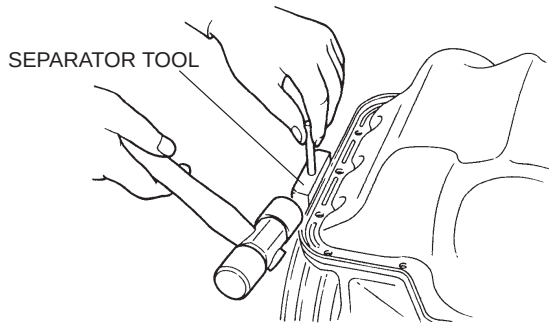


Oil Pan Disassembly Note

- Remove the oil pan by using a separator tool.

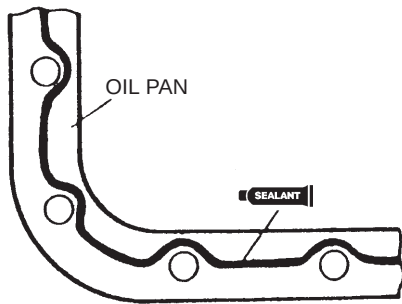


Oil Pan Assembly Note

- Apply silicone sealant to the oil pan as shown.

Thickness

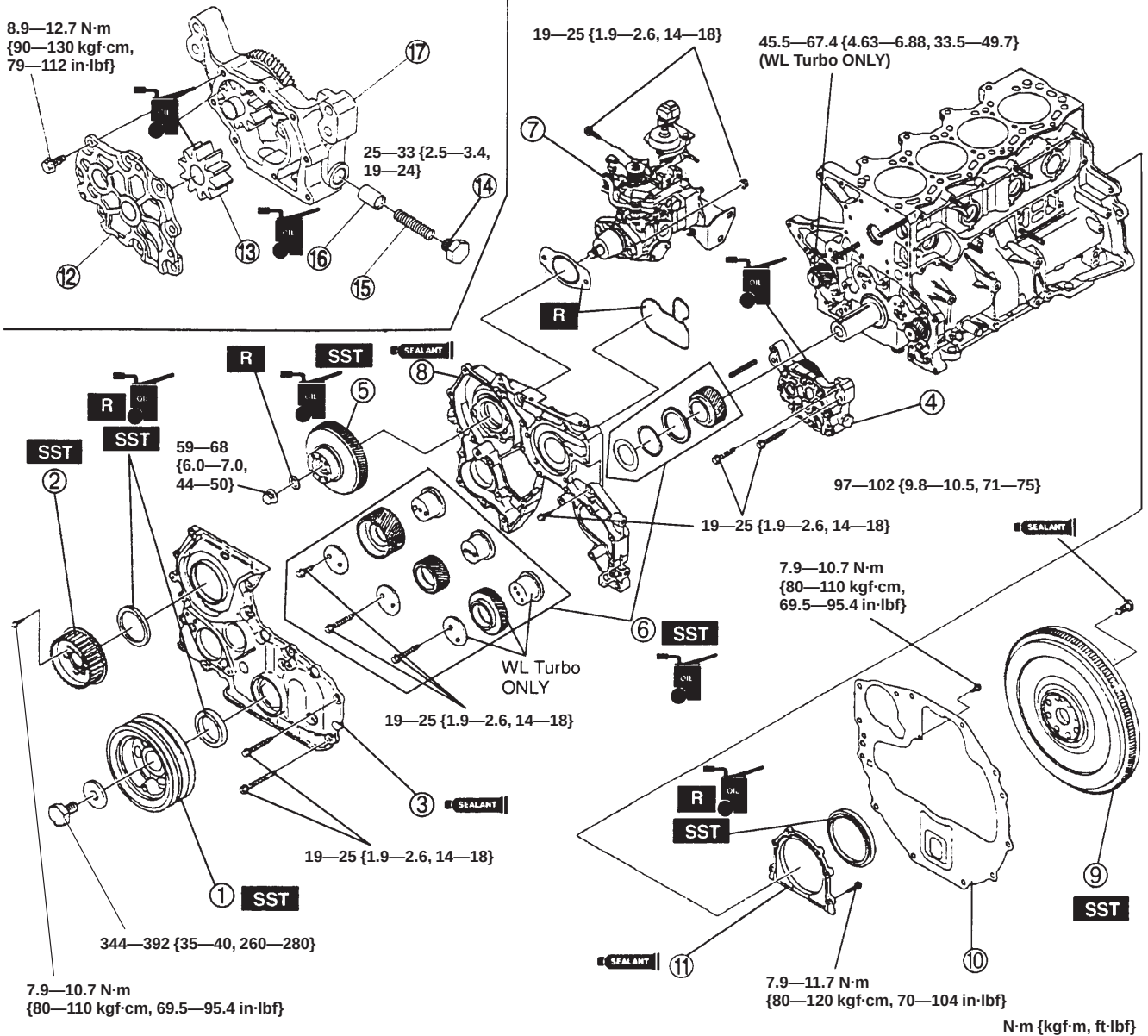
Ø2.0—3.0 mm {0.08—0.11 in}



ENGINE DISASSEMBLY/ASSEMBLY

CYLINDER BLOCK DISASSEMBLY/ASSEMBLY (II)

