

Primary Pulley and Secondary Pulley

CONTINUOUSLY VARIABLE TRANSMISSION

41.Primary Pulley and Secondary Pulley

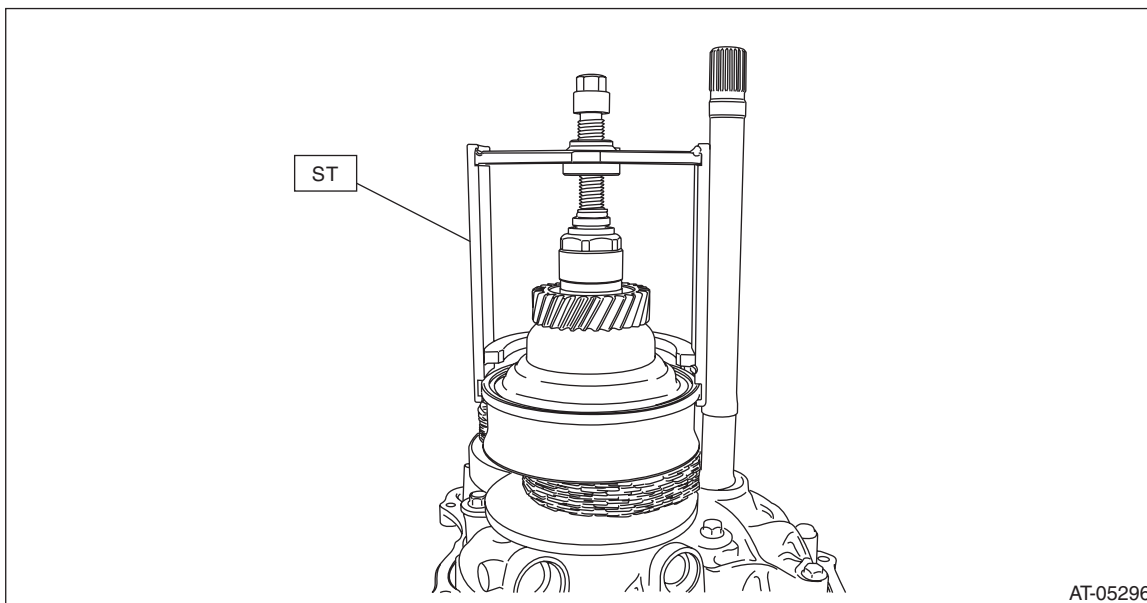
A: REMOVAL

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)-136, REMOVAL, Air Breather Hose.>
- 3) Remove the oil pan and control valve body. <Ref. to CVT(TR690)-112, REMOVAL, Control Valve Body.>
- 4) Remove the transmission harness. <Ref. to CVT(TR690)-123, REMOVAL, Transmission Harness.>
- 5) Remove the extension case. <Ref. to CVT(TR690)-142, REMOVAL, Extension Case.>
- 6) Remove the rear drive shaft. <Ref. to CVT(TR690)-146, REMOVAL, Rear Drive Shaft.>
- 7) Remove the transfer clutch assembly. <Ref. to CVT(TR690)-151, REMOVAL, Transfer Clutch.>
- 8) Remove the center differential carrier. <Ref. to CVT(TR690)-154, REMOVAL, Center Differential Carrier.>
- 9) Remove the transfer reduction driven gear assembly. <Ref. to CVT(TR690)-158, REMOVAL, Transfer Reduction Driven Gear.>
- 10) Remove the intermediate case. <Ref. to CVT(TR690)-165, REMOVAL, Intermediate Case.>
- 11) Remove the forward clutch assembly. <Ref. to CVT(TR690)-181, REMOVAL, Forward Clutch Assembly.>
- 12) Remove the transmission case. <Ref. to CVT(TR690)-212, REMOVAL, Transmission Case.>
- 13) Set the ST to the secondary pulley, and expand the V groove of pulley until the variator chain gets completely loose.

