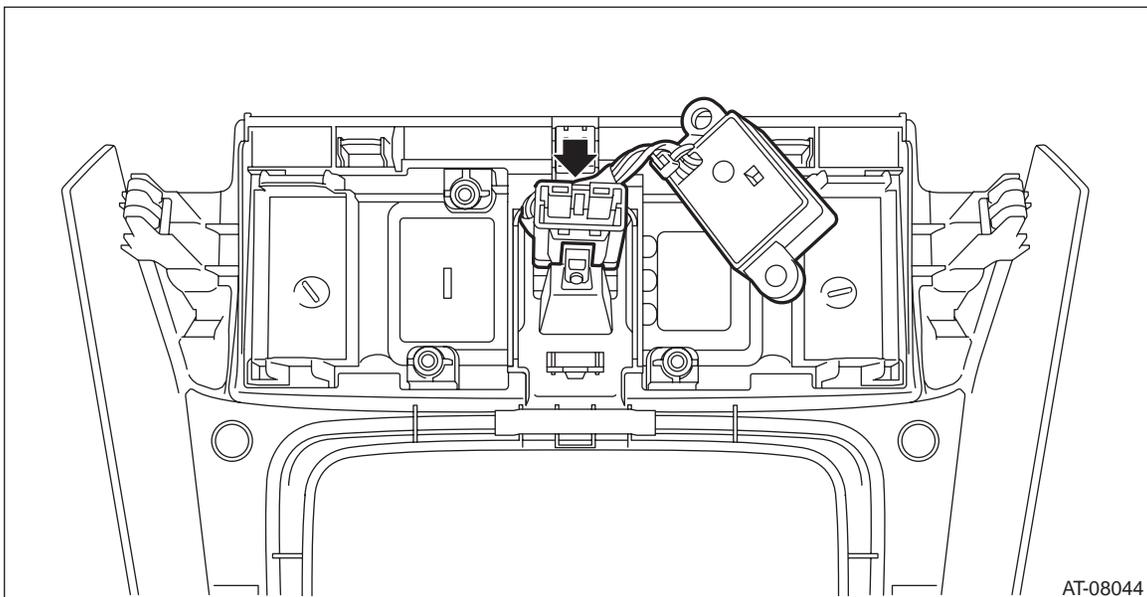
22.X MODE Switch

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 screws which secure the X MODE switch from the cover - shift lever.



- 4) Disconnect the connector from the cover - shift lever and remove the X MODE switch.



B: INSTALLATION

Install in the reverse order of removal.

X MODE Switch

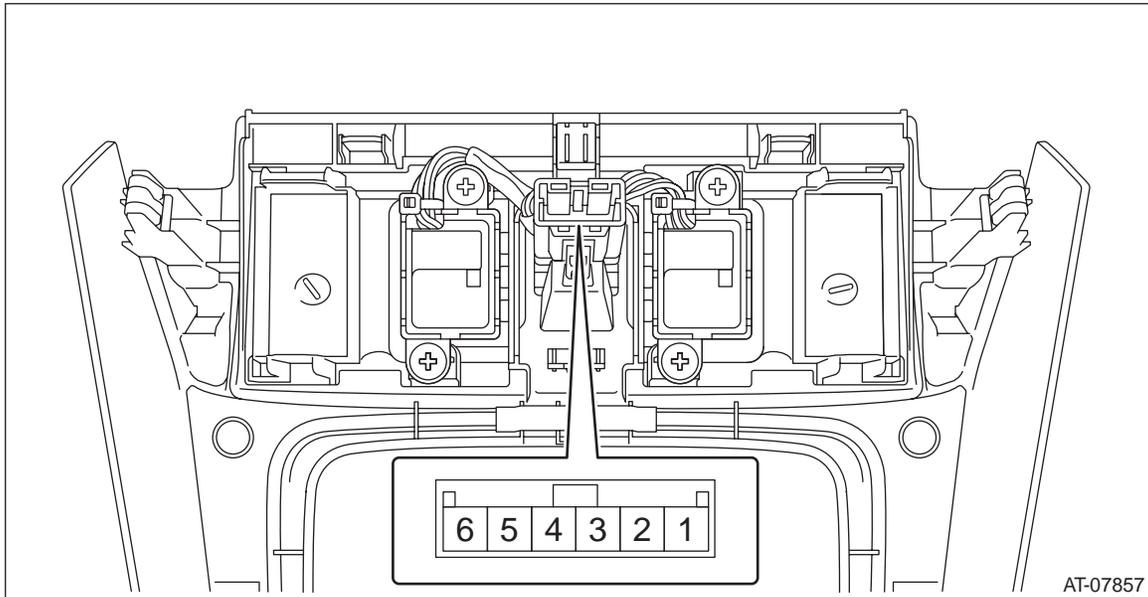
CONTINUOUSLY VARIABLE TRANSMISSION

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

Refer to “CVT (TR580)” section for X MODE system inspection. <Ref. to CVT(TR580)-138, CHECK X MODE SYSTEM, INSPECTION, X MODE Switch.>

Transmission Control Module (TCM)

CONTINUOUSLY VARIABLE TRANSMISSION

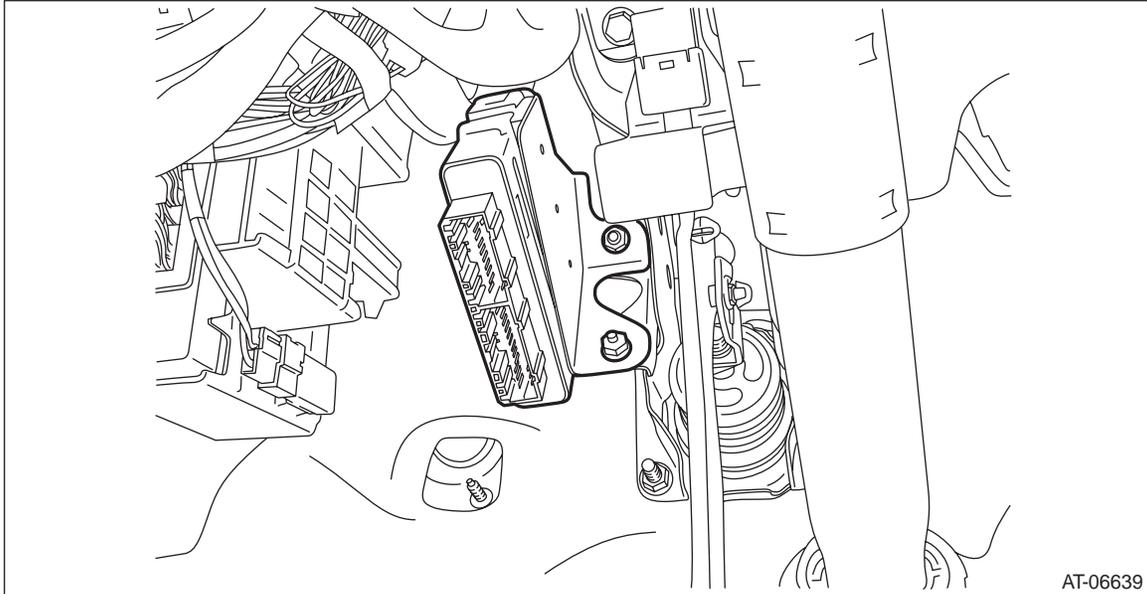
23. Transmission Control Module (TCM)

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.

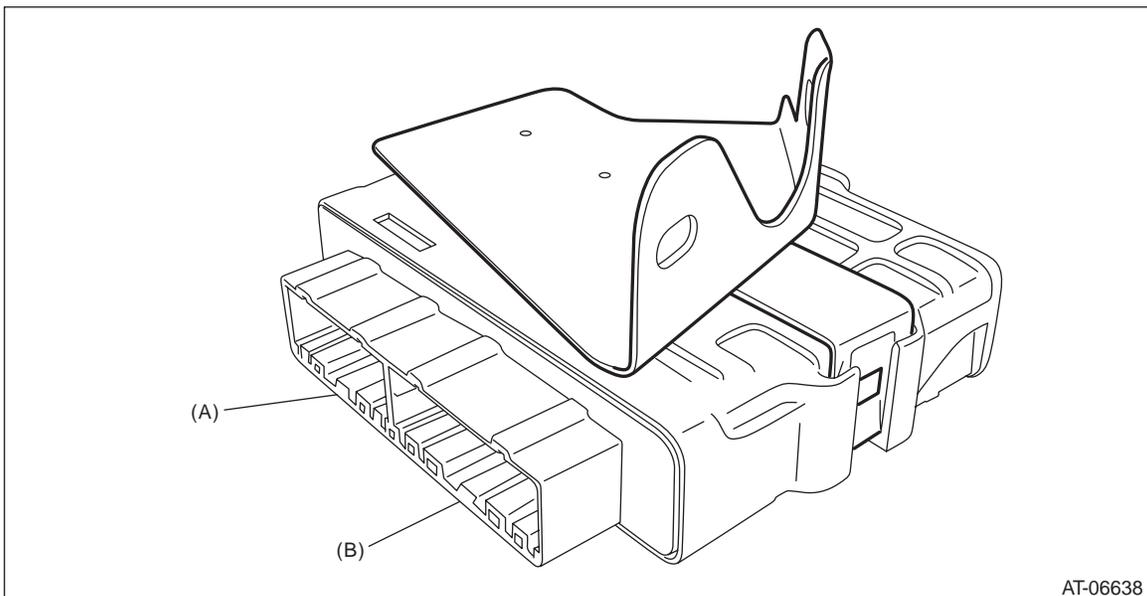


B: INSTALLATION

- 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

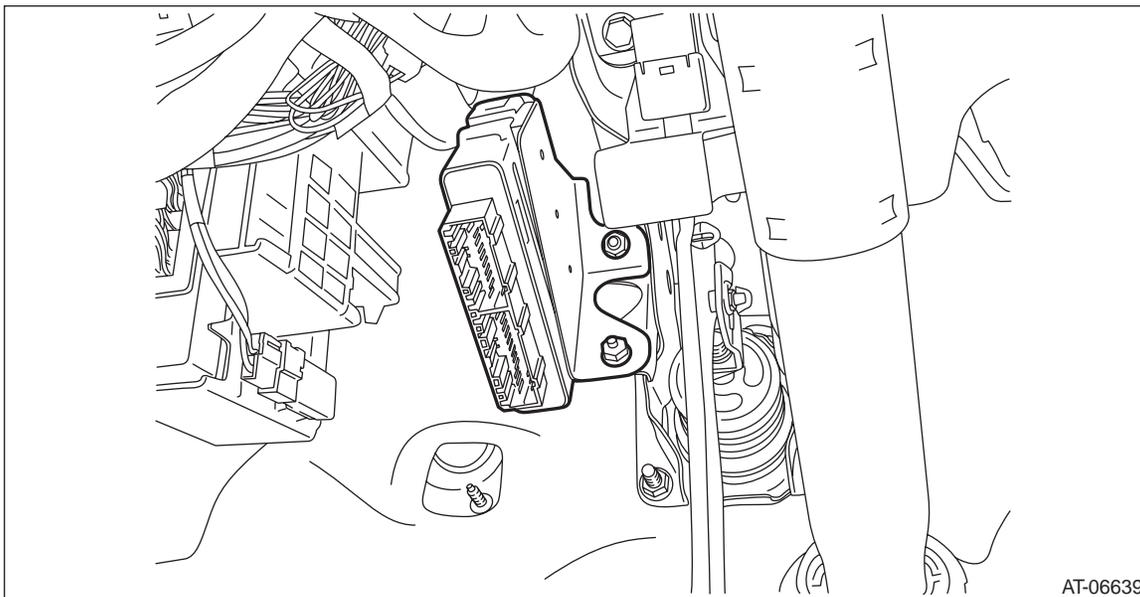
Transmission Control Module (TCM)

CONTINUOUSLY VARIABLE TRANSMISSION

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) Connect the battery ground terminal.

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

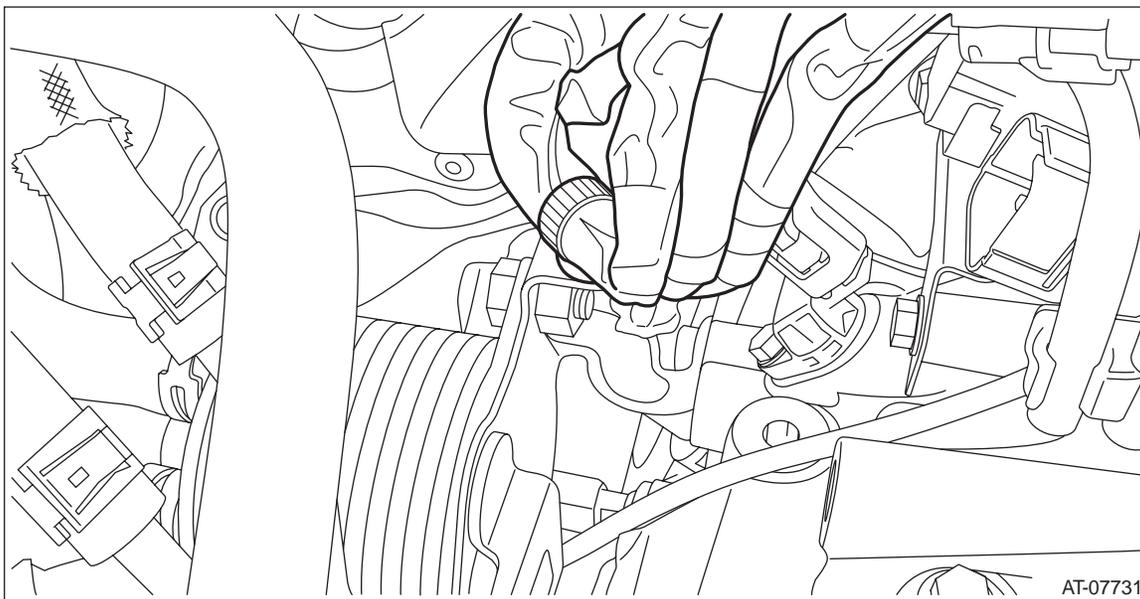
24.CVTF Cooler (With Warmer Function)

A: REMOVAL

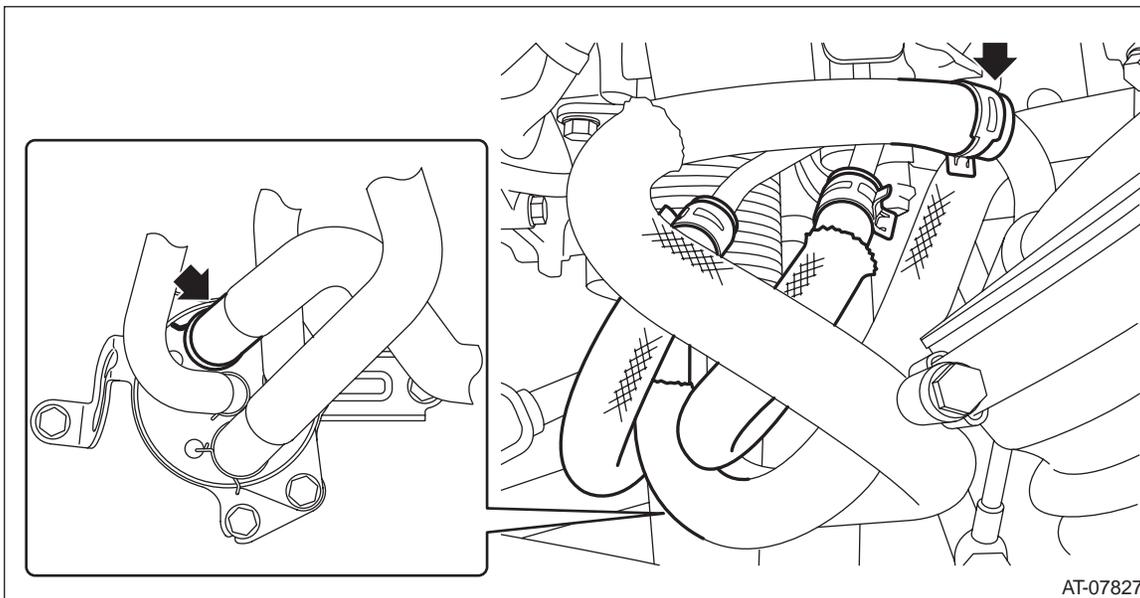
CAUTION:

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(H4DOTC)-13, REPLACEMENT, Engine Coolant.>
- 3) Remove the intercooler. <Ref. to IN(H4DOTC)-35, REMOVAL, Intercooler.>
- 4) Remove the harness clip from the CVTF cooler bracket.



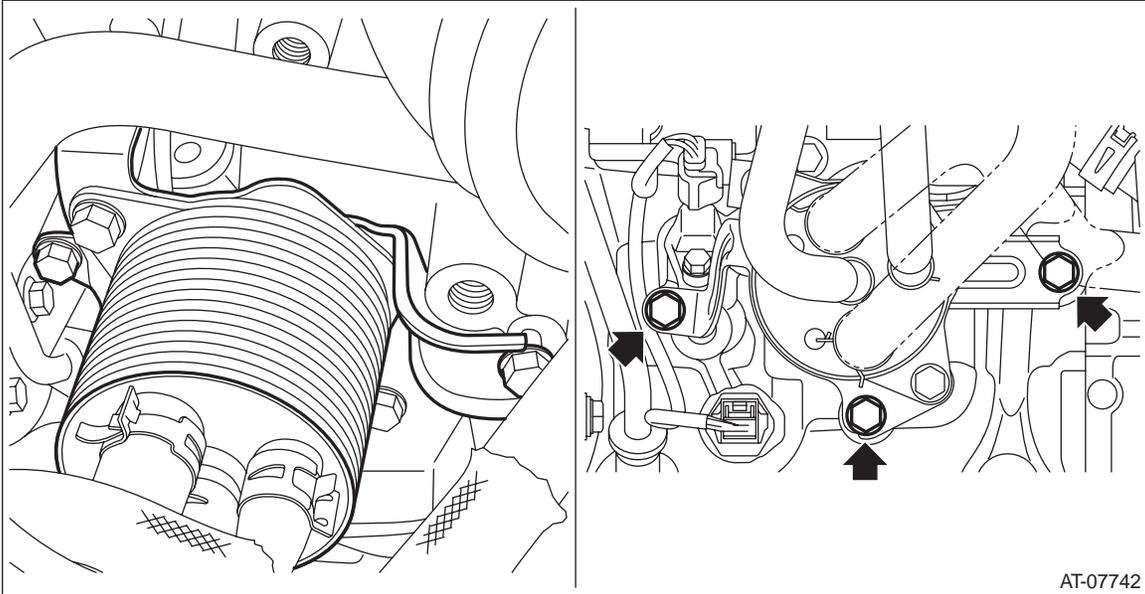
- 5) Remove the engine coolant outlet hose, engine coolant inlet hose, CVTF inlet hose and CVTF outlet hose.



CVTF Cooler (With Warmer Function)

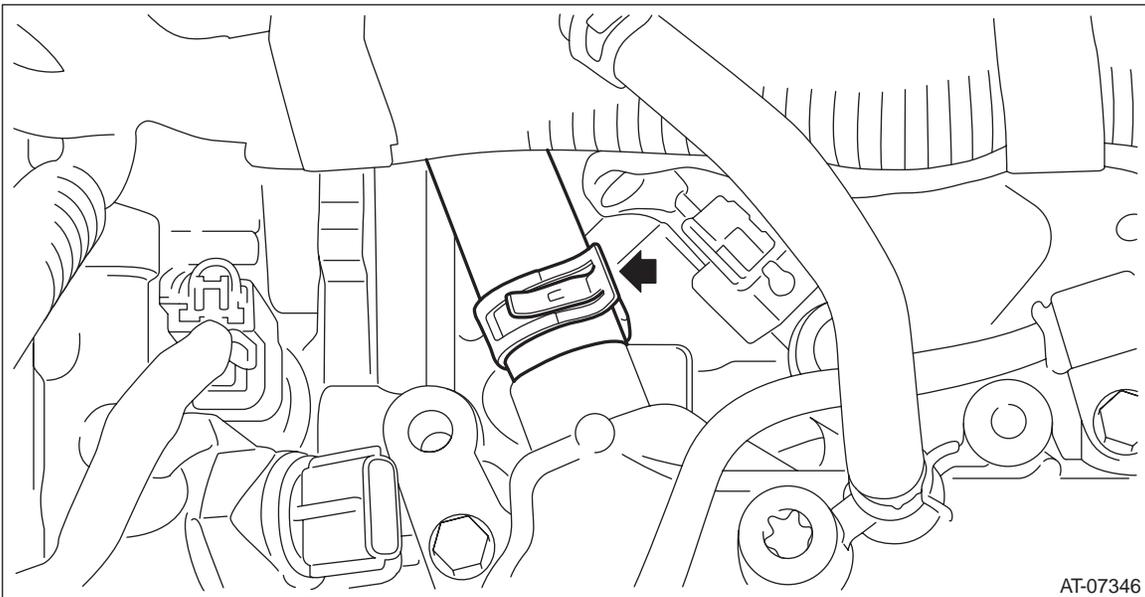
CONTINUOUSLY VARIABLE TRANSMISSION

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



7) Remove the intake manifold, EGR valve, and the insulator. <Ref. to FU(H4DOTC)-19, REMOVAL, Intake Manifold.> <Ref. to EC(H4DOTC)-29, REMOVAL, EGR Control Valve.>

8) Disconnect the engine coolant inlet hose.



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CVTF Cooler (With Warmer Function)

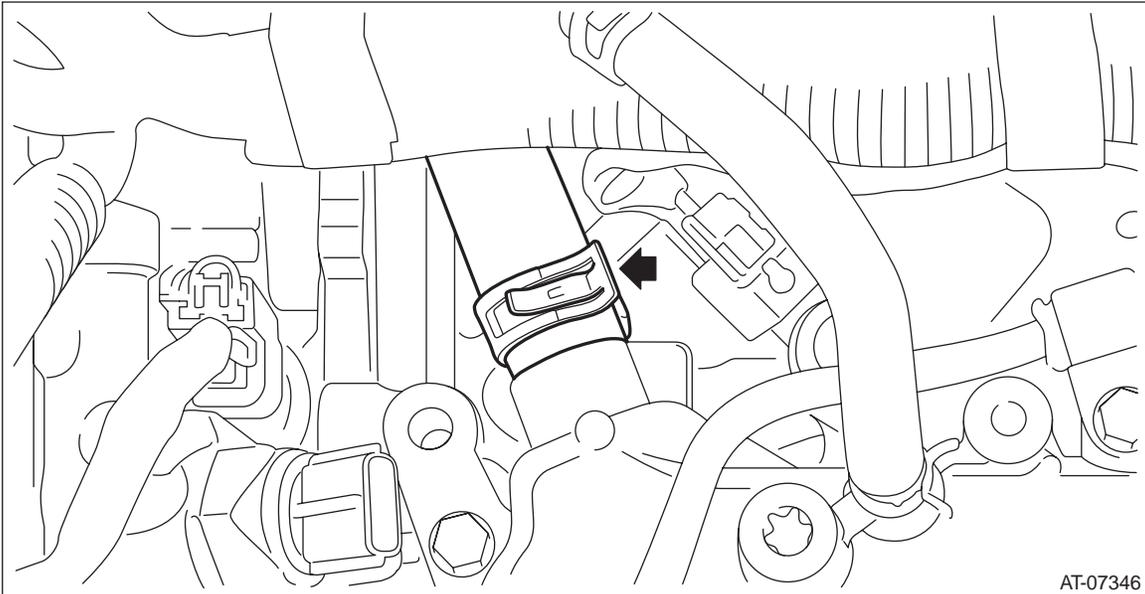
CONTINUOUSLY VARIABLE TRANSMISSION

B: INSTALLATION

1) Connect the engine coolant inlet hose.

NOTE:

When installing the engine coolant inlet hose, the triangle marking should face upward.



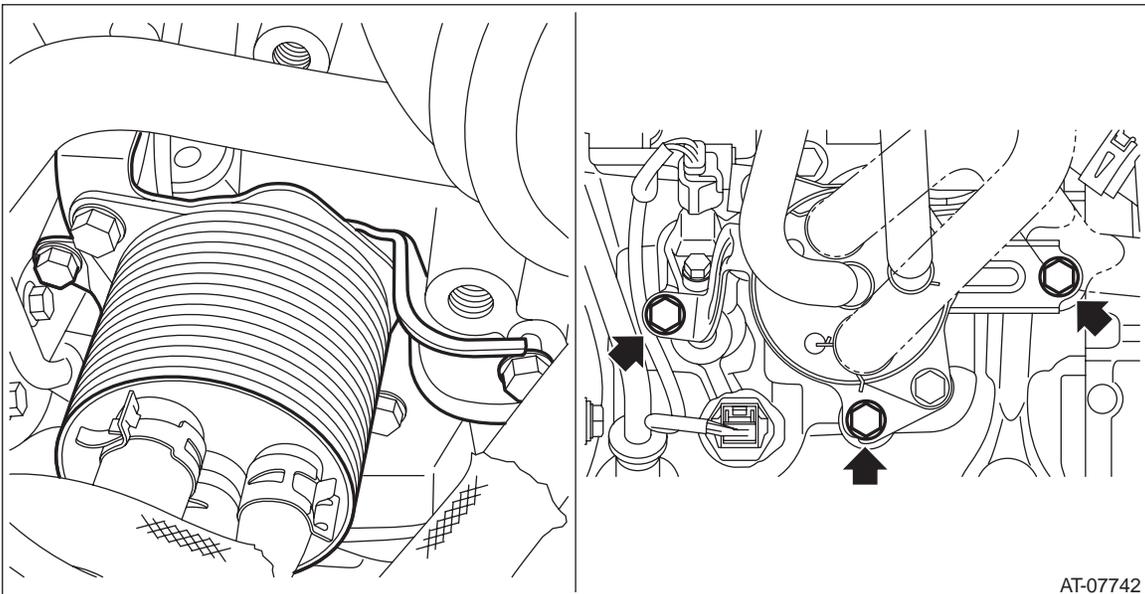
2) Install the insulator, EGR valve, and the intake manifold.<Ref. to FU(H4DOTC)-30, INSTALLATION, In-take Manifold.> <Ref. to EC(H4DOTC)-30, INSTALLATION, EGR Control Valve.>

3) Replace the CVTF inlet hose and the outlet hose.

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

Tightening torque:

23 N·m (2.3 kgf·m, 17.0 ft·lb)



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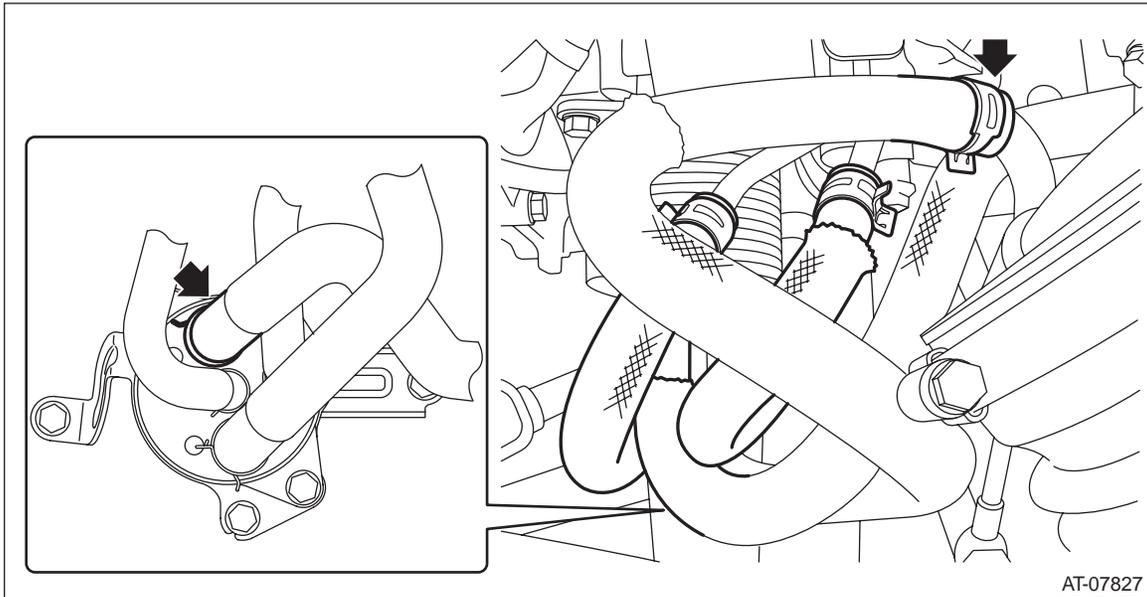
CVTF Cooler (With Warmer Function)

CONTINUOUSLY VARIABLE TRANSMISSION

5) Install the engine coolant outlet hose, engine coolant inlet hose, CVTF inlet hose and CVTF outlet hose.

NOTE:

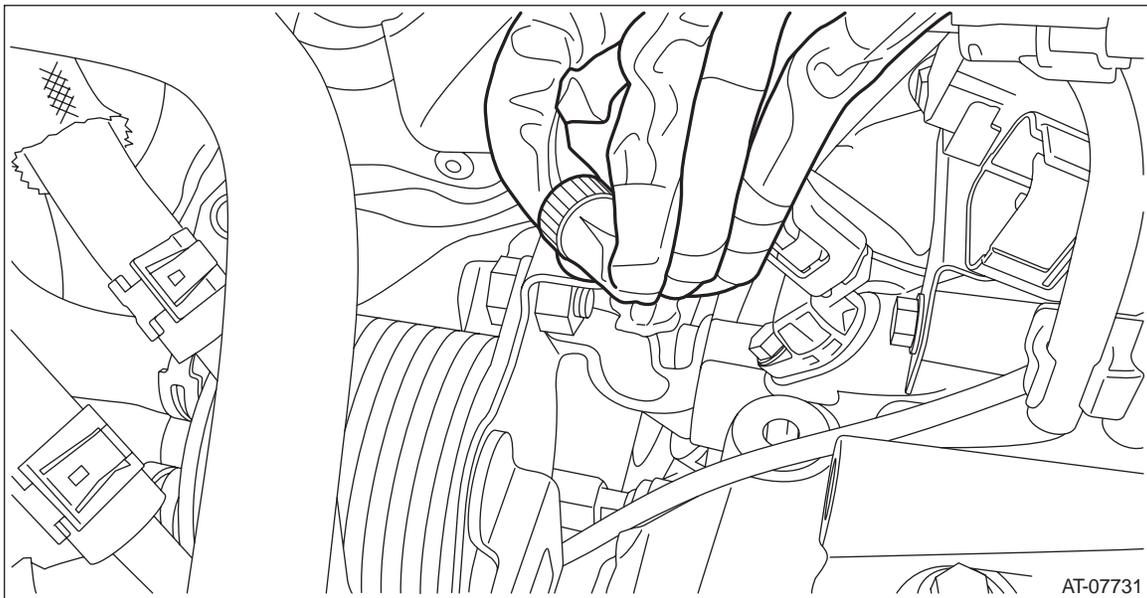
Use new CVTF hoses.



6) Check installation condition of hoses.

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

7) Install the harness clip to the CVTF cooler bracket.



8) Install the intercooler.<Ref. to IN(H4DOTC)-37, INSTALLATION, Intercooler.>

9) Connect the battery ground terminal.

10) Fill engine coolant.<Ref. to CO(H4DOTC)-13, REPLACEMENT, Engine Coolant.>

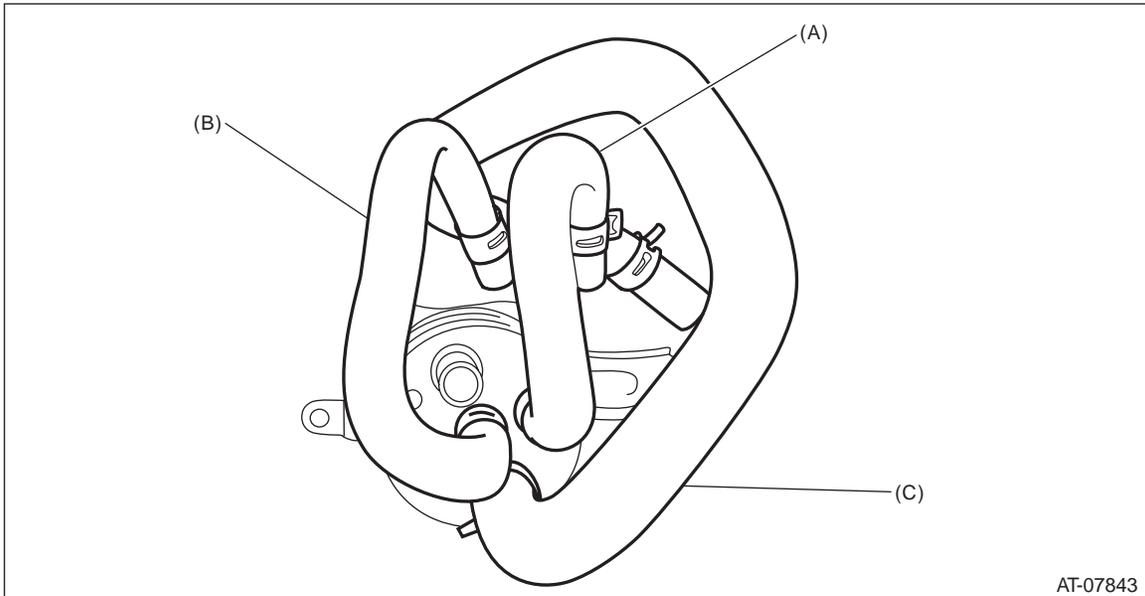
11) Adjust the CVTF level.<Ref. to CVT(TR690)-36, ADJUSTMENT, CVTF.>

CVTF Cooler (With Warmer Function)

CONTINUOUSLY VARIABLE TRANSMISSION

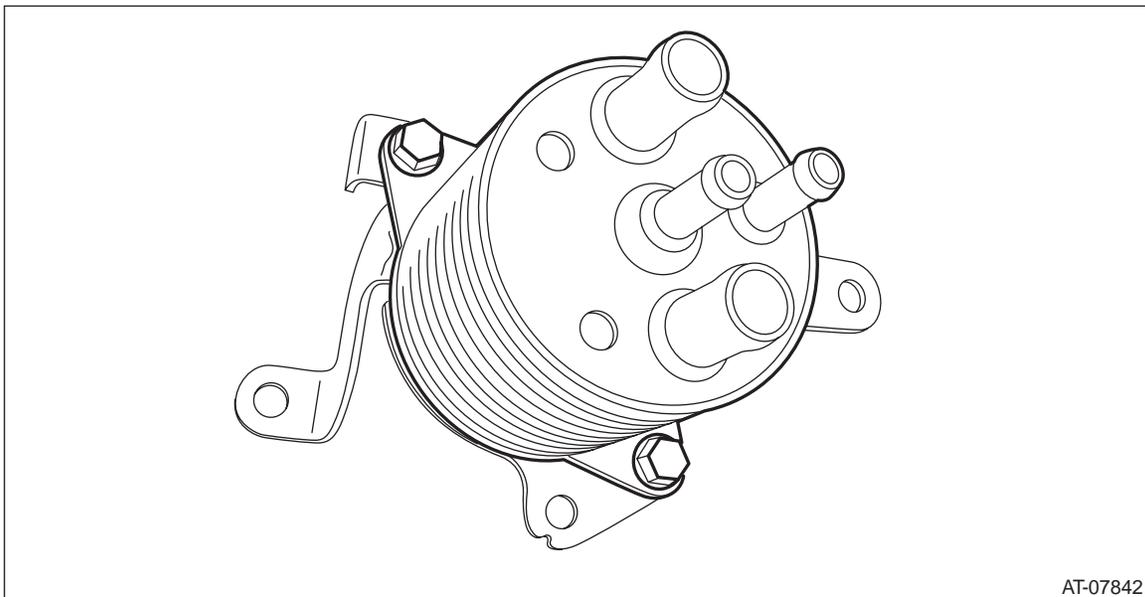
C: DISASSEMBLY

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



- (A) CVTF cooler outlet hose
- (B) CVTF cooler inlet 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)

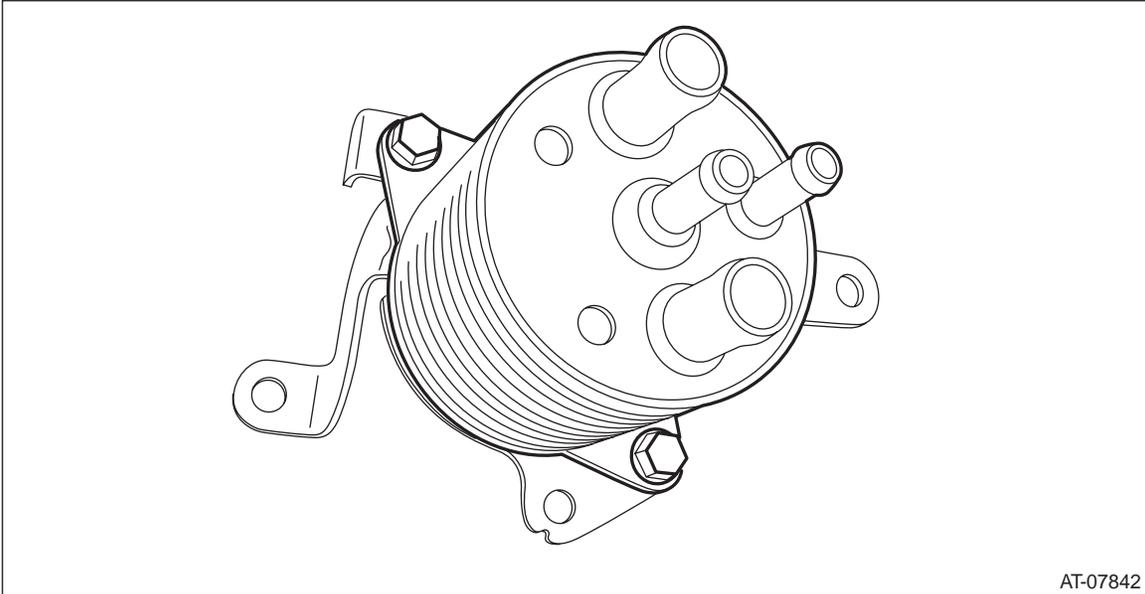
CONTINUOUSLY VARIABLE TRANSMISSION

D: ASSEMBLY

1) Attach the bracket.

Tightening torque:

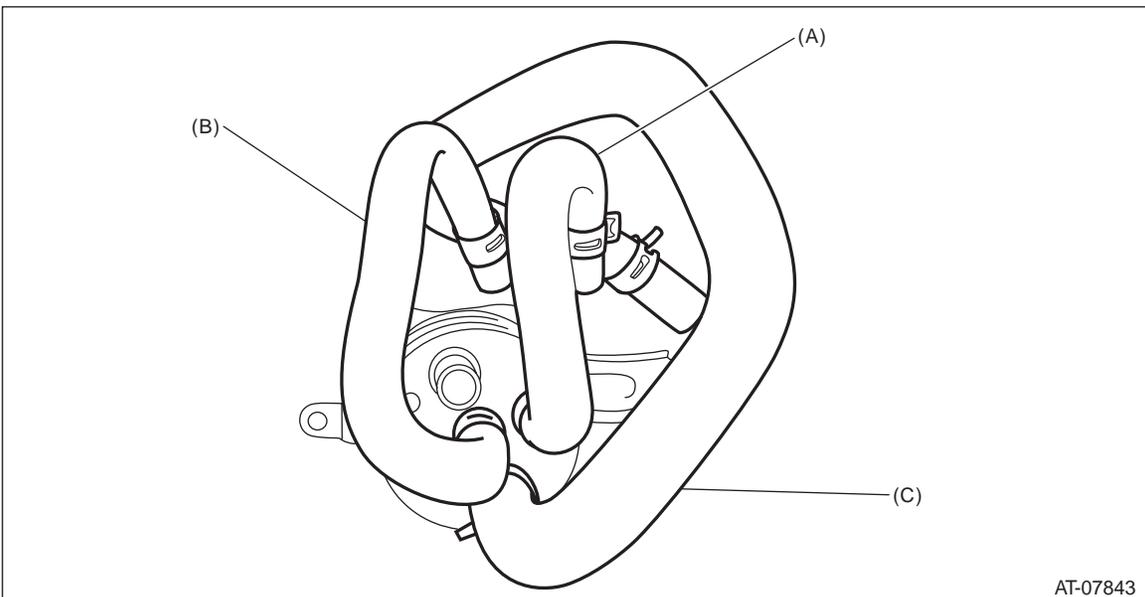
23 N·m (2.3 kgf·m, 17.0 ft·lb)



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

CVTF Cooler (With Warmer Function)

CONTINUOUSLY VARIABLE TRANSMISSION

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.

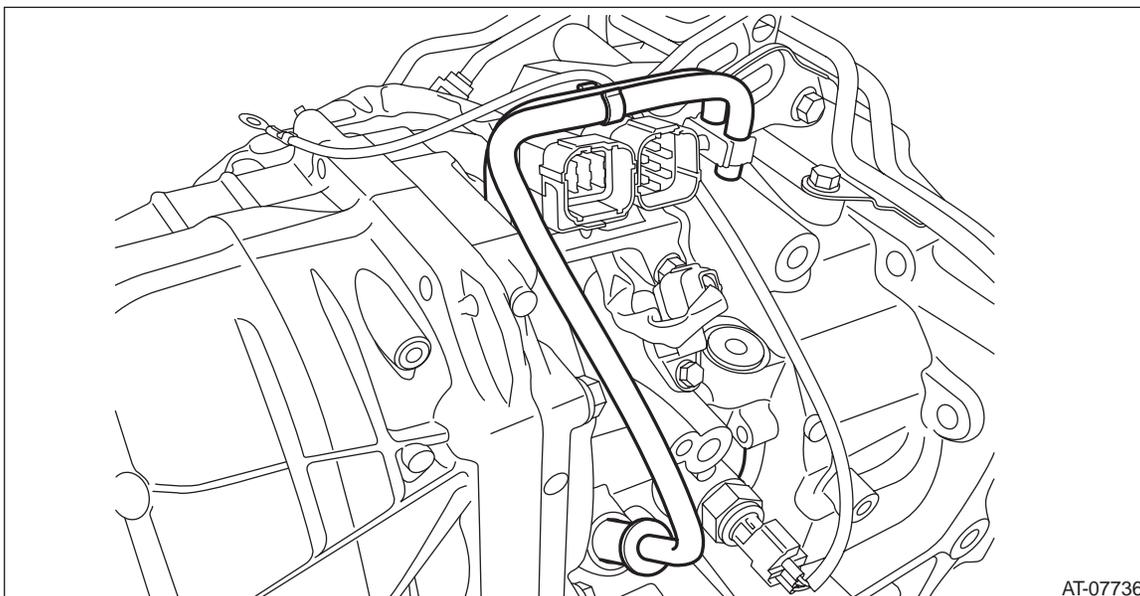
Air Breather Hose

CONTINUOUSLY VARIABLE TRANSMISSION

25. Air Breather Hose

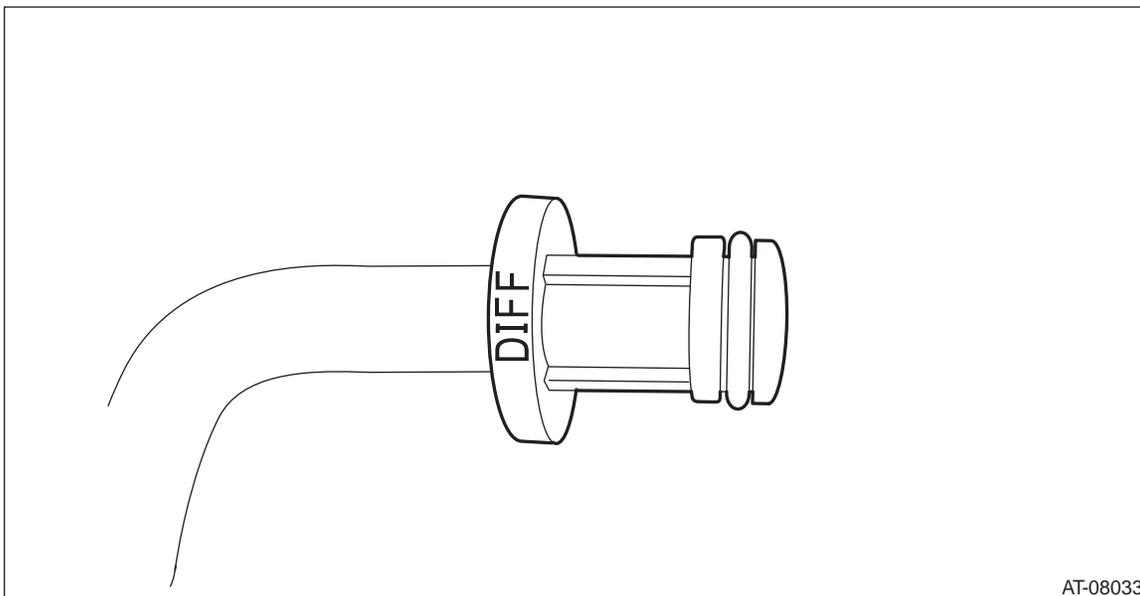
A: REMOVAL

- 1) Remove the intercooler. <Ref. to IN(H4DOTC)-35, REMOVAL, Intercooler.>
- 2) Remove the two air breather hoses.



AT-07736

- 3) Remove the oil cap.



AT-08033

B: INSTALLATION

Install in the reverse order of removal.

NOTE:

Use new O-rings.

C: INSPECTION

- Check the hose for peeling, crack or clogging.
- Check the oil cap is not cracked or clogged.
- Check O-ring of oil cap is not damaged.

26. Drive Plate

A: REMOVAL

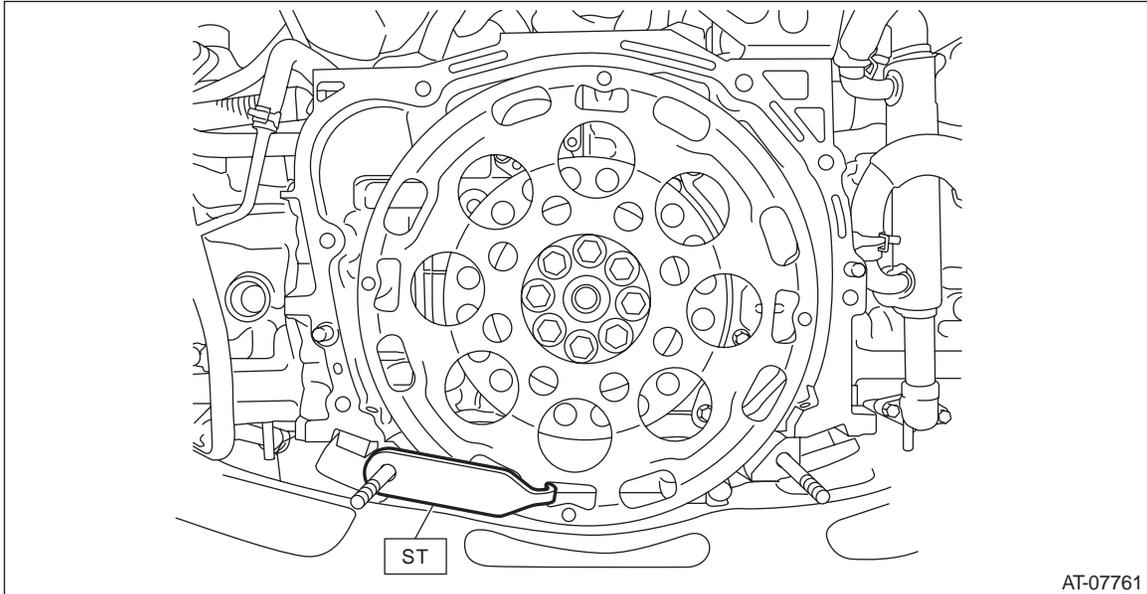
1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TR690)-56, REMOVAL, Automatic Transmission Assembly.>

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.

Drive Plate

CONTINUOUSLY VARIABLE TRANSMISSION

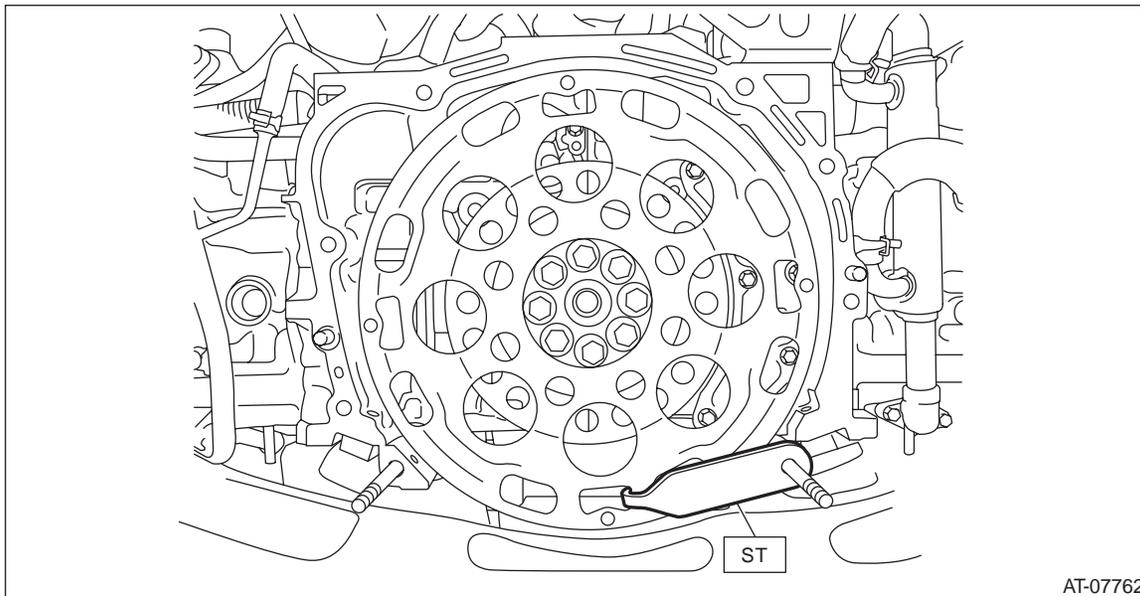
B: INSTALLATION

- 1) Temporarily install the drive plate and reinforcement drive plate.
- 2) Set the ST.

NOTE:

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

ST 498497300 CRANKSHAFT STOPPER



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

NOTE:

Fix the engine unit.

- (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(TR690)-69, INSTALLATION, Automatic Transmission Assembly.>

C: INSPECTION

Check the drive cable for damage.

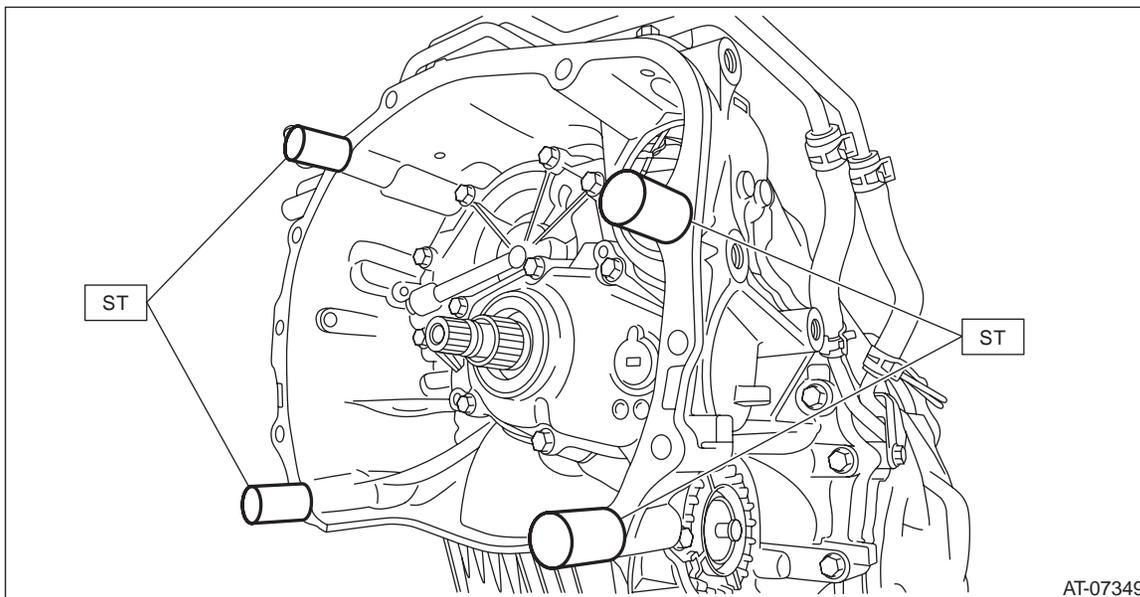
27. Preparation for Overhaul

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(TR690)-138, REMOVAL, Torque Converter Assembly.>
- 3) Attach the ST on the transmission.
ST 18632AA000 STAND ASSY



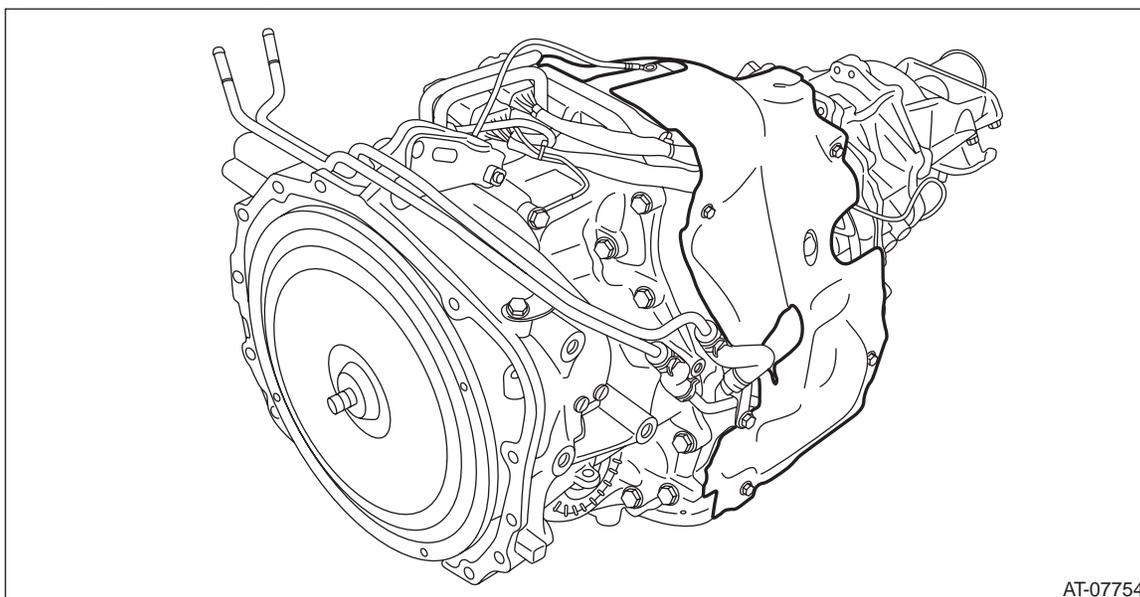
- 4) Remove the transmission cover on the transmission upper side.

NOTE:

Install using the following tightening torque.

Tightening torque:

8 N·m (0.8 kgf·m, 5.9 ft·lb)



- 5) Place the transmission assembly on end.

Torque Converter Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

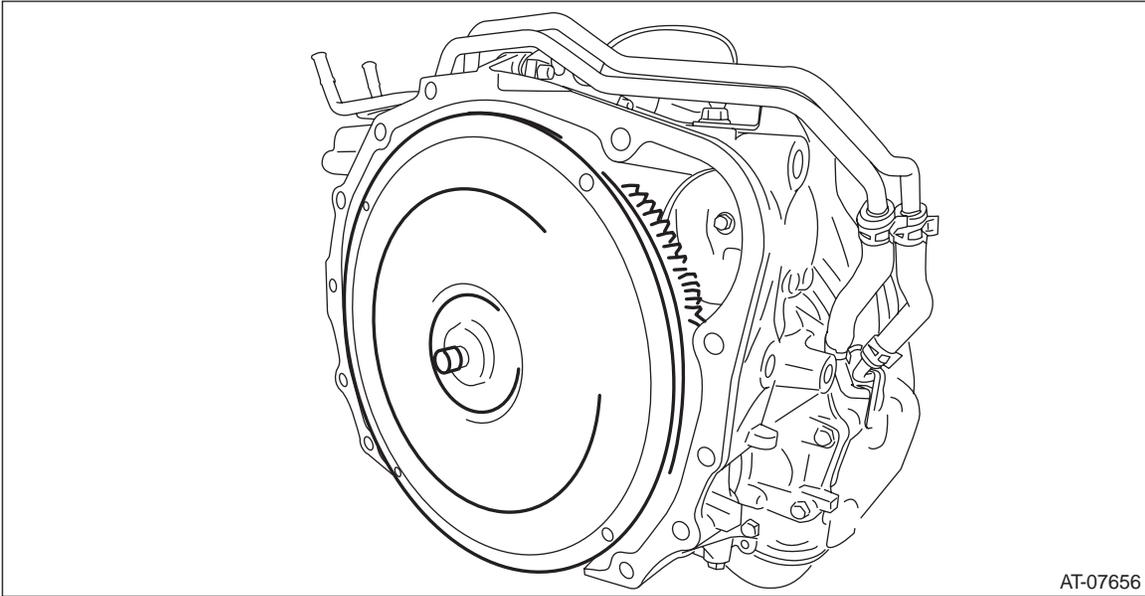
28. Torque Converter Assembly

A: REMOVAL

- 1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TR690)-56, REMOVAL, Automatic Transmission Assembly.>
- 2) Pull out the torque converter assembly horizontally.

CAUTION:

Do not scratch the inside of engaging parts.



- 3) Remove the O-ring from the front reduction drive gear.

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Torque Converter Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

B: INSTALLATION

1) Install the O-ring to front reduction drive gear.

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:

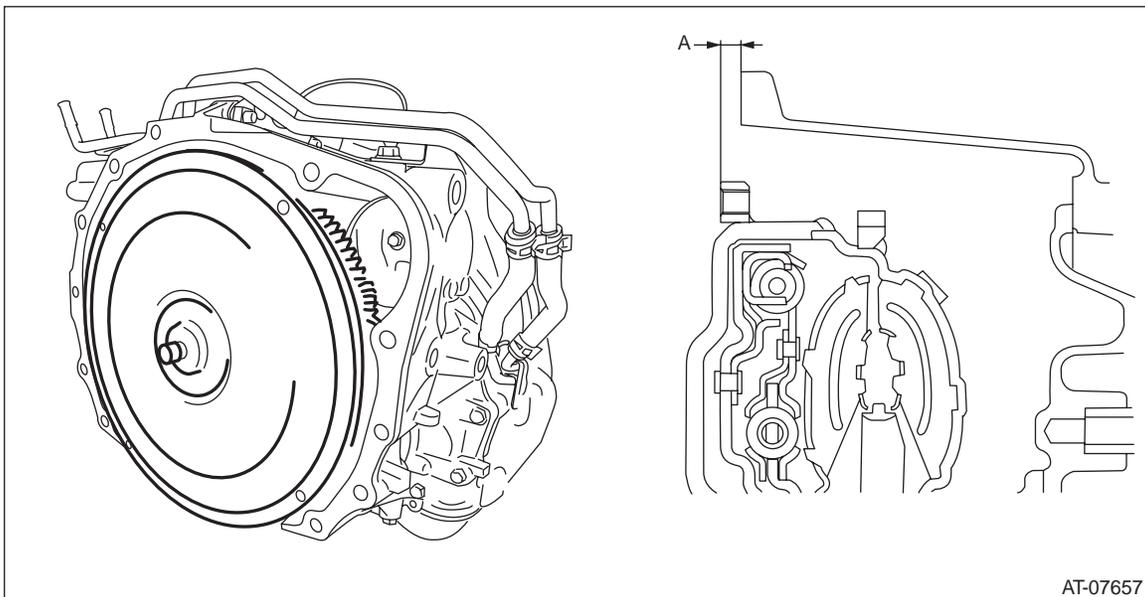
- Apply CVTF to the oil seal lip.
- Do not damage the oil seal and O-ring.

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(TR690)-69, 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.

Extension Case

CONTINUOUSLY VARIABLE TRANSMISSION

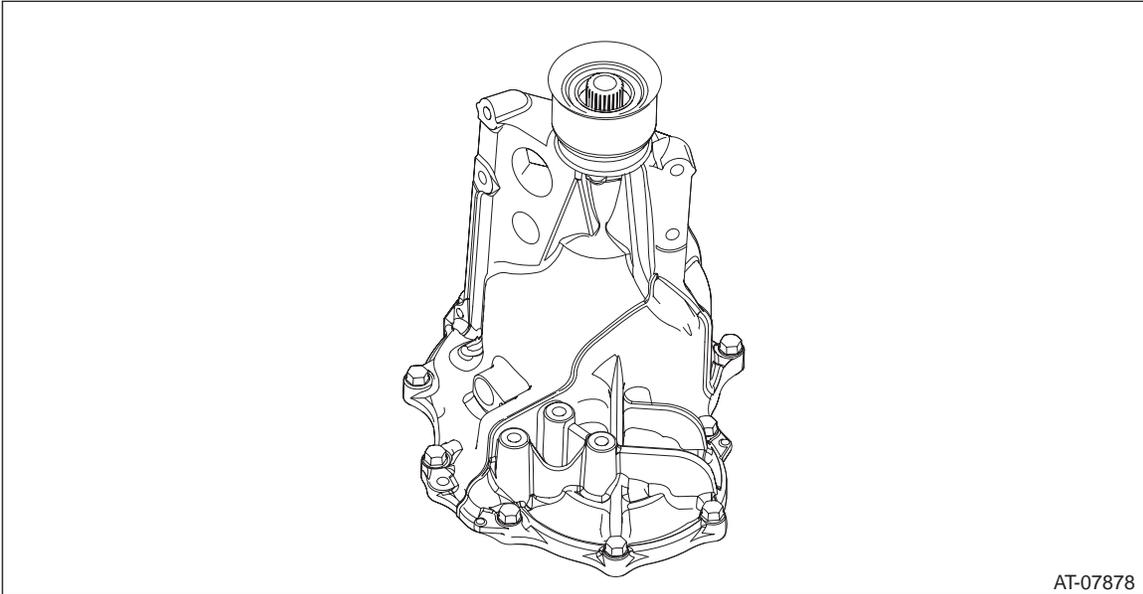
29.Extension Case

A: REMOVAL

- 1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TR690)-56, REMOVAL, Automatic Transmission Assembly.>
- 2) Remove the front wheel speed sensor. <Ref. to CVT(TR690)-105, REMOVAL, Front Wheel Speed Sensor.>
- 3) Remove the harness clip, and remove the extension case.

NOTE:

The total number of extension case mounting bolts is 10.



Extension Case

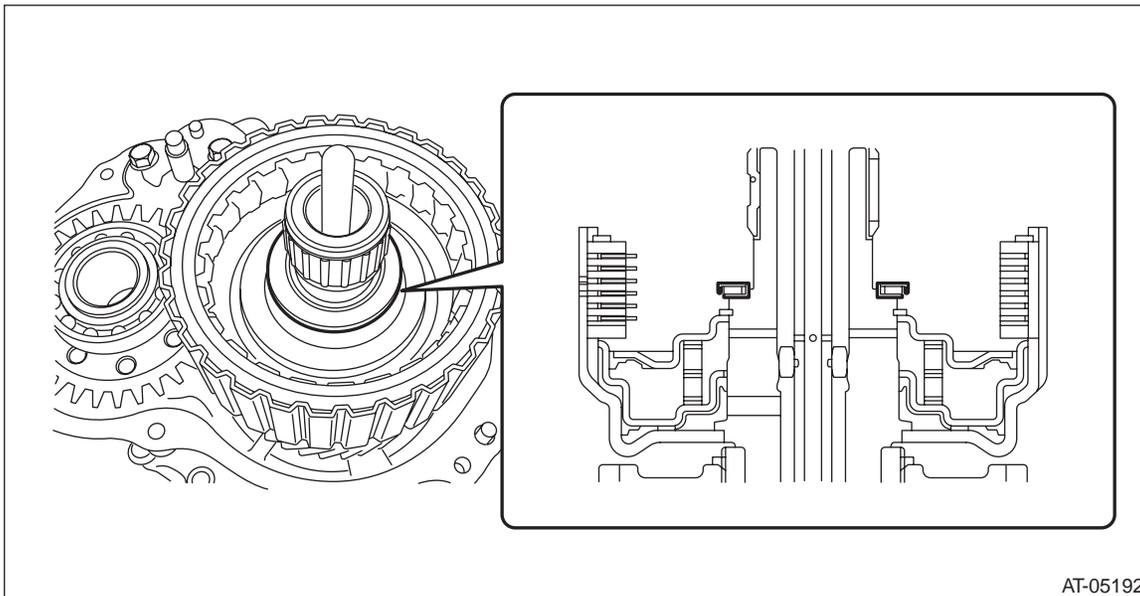
CONTINUOUSLY VARIABLE TRANSMISSION

B: INSTALLATION

- 1) Clean the mating surface of the extension case and intermediate case.
- 2) Select the thrust needle bearing.<Ref. to CVT(TR690)-145, ADJUSTMENT, Rear Drive Shaft.>
- 3) Select the shim for transfer reduction driven gear.<Ref. to CVT(TR690)-163, ADJUSTMENT, Transfer Reduction Driven Gear.>
- 4) Install the selected thrust needle bearing to transfer clutch assembly.

NOTE:

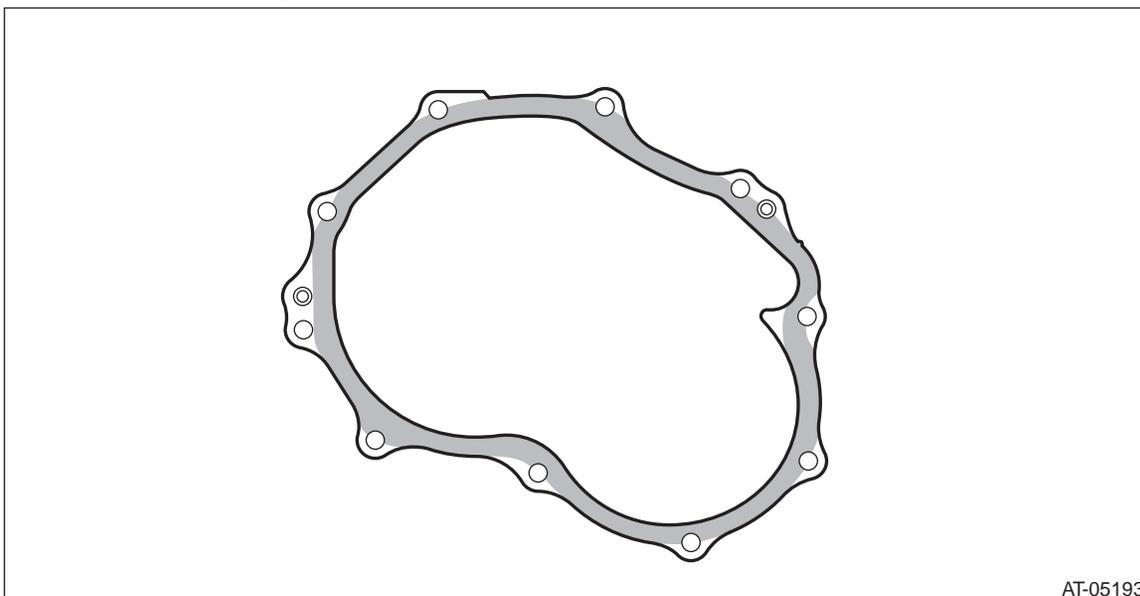
Install the thrust needle bearing in the correct direction.



- 5) Attach the selected shim to transfer reduction driven gear assembly.
- 6) Apply liquid gasket to extension case seamlessly.

Liquid gasket:

THREE BOND 1215B or equivalent



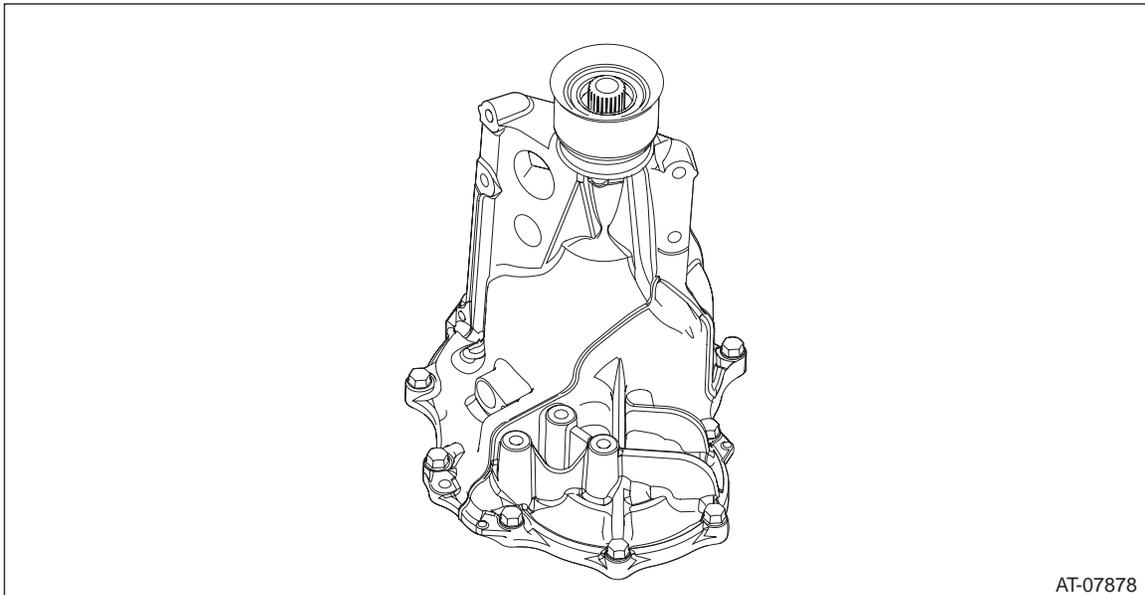
Extension Case

CONTINUOUSLY VARIABLE TRANSMISSION

7) Install the extension case.

Tightening torque:

25 N·m (2.5 kgf-m, 18.4 ft-lb)



8) Install the front wheel speed sensor. <Ref. to CVT(TR690)-105, INSTALLATION, Front Wheel Speed Sensor.>

9) Install the transmission assembly. <Ref. to CVT(TR690)-69, 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.

D: ASSEMBLY

- 1) Press-fit the dust cover into extension case.
- 2) Install the extension case oil seal to extension case.

ST 498057300 INSTALLER

E: INSPECTION

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

F: ADJUSTMENT

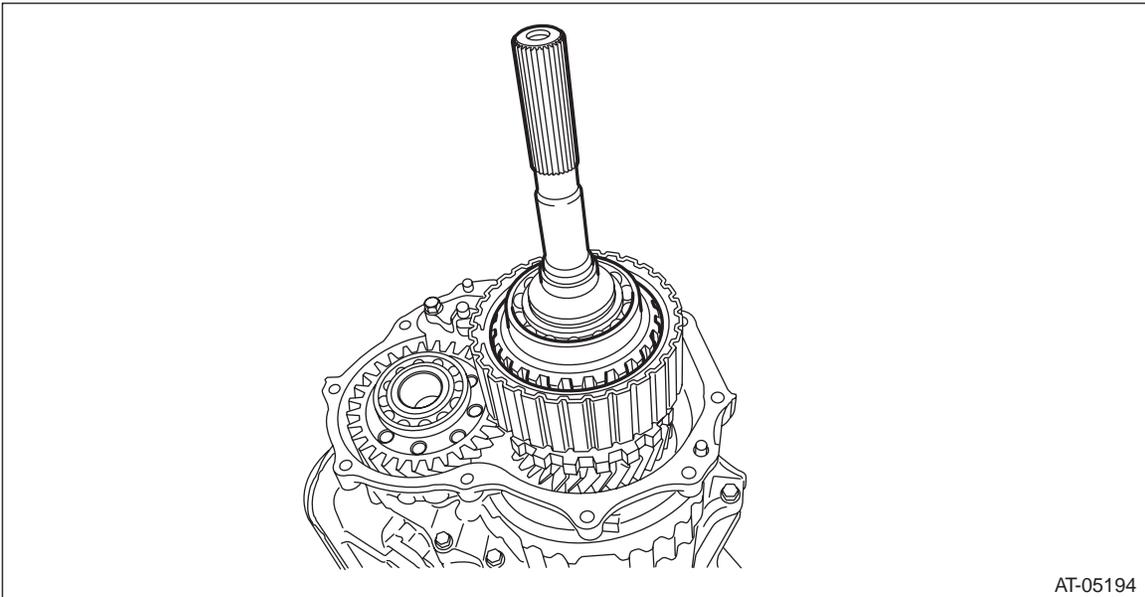
NOTE:

When replacing the extension case, select the shims for rear drive shaft thrust needle bearing and transfer reduction driven gear. <Ref. to CVT(TR690)-145, ADJUSTMENT, Rear Drive Shaft.> <Ref. to CVT(TR690)-163, ADJUSTMENT, Transfer Reduction Driven Gear.>

30.Rear Drive Shaft

A: REMOVAL

- 1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TR690)-56, REMOVAL, Automatic Transmission Assembly.>
- 2) Remove the extension case. <Ref. to CVT(TR690)-140, REMOVAL, Extension Case.>
- 3) Remove the rear drive shaft.



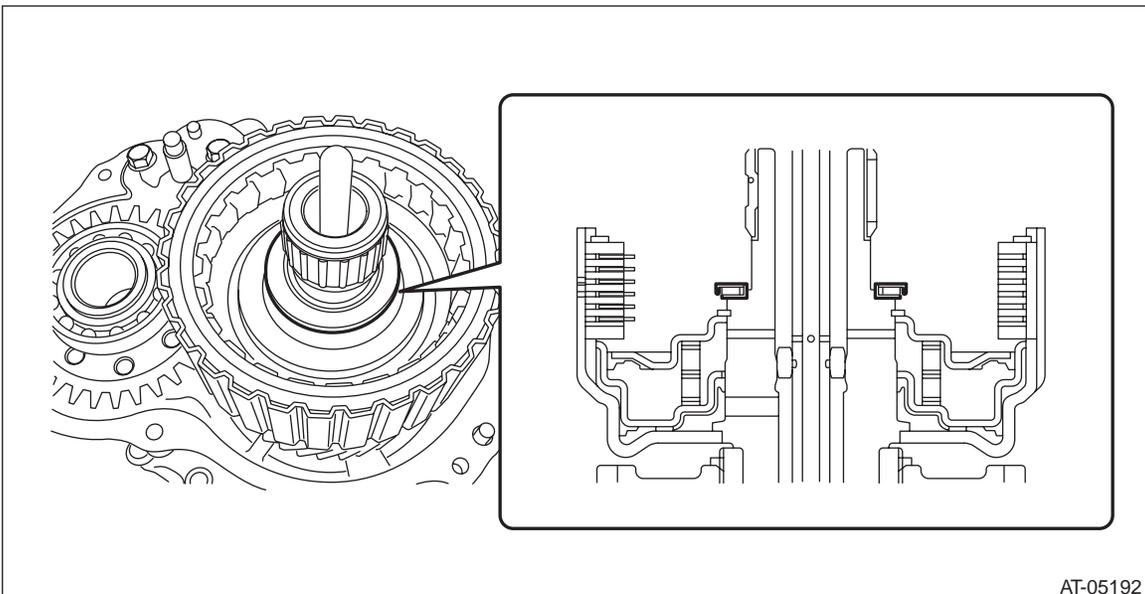
AT-05194

B: INSTALLATION

- 1) Select the thrust needle bearing. <Ref. to CVT(TR690)-145, ADJUSTMENT, Rear Drive Shaft.>
- 2) Install the selected thrust needle bearing to transfer clutch assembly.

NOTE:

Install the thrust needle bearing in the correct direction.

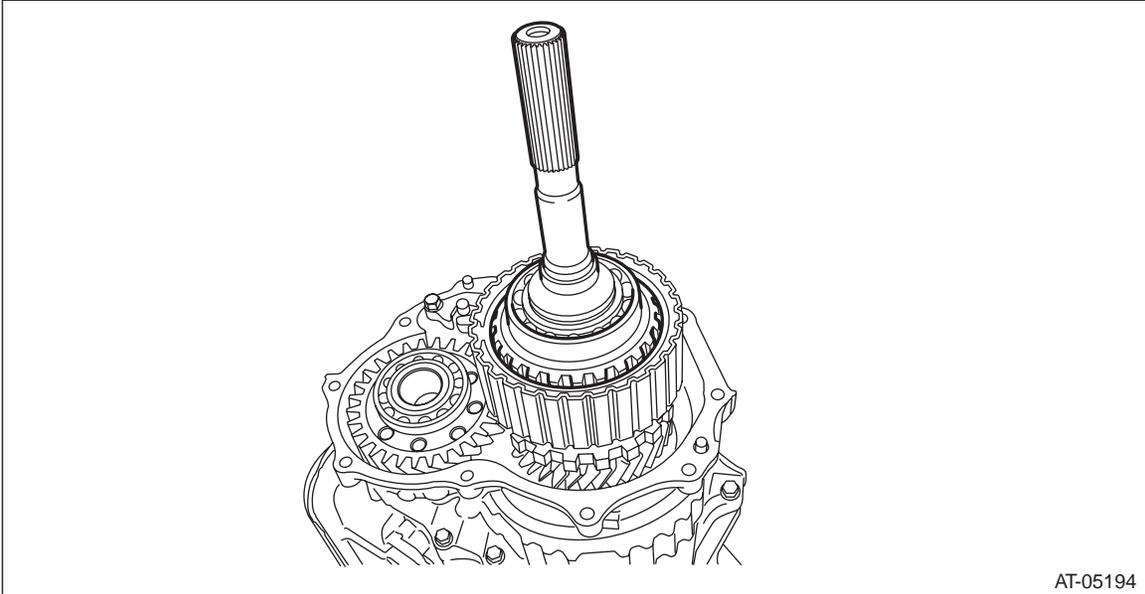


AT-05192

Rear Drive Shaft

CONTINUOUSLY VARIABLE TRANSMISSION

3) Install the rear drive shaft.



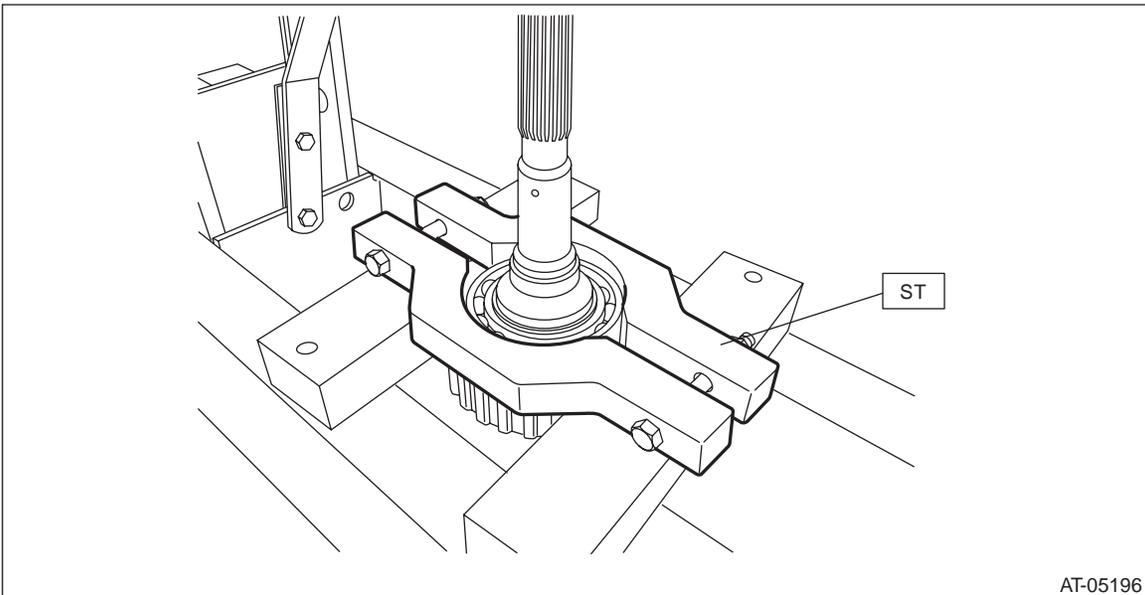
4) Install the extension case. <Ref. to CVT(TR690)-141, INSTALLATION, Extension Case.>

5) Install the transmission assembly to the vehicle. <Ref. to CVT(TR690)-69, INSTALLATION, Automatic Transmission Assembly.>

C: DISASSEMBLY

1) Remove the ball bearing using ST.

ST 498077600 REMOVER



CVT(TR690)-144

Rear Drive Shaft

CONTINUOUSLY VARIABLE TRANSMISSION

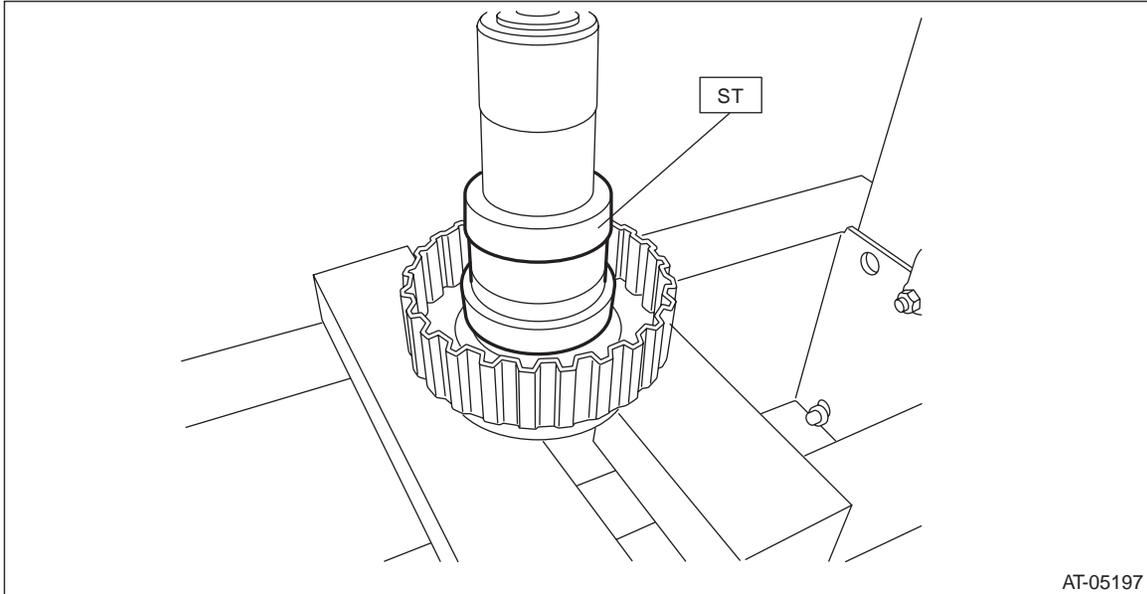
D: ASSEMBLY

1) Using the ST, install the ball bearing.

NOTE:

- Use a new ball bearing.
- Apply CVTF to press-fitting surface of ball bearing.

ST 399513600 INSTALLER



E: INSPECTION

- Check each part for crack, damage or dust.
- Check the ball bearing for smooth rotation.
- Check the ball bearing for excessive looseness.

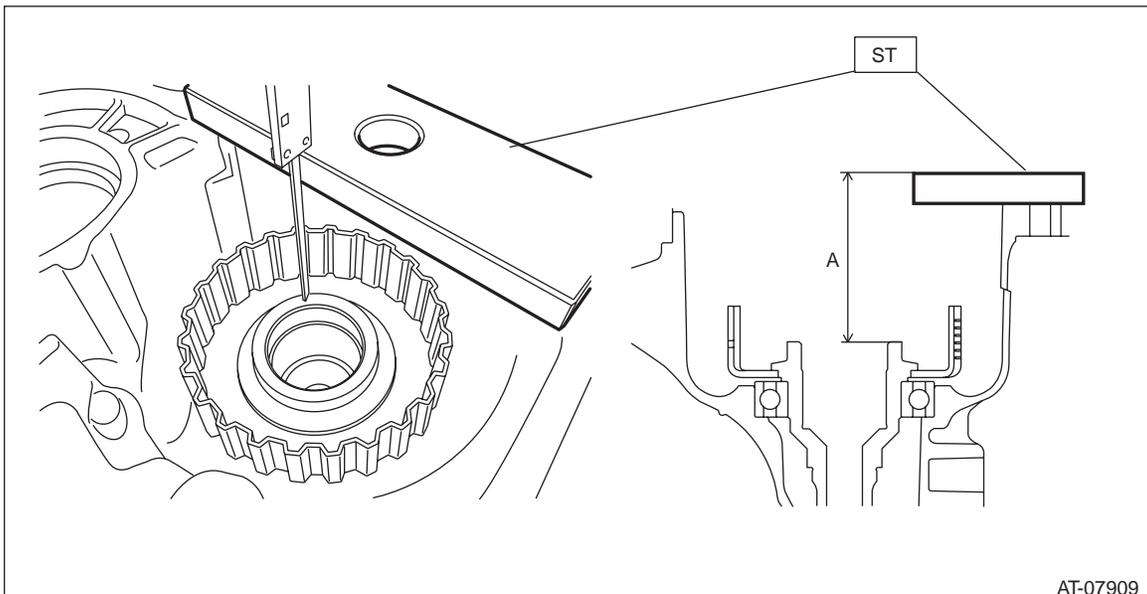
F: ADJUSTMENT

NOTE:

When replacing the rear drive shaft or bearing, select the thrust needle bearing.

1) Using the ST, measure the distance "A" from ST end face to rear drive shaft thrust needle bearing catch surface.

ST 398643600 GAUGE



Rear Drive Shaft

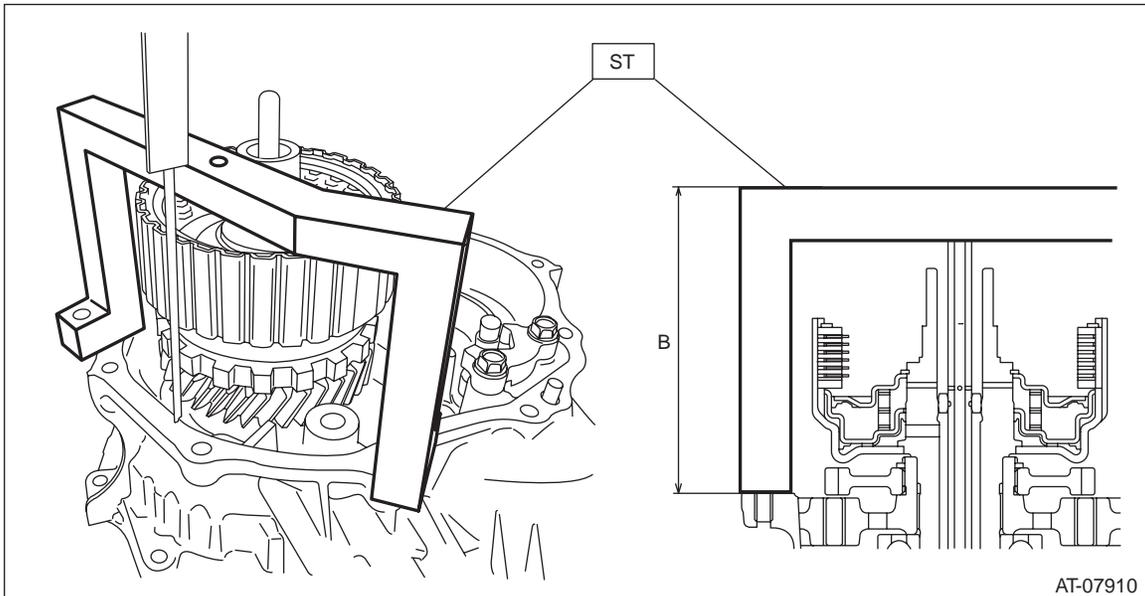
CONTINUOUSLY VARIABLE TRANSMISSION

2) Using the ST, measure the height "B" from the intermediate case mating surface to the ST end face.

NOTE:

Place the measurement tool at the dent on ST upper side to measure.

ST 499737100 PULLER SET

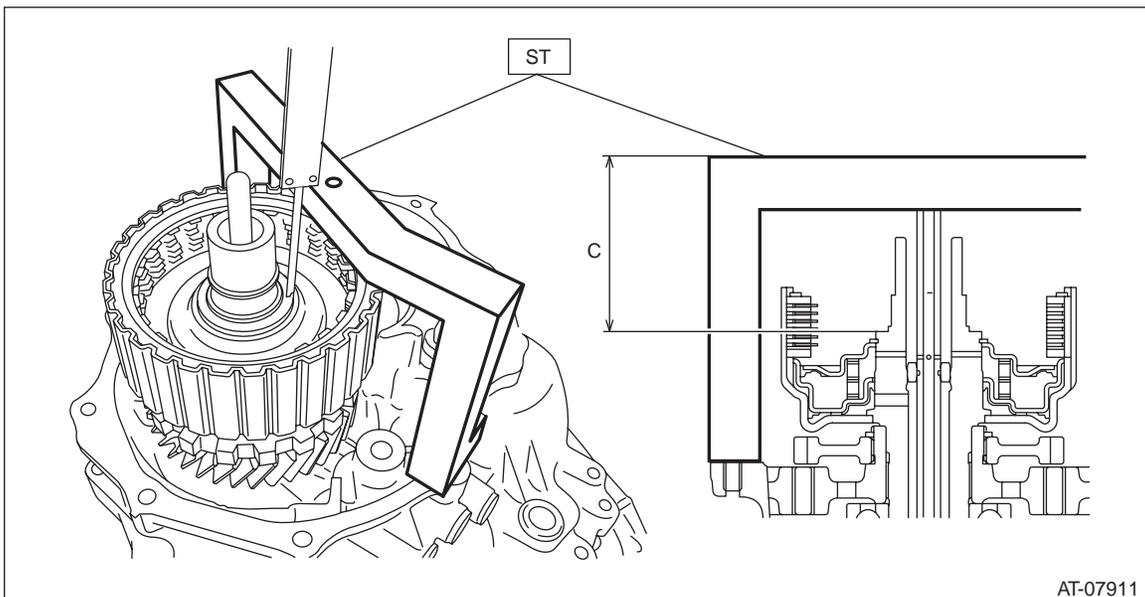


3) Using the ST, measure the height "C" from ST end face to transfer clutch assembly thrust needle bearing catch surface.

NOTE:

Place the measurement tool at the dent on ST upper side to measure.

ST 499737100 PULLER SET



Rear Drive Shaft

CONTINUOUSLY VARIABLE TRANSMISSION

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

$$T \text{ mm} = (A - 15) - (B - C) - (0.05 - 0.25)$$

$$[T \text{ in} = (A - 0.591) - (B - C) - (0.002 - 0.01)]$$

T: Thrust bearing thickness

A: Height from the ST end face to the rear drive shaft thrust needle bearing catch surface

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

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

15 mm (0.591 in): Thickness of ST

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

Thrust bearing	
Part No.	Thickness mm (in)
806536020	3.8 (0.15)
806535030	4.0 (0.157)
806535040	4.2 (0.165)
806535050	4.4 (0.173)
806535060	4.6 (0.181)
806535070	4.8 (0.189)
806535090	5.0 (0.197)

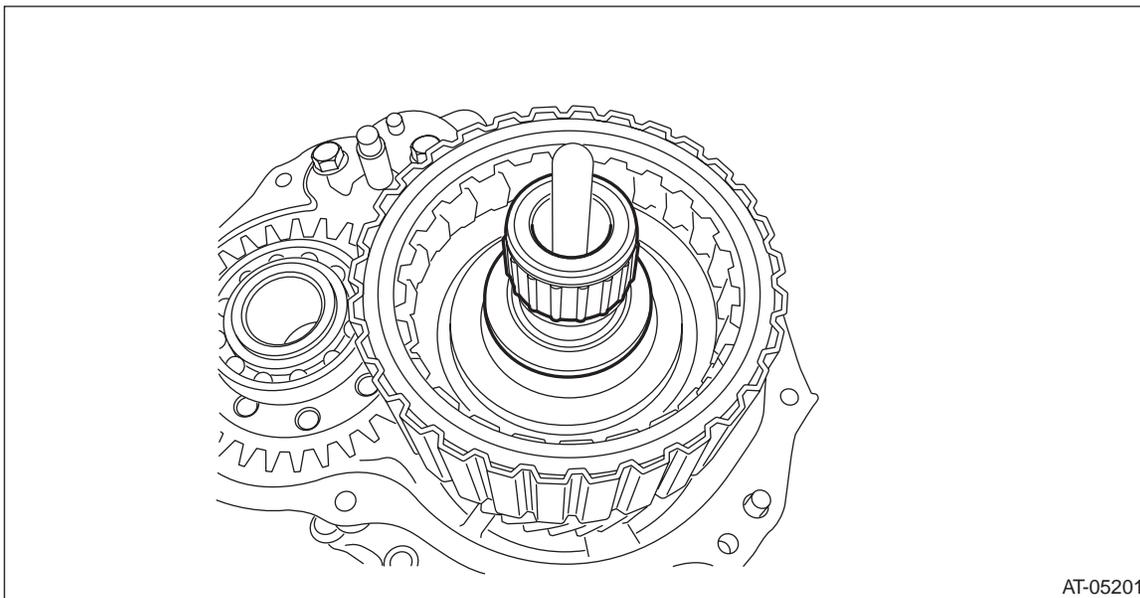
Transfer Clutch

CONTINUOUSLY VARIABLE TRANSMISSION

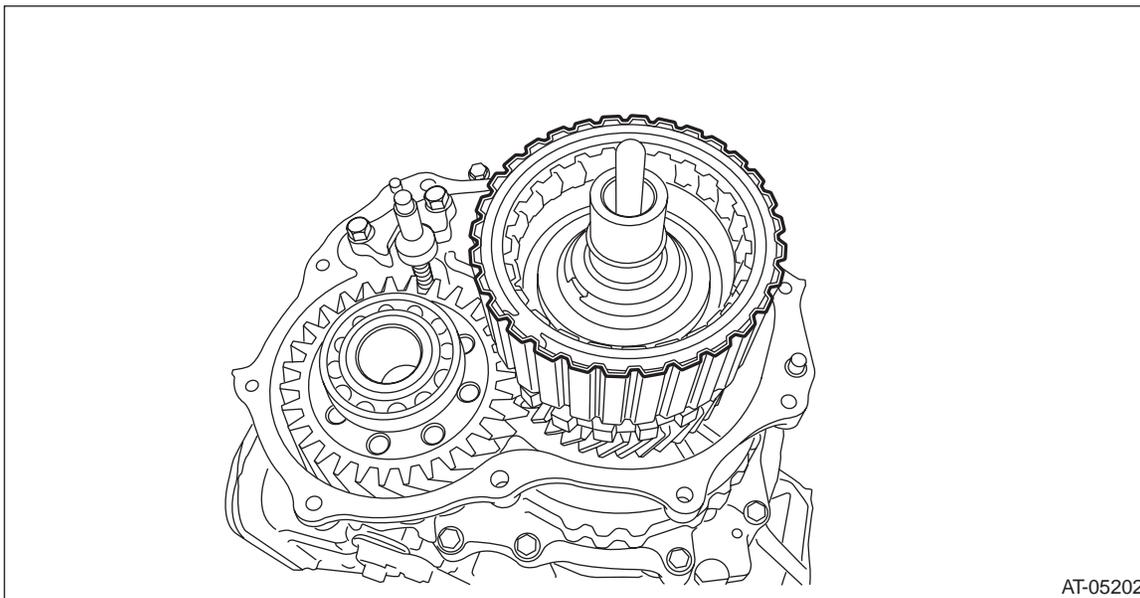
31.Transfer Clutch

A: REMOVAL

- 1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TR690)-56, REMOVAL, Automatic Transmission Assembly.>
- 2) Remove the extension case. <Ref. to CVT(TR690)-140, REMOVAL, Extension Case.>
- 3) Remove the rear drive shaft. <Ref. to CVT(TR690)-143, REMOVAL, Rear Drive Shaft.>
- 4) Remove the thrust needle bearing and needle bearing.



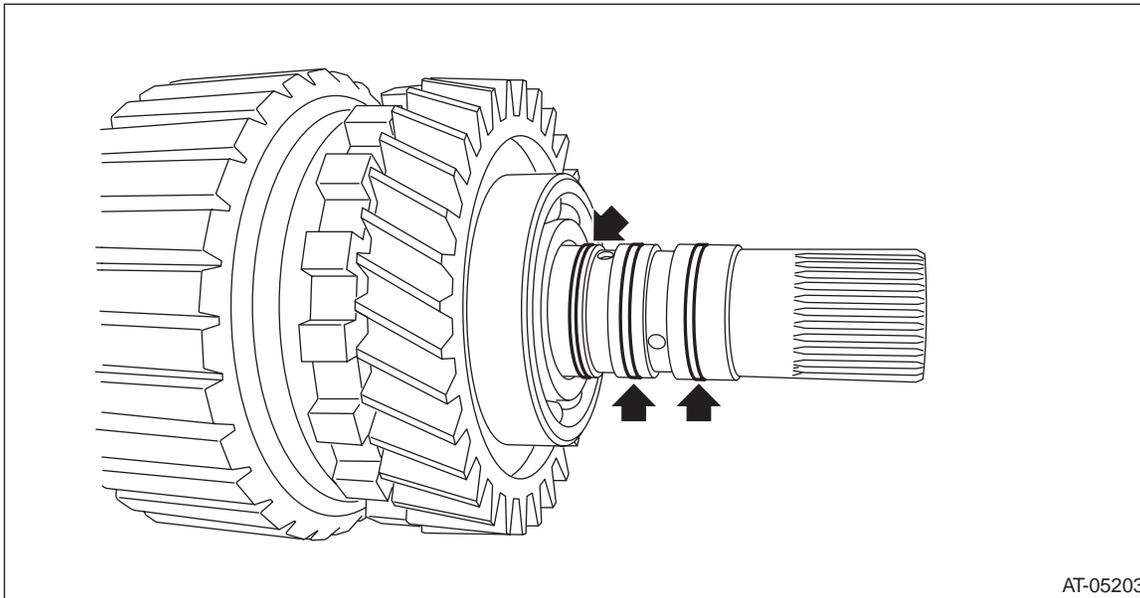
- 5) Remove the transfer clutch assembly.



Transfer Clutch

CONTINUOUSLY VARIABLE TRANSMISSION

6) Remove the seal ring from transfer clutch assembly.

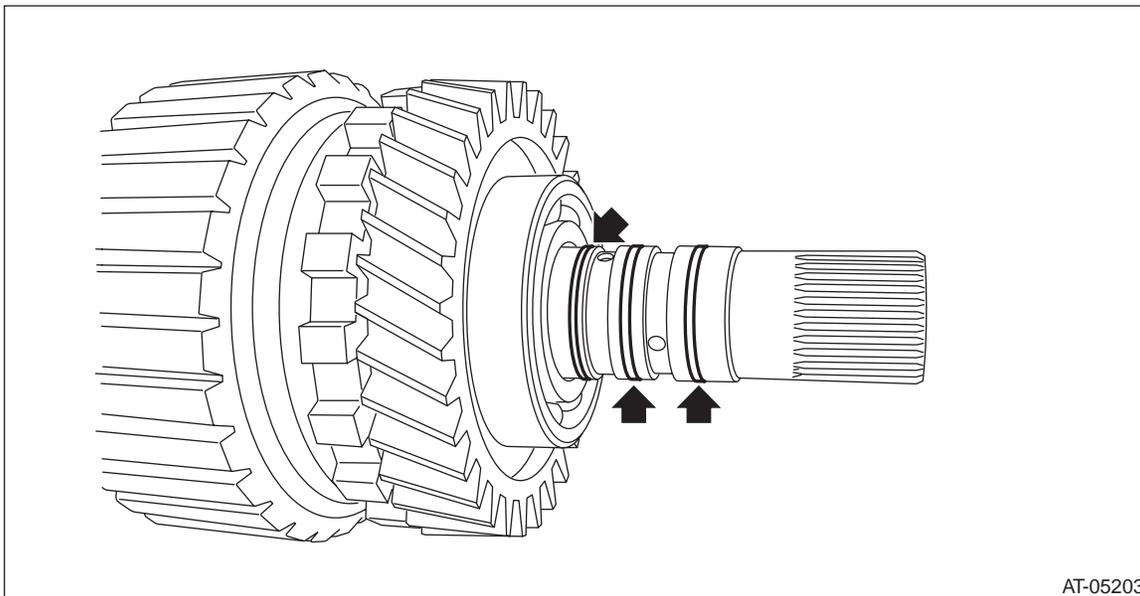


B: INSTALLATION

1) Apply CVTF to the seal ring and attach it to the seal ring groove of transfer clutch assembly.

NOTE:

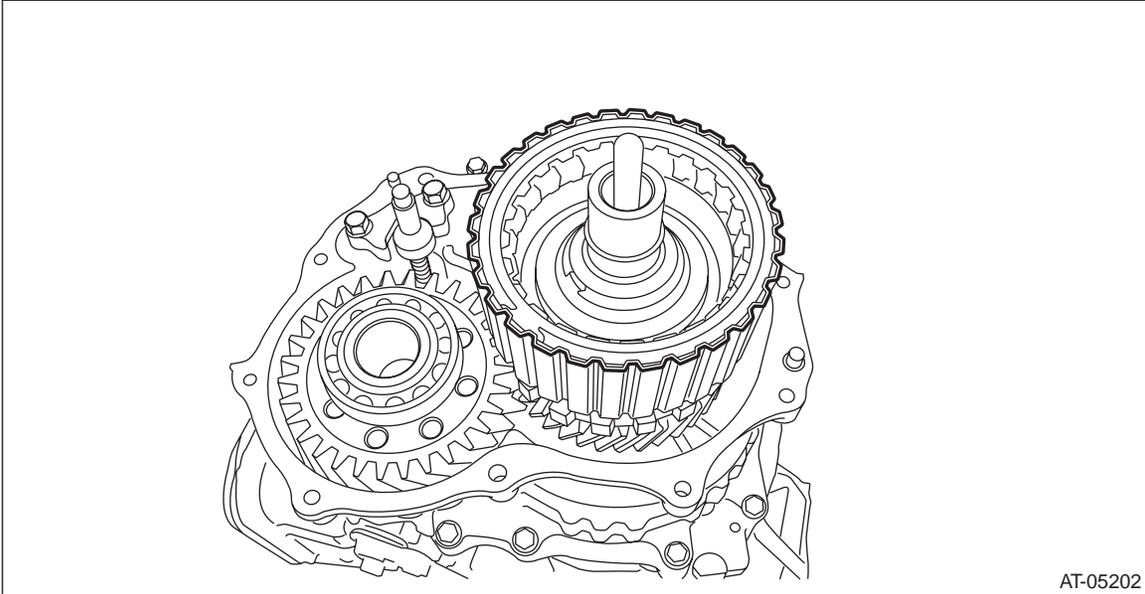
- Use a new seal ring.
- When installing the seal ring, do not expand the seal ring too much.



Transfer Clutch

CONTINUOUSLY VARIABLE TRANSMISSION

2) Install the transfer clutch assembly.

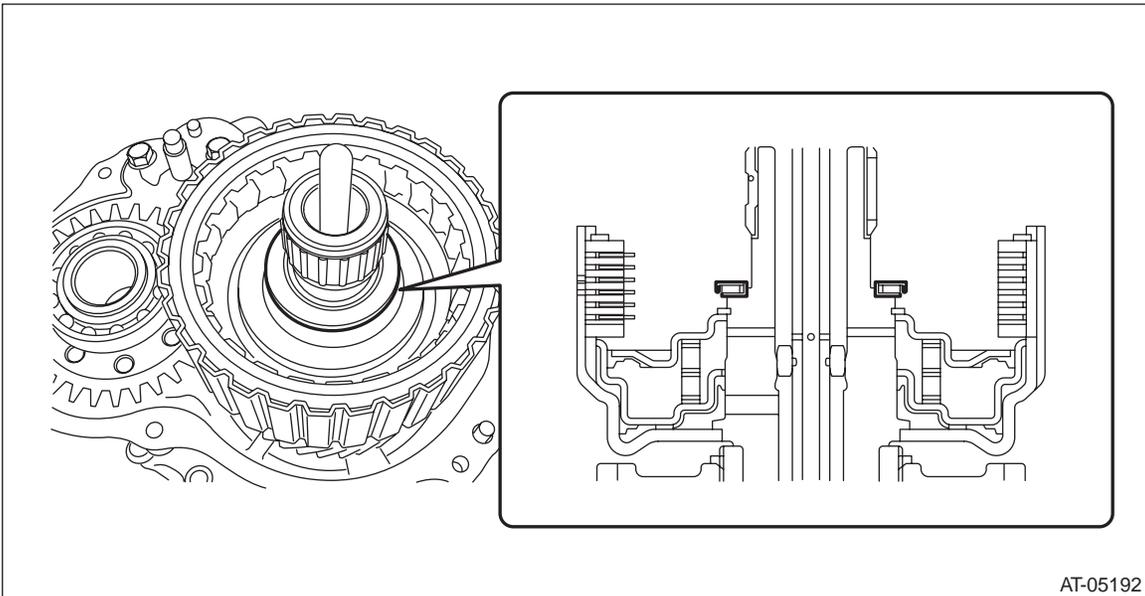


AT-05202

3) Select the thrust needle bearing. <Ref. to CVT(TR690)-145, ADJUSTMENT, Rear Drive Shaft.>
4) Install the selected thrust needle bearing and needle bearing to transfer clutch assembly.

