

**MECHANICAL**

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**ENGINE OVERHAUL SERVICE WARNING**

CHU011002000E01

**Warning**

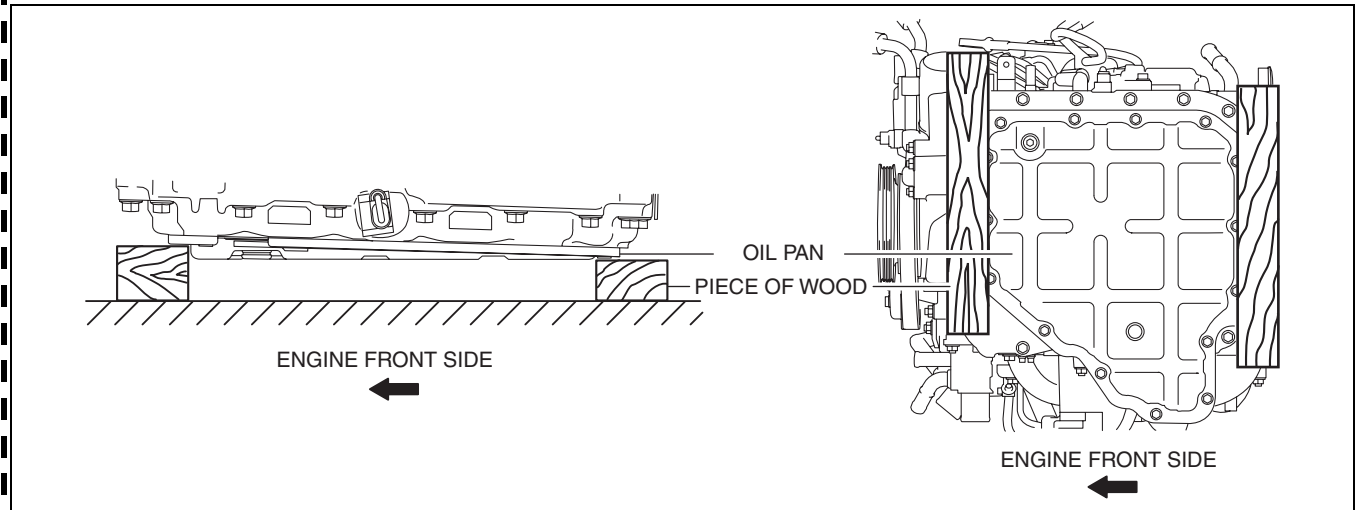
- Continuous exposure to USED engine oil has caused skin cancer in laboratory mice. Protect your skin by washing with soap and water immediately after this work.

**ENGINE MOUNTING/DISMOUNTING**

CHU011002000E12

**Caution**

- The oil pan could be damaged or dented if the engine's own weight is subjected to an impact against a level surface. Always set two pieces of wood in the positions shown in the figure to prevent the oil pan from being dented. If the oil pan is dented, the amount of intake oil and the fluid pressure will decrease. (Type B)

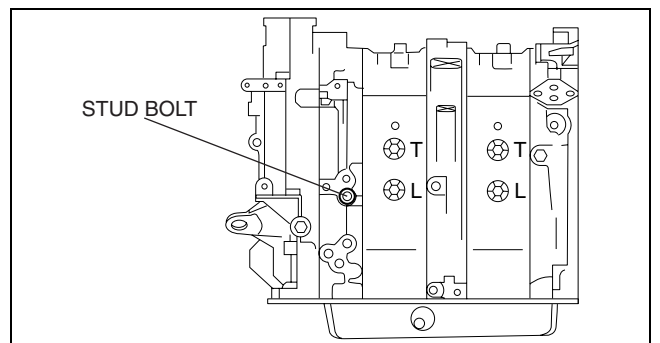


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**Mounting**

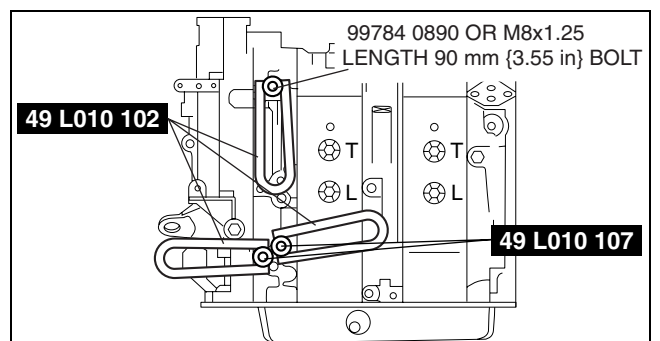
**Using 49 L010 1A0**

1. Remove the stud bolt.



CHU0110E048

2. Install the **SSTs** (arms) to the specified three position as shown in the figure, and temporarily tighten with the **SSTs** (bolts) and **99784 0890 or M8x1.25 length 90 mm {3.55 in}** bolt.

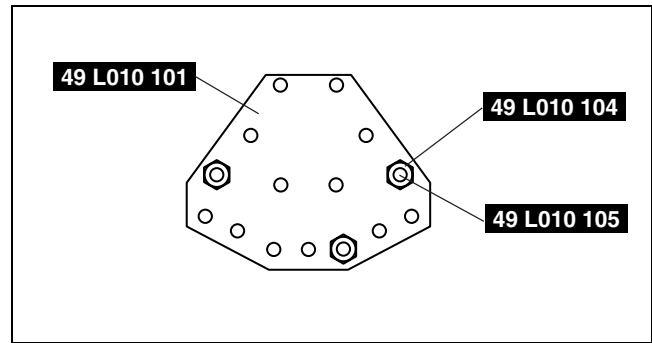


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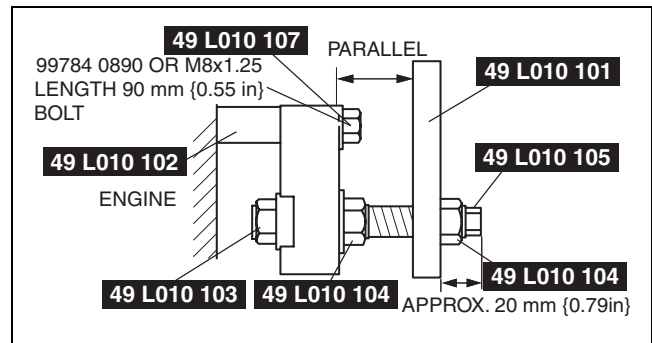
3. Install the **SSTs** (bolt, nut) to the three specified positions as shown in the figure.
4. Install the **SSTs** (bolts, nuts, hook, plate) in Step 3 to the **SST** (arms, bolts) set in Step 2.
5. Adjust the bolt threads by turning them so that they project **approx. 20 mm {0.79 in}** from the plate end.
6. Adjust the bolts and nuts so that the plate and arms are parallel.



BHJ0110E003

7. Mount the engine to the SST (engine stand).
8. Remove the oil pan drain plug and drain the engine oil.
9. Replace with a new washer and install the oil pan drain plug.