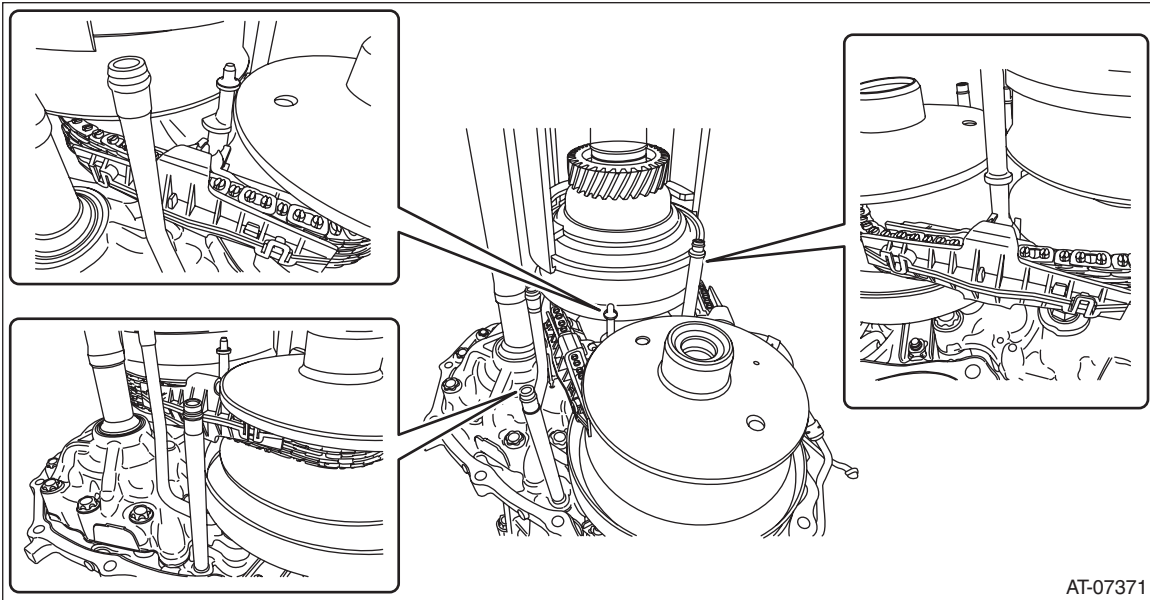
ST 18769AA000 EXPANDER PULLEY



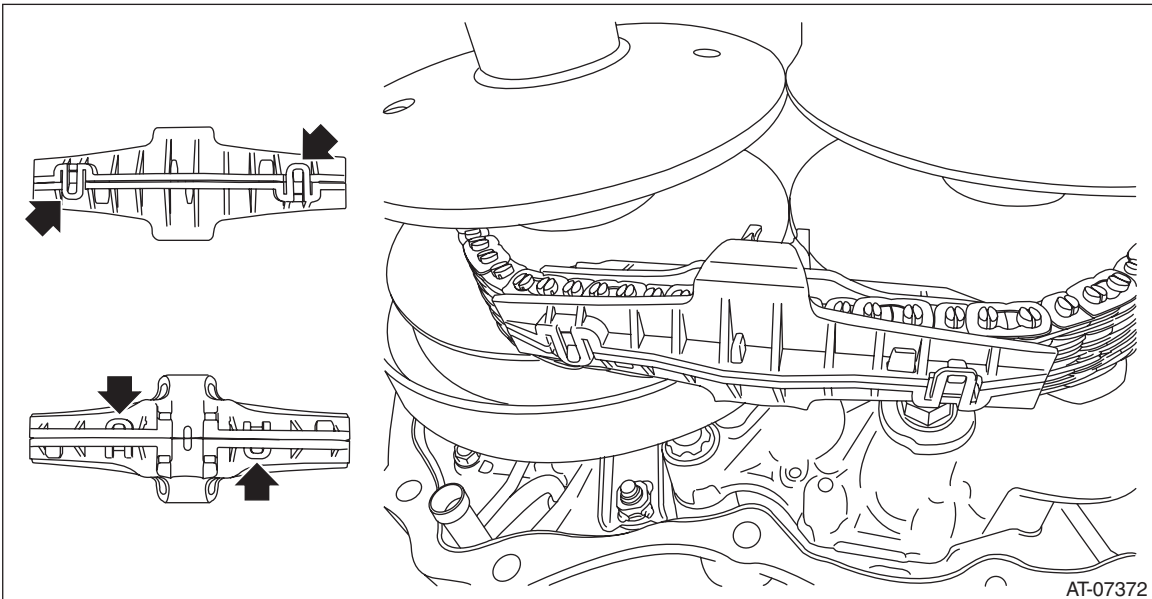
Primary Pulley and Secondary Pulley

CONTINUOUSLY VARIABLE TRANSMISSION

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



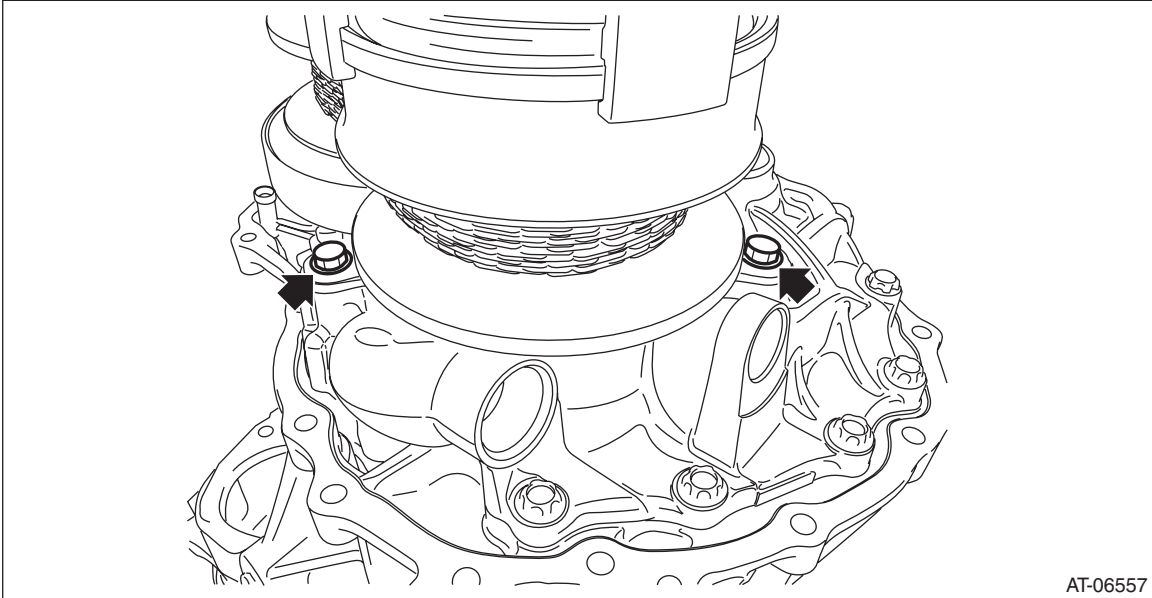
- 16) Detach the four claws to remove the two chain guides.



Primary Pulley and Secondary Pulley

CONTINUOUSLY VARIABLE TRANSMISSION

17) Remove the secondary pulley mounting bolt.

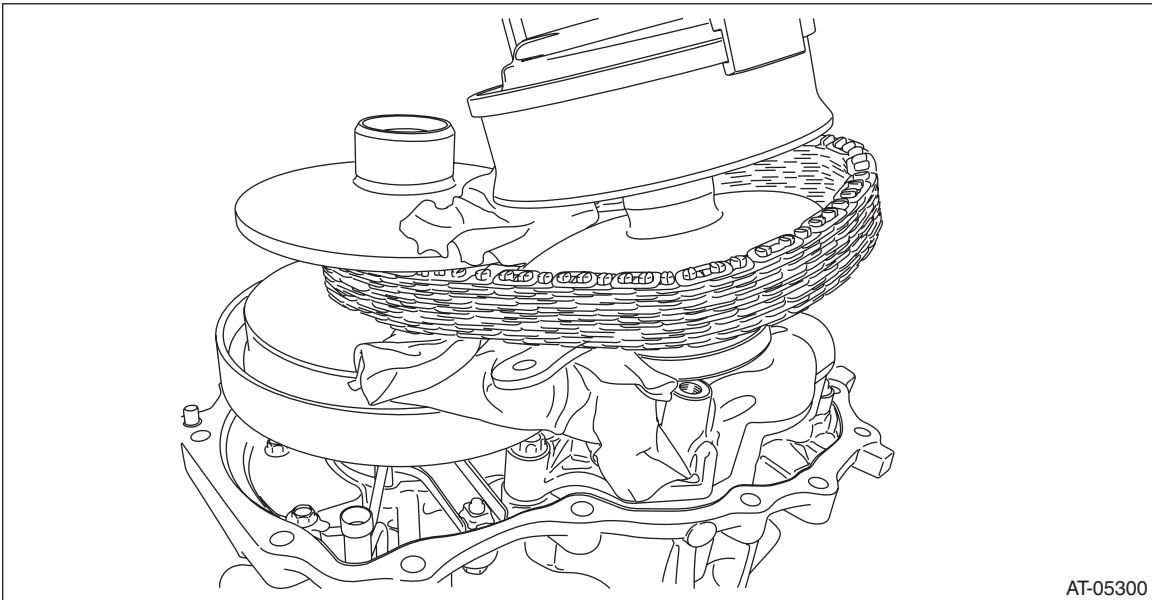


AT-06557

18) 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.



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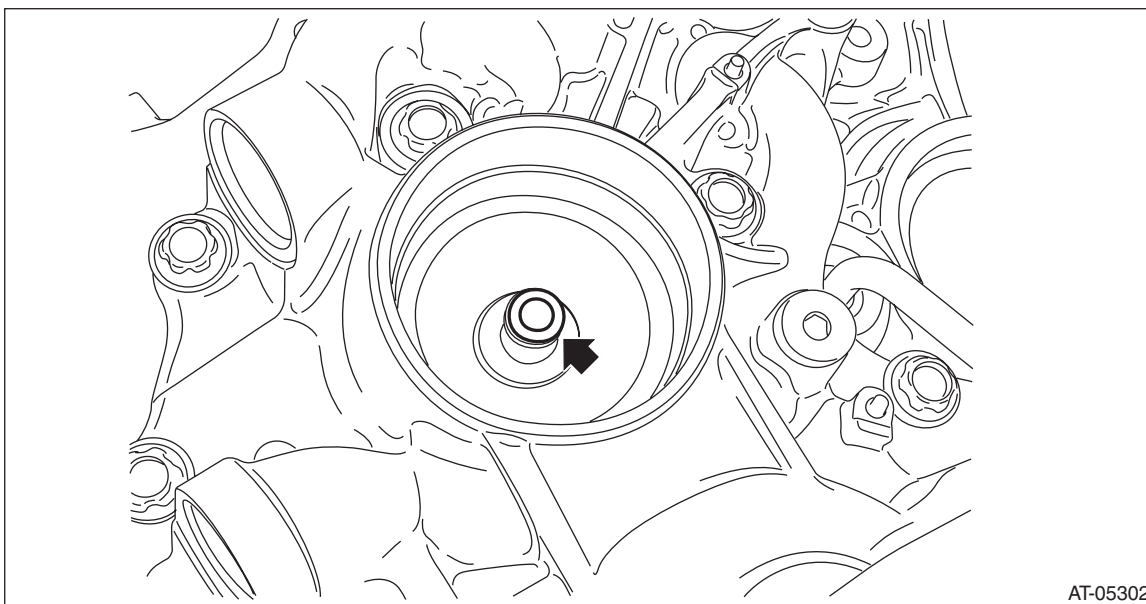
Primary Pulley and Secondary Pulley

