

## Engine Lubrication Description

A crankshaft driven trochoid type pump provides engine oil to all power unit components requiring lubrication. Oil from the oil pan is drawn through the oil strainer and passed through a spin-on type oil filter before entering main oil gallery.

A pressure regulator (relief valve) is positioned between the oil pump and oil filter to maintain oil pressure at a constant level.

From the main gallery, oil flow is directed through either drilled internal passages or by splash method to those surfaces requiring lubrication.

## Engine Oil Lubrication Chart

The diagram illustrates the lubrication system for a 4-cylinder engine. The oil pan at the bottom collects oil, which is then pumped through an oil strainer, oil pump, pressure regulator, and oil filter into the main gallery. The main gallery distributes oil to the crankshaft main journals, crank pins, and pistons for cylinders 1, 2, and 3. It also flows to the cylinder head, camshaft housing, and camshaft journals for both the intake (IN) and exhaust (EX) camshafts. The chain tensioner adjuster is also connected to the main gallery. The diagram includes labels for various components like No. 1, 2, 3, and 4 crankshaft main journals, crank pins, pistons, camshaft journals, and cam faces.

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## Diagnostic Information and Procedures

### Oil Pressure Check

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Refer to "Oil Pressure Check" in Section 0B (Page 0B-20).

### Oil Change Reminder System

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Refer to "Oil Change Reminder System Description" in Section 1A (Page 1A-14).

### Low Oil Pressure Caution System

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Refer to "Caution System Description" in Section 1A (Page 1A-7).

### Powerhead Lubrication System Diagnosis

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| Condition                | Possible cause                             | Correction / Reference Item |
|--------------------------|--|-----------------------------|
| <b>Low oil pressure</b>  | Clogged oil filter.                        | <i>Replace.</i>             |
|                          | Leakage from oil passages.                 | <i>Repair or replace.</i>   |
|                          | Defective oil pump.                        | <i>Replace.</i>             |
|                          | Defective oil pressure regulator.          | <i>Replace.</i>             |
|                          | Damaged O-ring.                            | <i>Replace.</i>             |
|                          | Combination of above item.                 | <i>Repair or replace.</i>   |
| <b>High oil pressure</b> | Using an engine oil of too high viscosity. | <i>Replace.</i>             |
|                          | Clogged oil passage.                       | <i>Clean or replace.</i>    |
|                          | Clogged oil pressure regulator.            | <i>Replace.</i>             |
|                          | Combination of above items.                | <i>Repair or replace</i>    |

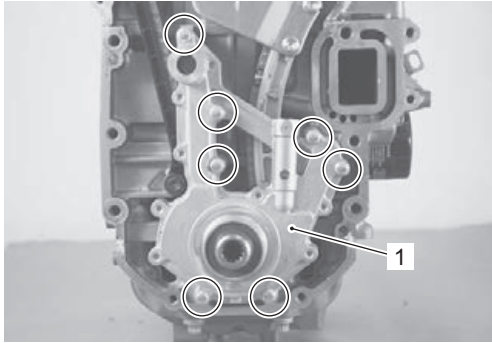
## Service Instructions

### Oil Pump Removal and Installation

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#### Removal

- 1) Remove the power unit.  
Refer to "Power Unit Removal and Installation" in Section 1D (Page 1D-14).
- 2) Remove the seven bolts securing oil pump (1), then remove the oil pump.



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#### Installation

Installation is reverse order of removal with special attention to the following steps.

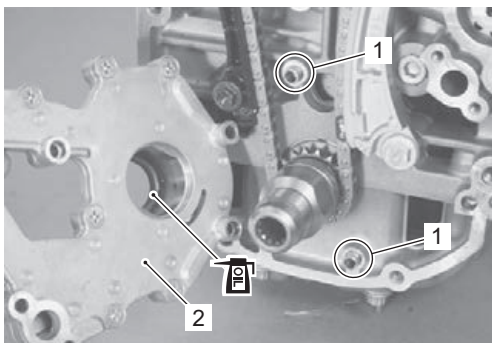
- Apply engine oil to oil seal lip.
- Install the dowel pins (1) and oil pump assembly (2), then tighten seven bolts securely.

#### NOTE

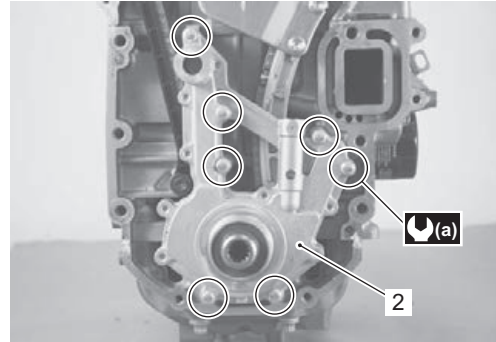
**When installing oil pump assembly be sure position of oil pump inner rotor matches with crankshaft.**

#### Tightening torque

Oil pump (a): 11 N·m (1.1 kgf-m, 8 lbf-ft)



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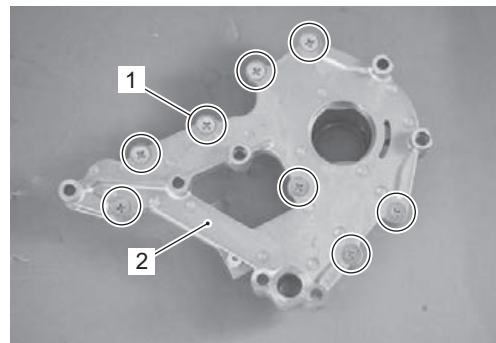
- Pour approx. 20 ml (0.7 oz.) of engine oil into pump case for initial lubrication.