NOTE:

Install the thrust needle bearing in the correct direction.



AT-05192

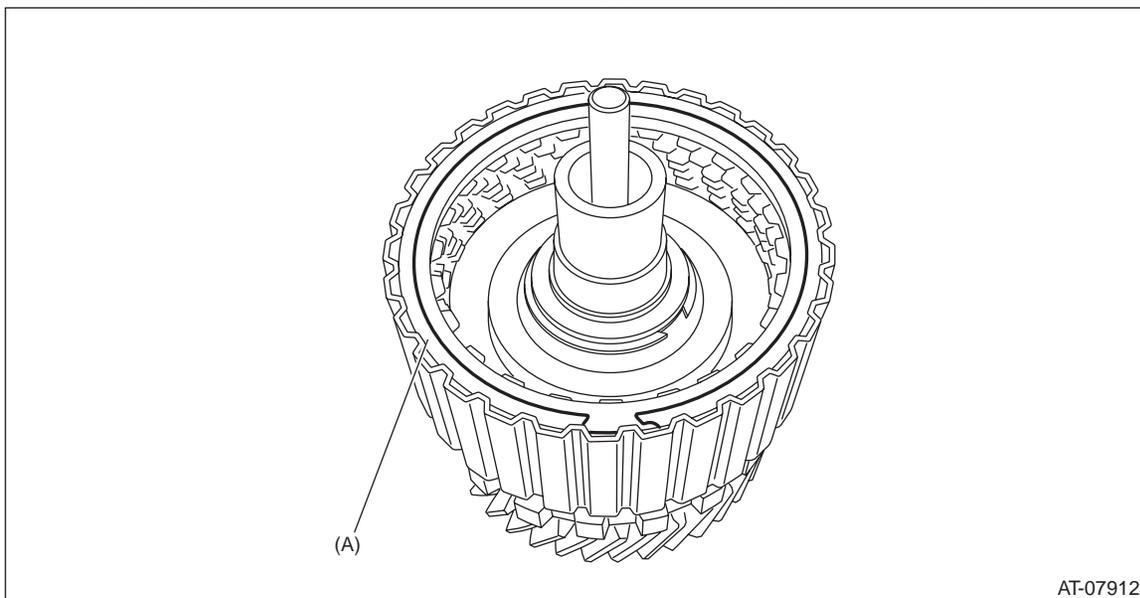
5) Install the rear drive shaft. <Ref. to CVT(TR690)-143, Rear Drive Shaft.>
6) Install the extension case. <Ref. to CVT(TR690)-141, INSTALLATION, Extension Case.>
7) Install the transmission assembly to the vehicle. <Ref. to CVT(TR690)-69, INSTALLATION, Automatic Transmission Assembly.>

Transfer Clutch

CONTINUOUSLY VARIABLE TRANSMISSION

C: DISASSEMBLY

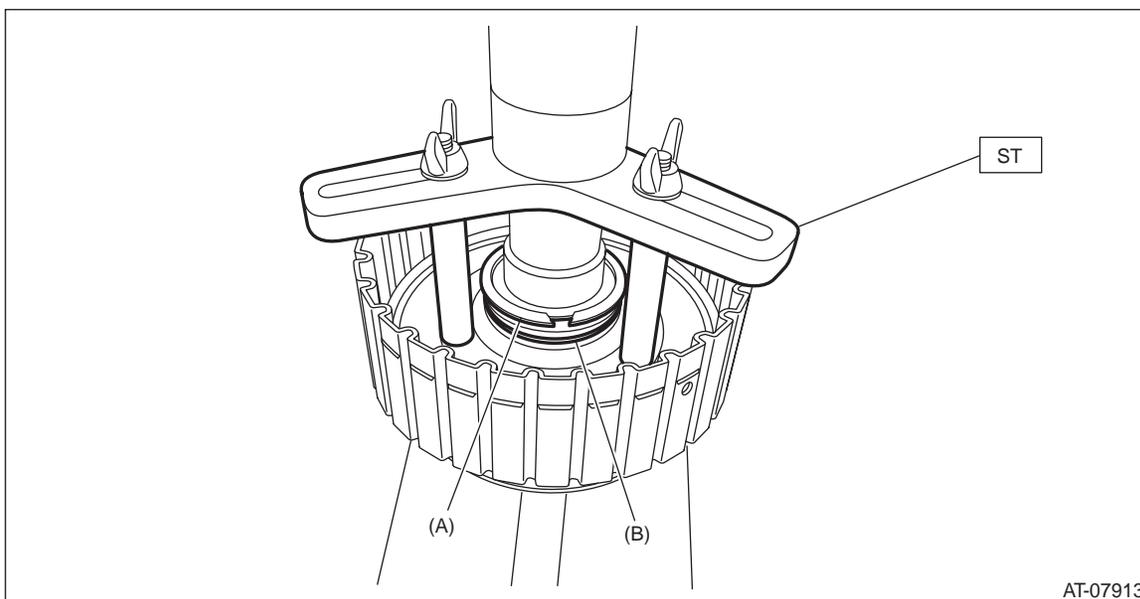
1) Remove the snap ring, and then remove the retaining plate, drive plate and driven plate.



(A) Snap ring

2) Using the ST, remove the snap ring.

ST 18762AA000 or 18762AA001 COMPRESSOR SPECIAL TOOL



(A) Snap ring

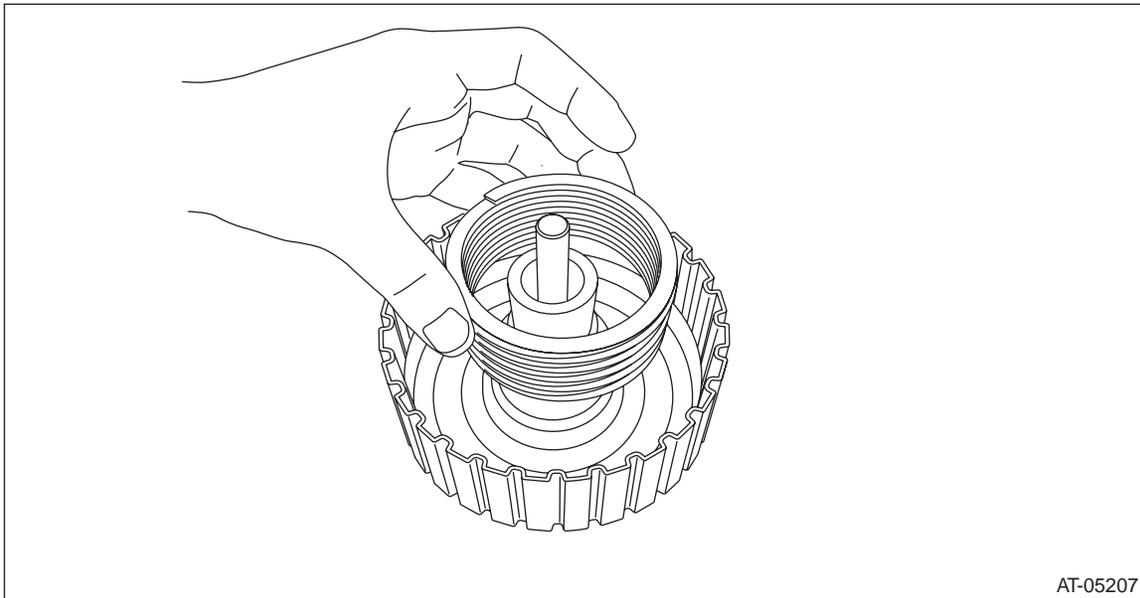
(B) Transfer clutch piston seal

3) Remove the transfer clutch piston seal.

Transfer Clutch

CONTINUOUSLY VARIABLE TRANSMISSION

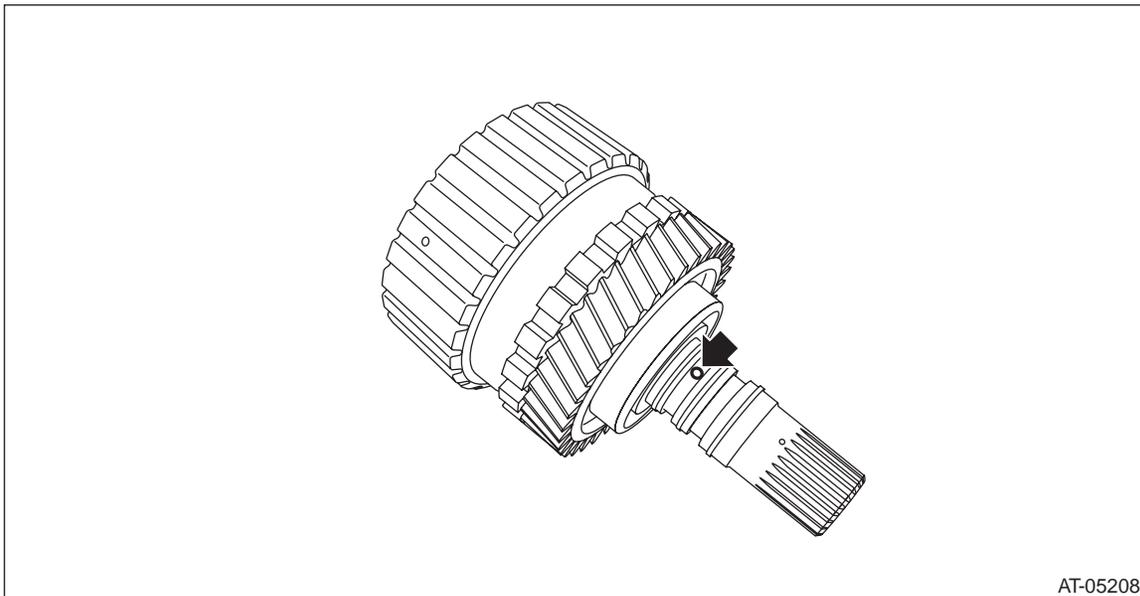
4) Remove the return spring.



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

NOTE:

Block the hole opposite to the one to be blown with compressed air by your finger.



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Transfer Clutch

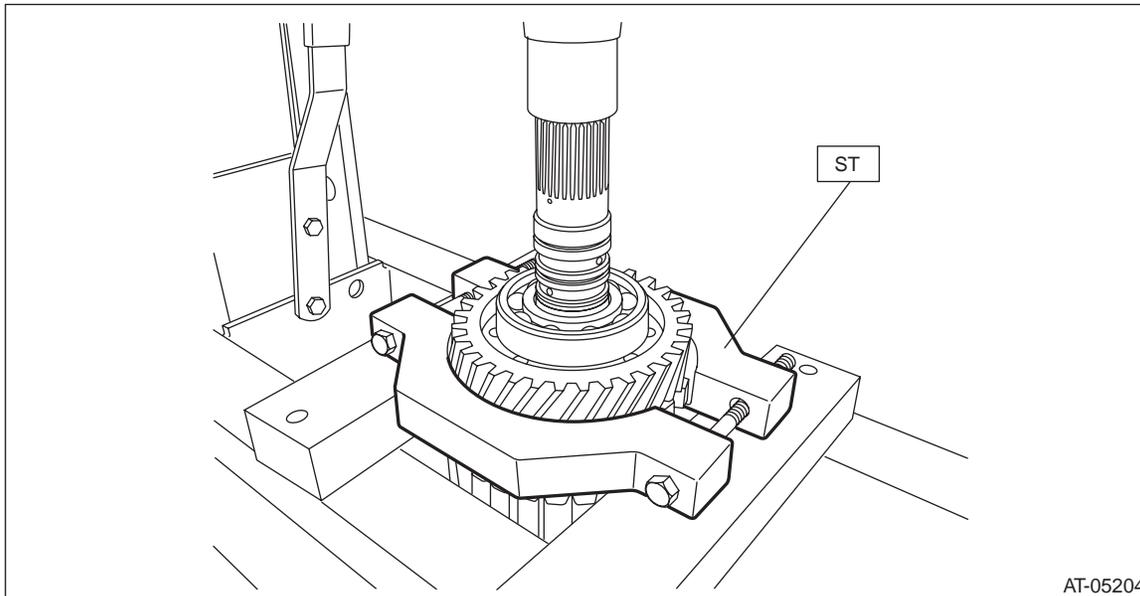
CONTINUOUSLY VARIABLE TRANSMISSION

6) Using ST, remove transfer drive gear, parking gear and ball bearing.

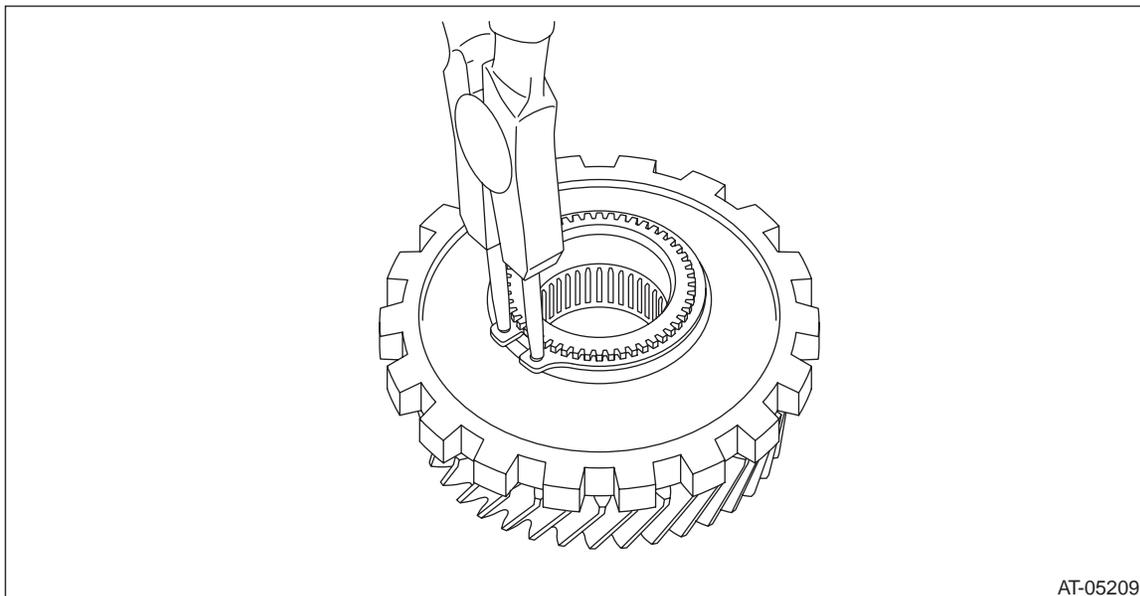
ST 18767AA000 BEARING REMOVER

NOTE:

Let the ST sit on the parking gear.



7) Remove the snap ring from transfer reduction drive gear.



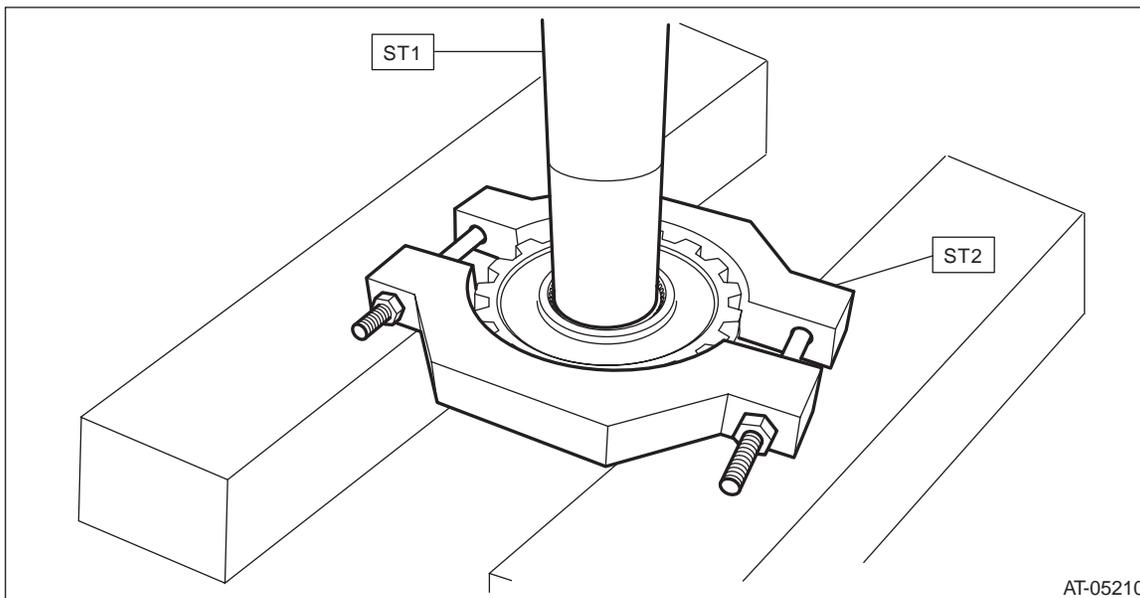
Transfer Clutch

CONTINUOUSLY VARIABLE TRANSMISSION

8) Using the ST, remove the parking gear from transfer reduction drive gear.

ST1 499277100 BUSHING 1-2 INSTALLER

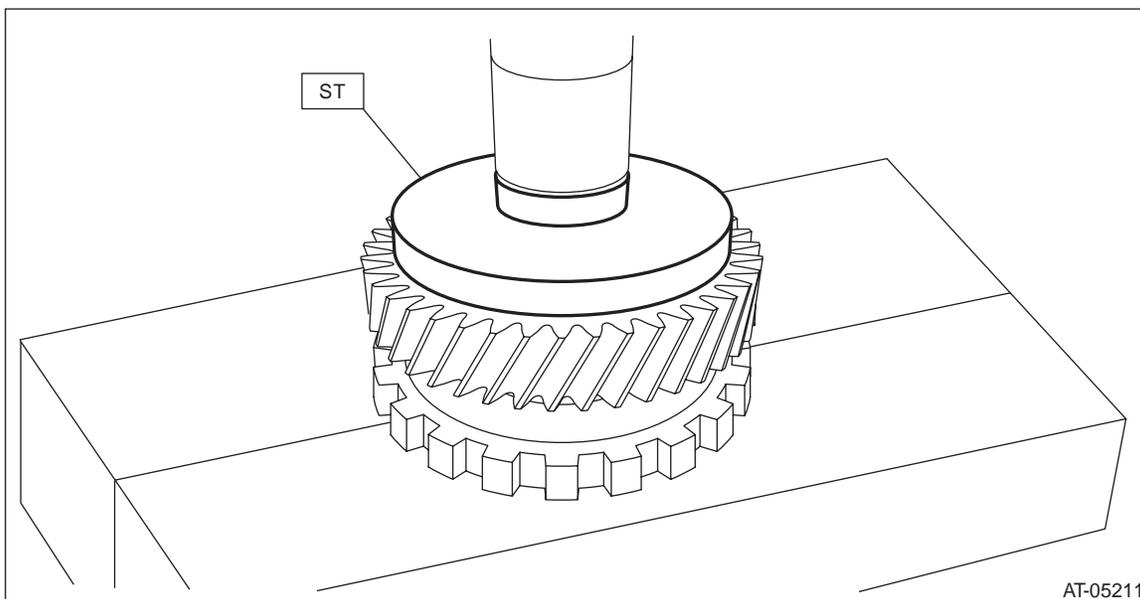
ST2 18767AA000 BEARING REMOVER



D: ASSEMBLY

1) Using the ST, install the parking gear to transfer reduction drive gear.

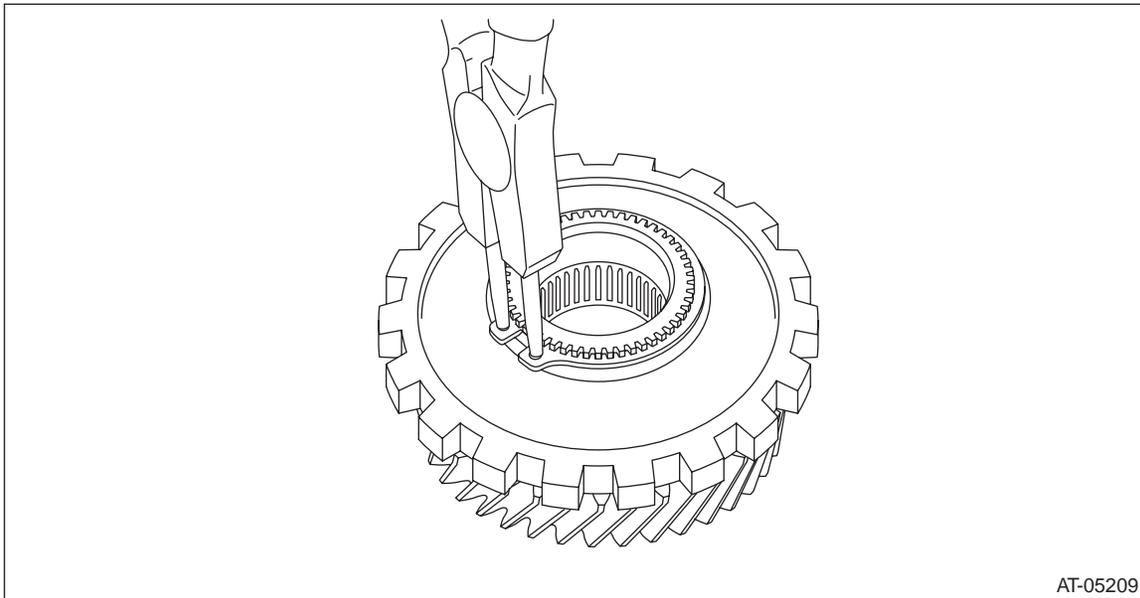
ST 398177700 INSTALLER



Transfer Clutch

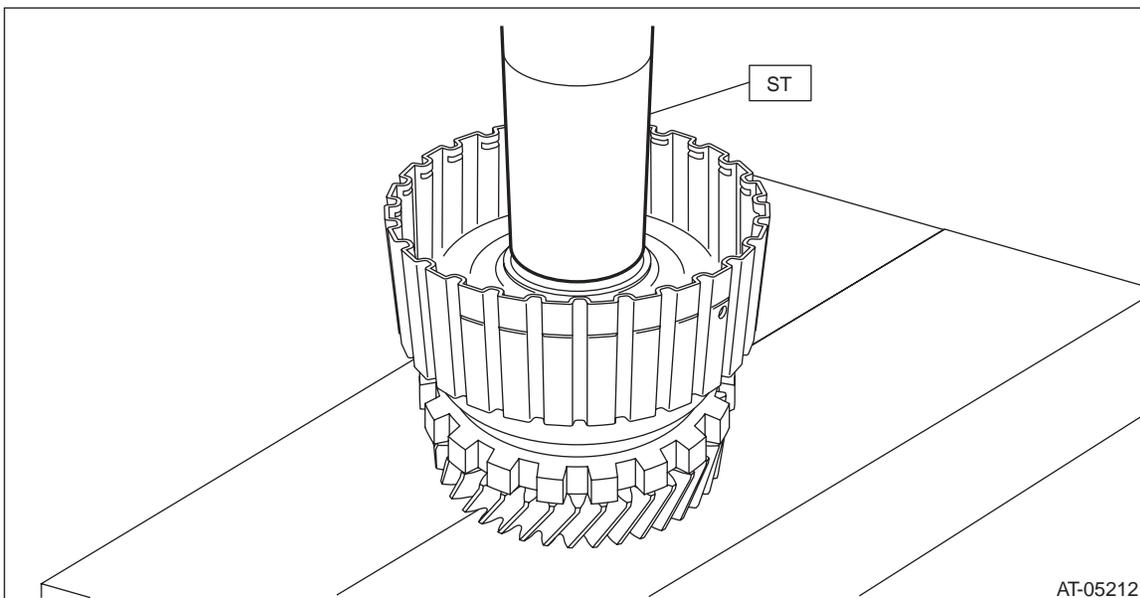
CONTINUOUSLY VARIABLE TRANSMISSION

2) Install the snap ring to transfer reduction drive gear.



AT-05209

3) Using the ST, install the transfer reduction drive gear to transfer reduction drive gear shaft.
ST 499277100 BUSHING 1-2 INSTALLER



AT-05212

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Transfer Clutch

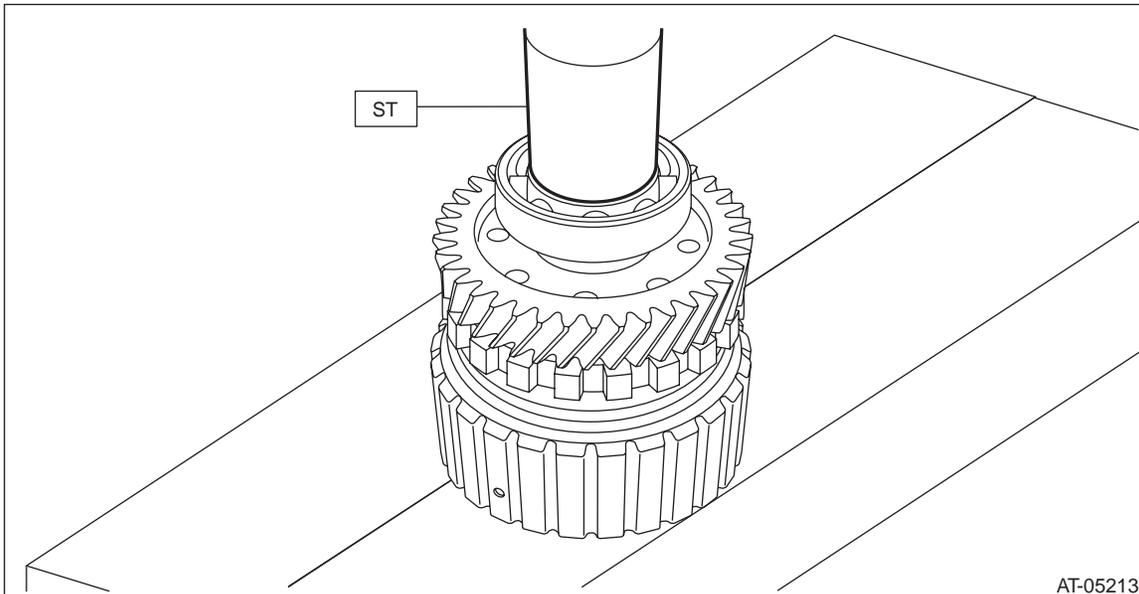
CONTINUOUSLY VARIABLE TRANSMISSION

4) Using the ST, install the ball bearing.

NOTE:

Use a new ball bearing.

ST 499277100 BUSHING 1-2 INSTALLER

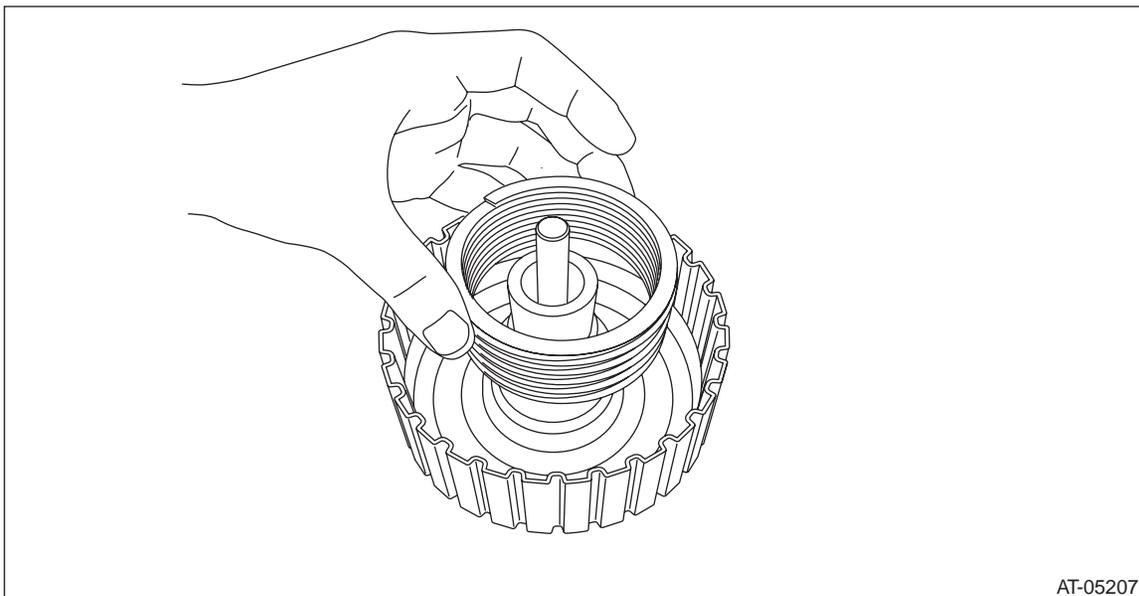


5) Attach the transfer clutch piston to the reduction drive gear shaft.

NOTE:

Apply CVTF to the transfer clutch piston lip.

6) Install the return spring.



7) Install the transfer clutch piston seal.

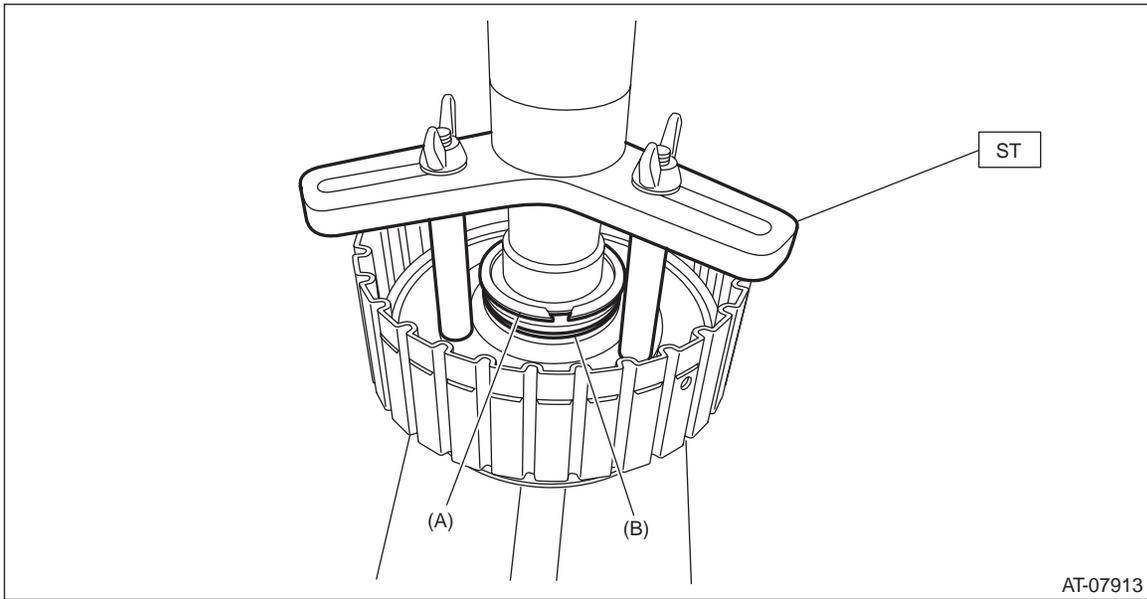
Transfer Clutch

CONTINUOUSLY VARIABLE TRANSMISSION

8) Using the ST, install the snap ring.

ST 18762AA000 or 18762AA001

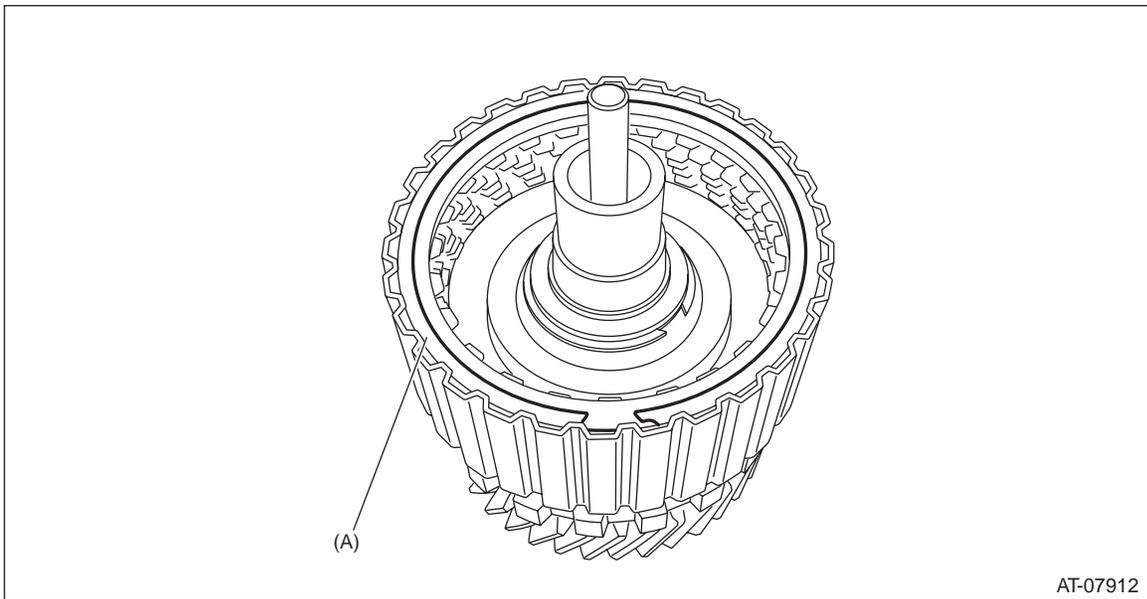
COMPRESSOR SPECIAL TOOL



(A) Snap ring

(B) Transfer clutch piston seal

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



(A) Snap ring

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

Transfer Clutch

CONTINUOUSLY VARIABLE TRANSMISSION

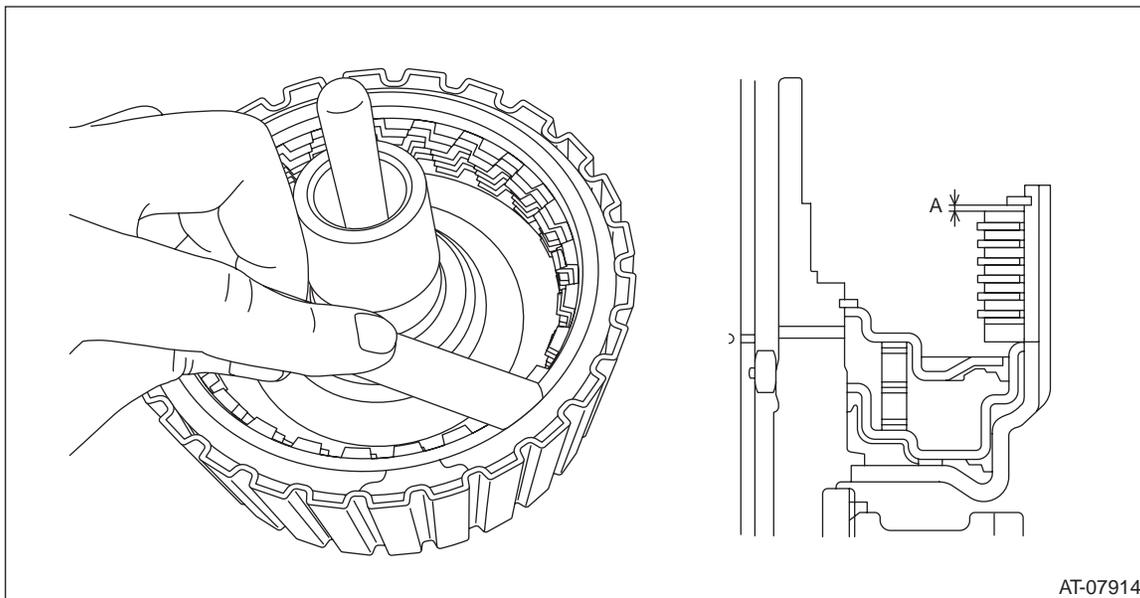
11) When clearance “A” exceeds the limit for use, replace the drive plate and driven plate as a set, and select and adjust the pressure plate within the initial specified value.

Initial standard:

0.7 — 1.1 mm (0.028 — 0.043 in)

Limit thickness:

1.6 mm (0.063 in)



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

12) Check the clearance between the snap ring and retaining plate.<Ref. to CVT(TR690)-159, INSPECTION, Transfer Clutch.>

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Transfer Clutch

CONTINUOUSLY VARIABLE TRANSMISSION

E: INSPECTION

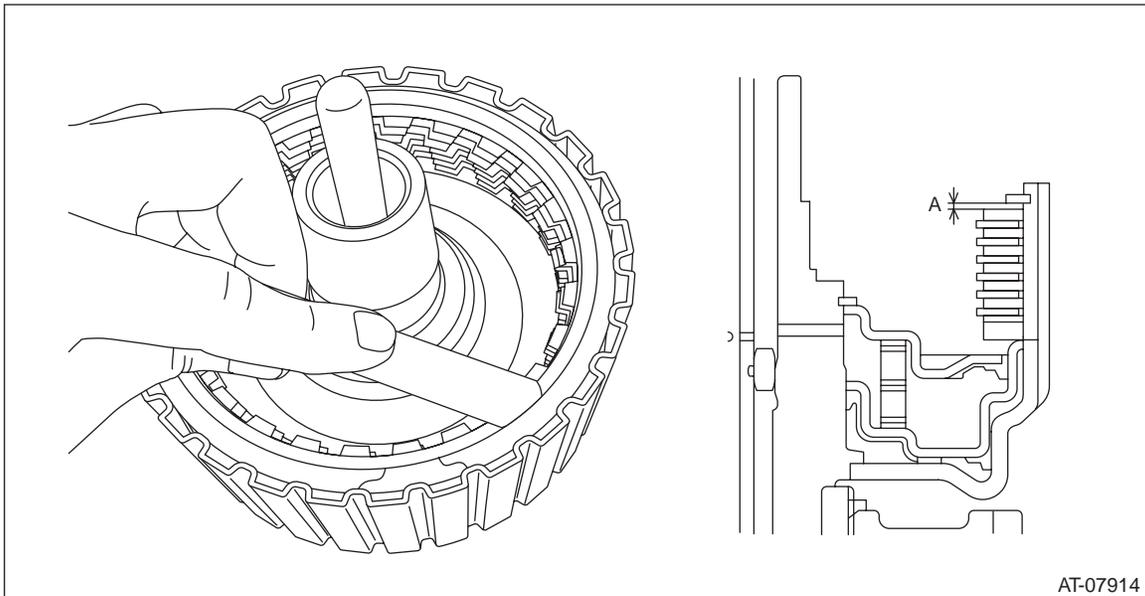
- Inspect the drive plate facing for wear and damage.
 - Driven plate for discoloration (burned color)
 - Make sure the snap ring is not worn and the return spring has no permanent distortion, damage, or deformation.
 - Check the lip seal for damage.
 - Inspect the extension end play, and adjust it to within the standard value. <Ref. to CVT(TR690)-159, ADJUSTMENT, Transfer Clutch.>
- 1) Before measuring clearance “A” between snap ring and retaining plate, place same thickness shims on both sides to prevent the retaining 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:

1.6 mm (0.063 in)



AT-07914

- 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:

Turn OFF the X MODE switch and perform 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.

F: ADJUSTMENT

NOTE:

Refer to the Rear Drive Shaft. <Ref. to CVT(TR690)-145, ADJUSTMENT, Rear Drive Shaft.>

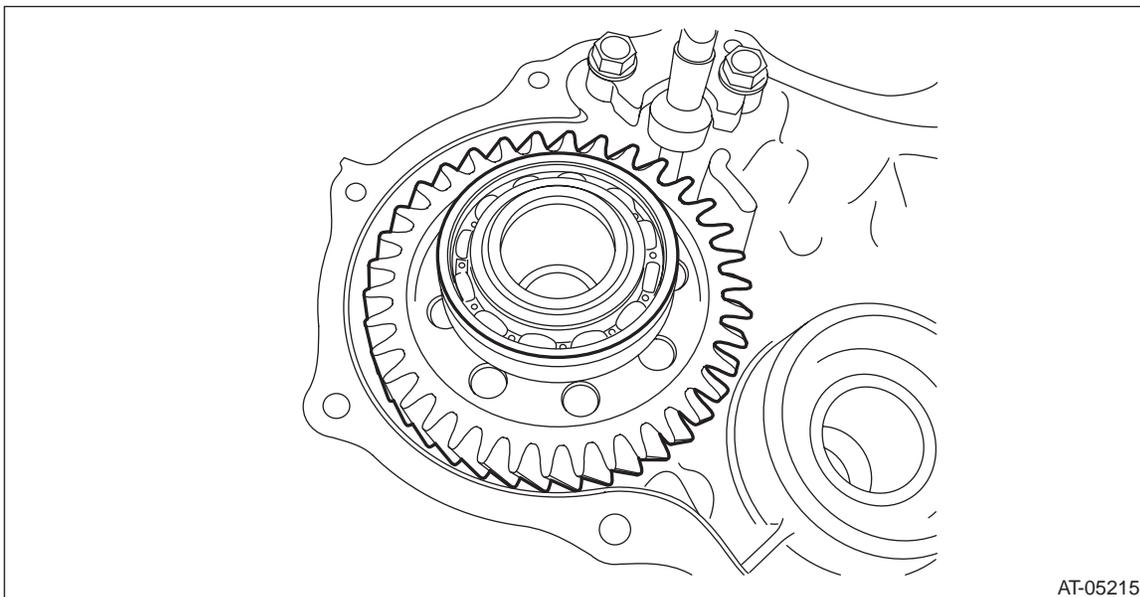
Transfer Reduction Driven Gear

CONTINUOUSLY VARIABLE TRANSMISSION

32. Transfer Reduction Driven Gear

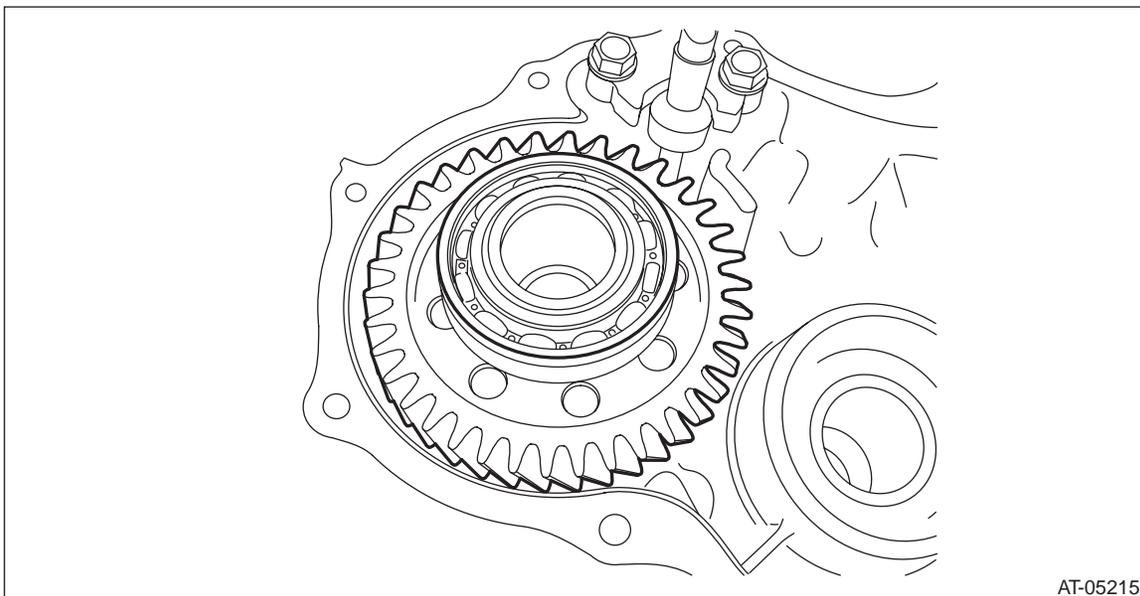
A: REMOVAL

- 1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TR690)-56, REMOVAL, Automatic Transmission Assembly.>
- 2) Remove the extension case. <Ref. to CVT(TR690)-140, REMOVAL, Extension Case.>
- 3) Remove the rear drive shaft. <Ref. to CVT(TR690)-143, REMOVAL, Rear Drive Shaft.>
- 4) Remove the transfer clutch assembly. <Ref. to CVT(TR690)-148, REMOVAL, Transfer Clutch.>
- 5) Remove the transfer reduction driven gear assembly.



B: INSTALLATION

- 1) Install the reduction driven gear assembly.



- 2) Select shims. <Ref. to CVT(TR690)-163, ADJUSTMENT, Transfer Reduction Driven Gear.>
- 3) Install the transfer clutch assembly. <Ref. to CVT(TR690)-149, INSTALLATION, Transfer Clutch.>
- 4) Install the rear drive shaft. <Ref. to CVT(TR690)-143, INSTALLATION, Rear Drive Shaft.>
- 5) Mount the selected shim onto ball bearing.
- 6) Install the extension case. <Ref. to CVT(TR690)-141, INSTALLATION, Extension Case.>

CVT(TR690)-160

Transfer Reduction Driven Gear

CONTINUOUSLY VARIABLE TRANSMISSION

7) Install the transmission assembly to the vehicle. <Ref. to CVT(TR690)-69, INSTALLATION, Automatic Transmission Assembly.>

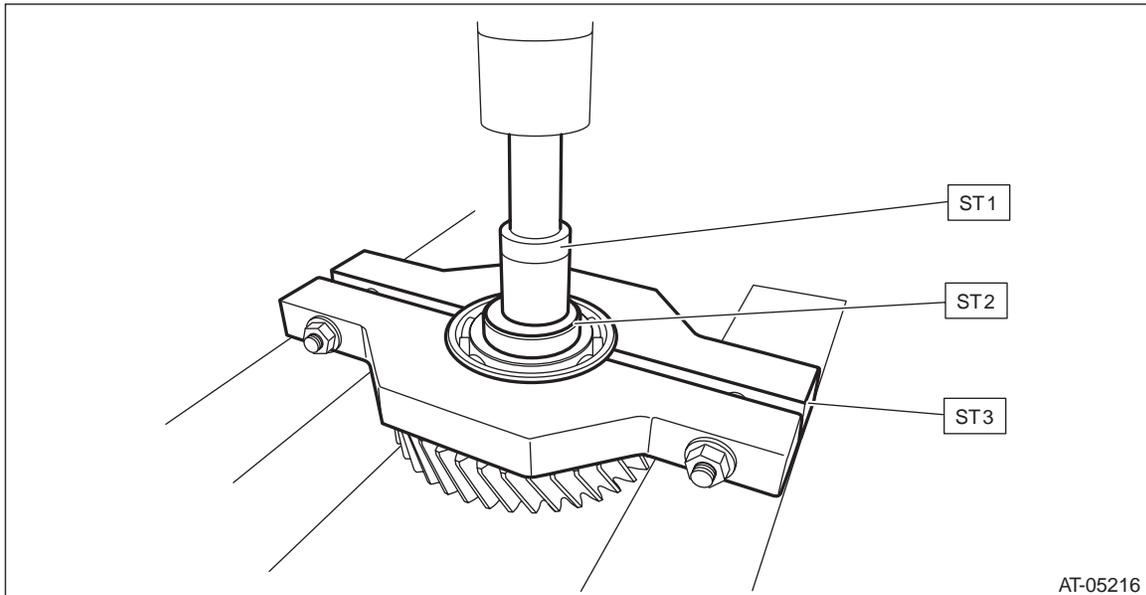
C: DISASSEMBLY

1) Using the ST, remove the ball bearing (large) from transfer reduction driven gear.

ST1 899864100 REMOVER

ST2 398497701 SEAT

ST3 498077600 REMOVER

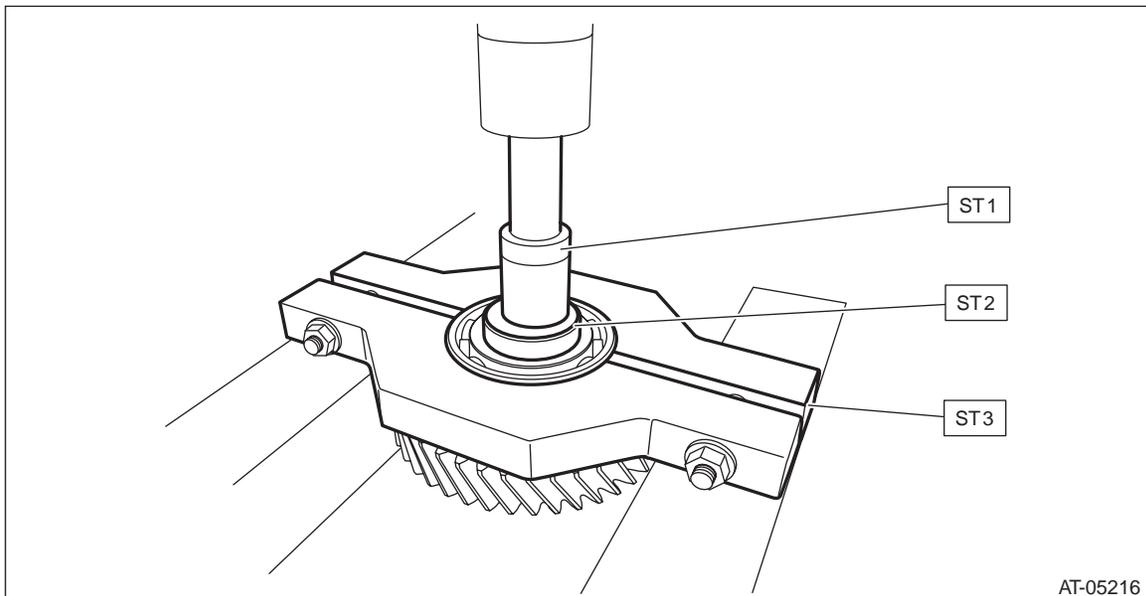


2) Using the ST, remove the ball bearing (small) from transfer reduction driven gear.

ST1 899864100 REMOVER

ST2 398497701 SEAT

ST3 18720AA000 REMOVER



Transfer Reduction Driven Gear

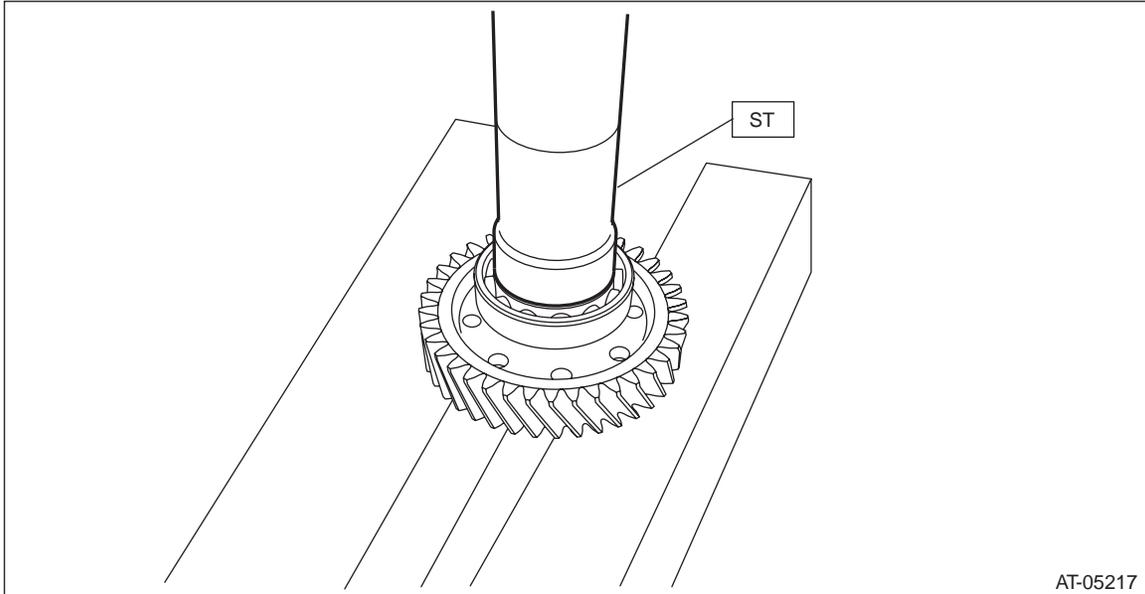
CONTINUOUSLY VARIABLE TRANSMISSION

D: ASSEMBLY

1) Install the new ball bearing (large) to reduction driven gear using the ST.
ST 499277100 BUSHING 1-2 INSTALLER

NOTE:

- Use a new ball bearing.
- Install to the splines inside transfer reduction driven gear shaft.



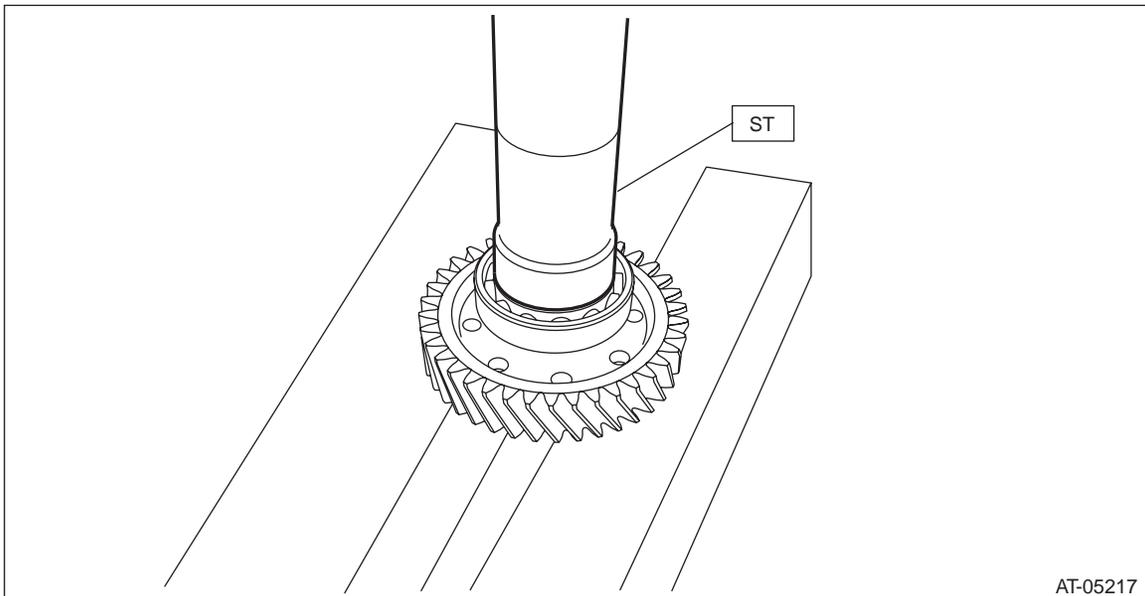
AT-05217

2) Install the new ball bearing (small) to reduction driven gear.

NOTE:

Use a new ball bearing.

ST 499277100 BUSHING 1-2 INSTALLER



AT-05217

E: INSPECTION

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

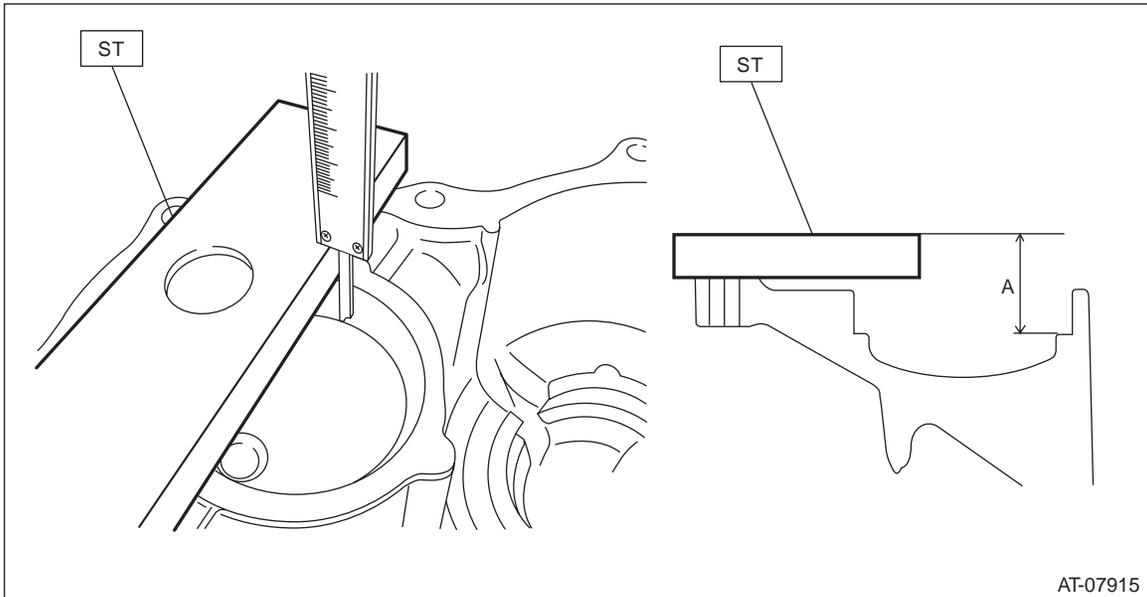
Transfer Reduction Driven Gear

CONTINUOUSLY VARIABLE TRANSMISSION

F: ADJUSTMENT

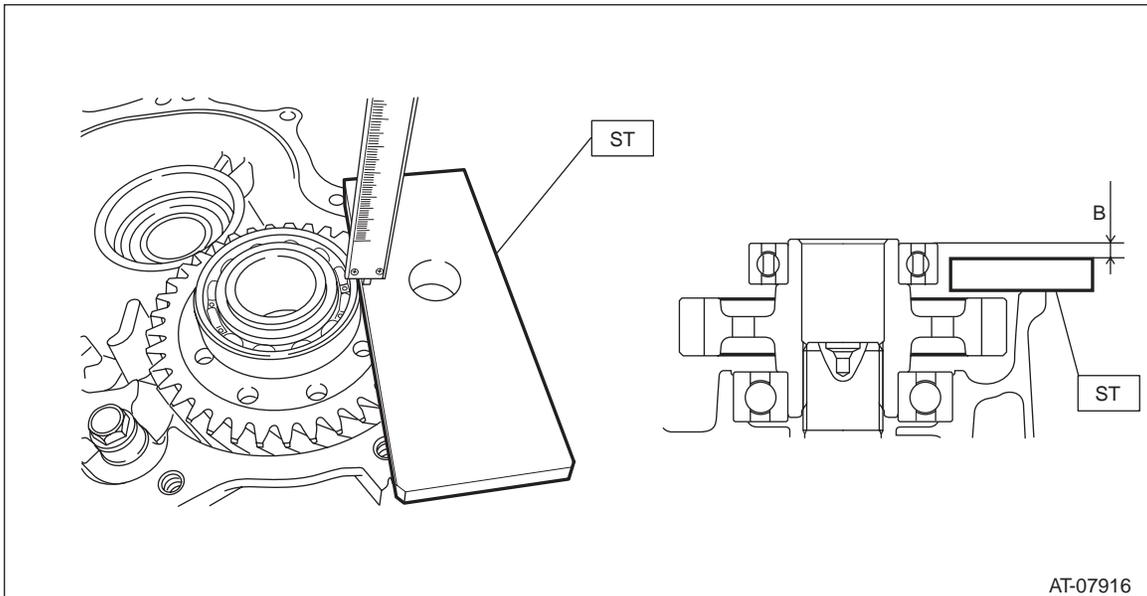
1) Measure depth "A" from the ST upper face to the ball bearing catch surface.

ST 398643600 GAUGE



2) Measure height "B" from the ST to the end of the ball bearing outer ring.

ST 398643600 GAUGE



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Transfer Reduction Driven Gear

CONTINUOUSLY VARIABLE TRANSMISSION

3) Obtain the thickness of shim using the following formula to select none to two shims.

$$T \text{ mm} = (A - 15) - (B + 15) - (0.05 - 0.25)$$

$$[T \text{ in} = (A - 0.591) - (B + 0.591) - (0.002 - 0.01)]$$

T: Shim thickness

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

B: Height from the ST to the end of the ball bearing outer ring

15 mm (0.591 in): Thickness of ST

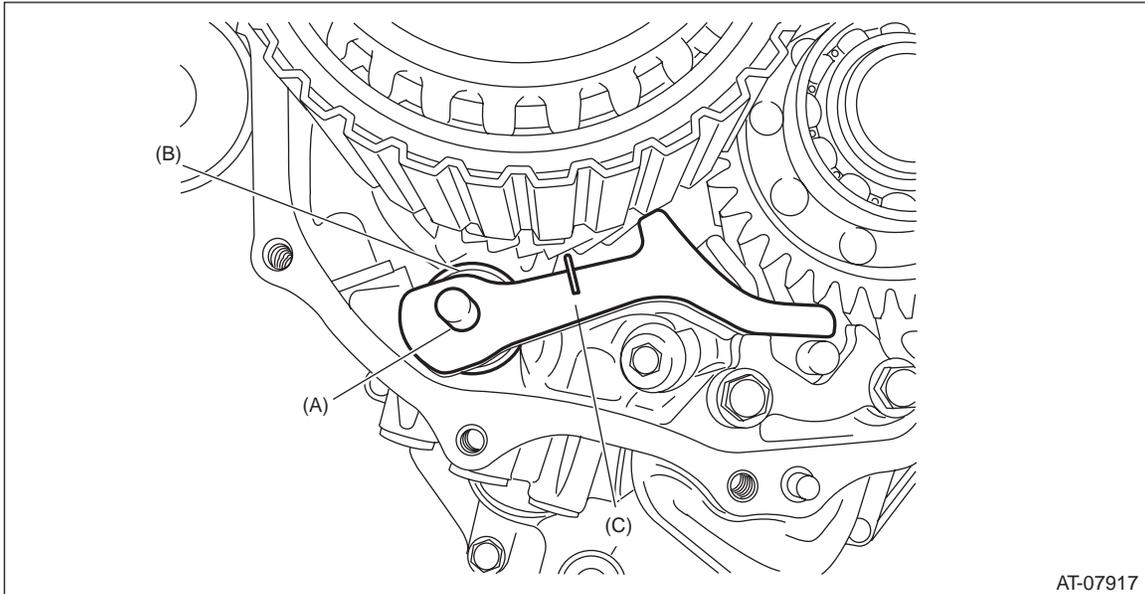
0.05 — 0.25 mm (0.002 — 0.01 in): Clearance

Shim	
Part No.	Thickness mm (in)
31288AA190	0.2 (0.008)
31288AA200	0.3 (0.012)
31288AA210	0.5 (0.02)

33. Parking Pawl

A: REMOVAL

- 1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TR690)-56, REMOVAL, Automatic Transmission Assembly.>
- 2) Shift the range select lever to "N" range.
- 3) Remove the extension case. <Ref. to CVT(TR690)-140, 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

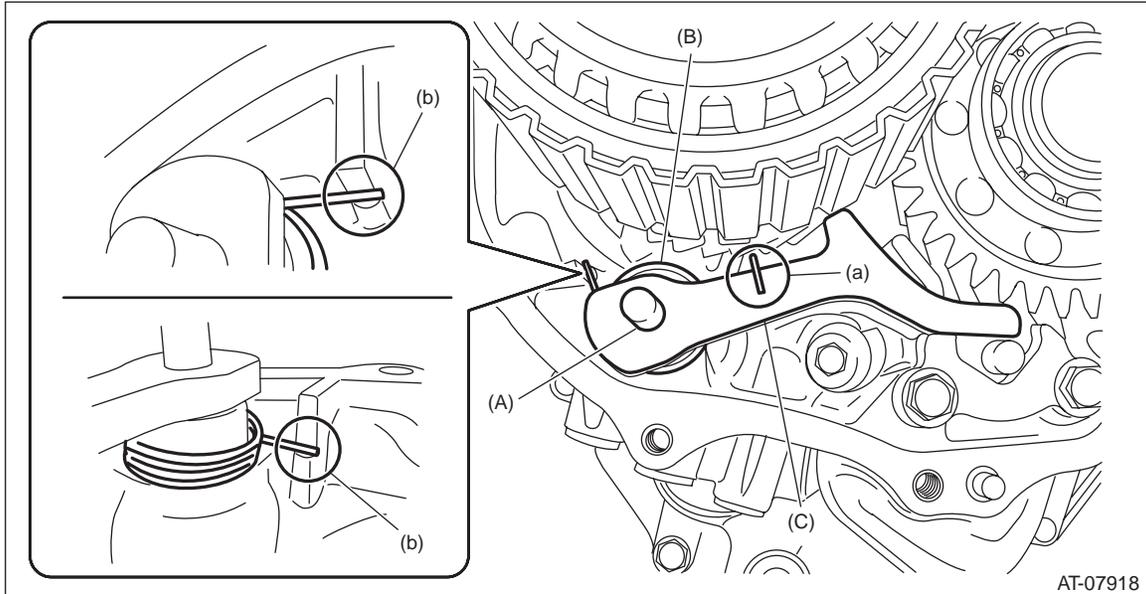
CONTINUOUSLY VARIABLE TRANSMISSION

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 intermediate case as shown in (b).



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

- 3) Install the extension case. <Ref. to CVT(TR690)-141, INSTALLATION, Extension Case.>
- 4) Install the transmission assembly to the vehicle. <Ref. to CVT(TR690)-69, INSTALLATION, Automatic Transmission Assembly.>

C: INSPECTION

- Check the parking pawl for breakage or damage.
- Check the return spring for fatigue.

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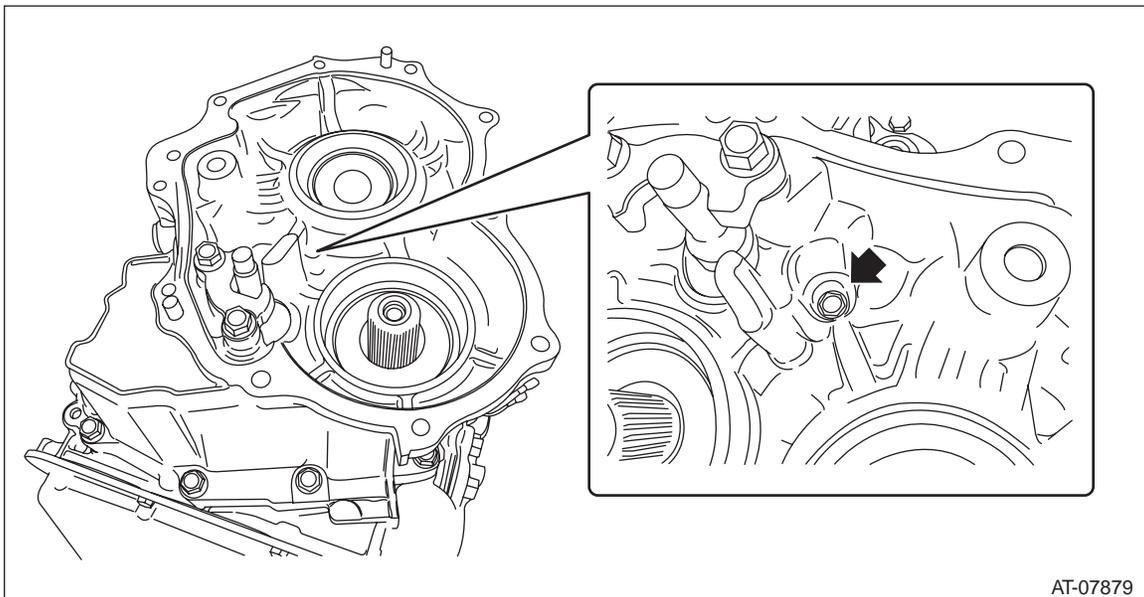
34. Intermediate Case

A: REMOVAL

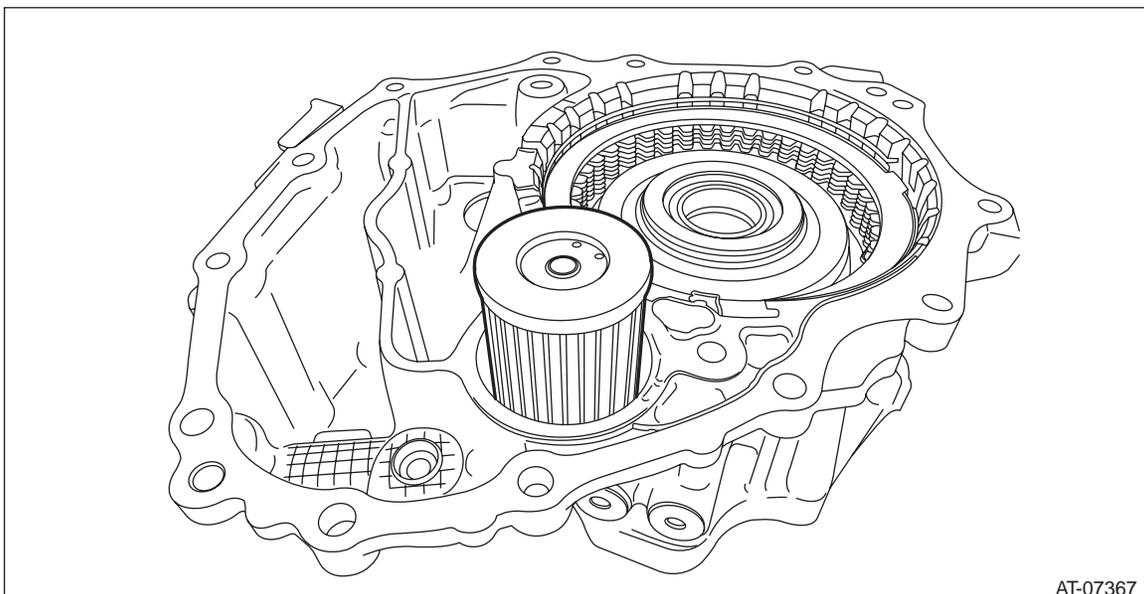
- 1) Remove the transmission assembly from vehicle body. <Ref. to CVT(TR690)-56, REMOVAL, Automatic Transmission Assembly.>
- 2) Remove the extension case. <Ref. to CVT(TR690)-140, REMOVAL, Extension Case.>
- 3) Remove the parking pawl. <Ref. to CVT(TR690)-165, REMOVAL, Parking Pawl.>
- 4) Remove the rear drive shaft. <Ref. to CVT(TR690)-143, REMOVAL, Rear Drive Shaft.>
- 5) Remove the transfer clutch assembly. <Ref. to CVT(TR690)-148, REMOVAL, Transfer Clutch.>
- 6) Remove the transfer reduction driven gear assembly. <Ref. to CVT(TR690)-160, REMOVAL, Transfer Reduction Driven Gear.>
- 7) Remove the intermediate case.

NOTE:

- The total number of intermediate case mounting bolts is 14.
- Inside the transmission is a single bolt (arrowed).



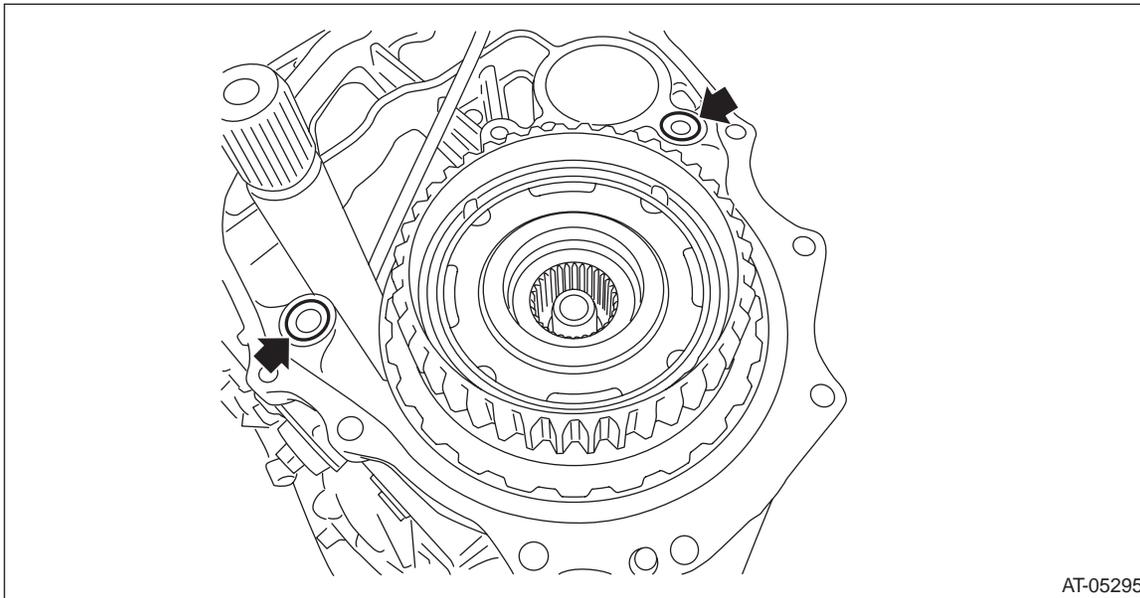
- 8) Remove the CVTF filter.



Intermediate Case

CONTINUOUSLY VARIABLE TRANSMISSION

9) Remove the O-ring from the transmission case.

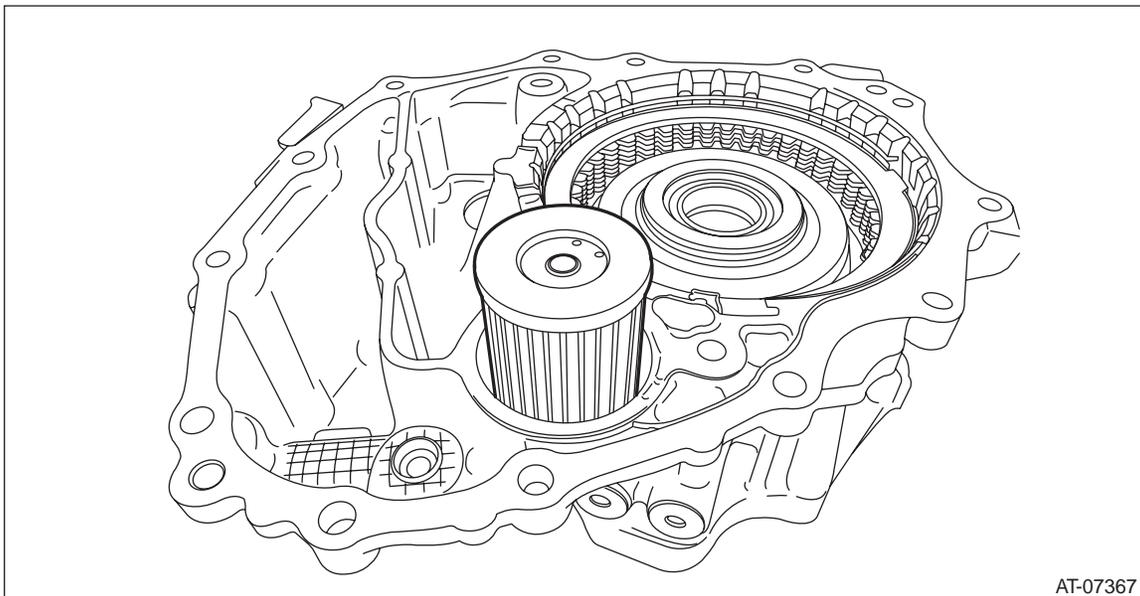


B: INSTALLATION

- 1) Clean the mating surface of intermediate case and transmission case.
- 2) Face the O-ring side of the CVTF filter to the intermediate case side, and install the CVTF filter.

NOTE:

Apply CVTF to the O-rings.



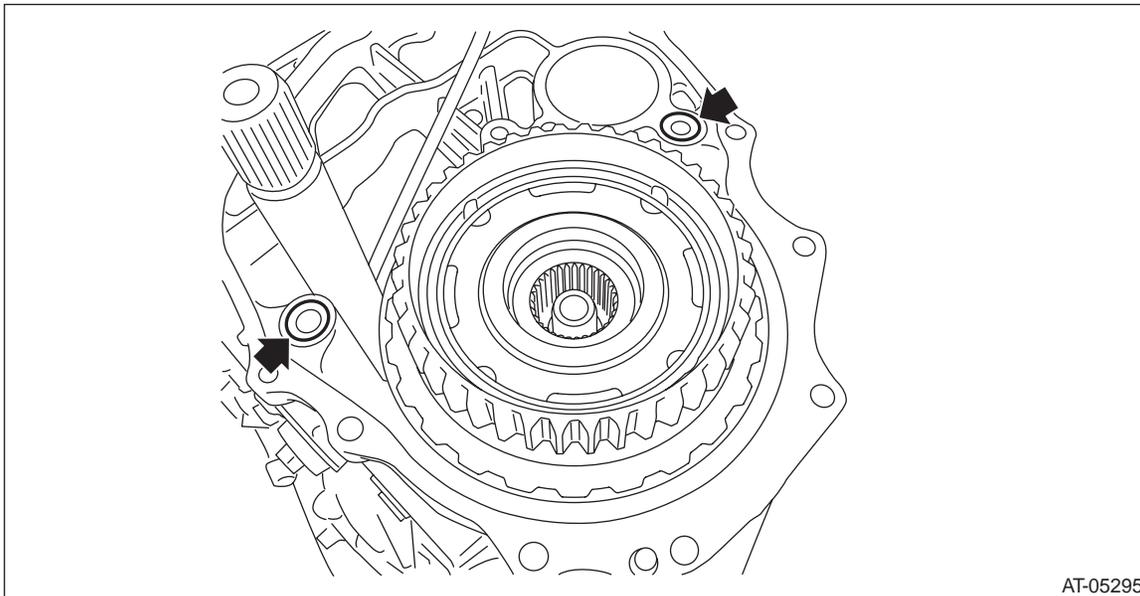
Intermediate Case

CONTINUOUSLY VARIABLE TRANSMISSION

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

NOTE:

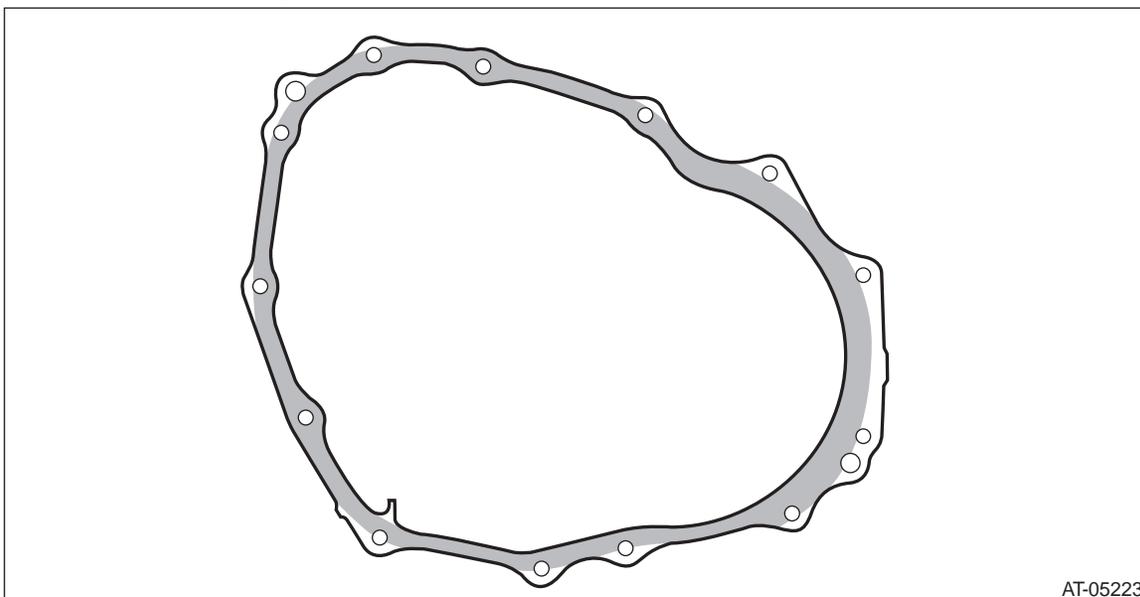
- Use new O-rings.
- Apply CVTF to the O-rings.



4) Apply liquid gasket to intermediate case seamlessly.

Liquid gasket:

THREE BOND 1215B or equivalent



Intermediate Case

CONTINUOUSLY VARIABLE TRANSMISSION

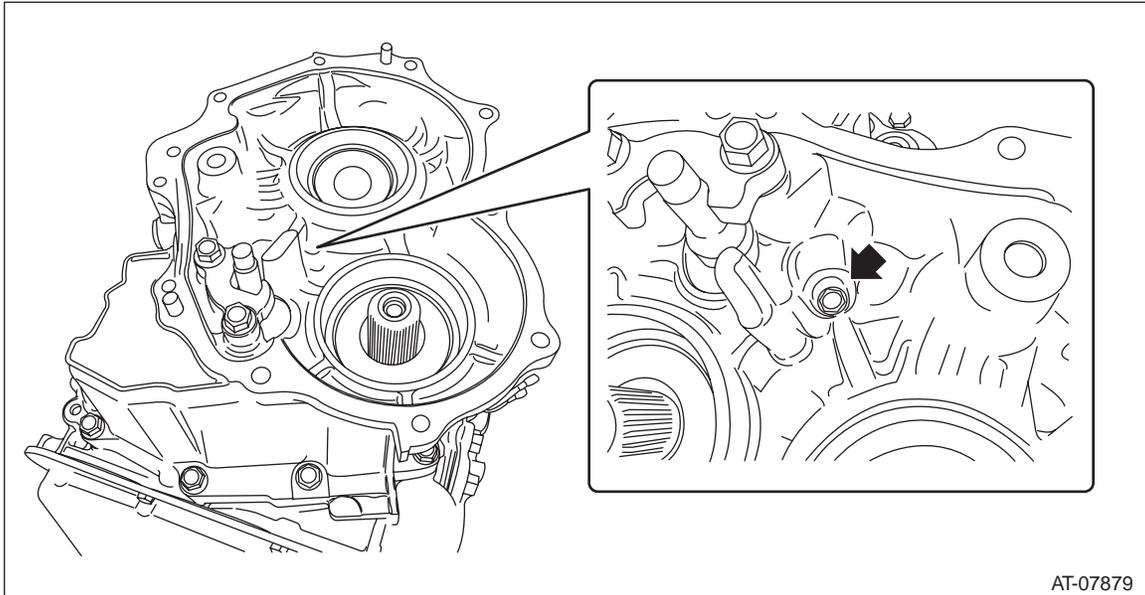
5) Install the intermediate case and the transmission hanger to the transmission case.

NOTE:

Make sure to install the arrowed bolt.

Tightening torque:

25 N·m (2.5 kgf·m, 18.4 ft·lb)



6) Install the transfer reduction driven gear assembly.<Ref. to CVT(TR690)-160, INSTALLATION, Transfer Reduction Driven Gear.>

7) Install the transfer clutch assembly.<Ref. to CVT(TR690)-149, INSTALLATION, Transfer Clutch.>

8) Install the rear drive shaft.<Ref. to CVT(TR690)-143, INSTALLATION, Rear Drive Shaft.>

9) Install the parking pawl.<Ref. to CVT(TR690)-166, INSTALLATION, Parking Pawl.>

10) Install the extension case.<Ref. to CVT(TR690)-141, INSTALLATION, Extension Case.>

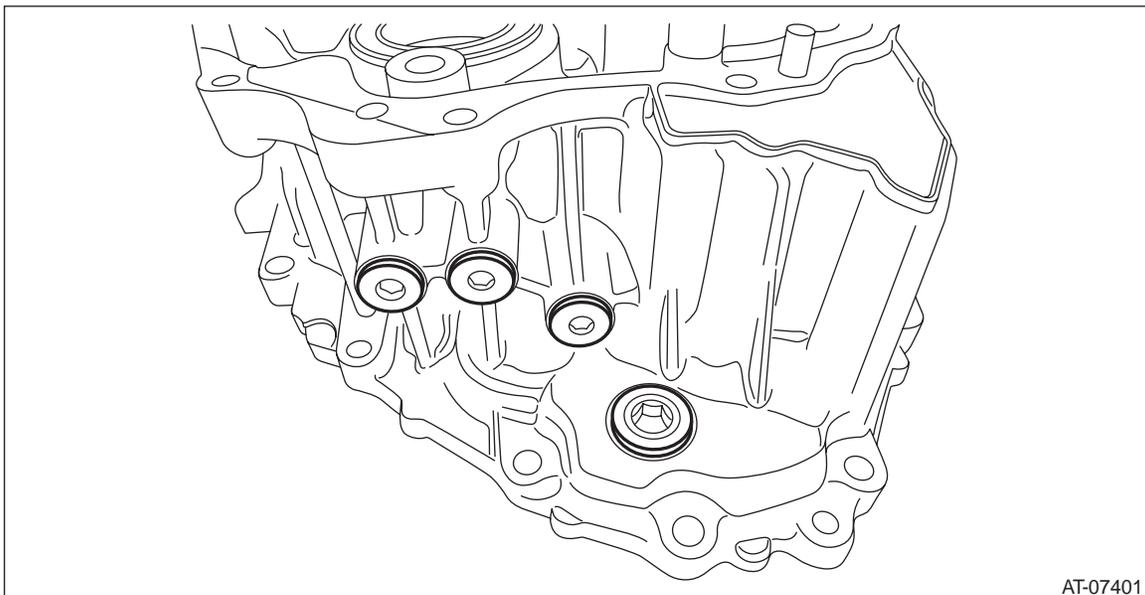
11) Install the transmission to vehicle.<Ref. to CVT(TR690)-69, INSTALLATION, Automatic Transmission Assembly.>

C: DISASSEMBLY

1) Remove the parking support.

2) Remove the CVTF filler plug.

3) Remove all plugs from intermediate case.



CVT(TR690)-170

Intermediate Case

CONTINUOUSLY VARIABLE TRANSMISSION

4) Remove the reverse brake assembly. <Ref. to CVT(TR690)-173, DISASSEMBLY, Reverse Brake Assembly.>

D: ASSEMBLY

1) Install the reverse brake. <Ref. to CVT(TR690)-176, ASSEMBLY, Reverse Brake Assembly.>

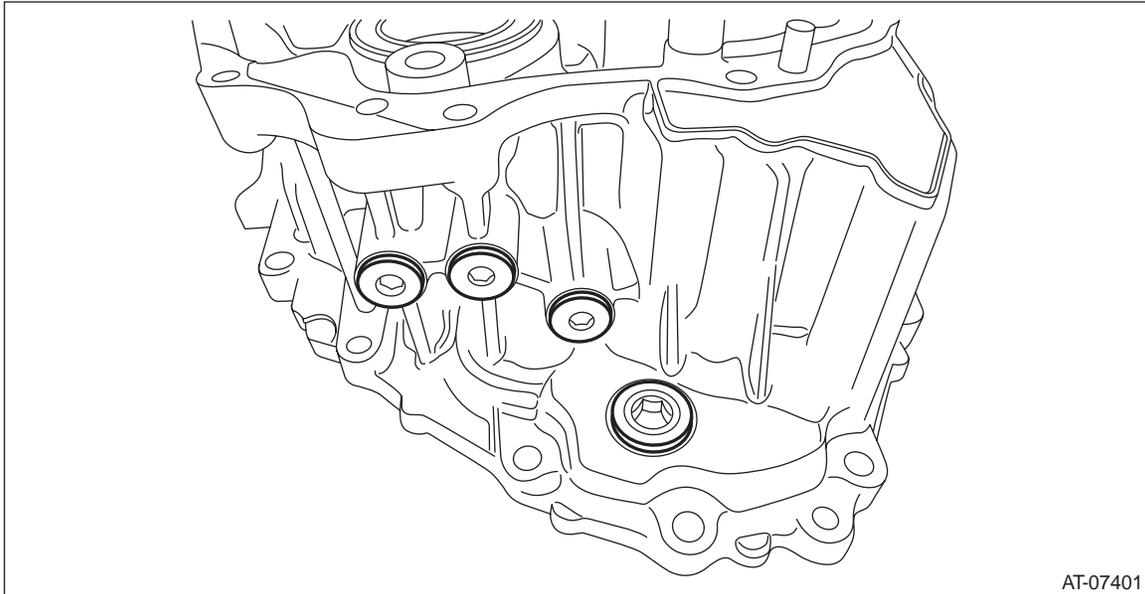
2) Install all plugs to intermediate case.

Tightening torque:

25 N·m (2.5 kgf·m, 18.4 ft·lb)

NOTE:

Use new O-rings.



3) Install the parking support.

Tightening torque:

25 N·m (2.5 kgf·m, 18.4 ft·lb)

4) Install the CVTF filler plug.

NOTE:

Replace the gasket of CVTF filler plug with a new part after installing the transmission assembly to vehicle and adjusting CVTF fluid.

E: INSPECTION

- Check the intermediate case for fissures, cracks or damage.
- Check for leakage of CVTF from the connections between intermediate case and transmission case, and between intermediate case and extension case.

CVTF Filter

CONTINUOUSLY VARIABLE TRANSMISSION

35.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 “Intermediate Case”. <Ref. to CVT(TR690)-167, REMOVAL, Intermediate Case.>

B: INSTALLATION

NOTE:

For installation of CVTF filter, refer to “Intermediate Case”. <Ref. to CVT(TR690)-168, INSTALLATION, Intermediate 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.

36.Reverse Brake Assembly

A: REMOVAL

NOTE:

For removal of reverse brake assembly, refer to "Intermediate Case". <Ref. to CVT(TR690)-167, REMOVAL, Intermediate Case.>

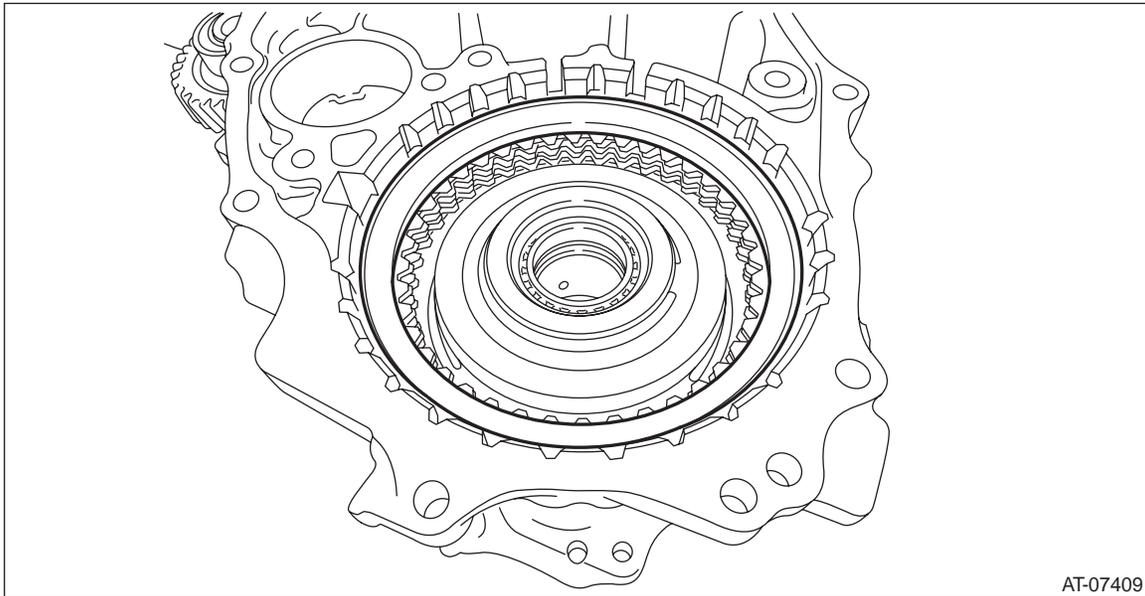
B: INSTALLATION

NOTE:

For installation of reverse brake assembly, refer to "Intermediate Case". <Ref. to CVT(TR690)-168, INSTALLATION, Intermediate Case.>

C: DISASSEMBLY

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



Reverse Brake Assembly

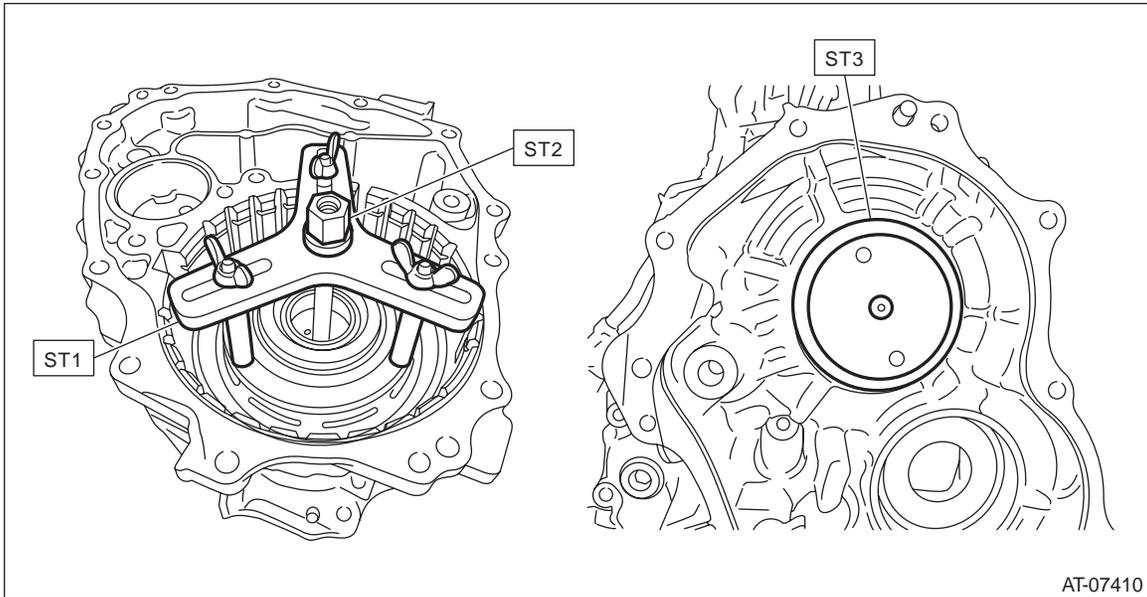
CONTINUOUSLY VARIABLE TRANSMISSION

3) Set the ST1, ST2 and ST3 to intermediate case.

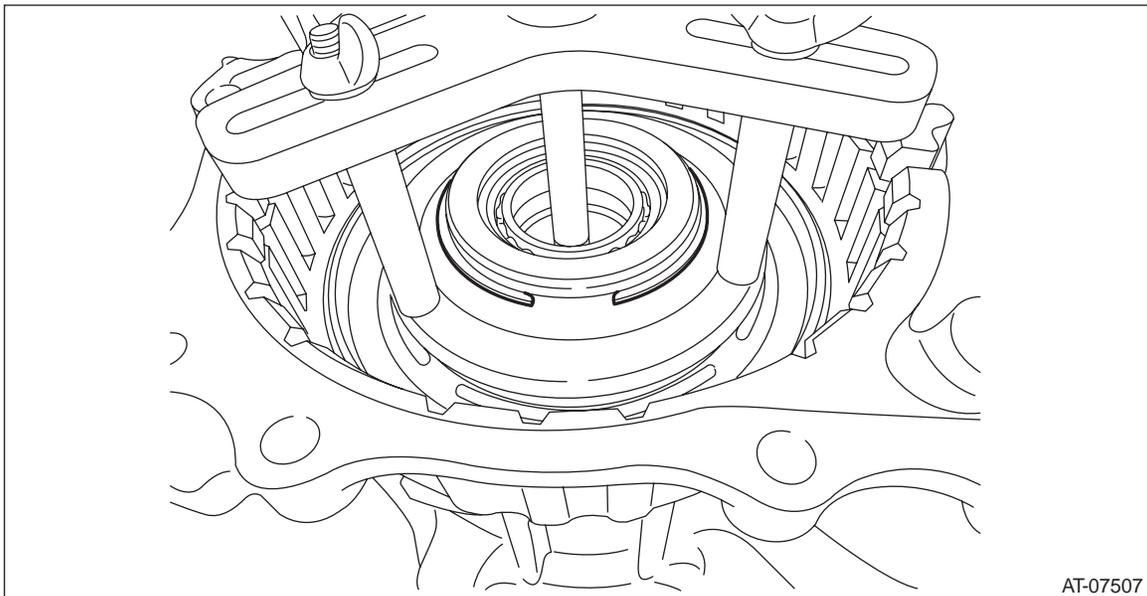
ST1 18762AA000 or 18762AA001 COMPRESSOR SPECIAL TOOL

ST2 18763AA000 COMPRESSOR SHAFT

ST3 18765AA000 COMPRESSOR SUPPORT



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

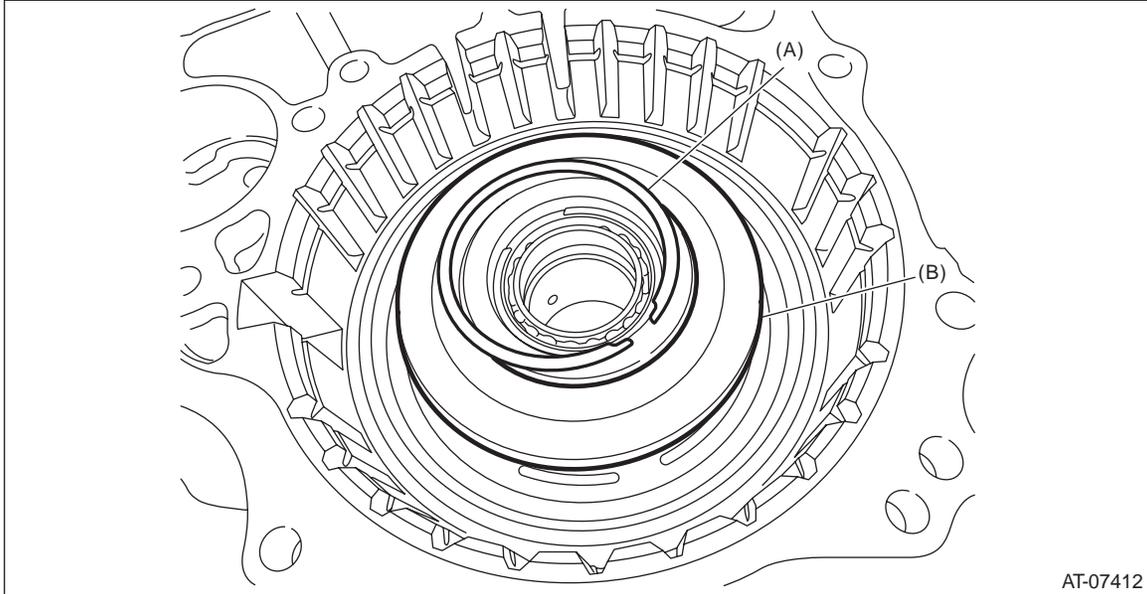


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Reverse Brake Assembly

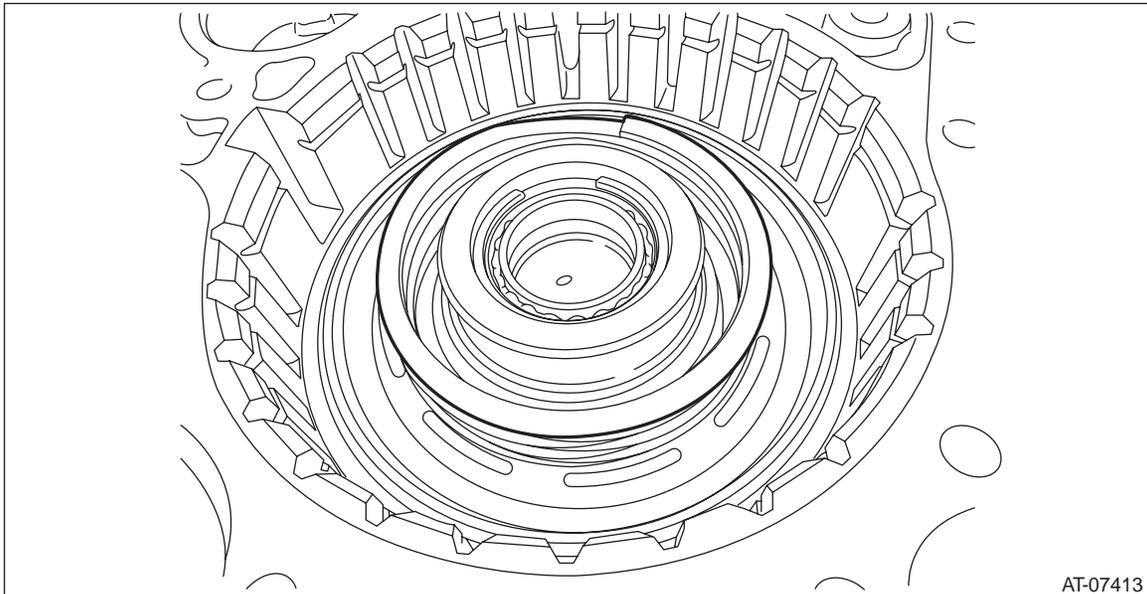
CONTINUOUSLY VARIABLE TRANSMISSION

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



- (A) Snap ring
- (B) Spring retainer

6) Remove the return spring.

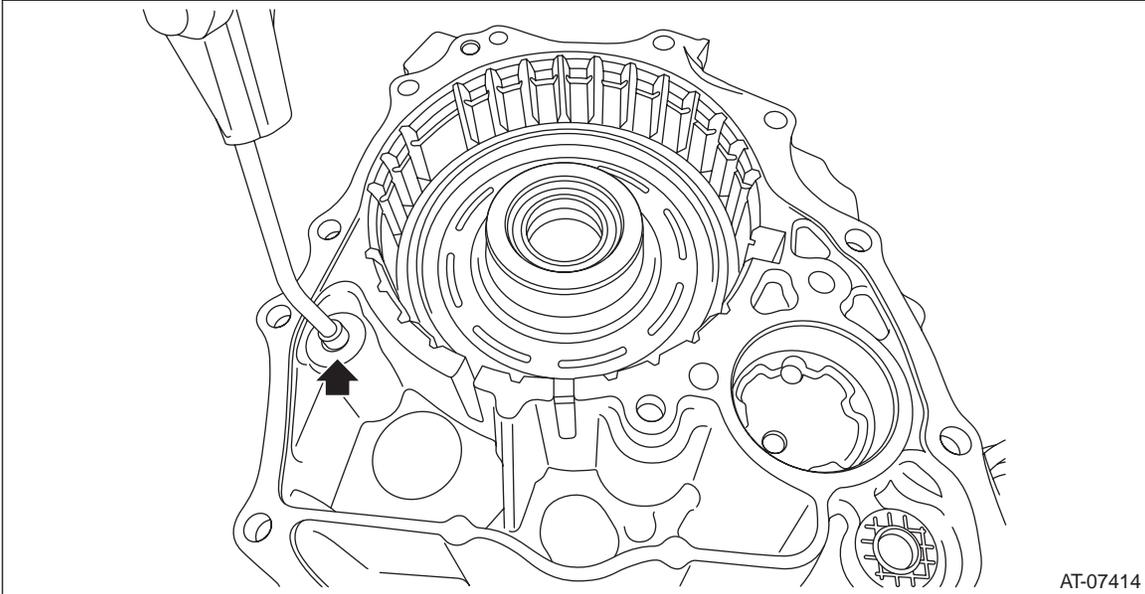


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Reverse Brake Assembly

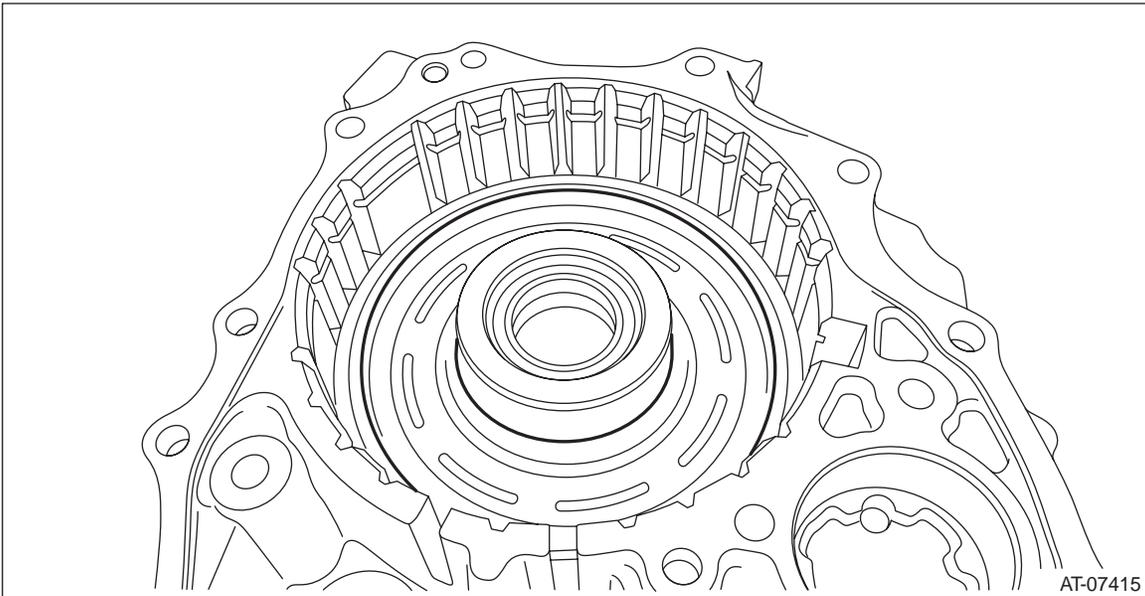
CONTINUOUSLY VARIABLE TRANSMISSION

7) Remove the reverse brake piston by blowing compressed air intermittently from intermediate case hole.



