COMPONENT IDENTIFICATION

Figure 1 illustrates a typical version of a 8SY-STP engine. Your engine may have different equipment from that illustrated.

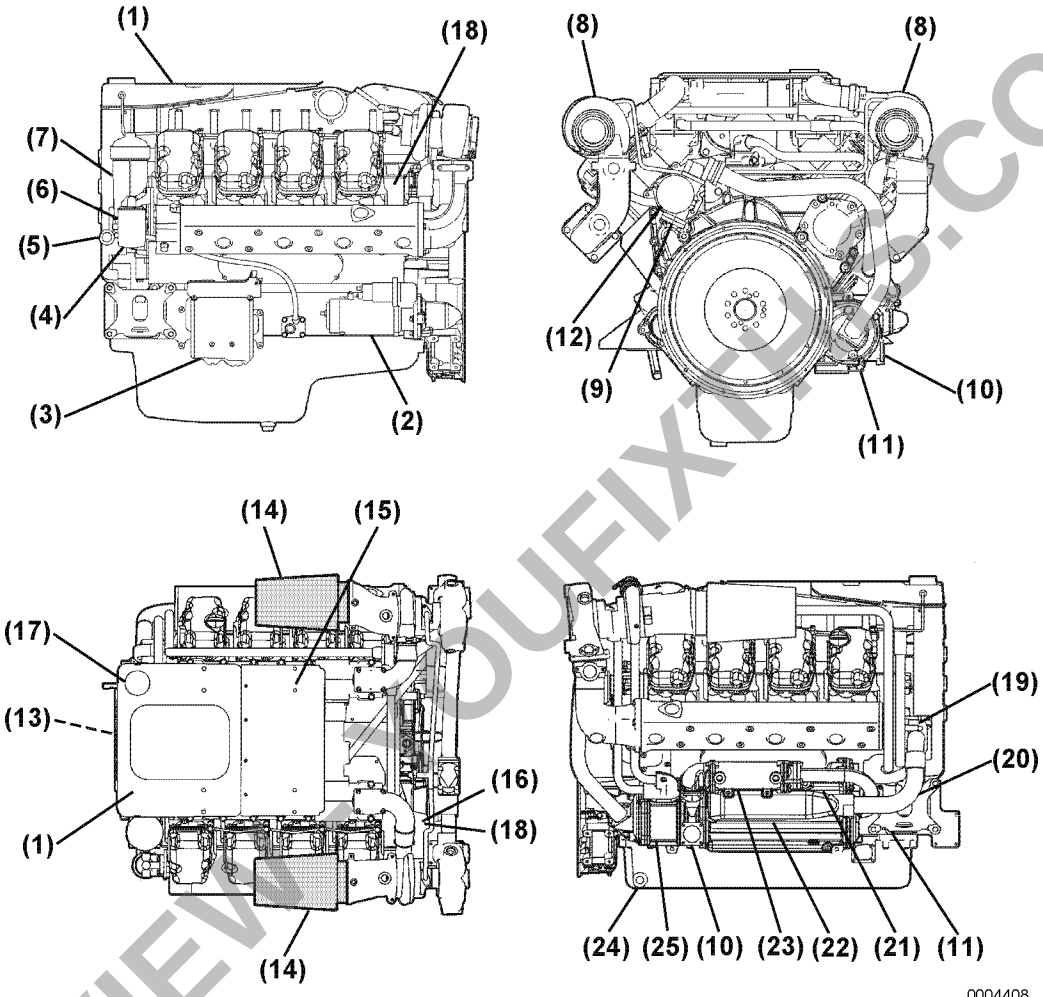


Figure 1

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Rotation Speeds

Check instruments at regular intervals.

Rotation Speed	
0 - 500 rpm	Prohibited engine speed, passed through when stopping and starting.
500 - 700 rpm	Low idle. Engine idling is controlled by the EMS / S6 control system.
700 - 2200 rpm	Normal operating speed. The engine operating speed range is controlled by the EMS / S6 control system.
2200 - 2600 rpm	Unsuitable operating speed.
2600 - 3000 rpm	Prohibited engine speed.

Redundant Throttle Mode

If there is a fault with the normal throttle or if CAN communication is interrupted, a redundant throttle system is provided.

In the event of a CAN open circuit or throttle fault:

- The EMS automatically switches to the redundant throttle located on the key switch panel.
- The redundant throttle must be set at zero to be activated.
- A light will illuminate on the panel, indicating the redundant throttle is activated.

Coolant Temperature

Normal coolant temperature when the engine is running is 70˚ to 93˚C (158˚ to 199˚F).

The EMS / S6 control system has the following alarm levels:

- If the temperature is high, 98˚ to 103˚C, (208˚ to 217˚F) for one second, the S6 control will send a CAN message which activates a warning.
- If the temperature exceeds 103˚C (217˚F), a warning is activated.
- A fault code is generated in the control unit.

After an alarm, approved values must be registered for more than two seconds before resetting the alarm.

Excessively high coolant temperature can damage the engine.