### Oil Pump Disassembly and Assembly

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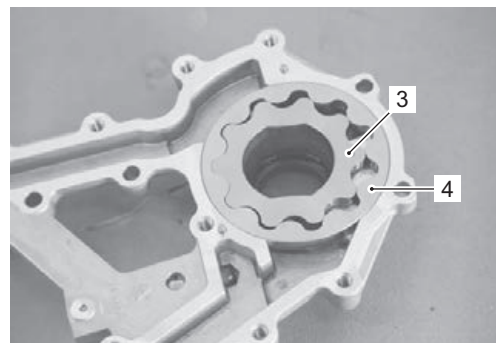
#### Disassembly

- 1) Remove the eight screws (1) securing oil pump rotor plate (2) to the oil pump case, then remove oil pump rotor plate.



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- 2) Take out inner rotor (3) and outer rotor (4).



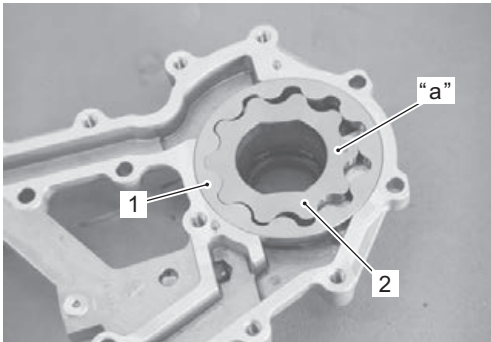
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**Assembly**

- 1) Wash, clean and then dry all disassembly parts.
- 2) Apply thin coat of engine oil to inner and outer rotors, inside surfaces of oil pump case and plate.
- 3) Install outer rotor (1) and inner rotor (2) to pump case.

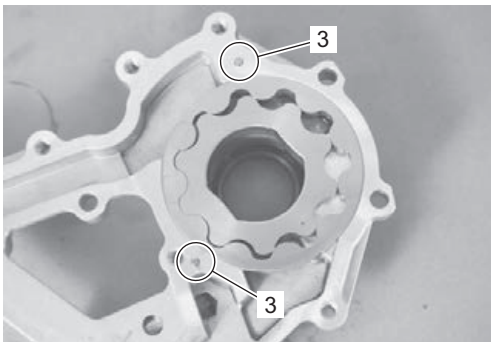
**NOTE**

**When installing outer and inner rotors, the punch mark "a" on each rotor must face original direction.**

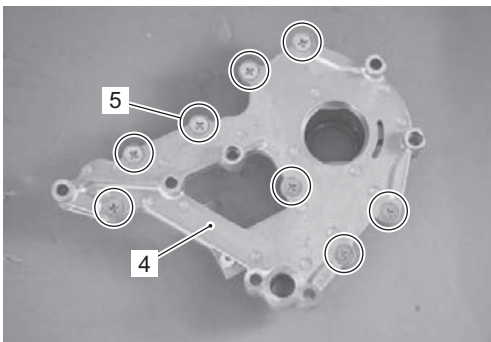


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- 4) Install dowel pins (3) and rotor plate (4), and then tighten screws (5) securely. After mounting the rotor plate, make sure that each rotor turns smoothly by hand.



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- 5) Pour approx. 20 ml (0.7 oz.) of engine oil into pump case for initial lubrication.

**Inspection Oil Pump Component Parts**

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**NOTE**

**If any repair is required on outer rotor, inner rotor and oil pump case / plate, replace them as an oil pump assembly.**

**Oil Pump Component Parts**

Check outer and inner rotors, rotor plate and oil pump case for excessive wear or damage. Replace as necessary.



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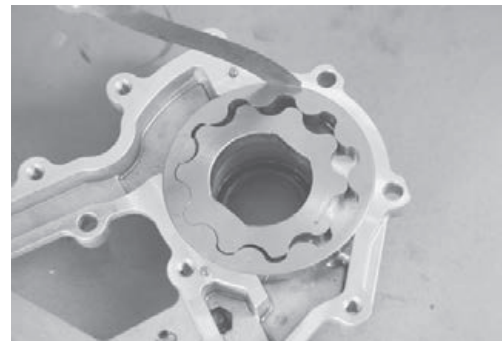
**Measuring Radial Clearance**

Using a feeler gauge, measure radial clearance between outer rotor and case.

If measurement is not within specifications, replace oil pump assembly.