D: ASSEMBLY

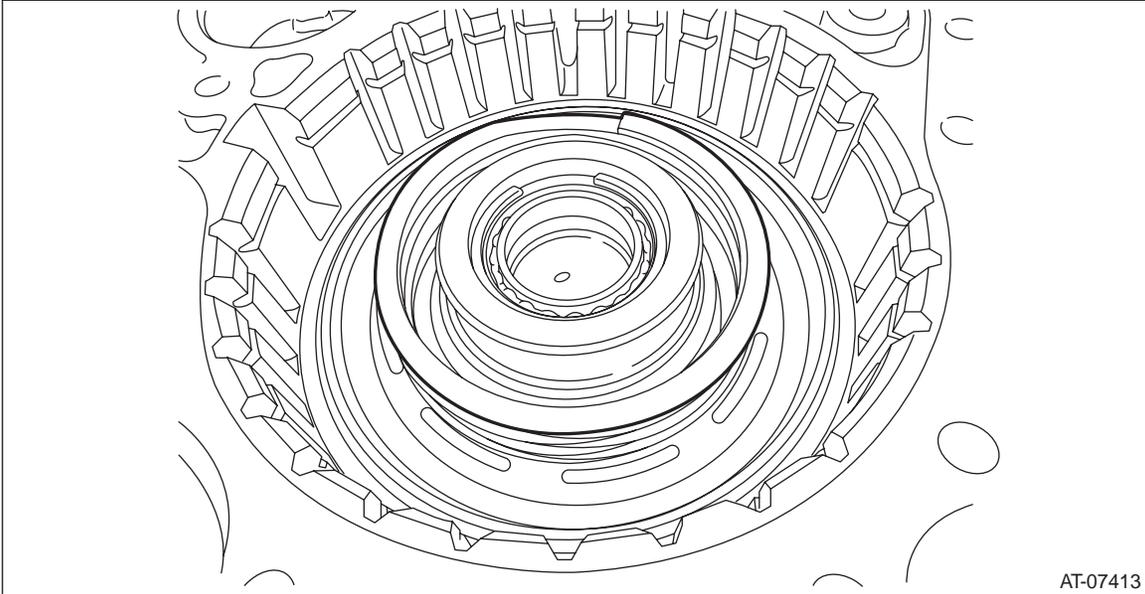
1) Apply CVTF to the seal of reverse brake piston and install it to intermediate case.



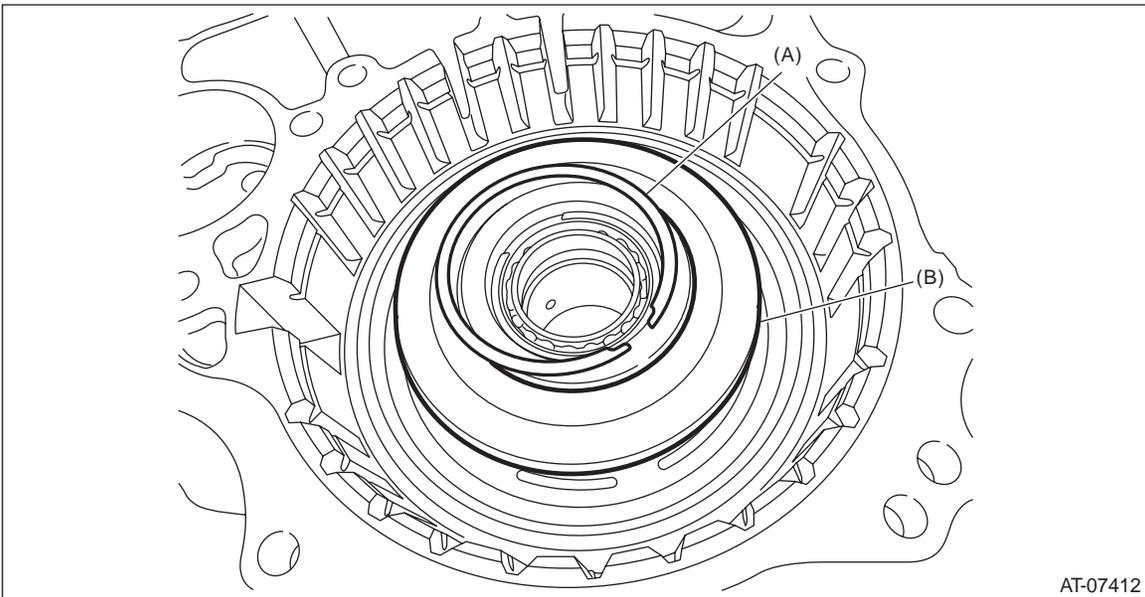
Reverse Brake Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

2) Install the return spring.



3) Set the spring retainer and snap ring.



- (A) Snap ring
- (B) Spring retainer

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Reverse Brake Assembly

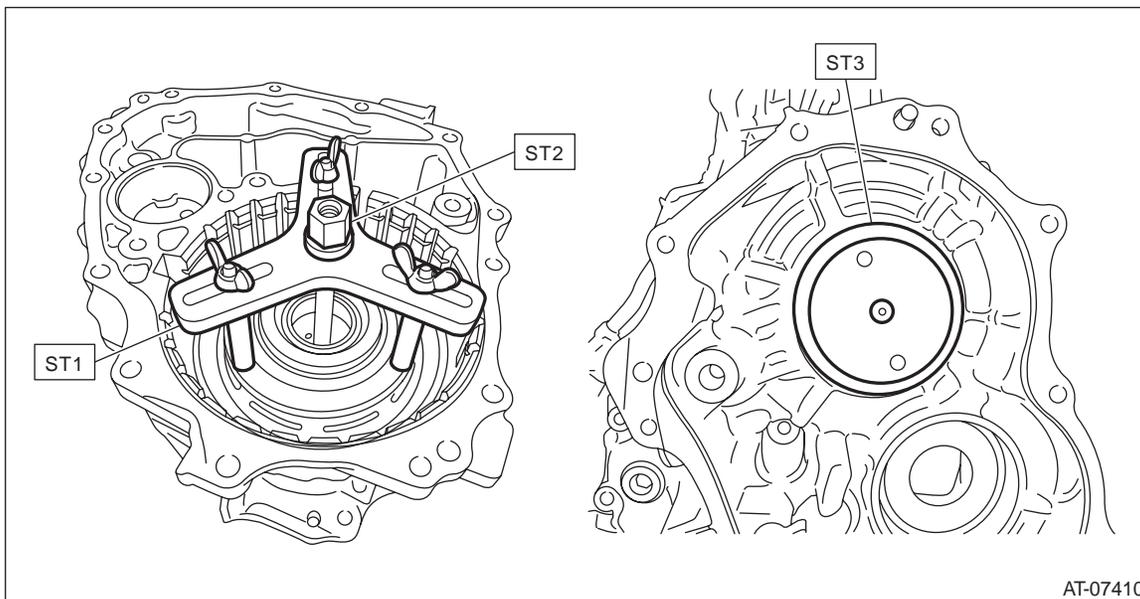
CONTINUOUSLY VARIABLE TRANSMISSION

4) Set the ST1, ST2 and ST3 to intermediate case.

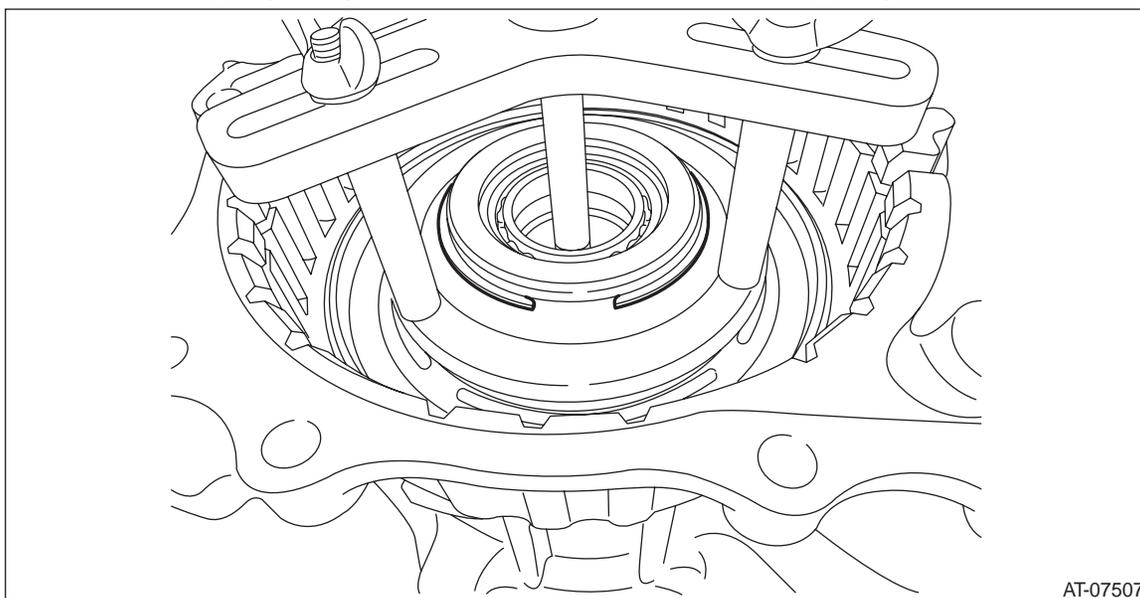
ST1 18762AA000 or 18762AA001 COMPRESSOR SPECIAL TOOL

ST2 18763AA000 COMPRESSOR SHAFT

ST3 18765AA000 COMPRESSOR SUPPORT



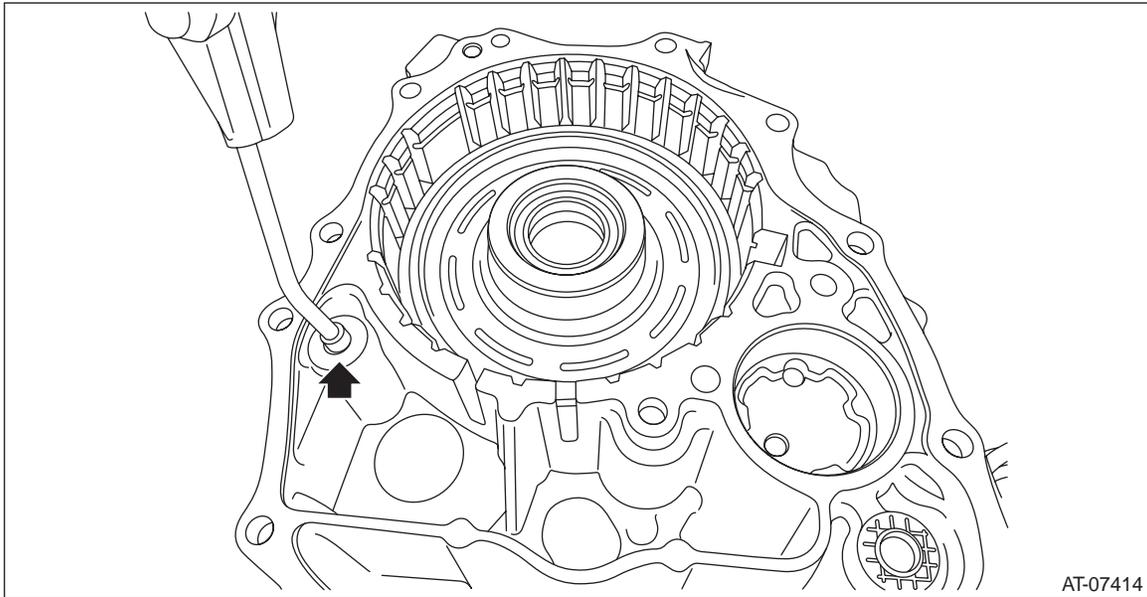
5) Compress the return spring using the ST attached, and install the snap ring.



Reverse Brake Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

6) Check the operation of reverse brake piston by blowing compressed air intermittently from intermediate case hole.



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

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

NOTE:

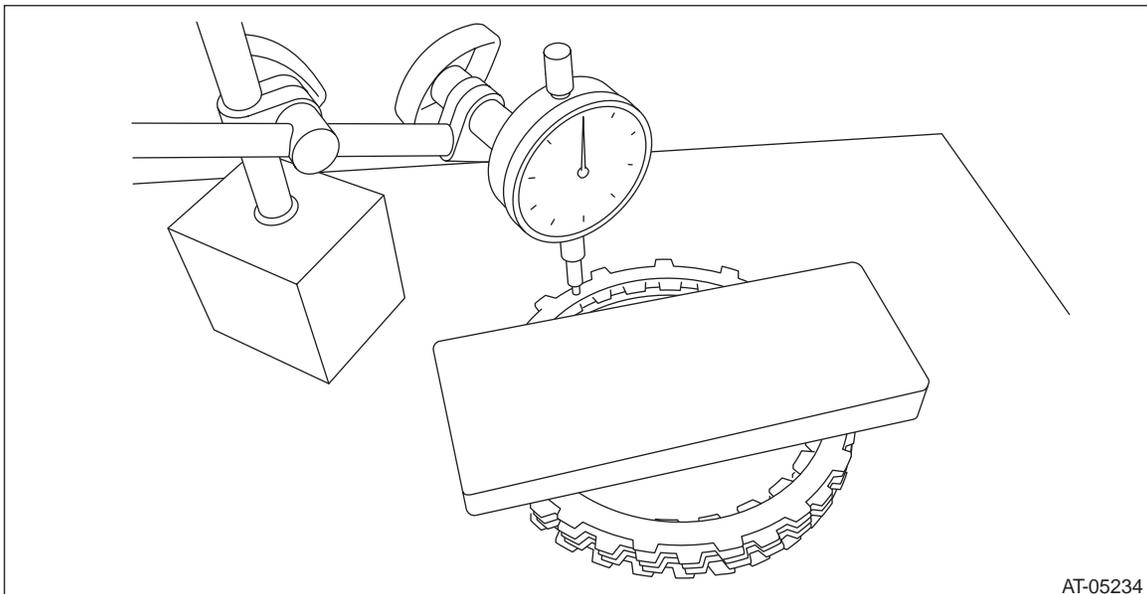
The value, which is read in the gauge at this time, is zero point.

9) 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 84 N (8.6 kgf, 18.9 lb).

10) Put the flat board on retaining plate.



11) Using the following formula, read the push/pull gauge, and calculate “N”.

$$N = 84 \text{ N (8.6 kgf, 18.9 lb)} - Z$$

84 N (8.6 kgf, 18.9 lb) : Load applied to clutch plate

Z: Flat board weight

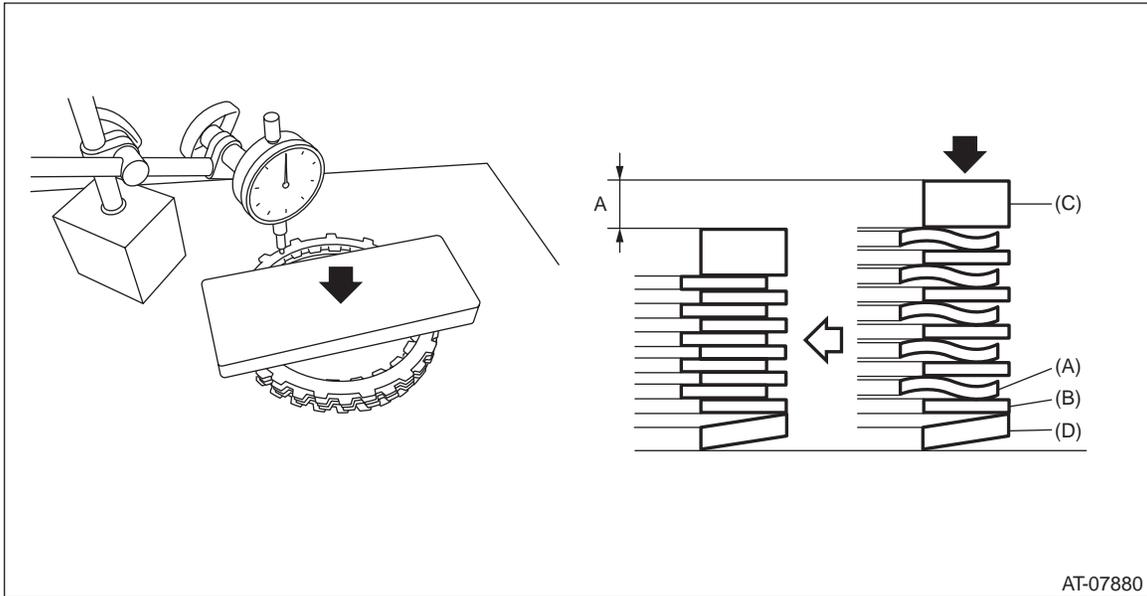
Reverse Brake Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

12) Press the center of retaining plate by applying a force of “N” or more 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.



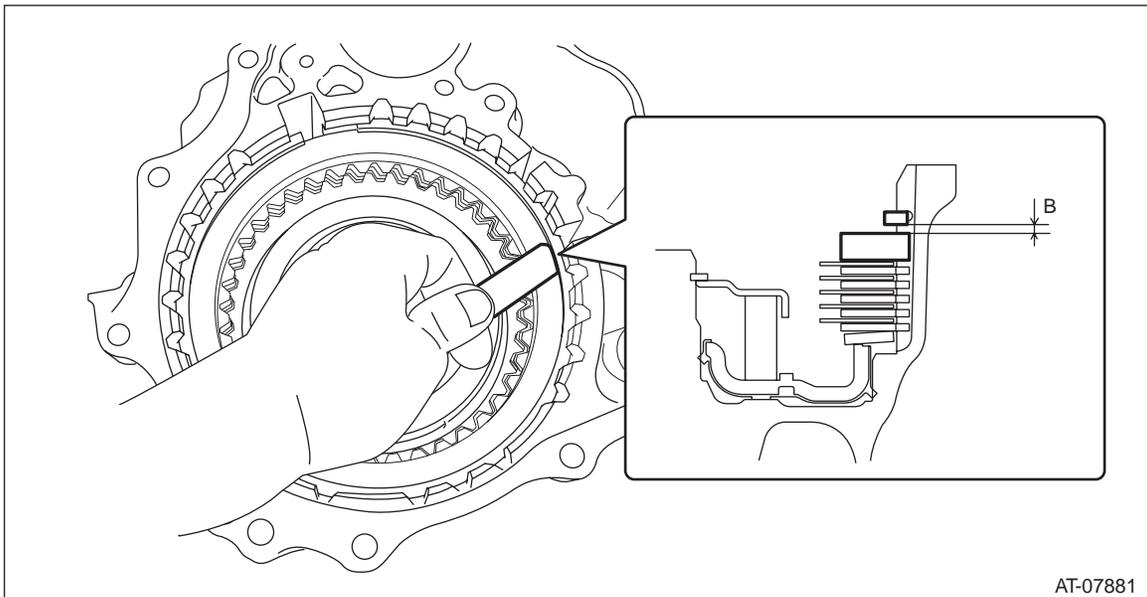
- (A) Drive plate
- (B) Driven plate
- (C) Retaining plate
- (D) Dish plate

13) Install the dish plate, drive plate, driven plate, retaining plate and snap ring to intermediate case.

NOTE:

Install the dish plate in the correct direction.

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



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Reverse Brake Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

15) 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:

2.88 — 3.18 mm (0.113 — 0.125 in)

Limit thickness:

3.38 mm (0.133 in)

Retaining plate	
Part No.	Thickness mm (in)
31567AB680	5.6 (0.220)
31567AB690	5.8 (0.228)
31567AB700	6.0 (0.236)
31579AB710	6.2 (0.244)

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(TR690)-176, ASSEMBLY, Reverse Brake Assembly.>

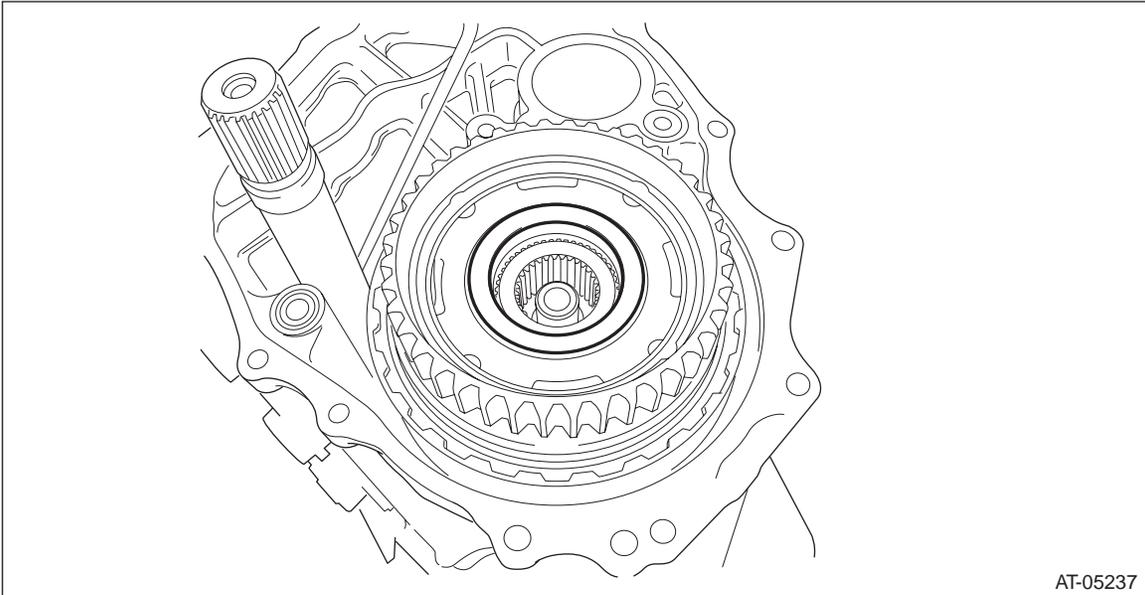
Forward Clutch Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

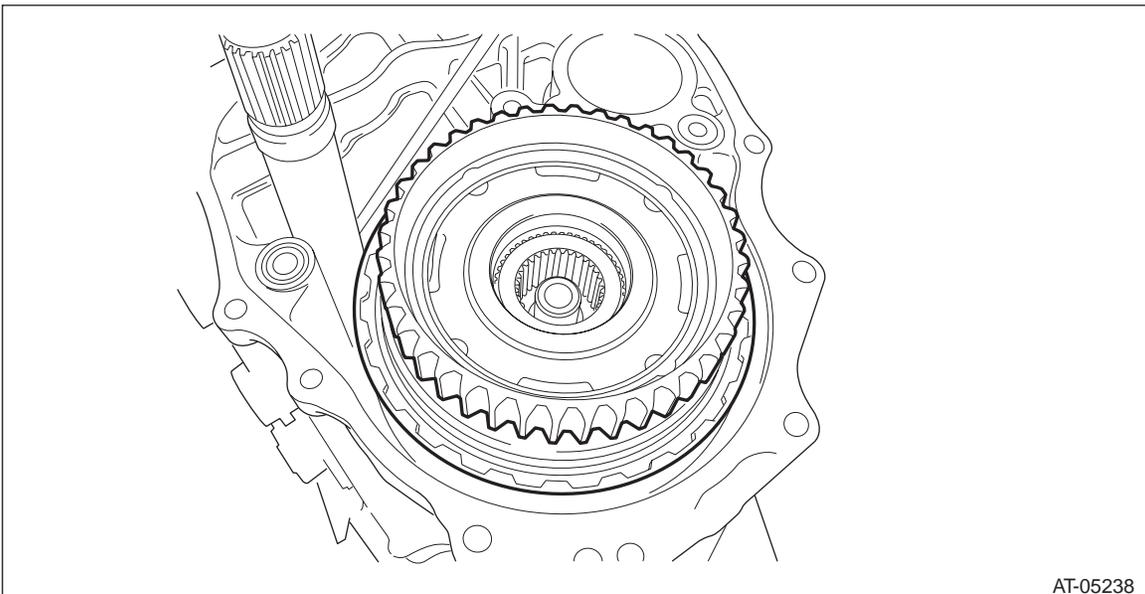
37. Forward Clutch Assembly

A: REMOVAL

- 1) Remove the transmission from the vehicle. <Ref. to CVT(TR690)-56, REMOVAL, Automatic Transmission Assembly.>
- 2) Remove the extension case. <Ref. to CVT(TR690)-140, REMOVAL, Extension Case.>
- 3) Remove the rear drive shaft. <Ref. to CVT(TR690)-143, REMOVAL, Rear Drive Shaft.>
- 4) Remove the transfer clutch assembly. <Ref. to CVT(TR690)-148, REMOVAL, Transfer Clutch.>
- 5) Remove the transfer reduction driven gear. <Ref. to CVT(TR690)-160, REMOVAL, Transfer Reduction Driven Gear.>
- 6) Remove the intermediate case. <Ref. to CVT(TR690)-167, REMOVAL, Intermediate Case.>
- 7) Remove the thrust needle bearing.



- 8) Remove the forward clutch assembly.

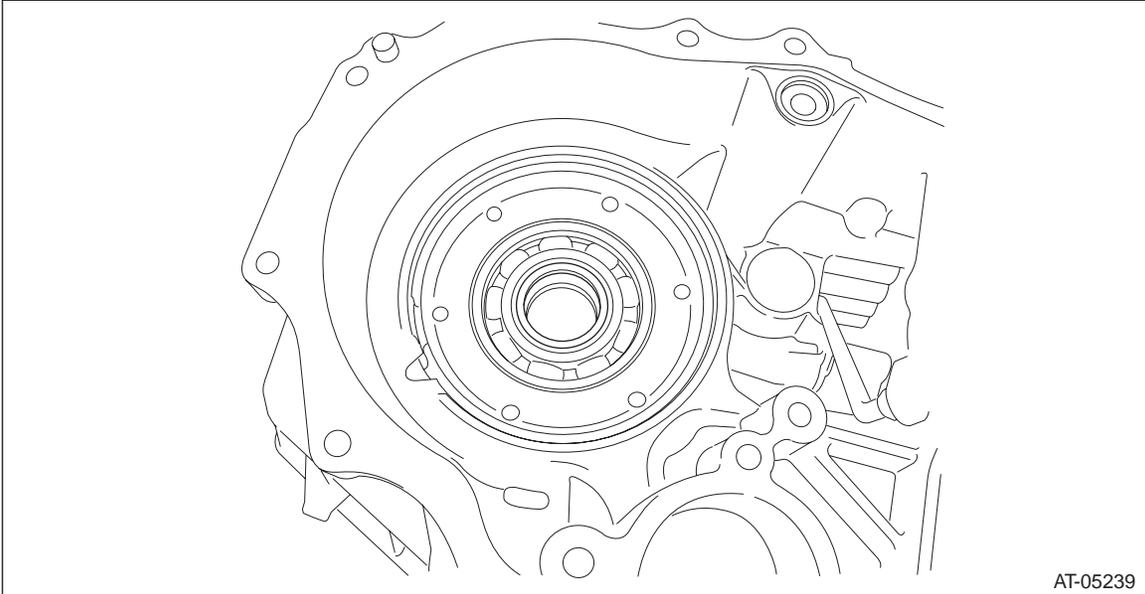


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Forward Clutch Assembly

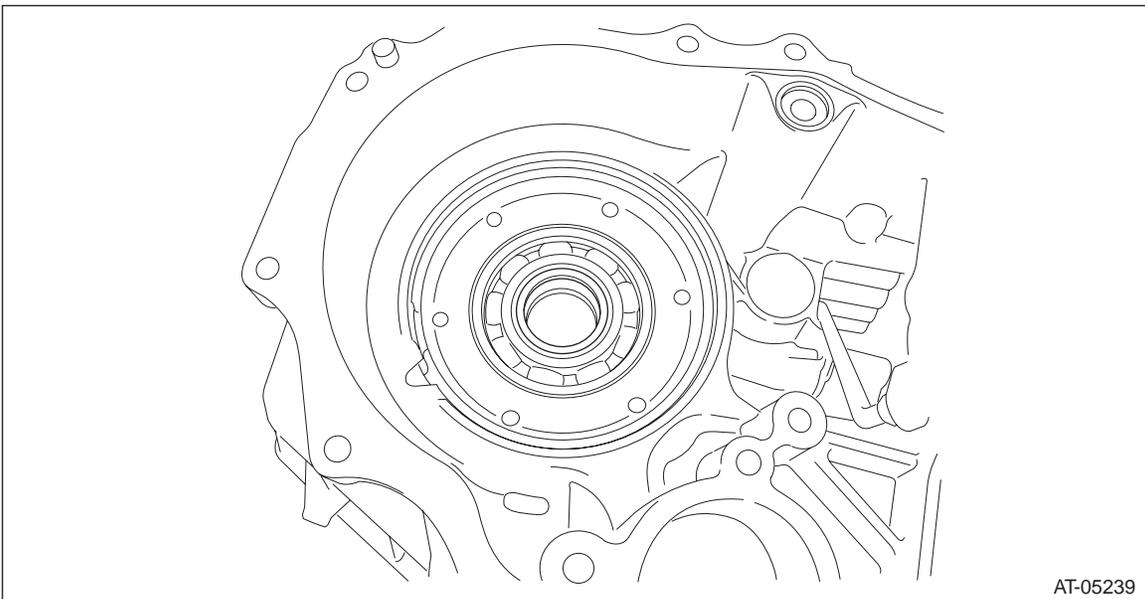
CONTINUOUSLY VARIABLE TRANSMISSION

9) Remove the washer.



B: INSTALLATION

- 1) Select a washer. <Ref. to CVT(TR690)-200, ADJUSTMENT, Forward Clutch Assembly.>
- 2) Install the selected washer.

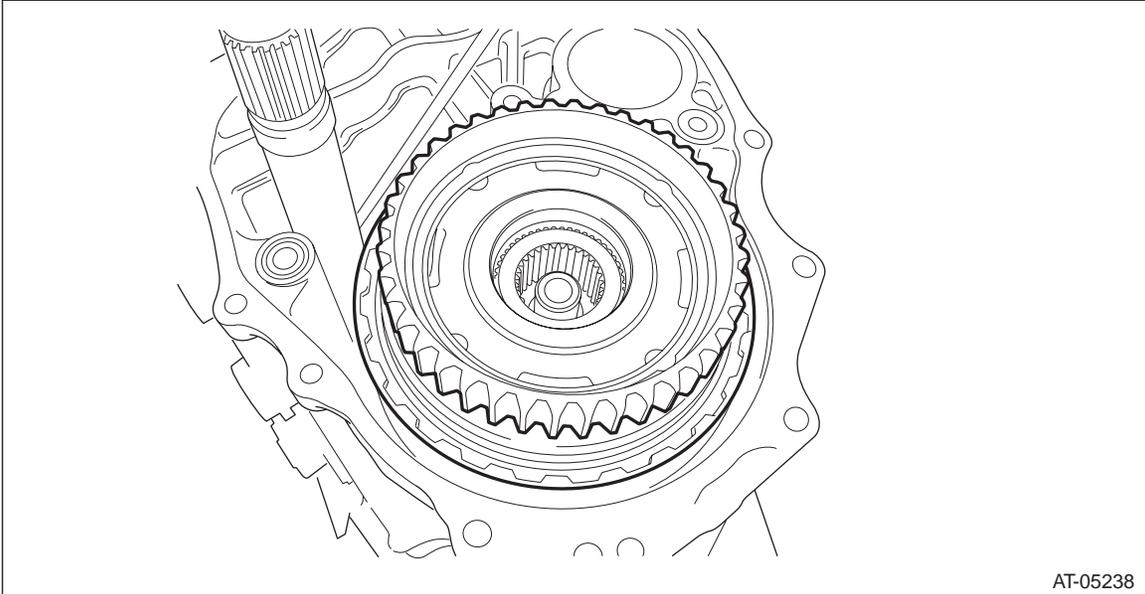


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Forward Clutch Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

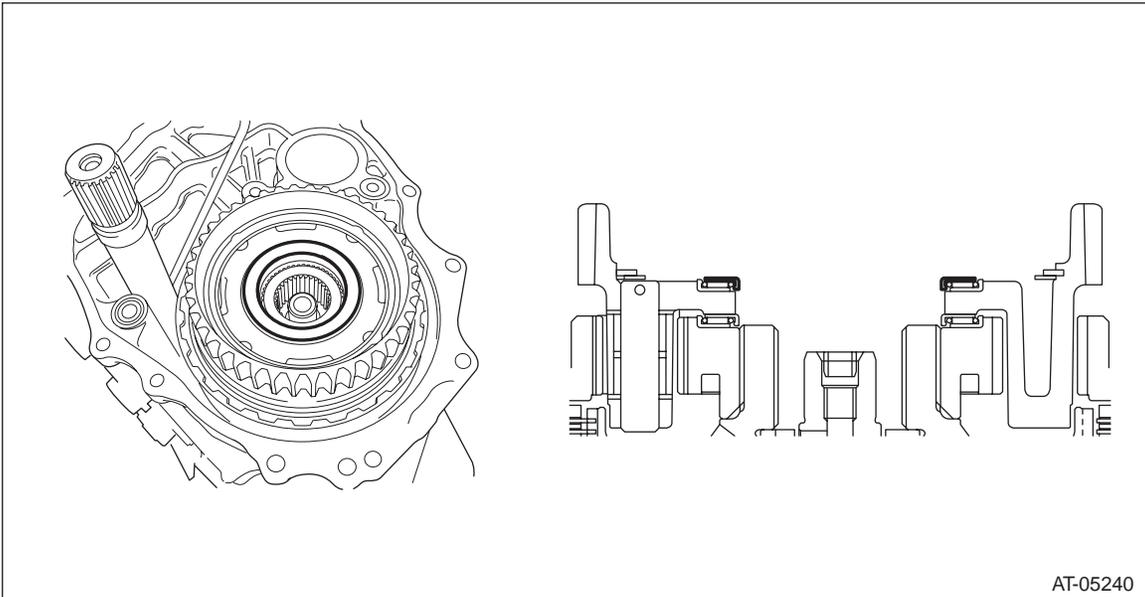
3) Install the forward clutch assembly.



4) Install the thrust needle bearing.

NOTE:

Install the thrust needle bearing in the correct direction.



5) Install the intermediate case. <Ref. to CVT(TR690)-168, INSTALLATION, Intermediate Case.>

6) Install the transfer reduction driven gear assembly. <Ref. to CVT(TR690)-160, INSTALLATION, Transfer Reduction Driven Gear.>

7) Install the transfer clutch assembly. <Ref. to CVT(TR690)-149, INSTALLATION, Transfer Clutch.>

8) Install the rear drive shaft. <Ref. to CVT(TR690)-143, INSTALLATION, Rear Drive Shaft.>

9) Install the extension case. <Ref. to CVT(TR690)-141, INSTALLATION, Extension Case.>

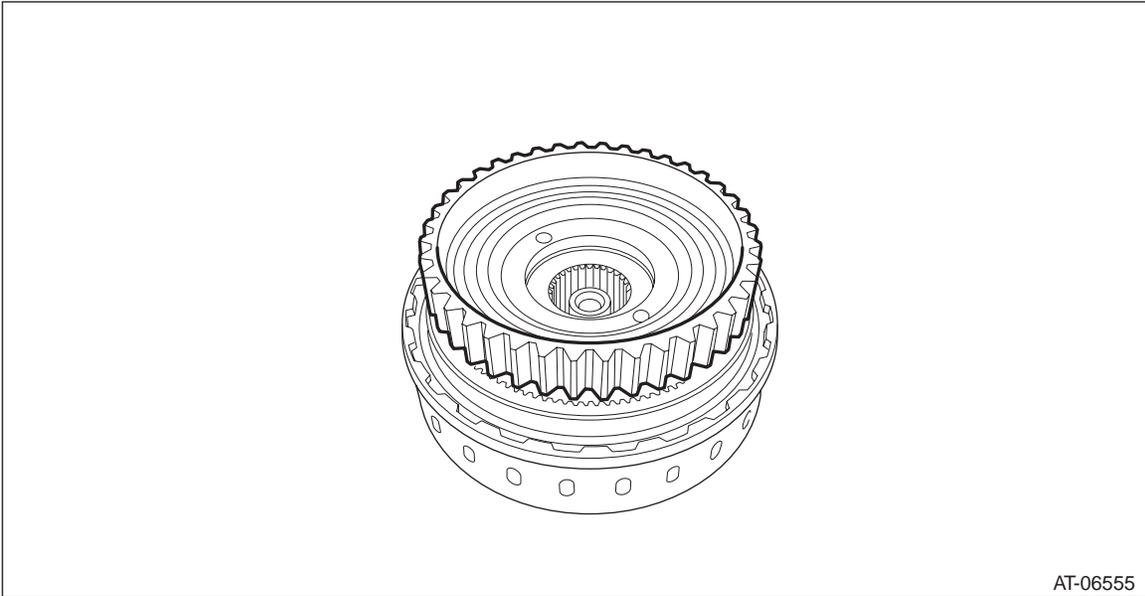
10) Install the transmission to vehicle. <Ref. to CVT(TR690)-69, INSTALLATION, Automatic Transmission Assembly.>

Forward Clutch Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

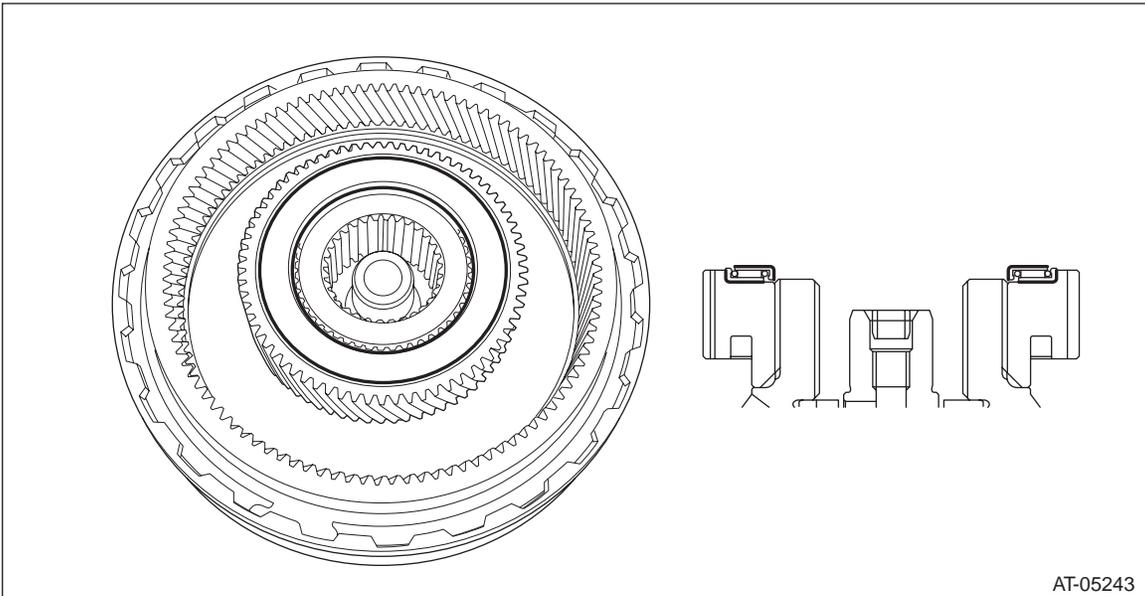
C: DISASSEMBLY

1) Remove the planetary carrier assembly.



AT-06555

2) Remove the thrust needle bearing.



AT-05243

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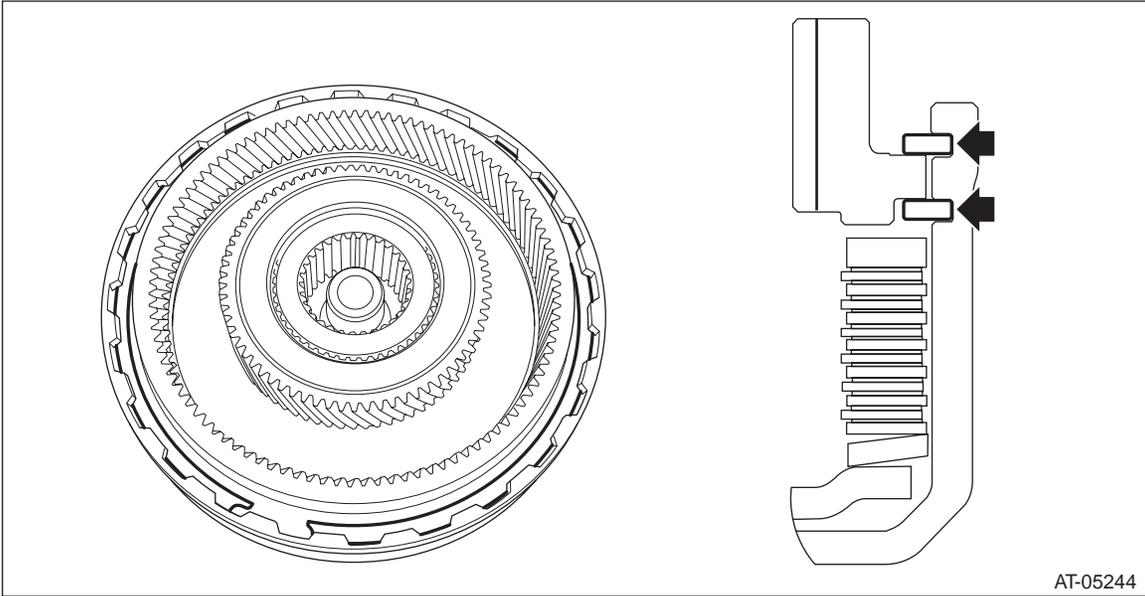
Forward Clutch Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

3) Remove the snap ring.

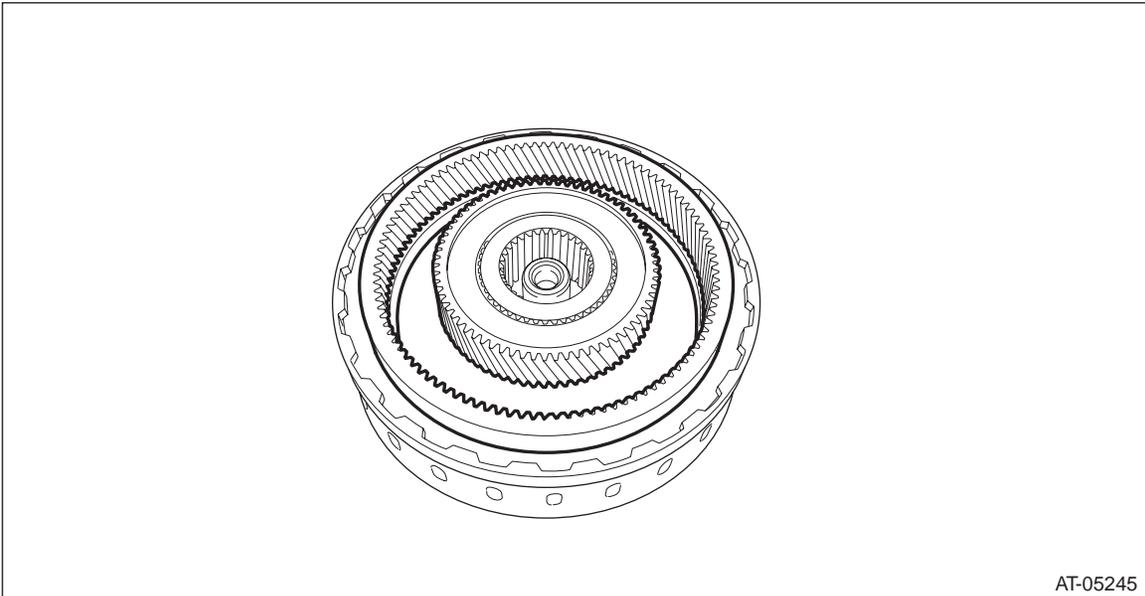
NOTE:

Use marking or labeling to the upper snap ring for measurement of the snap ring thickness when selecting the retaining plate.



AT-05244

4) Remove the internal gear.

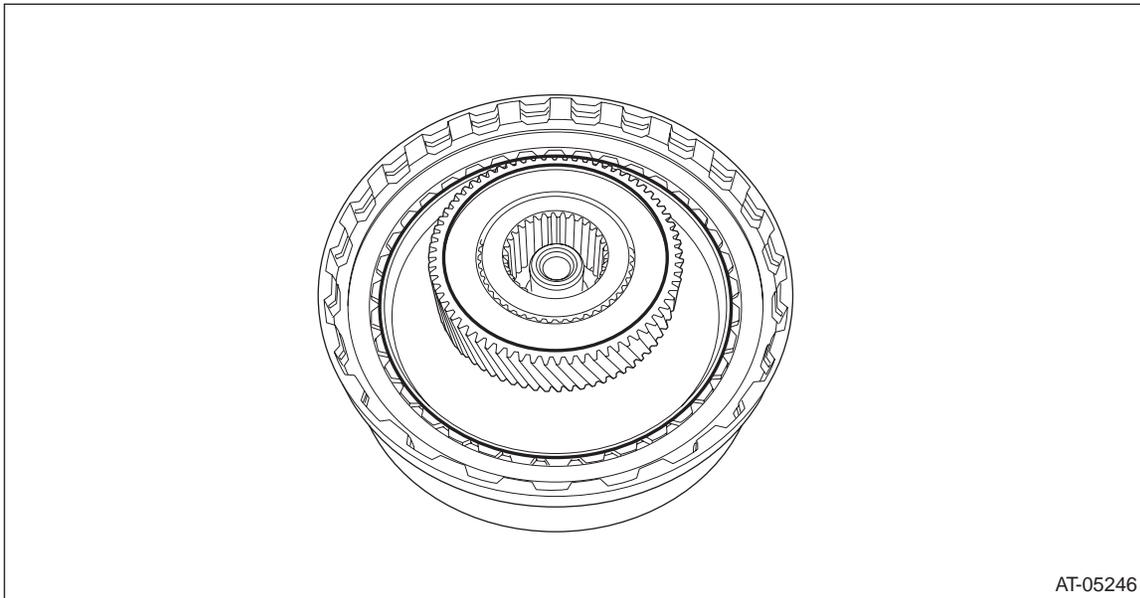


AT-05245

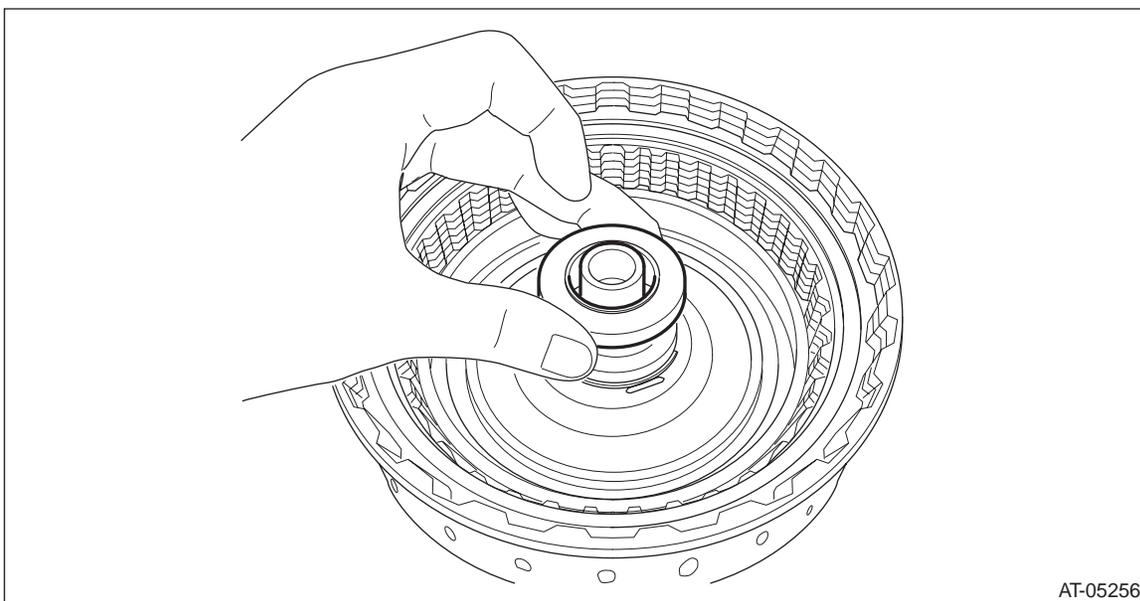
Forward Clutch Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

5) Remove the sun gear.



6) Remove the washer.

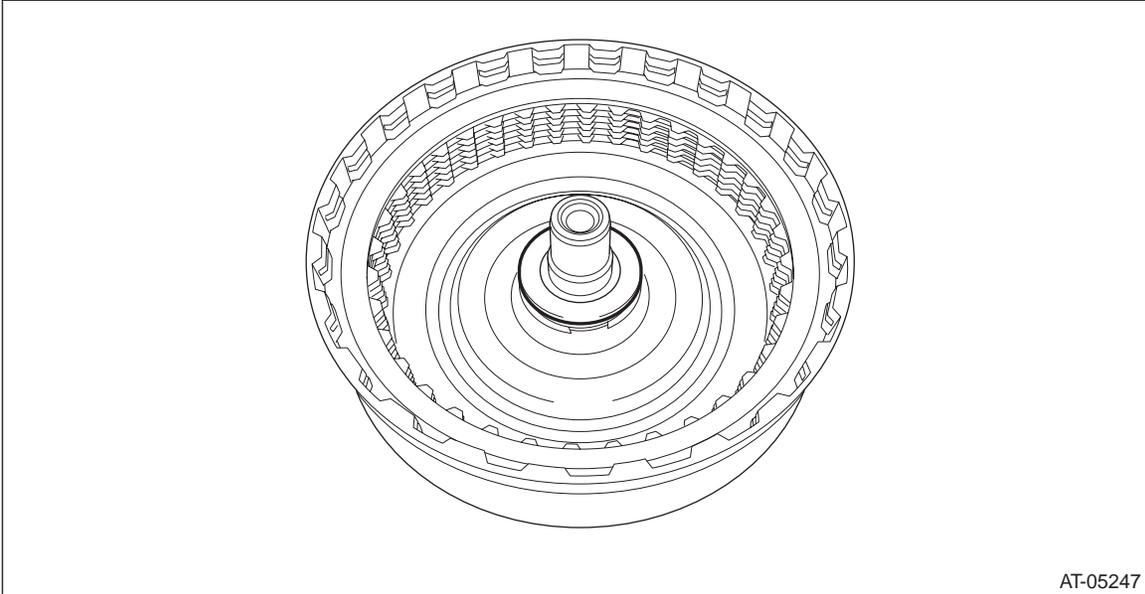


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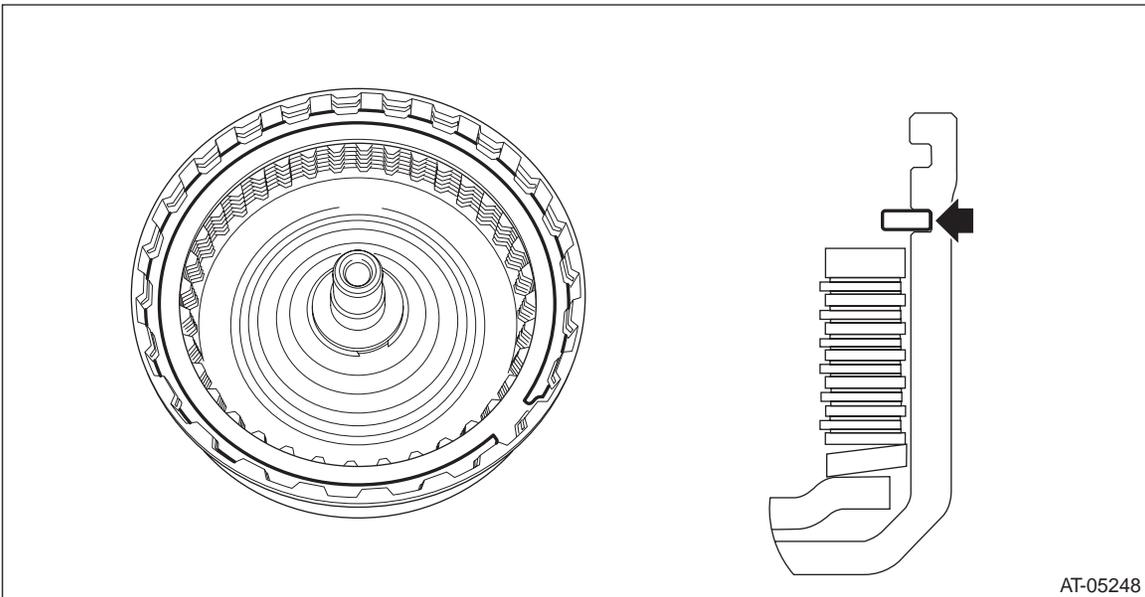
Forward Clutch Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

7) Remove the thrust needle bearing.



8) Remove the snap ring.

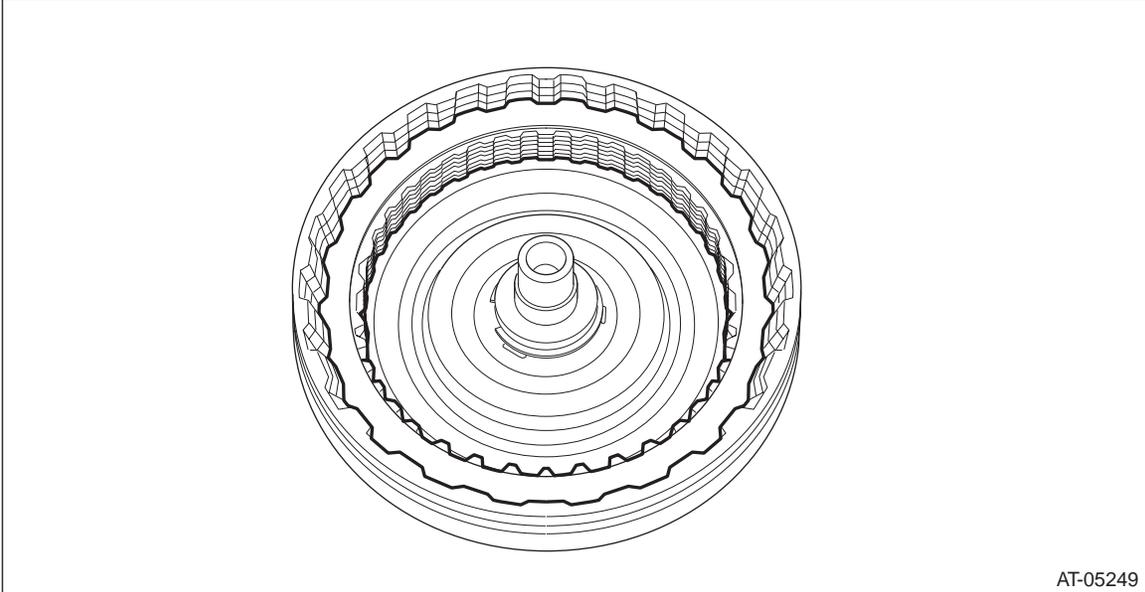


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Forward Clutch Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

9) Remove the retaining plate, drive plate, driven plate and dish plate.

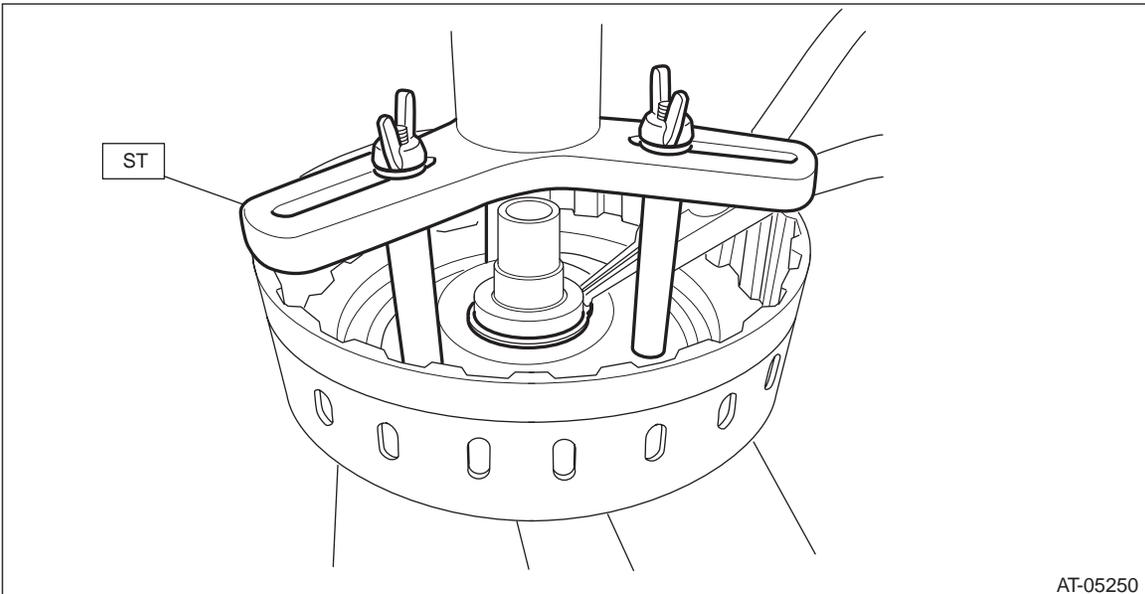


AT-05249

10) Using the ST, remove the snap ring.

ST 18762AA000 or 18762AA001

COMPRESSOR SPECIAL TOOL



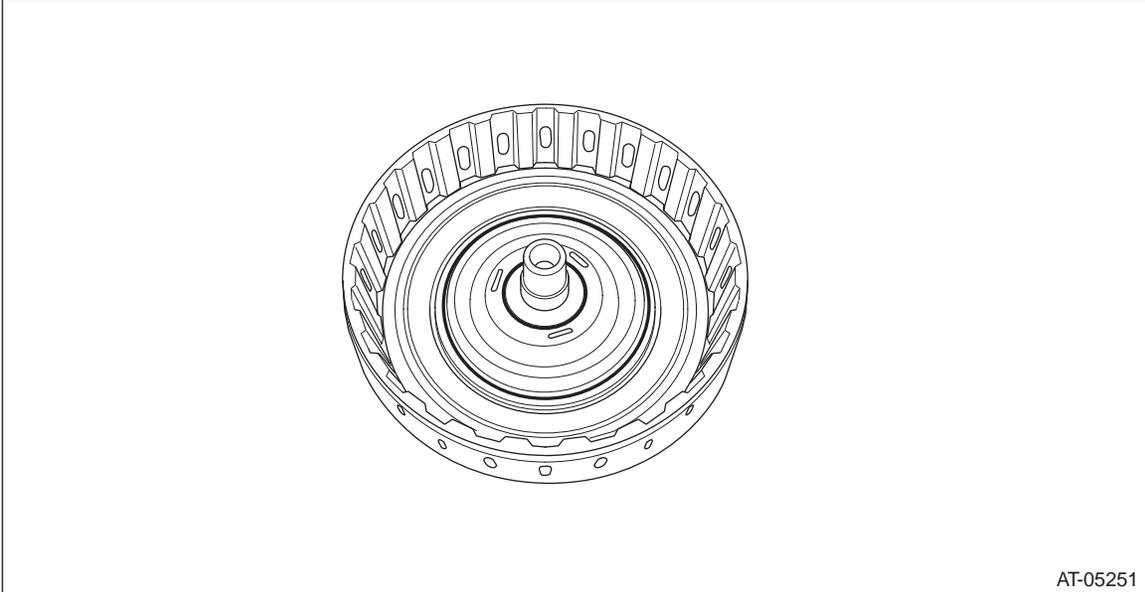
AT-05250

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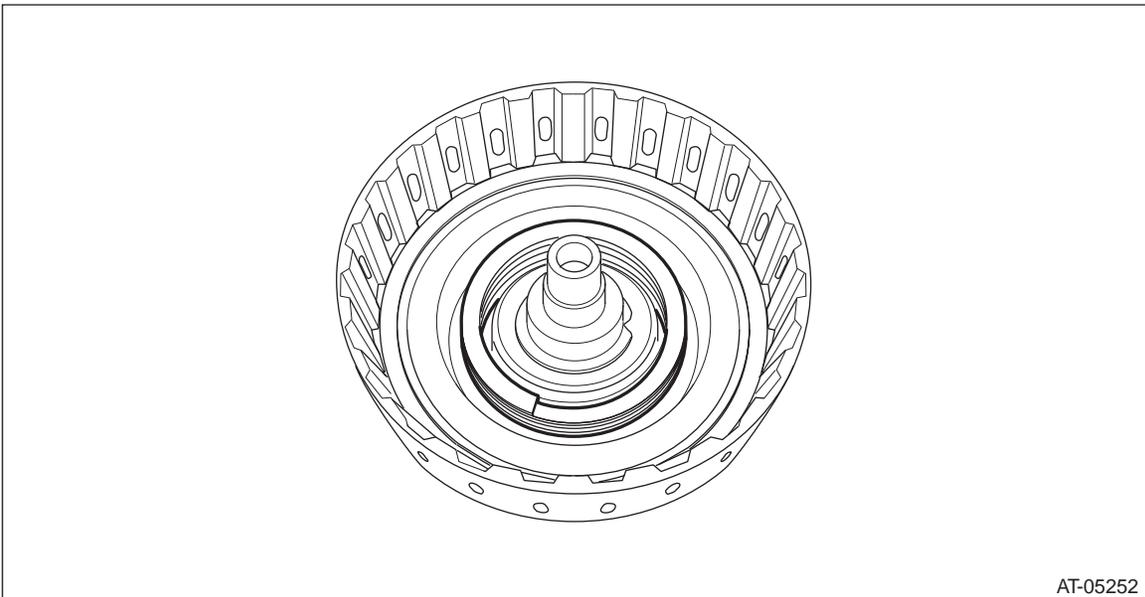
Forward Clutch Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

11) Remove the forward clutch piston retainer.



12) Remove the return spring.

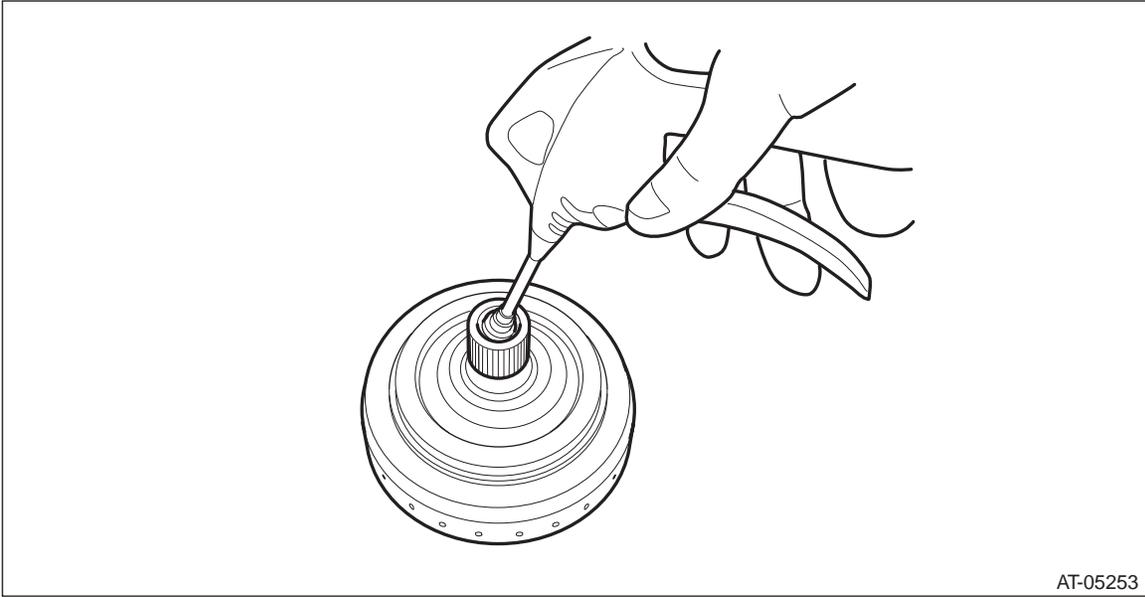


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Forward Clutch Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

13) Remove the forward clutch piston by blowing compressed air intermittently from end of forward clutch drum.



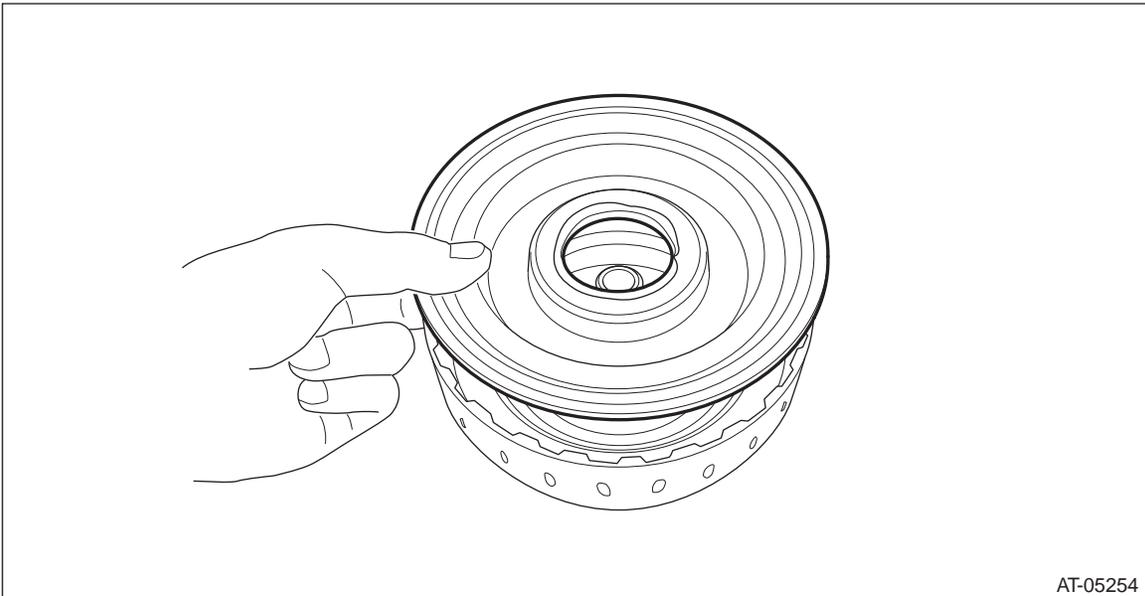
AT-05253

D: 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.



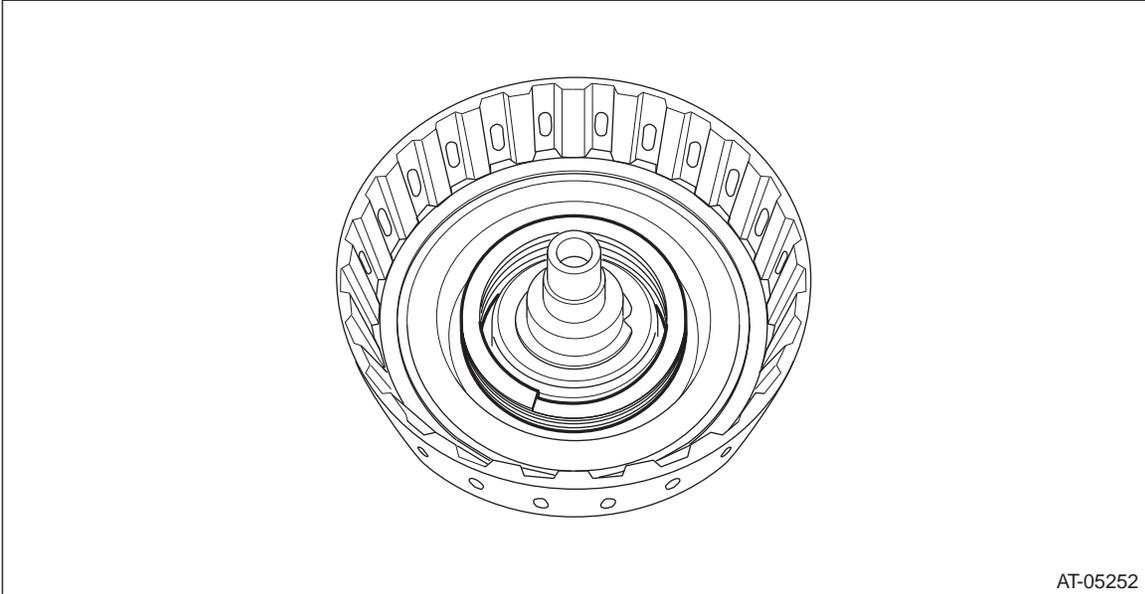
AT-05254

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Forward Clutch Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

2) Install the return spring.

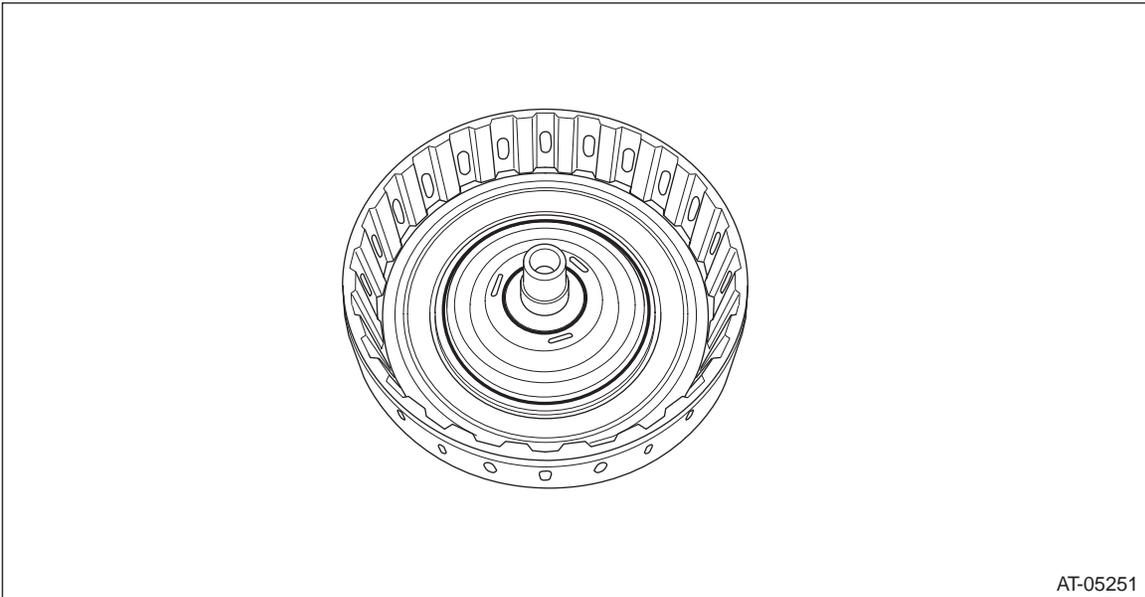


AT-05252

3) Install the forward clutch piston retainer.

NOTE:

Apply CVTF to the sealing area of forward clutch piston retainer.



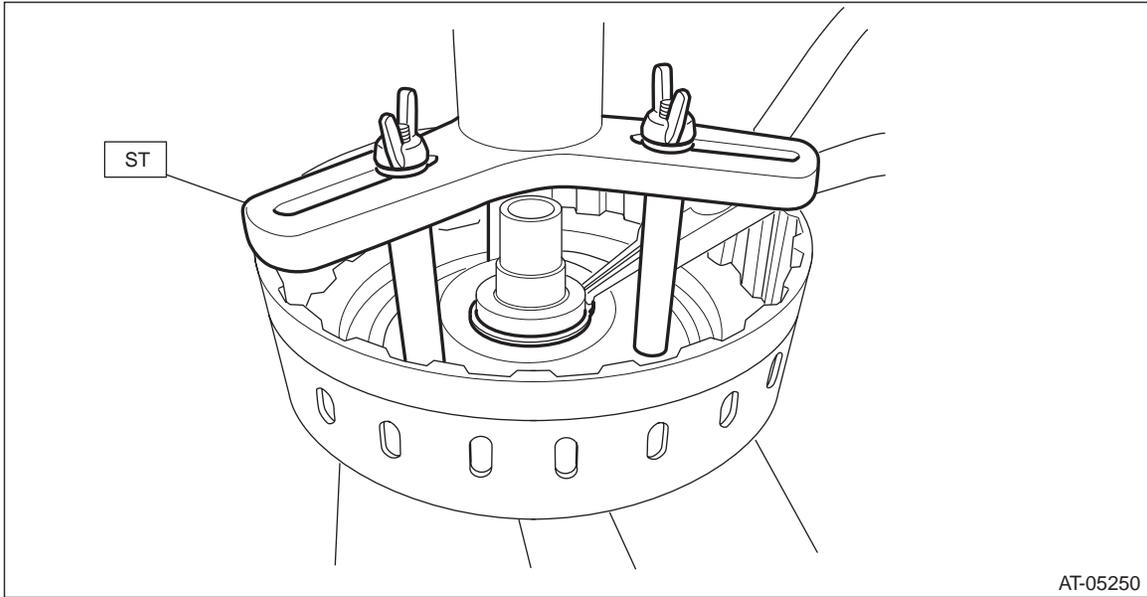
AT-05251

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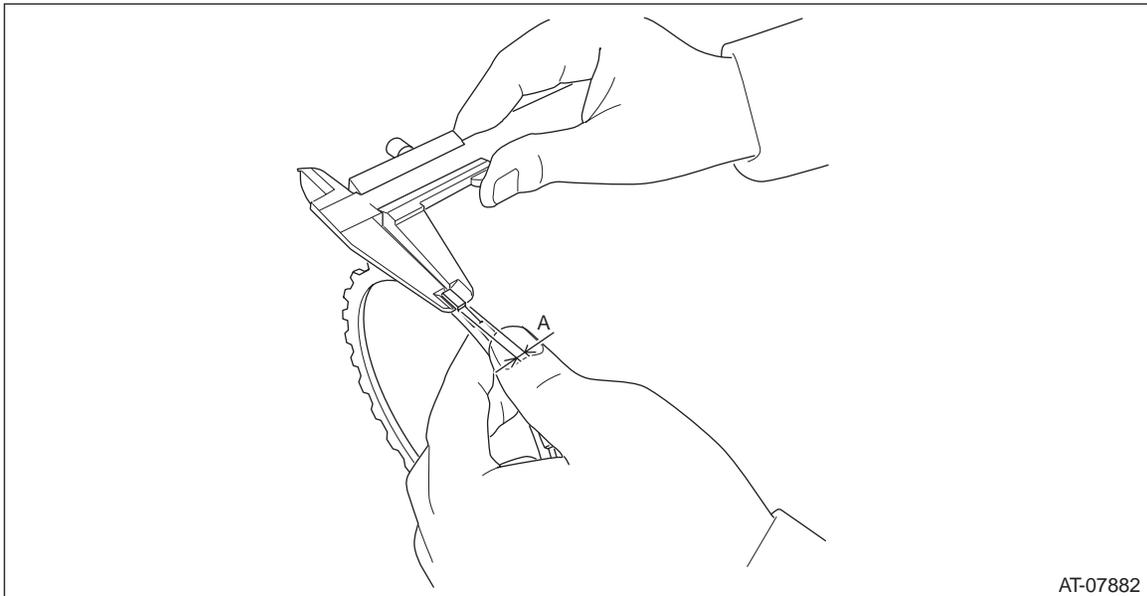
Forward Clutch Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

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



- 5) Measure thickness "A" of the retaining plate installed.

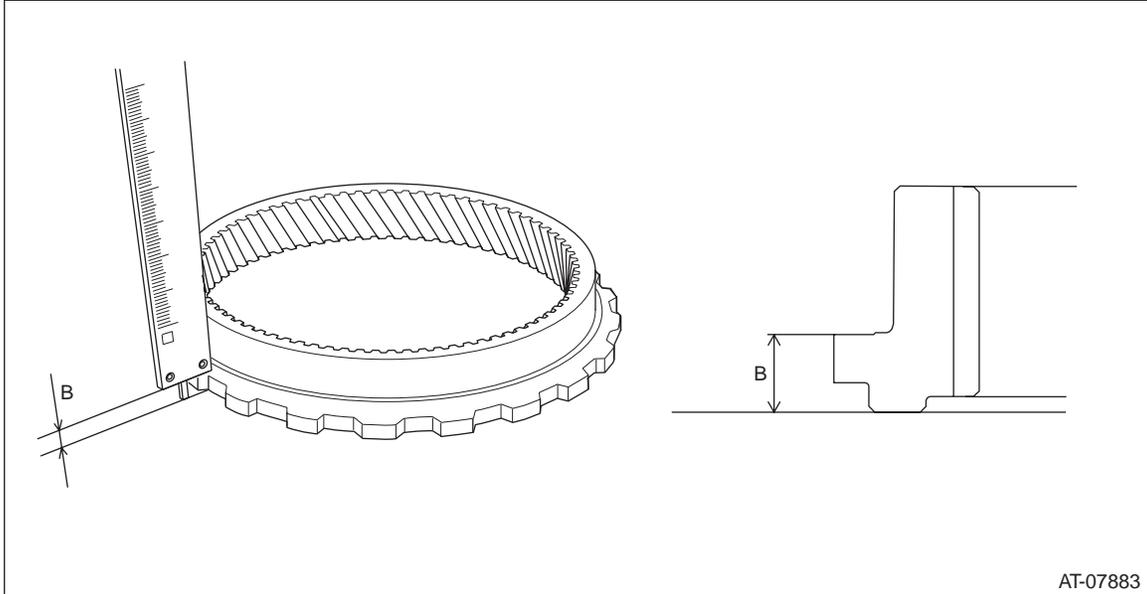


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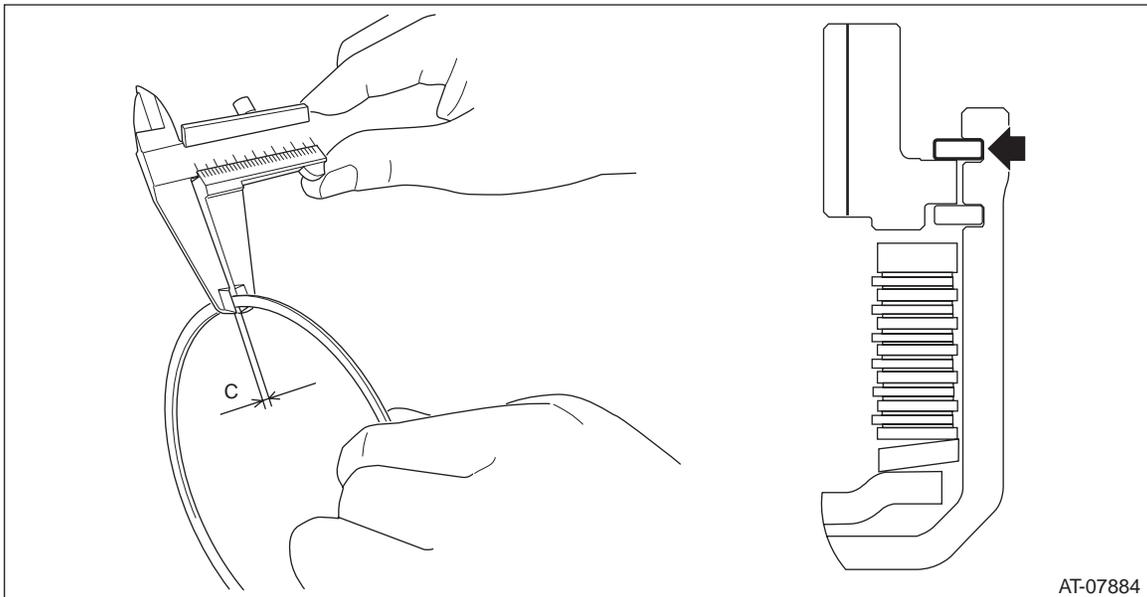
Forward Clutch Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

6) Measure thickness "B" of the internal gear on a surface plate.



7) Measure thickness "C" of labelled or marked snap ring.

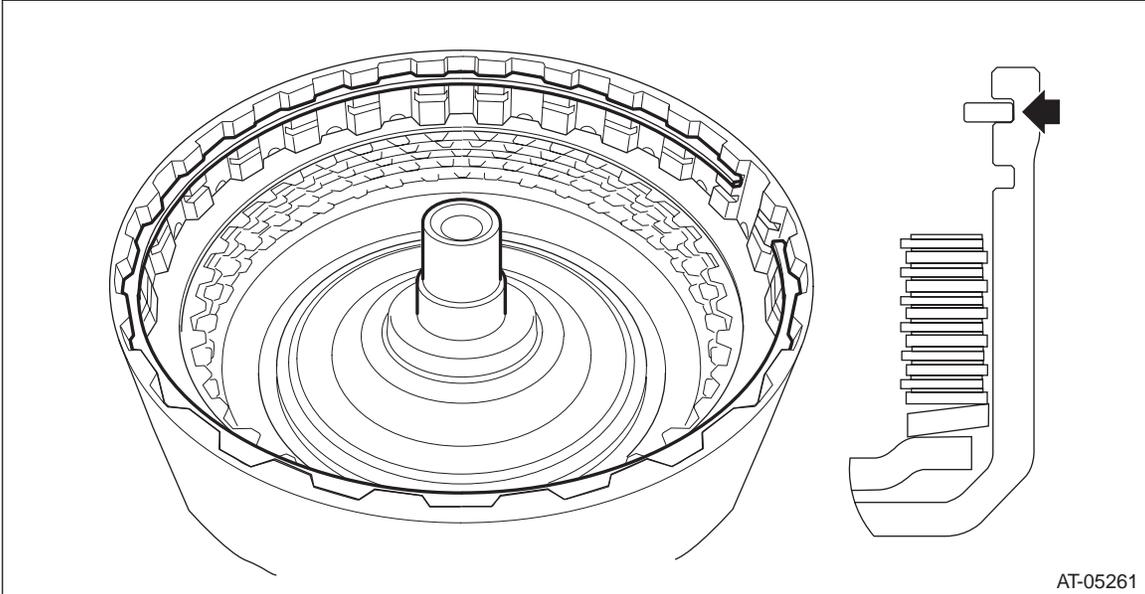


8) Install the dish plate, drive plate and driven plate.

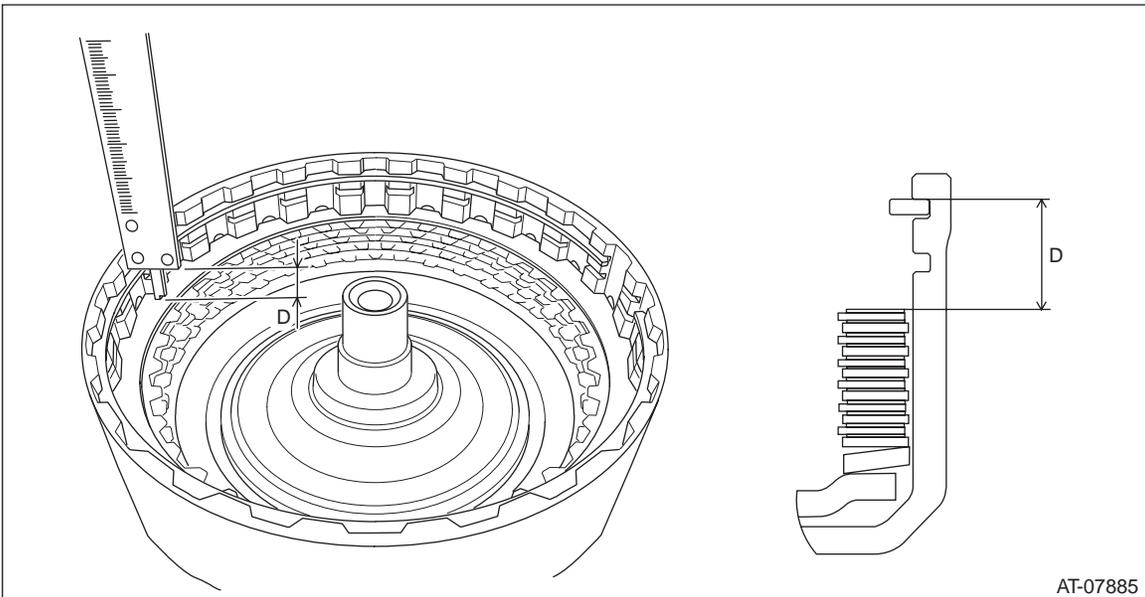
Forward Clutch Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

9) Install the snap ring at the location (upper groove) indicated in the figure.



10) Measure depth "D" of snap ring and driven plate while lifting the snap ring.



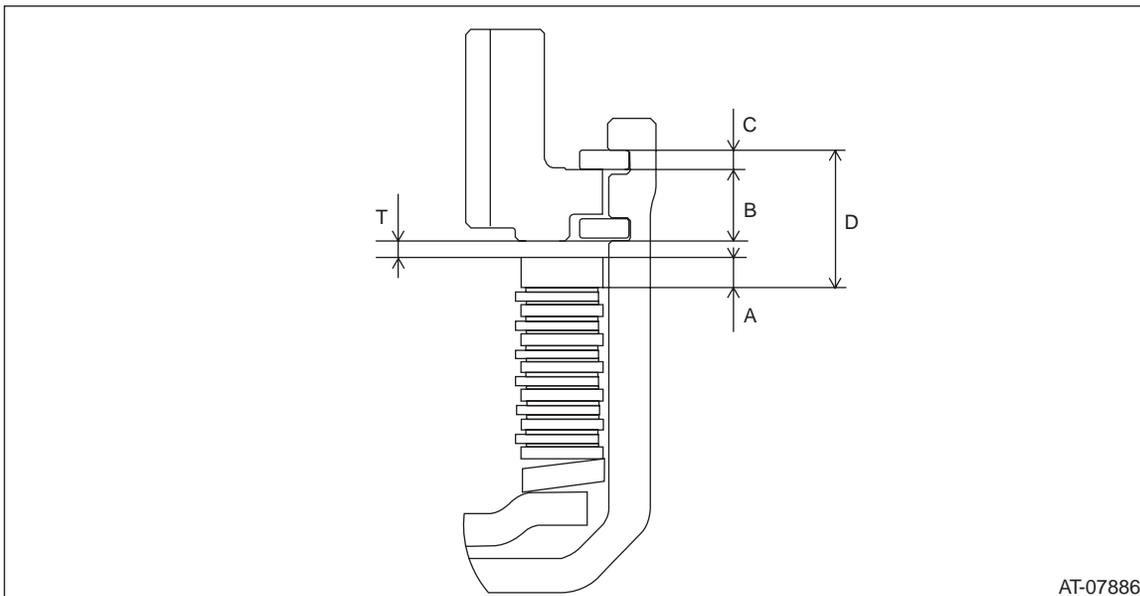
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Forward Clutch Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

11) Calculate clearance "T" from internal gear to retaining plate with the obtained value from step 5) through step 10).

Formula: $T \text{ mm (in)} = D - A - B - C$



AT-07886

12) If the value "T" obtained from step 11) exceeds the limit for use, replace the drive plate and driven plate with new parts and select the retaining plate within the initial standard value.

Initial standard:

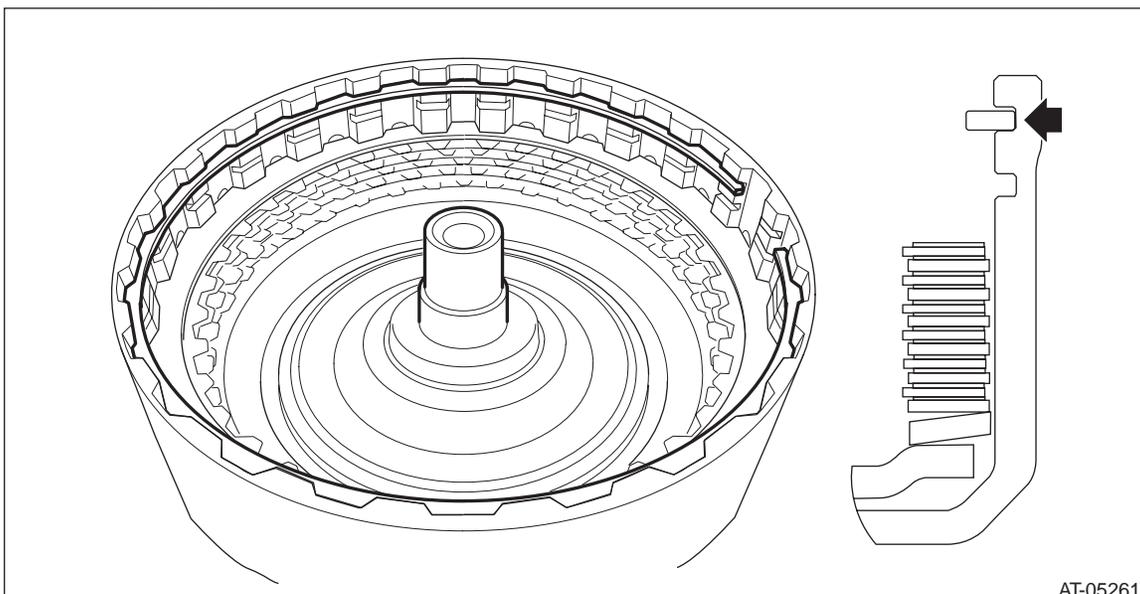
1.2 — 1.6 mm (0.047 — 0.063 in)

Limit thickness:

2.4 mm (0.09 in)

Retaining plate	
Item number	Thickness mm (in)
31567AB670	3.2 (0.126)
31567AB660	3.0 (0.118)
31567AB650	2.8 (0.110)
31567AB640	2.6 (0.102)

13) Remove the snap ring.

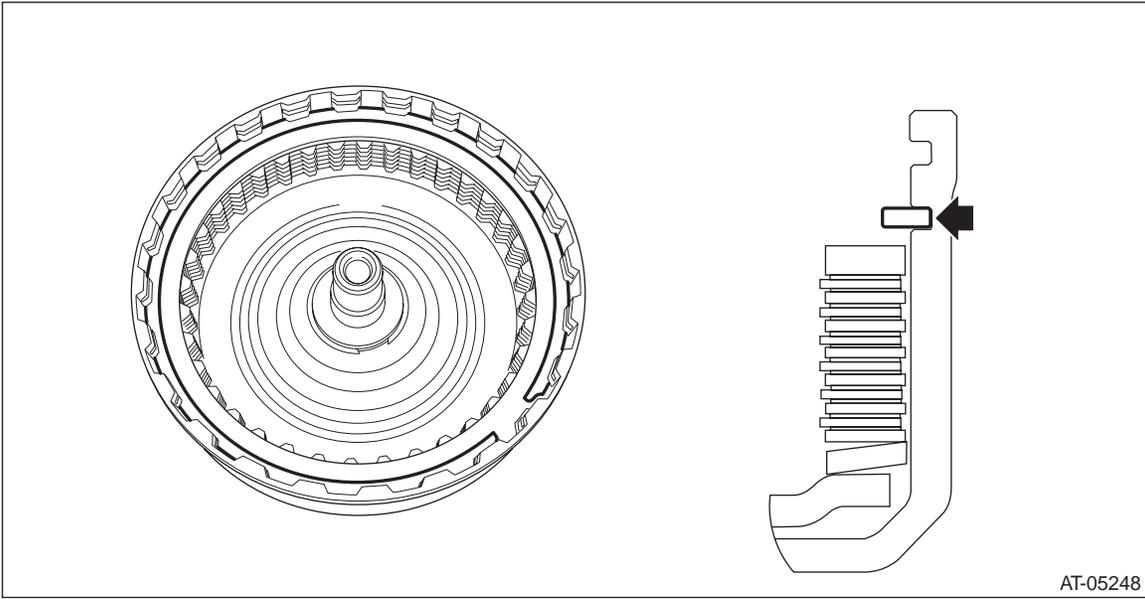


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Forward Clutch Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

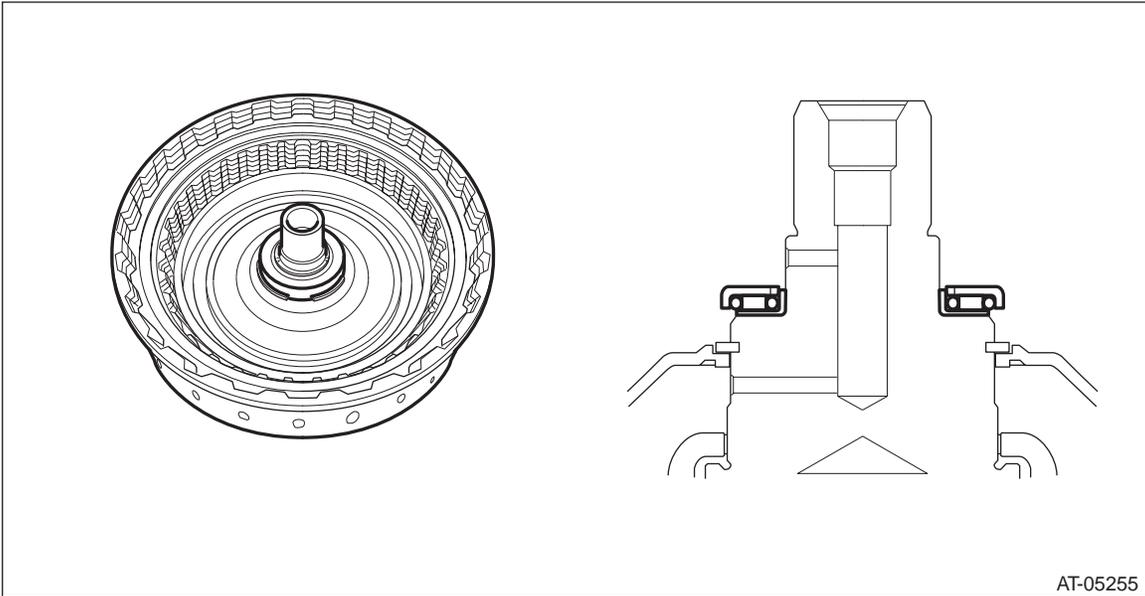
- 14) Replace with the selected retaining plate to install.
- 15) Install the snap ring to the lower groove.



- 16) Install the thrust needle bearing.

NOTE:

Install the thrust needle bearing in the correct direction.

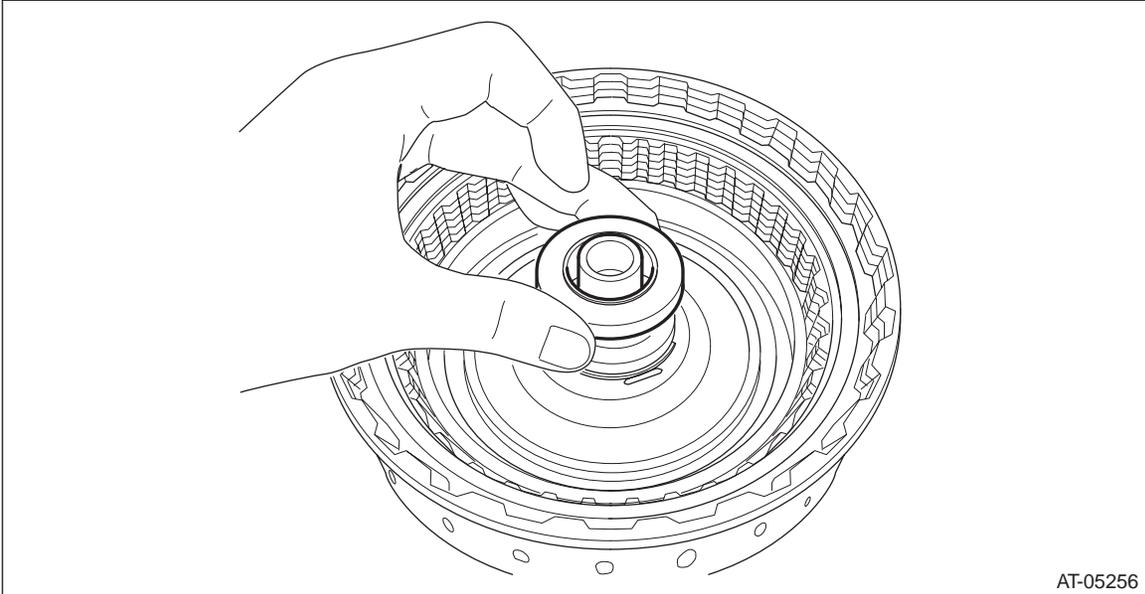


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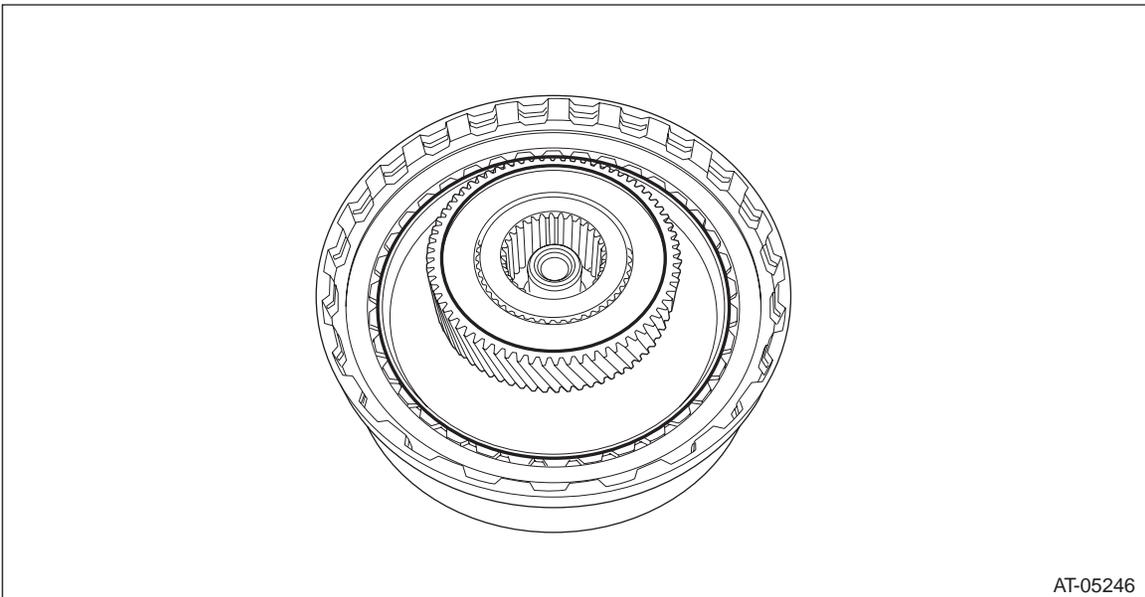
Forward Clutch Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

17) Install the washer.



18) Install the sun gear.

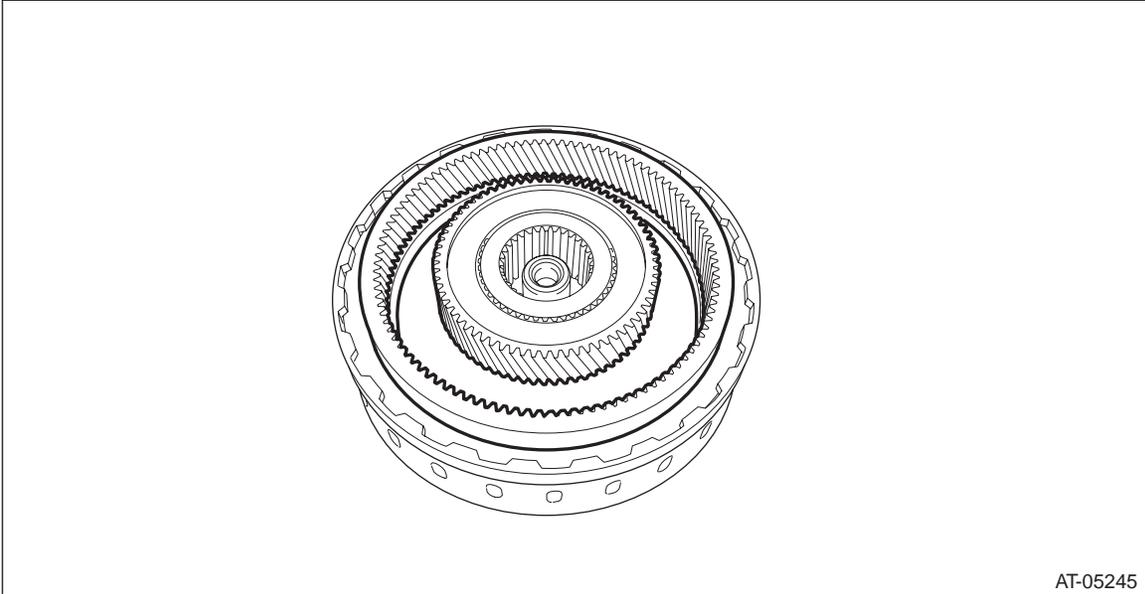


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Forward Clutch Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

19) Install the internal gear.



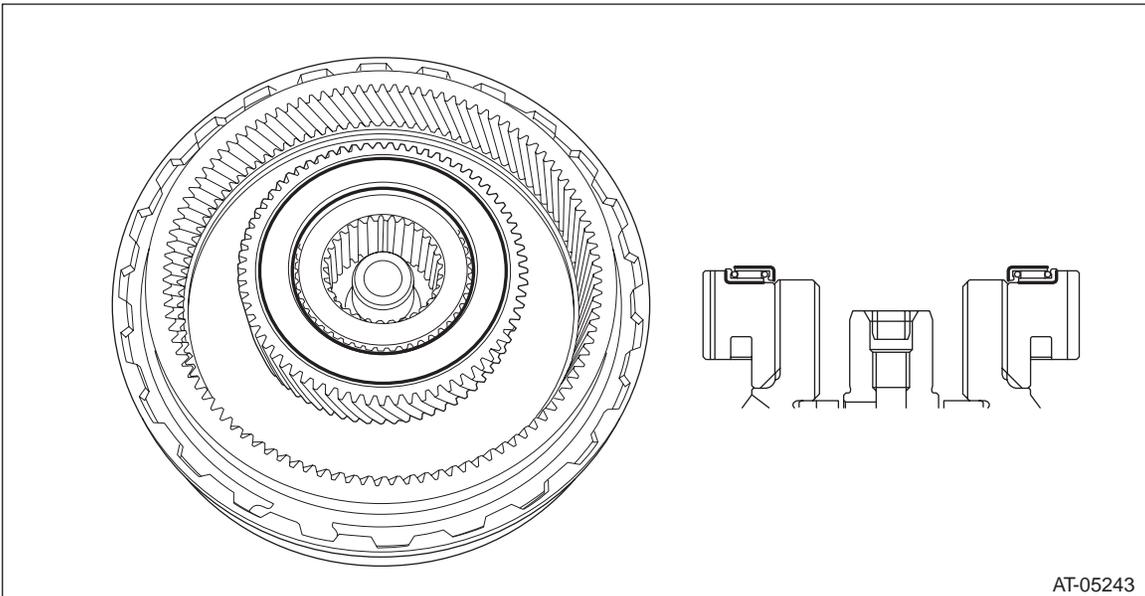
AT-05245

20) Install the snap ring.