1. Disassemble in the order shown in the figure.
2. Assemble in the reverse order of disassembly.

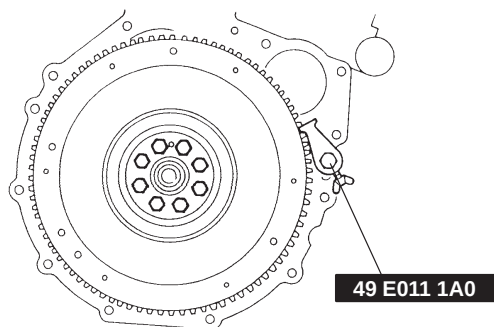


1	Crankshaft pulley + Disassembly Note + Assembly Note
2	FIP pulley + Disassembly Note + Assembly Note
3	Timing gear cover + Disassembly Note + Assembly Note
4	Oil pump
5	FIP gear + Disassembly Note
6	Timing gear + Assembly Note
7	FIP
8	Timing gear case + Disassembly Note + Assembly Note

9	Flywheel + Disassembly Note + Assembly Note
10	End plate
11	Rear cover + Disassembly Note + Assembly Note
12	Oil pump cover + Assembly Note
13	Driven gear
14	Plug
15	Plunger spring
16	Control plunger
17	Oil pump body

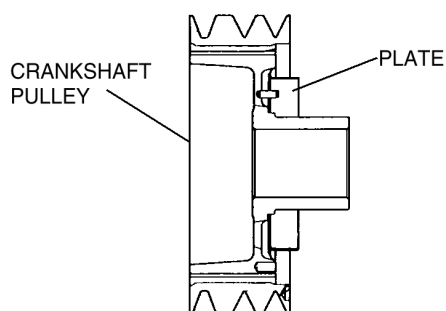
Crankshaft Pulley Disassembly Note

- Remove the crankshaft pulley by using the SST.



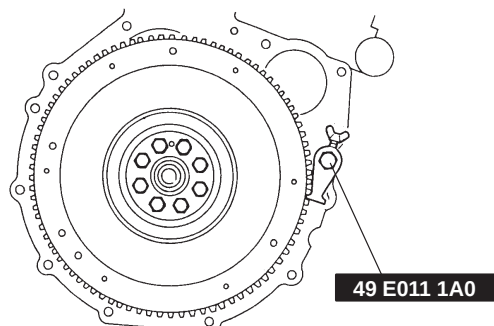
Caution

- The TDC sensor plate is a very important part for engine operation control; any deformation of the plate may disable the operation control. When disassembling/assembling the crankshaft pulley, be very careful not to deform the plate by interference with other parts or improper handling.



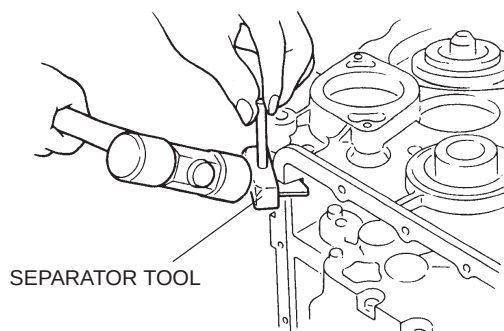
FIP Pulley Disassembly Note

- Remove the FIP pulley by using the SST.

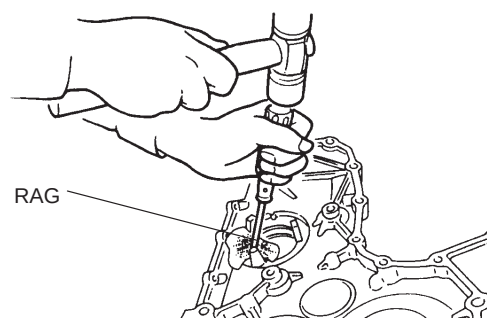


Timing Gear Cover Disassembly Note

- Remove the timing gear cover by using a separator tool.