CONTINUOUSLY VARIABLE TRANSMISSION

- 19) Remove the variator chain from primary pulley.
- 20) Remove the primary pulley mounting bolt.



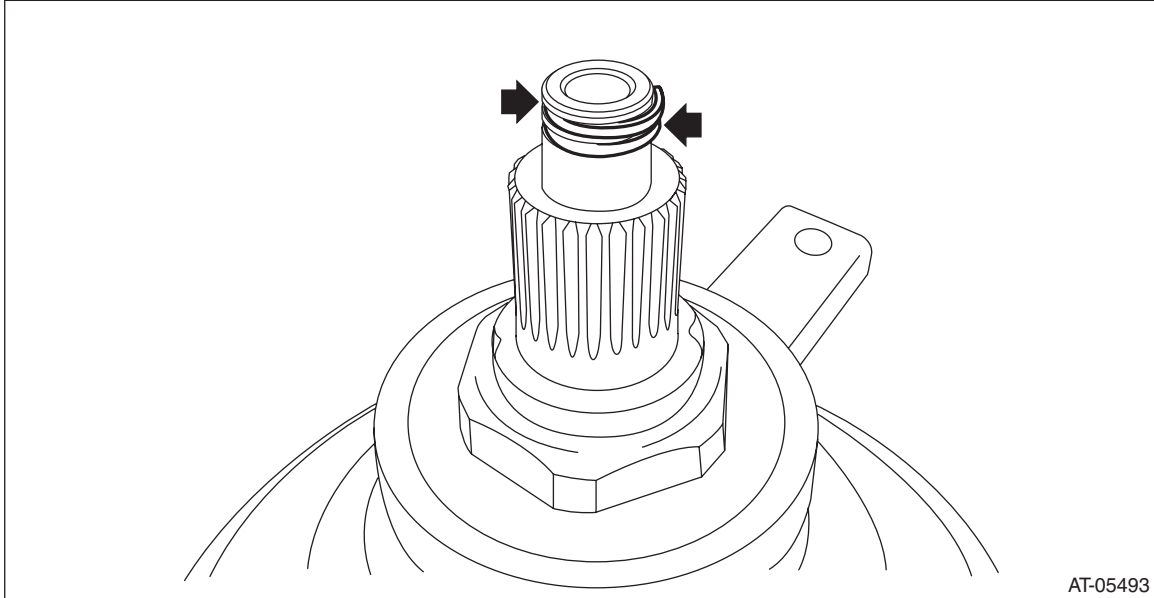
- 21) Remove the primary pulley.
- 22) Remove the two seal rings from drive pinion retainer.



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23) Remove the two seal rings from primary pulley.



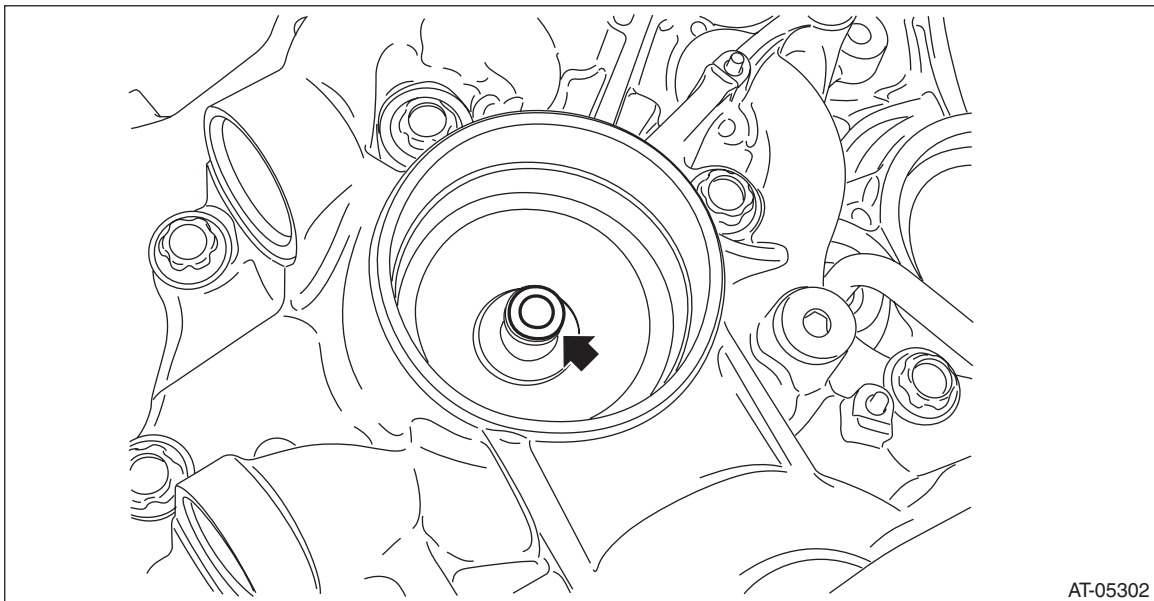
B: INSTALLATION

1) Select shims for pulley alignment. <Ref. to CVT(TR690)-238, ADJUSTMENT, Primary Pulley and Secondary Pulley.>

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

NOTE:

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



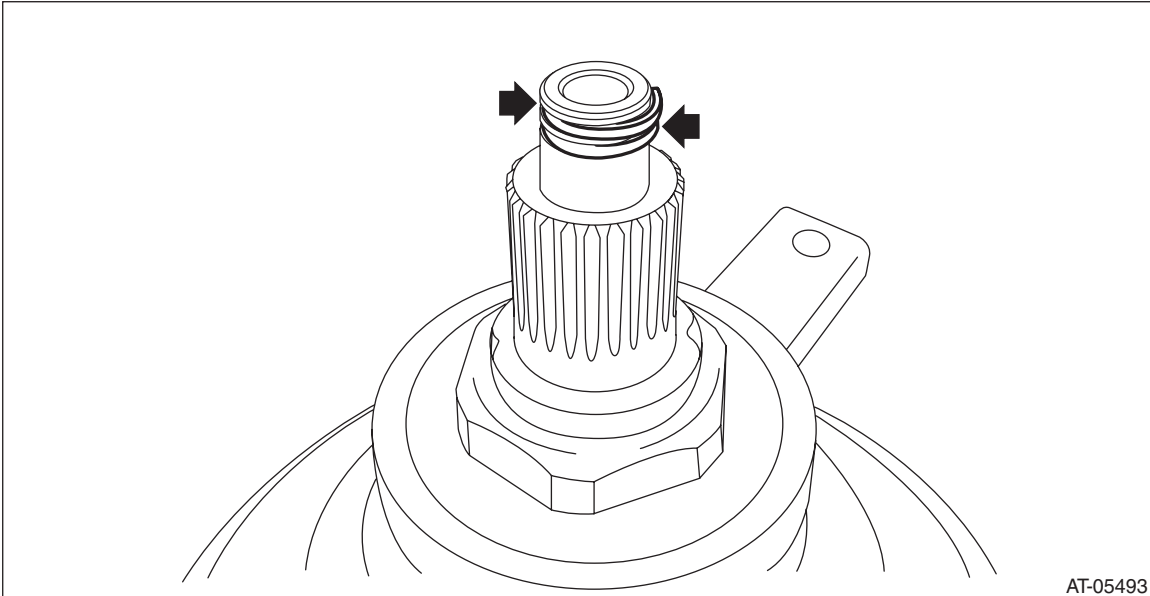
Primary Pulley and Secondary Pulley

CONTINUOUSLY VARIABLE TRANSMISSION

- 3) Install the selected shims to the primary pulley bearing catch surface.
- 4) Install the two seal rings to primary pulley.

NOTE:

- Use new seal rings.
- 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:

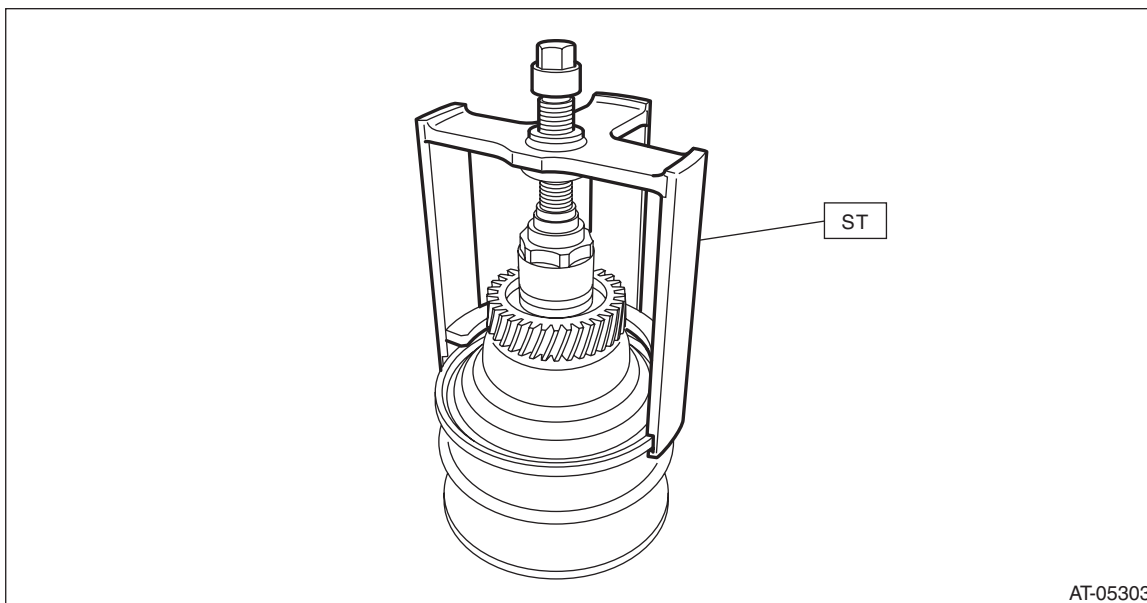
21 N·m (2.1 kgf-m, 15.5 ft-lb)



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

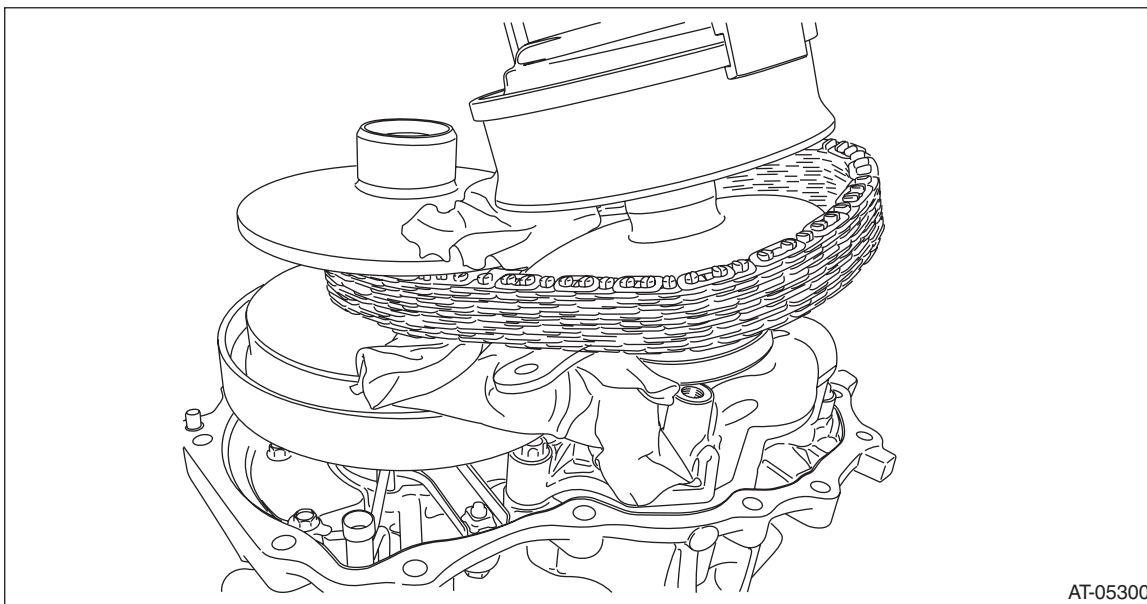


- 7) Place the variator chain on the primary pulley groove and attach the secondary pulley and variator chain together to the drive pinion retainer.

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.