21) Install the thrust needle bearing.

NOTE:

Make sure to install in the right direction.



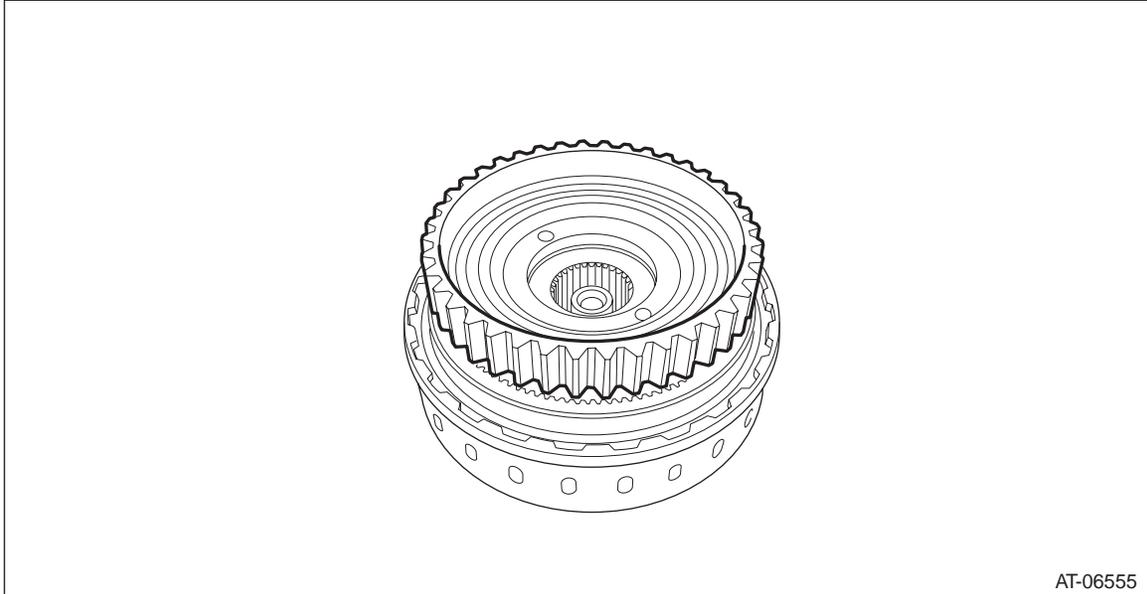
AT-05243

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Forward Clutch Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

22) Install the planetary carrier assembly.

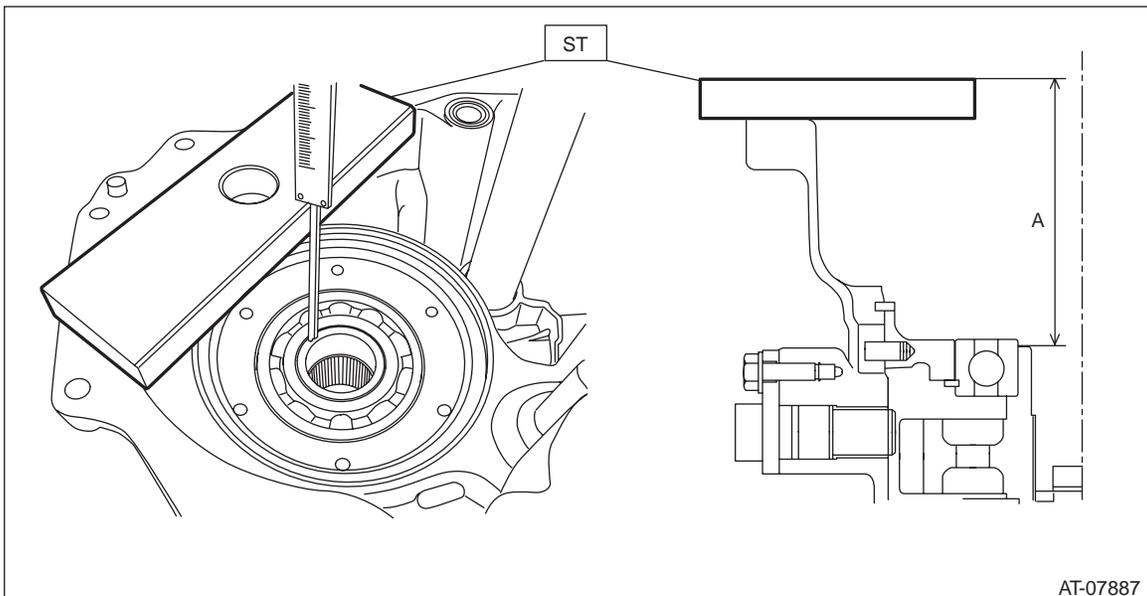


E: INSPECTION

- 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 assembly. <Ref. to CVT(TR690)-191, ASSEMBLY, Forward Clutch Assembly.>

F: ADJUSTMENT

- 1) Measure depth "A" from the ST upper face to the washer catch surface.
ST 398643600 GAUGE

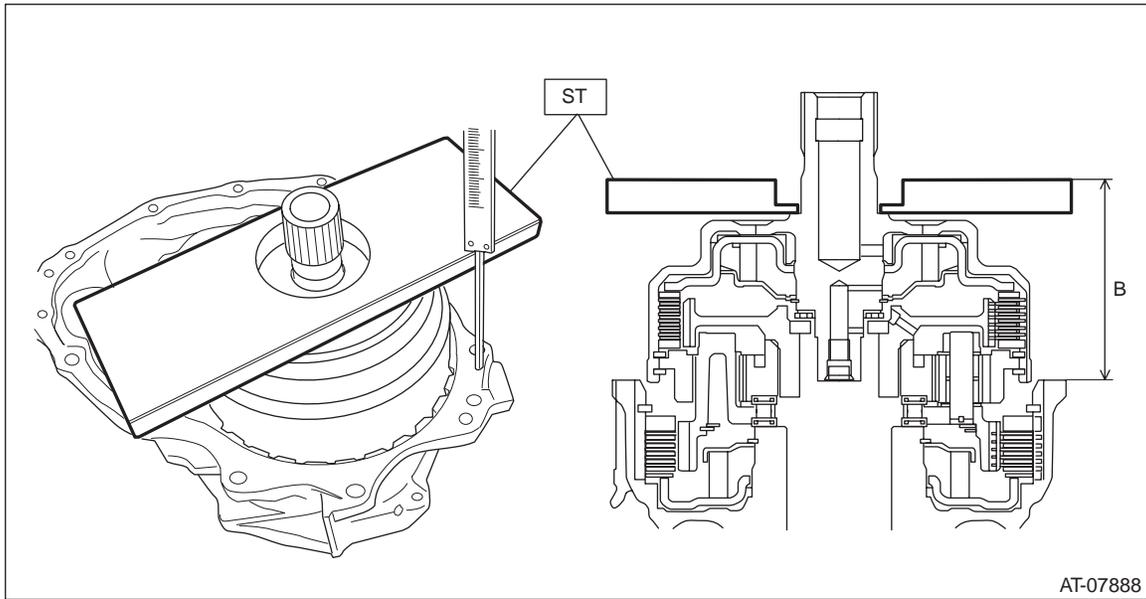


2) Install the forward clutch assembly to intermediate case.

Forward Clutch Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

3) Setting the ST, measure height "B" from the ST upper side to the intermediate case mating surface.
ST 499575600 GAUGE



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

Calculation formula:

$$T \text{ (mm)} = (A - 15) - (B - 15) - (0.35 - 0.70)$$

$$[T \text{ (in)} = (A - 0.591) - (B - 0.591) - (0.014 - 0.028)]$$

T: Washer thickness

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

B: Height from the upper surface of the ST to the mating surface of the intermediate case

15 mm (0.591 in): Thickness of ST

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

5) Select the washer to meet the value "T" obtained from step 4).

Washer	
Part No.	Washer thickness mm (in)
803034040	1.0 (0.039)
803034041	1.2 (0.047)
803034042	1.4 (0.055)
803034043	1.6 (0.063)

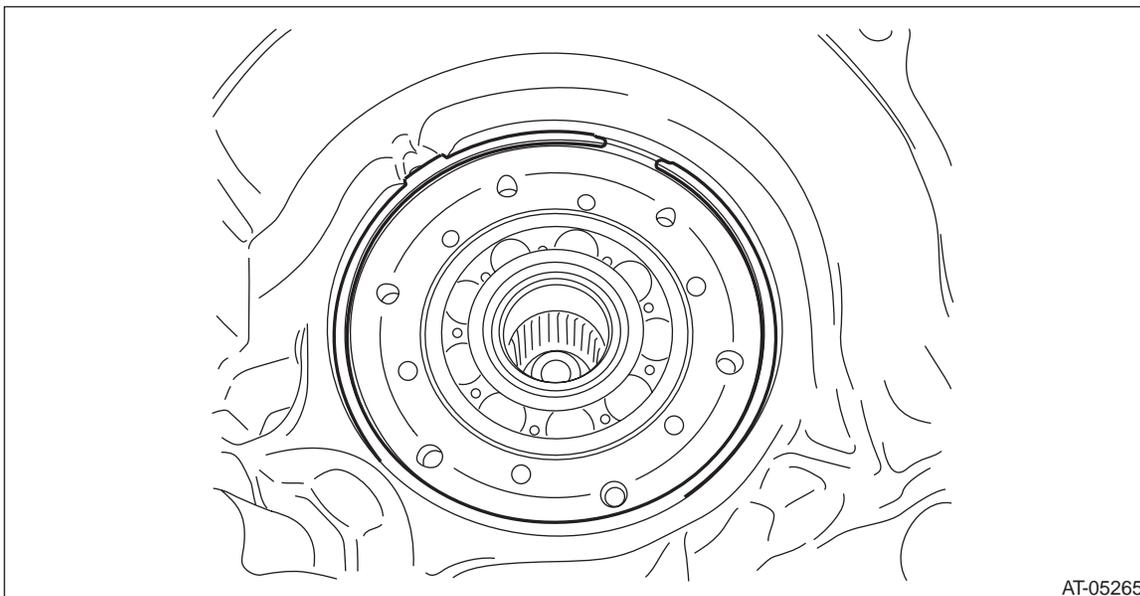
Reduction Driven Gear

CONTINUOUSLY VARIABLE TRANSMISSION

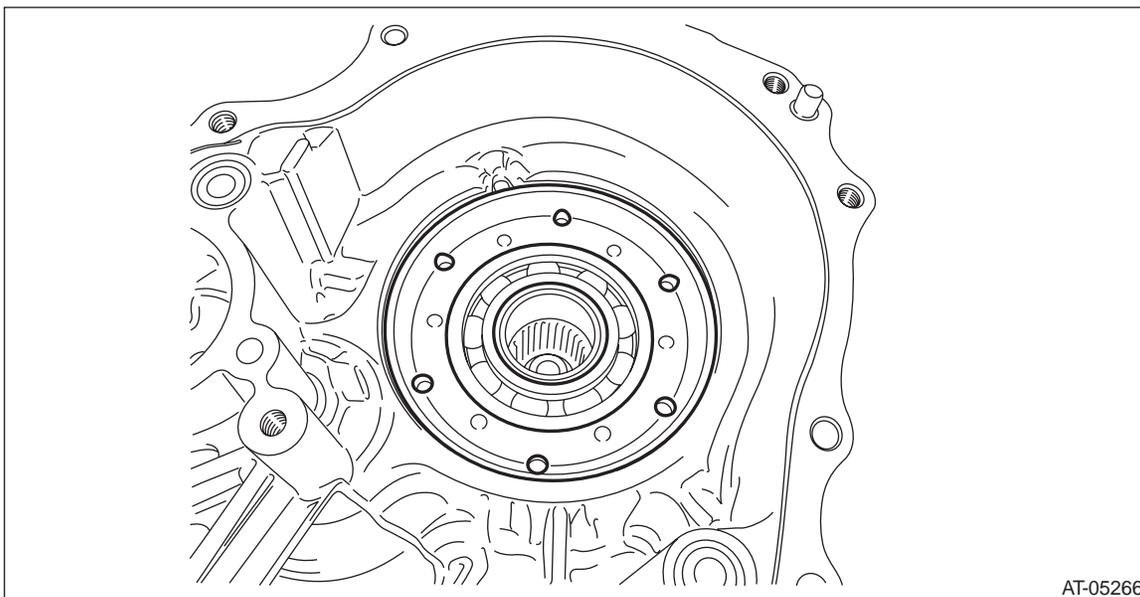
38.Reduction Driven Gear

A: REMOVAL

- 1) Remove the transmission from the vehicle. <Ref. to CVT(TR690)-56, REMOVAL, Automatic Transmission Assembly.>
- 2) Remove the extension case. <Ref. to CVT(TR690)-140, REMOVAL, Extension Case.>
- 3) Remove the rear drive shaft. <Ref. to CVT(TR690)-143, REMOVAL, Rear Drive Shaft.>
- 4) Remove the transfer clutch assembly. <Ref. to CVT(TR690)-148, REMOVAL, Transfer Clutch.>
- 5) Remove the transfer reduction driven gear assembly. <Ref. to CVT(TR690)-160, REMOVAL, Transfer Reduction Driven Gear.>
- 6) Remove the intermediate case. <Ref. to CVT(TR690)-167, REMOVAL, Intermediate Case.>
- 7) Remove the forward clutch assembly. <Ref. to CVT(TR690)-182, REMOVAL, Forward Clutch Assembly.>
- 8) Remove the snap ring.



- 9) Remove the reduction driven gear assembly.

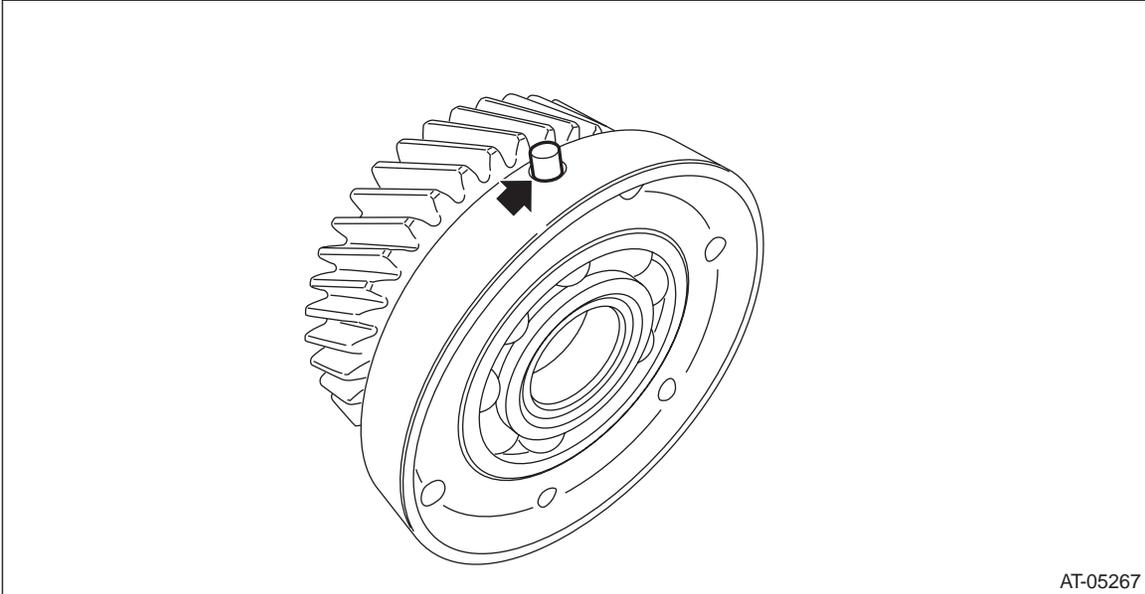


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Reduction Driven Gear

CONTINUOUSLY VARIABLE TRANSMISSION

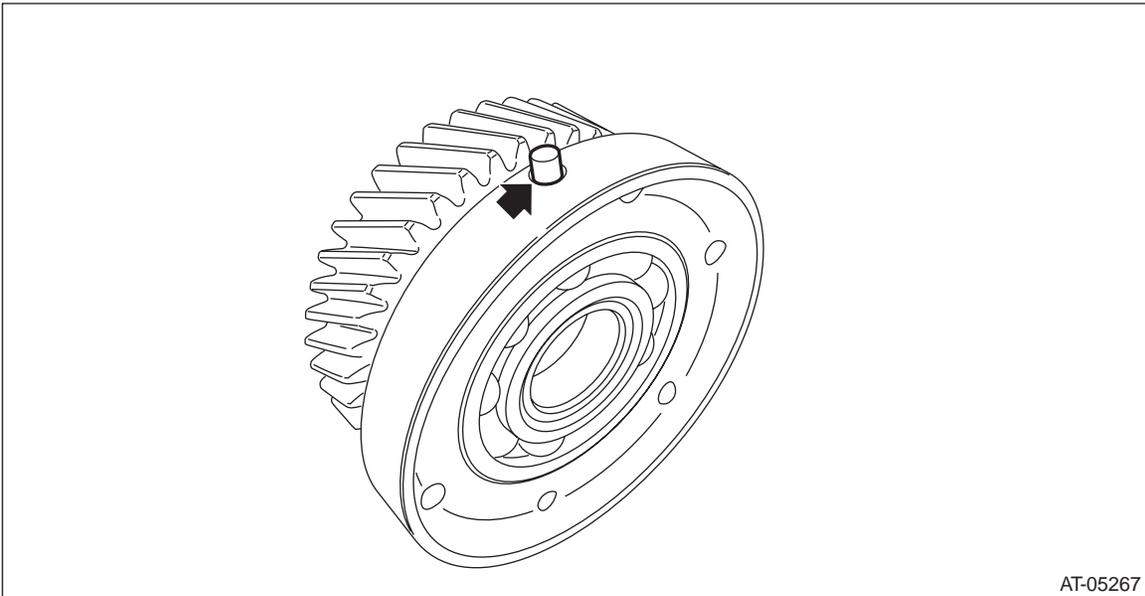
10) Remove the straight pin.



AT-05267

B: INSTALLATION

1) Install the straight pin to reduction driven gear assembly.



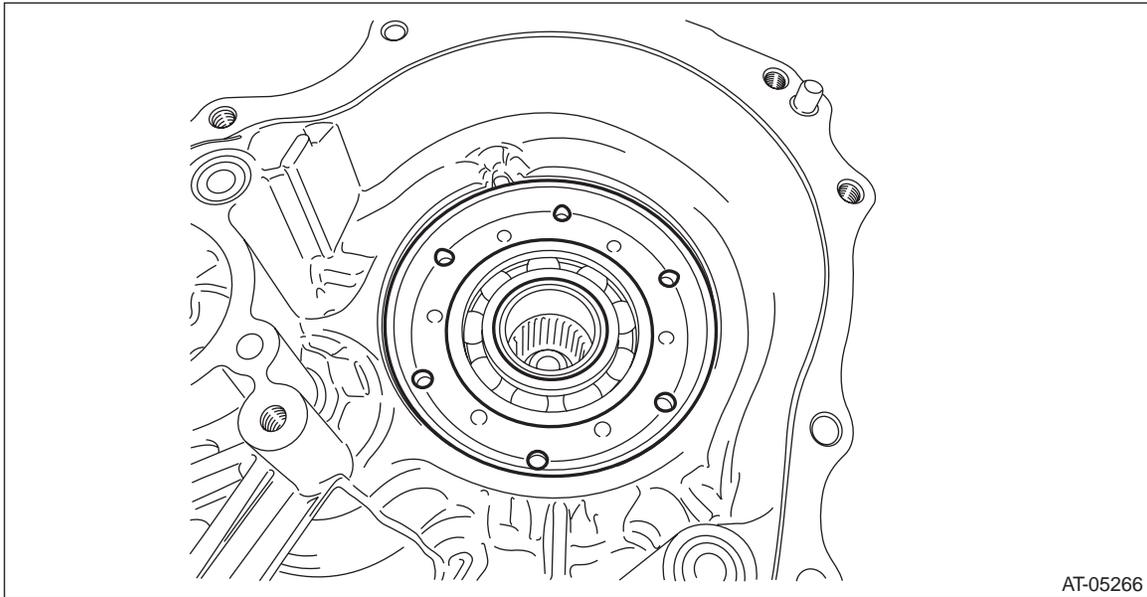
AT-05267

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Reduction Driven Gear

CONTINUOUSLY VARIABLE TRANSMISSION

2) Fit the straight pin portion to the recess portion of transmission case and install the reduction driven gear and install the snap ring.



3) Select the snap ring. <Ref. to CVT(TR690)-208, ADJUSTMENT, Reduction Driven Gear.>
4) Replace with the selected snap ring.

NOTE:

If the clearance measured in step 3) is within standard, the snap ring replacement is not necessary.

5) Install the forward clutch assembly. <Ref. to CVT(TR690)-183, INSTALLATION, Forward Clutch Assembly.>

6) Install the intermediate case. <Ref. to CVT(TR690)-168, INSTALLATION, Intermediate Case.>

7) Install the transfer reduction driven gear assembly. <Ref. to CVT(TR690)-160, INSTALLATION, Transfer Reduction Driven Gear.>

8) Install the transfer clutch assembly. <Ref. to CVT(TR690)-149, INSTALLATION, Transfer Clutch.>

9) Install the rear drive shaft. <Ref. to CVT(TR690)-143, INSTALLATION, Rear Drive Shaft.>

10) Install the extension case. <Ref. to CVT(TR690)-141, INSTALLATION, Extension Case.>

11) Install the transmission to vehicle. <Ref. to CVT(TR690)-69, INSTALLATION, Automatic Transmission Assembly.>

Reduction Driven Gear

CONTINUOUSLY VARIABLE TRANSMISSION

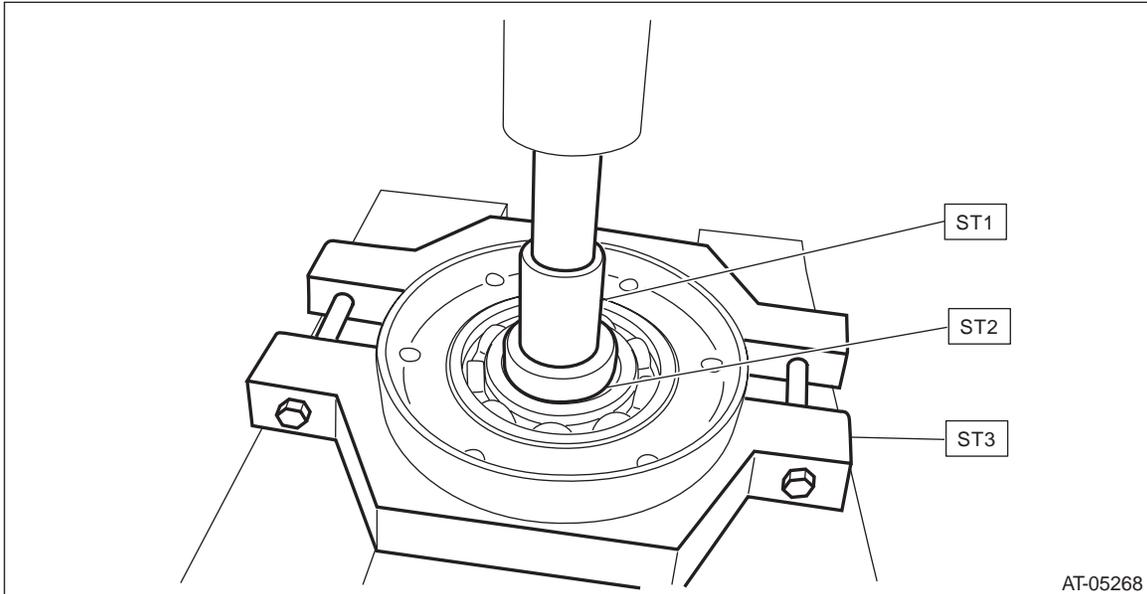
C: DISASSEMBLY

1) Remove the bearing retainer using ST1, ST2 and ST3.

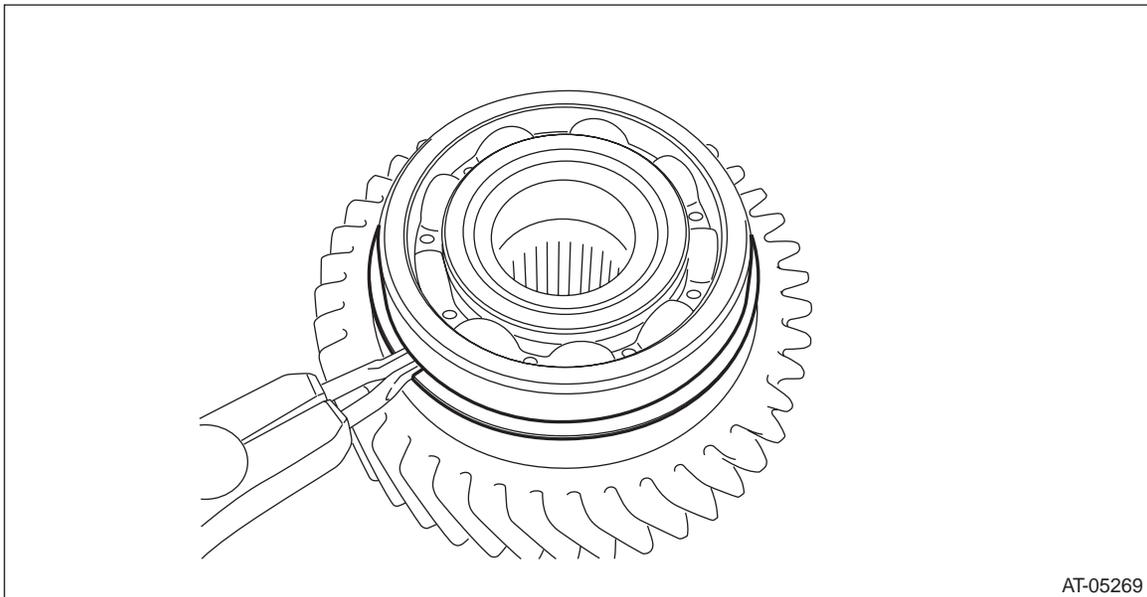
ST1 899864100 REMOVER

ST2 398497701 SEAT

ST3 18767AA000 BEARING REMOVER



2) Remove the snap ring.



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Reduction Driven Gear

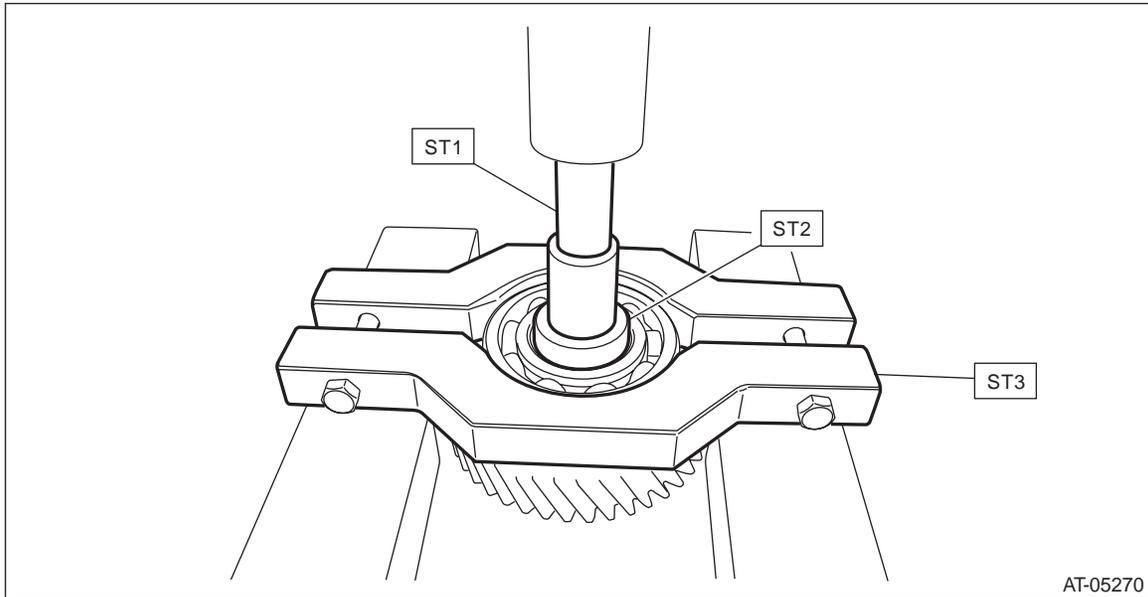
CONTINUOUSLY VARIABLE TRANSMISSION

3) Remove the ball bearing using ST1, ST2 and ST3.

ST1 899864100 REMOVER

ST2 398497701 SEAT

ST3 498077600 REMOVER



Reduction Driven Gear

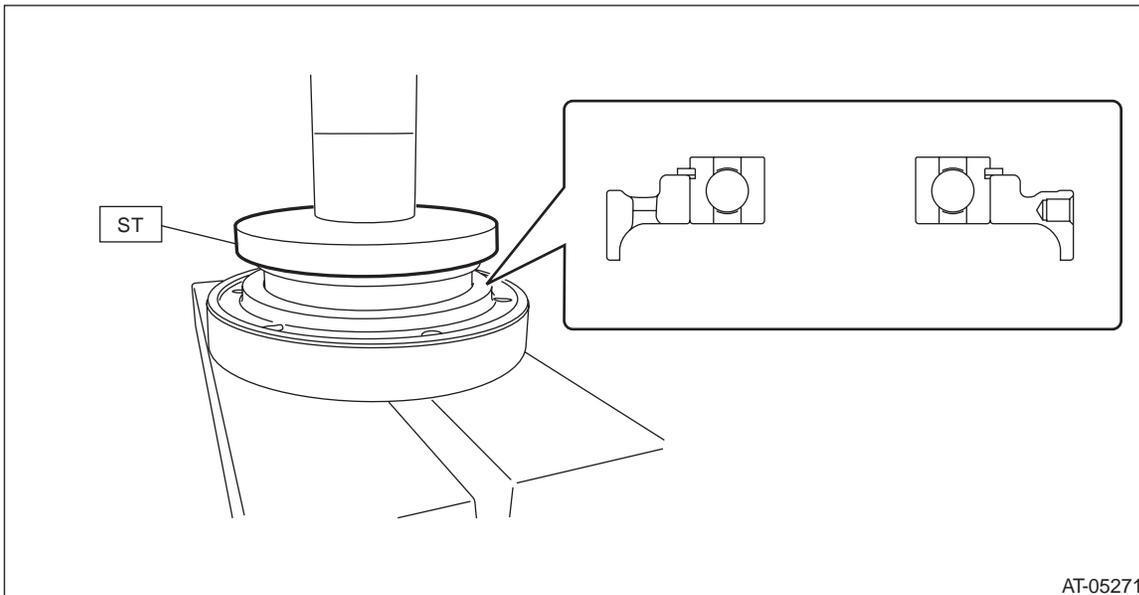
CONTINUOUSLY VARIABLE TRANSMISSION

D: ASSEMBLY

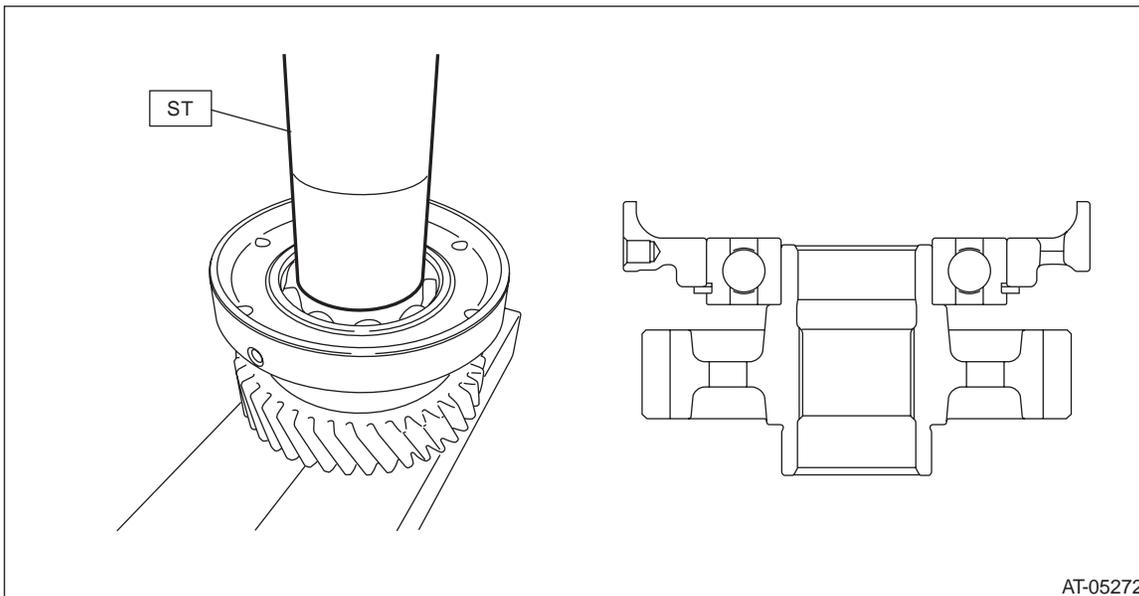
1) Using the ST, install the ball bearing to bearing retainer.
ST 398177700 INSTALLER

NOTE:

- Use a new ball bearing.
- Make sure to install the ball bearing in the right direction.
- Apply CVTF to the press-fitting area.



2) Using the ST, install the reduction driven gear.
ST 499277200 INSTALLER



E: INSPECTION

- Check the ball bearing for smooth rotation.
- Check the ball bearing for excessive looseness.
- Check the reduction driven gear for breakage or damage.
- Check the clearance between snap ring and transmission case and replace the snap ring as necessary.

Reduction Driven Gear

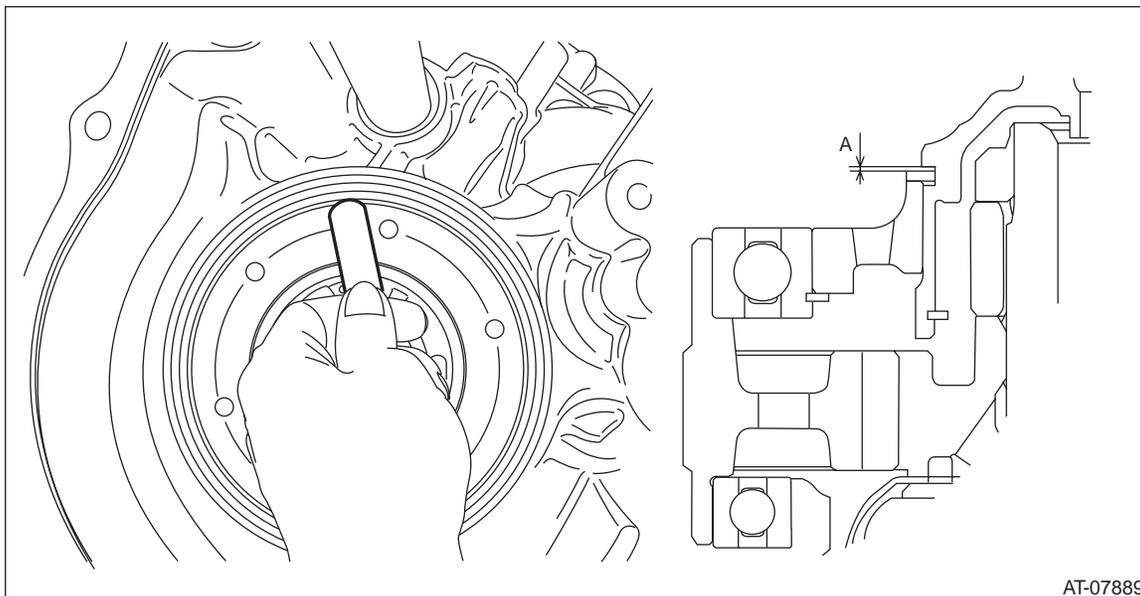
CONTINUOUSLY VARIABLE TRANSMISSION

F: ADJUSTMENT

1) Measure clearance "A" between snap ring and transmission case.

Specification:

0.05 — 0.25 mm (0.002 — 0.01 in)



2) If clearance "A" is out of standard, select the snap ring within standard.

Snap ring	
Part No.	Thickness mm (in)
805100460	2.0 (0.079)
805100461	2.1 (0.083)
805100462	2.2 (0.087)
805100463	2.3 (0.091)
805100464	2.4 (0.094)

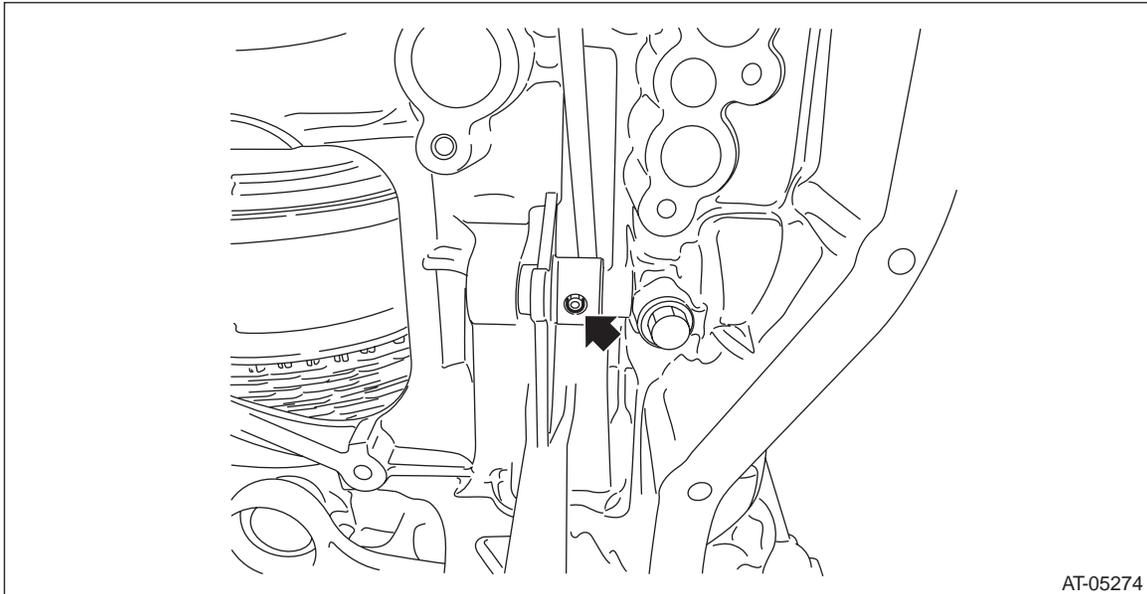
39. Transmission Control Device

A: REMOVAL

- 1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TR690)-56, REMOVAL, Automatic Transmission Assembly.>
- 2) Remove the oil pan and control valve body. <Ref. to CVT(TR690)-109, REMOVAL, Control Valve Body.>
- 3) Remove the inhibitor switch. <Ref. to CVT(TR690)-95, REMOVAL, Inhibitor Switch.>
- 4) Remove the spring pin.

NOTE:

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



AT-05274

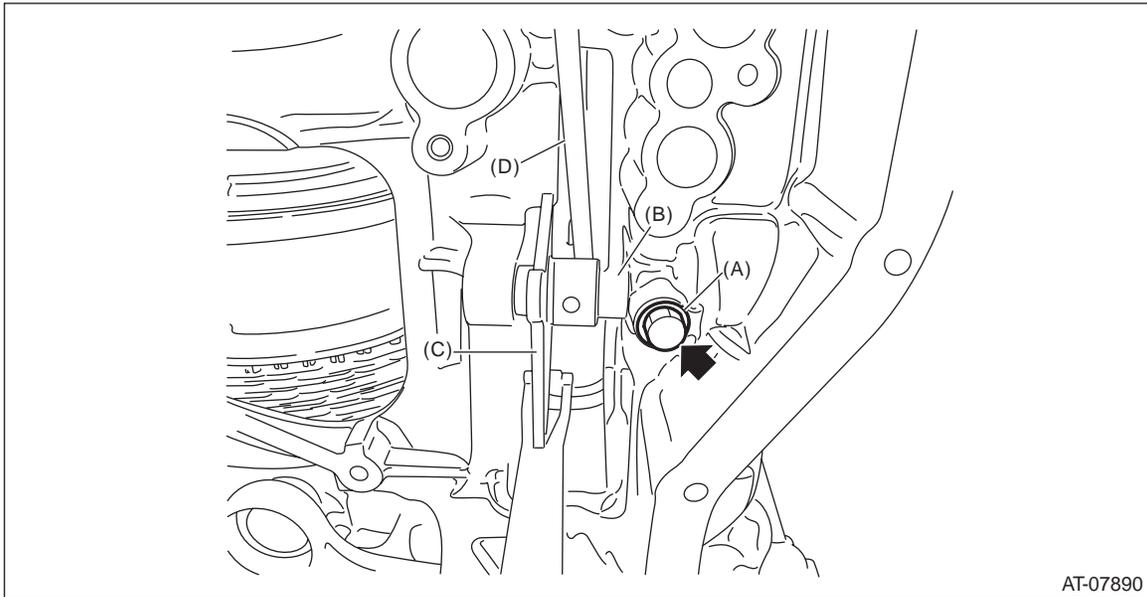
Transmission Control Device

CONTINUOUSLY VARIABLE TRANSMISSION

5) Remove the bolt and remove the range select lever, manual plate and parking rod.

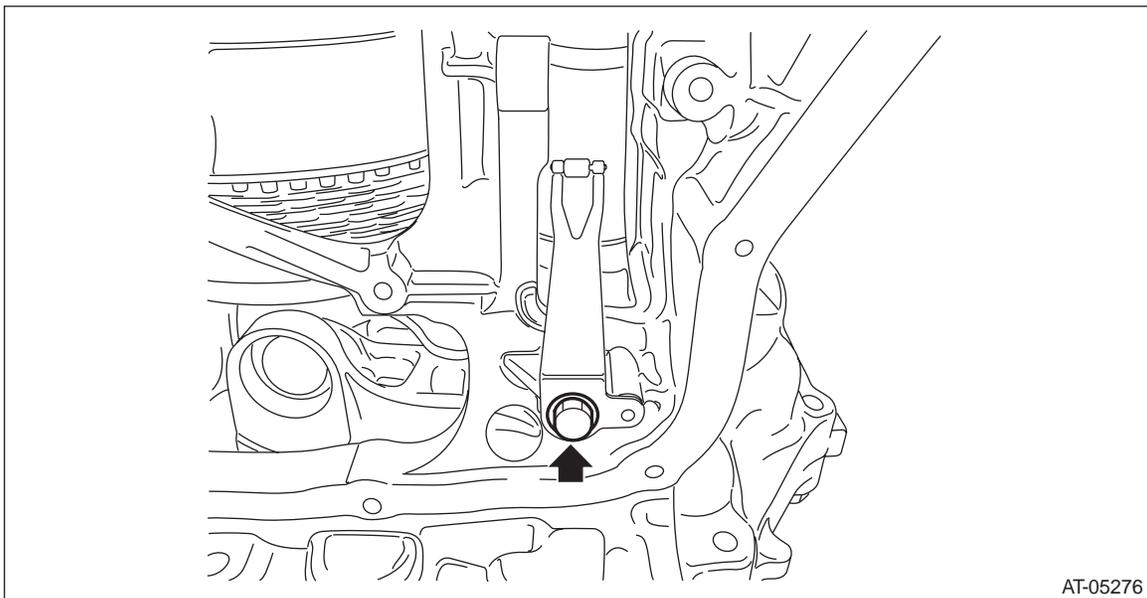
NOTE:

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



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

6) Remove the detent spring.



Transmission Control Device

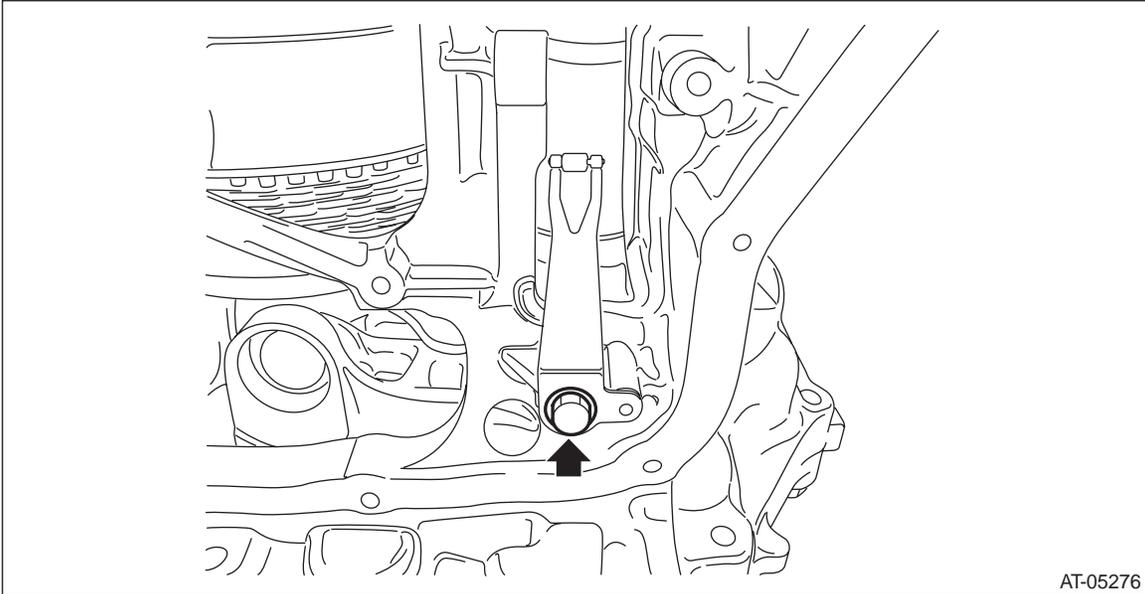
CONTINUOUSLY VARIABLE TRANSMISSION

B: INSTALLATION

1) Install the detent spring to the transmission case.

Tightening torque:

7 N·m (0.7 kgf·m, 5.2 ft-lb)

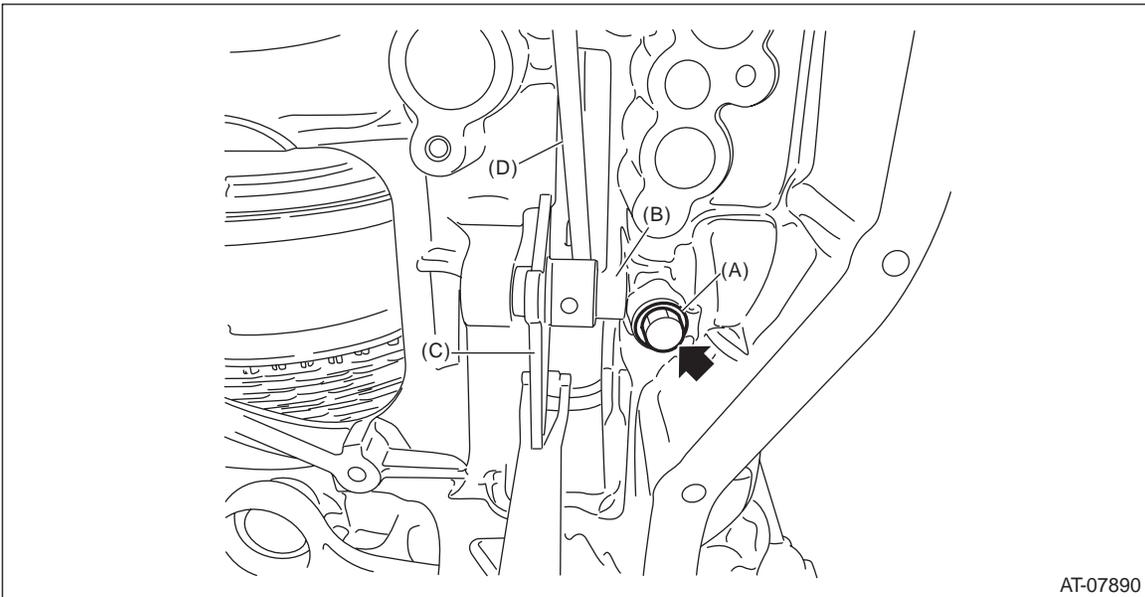


AT-05276

2) Install the manual plate, parking rod, range select lever and bolt.

Tightening torque:

7 N·m (0.7 kgf·m, 5.2 ft-lb)



AT-07890

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

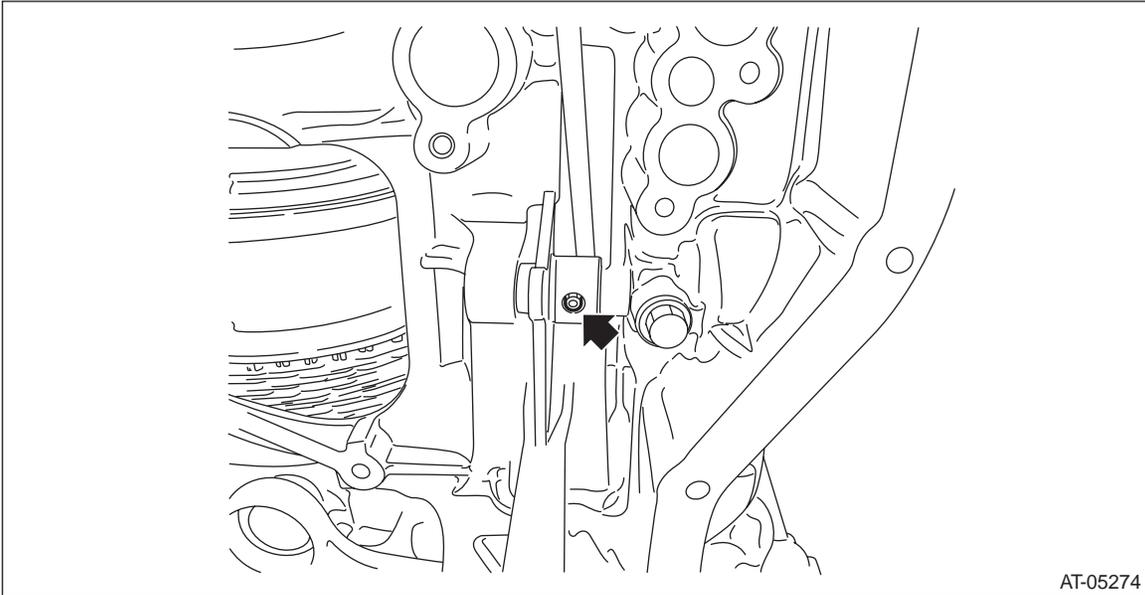
Transmission Control Device

CONTINUOUSLY VARIABLE TRANSMISSION

3) Install the spring pin.

NOTE:

Use new spring pin.



AT-05274

4) Install the inhibitor switch. <Ref. to CVT(TR690)-92, Inhibitor Switch.>

5) Adjust the inhibitor switch. <Ref. to CVT(TR690)-92, Inhibitor Switch.>

6) Install the control valve body and oil pan. <Ref. to CVT(TR690)-113, INSTALLATION, Control Valve Body.>

7) Install the transmission assembly to the vehicle. <Ref. to CVT(TR690)-69, INSTALLATION, Automatic Transmission Assembly.>

C: INSPECTION

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

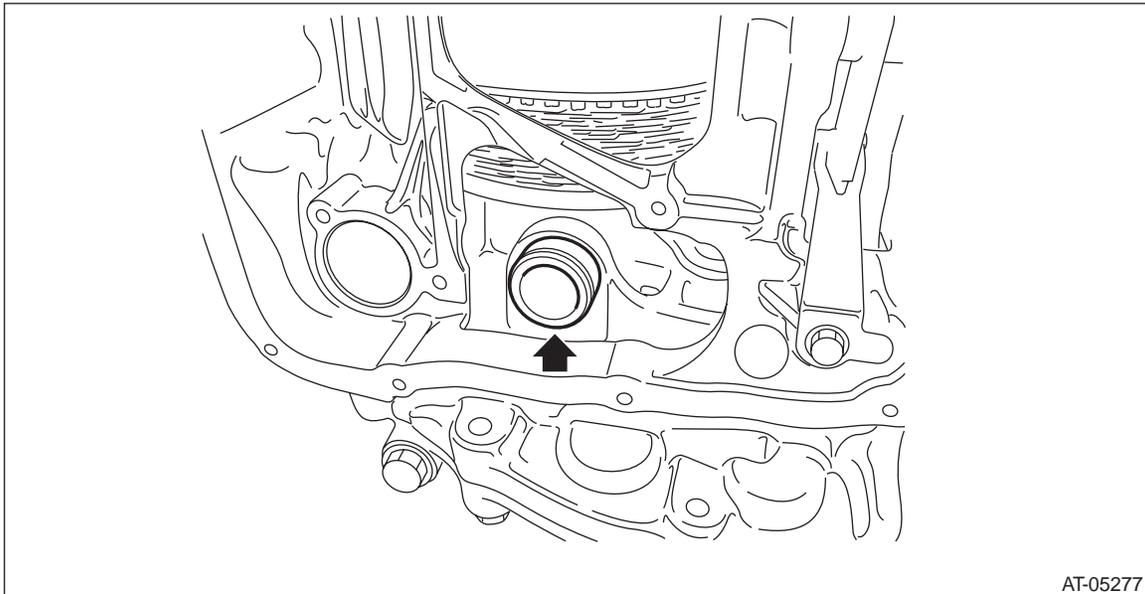
40. Transmission Case

A: REMOVAL

- 1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TR690)-56, REMOVAL, Automatic Transmission Assembly.>
- 2) Remove the air breather hose. <Ref. to CVT(TR690)-134, REMOVAL, Air Breather Hose.>
- 3) Remove the transmission harness. <Ref. to CVT(TR690)-120, REMOVAL, Transmission Harness.>
- 4) Remove the secondary speed sensor. <Ref. to CVT(TR690)-99, REMOVAL, Secondary Speed Sensor.>
- 5) Remove the inhibitor switch. <Ref. to CVT(TR690)-95, REMOVAL, Inhibitor Switch.>
- 6) Remove the extension case. <Ref. to CVT(TR690)-140, REMOVAL, Extension Case.>
- 7) Remove the rear drive shaft. <Ref. to CVT(TR690)-143, REMOVAL, Rear Drive Shaft.>
- 8) Remove the transfer clutch assembly. <Ref. to CVT(TR690)-148, REMOVAL, Transfer Clutch.>
- 9) Remove the transfer reduction driven gear assembly. <Ref. to CVT(TR690)-160, REMOVAL, Transfer Reduction Driven Gear.>
- 10) Remove the intermediate case. <Ref. to CVT(TR690)-167, REMOVAL, Intermediate Case.>
- 11) Remove the forward clutch assembly. <Ref. to CVT(TR690)-182, REMOVAL, Forward Clutch Assembly.>
- 12) Remove the reduction driven gear. <Ref. to CVT(TR690)-202, REMOVAL, Reduction Driven Gear.>
- 13) Remove the oil pan and control valve body. <Ref. to CVT(TR690)-109, REMOVAL, Control Valve Body.>

NOTE:

When removing the control valve body, also remove the pressure pipe if it is attached on the case.



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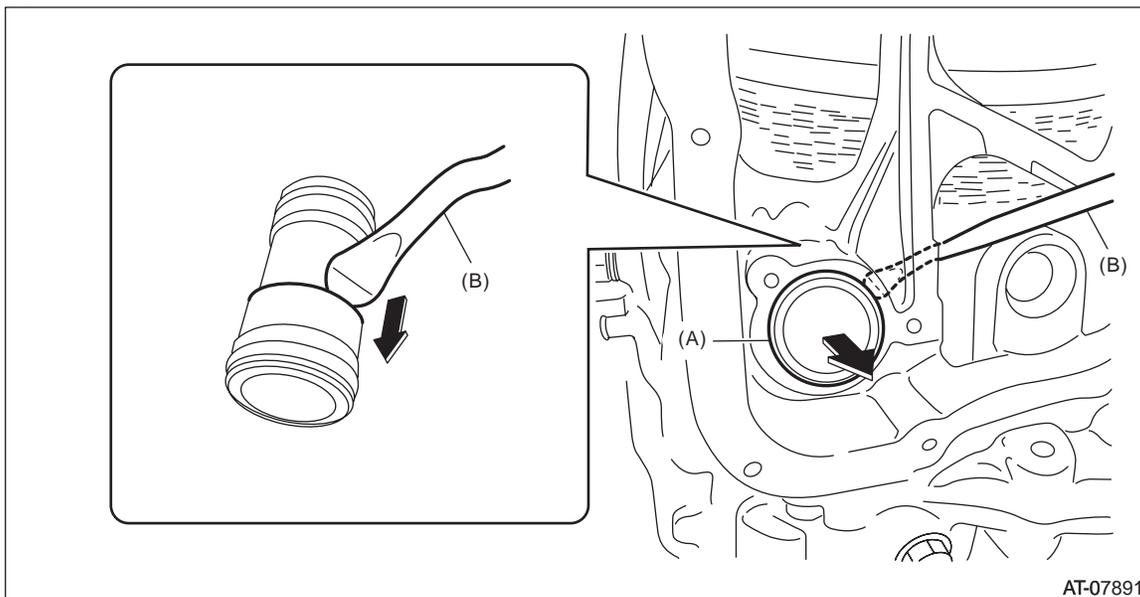
Transmission Case

CONTINUOUSLY VARIABLE TRANSMISSION

14) Remove the CVTF pipe using a tire lever etc.

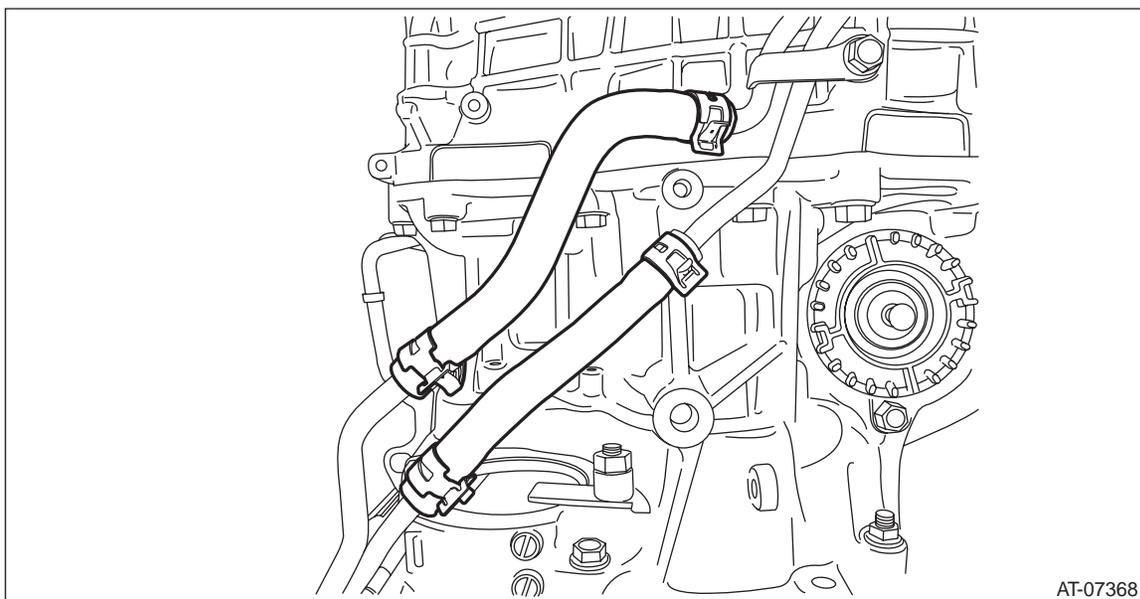
NOTE:

Remove by hooking the stepped portion of CVTF pipe with a tire lever etc.



- (A) CVTF pipe
- (B) Tire lever

15) Remove the CVTF cooler hose.



16) Remove the transmission case.

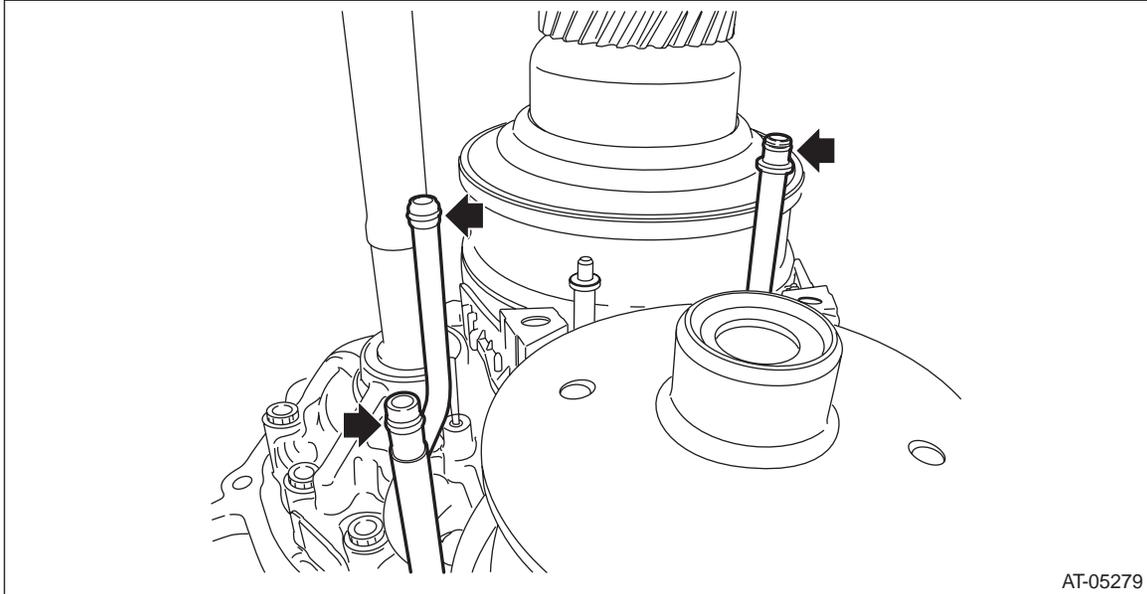
NOTE:

The total number of transmission case mounting bolts is 15.

Transmission Case

CONTINUOUSLY VARIABLE TRANSMISSION

17) Remove the O-ring of lubrication pipe.



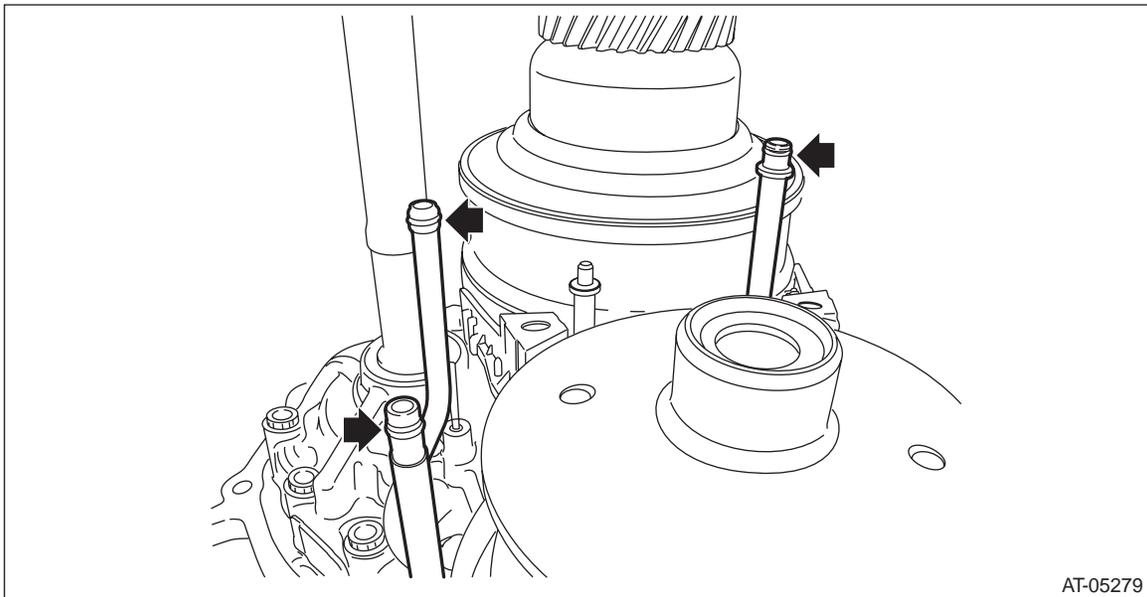
18) Remove the control device system. <Ref. to CVT(TR690)-209, REMOVAL, Transmission Control Device.>

B: INSTALLATION

- 1) Clean the mating surface of transmission case and converter case.
- 2) Install the control device system.<Ref. to CVT(TR690)-211, INSTALLATION, Transmission Control Device.>
- 3) Install the O-ring to the lubrication pipe.

NOTE:

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

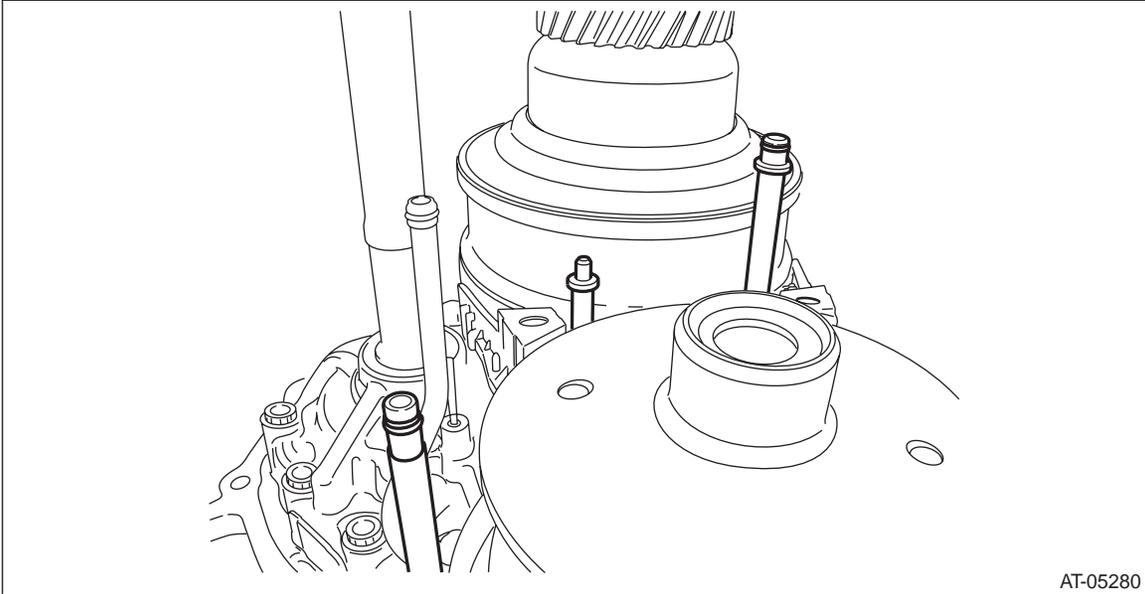


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Transmission Case

CONTINUOUSLY VARIABLE TRANSMISSION

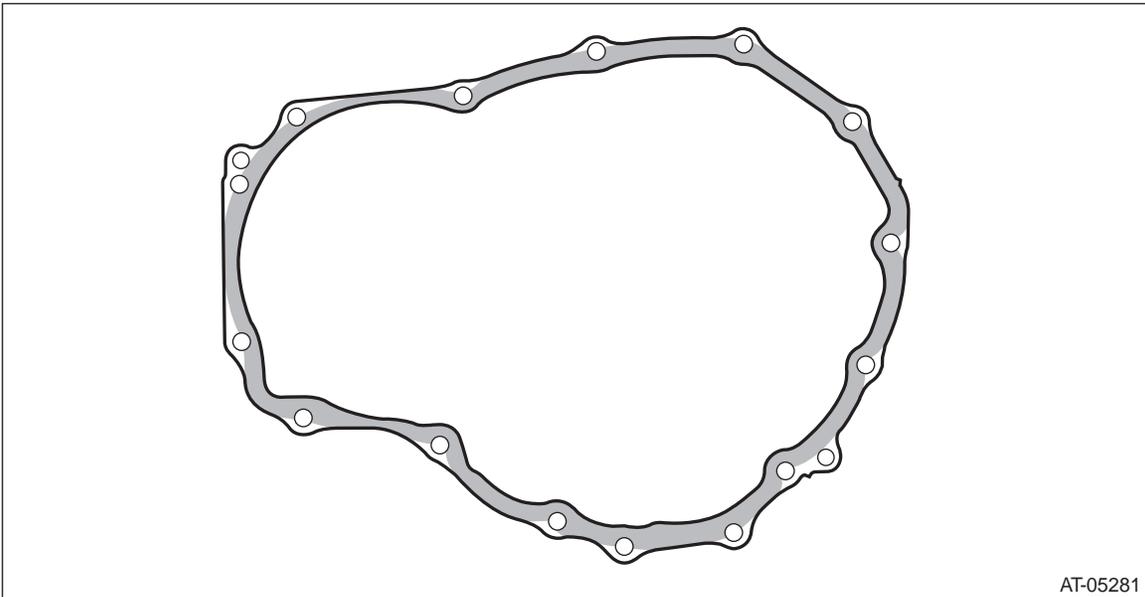
4) Make sure the lubrication pipe and support rod are in vertical position.



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

Liquid gasket:

THREE BOND 1215B or equivalent



6) Install the transmission case.

CAUTION:

If the transmission case gets in contact with the lubrication pipe and support rod, do not install the transmission case forcibly.

NOTE:

- Install while checking the lubrication pipe and support rod is being inserted properly into transmission case.
- If installing the transmission is difficult, check if the lubrication pipe and support rod are bent.
- The total number of transmission case mounting bolts is 15.

Tightening torque:

41 N·m (4.2 kgf·m, 30.2 ft·lb)

Transmission Case

CONTINUOUSLY VARIABLE TRANSMISSION

7) Install the O-ring to CVTF pipe.

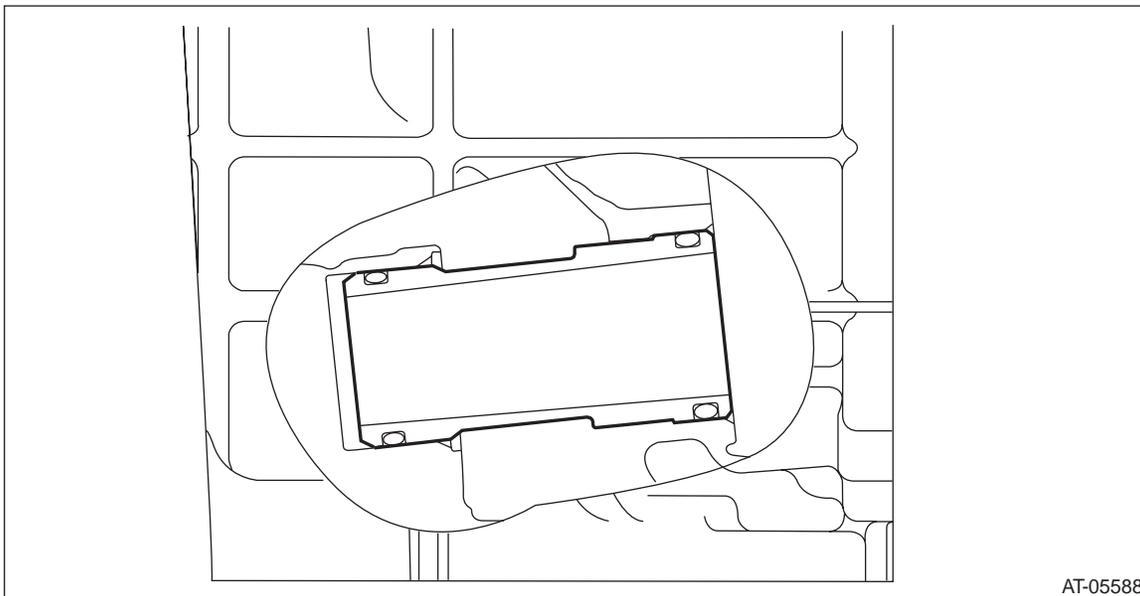
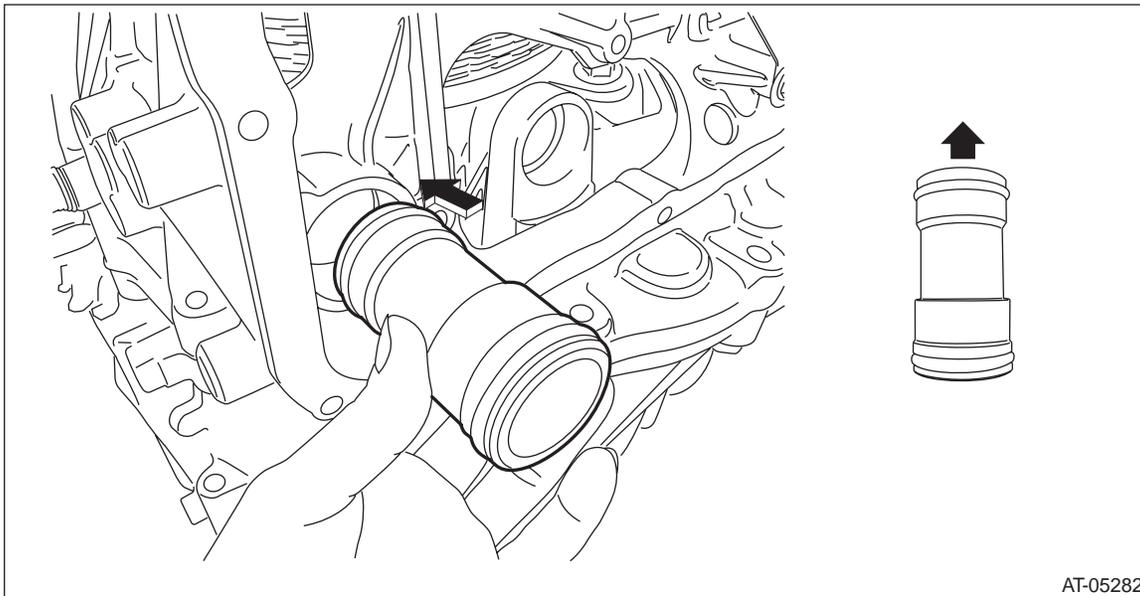
NOTE:

Use new O-rings.

8) The smaller opening of CVTF pipe should be inserted to transmission.

NOTE:

After installing, make sure the CVTF pipe does not stick out of transmission case.



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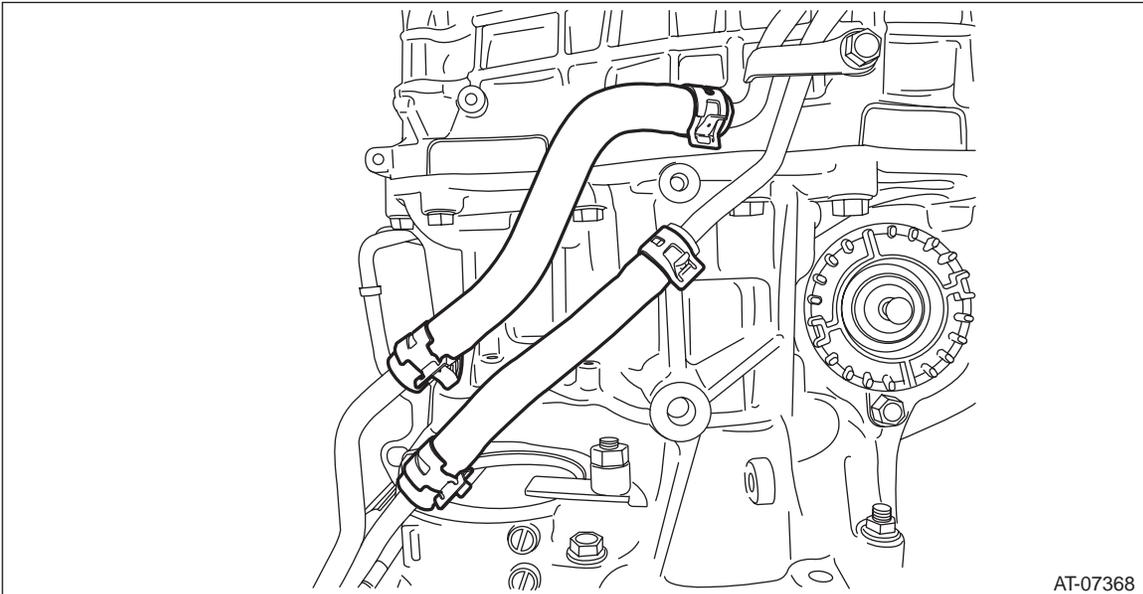
Transmission Case

CONTINUOUSLY VARIABLE TRANSMISSION

9) Install the CVTF hose.

NOTE:

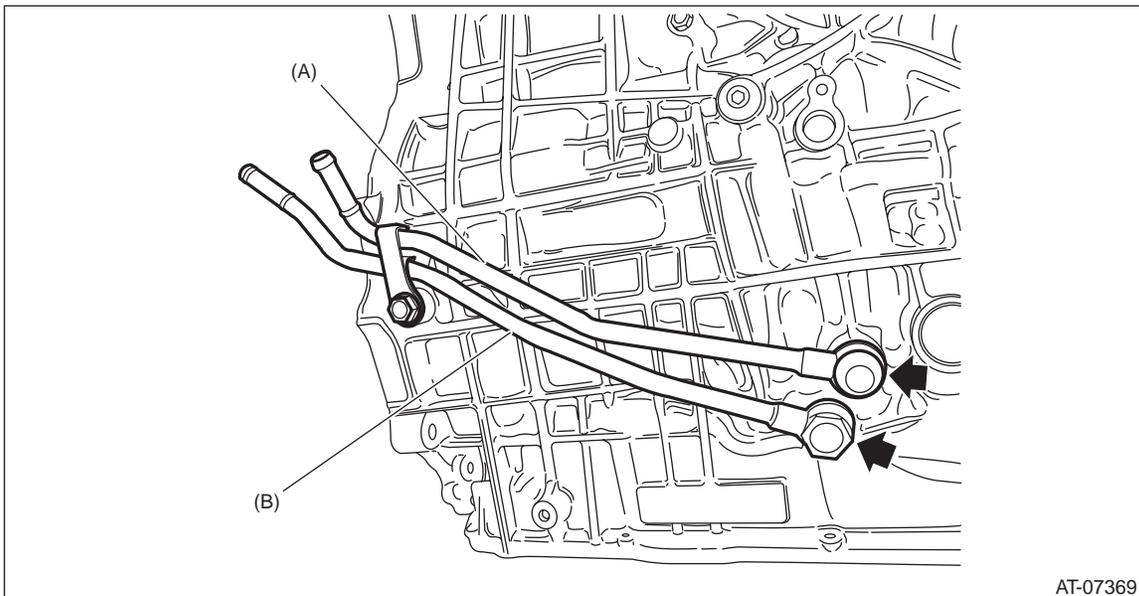
- Use new CVTF hoses.
- Install the CVTF hose with the painted position facing the rear side of transmission.



- 10) Install the reduction driven gear.<Ref. to CVT(TR690)-203, INSTALLATION, Reduction Driven Gear.>
11) Install the forward clutch assembly.<Ref. to CVT(TR690)-183, INSTALLATION, Forward Clutch Assembly.>
12) Install the intermediate case.<Ref. to CVT(TR690)-168, INSTALLATION, Intermediate Case.>
13) Install the transfer reduction driven gear assembly.<Ref. to CVT(TR690)-160, INSTALLATION, Transfer Reduction Driven Gear.>
14) Install the transfer clutch assembly.<Ref. to CVT(TR690)-149, INSTALLATION, Transfer Clutch.>
15) Install the rear drive shaft.<Ref. to CVT(TR690)-143, INSTALLATION, Rear Drive Shaft.>
16) Install the extension case.<Ref. to CVT(TR690)-141, INSTALLATION, Extension Case.>
17) Install the inhibitor switch.<Ref. to CVT(TR690)-97, INSTALLATION, Inhibitor Switch.>
18) Install the secondary speed sensor.<Ref. to CVT(TR690)-100, INSTALLATION, Secondary Speed Sensor.>
19) Install the transmission harness.<Ref. to CVT(TR690)-122, INSTALLATION, Transmission Harness.>
20) Install the control valve body and oil pan.<Ref. to CVT(TR690)-113, INSTALLATION, Control Valve Body.>
21) Install the air breather hose.<Ref. to CVT(TR690)-134, INSTALLATION, Air Breather Hose.>
22) Install the transmission assembly to the vehicle.<Ref. to CVT(TR690)-69, INSTALLATION, Automatic Transmission Assembly.>

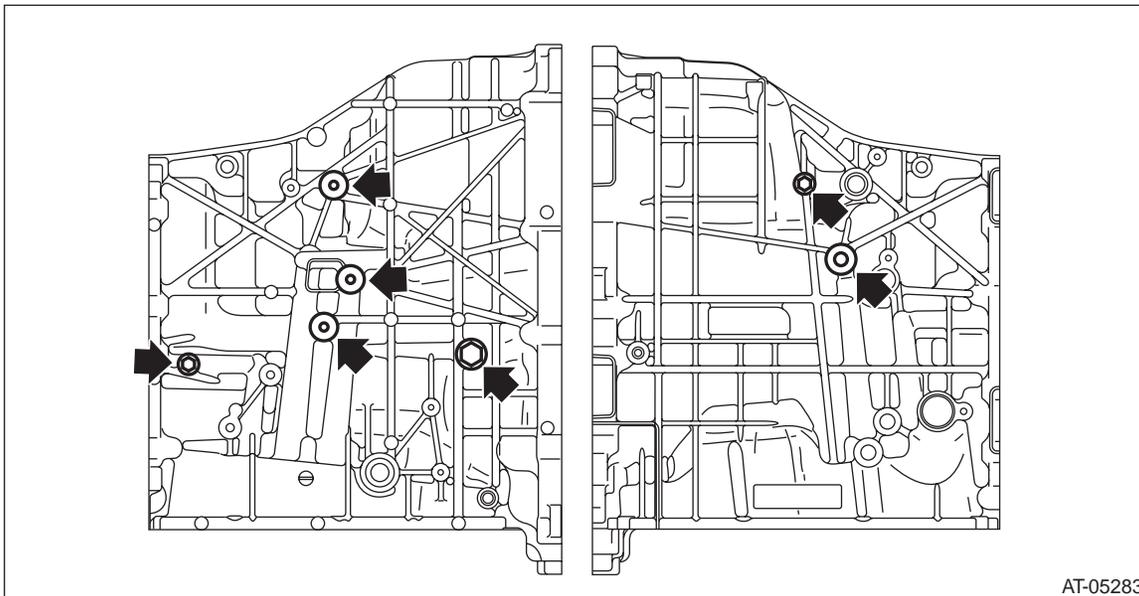
C: DISASSEMBLY

1) Remove the CVTF inlet pipe and CVTF outlet pipe.



- (A) CVTF outlet pipe
- (B) CVTF inlet pipe

2) Remove all plugs from the transmission case.

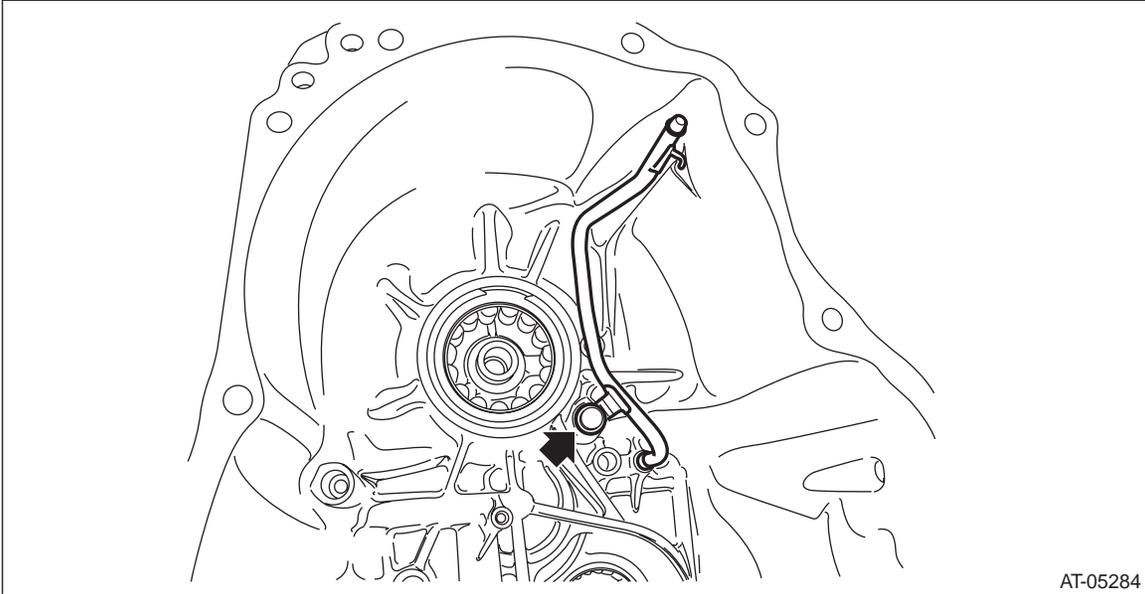


AT-05283

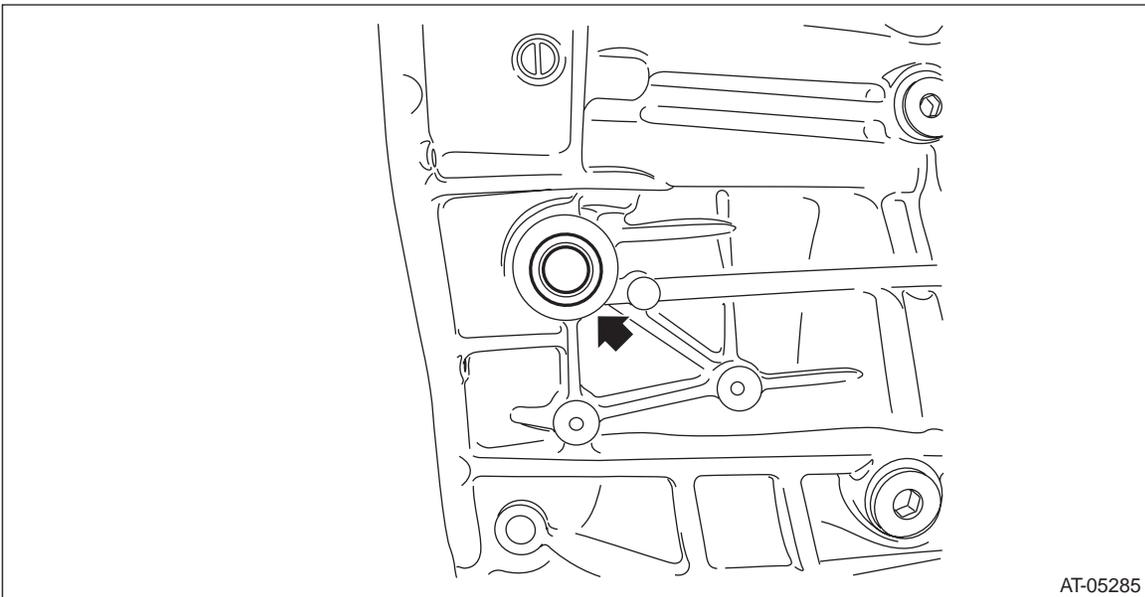
Transmission Case

CONTINUOUSLY VARIABLE TRANSMISSION

3) Remove the lubrication pipe.



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



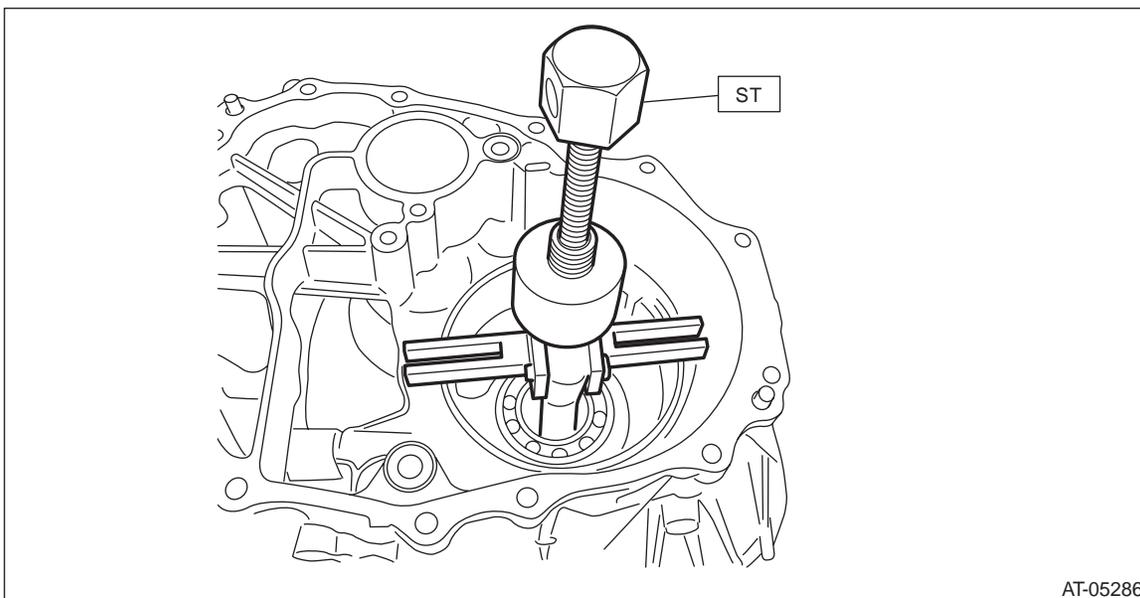
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Transmission Case

CONTINUOUSLY VARIABLE TRANSMISSION

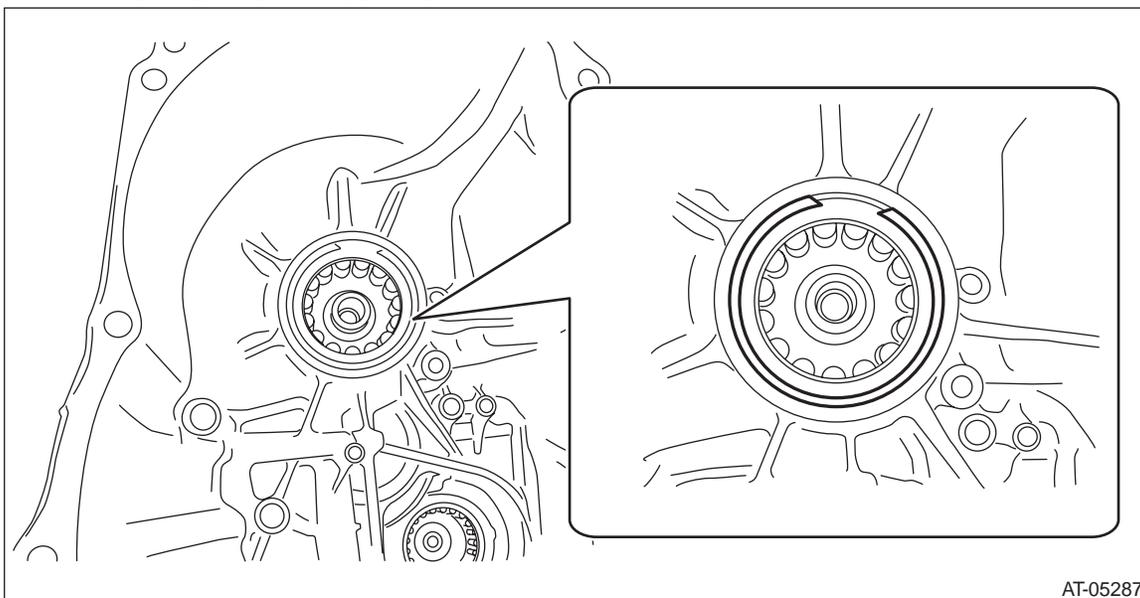
5) Remove the ball bearing from reduction driven gear using ST.

ST 398527700 PULLER ASSY



AT-05286

6) Remove the snap ring on primary pulley side.



AT-05287

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Transmission Case

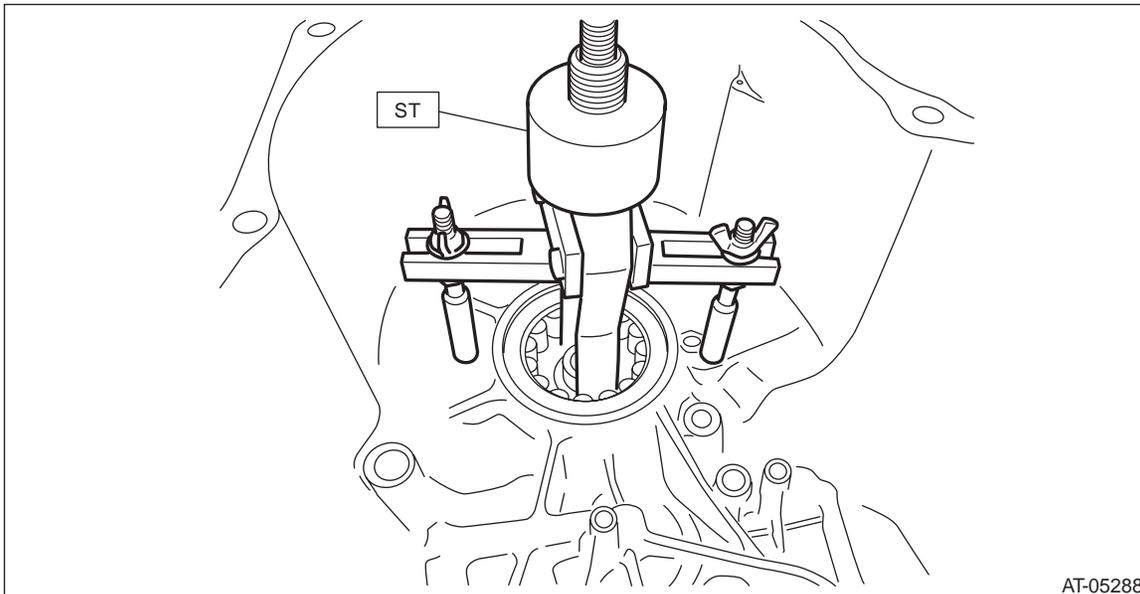
CONTINUOUSLY VARIABLE TRANSMISSION

7) Using the ST, remove the roller bearing on primary pulley side.

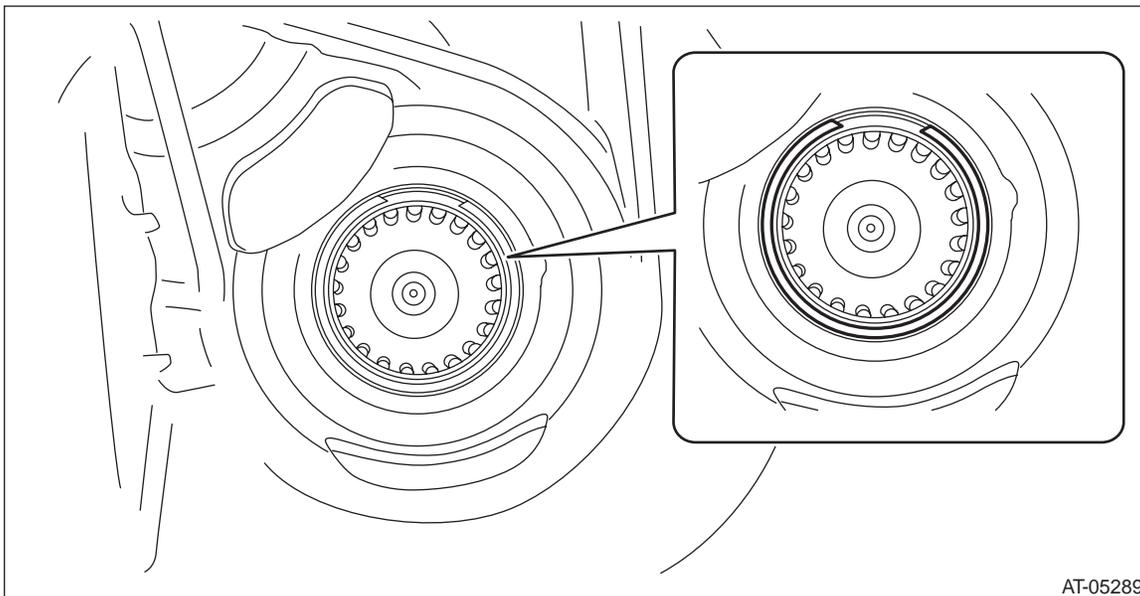
NOTE:

Warm up the bearing area of transmission case using a drier or heat gun.

ST 398527700 PULLER ASSY



8) Remove the snap ring on secondary pulley side.



Transmission Case

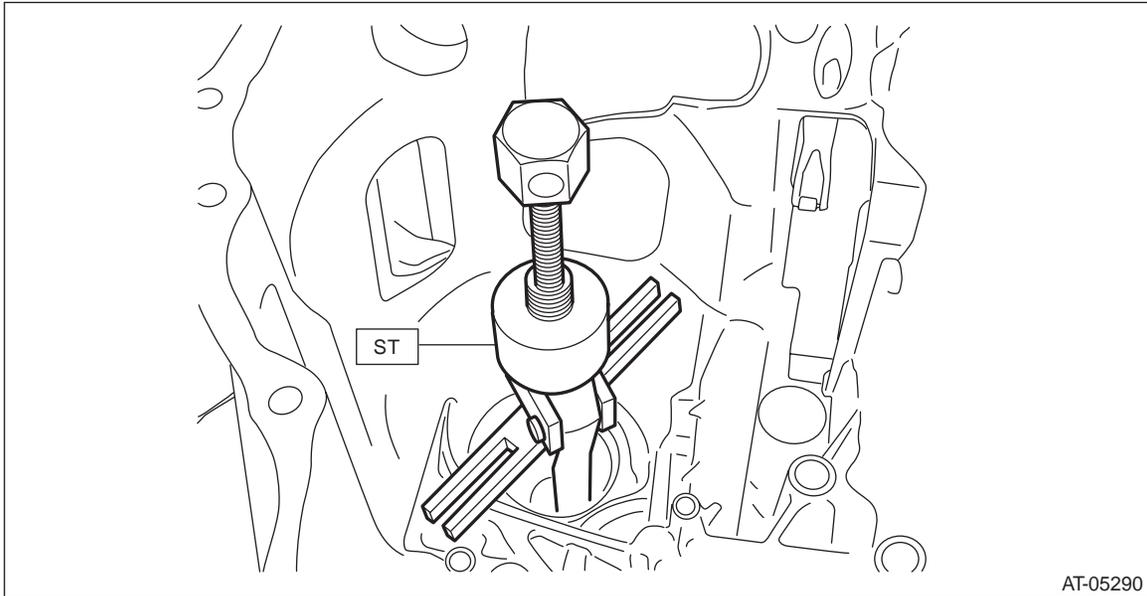
CONTINUOUSLY VARIABLE TRANSMISSION

9) Using the ST, remove the roller bearing on secondary pulley side.

NOTE:

Warm up the bearing area of transmission case using a drier or heat gun.

ST 398527700 PULLER ASSY



AT-05290

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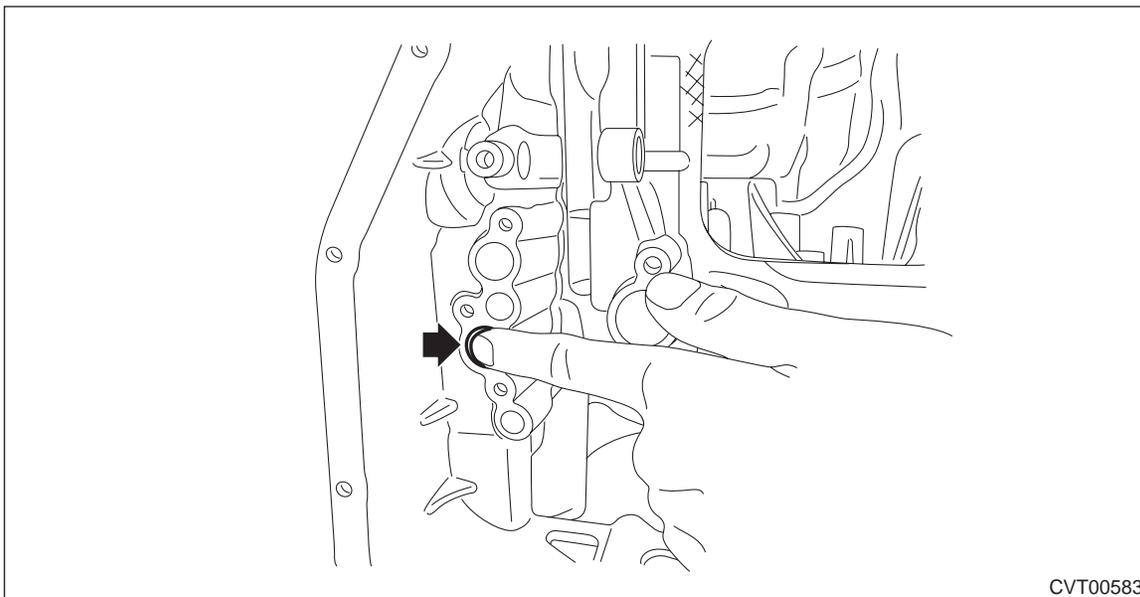
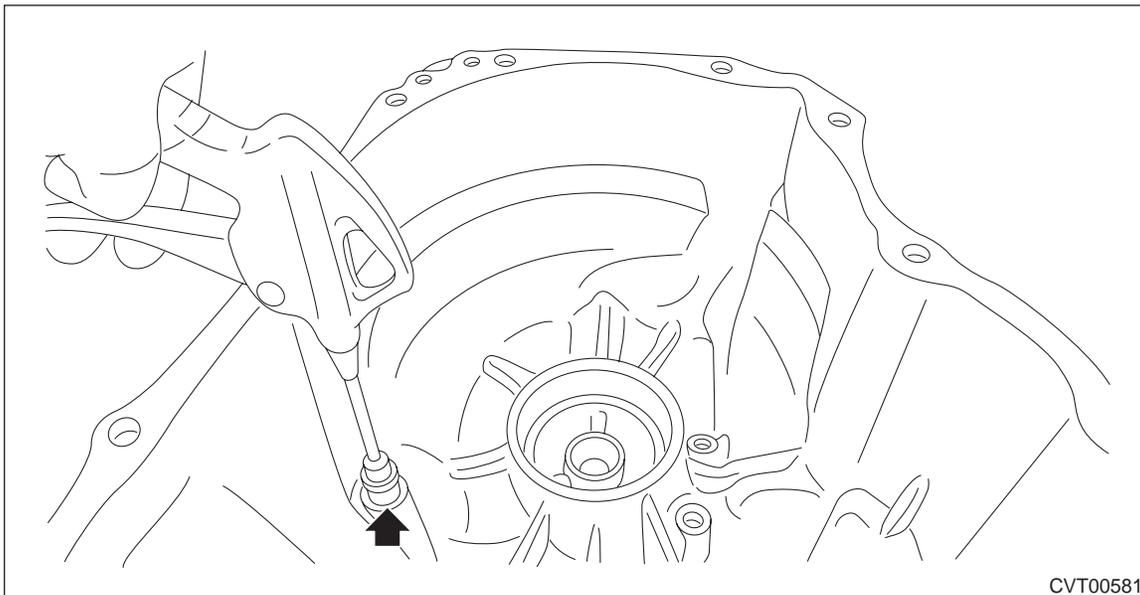
Transmission Case

CONTINUOUSLY VARIABLE TRANSMISSION

10) Remove the CVTF filter by blowing compressed air through the transmission case hole.

NOTE:

Hold the CVTF filter with a finger to prevent compressed air from leaking.



