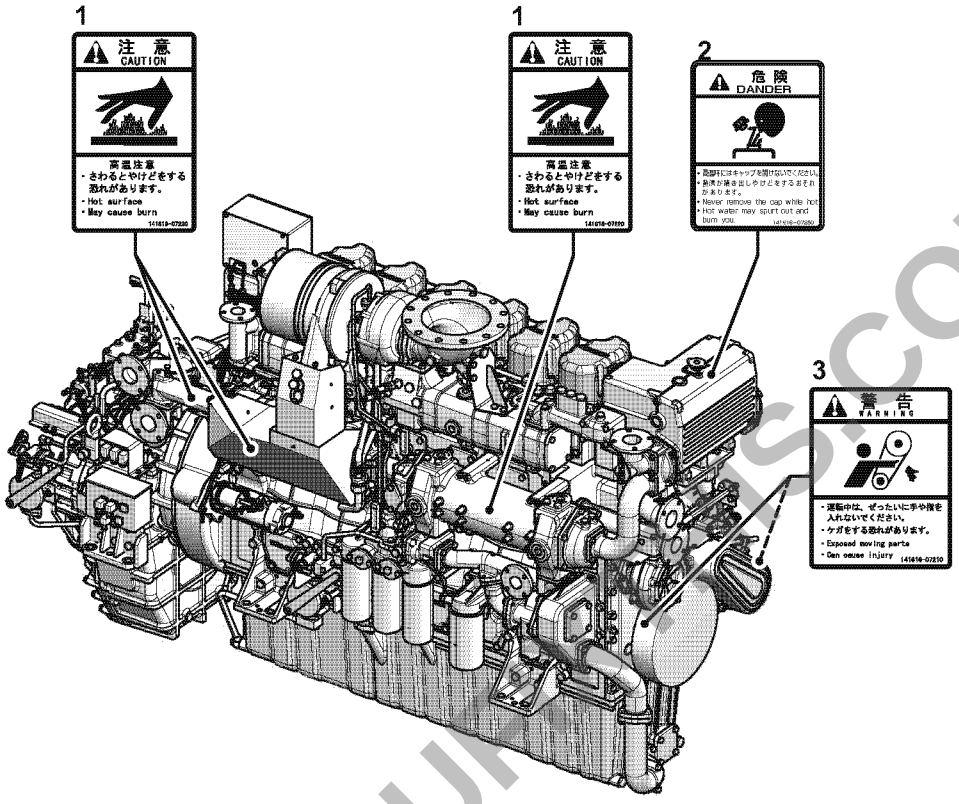
■ Non-operation side



No.	Part No.
1	141616-07220
2	141616-07250
3	141616-07210

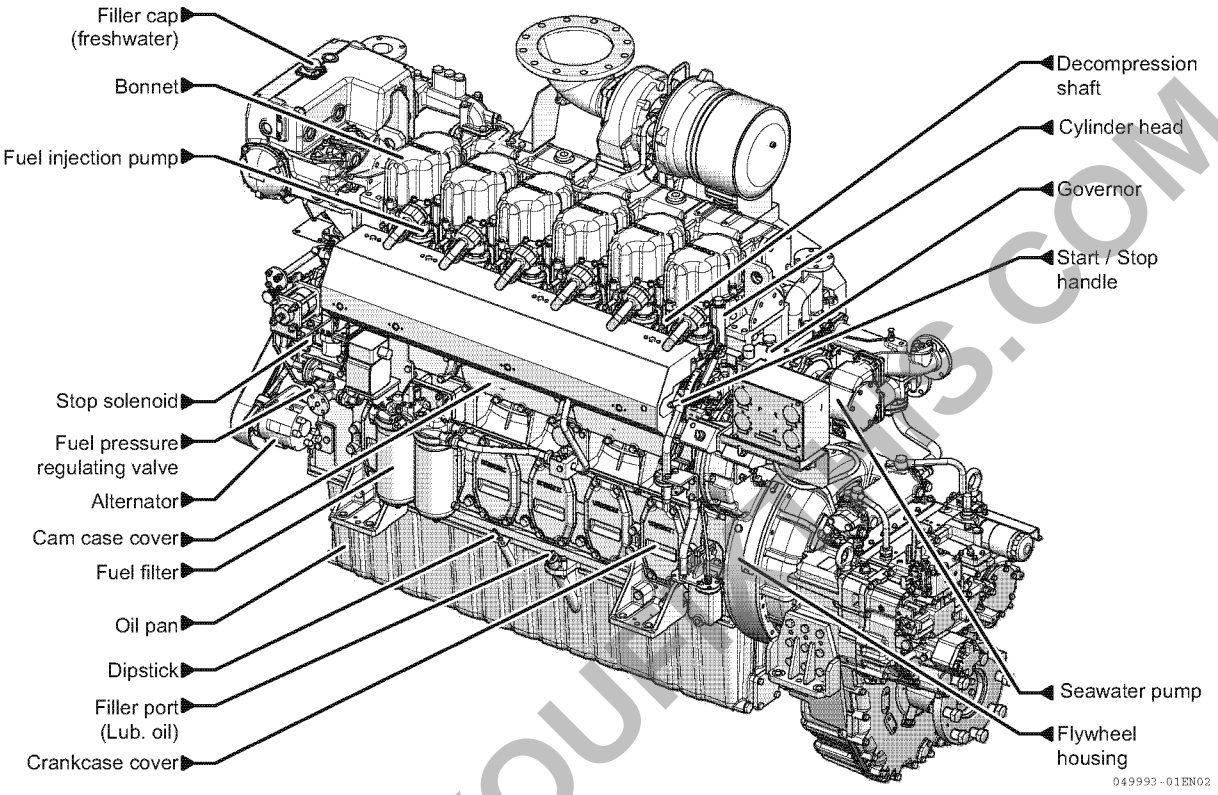
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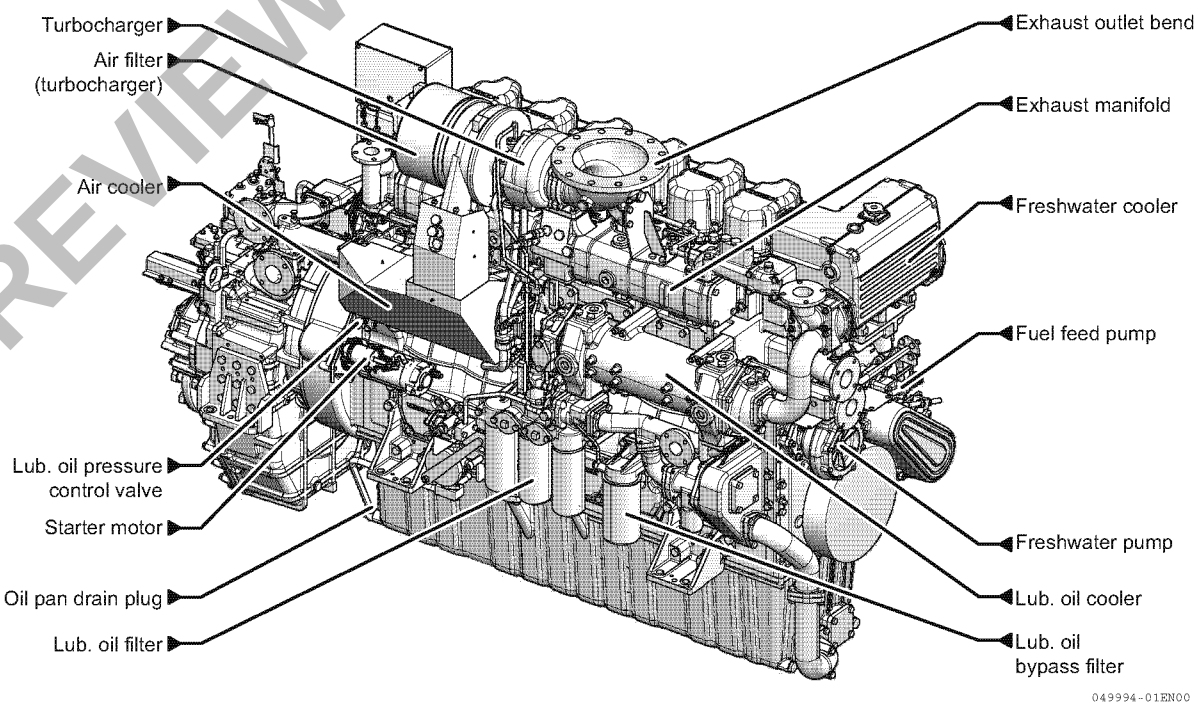
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Engine Component Names

■ Operation side



■ Non-operation side



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Precautions against work

⚠ WARNING

Before you start work



- **Disconnect the power source. You can get burned or suffer an electric shock.**
  When you check the battery system, make sure that you disconnect the earth cable (-) terminal.
  You can cause a short circuit and a fire.