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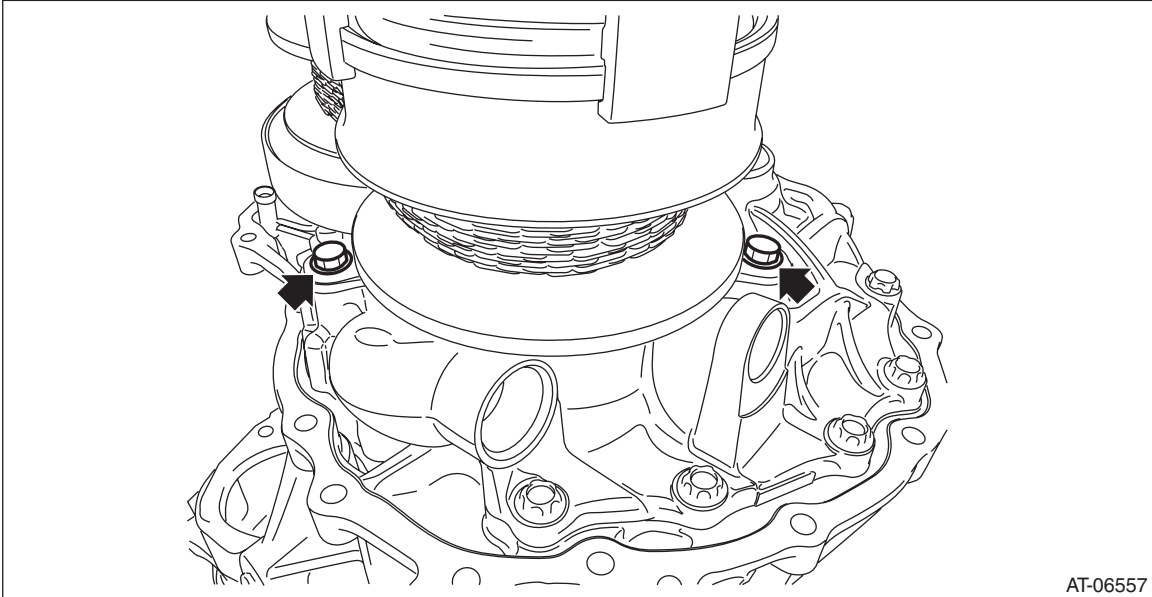
8) Install the secondary pulley bolt.

NOTE:

Apply CVTF to the bolt.

Tightening torque:

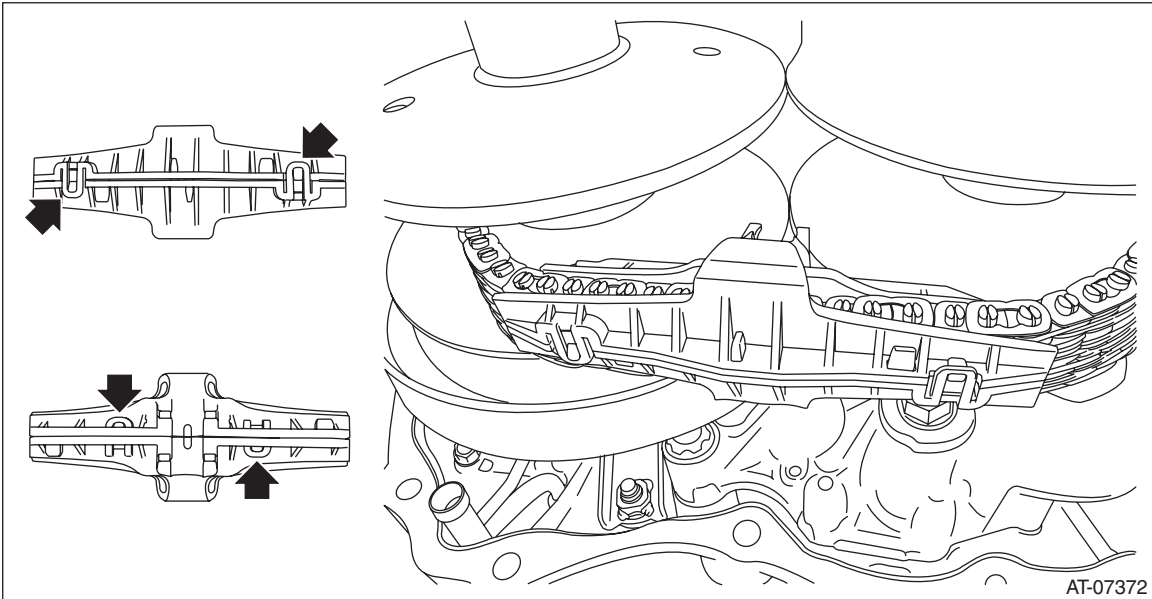
33 N·m (3.4 kgf-m, 24.3 ft-lb)



9) Install the chain guide.

NOTE:

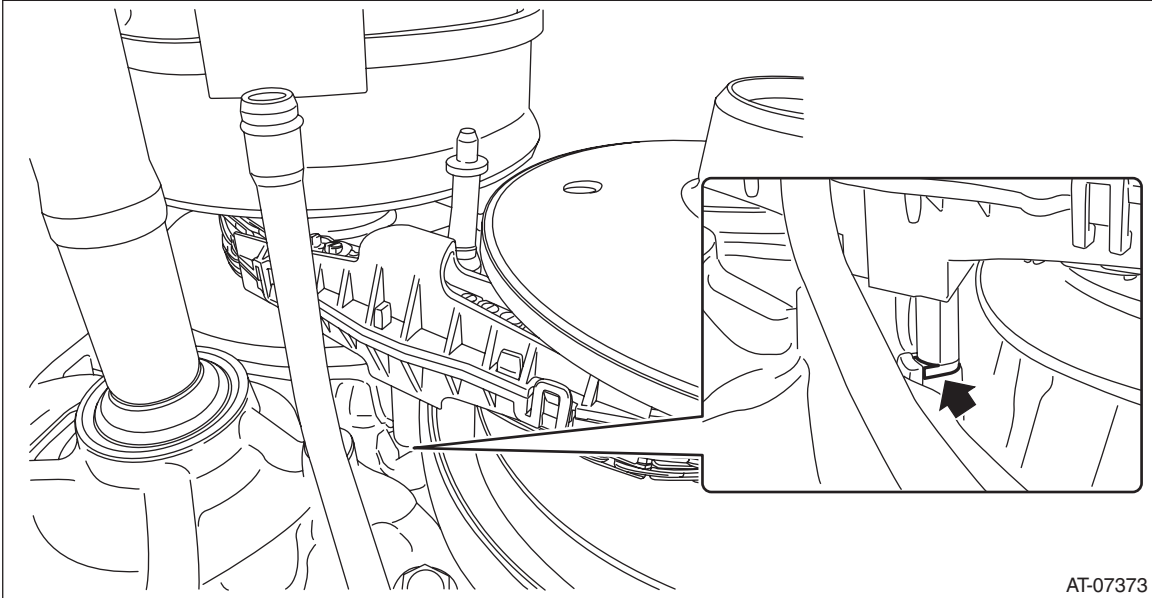
Install it with two claws facing outward and with two claws facing inward.