Transmission Case

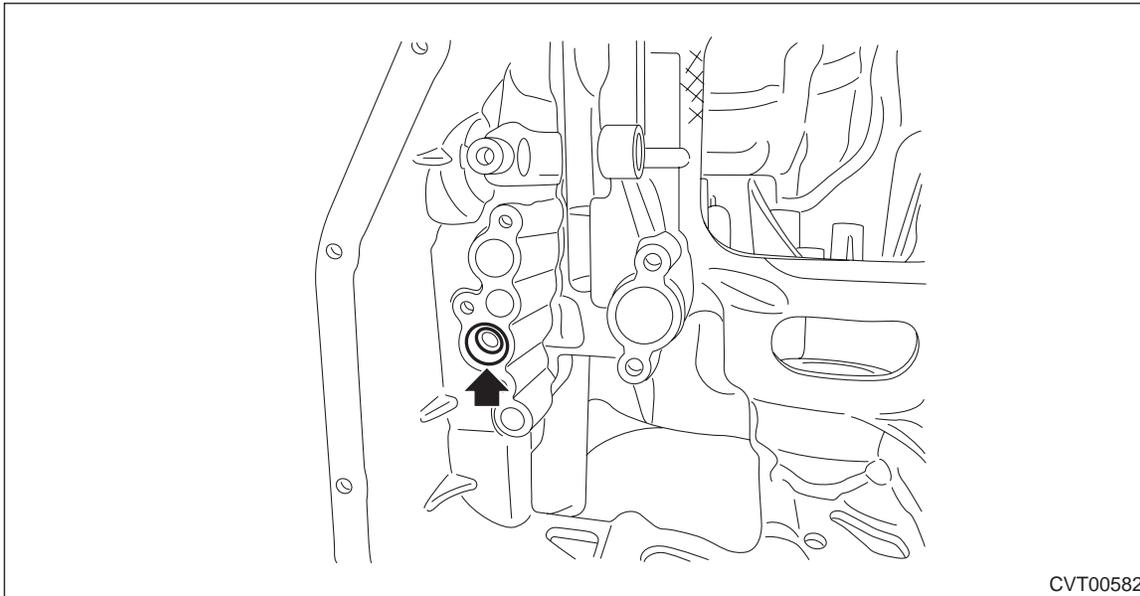
CONTINUOUSLY VARIABLE TRANSMISSION

D: ASSEMBLY

1) Install the CVTF filter.

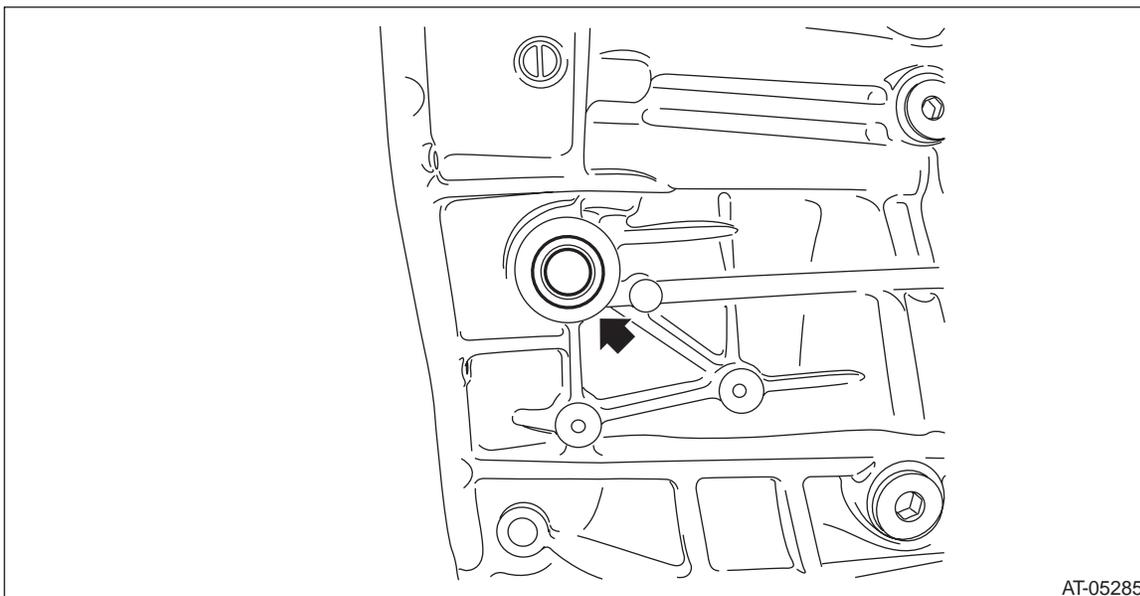
NOTE:

- Use a new CVTF filter.
- Apply CVTF to the CVTF filter.
- Make sure that the CVTF filter does not protrude from the transmission case.



CVT00582

2) Using the ST, install the oil seal.
ST 18657AA000 INSTALLER



AT-05285

Transmission Case

CONTINUOUSLY VARIABLE TRANSMISSION

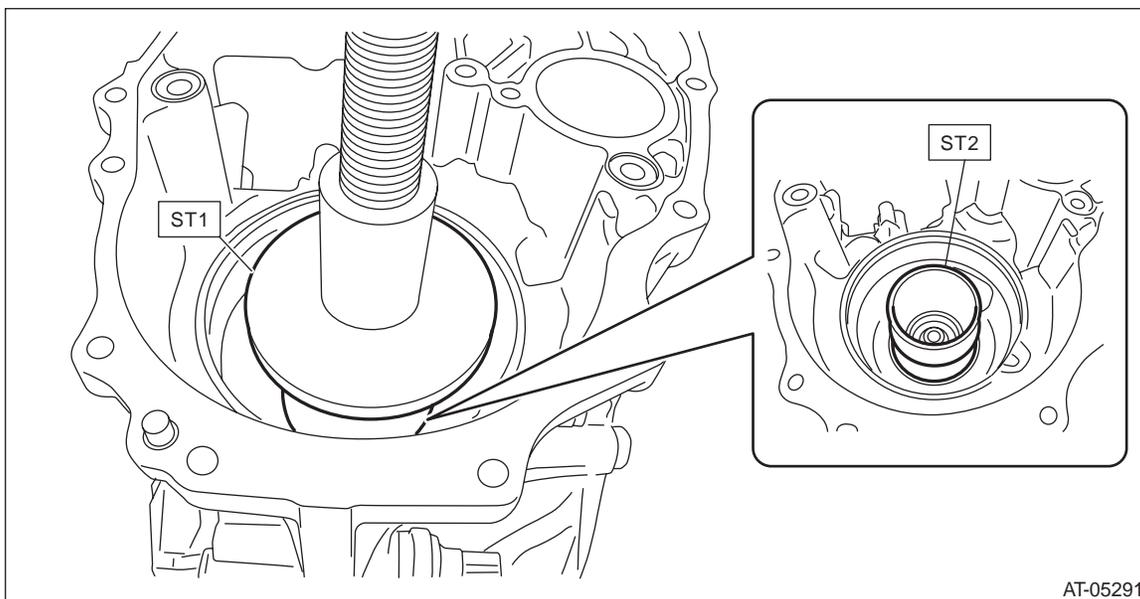
3) Using ST1 and ST2, install the ball bearing on the reduction gear side.

NOTE:

Use a new ball bearing.

ST1 398177700 INSTALLER

ST2 499755602 PRESS SNAP RING



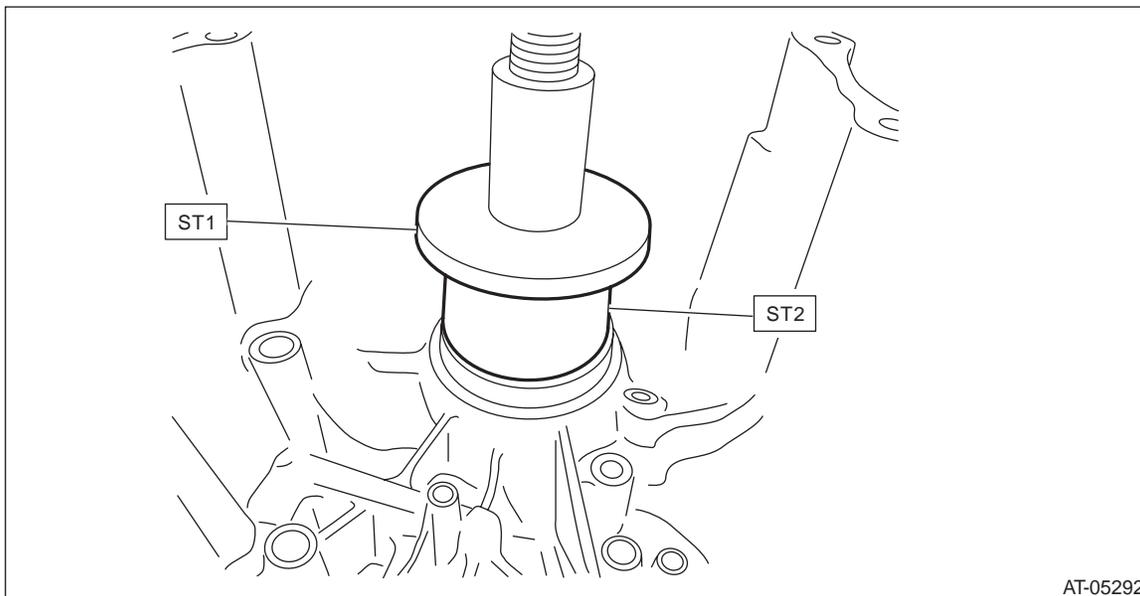
4) Using ST1 and ST2, install the roller bearing on primary pulley side.

NOTE:

- Use a new roller bearing.
- Make adjustment so that the press gets in contact with the center of ST2.

ST1 398177700 INSTALLER

ST2 20299AG010 PRESS SNAP RING



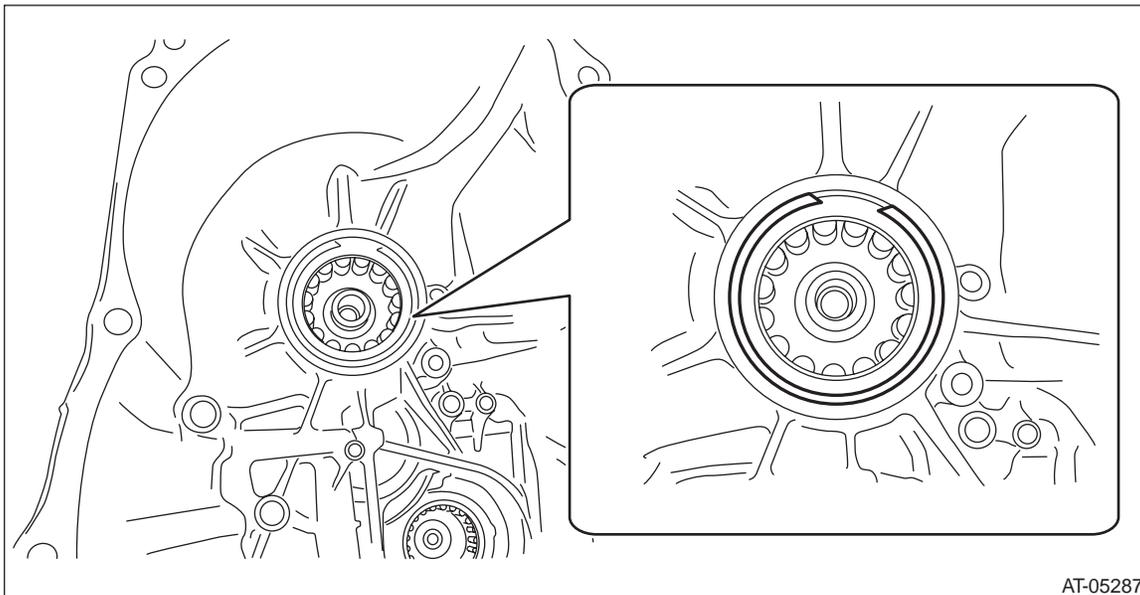
Transmission Case

CONTINUOUSLY VARIABLE TRANSMISSION

5) Install the snap ring on primary pulley side.

NOTE:

Use new snap rings.



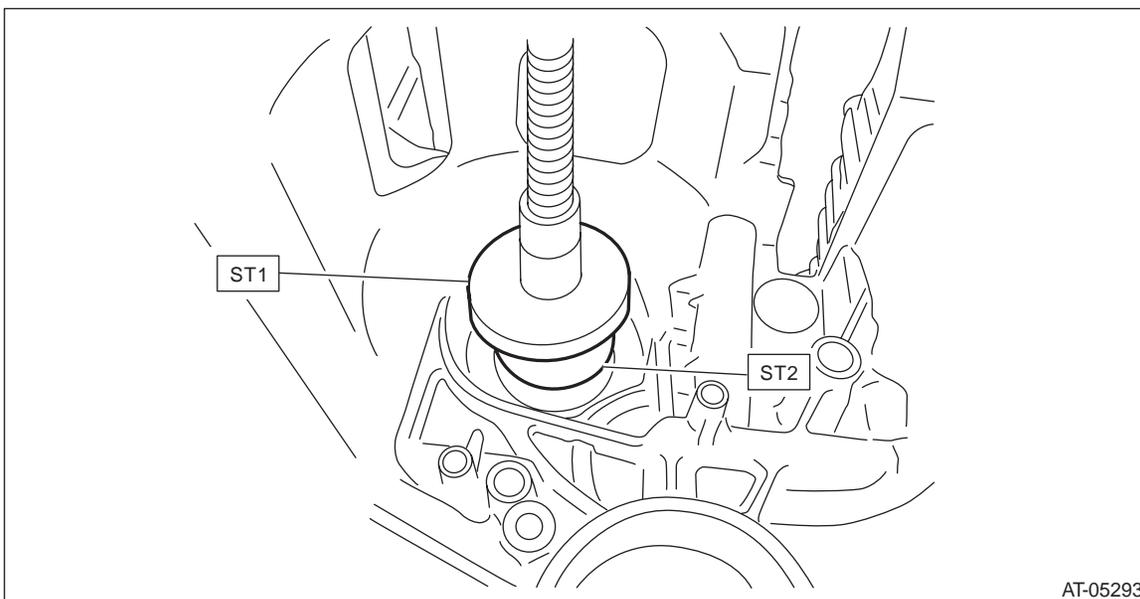
6) Using ST1 and ST2, install the roller bearing on secondary pulley side.

NOTE:

- Use a new roller bearing.
- Make adjustment so that the press gets in contact with the center of ST2.

ST1 398177700 INSTALLER

ST2 499755602 PRESS SNAP RING



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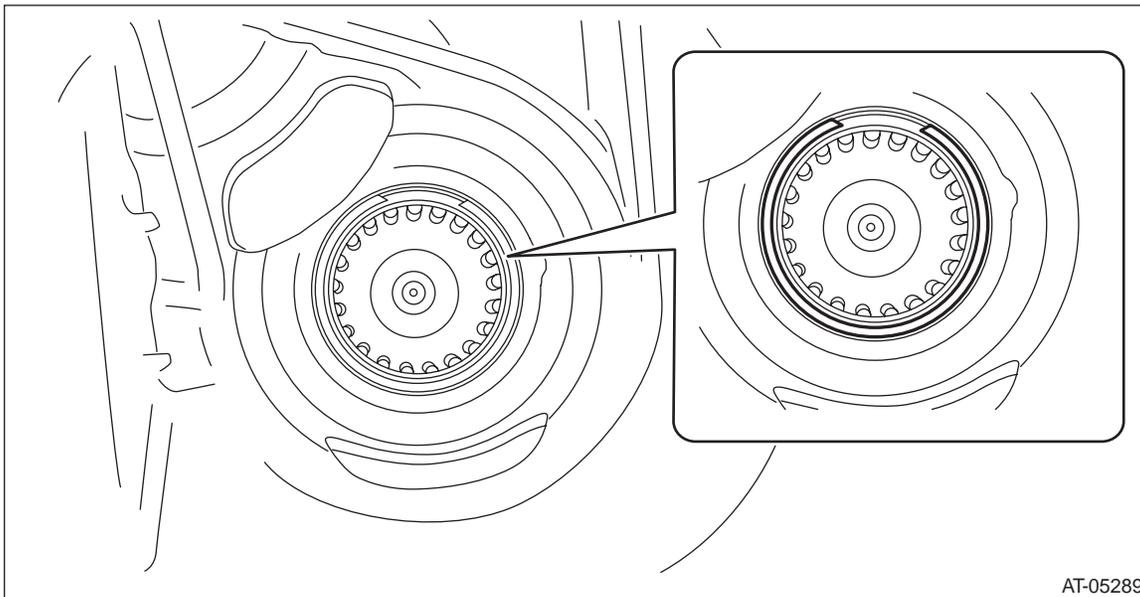
Transmission Case

CONTINUOUSLY VARIABLE TRANSMISSION

7) Install the snap ring on secondary pulley side.

NOTE:

Use new snap rings.



8) Install all plugs.

NOTE:

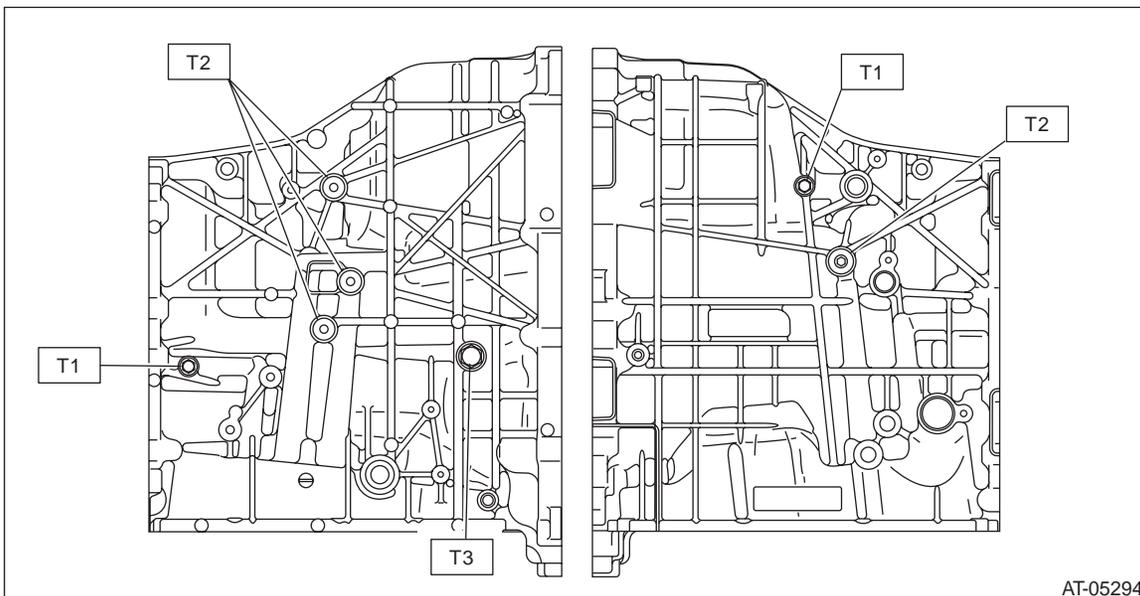
Use new gaskets and O-rings.

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: 35 N·m (3.5 kgf-m, 25.8 ft-lb)



Transmission Case

CONTINUOUSLY VARIABLE TRANSMISSION

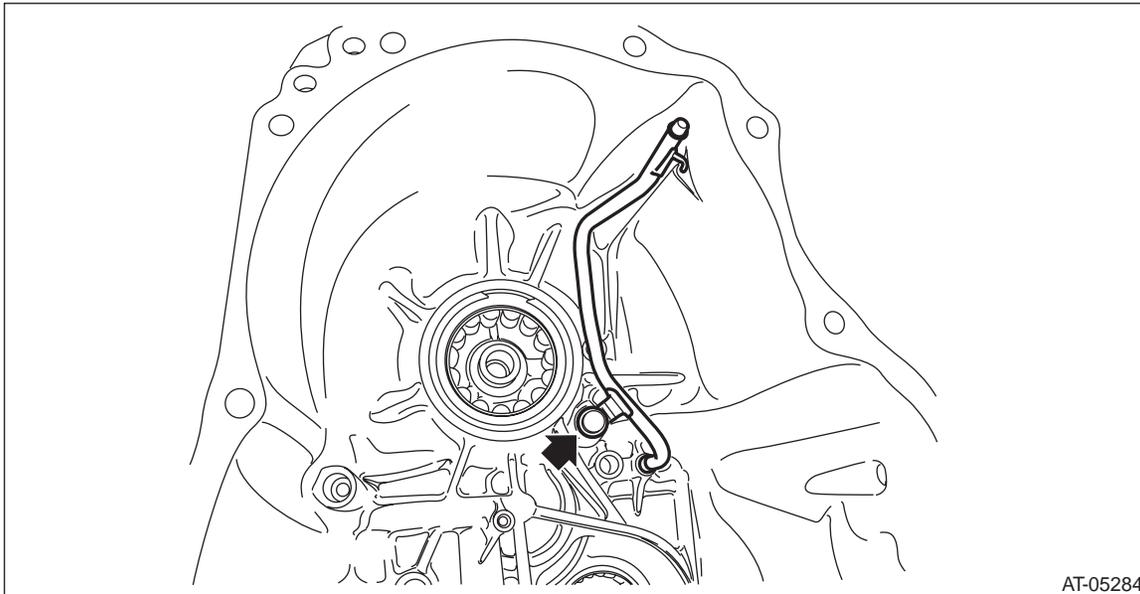
9) Install the lubrication pipe and O-ring.

NOTE:

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

Tightening torque:

16 N·m (1.6 kgf-m, 11.8 ft-lb)



AT-05284

10) Install the CVTF inlet pipe and CVTF outlet pipe.

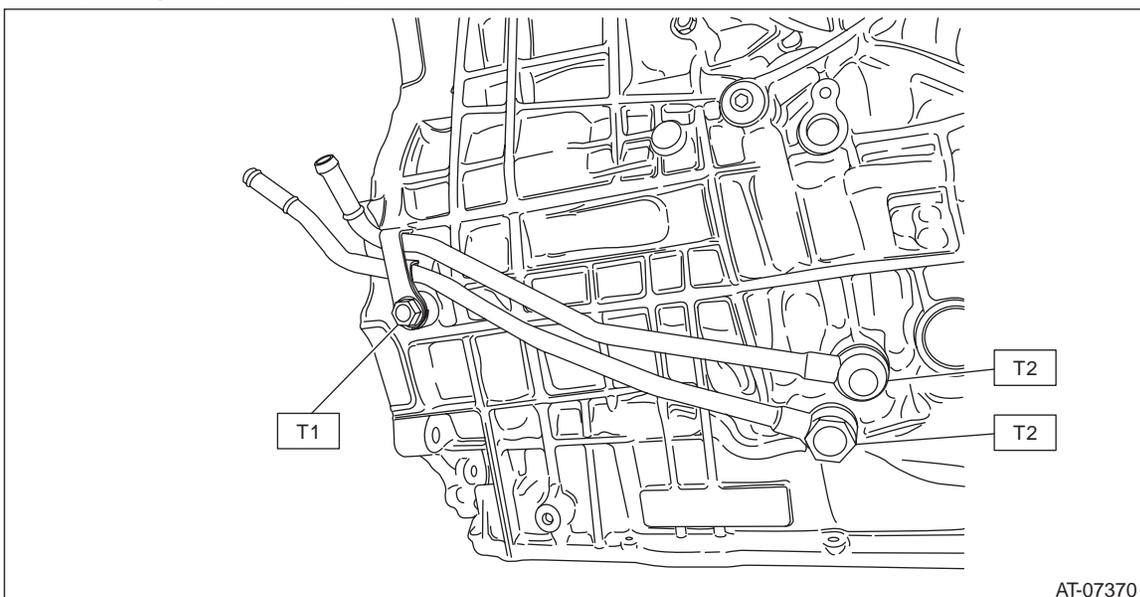
NOTE:

Use a new gasket.

Tightening torque:

T1: 16 N·m (1.6 kgf-m, 11.8 ft-lb)

T2: 40 N·m (4.1 kgf-m, 29.5 ft-lb)



AT-07370

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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 for leakage of CVTF from the connection between intermediate case and transmission case.
- Check the lubrication pipe for bend or damage.
- Check the bearing for smooth operation.
- Check the bearing for seizure or wear.

F: ADJUSTMENT

NOTE:

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

- Select the thrust bearing for the forward clutch assembly. <Ref. to CVT(TR690)-200, ADJUSTMENT, Forward Clutch Assembly.>
- Select the snap ring for the reduction gear. <Ref. to CVT(TR690)-208, ADJUSTMENT, Reduction Driven Gear.>

Primary Pulley and Secondary Pulley

CONTINUOUSLY VARIABLE TRANSMISSION

41. Primary Pulley and Secondary Pulley

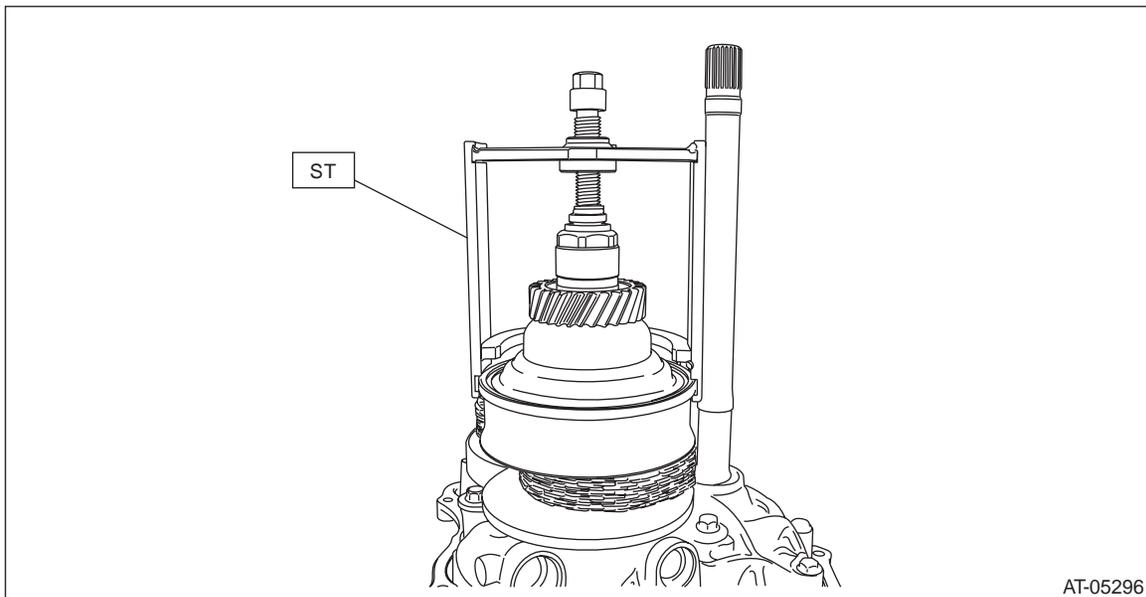
A: REMOVAL

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(TR690)-56, REMOVAL, Automatic Transmission Assembly.>
- 2) Remove the air breather hose. <Ref. to CVT(TR690)-134, REMOVAL, Air Breather Hose.>
- 3) Remove the oil pan and control valve body. <Ref. to CVT(TR690)-109, REMOVAL, Control Valve Body.>
- 4) Remove the transmission harness. <Ref. to CVT(TR690)-120, REMOVAL, Transmission Harness.>
- 5) Remove the extension case. <Ref. to CVT(TR690)-140, REMOVAL, Extension Case.>
- 6) Remove the rear drive shaft. <Ref. to CVT(TR690)-143, REMOVAL, Rear Drive Shaft.>
- 7) Remove the transfer clutch assembly. <Ref. to CVT(TR690)-148, REMOVAL, Transfer Clutch.>
- 8) Remove the transfer reduction driven gear assembly. <Ref. to CVT(TR690)-160, REMOVAL, Transfer Reduction Driven Gear.>
- 9) Remove the intermediate case. <Ref. to CVT(TR690)-167, REMOVAL, Intermediate Case.>
- 10) Remove the forward clutch assembly. <Ref. to CVT(TR690)-182, REMOVAL, Forward Clutch Assembly.>
- 11) Remove the transmission case. <Ref. to CVT(TR690)-213, REMOVAL, Transmission Case.>
- 12) Set the ST to the secondary pulley, and expand the V groove of pulley until the variator chain gets completely loose.

ST 18769AA000 EXPANDER PULLEY

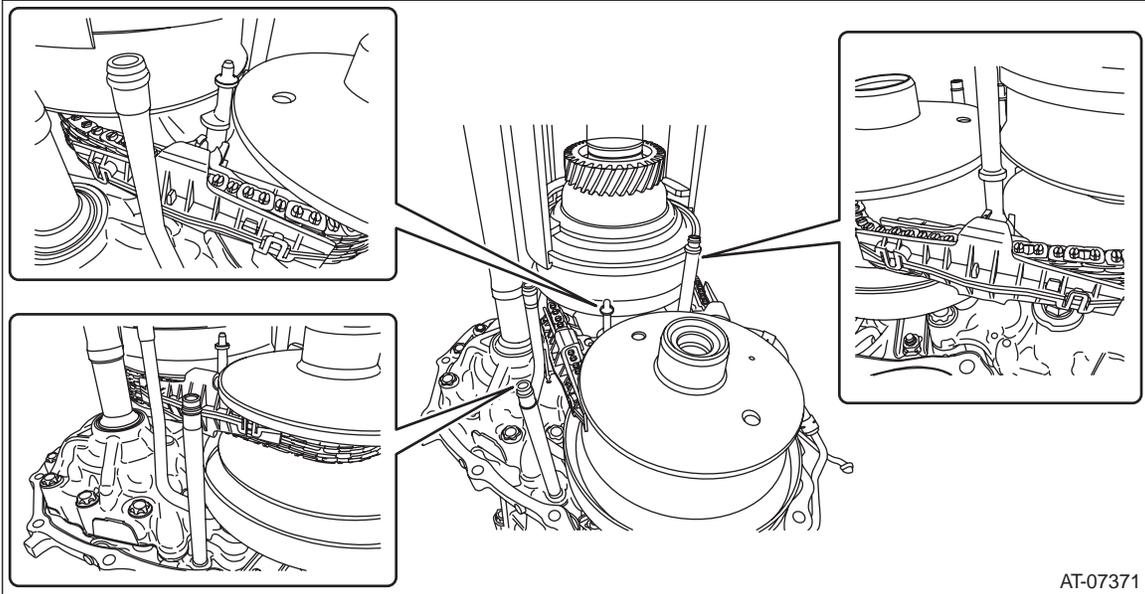


- 13) Remove the chain guide from lubrication pipe and support rod.

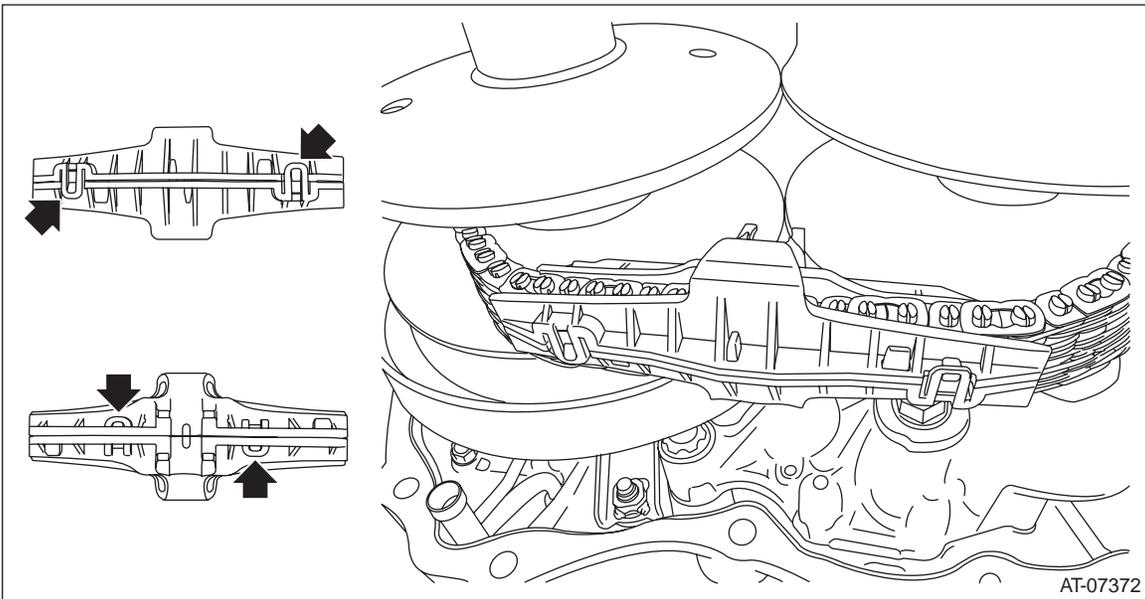
Primary Pulley and Secondary Pulley

CONTINUOUSLY VARIABLE TRANSMISSION

14) Remove the lubrication pipe and support rod.



15) Detach the four claws to remove the two chain guides.

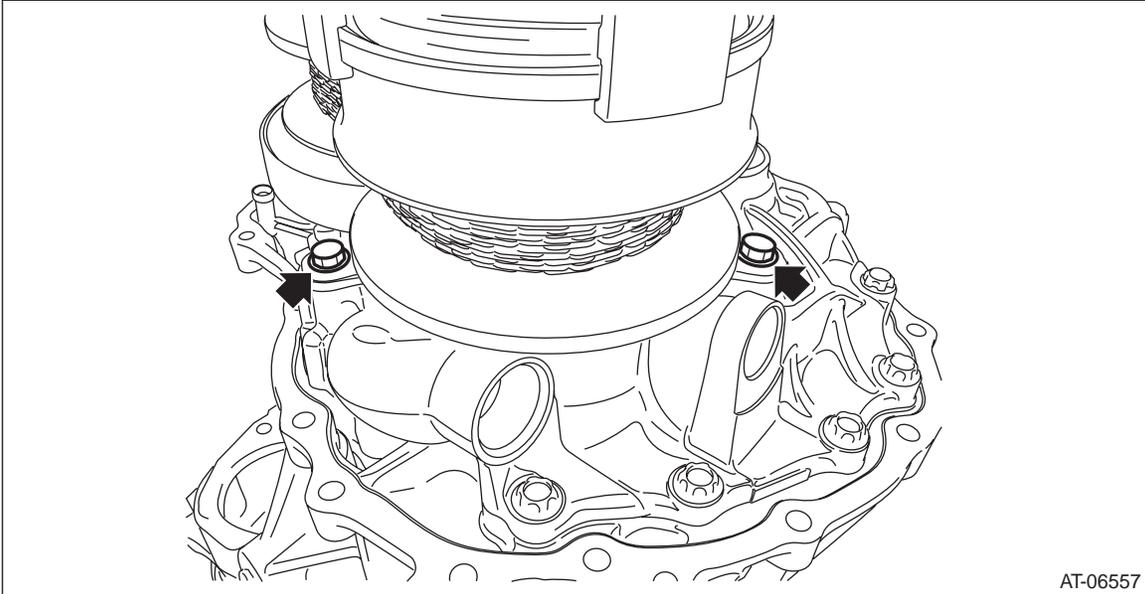


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Primary Pulley and Secondary Pulley

CONTINUOUSLY VARIABLE TRANSMISSION

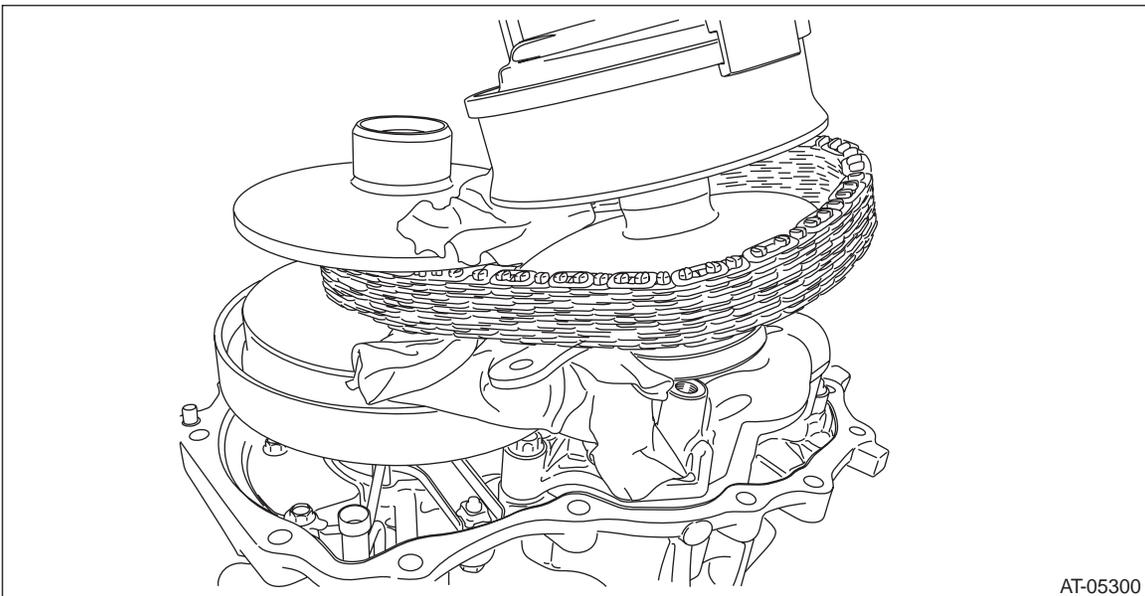
16) Remove the secondary pulley mounting bolt.



17) Remove the secondary pulley from drive pinion retainer and intersect the V groove of secondary pulley and V groove of primary pulley. Remove the variator chain from secondary pulley and remove the secondary pulley.

CAUTION:

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



18) Remove the variator chain from primary pulley.

Primary Pulley and Secondary Pulley

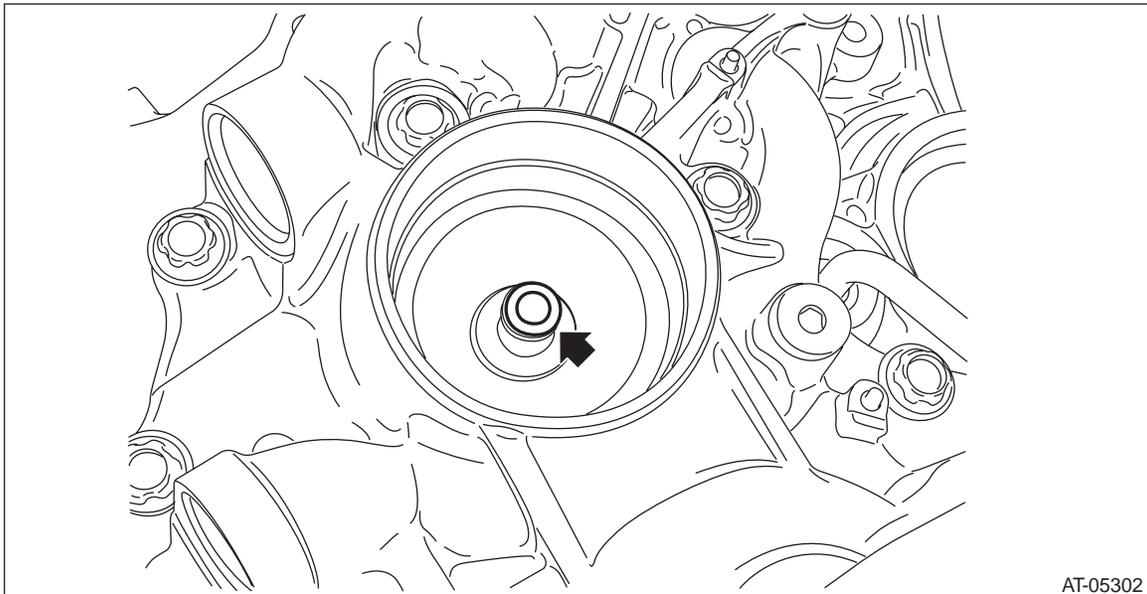
CONTINUOUSLY VARIABLE TRANSMISSION

19) Remove the primary pulley mounting bolt.



20) Remove the primary pulley.

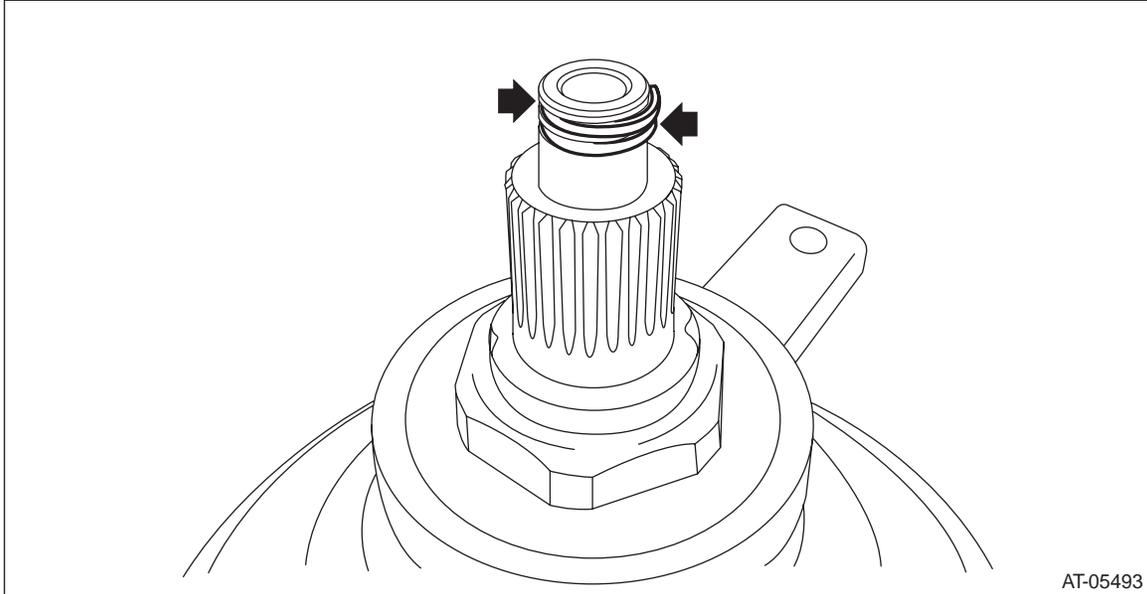
21) Remove the two seal rings from drive pinion retainer.



Primary Pulley and Secondary Pulley

CONTINUOUSLY VARIABLE TRANSMISSION

22) Remove the two seal rings from primary pulley.



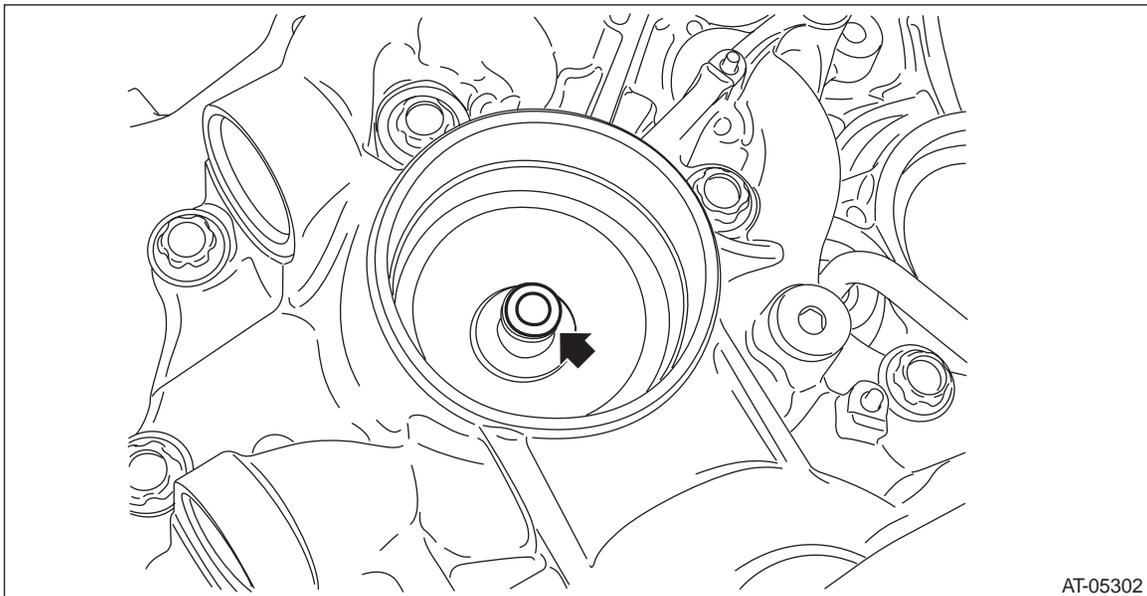
B: INSTALLATION

1) Select shims for pulley alignment. <Ref. to CVT(TR690)-241, ADJUSTMENT, Primary Pulley and Secondary Pulley.>

2) Install the two seal rings to drive pinion retainer.

NOTE:

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



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

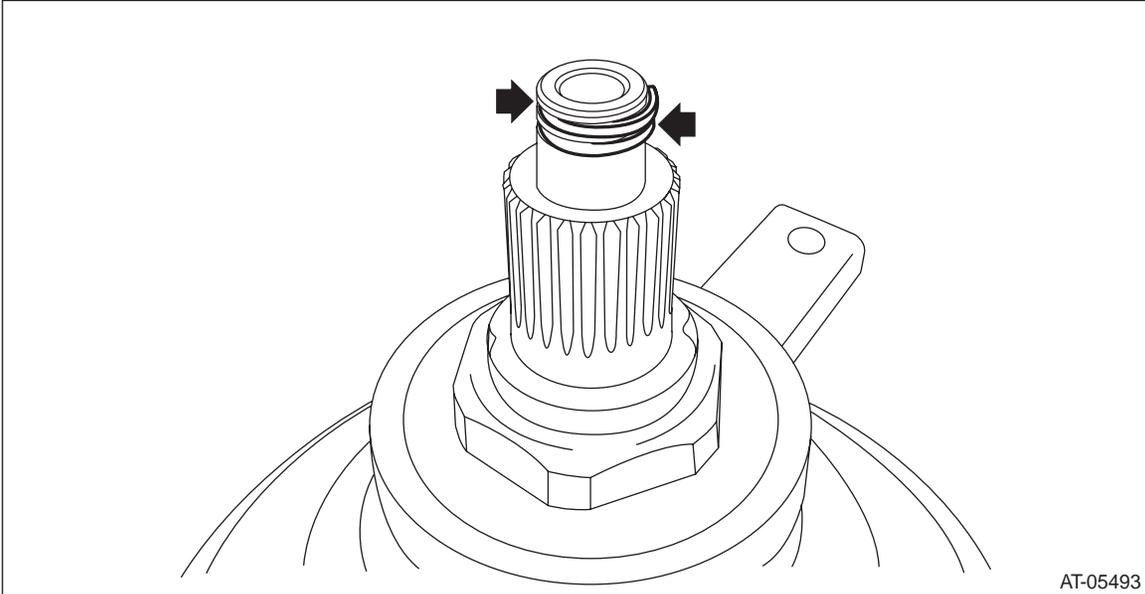
Primary Pulley and Secondary Pulley

CONTINUOUSLY VARIABLE TRANSMISSION

4) Install the two seal rings to primary pulley.

NOTE:

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



5) Install the primary pulley and adjust the position of bolt holes of primary bearing retainer and converter case to tighten the primary pulley bolt.

NOTE:

Use a new seal washer.

Tightening torque:

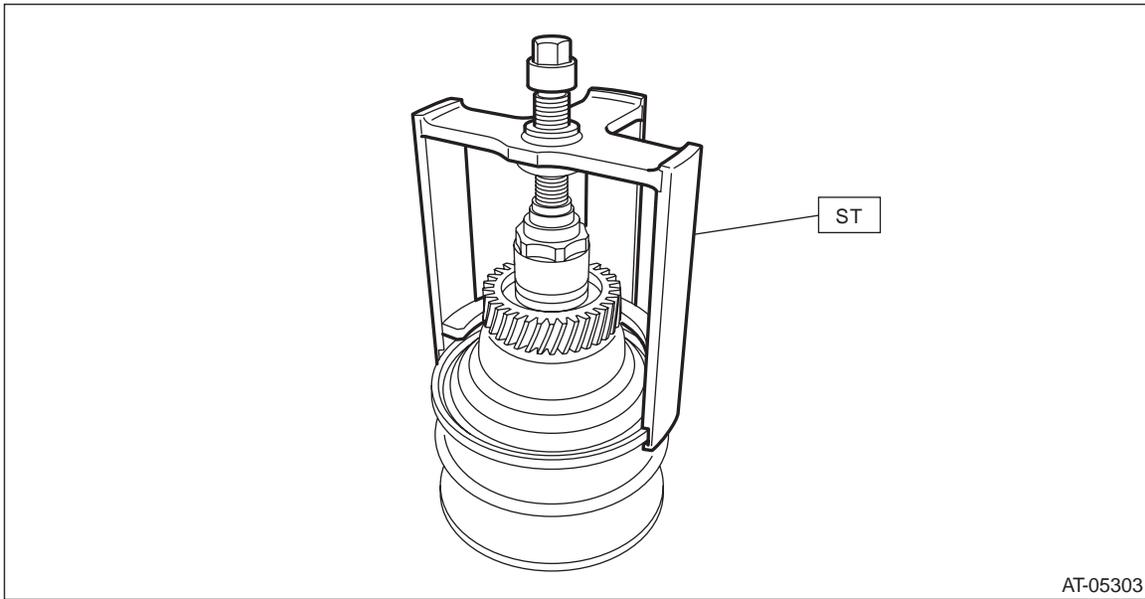
21 N·m (2.1 kgf-m, 15.5 ft-lb)



Primary Pulley and Secondary Pulley

CONTINUOUSLY VARIABLE TRANSMISSION

- 6) Set the ST to secondary pulley and expand the V groove of pulley.
ST 18769AA000 EXPANDER PULLEY

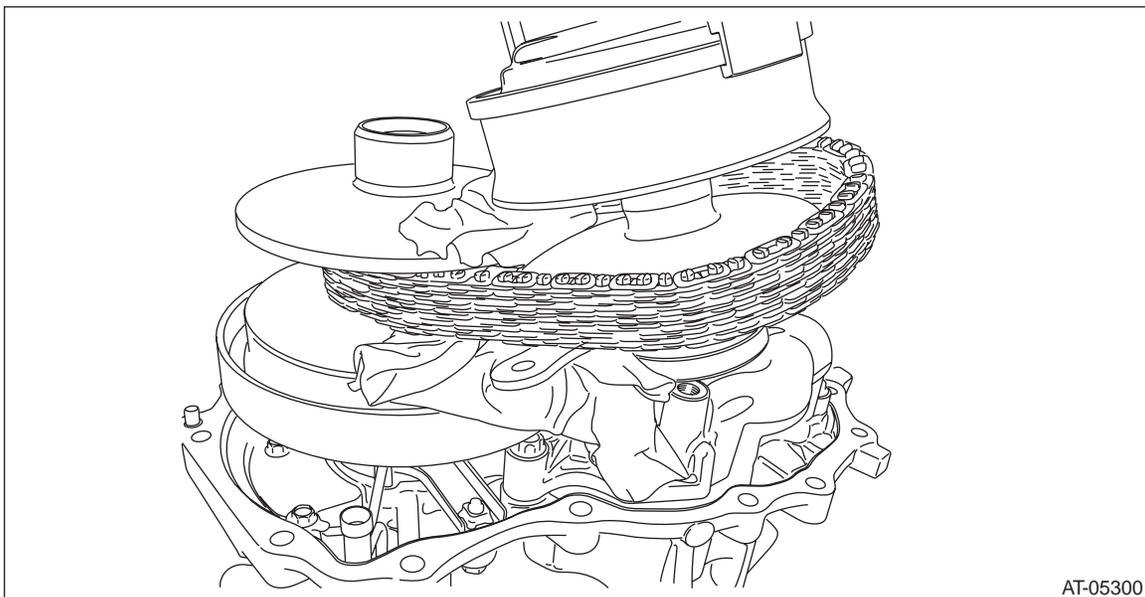


- 7) Place the variator chain on the primary pulley groove and attach the secondary pulley and variator chain together to the drive pinion retainer.

CAUTION:

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

- (1) Place the variator chain on primary pulley.
- (2) 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.



- (3) While aligning the bolt hole of secondary bearing retainer and the bolt hole of driving pinion retainer, install the secondary pulley to drive pinion retainer.

Primary Pulley and Secondary Pulley

CONTINUOUSLY VARIABLE TRANSMISSION

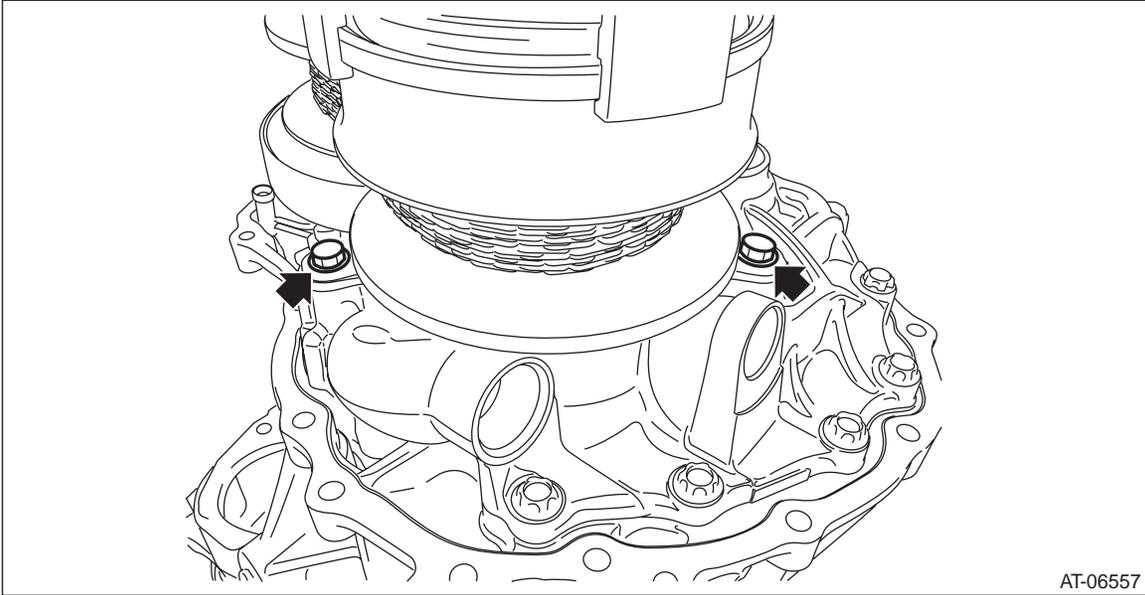
8) Install the secondary pulley bolt.

NOTE:

Apply CVTF to the bolt.

Tightening torque:

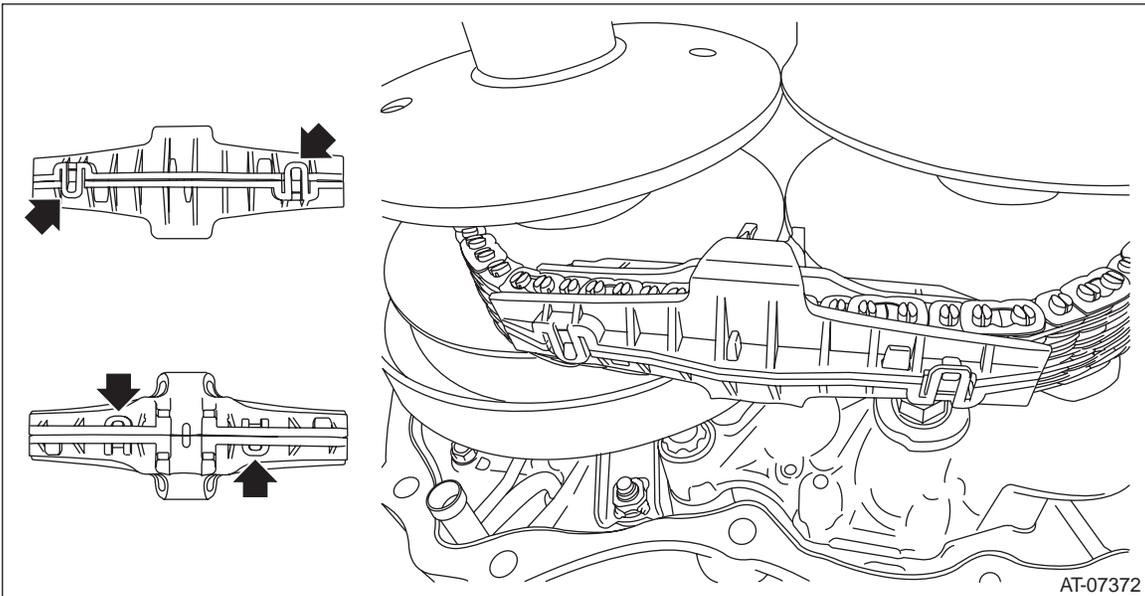
33 N·m (3.4 kgf·m, 24.3 ft·lb)



9) Install the chain guide.

NOTE:

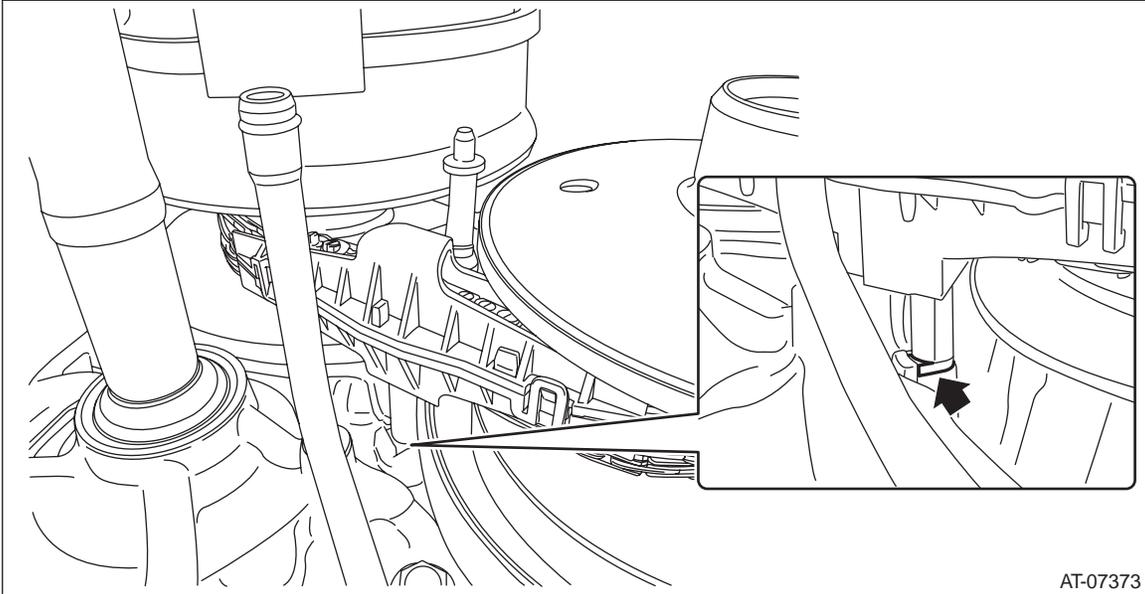
Install it with two claws facing outward and with two claws facing inward.



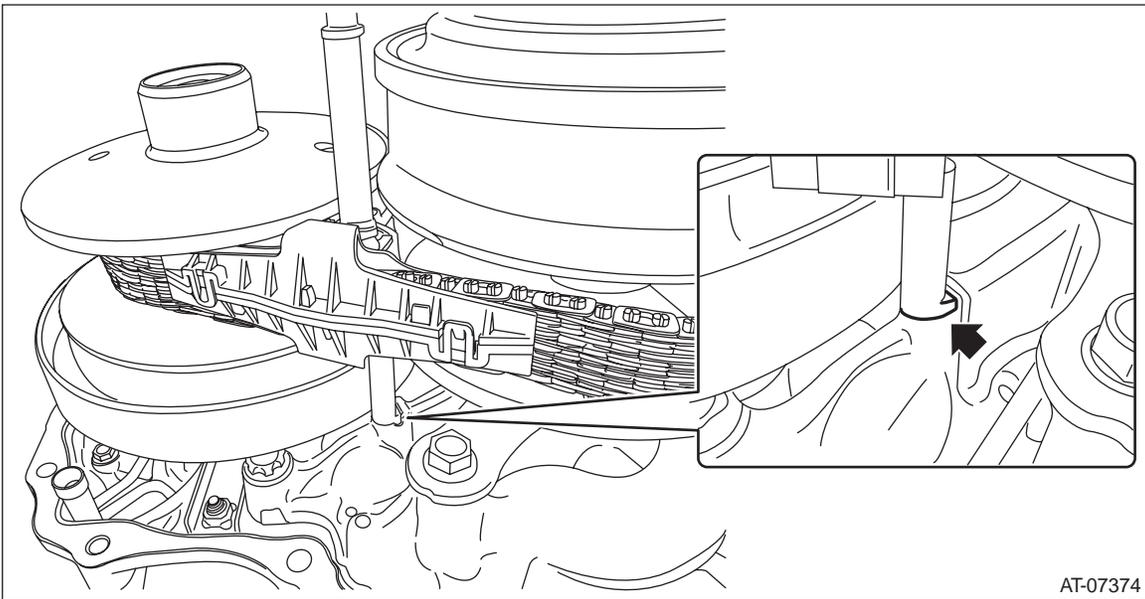
Primary Pulley and Secondary Pulley

CONTINUOUSLY VARIABLE TRANSMISSION

- 10) Engage the cutout portions of support rod and drive pinion retainer and install the support rod.



- 11) Engage the cutout portions of lubrication pipe and drive pinion retainer and install the lubrication pipe.

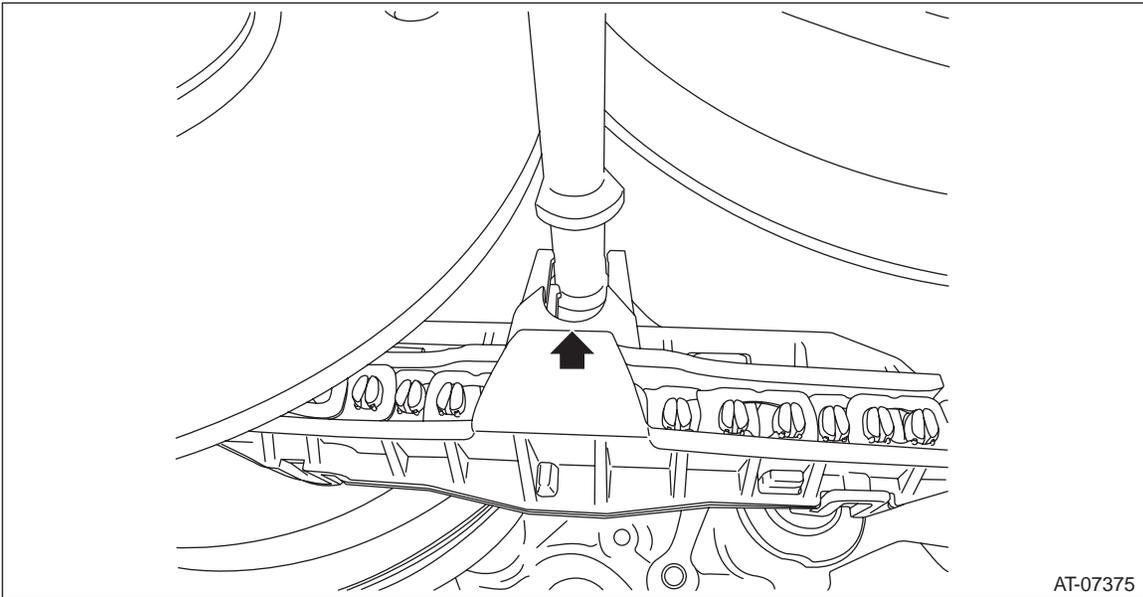


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Primary Pulley and Secondary Pulley

CONTINUOUSLY VARIABLE TRANSMISSION

12) Install the chain guide so that the lubrication pipe and support rod run through between the protrusions of each chain guide. Then remove the ST (EXPANDER PULLEY).

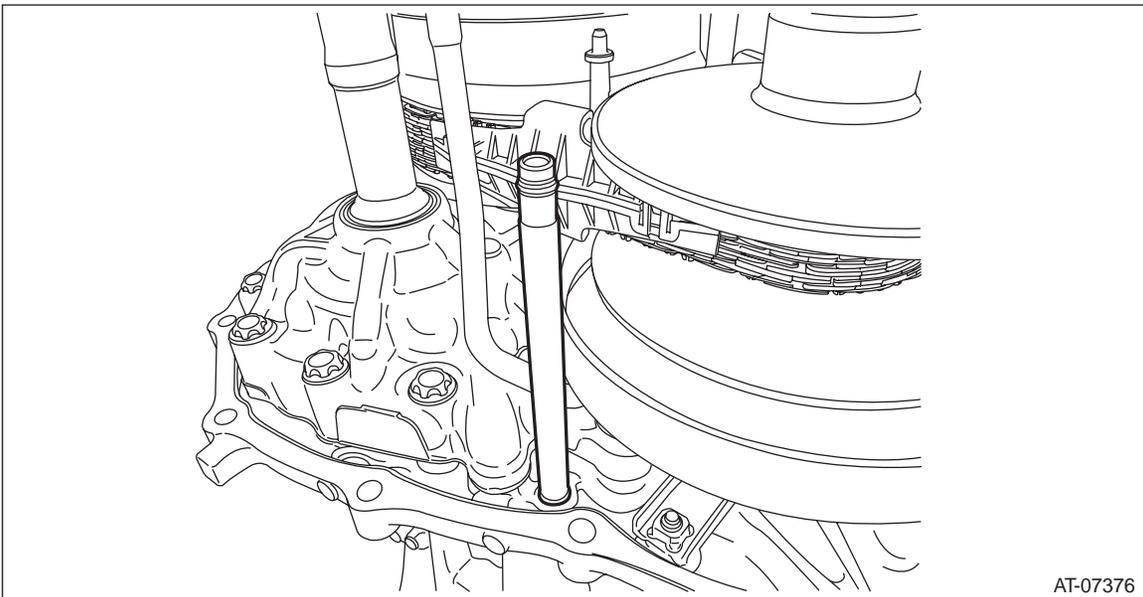


13) Install the O-ring to the lubrication pipe.

NOTE:

Use new O-rings.

14) Install the lubrication pipe.



15) Install the transmission case. <Ref. to CVT(TR690)-215, INSTALLATION, Transmission Case.>

16) Install the forward clutch assembly. <Ref. to CVT(TR690)-183, INSTALLATION, Forward Clutch Assembly.>

17) Install the intermediate case. <Ref. to CVT(TR690)-168, INSTALLATION, Intermediate Case.>

18) Install the transfer reduction driven gear assembly. <Ref. to CVT(TR690)-160, INSTALLATION, Transfer Reduction Driven Gear.>

19) Install the transfer clutch assembly. <Ref. to CVT(TR690)-149, INSTALLATION, Transfer Clutch.>

20) Install the rear drive shaft. <Ref. to CVT(TR690)-143, INSTALLATION, Rear Drive Shaft.>

21) Install the extension case. <Ref. to CVT(TR690)-141, INSTALLATION, Extension Case.>

22) Install the transmission harness. <Ref. to CVT(TR690)-122, INSTALLATION, Transmission Harness.>

23) Install the control valve body and oil pan. <Ref. to CVT(TR690)-113, INSTALLATION, Control Valve Body.>

Primary Pulley and Secondary Pulley

CONTINUOUSLY VARIABLE TRANSMISSION

24) Install the air breather hose. <Ref. to CVT(TR690)-134, INSTALLATION, Air Breather Hose.>

25) Install the transmission assembly to the vehicle. <Ref. to CVT(TR690)-69, INSTALLATION, Automatic Transmission Assembly.>

C: INSPECTION

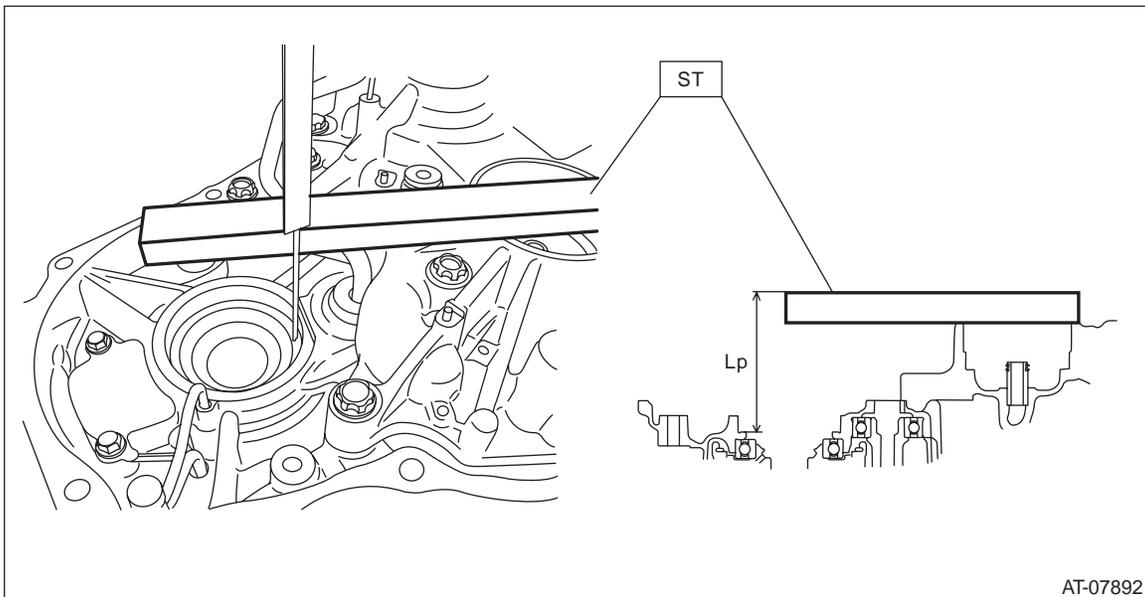
- Check the surface of primary and secondary pulley cones for damage or wear.
- Check the primary and secondary pulley for damage.
- Check the bearing for seizure or wear.
- Apply CVTF to bearing and rotate the bearing to check for noise or dragging etc.

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

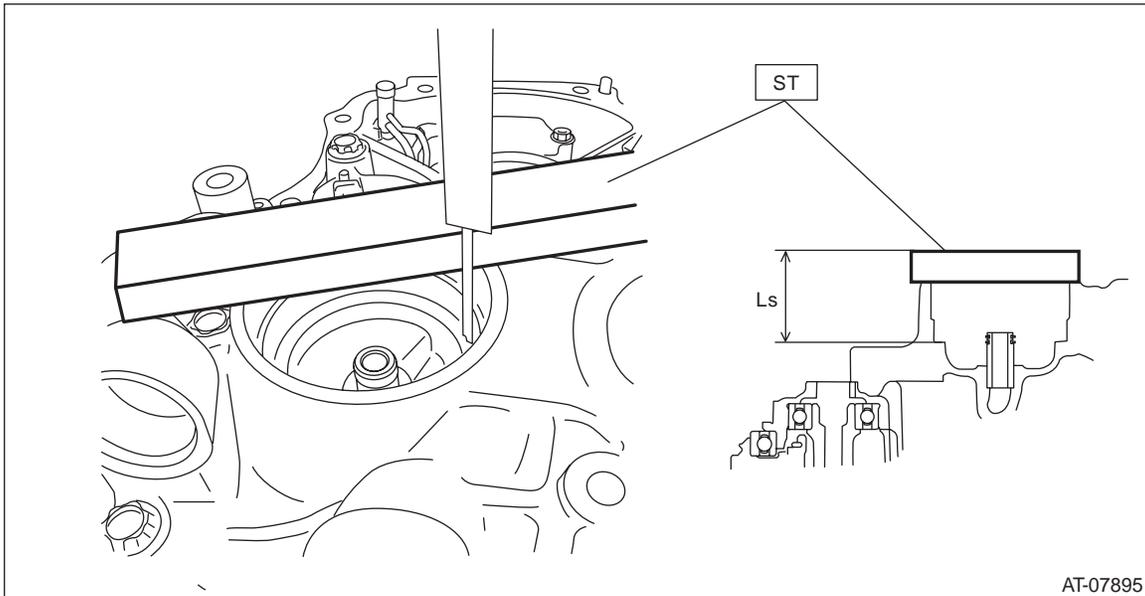


Primary Pulley and Secondary Pulley

CONTINUOUSLY VARIABLE TRANSMISSION

2) Measure height “Ls” from the drive pinion retainer upper face to the secondary pulley bearing catch surface at several points and calculate the average.

ST 499575400 GAUGE



AT-07895

3) Calculate the following formula.

Calculation formula:

$$T \text{ (mm)} = B + (L_p - L_s) + 31.601 - A$$

$$[T \text{ (in)} = B + (L_p - L_s) + 1.224 - A]$$

T: Pulley alignment

A: Specified primary pulley dimension

B: Specified secondary pulley dimension

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

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

31.601 mm (1.224 in): Constant

Pulley alignment T mm (in)	Shim thickness mm (in)
0.050 — 0.150 (0.002 — 0.006)	0.1 (0.004)
0.151 — 0.250 (0.006 — 0.01)	0.2 (0.008)
0.251 — 0.350 (0.01 — 0.014)	0.3 (0.012)
0.351 — 0.450 (0.014 — 0.018)	0.4 (0.016)
0.451 — 0.550 (0.018 — 0.022)	0.5 (0.020)
0.551 — 0.650 (0.022 — 0.026)	0.6 (0.024)
0.651 — 0.750 (0.026 — 0.030)	0.7 (0.028)
0.751 — 0.850 (0.030 — 0.033)	0.8 (0.031)
0.851 — 0.950 (0.033 — 0.037)	0.9 (0.035)

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

Part No.	Shim thickness mm (in)
32451AA000	0.1 (0.004)
32451AA010	0.2 (0.008)
32451AA020	0.3 (0.012)
32451AA030	0.4 (0.016)
32451AA040	0.5 (0.020)

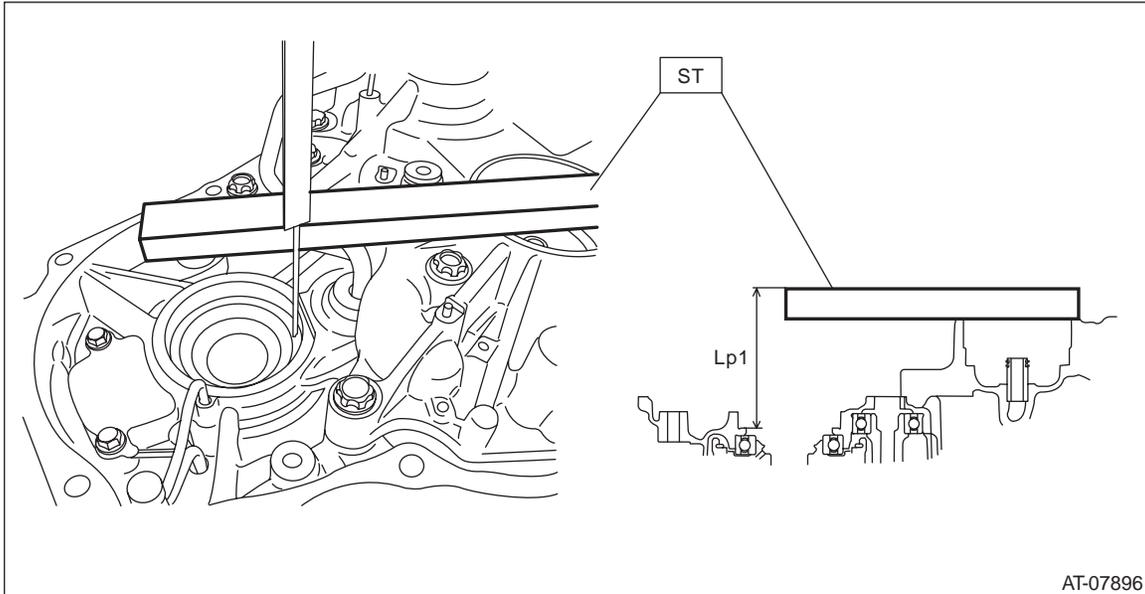
Primary Pulley and Secondary Pulley

CONTINUOUSLY VARIABLE TRANSMISSION

2. PROCEDURE WHEN REPLACING ONLY DRIVE PINION RETAINER OR CONVERTER CASE

- 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 converter case.
- 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.

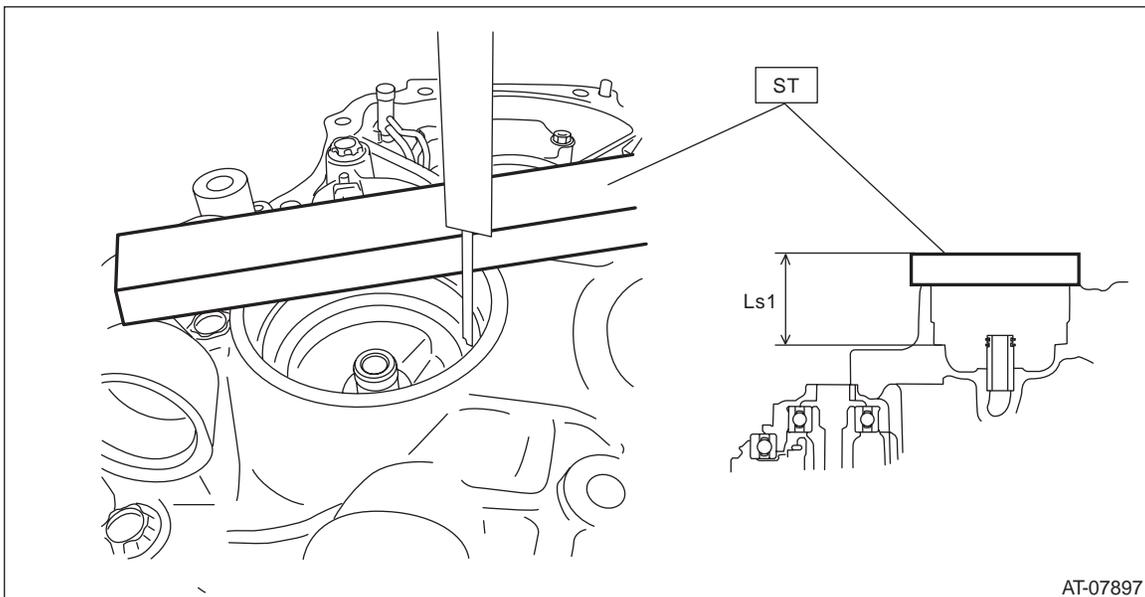
ST 499575400 GAUGE



AT-07896

- 4) Using the current drive pinion retainer or current converter case, measure depth "Ls1" from the ST upper face to the secondary pulley bearing catch surface at several points and calculate the average.

ST 499575400 GAUGE



AT-07897

- 5) Calculate the "LD1" using the following formula and record it.

Calculation formula:

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

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

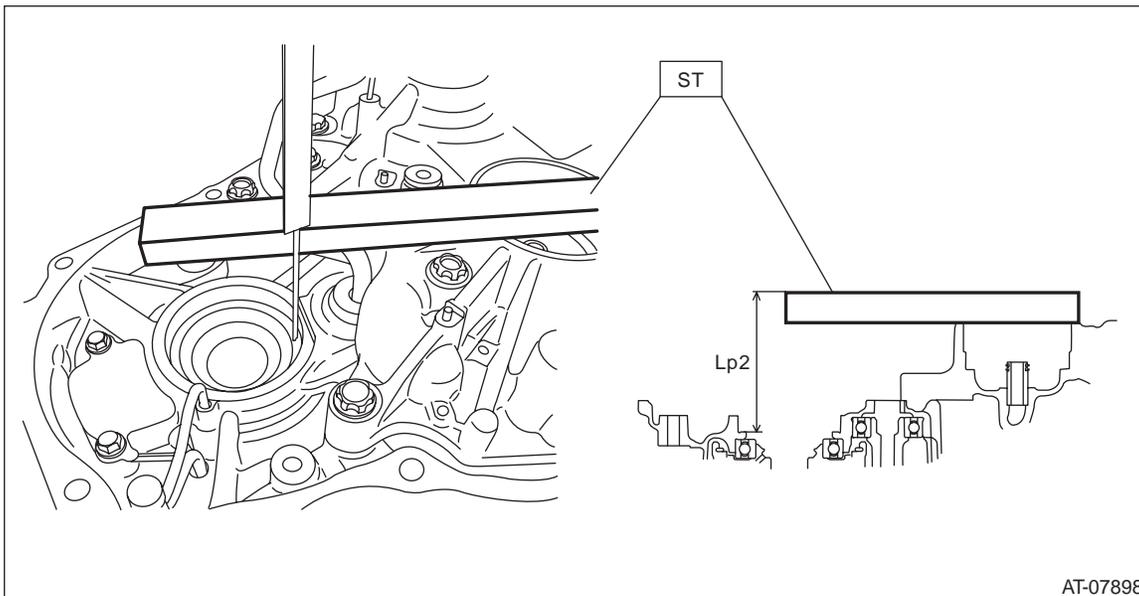
Ls1: Depth from the ST upper face to the secondary pulley bearing catch surface

Primary Pulley and Secondary Pulley

CONTINUOUSLY VARIABLE TRANSMISSION

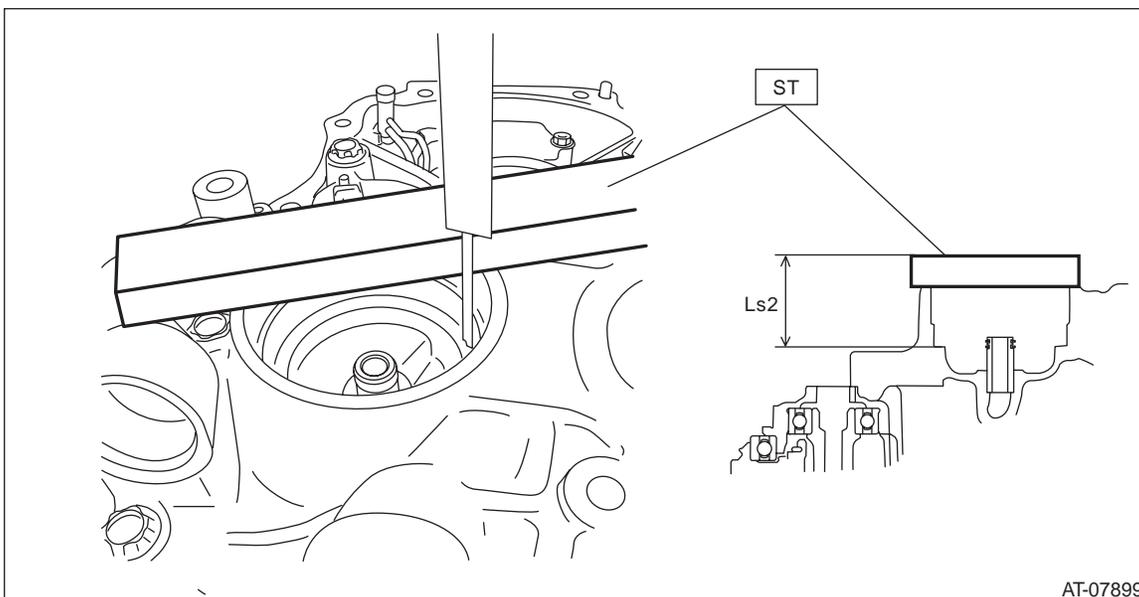
6) Using the new drive pinion retainer or new converter case, measure depth “Lp2” from the ST upper face to the primary pulley bearing catch surface at several points and calculate the average.

ST 499575400 GAUGE



7) Using the new drive pinion retainer or new converter case, measure 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:

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

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 converter case and current drive pinion retainer or current converter case

LD1: Calculated value of current drive pinion retainer or current converter case

LD2: Calculated value of new drive pinion retainer or new converter case

Difference of the case (T1) mm (in)	Shim selection procedure
0 — 0.020 (0 — 0.00078)	Select new shim of same thickness with the shim that is used on primary pulley side of the current converter case.
0.021 — 0.070 (0.000827 — 0.00275)	Select new shim of same thickness with the shim that is used on primary pulley side of the current converter case.
0.071 — 0.125 (0.00279 — 0.00492)	Select the shim 0.1 mm thinner than the shim that is used on primary pulley side of the current converter case.
0.126 — 0.170 (0.00496 — 0.00669)	Select the shim 0.1 mm thinner than the shim that is used on primary pulley side of the current converter case.
0.171 — 0.230 (0.00673 — 0.00905)	Select the shim 0.2 mm thinner than the shim that is used on primary pulley side of the current converter case.
0.231 — 0.250 (0.00909 — 0.00984)	Select the shim 0.3 mm thinner than the shim that is used on primary pulley side of the current converter case.
0.251 — 0.300 (0.00988 — 0.01181)	Select the shim 0.3 mm thinner than the shim that is used on primary pulley side of the current converter case.

Difference of the case (T2) mm (in)	Shim selection procedure
0 — 0.020 (0 — 0.00078)	Select new shim of same thickness with the shim that is used on primary pulley side of the current converter case.
0.021 — 0.080 (0.000827 — 0.00315)	Select new shim of same thickness with the shim that is used on primary pulley side of the current converter case.
0.081 — 0.100 (0.00318 — 0.00393)	Select the shim 0.1 mm thicker than the shim that is used on primary pulley side of the current converter case.
0.101 — 0.120 (0.00397 — 0.00472)	Select the shim 0.1 mm thicker than the shim that is used on primary pulley side of the current converter case.
0.121 — 0.180 (0.00476 — 0.00708)	Select the shim 0.1 mm thicker than the shim that is used on primary pulley side of the current converter case.
0.181 — 0.220 (0.00712 — 0.00866)	Select the shim 0.2 mm thicker than the shim that is used on primary pulley side of the current converter case.
0.221 — 0.280 (0.00870 — 0.01102)	Select the shim 0.2 mm thicker than the shim that is used on primary pulley side of the current converter case.
0.281 — 0.300 (0.01106 — 0.01181)	Select the shim 0.3 mm thicker than the shim that is used on primary pulley side of the current converter case.

Part No.	Shim thickness mm (in)
32451AA000	0.1 (0.004)
32451AA010	0.2 (0.008)
32451AA020	0.3 (0.012)
32451AA030	0.4 (0.016)
32451AA040	0.5 (0.020)

Variator Chain

CONTINUOUSLY VARIABLE TRANSMISSION

42. Variator Chain

A: REMOVAL

For removal of variator chain, refer to “Primary Pulley and Secondary Pulley”. <Ref. to CVT(TR690)-231, REMOVAL, Primary Pulley and Secondary Pulley.>

B: INSTALLATION

For installation of variator chain, refer to “Primary Pulley and Secondary Pulley”. <Ref. to CVT(TR690)-235, INSTALLATION, Primary Pulley and Secondary Pulley.>

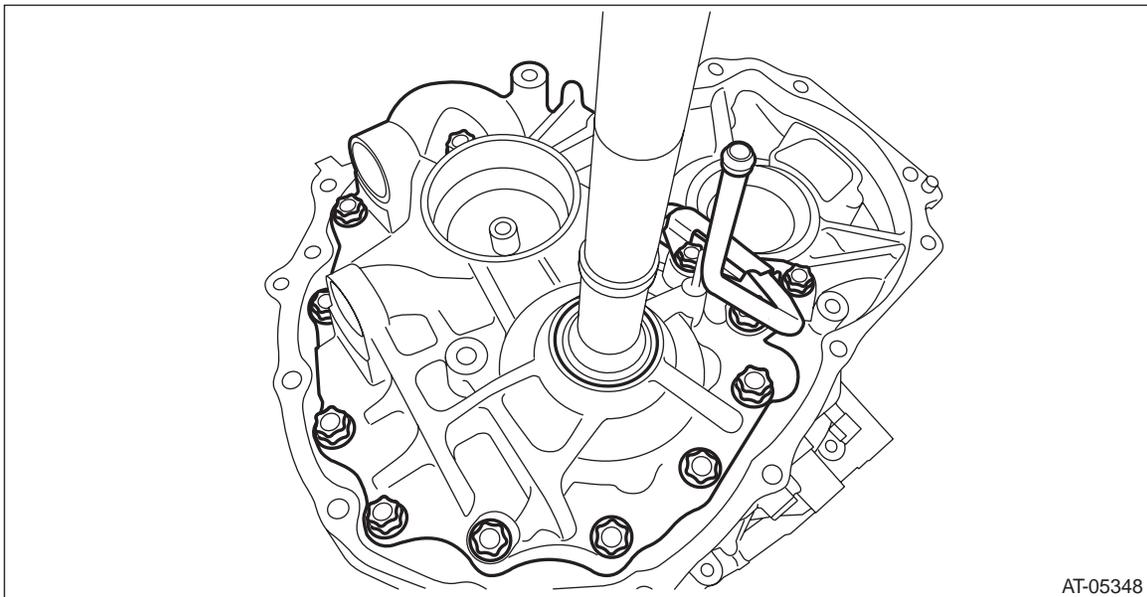
C: INSPECTION

Check the variator chain for damage and wear.

43. Drive Pinion Shaft Assembly

A: REMOVAL

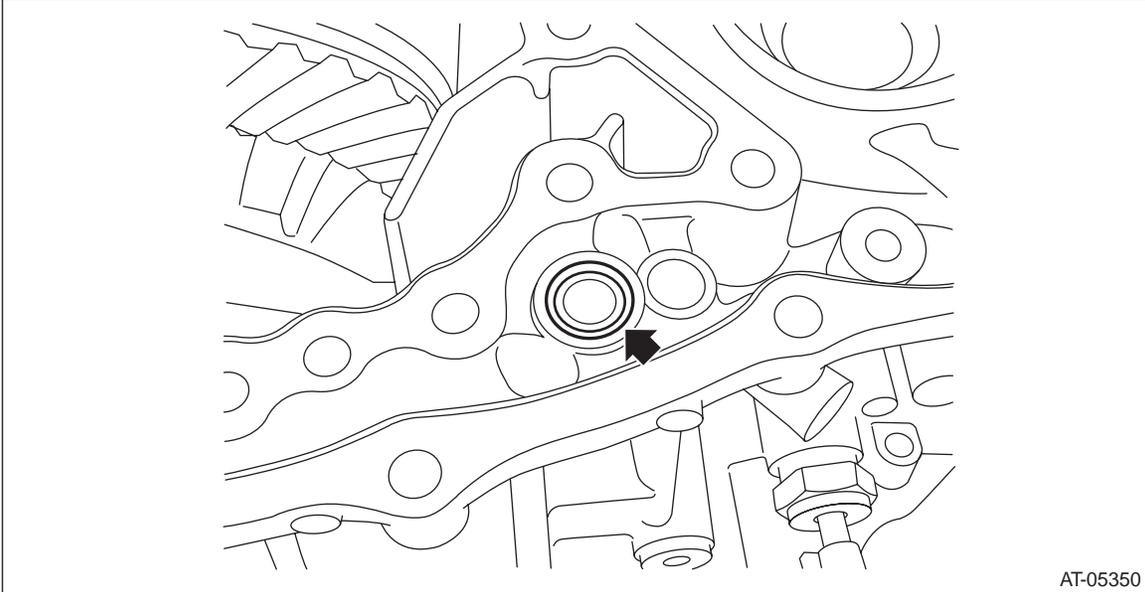
- 1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TR690)-56, REMOVAL, Automatic Transmission Assembly.>
- 2) Remove the air breather hose. <Ref. to CVT(TR690)-134, REMOVAL, Air Breather Hose.>
- 3) Remove the oil pan and control valve body. <Ref. to CVT(TR690)-109, REMOVAL, Control Valve Body.>
- 4) Remove the transmission harness. <Ref. to CVT(TR690)-120, REMOVAL, Transmission Harness.>
- 5) Remove the extension case. <Ref. to CVT(TR690)-140, REMOVAL, Extension Case.>
- 6) Remove the rear drive shaft. <Ref. to CVT(TR690)-143, REMOVAL, Rear Drive Shaft.>
- 7) Remove the transfer clutch assembly. <Ref. to CVT(TR690)-148, REMOVAL, Transfer Clutch.>
- 8) Remove the transfer reduction driven gear assembly. <Ref. to CVT(TR690)-160, REMOVAL, Transfer Reduction Driven Gear.>
- 9) Remove the intermediate case. <Ref. to CVT(TR690)-167, REMOVAL, Intermediate Case.>
- 10) Remove the forward clutch assembly. <Ref. to CVT(TR690)-182, REMOVAL, Forward Clutch Assembly.>
- 11) Remove the transmission case. <Ref. to CVT(TR690)-213, REMOVAL, Transmission Case.>
- 12) Remove the primary pulley, secondary pulley and variator chain. <Ref. to CVT(TR690)-231, REMOVAL, Primary Pulley and Secondary Pulley.>
- 13) Using the ST, remove the drive pinion retainer and lubrication pipe.
ST 18270KA020 SOCKET (E20)



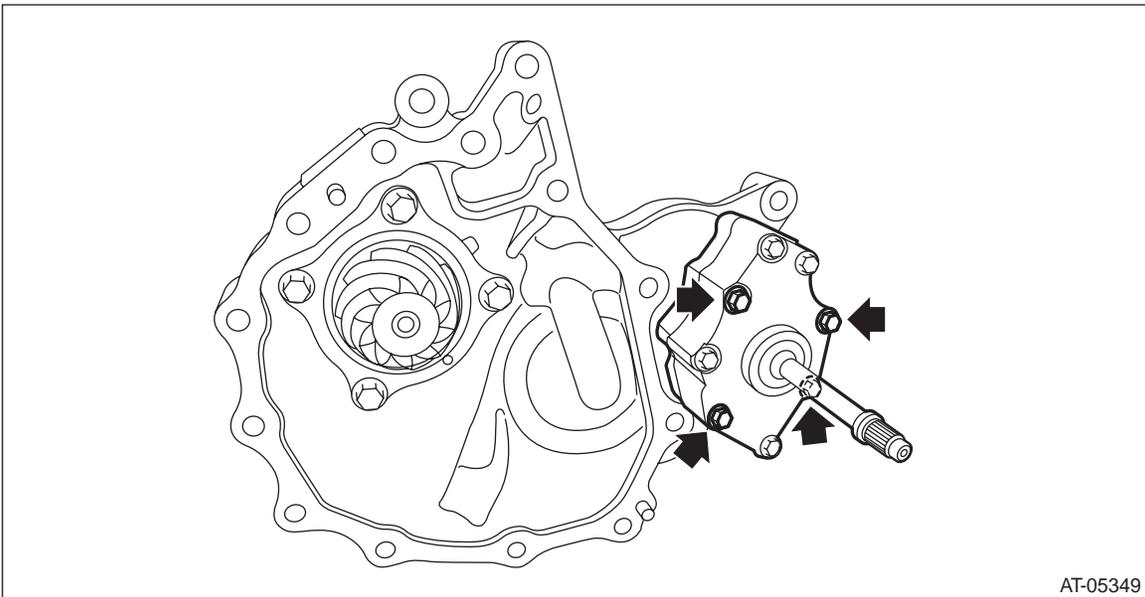
Drive Pinion Shaft Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

14) Remove the O-ring.



15) Remove the oil pump and the plate.

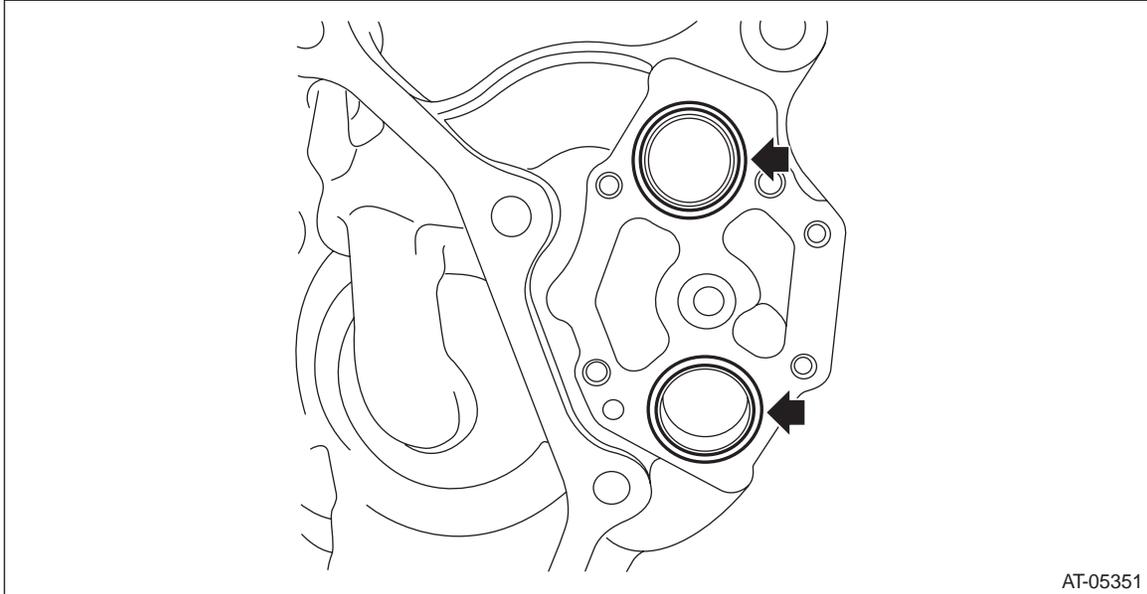


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Drive Pinion Shaft Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

16) Remove the O-ring.

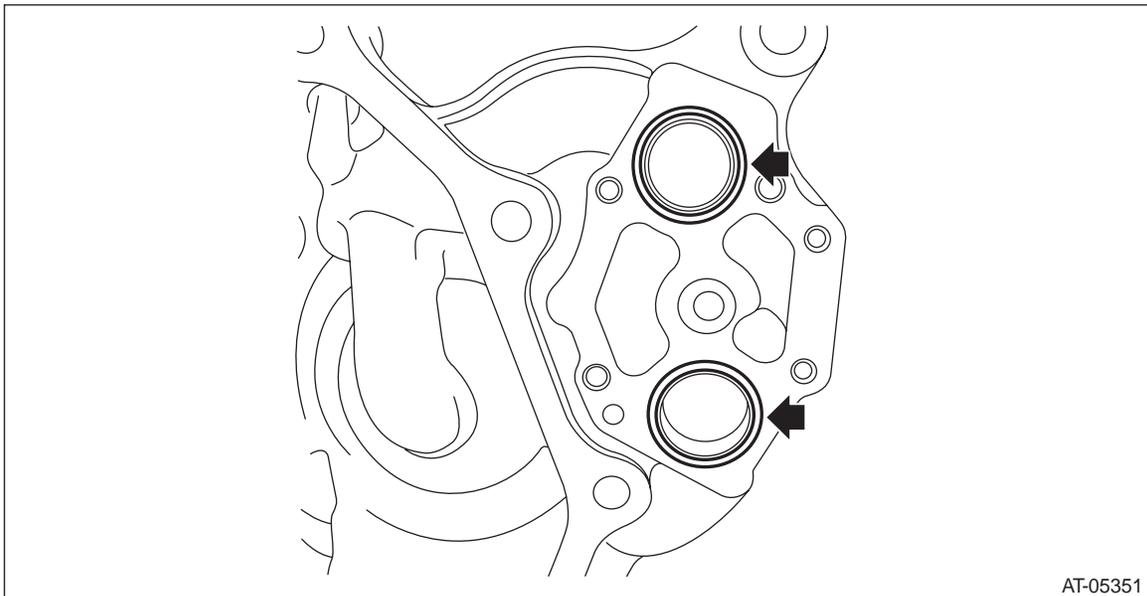


B: INSTALLATION

- 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(TR690)-262, ADJUSTMENT, Drive Pinion Shaft Assembly.>
- 3) Install the O-ring for oil pump to drive pinion retainer.

NOTE:

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



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Drive Pinion Shaft Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

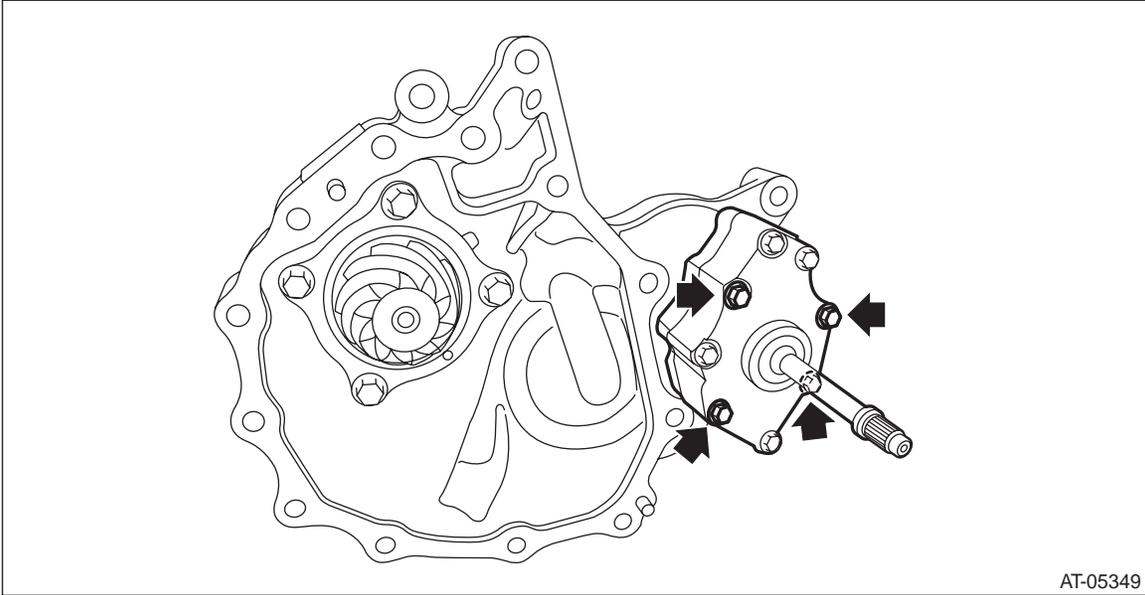
4) Install the plate and the oil pump.

NOTE:

Apply CVTF to the bolt.

Tightening torque:

8.5 N·m (0.9 kgf-m, 6.3 ft-lb)



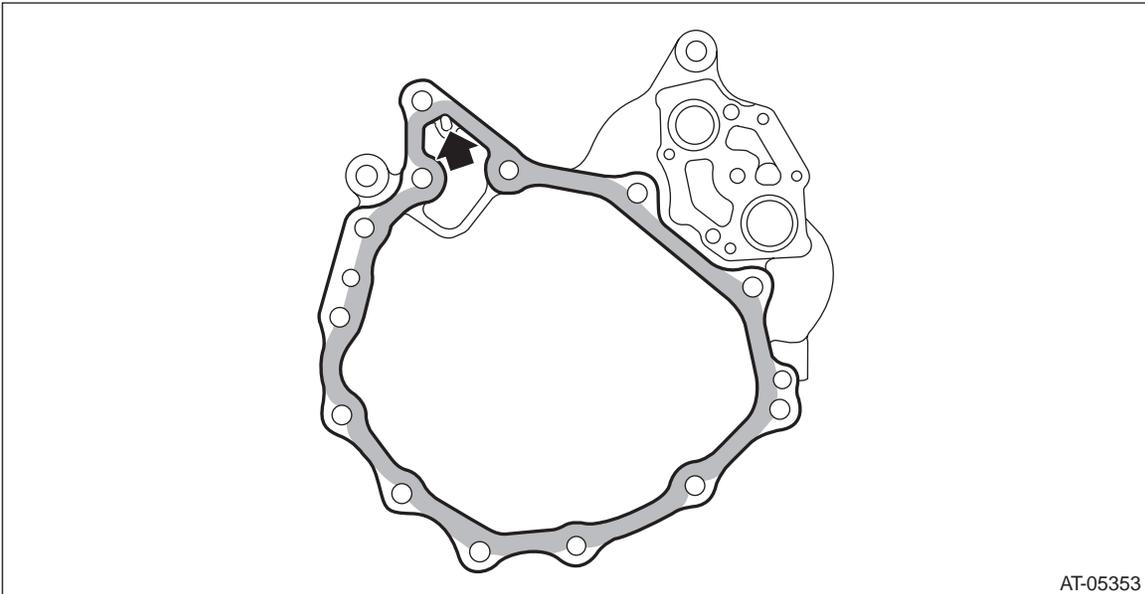
5) Apply liquid gasket seamlessly to the mating surface of drive pinion retainer.

NOTE:

Be careful not to block the arrowed hole when applying liquid gasket.