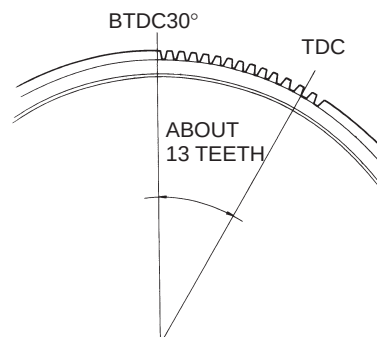


- Remove the oil seal by using a screwdriver protected with a rag.



FIP Gear Disassembly Note

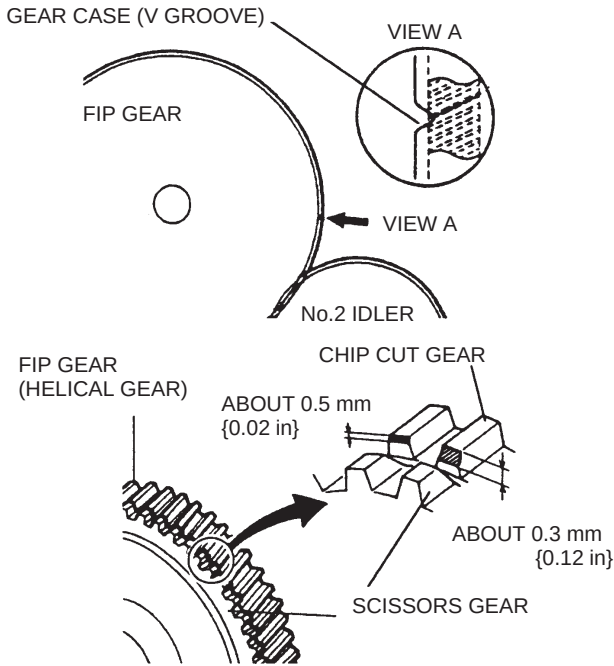
- Set the No.1 cylinder to compression TDC.
- Rotate the flywheel ring gear from TDC to approximately 30° BTDC (about 13 teeth on the gear).



- Verify that the end-gap (V groove) of the timing gear case and the chip cut gear of the FIP gear are aligned.

Note

- If the chip cut gear is hard to find, move the FIP gear on notch back and forth, then check the chip cut gear.



Warning

- When removing the injection pump gear, be sure to fix the scissors gear to the injection pump gear using a lock bolt (M8 × 1.25; length under the bolt head is approximately 14 mm). Otherwise, the scissors gear will rotate with the spring force, causing personal injury.

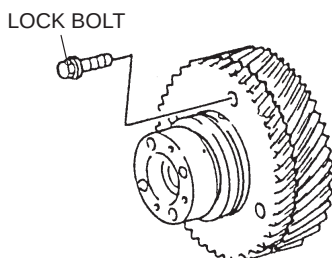
Caution

- When removing the injection pump gear, be sure to fix the scissors gear to the injection pump gear using a lock bolt (M8 × 1.25; length under the bolt head is approximately 14 mm) to prevent the scissors gear from rotating with the spring force. Otherwise, the scissors gear will not align with the injection pump gear, and the injection pump gear with the scissors gear will not engage with the idler gear.

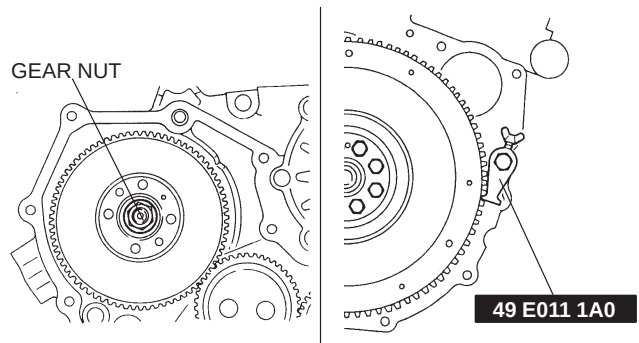
Note

- A injection pump gear with a scissors gear has a lock bolt hole.

- Fix the scissors gear to the injection pump gear using a lock bolt (M8 × 1.25; length under the bolt head is approximately 14 mm).



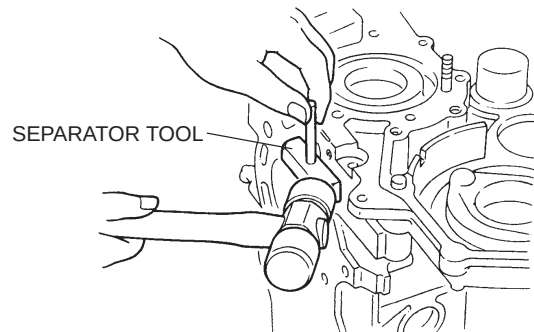
- Hold the crankshaft using the SST and loosen the gear nut.



- Remove the FIP gear using the SST.