**Tightening torque**  
**Type A : 29.4—39.2 N·m {3.00—3.99 kgf·m, 21.7—28.9 ft·lbf}**  
**Type B : 29.4—41.2 N·m {3.00—4.20 kgf·m, 21.7—30.3 ft·lbf}**



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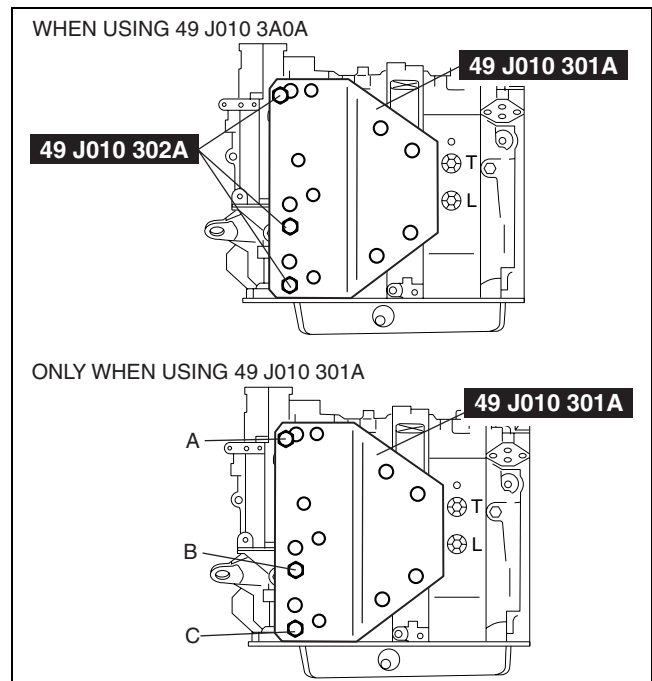
**Using 49 J010 3A0A**

1. Install the **SSTs** to the position shown in the figure.

A	M8×1.25 length 25 mm {1.28 in} bolt
B	99940 1201 (left side engine mount installation nut) or M12×1.5 nut
C	99756 1230 (left side engine mount installation nut) + washer

2. Mount the engine to the **SST** (engine stand).
3. Remove the oil pan drain plug and drain the engine oil.
4. Install the oil pan drain plug with a new washer.

**Tightening torque**  
**Type A : 29.4—39.2 N·m {3.00—3.99 kgf·m, 21.7—28.9 ft·lbf}**  
**Type B : 29.4—41.2 N·m {3.00—4.20 kgf·m, 21.7—30.3 ft·lbf}**



CHU0110E058

**Dismounting**

1. Dismount in the reverse order of mounting.
2. Tighten the stud bolt. (Only when using 49 L010 101.)

**Tightening torque**  
**14.7—34.3 N·m {1.50—3.49 kgf·m, 10.9—25.2 ft·lbf}**

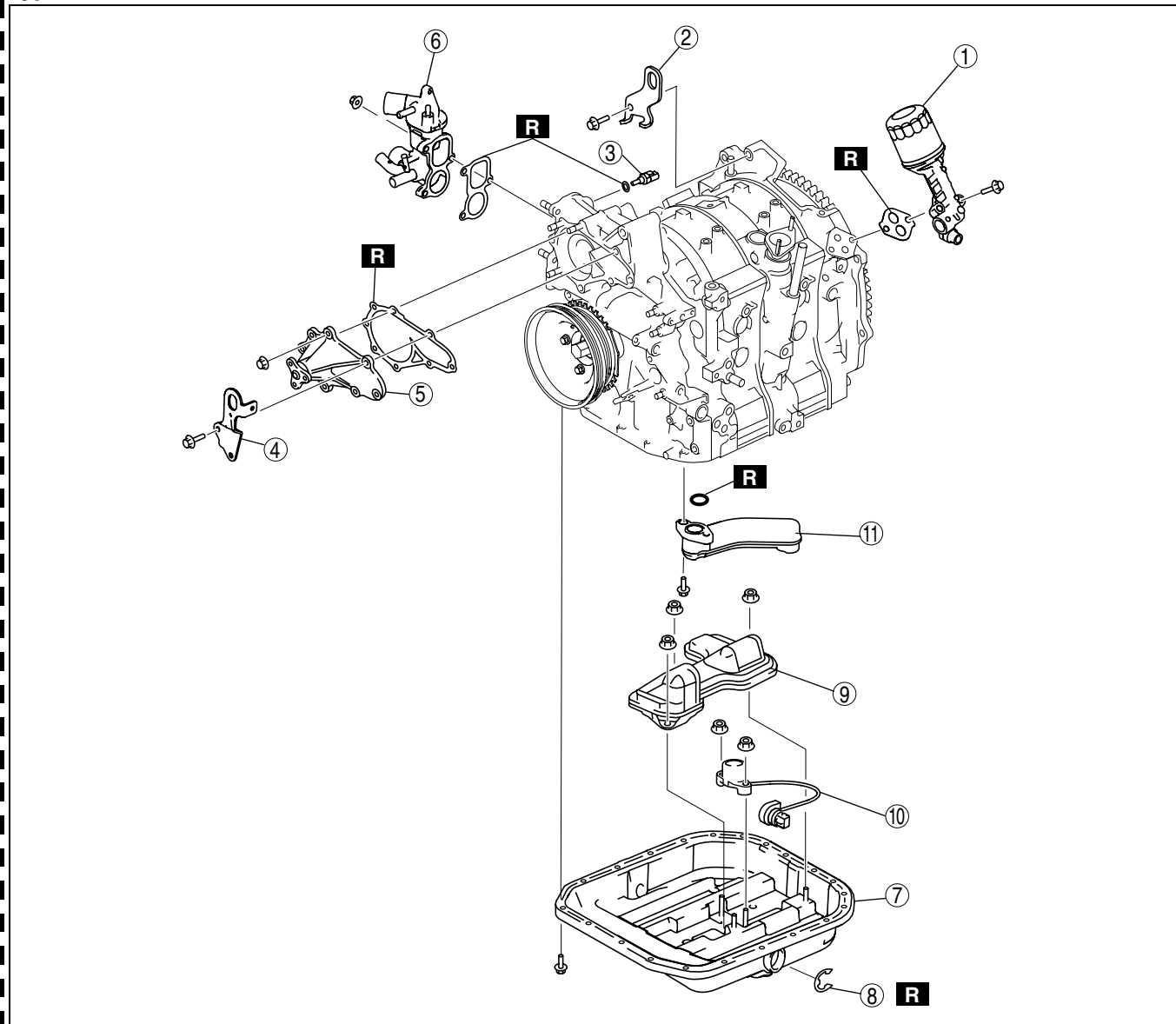
**MECHANICAL**

**HOUSING DISASSEMBLY I**

CHU011002000E04

1. Disassemble in the order indicated in the table.

Type A



BHJ0110E006

1	Oil filter component
2	Engine hanger (engine rear side)
3	Engine coolant temperature sensor
4	Engine hanger (engine front side)
5	Water pump body
6	Thermostat component