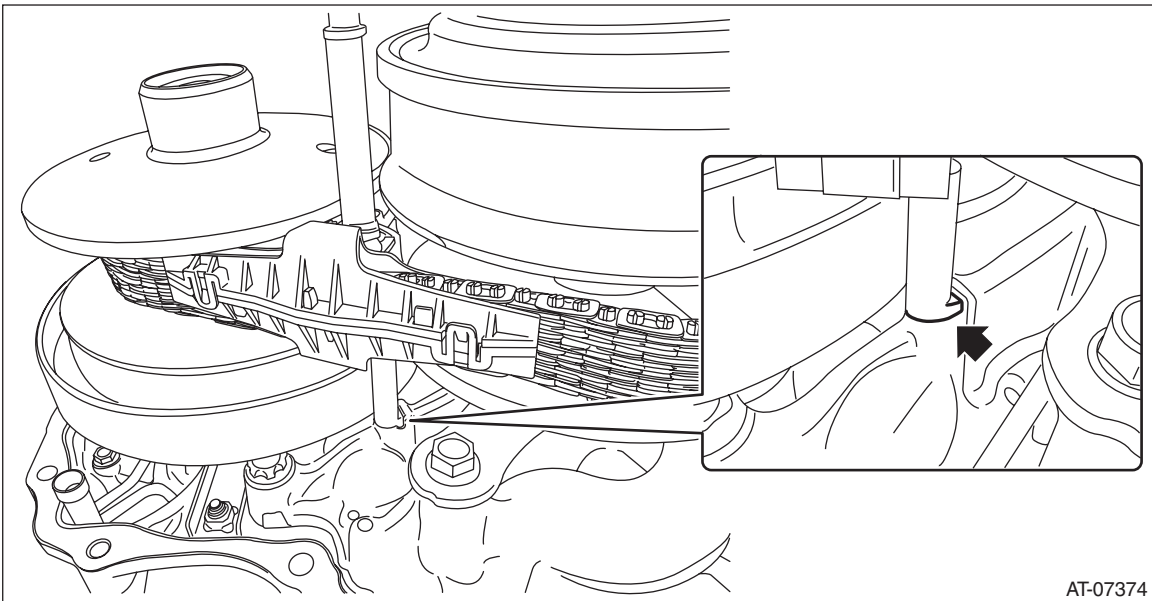
Primary Pulley and Secondary Pulley

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



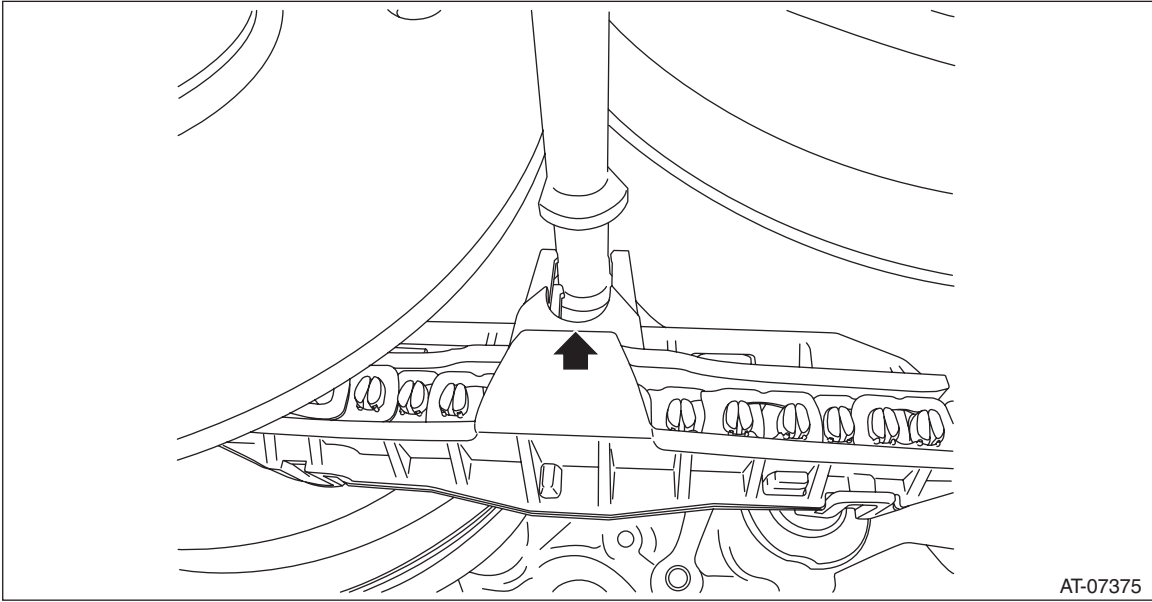
- 11) Engage the cutout portions of lubrication pipe and drive pinion retainer and install the lubrication pipe.



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).

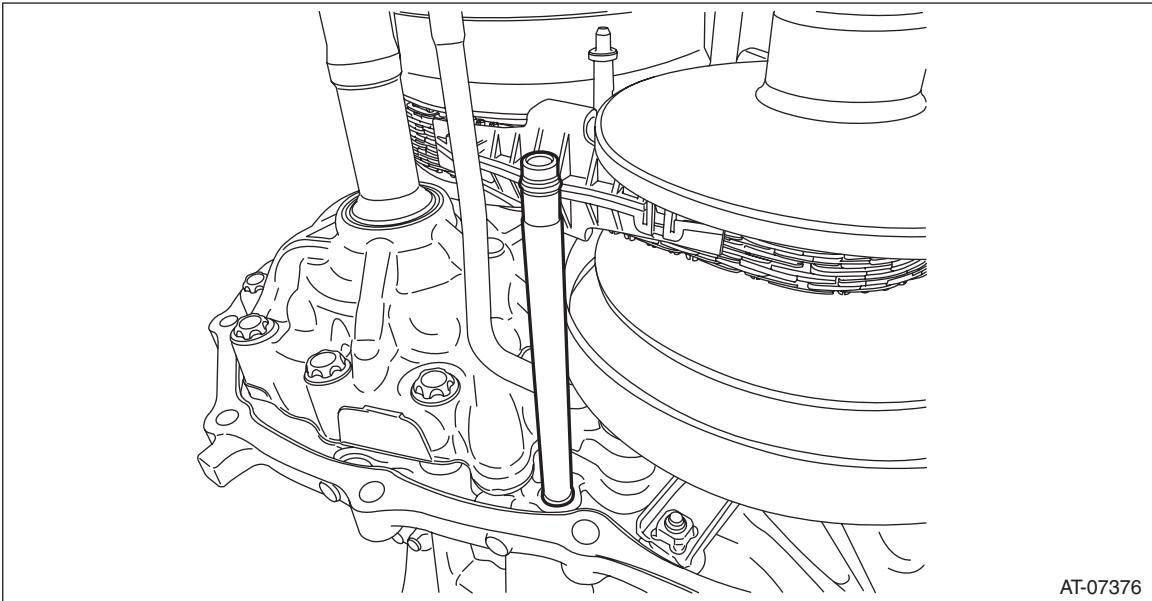


13) Install the O-ring to the lubrication pipe.

NOTE:

Use new O-rings.

14) Install the lubrication pipe.



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- 15) Install the transmission case. <Ref. to CVT(TR690)-214, INSTALLATION, Transmission Case.>
- 16) Install the forward clutch assembly. <Ref. to CVT(TR690)-182, INSTALLATION, Forward Clutch Assembly.>
- 17) Install the intermediate case. <Ref. to CVT(TR690)-166, INSTALLATION, Intermediate Case.>
- 18) Install the transfer reduction driven gear assembly. <Ref. to CVT(TR690)-158, INSTALLATION, Transfer Reduction Driven Gear.>
- 19) Install the center differential carrier. <Ref. to CVT(TR690)-155, INSTALLATION, Center Differential Carrier.>
- 20) Install the transfer clutch assembly. <Ref. to CVT(TR690)-151, INSTALLATION, Transfer Clutch.>
- 21) Install the rear drive shaft. <Ref. to CVT(TR690)-146, INSTALLATION, Rear Drive Shaft.>
- 22) Install the extension case. <Ref. to CVT(TR690)-143, INSTALLATION, Extension Case.>
- 23) Install the transmission harness. <Ref. to CVT(TR690)-125, INSTALLATION, Transmission Harness.>
- 24) Install the control valve body and oil pan. <Ref. to CVT(TR690)-116, INSTALLATION, Control Valve Body.>
- 25) Install the air breather hose. <Ref. to CVT(TR690)-136, INSTALLATION, Air Breather Hose.>
- 26) Install the transmission assembly to the vehicle. <Ref. to CVT(TR690)-69, INSTALLATION, Automatic Transmission Assembly.>