Do not get caught in the engine



- **Be careful that your body does not touch any rotating parts when you turn the flywheel. Never put your hand into the cylinder block.**
- **Make sure that you remove the turning bar from the flywheel after you finish your task. If you start the engine with the turning bar attached, it can come off and cause fatal accident.**

Work with sufficient holding and lifting conditions



- **Do not hold the engine with blocks or wood blocks. Never work while holding the engine only with the jack. Be sure to use the specified metal fittings to lift and hold the engine to the specified location. It can cause fatal accident.**
- **When you work with heavy parts, use the specified tools and a safe wire rope.**

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Inspection before Engine Start

Do these checks before engine start.

Visual inspection of the engine

Check the following and make sure that there are no defects. If you find a defect, do not start the engine. Consult your YANMAR dealer or distributor.

- Check for oil leaks from the lubricating oil system.
- Check for fuel oil leaks from the fuel system.
- Check for water leaks (seawater and freshwater) from the cooling water system.
- Check for gas leaks from the exhaust pipe.
- Check parts for damage and chippings.
- Check for loose or missing bolts.
- Check for loose or missing wire ends.

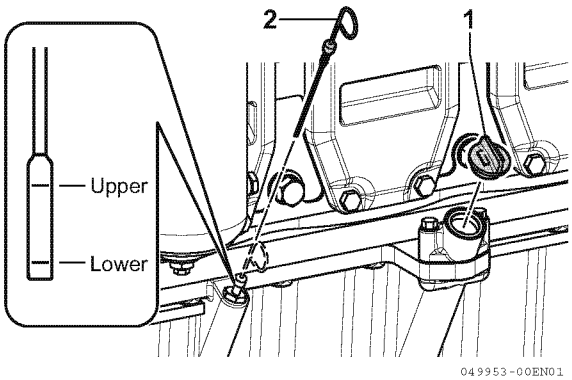
Checking and refilling the fuel oil

- Drain the fuel tank.
- Open the drain cock (or plug) of the fuel filter No.1 (hull-mounted) and drain them.
- Check the fuel level inside the tank. If necessary, refill with fuel oil.
- Refill fuel oil sufficiently to avoid running out of fuel oil during operation.
- Open the fuel cock (valve) on the fuel tank.
- Bleed air from the fuel system if: You removed parts of the fuel system, e.g. the fuel filter. Refer to P32 [Bleeding the fuel system] for instructions on how to bleed air from the fuel system.

Checking and refilling the engine lubricating oil

Check and refill engine lubricating oil before engine start. The lubricating oil level fluctuates after engine start. This makes it difficult to read the correct oil level. Check the level of the engine lubricating oil with the dipstick 2.

Make sure that the oil level is between the upper and lower lines on the dipstick. If necessary, fill with lubricating oil to the upper line on the dipstick.



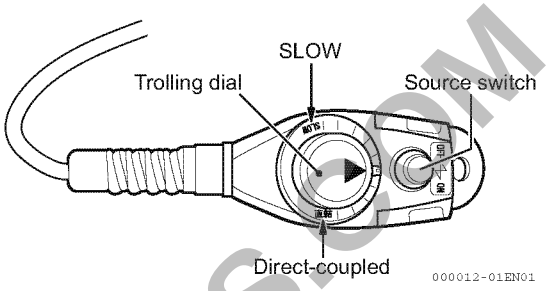
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■ Trolling dial
(Electronic trolling available as an option)

Make sure to turn off the power switch of the trolling dial during normal operation.
Do not use trolling mode during cruising with the clutch connected.