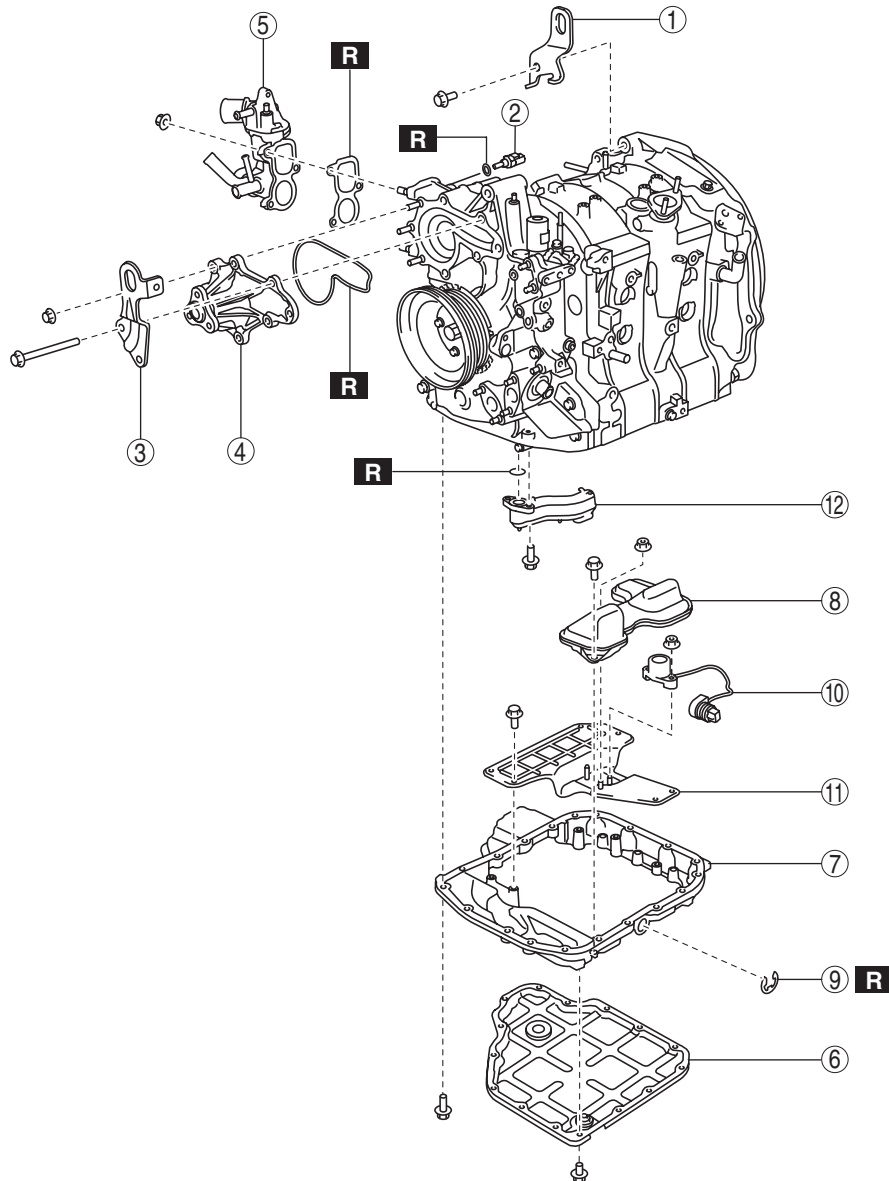
7	Oil pan (See 01-10-5 Oil Pan Disassembly Note.)
8	Clip
9	Oil baffle plate
10	Oil-level sensor
11	Oil strainer

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CHU011002000E04

Type B

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BHJ0110F002

1	Engine hanger (engine rear side)
2	Engine coolant temperature sensor
3	Engine hanger (engine front side)
4	Water pump body
5	Thermostat component
6	Oil pan (See 01-10-5 Oil Pan Disassembly Note.)

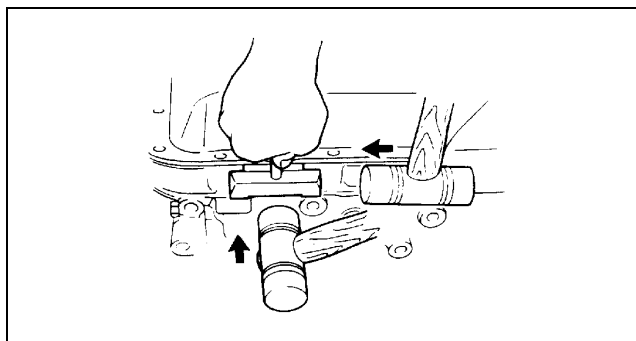
7	Oil pan upper block (See 01-10-5 Oil Pan Upper Block Disassembly Note.)
8	Baffle plate
9	Clip
10	Oil level switch
11	Baffle plate
12	Oil strainer

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**MECHANICAL**

**Oil Pan Disassembly Note**

1. Remove the oil pan using the separator tool.

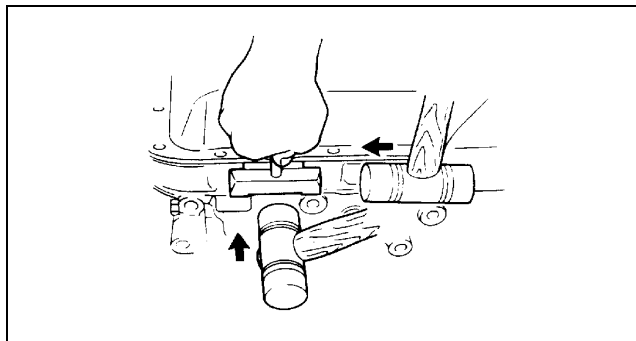


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**Oil Pan Upper Block Disassembly Note**

1. Remove the oil pan upper block using the separator tool.



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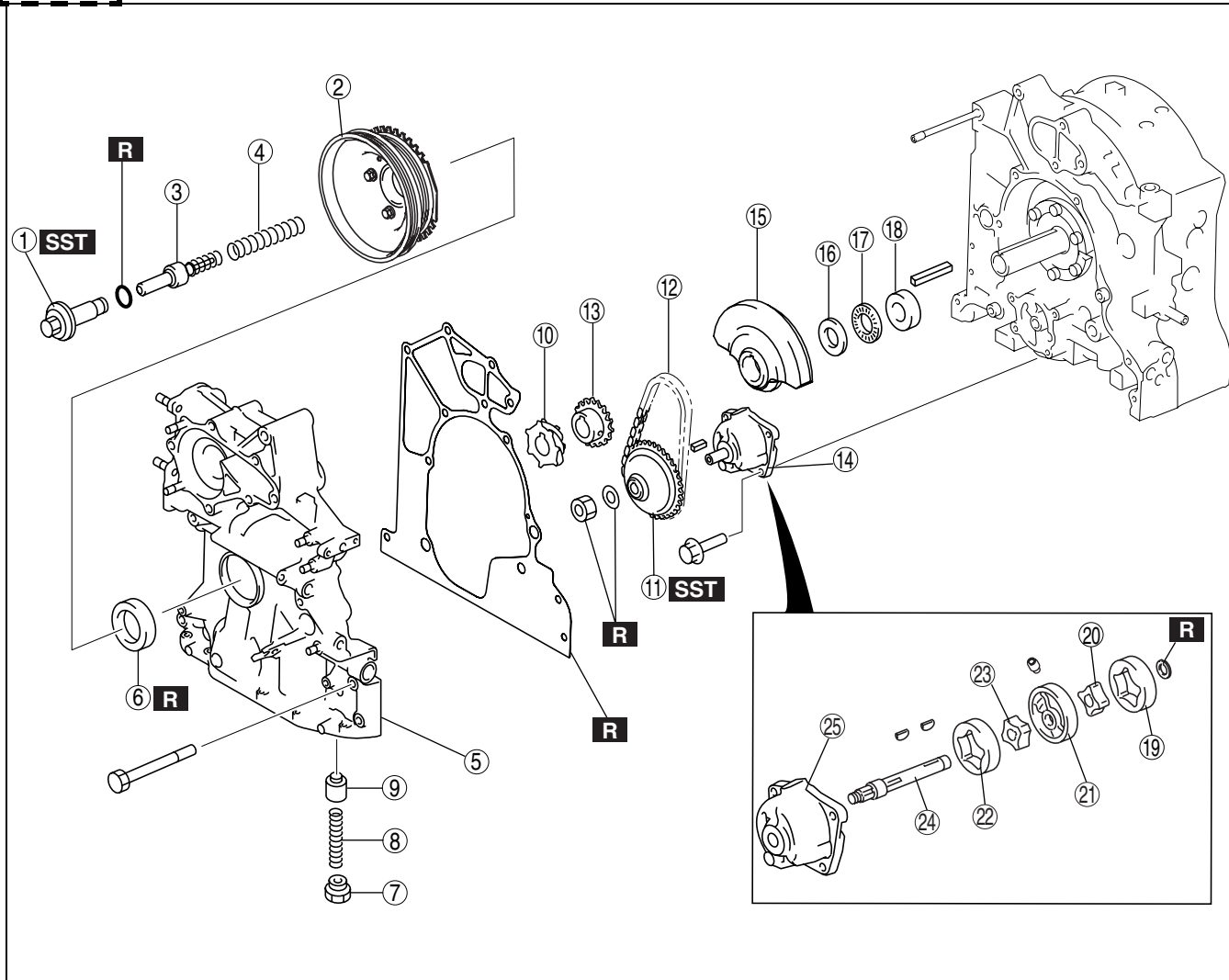
**MECHANICAL**

