



Operation and Maintenance Manual

**3408C, 3412, 3412C and 3412D High
Performance Marine Engines**



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Media Number -SEBU6497-07

Publication Date -01/12/2005

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Foreword

Literature Information

This manual contains safety, operation instructions, lubrication and maintenance information. This manual should be stored in or near the engine area in a literature holder or literature storage area. Read, study and keep it with the literature and engine information.

English is the primary language for all Caterpillar publications. The English used facilitates translation and consistency in electronic media delivery.

Some photographs or illustrations in this manual show details or attachments that may be different from your engine. Guards and covers may have been removed for illustrative purposes. Continuing improvement and advancement of product design may have caused changes to your engine which are not included in this manual. Whenever a question arises regarding your engine, or this manual, please consult with your Caterpillar dealer for the latest available information.

Safety

This safety section lists basic safety precautions. In addition, this section identifies hazardous, warning situations. Read and understand the basic precautions listed in the safety section before operating or performing lubrication, maintenance and repair on this product.

Operation

Operating techniques outlined in this manual are basic. They assist with developing the skills and techniques required to operate the engine more efficiently and economically. Skill and techniques develop as the operator gains knowledge of the engine and its capabilities.

The operation section is a reference for operators. Photographs and illustrations guide the operator through procedures of inspecting, starting, operating and stopping the engine. This section also includes a discussion of electronic diagnostic information.

Maintenance

The maintenance section is a guide to engine care. The illustrated, step-by-step instructions are grouped by fuel consumption, service hours and/or calendar time maintenance intervals. Items in the maintenance schedule are referenced to detailed instructions that follow.

Use fuel consumption or service hours to determine intervals. Calendar intervals shown (daily, annually, etc.) may be used instead of service meter intervals if they provide more convenient schedules and approximate the indicated service meter reading.



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Engine Air Cleaner Service Indicator - Inspect

SMCS - 7452-040

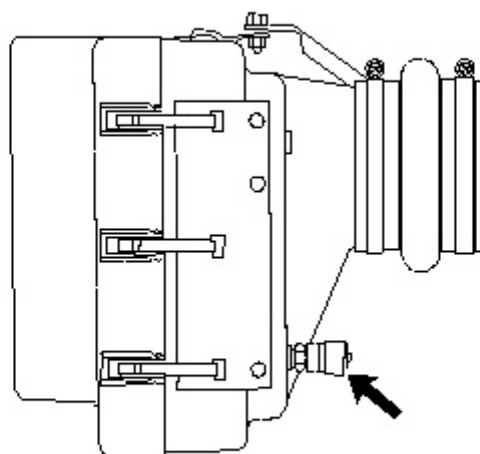


Illustration 1

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Typical air cleaner service indicator that is mounted on the air cleaner housing

An air cleaner service indicator may be mounted on the air cleaner element or in a remote location.

Some vessels are equipped with a low air pressure indicator that monitors the inlet air pressure. This indicator measures air pressure before the air is drawn through the air cleaner element. Then, the indicator monitors the pressure level after the air has passed through the air cleaner element. As the air cleaner element becomes dirty, this air cleaner pressure differential rises.

Some vessels may be equipped with a different air cleaner indicator.

If your vessel is equipped with a different type of air cleaner indicator, follow the recommendations for the vessel. You can also follow the recommendations in the air cleaner OEM in order to service the air cleaner element.

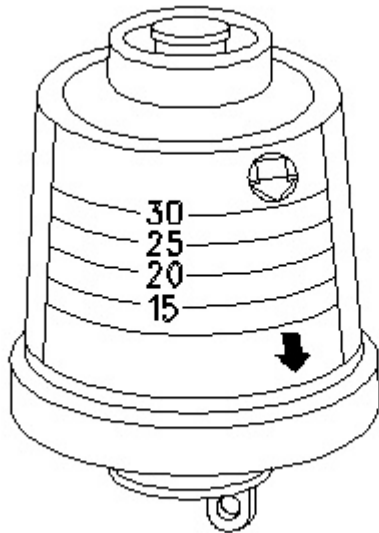


Illustration 2
Typical Air Cleaner Service Indicator

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Observe the air cleaner service indicator. You should clean the air cleaner element, or you should replace the air cleaner element under two conditions:

- The yellow diaphragm enters the red zone.
- The service indicator displays the red color at any time.
- The red piston locks in the visible position.