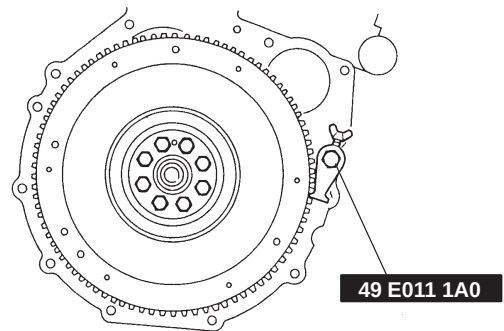
Timing Gear Case Disassembly Note

- Remove the timing gear case by using the separator tool.



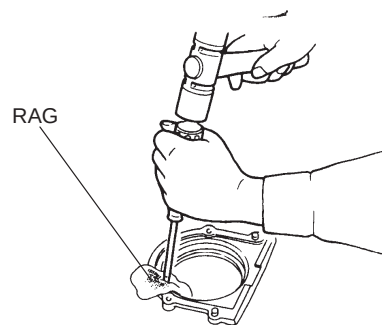
Flywheel Disassembly Note

- Remove the flywheel by using the SST.



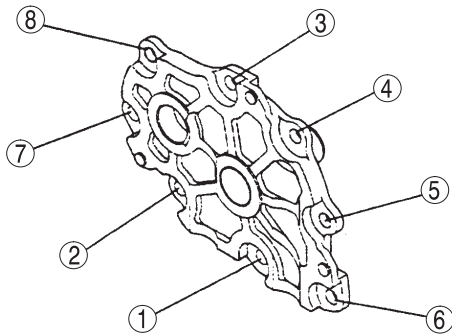
Rear Cover Disassembly Note

- Remove the oil seal by using a screwdriver protected with a rag.



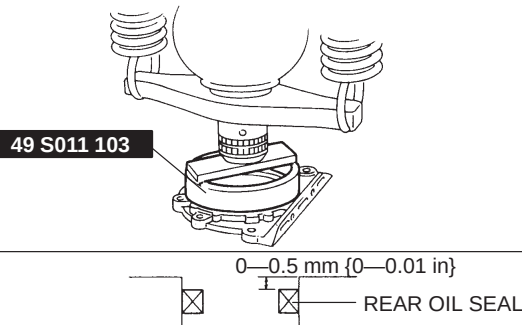
Oil Pump Cover Assembly Note

- Tighten the bolts in two or three steps in the order shown.



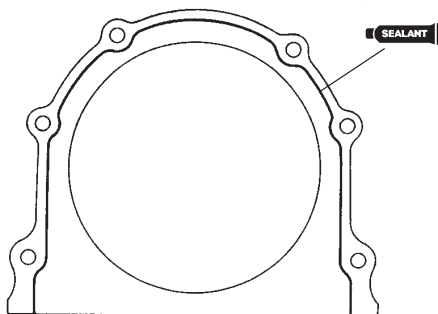
Rear Cover Assembly Note

1. Apply clean engine oil to the oil seal.
2. Push the oil seal slightly in by hand.
3. Press the oil seal in evenly by using the SST.



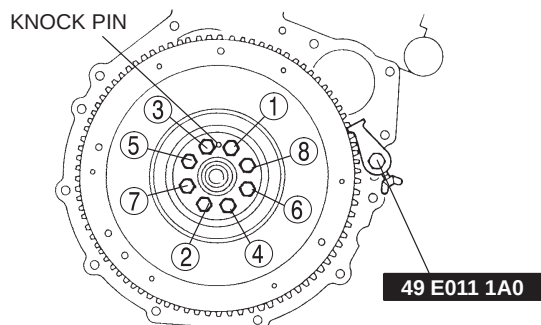
4. Apply silicone sealant to the rear cover as shown.

Thickness
 $\varnothing 2 \text{ mm } \{0.07 \text{ in}\}$



Flywheel Assembly Note

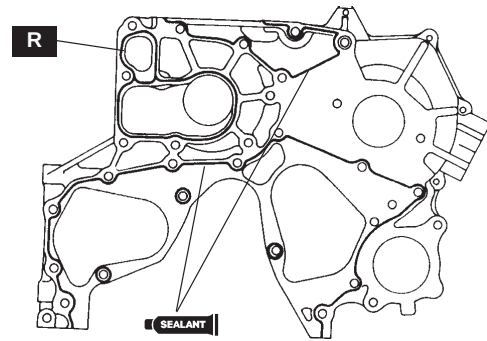
1. Hold the crankshaft by using the SST.
2. Tighten the crank bolts in the order shown.