**HOUSING DISASSEMBLY II**

CHU011002000E05

1. Disassemble in the order indicated in the table.

**Type A**



BHJ0110E008

1	Pulley lockbolt (See 01-10-7 Pulley Lockbolt Disassembly Note.)
2	Pulley component
3	Eccentric shaft bypass valve
4	Spring
5	Front cover (See 01-10-7 Front Cover Disassembly Note.)
6	Front oil seal
7	Plug
8	Control valve spring
9	Control valve
10	Metering oil pump drive gear
11	Oil pump sprocket wheel (See 01-10-7 Oil Pump Sprocket Disassembly Note.)
12	Oil pump chain

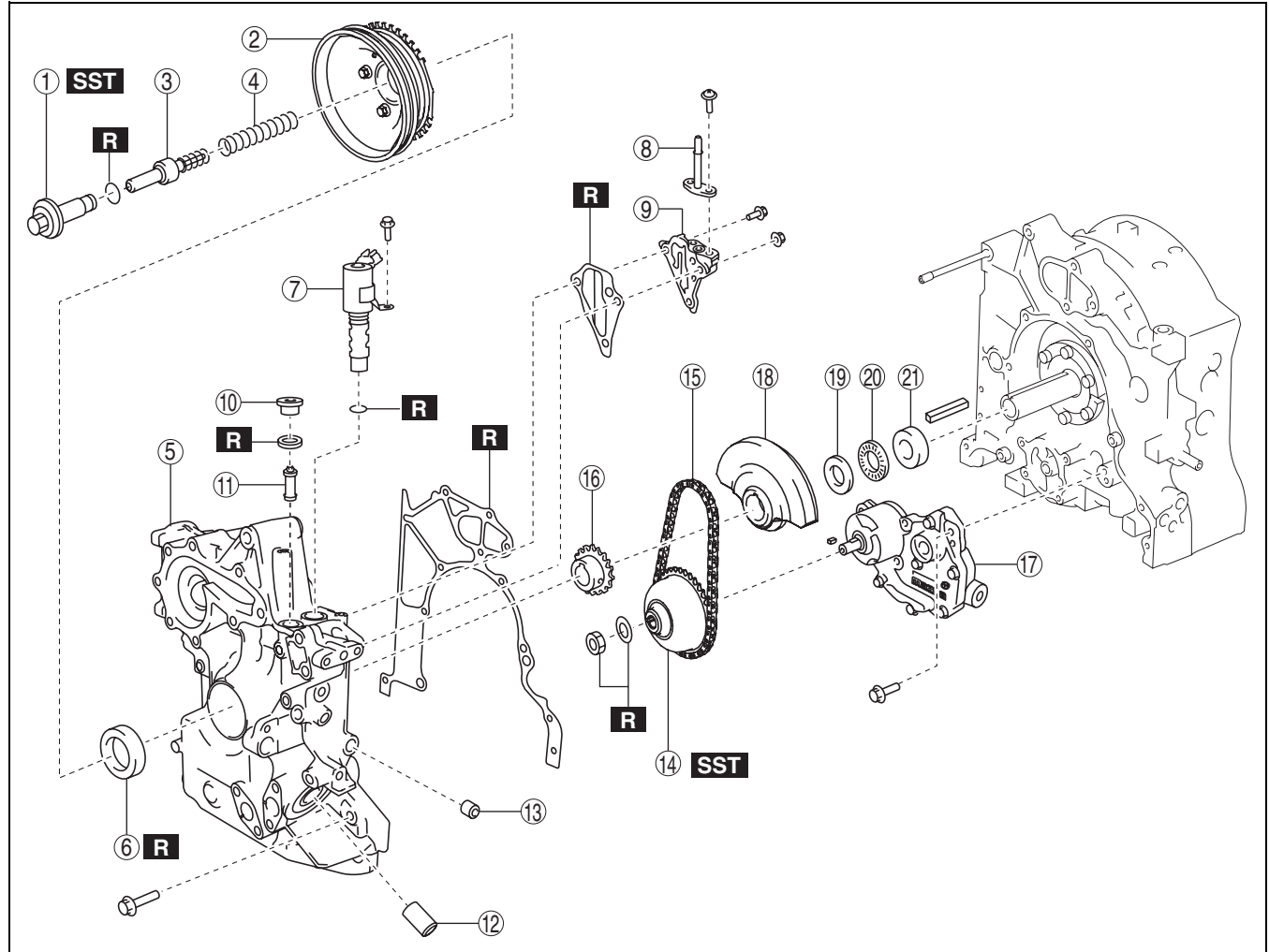
13	Oil pump drive gear
14	Oil pump component
15	Balance weight
16	Thrust plate
17	Needle bearing
18	Spacer
19	Rear outer rotor
20	Rear inner rotor
21	Middle plate
22	Front outer rotor
23	Front inner rotor
24	Shaft
25	Oil pump body

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CHU011002000E04

**Type B**

**01-10**



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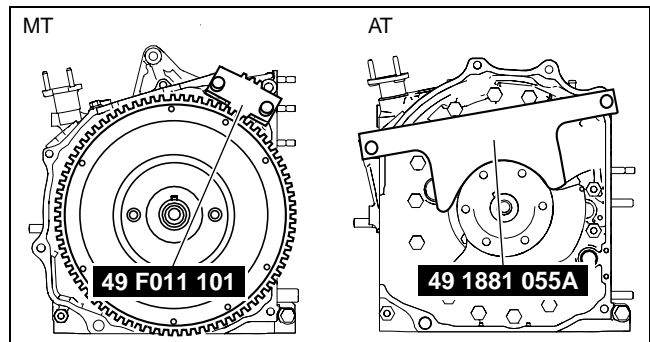
1	Pulley lockbolt (See 01-10-7 Pulley Lockbolt Disassembly Note.)
2	Pulley component
3	Eccentric shaft bypass valve
4	Spring
5	Front cover (See 01-10-7 Front Cover Disassembly Note.)
6	Front oil seal
7	OCV
8	Oil pipe
9	OCV case
10	Plug
11	OCV oil filter