Liquid gasket:

THREE BOND 1215B or equivalent



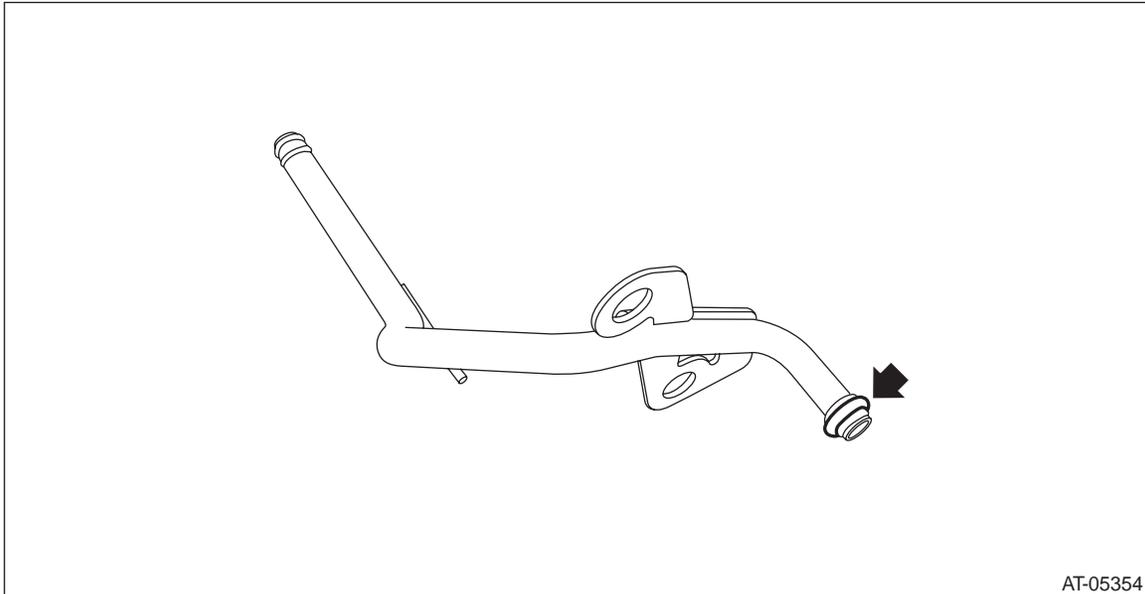
Drive Pinion Shaft Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

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

NOTE:

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



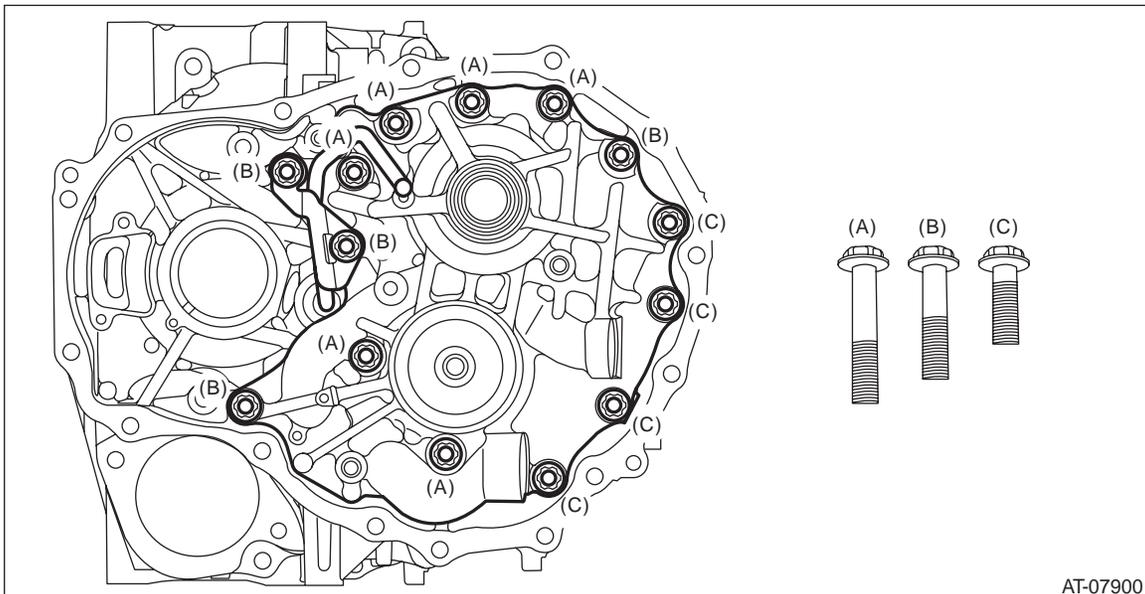
7) Install the drive pinion retainer and lubrication pipe to converter case and tighten the bolt using the ST. ST 18270KA020 SOCKET (E20)

NOTE:

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

Tightening torque:

43 N·m (4.4 kgf·m, 31.7 ft·lb)



8) Install the primary pulley, secondary pulley and variator chain.<Ref. to CVT(TR690)-235, INSTALLATION, Primary Pulley and Secondary Pulley.>

9) Install the transmission case.<Ref. to CVT(TR690)-215, INSTALLATION, Transmission Case.>

10) Install the forward clutch assembly.<Ref. to CVT(TR690)-183, INSTALLATION, Forward Clutch Assembly.>

11) Install the intermediate case.<Ref. to CVT(TR690)-168, INSTALLATION, Intermediate Case.>

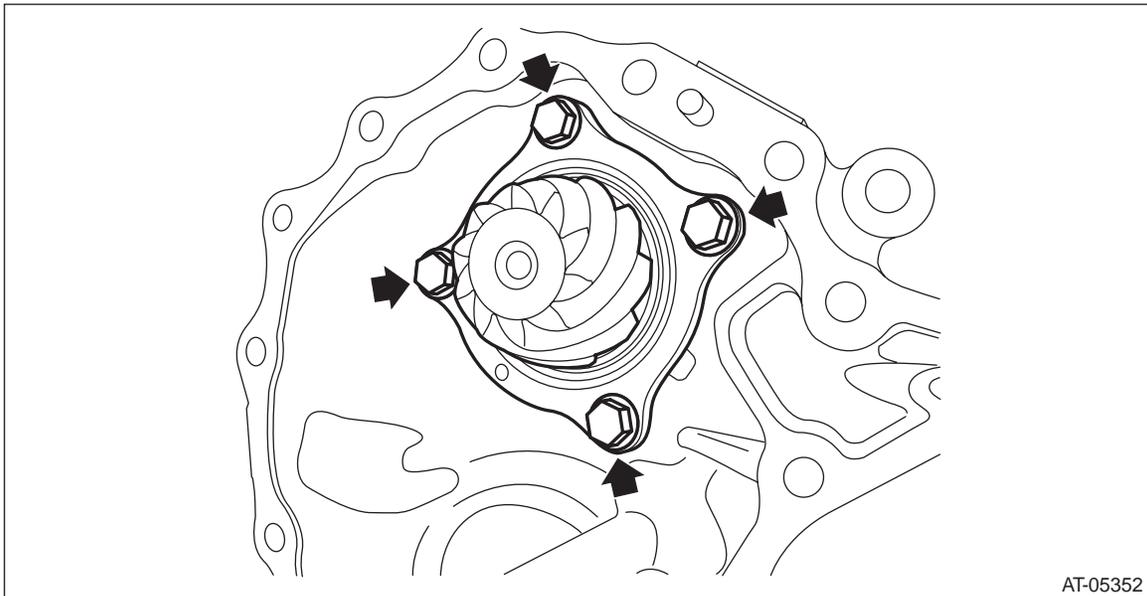
Drive Pinion Shaft Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

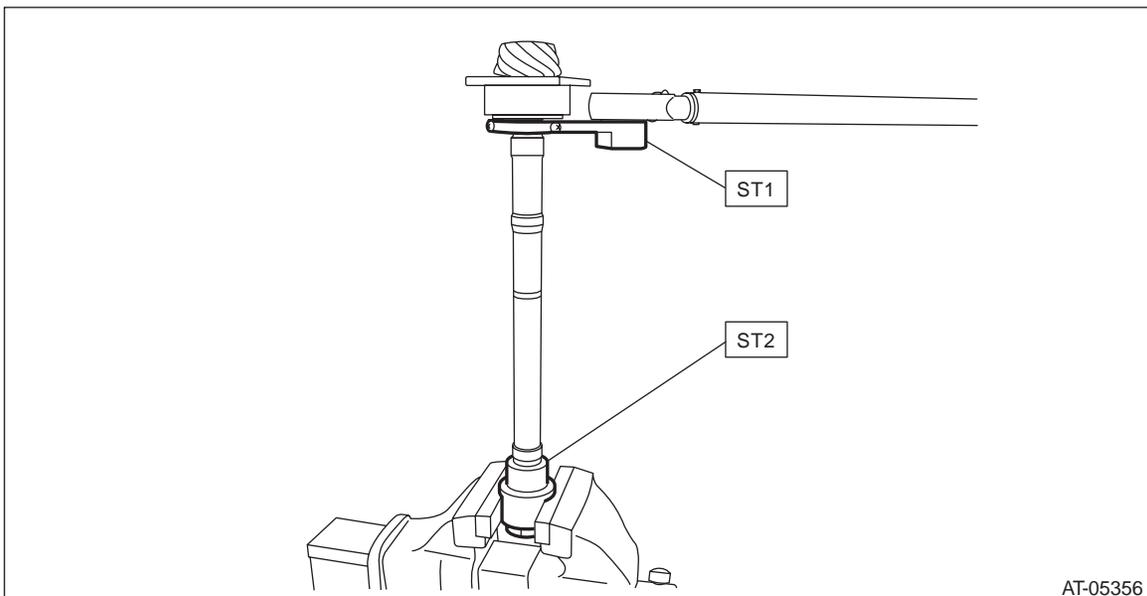
- 12) Install the transfer reduction driven gear assembly.<Ref. to CVT(TR690)-160, INSTALLATION, Transfer Reduction Driven Gear.>
- 13) Install the transfer clutch assembly.<Ref. to CVT(TR690)-149, INSTALLATION, Transfer Clutch.>
- 14) Install the rear drive shaft.<Ref. to CVT(TR690)-143, INSTALLATION, Rear Drive Shaft.>
- 15) Install the extension case.<Ref. to CVT(TR690)-141, INSTALLATION, Extension Case.>
- 16) Install the transmission harness.<Ref. to CVT(TR690)-122, INSTALLATION, Transmission Harness.>
- 17) Install the oil pan and control valve body.<Ref. to CVT(TR690)-113, INSTALLATION, Control Valve Body.>
- 18) Install the air breather hose.<Ref. to CVT(TR690)-134, INSTALLATION, Air Breather Hose.>
- 19) Install the transmission assembly to the vehicle.<Ref. to CVT(TR690)-69, INSTALLATION, Automatic Transmission Assembly.>

C: DISASSEMBLY

- 1) Remove the drive pinion assembly.



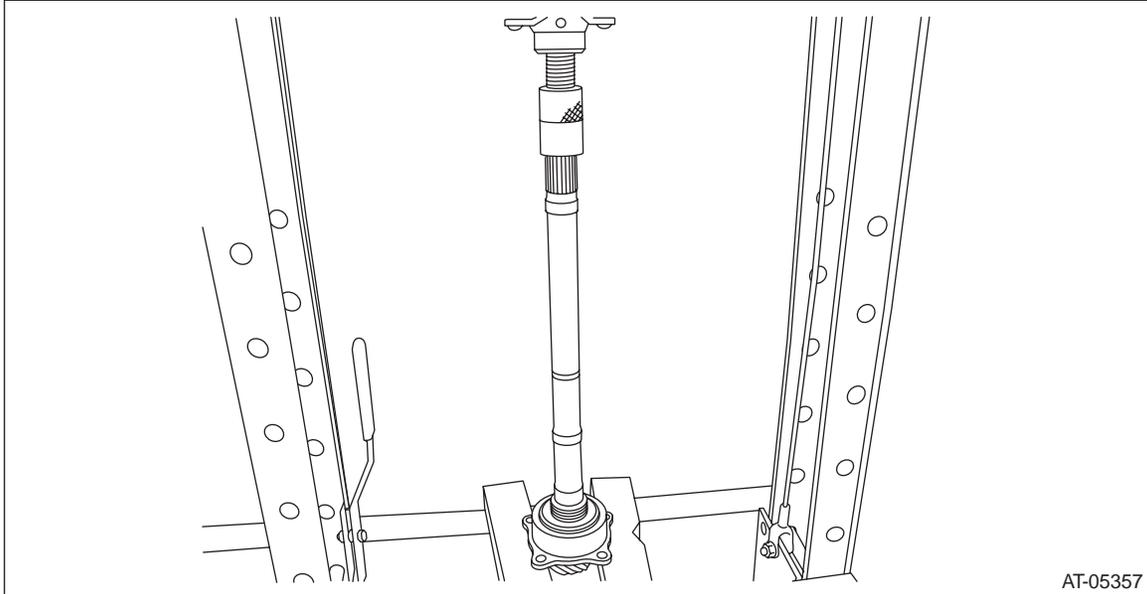
- 2) Flatten the tab of the lock nut.
 - 3) Using ST1 and ST2, fix at the spline portion of drive pinion shaft to remove the lock nut.
- ST1 18621AA000 WRENCH
ST2 18667AA010 HOLDER



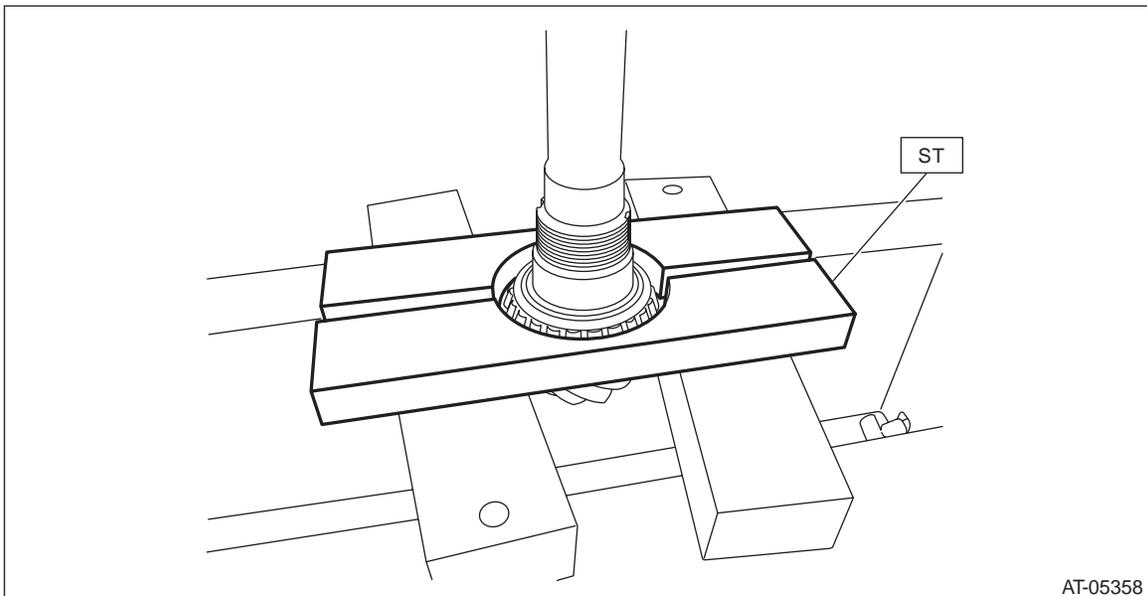
Drive Pinion Shaft Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

- 4) Remove the taper roller bearing and outer race from drive pinion shaft.



- 5) Remove the inner bearing inner race from the drive pinion shaft using ST.
ST 498077000 REMOVER



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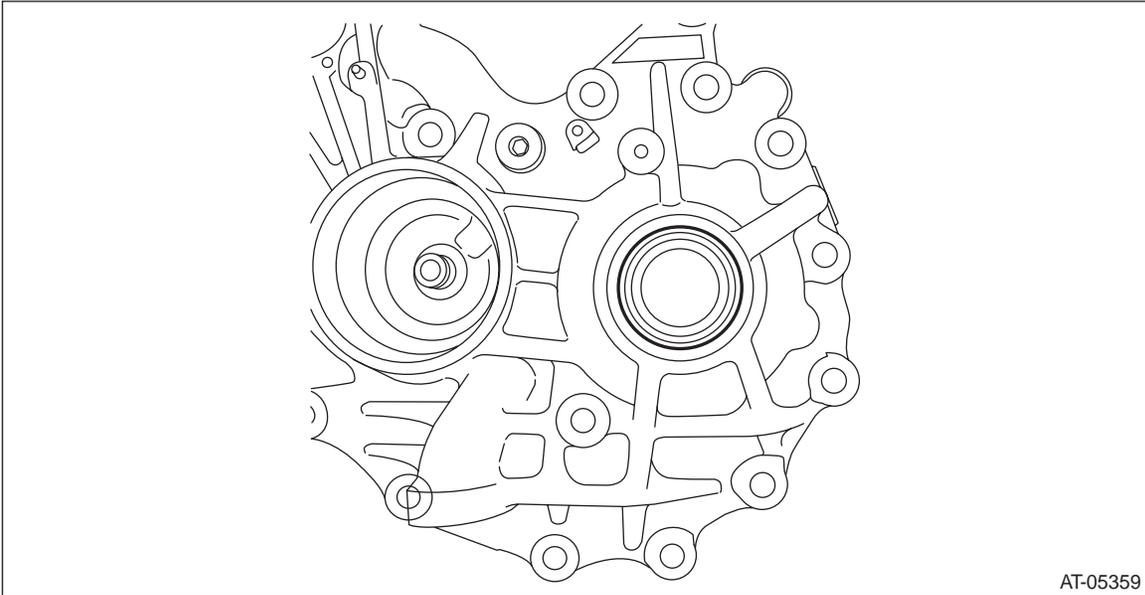
Drive Pinion Shaft Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

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

CAUTION:

Do not damage the fitting surface of drive pinion bearing.



AT-05359

7) Remove the plug from drive pinion retainer.

Drive Pinion Shaft Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

D: ASSEMBLY

1) Install the O-ring to plug and 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)

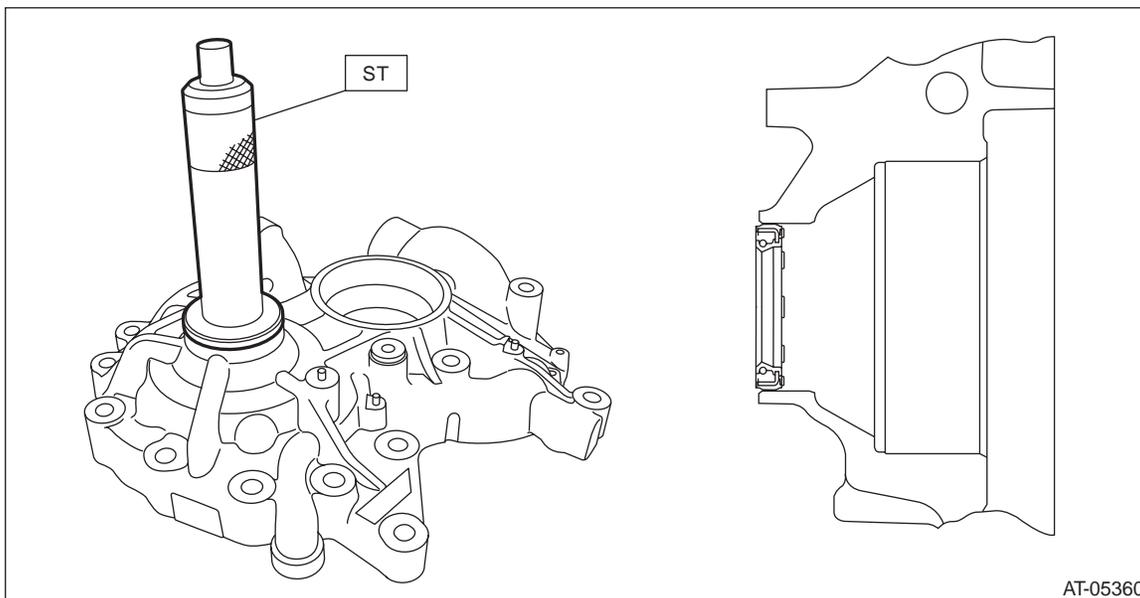
2) Using the ST, install the oil seal to drive pinion retainer.

NOTE:

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

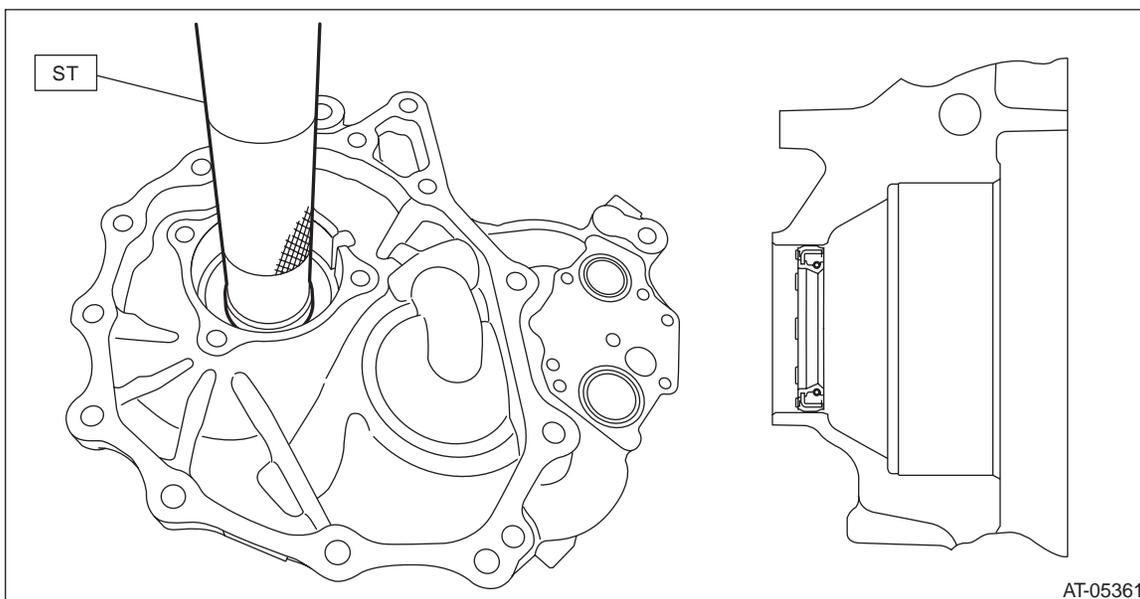
Pulley side

ST 18657AA020 OIL SEAL INSTALLER



Front differential side

ST 499277100 INSTALLER

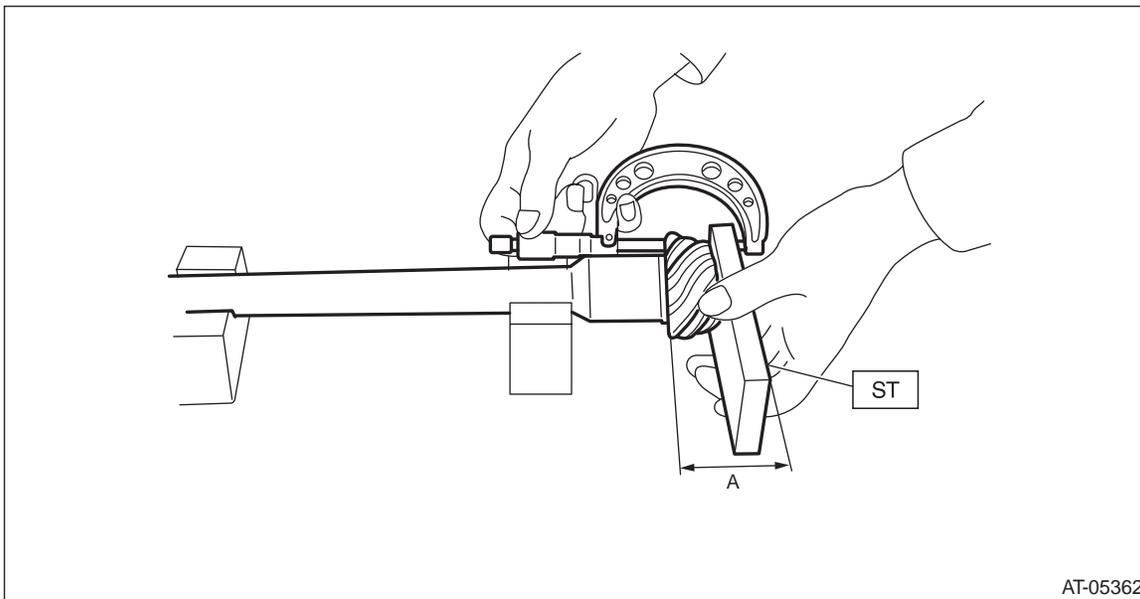


Drive Pinion Shaft Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

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

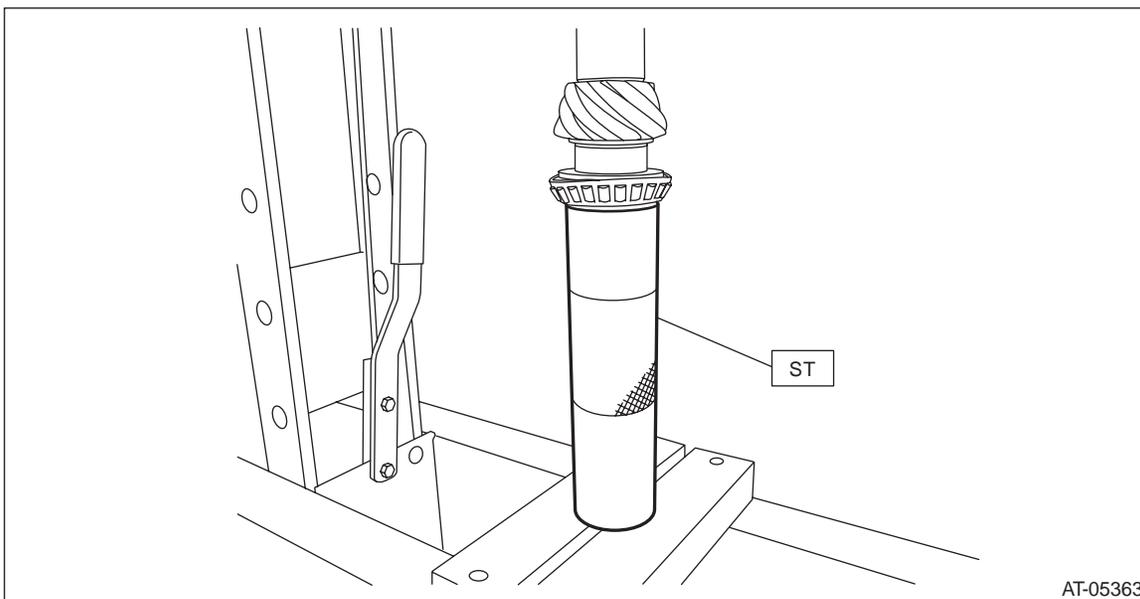
ST 398643600 GAUGE



AT-05362

4) Press-fit the new taper roller bearing front side inner race using the ST.

ST 499277200 INSTALLER



AT-05363

Drive Pinion Shaft Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

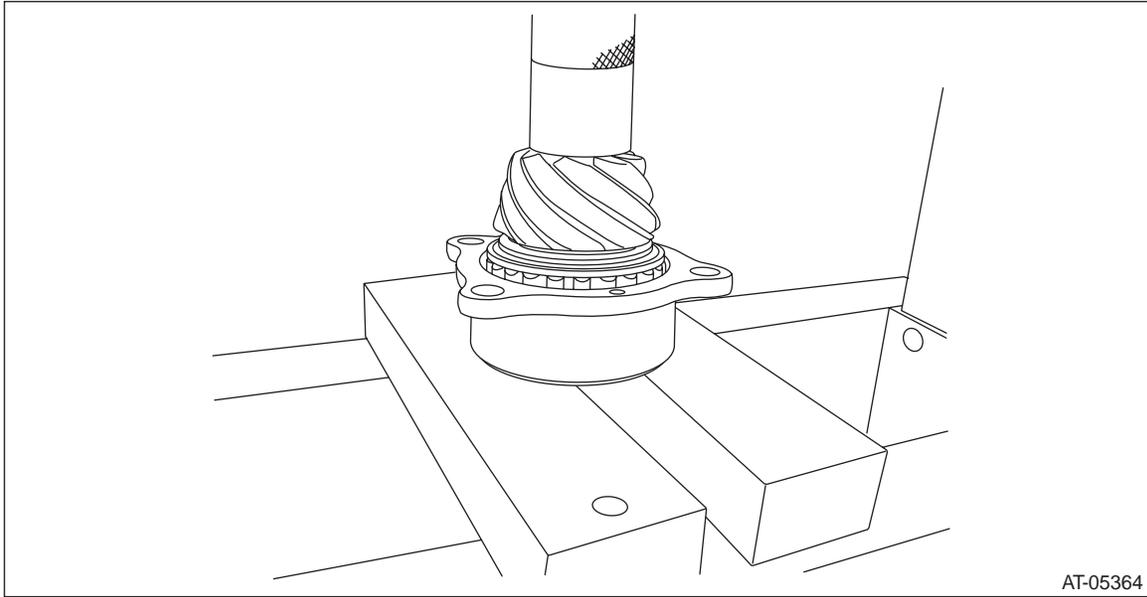
5) Press-fit the new taper roller bearing rear side inner race and outer race together.

CAUTION:

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

NOTE:

Press in to a position where the bearing rotates smoothly without play.



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Drive Pinion Shaft Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

6) Tighten a new lock nut using the ST.

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

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

T1: 130 N·m (13.3 kgf·m, 95.9 ft·lb)

[Required torque setting]

T2: Tightening torque

L1: ST1 length 0.1 m (3.94 in)

L2: Torque wrench length

Example:

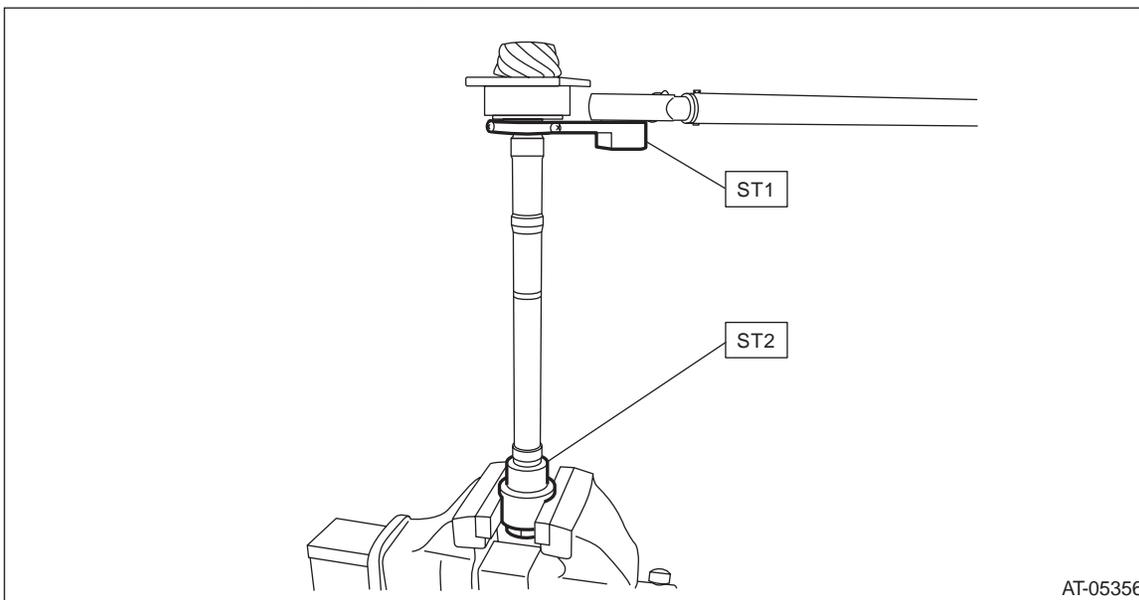
Torque wrench length m (in)	Tightening torque N·m (kgf·m, ft·lb)
0.4 (15.75)	104 (10.6, 76.7)
0.45 (17.72)	106 (10.8, 78.2)
0.5 (19.69)	108 (11.0, 79.7)
0.55 (21.65)	110 (11.2, 81.1)

ST1 18621AA000 WRENCH

ST2 18667AA010 HOLDER

NOTE:

Tighten the lock nut while directly aligning ST1 and torque wrench.



7) Apply differential gear oil to roller of bearing and rotate the bearing several times.

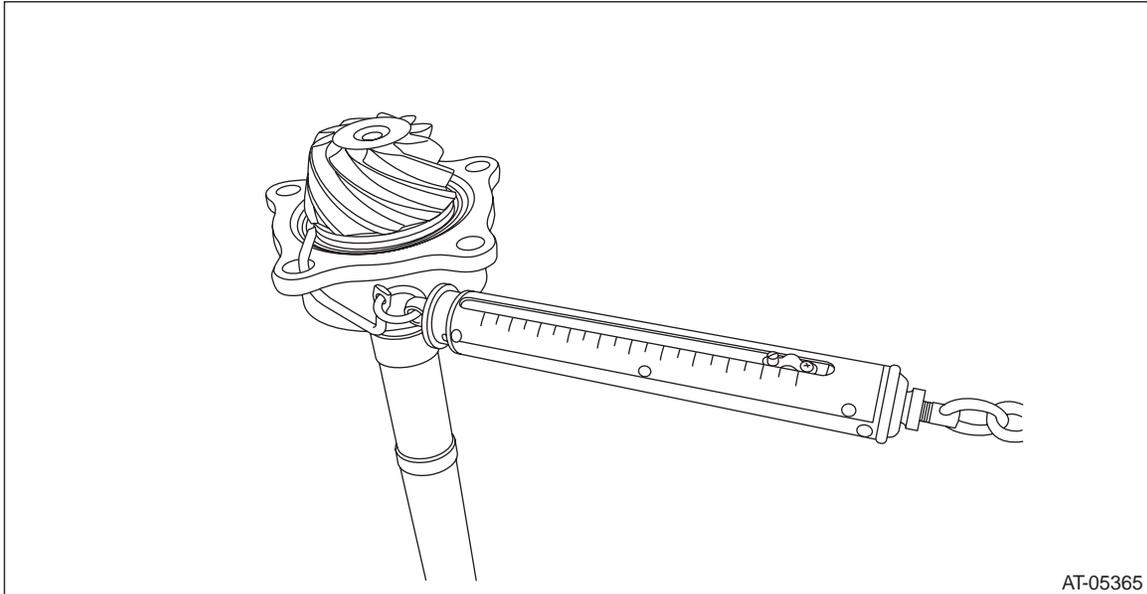
Drive Pinion Shaft Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

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

Starting torque:

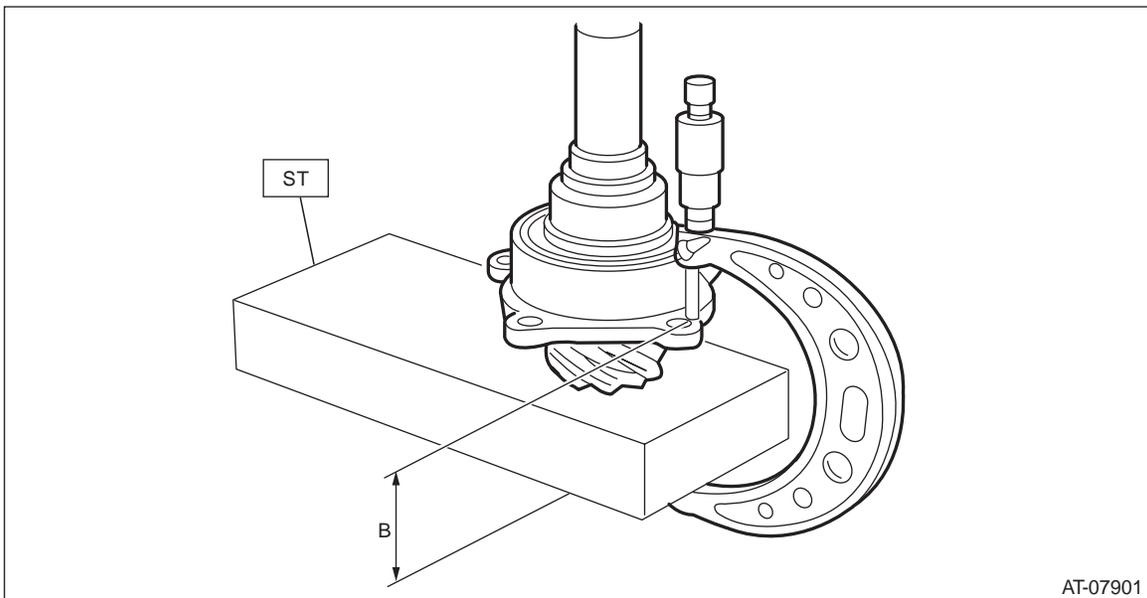
16.3 — 42.7 N (1.7 — 4.4 kgf, 4.4 — 9.6 lbf)



9) Crimp the lock nut in 2 locations.

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

ST 398643600 GAUGE



11) Obtain thickness "t" mm (in) of the drive pinion shim.

$$t = 6.55 \pm 0.1225 - (B - A)$$

Drive Pinion Shaft Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

12) Select three or less shims from following table.

Drive pinion shim	
Part No.	Thickness mm (in)
31451AA050	0.150 (0.0059)
31451AA060	0.175 (0.0069)
31451AA070	0.200 (0.0079)
31451AA080	0.225 (0.0089)
31451AA090	0.250 (0.0098)
31451AA100	0.275 (0.0108)
31451AA240	0.300 (0.0118)

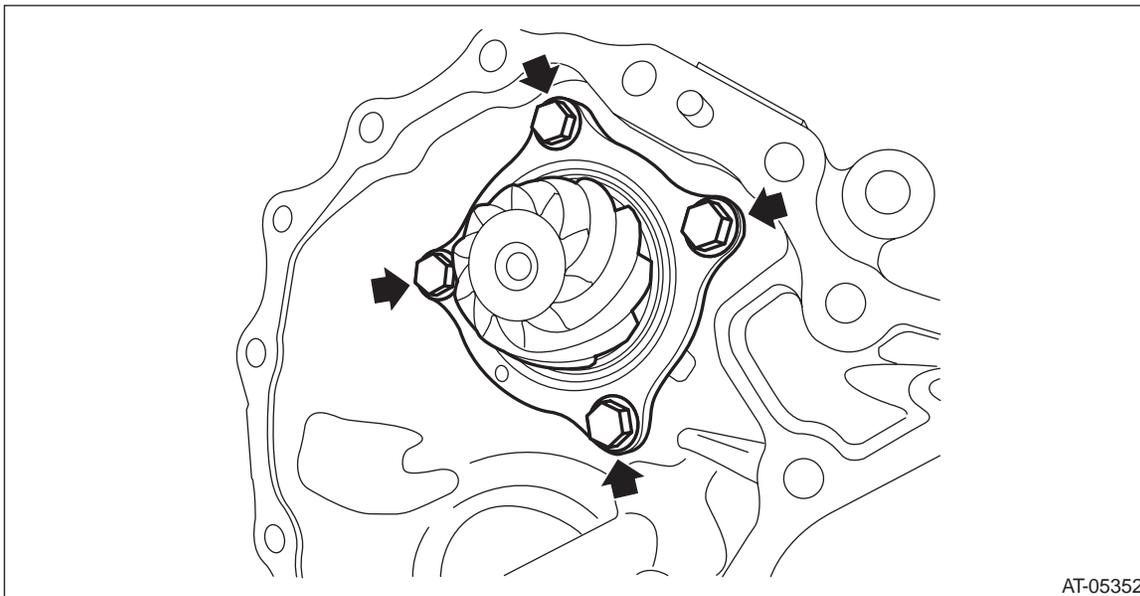
13) Install the shims selected for drive pinion retainer and drive pinion shaft assembly.

NOTE:

Be careful not to bend the shim.

Tightening torque:

70 N·m (7.1 kgf-m, 51.6 ft-lb)



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Drive Pinion Shaft Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

E: INSPECTION

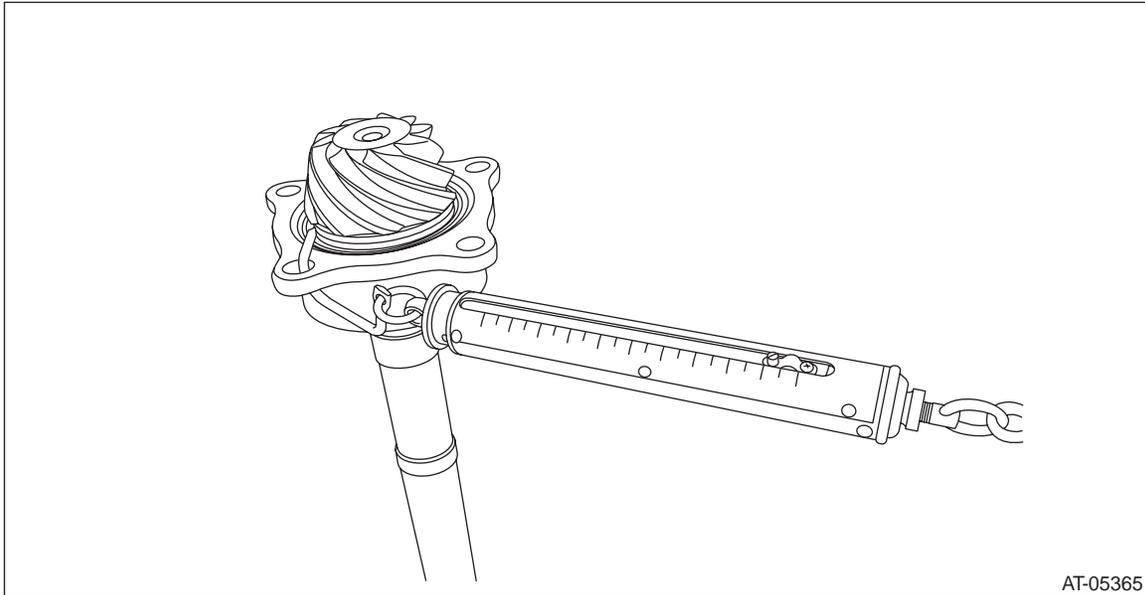
- Make sure that all component parts are free of scratches, holes and other faults.
- Check the tooth contact. <Ref. to CVT(TR690)-262, ADJUSTMENT, Drive Pinion Shaft Assembly.>
- Apply CVTF to bearing and rotate the bearing to check for noise or dragging etc.
- Check the bearing preload of drive pinion shaft.

CAUTION:

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

Starting torque:

16.3 — 42.7 N (1.7 — 4.4 kgf, 4.4 — 9.6 lbf)



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Drive Pinion Shaft Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

F: ADJUSTMENT

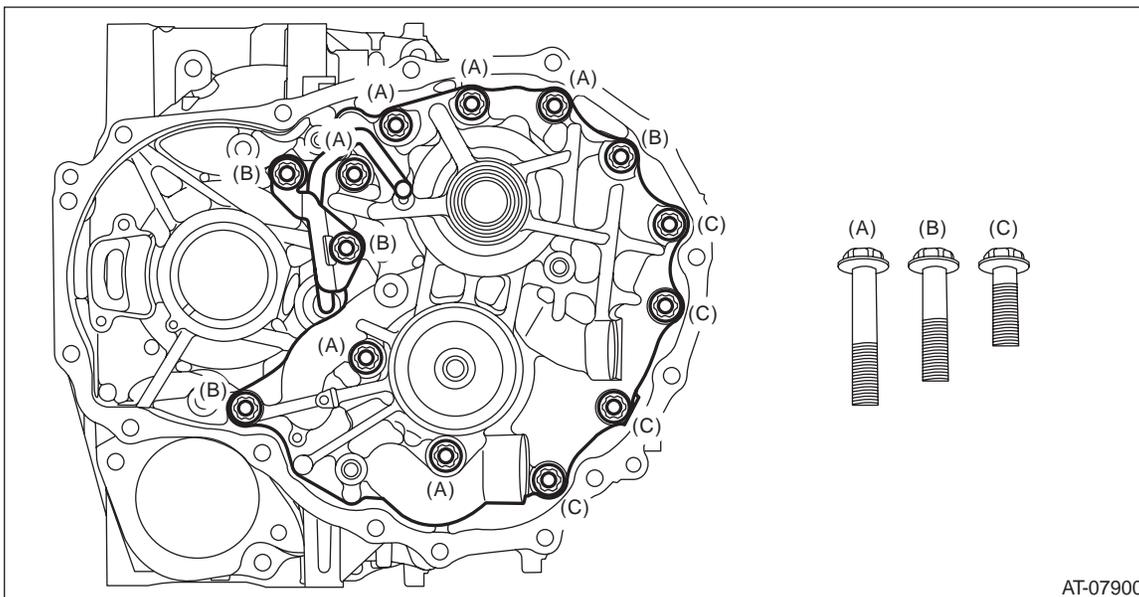
- 1) Remove the liquid gasket from the mating surface completely.
- 2) Using the ST, install the drive pinion retainer to converter case.
ST 18270KA020 SOCKET (E20)

NOTE:

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

Tightening torque:

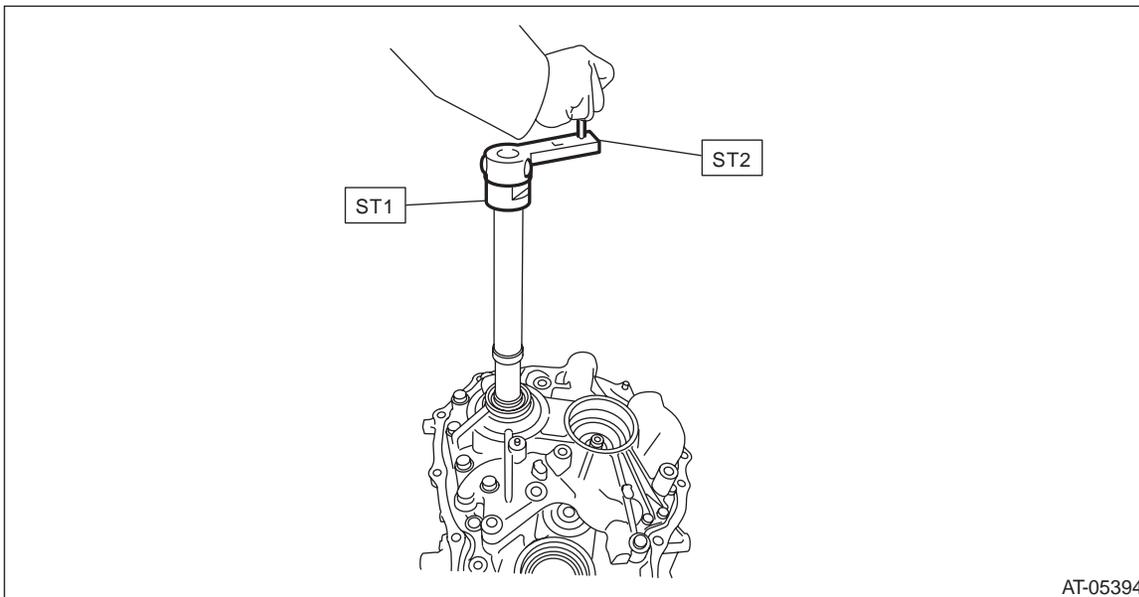
43 N·m (4.4 kgf·m, 31.7 ft·lb)



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

ST1 18667AA010 HOLDER

ST2 499787700 WRENCH



Drive Pinion Shaft Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

4) Adjust the drive pinion and hypoid driven gear backlash. <Ref. to CVT(TR690)-283, ADJUSTMENT, Front Differential Assembly.>

5) Using the ST, remove the drive pinion retainer from converter case.

ST 18270KA020 SOCKET (E20)

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.

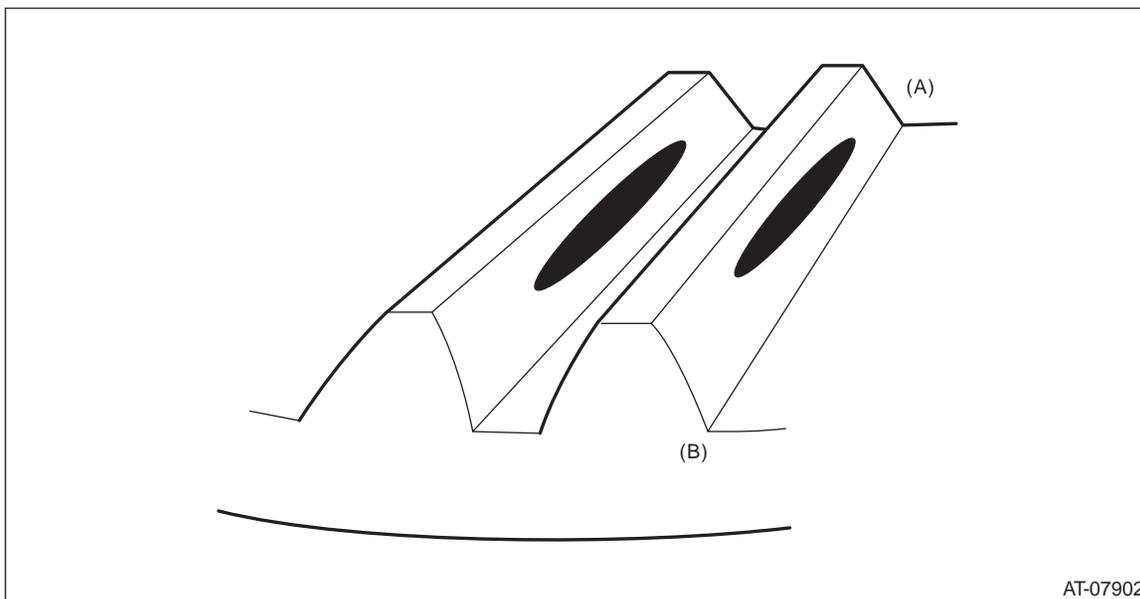
If the teeth contact is inappropriate, adjust the backlash or thickness of the shim. <Ref. to CVT(TR690)-283, ADJUSTMENT, Front Differential Assembly.>

NOTE:

After correction, wipe off the lead-free red dye.

- 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

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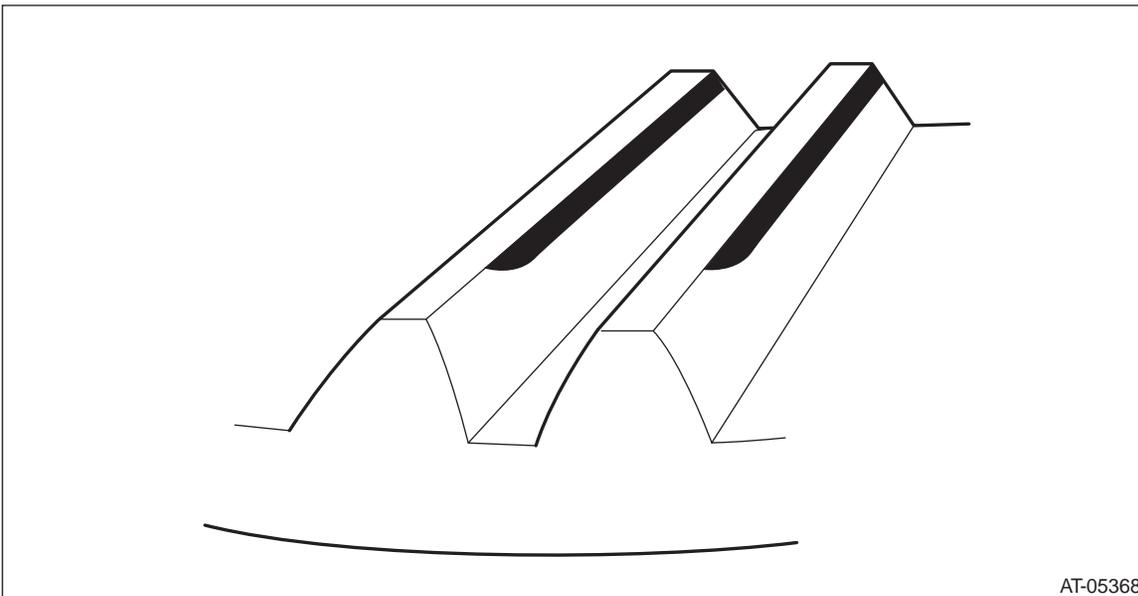
Drive Pinion Shaft Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

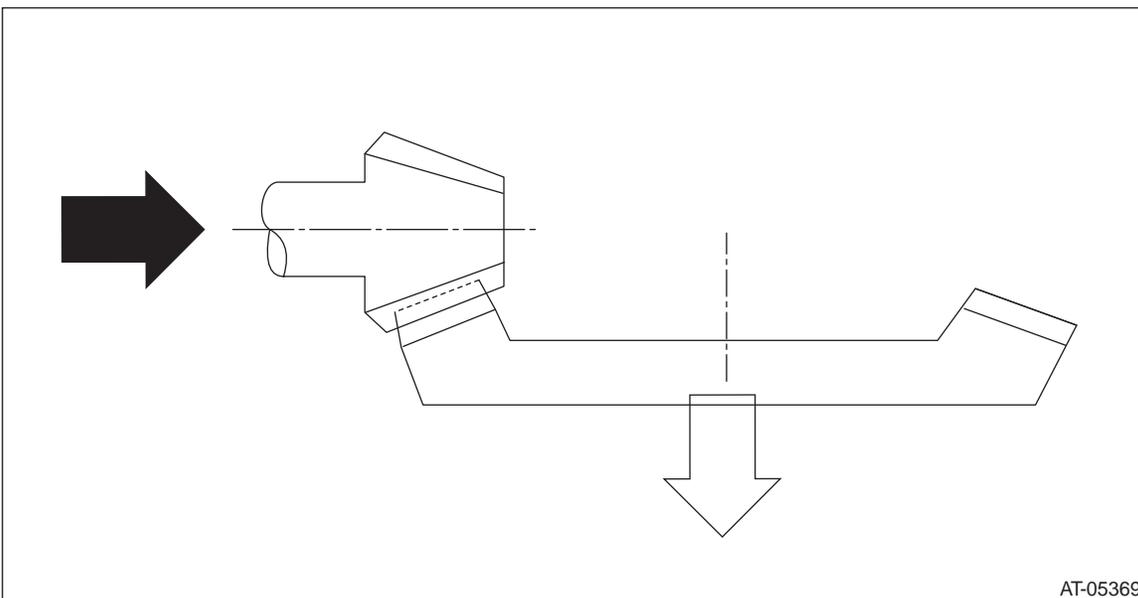
- Face contact

Check item: Backlash is too large.

Contact pattern



Corrective action: Increase thickness of pinion height adjusting washer according to the procedure for bringing drive pinion close to hypoid driven gear side.



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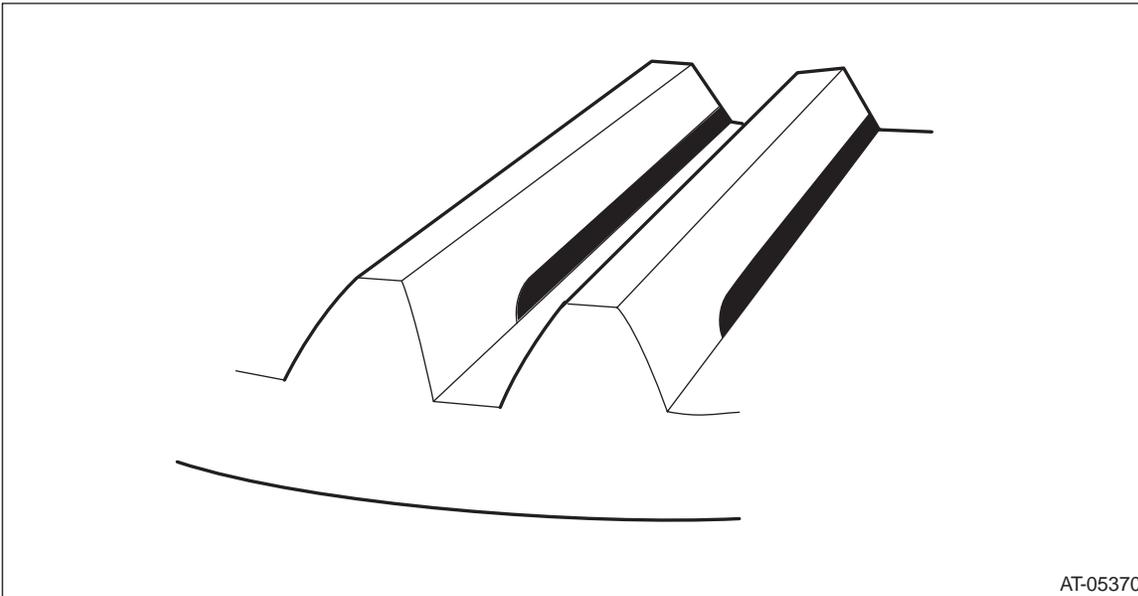
Drive Pinion Shaft Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

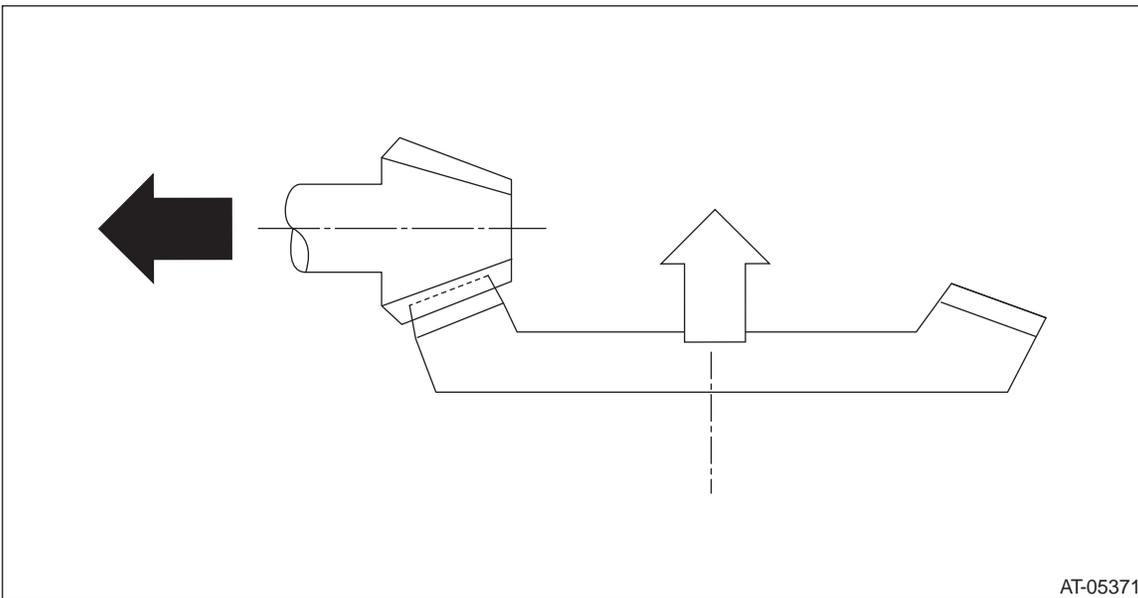
- Flank contact

Check item: Backlash is too small.

Contact pattern



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



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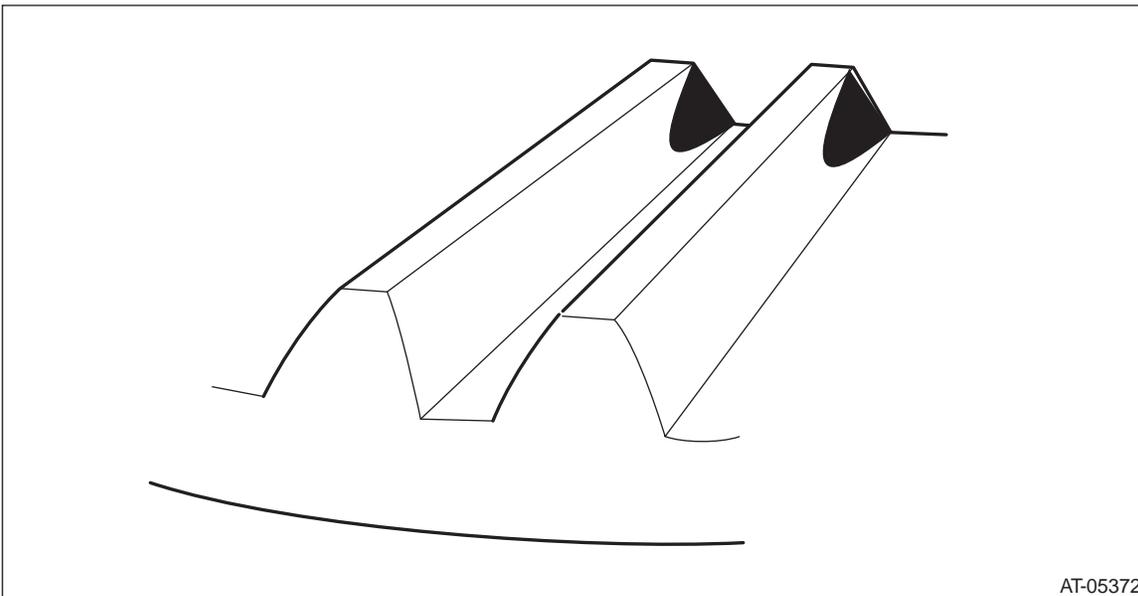
Drive Pinion Shaft Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

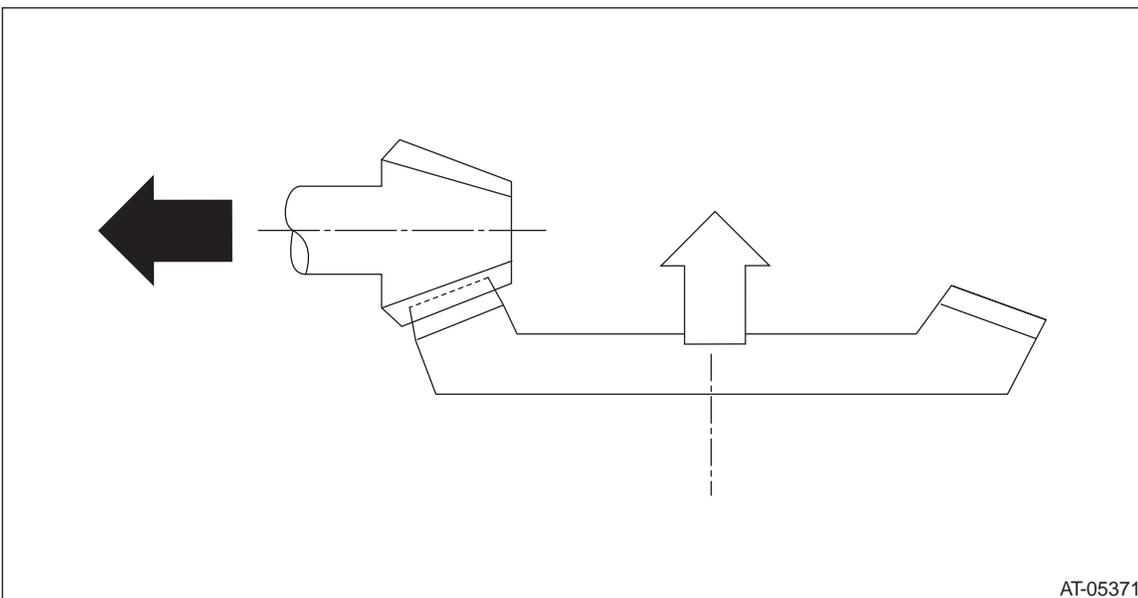
- Toe contact (inside contact)

Check item: Teeth contact area is too small.

Contact pattern



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



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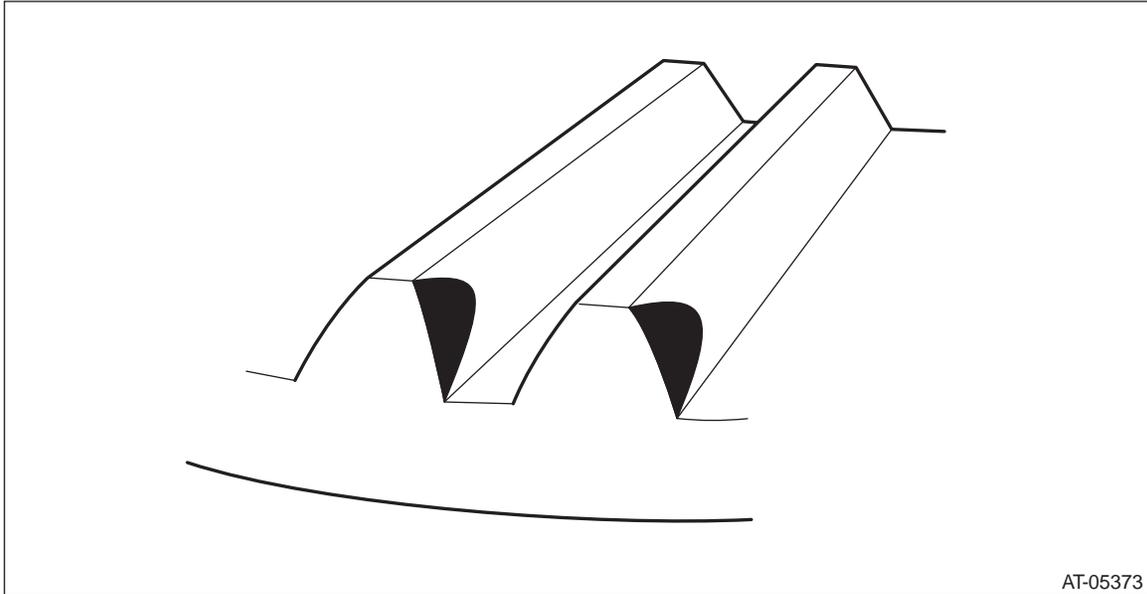
Drive Pinion Shaft Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

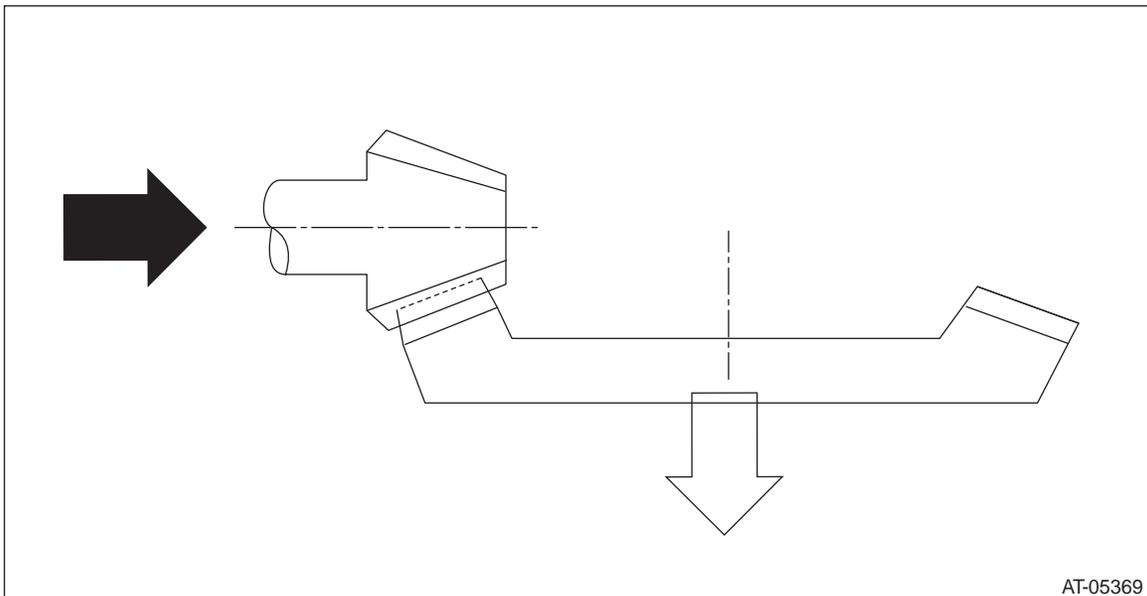
- Heel contact (outside end contact)

Check item: Teeth contact area is too small.

Contact pattern



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



7) If tooth contact is correct, mark the differential side retainer position and loosen. After fitting a new O-ring and oil seal, screw in the differential side retainer to the marked position.

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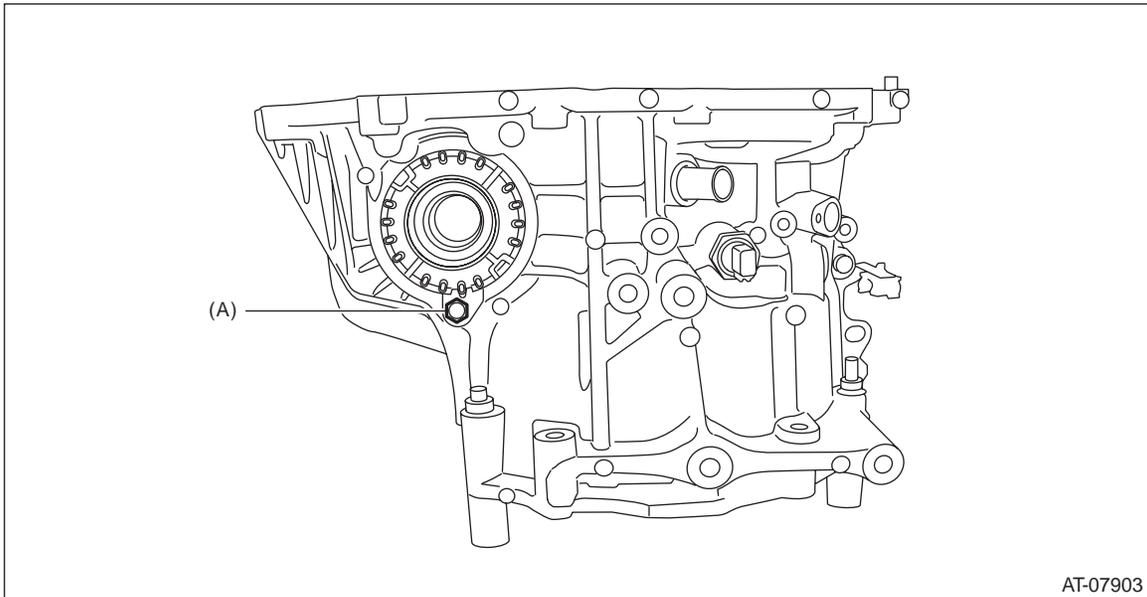
Drive Pinion Shaft Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

8) Tighten the lock plate with specified torque.

Tightening torque:

25 N·m (2.5 kgf-m, 18.4 ft-lb)



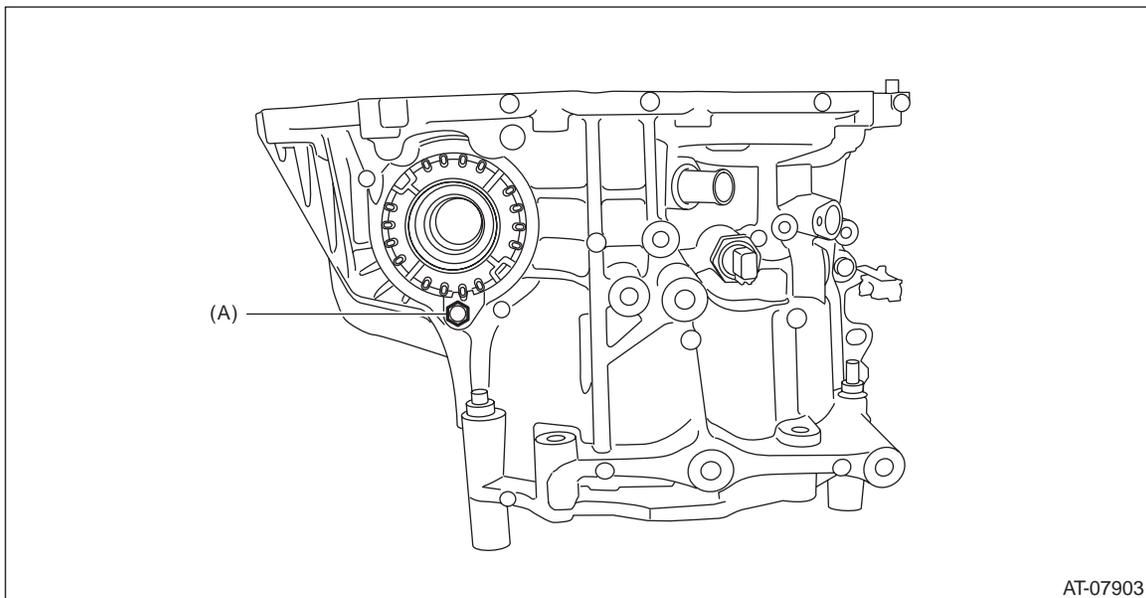
(A) Lock plate

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44. Front Differential Assembly

A: REMOVAL

- 1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TR690)-56, REMOVAL, Automatic Transmission Assembly.>
- 2) Remove the air breather hose. <Ref. to CVT(TR690)-134, REMOVAL, Air Breather Hose.>
- 3) Remove the oil pan and control valve body. <Ref. to CVT(TR690)-109, REMOVAL, Control Valve Body.>
- 4) Remove the transmission harness. <Ref. to CVT(TR690)-120, REMOVAL, Transmission Harness.>
- 5) Remove the extension case. <Ref. to CVT(TR690)-140, REMOVAL, Extension Case.>
- 6) Remove the rear drive shaft. <Ref. to CVT(TR690)-143, REMOVAL, Rear Drive Shaft.>
- 7) Remove the transfer clutch assembly. <Ref. to CVT(TR690)-148, REMOVAL, Transfer Clutch.>
- 8) Remove the transfer reduction driven gear assembly. <Ref. to CVT(TR690)-160, REMOVAL, Transfer Reduction Driven Gear.>
- 9) Remove the intermediate case. <Ref. to CVT(TR690)-167, REMOVAL, Intermediate Case.>
- 10) Remove the forward clutch assembly. <Ref. to CVT(TR690)-182, REMOVAL, Forward Clutch Assembly.>
- 11) Remove the transmission case. <Ref. to CVT(TR690)-213, REMOVAL, Transmission Case.>
- 12) Remove the primary pulley, secondary pulley and variator chain. <Ref. to CVT(TR690)-231, REMOVAL, Primary Pulley and Secondary Pulley.>
- 13) Remove the drive pinion shaft assembly. <Ref. to CVT(TR690)-247, REMOVAL, Drive Pinion Shaft Assembly.>
- 14) Remove the lock plates on both sides.



(A) Lock plate

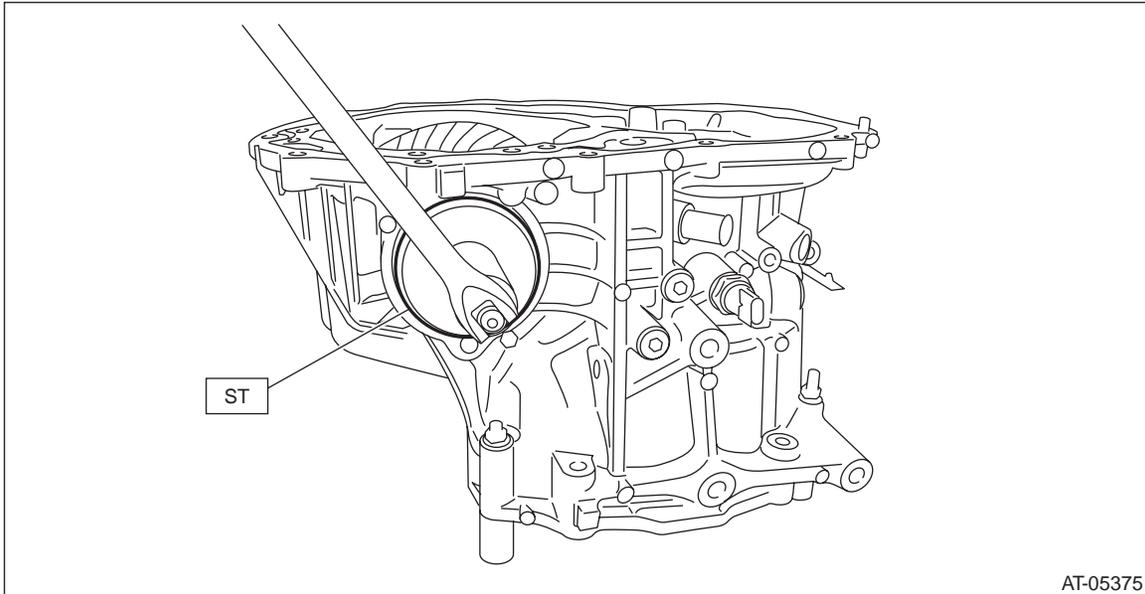
Front Differential Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

15) Remove the differential side retainers using ST.
ST 18658AA020 WRENCH COMPL RETAINER

NOTE:

- Support the differential case assembly by hand to avoid damaging the retainer mounting hole of the converter case.
- When keeping the retainers aside, use labels etc. to avoid confusing the left and right.



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

17) Remove the oil seals and O-rings from both differential side retainers. <Ref. to CVT(TR690)-275, SIDE RETAINER, DISASSEMBLY, Front Differential Assembly.>

B: INSTALLATION

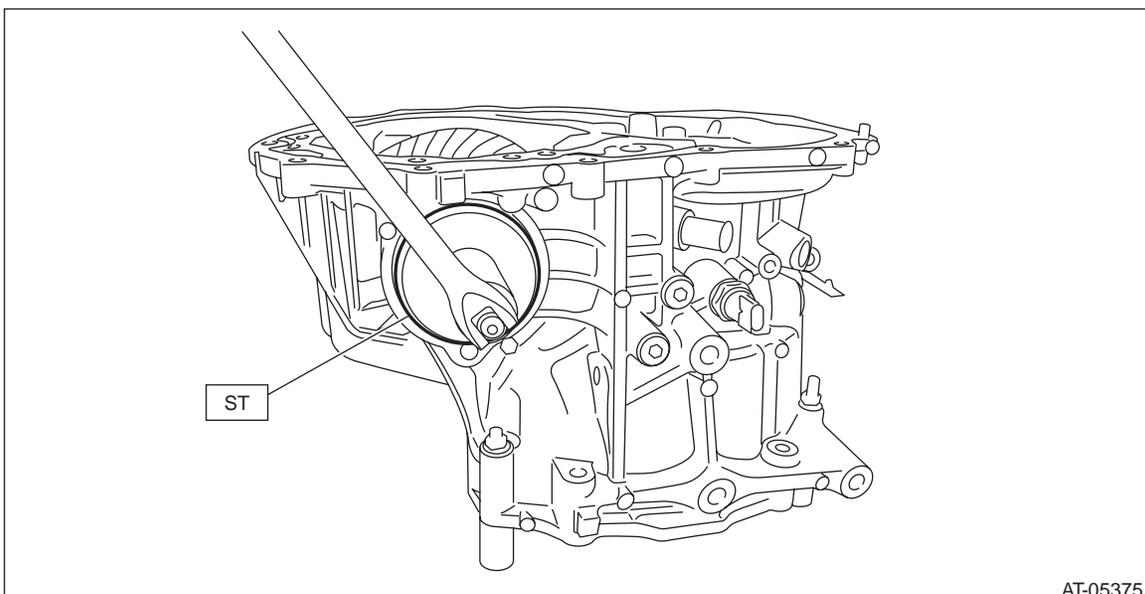
1) Install the front differential assembly to the converter case.

NOTE:

Be careful not to damage the inside of the case (especially the mating surface of the differential side retainers).

2) Temporarily install the differential side retainers using ST.

ST 18658AA020 WRENCH COMPL RETAINER



CVT(TR690)-270

Front Differential Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

3) Adjust the backlash of the front differential. <Ref. to CVT(TR690)-283, ADJUSTMENT, Front Differential Assembly.>

4) Inspect and adjust the tooth contact. <Ref. to CVT(TR690)-262, ADJUSTMENT, Drive Pinion Shaft Assembly.>

5) Remove the differential side retainers and install the O-rings and oil seals. <Ref. to CVT(TR690)-282, SIDE RETAINER, ASSEMBLY, Front Differential Assembly.>

NOTE:

- Record how many turns were needed to remove.
- Use new O-rings and oil seals.

6) Install the differential side retainers using ST.

NOTE:

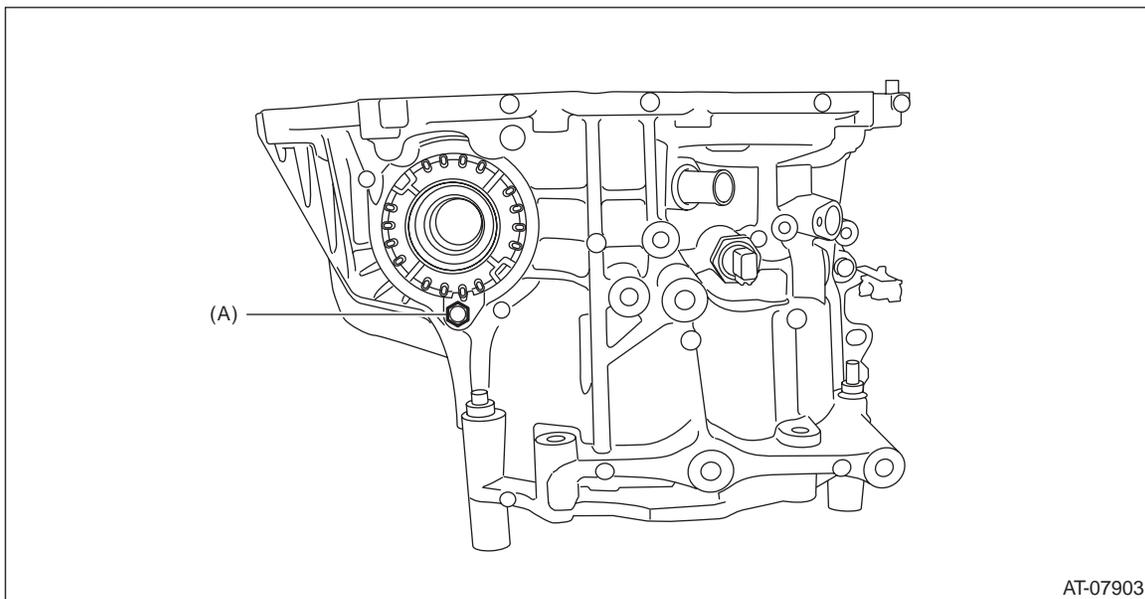
When attaching, turn the differential side retainer by the same number of turns it took to remove, and align the marks.

ST 18658AA020 WRENCH COMPL RETAINER

7) Install the lock plate.

Tightening torque:

25 N·m (2.5 kgf·m, 18.4 ft·lb)



(A) Lock plate

8) Install the drive pinion shaft assembly. <Ref. to CVT(TR690)-249, INSTALLATION, Drive Pinion Shaft Assembly.>

9) Install the primary pulley, secondary pulley and variator chain. <Ref. to CVT(TR690)-235, INSTALLATION, Primary Pulley and Secondary Pulley.>

10) Install the transmission case. <Ref. to CVT(TR690)-215, INSTALLATION, Transmission Case.>

11) Install the forward clutch assembly. <Ref. to CVT(TR690)-183, INSTALLATION, Forward Clutch Assembly.>

12) Install the intermediate case. <Ref. to CVT(TR690)-168, INSTALLATION, Intermediate Case.>

13) Install the transfer reduction driven gear assembly. <Ref. to CVT(TR690)-160, INSTALLATION, Transfer Reduction Driven Gear.>

14) Install the transfer clutch assembly. <Ref. to CVT(TR690)-149, INSTALLATION, Transfer Clutch.>

15) Install the rear drive shaft. <Ref. to CVT(TR690)-143, INSTALLATION, Rear Drive Shaft.>

16) Install the extension case. <Ref. to CVT(TR690)-141, INSTALLATION, Extension Case.>

17) Install the transmission harness. <Ref. to CVT(TR690)-122, INSTALLATION, Transmission Harness.>

18) Install the control valve body and oil pan. <Ref. to CVT(TR690)-113, INSTALLATION, Control Valve Body.>

Front Differential Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

19) Install the air breather hose. <Ref. to CVT(TR690)-134, INSTALLATION, Air Breather Hose.>

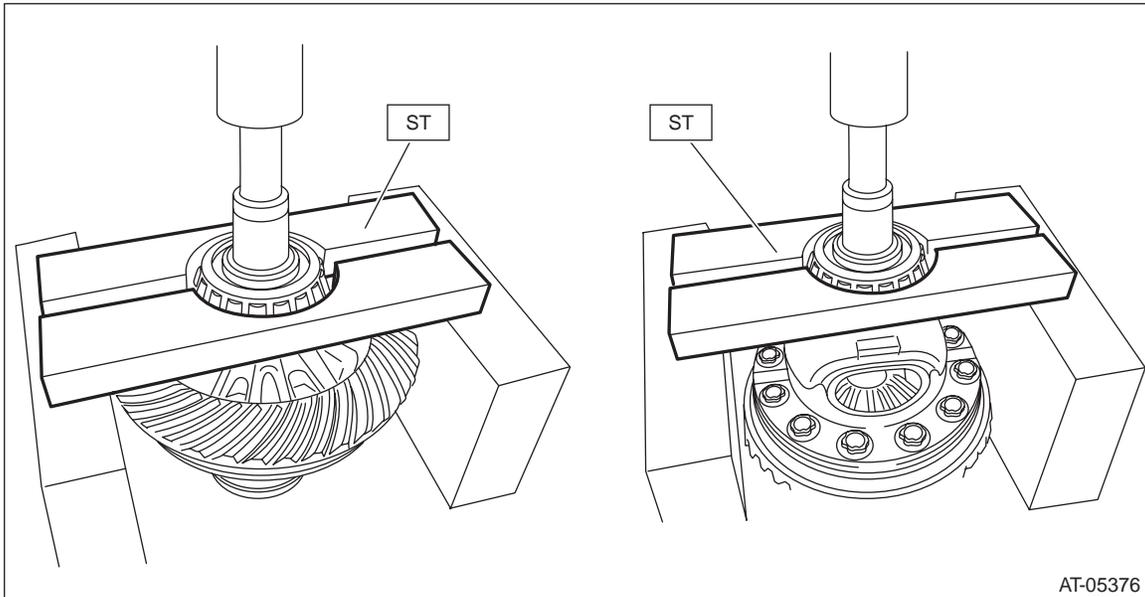
20) Install the transmission assembly to the vehicle. <Ref. to CVT(TR690)-69, INSTALLATION, Automatic Transmission Assembly.>

C: DISASSEMBLY

1. DIFFERENTIAL CASE ASSEMBLY

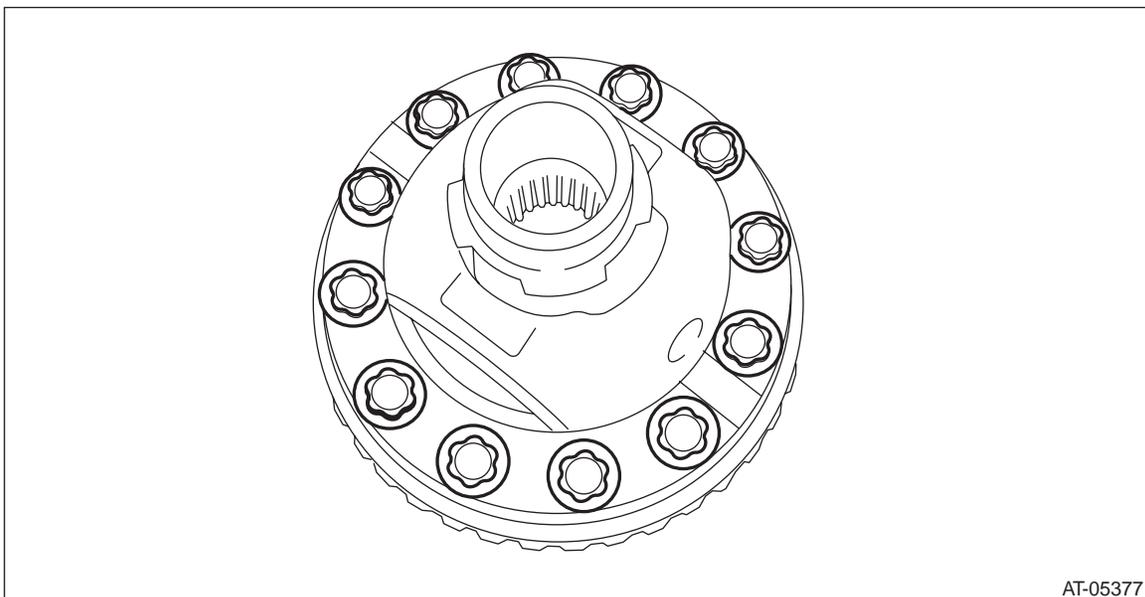
1) Remove the taper roller bearing using the ST.

ST 498077000 REMOVER



2) Remove the hypoid driven gear mounting bolt using the ST.

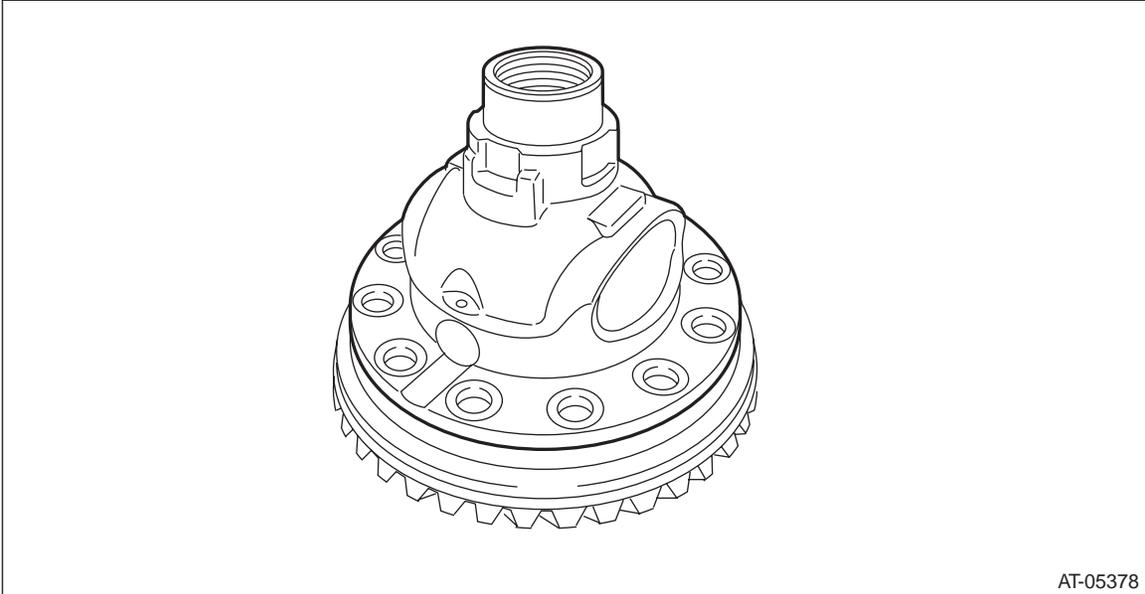
ST 18270KA020 SOCKET (E20)



Front Differential Assembly

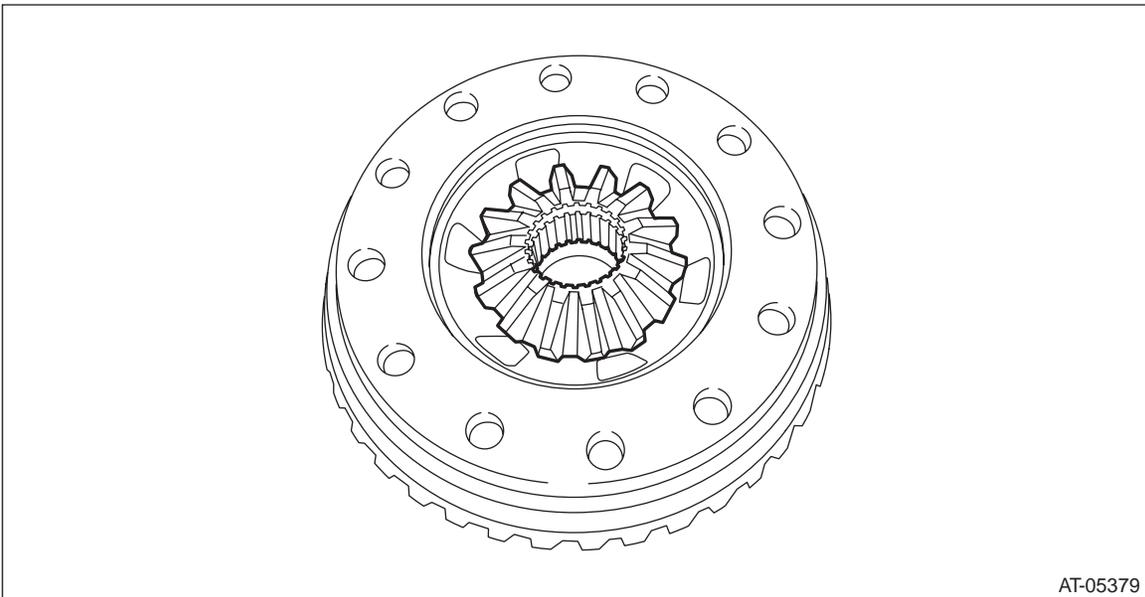
CONTINUOUSLY VARIABLE TRANSMISSION

3) Remove the differential case (LH).



AT-05378

4) Remove the differential bevel gear and washer from differential case.



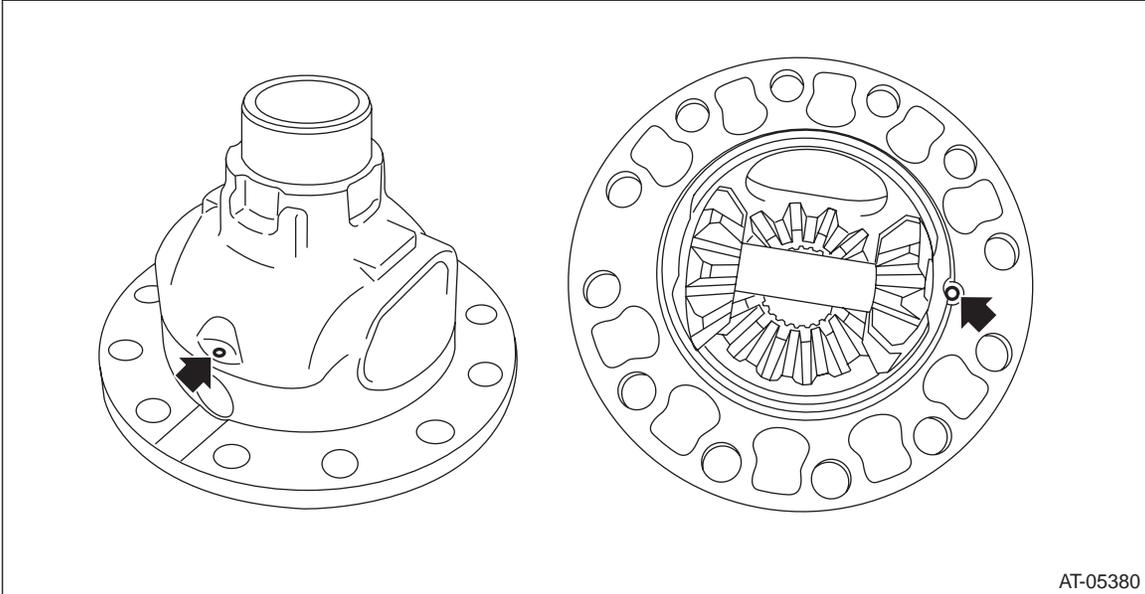
AT-05379

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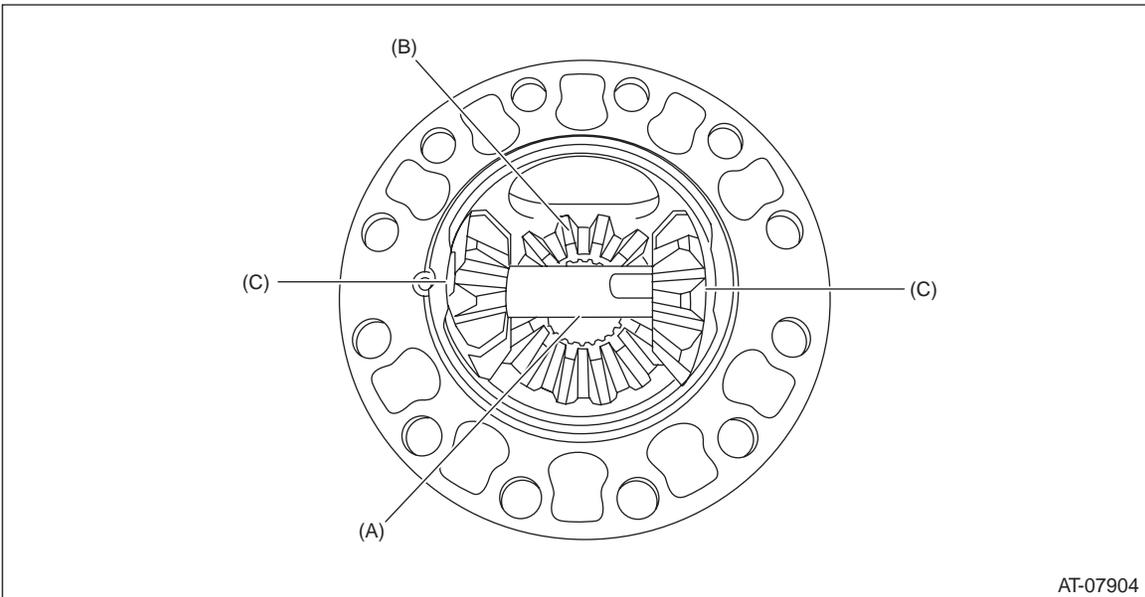
Front Differential Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

5) Remove the straight pin.



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

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Front Differential Assembly

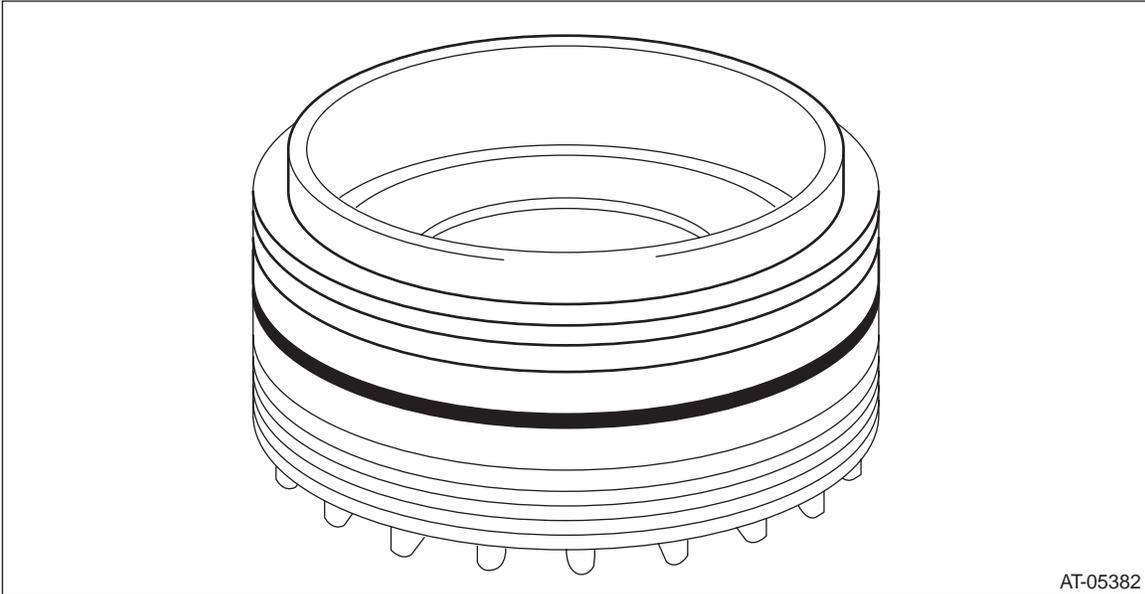
CONTINUOUSLY VARIABLE TRANSMISSION

2. SIDE RETAINER

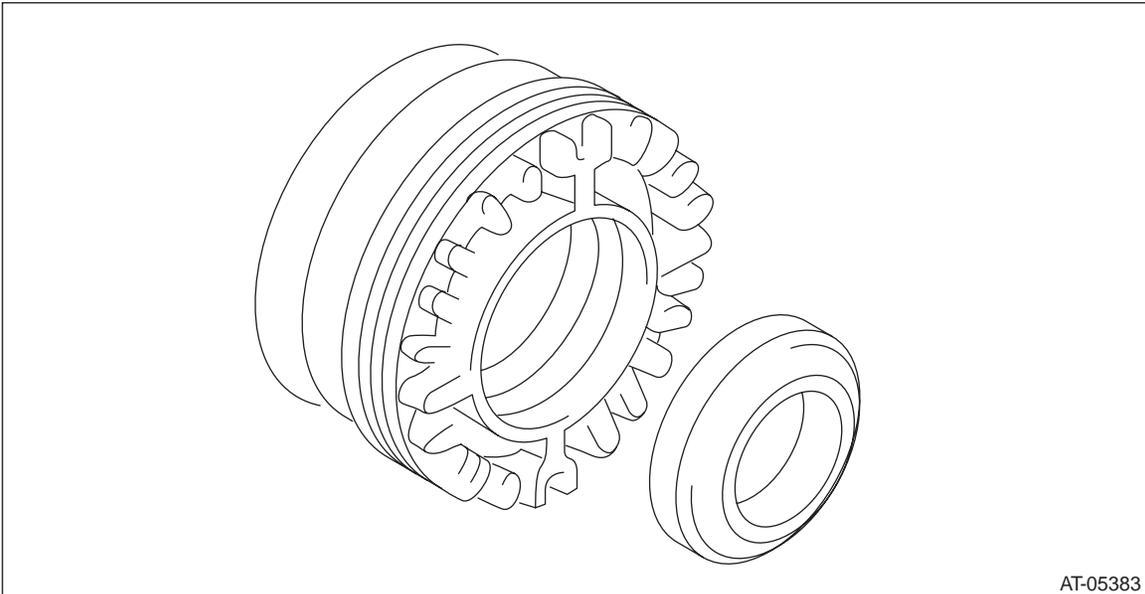
NOTE:

After adjusting the drive pinion backlash and tooth contact, replace the oil seal and O-ring with new parts.

1) Remove the O-ring.



2) Remove the oil seal.