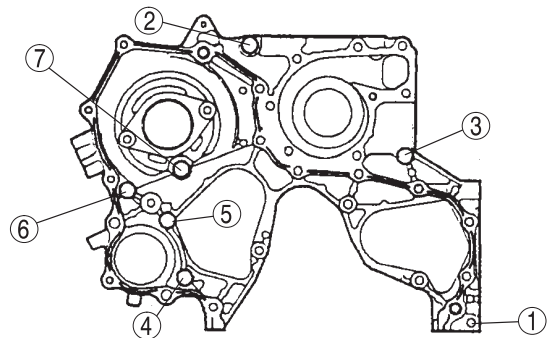
Timing Gear Case Assembly Note

1. Install the new O-ring.
2. Apply silicone sealant to the timing gear case as shown. Do not apply sealant to the O-ring.

Thickness
 $\varnothing 1.5-2.5 \text{ mm } \{0.060-0.098 \text{ in}\}$

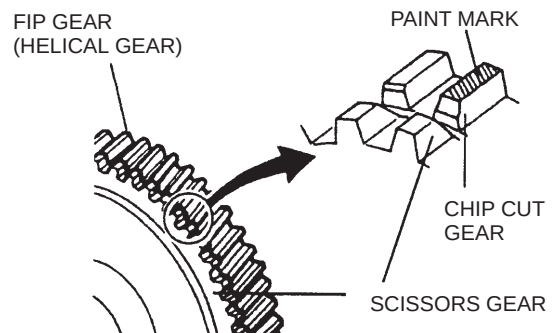


3. Tighten the bolts in two or three steps in the order shown.

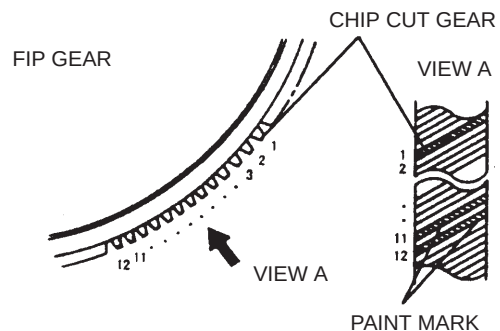


Timing Gear Assembly Note

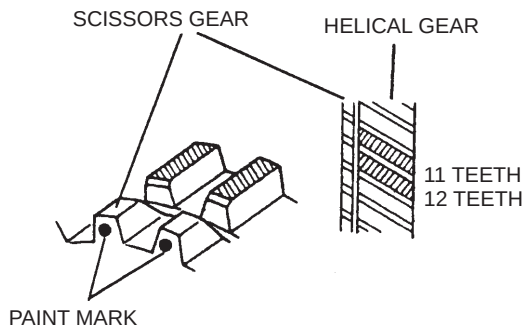
1. Make a paint mark on the chip cut gear of FIP gear.



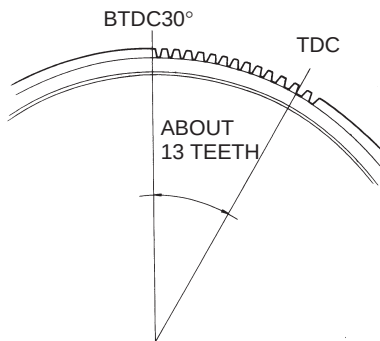
2. Make a paint mark on the 11th and 12th teeth of the helical gear counting clockwise from chip cut gear.



3. Verify that the 11th and 12th teeth of the FIP gear (helical gear) and the teeth of the scissors gear are aligned, then mark a paint mark on the scissors gear.

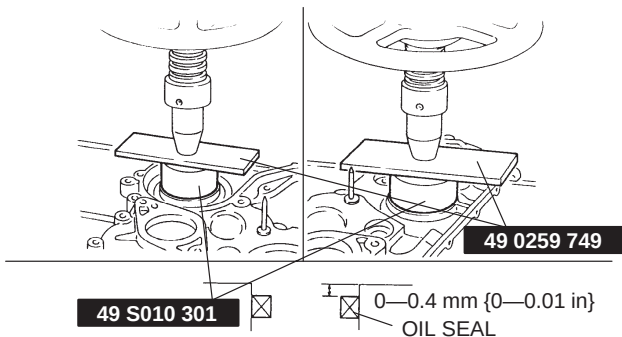


4. Set the No.1 cylinder to compression TDC.
5. Rotate the flywheel ring gear from TDC to approximately 30° BTDC (about 13 teeth on the gear.)