12	Oil filter joint
13	Plug
14	Oil pump sprocket wheel (See 01-10-7 Oil Pump Sprocket Disassembly Note.)
15	Oil pump chain
16	Oil pump drive gear
17	Oil pump component
18	Balance weight
19	Thrust plate
20	Needle bearing
21	Spacer

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## Pulley Lockbolt Disassembly Note

1. Lock the flywheel (MT) or counterweight (AT) against rotation using the **SST**.

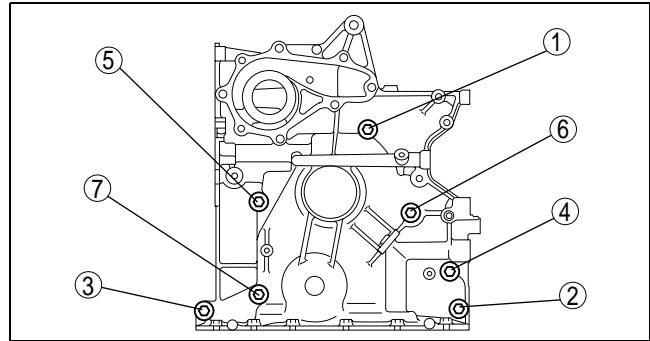


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## Front Cover Disassembly Note

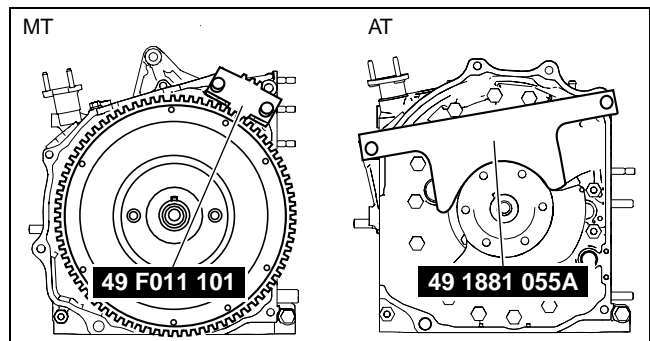
1. Loosen the engine front cover installation bolts in the order shown in the figure.



BHJ0110E009

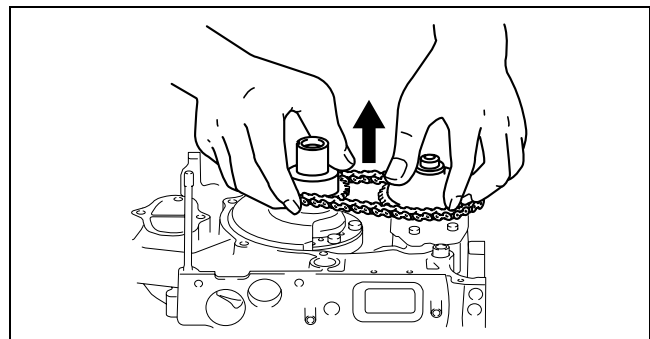
## Oil Pump Sprocket Disassembly Note

1. Lock the flywheel (MT) or counterweight (AT) against rotation using the **SST**.
2. Unlock the crimped part of the lock washer and remove the locknut and lock washer.



BHJ0110E007

3. Remove the oil pump drive gear and oil pump sprocket wheel with the oil pump chain engaged.



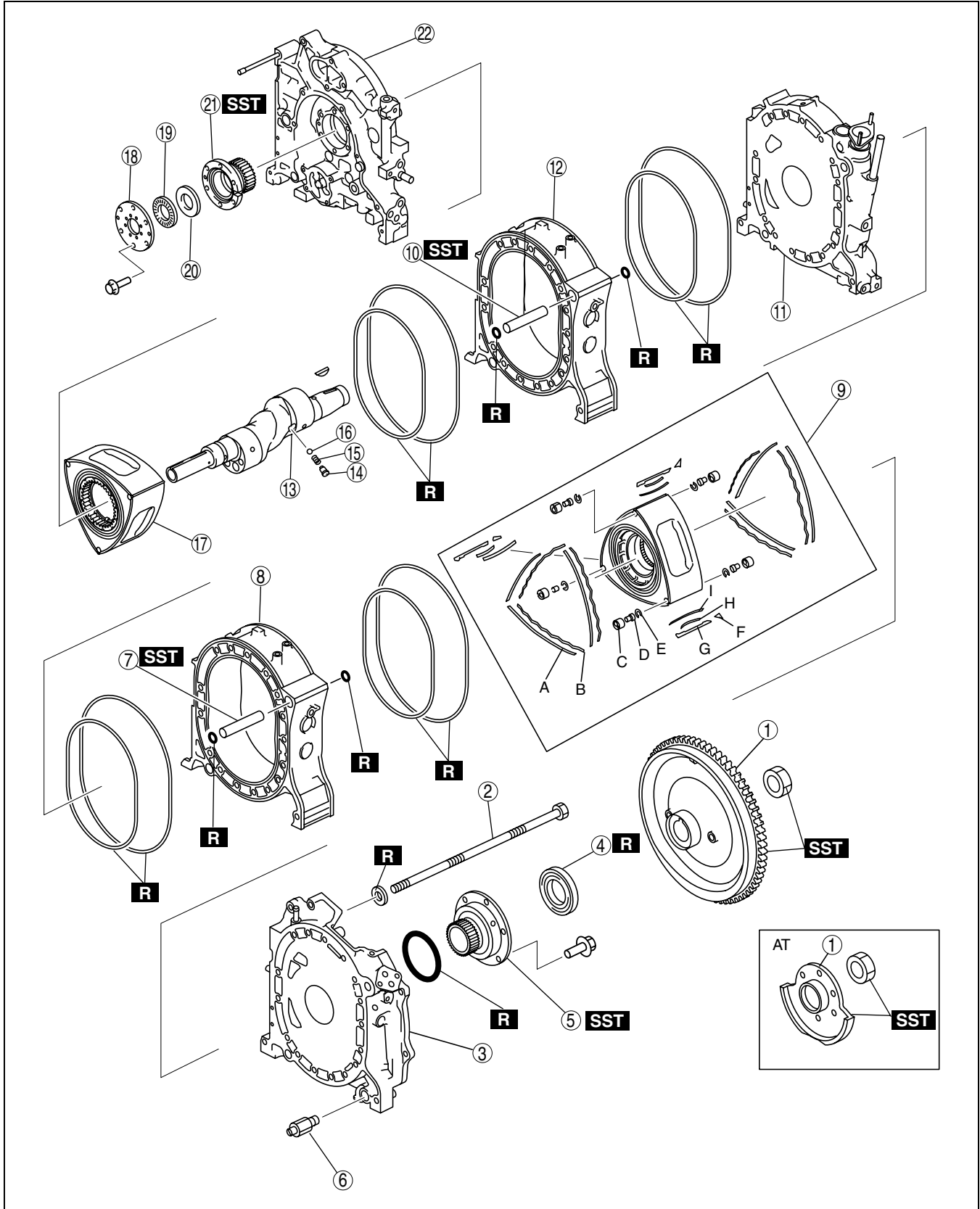
BHJ0110E104

# MECHANICAL

## HOUSING DISASSEMBLY III

CHU011002000E06

1. Disassemble in the order indicated in the table.



BHJ01110E010

1	Flywheel (MT), counterweight (AT) (See 01-10-9 Flywheel (MT), Counterweight (AT) Disassembly Note.)
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2	Tension bolt (See 01-10-10 Tension Bolt Disassembly Note.)
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**MECHANICAL**