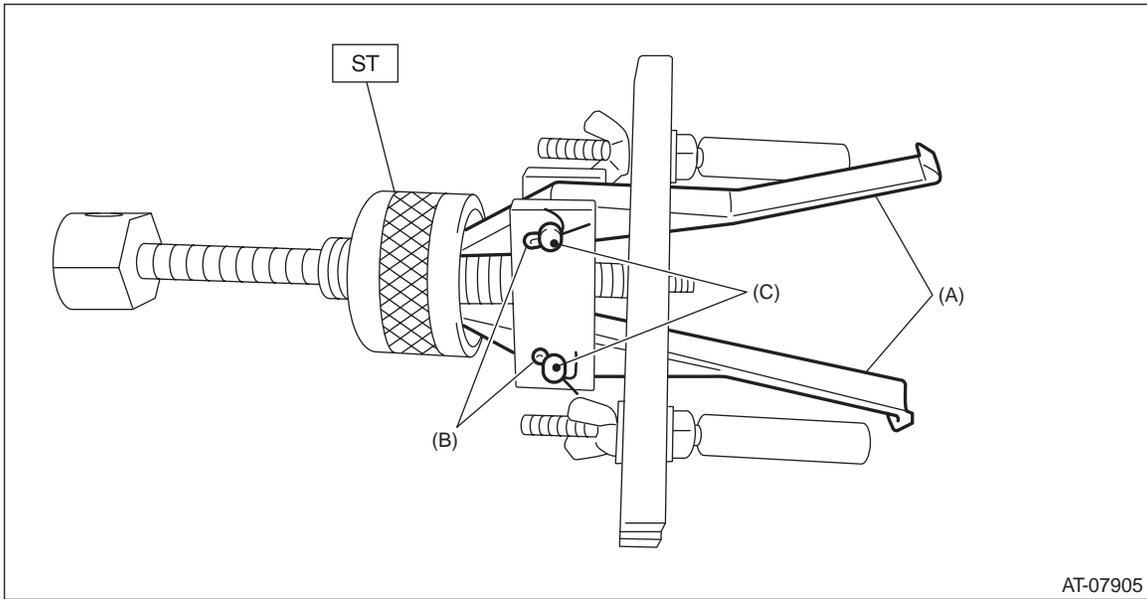


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Front Differential Assembly

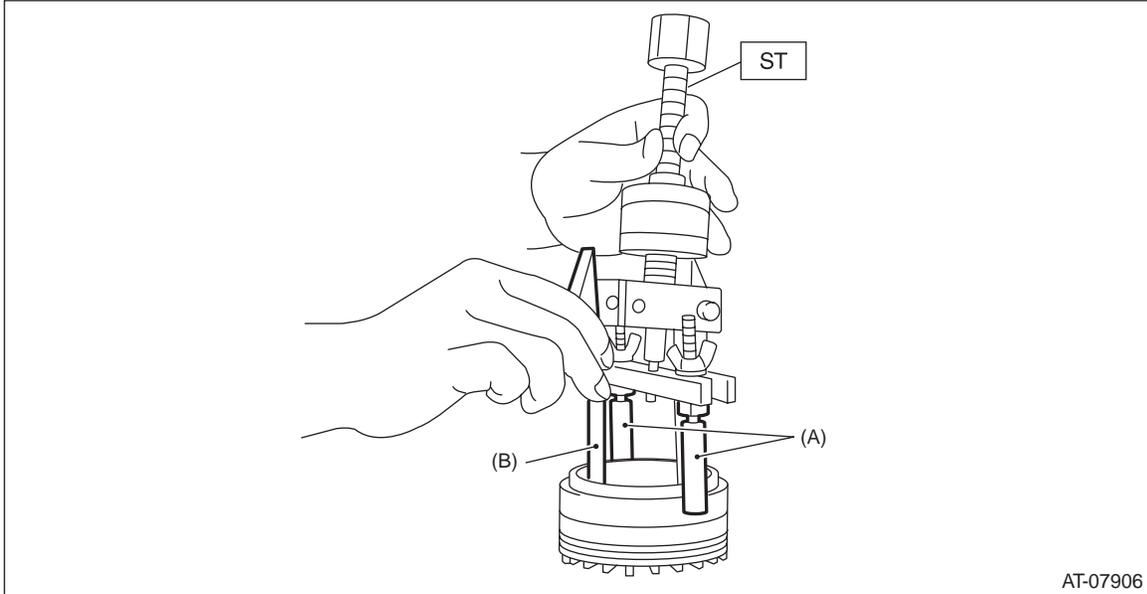
CONTINUOUSLY VARIABLE TRANSMISSION

3) Remove the SPLIT PIN (ST), and then remove the claw.
ST 398527700 PULLER ASSY



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

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



- (A) Shaft
- (B) Claw

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

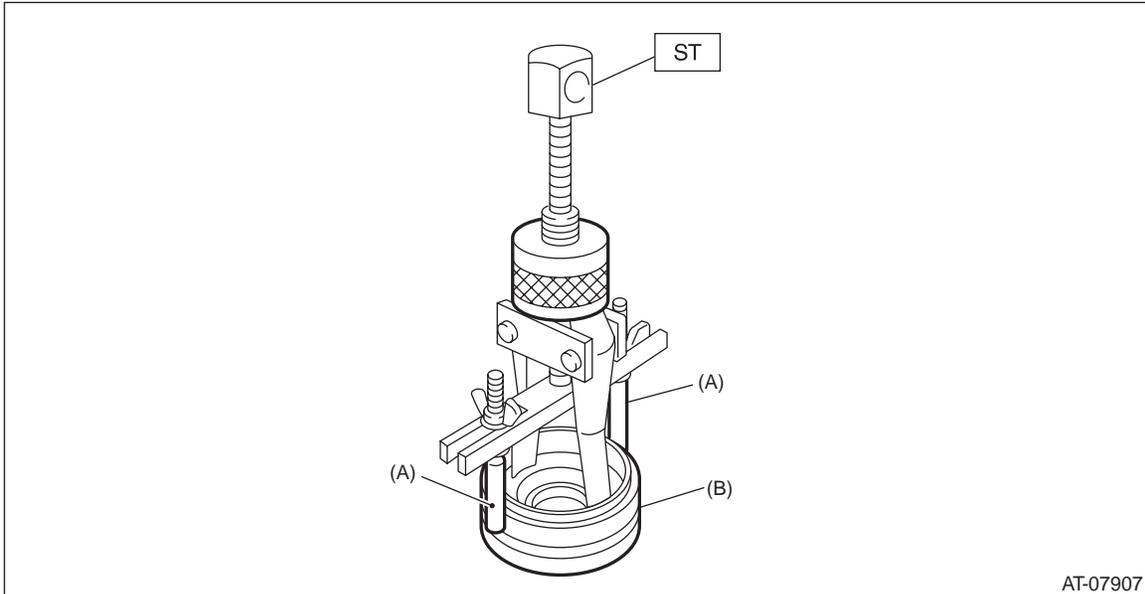
Front Differential Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

6) Hold the shaft of ST to avoid removing from side retainer, and then remove the bearing outer race.
ST 398527700 PULLER ASSY

NOTE:

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

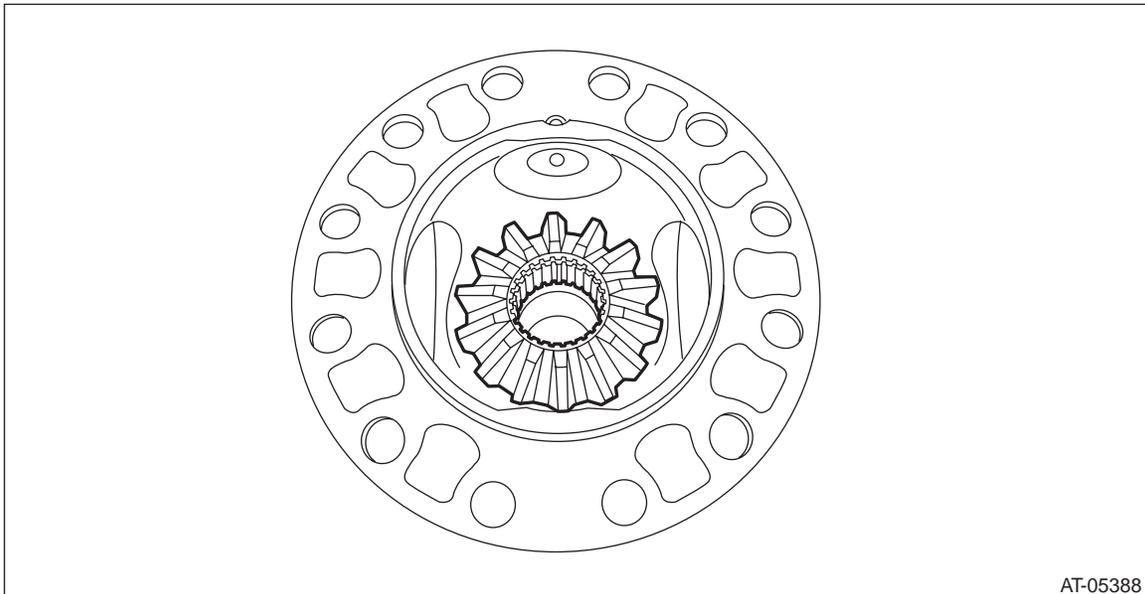


- (A) Shaft
- (B) Side retainer

D: ASSEMBLY

1. DIFFERENTIAL CASE ASSEMBLY

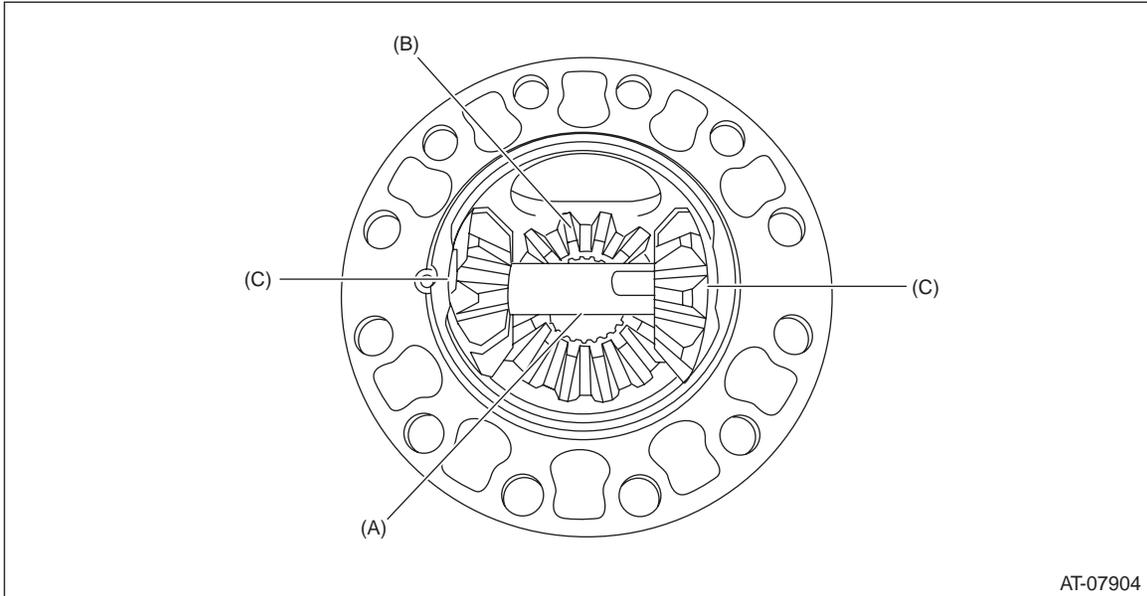
1) Install the washer and differential bevel gear into differential case (LH).



Front Differential Assembly

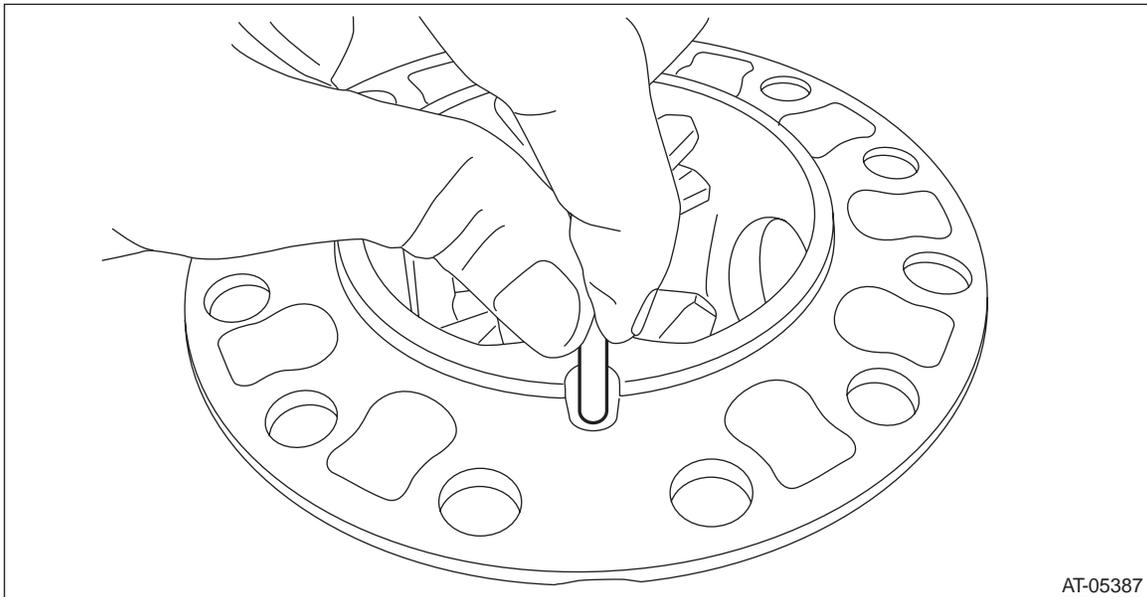
CONTINUOUSLY VARIABLE TRANSMISSION

2) Install the differential bevel gear pinions into differential case (LH) and install the pinion shaft.



- (A) Pinion shaft
- (B) Differential bevel gear
- (C) Differential bevel pinion

3) Install the straight pin.

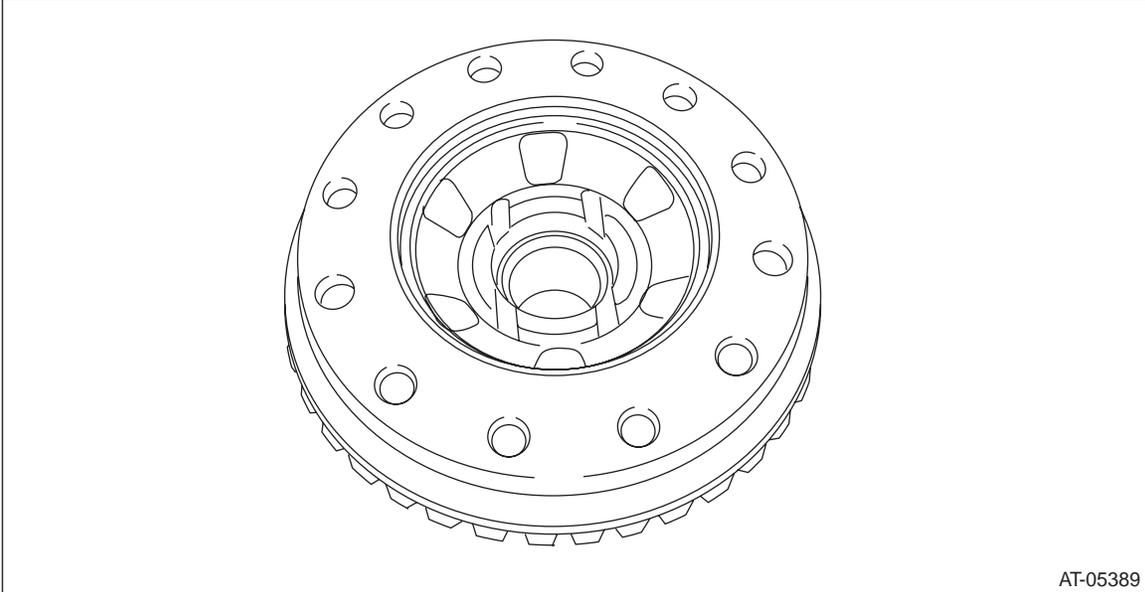


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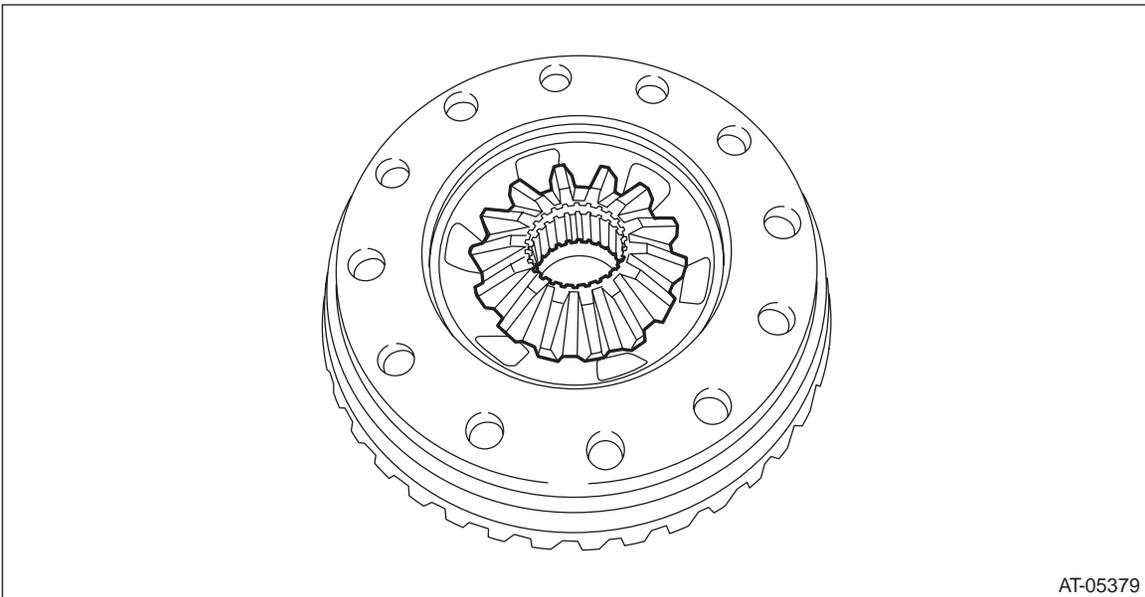
Front Differential Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

- 4) Install the differential case (RH) to hypoid driven gear and secure with vise.



- 5) Install the washer and differential bevel gear to the differential case (RH).



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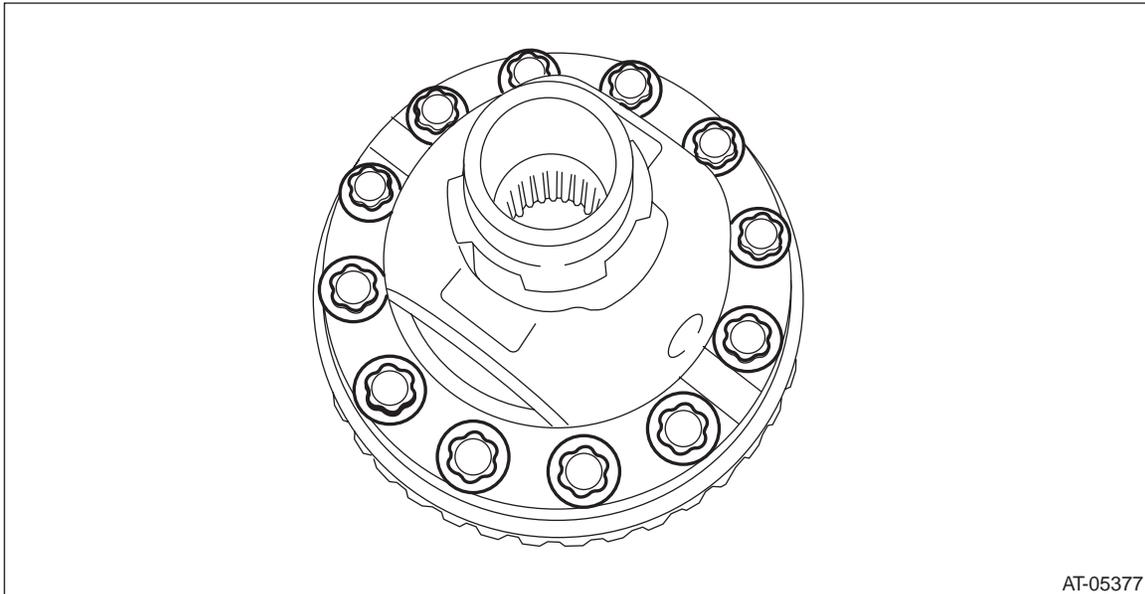
Front Differential Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

6) Using the ST, install the hypoid driven gear by tightening the installation bolt.
ST 18270KA020 SOCKET (E20)

Tightening torque:

20 N·m (2.0 kgf-m, 14.8 ft-lb)



7) While checking the tightening angle with the angle gauge, further tighten the hypoid driven gear mounting bolts.

Tightening angle:

$28^{\circ} \pm 2^{\circ}$

8) Measurement of backlash (selection of washer)

(1) Install the SUBARU genuine axle shaft to differential case.

Part No. 38415AA070 Axle shaft

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

ST1 498247001 MAGNET BASE

ST2 498247100 DIAL GAUGE

NOTE:

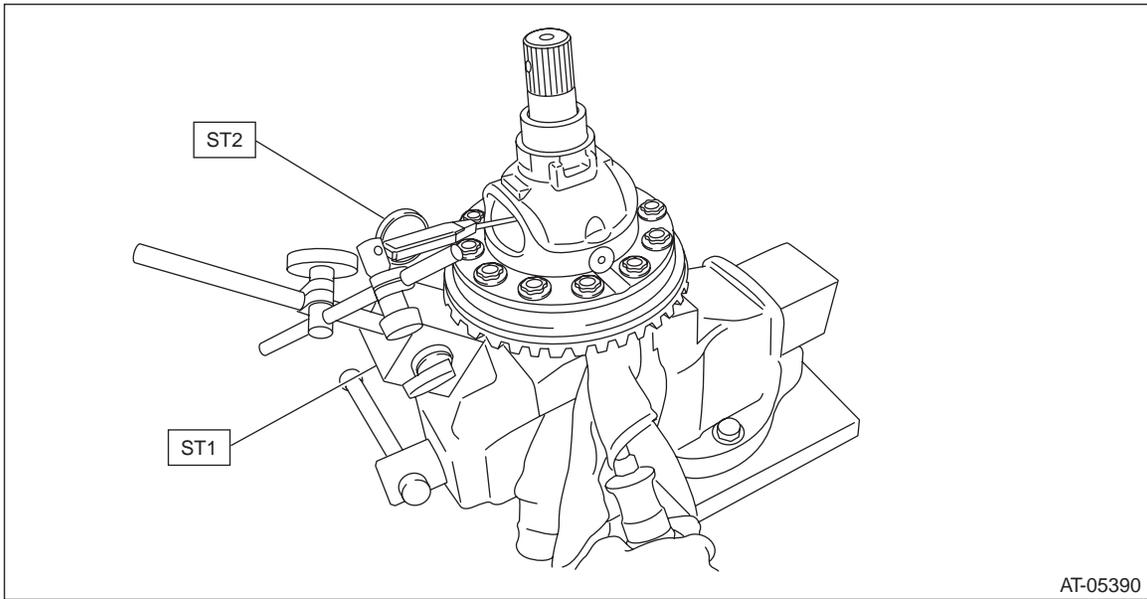
- Measure the backlash by applying a differential bevel pinion tooth between two differential bevel gear teeth.
- When measuring, fix the differential bevel pinion in place with a screwdriver covered with cloth, or a similar tool.

Front Differential Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

Specification:

0.13 — 0.18 mm (0.0051 — 0.0071 in)



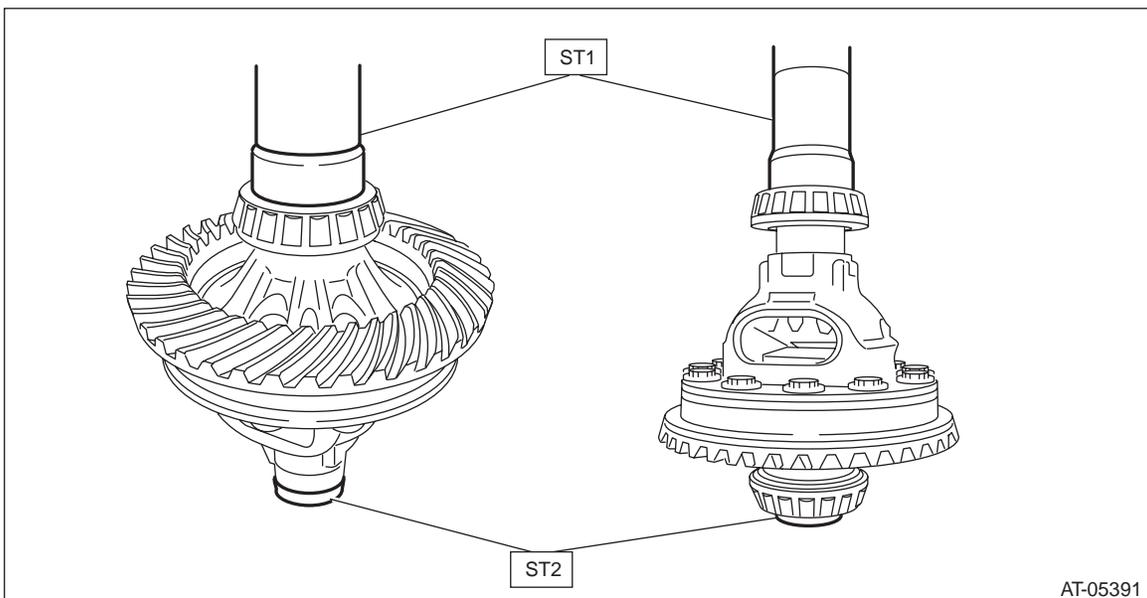
(3) If the backlash is not within specification, select a washer from the table below and replace.

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

9) Using the ST, install the left and right taper roller bearings.

ST1 499277100 BUSHING 1-2 INSTALLER

ST2 398497701 SEAT



Front Differential Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

2. SIDE RETAINER

NOTE:

After adjusting the backlash and tooth contact, replace the oil seal and O-ring of side retainer with new parts.

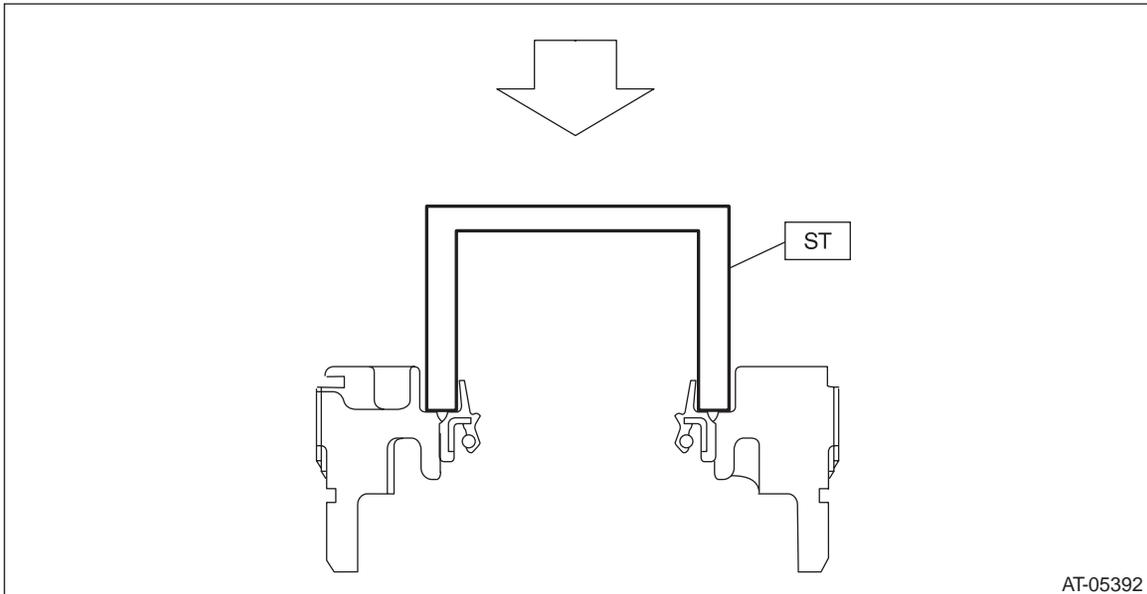
1) Press-fit the bearing outer race to side retainer.

2) Using the ST, install the oil seal.

NOTE:

- Use a new oil seal.
- Apply differential oil to the oil seal lip.
- Oil seal has an identification mark (R, L). When installing oil seals, do not confuse the left and right.

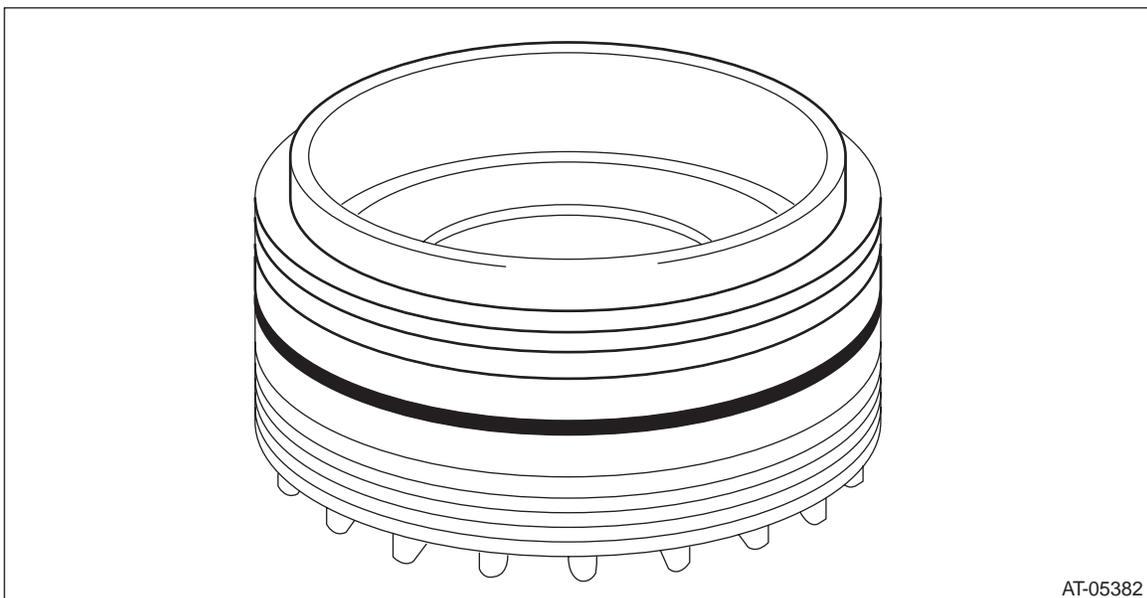
ST 18675AA000 DIFFERENTIAL SIDE OIL SEAL INSTALLER



3) Install the O-ring.

NOTE:

- Use new O-rings.
- Apply gear oil to O-ring.



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Front Differential Assembly

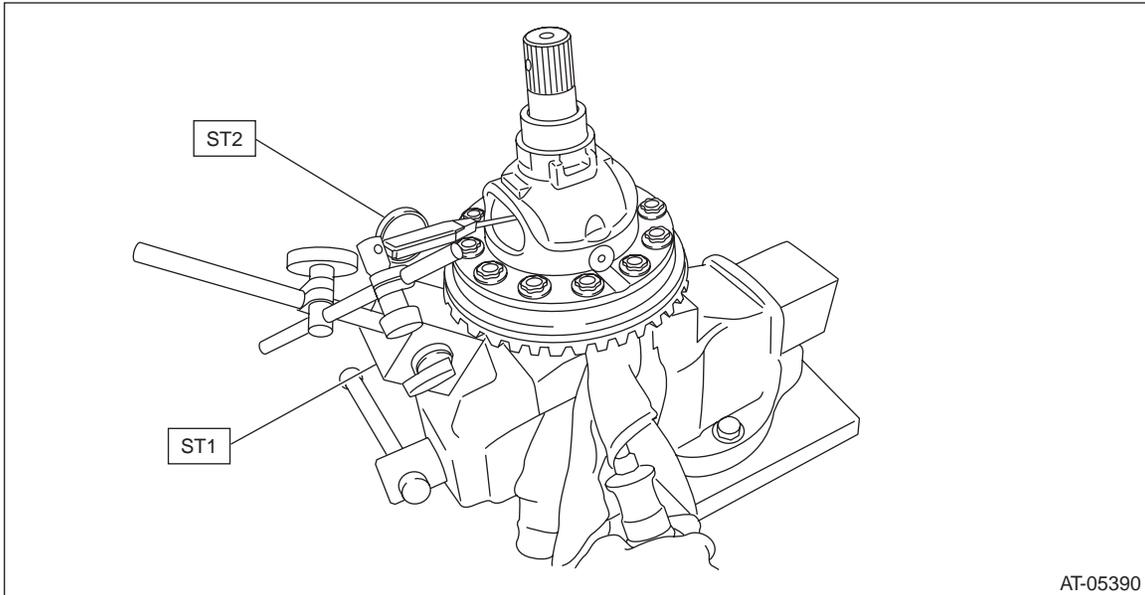
CONTINUOUSLY VARIABLE TRANSMISSION

E: INSPECTION

- Check each component for scratches, damage or other faults.
- Inspect the backlash of the pinion gear.

Specification:

0.13 — 0.18 mm (0.0051 — 0.0071 in)



- Measure the hypoid gear backlash, and then adjust it to be within specification. <Ref. to CVT(TR690)-283, ADJUSTMENT, Front Differential Assembly.>

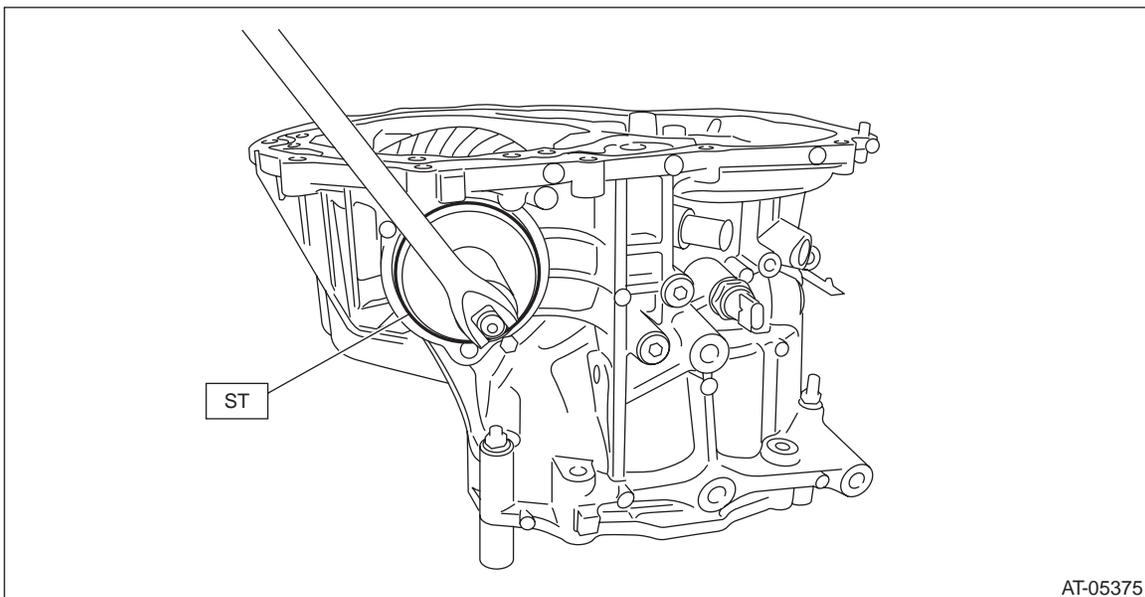
F: ADJUSTMENT

- 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



Front Differential Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

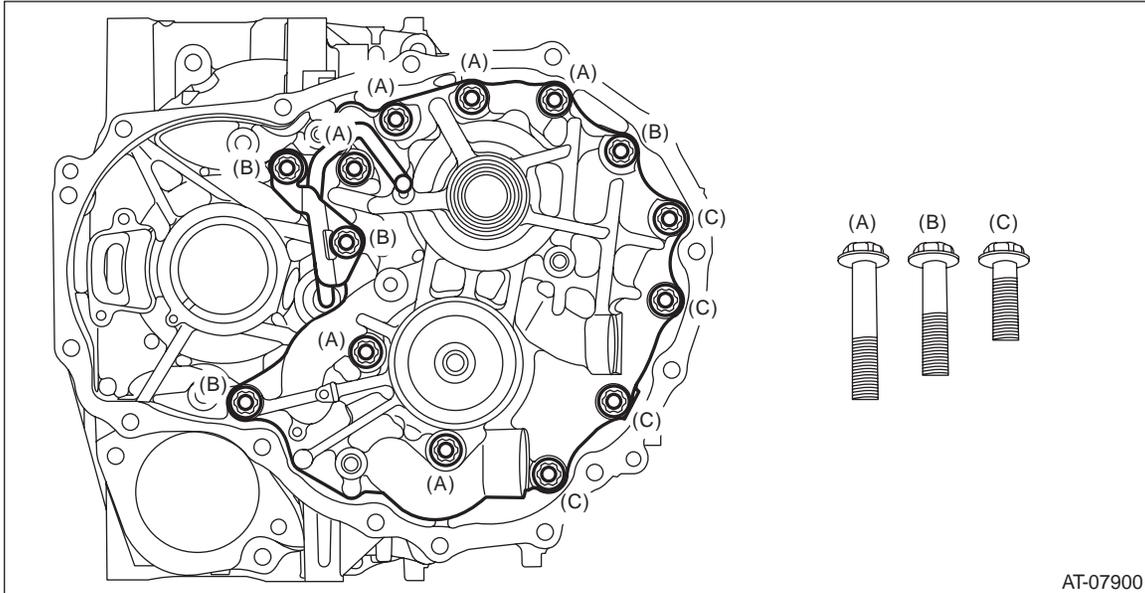
- 2) Remove the remaining liquid gasket from the mating surface completely.
- 3) Using the ST, install the drive pinion assembly to converter case.
ST 18270KA020 SOCKET (E20)

NOTE:

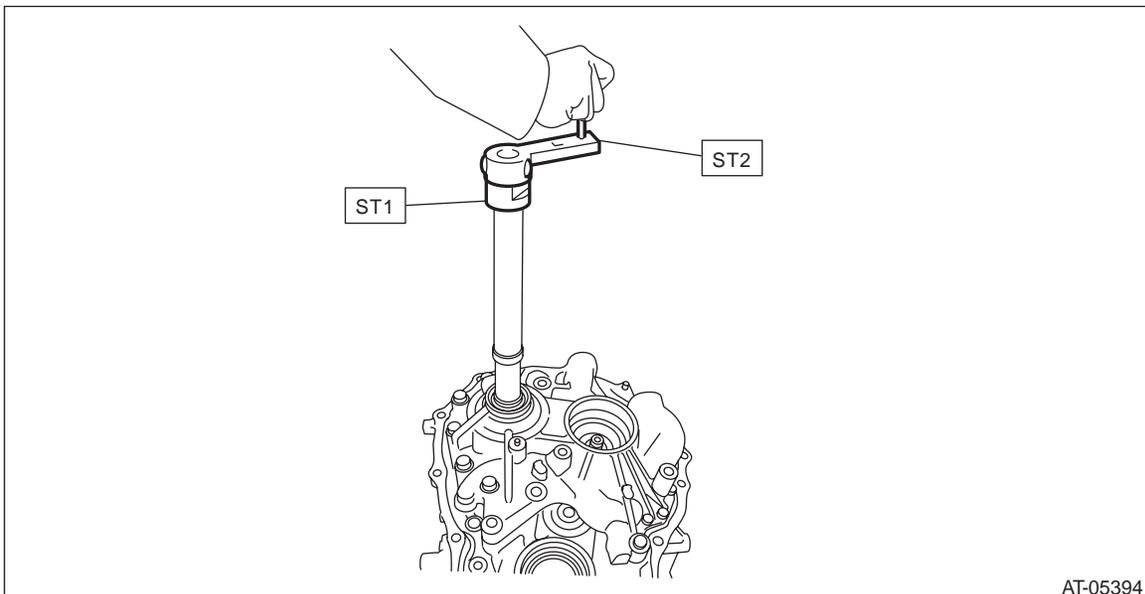
Do not confuse the three different-length bolts when installing.

Tightening torque:

43 N·m (4.4 kgf·m, 31.7 ft·lb)



- 4) Rotate the drive pinion shaft ten times or more using ST1 and ST2.
ST1 18667AA010 HOLDER
ST2 499787700 WRENCH

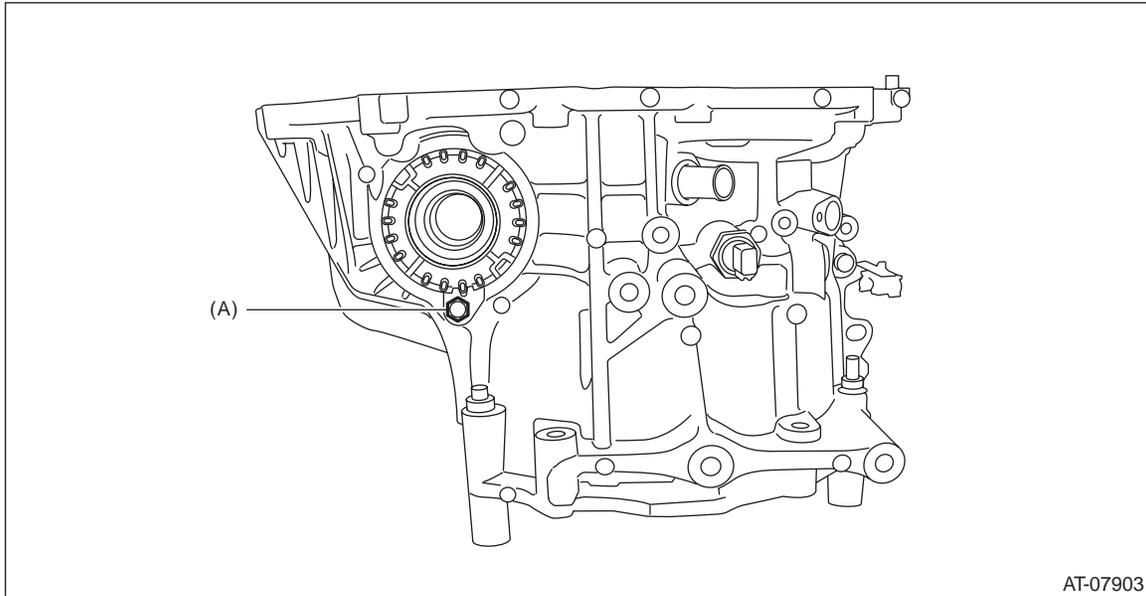


- 5) While rotating the pinion shaft, tighten the retainer LH and loosen the retainer RH until the shaft can't be turned anymore. The backlash is "zero" when the pinion shaft comes to the point where it doesn't rotate.

Front Differential Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

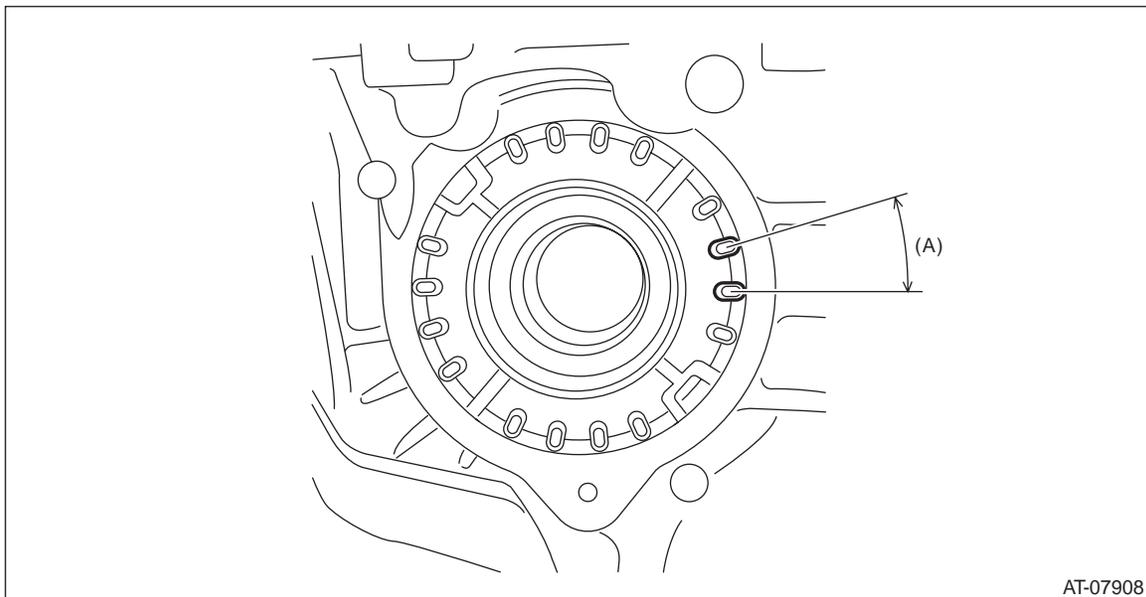
6) After the “zero” state is established, loosen the retainer LH by 3 notches and secure it with the lock plate. Loosen the retainer RH and retighten until it stops. Rotate the drive pinion 2 or 3 times. Tighten the retainer RH further 1-3/4 notches. This sets the preload. Finally, secure the retainer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



(A) Lock plate

NOTE:

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



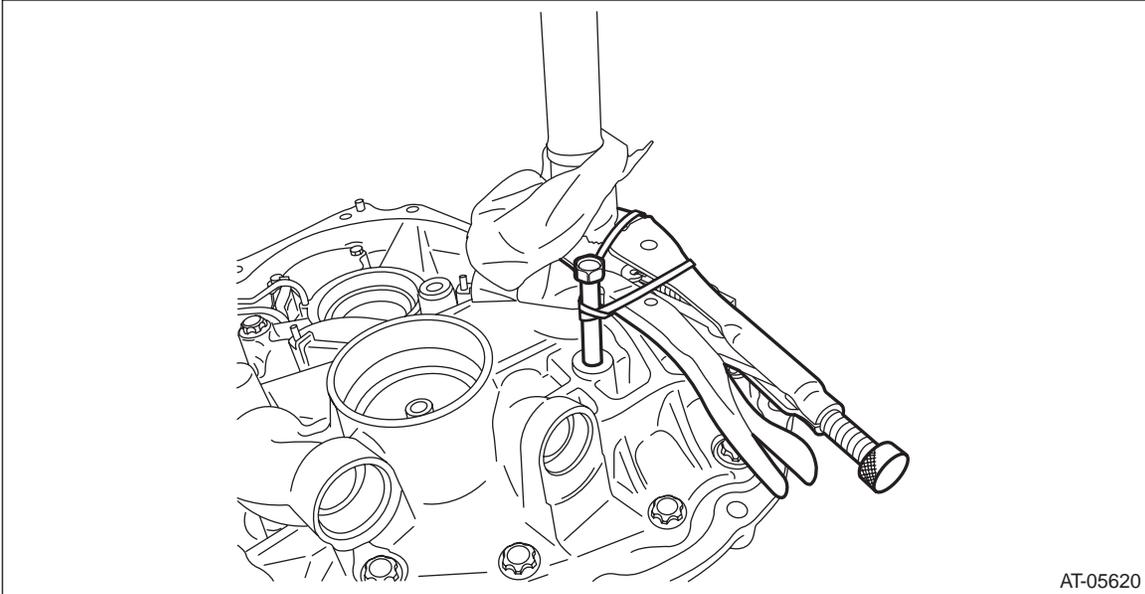
(A) 1 tooth

7) Insert the two SUBARU genuine axle shafts into differential case.
Part No. 38415AA070 AXLE SHAFT

Front Differential Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

8) Wrap the drive shaft pinion shaft with cloth and pinch with vise pliers. Install the installation bolt into the bolt hole of secondary pulley and secure the bolt and vise pliers using a band or wire. Make sure the drive pinion shaft does not move.

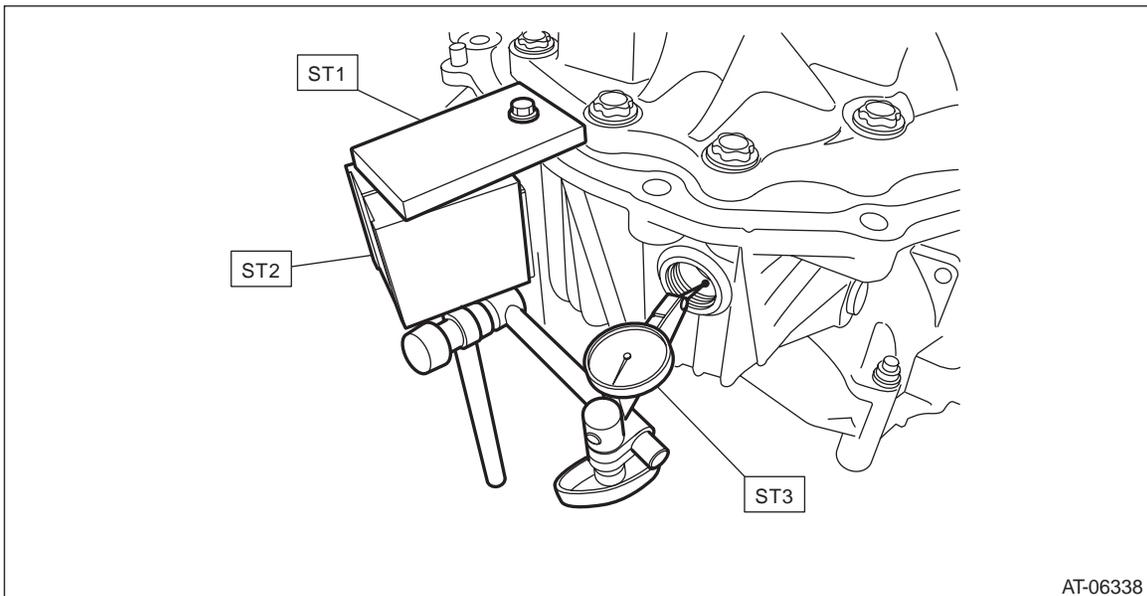


9) Check the backlash is within specification using ST1, ST2 and ST3.

ST1 498255400 PLATE
ST2 498247001 MAGNET BASE
ST3 498247100 DIAL GAUGE

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(TR690)-262, ADJUSTMENT, Drive Pinion Shaft Assembly.>

45.Oil Pump

A: REMOVAL

NOTE:

Refer to "Drive Pinion Shaft" for removal procedures. <Ref. to CVT(TR690)-247, REMOVAL, Drive Pinion Shaft Assembly.>

B: INSTALLATION

NOTE:

Refer to "Drive Pinion Shaft" for installation procedures. <Ref. to CVT(TR690)-249, INSTALLATION, Drive Pinion Shaft Assembly.>

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(TR690)-51, INSPECTION, Secondary Pressure (Line Pressure) Test.>
 - 2) Remove the oil pan and oil strainer. <Ref. to CVT(TR690)-109, REMOVAL, Control Valve Body.>
 - 3) Check oil strainer for clogging.

When oil strainer has no clogging, replace the oil pump.

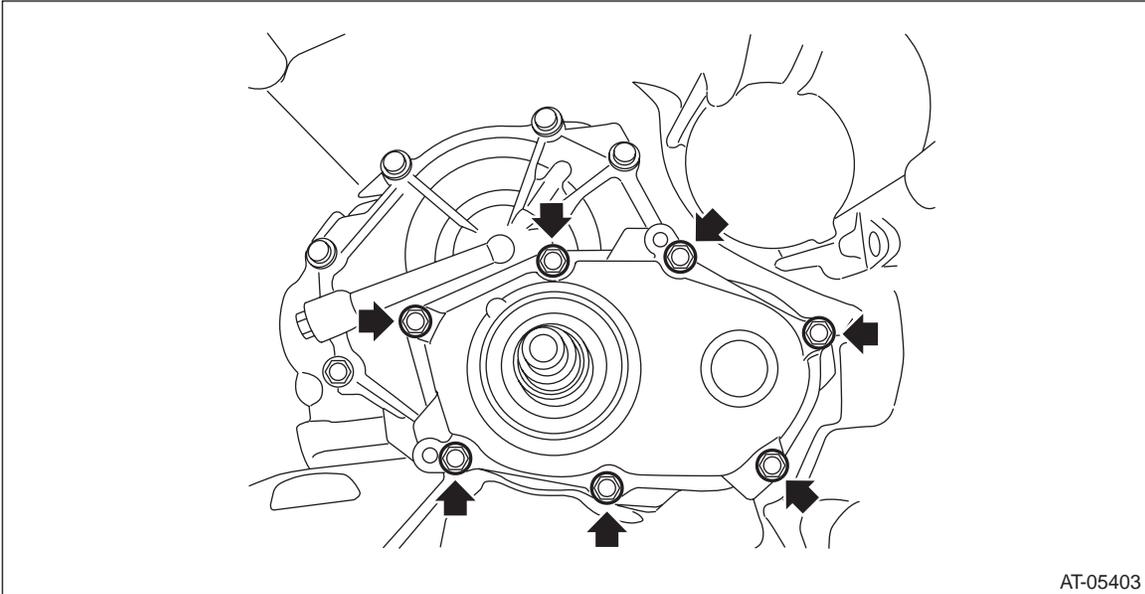
Oil Pump Chain

CONTINUOUSLY VARIABLE TRANSMISSION

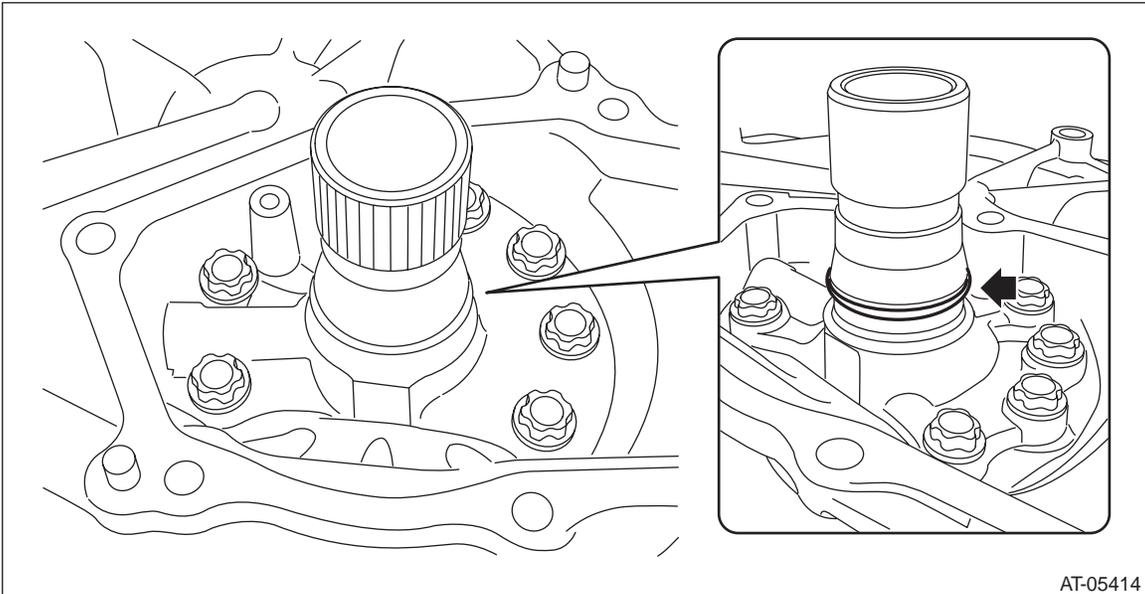
46. Oil Pump Chain

A: REMOVAL

- 1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TR690)-56, REMOVAL, Automatic Transmission Assembly.>
- 2) Remove the torque converter assembly. <Ref. to CVT(TR690)-138, REMOVAL, Torque Converter Assembly.>
- 3) Remove the oil pump chain cover.



- 4) Remove the seal ring from center support COMPL.



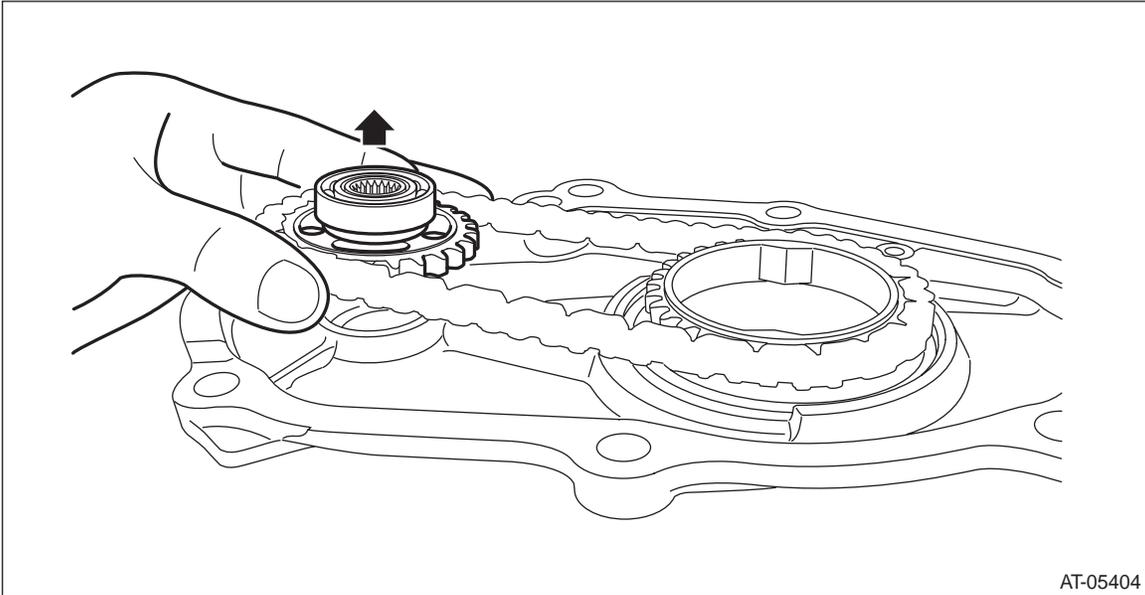
Oil Pump Chain

CONTINUOUSLY VARIABLE TRANSMISSION

5) Remove the driven sprocket from oil pump chain cover to remove the oil pump chain.

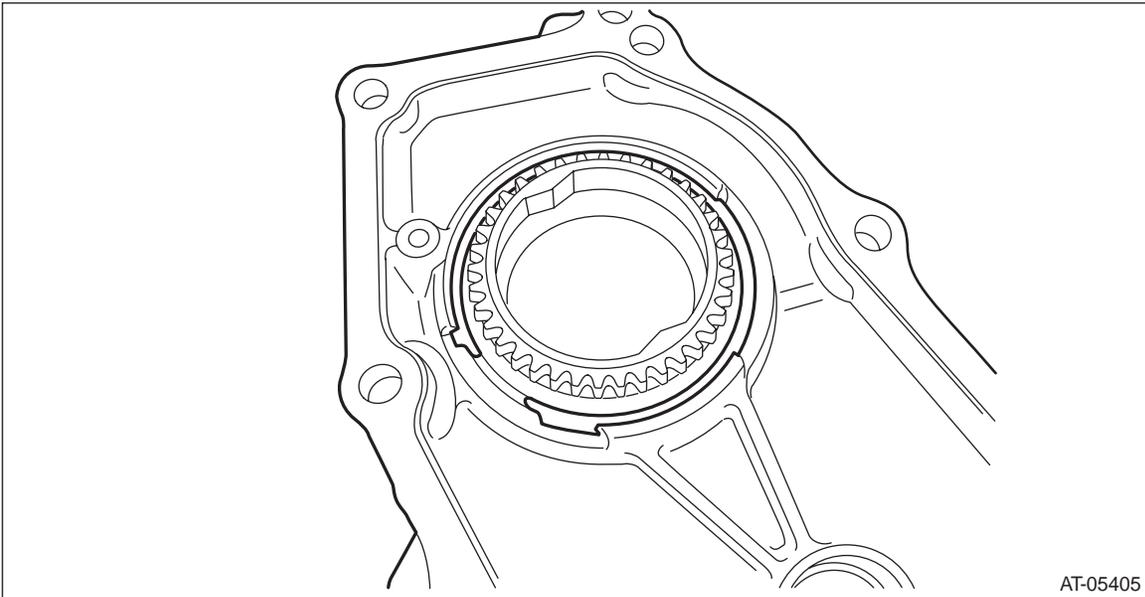
NOTE:

The driven sprocket is replaced as an assembly only, because it is a non-disassembly part.



AT-05404

6) Remove the snap ring.



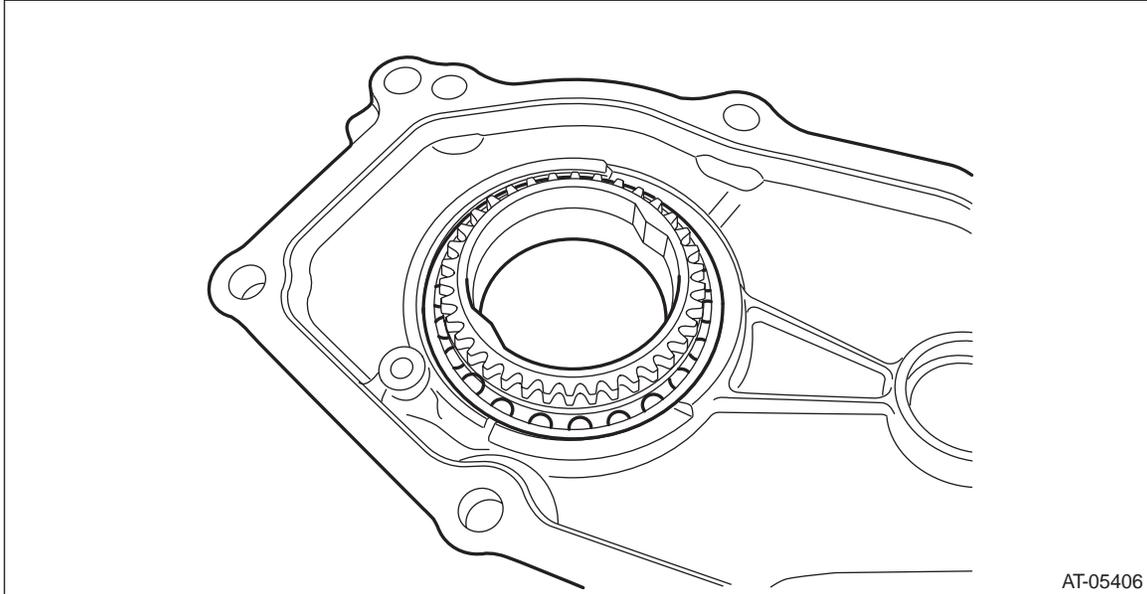
AT-05405

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Oil Pump Chain

CONTINUOUSLY VARIABLE TRANSMISSION

7) Remove the drive sprocket.



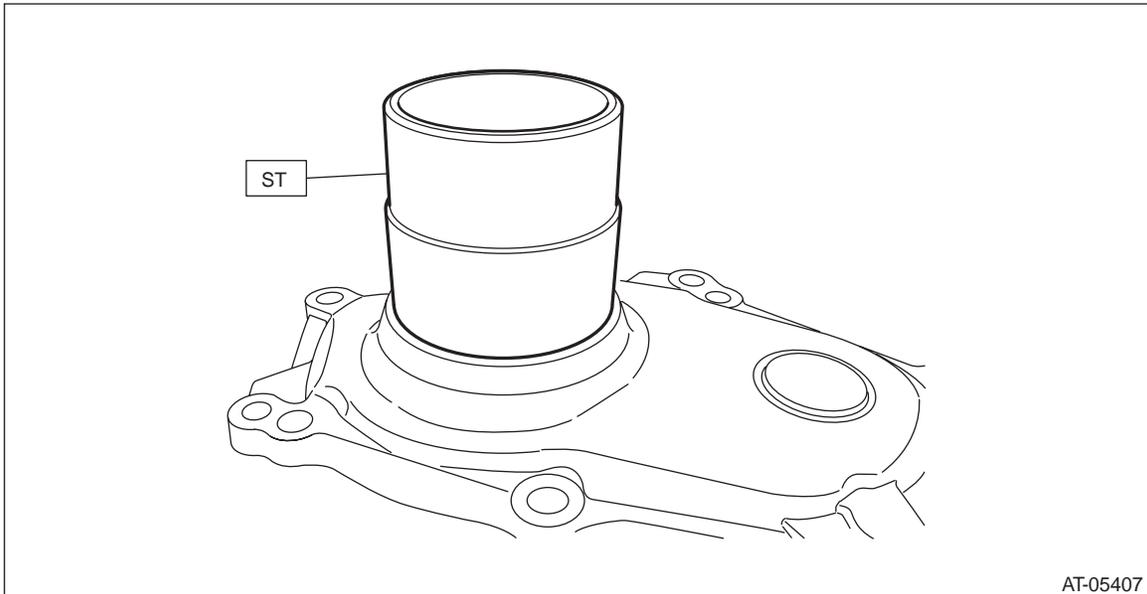
8) Remove the oil seal from the oil pump chain cover.

B: INSTALLATION

1) Clean the mating surface of oil pump chain cover and converter case cover.

2) Using the ST, install the oil seal.

ST 499755602 PRESS SNAP RING

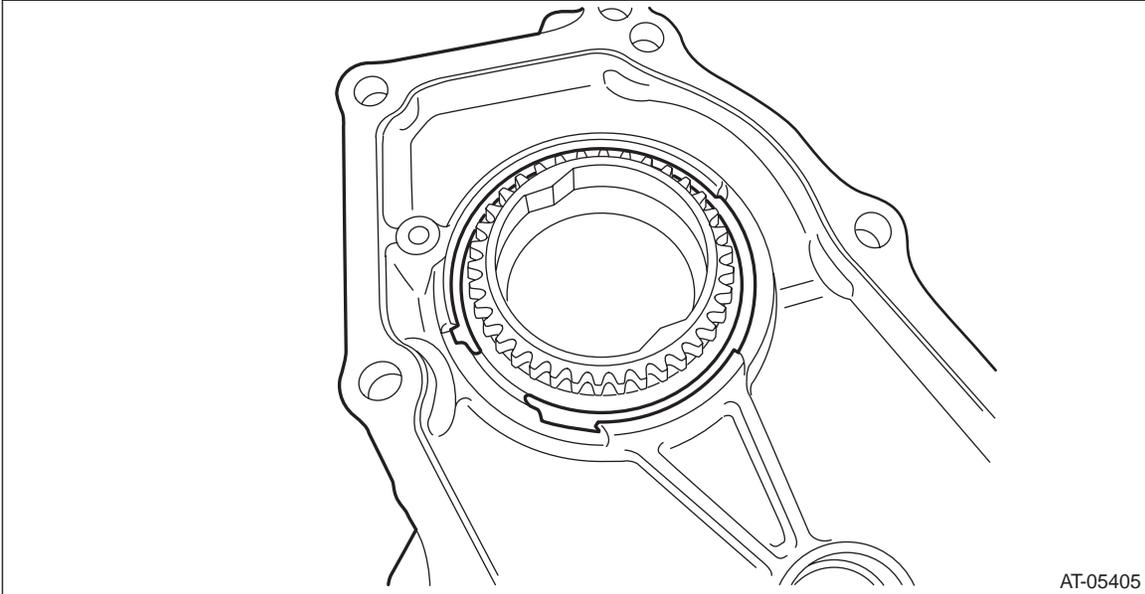


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Oil Pump Chain

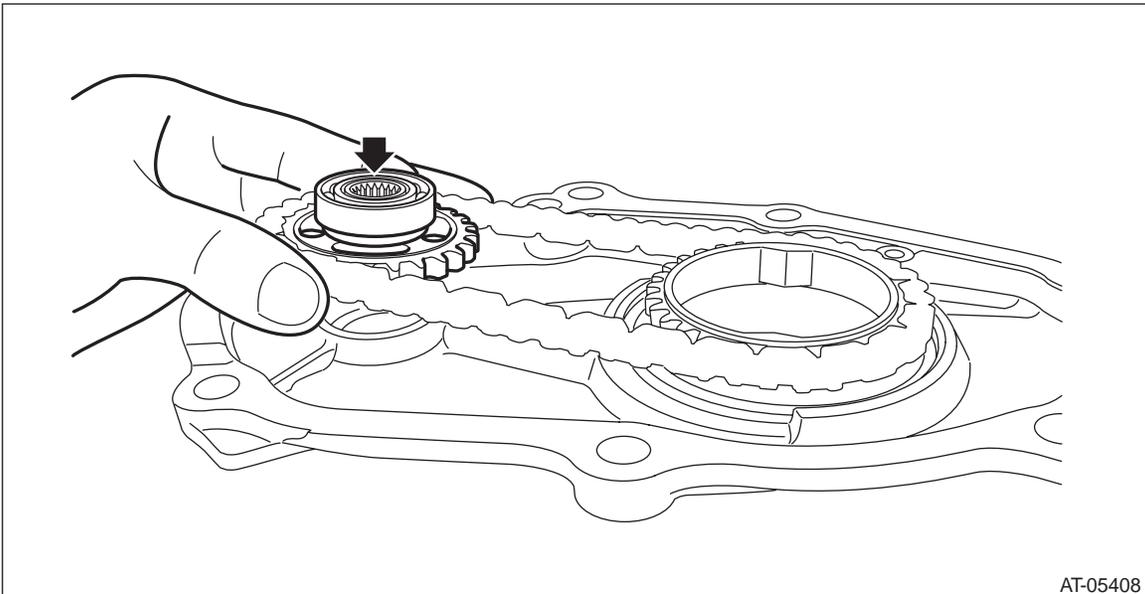
CONTINUOUSLY VARIABLE TRANSMISSION

- 3) Install the drive sprocket and install the snap ring.



- 4) Place the oil pump chain on drive sprocket.

- 5) Place the oil pump chain on driven sprocket and install the driven sprocket to oil pump chain cover.



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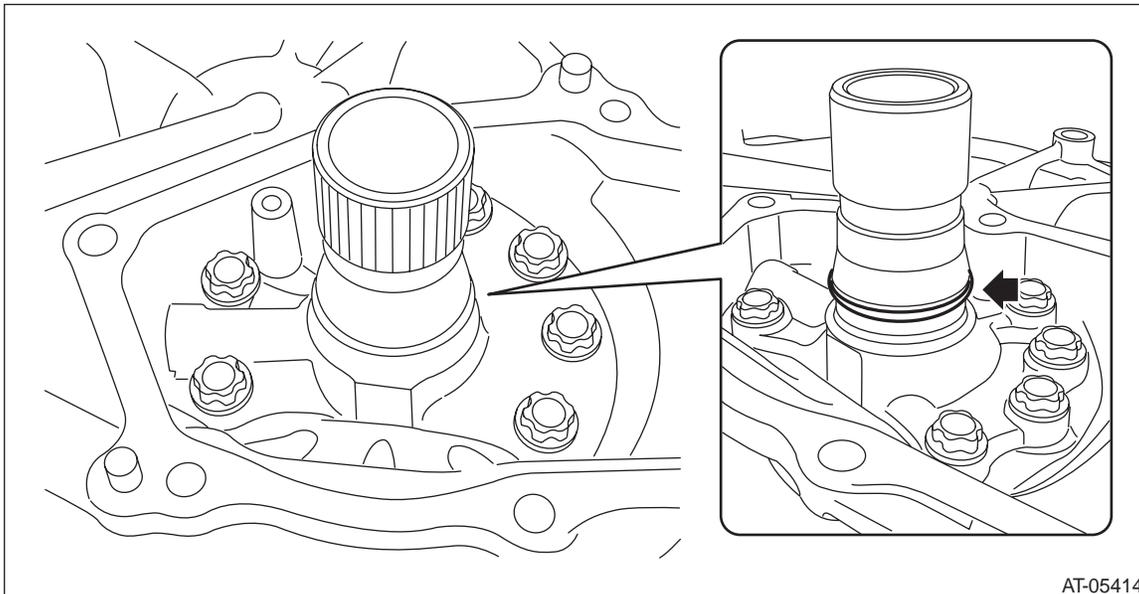
Oil Pump Chain

CONTINUOUSLY VARIABLE TRANSMISSION

6) Install the seal ring to center support COMPL.

NOTE:

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



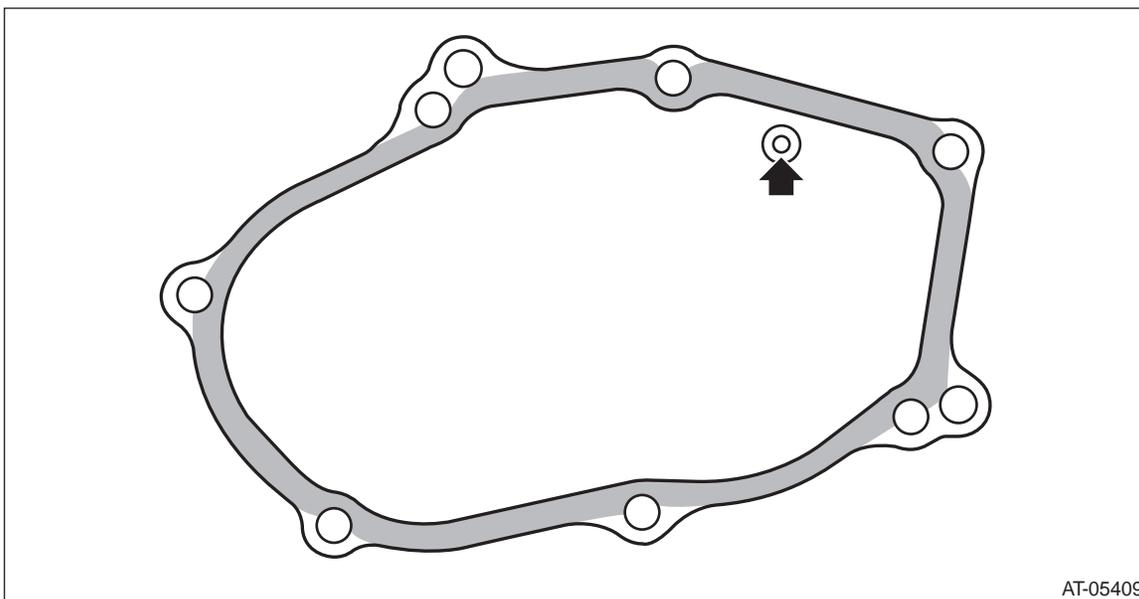
7) Apply liquid gasket seamlessly to the mating surface of oil pump chain cover.

CAUTION:

Do not apply liquid gasket at the arrowed hole.

Liquid gasket:

THREE BOND 1215B or equivalent



Oil Pump Chain

CONTINUOUSLY VARIABLE TRANSMISSION

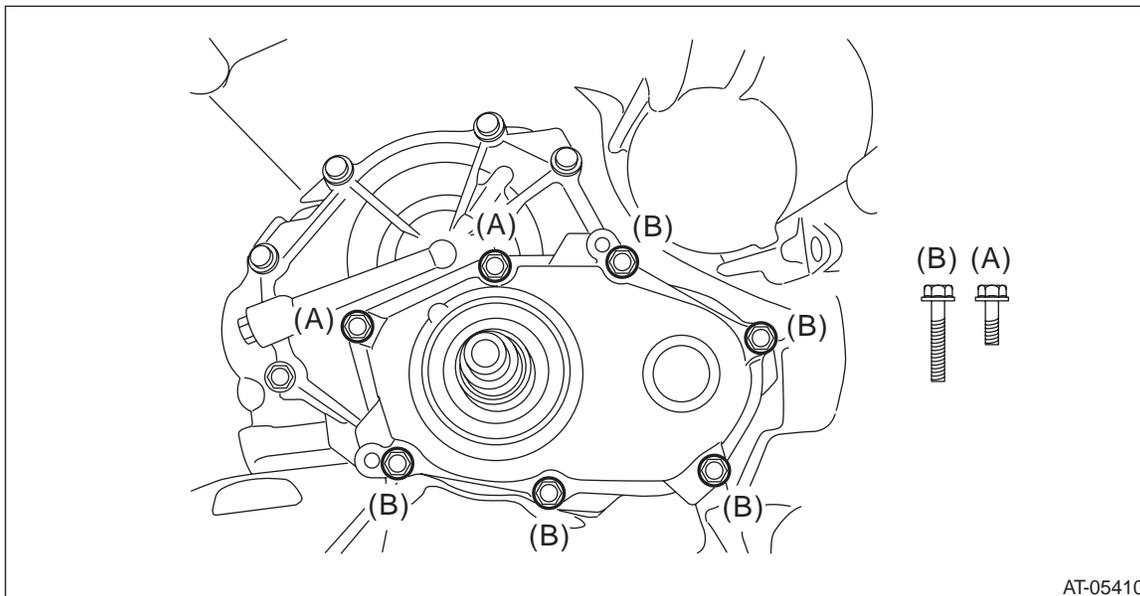
8) Install the oil pump chain cover.

NOTE:

There are two types of bolt.

Tightening torque:

24 N·m (2.4 kgf·m, 17.7 ft·lb)



9) Install the torque converter assembly.<Ref. to CVT(TR690)-139, INSTALLATION, Torque Converter Assembly.>

10) Install the transmission assembly to the vehicle.<Ref. to CVT(TR690)-69, INSTALLATION, Automatic Transmission Assembly.>

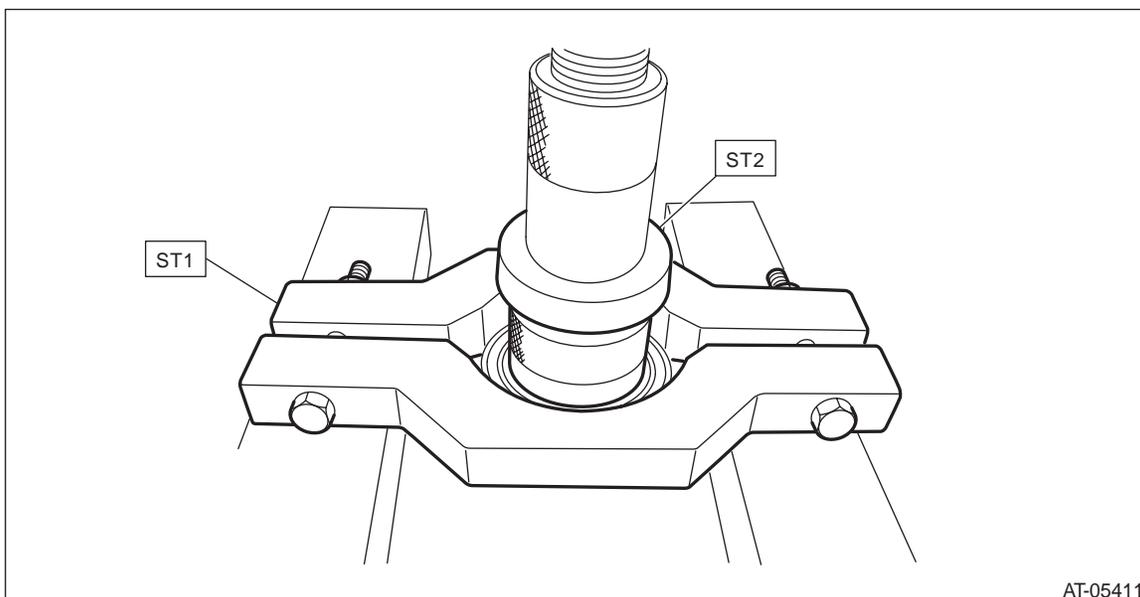
C: DISASSEMBLY

1. DRIVE SPROCKET

1) Remove the ball bearing using ST.

ST1 498077600 REMOVER

ST2 399513600 INSTALLER



Oil Pump Chain

CONTINUOUSLY VARIABLE TRANSMISSION

D: ASSEMBLY

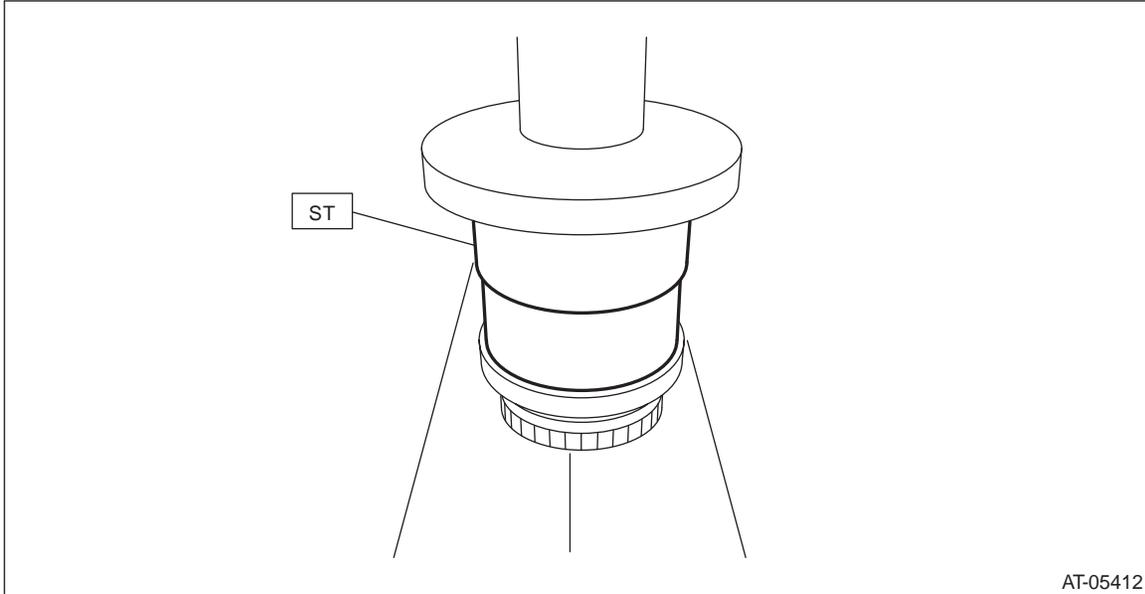
1. DRIVE SPROCKET

1) Using the ST, install the ball bearing.

NOTE:

Use a new ball bearing.

ST 499755602 PRESS SNAP RING



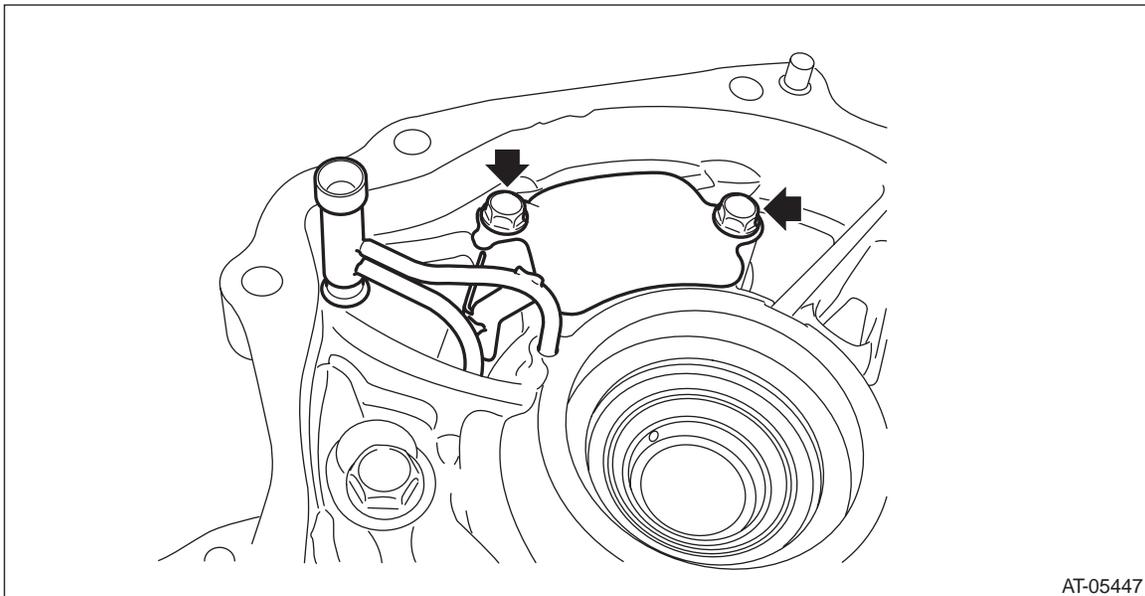
E: INSPECTION

- 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.

47. Converter Case Cover

A: REMOVAL

- 1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TR690)-56, REMOVAL, Automatic Transmission Assembly.>
- 2) Remove the air breather hose. <Ref. to CVT(TR690)-134, REMOVAL, Air Breather Hose.>
- 3) Remove the oil pan and control valve body. <Ref. to CVT(TR690)-109, REMOVAL, Control Valve Body.>
- 4) Remove the transmission harness. <Ref. to CVT(TR690)-120, REMOVAL, Transmission Harness.>
- 5) Remove the extension case. <Ref. to CVT(TR690)-140, REMOVAL, Extension Case.>
- 6) Remove the rear drive shaft. <Ref. to CVT(TR690)-143, REMOVAL, Rear Drive Shaft.>
- 7) Remove the transfer clutch assembly. <Ref. to CVT(TR690)-148, REMOVAL, Transfer Clutch.>
- 8) Remove the transfer reduction driven gear assembly. <Ref. to CVT(TR690)-160, REMOVAL, Transfer Reduction Driven Gear.>
- 9) Remove the intermediate case. <Ref. to CVT(TR690)-167, REMOVAL, Intermediate Case.>
- 10) Remove the forward clutch assembly. <Ref. to CVT(TR690)-182, REMOVAL, Forward Clutch Assembly.>
- 11) Remove the transmission case. <Ref. to CVT(TR690)-213, REMOVAL, Transmission Case.>
- 12) Remove the primary pulley, secondary pulley and variator chain. <Ref. to CVT(TR690)-231, REMOVAL, Primary Pulley and Secondary Pulley.>
- 13) Remove the drive pinion shaft assembly. <Ref. to CVT(TR690)-247, REMOVAL, Drive Pinion Shaft Assembly.>
- 14) Remove the oil stopper plate and lubrication pipe.

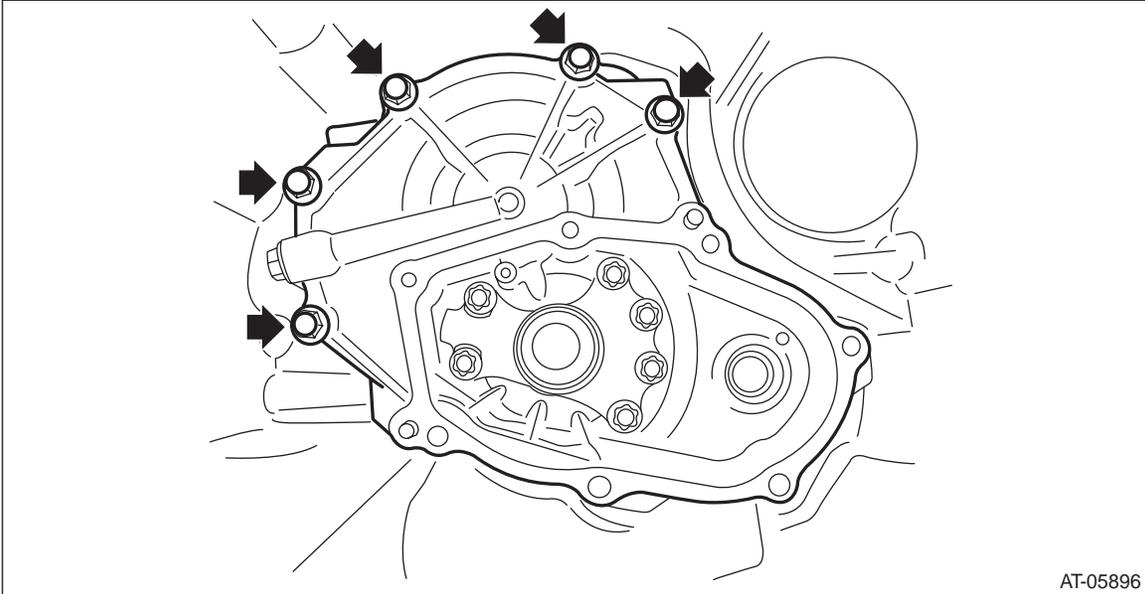


- 15) Flip over the converter case.
- 16) Remove the oil pump chain cover and the oil pump chain. <Ref. to CVT(TR690)-288, REMOVAL, Oil Pump Chain.>

Converter Case Cover

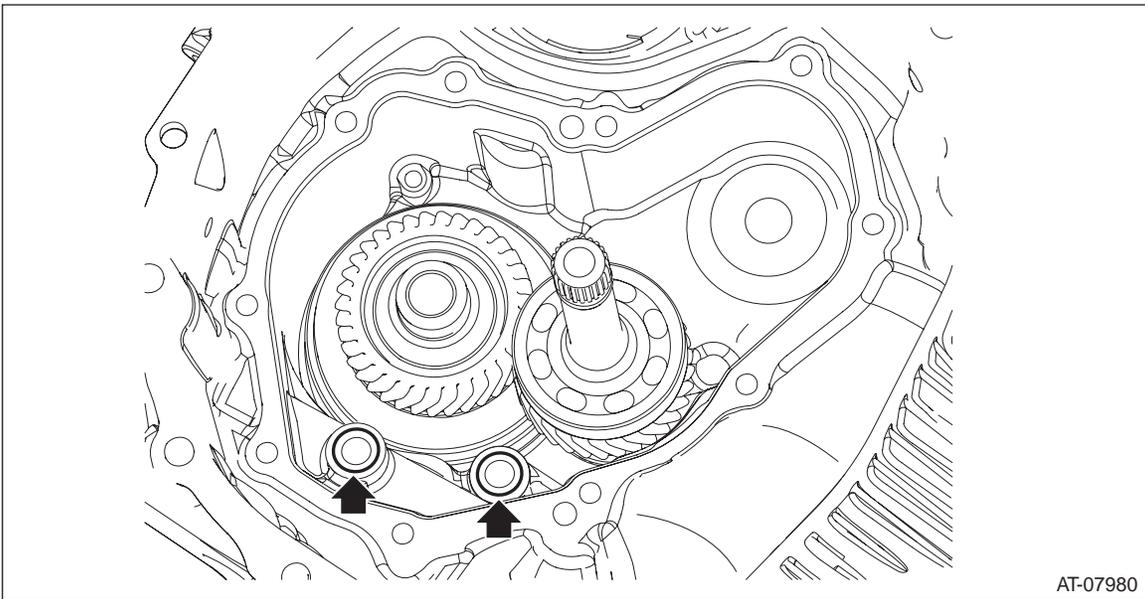
CONTINUOUSLY VARIABLE TRANSMISSION

17) Remove the converter case cover.



AT-05896

18) Remove the O-ring.



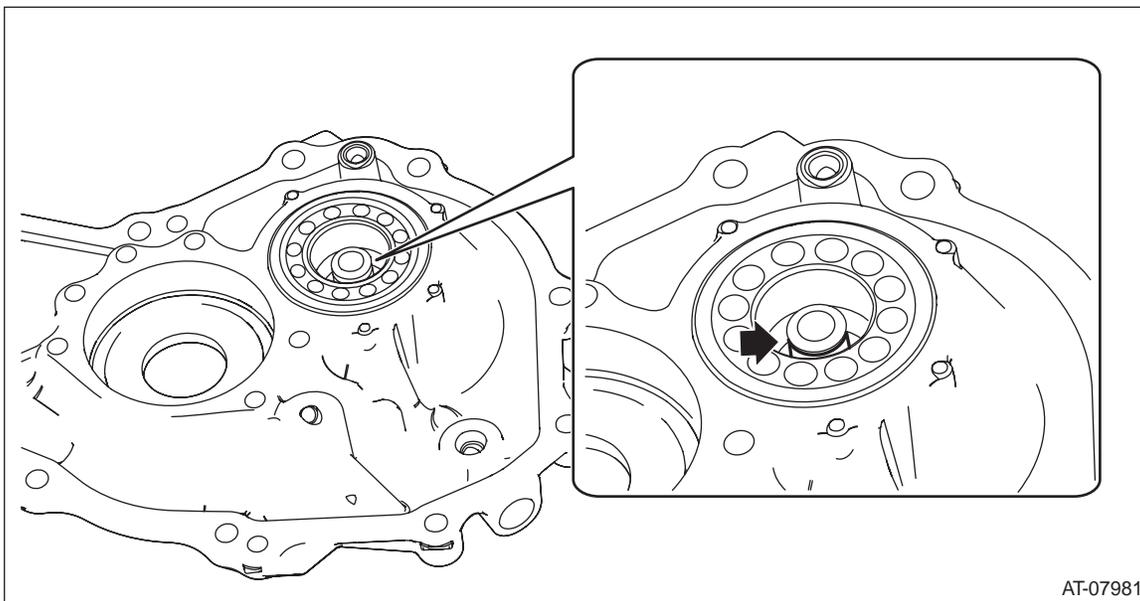
AT-07980

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Converter Case Cover

CONTINUOUSLY VARIABLE TRANSMISSION

19) Remove the seal ring from converter case cover.

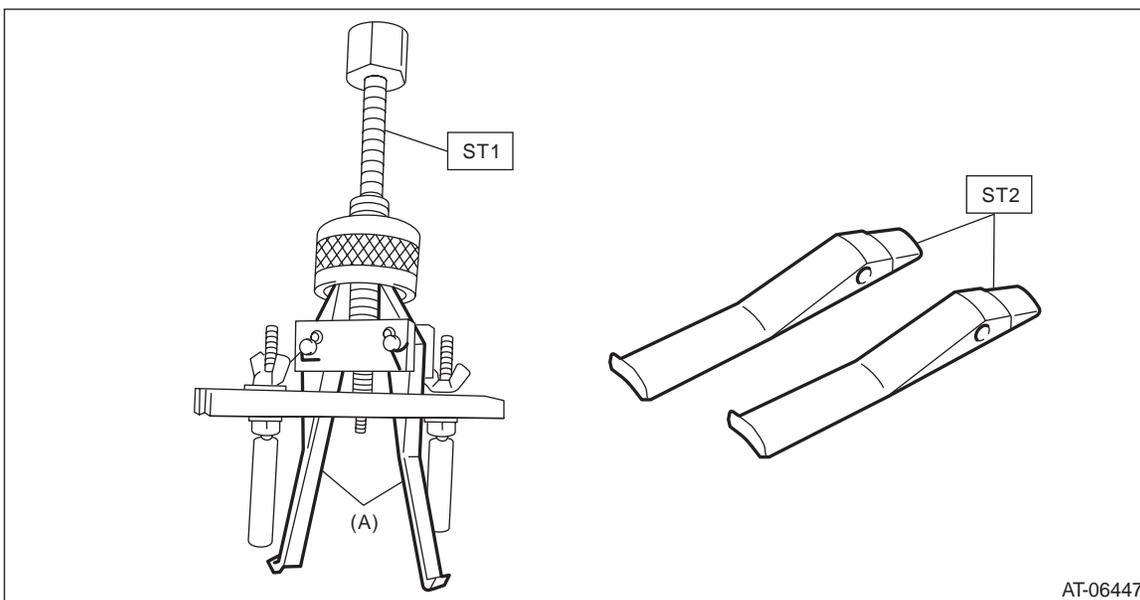


20) Using the ST, remove the ball bearing from the converter case cover.

(1) Remove the claw of ST1, and attach the claw of ST2.

ST1 398527700 PULLER ASSY

ST2 18760AA000 CLAW



(A) Claw

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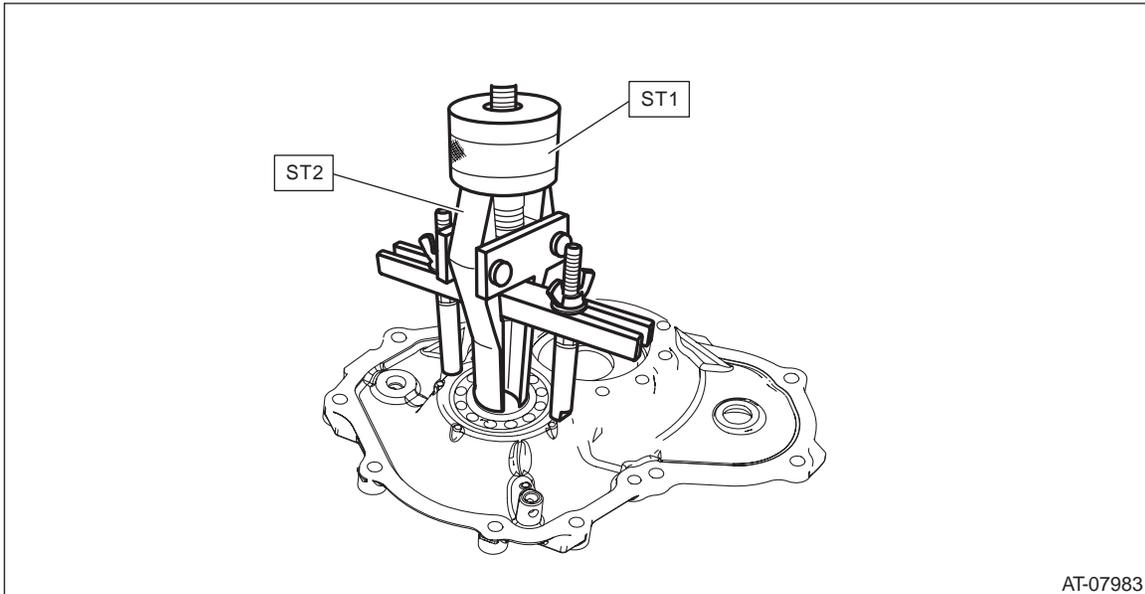
Converter Case Cover

CONTINUOUSLY VARIABLE TRANSMISSION

(2) Using the ST, remove the ball bearing from the converter case cover.

ST1 398527700 PULLER ASSY

ST2 18760AA000 CLAW



B: INSTALLATION

1) Clean the mating surface of converter case cover and converter case.

2) Adjust the shims of front reduction drive gear and front reduction driven gear. <Ref. to CVT(TR690)-310, ADJUSTMENT, Front Reduction Drive Gear.> <Ref. to CVT(TR690)-318, ADJUSTMENT, Front Reduction Driven Gear.>

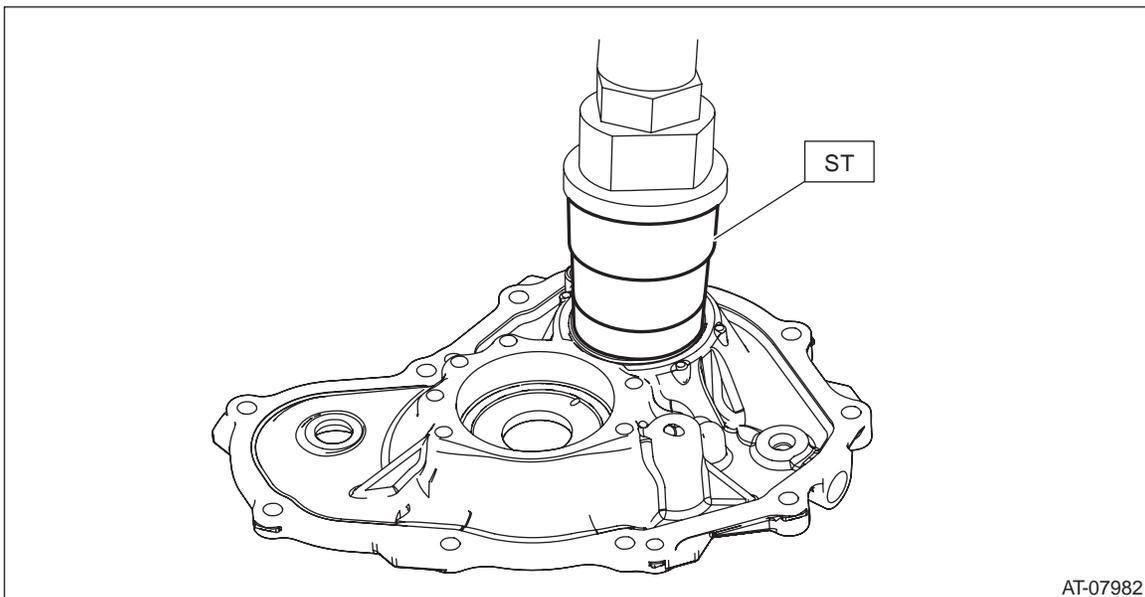
3) Apply CVTF to the selected shims and install on the bearing catch surface of the front reduction driven gear.

4) Using the ST, install the ball bearing to the converter case cover.

NOTE:

Use a new ball bearing.

ST 499755602 PRESS SNAP RING



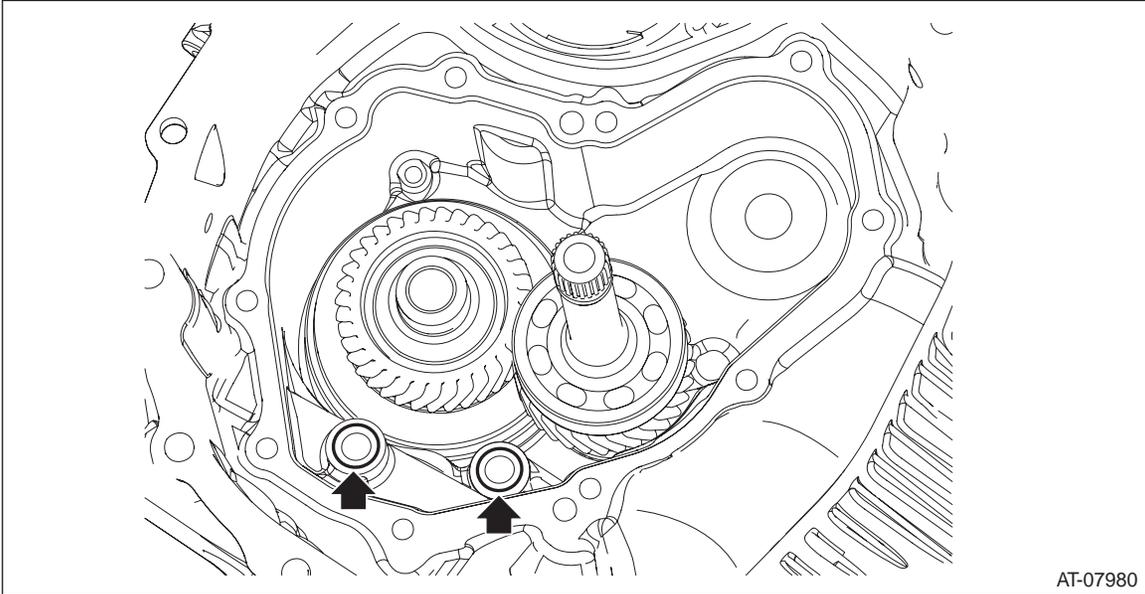
Converter Case Cover

CONTINUOUSLY VARIABLE TRANSMISSION

5) Install the O-rings.

NOTE:

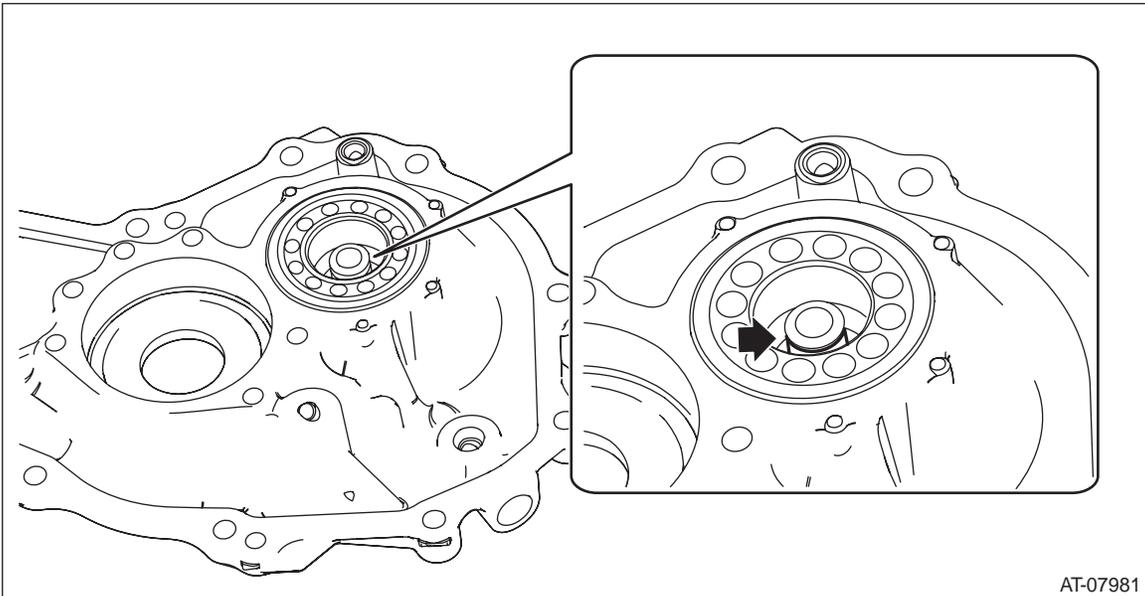
- Use new O-rings.
- Apply CVTF to the O-rings.



6) Apply CVTF to the selected shims and install on the bearing catch surface of the front reduction drive gear.
7) Install the seal ring to converter case cover.

NOTE:

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



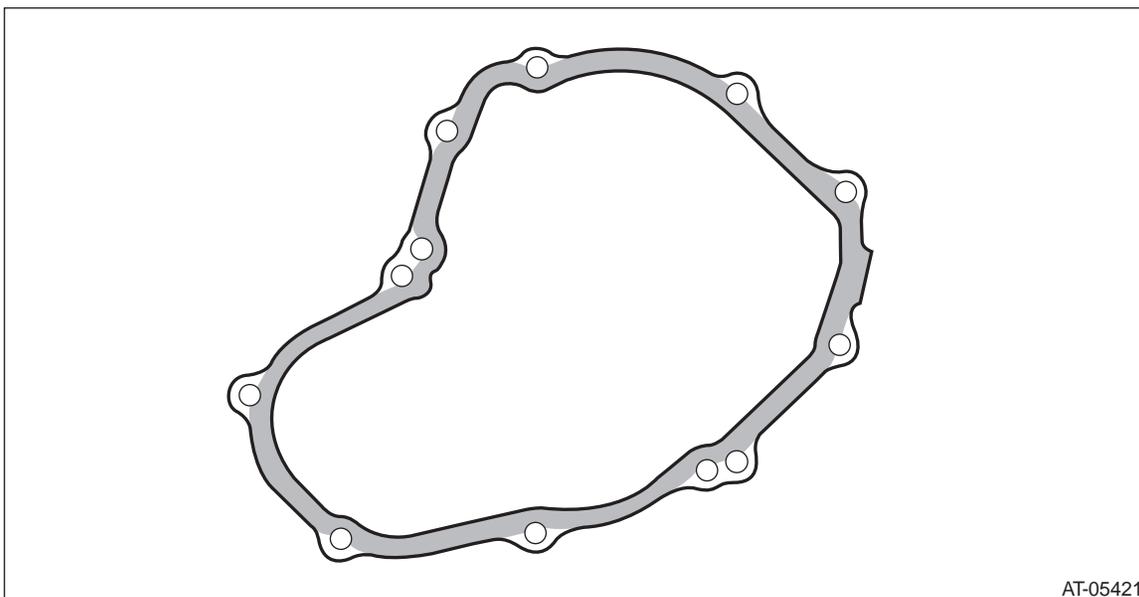
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Converter Case Cover

CONTINUOUSLY VARIABLE TRANSMISSION

8) Apply liquid gasket seamlessly to the mating surface of converter case cover.