Timing Gear Cover Assembly Note

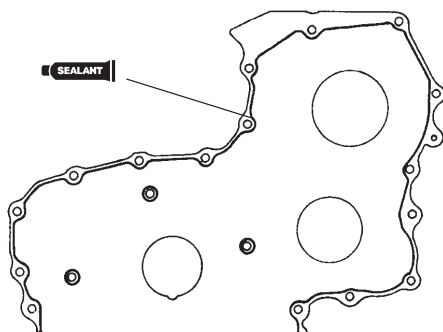
1. Apply clean engine oil to the oil seal.
2. Push the oil seal slightly in by hand.
3. Press the oil seal in evenly by using the SST.



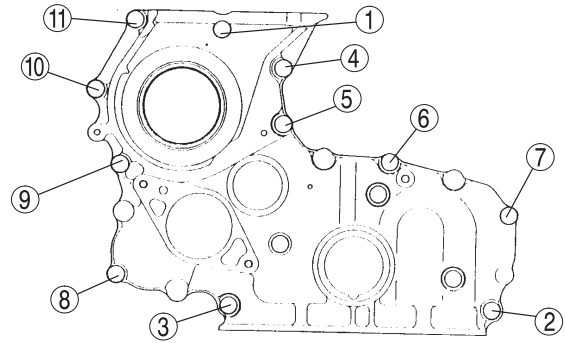
4. Apply silicone sealant to the timing gear cover as shown.

Thickness

ø 1.5—2.5 mm {0.060—0.098 in}

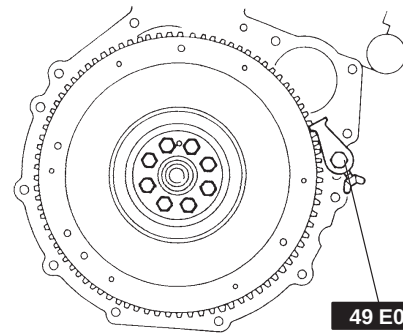


5. Tighten the bolts in two or three steps in the order shown.

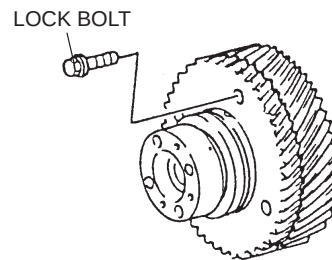


FIP Gear Assembly Note

1. Install the FIP pulley using the SST.

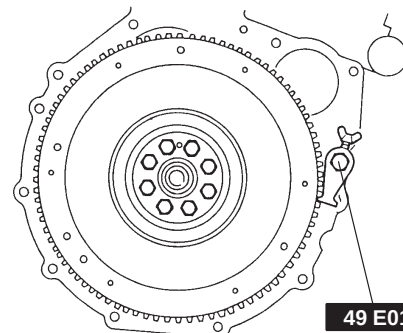


2. Remove the lock bolt.



Crankshaft Pulley Assembly Note

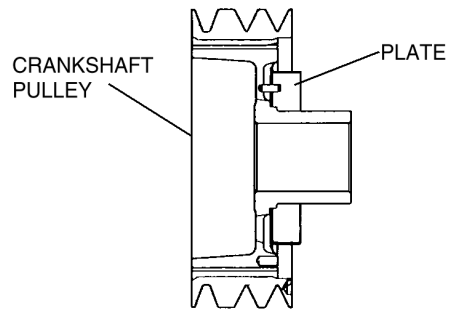
- Install the crankshaft pulley using the SST.



Caution

- The TDC sensor plate is a very important part for engine operation control; any deformation of the plate may disable the operation control.