1. Move the clutch handle to N (neutral).
2. Adjust the engine speed below 700 min^{-1} with the governor handle.
3. Set the trolling dial to the "direct-coupled" position.
4. Turn on the power switch of the trolling dial.
5. Put the clutch handle to AHEAD or ASTERN.
6. Adjust the propeller speed with the dial to the trolling mode.
   - Turn the dial to SLOW to decrease the propeller speed.
   - Turn the dial to the "direct-coupled" side to increase the propeller speed.
   - When the scale is "direct-coupled", the mode is direct-coupled mode.
7. To stop trolling, set the dial to the "direct-coupled" position and turn off the power switch.



● When the engine speed exceeds 725 min^{-1}

- in the electronic trolling, the clutch is automatically set to the direct-coupled mode when the engine speed exceeds 725 min-1.
- To resume trolling, set the dial to the "direct-coupled" position and decrease the engine speed to the idling speed.

NOTICE

Never turn on the power switch with the clutch engaged.
It causes an electrical shock and is dangerous.

For details, refer to this separate document "Electronic Trolling Operation Manual."

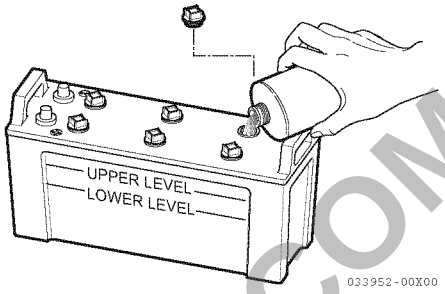
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Inspecting and servicing the electric parts

■ Inspecting the battery fluid level

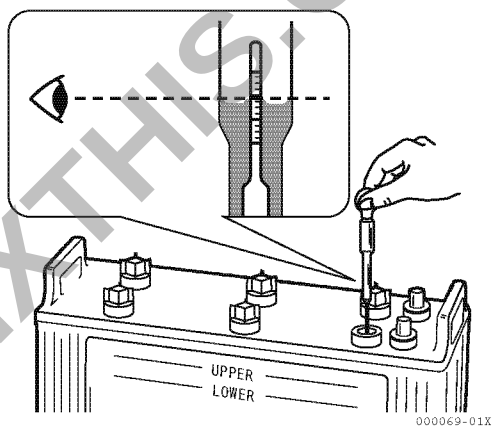
If you continuously use the battery with only a small quantity of battery fluid, the battery becomes unusable. Check the fluid level periodically. If the fluid is less than the specified level, refill with commercial distillated water. In hot conditions (e.g. during summer), check the fluid level earlier than specified. This is because the battery fluid evaporates faster.



Inspection interval	Every 250 hours (or every 1 month)

Battery fluid standard specific gravity	1.28 (at 20 °C)

Note: Recharge when at 1.22 or less.



NOTICE

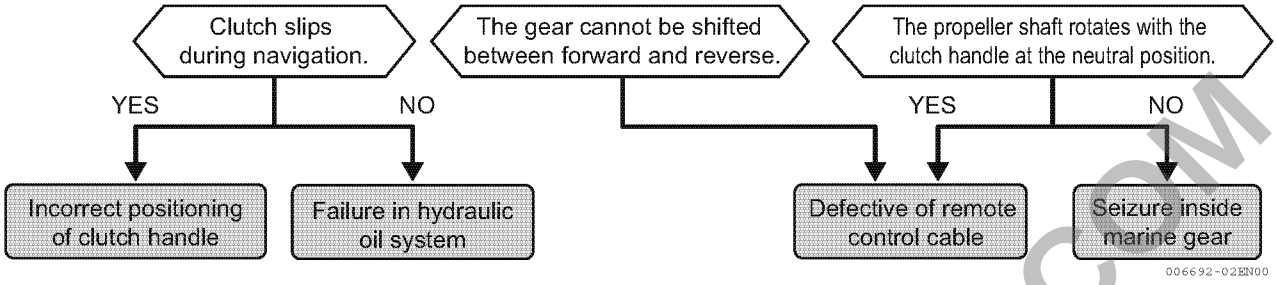
If the engine rotation does not increase and the engine does not start, measure the specific gravity of the battery fluid.

Recharge the battery if the measured specific gravity value is lower than the specified value. If the specific gravity does not increase, replace the battery.