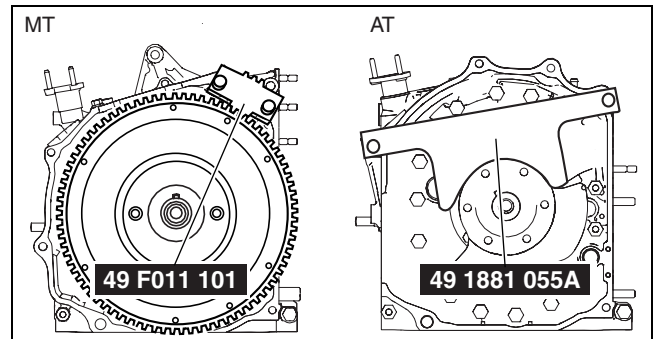
3	Rear housing (See 01-10-10 Rear Housing Disassembly Note.)
4	Rear oil seal
5	Rear stationary gear (See 01-10-10 Stationary Gear Disassembly Note.)
6	Pressure regulator (Type A)
7	Tubular dowel (rear rotor housing side) (See 01-10-10 Tubular Dowel Disassembly Note.)
8	Rear rotor housing (See 01-10-11 Rotor Housing Disassembly Note.)
9	Rear rotor A: Side seal B: Side seal spring C: Corner seal D: Corner seal plug E: Corner Seal Spring F: Side piece G: Apex seal H: Apex seal spring (short) I: Apex seal spring (long) (See 01-10-11 Rotor Disassembly Note.)

10	Tubular dowel (front rotor housing side) (See 01-10-10 Tubular Dowel Disassembly Note.)
11	Intermediate housing (See 01-10-12 Intermediate Housing Disassembly Note.)
12	Front rotor housing (See 01-10-11 Rotor Housing Disassembly Note.)
13	Eccentric shaft
14	Oil jet plug
15	Spring
16	Steel ball
17	Front rotor (See 01-10-11 Rotor Disassembly Note.)
18	Plate
19	Needle bearing
20	Thrust plate
21	Front stationary gear (See 01-10-10 Stationary Gear Disassembly Note.)
22	Front housing

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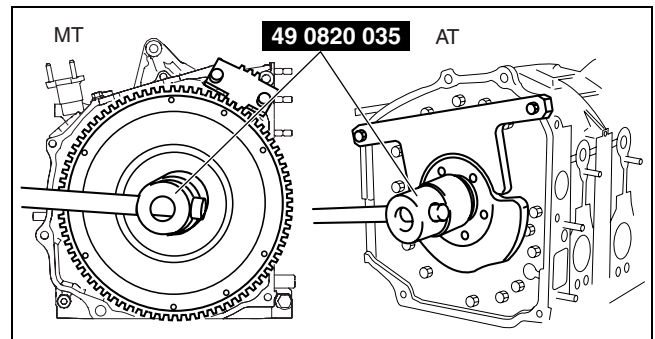
**Flywheel (MT), Counterweight (AT) Disassembly Note**

1. Lock the flywheel (MT) or counterweight (AT) against rotation using the **SST**.



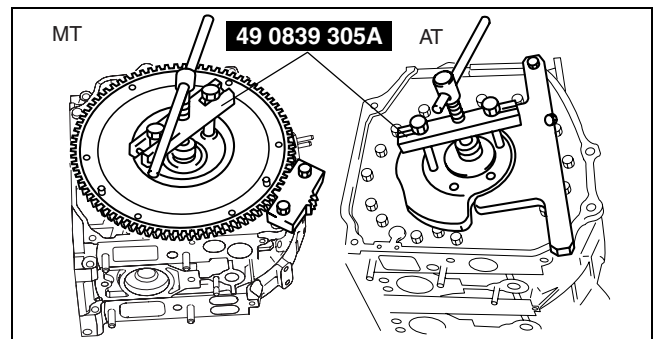
BHJ0110E007

2. Remove the locknut using the **SST**.



BHJ0110E011

3. Remove the flywheel (MT) or counterweight (AT), using the **SST**.

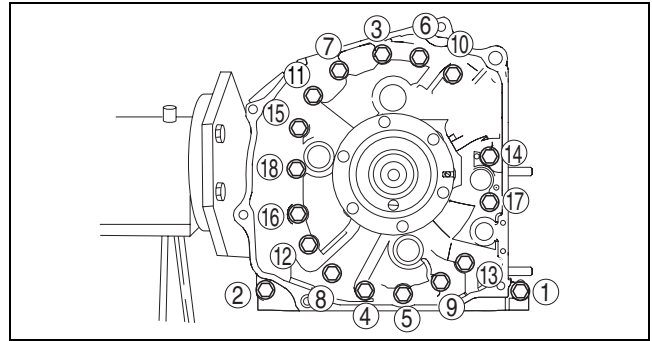


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**Tension Bolt Disassembly Note**

1. Loosen the tension bolts in 2—3 passes in the order shown in the figure and remove them.



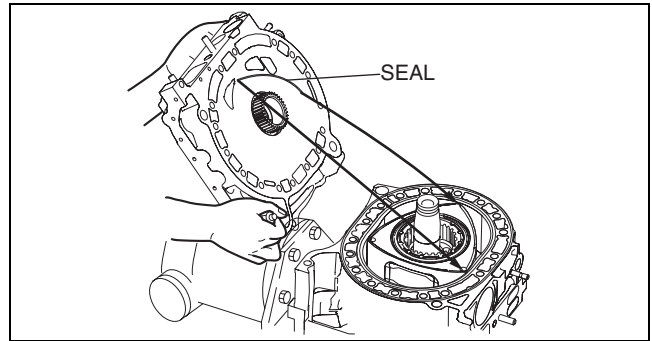
BHJ0110E013

**Rear Housing Disassembly Note**

1. Move the rear housing to the left and right to cut the oil film.
2. Remove the rear housing.

**Caution**

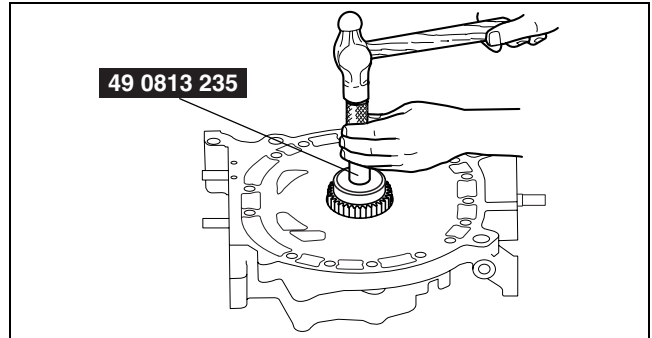
- If a seal adheres to the rear housing, put it back in its original position in the rotor.