C: INSPECTION

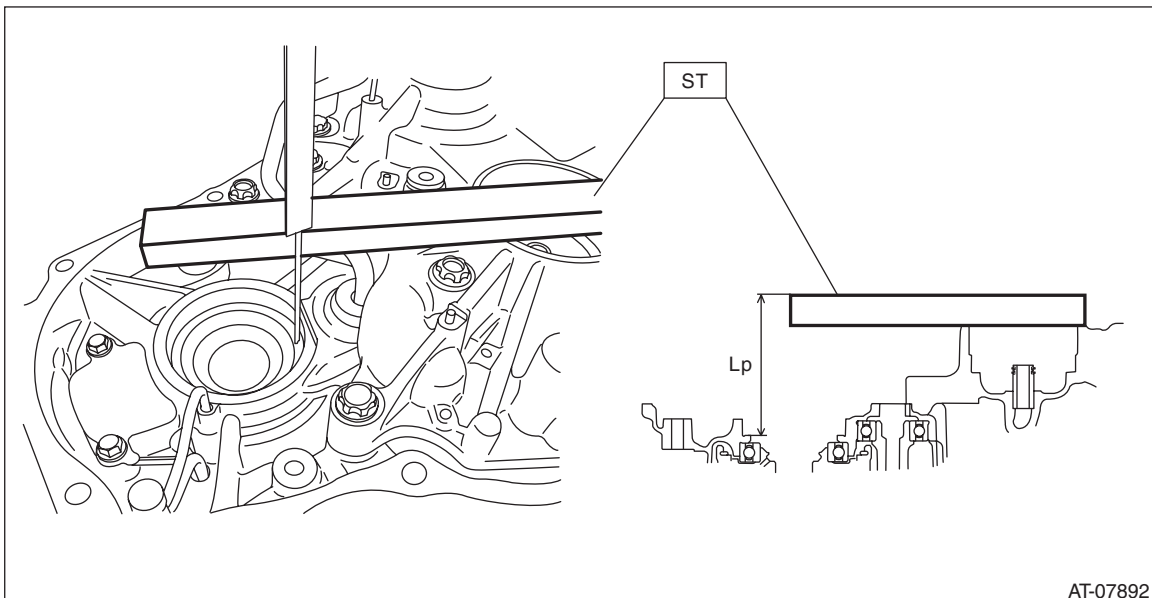
- Check the surface of primary and secondary pulley cones for damage or wear.
- Check the primary and secondary pulley for damage.
- Check the bearing for seizure or wear.
- Apply CVTF to bearing and rotate the bearing to check for noise or dragging etc.

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

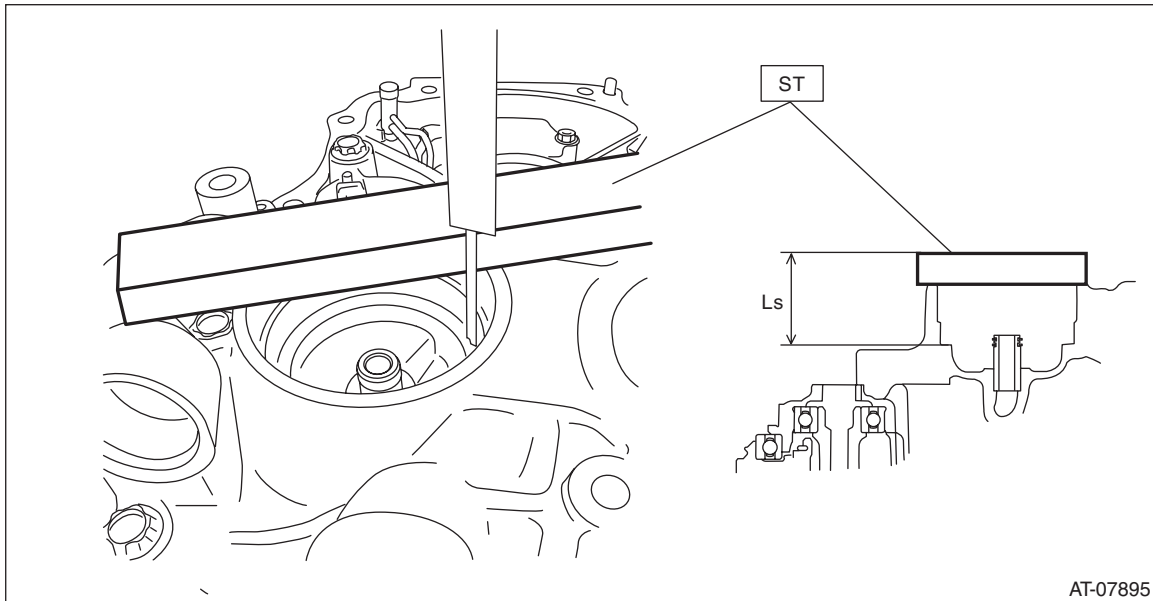


Primary Pulley and Secondary Pulley

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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)