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Marine gear failure



● Incorrect positioning of clutch handle

No.	Failure Content	Countermeasure	Reference Page
1	The trolling handle is in the trolling position	Move the handle out of the trolling position	57
2	There is phase difference between clutch handle and clutch lever	Adjust the remote control cable clamp position and correct the phase between clutch handle and clutch lever	83

● Failure in hydraulic oil system

No.	Failure Content	Countermeasure	Reference Page
1	Lubricating oil filter is clogged	Replace the element Clean the strainer	75
2	Insufficient lubricating oil level	Refill with lubricating oil	41
3	Hydraulic oil pump is defective	Check the part, then disassemble and clean it	-

● Defective remote control cable

No.	Failure Content	Countermeasure	Reference Page
1	Cable stroke is not adjusted properly	Re-adjust the cable	83
2	Cable is broken	Replace the cable	-

● Seizure inside marine gear

No.	Failure Content	Countermeasure	Reference Page
1	Friction plate, or plate, is seized up	Check the part, then disassemble and clean it Or contact your YANMAR dealer or distributor	-
2	Pinion gear or bushing is seized up	Check the part, then disassemble and clean it Or contact your YANMAR dealer or distributor	-

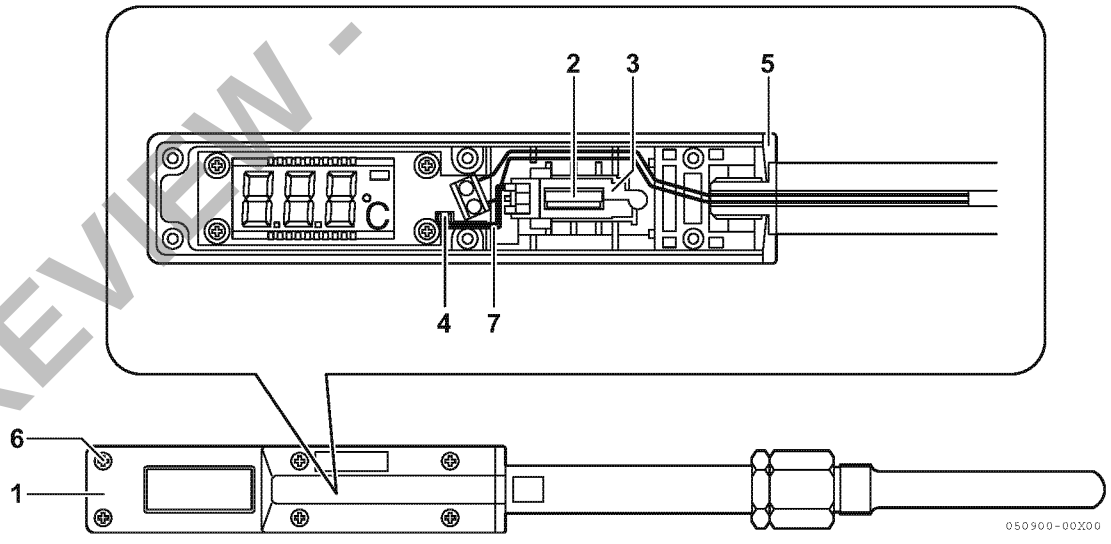
If you cannot take the correct countermeasures, consult your YANMAR dealer or distributor

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the pawl is stuck with a click sound). If you insert the battery in the incorrect polarity, the holder does not close completely. Check that the battery is inserted in the correct polarity.

7. Inserting the battery holder
   Store the battery holder in the body case 5.
8. Setting the system voltage to 0V
   Touch the connector polarity on the board with a screwdriver for approximately 3 seconds before inserting the connector 4. This is to secure the system reset at the time of inserting the connector (the system voltage must be cleared to 0V).
9. Inserting the connector
   Insert the connector on the tip of the lead wire 7 attached in the battery holder 3 to the connector of the printed circuit board. The connector has a polarity. You cannot insert the connector in a reverse direction. If you find it difficult to insert the connector, do not forcibly insert the connector and check the polarity. (Care must be taken not to pinch the lead wire when you close the upper cover).
10. Closing the upper cover
    Install the upper cover 1 to the body case 5.
    Tighten the screws 6 equally. (Standard tightening torque: 0.4 N·m) If the tightening of the screws is inappropriate, the front cover may be removed while using. It can cause an accident.