If run for extended periods under an extremely light load, the engine may have difficulty in maintaining normal operating temperature. However, the temperature will rise to a normal level again when the load on the engine is increased.

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STARTING THE ENGINE

NOTICE: *If the vessel is equipped with a water lift (water lock) muffler, excessive cranking could cause seawater to enter the cylinders and damage the engine. If the engine does not start after cranking for 15 seconds, close the thrilled water intake valve to avoid filling the muffler with water. Crank for 15 seconds or until the engine starts. When the engines does start, stop the engine immediately and press the switch to the OFF position.*

To start the engine:

1. Open the seacock (if equipped).
2. Open the fuel tank cock.
3. Put transmission in neutral.
4. Turn the battery master switch (if equipped) ON.
5. Press the ENG ON switch (if equipped) or turn key switch to ON. NOTICE: *NEVER hold the key in the START position for longer than 15 seconds or the starter motor will overheat.*

Starting at Low Temperatures

Comply with local environmental requirements. Use engine heaters to avoid starting problems and white smoke.
NOTICE: *NEVER use an engine starting aid such as ether. Engine damage will result.*

To limit white smoke, run the engine at low speed and under moderate load until the engine reaches normal operating temperature. A light load on a cold engine provides better combustion and faster engine warm-up than no load.

Avoid running the engine at idling speed any longer than necessary.

SHUTTING DOWN THE ENGINE

NOTICE: *For maximum engine life, Yanmar recommends that when shutting down the engine, you allow the engine to run, without load, for five minutes. This will allow the engine components that operate at high temperatures, such as the exhaust system, to cool slightly before the engine itself is shut down.*

1. Check to see that there are no active faults.
2. Push the OFF switch (if equipped) or turn the key switch to OFF. Use the emergency stop switch (if equipped) only in an emergency.
3. Turn the battery master switch (if equipped) OFF.
4. Close the fuel tank cock.
5. Close the seacock (if equipped). NOTICE: *ALWAYS close the seacock when you shut down the engine. Neglecting to close the seacock could allow water to leak into the boat and may cause it to sink.*

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Engines with Low Operating Hours

Run the engine until it reaches operating temperature and then perform the following maintenance procedures:

- Check the engine oil level. *See Checking the Engine Oil on page 22.*
- Check the coolant level. *See Checking the Coolant Level on page 24.*
- Check the low-pressure indicator. *See Checking the Alarm Indicators on page 26.*
- Check the fuel level. *See Filling the Fuel Tank on page 19.*
- Check the battery electrolyte level. *See Checking the Battery Electrolyte Level (Serviceable Batteries Only) on page 49.*
- Clean the battery. *See Cleaning the Battery on page 27.*
- Check for any leakage, repair as necessary.

○: Check or Clean ◇: Replace ●: Contact your authorized Yanmar marine dealer or distributor							
			Periodic Maintenance Interval				
System	Item	Daily	Every 50 hours or one month which-ever comes first	Every 250 hours or one year which-ever comes first	Every 500 hours or 2 years which-ever comes first	Every 1000 hours or 4 years which-ever comes first	Every 2000 hours or 8 years which- ever comes first
Whole	Visual inspection of engine exterior	○					
Fuel System	Check the fuel level and refill	○					
	Drain the fuel tank			○			
	Drain the fuel filter and the fuel / water separator		○ (Initial 50)				
	Replace the fuel filter element		◇ (Initial 50)	◇			
	Check the unit injector / rocker arms			●* (Initial 250)		●*	
	Overhaul and check the fuel feed pump						●
	Replace the rubber fuel hoses	Replace every 2 years or every 2000 hours, whichever comes first.					
Lubricating System	Check the engine oil level	○					
	Change the engine oil		◇ (Initial 50)	◇			
	Replace the engine oil filter element		◇ (Initial 50)	◇			
	Replace closed crankcase ventilation filter			◇			
	Clean the centrifugal oil cleaner		○ (Initial 50)	○			
	Clean engine oil cooler						●

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2. Loosen the drain plug **(Figure 2, (3))** at the bottom of the fuel filter / water separator and drain off any water or dirt. **WARNING!** ***ALWAYS wear eye protection. The fuel system is under pressure and fuel could spray out when any fuel system components are removed.***

Note: If the fuel filter / water separator is positioned higher than the fuel level in the fuel tank, water may not drip out when the fuel filter / water separator drain cock is opened. If this happens, turn the air vent screw (if equipped) on the top of the fuel filter / water separator 2-3 turns counterclockwise. Be sure to tighten the air vent screw after the water has drained out.

3. Turn the filter container **(Figure 2, (2))** counterclockwise to remove. NOTICE: *When you remove any fuel system component to perform maintenance (such as changing the fuel filter) place an approved container under the opening to catch the fuel.*
4. Remove the filter element.
5. Lubricate the seal and install a new filter element into the container.
6. Install filter container and hand-tighten.
7. Open the fuel tank cock **(Figure 2, (1))**.
8. After reinstalling the fuel filter and the fuel filter / water separator, bleed air from the fuel system. *See Bleeding the Fuel System on page 20.*

Changing Engine Oil and Replacing Engine Oil Filter Element

The engine oil on a new engine becomes contaminated from the initial break-in of internal parts. It is very important that the initial oil replacement is performed as scheduled.