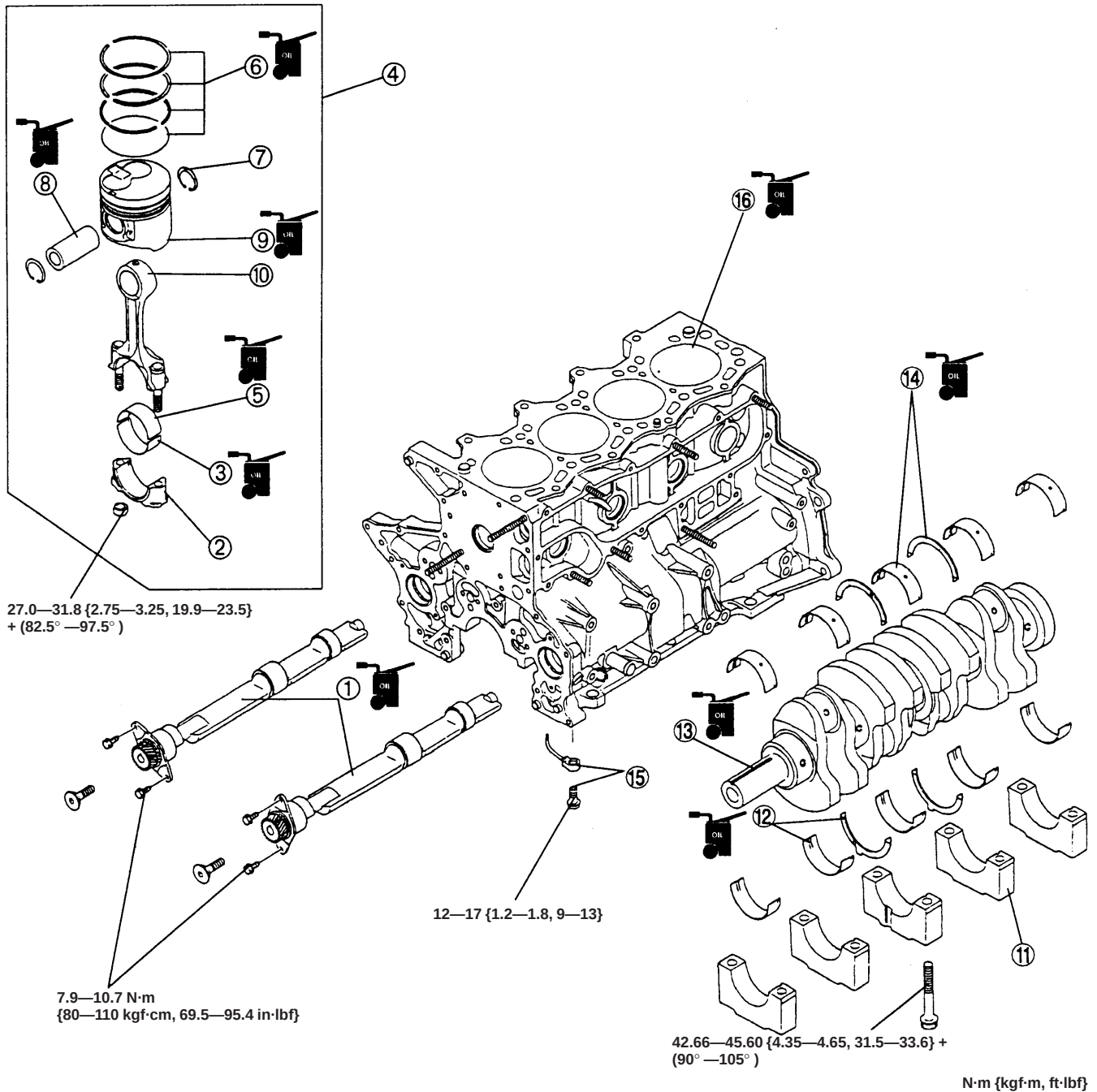
When disassembling/assembling the crankshaft pulley, be very careful not to deform the plate by interference with other parts or improper handling.



ENGINE DISASSEMBLY/ASSEMBLY

CYLINDER BLOCK DISASSEMBLY/ASSEMBLY (III)

1. Disassemble in the order shown in the figure.
2. Assemble in the reverse order of disassembly.



1	Balance shaft (WL Turbo) + Disassembly Note
2	Connecting rod cap + Disassembly Note
3	Connecting rod bearing, lower
4	Piston, Connecting rod + Disassembly Note + Assembly Note
5	Connecting rod bearing, upper
6	Piston ring
7	Piston pin clip
8	Piston pin
9	Piston

10	Connecting rod
11	Main bearing cap + Disassembly Note + Assembly Note
12	Main bearing, lower, Thrust bearing, lower
13	Crankshaft + Disassembly Note
14	Main bearing, upper, Thrust bearing, upper
15	Oil jet valve, Nozzle
16	Cylinder block

Balance shaft (WL Turbo) Disassembly Note

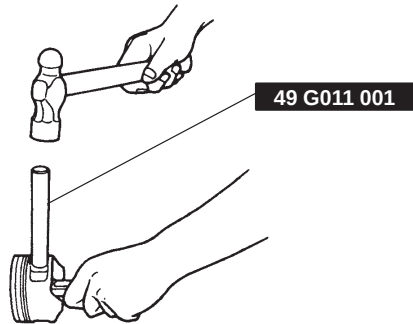
- Measure the balance shaft end play.
(Refer to ENGINE INSPECTION/REPAIR, BALANCE SHAFT INSPECTION.)
(WL Turbo)

Connecting Rod Cap Disassembly Note

- Measure the connecting rod side clearance.
(Refer to ENGINE INSPECTION/REPAIR, CONNECTING ROD SIDE CLEARANCE INSPECTION.)