CHU0110E039

**Stationary Gear Disassembly Note**

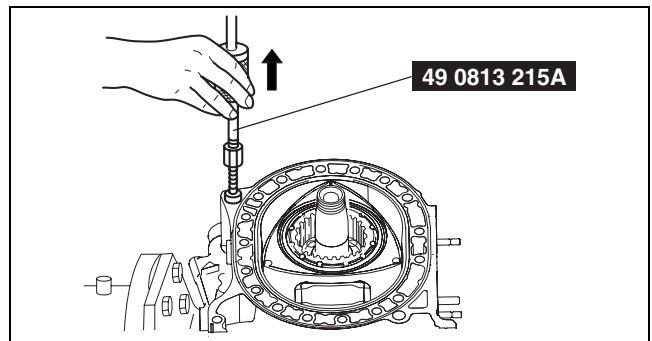
1. Remove the stationary gear using the SST.



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**Tubular Dowel Disassembly Note**

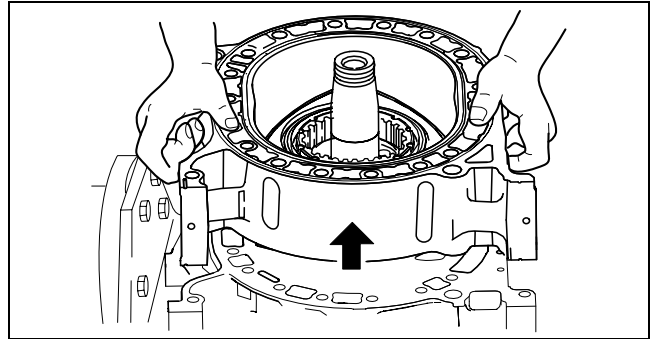
1. Remove the tubular dowel using the SST.



BHJ0110E017

## Rotor Housing Disassembly Note

1. Remove the rotor housing being careful not to drop the apex seal.



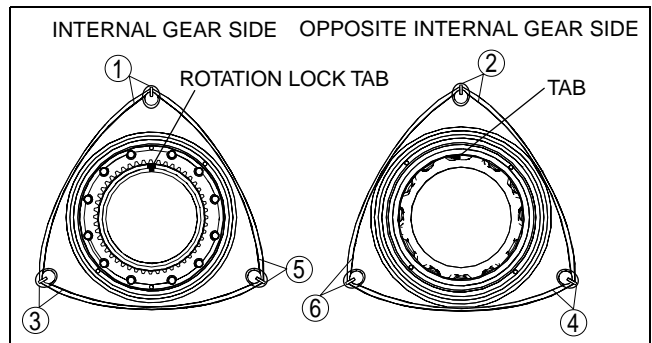
BHJ0110E020

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## Rotor Disassembly Note

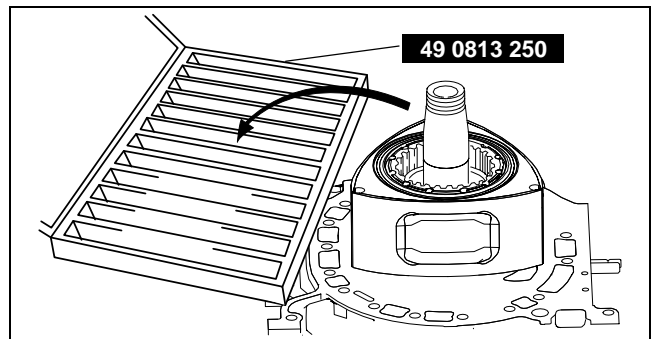
### Note

- Pair each seal and spring according to the numbers shown in the figure, and place them in the **SST** according to the numbers shown on the **SST**.



CHU0110E056

1. Remove the side piece, apex seal, corner seal, side seal, and spring on the engine rear side, and place them in the **SST** while keeping them in order.

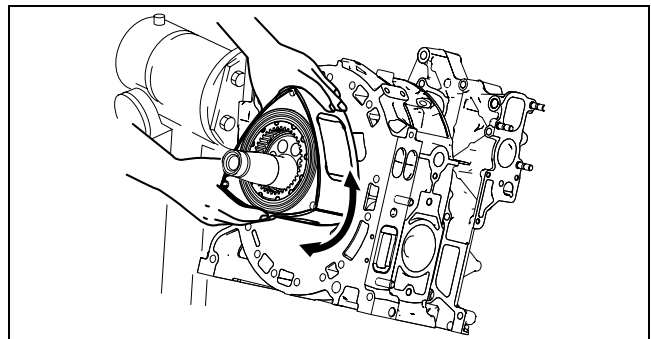


BHJ0110E019

2. Move the rotor to the left and right to cut the oil film.
3. Remove the rotor.

### Caution

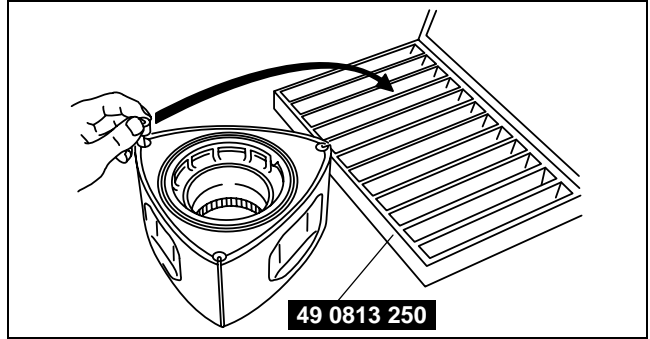
- If a seal adheres to the side housing, put it back in its original position in the rotor.
- Place the removed rotor upright on soft material such as a rubber sheet or cloth. Do not allow the oil seal to directly contact metal or similar hard surface.



BHJ0110E021

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- Remove the corner seal, side seal, and spring on the engine front side, and place them in the **SST** while keeping them in order.



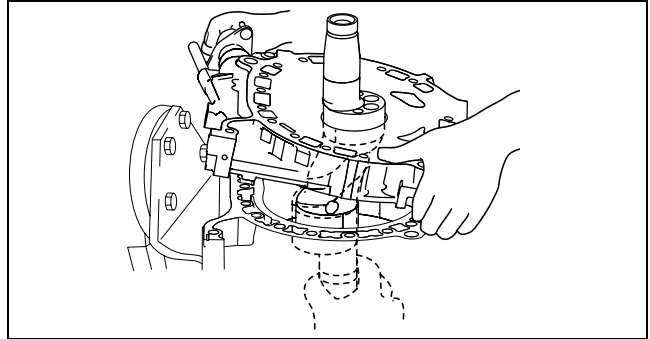
BHJ0110E022

### Intermediate Housing Disassembly Note

- Lift the intermediate housing up while another person pushes the eccentric shaft upward **approx. 3 cm {1.18 in}**.
- Rotate and remove the intermediate housing at the point where the eccentric shaft does not catch.

#### Caution

- If a seal adheres to the intermediate housing, put it back in its original position in the rotor.