Test the Air Cleaner Service Indicator

Air cleaner service indicators are important, inexpensive instruments. Two methods can be used to test the service indicator.

- Check for ease of resetting. The service indicator should reset in less than three pushes.
- Check the movement of the yellow core when the engine is accelerated to the engine rated rpm. The yellow core should latch at the approximate greatest vacuum that is attained.

The air cleaner service indicator should be replaced under certain conditions and at certain times:

- The service indicator does not reset easily.
- The yellow core does not latch at the greatest vacuum.
- The engine is used for a year.
- The engine is overhauled.
- Major engine components are replaced.

Note: Replace the air cleaner service indicator often whenever you operate in a severely dusty environment.

If the new service indicator will not reset, the hole for the service indicator may be plugged.

Note: When a new service indicator is installed, excessive force may crack the top of the service indicator. Tighten the service indicator to a torque of 2 N·m (18 lb in).

Service the Air Cleaner Service Indicator

NOTICE

Never run the engine without an air cleaner element installed. Never run the engine with a damaged air cleaner element. Do not use air cleaner elements with damaged pleats, gaskets or seals. Dirt entering the engine causes premature wear and damage to engine components. Air cleaner elements help to prevent airborne debris from entering the air inlet.

NOTICE

Never service the air cleaner element with the engine running since this will allow dirt to enter the engine.

If the air cleaner element becomes plugged, the air can split the filter material. Unfiltered air will drastically accelerate internal engine wear. Your Caterpillar dealer has air filter elements for this unit. Consult your Caterpillar dealer for the correct air cleaner element.

If the air cleaner service indicator appears red at any time, clean the air cleaner element or install a new air cleaner element. At 250 hour intervals, clean the air cleaner element or replace the air cleaner element .

Refer to the Operation and Maintenance Manual (Maintenance Section) for more information on servicing the air cleaner element.



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Engine Crankcase Breather - Clean

SMCS - 1317-070

NOTICE

Perform this maintenance with the engine stopped.

If the crankcase breather is not maintained on a regular basis, the crankcase breather will become plugged. A plugged crankcase breather will cause excessive crankcase pressure that may cause crankshaft seal leakage.

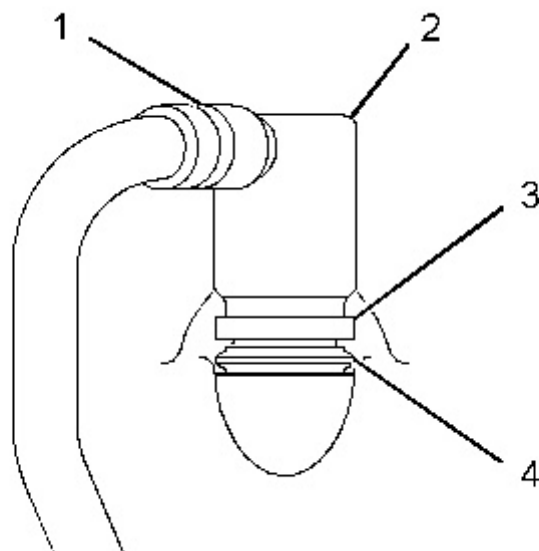


Illustration 1
Typical example

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- (1) Hose clamp
- (2) Breather assembly
- (3) Retaining clamp
- (4) Seal

1. Loosen hose clamp (1) and remove the hose from breather assembly (2) .
 2. Loosen retaining clamp (3). Remove the breather assembly and seal (4) .
 3. Wash the breather element in solvent that is clean and nonflammable. Allow the breather element to dry before installation.
 4. Install a breather element that is clean and dry. Install the seal, the breather assembly, and the clamp. Refer to the Specifications, SENR3130 in order to locate the proper torques.
 5. Install the hose. Install the hose clamp. Refer to the Specifications, SENR3130 in order to locate the proper torques.
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Engine Mounts - Inspect

SMCS - 1152-040

Inspect the engine mounts for deterioration and for proper bolt torque. Engine vibration can be caused by the following conditions:

- Improper mounting of the engine
- Deterioration of the engine mounts

Any engine mount that shows deterioration should be replaced. Refer to Special Publication, SENR3130, "Torque Specifications" for the recommended torques. Refer to the OEM recommendations for more information.