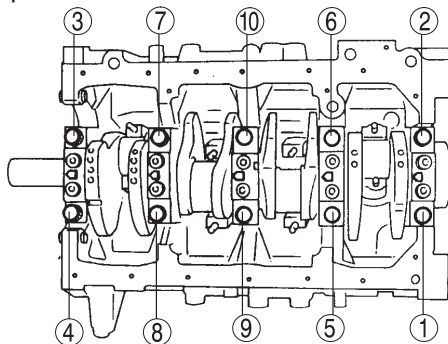
Piston, Connecting Rod Disassembly Note

1. Measure the connecting rod oil clearance.
(Refer to ENGINE INSPECTION/REPAIR, CONNECTING ROD OIL CLEARANCE INSPECTION/REPAIR.)
2. Check the oscillation torque.
(Refer to ENGINE INSPECTION/REPAIR, PISTON AND CONNECTING ROD INSPECTION.)
3. Remove the piston pin by using the SST.



Main Bearing Cap Disassembly Note

1. Measure the crankshaft end play.
(Refer to ENGINE INSPECTION/REPAIR, CRANKSHAFT END PLAY INSPECTION/REPAIR.)
2. Loosen the main bearing cap bolts in two or three steps in the order shown.



Crankshaft Disassembly Note

- Measure the main journal oil clearance.
(Refer to ENGINE INSPECTION/REPAIR, CRANKSHAFT OIL CLEARANCE INSPECTION/REPAIR.)

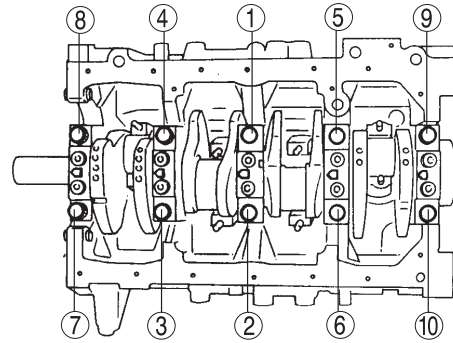
Main Bearing Cap Assembly Note

1. Apply clean engine oil to the bolt threads and seat faces of the lower cylinder block bolts.

2. Tighten the bolts in two or three steps in the order shown.

Tightening torque

75—82 N·m {7.6—8.4 kgf·m, 55—60 ft·lbf}

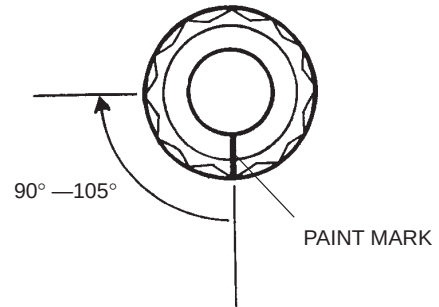


3. Loosen all bolts.
4. Tighten them in two or three steps as in step 2.

Tightening torque

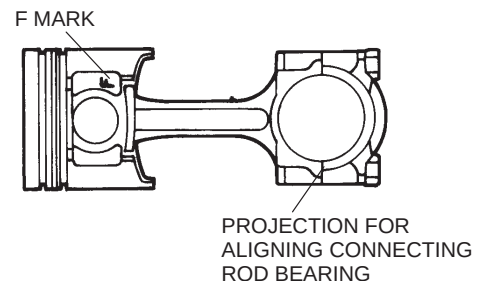
42.66—45.60 N·m
{4.35—4.65 kgf·m, 31.5—33.6 ft·lbf}

5. Put a paint mark on each bolt head.
6. Using the marks as a reference, tighten the bolts by turning each 90°—105° as in step 2.



Piston, Connecting Rod Assembly Note

1. Assemble the piston and the connecting rod in the direction from which they were disassembled.
2. Apply clean engine oil to the piston pin.
3. Install the piston pin until the pin contacts the clip as shown. If the pin cannot be installed easily, heat the piston.



4. Verify that the second ring is installed with tapered face upward.
5. Verify that the top ring is installed with tapered face side upward.

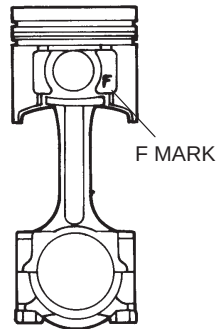
SECTION OF
FIRST RING



SECTION OF
SECOND RING



6. Insert the piston and connecting rod assembly into the cylinder with the F mark facing the front of the engine.



7. Align the matching marks on the connecting rod and the connecting rod cap. Install the connecting rod cap.
8. tighten the nuts in two or three steps.

Tightening torque

27.0—31.8 N·m

{2.75—3.25 kgf·m, 19.9—23.5 ft·lbf}

9. Put a paint mark on each nut.
10. Using the marks as a reference, tighten the nuts by turning each **82.5° —97.5°**.