It is easiest and most effective to drain the engine oil after operation while the engine is still warm. **WARNING!** ***If you must drain the engine oil while it is still hot, stay clear of the hot engine oil to avoid being burned. ALWAYS wear eye protection.***

1. Remove the engine oil dipstick. Attach the oil drain pump (if equipped) and pump out the oil. Dispose of waste properly. NOTICE: *Prevent dirt and debris from contaminating engine oil. Carefully clean the oil cap / dipstick and the surrounding area before you remove the cap.*
   For easier draining, remove the engine oil filler cap.
2. Turn the engine oil filter lid **(Figure 3, (1))** clockwise with a box wrench to remove.
3. Lift out the filter housing lid **(Figure 3, (1))** with filter **(Figure 3, (3))**. The filter housing **(Figure 3, (4))** will drain automatically once the filter has been removed.

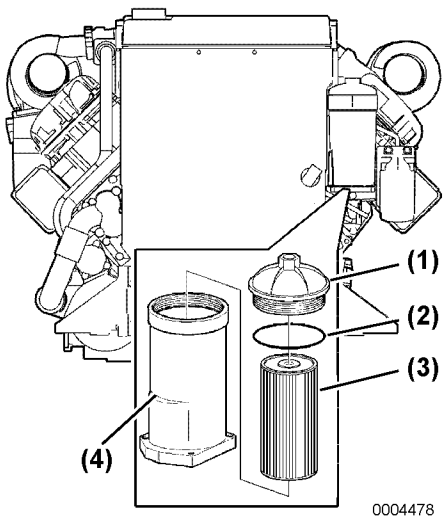


Figure 3

4. Remove the filter element **(Figure 3, (3))** from the lid **(Figure 3, (1))** by carefully bending the filter to one side.
5. Remove the O-ring **(Figure 3, (2))** from the lid **(Figure 3, (1))**.

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6. Lubricate a new O-ring with clean engine oil and install in the lid **(Figure 3, (1))**.
7. Press a new filter element **(Figure 3, (3))** into the snap fastener in the lid.
8. Make sure that all oil is drained from the filter housing.
9. Replace the filter lid **(Figure 3, (1))** and tighten to 25 N·m (18 ft-lb).

Note: If the deposits in the centrifugal cleaner are more than 20 mm (0.75 in.) thick, replace the oil filter more often. The same is true for cleaning the centrifugal oil cleaner and changing the oil. See Cleaning the Centrifugal Engine Oil Cleaner on page 46.

10. Fill with new engine oil. *See Adding Engine Oil on page 23*. NOTICE: *Only use the engine oil specified. Other engine oils may affect warranty coverage, cause internal engine components to seize, or shorten engine life. NEVER mix different types of engine oil. This may adversely affect the lubricating properties of the engine oil.*
11. Perform a trial run and check for oil leaks.
12. Approximately 10 minutes after stopping the engine, remove the oil dipstick and check the oil level. Add oil if the level is too low.
    NOTICE: *NEVER overfill. Overfilling may result in white exhaust smoke, engine overspeed or internal damage. ALWAYS keep the oil level between upper and lower lines on the oil cap / dipstick.*

Cleaning the Centrifugal Engine Oil Cleaner

Clean the centrifugal engine oil cleaner every time the oil is changed.

1. Clean the oil cleaner cover. Turn the nut counterclockwise to remove. Carefully remove the cover in case the oil is hot.
2. Lift out the rotor and turn the nut on the rotor bowl counterclockwise three turns **(Figure 4)**.

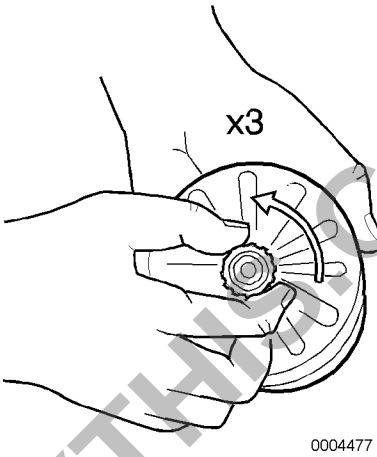


Figure 4

- If the nut is jammed, clamp the nut in a vise and turn the rotor three turns counterclockwise by hand or with a screwdriver **(Figure 5)**. NOTICE: *NEVER clamp the rotor in a vise. NEVER strike the rotor bowl. Doing so may cause damage resulting in imbalance.*

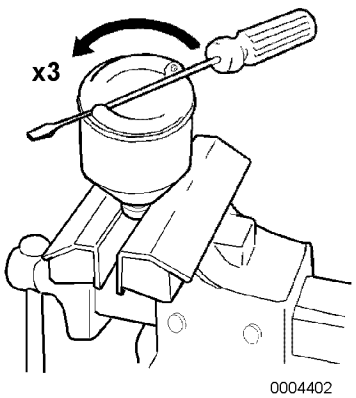


Figure 5

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SPECIFICATIONS

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