**Radial clearance**

**Service limit: 0.31 mm (0.012 in.)**



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## 1E-5 Power Unit Lubrication:

### Measuring Side Clearance

Using straightedge and feeler gauge, measure side clearance.

If measurement is not within specifications, replace oil pump assembly.

### Side clearance

**Service limit: 0.15 mm (0.006 in.)**



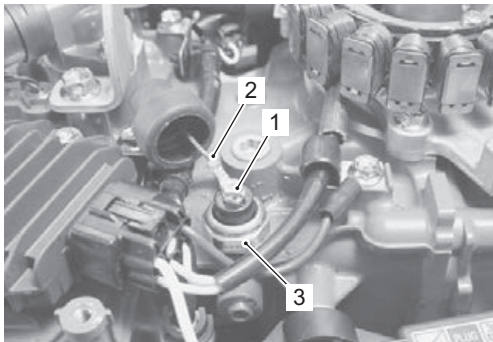
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### Oil Pressure Switch Removal and Installation

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#### Removal

- 1) Remove the ring gear cover and flywheel.  
Refer to "Flywheel Removal and Installation" in Section 1K (Page 1K-4).
- 2) Loosen screw (1) and disconnect blue lead wire (2) from oil pressure switch (3).



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- 3) Remove oil pressure switch from cylinder block.

### Installation

Installation is reverse order of removal with special attention to the following steps.

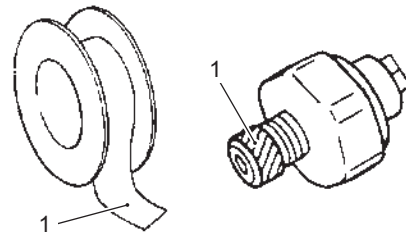
- Before installing oil pressure switch, wrap screw threads with sealing tape (1) then tighten switch to specified torque.

#### NOTE

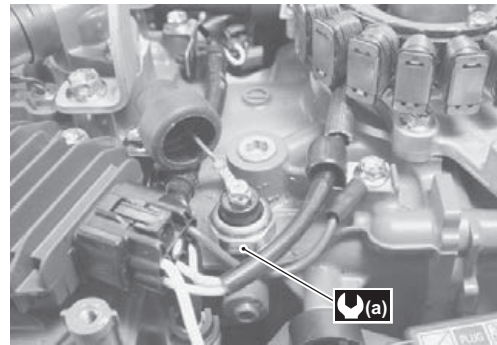
**Cut off any excess sealing tape from switch threads before installation.**

#### Tightening torque

**Oil pressure switch (a): 13 N·m (1.3 kgf-m, 9.5 lbf-ft)**



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- Start engine and check oil pressure switch for oil leakage.  
Reseal switch if oil leakage is found.

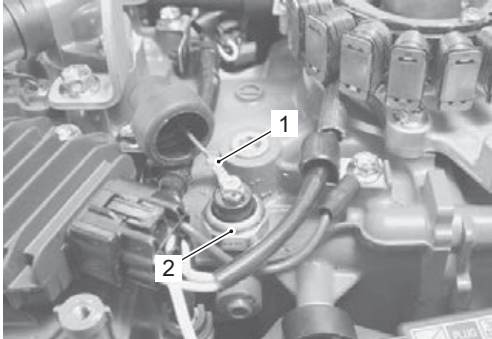
## Oil Pressure Switch Inspection

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### NOTE

**Before checking the oil pressure switch, make sure the engine oil pressure is within specification.**

- 1) Remove the ring gear cover.  
Refer to "Ring Gear Cover Removal and Installation" in Section 1D (Page 1D-2).
- 2) Remove the blue lead wire (1) from oil pressure switch (2).




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### ⚠ WARNING


**When the engine is running, keep your hands, hair, clothing, etc., away from the engine.**

- 3) Check the continuity between the switch terminal and engine body ground.

### Special tool

 : 09930-99320 (Digital tester)

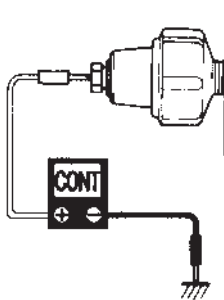
### Tester knob indication

Continuity (  )

### Oil pressure switch continuity

Engine running: Infinity

Engine stopped: Continuity



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- 4) If measurement exceeds specification, replace oil pressure switch.
- 5) Reinstall parts removed earlier.

## Oil Strainer Removal and Installation

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### Removal

Refer to "Engine Holder / Oil Pan / Driveshaft Housing / Mounts Disassembly" in Section 2A (Page 2A-13).

### Installation

Refer to "Engine Holder / Oil Pan / Driveshaft Housing / Mounts Assembly" in Section 2A (Page 2A-15).

## Oil Strainer Related Parts Inspection

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- Inspect oil strainer. Replace strainer if cracked, damaged or other abnormal conditions.  
If clog or obstruction, clean oil strainer.
- Check condition of O-ring. Replace O-ring if nicked, cut, worn or other abnormal condition.



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