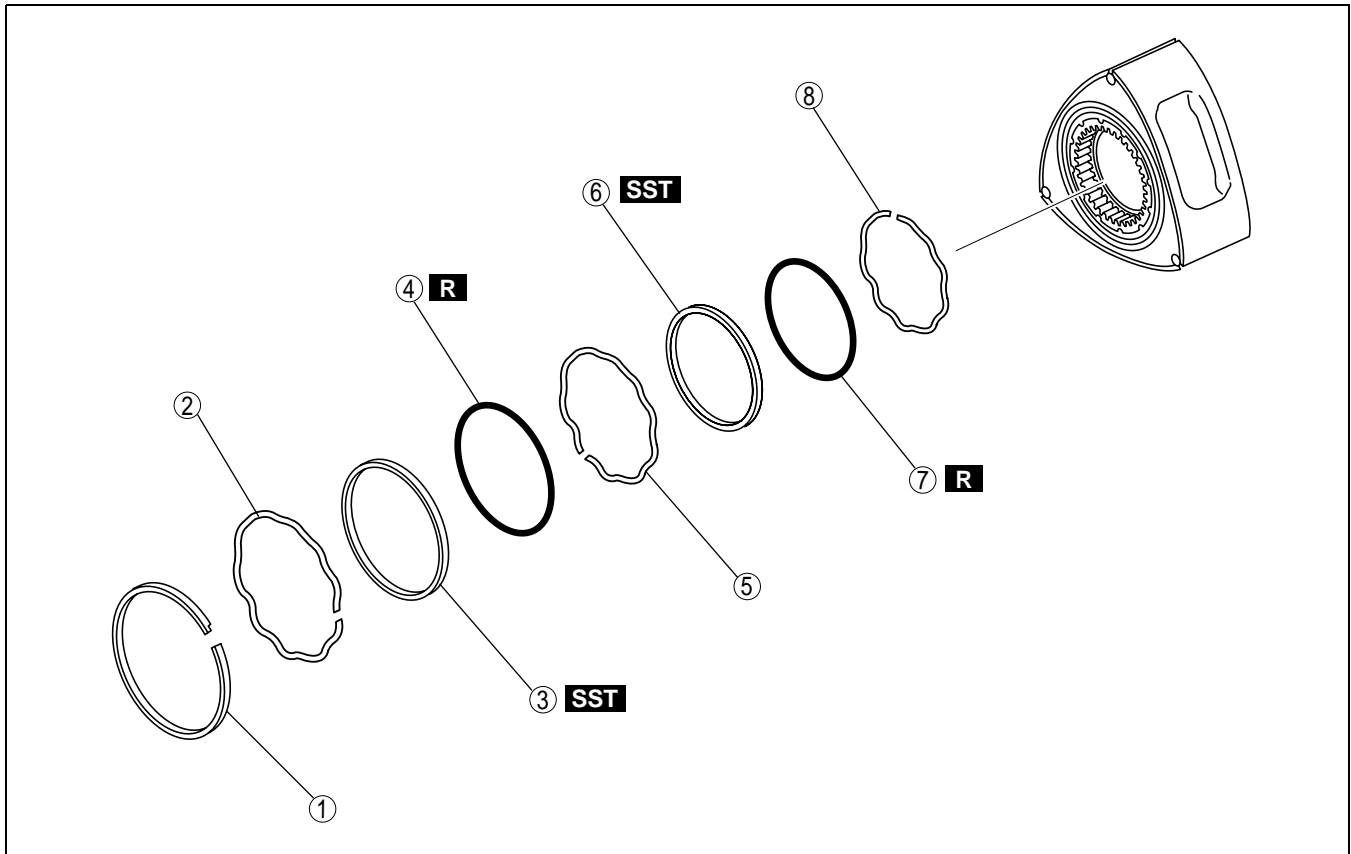


BHJ0110E023

### ROTOR DISASSEMBLY

CHU011002000E07

- Disassemble in the order indicated in the table.



BHJ0110E024

1	Cut-off seal
2	Cut-off seal spring

3	Outer oil seal (See 01-10-13 Oil Seal Disassembly Note.)
4	Outer O-ring (large radius)

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5	Outer oil seal spring (See 01–10–13 Oil Seal Spring Disassembly Note.)
6	Inner oil seal (See 01–10–13 Oil Seal Disassembly Note.)

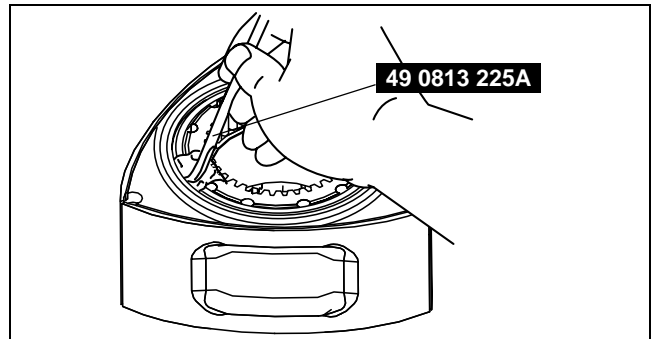
7	Inner O-ring (small radius)
8	Inner oil seal spring (See 01–10–13 Oil Seal Spring Disassembly Note.)

### Oil Seal Disassembly Note

1. Remove the oil seal using the **SST**.

#### Caution

- Be sure to keep the removed oil seals separated according to their removal position.



BHJ0110E025

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### Oil Seal Spring Disassembly Note

#### Caution

- Be sure to keep the removed oil seal springs separated according to their removal positions.

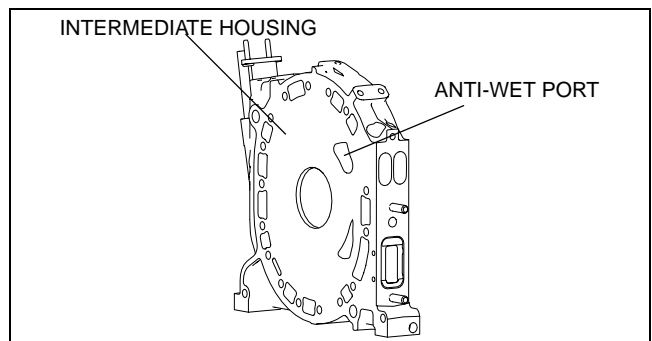
### SIDE HOUSING (FRONT, INTERMEDIATE, REAR) INSPECTION

CHU011010D00E01

1. Inspect the intermediate housing for clogging in the intake and exhaust port.

#### Caution

- Carefully inspect the anti-wet port of the intermediate housing since it is an essential port.
- If there is any malfunction, replace the corresponding side housing.

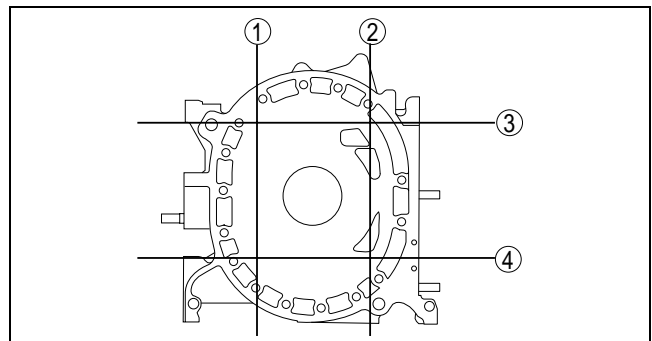


CHU0110E001

2. Inspect the side housing for distortion in four positions as shown in the figure using a straight edge and a feeler gauge.
  - If the distortion exceeds the maximum, replace the corresponding side housing.

**Maximum distortion**  
**0.04 mm {0.0016 in}**

3. Inspect the following three items related to wear in the areas where the rotor contacts the side housing using a dial gauge.
  - If any one of the items exceeds the maximum, replace the corresponding side housing.



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