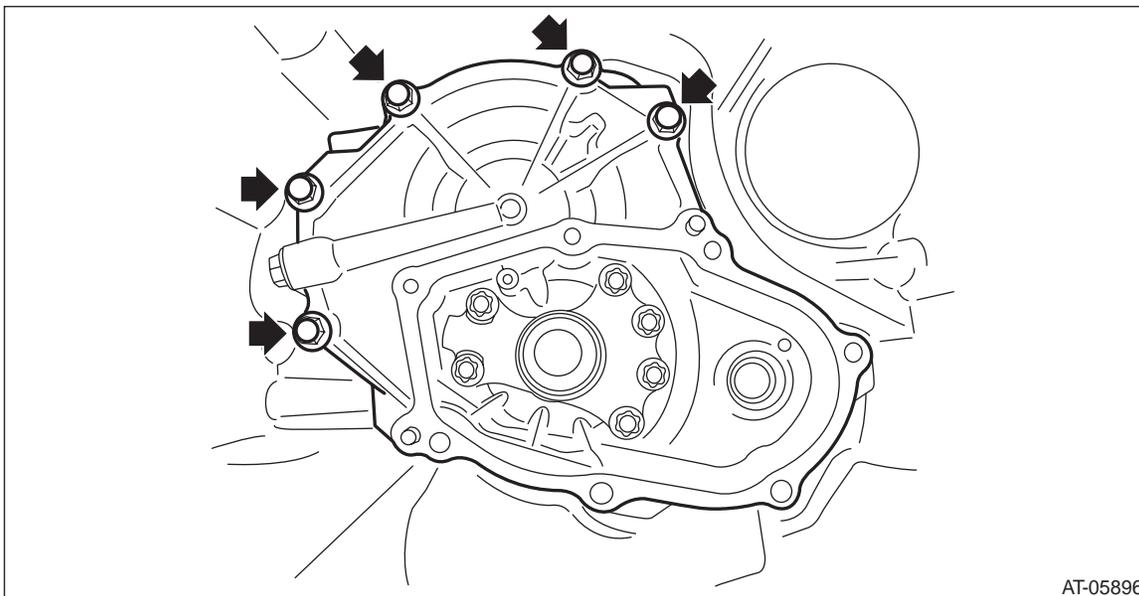
Liquid gasket:
THREE BOND 1215B or equivalent



AT-05421

9) Install the converter case cover.

Tightening torque:
24 N·m (2.4 kgf·m, 17.7 ft·lb)



AT-05896

10) Install the oil pump chain cover and the oil pump chain.<Ref. to CVT(TR690)-290, INSTALLATION, Oil Pump Chain.>

11) Flip over the converter case cover.

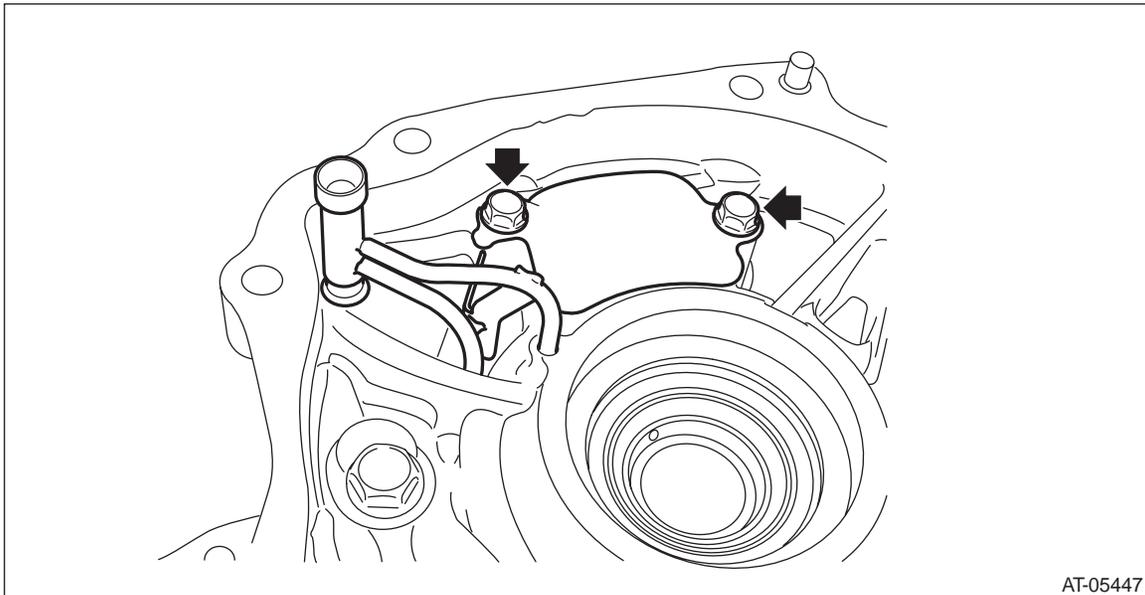
Converter Case Cover

CONTINUOUSLY VARIABLE TRANSMISSION

12) Install the oil stopper plate and lubrication pipe.

Tightening torque:

9 N·m (0.9 kgf·m, 6.6 ft·lb)



13) Install the drive pinion shaft assembly.<Ref. to CVT(TR690)-249, INSTALLATION, Drive Pinion Shaft Assembly.>

14) Install the primary pulley, secondary pulley and variator chain.<Ref. to CVT(TR690)-235, INSTALLATION, Primary Pulley and Secondary Pulley.>

15) Install the transmission case.<Ref. to CVT(TR690)-215, INSTALLATION, Transmission Case.>

16) Install the forward clutch assembly.<Ref. to CVT(TR690)-183, INSTALLATION, Forward Clutch Assembly.>

17) Install the intermediate case.<Ref. to CVT(TR690)-168, INSTALLATION, Intermediate Case.>

18) Install the transfer reduction driven gear assembly.<Ref. to CVT(TR690)-160, INSTALLATION, Transfer Reduction Driven Gear.>

19) Install the transfer clutch assembly.<Ref. to CVT(TR690)-149, INSTALLATION, Transfer Clutch.>

20) Install the rear drive shaft.<Ref. to CVT(TR690)-143, INSTALLATION, Rear Drive Shaft.>

21) Install the extension case.<Ref. to CVT(TR690)-141, INSTALLATION, Extension Case.>

22) Install the transmission harness.<Ref. to CVT(TR690)-122, INSTALLATION, Transmission Harness.>

23) Install the control valve body and oil pan.<Ref. to CVT(TR690)-113, INSTALLATION, Control Valve Body.>

24) Install the air breather hose.<Ref. to CVT(TR690)-134, INSTALLATION, Air Breather Hose.>

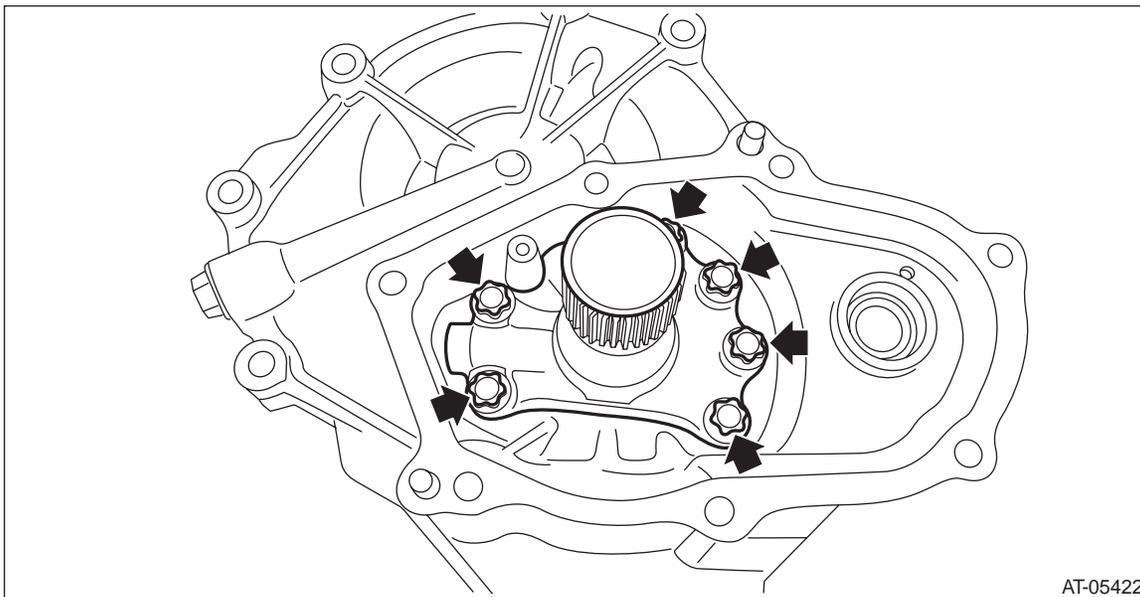
25) Install the transmission assembly to the vehicle.<Ref. to CVT(TR690)-69, INSTALLATION, Automatic Transmission Assembly.>

Converter Case Cover

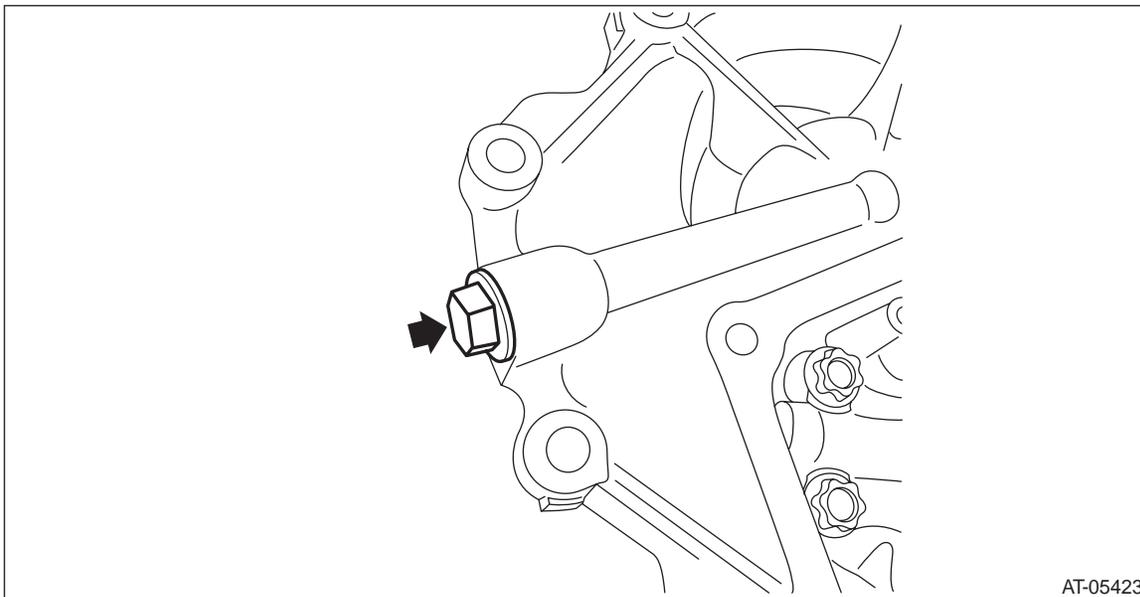
CONTINUOUSLY VARIABLE TRANSMISSION

C: DISASSEMBLY

- 1) Using ST, remove the center support COMPL.
ST 18270KA010 SOCKET (E16)



- 2) Remove the plug and O-ring.



D: ASSEMBLY

- 1) Install the plugs.

NOTE:

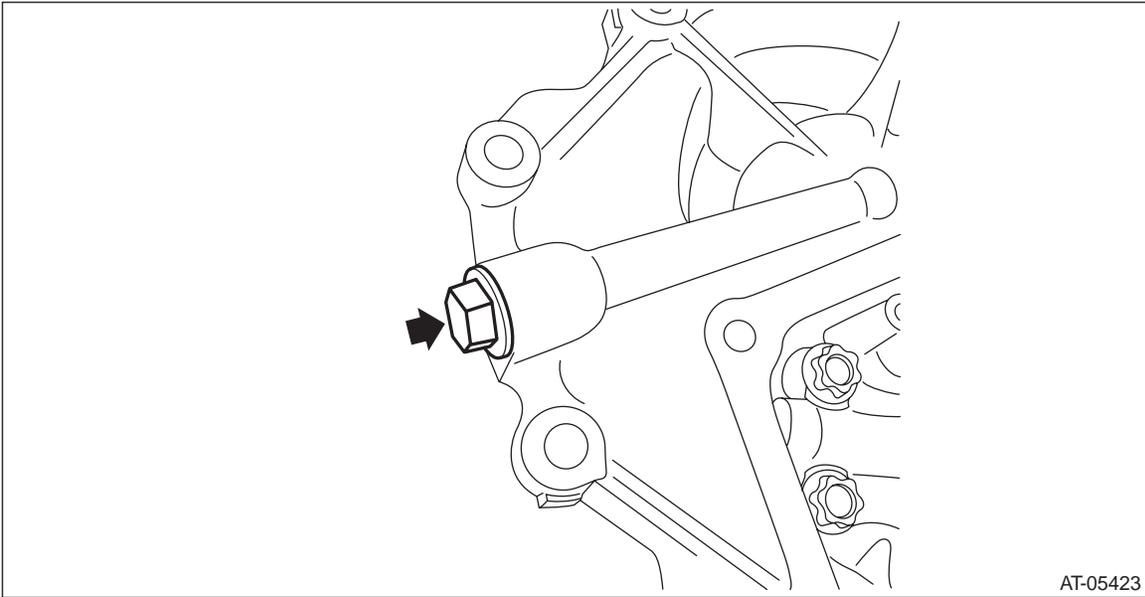
- Use new O-rings.
- Apply CVTF to the O-ring.

Converter Case Cover

CONTINUOUSLY VARIABLE TRANSMISSION

Tightening torque:

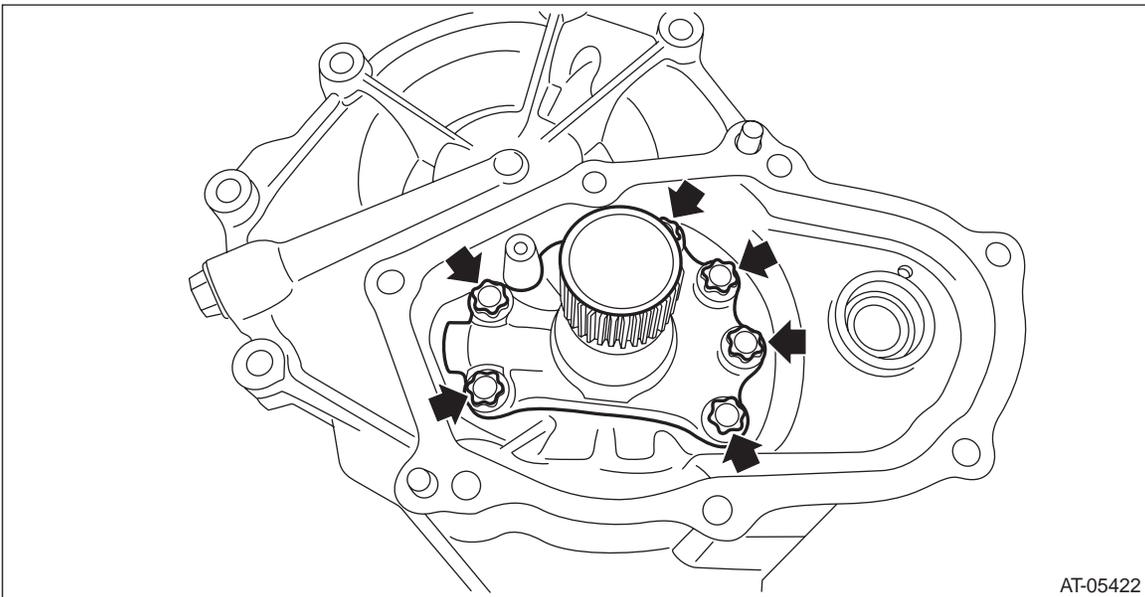
25 N·m (2.5 kgf·m, 18.4 ft·lb)



2) Using ST, install the center support COMPL.
ST 18270KA010 SOCKET (E16)

Tightening torque:

21.5 N·m (2.2 kgf·m, 15.9 ft·lb)



E: INSPECTION

- Check for leakage of CVTF from the connection between converter case and converter case cover.
- Check there is no damage or cracks on the converter case cover.

F: ADJUSTMENT

When replacing the converter case cover, select the following shims.

- Select the shim for front reduction drive gear. <Ref. to CVT(TR690)-310, ADJUSTMENT, Front Reduction Drive Gear.>
- Select the shim for front reduction driven gear. <Ref. to CVT(TR690)-318, ADJUSTMENT, Front Reduction Driven Gear.>

CVT(TR690)-303

Front Reduction Drive Gear

CONTINUOUSLY VARIABLE TRANSMISSION

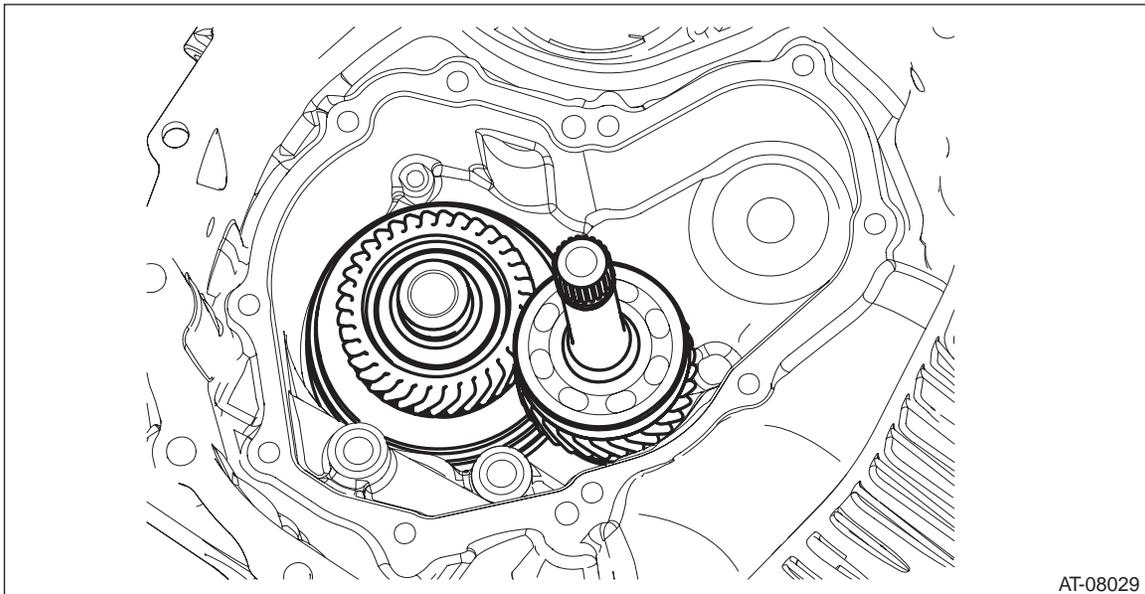
48. Front Reduction Drive Gear

A: REMOVAL

- 1) Remove the transmission assembly from the vehicle.<Ref. to CVT(TR690)-56, REMOVAL, Automatic Transmission Assembly.>
- 2) Remove the air breather hose.<Ref. to CVT(TR690)-134, REMOVAL, Air Breather Hose.>
- 3) Remove the oil pan and control valve body.<Ref. to CVT(TR690)-109, REMOVAL, Control Valve Body.>
- 4) Remove the transmission harness.<Ref. to CVT(TR690)-120, REMOVAL, Transmission Harness.>
- 5) Remove the primary speed sensor.<Ref. to CVT(TR690)-102, REMOVAL, Primary Speed Sensor.>
- 6) Remove the extension case.<Ref. to CVT(TR690)-140, REMOVAL, Extension Case.>
- 7) Remove the rear drive shaft.<Ref. to CVT(TR690)-143, REMOVAL, Rear Drive Shaft.>
- 8) Remove the transfer clutch assembly.<Ref. to CVT(TR690)-148, REMOVAL, Transfer Clutch.>
- 9) Remove the transfer reduction driven gear assembly.<Ref. to CVT(TR690)-160, REMOVAL, Transfer Reduction Driven Gear.>
- 10) Remove the intermediate case.<Ref. to CVT(TR690)-167, REMOVAL, Intermediate Case.>
- 11) Remove the forward clutch assembly.<Ref. to CVT(TR690)-182, REMOVAL, Forward Clutch Assembly.>
- 12) Remove the transmission case.<Ref. to CVT(TR690)-213, REMOVAL, Transmission Case.>
- 13) Remove the primary pulley, secondary pulley and variator chain.<Ref. to CVT(TR690)-231, REMOVAL, Primary Pulley and Secondary Pulley.>
- 14) Remove the drive pinion shaft assembly.<Ref. to CVT(TR690)-247, REMOVAL, Drive Pinion Shaft Assembly.>
- 15) Remove the converter case cover.<Ref. to CVT(TR690)-295, REMOVAL, Converter Case Cover.>
- 16) Remove the front reduction drive gear and front reduction driven gear together.

NOTE:

Remove the front reduction driven shaft while holding it.



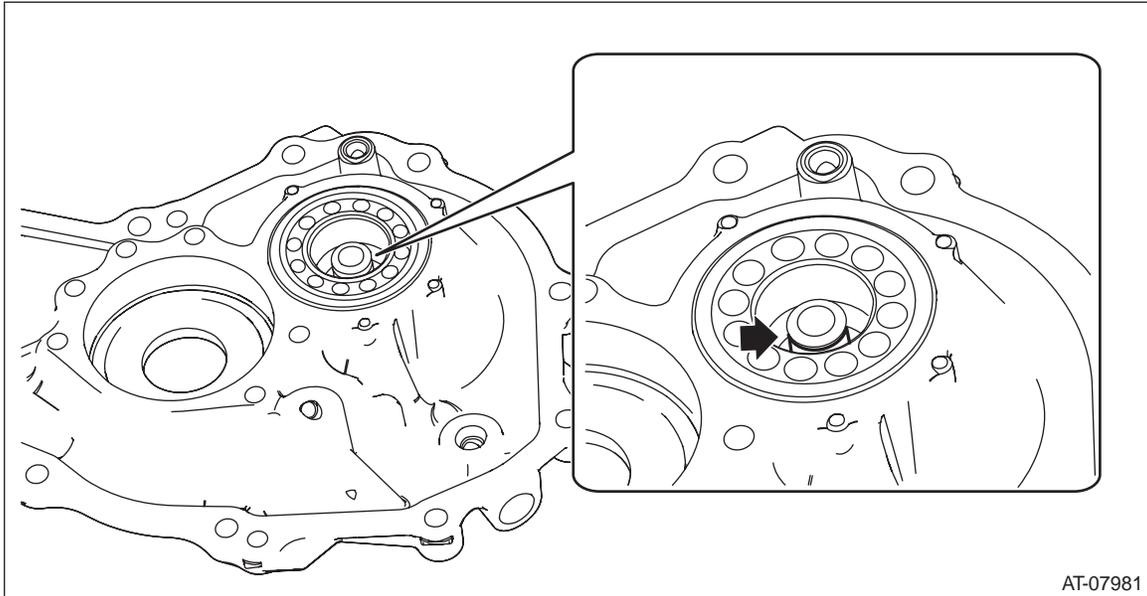
AT-08029

- 17) Remove the shims of the front reduction driven gear from the converter case.

Front Reduction Drive Gear

CONTINUOUSLY VARIABLE TRANSMISSION

18) Remove the seal rings.

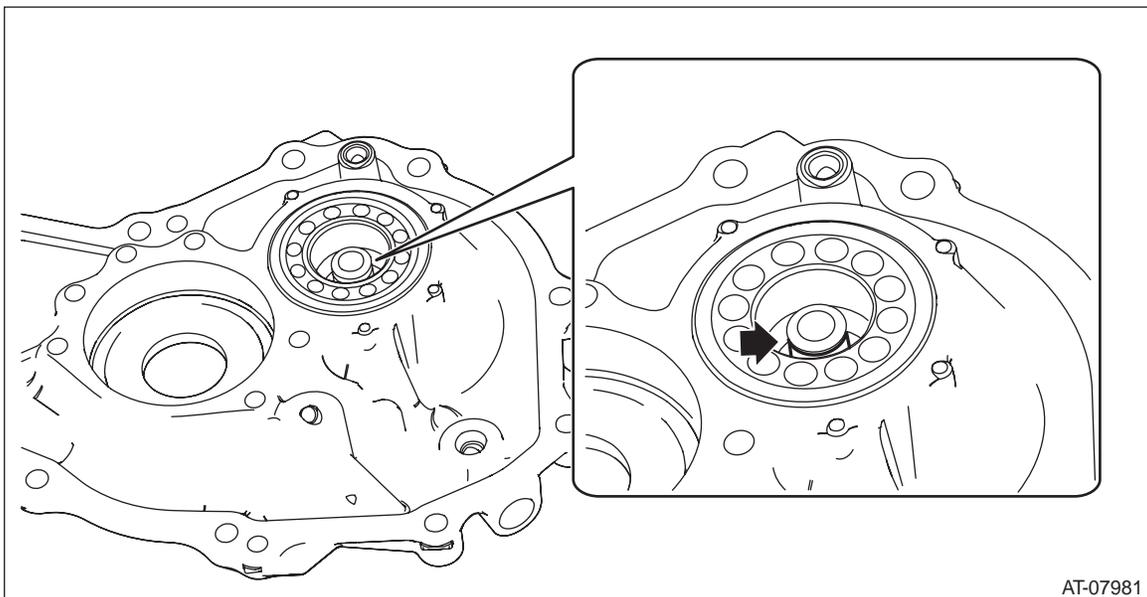


B: INSTALLATION

- 1) Clean the mating surface of converter case cover and converter case.
- 2) Select the shim for front reduction drive gear.<Ref. to CVT(TR690)-310, ADJUSTMENT, Front Reduction Drive Gear.>
- 3) Apply CVTF to the shims and install on the bearing catch surface of the front reduction driven gear.
- 4) Install the seal ring to converter case cover.

NOTE:

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



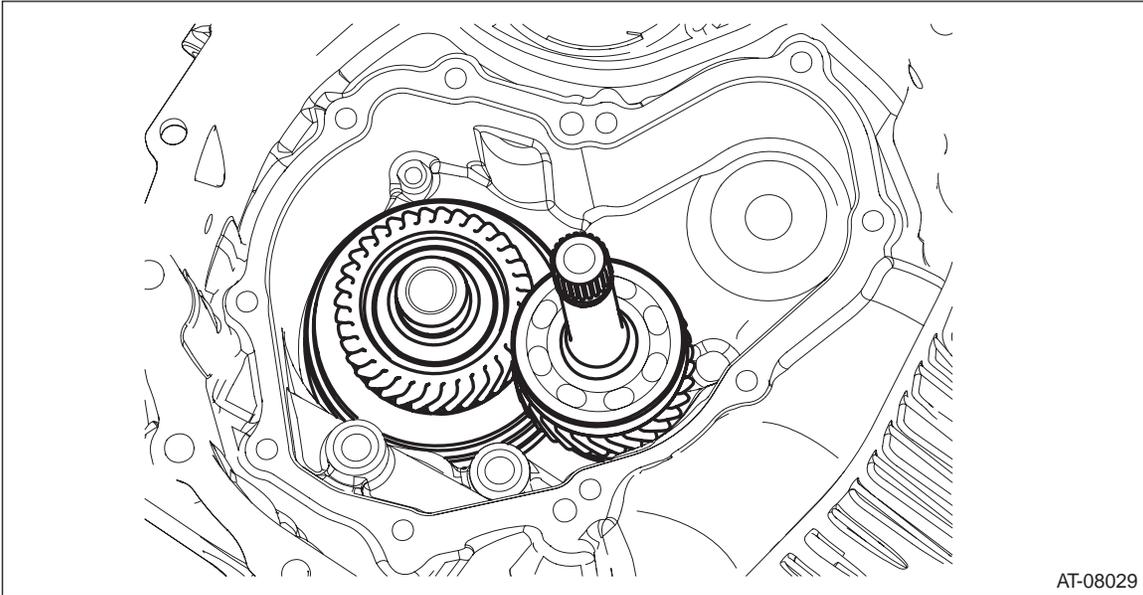
Front Reduction Drive Gear

CONTINUOUSLY VARIABLE TRANSMISSION

5) Install the front reduction drive gear and front reduction driven gear together.

CAUTION:

Be careful not to detach the spline of input clutch and the spline of front reduction driven shaft.



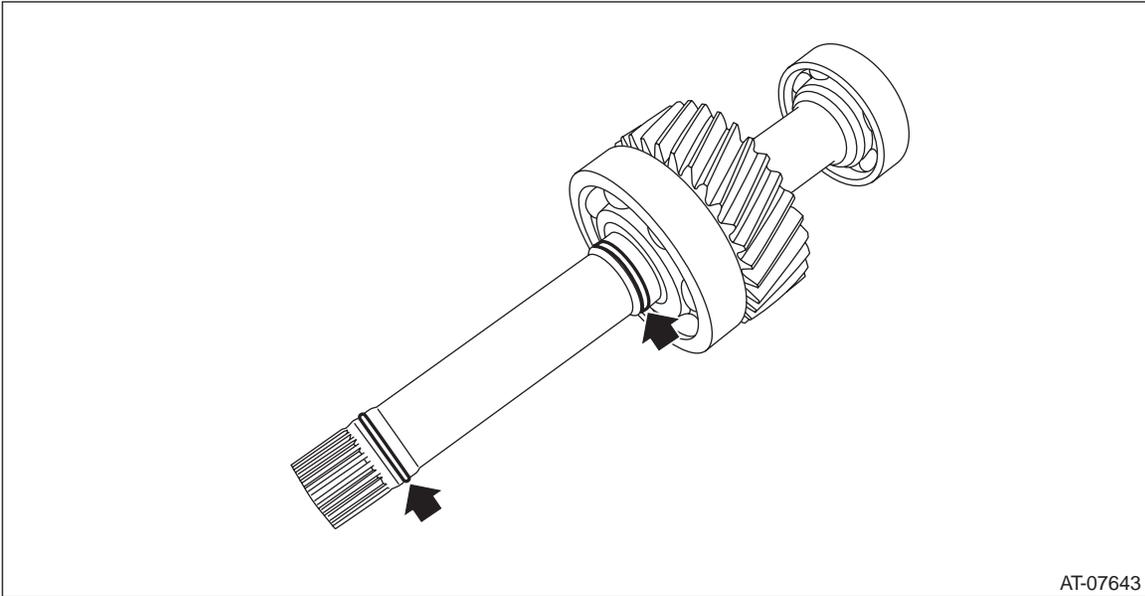
- 6) Install the converter case cover.<Ref. to CVT(TR690)-298, INSTALLATION, Converter Case Cover.>
- 7) Install the drive pinion shaft assembly.<Ref. to CVT(TR690)-249, INSTALLATION, Drive Pinion Shaft Assembly.>
- 8) Install the primary pulley, secondary pulley and variator chain.<Ref. to CVT(TR690)-235, INSTALLATION, Primary Pulley and Secondary Pulley.>
- 9) Install the transmission case.<Ref. to CVT(TR690)-215, INSTALLATION, Transmission Case.>
- 10) Install the forward clutch assembly.<Ref. to CVT(TR690)-183, INSTALLATION, Forward Clutch Assembly.>
- 11) Install the intermediate case.<Ref. to CVT(TR690)-168, INSTALLATION, Intermediate Case.>
- 12) Install the transfer reduction driven gear assembly.<Ref. to CVT(TR690)-160, INSTALLATION, Transfer Reduction Driven Gear.>
- 13) Install the transfer clutch assembly.<Ref. to CVT(TR690)-149, INSTALLATION, Transfer Clutch.>
- 14) Install the rear drive shaft.<Ref. to CVT(TR690)-143, INSTALLATION, Rear Drive Shaft.>
- 15) Install the extension case.<Ref. to CVT(TR690)-141, INSTALLATION, Extension Case.>
- 16) Install the primary speed sensor.<Ref. to CVT(TR690)-103, INSTALLATION, Primary Speed Sensor.>
- 17) Install the transmission harness.<Ref. to CVT(TR690)-122, INSTALLATION, Transmission Harness.>
- 18) Install the control valve body and oil pan.<Ref. to CVT(TR690)-113, INSTALLATION, Control Valve Body.>
- 19) Install the air breather hose.<Ref. to CVT(TR690)-134, INSTALLATION, Air Breather Hose.>
- 20) Install the transmission assembly to the vehicle.<Ref. to CVT(TR690)-69, INSTALLATION, Automatic Transmission Assembly.>

Front Reduction Drive Gear

CONTINUOUSLY VARIABLE TRANSMISSION

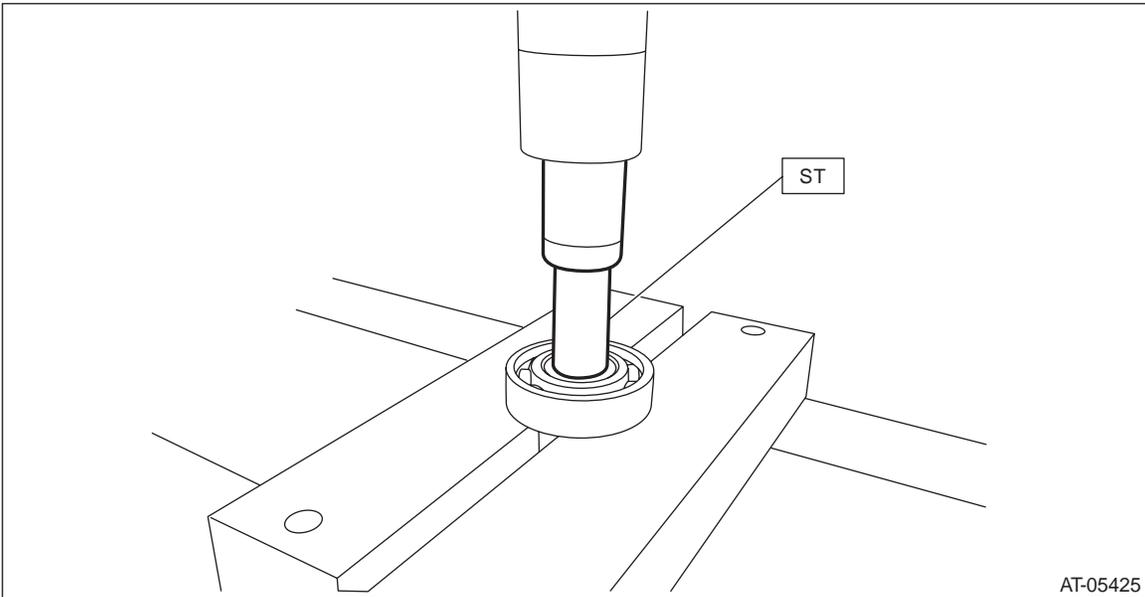
C: DISASSEMBLY

1) Remove the seal ring and O-ring.



AT-07643

2) Using the ST, remove the ball bearing from front reduction drive gear.
ST 899864100 REMOVER



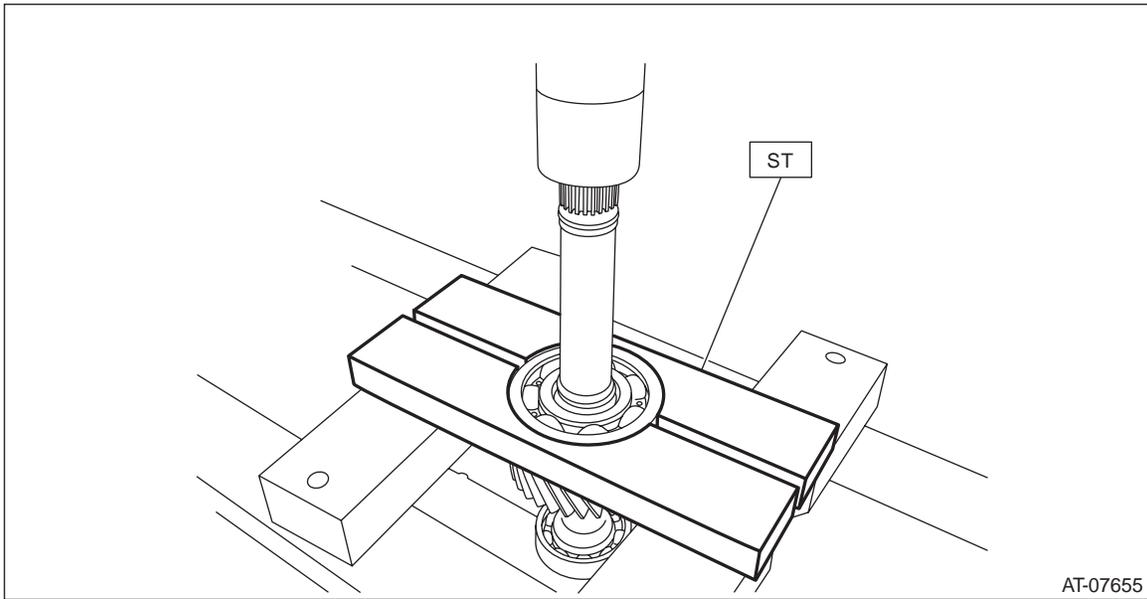
AT-05425

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Front Reduction Drive Gear

CONTINUOUSLY VARIABLE TRANSMISSION

- 3) Using the ST, remove the ball bearing from front reduction drive gear.
ST 498077000 REMOVER



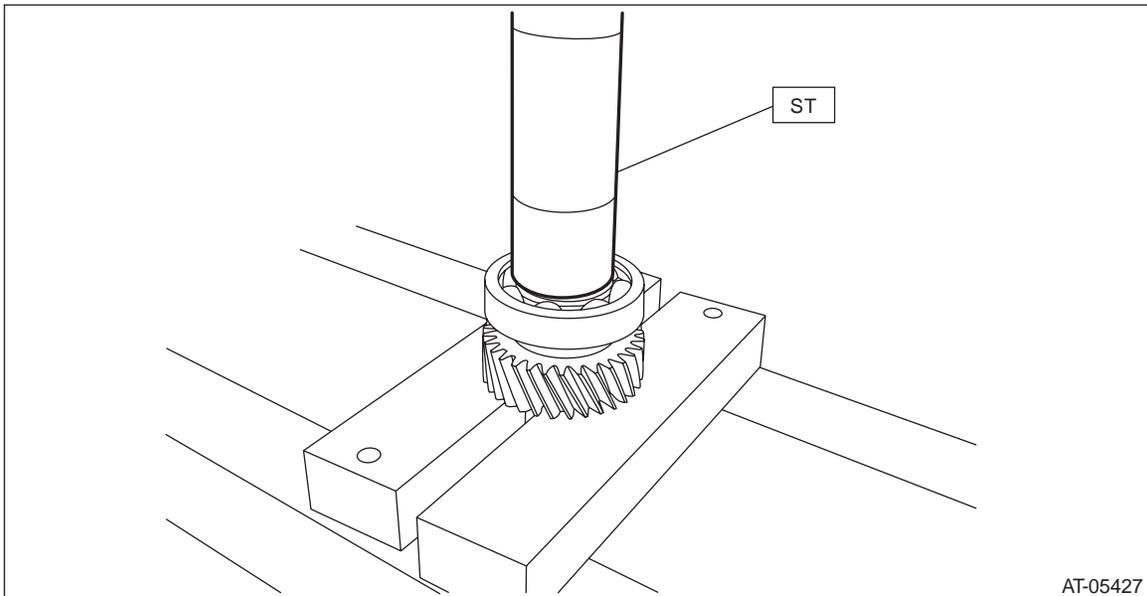
D: ASSEMBLY

- 1) Using the ST, install the ball bearing to front reduction drive gear.

NOTE:

Use a new ball bearing.

ST 18651AA000 INSTALLER



Front Reduction Drive Gear

CONTINUOUSLY VARIABLE TRANSMISSION

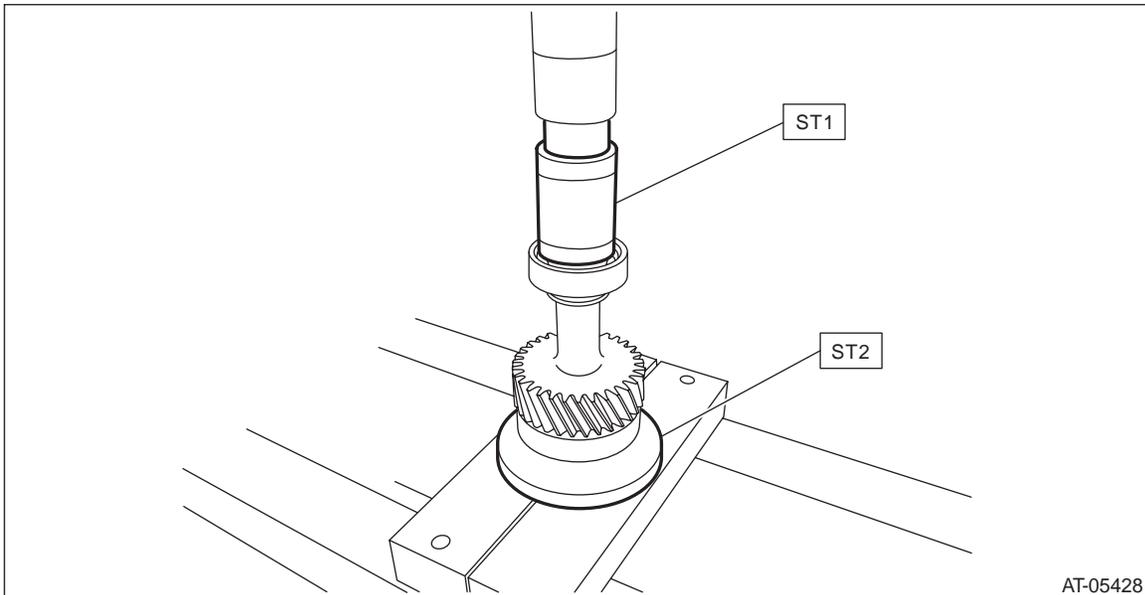
2) Using ST1 and ST2, install the ball bearing to front reduction drive gear.

NOTE:

Use a new ball bearing.

ST1 499757002 PRESS SNAP RING

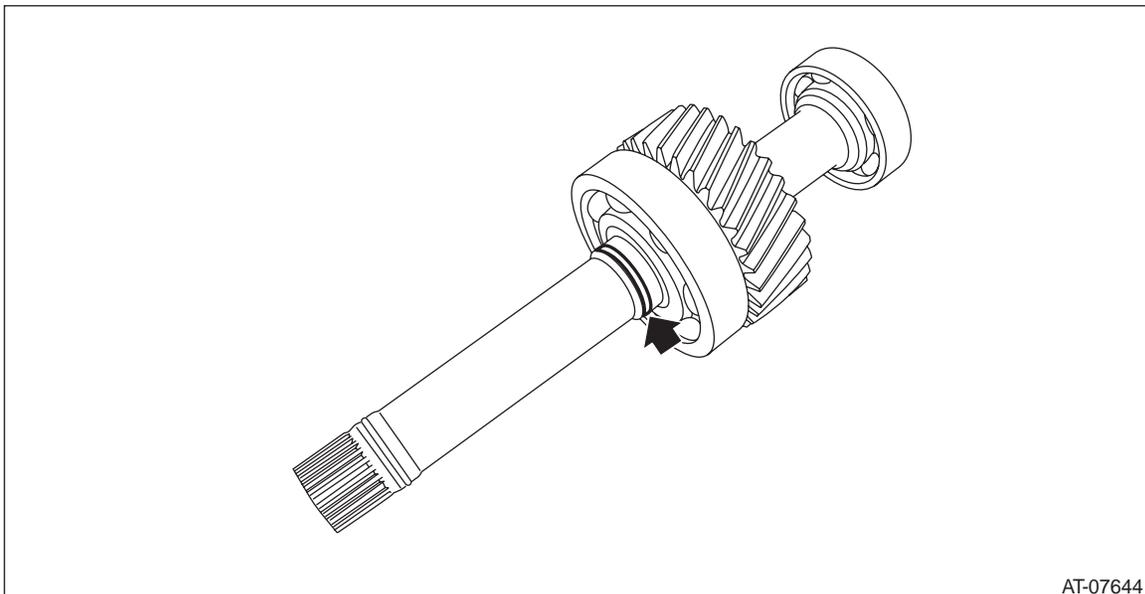
ST2 398177700 INSTALLER



3) Install the seal ring.

NOTE:

- Use a new seal ring.
- When installing the seal ring, do not expand the seal ring too much.
- Install the O-ring when installing the torque converter assembly.



E: INSPECTION

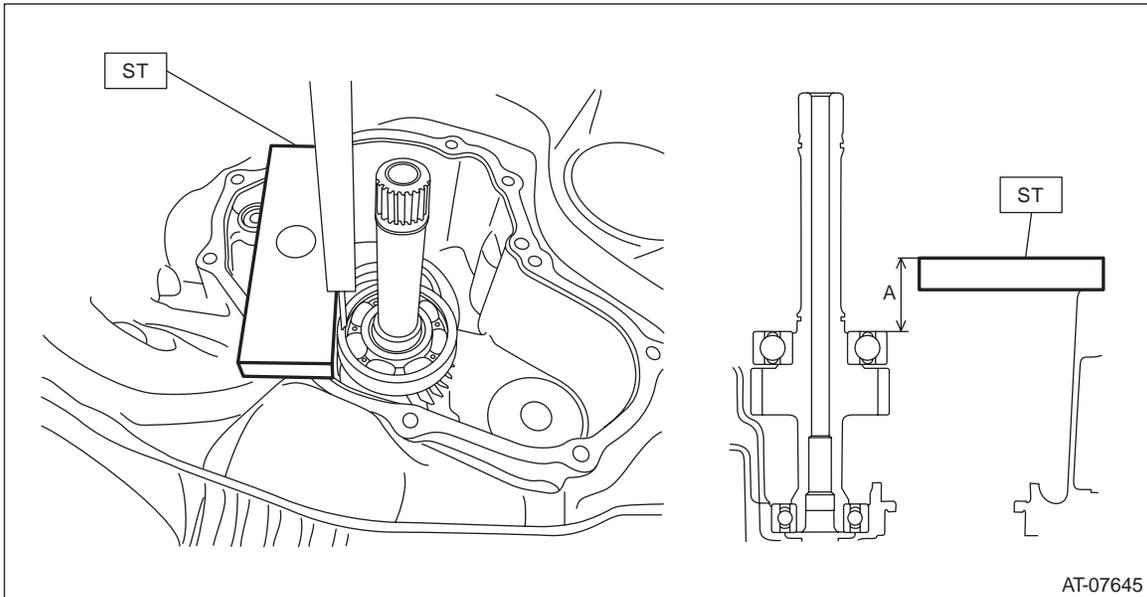
- Replace if its tooth surfaces are broken, damaged or excessively worn.
- Check the bearing for seizure or wear.
- Apply CVTF to bearing and rotate the bearing to check for noise or dragging etc.

Front Reduction Drive Gear

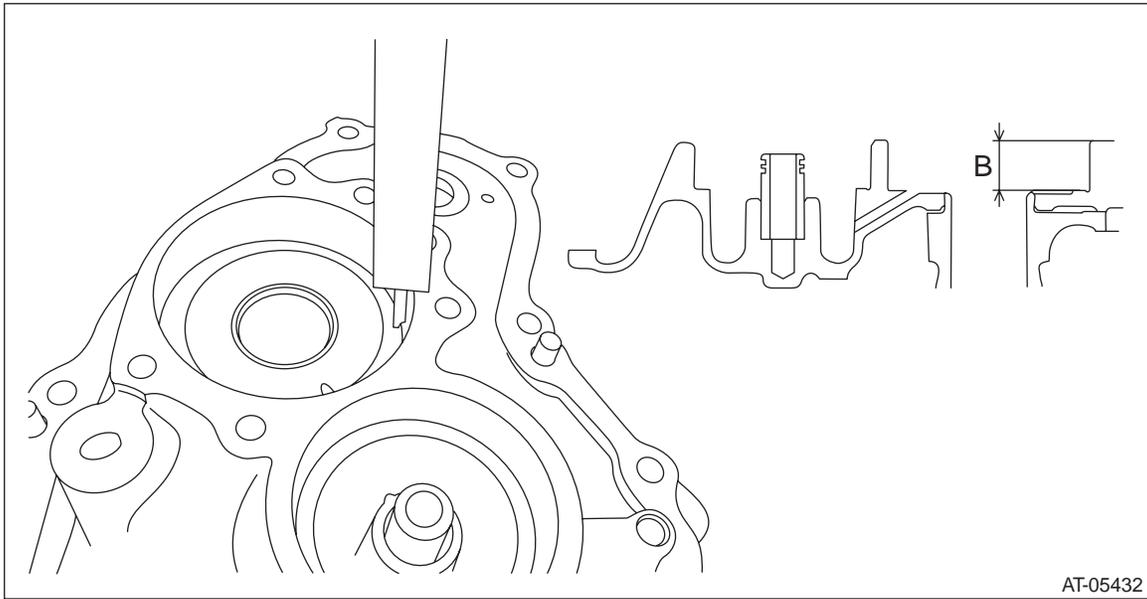
CONTINUOUSLY VARIABLE TRANSMISSION

F: ADJUSTMENT

- 1) Measure height "A" from the ST upper face to the bearing end face using the ST.
ST 398643600 GAUGE



- 2) Measure depth "B" from the converter case cover upper face to the bearing catch surface.

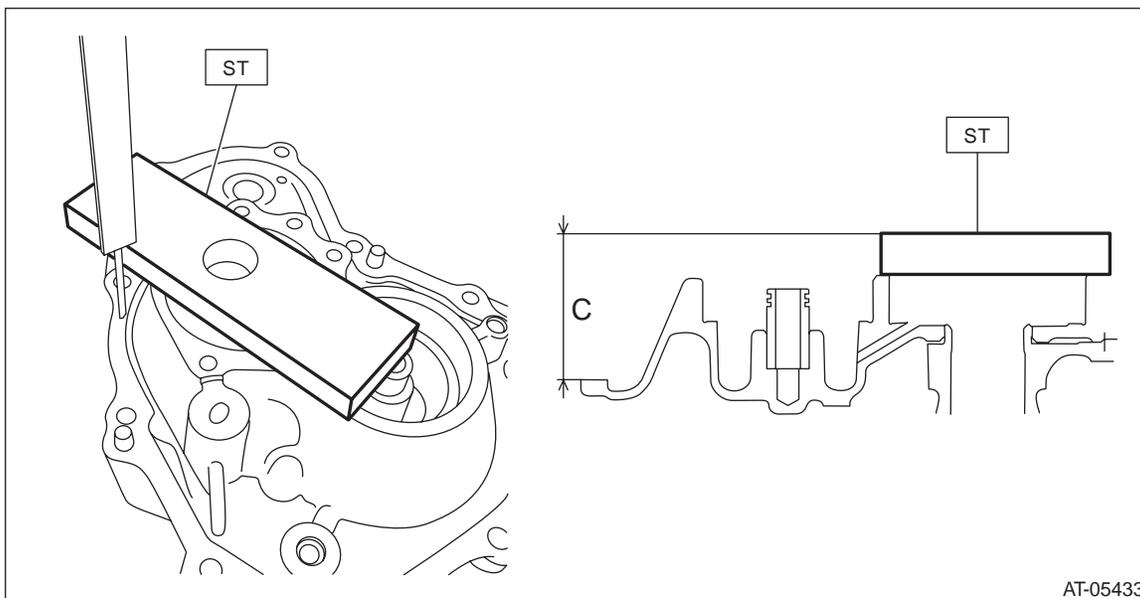


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Front Reduction Drive Gear

CONTINUOUSLY VARIABLE TRANSMISSION

3) Using the ST, measure height "C" from the ST upper face to the converter case cover mating surface.
ST 398643600 GAUGE



4) Using the following formula, calculate clearance "T" to select shims.

Calculation formula:

$$T \text{ mm} = (A - 15) - ((C - 15) - B)$$

$$[T \text{ in} = (A - 0.591) - ((C - 0.591) - B)]$$

T: Clearance

A: Depth from the ST upper face to the bearing end surface

B: Depth from the converter case cover upper face to the bearing catch surface

C: Height from the ST upper face to the converter case cover mating surface

15 mm (0.591 in): Thickness of ST

Clearance "T" mm (in)	Thickness of shim mm (in)	Part No.
1.070 — 1.174 (0.042 — 0.045)	1.0 (0.039)	31288AA160
1.175 — 1.274 (0.046 — 0.049)	1.1 (0.043)	31288AA170
1.275 — 1.374 (0.050 — 0.053)	1.2 (0.047)	31288AA180
1.375 — 1.474 (0.054 — 0.057)	1.3 (0.051)	31288AA220
1.475 — 1.580 (0.058 — 0.062)	1.4 (0.055)	31288AA230

Front Reduction Driven Gear

CONTINUOUSLY VARIABLE TRANSMISSION

49. Front Reduction Driven Gear

A: REMOVAL

NOTE:

For removal of front reduction driven gear, refer to the "Front Reduction Drive Gear". <Ref. to CVT(TR690)-304, REMOVAL, Front Reduction Drive Gear.>

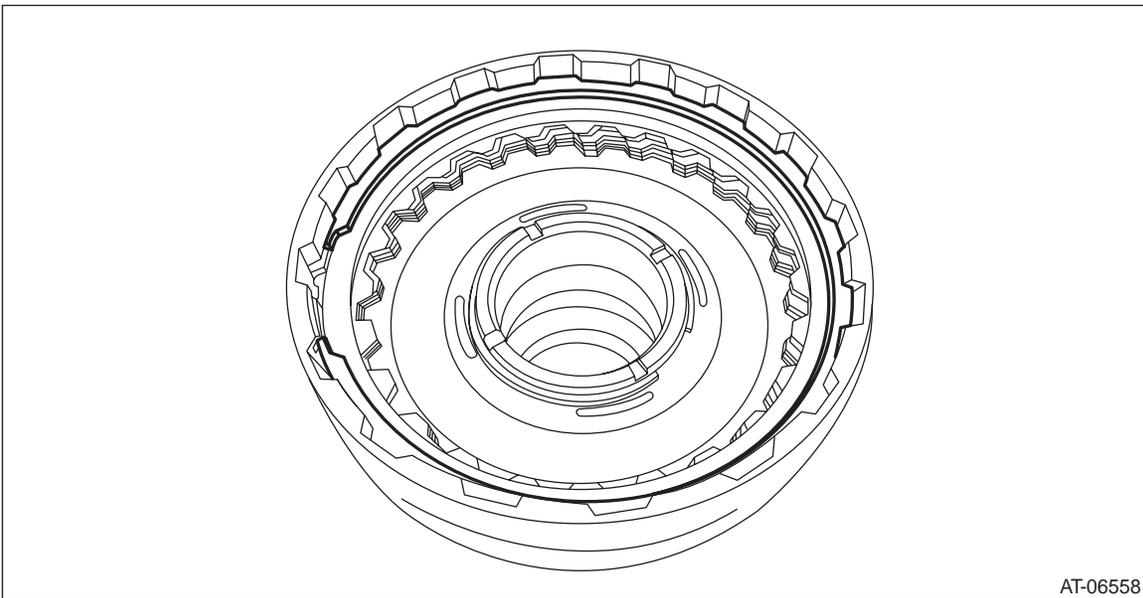
B: INSTALLATION

NOTE:

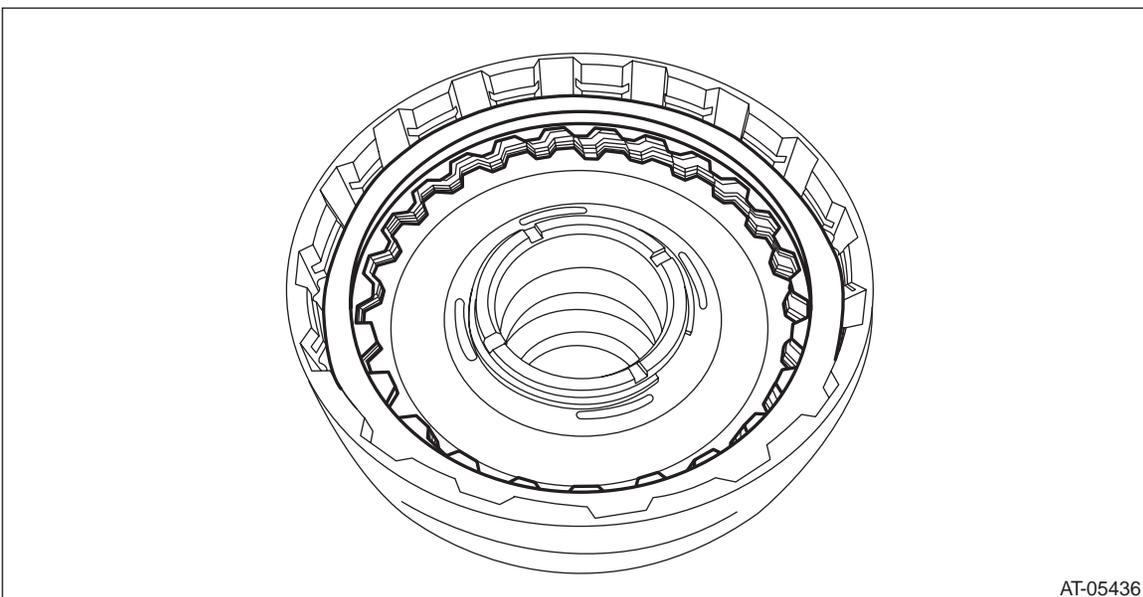
For installation of front reduction driven gear, refer to the "Front Reduction Drive Gear". <Ref. to CVT(TR690)-305, INSTALLATION, Front Reduction Drive Gear.>

C: DISASSEMBLY

- 1) Remove the front reduction driven shaft from the front reduction driven gear.
- 2) Remove the snap ring.



- 3) Remove the retaining plate, drive plate, driven plate and dish plate.

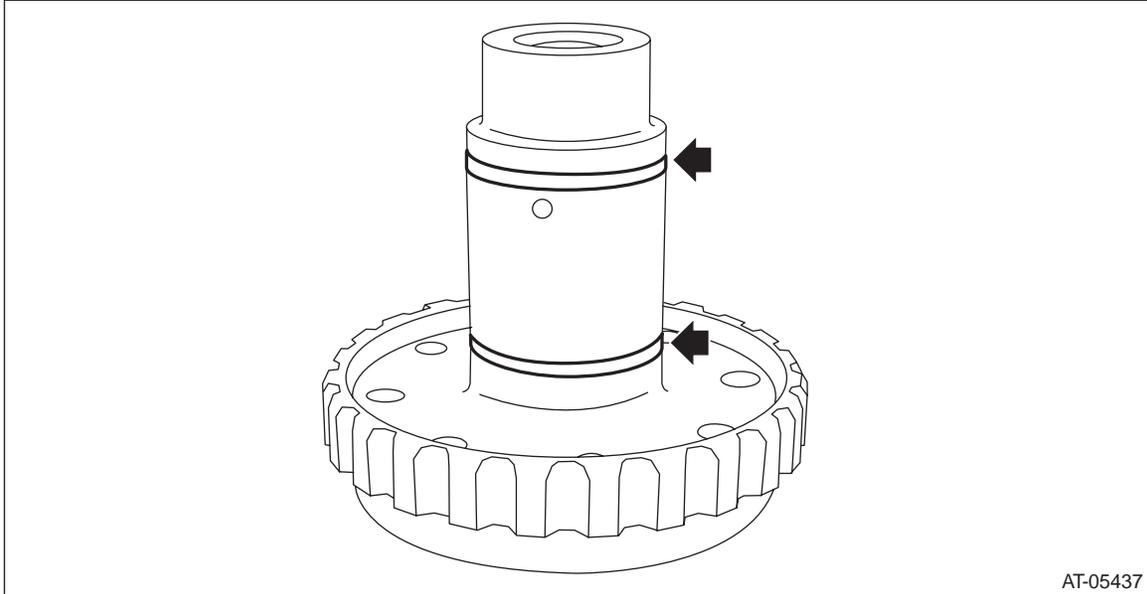


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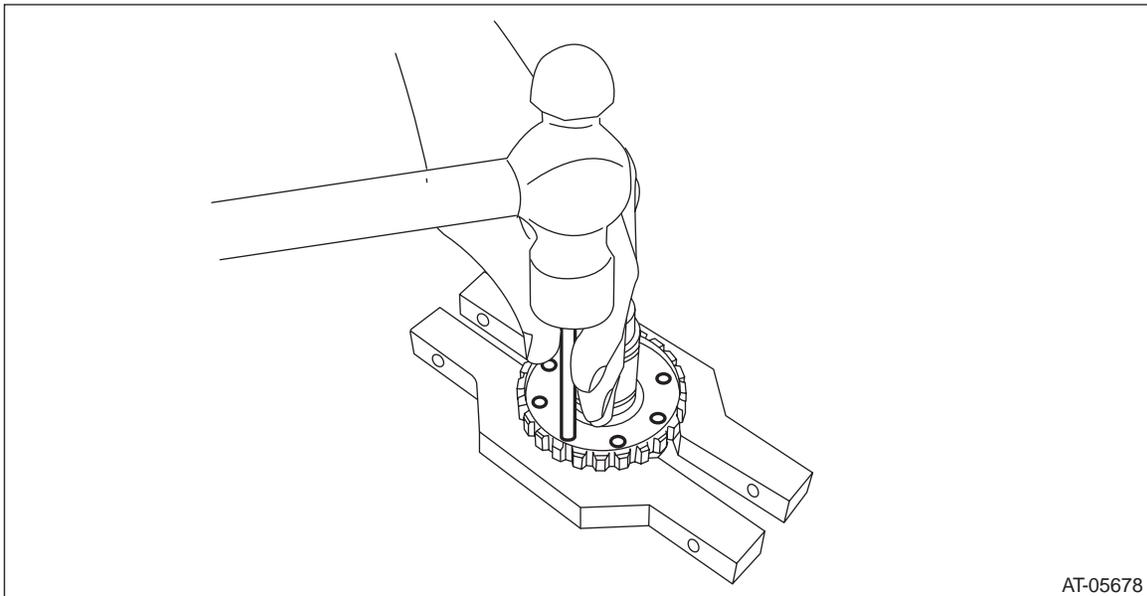
Front Reduction Driven Gear

CONTINUOUSLY VARIABLE TRANSMISSION

4) Remove the seal ring from front reduction driven shaft.



5) Remove the ball bearing, while tapping the entire circumference around the ball bearing outer race a little at a time through the front reduction driven shaft hole using the round bar with diameter of 7 mm (0.28 in).



D: ASSEMBLY

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

NOTE:

Make sure of the direction of dish plate.

2) 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.

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

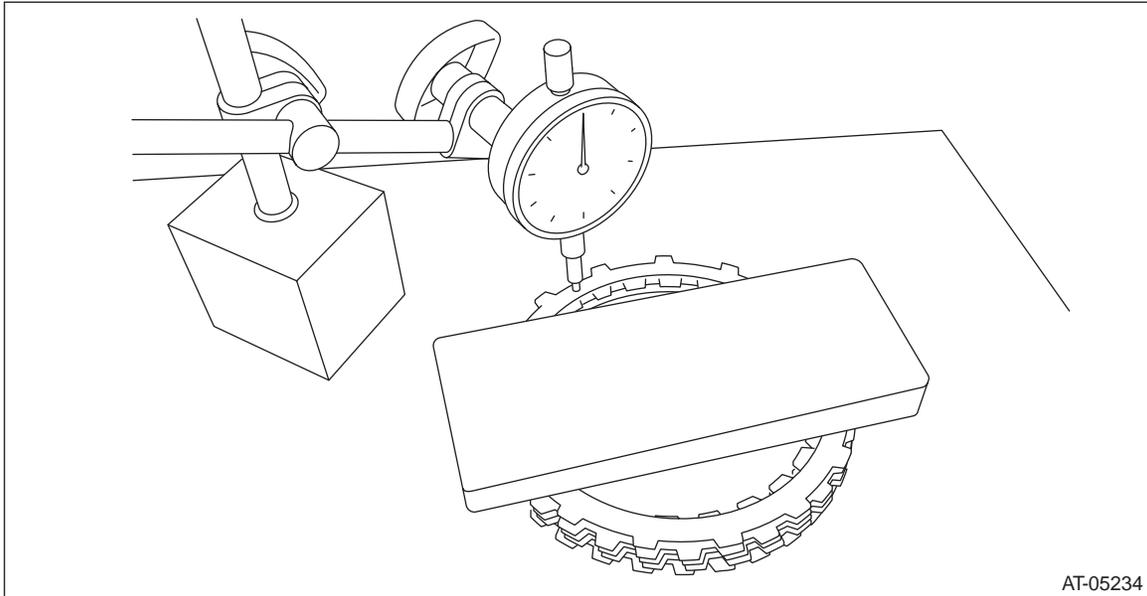
NOTE:

- Use a stiff board which does not bend against load as a flat board to be put on retaining plate.
- Use a flat board weighing less than 130 N (13.3 kgf, 29.2 lb).

Front Reduction Driven Gear

CONTINUOUSLY VARIABLE TRANSMISSION

4) Put the flat board on retaining plate.



5) Using the following formula, calculate load "N", a force of pressing with push/pull gauge.

$$N = 130N (13.3 \text{ kgf}, 29.2 \text{ kg}) - Z$$

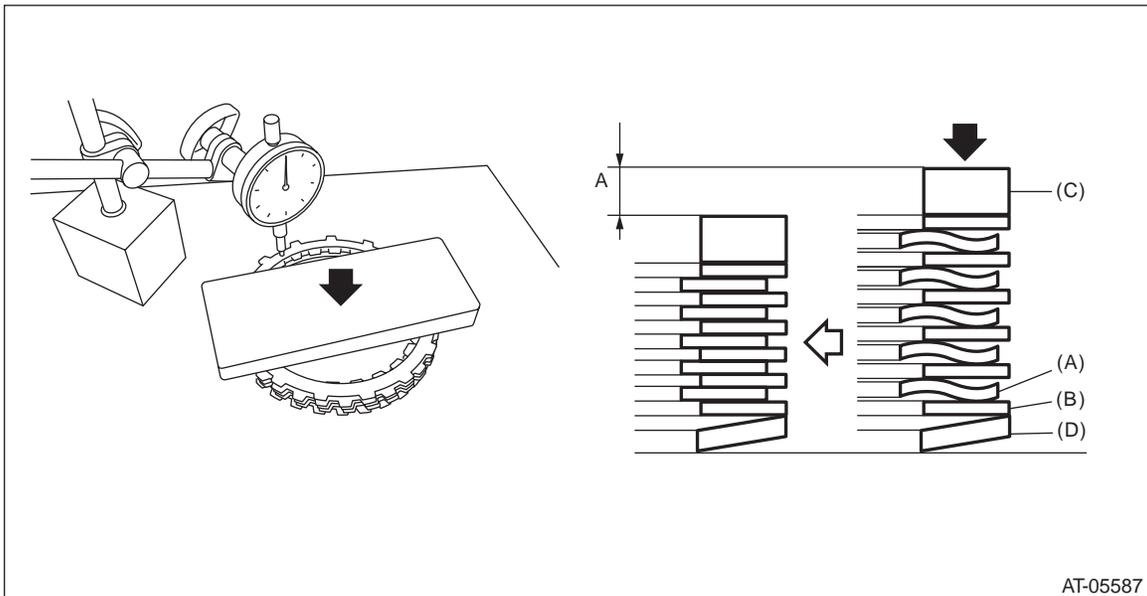
130 N (13.3 kgf, 29.2 lb) : Load applied to clutch plate

Z: Flat board weight

6) Press the center of retaining plate by applying a force of "N" using push/pull gauge, and then measure and record the 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
- (D) Dish plate

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

NOTE:

Make sure of the direction of dish plate.

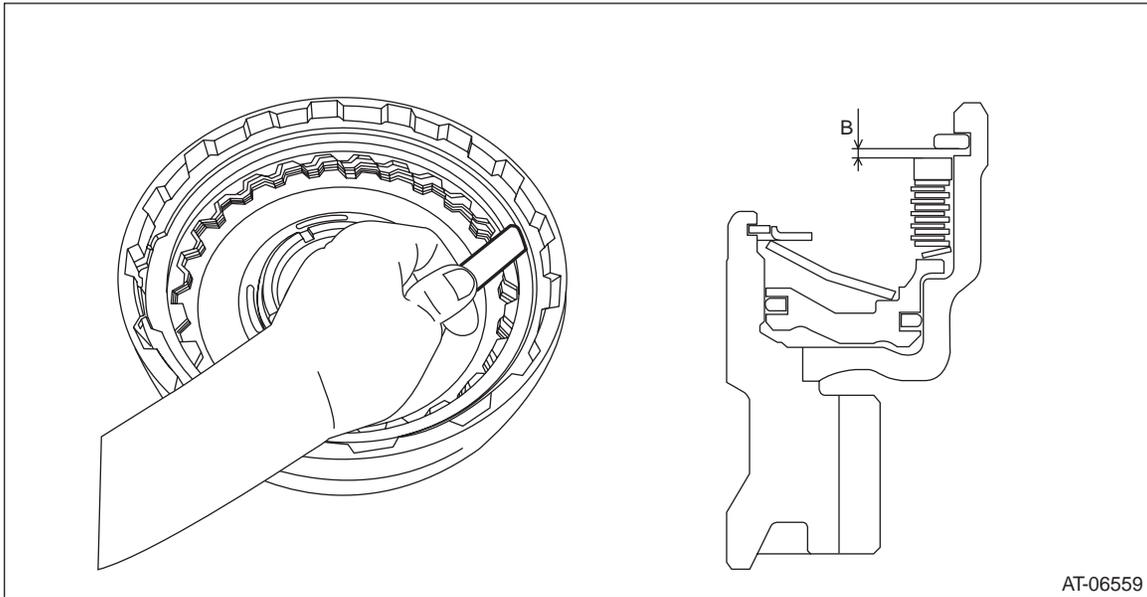
Front Reduction Driven Gear

CONTINUOUSLY VARIABLE TRANSMISSION

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

NOTE:

Before measuring, press down the whole circumference of retaining plate using your finger.



9) Piston stroke calculation

Calculate with A and B dimensions recorded before.

If out of standard, replace with a new drive plate and adjust it within standard.

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

S: Piston stroke

A: Compression amount of drive plate and dish plate

B: Clearance between retaining plate and snap ring

Specification:

2.4 — 2.8 mm (0.094 — 0.11 in)

Retaining plate	
Part No.	Thickness mm (in)
31667AB430	3.1 (0.122)
31667AB440	3.3 (0.130)
31667AB450	3.5 (0.138)

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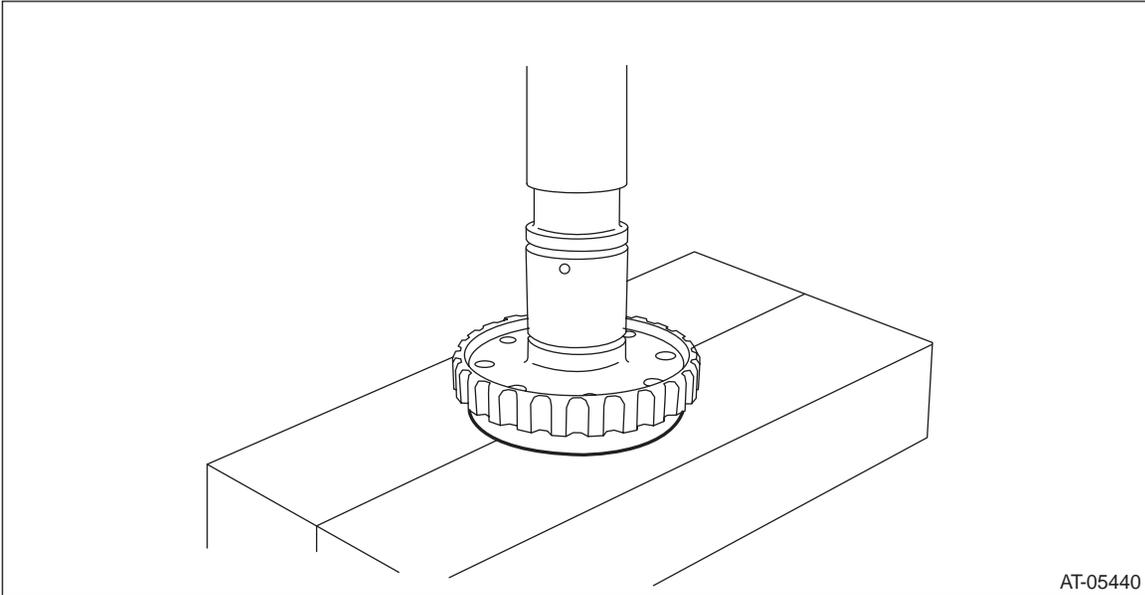
Front Reduction Driven Gear

CONTINUOUSLY VARIABLE TRANSMISSION

10) Press-fit the ball bearing into front driven shaft.

NOTE:

Use a new ball bearing.

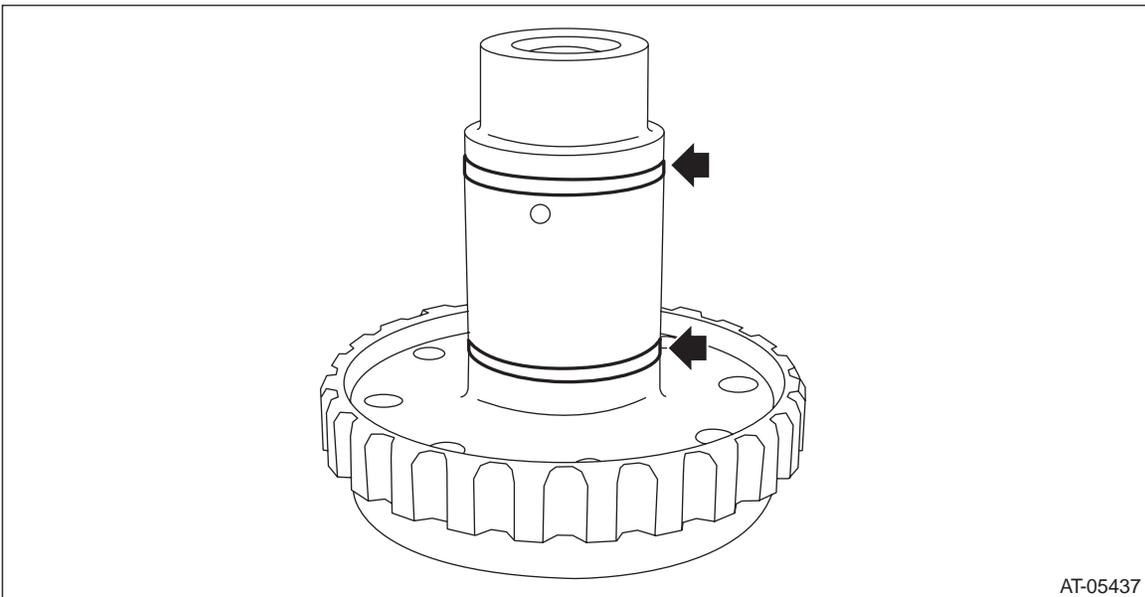


AT-05440

11) Install the seal ring to the front driven shaft.

NOTE:

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



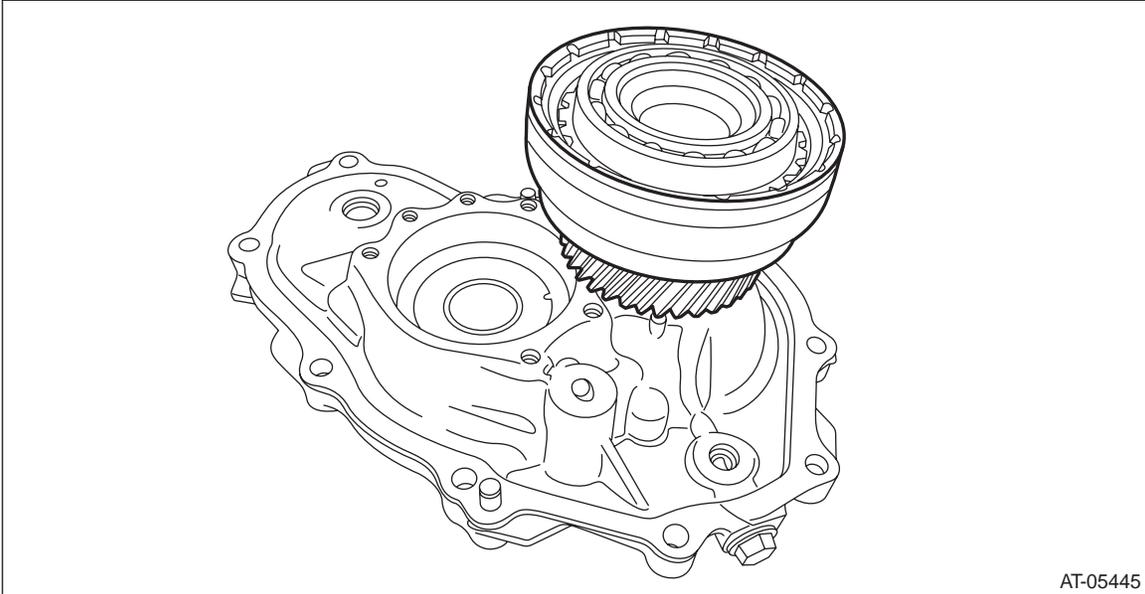
AT-05437

12) Install the front reduction driven shaft to the front reduction driven gear.

Front Reduction Driven Gear

CONTINUOUSLY VARIABLE TRANSMISSION

13) Install the front reduction driven gear assembly to converter case cover.

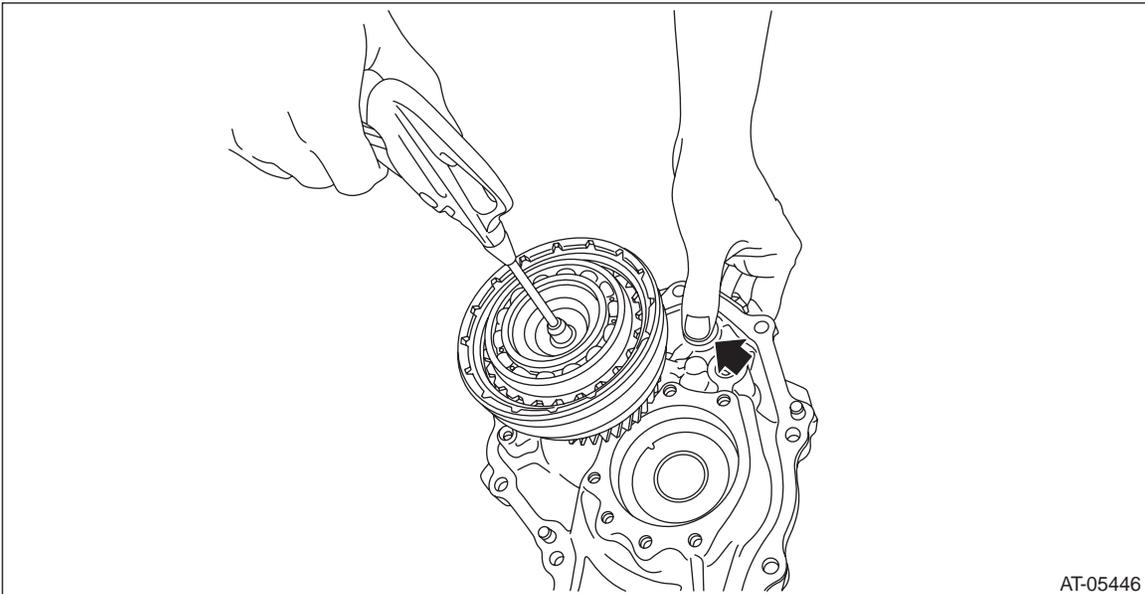


AT-05445

14) Apply compressed air intermittently to check the piston operation.

NOTE:

Hold the arrowed area with a finger.



AT-05446

E: INSPECTION

- Check the drive plate for wear and damage.
- Check the driven plate for discoloration (burnt color).
- Check for worn snap ring, fatigue or damaged return spring or deformed piston retainer.
- Replace if its tooth surfaces are broken, damaged 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.

Front Reduction Driven Gear

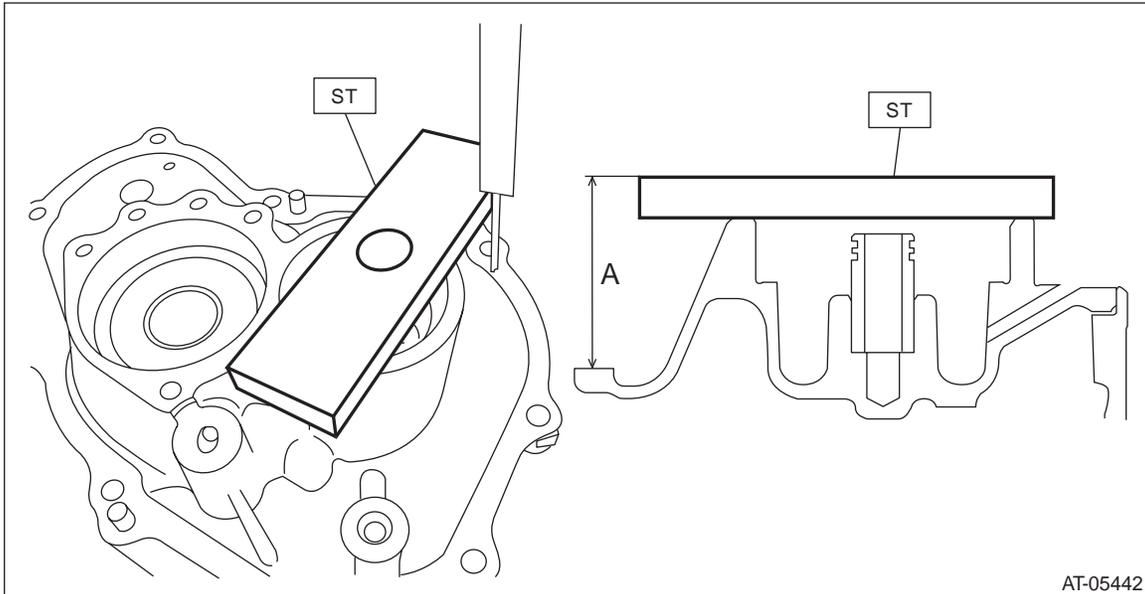
CONTINUOUSLY VARIABLE TRANSMISSION

F: ADJUSTMENT

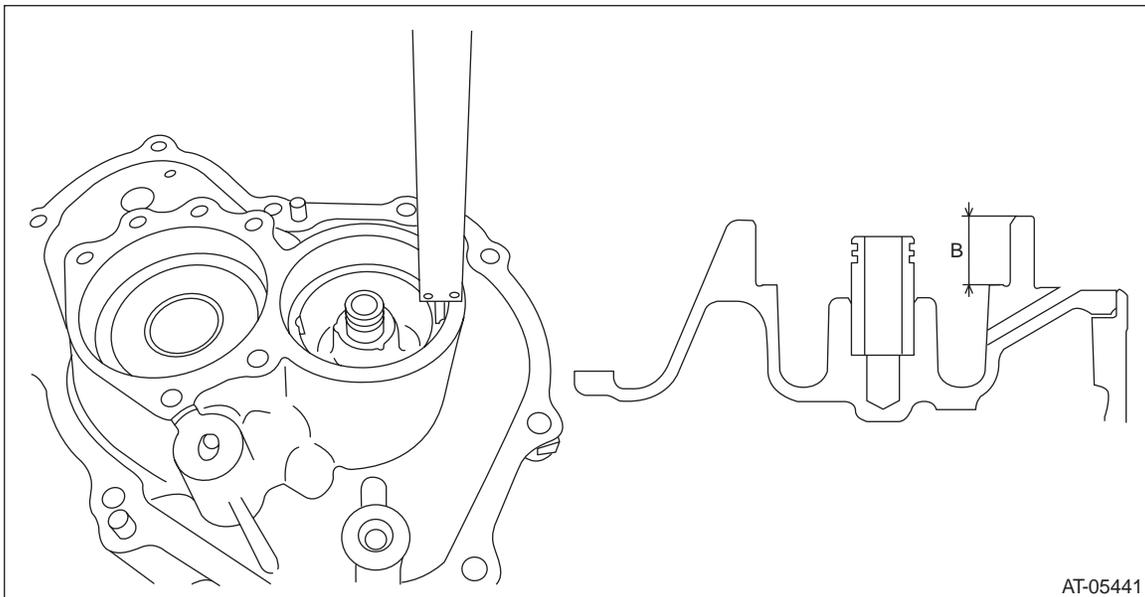
1) If the ball bearing is attached, remove the bearing and shims. <Ref. to CVT(TR690)-295, REMOVAL, Converter Case Cover.>

2) Using the ST, measure height "A" from the ST upper face to the mating surface of the case.

ST 398643600 GAUGE



3) Measure depth "B" from the converter case cover upper face to the bearing catch surface.



4) Install the ball bearing to the reduction driven gear.

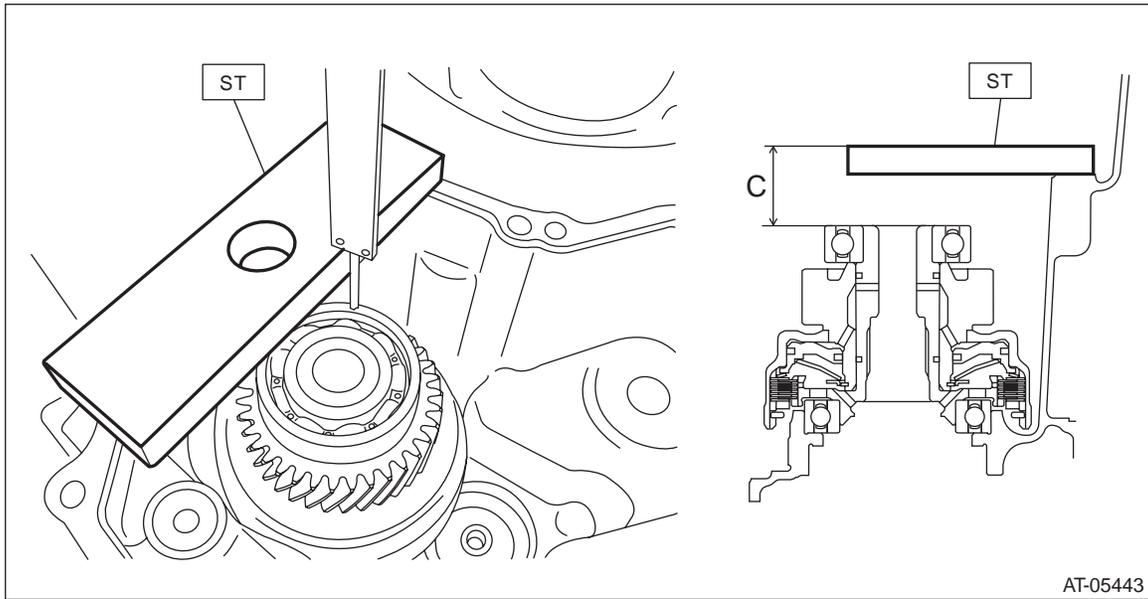
NOTE:

Use a new ball bearing.

Front Reduction Driven Gear

CONTINUOUSLY VARIABLE TRANSMISSION

- 5) Measure depth "C" from the ST upper face to the bearing end face using the ST.
 ST 398643600 GAUGE



AT-05443

- 6) Calculate clearance "T" using the following formula.

Formula: $T \text{ mm} = (C - 15) - ((A - 15) - B)$

$[T \text{ in} = (C - 0.591) - ((A - 0.591) - B)]$

T: Clearance

A: Height from the ST upper face to the converter case mating surface

B: Depth from the converter case cover upper face to the bearing catch surface

C: Depth from the ST upper face to the bearing end face

15 mm (0.591 in): Thickness of ST

Clearance "T" mm (in)	Thickness of shim mm (in)
0.470 — 0.569 (0.019 — 0.021)	0.4 (0.016)
0.570 — 0.669 (0.022 — 0.025)	0.5 (0.020)
0.670 — 0.769 (0.026 — 0.029)	0.6 (0.024)
0.770 — 0.869 (0.030 — 0.033)	0.7 (0.028)
0.870 — 0.980 (0.034 — 0.039)	0.8 (0.031)

- 7) Select one to two shims so that the total thickness meets the value obtained from above.

Part No.	Thickness of shim mm (in)
31288AA130	0.2 (0.008)
31288AA140	0.3 (0.012)
31288AA150	0.5 (0.020)

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Converter Case

CONTINUOUSLY VARIABLE TRANSMISSION

50. Converter Case

A: REMOVAL

- 1) Remove the transmission assembly from the vehicle. <Ref. to CVT(TR690)-56, REMOVAL, Automatic Transmission Assembly.>
- 2) Remove the air breather hose. <Ref. to CVT(TR690)-134, REMOVAL, Air Breather Hose.>
- 3) Remove the oil pan and control valve body. <Ref. to CVT(TR690)-109, REMOVAL, Control Valve Body.>
- 4) Remove the transmission harness. <Ref. to CVT(TR690)-120, REMOVAL, Transmission Harness.>
- 5) Remove the secondary pressure sensor. <Ref. to CVT(TR690)-107, REMOVAL, Secondary Pressure Sensor.>
- 6) Remove the primary speed sensor. <Ref. to CVT(TR690)-102, REMOVAL, Primary Speed Sensor.>
- 7) Remove the extension case. <Ref. to CVT(TR690)-140, REMOVAL, Extension Case.>
- 8) Remove the rear drive shaft. <Ref. to CVT(TR690)-143, REMOVAL, Rear Drive Shaft.>
- 9) Remove the transfer clutch assembly. <Ref. to CVT(TR690)-148, REMOVAL, Transfer Clutch.>
- 10) Remove the transfer reduction driven gear assembly. <Ref. to CVT(TR690)-160, REMOVAL, Transfer Reduction Driven Gear.>
- 11) Remove the intermediate case. <Ref. to CVT(TR690)-167, REMOVAL, Intermediate Case.>
- 12) Remove the forward clutch assembly. <Ref. to CVT(TR690)-182, REMOVAL, Forward Clutch Assembly.>
- 13) Remove the transmission case. <Ref. to CVT(TR690)-213, REMOVAL, Transmission Case.>
- 14) Remove the primary pulley, secondary pulley and variator chain. <Ref. to CVT(TR690)-231, REMOVAL, Primary Pulley and Secondary Pulley.>
- 15) Remove the drive pinion shaft assembly. <Ref. to CVT(TR690)-247, REMOVAL, Drive Pinion Shaft Assembly.>
- 16) Remove the front differential assembly. <Ref. to CVT(TR690)-269, REMOVAL, Front Differential Assembly.>
- 17) Remove the converter case cover. <Ref. to CVT(TR690)-295, REMOVAL, Converter Case Cover.>
- 18) Remove the front reduction drive gear and front reduction driven gear. <Ref. to CVT(TR690)-304, REMOVAL, Front Reduction Drive Gear.>

B: INSTALLATION

- 1) Install the front reduction drive gear and front reduction driven gear. <Ref. to CVT(TR690)-305, INSTALLATION, Front Reduction Drive Gear.>
- 2) Install the converter case cover. <Ref. to CVT(TR690)-298, INSTALLATION, Converter Case Cover.>
- 3) Install the front differential assembly. <Ref. to CVT(TR690)-270, INSTALLATION, Front Differential Assembly.>
- 4) Install the drive pinion shaft assembly. <Ref. to CVT(TR690)-249, INSTALLATION, Drive Pinion Shaft Assembly.>
- 5) Install the primary pulley, secondary pulley and steel chain. <Ref. to CVT(TR690)-235, INSTALLATION, Primary Pulley and Secondary Pulley.>
- 6) Install the transmission case. <Ref. to CVT(TR690)-213, REMOVAL, Transmission Case.>
- 7) Install the forward clutch assembly. <Ref. to CVT(TR690)-183, INSTALLATION, Forward Clutch Assembly.>
- 8) Install the intermediate case. <Ref. to CVT(TR690)-168, INSTALLATION, Intermediate Case.>
- 9) Install the transfer reduction driven gear. <Ref. to CVT(TR690)-160, INSTALLATION, Transfer Reduction Driven Gear.>
- 10) Install the transfer clutch assembly. <Ref. to CVT(TR690)-149, INSTALLATION, Transfer Clutch.>
- 11) Install the rear drive shaft. <Ref. to CVT(TR690)-143, INSTALLATION, Rear Drive Shaft.>
- 12) Install the extension case. <Ref. to CVT(TR690)-141, INSTALLATION, Extension Case.>
- 13) Install the primary speed sensor. <Ref. to CVT(TR690)-103, INSTALLATION, Primary Speed Sensor.>
- 14) Install the secondary pressure sensor. <Ref. to CVT(TR690)-107, INSTALLATION, Secondary Pressure Sensor.>
- 15) Install the transmission harness. <Ref. to CVT(TR690)-122, INSTALLATION, Transmission Harness.>
- 16) Install the control valve body and oil pan. <Ref. to CVT(TR690)-113, INSTALLATION, Control Valve Body.>
- 17) Install the air breather hose. <Ref. to CVT(TR690)-134, INSTALLATION, Air Breather Hose.>

CVT(TR690)-320

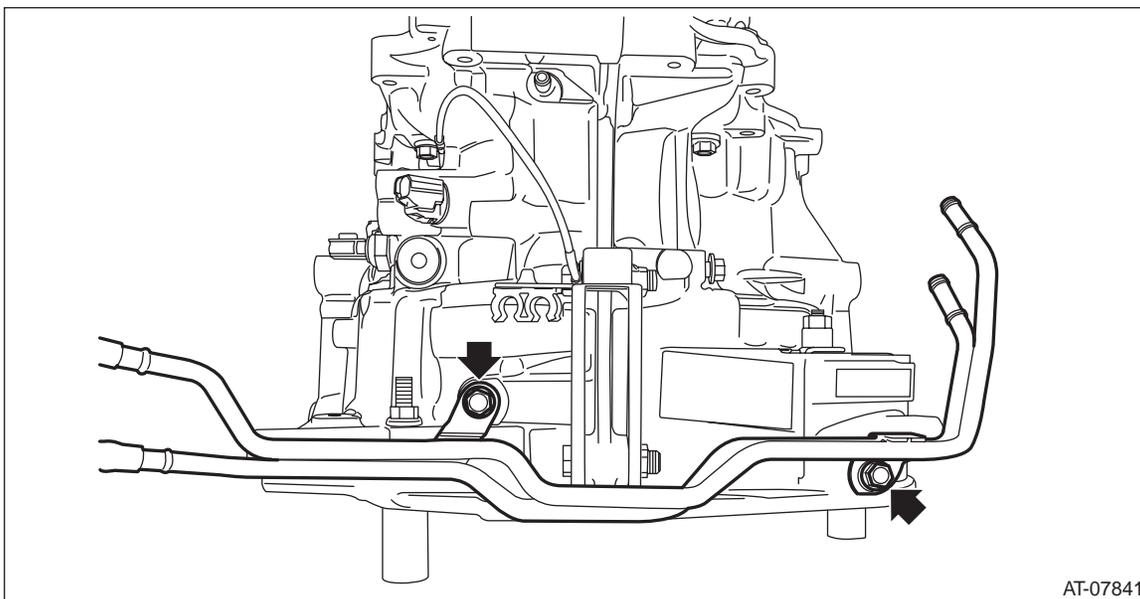
Converter Case

CONTINUOUSLY VARIABLE TRANSMISSION

18) Install the transmission assembly to the vehicle. <Ref. to CVT(TR690)-69, INSTALLATION, Automatic Transmission Assembly.>

C: DISASSEMBLY

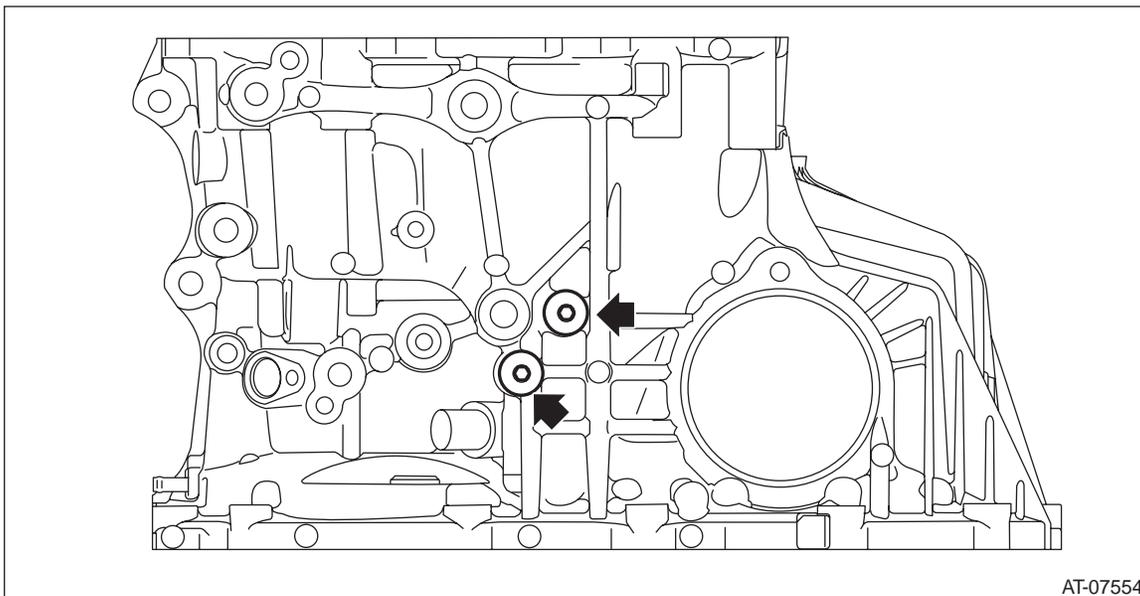
1) Remove the CVTF cooler pipe COMPL.



2) Remove the pitching stopper bracket and transmission radio ground cord, if mounted.

3) Remove the oil drain plug and overflow drain plug. <Ref. to CVT(TR690)-43, REPLACEMENT, Differential Gear Oil.>

4) Remove all plugs.



Converter Case

CONTINUOUSLY VARIABLE TRANSMISSION

D: ASSEMBLY

1) Install the oil drain plug and overflow drain plug.

NOTE:

Overflow plug of differential gear oil is temporarily attached.

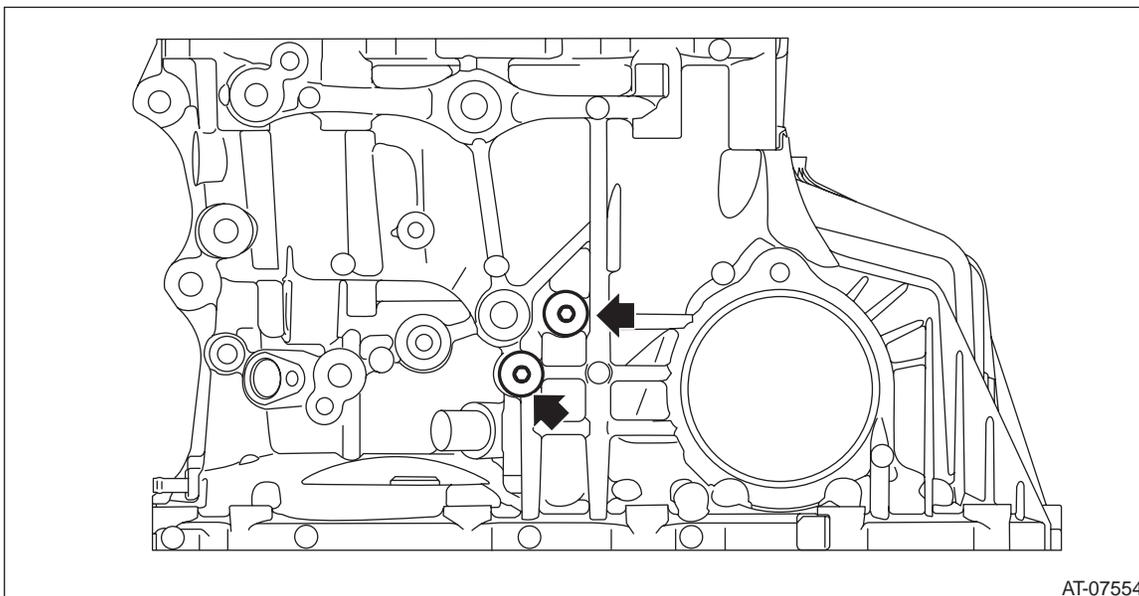
2) Install all plugs.

NOTE:

Use new O-rings.

Tightening torque:

25 N·m (2.5 kgf·m, 18.4 ft·lb)



AT-07554

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

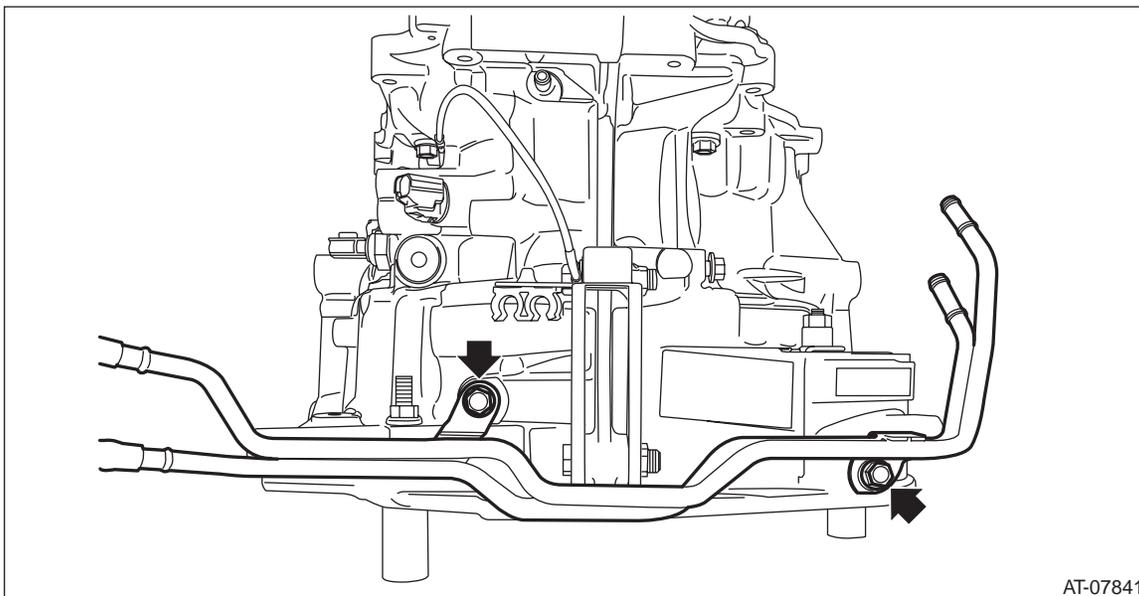
Tightening torque:

41 N·m (4.2 kgf·m, 30.2 ft·lb)

4) Install the CVTF cooler pipe COMPL.

Tightening torque:

16 N·m (1.6 kgf·m, 11.8 ft·lb)



AT-07841

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.

F: ADJUSTMENT

When replacing the converter case cover, select the following shims.

- Select the shim for front reduction drive gear. <Ref. to CVT(TR690)-310, ADJUSTMENT, Front Reduction Drive Gear.>
- Select the shim for front reduction driven gear. <Ref. to CVT(TR690)-318, ADJUSTMENT, Front Reduction Driven Gear.>
- Select shims for primary pulley. <Ref. to CVT(TR690)-241, ADJUSTMENT, Primary Pulley and Secondary Pulley.>

Diagnostics with Phenomenon

CONTINUOUSLY VARIABLE TRANSMISSION

51. 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

CONTINUOUSLY VARIABLE TRANSMISSION (DIAGNOSTICS)

CVT(diag)

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