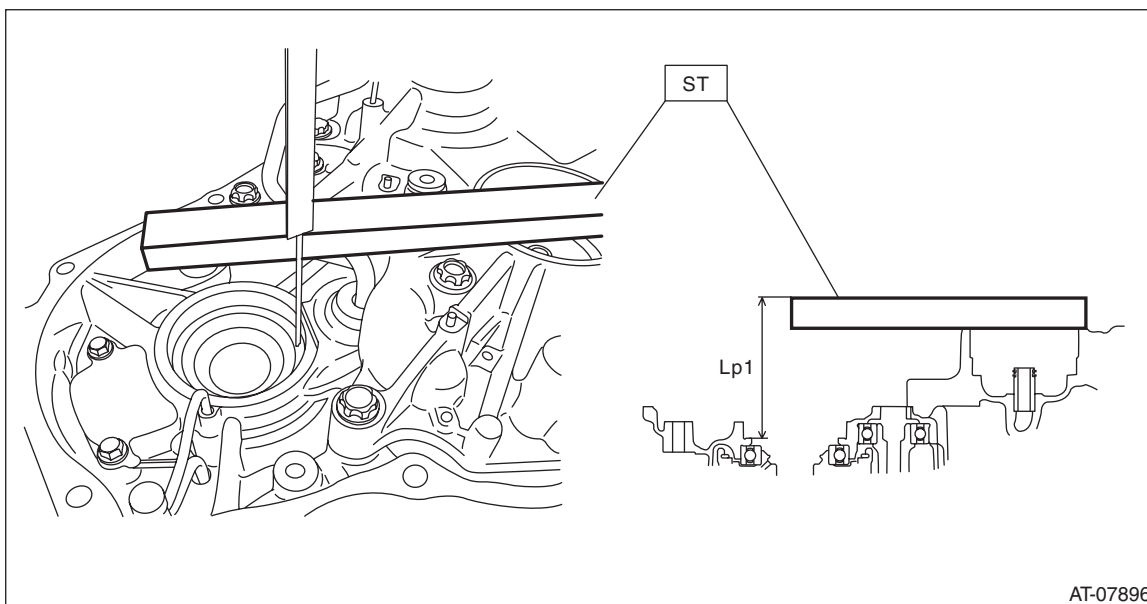
Primary Pulley and Secondary Pulley

CONTINUOUSLY VARIABLE TRANSMISSION

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

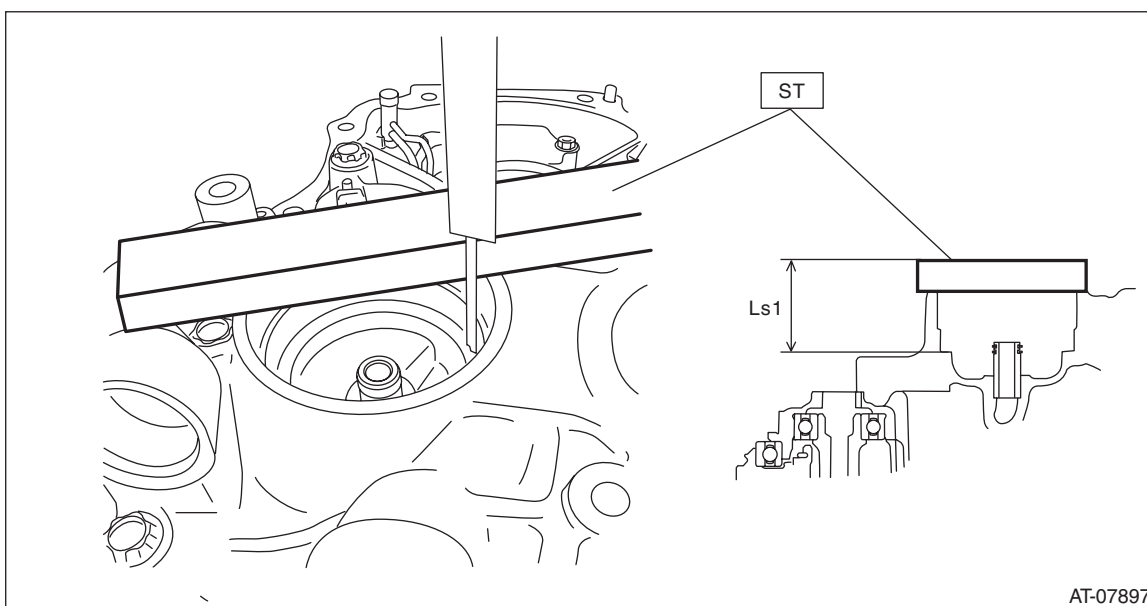
- 1) Clean the mating surface of current drive pinion retainer and converter case.
- 2) Measure and record the shim thickness that is attached on the current converter case.
- 3) Using the current drive pinion retainer, measure depth “Lp1” from the ST upper face to the primary pulley bearing catch surface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

ST 499575400 GAUGE



- 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



- 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

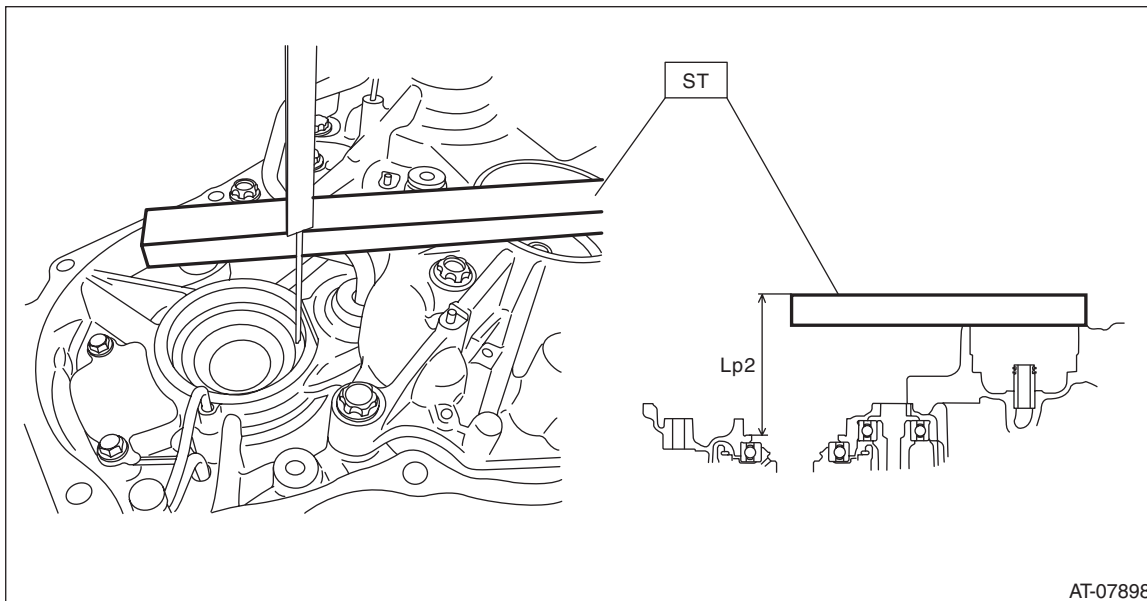
Ls1: Depth from the ST upper face to the secondary pulley bearing catch surface

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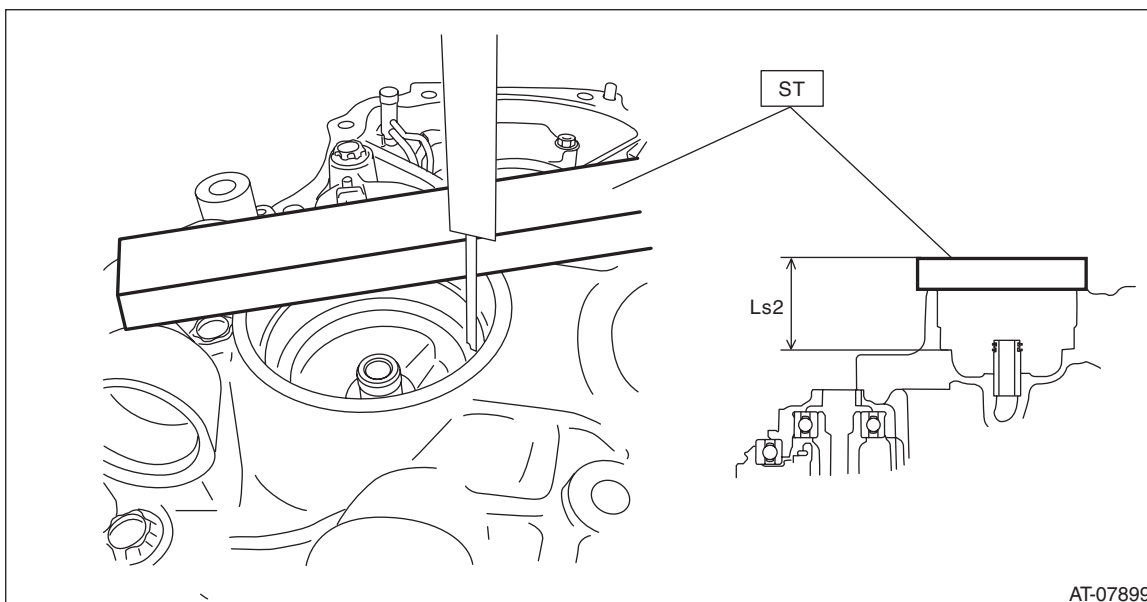
6) Using the new drive pinion retainer or new converter case, measure depth “Lp2” from the ST upper face to the primary pulley bearing catch surface at several points and calculate the average.

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

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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)