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No.	Name	Thread diameter x pitch	Face-to-face width of bolt or nut mm	Tightening torque N·m	Remarks
18	Nozzle sleeve	M28 × 1.5	-	$235\ ^{+10}_{0}$	
19	LOP drive gear tightening nut	M24 × 2.0	36	170 ± 10	
20	Fuel injection pressure adjusting nut	M35 ×1.5	41	100 ± 3	
21	High-pressure fuel pipe joint (pump side)	M10 × 1.5	Hex-socket 8	30 to 34	

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FOR YOUR SAFETY

We are confident that you will be fully satisfied with this product if you use it as described in this manual. But if you do not obey all instructions, dangerous accidents and damage (e.g. injuries, burn injuries and fire) can occur. Before you use the engine, carefully read and thoroughly understand all safety precautions.

About Safety Labels



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ABOUT THIS OPERATION MANUAL

The major terms used in this operation manual are defined as follows:

The front of the engine: opposite side of the flywheel

The back of the engine: the flywheel side

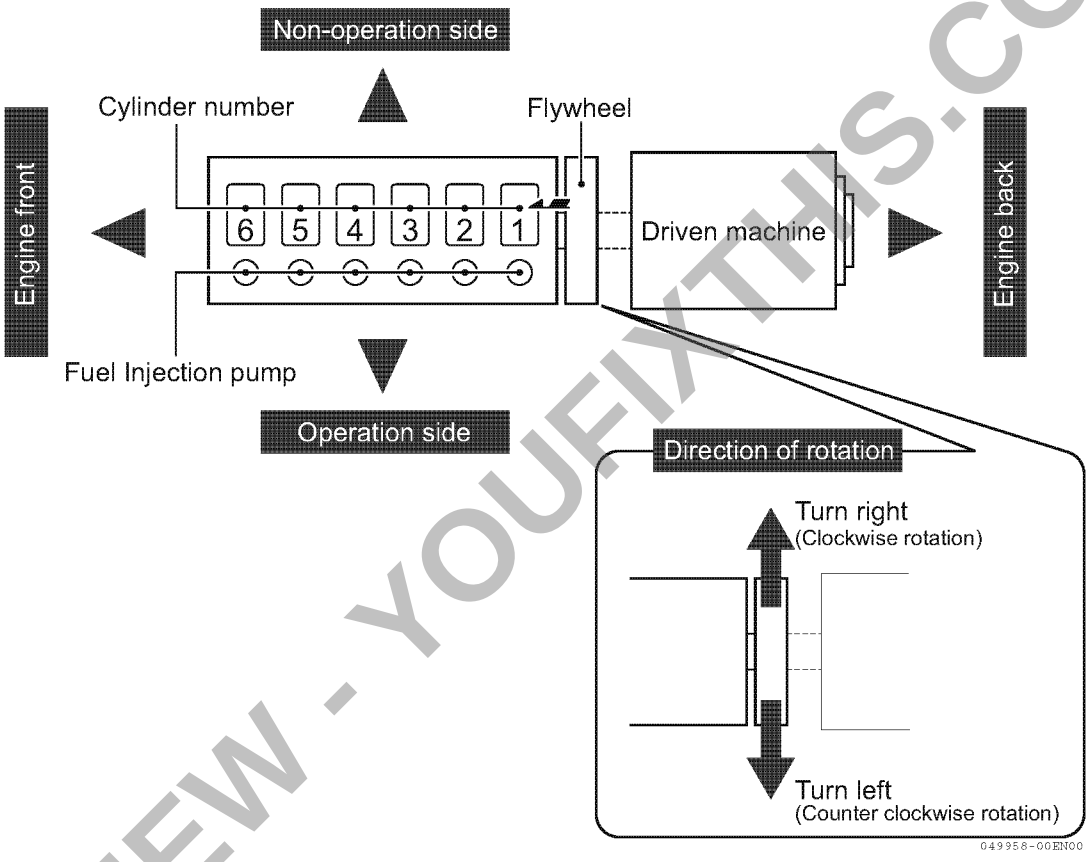
Operation side: on the left side as viewed from the flywheel side (fuel injection pump side)

Non-operation side: on the right side as viewed from the flywheel side (exhaust manifold side)

Turn right: clockwise rotation as viewed from the flywheel side

Turn left: counterclockwise rotation as viewed from the flywheel side

Cylinder number: counted from the flywheel side (1, 2, 3, ...)



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